Service Manual

SSD-4000

SERVICE MANUAL

PRO SOUND

SSD - 4000

1 / 2

English Edition

Document Number : MN2-0233
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Contents of SSD-4000 SERVICE MANUAL 1/2

Contents of SSD-4000 SERVICE MANUAL 2/2

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SECTION 1

How to use this service manual

1-1 Service Manual

1) This service manual has been prepared for persons in charge of repair at the field.

2) This service manual is compiled according to the following basic principle. “For service, pick out a faulty PCB and replace it with a new PCB .”

3) Make the best use of this service manual, making also reference to available technical support information such as “Technical Bulletin”.

1-2 Contents of this Service Manual

1) The equipment is repaired by PCB replacement. Therefore this service manual does not include the circuit diagrams of the PCB unit. For the function of each PCBs whose circuit diagram is not included, refer to “SECTION 4 PRINCIPLE OF SYSTEM OPERATION”. In “SECTION 4”, Specification of System, Principle of System, System Block Diagram, PCB Block Diagram, the explanation of each PCB Block Diagram, and signal list are described. However, “Cable Connection Diagram”, “Circuit Diagram of PCB equipped with the panel switches which are easily exchangeable at the field” and “Circuit Diagram composed of general circuit such as TV monitor and Power Supply unit” are described in “SECTION 5 SCHEMATICS”.

2) For changes and modifications of as well as additions to specifications, if any, prompt information will be given to you by means of “APPENDIX Manual Change Information”.

●IMPORTANT●	Always observe the manner specified for replacement, addition, or deletion of “Manual Change” to prevent missing of necessary information and keeping of erroneous information.

1-3 Construction of This Service Manual

The structure of Service Manual is as follows:

1) Service Instructions .....SECTION 1〜3, 5〜9, 11
2) Principle of Operation.....SECTION 4
3) Parts List.....SECTION 10
4) Manual Change Information.....APPENDIX

1-4 Contents of Each Section

SECTION 1 How to use this service manual

Describes the purpose of the Service Manual.

SECTION 2 PRECAUTIONS

Describes general precautions and preparations for maintenance service. Be sure to follow working procedures if mentioned.

SECTION 3 BEFORE REPAIRING

Gives information peculiar to the equipment and care to be taken before starting repair work.

SECTION 4 PRINCIPLE OF SYSTEM OPERATION

Describes Specification of System, Principle of System, System Block Diagram, PCB Block diagram, the explanation of each PCB Block Diagram, and Signal List. Gives the convenience of grasping flow of major signals and mutual communication between units in the whole system.

SECTION 5 SCHEMATICS

Gives the cable connection diagram including all cables used, the circuit diagram of PCB equipped with switches, and the circuit diagram of TV monitor and Power Supply unit.

SECTION 6 TROUBLESHOOTING

Describes precautions on actual repair work and shows the necessary tools and measuring instruments. Also, includes many hints on primary diagnosis and measures to be taken in the field.

SECTION 7 ADJUSTMENT PROCEDURE

Gives guides of adjustments of PCBs and units which some PCBs need when they are replaced.

SECTION 8 PERFORMANCE CHECK

Describes the procedure of checking for proper operation after repair and provides the forms of check sheet.

SECTION 9 DISASSEMBLING PROCEDURE

Disassembling Procedure Illustrates the disassembly and assembly of main components. Be sure to follow working procedures if specified.

SECTION 10 PARTS LIST

Lists the mechanical parts and electrical part which replacement possibility are considered .

SECTION 11 SERVICE INFORMATION

Provides available information about maintenance service.

APPENDIX SERVICE MANUAL Appendix

Manual change information, the revision list of this manual, is filed in this section.

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SECTION 2

PRECAUTIONS

2-1 Precautions Against Electrical Hazards to Serviceman

When disassembling the equipment after checking it for a trouble symptom, give care to the following:

1) Be sure to unplug the equipment before disassembly.
2) Be sure to turn off the main switch on the equipment when removing electrical parts such as PCBs, probe, and cable.
3) Safety alert symbols
   The indication ⚠ used on this equipment and in this service manual have the following meaning.

"Indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury."

"A caution message is inserted here."

2-2 Precautions Against Mechanical Hazards to Serviceman

When disassembling the equipment, give care to the following to protect serviceman from hazards :

1) Keep the working environment neat.
   Wear working gloves to protect your hands from getting injured by burrs on the unit and casing.
2) Use only proper tools suited to work being made.
3) Be sure to observe the specified disassembly procedure shown in SECTION 9.
4) Take sufficient care not to damage component with undue load.

2-3 Precautions Against Germ Hazards to Serviceman

1) When it is necessary to touch the equipment, options and/or other peripheral devices at a customer who uses intracorporeal (transesophageal, transurethral, transvaginal, transrectal) probes that need sterilization, take special care to protect your hands against germs, irrespective of the usage of the equipment: whether it is used in the operation room or not.
2) Service tools are subject to germ pollution in hospitals and, therefore, need periodical sterilization.
3) Be careful not to directly touch anything assumable to have germ pollution. If necessary, ask the customer for effective protection against germs.

2-4 Precautions for Keeping Electrical Safety

1) Be sure to ground the equipment securely.
2) Perfectness in grounding, screw tightening, and cover installation is essential. Negligence of it could cause a possibility of leakage current from outer fitting which may lead to serious damage to a patient being diagnosed.

2-5 Precautions for Keeping Mechanical Safety

Take care to the following to prevent the equipment from being damaged or broken during disassembly and reassembly work.

1) Be sure to observe the specified disassembly procedure.
2) Take care not to damage component parts by undue load.
3) When reassembling the equipment, carefully check every part for loosening, distortion and creak.
4) Use only the specified screws and nuts. Using any other screws and/or nuts would affect not only mechanical performance, but also electrical performance of the equipment.

2-6 Precautions for Keeping Chemicals Safety

Whenever grease, oil or other chemicals is used for maintenance service, options and/or peripheral devices, be sure to clean the equipment and/or devices after service work.

2-7 Preparation to be Made at Service Center

1) When called by a customer on the telephone, note the followings:

- Name of equipment
- Serial number of equipment
- Name of hospital
- Telephone number
- Name of person in charge
- Detail of trouble symptom as far as possible
- State of connection to optional devices

2) Go over the “Technical Bulletin” to see whether the complained trouble can be mended by means of regular repairing method.

2-8 Care to be Taken in the Field

1) Check for trouble symptoms.
2) Check for connection to optional devices and other peripheral devices.
3) Record the preset data to a floppy disk.
   When record in a lump the internal data such as the preset data, patient data, image data and others, record them to an MO disk.
4) After working, restore the equipment according to the above mentioned contents of memory if necessary.
5) After completion of work, put back the peripheral devices to the original condition.

2-9 Precaution for Monitor repairing

1) Subjecting the unit to strong shocks may result in damage to the CRT or malfunction, therefore care must be taken when transporting or installing the unit.

●DANGER 	● High voltages are present inside the display chassis. Only experienced technicians should touch internal parts.

● DANGER 	● The electric charge has remained in CRT after the power switch is turned off. Because the high voltage is usually used for CRT. So make the electric charge escape with a grounding stick which is connected to the ground of the chassis and through the resistance for high voltage (Approx. 1MΩ) before removing the anode cap. Some electric charge remains in CRT after escaping with a grounding stick. Do not touch the metallic part of anode cap with bare hands, when detaching the anode cap directly.

2) CRT with the deflecting yoke is already adjusted to the best condition. Do not touch the deflecting yoke and the magnet of the neck part.
3) Be sure to detach the metallic goods such as a wrist watch from your body before doing the repair work.

To prevent the secondary damage and the electrical shock, the matters above should be taken into careful consideration.

2-10 Handling of S.M.D. PCBs

It is an Aloka's policy that neither repair nor modification of PCBs used for S.M.D. is made in the field as a rule because of the following reasons:

[REMARKS] PCB does not need repairing or modifying in the field as a rule.

When handling a PCB, do not touch the IC unless it is necessary.

IC soiled with worker's hands may cause corrosion. Additionally, foreign particles such as fine solder dust could be the cause of short-circuited IC lead wires whose pitch is smaller than that of the traditional ones.

●CAUTION●	When handling a PCB, avoid touching the IC and connector pins on the devices to prevent ESD (Electro Static Discharge) damage. A service person should preferably wear an ESD wrist strap correctly grounded when handling a PCB.

Do not give excessively large shocks to the PCB.

When replacing the ROM (Read Only Memory) on the PCB, attempting to force the ROM into its socket would cause the PCB to be subjected to an undue force, and the following faults may :

1) Damage to PCB intermediate-layer patterns,
2) Peeling of chip devices (resistor, capacitor, diode, etc.)
3) Damage to a junction between electrode and internal element of chip devices,
4) Peeling of patterns (especially those for mounting the parts) together with chip devices since those patterns are rather fragile compared with PCBs used before now, and
5) Damage to parts on the reverse side in the case of PCBs of both-side mounting type.

Also, a PCB mounted improperly or a warped PCB mounted as it is may cause the chip devices to come off and the fine patterns to be cut.

Additionally, reuse of chip devices (including resistors, capacitors, diodes, etc.) is strictly inhibited because of the following reason: Since the chip devices are lacking in lead wires, such as those found in the traditional component parts, heat given to the PCB will be directly conducted to the inside of chip devices. As a result, a thermal stress will occur due to a difference in thermal expansion coefficient between each chip device and PCB, giving rise of the possibility of cracks inside of or on the surface of chip devices or the possibility of thermal breaking (internal burning).

Very thin wiring patterns require extreme care in handling of the PCB

Be sure to observe the precautions mentioned above also to prevent the secondary accidents.

2-11 System Symbols

Symbols used by Aloka are described below, together with reference to IEC publication(s).

No.	Symbol	IEC publication	Description
1		417-5032	Alternating current
2		417-5019	Protective earth (ground) When remove the grounding cable from the terminal which is indicated with this symbol on this equipment, you must reconnect it to proper terminal to avoid electrical shock hazard
3		417-5017	Earth (ground) When remove the grounding cable from the terminal which is indicated with this symbol on this equipment, you must reconnect it to proper terminal to avoid electrical shock hazard.
4		417-5021	Equipotentiality
5		348	Attention, consult ACCOMPANYING DOCUMENTS
6		417-5008	Off (power : disconnection from the mains)
7		417-5007	On (power : connection to the mains)
8		878-02-03	TYPE BF EQUIPMENT
9		878-03-01	Dangerous voltage

2-12 A combination of UCW-4000B and software version.

A steerable CW Doppler unit UCW-4000 was changed to UCW-4000B to apply Independent probe connector unit EU-9094 (option). Therefore, please pay attention to the following points before installation of UCW-4000B.

1) Both SCU-4000* and EU-9094 cannot install to SSD-4000 simultaneously. Because, the Independent probe connector unit mounts to the same position of mechanical radial probe connector.
2) UCW-4000B cannot apply to the systems of S/N. M00104 - M01100.
3) There is a difference of the setting of JP1 in EP409200 by a combination of software version.

Software version	UCW-4000/ UCW-4000B	JP setting in the board	MAINTENANCE、SYSTEM1screen display
Ver1.0~3.0	UCW-4000	None	Displays as UCW-4000.
Ver1.0~3.0	UCW-4000B	Remove a jumper from JP1 in EP490200 board.	Displays as UCW-4000.
Ver3.1~	UCW-4000	None	Displays as UCW-4000.
Ver3.1~	UCW-4000B	Do not remove a jumper from JP1 in EP490200 board.	Displays as UCW-4000B.

2-13 A combination of SCU-4000/4000B and AD_DA "EP444400"/DBP "EP478400" board.

There is a possibility that SSD-4000 does not work correctly by a combination of SCU-4000/4000B and AD_DA "EP444400"/DBP "EP478400" board. Therefore, please refer to the following list for availability.

Board in SSD-4000	SCU-4000/4000B	Status
AD_DA EP444400	SCU-4000	Available without problem
AD_DA EP444400	SCU-4000B	Available without problem
DBP EP478400	SCU-4000	Not available
DBP EP478400	SCU-4000B	Available without problem

SECTION 3

Before Repairing

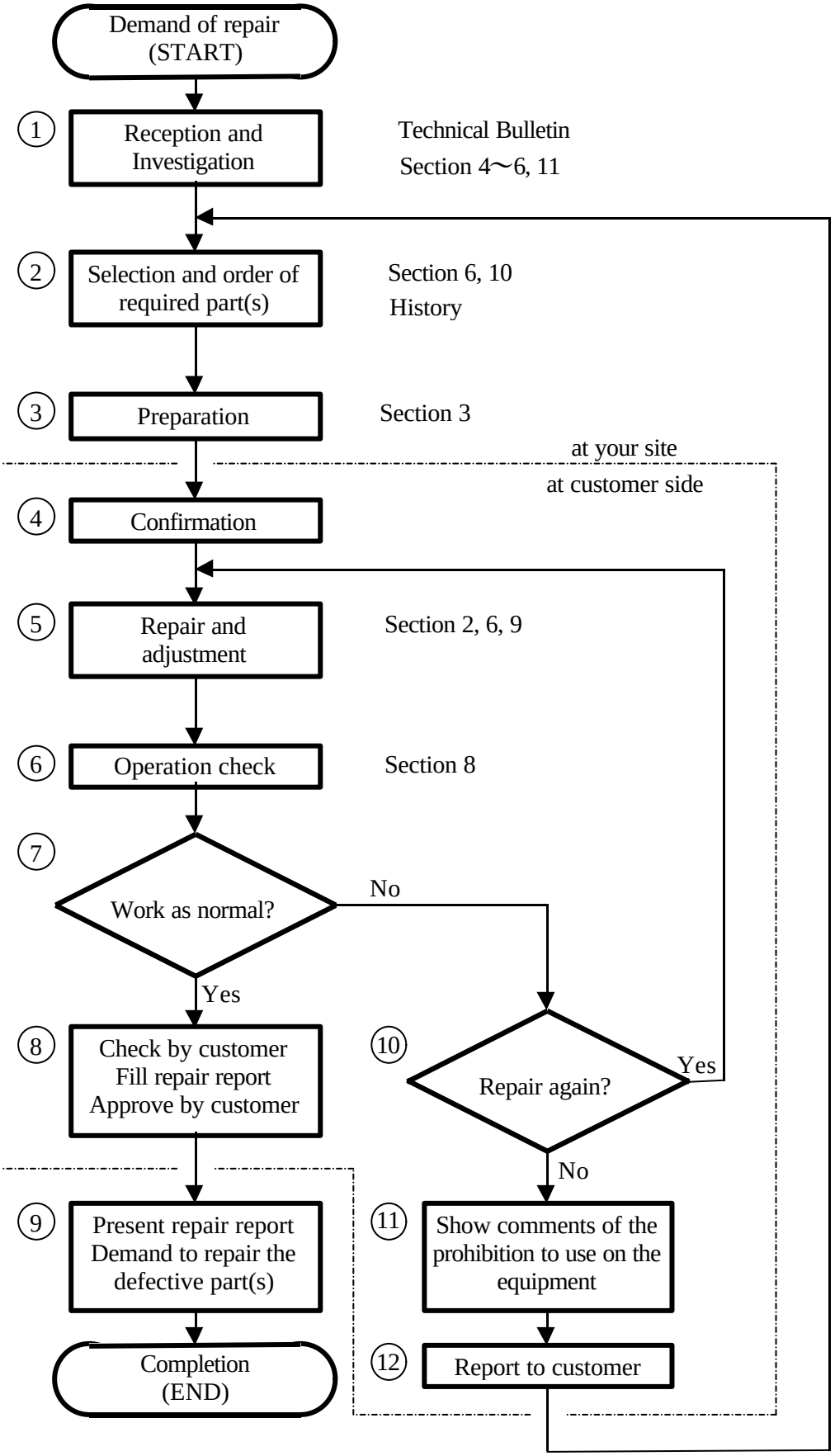
3-1 Repair work on the description of Service Manual

The typical processes for the repair work are shown as the Flow Chart on the next page. Do the repair work according to this procedure. In the case of modification of the Technical Bulletin or Upgrade Kit, see the next item 3-2.

Each procedures of flow chart are numbered to refer its detail shown from page 3-3. Furthermore, the Flow Chart and its explanation show the time when each section of service manual are required on repair work. This is a guide for the usage of service manual.

The service manual is very important for the repair work, especially readjustment and performance check after completion of repair work. This is to keep the safety and quality of equipment. If you make them, you have to describe that the treatment has been done according to the applied section of service manual, on the repair report or the like.

The circled numbers shown in the Flow Chart on next page, are corresponded to the procedure number shown from page 3-3.


Demand of repair
(START)
1
Reception and
Investigation
Technical Bulletin
Section 4～6, 11
2
Selection and order of
required part(s)
Section 6, 10
History
3
Preparation
Section 3
at your site
at customer side
4
Confirmation
5
Repair and
adjustment
Section 2, 6, 9
6
Operation check
Section 8
7
Work as normal?
No
Yes
8
Check by customer
Fill repair report
Approve by customer
10
Repair again?
Yes
No
9
Present repair report
Demand to repair the
defective part(s)
11
Show comments of the
prohibition to use on the
equipment
12
Report to customer
Completion
(END)

Procedure 1 Reception of repair and investigation

Accept the repair request from the customer or distributor. At this time, the following points have to be confirmed and checked,

- Model name/number, and serial number
- Name of customer, address, phone number, and name of person in charge
- Configuration of the connection of peripheral devices
- Software version or the like shown on the start up display (if possible)
- Detail of phenomenon appeared on the function of equipment

Make an examination what circuit may be defective as the function of equipment based on the above information. If you need to know about the basic operation and special information for the maintenance, refer to the following sections, or ask to the *Technical Support*,

- ◆ Section 4 PRINCIPLE OF SYSTEM OPERATION
- ◆ Section 5 SCHEMATICS
- ◆ Section 6 TROUBLESHOOTING
- ◆ Section 11 SERVICE INFORMATION

The reported phenomenon may be the original problem on the equipment. Because, refer to the *Technical Bulletin* separately issued to check it whether defectiveness or not. If it has been reported as the original problem, make a work according to the Technical Bulletin.

Procedure 2 Selection of required parts and order

If you find the doubtful circuit, order the necessary parts. Then check the delivery date and decide the date to visit on the consultation with the customer.
For the selection and order of parts, refer to the following sections,

- ◆ Section 6 TROUBLESHOOTING
- ◆ Section 10 PARTS LIST

For the electrical parts such as UNIT, check the history information on the *HISTORY* of this equipment separately issued.

Procedure 3 Preparation of visiting the customer

Check the required tools, measuring devices and parts to be replaced before the visiting the customer. Then check the special information for the equipment reference with the following section,

◆ Section 3 BEFORE REPAIRING

Procedure 4 Confirmation of phenomenon

Confirm the appeared phenomenon and condition to happen it with the customer. If you don't know about the operation of equipment, refer to the *Operation Manual* attached to the equipment.

Procedure 5 Repair and readjustment

Repair the defective circuit with the brought parts. For the repair work, read the following section carefully,

◆ Section 2 PRECAUTIONS

And, examine the trouble reason depending on the situation with following section,

◆ Section 6 TROUBLESHOOTING

The electrical or mechanical readjustment may be requested depending on the replaced parts. Because, refer to the following section after completion of repair,

◆ Section 7 ADJUSTMENT

Procedure 6 Operation check

Check the system behavior to keep its condition as same as before in trouble, reference with the following section. Be sure to do according to the description because check items are depending on the portion to be treated.

◆ Section 8 PERFORMANCE CHECK

Procedure 7 Judgment of the operation quality

If the result of “Procedure 6” is passed to the all standards, do the next “Procedure 8”. On the other side, if not, make a judgment of “Procedure 10”.

Procedure 8 Confirm by customer, make repair report and approve

Reconfirm the solution of trouble phenomenon with the customer. Then make a repair report and obtain approval of customer.

The repair report shows not only the treatment but also the method of readjustment and operation check. If they have been done according to the service manual, the followings have to be shown,

“Readjusted according to the Section 7 of service manual.”

“Checked according to the Section 8 of service manual, and passed.”

Procedure 9 Presentation of report and order to repair parts

Fill the repair report with necessary item, and present it according to the certain procedure.

If the defective parts that trouble cause included is available to use again by repair, make an order to do. If you cannot judge whether the part can be used again or not, ask to the *Technical Support*.

Procedure 10 Judgment of possibility to repair again

As the result of judgment on “Procedure 7”, if the trouble is not solved, judge the possibility to make the repair work again.

If available, return to “Procedure 5” and continue to work.

If unavailable, go to “Procedure 11”.

Procedure 11 Indication of the prohibition to use

As the result of judgment on “Procedure 10”, if you judge that it is impossible to continue the repair work at this time, indicate that the equipment is still out of order, and also show the prohibition to use, on the equipment.

Procedure 12 Report to the customer

Report the reason why the trouble cannot be solved to the customer. Then consult about the plan of next repair work.

And do the same way from “Procedure 2”.

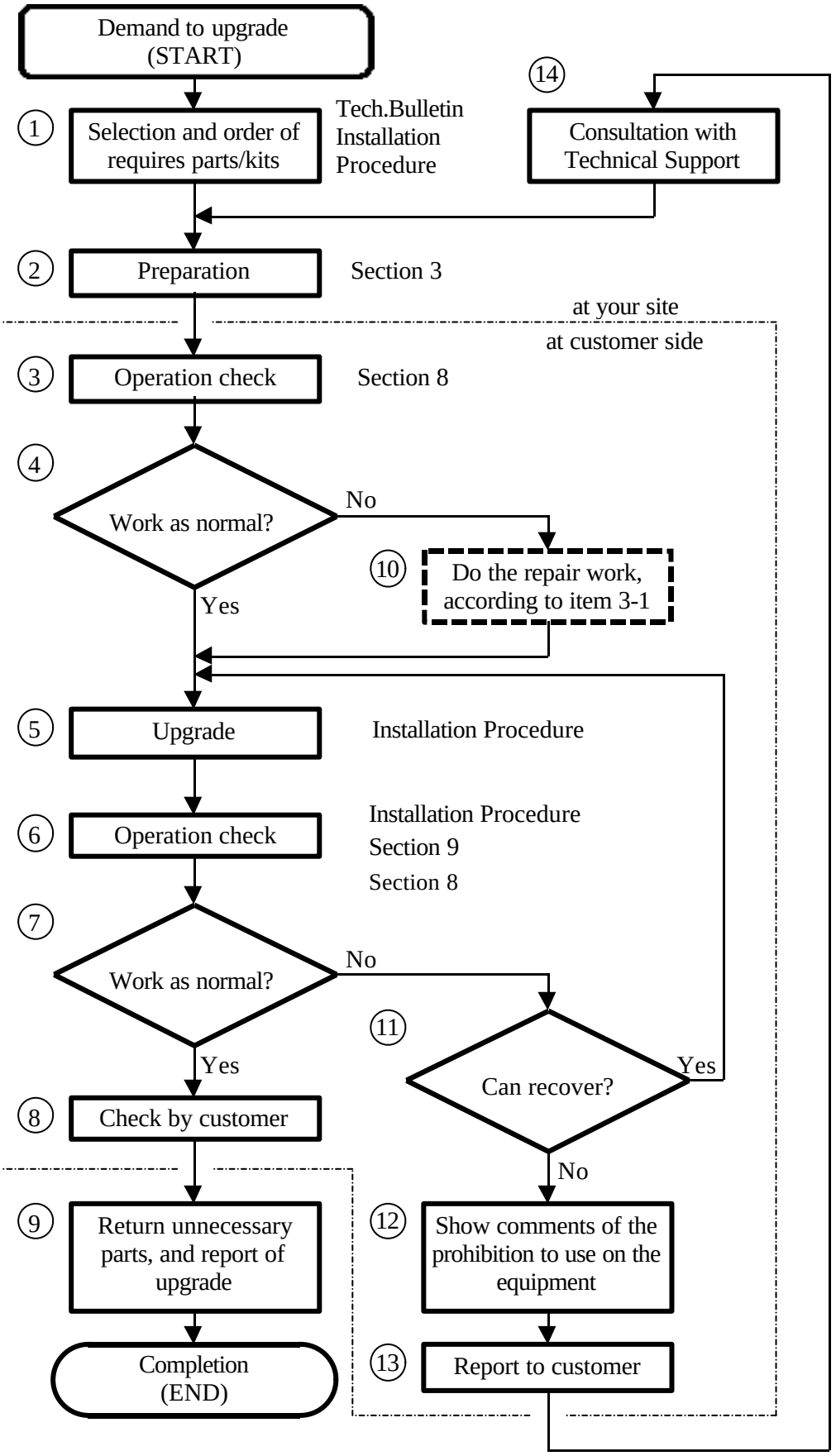
3-2 Upgrade work on the description of Service Manual

The typical processes for the upgrade work are shown as the Flow Chart on the next page. Do the upgrade work according to this procedure. In the case of repair work, see the previous item 3-1.

Each procedures of flow chart are numbered to refer its detail shown from page 3-8. Furthermore, the Flow Chart and its explanation show the time when each section of service manual are required on upgrade work. This is a guide for the usage of service manual.

The service manual is very important for the upgrade work, especially readjustment and performance check after completion of upgrade work. This is to keep the safety and quality of equipment.

The circled numbers shown in the Flow Chart on next page, are corresponded to the procedure number shown from page 3-8.


Demand to upgrade
(START)
1
Selection and order of requires parts/kits
Tech.Bulletin
Installation
Procedure
14
Consultation with Technical Support
2
Preparation
Section 3
at your site
at customer side
3
Operation check
Section 8
4
Work as normal?
No
Yes
10
Do the repair work, according to item 3-1
5
Upgrade
Installation Procedure
6
Operation check
Installation Procedure
Section 9
Section 8
7
Work as normal?
No
Yes
11
Can recover?
Yes
No
8
Check by customer
9
Return unnecessary parts, and report of upgrade
12
Show comments of the prohibition to use on the equipment
13
Report to customer
Completion
(END)

Procedure 1 Selection of required parts / kits and order

Accept the upgrade request from the customer, distributor or person in charge of sales. At this time, the following points have to be confirmed and checked to decide the parts and kits,

- Document name that announced the upgrade or kit requested
- Model name/number, and serial number
- Name of customer, address, phone number, and name of person in charge
- Configuration of the connection of peripheral devices
- Software version or the like shown on the start up display

Make an examination what parts or kits are required based on the above information. For the selection, refer to the following document separately issued, or ask to the *Technical Support*,

◆ Technical Bulletin

To confirm the detail of upgrade, see the *Installation Procedure* attached with applied Technical Bulletin.

Depending on the upgrade, hardware, or software, the other upgrade may be required. Check it with the *Technical Bulletin*.

Then, confirm the delivery date of required parts or kits, and decide the date to visit on the consultation with the customer.

Procedure 2 Preparation of visiting the customer

Check the required tools, measuring devices and parts or kits to be used before the visiting the customer. Then check the special information for the equipment reference with the following section and document,

◆ Section 3 BEFORE REPAIRING
◆ Technical Bulletin and/or Installation Procedure

Procedure 3 Operation check before upgrade

On the basis of work, the upgrade to the defective equipment is prohibited. Because, before upgrade work, check the behavior of equipment whether normal or not according to following section and document,

- Section 8 PERFORMANCE CHECK
- *Operation Manual*

Procedure 4 Judgment of the operation quality

If the result of “Procedure 3” is passed to the all standards, do the next “Procedure 5”. On the other side, if not, go to “Procedure 10”.

Procedure 5 Upgrade work

Do the upgrade work according to the following document,

- Installation Procedure attached with kit or Technical Bulletin

Procedure 6 Operation check after upgrade

Check the system behavior to keep its condition as same as before the upgrade, reference with the following section. Be sure to do according to the description because check items are depending on the portion to be treated.

- Section 8 PERFORMANCE CHECK
- *Installation Procedure*

Procedure 7 Judgment of the operation quality

If the result of “Procedure 6” is passed to the all standards, do the next “Procedure 8”. On the other side, if not, make a judgment of “Procedure 11”.

Procedure 8 Confirmation by customer

Reconfirm any functions of equipment with the customer. Then, if need, introduce and explain about the new functions and specification added by this upgrade.

Furthermore, if need, make a report to be approved by the customer. The report shows not only the treatment but also the method of operation check. If it has been done according to the service manual, the following has to be shown,

"Checked according to the Section 8 of service manual, and passed."

Procedure 9 Return of unnecessary parts and report of completion

According to the *Technical Bulletin*, return the unnecessary replaced or unused parts as soon as possible if suggested.

And, if the report of upgrade is suggested on the same document, report it with the information required.

Procedure 10 Work for the abnormal behavior of equipment

On the result of judgment in "Procedure 4", if the equipment does not work normal, solve the problem according to item 3-1 "Repair work on the description of service manual" shown in this section.

When the problem is solved, return to "Procedure 5" of this item and continue to do the upgrade work.

Procedure 11 Judgment of possibility to recover

As the result of judgment on "Procedure 7", if the problem has been made by this upgrade, judge the possibility to recover it.

If available, return to "Procedure 5" and continue to work.

If unavailable, go to "Procedure 12".

Procedure 12 Indication of the prohibition to use

As the result of judgment on "Procedure 11", if you judge that it is impossible to recover at this time, indicate that the equipment is the out of order, and also show the prohibition to use, on the equipment.

Procedure 13 Report to the customer

Report to the customer that the upgrade has not been completed because of the problem on the upgrade work. Then make a schedule to fix and complete it.

Procedure 14 Asking to the Technical Support

Report to the *Technical Support* about the happening of problem on the upgrade work, make an examination to solve and order the additional parts. Before the asking, check the following points,

- Name of kit, or the issue number of *Technical Bulletin* showing the upgrade
- Model name/number, and serial number
- Configuration of the connection of peripheral devices
- Software version or the like shown on the start up display
- Indication of equipment such as Upgrade or History Label
- Detail of phenomenon appeared on the function of equipment

3-3 Messages

In this equipment, messages are displayed warning that the equipment is malfunctioning or advising the correct operation method.

There are two types of message, differing according to their content.

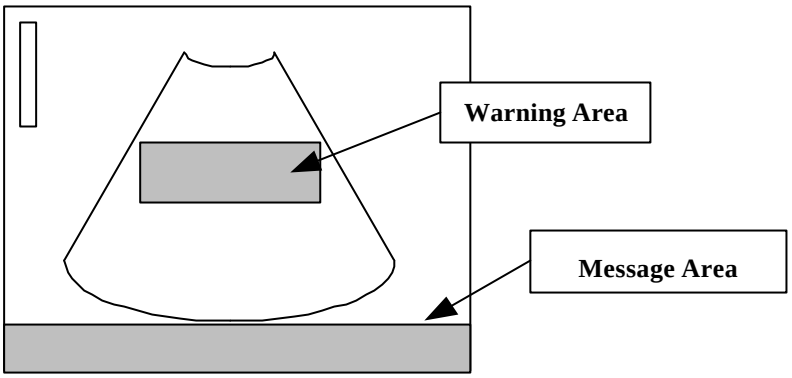


Fig. Message Areas

1) WARNING

This appears at the center of screen and an alarm tone is also emitted.

2) Measurement assistance message

These refer to message used to assist you in measurement and error message. They are displayed in the message area at the bottom of the screen while measurement is taking place (While you are using the track-ball or rotary switch during measurement).

3) Assistance message

When you use the keyboard to operate a function in a menu, assistance message appear in the message area at the bottom of the screen.

4) General messages

These are message related to panel and menu operations. They are displayed in the message area at the bottom of the screen.

5) Beep tone

This tone is emitted together with one of message 1 to 4. To mute this tone, select Warning message in Display Control of PRESET.

6) Application measurement assistance message

These refer to message used to assist you in application measurement and error message. They are displayed in the message area at the bottom of the screen while measurement is taking place (While you are using the track-ball or rotary switch during measurement).

1) WARNING

No.	Message	Cause	Treatment
1	Backup memory will be reset to factory default. Do you still wish to continue?	Pressing both “CTRL” and “R” simultaneously to clear the PRESET data and stored data.	Select “OK” or “Cancel” after displaying the arrow mark on the screen. If you select “OK”, all back up data are cleared.
2	Hard disk Access error. Hard disk requires being diagnosed.	In Preset control function, Data cannot write into the Hard disk.	Press “OK” after displaying the arrow mark on the screen.
3	Disk crashed.	In Preset control function, Data in the Floppy Disk (FD) cannot read out. (Disk crashed)	Press “OK” after displaying the arrow mark on the screen.
4	Error: No disk, or disk unformatted.	In Preset control function, the data storing was performed though FD was not inserted or unformatted FD was inserted.	Select “Retry” or “Cancel” after displaying the arrow mark on the screen.
5	Error: Disk write protected.	In Preset control function, the data storing was performed though FD was protected from the writing.	Select “Retry” or “Cancel” after displaying the arrow mark on the screen.
6	Error: Insufficient disk space. Please insert new disk.	When the data are storing into the FD in Preset control function, the capacity is not enough to storing.	Select “Continue” or “Cancel” after displaying the arrow mark on the screen.
7	Error: Disk full. Please delete image.	When the data are loading from the FD or MO in Preset control function, the capacity of Hard disk is not enough to storing.	Press “OK” after displaying the arrow mark on the screen.
8	Hard disk Access error. Hard disk requires being diagnosed.	The data has been Initialized, because of the data of Hard disk was damaged.	Press “OK” after displaying the arrow mark on the screen.
9	Store images to Removable disk.	The images were stored into the external media by STORE switch.	Wait until storing of data is completed.
10	Could not open DICOMDIR!	When searching the DICOM files from Image Browser, the data could not be found.	Select “Retry” or “Cancel” after displaying the arrow mark on the screen.
No.	Message	Cause	Treatment
11	Can not open file ******** (File name).	After searching the files from Image Browser, the files cannot open.	Select “Retry” or “Cancel” after displaying the arrow mark on

			the screen.
12	Disk crashed.	The removable disk is crashed.	Press “OK” after displaying the arrow mark on the screen.
13	MO drive not accessible. The device is not ready.	The removable disk cannot recognize.	Press “OK” after displaying the arrow mark on the screen.
14	Invalid probe connected.	You connected a probe not intended for use with the equipment.	Connect suitable probe

SECTION 4

PRINCIPLE OF SYSTEM OPERATION

4-1 System Specifications

Scanning System Electronic Linear Scanning
Electronic Convex Scanning
Electronic Sector Scanning
Mechanical Radial Scanning *
:Ver.1.1.1 and higher, the SCU-4000 is required.

Simultaneously Attached Probes
Electronic Probe 3 probes
Mechanical probe 1 probe *
: Ver.1.1.1 and higher, the SCU-4000 is required.

Operating Modes: B, M, D (PW Doppler, CW Doppler, STCW Doppler),
Flow (Velocity/Variance, Power Flow)
VOL (Ver.1.1.1 and higher, the EU-9084* is required)

M, D Mode Display
Scroll display: Moving Bar display
Sweep Speed M: 7 speeds selectable (1, 1.5, 2, 3, 4, 6, 8 Sec/Plane)
D: 7 speeds selectable (1, 1.5, 2, 3, 4, 6, 8 Sec/Plane)

Diagnostic Distance: 2~24 cm (Each probe has a diagnostic distance limit.)

Display modes

	Electronic Linear Electronic Convex	Electronic Sector	Mechanical	Volume	In-dependent
B, B-Zoom, 2B	○	○	○	○	×
B (F), B (PF), B(F)-Zoom, B(PF)-Zoom 2B(F), 2B(PF)	○	○	×	○	×
B/M	○	○	×	○	×
B(F)/M(F) B(PF)/M(PF)	○	○	×	○	×
B/PW Doppler B(F)/PW Doppler B(PF)/PW Doppler	○	○	×	○	×
B/CW Doppler B(F)/CW Doppler B(PF)/CW Doppler	×	○ (Dependent on probe)	×	×	×
M	○	○	×	○	×
M(F), M(PF)	○	○	×	○	×
PW Doppler	○	○	×	○	×
CW Doppler	×	○ (Dependent on probe)	×	×	○
B -> VOL	×	×	×	○	×

B/VOL	×	×	×	○	×

○：Possible, ×：Impossible, F: Flow, PF: Power Flow

・The option unit is required for connection of the mechanical radial probe.

・ The electronic sector probe CW Doppler function (STCW Doppler) is required optional unit.・The option unit is required for connection of the independent probe.

Probe Frequency

Electronic Probes Probe nominal frequency is 2.5~7.5 MHz.
Selection is possible by Image Freq.

Mechanical Probes 6~10 MHz (the SCU-4000* is required)

Volume mode Probe 3.5 MHz (the Option unit is required)

Transmission Frequency

2.14, 2.5, 3.0, 3.75, 5.0, 6.0, 7.5, 10MHz (Each probe has a frequency limit)

Transmission Method

Electronic Linear, Convex: One time wave transmission / Burst wave transmission

Electronic Sector: One time wave transmission / Burst wave transmission / Continuous wave transmission

Mechanical (the SCU-4000 is required): One time wave transmission

(Wave count during burst wave transmission: 15 waves max.)

Transmission Voltage Electronic: 100 V max.
Mechanical (the SCU-4000* is required): 150 V max.
CW Transmission voltage: 50 V max.

Transmission Power Control

Transmission voltage is controlled by a rotary encoder.

Transmission Voltage Monitoring

The transmission voltage value is monitored by the CPU, which also stops transmission and cuts off transmission power supply output.

Focusing System

Electronic Linear, Convex:

Transmission: 4 Levels max. (selectable from 8 types) + Acoustic lens

Reception: Continuously variable + Acoustic lens

Electronic Sector:

Transmission: 4 Levels max. (selectable from 8 types) + Acoustic lens

Reception: Continuously variable + Acoustic lens

Mechanical (The SCU-4000* is required): Indented surface transducer.

Receiving Addition System

Electronic: Digital addition

Mechanical (the SCU-4000* is required): Analog addition

Receiving Variable Band Filter: Compatible with each frequency

Receiving Multiprocessing (electronic probe):

Bi-directional simultaneous reception in both black and white and color are possible.

Image Quality Adjustment

B Gain	30 ~ 90dB (60/256 dB step)
M Gain	± 30 dB from the B Gain setting
STC	8-level slide variable resistor Treated as digital information from the panel.
Contrast	16 levels (B, M independent)
AGC	16 levels(B, M independent)
Relief	Off + 3 levels
FTC	On/Off
Image/Freq. Select	B: 4 kinds M: 4kinds

Scanning line density: Variable in accordance with the diagnostic distance, zoom and line density settings.

Steered Beam: ±30° max. (special probe only)

Spectral Doppler

Frequency Analysis System: FFT system

Display: Power spectrum

Frequencies:
PW Doppler 2.14, 2.5, 3, 3.75, 5, 6, 7.5 MHz
CW Doppler 2, 2.14, 3, 3.75, 5 MHz

Analysis Rate (Velocity Range) : There are limits depending on the probe frequency.
PW Doppler：±0.5kHz ~ 20kHz
CW Doppler : ±0.5kHz ~ 42kHz

Sample Point: 1 point

Sampling Volume: 0.5 ~ 20 mm (0.5mm step)

Filters:
PW Doppler: Approx. 50, 100, 200, 400, 800, 1600 Hz
CW Doppler: Approx. 50, 100, 200, 400, 800, 1600 Hz

Doppler Gain: 0 ~ 60dB, 0.83dB step

Reject : 16 levels, selectable

Contrast : 16 levels, selectable

Audio Output: Speaker and VCR output, stereo

Base Line Shift : Possible after Freeze (However, not possible in the physiological signal.)

Spectrum Invert: Possible after Freeze (However, the physiological signal also moves together.)

Doppler information lost portion interpolation processing function: Yes

Doppler sound output function during B Mode image display: ..... Yes

Color Flow

Frequency Estimation System:	Auto-correlation method
Display:	Velocity Variance Velocity/Variance Power Flow
Flow Gain:	0 ~ 31.75dB、0.25dB step
Frequencies:	2.14, 2.5, 3, 3.75, 5, 7.5 MHz
Depth of Field:	24 cm max.
Sampling:	Changes in accordance with the diagnostic distance.
Decimation:	8 times max.
Average:	B-Flow mode: . ..... 3 ~ 7 B-Tissue mode: ..... 3 ~ 7 M-mode (Flow and Tissue): 20
Flow Filter:	6 types
Spatial Filter:	4 types
Rejection:	Motion Reject 4 types Color Reject Implemented in color coding.
Color Enhance:	Implemented in color coding.
Color Image Select:	3 types
Multiple echo removal function:	Yes
Color image integration display function:	Yes (Color capture)
Color Coding:	Total 30 types

DIU

Image Gradation:	Black and White 64 steps, Velocity ± 31 steps, Variance 16 steps, Power Flow 32 steps	
Displayable Scanning Lines:	1024 lines max.	
Cine Memory:	Black and White	512 ×65536×6-bit
	Velocity/Power Flow	512 ×65536×6-bit
	Variance	512 ×65536×4-bit
Display Memory:	Black and White	512 × 1024 × 8-bit
	Velocity/Power	512 × 1024 × 8-bit
	Variance	512 × 1024 × 4-bit
Image Display Synchronization Method:	TV frame sync / Ultrasonic frame sync, switchable	
	Ping-Pong System ON/OFF switchable	
Image Processing	Line Correlation	Off, Low, High
	Frame Correlation	Off, Low, Mid, High
	Frame Interpolation	On/Off
	Post Process	5 types
	View Gamma	5 types
Cine Memory Function:	Search Max. 256 frames (when there are 256 scanning lines)	
	Scroll 128 screens (512 Pixels per screen)	
	Store/Review Max. 999 frames	

Image Display Functions

B/* Mode Up/Down Left-Right Display		Possible
B Mode Image:	Zoom	Write Zoom Possible
		Read Zoom Possible (During Freeze ×2 only)
	Position Movement	Yes
	Left-Right/Up-Down Inversion	Yes
	90° Rotation Display	Yes
2B Image, Black and White/Color Real Time Display		Yes
M Mode Image:	Window Display	Yes
	Echo Erase	Yes
Request Function (Display mode change after Freeze)		Yes
D Mode Image Black and White Reversal Display		Yes
Black and White, Color Display Priority Function		Yes
Color display of black and white image		Yes

Auto display: date, time, Imaging frequency, Image direction mark, Diagnostic distance, Gain, Contrast, Frame Rate, Transmission voltage (% display), Focus mark, Velocity range, Heart rate, R-delay, BSA/GW/PSA, Maximum Velocity, Doppler angle correction value,

Preset name, VOL gamma, Opacity

Character Input: Hospital name, Patient number (ID), Patient name, Patient age, Gender, Height, Weight, Body surface area, Number of weeks of pregnancy, Comments (Movable using a trackball.)
Annotation characters (Movable using a trackball.)

Graphic Display: Range mark, Time mark, Velocity mark,

Puncture guide line, Body mark,

Cursor (includes Sample gate, M-window, Angle mark),

Flow area mark, Cine scale, Bi-plane mark,

Multi-plane mark

Measuring Function

B Mode Basic Measurements
DIST, Area (Trace, Ellipse, Circle), Volume 1, Volume 2 (Biplane, Single plane), B Index

M Mode Basic Measurements

M.VEL, M Length. M Time, Heart Rate, M Index

D Mode Basic Measurements
D.VEL, ACCEL, Mean VEL, D.Time, Resistance Index, Pulsatility Index,

P1/2T(VA), Heart Rate, Time, D. Caliper, D. Index, Stenosis Flow,

Regurgitation Flow, D Trace

B/D Mode Basic Measurements

Flow Volume, Stroke Volume

Obstetric Measurements

Gestational age measurement, Fetal weight measurement, Amniotic fluid

index measurement, Fetal Doppler measurement, Fetal heart function

measurement, Cervix measurement

Gynecological Measurements
Gynecological measurement, Follicle growth measurement, Bladder measurement, GYN Dop measurement

Cardiac Function Measurements
Left ventricular function measurement, M Mode measurement, D mode measurement

Peripheral Vessel Measurements

Histogram measurement

Report Functions: Obstetrical/ Gynecological Report
Cardiac Report
PV Report (Ver. 2.0 and higher)
Urology Report (Ver. 2.0 and higher)

VCR manual calibration function (Ver.3.0 and higher)

TV Monitor: 15-inch Color Monitor (Non-interlace)

Input-Output Signal:

R, G, B, Sync output for color TV monitor:	1 system
Composite output for B/W video printer:	1 system
Control signal (Print/Busy):	1 system
R, G, B, Sync output for color video printer	1 system
Control signal (Print/Busy):	1 system
VTR Output	
Color Composite:	1 system
Y/C:	1 system
R, G, B, SYNC:	1 system
Audio L/R:	1 system
VTR Input (Input signals are switched on the main unit side and used.)	
Color Composite:	1 system
Y/C:	1 system
Audio L/R:	1 system
For VTR Remote Control (for SVO-9500MD/MDP)	1 system

External interface	RS-232C	1 system
	Centronics	1 system
Power Supply Voltage:	100 Volt System	AC 100~120 V ± 10%
	200 Volt System	AC 200~240 V ± 10%

Service Receptacle (AC outlet):

Color TV Monitor :		1 system (internal)
Printers, VTR other (Total	Max. 500 VA):	4 systems

Power Consumption 1100 VA

Classification according to protection against surges: Class 1 Device

Classification according to degree of protection against surges: BF type

Use Environment:	Ambient Temperature	10～40℃
	Relative Humidity	30～75%
	Air Pressure	700～1060hPa

Cabinet Dimensions: 500 mm (W) × 850 mm (D) × 1350 mm (H)

Weight Approx. 150 kg

Major Options

Photographic Equipment

Black and White Video Printer	UP-895MD (NTSC)
	UP-895CE (PAL)
	UP-895MD/SYN (NTSC/PAL)
	P91/P91W/P91E
Color Video Printer	UP-2950MD (NTSC)
	UP-2850P (PAL)
	UP-21MD (UC)
	UP-21MD (CED)
	CP700A/CP700UM/CP700E
	CP900A/CP900UM/CP900E
VTR	SVO-9500MD4/MDP4
	AG-7350/AG-7350E

Physiological Signal Display Unit

PEU-4000

Display Information: ECG (or DC IN), PCG,
PULSE (or DC IN)

Sensitivity/Position: Variable

Sweep Speed: 1, 1.5, 2, 3, 4, 6, 8 (Sec/Frame)

Mechanical Probe Connection Unit

SCU-4000 (Ver.1.1.1 and higher) *1

SCU-4000B（Ver.3.1 and higher）

STCW Doppler unit

UCW-4000

UCW-4000B (Ver.3.1 and higher) *2

Tissue Harmonic Imaging unit

EU-9082 * Note: In case where the serial number of system is M00501 onwards, EU-9082 is not optional item. Since, EP444100** is included as standard.

VCM unit

EU-9083 （Ver.1.1.2 and higher）

VOL mode unit

EU-9084 （Ver.1.1.1 and higher）

EU-9084B (Ver.2.1.3 and higher)

Foot switch

MP-2345B

MP-2614B (3-point)

Serial I/O isolation unit

SIU-4000 (Ver. 2.0 and higher)

Independent probe connecting unit

EU-9094 (Ver.3.1 and higher)*3

*1： The SSD-4000 of which “DBP EP478400” was installed into the system is not able to use SCU-4000. See page 2-6 for detail.

*2： There is a difference of the setting of JP1 in EP409200 by a combination of software version. See page 2-6 for detail.

3： Both SCU-4000 and EU-9094 cannot install to SSD-4000 simultaneously. Because, the Independent probe connector unit mounts to the same position of mechanical radial probe connector.

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4-2 System Configuration

This ultrasonic diagnostic equipment (SSD-4000) consists of the following units.

Main Body	PSC-135
	USM-25*
	Tx & Rx part
	Digital Beam Former part
	Flow/Doppler part
	DIU part
Main Panel	L-KEY-75*
Viewing Color TV monitor	IPC-1530Q (Non-Interlace) IPC-1530(U) (Non-Interlace)
Power supply unit	PSU-S4000*

Optional devices

Continuous Doppler unit	UCW-4000 UCW-4000B (Ver.3.1 and higher)
Tissue Harmonic Echo unit	EU-9082

Note 1: In case where the serial number of system is M00501 onwards, EU-9082 is not optional item. Since, EP444100** of EU-9082 is included as standard.

Physio. signal display unit	PEU-4000
Mechanical scan unit	SCU-4000 (Ver. 1.1.1 and higher) SCU-4000B (Ver.3.1 and higher)
Volume mode unit	EU-9084 (Ver.1.1.1 and higher) EU-9084B (Ver. 2.1.3 and higher)
Data Management unit (VCM)	EU-9083 (Ver.1.1.2 and higher)
3-point foot switch	MP-2614B
B/W printer	UP-895MD (NTSC), UP-895CE (PAL) UP-895MD/SYN (NTSC/PAL) P91/P91W/P91E
Color Video Printer	UP-2950MD (NTSC) UP-2850P (PAL) UP-21MD (UC) UP-21MD (CED) CP700A/CP700UM/CP700E CP900A/CP900UM/CP900E
VCR	SVO-9500MD4 (NTSC) SVO-9500MDP4 (PAL) AG-7350 (NTSC) AG-7350E (PAL)
Serial I/O isolation unit	SIU-4000 (Ver.2.0 and higher)
Independent probe connecting unit	EU-9094 (Ver.3.1 and higher)

4-3 System Block Diagram

A list of all the PCB's mounted in this equipment (with the exception of the power supply unit and the external operations), and a system block diagram, are shown form the next

SSD-4000 PCB LIST (1/2) *(Ver. 1.0.2 and lower)*

SSD-4000	Unit / Module	PCB model name	Name	Description
Main body	PSC-135	EP4261	Foot SW PCB	Connector for Foot Switch
Main panel	L-KEY-75			Operation Panel part, connected to the CPU board with the RS232C.
Ultrasound Main Unit USM-25	Tx/Rx part	EP4438	Probe Select 1	Probe connector
		EP4439	Probe Select 2	HVS control
		EP4500 /EP4441	Tx & Tx Focus /Tx & Tx Focus 2	The electronic probe Tx circuit, transmission voltage monitor, generates the transmission trigger for the electronic probe. (Transmission circuit for STCW)
		EP4437	Rx Connector	
		EP4440	Pre AMP	Initial Stage Pre Amp, Variable Gain AMP(Pre AMP2 (Signal level matching to the Beam Former input part)
		EP4443	A. ITF	PreSTC1, 2 generation, STC, LGC generation, mechanical probe control timing.
		EP4444	AD_DA	B/W image reception main amp unit, output of black and white data to the DIU.
	Digital Beam Former	EP4429	Rx Beam Former	A/D, digital delay circuit, handles *n*-ch with one PCB.
		EP4430	TxRx CTRL	Control of transmission power, DBF control, ultrasound data collection timing generation, HR count.
	Flow/Doppler part	EP4435	CFP	Quadrature detection (for both Spectral Doppler and Color), Color Flow Processor (Velocity, Variance, Power calculations)
		EP4436	SDP	Frequency analysis for Spectral Doppler., Spectral Doppler, Color Flow Interface
	Mother Board	EP4445	Mother	
	Digital Imaging Part	EP4423	CPU	SSD-4000 overall control CPU, graphic character generation
		EP4467	MGR	Generation of parameters for interpolation in the scan converter, generation of the DIU's basic clock
		EP4464	BSC (B/W DSC)	Ultrasonic line data receiver for Black & White mode, pre-processing of data for the Black & White mode., US line Mass Memory for black and white with capacity for 65536 records and control for that memory, Black and white Scan Converter (2-dimensional interpolation), Video memory

SSD-4000 PCB LIST (2/2) *(Ver. 1.0.2 and lower)*

SSD-4000	Unit / Module	PCB model name	Name	Description
		EP4465	CSC (COL DSC)	Ultrasonic line data receiver for Color mode, pre-processing of data for the Color mode, Color line Mass Memory with capacity for 65536 records, Color Scan Converter (2-dimensional interpolation), Video memory
		EP4466	VPU	Conversion of black and white, Velocity, Variance data to Composite, Y/C, analog RGB data, Conversion of external Composite, Y/C to digital RGB
		EP4473	Audio	Audio Amp
		EP4472	DISTRIBUTOR	Distribution of Video signals
Viewing Color TV monitor	IPC-1530Q			15” Color TV monitor(Non-Interlace)
Power supply unit PSU-S4000	Primary Power Supply unit	PSU-S4000-1	Primary Power Supply	Supplies AC100V or AC200V system
	Secondary Power Supply unit	PSU-S4000-2	Secondary Power Supply	DC: +3.3V、+5.1V、±5.0V、+12V、±15V、HVA (0 ~ -80V)、HVB (0 ~ +50V)
Physio signal display unit PEU-4000	EP4536		Volume	Control knobs for physiological signals.
	EP4468		PSC	A/D of physiological signals and conversion to TV signals.
	Physio signal unit EU-5044	EP4578	Physio Amp	Amplifier for physiological signals (ECG, PCG, PULSE).
STCW Doppler unit	UCW-4000	EP4442	STCW	Quadrature detection and A/D for STCW Doppler

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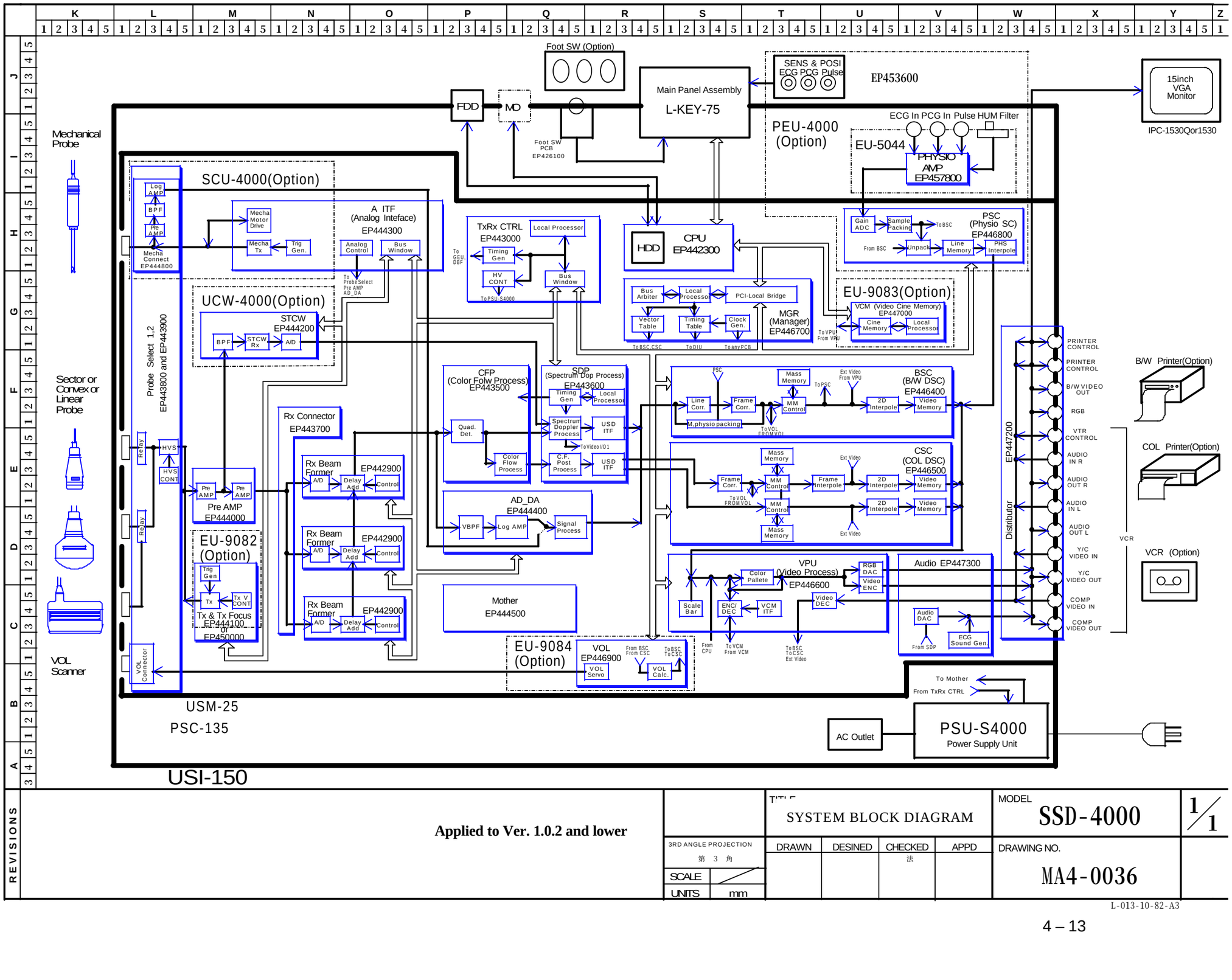

REVISIONS		TITLE	MODEL	
	Applied to Ver. 1.0.2 and lower	SYSTEM BLOCK DIAGRAM	SSD-4000	1/1
		3RD ANGLE PROJECTION 第 3 角	DRAWN / DESINED / CHECKED 法 / APPD	DRAWING NO. MA4-0036
		SCALE / UNITS mm		

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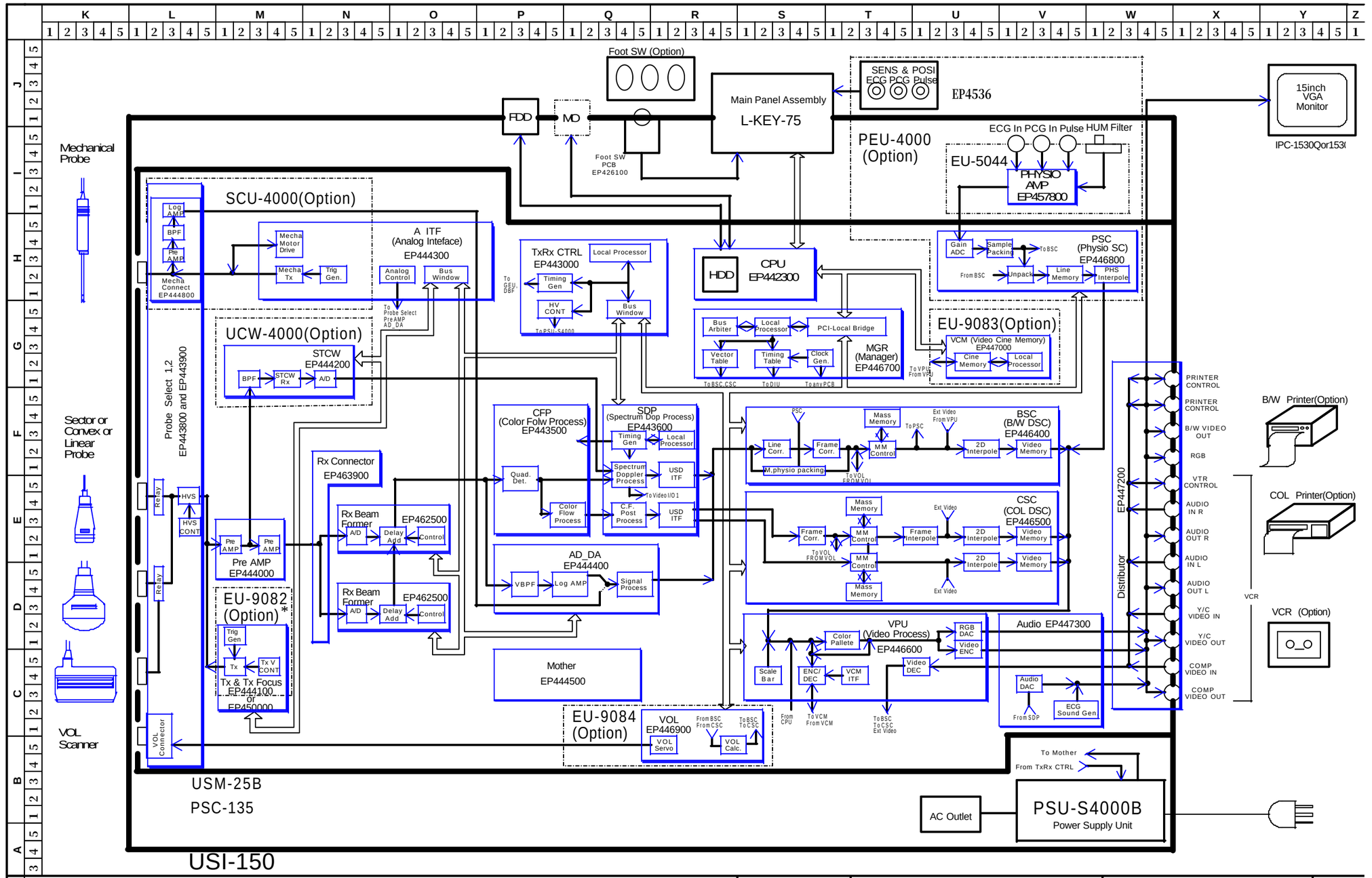
SSD-4000 PCB LIST (1/2) *(Ver. 1.0.3 and higher)*

SSD-4000	Unit / Module	PCB model name	Name	Description
Main body	PSC-135	EP4261	Foot SW PCB	Connector for Foot Switch
Main panel	L-KEY-75			Operation Panel part, connected to the CPU board with the RS232C.
Ultrasound Main Unit USM-25	Tx/Rx part	EP4438	Probe Select 1	Probe connector
		EP4439	Probe Select 2	HVS control
		EP4500 /EP4441	Tx & Tx Focus /Tx & Tx Focus 2	The electronic probe Tx circuit, transmission voltage monitor, generates the transmission trigger for the electronic probe. (Transmission circuit for STCW)
		EP4639	Rx Connector	
		EP4440	Pre AMP	Initial Stage Pre Amp, Variable Gain AMP(Pre AMP2 (Signal level matching to the Beam Former input part)
		EP4443	A. ITF	PreSTC1, 2 generation, STC, LGC generation, mechanical probe control timing.
		EP4444	AD_DA	B/W image reception main amp unit, output of black and white data to the DIU.
	Digital Beam Former	EP4625	Rx Beam Former	A/D, digital delay circuit, handles *n*-ch with one PCB.
		EP4430	TxRx CTRL	Control of transmission power, DBF control, ultrasound data collection timing generation, HR count.
	Flow/Doppler part	EP4435	CFP	Quadrature detection (for both Spectral Doppler and Color), Color Flow Processor (Velocity, Variance, Power calculations)
		EP4436	SDP	Frequency analysis for Spectral Doppler., Spectral Doppler, Color Flow Interface
	Mother Board	EP4445	Mother	
	Digital Imaging Part	EP4423	CPU	SSD-4000 overall control CPU, graphic character generation
		EP4467	MGR	Generation of parameters for interpolation in the scan converter, generation of the DIU's basic clock
		EP4464	BSC (B/W DSC)	Ultrasonic line data receiver for Black & White mode, pre-processing of data for the Black & White mode., US line Mass Memory for black and white with capacity for 65536 records and control for that memory, Black and white Scan Converter (2-dimensional interpolation), Video memory

SSD-4000 PCB LIST (2/2) *(Ver. 1.0.3 and higher)*

SSD-4000	Unit / Module	PCB model name	Name	Description
		EP4465	CSC (COL DSC)	Ultrasonic line data receiver for Color mode, pre-processing of data for the Color mode, Color line Mass Memory with capacity for 65536 records, Color Scan Converter (2-dimensional interpolation), Video memory
		EP4466	VPU	Conversion of black and white, Velocity, Variance data to Composite, Y/C, analog RGB data, Conversion of external Composite, Y/C to digital RGB
		EP4473	Audio	Audio Amp
		EP4472	DISTRIBUTOR	Distribution of Video signals
Viewing Color TV monitor	IPC-1530Q			15” Color TV monitor(Non-Interlace)
Power supply unit PSU-S4000	Primary Power Supply unit	PSU-S4000B-1	Primary Power Supply	Supplies AC100V or AC200V system
	Secondary Power Supply unit	PSU-S4000B-2	Secondary Power Supply	DC: +3.3V、+5.1V、±5.0V、+12V、±15V、HVA (0 ~ -80V)、HVB (0 ~ +50V)
Physio signal display unit PEU-4000		EP4536	Volume	Control knobs for physiological signals.
		EP4468	PSC	A/D of physiological signals and conversion to TV signals.
	Physio signal unit EU-5044	EP4578	Physio Amp	Amplifier for physiological signals (ECG, PCG, PULSE).
STCW Doppler unit	UCW-4000	EP4442	STCW	Quadrature detection and A/D for STCW Doppler
Mechanical unit (Ver.1.1.1and higher)	SCU-4000	EP4448	Mecha Connect	Probe connector for mechanical radial probe, Pre Amp, BPF, Log Amp
		EP444301	A_ITF	Generates Tx Trigger signal for mechanical probe, Transmission circuit, Motor drive circuit, Position detector circuit for transducer element.
VOL mode unit (Ver.1.1.1 and higher)	EU-9084	EP4469	VOL	Volume mode calculator, Motor servo circuit
Data Management unit (Ver.1.1.2 and higher)	EU-9083	EP4470	VCM	Multi frames memory for DICOM



REVISIONS

*: In case where the serial number of system is M00501 onwards, EU-9082 is not optional item. Since, EP444100** is included as standard.

(Applied to Ver. 1.0.3 and higher)

3RD ANGLE PROJECTION 第 3 角	TITLE: SYSTEM BLOCK DIAGRAM				MODEL: SSD-4000
SCALE	DRAWN	DESINED	CHECKED	APPD	DRAWING NO. MA4-0036
UNITS: mm			法		1/1

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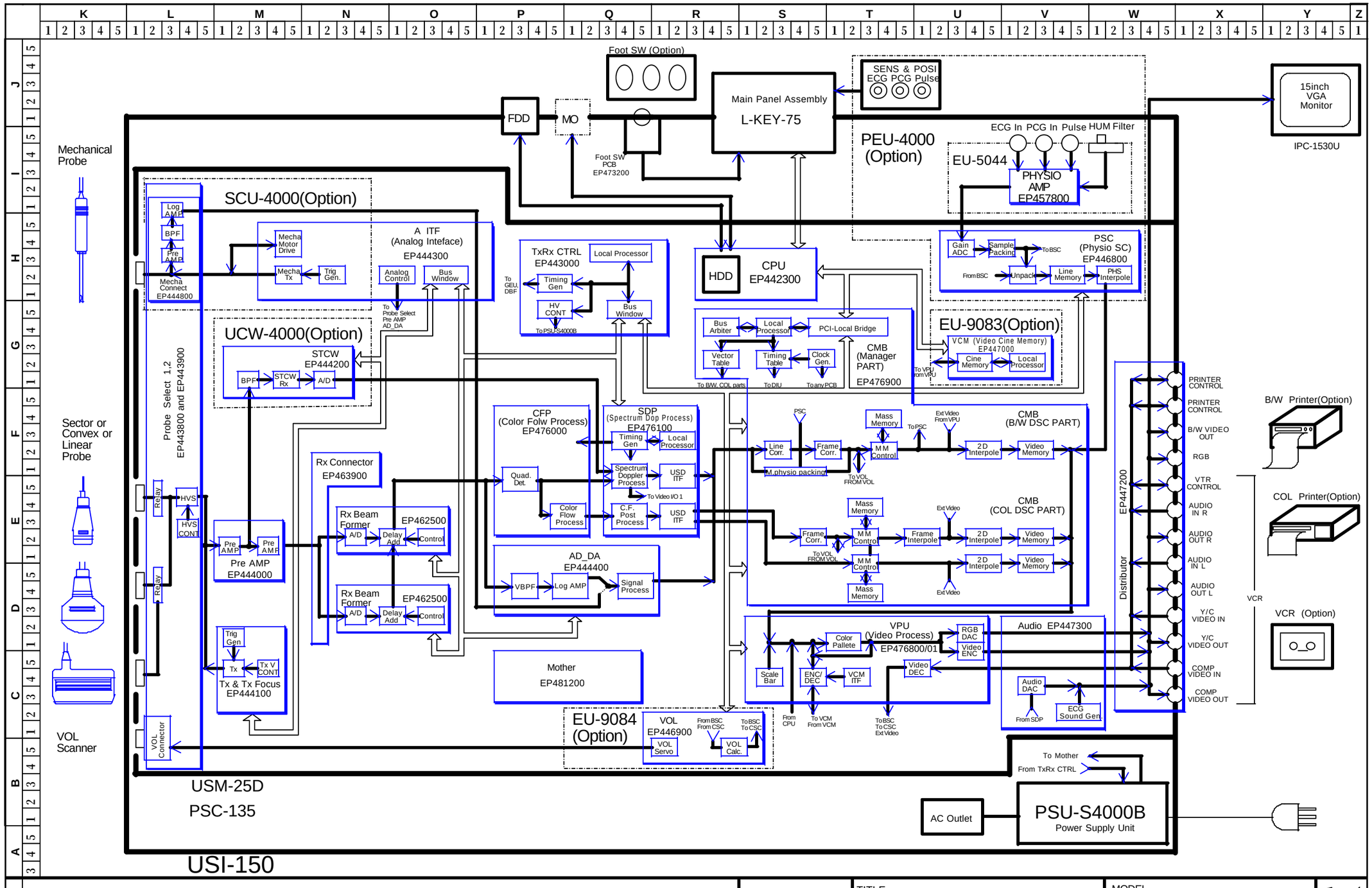
SSD-4000 PCB LIST (1/2) *(S/N. M01101 and higher)*

SSD-4000	Unit / Module	PCB model name	Name	Description
Main body	PSC-135	EP4732	Foot SW PCB	Connector for Foot Switch
Main panel	L-KEY-75*			Operation Panel part, connected to the CPU board with the RS232C.
Ultrasound Main Unit USM-25	Tx/Rx part	EP4438	Probe Select 1	Probe connector
		EP443901	Probe Select 2	HVS control
		EP4441	Tx & Tx Focus 2	The electronic probe Tx circuit, transmission voltage monitor, generates the transmission trigger for the electronic probe, Transmission circuit for STCW
		EP4639	Rx Connector	
		EP4440	Pre AMP	Initial Stage Pre Amp, Variable Gain AMP(Pre AMP2 (Signal level matching to the Beam Former input part)
		EP4443	A. ITF	PreSTC1, 2 generation, STC, LGC generation, mechanical probe control timing.
		EP4444	AD_DA	B/W image reception main amp unit, output of black and white data to the DIU.
	Digital Beam Former	EP4625	Rx Beam Former	A/D, digital delay circuit, handles *n*-ch with one PCB.
		EP4430	Tx Rx CTRL	Control of transmission power, DBF control, ultrasound data collection timing generation, HR count.
	Flow/Doppler part	EP4760	CFP	Quadrature detection (for both Spectral Doppler and Color), Color Flow Processor (Velocity, Variance, Power calculations)
		EP4761	SDP	Frequency analysis for Spectral Doppler., Spectral Doppler, Color Flow Interface
	Mother Board	EP4812	Mother	
	Digital Imaging Part	EP4423	CPU	SSD-4000 overall control CPU, graphic character generation
		EP476800/ EP476801	VPU	Conversion of black and white, Velocity, Variance data to Composite, Y/C, analog RGB data, Conversion of external Composite, Y/C to digital RGB
		EP4473	Audio	Audio Amp
		EP4472	DISTRIBUTOR	Distribution of Video signals

SSD-4000 PCB LIST (2/2) *(S/N. M01101 and higher)*

SSD-4000	Unit / Module	PCB model name	Name	Description
		EP4769	CMB	Generation of parameters for interpolation in the scan converter, generation of the DIU's basic clock, Ultrasonic line data receiver for Black & White mode, pre-processing of data for the Black & White mode., US line Mass Memory for black and white with capacity for 65536 records and control for that memory, Black and white Scan Converter (2-dimensional interpolation), Video memory Ultrasonic line data receiver for Color mode, pre-processing of data for the Color mode, Color line Mass Memory with capacity for 65536 records, Color Scan Converter (2-dimensional interpolation), Video memory
Viewing Color TV monitor	IPC-1530(U)			15" Color TV monitor (Non-Interlace)
Power supply unit PSU-S4000*	Primary Power Supply unit	PSU-S4000B-1	Primary Power Supply	Supplies AC100V or AC200V system
	Secondary Power Supply unit	PSU-S4000B-2B	Secondary Power Supply	DC: +3.3V, +5.1V, ±5.0V, +12V, ±15V, HVA (0 ~ -80V), HVB (0 ~ +50V)
Physio signal display unit PEU-4000		EP4536	Volume	Control knobs for physiological signals.
		EP4468	PSC	A/D of physiological signals and conversion to TV signals.
	Physio signal unit EU-5044	EP4578	Physio Amp	Amplifier for physiological signals (ECG, PCG, PULSE).
STCW Doppler unit	UCW-4000	EP4442	STCW	Quadrature detection and A/D for STCW Doppler
Mechanical unit (Ver.1.1.1and higher)	SCU-4000	EP4448	Mecha Connect	Probe connector for mechanical radial probe, Pre Amp, BPF, Log Amp
		EP444301	A_ITF	Generates Tx Trigger signal for mechanical probe, Transmission circuit, Motor drive circuit, Position detector circuit for transducer element.
VOL mode unit (Ver.1.1.1 and higher)	EU-9084	EP4469	VOL	Volume mode calculator, Motor servo circuit
Data Management unit (Ver.1.1.2 and higher)	EU-9083	EP4470	VCM	Multi frames memory for DICOM



REVISIONS

Ver. 2.1 and S/N.M01101~

3RD ANGLE PROJECTION 第 3 角	DRAWN	DESINED	CHECKED 法	APPD
SCALE				
UNITS mm				

TITLE: SYSTEM BLOCK DIAGRAM

MODEL: SSD-4000

1/1

DRAWING NO.: MA4-0036

L-013-10-82-A3

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4-4 Principle of System Operation

4-4-1 System Control

CPU board

CPU board controls whole operation of the equipment.

This general purpose computer controls HDD (Hard Disk Drive) and FDD (Floppy Disk Drive).

The connected Hard Disk includes the following data.

The program of this general purpose computer

The programs of other CPUs in the equipment.

(Only when the specific command is executed, the programs are transferred from Hard disk to Flash Memories.)

Focus data for Tx/Rx circuit corresponded to each probe type.*

*:On Ver. 2.0 onwards, the focus data are not stored into the hard disk..

Parameter data for Scan converter corresponded to each probe type.

Preset data.

The general purpose computer transfers the probe-type dependant data to DIU and Tx/Rx part from the hard disk during the operation, when it is necessary.

On the other hand, Floppy disk drive reads the version up data from Floppy disk, and back up the Preset data to Floppy disk.

Main Panel part L-KEY-75 (Operation panel)

Main Panel part reads the information of switches, volumes, keyboard and transfer these information to CPU board by serial communication.

Peripheral MPUs

In addition to the above CPU, MGR/CMB board (for the control of Mass Memory) and Tx & Rx Control board (V50, for the control of Tx/Rx part) have Micro Processors.

The software for MPU on MGR/CMB board and Tx & Rx Control board are also stored in Flash Memory on each board (as same as CPU board), and the general purpose computer re-write the software of those board in case of the version up.

Address bus, Data bus

The following address and data buses are used to control equipment inside.

PCI BUS：The exclusive bus to connect the general purpose computer (CPU board) and DIU part. The CPU board transfers the Hard Disk data into Digital Imaging unit and Tx/Rx unit via this bus. (The CPU board can access all registers on LOCAL BUS, USC BUS, and Front End Bus via this PCI BUS.)

LOCAL BUS：The address and data bus in Digital Imaging unit.

USC BUS：UltraSound Control BUS. The address and data bus in Tx/Rx unit.

Front End Bus：The address and data bus inside the Front End part.

Using the Bus Bridge between PCI BUS and LOCAL BUS, and LOCAL BUS and USC BUS avoids to leak the noise from CPU to Tx/Rx part, by connecting these buses only when CPU accesses ahead of USC BUS.

Data for each probe type

The focus data and parameter data for each probe are stored in the hard disk. *

*:On Ver. 2.0 onwards, the focus data are not stored into the hard disk..

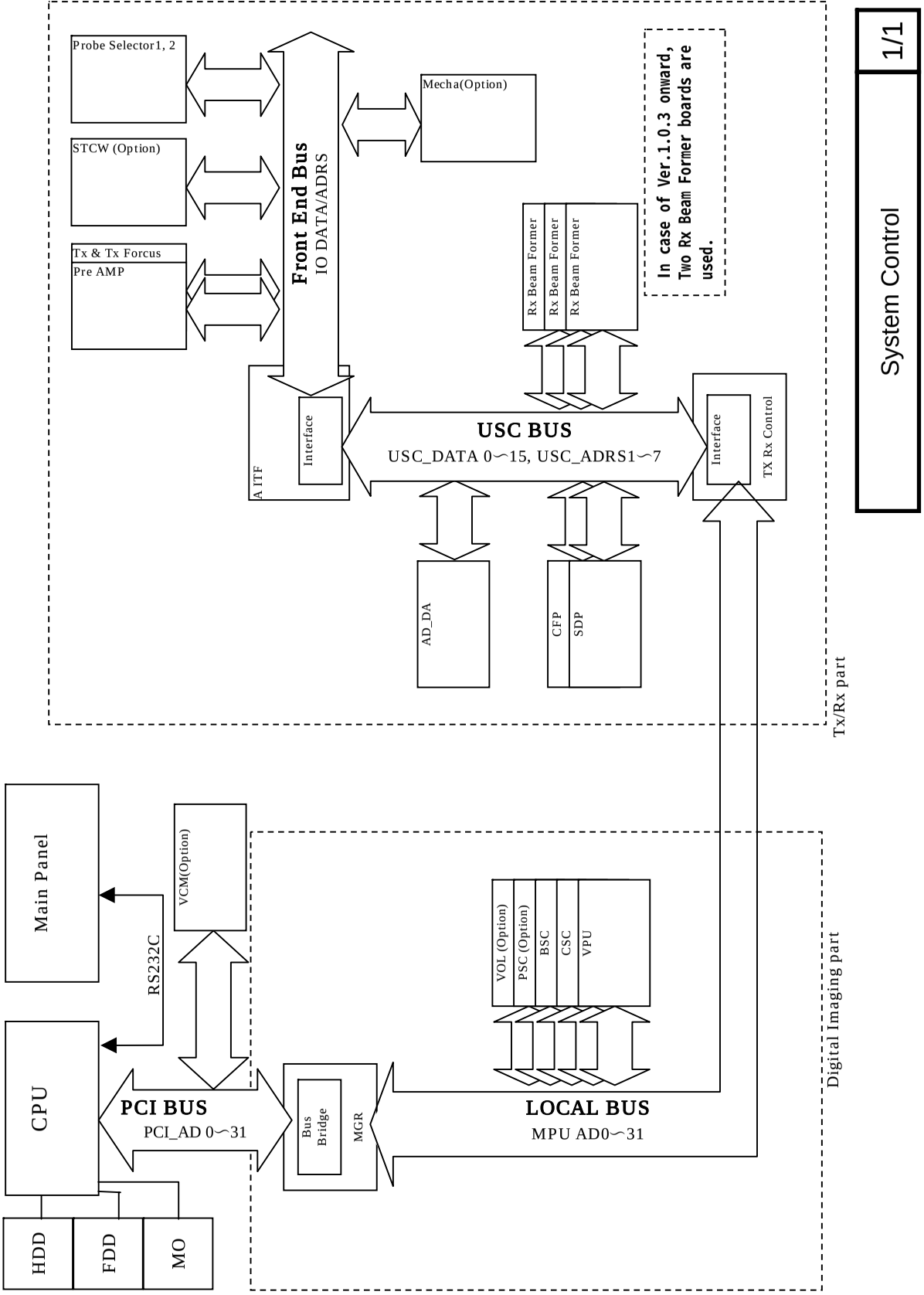
Addition of new probe data by the version up, etc. is done in the following procedure.

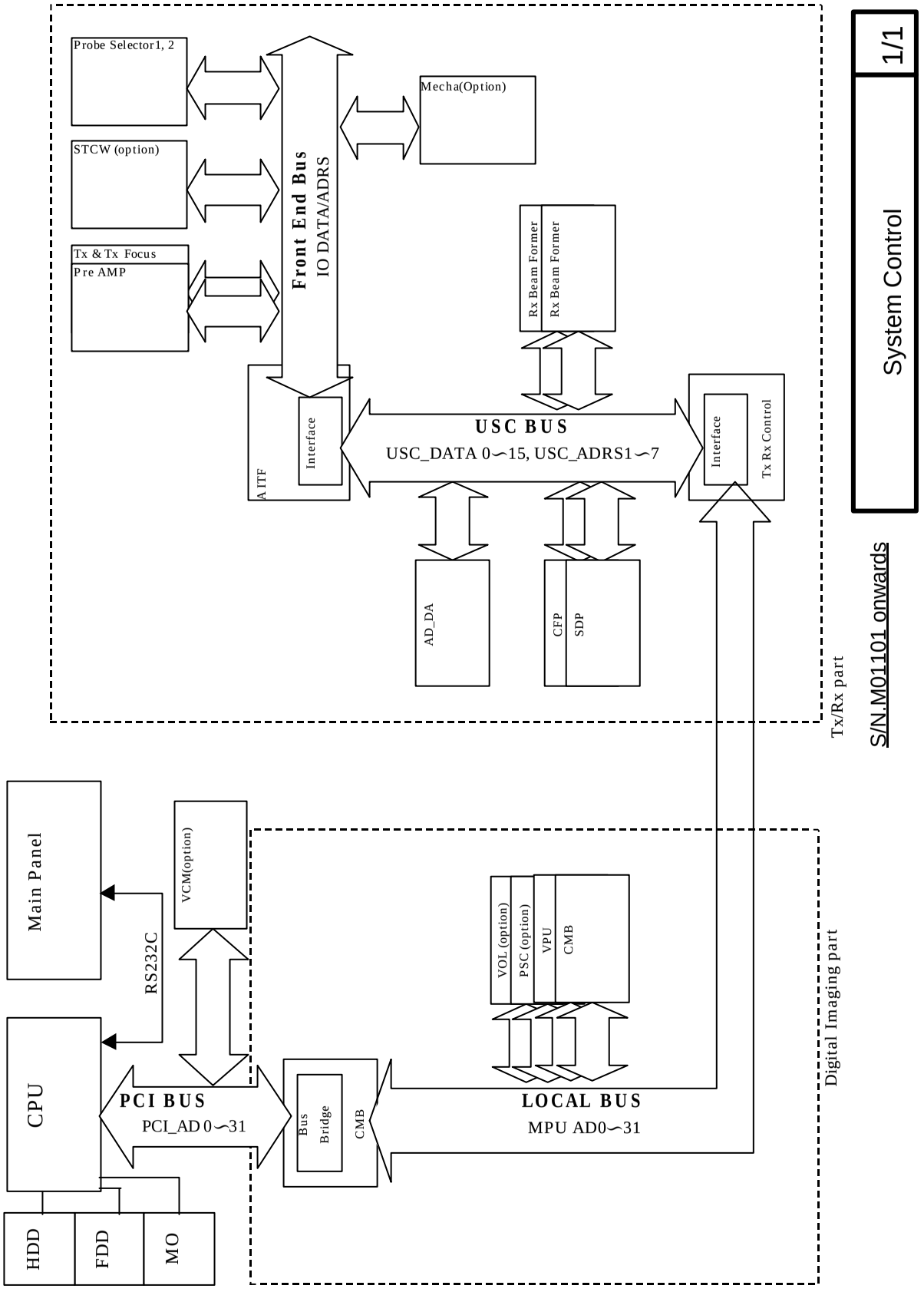
① From the floppy disk, the focus original data and the parameter data are copied into the hard disk.

② When the added new probe is connected first time, the CPU calculates/extracts the Tx/Rx focus data from the focus original data, and store the extracted data into the hard disk again. This calculation/extraction takes several seconds or few minutes. (Few minutes: Only when a mount of focus data is required such as the steered linear probe.)

[Note] In actual version up, you may replace the hard disk which already contains the extracted focus data.

In normal operation, the probe data (Tx/Rx focus data, parameter data) stored in the hard disk is used. The order of data transfer is Hard Disk→CPU→DIU/DBF. If all data for one probe type is transferred, it takes a lot of time. Therefore only necessary data (such as each Magnification and focus data in the specified mode) is transferred. When the setting is changed from the operation panel, the machine quickly responses if the focus data already exists in DBF, and few seconds or ten seconds delay occurs if the focus data does not exist in DBF.


1/1
System Control
Probe Selector1, 2
STCW (Option)
Tx & Tx Forcus
Pre AMP
Front End Bus
IO DATA/ADRS
Mecha(Option)
In case of Ver.1.0.3 onward, Two Rx Beam Former boards are used.
Rx Beam Former
Rx Beam Former
Rx Beam Former
A ITF
Interface
USC BUS
USC_DATA 0~15, USC_ADRS1~7
Interface
TX Rx Control
AD_DA
CFP
SDP
Tx/Rx part
Main Panel
VCM(Option)
RS232C
CPU
PCI BUS
PCI_AD 0~31
Bus Bridge
MGR
VOL (Option)
PSC (Option)
BSC
CSC
VPU
LOCAL BUS
MPU AD0~31
HDD
FDD
MO
Digital Imaging part


1/1
System Control
S/N.M01101 onwards
Tx/Rx part
Probe Selector1, 2
STCW (option)
Tx & Tx Focus
Pre AMP
Front End Bus
IO DATA/ADRS
Mecha(Option)
Rx Beam Former
Rx Beam Former
A ITF
Interface
USC BUS
USC_DATA 0∽15, USC_ADRS1∽7
Interface
Tx Rx Control
AD_DA
CFP
SDP
Main Panel
VCM(option)
RS232C
CPU
PCI BUS
PCI_AD 0∽31
Bus
Bridge
CMB
VOL (option)
PSC (option)
VPU
CMB
LOCAL BUS
MPU AD0∽31
HDD
FDD
MO
Digital Imaging part

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4-4-2 Transmission and Reception block

Tx/Rx part consists of

Tx/Rx module,

Digital Beam Former module, and

Flow/Doppler module.

In addition, the following module/unit are installed in Tx/Rx unit.

STCW Doppler unit UCW-4000* (Option)

Mechanical unit SCU-4000 (Option, Ver. 1.1.1 and higher),

Tissue Harmonic Imaging unit EU-9082 (Option)

Tx Rx module：

Based on the control signals from Analog Interface and the transmission triggers (Delayed Triggers), this module transmits for electronic probes.

The received signals are amplified by PRE AMP1, and sent to Rx Beam Former or UCW-4000.

Connector module：

This module is PCB which mounts the connector to connect a electronic probes (Phased array sector, electronic linear/convex).

◇ The connector for Phased array sector probes and the connector for Linear/Convex probes are used in common, it is not like SSD-2200 system.

The Probe Select 2 PCB mounts HVS (High Voltage Switch) which selects simultaneous TX/Rx elements for Linear/Convex probes. (The control of HVS is done from Analog Interface.)

STCW Doppler unit UCW-4000

The received signal, sent from PRE AMP1, is amplified again by Variable Gain AMP to match the signal level to the input level of A/D at the first stage of DBF(Digital Beam Former).

There are Tx circuit, Rx Quadratural detector, and A/D for STCW in this unit.

Digital Beam Former：

The analog received signal sent from Variable Gain AMP are converted to the digital signal respectively. Then data for each channel is delayed according to Rx focus point, and added together.

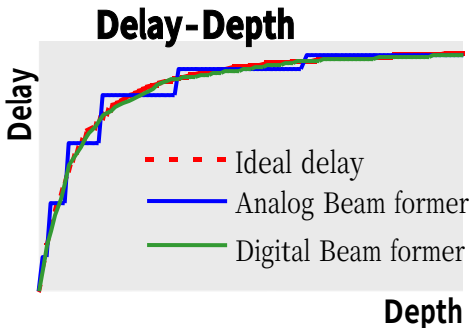
◇The delay is digitally processed, delay the readout from FIFO memory etc., and it is possible to vary high accurate delay continuously. (The continuous change of Rx focus point.)

And the function ,which very the weight of each received signal continuously, makes the Rx beam sharp.

◇The signal in the process is digital data, therefore it allows parallel processing by time sharing and frame rate up.

◇This system does not have the trouble, which is the difference of brightness in every 1cm depth caused by one of the Rx focus boards (Delay and Adder circuit), like SSD-650, 1200, and 2000 etc.

Rx Pixel Focusing
(Rx continuos dynamic focusing)



For B/W US image, delayed and added Rx data passes through Pre process circuit (same as Main Amp part in previous machine), such as the selection of used frequency according to the depth, LOG compression, Detector, AGC, FTC, CONTRAST, etc. (There are two same circuits for B/W Rx parallel processing.)

Then B/W data is sent to DIU (Digital Imaging Unit) in every one line, via USD BUS (Ultrasonic Line Data Bus).

The delayed and added Rx data is also sent to Flow/Doppler module for the frequency analysis of PW Doppler and the Color Flow calculation.

On the other hand, Tx & Rx part has the following circuits.

Tx Trigger generator for the electronic probes.

The generator of Analog control signal used for Rx signal, such as Pre STC signal and STC signal.

Timing / Control signal generator for Tx/Rx unit.

Flow/Doppler module：

Flow/Doppler module executes the frequency analysis for PW Doppler / CW Doppler, and Color Flow calculation.

For PW Doppler, Quadratural detection and FFT frequency analysis are executed for Rx signal delayed and added in Rx Beam Former, then sent to DIU via USD Bus.

For CW Doppler, the frequency analysis is executed for the detected and added signal from UCW-4000, then sent to DIU via USD Bus as same as PW Doppler.

For Color Flow calculation, the Rx signal delayed and added in Rx Beam Former is used, as same as PW Doppler. Quadratural detection is executed. Then several Rx (line) signals are memorized into Memory Block (according to Color Average setting). Data read out from Memory block passes through the filter, which cut off Wall Motion, and Auto-correlation circuit. Auto-correlation, which correlates signal with previous same depth signal, gives velocity information. And auto-correlation between the same signal gives Doppler signal intensity. Using these velocity and intensity information, Velocity, Variance, and Power data are calculated. The calculated data is sent to DIU, via the clutter reject circuit, the spatial filter, and (Color data's) USD Bus.

Mechanical probe unit SCU-4000 (Option)： Ver.1.1.1 and higher

This is an optional unit to connect mechanical radial probes.

Based on Tx timing from Analog Interface board, Tx trigger is generated in accordance with Tx frequency, then Tx circuit on Analog Interface board transmits.

The received signal is amplified by Pre Amp on Mecha Connect board. And the usable frequency is selected, and Log compression is executed. Then the signal is inputted into AD_DA board in DBF, and passes through the same circuit as electronic probe.

On the other hand, Analog Interface board detects the transducer position. Then this board generates Tx timing, and drives the motor.

Phased array sector, or Convex, or Linear Probe

EP4438 EP4439 Probe Selector

Relay

Relay

Relay

HVS

HVS Cont

VOL Control

Mechanical Probe

EP4500 Tx & Tx Focus

EP4441 Tx & Tx Focus 2

HVA

Tx

Tx V Cont

STCW Tx

Tx trig

Trigger generator

EU-9082 THE

STCW UCW-4000

EP4442 STCW

LPF

STCW Rx

A/D

CW DATA I, Q

EP4440 Pre AMP

Pre AMP1

Pre AMP2

EP4437 Rx Connector

PreSTC1

PreSTC2

EP4443 A ITF

Analog Control Signal Generator

STC 1,2

F0 CONT

CPU Bus Window

EP4448 Mecha Connector

PreAmp

VBPF

Log Amp

MECHA LOG OUT

HVB

Tx

Trig. Gen.

Mecha Probe Interface

M Tx Timing

Mechanical Servo

Motor Drive

TD Pos. detect

Tx timing

←M US Start

Mecha Tx Hold→

SCU-4000

Mechanical unit

EP4429 Rx Beam Former

A/D

Delay & Add

Control

EP4429 Rx Beam Former

A/D

Delay & Add

Control

EP4429 Rx Beam Former

A/D

Delay & Add

Control

DBF_DATA 0～15

EP4430 Tx Rx Control

Local Processor (V50)

CPU Bus Window

Timing Generator

HV Cont

TX START, TXCLK
DOP4F0
ADCLK 0～7
UBW, UMMODE
UFLOW, UDOP
UCW, UFBLK
UFOCUS0～2
ECG FRAME 0,1
BEAM NO 0～9
MECH ON/
NEW FRAME/

HV CONT 0～5
HV CONT A_B
to Power supply unit

EP4445 Mother Board

CW DATA I, Q

PCB Lcation

Front

Video I/O

Mother

Probe Connector

Mecha Connector(Option

Mecha(Option)

MECHA LOG OUT

EP4444 AD_DA

VBPF

D/A

LOG AMP

Detect

Pre Process

A/D

Output Logic

STC 1,2

GAIN Cont

Gain(from MPU bus)

D/A

LOG AMP

Detect

Pre Process

A/D

BMD_DATA_0～7

to Digital Imaging Unit

EP4435 CFP

Quad. Det. For Color With BB Filter

Corner Turning Memory

MTI Filter

Correlator For Signal & Clutter

Quad.Det. For Spectrum Doppler With BB Filter

CTM Controller

Coordinate Transformer

Thresholding

Sequence & Det. Proc. Control

Var

Vel/Pwr

Det_Q

Det_I

CFP Timing

Q.D. Control Data

EP4436 SDP

Q.D. Cont.

Audio Interface

DOP Audio (DAC D L, R)

to Digital Imaging Unit

UAT Bus Interface

Time Domain Processor

Frequency Domain & Housekeeping Processor

USD Interface

Vel/Pwr

Var

Spatial Filter

Resample

Line Filter With Anti-alias

USD Interface

Vel or Pwr

to Digital Imaging Unit

Var

UAT & USC Interface

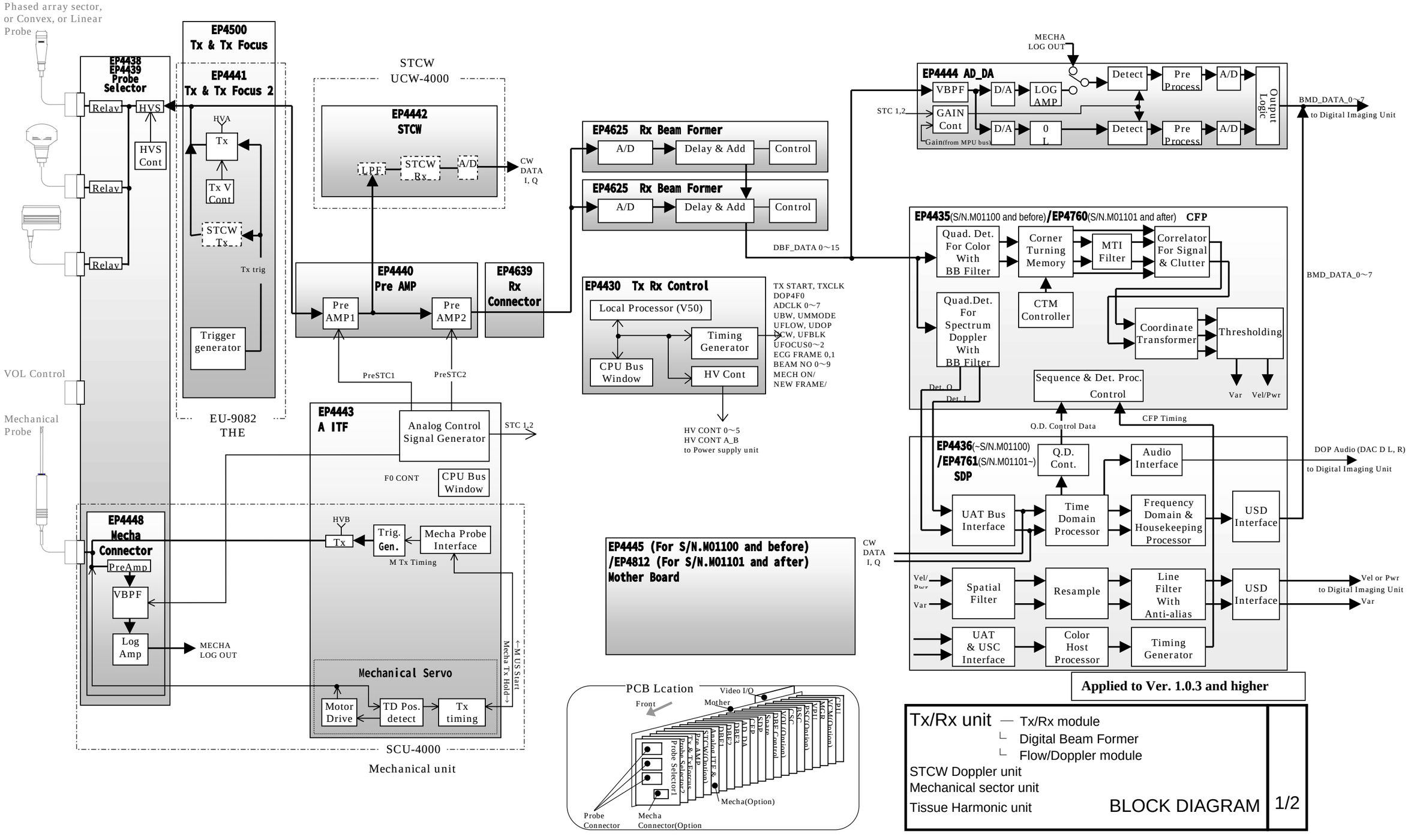
Color Host Processor

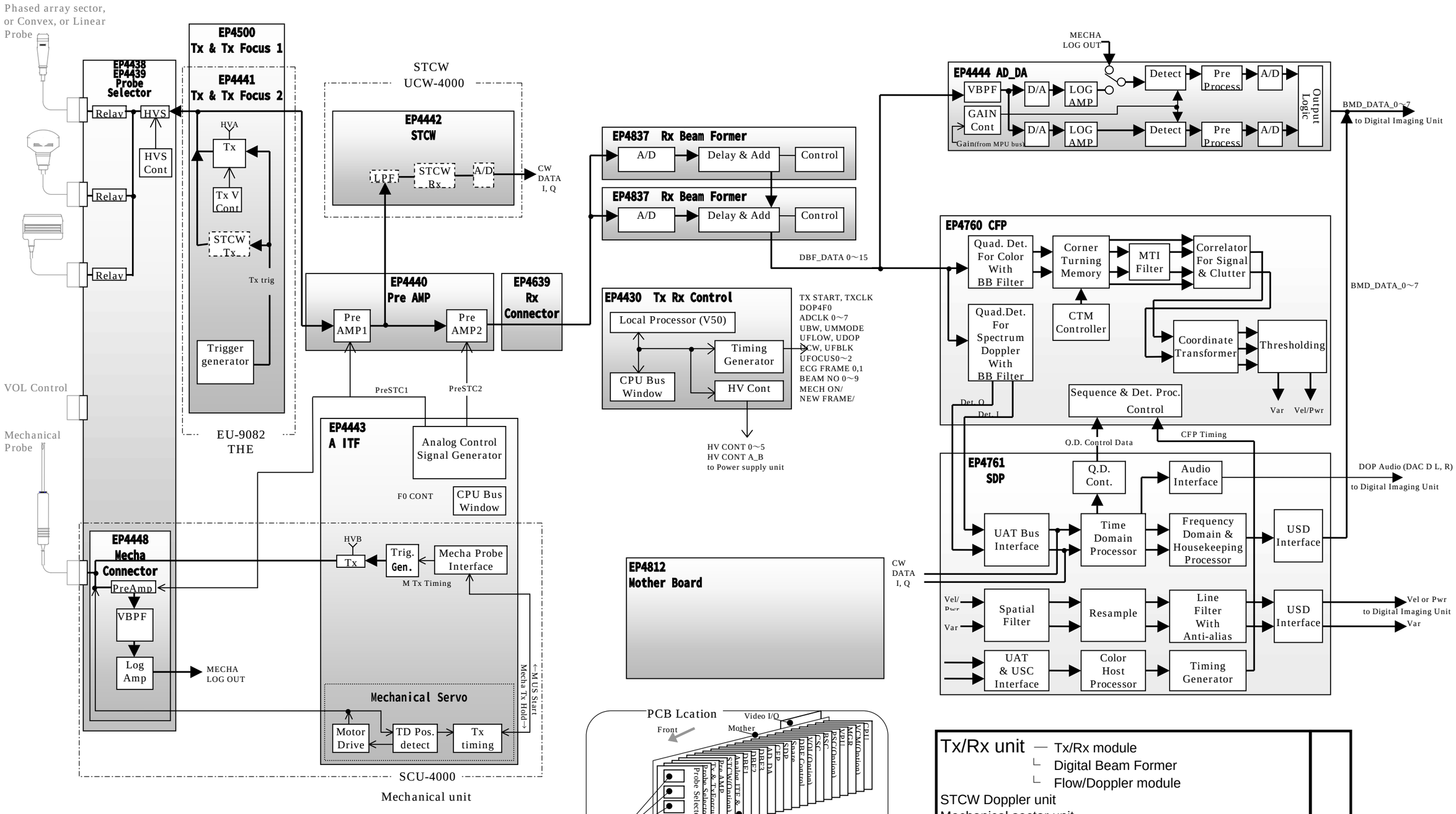
Timing Generator

Applied to Ver. 1.0.2 and lower

Tx/Rx unit — Tx/Rx module
└ Digital Beam Former
└ Flow/Doppler module
STCW Doppler unit
Mechanical sector unit
Tissue Harmonic unit

BLOCK DIAGRAM 1/2


Phased array sector, or Convex, or Linear Probe
EP4438 EP4439 Probe Selector
Relay
HVS
HVS Cont
EP4500 Tx & Tx Focus
EP4441 Tx & Tx Focus 2
HVA
Tx
Tx V Cont
STCW Tx
Tx trig
Trigger generator
EU-9082 THE
STCW UCW-4000
EP4442 STCW
LPF
STCW Rx
A/D
CW DATA I, Q
EP4440 Pre AMP
Pre AMP1
Pre AMP2
EP4639 Rx Connector
PreSTC1
PreSTC2
EP4625 Rx Beam Former
A/D
Delay & Add
Control
DBF_DATA 0～15
EP4430 Tx Rx Control
Local Processor (V50)
CPU Bus Window
Timing Generator
HV Cont
TX START, TXCLK
DOP4F0
ADCLK 0～7
UBW, UMMODE
UFLOW, UDOP
UCW, UFBLK
UFOCUS0～2
ECG FRAME 0,1
BEAM NO 0～9
MECH ON/
NEW FRAME/
HV CONT 0～5
HV CONT A_B
to Power supply unit
MECHA LOG OUT
EP4444 AD_DA
VBPF
D/A
LOG AMP
Detect
Pre Process
A/D
Ouput Logic
BMD_DATA_0～7
to Digital Imaging Unit
STC 1,2
GAIN Cont
Gain(from MPU bus)
0 L
EP4435(S/N.M01100 and before)/EP4760(S/N.M01101 and after) CFP
Quad. Det. For Color With BB Filter
Corner Turning Memory
MTI Filter
Correlator For Signal & Clutter
Quad.Det. For Spectrum Doppler With BB Filter
CTM Controller
Coordinate Transformer
Thresholding
Sequence & Det. Proc. Control
Var
Vel/Pwr
Det_O
Det_I
CFP Timing
Q.D. Control Data
EP4436(~S/N.M01100) /EP4761(S/N.M01101~) SDP
Q.D. Cont.
Audio Interface
DOP Audio (DAC D L, R)
to Digital Imaging Unit
UAT Bus Interface
Time Domain Processor
Frequency Domain & Housekeeping Processor
USD Interface
Vel/Pwr
Var
Spatial Filter
Resample
Line Filter With Anti-alias
Vel or Pwr
to Digital Imaging Unit
Var
UAT & USC Interface
Color Host Processor
Timing Generator
EP4445 (For S/N.M01100 and before)
/EP4812 (For S/N.M01101 and after)
Mother Board
CW DATA I, Q
VOL Control
Mechanical Probe
EP4448 Mecha Connector
PreAmp
VBPF
Log Amp
MECHA LOG OUT
EP4443 A ITF
Analog Control Signal Generator
STC 1,2
F0 CONT
CPU Bus Window
HVB
Tx
Trig. Gen.
Mecha Probe Interface
M Tx Timing
Mechanical Servo
Motor Drive
TD Pos. detect
Tx timing
←M US Start
Mecha Tx Hold→
SCU-4000
Mechanical unit
PCB Lcation
Front
Video I/O
Mother
Probe Connector
Mecha Connector(Option
Mecha(Option)
Applied to Ver. 1.0.3 and higher
Tx/Rx unit
Tx/Rx module
Digital Beam Former
Flow/Doppler module
STCW Doppler unit
Mechanical sector unit
Tissue Harmonic unit
BLOCK DIAGRAM
1/2

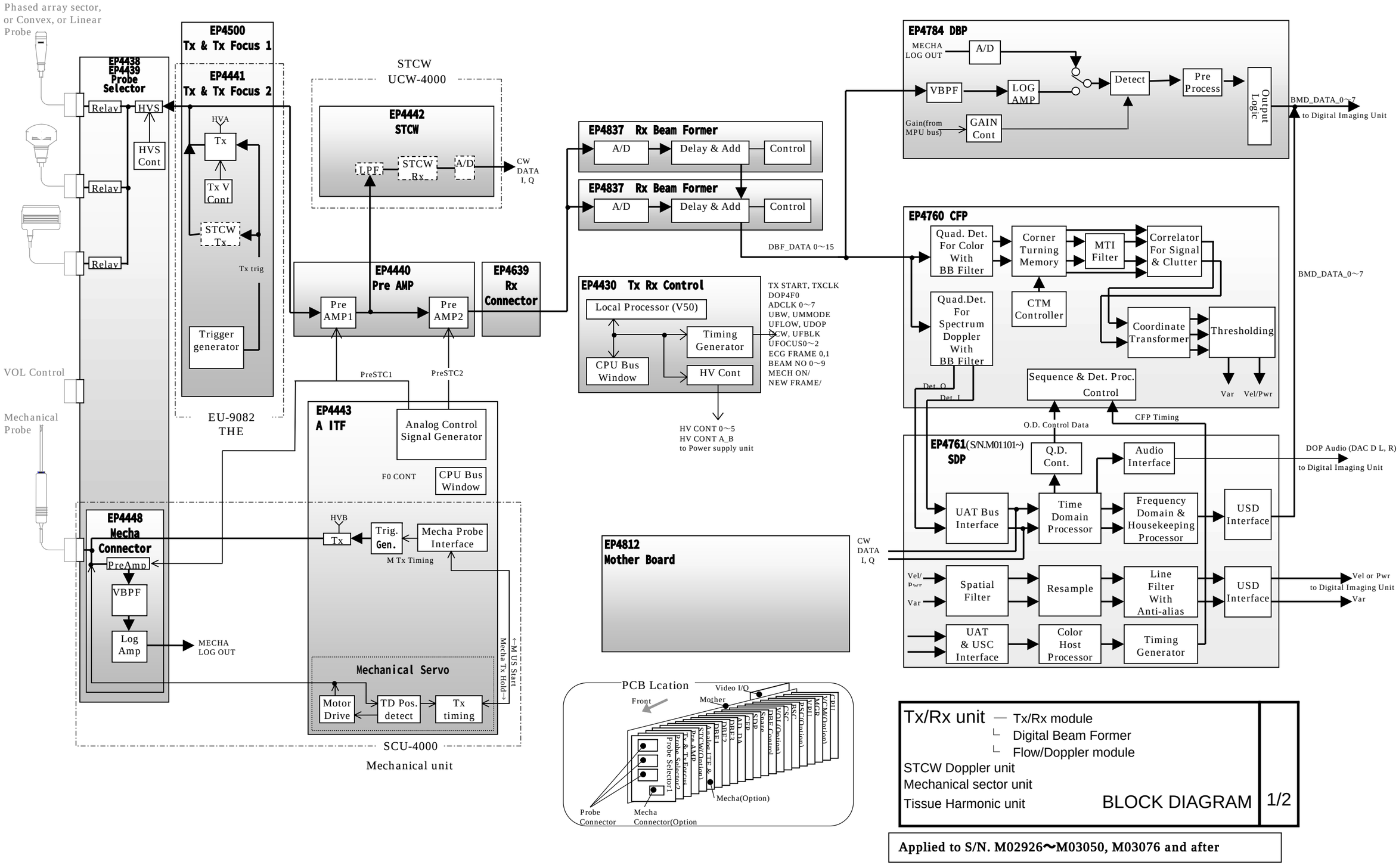


Tx/Rx unit — Tx/Rx module
└ Digital Beam Former
└ Flow/Doppler module
STCW Doppler unit
Mechanical sector unit
Tissue Harmonic unit

BLOCK DIAGRAM

1/2

Applied to S/N. M02347, M02348, M02365, M02400, M02414, M02416, M02430~M02470, M02601~M02750, M02801~M02925, M03051~M03075 of Ver. 2.1.4~3.0.0



Tx/Rx unit — Tx/Rx module
└ Digital Beam Former
└ Flow/Doppler module
STCW Doppler unit
Mechanical sector unit
Tissue Harmonic unit

BLOCK DIAGRAM 1/2

Applied to S/N. M02926～M03050, M03076 and after

4-4-3 Digital Imaging Unit

Digital Imaging Unit consists of the following parts,

- ◇ CPU part which controls whole ultrasound diagnostic equipment
- ◇ Mass Memory part which stores Ultrasonic information
- ◇ Scan converter part which converts Ultrasound information into TV signal
- ◇ Interface circuit with the peripheral equipment

, and have the following features.

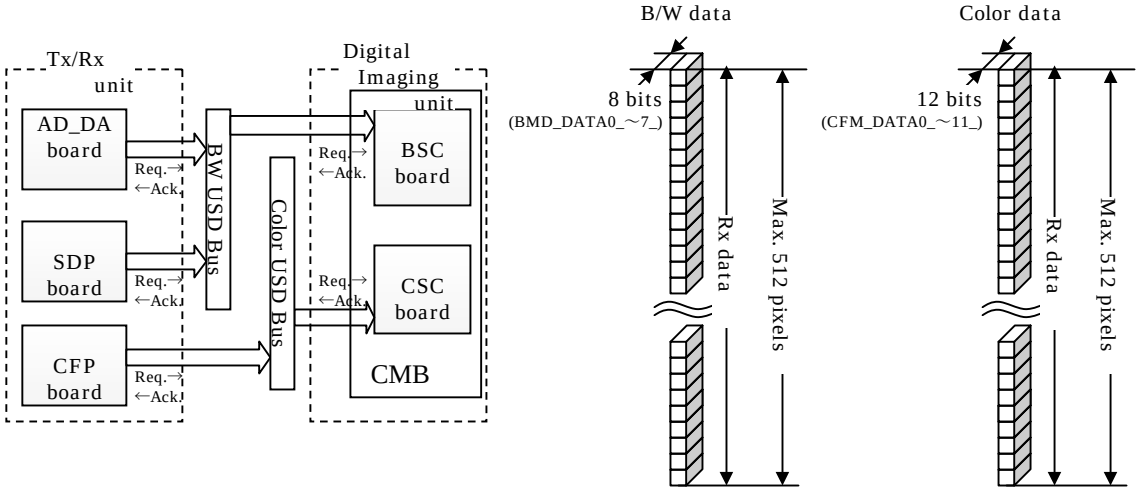
- ◇CPU and Mass memory manager which use Flash Memory for the program ROM. Flash memory is erasable and Re-writable on the board.
- ◇Data input part corresponded to M/D up and down split display.
- ◇Mass Memory part whose capacity is 65536 records and length varies.
- ◇Scan converter part which adopts 2 dimensional interpolation. (The processing speed is increased so that it can be used as VTR memory too.)
- ◇RGB⇔NTSC/PAL CODEC by digital processing.

On the other hand, the following optional board/unit is installed in Digital Imaging Unit.

PSC board of Physio. signal display unit, VCM board of VCM unit and VOL board of Volume mode unit.

USD Bus (Ultrasonic Line Data Bus)

Tx/Rx unit send the Rx data to DIU, every line. This transfer of Rx data uses the defined exclusive bus named USD Bus. USD Bus is prepared for B/W and Color (Velocity/Power, Variance) respectively. Tx/Rx unit outputs Request signal to DIU after completing one Rx line, and receive Acknowledge signal from DIU, then send Rx data to DIU via USD Bus.



Pre Process Part

B/W and Color (Velocity/Power, Variance) data from USD Bus are received by Scan Converter board for Black-and-white mode and Scan Converter board for Color Flow mode, then the following Pre processes are executed.

Pre-process for Plane mode (B mode)

B/W data: Line correlation, Frame correlation,

Velocity/Power data: Frame correlation

Pre-process for Line mode (M mode/Physio signal, DOP mode)

B/W data: Physio signal addition, thinned-out of Line, M Smooth

Velocity, Variance: Delay of M mode, thinned-out of Line, M Smooth

The contents of each process is as follows.

Line correlation：The previous and next US lines are correlated at the same depth of pixel. It makes lateral connection smooth, and reduces noise.

Frame correlation：The previous and next US frames are correlated at the same position of pixel. It makes the image smooth in the time direction, and reduces noise.

Physio signals addition： In B/W Line mode, the Header (the beginning 8 pixels of US line) is used for the storage of physiological signals. Stored physiological signals are read out in the same timing as US data, and converted to TV signal.

Line thin-out： Thins out the line according to the sweep speed.

Finally the header is added and sent to the next Mass Memory part.

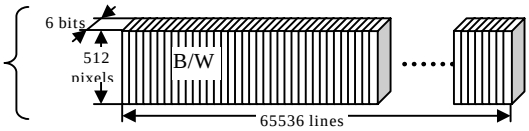
Header: In B/W Line-mode and PEU-4000 installed, 8 pixels used for Physio signals.

Mass Memory part

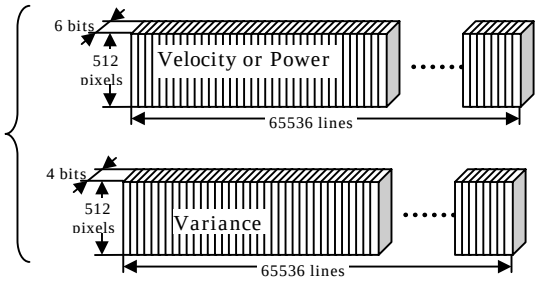
Mass Memory has the capacity of 65536 records (lines) for B/W, Velocity, and Variance respectively. And it is used for real-time display and Cine memory's SEARCH/REVIEW function.

Further, there is the frame interpolation process (Frame Accelerator) for Velocity, which makes color variation in time smooth at real-time display.

Mass Memory for B/W

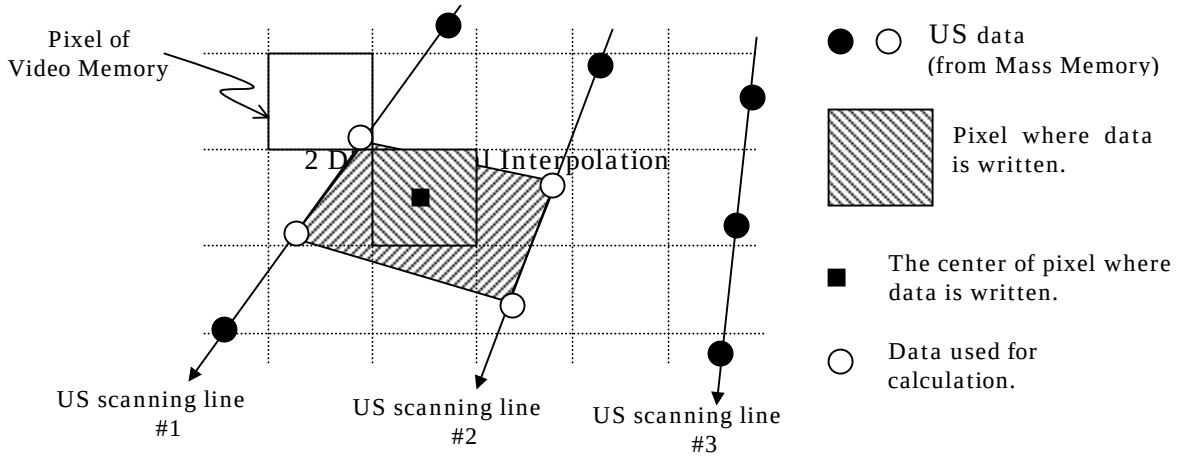


Mass Memory for Color



Scan Converter part

Data from Mass Memory is converted to the display format, by 2 dimensional interpolation, and written into the display memory (Video Memory).



Data from Video Memory is read out in TV scan direction, then sent to Post Process part.

Post Process part (Video Process part)

The signal passes through the addition of Gray scale bar & Color bar, the addition of characters & graphics, the decision of display priority, B/W enhancement, and Color coding from Velocity/Variance to RGB, then outputted to Color TV monitor.

Further, there are Encoder/Decoder circuit for VTR output/input, and the input/output circuit of Ultrasonic data for VCM (Video Cine Memory).

The connectors on DISTRIBUTOR board outputs the signal to external printer and input/output the signal for VTR.

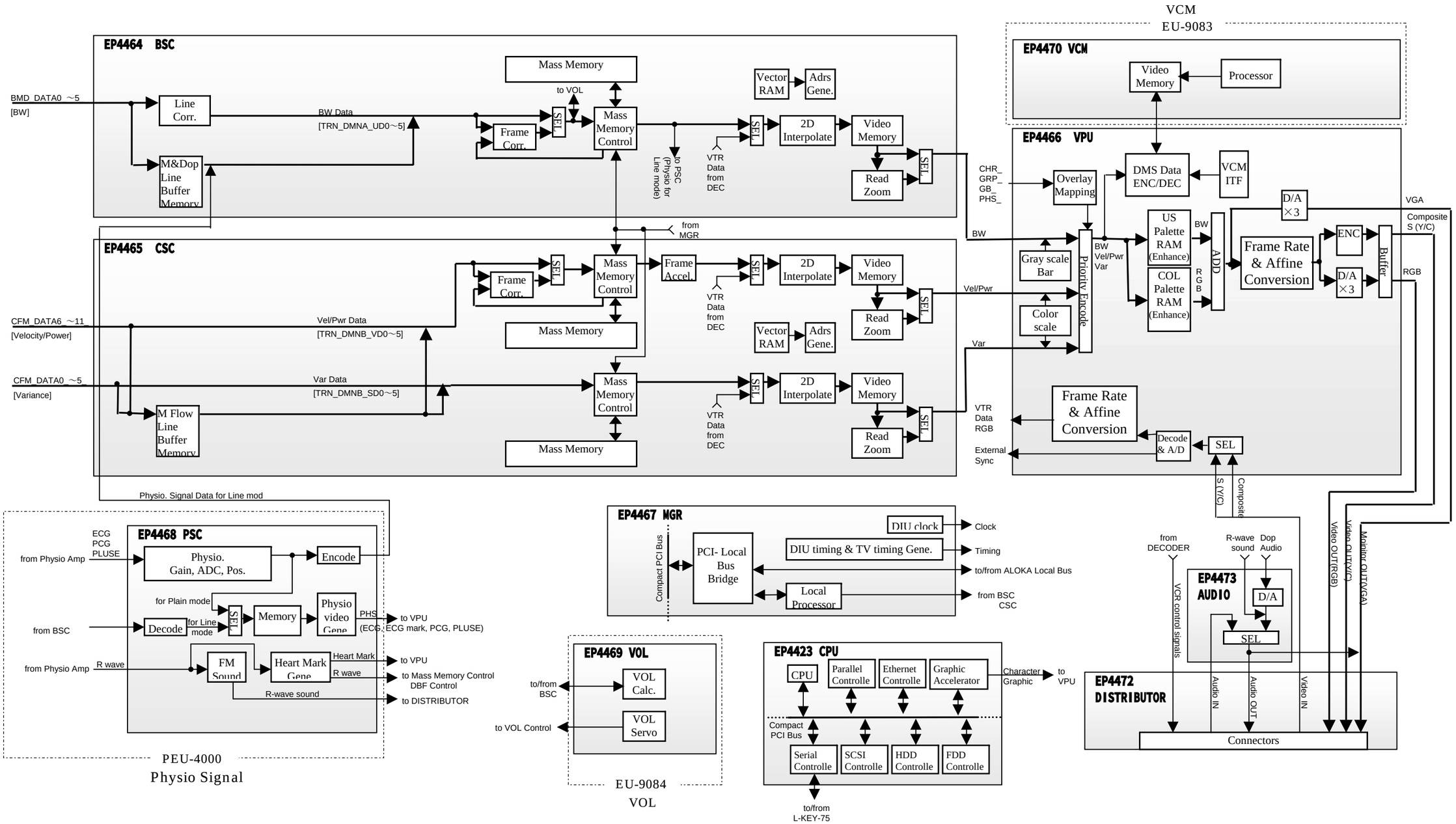
CPU part

This part is CPU which controls whole Ultrasound diagnostic equipment.

This CPU controls DIU, and connected with Tx/Rx unit via USC BUS. On the other hand, the CPU is connected to Panel part by serial communication.

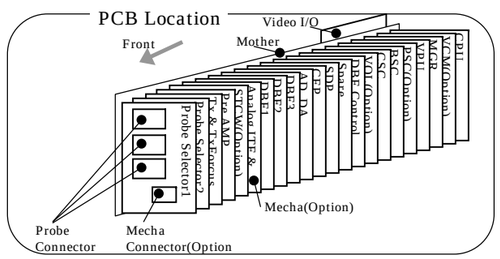
TIMING generator part

The timing in DIU and the TV display timing are generated by Manager (MGR/CMB) board. And Manager/CMB board also generates the Vector data used for 2 dimensional interpolation.



Applied to S/N.M01100 and before

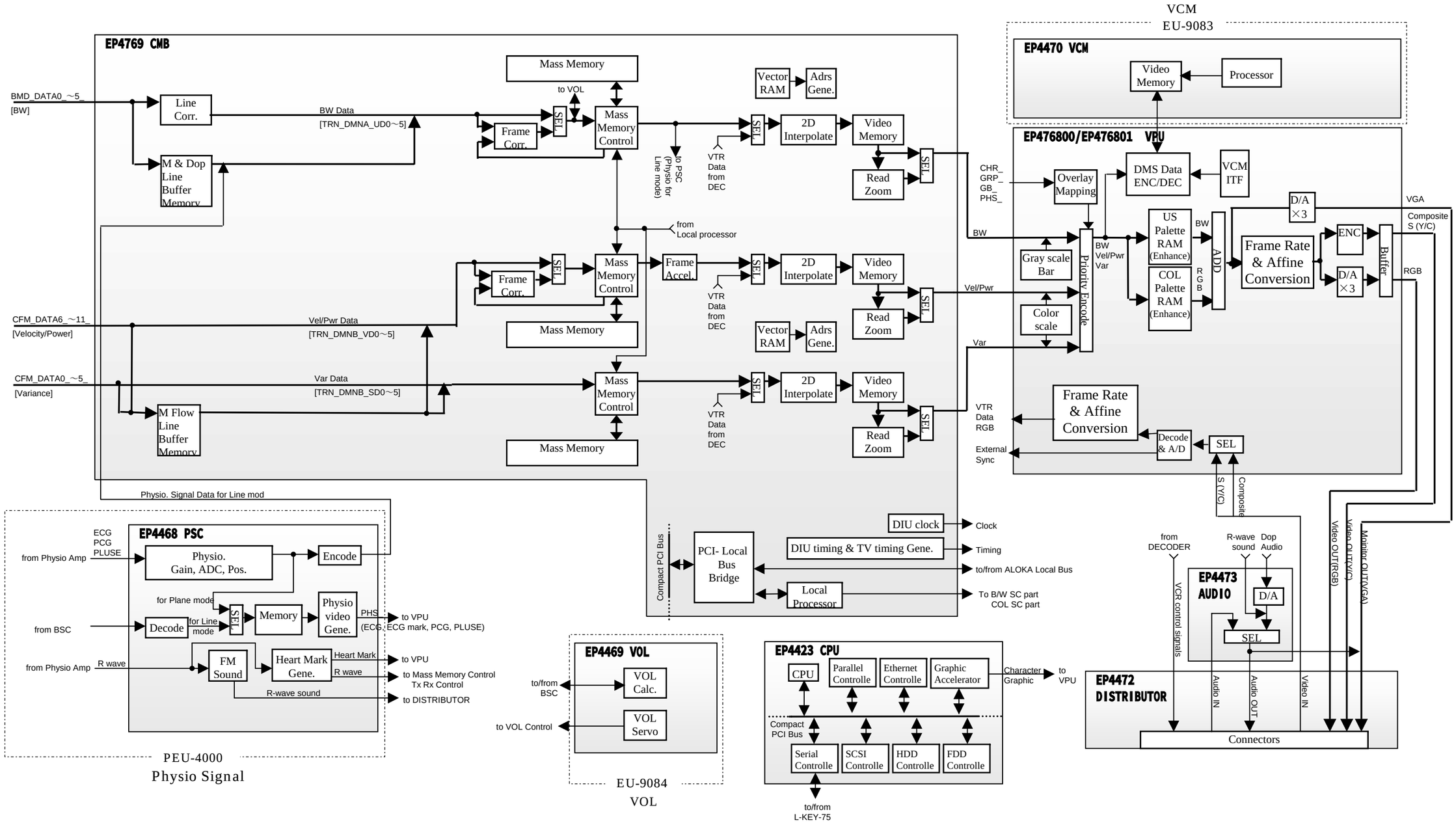
PCB Location

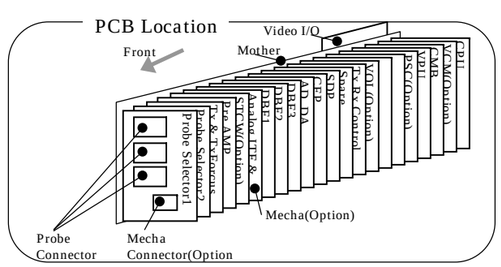


Digital Imaging Unit

Physio Signal unit
Video Cine Memory uint
VOL Mode unit

BLOCK DIAGRAM 2/2





Applied to S/N.M01101onwards

Digital Imaging Unit

Physio Signal unit
Video Cine Memory uint
VOL Mode unit

BLOCK DIAGRAM 2/2

4-4-4 Physio signal display unit PEU-4000 (Option)

Physio signal display unit consists of the following parts.

Amplifier part of Physiological signals (Physio Amp board)

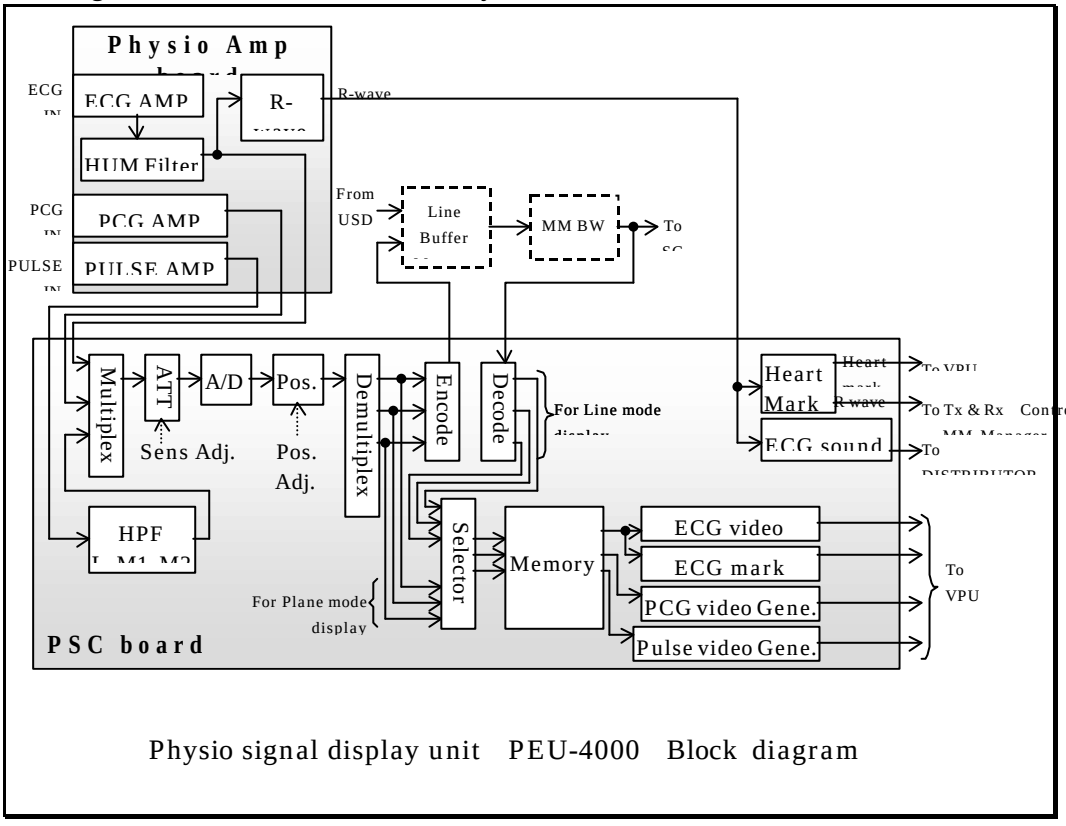
Converter part from Physiological signal to TV signal (PSC board)

The Physiological signal amplifier outputs each signals, ECG / PCG / PULSE, to PSC board in DIU. And the sensitivity and position are adjusted in PSC board.

For Line mode, these Physio signals are delayed to adjust time with Doppler, and stored in Mass Memory as the Header of Line mode Rx line. Physio signals from Mass Memory is inputted into PSC board again, and switched over the signal for Plane mode display.

To display on TV screen, these signals are written in the memory first, then Video Generators for ECG, PCG, and PULSE generate Overlay signals. The Overlay signals are sent to VPU board.

The generation of ECG sound and R-Sync mark etc. are executed in PSC board.

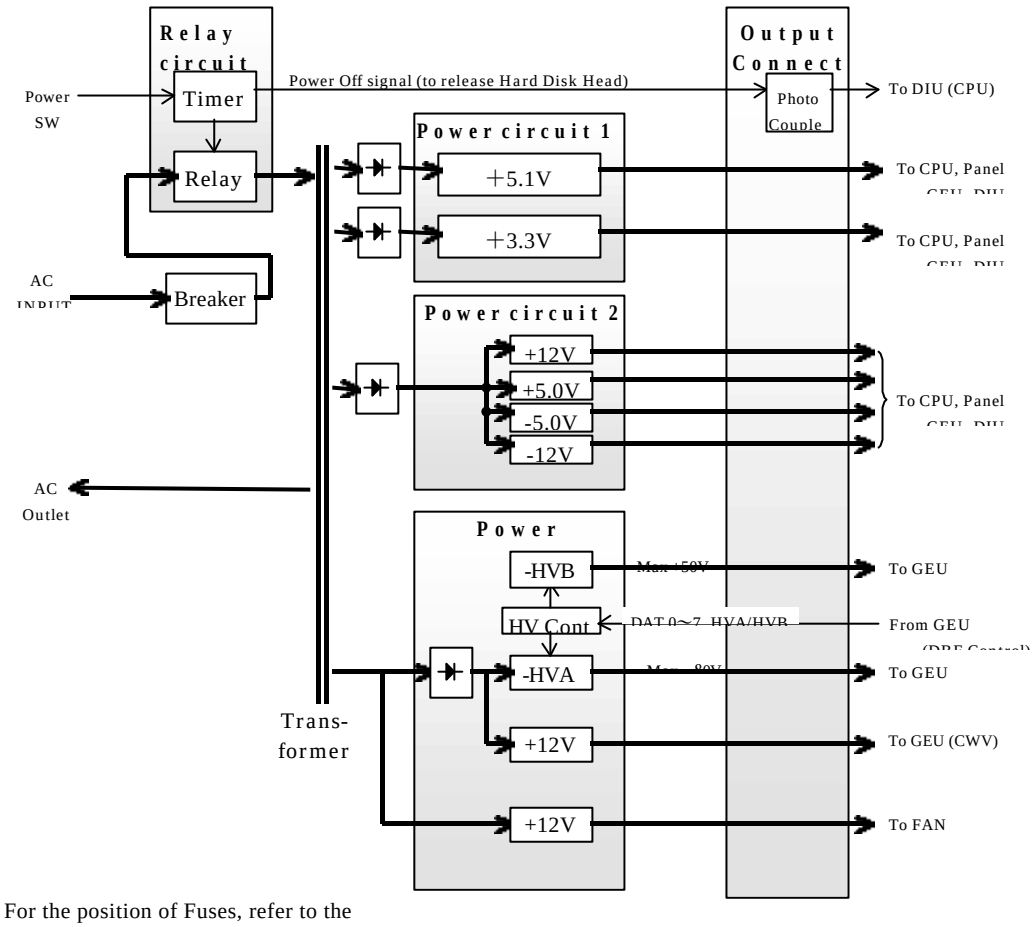


Physio signal display unit PEU-4000 Block diagram

4-4-5 Power supply unit PSU-S4000

The power supply unit comprises a series power supply and switching power supply. It supplies the power required by the main unit. It also has an isolated power for the optional recording device.

The transmission voltage for the electronic scanning probe (HVA), and mechanical scanner probe (HVB) is controlled by the control signals (DAT 0~5, HVA/HVB) from the main unit.



For the position of Fuses, refer to the SECTION 5 SCHEMATICS.

Power Supply unit PSU-S4000 Block diagram

4-5 Principle of PCB operation

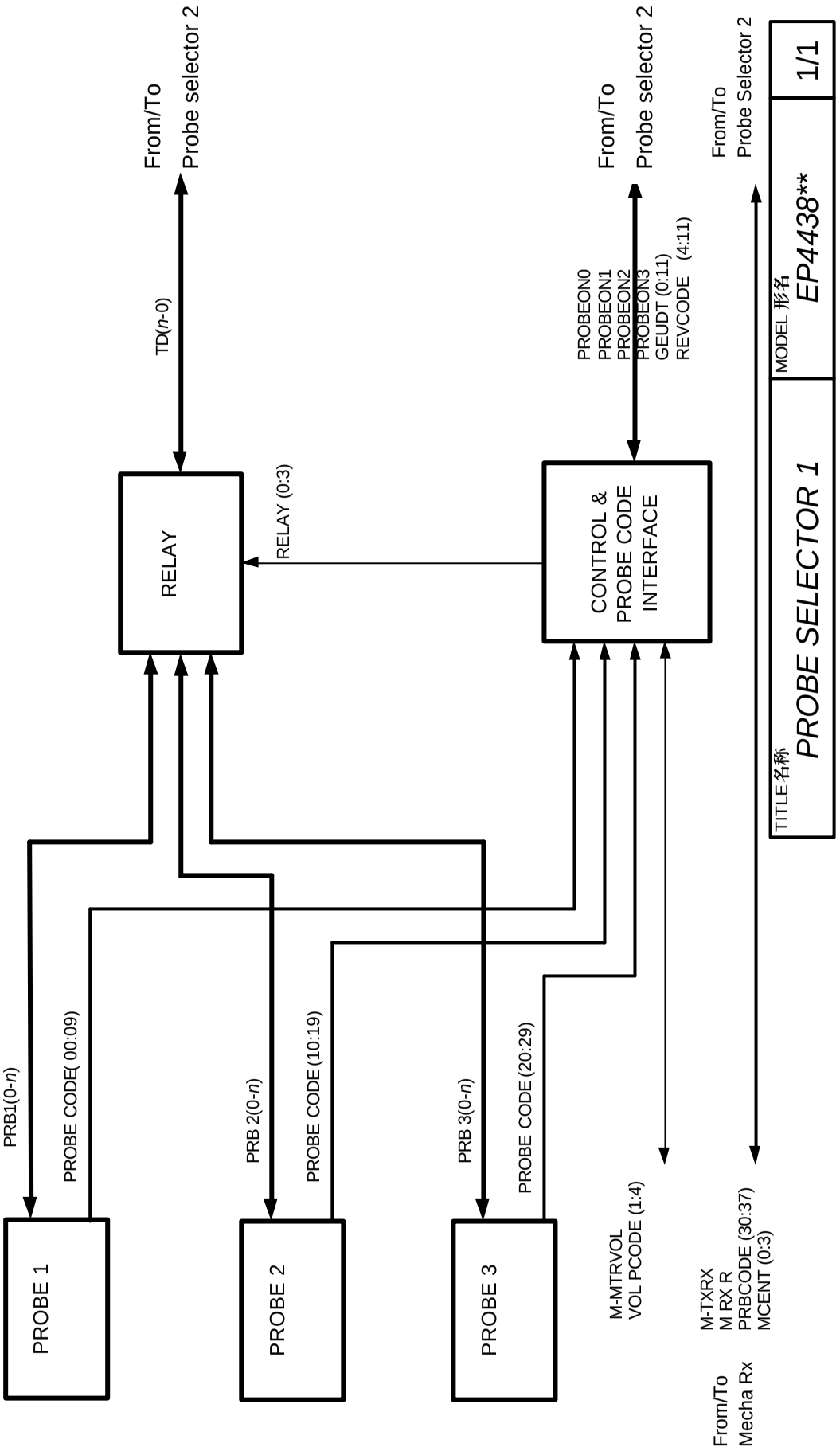
PCB Reference Table in Section 4

No.	Title	Model (1)	Model (2)	Model (3)
1	Probe selector 1	EP4438**		
2	Probe selector 2	EP4439**		
3	Tx & Tx Focus	EP4500**		
4	Pre AMP & Variable Gain AMP	EP4440**		
5	Rx Beam Former	EP4429**	EP4625**	EP4837**
6	TxRx Control	EP4430**		
7	Analog Interface	EP4443**		
8	AD_DA	EP4444**		
9	CFP	EP4435**	EP4760**	
10	SDP	EP4436**	EP4761**	
11	STCW	EP4442**	EP4902**	
12	BSC (B/W DSC)	EP4464**		
13	CSC (Color DSC)	EP4465**		
14	VPU (Video Process)	EP4466**	EP4768**	
15	MGR (Manager)	EP4467**		
16	CPU	EP4423**		
17	Audio	EP4473**		
18	PSC (Physio. SC)	EP4468**		
19	Physio. AMP	EP4578**		
20	VOL / Servo Control	EP4469**		
21	Mecha. Connector	EP4448**		
22	VCM (Video Cine Memory)	EP4470**		
23	TX & TX FOCUS 2	EP4441**		
24	CMB	EP4768**		
25	DBP	EP4784**		

4-5-1 Probe selector 1

This board is configured from three probe connectors for electronic probes, Relay and Probe Code Interface.

1) Probe Connector：
   These are connectors for connecting probes.
2) Relay:
   This consists of 128 relays and which switch the one from PROBE 1, PROBE 2 and PROBE 3.
3) Probe Code Interface
   Controls the relay data for probe selector, and outputs the probe code data.

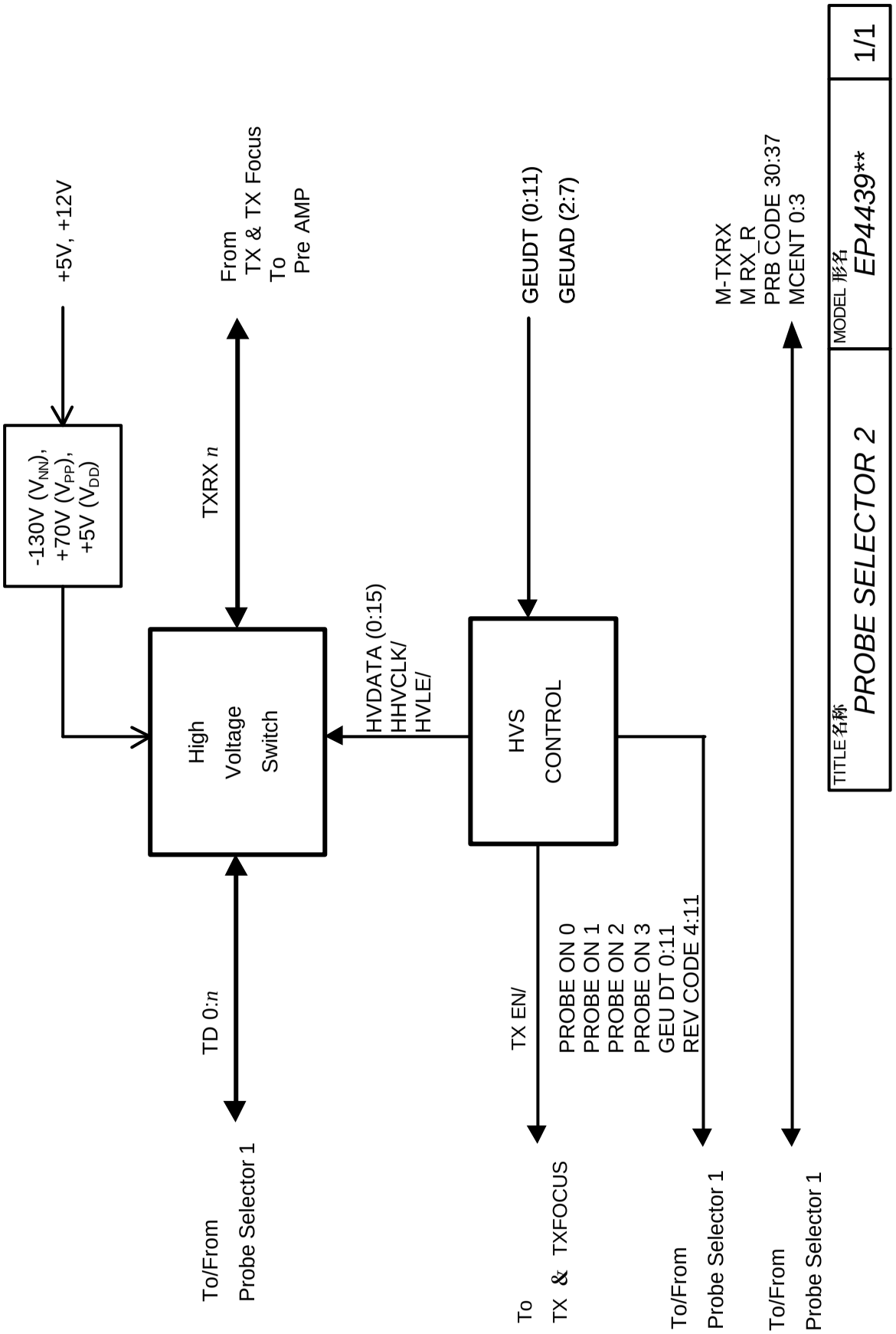

From/To
Probe selector 2
TD(n-0)
RELAY
RELAY (0:3)
CONTROL &
PROBE CODE
INTERFACE
PROBEON0
PROBEON1
PROBEON2
PROBEON3
GEUDT (0:11)
REVCODE (4:11)
From/To
Probe selector 2
From/To
Probe Selector 2
MODEL 形名
EP4438**
1/1
TITLE 名称
PROBE SELECTOR 1
PRB1(0-n)
PROBE CODE(00:09)
PRB 2(0-n)
PROBE CODE (10:19)
PRB 3(0-n)
PROBE CODE (20:29)
PROBE 1
PROBE 2
PROBE 3
M-MTRVOL
VOL PCODE (1:4)
M-TXRX
M RX R
PRBCODE (30:37)
MCENT (0:3)
From/To
Mecha Rx

4-5-2 Probe Selector 2

This board consists of High Voltage Switch（HVS）and its control circuits.

1) HVS (High voltage resistant analog switch):
   This consists of 16 HVS, and transducers up to 128 channels are selected and connected to the Tx/Rx system.

2) High Voltage Switch Control
   This consists of ROM（Read Only Memory）and logic circuits, and it controls HVS.


+5V, +12V
-130V (V_{NN}), +70V (V_{PP}), +5V (V_{DD})
From TX & TX Focus To Pre AMP
TXRX n
GEUDT (0:11)
GEUAD (2:7)
M-TXRX
M RX_R
PRB CODE 30:37
MCENT 0:3
High Voltage Switch
HVDATA (0:15)
HHVCLK/
HVLE/
HVS CONTROL
TD 0:n
To/From Probe Selector 1
TX EN/
PROBE ON 0
PROBE ON 1
PROBE ON 2
PROBE ON 3
GEU DT 0:11
REV CODE 4:11
To TX & TXFOCUS
To/From Probe Selector 1
To/From Probe Selector 1
TITLE 名称
PROBE SELECTOR 2
MODEL 形名
EP4439**
1/1

4-5-3 Tx & Tx Focus

This circuit board performs setting of the amount of delay in each channel for electronic focusing of transmission, and outputs a transmission trigger signal at the TTL level (to the transmission drive circuit). The output transmission trigger is used in the B (M) mode, PW Doppler mode, Flow mode and STCW mode.

1) TX_CNT (Tx Control, FPGA)
   This latches transmission conditions set externally and generates Focus calculator, Delay data and Gate Array control signals.

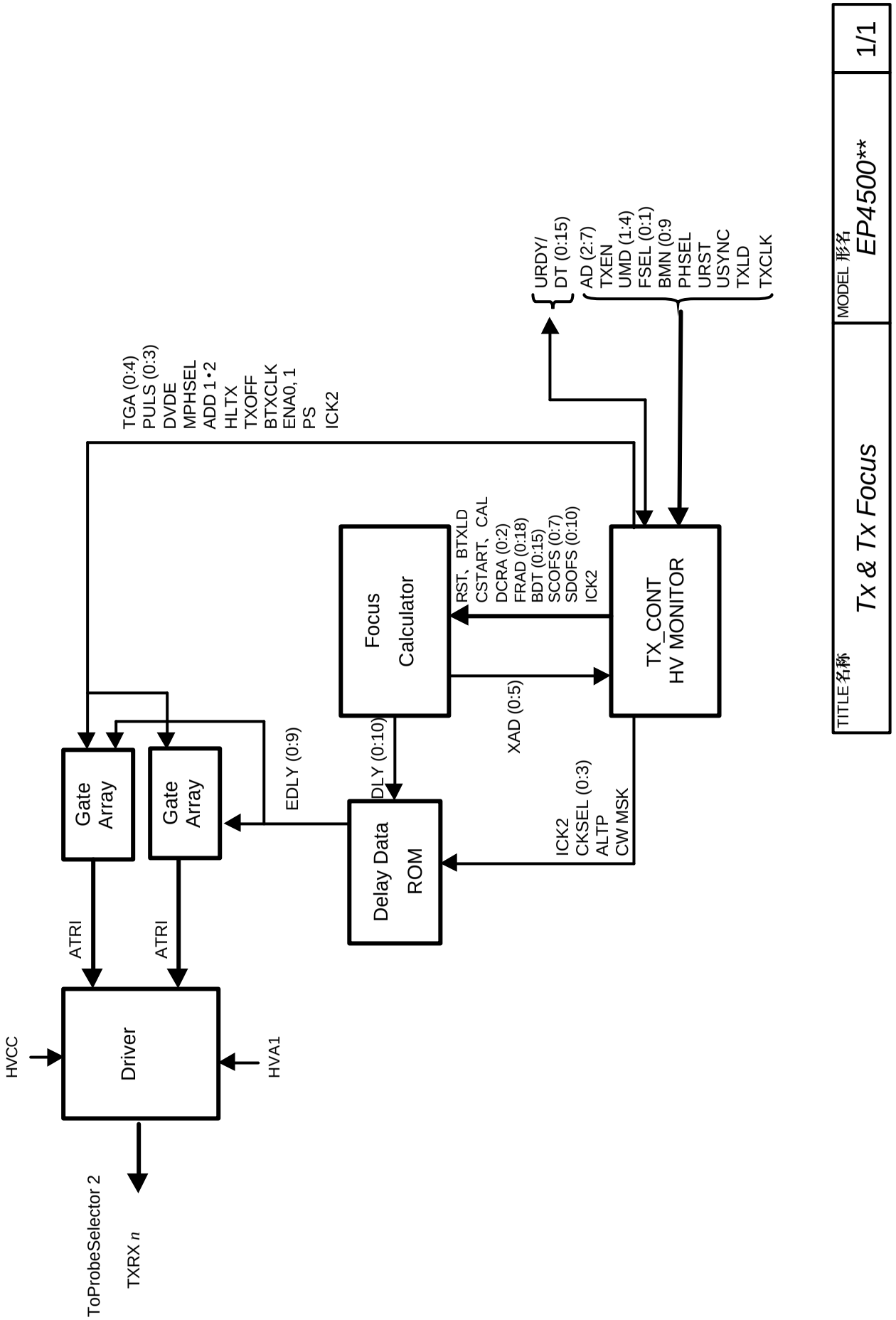
2) FocusCalculator
   Outputs delay amount data to perform transmission focusing.

3) Delay Data ROM
   Outputs delay data based on delay amount data sent from Focus Calculator.

4) Gate Array
   Generates a transmission trigger for each channel based on the delay data (amount of delay) set for each channel from ROM and wave count data (number of transmission wave pulses).

5) Driver
   This is the output driver for the transmission trigger signal.

6) HV Monitor
   Converts high voltage to digital, then outputs it as register data.


TITLE 名称
Tx & Tx Focus
MODEL 形名
EP4500**
1/1
TGA (0:4)
PULS (0:3)
DVDE
MPHSEL
ADD 1・2
HLTX
TXOFF
BTXCLK
ENA0, 1
PS
ICK2
URDY/
DT (0:15)
AD (2:7)
TXEN
UMD (1:4)
FSEL (0:1)
BMN (0:9
PHSEL
URST
USYNC
TXLD
TXCLK
Focus
Calculator
RST、BTXLD
CSTART、CAL
DCRA (0:2)
FRAD (0:18)
BDT (0:15)
SCOFS (0:7)
SDOFS (0:10)
ICK2
TX_CONT
HV MONITOR
XAD (0:5)
Gate
Array
Gate
Array
EDLY (0:9)
DLY (0:10)
Delay Data
ROM
ICK2
CKSEL (0:3)
ALTP
CW MSK
ATRI
ATRI
HVCC
Driver
HVA1
ToProbeSelector 2
TXRX n

4-5-4 PreAMP & VariableGainAMP

This board is the initial stage Pre Amp 1 and Pre AMP2 (Variable Gain AMP) for the electronic probes.

1) PreAMP 1

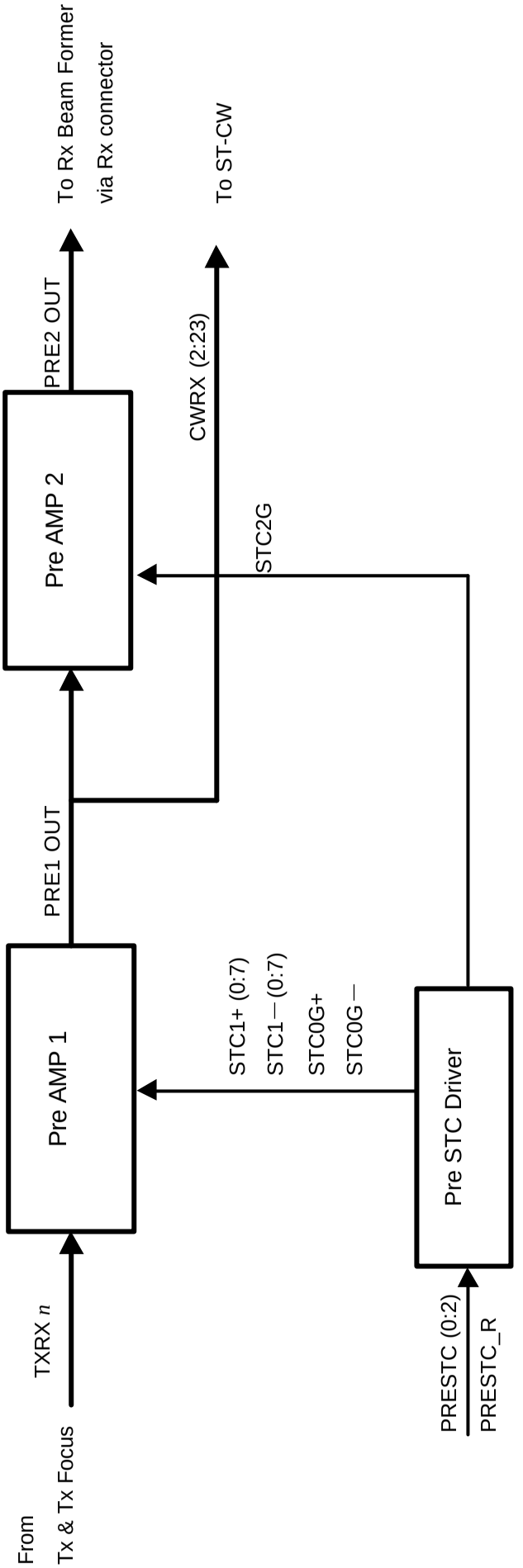
This initial stage Pre Amp has the capability of varying the gain. The maximum gain of each Pre Amp is +37 dB.

2) Pre AMP 2

This amp further amplifies the PreAmp1 signal and sends it to the beam former board. The gain is a maximum of 30 dB.

3) PreSTCDriver

Generates + or - voltage which is symmetrical to the PreSTC1 voltage and controls the Pre Amp's gain. One drive circuit drives 6 Pre Amp circuits.



TITLE 名称	*Pre AMP & Variable Gain AMP*
MODEL 形名	*EP4440***
	1/1

4-5-5 Rx Beam Former

By providing this board with multiple cascade connections, it is possible to configure a digital beam former (for various numbers of channels) compatible with various types of probe. Also, by time dividing one transmission beam and giving it different delays, beams in multiple directions can be received simultaneously.

This board is configured from a delay & adder and the DMA controller which controls it, as well as focus data memory which can store DBF focus data for 1 probe.

Each channel of echo data is added to step by step through a pipeline adder with a daisy chain configuration, then sent to the next board.

Block 0～m

A.A Filter:

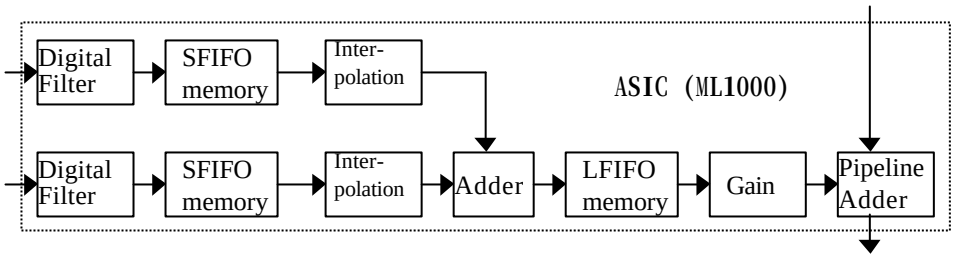
This is a filter for removing aliasing from A/D sampling.

A/D:

This is a 12-bit A/D converter. The sampling clock varies according to the transmission center frequency. (When the transmission center frequency is 2.1~3.75 MHz, sampling is done at 8f0 and when the transmission center frequency is 5.0~10 MHz, sampling is done at 4f0.)

Delay & Adder :

This has been made into an ASIC and is configured internally as shown in the following diagram. Continuous variation of the receiving focus can be performed with this Rx Beam Former.



Digital Filter:

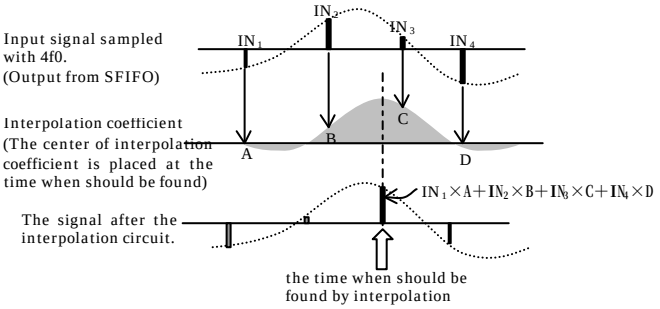
This filter is configured from a low pass filter (at 8f0, it performs band limitation for oversampled data and drops the data rate to 4f0) and a band pass filter (cuts the DC component).

SFIFO (Short FIFO Memory):

This FIFO memory is for delay correction processing for 1 channel in the depth direction. Through delays in reading, delays of n times the sampling clock occur. In reading, 4 continuous data are output simultaneously by the shift register for the subsequent interpolation circuit.

Interpolation:

Using 4 neighboring data read from SFIFO memory, data which match the amount of delay is calculated by the interpolation. Through this interpolation, the phase can be made to deviate at a resolution of 1/32 of the sample.



Adder:

Interpolated data are added to the neighboring channel and sent to LFIFO.

LFIFO (Long FIFO Memory):

This is FIFO memory for performing large delay-time compensation processing between channels.

Gain:

This is time variable gain processing for reception apodization. The gain is changed linearly from the initial value to the final apodization. (Through reception apodization, the receiving beam can be more contracted and lateral resolution is improved.)

Pipeline Adder:

This is an adder circuit, which adds the data in succeeding channels by adding to the neighbor channel and sending the result to the next channel.

Control circuit:

In performing delay & adding through the DBF, an extremely large number of focus data are required. These focus data can be divided into static focus data (data which change in the probe or scanning mode) and dynamic focus data (data which it is necessary to set in each beam). Static focus data are set directly in the hardware register by the host before freeze is released.

As for dynamic focus data, while the previous beam is being received, the data which are used to configure the next beam are transferred, by DMA, from Focus Data Memory to ASIC in each beam (according to Beam Timing signals).

DMA BUS:

This is a 16-bit bi-directional internal bus used in DMA transfer when setting focus data in the DBF.

Bus Interface:

This is an interface between the DMA Bus and the MPU Bus (USC Bus).

Board ID:

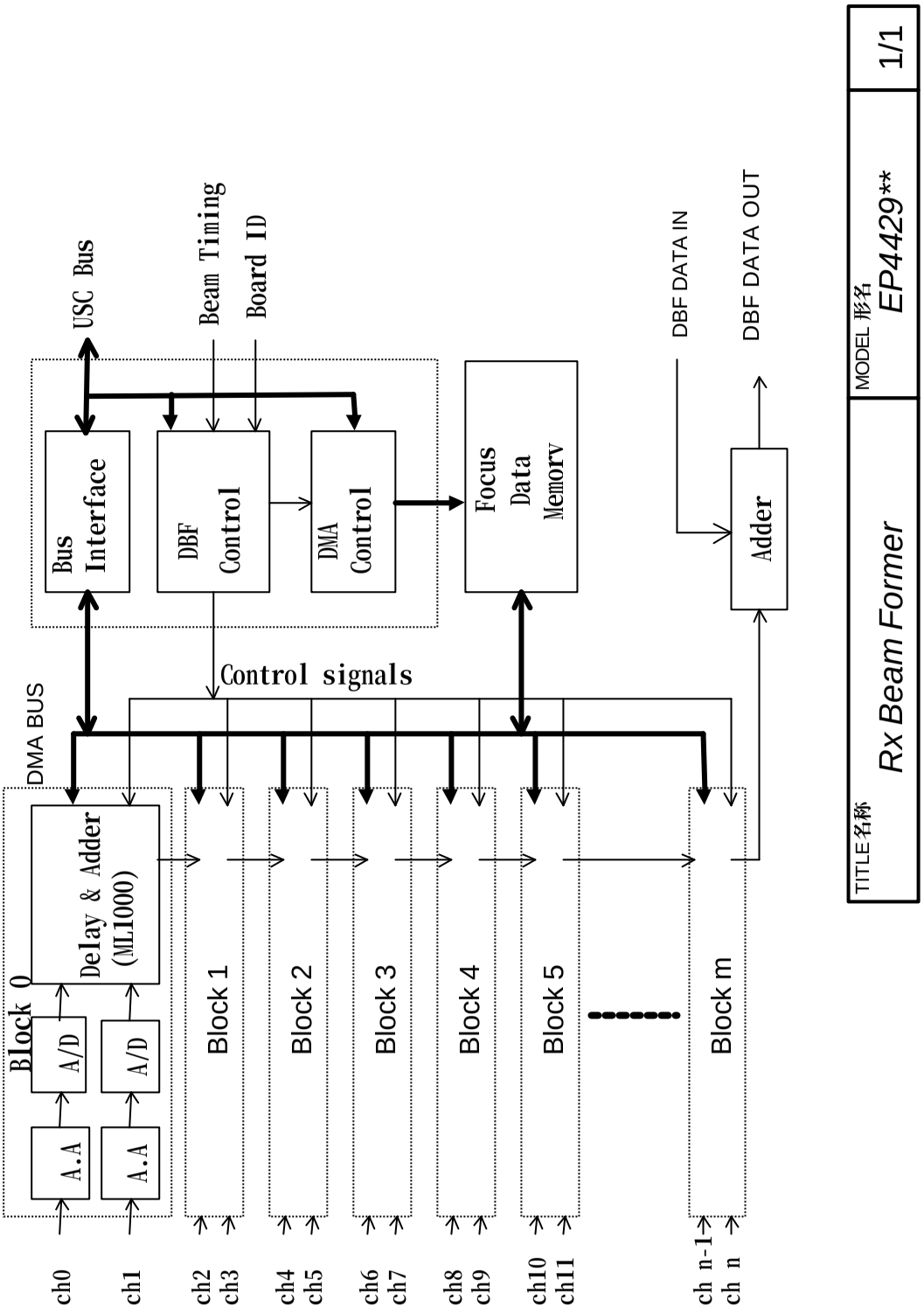
The board number (Board ID) is prepared in each slot on the Mother board, and each board find its process channels.

DMA Control:

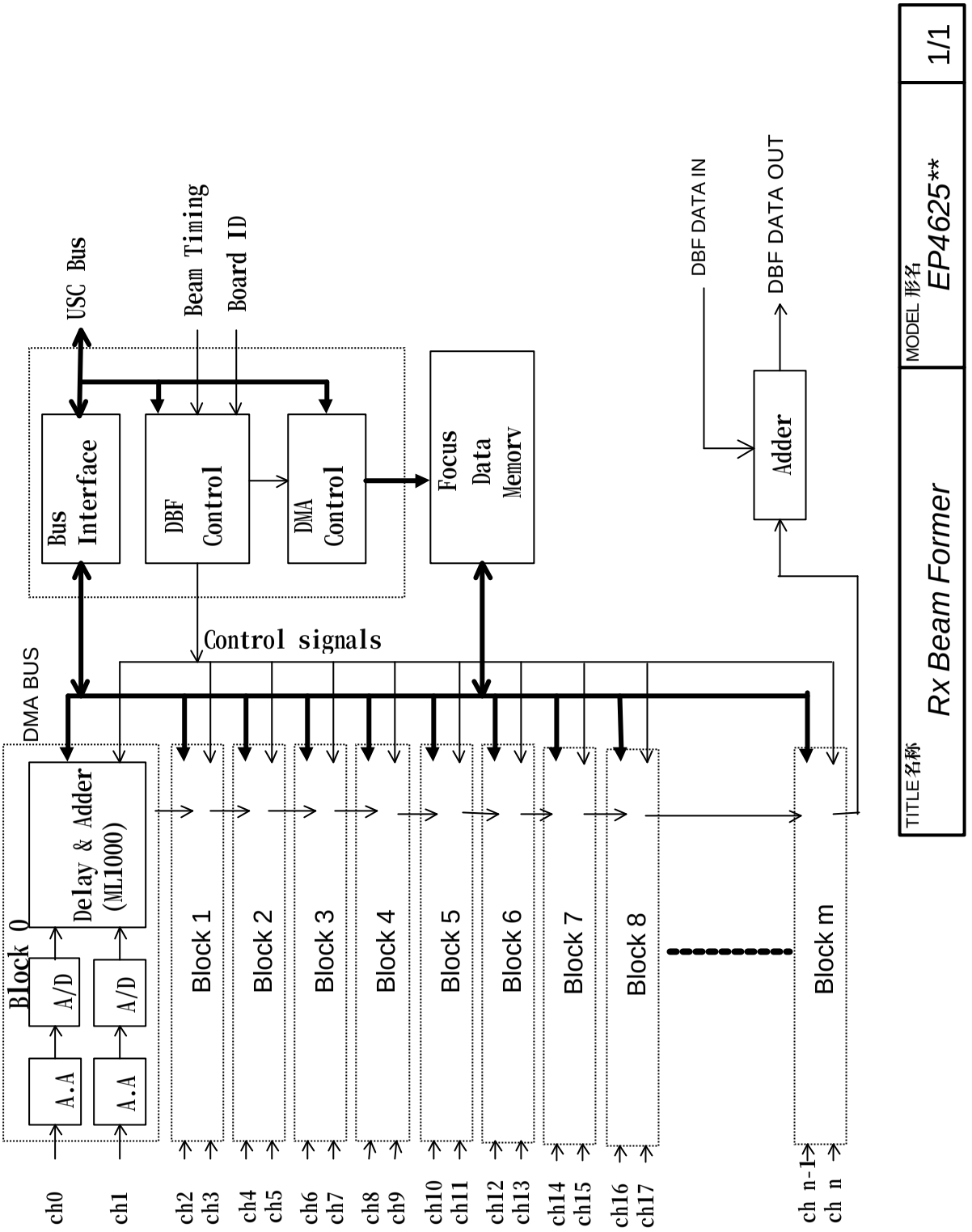
This transfers focus data which are set in each delay & adder by DMA transfer in beam units from focus data memory. Control is carried out by the DMA controller through commands from the host and timing signals.

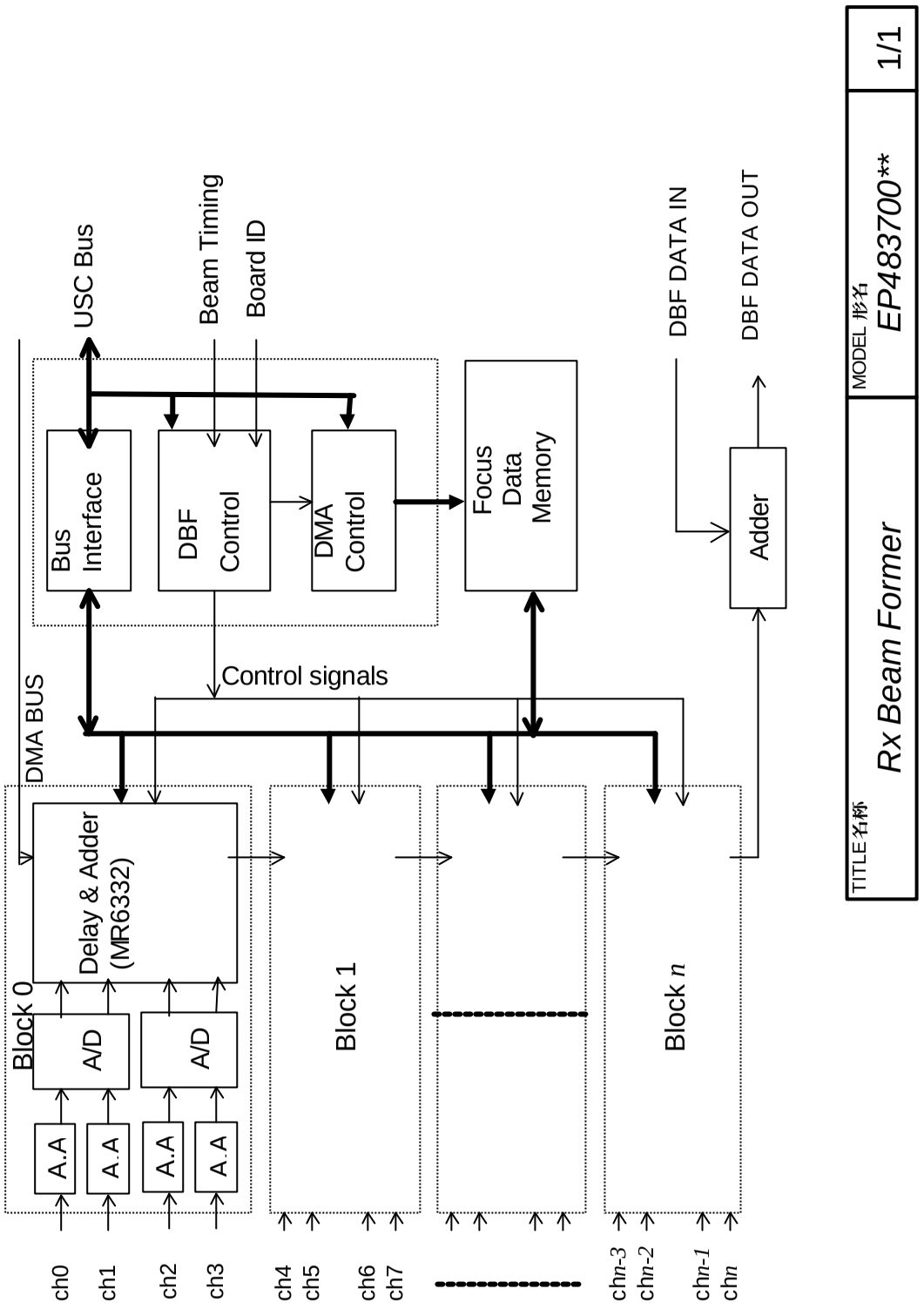
Focus Data Memory:

Focus Data Memory stores the dynamic focus data, which is set for the channel in beam unit, for three probe types.


USC Bus
Beam Timing
Board ID
DBF DATA IN
DBF DATA OUT
Bus Interface
DBF Control
DMA Control
Focus Data Memory
Adder
Control signals
DMA BUS
Block 0
Delay & Adder (ML1000)
A/D
A/D
A.A
A.A
Block 1
Block 2
Block 3
Block 4
Block 5
Block m
ch0
ch1
ch2 ch3
ch4 ch5
ch6 ch7
ch8 ch9
ch10 ch11
ch n-1 ch n
TITLE名称
Rx Beam Former
MODEL 形名
EP4429**
1/1

1)


USC Bus
Beam Timing
Board ID
DBF DATA IN
DBF DATA OUT
Bus Interface
DBF Control
DMA Control
Focus Data Memory
Adder
Control signals
DMA BUS
Block 0
A.A
A/D
Delay & Adder (ML1000)
Block 1
Block 2
Block 3
Block 4
Block 5
Block 6
Block 7
Block 8
Block m
ch0
ch1
ch2 ch3
ch4 ch5
ch6 ch7
ch8 ch9
ch10 ch11
ch12 ch13
ch14 ch15
ch16 ch17
ch n-1
ch n
TITLE 名称
Rx Beam Former
MODEL 形名
EP4625**
1/1


USC Bus
Beam Timing
Board ID
DBF DATA IN
DBF DATA OUT
Bus Interface
DBF Control
DMA Control
Focus Data Memory
Adder
Control signals
DMA BUS
Block 0
Delay & Adder (MR6332)
A/D
A/D
A.A
A.A
A.A
A.A
Block 1
Block n
ch0
ch1
ch2
ch3
ch4
ch5
ch6
ch7
chn-3
chn-2
chn-1
chn
TITLE 名称
Rx Beam Former
MODEL 形名
EP483700**
1/1

4-5-6 Tx Rx Control

This circuit board performs interfacing of the DBF unit (Front end interface, Tx trigger, Rx focusing, beam processor, Doppler processor, flow processor and the units which make up their control units) and the host processor and the IBM/PC (for debugging). And it generates data collection timing, R-delay and heart rate counts, and FPGA initialization of each Rx/Tx beam former.

Local Processor (Flash Memory, Dual Port RAM):

This is a NEC 16-bit CPU (V50HL). Flash Memory (Program, FPGA data) and dual port RAM are used for memory.

In the normal operating state, the local processor and host share dual port RAM and carry out communications. However, when upgraded, the host accesses the local processor's bus directly and the local processor's program and FPGA configuration data are written to the local processor's flash memory.

Control Bus Interface (Host Bus Buffer, UC BUS Buffer):

This is a bus buffer, which connects between the DIU and host bus for controlling DBF.

Timing Generator:

This generator generates a basic clock of 120 MHz, the Doppler PRF and Tx/Rx timing. Tx/Rx timing is sent to each PCB in the DBF by the UAT Bus (ultrasound Tx/Rx timing signal bus).

R-Delay Generator:

Through the R-wave signal sent from the DIU, this generator outputs delay signal, R Delay in 50 μs units.

Heart Rate Count:

The R wave signal is counted in 1 ms units by the local's timer, and after an average is calculated from several pulse beats, it is output.

TV sync:

This is a signal for synchronizing the ultrasonic scan frame with the TV vertical sync signal (VD). The signal is sent from the digital imaging unit.

Probe connect:

This detects connection of a probe and generates interrupt processing to the host. This board does not participate in processing after interrupt, and doesn't read the probe code.

Watch dog timer 1:

This timer monitors failure at the local processor and in the case of faulty operation (failure of the timer to reset within the predetermined time), it resets the local processor and returns the reset state status to the host.

Watch dog timer 2:

This time monitor watchs failure at Host Processor.

PC Interface:

This connects the ISA bus to an external personal computer. Using this, the board in the DBF unit can be accessed directly by a personal computer and individual circuit boards inside the unit can be adjusted and inspected .

HV Control:

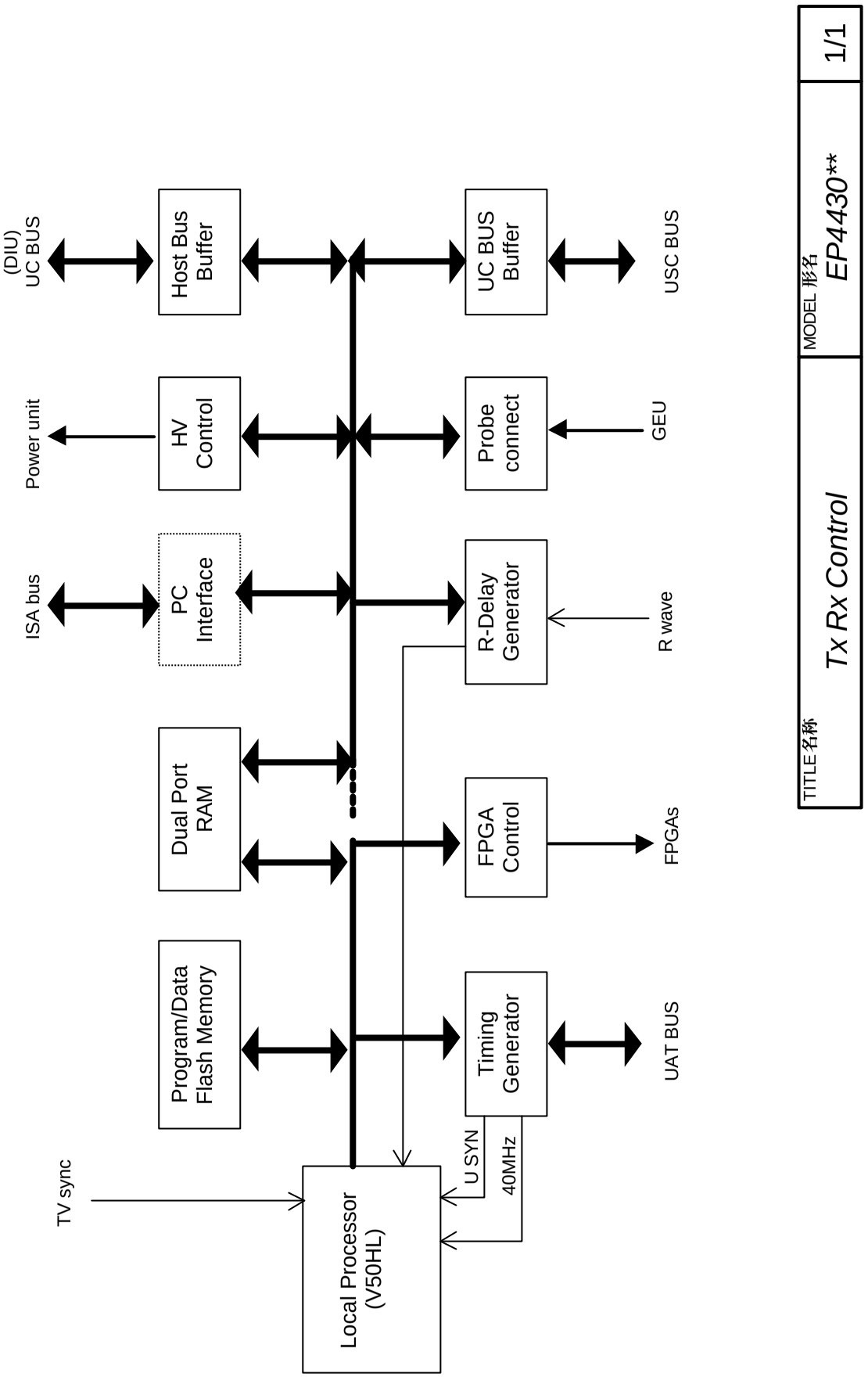
This outputs control signals which control the transmission voltage.

FPGA Control:

This outputs signals for setting FPGA data.

LED:

The operating state can be checked by the LED.


(DIU)
UC BUS
Host Bus Buffer
UC BUS Buffer
USC BUS
Power unit
HV Control
Probe connect
GEU
ISA bus
PC Interface
R-Delay Generator
R wave
Dual Port RAM
FPGA Control
FPGAs
Program/Data Flash Memory
Timing Generator
UAT BUS
TV sync
U SYN
40MHz
Local Processor (V50HL)
TITLE名称
Tx Rx Control
MODEL 形名
EP4430**
1/1

(Blank page)

4-5-7 A ITF

The major purpose of this PCB is control of the front end unit, and it has the following functions.

Interface for the CPU bus (between the USC BUS and Front End bus).

Generation of analog circuit control signals.

Generation of mechanical probes timing.

Bus Buffer (for Data Bus, for Address Bus):

A CPU bus (USC BUS: Ultrasound Control Bus) is provided for a Data bus and for an Address bus.

Bus Window (for Data Bus, for Address Bus):

The CPU is asynchronous with the system. Therefore, since the noise from the CPU bus is not transmitted to the front end unit, this window is closed when the front end unit is not accessed.

Local DMA Function (DMA Controller, DMA Data & Address Memory):

Data for each Mode, such as Pre STC, can be first received from the CPU and stored here in memory, then during the US Blank period, it can be set (transferred from memory to the front end unit (and within this PCB).

If the local DMA function is being used, it is necessary to wait for data from the CPU and a "URDY" signal can be output to the Bus Buffer from the DMA Controller.

Counter for Signal Start:

Generates the respective analog control signal start timings.

Analog Control Signal Generator

This signal generator generates the following analog control signals.

Pre STC 1:

(Just as with the previous Pre STC) this is used to suppress saturation of signals from near distances. Pre STC 1 controls the gain of Pre Amp 1.

Pre STC 2:

When the Pre Amp (Pre Amp 1) output is maximum, this signal is 100 mV~200 mV, but the A/D input range is 1 Vp-p. Then, matching of levels between the "Pre Amp 1 output" and "A/D input" is performed by Pre Amp 2. The signal used to control this Pre Amp 2's gain is Pre STC 2. (Pre STC 2 can be changed in the depth direction and the probe model name and Tx frequency, etc. change.)

*STC :

This is the STC signal which corresponds to the setting with the panel's STC knob. The value set by the STC knob is converted from analog to digital at the operation panel and read to the CPU via the RS232C, then is sent to this circuit board digitally via the USC bus.

*Aperture Compensation :

Through DBF use, the near distance aperture begins from few elements. Then the aperture compensation signal is added to the Gain signal and the near distance start is prevented from becoming dark.

*Angle Gain:

The apparent aperture of the phased array sector probe (electronic sector probe) becomes smaller (from the center), when the ultrasound beam is steered. Therefore this signal is used to perform Gain compensation in the Angle direction. (This compensation is always constant and cannot be changed from the operation panel.)

*Lateral Gain:

This is a signal used to change the gain according to the direction of the ultrasonic beam. This lateral gain signal changes in accordance with the “Angle Gain” setting in the operation panel. (In the kinetic image, etc., in order to make detection of the heart wall edge easier, gain in a specific direction can be raised.)

*: The signals of STC, Aperture Compensation, Angle Gain and Lateral Gain are mixed as Gain Control signal, then outputs it to AD_DA board.

A/D converter :

In order to detect the plane direction of a multi-plane (Trans-esophageal) probe, this A/D converter converts the Potentio signal from the Multi Plane Probe to digital.

Mechanical Probe Interface:

With the signals, Mech Line Start and Mech Frame Start, it generates US Blank (Usync), Mecha Hold that holds to make the Start in the certain depth to prevent the miss function by interferences.

Trig.Generator

Generates the transmission trigger signal based on M Tx Timing signal sent from Mecha. Probe Interface.

Tx Driver

Generates transmission pulse based on transmission trigger signal.

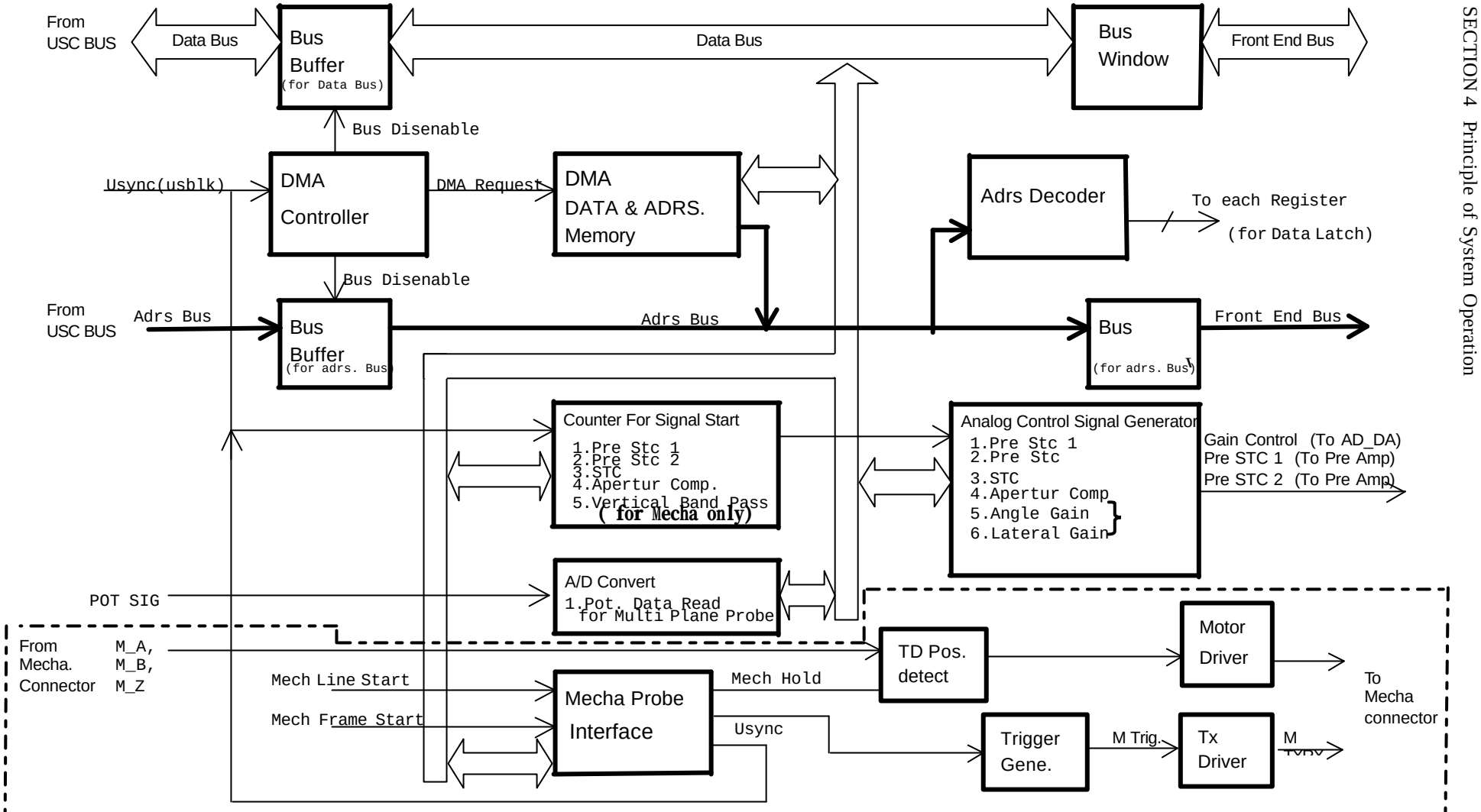
TD Position Detect & Motor Drive

Controls motor driving for mechanical probe based on encoder signals (M_A, M_B, M_Z) from the mechanical probe.

Tx timing

Generates transmission timing signal for mechanical probe.

When “Mech. Tx Hold” signal from Mechanical Probe Interface is received, stop a revolution of motor.



TITLE 名称	MODEL 形名	
A ITF	*EP4443***	1/1

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4-5-8 AD_DA

This is the BW image beam processor. (This corresponds to the Main AMP in the previous equipment.)

Receiving signals sent from the Rx Beam Former undergo analog signal processing after conversion to analog form, then are converted to digital and output to the Digital Imaging Unit.

Digital Filter (Center Frequency Variable BPF):

16-bit US signals which underwent phasing addition in the Beam Former board first undergo band pass filtering in the ML2011. Both the character of DBF and allocation of depth direction are set by register data.

Stage Distribution & Limit:

Through 3 types of bit shifting which are carried out in accordance with the signal size, the gain is divided into 3 types.

During parallel reception, (previously, 2 US signals were processed in 1 system), from this output, it becomes necessary for circuits for 2 systems to be used.

D/A Converter:

After adding, a series of signal processing is performed in analog. After division into stages, they are converted to analog, pass through the LPF corresponding to the band of the receiving signal. Then, they are input to the Log AMP.

Analog Signal Processing:

Log compression, detection, FTC, Relief, AGC, Contrast, Video Amp, and AA Filter are provided in 2 circuits for 2-direction simultaneous reception (parallel processing)

As the signal process specification, there are one type of FTC, six steps of RELIEF, 16 steps of AGC, and 16 steps of CONTRAST.

Gain Control:

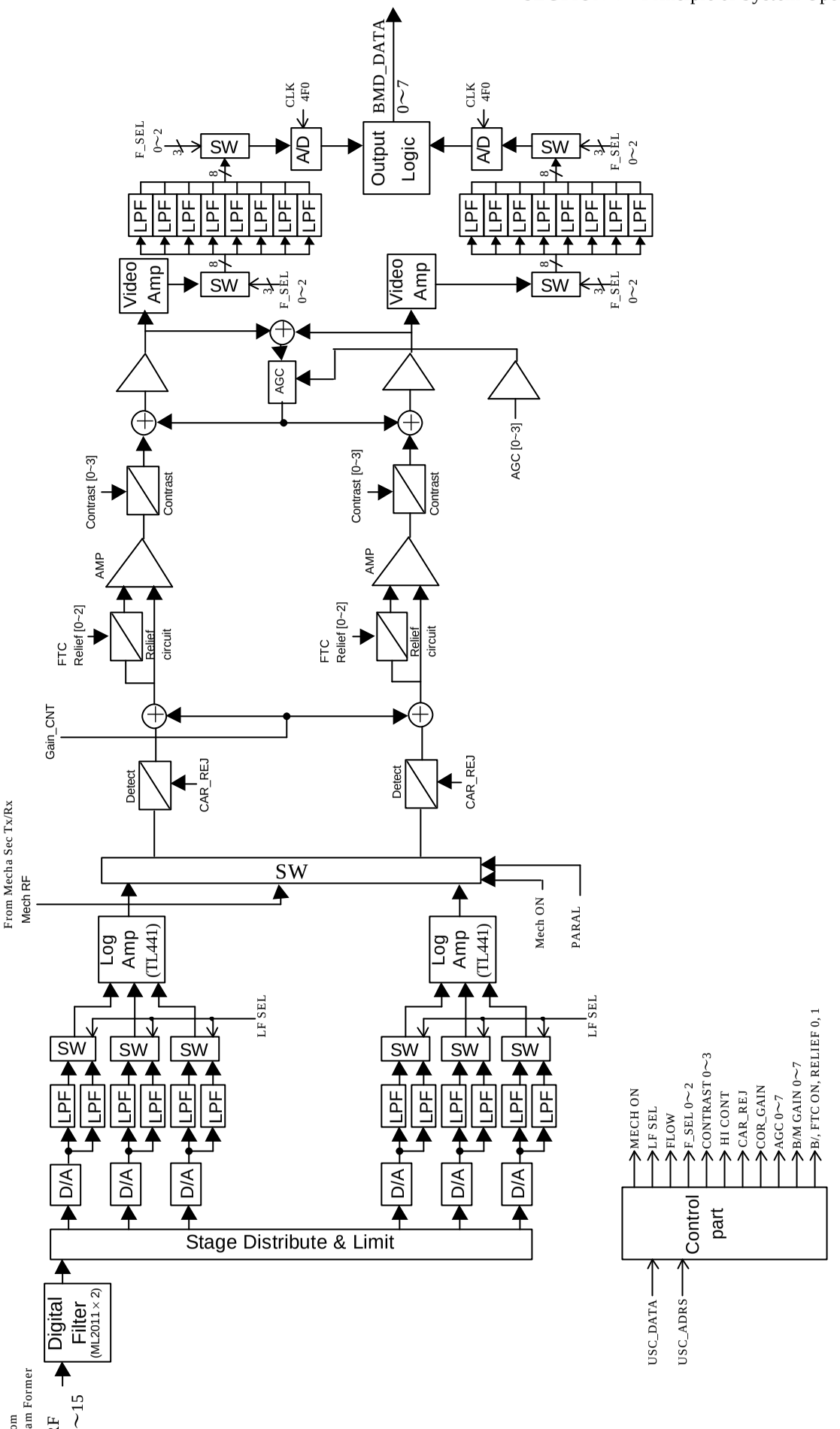
The Gain is controlled by the Gain_CNT signal sent from Analog Interface board.

Digital Output:

After the AA Filter, data are converted from analog to digital, then are decimated by FIFO to the proper sample count and output to the DIU.

Control:

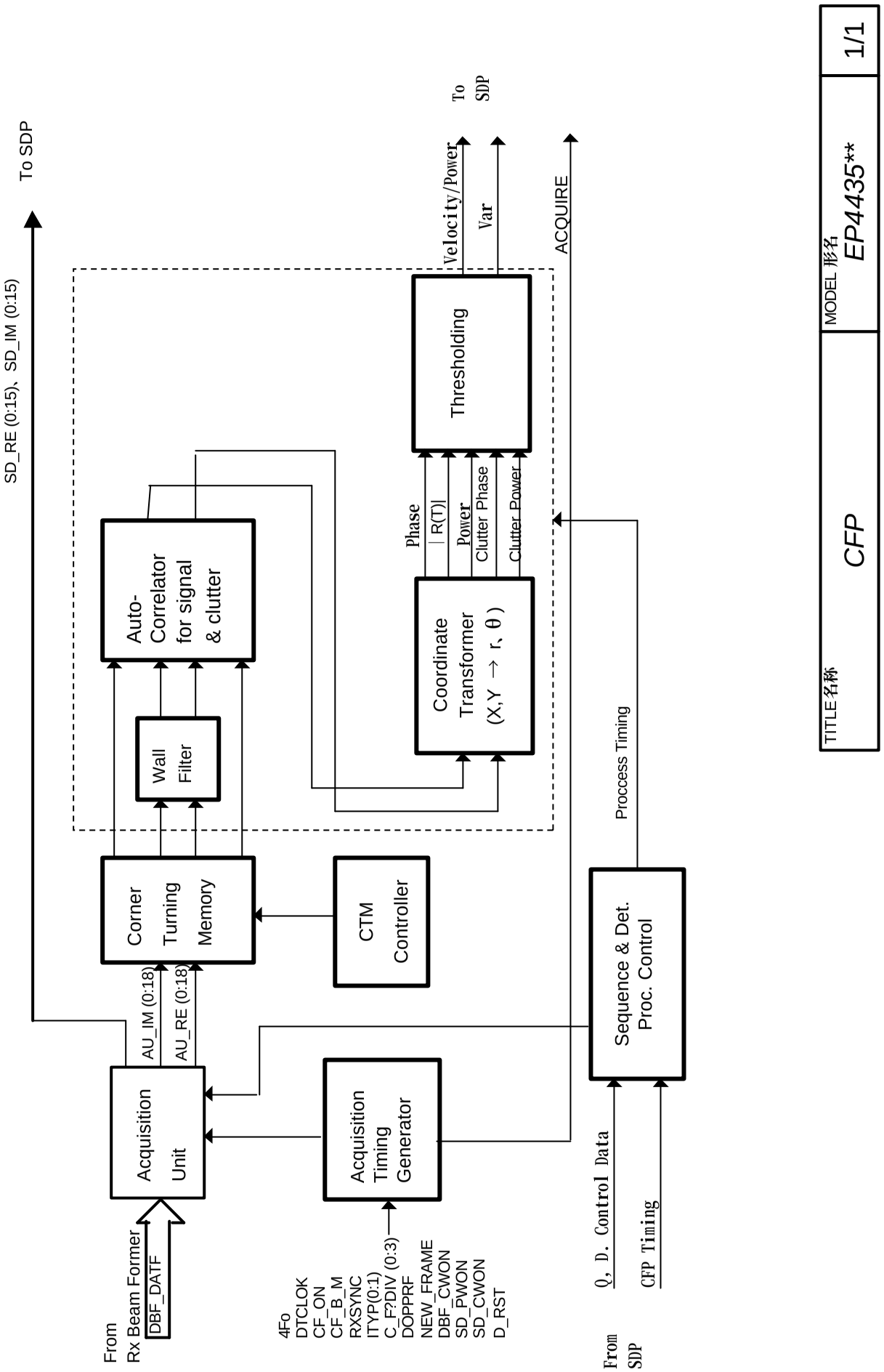
This control creates the control signals necessary for this board. The basic clock is 4f0 in the Single Process Mode and 8f0 in the Parallel Process Mode.


From Beam Former
RF 0~15
Digital Filter (ML2011×2)
Stage Distribute & Limit
D/A
LPF
SW
LF SEL
Log Amp (TL441)
From Mecha Sec Tx/Rx
Mech RF
SW
Mech ON
PARAL
Detect
CAR_REJ
Gain_CNT
FTC Relief [0~2]
Relief circuit
AMP
Contrast [0~3]
Contrast
AGC
AGC [0~3]
Video Amp
F_SEL 0~2
A/D
CLK 4F0
Output Logic
BMD_DATA 0~7
USC_DATA
USC_ADRS
Control part
MECH ON
LF SEL
FLOW
F_SEL 0~2
CONTRAST 0~3
HI CONT
CAR_REJ
COR_GAIN
AGC 0~7
B/M GAIN 0~7
B/, FTC ON, RELIEF 0, 1
TITLE 名称 AD_DA
MODEL 形名 EP4444**
1/1

4-5-9 CFP

This circuit board performs quadrature detection (for both Spectral Doppler, Color Doppler) and performs color calculations for signals sent from the after quadrature detection, and determines Velocity, Variance and Power.

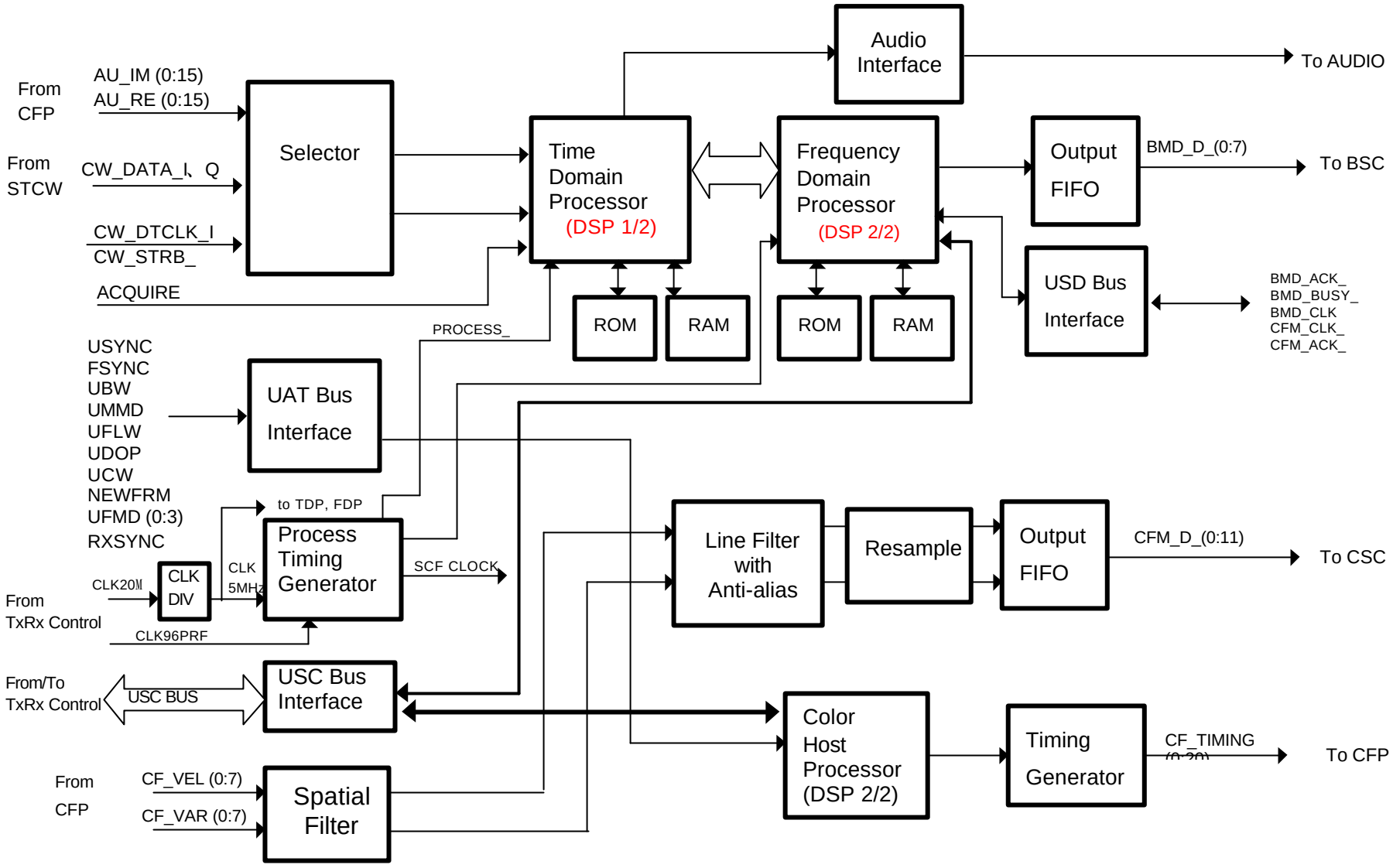
1) Acquisition Unit：
   This fetches RF digital data from the Rx Beam Former board and performs quadrature detection (digitally).
   Afterward, it outputs the data via a (digital) low pass filter to SDP's frequency analysis unit and to the color calculation block of this
2) Memory Block：
   This is configured from Memory Blocks 1 and 2 for 2 channels, Channel A and Channel B (CF_A_I, Q and CF_B_I, Q). The line memory of each memory block has a capacity corresponding to 8 directions, with 16 times in a single direction. (B color calculations are executed from data for multiple times from the same direction.) Multiple line data after quadrature detection are first stored in this memory block, then data in the same direction and at the same depth are read out continuously and color calculations are executed.
3) Wall Filter：
   This is a filter for eliminating wall motion. The filter's characteristics are changed by setting the flow filter.
4) Correlator for signal & clutter
   Data from the same position before time T (T is the data repetition cycle) are auto-correlated with the current data and velocity vectors are determined. And by auto-correlating the same data among themselves, Doppler signal intensity (power) is determined.
   This calculates the clutter velocity component and the power. Each caluculated result is cumulatively added and outputed.
5) CoordinateTransformer
   An average velocity (VEL) is determined by coordinate conversion of the auto correlator's output. Also, the variance (VAR) from $\sum|R(T)|$ and $\sum R(0)$ and the Doppler signal strength (PWR) is determined from $\sum R(0)$.
6) Thresholding
   Clutter is estimated (by the organizational movement) and data are cleared from portions with clutter.
7) Sequence & Det. Proc. Control
   Controls Color calculator block based on the control and timing signals sent from SDP board.


To SDP
SD_RE (0:15)、SD_IM (0:15)
To SDP
Velocity/Power
Var
ACQUIRE
Thresholding
Auto-
Correlator
for signal
& clutter
Wall
Filter
Coordinate
Transformer
(X,Y → r、θ)
Phase
| R(T)|
Power
Clutter Phase
Clutter Power
Corner
Turning
Memory
CTM
Controller
Proccess Timing
AU_IM (0:18)
AU_RE (0:18)
Acquisition
Unit
Acquisition
Timing
Generator
Sequence & Det.
Proc. Control
From
Rx Beam Former
DBF_DATF
4Fo
DTCLOK
CF_ON
CF_B_M
RXSYNC
ITYP(0:1)
C_F?DIV (0:3)
DOPPRF
NEW_FRAME
DBF_CWON
SD_PWON
SD_CWON
D_RST
From
SDP
Q, D. Control Data
CFP Timing
TITLE 名称
CFP
MODEL 形名
EP4435**
1/1

4-5-10 SDP

This board performs Doppler analysis for Spectrum Doppler sent from the CFP board after quadrature detection. And this receives Velocity, Variance and Power data from the CFP board, and after passing it, through the spatial filter and re-sampling. Afterwards, it performs Pixel Smoothing process and Variance Enhancement process. This board sends them to the Digital Imaging Unit via the color ULD Bus (Ultrasonic Line Data Bus).

1) Time Domain Processor：
   This performs missing signal estimation, wall motion filter processing and Doppler deviation frequency with FFT calculation. Doppler Audio calculations are also performed here.
2) Frequency Domain Processor：
   On analyzed the Doppler deviation frequency by FFT calculations, this processor performs averaging of the frequency direction, averaging of the timer direction, log compression, gray scale mapping and interpolation of the number of points in the frequency direction, then outputs the results to FIFO memory.
3) Output FIFO：
   After Doppler calculation results are written to this FIFO memory, they are sent to the Digital Imaging Unit via the ULD Bus (Ultrasonic Line Data Bus).
4) ULD Bus Interface：
   The ULD bus is used in common in the B-mode, M-mode and Doppler. Therefore, if one line of data are written to the FIFO memory, if this interface circuit outputs a request signal to the bus and receives an acknowledge signal, the Doppler calculation results are output to the ULD bus.
5) Process Timing Generator：
   This generates signal (PROCESS_) which is the standard for the time domain processor's basic interrupt cycle (PRF). It also generates the clock (SCF CLOCK) for the Switch Capacitor Filter for audio signals.
6) USC Bus Interface：
   This interface receives control commands from the host via the USC bus.
7) Spatial Filter：
   This uses a spatial direction (2-dimensional) filter, eliminates color noise and smoothes color data.
8) Resample
   This conducts re-sampling of data for TV display through the DIU.
9) Timing Generator：
   Generates timing signal for color calculation, and output it to CFP board.

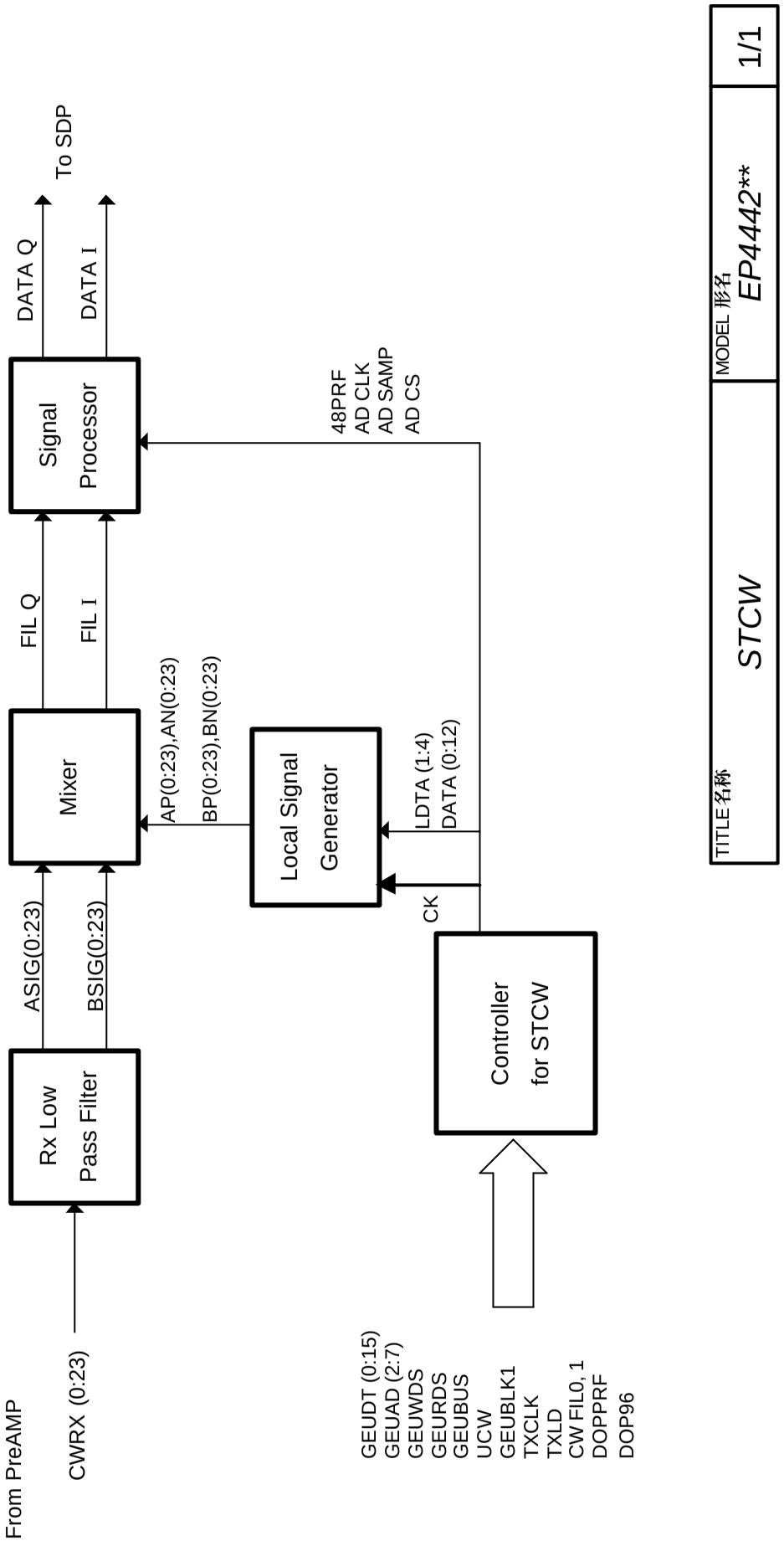


TITLE 名称	MODEL 形名	
SDP	*EP4436***	1/1

4-5-11 STCW

This circuit board is configured from STCW (Steerable Continuous Wave Doppler) Rx circuits, etc.

1) Rx Low Pass Filter for STCW：
   This is an approximately 6 MHz band elimination filter.
2) Mixer (for STCW)：
   This carries out quadrature detection by sin+/- and cos+/- signals.
3) Local Signal Generator for STCW：
   Generates sin+/- and cos+/- signals for 24 channels.
4) Signal Processor (analog signal process for CW):
   STCW can be interchanged. This processor is configured from an AA filter and A/D converter.
5) Controller for STCW . (Control for CW Doppler)：
   This is configured from a local signal generator control circuit, an A/D converter control circuit, etc.


From PreAMP
CWRX (0:23)
Rx Low Pass Filter
ASIG(0:23)
BSIG(0:23)
Mixer
FIL Q
FIL I
Signal Processor
DATA Q
DATA I
To SDP
AP(0:23),AN(0:23)
BP(0:23),BN(0:23)
Local Signal Generator
LDTA (1:4)
DATA (0:12)
CK
48PRF
AD CLK
AD SAMP
AD CS
Controller for STCW
GEUDT (0:15)
GEUAD (2:7)
GEUWDS
GEURDS
GEUBUS
UCW
GEUBLK1
TXCLK
TXLD
CW FIL0, 1
DOPPRF
DOP96
TITLE 名称
STCW
MODEL 形名
EP4442**
1/1

4-5-12 BSC (BW DSC)

This consists of the Ultrasonic Line Data Receiver (ULDR), Mass Memory (MM) and Scan converter (SC) for the black-and white mode (B, M, D-modes).

Ultrasonic Line Data Receiver:

For Plane mode, It carries out preprocessing of data received from the Ultrasonic Line Data Bus, such as correlation, , and send it to Mass Memory

For Line mode, It performs mainly sweep speed generation and US data re-sampling for the Line Mode (M-mode, Doppler Mode).

Mass Memory:

This is large capacity memory, which is capable of storing 65536 black and white lines sent from the ULDR block. And Frame correlation circuit for black-and-white is also mounted on this board.

The ultrasound data stored in this memory are used for real time display and for Search in Cine memory.

Data read from this mass memory are sent to the SC BW block.

Scan Converter:

This carries out 2-dimensional interpolation of Ultrasound line data sent from mass memory, the same as the SSD-5000/5500, then converts them to the TV display format and outputs them.

1) Line Correlation Circuit for B/W Data

   Line Memory ：

   There are two line memories, each line memory has a capacity for a respective ultrasound line (512 pixels x 6 bits) and is used in line correlation.

   By gathering 3 ultrasonic lines (2 lines from line memory and 1 line as current ultrasonic data) and applying a FIR filter in the horizontal direction, line correlation is accomplished.

2) B/W Data Frame Correlation Circuit

   Frame Correlation Auto Setting: In order to prevent differences in the apparent fast and slow frame rate effect in the same correlation, the correlation table is switched to match the frame rate.

3) Line Buffer Memory (for M & Doppler)：

   This is line buffer memory for time axis adjustment with a 512 pixel x 6-bit capacity.

4) SEL

   This is a physiological signal/US data selector circuit for adding the physiological signal to the initial 8 bits of the US record. (In the Line Mode, the physiological signal and US data are stored together in mass memory for each record.)

5) Micro Processor

This is a microprocessor for controlling the ultrasound line data stored in mass memory. The Hitachi SH4 is used for this processor.

The program is written in 64 Mbits of Flash Memory and can be upgraded by the CPU.

6) Mass Memory Controller

This generates mass memory read, write and refresh cycles.

7) Mass Memory

This is variable length mass memory with a capacity of 65536 records (US Lines). The memory's capacity is 65536 records x 512 pixels x 6 bits, and is controlled every 32 records/cluster. STORE image for Cine Memory is recorded in Hard Disk.

8) Vector RAM

Parameters used in interpolation of ultrasound data are set in this Vector RAM from the MGR (Manager) board.

This memory has a capacity of 128 KBytes, enough for 2 frames of data with 512 lines per 1 US frame.

9) Address Generator

Generates interpolation address information and Video RAM addresses.

10) SEL

This selects between internal ultrasound data (6-bit) and external VTR data (R, 6-bit).

Signals from the VTR are converted to digital RGB signals (6 bits each) by the VPU board, then are written to Video RAM on the SC BW block and the SC COL block with the following allocations.

R (6-bit) → SC BW Block for BW (within 8 bits), 6 bits are used.

G (6-bit) → SC COL Block for Velocity (within 8 bits), 6 bits are used.

B (6-bit) → SC COL Block for the remaining 2 Velocity bits and for Variance, 4 bits are used

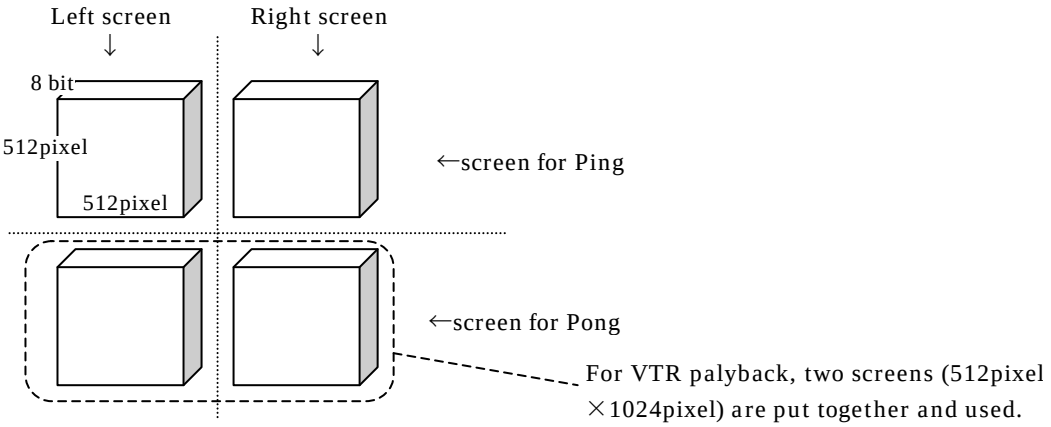
11) 2D Interpolation

This performs calculations for 2-dimensional interpolation. (In the horizontal direction, interpolation of up to 32 pixels can be done.)

6-bit data become 8-bit data after interpolation. (However in M and D, there is no interpolation, so data remain 6-bit data even after being output from the interpolation circuit, and the lower order 2 bits are unused.)

12) Video Memory (1M Byte)

This is display memory with a capacity of 4 screens (512 pixels x 512 pixels x 8 bits per screen) and the 4 screens have the following configuration.



Ultrasonic data are written to this Video RAM in the same display format as that of a TV screen. And they are synchronized with the TV Sync signal and read out. There is enough memory for 4 screens and they can be used for complex modes (B/M, B/D, B/B), single mode requests after freeze, for Ping-Pong display, etc.

Also, data from the VTR during VTR playback are also written to this Video RAM. (During VTR playback, and during real time, data from the VTR pass through this Video RAM and serve to reduce image wobble.)

The Video RAM write cycle is 80 ns and data from the VTR can also be written to it directly (without passing through the VTR ITF, etc.)

13) VGA Display Control block

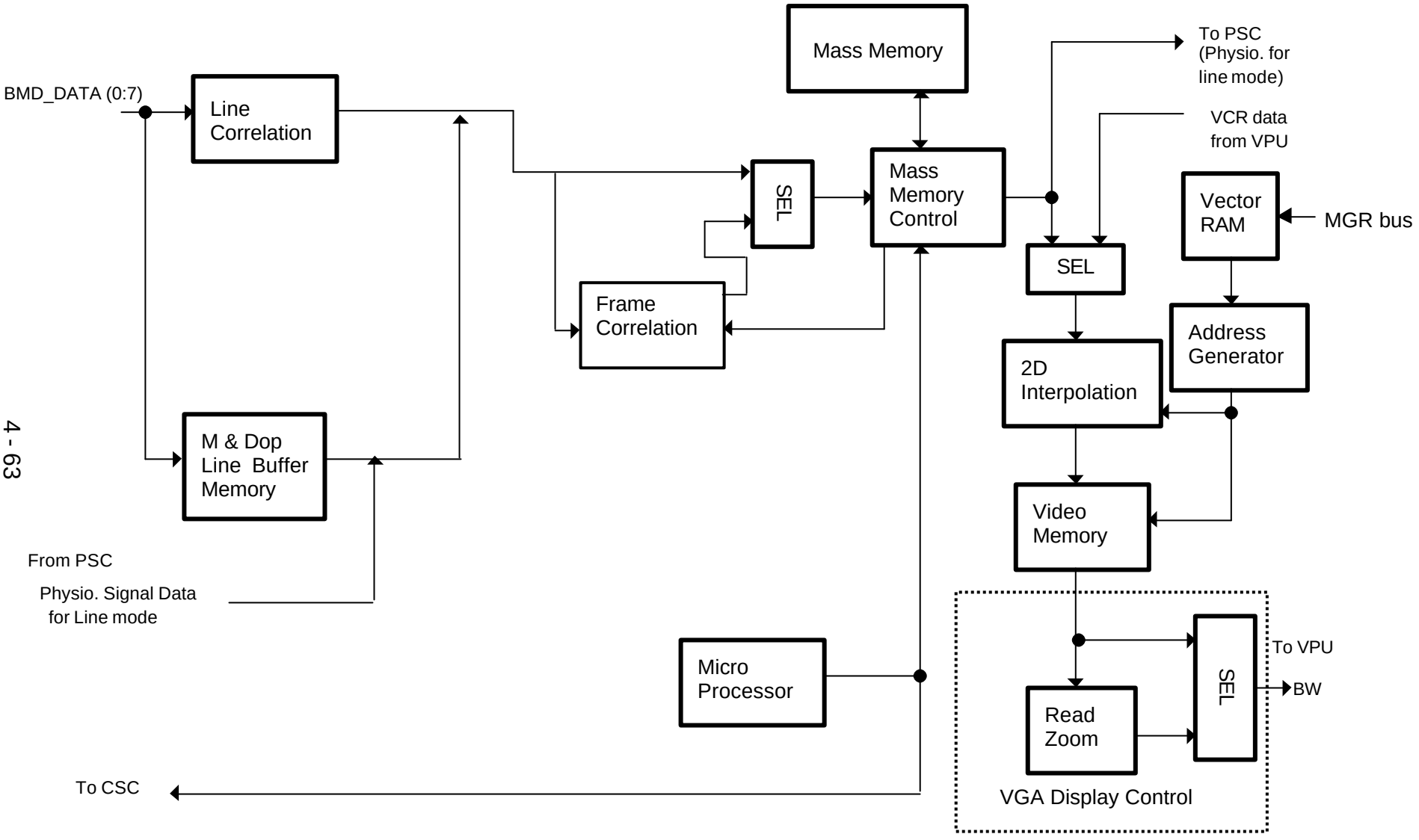
This block performs TV display control to satisfy the specification of non interlace display by using the ASICfor non interlace diplay.

• Read Zoom

This is a circuit for performing Zooming (Read Zoom) after frozen.

• SEL

This selects between a normal image and a Zoom image.



TITLE 名称	MODEL 形名	
BSC	*EP4464***	1/1

4-5-13 CSC (Color DSC)

This consistes of the Ultrasonic Line Data Receiver (ULDR) for Color flow mode (Plane and Line Modes), Mass Memory and Scan Converter.

ULDR:

It carries out preprocessing of Color Flow data (Velocity and Variance) received from the Ultrasonic Line Data Bus, such as correlation, and sends it to Mass Memory.

Mass Memory:

This is a large capacity memory where 65,536 lines of color line information (Velocity: 6-bit; Variance: 4-bit) sent from the ULDR block can be stored. And Frame correlation circuit for color (Velocity) is also mounted on this board.

The color data stored in this memory (Velocity, Variance) are used for real time display and for Search in Cine memory.

Data read from mass memory are sent to the SC COL block.

SC COL:

Color line data (Velocity, Variance) sent from mass memory undergo 2-dimensional interpolation and converted to TV display format, then output.

1) Velocity Data Frame Correlation Circuit
   This is configured from a Frame Correlation Table and a Selector. It has the same operation as the circuit for B/W.
2) M Flow Line Buffer Memory (for M Flow)：
   This is line buffer memory for time axis adjustment with a 512 pixel x 6-bit capacity.
3) Mass Memory Controller
   This generates timing signals (mass memory read, write and refresh cycles) for mass memory, and rearrange the data according to the their signals. When read out the data (Volocity deta only) from mass memory, it adds the beam number into the data.
4) Mass Memory
   These are memories to store the Velocity and Variance data.
   These are two variable length mass memory with a capacity of 65536 records (US Lines).
5) Frame Accelerator
   This circuit executes the frame interpolation, to increase frame rate of velocity data in appearance.
6) Vector RAM
   Parameters used in interpolation of ultrasound data are set in this Vector RAM from the MGR (Manager) board.
   This memory has a capacity of 128 KBytes, enough for 2 frames of data with 512 lines per 1 US frame.

7) Address Generator

Generates interpolation address information and Video RAM addresses.

Velocity Data

SEL： Switches between internal Velocity data (6-bit) or external VTR data (Green: 6-bit + Blue: 2-bit).

2D Interpolation：

Performs calculations for 2-dimensions interpolation.

Video memory：

This is display memory with the capacity for 4 screens worth (512 pixels x 512 pixels x 8 bits per screen).

Velocity data (6-bit) are written to this Video memory in the same display format as that of a TV screen. And they are synchronized with the TV Sync signal and read out.

VGA Display Control block:

This block performs TV display control to satisfy the specification of non interlace display by using the ASICfor non interlace diplay.

Read Zoom：

This circuit performs Zoom operation (Read Zoom) after freeze.

SEL：

Switches between the normal image and the zoom image.

Variance Data

SEL： Switches between internal Variance data (4-bit)) and external VTR data (Blue, 4-bit).

2D Interpolation：

Performs the calculations necessary for 2-dimensional interpolation.

Video memory：

This is display RAM with a 4-screen capacity (512 pixel x 512 pixel x 4 bits per screen). Variance data (4-bit) are written to this video RAM in the same display format as a TV screen, and are read out in sync with the TV's sync signal.

VGA Display Control block:

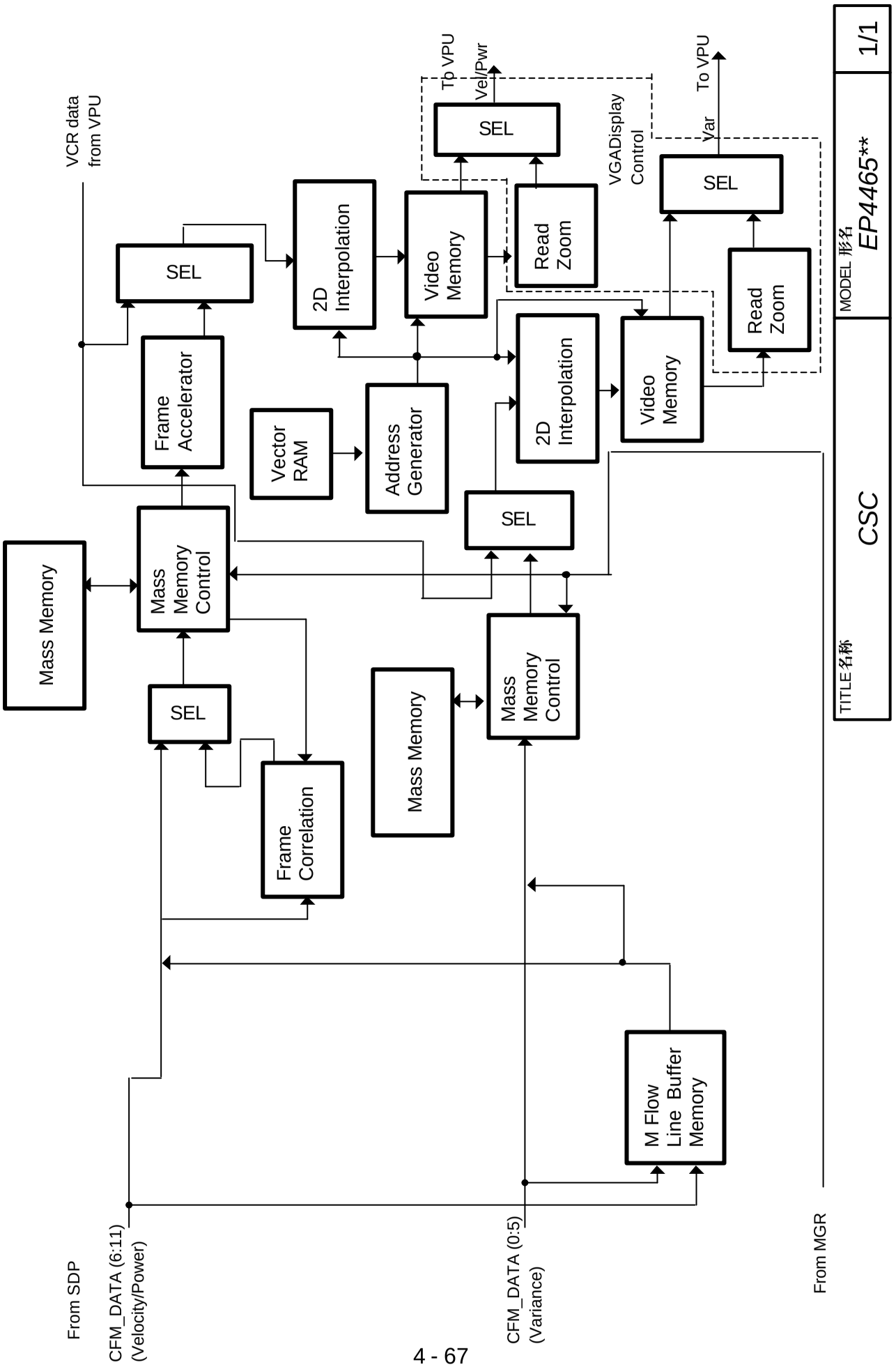
This block performs TV display control to satisfy the specification of non interlace display by using the ASICfor non interlace diplay.

Read Zoom：

This is a circuit for executing a zoom operation (Read Zoom) after freeze.

SEL：

This selects between the normal image and a zoom image.Velocity Data


TITLE名称
CSC
MODEL 形名
EP4465**
1/1
From SDP
CFM_DATA (6:11)
(Velocity/Power)
CFM_DATA (0:5)
(Variance)
From MGR
VCR data
from VPU
To VPU
Vel/Pwr
To VPU
Var
VGADisplay
Control
SEL
SEL
SEL
SEL
SEL
2D
Interpolation
2D
Interpolation
Video
Memory
Video
Memory
Read
Zoom
Read
Zoom
Frame
Accelerator
Vector
RAM
Address
Generator
Mass
Memory
Control
Mass
Memory
Control
Mass Memory
Mass Memory
Frame
Correlation
M Flow
Line Buffer
Memory

4-5-14 VPU

Graphics and other overlay signals are added to UDA (Ultrasound Data), VDA (Velocity Data) or SDA (Sigma = Variance Data) data after interpolation which are sent from the scan converter, then VGA signal for non interlace monitor and an analog TV signal (Composite, Y/C, Analog RGB) are output.

Also, this PCB contains a video signal interface circuit for interfacing with the VCM (Video Cine Memory).

And this converts external Composite signals, Y/C signals and analog RGB signals to digital RGB data (6-bit x 3) and outputs them to the Scan Converter boards.

1) Overlay Mapping
   This receives Graphic signals and Physio signals and outputs Code signals for overlay, "OVCD."
2) Scale Bar Generator
   This generates the gray scale bar and color bar. Test patterns (which can be displayed in operations in the Maintenance Menu) are also generated here.
3) Priority Encode
   Based on priority order settings (UCP: Ultrasound_ Compare, VCP, SCP) from the operation panel, display or non-display of BW data and Velocity / Variance data is decided.
4) US Palette RAM
   This uses three 256K bit RAM modules and performs BW signal coding processing. BW data are converted to image quality which corresponds to the Gamma and Post Process settings by this circuit.
5) Color Palette RAM
   This uses three 256K bit RAM modules and performs color signal coding processing. Velocity and Variance data are converted to RGB data which correspond to the color coding settings by this circuit.
6) Add & Clump
   This adds BW data from US Palette RAM and Flow information (RGB data) from the Color Palette RAM. Since the BW and R, G and B data before adding are 8-bit data, respectively, it is possible that each 8 bits of RGB data after adding will exceed "FF", and when it exceeds "FF", it is clumped together with "FF."
7) VCM Data ENC/DEC
   This converts BW, Velocity and Variance data to Palette data for the VCM. And this decodes palette data (BW or Variance, Velocity) from the VCM and converts it to BW, Velocity and Variance data.

8) VCM ITF

This selects between output of Palette data or RGB data (internal data or playback data from the VTR) to the VCM.

9) FrameRate & Affined Conversion

Converts VGA signal to digital RGB signals as TV timing form for NTSC/PAL.

10) ENC

This is a digital encoder which encodes digital RGB signals to composite signals or Y/C signals.

11) D/A

This converts digital RGB signals to analog RGB signals.

12) Buffer

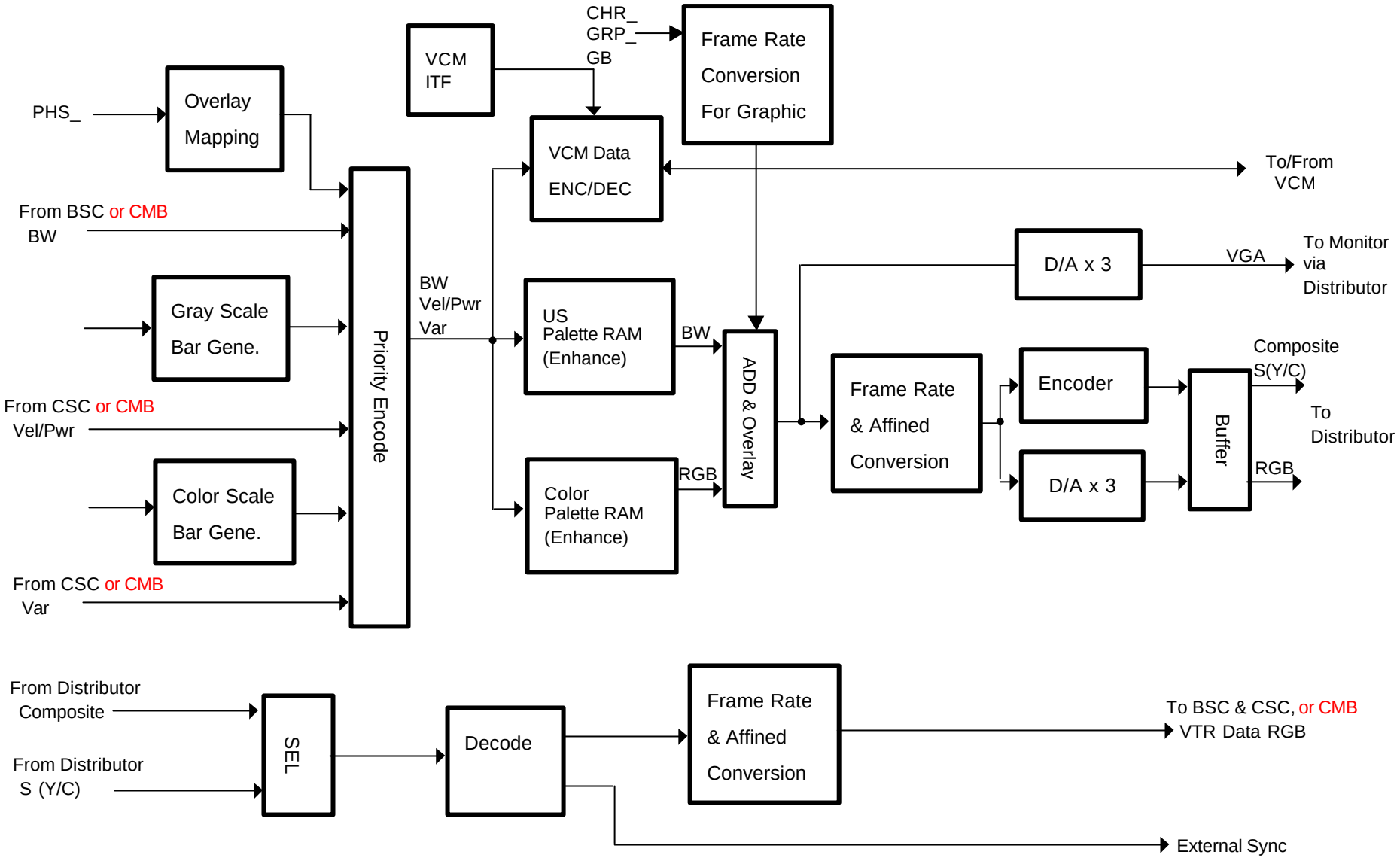
Buffer for the distribution of TV signals.

13) Video Decoder

This uses a digital video decoder, and there are internally the video multiplex for selection of Composite or Y/C and a digital decoder which converts composite or Y/C signals to digital RGB signals (8-bit x 3).

14) Freme Rate & Affined Conversion

This performs frame rate conversion of the digital RGB signals which converted at Digital Video Decoder. And when PAL system , the image resolution is converted (expansion).



TITLE 名称	MODEL 形名	
VPU	*EP4466***	1/1

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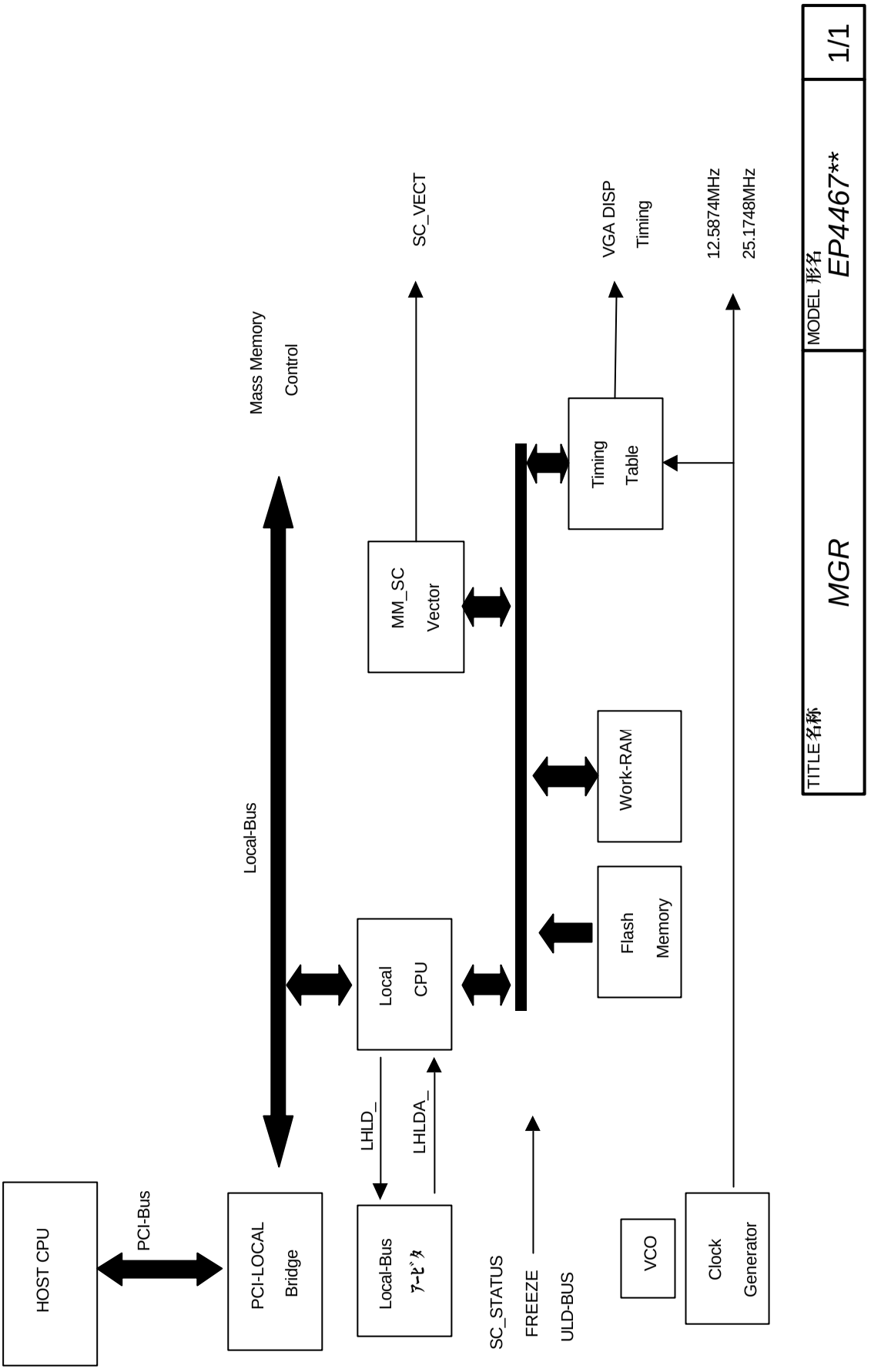
4-5-15 MGR

Timing is achieved by the TV timing signal and signals, etc. for specifying the screen display frame, etc. and the basic clock in the Digital Imaging Unit is generated.

1) Clock Generator
   This is the Digital Imaging Unit's main clock. The divided by 4 clock is sent to each PCB in the DIU.
2) MM_SC Vector
   Generates Vector RAM data and outputs them to both BSC and CSC boards.
3) Timing Table
   This controls TV Timing signal and signal for setting of the frame of image.
   This memory is divided between that for Horizontal and that for Vertical, with the addresses being circulated and display frame generated and supplied to each block.
4) Local CPU (SH-4)
   This is the main 24-bit digital signal processor, which operates at 40 MHz.
   This gemerates control signal for Mass Memory in BSC and CSC boards.
5) PCI-Local Bus Interface
   Interface between Compact PCI Bus and Local Bus.


HOST CPU
PCI-Bus
PCI-LOCAL Bridge
Local-Bus
Mass Memory Control
Local-Bus ﾌｧｰﾋﾞﾀ
LHLD_
LHLDA_
Local CPU
SC_STATUS
FREEZE
ULD-BUS
MM_SC Vector
SC_VECT
Timing Table
VGA DISP Timing
Work-RAM
Flash Memory
VCO
Clock Generator
12.5874MHz
25.1748MHz
TITLE 名称 MGR
MODEL 形名 EP4467**
1/1

4-5-16 CPU

This is a general purpose computer (general purpose personal computer) which runs General OS, and, just with ordinary general purpose computers, the circuits from which it is configured are changed gradually one part at a time.

The major functions of this computer are control of the hard disk, and communications with the MGR board inside the Digital Imaging Unit.

This computer also performs reading of program data from the floppy disk drive and detailed calculations of data for focusing.

As for other functions, a battery is mounted in this computer which maintains a system overall calendar (clock) from which the calendar on the PCB is created.

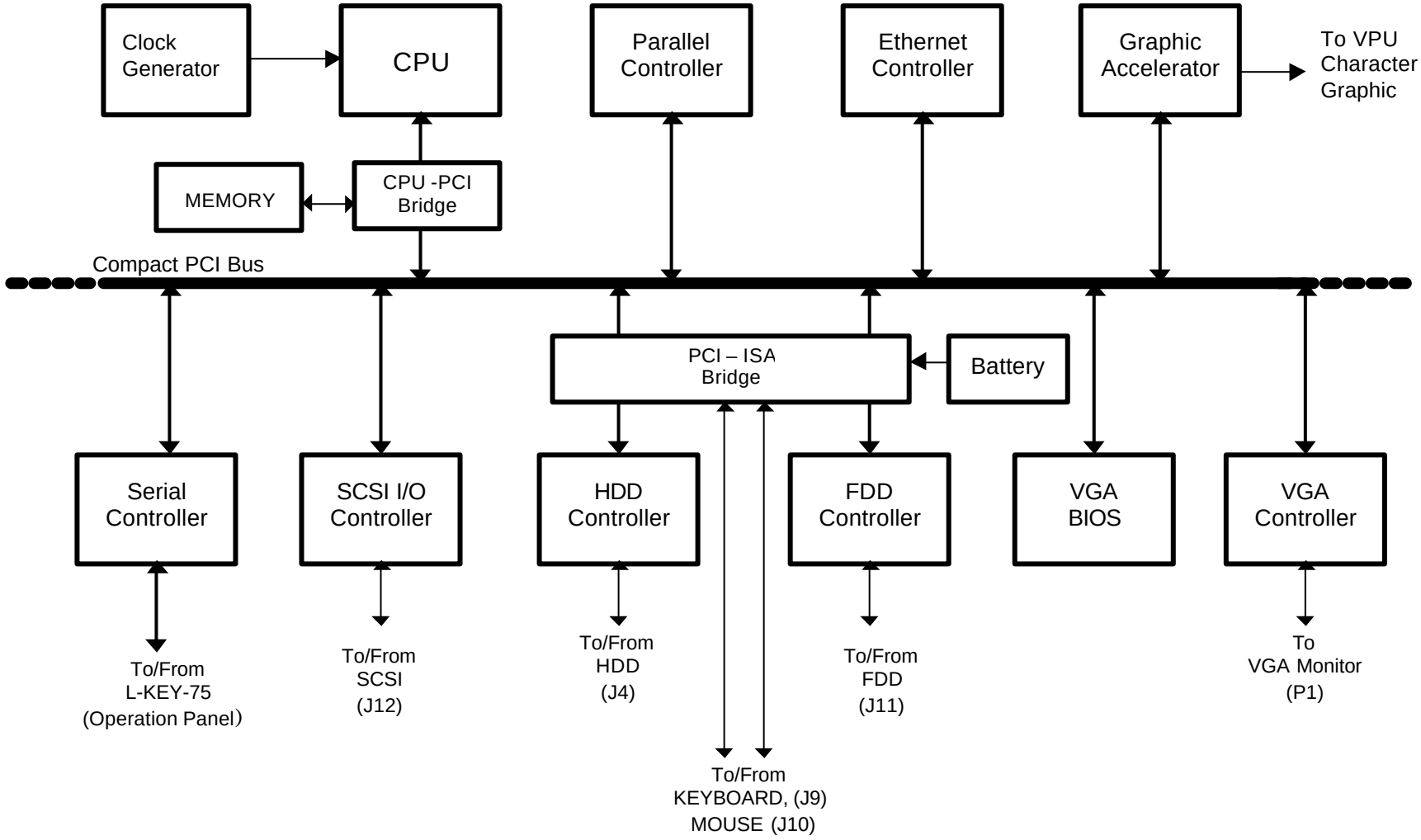
1) CPU
   An AMD K6 based microprocessor.
2) Clock Generator
   Supplies a clock to the BUS.
3) CPU – PCI bridge
   Interface between PCIBUS and CPUBUS. Performs control of cache memory and the PCI bus.
4) MEMORY
   Memory installed in this general purpose computer. (64MB, DIMM)
5) HDD Controller
   A hard disk drive is connected here.
6) VGA BIOS
   This is BIOS ROM for the VGA display.
7) VGA Controller
   Controller for the VGA display.
8) PCI – ISA Bridge(Key Board, Real Time Clock)
   This is a 16-bit bus (ISA bus) controller.
   The calendar (clock) for the system overall runs based on this real time clock's calendar.
   The battery for this calendar (clock) is mounted on this circuit board.
9) KEYBOARD / MOUSE
   The same keyboard and mouse as that of a personal computer can be connected.
10) Serial Controller
    Communicates between Operation panel and this board.
11) FDD Controller
    1.4 MByte floppy disk drive is connected here.

12) Graphic Accelerator

Outputs character and graphic data to VPU board with LVDs（Low Voltage Differential Signaling）.

13) SCSI Controller

SCSI device (MO disk drive, etc) is connected here.



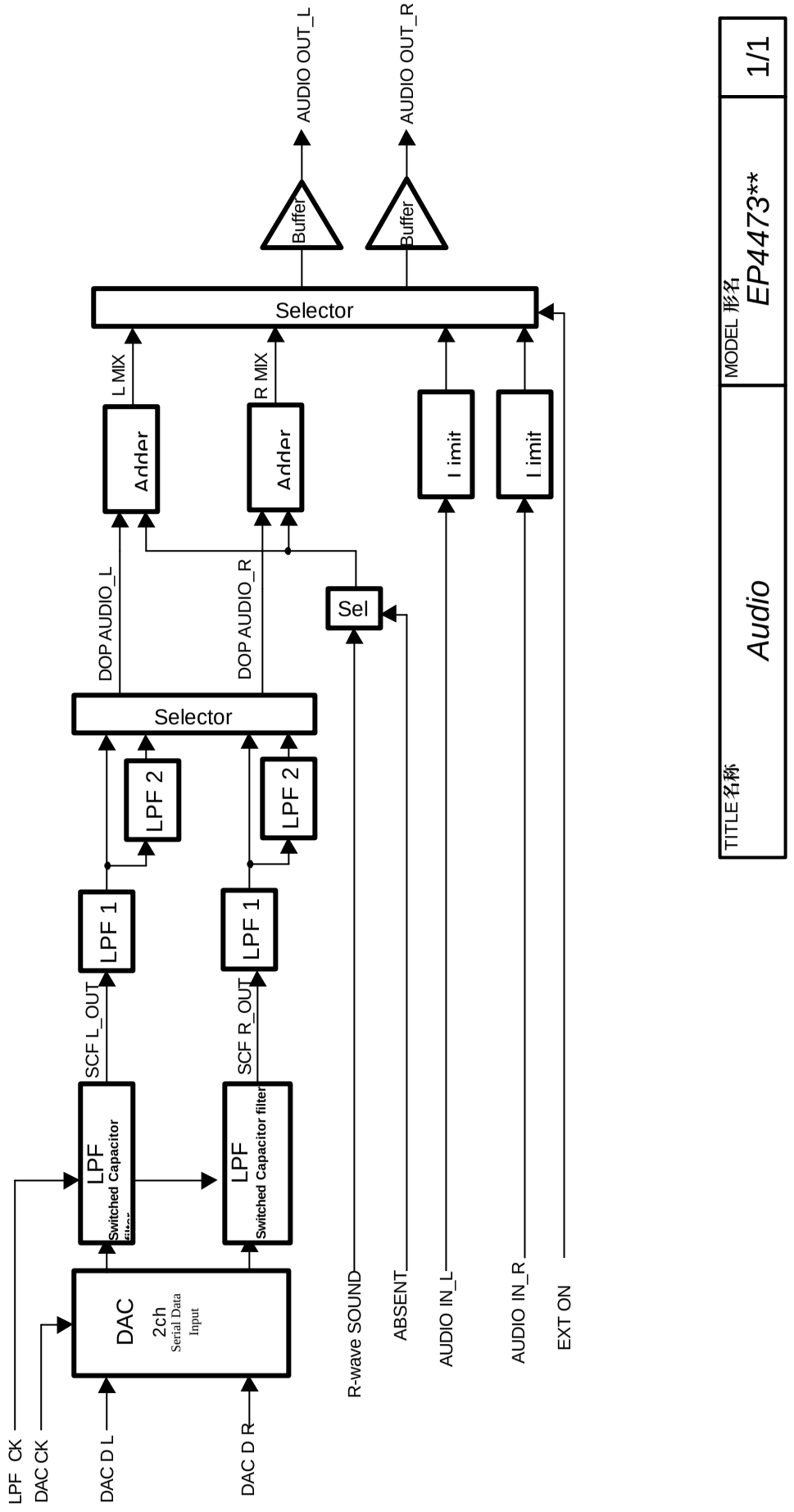
TITLE 名称	MODEL 形名	
CPU	*EP4423***	1/1

(Blank page)

4-5-17 Audio

This is the audio signal distribution circuit.

1) DAC
   This converts respective left and right serial (digital) Doppler sound data sent from the SDP board from digital to analog.
2) LPF (Switched Capacitor Filter)
   This is a low pass filter for cutting the higher harmonics from D/A converted staged waveforms. A switched capacitor filter (SCF) which is necessary for matching D/A quantized frequencies and for changing steep cutoff frequencies is used.
3) LPF 1
   This is a low pass filter (with a cutoff frequency of 18 KHz) for preventing SCF switching noise.
4) LPF 2
   When Doppler PRF are low, at 500 Hz and 1 KHz, the SCF's switching frequency is low and the switching noise frequency is also low, so LPF 2, with a cutoff frequency that is even lower than that of LPF1 is used to prevent noise from getting mixed in.
5) Selector
   This selects whether to use the output from LPF1 or the output from LPF2.
6) Sel
   This selector decides whether to use or not to use the ECG R wave BEEP sound (ECG BEEP SOUND) which is sent from the PSC board. When the sound is not used, it is turned OFF by the ABSENT signal so that unnecessary noise is not output.
7) Adder
   This mixes the ECG BEEP SOUND and Doppler sound (left and right). The mixed sounds are output at the audio out connector for VTR. It is used at the same time for a sound which is emitted by the equipment's own speakers.
8) Limit
   This is an input limitter circuit for audio signals played back from the VTR.
9) Selector
   This selects between internal Doppler sound (sound data from the SDP board) and external (VTR) sound.
10) Buffer
    This is the buffer for audio. This is output via the motherboard to the TV monitor (with speakers).


AUDIO OUT_L
AUDIO OUT_R
Buffer
Buffer
Selector
L MIX
R MIX
Adder
Adder
Limit
Limit
DOP AUDIO_L
DOP AUDIO_R
Sel
Selector
LPF 2
LPF 2
LPF 1
LPF 1
SCF L_OUT
SCF R_OUT
LPF
Switched Capacitor filter
LPF
Switched Capacitor filter
DAC
2ch
Serial Data
Input
LPF CK
DAC CK
DAC D L
DAC D R
R-wave SOUND
ABSENT
AUDIO IN_L
AUDIO IN_R
EXT ON
TITLE 名称
Audio
MODEL 形名
EP4473**
1/1

4-5-18 PSC (PCB for Physio signal display unit PEU-4000)

The major functions are 3-channel (ECG, PCG, PULSE) A/D conversion and conversion of physiological signals to TV signals.

1) Sample Rate Generator
   This generates the sampling rate which is the basis for the sweep speed. The TV horizontal Sync signal (TV H timing) is divided by 17 and supplied where needed.
2) ECG_LPF (100Hz, －12dB/oct)
   This is a Nyquist filter which takes into consideration the ECG signal characteristics.
3) PCG_LPF (1KHz, －12dB/oct)
   This is a Nyquist filter which takes into consideration the PCG signal characteristics.
4) HPF L, HPF M1, HPF M2
   This is a high pass filter for PCG. It is selected for each preset application. (HPF L: 50 Hz, 6 dB/oct., HPF M1: 50 Hz, 12 dB/oct., HPF M2: 150Hz, 24 dB/oct.)
5) Sel, Filter PCG
   Selects a PCG filter in accordance with the register setting (Filter PCG).
6) Emphasis
   This is a high pass filter for high frequency emphasis of PCG signals.
7) PULSE_LPF (100Hz, －12dB)
   This is a Nyquist filter which takes into consideration the PULSE signal characteristics.
8) MPX
   This selects which physiological signal will undergo A/D conversion.
9) ATT, SENS
   This is an attenuation circuit for adjusting the sensitivity of physiological signals. (SENS in the drawing has registers for 3 channels, ECG, PCG and PULSE.)
10) AD Converter
    Converts physiological signals to 10-bit digital signals, and use higher 9-bit from them.
11) Position, POS
    Adds values corresponding to the display position to the AD converter's output and sets limits. (POS in the diagram is a register where values corresponding to the display position are set.)
12) DEMUX
    This divides the time divided physiological signal data into the ECG, PCG and PULSE signals. Also, since the PCG frequency band is high compared to the sweep speed, it samples the MAX value (P MAX) and MIN value (P MIN) and corrects them.
13) Encode
    Outputs physiological signal data to the ULDR L circuit board. Physiological signals are

packed in the Line mode (M Doppler mode) record's header. (8 bits of the black and white record header are reserved for the physiological signal.) Records with the physiological signal packed in them are stored together with the physiological signals in mass memory, so even after reading from mass memory, the time phases of the physiological signals and M (or Doppler) image can be matched.

14) VA Count

This generates addresses in the vertical direction from display frame timing (DISP V FRAME) in the vertical direction. By using the current vertical address (Now VA) and the just previous vertical address (Prev VA), when the amplitude is reduced (in B/M vertical display, etc.) and displayed, linkage with physiological signals is improved in the output.

15) MM In, Decode

While in the Line mode, physiological signals are extracted from the US data output from the MM BW board and the ECG, PCG (PMAX, PMIN) and PULSE signals are divided to each channel.

And there is a delay buffer which can delay the physiological signal for 1 sec. (max) to revise the delay of Doppler spectrum.

16) Sel×4

Selects whether the Line mode physiological signal (*** on L) or the Plane mode physiological signal (*** on P) will be used.

17) Memory

This is the memory for physiological signals for displaying them on the screen. (When displaying physiological signals in B images and storing them, the physiological signal is stored in thehard disk.)

18) －16, ＋16 (ECG－16, ECG＋16)

Generates the signals which are the basis for the ECG sync mark. The ECG sync mark is displayed with an amplitude of ±16 lines (16 TV lines).

19) HA Generator

The address in the horizontal direction when the physiological signal is read from memory is generated from the horizontal direction display frame timing (DISP H FRAME). (In order to display scroll, the current horizontal write address is referred to and the read out address is generated.)

20) Write Address Generator

This generator generates the horizontal address when the physiological signal is written to memory. (The memory's vertical address corresponds to the physiological signal's amplitude.)

21) CMP × 6pcs.

This compares the output from memory with the current vertical address (and the just previous vertical address) and if the values are the same, the physiological signal is

displayed on the screen. This is a comparater to make that comparison.

22) ECG Video Generator

Performs ECG signal interpolation.

23) ECG Marker Generator

Generates the ECG sync mark.

24) PCG Video Generator

This fills in the lines between the PCG MAX value and MIN value.

25) PLS Video Generator (PWR OUT PLS)

This performs PULSE signal interpolation.

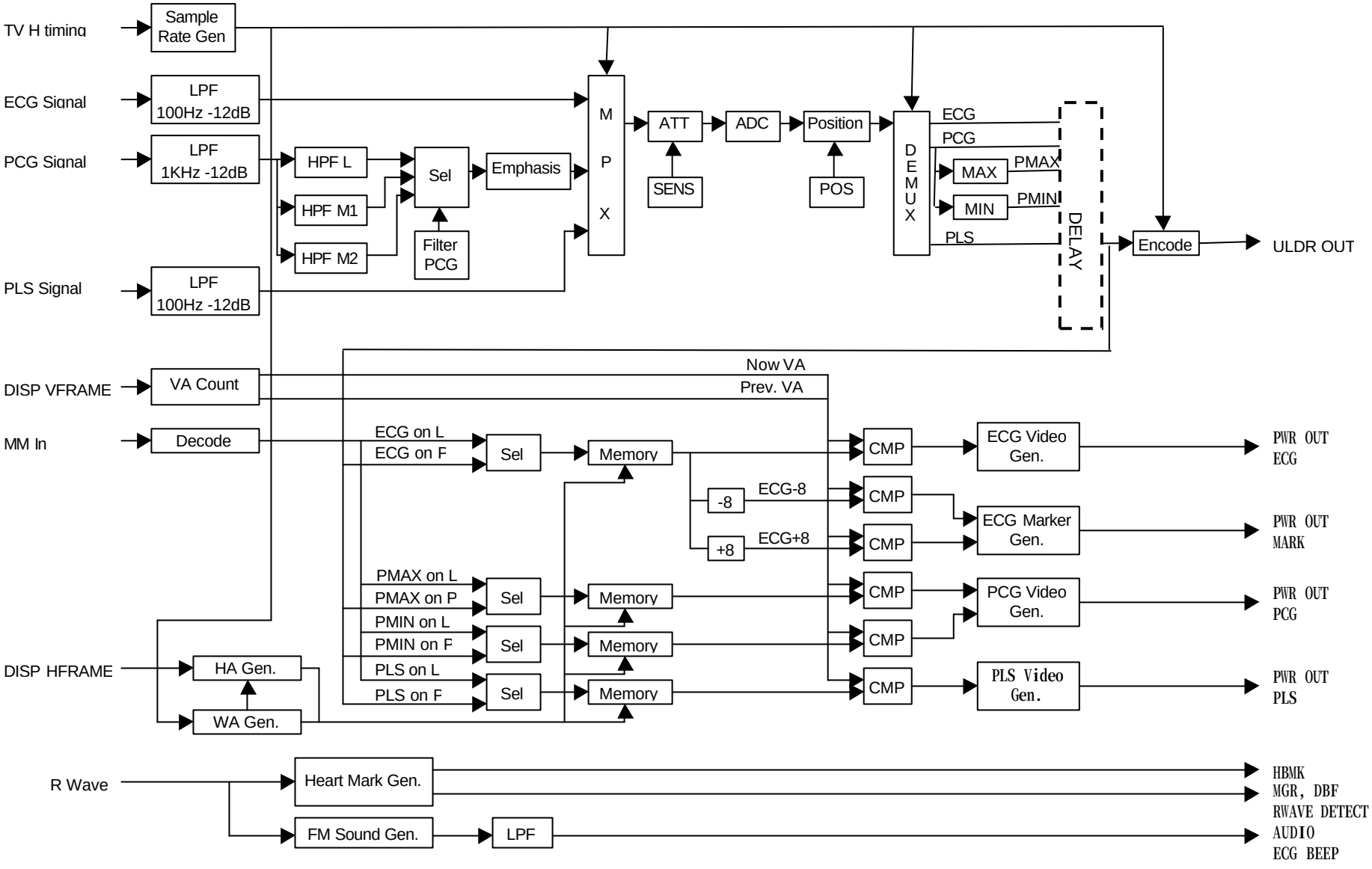
26) Heart Mark Generator

When the ECG's R wave comes, the heart mark (♥) is displayed for 3 TV fields. Together with this display, the LED on the PCB lights up.

Also, the R wave detection information is sent to the "Mass Memory Manager" and "Digital Beam Former."

27) FM Sound Generator, LPF：

This generates a BEEP sound from the ECG R wave (using a FM sound source). (The generated BEEP sound is sent to the DISTRIBUTOR board and finally is output by the TV monitor's speaker.)



TITLE 名称	MODEL 形名	
PSC	*EP4468***	1/1

4-5-19 Physio Amp (PCB for Physio signal display unit PEU-4000)

This circuit board is the physiological signal amp for the SSD-4000. Internal circuitry includes the patient sensor unit circuits (inside the dotted line in the block diagram) and the device side circuits. These circuits are electrically isolated using a photocoupler and DC-DC converter.

1) ECG Circuits

ECG PreAmp：This is the initial stage AMP of the ECG signal. It amplifies an approximately 20 dB signal.

Amp & Auto offset compensation：This is the ECG signal amp, and amplifies it to approximately 40 dB. Also, it suppresses ECG signal offset voltage fluctuations.

HUM Filter：This filter eliminates humming noise from the application power supply.

HUM Filter Exch. SW：This is a 50/60 Hz select switch for the HUM filter. The select switch is mounted in the physiological unit's cabinet and can be operated externally.

OSC：Generates a triangular wave (with an amplitude of approx. 6 V pp and a generation cycle of approx. 1.8 KHz).

Comparator：Compares the ECG signal from the HUM filter and the triangular wave from the OSC and performs pulse width modulation.

Photo Coupler：A photocoupler is used for the purpose of isolating the patient side sensor unit circuit and the equipment side circuit.

L.P.F.(Low Pass Filter)：Demodulates signals from the photocoupler which have undergone pulse width modulation and converts them to analog signals.

Gain & Offset Adj.：Adjusts the Offset voltage and amplitude of signals from the L.P.F. The offset voltage is +2.5 V.

ECG DC IN：Input unit for signals from an external device.

Gain & Offset Adj.：Adjusts the gain and offset of signals from ECG DC IN. The offset voltage is +2.5V.

Switch：This is a switch for switching between the ECG signal and the DC IN signal. If a signal is input to DC IN, it is switched to the DC IN side. If signals are input simultaneously to ECG and DC IN, DC IN is output.

R-SIG. Detector： Detects the ECG signal's R wave.

2) PCG circuits

PCG Amp：This is the initial stage amp for PCG signals. It amplifies approximately 28 dB signals.

OSC：Generates a triangular wave (with an amplitude of approx. 6 V pp and a generation cycle of approx. 6 KHz)

Comparator：Compares the signals from the PCG Amp and the OSC and performs pulse width modulation.

Photo Coupler：A photocoupler is used for the purpose of isolating the patient side sensor unit circuit and the equipment side circuit.

L.P.F.(Low Pass Filter)：Demodulates signals from the photocoupler which have undergone pulse width modulation and converts them to analog signals.

Gain & Offset Adj.：Adjusts the Offset voltage and amplitude of signals from the L.P.F. The offset voltage is 0 V.

3) PULSE circuits

Pulse Amp： This is the initial stage amp for PULSE signals. It amplifies approx. 14 dB signals.

H.P.F.： This is a high pass filter for DC cutoff.

OSC：Generates a triangular wave (with an amplitude of approx. 6 V pp and a generation cycle of approx. 1.8 KHz).

Comparator：Compares signals from the H.P.F. and from the OSC and modulates the pulse width.

Photo Coupler：A photocoupler is used for the purpose of isolating the patient side sensor unit circuit and the equipment side circuit.

L.P.F.：Demodulates signals from the photocoupler which have undergone pulse width modulation and converts them to analog signals.

Gain & Offset Adj.：Adjusts the Offset voltage and amplitude of signals from the L.P.F.

Pulse DC IN：Unit for inputting signals from an external device.

Gain & Offset Adj.：Adjusts the signal gain and offset from pulse DC IN.

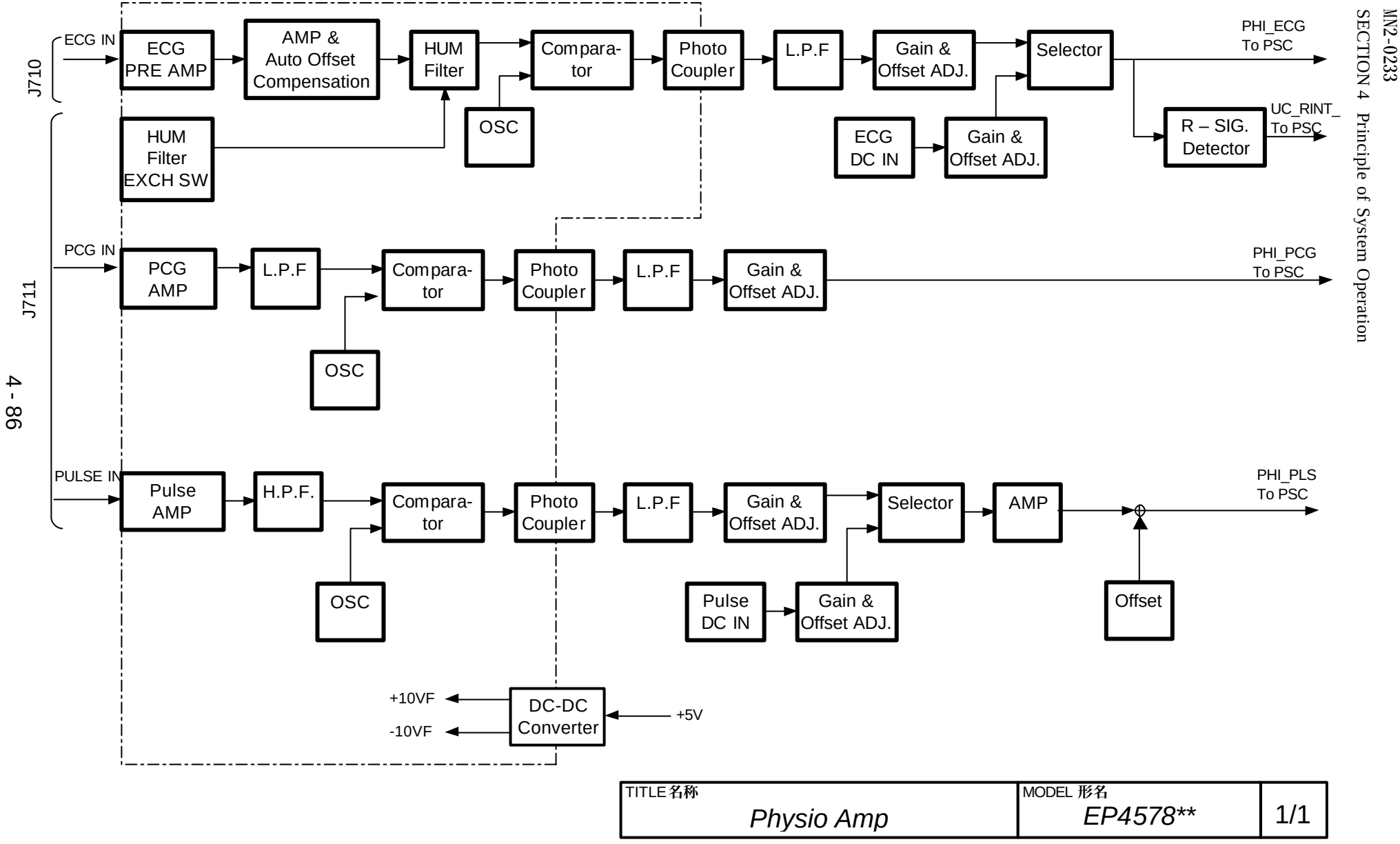
Switch：This switch switches between pulse signals and DC IN signals. If signals are input to DC IN, it is switched to the DC IN side. If signals are input simultaneously to PULSE and DC IN, DC IN is output.

AMP： Amplifies signals from the switch.

Offset：Adds an offset voltage to signals from the AMP. The offset voltage is +2.5 V.

4) DC-DC converter：

Supplies power to the patient side sensor circuit (the portion enclosed by a dotted line in the block diagram). A DC-DC converter is used for the purpose of isolating the patient side sensor circuit and the equipment side circuits.



TITLE 名称	MODEL 形名	
Physio Amp	*EP4578***	1/1

(Blank page)

4-5-20 VOL / Servo Control [Ver.1.1.1 and higher]

This board executes the calculation of VOL image and the motor control of probe for VOL mode.

CPU Interface

This interface is connected with Local Bus, and have the registers addressed on the local address D00 – D7C. This circuit exists in one FPGA (CPU ITF) with the Servo Control circuit together

Servo Control

This is the motor driver which has servo function. The circuit watches the encoder pulse from motor, and generates the start timing for Tx/Rx and calculation. It is consist of a part of FPGA (CPU ITF) and the controller.

Servo CPU

This is micro-controller which control the Servo Controller. The communication with HOST is executed via exclusive dual port memory.

Data Interface

This control the operation of data input/output part, according to the several signal issued by ULDR. And when Vol image is re- calculated by the data read from the Mass Memory, the several signals, issued by ULDR in normal operation, is generated by this circuit. This circuit exist in one FPGA (MM ITF) with Mass Memory Interface together.

Calc FPGA

This is the calculator for 3D mode, and generates 3D data by calculating US data or CFM data (CFM is not used). This circuit is operated as two kinds of calculation method, the Volume and the Rendering calculation, by changing the FPGA's defined data. And it controls the Frame Register too.

Frame Register

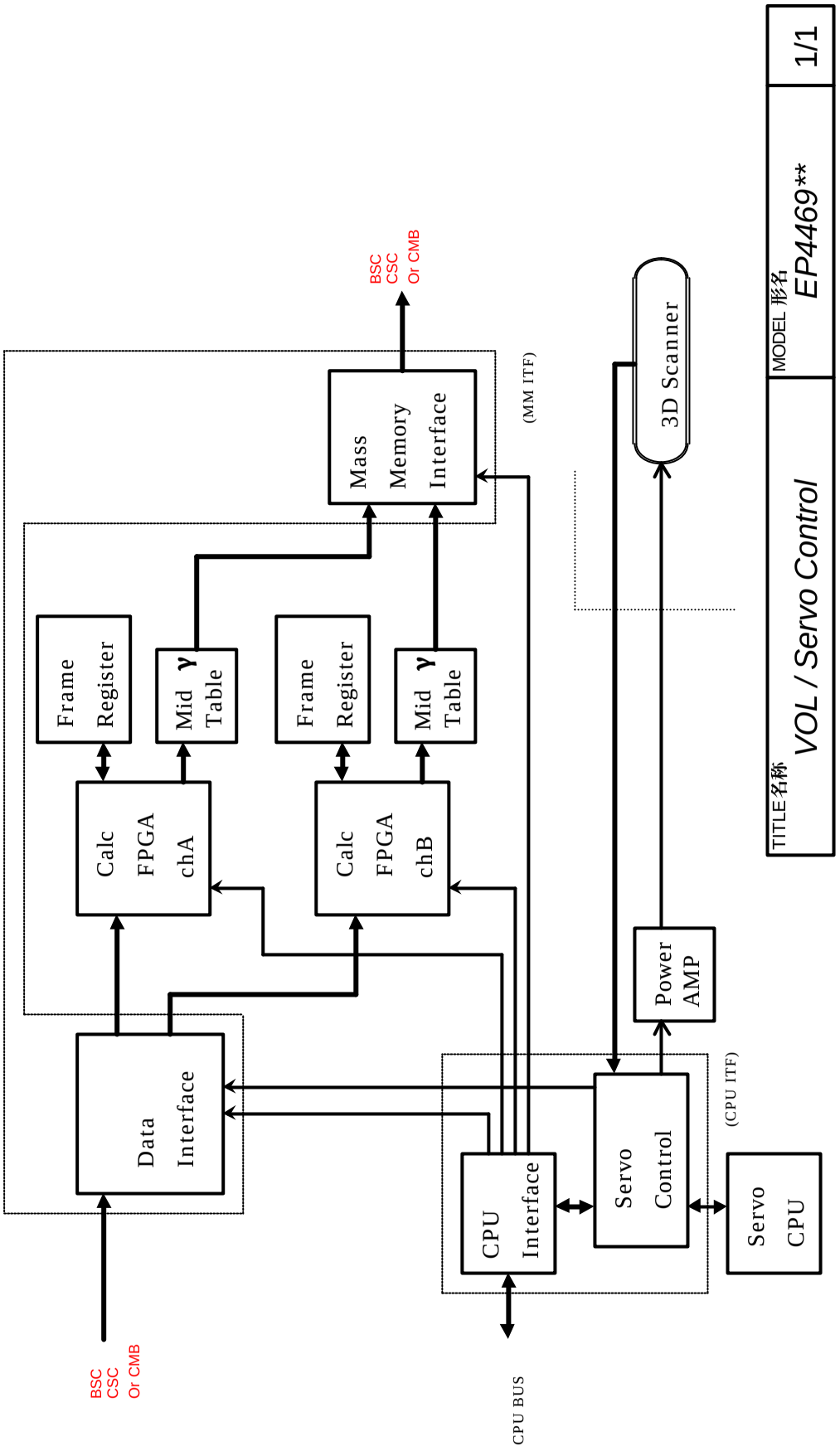
This store one frame data for side view calculation. It is operated in Read-modify-write which the readout data and new data are calculated and rewritten. This is consist of SRAM, and does not function for top view calculation.

Mid γ Table

This is γ table for rounding the 16 bits of calculation result into 8 bits of data. It consists of ROM.

Mass Memory Interface

This stores the calculation result in one line of FIFO memory. It outputs the request of data transfer to ULDR when data output is available, and output the calculation result according to data output request. This circuit exist in one FPGA (MM ITF) with Data Interface together.


TITLE 名称
VOL / Servo Control
MODEL 形名
EP4469**
1/1
BSC
CSC
Or CMB
Mass
Memory
Interface
(MM ITF)
3D Scanner
Frame
Register
Mid γ
Table
Frame
Register
Mid γ
Table
Calc
FPGA
chA
Calc
FPGA
chB
Power
AMP
Data
Interface
CPU
Interface
Servo
Control
(CPU ITF)
Servo
CPU
BSC
CSC
Or CMB
CPU BUS

4-5-21 Mecha. Connector [Ver.1.1.1 and higher] (PCB for unit SCU-4000)

This circuit board is configured from a connector for a mechanical probe, a Pre Amp and reception circuit for a mechanical probe.

1) Probe Connector for Mecha：

Connects to the mechanical radial probe.

2) Pre Amp for Mecha：

This is a Pre Amp for a mechanical probe with a gain variation function. Maximum gain is 30 dB.

3) Band Pass Filter for Mecha：

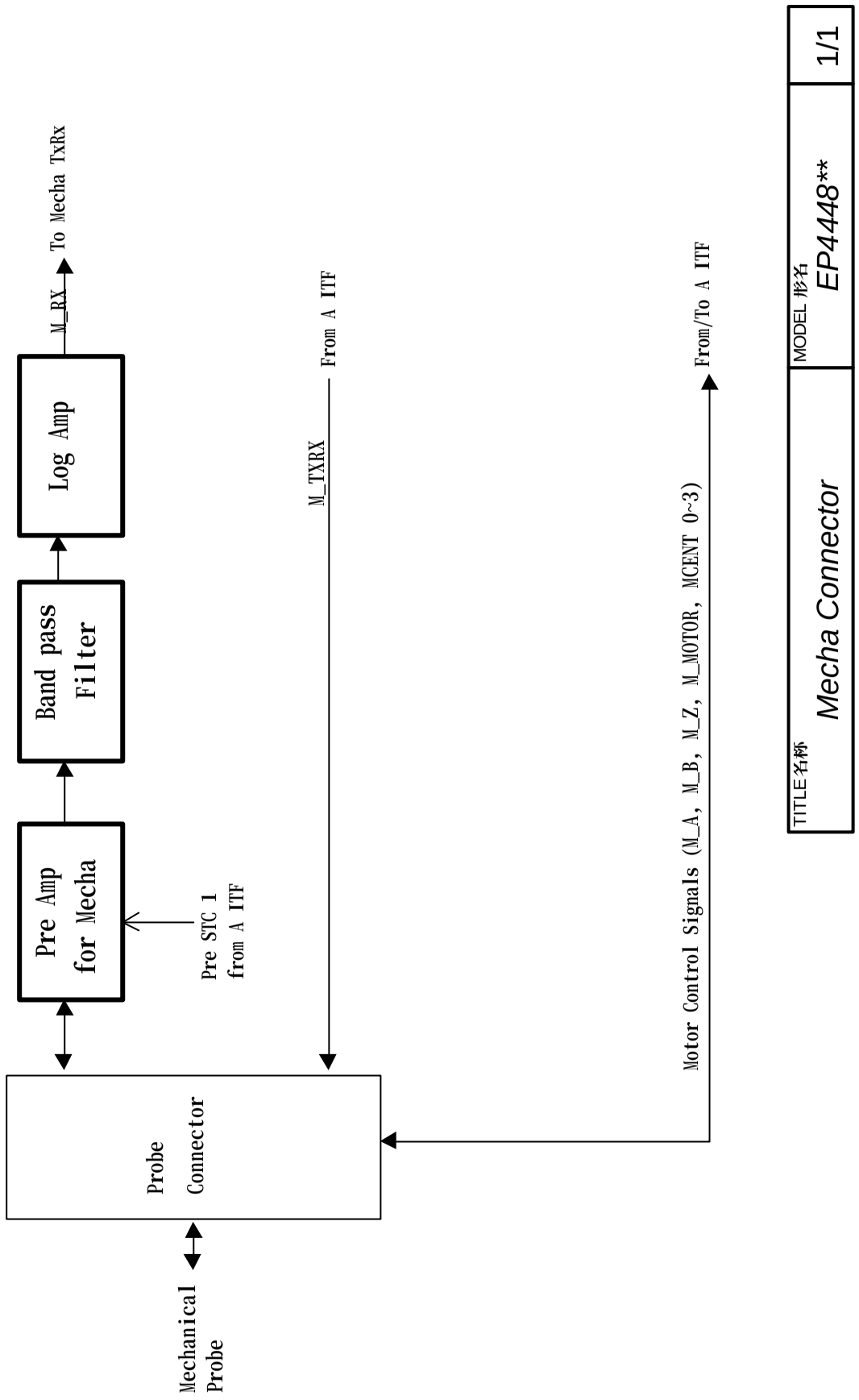
This is a band pass filter which changes the frequency according to the depth of the image.

4) 30dB Amp

There are two 30dB AMPs to consist of LOG amp. The total gain becomes 60dB.

5) Log Amp (Reception Log Amp)：

Performs Log compression. Output signals are sent to the AD_DA board.


Mechanical Probe
Probe Connector
Pre Amp for Mecha
Band pass Filter
Log Amp
Pre STC 1 from A ITF
M_TXRX
From A ITF
M_RX
To Mecha TxRx
Motor Control Signals (M_A, M_B, M_Z, M_MOTOR, MCENT 0~3)
From/To A ITF
TITLE名称
Mecha Connector
MODEL 形名
EP4448**
1/1

4-5-22 VCM (Video Cine Memory) [Ver.1.1.2 and higher]

This circuit board executes the multi-frame storage for DICOM, and it consists of the following blocks.

- PCI AND PLX9050 LOCAL INTERFACE BLOCK
- DSP LOCAL INTERFACE BLOCK
- VIDEO CONTROL BLOCK
- MEMORY CONTROL BLOCK
- DIMM（64M bytes x 4）MEMORY FOR IMAGE STORAGE

1) PCI AND PLX9050 LOCAL INTERFACE BLOCK

This block consists of “PCI interface” to communicate with HOST and local interface of “PLX9050” for “PCI-TO-LOCAL BUS”. The HOST can be linked together with DSP by interfacing via this local bus.

2) DSP LOCAL INTERFACE BLOCK

This block executes the control and calculation of firmware with DSP. DSP executes a basic control together with software to output the converted image data according to direction of command and parameter inputted from HOST.

3) VIDEO CONTROL BLOCK

This block controls together with "MEMORY CONTROL" the input of image data from LVDS, the data conversion for writing into the image memory (DIMM), and the data conversion in the image memory for output to LVDS.

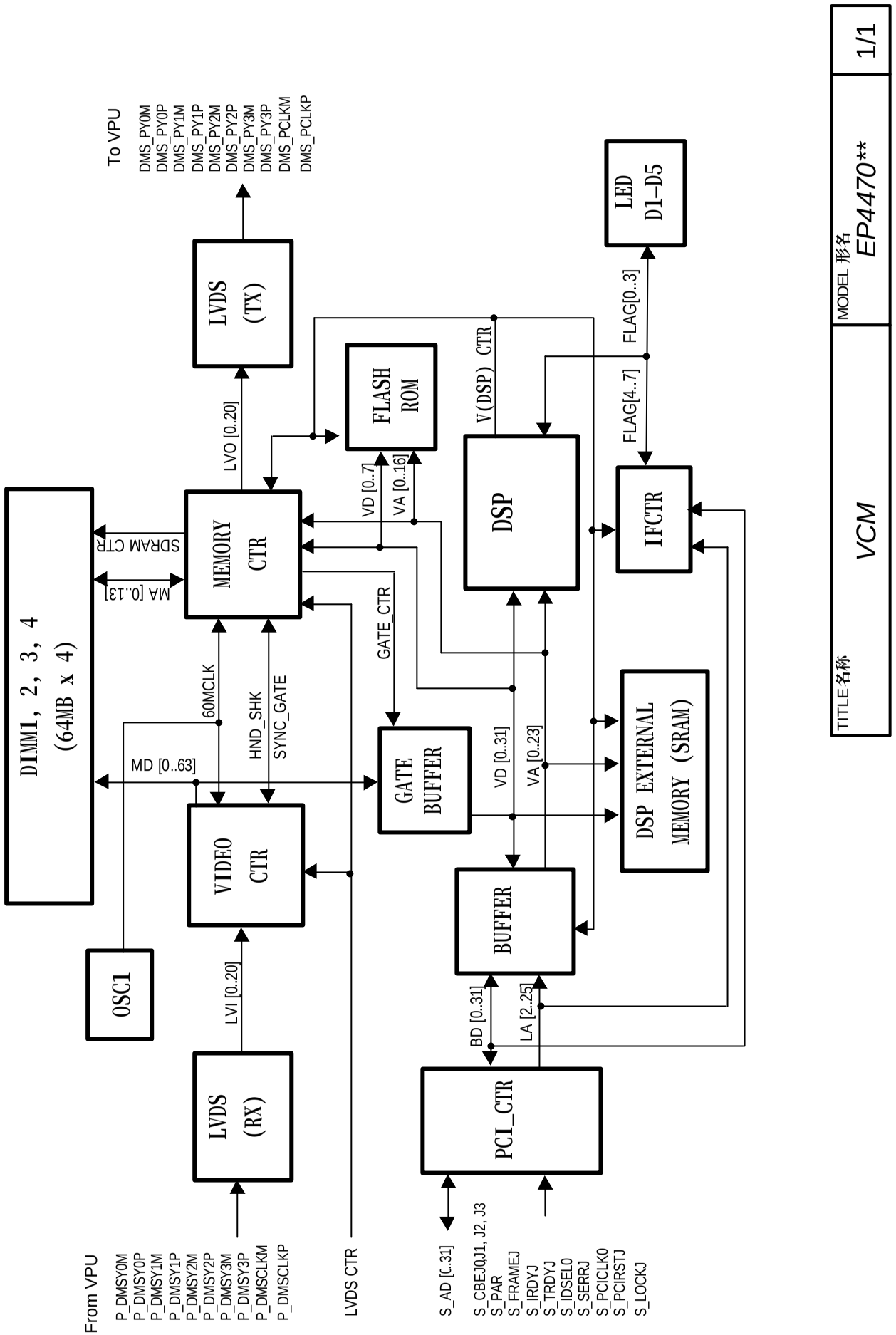
4) MEMORY CONTROL BLOCK

This block generates address of image memory (DIMM) and control signals, and controls the gate signal of the pointer (position) for display.
This block executes both the acquisition of external IN/OUT signals and the request of interruption for DSP. And, it has a control register and parameter register from DSP.

5) DIMM MEMORY FOR IMAGE STORAGE

The writable frame number in the image memory is as follows.

・B/W （Black-and-White）	8-bit data：	Max. 216 frames
・Parette (Color)	14-bit data：	Max. 108 frames
・RGB（Color）	16-bit data：	Max. 108 frames


TITLE 名称
VCM
MODEL 形名
EP4470**
1/1
To VPU
DMS_PY0M
DMS_PY0P
DMS_PY1M
DMS_PY1P
DMS_PY2M
DMS_PY2P
DMS_PY3M
DMS_PY3P
DMS_PCLKM
DMS_PCLKP
LVDS (TX)
LVO [0..20]
FLASH ROM
VD [0..7]
VA [0..16]
V(DSP) CTR
LED D1–D5
FLAG[0..3]
FLAG[4..7]
DSP
IFCTR
DIMM1, 2, 3, 4 (64MB x 4)
SDRAM CTR
MA [0..13]
MEMORY CTR
60MCLK
HND_SHK
SYNC_GATE
GATE_CTR
MD [0..63]
GATE BUFFER
VD [0..31]
VA [0..23]
DSP EXTERNAL MEMORY (SRAM)
VIDEO CTR
BUFFER
OSC1
LVI [0..20]
BD [0..31]
LA [2..25]
LVDS (RX)
PCI_CTR
From VPU
P_DMSY0M
P_DMSY0P
P_DMSY1M
P_DMSY1P
P_DMSY2M
P_DMSY2P
P_DMSY3M
P_DMSY3P
P_DMSCLKM
P_DMSCLKP
LVDS CTR
S_AD [0..31]
S_CBEJ0J1, J2, J3
S_PAR
S_FRAMEJ
S_IRDYJ
S_TRDYJ
S_IDSEL0
S_SERRJ
S_PCICLK0
S_PCIRSTJ
S_LOCKJ

4-5-23 Tx & Tx Focus 2

This circuit board performs setting of the amount of delay in each channel for electronic focusing of transmission, and outputs a transmission trigger signal at the TTL level (to the transmission drive circuit). The output transmission trigger is used in the B (M) mode, PW Doppler mode, Flow mode and STCW mode. THE (Tissue Harmonic Echo) image is also available.

1) TX_CNT (Tx Control, FPGA)
   This latches transmission conditions set externally and generates Focus calculator, Delay data and Gate Array control signals.

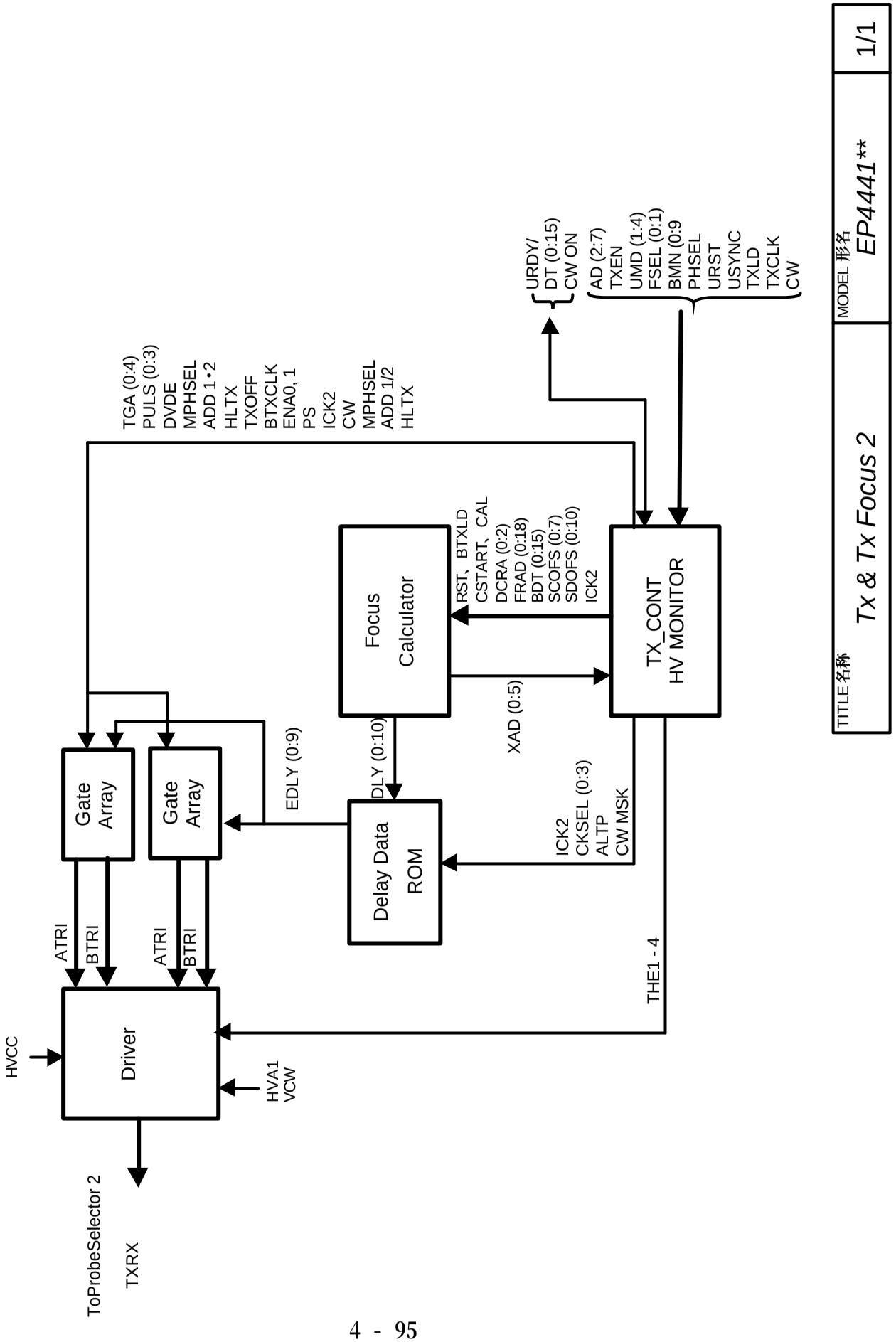
2) FocusCalculator
   Outputs delay amount data to perform transmission focusing.

3) Delay Data ROM
   Outputs delay data based on delay amount data sent from Focus Calculator.

4) Gate Array
   Generates a transmission trigger for each channel based on the delay data (amount of delay) set for each channel from ROM and wave count data (number of transmission wave pulses).

5) Driver
   This is the output driver for the transmission trigger signal. Also, this generates transmission signal for STCW.

6) HV Monitor
   Converts high voltage to digital, then outputs it as register data.


TITLE 名称
Tx & Tx Focus 2
MODEL 形名
EP4441**
1/1
TGA (0:4)
PULS (0:3)
DVDE
MPHSEL
ADD 1・2
HLTX
TXOFF
BTXCLK
ENA0, 1
PS
ICK2
CW
MPHSEL
ADD 1/2
HLTX
URDY/
DT (0:15)
CW ON
AD (2:7)
TXEN
UMD (1:4)
FSEL (0:1)
BMN (0:9
PHSEL
URST
USYNC
TXLD
TXCLK
CW
Focus
Calculator
TX_CONT
HV MONITOR
RST、BTXLD
CSTART、CAL
DCRA (0:2)
FRAD (0:18)
BDT (0:15)
SCOFS (0:7)
SDOFS (0:10)
ICK2
XAD (0:5)
Gate
Array
Gate
Array
EDLY (0:9)
DLY (0:10)
Delay Data
ROM
ICK2
CKSEL (0:3)
ALTP
CW MSK
ATRI
BTRI
ATRI
BTRI
THE1 - 4
HVCC
Driver
HVA1
VCW
ToProbeSelector 2
TXRX

4-5-24 CMB

This consists of the Ultrasonic Line Data Receiver (ULDR), Mass Memory (MM) and Scan converter (SC) for the black-and white mode (B, M, D-modes) and Color Flow mode. And the timing is achieved by the TV timing signal and signals, etc. for specifying the screen display frame, etc. and the basic clock in the Digital Imaging Unit is generated.

For B/W mode

Ultrasonic Line Data Receiver:

For Plane mode, It carries out preprocessing of data received from the Ultrasonic Line Data Bus, such as correlation, , and send it to Mass Memory

For Line mode, It performs mainly sweep speed generation and US data re-sampling for the Line Mode (M-mode, Doppler Mode).

Mass Memory:

This is large capacity memory, which is capable of storing 65536 black and white lines sent from the ULDR block. And Frame correlation circuit for black-and-white is also mounted on this board.

The ultrasound data stored in this memory are used for real time display and for Search in Cine memory.

Data read from this mass memory are sent to the SC BW block.

Scan Converter:

This carries out 2-dimensional interpolation of Ultrasound line data sent from mass memory, the same as the SSD-5000/5500, then converts them to the TV display format and outputs them.

1) Line Correlation Circuit for B/W Data

   Line Memory ：

   There are two line memories, each line memory has a capacity for a respective ultrasound line (512 pixels x 6 bits) and is used in line correlation.

   By gathering 3 ultrasonic lines (2 lines from line memory and 1 line as current ultrasonic data) and applying a FIR filter in the horizontal direction, line correlation is accomplished.

2) B/W Data Frame Correlation Circuit

   Frame Correlation Auto Setting: In order to prevent differences in the apparent fast and slow frame rate effect in the same correlation, the correlation table is switched to match the frame rate.

3) Line Buffer Memory (for M & Doppler)：

   This is line buffer memory for time axis adjustment with a 512 pixel x 6-bit capacity.

4) Mass Memory Controller

   This generates mass memory read, write and refresh cycles.

5) Mass Memory

   This is variable length mass memory with a capacity of 65536 records (US Lines). The

memory's capacity is 65536 records x 512 pixels x 6 bits, and is controlled every 32 records/cluster. STORE image for Cine Memory is recorded in Hard Disk.

6) Vector RAM

Parameters used in interpolation of ultrasound data are set in this Vector RAM from the MGR (Manager) board.

This memory has a capacity of 128 KBytes, enough for 2 frames of data with 512 lines per 1 US frame.

7) Address Generator

Generates interpolation address information and Video RAM addresses.

8) SEL

This selects between internal ultrasound data (6-bit) and external VTR data (R, 6-bit).

Signals from the VTR are converted to digital RGB signals (6 bits each) by the VPU board, then are written to Video RAM on the SC BW block and the SC COL block with the following allocations.

R (6-bit) → SC BW Block for BW (within 8 bits), 6 bits are used.

G (6-bit) → SC COL Block for Velocity (within 8 bits), 6 bits are used.

B (6-bit) → SC COL Block for the remaining 2 Velocity bits and for Variance, 4 bits are used

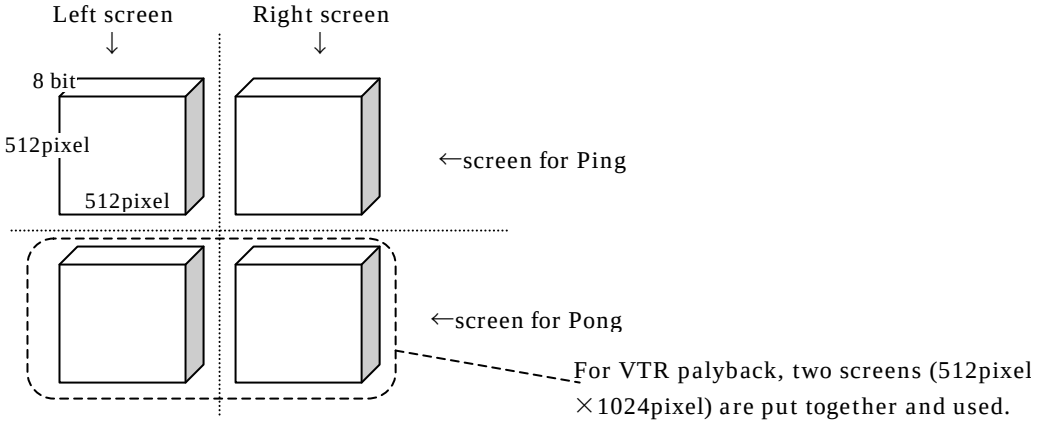
9) 2D Interpolation

This performs calculations for 2-dimensional interpolation. (In the horizontal direction, interpolation of up to 32 pixels can be done.)

6-bit data become 8-bit data after interpolation. (However in M and D, there is no interpolation, so data remain 6-bit data even after being output from the interpolation circuit, and the lower order 2 bits are unused.)

10) Video Memory (1M Byte)

This is display memory with a capacity of 4 screens (512 pixels x 512 pixels x 8 bits per screen) and the 4 screens have the following configuration.



Ultrasonic data are written to this Video RAM in the same display format as that of a TV screen. And they are synchronized with the TV Sync signal and read out. There is enough

memory for 4 screens and they can be used for complex modes (B/M, B/D, B/B), single mode requests after freeze, for Ping-Pong display, etc.

Also, data from the VTR during VTR playback are also written to this Video RAM. (During VTR playback, and during real time, data from the VTR pass through this Video RAM and serve to reduce image wobble.)

The Video RAM write cycle is 80 ns and data from the VTR can also be written to it directly (without passing through the VTR ITF, etc.)

11) VGA Display Control block

This block performs TV display control to satisfy the specification of non interlace display by using the ASICfor non interlace diplay.

- Read Zoom

  This is a circuit for performing Zooming (Read Zoom) after frozen.

- SEL

  This selects between a normal image and a Zoom image.

For Color Flow mode

This consistes of the Ultrasonic Line Data Receiver (ULDR) for Color flow mode (Plane and Line Modes), Mass Memory and Scan Converter.

ULDR:

It carries out preprocessing of Color Flow data (Velocity and Variance) received from the Ultrasonic Line Data Bus, such as correlation, and sends it to Mass Memory.

Mass Memory:

This is a large capacity memory where 65,536 lines of color line information (Velocity: 6-bit; Variance: 4-bit) sent from the ULDR block can be stored. And Frame correlation circuit for color (Velocity) is also mounted on this board.

The color data stored in this memory (Velocity, Variance) are used for real time display and for Search in Cine memory.

Data read from mass memory are sent to the SC COL block.

SC COL:

Color line data (Velocity, Variance) sent from mass memory undergo 2-dimensional interpolation and converted to TV display format, then output.

13) Velocity Data Frame Correlation Circuit

This is configured from a Frame Correlation Table and a Selector. It has the same operation as the circuit for B/W.

14) M Flow Line Buffer Memory (for M Flow)：

This is line buffer memory for time axis adjustment with a 512 pixel x 6-bit capacity.

15) Mass Memory Controller

This generates timing signals (mass memory read, write and refresh cycles) for mass

memory, and rearrange the data according to the their signals. When read out the data (Volocity deta only) from mass memory, it adds the beam number into the data.

16) Mass Memory

These are memories to store the Velocity and Variance data.

These are two variable length mass memory with a capacity of 65536 records (US Lines).

17) Frame Accelerator

This circuit executes the frame interpolation, to increase frame rate of velocity data in appearance.

18) Vector RAM

Parameters used in interpolation of ultrasound data are set in this Vector RAM from the MGR (Manager) board.

This memory has a capacity of 128 KBytes, enough for 2 frames of data with 512 lines per 1 US frame.

19) Address Generator

Generates interpolation address information and Video RAM addresses.

Velocity Data

20) SEL： Switches between internal Velocity data (6-bit) or external VTR data (Green: 6-bit + Blue: 2-bit).

21) 2D Interpolation：

Performs calculations for 2-dimensions interpolation.

22) Video memory：

This is display memory with the capacity for 4 screens worth (512 pixels x 512 pixels x 8 bits per screen).

Velocity data (6-bit) are written to this Video memory in the same display format as that of a TV screen. And they are synchronized with the TV Sync signal and read out.

23) VGA Display Control block:

This block performs TV display control to satisfy the specification of non interlace display by using the ASICfor non interlace diplay.

Read Zoom：

This circuit performs Zoom operation (Read Zoom) after freeze.

SEL：

Switches between the normal image and the zoom image.

Variance Data

24) SEL： Switches between internal Variance data (4-bit)) and external VTR data (Blue, 4-bit).

25) 2D Interpolation：

Performs the calculations necessary for 2-dimensional interpolation.

26) Video memory：

This is display RAM with a 4-screen capacity (512 pixel x 512 pixel x 4 bits per screen). Variance data (4-bit) are written to this video RAM in the same display format as a TV screen, and are read out in sync with the TV's sync signal.

27) VGA Display Control block:

This block performs TV display control to satisfy the specification of non interlace display by using the ASICfor non interlace diplay.

Read Zoom：

This is a circuit for executing a zoom operation (Read Zoom) after freeze.

SEL：

This selects between the normal image and a zoom image.Velocity Data

28) Clock Generator

This is the Digital Imaging Unit's main clock. The divided by 4 clock is sent to each PCB in the DIU.

29) MM_SC Vector

Generates Vector RAM data and outputs them to both BSC and CSC boards.

30) Timing Table

This controls TV Timing signal and signal for setting of the frame of image.

This memory is divided between that for Horizontal and that for Vertical, with the addresses being circulated and display frame generated and supplied to each block.

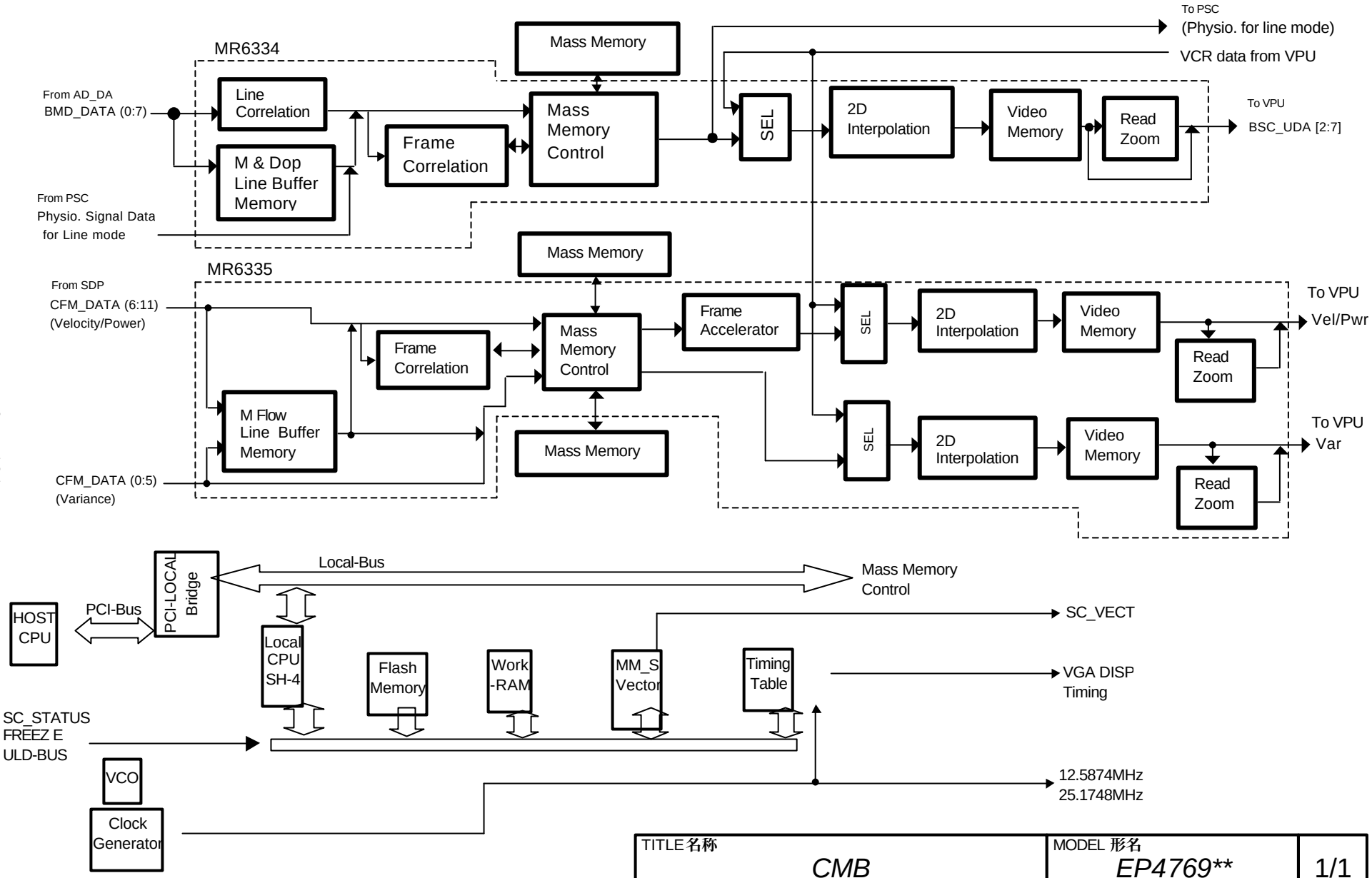
31) Local CPU (SH-4)

This is the main 24-bit digital signal processor, which operates at 40 MHz.

This gemerates control signal for Mass Memory in this board.

32) PCI-Local Bus Interface

Interface between Compact PCI Bus and Local Bus.

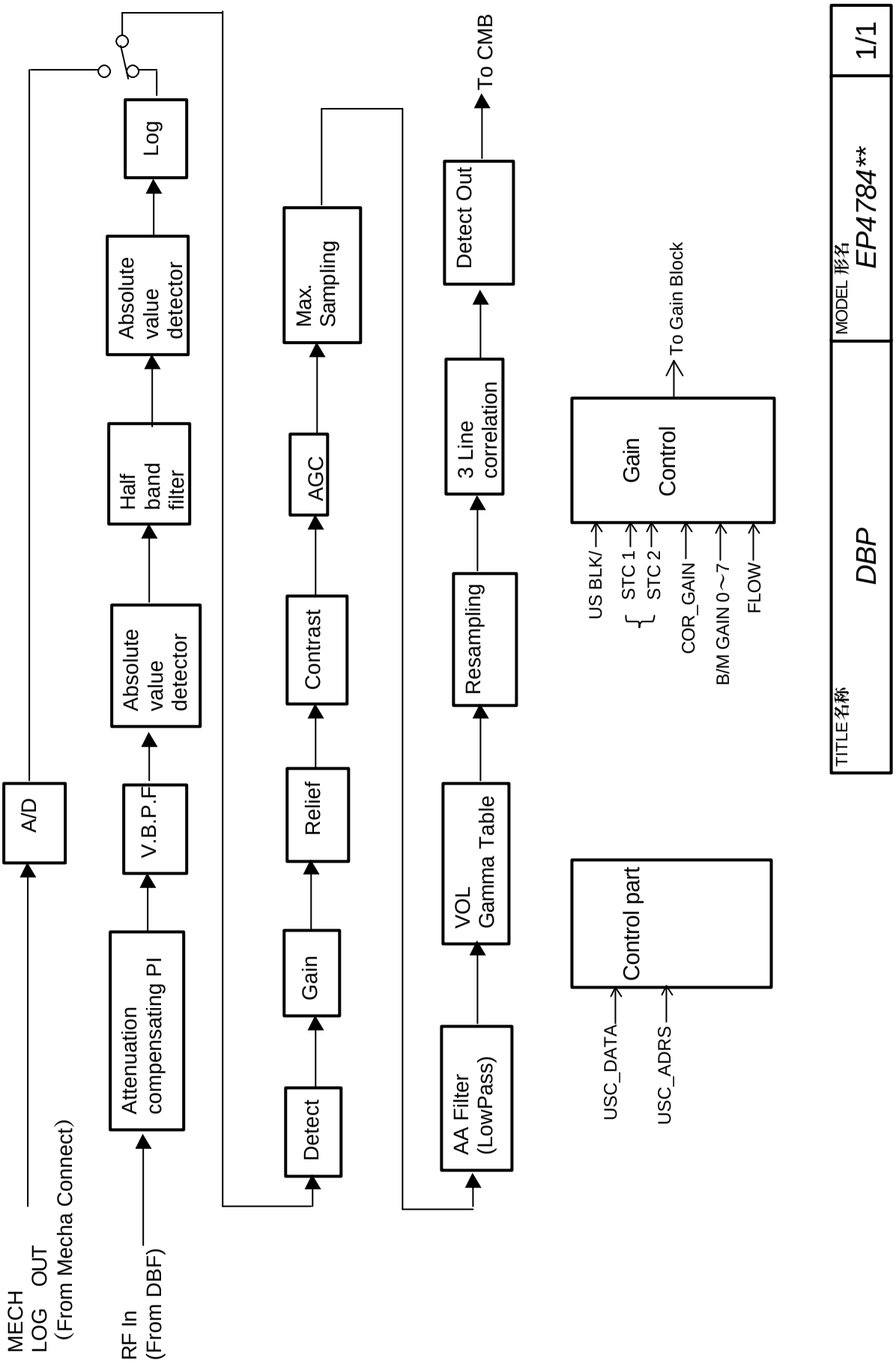


TITLE 名称	MODEL 形名	
CMB	*EP4769***	1/1

4-5-25 DBP

DBP is the beam process for BW image. (Equivalent to Main AMP in the conventional machine.) It processes the reception signal from Beam Former digitally and outputs to Digital Imaging Unit.

1) Digital Filter (Variable central frequency BPF):
   The 16bit US signal phase added by Beam Former is band-limited at ML2011. Each ML2011 has 64 kinds of BPF with a 9-tap FIR (20-tap for Harmonic Echo) that is divided into 64 in the depth direction and assigned appropriately for use.
2) Digital Signal Processing:
   Digital Signal Processing consists of Log Compression, Demodulation, Relief, AGC, CONTRAST, VIDEO AMP, and AA FILTER.
   The signal processing functions are FTC, RELIEF (4 steps), AGC (16 steps) and CONTRAST (16 steps).
3) Gain Control:
   Gain is controlled by follows:
   - BW Gain: It is controlled from the operation panel (It is set to this PCB digitally via USC Bus as well as the other register data).
   - STC1: It is controlled from the operation panel.
   - STC2: It compensates the gain difference caused by scan angle.
   - FLOW: During M-Flow, it compensates the BW gain that becomes too high (too bright BW) due to the burst pulse transmission.
   - COR_GAIN: It compensates the signal level difference at the transmission dynamic focusing.
4) Digital Output:
   After AA Filter, pixel skipping is done to match the specified number of samples at FIFO for output data.
5) Control:
   It generates the control signal required for this PCB. Basic clock is 4f0 for Single Process Mode and 8f0 for Parallel Process Mode.


MECH
LOG OUT
(From Mecha Connect)
RF In
(From DBF)
A/D
V.B.P.F
Attenuation compensating PI
Absolute value detector
Half band filter
Absolute value detector
Log
Detect
Gain
Relief
Contrast
AGC
Max. Sampling
AA Filter (LowPass)
VOL Gamma Table
Resampling
3 Line correlation
Detect Out
To CMB
USC_DATA
USC_ADRS
Control part
US BLK/
STC 1
STC 2
COR_GAIN
B/M GAIN 0～7
FLOW
Gain Control
To Gain Block
TITLE 名称
DBP
MODEL 形名
EP4784**
1/1

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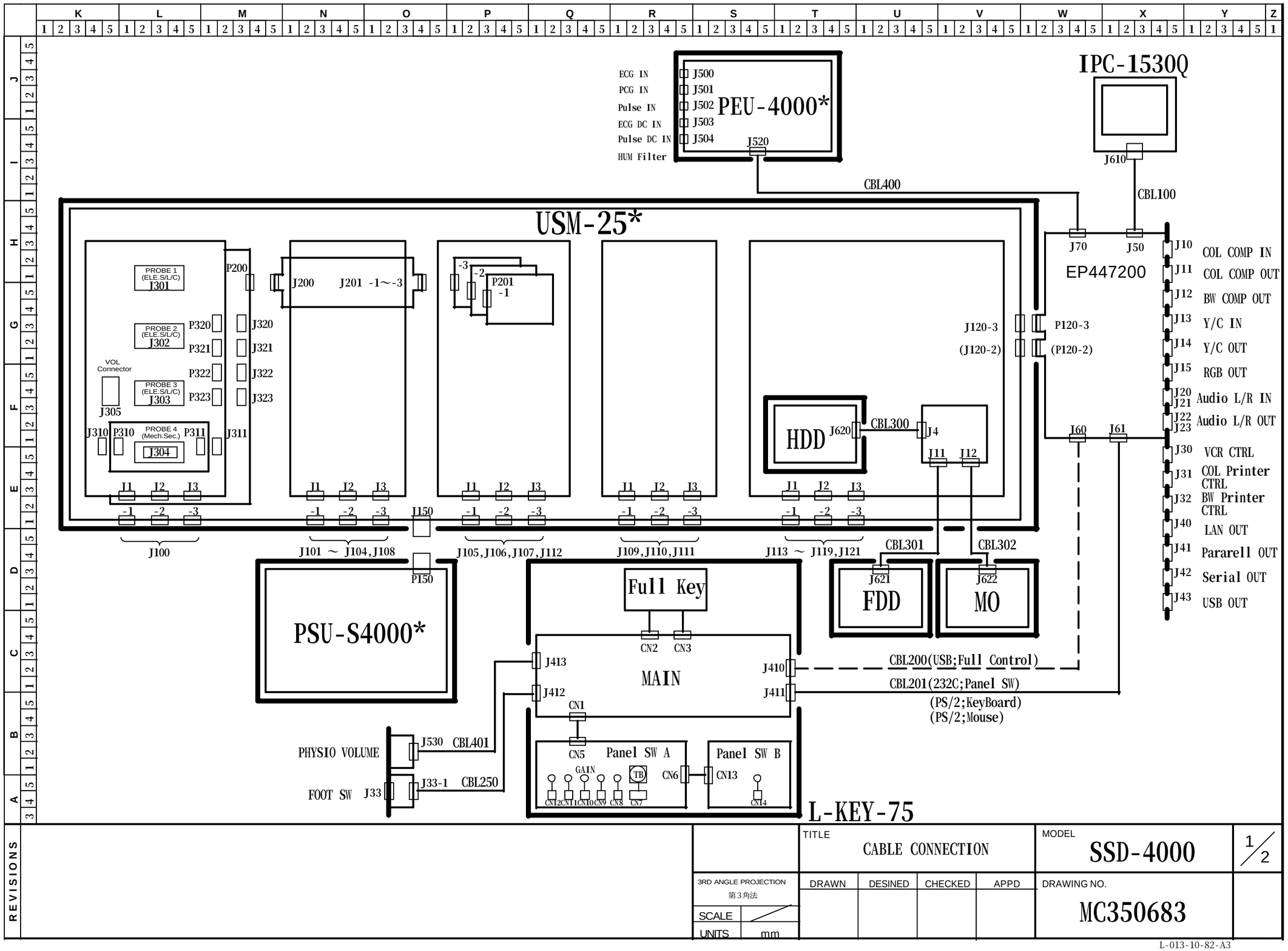
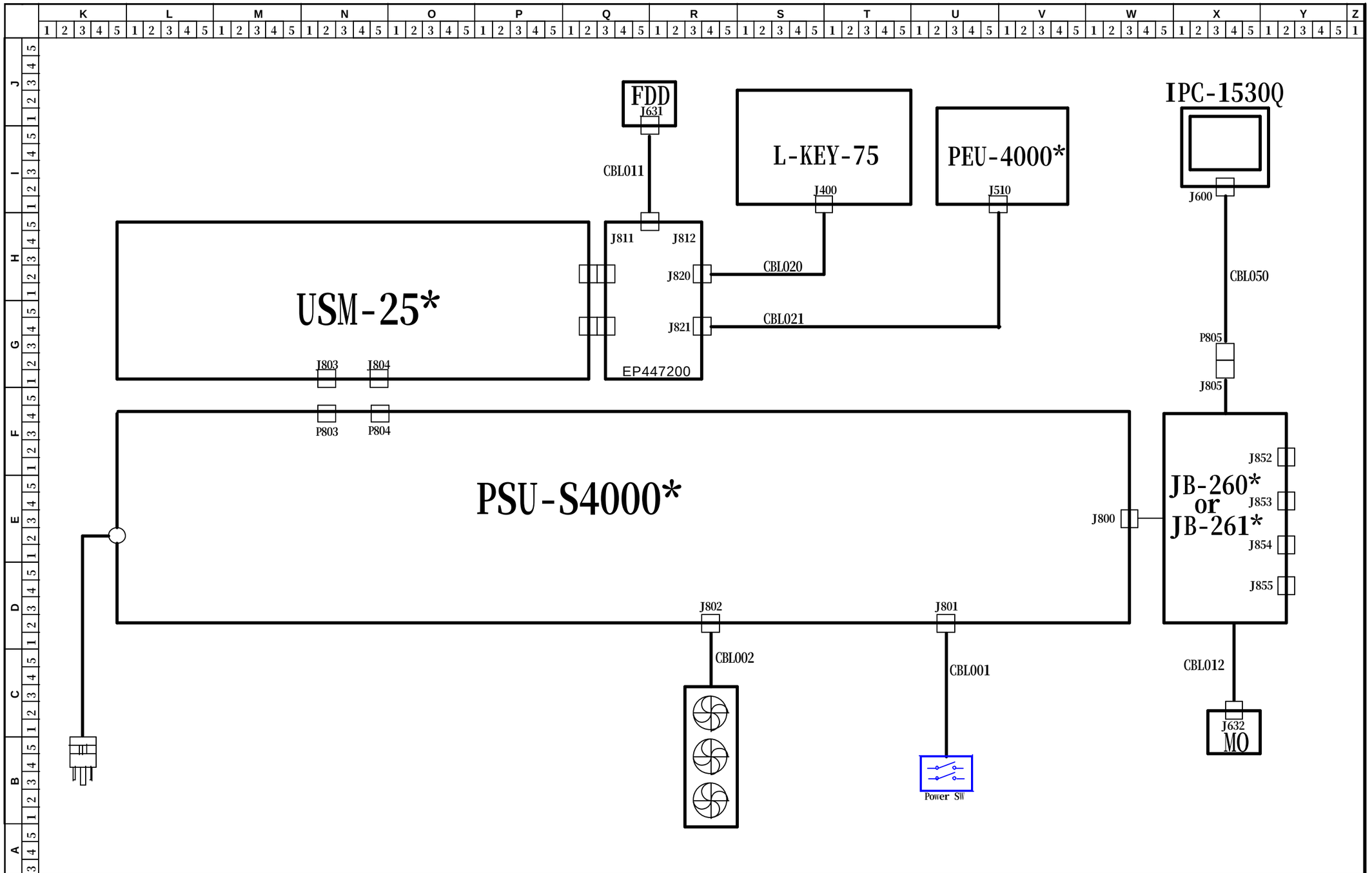
SECTION 5

SCHEMATICS



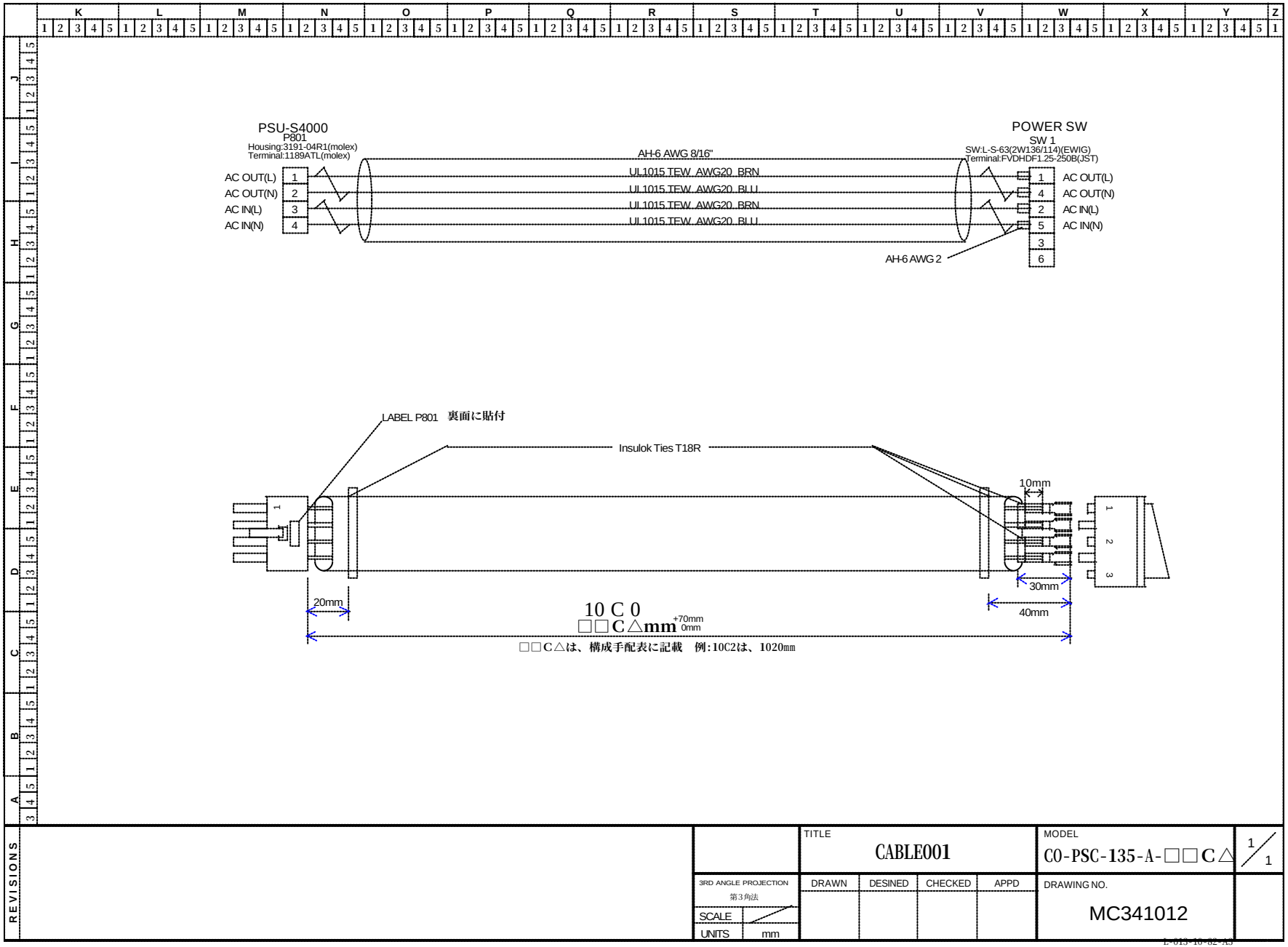
REVISIONS		TITLE	MODEL	
		CABLE CONNECTION	SSD-4000	1/2
3RD ANGLE PROJECTION 第3角法		DRAWN / DESINED / CHECKED / APPD	DRAWING NO.	
SCALE			MC350683	
UNITS	mm			

L-013-10-82-A3



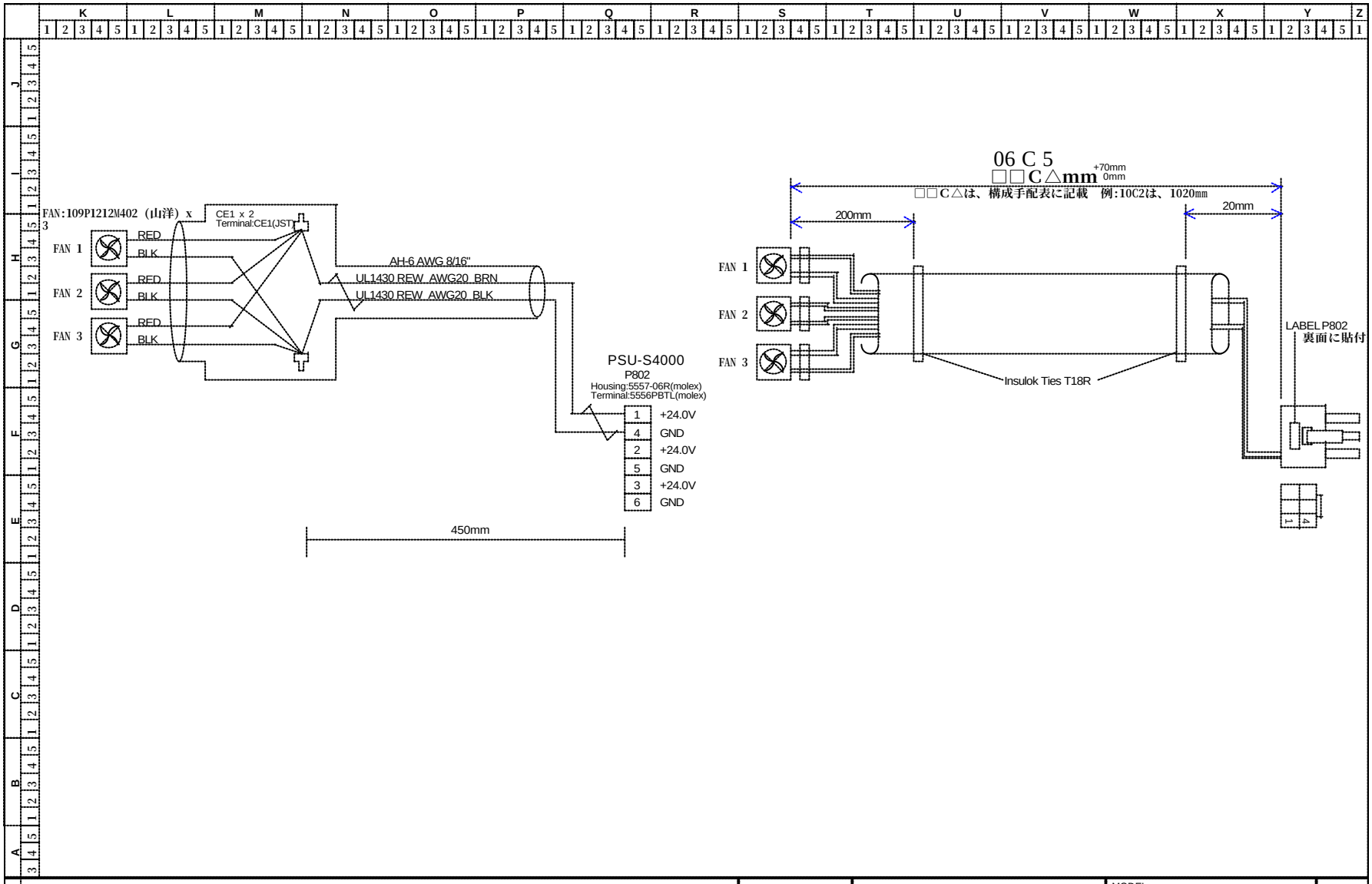
REVISIONS		TITLE: CABLE CONNECTION	MODEL: SSD-4000	2/2
	3RD ANGLE PROJECTION 第3角法	DRAWN / DESINED / CHECKED / APPD	DRAWING NO. MC350684	
	SCALE / UNITS mm			

L-013-10-82-A3



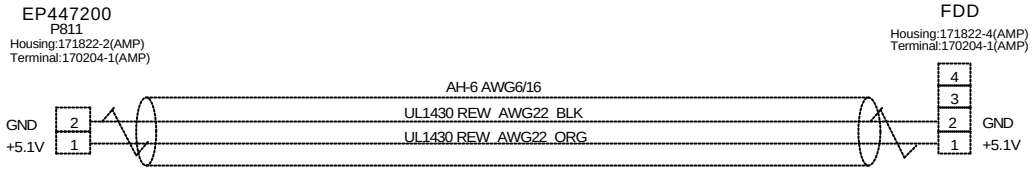
REVISIONS		TITLE: CABLE001	MODEL: C0-PSC-135-A-□□C△	1/1
	3RD ANGLE PROJECTION 第3角法 SCALE UNITS mm	DRAWN / DESINED / CHECKED / APPD	DRAWING NO. MC341012	

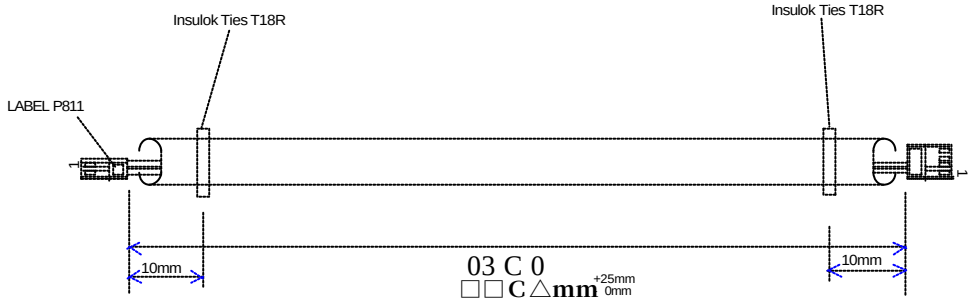
L-013-16-02-A3



REVISIONS		TITLE: CABLE002	MODEL: CO-PSC-135-B-□□C△	1/1
	3RD ANGLE PROJECTION 第3角法	DRAWN / DESINED / CHECKED / APPD	DRAWING NO. MC341013	
	SCALE / UNITS mm			

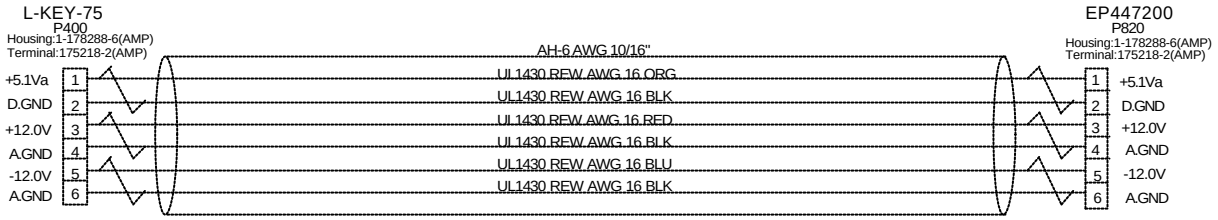
L-013-10-82-A3

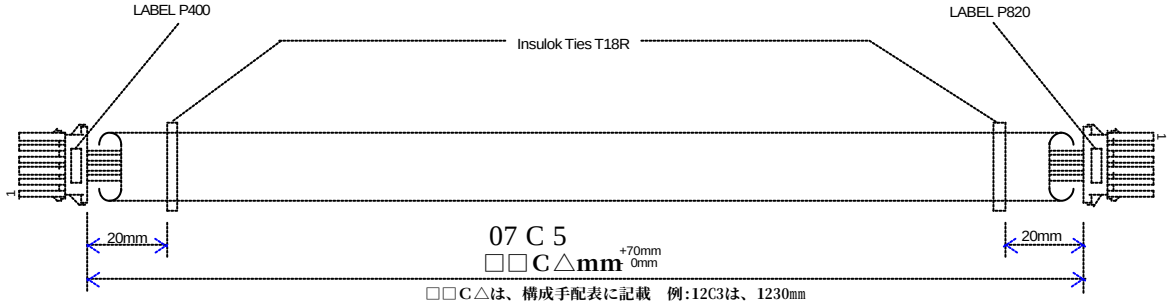




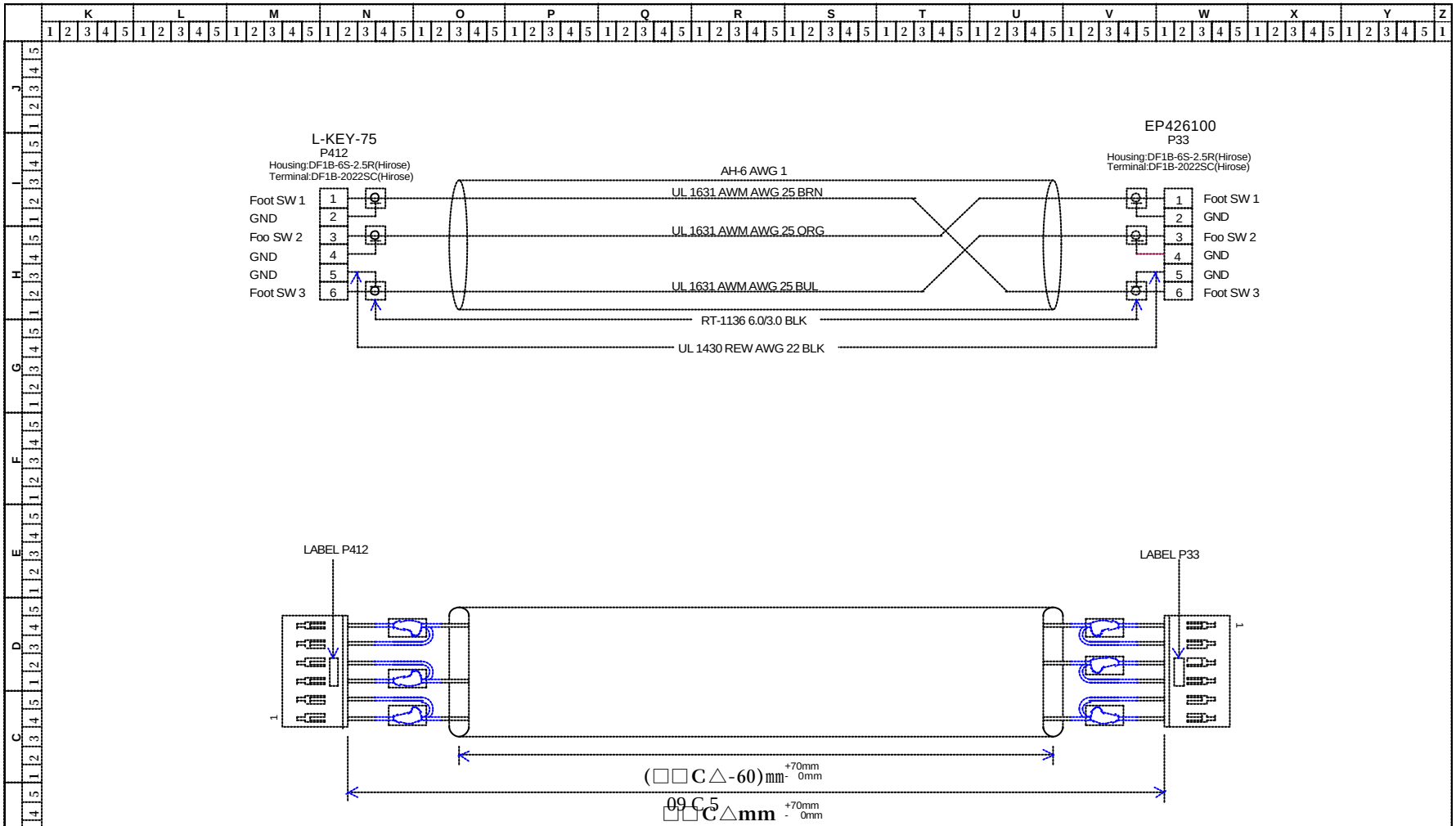
REVISIONS		TITLE: CABLE011			MODEL: C0-PSC-135-C-□□C△ 1/1
	3RD ANGLE PROJECTION 第3角法	DRAWN	DESINED	CHECKED	APPD
	SCALE				DRAWING NO. MC341014
	UNITS mm				

L-013-16-82-A3



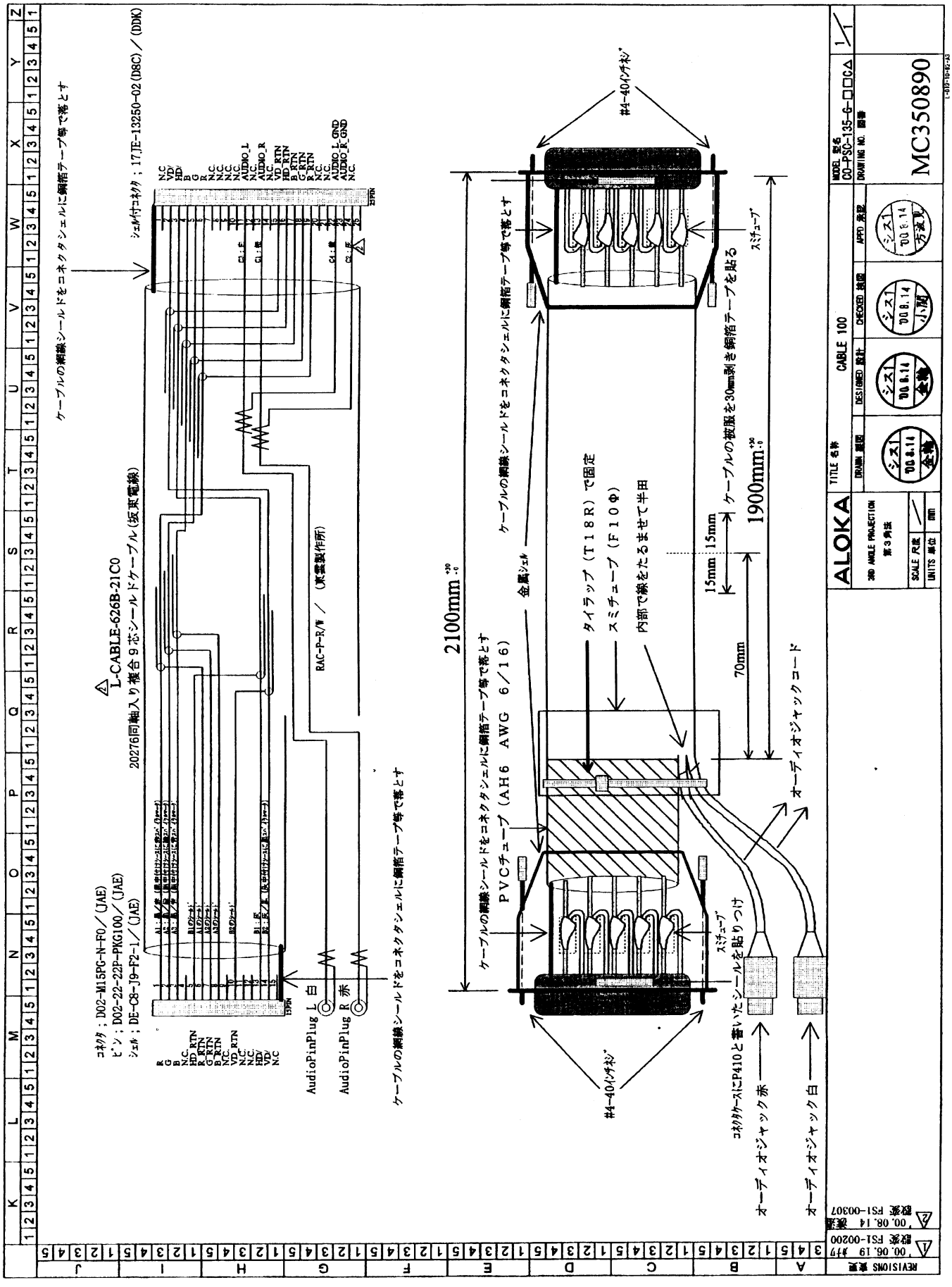


REVISIONS		TITLE: CABLE020	MODEL: C0-PSC-135-E-□□C△	1/1
	3RD ANGLE PROJECTION 第3角法 SCALE / UNITS mm	DRAWN / DESINED / CHECKED / APPD	DRAWING NO. MC341016	



REVISIONS		TITLE: CABLE250		MODEL: C0-PSC-135-F-□□C△	1/1
	3RD ANGLE PROJECTION 第3角法	DRAWN	DESINED	CHECKED	APPD
	SCALE				DRAWING NO. MC341018
	UNITS mm				

L-615-16-82-A5

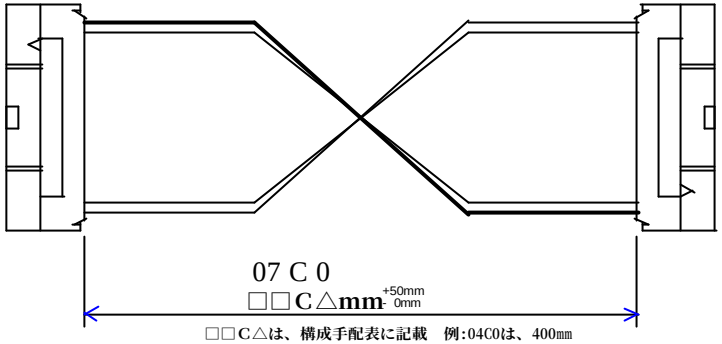

ケーブルの網線シールドをコネクタシェルに銅箔テープ等で落とす
L-CABLE-626B-21C0
20276同軸入り複合9芯シールドケーブル(坂東電線)
コネクタ；D02-M15PG-N-F0／(JAE)
ピン；D02-22-22P-PKG100／(JAE)
シェル；DE-C8-J9-F2-1／(JAE)
シェル付コネクタ；17JE-13250-02(D8C)／(DDK)
AudioPinPlug L 白
AudioPinPlug R 赤
RAC-P-R/W ／ (東雲製作所)
2100mm
PVCチューブ（AH6 AWG 6／16）
金属シェル
タイラップ（T18R）で固定
スミチューブ（F10Φ）
内部で線をたるませて半田
15mm 15mm
70mm
1900mm
ケーブルの被服を30mm剥き銅箔テープを貼る
#4-40インチネジ
オーディオジャックコード
コネクタケースにP410と書いたシールを貼りつけ
オーディオジャック赤
オーディオジャック白
ALOKA
CABLE 100
MC350890
MODEL 型名
CO-PSC-135-G-□□C△
DRAWING NO. 図番
1/1
3RD ANGLE PROJECTION
第3角法
SCALE 尺度
UNITS 単位
mm
DRAWN 製図
DESIGNED 設計
CHECKED 検図
APPD 承認
REVISIONS 変更
変更 FS1-00307 '00.08.14
変更 FS1-00200 '00.06.19

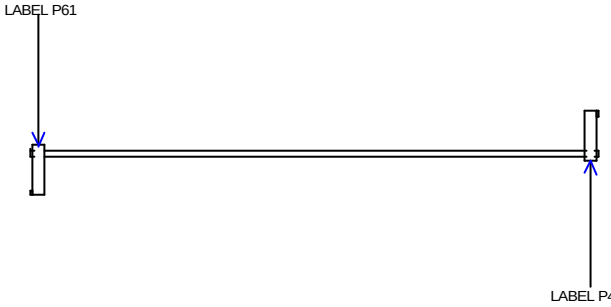
EP447200
P61
Housing:FAS-3001-2101-0BF(YAMAICHI)

TFC28-30C

L-KEY-75
P411
Housing:FAS-3001-2101-0BF(YAMAICHI)

GND	1	1	GND
GND	2	2	GND
GND	3	3	GND
GND	4	4	GND
DMS_LED	5	5	DMS_LED
	6	6	
	7	7	
	8	8	
SRP_RST_	9	9	SRP_RST_
OPI_SELFRZ	10	10	OPI_SELFRZ
OPI_ALLFRZ	11	11	OPI_ALLFRZ
GND	12	12	GND
SRP_CTSB	13	13	SRP_CTSB
SRP_RTSB	14	14	SRP_RTSB
SRP_RXDB	15	15	SRP_RXDB
SRP_TXDB	16	16	SRP_TXDB
GND	17	17	GND
GND	18	18	GND
GND	19	19	GND
GND	20	20	GND
SRP_MFCLK	21	21	SRP_MFCLK
GND	22	22	GND
SRP_MFDATA	23	23	SRP_MFDATA
GND	24	24	GND
GND	25	25	GND
SRP_MBCLK	26	26	SRP_MBCLK
GND	27	27	GND
SRP_KBDATA	28	28	SRP_KBDATA
GND	29	29	GND
GND	30	30	GND



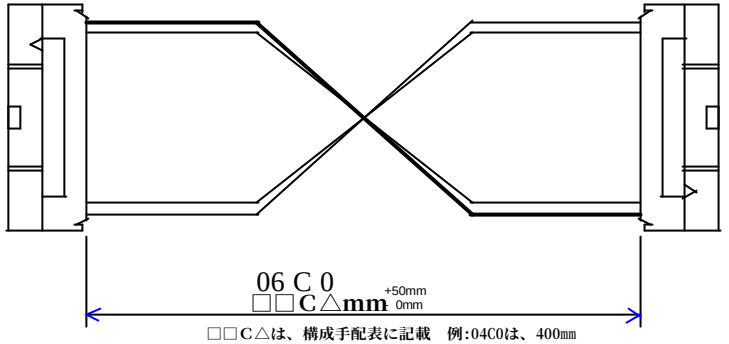


REVISIONS		TITLE	CABLE201	MODEL	C0-PSC-135-H-□□C△
		3RD ANGLE PROJECTION 第3角法	DRAWN / DESINED / CHECKED / APPD	DRAWING NO.	MC341017
		SCALE			
		UNITS mm			

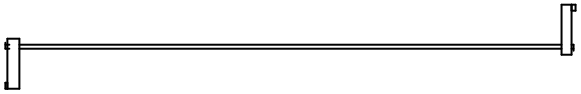
1/1

L-013-10-82-A5

EP4423 Housing:XG4M-3430-T(OMRON) Lock:XG4Z-0002(OMRON)		FLEX-S(34)-7/0.127・2651P		FDD Housing:XG4M-3430-T(OMRON)
GND	1		1	GND
RWC_/RPM_	2		2	RWC_/RPM_
GND	3		3	GND
	4		4	
GND	5		5	GND
	6		6	
GND	7		7	GND
INDEX_	8		8	INDEX_
GND	9		9	GND
MTR0_	10		10	MTR0_
GND	11		11	GND
DRVSEL1_	12		12	DRVSEL1_
GND	13		13	GND
DRVSEL0_	14		14	DRVSEL0_
GND	15		15	GND
MTR1_	16		16	MTR1_
GND	17		17	GND
DIRRSEL	18		18	DIRRSEL
GND	19		19	GND
STEP	20		20	STEP
GND	21		21	GND
WD	22		22	WD
GND	23		23	GND
WG	24		24	WG
GND	25		25	GND
TRK00_	26		26	TRK00_
GND	27		27	GND
WP_	28		28	WP_
GND	29		29	GND
RD	30		30	RD
GDN	31		31	GDN
HDSEL_	32		32	HDSEL_
GND	33		33	GND
DSKHG_	34		34	DSKHG_



□□C△は、構成手配表に記載　例:04C0は、400㎜

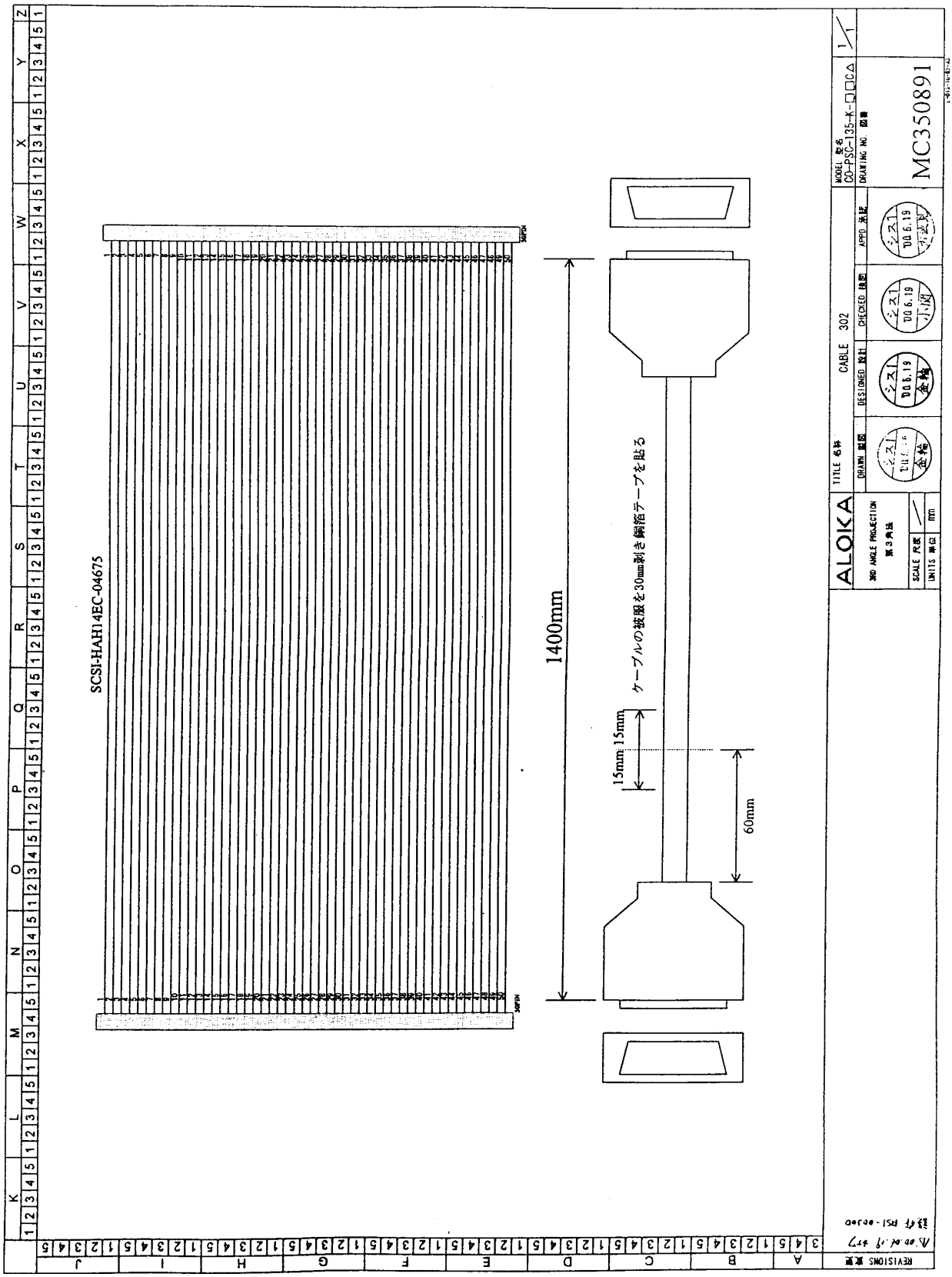


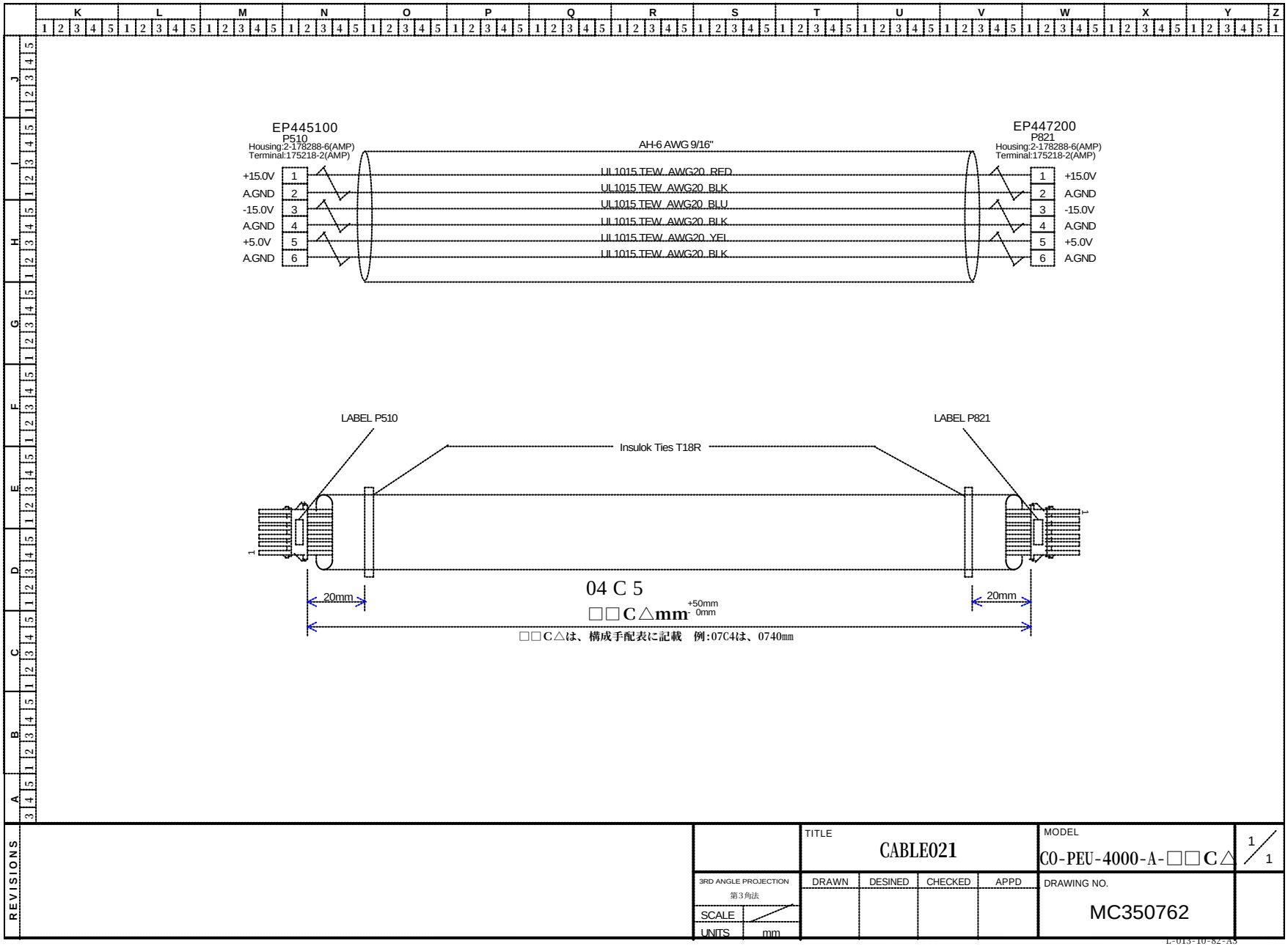
REVISIONS

3RD ANGLE PROJECTION 第3角法	TITLE: CABLE301				MODEL: C0-PSC-135-J-□□C△
SCALE		DRAWN	DESINED	CHECKED	APPD
UNITS: mm					DRAWING NO.: MC341019

1/1

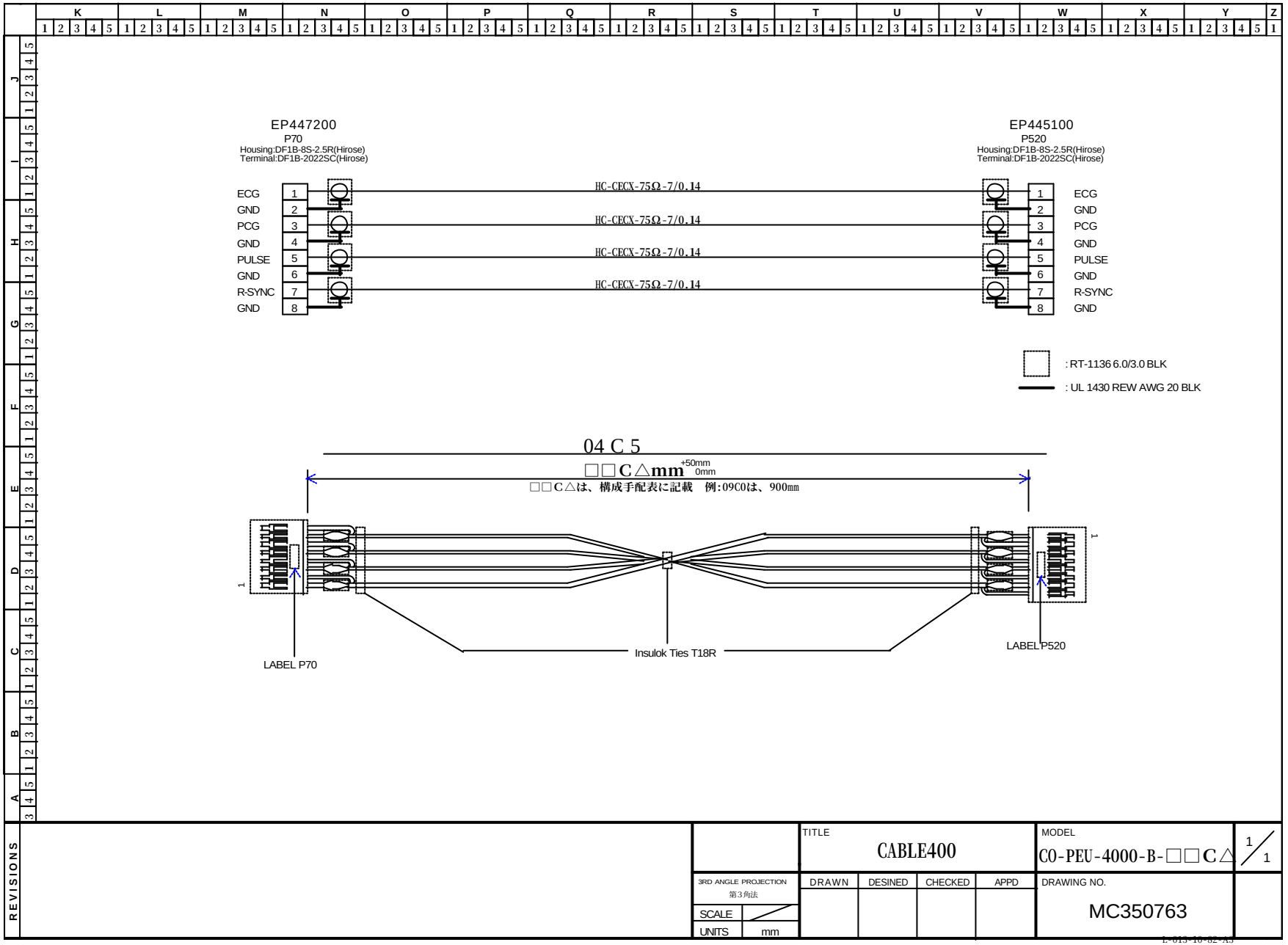
L-013-10-82-A3


SCSI-HAH14EC-04675
1400mm
15mm 15mm
60mm
ケーブルの被服を30mm剥き銅箔テープを貼る
ALOKA
CABLE 302
MC350891



REVISIONS		TITLE: CABLE021		MODEL: C0-PEU-4000-A-□□C△	1/1
	3RD ANGLE PROJECTION 第3角法	DRAWN	DESINED	CHECKED	APPD
	SCALE				DRAWING NO. MC350762
	UNITS mm				

L-013-10-82-A3



REVISIONS		TITLE: CABLE400		MODEL: C0-PEU-4000-B-□□C△	1/1
	3RD ANGLE PROJECTION 第3角法	DRAWN	DESINED	CHECKED	APPD
	SCALE				DRAWING NO. MC350763
	UNITS mm				

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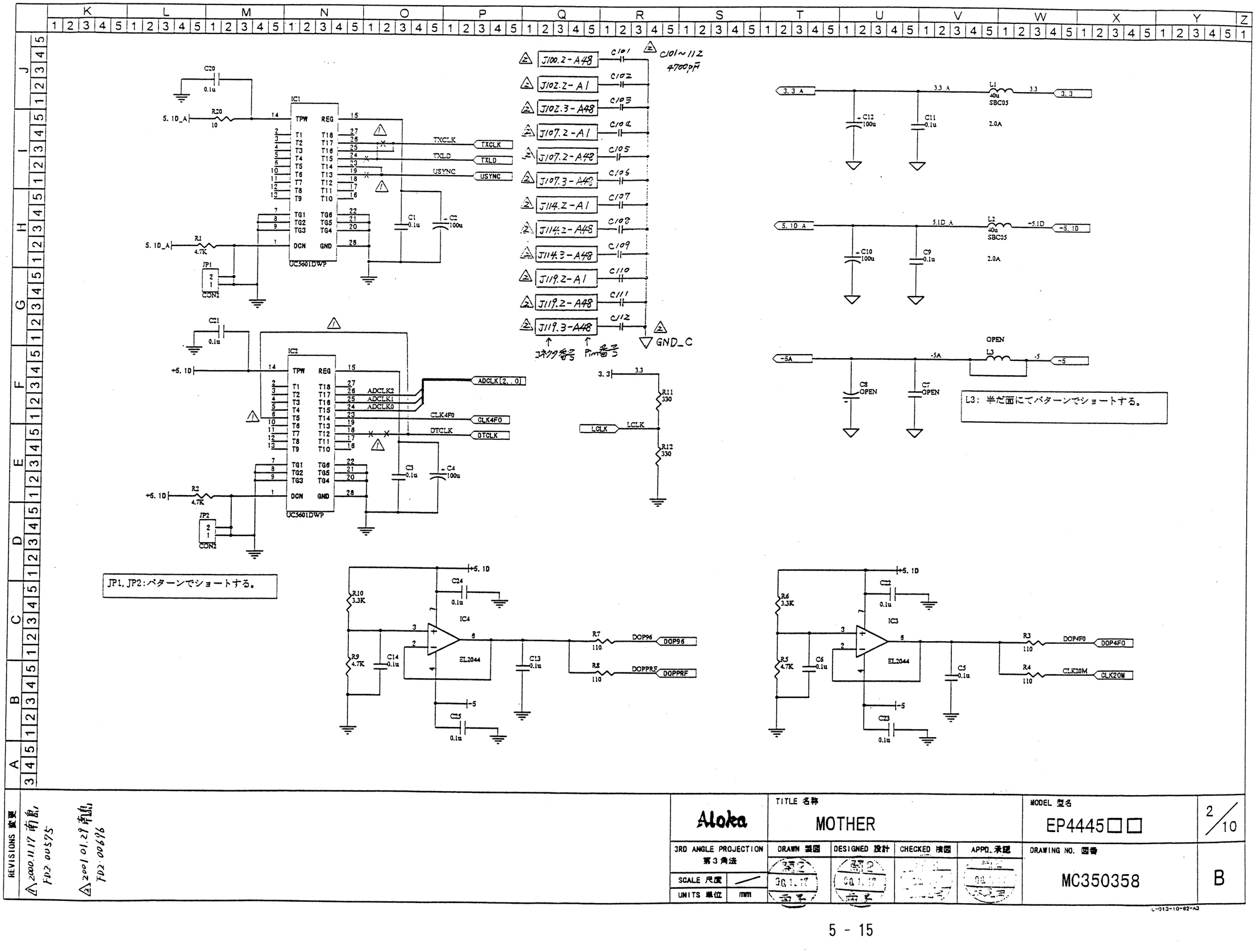
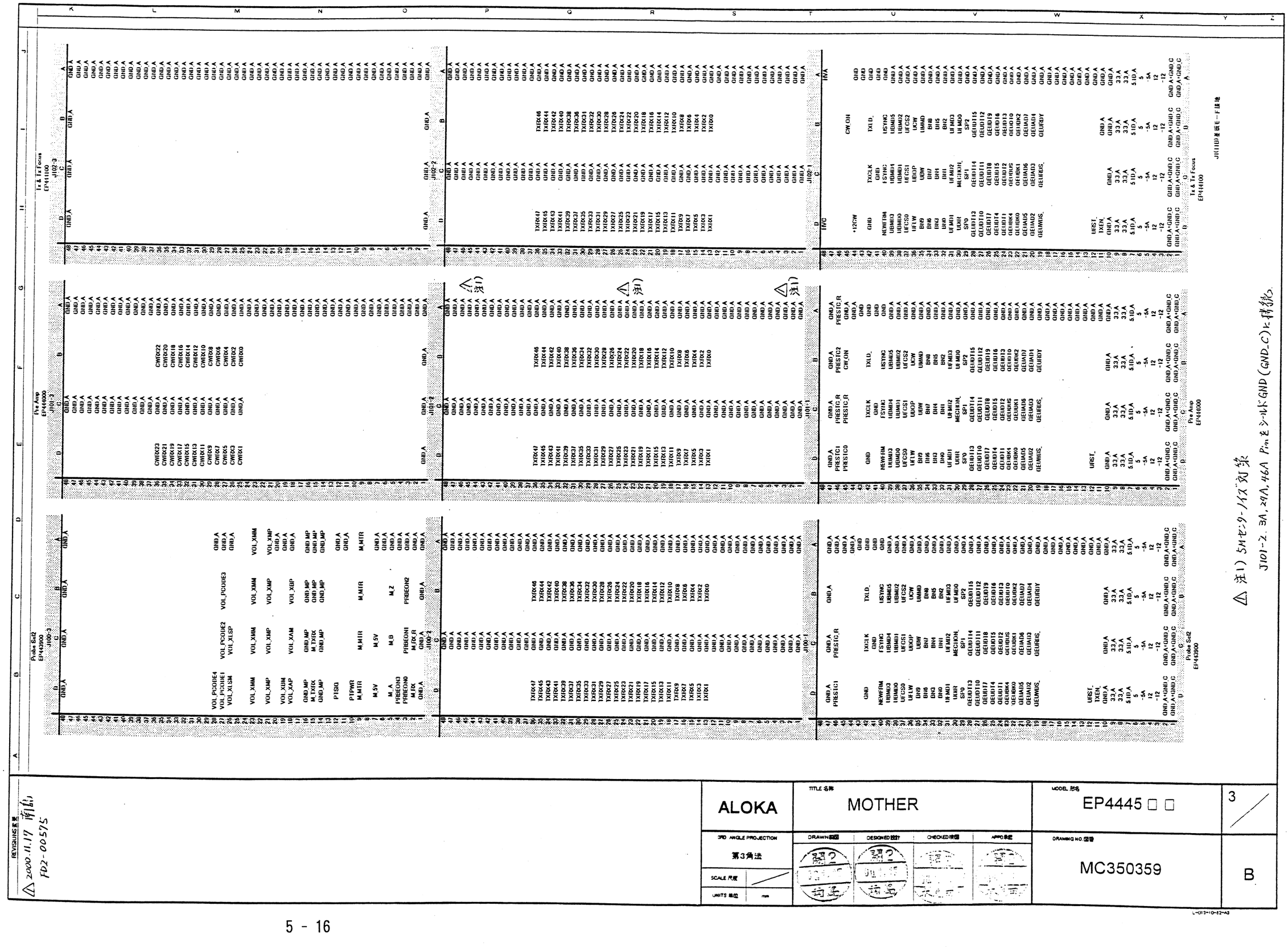


REVISIONS 変更		
△	2000.11.17 南島 FD2 005/5	
△2	2001.01.29 南島 FD2 006/6	

Aloka	TITLE 名称: MOTHER				MODEL 型名: EP4445□□	2/10
3RD ANGLE PROJECTION 第3角法	DRAWN 製図	DESIGNED 設計	CHECKED 検図	APPD. 承認	DRAWING NO. 図番: MC350358	B
SCALE 尺度 /	00.1.17	00.1.17				
UNITS 単位 mm						

L-013-10-82-A3

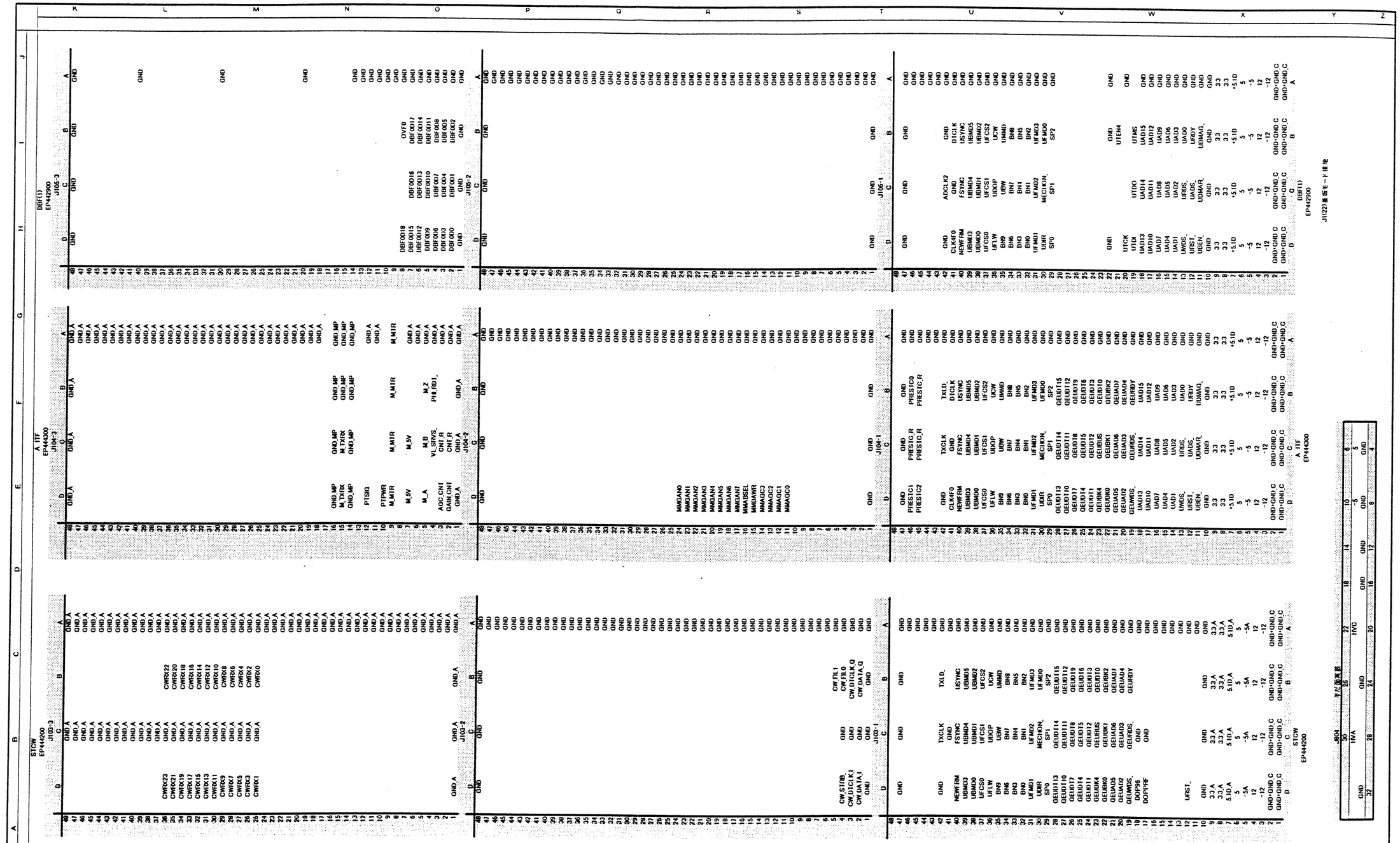


REVISIONS変更

△ 2000.11.17 南出
FD2-00575

ALOKA	TITLE 名称: MOTHER	MODEL 形名: EP4445 □ □	3 /
3RD ANGLE PROJECTION 第3角法	DRAWN 製図 / DESIGNED 設計 / CHECKED 検図 / APPD 承認	DRAWING NO. 図番: MC350359	B
SCALE 尺度 / UNITS 単位: mm			

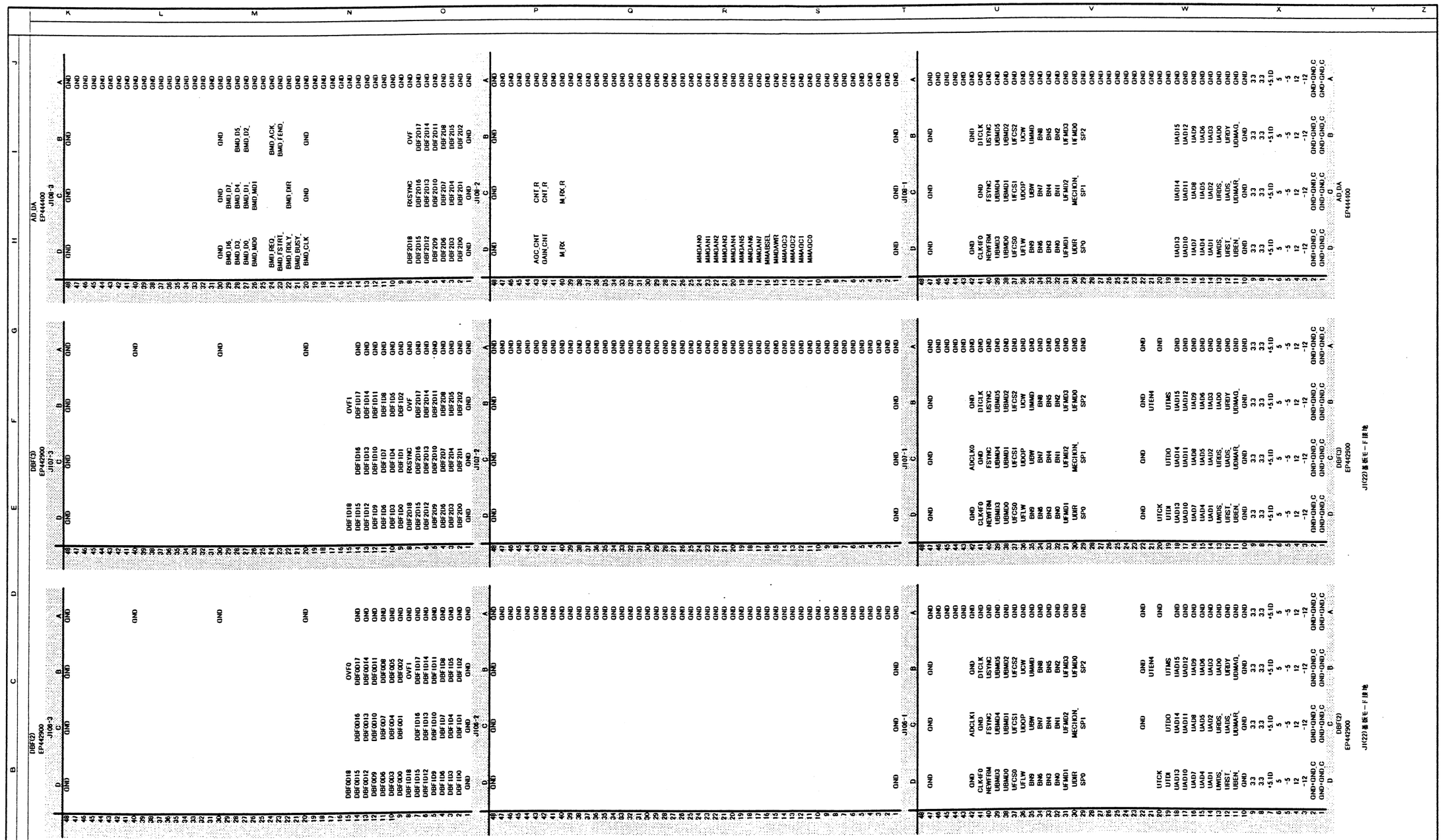
L-012-10-82-A3

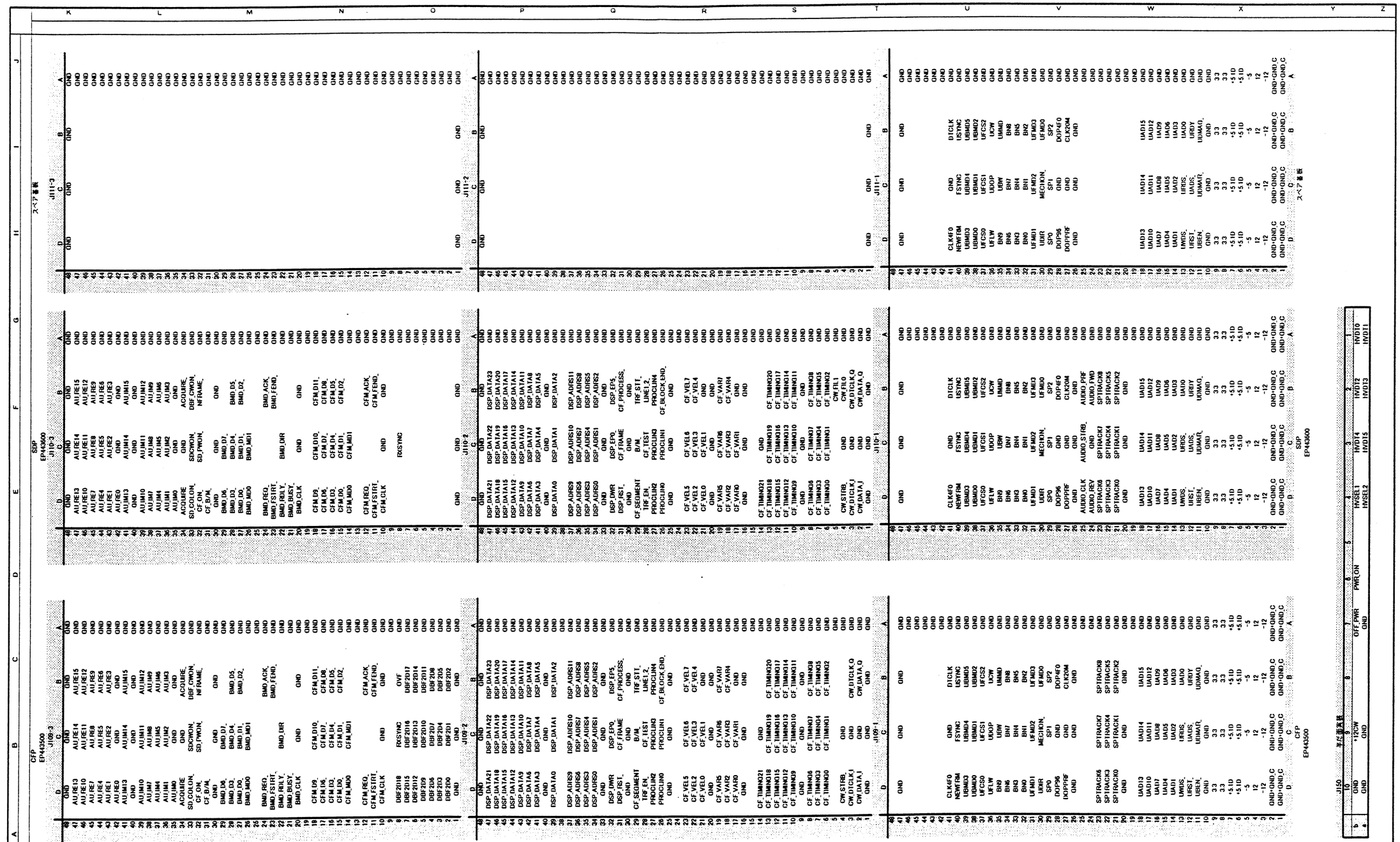


ALOKA	TITLE 名称: MOTHER		MODEL 形名: EP4445 □ □	4 /
3RD ANGLE PROJECTION 第3角法	DRAWN 製図: 開2 00.1.17 南島	DESIGNED 設計: 開2 00.1.17 南島	CHECKED 検図: 開2 00.1.17 木見田	APPD 承認: 開2 00.1.17 木見田
SCALE 尺度			DRAWING NO 図番: MC350360	B
UNITS 単位 mm				

REVISIONS 変更

L-013-10-92-A3


AD,DA
EP44400
J108-3
J108-2
J108-1
D
C
B
A
GND
BMD_D6
BMD_D3
BMD_D0
BMD_MD0
BMD_D7
BMD_D4
BMD_D1
BMD_MD1
BMD_REQ_
BMD_FSTRT_
BMD_ROLY_
BMD_BUSY_
BMD_CLK
BMD_ACK_
BMD_FEND_
DIR
CNT_R
GAIN_CNT
M_TDX
M_TDX_R
RXSYNC
OVF
DBF2018
DBF2015
DBF2012
DBF2009
DBF2006
DBF2003
DBF2000
DBF2017
DBF2014
DBF2011
DBF208
DBF205
DBF202
MMGAN0
MMGAN1
MMGAN2
MMGAN3
MMGAN4
MMGAN5
MMGAN6
MMGAN7
MMASEL
MMAWR
MMAOC3
MMAOC2
MMAOC1
MMAOC0
EP44400
DBF(3)
EP44290
J107-3
J107-2
J107-1
DBF1D18
DBF1D15
DBF1D12
DBF1D9
DBF1D6
DBF1D3
DBF1D0
DBF1D16
DBF1D13
DBF1D10
DBF1D7
DBF1D4
DBF1D1
OVF1
DBF1D17
DBF1D14
DBF1D11
DBF108
DBF105
DBF102
ADCLK0
CLK4F0
NEWFRM
UBMD3
UBMD0
UFCS0
UWR
BN8
BN5
BN2
UFMD3
UFMD0
SP2
UTCK
UTDI
UTDO
UTMS
UTEN4
UAD15
UAD12
UAD9
UAD6
UAD3
UAD0
UBRS_
UBST_
UBMA0_
ADCLK1
CLK4F1
FSYNC
UBMD4
UBMD1
UFCS1
UWW
BN7
BN4
BN1
UFMD2
UFMD1
MECHON_
SP1
UAD14
UAD11
UAD8
UAD5
UAD2
UBRS_
UBST_
UBMA1_
DBF(2)
EP44290
J1(22)基板モ－ド接地
ALOKA
TITLE 名称
MOTHER
MODEL 形名
EP4445 □ □
5
3RD ANGLE PROJECTION
第3角法
SCALE 尺度
UNITS 単位
mm
DRAWN 製図
DESIGNED 設計
CHECKED 検図
APPD 承認
00.1.17
南島
DRAWING NO 図番
MC350361
B
REVISIONS 変更



REVISIONS 変更

ALOKA

TITLE 名称
MOTHER

MODEL 形名
EP4445 □ □

6

3RD ANGLE PROJECTION
第3角法

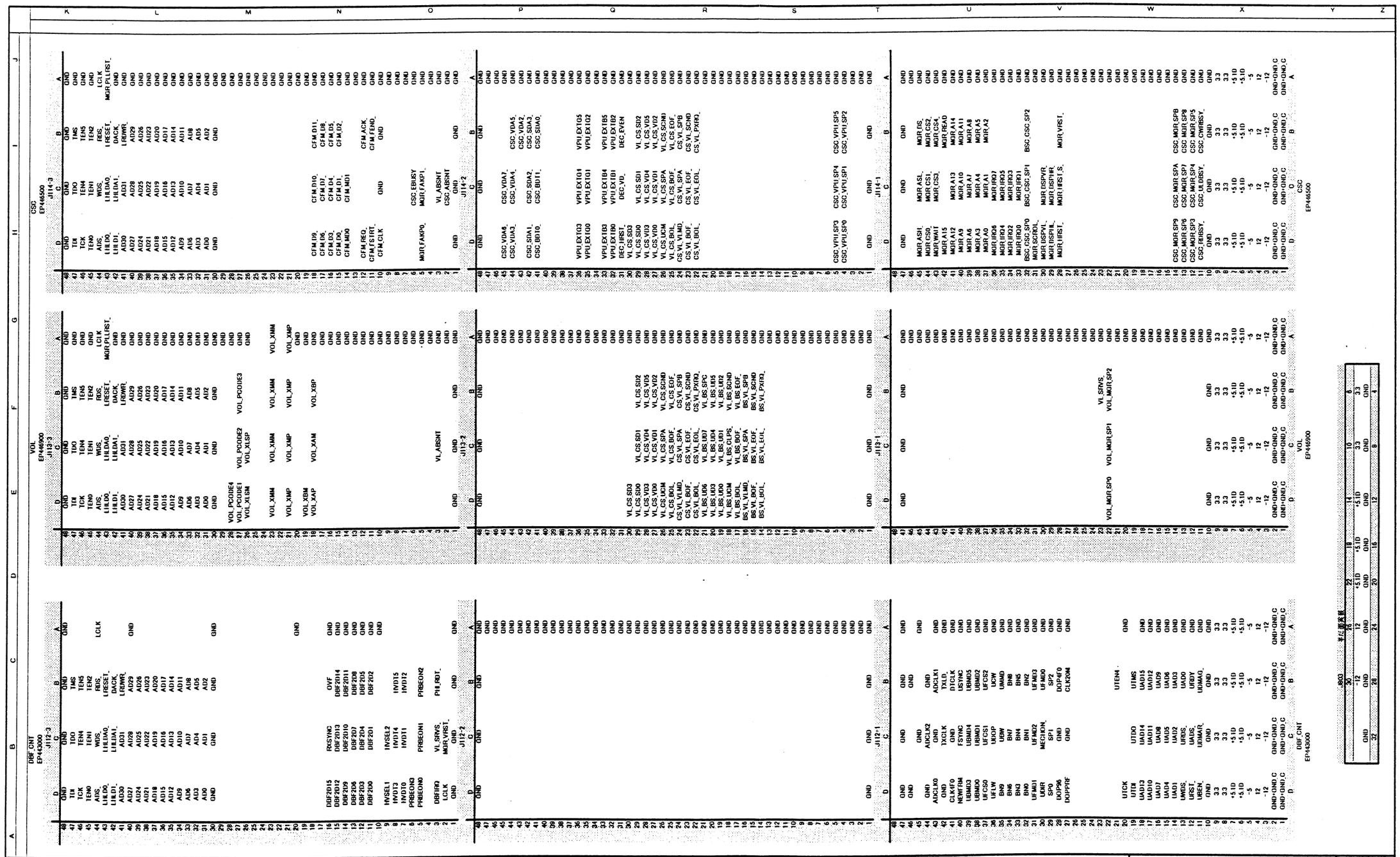
SCALE 尺度
UNITS 単位 mm

DRAWN 製図	DESIGNED 設計	CHECKED 検図	APPD 承認
開2 00.1.17 南島	開2 00.1.17 南島	開2 00.1.17 木尾田	開2 00.1.17 木尾田

DRAWING NO 図番
MC350362

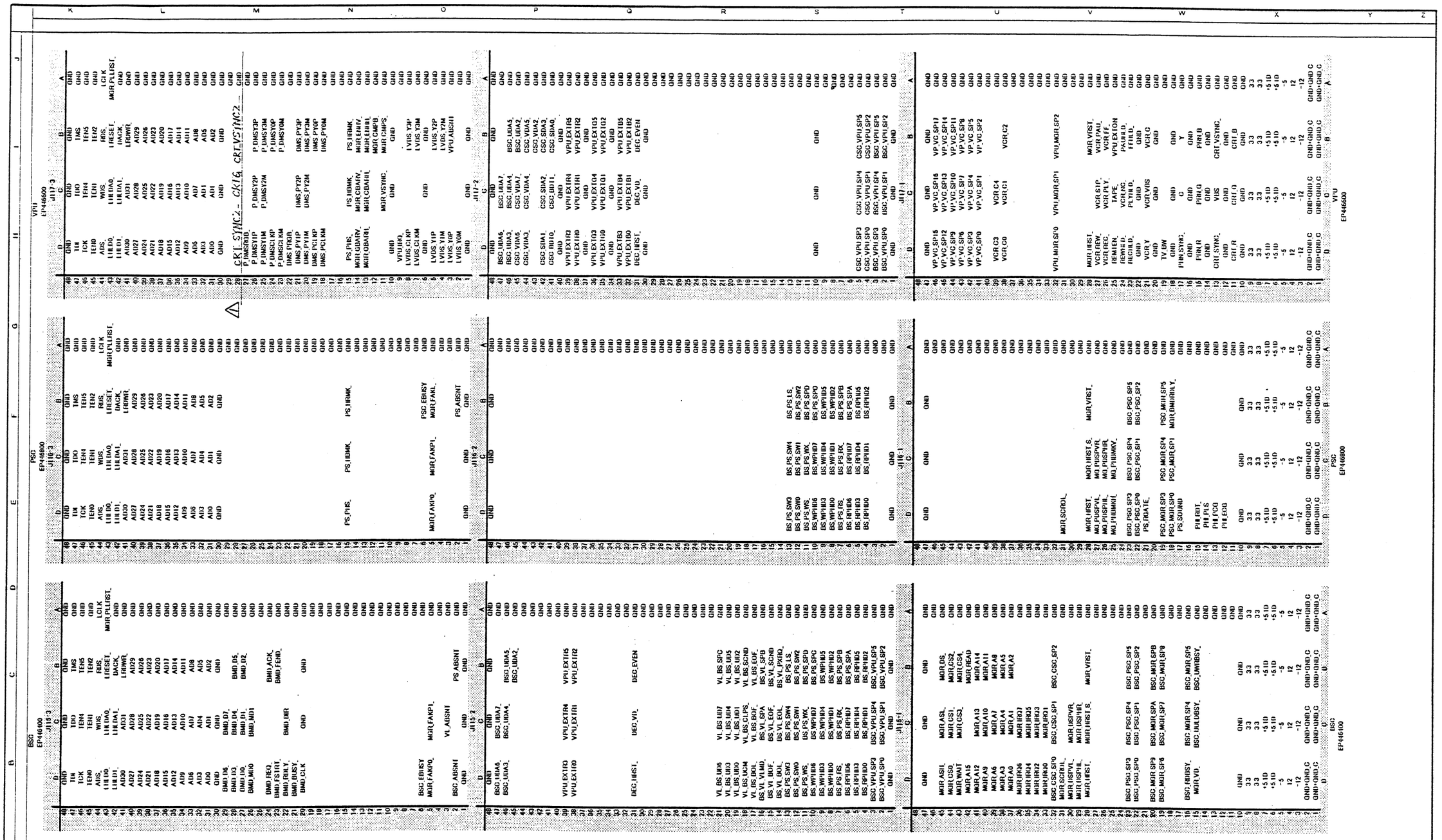
B

L-013-10-02-A3



REVISIONS 改定						
	ALOKA	TITLE 名称 MOTHER		MODEL 形名 EP4445 □ □	7	
	3RD ANGLE PROJECTION 第3角法	DRAWN 製図 開2 00.1.17 南島	DESIGNED 設計 開2 00.1.17 南島	CHECKED 検図 開2 00.1.17 木兒田	APPD 承認 開2 00.1.17 木兒田	DRAWING NO 図番 MC350363	B
	SCALE 尺度						
	UNITS 単位 mm						

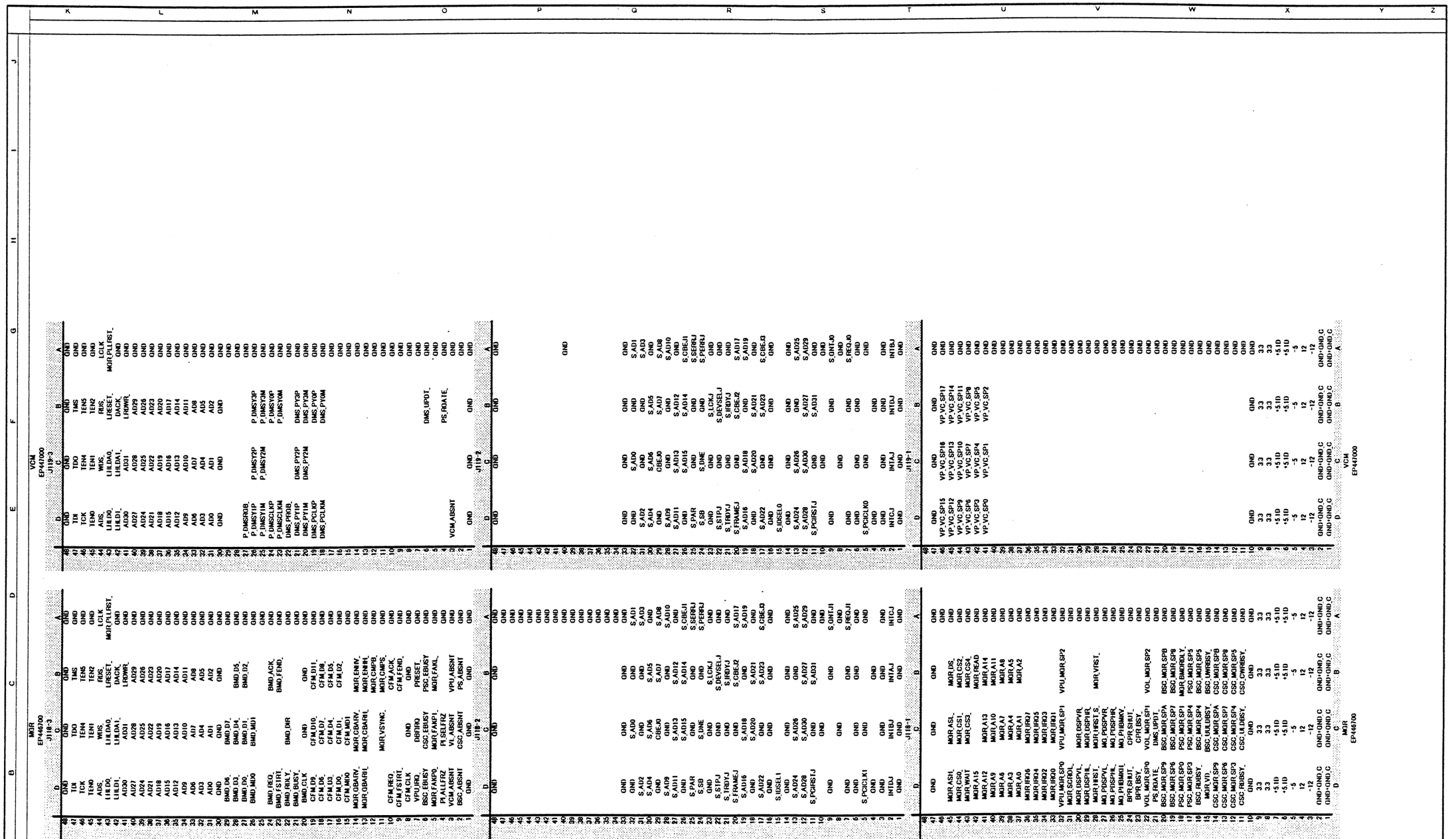
L-01-10-82-A3



REVISIONS
△ 2000/11/02 南部
FD2-00575

ALOKA	TITLE 名称 MOTHER	MODEL 形名 EP4445 □ □	8
3RD ANGLE PROJECTION 第3角法 SCALE 尺度 UNITS 単位 mm	DRAWN 製図 / DESIGNED 設計 / CHECKED 検図 / APPD 承認	DRAWING NO. 図番 MC350364	B

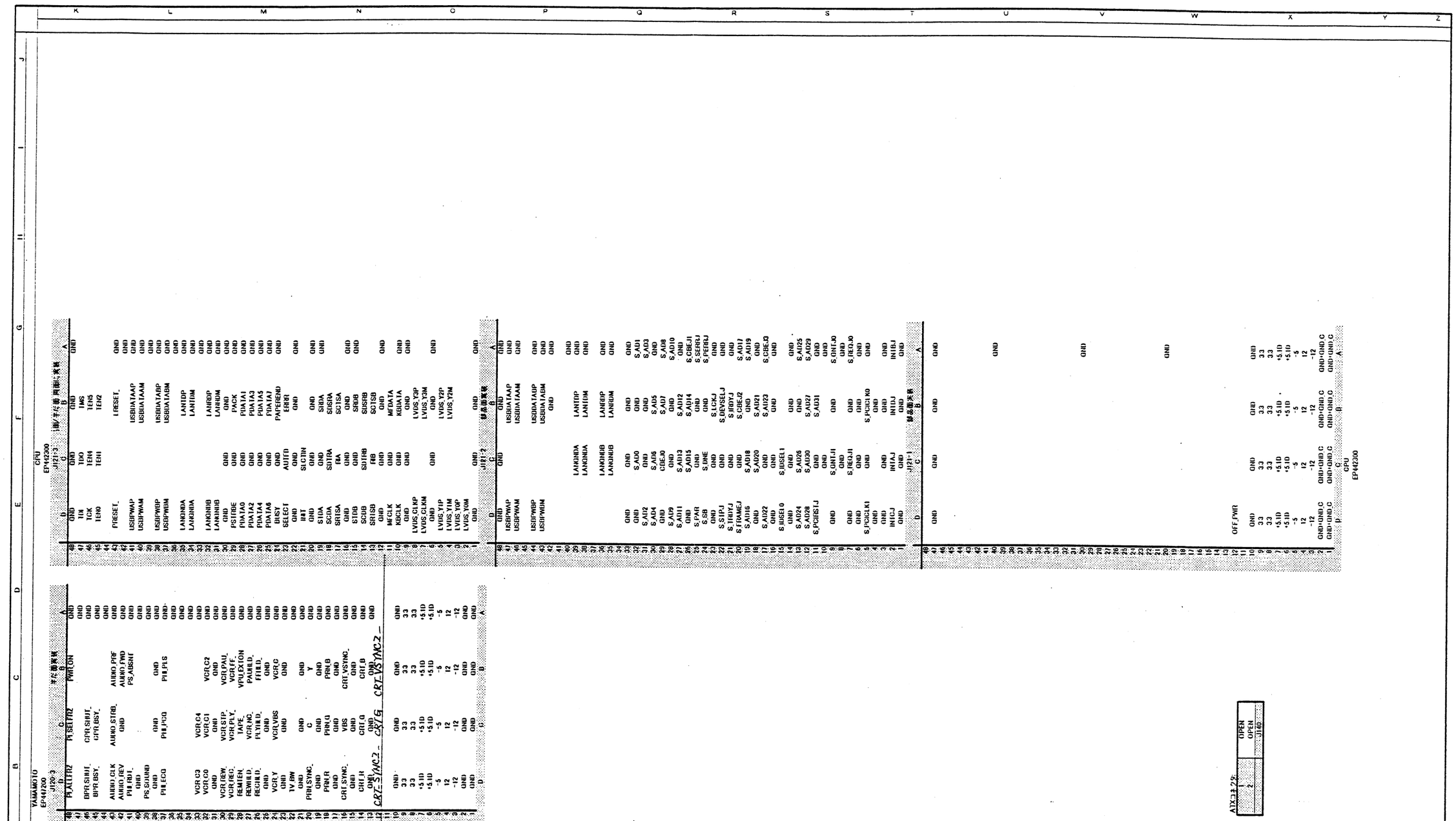
L-013-10-62-A3



ALOKA	TITLE 名称 MOTHER		MODEL 形名 EP4445 □ □		9
3RD ANGLE PROJECTION 第3角法	DRAWN 製図 開2 00.1.17 南島	DESIGNED 設計 開2 00.1.17 南島	CHECKED 検図 開2 00.1.17 水見田	APPD 承認 開2 00.1.17 水見田	DRAWING NO 図番 MC350365	B
SCALE 尺度						
UNITS 単位 mm						

REVISIONS 変更

L-013-10-62-A3


CPU
EP442300
J121-3
J120-3
J120-2
J121-1
YAMAHOTO
EP44200
CRT_SYNC2_
OPEN
OPEN
JUMP
AIX23 2.5
REVISIONS 変更
2000/11/02 南良
FD2.00575
ALOKA
TITLE 名称
MOTHER
MODEL 形名
EP4445 □ □
10
3RD ANGLE PROJECTION
第3角法
DRAWN 製図
DESIGNED 設計
CHECKED 検図
APPD 承認
SCALE 尺度
UNITS 単位
mm
DRAWING NO. 図番
MC350366
B

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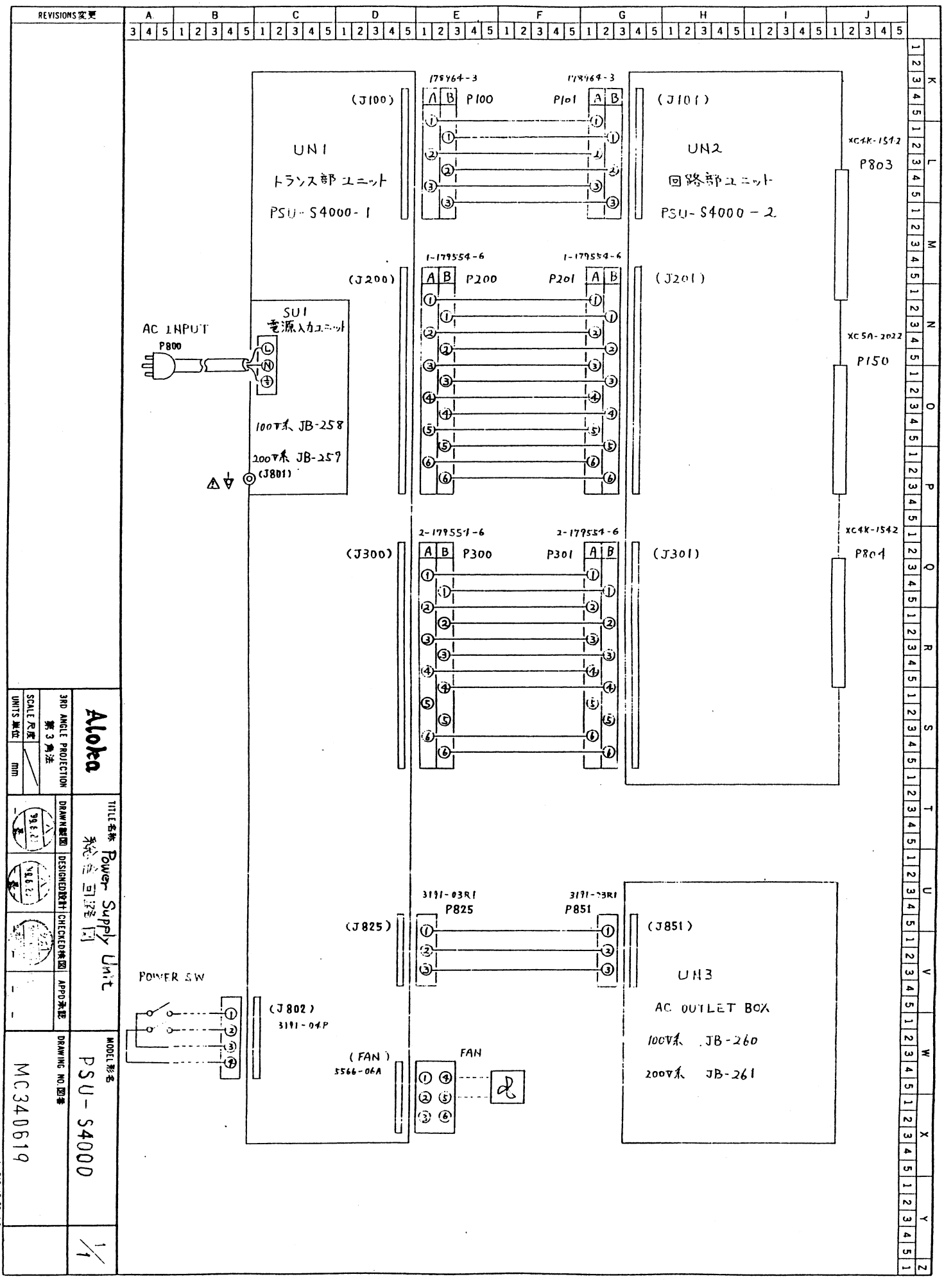
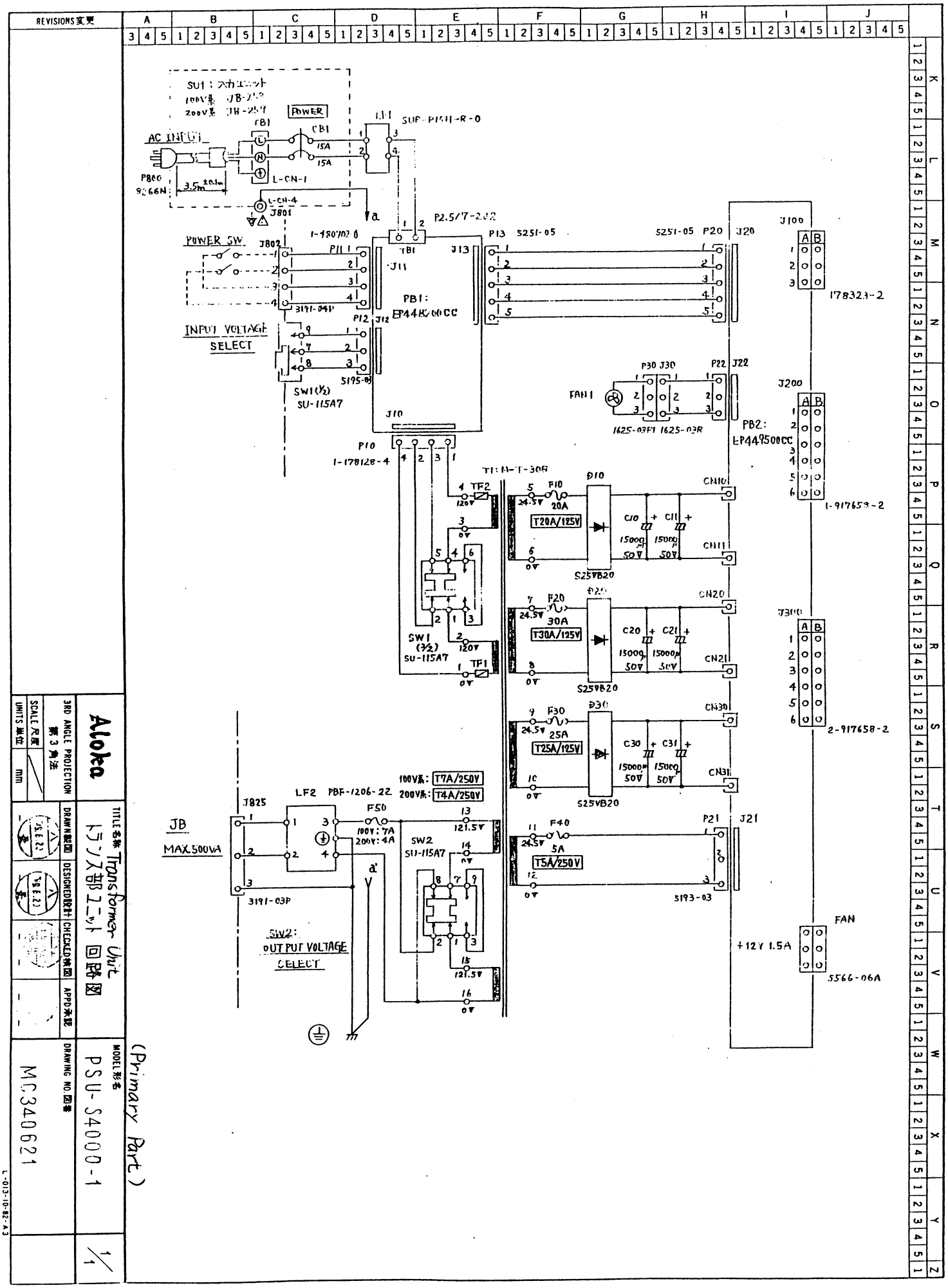
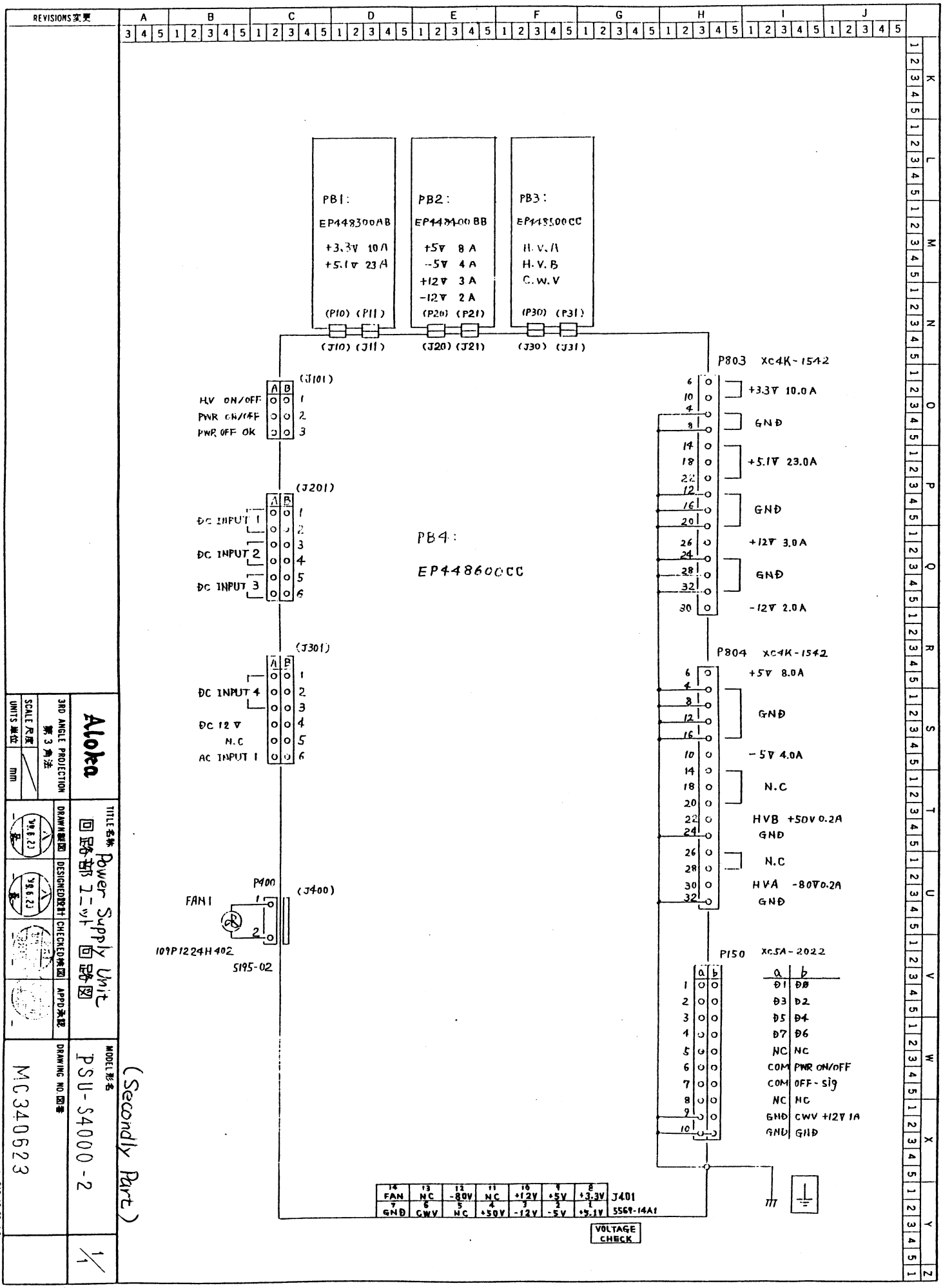
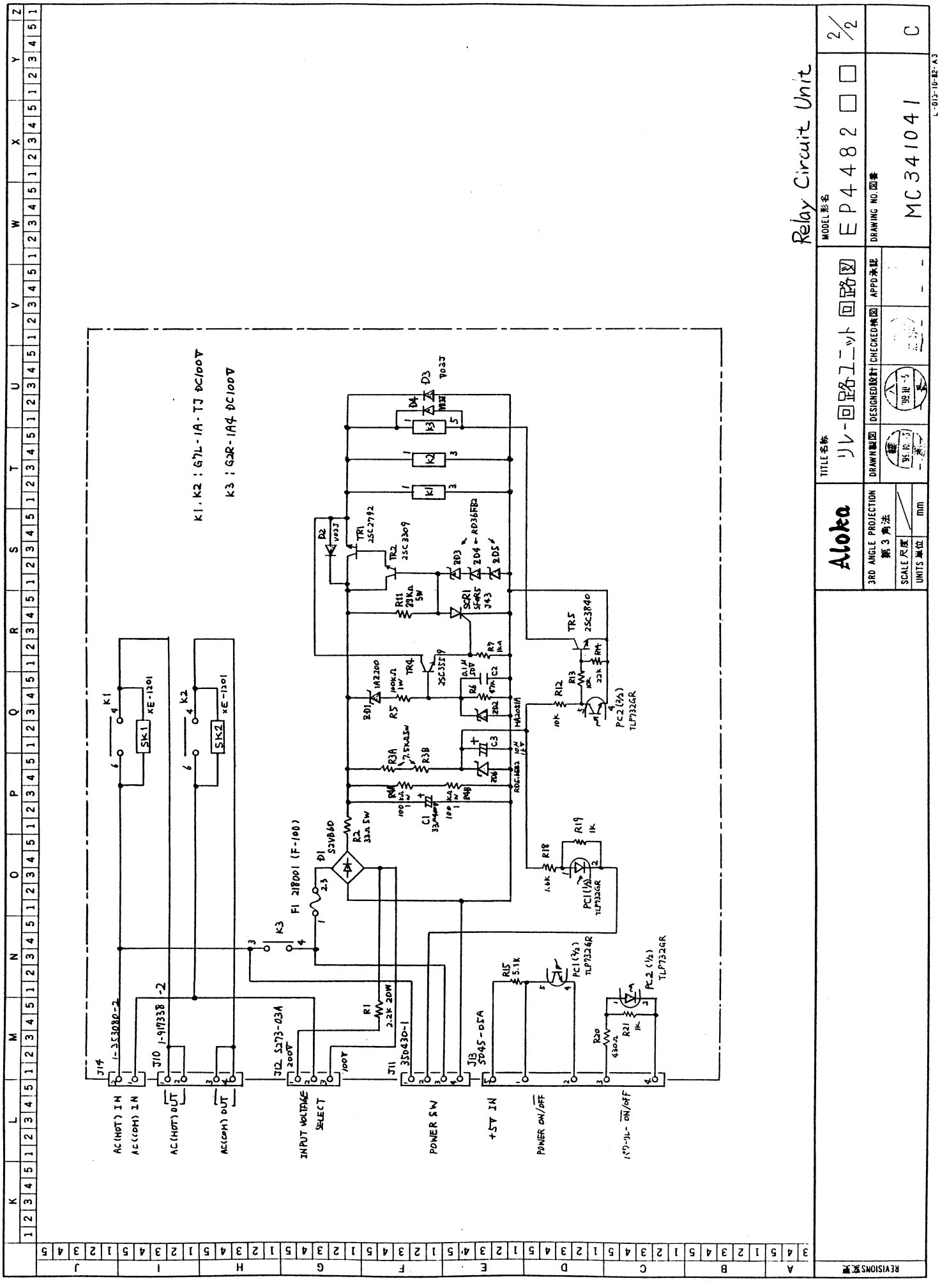
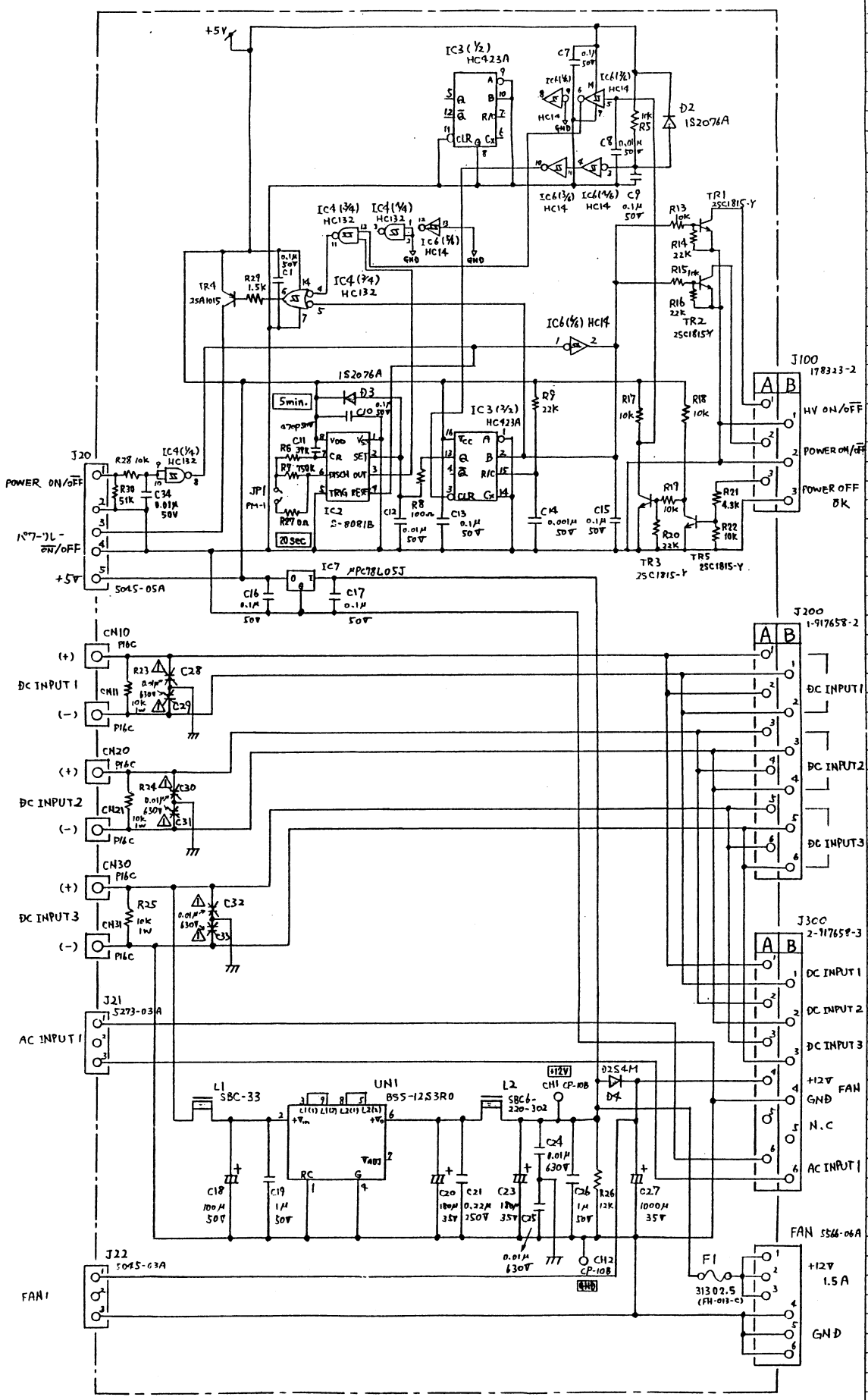

REVISIONS変更
(J100)
178964-3
P100
P101
178969-3
(J101)
UN1
トランス部ユニット
PSU-S4000-1
UN2
回路部ユニット
PSU-S4000-2
XG4K-1512
P803
1-179554-6
(J200)
P200
P201
(J201)
SU1
電源入力ユニット
AC INPUT
P800
100V系 JB-258
200V系 JB-259
(J801)
XG5A-2022
P150
2-179551-6
(J300)
P300
P301
(J301)
XG4K-1542
P801
3191-03R1
P825
P851
(J825)
(J851)
UN3
AC OUTLET BOX
100V系 JB-260
200V系 JB-261
POWER SW
(J802)
3191-04P
(FAN)
5566-06A
FAN
Aloka
3RD ANGLE PROJECTION
第3角法
SCALE 尺度
UNITS 単位
mm
TITLE名称 Power Supply Unit
DRAWN製図
DESIGNED設計
CHECKED検図
APPD承認
MODEL形名
PSU-S4000
DRAWING NO.図番
MC340619
1/1


REVISIONS 変更
Aloka
TITLE 名称 Transformer Unit トランス部ユニット 回路図
3RD ANGLE PROJECTION 第3角法
SCALE 尺度
UNITS 単位
mm
DRAWN 製図
DESIGNED 設計
CHECKED 検図
APPD 承認
MODEL 形名
PSU-S4000-1
DRAWING NO. 図番
MC340621
1/1
(Primary Part)
L-013-10-82-A3
SU1 : ユニット
POWER
AC INPUT
CB1
15A
15A
L-CN-1
L-CN-4
J801
PB00
9266N
3.5m
LF1
SUF-P15H-R-0
POWER SW
J802
INPUT VOLTAGE SELECT
SW1(½)
SU-115A7
PB1:
EP448500CC
PB2:
EP449500CC
FAN1
1625-03F1
1625-03R
FAN
+12V 1.5A
5566-06A
TF1
TF2
T1: M-T-305
F10
20A
T20A/125V
F20
30A
T30A/125V
F30
25A
T25A/125V
F40
5A
T5A/250V
S25VB20
C10
C11
C20
C21
C30
C31
15000μF 50V
CN10
CN11
CN20
CN21
CN30
CN31
P21
J21
5193-03
J825
3191-03P
LF2
PBF-1206-22
F50
100V系: T7A/250V
200V系: T4A/250V
100V: 7A
200V: 4A
SW2
SU-115A7
SW2:
OUTPUT VOLTAGE
SELECT
JB
MAX 500VA
J100
J200
J300
178323-2
1-917658-2
2-917658-2
P10
J10
P11
J11
P12
J12
P13
J13
TB1
P20
J20
P22
J22
P30
J30
1-178128-4
3191-04P
5195-03
2.5/7-2.32
S251-05

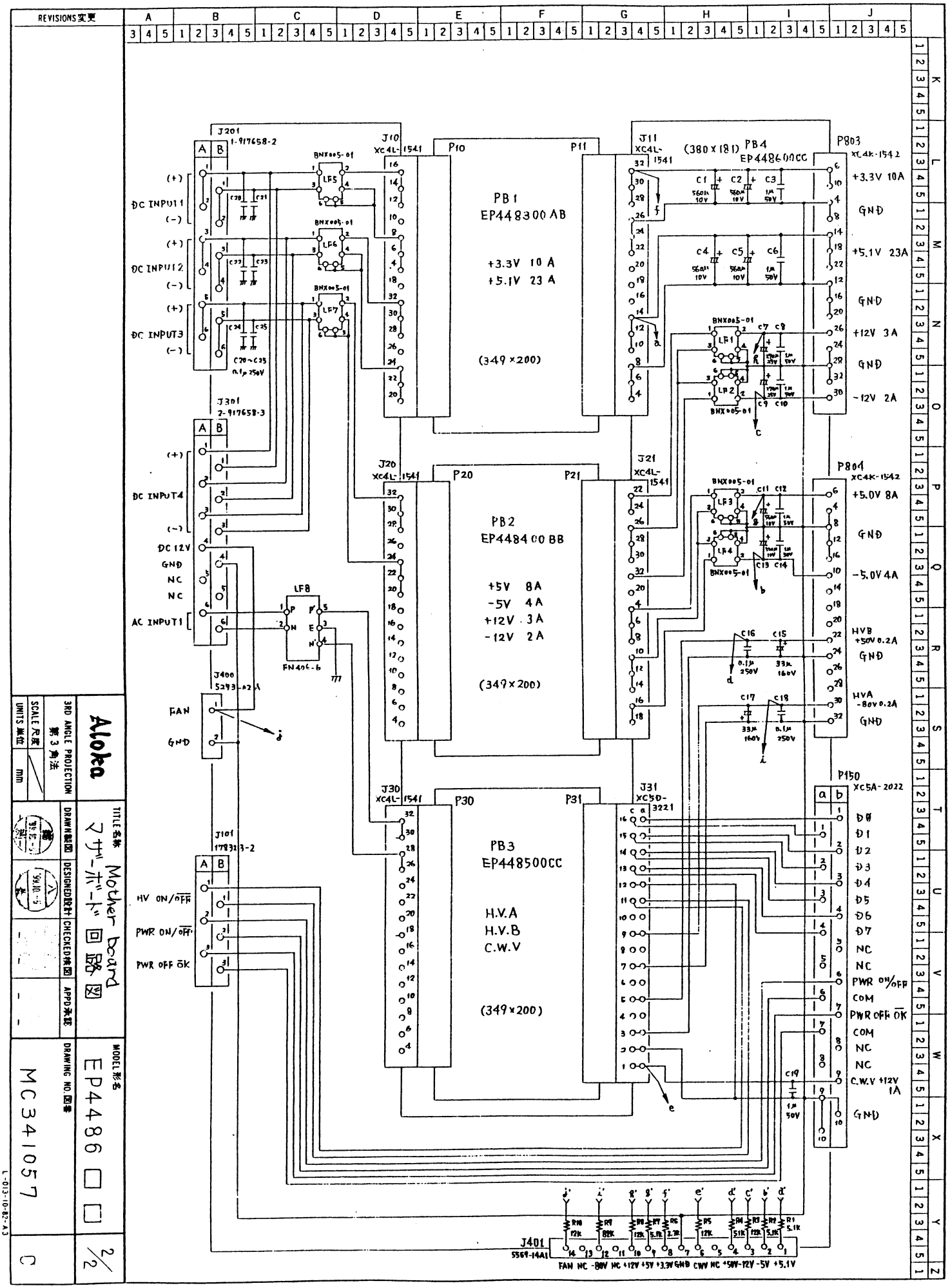

REVISIONS変更
PB1:
EP448300AB
+3.3V 10A
+5.1V 23A
(P10) (P11)
PB2:
EP448400BB
+5V 8A
-5V 4A
+12V 3A
-12V 2A
(P20) (P21)
PB3:
EP448500CC
H.V.A
H.V.B
C.W.V
(P30) (P31)
(J10) (J11) (J20) (J21) (J30) (J31)
(J101)
H.V ON/OFF
PWR ON/OFF
PWR OFF OK
(J201)
DC INPUT 1
DC INPUT 2
DC INPUT 3
PB4:
EP448600CC
(J301)
DC INPUT 4
DC 12V
N.C
AC INPUT 1
P400
(J400)
FAN1
109P1224H402
5195-02
P803 XG4K-1542
+3.3V 10.0A
GND
+5.1V 23.0A
GND
+12V 3.0A
GND
-12V 2.0A
P804 XG4K-1542
+5V 8.0A
GND
-5V 4.0A
N.C
HVB +50V 0.2A
GND
N.C
HVA -80V 0.2A
GND
P150 XG5A-2022
D1 D0
D3 D2
D5 D4
D7 D6
NC NC
COM PWR ON/OFF
COM OFF-sig
NC NC
GND CWV +12V 1A
GND GND
14 FAN 13 NC 12 -80V 11 NC 10 +12V 9 +5V 8 +3.3V
7 GND 6 CWV 5 NC 4 +50V 3 -12V 2 -5V 1 +5.1V
J401
5569-14A1
VOLTAGE CHECK
Aloka
3RD ANGLE PROJECTION
第3角法
SCALE尺度
UNITS単位
mm
TITLE名称 Power Supply Unit 回路部ユニット 回路図
DRAWN製図
DESIGNED設計
CHECKED検図
APPD承認
MODEL形名 PSU-S4000-2
DRAWING NO.図番 MC340623
1/1
(Secondly Part)

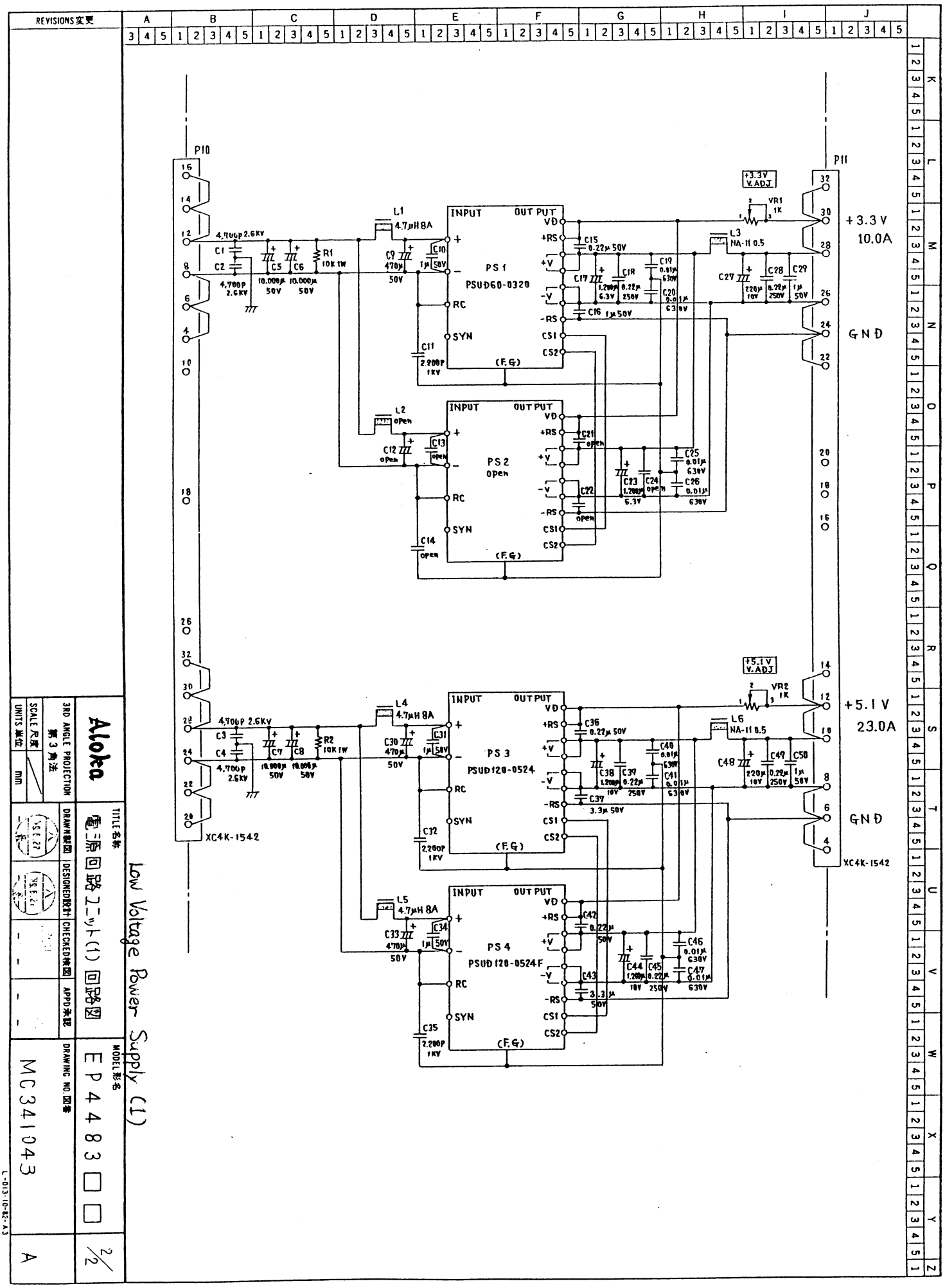

Relay Circuit Unit
K1, K2 : G7L-1A-TJ DC100V
K3 : G2R-1A4 DC100V
Aloka
TITLE 名称 リレー回路ユニット回路図
MODEL 形名 EP44820□□
DRAWING NO. 図番 MC341041
2/2
C
3RD ANGLE PROJECTION 第3角法
SCALE 尺度
UNITS 単位 mm
DRAWN 製図
DESIGNED 設計
CHECKED 検図
APPD 承認
AC(HOT) IN
AC(COM) IN
AC(HOT) OUT
AC(COM) OUT
INPUT VOLTAGE SELECT
POWER SW
+5V IN
POWER ON/OFF
REMOTE ON/OFF
REVISIONS

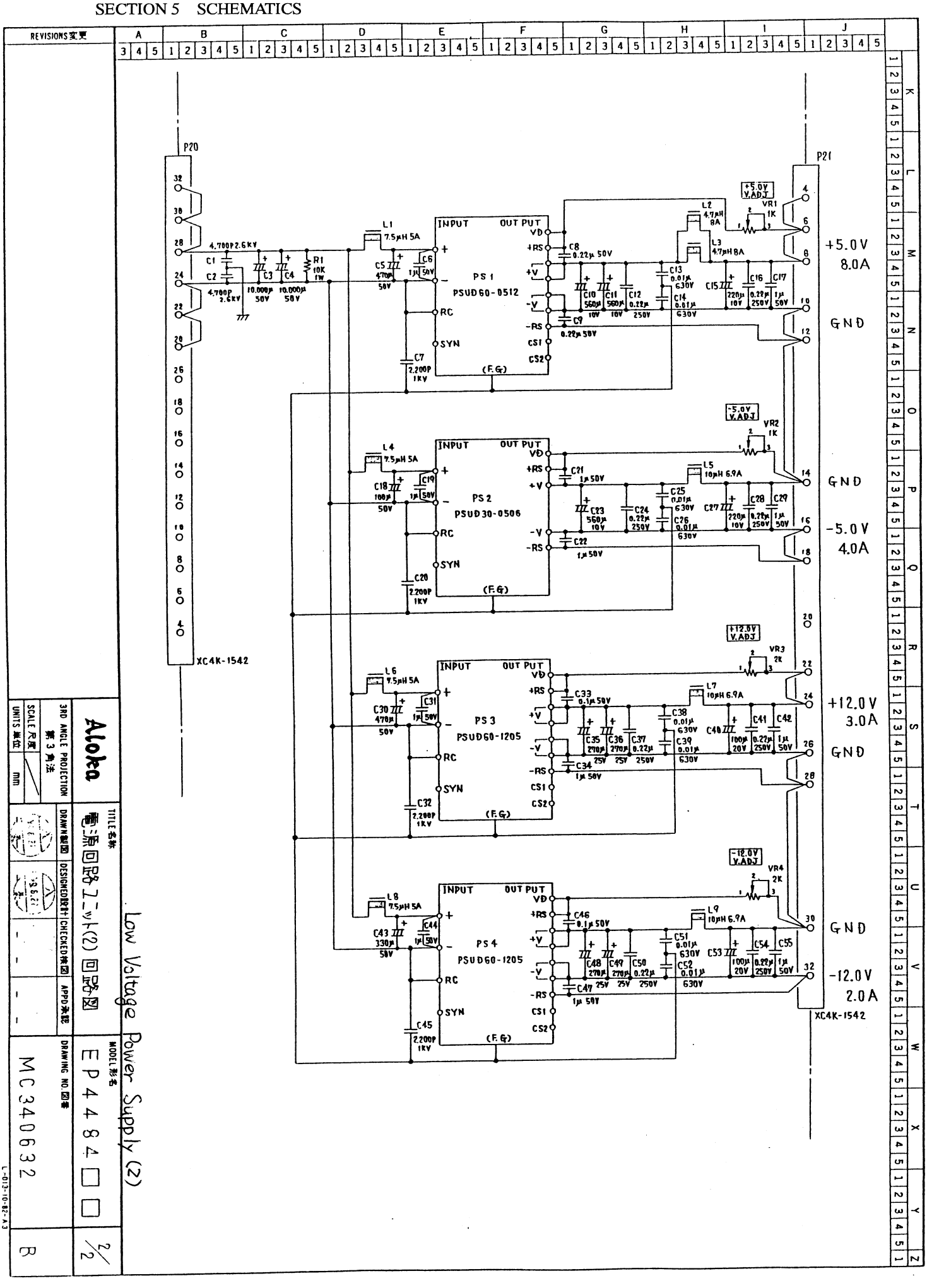


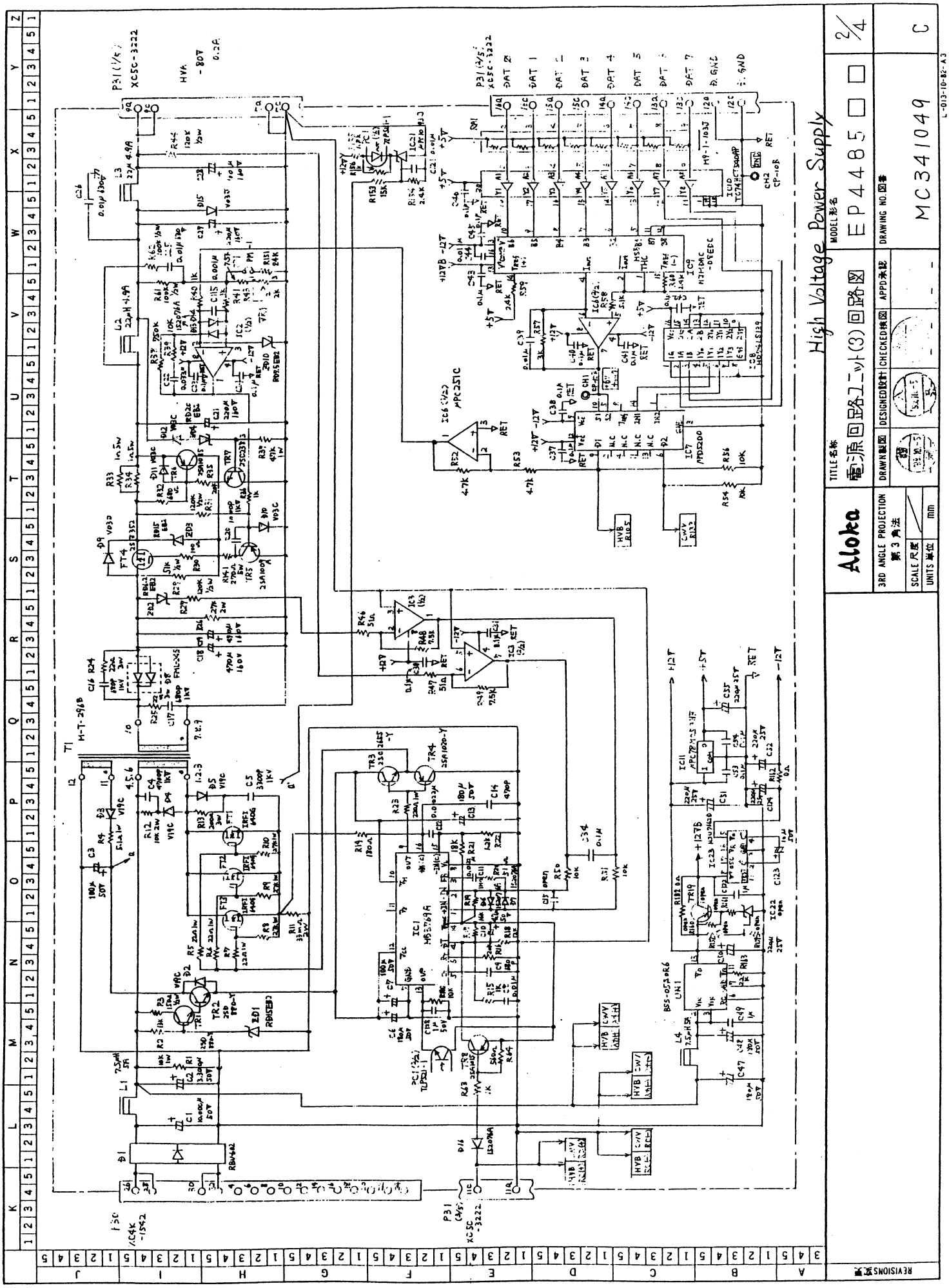
REVISIONS変更	
△'00.07.13 パスル幅変更	
㊀ FSI-00278	
Aloka	
3RD ANGLE PROJECTION 第3角法	
UNITS 単位: mm	SCALE 尺度:
DRAWN 製図	
DESIGNED 設計	
CHECKED 検図	- -
APPD 承認	- -
TITLE 名称	Connector Junction Unit コネクタ中継ユニット回路図
MODEL 形名	EP4495 □□
DRAWING NO. 図番	MC341065
	C
	2/2

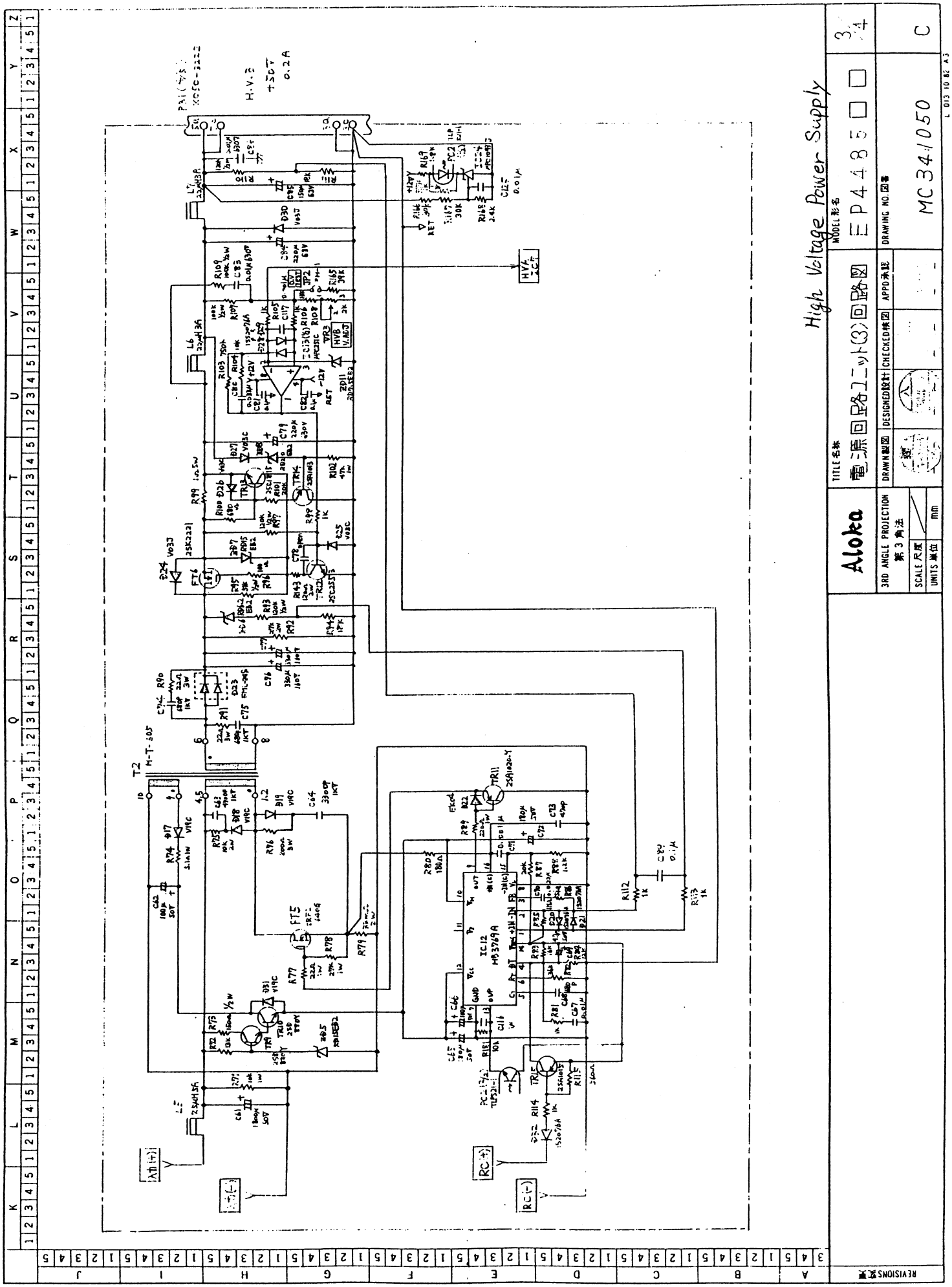
L-013-10-82-A3


REVISIONS変更
PB1
EP448300AB
+3.3V 10A
+5.1V 23A
(349×200)
PB2
EP448400BB
+5V 8A
-5V 4A
+12V 3A
-12V 2A
(349×200)
PB3
EP448500CC
H.V.A
H.V.B
C.W.V
(349×200)
PB4
EP448600CC
(380×181)
+3.3V 10A
GND
+5.1V 23A
GND
+12V 3A
GND
-12V 2A
+5.0V 8A
GND
-5.0V 4A
HVB +50V 0.2A
GND
HVA -80V 0.2A
GND
C.W.V +12V 1A
GND
DC INPUT1
DC INPUT2
DC INPUT3
DC INPUT4
DC 12V
GND
NC
NC
AC INPUT1
FAN
GND
HV ON/OFF
PWR ON/OFF
PWR OFF OK
PWR ON/OFF
COM
PWR OFF OK
COM
NC
NC
FAN NC -80V NC +12V +5V +3.3V GND C.W.V NC +50V -12V -5V +5.1V
3RD ANGLE PROJECTION
第3角法
UNITS 単位 mm
SCALE 尺度
DRAWN 製図
DESIGNED 設計
CHECKED 検図
APPD 承認
TITLE 名称 マザーボード回路図 Mother board
MODEL 形名 EP4486□□
DRAWING NO. 図番 MC341057
2/2
C


REVISIONS変更
P10
P11
XC4K-1542
XC4K-1542
L1 4.7μH 8A
L2 open
L3 NA-11 0.5
L4 4.7μH 8A
L5 4.7μH 8A
L6 NA-11 0.5
PS 1
PSUD60-0320
PS 2
open
PS 3
PSUD120-0524
PS 4
PSUD120-0524F
INPUT
OUT PUT
VD
+RS
+V
-V
-RS
CS1
CS2
RC
SYN
(F.G)
+3.3V V.ADJ
VR1 1K
+3.3 V
10.0A
GND
+5.1V V.ADJ
VR2 1K
+5.1 V
23.0A
GND
Aloka
3RD ANGLE PROJECTION 第3角法
SCALE 尺度
UNITS 単位
mm
TITLE 名称
電源回路ユニット(1) 回路図
DRAWN 製図
DESIGNED 設計
CHECKED 検図
APPD 承認
MODEL 形名
EP4483□□
DRAWING NO. 図番
MC341043
A
2/2
Low Voltage Power Supply (1)
L-013-10-82-A3


REVISIONS変更
P20
P21
XC4K-1542
XC4K-1542
PS 1
PSUD60-0512
PS 2
PSUD30-0506
PS 3
PSUD60-1205
PS 4
PSUD60-1205
INPUT
OUT PUT
+5.0V 8.0A
GND
-5.0V 4.0A
GND
+12.0V 3.0A
GND
-12.0V 2.0A
GND
+5.0V V.ADJ
-5.0V V.ADJ
+12.0V V.ADJ
-12.0V V.ADJ
Aloka
電源回路ユニット(2) 回路図
Low Voltage Power Supply (2)
EP4484
MC340632
B
2/2


High Voltage Power Supply
Aloka
TITLE 名称
電源回路ユニット(3)回路図
MODEL 形名
EP4485
DRAWING NO. 図番
MC341049
2/4
C
DRAWN 製図
DESIGNED 設計
CHECKED 検図
APPD 承認
3RD ANGLE PROJECTION
第3角法
SCALE 尺度
UNITS 単位
mm
REVISIONS


High Voltage Power Supply
Aloha
TITLE 名称
電源回路ユニット(3)回路図
MODEL 形名
EP4485□□
DRAWING NO. 図番
MC341050
REVISIONS 改訂
3rd ANGLE PROJECTION
第3角法
SCALE 尺度
UNITS 単位
mm
DRAWN 製図
DESIGNED 設計
CHECKED 検図
APPD 承認
T2
H-T-805
IC12
M63769A
TR11
2SA1020-Y
TR12
2SC2383
TR13
2SC1815
TR14
2SA1015
TR15
2SA1015
TR16
2SC2383
TR17
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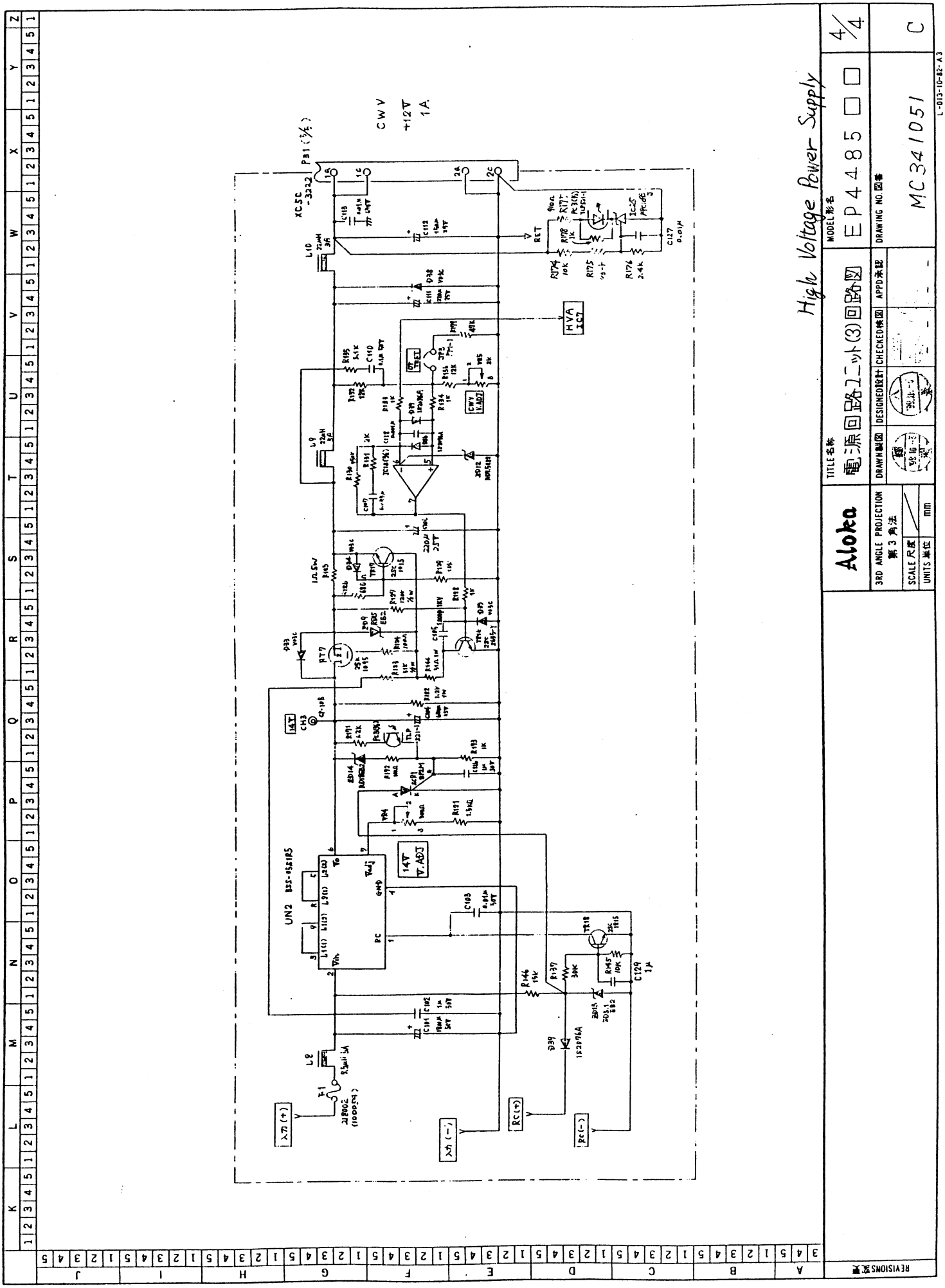
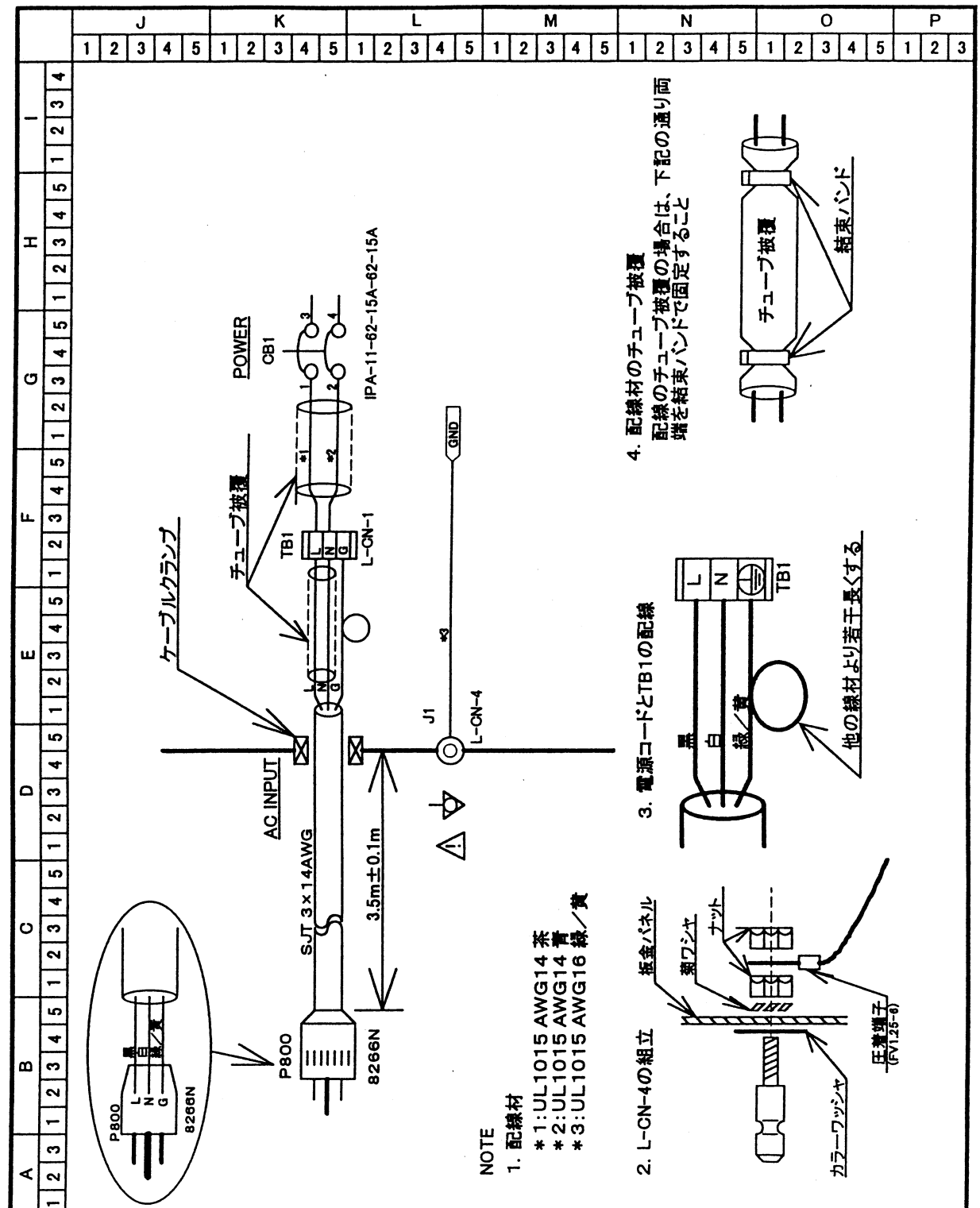
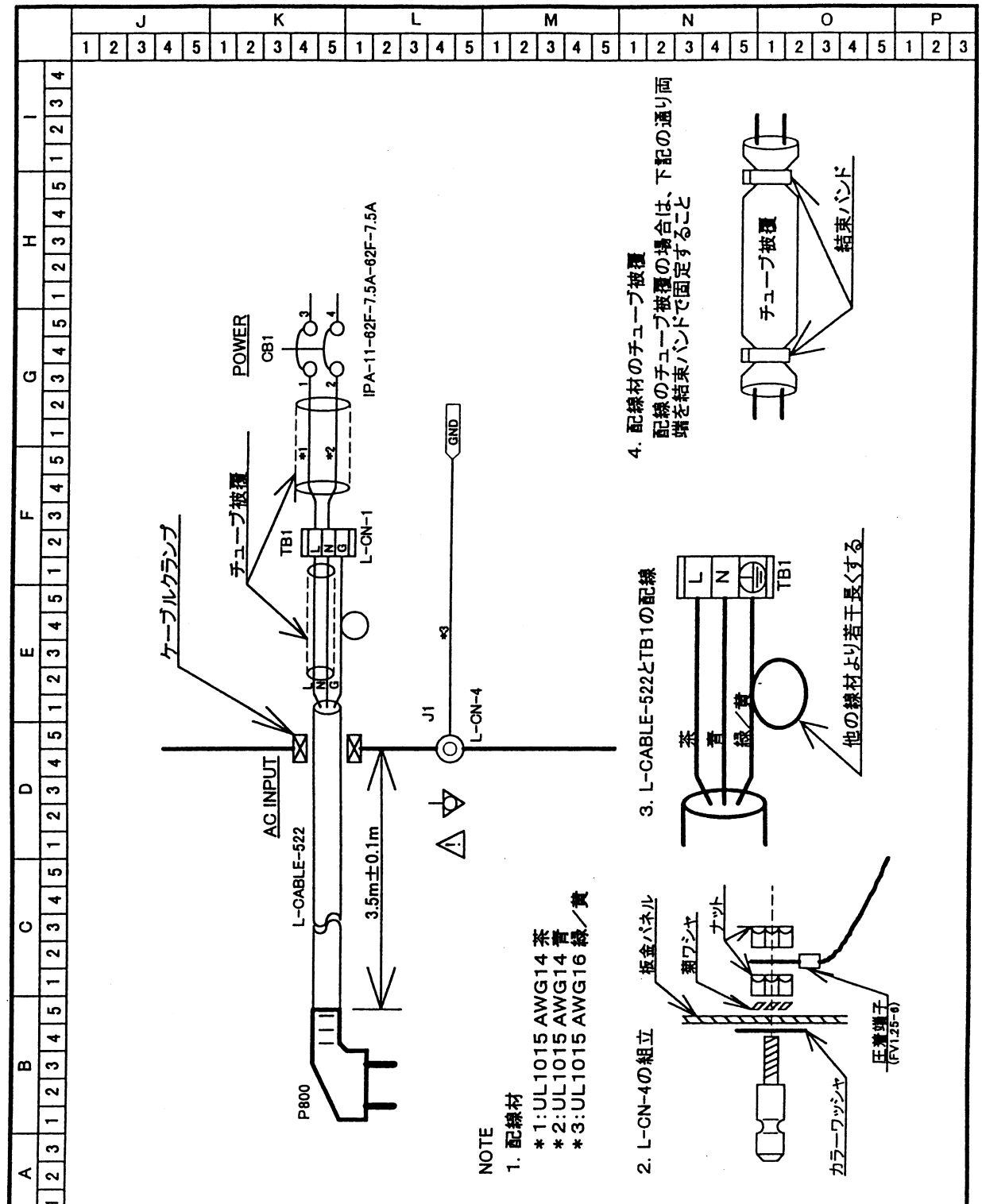
TR975
2SC2383
TR976
2SC2383
TR977
2SC2383
TR978
2SC2383
TR979
2SC2383
TR980
2SC2383
TR981
2SC2383
TR982
2SC2383
TR983
2SC2383
TR984
2SC2383
TR985
2SC2383
TR986
2SC2383
TR987
2SC2383
TR988
2SC2383
TR989
2SC2383
TR990
2SC2383
TR991
2SC2383
TR992
2SC2383
TR993
2SC2383
TR994
2SC2383
TR995
2SC2383
TR996
2SC2383
TR997
2SC2383
TR998
2SC2383
TR999
2SC2383
TR1000
2SC2383

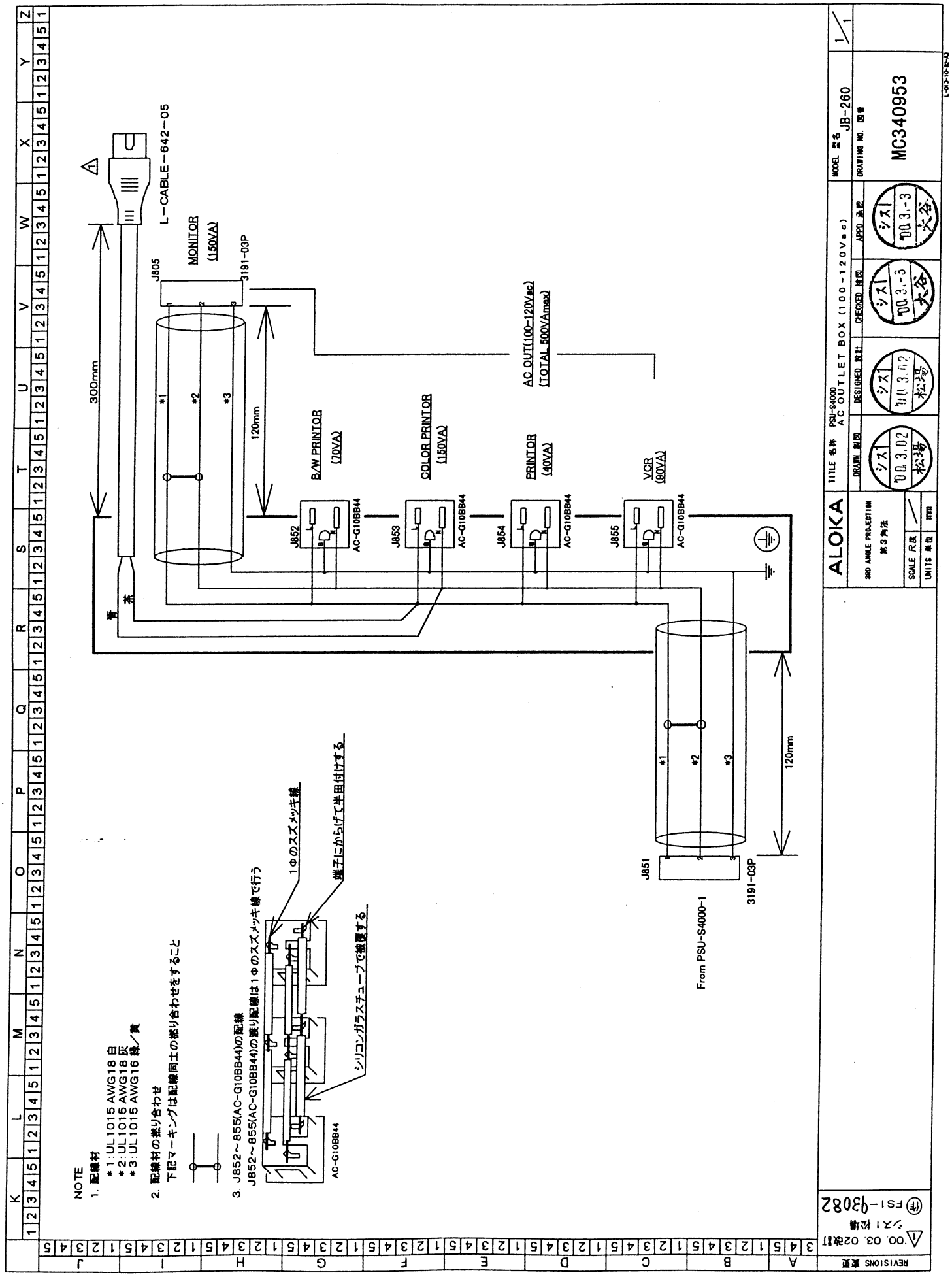

High Voltage Power Supply
電源回路ユニット(3)回路図
Aloka
TITLE 名称
MODEL 形名
EP4485
DRAWING NO. 図番
MC341051
DRAWN 製図
DESIGNED 設計
CHECKED 検図
APPD 承認
3RD ANGLE PROJECTION
第3角法
SCALE 尺度
UNITS 単位
mm
REVISIONS 改訂
4/4
C
+12V
1A
CWV
HVA
14T
T.ADJ
UN2
TRIG
RET
TEST
CWV ADJ
X方向(+)
X方向(-)
RC(+)
RC(-)

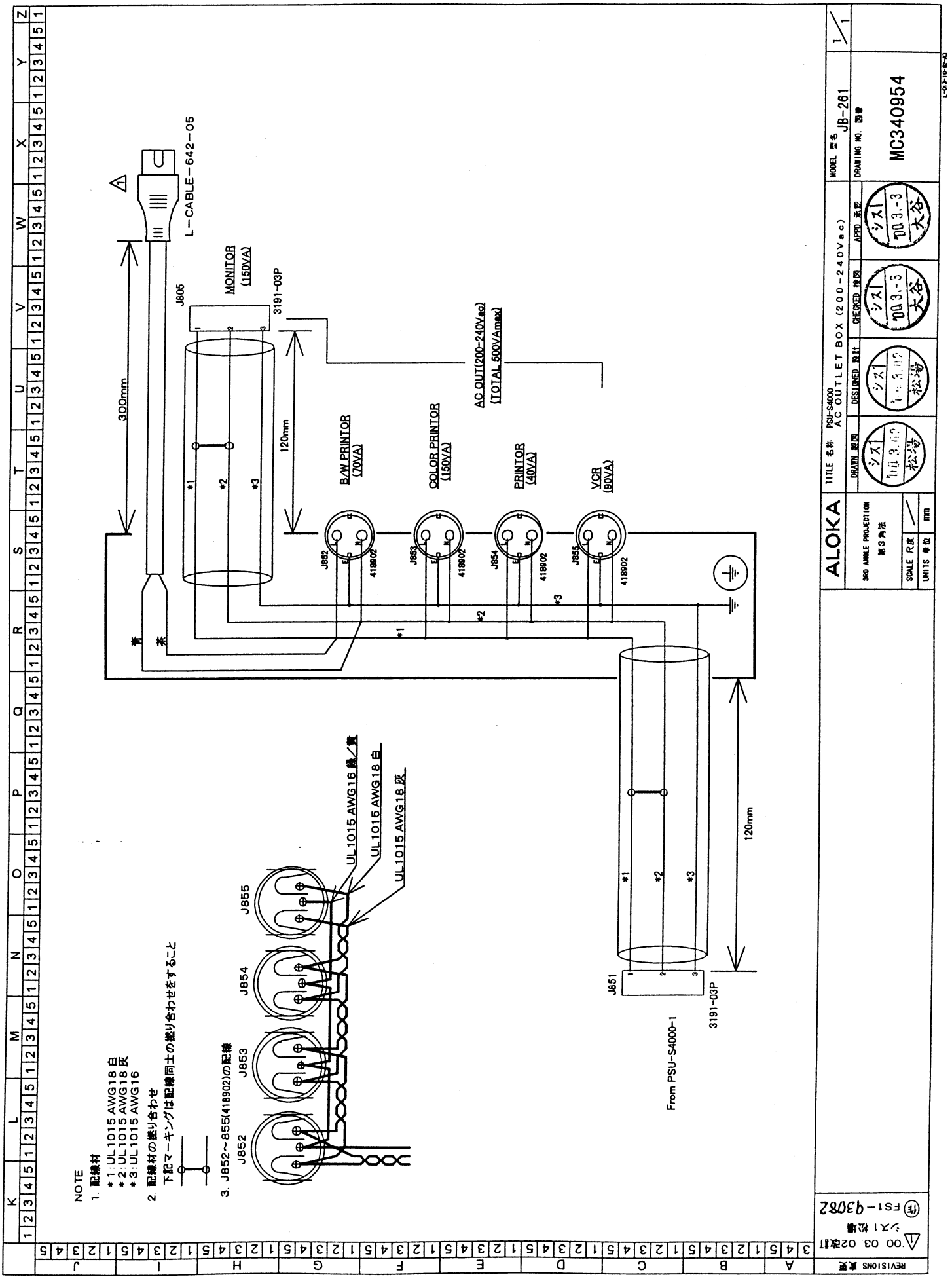


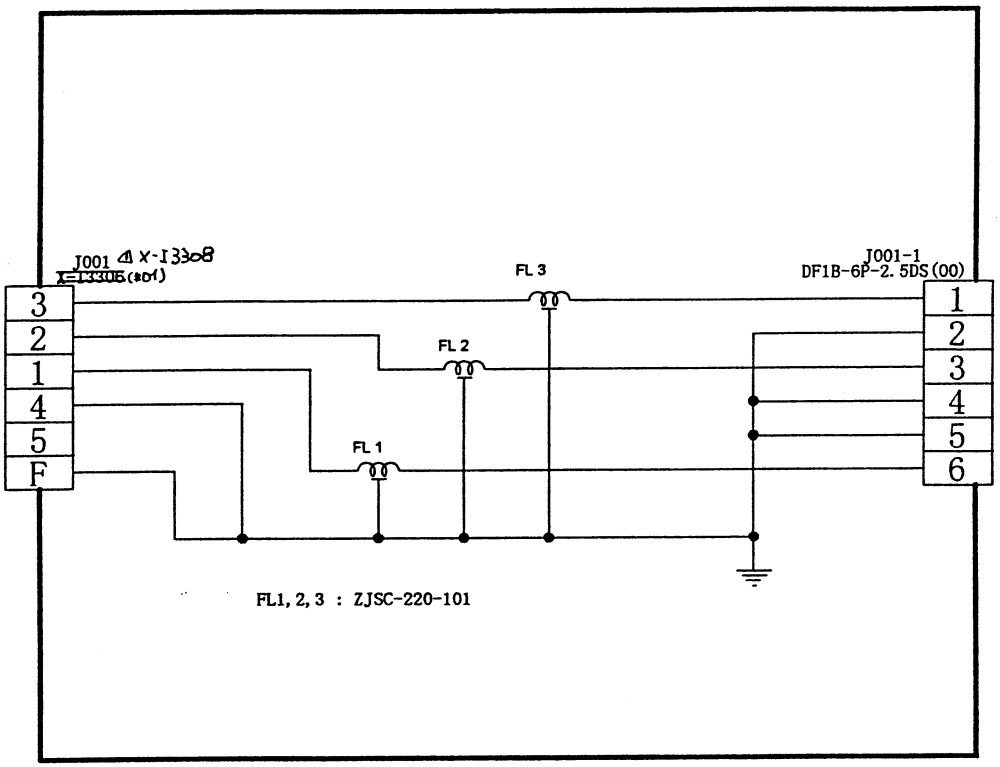
TITLE PSU−S4000用 Power Cable Unit for 100V 入力パネル回路図(100V)		MODEL JB−258	1/1
3RD ANGLE PROJECTION 第3角法	DRAWN シス1 00.2.09 松場	DESIGNED シス1 00.2.09 松場	CHECKED シス1 00.2.10 三木	APPD シス1 00.2.10 三木	DRAWING NO. MC402066	
SCALE						
UNITS mm						



REVISIONS			
TITLE	PSU−S4000用 Power Cable Unit for 200V 入力パネル回路図(200V)	MODEL	JB−259
			1/1
3RD ANGLE PROJECTION 第3角法	DRAWN シス 02.7.09 松場	DESIGNED シス 02.7.09 松場	CHECKED 02.2.10	APPD 02.2.10	DRAWING NO. MC402067
SCALE			
UNITS mm			


NOTE
1. 配線材
*1:UL1015 AWG18 白
*2:UL1015 AWG18 灰
*3:UL1015 AWG16 緑／黄
2. 配線材の縒り合わせ
下記マーキングは配線同士の縒り合わせをすること
3. J852～855(AC-G10BB44)の配線
J852～855(AC-G10BB44)の渡り配線は1Φのスズメッキ線で行う
1Φのスズメッキ線
端子にからげて半田付けする
シリコンガラスチューブで被覆する
AC-G10BB44
L-CABLE-642-05
MONITOR
(150VA)
J805
3191-03P
300mm
120mm
*1
*2
*3
青
未
B/W PRINTOR
(70VA)
COLOR PRINTOR
(150VA)
PRINTOR
(40VA)
VCR
(90VA)
AC OUT(100-120Vac)
(TOTAL 500VAmax)
J852
J853
J854
J855
AC-G10BB44
J851
From PSU-S4000-1
ALOKA
TITLE 名称 PSU-64000
AC OUTLET BOX (100-120Vac)
MODEL 型名 UJB-260
DRAWING NO. 図番
MC340953
DRAWN 製図
DESIGNED 設計
CHECKED 検図
APPD 承認
SCALE 尺度
UNITS 単位
3RD ANGLE PROJECTION
第3角法
REVISIONS 変更
△'00.03.02 改訂
FS1-43082

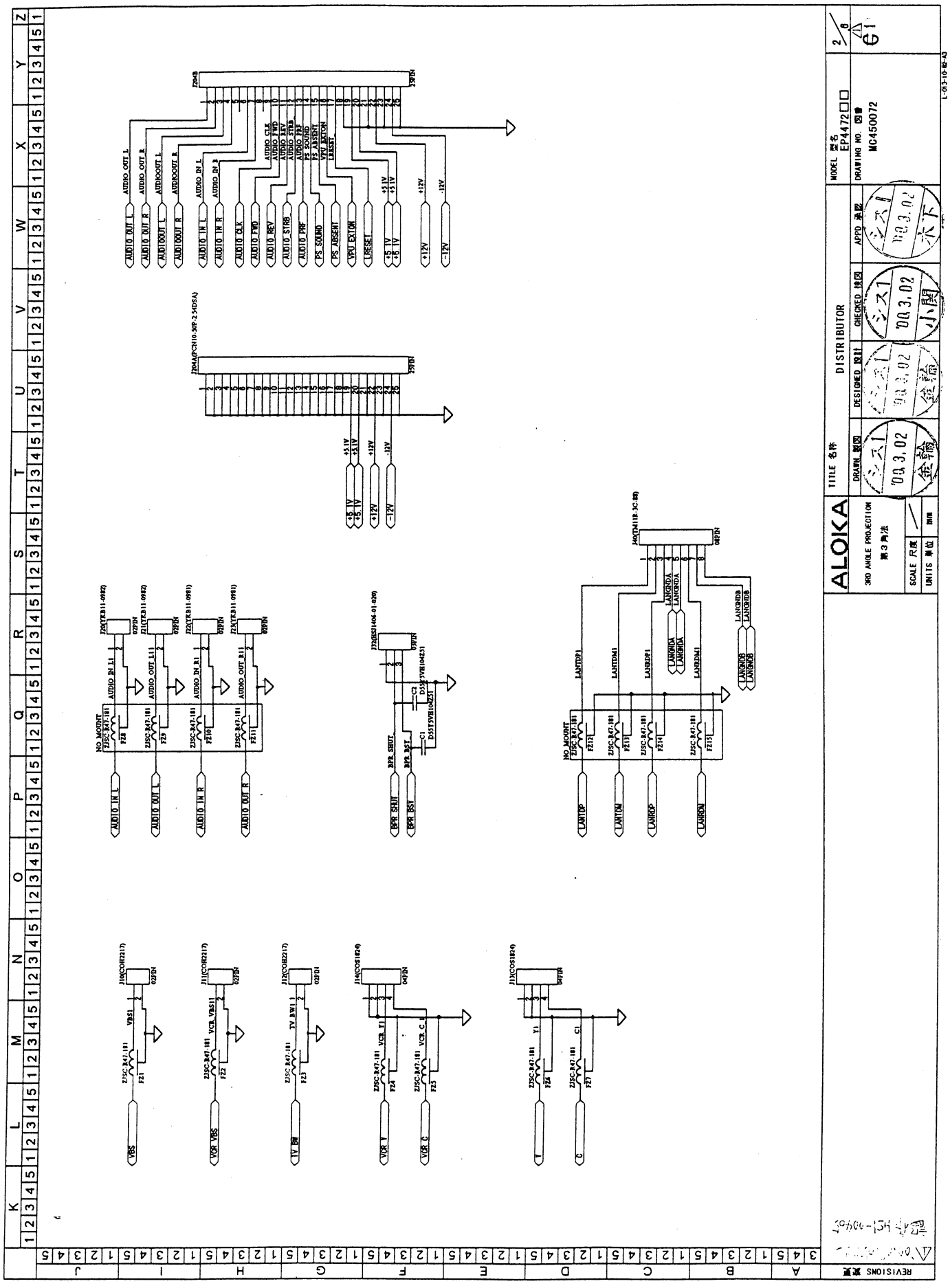

L-CABLE-642-05
300mm
MONITOR (150VA)
3191-03P
J805
120mm
AC OUT(200-240Vac) (TOTAL 500VAmax)
B/W PRINTOR (70VA)
COLOR PRINTOR (150VA)
PRINTOR (40VA)
VCR (90VA)
J852
J853
J854
J855
418902
*1
*2
*3
青
茶
UL1015 AWG16 緑/黄
UL1015 AWG18 白
UL1015 AWG18 灰
J851
3191-03P
From PSU-S4000-1
NOTE
1. 配線材
*1:UL1015 AWG18 白
*2:UL1015 AWG18 灰
*3:UL1015 AWG16
2. 配線材の縒り合わせ
下記マーキングは配線同士の縒り合わせをすること
3. J852~855(418902)の配線
TITLE 名称 PSP-S4000 AC OUTLET BOX (200-240Vac)
MODEL 型名 JB-261
DRAWING NO. 図番 MC340954
ALOKA
3RD ANGLE PROJECTION 第3角法
SCALE 尺度
UNITS 単位 mm
REVISIONS 変更

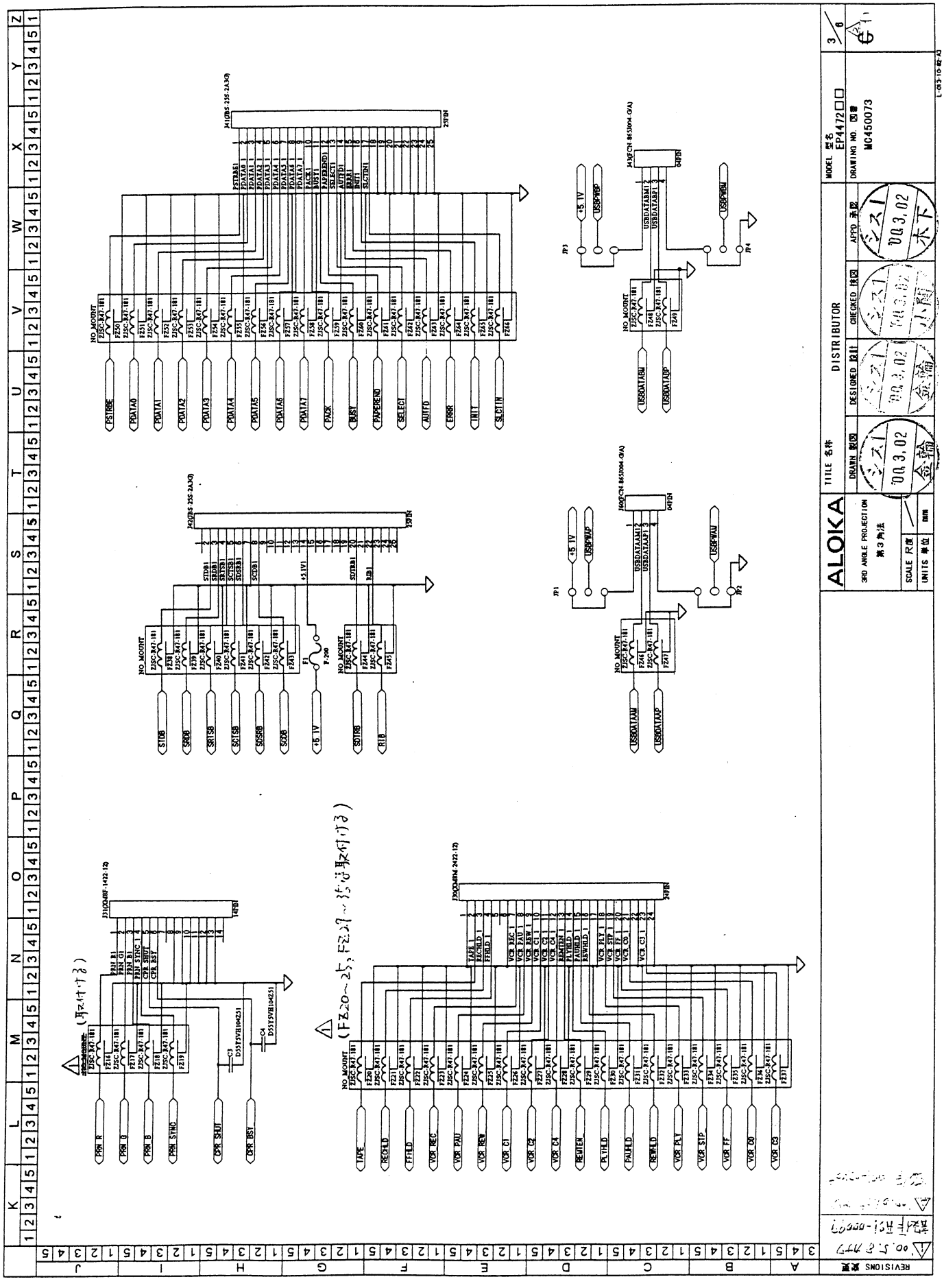


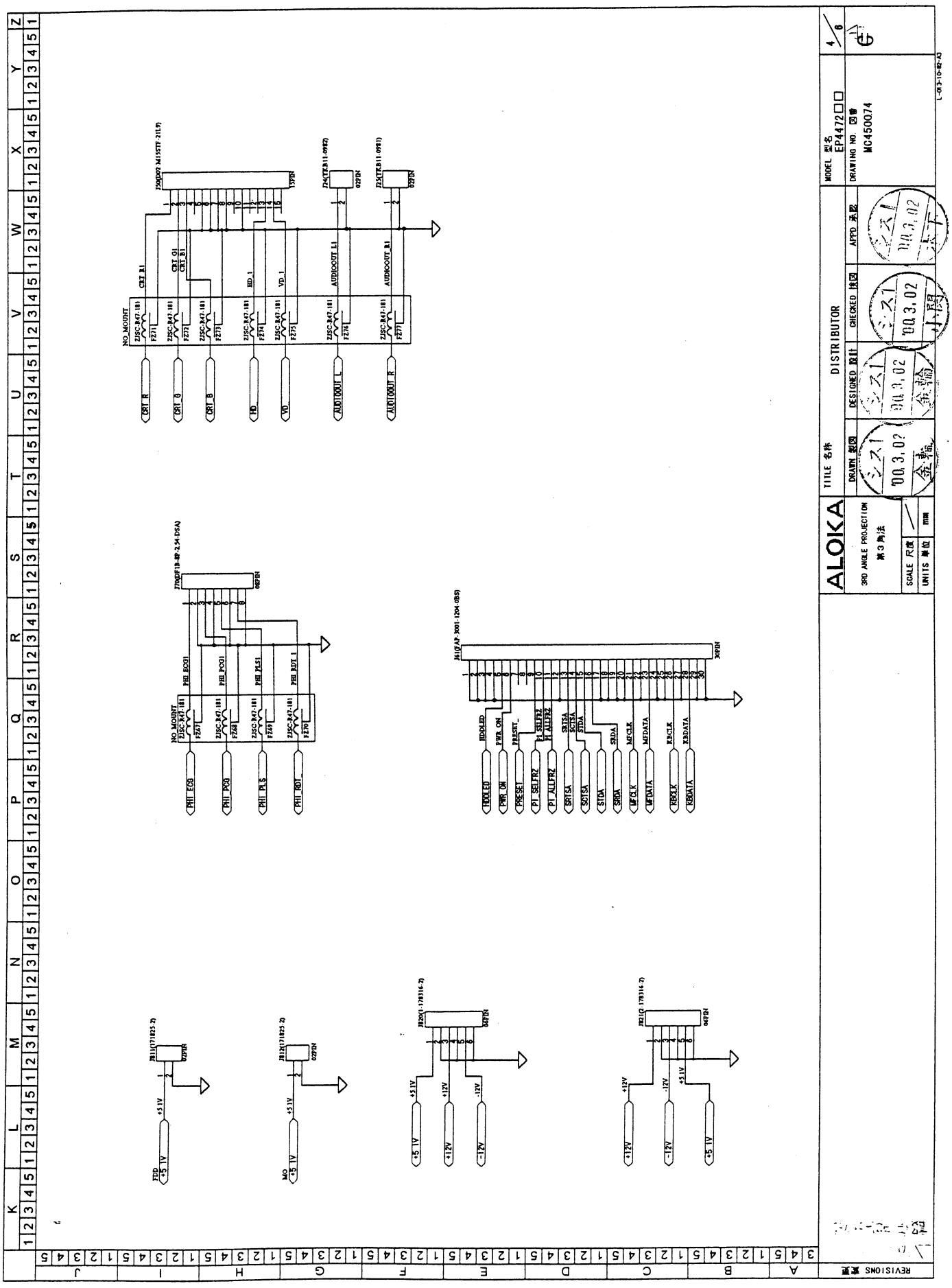
REVISIONS変更
⊿97.07.16 橋詰 FS1-70474

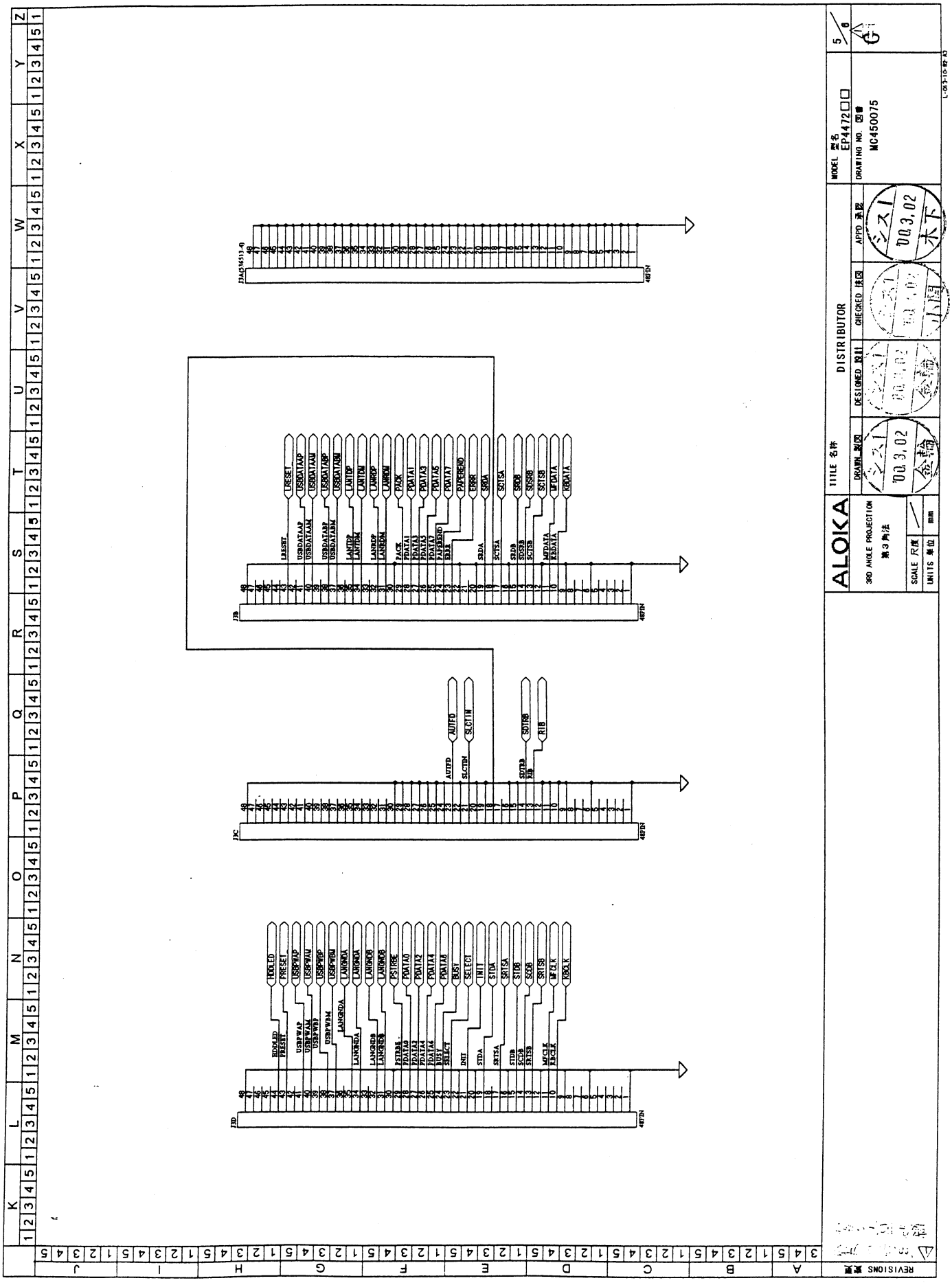
Aloka	TITLE: Foot SW PCB	MODEL: EP4261 00	1/1
3RD ANGLE PROJECTION 第3角法	DRAWN: シス 97.6.12 橋詰 / DESINED: シス 97.6.12 橋詰 / CHECKED: シス 97.6.12 宮本 / APP'D: シス 97.6.12 三木	DRAWING NO. MC401971	A
SCALE			
UNITS mm			

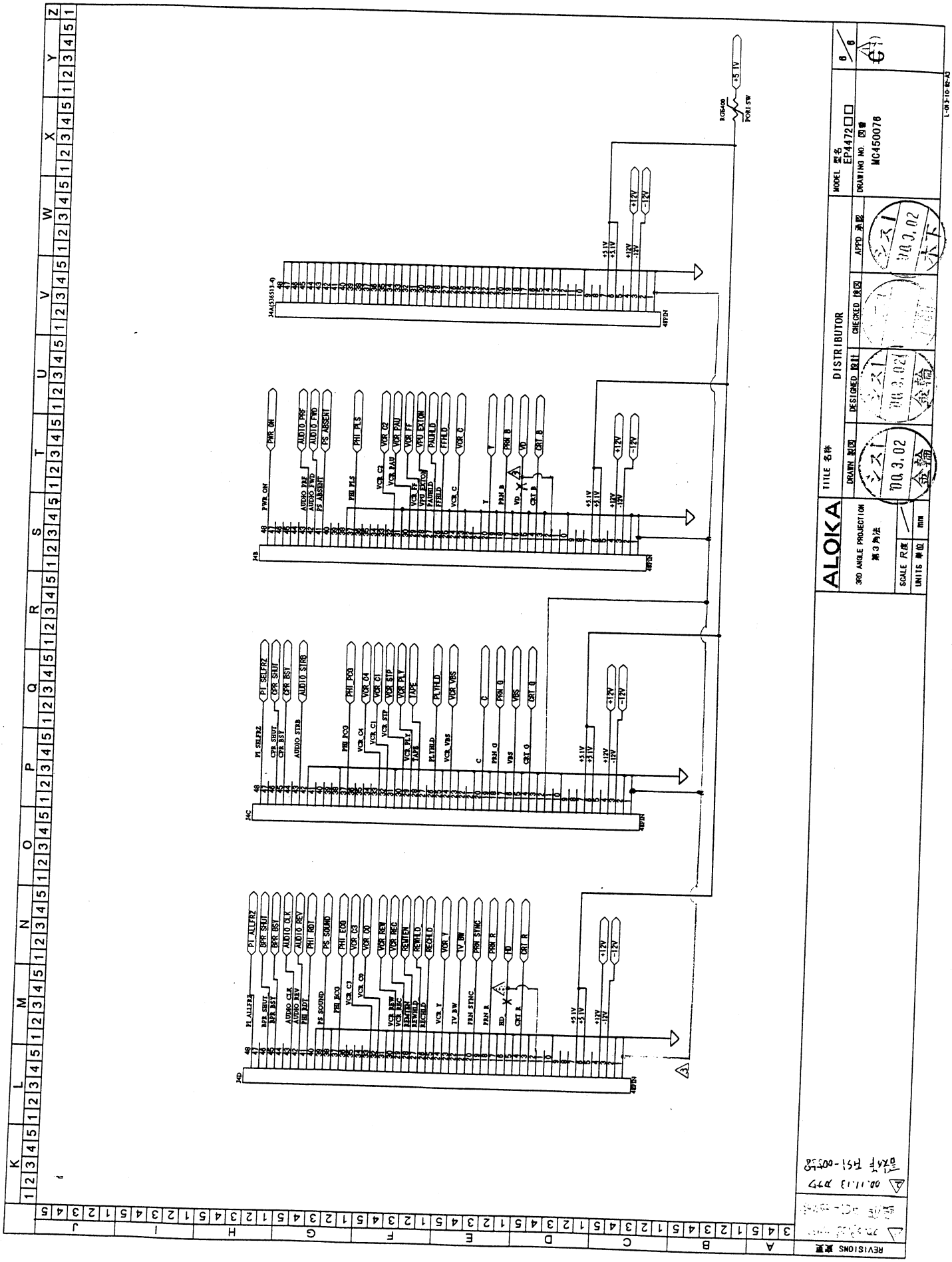
L-015·B-10-82-A4

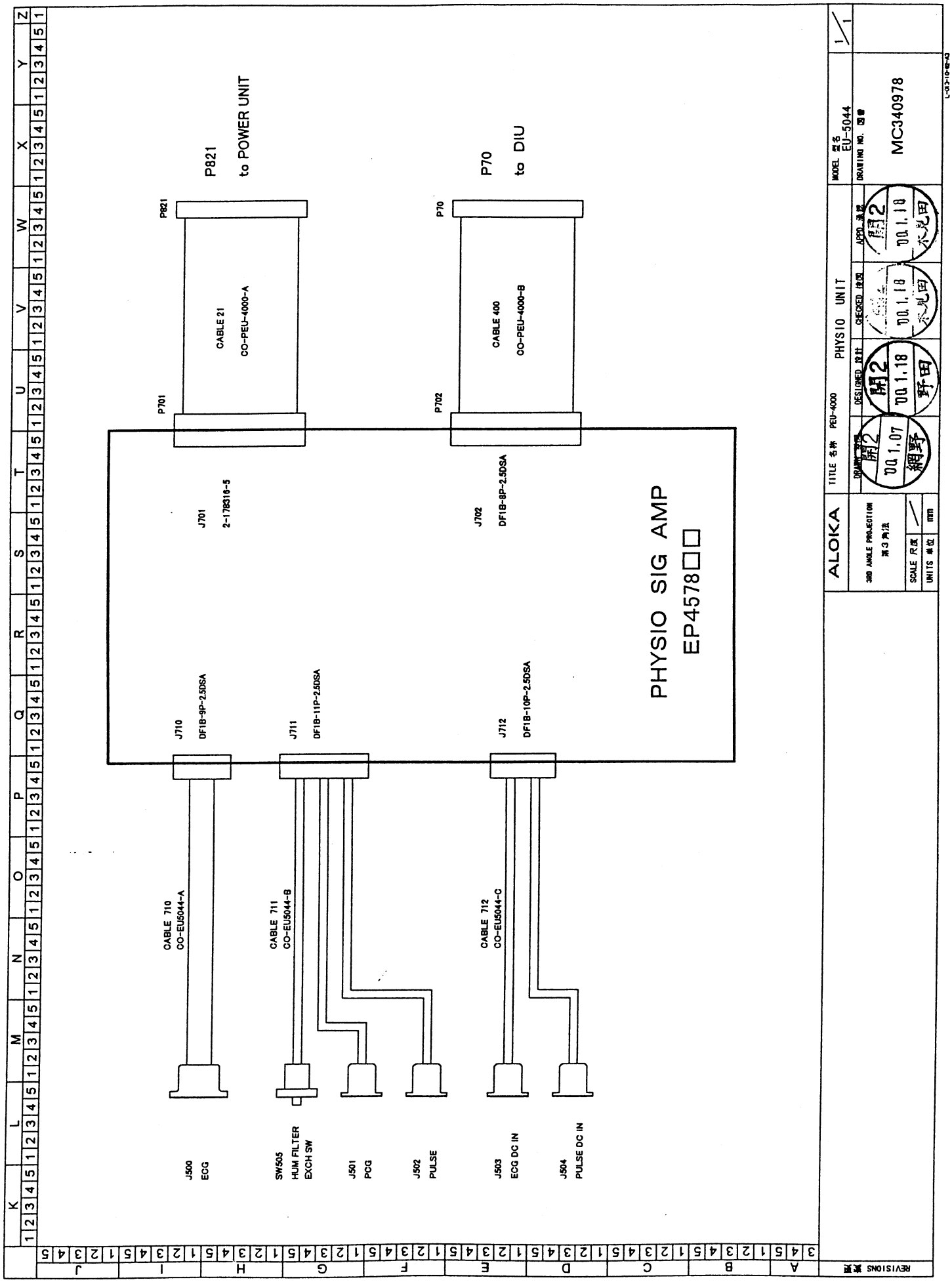

ALOKA
DISTRIBUTOR
EP4472□□
MG450072
3RD ANGLE PROJECTION
第3角法
AUDIO_OUT_L
AUDIO_OUT_R
AUDIOOUT_L
AUDIOOUT_R
AUDIO_IN_L
AUDIO_IN_R
AUDIO_CLK
AUDIO_FWD
AUDIO_REV
AUDIO_STRB
AUDIO_PRF
PS_SOUND
PS_ABSENT
VPU_EXTON
LRESET
+5.1V
+8.1V
+12V
-12V
VBS
VCR_VBS
TV_BW
VCR_Y
VCR_C
Y
C
LANTOP
LANTOM
LANBOP
LANBOM
BPR_SHUT
BPR_BSY

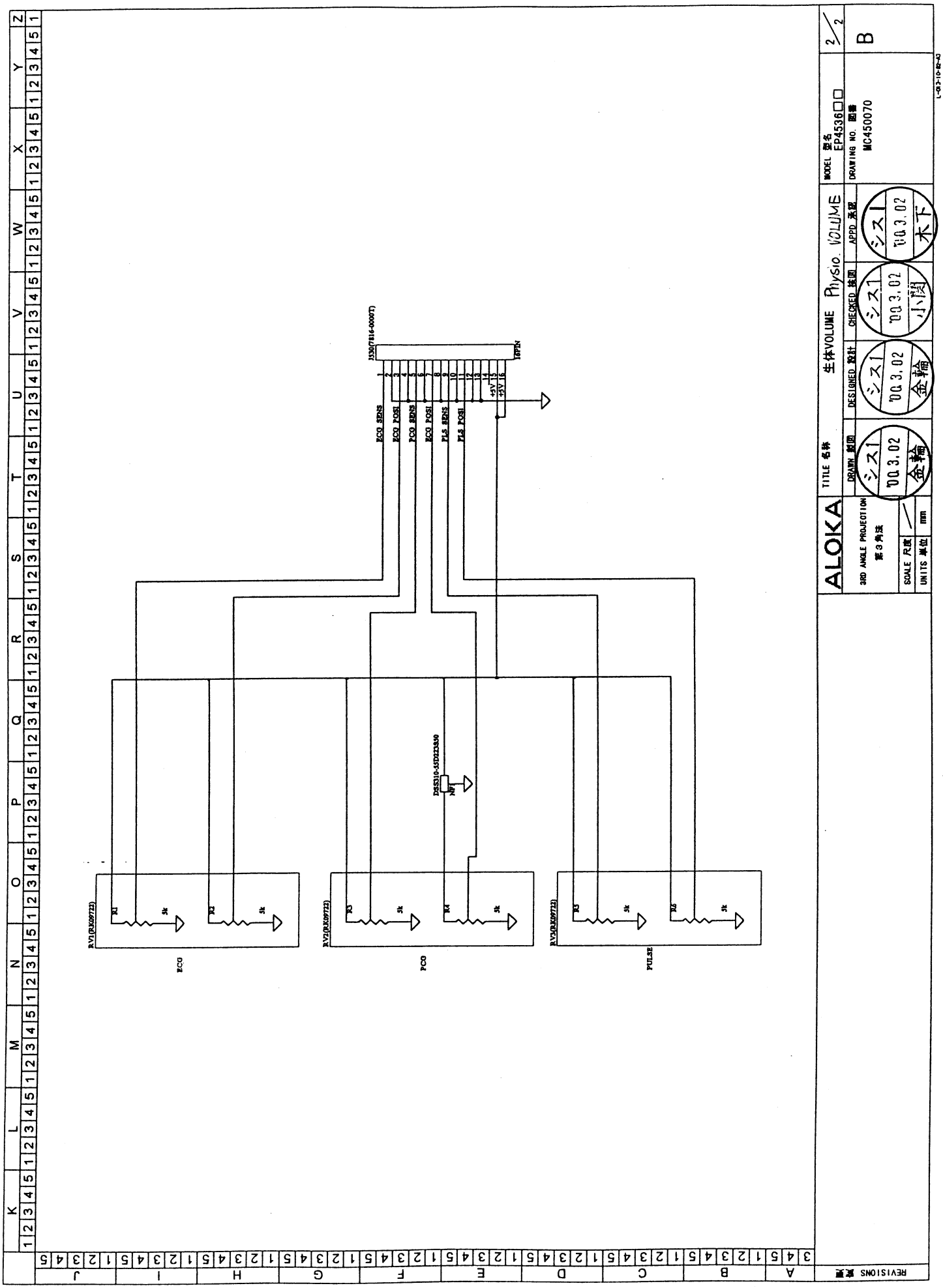

ALOKA
DISTRIBUTOR
MODEL 型名 EP4472□□
DRAWING NO. 図番 MG450073
3RD ANGLE PROJECTION
第3角法
SCALE R/E
UNITS 単位 mm
REVISIONS 改訂
PSTRBE
PDATA0
PDATA1
PDATA2
PDATA3
PDATA4
PDATA5
PDATA6
PDATA7
PACK
BUSY
PAPEREND
SELECT
AUTOFD
ERROR
INIT
SLCTIN
USBDATABM
USBDATABP
USBDATAAM
USBDATAAP
+5.1V
+15.1V
-15.1V
TAPE
REGLD
FFLD
VCR REC
VCR PAU
VCR REW
VCR C1
VCR C2
VCR C4
REWTEN
CK THLD
PAULD
REWLD
VCR PLY
VCR STP
VCR FF
VCR C0
VCR C3
PRN R
PRN G
PRN B
PRN SYNC
CPR SHUT
CPR RST

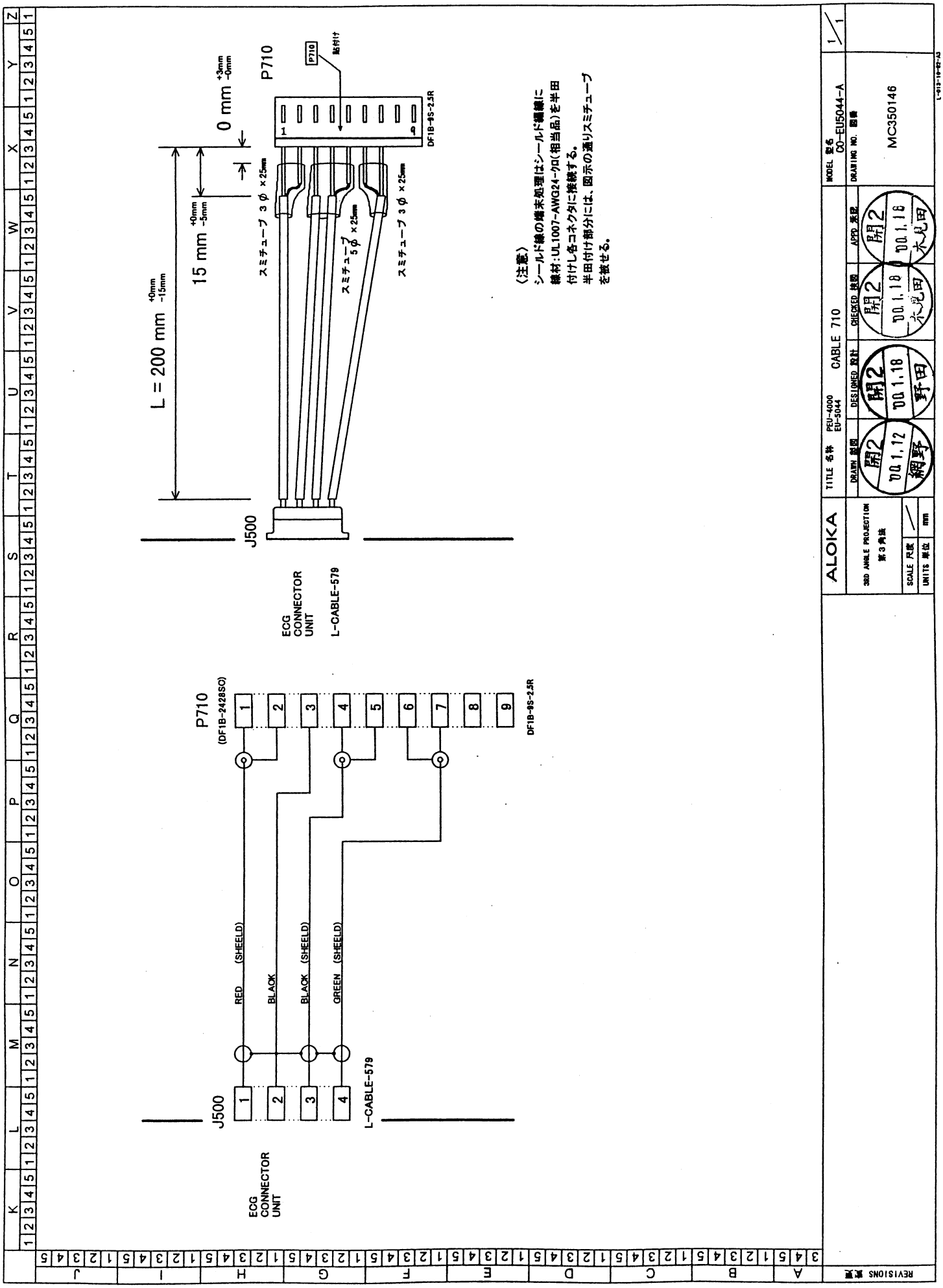

ALOKA
DISTRIBUTOR
MODEL 型名 EP4472□□
DRAWING NO. 図番 MG450074
APPD 承認
CHECKED 検図
DESIGNED 設計
DRAWN 製図
TITLE 名称
3RD ANGLE PROJECTION 第3角法
SCALE 尺度
UNITS 単位 mm
REVISIONS 変更
CRT_R
CRT_G
CRT_B
HD
VD
AUDIOOUT_L
AUDIOOUT_R
FDD
MO
PWR_ON
PRESET_
PI_SELFRZ
PI_ALLFRZ
SRTSA
SCTSA
STDA
SRDA
MFCLK
MFDATA
KBCLK
KBDATA
+5.1V
+12V
-12V

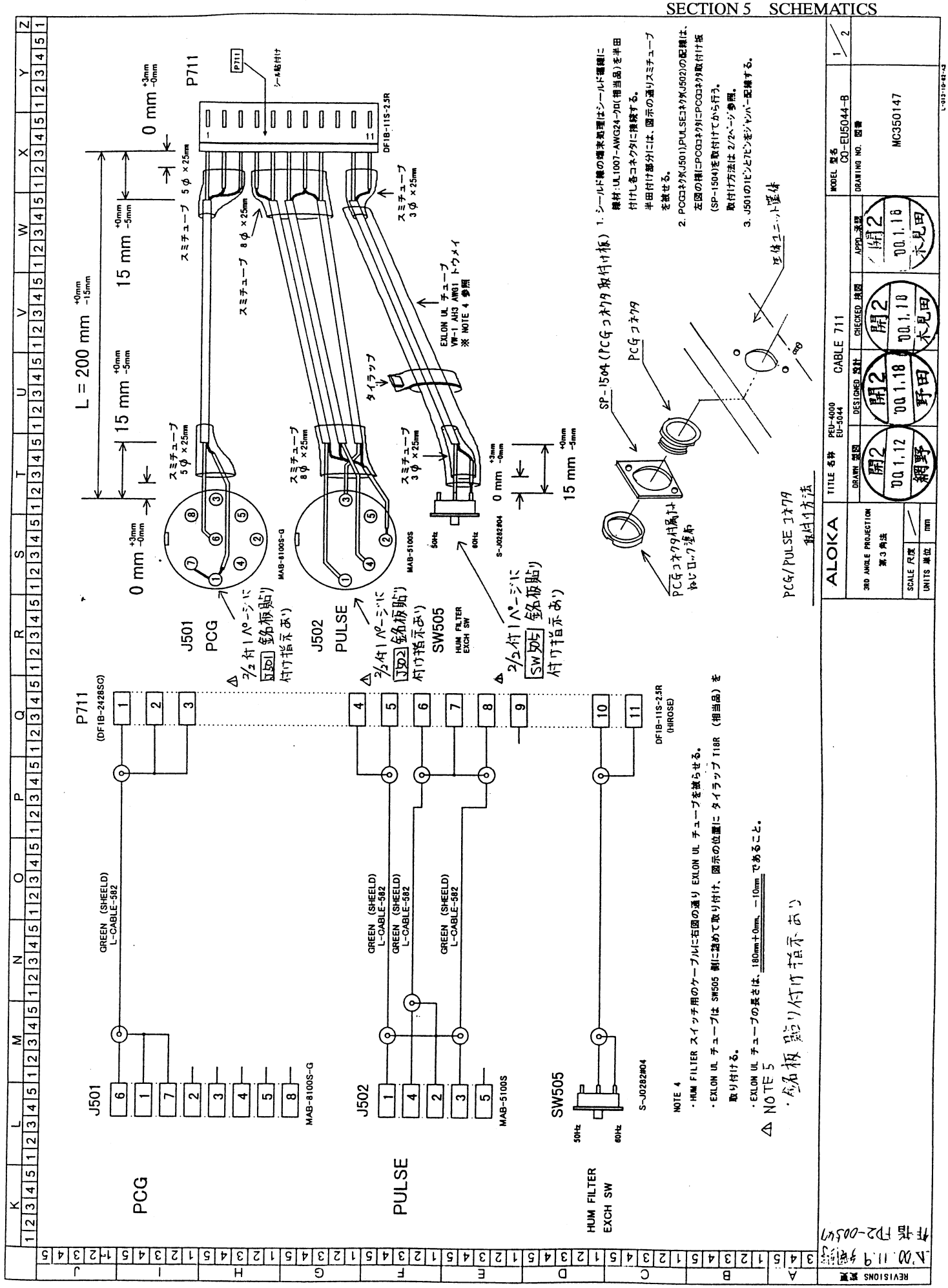

ALOKA
DISTRIBUTOR
MODEL 型名 EP4472□□
DRAWING NO. 図番 MC450075
DRAWN 製図
DESIGNED 設計
CHECKED 検図
APPD 承認
SCALE 尺度
UNITS 単位
mm
REVISIONS

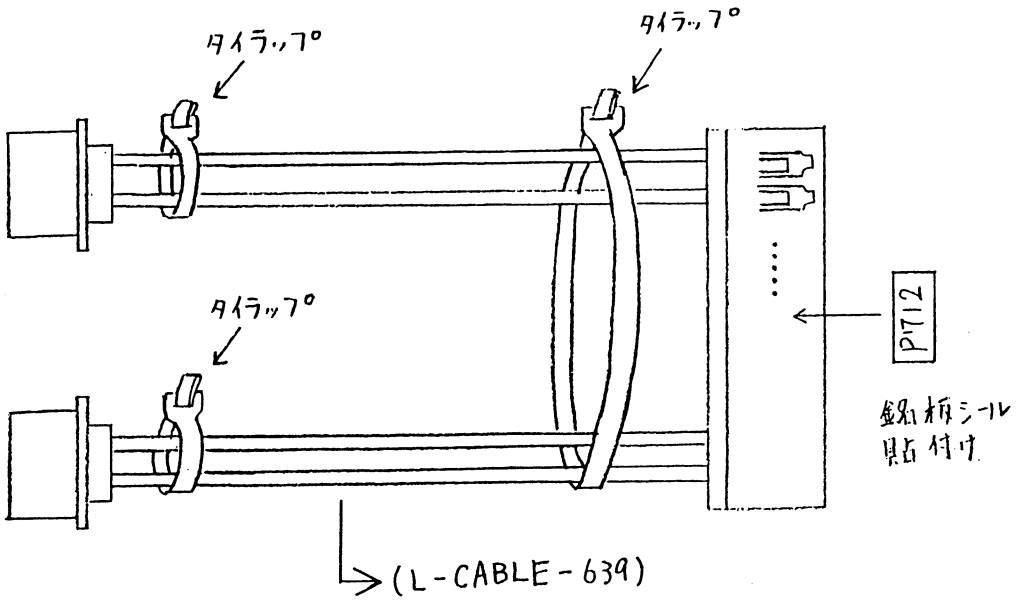

ALOKA
DISTRIBUTOR
MODEL 型名 EP4472□□
DRAWING NO. 図番 MC450076
APPD 承認
CHECKED 検図
DESIGNED 設計
DRAWN 製図
TITLE 名称
3RD ANGLE PROJECTION 第3角法
SCALE 尺度
UNITS 単位 mm
REVISIONS 改訂
PWR_ON
AUDIO PRF
AUDIO FWD
PS_ABSENT
PHI_PLS
VCR_C2
VCR_PAU
VCR_FF
VCR_EXTOW
PAUHLD
FFHLD
VCR_C
PRM_B
VD
CRT_B
P1_SELFRZ
CPR_SHUT
CPR_BSY
AUDIO_STRB
PHI_PC0
VCR_C4
VCR_C1
VCR_STP
VCR_PLY
TAPE
PLYHLD
VCR_VBS
C
PRM_G
VBS
CRT_G
P1_ALLFRZ
CPR_RST
AUDIO_CLK
AUDIO_REV
PHI_RDT
PS_SOUND
VCR_C3
VCR_C0
VCR_REW
VCR_REC
REWIND
RECHLD
VCR_Y
TV_BW
PRM_SYNC
PRM_R
HD
CRT_R
+5.1V
+12V
-12V
-5.1V
POWER SW
MC450076


P821
to POWER UNIT
P70
to DIU
CABLE 21
CO-PEU-4000-A
CABLE 400
CO-PEU-4000-B
P821
P701
P70
P702
J701
2-178316-5
J702
DF1B-8P-2.5DSA
PHYSIO SIG AMP
EP4578□□
J710
DF1B-9P-2.5DSA
J711
DF1B-11P-2.5DSA
J712
DF1B-10P-2.5DSA
CABLE 710
CO-EU5044-A
CABLE 711
CO-EU5044-B
CABLE 712
CO-EU5044-C
J500
ECG
SW505
HUM FILTER
EXCH SW
J501
PCG
J502
PULSE
J503
ECG DC IN
J504
PULSE DC IN
ALOKA
TITLE PEU-4000
PHYSIO UNIT
MODEL EU-5044
DRAWING NO. MC340978
DESIGNED
CHECKED
APPD
00.1.07
00.1.18
00.1.18
SCALE
UNITS mm
REVISIONS


ALOKA
TITLE 名称
生体VOLUME Physio. VOLUME
MODEL 型名 EP4536□□
DRAWING NO. 図番 MC450070
DRAWN 製図
DESIGNED 設計
CHECKED 検図
APPD 承認
3RD ANGLE PROJECTION 第3角法
SCALE 尺度
UNITS 単位 mm
REVISIONS
ECG
PCG
PULSE


L = 200 mm +0mm -15mm
15 mm +0mm -5mm
0 mm +3mm -0mm
P710
DF1B-9S-2.5R
スミチューブ 3φ ×25mm
スミチューブ 5φ ×25mm
J500
ECG CONNECTOR UNIT
L-CABLE-579
〈注意〉
シールド線の端末処理はシールド編線に
線材:UL1007-AWG24-9(相当品)を半田
付けし各コネクタに接続する。
半田付け部分には、図示の通りスミチューブ
を被せる。
P710
(DF1B-2428SCO)
RED (SHEELD)
BLACK
BLACK (SHEELD)
GREEN (SHEELD)
ALOKA
CABLE 710
MC350146


ALOKA
3RD ANGLE PROJECTION 第3角法
TITLE 名称 CABLE 711
PEU-4000 EU-5044
DRAWN 製図 DESIGNED 設計 CHECKED 検図 APPD. 承認
MODEL 型名 CO-EU5044-B
DRAWING NO. 図番 MC350147
SCALE 尺度
UNITS 単位 mm
REVISIONS 改訂
P711
(DF1B-2428SC)
PCG
PULSE
HUM FILTER EXCH SW
J501
J502
SW505
MAB-8100S-G
MAB-5100S
S-J0282804
DF1B-11S-2.5R (HIROSE)
GREEN (SHEELD) L-CABLE-582
L = 200 mm +0mm -15mm
15 mm +0mm -5mm
0 mm +3mm -0mm
スミチューブ 5φ×25mm
スミチューブ 8φ×25mm
スミチューブ 3φ×25mm
タイラップ
EXLON UL チューブ VW-1 AH3 AWG1 トウメイ ※ NOTE 4 参照
シール貼付け
50Hz
60Hz
NOTE 4
・HUM FILTER スイッチ用のケーブルに右図の通り EXLON UL チューブを被らせる。
・EXLON UL チューブは SW505 側に詰めて取り付け、図示の位置に タイラップ T18R (相当品) を取り付ける。
・EXLON UL チューブの長さは、180mm+0mm, −10mm であること。
△ NOTE 5
・名板 貼り付け指示あり
1. シールド線の端末処理はシールド編線に
材料: UL1007-AWG24-7P(相当品)を半田
付けしコネクタに接続する。
半田付け部分には、図示の通りスミチューブ
を被せる。
2. PCGコネクタ(J501),PULSEコネクタ(J502)の配線は、
左図の様にPCGコネクタ,PCGコネクタが取付け板
(SP-1504)を取付けてから行う。
取付け方法は 2/2ページ参照。
3. J501のピンとピンをジャンパー配線する。
SP-1504 (PCGコネクタ取付け板)
PCGコネクタ
PCGコネクタ付属ネジロック済み
PCG/PULSE コネクタ 取付け方法
2/2ページに 名板貼り付け指示あり
2/2ページに J502 名板貼り付け指示あり
2/2ページに SW505 名板貼り付け指示あり



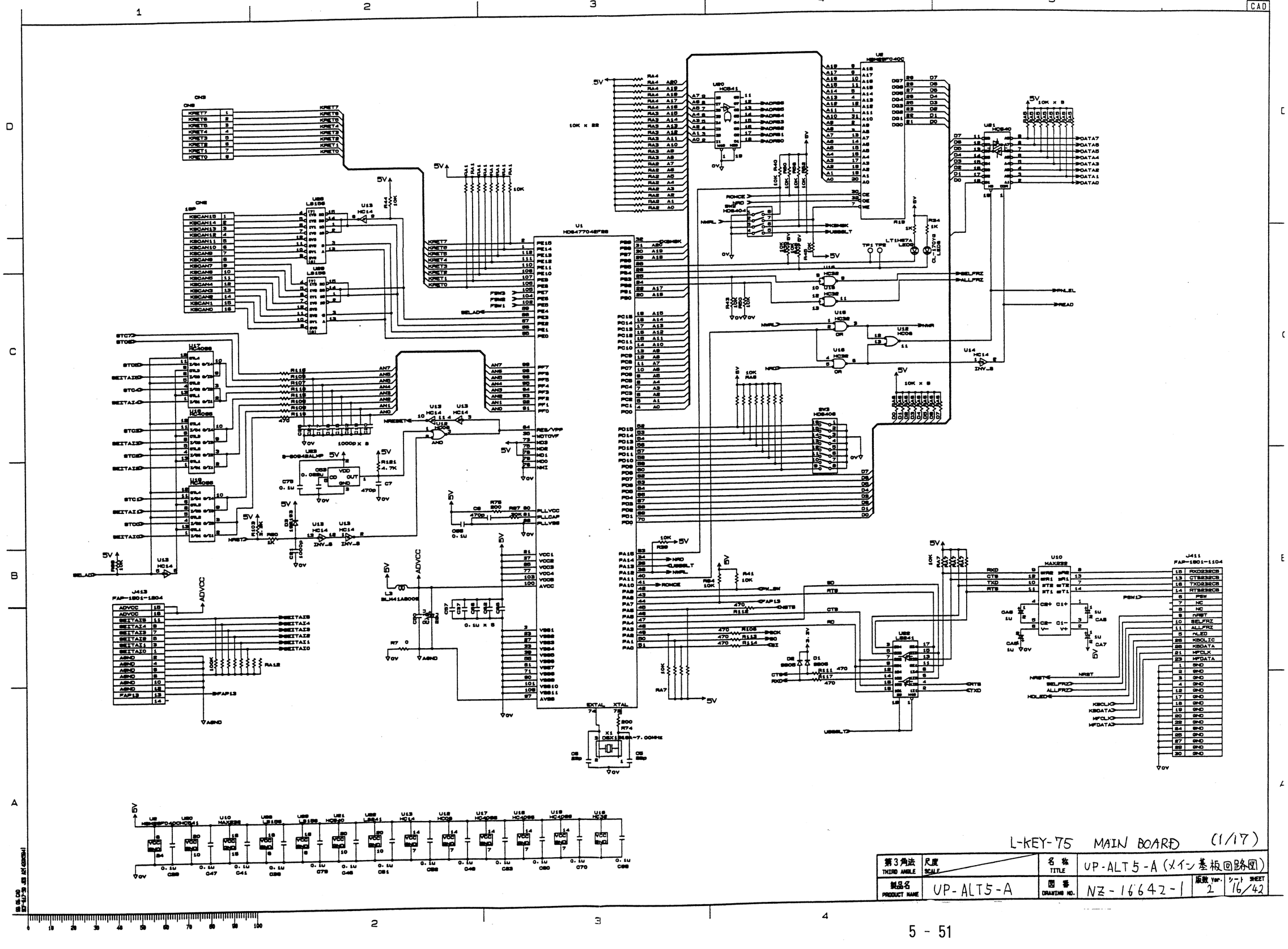
上記の通り L - CABLE-639 にタイラップによる結束3ヶ所及び P712 銘板を指示位置に貼付けること。

タイラップは T18R(相当品)を使用
タイラップの取付け位置は各コネクタの根元付近に取付け

REVISIONS変更

Aloka	TITLE名称 CABLE 712	MODEL形名 CO-EU5044-C	1/1
3RD ANGLE PROJECTION 第3角法	DRAWN製図	DESIGNED設計	CHECKED検図	APPD承認	DRAWING NO.図番 MC450033	
SCALE尺度						
UNITS単位	mm					

L-015-B-10-82-A4


CAD
1
2
3
4
5
U1
HD64770F28
U8
HD6473040C
U20
HC541
U21
HC540
U22
HC541
U23
HC540
U24
HC541
U25
HC540
U26
HC541
U27
HC540
U28
HC541
U29
HC540
U30
HC541
U31
HC540
U32
HC541
U33
HC540
U34
HC541
U35
HC540
U36
HC541
U37
HC540
U38
HC541
U39
HC540

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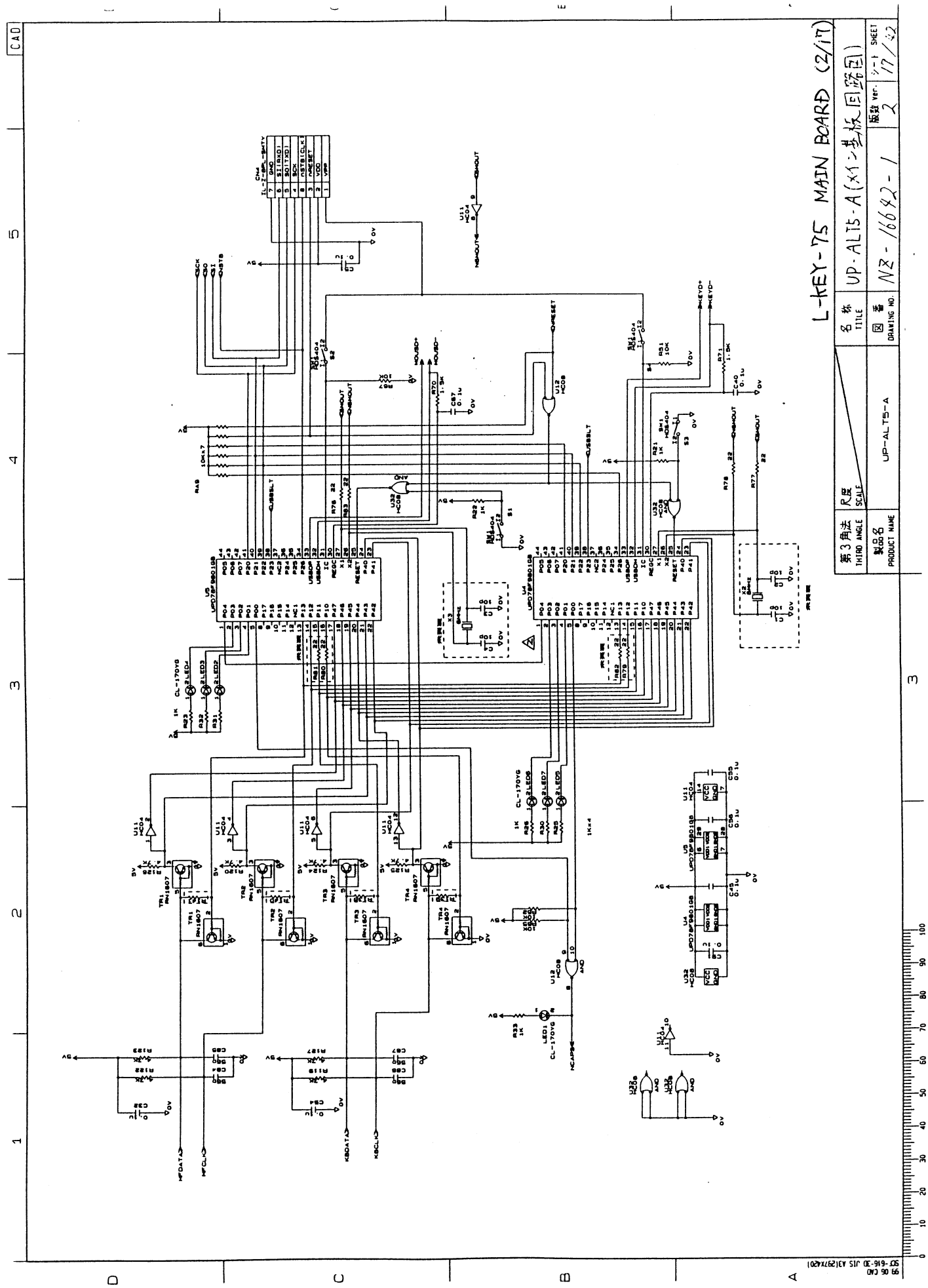
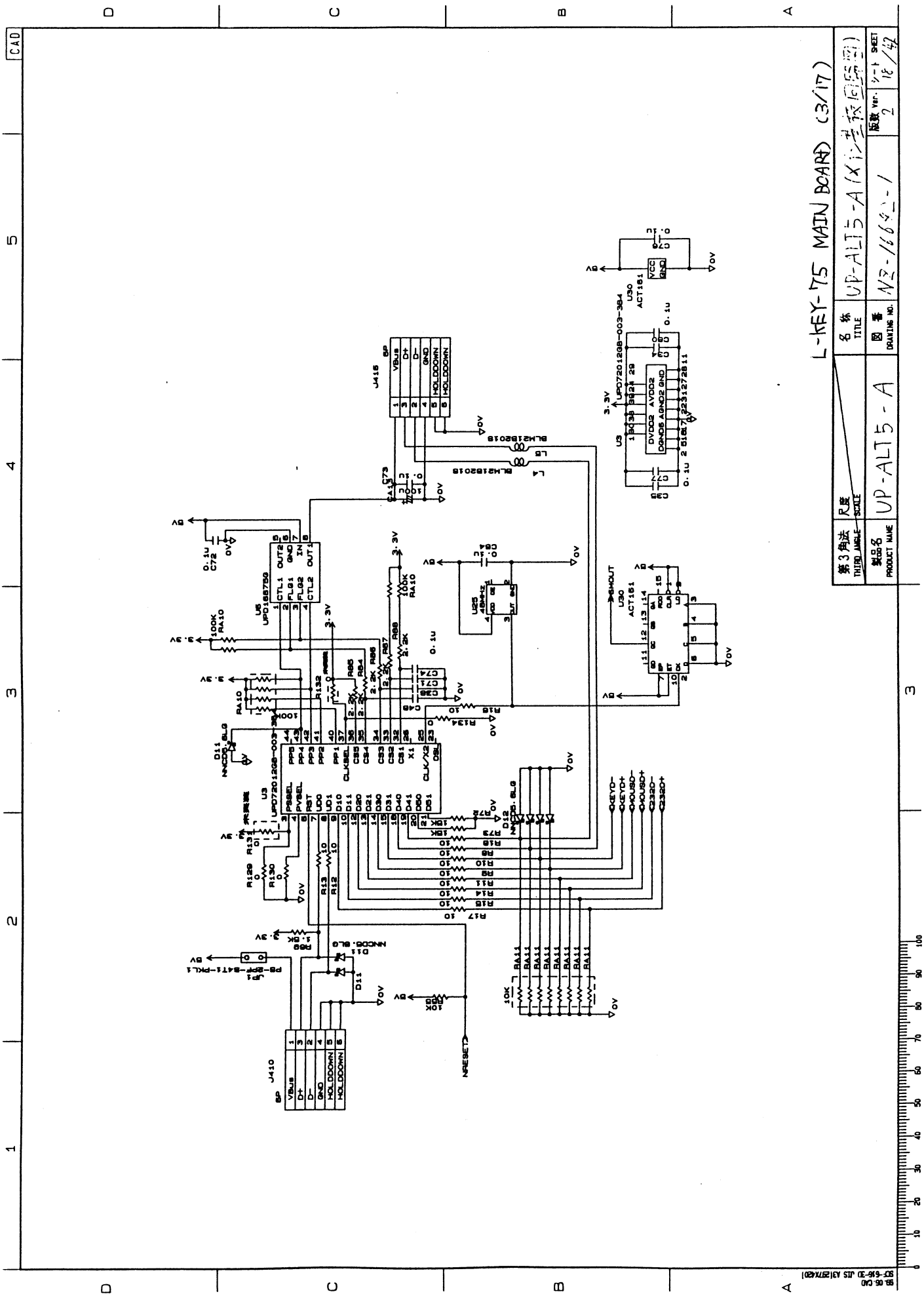
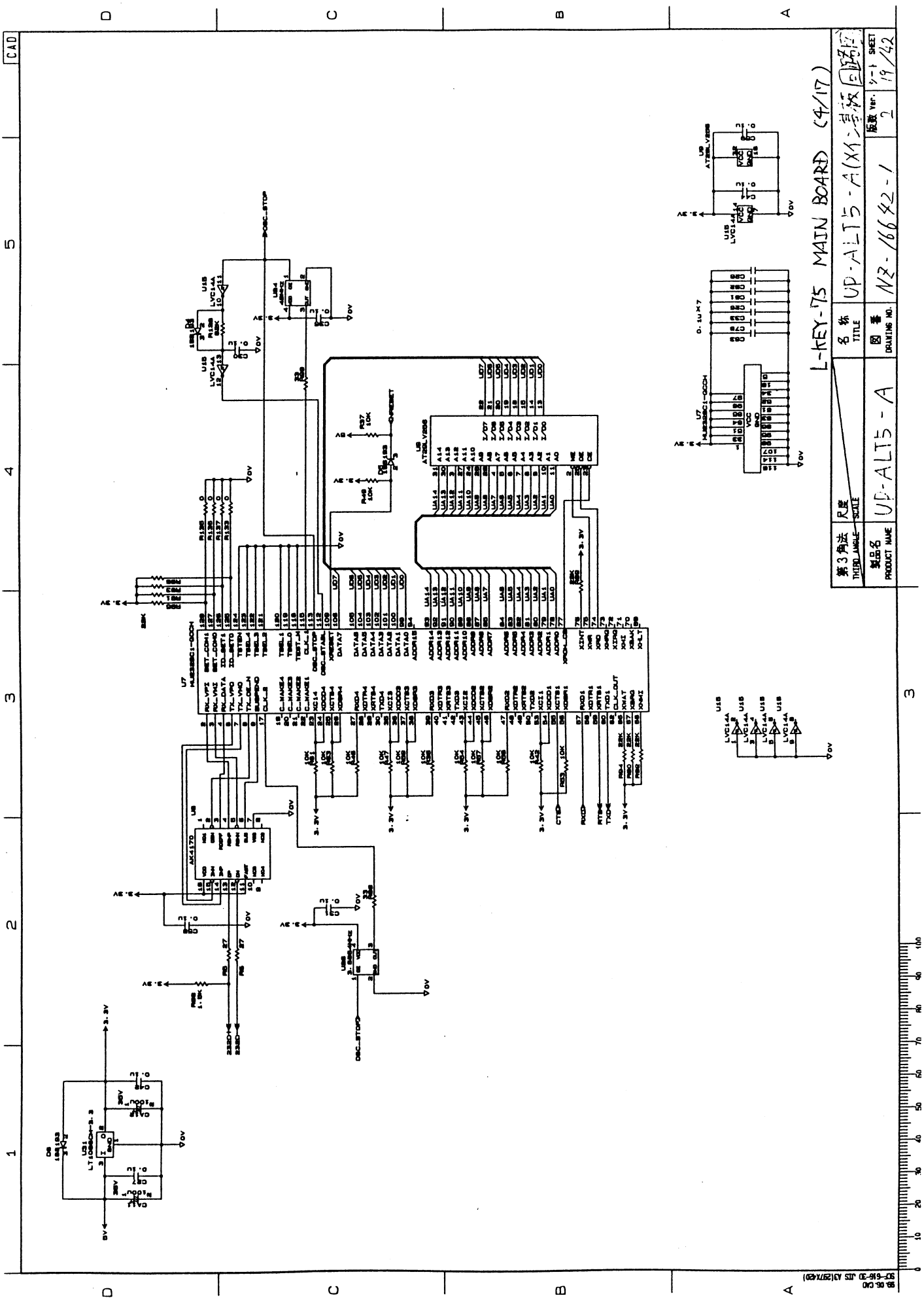
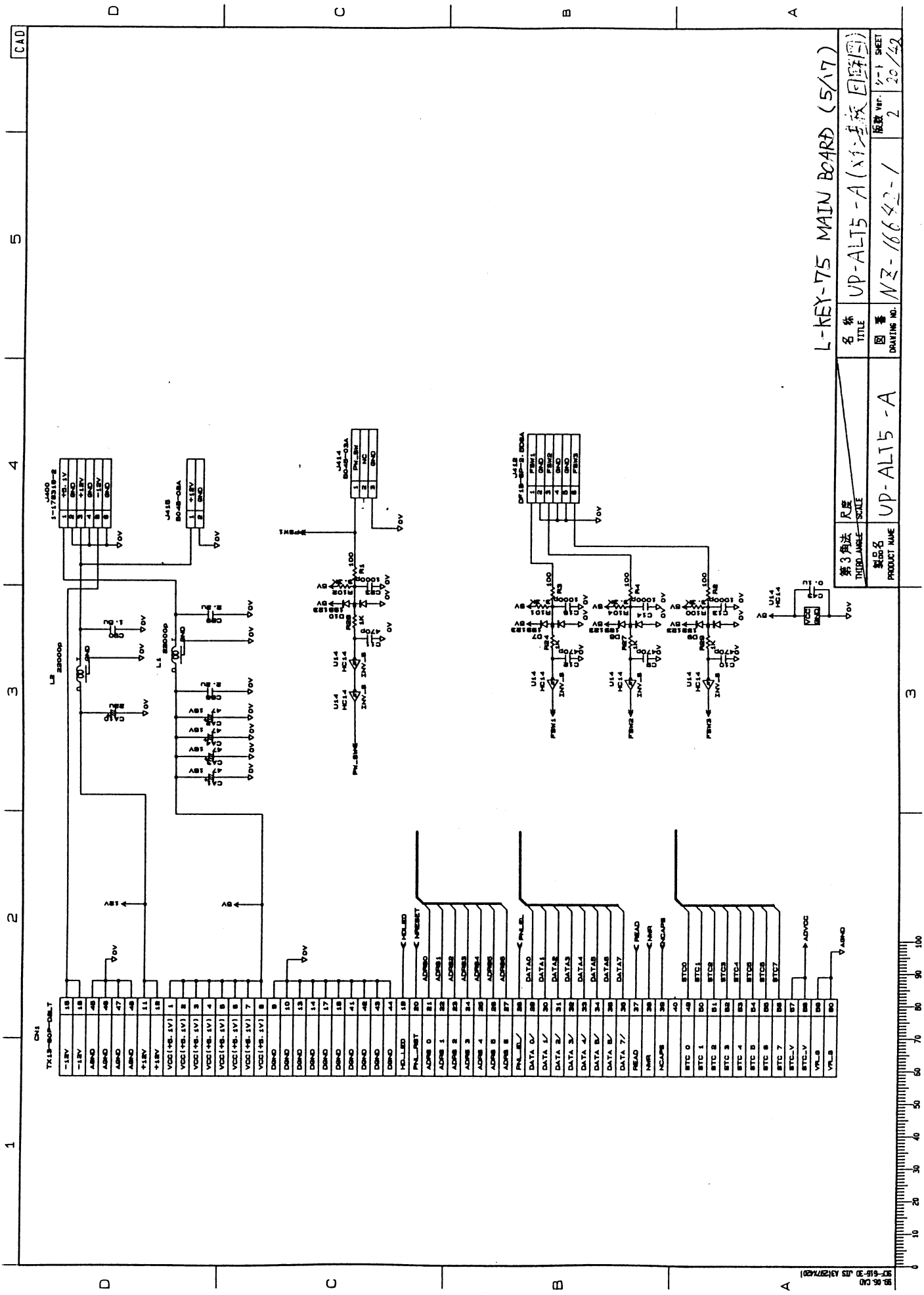
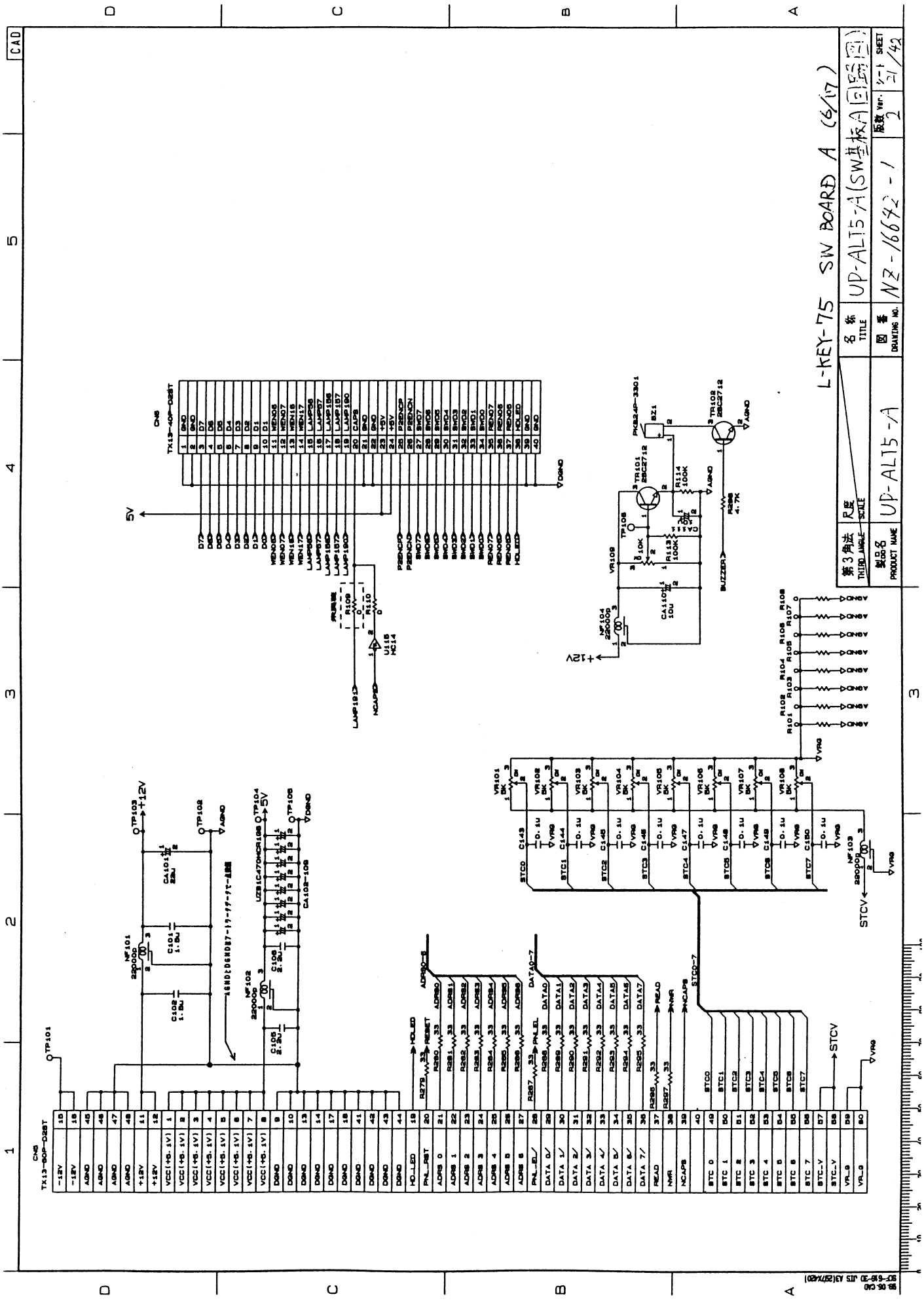
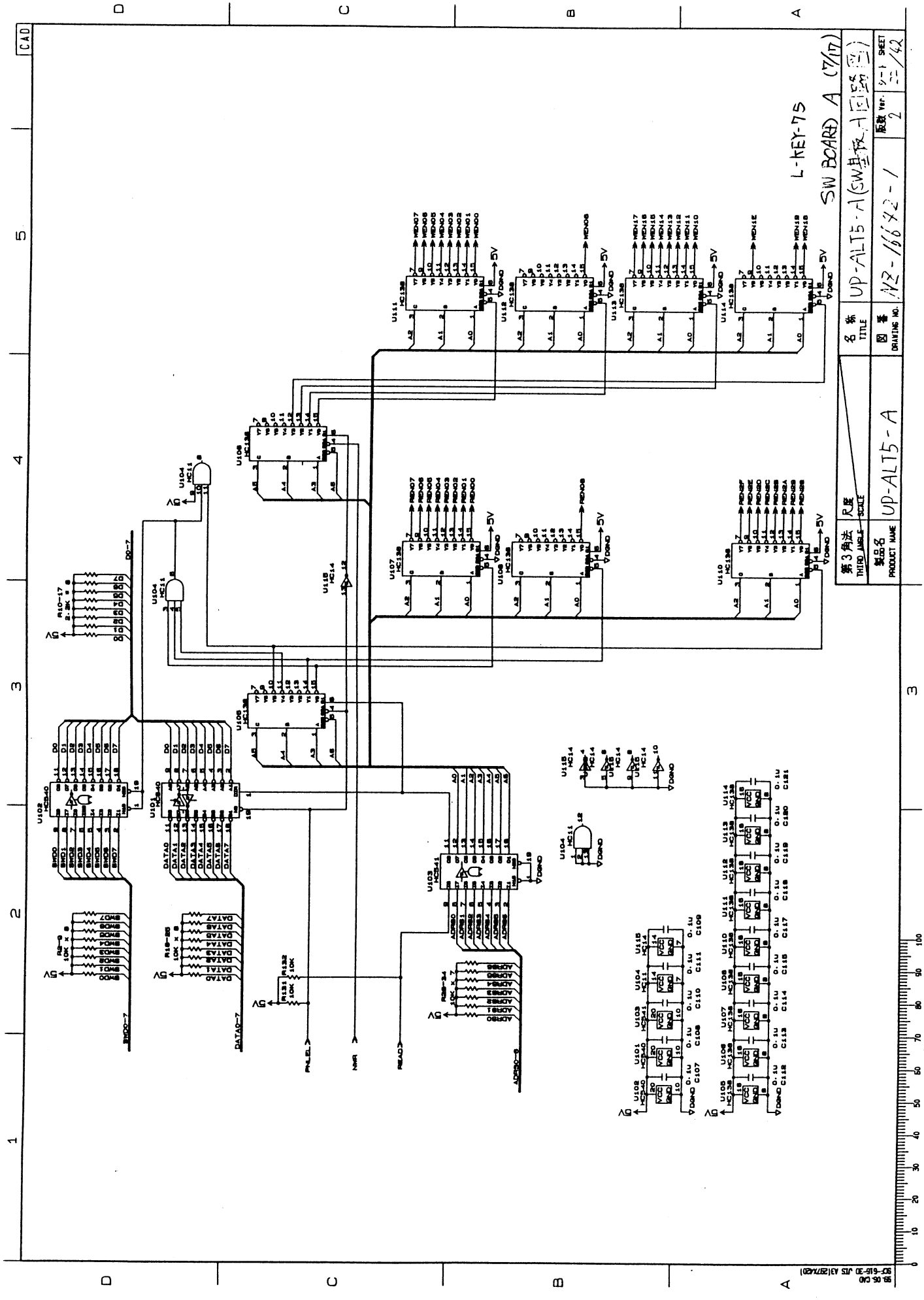

L-KEY-75 MAIN BOARD (2/17)
UP-ALT5-A(メイン基板回路図)
UP-ALT5-A
NZ-1682-1
2
17/32
第3角法
THIRD ANGLE
製品名
PRODUCT NAME
尺度
SCALE
名称
TITLE
図番
DRAWING NO.
版数 ver.
シート SHEET
CAD
99.06.CAD
SCF-616-3D JIS A3(297X420)

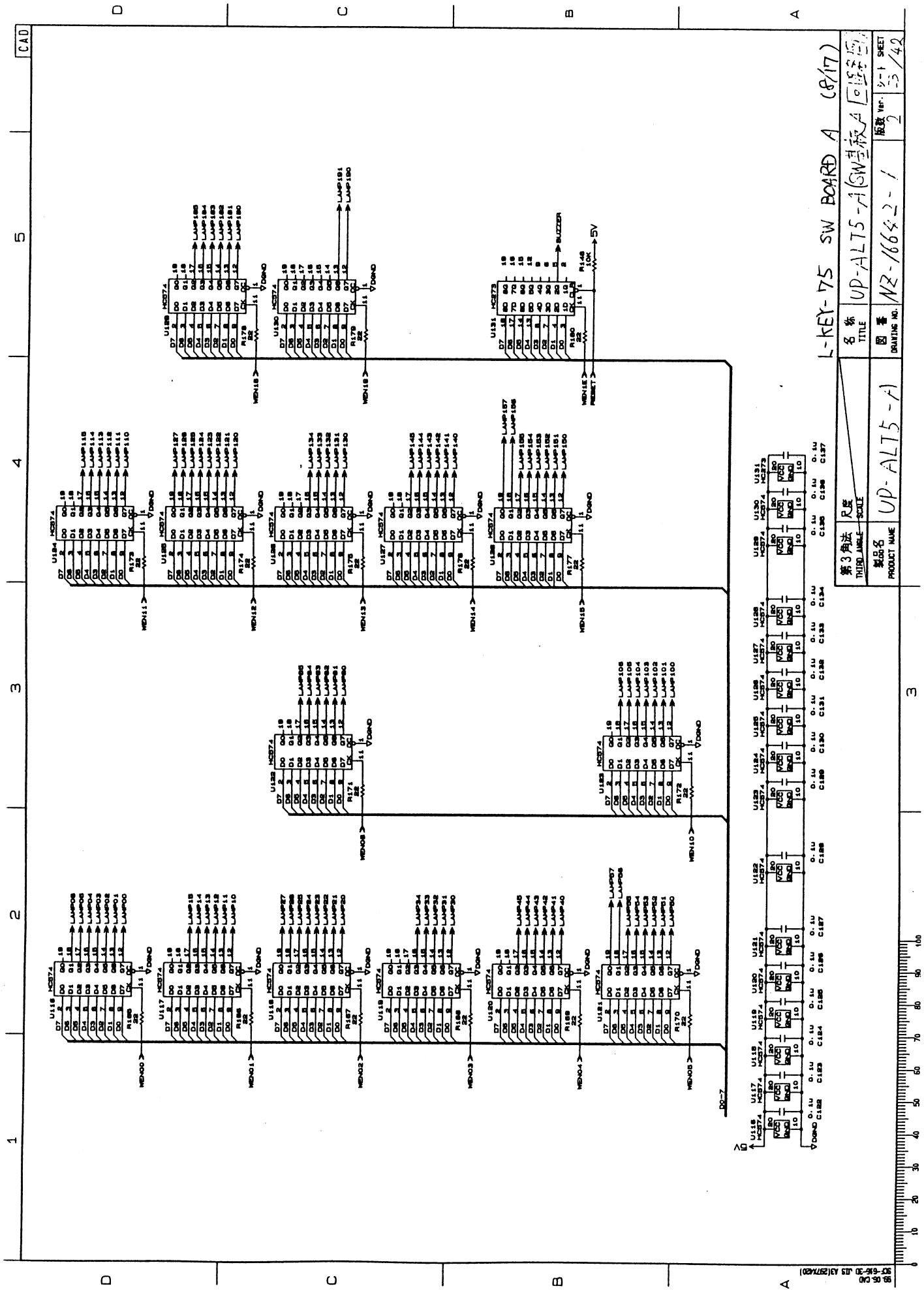

L-KEY-75 MAIN BOARD (3/17)
UP-ALT5-A
UP-ALT5-A
3rd ANGLE
SCALE
PRODUCT NAME
DRAWING NO.
SHEET
J410
J416
U3
U5
U30
U25
U9
NRESET

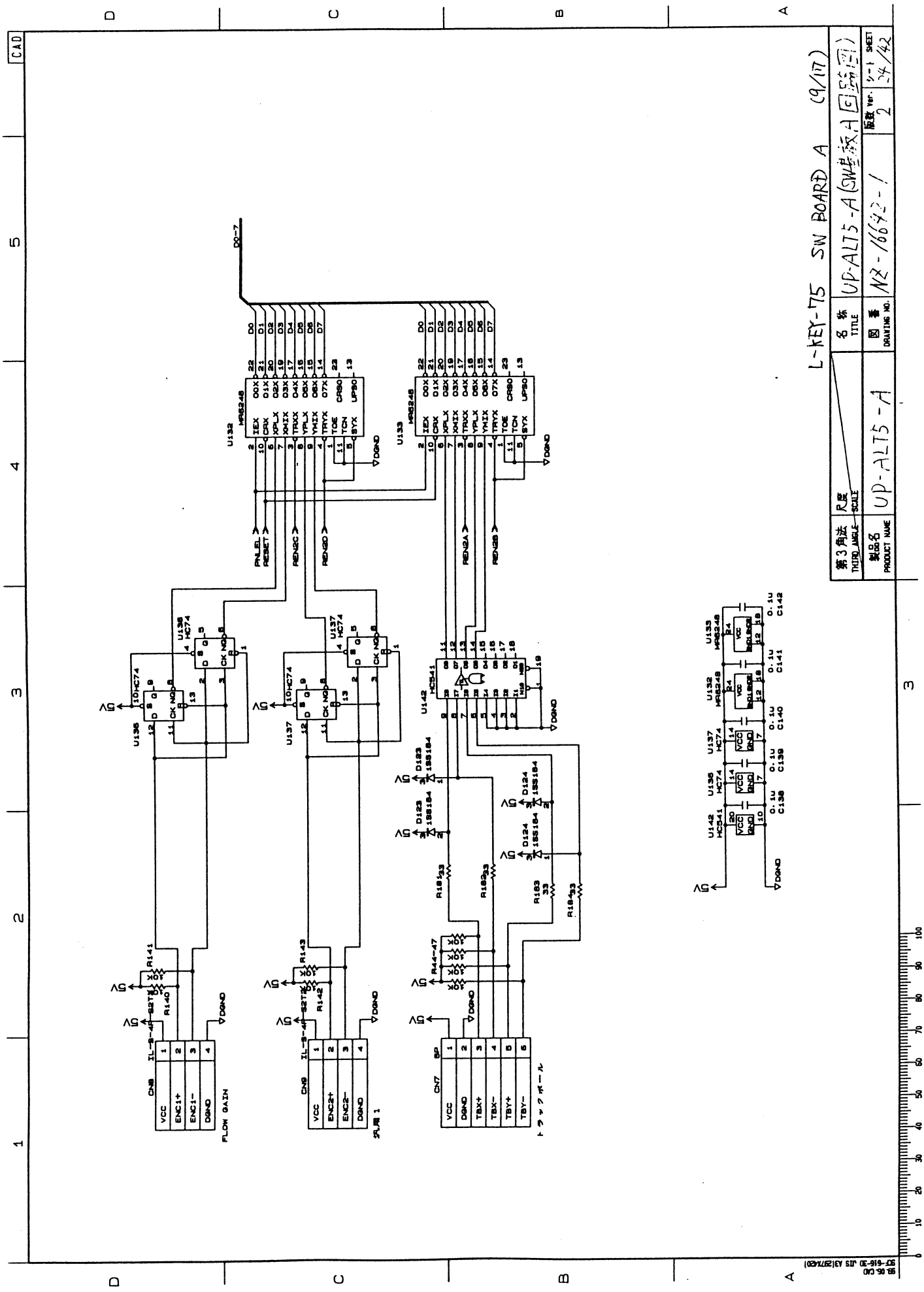

L-KEY-75 MAIN BOARD (4/17)
UP-ALT5-A
MN2-1662-1
UP-ALT5-A
第3角法
THIRD ANGLE
尺度
SCALE
製品名
PRODUCT NAME
名称
TITLE
図番
DRAWING NO.
版数 Ver.
SHEET
CAD

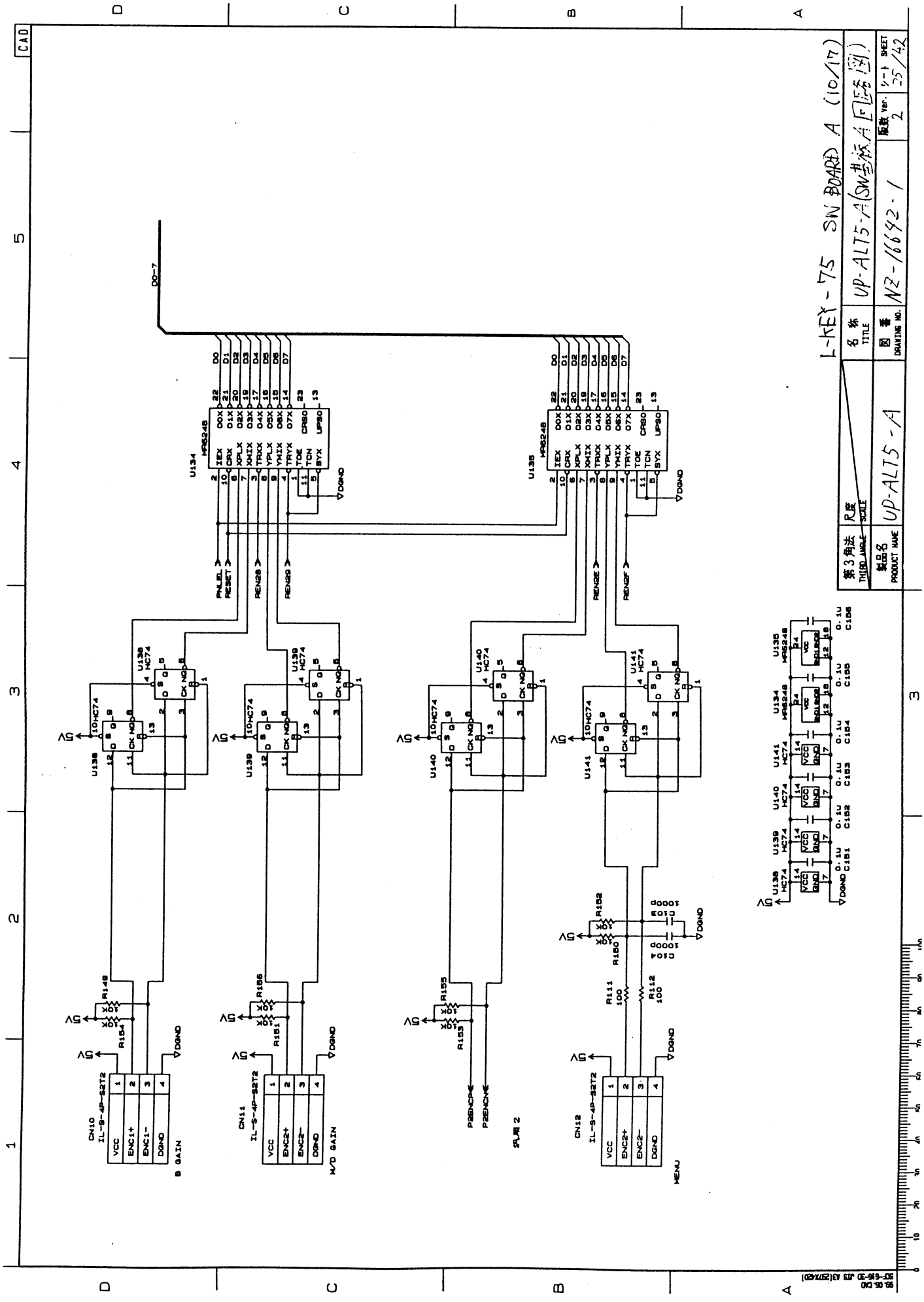

L-KEY-75 MAIN BOARD (5/17)
UP-ALT5-A
UP-ALT5-A
MZ-16642-1
CAD

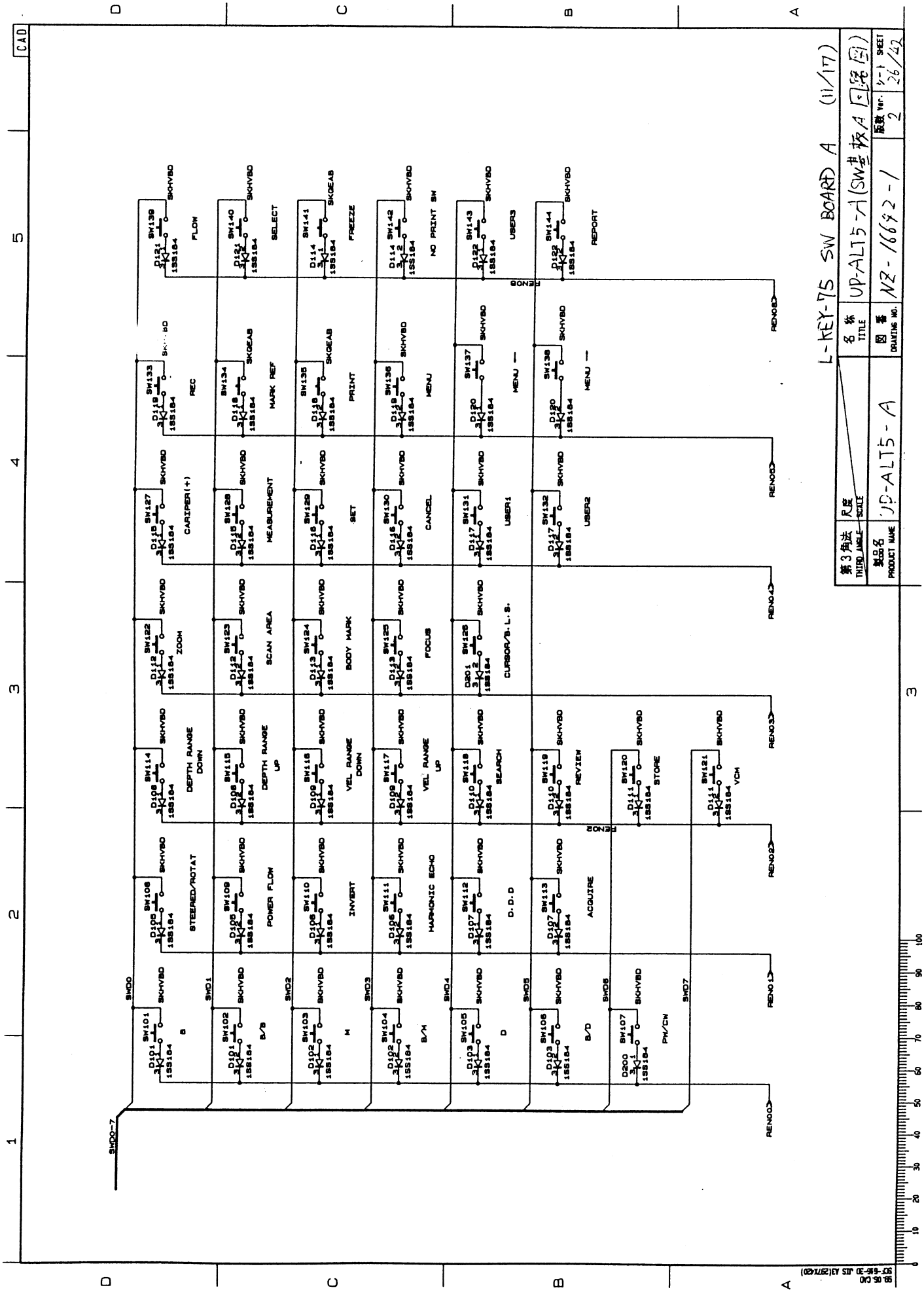

L-KEY-75 SW BOARD A (6/17)
UP-ALI5-A
UP-ALI5-A(SW基板A回路図)
MZ-16642 - 1
2
31/42

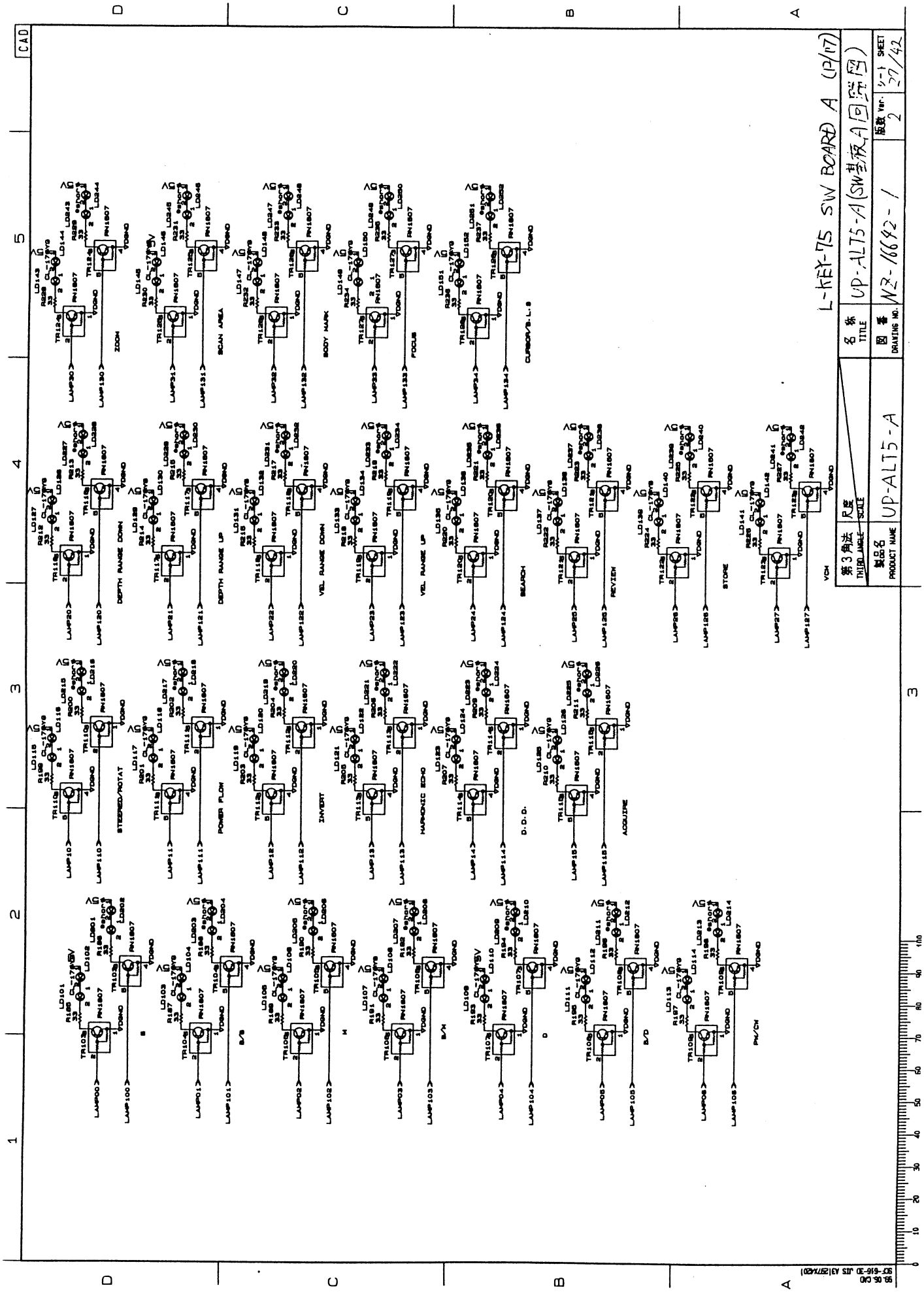

SW BOARD A (7/17)
L-KEY-75
UP-ALT5-A
UP-ALT5-A
A2-16642-1
2/42

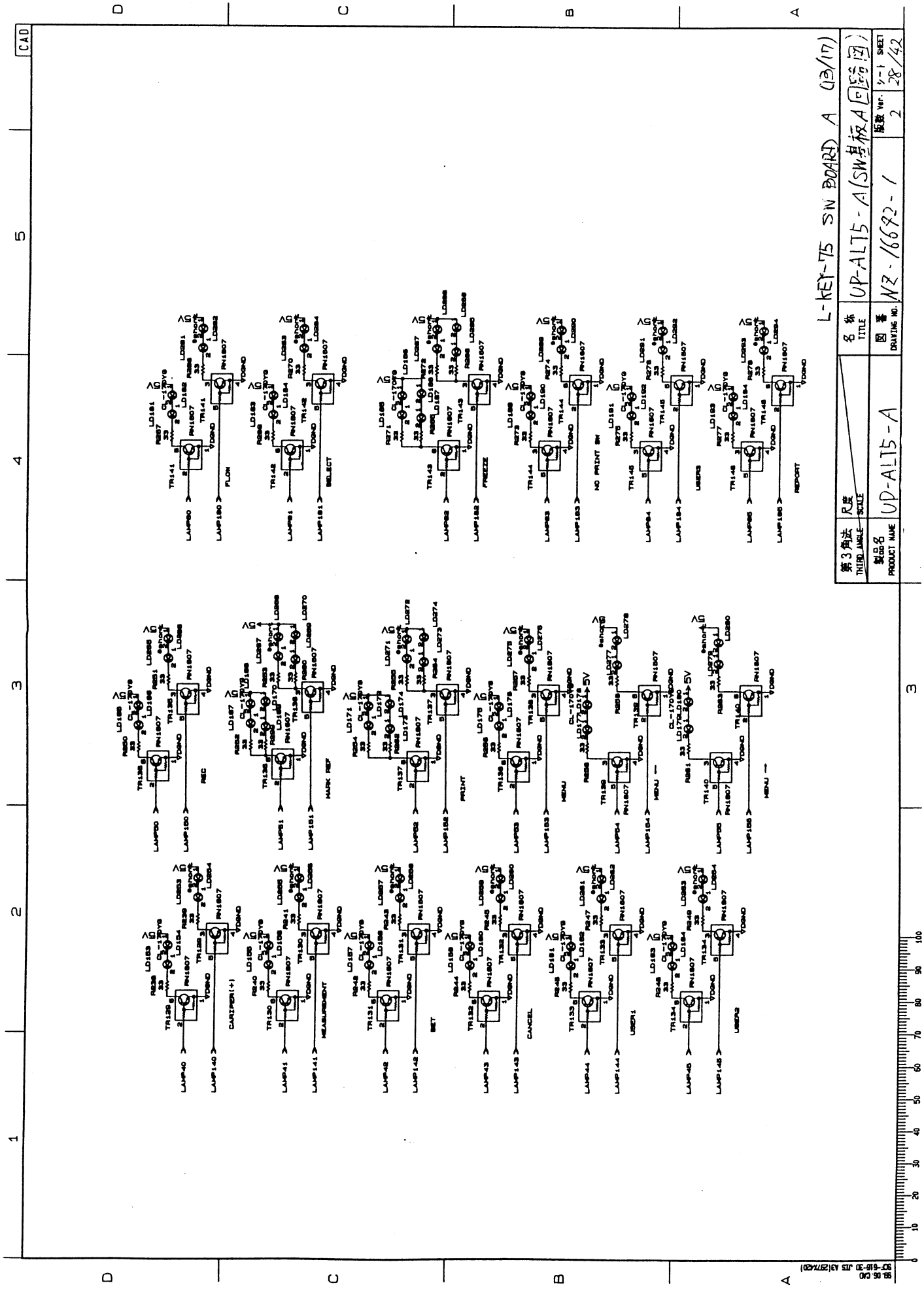

L-KEY-75 SW BOARD A (8/17)
UP-ALT5-A1
UP-ALT5-A1
MN2-1664200
2
53/42
第3角法
THIRD ANGLE
尺度
SCALE
名称
TITLE
図番
DRAWING NO.
版数
Ver.
シート
SHEET
製品名
PRODUCT NAME
CAD

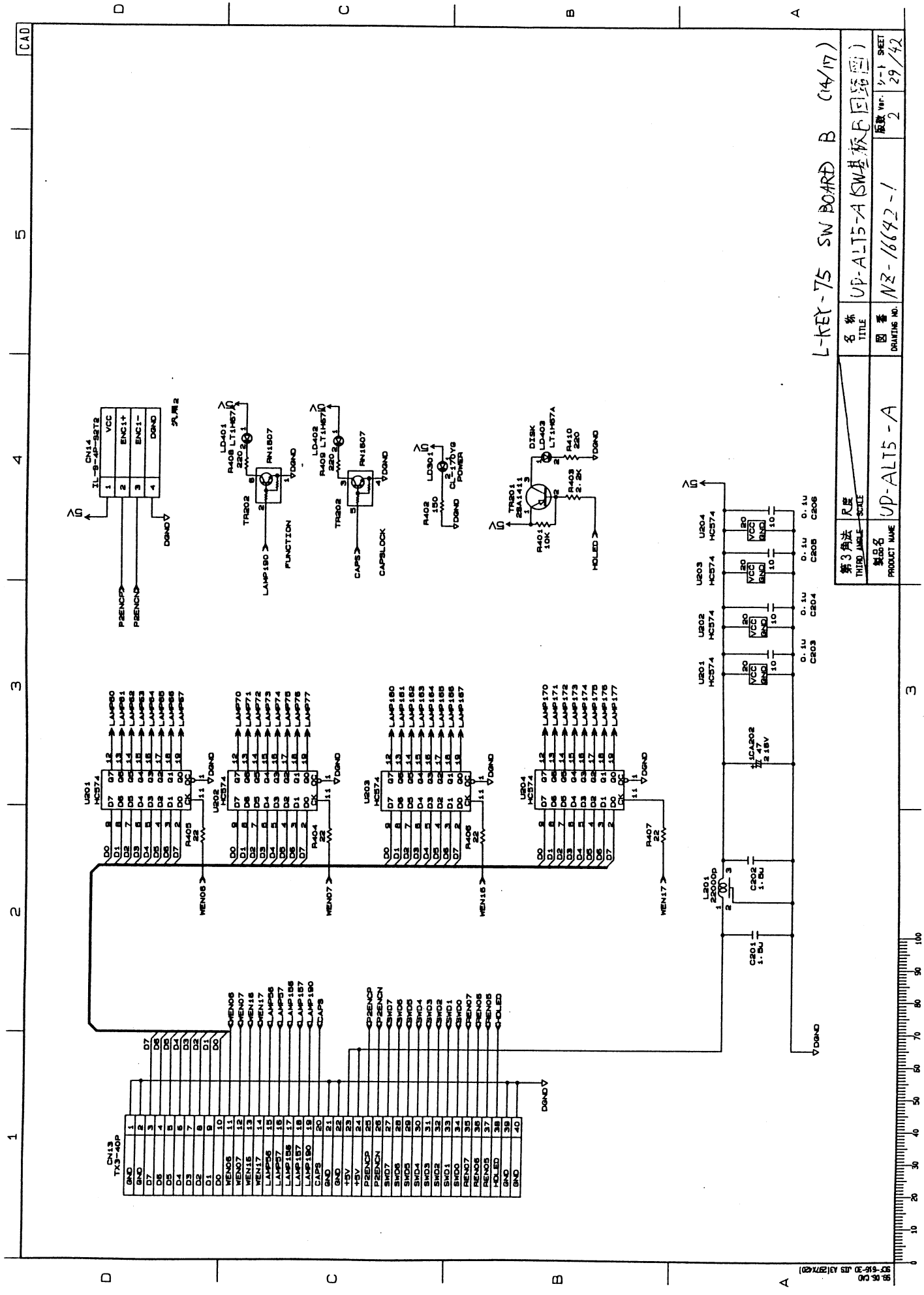

L-KEY-75 SW BOARD A (9/17)
UP-ALT5-A
UP-ALT5-1
MN2-166422-1
FLOW GAIN
ROLL 1
トラックボール

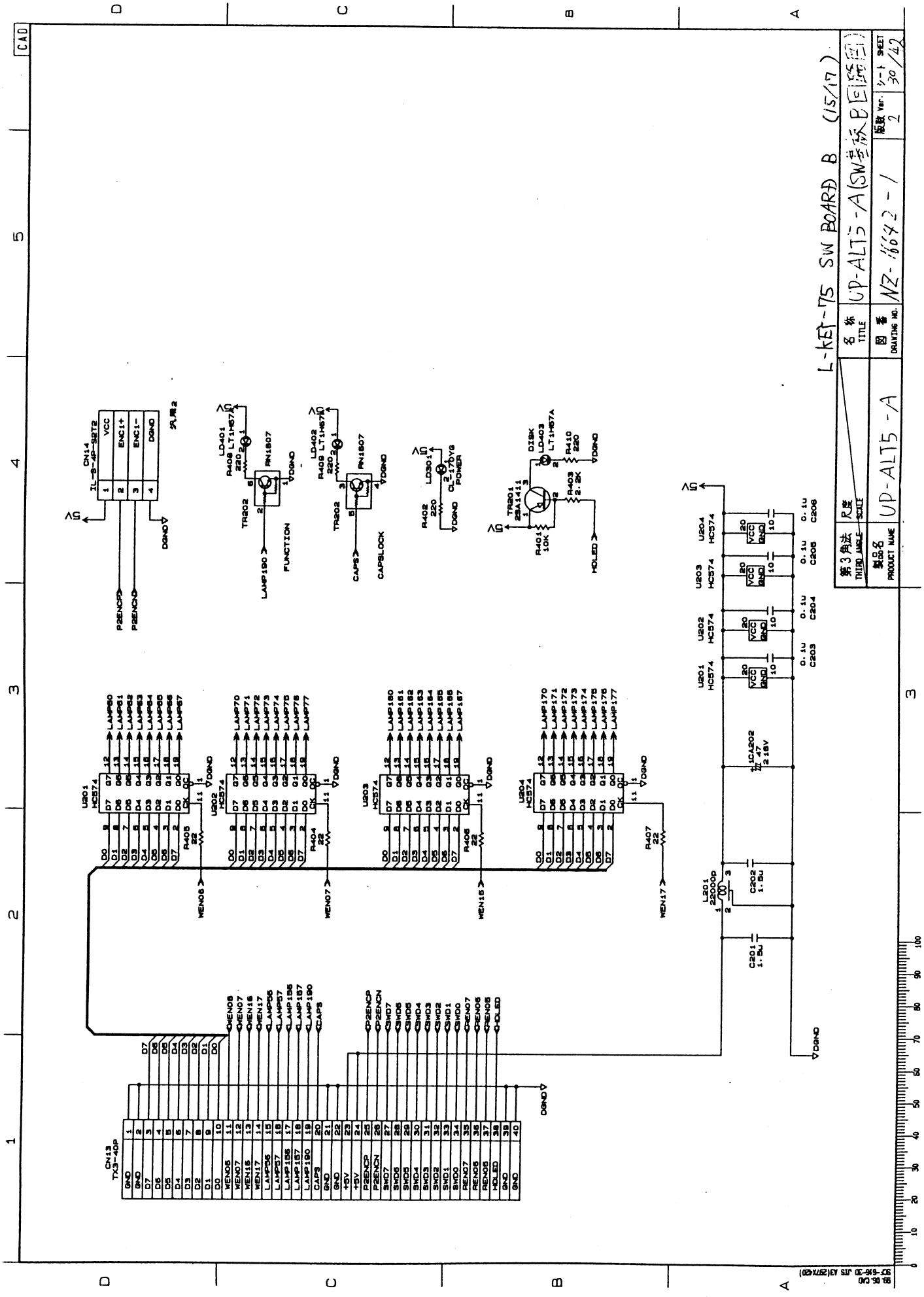

L-KEY-75 SW BOARD A (10/17)
UP-ALT5-A
UP-ALT5-A
NZ-16642-1
2
25/42
B GAIN
M/D GAIN
PLAY 2
MENU

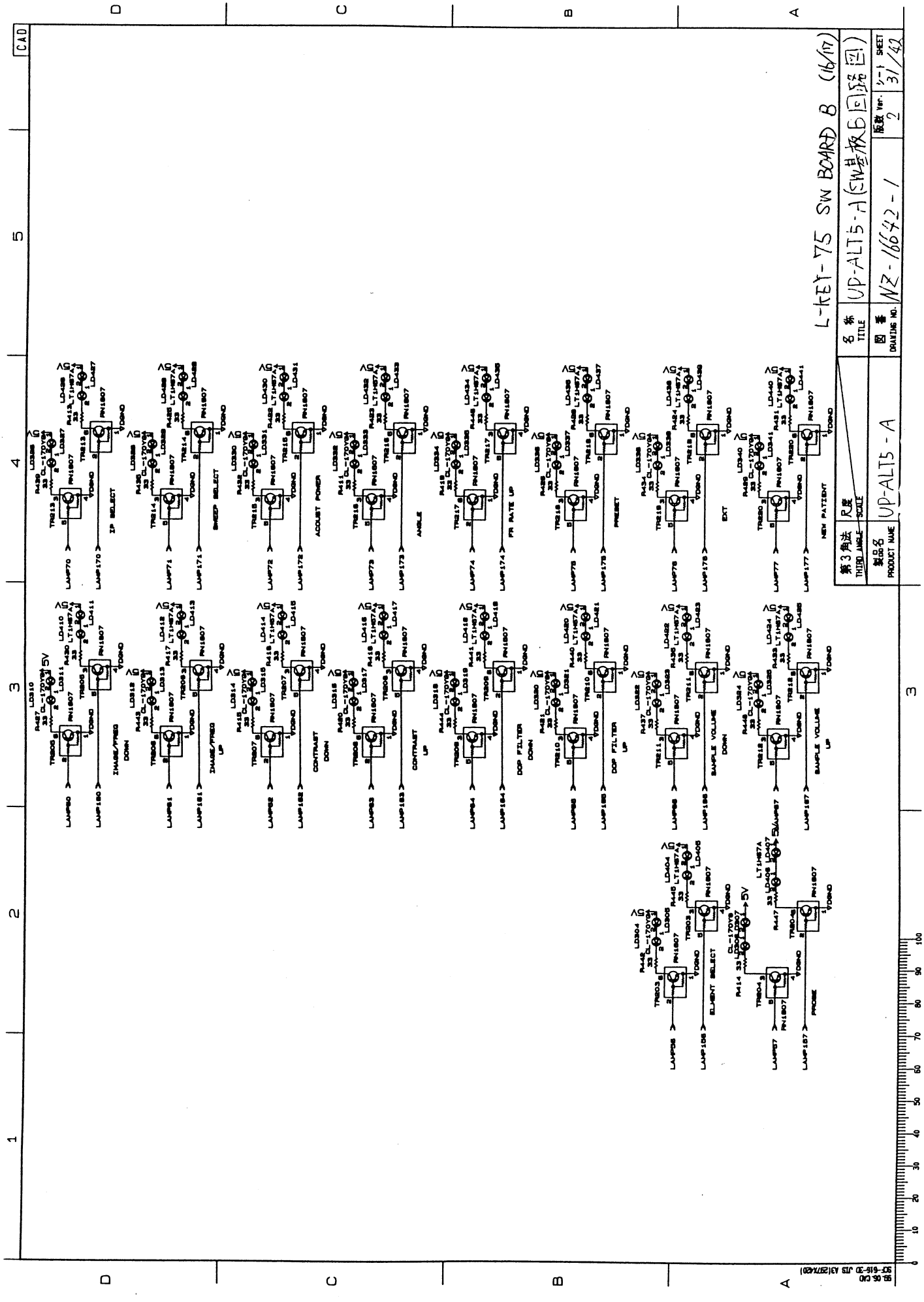

L-KEY-75 SW BOARD A (11/17)
UP-ALT5-A
UP-ALT5-A (SW基板A回路図)
NZ-16692-1
2
26/42
SW00 B
SW01 B/B
SW02 M
SW03 B/M
SW04 D
SW05 D.D.D
SW06 B/D
SW07 PW/CW
SW00-7
REN00
REN01
REN02
REN03
REN04
REN05
REN06
REN07
STEERED/ROTAT
POWER FLOW
INVERT
HARMONIC ECHO
D.D.D
ACQUIRE
PW/CW
DEPTH RANGE DOWN
DEPTH RANGE UP
VEL RANGE DOWN
VEL RANGE UP
SEARCH
REVIEW
STORE
VCM
ZOOM
SCAN AREA
BODY MARK
FOCUS
CURSOR/B.L.S.
CARIPER(+)
MEASUREMENT
SET
CANCEL
USER1
USER2
REC
MARK REF
PRINT
MENU
MENU
FLOW
SELECT
FREEZE
NO PRINT SW
USER3
REPORT

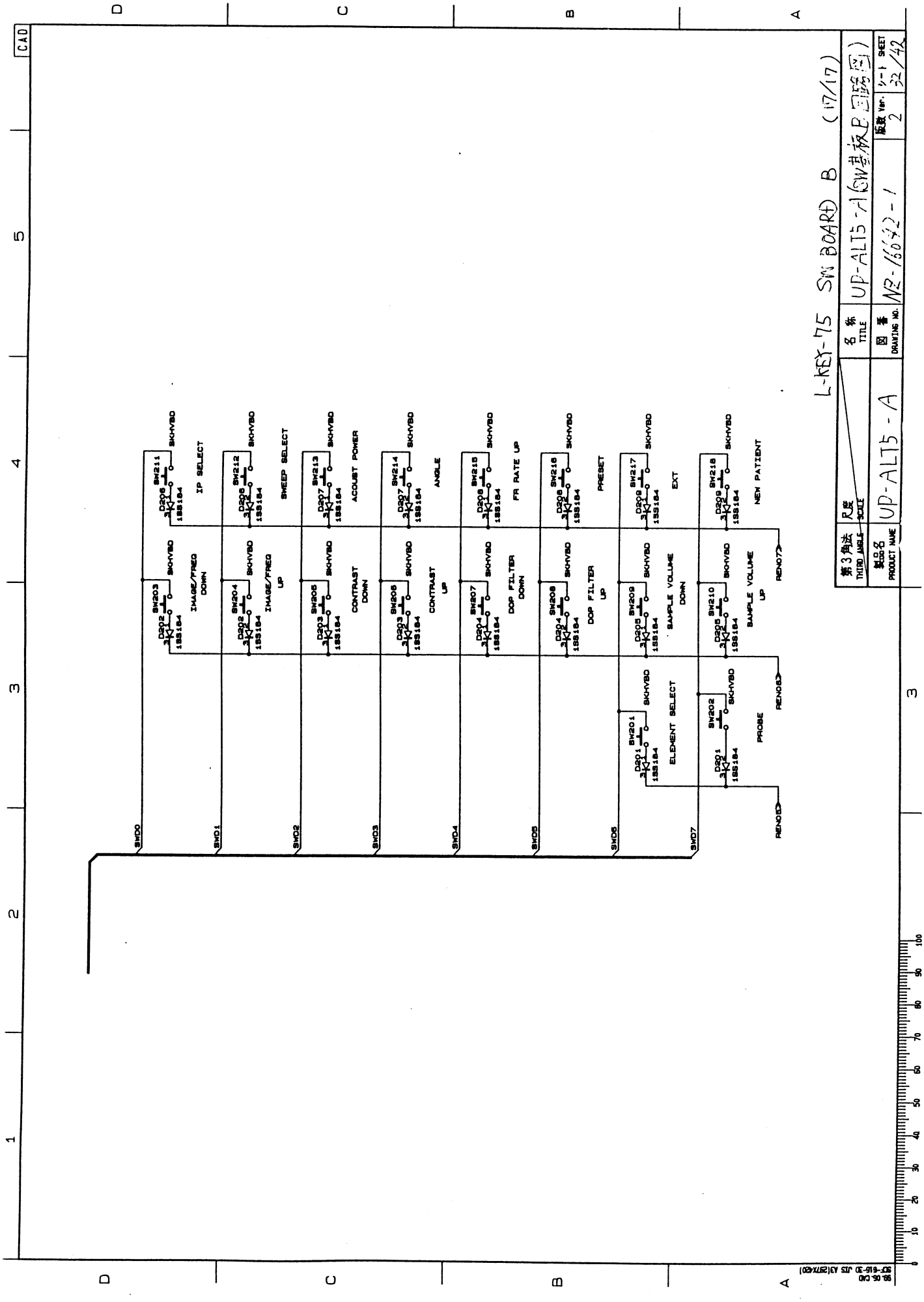

L-KEY-75 SW BOARD A (1/17)
UP-ALT5-A(SW基板A回路図)
UP-ALT5-A
N2-16692-1
2
27/42
ZOOM
SCAN AREA
BODY MARK
FOCUS
CURSOR/B.L.S
DEPTH RANGE DOWN
DEPTH RANGE UP
VEL RANGE DOWN
VEL RANGE UP
SEARCH
REVIEW
STORE
VCH
STEERED/ROTAT
POWER FLOW
INVERT
HARMONIC ECHO
D.D.D.
ACQUIRE
B
B/W
M
B/M
D
B/D
PW/CW


L-KEY-75 SW BOARD A (13/17)
UP-ALT5-A
UP-ALT5-A
MZ-16682-1
2
28/42
REC
MARK REF
PRINT
MENU
MENU →
MENU ←
CARIPER(+)
MEASUREMENT
SET
CANCEL
USER1
USER2
FLOW
SELECT
FREEZE
NO PRINT SW
USER3
REPORT

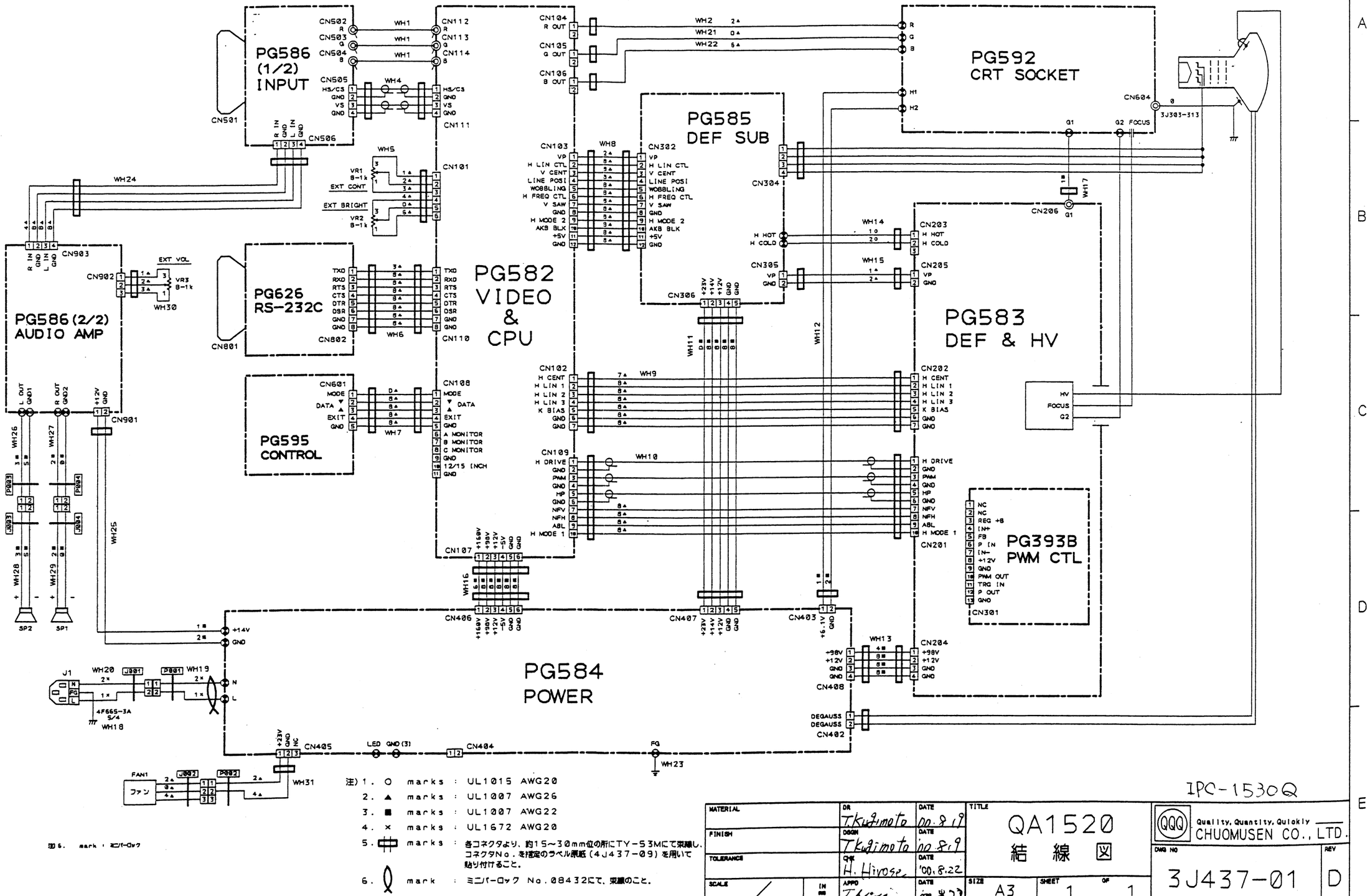

L-KEY-75 SW BOARD B (14/17)
UP-ALT5-A
UP-ALT5-A
NZ-16642-1
CN14
CN13
U201
U202
U203
U204
TR201
TR202
LD401
LD402
LD301
DISK
R401
R402
R403
R404
R405
R406
R407
R408
R409
R410
C201
C202
C203
C204
C205
C206
L201
IC1202
RN1807
FUNCTION
CAPSLOCK
POWER
DGND
+5V


L-KEY-75 SW BOARD B (15/17)
UP-ALT5-A
UP-ALT5 -A
NZ-16642 - 1
CN14
CN13
U201
U202
U203
U204
TR201
TR202
LD401
LD402
LD403
LD301
RN1807
DISK
POWER
FUNCTION
CAPSLOCK
HOLED
P2ENCP
P2ENCN
MEN06
MEN07
MEN16
MEN17
DGND
5V


L-KEY-75 SW BOARD B (16/17)
UP-ALT5-A (SW基板回路図)
MZ-16642-1
UP-ALT5-A
第3角法
THIRD ANGLE
尺度
SCALE
製品名
PRODUCT NAME
名称
TITLE
図番
DRAWING NO.
版数 Ver.
SHEET
31/42
IP SELECT
SWEEP SELECT
ACOUST POWER
ANGLE
PR RATE UP
PRESET
EXT
NEW PATIENT
PHASE/FREQ DOWN
PHASE/FREQ UP
CONTRAST DOWN
CONTRAST UP
DOP FILTER DOWN
DOP FILTER UP
SAMPLE VOLUME DOWN
SAMPLE VOLUME UP
ELMENT SELECT
PROBE


L-KEY-75 SW BOARD B (17/17)
UP-ALTS-A
UP-ALTS
MN2-1660-1
2
32/42
SW00
SW01
SW02
SW03
SW04
SW05
SW06
SW07
IMAGE/FREQ DOWN
IMAGE/FREQ UP
CONTRAST DOWN
CONTRAST UP
DOP FILTER DOWN
DOP FILTER UP
SAMPLE VOLUME DOWN
SAMPLE VOLUME UP
ELEMENT SELECT
PROBE
IP SELECT
SWEEP SELECT
ACOUST POWER
ANGLE
FR RATE UP
PRESET
EXT
NEW PATIENT

REV	DESCRIPTION	ECO.NO.	DATE	BY	APPD
A	注5) タイラップ指定追記	DEC3051	00.2.1	釘本	小林
B	配線見直し	ECC2654	00.5.23	釘本	T.M
C	タイラップ追加, 注6) 追加.	DEC3371	00.6.22	釘本	
D	配線見直し	ECC2689	00.8.9	釘本	



注) 1. ○ marks : UL1015 AWG20
2. ▲ marks : UL1007 AWG26
3. ■ marks : UL1007 AWG22
4. × marks : UL1672 AWG20
5. ⊟ marks : 各コネクタより、約15～30mm位の所にTY-53Mにて束線し、コネクタNo.を指定のラベル原紙(4J437-09)を用いて貼り付けること。
6. ⌀ mark : ミニバーロック No.08432にて、束線のこと。

図6. mark : ミニバーロック

IPC-1530Q

MATERIAL		DR T.Kujimoto	DATE 00.8.19	TITLE QA1520 結線図	QQQ Quality, Quantity, Quickly CHUOMUSEN CO., LTD.
FINISH		DSGN T.Kujimoto	DATE 00.8.9		
TOLERANCE		CHK H.Hirose	DATE '00.8.22		DWG NO 3J437-01 REV D
SCALE /	IN mm	APPD T.Kujimoto	DATE 00.8.23	SIZE A3 SHEET 1 OF 1	

NOTES
1. All capacitors are 50V unless otherwise noted. Unit is in FARAD(F).
2. All resistors are 0.1W unless otherwise noted. Unit is in OHM(Ω).
3. Components marked with ※ are subject to change without notice.
4. Semiconductors may be changed for equivalent ones.
5. Ⓜ : Fixed Metal Film Resistor

REV	DESCRIPTION	ECO.NO.	DATE	BY	APPD
A	DEL: IC33~35 etc	DEC 3334	'00-6-12	Ishida	T.Koya

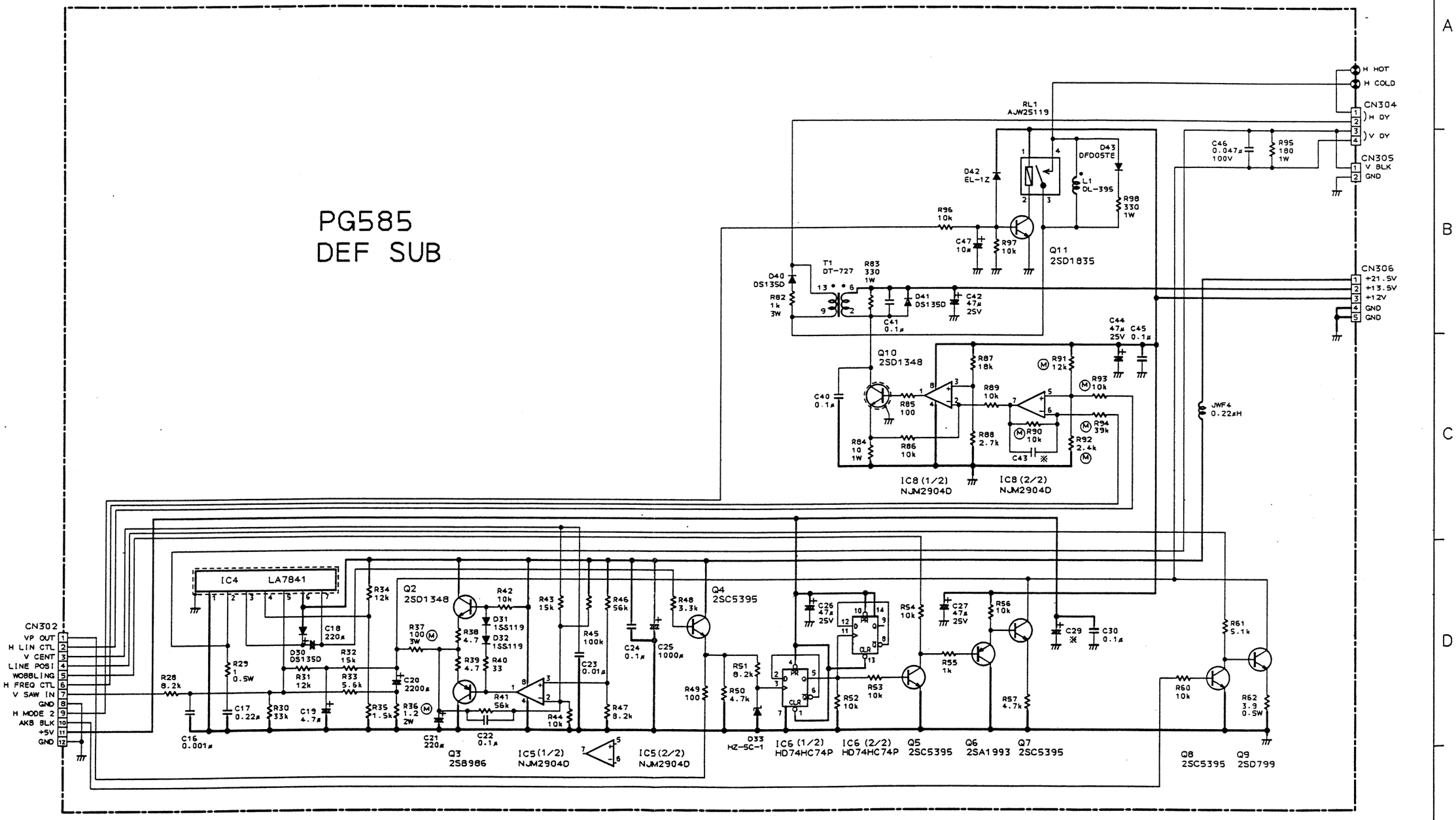
PG582A
VIDEO & CPU

IPC-153c Q

MATERIAL	DR T.Kobayashi	DATE '00.6.9	TITLE QA1520 VIDEO & CPU CIRCUIT DIAGRAM		Quality, Quantity, Quickly— CHUOMUSEN CO., LTD
FINISH	DSGN T.Kudimoto	DATE '00.6.12			DWG NO 2N437-201 REV A
TOLERANCE	CHK H.Hirose	DATE '00.6.12			
SCALE / IN mm	APPD T.Koya	DATE '00.6.12	SIZE A2	SHEET 1 OF 1	

REV	DESCRIPTION	ECO.NO.	DATE	BY	APPD
A	定数変更	ECC2612	00.5.30	村下	小久

PG585
DEF SUB



NOTES

1. All capacitors are 50V unless otherwise noted. Unit is in FARAD (F).
2. All resistors are 0.25W unless otherwise noted. Unit is in OHM (Ω).
3. Components marked with ※ are subject to change without notice.
4. Semiconductors may be changed for equivalent ones.
5. Ⓜ: Fixed Metal Film Resistor

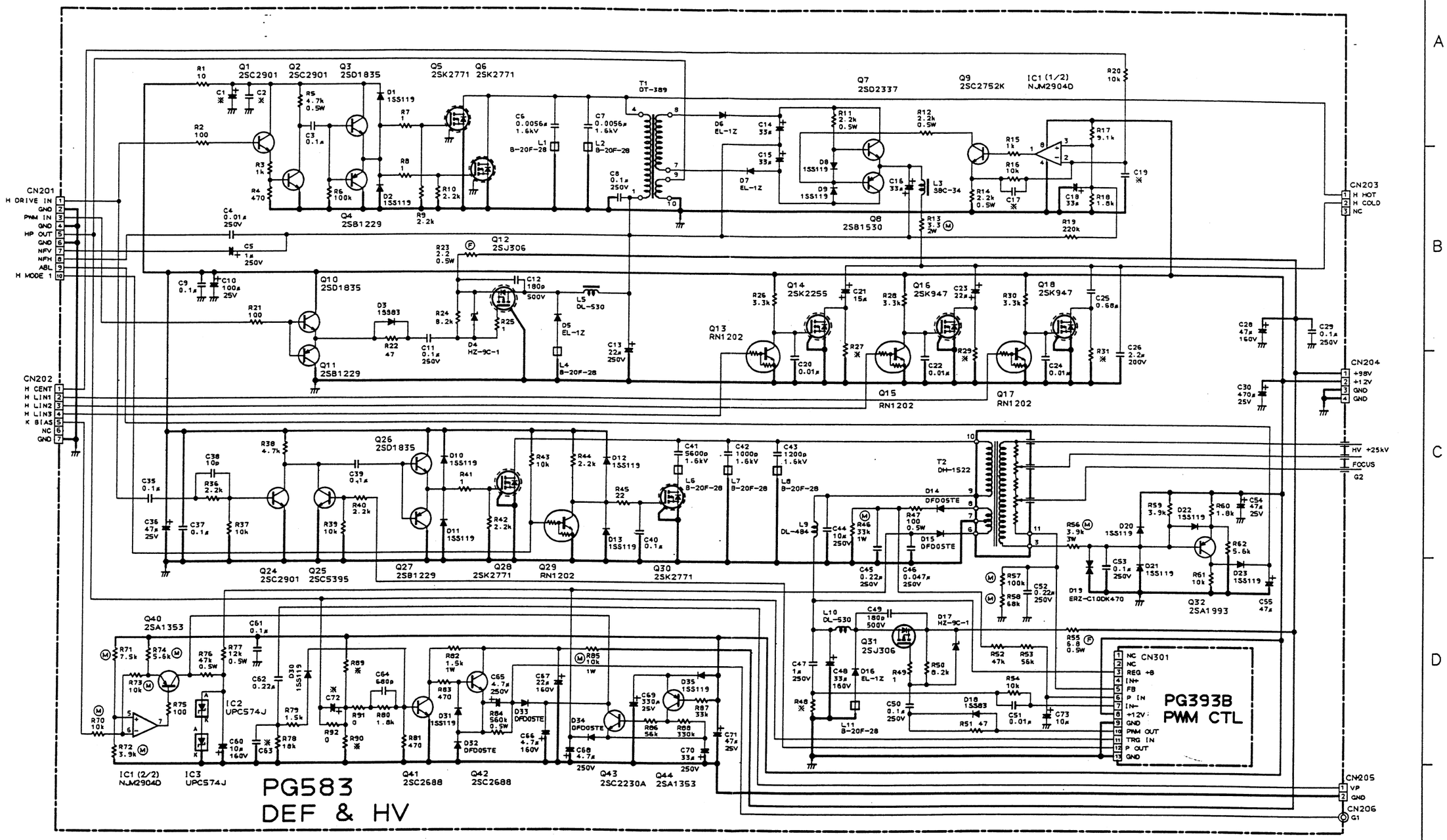
IPC-1530Q

MATERIAL	DR T. Kobayashi	DATE 00.5.30	TITLE QA1520 DEF SUB CIRCUIT DIAGRAM
FINISH	DSGN T. Fujimoto	DATE 00.5.30	
TOLERANCE	CHK H. Hirose	DATE '00.6.31	
SCALE /	APPD T. Miyaura	DATE 00.6.31	SIZE A3 SHEET 1 OF 1

QQQ Quality, Quantity, Quickly — CHUOMUSEN CO., LTD

DWG NO 3N437-203 REV A

REV	DESCRIPTION	ECO.NO.	DATE	BY	APPD
A	定数変更	ECC 3862	600530	T.K	Y.H



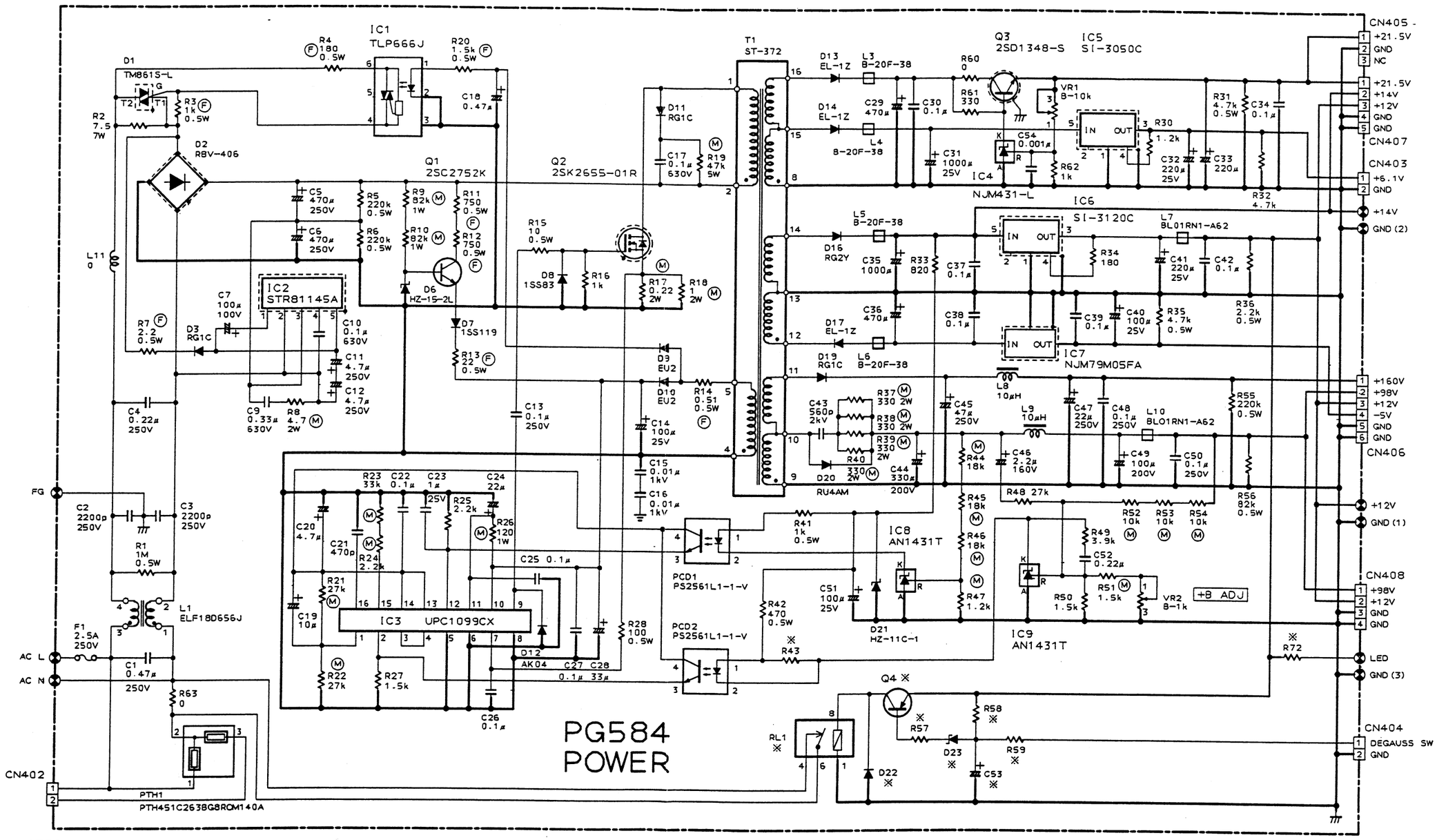
NOTES

1. All capacitors are 50V unless otherwise noted. Unit is in FARAD (F).
2. All resistors are 0.25W unless otherwise noted. Unit is in OHM (Ω).
3. Components marked with ※ are subject to change without notice.
4. Semiconductors may be changed for equivalent ones.
5. (F) : Fuse Resistor
6. (M) : Fixed Metal Film Resistor

IPC-1530Q

MATERIAL	DR T.Kobayashi '00.5.30	TITLE	QA1520 DEF & HV CIRCUIT DIAGRAM	QQQ Quality, Quantity, Quickly CHUOMUSEN CO., LTD.	
FINISH	DSGN T.Kijimoto 00.5.30			DWG NO 3N437-207	REV A
TOLERANCE	CHK H.Hirose '00.5.31				
SCALE / IN mm	APPD T.Murai 00.5.31	SIZE A3	SHEET 1 OF 1		

REV	DESCRIPTION	ECO.NO.	DATE	BY	APPD
A	底板変更	ECO-00520	00.5.30	佐竹	T.L.



NOTES

1. All capacitors are 50V unless otherwise noted. Unit is in FARAD (F).
2. All resistors are 0.25W unless otherwise noted. Unit is in OHM (Ω).
3. Components marked with ※ are subject to change without notice.
4. Semiconductors may be changed for equivalent ones.
5. (M) : Fixed Metal Film Resistor
6. (F) : Fuse Resistor

IPC-1530Q

MATERIAL	DR T.Takayashi	DATE '00.5.30	TITLE QA1520 POWER CIRCUIT DIAGRAM	QQQ Quality, Quantity, Quickly — CHUOMUSEN CO., LTD.	
FINISH	DSGN T.Kugimoto	DATE '00.5.30		DWG NO 3N437-202	REV A
TOLERANCE	CHK H.Hirose	DATE '00.5.31			
SCALE /	IN mm	APPD T.Miyano	DATE '00.6.8	SIZE A3	SHEET 1 OF 1

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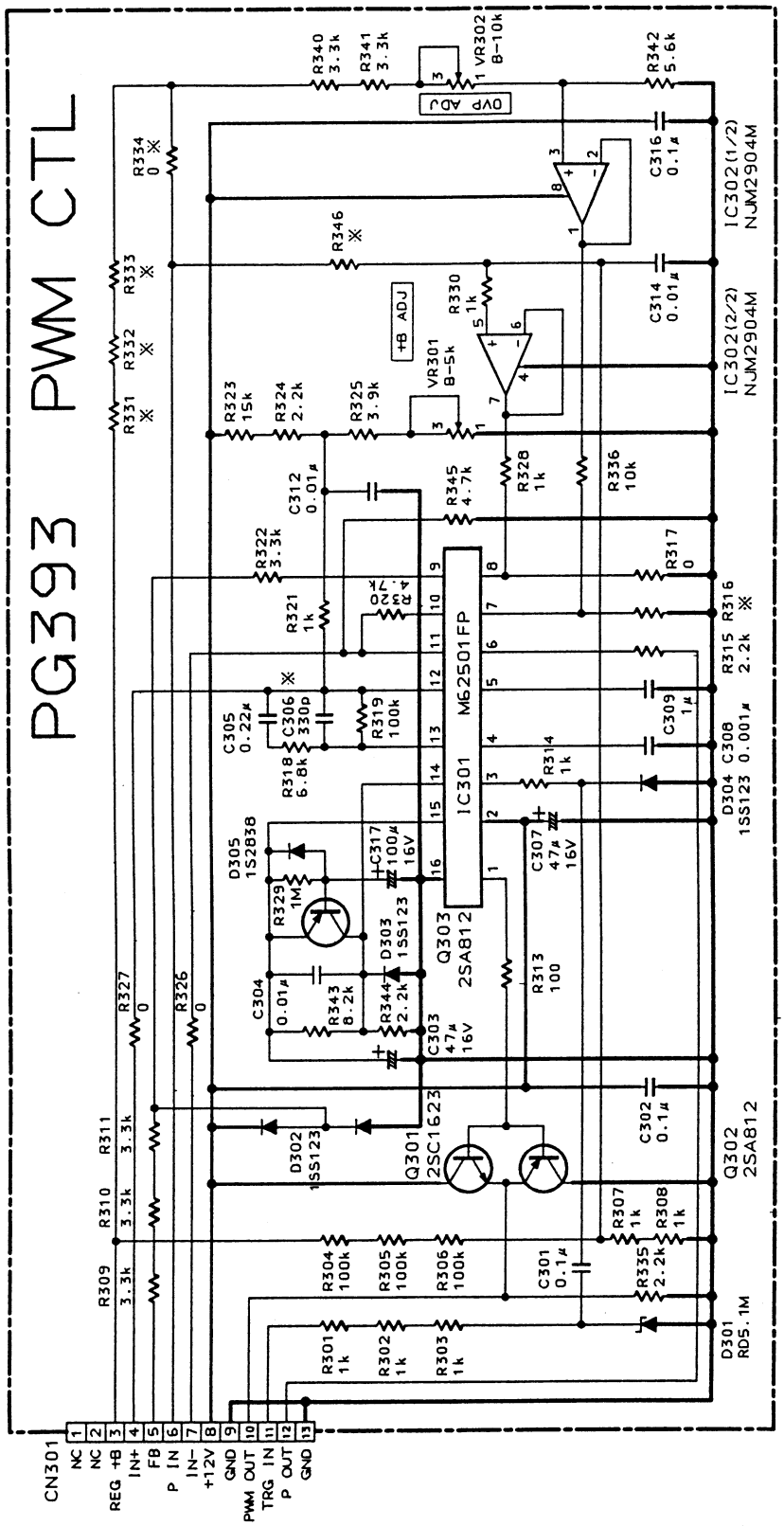
REV	DESCRIPTION	ECO.NO	DATE	BY	APPD
A	定数変更	EC03662	00.5.30	伍	TM



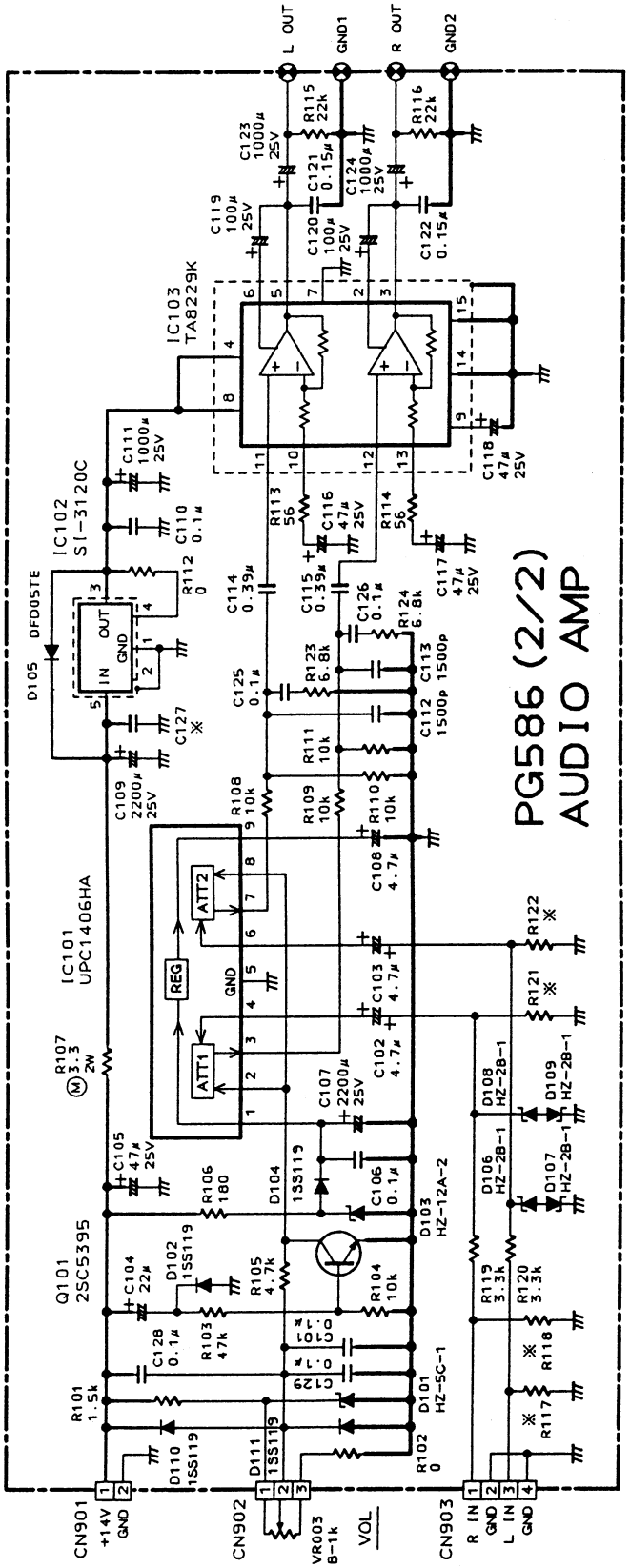
NOTES

1. All capacitors are 50V unless otherwise noted.
   Unit is in FARAD(F).
2. All resistors are 0.1W unless otherwise noted.
   Unit is in OHM(Ω).
3. Components marked with ※ are subject to change without notice.
4. Semiconductors may be changed for equivalent ones.

IPC-1530Q

MATERIAL	DR T.Ishiyama	DATE 00.5.30	TITLE QA1520 PWM CTL CIRCUIT DIAGRAM	QQQ Quality, Quantity, Quickly— CHUOMUSEN CO., LTD.	
FINISH	DSGN T.Fujimoto	DATE 00.5.30		DWG NO 4N437-204	REV A
TOLERANCE	CHK H.Hirose	DATE 00.5.31			
SCALE / IN mm	APPD T.Miyano	DATE 00.5.31	SIZE A4	SHEET 1 OF 1	

REV	DESCRIPTION	ECO.NO	DATE	BY	APPD
A	2版発行	ECC2662	00.5.31	KTA	TM



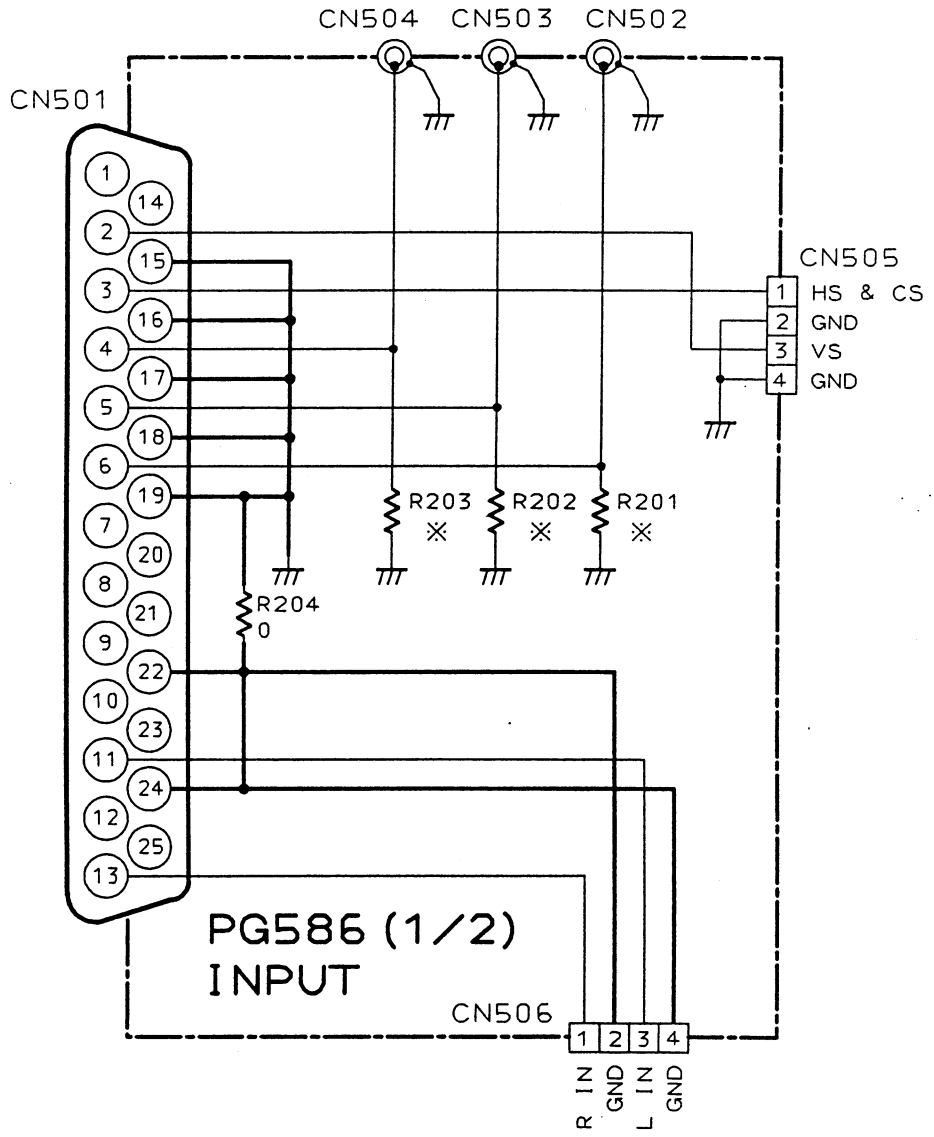
NOTES

1. All capacitors are 50V unless otherwise noted. Unit is in FARAD(F).
2. All resistors are 0.25W unless otherwise noted. Unit is in OHM(Ω).
3. Components marked with ※ are subject to change without notice.
4. Semiconductors may be changed for equivalent ones.
5. Ⓜ : Fixed Metal Film Resistor

IPC-15306

MATERIAL	DR T.Takayashi	DATE 00.5.30	TITLE QA1520 AUDIO AMP CIRCUIT DIAGRAM	QQQ Quality, Quantity, Quickly— CHUOMUSEN CO., LTD.	
FINISH	DSGN T.Kojima	DATE 00.5.30			
TOLERANCE	CHK H.Hirose	DATE 00.5.31		DWG NO 4N437-205	REV A
SCALE /	APPD T.Hirata	DATE 00.5.31	SIZE A4	SHEET 1 OF 1	

REV	DESCRIPTION	ECO.NO.	DATE	BY	APPD



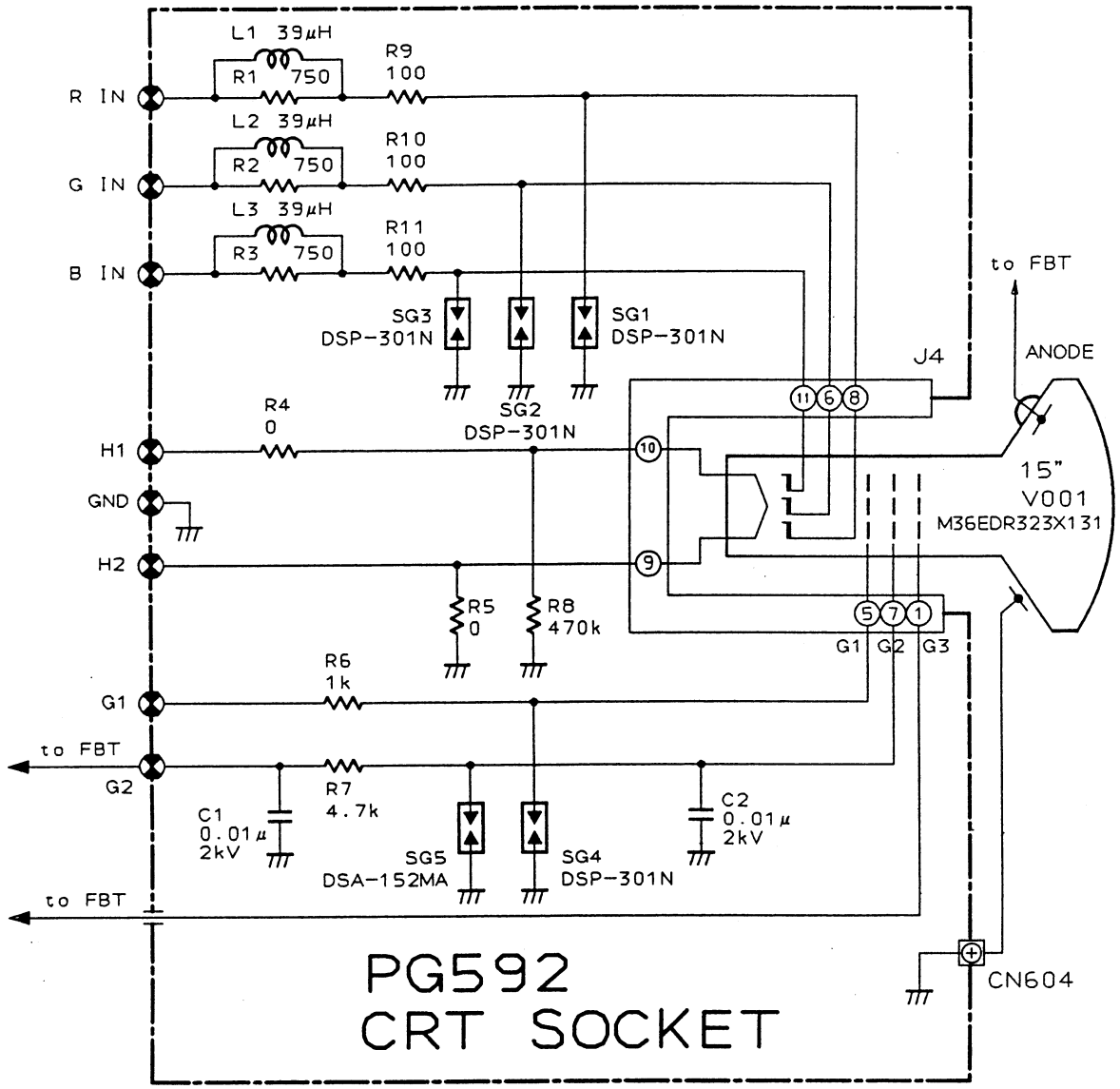
NOTES

1. All resistors are 0.25W unless otherwise noted. Unit is in OHM(Ω).
2. Components marked with ※ are subject to change without notice.
3. Semiconductors may be changed for equivalent ones.

IPC-1530

MATERIAL	DR T. Hayashi	DATE '00.1.11	TITLE QA1520 INPUT CIRCUIT DIAGRAM	QQQ Quality, Quantity, Quickly CHUOMUSEN CO., LTD	
FINISH	DSGN T. Kugimoto	DATE 00.1.11		DWG NO 4N437-208	REV
TOLERANCE	CHK H. Hirose	DATE 00.1.12			
SCALE / IN mm	APPD T. Hayashi	DATE 00.1.13	SIZE A4	SHEET 1 OF 1	

REV	DESCRIPTION	ECO. NO.	DATE	BY	APPD
A	定数変更	ECC2662	00530	[illegible]	[illegible]



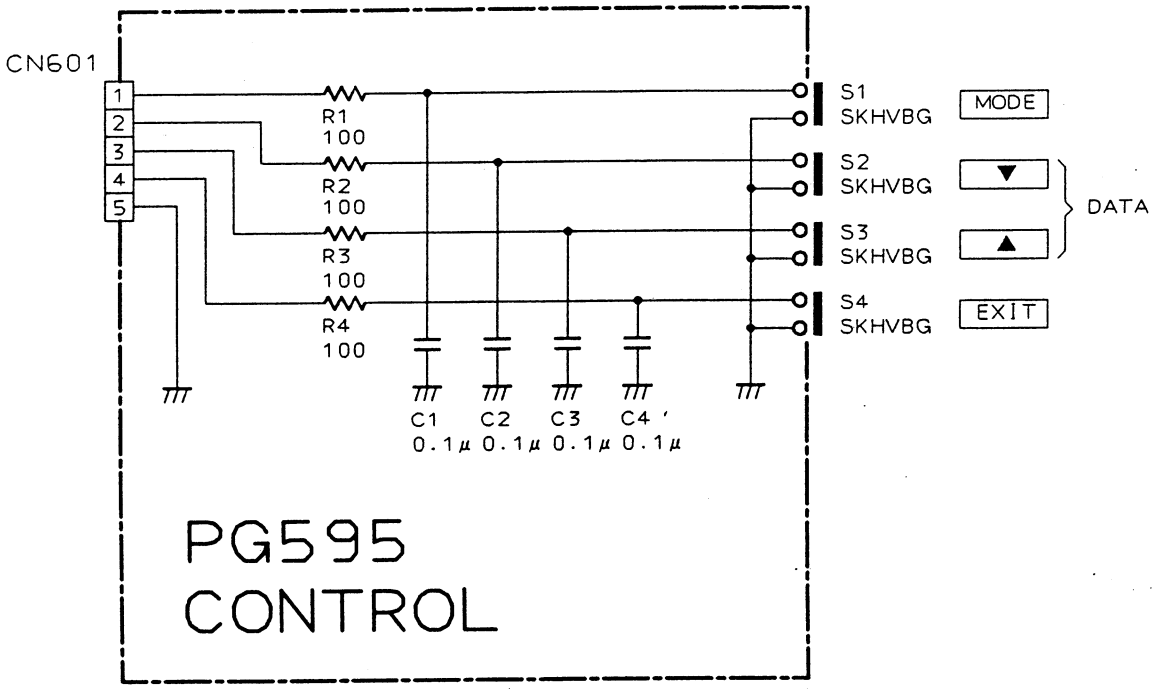
NOTES

1. Capacitors Unit is in FARAD (F).
2. All resistors are 0.5W unless otherwise noted. Unit is in OHM (Ω).

IPC-1530Q

MATERIAL	DR T. Kobayashi 00.5.30	TITLE	QA1520 CRT SOCKET CIRCUIT DIAGRAM	QQQ Quality, Quantity, Quickly	CHUOMUSEN CO., LTD.
FINISH	DSGN T. Kufinoto 00530				
TOLERANCE	CHK H. Hirose 00.5.31			DWG NO 4N437-209	REV A
SCALE / IN mm	APPD T. Miyai 00.5.31	SIZE A4	SHEET 1 OF 1		

REV	DESCRIPTION	ECO.NO	DATE	BY	APPD



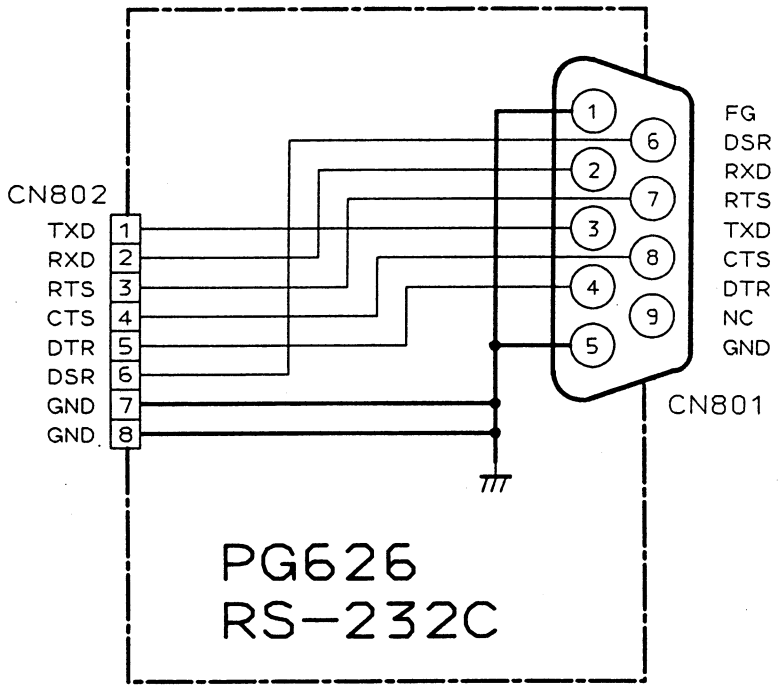
NOTES

1. All capacitors are 50V unless otherwise noted. Unit is in FARAD (F).
2. All resistors are 0.25W unless otherwise noted. Unit is in OHM (Ω).

IPC-1530Q

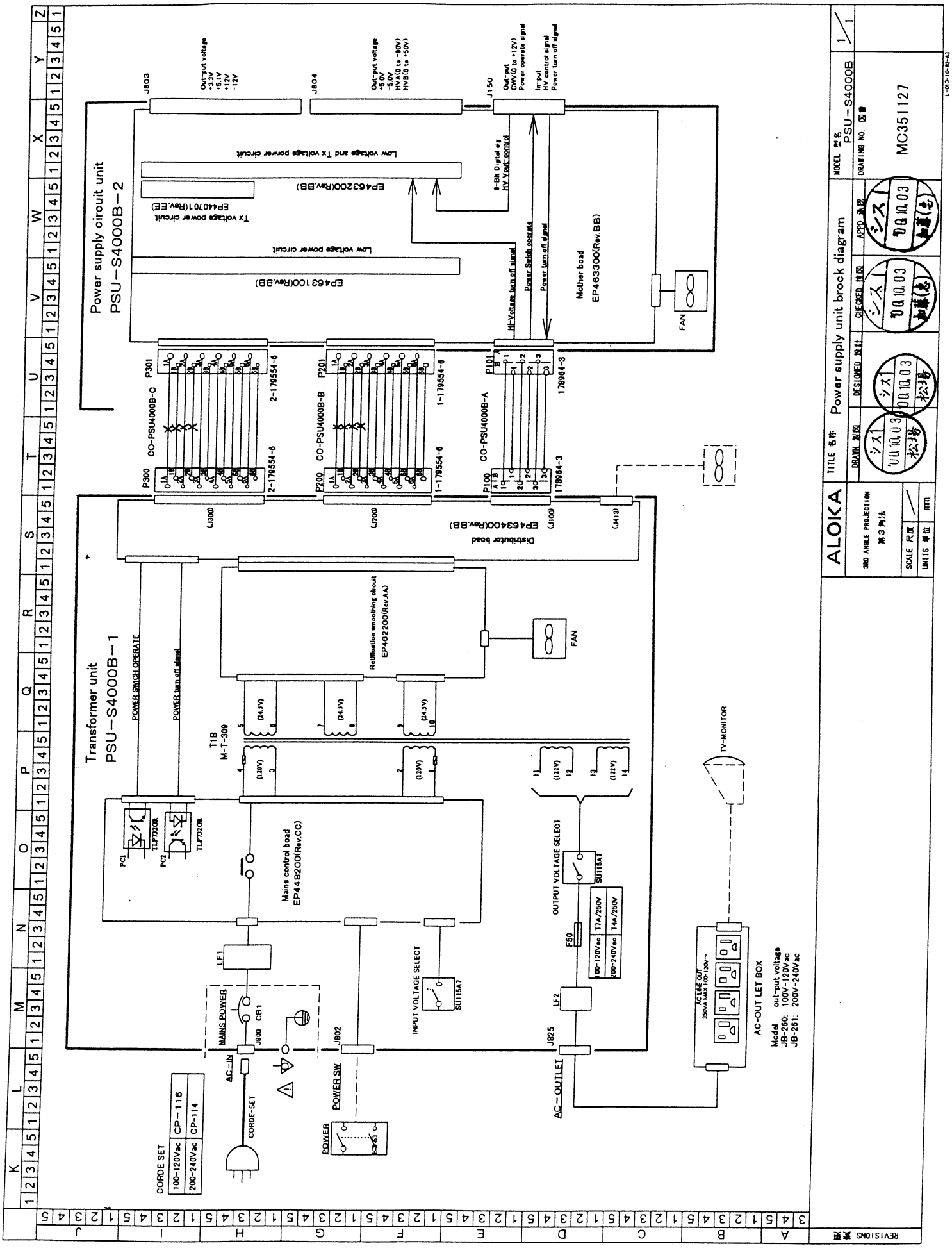
MATERIAL	DR T. Hayashi	DATE '99.7.6	TITLE QA1520 CONTROL CIRCUIT DIAGRAM	QQQ Quality, Quantity, Quickly CHUOMUSEN CO., LTD.	
FINISH	DSGN J. Fujimoto	DATE '99.7.13			
TOLERANCE	CHK H. Hirose	DATE '99.7.13		DWG NO 4N437-210	REV
SCALE /	APPD Y. Nagai	DATE '99.7.13	SIZE A4	SHEET 1 OF 1	

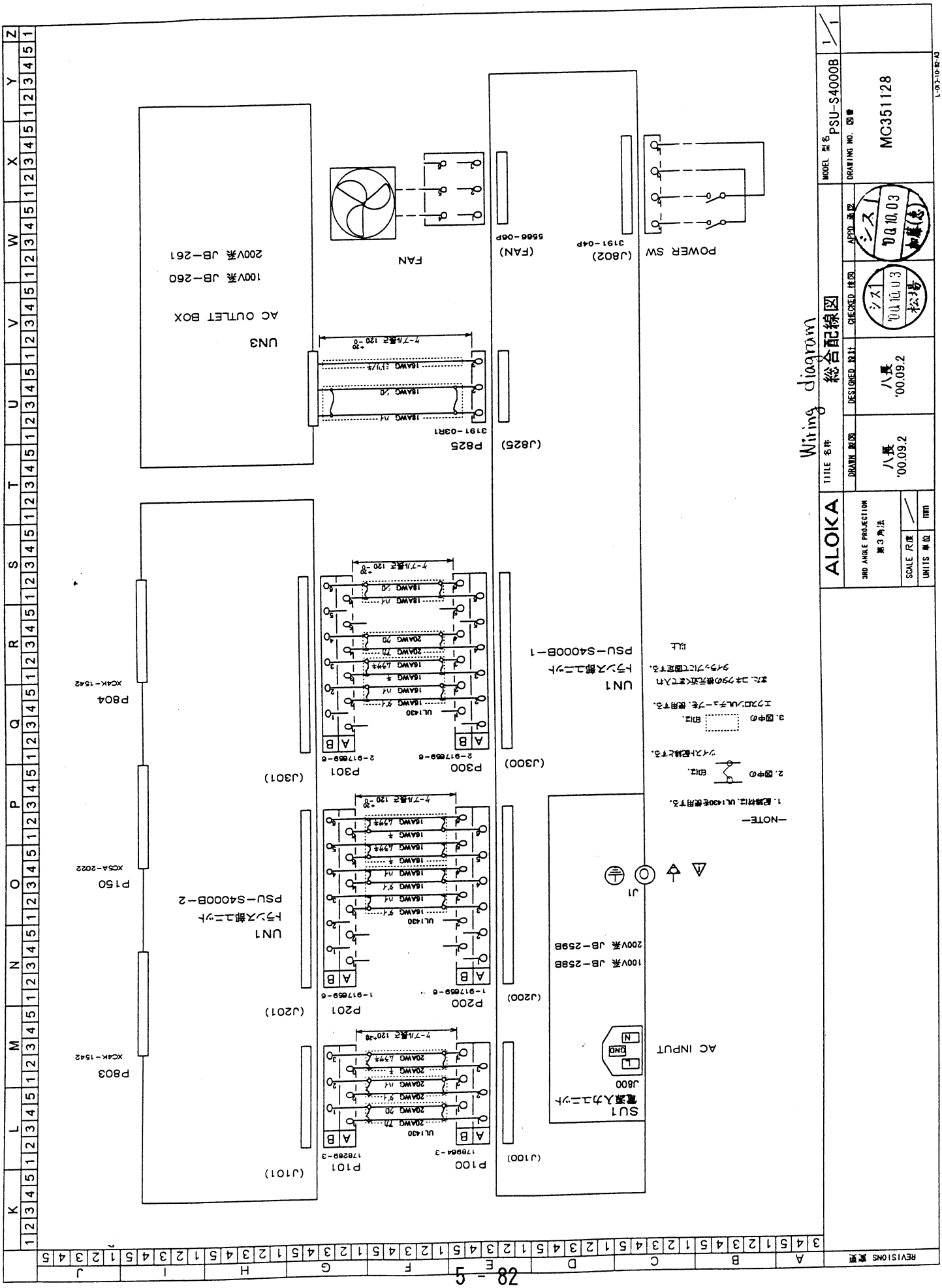
REV	DESCRIPTION	ECO.NO.	DATE	BY	APPD

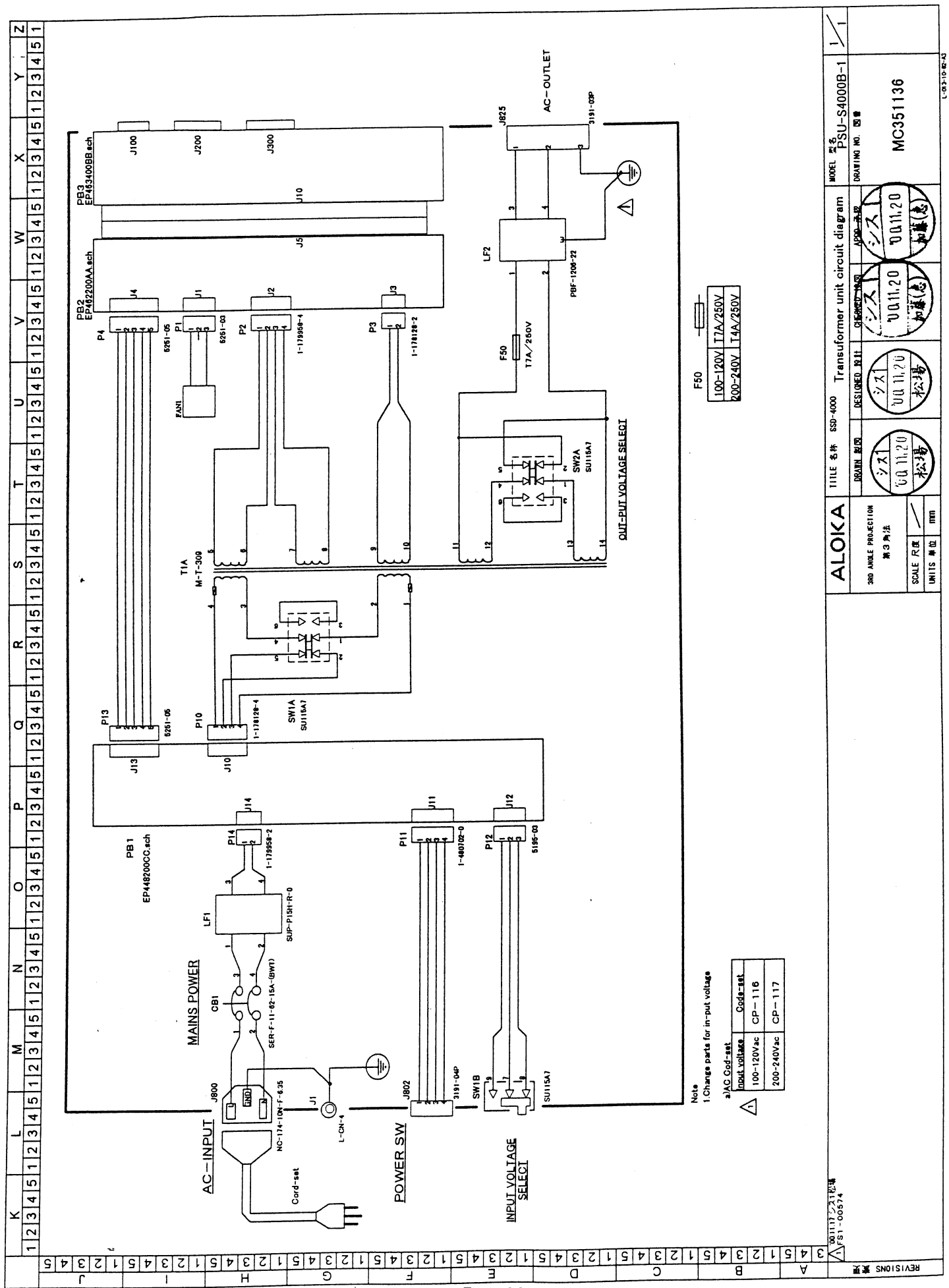


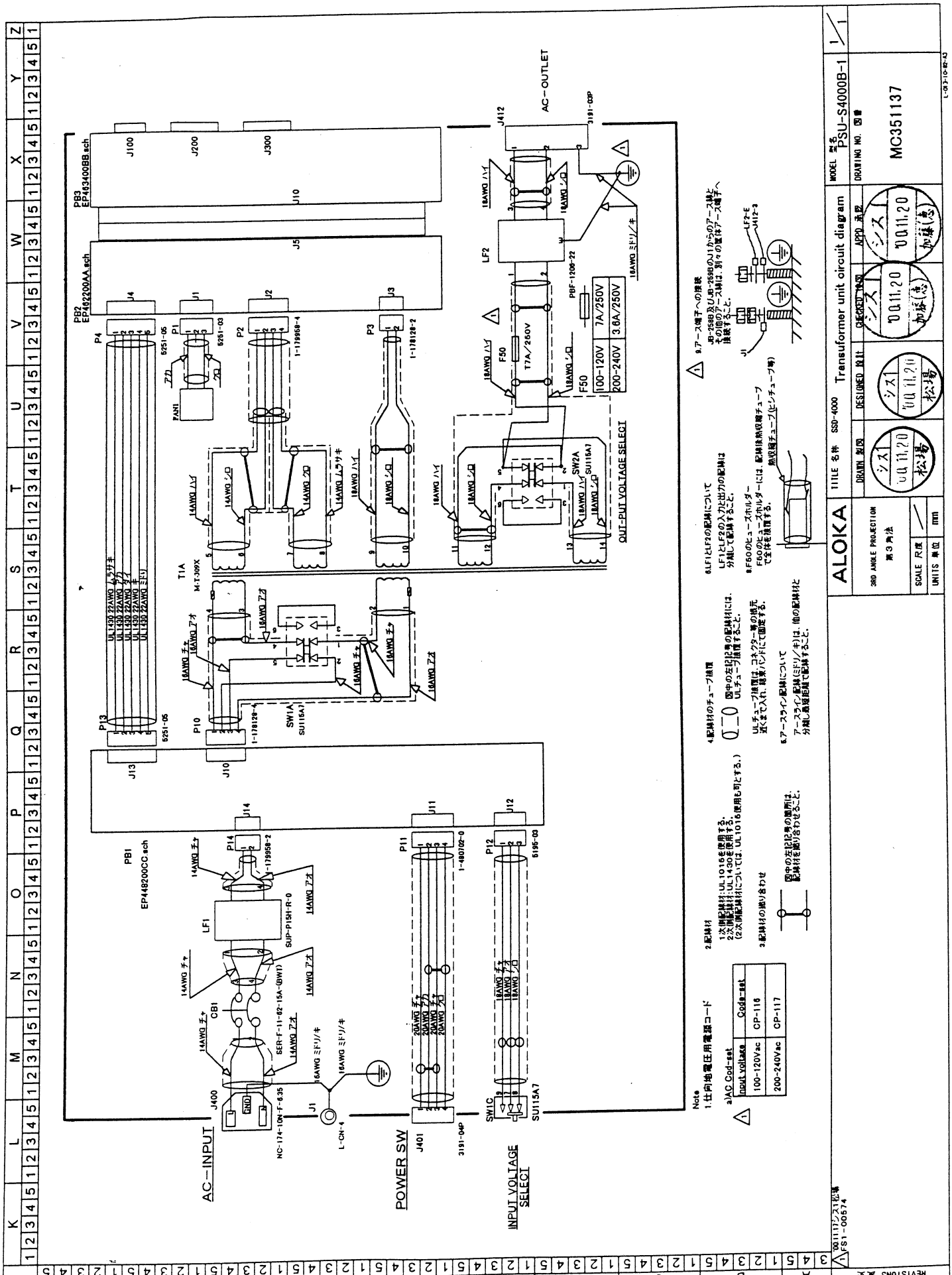
IPC-1530Q

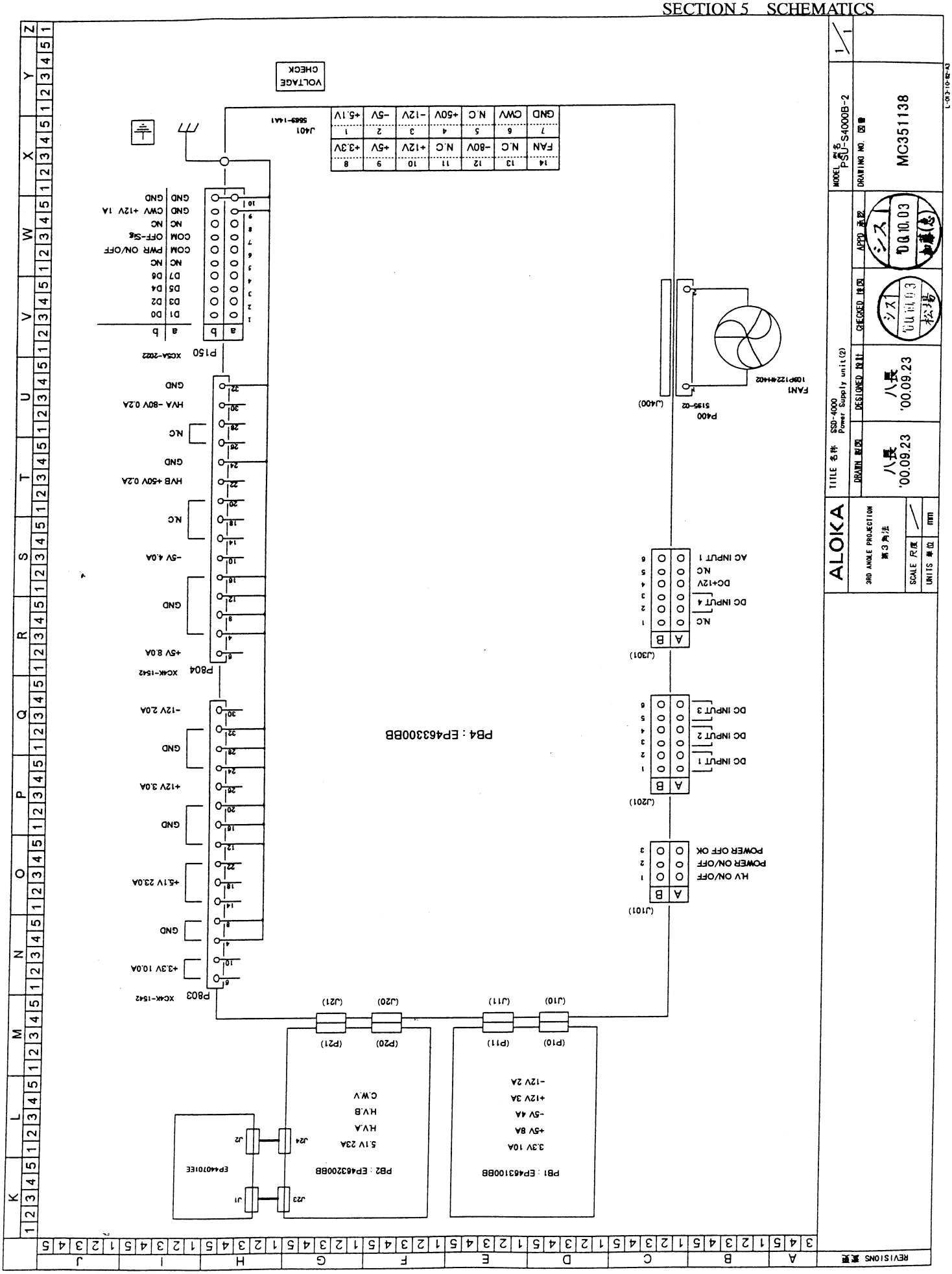
MATERIAL	DR T.Kobayashi	DATE '00.1.11	TITLE QA1520 RS-232C CIRCUIT DIAGRAM	QQQ Quality, Quantity, Quickly— CHUOMUSEN CO., LTD	
FINISH	DSGN T.Kugimoto	DATE 00.1.11			
TOLERANCE	CHK H.Hirose	DATE '00.1.12		DWG NO 4N437-211	REV
SCALE / IN mm	APPD T.Kobayashi	DATE '00.1.13	SIZE A4	SHEET 1 OF 1	

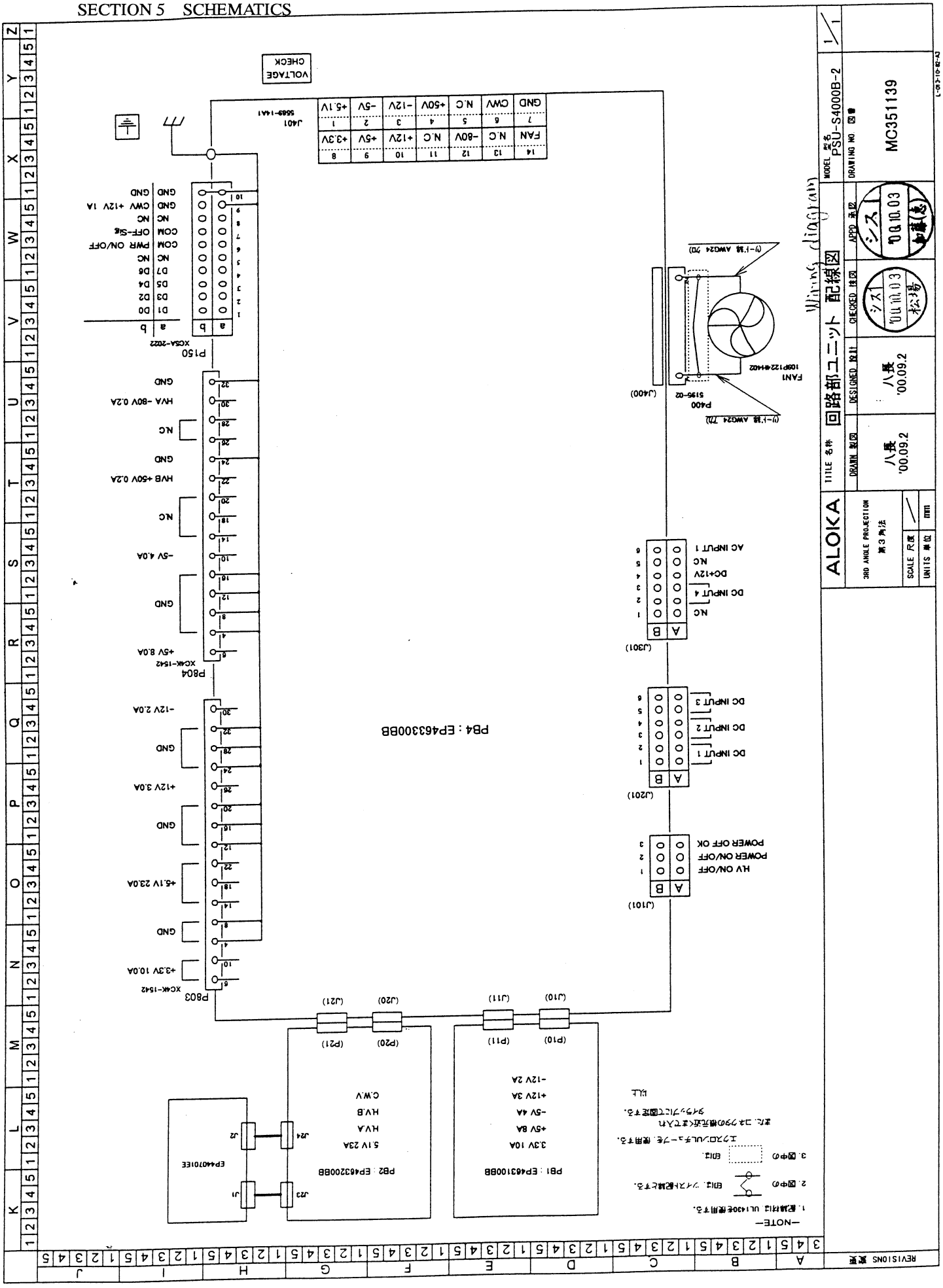

Power supply circuit unit
PSU-S4000B-2
Transformer unit
PSU-S4000B-1
Mother board
EP483300(Rev.BB)
Distributor board
EP463400(Rev.BB)
Rectification smoothing circuit
EP462200(Rev.AA)
Mains control board
EP448200(Rev.GC)
CO-PSU4000B-A
CO-PSU4000B-B
CO-PSU4000B-C
FAN
TV-MONITOR
AC-OUT LET BOX
AC-IN
CORDE-SET
POWER SW
MAINS POWER
INPUT VOLTAGE SELECT
OUTPUT VOLTAGE SELECT
ALOKA
Power supply unit brock diagram
PSU-S4000B
MC351127

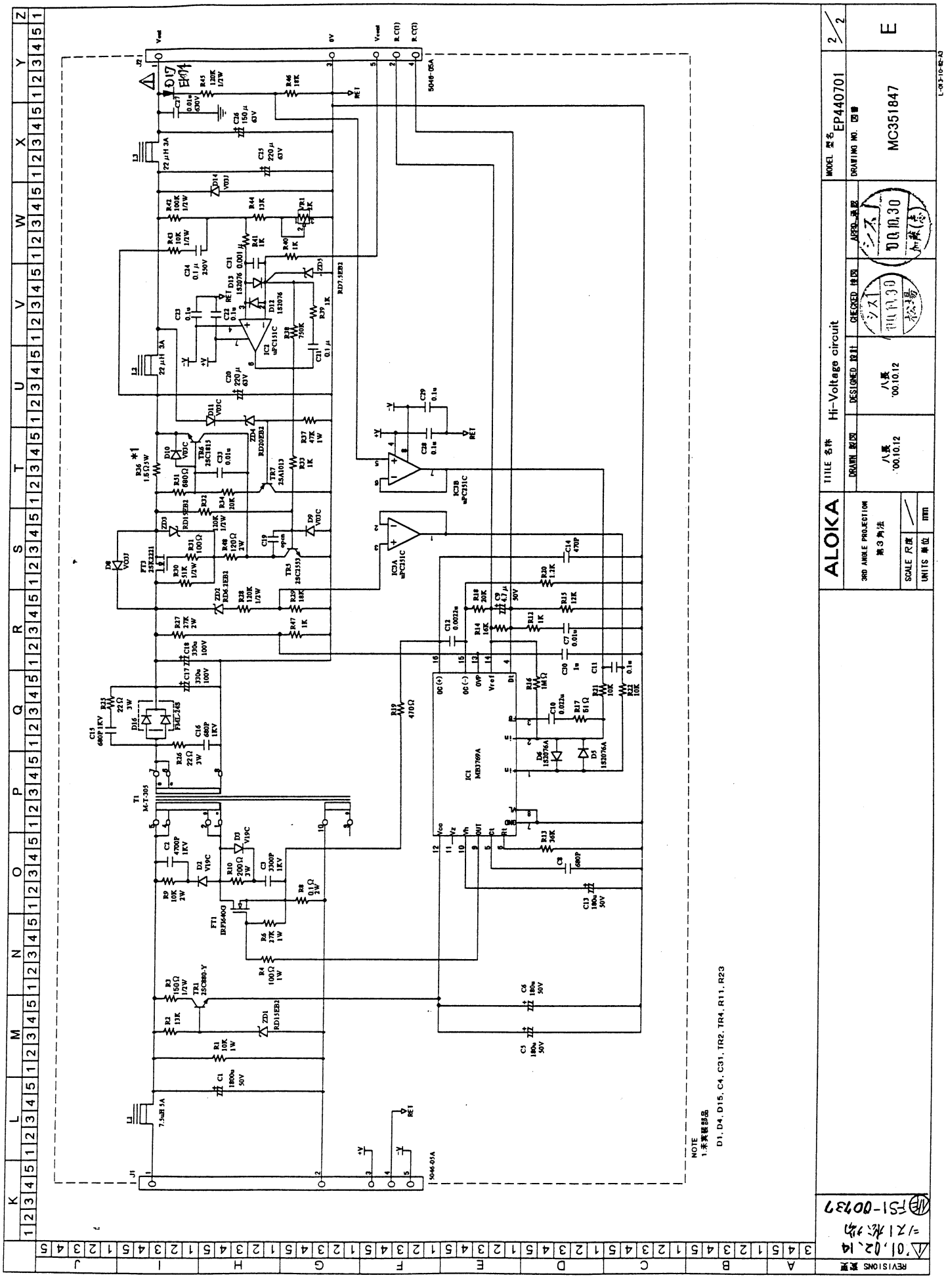

Wiring diagram
総合配線図
ALOKA
MODEL 型名 PSU-S4000B
DRAWING NO. 図番 MC351128
DRAWN 製図 八馬 '00.09.2
DESIGNED 設計 八馬 '00.09.2
CHECKED 検図
APPD. 承認
SCALE 尺度
UNITS 単位 mm
3RD ANGLE PROJECTION 第3角法
REVISIONS 変更
POWER SW
FAN
AC OUTLET BOX
AC INPUT
UN1
UN3
P100
P101
P200
P201
P300
P301
P804
P825
P150
P803
J100
J101
J200
J201
J300
J301
J802
J825
J800
J1

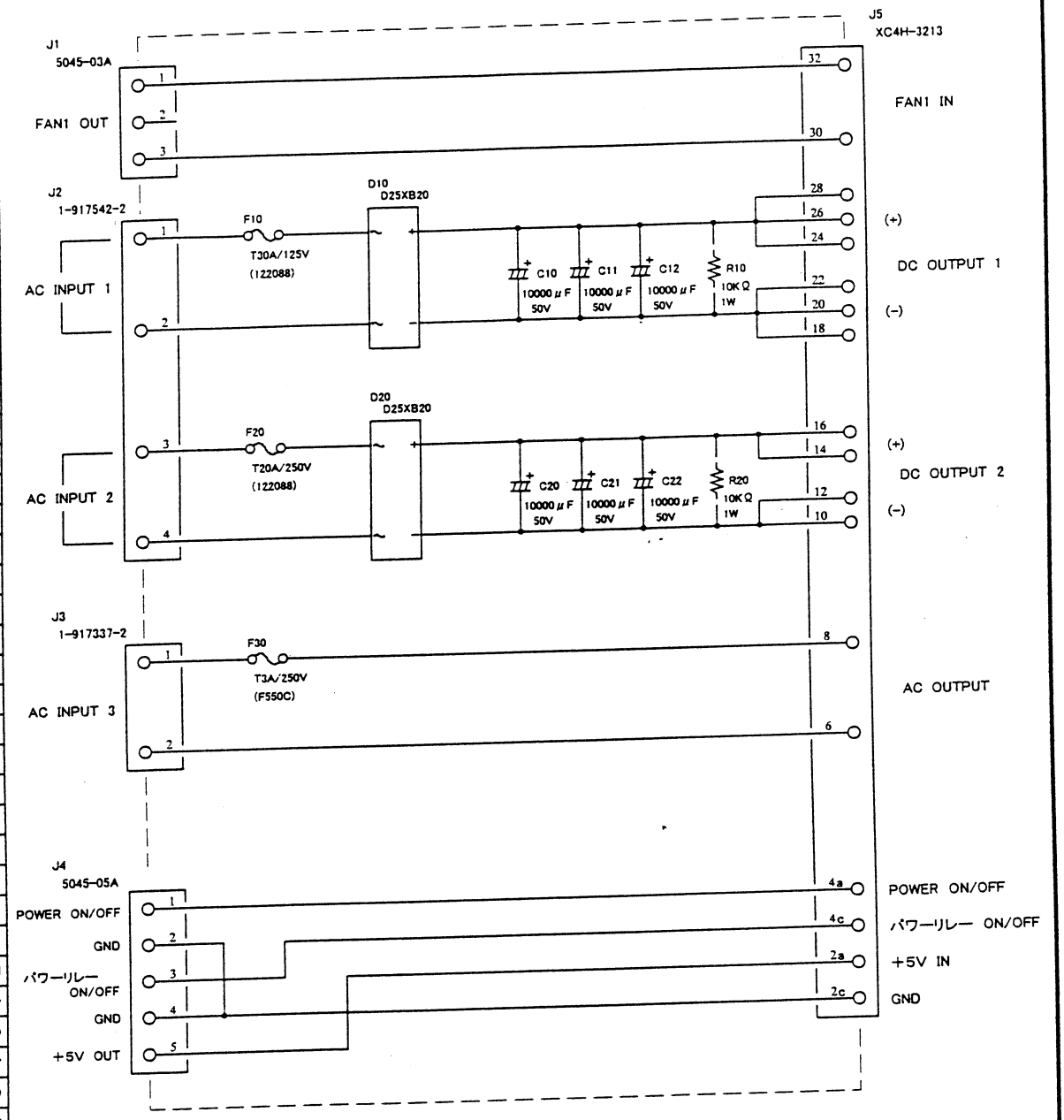

AC-OUTLET
J825
3191-03P
PB3
EP463400BB.sch
J100
J200
J300
J10
J5
PB2
EP462200AA.sch
J4
J1
J2
J3
P4
P1
P2
P3
5251-05
5251-03
1-179958-4
1-178128-2
PANEL
LF2
PBF-1206-22
F50
T7A/250V
100-120V T7A/250V
200-240V T4A/250V
T1A
M-T-309
SW2A
SU115A7
OUT-PUT VOLTAGE SELECT
P13
P10
1-178128-4
SW1A
SU115A7
J13
J10
PB1
EP448200CG.sch
J14
J11
J12
P14
P11
P12
1-179958-2
1-480702-0
5195-03
LF1
SUP-P15H-R-0
MAINS POWER
OB1
SER-F-11-02-15A-(BWT)
J800
GND
NC-174-10N-F-6.35
J1
L-CN-4
AC-INPUT
Cord-set
J802
3191-04P
SW1B
SU115A7
POWER SW
INPUT VOLTAGE SELECT
Note
1.Change parts for in-put voltage
a)AC Cod-set
in-put voltage
Code-set
100-120Vac
CP-116
200-240Vac
CP-117
ALOKA
3RD ANGLE PROJECTION
第3角法
SCALE 尺度
UNITS 単位
mm
TITLE 名称 SSD-4000 Transuformer unit circuit diagram
DRAWN 製図
DESIGNED 設計
CHECKED 照査
APPD 承認
MODEL 型名 PSU-S4000B-1
DRAWING NO. 図番 MC351136
REVISIONS
FS1-00574


ALOKA
TITLE 名称 SSD-4000 Transformer unit circuit diagram
MODEL 型名 PSU-S4000B-1
DRAWING NO. 図番
MC351137
DESIGNED 設計
CHECKED 照合
APPD 承認
DRAWN 製図
SCALE 尺度
UNITS 単位
mm
3RD ANGLE PROJECTION 第3角法
AC-INPUT
POWER SW
INPUT VOLTAGE SELECT
AC-OUTLET
OUT-PUT VOLTAGE SELECT
100-120V 7A/250V
200-240V 3.6A/250V
Note
1.仕向地電圧用電源コード
2.配線材
3.配線材の撚り合わせ
4.配線材のチューブ処理
5.アースライン配線について
6.LF1とLF2の配線について
8.F50のヒューズホルダー
9.アース端子への接続


VOLTAGE CHECK
J401
5569-14A1
GND | C.W.V | N.C | +50V | -12V | -5V | +5.1V
FAN | N.C | -80V | N.C | +12V | +5V | +3.3V
P150
XCSA-2022
GND
C.W.V +12V 1A
GND
D1 D0
D3 D2
D5 D4
D7 D6
NC NC
PWR ON/OFF COM
OFF-SIG COM
NC NC
NC NC
P803
XC4K-1542
+3.3V 10.0A
GND
+5.1V 23.0A
GND
+12V 3.0A
GND
-12V 2.0A
P804
XC4K-1542
+5V 8.0A
GND
-5V 4.0A
N.C
GND
HV.B +50V 0.2A
N.C
GND
HV.A -80V 0.2A
GND
P400
S19S-02
(J400)
FAN1
109P122441402
(J301)
AC INPUT 1
N.C
DC+12V
DC INPUT 4
N.C
(J201)
DC INPUT 3
DC INPUT 2
DC INPUT 1
(J101)
H.V ON/OFF
POWER ON/OFF
POWER OFF OK
PB4 : EP463300BB
(J21) (J20) (J11) (J10)
(P21) (P20) (P11) (P10)
PB2 : EP463200BB
5.1V 23A
H.V.A
H.V.B
C.W.V
EP440701EE
J24 J2 J23 J1
PB1 : EP463100BB
3.3V 10A
+5V 8A
-5V 4A
+12V 3A
-12V 2A
TITLE 名称 SSD-4000 Power Supply unit(2)
DRAWN 製図
DESIGNED 設計
CHECKED 検図
APPD 承認
DRAWING NO. 図番 MC351138
MODEL 機名 PSU-S4000B-2
ALOKA
3RD ANGLE PROJECTION 第3角法
SCALE 尺度
UNITS 単位 mm
REVISIONS 変更


PB4 : EP463300BB
PB1 : EP463100BB
PB2 : EP463200BB
P803
P804
P150
J401
J400
J301
J201
J101
FAN1
P400
ALOKA
PSU-S4000B-2
MC351139
回路ユニット 配線図
八原 '00.09.2
3RD ANGLE PROJECTION 第3角法
NOTE

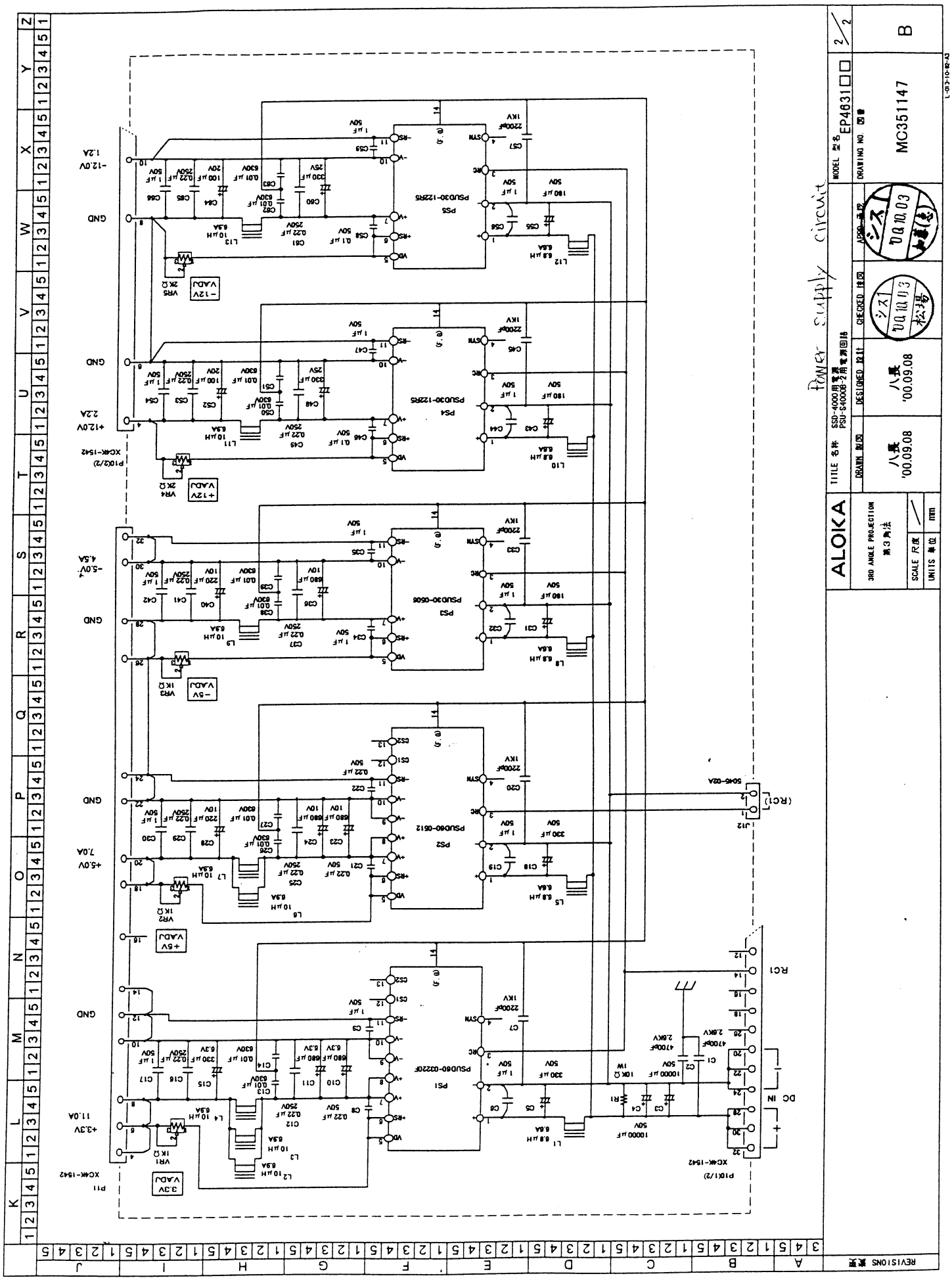

ALOKA
TITLE 名称 Hi-Voltage circuit
MODEL 型名 EP440701
DRAWING NO. 図番 MC351847
DRAWN 製図 八馬 '00.10.12
DESIGNED 設計 八馬 '00.10.12
CHECKED 検図
APPD 承認
3RD ANGLE PROJECTION 第3角法
SCALE 尺度
UNITS 単位 mm
2/2
E
NOTE
1.未実装部品
D1, D4, D15, C4, C31, TR2, TR4, R11, R23
REVISIONS 変更
'01.02.14
FS1-00737

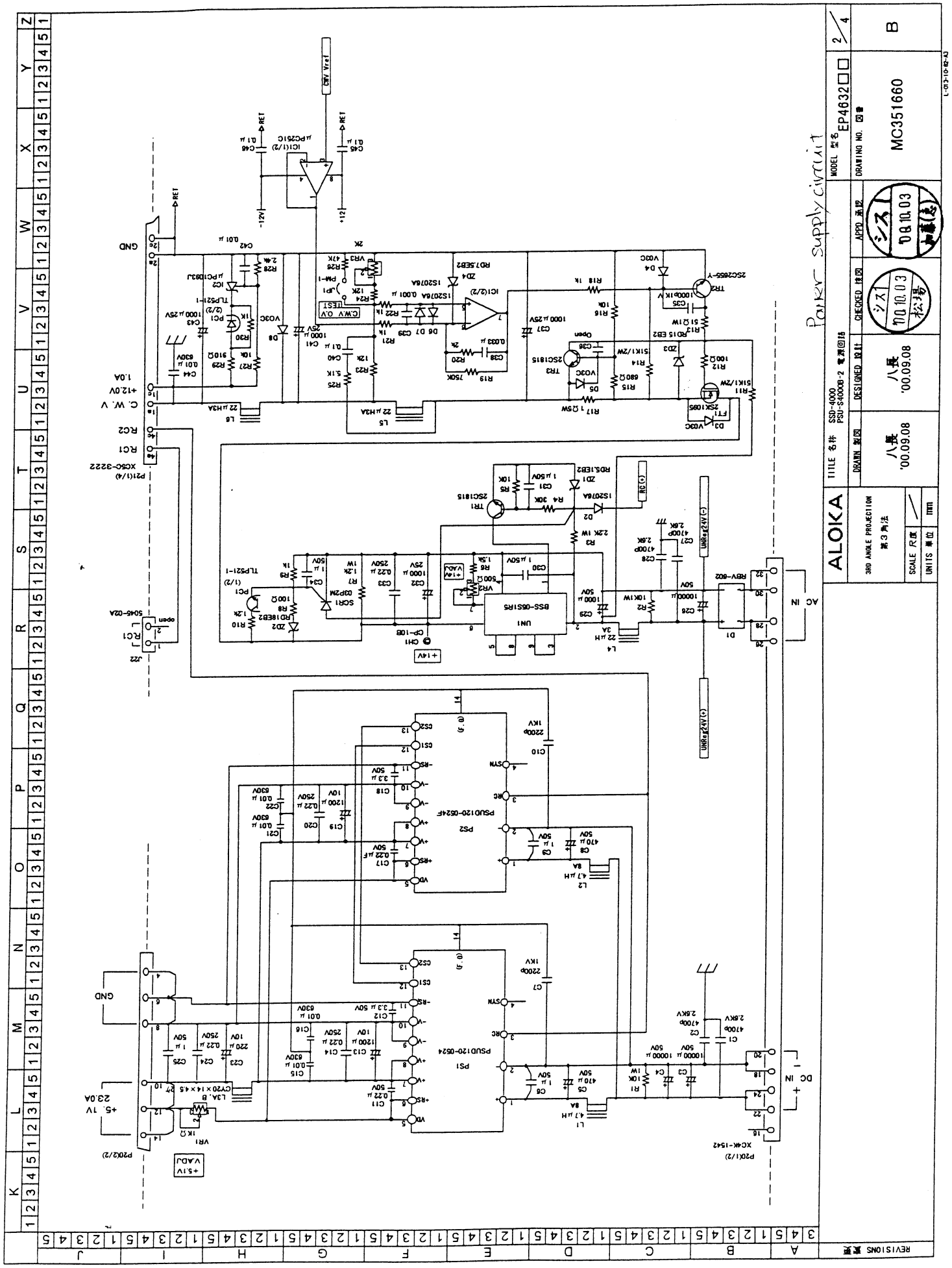


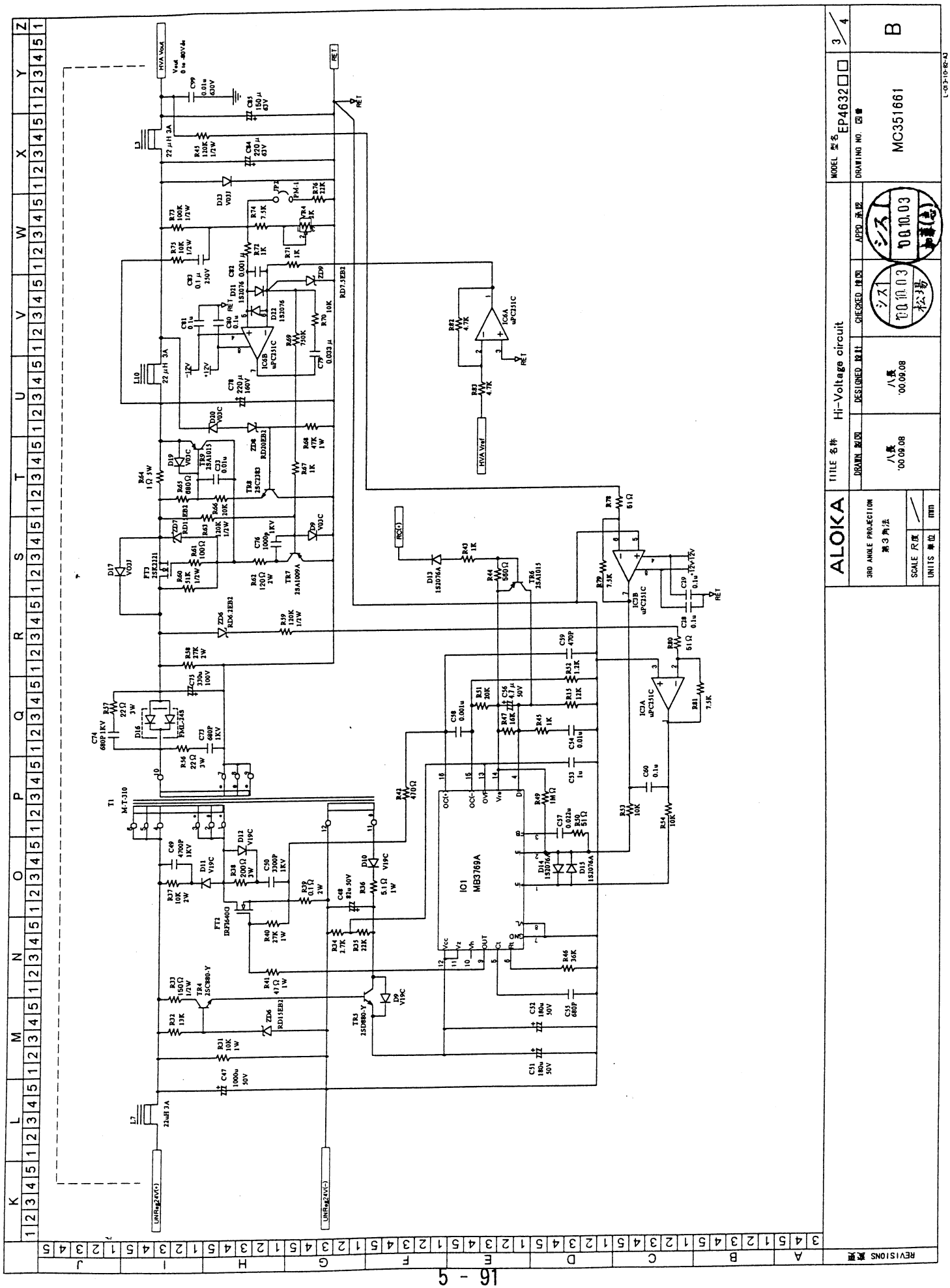
REVISIONS変更

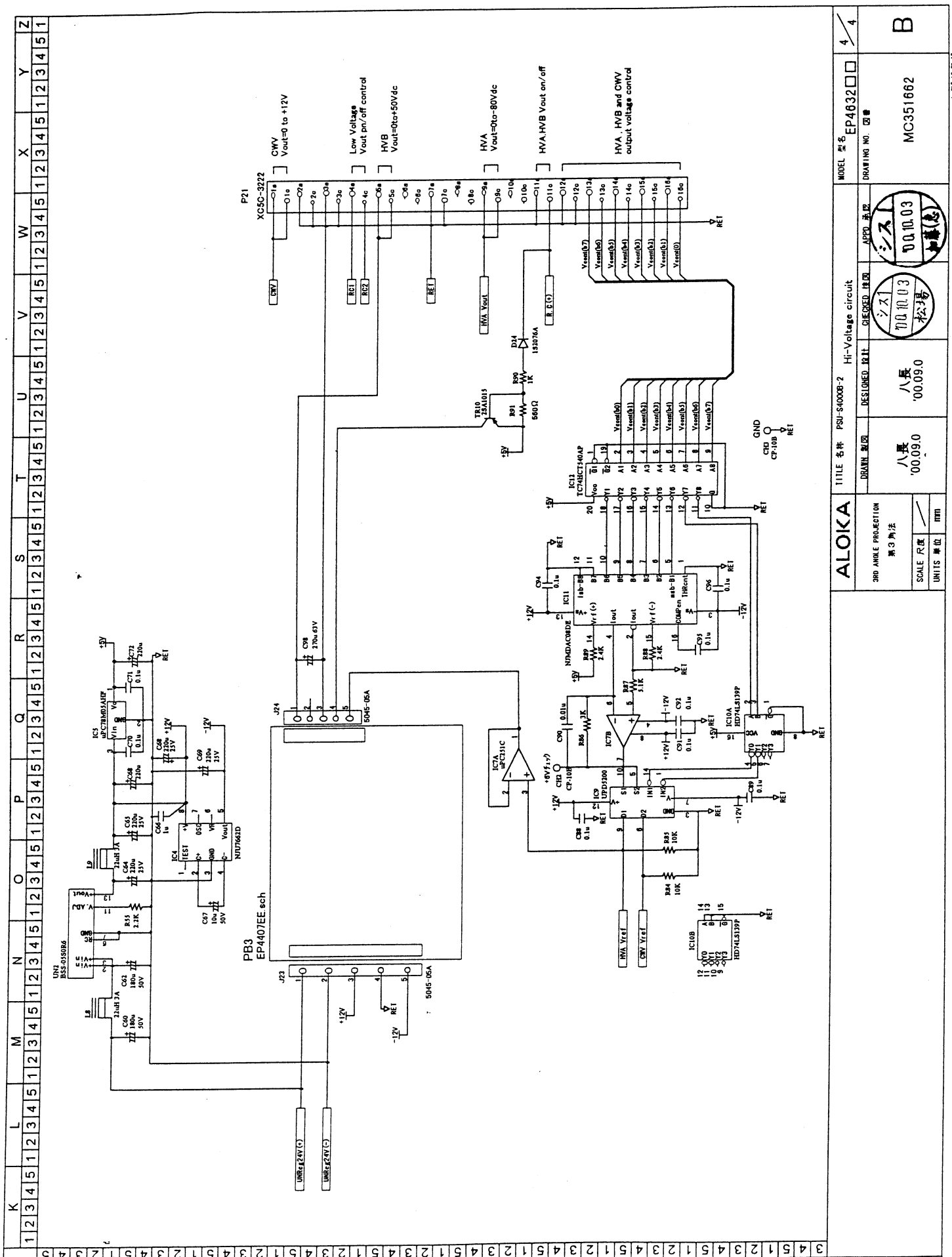
ALOKA	TITLE 名称 Rectification circuit 整流平滑部回路図	MODEL 形名 EP4622□□	2/2
3RD ANGLE PROJECTION 第3角法	DRAWN 製図 八 00.6.15	DESIGNED 設計 八 00.6.15	CHECKED 検図 シスI 00.7.04 松場 / APPD 承認 シスI 00.7.-4 大谷
SCALE 尺度			DRAWING NO. 図番 MC450106
UNITS 単位 mm			A

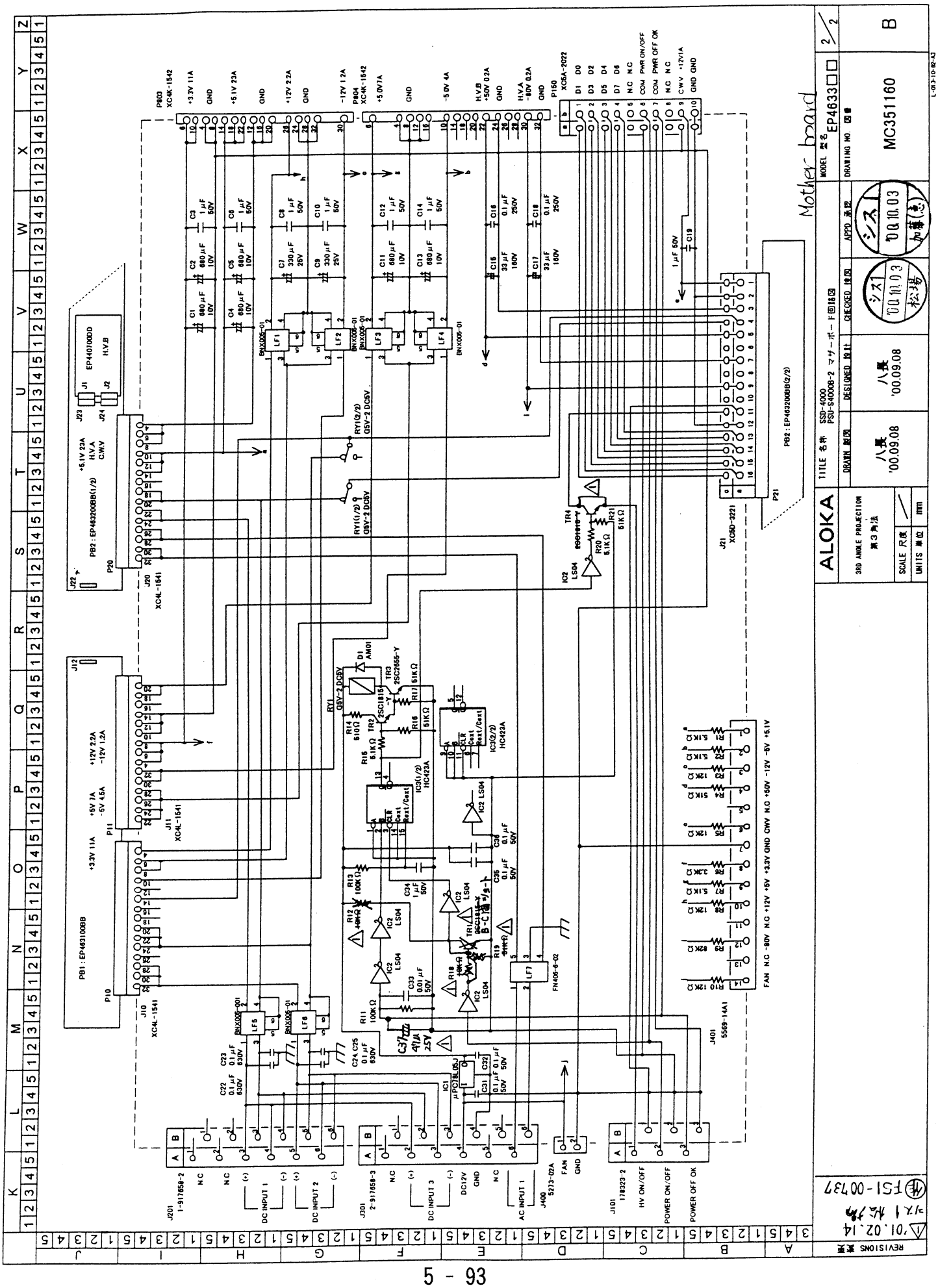
15-May-2000

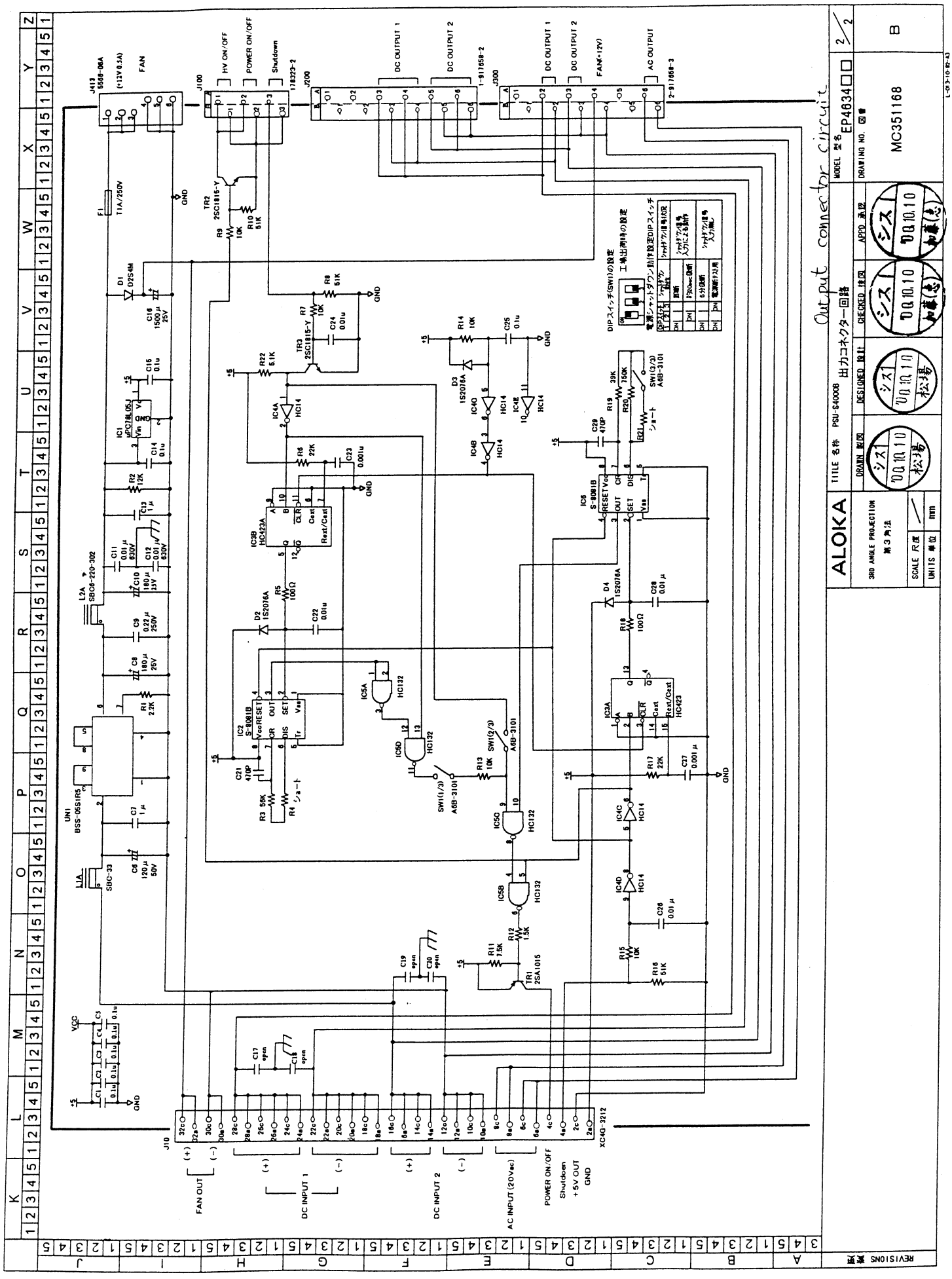

POWER SUPPLY CIRCUIT
ALOKA
3RD ANGLE PROJECTION
第3角法
TITLE 名称 SSD-4000用電源回路
PSU-640008-2用電源回路
DRAWN 製図 八馬 '00.09.08
DESIGNED 設計 八馬 '00.09.08
CHECKED 検図
APPD 承認
MODEL 型名 EP4631□□
DRAWING NO. 図番 MC351147
2/2
B
SCALE 尺度
UNITS 単位 mm
REVISIONS 変更
PS1 PSUD60-03220F
PS2 PSUD60-0512
PS3 PSUD30-0506
PS4 PSUD30-12ERS
PS5 PSUD30-12ERS
DC IN
RC1
-12.0V 1.2A
+12.0V 2.2A
-5.0V 4.5A
+5.0V 7.0A
+3.3V 11.0A
GND

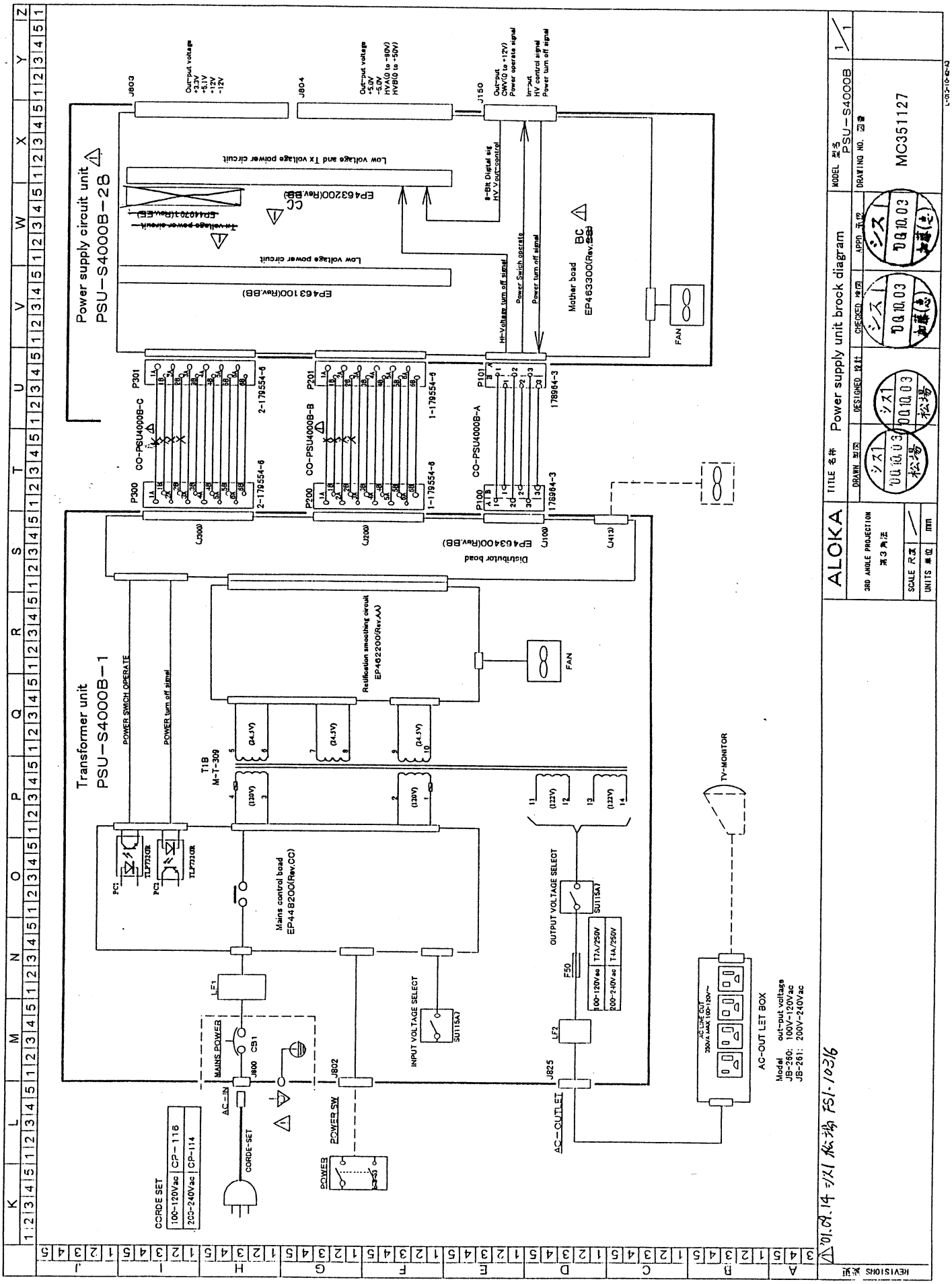

Power supply circuit
ALOKA
TITLE 名称 SSD-4000 PSU-S40008-2 電源回路
MODEL 型名 EP4632□□
DRAWING NO. 図番 MC351660
DRAWN 製図 八馬 '00.09.08
DESIGNED 設計 八馬 '00.09.08
CHECKED 検図
APPD 承認
3RD ANGLE PROJECTION 第3角法
SCALE 尺度
UNITS 単位 mm
REVISIONS 変更
2/4
B
AC IN
DC IN
GND
+12.0V 1.0A
C.W.V
+5.1V 23.0A
UNReg24V(+)
UNReg24V(-)
PSU120-0524
PSU120-0524F
UNI BSS-05S1R5
TLP521-1
2SC1815
2SC2855-Y
IS2076A
RD5.1EB2
RD15 EB2
RD18EB2
SCR1 03P2M
XC4K-1542
XOSO-3222
50H5-02A
+14V
+5.1V VADJ
C.W.V O.V
TEST
VR1 1KΩ
CV20×14×45
L3A, B
L1 4.7μH 8A
L2 4.7μH 8A
L3 22μH 3A
L4 22μH 3A
L5 22μH 3A
L6 22μH 3A

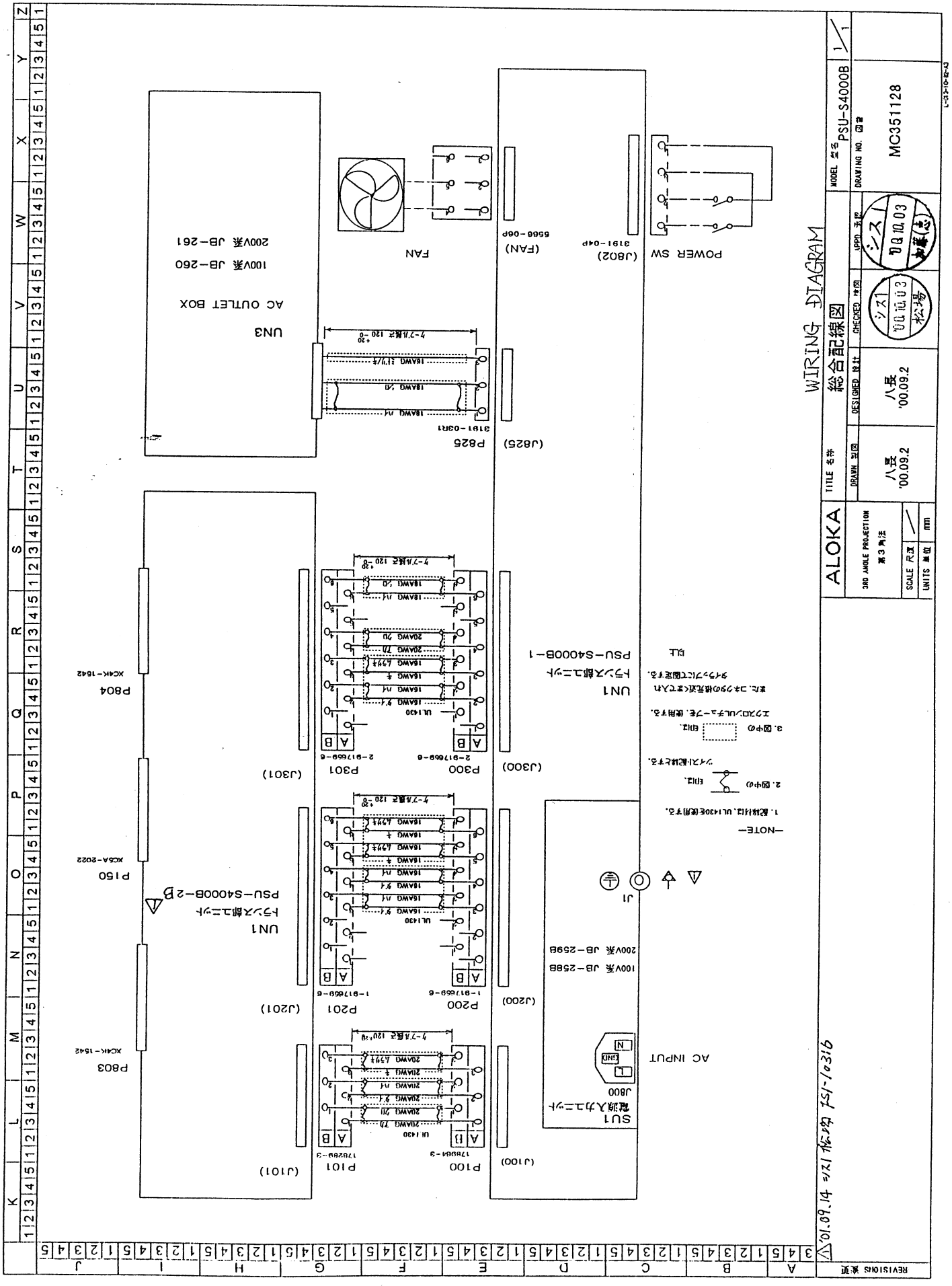

ALOKA
TITLE 名称 Hi-Voltage circuit
3RD ANGLE PROJECTION
第3角法
SCALE R寸
UNITS 単位 mm
DRAWN 製図 八島 '00.09.08
DESIGNED 設計 八島 '00.09.08
CHECKED 検図
APPD 承認
MODEL 型名 EP4632□□
DRAWING NO. 図番 MC351661
3/4
B
REVISIONS 改訂
IC1 MB3769A
T1 M-T-310
HVA Vout
UNReg24V(+)
UNReg24V(-)
HVA Vref
RET

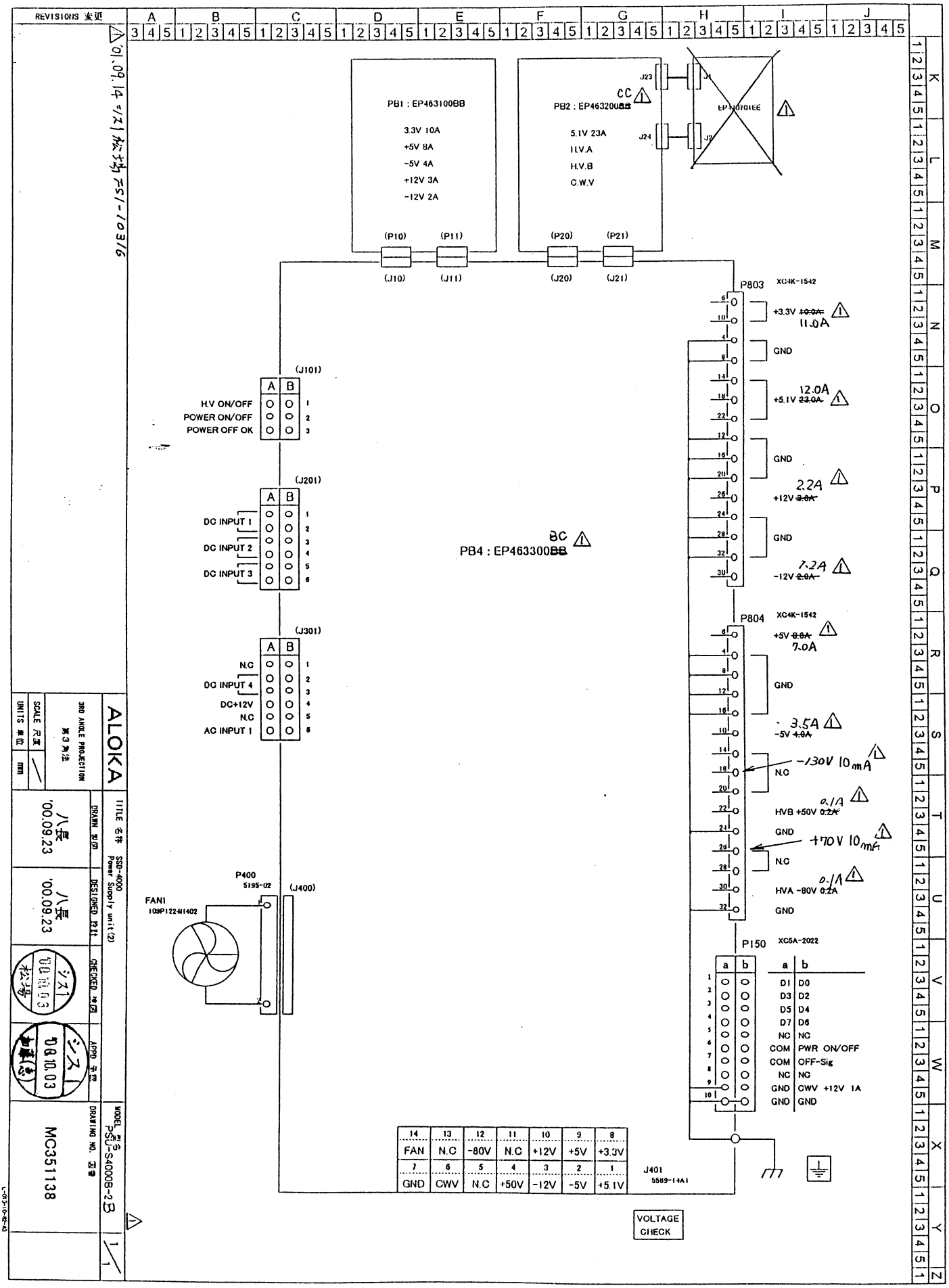

CWV Vout=0 to +12V
Low Voltage Vout on/ off control
HVB Vout=0to+50Vdc
HVA Vout=0to-80Vdc
HVA,HVB Vout on/off
HVA, HVB and CWV output voltage control
P21
XG5D-3222
J24
5045-05A
PB3
EP4407EE.sch
J23
5045-05A
ALOKA
TITLE 名称 PSU-S4000B-2 Hi-Voltage circuit
DRAWN 製図
DESIGNED 設計
CHECKED 検図
APPD 承認
MODEL 型名 EP4632□□
DRAWING NO. 図番
MC351662
3RD ANGLE PROJECTION 第3角法
SCALE 尺度
UNITS 単位
REVISIONS 改訂

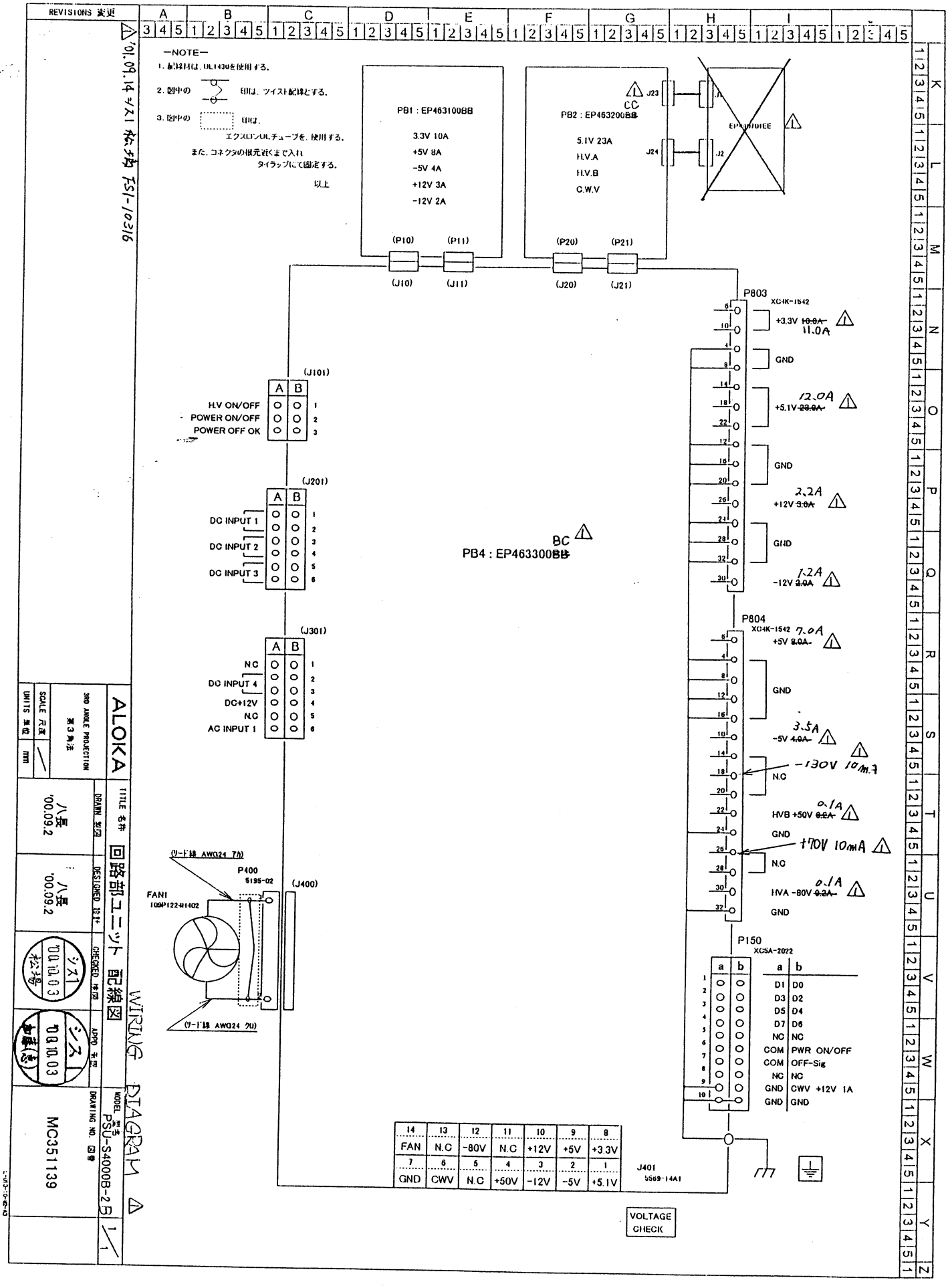

Mother board
ALOKA
MC351160
EP4633□□
SSD-4000
PSU-840008-2 マザーボード回路図
30D ANGLE PROJECTION
第3角法
DRAWN 製図
DESIGNED 設計
CHECKED 検図
APPD 承認
DRAWING NO. 図番
SCALE 尺度
UNITS 単位
REVISIONS 変更
'00.09.08
'00.10.03
'01.02.14
TSI-00737
PB1 : EP4631008B
PB2 : EP4632008B(1/2)
PB2 : EP4632008B(2/2)
P10
P11
P20
P21
J10
J11
J12
J20
J21
J22
J23
J24
P803
P804
P150
J201
J301
J101
J401
J400
IC1
IC2
IC3(1/2)
IC3(2/2)
TR1
TR2
TR3
TR4
RY1
RY1(1/2)
RY1(2/2)
D1
LF1
LF2
LF3
LF4
LF5
LF6
LF7
DC INPUT 1
DC INPUT 2
DC INPUT 3
AC INPUT 1
FAN
HV ON/OFF
POWER ON/OFF
POWER OFF OK
DC12V
GND
FAN N.C -80V N.C +12V +6V +3.3V GND CWV N.C +50V -12V -6V +5.1V

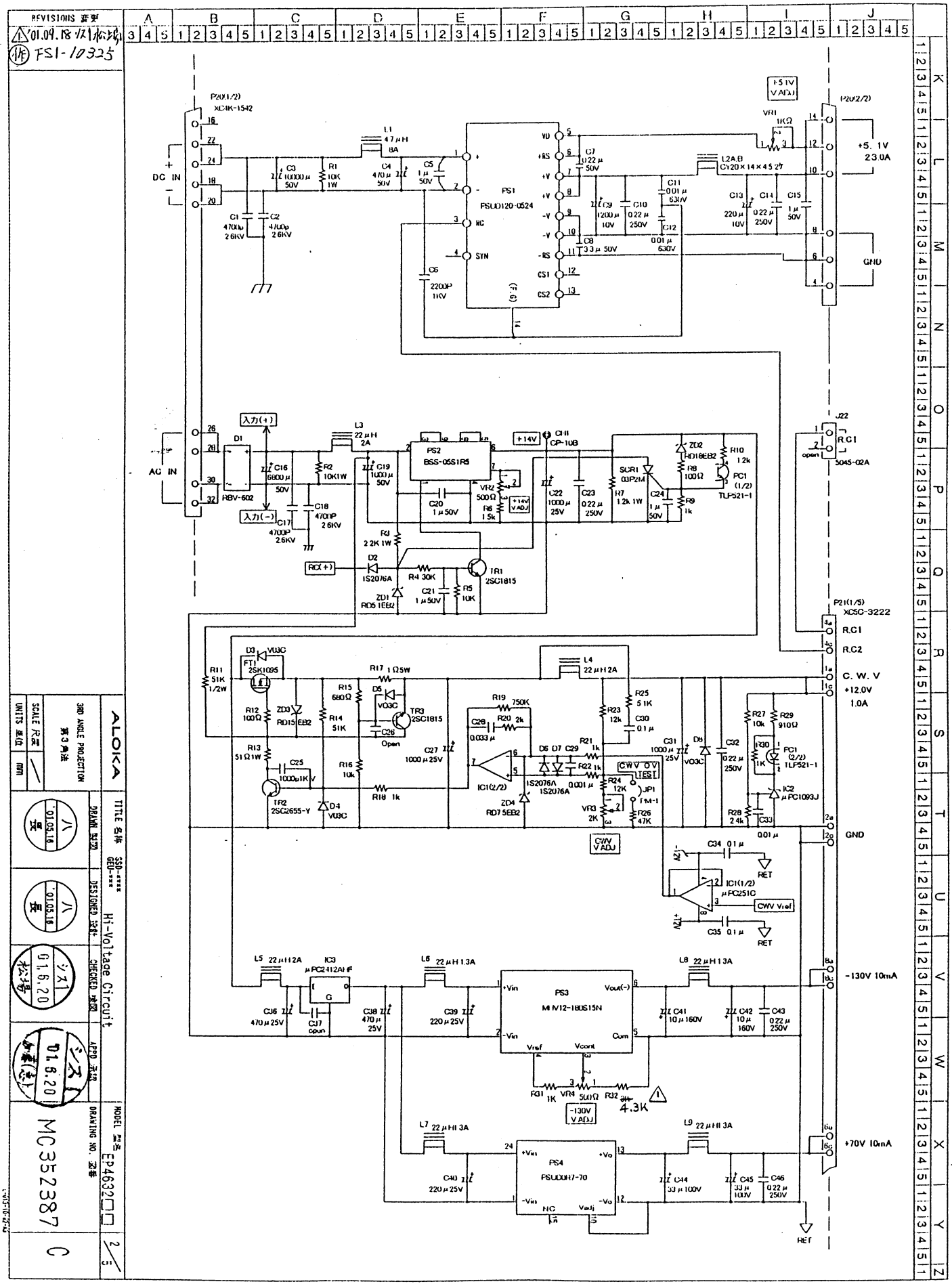

Output connector circuit
出力コネクター回路
ALOKA
PSU-S400DB
EP4834□□
MC351168
3RD ANGLE PROJECTION
第3角法
DRAWN 製図
DESIGNED 設計
CHECKED 検図
APPD 承認
SCALE 尺度
UNITS 単位
mm
REVISIONS
J413 5568-06A (+12V 0.1A) FAN
J100 HV ON/OFF
POWER ON/OFF
Shutdown
J200 DC OUTPUT 1
DC OUTPUT 2
J300 DC OUTPUT 1
DC OUTPUT 2
FAN(+12V)
AC OUTPUT
J10 XC4G-3212
FAN OUT
DC INPUT 1
DC INPUT 2
AC INPUT (20Vac)
POWER ON/OFF
Shutdown
+5V OUT
GND
DIP スイッチ(SW1)の設定
工場出荷時の設定
電源シャットダウン動作設定DIP スイッチ
UNI BSS-06SIP05
L1A SBC-33
L2A SBCF-220-302
IC1 μPC78L05J
IC2 S-8081B
IC3B HC423A
IC5A IC5B IC5C IC5D HC132
IC4A IC4B IC4C IC4D IC4E HC14
IC6 S-8081B
IC2A HC423
TR1 2SA1015
TR2 2SC1815-Y
TR3 2SC1815-Y
D1 D2S4M
D2 1S2076A
D3 1S2076A
D4 1S2076A
F1 T1A/250V
SW1(1/2) A6B-3101
SW1(2/2) A6B-3101


Power supply circuit unit
PSU-S4000B-28
Transformer unit
PSU-S4000B-1
Low voltage and Tx voltage power circuit
Low voltage power circuit
Mother boad
EP463300(Rev.BB)
Distributor boad
EP463400(Rev.BB)
Rectification smoothing circuit
EP462200(Rev.AA)
Mains control boad
EP448200(Rev.CC)
CO-PSU4000B-A
CO-PSU4000B-B
CO-PSU4000B-C
FAN
TV-MONITOR
AC-OUT LET BOX
OUTPUT VOLTAGE SELECT
INPUT VOLTAGE SELECT
POWER SWCH OPERATE
POWER turn off signal
Power Switch operate
Power turn off signal
Hi-Voltage turn off signal
8-Bit Digital sig
HV Vout control
MAINS POWER
POWER SW
AC-IN
CORDE-SET
AC-OUTLET
ALOKA
Power supply unit brock diagram
PSU-S4000B
MC351127


WIRING DIAGRAM
総合配線図
ALOKA
MODEL 型名 PSU-S4000B
DRAWING NO. 図番 MC351128
DRAWN 製図 八景 '00.09.2
DESIGNED 設計 八景 '00.09.2
CHECKED 検図
APPD 承認
TITLE 名称
3RD ANGLE PROJECTION 第3角法
SCALE 尺度
UNITS 単位 mm
REVISIONS 変更
'01.09.14 ﾘｽﾄ作成 FSI-10316
POWER SW
(J802)
3191-04P
FAN
(FAN)
5566-06P
UN3
AC OUTLET BOX
100V系 JB-260
200V系 JB-261
P825
(J825)
3191-03R1
UN1
ﾊﾟﾜｰｽﾀｰﾄﾕﾆｯﾄ
PSU-S4000B-1
P300
(J300)
P301
(J301)
P200
(J200)
P201
(J201)
P100
(J100)
P101
(J101)
P804
P150
P803
SU1
電源入力ユニット
J800
AC INPUT
100V系 JB-258B
200V系 JB-259B
J1
UN1
ﾊﾟﾜｰｽﾀｰﾄﾕﾆｯﾄ
PSU-S4000B-2
NOTE
1. 配線材は、UL1430を使用する。
2. 図中の ▽ 印は、マイカル配線をする。
3. 図中の □ 印は、ヨコクロルビスコテ、使用する。
また、コネクタの挿元近くまでスリーブをカシメて固定する。
以上


REVISIONS 変更
01.09.14 ﾏﾂｲ松勢 PS1-1037G
PB1 : EP463100BB
3.3V 10A
+5V 8A
-5V 4A
+12V 3A
-12V 2A
PB2 : EP463200BB
5.1V 23A
H.V.A
H.V.B
C.W.V
CC
PB4 : EP463300BB
BC
(P10) (P11) (P20) (P21)
(J10) (J11) (J20) (J21)
(J101)
H.V ON/OFF
POWER ON/OFF
POWER OFF OK
(J201)
DC INPUT 1
DC INPUT 2
DC INPUT 3
(J301)
N.C
DC INPUT 4
DC+12V
N.C
AC INPUT 1
P400
5195-02
(J400)
FAN1
109P122411402
P803
XC4K-1542
+3.3V 11.0A
GND
+5.1V 12.0A
GND
+12V 2.2A
GND
-12V 7.2A
P804
XC4K-1542
+5V 7.0A
GND
-5V 3.5A
N.C -130V 10mA
HVB +50V 0.1A
GND +70V 10mA
N.C
HVA -80V 0.1A
GND
P150
XC5A-2022
a b
D1 D0
D3 D2
D5 D4
D7 D6
NC NC
COM PWR ON/OFF
COM OFF-Sig
NC NC
GND CWV +12V 1A
GND GND
J401
5589-14A1
14 13 12 11 10 9 8
FAN N.C -80V N.C +12V +5V +3.3V
7 6 5 4 3 2 1
GND CWV N.C +50V -12V -5V +5.1V
VOLTAGE CHECK
ALOKA
TITLE 名称 SSP-4000 Power Supply unit(2)
DRAWN 製図 八長 '00.09.23
DESIGNED 設計 八長 '00.09.23
CHECKED 検図 シスト 00.10.03 松澤
APPD 承認 シスト 00.10.03
MODEL 型名 PSU-S4000B-2B
DRAWING NO. 図番 MC351138
SCALE 尺度 UNITS 単位 mm
3RD ANGLE PROJECTION 第3角法


REVISIONS 変更
'01.09.14 システム 松沢 FSI-10316
—NOTE—
1. 配線材は、UL1430を使用する。
2. 図中の 印は、ツイスト配線とする。
3. 図中の 印は、
エクスロンULチューブを、使用する。
また、コネクタの根元近くまで入れ
タイラップにて固定する。
以上
PB1 : EP463100BB
3.3V 10A
+5V 8A
-5V 4A
+12V 3A
-12V 2A
PB2 : EP463200BB
5.1V 23A
H.V.A
H.V.B
C.W.V
J23
J24
J1
J2
(P10) (P11) (P20) (P21)
(J10) (J11) (J20) (J21)
(J101)
H.V ON/OFF
POWER ON/OFF
POWER OFF OK
(J201)
DC INPUT 1
DC INPUT 2
DC INPUT 3
(J301)
N.C
DC INPUT 4
DC+12V
N.C
AC INPUT 1
PB4 : EP463300BB
P803
XG4K-1542
+3.3V 10.0A 11.0A
GND
+5.1V 23.0A 12.0A
GND
+12V 3.0A 2.2A
GND
-12V 2.0A 1.2A
P804
XG4K-1542
+5V 8.0A 7.0A
GND
-5V 4.0A 3.5A
N.C -130V 10mA
HVB +50V 0.2A 0.1A
GND +70V 10mA
N.C
HVA -80V 0.2A 0.1A
GND
P150
XGSA-2022
D1 D0
D3 D2
D5 D4
D7 D6
NC NC
COM PWR ON/OFF
COM OFF-Sig
NC NC
GND CWV +12V 1A
GND GND
(リード線 AWG24 7/0)
P400
5195-02
(J400)
FAN1
109P1224H402
(リード線 AWG24 7/0)
14 13 12 11 10 9 8
FAN N.C -80V N.C +12V +5V +3.3V
7 6 5 4 3 2 1
GND CWV N.C +50V -12V -5V +5.1V
J401
5569-14A1
VOLTAGE CHECK
ALOKA
TITLE 名称 回路部ユニット 配線図
WIRING DIAGRAM
DRAWN 製図 八長 '00.09.2
DESIGNED 設計 八長 '00.09.2
CHECKED 検図 システム '00.10.03
APPD 承認 システム '00.10.03
MODEL 型式 PSU-S4000B-25
DRAWING NO. 図番 MC351139
SCALE 尺度 —
UNITS 単位 mm
3RD ANGLE PROJECTION 第3角法

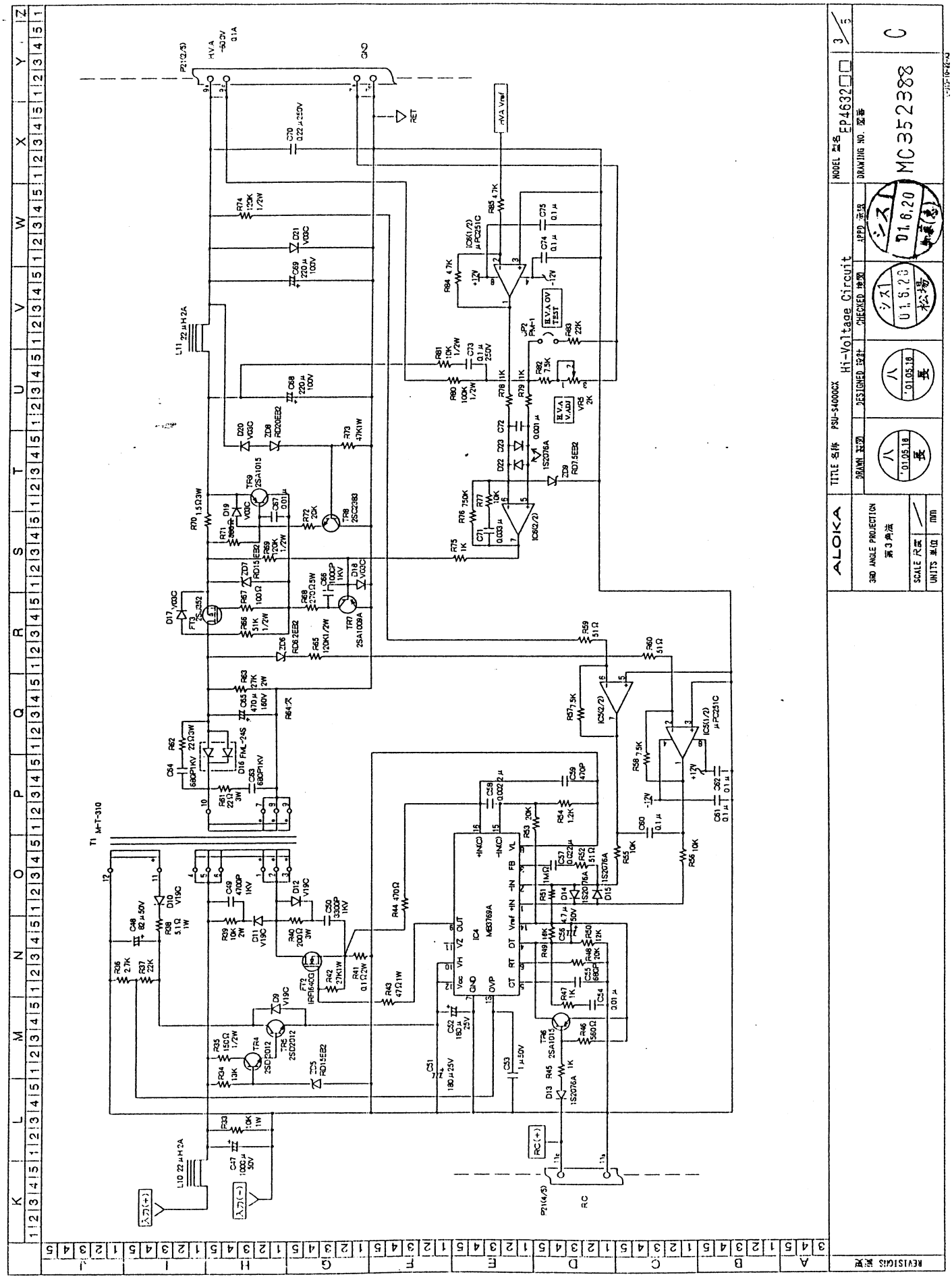


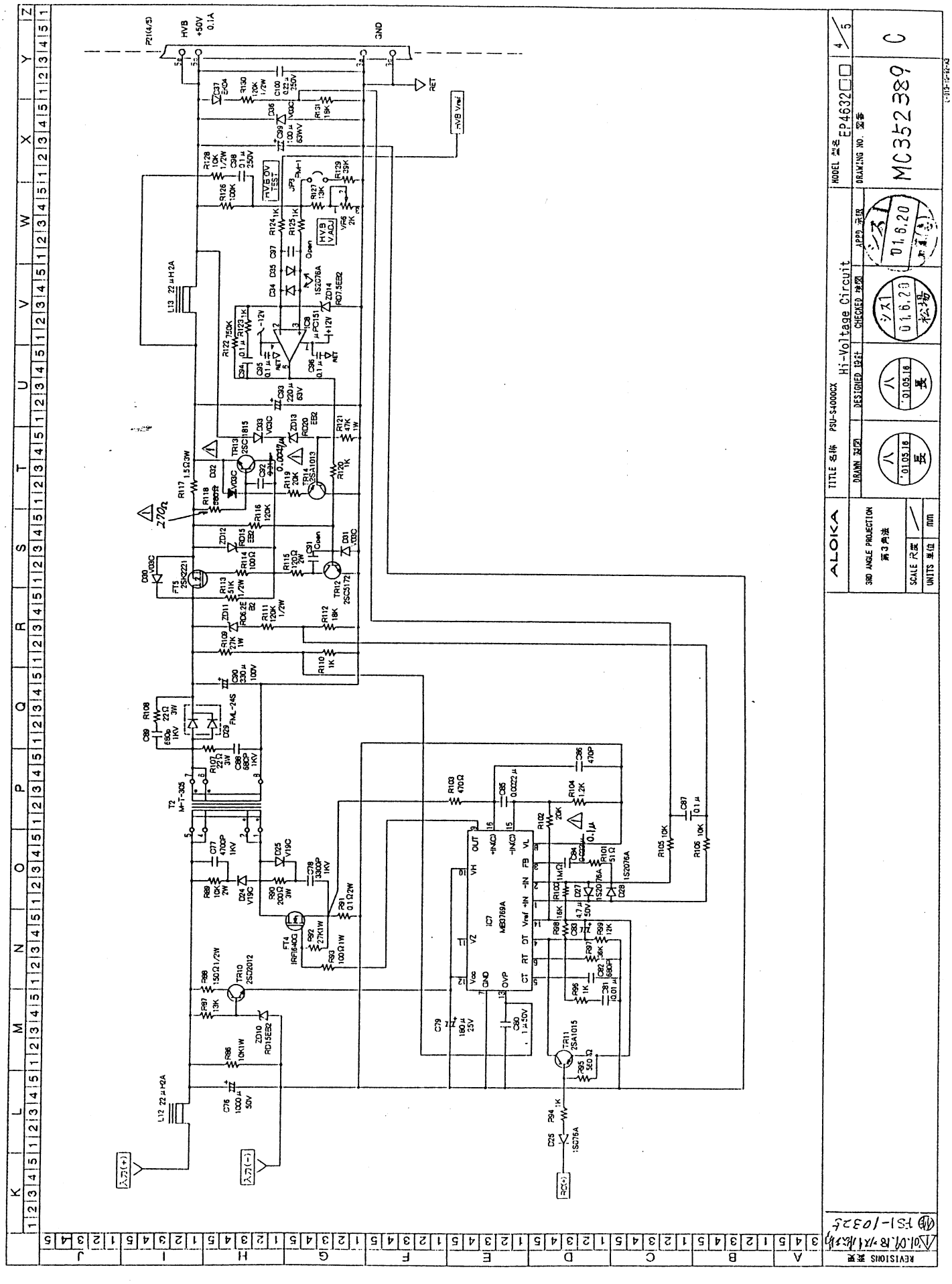
REVISIONS 変更

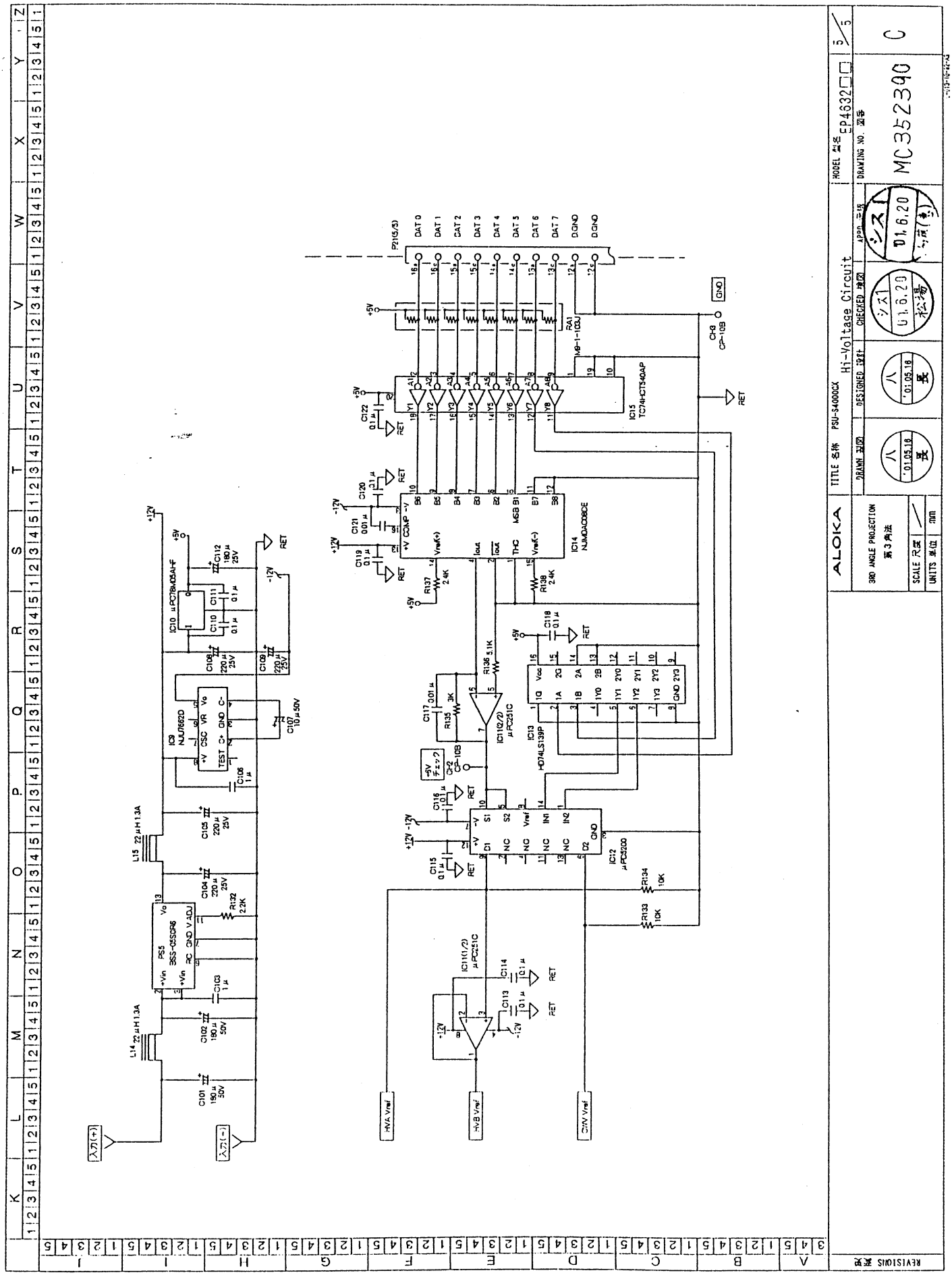
01.09.18 改訂 松浦

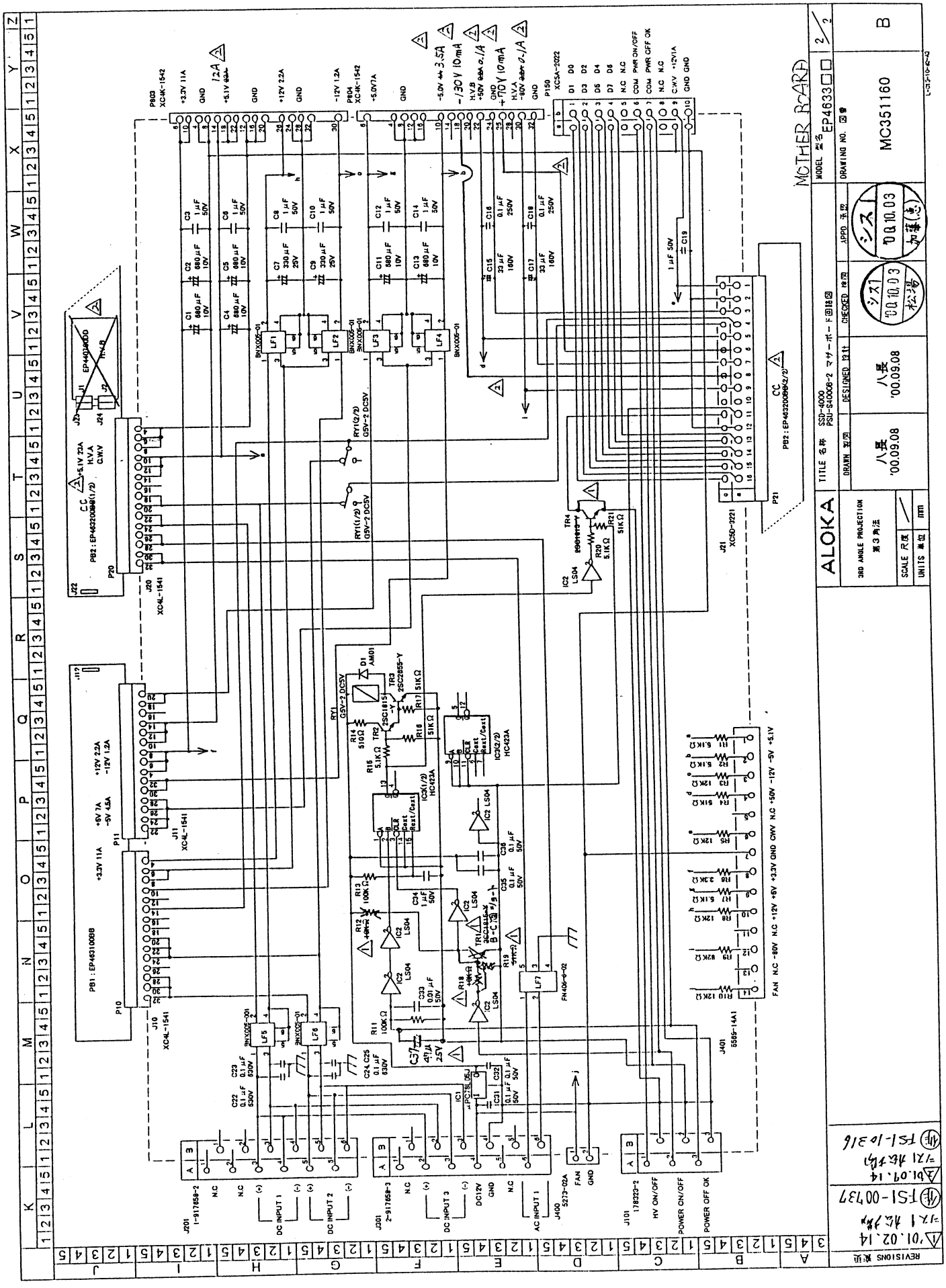
作 FS1-10325

UNITS 単位	mm
SCALE 尺度	—
3RD ANGLE PROJECTION 第3角法	
ALOKA	
TITLE 名称	Hi-Voltage Circuit
DRAWN 製図	八 '01.05.16
DESIGNED 設計	八 '01.05.16
CHECKED 検図	シズ 01.6.20 松浦
APPD 承認	シズ 01.6.20
MODEL 型式	EP4632□□
DRAWING NO. 図番	MC352387 C
	2/3


ALOKA
TITLE 名称 PSU-S4000CX Hi-Voltage Circuit
MODEL 型名 EP4632
DRAWING NO. 図番 MC352388
3RD ANGLE PROJECTION 第3角法
SCALE 尺度 1/1
UNITS 単位 mm
DRAWN 作図
DESIGNED 設計
CHECKED 検図
APPD 承認
REVISIONS 改変


Hi-Voltage Circuit
PSU-S4000CX
ALOKA
MODEL 型名 EP4632□□
DRAWING NO. 図番
MC352389 C
DRAWN 製図
DESIGNED 設計
CHECKED 検図
APPD 承認
SCALE 尺度
UNITS 単位
mm
REVISIONS 改訂
HVB
+50V
0.1A
GND
RET
HVB Vref
HVB 0V TEST
HVB VADJ
T2 M-T-305
IC7 MB3769A
TR10 2SD2012
TR11 2SA1015
TR12 2SC3172
TR13 2SC1815
TR14 2SA1013
FT4 IRF640G
FT5 2SK2221
D29 FML-24S
D26 1S2076A
D28 1S2076A
D27 1S2076A
D25 1S2076A
L12 22μH2A
L13 22μH2A
入力(+)
入力(-)


Hi-Voltage Circuit
PSU-S4000CX
EP4632
MC352390
ALOKA
3RD ANGLE PROJECTION
DRAWN
DESIGNED
CHECKED
SCALE
UNITS
REVISIONS


MOTHER BOARD
ALOKA
MC351160
B
DRAWING NO.
MODEL EP4633□□
TITLE SSD-4000
PSU-S40008-2 マザーボード回路図
DRAWN
DESIGNED
CHECKED
APPD
SCALE
UNITS
3RD ANGLE PROJECTION
REVISIONS
TSI-00737
TSI-10316
PB1 : EP4010008
PB2 : EP4632008
PB3 : EP4633008
PB4 : EP4634008
P10
P11
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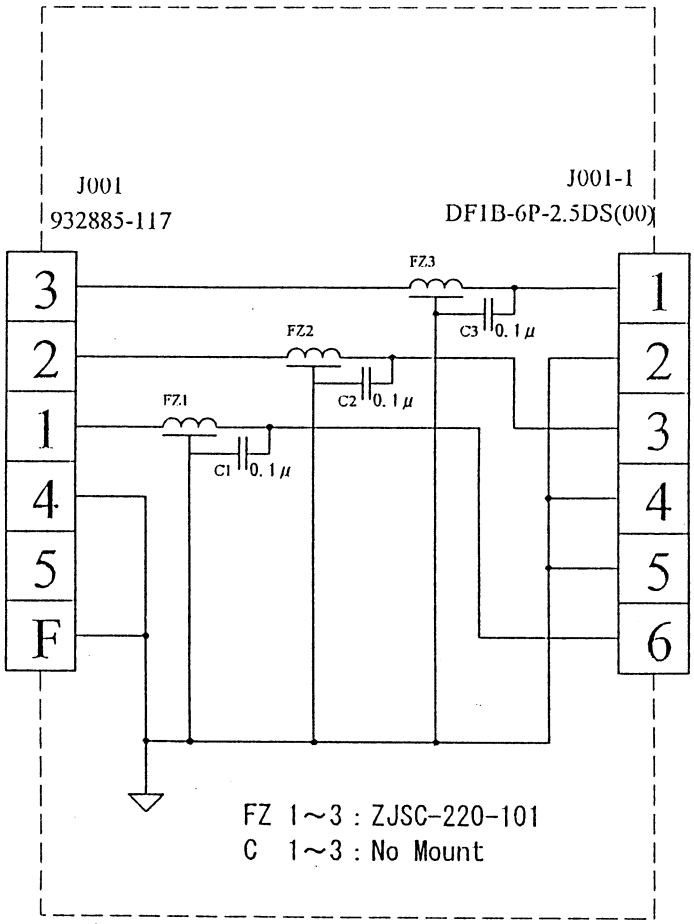
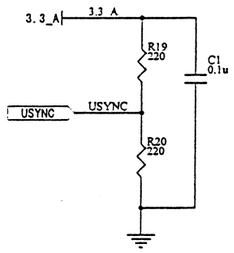
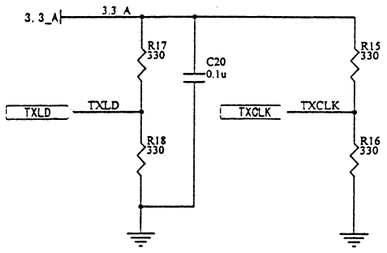
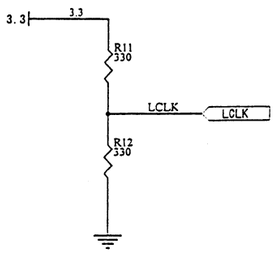


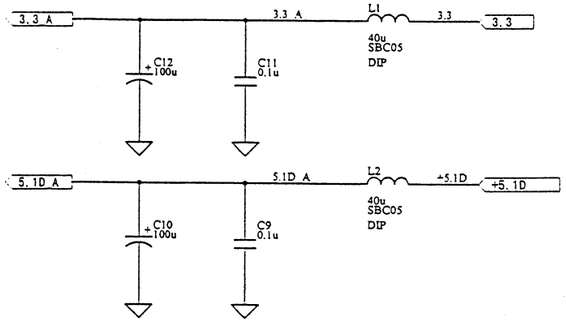
REVISIONS

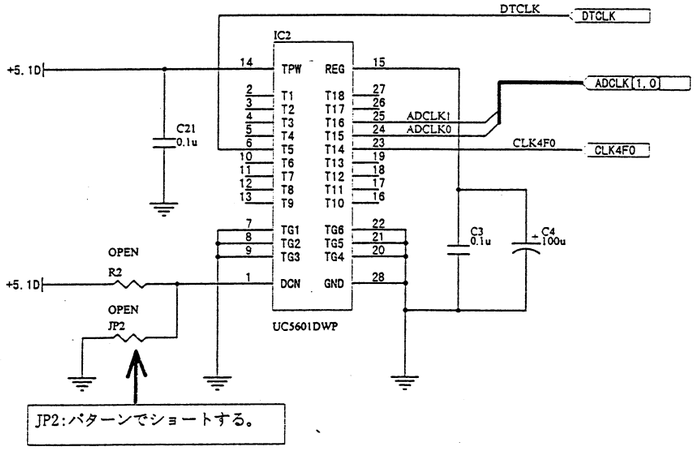
ALOKA	TITLE: Foot SW PCB				MODEL: EP4732 □□	2/2
3RD ANGLE PROJECTION 第3角法	DRAWN: シス1 01.9.19 渡邊(有)	DESIGNED: シス1 01.9.19 渡邊(有)	CHECKED: シス 01.9.19 加藤(恵)	APPD: シス 01.9.19 加藤(恵)	DRAWING NO. MC450267	A
SCALE						
UNITS	mm					

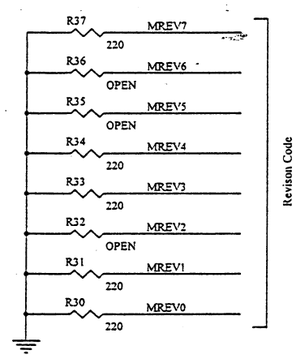












Revison Code 設定表

Revison bit	定義	設定			
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7	形名設定	L	L	L	L
6		H	H	H	H
5	H固定	H	H	H	H
4		L			
3	リビジョン設定	L			
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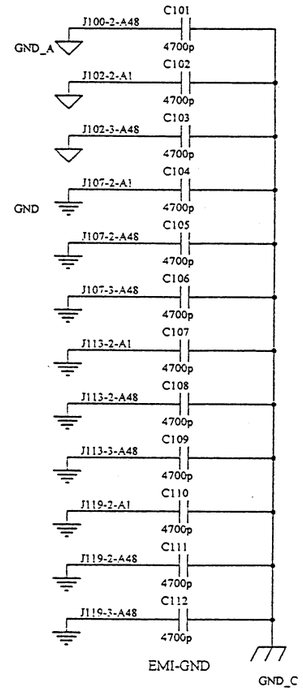
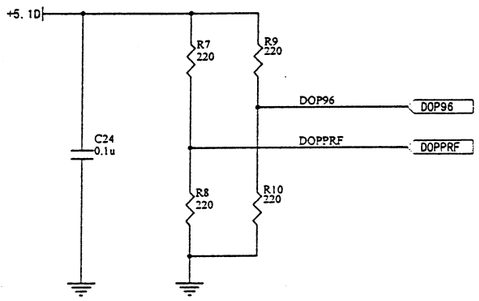
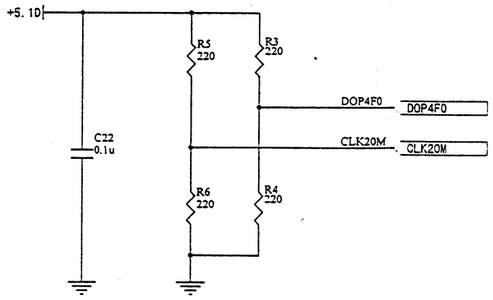


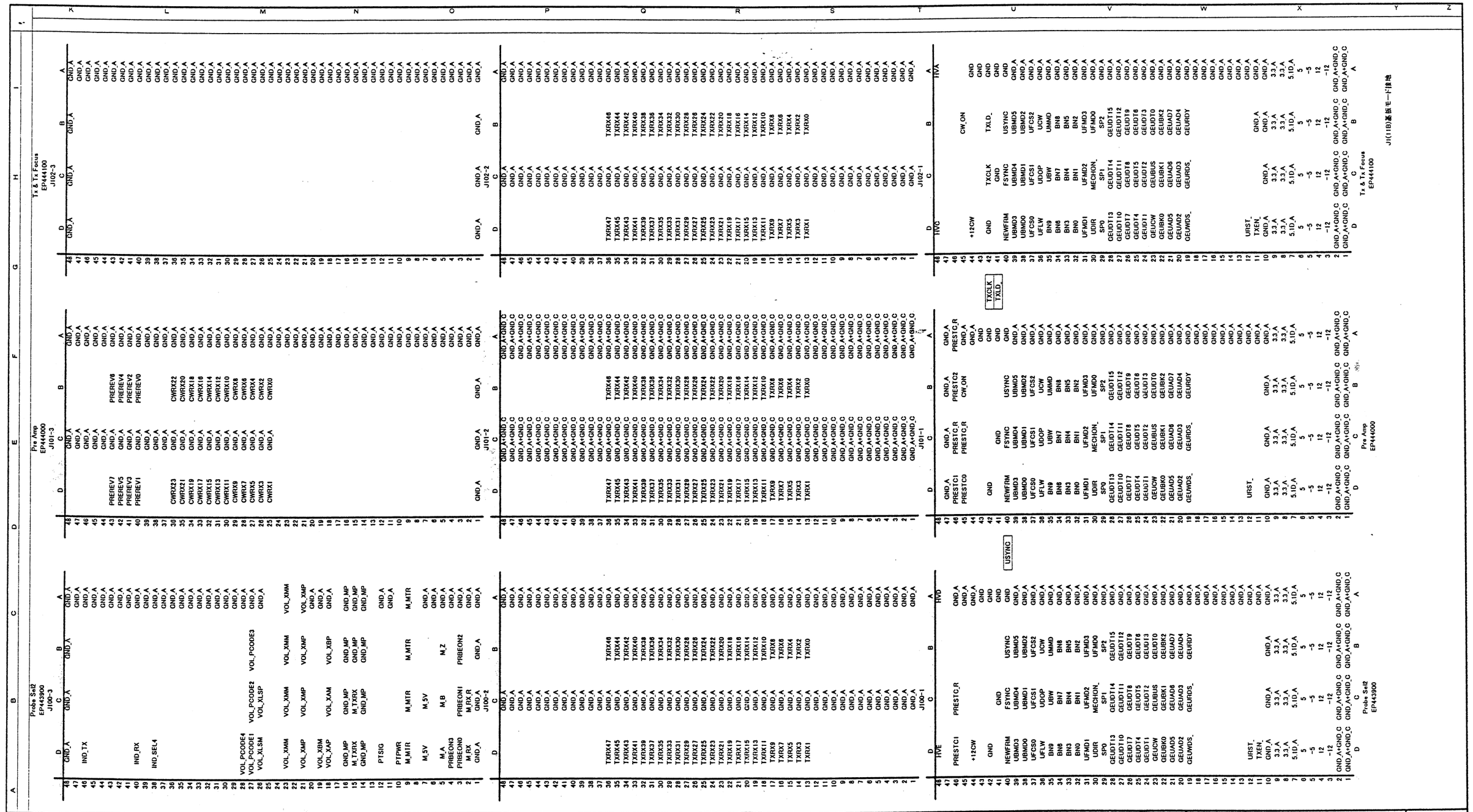




REVISIONS 変更
△ 2002/01/25 FD2-10564 南島

Aloka	TITLE 名称 MOTHER			MODEL 型名 EP4812□□	2/8
3RD ANGLE PROJECTION 第3角法	DRAWN 製図 開2 02.1.25 南島	DESIGNED 設計 開2 02.1.25 南島	CHECKED 検図 開2 02.1.25 木見田	APPROVED 承認 開2 02.1.25 木見田	DRAWING NO. 図番 MC353001	D
SCALE 尺度 /						
UNITS 単位 mm						

L-013-10-82-A3



REVISIONS変更

△ 2002/01/25 FD2-10564 南島行

ALOKA	TITLE 名称: MOTHER	MODEL 形名: EP4812 □ □	3
3RD ANGLE PROJECTION 第3角法	DRAWN製図: 開2 02.1.25 南島 / DESIGNED設計: 開2 02.1.25 南島 / CHECKED検図: 開2 '02.1.25 木見田 / APPD承認: 開2 '02.1.25 木見田	DRAWING NO.図番: MC353002	D
SCALE 尺度			
UNITS 単位: mm			

L-013-10-82-A3

REVISIONS 変更

△ 2002/01/25 FD2-10564 南島

ALOKA

TITLE 名称: MOTHER

MODEL 形名: EP4812 □ □

3RD ANGLE PROJECTION 第3角法

SCALE 尺度

UNITS 単位: mm

DRAWN 製図: 開2 02.1.25 南島

DESIGNED 設計: 開2 02.1.25 南島

CHECKED 検図: 開2 02.1.25 木見田

APPD 承認: 開2 02.1.25 木見田

DRAWING NO. 図番: MC353003

4

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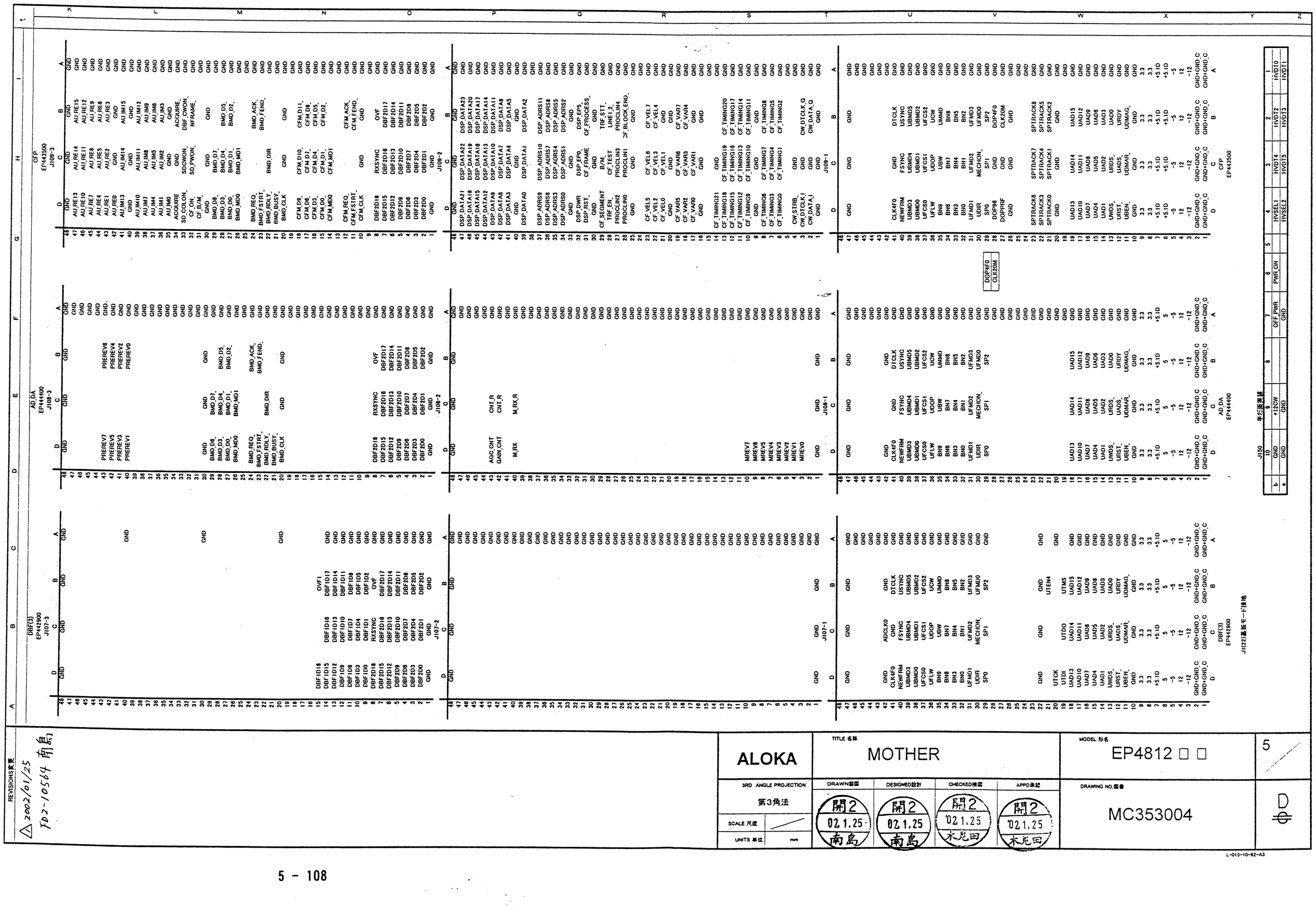
L-013-10-82-A3



REVISIONS 変更

△ 2002/01/25 ID2-10564 南島

ALOKA	TITLE 名称: MOTHER
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SCALE 尺度 / UNITS 単位 mm	DRAWING NO. 図番: MC353004
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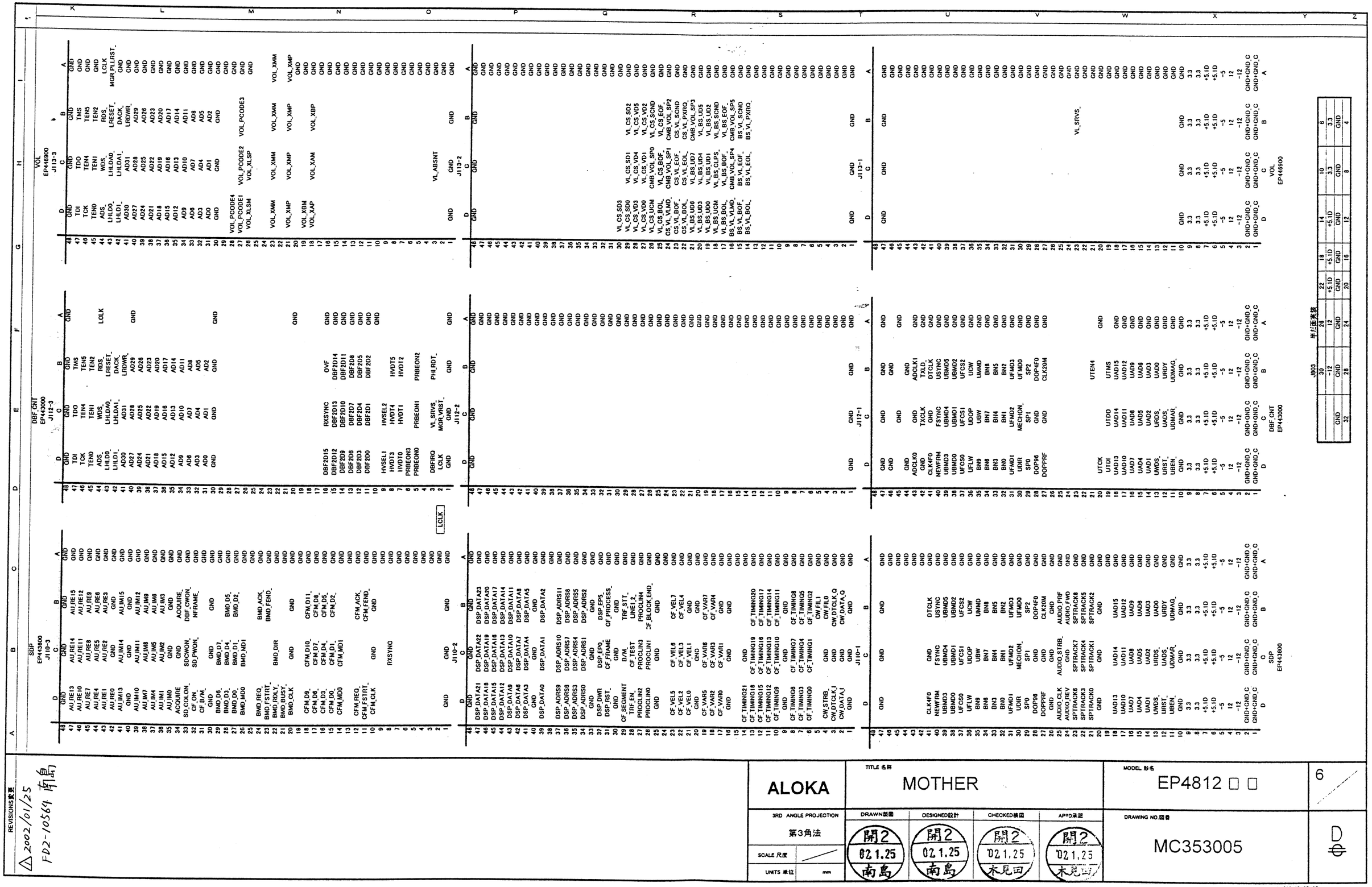
CHECKED 検図: 開2 02.1.25 水尻田	APPD 承認: 開2 02.1.25 水尻田
5	D

L-013-10-82-A3



REVISIONS 変更				
△	2002/01/25	FD2-10564 南島		

ALOKA	TITLE 名称: MOTHER	MODEL 形名: EP4812 □ □	6
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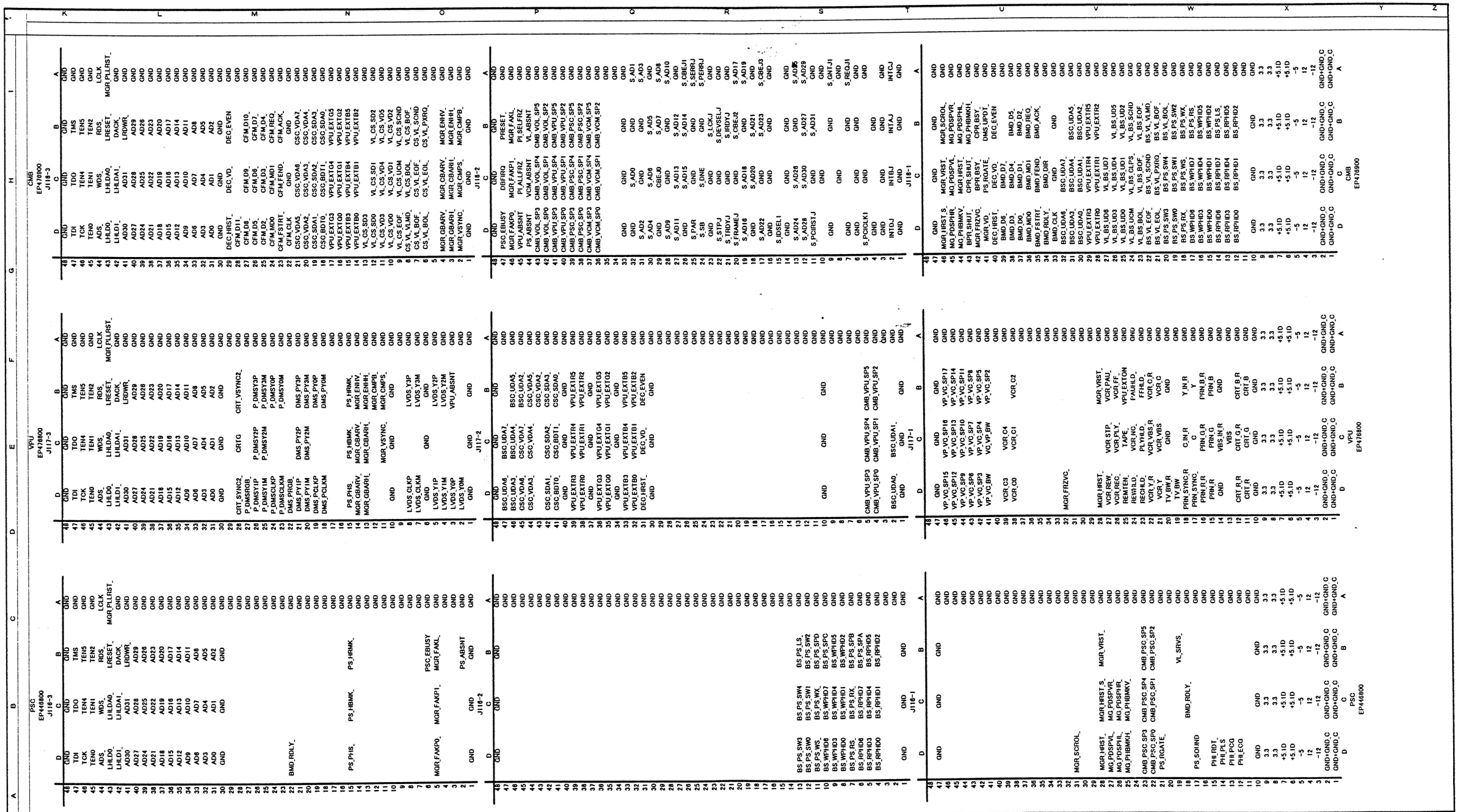
SCALE 尺度 / UNITS 単位 mm			

L-013-10-82-A3



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48	GND	GND	GND	GND	GND			D	C	B	A														
47	TDI	TDO	TMS	GND	GND			GND	GND	GND	GND														
46	TCK	TEN4	TEN5	GND	GND			TDI	TDO	TMS	GND														
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44	ADS_	WDS_	RDS_	LCLK	GND			TEN0	TEN1	TEN2	GND														
43	LHLDO_	LHLDA0_	LRESET_	MGR_PLLRST_	GND			HDDLED			GND														
42	LHLDI_	LHLDAI_	DACK_	GND	GND	AUDIO_PRF	AUDIO_STRB_	PRESET_		LRESET_	GND														
41	AD30	AD31	LRDWR_	GND	GND	AUDIO_FWD	GND				GND														
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37	AD18	AD19	AD20	GND	GND	GND	PHI_PLS	USBPWBP		USBDATABP	GND														
36	AD15	AD16	AD17	GND	GND			USBPWBM		USBDATABM	GND														
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34	AD9	AD10	AD11	GND	GND			LANGNDA		LANTDP	GND														
33	AD6	AD7	AD8	GND	GND			LANGNDA		LANTDM	GND														
32	AD3	AD4	AD5	GND	GND						GND														
31	AD0	AD1	AD2	GND	GND			LANGNDB		LANRDP	GND														
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29				PSTRBE	GND			GND		PACK	GND														
28				PDATA0	GND			PDATA0		PDATA1	GND														
27				PDATA2	GND			PDATA2		PDATA3	GND														
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22				GND	GND			GND		GND	GND														
21				INIT	SLCTIN			INIT																	
20				GND	GND			GND		GND	GND														
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18				SCDA	SDTRA			SCDA		SDSTSA															
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7					LVDS_CLKM	+5.1D	+5.1D			LVDS_Y3M															
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3					LVDS_Y0P	-12	12																		
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4					LVDS_Y1M	12	-12			LVDS_Y2M															
3					LVDS_Y0P	-12	12																		
2					LVDS_Y0M	GND	GND																		
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	A	B	C	D	E	F	G	H	I	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z

	A	B	C	D	E	F	G	H	I	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z
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23				SELECT	GND			SELECT		ERRR															
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	A	B	C	D	E	F	G	H	I	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z
		VCM EP447000 J119-3						CPU EP442300 J120-3	半ハ面実装																
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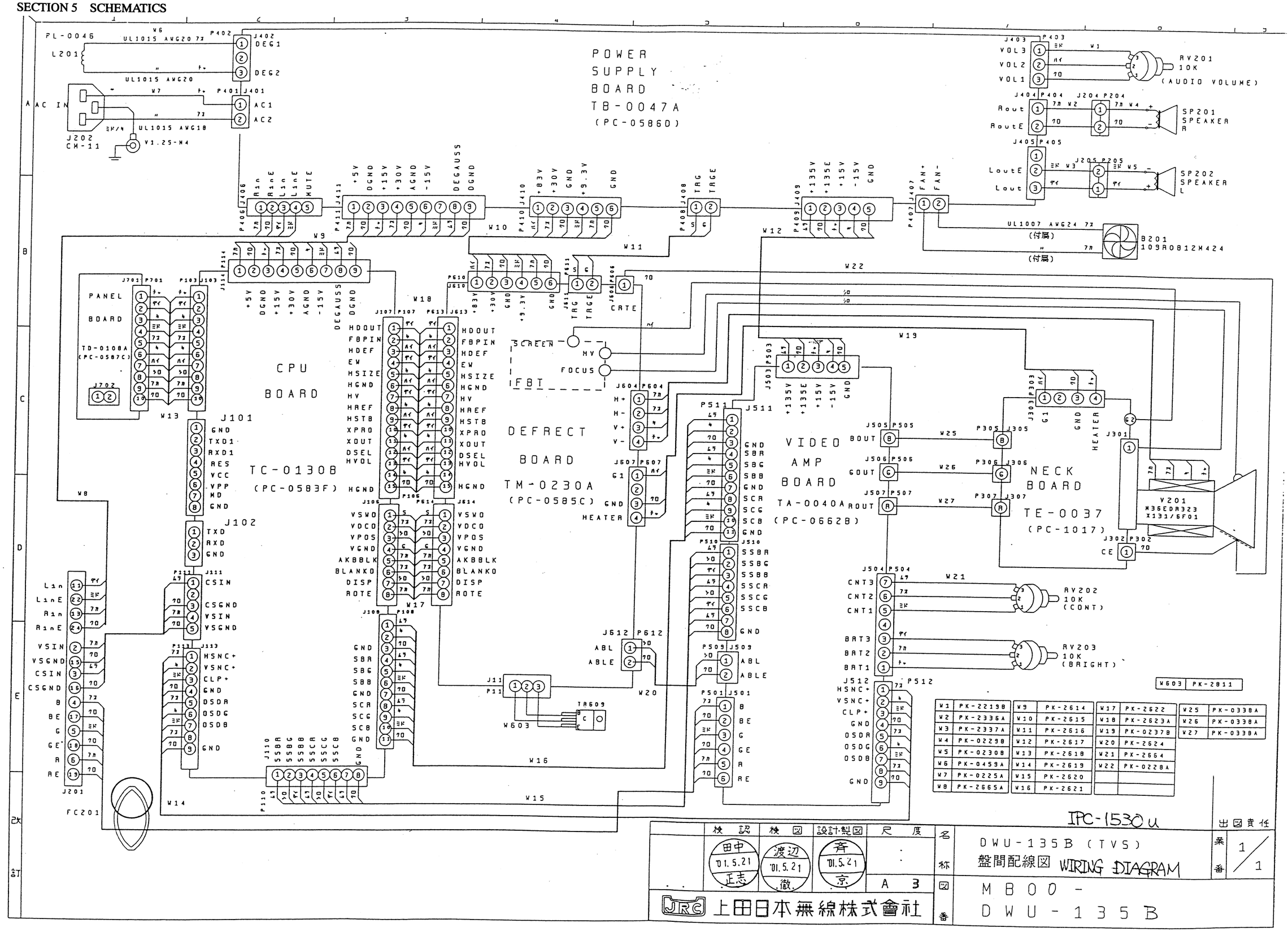
31	AD0	AD1	AD2	GND	GND			LANGNDB		LANRDP	GND														
30	GND	GND		GND	GND			GND		LANRDM	GND														
29				PSTRBE	GND			GND		PACK	GND														
28				PDATA0	GND			PDATA0		PDATA1	GND														
27				PDATA2	GND			PDATA2		PDATA3	GND														
26				PDATA4	GND			PDATA4		PDATA5	GND														
25				PDATA6	GND			PDATA6		PDATA7	GND														
24				BUSY	GND			BUSY		PAPEREND	GND														
23				SELECT	GND			SELECT		ERRR															
22				GND	GND			GND		GND	GND														
21				INIT	SLCTIN			INIT																	
20				GND	GND			GND		GND	GND														
19				STDA	SRDA			STDA		SDSRA	GND														
18				SCDA	SDTRA			SCDA		SDSTSA															
17				SRTSA	RIA			SRTSA		SCTSA															
16				GND	GND			GND		GND	GND														
15				STDB	SRDB			STDB		SRDB	GND														
14				SCDB	SDTRB			SCDB		SDSRB															
13				SRTSB	RIB			SRTSB		SCTSB															
12				GND	GND			GND		GND	GND														
11				MFCLK	MFDATA			MFCLK		MFDATA	GND														
10		GND		KBCLK	KBDATA	GND	GND	KBCLK		KBDATA	GND														
9				GND	GND			GND		GND															
8					LVDS_CLKP					LVDS_Y3P															
7					LVDS_CLKM	+5.1D	+5.1D			LVDS_Y3M															
6					GND	+5.1D	+5.1D			GND	GND														
5					LVDS_Y1P					LVDS_Y2P															
4					LVDS_Y1M	12	-12			LVDS_Y2M															
3					LVDS_Y0P	-12	12																		
2					LVDS_Y0M	GND	GND																		
1				GND	GND	GND	GND	GND	GND	GND	GND														
	A	B	C	D	E	F	G	H	I	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z

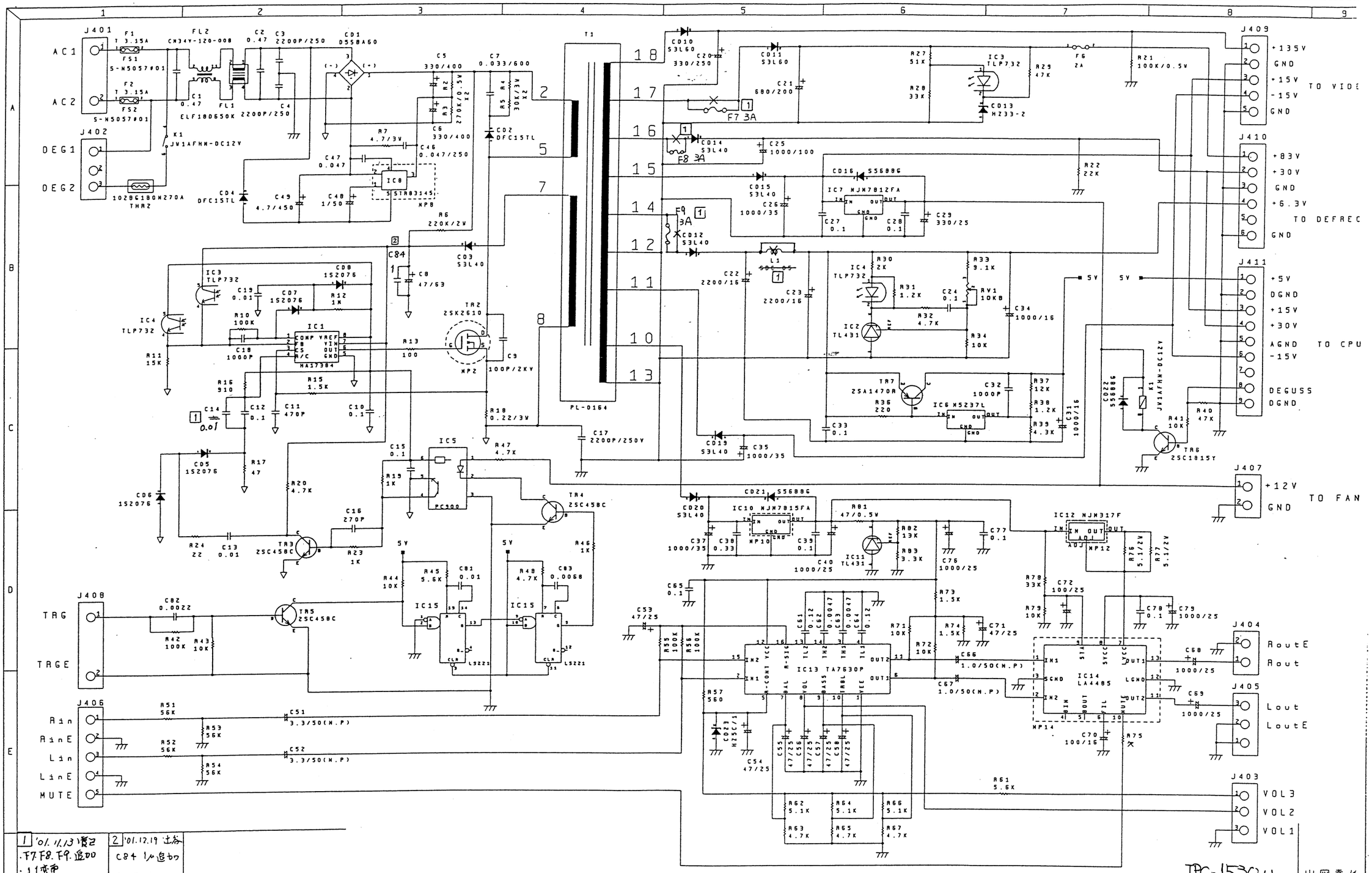
REVISIONS 変更

△ 2002/01/25 FD2-10564 南島(1)

ALOKA	TITLE 名称 MOTHER	MODEL 形名 EP4812 □ □	8
3RD ANGLE PROJECTION 第3角法	DRAWN 製図 開2 02.1.25 南島	DESIGNED 設計 開2 02.1.25 南島	CHECKED 検図 開2 02.1.25 未見田
SCALE 尺度			APPD 承認 開2 02.1.25 未見田
UNITS 単位 mm			DRAWING NO. 図番 MC353007

L-013-10-82-A3


POWER SUPPLY BOARD TB-0047A (PC-0586D)
FL-0046
L201
AC IN
J202 CM-11
UL1015 AWG20
UL1015 AWG18
V1.25-M4
P402 J402 DEG1 DEG2 DEG3
P401 J401 AC1 AC2
J403 VOL3 VOL2 VOL1
RV201 10K (AUDIO VOLUME)
J404 P404 J204 P204 Rout RoutE
SP201 SPEAKER R
J405 P405 J205 P205 LoutE Lout
SP202 SPEAKER L
P406 J406 Rin RinE Lin LinE MUTE
P411 J411 +5V DGND +15V +30V AGND -15V DEGAUSS DGND
P410 J410 +83V +30V GND +9.3V GND
P408 J408 TRG TRGE
P409 J409 +135V +135E +15V -15V GND
P407 J407 FAN+ FAN-
UL1007 AWG24 (付属)
B201 109R0812M424
W6 W7 W8 W9 W10 W11 W12 W13 W14 W15 W16 W17 W18 W19 W20 W21 W22 W25 W26 W27 W603
PANEL BOARD TD-0108A (PC-0587C)
J701 P701 P103 J103
J702
CPU BOARD TC-01308 (PC-0583F)
J101 GND TXD1 RXD1 RES VCC VPP MD GND
J102 TXD RXD GND
P111 J111 CSIN CSGND VSIN VSGND
P113 J113 HSNC+ VSNC+ CLP+ GND OSDR OSDG OSDB
J201 Lin LinE Rin RinE VSIN VSGND CSIN CSGND B BE G GE R RE
FC201
P107 P613 J613 HDOUT FBPIN HDEF EW HSIZE HGND HV HREF HSTB XPRO XOUT DSEL HVOL
P106 P614 J614 VSWO VDCO VPOS VGND AKBBLK BLANKO DISP ROTE
P108 J108 GND SBR SBG SBB GND SCR SCG SCB GND
P110 J110 SSBR SSBG SSBB SSCR SSCG SSCB GND
SCREEN HV FOCUS
IFBT
DEFRECT BOARD TM-0230A (PC-0585C)
J604 P604 H+ H- V+ V-
J607 P607 G1 GND HEATER
J612 P612 ABL ABLE
J11 P11
TR609
W603
P511 J511 GND SBR SBG SBB GND SCR SCG SCB GND
P510 J510 SSBR SSBG SSBB SSCR SSCG SSCB GND
P509 J509 ABL ABLE
P501 J501 B BE G GE R RE
VIDEO AMP BOARD TA-0040A (PC-0662B)
P503 J503 +135V +135E +15V -15V GND
J505 P505 BOUT
J506 P506 GOUT
J507 P507 ROUT
P305 J305 P306 J306 P307 J307
NECK BOARD TE-0037 (PC-1017)
J303 P303 G1 GND HEATER
J301
V201 M36EDR323 X131/6F01
J302 P302 CE
J504 P504 CNT3 CNT2 CNT1 BAT3 BAT2 BAT1
RV202 10K (CONT)
RV203 10K (BRIGHT)
J512 P512 HSNC+ VSNC+ CLP+ GND OSDR OSDG OSDB GND
W1 PK-2219B
W2 PK-2336A
W3 PK-2337A
W4 PK-0229B
W5 PK-0230B
W6 PK-0459A
W7 PK-0225A
W8 PK-2665A
W9 PK-2614
W10 PK-2615
W11 PK-2616
W12 PK-2617
W13 PK-2618
W14 PK-2619
W15 PK-2620
W16 PK-2621
W17 PK-2622
W18 PK-2623A
W19 PK-0237B
W20 PK-2624
W21 PK-2664
W22 PK-0228A
W25 PK-0338A
W26 PK-0338A
W27 PK-0338A
W603 PK-2811
IPC-1530u
検認 田中 01.5.21 正志
検図 渡辺 01.5.21 徹
設計・製図 斉 01.5.21 京
尺度 A 3
名称 DWU-135B (TVS) 盤間配線図 WIRING DIAGRAM
図番 MB00-DWU-135B
枚番 1/1
出図責任
JRC 上田日本無線株式會社



1	'01.11.13	賀	F7.F8.F9.追加 L1変更 SBG-05→0Ω C14変更 抵抗のみ→0.01μF 変更No.1
2	'01.12.19	土谷	C84 1μ追加 実画No.3

検認	検図	設計製図	尺度	名称	DWU-135B 電源回路 POWER SUPPLY CIRCUIT
田中 '01.5.21 正志	渡辺 '01.5.21 徹	斉 '01.5.21 京	A3	図番	MD02- TB-0047A

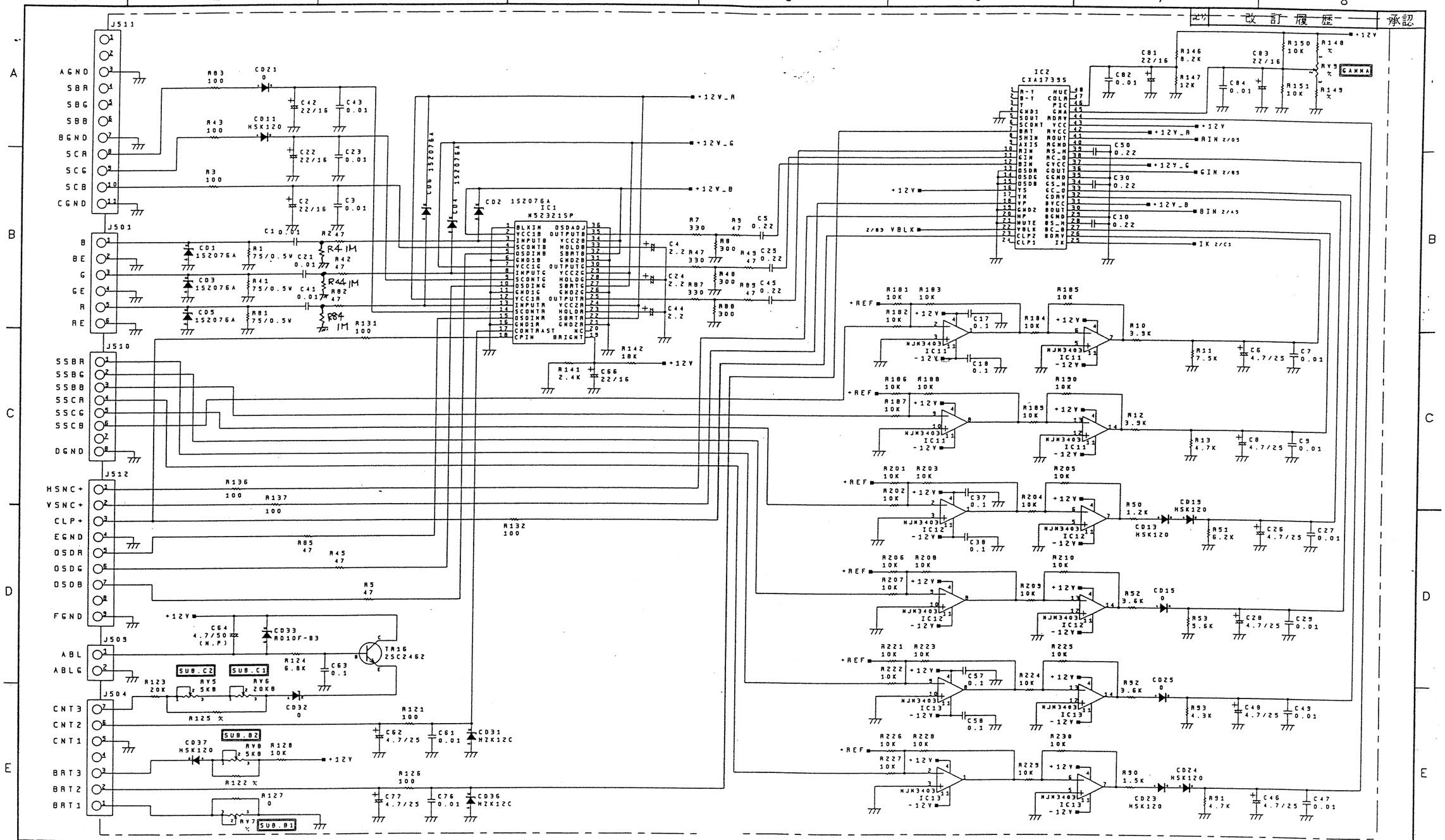
JRC 上田日本無線株式會社

IPC-1530U 出図責任

MP2	PC1344-30-PB
MP8	KTH0061
MP10	PC1136A-30-PB
MP12	OSH-2425-5P
MP14	KTH0040

注意
指示無きコンデンサは50V耐圧
指示無き抵抗は1／8W

1IR	R45.R48 R51-R57.R61-R67 R71-R74.R78.R79 R82.R83


改訂履歴
承認
J511
AGND
SBR
SBG
SBB
BGND
SCR
SCG
SCB
CGND
J501
B
BE
G
GE
R
RE
J510
SSBR
SSBG
SSBB
SSCR
SSCG
SSCB
DGND
J512
HSNC+
VSNC+
CLP+
EGND
OSDR
OSDG
OSDB
FGND
J509
ABL
ABLG
J504
CNT3
CNT2
CNT1
BRT3
BRT2
BRT1
IC1
M52321SP
IC2
CXA1739S
NJM3403
+12V_R
+12V_G
+12V_B
+12V
-12V
+REF
RIN 2/D5
GIN 2/B5
BIN 2/A5
IK 2/C5
2/B3 YBLK
SUB.C2
SUB.C1
SUB.B2
SUB.B1
GAMMA
TR16 2SC2462
IPC-1530U
出図責任
VIDEO AMP CIRCUIT
MDO1-
TA-1040A
上田日本無線株式會社
A3
1/3

記号	改訂履歴	承認

MP1	PC-2444B-50-PB
MP2	PC-2444B-50-PB
MP3	PC-2444B-50-PB

IPC-1530U

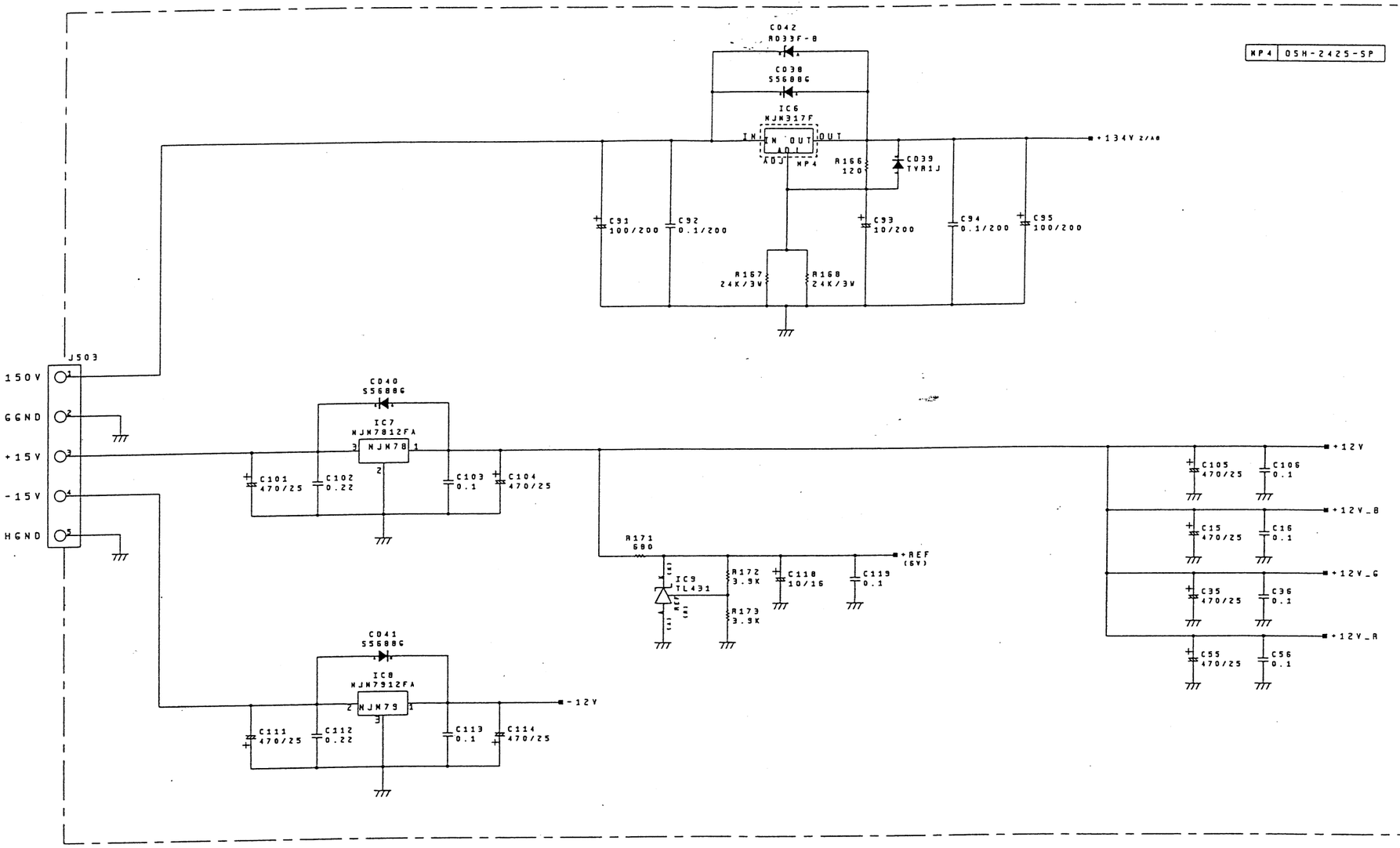
検認	検図	担当	尺度	名称	VIDEO AMP CIRCUIT	葉番	2/3
田中 '01.5.21 正志	渡辺 '01.5.21 徹	辻 '01.5.21 谷	A3	図番	MD01-TA-0040A		

JRC 上田日本無線株式會社

出図責任

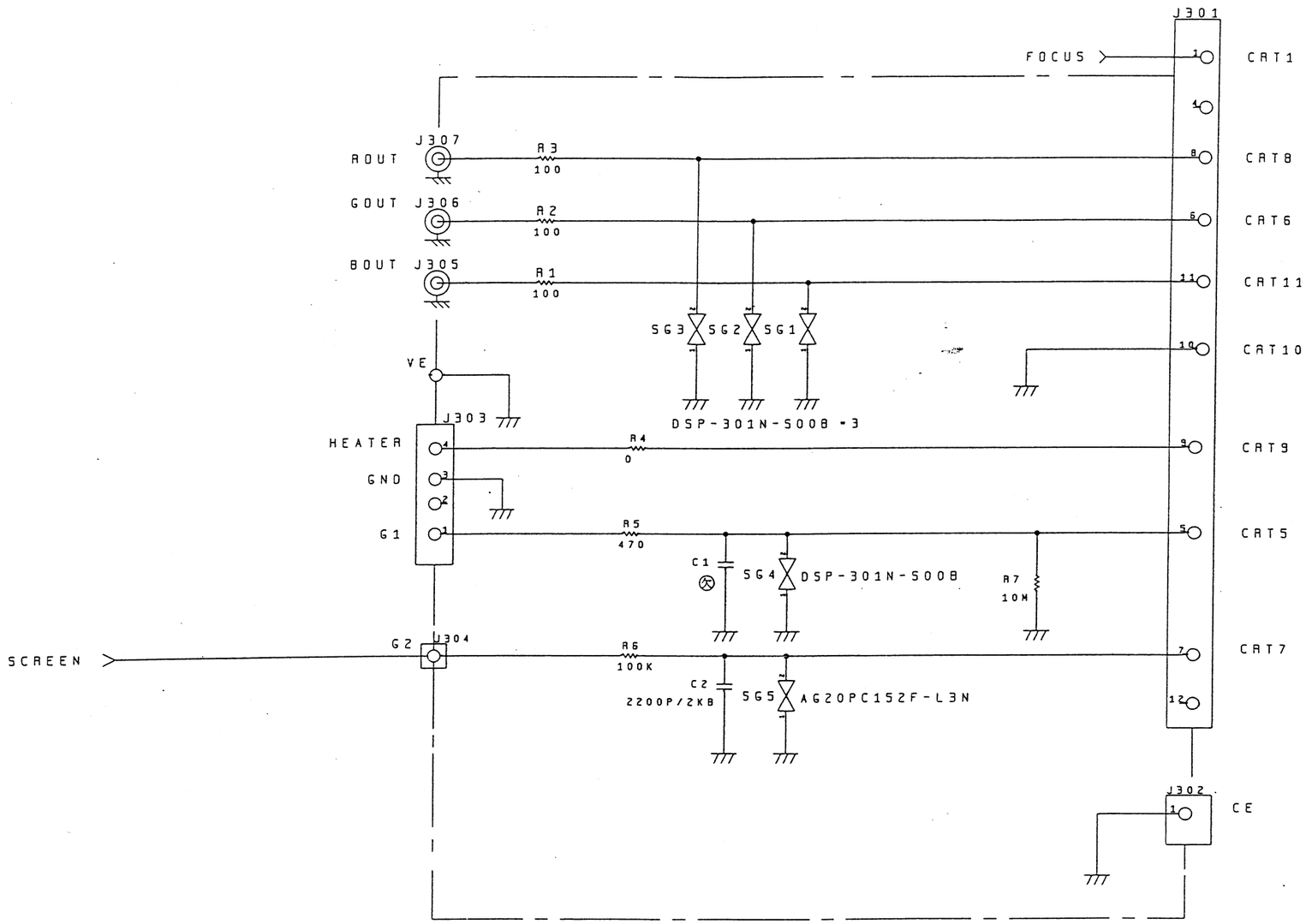
第3角法 単位 mm

記号	改訂履歴	承認



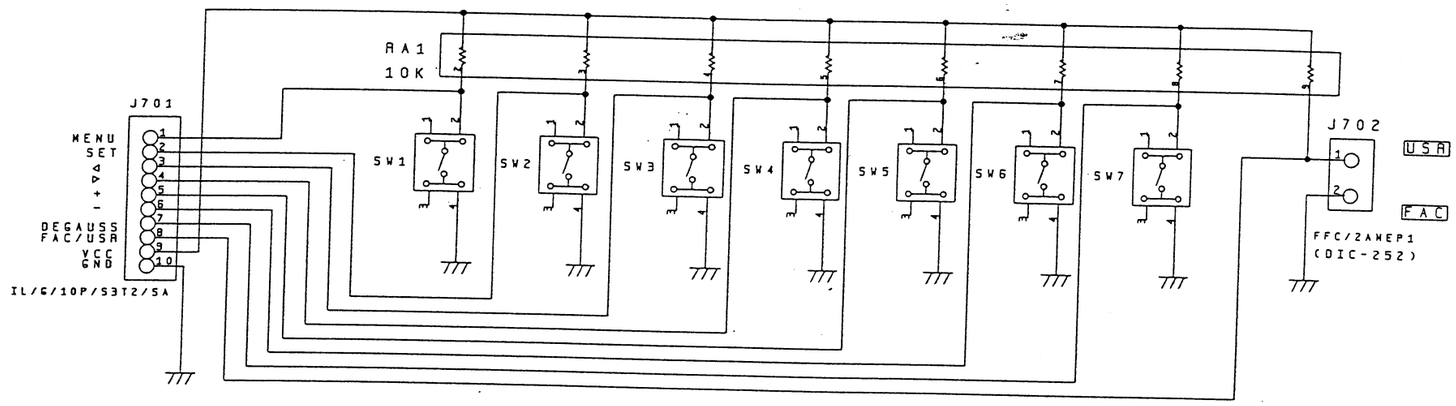
	検認	検図	担当	尺度	名称	出図責任	葉番
	田中 01.5.21 正志	渡辺 01.5.21 徹	辻 01.5.21 谷	A3	VIDEO AMP CIRCUIT		3/3
JRC 上田日本無線株式會社					図番 MD01-TA-0040A	IPC-1530u	

第3角法 単位 mm



	検認	検図	設計・製図	尺度		出図責任
	田中 01.5.21 正志	渡辺 01.5.21 徹	斉 01.5.21 京	: A3	名称 DWU-135B NECK BOARD CIRCUIT	第 1 / 番 1
JRC 上田日本無線株式會社					図番 MD00-TE-0037	

IPC-1530 u

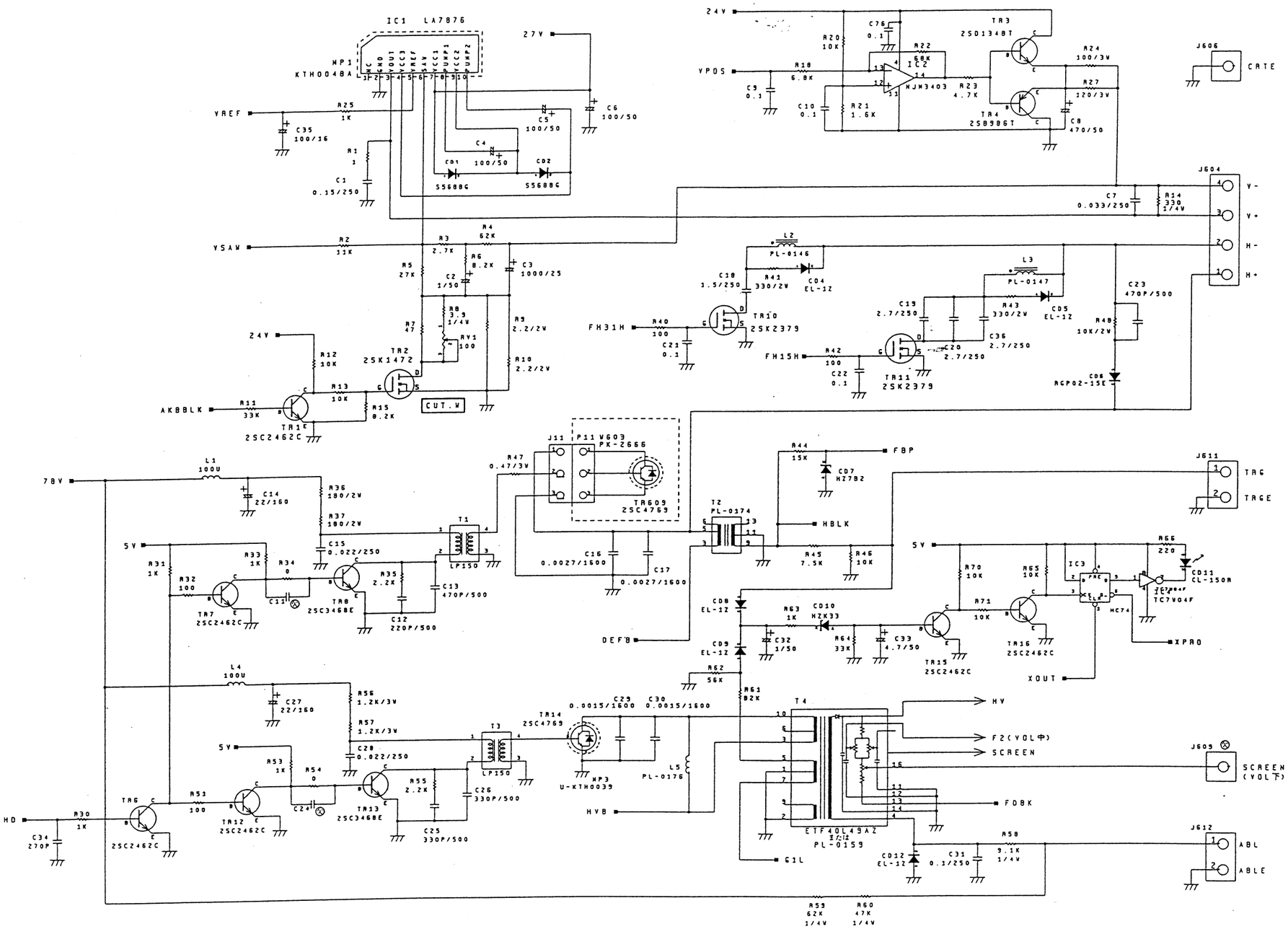


IPC-1530A

	確認	検図	製図	尺度		
	苗中 '01.5.21 正志	渡辺 '01.5.21 ・徹・	斉 '01.5.21 ・京・	: A3	名称	パネル回路 PANEL CIRCUIT
JRC	上田日本無線株式會社				図番	MD00-TD-0108A

出図責任 | 枚番 1/1

記号	改訂履歴	承認



IPC-1530U

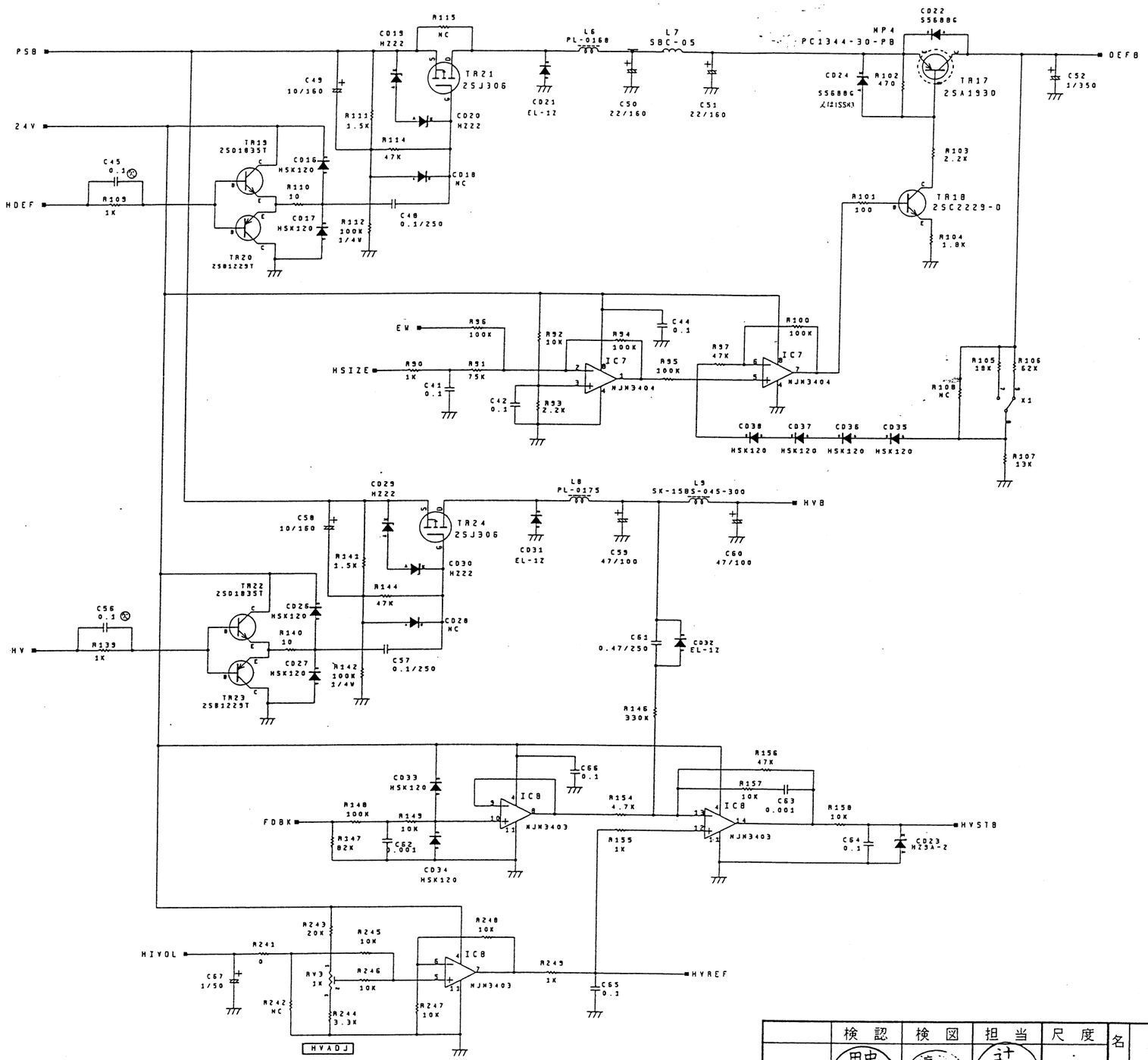
出図責任

	検認	検図	担当	尺度	名称	葉番
	田中 '01.5.21 正志	渡辺 '01.5.21 徹	辻 '01.5.21 谷	A3	DWU-135B 偏向回路 DEFLECTION	1/3
					図番 MD00- CIRCUIT TM-0230A	

JRC 上田日本無線株式會社

第3角法 単位 mm

必ず	改訂履歴	承認



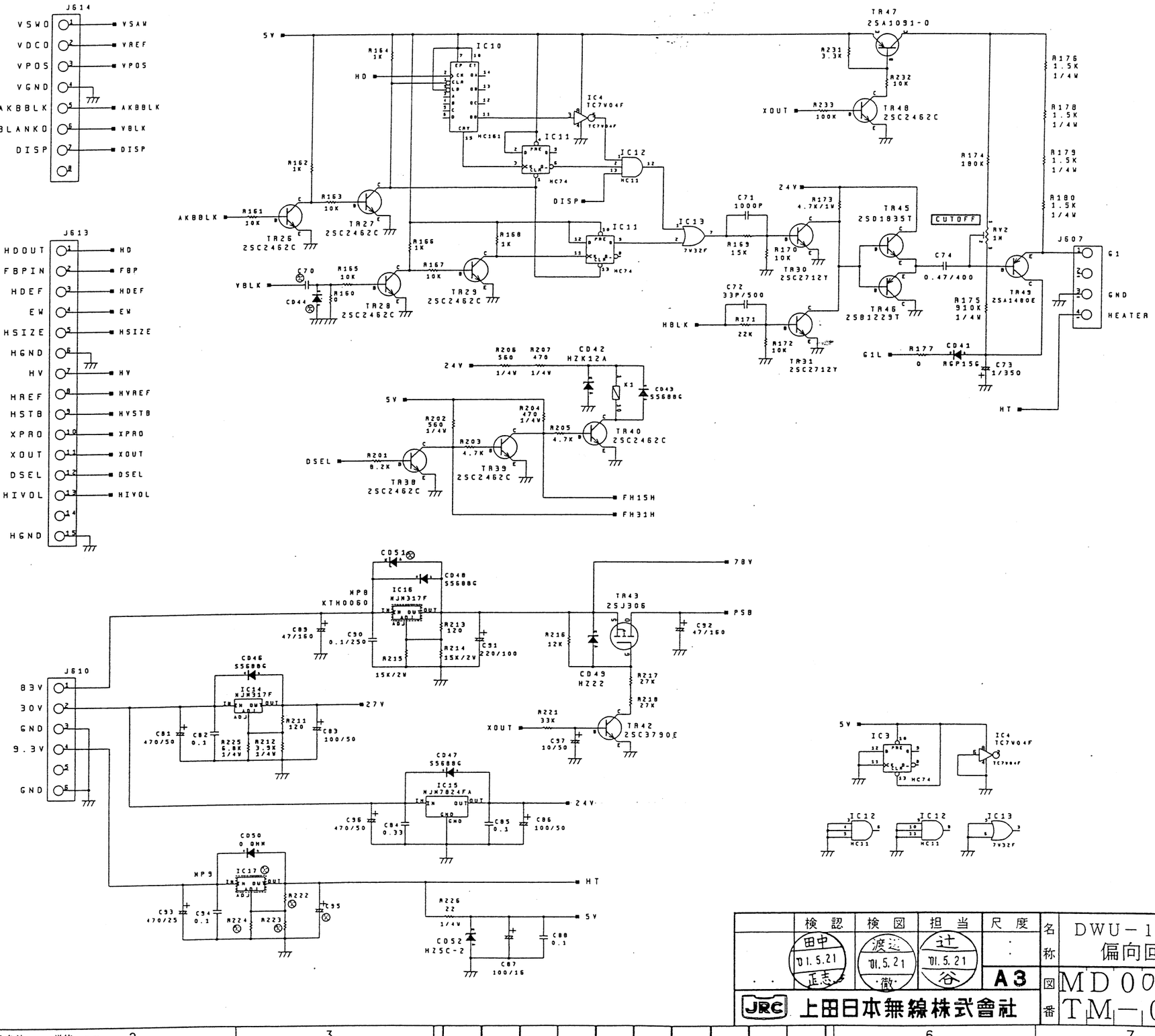
	検認	検図	担当	尺度	名称	DWU-135B DEFLECTION 偏向回路 CIRCUIT	葉番	2/3
	田中 01.5.21 正志	渡辺 01.5.21 徹	辻 01.5.21 谷	A3	図番	MD00-TM-0230A		

JRC 上田日本無線株式會社

IPC-1530U 出図責任

第3角法 単位 mm

記号	改訂履歴	承認

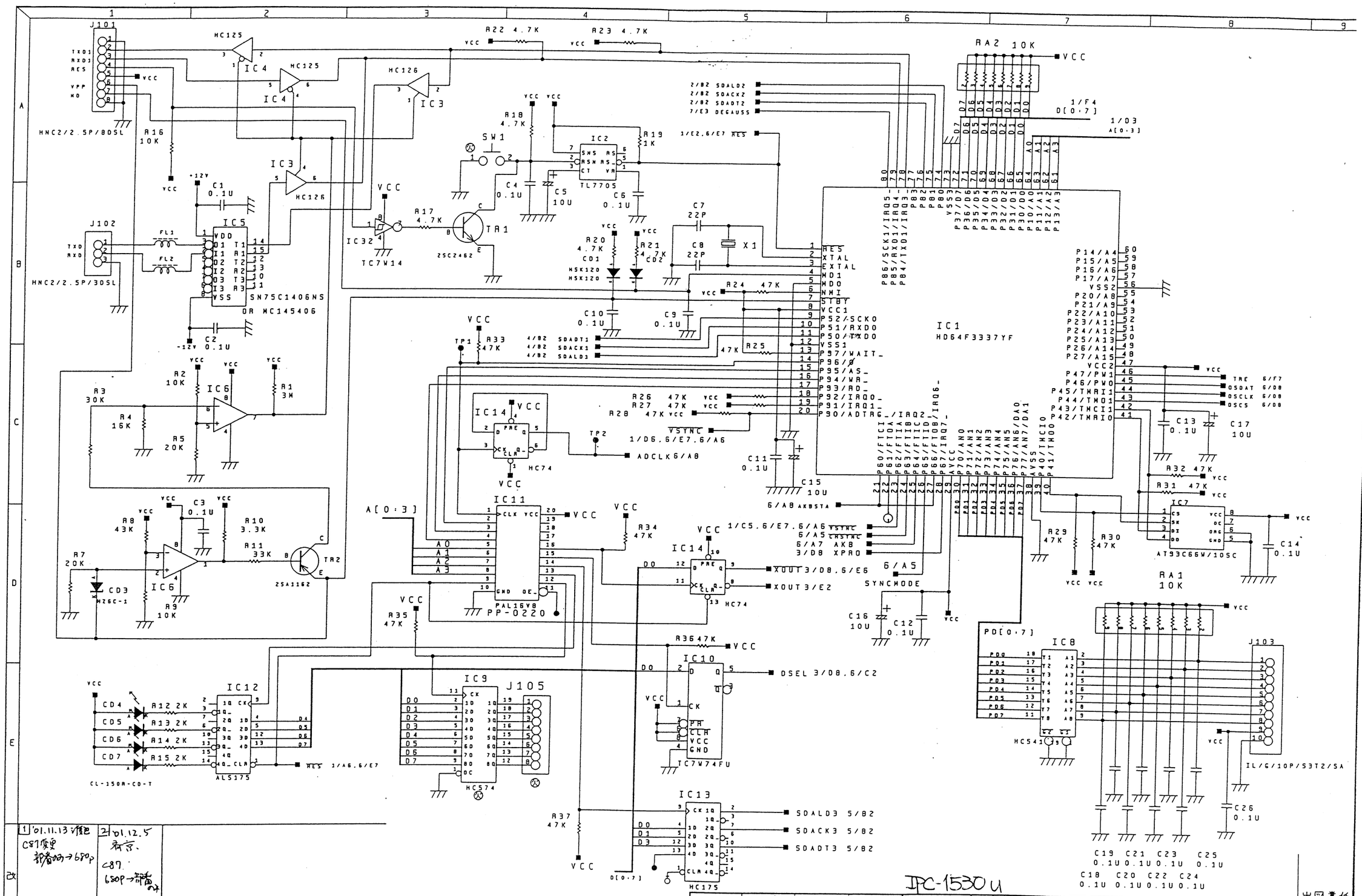


	検認	検図	担当	尺度	名称	DWU-135B DEFLECTION 偏向回路 CIRCUIT	葉番	3/3
	田中 01.5.21 正志	渡辺 01.5.21 徹	辻 01.5.21 谷	A3	図番	MD00-TM-0230A		

JRC 上田日本無線株式會社

IPC-1530U 出図責任

第3角法 単位 mm



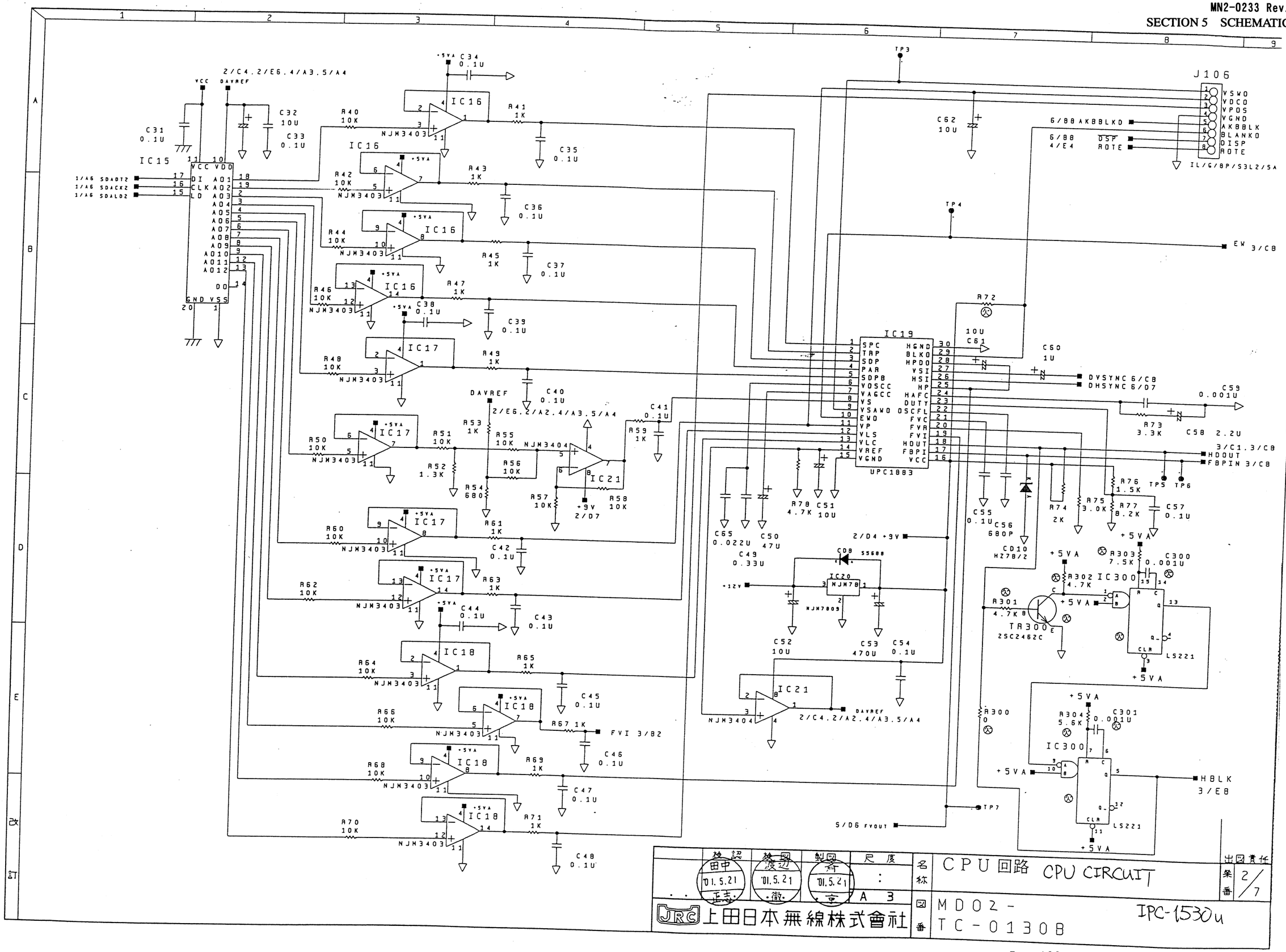
改訂		
1 '01.11.13 訂正 C87変更 部番号→680P	2 01.12.5 寺京、 C87. 680P→部番なし	
変更No.1	変更NO 2	
'01-11-13 田中	01.12-5 田中	

検認	検図	製図	尺度
田中 '01.5.21 正志	渡辺 01.5.21	斉 01.5.21	: A 3

JRC 上田日本無線株式會社

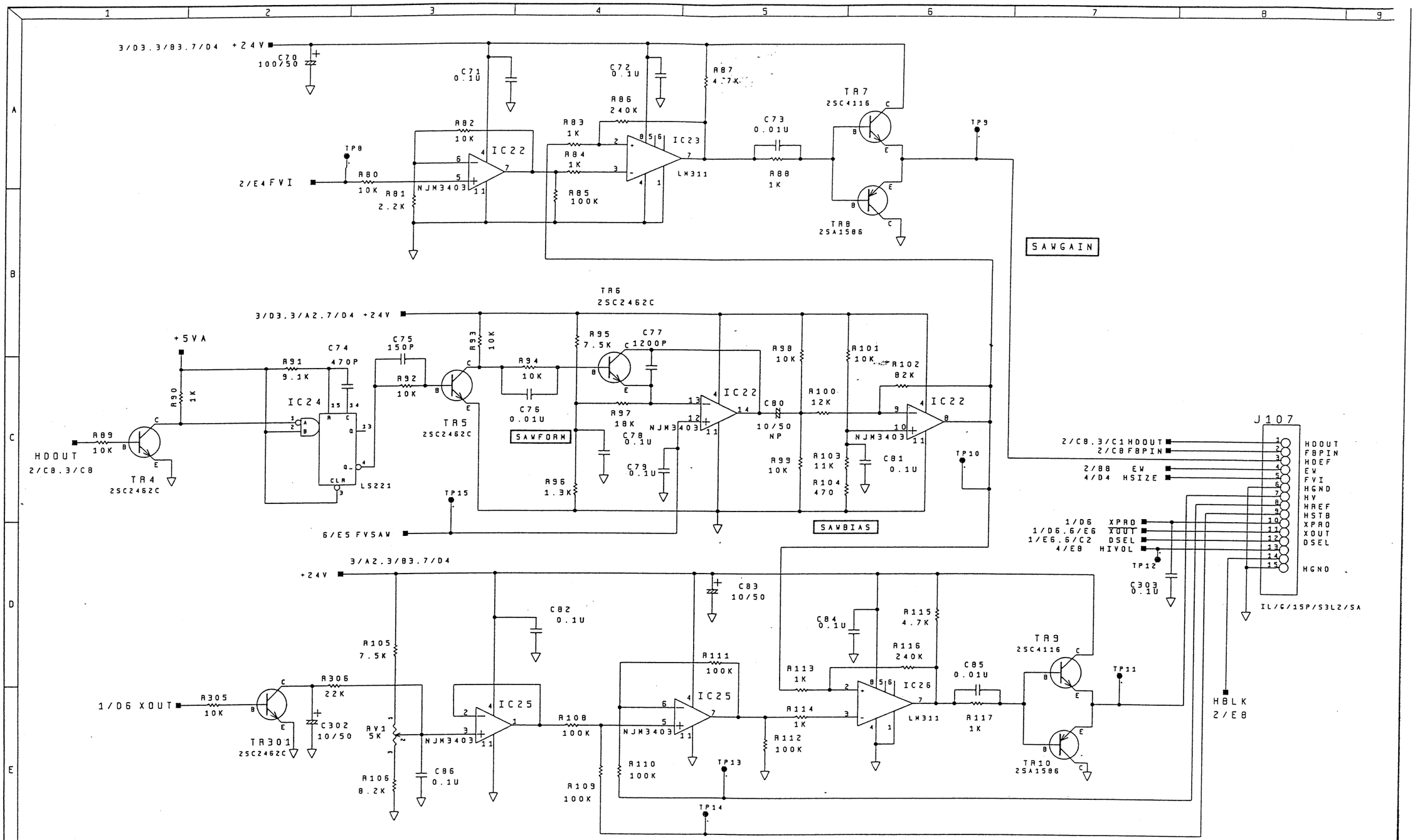
名称	CPU回路 CPU CIRCUIT
図番	MD02-TC-0130B
出図責任	
葉番	1/7

JPC-1530 U



改訂	検認	設図	製図	尺度	名称	CPU回路 CPU CIRCUIT
	田中 01.5.21	渡辺 01.5.21	01.5.21	: A3	図番	MD02-TC-0130B
	JRC 上田日本無線株式會社					IPC-1530u

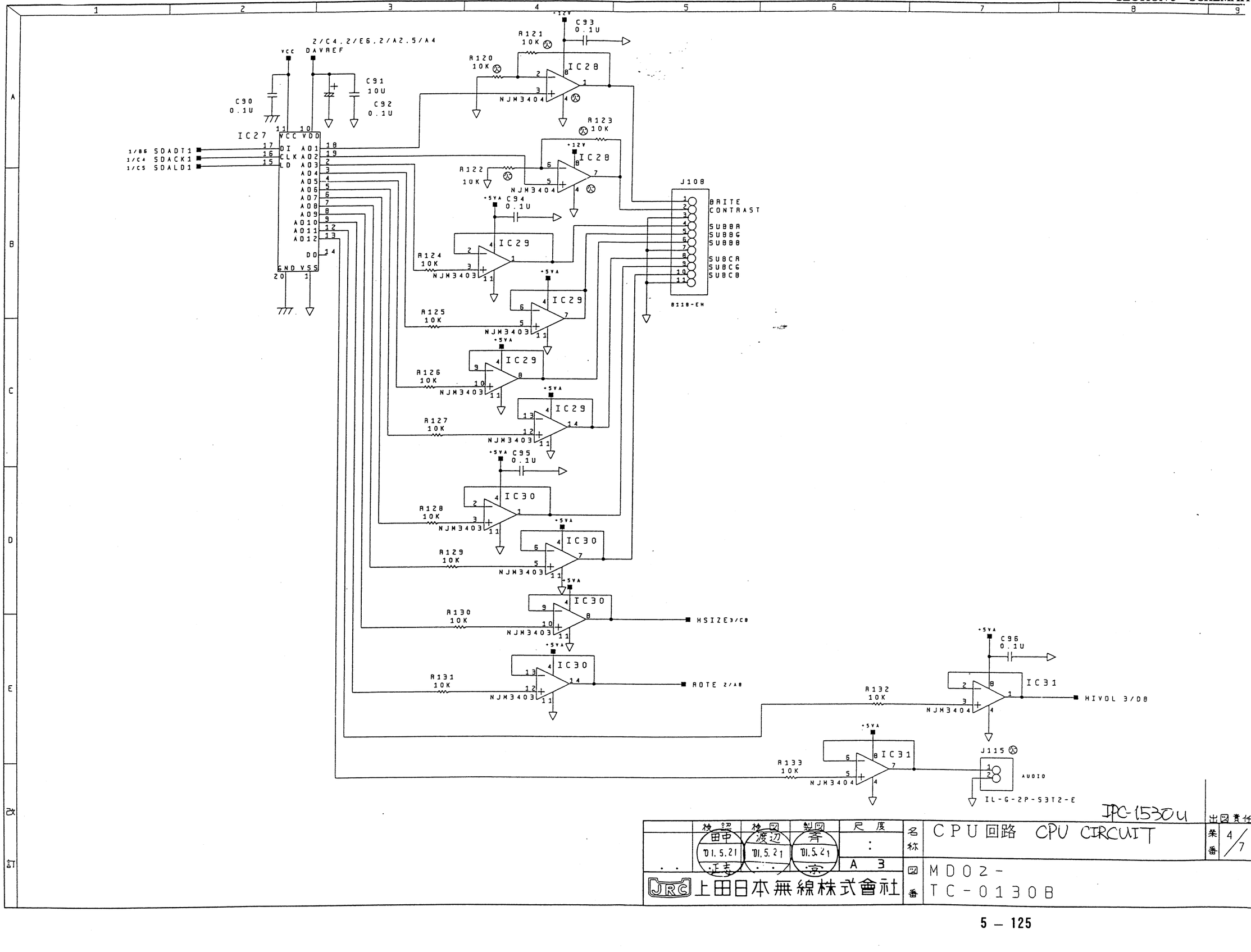
出図責任 枚番 2/7



IPC-1530u

	検認 田中 01.5.21 正志	検図 渡辺 01.5.21 徹	製図 斉 01.5.21 京	尺度 : A 3	名称	CPU回路 CPU CIRCUIT
	JRC 上田日本無線株式會社				図番	MD02-TC-0130B

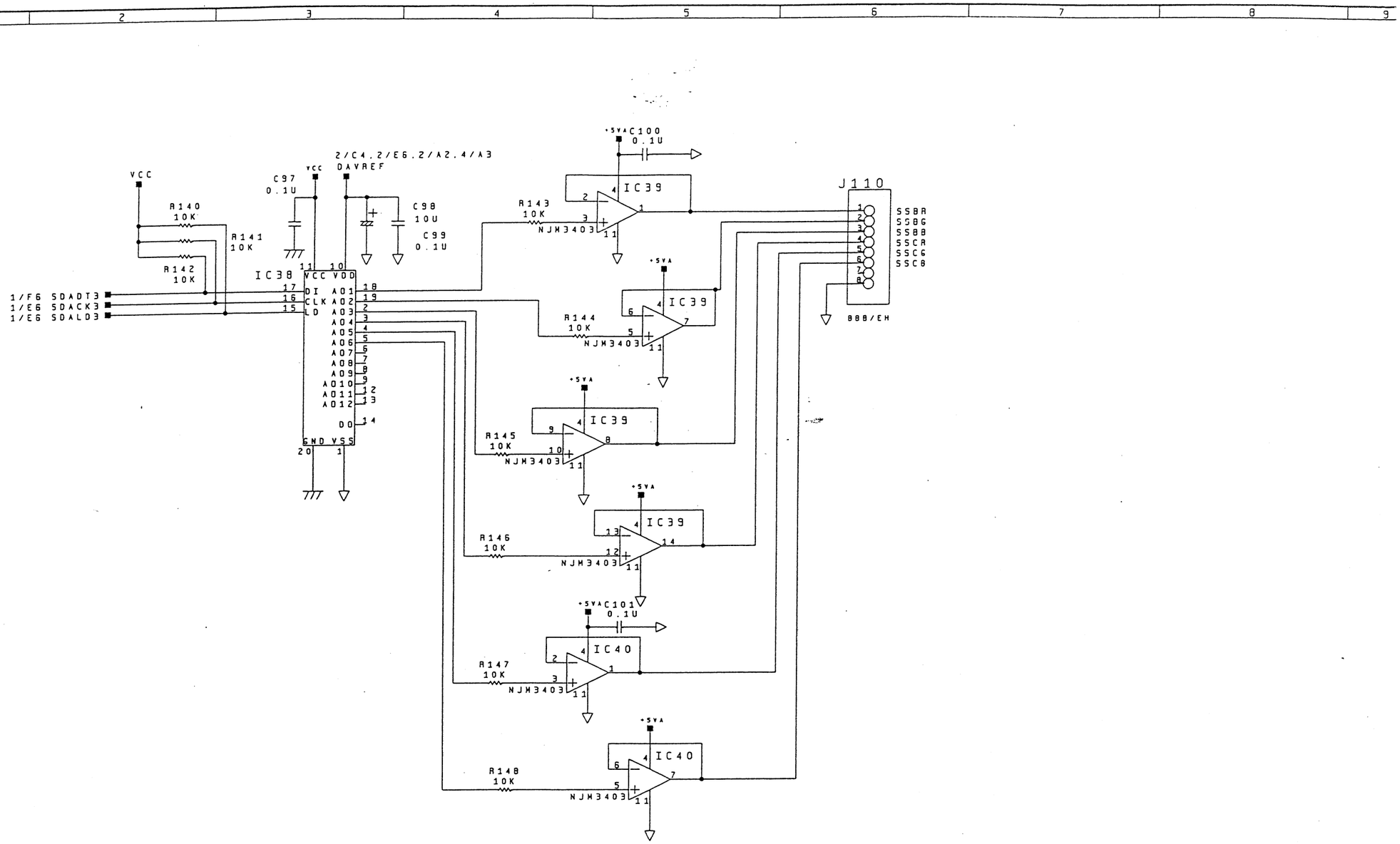
出図責任 葉番 3/7



検認	検図	製図	尺度	名称	CPU回路 CPU CIRCUIT	出図責任
田中 01.5.21 正吉	渡辺 01.5.21	斉 01.5.21 京	: A 3	図番	MD02-TC-0130B	葉番 4/7

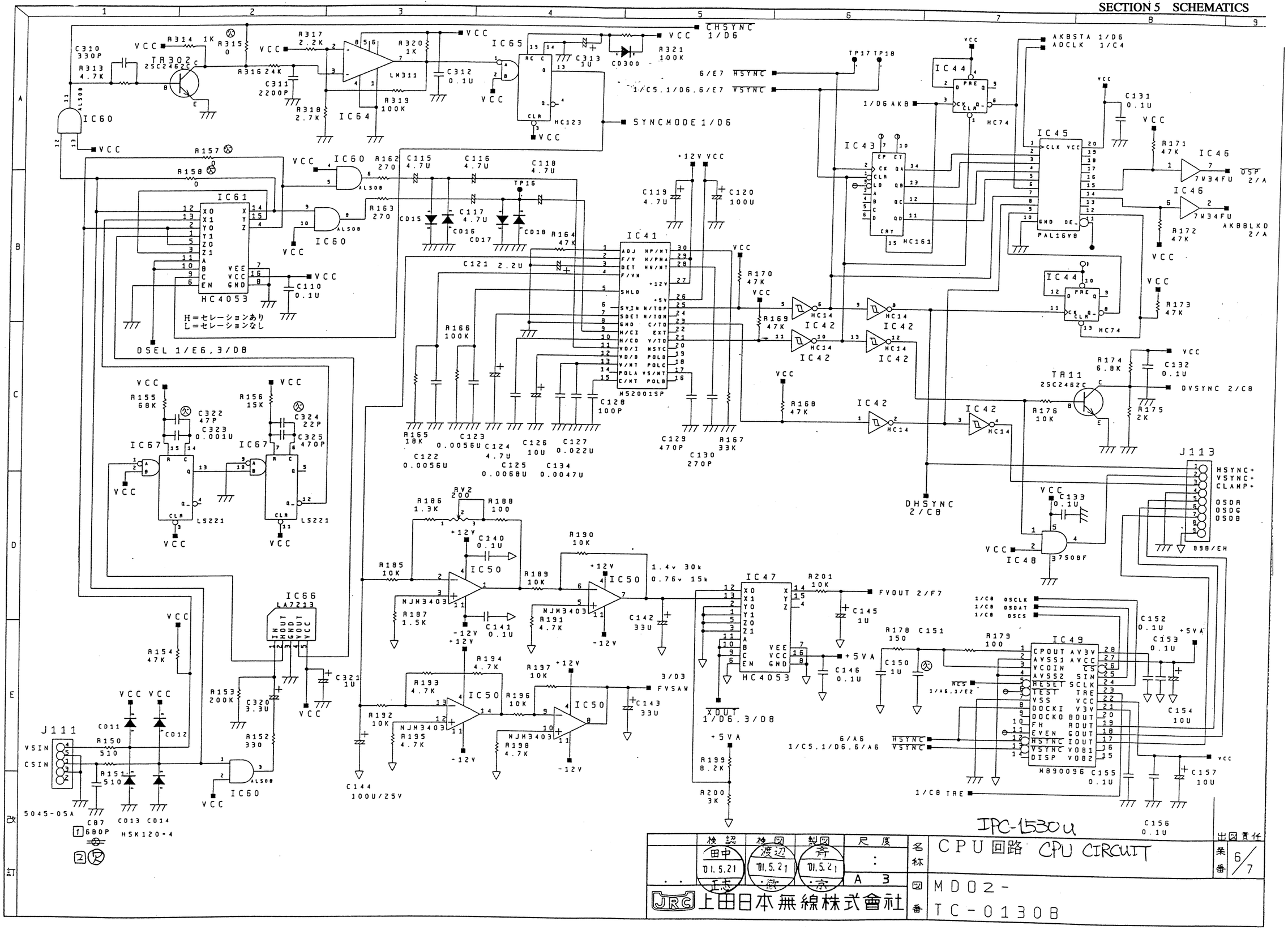
JRC 上田日本無線株式會社

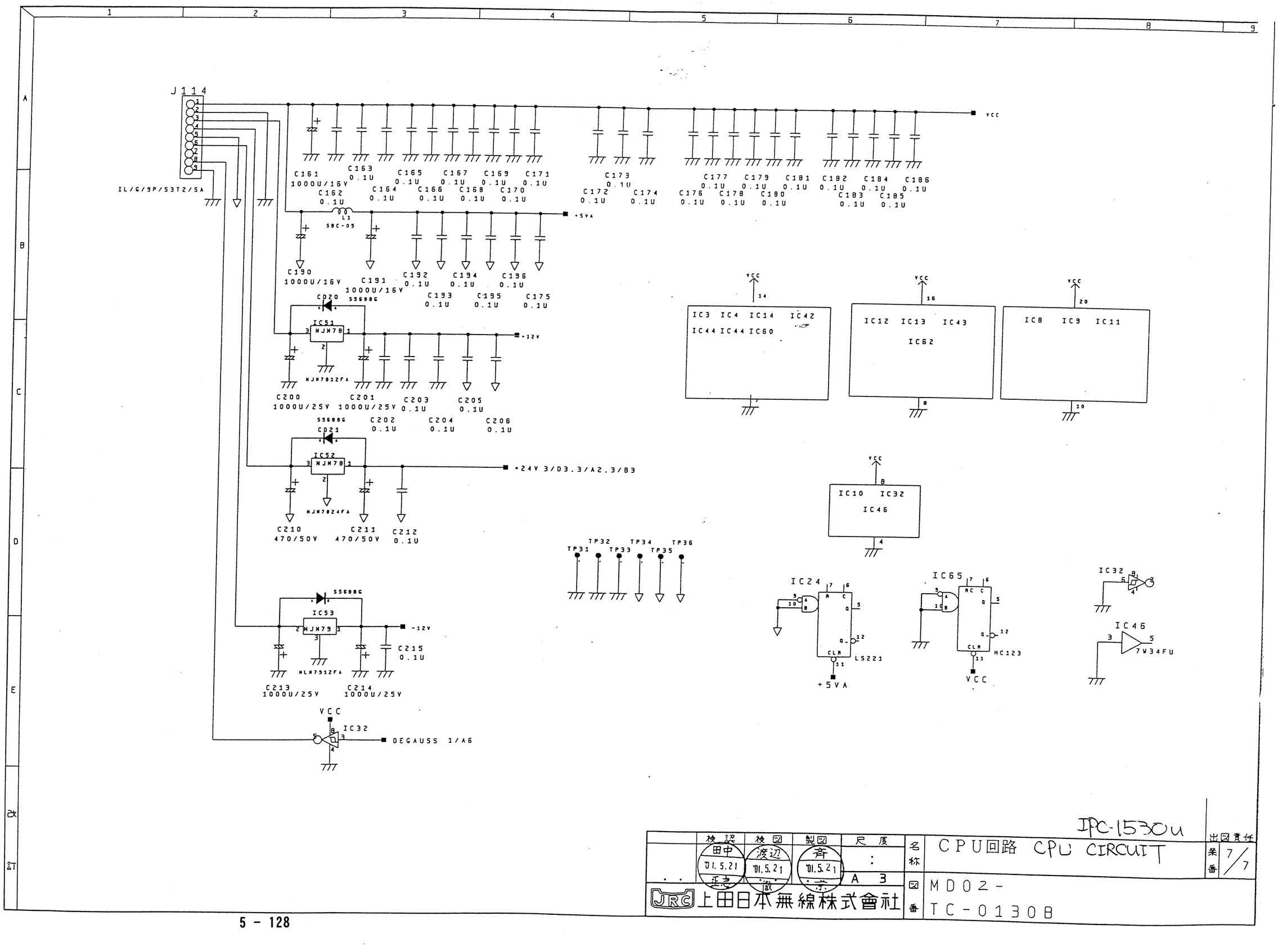
IPC-1530U



IPC-1530u

	検認	検図	製図	尺度	名称	CPU回路 CPU CIRCUIT
	田中 01.5.2 正志	渡辺 01.5.21 徹	斉 01.5.21 京	: A3	図番	MD02-TC-0130B
	JRC 上田日本無線株式會社					出図責任 / 枚番 5/7

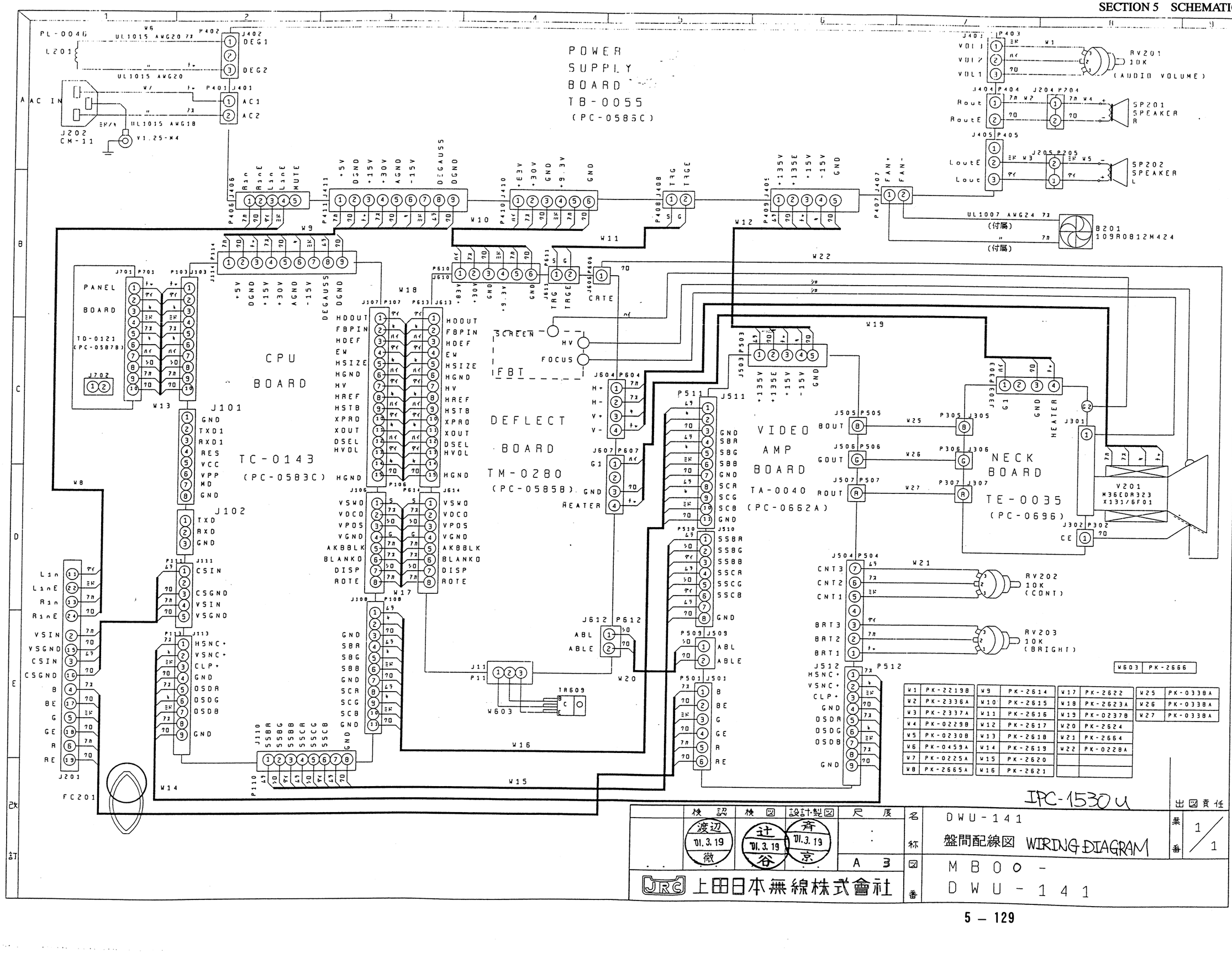

IC60
IC61
HC4053
H=セレーションあり
L=セレーションなし
DSEL 1/E6.3/D8
IC41
M52001SP
IC65
HC123
IC64
LM311
IC67
LS221
IC66
LA7213
IC50
NJM3403
IC47
IC45
PAL16V8
IC46
7W34FU
IC44
HC74
IC43
HC161
IC42
HC14
IC48
IC49
M890096
TA302
TA11
2SC2462C
J111
5045-05A
HSK120-4
J113
SYNCMODE 1/D6
CHSYNC 1/D6
AKBSTA 1/D6
ADCLK 1/C4
FVOUT 2/F7
FVSAW 3/D3
XOUT 1/D6.3/D8
DVSYNC 2/C8
DHSYNC 2/C8
HSYNC+
VSYNC+
CLAMP+
OSDA
OSDG
OSDB
IPC-1530U
CPU回路 CPU CIRCUIT
MD02-
TC-01308
5 — 127

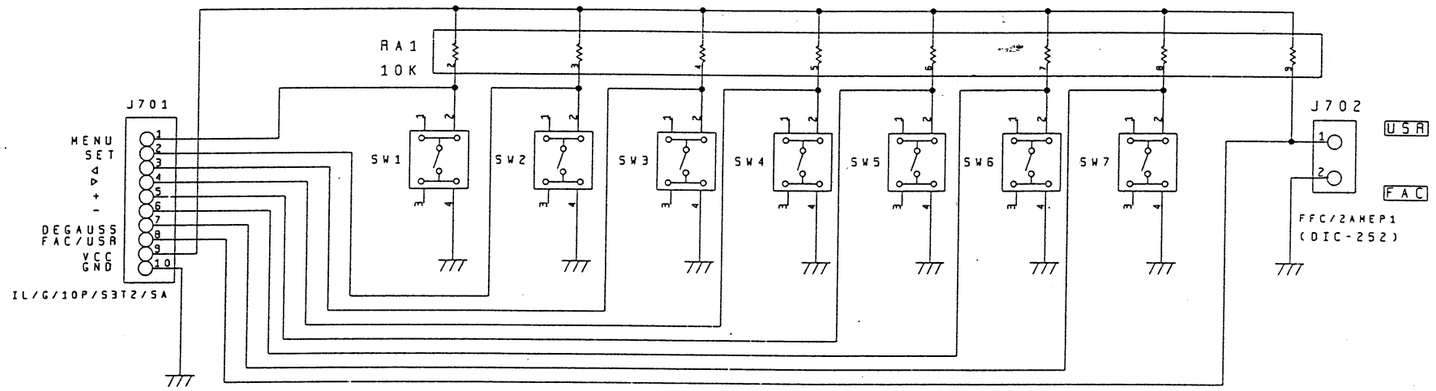


	検認	検図	製図	尺度	名称	CPU回路 CPU CIRCUIT	出図責任	
	田中 01.5.21	渡辺 01.5.21	斉 01.5.21	:			枚番	7/7
				A 3	図番	MD02- TC-0130B		

IPC-1530U

JRC 上田日本無線株式會社

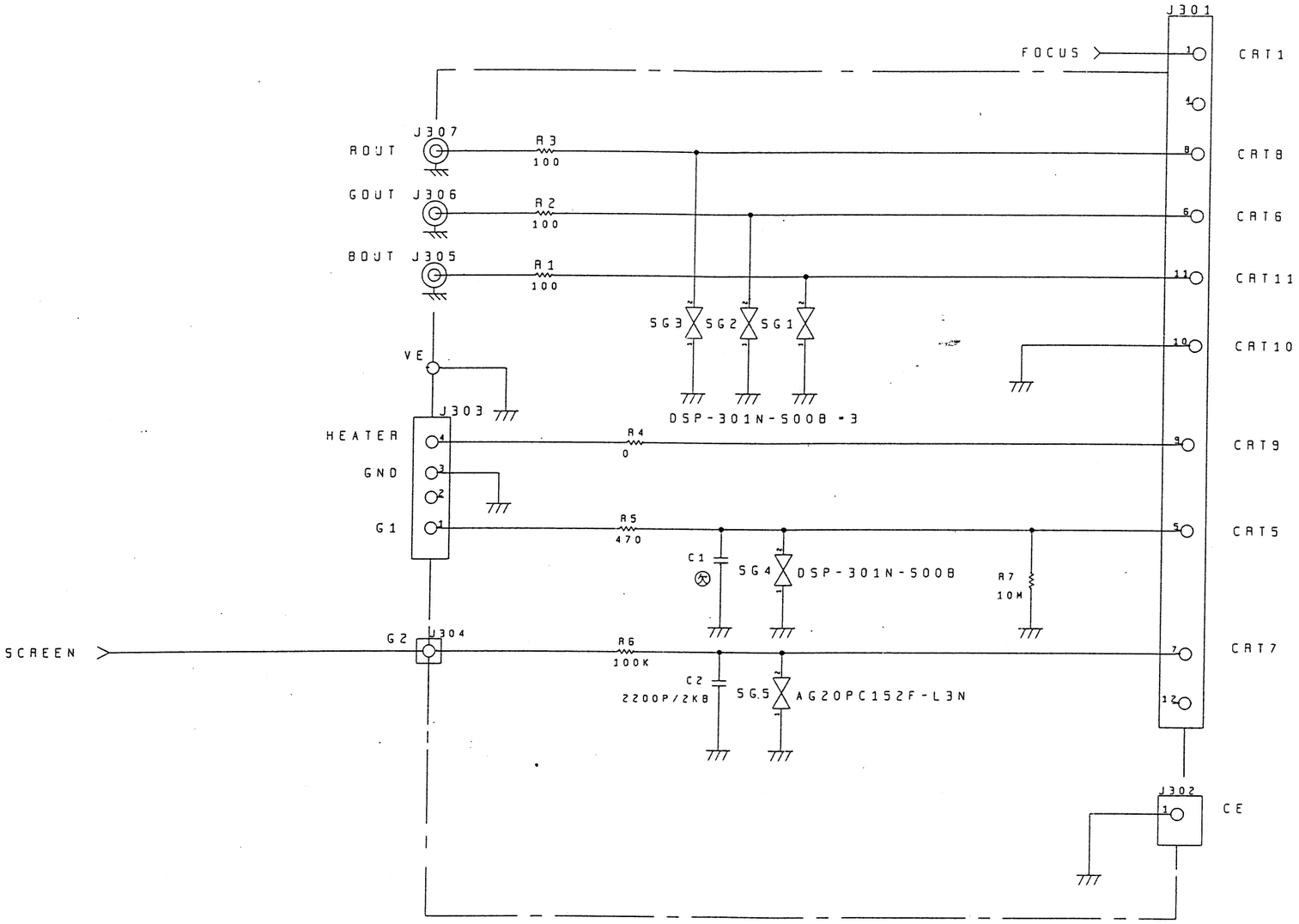

POWER SUPPLY BOARD TB-0055 (PC-0585C)
CPU BOARD TC-0143 (PC-0583C)
DEFLECT BOARD TM-0280 (PC-0585B)
VIDEO AMP BOARD TA-0040 (PC-0662A)
NECK BOARD TE-0035 (PC-0696)
PANEL BOARD TD-0121 (PC-0587B)
AC IN
FBT
SCREEN
HV
FOCUS
CATE
RV201 10K (AUDIO VOLUME)
SP201 SPEAKER R
SP202 SPEAKER L
RV202 10K (CONT)
RV203 10K (BRIGHT)
B201 109R0812M424
V201 M36EDR323 X131/6F01
FC201
TR603
W603
W603 PK-2666
W1 PK-22198
W2 PK-2336A
W3 PK-2337A
W4 PK-02298
W5 PK-02308
W6 PK-0459A
W7 PK-0225A
W8 PK-2665A
W9 PK-2614
W10 PK-2615
W11 PK-2616
W12 PK-2617
W13 PK-2618
W14 PK-2619
W15 PK-2620
W16 PK-2621
W17 PK-2622
W18 PK-2623A
W19 PK-02378
W20 PK-2624
W21 PK-2664
W22 PK-0228A
W25 PK-0338A
W26 PK-0338A
W27 PK-0338A
IPC-1530 4
DWU-141
盤間配線図 WIRING DIAGRAM
MB00-DWU-141
A3
1/1
上田日本無線株式會社



IPC-1530 U

	検図	製図	尺度	名称	出図責任
	渡辺 '01.3.19	辻 '01.3.19	:	パネル回路 PANEL CIRCUIT	承番 1/1
	薮	谷	A 3	図番 MD00-TD-0121	

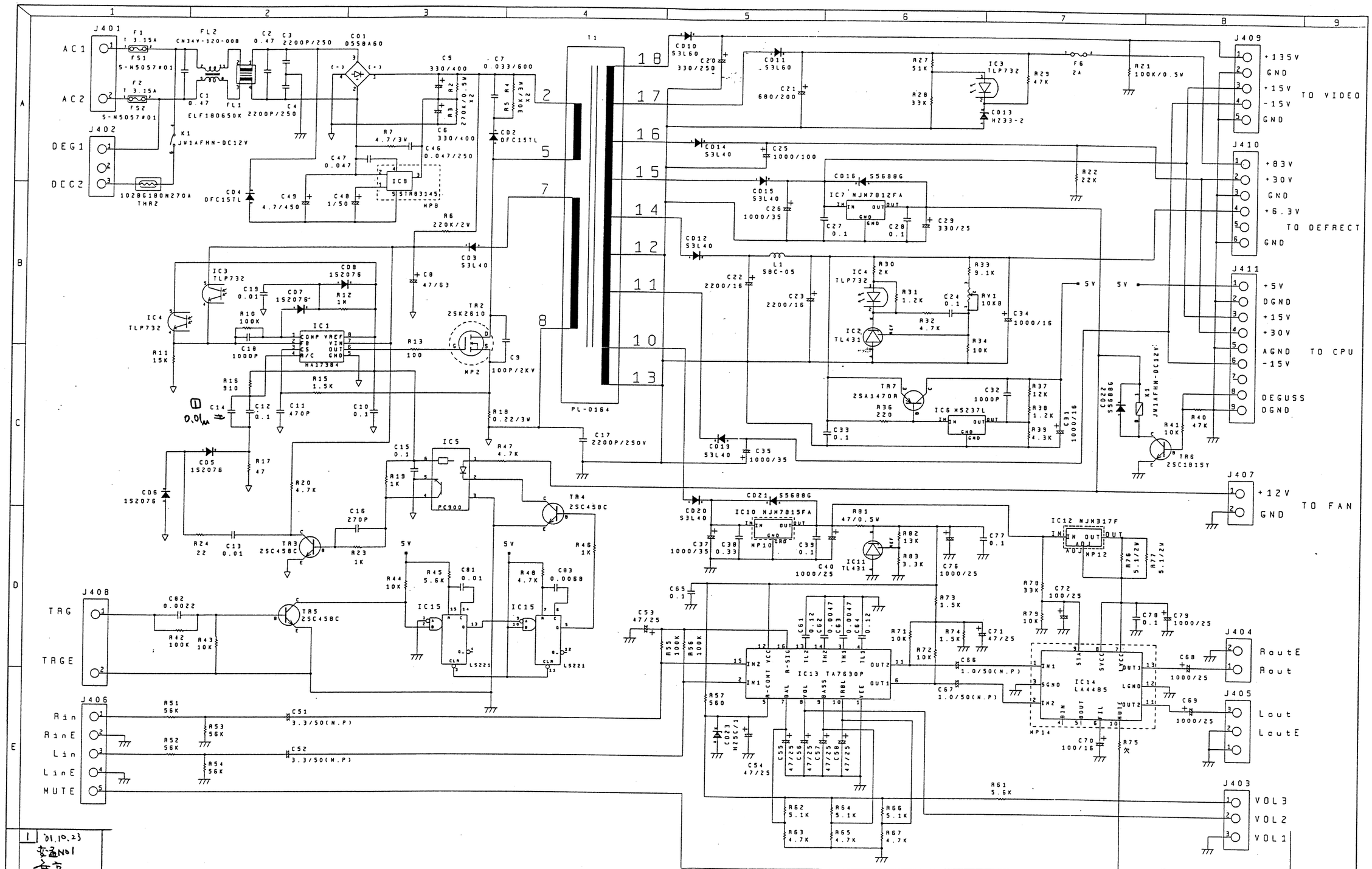
上田日本無線株式會社



IPC-1530U

	検認	検図	設計・製図	尺度			出図責任
	渡辺 '01.3.19 徹	辻 '01.3.19 谷	斉 '01.3.19 京	:	名称	DWU-141 NECK BOARD CIRCUIT	枚番 1/1
				A 3	図番	MD00-TE-0035	
JRC 上田日本無線株式會社							

改訂 A B C D E



MP2	PC1344-30-PB
MP8	KTH0061
MP10	PC1136A-30-PB
MP12	OSH-2425-SP
MP14	KTH0040

注意
指示無きｺﾝﾃﾞﾝｻは50V耐圧
指示無き抵抗は1／8W

1IA	R45.R48 R51-R57.R61-R67 R71-R74.R78.R79 R82.R83

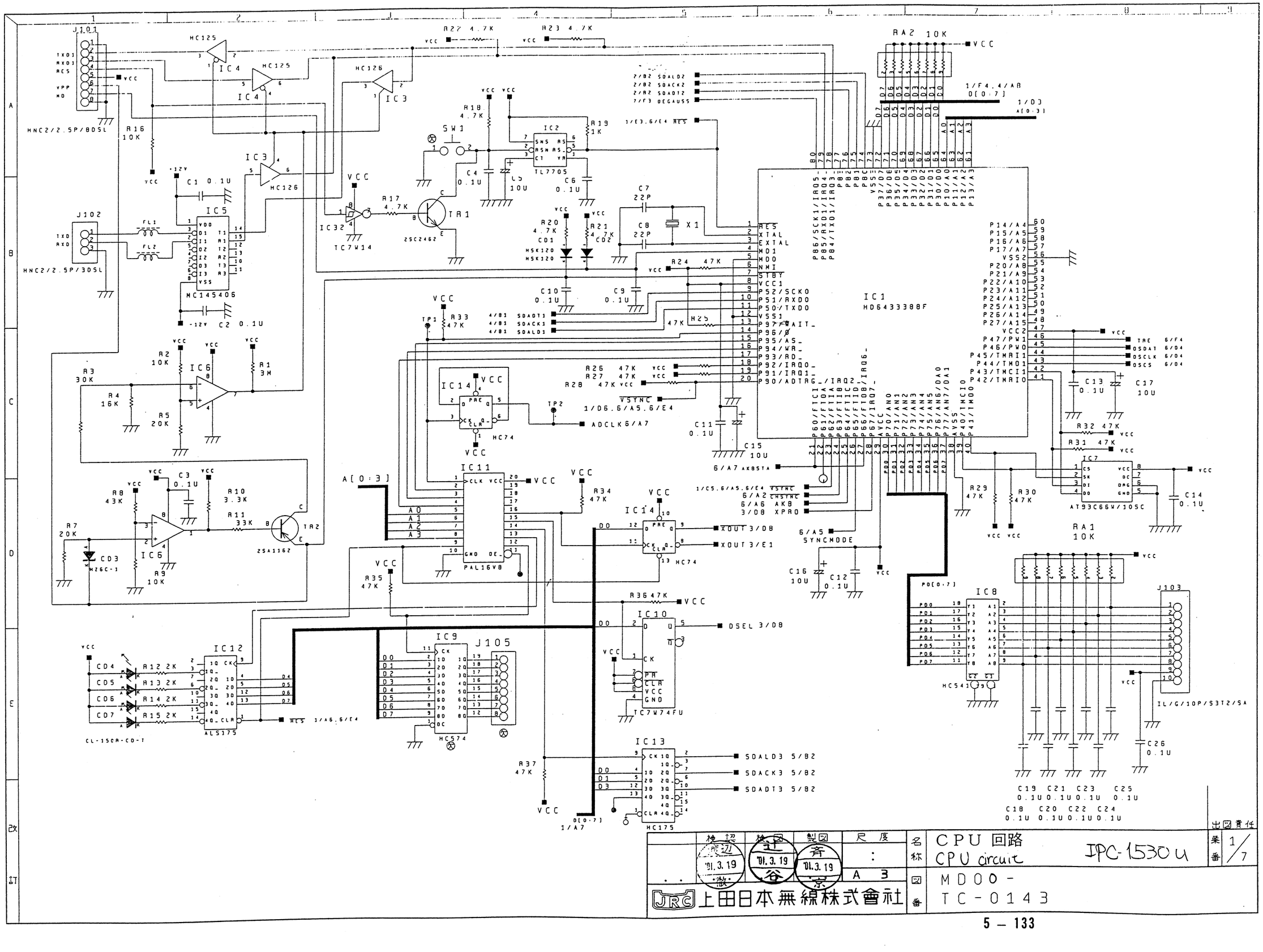
	検認	検図	設計製図	尺度	名称	DWU-141	葉番	1/1
	渡辺 '01.3.19 徹	辻 '01.3.19 谷	斉 '01.3.19 京	A3	図番	MDOL-TB-0055		

JRC 上田日本無線株式會社

出図責任

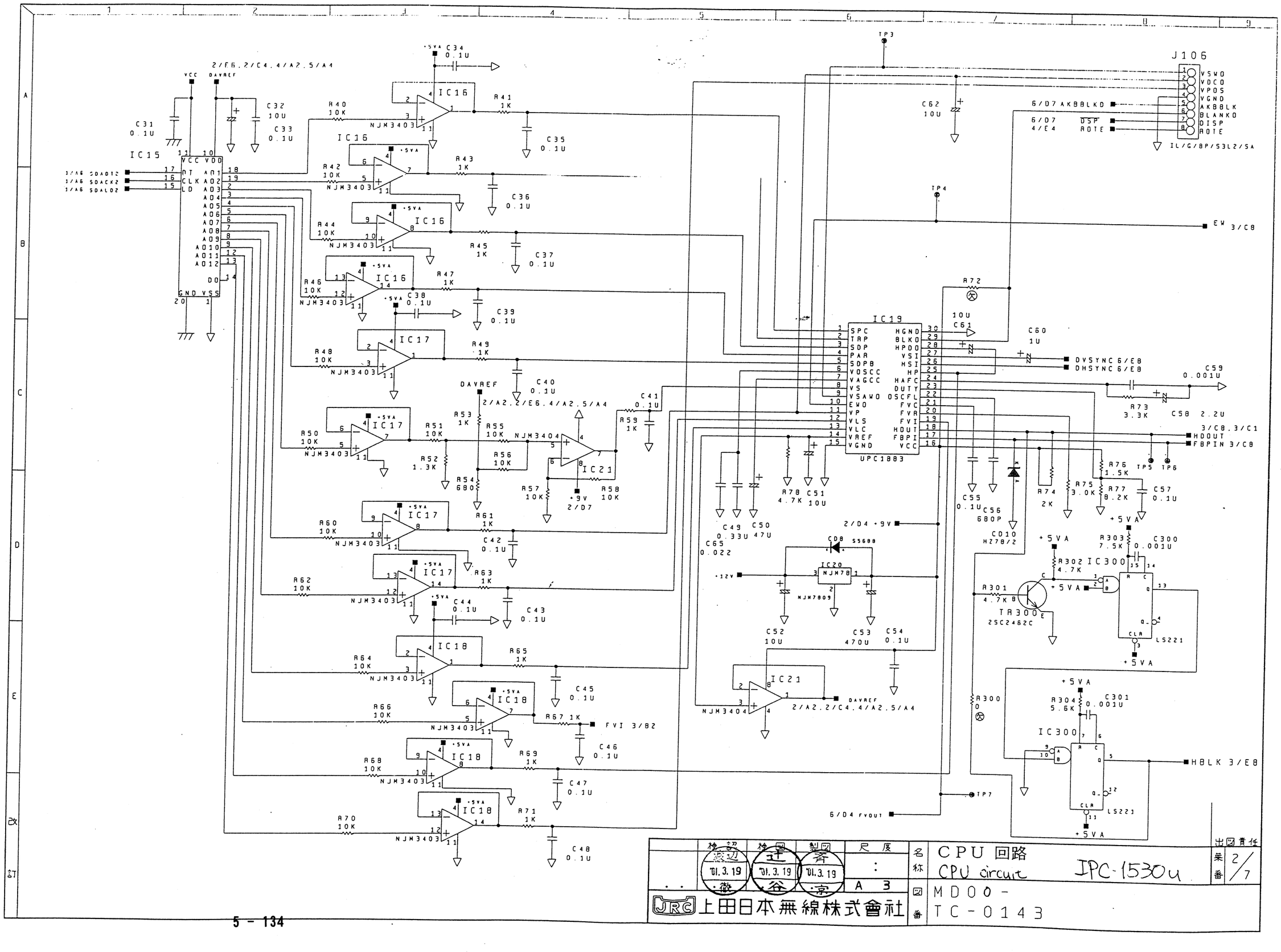
1	'01.10.23	変更No1 斉京 C14尺→0.01M
改訂		
承認	'01.10.23	

5 - 132

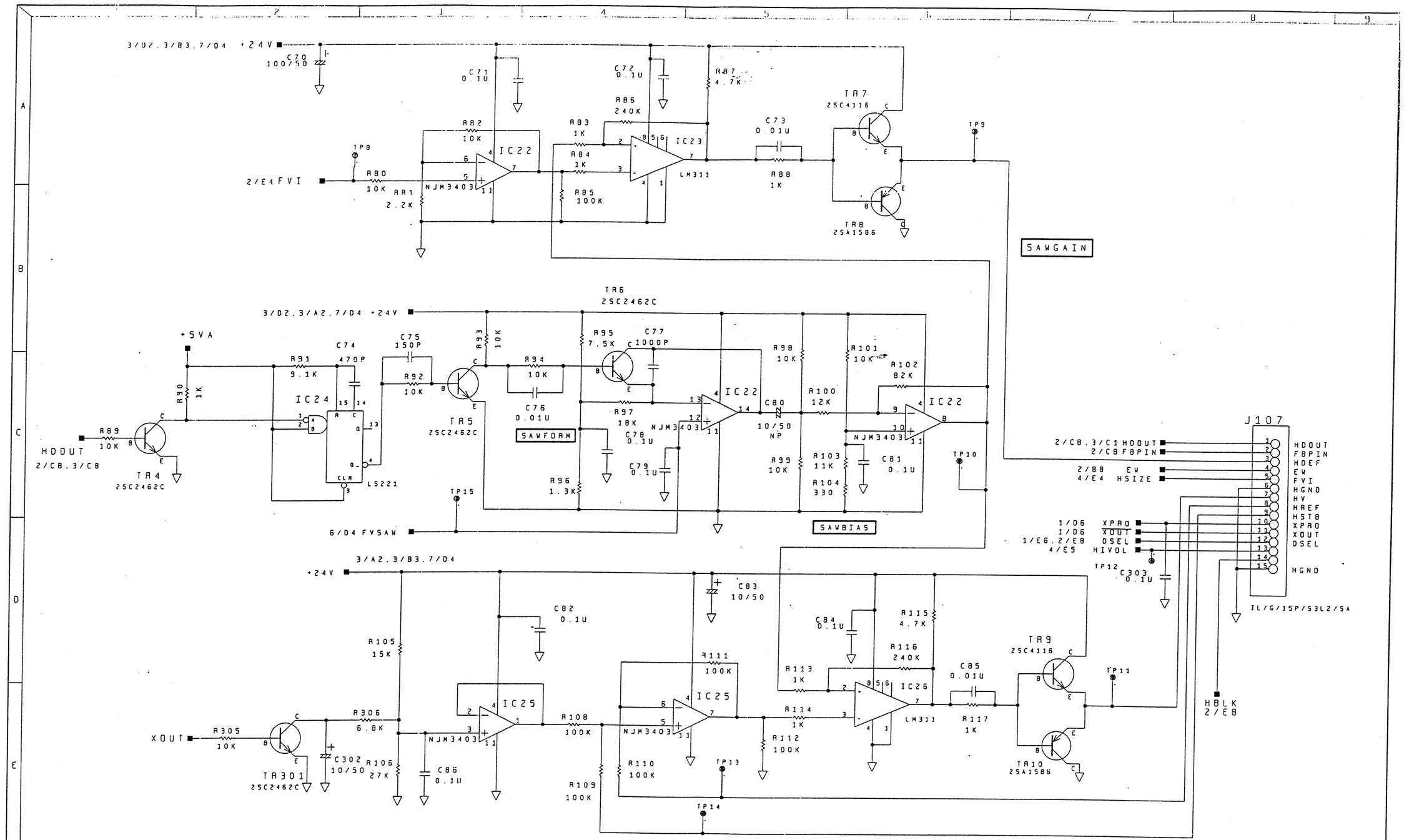


検認	検図	製図	尺度	名称	CPU 回路 CPU circuit	IPC-1530U	出図責任
渡辺 91.3.19	辻 91.3.19	斉 91.3.19	: A3	図番	MD00-TC-0143		葉番 1/7

JRC 上田日本無線株式會社

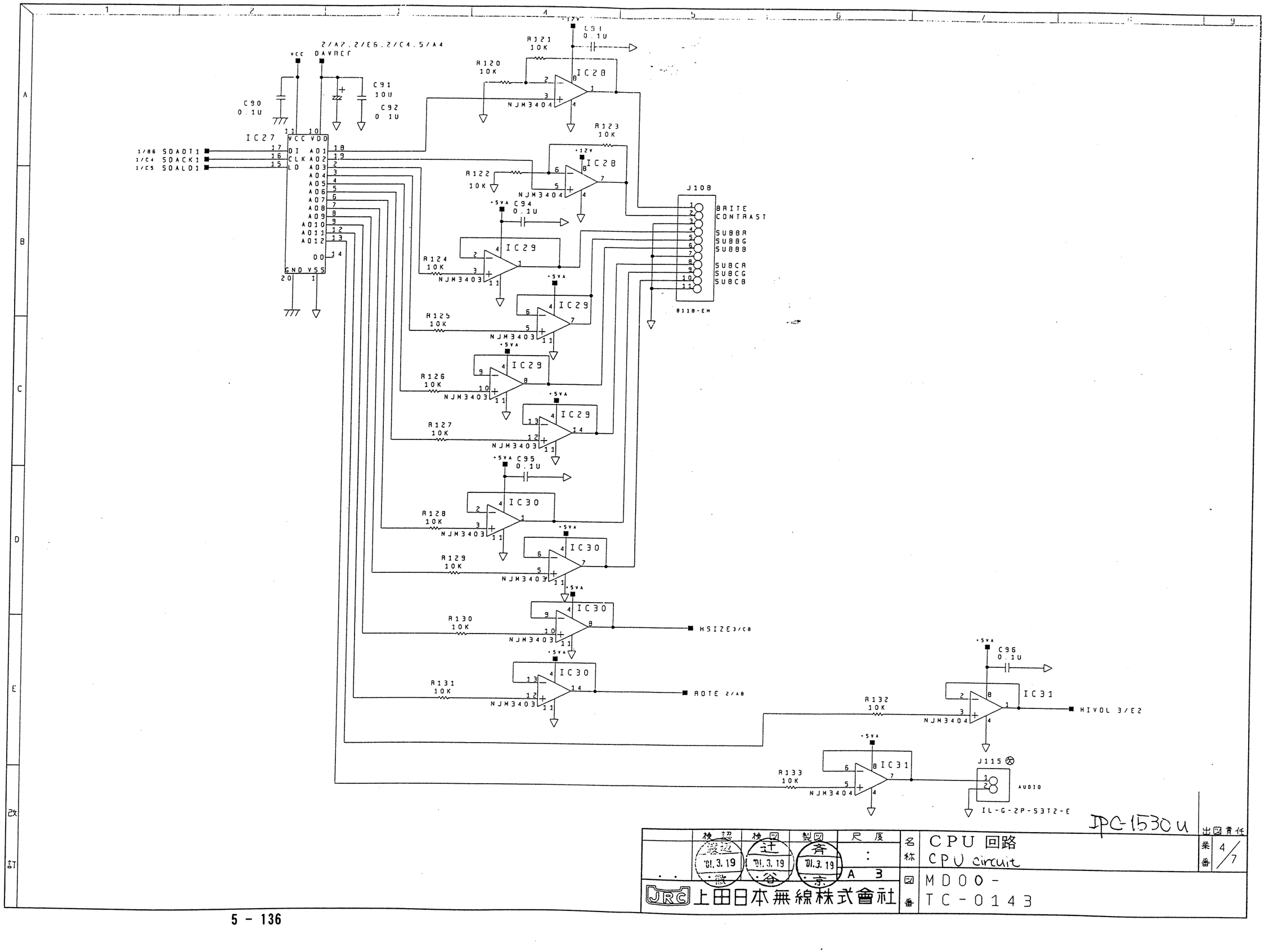


検図 渡辺 01.3.19	検図 辻 01.3.19	製図 斉 01.3.19	尺度 : A 3	名称 CPU 回路 CPU circuit IPC-1530U	出図責任 呉番 2/7
JRC 上田日本無線株式會社				図番 MD00-TC-0143	



IPC-1530U

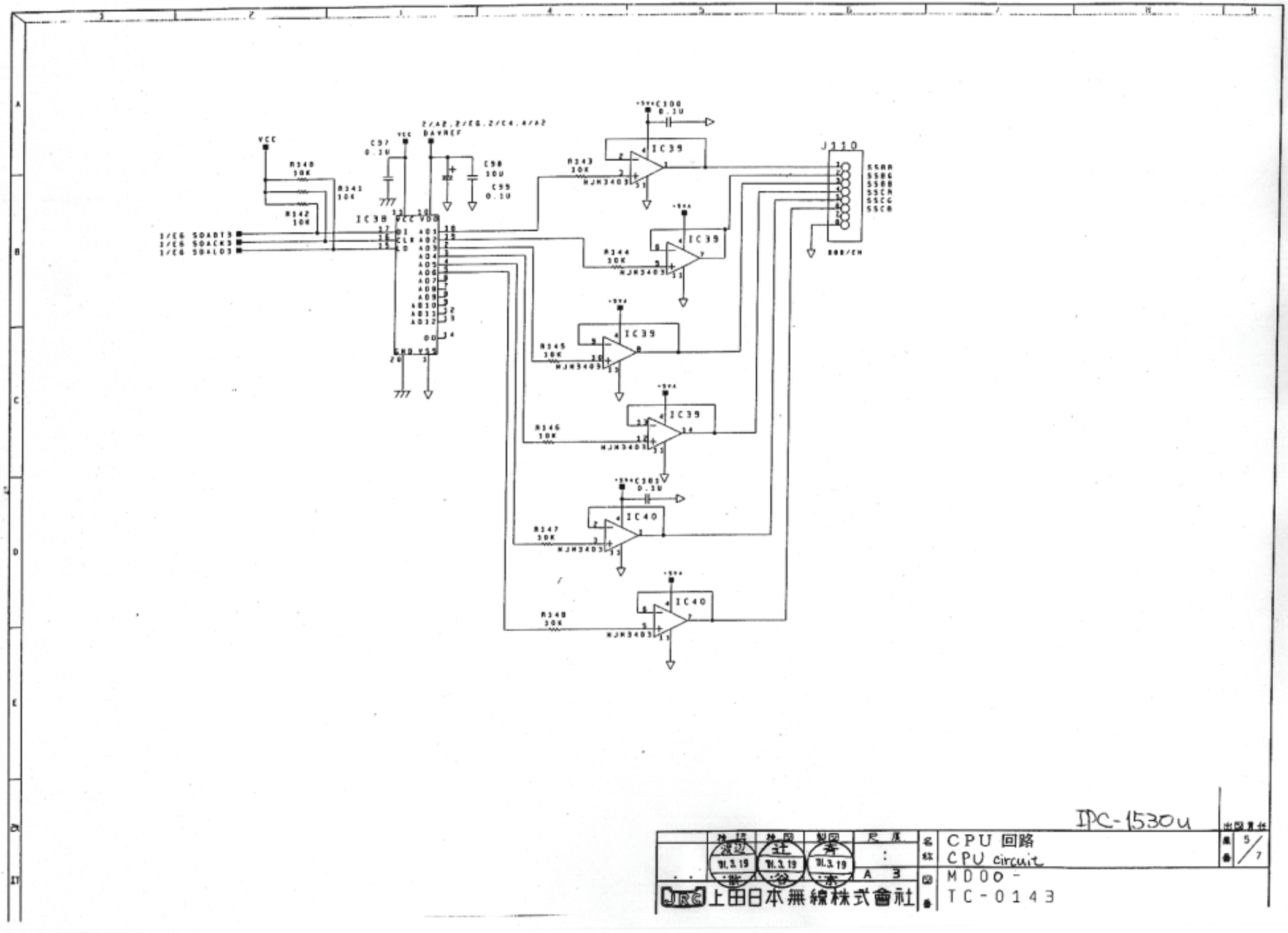
	検討	検図	製図	尺度	名称	CPU 回路 / CPU Circuit
	'01.3.19	'01.3.19	'01.3.19	:		出図責任
				A 3	図番	MD00-TC-0143
	JRC 上田日本無線株式會社					枚番 3/7



	検認	検図	製図	尺度	名称	CPU 回路 CPU circuit	出図責任
	'91.3.19	'91.3.19	'91.3.19	: A3	図番	MD00-TC-0143	枚番 4/7

JRC 上田日本無線株式會社

JPC-1530U

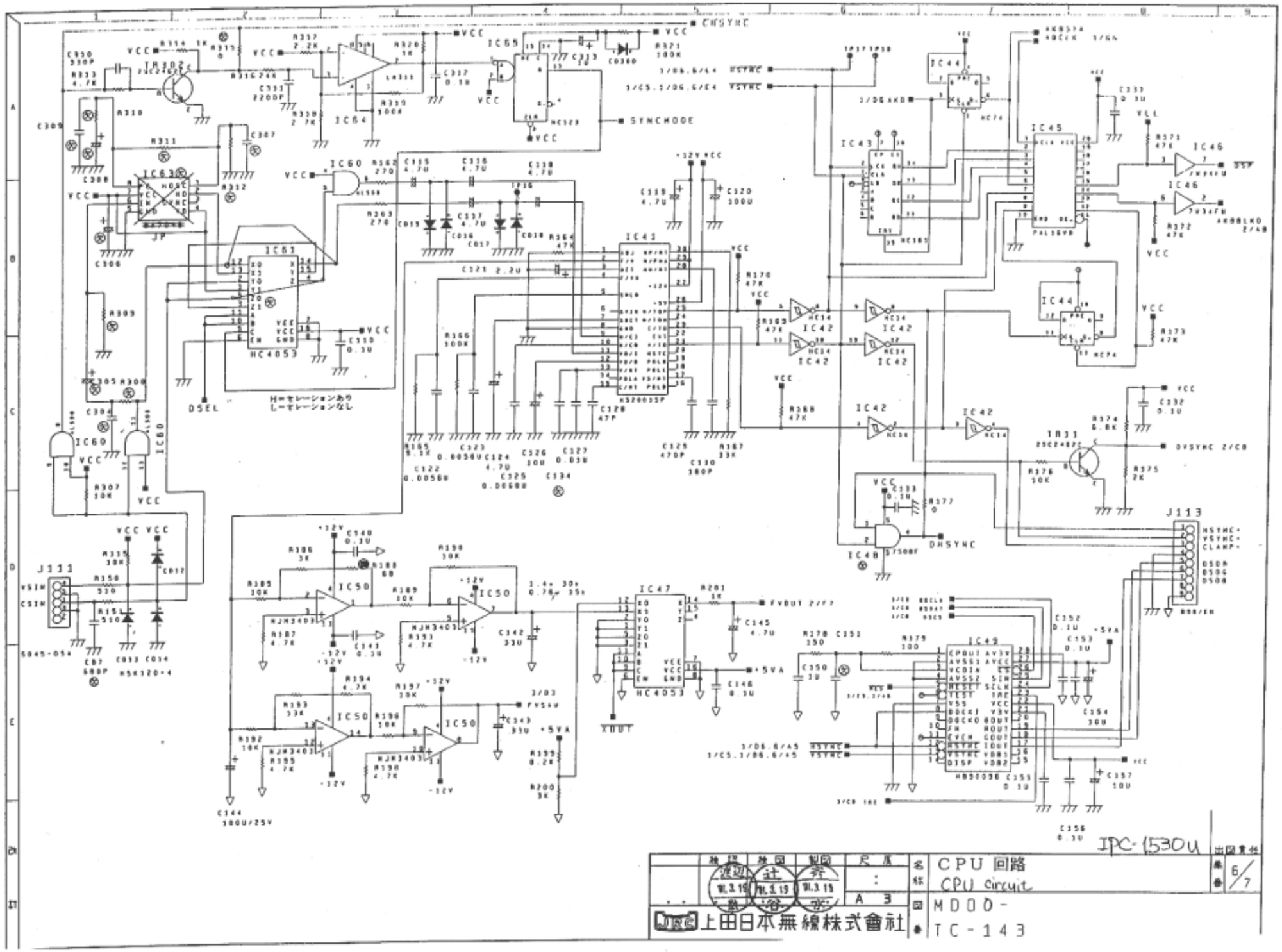


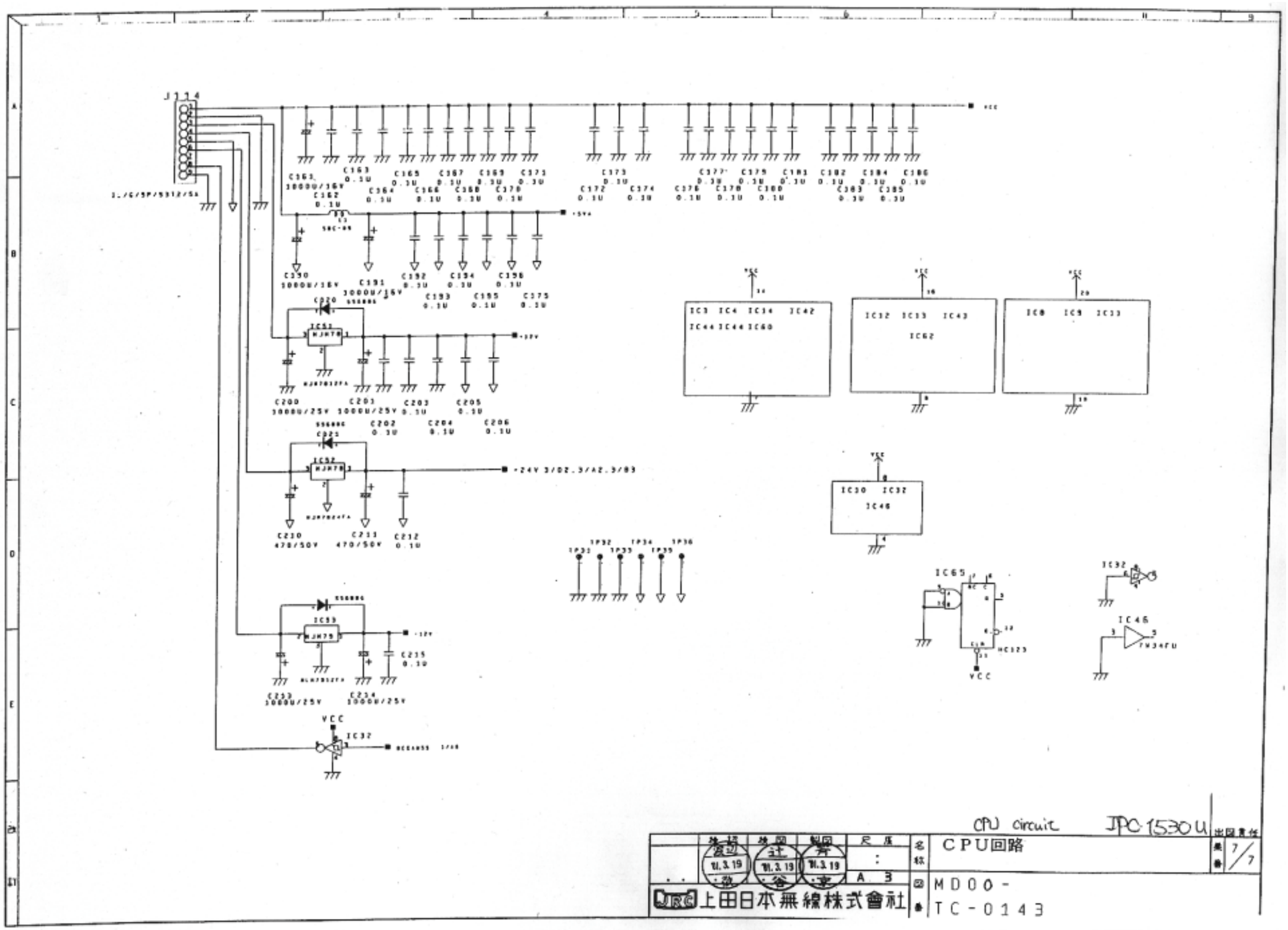
IPC-1530U

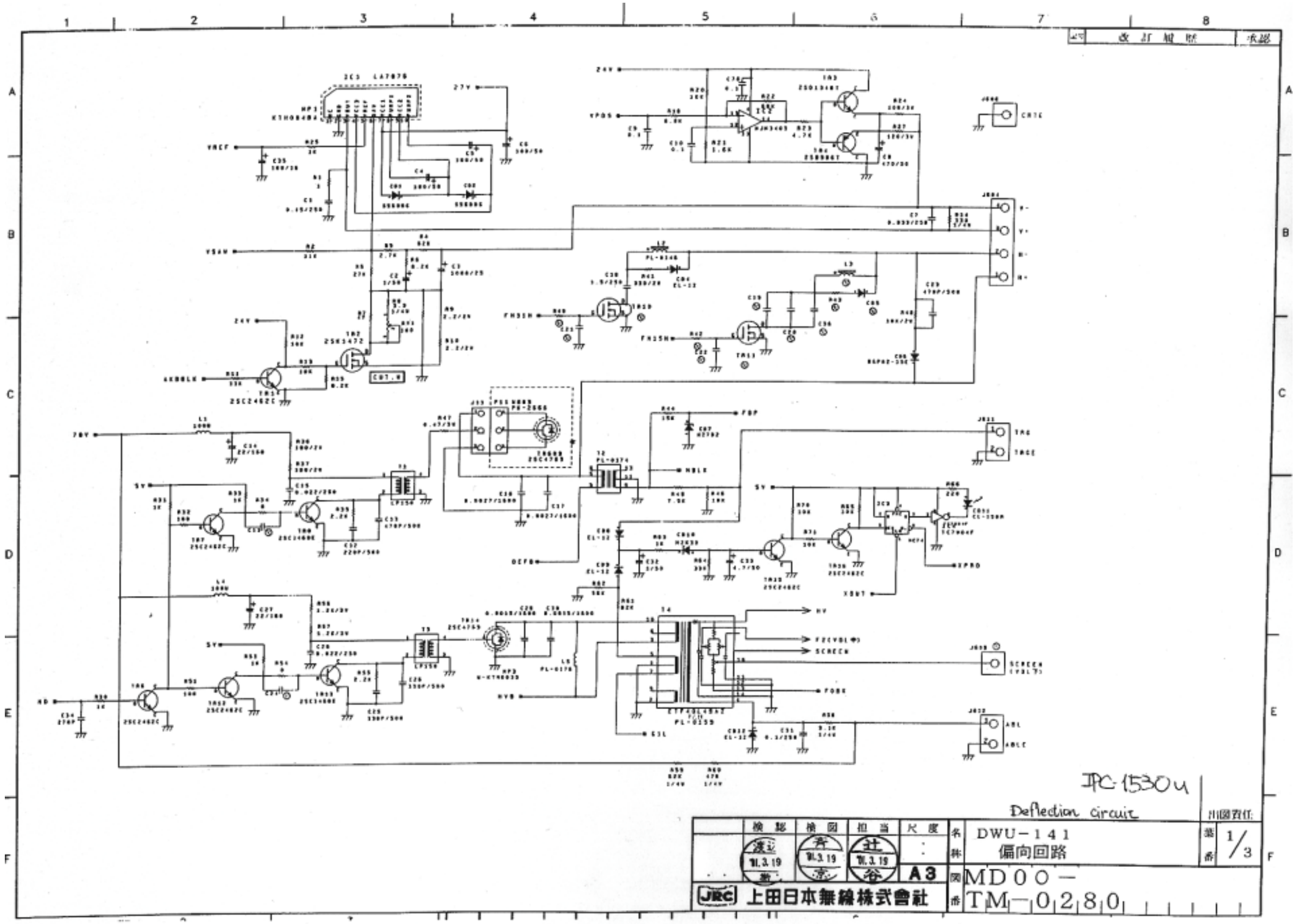
	作図 渡辺 91.3.19	検図 辻 91.3.19	製図 斉 91.3.19	尺度 :	名称	CPU 回路 / CPU circuit
				A 3	図番	MD00-TC-0143

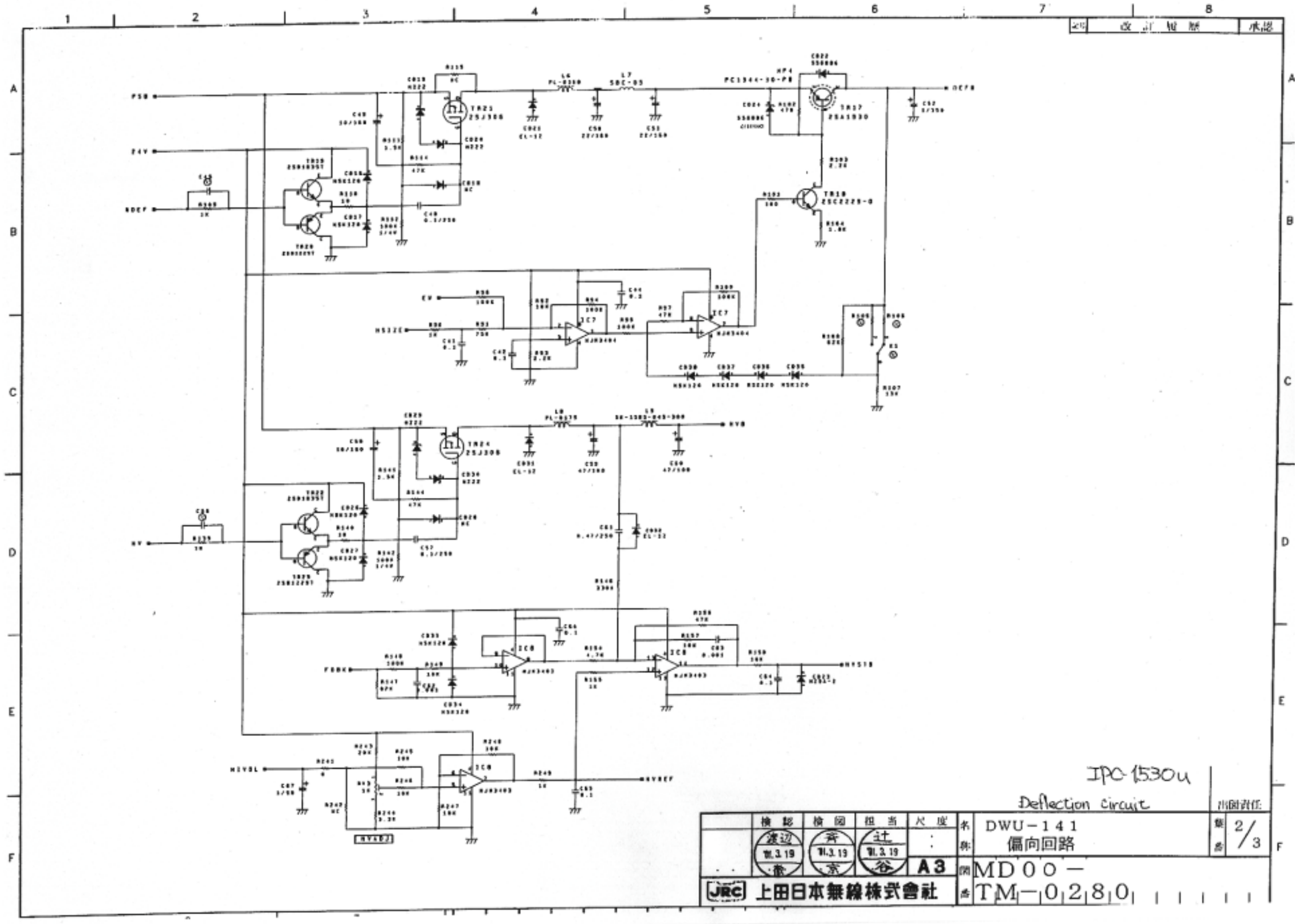
JRC 上田日本無線株式會社

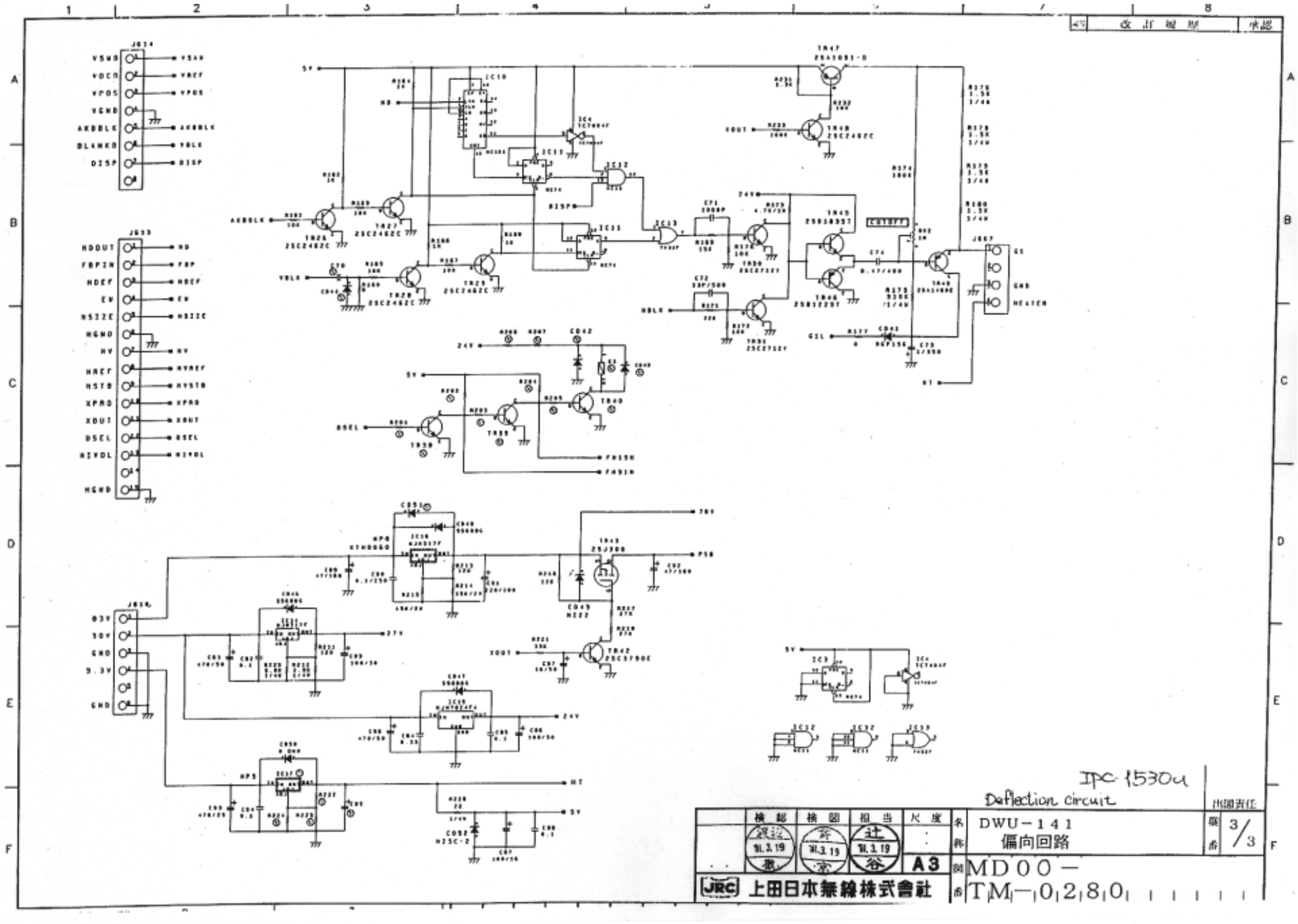
出図責任 5/7

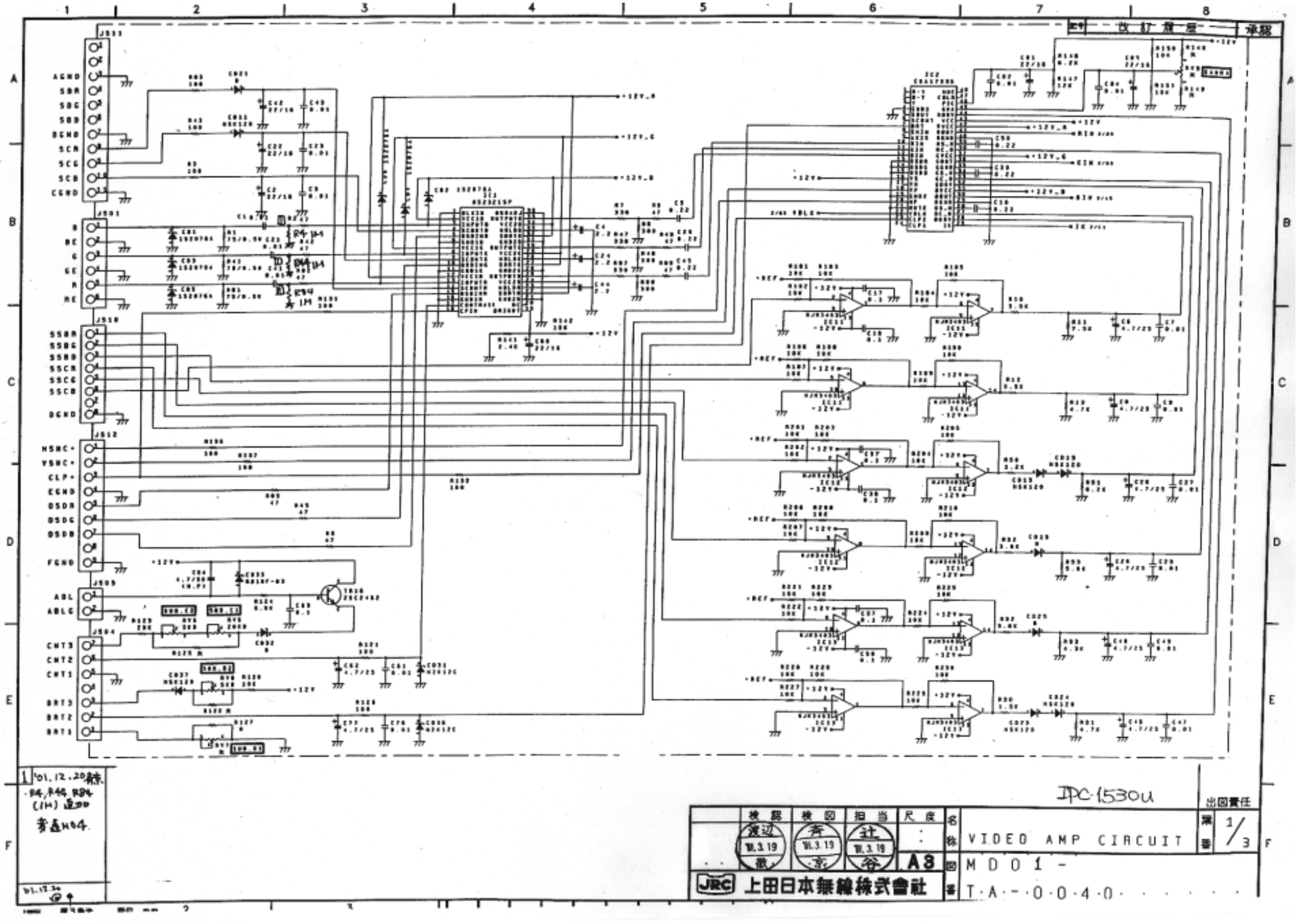

CHSYNC
SYNCMODE
HSYNC
VSYNC
DSEL
H=セレーションあり
L=セレーションなし
IC60
IC61
HC4053
IC63
IC65
IC64
IC43
IC44
IC45
IC46
IC42
IC47
IC50
IC49
IC48
XOUT
DHSYNC
DVSYNC 2/C8
J111
J113
CPU 回路
CPU Circuit
MDOD-
TC-143
IPC-1530U
上田日本無線株式會社
6/7

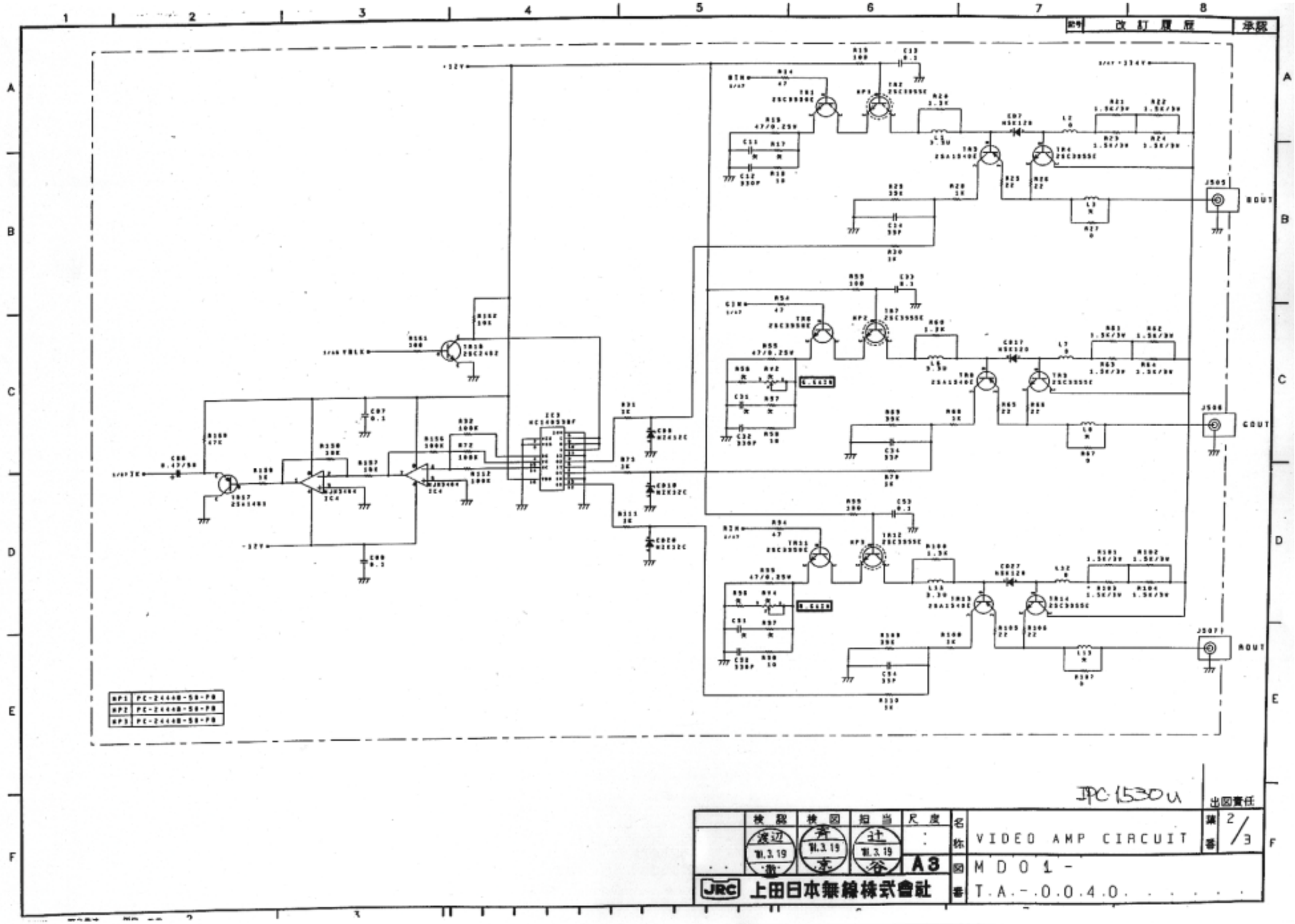

CPU circuit JPC-1530U
CPU回路
MD00-
TC-0143
上田日本無線株式會社
+24V 3/D2.3/A2.3/B3
VCC

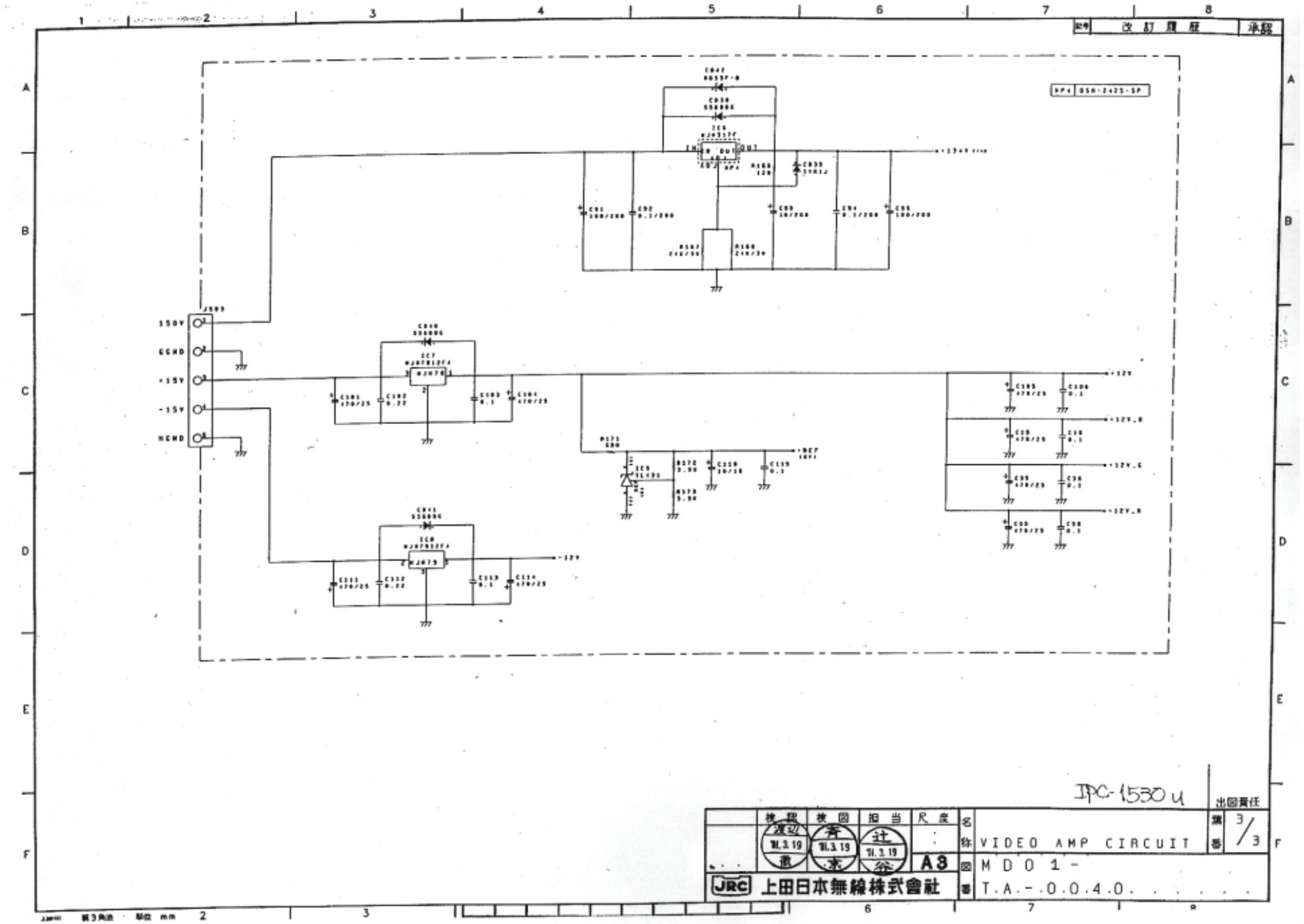

IPC-1530U
Deflection circuit
DWU-141
偏向回路
MD00-
TM-0280
1/3
A3
上田日本無線株式會社


IPC-1530U
Deflection Circuit
DWU-141
偏向回路
2/3
MD00-
TM-0280
上田日本無線株式會社
A3


Deflection circuit
DWU-141
偏向回路
MD00-
TM-10281
3/3
A3
JRC 上田日本無線株式會社


JSS3
AGND
SBR
SBG
SBB
BGND
SCR
SCG
SCB
CGND
JS01
R
RE
G
GE
B
BE
JS10
SSBR
SSBG
SSBB
SSCR
SSCG
SSCB
BGND
JS12
HSNC+
VSNC+
CLP+
EGND
DSDR
DSDG
DSDB
FGND
JS05
ABL
ABLC
JS04
CNT3
CNT2
CNT1
BRT3
BRT2
BRT1
IC1
M52015SP
IC2
CXA1530S
IC11
IC12
IC13
IC14
IC15
IC16
IC17
IC18
IC19
IC20
IC21
IC22
IC23
IC24
+12V
-12V
+REF
改訂履歴
承認
1 '01.12.20 新規
R4,R46,R84
(1H) 追加
青森H04
'01.12.20
検図
渡辺 '01.3.19
検図
青 '01.3.19
担当
辻 '01.3.19
尺度
A3
名称
VIDEO AMP CIRCUIT
図番
M D O 1 -
T·A··0·0·4·0·
出図責任
頁番
1/3
IPC-1530U
JRC 上田日本無線株式會社


改訂履歴
承認
+12V
-12V
+33.4V
VIDEO AMP CIRCUIT
JRC 上田日本無線株式會社
A3
MD01-
T.A.-.0.0.4.0.
2/3
JPC-1530U
出図責任
検図
担当
尺度
名称
図番
講番


改訂履歴
承認
KP4 05H-2425-SP
J503
150V
GGND
+15V
-15V
HGND
+32V
+32V_B
+32V_G
+32V_R
-32V
IPC-1530 U
出図責任
検図
渡辺 '91.3.19
検図
斉 '91.3.19
担当
辻 '91.3.19
尺度
A3
名称
VIDEO AMP CIRCUIT
図番
MDO1-
T.A.-.0.0.4.0.
頁番
3/3
JRC 上田日本無線株式會社

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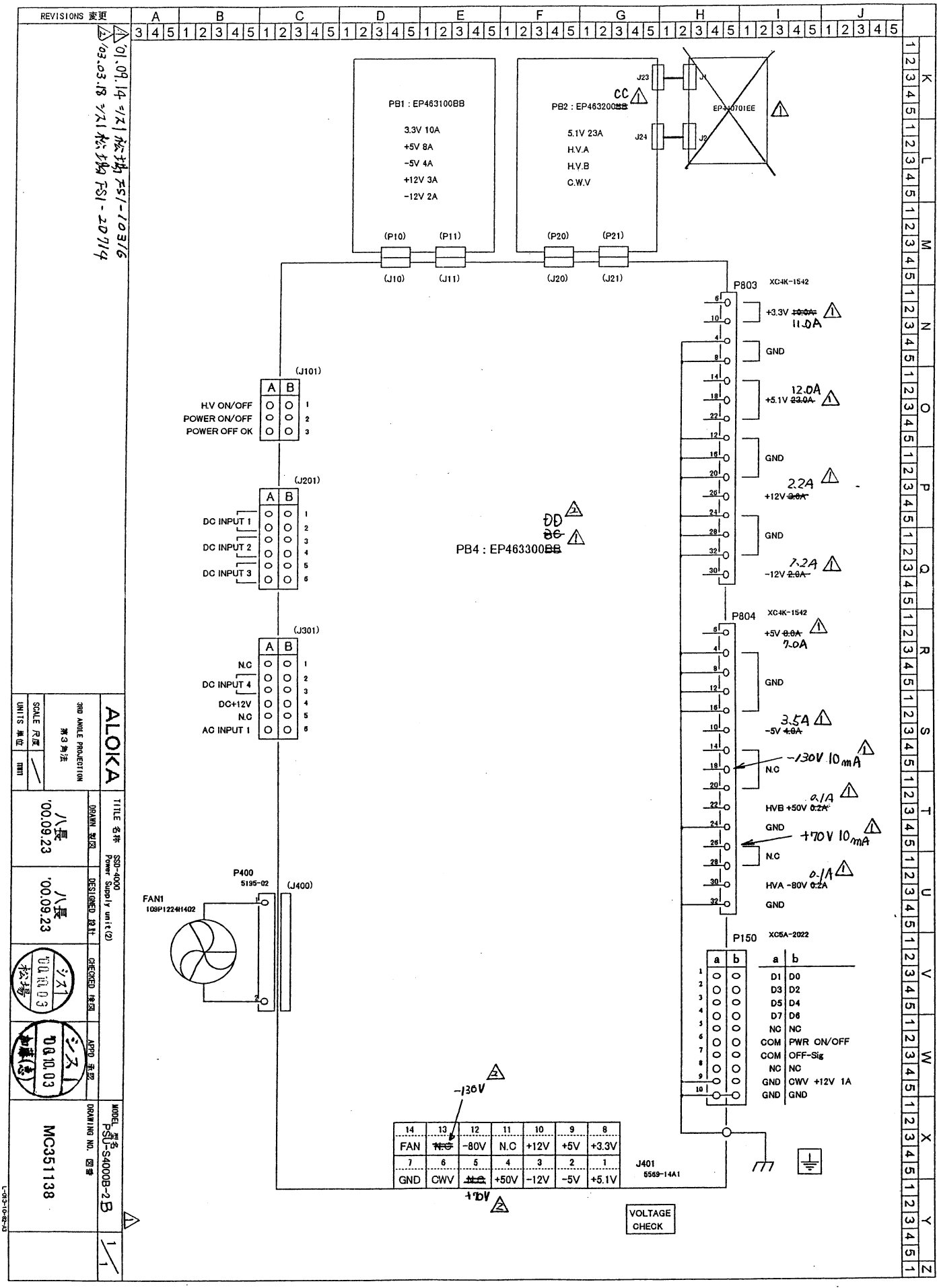
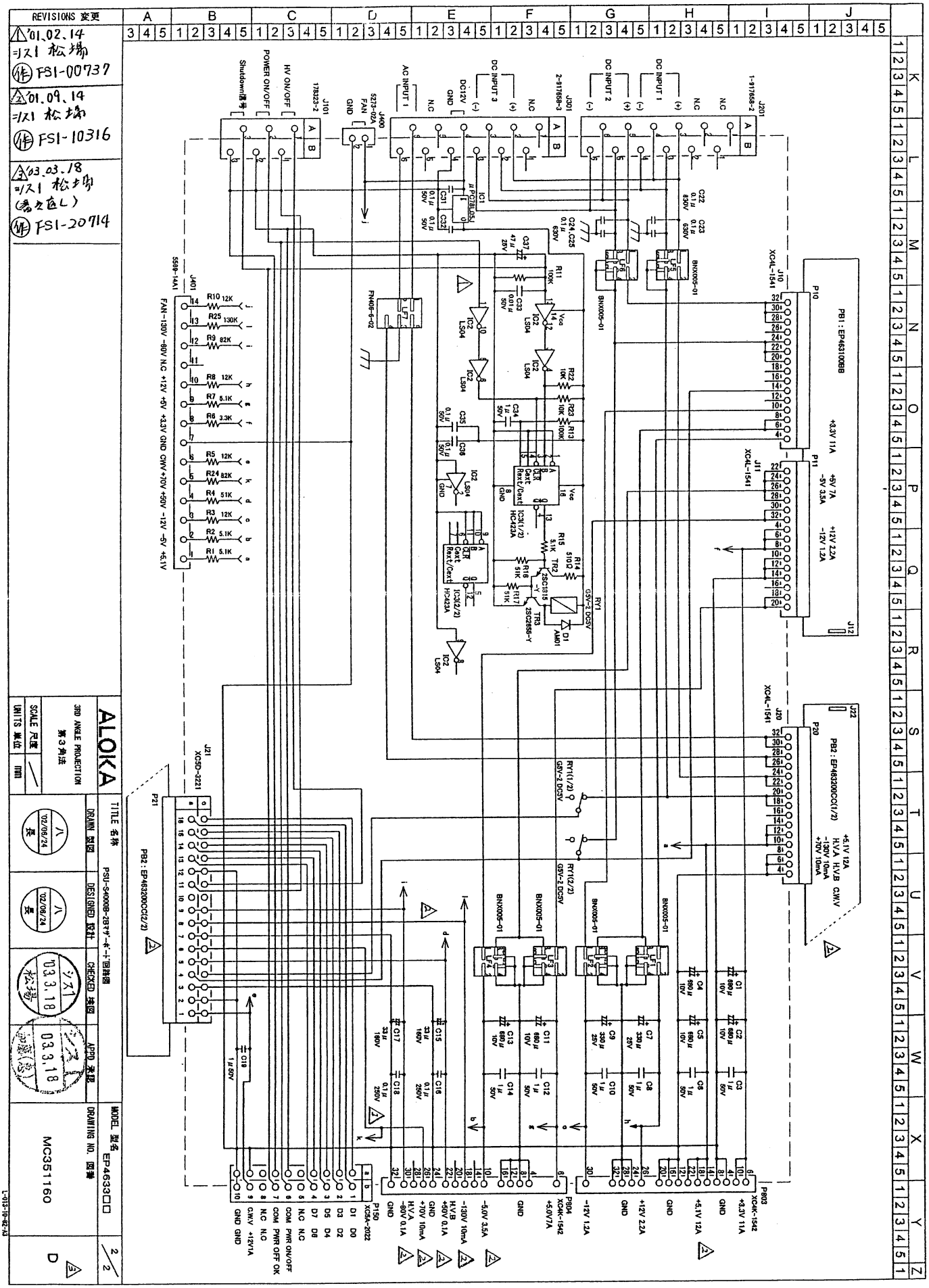

REVISIONS 変更
'01.09.14 システム松坂 FSI-10316
'03.03.18 システム松坂 FSI-20714
PB1 : EP463100BB
3.3V 10A
+5V 8A
-5V 4A
+12V 3A
-12V 2A
PB2 : EP463200BB
5.1V 23A
H.V.A
H.V.B
C.W.V
EP463701EE
(P10) (P11) (P20) (P21)
(J10) (J11) (J20) (J21)
P803 XC4K-1542
+3.3V 10.0A → 11.0A
GND
+5.1V 23.0A → 12.0A
GND
+12V 3.0A → 2.2A
GND
-12V 2.0A → 1.2A
P804 XC4K-1542
+5V 8.0A → 7.0A
GND
-5V 4.0A → 3.5A
N.C -130V 10mA
HVB +50V 0.2A → 0.1A
GND +170V 10mA
N.C
HVA -80V 0.2A → 0.1A
GND
P150 XC5A-2022
a b
D1 D0
D3 D2
D5 D4
D7 D6
NC NC
COM PWR ON/OFF
COM OFF-Sig
NC NC
GND CWV +12V 1A
GND GND
(J101)
H.V ON/OFF
POWER ON/OFF
POWER OFF OK
(J201)
DC INPUT 1
DC INPUT 2
DC INPUT 3
(J301)
N.C
DC INPUT 4
DC+12V
N.C
AC INPUT 1
PB4 : EP463300BB
P400 5195-02
(J400)
FAN1 109P1224H1402
J401 5569-14A1
14 13 12 11 10 9 8
FAN N.C -80V N.C +12V +5V +3.3V
7 6 5 4 3 2 1
GND CWV N.C +50V -12V -5V +5.1V
-130V
+170V
VOLTAGE CHECK
ALOKA
3RD ANGLE PROJECTION 第3角法
SCALE 尺度
UNITS 単位 mm
TITLE 名称 SSD-4000 Power Supply unit(2)
DRAWN 製図 八尾 '00.09.23
DESIGNED 設計 八尾 '00.09.23
CHECKED 検図 システム松坂 '03.03.03
APPD 承認 システム松坂 '03.10.03
MODEL 型名 PSU-S4000B-2B
DRAWING NO. 図番 MC351138
1/1


REVISIONS 変更
ALOKA
TITLE 名称
PSU-S4000B-2817ﾔﾏﾄ+ｶｰﾄﾘ回路図
DRAWN 製図
DESIGNED 設計
CHECKED 検図
APPD 承認
MODEL 型名 EP4633□□
DRAWING NO. 図番
MC351160
SCALE 尺度
UNITS 単位
3RD ANGLE PROJECTION
第3角法
PB1 : EP4631008B
PB2 : EP4632000C(1/2)
PB2 : EP4632000C(2/2)
FAN-130V -60V N.C +12V +5V +3.3V GND CWV +70V +50V -12V -5V +5.1V
+3.3V 11A
+5V 7A
-5V 3.5A
+12V 2.2A
-12V 1.2A
+5.1V 12A
H.V.A H.V.B
-130V 10mA
+70V 10mA
G.W.V
-5.0V 3.5A
-130V 10mA
H.V.B +50V 0.1A
H.V.A -60V 0.1A
+12V 2.2A
+5.1V 12A
+3.3V 11A
-12V 1.2A
+5.0V7A
GND
D
2/2

CAD

CN8 KRET7 KRET6 KRET5 KRET4 KRET3 KRET2 KRET1 KRET0

CN2 16P KSCAN15 KSCAN14 KSCAN13 KSCAN12 KSCAN11 KSCAN10 KSCAN9 KSCAN8 KSCAN7 KSCAN6 KSCAN5 KSCAN4 KSCAN3 KSCAN2 KSCAN1 KSCAN0

U28 LS156 U29 LS156 U13 HC14 R44 10K 10K x 22 RA4

U1 HD64F7044F28

U2 HSN29F040FPTN

U20 HC541 ADRS6 ADRS5 ADRS4 ADRS3 ADRS2 ADRS1 ADRS0

SW2 HD6404 ROMCE NRD NWRL KBMSK FWE R145 0

U21 HC640 DATA7 DATA6 DATA5 DATA4 DATA3 DATA2 DATA1 DATA0

U16 HC32 SELFRZ ALLFRZ NWR PNLEL READ

U12 HC08 U14 HC14 INV_9

TP1 TP2 LT1H67A LED9 CL-170Y9 LED8

SW3 HD6408

U17 HC4066 U18 HC4066 U19 HC4066 R110 R109 R108 R107 R106 R105 470 1000p x 8

U23 S-80942CLMC C53 0.022u C58 0.1u C7 470p R121 4.7K

U13 HC14 U12 HC08 NRESET AND R144 0 FWE

R75 200 C8 470p R97 3K C66 0.1u

U1 PE15 PE14 PE13 PE12 PE11 PE10 PE9 PE8 PE7 PE6 PE5 PE4 PE3 PE2 PE1 PE0 FSW3 FSW2 FSW1 SELAD KRET7 KRET6 KRET5 KRET4 KRET3 KRET2 KRET1 KRET0

U1 AN7 AN6 AN5 AN4 AN3 AN2 AN1 AN0 PF7 PF6 PF5 PF4 PF3 PF2 PF1 PF0

U1 RES/VPP WDTOVF HD3 HD2 HD1 HD0 NMI PLLVCC PLLCAP PLLVSS VCC VSS AVCC AVSS

U1 PB9 PB8 PB7 PB6 PB5 PB4 PB3 PB2 PB1 PB0 KBMSK

U1 PC15 PC14 PC13 PC12 PC11 PC10 PC9 PC8 PC7 PC6 PC5 PC4 PC3 PC2 PC1 PC0

U1 PD15 PD14 PD13 PD12 PD11 PD10 PD9 PD8 PD7 PD6 PD5 PD4 PD3 PD2 PD1 PD0

U1 PA15 PA14 PA13 PA12 PA11 PA10 PA9 PA8 PA7 PA6 PA5 PA4 PA3 PA2 PA1 PA0 ROMCE NRD DTCNTL NWRL FAP13 NSTB SCK SO SI

U1 EXTAL XTAL X1 DSX151GA-6.4512M C5 22p C6 22p

L3 BLM41AF800 C50 0.1u C51 22u C57 C48 C49 C62 C61 0.1u x 5 R7 0

J413 FAP-1601-1204 ADVCC AGND SEITAI5 SEITAI4 SEITAI3 SEITAI2 SEITAI1 SEITAI0 RA12 100K FAP13

U10 MAX232 RXD CTS TXD RTS C1 C2 C3 C4 C5 RTS CTS SD RD PSW1

J411 FAP-1601-1104 RXD232CB CTS232CB TXD232CB RTS232CB PSW NC NC nRST SELFRZ ALLFRZ nLED KBCLIC KBDATA HFCLK HFDATA GND

U2 U20 U10 U26 U29 U21 U13 U12 U17 U18 U19 U16 C42 C47 C41 C39 C59 C46 C52 C49 C63 C60 C70 C69 0.1u

L-KEY-75C 1/13 常用図

第3角法 THIRD ANGLE	尺度 SCALE	—	名称 TITLE	UP-ALT5-B (メイン基板回路図)
製品名 PRODUCT NAME			図番 DRAWING NO.	

03.01.CAD SCF-617-JE

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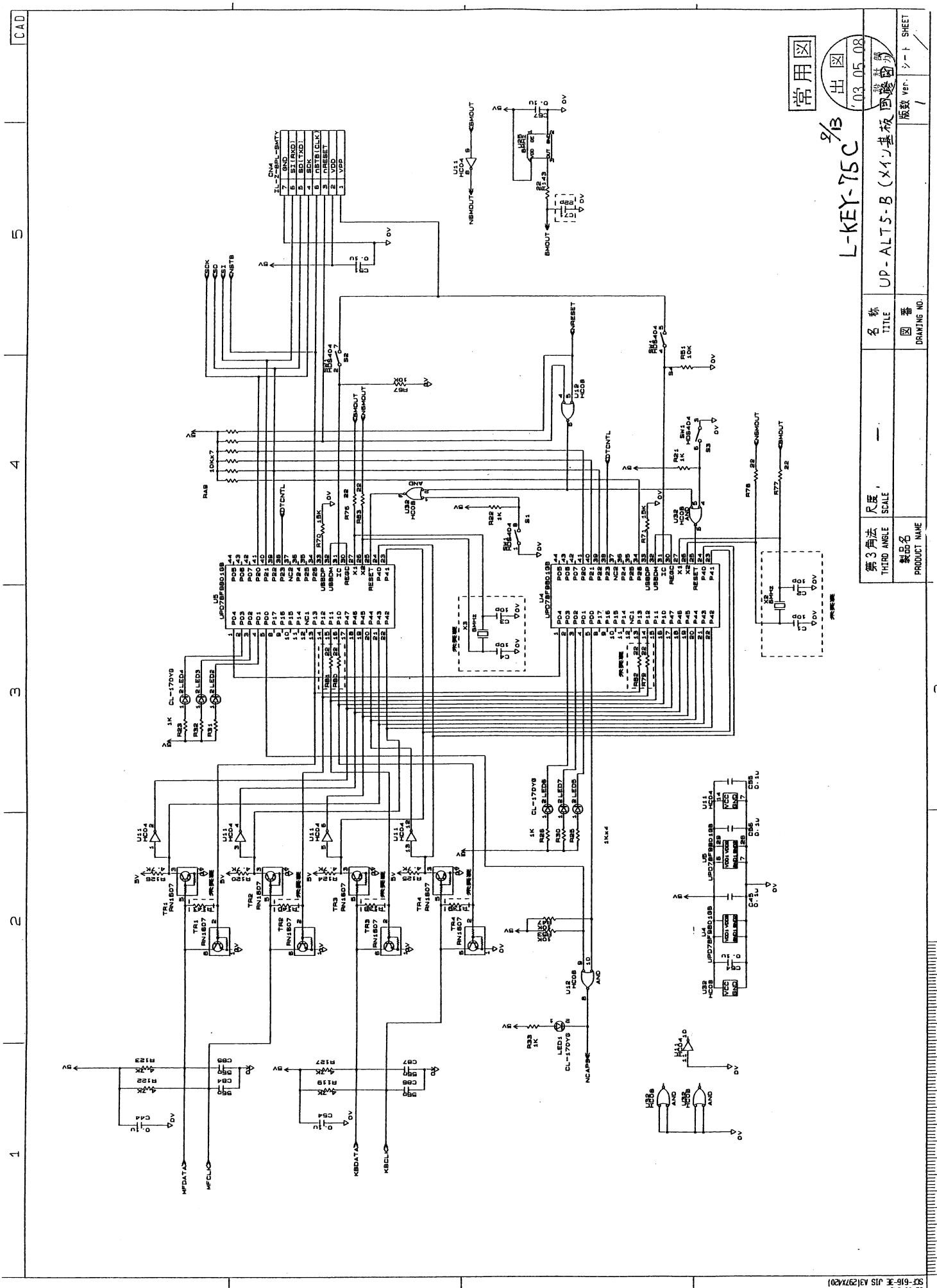
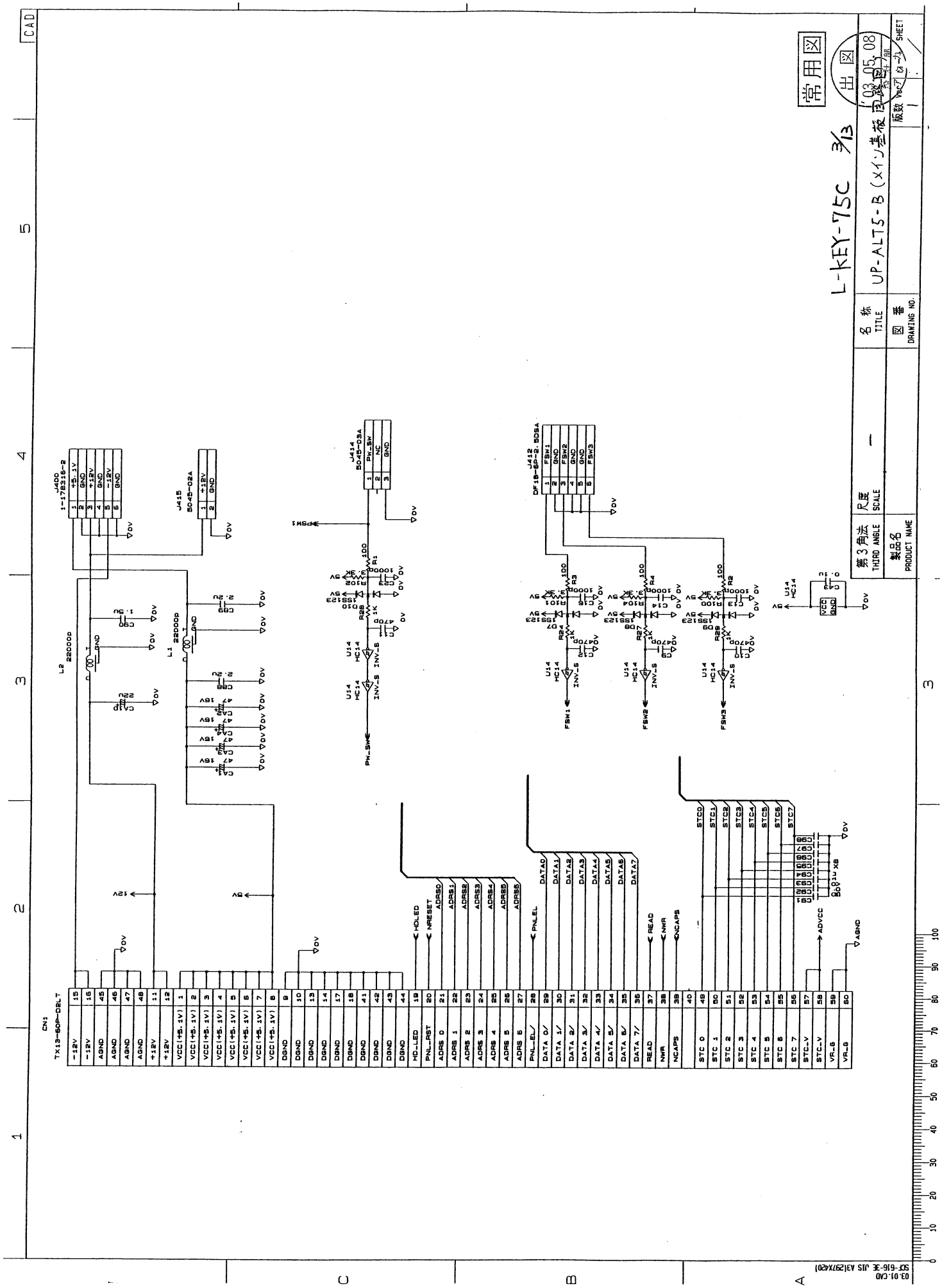
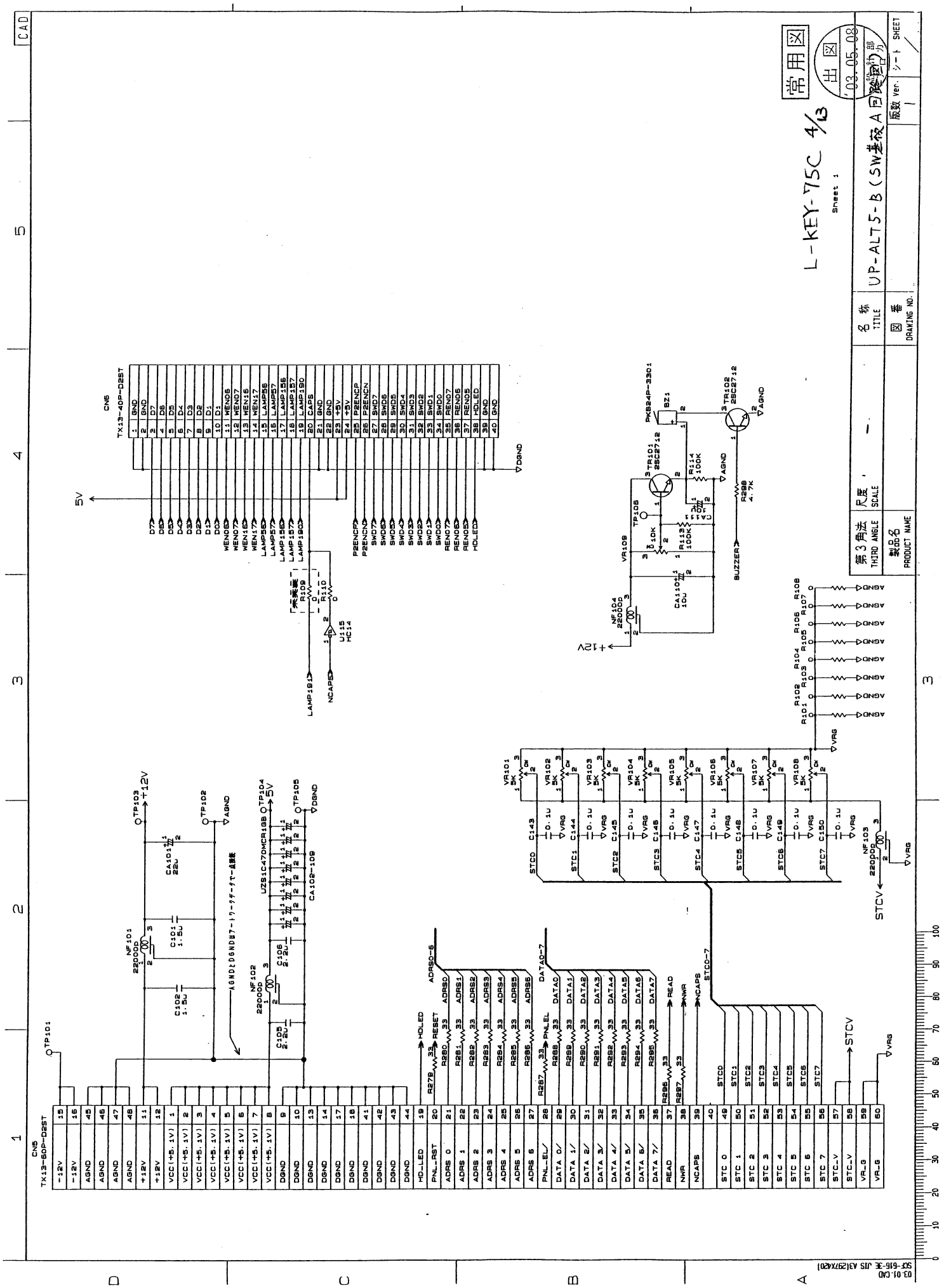
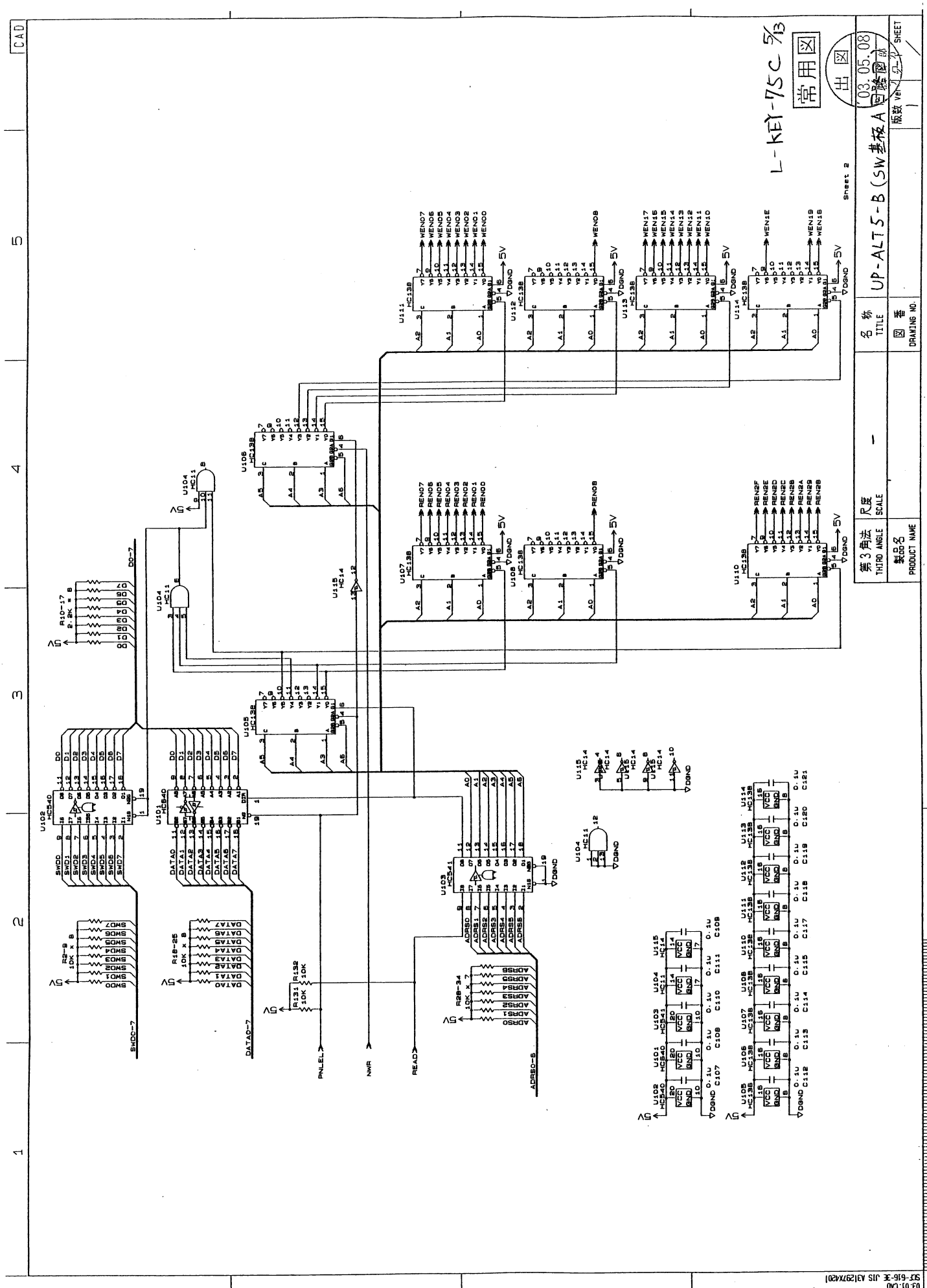

L-KEY-75C 2/3
UP-ALT5-B (メイン基板回路図)
常用図
出図
03.05.08
第3角法
THIRD ANGLE
尺度
SCALE
名称
TITLE
図番
DRAWING NO.
製品名
PRODUCT NAME
シート SHEET
版数 Ver.
CAD


L-KEY-75C 3/3
UP-ALT5-B (メイン基板回路図)
'03.05.08
常用図
出図
第3角法
THIRD ANGLE
尺度
SCALE
名称
TITLE
図番
DRAWING NO.
製品名
PRODUCT NAME
板数
SHEET
CAD
CN1
TX13-60P-DRLT
J400
1-178316-2
J415
5045-02A
J414
5045-03A
J412
DF18-6P-2.0DSA
U14
HC14
INV-S
PW_SW
FSW1
FSW2
FSW3
HOLED
NRESET
PNL_RST
PNLEL
READ
NWR
NCAPS
ADVCC
AGND
03.01.CAD


L-KEY-75C 4/13
UP-AL75-B (SW基板A図)
CAD
CN5
TX13-60P-D2ST
CN6
TX13-40P-D2ST
5V
+12V
DGND
AGND
VRG
STCV
HOLED
RESET
PNL_RST
PNL_EL/
READ
NWR
NCAPS
STC0-7
ADRS0-5
DATA0-7
TR101 2SC2712
TR102 2SC2712
PKB24P-3301
BUZZER
U115 HC14
U2S1C47DMCR1GB
NF101 220ODp
NF102 220ODp
NF103 220ODp
NF104 220ODp
03.05.08
第3角法
THIRD ANGLE
尺度
SCALE
名称
TITLE
図番
DRAWING NO.
製品名
PRODUCT NAME
シート
SHEET
版数
Ver.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常用図
UP-ALT5-B (SW基板A 回路図)
'03.05.08
出図
第3角法
THIRD ANGLE
尺度
SCALE
名称
TITLE
図番
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PRODUCT NAME
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ADRS0-5
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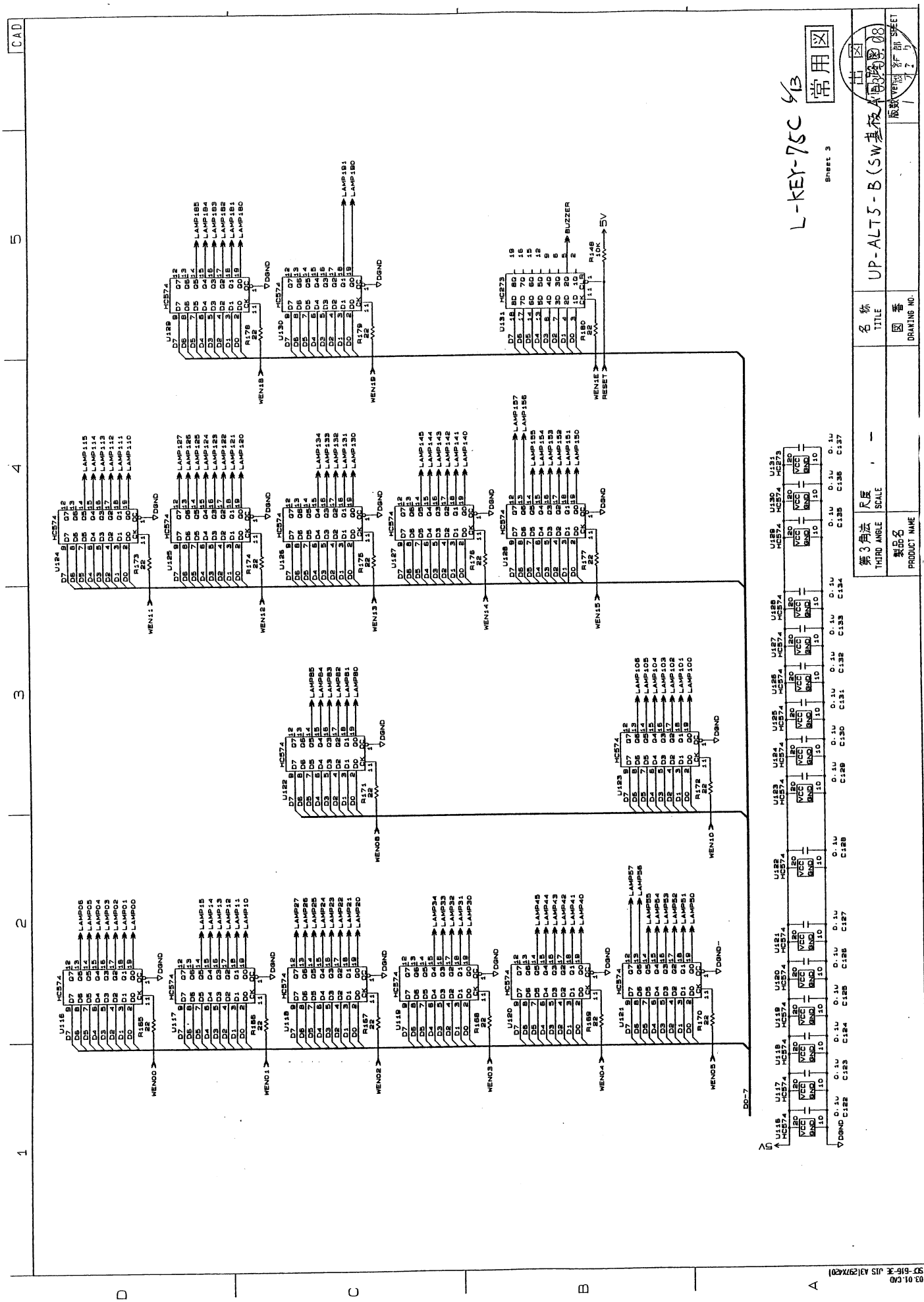
5V
DGND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WEN03
WEN04
WEN05
WEN09
WEN10
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WEN12
WEN13
WEN14
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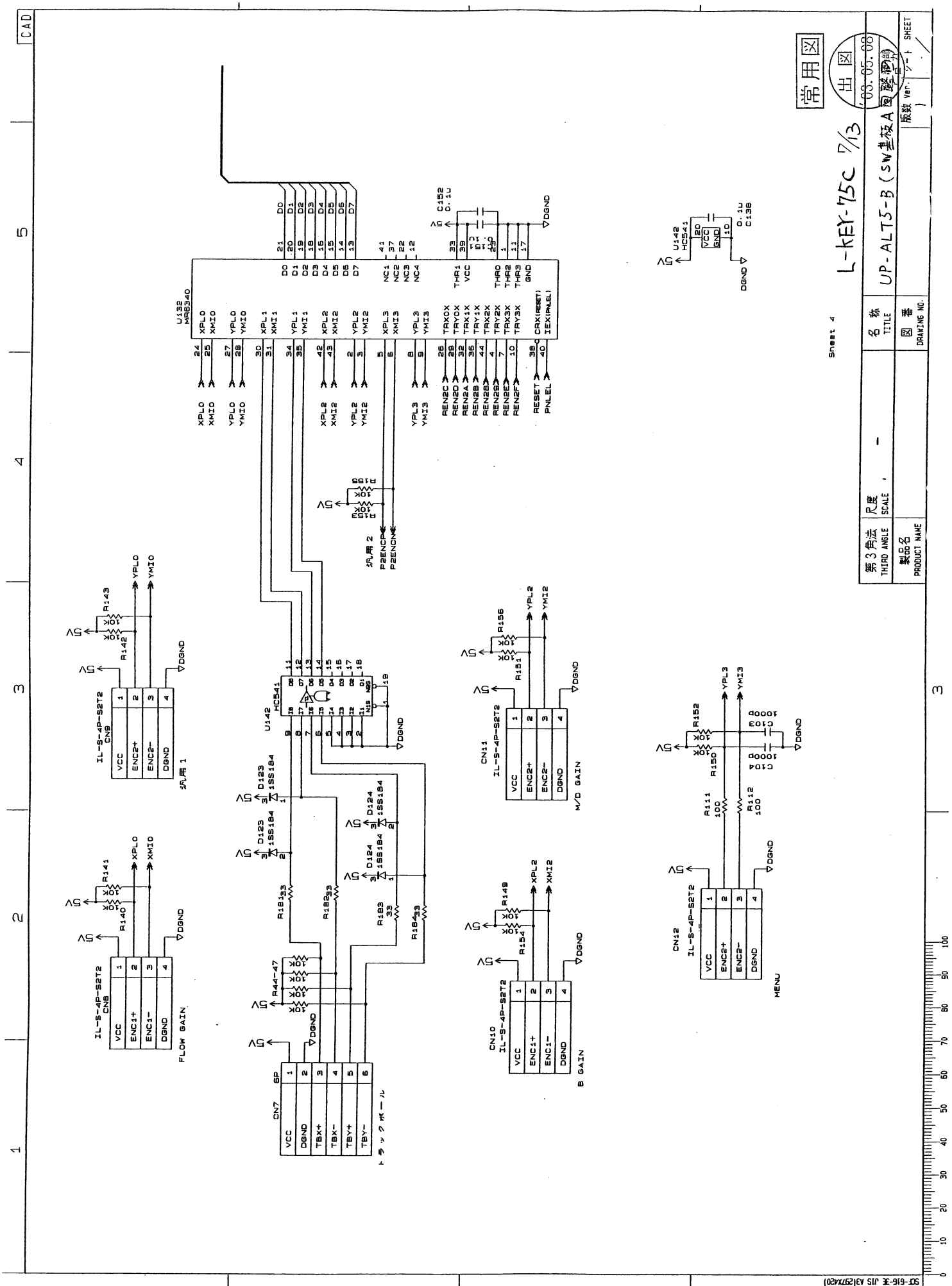
WEN16
WEN17
WEN18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出図
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U142 HC541
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CN9 IL-S-4P-S2T2
CN11 IL-S-4P-S2T2
CN12 IL-S-4P-S2T2
CN10 IL-S-4P-S2T2
CN7 6P
FLOW GAIN
M/D GAIN
B GAIN
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トラックボール
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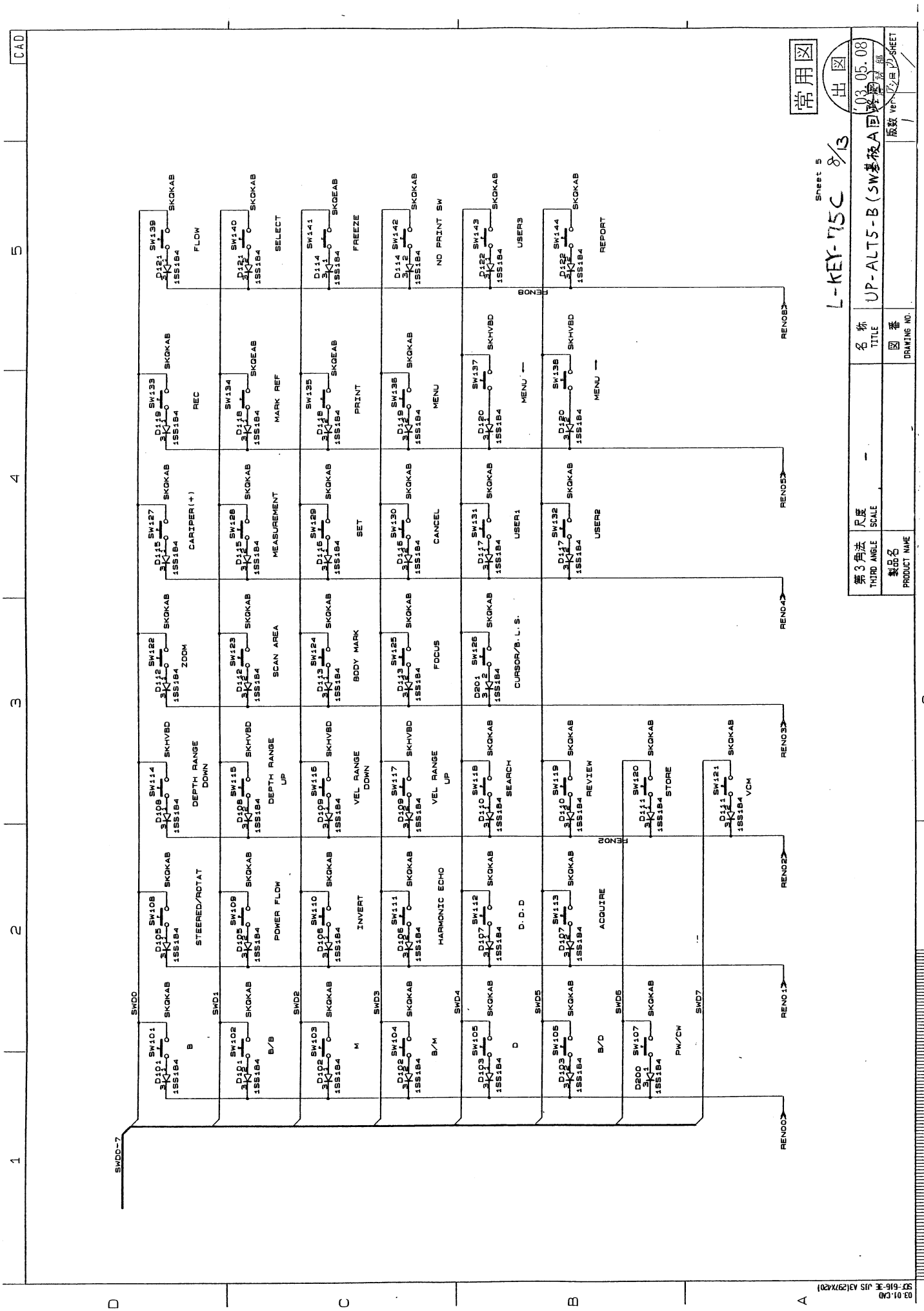
汎用 2
C152 0.1u
C138 0.1u
C104 1000P
R111 100
R112 100
R183 33
D123 1SS184
D124 1SS184
5V
DGND
XPL0
XMI0
YPL0
YMI0
XPL2
XMI2
YPL2
YMI2
YPL3
YMI3
P2ENCP
P2ENCN
RESET
PNLEL
VCC
ENC1+
ENC1-
ENC2+
ENC2-
TBX+
TBX-
TBY+
TBY-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Sheet 5
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SWD2
SWD3
SWD4
SWD5
SWD6
SWD7
SWDD-7
RENO0
RENO1
RENO2
RENO3
RENO4
RENO5
RENO8
RENO9
FENO2
FENO8
STEERED/ROTAT
B
POWER FLOW
B/B
INVERT
M
HARMONIC ECHO
B/M
D
D. D. D
ACQUIRE
B/D
PW/CW
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DEPTH RANGE UP
VEL RANGE DOWN
VEL RANGE UP
SEARCH
REVIEW
STORE
VCM
ZOOM
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BODY MARK
FOCUS
CURSOR/B. L. S.
CARIPER(+)
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CANCEL
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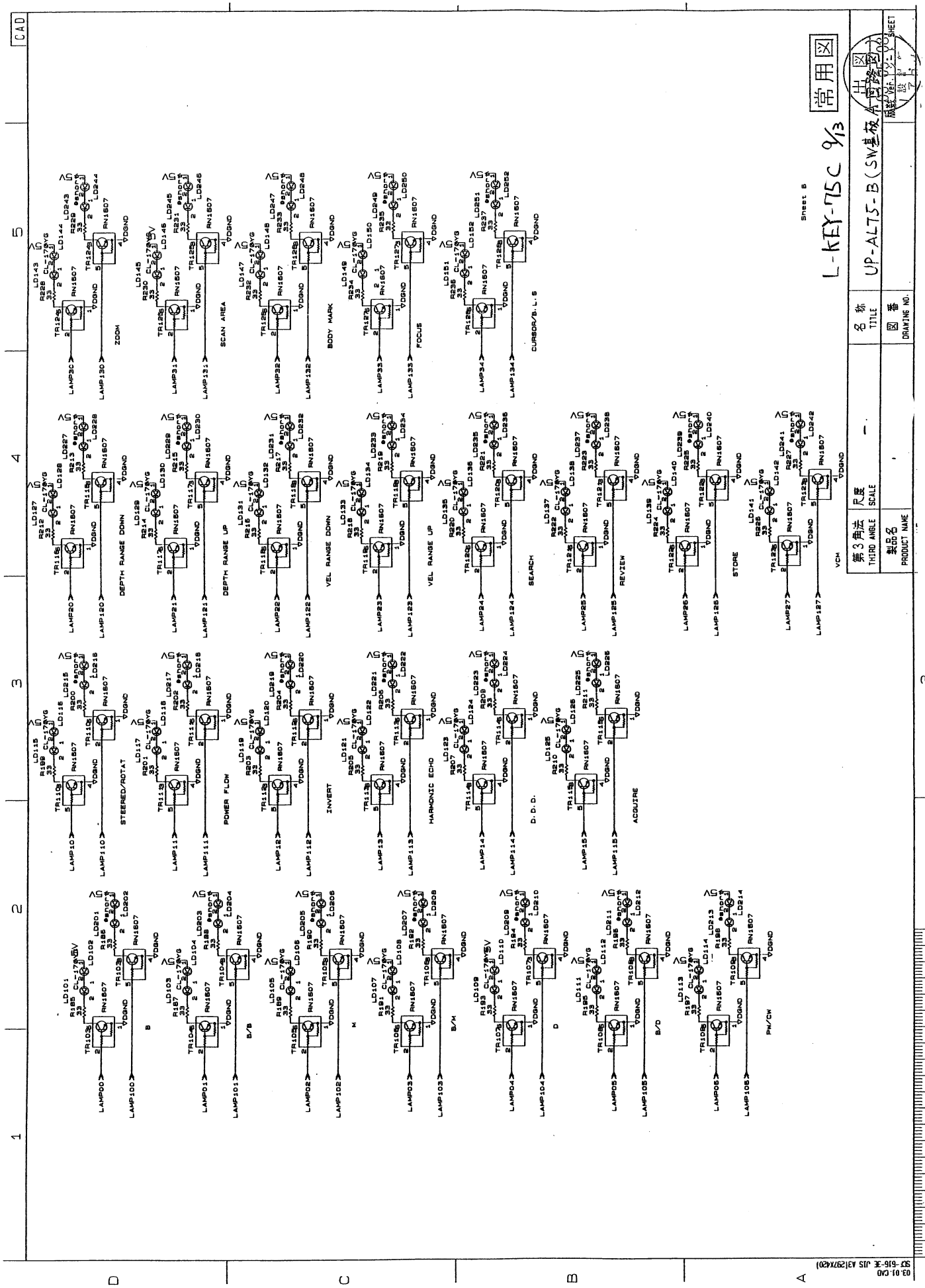
REC
MARK REF
PRINT
MENU
USER2
FLOW
SELECT
FREEZE
NO PRINT SW
USER3
REPORT
MENU
常用図
出図
'03.05.08
第3角法
THIRD ANGLE
尺度
SCALE
名称
TITLE
図番
DRAWING NO.
製品名
PRODUCT NAME
版数
SHEET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出図
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DEPTH RANGE UP
VEL RANGE DOWN
VEL RANGE UP
SEARCH
REVIEW
STORE
CURSOR/B.L.S
BODY MARK
FOCUS
SCAN AREA
ZOOM
STEERED/ROTAT
POWER FLOW
INVERT
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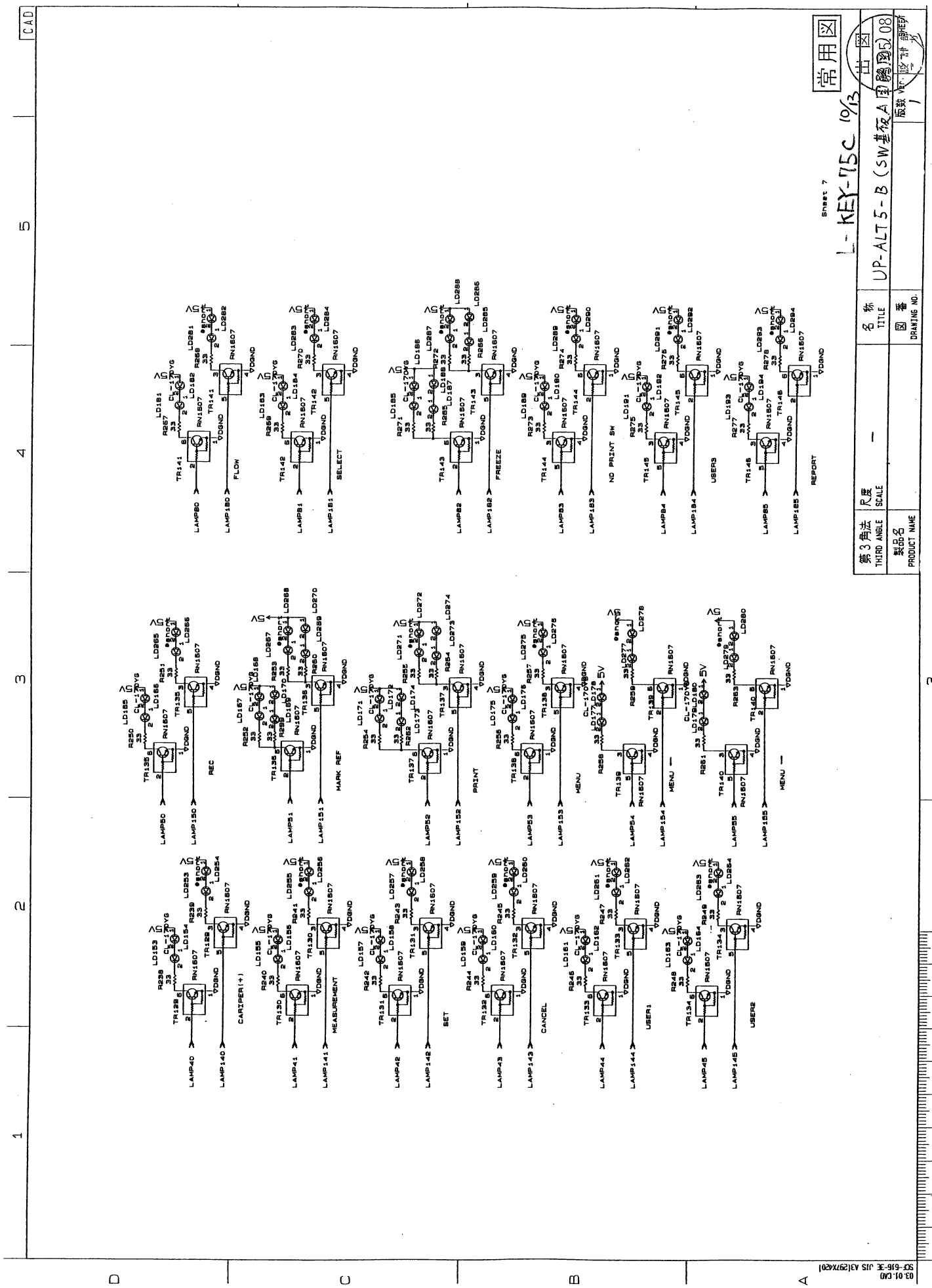
D.D.D.
ACQUIRE
VCM
B
B/B
M
B/M
D
B/D
PW/CW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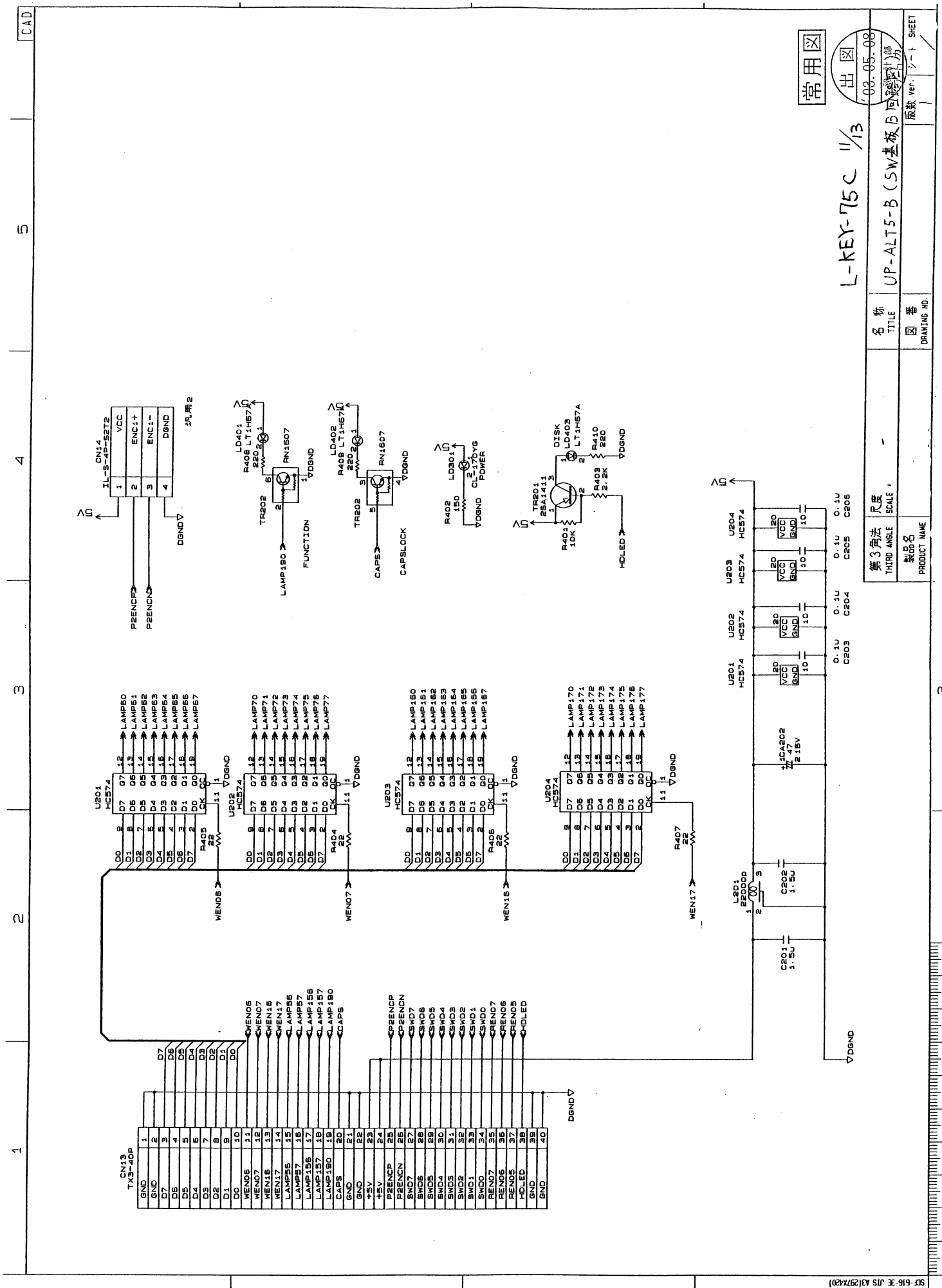
第3角法 THIRD ANGLE
尺度 SCALE
名称 TITLE
図番 DRAWING NO.
製品名 PRODUCT NAME
REC
MARK REF
PRINT
MENU
MENU —
MENU —
CARIPER(+)
MEASUREMENT
SET
CANCEL
USER1
USER2
FLOW
SELECT
FREEZE
ND PRINT SW
USERS
REPORT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常用図
出図
'02.05.09
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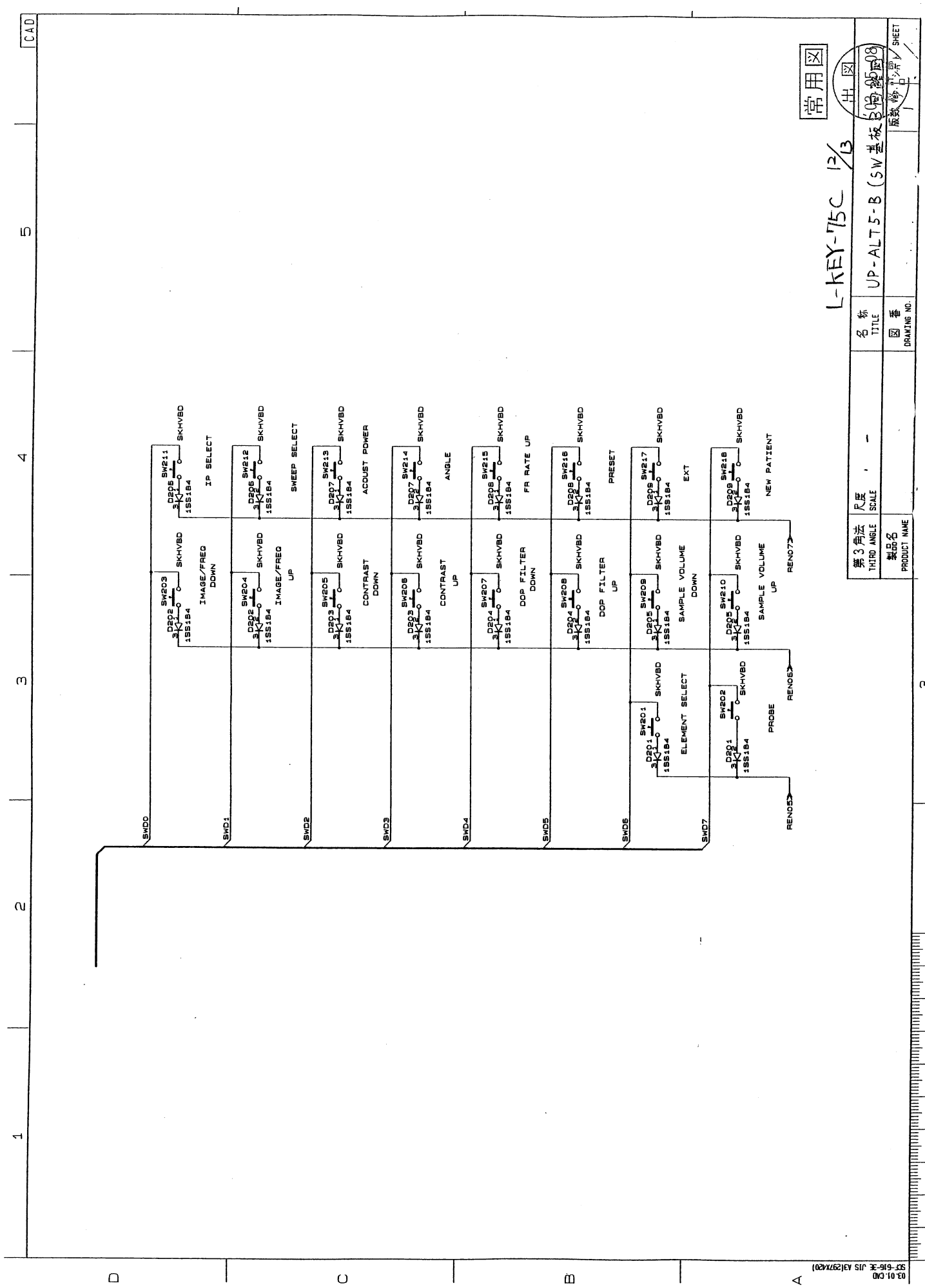
CN13 TX3-40P
U201 HC574
U202 HC574
U203 HC574
U204 HC574
TR201 2SA1411
TR202
LD401 LT1H67A
LD402 LT1H67A
LD403 LT1H67A
LD301 CL-170YG
RN1607
R401 10K
R402 150
R403 2.2K
R404 22
R405 22
R406 22
R407 22
R408 220
R409 220
R410 220
C201 1.5U
C202 1.5U
C203 0.1U
C204 0.1U
C205 0.1U
C206 0.1U
L201 2200UH
CA202 47 25V
FUNCTION
CAPSLOCK
POWER
DISK
LAMP190
CAPS
HDLED
DGND
5V
WEN05
WEN07
WEN16
WEN17
P2ENCP
P2ENCN
SWD7
SWD6
SWD5
SWD4
SWD3
SWD2
SWD1
SWD0
REN07
REN06
REN05
第3角法
THIRD ANGLE
尺度
SCALE
製品名
PRODUCT NAME
名称
TITLE
図番
DRAWING NO.
版数 Ver.
シート SHEET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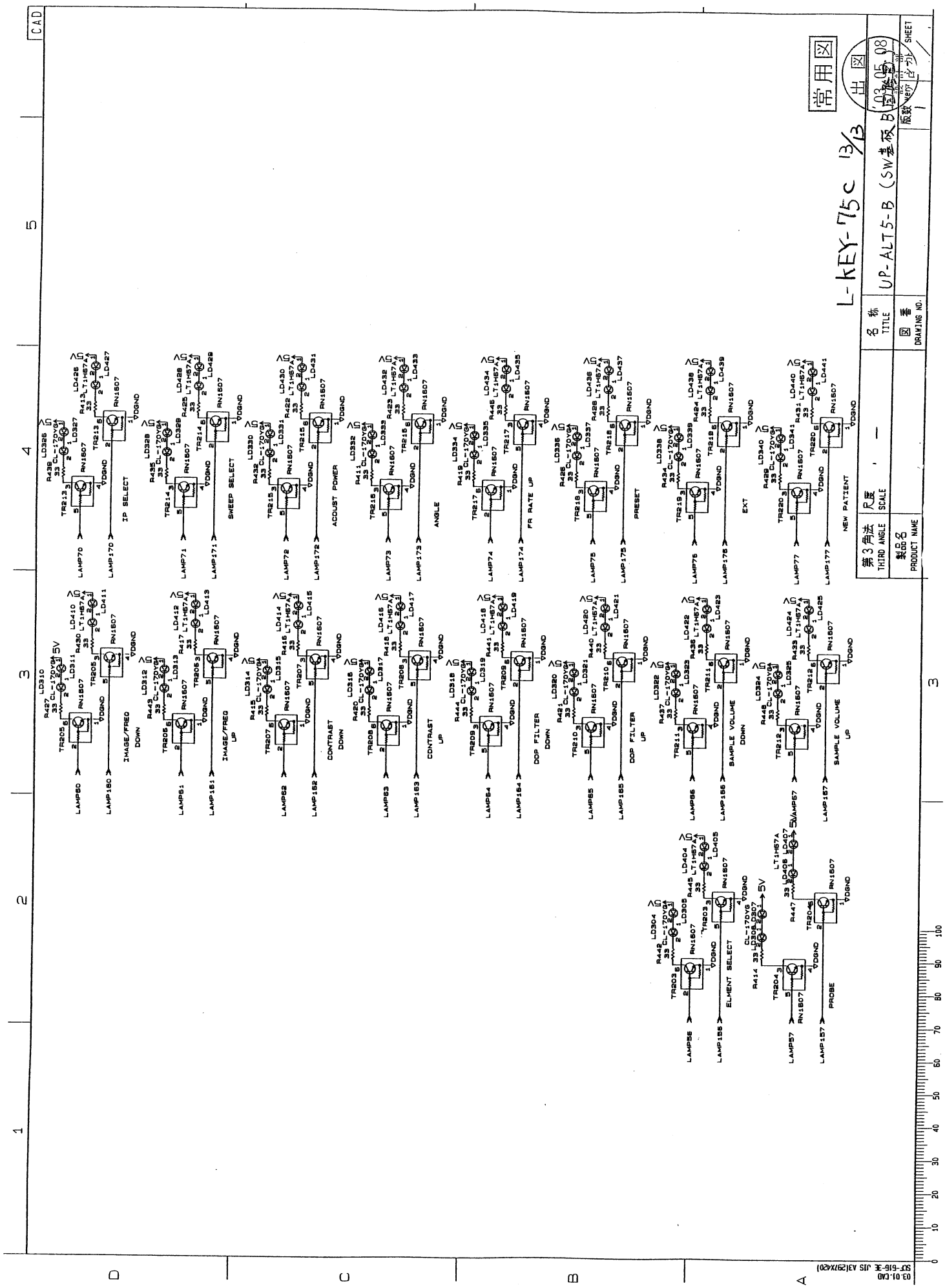
IMAGE/FREQ DOWN
SWEEP SELECT
IMAGE/FREQ UP
ACOUST POWER
CONTRAST DOWN
ANGLE
CONTRAST UP
FR RATE UP
DOP FILTER DOWN
PRESET
DOP FILTER UP
EXT
SAMPLE VOLUME DOWN
NEW PATIENT
SAMPLE VOLUME UP
ELEMENT SELECT
PROBE
SKHVBD
1SS184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UP-ALT5-B (SW基板B)
IP SELECT
SWEEP SELECT
ACOUST POWER
ANGLE
FR RATE UP
PRESET
EXT
NEW PATTERN
IMAGE/FREQ DOWN
IMAGE/FREQ UP
CONTRAST DOWN
CONTRAST UP
DOP FILTER DOWN
DOP FILTER UP
SAMPLE VOLUME DOWN
SAMPLE VOLUME UP
ELMENT SELECT
PROBE

SSD-4000 SERVICE MANUAL

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FILE 1

SERVICE MANUAL

PRO SOUND

SSD - 4000

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English Edition

Document Number : MN2-0233
Document Revision : 3

FILE 2

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SECTION 6

TROUBLESHOOTING

6-1 Introduction

This trouble shooting makes integral part of the Service Manual. And it has been prepared for the persistent purpose of providing for repairing guidelines.
What has been described herein, moreover, is subject to the prerequisite for a repair to be made by replacing a PCB.

6-2 Precautions

To prevent a new problem (secondary disaster) from taking place in the process of trouble shooting as described herein, every engineer concerned should duly take the following precautions:

1) Never remove any part from the electric system, including PCB, probe, cable, etc., before powering off the equipment.

2) Do not proceed to a disassembly of equipment without observing the established disassembly procedure. Be careful enough for wrongly disassembling the equipment would damage or break it down.

3) To make certain of a voltage and/or a signal waveform, it is necessary to thoroughly know the specification and handling procedure relating to a measuring instrument employed.

4) To ground a measuring instrument probe or the like, it is naturally necessary to know where a signal to determine is grounded. Before using the instrument, moreover, make certain for which the grounding terminal is intended, analog, digital, alternating current, direct current, high voltage or low voltage.

●CAUTION● Failure to ground properly might result in an incapability of observing an accurate voltage or waveform or in a probability of burning out the measuring instrument or ultrasound diagnostic equipment or both.

5) Do not fit a measuring instrument probe or the like to a measuring point before turning off the ultrasound diagnostic equipment.

●CAUTION● To determine an especially high voltage, it might rupture a circuit in the ultrasound diagnostic equipment. Besides, it might endanger an engineer or engineers concerned.

6) To replace or repair a PCB, make certain of its compatibility, etc, in accordance with the "History of SSD-4000".
If a wrong ROM should be mounted on a PCB, employ the ROM originally employed in the user's equipment or select an appropriate one in accordance with the History.

●CAUTION● If an incompatible PCB should be inserted into the equipment, there are possibilities that the equipment may be burnt out. If such incompatible PCB should remain inserted in the equipment after completion of a repair, moreover, it should be fully noted that another problem might take place newly.

7) Without definitively knowing that failure has taken place, do not unnecessarily change any controls and/or switches on a PCB from their original settings.
To determine whether or not a problem is the failure, see Section 8 "Performance Check."
If a readjustment is required, see Section 7"Adjustment Procedure."

●CAUTION● An unnecessary change of controls' or switches' settings might bring about a new problem, probably making the equipment unrepairable.

8) While you are shooting trouble in accordance with the present procedure, it may be necessary to consult with Technical Support. In such a case, provide at least the following information:

i) Equipment model number,

ii) Equipment serial number,

iii) History of equipment (repairs and/or modifications so far made), and software version, and

iv) Specific problem situations (Send a photo or photos.)

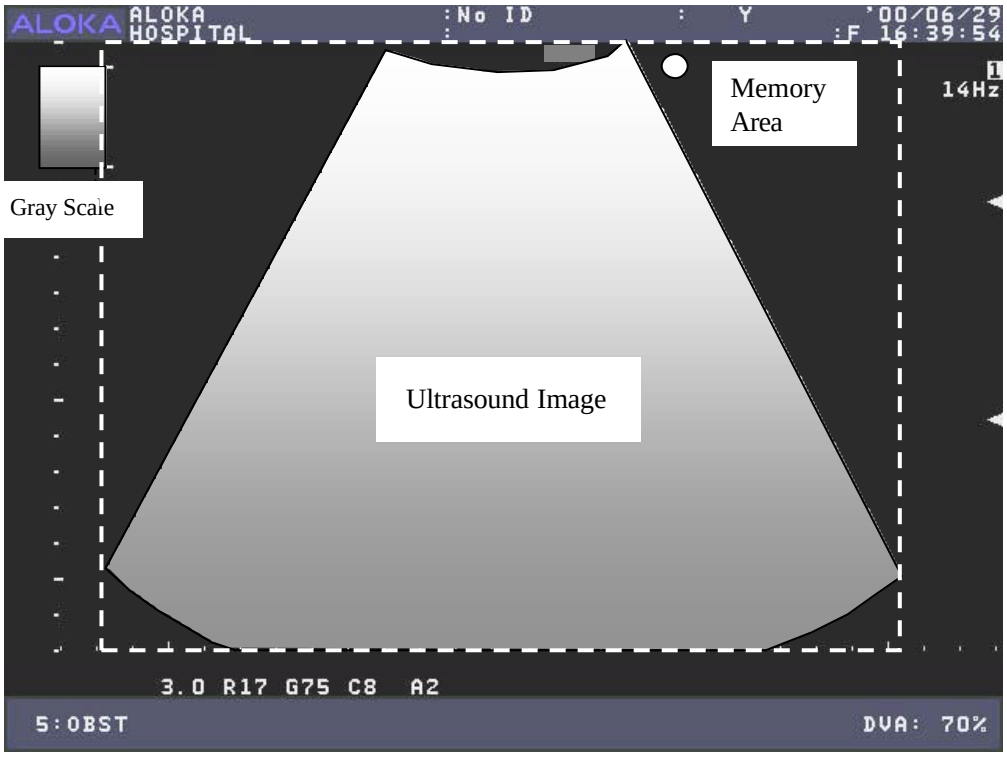


Fig.6-1 The Configuration On Display

To give an explanation about the situations of a problem, it is necessary to clarify to which it relates out of the elements composing the scene, while referring to the illustration given above. Related component elements may be roughly classified as follows:

- Ultrasound Image : An ultrasound tomographic image; its contour varies with an image mode, a probe, etc.
- Memory Area : A full size of memory required to display an ultrasound image.
- Gray Scale : An indicator of image gradients; its pattern varies with a setting of enhancement, gamma or the like.
- Character : A component of the text relating to a hospital name, ID, automatic display, etc.
- Graphic : A component of scale marks, active marks, body marks, etc.

6-3 Tools and Measuring Instruments Required

The tools and measuring instruments, which are required for a repair on a standard basis, are as follows:

1) Oscilloscope

Sensitivity : 5mV/div.
Frequency band : DC~50MHz
Maximum input voltage : 400V or more

2) Multi Meter

Class : 0.5 class
Range : ACV, DCV, DCA, Ω

3) Extension Card : EP442100BB

4) Test Piece:

Made by RMI (Radiation Measurements, INC.)
RMI-412 or RMI-403GS

5) Probe

Convex : UST-9123

6) ECG (EKG) simulator

EKG-101 (Made by Fukuda electronics) or equal model

6-4 Information

The settings for all functions are performed by the CPU (Central Processing Unit).
There are functions available that can be set by the user from an external source, and there are also functions that allow only servicemen to make the settings.
This section explains the various settings and amendments to avoid damaging and misunderstanding performance-related issued during repair work.

6-4-1 Automatic settings after switching the power supply on

The CPU will enter the initial setting mode when the power supply is switched on. The following procedures will be visibly executed prior to ultrasound waves being transmitted and images created and displayed.

The blower fins will begin to rotate.
↓
The power lamp will be illuminated and the DISK LED will blink
The switches are illuminated in order.
↓
[ALOKA Science & Humanity] , will be displayed on the TV monitor .
↓
[SSD-4000 System set-up in progress], will be displayed on the TV monitor
↓
Characters and graphics will be displayed on the TV monitor.
↓
The operation panel will be illuminated.
↓
An ultrasound wave image will be displayed.

6-4-2 Jumper (JP) settings

JP switches (jumper connectors) for the initial equipment settings and JP switches that correspond to a variety of uses are attached to the PCB. If the correct specifications are not made with these switches, the equipment will not only malfunction, but there is a risk that it may lead to new malfunctions. Reset these switches while referring to fig.6-5 if they are amended under unavoidable conditions.

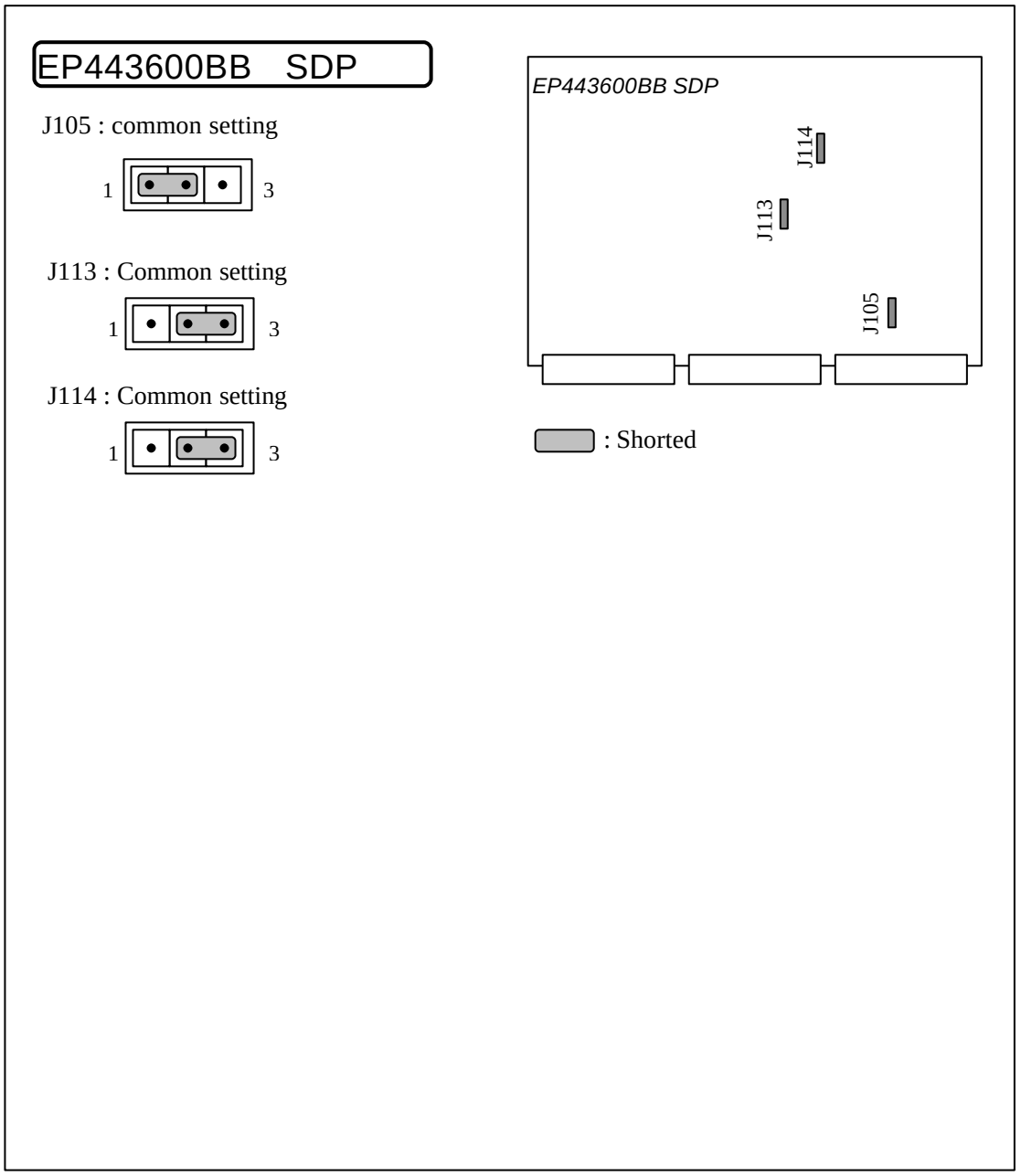


Fig. 6 - 5

6-4-3 Attention of connecting optional units

In the case of connecting the optional units, some optional units require other PCB something like an interface between the main body and optional unit, therefore, refer to the following table about the construction of optional units in advance.

OPTIONAL UNIT	CONSTRUCTION (Expecting constitution of except unit and PCB)
PEU-4000* Physio signal display unit	PSC EP4468** Physio signal unit EU-5044*
SCU-4000 (Ver.1.1.1 and higher) Mechanical unit	A ITF EP444301 Mech. Connector EP4448**
UCW-4000 Steerable CW Doppler unit	STCW EP4442**
EU-9082 Tissue Harmonic Echo unit	Tx & Tx Focus2 EP4441** EP4441** is included as standard from S/N.M00501 onwards.
EU-9083 (Ver.1.1.2 and higher) Video Cine Memory (VCM) unit	VCM EP4470**
EU-9084 (Ver.1.1.1 and higher) Volume mode unit	VOL EP4469**
UCW-4000 B (Ver.3.1 and higher) Steerable CW Doppler unit with Independent	STCW with IND EP4902**
EU-9094 (Ver.3.1 and higher) Independent probe connector unit	Independent probe connector EP4901**

Table 6 – 1

6-4-4 User-defined function settings

The functions that may be set up by the user are listed below. This data is backed up onto the hard disk or the internal memory (EP4423**) with a battery.

No.	User-defined settings	Storage medium	Battery back-up
1	Date and time	Internal memory	Yes
2	Hospital name	Hard disk	No
3	Preset	Hard disk	No

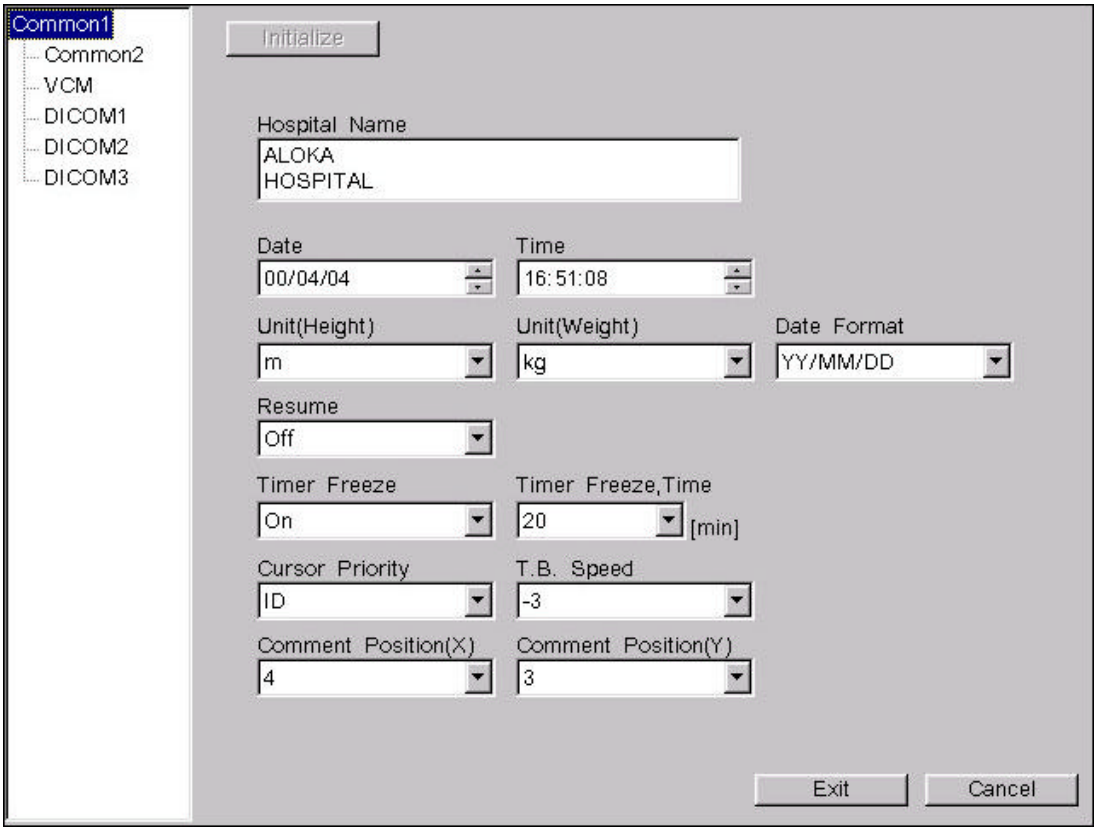
Although the back-up data will not be erased under normal conditions, there is a chance that it will be erased during repairs and upgrades. Save the back-up data prior to performing these tasks and restore it when the work has been completed.

○ Reference ○ : The back-up battery is mounted on the CPU board.

Refer to the following for details on the methods of setting up the back-up functions. Refer to the Operator's manuals provided with each item of equipment for further details.

6-4-4-1 Hospital name and date/time settings

Select the PRESET LIST in PRESET, and select COMMON PRESET in the PRESET screen and then enter the data with a full keyboard, and



Select [Exit] to register the data.

6-4-4-2 Preset settings

1) Press the [PRESET] switch.

2) Select [SET UP OF PRESET] or [COMMON PRESET] from the PRESET screen.

3) Select something from the Tree view and then register the contents of each set-up menu or set the contents of COMMON PRESET.

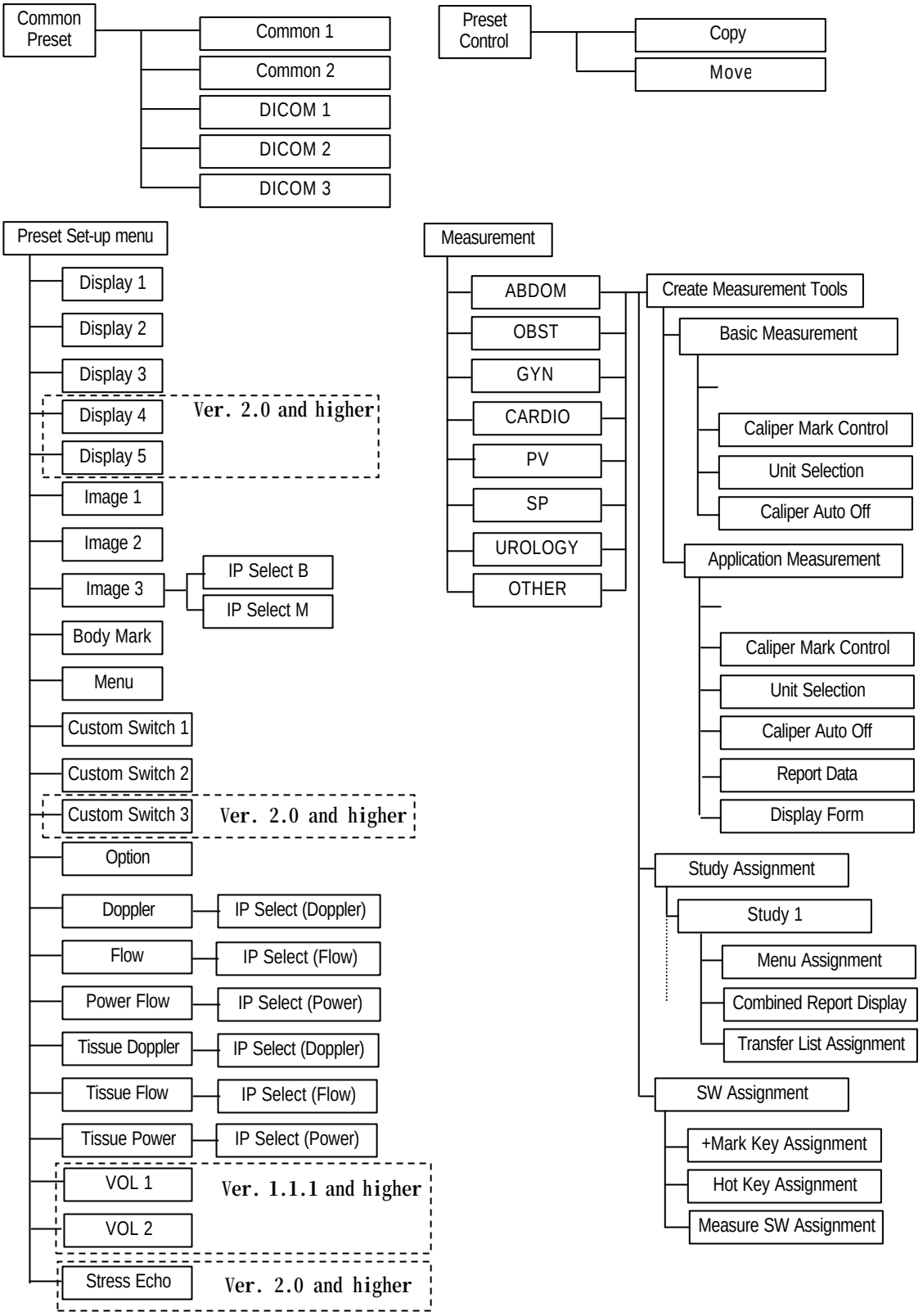
4) Register the preset name in [PRESET NAME].

5) Press [EXIT]

6-4-4-3 Preset table constitution

The next page shows the Preset table constitution for reference.

Preset table constitution



6-4-5 Resetting the Backup data

A backup feature is available to normally store the user's settings. In normal use, it will not be necessary to erase all the information so stored. It is necessary, however, to reset the backup memory with reference to the item 6-4-7 given below in any of the following events:

● IMPORTANT ● Resetting the backup data will erase the all user preset installed by floppy disk.
Please prepar all of the installed floppy disk for user preset beforhand when reset the backup data.

●**CAUTION**● Resetting the backup data will erase all presettings and hospital name.
To set them all over again after resetting the backup data, it is necessary to stor the preset data according to “Backup the preset data” described in 6-4-6.

1) When the software has been altered for an upgrade or for any other reason,
2) When an unnecessary (abnormal) character or characters or code or codes is displayed in the data which have been set by the user.
3) When the system fails to start up even if the equipment is powered on.

Under such a circumstance, resetting the backup memory is a mere provisional action consistently. To make a substantial repair, refer to 6-4-10 and 11. In such a situation, moreover, it is impossible to store the set information, such as presettings, etc.

●**CAUTION**● NEVER reinstall the backup data saved in the state of item 2) or 3) above.
In case such data is reinstalled by mistake, not only the problem may recur but also the system may fail to be started.

○REFERENCE○ This equipment is not equipped with backup RAM which was installed in our previous equipment.

6-4-6 Backup the preset data

On the SSD-4000, all the preset data including the measuring function (obstetrical table) can be backed up and reinstalled.

There are the following two methods of backing up such data: saving the data from the preset control available for the user and saving it from the maintenance menu for use by the service personnel only.

The backup data is saved on the floppy disk through the floppy disk drive installed in the equipment. Therefore, it is necessary to prepare a formatted floppy disk.
The capacity of backup data from the maintenance menu becomes big, because this function saves all internal data in one lump package. Therefore, it is necessary to prepare a formatted MO disk and MO disk drive. A floppy disk and an MO disk should be prepared by each of you when necessary.

○REFERENCE○ The floppy disk is the 3.5-inch, 2HD and 1.44MB DOS-formatted disk. The MO disk is 3.5-inch, DOS-formatted disk. The equipment itself has no formatting function.

●CAUTION● When backup the preset data

When it is suspected that the backup data is damaged due to a failure, etc., or unnecessary data is contained in the backup data, do not back up the preset data. If you reinstall such data by mistake, the failure may recur or a new failure may be caused.

●CAUTION● During backup the preset data

While the LED lamp of the floppy disk drive or MO disk drive is on, NEVER push the eject button to remove the floppy disk or MO disk. The floppy/MO disk drive and floppy/MO disk may be damaged.

1) About saving the data from the preset control (Copy of Preset/Library)

Necessary items only can also be backed up for each preset or each library. (Hospital names cannot be backed up.)
For details of the operational procedures, refer to the operator's manual.

① Select Preset.
② Select Preset Control

③ Insert a floppy disk, and select “To Floppy”. Then select “Copy”. The following message will display on the TV monitor.

In progress. Please wait.

④ Copy the necessary preset items to the floppy disk.

2) Saving the data from the maintenance menu (Copy Preset)

For details, refer to 11-2-2, "Maintenance menu" in Section 11. All the backup data is saved collectively. All the backup data is backed up collectively.

① Press the Preset switch to display the preset select screen.

② Press CTRL + S to turn on the maintenance mode.

③ Select “UP GRADE” from Tree View.

④ Select “Back-Up Data Save” from the maintenance menu.

During backup, the message "In progress. Please wait." is displayed at the lower left of the TV monitor.

6-4-7 How to reset the backup data

Resetting the backup data is done from the operation panel.

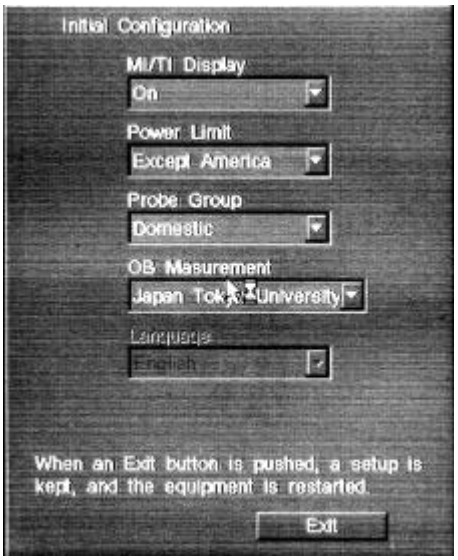
1) Resetting the backup data from the operation panel

① Press the Preset switch to display the preset select screen.

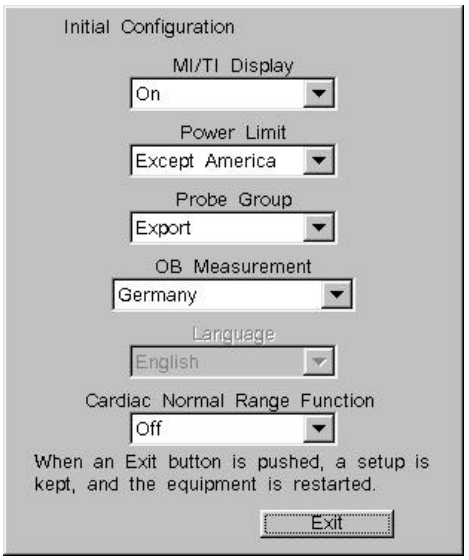
② Press CTRL + R, then the message below will appear on the TV monitor.

③ Press OK switch, then the machine automayically re-boot itself.

④ After re-booting, the window shown below will appear on the TV monitor.



Ver.1.1.2 and lower

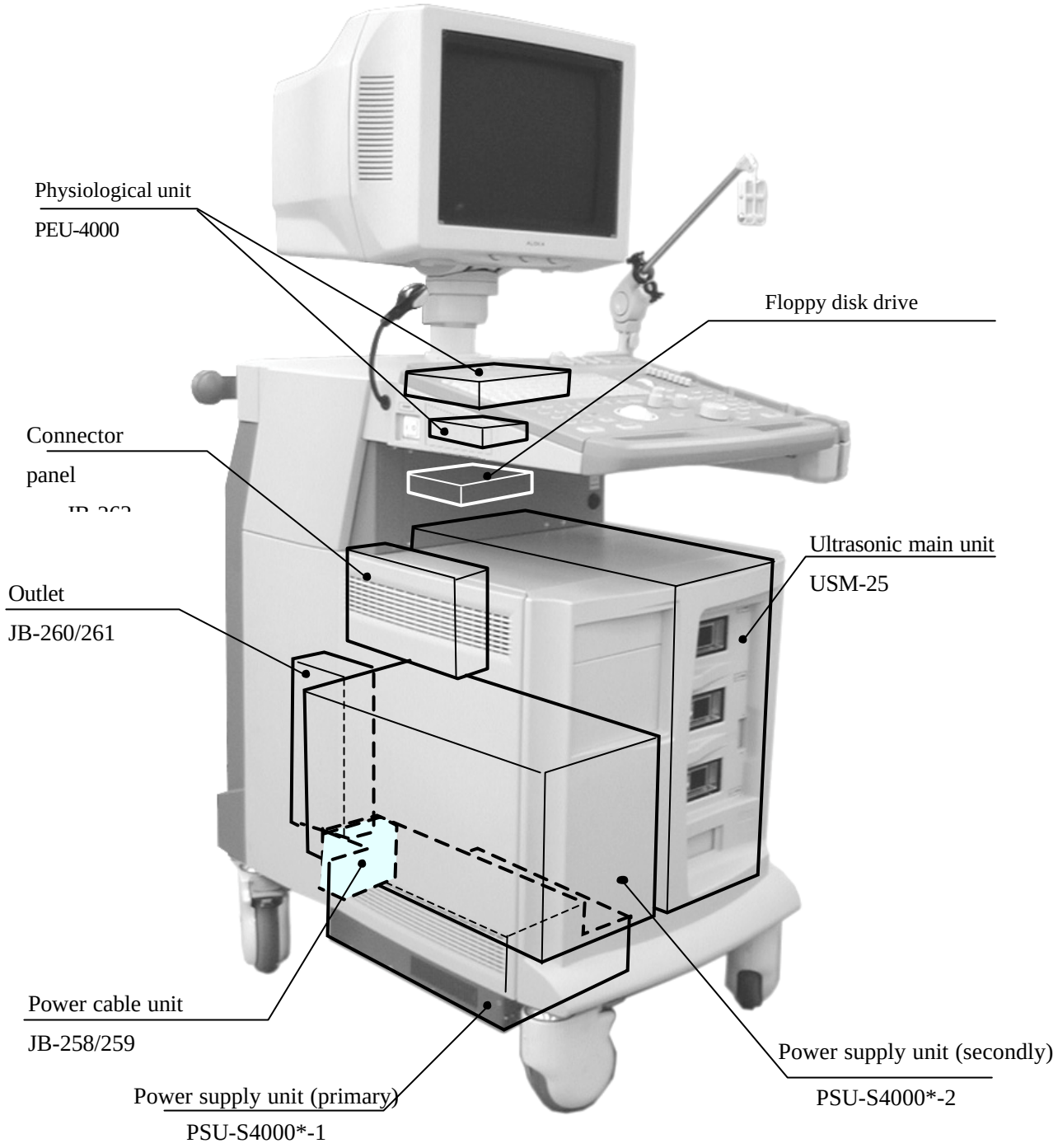


Ver.2.0.0 and higher

⑤ Confirm the contents of Configuration, then select “EXIT” and turn the power off and on again automatically.

6-4-8 Location of unit

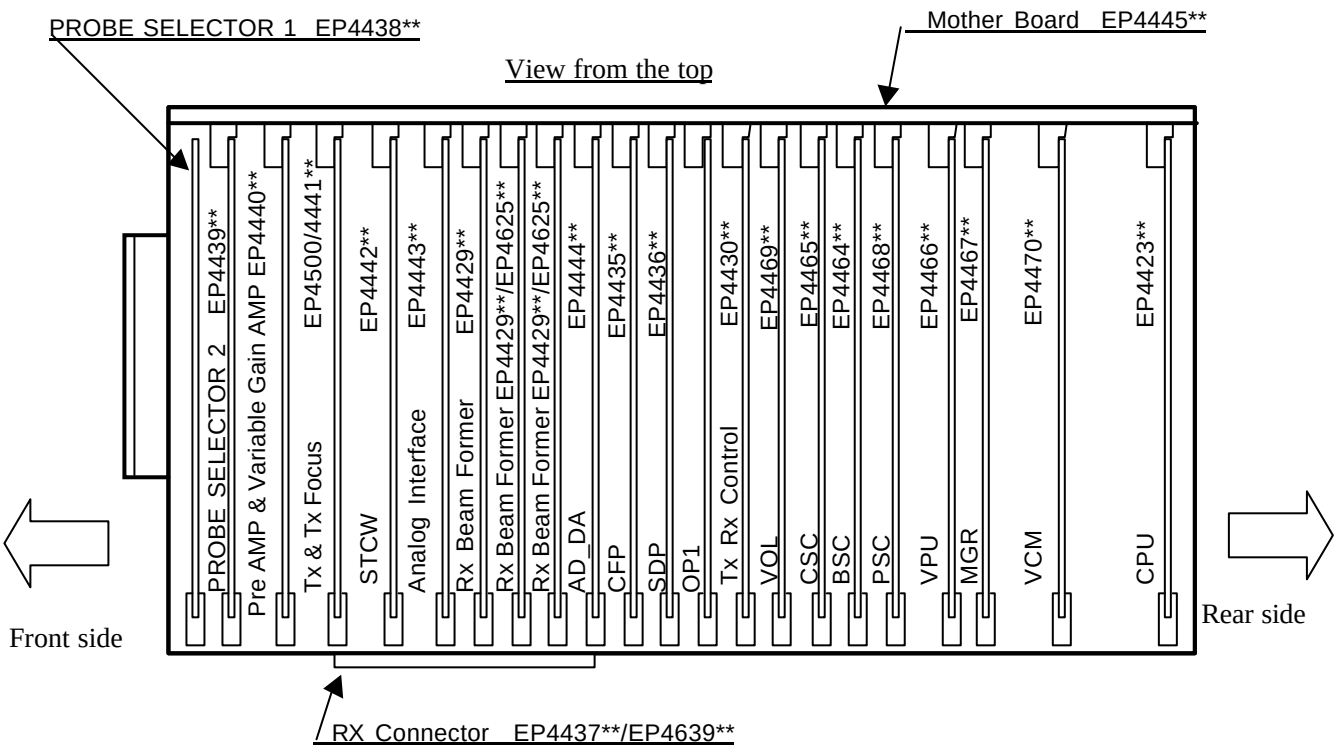
The location of the all units and PCBs with main chassis and PCBs in each unit is shown below figure. Refer to the disassembling procedure and parts list when repairing or upgrading.



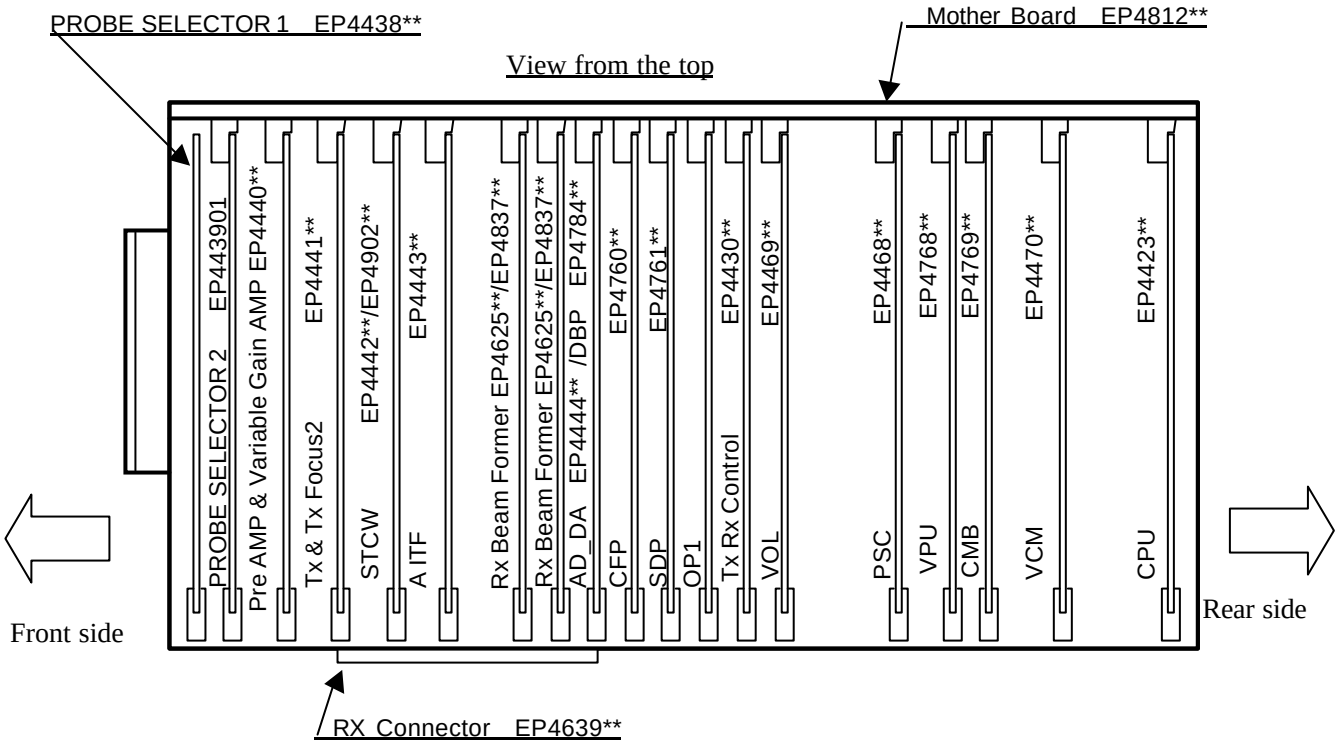
Ultrasonic Main unit (USM-25*)

The construction of this module and PCB location is shown following for reference.

Applied to S/N. M01100 and before

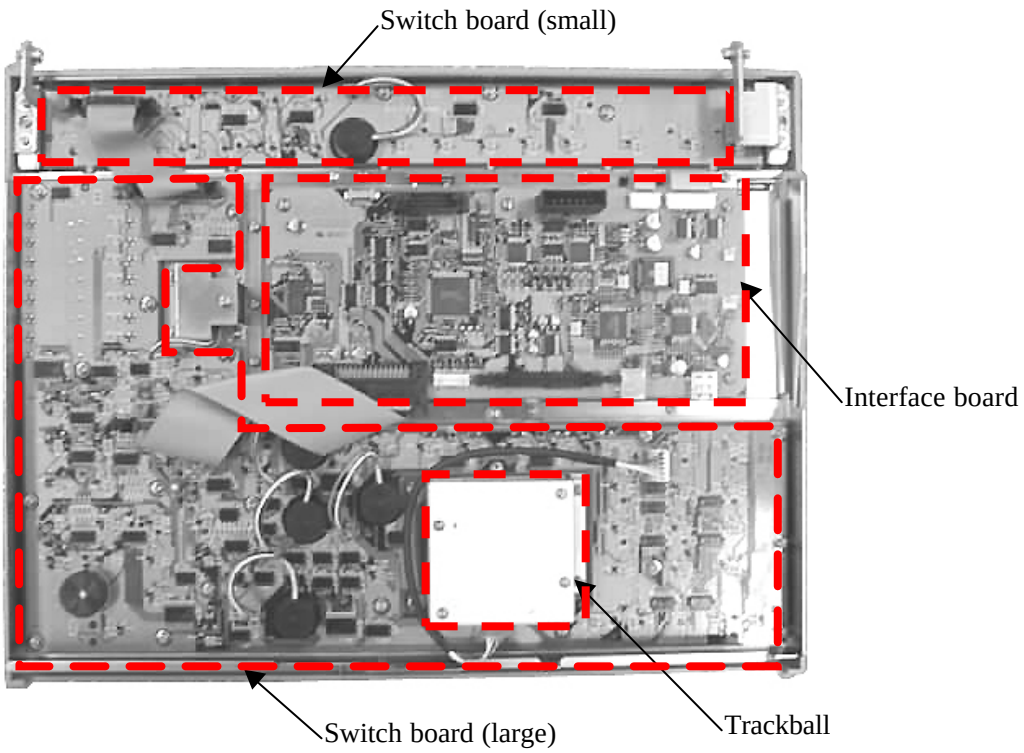


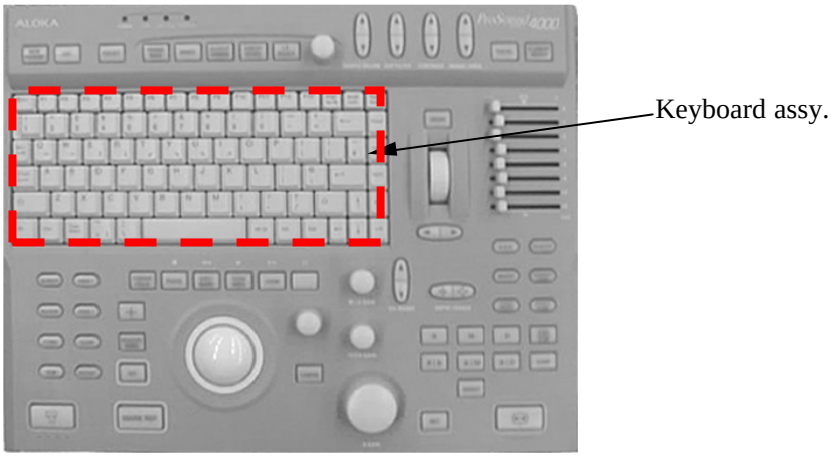
Applied to S/N. M01101 and after



Main panel (L-KEY-75*)

The construction of operation panel and PCB location is shown following for reference.

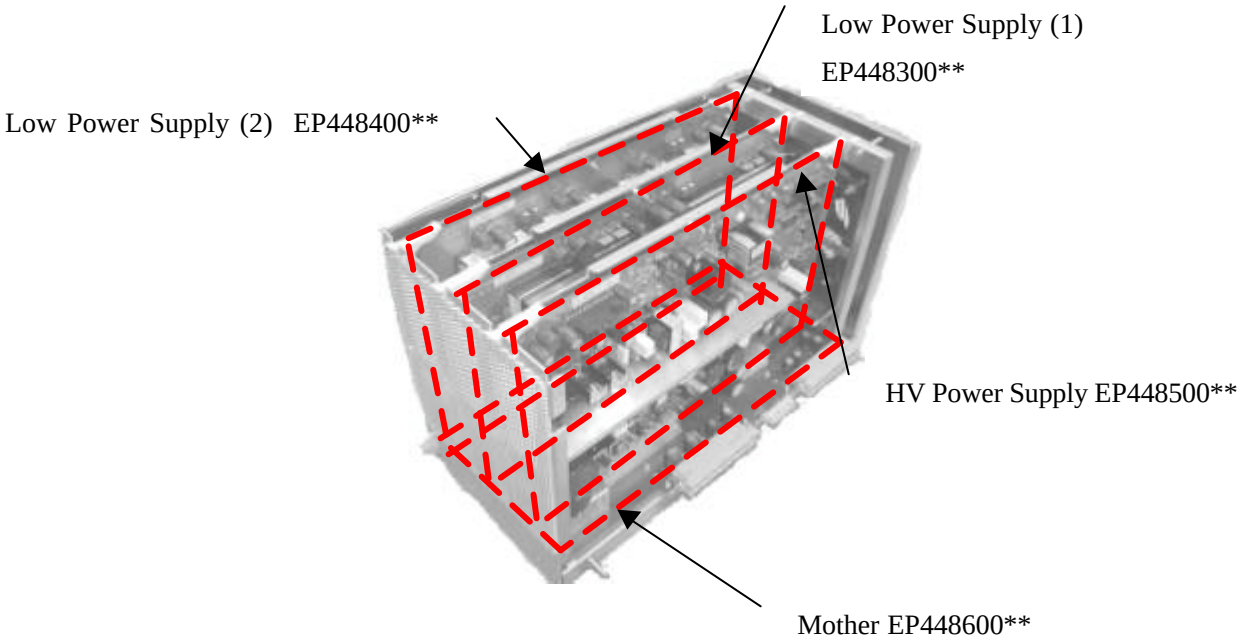




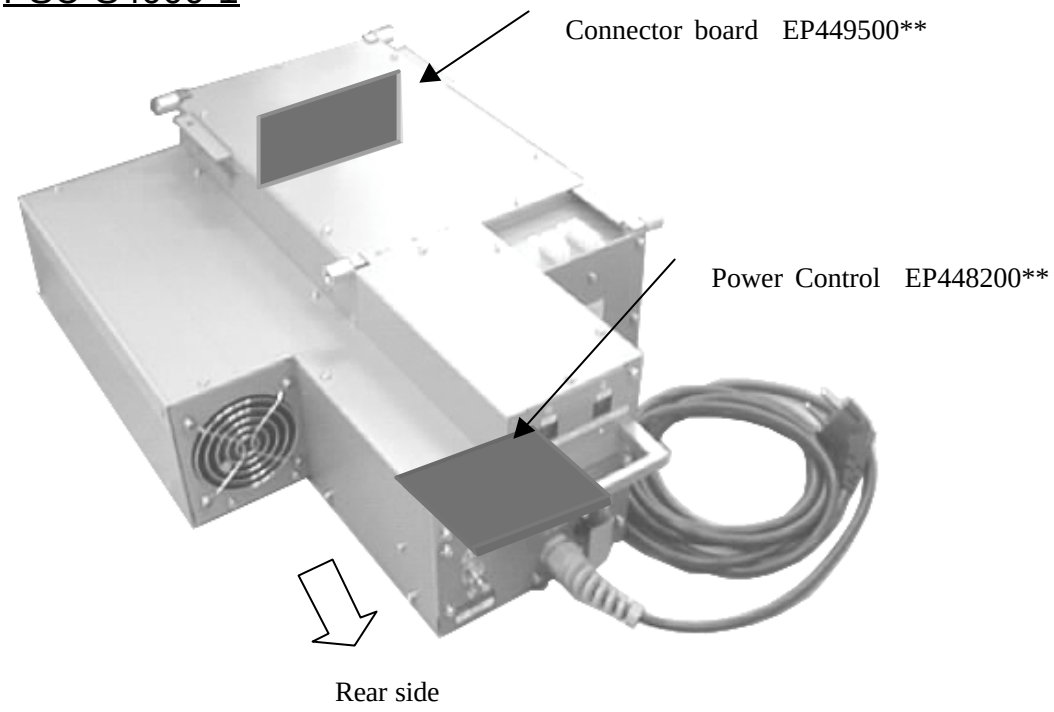
Power supply unit (PSU-S4000*)

The construction of power supply units and PCB locations are shown following for reference.。

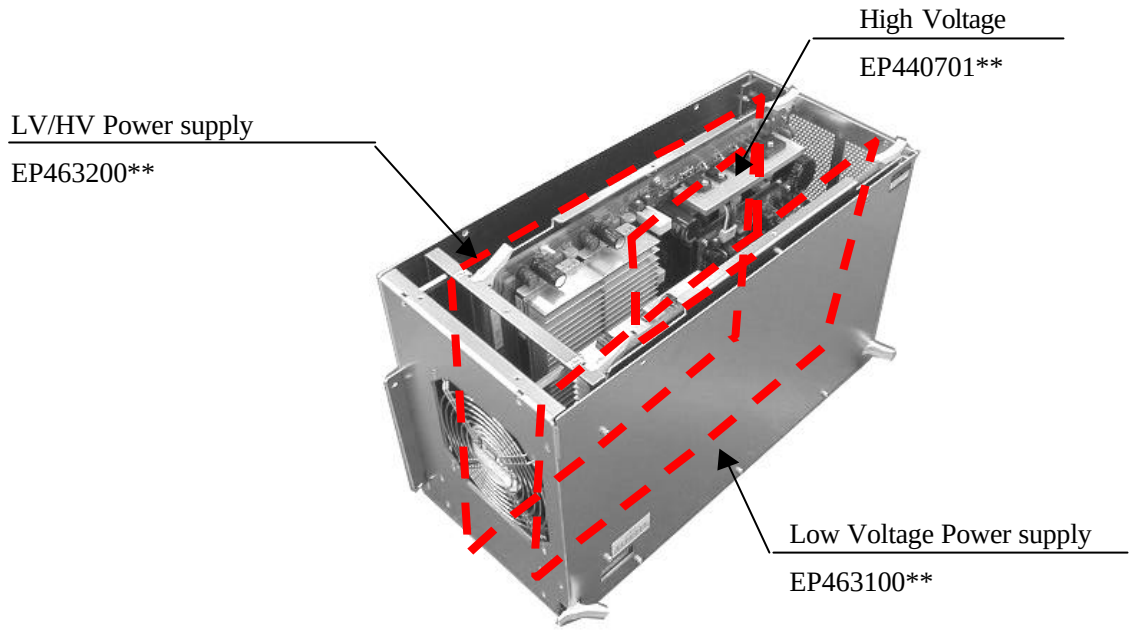
PSU-S4000-2



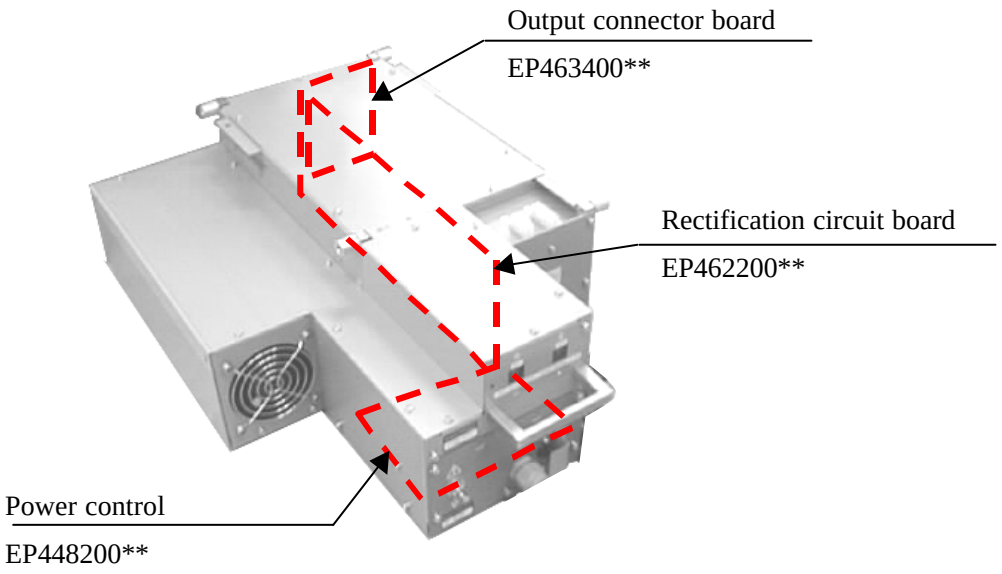
PSU-S4000-1



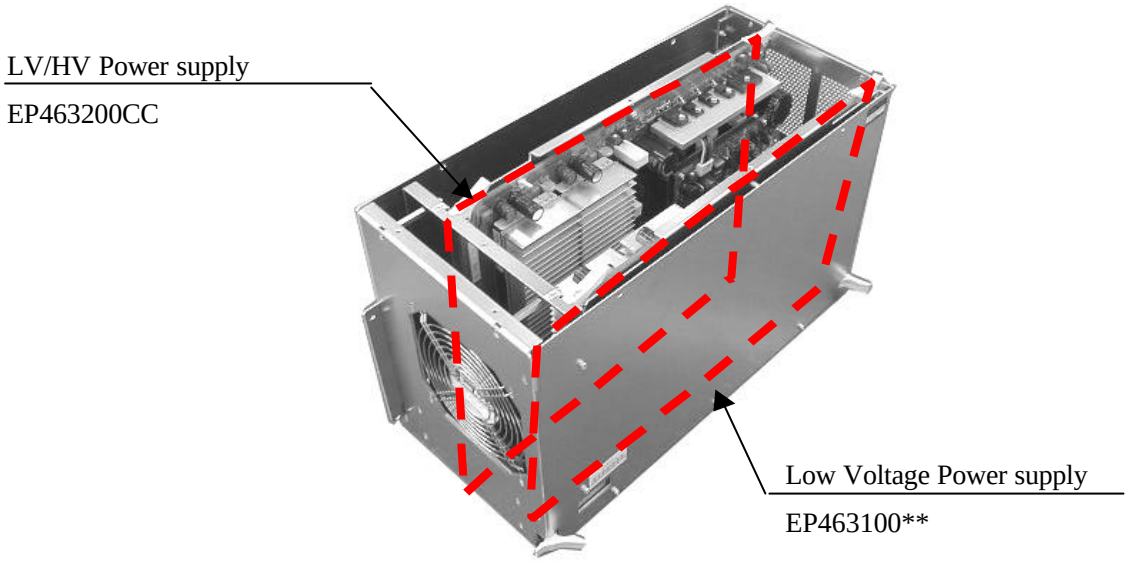
PSU-S4000B-2



PSU-S4000B-1



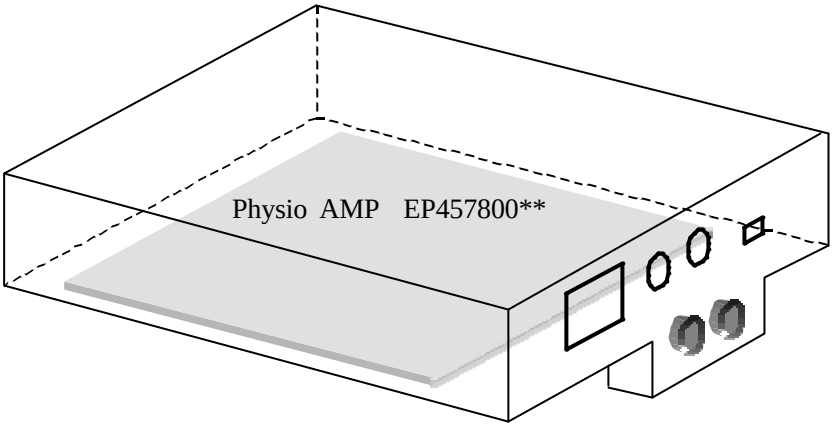
PSU-S4000B-2B



Physio signal display unit (PEU-4000)

The location of physiological signal display unit PCBs is shown following for reference.

PSC (physiological signal memory) PCB is inserted into USM-25 unit, refer to “PCB location of USM-25”.

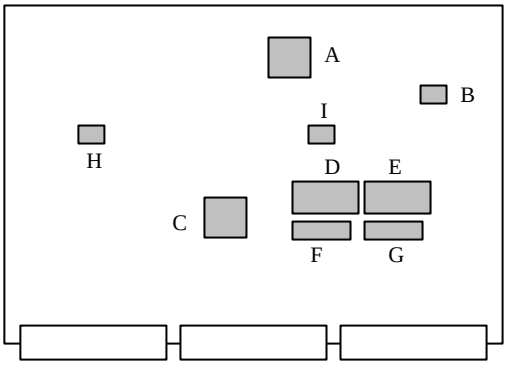


6-4-9 Location of ROMs

The location of ROMs are shown following figures. Please refer for replacing the ROMs on upgrade etc.

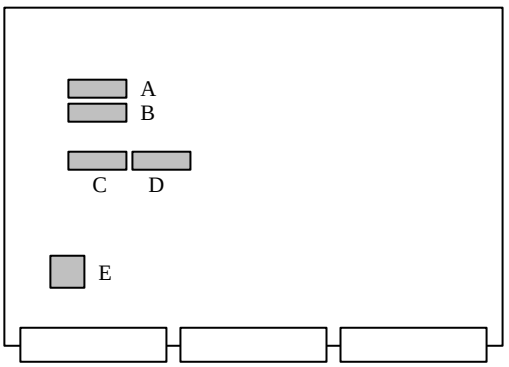
EP443500 CFP

	ROM No.
A	35148*
B	35112*
C	3539*
D	00616*-3557*
E	00615*-3556*
F	3538*
G	3537*
H	3587*
I	3574*



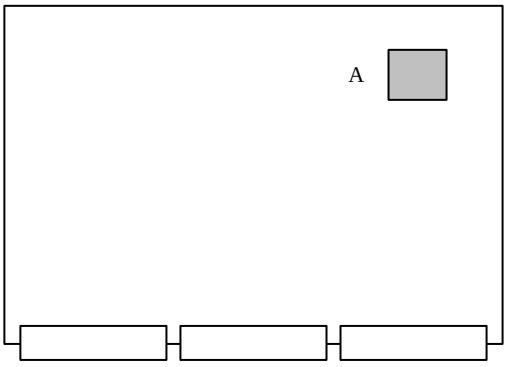
EP443600 SDP

	ROM No.
A	36146*
B	36137*
C	36106*
D	36105*
E	1205*



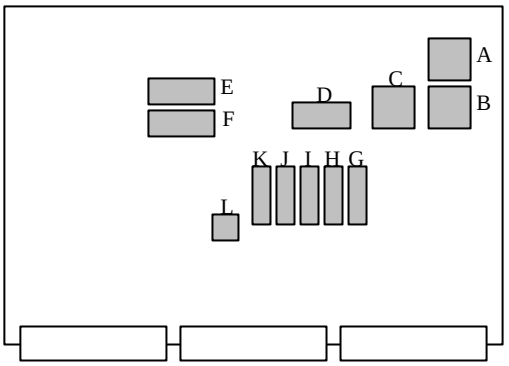
EP444200 STCW

	ROM No.
A	4224*



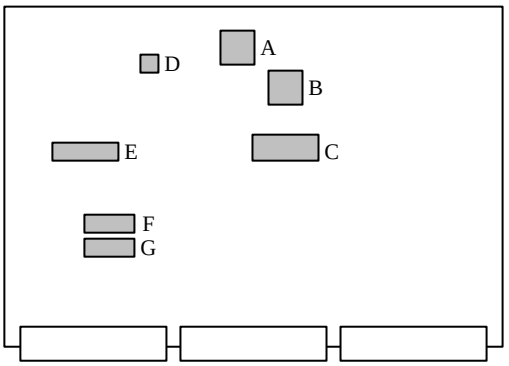
EP444300 Analog Interface

	ROM No.
A	1255*
B	1256*
C	1258*
D	L-ROM-1264*
E	L-ROM-1265*
F	L-ROM-1266*
G	1259*
H	1257*
I	1262*
J	1261*
K	1260*
L	1263*



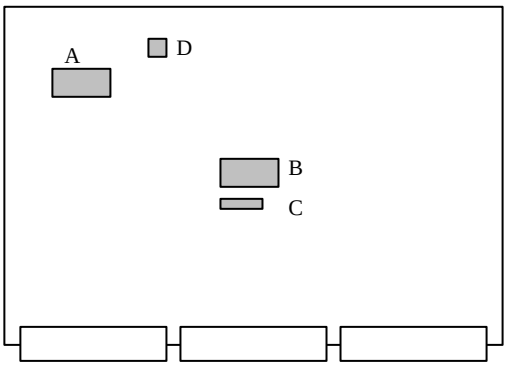
EP446400 BSC

	ROM No.
A	64149*
B	64126*
C	00635*-64103*
D	64137*
E	00636*-64107*
F	6453*
G	6438*



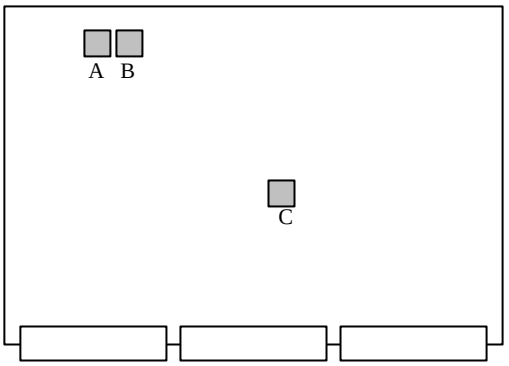
EP446500 CSC

	ROM No.
A	00644*-6579*
B	00643*-6544*
C	6537*
D	65136*



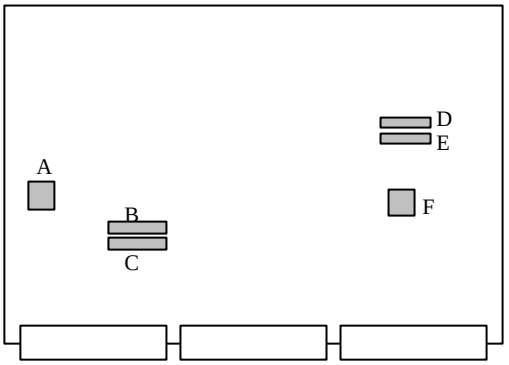
EP446700 MGR

	ROM No.
A	67174*
B	67173*
C	67117*



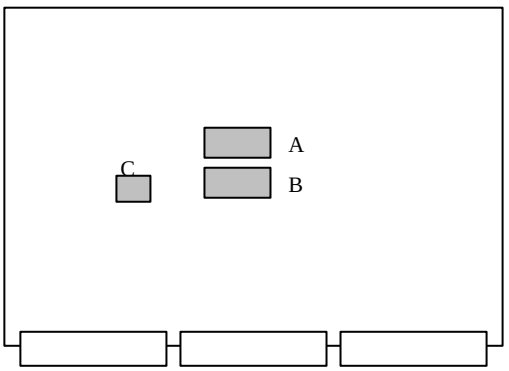
EP446800 PSC

	ROM No.
A	6849*
B	6824*
C	6812*
D	6866*
E	6858*
F	6850*



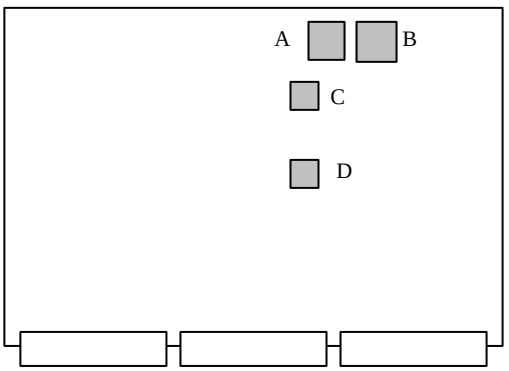
EP444400 AD_DA

	ROM No.
A	00510*-44801*
B	00511*-44802*
C	44807*



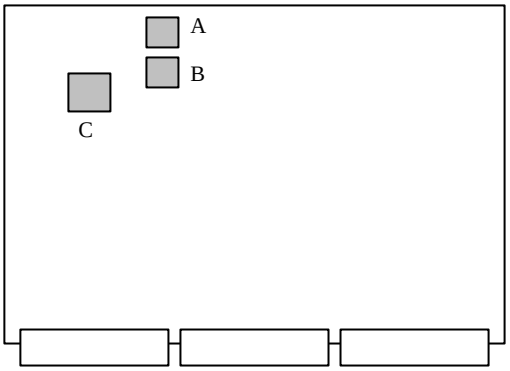
EP450000 Tx & Tx Focus

	ROM No.
A	1253*
B	1254*
C	1252*
D	1251*



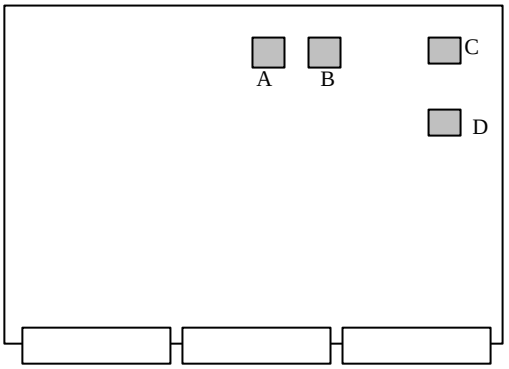
EP443900 PROBE CONNECTOR 2

	ROM No.
A	3913*
B	3912*
C	3938*



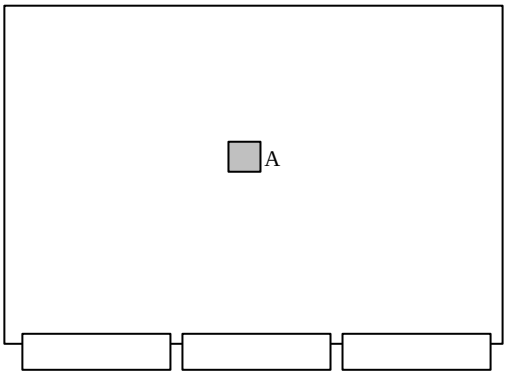
EP444100 Tx & Tx Focus 2

	ROM No.
A	1253*
B	1254*
C	1252*
D	1251*



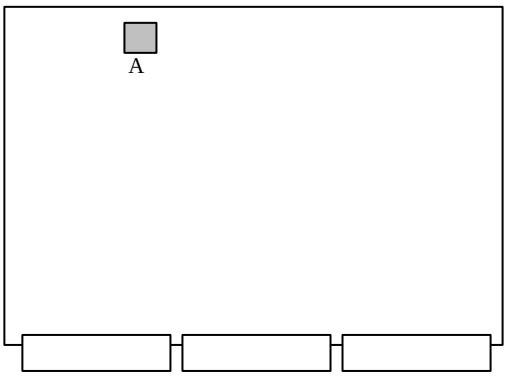
EP443000 Tx Rx Control

	ROM No.
A	1211*



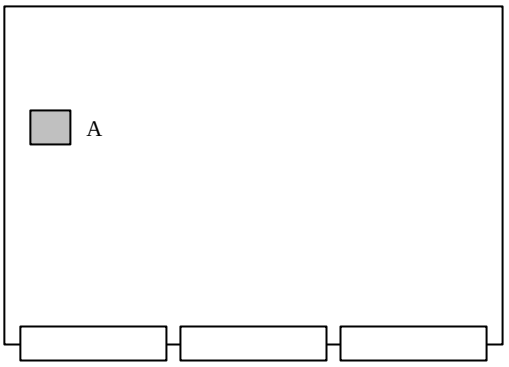
EP446600 VPU

	ROM No.
A	66143*



EP476900 CMB

	ROM No.
A	L-ROM-1346*



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6-4-10 Action to be taken if the equipment fails to be started or the panel operation is locked up

In case the system fails to start or crashes even if it starts, "Checklist Map" in paragraph 6-5 is not effective. Perform repair operation by referring to the following items.

1) Checking the power voltage

First of all, check the output voltage of the power supply unit.

There are four CPUs in this system. The CPU controls the whole system. The three remained CPU controls the peripheral circuits.

If a +3.3V/+5V/+12V power supply is not delivered from the power supply unit to these CPUs and the hard disk drive, or the supplied power is abnormal, trouble will be brought upon the whole system.

Even if the power supply unit is normal, it is also suspected that the connection cable is broken or the power distributing circuit on each PC board is at fault.

The CPUs are installed on the following PC boards, respectively.

EP4423**	CPU	(USM-25*)	
EP4467**	MGR	(USM-25*)	(S/N. M01100 and before)
EP4430**	Tx Rx Control	(USM-25*)	
I/F	Interface	(L-KEY-75*)	
EP4769**	CMB	(USM-25*)	(S/N. M01101 and after)

2) Trouble attributable to the flash memory

The flash memory is installed on the following PC boards. If the data in such memory is abnormal, troubles such as a failure to start the equipment will occur.

● EP4441**/EP4500**	Tx & Tx Focus	
● EP4436**/EP4761**	SDP	
● EP4467**	MGR	(S/N. M01100 and before)
● EP4430**	Tx Rx Control	
● EP4769**	CMB	(S/N. M01101 and after)

3) Trouble attributable to the backup data

The backup data is saved on the hard disk. If this data is abnormal, troubles such as a failure to start the equipment will occur.

Delete the backup data by referring to paragraph 6-4-8, "Resetting the backup data", then check the operation.

4) Problem relating to various type of busses

If a bus signal considered abnormal, it is difficult to find out the failed part.

If the system should fail to start up or should be locking up, proceed with repairing while referring to the information given below. It is recommended, however, to consult with Technical Support in its earliest possible stage

PCB		Type of BUS			
		PCI BUS	LOCAL BUS	USC BUS	Front End BUS
EP4439**	Probe Selector 2				⇔
EP4441**/EP4500**	Tx & Tx Focus				⇔
EP4429**/EP4625**/EP4837**	Rx Beam Former			⇔	
EP4430**	Tx Rx Control		⇔	⇔	
EP4443**	A ITF			⇔	⇔
EP4444**	AD_DA			⇔	
EP4435**/EP4760**	CFP			⇔	
EP4436**/EP4761**	SDP			⇔	
EP4442**/EP4902**	STCW				⇔
EP4464**	BSC		⇔		
EP4465**	CSC		⇔		
EP4467**	MGR	⇔	⇔		
EP4466**/EP4768**	VPU		⇔		
EP4423**	CPU	⇔			
EP4468**	PSC		⇔		
EP4469**	VOL		⇔		
EP4470**	VCM	⇔	⇔		
EP4769**	CMB	⇔	⇔		
EP4784**	DBP			⇔	

⇔ : The bus read and writes on the related PCB

← : The bus writes on the related PCB

→ : The bus reads on the related PCB

Available in addition to the buses enumerated above are the “local buses” which are controlled on a unit by unit basis.

6-4-10 Action to be taken if the equipment fails to be started or the panel operation is locked up

In case the system fails to start or crashes even if it starts, "Checklist Map" in paragraph 6-5 is not effective. Perform repair operation by referring to the following items.

1) Checking the power voltage

First of all, check the output voltage of the power supply unit.

There are four CPUs in this system. The CPU controls the whole system. The three remained CPU controls the peripheral circuits.

If a +3.3V/+5V/+12V power supply is not delivered from the power supply unit to these CPUs and the hard disk drive, or the supplied power is abnormal, trouble will be brought upon the whole system.

Even if the power supply unit is normal, it is also suspected that the connection cable is broken or the power distributing circuit on each PC board is at fault.

The CPUs are installed on the following PC boards, respectively.

EP4423**	CPU	(USM-25*)	
EP4467**	MGR	(USM-25*)	(S/N. M01100 and before)
EP4430**	Tx Rx Control	(USM-25*)	
I/F	Interface	(L-KEY-75*)	
EP4769**	CMB	(USM-25*)	(S/N. M01101 and after)

2) Trouble attributable to the flash memory

The flash memory is installed on the following PC boards. If the data in such memory is abnormal, troubles such as a failure to start the equipment will occur.

● EP4441**/EP4500**	Tx & Tx Focus	
● EP4436**/EP4761**	SDP	
● EP4467**	MGR	(S/N. M01100 and before)
● EP4430**	Tx Rx Control	
● EP4769**	CMB	(S/N. M01101 and after)

3) Trouble attributable to the backup data

The backup data is saved on the hard disk. If this data is abnormal, troubles such as a failure to start the equipment will occur.

Delete the backup data by referring to paragraph 6-4-8, "Resetting the backup data", then check the operation.

4) Problem relating to various type of busses

If a bus signal considered abnormal, it is difficult to find out the failed part.

If the system should fail to start up or should be locking up, proceed with repairing while referring to the information given below. It is recommended, however, to consult with Technical Support in its earliest possible stage

PCB		Type of BUS			
		PCI BUS	LOCAL BUS	USC BUS	Front End BUS
EP4439**	Probe Selector 2				⇔
EP4441**/EP4500**	Tx & Tx Focus				⇔
EP4429**/EP4625**	Rx Beam Former			⇔	
EP4430**	Tx Rx Control		⇔	⇔	
EP4443**	A ITF			⇔	⇔
EP4444**	AD_DA			⇔	
EP4435**/EP4760**	CFP			⇔	
EP4436**/EP4761**	SDP			⇔	
EP4442**	STCW				⇔
EP4464**	BSC		⇔		
EP4465**	CSC		⇔		
EP4467**	MGR	⇔	⇔		
EP4466**/EP4768**	VPU		⇔		
EP4423**	CPU	⇔			
EP4468**	PSC		⇔		
EP4469**	VOL		⇔		
EP4470**	VCM	⇔	⇔		
EP4769**	CMB	⇔	⇔		

⇔ : The bus read and writes on the related PCB

← : The bus writes on the related PCB

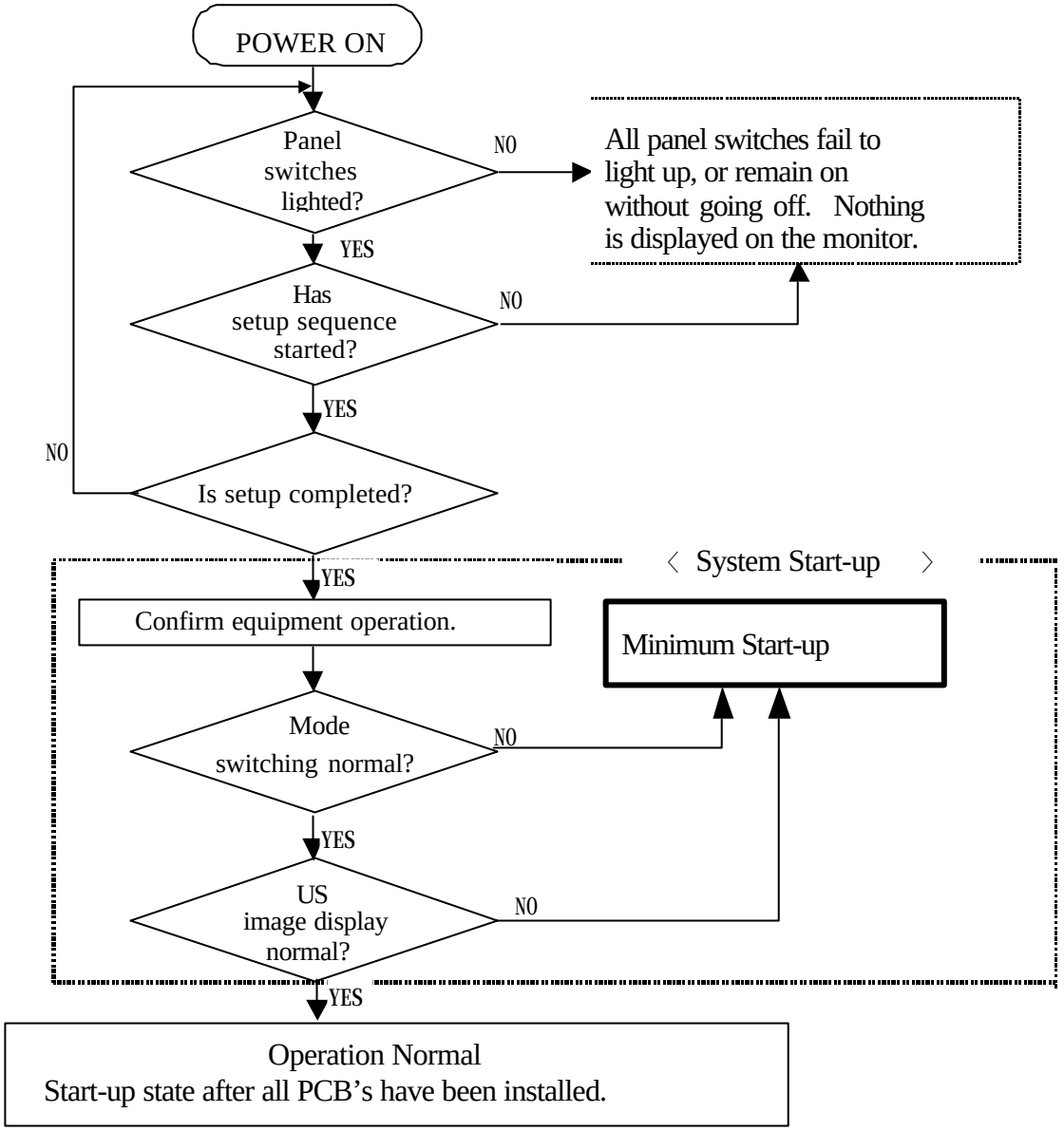
→ : The bus reads on the related PCB

Available in addition to the buses enumerated above are the “local buses” which are controlled on a unit by unit basis.

6-4-11 Minimum Start-up

In this section, we will explain concerning the minimum start-up as information necessary for repairs (starting up the system with the minimum PCB configuration).

1) Definition of Minimum Start-up
The minimum start-up is defined to be the system's start-up state when the equipment's power is switched on and the system started, then stabilizing in that state (with nothing displayed in the US image area at that time). If the set-up operation is started a second time by pressing a mode or other switch after the system has started up, then that is also considered to be the minimum start-up state.



2) Combination that enables minimum start-up

The PCBs necessary for starting the equipment in this system are shown in the minimum PCB below.

● Caution ● We suppose that the Power Supply unit (PSU-S4000*), the Mother board (EP4445**/EP4812**), the Operation panel (L-KEY-75*), the TV monitor (IPC-1530Q*/IPC-1530U), FDD (Floppy Disk Drive) and the HDD (Hard Disk Drive) are connected correctly and they work properly.

● Caution ● Please check the power switch turned off when you remove the PCB from the equipment. If the power is ON, the secondary failure will occur.

1.	CPU	EP4423**	
2.	VPU	EP4466**/EP4768**	
3.	TX & TX FOCUS	EP4441**/EP4500**	
4.	SDP	EP4436**/EP4761**	
5.	TX RX Control	EP4430**	
6.	MGR	EP4467**	(S/N.M01100 and before)
7.	BSC	EP4464**	(S/N.M01100 and before)
8.	AD_DA	EP4444**	(S/N. M02925 and before, M03051~M03075)
9.	Rx Beam Former	EP4429**/EP4625**/EP4837**	
10.	A ITF	EP4443**	
11.	CMB	EP4769**	(S/N.M01101 and after)
12.	DBP	EP4784**	(S/N. M02926~M03050, M03076 and after)

The equipment will start up if these boars and one probe (Phases array, Linear or Convex) are connected.

● In case of probe is not connected.

The equipment will start up after set-up message displayed. The characters and graphics are displayed completely, and the ultrasound image is not displayed.

The “EXT” switch on the Operation panel and the “PROBE” select switch are only effective.

3) Reaction and Phenomenon when one circuit board is taken out from the equipment and the power is switched on.

◆ Main panel L-KEY-75*

The system will start up normally, but the LEDs of POWER / HDD and panel switches are not lighted, and the following message will appear on the TV monitor.

The system does not start up shut-down process though the power switch is OFF. And, 5 minutes later, the system shuts down suddenly.

Service Control Manager At least one service or driver failed during system startup. Use event viewer to examine the event log for details.

◆ CPU EP4423**

Graphic bar in blue is displayed on the TV monitor, and the switches of the operation panel are continuously illuminated in order.

The system does not start up shut-down process though the power switch is OFF. And, 5 minutes later, the system shuts down suddenly.

The following shows the phenomenon when connector is removed.

P221 : Graphic bar in blue is displayed on the TV monitor, and the switches of the operation panel are continuously illuminated in order. But the system starts up normally by pressing the "F1" key when graphic bar in blue is displaying. (The FDD is not recognized.)

When graphic bar in blue is displaying, the system does not start the shut-down process even if the power switch is OFF. Probe Selector 1 and Probe Selector 2

EP4438**&EP4439**

The system will start up normally and only background noises will be displayed on the TV monitor.

But only "EXIT", PRESET" and "PROBE" switches on the operation panel are illuminated.

◆ Rx Connector EP4437**/EP4639**

The system will start up normally and only background noises will be displayed on the TV monitor.

◆ Tx Tx Focus EP4441**/EP4500**

After "ALOKA" logotype is displayed on the TV screen, the following message is displayed on the TV screen.

TXT FLASH TXT FLASH Write Error

At that time, press "Enter", the system will start up continuously, then the following message is displayed on the TV screen.

Power for ultrasound transmission was shut off as the system detected abnormal drive voltage. Please reboot the system.

◆ Pre AMP & Variable Gain AMP EP4440**

The system will start up normally and only background noises will be displayed on the TV monitor.

◆ Rx Beam Former EP4429**/EP4625**/EP4837**

After “ALOKA” logotype is displayed on the TV screen, and the following message is displayed on the TV screen.

```
Hard Access Error
    RxBeamFormer Focus Table Write Access Error
```

At that time, the system will start up continuously by pressing “Enter” on keyboard, and then US image with three echo gaps is displayed. (In case of convex probe).

When pull out the right side one from three “Rx Beam Former” boards, US image is not displayed.

◆ Tx Rx Control EP4430**

After “ALOKA” logotype is displayed on the TV screen, and the following message is displayed on the TV screen. By pressing the Enter key, various messages will appear on the TV screen

```
TXT Flash Write Error
    ************************************
```

The system does not start up shut-down process though the power switch is OFF. And, 5 minutes later, the system shuts down suddenly.

◆ A ITF EP4443**

After “ALOKA” logotype is displayed on the TV screen, and the following message and character/graphic are displayed on the TV screen.

```
Invalid probe connected.
```

◆ AD_DA EP4444**

The system will start up normally. But US image is not displayed on the TV screen.

◆ CFP EP4435**/EP4760**

The system will start up normally. But Color flow image and Doppler spectrum are not displayed on the TV screen.

◆ SDP EP4436**/EP4761**

After “ALOKA” logotype is displayed on the TV screen, and the following message is displayed on the TV screen. By pressing the Enter key, various messages will appear on the TV screen.

```
Hard No Answer
    Spectrum Doppler initialize error. No. 0X48
```

The system does not start up shut-down process though the power switch is OFF. And, 5 minutes later, the system shuts down suddenly.

◆ STCW EP4442**

The system will start up normally. But the STCW function does not work.

◆ BSC EP4464**

The system will start up normally. But the image is not displayed. And, when you change the mode, the following error message is displayed on the TV screen.

```
Manager Processor Command Error
  Manager Processor Busy with Command
  OldCmd = 0x**, OldPara = 0x**
  NewCmd = 0x**, NewPara = 0x**
```

The system does not start up shut-down process though the power switch is OFF. And, 5 minutes later, the system shuts down suddenly.

◆ CSC EP4465**

The system will start up normally. But the Color flow image is not displayed.

◆ MGR EP4467**

Nothing is displayed on the TV screen, and the switches of the operation panel are continuously illuminated in order.

The system does not start up shut-down process though the power switch is OFF. And, 5 minutes later, the system shuts down suddenly.

◆ VPU EP4466**/EP4768**

Nothing is displayed on the TV screen, and the switches of the operation panel are continuously illuminated in order.

The system does not start up shut-down process though the power switch is OFF. And, 5 minutes later, the system shuts down suddenly.

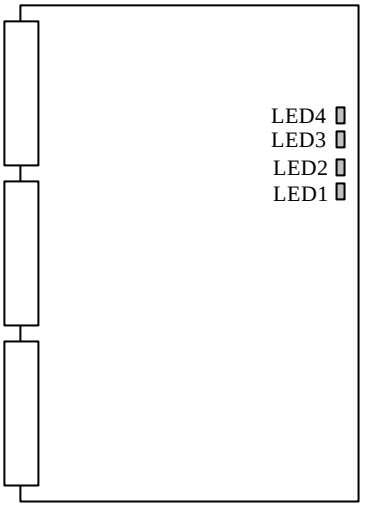
◆ PSC EP4468**

The system will start up normally. But the physiological signals are not displayed

6-4-12 LED's on the PCB's

LED's are mounted on several of the PCB's. These LED's can be used to determine the operating state of the PCB and also to detect a faulty PCB. LED's include some which independently indicate the operating state of a circuit and some which indicate the operating state as related to other circuit boards, so the cause of trouble may not necessarily be in the board on which the LED is mounted. The location and operating state of the LED's are shown below.

EP4430** Tx Rx Control



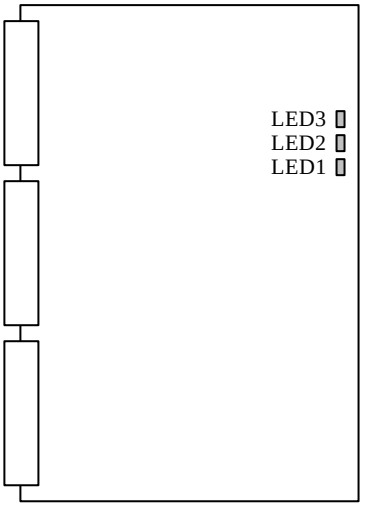
LED1 (red) : Lights up when watch dog timer is in reset state.

LED2 (green) : Lights up when initializing work for IC9 is completed. Lights up while DONE signal is outputting.

LED3 (red) : Turn off when initializing work for IC9 is completed.

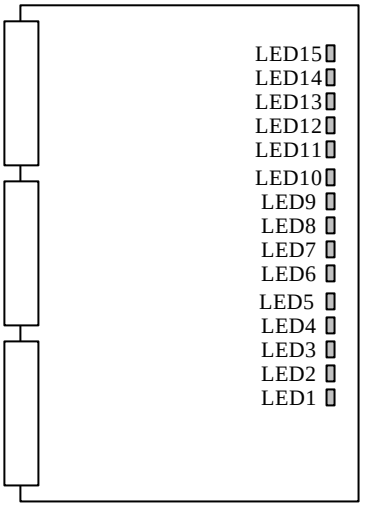
LED4 (green) : Lights up when read out the revision of DBF board completely after POWER switch ON or Reboot the system., and turn off when DBF board becomes a state of stand-by.
Then, lights up when the sequence for each mode is starting, and turn off by freezing.

EP4435** CFP



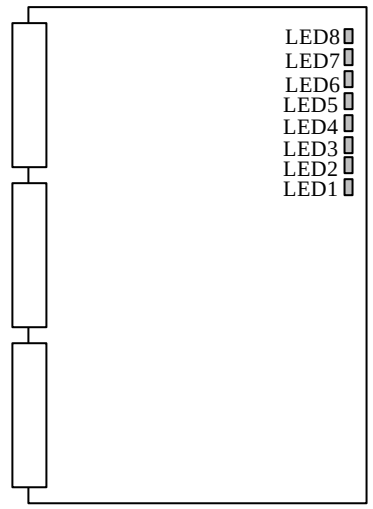
LED1（red） : Lights up when configuration error for IC89 occurs.
LED2（red） : Lights up when configuration error for IC92 occurs.
LED3（red） : Lights up when configuration error for IC88 occurs.

EP4436** SDP



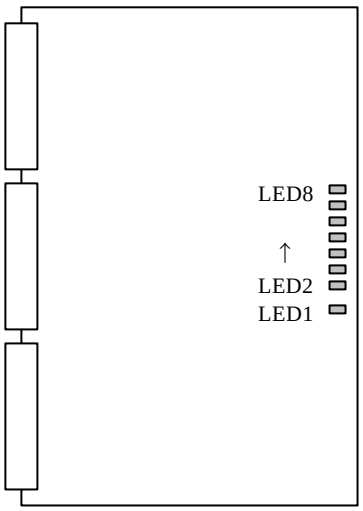
LED1（red） : Lights up when device for debugging is connected.
LED2（green） : Lights up when initializing work for DSP is normal.
LED3（red） : Blinking when internal error (illegal error) occurs.
Lights up when external bus error for DSP occurs.
LED4（red） : Blinking when internal error (stuck error) occurs.
LED5（red） : Blinking when error of RS-232C port for DSP occurs.
Lights up when access error of FIFO for output of color data occurs.
LED6（red） : Not use
LED7（red） : Not use
LED8（yellow） : Lights up when the DSP working.
LED9（yellow） : Lights up when the MSE working.
LED10（yellow） : Repeat the light up or turn off when over run error of DSP processing occurs.
LED11（yellow） : When abnormal operation of DSP occurs, lights up the LED11 and turn off the LED8.
LED12（green） : Lights up when the DSP working.
LED13（green） : Lights up when the CW Doppler working.
LED14（green） : Lights up when the output of spectrum Doppler is stopped.
LED15（green） : Repeat the light up or turn off when over run error of DSP processing occurs.
When abnormal operation of DSP occurs, lights up the LED15 and turn off the LED12.

EP4464** BSC



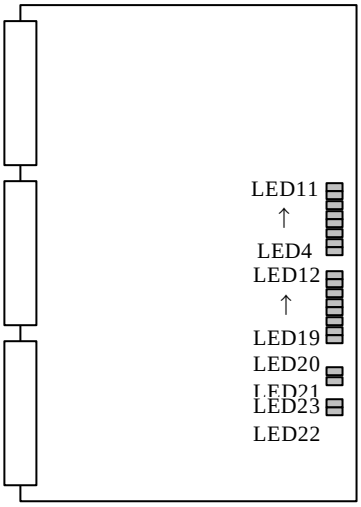
LED1（green）: For debugging. Normally, This LED is not lighted.
LED2（green）: For debugging. Normally, This LED is not lighted.
LED3（green）: For debugging. Normally, This LED is not lighted.
LED4（green）: For debugging. Normally, This LED is not lighted.
LED5（green）: For debugging. Normally, This LED is not lighted.
LED6（green）: For debugging. Normally, This LED is not lighted.
LED7（green）: For debugging. Normally, This LED is not lighted.
LED8（green）: For debugging. Normally, This LED is not lighted.

EP4465** CSC



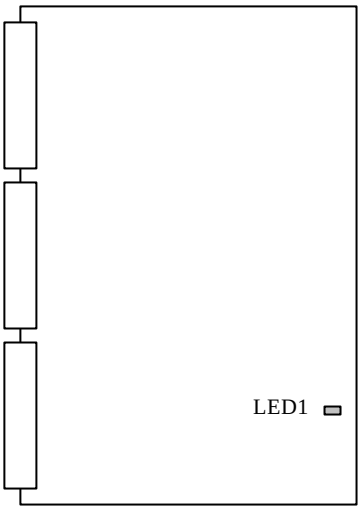
LED1（green）: For debugging. Normally, This LED is not lighted.
LED2（green）: For debugging. Normally, This LED is not lighted.
LED3（green）: For debugging. Normally, This LED is not lighted.
LED4（green）: For debugging. Normally, This LED is not lighted.
LED5（green）: For debugging. Normally, This LED is not lighted.
LED6（green）: For debugging. Normally, This LED is not lighted.
LED7（green）: For debugging. Normally, This LED is not lighted.
LED8（green） : For debugging. Normally, This LED is not lighted.

EP4467** MGR



LED4（green） : For debugging. Normally, This LED is not lighted.
LED5（green） : For debugging. Normally, This LED is not lighted.
LED6（green） : For debugging. Normally, This LED is not lighted.
LED7（green） : For debugging. Normally, This LED is not lighted.
LED8（green） : For debugging. Normally, This LED is not lighted.
LED9（green） : For debugging. Normally, This LED is not lighted.
LED10（green） : For debugging. Normally, This LED is not lighted.
LED11（green） : For debugging. Normally, This LED is not lighted.
LED12（green） : For debugging. Normally, This LED is not lighted.
LED13（green） : For debugging. Normally, This LED is not lighted.
LED14（green） : For debugging. Normally, This LED is not lighted.
LED15（green） : For debugging. Normally, This LED is not lighted.
LED16（green） : For debugging. Normally, This LED is not lighted.
LED17（green） : For debugging. Normally, This LED is not lighted.
LED18（green） : For debugging. Normally, This LED is not lighted.
LED19（green） : For debugging. Normally, This LED is not lighted.
LED20（green） : For debugging. Normally, This LED is not lighted.
LED21（green） : For debugging. Normally, This LED is not lighted.
LED22（green） : For debugging. Normally, This LED is not lighted.
LED23（green） : For debugging. Normally, This LED is not lighted.

EP4468** PSC



LED1（green） : Lights up when an R wave is detected.

6-5 Check List Map

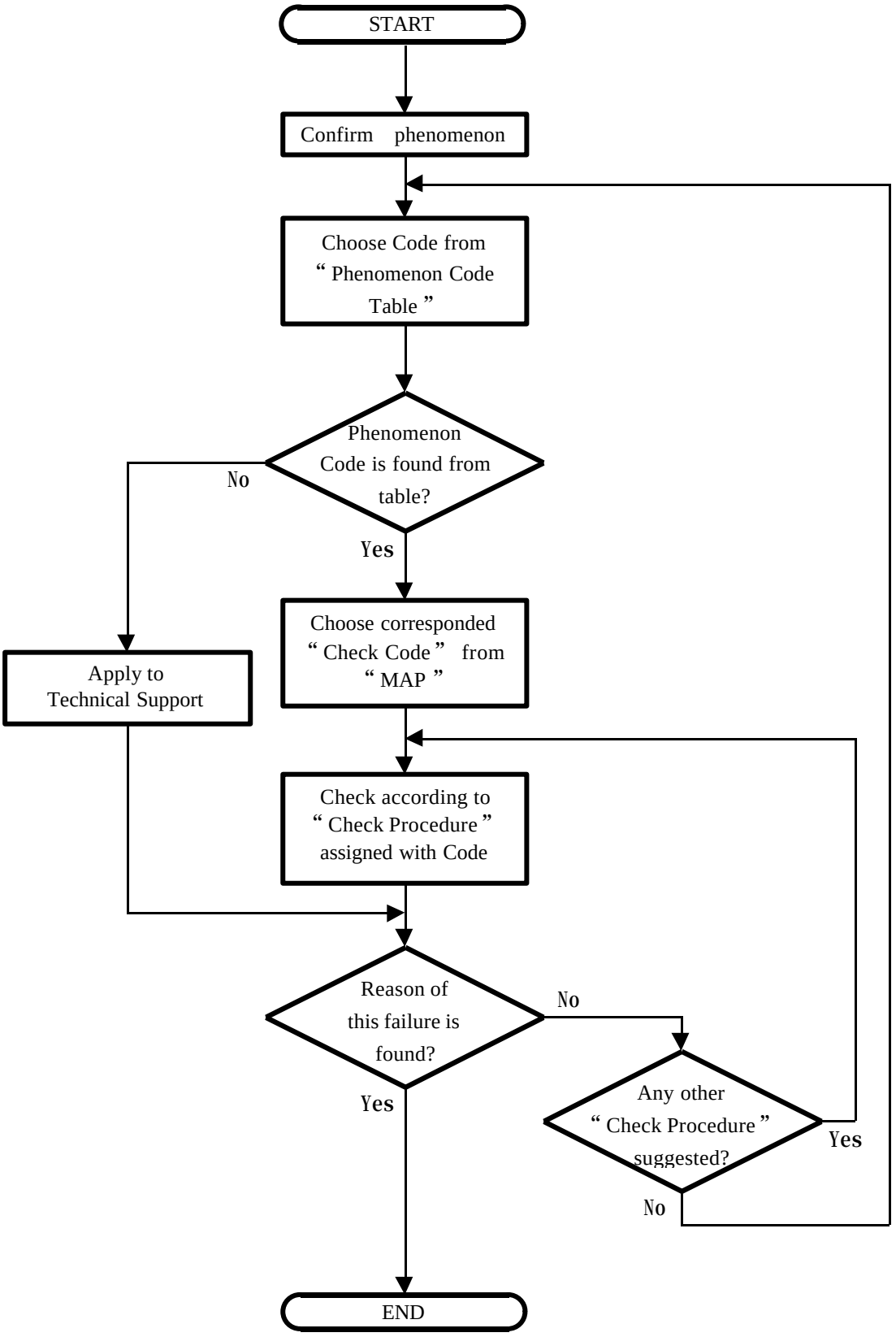
This " Check List Map " provides you with the data, based on which you may assume a PCB or unit considered to have caused the equipment failure. It comprises the following information.

- Phenomenon Code Table : General failure phenomena have been classified into codes. A failure is related with the " MAP " through each of codes.
- MAP : This is a table showing the relations of a " Code " given in the " Phenomenon Code Table", that is, a failure phenomenon, with the PCB or unit assumed to cause that failure.
- Check Procedure : These steps show the norms on which you may determine a failure concerning the PCBs and/or units entered on the "MAP ".

6-5-1 Flow chart for the usage of Check List Map

The method of cross reference for tree part, "Phenomenon Code Table", "MAP" and " Check Procedure" , in "Check List Map" on the next page with the flow chart.

Flow chart for the usage of Check List Map



6-5-2 Phenomenon Code Table

The general failure phenomena envisaged herein are roughly classified as described below while being code with two alphabetical characters and gives the "Phenomenon Code" to refer the "MAP"

Phenomenon	Code
Failure on the ultrasound image with any display mode	**US**
Failure on the display of characters or graphics	**CG**
Failure about the timing synchronization or observational monitor	**TM**
Failure on the general operation or function	**FU**
Failure on the power supply, recording or panel control knobs	**PM**
Failure on the physiological signal display	**PH**
Failure on the spectral Doppler	**DP**
Failure on the color flow Doppler or color image display	**CD**

The "Phenomenon Code Tables" are used to provide the "Check Procedure" in order to judge whether the trouble cause is existing or not according to the "MAP".
The "Phenomenon Code Tables" are shown based on the classification with above codes, from next page,

US Failure of the ultrasound image (UltraSound)

Code		Aply	Problems
item	div		
US-1	1	○	Ultrasound image is not all displayed.
	2	○	Ultrasound image is not all displayed in a particular MODE.
	3	○	Ultrasound image is not all displayed only for LINEAR (or CONVEX).
	4		Ultrasound image is not all displayed only for MECHANICAL SCANNER.
	5	○	Ultrasound image is not all displayed only for PHASED ARRAY.
	6	○	Only particular Ultrasound image is not displayed in multiples Ultrasound image displays.
US-2	1	○	Display of Ultrasound image area become white.
US-3	1	○	Unnecessary dots or lines are displayed in Ultrasound image area.
	2	○	Regular horizontal or vertical stripes are displayed in Ultrasound image area.
US-4	1	○	Lacks of ECHO are displayed in LINEAR (or CONVEX).
	2		Lacks of ECHO are displayed in MECHANICAL SCANNER.
	3	○	Lacks of ECHO are displayed in PHASED ARRAY.
US-5	1	○	Noises are seen on the Ultrasound image in LINEAR (or CONVEX)
	2		Noises are seen on the Ultrasound image in MECHANICAL SCANNER.
	3	○	Noises are seen on the Ultrasound image in PHASED ARRAY.
	4	○	Noises are seen on the Ultrasound image in all Ultrasound images.
US-6	1	○	Sensitivity of Ultrasound image is low in LINEAR (or CONVEX).
	2		Sensitivity of Ultrasound image is low in MECHANICAL SCANNER.
	3	○	Sensitivity of Ultrasound image is low in PHASED ARRAY.
	4	○	Sensitivity of Ultrasound image is low in all Ultrasound images.
US-7	1	○	Same as depth band is difference brightness in Ultrasound image.
US-8	1	○	Image varies as if enhanced, without gradation.
	2	○	Ultrasound image becomes moiré in MECHANICAL SCANNER, PHASED ARRAY, CONVEX.
US-9	1	○	Form of Ultrasound image is abnormally displayed.
US-10	1	○	Unnecessary multiples of Ultrasound images are displayed in LINEAR (or CONVEX).
	2		Unnecessary multiples of Ultrasound images are displayed in MECHANICAL SCANNER.
	3	○	Unnecessary multiples of Ultrasound image are displayed in PHASED ARRAY.
	4	○	Unnecessary multiples of Ultrasound image are displayed in all Ultrasound images.

○:Marked items are effective on this system.

CG Failure on the characters or graphics (**C**haracter & **G**raphic)

Code		Aply	Problems
item	div.		
CG-1	1	○	Characters are displayed in the entire screen.
CG-2	1	○	Only Caliper, Graphic are not displayed.
	2	○	Only Caliper, Graphic are abnormally displayed.
CG-3	1	○	The entire screen becomes white.
	2	○	Unnecessary dots or stripes are displayed in all or parts of image.
CG-4	1	○	TIME and DATE are abnormally displayed.
CG-5	1	○	Characters are not displayed, key in cannot be made.
	2	○	Characters are abnormally displayed.
CG-6	1	○	Measured value is not correct.

○:Marked items are effective on this system.

TM Failure about the timing or monitor (Timing & Monitor)

Code		Aply	Problems
item	div.		
TM-1	1	○	All images are not displayed in any Monitor.
	2	○	Image is not displayed in a particular Monitor.
TM-2	1	○	All Images are not synchronized in any Monitor.
	2	○	Image is not synchronized in a particular Monitor.
TM-3	1	○	Entire image shake. Abnormality is seen when brightness varies in any Monitor.
	2	○	Entire image shake in a particular Monitor. Abnormality is seen.
TM-4	1	○	The VCM screen is not synchronized. Abnormality is seen.

○:Marked items are effective on this system.

FU Failure on the general operation or function (**FU**nction)

Code		Aply	Problems
item	div.		
FU-1	1	○	System locks up, or panel information is not accepted.
	2	○	The ERROR messages are shown on the monitor.
	3	○	The VOL mode doesn't work. Functions and the images that related to the VOL mode don't work.

○:Marked items are effective on this system.

PM Failure on power supply, recording, switch & controls (**P**ower & **M**emory)

Code		Aply	Problems
item	div		
PM-1	1	○	Power output is not present, or abnormally outputted.
PM-2	1	○	Switches and/or Controls are inoperative.
	2	○	Switches and/or Controls are abnormally operated.
	3	○	Camera shutter (or printing) is inoperative.
PM-3	1	○	Photographed picture is not normal (Monitor is normal).
	2	○	Playback image is abnormally displayed (usual image is normal).
PM-4	1	○	The recorded image and play back images are abnormally in VCM. (The display image with main system is normal)

○:Marked items are effective on this system.

PH Failure on the physiological signal display (**PH**ysiological Signal)

Code		Aply	Problems
item	div.		
PH-1	1	○	ECG (EKG) waveform is not displayed.
	2	○	ECG (EKG) waveform is abnormally displayed or sensitivity is low.
	3	○	ECG (EKG) waveform is abnormally displayed in a particular Mode, or not displayed.
	4	○	ECG (EKG) Synchronization is not correctly operated.
PH-2	1		PULSE waveform is not displayed.
	2		PULSE waveform is abnormally displayed, or sensitivity is low.
PH-3	1	○	PCG waveform is not displayed.
	2	○	PCG waveform is abnormally displayed, or sensitivity is low.

○:Marked items are effective on this system.

DP Failure on the spectral Doppler (**D**o**P**pler)

Code		Aply	Problems
item	div.		
DP-1	1	○	Doppler image is not displayed.
	2	○	Doppler image is not displayed in a particular Mode.
	3	○	Doppler image is not displayed in a particular Probe.
	4	○	Doppler image is not displayed either PW or CW.
DP-2	1	○	Doppler image is abnormally displayed.
	2	○	Doppler image is abnormally displayed in a particular Mode.
	3	○	Doppler image is abnormally displayed in a particular Probe.
	4	○	Doppler image is abnormally displayed either PW or CW.
DP-3	1	○	Mirror or Side band noise appears on image or a large amount of noise.
	2	○	Mirror or Side band noise appears in a particular Mode, or a large amount of noise.
	3	○	Mirror or Side band noise appears in a particular Probe, or a large amount of noise.
	4	○	Mirror or Side band noise appears either PW or CW.
DP-4	1	○	Sensitivity of Doppler image is low.
	2	○	Sensitivity of Doppler image is low in a particular Mode.
	3	○	Sensitivity of Doppler image is low in a particular Probe.
	4	○	Sensitivity of Doppler image is low either PW or CW.
DP-5	1	○	Doppler sound is low or not outputted.

○ :Marked items are effective on this system.

CD Failure on the color flow or color display (**C**olor **D**isplay)

Code		Aply	Problems
item	div.		
CD-1	1	○	Color is not displayed in Ultrasound image area.
	2	○	Color is not displayed in Ultrasound image area in a particular Mode.
	3	○	Color is not displayed in Ultrasound image area in a particular Probe.
CD-2	1	○	Color noises are seen in Ultrasound image area, or a large amount of noises are seen.
	2	○	Noises are seen in Ultrasound image in a particular Mode.
	3	○	Noises are seen in Ultrasound image in a particular Probe.
CD-3	1	○	Color is abnormally displayed in Ultrasound image area.
	2	○	Color is abnormally displayed in Ultrasound image area in a particular Mode.
	3	○	Color is abnormally displayed in Ultrasound image area in a particular Probe.
CD-4	1	○	Color is abnormally displayed in Playback mode.
CD-5	1	○	Color is not displayed entire image, or abnormally displayed.

○:Marked items are effective on this system.

6-5-3 MAP

Concerning the typical failure phenomena identified by “Phenomenon Codes”, those PCBs or units which may be deemed to have caused such phenomena are shown below.
This MAP has phenomena classified by “Problem Code”. A PCB or unit assumed to be causative of the related phenomenon is marked with a “Check List Code” for your referring to the “Check Procedure”.

Failure on the ultrasound image with any display mode

Check List Problem Code			US-1						US-2	US-3		US-4			US-5			
Item		Code	1	2	3	4	5	6	1	1	2	1	2	3	1	2	3	4
Operation		A1	○	○	○		○		○									
External Noise		A2													○		○	○
Power supply (PSU-S4000*)		A3	○	○	○		○								○		○	○
Probe/Scanner		A4	○		○		○					○		○	○		○	
Monitor	IPC-1530Q /IPC-1530(u)	A5																
L-KEY-75*	Main panel	B1	○	○														○
EP4438**	Probe Selector 1	C1	○									○		○	○		○	
EP4439**	Probe Selector 2	C2	○									○		○	○		○	
EP4437** /EP4639**	Rx connector	C3	○									○		○	○		○	
EP4441**	Tx & Tx Focus 2 (For EU-9082)	C4	○	○	○		○			○	○	○		○	○		○	
EP4500**	Tx & Tx Focus	C5	○	○	○		○			○	○	○		○	○		○	
EP4440**	Pre AMP & Variable Gain AMP	C6	○	○						○	○	○		○	○		○	
EP4429** /EP4625** /EP4837**	Rx Beam Former	C7	○							○	○	○		○	○		○	
EP4430**	Tx Rx Control	C8	○	○	○		○	○		○	○	○		○	○		○	
EP4443**	A ITF	C9	○		○	○	○	○	○	○	○		○		○		○	○
EP4444** /EP4784**	AD_DA DBP	C10	○	○	○	○	○		○	○	○				○		○	○
EP4435** /EP4760**	CFP	C11																
EP4436** /EP4761**	SDP	C12																
EP4464**	BSC	C13	○	○	○		○	○	○	○	○		○					
EP4465**	CSC	C14																
EP4467**	MGR	C15	○	○	○		○	○	○	○	○							
EP4466** /EP4768**	VPU	C16	○						○	○	○							
EP4423**	CPU	C17																
EP4473**	Audio	C18																
EP4472**	Distributor	C19																
EP4445** /EP4812**	Mother	C20																
EP4769**	CMB	C21	○	○	○		○	○	○	○	○		○					
UCW-4000* EP4442**/EP4902** STCW		D1																
PEU-4000 EP4468**	PSC	D2																
PEU-4000 EP4578**	Physio. AMP	D3																
SCU-4000* EP4448**	Mecha. Connector	D4				○							○					
EU-9083 EP4470**	VCM	D5																
EU-9084 EP4469**	VOL	D6																
B/W Printer		E1																
Color Printer		E2																
VCR		E3																

Check List Problem Code		US-6				US-7	US-8		US-9	US-10			
Item	Code	1	2	3	4	1	1	2	1	1	2	3	4
Operation	A1	○		○	○	○	○						
External Noise	A2												
Power supply (PSU-S4000*)	A3	○	○	○	○								
Probe/Scanner	A4	○	○	○									
Monitor IPC-1530Q /IPC-1530(u)	A5												
L-KEY-75* Main panel	B1	○		○	○	○							
EP4438** Probe Selector 1	C1												
EP4439** Probe Selector 2	C2	○		○									
EP4437** /EP4639** Rx connector	C3												
EP4441** Tx & Tx Focus 2 (For EU-9082)	C4	○		○					○				
EP4500** Tx & Tx Focus	C5	○		○					○				
EP4440** Pre AMP & Variable Gain AMP	C6	○		○									
EP4429** /EP4625** /EP4837** Rx Beam Former	C7	○		○		○	○		○				
EP4430** Tx Rx Control	C8	○		○	○	○	○		○	○		○	○
EP4443** A ITF	C9	○	○	○	○				○				
EP4444** /EP4784** AD_DA DBP	C10	○		○	○	○	○		○				
EP4435** /EP4760** CFP	C11												
EP4436** /EP4761** SDP	C12												
EP4464** BSC	C13						○	○	○	○	○	○	○
EP4465** CSC	C14												
EP4467** MGR	C15						○	○	○	○	○	○	○
EP4466** /EP4768** VPU	C16						○		○	○	○	○	○
EP4423** CPU	C17						○		○	○	○	○	○
EP4473** Audio	C18												
EP4472** Distributor	C19												
EP4445** /EP4812** Mother	C20												
EP4769** CMB	C21						○	○	○	○	○	○	○
UCW-4000* EP4442**/EP4902** STCW	D1												
PEU-4000 EP4468** PSC	D2												
PEU-4000 EP4578** Physio. AMP	D3												
SCU-4000* EP4448** Mecha. Connector	D4		○										
EU-9083 EP4470** VCM	D5												
EU-9084 EP4469** VOL	D6												
B/W Printer	E1												
Color Printer	E2												
VCR	E3												

Failure on the display of characters or graphics （Character & Graphic）

Check List Problem Code		CG-1	CG-2		CG-3		CG-4	CG-5		CG-6
Item	Code	1	1	2	1	2	1	1	2	1
Operation	A1									
External Noise	A2									
Power supply (PSU-S4000*)	A3									
Probe/Scanner	A4									
Monitor IPC-1530Q /IPC-1530(u)	A5				○	○				
L-KEY-75* Main panel	B1							○	○	○
EP4438** Probe Selector 1	C1									
EP4439** Probe Selector 2	C2									
EP4437** /EP4639** Rx connector	C3									
EP4441** Tx & Tx Focus 2 (For EU-9082)	C4									
EP4500** Tx & Tx Focus	C5									
EP4440** Pre AMP & Variable Gain AMP	C6									
EP4429** /EP4625** /EP4837** Rx Beam Former	C7									
EP4430** Tx Rx Control	C8									
EP4443** A ITF	C9									
EP4444** /EP4784** AD_DA DBP	C10									
EP4435** /EP4760** CFP	C11									
EP4436** /EP4761** SDP	C12									
EP4464** BSC	C13									
EP4465** CSC	C14									
EP4467** MGR	C15				○	○				
EP4466** /EP4768** VPU	C16	○	○	○	○	○				
EP4423** CPU	C17	○	○	○	○	○	○	○	○	○
EP4473** Audio	C18									
EP4472** Distributor	C19				○					
EP4445** /EP4812** Mother	C20									
EP4769** CMB	C21				○	○				
UCW-4000* EP4442**/EP4902** STCW	D1									
PEU-4000 EP4468** PSC	D2									
PEU-4000 EP4578** Physio. AMP	D3									
SCU-4000* EP4448** Mecha. Connector	D4									
EU-9083 EP4470** VCM	D5									
EU-9084 EP4469** VOL	D6									
B/W Printer	E1									
Color Printer	E2									
VCR	E3									

Failure about the timing synchronization or observational monitor （Timing & Monitor）

Check List Problem Code		TM-1		TM-2		TM-3		TM-4
Item	Code	1	2	1	2	1	2	1
Operation	A1	○	○					○
External Noise	A2							
Power supply (PSU-S4000*)	A3	○		○		○		
Probe/Scanner	A4							
Monitor IPC-1530Q /IPC-1530(u)	A5		○		○		○	
L-KEY-75* Main panel	B1							
EP4438** Probe Selector 1	C1							
EP4439** Probe Selector 2	C2							
EP4437** Rx connector /EP4639**	C3							
EP4441** Tx & Tx Focus 2 (For EU-9082)	C4							
EP4500** Tx & Tx Focus	C5							
EP4440** Pre AMP & Variable Gain AMP	C6							
EP4429** Rx Beam Former /EP4625** /EP4837**	C7							
EP4430** Tx Rx Control	C8							
EP4443** A ITF	C9							
EP4444** AD_DA /EP4784** DBP	C10							
EP4435** CFP /EP4760**	C11							
EP4436** SDP /EP4761**	C12							
EP4464** BSC	C13							
EP4465** CSC	C14							
EP4467** MGR	C15	○		○		○		
EP4466** VPU /EP4768**	C16	○	○	○	○	○	○	○
EP4423** CPU	C17	○		○				
EP4473** Audio	C18							
EP4472** Distributor	C19		○		○		○	
EP4445** Mother /EP4812**	C20							
EP4769** CMB	C21	○		○		○		
UCW-4000* EP4442**/EP4902** STCW	D1							
PEU-4000 EP4468** PSC	D2							
PEU-4000 EP4578** Physio. AMP	D3							
SCU-4000* EP4448** Mecha. Connector	D4							
EU-9083 EP4470** VCM	D5							○
EU-9084 EP4469** VOL	D6							
B/W Printer	E1							
Color Printer	E2							
VCR	E3							

Failure on the general operation or function （**FU**nction）

Check List Problem Code			FU-1		
Item		Code	1	2	3
Operation		A1			
External Noise		A2			
Power supply (PSU-S4000*)		A3	○		
Probe/Scanner		A4			○
Monitor	IPC-1530Q /IPC-1530(u)	A5			
L-KEY-75*	Main panel	B1	○	○	○
EP4438**	Probe Selector 1	C1			
EP4439**	Probe Selector 2	C2			
EP4437** /EP4639**	Rx connector	C3			
EP4441**	Tx & Tx Focus 2 (For EU-9082)	C4	○	○	
EP4500**	Tx & Tx Focus	C5	○	○	
EP4440**	Pre AMP & Variable Gain AMP	C6			
EP4429** /EP4625** /EP4837**	Rx Beam Former	C7	○	○	
EP4430**	Tx Rx Control	C8	○	○	
EP4443**	A ITF	C9	○	○	
EP4444** /EP4784**	AD_DA DBP	C10		○	
EP4435** /EP4760**	CFP	C11			
EP4436** /EP4761**	SDP	C12	○	○	
EP4464**	BSC	C13	○	○	
EP4465**	CSC	C14			
EP4467**	MGR	C15	○		○
EP4466** /EP4768**	VPU	C16	○		○
EP4423**	CPU	C17	○		○
EP4473**	Audio	C18			
EP4472**	Distributor	C19			
EP4445** /EP4812**	Mother	C20			
EP4769**	CMB	C21	○	○	○
UCW-4000* EP4442**/EP4902** STCW		D1			
PEU-4000 EP4468**	PSC	D2			
PEU-4000 EP4578**	Physio. AMP	D3			
SCU-4000* EP4448**	Mecha. Connector	D4			
EU-9083 EP4470**	VCM	D5			
EU-9084 EP4469**	VOL	D6			○
B/W Printer		E1			
Color Printer		E2			
VCR		E3			

Failure on the power supply, recording or panel control knobs （**P**ower & **M**emory）

Check List Problem Code		PM-1	PM-2			PM-3		PM-4
Item	Code	1	1	2	3	1	2	1
Operation	A1		○	○	○			
External Noise	A2							
Power supply (PSU-S4000*)	A3	○						
Probe/Scanner	A4							
Monitor IPC-1530Q /IPC-1530(u)	A5							
L-KEY-75* Main panel	B1		○	○	○			
EP4438** Probe Selector 1	C1							
EP4439** Probe Selector 2	C2							
EP4437** Rx connector /EP4639**	C3							
EP4441** Tx & Tx Focus 2 (For EU-9082)	C4							
EP4500** Tx & Tx Focus	C5							
EP4440** Pre AMP & Variable Gain AMP	C6							
EP4429** Rx Beam Former /EP4625** /EP4837**	C7							
EP4430** Tx Rx Control	C8		○					
EP4443** A ITF	C9		○					
EP4444** AD_DA /EP4784** DBP	C10		○					
EP4435** CFP /EP4760**	C11							
EP4436** SDP /EP4761**	C12							
EP4464** BSC	C13							
EP4465** CSC	C14							
EP4467** MGR	C15				○			
EP4466** VPU /EP4768**	C16					○	○	○
EP4423** CPU	C17		○	○	○			
EP4473** Audio	C18							
EP4472** Distributor	C19				○			
EP4445** Mother /EP4812**	C20							
EP4769** CMB	C21				○			
UCW-4000* EP4442**/EP4902** STCW	D1							
PEU-4000 EP4468** PSC	D2							
PEU-4000 EP4578** Physio. AMP	D3							
SCU-4000* EP4448** Mecha. Connector	D4							
EU-9083 EP4470** VCM	D5							○
EU-9084 EP4469** VOL	D6							
B/W Printer	E1				○	○		
Color Printer	E2				○	○		
VCR	E3						○	

Failure on the physiological signal display （**PH**ysiological signal）

Check List Problem Code			PH-1				PH-2		PH-3	
Item		Code	1	2	3	4	1	2	1	2
Operation		A1	○			○	○		○	
External Noise		A2								
Power supply (PSU-S4000*)		A3								
Probe/Scanner		A4								
Monitor	IPC-1530Q /IPC-1530(u)	A5								
L-KEY-75*	Main panel	B1								
EP4438**	Probe Selector 1	C1								
EP4439**	Probe Selector 2	C2								
EP4437** /EP4639**	Rx connector	C3								
EP4441**	Tx & Tx Focus 2 (For EU-9082)	C4								
EP4500**	Tx & Tx Focus	C5								
EP4440**	Pre AMP & Variable Gain AMP	C6								
EP4429** /EP4625** /EP4837**	Rx Beam Former	C7								
EP4430**	Tx Rx Control	C8				○				
EP4443**	A ITF	C9								
EP4444** /EP4784**	AD_DA DBP	C10								
EP4435** /EP4760**	CFP	C11								
EP4436** /EP4761**	SDP	C12								
EP4464**	BSC	C13		○	○	○	○	○	○	○
EP4465**	CSC	C14								
EP4467**	MGR	C15								
EP4466** /EP4768**	VPU	C16	○	○	○		○		○	
EP4423**	CPU	C17								
EP4473**	Audio	C18								
EP4472**	Distributor	C19								
EP4445** /EP4812**	Mother	C20								
EP4769**	CMB	C21		○	○	○	○	○	○	○
UCW-4000* EP4442**/EP4902** STCW		D1								
PEU-4000 EP4468**	PSC	D2	○	○	○	○	○	○	○	○
PEU-4000 EP4578**	Physio. AMP	D3	○	○	○	○	○	○	○	○
SCU-4000* EP4448**	Mecha. Connector	D4								
EU-9083 EP4470**	VCM	D5								
EU-9084 EP4469**	VOL	D6								
B/W Printer		E1								
Color Printer		E2								
VCR		E3								

Failure on the spectral Doppler （**D**o**P**pler）

Check List Problem Code		DP-1				DP-2				DP-3				DP-4				DP-5
Item	Code	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1
Operation	A1	○	○	○	○									○	○		○	○
External Noise	A2																	
Power supply (PSU-S4000*)	A3																	
Probe/Scanner	A4	○		○		○		○	○			○		○		○	○	
Monitor IPC-1530Q /IPC-1530(u)	A5																	○
L-KEY-75* Main panel	B1																	
EP4438** Probe Selector 1	C1																	
EP4439** Probe Selector 2	C2																	
EP4437** Rx connector /EP4639**	C3																	
EP4441** Tx & Tx Focus 2 (For EU-9082)	C4	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	
EP4500** Tx & Tx Focus	C5	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	
EP4440** Pre AMP & Variable Gain AMP	C6	○			○	○	○	○	○	○	○	○	○	○	○	○	○	
EP4429** Rx Beam Former /EP4625** /EP4837**	C7	○			○	○	○	○	○					○	○	○	○	
EP4430** Tx Rx Control	C8	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	
EP4443** A ITF	C9					○	○	○	○									
EP4444** AD_DA /EP4784** DBP	C10																	
EP4435** CFP /EP4760**	C11	○	○		○	○	○	○	○	○	○	○	○	○	○	○	○	○
EP4436** SDP /EP4761**	C12	○	○		○	○	○	○	○	○	○	○	○	○	○	○	○	○
EP4464** BSC	C13	○	○															
EP4465** CSC	C14																	
EP4467** MGR	C15	○	○	○														
EP4466** VPU /EP4768**	C16																	
EP4423** CPU	C17	○																
EP4473** Audio	C18																	○
EP4472** Distributor	C19																	○
EP4445** Mother /EP4812**	C20																	
EP4769** CMB	C21	○	○	○														
UCW-4000* EP4442**/EP4902** STCW	D1	○	○	○	○				○				○				○	
PEU-4000 EP4468** PSC	D2																	
PEU-4000 EP4578** Physio. AMP	D3																	
SCU-4000* EP4448** Mecha. Connector	D4																	
EU-9083 EP4470** VCM	D5																	
EU-9084 EP4469** VOL	D6																	
B/W Printer	E1																	
Color Printer	E2																	
VCR	E3																	

Failure on the color flow Doppler or color image display （**C**olor **D**isplay）

Check List Problem Code			CD-1			CD-2			CD-3			CD-4	CD-5
Item		Code	1	2	3	1	2	3	1	2	3	1	2
Operation		A1	○	○	○	○							
External Noise		A2											
Power supply (PSU-S4000*)		A3											
Probe/Scanner		A4	○		○	○		○	○		○		
Monitor	IPC-1530Q /IPC-1530(u)	A5											
L-KEY-75*	Main panel	B1											
EP4438**	Probe Selector 1	C1											
EP4439**	Probe Selector 2	C2											
EP4437** /EP4639**	Rx connector	C3											
EP4441**	Tx & Tx Focus 2 (For EU-9082)	C4	○	○	○	○	○	○	○	○	○		
EP4500**	Tx & Tx Focus	C5	○	○	○	○	○	○	○	○	○		
EP4440**	Pre AMP & Variable Gain AMP	C6	○			○	○	○	○				
EP4429** /EP4625** /EP4837**	Rx Beam Former	C7		○					○				
EP4430**	Tx Rx Control	C8	○	○	○	○	○	○	○	○	○		
EP4443**	A ITF	C9											
EP4444** /EP4784**	AD_DA DBP	C10	○										
EP4435** /EP4760**	CFP	C11	○	○		○	○	○	○	○	○		
EP4436** /EP4761**	SDP	C12	○	○		○	○	○	○	○	○		
EP4464**	BSC	C13											
EP4465**	CSC	C14	○	○	○	○	○	○	○	○	○	○	○
EP4467**	MGR	C15	○	○	○	○	○	○	○	○	○		○
EP4466** /EP4768**	VPU	C16	○									○	○
EP4423**	CPU	C17	○	○									○
EP4473**	Audio	C18											
EP4472**	Distributor	C19											
EP4445** /EP4812**	Mother	C20											
EP4769**	CMB	C21	○	○	○	○	○	○	○	○	○	○	○
UCW-4000* EP4442**/EP4902** STCW		D1											
PEU-4000 EP4468**	PSC	D2											
PEU-4000 EP4578**	Physio. AMP	D3											
SCU-4000* EP4448**	Mecha. Connector	D4											
EU-9083 EP4470**	VCM	D5											
EU-9084 EP4469**	VOL	D6											
B/W Printer		E1											
Color Printer		E2											
VCR		E3											

6-5-4 PCB Check Procedure

This “PCB check Procedure” is divided by “ CHECK CODE".
Before use this procedure, find “ CHECK CODE" corresponding to the symptom using “Problem Code Table” and “MAP”.
This procedure shows description to confirm for each “CHECK CODE” listed in “MAP”
And this procedure estimates one trouble exits in Ultrasound diagnostic equipment.

How to use “PCB Check Procedure”.

1) Refer to the explanation in each “CHECK CODE”.
2) Follow the procedure related the problem.
3) Some procedure require to refer Waveform and Adjustment procedure.
4) In “Abnormal” or “Normal”, continue the confirmation described.

"C8"	:	If there is other confirmation, please jump to the CHECK CODE "C8" which is shown at head of phrase.
“3”)	:	There is a description to confirm in other item (3).Please refer it and check a relative item.
Replace this PCB	:	After some confirmation, it has been judged that the corresponded PCB is defective.

5) Other cause can be thought.
It has been judged that this PCB or Unit is defective.
However, other cause can be thought. So you should check the other symptoms occur or not.

A1 Operation

It is important that you understand the operation and specification.

At first, you should be check that the symptom is caused by the operation or its specification, according to " SECTION 8 PERFORMANCE CHECK".

However, if you cannot judge, you should inquire of technical Support.

●CAUTION● Do not change or readjust the switches and variable resistors which are located inside of the equipment thoughtlessly. It may make the other big problem.

○REFERENCE○ The operation and specification may be changed by software or its level. Please refer "HISTORY OF IMPROVEMENT" and "Technical Bulletin".

Please refer to "3-3 Messages" with SECTION 3 onto SSD-4000 Service Manual 1/2 about displayed message on screen.

A2 External Noise Factor

Against the noise which is an unexpected phenomenon suspected to be external, try to change the equipment location and the power supply line.
To investigate into the environments where the equipment is installed, refer to the following points:

(1) Isn't such a voltage fluctuate or noise inducer as X-ray equipment or the like existing in a near room?
(2) Isn't such a noise-inducer as a computer or the like existing nearby?
(3) Isn't such a radio wave transmitting station as a broadcasting station or the like existing nearby?
(4) Isn't a high-voltage overhead cable existing nearby?
(5) Is the noise level affected when a fluorescent lamp is switched off or when the probe is brought nearer to such lamp?
(6) Aren't optional units, such as VTR, physiological signal unit, etc. affecting?
(7) Doesn't the noise level change even if the equipment is securely grounded onto the building by the use of a thick and short grounding cable? It is necessary, however, to confirm beforehand that the building itself has been grounded securely.
(8) Doesn't the building-fed power have any noise or voltage fluctuation?

The corrective action to be taken differs between the noise generated by the equipment itself and the external one. If the worker concerned has insufficient knowledge to take such action, check the items specified below first and then make contact with Technical Support.

(1) Are the noise and phenomena equivalent thereto taking place under normal working conditions in a limited mode, with a limited probe and/or by a limited usage only?
(2) Make certain of such low-voltage power supplies as +3.3V, ±5V and ±15V.
(3) With the probe held by hand, does the noise increase or decrease?
(4) With the probe redirected, does the noise increase or decrease?
(5) In what direction does the noise (nor streak) change on the ultrasound image (or on the entire screen)? And is such change regular or irregular?

A3 Power Supply PSU-S4000*

Check each output voltage according to following table and figures.
The checking must be done in following condition.

<In case of PSU-S4000>

1) Connect the electronic linear / convex / phased array probe.

2) Wait for 30 minutes after turning the power switch on.

3) AC input voltage to the power supply unit must be set within ±10% of standard at worst.

4) Make without load condition when you measure AC OUTLET.

Check Point			Output Voltage (Standard)	
Connector No.	Pin	GND		
J401	1	7	+5.1V	+5.3V～+5.1V
	2	7	−5.0V	−5.2V～−5.0V
	3	7	−12.0V	−12.2V～−12.0V
	4	7	HVB	Refer to table of HVB
	5	—	NC or +70V	———
	6	7	CWV	Refer to table of CWV
	8	7	+3.3V	+3.5V～+3.3V
	9	7	+5.0V	+5.2V～+5.0V
	10	7	+12.0V	+12.2V～+12.0V
	11	—	NC	———
	12	7	HVA	Refer to table of HVA
	13	—	NC or –130V	———
	14	7	+12Vb	+13.5V～+10.5V
AC OUTLET			Same as AC input Voltage	Within ±3.0%

An ultrasound transmission voltage is controlled variably by the control signal supplied from the exterior as shown in a table given on the next page. That voltage is controlled by a 6-bit TTL signal.

High Voltage specification

HV Control (HVA/HVB)							Output Voltage		Current (Max.)
HEX	b0	b1	b2	b3	b4	b5	HVA	HVB	
—	×	×	×	×	×	×	OFF	OFF	
3F	H	H	H	H	H	H	OFF	OFF	
～	～	～	～	～	～	～	～	～	～
1A	L	H	L	H	H	L	-31.2V	+19.5V	0.25A
19	H	L	L	H	H	L	-32.5V	+20.3V	0.25A
01	H	L	L	L	L	L	-78.75V	+49.2V	0.1A
00	L	L	L	L	L	L	-80.0V	+50.0V	0.1A

CWV specification

HV Control (CWV)							Output Voltage	Current (Max.)
HEX	b0	b1	b2	b3	b4	b5	CWV	
—	×	×	×	×	×	×	OFF	
3F	H	H	H	H	H	H	OFF	
3A	L	H	L	H	H	H	+0.9V	0.08A
39	H	L	L	H	H	H	+1.1V	0.09A
～	～	～	～	～	～	～	～	～
01	H	L	L	L	L	L	+11.8V	0.98A
00	L	L	L	L	L	L	+12.0V	1.0A

Connector arrangement of PSU-S4000*-2

A. Applied to S/N. M00101 through M02606, M02772 and M02773

J401：VOLTAGE CHECK

14	FAN	NC	HVA	NC	+12.0V	5.0V	+3.3V	8
7	GND	CWV	NC	HVB	-12.0V	-5.0V	+5.1V	1

B. Applied to S/N. M02607 through M02771, M02774 and higher

J401：VOLTAGE CHECK

14	FAN	-130V	HVA	NC	+12.0V	5.0V	+3.3V	8
7	GND	CWV	+70V	HVB	-12.0V	-5.0V	+5.1V	1

Power Distribution Map for PSU-S4000

Power supply unit		PSU-S4000-2									PSU-S4000-1	
PSU-S4000		+3.3V	+5.1Va	+12.0V	-12.0V	+5.0V	-5.0V	HVB	HVA	CWV	+12.0V	AC OUT
EP4483**		O	O									
EP4484**				O	O	O	O					
EP4485**								O	O	O		
EP4495**											O	
USI-150												
Fan											O	
IPC-1530Q	TV monitor											O
L-KEY-75*	Main panel		O	O	O							
HDD			O									
FDD			O									
EP4261**	Foot SW PCB											
EP4438**	Probe Selector 1	O		O	O	O	O					
EP4439**	Probe Selector 2	O		O	O	O	O					
EP4440**	Pre AMP			O		O	O					
EP4441**/EP4500**	Tx & Tx Focus	O	O	O	O	O	O EP4441 only	O	O	O		
EP4442**	STCW	O	O			O	O					
EP4443**	A ITF	O	O	O	O	O 01 only	O 01 only					
EP4429**	Rx Beam Former	O	O			O	O					
EP4429**	Rx Beam Former	O	O			O	O					
EP4429**	Rx Beam Former	O	O			O	O					
EP4444**	AD_DA	O	O	O	O	O	O					

Power supply unit PSU-S4000		PSU-S4000-2									PSU-S4000-1	
		+3.3V	+5.1Vd	+12.0V	-12.0V	+5.0V	-5.0V	HVB	HVA	CWV	+12.0V	AC
EP4483**		O	O									
EP4484**				O	O	O	O					
EP4485**								O	O	O		
EP4495**											O	
EP4435**	CFP	O	O									
EP4436**	SDP	O	O									
EP4430**	Tx Rx Control	O	O									
EP4469**	VOL	O	O	O	O		O					
EP4465**	CSC	O	O									
EP4464**	BSC	O	O									
EP4468**	PSC	O	O	O	O							
EP4466**	VPU	O	O	O	O							
EP4467**	MGR	O	O									
EP4470**	VCM	O	O	O	O		O					
EP4423**	CPU	O	O	O	O		O					
EP4472**	Distributor		O	O	O							
EP4473**	Audio		O	O	O							

Power Distribution Map for PSU-S4000*

Power supply unit		PSU-S4000*-2*									PSU-S4000*-1	
PSU-S4000*		+3.3V	+5.1Va	+12.0V	-12.0V	+5.0V	-5.0V	HVB	HVA	CWV	+12.0V	AC OUT
EP4631**		○		○	○	○	○					
EP4632**			○					○	○	○		
EP4634**											○	
USI-150												
Fan											○	
IPC-1530Q/IPC-1530(u)	TV monitor											○
L-KEY-75*	Main panel		○	○	○							
HDD			○									
FDD			○									
EP4261**	Foot SW PCB											
EP4438**	Probe Selector 1	○		○	○	○	○					
EP4439**	Probe Selector 2	○		○	○	○	○					
EP4440**	Pre AMP			○		○	○					
EP4441**/EP4500**	Tx & Tx Focus	○	○	○	○	○	○ EP4441	○	○	○		
EP4442**/EP4902**	STCW	○	○			○	○					
EP4443**	A ITF	○	○	○	○	○ 01のみ	○ 01のみ					
EP4625**/EP4837**	Rx Beam Former	○	○			○	○					
EP4625**/EP4837**	Rx Beam Former	○	○			○	○					
EP4444**	AD_DA	○	○	○	○	○	○					
EP4784**	DBP	○	○	○	○	○	○					

Power supply unit PSU-S4000*		PSU-S4000*-2*									PSU-S4000*-1	
		+3.3V	+5.1Vd	+12.0V	-12.0V	+5.0V	-5.0V	HVB	HVA	CWV	+12.0V	AC
EP4631**		O		O	O	O	O					
EP4632**			O					O	O	O		
EP4634**											O	
EP4435**/EP4760**	CFP	O	O									
EP4436**/EP4761**	SDP	O	O									
EP4430**	Tx Rx Control	O	O									
EP4469**	VOL	O	O	O	O		O					
EP4465**	CSC	O	O									
EP4464**	BSC	O	O									
EP4468**	PSC	O	O	O	O							
EP4466**/EP4768**	VPU	O	O	O	O							
EP4467**	MGR	O	O									
EP4470**	VCM	O	O	O	O		O					
EP4423**	CPU	O	O	O	O		O					
EP4472**	Distributor		O	O	O							
EP4473**	Audio		O	O	O							
EP4769**	CMB	O	O									

A4 Probe / Scanner

This system is connectable with an electronic scanning probe. First of all, therefore, it is important to make certain in which probe the failure phenomenon has taken place.

1) Electronic Probe only

1)-1 Confirmation by Use of Another Probe or Unit

Make a checkout of performance, using a probe of the same model number as that in which the failure has taken place, if possible. To check for performance, moreover, connect the apparently failed probe with a system of identical type available as a substitute, if any.

1)-2 Coin Check (Effective for electronic linear and convex sector probe.)

Set the system in B mode and slowly move a fine metal bar, such as a resistor lead or the like, from end to end while fitting it to the probe lightly on the surface. Then, observe the ultrasound image on the TV monitor. There are possibilities that the probe may have ailed if the problem should fall in any of the following cases while moving the metal bar.

- Echo gap at one location :
  If the probe is normal, the failure has taken place on the high-voltage switch (HVS) circuit or from the probe selector to the probe.

  ····· C1

- Echo gaps at two or more locations at equal intervals :
  If the probe is normal, the failure relates to the signal lines covering the crystal on the probe or to the HVS circuit.

  ····· C1/C2/C4/C5/C6

- Two or more echoes appear at equal intervals.
  A failure of the signal line provided on equal terms with a transducer of the probe or a failure of the HVS circuit.

  ····· C2/C4/C5

- Echo gaps over a certain consecutive span:
  If the probe is normal, the failure has taken place in the HVS control circuit or from the probe selector to the probe.

  ····· C2/C4/C5/C7

2) Probe Code

To make the system identify the type of a probe, a “probe code” is provided individually.

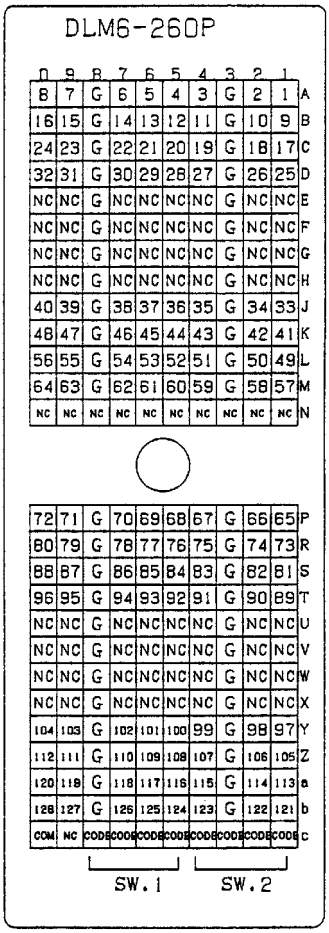
This “probe code” is used to determine conceivability or to read out the information peculiar to a probe stored in the parameter memory. A probe code is set according to a variation of how pins are arranged in a connector of the probe. If any of these pins has bent or broken, the system will not only fail to identify a probe code but also, in the worst case, may mistake it for the code of a different probe. This involves the fear that the system eventually set up may be put into a dangerous condition. Strictly check every pin for a possible bend or breakage, accordingly.

●CAUTION● If the probe should be mounted and removed repetitively onto the system equipment while leaving a probe pin bent, there are possibilities that the system connector may break down. In addition, the system connector so broken down has really ruptured a pin in another probe in the worst case so far experienced.

It is necessary, therefore, to find out a pin bent or broken in its earliest possible stages.

If there is an impediment to the path through which a probe code is transmitted, moreover, a similar failure phenomenon will appear.

····· C1/C2/C4/C5/C9/C15/D1



Connector for electrical linear, convex and pheased array probe.

Model : UST-9123

G : GND

Probe Code SW1: 5, SW2: 6

In case of the probe code is not recognized normally and the message of “Invalid Probe” is shown on the TV monitor, the poor connection of the probe connector may occur this trouble.

A5 TV monitor IPC-1530Q/IPC-1530(U)

For this checking, refer “SECTION 7 SCHEMATICS”.

Check the contrast and brightness potentiometers for proper setting at first. And referring **A3**, check the voltage supplied for TV monitor.

○REFERENCE○ An impression of an ultrasound image depends largely on setting of contrast and brightness. User complaints about insufficient sensitiveness or resolving power may be sometimes solved by adjustments of contrast and brightness potentiometers.
Remember the fact that excessively high setting of those potentiometers would cause characters and graphics to flicker.

If the display power switch is repeatedly turned on and off at random, a spot may be produced on the CRT or a fault may result. Care should be taken.

1) Precaution for Monitor repairing

1)-1 Subjecting the unit to strong shocks may result in damage to the CRT or malfunction, therefore care must be taken when transporting or installing the unit.

● **DANGER** ● High voltages are present inside the display chassis. Only experienced technicians should touch internal parts.

● **DANGER** ● The electric charge has remained in CRT after the power switch is turned off. Because the high voltage is usually used for CRT. So make the electric charge escape with a grounding stick which is connected to the ground of the chassis and through the resistance for high voltage (Approx. 1MΩ) before removing the anode cap.
Some electric charge remains in CRT after escaping with a grounding stick.
Do not touch the metallic part of anode cap with bare hands, when detaching the anode cap directly.

1)-2 CRT with the deflecting yoke is already adjusted to the best condition. Do not touch the deflecting yoke and the magnet of the neck part.

1)-3 Be sure to detach the metallic goods such as a wristwatch from your body before doing the repair work.

1)-4 To prevent the secondary damage and the electrical shock, the matters above should be taken into careful consideration.

1)-5 Avoid covering the air hole or installing this equipment by the side of any source of heat. Install the equipment in a place with good ventilation as much as possible.

1)-6 Avoid using the equipment in direct sunlight or a bright place. It may raise the temperature or make the screen unclear.

1)-7 Avoid using the equipment near magnetic sources such as a transformer, motor and power line. It can cause color phase irregularity or picture shaking.

1)-8 Giving strong shocks or vibration can cause damage to or trouble with the CRT. When transporting or setting up the equipment, handle with care.

1)-9 Before replacing the fuse, be sure to turn off the power and unplug the power cable.

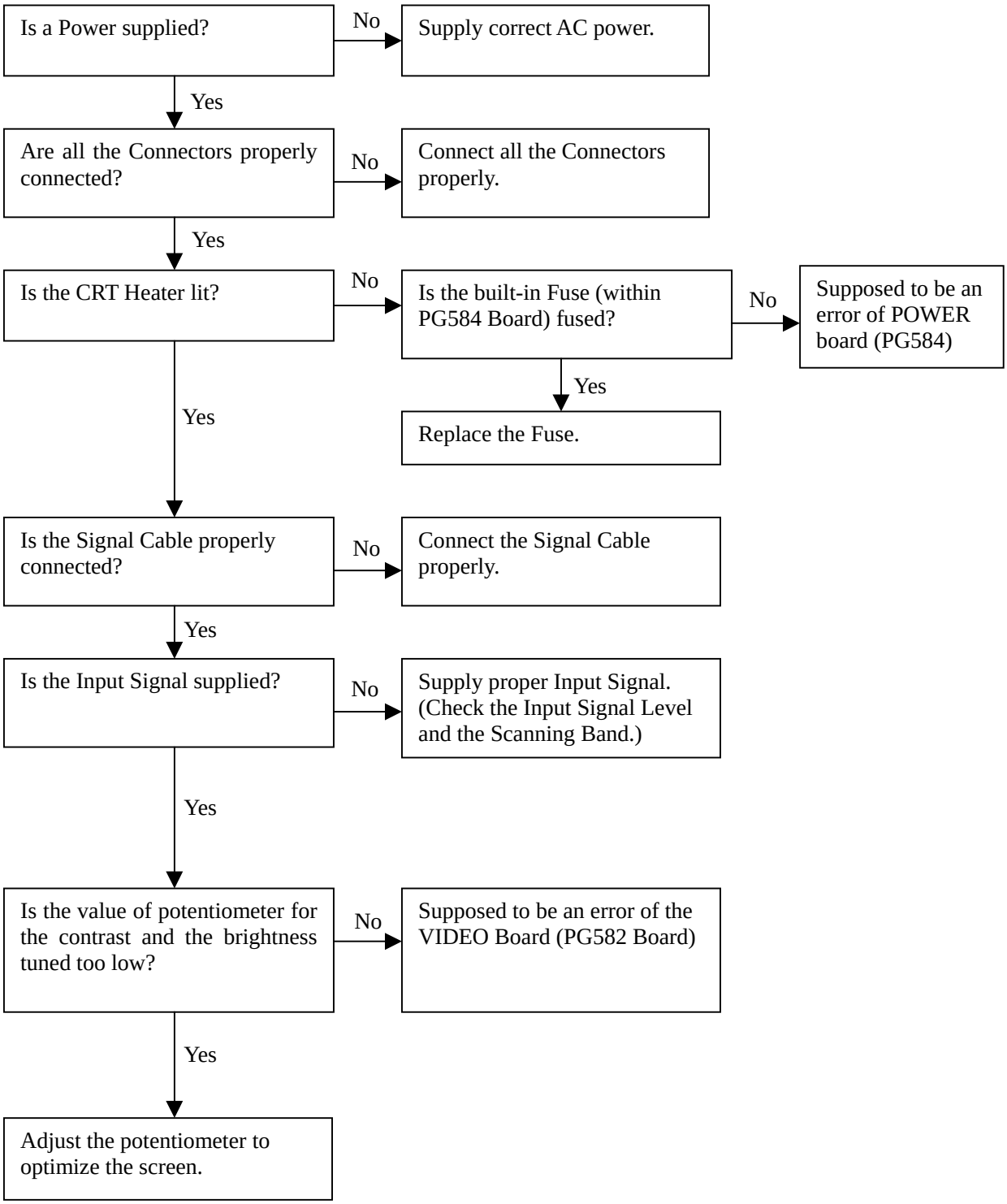
●CAUTION● When you replace the fuse, you must use the same rating one.

1)-10 If the display power switch is repeatedly turned on and off at random, a spot may be produced on the CRT or a fault may result. Care should be taken.

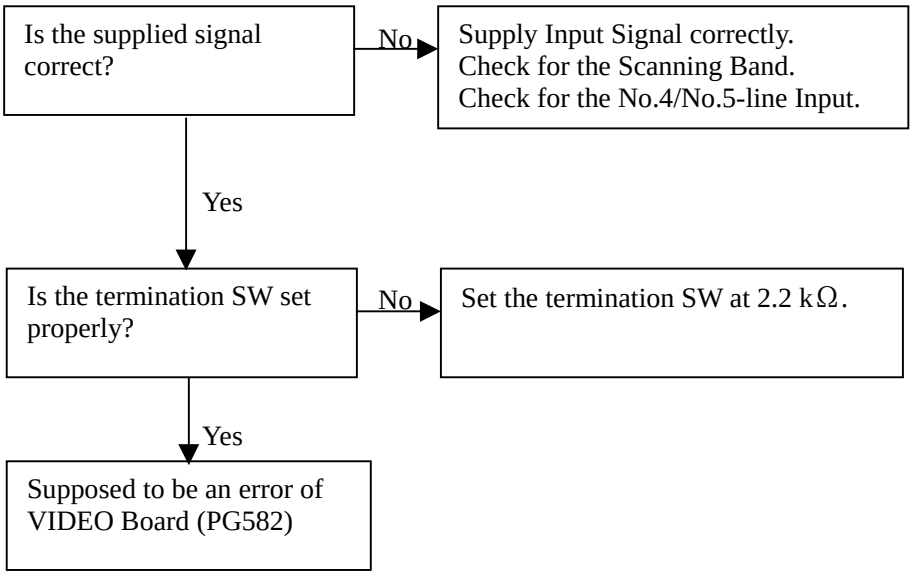
●CAUTION● Do not adjust any potentiometers unless they have been altered.
When you perform the adjustment, note that the rear cover must be taken off in any case.

<IPC-1530Q : Troubleshooting>

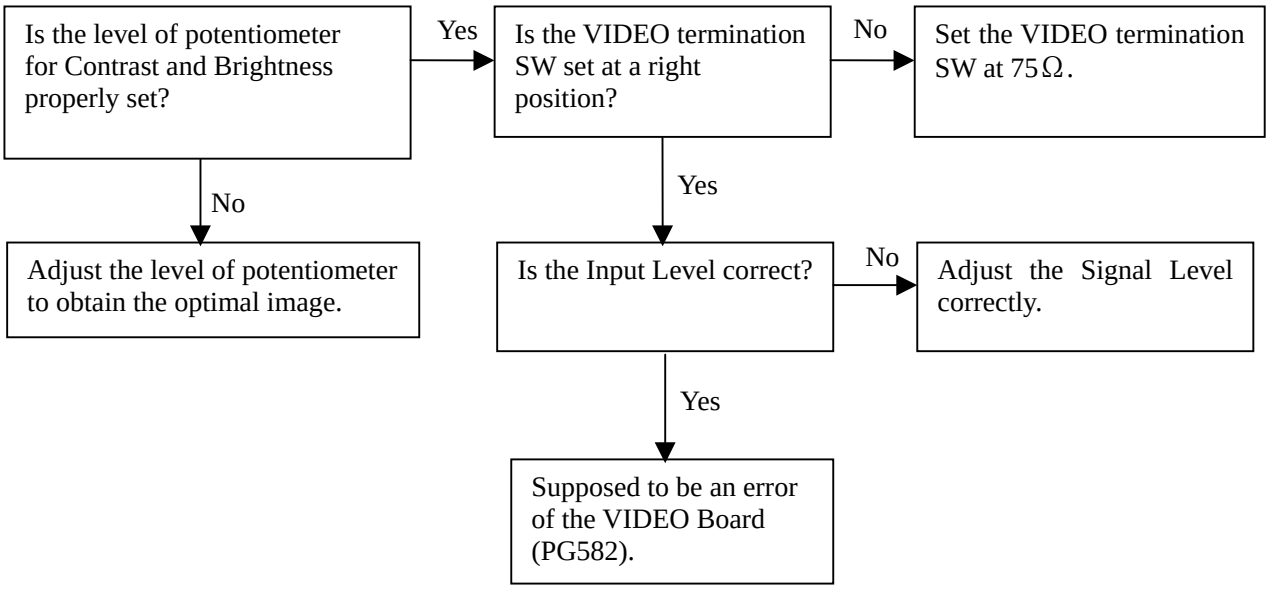
(1) Unable to view an Image



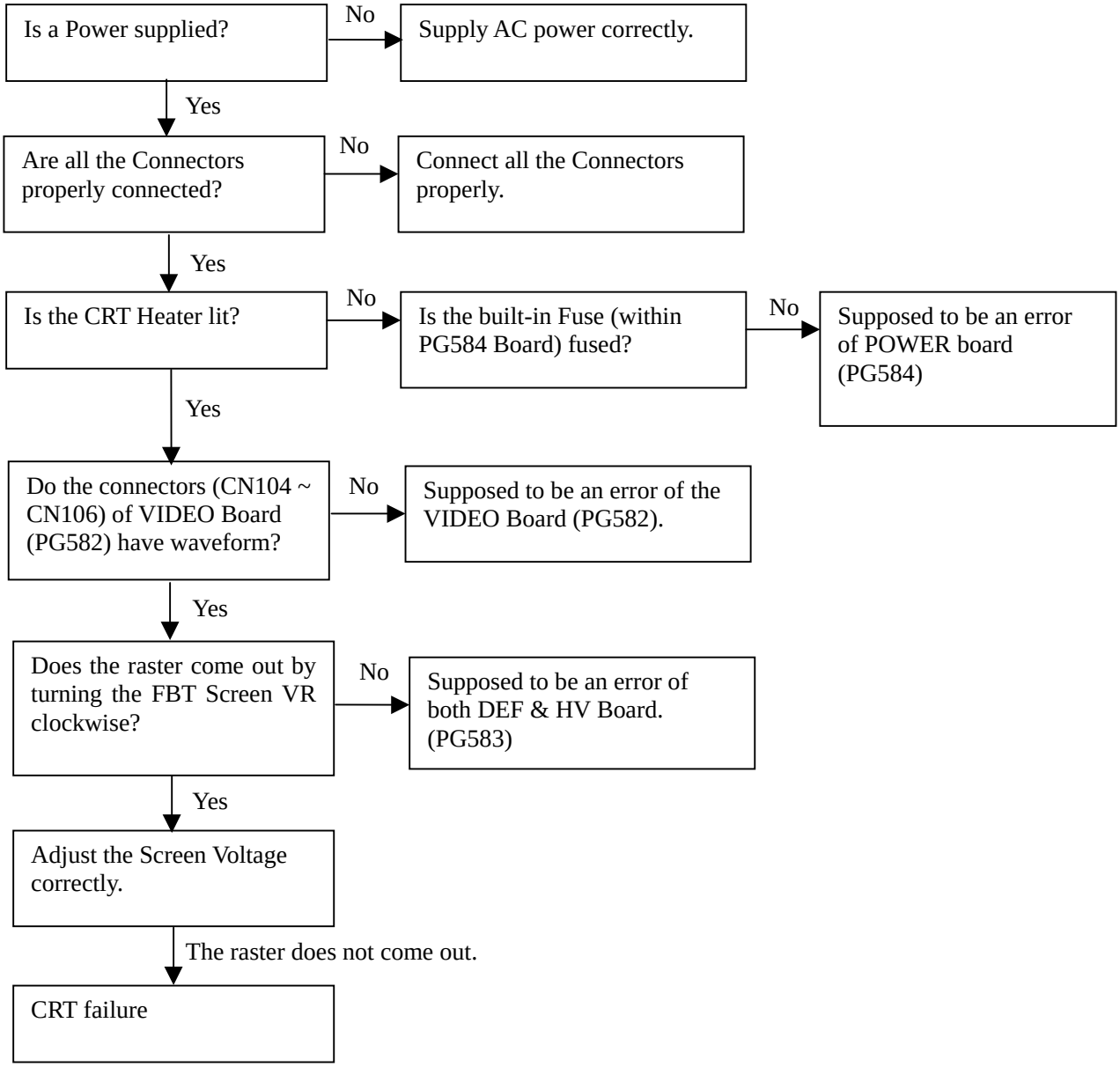
(2) Unable to obtain Synchronizing



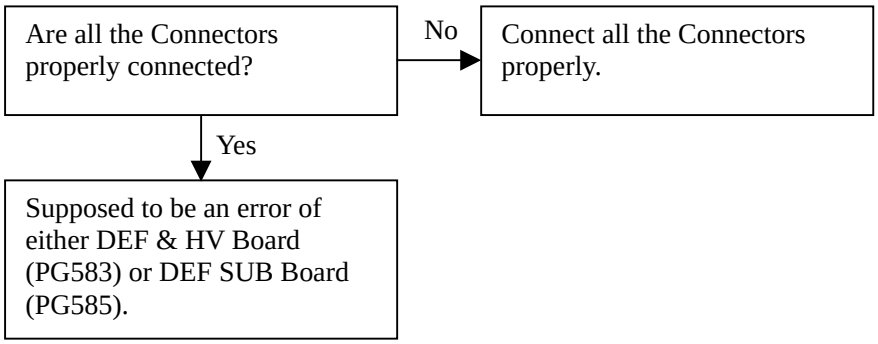
(3) An Image is too bright.



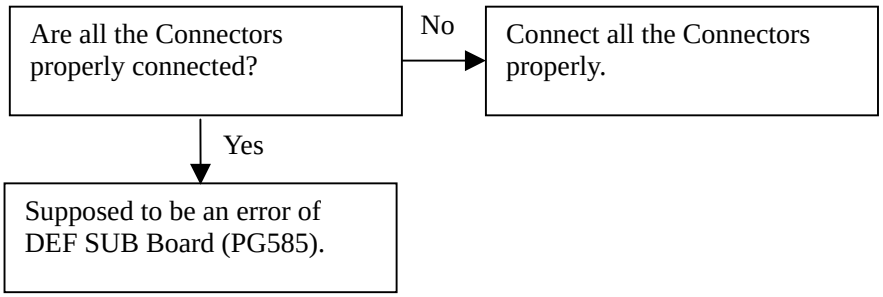
(4) The Raster does not come out.



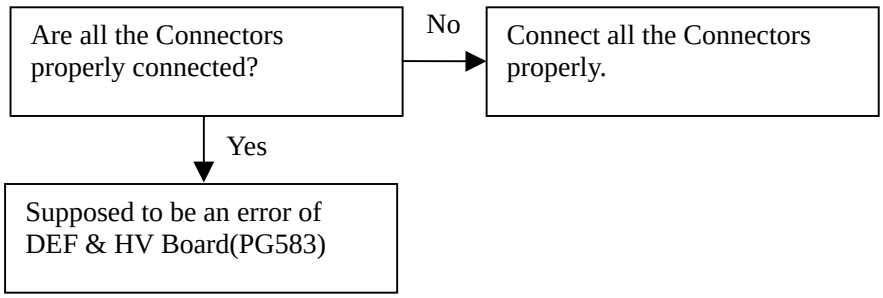
(5) The raster turns into vertically one line.



(6) The raster turns into horizontally one line.



(7) The Retrace can be seen.



<Fuse replacement procedure>

Detach AC Power Connector from the power cable. Use a screwdriver and unfasten three screws for the cover mounting (Fig. 1 ①), and then pull it out.

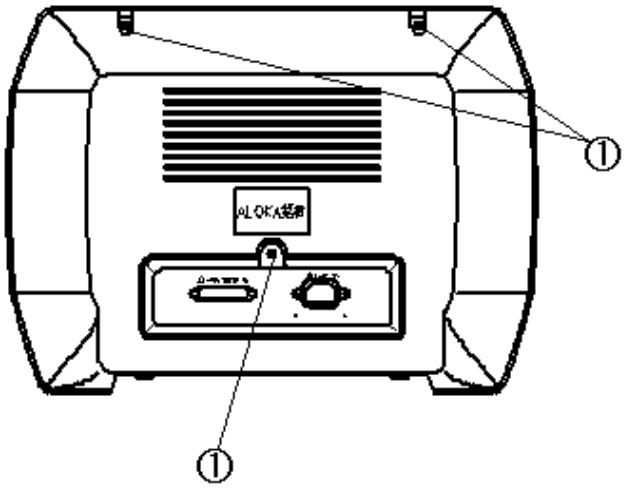


Fig. 1 Machine-screws position to mount Cover

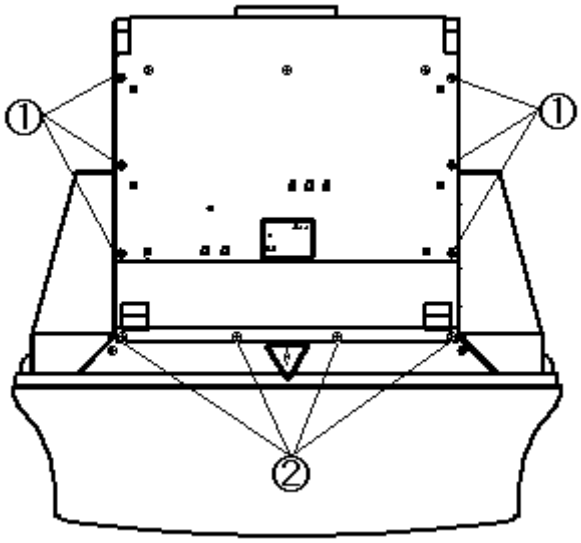


Fig. 2 (a) State after the Cover detached (Monitor upper part)

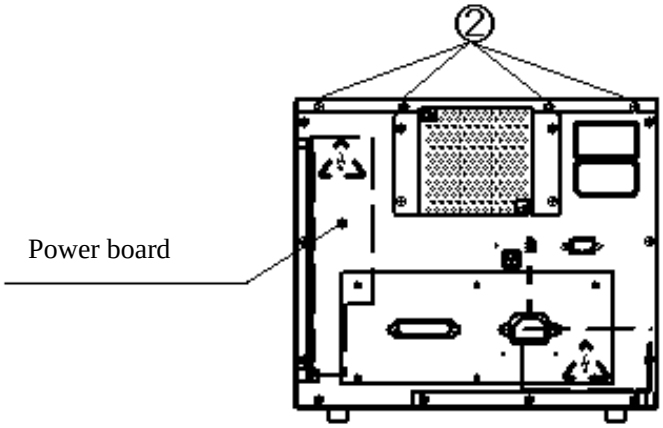


Fig. 2 (b) State after the Cover detached (Monitor rear side)

Remove the screws (6 pieces) of ① of Fig. 2 (a) and (b), and unfasten the screws (8 pieces) of ② to open the upper shield-cover. You can find the Power Board on the right side. Furthermore, when replacing the Fuse, it will be easier to take off the machine-screws (3 pieces) on the Board and hold the Board up.

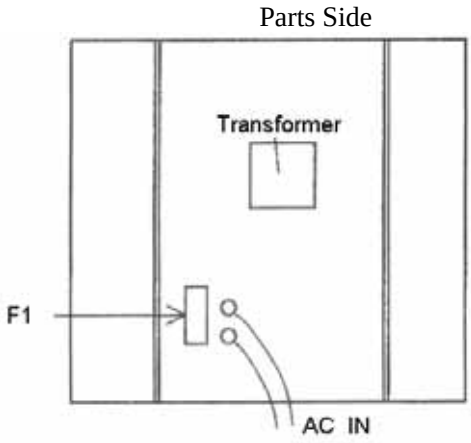


Fig. 3 Fuse position on the Power Board

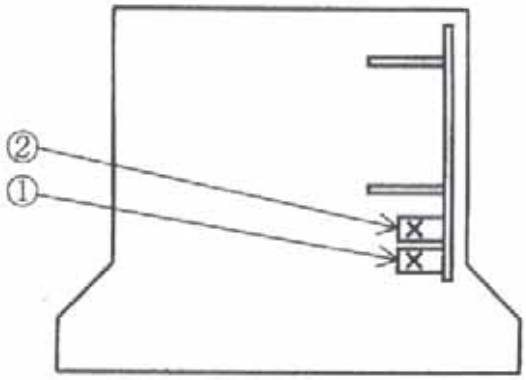
*:A Fuse is fixed on the Fuse Holder.

<Functions of Each Potentiometer>

(1) Power (PG584 Board)

(a) Location of potentiometer

(Top View)



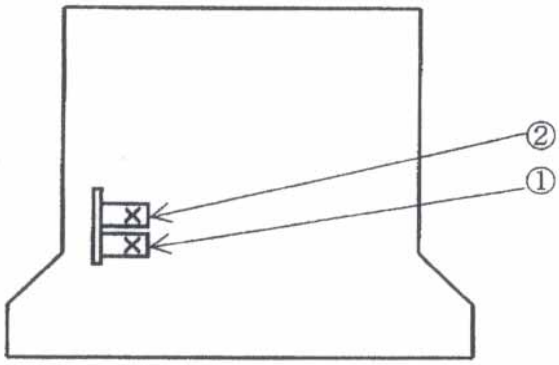
(b) Functions of potentiometer Model : PG584

No	Part No.	Function
①	VR2	Adjust the voltage of +B2 to 98 V ±1 V.
②	VR1	Adjust the voltage of +B3 to 21.3 V±0.2 V.

(2) PWM CTL (PG393 Board)

(a) Location of Potentiometer

(Top View)

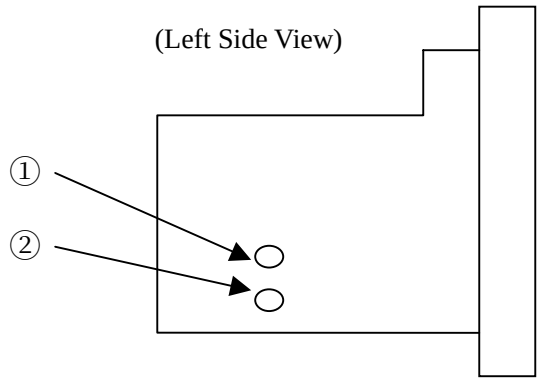


(b) Functions of Potentiometer Model : PG393

No	Part No	Function
①	VR301	Adjust the high voltage to 25 kV. *Never move this potentiometer since this is related to DHHS Regulations. To avoid movement, the VR is silicon-fixed.
②	VR302	For the X-ray protection, it is provided with the high voltage protector. *Never move this potentiometer since this is related to DHHS Regulations. To avoid movement, the VR is silicon-fixed.

(3) DEF & HV(PG583 Board)

(a) Location of Potentiometer

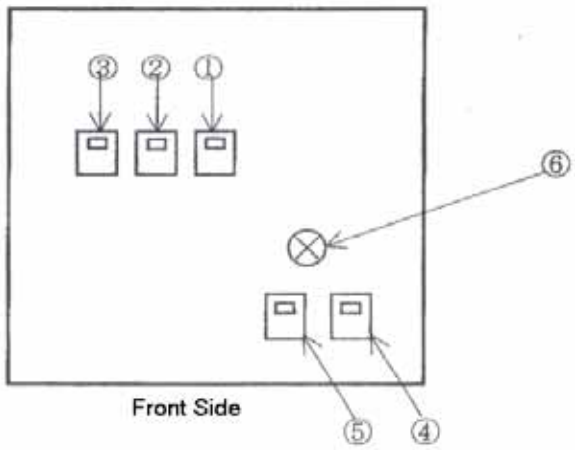


(b) Functions of Potentiometer Model : PG583

No	Part No.	Function
①	FBT (FOCUS VR)	Adjust the Focus of characters to come into a focus.
②	FBT (SCREEN VR)	Never move this unit after shipment since the default values are properly adjusted before shipment.

(4) VIDEO(PG582 Board)

(a) Location of Potentiometer (Top View)



(b) Functions of Potentiometer Model : PG582

No	Part No.	Function
①	SW1	Toggle the SW to the terminal at VIDEO (Red) 75Ω.
②	SW2	Toggle the SW to the terminal at VIDEO (Green) 75Ω.
③	SW3	Toggle the SW to the terminal at VIDEO (Blue) 75Ω.
④	SW4	Toggle the SW to the terminal at CS/HS 75Ω.
⑤	SW5	Toggle the SW to the terminal at VS 75Ω.
⑥	VR5	Never move this unit after shipment since the unit is initialized when the machine is charged before shipment.

<Waveform of Input / output signals>

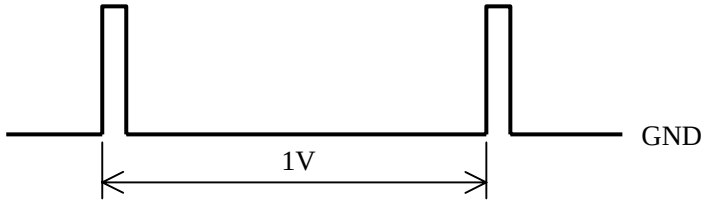
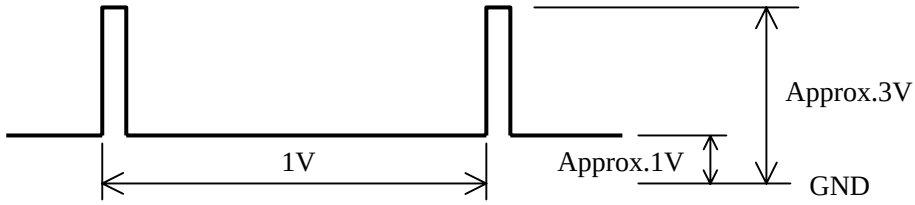
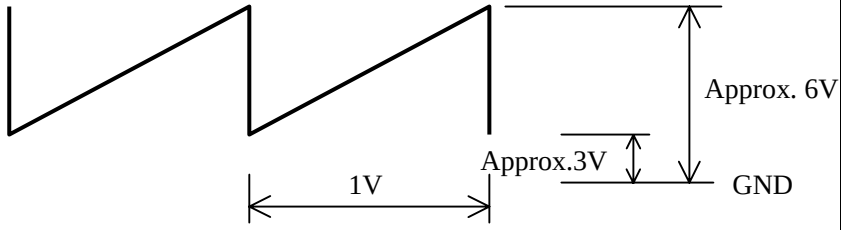
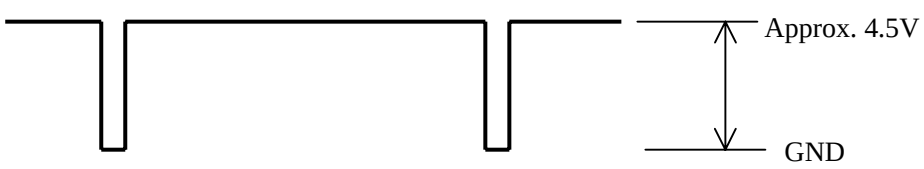
PG584 (POWER)

Terminal number		Output voltage
CN403	#1	+6.1V
	#2	GND
CN405	#1	+21.5V
	#2	GND
CN406	#1	+160V
	#2	+98V
	#3	+12V
	#4	-5V
	#5, #6	GND
CN407	#1	+21.5V
	#2	+14V
	#3	+12V
	#4, #5	GND
CN408	#1	+98V
	#2	+12V
	#3, #4	GND
	+14V	+14V
	GND-2	GND

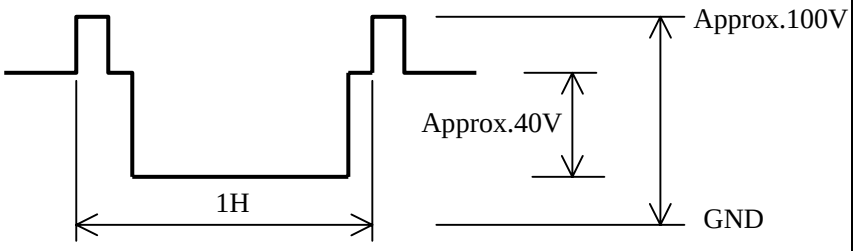
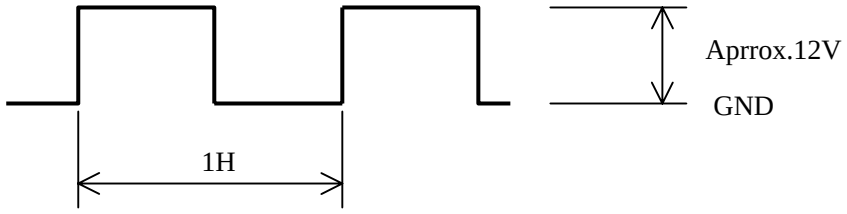
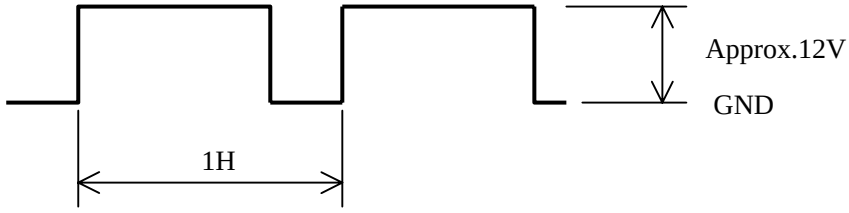
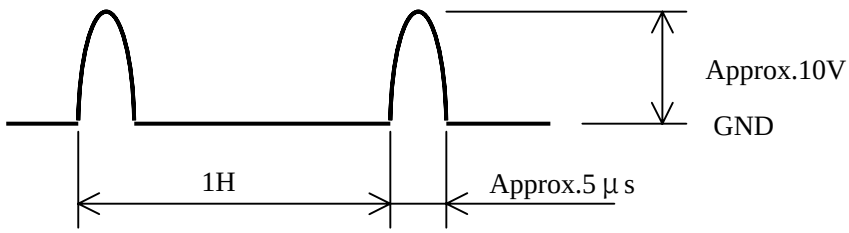
〔Remarks〕 Shows the period of Horizontal (1H) and Vertical (1V) for Input/output signals and voltage as a table below.

Input signal	1H	1V
NTSC	63.55 μs	16.68 ms
NTSC double scan speed	31.78 μs	16.68 ms
PAL	64.0 μs	20 ms
PAL double scan speed	32.0 μs	20 ms
VGA	31.75 μs	16.67 ms

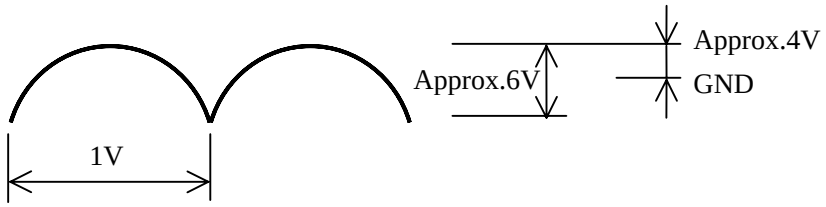
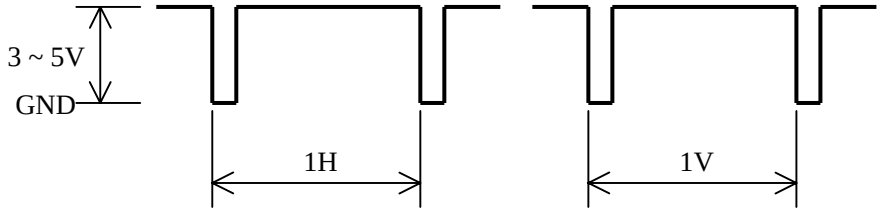
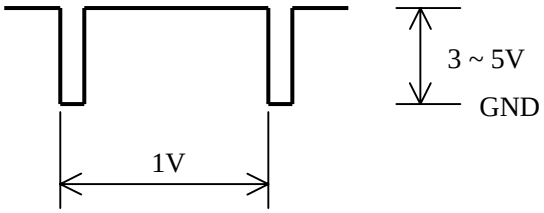
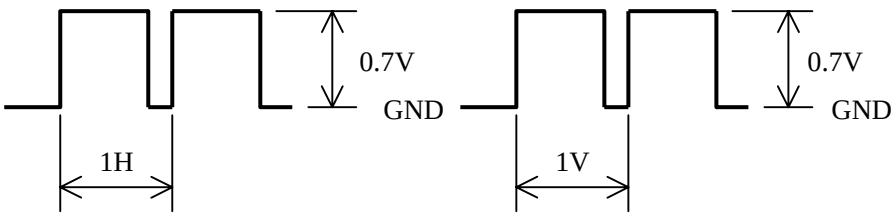
PG582 (VIDEO)

Terminal number		Input / output signal waveform and voltage
CN101	#1	Approx. +3V
	#2	0 ~ +3V (Depend on external CONTRAST VR)
	#4	Approx. +3V
	#5	0 ~ +3V (Depend on external BRIGHTNESS VR)
	#3, #6	GND
CN102	#1	0 ~ +5V (Depend on count of H CENT)
	#2, #3, #4	0 or +5V
	#5	0 ~ +5V (Depend on count of K BIAS)
CN103	#1	
	#2, #3, #5	0 ~ +5V
	#4	
	#6	Approx. 2V (NTSC, PAL) Approx. 3V (NTSC double scan speed, PAL double scan speed, VGA)
	#7	
	#8, #12	GND
	#9	0V (NTSC, PAL) +5V (NTSC double scan speed, PAL double scan speed, VGA)
	#10	

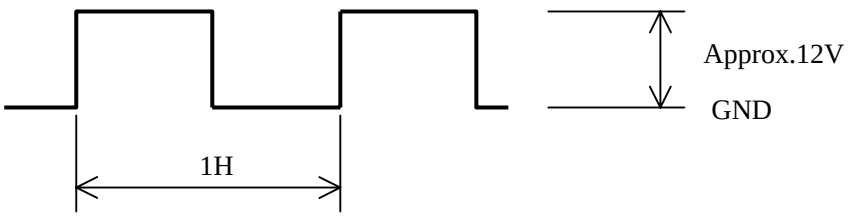
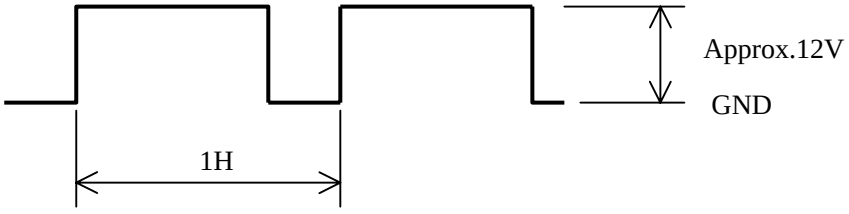
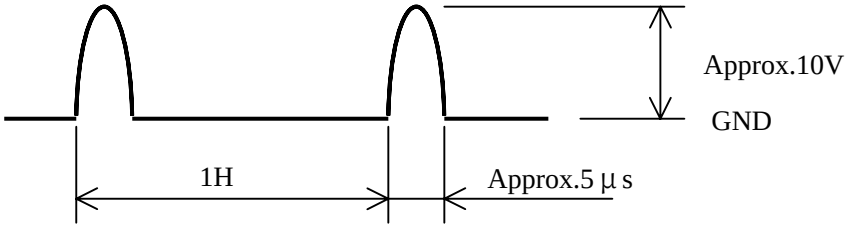
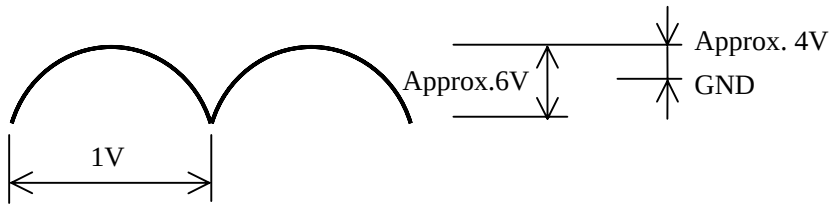
PG582 (VIDEO)

Terminal number		Input / output signal waveform and voltage
CN103	#11	+5V
CN104 CN105 CN106		 （Depend on external CONTRAST VR and BRIGHTNESS VR）
CN107	#1	+160V
	#2	+98V
	#3	+12V
	#4	-5V
	#5, #6	GND
CN108	#1, #2, #3, #4	0 or +5V (Depend on CONTROL SW)
	#5	GND
CN109	#1	
	#2, #4, #6	GND
	#3	
	#5	

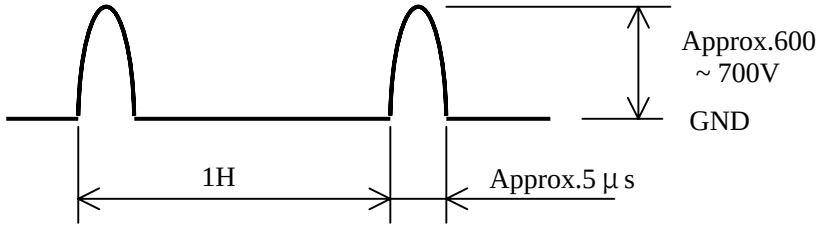
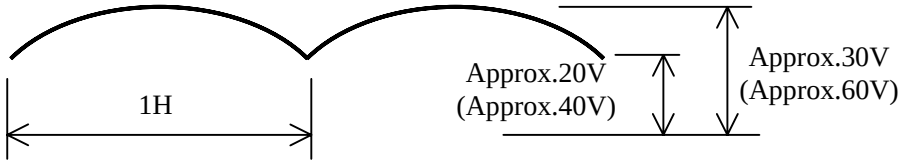
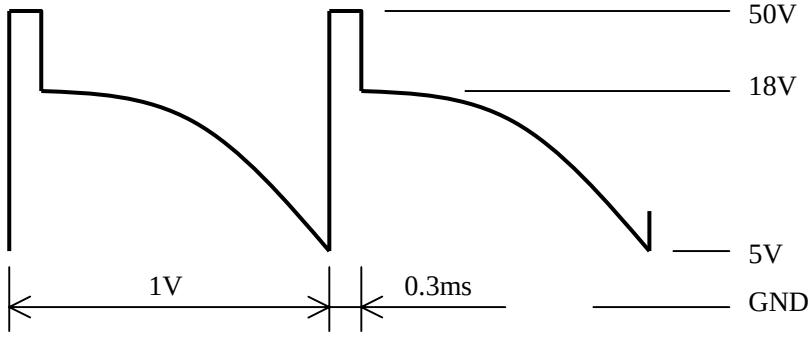
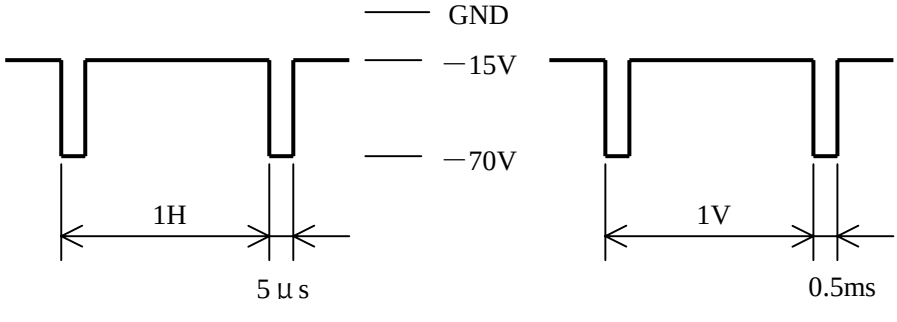
PG582 (VIDEO)

Terminal number		Input / output signal waveform and voltage
CN109	#7	
	#8	Approx. +2V
	#9	0 ~ Approx. +2V
	#10	0V (NTSC, PAL) +5V (NTSC double scan speed, PAL double scan speed, VGA)
CN110	#1 ~ #6	NC
	#7, #8	GND
CN111	#1	
	#3	
	#2, #4	GND
CN112 CN113 CN114	#1	

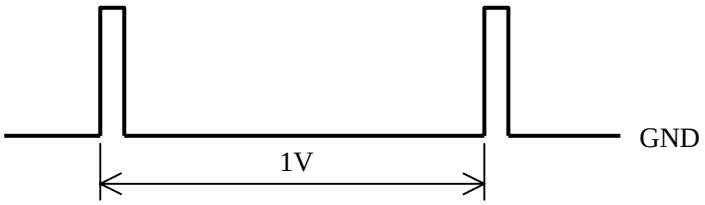
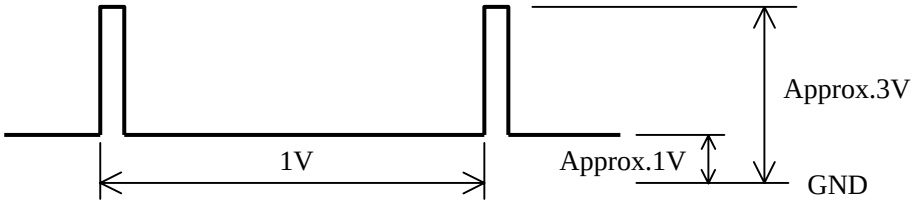
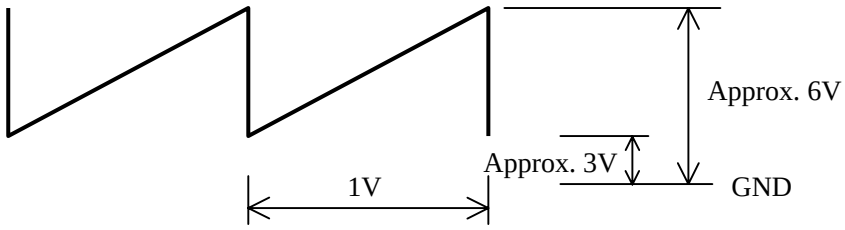
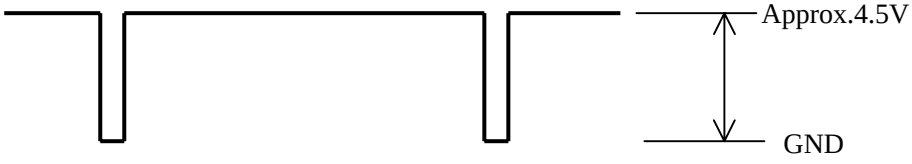
PG583 (DEF & HV)

Terminal number		Input / output signal waveform and voltage
CN201	#1	
	#2, #4, #6	GND
	#3	
	#5	
	#7	
	#8	Approx. +2V
	#9	0 ~ Approx. +2V
	#10	0V (NTSC, PAL) +5V (NTSC double scan speed, PAL double scan speed, VGA)
CN202	#1	0 ~ +5V (Depend on count of H CENT)
	#2, #3, #4	0 or +5V
	#5	0 ~ +5V (Depend on count of K BIAS)

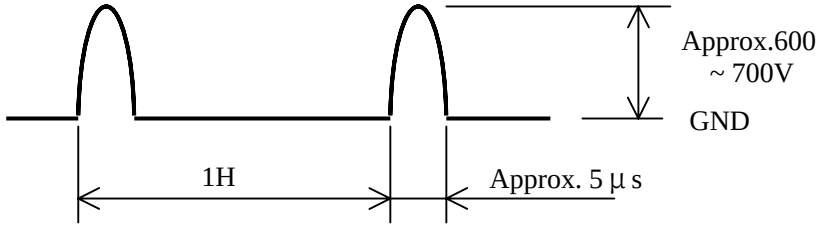
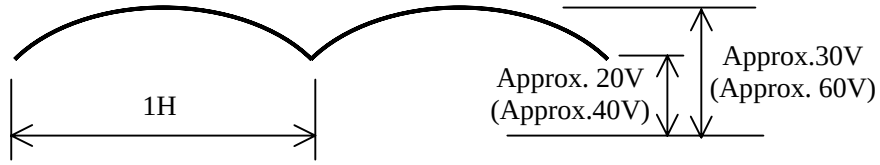
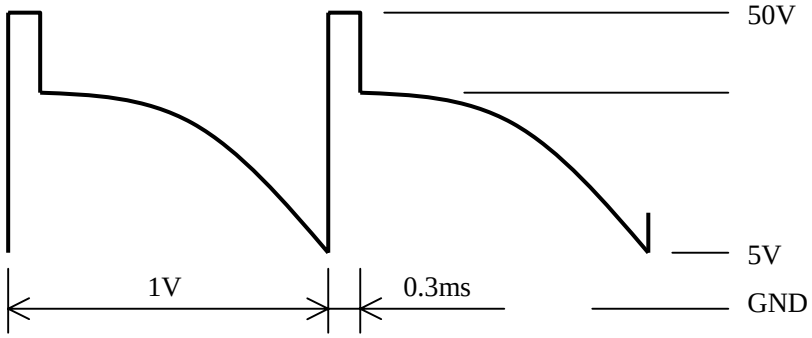
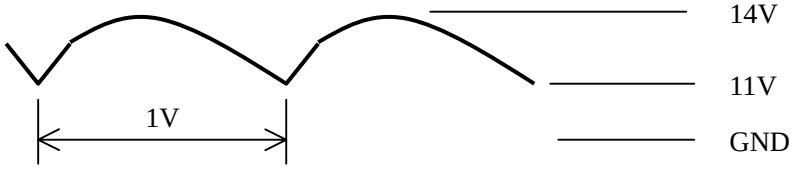
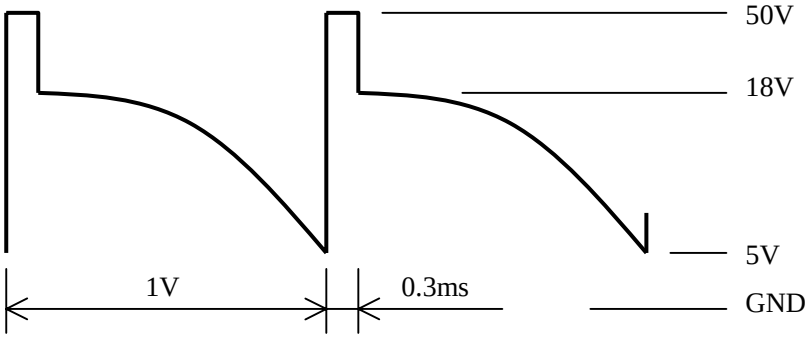
PG583 (DEF & HV)

Terminal number		Input / output signal waveform and voltage
CN203	#1	
	#2	 A number in parentheses ( ) : NTSC double scan speed, PAL double scan speed, VGA
	#3	NC
CN204	#1	+98V
	#2	+12V
	#3, #4	GND
CN205	#1	
	#2	GND
CN206		

PG585 (DEF SUB)

Terminal number		Input / output signal waveform and voltage
CN302	#1	
	#2, #3, #5	0 ~ +5V
	#4	
	#6	Approx. +2V (NTSC, PAL) Approx. +3V (NTSC double scan speed, PAL double scan speed, VGA)
	#7	
	#8, #12	GND
	#9	0V (NTSC, PAL) +5V (NTSC double scan speed, PAL double scan speed, VGA)
	#10	

PG580 (DEF SUB)

Terminal number		Input / output signal waveform and voltage
CN304	#1	
	#2	 A number in parentheses ( ) :NTSC double scan speed, PAL double scan speed, VGA
	#3	
	#4	
CN305	#1	
	#2	GND

PG585 (DEF SUB)

Terminal number		Input / output signal waveform and voltage
CN306	#1	+21.5V
	#2	+13.5V
	#3	+12.0V
	#4, #5	GND

PG586 (AUDIO AMP)

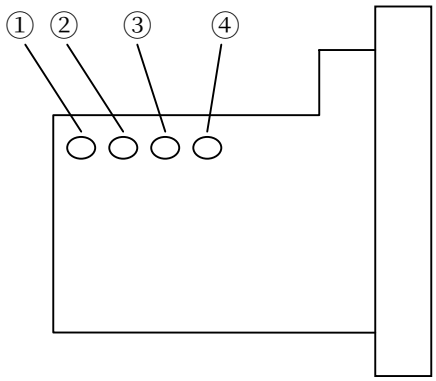
Terminal number		Input / output signal waveform and voltage
CN901	#1	+14.0V
	#2	GND
CN902	#1	+5V
	#2	0 ~ +5V (Depend on external VOL VR)
	#3	0V
CN903	#1, #3	0 ~ Approx. 2Vp-p
	#2, #4	GND

PG592 (CRT SOCKET)

Terminal number	Input / output signal waveform and voltage
G2	Approx. 600V

<On-Screen Display and Description of Functions>

The Display is tunable with the SW located at top/ left of the Screen.
(1) Locations of SWs



No	Name	Function
①	MODE	Used when selecting items to tuned.
②	▽	DOWN (used for Data Input)
③	△	UP (used for Data Input)
④	EXIT	Used for Data Entry.

(2) How to Operate Control SW

(a) Press “MODE” once to view MENU screen with a blue display.

↓

Select “ADJUSTMENT MENU” with ▽SW or △ SW, and press “MODE”.

↓

Further select the item to be tuned with ▽SW or △SW, and press “MODE”.

↓

Adjust the Set-Value with ▽SW or △SW, and press “EXIT” once for Entry.
(When further necessary to input items to be tuned, back to the previous screen.)

↓

Once every items are tuned, press “EXIT” several times to cancel the On-Screen Display. Up to this all the entry are memorized.

(b) Adjustment of SUB CONTRAST and SUB BRIGHT

Press “▽” SW once to display “CONTRAST”.

↓

Select either “CONTRAST” or “BRIGHT” via “MODE”.

↓

Tune the Set-Value with ▽SW or △ SW.

↓

Press “EXIT” to cancel the On-Screen Display. Up to this all the entry are memorized.

(3) On-Screen Display Description

(a) MENU

COLOR	:To calibrate the White-Balance
GEOMETRY	:To tune the Bias
ON SCREEN DISPLAY	:To tune the Position on the On-Screen Display
RECALL	:To get the screen Status back to that of pre-shipment.

(b) COLOR

R GAIN G GAIN B GAIN	To calibrate the White-Balance in high-intensity
R BIAS G BIAS B BIAS	To calibrate the White-Balance in low-intensity

(c) GEOMETRY

H SIZE	:To tune the Horizontal Size
H POSITION	:To tune the Horizontal Phase
V SIZE	:To tune the Vertical Size
V POSITION	:To tune the Vertical Center Position
SIDE PIN	:To tune Pin Distortion
TILT	:To tune the Tilt
KEY STONE	:To tune the Trapezoidal Distortion

(d) ON SCREEN DISPLAY

H POSITION	:To tune the Horizontal Position of On-Screen Display
V POSITION	:To tune the Vertical Position of On-Screen Display
DISPLAY TIME	:Time for the On-Screen Display to disappear

(e) RECALL

RECALL → MODE	:Press “MODE” to go back to the state of pre-shipment of a maker
CANCEL → EXIT	:Press “EXIT” to cancel “RECALL”.

CAUTION : Please make sure to record the image size first. Because, all settings are initialized to the state of pre-shipment of a maker by executing “RECALL” function.

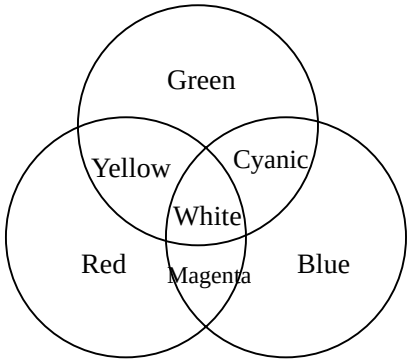
<How to calibrate the White-Balance>

(1) Calibration Menu

This is to perform the White-Balance calibration through the COLOR menu on the screen.

R GAIN, G GAIN, B GAIN :Items to calibrate the White-Balance in high-intensity.
R BIAS, G BIAS, B BIAS :Items to calibrate the White-Balance in low-intensity.

[Additive Primary Colors]



(2) White-Balance calibration in low-intensity

In case the screen seems Blue	Increases Red and Green through BIAS to White. Decreases Blue through BIAS to White.
In case the screen seems Purple	Increases Green through BIAS to White. Decreases Red and Blue through BIAS to White.
In case the screen seems Red	Increases Blue and Green through BIAS to White. Decreases Red through BIAS to White.
In case the screen seems Orange	Increases Blue through BIAS to White. Decreases Red and Green through BIAS to White.
In case the screen seems Yellow	Increases Blue through BIAS to White. Decreases Red and Green through BIAS to White.
In case the screen seems Green	Increases Red and Blue through BIAS to White. Decreases Green through BIAS to White.
In case the screen seems Cyan	Increases Red through BIAS to White. Decreases Green and Blue through BIAS to White.

(3) White-Balance calibration in high-intensity

In case the screen seems Blue	Increases Red and Green through GAIN to White. Decreases Blue through GAIN to White.
In case the screen seems Purple	Increases Green through GAIN to White. Decreases Red and Blue through GAIN to White.
In case the screen seems Red	Increases Blue and Green through GAIN to White. Decreases Red through GAIN to White.
In case the screen seems Orange	Increases Blue through GAIN to White. Decreases Red and Green through GAIN to White.
In case the screen seems Yellow	Increases Blue through GAIN to White. Decreases Red and Green through GAIN to White.
In case the screen seems Green	Increases Red and Blue through GAIN to White. Decreases Green through GAIN to White.
In case the screen seems Cyan	Increases Red through GAIN to White. Decreases Green and Blue through GAIN to White.

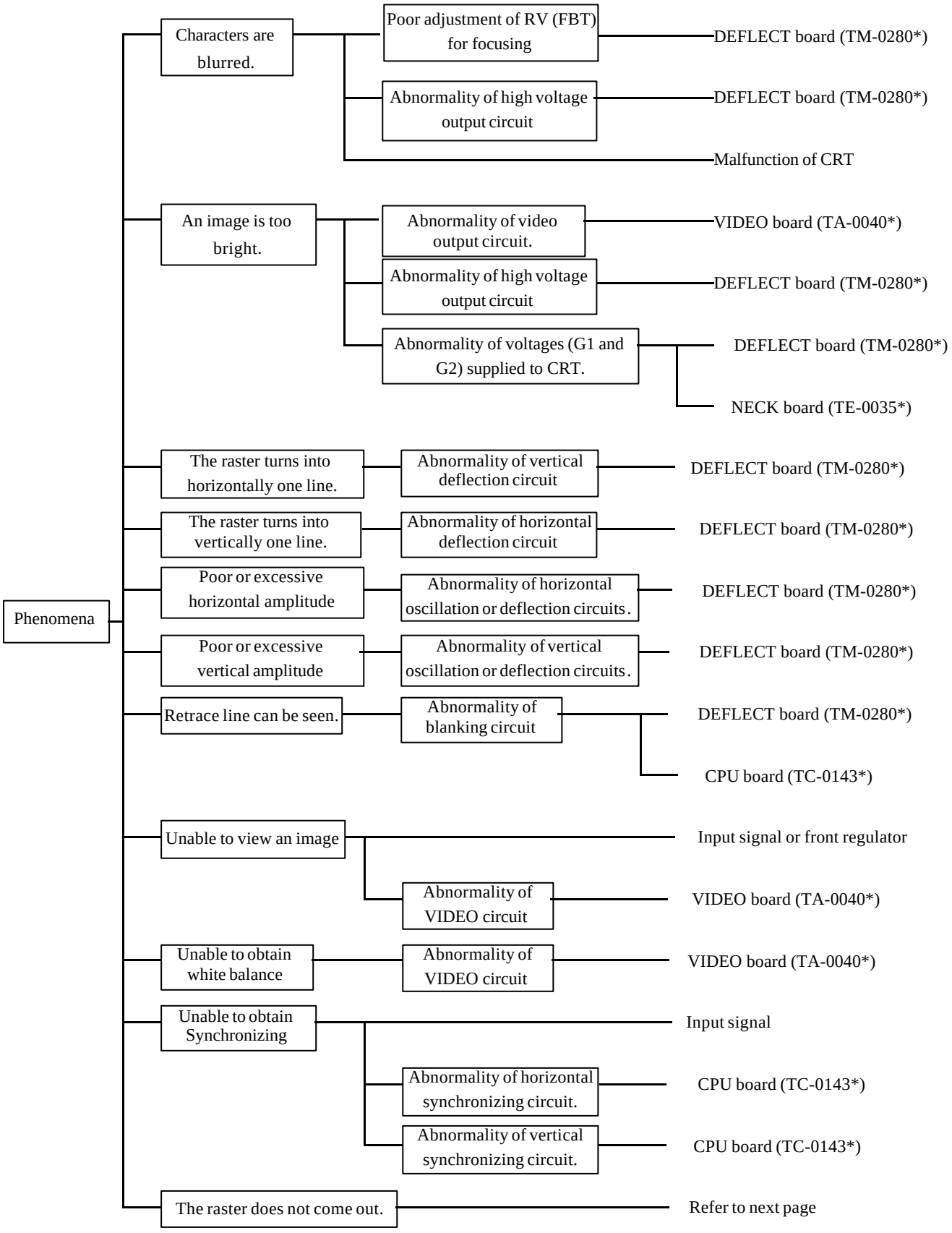
IPC-1530U: Troubleshooting

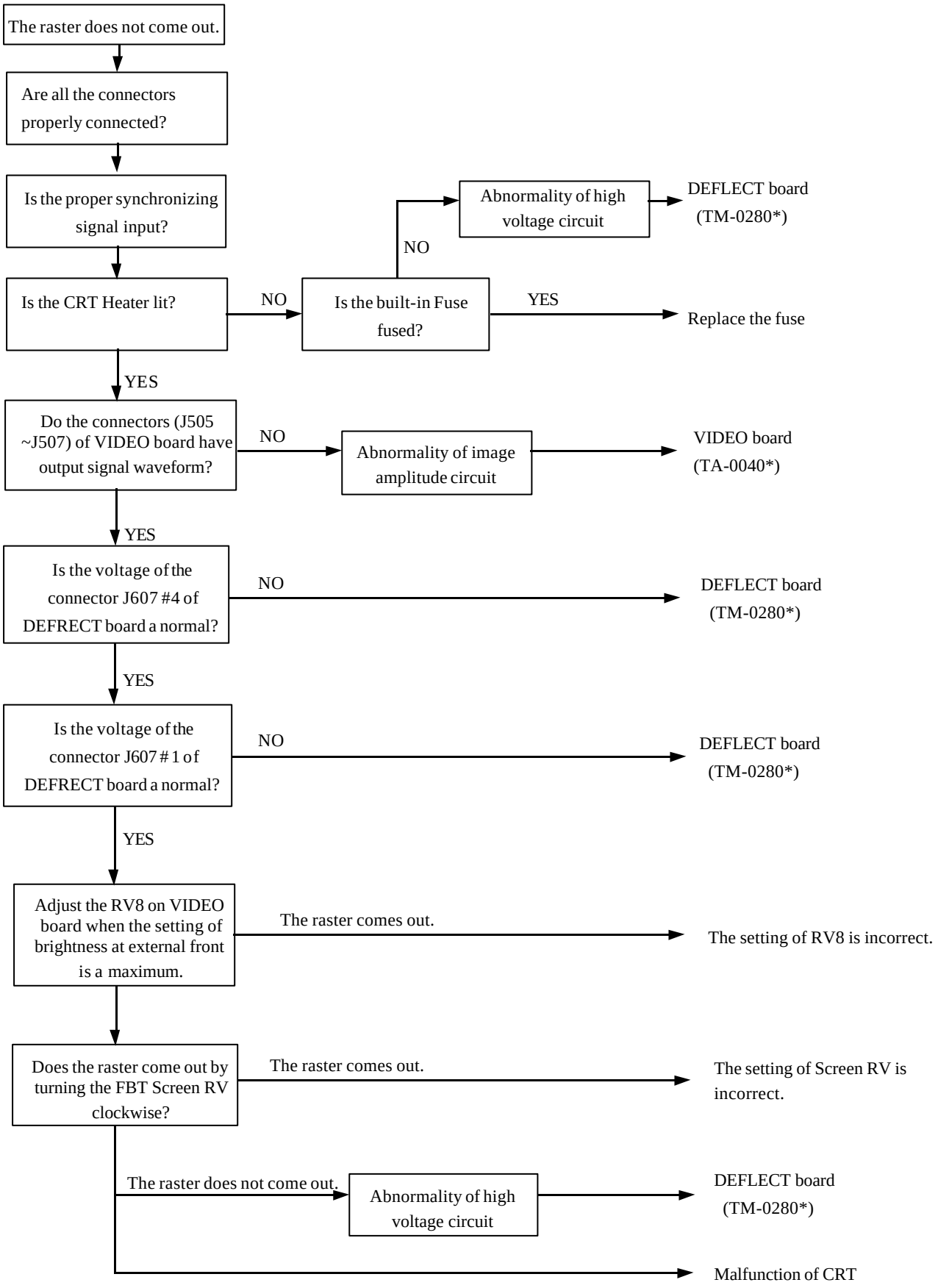
Monitor reference table with serial number

Set		Group A	Group B
S/N		M00101 ~ M00400, M00403, M00404, M00406 ~ M00440, M00451 ~ M00545	M00401, M00402, M00405, M00441 ~ M00450, M00546 ~
Power supply board	Model	TB-0055*	TB-0047*
CPU board	Model	TC-0143*	TC-0130*
Deflection board	Model	TM-0280*	TM-0230*
Video board	Model	TA-0040*	TA-0040*
Neck board	Model	TE-0035*	TE-0037*
Panel board	Model	TD-0121*	TD-0108*

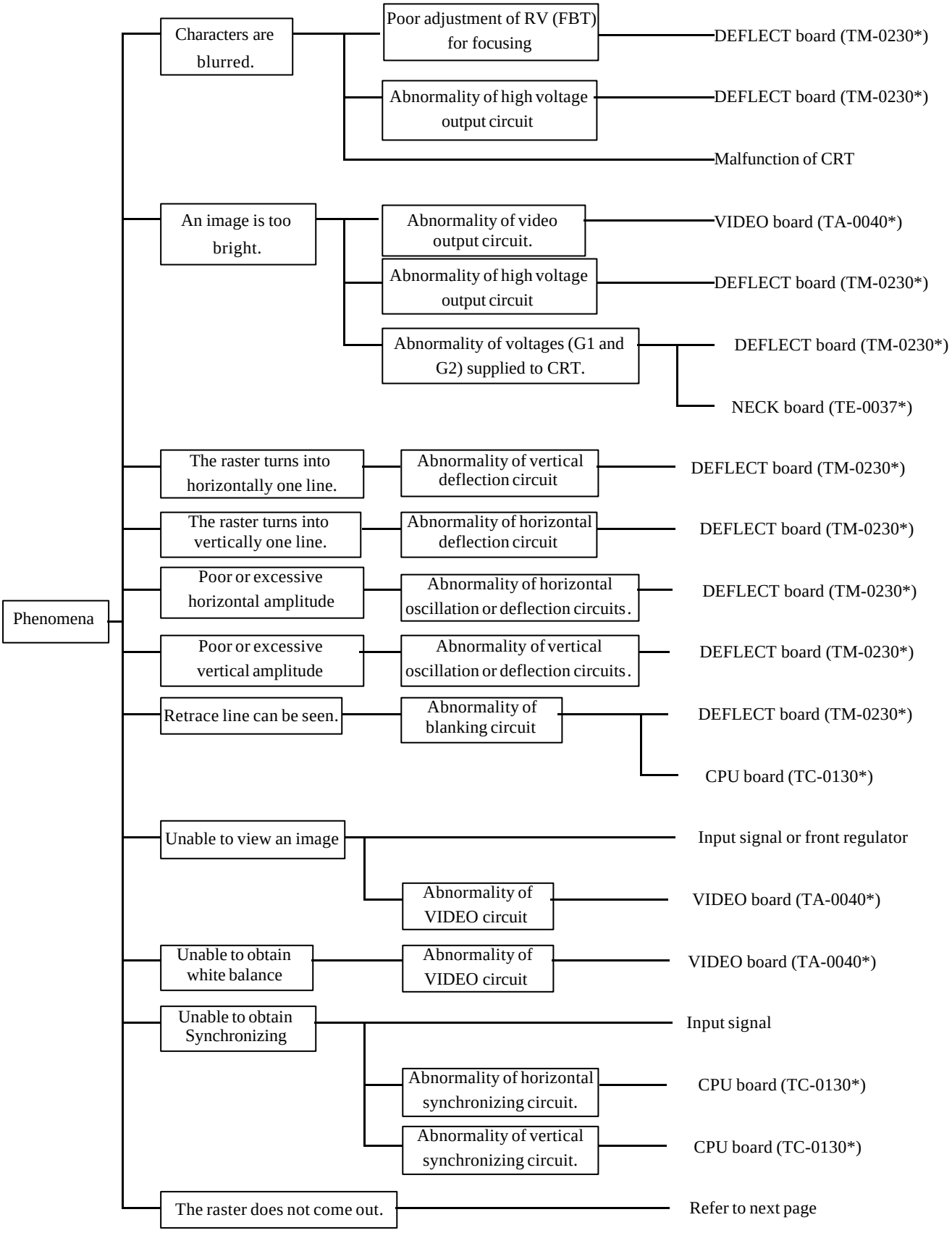
Note: Hereafter, the type of monitor is described as the model, or as the Group A and B which are separated by serial number.

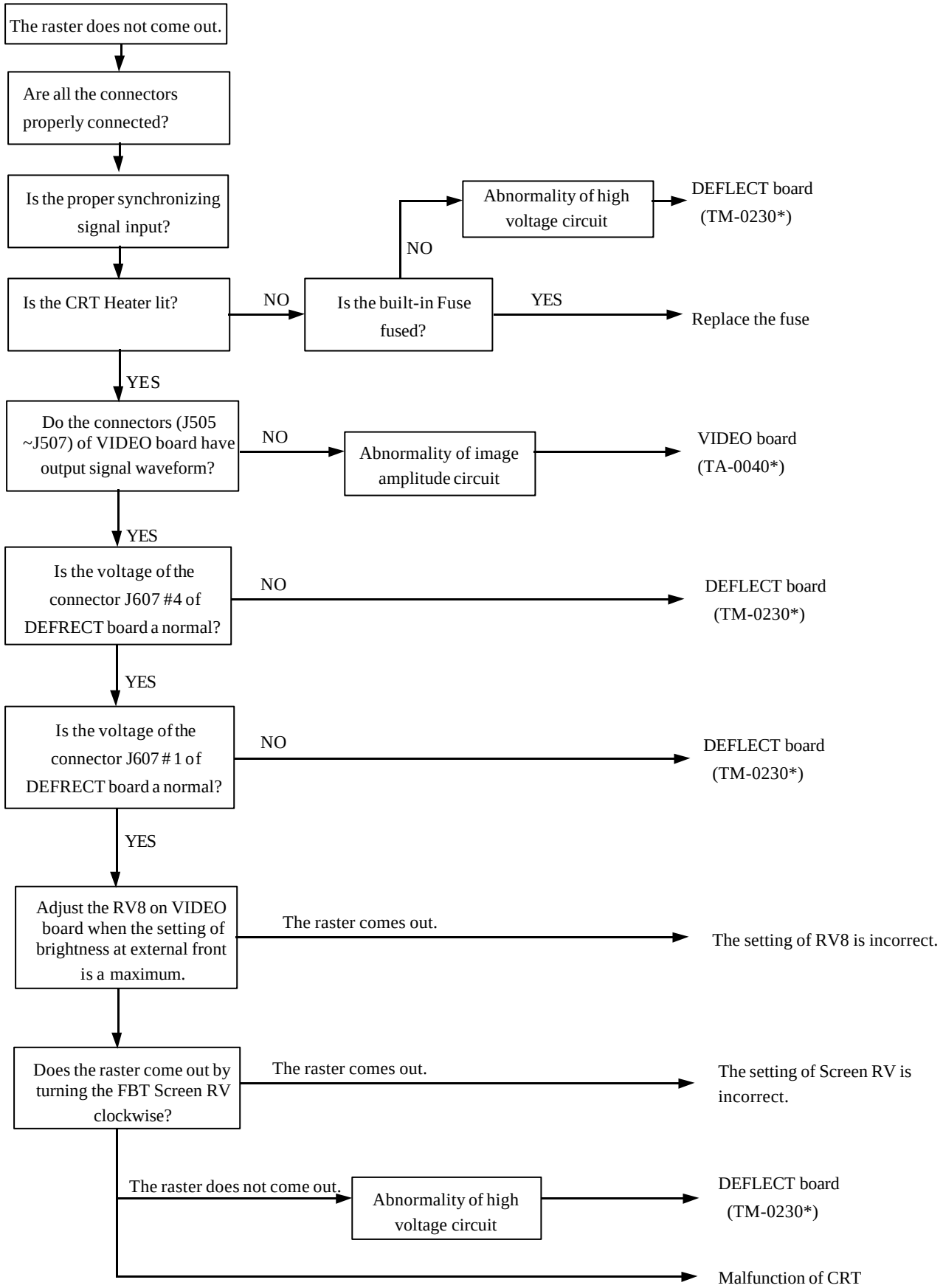
Troubleshooting for Group A




The raster does not come out.
Are all the connectors properly connected?
Is the proper synchronizing signal input?
Is the CRT Heater lit?
NO
Is the built-in Fuse fused?
NO
Abnormality of high voltage circuit
DEFLECT board (TM-0280*)
YES
Replace the fuse
YES
Do the connectors (J505 ~J507) of VIDEO board have output signal waveform?
NO
Abnormality of image amplitude circuit
VIDEO board (TA-0040*)
YES
Is the voltage of the connector J607 #4 of DEFRECT board a normal?
NO
DEFLECT board (TM-0280*)
YES
Is the voltage of the connector J607 # 1 of DEFRECT board a normal?
NO
DEFLECT board (TM-0280*)
YES
Adjust the RV8 on VIDEO board when the setting of brightness at external front is a maximum.
The raster comes out.
The setting of RV8 is incorrect.
Does the raster come out by turning the FBT Screen RV clockwise?
The raster comes out.
The setting of Screen RV is incorrect.
The raster does not come out.
Abnormality of high voltage circuit
DEFLECT board (TM-0280*)
Malfunction of CRT

Troubleshooting for Group B




The raster does not come out.
Are all the connectors properly connected?
Is the proper synchronizing signal input?
Is the CRT Heater lit?
NO
Is the built-in Fuse fused?
NO
Abnormality of high voltage circuit
DEFLECT board (TM-0230*)
YES
Replace the fuse
YES
Do the connectors (J505 ~J507) of VIDEO board have output signal waveform?
NO
Abnormality of image amplitude circuit
VIDEO board (TA-0040*)
YES
Is the voltage of the connector J607 #4 of DEFRECT board a normal?
NO
DEFLECT board (TM-0230*)
YES
Is the voltage of the connector J607 # 1 of DEFRECT board a normal?
NO
DEFLECT board (TM-0230*)
YES
Adjust the RV8 on VIDEO board when the setting of brightness at external front is a maximum.
The raster comes out.
The setting of RV8 is incorrect.
Does the raster come out by turning the FBT Screen RV clockwise?
The raster comes out.
The setting of Screen RV is incorrect.
The raster does not come out.
Abnormality of high voltage circuit
DEFLECT board (TM-0230*)
Malfunction of CRT

Adjustment procedure at each screen condition

1. Adjustment with a variable resistor

Screen condition	Variable resistor	Indication
The raster becomes dark.	TA-0040* RV8 (SUB.B2)	Turning it to counterclockwise
The raster becomes bright.	TA-0040* RV8 (SUB.B2)	Turning it to clockwise
White line appears at the upper part.	TM-0230* RV1 (CUT.W) TM-0280* RV1 (CUT.W)	Turning it to clockwise

2. Adjustment with OSD (On screen displayed menu)

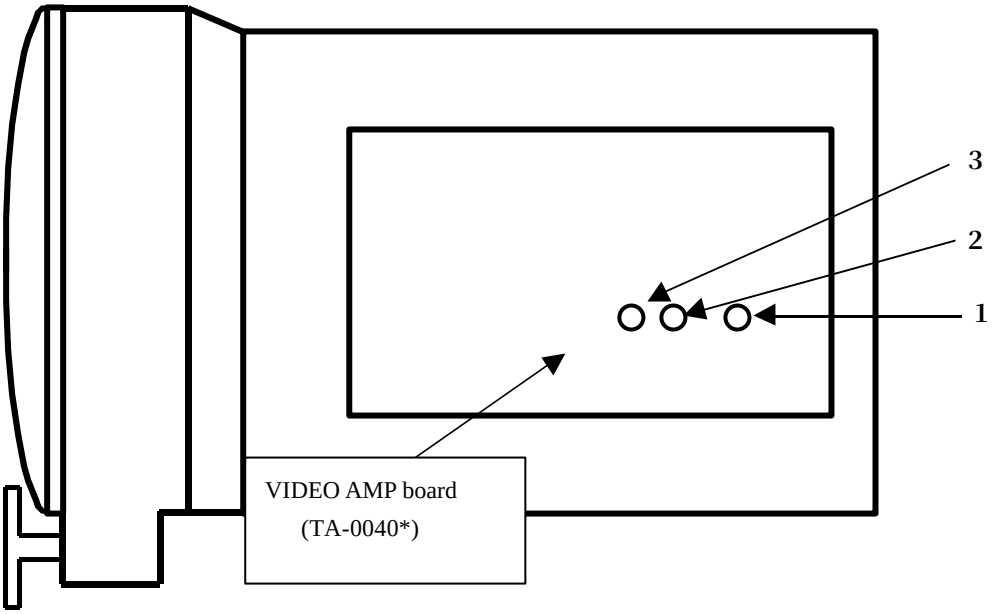
NOTE: Press MENU key to decide the setting of each item whenever you executed the adjustment work. Otherwise, the adjusted value cannot be memorized into the system.

Screen condition	Selection of OSD menu	Indication
The picture is shifted to the left.	HPOS	Push "-" key
The picture is shifted to the right.	HPOS	Push "+" key
The picture is shifted upward.	VPOS	Push "-" key
The picture is shifted downward.	VPOS	Push "+" key
The horizontal screen size is narrowed.	HSIZ	Push "+" key
The horizontal screen size is widened.	HSIZ	Push "-" key
The vertical screen size is narrowed.	VSIZ	Push "+" key
The vertical screen size is widened.	VSIZ	Push "-" key
The image is distorted like a barrel	SDP	Push "-" key
The image is distorted like a pincushion.	SDP	Push "+" key
The image is distorted like a trapezoidal.	TRP	Push "-" key
The image is distorted like an inverted trapezoidal.	TRP	Push "+" key
The image is distorted like a parallelogram (inclined to the right).	PAR	Push "+" key
The image is distorted like a parallelogram (inclined to the left).	PAR	Push "-" key
Abnormal color caused by magnetizing.	-	Push "DEGAUSS" key

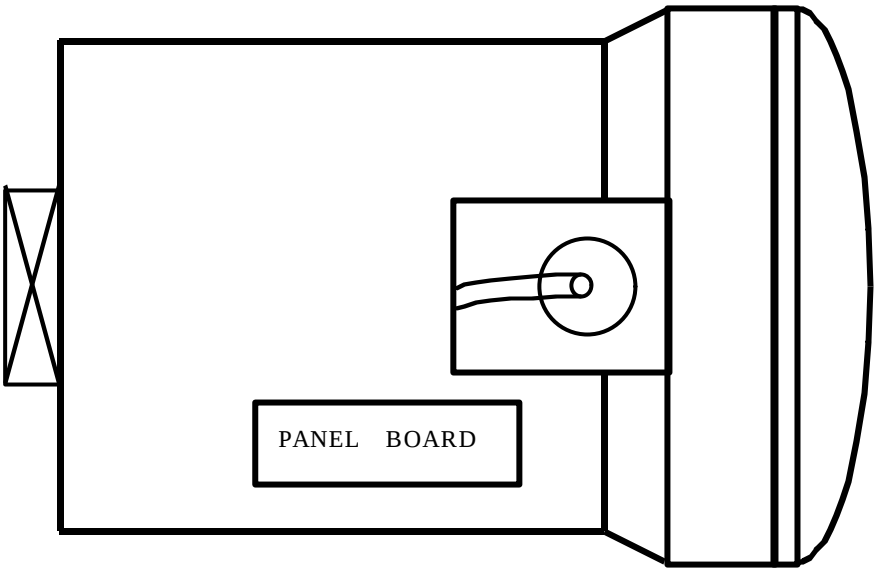
3. Adjustment of both chromaticity and brightness with WBC1 in OSD (On screen displayed menu)

Note: By executing this adjustment work, the relation with color cannot return to the original settings. Therefore, there is not quite a complicated situation, do not execute this work. If you need to do the adjustment, do it by using a measuring instrument (a luminance meter: Minolta)

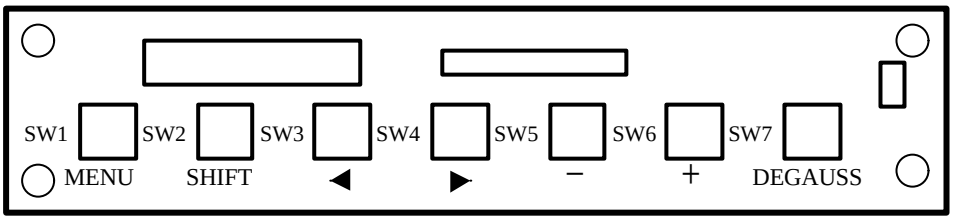
Screen condition	Selection of OSD menu	Indication
A luminance of brightness becomes red color.	SSBR, SSBG	Push "-" key for SSBR or "+" key for SSBG.
A luminance of brightness becomes magenta color.	SSBG	Push "+" key
A luminance of brightness becomes yellow color.	SSBR, SSBG	Push "-" key for SSBR or "-" key for SSBG
A luminance of brightness becomes yellowish green color.	SSBG	Push "-" key
A luminance of brightness becomes green color.	SSBR, SSBG	Push "+" key for SSBR or "-" key for SSBG.
A luminance of brightness becomes cyanic color.	SSBR	Push "+" key
A luminance of brightness becomes blue color.	SSBR, SSBG	Push "+" key for SSBR or "+" key for SSBG.
A luminance of contrast becomes red color.	SCR, SCG	Push "-" key for SCR or "+" key for SCG.
A luminance of contrast becomes magenta color.	SCG	Push "+" key
A luminance of contrast becomes yellow color.	SCR, SCG	Push "-" key for SCR or "-" key for SCG.
A luminance of contrast becomes yellowish green color.	SCG	Push "-" key
A luminance of contrast becomes green color.	SCR, SCG	Push "+" key for SCR or "-" key for SCG.
A luminance of contrast becomes cyanic color.	SCR	Push "+" key
A luminance of contrast becomes blue color.	SCR, SCG	Push "+" key for SCR or "+" key for SCG.
A luminance of contrast is too high.	ALL of SC*	Push "-" key
A luminance of contrast is too low.	ALL of SC*	Push "+" key



No.	RV No.	Title	Functional Description
1	RV8	SUB.B2	Adjusts the maximum luminance of raster.
2	RV5	SUB.C2	Adjust the maximum luminance of contrast slightly.
3	RV6	SUB.C1	Adjusts the maximum luminance of contrast.

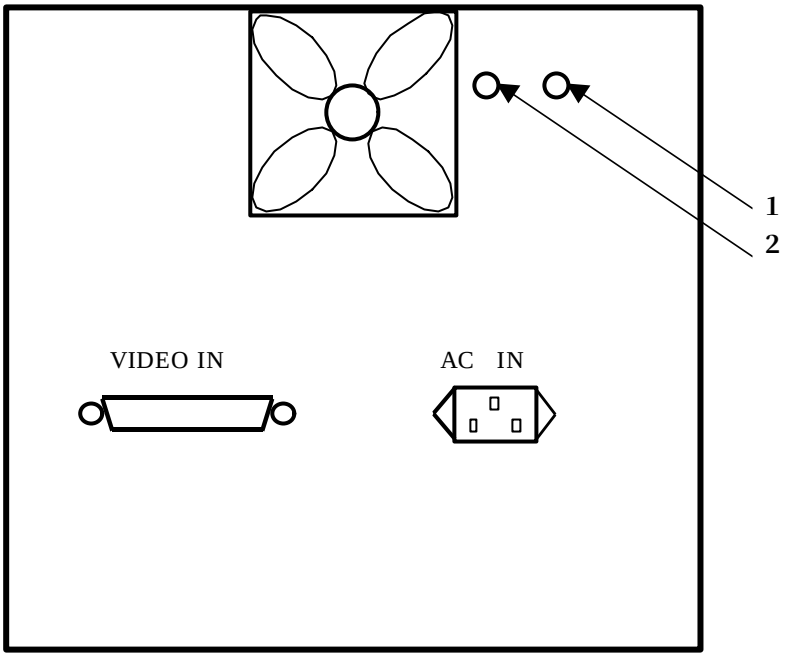


PANEL BOARD (TD-0121*、TD-0108*)



Explanation for the function of each key

Title	No.	Functional Description
MENU	SW1	Open or close the OSD menu. Push it to decide each item after executing the adjustment.
SHIFT	SW2	Blank key
◀	SW3	Push it to select the item.
▶	SW4	Push it to select the item.
-	SW5	Push it to adjust the setting value.
+	SW6	Push it to adjust the setting value.
DEGAUSS	SW7	Push it to degaussing.



Explanation for the function of each key

Title	No.	Functional Description
1	SCREEN	Adjusts the cut-off voltage on CRT. (Do not adjust it at field, because a monitor set may break down.)
2	FOCUS	Adjusts the focus of the image.

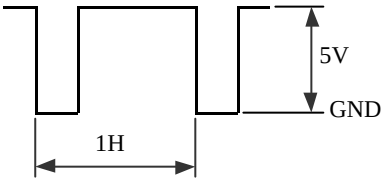
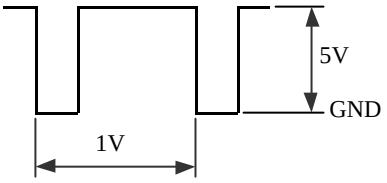
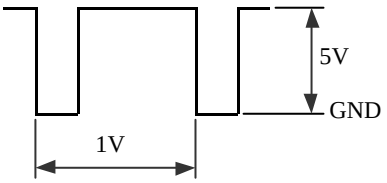
Input/output signal wave forms

○ TB-0047*/TB-0055* (POWER SUPPLY)

Terminal No.	Output voltages
J407 #1	+12V
J409 #1	Approx. +135V (Not stable)
J409 #3 J411 #3	Approx. +15V (Not Stable)
J409 #4 J411 #6	Approx. -15V (Not stable)
J410 #1	Approx. +83V (Not stable)
J410 #2 J411 #4	Approx. +30V (Not stable)
J410 #4	+6.3V
J411 #1	+5V
J407 #2 J409 #2 J409 #5 J410 #3 J410 #6 J411 #2 J411 #5	GND

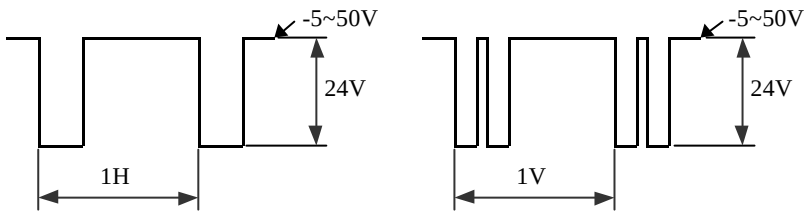
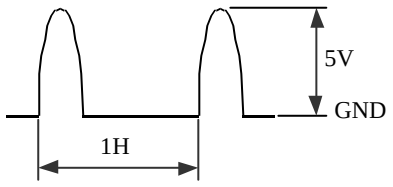
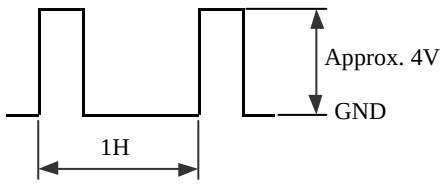
Input/output signal wave forms

○ TC-0130*/TC-0143* (CPU)

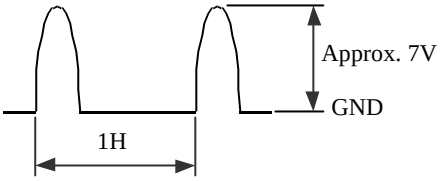
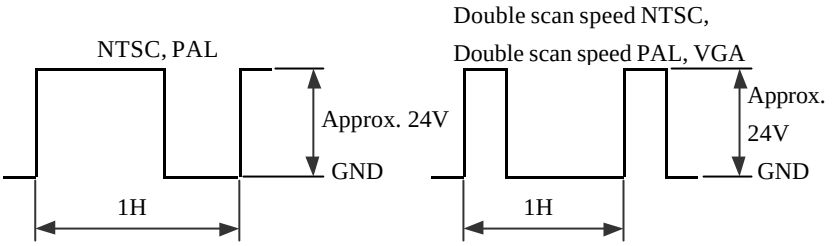
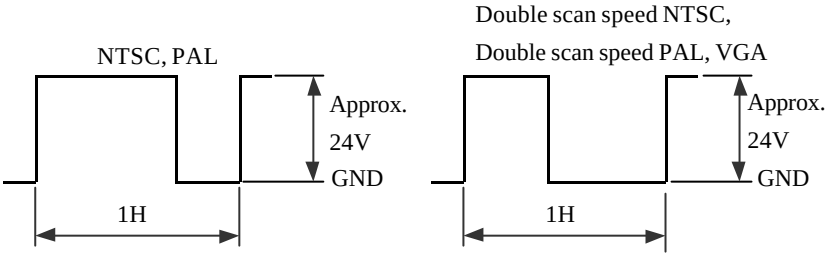
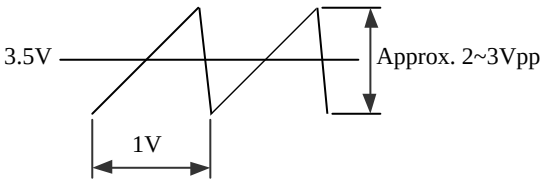
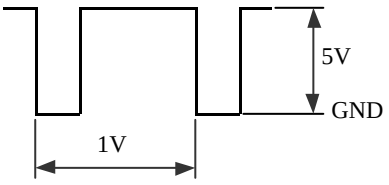
Terminal No.	Output voltages
J114 #1	+5V
J114 #3	Approx. +15V(Not stable)
J114 #4	Approx. +30V(Not stable)
J114 #6	Approx. -15V(Not stable)
J114 #2 J114 #5	GND
J111 #1	All signals  All signals except VGA signal 
J111 #4	All signals except VGA signal +5V VGA signal 
J111 #3 J111 #5	GND

Input/output signal wave forms

○ TM-0230*/TM-0280* (DEFRECT)

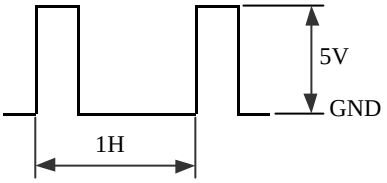
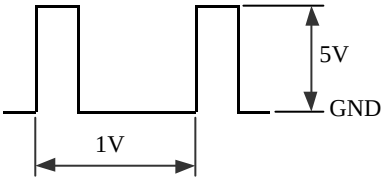
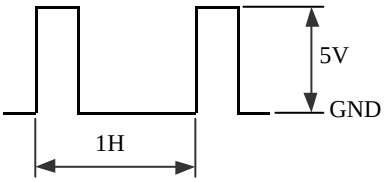
Terminal No.	Output signals
J610 #1	+83V (Not stable)
J610 #2	+30V (Not stable)
J610 #4	+6.3V
J610 #3 J610 #6	GND
J607 #1	
J607 #4	+6.3V
J607 #3	GND
J611 #1	
J611 #2	GND
J613 #1	

○ TM-0230*/TM-0280* (DEFRECT)

Terminal No.	Output voltages
J613 #2	
J613 #3	
J613 #7	
J613 #6 J613 #15	GND
J614 #1	
J614 #5	
J614 #4	GND

Input/output signal wave forms

○ TA-0040* (VIDEO AMP)

Terminal No.	Output voltages
J503 #1	+135V(Not stable)
J503 #3	+15V(Not stable)
J503 #4	-15V(Not stable)
J503 #2 J503 #5	GND
J512 #1	
J512 #2	
J512 #3	
J512 #4 J512 #9	GND

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B1 Main panel L-KEY-75*

To check this operation panel for confirmation, refer to Section 5 “Circuit Diagrams”.
First of all, determine whether the operation panel has all of its functions failed or the function relating to a switch or knob mounted on the operation panel only has failed.
Subsequently, refer to **A3** and make certain of the supplied power voltage

1) Faults relating to every panel function

1)-1 If the system is normal

The operation panel is connected with the system on a serial communication basis by way of the RS-232C interface. And it is designed to be operable independently.
If the system is operating to a certain extent except for those functions which are directly controlled by this unit, therefore, the failure may be deemed to have taken place in the unit.
It may be assumed, therefore, that the connecting cable has a fault. Check it for connections and conductivity, accordingly.

1)-2 If the system is also abnormal

A fault may be considered to have taken place in the panel information receiver, that is, CPU in the system.

••• C17

2) Fault relating to a Switch, Knob and/or LED

The related switch, knob or LED has failed. Replace it for a repair. Nevertheless, refer to the related checkout procedures concerning the functions involved in the following

STC、GAIN、CONTRAST、AGC、ACOUSTIC POWER

C1 Probe Selector 1 EP4438**

Refer to “Principle of System Operation” in section 4 for details on these confirmations.

Phenomenon which may occur by a failure of this unit

- Echo gap at one location
- Echo gap two or more locations at equal intervals

1) Fault relating to probe

1)-1 Is the phenomenon changed by re-connecting the probe?

Changed ····· Connection failure of the probe connector

Unchanged ····· 1)-2

1)-2 Refer to A3 and confirm the output of the power supply unit.

Normal ····· 1)-3

Abnormal ····· A3

1)-3 Has the same problem arisen with other electrical probe connectors?

YES ····· C2/C3/C4/C5

NO ····· 1)-4

1)-4 Is an abnormality noted when only one of the probes is used?

YES ····· A4

NO ····· Replace this PCB

2) Echo gap two or more locations at equal intervals

It may be impossible to identify a failed part as a result of confirming each check code specified below. If so, try to replace the PCB

····· C2/C3/C4/C5/C6/C7

C2 Probe Selector 2 EP4439**

Refer to “Principle of System Operation” in section 4 for details on these confirmations.

Phenomenon which may occur by a failure of this unit

- Echo gap two or more locations at equal intervals
- No US image on the monitor. Only noises are displayed. (No transmission)

1) Fault relating to probe

1)-1 Is the phenomenon changed by re-connecting the probe?

Changed ····· Connection failure of the probe connector

Unchanged ····· 1)-2

1)-2 Refer to A3 and confirm the output of the power supply unit.

Normal ····· 1)-3

Abnormal ····· A3

1)-3 Has the same problem arisen with other electrical probe connectors?

YES ····· C1/C3/C4/C5

NO ····· 1)-4

1)-4 Is an abnormality noted when only one of the probes is used?

YES ····· A4

NO ····· Replace this PCB

2) Echo gap two or more locations at equal intervals

It may be impossible to identify a failed part as a result of confirming each check code specified below. If so, try to replace the PCB

····· C1/C3/C4/C5/C6/C7

C3 Rx Connector EP4437**/EP4639**

Refer to “Principle of System Operation” in section 4 for details on these confirmations.

Phenomenon which may occur by a failure of this unit

- Echo gap two or more locations at equal intervals
- Low sensitivity with the ultrasound image (B/W, PW, COLOR)

1) Echo gap two or more locations at equal intervals

It may be impossible to identify a failed part as a result of confirming each check code specified below. If so, try to replace the PCB

•• C1/C2/C4/C5/C6/C7

2) Low sensitivity with the ultrasound image

It may be impossible to identify a failed part as a result of confirming each check code specified below. If so, try to replace the PCB

2)-1 Low sensitivity for B/W, PW and COLOR

•• A3/A4/C4/C5/C6/C7/C8/C9

2)-2 Low sensitivity only for B/W images

•• C8/C9/C10

2)-3 Low sensitivity only for PW images

•• A4/C11/C12

2)-4 Low sensitivity only for COLOR images

•• A4/C11/C12

C4 Tx & Tx Focus 2 EP4441**

Refer to “Principle of System Operation” in section 4 for details on these confirmations.

Phenomenon which may occur by a failure of this unit

- Echo gap two or more locations at equal intervals
- The ultrasound wave image (B/W, PW, COLOR) displays only noise (not transmitted)
- Low sensitivity with the ultrasound image (B/W, PW, COLOR)

Flash memory is installed on the following PC boards. If data in such memory is abnormal, trouble such as a failure to start the equipment will occur.

1) Echo gap two or more locations at equal intervals

It may be impossible to identify a failed part as a result of confirming each check code specified below. If so, try to replace the PCB

•• C1/C2/C3/C5/C6/C7

2) The ultrasound wave image displays only noise

2)-1 Confirm the following signals
TXCLK
TXSTRT_

Normal•••••••••••••••••••••••••••••••••••••• Replace this PCB
Abnormal ••••••••••••••••••••••••••••••••••• 2)-2

2)-2 It may be impossible to identify a failed part as a result of confirming each check code specified below. If so, try to replace the PCB

•• A3/C3/C7/C8/C9

3) Low sensitivity with the ultrasound image

It may be impossible to identify a failed part as a result of confirming each check code specified below. If so, try to replace the PCB

3)-1 Refer to **A3** and confirm the **HVA** output.

Normal•••••••••••••••••••••••••••••••••••••• A4/C6/C7/C8/C9/C10
Abnormal ••••••••••••••••••••••••••••••••••• A3

3)-2 It may be impossible to identify a failed part as a result of confirming each check code specified at an above. If so, try to replace the PCB

C5 Tx Tx Focus EP4500**

Refer to “Principle of System Operation” in section 4 for details on these confirmations.

Phenomenon which may occur by a failure of this unit

- Echo gap two or more locations at equal intervals
- The ultrasound wave image (B/W, PW, COLOR) displays only noise (not transmitted)
- Low sensitivity with the ultrasound image (B/W, PW, COLOR)

Flash memory is installed on the following PC boards. If data in such memory is abnormal, trouble such as a failure to start the equipment will occur.

1) Echo gap two or more locations at equal intervals

It may be impossible to identify a failed part as a result of confirming each check code specified below. If so, try to replace the PCB

•• C1/C2/C3/C5/C6/C7

2) The ultrasound wave image displays only noise

2)-1 Confirm the following signals
TXCLK
TXSTRT_

Normal•••••••••••••••••••••••••••••••••••••• Replace this PCB
Abnormal •••••••••••••••••••••••••••••••••••• 2)-2

2)-2 It may be impossible to identify a failed part as a result of confirming each check code specified below. If so, try to replace the PCB

•• A3/C3/C7/C8/C9

3) Low sensitivity with the ultrasound image

It may be impossible to identify a failed part as a result of confirming each check code specified below. If so, try to replace the PCB

3)-1 Refer to **A3** and confirm the **HVA** output.

Normal•••••••••••••••••••••••••••••••••••••• A4/C6/C7/C8/C9/C10
Abnormal •••••••••••••••••••••••••••••••••••• A3

3)-2 It may be impossible to identify a failed part as a result of confirming each check code specified at an above. If so, try to replace the PCB

C6 Pre AMP & Variable Gain AMP EP4440**

Refer to “Principle of System Operation” in section 4 for details on these confirmations.

Phenomenon which may occur by a failure of this unit

- Echo gap two or more locations at equal intervals
- Low sensitivity with the ultrasound image (B/W, PW, COLOR)
- Low sensitivity with the CW Doppler image

1) Echo gap two or more locations at equal intervals

It may be impossible to identify a failed part as a result of confirming each check code specified below. If so, try to replace the PCB

•• C1/C2/C3/C4/C5/C7/C8

2) Low sensitivity with the ultrasound image

It may be impossible to identify a failed part as a result of confirming each check code specified below. If so, try to replace the PCB

••A3/A4/C1/C2/C3/C4/C5/C7/C8/C9

3) Low sensitivity with the CW Doppler image

It may be impossible to identify a failed part as a result of confirming each check code specified below. If so, try to replace the PCB

•• A3/A4/C12/D1

C7 Rx Beam Former EP4429**/EP4625**/EP4837**

Refer to “Principle of System Operation” in section 4 for details on these confirmations.

Phenomenon which may occur by a failure of this unit

- Echo gap two or more locations at equal intervals
- Low sensitivity with the ultrasound image (B/W, PW, COLOR)

1) Echo gap two or more locations at equal intervals or low sensitivity with the ultrasound image etc

It may be impossible to identify a failed part as a result of confirming each check code specified below. If so, try to replace the PCB

..... C1/C2/C3/C4/C5/C6/C9

2) Low sensitivity of ultrasound image

It may be impossible to identify a failed part as a result of confirming each check code specified below. If so, try to replace the PCB

..... A3/A4/C4/C5/C6/C9

C8 Tx Rx Control EP4430**

Refer to “Principle of System Operation” in section 4 for details on these confirmations.

Phenomenon which may occur by a failure of this unit

- Can not transmit
- Ultrasound image not displayed
- Abnormality with the ultrasound scanning line address
- Transmission voltage abnormality (electrical scans)
- Doppler and color images not displayed
- Heart rate display abnormality

Flash memory is installed on the following PC boards. If data in such memory is abnormal, trouble such as a failure to start the equipment will occur.

This PCB is mounted with an operation confirmation LED. Refer to “PCB LEDs” in 6-4-11 and confirm normal operations before implementing the confirmation tasks outlined below.
Replace this PCB if it is assumed from the confirmation result that it is the cause of the fault.

1) Can not transmit or Transmission voltage abnormality

It may be impossible to identify a failed part as a result of confirming each check code specified below. If so, try to replace the PCB

····· A3/C1/C2/C4/C5

2) Ultrasound image not displayed

It may be impossible to identify a failed part as a result of confirming each check code specified below. If so, try to replace the PCB

····· A3/C1/C2/C4/C5

3) Abnormality with the ultrasound scanning line address

····· Replace this PCB

4) Doppler and color images not displayed

It may be impossible to identify a failed part as a result of confirming each check code specified below. If so, try to replace the PCB

..... C7/C11/C12

5) Heart rate display abnormality

It may be impossible to identify a failed part as a result of confirming each check code specified below. If so, try to replace the PCB

..... D2/D3

C9 A ITF EP4443**

Refer to “Principle of System Operation” in section 4 for details on these confirmations.

Phenomenon which may occur by a failure of this unit

- Low sensitivity with the ultrasound image (B/W, PW, COLOR)
- A different in gain exists in the ultrasound image's beam direction
- Abnormality with the transmission for mechanical radial probes
- Abnormality with the rotation for mechanical radial probes

1) Low sensitivity with the ultrasound image

1)-1 Confirm the following signals
PreSTC1, PreSTC2, STC 1, STC 2, GAINCNT

Normal ····· A3/A4/C4/C5/C6/C7
Abnormal ····· Replace this PCB

2) A different in gain exists in the ultrasound image's beam direction

2)-1 Confirm the following signals
PreSTC1

Normal ····· C7/C8/C10
Abnormal ····· Replace this PCB

3) Abnormality with the transmission for mechanical radial probes

3)-1 Confirm the following signals

M TXRX, HVB

Normal ····· A4
Abnormal ····· Replace this PCB

4) Abnormality with the rotation for mechanical radial probes

4)-2 Confirm the following signals

M MTR+, M_A, M_B, M_Z

Normal ····· A4
Abnormal ····· Replace this PCB

C10 AD_DA	EP4444**	/DBP	EP4784**

Refer to “Principle of System Operation” in section 4 for details on these confirmations.

Phenomenon which may occur by a failure of this unit

- Low sensitivity of ultrasound image.
- Fault relating to gradation and sensitivity for ultrasound images.
- Fault relating to AGC, CONTRAST, RELIFE and FTC
- Low sensitivity or echo gap occurred when in the parallel receive mode.

1) Low sensitivity of ultrasound image (B/W image only)

It may be impossible to identify a failed part as a result of confirming each check code specified below. If so, try to replace the PCB

····· C8/C9

2) Fault relating to gradation and sensitivity for ultrasound images

2)-1 Confirm the following signals
USVIDO_P (TP13)
USVIDO_S (TP14)

Normal ····· C7/C13/C16/C21
Abnormal ····· Replace this PCB

3) Fault relating to AGC, CONTRAST, RELIFE and FTC

It may be impossible to identify a failed part as a result of confirming each check code specified below. If so, try to replace the PCB

····· B1

C11 CFP EP4435**/EP4760**

Refer to “Principle of System Operation” in section 4 for details on these confirmations.

Phenomenon which may occur by a failure of this unit

- Color display image abnormality or will not display
- Abnormality only with the power flow image display
- Only the PW Doppler image is not displayed

1) Color display image abnormality or will not display

It may be impossible to identify a failed part as a result of confirming each check code specified below. If so, try to replace the PCB

····· C12/C14/C15/C16/C21

2) Abnormality only with the power flow image display

····· Replace this PCB

3) Only the PW Doppler image is not displayed

It may be impossible to identify a failed part as a result of confirming each check code specified below. If so, try to replace the PCB

····· A3/C7/C9/C12

C12 SDP EP4436**/EP4761**

Refer to “Principle of System Operation” in section 4 for details on these confirmations.

Phenomenon which may occur by a failure of this unit

- Doppler (PW, CW) and color images not displayed
- Only the PW Doppler image is not displayed
- Only the CW Doppler image is not displayed
- Only the Color image is not displayed
- Doppler display image abnormality
- Color display image abnormality
- Doppler sound abnormality or cannot be heard

Flash memory is installed on the following PC boards. If data in such memory is abnormal, trouble such as a failure to start the equipment will occur.
This PCB is mounted with an operation confirmation LED. Refer to “PCB LEDs” in 6-4-11 and confirm normal operations before implementing the confirmation tasks outlined below.
Replace this PCB if it is assumed from the confirmation result that it is the cause of the fault.

1) Doppler (PW, CW) and color images not displayed

It may be impossible to identify a failed part as a result of confirming each check code specified below. If so, try to replace the PCB

····· A3/C8/C9

2) Only the PW Doppler image is not displayed

It may be impossible to identify a failed part as a result of confirming each check code specified below. If so, try to replace the PCB

····· A3/C7/C8/C9

3) Only the CW Doppler image is not displayed

It may be impossible to identify a failed part as a result of confirming each check code specified below. If so, try to replace the PCB

····· A3/C8/C9/D1

4) Only the color image is not displayed

It may be impossible to identify a failed part as a result of confirming each check code specified below. If so, try to replace the PCB

····· C8/C9/C11/C14/C15/C16/C21

5) Doppler display image abnormality

It may be impossible to identify a failed part as a result of confirming each check code specified below. If so, try to replace the PCB

····· C13/C15/C16/C21

6) Color display image abnormality

It may be impossible to identify a failed part as a result of confirming each check code specified below. If so, try to replace the PCB

····· C11/C14/C15/C16/C21

7) Doppler sound abnormality or cannot be heard

It may be impossible to identify a failed part as a result of confirming each check code specified below. If so, try to replace the PCB

····· A5/C18

C13 BSC EP4464**

Refer to “Principle of System Operation” in section 4 for details on these confirmations.

Phenomenon which may occur by a failure of this unit

- Plane mode images will not display
- Only B mode B/W images will not display
- Fault relating to Line correlation (BW: B mode)
- Fault relating to Frame correlation
- Fault relating to US address
- Line mode will not display
- Only M mode images will not display
- Only D mode images will not display
- Only M mode color images will not display
- Fault relating to Sweep speed
- Fault relating to Image display in the line mode
- Fault relating to physiological signal display in the line mode
- Fault relating to overall ultrasound image (B/W, DOPPLER, COLOR)
- Fault relating to cine memory function
- Ultrasound image formatting abnormality
- Fault relating to read zoom function
- Fault relating to ultrasound image display function
- Fault relating to video playback image

This PCB is mounted with an operation confirmation LED. Refer to “PCB LEDs” in 6-4-11 and confirm normal operations before implementing the confirmation tasks outlined below.
Replace this PCB if it is assumed from the confirmation result that it is the cause of the fault.

1) Plane mode images will not display

It may be impossible to identify a failed part as a result of confirming each check code specified below. If so, try to replace the PCB

..... C8/C10/C15

2) Only B mode B/W images will not display

It may be impossible to identify a failed part as a result of confirming each check code specified below. If so, try to replace the PCB

..... C8/C10

3) Fault relating to Line correlation (BW: B mode)

3)-1 Does this phenomenon change with line correlation settings?

YES ····· Replace this PCB

NO ····· 3)-2

3)-2 It may be impossible to identify a failed part as a result of confirming each check code specified below. If so, try to replace the PCB

····· C15

4) Fault relating to Frame correlation

4)-1 Does this phenomenon change with frame correlation settings?

YES ····· Replace this PCB

NO ····· 4)-2

4)-2 It may be impossible to identify a failed part as a result of confirming each check code specified below. If so, try to replace the PCB

····· C15

5) Fault relating to US address

It may be impossible to identify a failed part as a result of confirming each check code specified below. If so, try to replace the PCB

····· C8/C15

6) Line mode will not display

It may be impossible to identify a failed part as a result of confirming each check code specified below. If so, try to replace the PCB

····· C8/C15

7) Only M mode or D mode images will not display

It may be impossible to identify a failed part as a result of confirming each check code specified below. If so, try to replace the PCB

····· C15

8) Fault relating to Sweep speed

It may be impossible to identify a failed part as a result of confirming each check code specified below. If so, try to replace the PCB

····· C15

9) Fault relating to Image display in the line mode

It may be impossible to identify a failed part as a result of confirming each check code specified below. If so, try to replace the PCB

····· C15

10) Fault relating to physiological signal display in the line mode

It may be impossible to identify a failed part as a result of confirming each check code specified below. If so, try to replace the PCB

····· D2

11) Fault relating to overall ultrasound image

It may be impossible to identify a failed part as a result of confirming each check code specified below. If so, try to replace the PCB

····· C8/C10

12) Fault relating to cine memory function

Does this phenomenon change with the use of the cine memory function?

YES····· Replace this PCB
NO····· C15/C17

13) Ultrasound image formatting abnormality

It may be impossible to identify a failed part as a result of confirming each check code specified below. If so, try to replace the PCB

····· C15/C16

14) Fault relating to read zoom function

····· Replace this PCB

15) Fault relating to ultrasound image display function

- Display image abnormality in 2B mode
- Display image abnormality in Ping/Pong function used

..... Replace this PCB

16) Fault relating to video playback image

It may be impossible to identify a failed part as a result of confirming each check code specified below. If so, try to replace the PCB

..... C14/C16

C14 CSC EP4465**

Refer to “Principle of System Operation” in section 4 for details on these confirmations.

Phenomenon which may occur by a failure of this unit

- Only color VEL or POWER will not display in the B mode
- Only color VAR will not display in the B mode
- Only M mode color images will not display
- Fault relating to overall color image
- Ultrasound image formatting abnormality
- Fault relating to read zoom function
- Fault relating to ultrasound image display function
- Fault relating to video playback image

This PCB is mounted with an operation confirmation LED. Refer to “PCB LEDs” in 6-4-11 and confirm normal operations before implementing the confirmation tasks outlined below.
Replace this PCB if it is assumed from the confirmation result that it is the cause of the fault.

1) Only color VEL or POWER will not display in the B mode

It may be impossible to identify a failed part as a result of confirming each check code specified below. If so, try to replace the PCB

..... C8/C11/C12

2) Only color VAR will not display in the B mode

It may be impossible to identify a failed part as a result of confirming each check code specified below. If so, try to replace the PCB

..... C8/C11/C12

3) Only M mode color images will not display

It may be impossible to identify a failed part as a result of confirming each check code specified below. If so, try to replace the PCB

..... C15

4) Fault relating to overall color image

It may be impossible to identify a failed part as a result of confirming each check code specified below. If so, try to replace the PCB

····· C8/C11/C12/C15

5) Ultrasound image formatting abnormality

It may be impossible to identify a failed part as a result of confirming each check code specified below. If so, try to replace the PCB

····· C15/C17

6) Fault relating to read zoom function

····· Replace this PCB

7) Fault relating to ultrasound image display function

- Display image abnormality in 2B mode
- Display image abnormality in Ping/Pong function used

····· Replace this PCB

8) Fault relating to video playback image

It may be impossible to identify a failed part as a result of confirming each check code specified below. If so, try to replace the PCB

····· C13/C16

C15 MGR EP4467**

Refer to “Principle of System Operation” in section 4 for details on these confirmations.

Phenomenon which may occur by a failure of this unit

- Cannot start up the equipment
- Cannot acquire synchronization between the TV monitor and storage device
- The print SW will not operate

This PCB is mounted with an operation confirmation LED. Refer to “PCB LEDs” in 6-4-11 and confirm normal operations before implementing the confirmation tasks outlined below.
Replace this PCB if it is assumed from the confirmation result that it is the cause of the fault.

9) Cannot start up the equipment

Confirm the operational status of the LEDs

Normal ····· 6-4-11
Abnormal ····· Replace this PCB

10) Cannot acquire synchronization between the TV monitor and storage device

It may be impossible to identify a failed part as a result of confirming each check code specified below. If so, try to replace the PCB

····· A5/C16/E1/E2/E3

C16 VPU EP4466**/EP4768**

Refer to “Principle of System Operation” in section 4 for details on these confirmations.

Phenomenon which may occur by a failure of this unit

- Synchronization not acquired for the TV display image
- Fault relating to ultrasound image gradation
- The Doppler image will not display NEGA
- Either red, green or blue will not display on the TV monitor or color printer
- Monochrome and color composites or the Y/C video signals will not output
- Overlay display abnormality
- VCM record/playback abnormality
- The VCR playback image is not displayed even when switched across to EXT input
- RGB for external input will not display individually or in combination
- Only external input Y/C will not display or is abnormal
- Only external input composite video signals will not display
- VCR playback image display intensity abnormality

This PCB is mounted with an operation confirmation LED. Refer to “PCB LEDs” in 6-4-11 and confirm normal operations before implementing the confirmation tasks outlined below.
Replace this PCB if it is assumed from the confirmation result that it is the cause of the fault.

1) Synchronization not acquired for the TV display image

1)-1 Confirm the following signals
MON_SYNC_

Normal ····· A5/E1/E2/E3
Abnormal ····· 1)-2

1)-2 It may be impossible to identify a failed part as a result of confirming each check code specified below. If so, try to replace the PCB
····· C15/C21

2) Fault relating to ultrasound image gradation

2)-1 Is the POST PROCESS setting applicable?
YES····· 2)-2
NO····· A1

2)-2 Does the test pattern display normally?

YES ····· 2)-3

NO ····· Replace this PCB

2)-3 Does the VCR playback image display normally?

····· C13/C14/C21

3) The Doppler image will not display with NEGA

····· Replace this PCB

4) Either red, green or blue will not display on the TV monitor or color printer

4)-1 Confirm the following signals

MON_R
MON_G
MON_B

Normal ····· C19

Abnormal ····· 4)-2 へ

4)-2 It may be impossible to identify a failed part as a result of confirming each check code specified below. If so, try to replace the PCB

····· A5/E1/E2/E3

5) Monochrome and color composites or the Y/C video signals will not output

5)-1 Confirm the following signals

PRN_BW
VCR_VBS
VCR_Y
VCR_C

Normal ····· E1/E2/E3

Abnormal ····· Replace this PCB

6) Overlay display abnormality

It may be impossible to identify a failed part as a result of confirming each check code specified below. If so, try to replace the PCB

····· C17

7) VCM record/playback abnormality

It may be impossible to identify a failed part as a result of confirming each check code specified below. If so, try to replace the PCB

····· D5

8) The VCR playback image is not displayed even when switched across to EXT input

It may be impossible to identify a failed part as a result of confirming each check code specified below. If so, try to replace the PCB

····· A1/E3

9) RGB for external input will not display individually or in combination

9)-1 Does the ultrasound diagnostic system image display normally?

YES····· 9)-2

NO····· A5/C13/C14/C21

9)-2 Confirm the following signals

R_IN

G_IN

B_IN

Normal ····· 9)-3

Abnormal ····· C15/C19/E3/C21

9)-3 It may be impossible to identify a failed part as a result of confirming each check code specified below. If so, try to replace the PCB

····· C15/C19/C21

10) Only external input Y/C will not display or is abnormal

10)-1 Confirm the following signals

YIN

CIN

Normal ····· 10)-2

Abnormal ····· C15/C19/E3/C21

10)-2 It may be impossible to identify a failed part as a result of confirming each check code specified below. If so, try to replace the PCB

..... C13/C14/C21

11) Only external input composite video signals will not display

It may be impossible to identify a failed part as a result of confirming each check code specified below. If so, try to replace the PCB

..... C13/C14/C15/E3/C21

12) VCR playback image display intensity abnormality

It may be impossible to identify a failed part as a result of confirming each check code specified below. If so, try to replace the PCB

..... E3

C17 CPU EP4423**

Refer to “Principle of System Operation” in section 4 for details on these confirmations.

Phenomenon which may occur by a failure of this unit

- Cannot start up the system
- Equipment cannot be controlled

This PCB is mounted with an operation confirmation LED. Refer to “PCB LEDs” in 6-4-11 and confirm normal operations before implementing the confirmation tasks outlined below.
Replace this PCB if it is assumed from the confirmation result that it is the cause of the fault.

1) Cannot start up the system

Refer to the contents provided in 6-4-10, select the PCB or unit linked to the CPU path, and then confirm the corresponding check codes.

2) Equipment cannot be controlled

Refer to the contents provided in 6-4-10, select the PCB or unit linked to the CPU path, and then confirm the corresponding check codes.

3) Other faults

Refer to “ROM Arrangement”, “PCB Switch Settings” and “Jumper (JP) Settings” in Section 6. Troubleshooting and confirm that the wiring and settings have been made correctly.

C18 Audio EP4473**

Refer to “Principle of System Operation” in section 4 for details on these confirmations.

Phenomenon which may occur by a failure of this unit

- Doppler audio will not output
- R wave sound will not output
- External input sound will not output

1) Doppler audio will not output

It may be impossible to identify a failed part as a result of confirming each check code specified below. If so, try to replace the PCB

..... A1/C12

2) R wave sound will not output

It may be impossible to identify a failed part as a result of confirming each check code specified below. If so, try to replace the PCB

..... D2

3) External input sound will not output

It may be impossible to identify a failed part as a result of confirming each check code specified below. If so, try to replace the PCB

..... A1/C15/C16/E3/C21

C19 Distributor EP4472**

Refer to “Principle of System Operation” in section 4 for details on these confirmations.

Phenomenon which may occur by a failure of this unit

- Failure related to external output signal
- Failure related to external input signal
- Failure related to printer control signal

This PC board is not mounted with an electrical circuit.
Check the connections for all connectors and the condition of the solder if a failure is assumed with this PC board.

4) Failure related to external output signal

..... C16

5) Failure related to external input signal

..... C16

6) Failure related to printer control signal

..... C15/C21

C20 Mother EP4445**/EP4812**

Refer to “Circuit Diagram” in section 5 for details on these confirmations.
In the event of a phenomenon other than those described below, refer to a list of motherboard signal list described on section 5 to identify a failed part. Or return to the map to make certain all over again of the “check code”.

- Fault relating to power supply
  ····· A3

- Fault relating to probe or scanner
  ····· A4/C16/C17

- Fault relating to BUS line
  ····· C16/C17

C21 CMB EP4769**

Refer to “Principle of System Operation” in section 4 for details on these confirmations.

Phenomenon which may occur by a failure of this unit

- Plane mode images will not display
- Only B mode B/W images will not display
- Fault relating to Line correlation (BW: B mode)
- Fault relating to Frame correlation
- Fault relating to US address
- Line mode will not display
- Only M mode images will not display
- Only D mode images will not display
- Only M mode color images will not display
- Fault relating to Sweep speed
- Fault relating to Image display in the line mode
- Fault relating to physiological signal display in the line mode
- Fault relating to overall ultrasound image (B/W, DOPPLER, COLOR)
- Fault relating to cine memory function
- Ultrasound image formatting abnormality
- Fault relating to read zoom function
- Fault relating to ultrasound image display function
- Fault relating to video playback image

This PCB is mounted with an operation confirmation LED. Refer to “PCB LEDs” in 6-4-11 and confirm normal operations before implementing the confirmation tasks outlined below.
Replace this PCB if it is assumed from the confirmation result that it is the cause of the fault.

1) Plane mode images will not display

It may be impossible to identify a failed part as a result of confirming each check code specified below. If so, try to replace the PCB

••• C8/C10/C15

2) Only B mode B/W images will not display

It may be impossible to identify a failed part as a result of confirming each check code specified below. If so, try to replace the PCB

••• C8/C10

3) Fault relating to Line correlation (BW: B mode)

3)-1 Does this phenomenon change with line correlation settings?

YES ••• Replace this PCB

NO ••• 3)-2

3)-2 It may be impossible to identify a failed part as a result of confirming each check code specified below. If so, try to replace the PCB

••• C15

4) Fault relating to Frame correlation

4)-1 Does this phenomenon change with frame correlation settings?

YES ••• Replace this PCB

NO ••• 4)-2

4)-2 It may be impossible to identify a failed part as a result of confirming each check code specified below. If so, try to replace the PCB

••• C15

5) Fault relating to US address

It may be impossible to identify a failed part as a result of confirming each check code specified below. If so, try to replace the PCB

••• C8/C15

6) Line mode will not display

It may be impossible to identify a failed part as a result of confirming each check code specified below. If so, try to replace the PCB

••• C8/C15

7) Only M mode or D mode images will not display

It may be impossible to identify a failed part as a result of confirming each check code specified below. If so, try to replace the PCB

••• C15

8) Fault relating to Sweep speed

It may be impossible to identify a failed part as a result of confirming each check code specified below. If so, try to replace the PCB

••• C15

9) Fault relating to Image display in the line mode

It may be impossible to identify a failed part as a result of confirming each check code specified below. If so, try to replace the PCB

•• C15

10) Fault relating to physiological signal display in the line mode

It may be impossible to identify a failed part as a result of confirming each check code specified below. If so, try to replace the PCB

•• D2

11) Fault relating to overall ultrasound image

It may be impossible to identify a failed part as a result of confirming each check code specified below. If so, try to replace the PCB

•• C8/C10

12) Fault relating to cine memory function

Does this phenomenon change with the use of the cine memory function?

YES •• Replace this PCB
NO •• C15/C17

13) Ultrasound image formatting abnormality

It may be impossible to identify a failed part as a result of confirming each check code specified below. If so, try to replace the PCB

•• C15/C16

14) Fault relating to read zoom function

•• Replace this PCB

15) Fault relating to ultrasound image display function

- Display image abnormality in 2B mode
- Display image abnormality in Ping/Pong function used

•• Replace this PCB

16) Fault relating to video playback image

It may be impossible to identify a failed part as a result of confirming each check code specified below. If so, try to replace the PCB

•• C14/C16

17) Only color VEL or POWER will not display in the B mode

It may be impossible to identify a failed part as a result of confirming each check code specified below. If so, try to replace the PCB

•• C8/C11/C12

18) Only color VAR will not display in the B mode

It may be impossible to identify a failed part as a result of confirming each check code specified below. If so, try to replace the PCB

•• C8/C11/C12

19) Only M mode color images will not display

It may be impossible to identify a failed part as a result of confirming each check code specified below. If so, try to replace the PCB

•• C15

20) Fault relating to overall color image

It may be impossible to identify a failed part as a result of confirming each check code specified below. If so, try to replace the PCB

•• C8/C11/C12/C15

21) Ultrasound image formatting abnormality

It may be impossible to identify a failed part as a result of confirming each check code specified below. If so, try to replace the PCB

•• C15/C17

22) Fault relating to read zoom function

•• Replace this PCB

23) Fault relating to ultrasound image display function

- Display image abnormality in 2B mode
- Display image abnormality in Ping/Pong function used

•• Replace this PCB

24) Fault relating to video playback image

It may be impossible to identify a failed part as a result of confirming each check code specified below. If so, try to replace the PCB

•• C13/C16

25) Cannot start up the equipment

Confirm the operational status of the LEDs

Normal•• 6-4-11

Abnormal •••••••••••••••••••••••••••••••••••••• Replace this PCB

26) Cannot acquire synchronization between the TV monitor and storage device

It may be impossible to identify a failed part as a result of confirming each check code specified below. If so, try to replace the PCB

•• A5/C16/E1/E2/E3

D1 STCW EP4442**/EP4902**

Refer to “Principle of System Operation” in section 4 for details on these confirmations.

Phenomenon which may occur by a failure of this unit

- Low sensitivity with the CW Doppler image
- Side band or other forms of noise appears on the CW Doppler image
- A mirror phenomenon appears on the CW Doppler image

1) Low sensitivity with the CW Doppler image

It may be impossible to identify a failed part as a result of confirming each check code specified below. If so, try to replace the PCB

..... A3/A4/C4/C12

2) Side band or other forms of noise appears on the CW Doppler image

It may be impossible to identify a failed part as a result of confirming each check code specified below. If so, try to replace the PCB

..... A4/C4/C12

3) A mirror phenomenon appears on the CW Doppler image

It may be impossible to identify a failed part as a result of confirming each check code specified below. If so, try to replace the PCB

..... C12

D2 PSC EP4468**

Refer to “Principle of System Operation” in section 4 for details on these confirmations.

Phenomenon which may occur by a failure of this unit

- Physiological signal display is abnormal or will not display
- Physiological signal will not display in the M or B modes
- The ECG Sync. Function will not operate or the image will not update
- The heart mark will not display
- The synchronized sound for the R wave will not output

This PCB is mounted with an operation confirmation LED. Refer to “PCB LEDs” in 6-4-11 and confirm normal operations before implementing the confirmation tasks outlined below.
Replace this PCB if it is assumed from the confirmation result that it is the cause of the fault.

1) Physiological signal display is abnormal or will not display

It may be impossible to identify a failed part as a result of confirming each check code specified below. If so, try to replace the PCB

..... A1/D3

2) Physiological signal will not display in the M or B modes

It may be impossible to identify a failed part as a result of confirming each check code specified below. If so, try to replace the PCB

..... C13/C16/C21

3) The ECG Sync. Function will not operate or the image will not update

It may be impossible to identify a failed part as a result of confirming each check code specified below. If so, try to replace the PCB

..... C8/C13/D3/C21

4) The heart mark will not display

It may be impossible to identify a failed part as a result of confirming each check code specified below. If so, try to replace the PCB

..... C16/D3

5) The synchronized sound for the R wave will not output

It may be impossible to identify a failed part as a result of confirming each check code specified below. If so, try to replace the PCB

..... C18/D3

D4 Mecha. Connector EP4448**

Refer to “Principle of System Operation” in Section 4 for details on these confirmations.

Phenomenon which may occur by a failure of this unit

- Low sensitivity or no ultrasound image at mechanical probe.
- Echo gap at one location on mechanical probe.
- Noises in ultrasound image.
- Mechanical probe cannot be recognized.

1) Low sensitivity or no ultrasound image at mechanical probe.

1)-1 Confirm “M TXRX” signals at both J3C15 and J3D15 of EP444300 “A ITF” board.

- Normal•••••••••••••••••••••••••• Refer to 1)-2

Abnormal•••••••••••••••••••••••• A3/ A4/ C9

1)-2 Confirm “M RX” signal at J2D40 of EP444400 “AD_DA” board.

Normal•••••••••••••••••••••••••• C10

Abnormal•••••••••••••••••••••••• Replace Probe or PCB

2) Echo gap at one location on mechanical probe.

2)-1 Confirm “M TXRX” signals at both J3C15 and J3D15 of EP444300 “A ITF” board.

Normal•••••••••••••••••••••••••• Refer to 2)-2

Abnormal •••••••••••••••••••••••• A4/ C9

2)-2 Confirm “M RX” signals at J2D40 of EP444400 “AD_DA” board.

Normal•••••••••••••••••••••••••• Refer to C9

Abnormal •••••••••••••••••••••••• Replace Probe or PCB

3) Noises in ultrasound image.

•••••••••••••••••••••••••••••••• A2/A4/D4

4) Mechanical probe cannot be recognized.

4)-1 Confirm the connector pins at probe connector.

Normal •••••••••••••••••••••••••• Replace PCB

Abnormal •••••••••••••••••••••••• Repair or replace Probe

D5 VCM EP4470**

Refer to “Principle of System Operation” in Section 4 for details on these confirmations.

Phenomenon which may occur by a failure of this unit

- Loop (multi-frame) image cannot store into MO disk, or cannot read from MO disk.
- Loop (multi-frame) image cannot transfer via network.

1) Loop (multi-frame) image cannot store into MO disk, or cannot read from MO disk.

1)-1 Check MO disk or MO disk drive

Normal••••••••••••••••••••••••• Refer to 1)-2
Abnormal••••••••••••••••••••••• Replace MO disk or MO disk drive

1)-2 Check CPU and VPU boards.

Normal••••••••••••••••••••••••• Replace PCB
Abnormal••••••••••••••••••••••• Replace CPU or VPU board.

2) Loop (multi-frame) image cannot transfer via network.

2)-1 Check connection between system and network.

Normal ••••••••••••••••••••••••• Refer to 2)-2
Abnormal••••••••••••••••••••••• Replace network cable

2)-2 Check CPU and VPU boards.

Normal••••••••••••••••••••••••• Replace PCB
Abnormal••••••••••••••••••••••• Replace CPU or VPU board.

D6 VOL EP4469**

Refer to “Principle of System Operation” in Section 4 for details on these confirmations.

Phenomenon which may occur by a failure of this unit

- Fault relating to the VOLUME mode image
- Fault relating to the servo system for the VOLUME mode probe

1) Fault relating to the VOLUME mode image

It may be impossible to identify a failed part as a result of confirming each check code specified below. If so, try to replace the PCB

•• C13 / C14 / C15 / C16 / C17 / C21

2) Fault relating to the servo system for the VOLUME mode probe

It may be impossible to identify a failed part as a result of confirming each check code specified below. If so, try to replace the PCB

•• A4 / C17

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E1 B/W Printer

First of all, refer **A3** and confirm that a normal power supply voltage is fed to the B/W printer.

Subsequently, refer to the check codes given below and identify whether the phenomenon taking place arises from ultrasound diagnostic system or from the B/W printer.

..... C15/C16/C19/C21

E2 Color Printer

First of all, refer **A3** and confirm that a normal power supply voltage is fed to the Color printer.

Subsequently, refer to the check codes given below and identify whether the phenomenon taking place arises from ultrasound diagnostic system or from the Color printer.

C15/C16/C19/C21

E3 VCR

First of all, refer **A3** and confirm that a normal power supply voltage is fed to the VCR.

Subsequently, refer to the check codes given below and identify whether the phenomenon taking place arises from ultrasound diagnostic system or from the VCR.

····· C16/C18/C19

6-6 Waveform for Troubleshooting

It describes the waveforms from next page for the reference to judgment of failure PCB on the troubleshooting.
However, the specified waveforms have been selected to be signified to show with the consideration of specification of measuring equipment and characteristic of signals.
The waveforms are taken in the following condition, if it is not specified in each waveform

●CAUTION●	Since the connector pin numbers are dependent on each PCBs, the pin numbers are shown for each signal should be changed to those suited to each PCB by making reference with “Section 4 Principle of system operation”. The specified waveforms have been recorded with the Logic Analyzer and its printer. Because, the same waveform cannot be always taken with your measuring equipment, please pay attention.

The waveform are taken in the following condition, if it is not specified in each waveform.

- PROBE ：UST-9123
- PRESET ：Initial setting in the application “Abdomen”.
- STC ：CENTER (ALL)
- GAIN ：Initialize condition

EP4500**/4441** Tx & Tx Focus

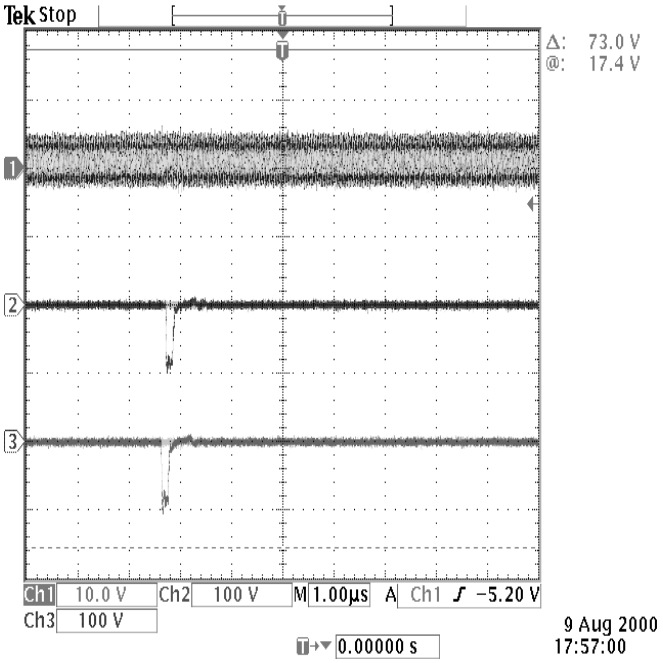
Mode : B

Range/Depth : 17cm

J1C42 TXCLK GND

J2B13 TXRX0 GND

J2B36 TXRX47 GND



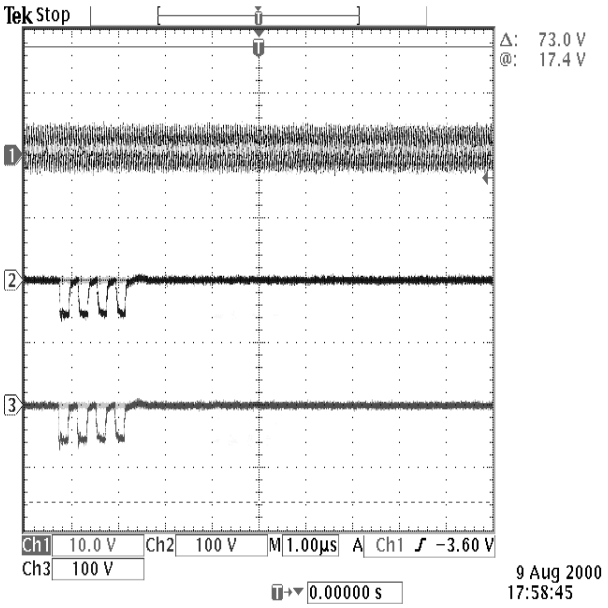
Mode : FLOW B

Range/Depth : 17cm

J1C42 TXCLK GND

J2B13 TXRX0 GND

J2B36 TXRX47 GND



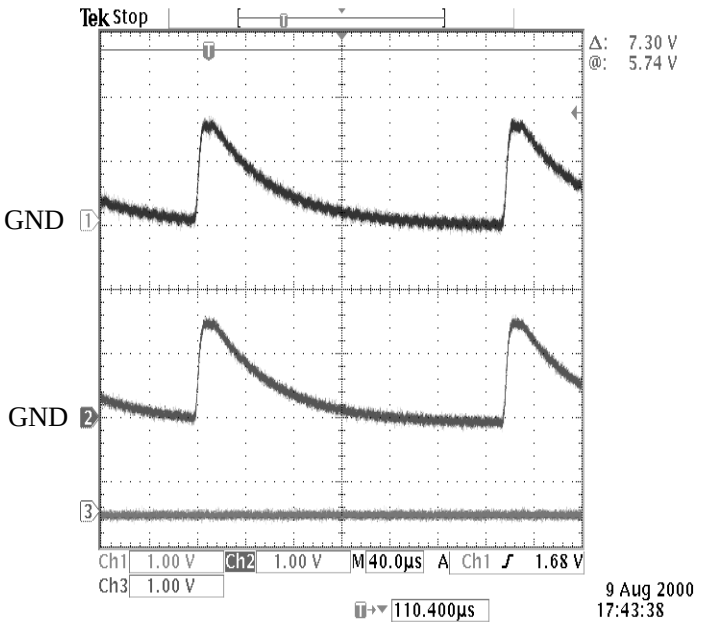
EP4443** A_ITF

Mode : B

Range/Depth : 17cm

TP3 PreSTC0

TP2 PreSTC1



EP4443** A_ITF

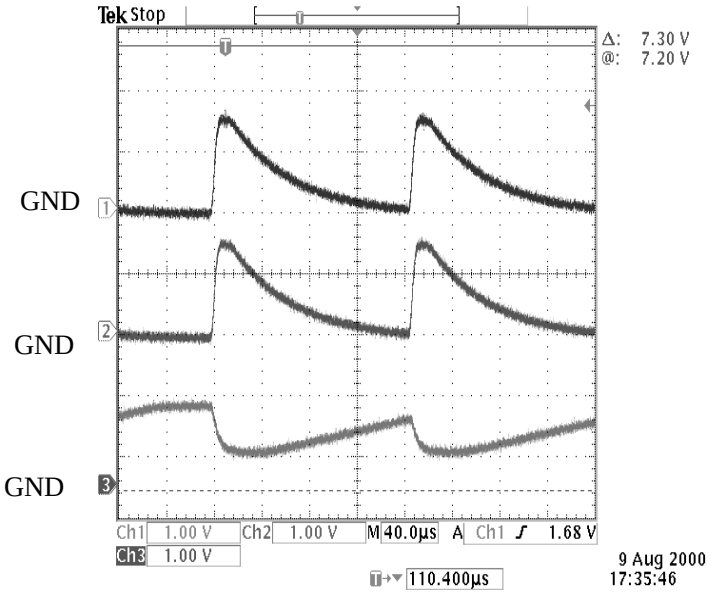
Mode : B

Range/Depth : 17cm

TP1 STC0G+

TP2 STC1G+

TP3 STC2G



EP4444** AD_DA

Mode : B

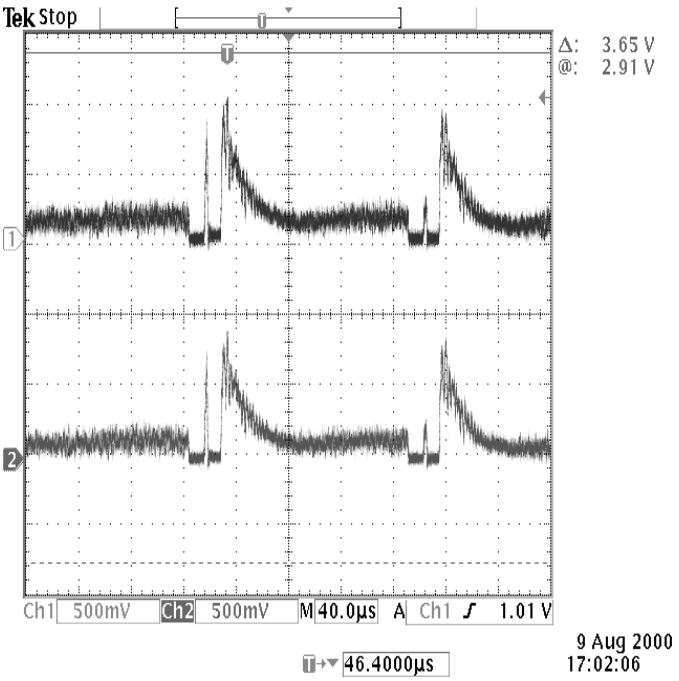
Range/Depth : 17cm

TP13 USVIDO_P

GND

TP14 USVIDO_S

GND



EP4466** VPU

Mode : B

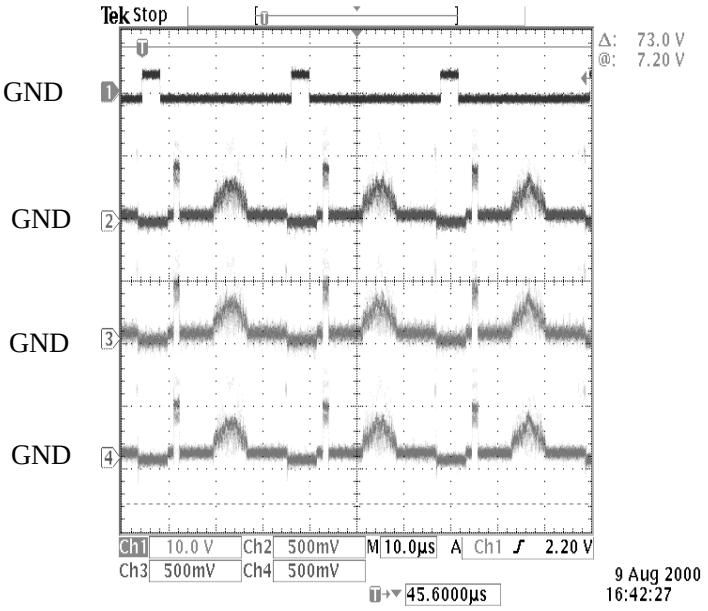
Range/Depth : 17cm

TP4 MON_SYNC

TP3 MON_R

TP1 MON_G

TP2 MON_B



Mode : B

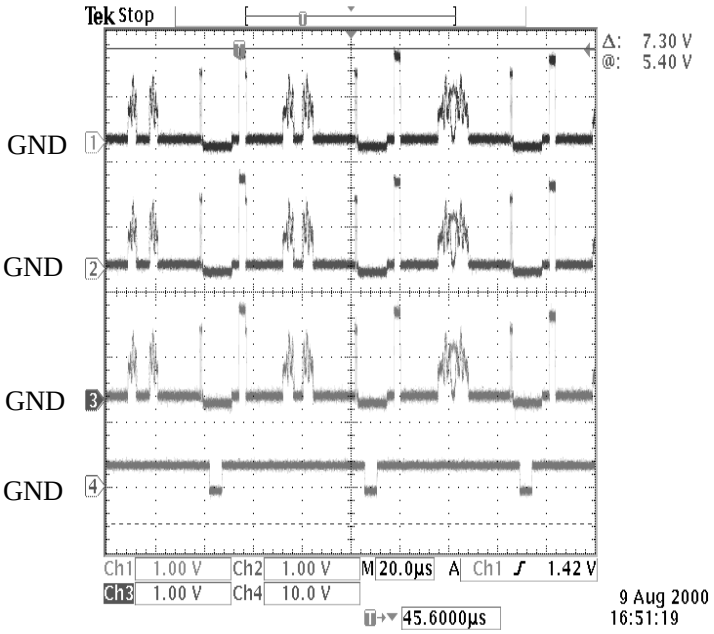
Range/Depth : 17cm

TP7 PRN_R

TP5 PRN_G

TP6 PRN_B

TP8 PRN_SYNC



EP4466** VPU

Mode : B

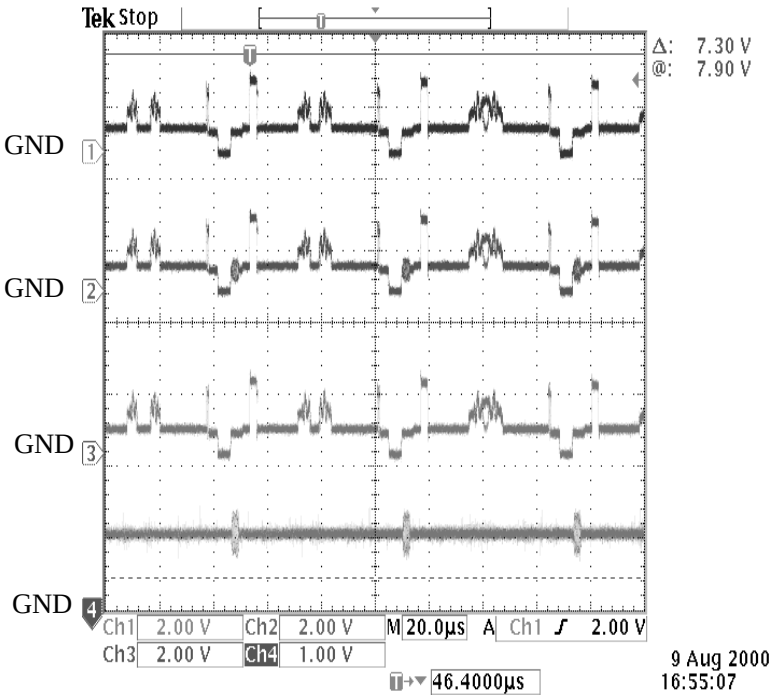
Range/Depth : 17cm

TP12 MON_BW1

TP11 VCR_VBS

TP9 VCR_Y

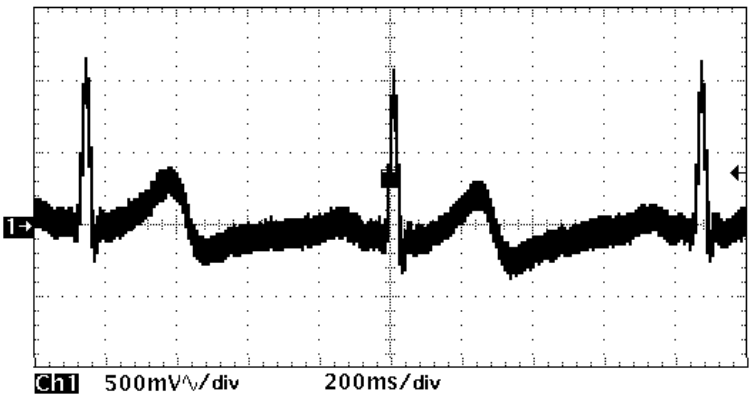
TP10 VCR_C



EP4578** Physio Amp

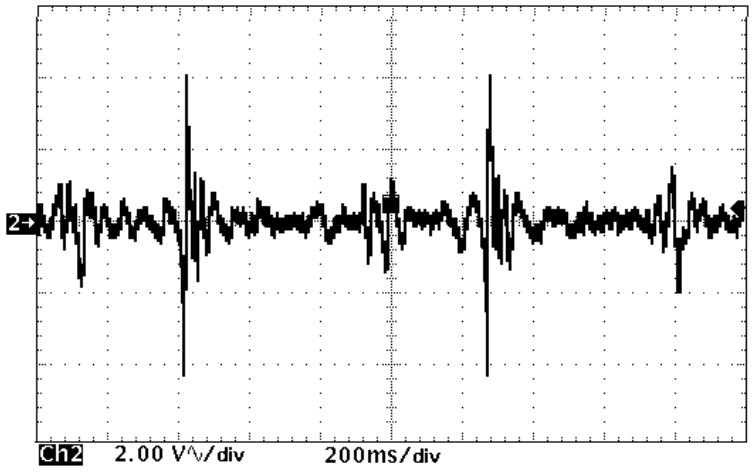
Mode : B
Range/Depth : 15cm
ECG : ON
ECG SENS : MAX
Hart Rate : 80bpm

TP603 PHI_ECG
GND



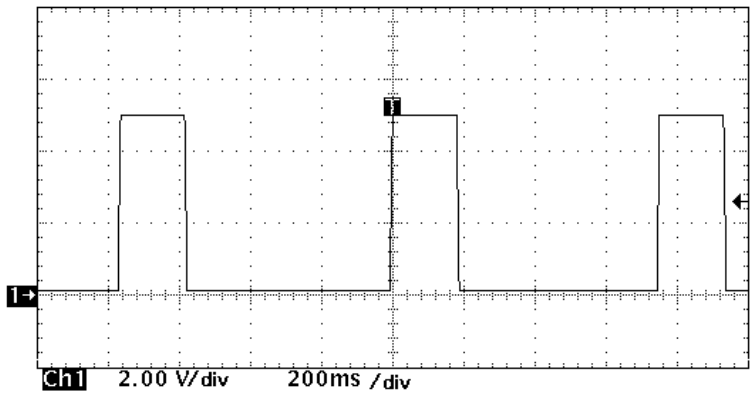
Mode : B
Range/Depth : 15cm
PCG : ON
PCG SENS : MAX
Hart Rate : 80bpm

TP604 PHI_PCG
GND



Mode : B
Range/Depth : 15cm
ECG : ON
ECG SENS : MAX
Hart Rate : 80bpm

TP602 ECG R_SIG
(UC RINT_)
GND



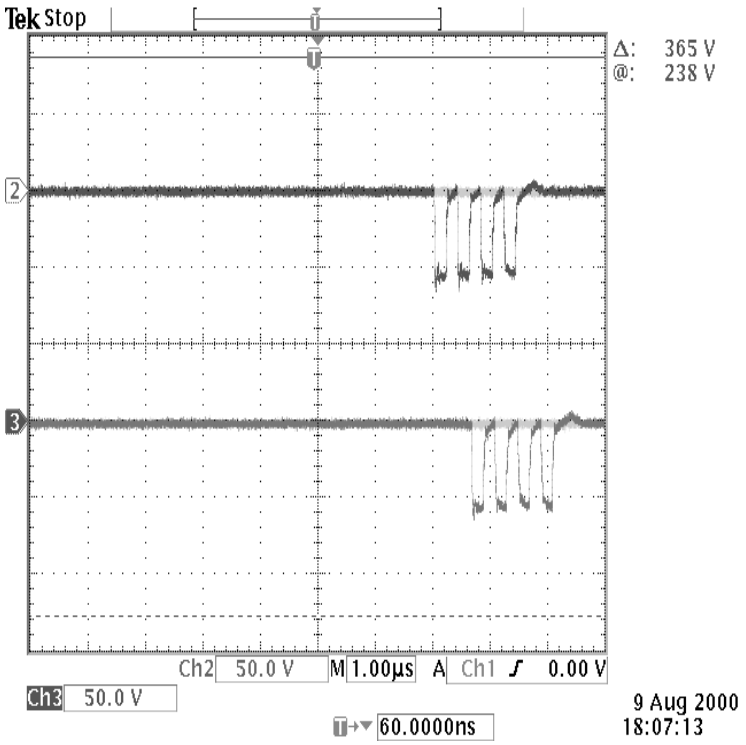
EP4441** Tx & Tx Focus 2

Mode : FLOW B

Range/Depth : 17cm

J2B13 TXRX0 GND

J2B23 TXRX21 GND

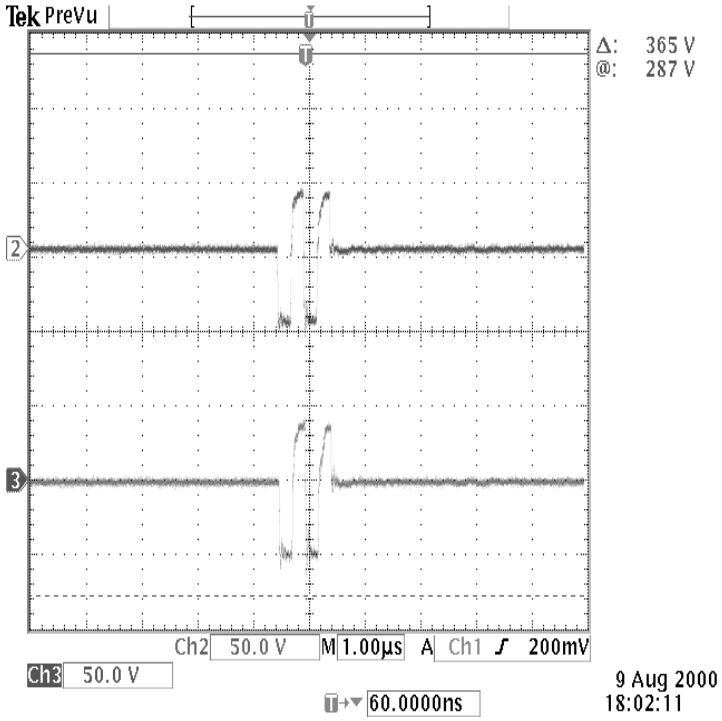


Mode : B / Tissue Harmonic Imaging: ON

Range/Depth : 17cm

J2B13 TXRX0 GND

J2B36 TXRX47 GND



SECTION 7

ADJUSTMENT PROCEDURE

7-1 Introduction

The adjustment points shown in this adjustment procedure are points where the actual ultrasound image is directly adjusted.

7-2 Attention

In order to avoid some new trouble created by this adjustment procedure manual, the person performing this adjustment should be restricted to someone who has undergone the Aloka approved training course and who has a high level of technical expertise and knowledge.

Also, by all means investigate beforehand whether the trouble you are attempting to solve by adjustment is caused by faulty adjustment or by the failure of one of the circuits. Since indiscriminate readjustments can be a hindrance to restoring the equipment's original performance, please exercise great caution in performing adjustments.

When actually engaging in adjustments, be careful especially in the following points.

1) Begin the operation only after switching on the power and letting it warm up sufficiently.(30 minutes or more have passed after throwing the power switch ON.)
2) When adjusting variable resistors, do not exert greater force on the PCB than necessary.
3) Some of the variable resistors used in S.M.T. (Surface Mount Technology) may be smaller in size than those used in the past. When adjusting these devices, be sure to use a driver that is appropriate for each specific variable resistor.
4) Do not touch any variable resistor or any variable coil, etc. which is not specifically indicated in these procedures. There is danger of altering the circuit to the point where restoration of function will become impossible.

7-3 Tools and Measuring Instruments

The tools and measuring instruments which are ordinarily necessary when performing adjustments are as shown below.

1) Probe ：UST-9123, UST-5299
2) Driver ：for + M3 Phillips screwdriver, Adjustment driver
3) Extension board ：EP442100BB

7-4 Adjustment Procedure

7-4-1 EP444400** AD_DA

Purpose of Adjustment: To adjust the ultrasound image noise level to the appropriate value.

Item	Condition	Adjustment Point	Measuring Point	Standard
Adjust the noise level	Preset：Abdomen Setting of Preset Horizontal Smoothing ：Off Pixel Smoothing ：On Frame Smoothing：Off Setting of B mode image Probe：Convex Frequency：3.8MHz MODE：B DEPTH/RANGE：17cm Line Density：High Frame CORR(B)：0 FOCUS：Auto 1P Beam Processing：Single STC：MAX Gain：90 CONTRAST：1 AGC：0 Acoustic Power：0%	VR3	On TV screen	Make the area to the noise of 17th in high and 16th in low uniform. (Refer to Fig.7-4-1)

（Adjustment procedure）
- Put the probe in the air.
- Display 17th in high and 16th in low gray scale by selecting SLOPE2, and adjust VR3 so that noise fills up image area uniformly.

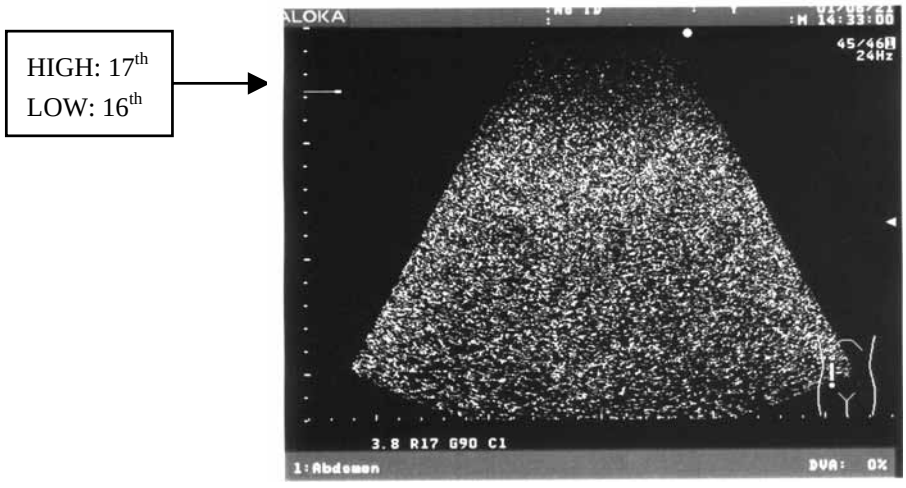


Fig. 7-4-1 Adjustment of the noise level.

7-4-2 EP444400** AD_DA

Purpose of Adjustment: To adjust the vertical lines when parallel receiving is performed.
(Sector) (STEP 1)

Item	Condition	Adjustment Point	Measuring Point	Standard
Adjust the vertical lines on B/W image (while pararell recieiving is performed)	Preset：Cardiac Setting of Preset Horizontal Smoothing ：Off Pixel Smoothing ：Off Frame Smoothing：Off Setting of B mode image Probe：Sector Frequency：3.0MHz MODE：B DEPTH/RANGE：17cm Line Density：High Frame CORR(B)：0 FOCUS：Auto 1P Beam Processing：Multi STC：Center Gain：90 CONTRAST：8 AGC：4 Acoustic Power：0%	VR5	On TV screen	Decrease the vertical lines on B/W image.

（Adjustment procedure）
●Put the probe in the air.
●Adjust VR5 so that the vertical lines may decrease most.

After the adjustment, check the image on the other probe if another probe is connected.
Refer to Fig. 7-4-2

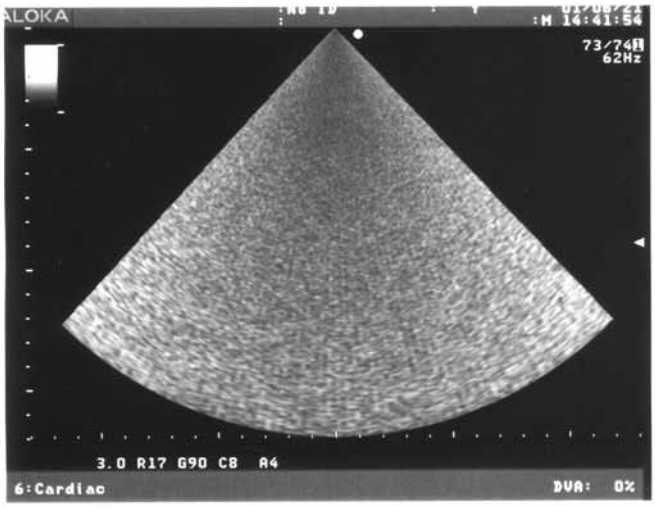


Fig. 7-4-2 Adjustment of the vertical lines when parallel receiving is performed.

7-4-3 EP444400** AD_DA

Purpose of Adjustment

To adjust the vertical lines when parallel receiving is performed.
(Sector) (STEP 2)

Item	Condition	Adjustment Point	Measuring Point	Standard
Adjust the vertical lines on B/W image (while pararell recieiving is performed)	Preset：Cardiac Setting of Preset Horizontal Smoothing ：Off Pixel Smoothing ：Off Frame Smoothing：Off Setting of B mode image Probe：Sector Frequency：3.0MHz MODE：B DEPTH/RANGE：15cm Line Density：Mid Frame CORR(B)：0 FOCUS：Auto 1P Beam Processing：Multi STC：Center Gain：Proper value CONTRAST：8 AGC：4 Acoustic Power：70%	VR2	On TV screen	Decrease the vertical lines on B/W image.

（Adjustment procedure）

●Put the probe on a body.

●Adjust VR2 in exactly so that the vertical lines may decrease most.

Remarks:

After the adjustment, check the image on the other probe if another probe is connected.

If the vertical lines remain, readjust the vertical lines on B/W image by "STEP1", and then execute this adjustment work again.

◆Confirmation of B mode image for Convex probe

Change the above setting to the following conditions, and confirm the vertical lines on B/W image was reduced.

Setting of Preset (Abdomen)

Horizontal Smoothing	：Low
Pixel Smoothing	：On
Frame Smoothing	：On

Setting of B mode image

Probe	：Convex
Frequency	：3.8MHz
Range	：17cm
Line Density	：High
Frame CORR(B)	：7
FOCUS	：Auto 2P
Beam Processing	：Multi
Gain	：Proper value
Acoustic power	：70%

◆Confirmation of B mode image for Sector probe

Change the above setting to the following conditions, and confirm the vertical lines on B/W image was reduced.

Setting of Preset (Cardiac)

Horizontal Smoothing	：Low
Pixel Smoothing	：Off
Frame Smoothing	：On

Setting of B mode image

Probe	：Sector
Frequency	：3.0MHz
Range	：15cm
Line Density	：Mid
Frame CORR(B)	：2
FOCUS	：Auto 1P
Beam Processing	：Multi
Gain	：B mode image：35～85, B+FLOW mode image：45～75
Acoustic power	：70%

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SECTION 8

PERFORMANCE CHECK

8-1 Introduction

"Performance Check" describes the items to be confirmed for the maintenance of an equipment quality and safety under the circumstances referred to below.

- Once a repair work has been done,
- Once an improvement, for a problem or the like, has been made,
- Once a change as to upgrade the functions and/or specifications has been made,
- When a periodic inspection is made.

8-2 Precautions

Unless otherwise specified, this performance check must be conducted with all coverings attached in place and under the following environments:

- 30 minutes or more have passed after throwing the power switch ON.

If the performance check specified herein should be conducted after a repair, an improvement or an upgrade, make certain of the following:

- All the PCBs removed are reconnected properly.
- All the connectors removed are reconnected properly.
- The replaced ROM and others are mounted in place on a printed circuit board.
  The power pin, in particular, should never be mistaken for the GND pin.
- The unnecessary ROM is not left behind inside the equipment.
- Tool, measuring probe, and the like are not left behind inside the equipment.
- Optional components and grounding cable are properly reconnected.
- Screws and the like are not left behind inside the equipment.

8-3 Making Entries in Repair Report

Upon completion of the check, enter findings thereof in such a form as repair report or the like. And present it to the user. Keep a copy thereof in custody.

8-4 Performance Check

Those items which are covered by a performance check vary, in principle, with what is done for the operation requiring the check. In accordance with the chart given below, identify an item or items required (those marked with ● in the chart). And check each of the items so marked.

The terms referred to in the chart, meanwhile, are defined, respectively, as follows:

" Power Supply Unit " Power supply body, isolation transformer, and power switch.

" Other units than above " Units other than the power supply unit.

Check Requiring Operation	CHECK ITEM			REMARKS
	Function	Image Quality	Safety	
Replacing parts inside power supply unit.	●	●	●	Including PCB replacement.
Replacing the power supply unit as a whole.	●	●		
Replacing parts inside physiological signal unit	●	●	●	Including PCB replacement.
Replacing physiological signal unit as a whole	●	●		
Replacing a PCB in units other than that the above.	●	●		
Replacing parts on PCB in other units.	●	●		Including ROM replacement.
Replacing units other than that referred to above as a whole.	●	●		Including a probe and scanner.
Performance check before the upgrade or improvement	●	●		
Periodic inspection	●	●	●	

What be checked in each of the check items, meanwhile, is given on the pages described below, to which you are requested to refer.

* Refer to the Electrical Safety Check Manual： MN2-0205 to check safety.

If a specified performance or rating should be found unsatisfied as a result of the check, the equipment should be deemed failed.

Now, refer to "Section 6 Troubleshooting" to dissolve the failure.

8-4-1 Functional check

Using the control panel of the equipment, you can check the operative condition of the function corresponding to each panel switch.

1) Checking the panel switch operation

When any PCB around the panel or any switch on the panel is replaced, particularly check the condition of the key top (cap). If the key top position is shifted, the switch may not operate normally.

- Panel LED lamps: Using "Panel Test" of the maintenance menu, check that all the LED lamps light.
- KEY BOARD

  Input of all the characters, SPACE, CLEAR, BS, SHIFT, RETURN, CAPS, ESC, TAB.

  COMMENT : Moves the cursor with the trackball
  ID : Patient number
  NEW PATIENT : Resets the ID, COMMENT, measuring function or picture condition
  FUNCTION : Operates a function assigned to the full keyboard
- MODE (Freeze OFF)

  When selecting B, M, D, PW/CW, B/B, B/M, B/D, FLOW or POWER FLOW, each image must be displayed normally.
- DEPTH/RANGE (Freeze OFF)

  In B mode, the image display magnification must be increased or reduced.
- VEL RANGE (Freeze OFF)

  In DOPPLER/FLOW mode, the velocity range must be increased or decreased.
- SELECT (Freeze ON/OFF)

  In B/* mode, the select screen must be switched.
- REC (Freeze ON or OFF)

  The recorder or function assigned by PRESET must operate.
- INVERT (Freeze ON or OFF)

  In B mode, the image must be reversed in left-right direction by pressing INVERT switch.
- IMAGE ROTATION (Freeze ON or OFF)

  In B mode, the image must be rotated in 90 degrees step by pressing the STEER/ROTATE switch.

2) Image adjusting function

The following items should be all checked with Freeze OFF.

- B-GAIN (Freeze OFF)
  In B/M mode, both gains must be adjusted by turning the GAIN control knob.
  The GAIN display must change from 30 to 90.
- M-GAIN (Freeze OFF)
  The gain of the M mode image must be corrected by turning the M-GAIN control knob.
  The GAIN display must change from 30 to 90.
- D-GAIN (Freeze OFF)
  The gain of the Doppler mode image must be adjusted by turning the D-GAIN control knob. The GAIN display must change from 00 to 60.
- F-GAIN (Freeze OFF)
  The gain of the Flow mode image must be adjusted by turning the F-GAIN control knob.
  The GAIN display must change from 00 to 32.
- STC (Freeze OFF, Depth: 24cm)
  The gains of both the B and M mode images must be adjusted corresponding to their depths. When all the STC controls are centered, they must be free of excessive variations in sensitivity.
- CONTRAST（Freeze OFF：B or M mode menu）
  The contrast of the B and M mode images must be adjusted by pressing the contrast ▲▼switches on the operation panel.
- RELIEF （Freeze OFF：B or M mode menu）
  The relief processing for the B and M mode images must be adjusted by pressing ←→ in the MENU.
- AGC （Freeze OFF：B or M mode menu）
  The AGC for the B and M mode images must be adjusted by pressing ←→ in the MENU.
- FTC (Freeze OFF：M mode menu)
  The relief processing for the M mode image must be adjusted by selecting FTC in the MENU.
- PIXEL SMOOTHING (Freeze OFF：B or M mode menu)
  The smoothing processing for B mode image must be adjusted by selecting PIXEL SMOOTHING (B) in the MENU.
- IP SELECT (Freeze OFF)

When you select the IP SELECT switch in each of the B and M modes and operate the rotary encoder, the picture quality must change to rather hard and rather soft.

- IMAGE FREQ (Freeze OFF)
  When you select the ▲▼ switches for IMAGE FREQ in each mode, the frequency of the ultrasound must be switched.

- ACOUSTIC POWER (Freeze OFF)
  The image sensitivity must be changed by pressing the ▲▼ switches for ACOUSTIC POWER in B mode.

- ANGLE (Freeze OFF)
  The angle correction mark must be displayed by pressing the ANGLE switch in D mode. The speed range in D mode must change by turning the rotary encoder .

- FRAME CORRELATION (Freeze OFF：B mode menu)
  For the B mode image, the level of frame correlation must be adjusted by FRAME CORRELATION setting in the MENU.

- LINE DENSITY (Freeze OFF：B mode menu)
  For the B mode image, the frame rate must change in 3 steps by changing the LINE DENSITY setting in the MENU.

- SWEEP SPEED (Freeze OFF：M mode menu)
  For the M mode image, the sweep speed must be adjusted by turning the M Sweep Speed rotary encoder on the touch panel M-MODE.

- ECHO ERASE (Freeze OFF：M mode menu)
  The M mode image must be erased from the bottom to the center or turned on, off or reset by turning the ←→ for ECHO ERASE in the MENU.

- Capture Mode (Freeze OFF)
  The flow mode image must be updated in fixed interval when the “Capture Mode” in "Flow1" of MENU is set to ON.

- FRAME RATE ACCELERATOR (Smoothing (Flow) :0, PIX SMOOTH :HIGH)
  In the B with color flow mode image , the continuity between the frames must be changed when "FRAME RATE ACCELERATION" in "Flow2" of MENU is set to ON.

3) FUNCTION

The following functions must operate normally.

- PROBE (Freeze OFF)

  The kinds, model names and frequencies of all the probes connected must be displayed on the monitor and the image of the selected probe must be displayed on the monitor.

- PRESET (Freeze ON/OFF)

  The preset menu must be displayed and the preset selected must be started. The preset must be registered on the Set Up Menu screen. Even if the power is once turned off, the preset registered must not be erased.

- PHYSIO （OPTION：With the PEU-4000 connected）

  With the physiological signal unit connected, the Physio Menu must be displayed.

- MENU (Freeze ON/OFF)

  The active mode menu must be displayed automatically.

4) MEASUREMENT functions

The following measurement functions must operate normally.

- DISTANCE (Freeze ON)

  The DISTANCE measurement function must operate normally.

5) TRACKBALL FUNCTION

The following functions must operate normally.

- CURSOR/B.L.S. (Freeze OFF)

  The cursor must be displayed when you select the CURSOR/B.L.S. switch in B/M mode. When you operate the trackball, the cursor direction must catch up with it in real time and M-MODE must be displayed corresponding to the cursor position.

- FOCUS (Freeze OFF)

  The FOCUS menu must be displayed on the monitor by selecting the FOCUS switch in B mode. When you manipulate the trackball, the focus mark on the monitor must catch up with it in real time and the focus point of the ultrasound image must change.

- BODY MARK

  When you select the BODY MARK switch, the body mark must appear on the monitor and the selected body mark must be displayed on the monitor.

- SCAN AREA (Freeze OFF)

  When you select the SCAN AREA switch in B mode and turn the rotary encoder, the scan area must be narrowed and the frame rate must increase. You must be able to steer within the maximum sight with the trackball.

- ZOOM (Freeze OFF)

  When you select the ZOOM switch in B mode and turn the rotary encoder, the image must be reduced or magnified (CW: Magnify, CCW: Reduce). The position must be moved (vertically, horizontally) with the trackball.

6) CINE MEMORY FUNCTION

- SEARCH (Freeze ON)

  After freezing in B/M mode, searching for the M image with the trackball and searching for the B image with the rotary encoder must be possible.

- STORE/REVIEW (Freeze ON)

  After moving the trackball or rotary encoder in the search state in B/M mode, when you store and review the displayed image, the stored B/M image must be displayed.

7) DOPPLER FUNCTION

Check that all the operations are normal by referring to the operator's manual.

- SAMPLE VOLUME

  In B/D mode, the size of sample volume for PW Doppler must be changed by operating SAMPLE VOLUME switch.

- DOPPLER FILTER

  In B/D mode, the noises around the base line must be eliminated by operating the DOP FILTER switch.

- DOPPLER MENU

8) FLOW/POWER FLOW FUNCTION

Check that all the operations are normal by referring to the operator's manual.

- FLOW/POWER MENU

9) PHYSIO SIGNAL (OPTION：With the PEU-4000 connected)

Connect the simulator to the physiological unit, connect the PCG cable and Pulse cable, then perform the following check operations.

- MODE (Freeze OFF)
  When you select the ECG Display in the MENU, an ECG waveform and heart rate must appear on the B image.
- When you select the PCG Display and Pulse Display in the MENU, a PCG and a Pulse waveform must appear on the screen.
- An ECG and a PCG waveform must be displayed on the M image and no unnecessary noise must be contained in them. Each SENSE operation must allow the amplitude of the waveform to change and the POSITION operation must allow the waveform to move from the top to the bottom of the M image.
- R-WAVE BEEP (Freeze OFF)
  When you select the R-WAVE BEEP in the MENU, a "beep" tone must be heard synchronizing with the rise of the ECG waveform (R wave).
- ECG SYNC (Freeze OFF)
  When you press the ECG 2B SYNC switch, the 2B display must appear, the SYNC mark must appear at the rise of the ECG waveform (R wave), and the right B image must be overwritten synchronizing with SYNC.

10) STCW Doppler (OPTION：With the UCW-4000 connected)

Connect the electronic sector probe available STCW to probe connector and perform the following check operations.

- STCW (Freeze OFF)
  B/D (CW) must be displayed when B/D (CW) is selected.
- ACOUSTIC POWER (Freeze OFF)
  When you select the ACOUSTIC POWER switch and turn the rotary encoder, the sensitivity of the CW Doppler must change.

11) VIDEO PRINTER

Before making the following checks, check that the Video Printer is connected properly. When you press the Video Printer Rec switch set by the preset, the Video Printer must be operated and the same image as displayed on the monitor must be recorded. The recorded image must be free of skew, tilt, and image missing. The image printed by the color printer

must be free of tint and color misalignment.。

12) VCR（OPTION：With the SVO-9500MDA connected）

Before performing the following checks, check that the SVO-9500MDA is connected properly.

- External input

  An external input image from the VCR must be output to the monitor with the EXT switch. The image must be displayed correctly without synchronization failure, etc.

- FREEZE

  The VCR playback image must be made freeze with the FREEZE switch.

- Playback measurement

  With the VCR playback image made freeze, measurement of the playback image must be possible.

- Audio

  The audio must also be recorded and played back normally.

- Remote control

REC and Pause for the VCR must be controlled from the EXT menu on the touch panel.

13) FOOT SWITCH（OPTION：With the MP-2614* connected）

Operation of the functions assigned by the preset must be possible.

14) Tissue Harmonic Imaging

・Select the Tissue Harmonic Imaging switch on the operation panel. Image must be changed to Tissue Harmonic Imaging image.

8-4-2 Image Quality Check

To ensure the quality of ultrasound images, check should be made by using a test piece or a similar object.

1) Image Quality

- TOTAL IMAGE QUALITY

  Condition : B mode, GAIN set to proper level, STC at center, CONTRAST 4
  PROBE : UST-9123

  A proper image must be shown with the probe placed on the abdominal region. There are not a noise, an unevenness, an unnecessary writing on the image. (If 5 MHz and/or 7.5 MHz probes are connected, the above check also should be made by using them.)

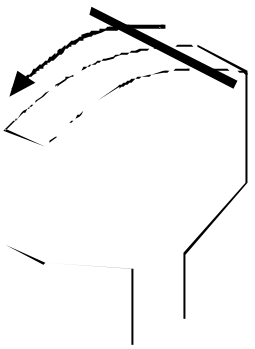
- COIN CHECK

  Confirm that the focus points change smoothly from F1 (F8) to F15 (F8).

  Condition : B mode, DEPTH/RANGE 17 cm

  Apply a thin film of jelly to the probe, put a thin metallic pin on the probe in right angle to the probe length direction, and move the pin slowly on the surface.

  Perform this once for focus F1 only, and also once for F8 only.



  Confirm that US image does not have the echo gap(s), or does not appear on two or more locations. Confirm that variable aperture is acting normally.

  Confirmation should be made by using the probe connectors 1,2 and 3.

- NOISE LEVEL

Condition：

Preset	：Abdomen （IMAGE 1 : FRAME SMOOTHING : OFF）
Probe	：UST-9123
Mode	：B
DEPTH / RANGE	：17 cm
GAIN	：MAX
STC	：MAX ALL
IMAGE/FREQ	：3.8M
CONTRAST	：1
DVA	：0%
FOCUS (B)	：AUTO (1P)
AGC (B)	：0
LINE DENSITY	：HIGH
HORIZONTAL SMOOTHING	：OFF
FRAME CORRELATION (B)	：0
PIXEL SMOOTHING	：ON
BEAM PROCESSING	：SINGLE
POST PROCESSING	：SLOPE2
POST PROCESSING LEVEL, LOW	：16
POST PROCESSING LEVEL, HIGH	：17

According the above condition, the whole of Ultrasound image area must be displayed in white.

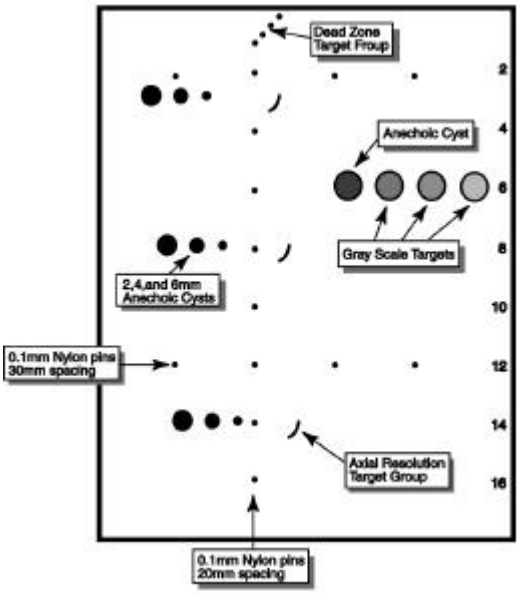
2) Total Performance test

- Total Sensitivity

  Condition : B mode, PROBE : UST-9123 used

  Use a test phantom, RMI-403 or an equivalent, confirm the following items.

  - ◆ A reflection echo of the seventh thread can be shown.
  - ◆ A solid echo of 11 cm or deeper can be seen.



- Resolution

  Use a probe UST-9123. MODE：B

  Use a test target ASU-32 KG1 (Aloka product), visually check the minimum distance recognizable in water.

  - ◆ Lateral resolution 3 mm or less
  - ◆ Axial resolution 2 mm or less

- Distance accuracy

  Use a probe UST-9123 and a test target ASU-32 KG1 (Aloka product).
  Confirm that an error of a distance accuracy is less than ±5%, when measure an interval of 60mm between targets (vertical and horizontal directions) in a reflection echo from the water (the temperature is 40℃±5℃).

8-4-3 Safety Check

When you do the Safety Check, refer to the Electrical Safety Check Manual; MN2-0205.

○IMPORTANT○	In Electrical Safety Checks, the method and rating of check differ in the degree of protection against electric shock. SSD-4000 belongs to " **Type BF applied part** " in the degree of protection against electric shock.

SSD-4000 CHECK SHEET

No.	Check Item	Details	Checked by 1	Checked by 2	Remarks
8-4-1	Functional Check				
1)	Panel Switch	PANEL LED			
		KEY BOARD			
		MODE			
		DEPTH/RANGE			
		VEL RANGE			
		SELECT			
		REC			
		INVERT			
		IMAGE ROTATION			
2)	Image Adjustment	B-GAIN			
		M-GAIN			
		D-GAIN			
		F-GAIN			
		STC			
		CONTRAST			
		RELIEF			
		AGC			
		FTC			
		PIXEL SMOOTHING			
		I.P. SELECT			
		IMAGE FREQ			
		ACOUSTIC POWER			
		ANGLE			
		FRAME CORRELATION			
		LINE DENSITY			
		SWEEP SPEED			
		ECHO ERASE			
		CAPTURE MODE			
		FRAME RATE ACCELERATOR			
3)	FUNCTION	PROBE			
		PRESET			
		PHYSIO			(OPTION)
		MENU			
4)	MEASUREMENT FUNCTION	DISTANCE			
5)	TRACK BALL FUNCTION	CURSOR/B.L.S.			
		FOCUS			
		BODY MARK			
		SCAN AREA			
		ZOOM			

SSD-4000 CHECK SHEET

No.	Check Item	Details	Checked by 1	Checked by 2	Remarks
6)	CINE MEMORY FUNCTION	SEARCH			
		STORE/REVIEW			
7)	DOPPLER FUNCTION	DOPPLER MENU			
		DOP FILTER			
		DOPPLER MENU			
8)	FLOW/POWER FUNCTION	FLOW/POWER MENU			
9)	PHYSIO. SIGNAL	MODE			(OPTION)
		R-WAVE BEEP			
		ECG SYNC			
10)	STCW Doppler	STCW			
		Acoustic Power			
11)	Video Printer				(OPTION)
12)	VCR	External input			(OPTION)
		FREEZE			(OPTION)
		Playback measurement			
		Audio			
		Remote control			
13)	FOOT SWITCH				(OPTION)
14)	Tissue Harmonic Imaging				(OPTION)
8-4-2	Image Quality Check				
1)	Image Quality	Total Image Quality			
		COIN CHECK			
		Noise level			
2)	Total Performance test	Total sensitivity			
		Resolution			
		Distance accuracy			
8-4-3	Safety Check				
1)	Checking Protected Earth Cable for Continuity				
2)	Measuring an Insulation Resistance				
3)	Earth Leakage Current	Normal			
		Single Fault Condition			
4)	Enclosure Leakage Current (a)	Normal			
		Single Fault Condition			
5)	Enclosure Leakage Current (b)	Normal			
		Single Fault Condition			
6)	Patient Leakage Current	Normal			
		Single Fault Condition			

SECTION 9

DISASSEMBLING PROCEDURE

SSD-4000 Disassembling Instruction

1. Parts Identification

2. Individual Unit Layout

3. Dismounting Flow Chart

4. Removing of Covers

5. Removing of Operation Panel Assembly, Knob, Interface PC board, Track ball, Roller Knob, Flexible board, Switch board, Light

6. Removing of JB-263/USM-25*

7. Removing of JB-260/261/Power Supply Unit(PSU-S4000*-1/-2*)/JB-258*/259*

8. Removing of Daughter board

9. Removing of Mother board

10. Removing of Floppy Disk Drive

11. Removing of Black and white Printer(UP-895*, P91*)
VCR (SVO-9500MD*,AG-7350*) , MO(DYNA MO 640SE)
Color Printer (UP-2850P/-2950MD/-21MD(*), CP700*/900*)

12. Removing of Monitor(IPC-1530Q/-1530(U))

13. Removing of Tilt base

14. Removing of Monitor Arm

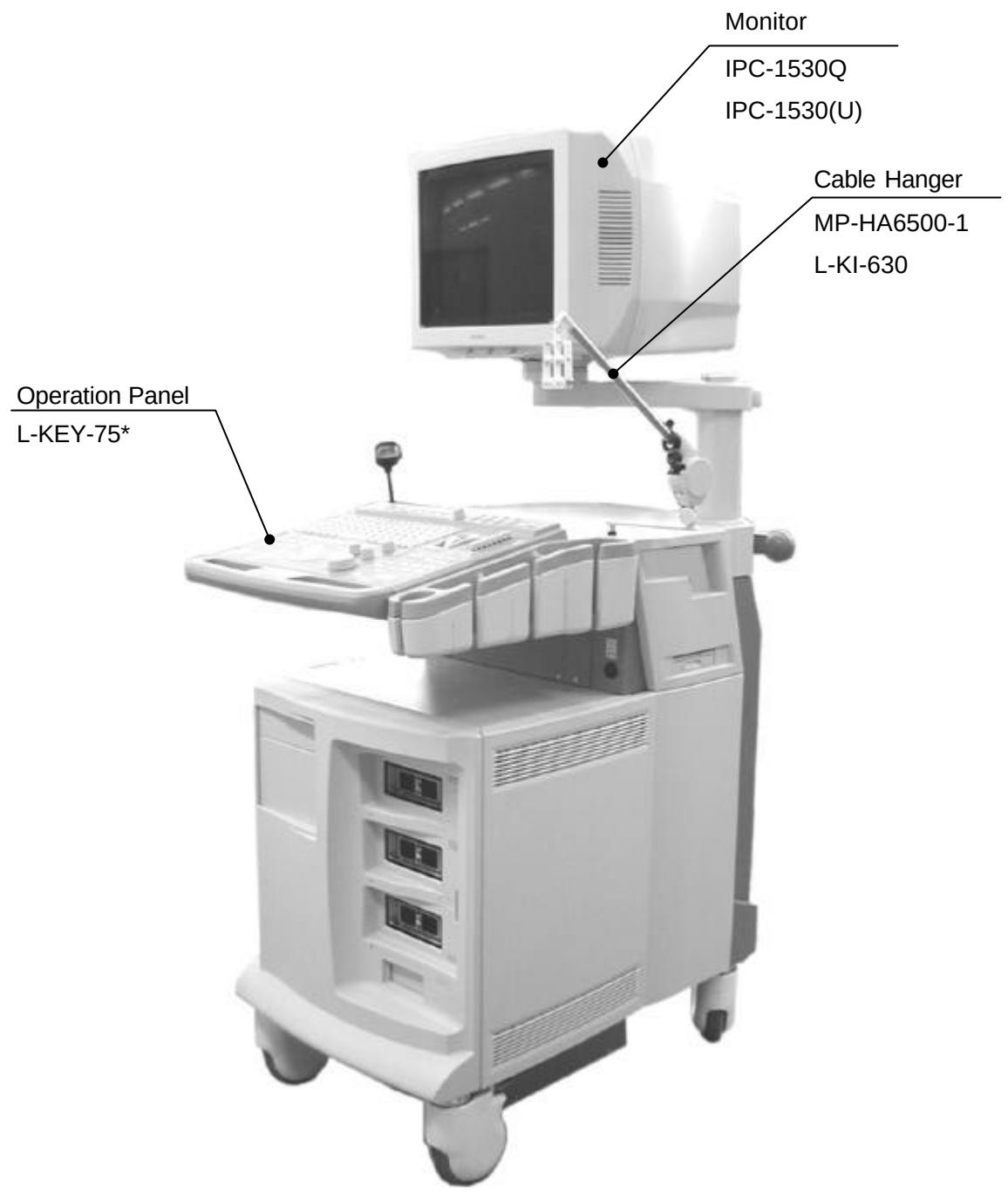
15. Removing of Foot Switch

16. Removing of Physio Unit

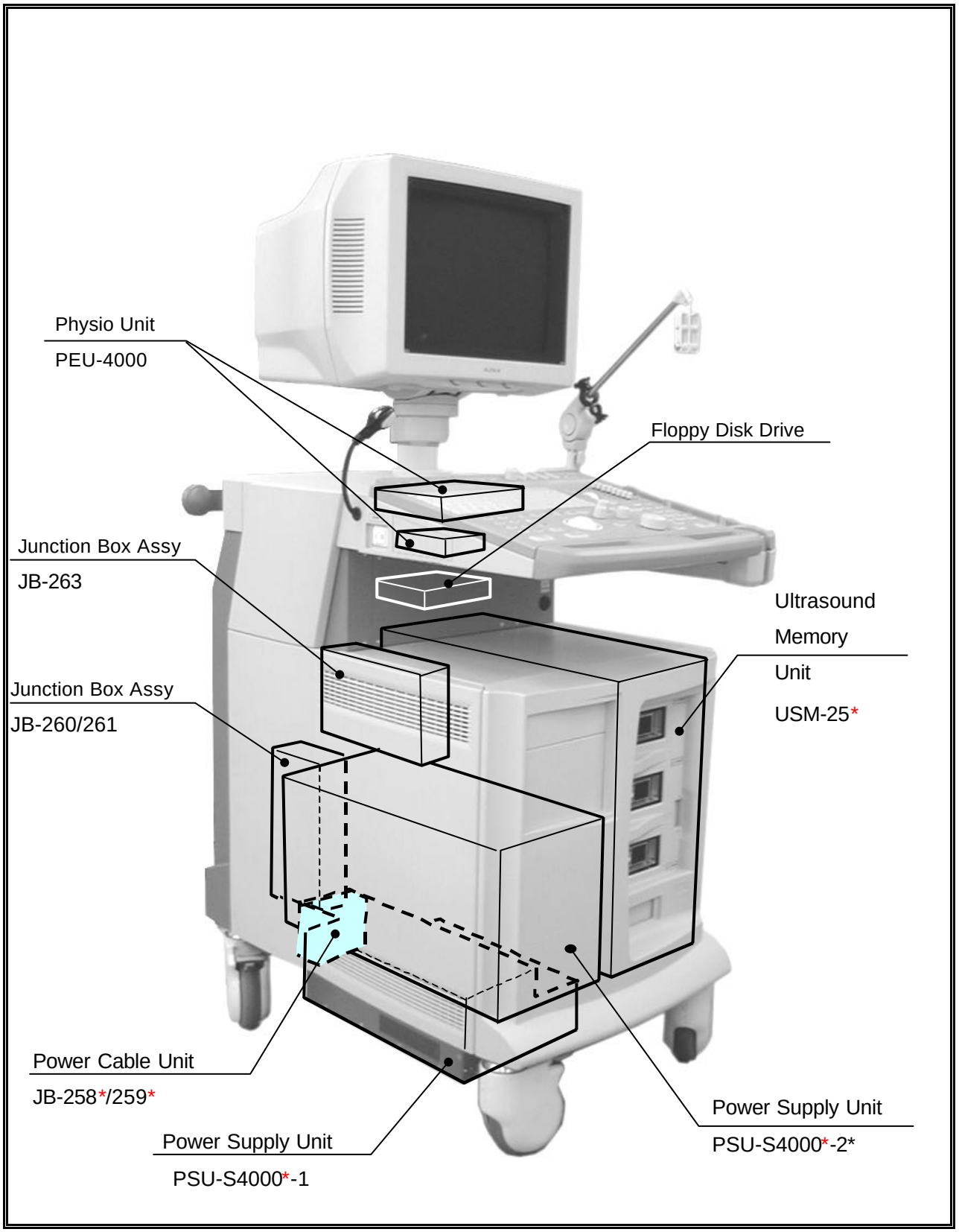
17. Removing of reinforcement metal fittings of the unit for the VOL mode

18. Removing of mechanical radial connection unit (SCU-4000)

1. Parts Identification

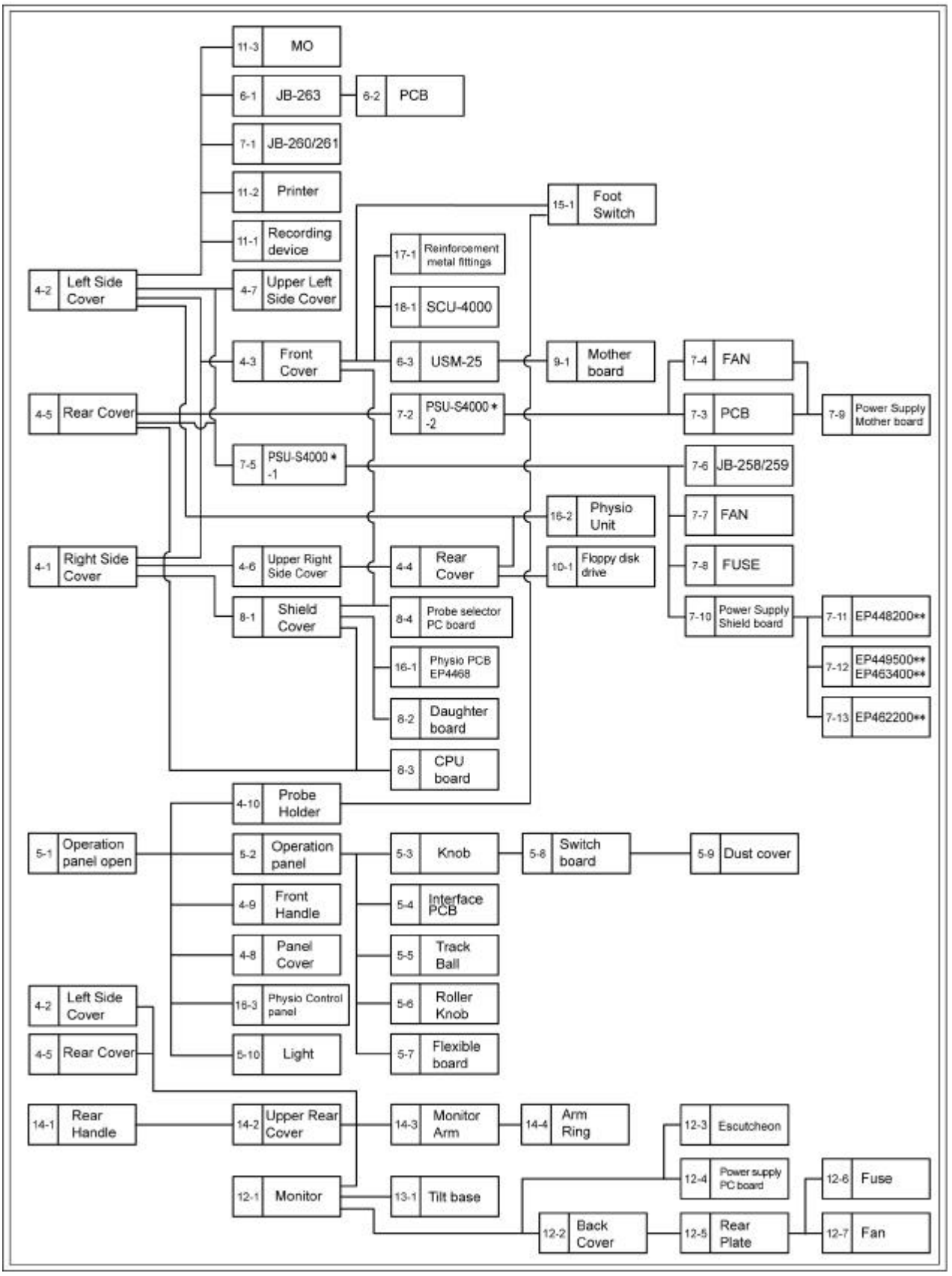


2. Individual Unit Layout

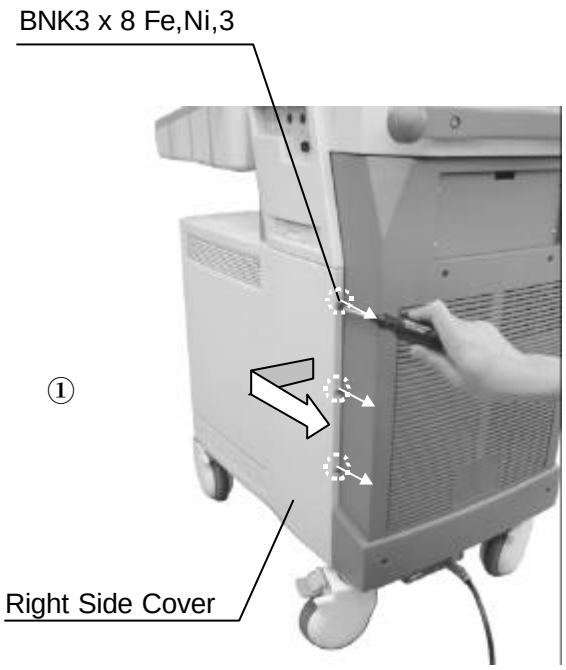


3. Dismounting Flow Chart

The disassembly procedure are made based on the Dismounting Flow Chart conduct operation in accordance with the flow.
Number in this paper is corresponding to No.in the flow chart.

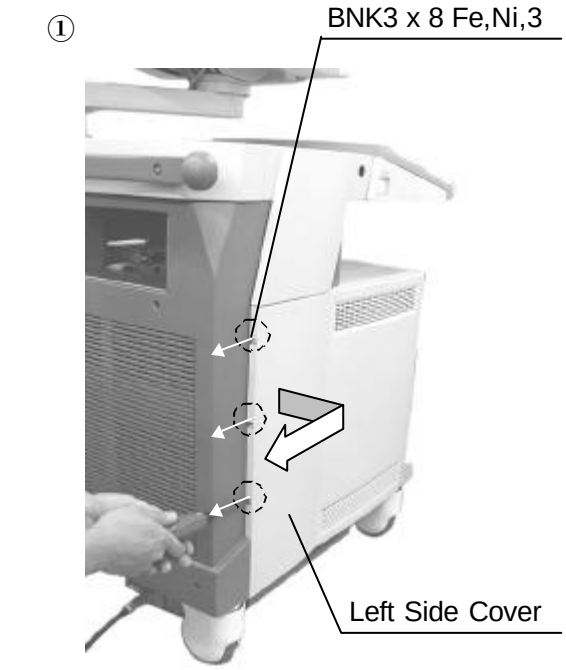


4. Removing of Covers



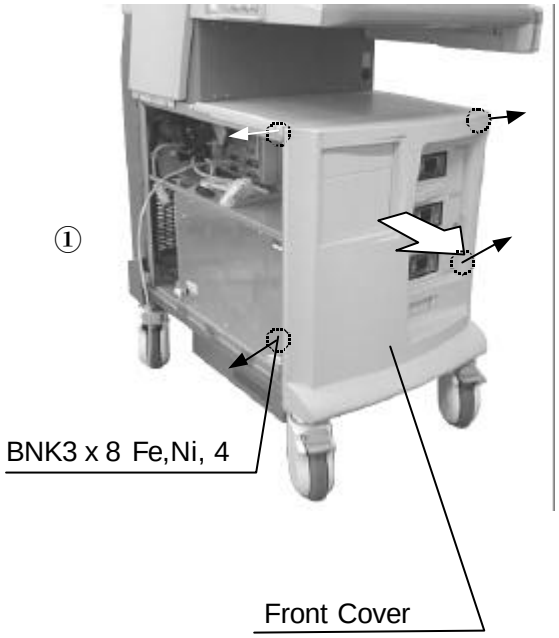
4-1 Removing of Right Side Cover

① Loosen 3 screws and remove right side cover.



4-2 Removing of Left Side Cover

① Loosen 3 screws and remove left side cover.



4-3 Removing of Front Cover

①Loosen 4 screws and remove front cover.

4-4 Removing of Small Rear Cover

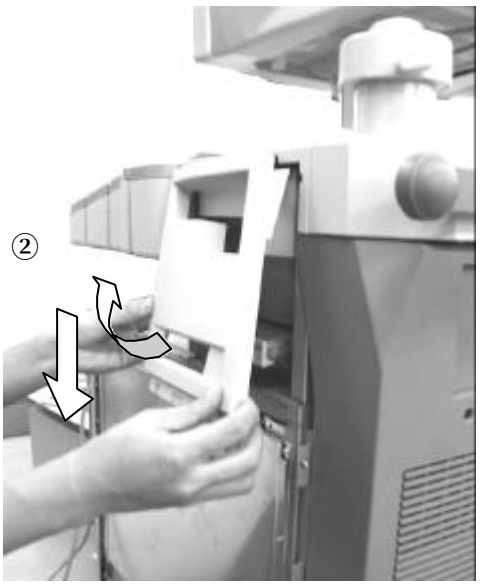
① Remove 4 screws and remove small rear cover.

4-5 Removing of Rear Cover

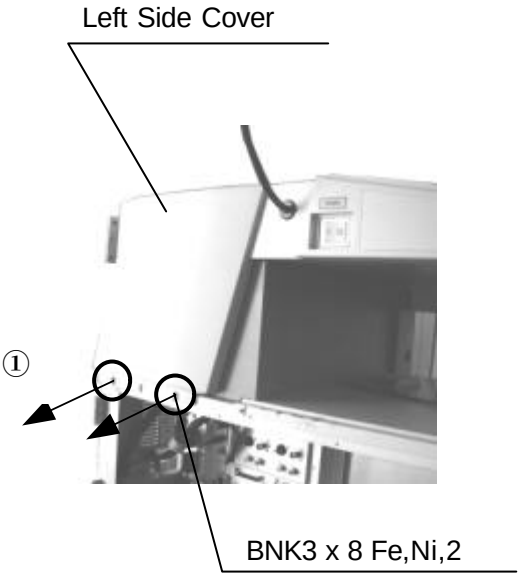
①Remove 4 screws and remove rear cover.

4-6 Removing of Upper Right Side Cover

①Remove 2 screws.

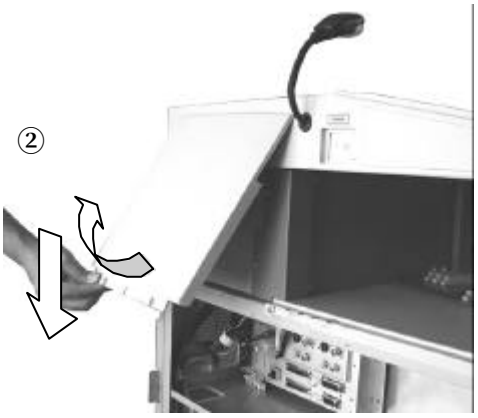


②Lift up the lower section of the upper right side cover and remove it.

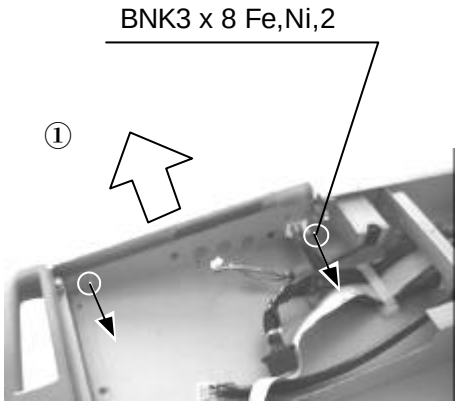


4-7 Removing of Upper Left Side Cover

① Remove 2 screws.

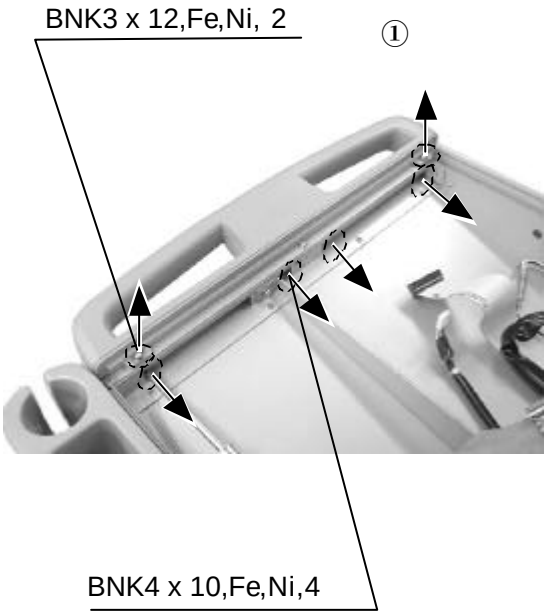


②Lift up the lower section of the upper left side cover and remove it.



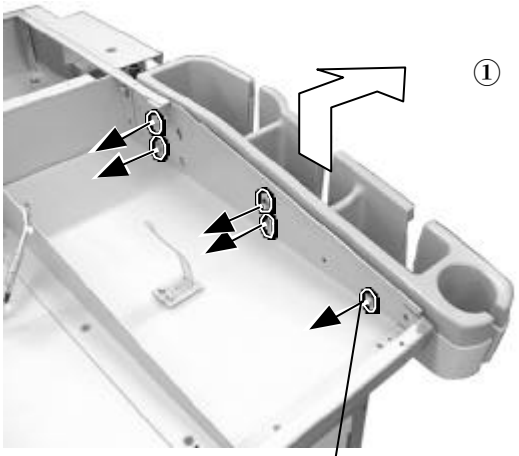
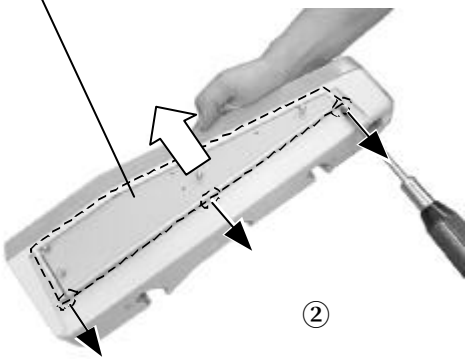
4-8 Removing of Panel Cover

①Remove 2 screws and remove panel cover.

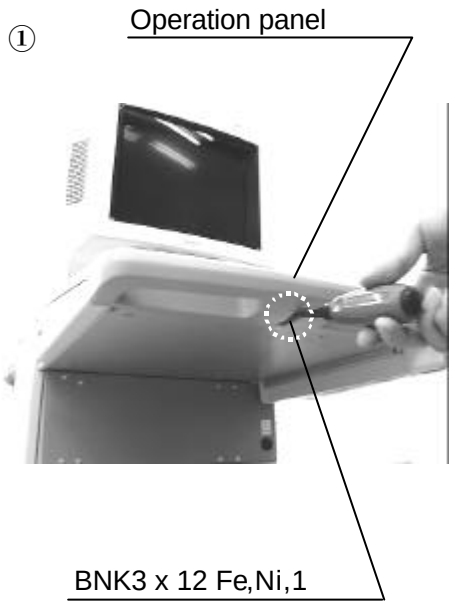


4-9 Removing of Front Handle

①Remove 6 screws and remove front handle.

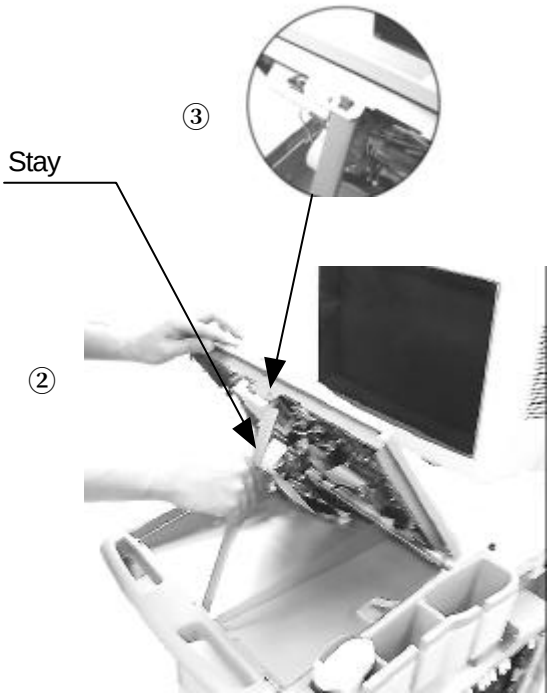
 BNK3 x 8,Fe,Ni,5	4-10 Removing of Probe Holder ①Remove 5 screws and remove probe holder.
Holder Fixture 	②Remove 3 screws and remove fixture.

5. Removing of Operation Panel Assembly, Knob, Interface PC board, Track ball, Roller Knob, Flexible board, Switch board, Light



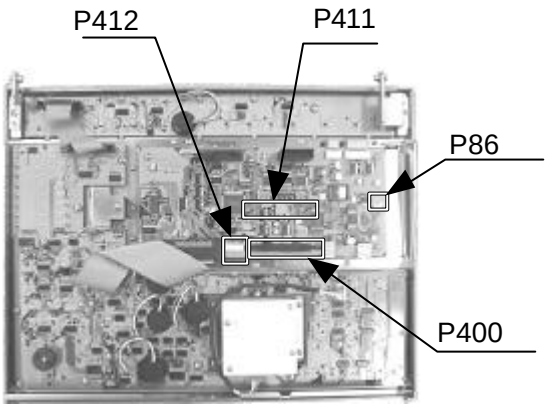
5-1How to open the operation panel

① Remove 1 screw.



② Lift up the front section of the operation panel.

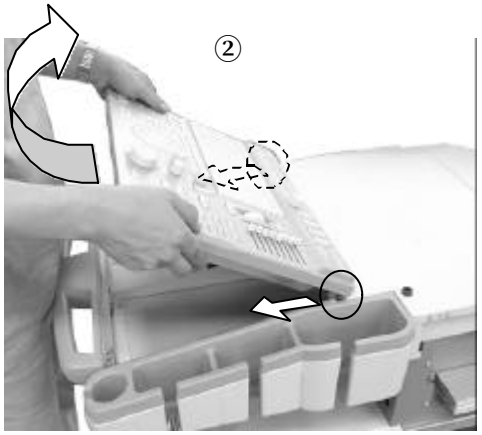
③Remove the clamp, stand up the stay, and fasten.



5-2 Removing of Operation Panel

①Disconnect all of the connectors from the Interface PC board.

- Connectors to unplug.
[P411,P400,P412,P86]

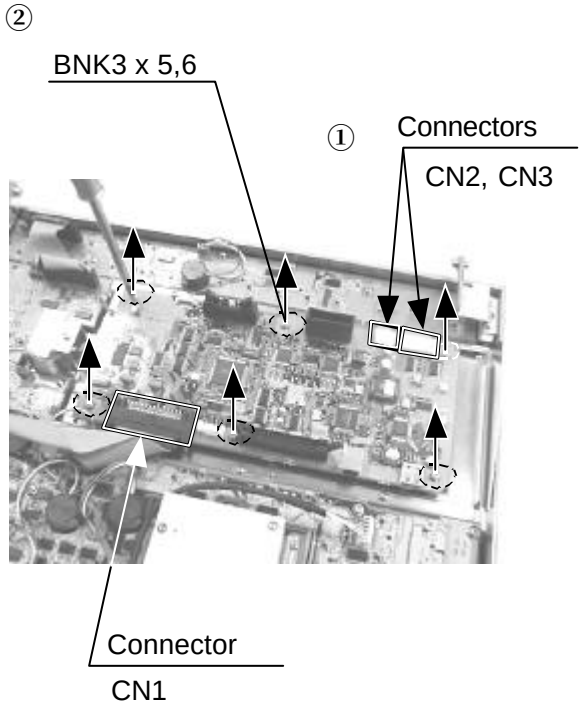


②Remove the operation panel to the front of main body.

5-3 Removing of Knobs

- Operation ① is only for when removing the switch board.

① Remove 8 STC knobs and 5 operation panel knobs.



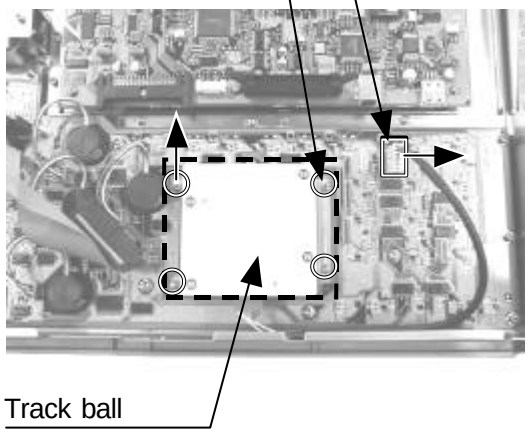
5-4 Removing of Interface PC board

①Disconnect all of the connectors from the interface PC board.

②Remove 6 screws and remove interface PC board.

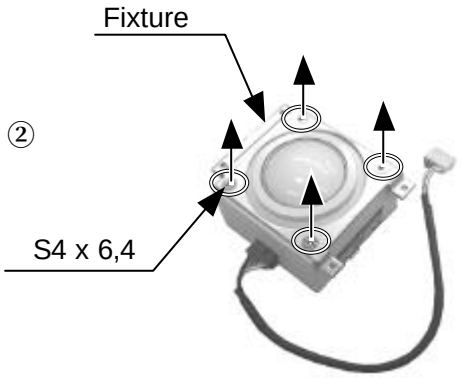
5-5 Removing of Track ball

①

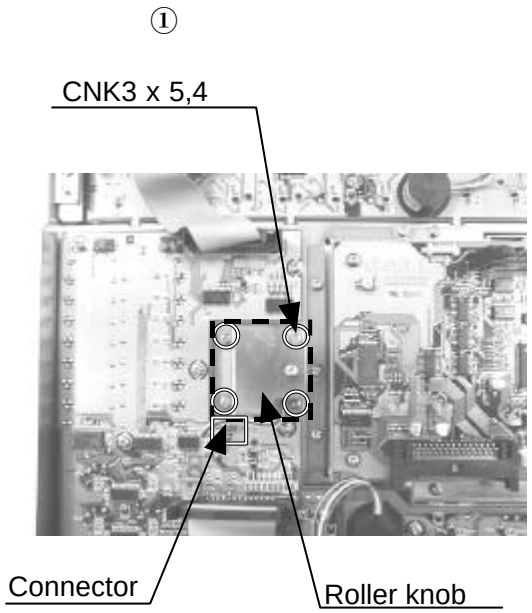


①Remove 4 screws and disconnect the connector (CN7), then remove track ball.

②

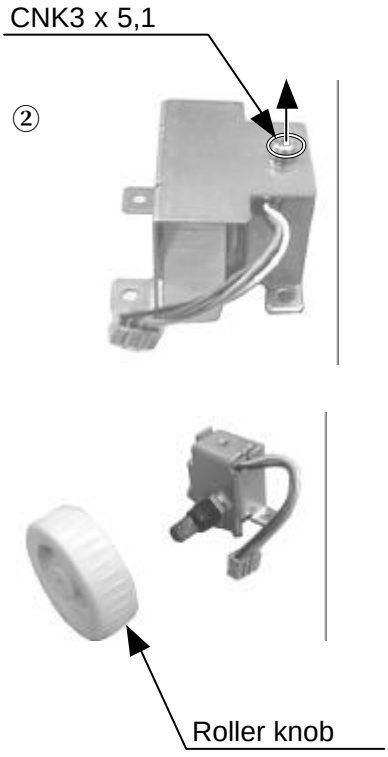


②Remove 4 screws and remve fixture.



5-6 Removing of Roller knob

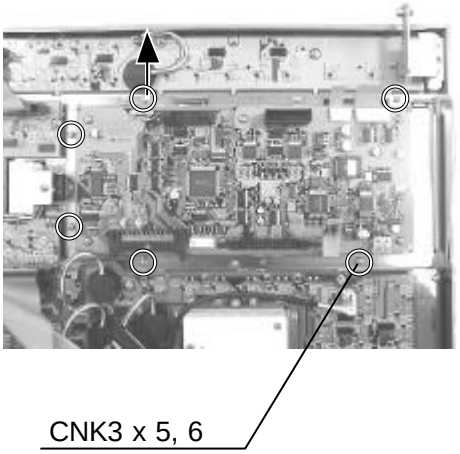
① Remove 4 screws and disconnect the connector, then remove roller knob.



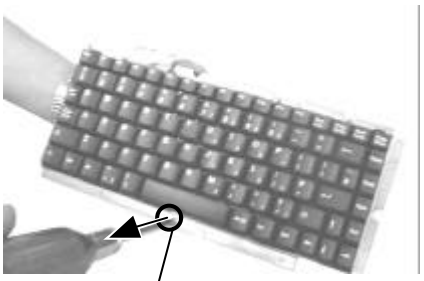
②Remove 1 screw and remove roller knob.

5-7 Removing of Flexible board

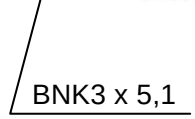
①



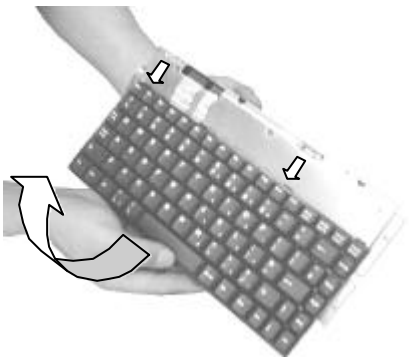
①Remove 6 screws and remove flexible board assembly.

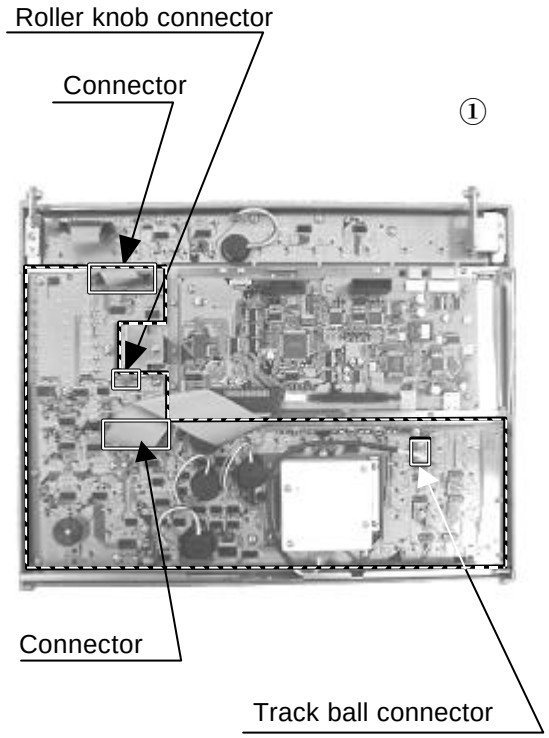


②



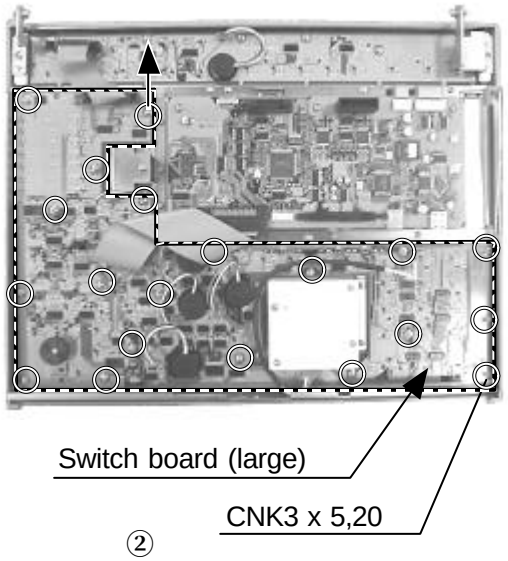
②Remove 1 screw and remove flexible board.



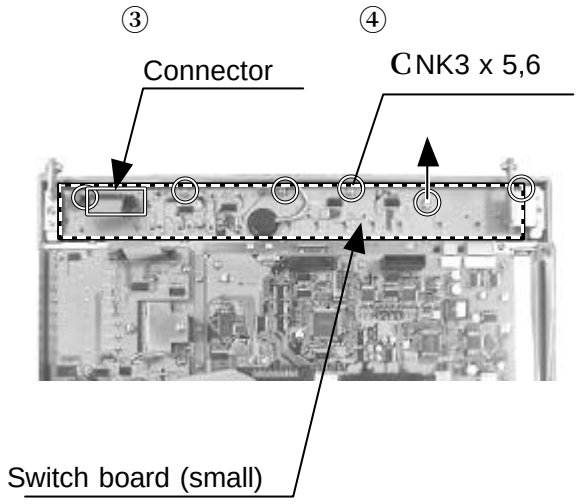


5-8 Removing of Switch board

①Disconnect all of the connector from switch board (large).

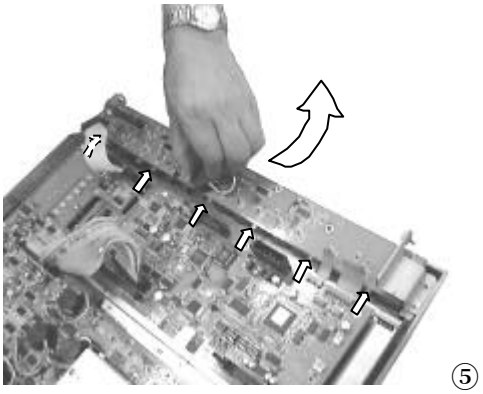


②Remove 20 screws and remove switch board(large).

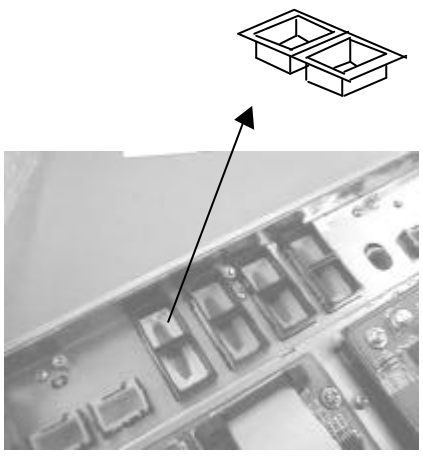


③Disconnect the connector from switch board (small).

④Remove 6 screws.



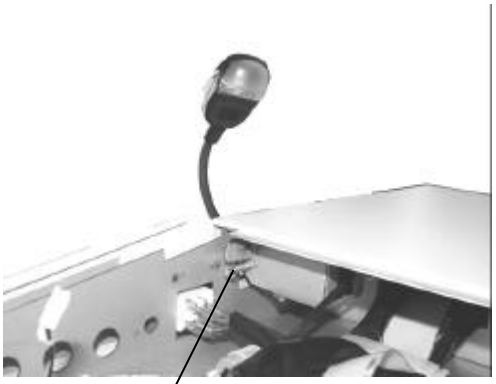
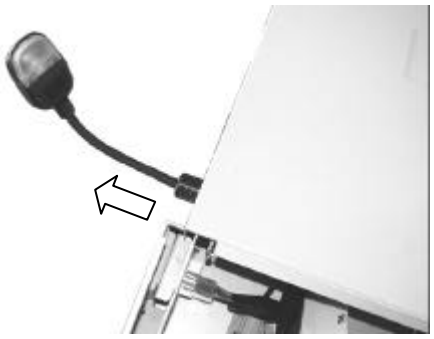
⑤Remove switch board (small).



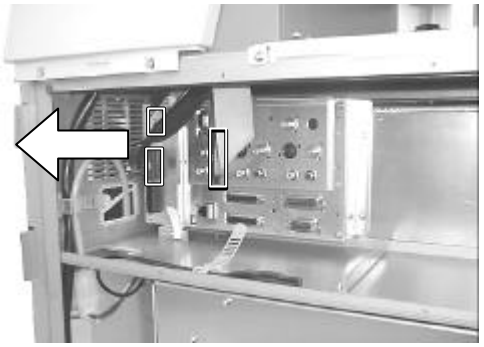
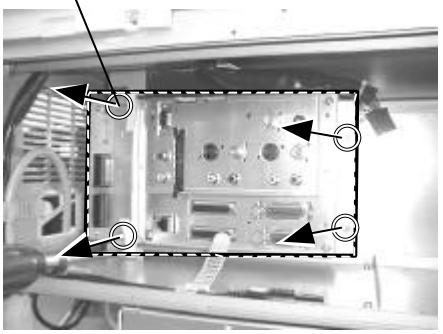
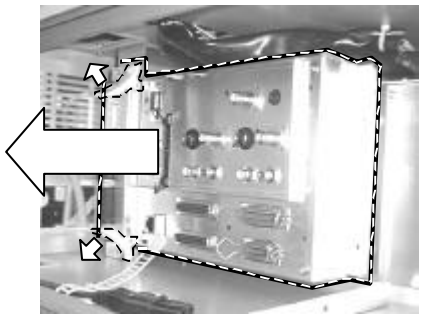
5-9 Removing of dust cover

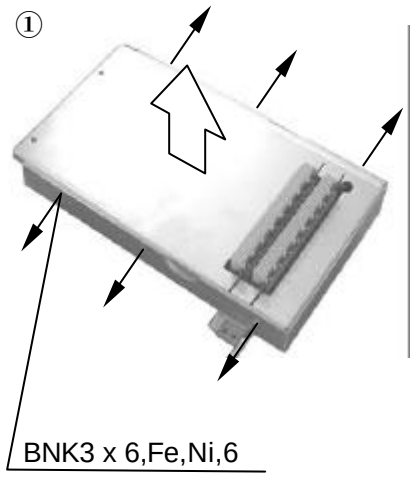
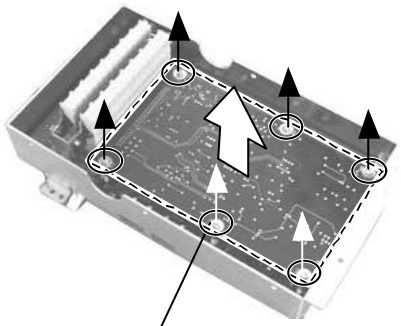
① Remove dust cover.

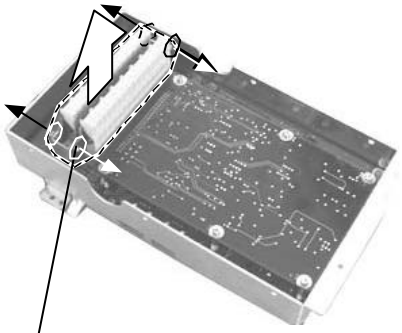
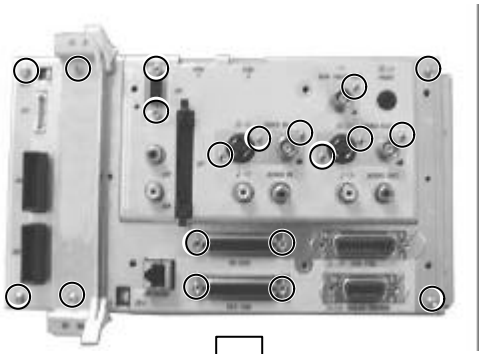
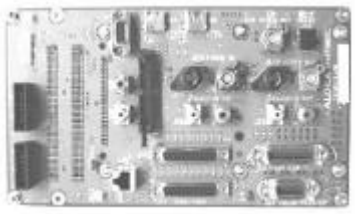
NOTE. This cover is into the seesaw switch. (seven places)

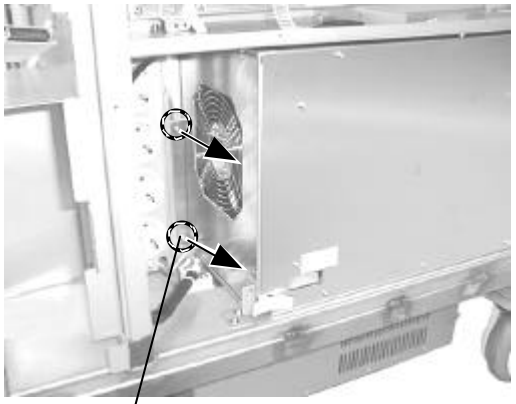
	5-10 Removing of Light ①Loosen 1 screw.
② 	②Take out the light.

6. Removing of JB-263/USM-25

① 	6-1Removing of JB-263 ①Disconnect all of the connectors from connector box (JB-263).
BNK3 x 8,Fe,Ni,4 ②  ③ 	②Remove 4 screws. ③Pull the levers, and remove connector box (JB-263).

①  BNK3 x 6,Fe,Ni,6	6-2 Removing of PCB ①Remove 6 screws and remove cover.
②  BNK3 x 6,Fe,Ni,6	②Remove 6 screws and remove PCB [EP447300].

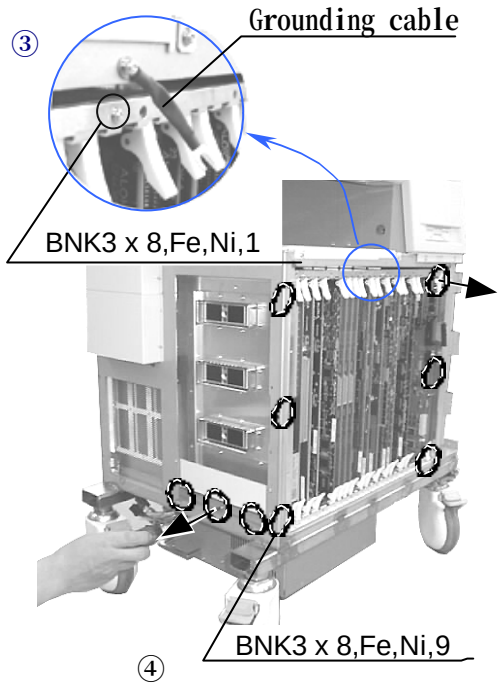
③  BNK3 x 6,Fe,Ni,4	③Remove 4 screws and remove 2 PCB.
 ④ 	④Remove 19 screws and remove PCB [EP447200].



6-3 Removing of USM-25*

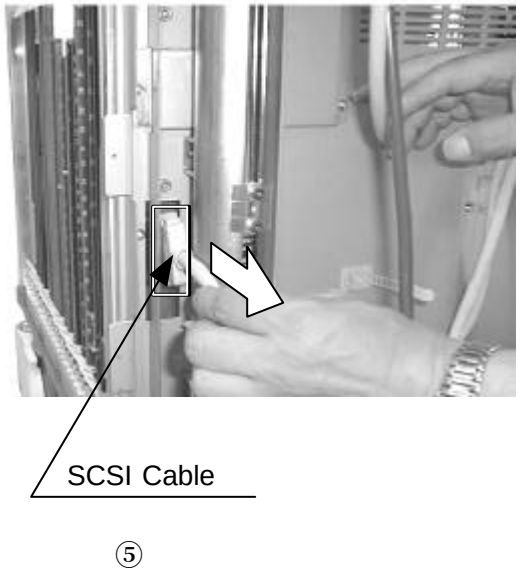
①Remove 2 screws from back of USM-25*.

②Remove 18 screws and remove shield cover.

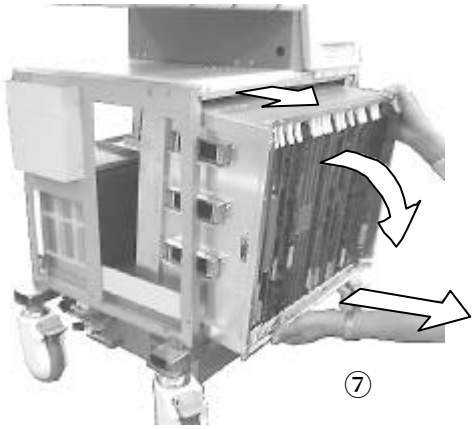


③ Loosen 1 screws, then disconnect Grounding cable.

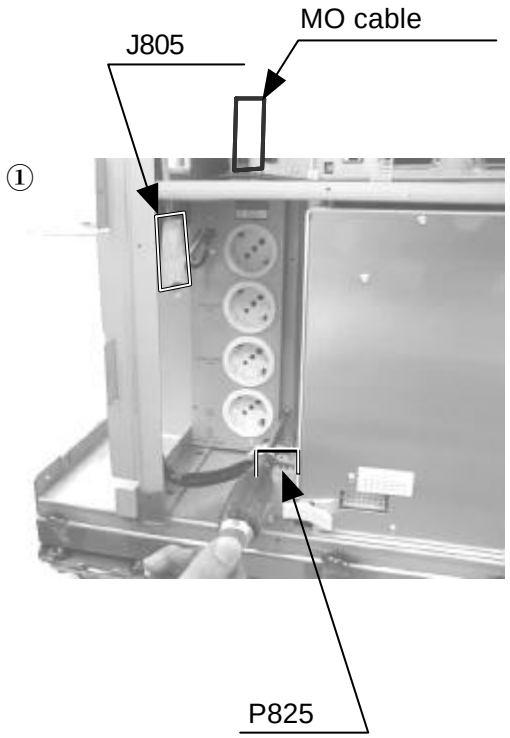
④Remove 9 screws.



⑤Disconnect SCSI cable.

 ⑥	⑥Pull out the connector(P221) from USM-25*.
 ⑦	⑦Remove USM-25*.

7. Removing of JB-260/261/Power Supply Unit (PSU-S4000*-1/-2*)/JB-258*/259*



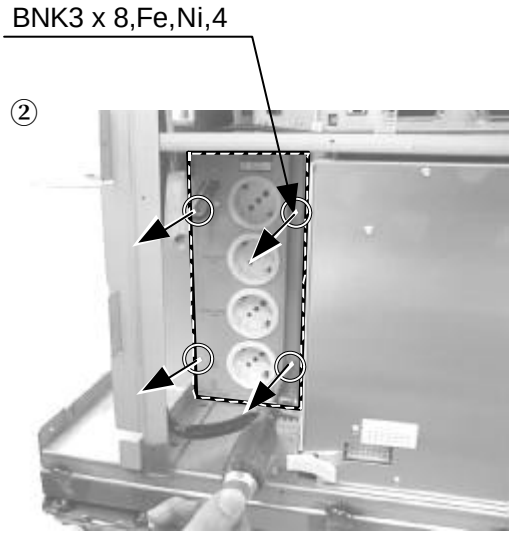
7-1 Removing of JB-260/261

①Disconnect 2 connectors.

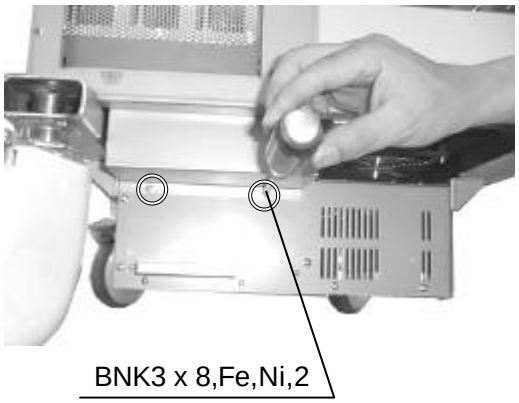
*( ) is the option.

- Connectors to unplug.

[P825, J805, (MO cable connector)]



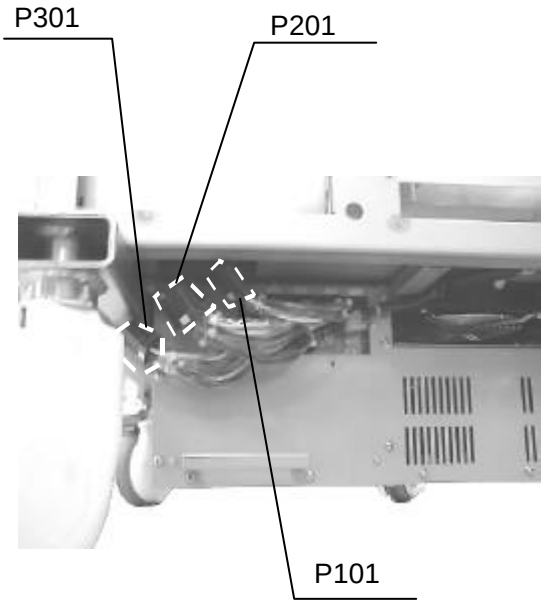
②Remove 4 screws and remove JB-260/261.



①

7-2 Removing of Power supply unit
(PSU-S4000*-2*)

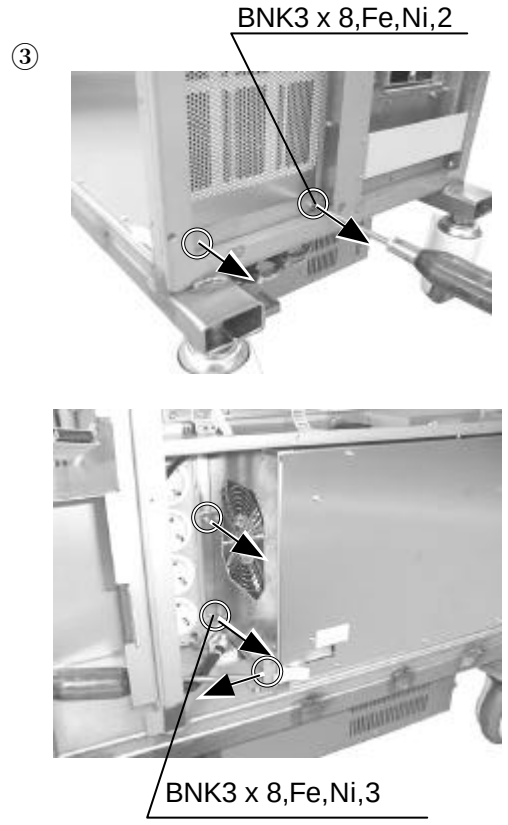
① Remove 2 screws at front bottom, then remove cover.



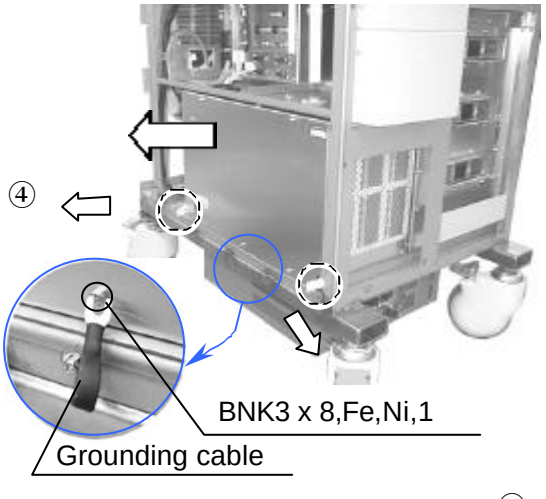
②

② Disconnect all connectors.

- Connectors to unplug
[P101, P201, P301]

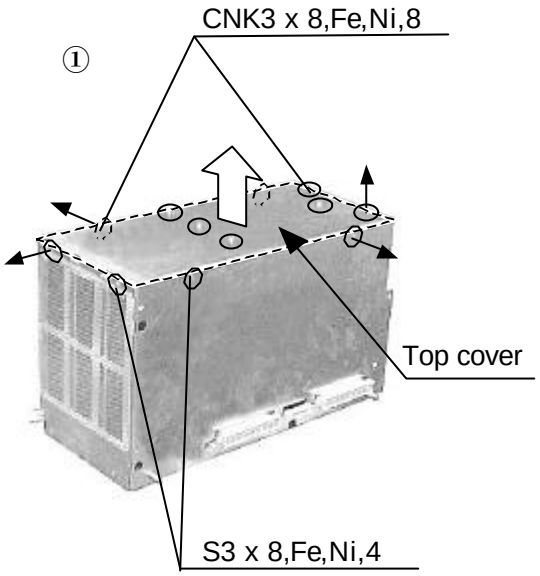


③Remove 5 screws.



④ Remove grounding cable by loosing a screw.

⑤Remove a power unit PSU-S4000*-2*. (Use Card puller.)



7-3 Removing of PCB

① Remove 12 screws and remove top cover.

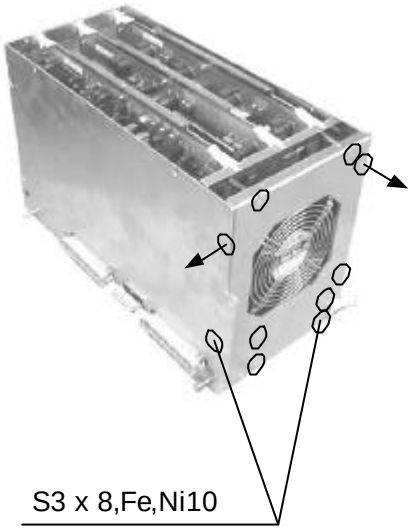
② S/N:M00101~M00300

② S/N:M00301~

- The part varies in the serial number. Do work referring to the following serial number.

②Remove PCB.

① S/N:M00101~M00300

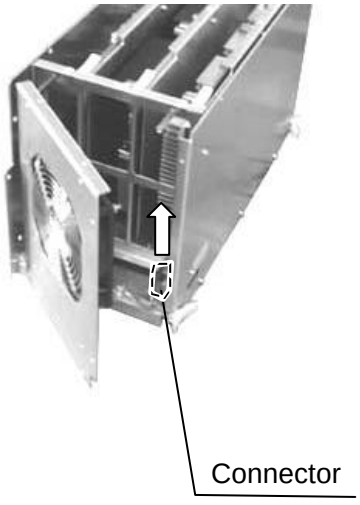


① S/N:M00301~

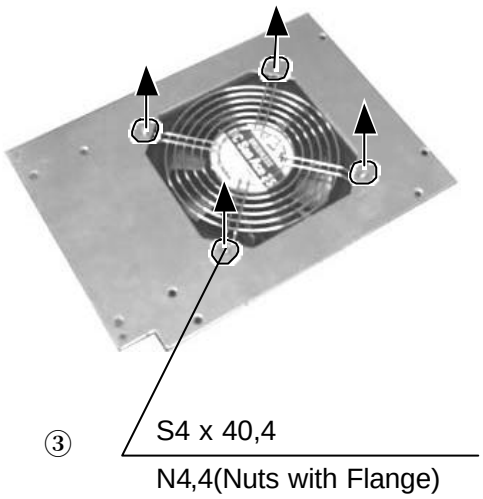
7-4 Removing of FAN

- The part varies in the serial number. Do work referring to the following serial number.

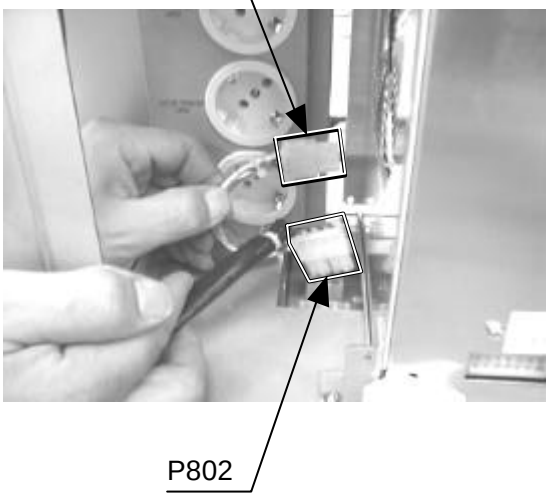
①Remove 10 screws and remove FAN assembly.



②Disconnect connector.



③Remove 4 screws and remove FAN and finger guard.



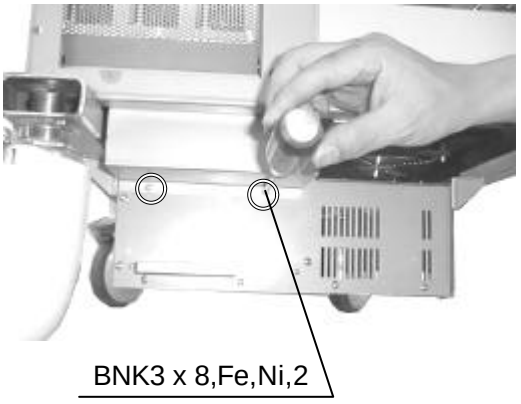
①

7-5 Removing of Power supply unit (PSU-S4000*-1).

① Disconnect all connectors.

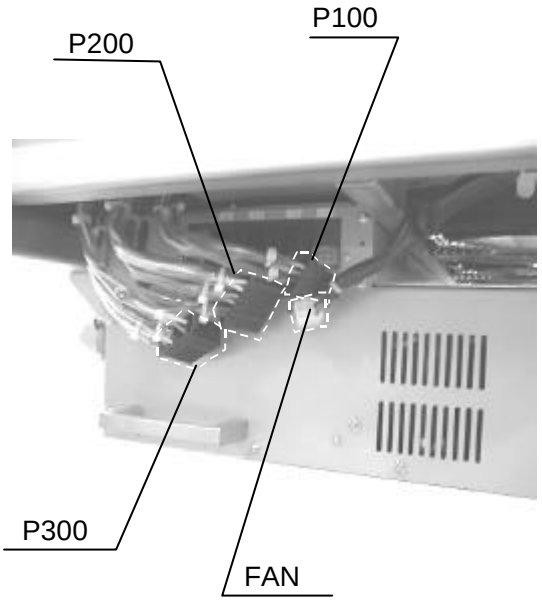
- Connectors to unplug.

[P802, P825]



②

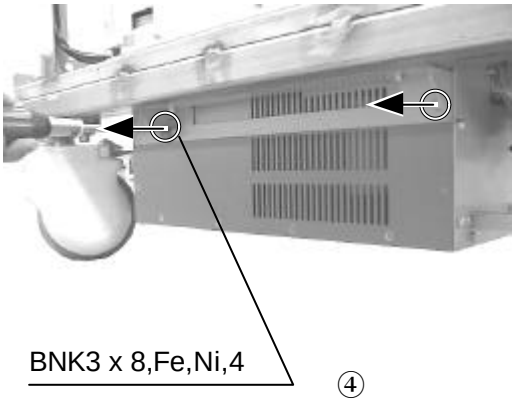
② Remove 2 screws at front bottom, then remove cover.



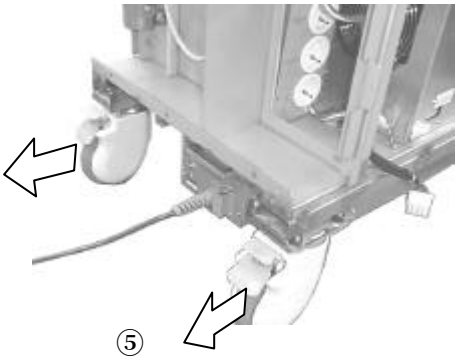
③

③ Disconnect all connectors.

- Connectors to unplug
[P100, P200, P300, FAN]



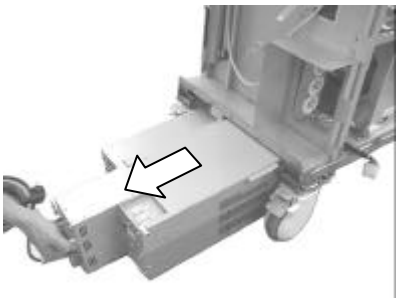
④Remove 4 screws at both sides.



⑤

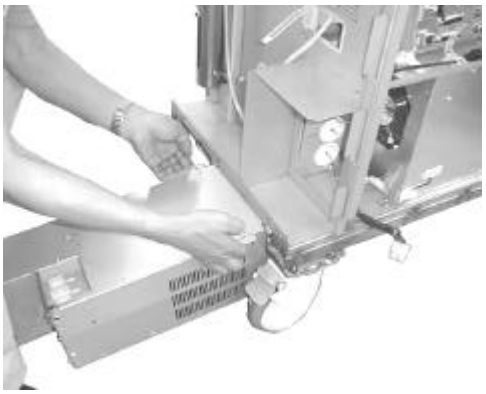
⑤Set the caster in parallel.

⑥Pull out the power unit PSU-S4000*-1 backward.



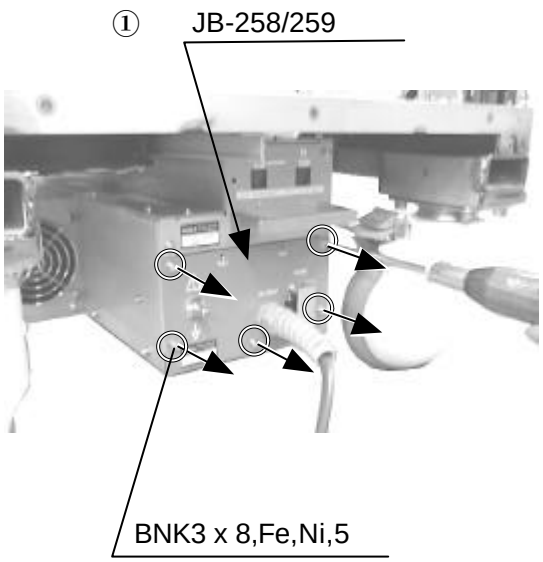
⑥

⑦



⑦Remove the power supply unit, not to drop it.

- Handle the power supply unit carefully, because the power supply unit is very heavy.



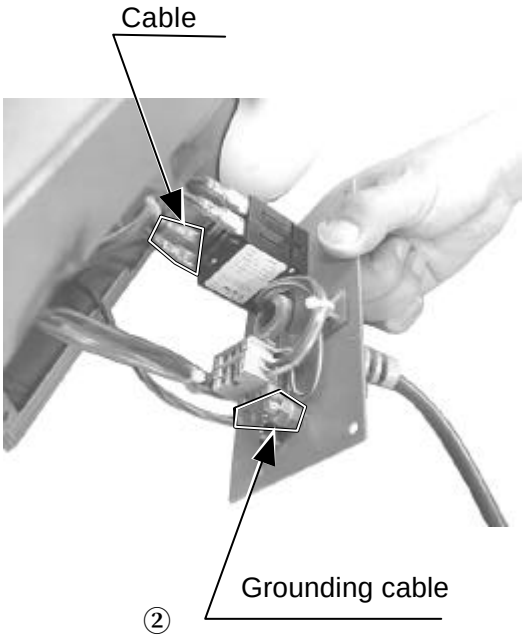
7-6 Removing of JB-258/259

- This work is to follow the following serial number.

S/N: M00101~M00300

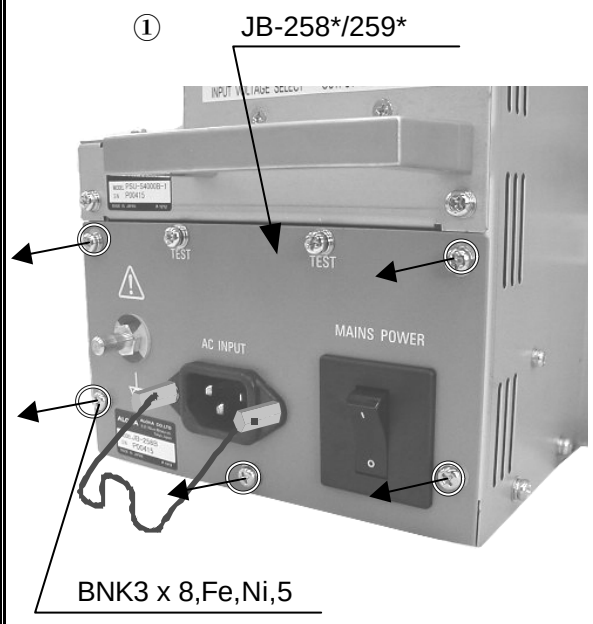
①Remove 5 screws and remove JB-258/259.

JB -258: For 100-120V
JB -259: For 200-240V



②Disconnect the cable and the ground cable.

- When connect the cables again, connect correctly.

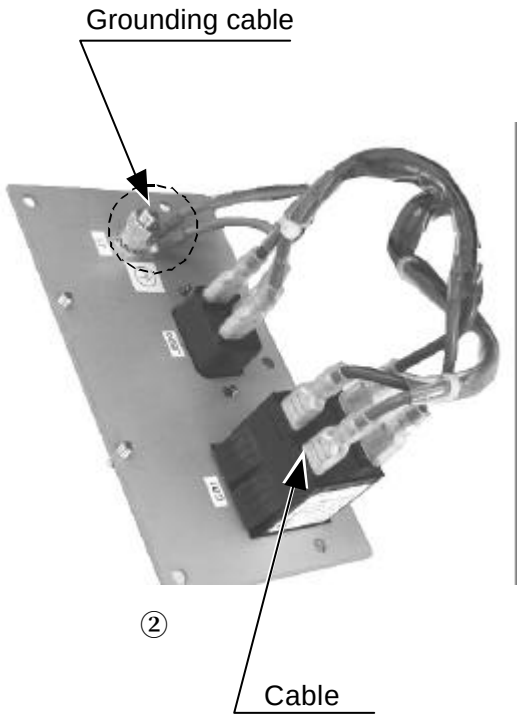


7-6 Removing of JB-258*/259*

S/N: M00301~

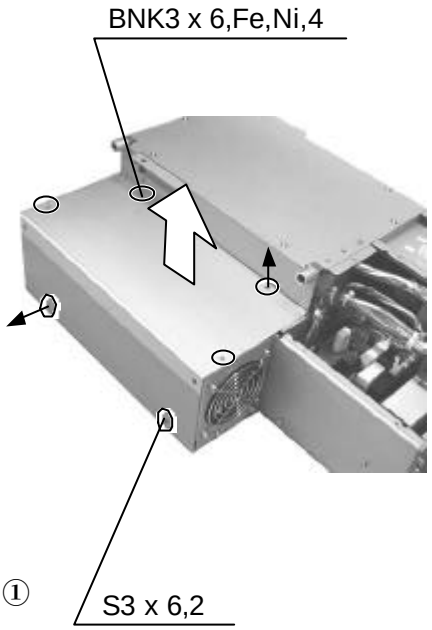
① Remove 5 screws and remove JB-258*/259*.

JB -258*: For 100 - 120V
JB -259*: For 200 - 240V



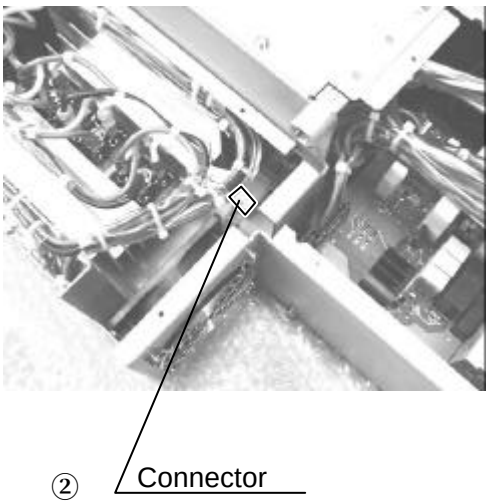
②Disconnect the cable and the grounding cable.

- When connect the cables again, connect correctly.

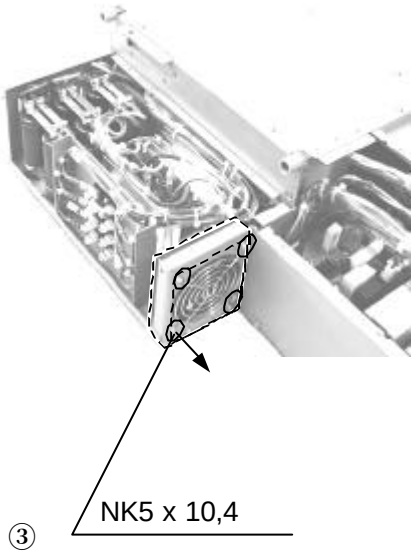


7-7 Removing of FAN

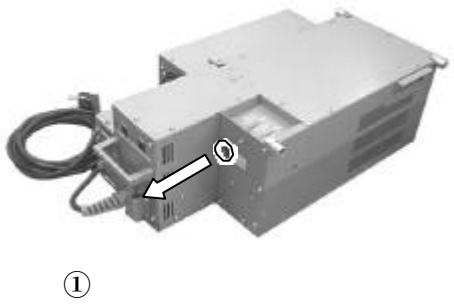
①Remove 6 screws and remove cover.



②Disconnect connector of the FAN.

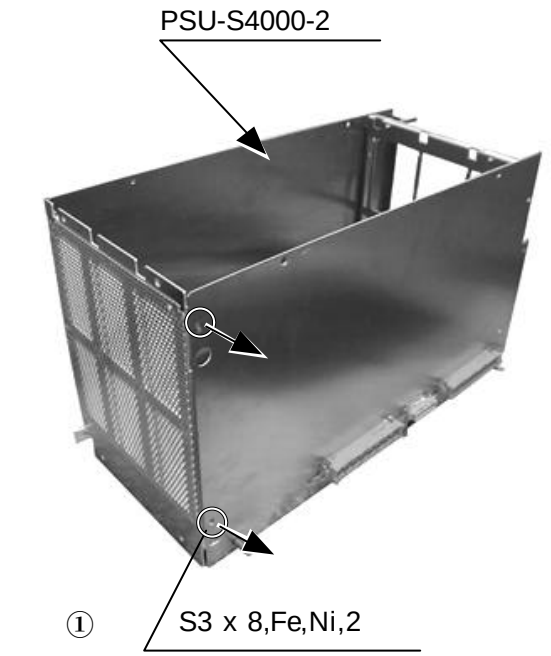


③Remove 4 screws and remove FAN and finger guard.



7-8 Removing of FUSE

① Remove fuse cap.

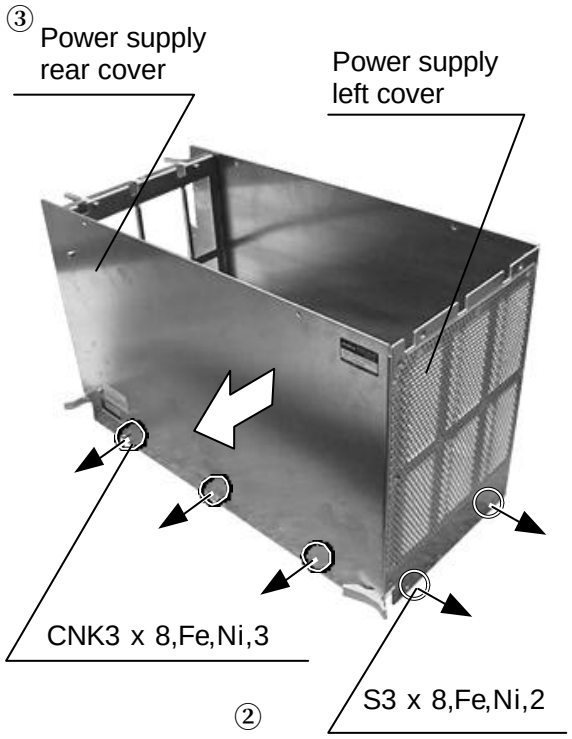


7-9 Removing of Power Supply Mother board

- This work is to follow the following serial number.

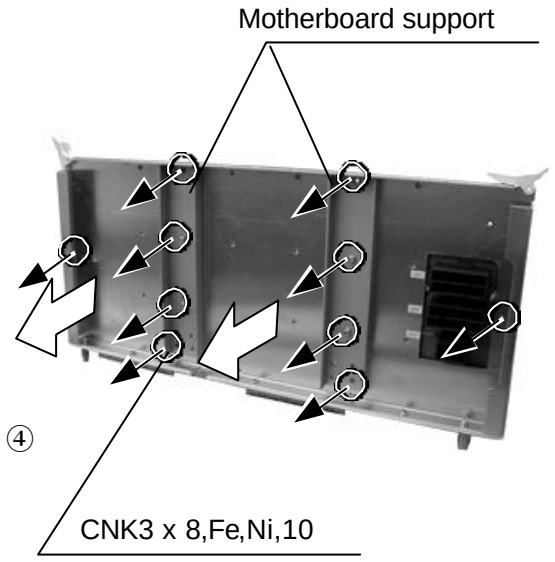
S/N: M00101~M00300

①Remove 2 screws.

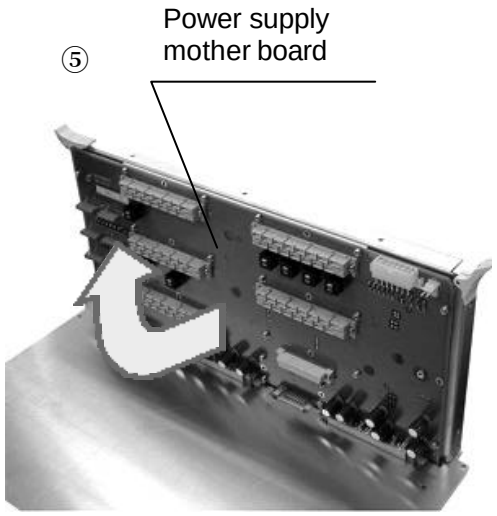


② Remove 5 screws.

③Remove power supply rear cover and power supply left cover at the same time.



④ Remove 10 screws and remove motherboard support.

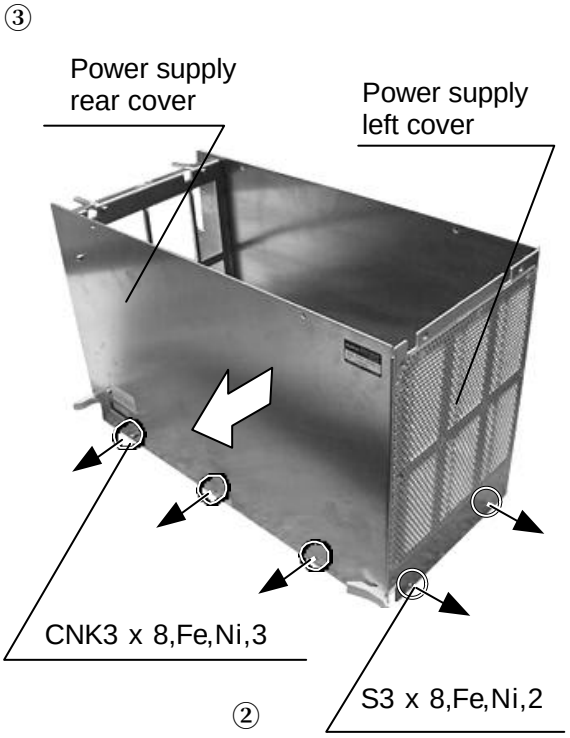


⑤ Push down the power supply motherboard in the front, after pull it out in the top.

7-9 Removing of Power Supply Mother board

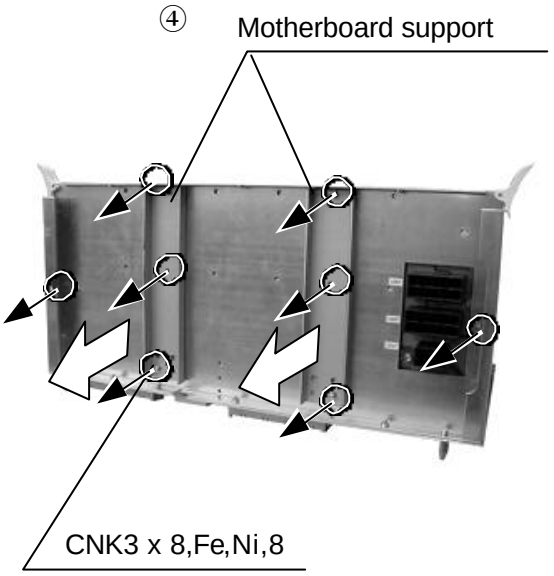
S/N: M00301~

①Remove 2 screws.

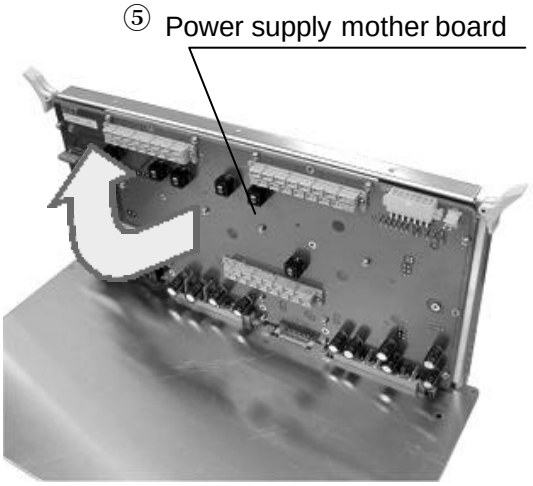


②Remove 5 screws.

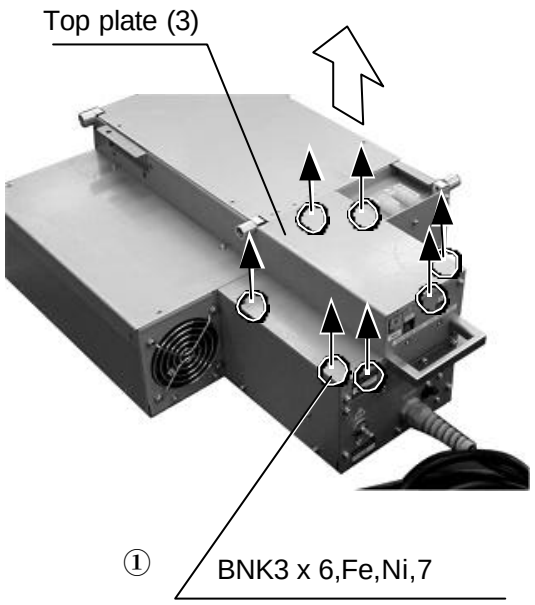
③Remove power supply rear cover and power supply left cover at the same time.



④ Remove 8 screws and remove 2 mother board support.

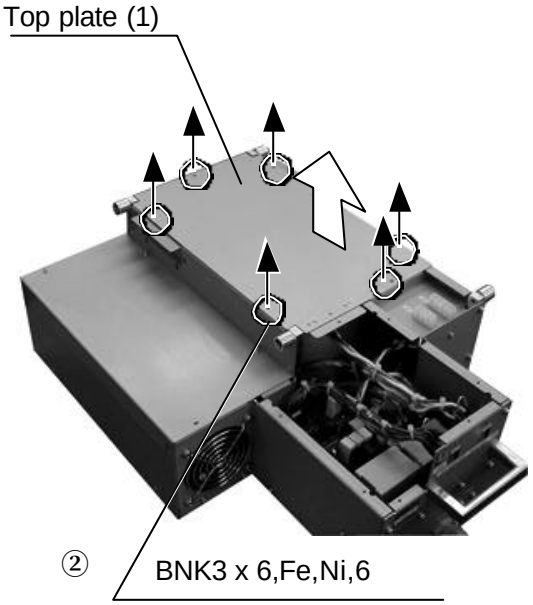


⑤ Push down the power supply mother board in the front, after pull it out in the top.

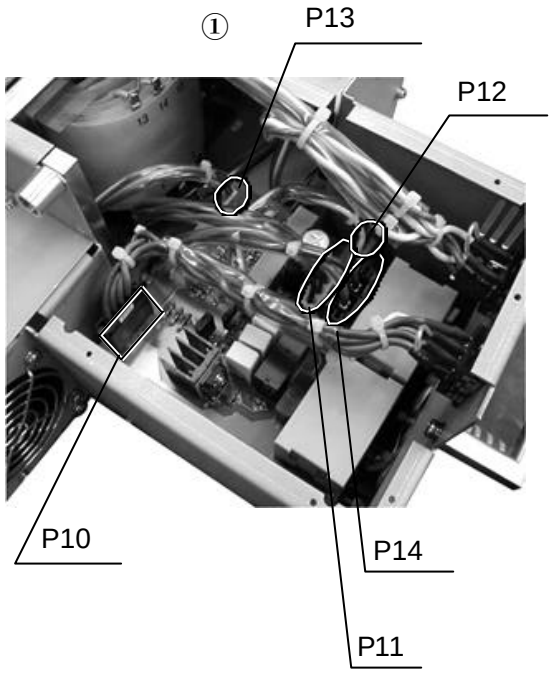


7-10 Removing of Power Supply Shield board

①Remove 7 screws and remove top plate (3).



②Remove 6 screws and remove Top plate (1).

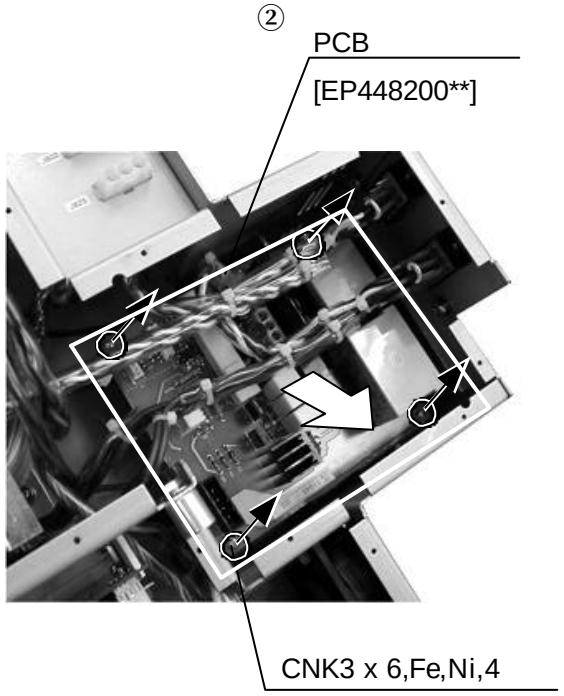


7-11 Removing of PCB[EP448200**]

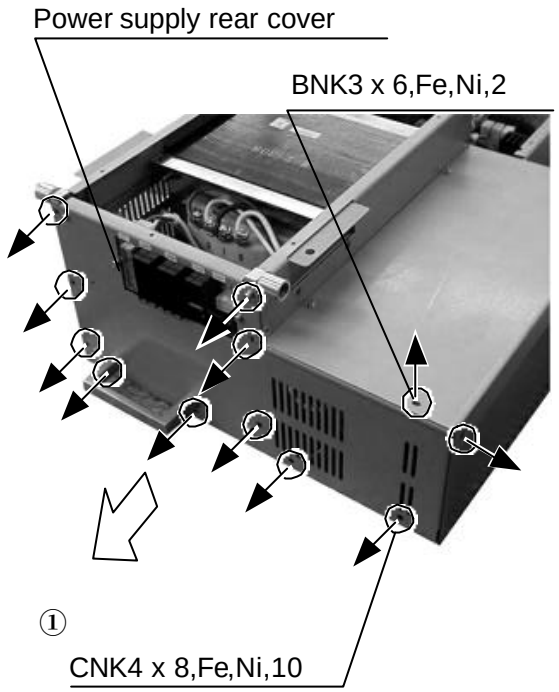
①Disconnect all connectors.

- Connectors to unplug

[P10, P11, P12, P13, P14]



②Remove 4 screws and remove PCB [EP448200**].

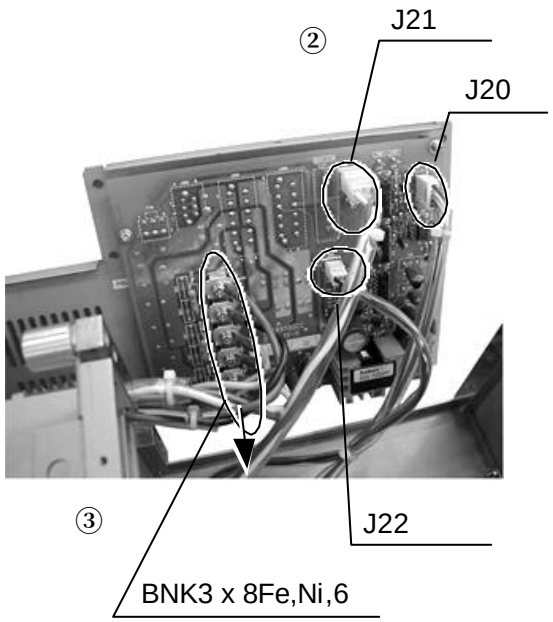


7-12 Removing of PCB[EP449500**]

- This work is to follow the following serial number.

S/N: M00101~M00300

① Remove 12 screws and remove power supply rear cover.

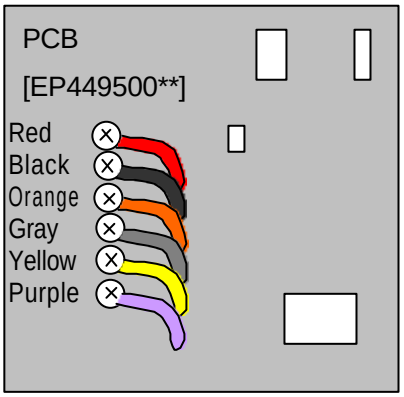


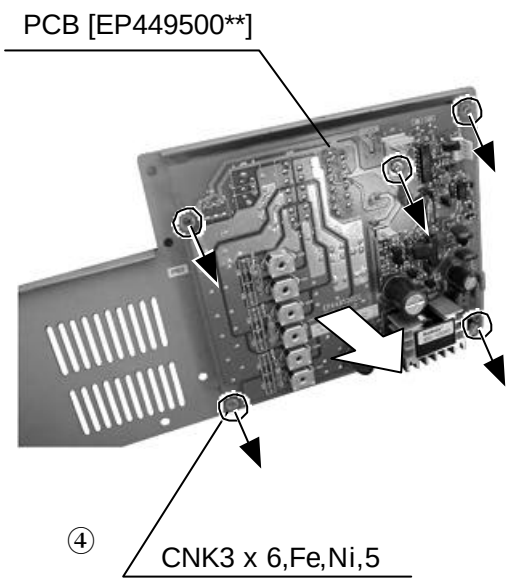
②Disconnect all of the connectors.

- Connectors to unplug
[J20, J21, J22]

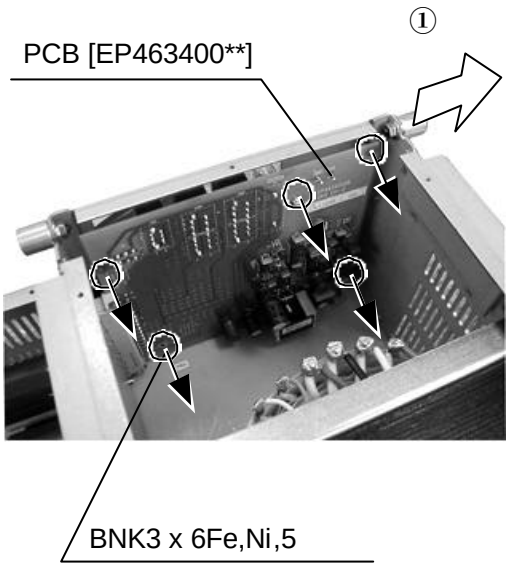
③Remove 6 screws and remove cable.

- Be careful the color of the cable in case of installation.





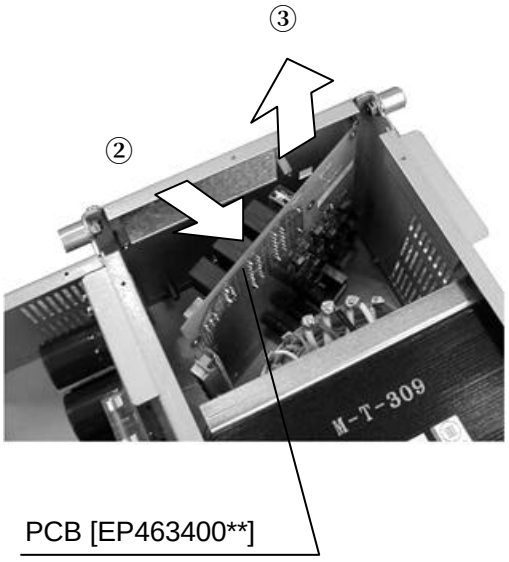
④Remove 5 screws and remove PCB [EP449500**].



7-12 Remove of PCB[EP463400**]

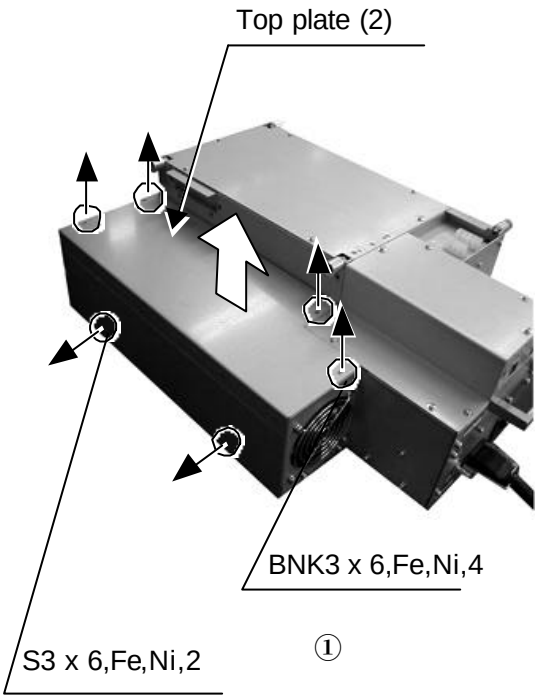
S/N: M00301~

① Remove 5 screws.
Make PCB [EP463400**] slide in the direction of the white arrow and remove it from the connector.



② Turns PCB [EP463400**] in the direction of the white arrow.

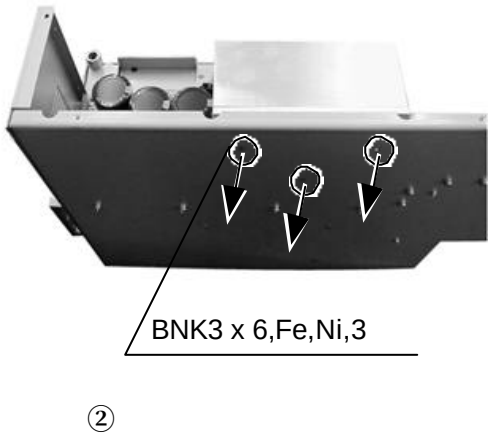
③ Pull it up.



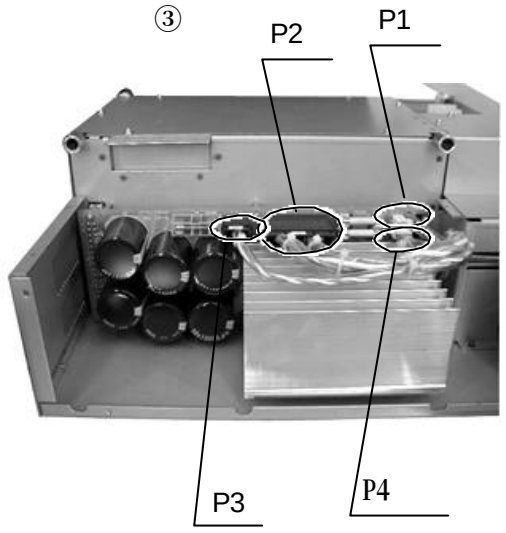
7-13 Remove of PCB[EP462200**]

S/N: M00301~

①Remove 6 screws and remove top plate (2).



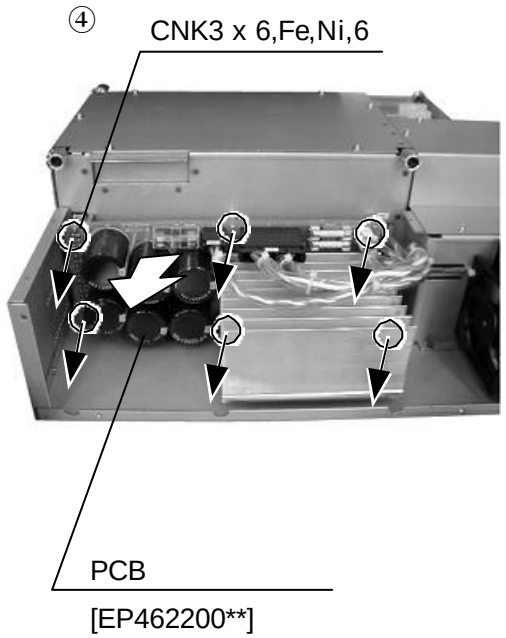
②Remove 3 screws from the back.



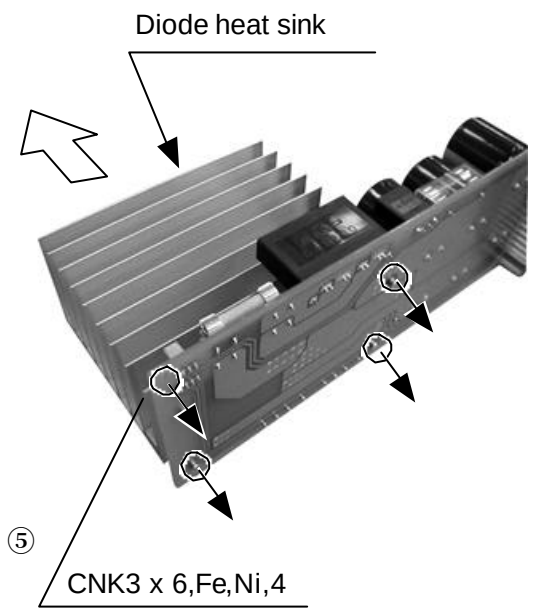
③Disconnect all connectors.

- Connectors to unplug

[P1, P2, P3, P4]

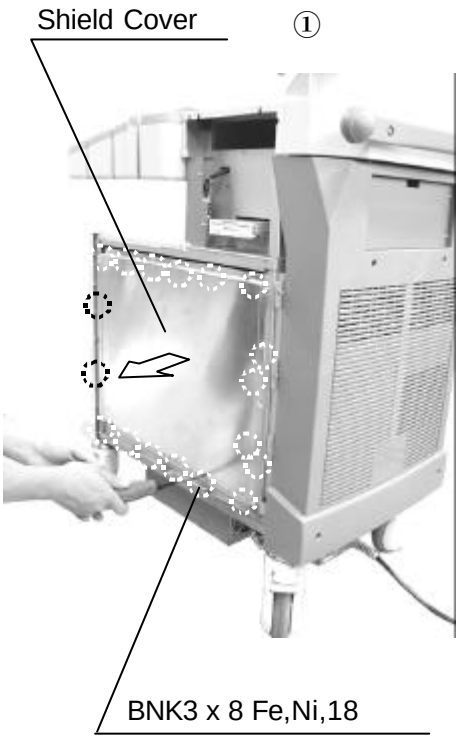


④ Remove 6 screws and remove PCB [EP462200**].



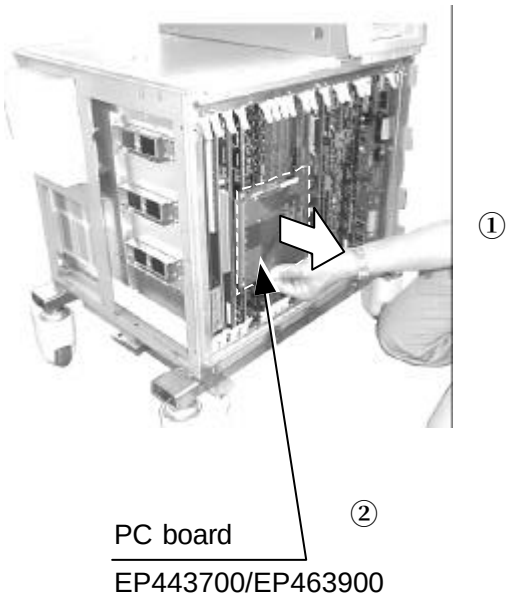
⑤ Remove 4 screws and remove diode heat sink.

8. Removing of Daughter board, CPU, Probe select PC board



8-1Removing of Shield Cover

①Remove 18 screws and remove shield cover.



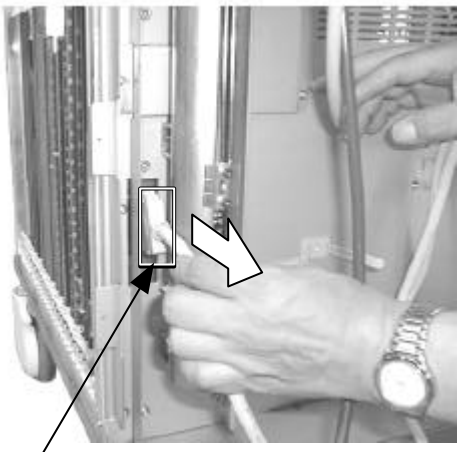
8-2 Removing of Daughter board

①Remove PC board.

S/N: M00101~M00300... EP443700
S/N: M00301~…… EP463900

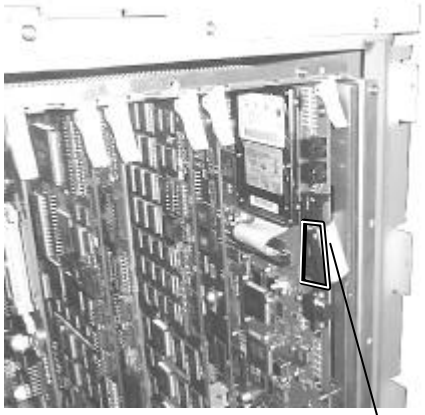
②Remove daughter board.

8-3 Removing of CPU



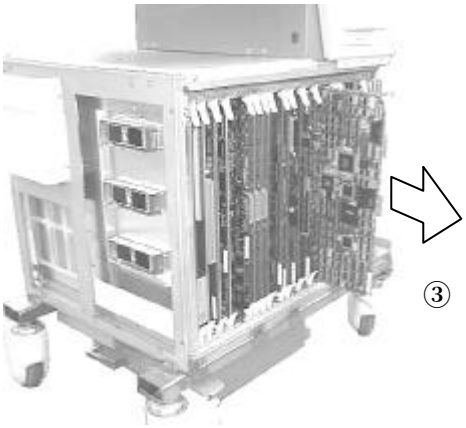
① SCSI Cable

①Disconnect SCSI cable.



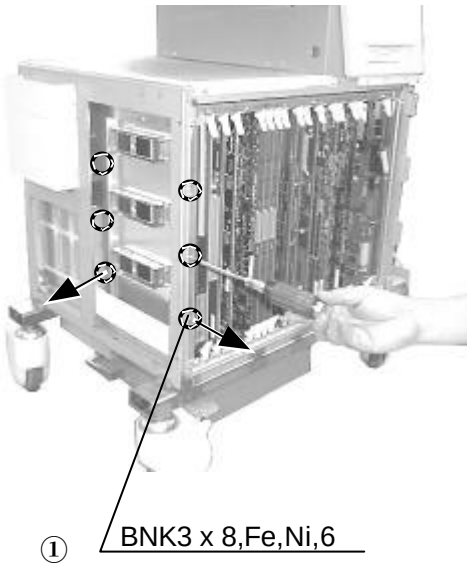
② Connector

②Disconnect the connector.



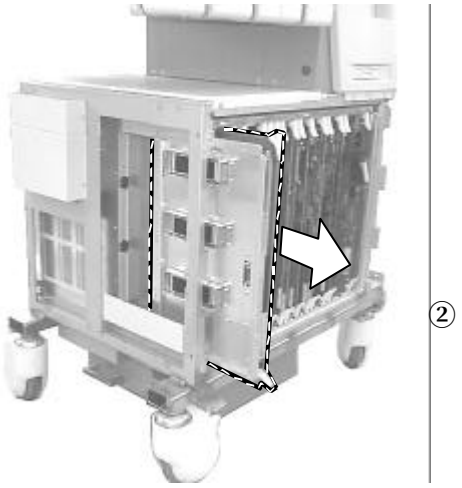
③

③Remove CPU.



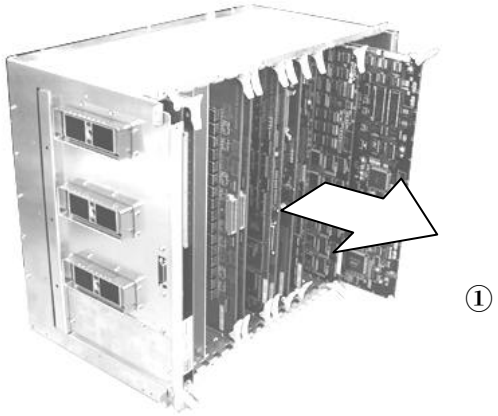
8-4 Removing of Probe selector PC board

①Remove 6 screws.



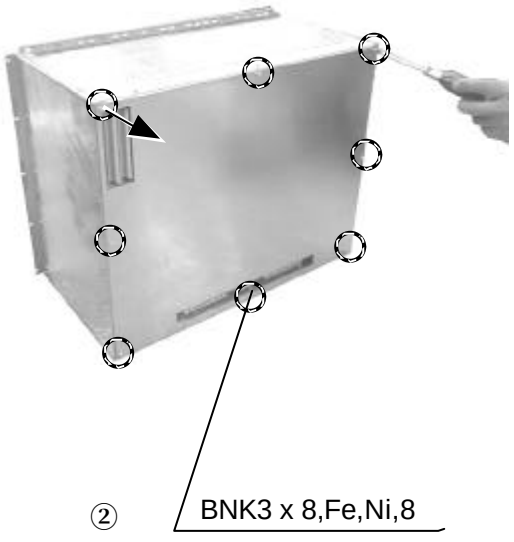
②Remove probe selector PC board.

9. Removing of Mother board

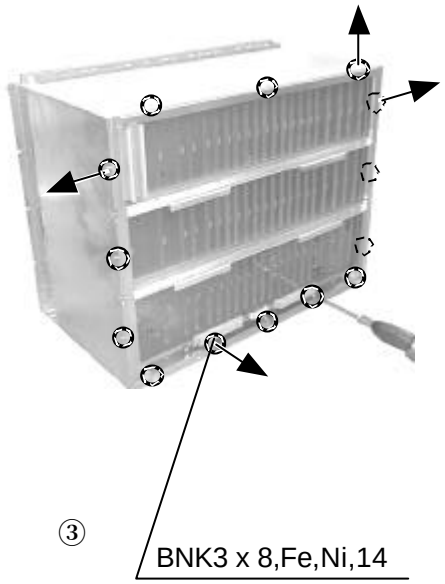


9-1Removing of Mother board

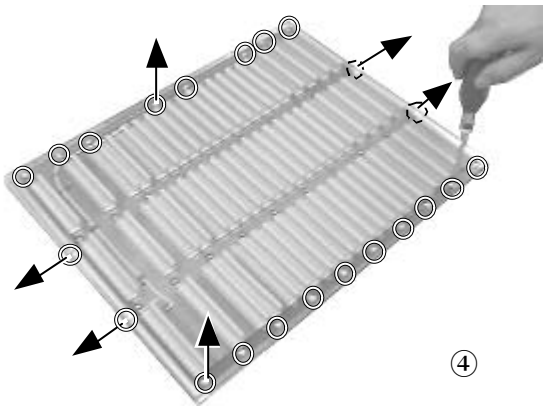
①Remove all of the daughter boards from USM-25*.



②Remove 8 screws and remove back cover.

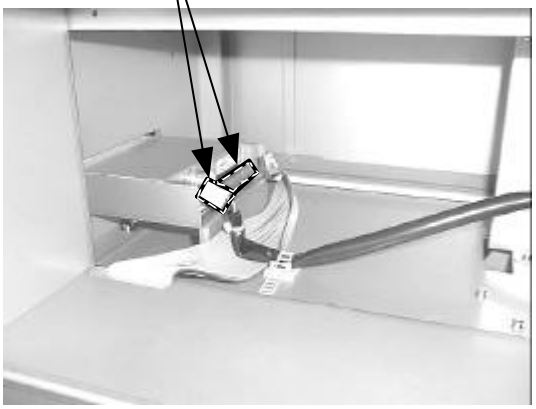


③Remove 14 screws and remove mother board unit.



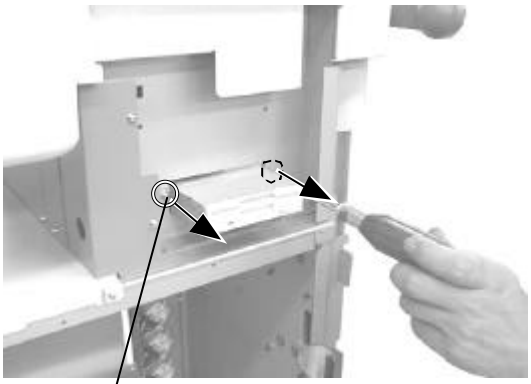
④Remove 22 screws and remove mother board.

10. Removing of Floppy Disk Drive



10-1 Removing of Floppy Disk Drive

①Disconnect connectors of the floppy disk drive from back of main body.



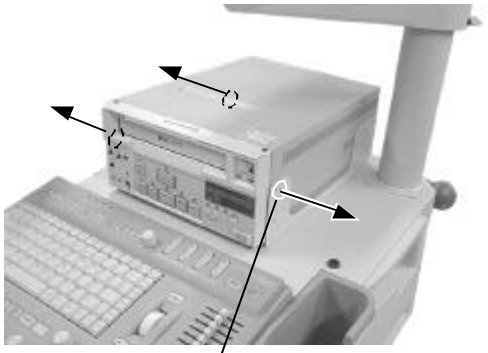
②Remove 2 screws and remove floppy disk drive.

11. Removing of Black and white Printer(UP-895*, P91*) VCR (SVO-9500MD*,AG-7350*), MO(DYNA MO 640SE) Color Printer(UP-2850P/-2950MD/-21MD(*), CP700*/900*)

11-1 Removing of Recording device

①Remove all the cables connected to the each recording device with wiring chart given below.

記録装置 Recorder				SSD-4000			
UP-2850P /-2950MD /-21MD(*)	IN PUT		R	J31 COLOR PRINTER			接栓板 Connector panel
			G				
			B				
			SYNC				
	CONTROL						
	~ AC IN			J854 COLOR PRINTER			AC outlet [JB-260/261]
CP700*/900*	IN PUT		R	J31 COLOR PRINTER			接栓板 Connector panel
			G/G+SYNC				
			B				
			H+V-SYNC				
	REMOTE						
	~ AC LINE			J854 COLOR PRINTER			AC outlet [JB-260/261]
UP-895*	VIDEO IN			J12 B/W VIDEO OUT			接栓板 Connector panel
	REMOTE			J32 PRINT CONTROL			
	~ AC IN			J853 PRINTER			AC outlet [JB-260/261]
P91*	VIDEO IN			J12 B/W VIDEO OUT			接栓板 Connector panel
	REMOTE			J32 PRINT CONTROL			
	~ AC LINE			J853 PRINTER			AC outlet [JB-260/261]
SVO-9500MD*	VIDEO IN			J10	VIDEO OUT		接栓板 Connector panel
	VIDEO IN S VIDEO			J13			
	VIDEO OUT			J11	VIDEO IN		
	VIDEO OUT S VIDEO			J14			
	AUDIO IN		CH-1	CH-1	J21	AUDIO OUT	
			CH-2	CH-2	J23		
	AUDIO OUT		CH-1	CH-1	J20	AUDIO IN	
			CH-2	CH-2	J22		
	REMOTE			J30 VCR CTRL			
	~ AC IN			J855 VCR			AC outlet [JB-260/261]
AG-7350*	VIDEO IN			J10	VIDEO OUT		接栓板 Connector panel
	S1 VIDEO IN			J13			
	VIDEO 2 OUT			J11	VIDEO IN		
	S1 VIDEO OUT			J14			
	AUDIO IN		CH-1	CH-1	J21	AUDIO OUT	
			CH-2	CH-2	J23		
	AUDIO OUT		CH-1	CH-1	J20	AUDIO IN	
			CH-2	CH-2	J22		
	~ AC IN			J855 VCR			AC outlet [JB-260/261]

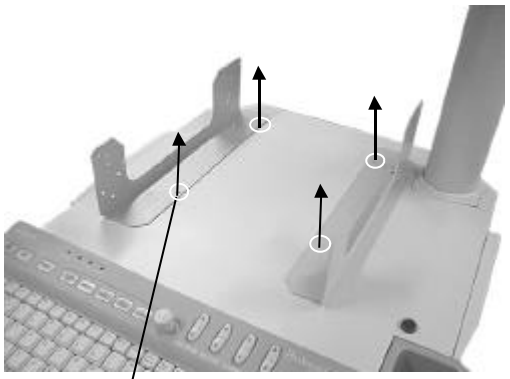


① * BNK3 x 10Fe,Ni,3
or BNK4 x 12Fe,Ni,3

In case of top rack
(SVO-9500MD*, CP700/900
UP-2850P/-2950MD/-21MD(*))

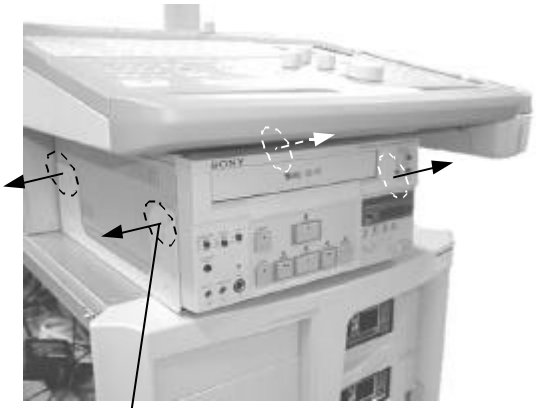
① Remove 3 screws and remove recording device.

- The screw being used by the carried record device is different.
  Refer to the following for the screw from name.
  UP-2850P/-2950MD/-21MD(*),
  SVO-9500*····BNK3 x 10 Fe,Ni,3
  CP700*/900*···· BNK4 x 12Fe,Ni,3



② S3 x 6 Fe,Ni,4

②Remove 4 screws and remove fixtures.



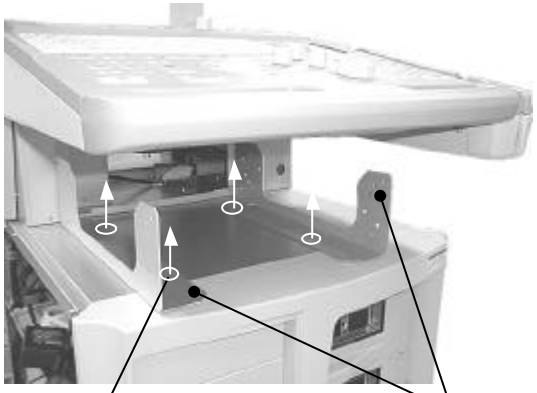
① *BNK3 x 10Fe,Ni,4
or BNK4 x 12Fe,Ni,4

In case of intermediate rack
(SVO-9500*, CP700*/900*,
UP-2850P/-2950MD/-21MD(*), AG-7350*)

①Remove 4 screws and remove recording device.

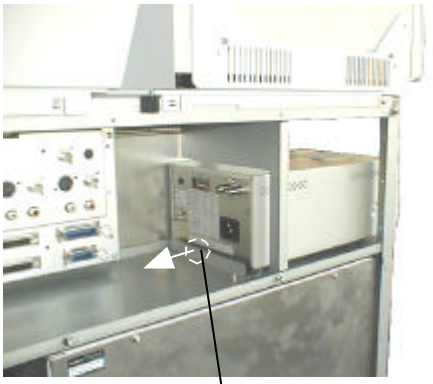
- The screw being used by the carried record device is different.
Refer to the following for the screw from name.

UP-2850P/-2950MD/-21MD(*),
SVO-9500*· · · ·BNK3 x 10 Fe,Ni,4
CP700*/900*, AG-7350*
· · · · BNK4 x 12Fe,Ni,4



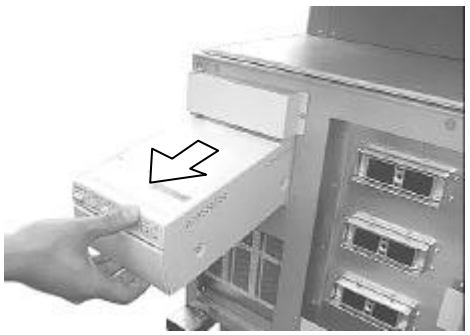
② S3 x 6 Fe,Ni,4
Fixture

②Remove 4 screws and remove fixtures.



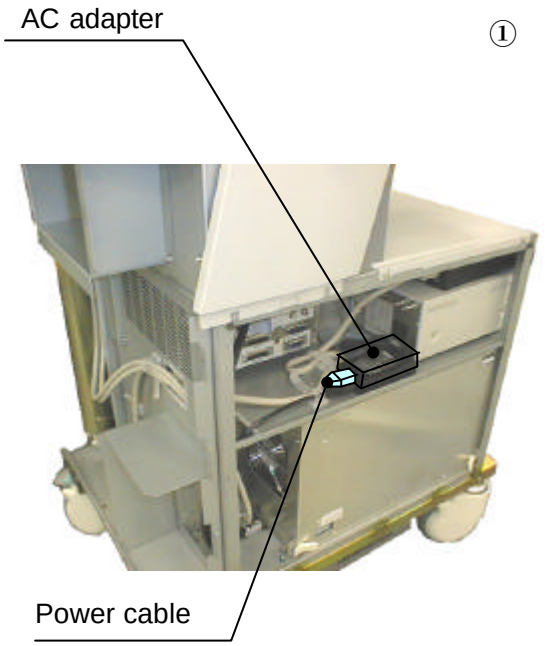
BNK3 x 6 Fe,Ni,1

①



11-2 Removing of Black and white Printer (UP-895*, P91*)

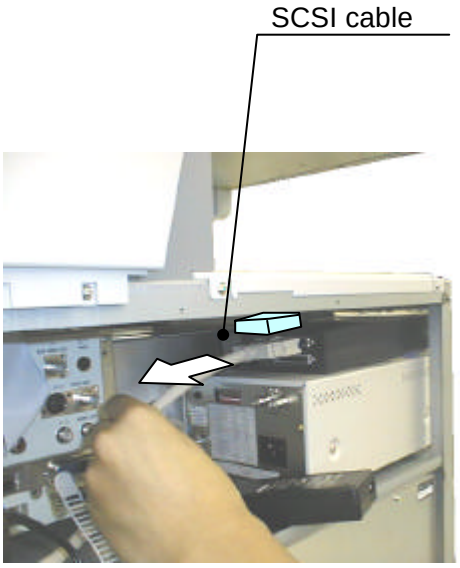
①Remove 1 screw and remove printer.



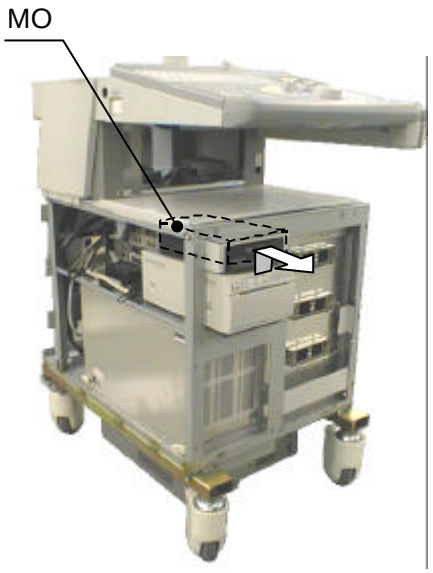
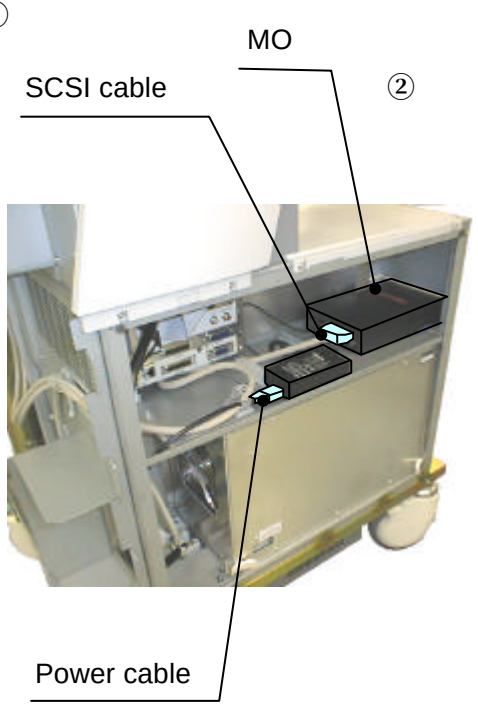
11-3 Removing of MO drive

In case of connected black and white printer with MO

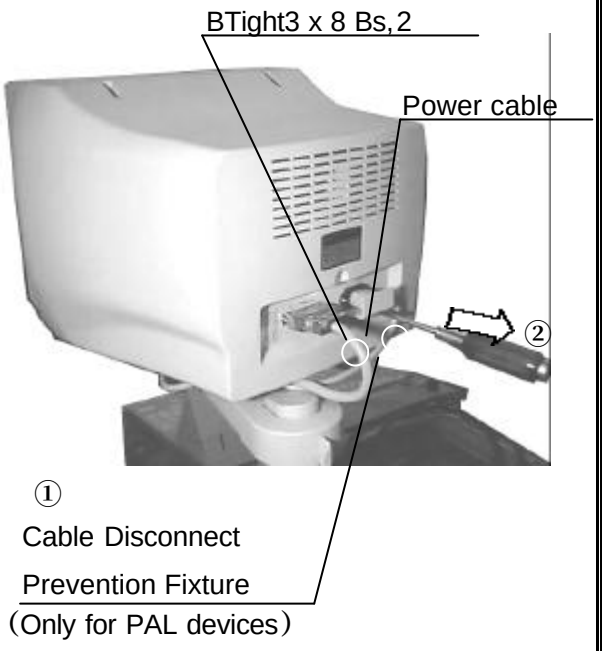
①Remove the clamp, then disconnect the power cable.



②Remove the SCSI cable.

③  	③Remove MO from the printer.
①  	Removing of MO In case of only MO ①Disconnect power cable and SCSI cable. ②Remove MO

12. Removing of Monitor(IPC-1530Q/-1530(U))

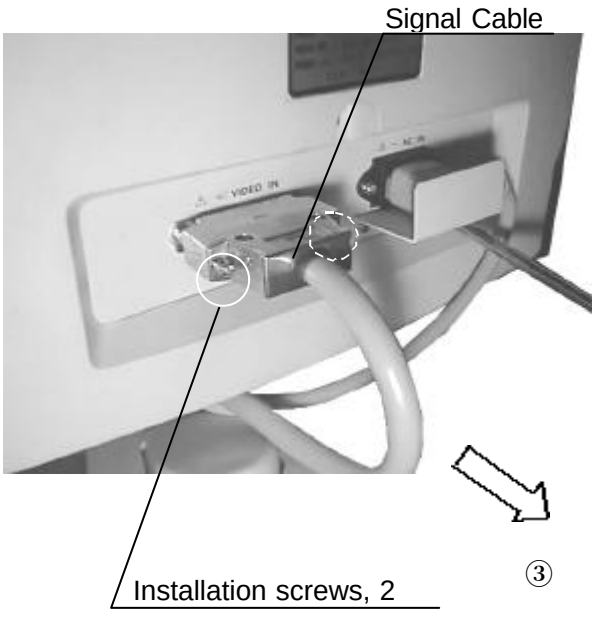


12-1 Removing of Monitor

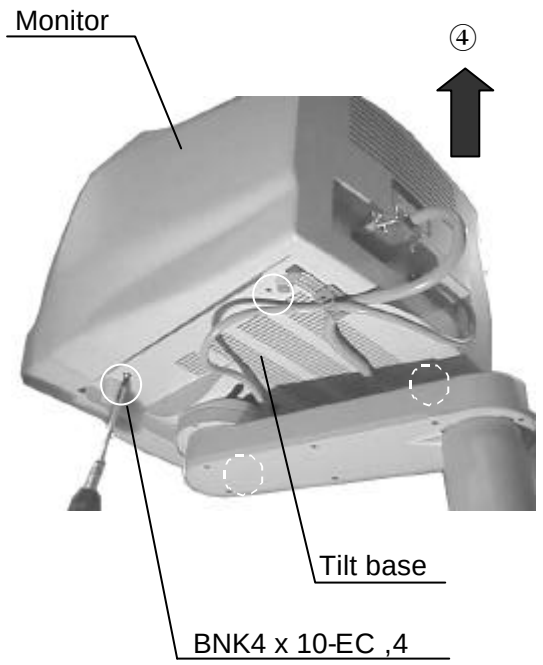
- Operation ① is only necessary for PAL device.

①Unfasten 2 screws and remove the cable disconnect prevention fixture.

②Remove the power cable.



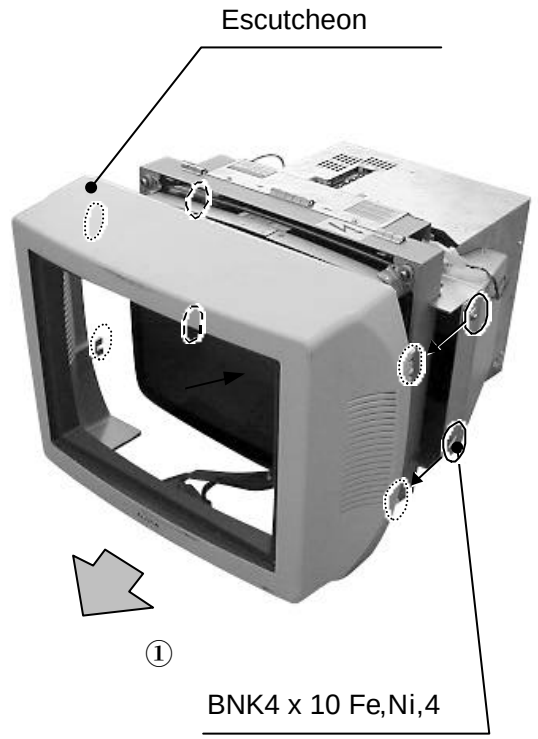
③Loosen the 2 screws for the signal cable, then remove it.



④Remove the 4 screws fastening the monitor, then remove the monitor from the tilt base.

12-2 Removing of Back Cover

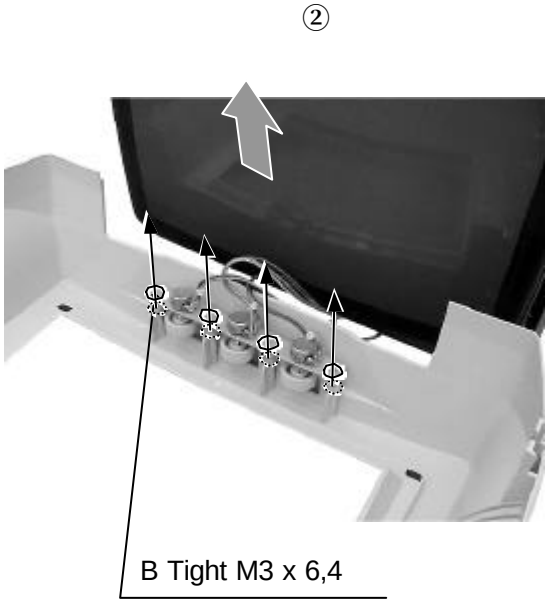
①Unfasten 3 screws, and remove the back cover.



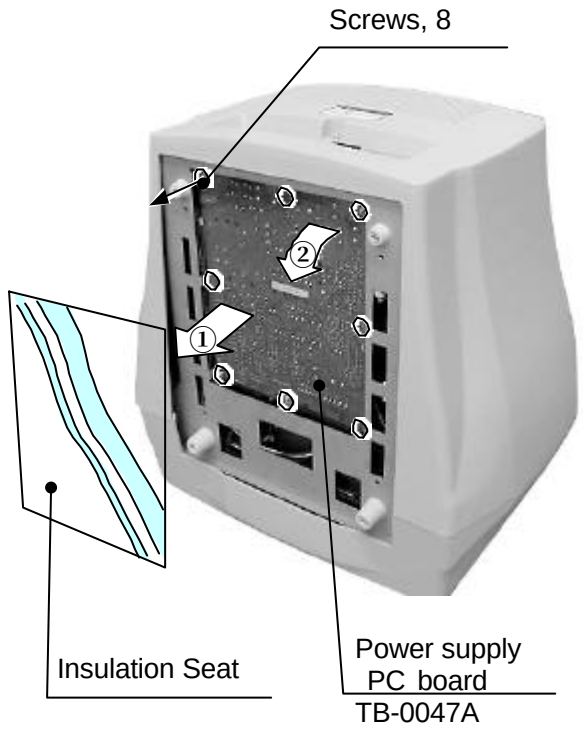
12-3 Removing of Escutcheon

①Loosen 4 screws, and remove the escutcheon.

- Be careful not to pull the cable of the volume knob.



②Unfasten 4 screws, and remove the volume knob.



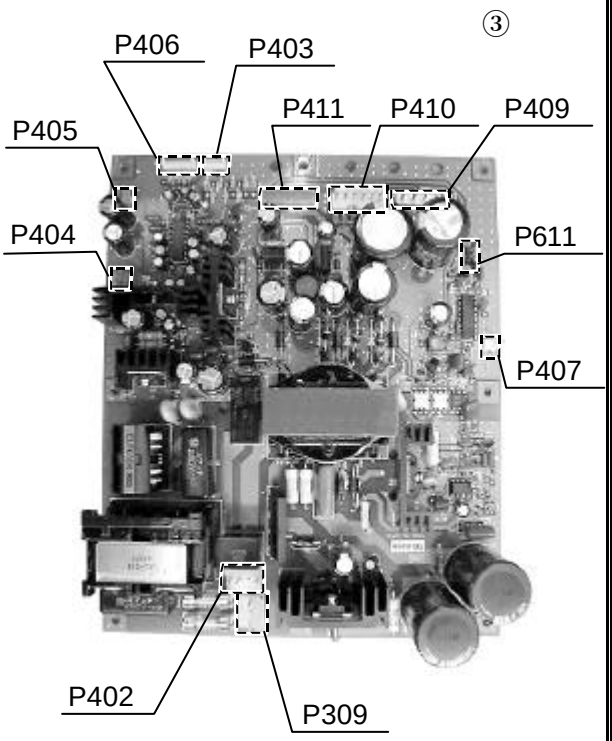
12-4 Removing of Power supply PC board

- This work is the case of IPC-1530 (U).
  It is omitted in case of IPC-1530Q.

①Unfasten 8 screws from the bottom of the monitor, and take off an insulation seat.

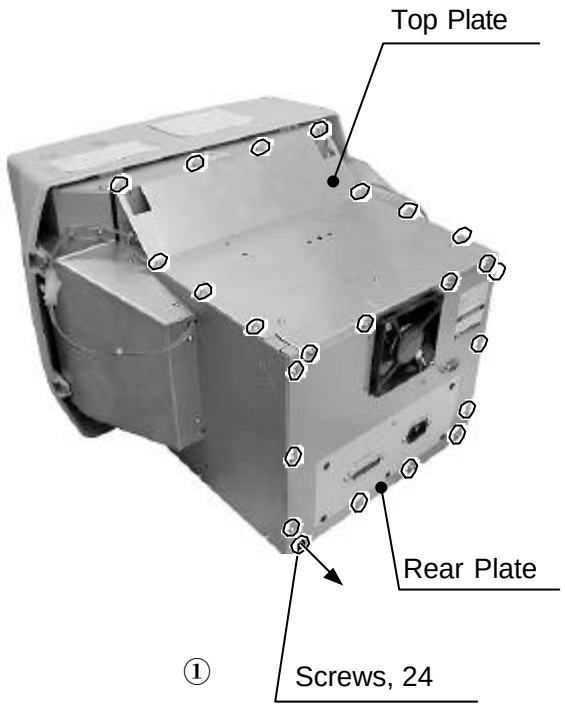
②Pull a power supply PC board to the front.

- Be careful not to pull the cable when you pull the PC board.



③Disconnect all connectors, and remove the power supply PC board.

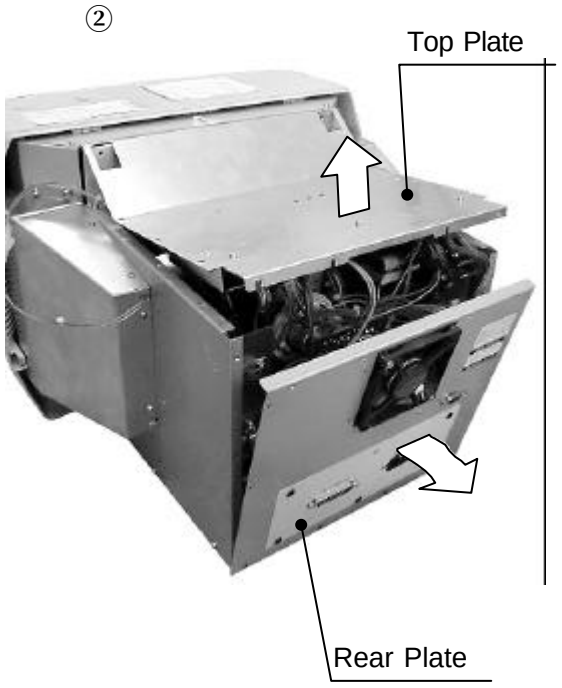
○Connectors to unplug
[P309, P402, P404, P405, P406, P403, P411, P410, P409, P611, P407]



12-5 Removing of Rear Plate

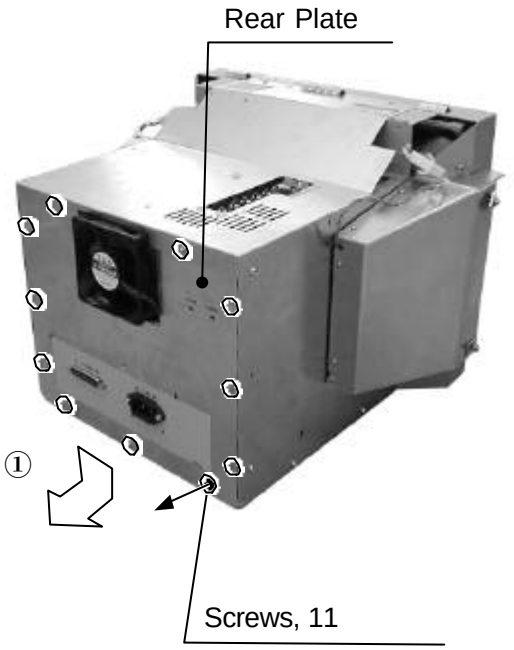
In case of IPC-1530Q

①Unfasten 24 screws from the top plate and the rear plate.



②Lift the top plate, and remove the rear plate.

- Be careful not to pull the cable.

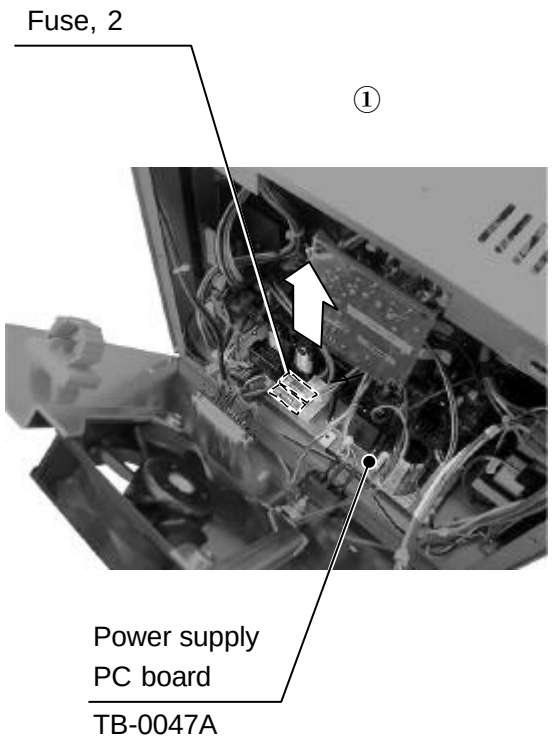


12-5 Removing of Rear Plate

In case of IPC-1530(U)

①Unfasten 11 screws.
Then slide downward, and remove the sheet metal back cover.

- Be careful not to pull the cable.

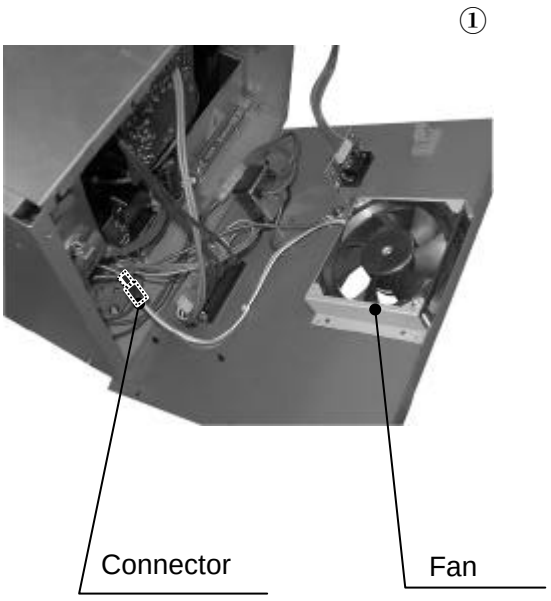


12-6 Removing of Fuse

- This work is the case of IPC-1530 (U).
  It is omitted in case of IPC-1530Q.

①Remove the fuse from the power supply PC board of the bottom.

- Be careful not to pull the cable.

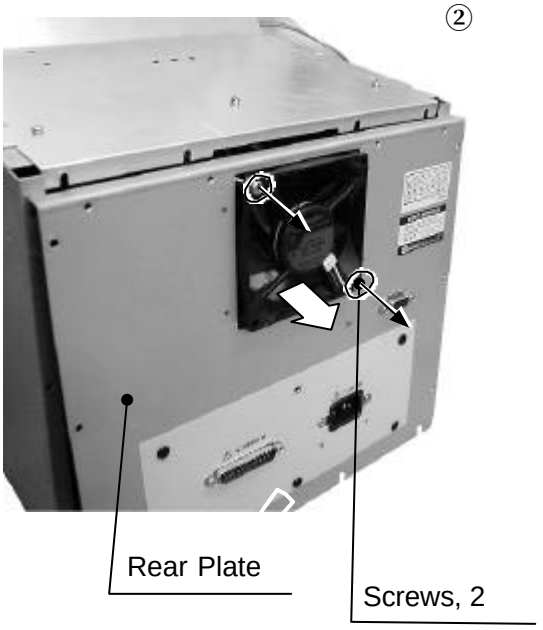


12-7 Removing of Fan

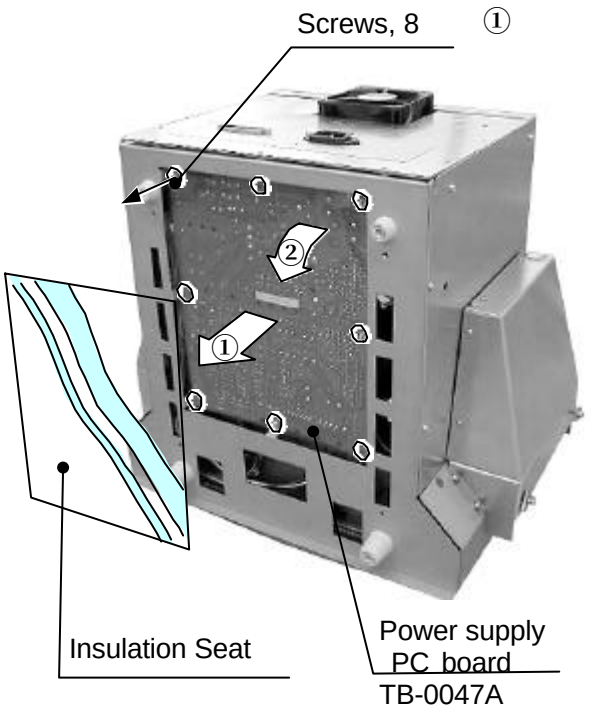
In case of IPC-1530Q

①Remove a fan's connector.

- Be careful not to pull a cable.



②Unfasten 2 screws, and remove the fan from the rear plate.



12-7 Removing of Fan

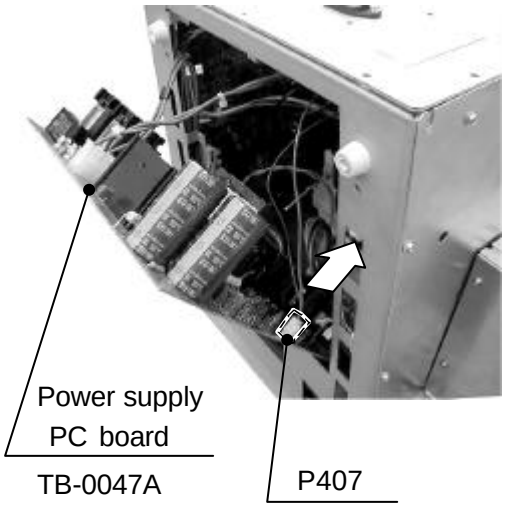
In case of IPC-1530 (U)

①Unfasten 8 screws from the bottom of the monitor, and take off an insulation seat.

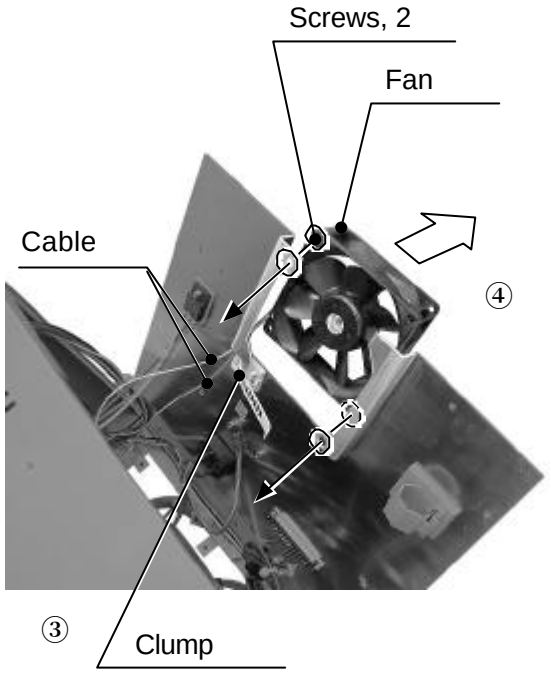
②Pull a power supply PC board to the front.

- Be careful not to pull the cable when you pull the PC board.

②



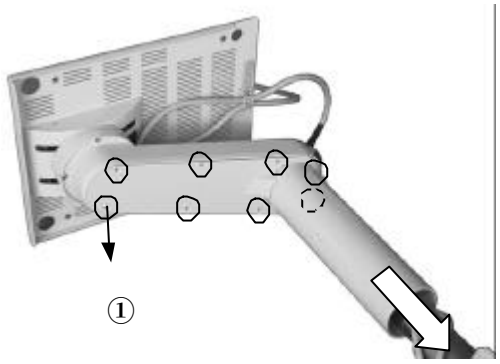
②Remove a fan's connector [P407] from the power supply PC board.



③Undo the clamp, and remove the cable.

④ Unfasten 2 screws, and remove the fan.

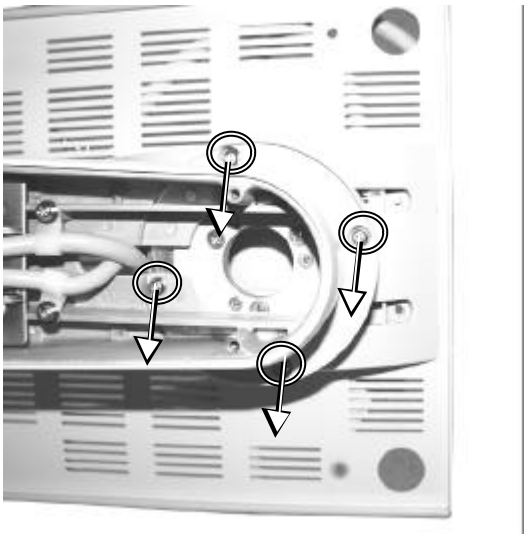
13. Removing of Tilt base



①

13-1 Removing of Tilt base

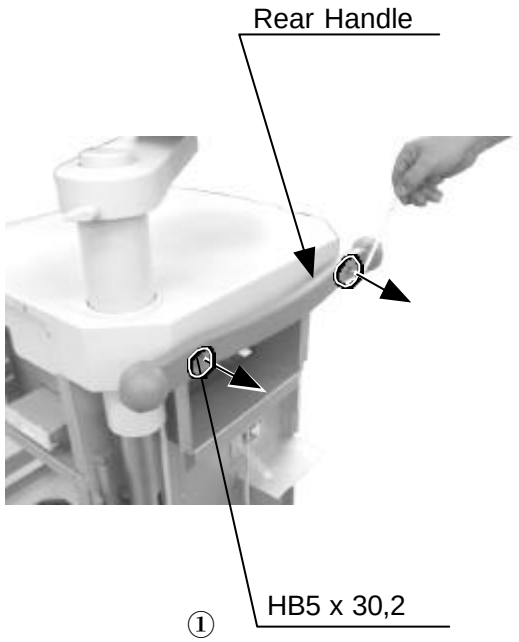
①Remove 8 screws and remove the arm cover.



②

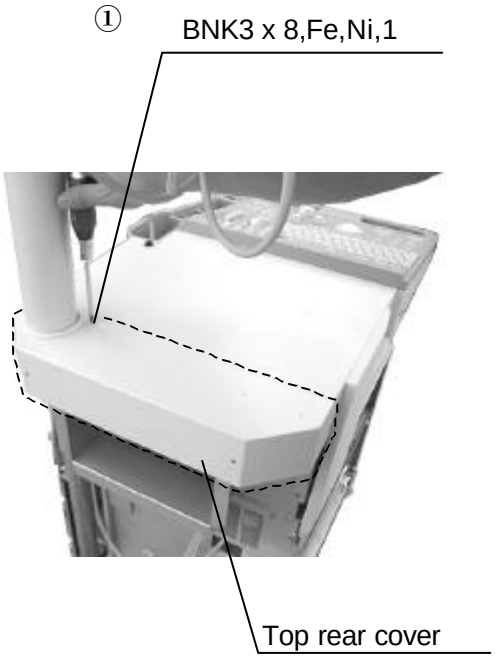
②Remove 4 screws and remove tilt base.

14. Removing of Rear Handle, Top Rear Cover, Monitor Arm, Arm Ring



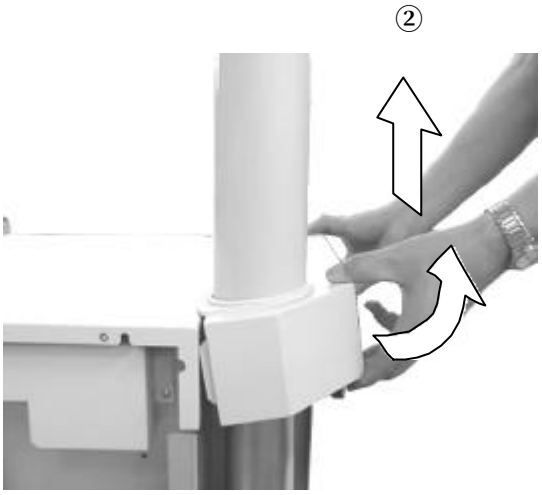
14-1 Removing of Rear Handle

①Remove 2 bolts and remove rear handle.

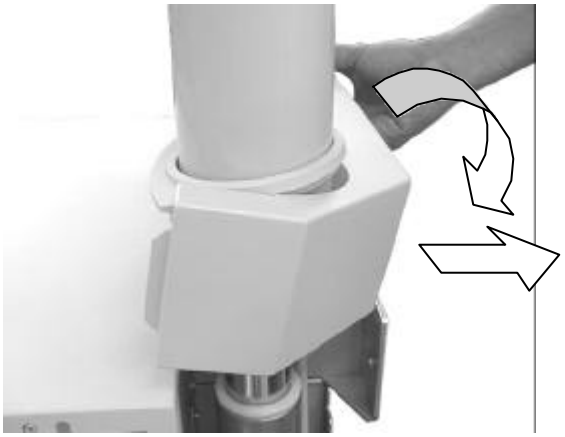


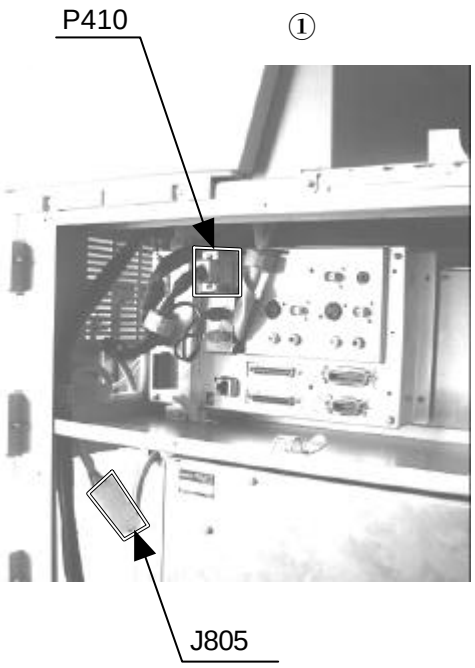
14-2 Removing of Top rear cover

①Remove 1 screw.



②Remove top rear cover.



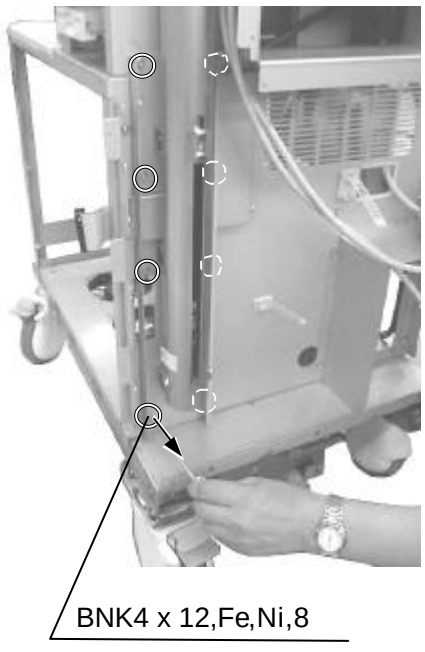


14-3 Removing of Monitor Arm

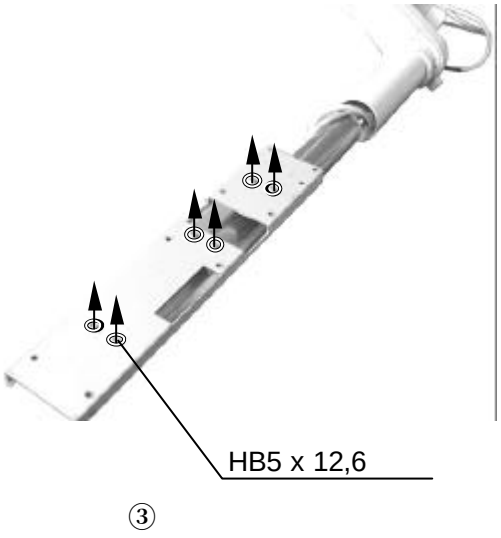
①Disconnect 2 connectors.

- Connectors to unplug

[P410,J805]

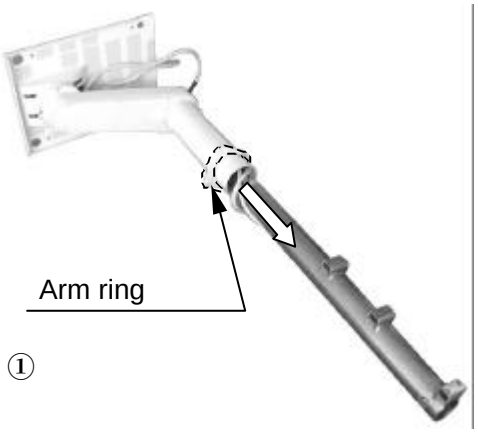


②Remove 8 screws.



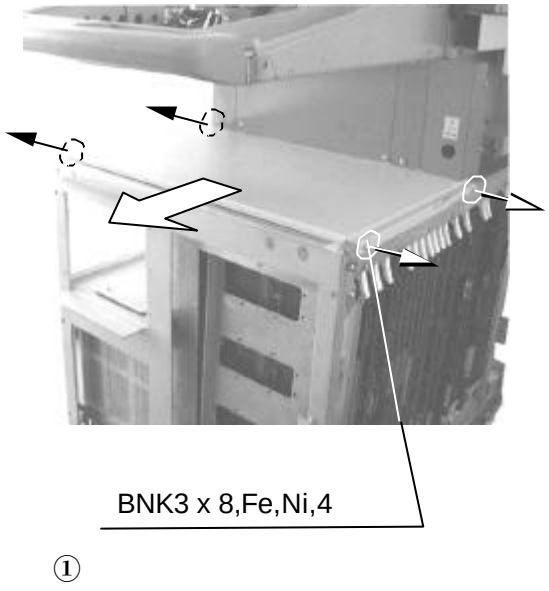
③Remove 6 bolts and remove fixture.

14-4 Removing of Arm Ring



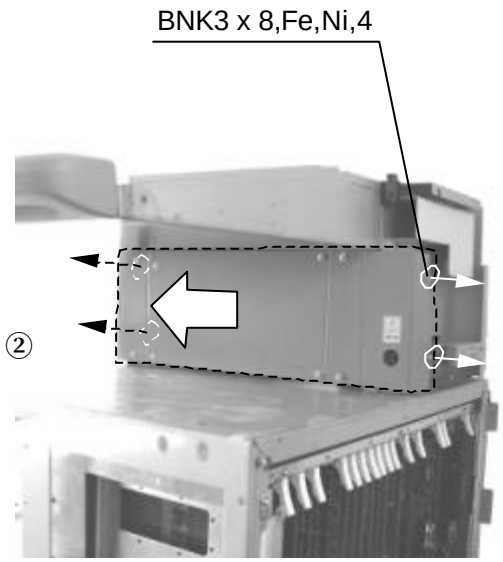
①Remove arm ring.

15.Removing of Foot Switch

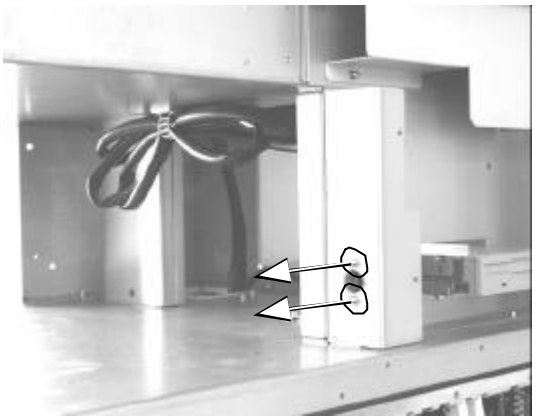


15-1 Removing of Foot Switch

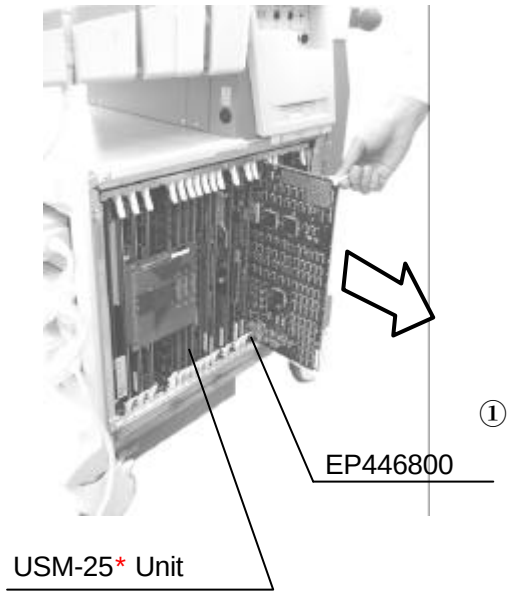
①Remove 4 screws and remove the rack panel.



②Remove 4 screws and remove cover.

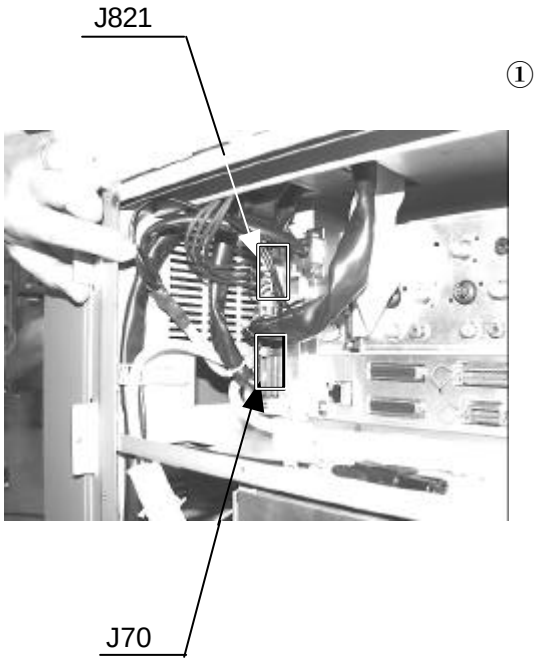
③ 	④Remove 2 screws and remove foot switch PC.

16. Removing of EP446800, Physio. Unit, Control Panel



16-1 Removing of EP446800

①Remove the PCB[EP446800].



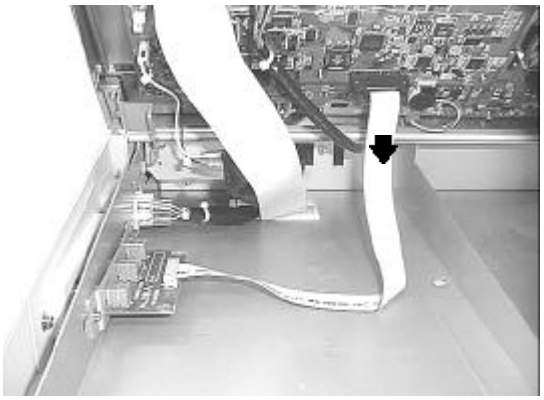
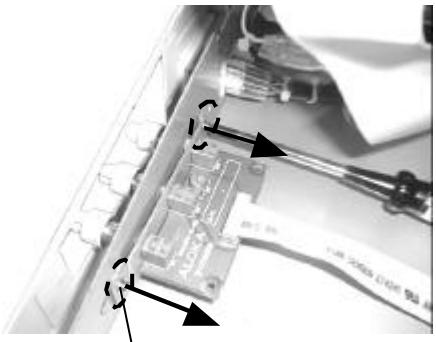
16-2 Removing of Physio Unit

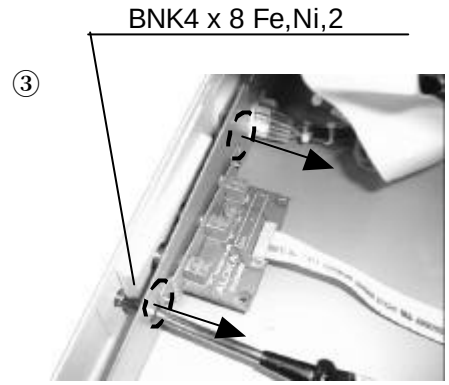
①Disconnect 2 connectors from JB-263.

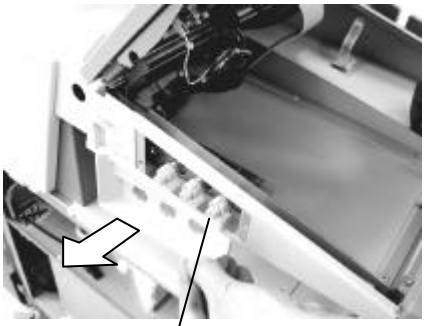
- Connectors to unplug

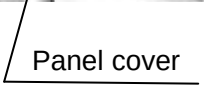
[J70, J821]

②Remove 4 screws and remove physio. unit.

① 	16-3 Removing of Physio Control Panel ①Disconnect the connector of physio control panel.
 ②	②Remove 2 screws and remove physio control panel.

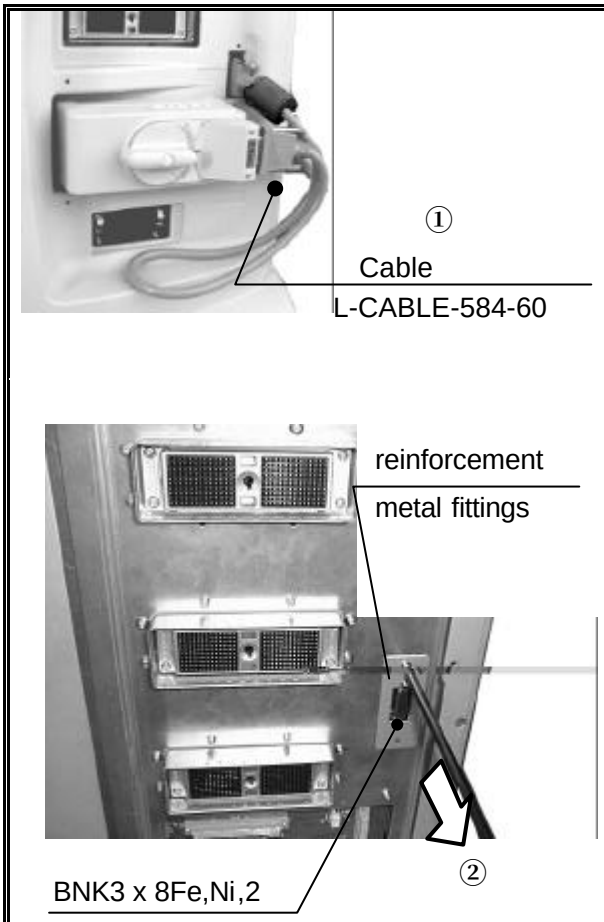






③Remove 2 screws and remove panel cover.

17. Removing of reinforcement metal fittings of the unit for the VOL mode

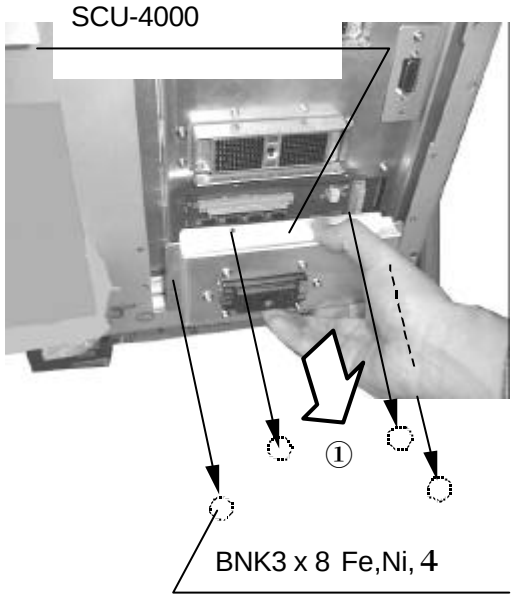


17-1 Removing of reinforcement metal fittings

① Remove the cables.

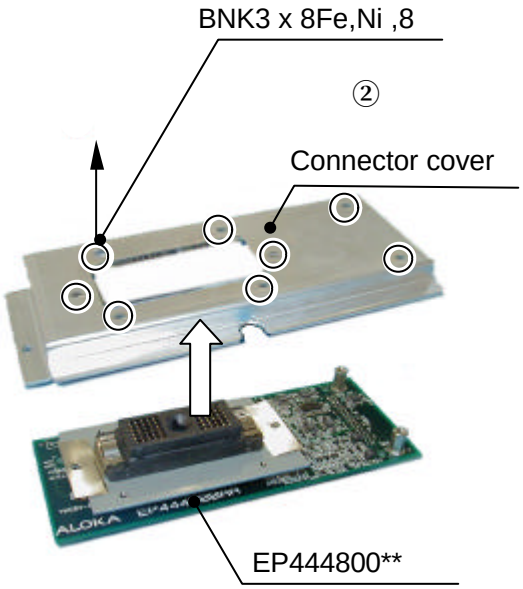
② Remove 2 screws and remove the reinforcement metal fittings.

18. Removing of mechanical radial connection unit (SCU-4000)



18-1 Removing of SCU-4000's connector cover

① Unfasten 4 screws, then remove the SCU-4000.



② Unfasten 8 screws, then remove the connector cover.

Rev.03

SSD-4000 据付要領書
INSTALLATION PROCEDURES

この据付要領書は、SSD-4000の納品等の際、据付の資料としてご使用ください。
※カラープリンタとＶＣＲを同時に搭載する場合は、MP-FX4000-2Cが必要です。

必要な工具：プラスドライバー、スタビドライバー（あらかじめ用意すること）

These installation procedures are provided for reference in installation of SSD-4000.
※When fixing both the Color printer and the VCR on the system simultaneously by using an attached fixture for VCR/Color printer, you should prepare a fixture of MP-FX4000-2C additionally.

Tool required : Phillips screw driver , Stabilizing screw driver(Provide it beforehand)

⚠ 注意

- ■ 装置の据付作業は、有資格者に限られる。
- ■ 装置を設置する場所の環境条件および電源設備は、取扱説明書の記載条件による。
- ■ 探触子の接続は、取扱説明書を参照すること。
- ■ 指定された機種以外のオプション機器は、取り付けしないこと。

⚠CAUTION

- ■ This system must be installed only by the qualified personnel.
- ■ The environmental conditions for the place of installation of the SSD-4000 system and the specifications of the power supply must satisfy the requirements stated in the operator's manual.
- ■ See the operator's manual for the connection of the probe.
- ■ Do not install optional equipment of other models.

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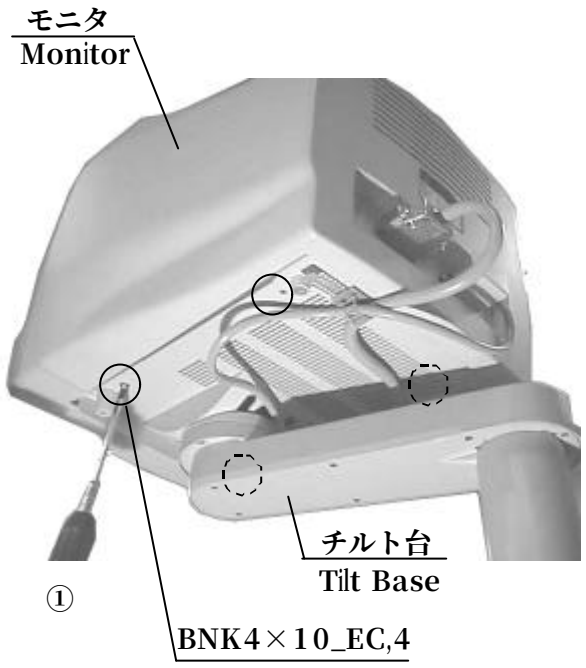
目次	CONTENTS

1．モニタの取り付け方法	1．Mounting of Monitor

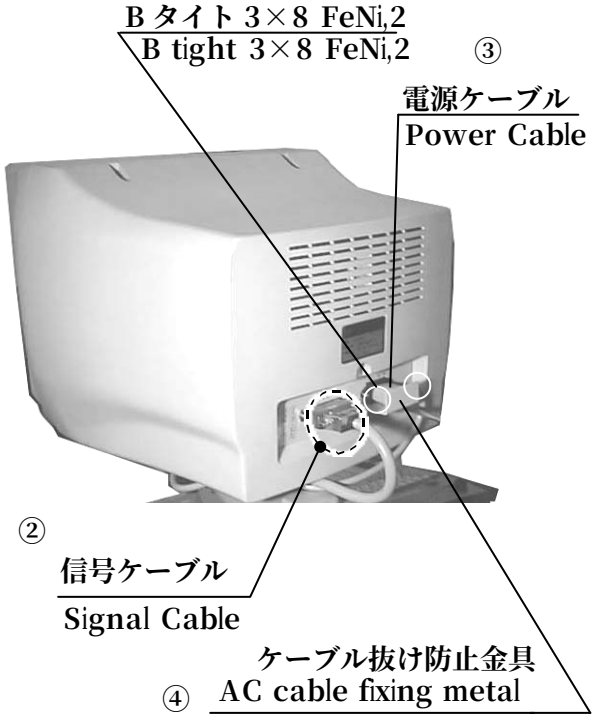


モニタの取り付け方法

Mounting of Monitor

① モニタ底面のゴム足をチルト台の穴に合わせて搭載し、ねじ 4 本で固定する。

① With match the rubber cushions at the bottom of the monitor and holes on the tilt base, then fix the monitor by use of 4 screws.



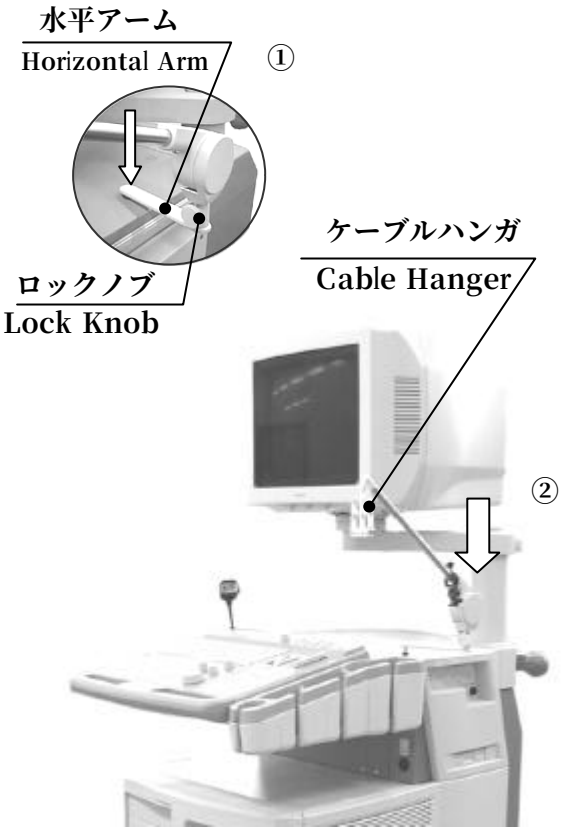
② 信号ケーブルをねじ 2 本で取り付ける。
③ 電源ケーブルを取り付ける。

④抜け防止金具をねじ 2 本で取り付ける。

② Connect the signal cable by use of 2 screws.
③ Connect the power cable.

④Attach the AC cable fixing metal by use of 2 screws.

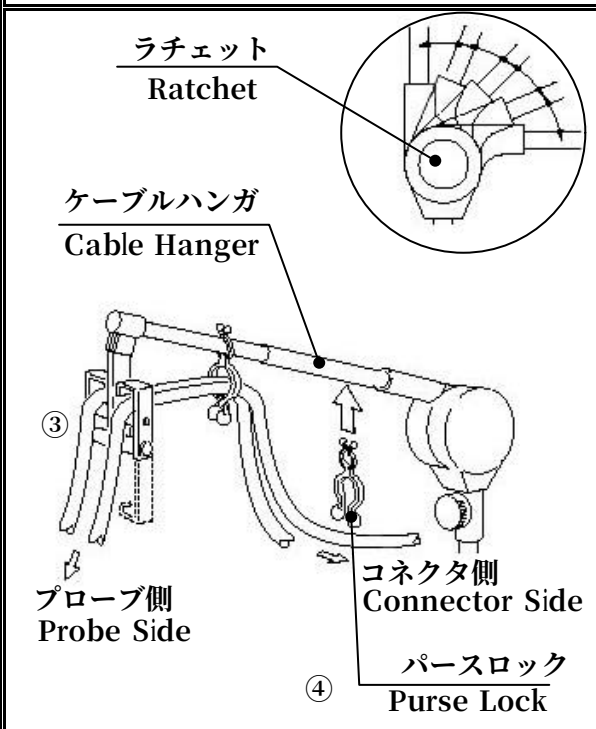
2. 付属品の取り付け方法	2. Mounting of Accessories



付属品の取付け方法
Mounting of Accessories

① 水平アームを取り付け穴に差し込む。
② ケーブルハンガを水平アームの穴に差し込み、ロックノブを締め付け固定する。

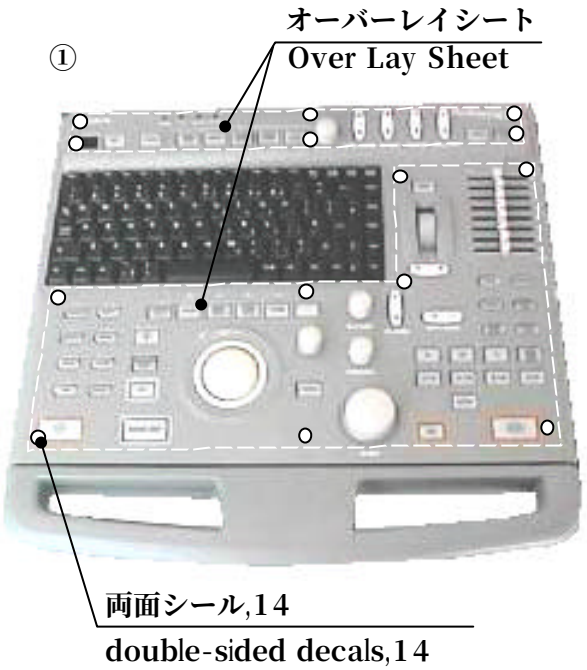
① Insert horizontal arm into mounting hole.
② Insert cable hanger into hole on horizontal arm, then tighten lock knob to secure them.



③ プローブケーブルを図のように引き出し、ケーブルハンガの角度をラチェットを押しながら調節する。
④ パースロックをケーブルハンガの 2 ヶ所に取り付けケーブルを固定する。
※ パースロックはケーブル 2 本まで装着可能

③ Lay out probe cable as illustrated, and adjust cable hanger to appropriate angle while pressing ratchet.
④ Install purse locks at 2 locations as illustrated on cable hanger, and secure cable.
※ Up to 2 cables may be loaded on 1 purse lock.

3．オーバーレイシートの取り付け方法	3．Mounting of Over Lay Sheet



オーバーレイシートの取付け方法
Mounting of Over Lay Sheet

※国内向けのみ作業を行う。
※This operation is only for Japanese models.

① 両面シール 14 枚の台紙を剥ぎ、オーバーレイシートを取り付ける。

① Peel off the backing paper from the 14 double-sided decals and paste the over lay sheet onto the panel.

4．記録装置の取り付け方法	4．Procedure for Installation of Recorder

取り付ける記録装置 / The recorder to be adapted

白黒プリンタ / black and white printer：SSZ-307/-309, P91

MO ドライブ /MO Drive : DYNA MO 640SE

カラープリンタ /Color printer : SSZ-707/709, CP-700 /-900

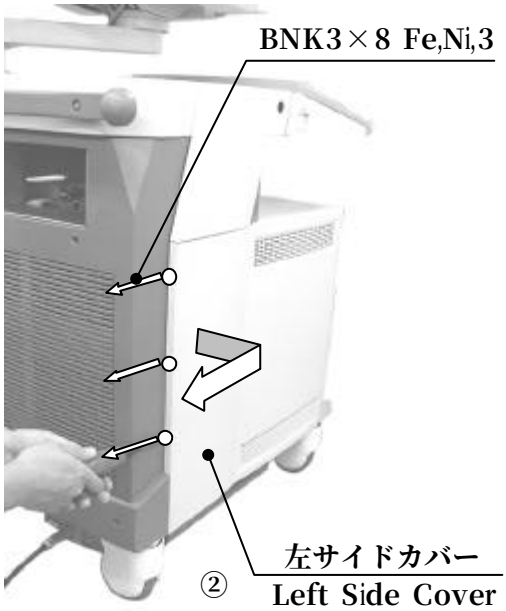
VCR : SVO-9500, AG7350E

4-1.白黒プリンタの取り付け方法	4-1.Procedure for Installation of black and white printer

右サイドカバーの取り外し方法
Removing of Right Side Cover

①右サイドカバーを、ねじ３本を緩めて取り外す。

① Loosen the 3 screws and remove right side cover.



左サイドカバーの取り外し方法
Removing of Left Side Cover

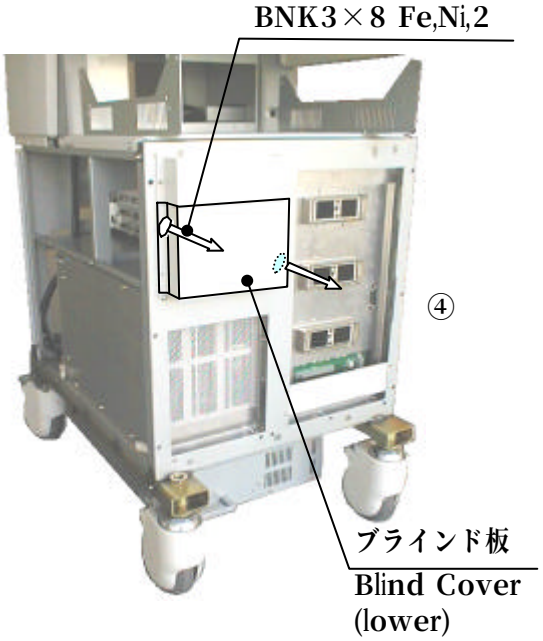
②左サイドカバーを、ねじ３本を緩めて取り外す。

②Loosen the 3 screws and remove left side cover.

フロントカバーの取り外し方法
Removing of Front Cover

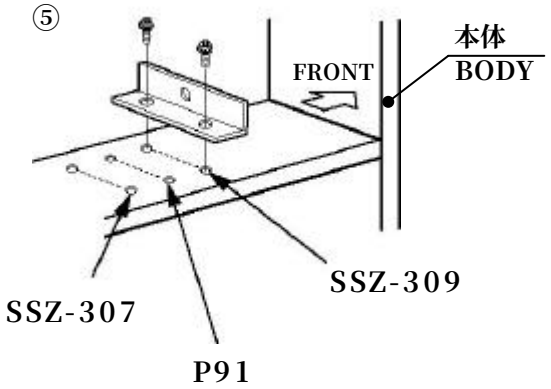
③フロントカバーを、ねじ４本を緩めて取り外す。

③Loosen the 4 screws and remove front cover.



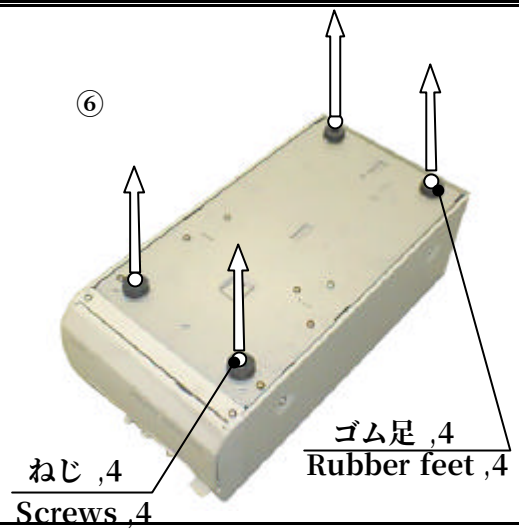
④ ねじ 2 本を取り外しブラインド板(下段)を取り外す。

④ Remove the 2 screws, then remove the blind cover(lower).



⑤指定の位置に、ストッパーをねじ２本で固定する。

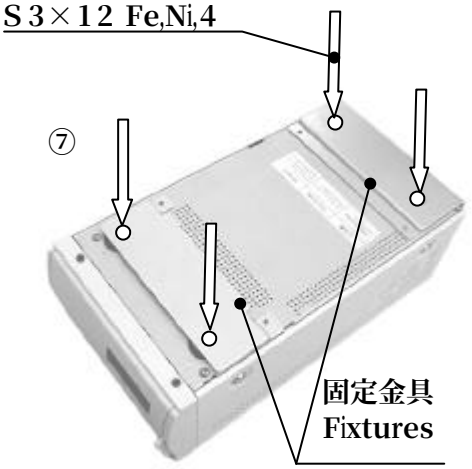
⑤ Fix the stopper on the designated position of the each printer, then fasten with 2 screws.



SSZ-307/-309 の場合
In case of SSZ-307/-309

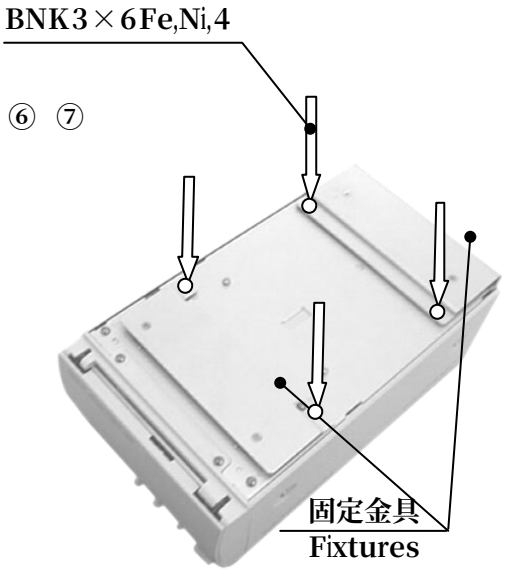
⑥SSZ-307/-309 のゴム足を固定しているねじ 4 本を取り外す。 ゴム足は残す。

⑥Remove the 4 rubber feet mounting screws on SSZ-307/-309.
Leave the rubber feet.



⑦ SSZ-307/-309 に付属の固定金具を付けねじ 4 本で固定する。

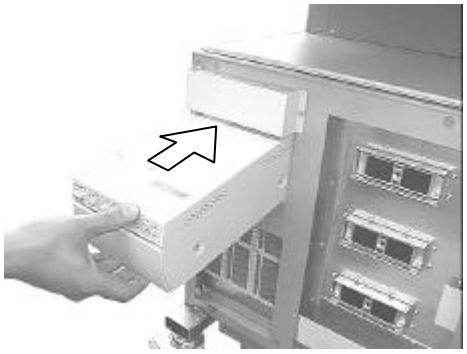
⑦Fasten the fixtures attached to the SSZ-307/-309 by the 4 screws.

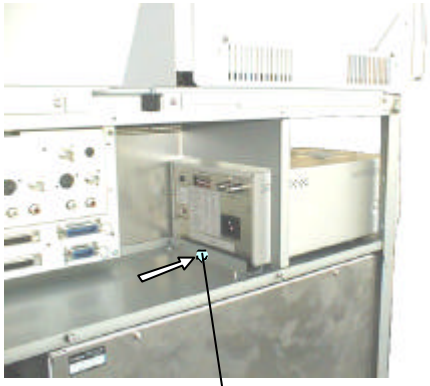


P91 の場合
In case of P91

⑥ P91 のゴム足を固定しているねじ 4 本は取り外さない。
⑦ P91 に付属の固定金具を付け、ねじ 4 本で固定する。

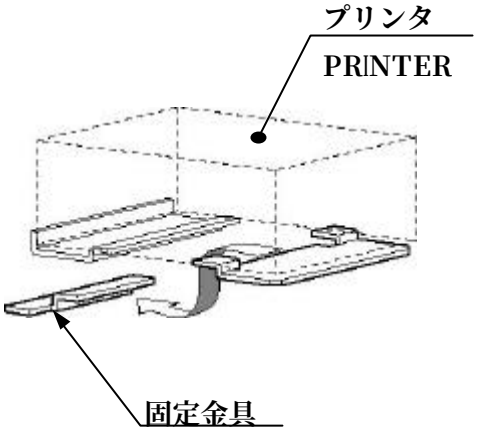
⑥ Don't remove the 4 rubber feet mounting screws on P91.
⑦ Fasten the fixtures attached to the P91 by the 4 screws.





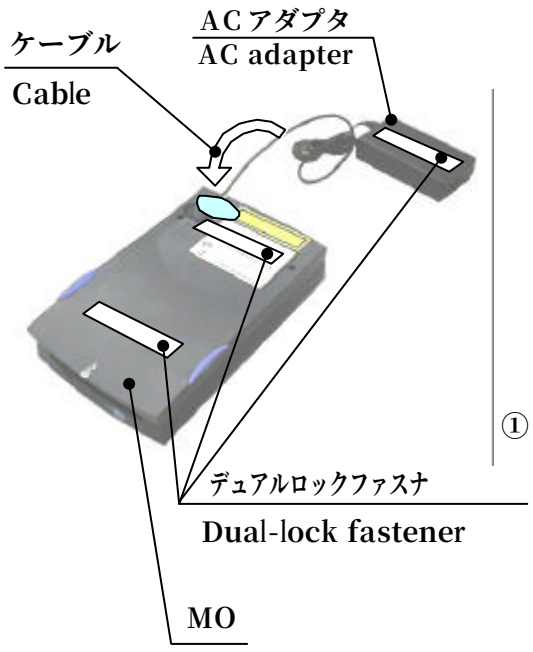
⑧ 記録装置を本体前方より挿入し、固定金具に合わせて後方をねじ１本で固定する。

⑧ Put the printer unit from the front of main body, then fasten with 1 screw.



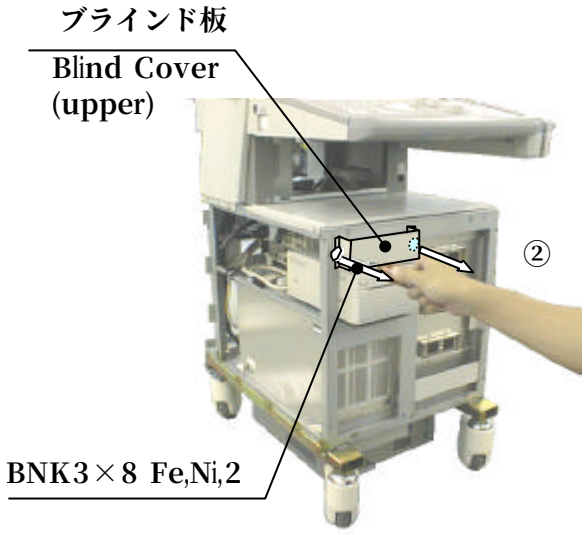
4-2. MO の取り付け方法

4-2. Installation of MO



① MO と AC アダプタにデュアルロックファスナを貼り付ける。AC アダプタを MO に接続する。

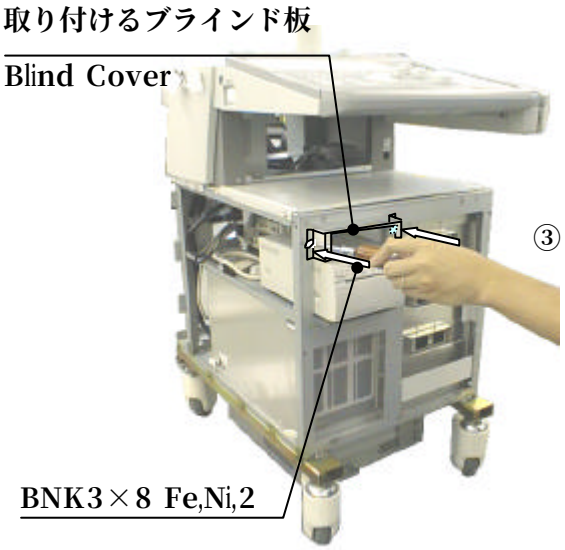
① Paste the dual-lock fastener on the MO and AC adapter, connect the AC adapter to the MO.



白黒プリンタと MO を取り付ける場合
In case of Install the
black and white printer and MO

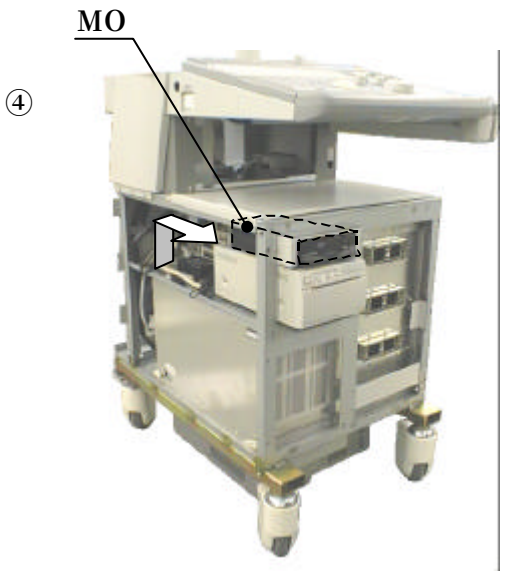
② ブラインド板(上段)を、ねじ 2 本を外して取り外す。

②Remove the 2 screws, then remove the blind cover (upper).



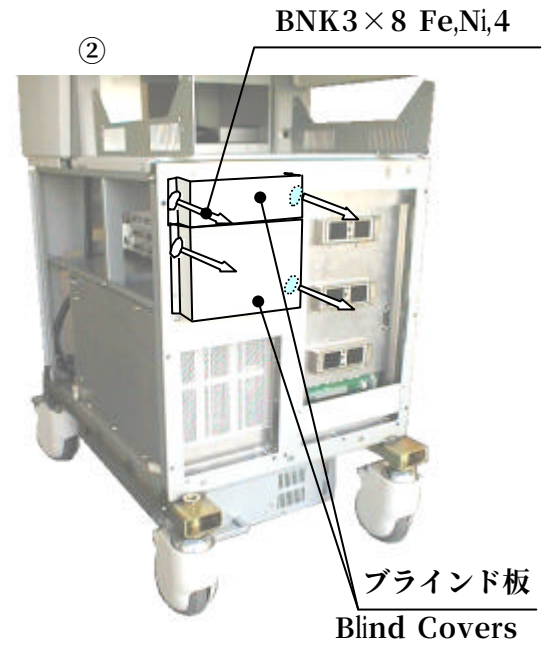
③2 枚重なっているブラインド板の内側のブラインド板をねじ 2 本で取り付ける。

③Install the inside one from a double blind covers by 2 screws



④ MO を記録装置の上に貼り付ける。

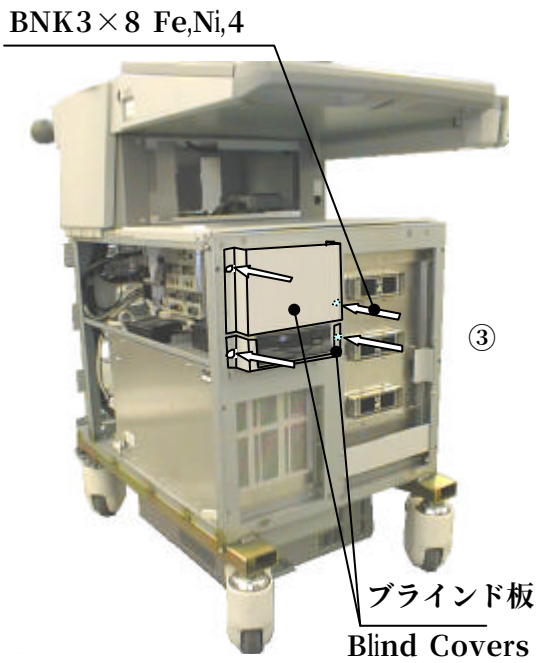
④ Put the MO onto the printer.



MO のみを取り付ける場合
In case of Install the MO

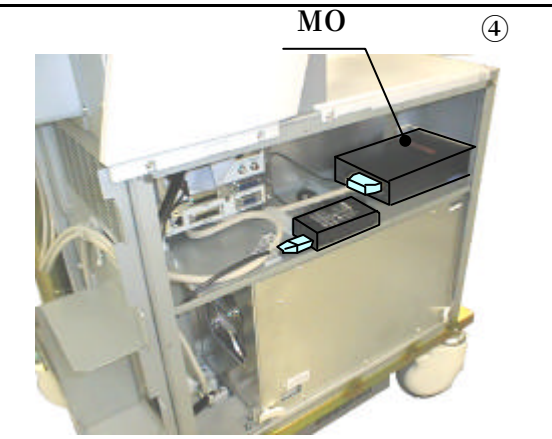
② ブラインド板(上段、下段)を、ねじ 4 本を外して取り外す。

② Remove the 4 screws, then remove the blind covers（upper and lower）.



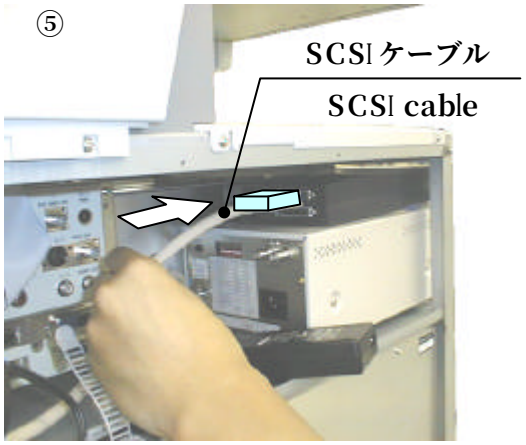
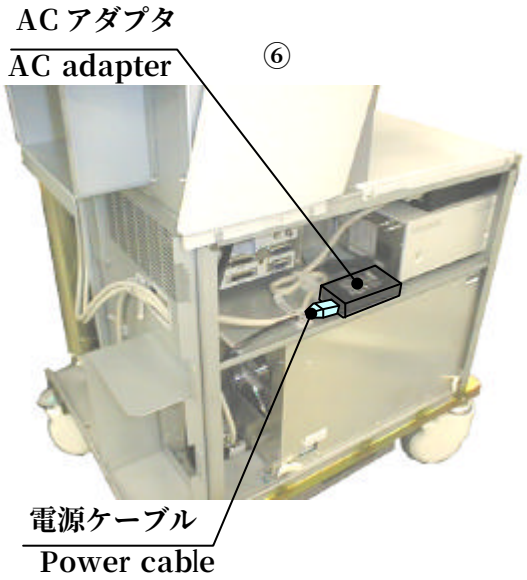
③ 2 枚重なっているブラインド板(上段)の内側のブラインド板を、ねじ 2 本で下段に取り付ける。
ブラインド板(下段)を、上段にねじ 2 本で取り付ける。

④Install the inside one from a double blind covers (upper) to lower part by 2 screws. Install the blind cover(lower) to upper part by 2 screws.

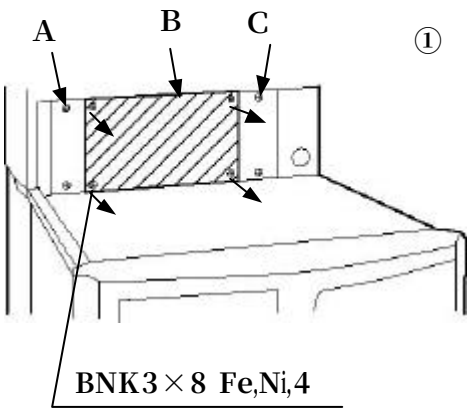


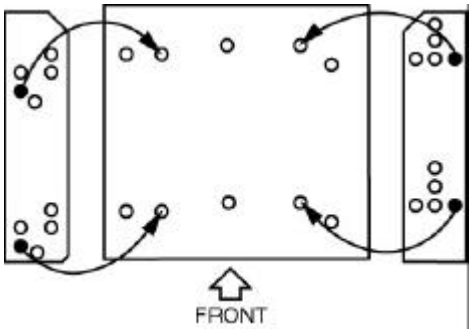
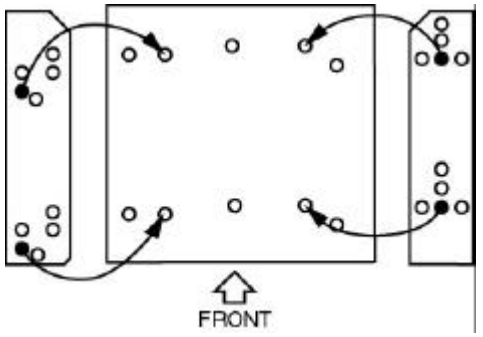
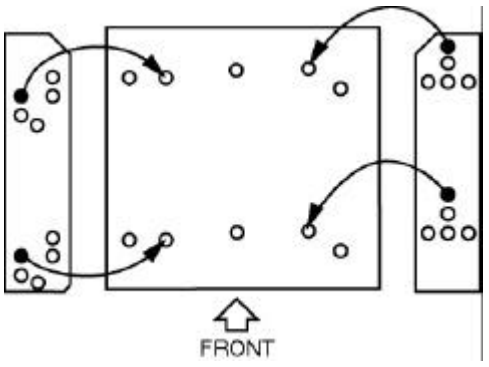
④ MO を、図の位置に貼り付ける。

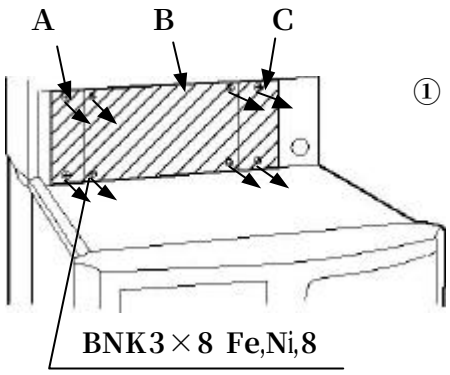
⑤Put the MO onto the position of picture.

	ケーブルの接続方法 Cable Connection Procedure ⑤ MO に SCSI ケーブルを接続する。 ⑤ Connect the SCSI cable to the MO.
	⑥ AC アダプタを図の位置に貼り付け電源ケーブルを接続する。 ケーブル類をクランプする。 ⑥Fix an AC adapter onto the position of picture, then connect power cable. Clamp the cables.

4-3.中間棚への記録装置の取り付け方法	4-3.Installation of Recorder to the intermediate rack.

	SVO-9500,CP-700/-900 の場合 In case of SVO-9500 and CP-700/-900 ① カバーBを、ねじ４本を外して取り外す。 ① Remove 4 screws and remove cover B.

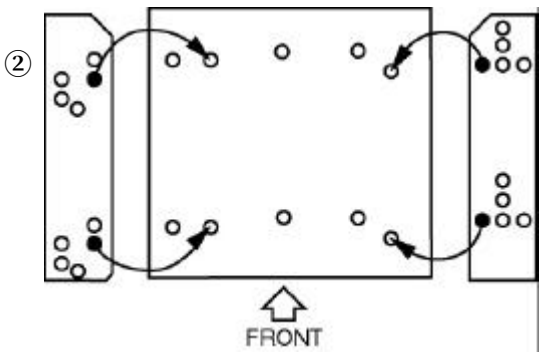
②  	SVO-9500 の場合 In case of SVO-9500 ② 中間棚の指定の位置に固定金具を置く。 ②Mount the fixtures on the designated position of the intermediate rack.
②  	CP-700 の場合 In case of CP-700 ②CP-700 のゴム足 4 個を外し中間棚の指定の位置に固定金具を置く。 ②Remove the 4 rubber feet on CP-700 then, mount the fixtures on the designated position of the intermediate rack.
②  	CP-900 の場合 In case of CP-900 ②CP-900 のゴム足 6 個を外し,中間棚の指定の位置に固定金具を置く。 ②Remove the 6 rubber feet on CP-900 then, mount the fixtures on the designated position of the intermediate rack.



SSZ-707,AG7350E の場合
In case of SSZ-707 and AG7350E

① カバーA,B,C を、ねじ 8 本を外して取り外す。

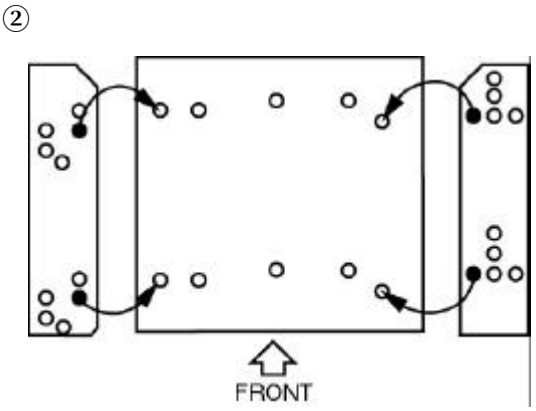
① Remove the 8 screws and remove cover A, cover B and cover C.



SSZ-707 の場合
In case of SSZ-707

② 中間棚の指定の位置に固定金具を置く。

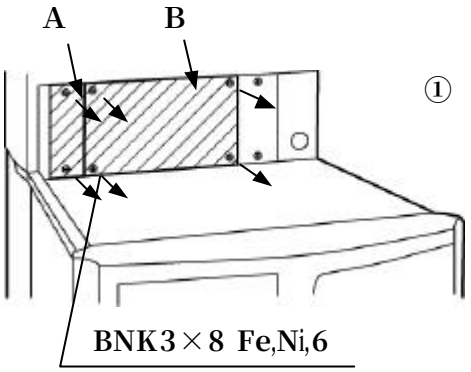
②Mount the fixtures on the designated position of the intermediate rack.



AG-7350E の場合
In case of AG-7350E

② 中間棚の指定の位置に固定金具を置く。

②Mount the fixtures on the designated position of the intermediate rack.

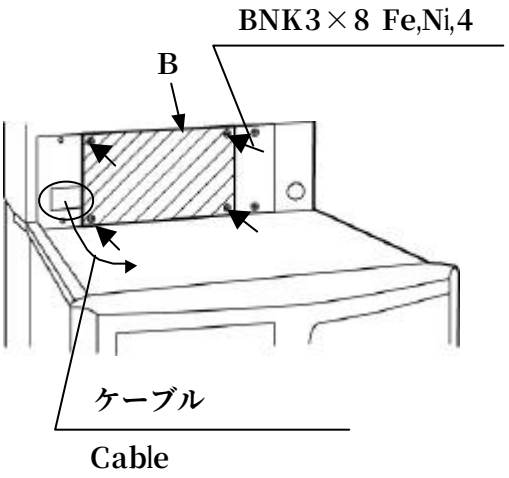


SSZ-709 の場合

In case of SSZ-709

① カバーA,B,を、ねじ 6 本を外して取り外す。

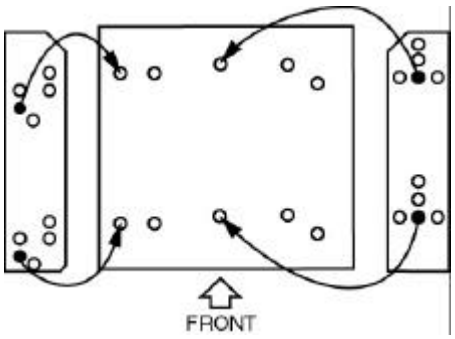
① Remove both the cover A and cover B by removing 6 screws.



プリンタケーブル、電源ケーブルを通した後、カバーB を固定する。

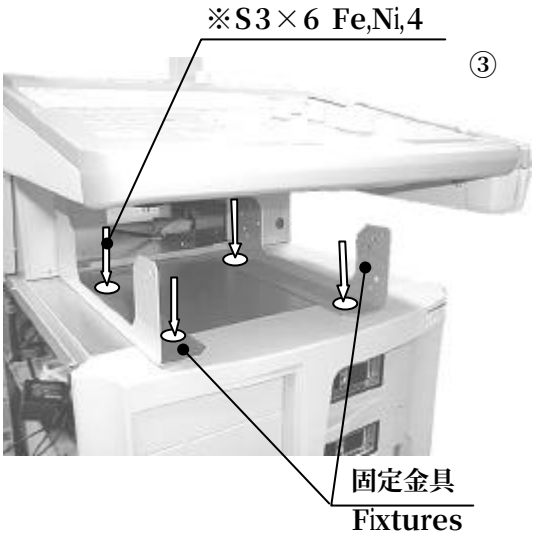
Fix the cover B to original position after letting both the cables of a printer and a power pass into an open space.

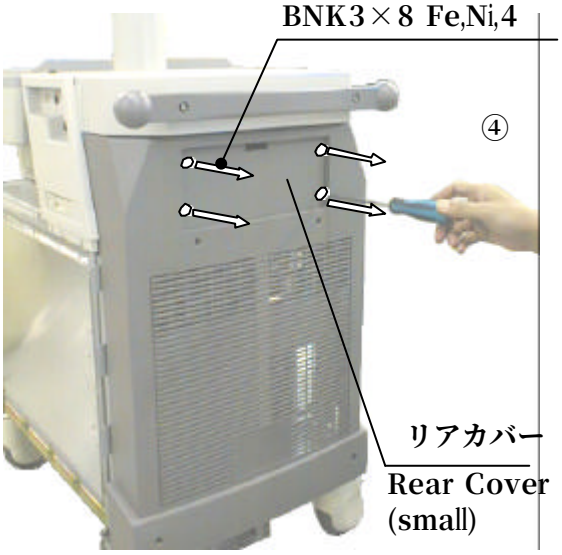
②



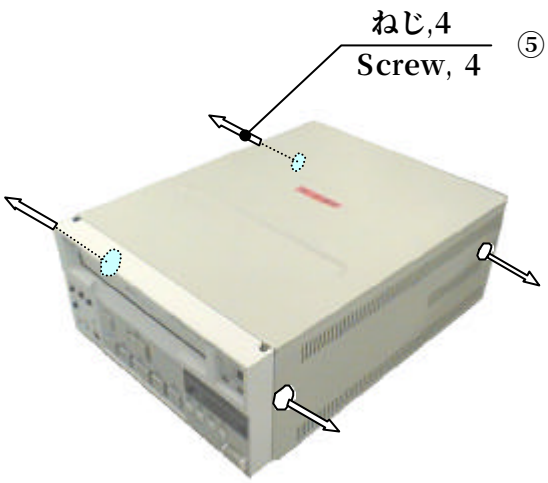
② 中間棚の指定の位置に固定金具を置く。

② Fix the fixtures at the designated position of the intermediate rack.

<table>
<tr>
<td> 
</td>
<td>③ 固定金具を、ねじ 4 本で固定する。
※S3×6 Fe,Ni のねじ以外は使用不可。

③ Fasten the fixtures with 4 screws.
※Don't use it except for the screw of S3×6 Fe,Ni.</td>
</tr>
<tr>
<td> 
</td>
<td>④ リアカバー(小)を、ねじ 4 本を外して取り外す。

④ Remove the 4 screws and remove rear cover(small).</td>
</tr>
</table>

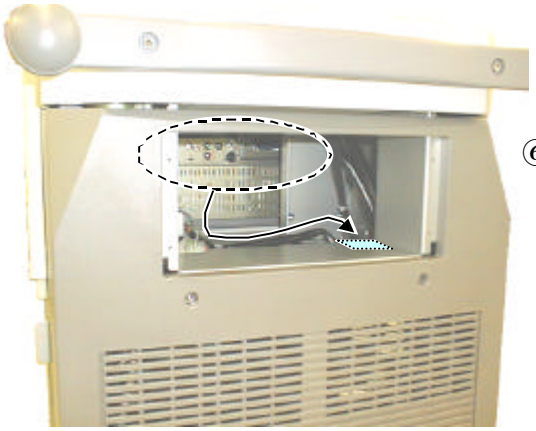


⑤ 記録装置のねじ 4 本を取り外す。

※AG7350E は、⑤の作業は不要。

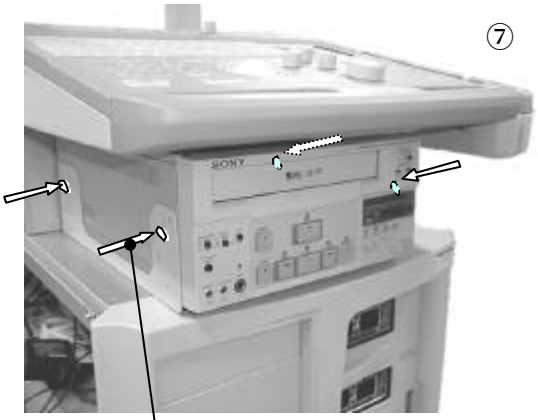
⑤ Remove the 4 screws from the recorder.

※AG7350E doesn't do the work of ⑤.



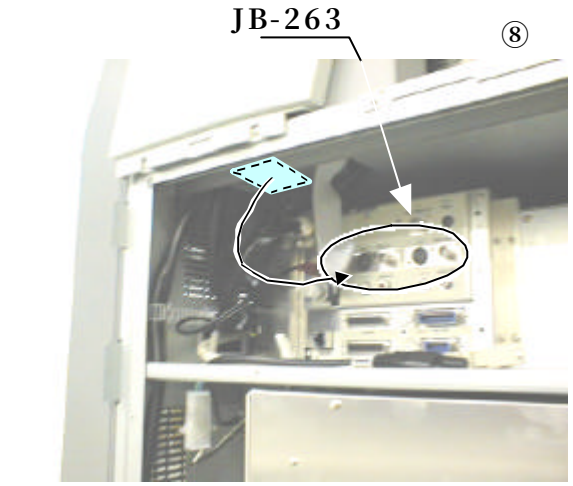
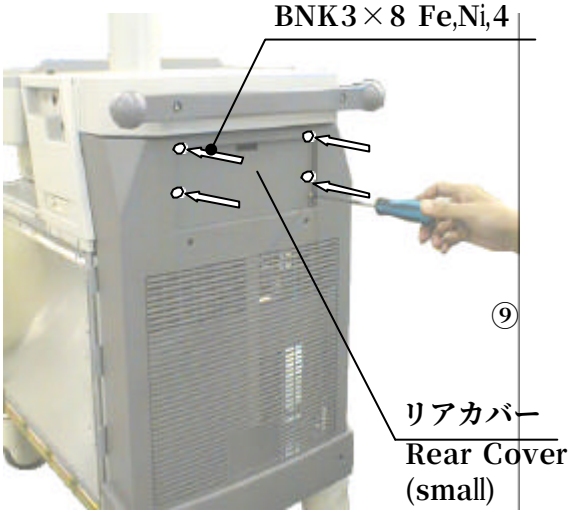
⑥ 記録装置にケーブルを接続し、ケーブルを角穴に通す。

⑥ Connect the cables and pass the cables through a quadrangle hole.

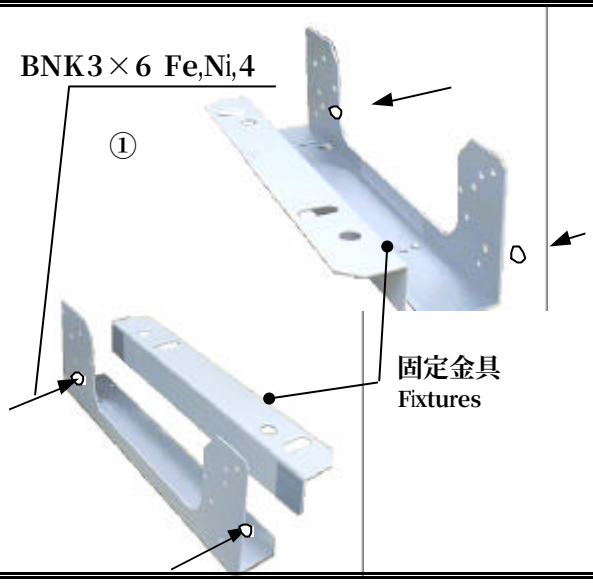


⑦ 記録装置を、ねじ 4 本で固定する。
※使用するねじについては以下を参照のこと。
SSZ-707/-709, SVO-9500
····BNK3×10 Fe,Ni,4
CP-700/-900,AG7350E····
BNK4×12Fe,Ni,4

⑥Fix the recorder unit with 4 screws.
※Refer to the following for 4 screw to use.
SSZ-707/-709, SVO-9500
····BNK3×10 Fe,Ni,4
CP-700/-900,AG7350E····
BNK4×12Fe,Ni,4

	⑧ ケーブルを、接栓 BOX(JB-263)に接続する。 ⑧ Connect the cables to connector box(JB-263).
	⑨ リアカバー小を、ねじ 4 本で取り付ける。 ⑨ Install the small rear cover with 4 screws.

4-4.天板への記録装置の取り付け方法	4-4.Installation of Recorder on the top rack

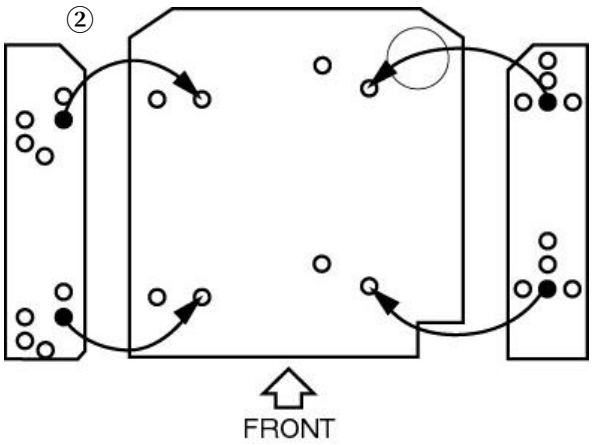


CP-700,SSZ-707/-709 の場合

In case of CP-700 and SSZ-707/-709

① 固定金具を、ねじ 4 本で結合する。

①Join the fixtures with the 4 screws.

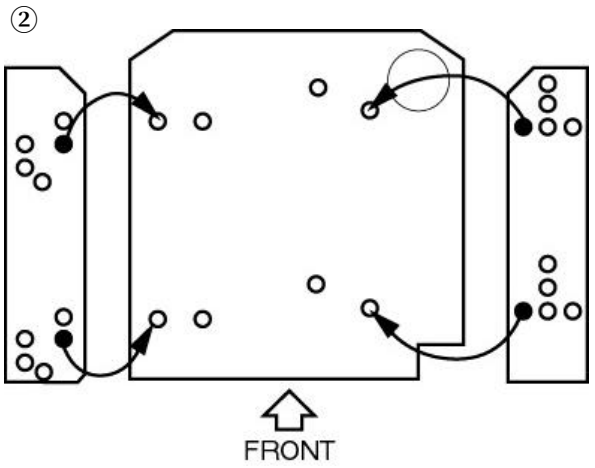


CP-700 の場合

In case of CP-700

②CP-700 のゴム足 4 個を取り外し、指定の位置に固定金具を置く。

②Remove the 4 rubber feet on CP-700 then, mount the fixtures on the designated position of the intermediate rack.

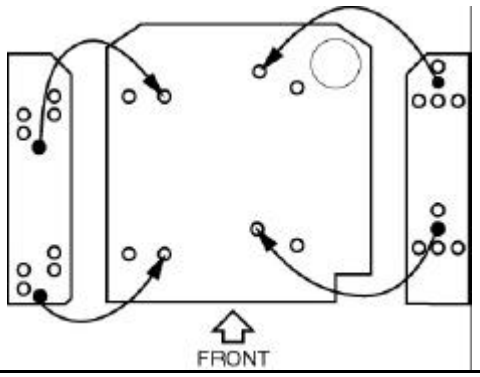
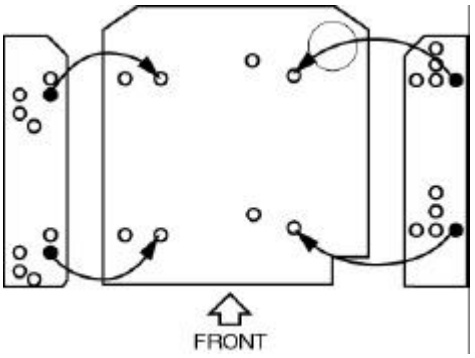
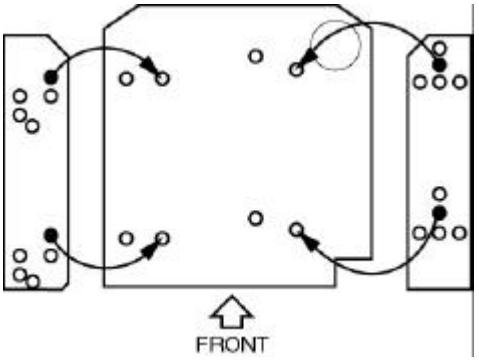


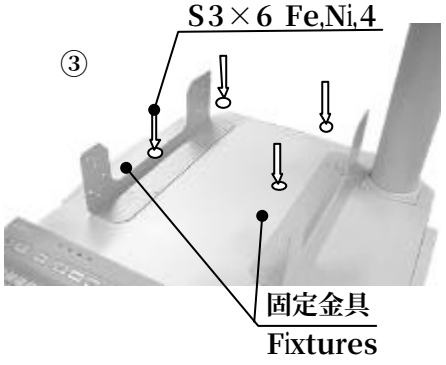
SSZ-707 の場合

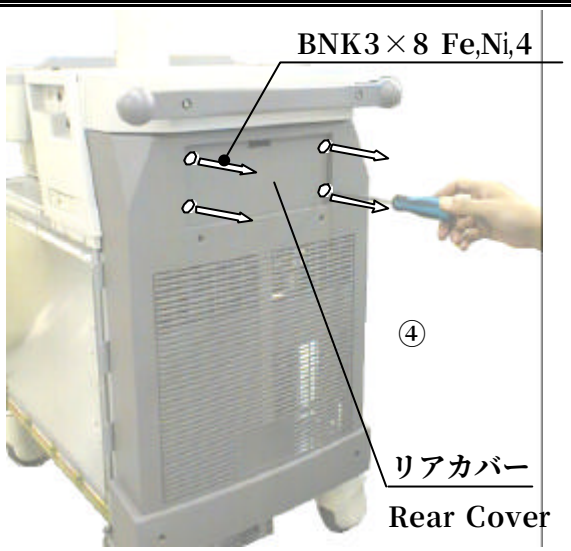
In case of SSZ-707

② 指定の位置に固定金具を置く。

② Mount the fixtures on the designated position of the top rack.

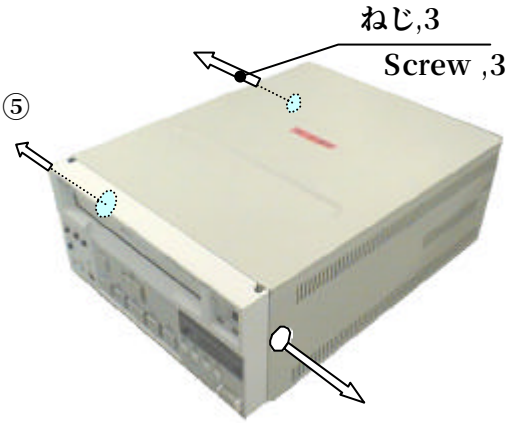
②  	SSZ-709 の場合 In case of SSZ-709 ② 指定の位置に固定金具を置く。 ② Mount the fixtures on the designated position of the top rack.
②  	SVO-9500 の場合 In case of SVO-9500 ② 指定の位置に固定金具を置く。 ② Mount the fixtures on the designated position of the top rack.
②  	CP-900 の場合 In case of CP-900 ②CP-900 のゴム足 6 個を取り外し,指定の位置に固定金具を置く。 ② Remove the 6 rubber feet on CP-900 then, mount the fixtures on the designated position of the intermediate rack.

 	③ 固定金具を、ねじ 4 本で固定する。 ③ Fasten the fixtures with the 4 screws.



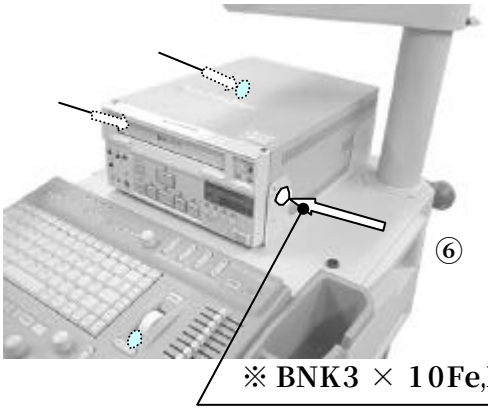
④ リアカバーを、ねじ４本を外して取り外す。

④ Remove the 4 screws and remove rear cover.



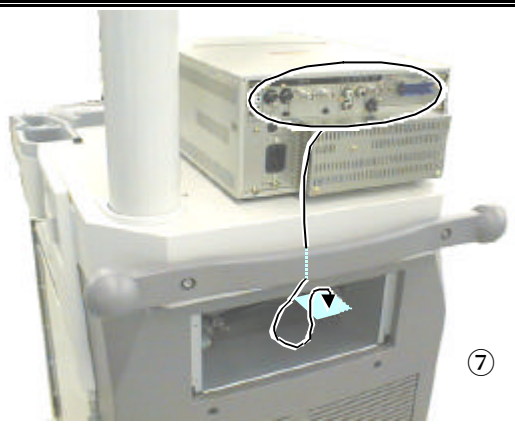
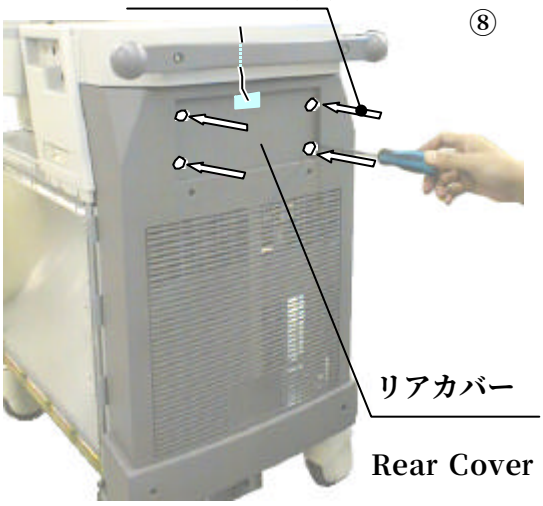
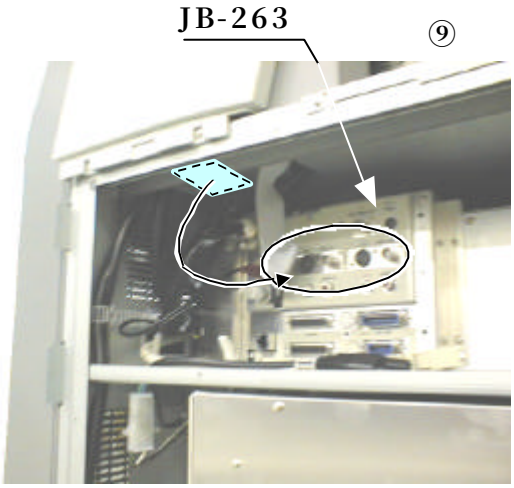
⑤ 記録装置のねじ３本を取り外す。

⑤ Remove the 3 screws from the recorder.



⑥ 記録装置を、ねじ３本で固定する。
※使用するねじについては以下を参照のこと。
SSZ-707/-709, SVO-9500‥‥
BNK3×10 Fe,Ni,3
CP-700/-900,AG7350E‥‥
BNK4 ×12Fe,Ni,3

⑥ Fix the recorder with 3 screws.
※Refer to the following for 3 screw to use.
SSZ-707/-709, SVO-9500‥‥
BNK3×10 Fe,Ni,3
CP-700/-900,AG7350E‥‥
BNK4 ×12Fe,Ni,3

	⑦ 記録装置にケーブルを接続し、ケーブルを角穴に通す。 ⑦ Connect the cables to recorder, and pass the cables through a quadrangle hole.
	⑧ ケーブルをリアカバーの切り欠きに通し、ねじ４本で取り付ける。 ⑧Pass the cables through a lack of rear cover, install the rear cover fasten with 4 screws.
	⑨ ケーブルを、接栓 BOX(JB-263)に接続する。 ⑨ Connect the cables to connector box(JB-263)

4-5. ケーブルの接続方法	4-5. Cable Connection Procedure.

ケーブルの接続方法
Cable Connection Procedure

① 下記の配線表に従い、記録装置に配線を行う。
① Carry out wiring in accordance to recorder with wiring chart given below.

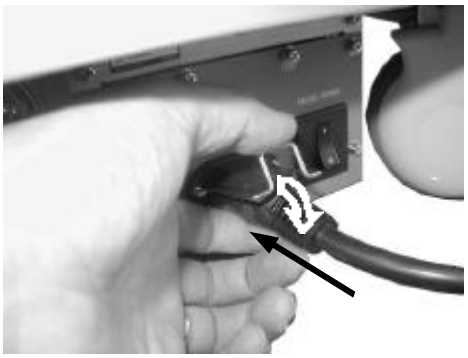
記録装置 Recorder			SSD-4000			
SSZ-707/-709	IN PUT	R	J31 COLOR PRINTER			接栓板 Connector panel
		G				
		B				
		SYNC				
	REMOTE					
	~ AC IN		J854 COLOR PRINTER			AC outlet [JB-260/261]
CP-700/-900	IN PUT	R	J31 COLOR PRINTER			接栓板 Connector panel
		G/G+SYNC				
		B				
		H+V-SYNC				
	REMOTE					
	~ AC LINE		J854 COLOR PRINTER			AC outlet [JB-260/261]
SSZ-307/-309	VIDEO IN		J12 B/W VIDEO OUT			接栓板 Connector panel
	REMOTE		J32 PRINT CONTROL			
	~ AC IN		J853 PRINTER			AC outlet [JB-260/261]
P91	VIDEO IN		J12 B/W VIDEO OUT			接栓板 Connector panel
	REMOTE		J32 PRINT CONTROL			
	~ AC LINE		J853 PRINTER			AC outlet [JB-260/261]
SVO-9500	VIDEO IN		J10	VIDEO OUT		接栓板 Connector panel
	VIDEO IN S VIDEO		J13			
	VIDEO OUT		J11	VIDEO IN		
	VIDEO OUT S VIDEO		J14			
	AUDIO IN	CH-1	CH-1	J21	AUDIO OUT	
		CH-2	CH-2	J23		
	AUDIO OUT	CH-1	CH-1	J20	AUDIO IN	
		CH-2	CH-2	J22		
	REMOTE		J30 VCR CTRL			
	~ AC IN		J855 VCR			AC outlet [JB-260/261]
AG-7350E	VIDEO IN		J10	VIDEO OUT		接栓板 Connector panel
	S1 VIDEO IN		J13			
	VIDEO 2 OUT		J11	VIDEO IN		
	S1 VIDEO OUT		J14			
	AUDIO IN	CH-1	CH-1	J21	AUDIO OUT	
		CH-2	CH-2	J23		
	AUDIO OUT	CH-1	CH-1	J20	AUDIO	
		CH-2	CH-2	J22	IN	
			J855			

4-6. カバーの取り付け方法	4-6. Mounting of Covers.

① カバーの取り外し方法と逆の手順で、カバーを取り付ける。

① Install the cover with the reverse of the cover removal method.

5. ケーブル固定方法	5. Fixing the power cable.



ケーブル固定方法

Fixing the power cable

①電源ケーブル差込後、ストッパでロックする。

①Lock the power cable with lock fittings.

Rev.03

UCW-4000 据付要領書
INSTALLATION PROCEDURES

SSD-4000 用連続波ドプラユニット

Doppler unit for SSD-4000

この据付要領書は、UCW-4000 の納品等の際、据付の資料としてご使用ください。
必要な工具：プラスドライバ、スタビドライバ（あらかじめ用意すること）
※ UCW-4000[EP444200]の作業を行うには、EU-9082[EP444100]が組み込まれている事が必要です。

These installation procedures are provided for reference in installation of UCW-4000.
Tool required : Phillips screw driver , Stabilizing screw driver(Provide it beforehand)
※ It is necessary for installation of UCW-4000[EP444200] to install EU-9082[EP444100].

⚠ 注意

- 装置の据付作業は、有資格者に限られる。
- 装置を設置する場所の環境条件および電源設備は、取扱説明書の記載条件による。

⚠CAUTION

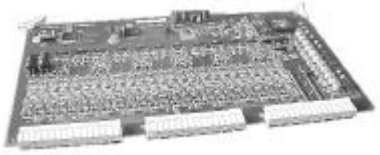
- This system must be installed only by the qualified personnel.
- The environmental conditions for the place of installation of the SSD-4000 system and the specifications of the power supply must satisfy the requirements stated in the operator's manual.

Total Page ：5

Rev.03

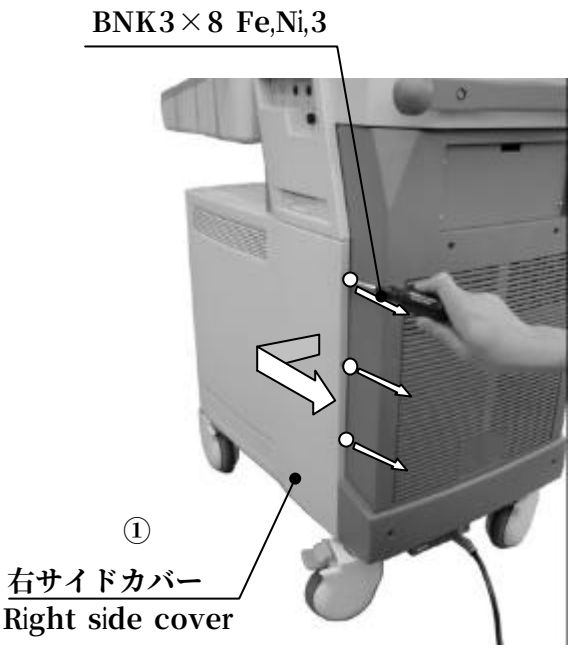
付属品リスト	List of Accessory Parts

下記の付属品が揃っているか確認してください。
Check to assure all the below-listed accessory parts to have been included in the shipping case.

No.	品　　名 Parts Name	外　　観 Appearance	個　数 Quantity
1	UCW-4000 PC 板 EP444200 UCW-4000 PC board EP444200		1

目次	CONTENTS

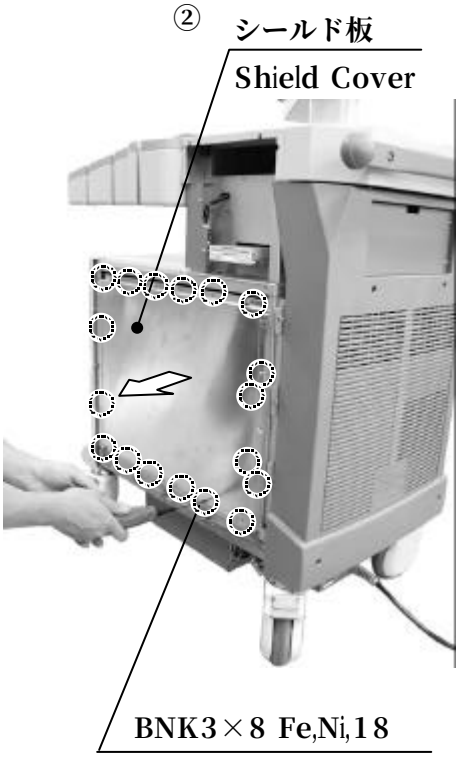
1．カバーの取り外し方法	1．Removing of Covers



右サイドカバーの取り外し方法
Removing of Right Side Cover

① 右サイドカバーを、ねじ３本を緩めて取り外す。

① Loosen 3 screws and remove right side cover.

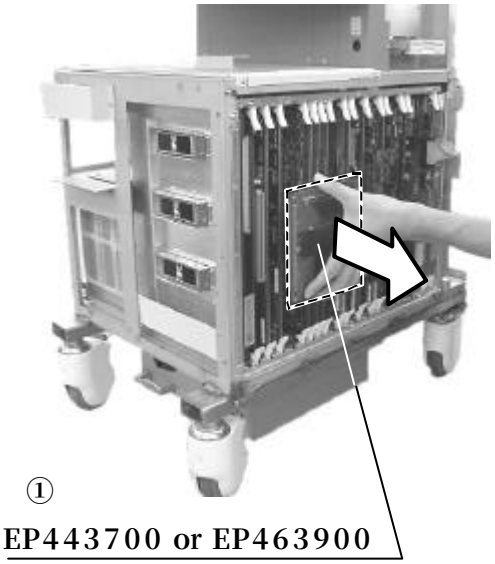


シールド板の取り外し方法
Removing of Shield Cover

② シールド板を、ねじ 18 本を外して取り外す。

② Remove 18 screws and remove shield cover.

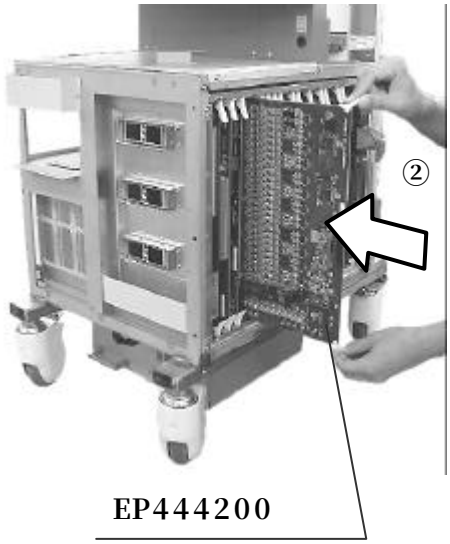
2．PC 板の取付け方法	2．Install the PCB



PC 板の取付け方法
Install the PCB

① PC 板[EP443700]または[EP463900]を抜く。

① Remove the PCB[EP443700] or [EP463900].



② PC 板[EP444200]を差し込む。

②Insert the PCB[EP444200].

3．動作確認	3．Confirmation of the work

①UST-5298 あるいは UST-5299 を接続し, B/D(CW)画像が表示されることを確認する。

①Connect UST-5298 or UST-5299 to the device, Confirm that a B/D (CW) mode image is indicated.

4．カバーの取り付け方法	4．Mounting of Covers

① PC 板[EP443700]または[EP463900]を取り付ける。
② カバーの取り外し方法と逆の手順で、カバーを取り付ける。

①Mount the PCB [EP443700] or [EP463900].
②Install the cover with the reverse of the Removing of Covers.

Rev.01

EU-9082 据付要領書
INSTALLATION PROCEDURES

SSD-4000用ハーモニックエコーユニット

Harmonic Echo Unit for SSD-4000

この据付要領書は、EU-9082の納品等の際、据付の資料としてご使用ください。
必要な工具：プラスドライバ、スタビドライバ（あらかじめ用意すること）

These installation procedures are provided for reference in installation of EU-9082.
Tool required : Phillips screw driver , Stabilizing screw driver(Provide it beforehand)

⚠ 注意

- 装置の据付作業は、有資格者に限られる。
- 装置を設置する場所の環境条件および電源設備は、取扱説明書の記載条件による。

⚠CAUTION

- This system must be installed only by the qualified personnel.
- The environmental conditions for the place of installation of the SSD-4000 system and the specifications of the power supply must satisfy the requirements stated in the operator's manual.

Total Page ：6

Rev. 01

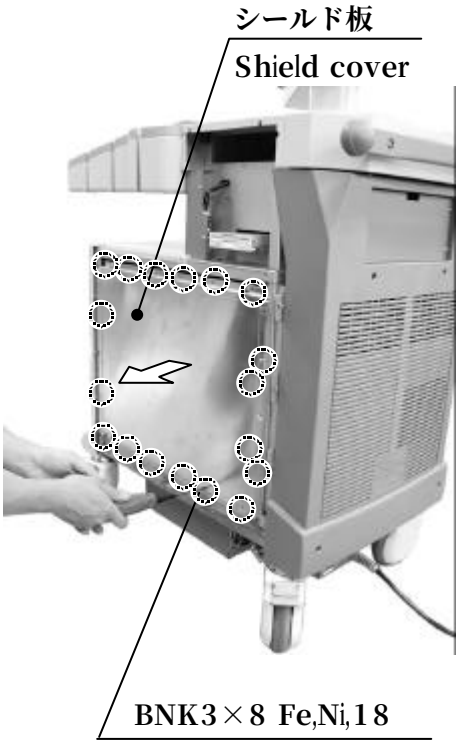
付属品リスト	List of Accessory Parts

下記の付属品が揃っているか確認してください。
Check to assure all the below-listed accessory parts to have been included in the shipping case.

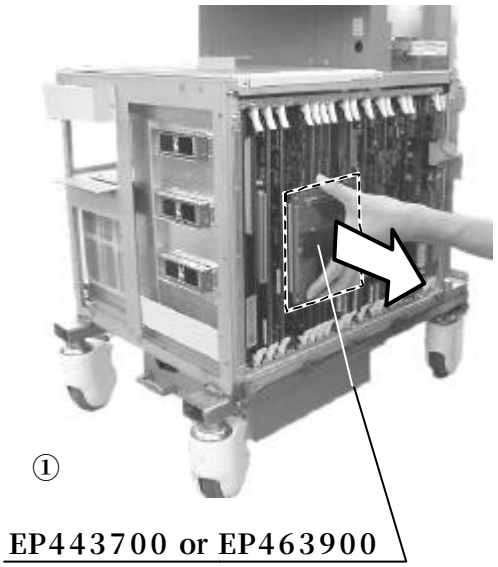
No.	品　　名 Parts Name	外　　観 Appearance	個　　数 Quantity
1	EU-9082 PC板 EP444100 EU-9082 PC board EP444100		1
2	PHD銘板 PHD label		1

Rev.01

目次	CONTENTS

1．カバーの取り外し方法	1．Removing of Covers
	右サイドカバーの取り外し方法 Removing of Right Side Cover ① 右サイドカバーを、ねじ３本を緩めて取り外す。 ① Loosen 3 screws and remove right side cover.
	シールド板の取り外し方法 Removing of Shield Cover ② シールド板を、ねじ 18 本を外して取り外す。 ② Remove 18 screws and remove shield cover.

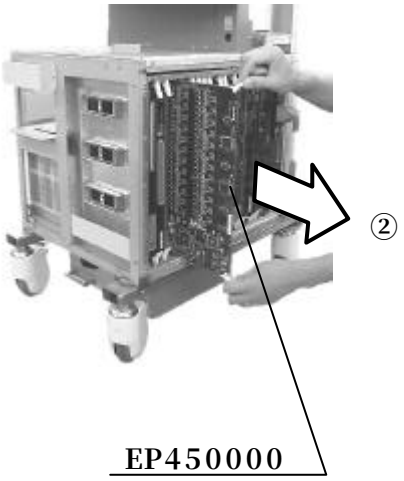
2．PC 板の取付け方法	2．Install the PCB



PC 板の取付け方法
Install the PCB

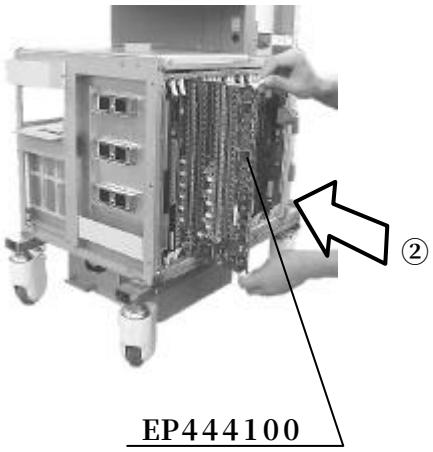
① PC 板[EP443700]または[EP463900]を抜く。

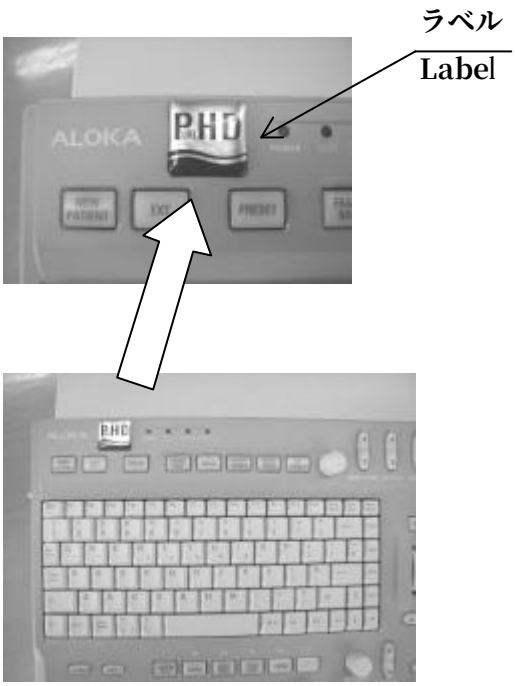
① Remove the PCB[EP443700] or [EP463900].



② PC 板[EP450000]を抜き、同じスロットへPC 板[EP444100]を差し込む。

② Remove the PCB[EP450000], then insert the PCB[EP444100] into the same slot.



	PHD ラベルの貼付け方法 Put PHD Label ③パネルに PHD 銘板を貼り付ける。 ③Put a PHD label onto panel.

3．動作確認	3．Confirmation of the work

①UST-9123 あるいは、UST-5299 接続し、“Tissue Harmonic Imaging”の画像が
表示されることを確認する。

①UST-9123 or UST-5299 is connected and
Confirm that the image of “Tissue Harmonic Imaging” is indicated.

4．カバーの取り付け方法	4．Mounting of Covers

①PC 板[EP443700]または[EP463900]を取り付ける。
②カバーの取り外し方法と逆の手順で、カバーを取り付ける。

①Mount the PCB [EP443700] or [EP463900].
②Install the cover with the reverse of the Removing of Covers.

Rev.01

PEU-4000 据付要領書
INSTALLATION PROCEDURES

SSD-4000 用生体信号ユニット
Physiological signal unit for SSD-4000

この据付要領書は、PEU-4000 の納品等の際、据付の資料としてご使用ください。
必要な工具：プラスドライバ、スタビドライバ、ボックスレンチ（あらかじめ用意すること）

These installation procedures are provided for reference in installation of PEU-4000.
Tool required : Phillips screw driver , Stabilizing screw driver, Nut driver with handle
(Provide it beforehand)

⚠ 注意

- 装置の据付作業は、有資格者に限られる。
- 装置を設置する場所の環境条件および電源設備は、取扱説明書の記載条件による。

⚠ CAUTION

- This system must be installed only by the qualified personnel.
- The environmental conditions for the place of installation of the PEU-4000 system and the specifications of the power supply must satisfy the requirements stated in the operator's manual.

Total Page : 16

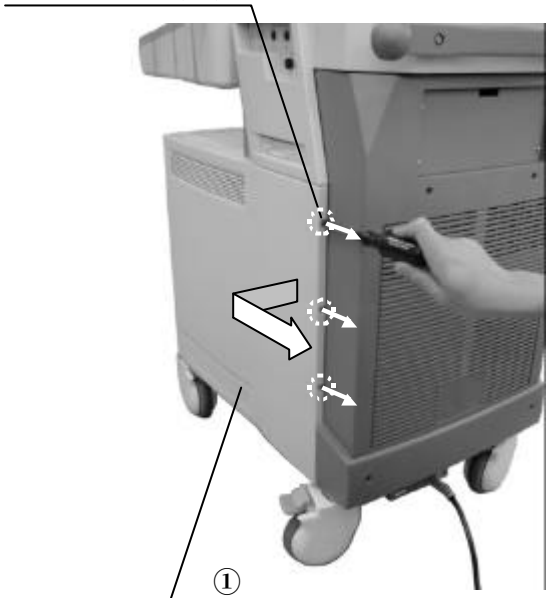
Rev.01

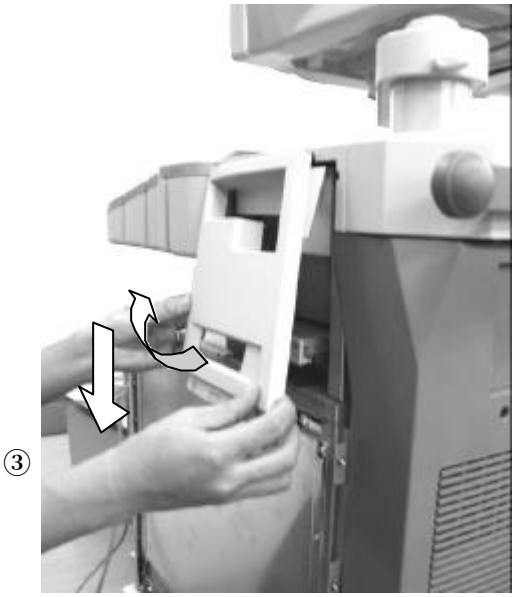
付属品リスト	List of Accessory Parts

下記の付属品が揃っているか確認してください。
Check to assure all the below-listed accessory parts to have been included in the shipping case.

No.	品　　名 Parts Name	外　　観 Appearance	個　　数 Quantity
1	生体パネルユニット (EU-5044) Physiology unit (EU-5044)		1
2	ＰＣ板 EP446800 PC board EP446800		1
3	ＥＣＧ誘導コード ECG signal cord	 L-CABLE-674　L-CABLE-675　L-CABLE-676	1
4	心電図クリップ電極 (SEC141) Electrocardiograph clip electrode (SEC141)	 One set of four	1
6	コントロールパネル (EP453600) Control Panel (EP453600)		1
7	カバー cover		1
8	BNK3×8 Fe,Ni		2
9	BNK4×8 Fe,Ni		2
10	絶縁表示銘板 (P-3223-UL) Isolated Label (P-3223-UL)		1

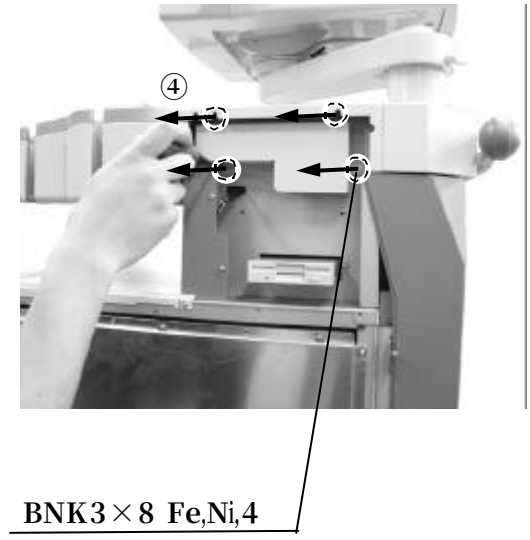
目次	CONTENTS

1．カバーの取り外し方法	1．Removing of Covers
	右サイドカバーの取り外し方法 Removing of Right Side Cover ①右サイドカバーを、ねじ３本を緩めて取り外す。 ①Loosen 3 screws and remove right side cover.
	右上サイドカバーの取り外し方法 Removing of Upper Right Side Cover ②ねじ 2 本を外す。 ②Remove 2 screws.



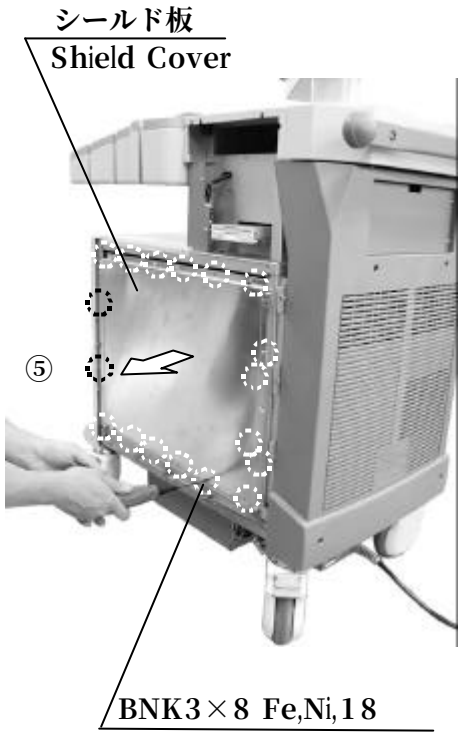
③右上サイドカバー下部を少し持ち上げて下に抜き取る。

③Lift up the lower section of the upper right side cover a bit and remove it.



④カバーを、ねじ 4 本を外して取り外す。

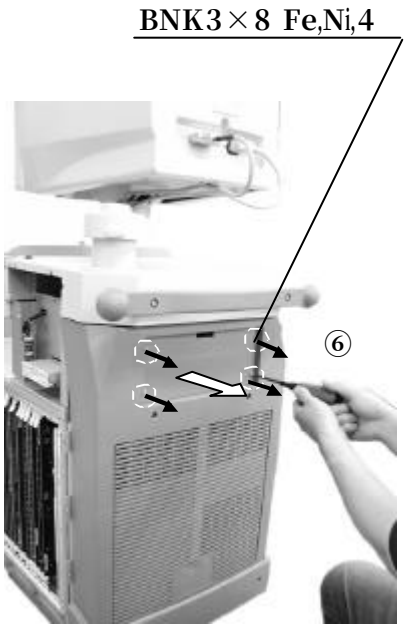
④Remove 4 screws and remove cover.



シールド板の取り外し方法
Removing of Shield Cover

⑤シールド板を、ねじ 18 本を外して取り外す。

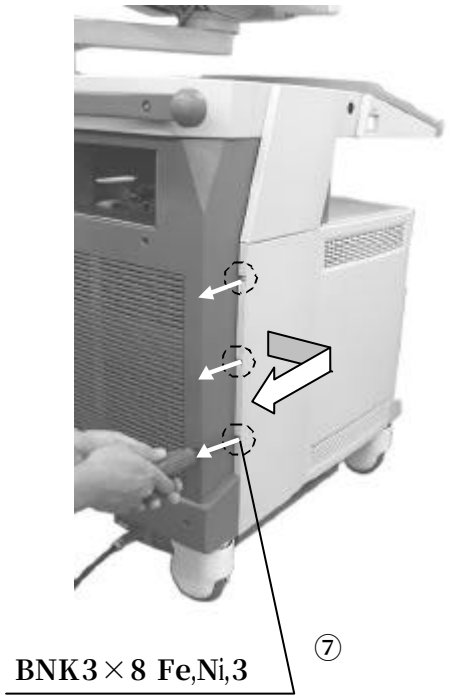
⑤ Remove 18 screws and remove shield cover.



リアカバー小の取り外し方法
Removing of Small Rear Cover

⑥ リアカバー小を、ねじ 4 本を外して取り外す。

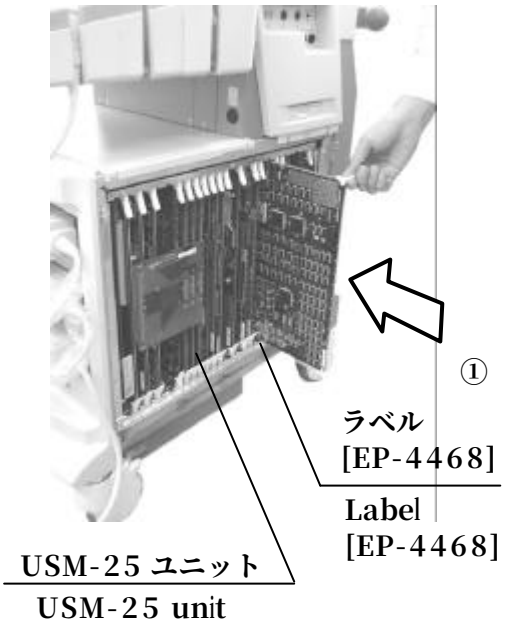
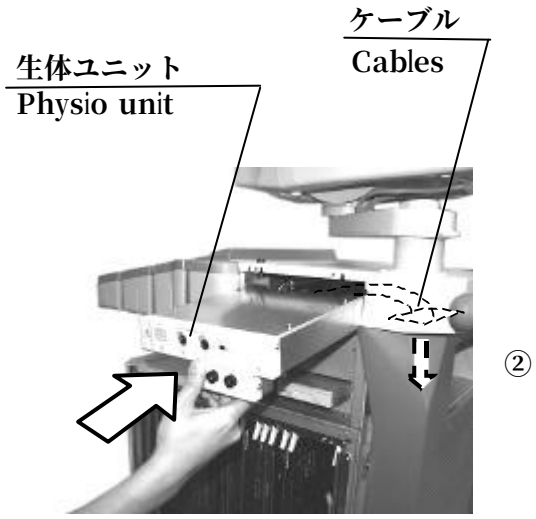
⑥ Remove 4 screws and remove small rear cover.

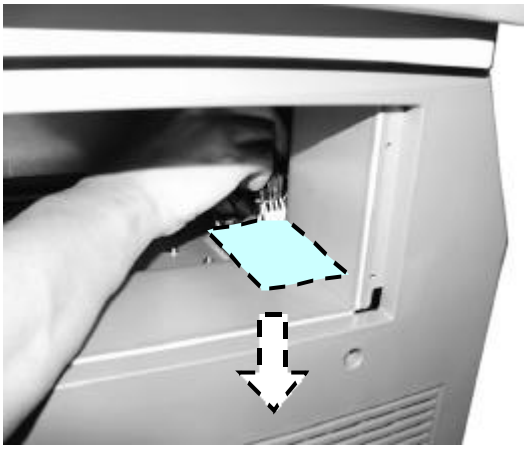


左サイドカバーの取り外し方法
Removing of Left Side Cover

⑦ 左サイドカバーを、ねじ３本を緩めて取り外す。

⑦Loosen 3 screws and remove left side cover.

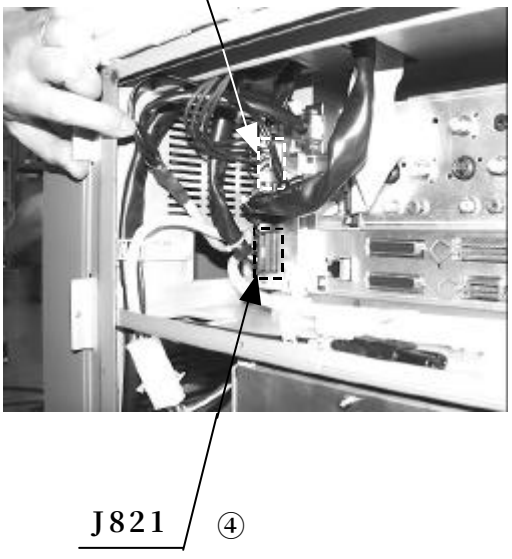
2．PEU-4000 の取付け方法	2．Mounting of PEU-4000
	PEU-4000 の取付け方法 Mounting of PEU-4000 ① PC 板[EP446800] 1 枚を USM-25 ユニットに差し込む。 ①Insert the PCB[EP446800] for the USM-25 unit.
	② ケーブル 2 本を、本体内部のケーブル穴に通す。 ②Install the unit and pass 2 cables through the hole of this inside of main body.



③

③さらに、ケーブル 2 本を、本体内部のケーブル通し穴に通す。

③ Pass 2 cables through a hole of this inside of the main body.



④信号ケーブル[CO-EU-4000-B-04C5]を接栓部の J821 に接続する。

⑤電源ケーブル[CO-EU-4000-A-04C5]を接栓部の J70 に接続する。

④Connect a signal cable [CO-EU-4000-B-04C5] to J821.

⑤Connect a power cable [CO-EU-4000-A-04C5] to J70.

⑥生体ユニットは、①項で外したねじ２本で取り付ける。

⑥Fix the unit with 2 screws removed in Step ①.

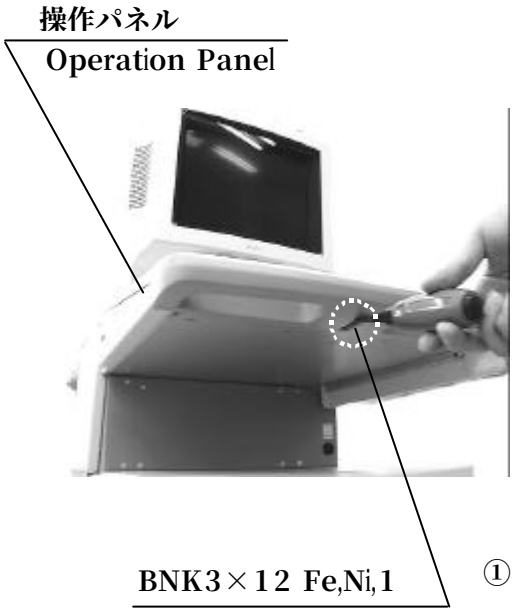
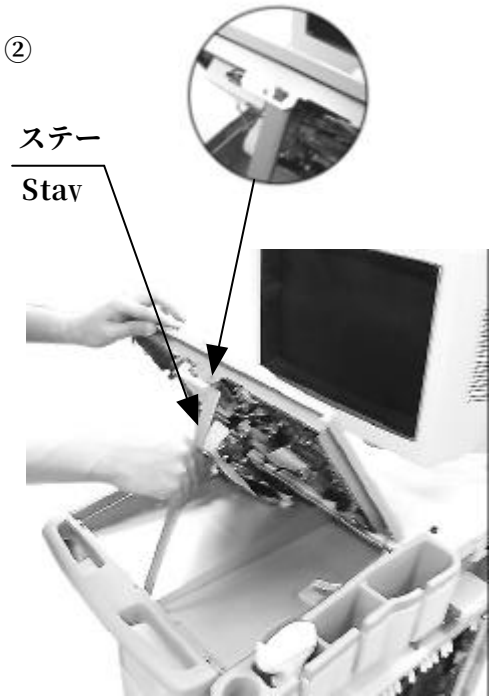
⑦右上サイドカバーに絶縁表示銘板(P-3223-UL)を貼り付ける。

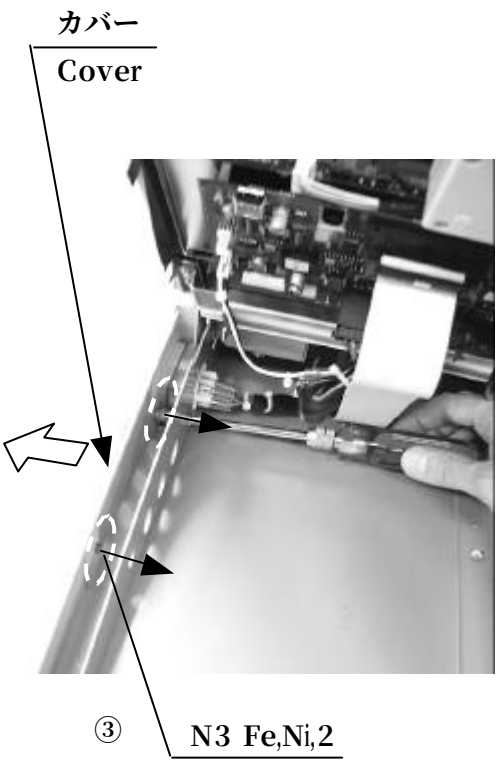
⑦ Put an label for isolated matter(P-3223-UL) at upper right side cover.

3．カバーの取り付け方法	3．Mounting of Covers

①カバーの取り外し方法と逆の手順で、カバーを取り付ける。

①Install the cover with the reverse of Removing of covers.

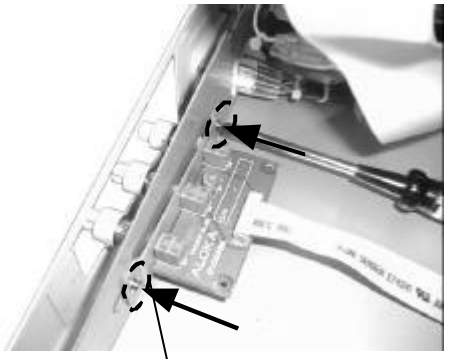
4．操作パネルの取り外し方法	4．Removing of Operation Panel
	操作パネルの取り外し方法 Removing of Operation Panel ①ねじ 1 本を外す。 ① Remove 1 screw.
	②操作パネルの前部を持ち上げる。 ステーをクランプから外し、ステーを立てて固定する。 ② Lift up the front section of the operation panel. Remove the clamp, stand up the stay, and fasten.



③ 操作パネル左側のカバーを、ナット 2 本を外して取り外す。

③Remove 2 nut and remove left side cover of operation panel.

５．コントロールパネルの取付け方法	５．Mounting of Control Panel

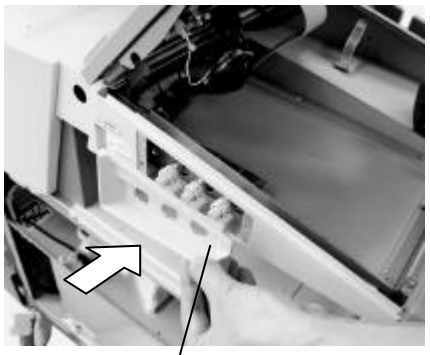


① BNK3×8 Fe,Ni,2

コントロールパネルの取付け方法
Mounting of Control Panel

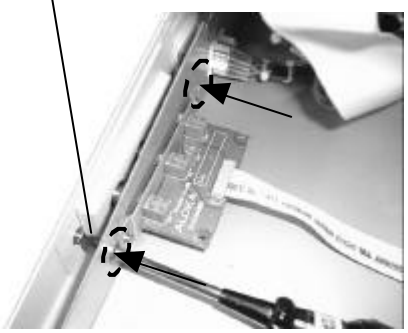
① コントロールパネル[EP453600]を、ねじ２本で取り付ける。

① Fix the control panel [EP453600] with 2 screws.



カバー
Cover

② BNK4×8 Fe,Ni,2

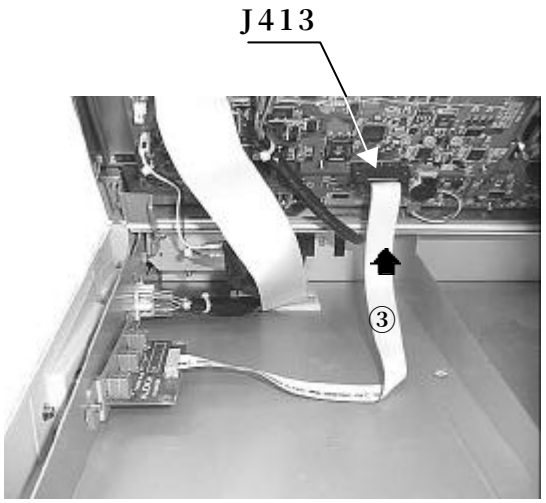


②カバーを、ねじ２本で取り付ける。

② Fix the cover with 2 screws.

注．ツマミが当たらぬ様に、カバーの位置を調整すること。

NOTE：Adjust the position of the cover so that a knob may not hit it.



③信号ケーブルをパネル部の J413 に取り付ける。

③ Connect a signal cable to J413 of operation panel.

6．動作確認	6．Confirmation of the work

①ECG 電極コード、心音マイク、脈波トランスデューサを接続し
ECG, PCG, PLUSE 波形が表示されることを確認する。

①Connect the ECG electrode code, heart sound microphone and pulse wave transducer and confirm that ECG, PCG and PLUSE wave form are indicated.

7．カバーの取り付け方法	7．Mounting of Covers

①カバーの取り外し方法と逆の手順で、カバーを取り付ける。

①Install the cover with the reverse of Removing of covers.

EU-9083 据付要領書
INSTALLATION PROCEDURES

SSD-4000 用データ管理ユニット [VCM]

本ユニットを接続すると、下記の機能が使用可能になります。

- ループ画像の取り込み
- ループ画像のシネサーチ及びループ再生
- Store on disk(Multi frame)
- Send to storage(Multi frame)
- 2 画面/4 画面分割表示

Data Management Unit [VCM] for SSD-4000.

By using this unit, the following functions are available.

- Acquirement of loop image.
- Image search and Loop play back function.
- Store on disk(Multi frame)
- Send to storage(Multi frame)
- Split and Quad windows display.

この据付要領書は、EU-9083 の納品等の際、据付の資料としてご使用ください。
必要な工具：プラスドライバー、スタビドライバー（あらかじめ用意すること）

These installation procedures are provided for reference in installation of EU-9083.
Tool required : Phillips screw driver , Stabilizing screw driver(Provide it beforehand)

⚠ 注意

- ■ 装置の据付作業は、有資格者に限られる。
- ■ 装置を設置する場所の環境条件および電源設備は、取扱説明書の記載条件による。
- ■ 探触子の接続は、取扱説明書を参照すること。
- ■ 指定された機種以外のオプション機器は、取り付けしないこと。

⚠CAUTION

- ■ This system must be installed only by the qualified personnel.
- ■ The environmental conditions for the place of installation of the SSD-4000 system and the specifications of the power supply must satisfy the requirements stated in the operator's manual.
- ■ See the operator's manual for the connection of the probe.
- ■ Do not install optional equipment of other models.

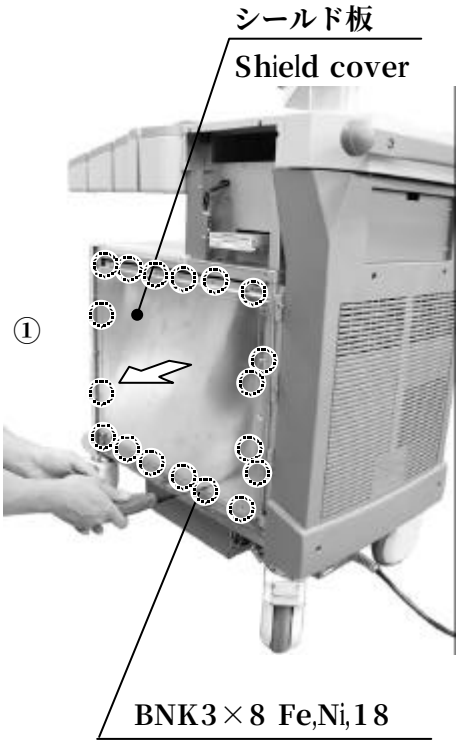
Total Page ：5

付属品リスト	List of Accessory Parts

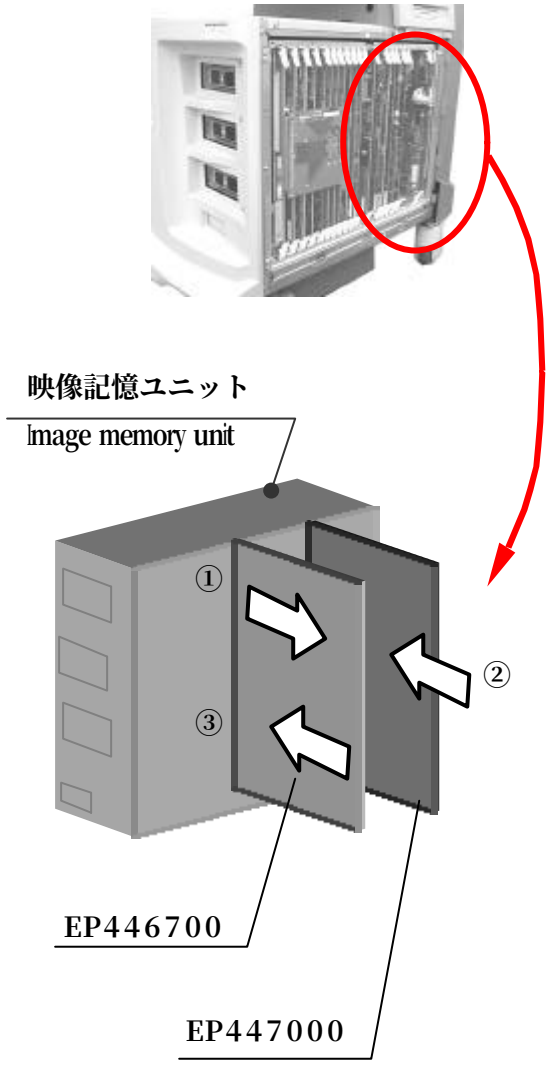
下記の付属品が揃っているか確認してください。
Check to assure all the below-listed accessory parts to have been included in the shipping case.

No.	品　　名 Parts Name	外　　観 Appearance	個　　数 Quantity
1	PC 板 EP447000 PC board EP447000		1

目次	CONTENTS

1．カバーの取り外し方法	1．Removing of Covers
	右サイドカバーの取り外し方法 Removing of Right Side Cover ① 右サイドカバーを、ねじ３本を緩めて取り外す。 ① Loosen 3 screws and remove right side cover.
	シールド板の取り外し方法 Removing of Shield Cover ① シールド板を、ねじ 18 本を外して取り外す。 ① Remove 18 screws and remove shield cover.

2．PCB の取り付け方法	2．Installation of PCB



PCB の取付け方法
Installation of PCB

① 左隣 PC 板[EP446700]を半分引き出す。
(PC 板[EP447000]のメモリカードがぶつかる為)
② PC 板[EP447000]を差し込む。
③ EP446700 を差し込む

① Draw half of the left neighbor PC boards [EP446700].
② Insert PC board [EP447000] in the image memory unit.
③ Insert the EP446700.

3．動作確認	3．Confirmation of the work

①ＶＣＭ機能が正常に動作することを確認する。

①Confirm the VCM function works normally.

4．カバーの取り付け方法	4．Mounting of Covers

①カバーの取り外し方法と逆の手順で、カバーを取り付ける。

①Install the cover with the reverse of the Removing of Covers.

EU-9084 据付要領書
INSTALLATION PROCEDURES

SSD-4000用VOLモード対応ユニット

Volume mode unit for SSD-4000.

この据付要領書は、EU-9084の納品等の際、据付の資料としてご使用ください。
必要な工具：プラスドライバー、スタビドライバー（あらかじめ用意すること。）

These installation procedures are provided for reference in installation of EU-9084.
Tool required : Phillips screw driver , Stabilizing screw driver(Provide it beforehand)

⚠ 注意

- 装置の据付作業は、有資格者に限られる。
- 装置を設置する場所の環境条件および電源設備は、取扱説明書の記載条件による。
- 探触子の接続は、取扱説明書を参照すること。
- 指定された機種以外のオプション機器は、取り付けしないこと。

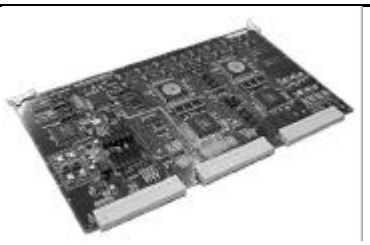
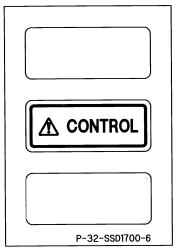
⚠CAUTION

- This system must be installed only by the qualified personnel.
- The environmental conditions for the place of installation of the SSD-4000 system and the specifications of the power supply must satisfy the requirements stated in the operator's manual.
- See the operator's manual for the connection of the probe.
- Do not install optional equipment of other models.

Total Page ：8

付属品リスト	List of Accessory Parts

下記の付属品が揃っているか確認してください。
Check to assure all the below-listed accessory parts to have been included in the shipping case.

No.	品　　名 Parts Name	外　　観 Appearance	個　　数 Quantity
1	PC 板 EP446900 PC board EP446900		1
2	補強板 Reinforcement board		1
3	付属ねじ （BNK3×8Fe,Ni） Accessory screws （BNK3×8Fe,Ni）		2
4	銘板 P-32-SSD1700-6 Label P-32-SSD1700-6		1
5	ケーブル L-CABLE-584-60 Cable L-CABLE-584-60		1
6	コア SFT-72S Core SFT-72S		1

目次	CONTENTS

EU-9084 組み込む前に、SSD-4000 の SN を確認して下さい。
本ユニットは SSD-4000 本体 SN M00201 以降について有効です。

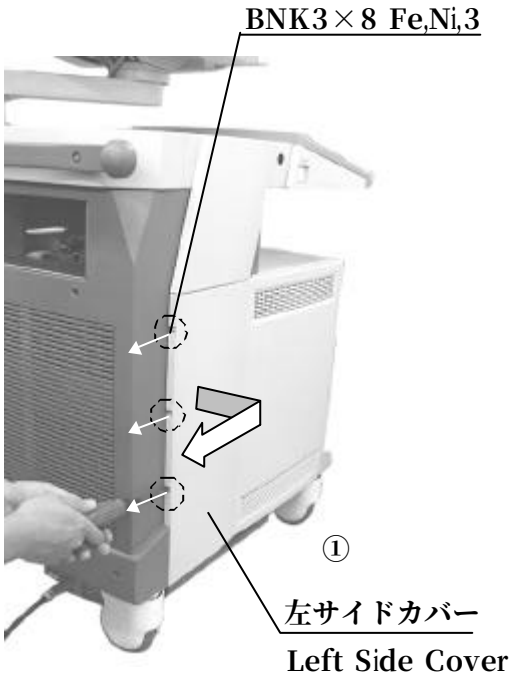
Before installing EU-9084, please confirm serial numbers of SSD-4000.
This unit is applicable to the serial number of M00201 onward.

1．カバーの取り外し方法	1．Removing of Covers

右サイドカバーの取り外し方法
Removing of Right Side Cover

① 右サイドカバーを、ねじ３本を緩めて取り外す。

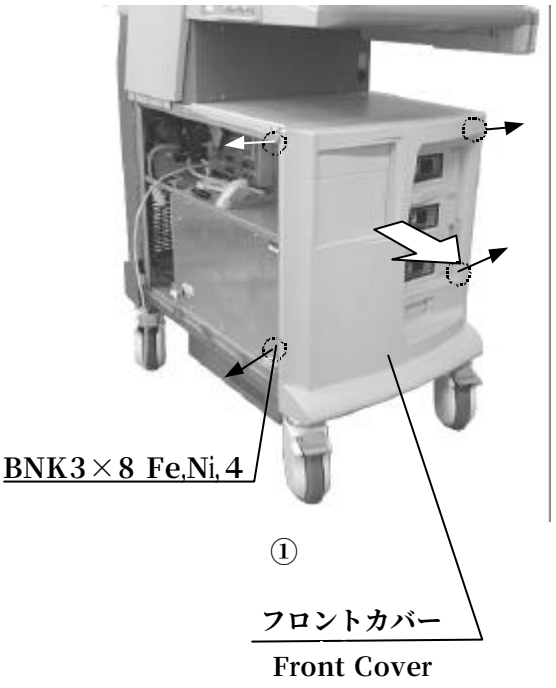
① Loosen 3 screws and remove right side cover.



左サイドカバーの取り外し方法
Removing of Left Side Cover

① 左サイドカバーを、ねじ３本を緩めて取り外す。

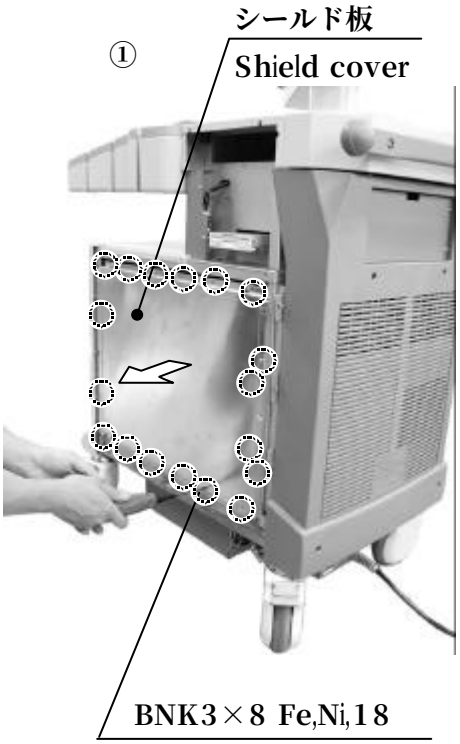
① Loosen 3 screws and remove left side cover.



フロントカバーの取り外し方法
Removing of Front Cover

① フロントカバーをねじ４本緩めて取り外す。

① Loosen 4 screws and remove front cover.

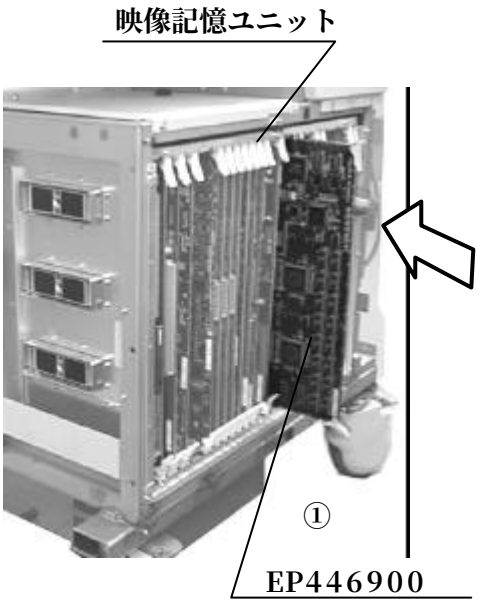


シールド板の取り外し方法
Removing of Shield Cover

① シールド板を、ねじ 18 本を外して取り外す。

① Remove 18 screws and remove shield cover.

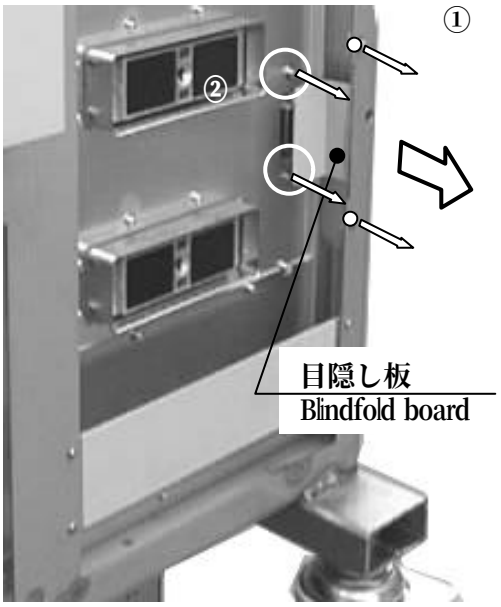
2．PCB の取付け方法	2．Installation of PCB



PCB の取付け方法
Installation of PCB

① PC 板[EP446900]を映像記憶ユニットに差し込む。

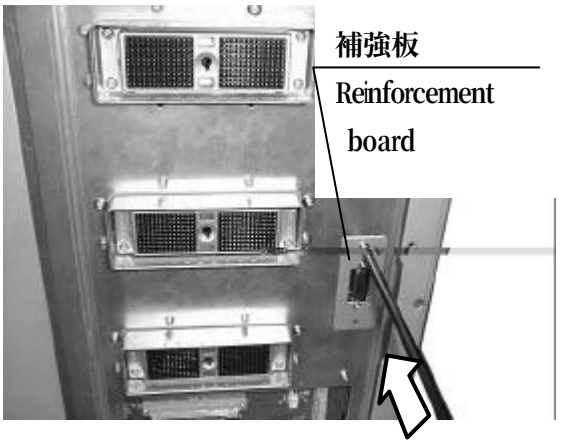
① Insert the PC board [EP446900] in the image memory unit.



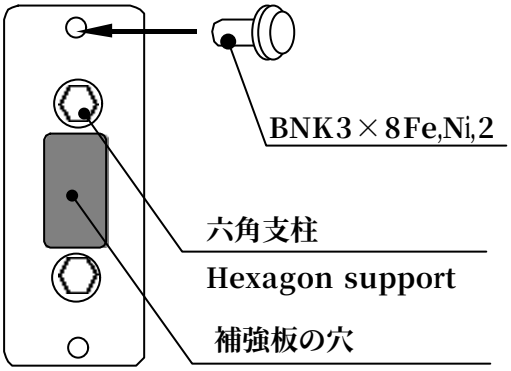
補強板の取り付け方法
Installation of the reinforcement board

①ねじ 2 本外して目隠し板を取り外す。
②ねじ 2 本外す。
（ねじ 4 本、目隠し板は今後不要）

① Remove 2 screws, and remove the blindfold board.
② Remove 2 screws.
(4 screw and the blindfold board will be unnecessary from now on.)



※注意　Attention



③ 補強板をねじ 2 本で取り付ける。

※補強板取り付け注意
六角支柱にコネクタのねじを締めるため
補強板の穴が六角支柱に合うように取付ける。

③ Fix the reinforcement board with 2 screws.

※Reinforcement board installation attention
Install it so that the hole of the reinforcement board may be suitable for the hexagon support. Because the screw of the connector is tightened in the hexagon support.

3．動作確認　3．Confirmation of the work

①プローブとケーブル［L-CABLE-584-60］を接続する。
②ＶＯＬ機能が正常に動作することを確認する。
③プローブとケーブル［L-CABLE-584-60］を外す。

① Connect the cable “L-CABLE-584-60” with the probe.
② Confirm the Volume mode function works normally.
③ Disconnect the cable “L-CABLE-584-60” from the probe.

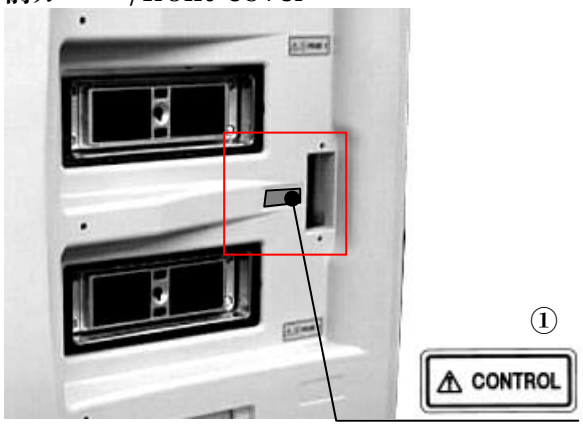
4．カバーの取り付け方法	4．Mounting of Covers

①カバーの取り外し方法と逆の手順で、カバーを取り付ける。

①Install the cover with the reverse of the Removing of Covers.

5．付属品の取り付け方法	5．Installation of accessories

前カバー /front cover

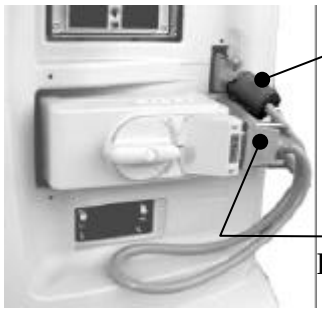


P-32-SSD1700-6

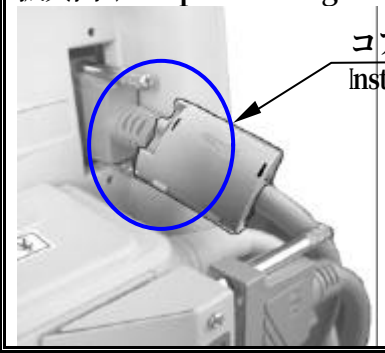
ラベルの貼り付け方法
Paste the label

① 図を参考にラベルを貼る。

① Put the label referring to the figure.



拡大図 ／Expansion figure



コアの取付け方法
Installation of core

①ケーブルをプローブに取り付け、コネクタに差し込む。

②図のようにケーブルにコアを取り付ける。

①Fix a cable on probe, and insert it in the connector.

②Install the core on the cable as the figure.

Rev.01

SCU-4000 据付要領書
INSTALLATION PROCEDURES

SSD-4000用メカニカルラジアル接続ユニット

Mechanical radial probe connecting unit

この据付要領書は、SCU-4000の納品等の際、据付の資料としてご使用ください。
必要な工具：プラスドライバ、スタビドライバ、マイナスドライバ
（あらかじめ用意すること）

These installation procedures are provided for reference in installation of SCU-4000.
Tool required : Phillips screw driver , Stabilizing screw driver,
Flat-bladed screw driver (Provide it beforehand)

⚠ 注意

- 装置の据付作業は、有資格者に限られる。
- 装置を設置する場所の環境条件および電源設備は、取扱説明書の記載条件による。
- 探触子の接続は、取扱説明書を参照すること。

⚠CAUTION

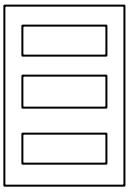
- This system must be installed only by the qualified personnel.
- The environmental conditions for the place of installation of the SSD-4000 system and the specifications of the power supply must satisfy the requirements stated in the operator's manual.
- See the operator's manual for the connection of the probe.

Total Page ：10

Rev.01

付属品リスト	List of Accessory Parts

下記の付属品が揃っているか確認してください。
Check to assure all the below-listed accessory parts to have been included in the shipping case.

No.	品　　名 Parts Name	外　　観 Appearance	個　　数 Quantity
1	PC 板 EP444301 PC board EP444301		1
2	コネクタ Connector unit		1
3	銘板 P-32-SSD1100-3B Label P-32-SSD1100-3B		1
4	付属ねじ （BNK3×8Fe,Ni） Accessory screw （BNK3×8Fe,Ni）		4
※5	ROM 44807C		1
※6	リビジョンシール Revision label		1

※ SSD-4000 本体の S/N:M00501 以降は不要。

※ It is unnecessary after S/N : M00501 of SSD-4000.

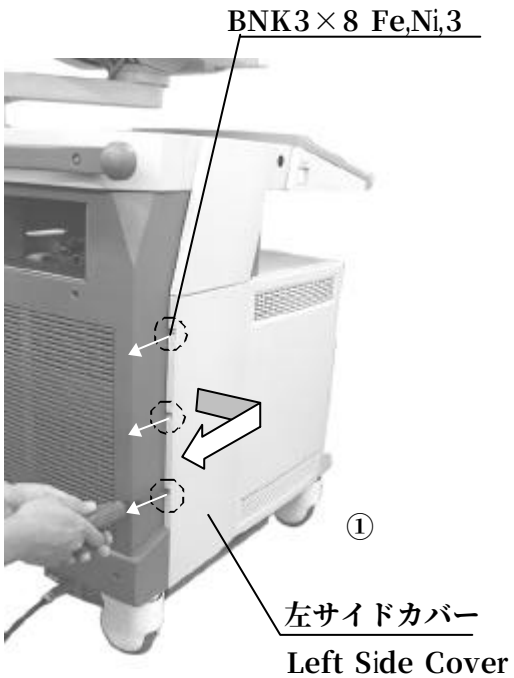
目次	CONTENTS

1．カバーの取り外し方法	1．Removing of Covers

右サイドカバーの取り外し方法
Removing of Right Side Cover

①ねじ３本緩めて右サイドカバーを取り外す。

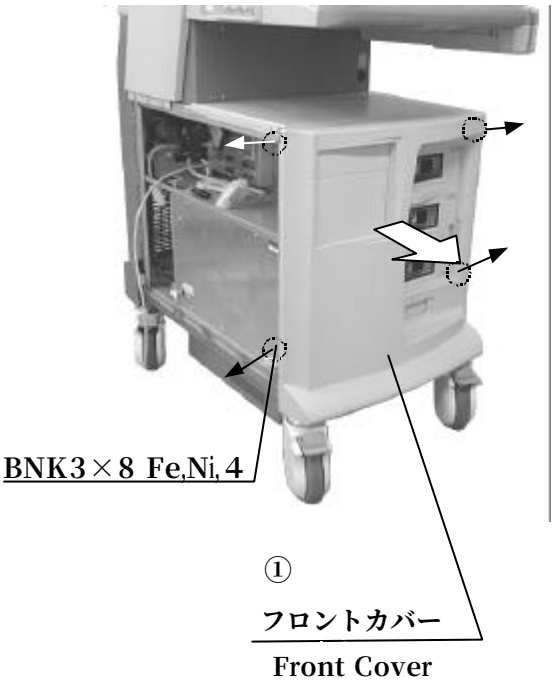
① Loosen 3 screws and remove right side cover.



左サイドカバーの取り外し方法
Removing of Left Side Cover

① ねじ３本を緩め左サイドカバーを取り外す。

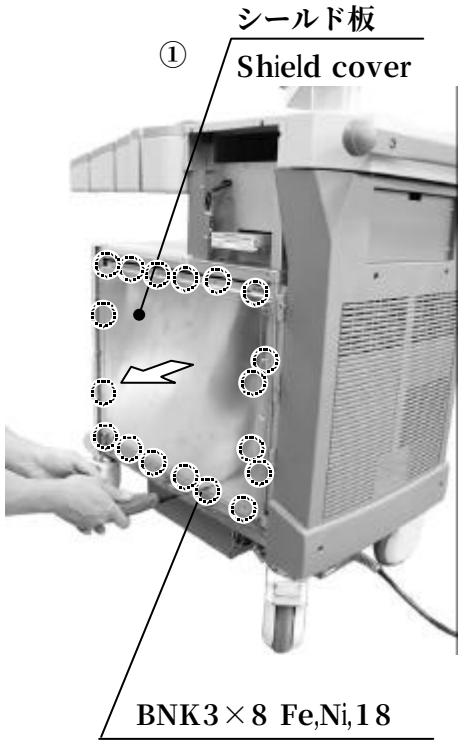
① Loosen 3 screws and remove left side cover.



フロントカバーの取り外し方法
Removing of Front Cover

①ねじ４本を緩めフロントカバーを取り外す。

①Loosen 4 screws and remove front cover.

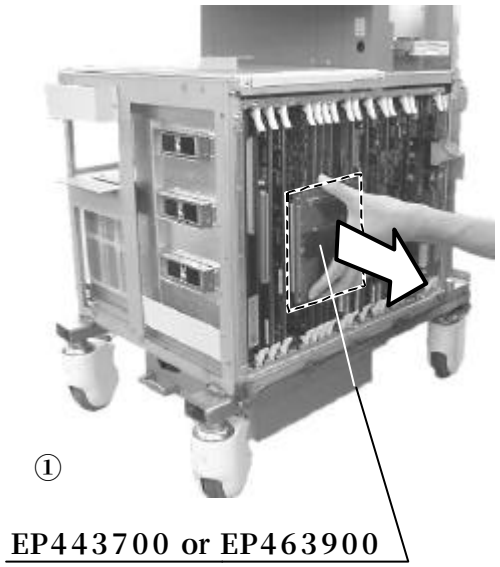


シールド板の取り外し方法
Removing of Shield Cover

① ねじ 18 本を外しシールド板を取り外す。

①Remove 18 screws and remove shield cover.

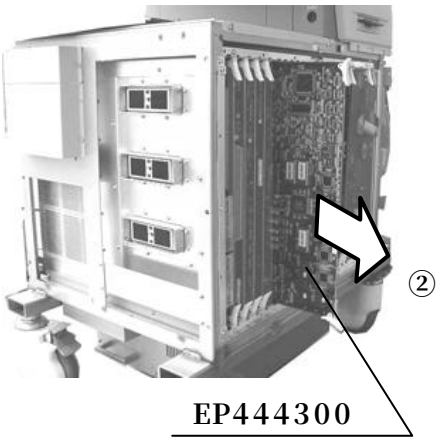
2．PCB の取り付け方法	2．Installation of PCB



PCB の取り付け方法
Installation of PCB

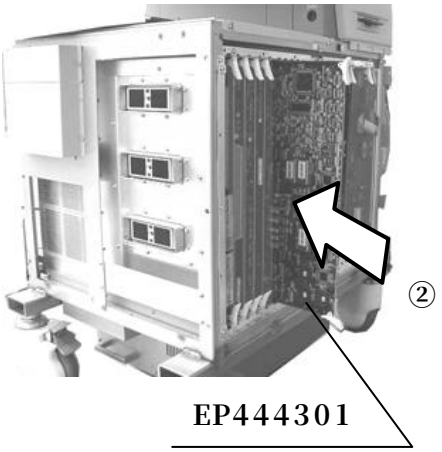
① PC 板[EP443700]または[EP463900]を抜く。

① Remove the PCB[EP443700] or [EP463900].



② PC 板[EP444300]を抜き、同じスロットへ PC 板[EP444301]を差し込む。

③PC 板[EP443700] または[EP463900]を取り付ける。



② Remove the PCB[EP444300], then insert the PCB[EP444301] into the same slot.

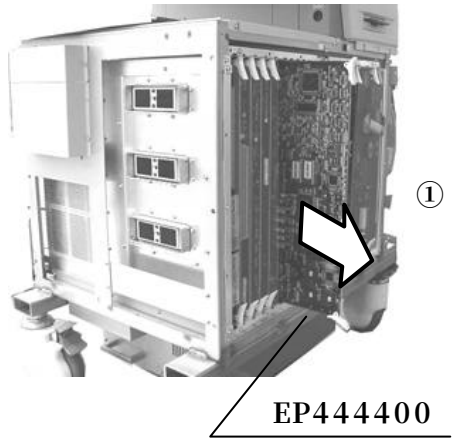
③ Mount the PCB [EP443700] or [EP463900].

3．ROM の交換方法	3．Exchange of the ROM

ROMの交換は SSD-4000 本体のシリアルを確認の上作業を行うこと。

Do work after you confirm SSD-4000's serial number as for the exchange of the ROM.

※ S/N : M00501 以降の装置は作業不要　　※ S/N : device after M00501 is unnecessary.

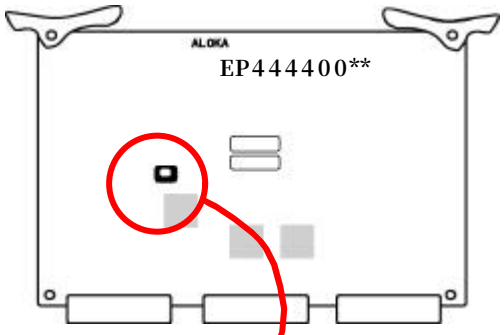


ROM の交換方法

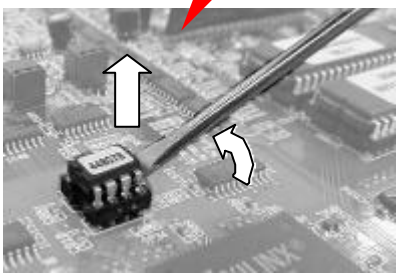
Exchange of the ROM

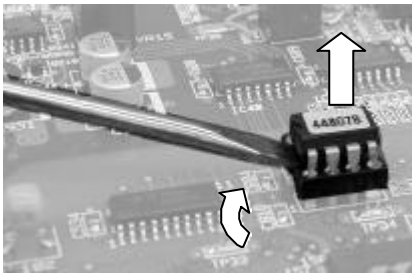
①PC 板[EP444400]を抜く。

①Remove the PCB[EP444400].



②ROM[44807B]



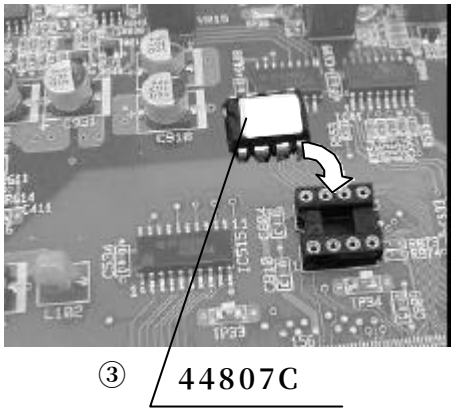
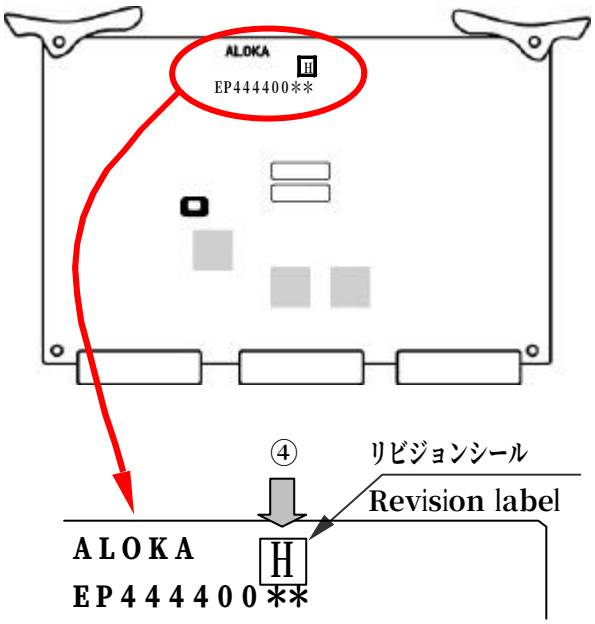
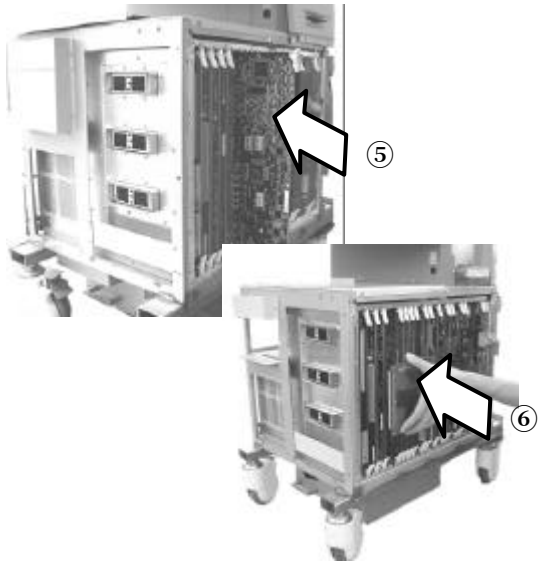


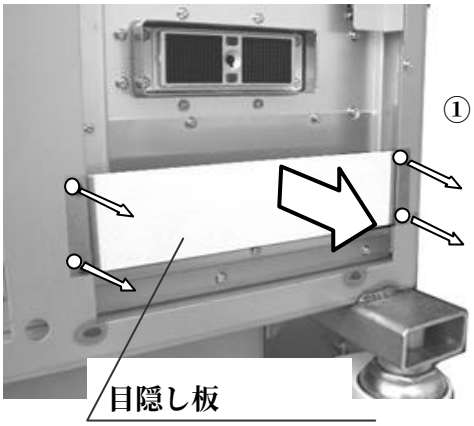
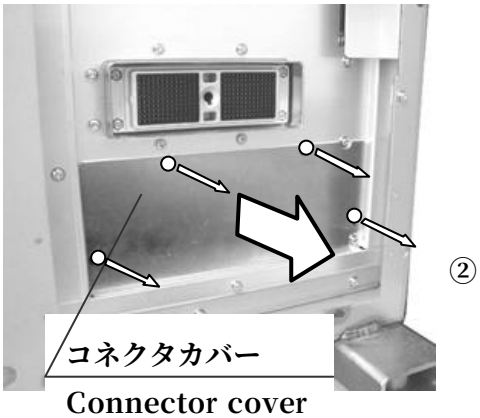
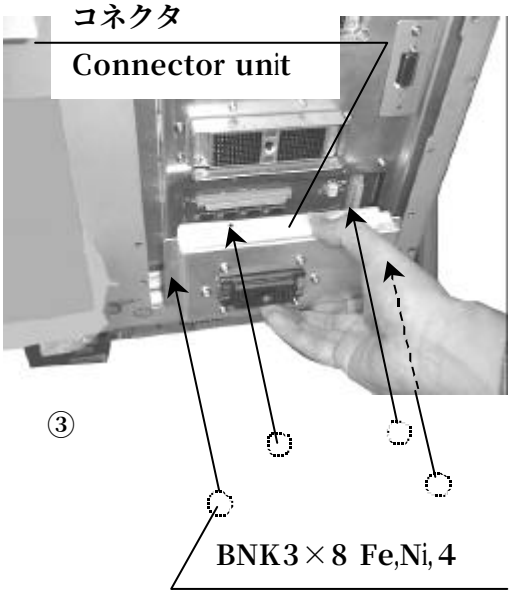
② マイナスドライバーを使用し
ROM[44807B]を取り外す。

※図の様に左右交互に押し上げ ROM を平行に PC 板[EP444400]から抜く。

② Remove the ROM [44807B] by using the flat-bladed screw driver.

※Push it up as the figure in the left-right alternation, and select a ROM from PCB[EP444400] in parallel.

	③ ROM[44807C]を取り付ける。 ③Install a ROM [44807C] on PCB.
	④ PC 板[EP444400]にリビジョンシールを貼り付ける。 ※PC 板[EP444400]形名の上方に貼る。 ④ Paste the revision label on PCB[EP444400]. ※Put it in the top of the PCB[EP444400] name.
	⑤ PC 板[EP444400]を元のスロットに差し込む。 ⑥ PC 板[EP443700]または[EP463900]を取り付ける。 ⑤ Insert PCB[EP444400]in the slot of the cause. ⑥ Remove the PCB[EP443700] or [EP463900].

4．コネクタの取り付け方法	4．Installation of Connector
	①ねじ４本外し、目隠し板を取り外す。 （以後不要） ①Remove 4 screws, and remove the blindfold board. (It is unnecessary from now on.)
	②ねじ４本外し、コネクタカバーを取り外す。 （以後不要） ②Remove 4 screws, and remove the connector cover. (It is unnecessary from now on.)
	③コネクタをねじ４本で取付ける。 ③Use 4 screws to install Connector unit.

5．動作確認	5．Confirmation of the work

①プローブを接続する。
②ＳＣＵ機能が正常に動作することを確認する。
③プローブを外す。

①Connect the mechanical radial probe to probe connector.
②Confirm the SCU function works normally.
③Disconnect the probe from the probe connector.

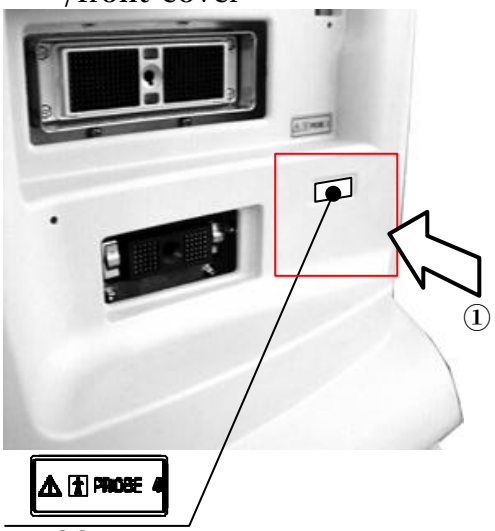
6．カバーの取り付け方法	6．Mounting of Covers

①カバーの取り外し方法と逆の手順で、カバーを取り付ける。

①Install the cover with the reverse of the Removing of Covers.

7．付属品の取り付け方法	7．Installation of accessories

前カバー /front cover



P-32-SSD1100-3B

ラベルの貼り付け方法
Paste the label

① 図を参考にラベルを貼る。

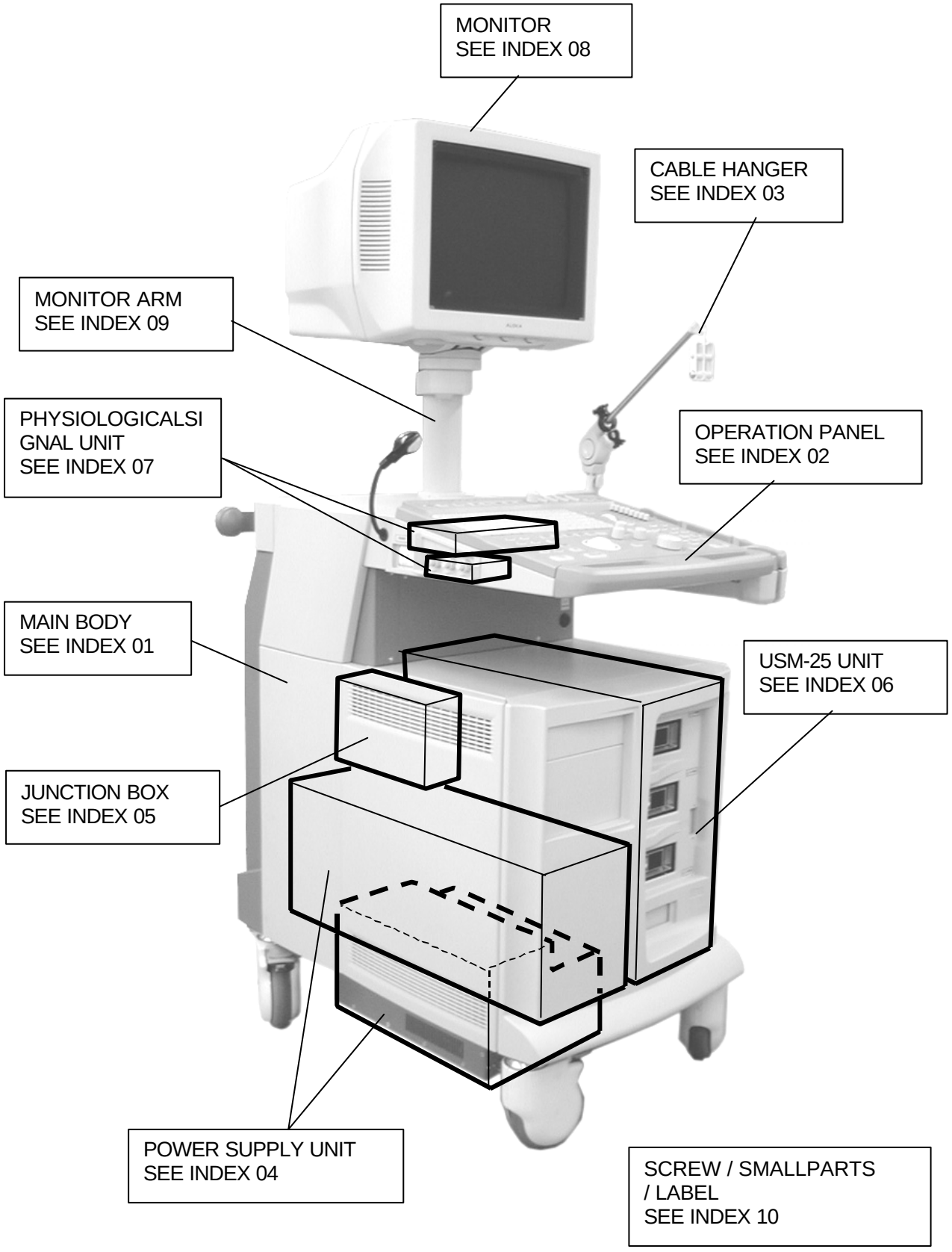
① Put the label referring to the figure.

SECTION 10

PARTS LIST

10-1 Contents of Parts List

Parts are separately shown as each portion of equipment. When you find the part, firstly choose the portion the part belonged, then open the page suggested with “INDEX”.



10-2 Appliance of Parts List

This Parts List consists of the parts for technical service and maintenance. Therefore, the parts model name (PARTS No.) is only valid to the technical support. When you order the parts shown in the List, please apply to our technical support section.

Before you find the parts with this Parts List, please note that nobody can use any description in this List for the other purpose.

10-3 Outline of Parts List

This Parts List shows many parts which are selected for the technical support and maintenance, and made with the illustrations and Lists. These parts are selected with one of the basis as below,

◆ For the surface of the equipment such as Cover and Connector

◆ Machinery and things to be broken without difficulty

◆ Operation panel including the Knob and Switch

◆ Cables

Excluding one soldered to the other part directly

◆ PCB

Please refer to the History which has been issued separately, because almost of the PCBs have the revisions.

◆ The things to be replaced frequently such as the variable resistor for the panel

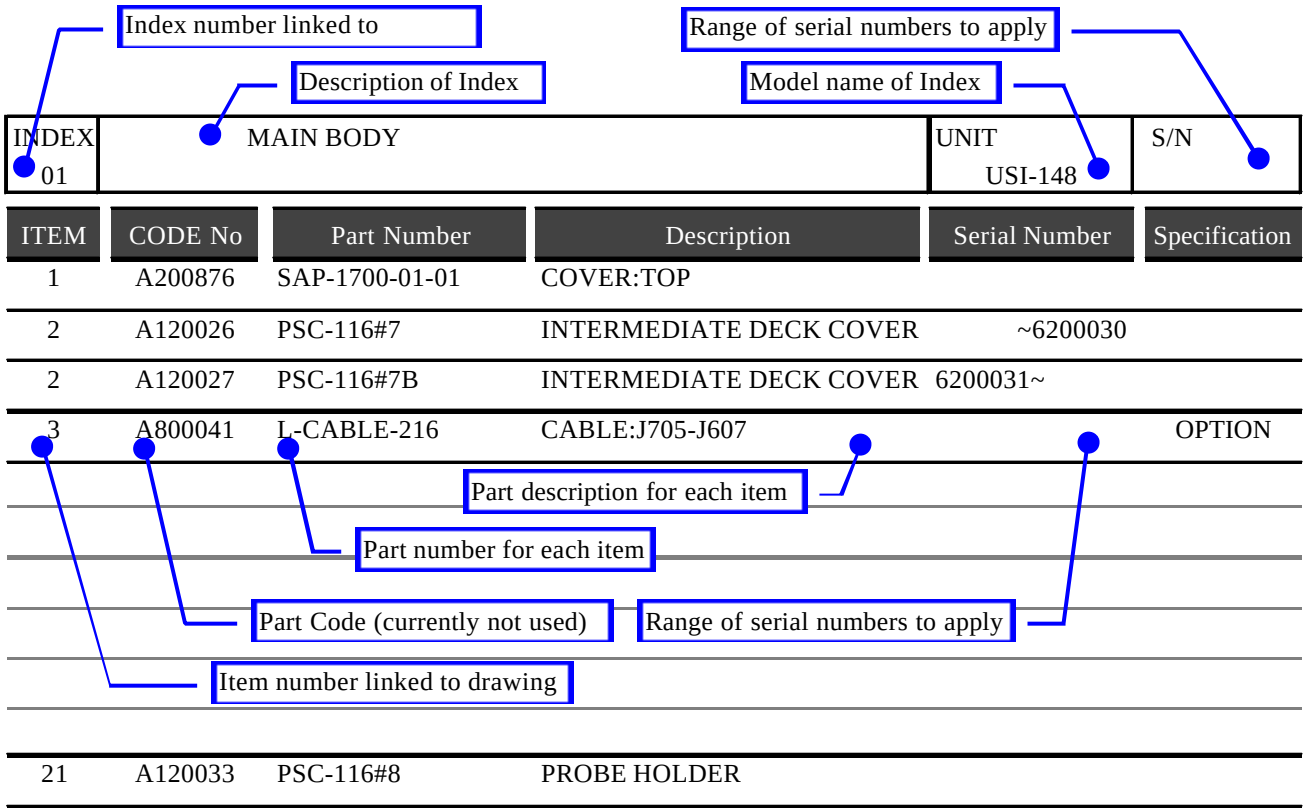
◆ General small parts such as screws and cable clamps

The location are not shown in the illustration.

◆ Things to be needed additionally for the technical support.

10-4 Explanation of Parts List

This Parts List is divided by some blocks (INDEX), and each block consists of the illustration and list.



INDEX 01	MAIN BODY			UNIT USI-148	S/N
ITEM	CODE No	Part Number	Description	Serial Number	Specification
1	A200876	SAP-1700-01-01	COVER:TOP		
2	A120026	PSC-116#7	INTERMEDIATE DECK COVER	~6200030	
2	A120027	PSC-116#7B	INTERMEDIATE DECK COVER	6200031~	
3	A800041	L-CABLE-216	CABLE:J705-J607		OPTION
21	A120033	PSC-116#8	PROBE HOLDER		

INDEX — The number of the division for each Parts List (illustrations and Lists). This is indicated in the illustration for whole equipment at the beginning.

UNIT — The name of this block (or unit) indicated by **INDEX**.
If the same block or unit will be revised, it will be distinguished with this and next **S/N**

S/N	If the same block or unit will be revised, it will be distinguished with UNIT, and this shows the beginning of production change.
ITEM	Relation numbers between illustration and List.
CODE No	Code number applied one by one to each parts. However, at this time (May '98), it is not acceptable to order.
Parts No	Parts number
SERIAL No	Applied serial number. If it shows "×××××～"、the part is available to serial number or after. On the other side, "～×××××" means valid to the serial number and before. If the blank, If the blank, it is not depended on the serial number.
SPEC	The specification, some differences on shipment, and the other remarks are shown.

10-5 Attention

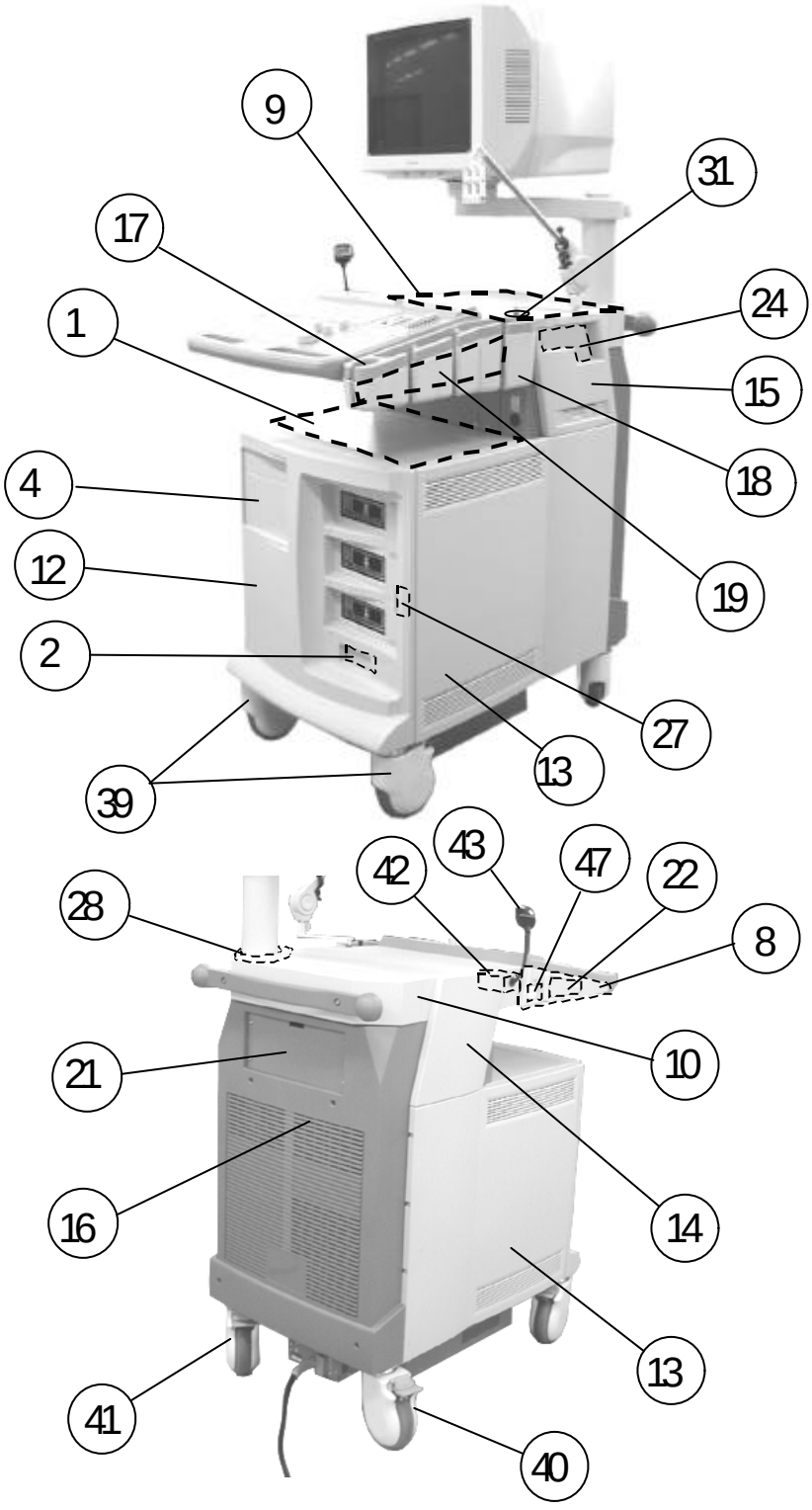
- Prohibition to use both previous and current format of Parts List.
  In the current one, the model names of some parts are deferent from previous.

- Reference with "History" for the order of PCBs.
  This Parts List does not show the PCB version (or not follow the each revision). Therefore, when you order the PCBs, please see the "History" issued separately.

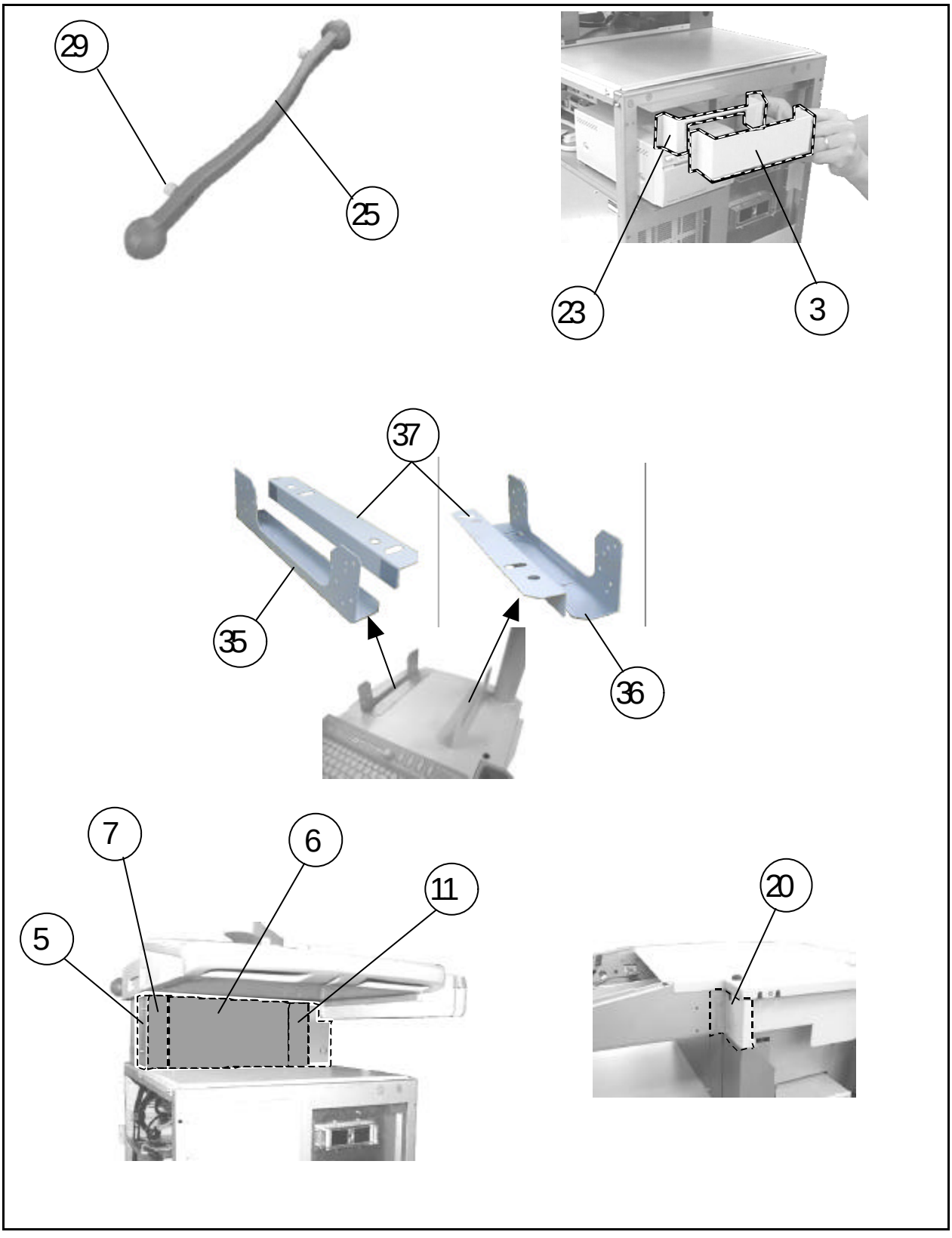
10-6 Parts List

The parts List is shown from next page. It consists of “INDEX”. For the portion of equipment suggested with “INDEX”, refer to the figure described in page 10-1.

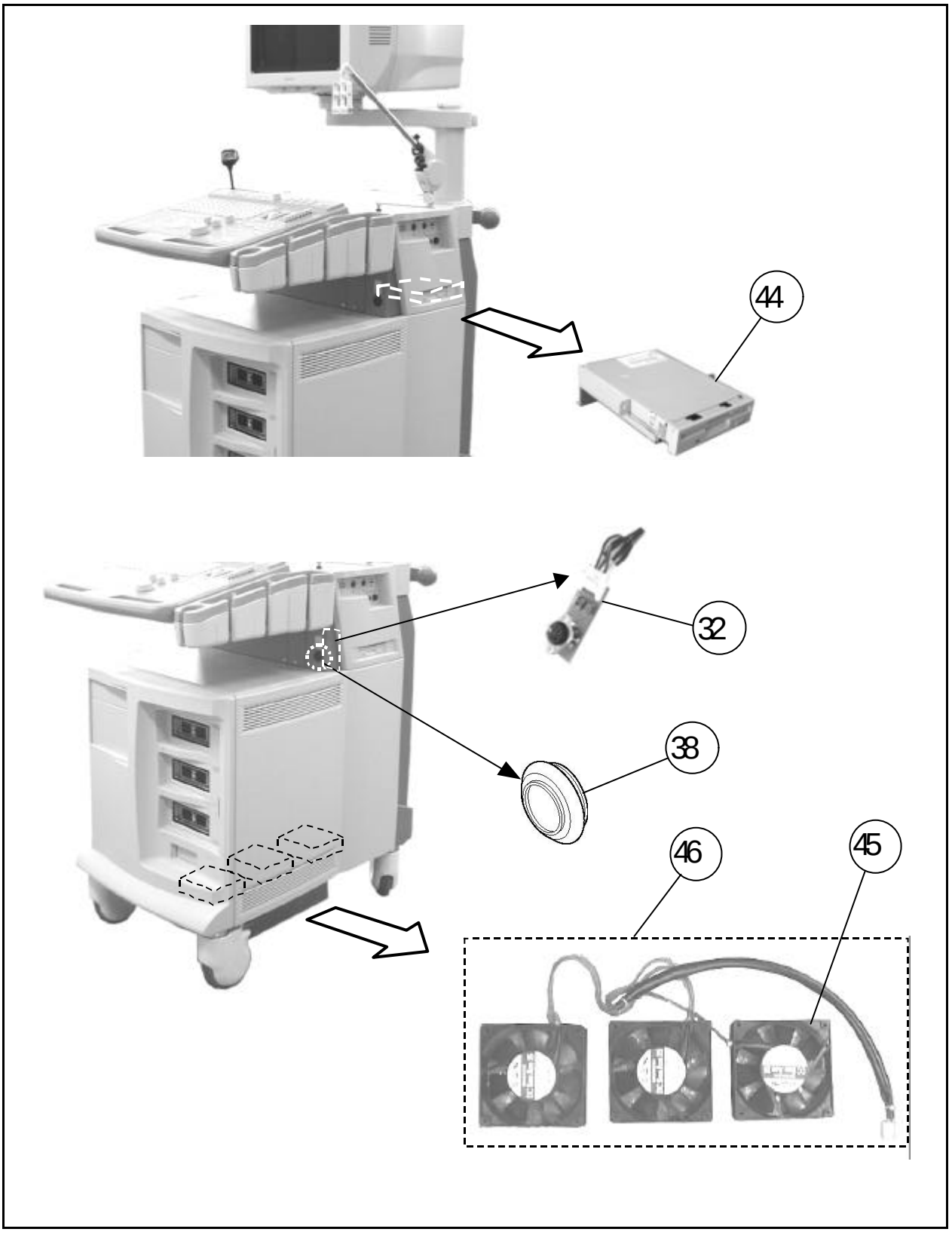
01	MAIN BODY	USI-150	S/N



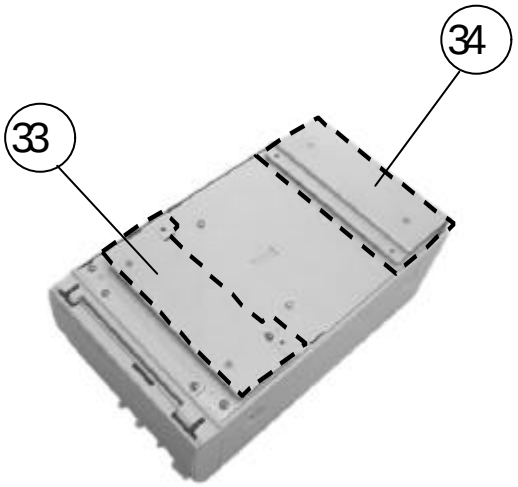
01	MAIN BODY	USI-150	S/N



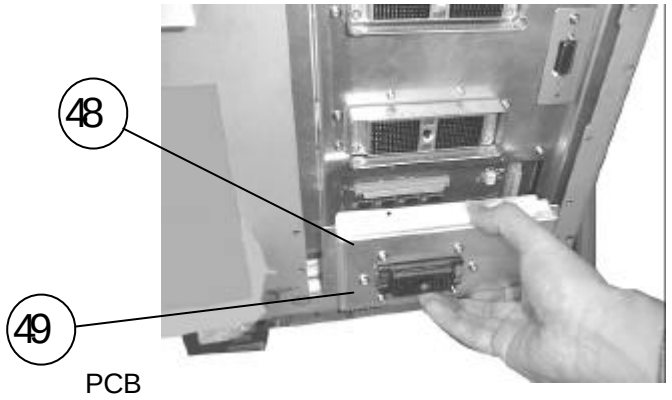
01	MAIN BODY	USI-150	S/N

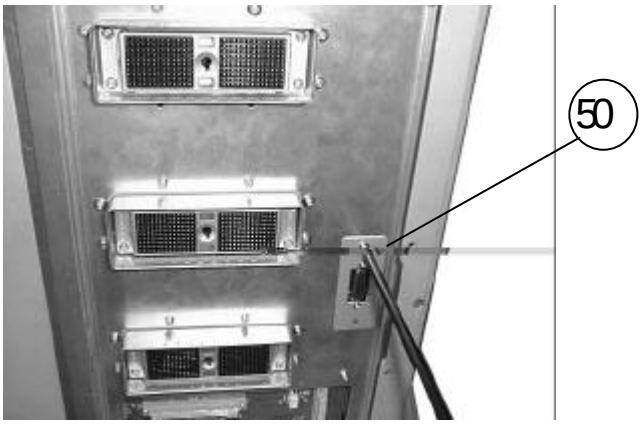


01	MAIN BODY	USI-150	S/N



01	MAIN BODY	USI-150	S/N





INDEX 01	MAIN BODY	UNIT USI-150	S/N

Item	Code	Part Number	Description	Serial Number	Specification
1	A110240	SAP-4000-01-01	SHELF1		
2	A120275	SAP-4000-01-02	COVER1		
3	A100461	SAP-4000-01-03	COVER2		
4	A110241	SAP-4000-01-04	COVER3		
5	A120276	SAP-4000-01-05	SHELF2		
6	A120277	SAP-4000-01-06	COVER4		
7	A110242	SAP-4000-01-07	COVER5		
8	A120278	SAP-4000-01-08	COVER:PANEL		
9	A100462	SAP-4000-01-09	COVER:TOP		
10	A120279	SAP-4000-01-10	COVER:REAR TOP		
11	A120280	SAP-4000-01-11	COVER6		
12	A120281	SAP-4000-01-12	COVER:FRONT		
13	A120296	SAP-4000-01-28	COVER:SIDE		
14	A120300	SAP-4000-01-32	COVER:UPPER LEFT SIDE		
15	A120301	SAP-4000-01-31	COVER:UPPER RIGHT SIDE		
16	A120297	SAP-4000-01-29	COVER:REAR		
17	A120286	USI-150#20	PROBE HOLDER		
18	A120298	SAP-4000-01-30	HOLDER COVER:UNDER		
19	A100463	USI-150#22	HOLDER:FIXED PLATE		
20	A110243	SAP-4000-01-13	COVER:SMALL		
21	A120288	SAP-4000-01-14	COVER:REAR SMALL		
22	A100464	SAP-4000-01-15	COSMETIC PLATE(1)		
23	A110244	SAP-4000-01-16	COVER7		
24	A110245	SAP-4000-01-17	COSMETIC PLATE(2)		
25	A120289	SAP-4000-01-18	HANDLE:BACK		
26	A110246	USI-150#30	STAY		

INDEX 01	MAIN BODY	UNIT USI-150	S/N

Item	Code	Part Number	Description	Serial Number	Specification
27	A120290	SAP-4000-01-19	COVER8		
28	A120295	USI-150#33	COVER:ARM		
29	A110247	SAP-4000-01-21	SPACER		
30	A120292	SAP-4000-01-22	HANDLE:FRONT		
31	A110248	PSC-135#27	RECEIVER		
32	A801659	EP426100**	PCB:FOOT SWITCH	M00101 ~ M01110	
32	A802687	EP473200**	PCB : FOOT SWITCH	M01111 ~	
33	A110249	SAP-4000-01-23	PLATE(1)		
34	A110250	SAP-4000-01-24	PLATE(2)		
35	A140359	SAP-4000-01-25	PLATE:LEFT		
36	A140360	SAP-4000-01-26	PLATE:RIGHT		
37	A140361	SAP-4000-01-27	PLATE(3)		
38	A120293	MG-2	CAP		
39	A201556	DC125BT5/W529U	CASTER:FRONT WITH LOCK		
40	A201558	DC125BP1/W529U	CASTER:REAR WITH LOCK		
41	A201557	DC125DBP1/W529U	CASTER:REAR WITH SWIVEL LOCK		
42	A616030	P-10-ASS1	LIGHT HOLDER		
43	A616029	LIGHT : FIZZ-461	LIGHT		
44	A897009	FD-235HF-A591	FLOPPY DISK DRIVE		
45	A625049	109P1212M402	FAN		
46	A201559	CO-PSC-135-B	FAN ASSY		
47	A611088	L-S-63	POWER SWITCH		
48	A100465	SCU-4000#1	MECHANICAL SCANNER UNIT COVER		FOR SCU-4000
49	A802592	EP444800**	PCB : MECHA. CONNECTOR	~	FOR SCU-4000
50	A100466	EU-9084#1	REINFORCEMENT PLATE		FOR EU-9084

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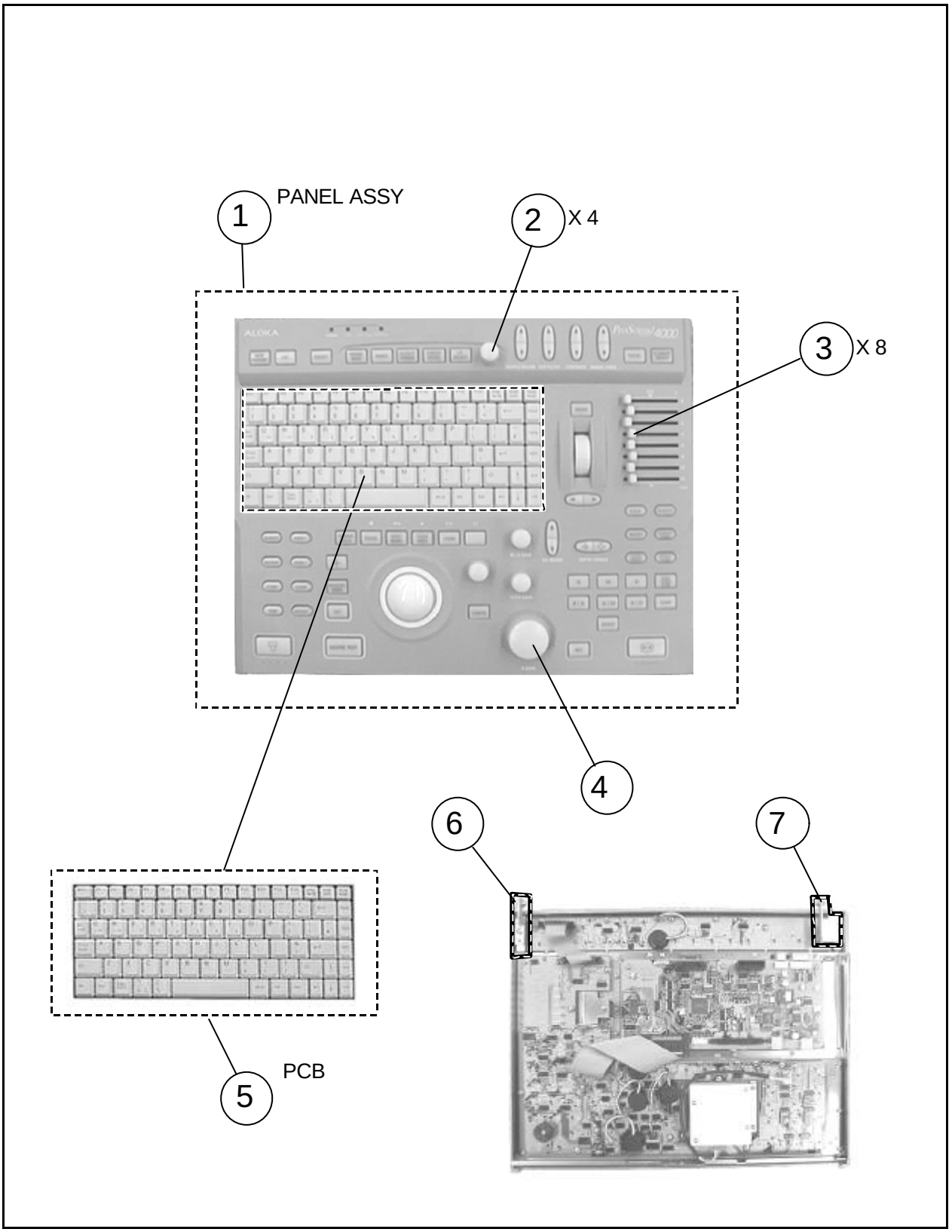
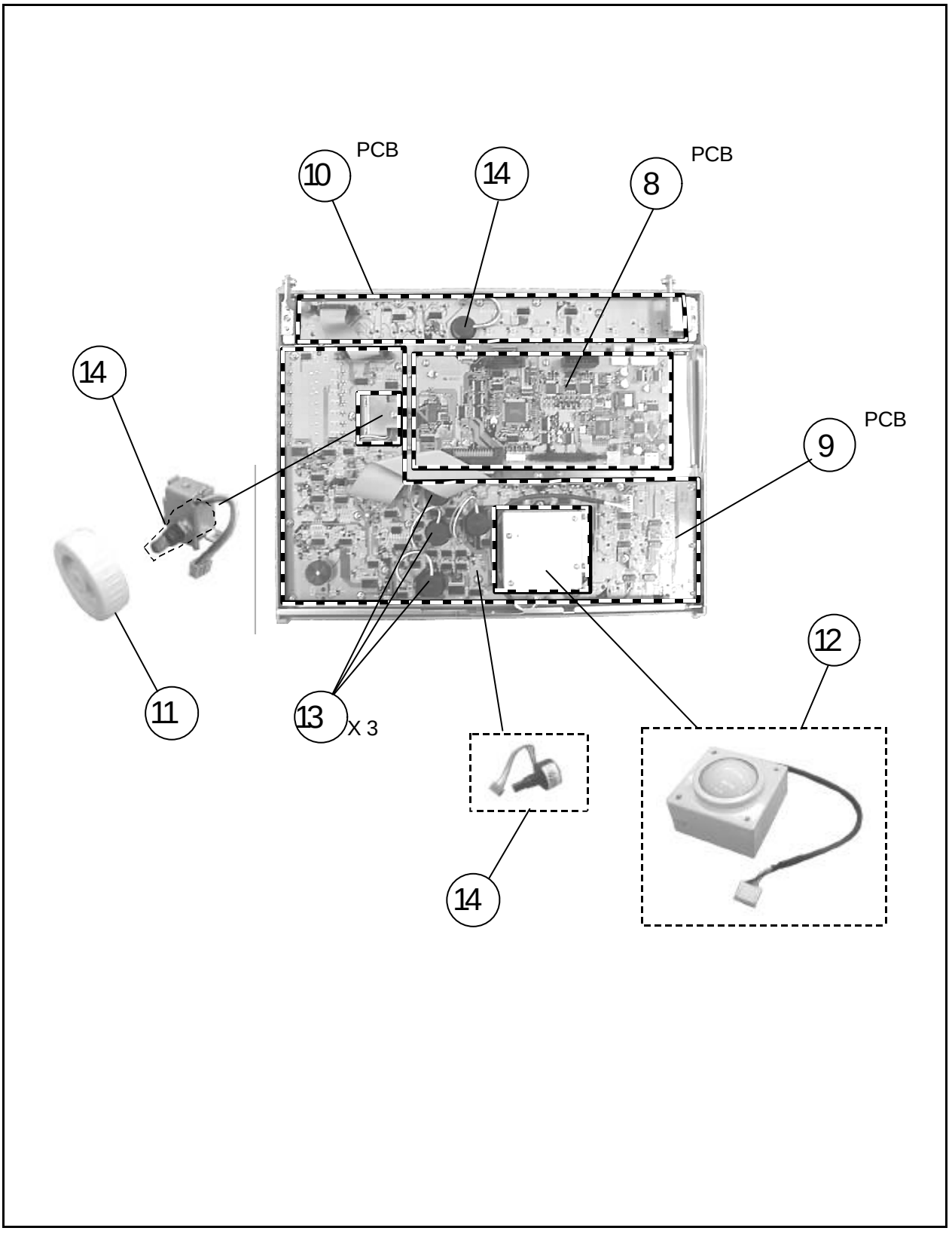
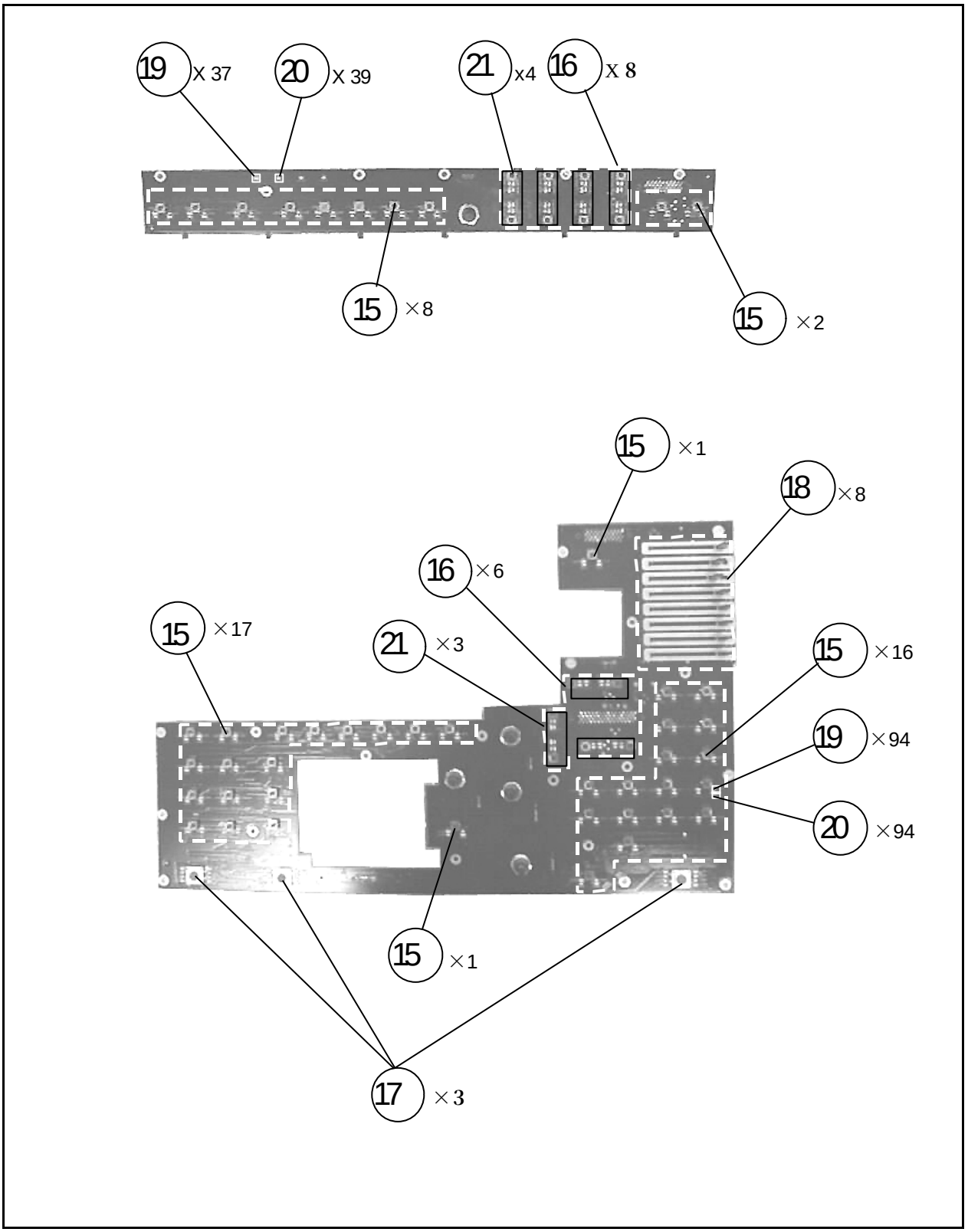
02	OPERATION PANEL	L-KEY-75*	S/N



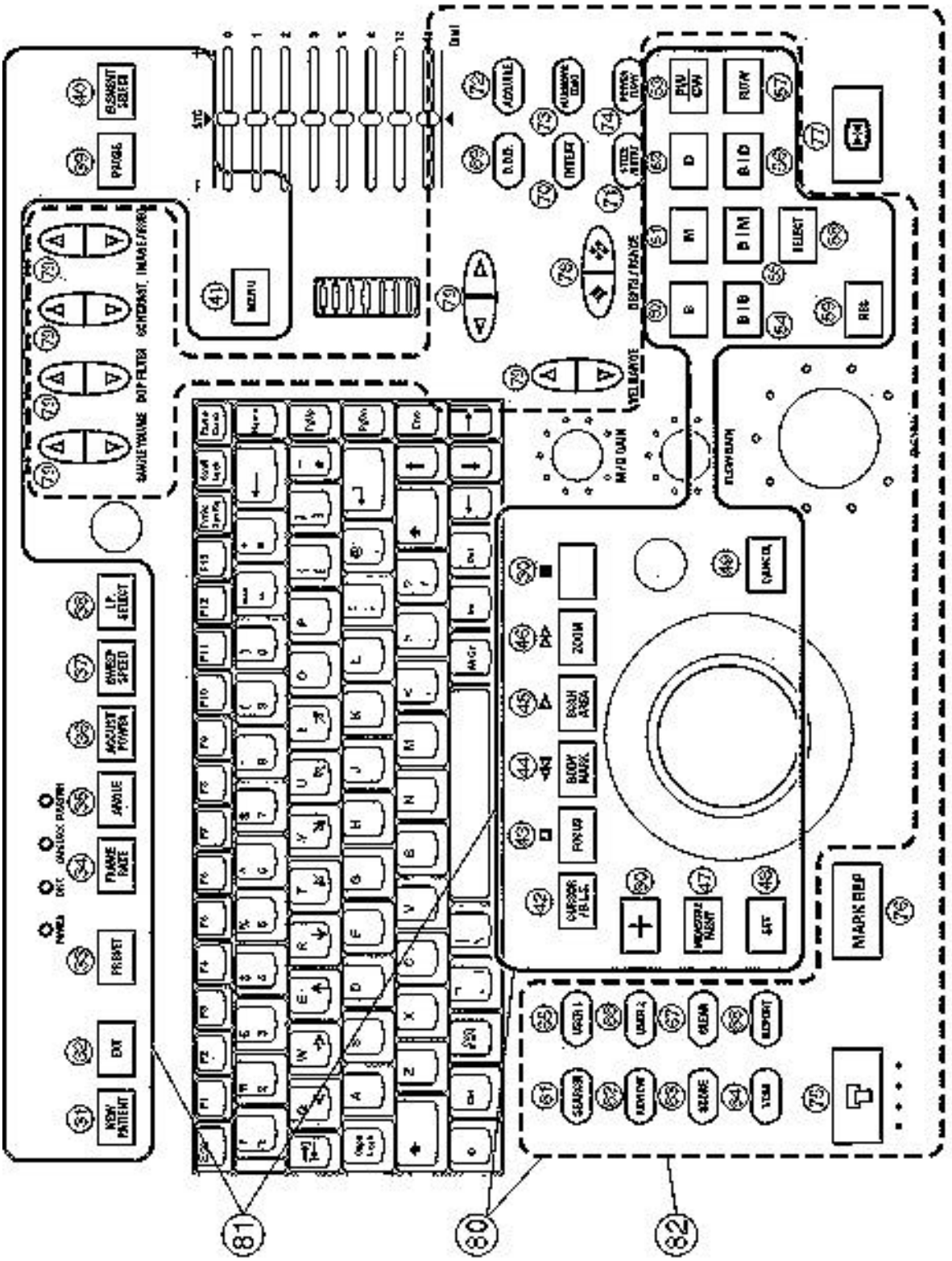
02	OPERATION PANEL	L-KEY-75*	S/N



02	OPERATION PANEL	L-KEY-75*	S/N



02	OPERATION PANEL	L-KEY-75*	



INDEX 02	OPERATION PANEL	UNIT L-KEY-75*	S/N

Item	Code	Part Number	Description	Serial Number	Specification
1	A201560	L-KEY-75	OPERATION PANEL ASSY		
1	A201576	L-KEY-75B	OPERATION PANEL ASSY	M00991 ~ M01000 M01011~M01019,	
1	A201672	L-KEY-75C	OPERATION PANEL ASSY	M01975 ~ M01995 M02001~	
2	A510057	SP-4128	KNOB(S)		
3	A510058	SP-4129	STC KNOB		
4	A510056	SP-4126	KNOB(L)		
5	A201561	KI-20A2-US01	FULL KEY BOARD		
6	A140362	PSC-135#35	PLATE		
7	A140363	PSC-135#36	PLATE		
8	A802205	MAIN PCB ASSY	INTERFACE PCB		
8	A802688	N376-0502-3	MAIN PCB ASSY		FOR L-KEY-75B/C
9	A802689	N376-0502-1	SW PCB A ASSY		FOR L-KEY-75B/C
9	A802206	SW PCB A ASSY	SWITCH BOARD : LARGE		
10	A802690	N376-0502-2	SW PCB B ASSY		FOR L-KEY-75B/C
10	A802207	SW PCB B ASSY	SWITCH BOARD : SMALL		
11	A510059	SP-4130	ROLLER KNOB		
12	A618008	L-TB-8	TRACK BALL		
13	A618021	L-RE-5	ROTARY ENCODER		
13	A618025	SA-N376-0511	ROTARY ENCODER		FOR L-KEY-75B/C
14	A618023	L-RE-7	ROTARY ENCODER		
15	A611183	SKQKAB	SWITCH		
16	A611099	SKHVBD	SWITCH		
17	A611101	SKQEAB	SWITCH		
18	A623073	EWAPFEX15B53	RESISTOR VARIABLE : SLIDE		
19	A616047	CL-170YG-CD	LED		
20	A616048	LTIH67A	LED		

INDEX 02	OPERATION PANEL	UNIT L-KEY-75*	S/N

Item	Code	Part Number	Description	Serial Number	Specification
21	A120294	N376-5020	DUST COVER		
30	A201577	N376-1037	KEY TOP :		FOR L-KEY-75B/C
30	A611184	N376-5031	KEY TOP :		
31	A201578	N376-1037-31	KEY TOP : NEW PATIENT		FOR L-KEY-75B/C
31	A611185	N376-5031-1	KEY TOP : NEW PATIENT		
32	A201579	N376-1037-44	KEY TOP : EXT		FOR L-KEY-75B/C
32	A611186	N376-5031-2	KEY TOP : EXT		
33	A201580	N376-1037-32	KEY TOP : PRESET		FOR L-KEY-75B/C
33	A611187	N376-5031-3	KEY TOP : PRESET		
34	A201581	N376-1037-45	KEY TOP : FRAME RATE		FOR L-KEY-75B/C
34	A611188	N376-5031-4	KEY TOP : FRAME RATE		
35	A201582	N376-1037-46	KEY TOP : ANGLE		FOR L-KEY-75B/C
35	A611189	N376-5031-5	KEY TOP : ANGLE		
36	A201583	N376-1037-33	KEY TOP : ACOUST POWER		FOR L-KEY-75B/C
36	A611190	N376-5031-6	KEY TOP : ACOUSTIC POWER		
37	A201584	N376-1037-47	KEY TOP : SWEEP SPEED		FOR L-KEY-75B/C
37	A611191	N376-5031-7	KEY TOP : SWEEP SPEED		
38	A201585	N376-1037-48	KEY TOP : IP. SELECT		FOR L-KEY-75B/C
38	A611192	N376-5031-8	KEY TOP : I.P. SELECT		
39	A201586	N376-1037-49	KEY TOP : PROBE		FOR L-KEY-75B/C
39	A611193	N376-5031-9	KEY TOP : PROBE		
40	A201587	N376-1037-50	KEY TOP : ELEMENT SELECT		FOR L-KEY-75B/C
40	A611194	N376-5031-10	KEY TOP : ELEMENT SELECT		
41	A201588	N376-1037-13	KEY TOP : MENU		FOR L-KEY-75B/C
41	A611195	N376-5031-11	KEY TOP : MENU		
42	A201589	N376-1037-30	KEY TOP : CURSOR/B.L.S.		FOR L-KEY-75B/C

INDEX 02	OPERATION PANEL	UNIT L-KEY-75*	S/N

Item	Code	Part Number	Description	Serial Number	Specification
42	A611196	N376-5031-12	KEY TOP : CURSOR/B.L.S.		
43	A201590	N376-1037-16	KEY TOP : FOCUS		FOR L-KEY-75B/C
43	A611197	N376-5031-13	KEY TOP : FOCUS		
44	A201591	N376-1037-15	KEY TOP : BODY MARK		FOR L-KEY-75B/C
44	A611198	N376-5031-14	KEY TOP : BODY MARK		
45	A201592	N376-1037-18	KEY TOP : SCAN AREA		FOR L-KEY-75B/C
45	A611199	N376-5031-15	KEY TOP : SCAN AREA		
46	A201593	N376-1037-19	KEY TOP : ZOOM		FOR L-KEY-75B/C
46	A611200	N376-5031-16	KEY TOP : ZOOM		
47	A201594	N376-1037-14	KEY TOP : MEASUREMENT		FOR L-KEY-75B/C
47	A611201	N376-5031-17	KEY TOP : MEASUREMENT		
48	A201595	N376-1037-17	KEY TOP : SET		FOR L-KEY-75B/C
48	A611202	N376-5031-18	KEY TOP : SET		
49	A201596	N376-1037-53	KEY TOP : CANCEL		FOR L-KEY-75B/C
49	A611203	N376-5031-19	KEY TOP : CANCEL		
50	A201597	N376-1037-22	KEY TOP : B		FOR L-KEY-75B/C
50	A611204	N376-5031-20	KEY TOP : B		
51	A201598	N376-1037-23	KEY TOP : M		FOR L-KEY-75B/C
51	A611205	N376-5031-21	KEY TOP : M		
52	A201599	N376-1037-26	KEY TOP : D		FOR L-KEY-75B/C
52	A611206	N376-5031-22	KEY TOP : D		
53	A201600	N376-1037-28	KEY TOP : PW/CW		FOR L-KEY-75B/C
53	A611207	N376-5031-23	KEY TOP : PW/CW		
54	A201601	N376-1037-20	KEY TOP : B|B		FOR L-KEY-75B/C
54	A611208	N376-5031-24	KEY TOP : B|B		
55	A201602	N376-1037-21	KEY TOP : B|M		FOR L-KEY-75B/C

INDEX 02	OPERATION PANEL	UNIT L-KEY-75*	S/N

Item	Code	Part Number	Description	Serial Number	Specification
55	A611209	N376-5031-25	KEY TOP : B|M		
56	A201603	N376-1037-27	KEY TOP : B|D		FOR L-KEY-75B/C
56	A611210	N376-5031-26	KEY TOP : B|D		
57	A201604	N376-1037-51	KEY TOP : FLOW		FOR L-KEY-75B/C
57	A611211	N376-5031-27	KEY TOP : FLOW		
58	A201605	N376-1037-29	KEY TOP : SELECT		FOR L-KEY-75B/C
58	A611212	N376-5031-28	KEY TOP : SELECT		
59	A201606	N376-1037-52	KEY TOP : REC		FOR L-KEY-75B/C
59	A611213	N376-5031-29	KEY TOP : REC		
60	A201607	N376-1037-24	KEY TOP : +		FOR L-KEY-75B/C
60	A611214	N376-5031-30	KEY TOP : +		
61	A201608	N376-1036-32	KEY TOP : SEARCH		FOR L-KEY-75B/C
61	A611215	N376-5030-1	KEY TOP : SEARCH		
62	A201609	N376-1036-33	KEY TOP : REVIEW		FOR L-KEY-75B/C
62	A611216	N376-5030-2	KEY TOP : REVIEW		
63	A201610	N376-1036-34	KEY TOP : STORE		FOR L-KEY-75B/C
63	A611217	N376-5030-3	KEY TOP : STORE		
64	A201611	N376-1036-35	KEY TOP : VCM		FOR L-KEY-75B/C
64	A611218	N376-5030-4	KEY TOP : VCM		
65	A201612	N376-1036-30	KEY TOP : USER1		FOR L-KEY-75B/C
65	A611219	N376-5030-5	KEY TOP : USER1		
66	A201613	N376-1036-31	KEY TOP : USER2		FOR L-KEY-75B/C
66	A611220	N376-5030-6	KEY TOP : USER2		
67	A201614	N376-1036-36	KEY TOP : CLEAR		FOR L-KEY-75B/C
67	A611221	N376-5030-7	KEY TOP : CLEAR		
68	A201615	N376-1036-42	KEY TOP : REPORT		FOR L-KEY-75B/C

INDEX 02	OPERATION PANEL	UNIT L-KEY-75*	S/N

Item	Code	Part Number	Description	Serial Number	Specification
68	A611222	N376-5030-8	KEY TOP : REPORT		
69	A201616	N376-1036-37	KEY TOP : D.D.D.		FOR L-KEY-75B/C
69	A611223	N376-5030-9	KEY TOP : D.D.D.		
70	A201617	N376-1036-38	KEY TOP : INVERT		FOR L-KEY-75B/C
70	A611224	N376-5030-10	KEY TOP : INVERT		
71	A201618	N376-1036-39	KEY TOP : STEER/ROTAT		FOR L-KEY-75B/C
71	A611225	N376-5030-11	KEY TOP : STEER/ROTAT		
72	A201619	N376-1036-29	KEY TOP : ACQUIRE		FOR L-KEY-75B/C
72	A611226	N376-5030-12	KEY TOP : ACQUIRE		
73	A201620	N376-1036-40	KEY TOP : HARMONIC ECHO		FOR L-KEY-75B/C
73	A611227	N376-5030-13	KEY TOP : HARMONIC ECHO		
74	A201621	N376-1036-41	KEY TOP : POWER FLOW		FOR L-LEY-75B/C
74	A611228	N376-5030-14	KEY TOP : POWER FLOW		
75	A201622	N376-1038-3	KEY TOP : PRINT		FOR L-KEY-75B/C
75	A611229	N376-5032-1	KEY TOP : PRINT		
76	A201623	N376-1038-1	KEY TOP : MARK REF		FOR L-KEY-75B/C
76	A611230	N376-5032-2	KEY TOP : MARK REF		
77	A201624	N376-1038-2	KEY TOP : FREEZE		FOR L-KEY-75B/C
77	A611231	N376-5032-3	KEY TOP : FREEZE		
78	A611232	N376-0510-1	KEY TOP : MAGNIFICATION		
78	A201625	N376-5033-1	KEY TOP : MAGNIFICATION		FOR L-KEY-75B/C
79	A611233	N376-0510-2	KEY TOP : DIRECTION		
79	A201626	N376-5033-2	KEY TOP : DIRECTION		FOR L-KEY-75B/C
80	A201627	SA-N376-0509	KEY TOP FULL SET		FOR L-KEY-75B/C
81	A201628	SA-N376-0522	KEY TOP B SET		FOR L-KEY-75B/C
82	A201629	SA-N376-0521	KEY TOP C SET		FOR L-KEY-75B/C

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INDEX 01	MAIN BODY	UNIT USI-150	S/N

Item	Code	Part Number	Description	Serial Number	Specification
1	A110240	SAP-4000-01-01	SHELF1		
2	A120275	SAP-4000-01-02	COVER1		
3	A100461	SAP-4000-01-03	COVER2		
4	A110241	SAP-4000-01-04	COVER3		
5	A120276	SAP-4000-01-05	SHELF2		
6	A120277	SAP-4000-01-06	COVER4		
7	A110242	SAP-4000-01-07	COVER5		
8	A120278	SAP-4000-01-08	COVER:PANEL		
9	A100462	SAP-4000-01-09	COVER:TOP		
10	A120279	SAP-4000-01-10	COVER:REAR TOP		
11	A120280	SAP-4000-01-11	COVER6		
12	A120281	SAP-4000-01-12	COVER:FRONT		
13	A120296	SAP-4000-01-28	COVER:SIDE		
14	A120300	SAP-4000-01-32	COVER:UPPER LEFT SIDE		
15	A120301	SAP-4000-01-31	COVER:UPPER RIGHT SIDE		
16	A120297	SAP-4000-01-29	COVER:REAR		
17	A120286	USI-150#20	PROBE HOLDER		
18	A120298	SAP-4000-01-30	HOLDER COVER:UNDER		
19	A100463	USI-150#22	HOLDER:FIXED PLATE		
20	A110243	SAP-4000-01-13	COVER:SMALL		
21	A120288	SAP-4000-01-14	COVER:REAR SMALL		
22	A100464	SAP-4000-01-15	COSMETIC PLATE(1)		
23	A110244	SAP-4000-01-16	COVER7		
24	A110245	SAP-4000-01-17	COSMETIC PLATE(2)		
25	A120289	SAP-4000-01-18	HANDLE:BACK		
26	A110246	USI-150#30	STAY		

INDEX 01	MAIN BODY	UNIT USI-150	S/N

Item	Code	Part Number	Description	Serial Number	Specification
27	A120290	SAP-4000-01-19	COVER8		
28	A120295	USI-150#33	COVER:ARM		
29	A110247	SAP-4000-01-21	SPACER		
30	A120292	SAP-4000-01-22	HANDLE:FRONT		
31	A110248	PSC-135#27	RECEIVER		
32	A801659	EP426100**	PCB:FOOT SWITCH	M00101 ~ M01110	
32	A802687	EP473200**	PCB : FOOT SWITCH	M01111 ~	
33	A110249	SAP-4000-01-23	PLATE(1)		
34	A110250	SAP-4000-01-24	PLATE(2)		
35	A140359	SAP-4000-01-25	PLATE:LEFT		
36	A140360	SAP-4000-01-26	PLATE:RIGHT		
37	A140361	SAP-4000-01-27	PLATE(3)		
38	A120293	MG-2	CAP		
39	A201556	DC125BT5/W529U	CASTER:FRONT WITH LOCK		
40	A201558	DC125BP1/W529U	CASTER:REAR WITH LOCK		
41	A201557	DC125DBP1/W529U	CASTER:REAR WITH SWIVEL LOCK		
42	A616030	P-10-ASS1	LIGHT HOLDER		
43	A616029	LIGHT : FIZZ-461	LIGHT		
44	A897009	FD-235HF-A591	FLOPPY DISK DRIVE		
45	A625049	109P1212M402	FAN		
46	A201559	CO-PSC-135-B	FAN ASSY		
47	A611088	L-S-63	POWER SWITCH		
48	A100465	SCU-4000#1	MECHANICAL SCANNER UNIT COVER		FOR SCU-4000
49	A802592	EP444800**	PCB : MECHA. CONNECTOR	~	FOR SCU-4000
50	A100466	EU-9084#1	REINFORCEMENT PLATE		FOR EU-9084

INDEX 02	OPERATION PANEL	UNIT L-KEY-75*	S/N

Item	Code	Part Number	Description	Serial Number	Specification
1	A201560	L-KEY-75	OPERATION PANEL ASSY		
1	A201576	L-KEY-75B	OPERATION PANEL ASSY	M00991 ~ M01000 M01011~M01019,	
1	A201672	L-KEY-75C	OPERATION PANEL ASSY	M01975 ~ M01995 M02001~	
2	A510057	SP-4128	KNOB(S)		
3	A510058	SP-4129	STC KNOB		
4	A510056	SP-4126	KNOB(L)		
5	A201561	KI-20A2-US01	FULL KEY BOARD		
6	A140362	PSC-135#35	PLATE		
7	A140363	PSC-135#36	PLATE		
8	A802205	MAIN PCB ASSY	INTERFACE PCB		
8	A802688	N376-0502-3	MAIN PCB ASSY		FOR L-KEY-75B/C
9	A802689	N376-0502-1	SW PCB A ASSY		FOR L-KEY-75B/C
9	A802206	SW PCB A ASSY	SWITCH BOARD : LARGE		
10	A802690	N376-0502-2	SW PCB B ASSY		FOR L-KEY-75B/C
10	A802207	SW PCB B ASSY	SWITCH BOARD : SMALL		
11	A510059	SP-4130	ROLLER KNOB		
12	A618008	L-TB-8	TRACK BALL		
13	A618021	L-RE-5	ROTARY ENCODER		
13	A618025	SA-N376-0511	ROTARY ENCODER		FOR L-KEY-75B/C
14	A618023	L-RE-7	ROTARY ENCODER		
15	A611183	SKQKAB	SWITCH		
16	A611099	SKHVBD	SWITCH		
17	A611101	SKQEAB	SWITCH		
18	A623073	EWAPFEX15B53	RESISTOR VARIABLE : SLIDE		
19	A616047	CL-170YG-CD	LED		
20	A616048	LTIH67A	LED		

INDEX 02	OPERATION PANEL	UNIT L-KEY-75*	S/N

Item	Code	Part Number	Description	Serial Number	Specification
21	A120294	N376-5020	DUST COVER		
30	A201577	N376-1037	KEY TOP :		FOR L-KEY-75B/C
30	A611184	N376-5031	KEY TOP :		
31	A201578	N376-1037-31	KEY TOP : NEW PATIENT		FOR L-KEY-75B/C
31	A611185	N376-5031-1	KEY TOP : NEW PATIENT		
32	A201579	N376-1037-44	KEY TOP : EXT		FOR L-KEY-75B/C
32	A611186	N376-5031-2	KEY TOP : EXT		
33	A201580	N376-1037-32	KEY TOP : PRESET		FOR L-KEY-75B/C
33	A611187	N376-5031-3	KEY TOP : PRESET		
34	A201581	N376-1037-45	KEY TOP : FRAME RATE		FOR L-KEY-75B/C
34	A611188	N376-5031-4	KEY TOP : FRAME RATE		
35	A201582	N376-1037-46	KEY TOP : ANGLE		FOR L-KEY-75B/C
35	A611189	N376-5031-5	KEY TOP : ANGLE		
36	A201583	N376-1037-33	KEY TOP : ACOUST POWER		FOR L-KEY-75B/C
36	A611190	N376-5031-6	KEY TOP : ACOUSTIC POWER		
37	A201584	N376-1037-47	KEY TOP : SWEEP SPEED		FOR L-KEY-75B/C
37	A611191	N376-5031-7	KEY TOP : SWEEP SPEED		
38	A201585	N376-1037-48	KEY TOP : IP. SELECT		FOR L-KEY-75B/C
38	A611192	N376-5031-8	KEY TOP : I.P. SELECT		
39	A201586	N376-1037-49	KEY TOP : PROBE		FOR L-KEY-75B/C
39	A611193	N376-5031-9	KEY TOP : PROBE		
40	A201587	N376-1037-50	KEY TOP : ELEMENT SELECT		FOR L-KEY-75B/C
40	A611194	N376-5031-10	KEY TOP : ELEMENT SELECT		
41	A201588	N376-1037-13	KEY TOP : MENU		FOR L-KEY-75B/C
41	A611195	N376-5031-11	KEY TOP : MENU		
42	A201589	N376-1037-30	KEY TOP : CURSOR/B.L.S.		FOR L-KEY-75B/C

INDEX 02	OPERATION PANEL	UNIT L-KEY-75*	S/N

Item	Code	Part Number	Description	Serial Number	Specification
42	A611196	N376-5031-12	KEY TOP : CURSOR/B.L.S.		
43	A201590	N376-1037-16	KEY TOP : FOCUS		FOR L-KEY-75B/C
43	A611197	N376-5031-13	KEY TOP : FOCUS		
44	A201591	N376-1037-15	KEY TOP : BODY MARK		FOR L-KEY-75B/C
44	A611198	N376-5031-14	KEY TOP : BODY MARK		
45	A201592	N376-1037-18	KEY TOP : SCAN AREA		FOR L-KEY-75B/C
45	A611199	N376-5031-15	KEY TOP : SCAN AREA		
46	A201593	N376-1037-19	KEY TOP : ZOOM		FOR L-KEY-75B/C
46	A611200	N376-5031-16	KEY TOP : ZOOM		
47	A201594	N376-1037-14	KEY TOP : MEASUREMENT		FOR L-KEY-75B/C
47	A611201	N376-5031-17	KEY TOP : MEASUREMENT		
48	A201595	N376-1037-17	KEY TOP : SET		FOR L-KEY-75B/C
48	A611202	N376-5031-18	KEY TOP : SET		
49	A201596	N376-1037-53	KEY TOP : CANCEL		FOR L-KEY-75B/C
49	A611203	N376-5031-19	KEY TOP : CANCEL		
50	A201597	N376-1037-22	KEY TOP : B		FOR L-KEY-75B/C
50	A611204	N376-5031-20	KEY TOP : B		
51	A201598	N376-1037-23	KEY TOP : M		FOR L-KEY-75B/C
51	A611205	N376-5031-21	KEY TOP : M		
52	A201599	N376-1037-26	KEY TOP : D		FOR L-KEY-75B/C
52	A611206	N376-5031-22	KEY TOP : D		
53	A201600	N376-1037-28	KEY TOP : PW/CW		FOR L-KEY-75B/C
53	A611207	N376-5031-23	KEY TOP : PW/CW		
54	A201601	N376-1037-20	KEY TOP : B|B		FOR L-KEY-75B/C
54	A611208	N376-5031-24	KEY TOP : B|B		
55	A201602	N376-1037-21	KEY TOP : B|M		FOR L-KEY-75B/C

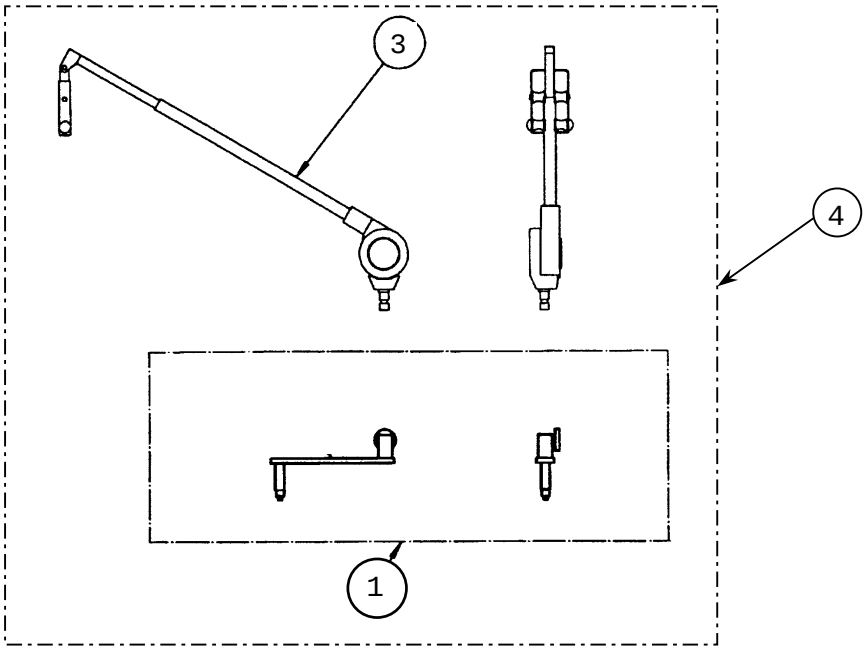
INDEX 02	OPERATION PANEL	UNIT L-KEY-75*	S/N

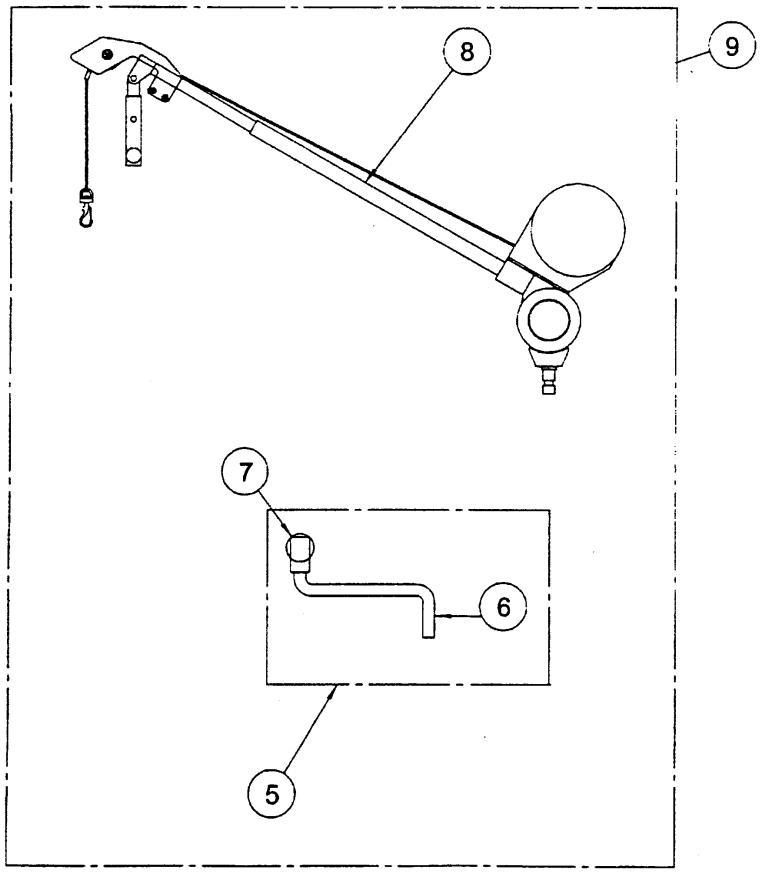
Item	Code	Part Number	Description	Serial Number	Specification
55	A611209	N376-5031-25	KEY TOP : B|M		
56	A201603	N376-1037-27	KEY TOP : B|D		FOR L-KEY-75B/C
56	A611210	N376-5031-26	KEY TOP : B|D		
57	A201604	N376-1037-51	KEY TOP : FLOW		FOR L-KEY-75B/C
57	A611211	N376-5031-27	KEY TOP : FLOW		
58	A201605	N376-1037-29	KEY TOP : SELECT		FOR L-KEY-75B/C
58	A611212	N376-5031-28	KEY TOP : SELECT		
59	A201606	N376-1037-52	KEY TOP : REC		FOR L-KEY-75B/C
59	A611213	N376-5031-29	KEY TOP : REC		
60	A201607	N376-1037-24	KEY TOP : +		FOR L-KEY-75B/C
60	A611214	N376-5031-30	KEY TOP : +		
61	A201608	N376-1036-32	KEY TOP : SEARCH		FOR L-KEY-75B/C
61	A611215	N376-5030-1	KEY TOP : SEARCH		
62	A201609	N376-1036-33	KEY TOP : REVIEW		FOR L-KEY-75B/C
62	A611216	N376-5030-2	KEY TOP : REVIEW		
63	A201610	N376-1036-34	KEY TOP : STORE		FOR L-KEY-75B/C
63	A611217	N376-5030-3	KEY TOP : STORE		
64	A201611	N376-1036-35	KEY TOP : VCM		FOR L-KEY-75B/C
64	A611218	N376-5030-4	KEY TOP : VCM		
65	A201612	N376-1036-30	KEY TOP : USER1		FOR L-KEY-75B/C
65	A611219	N376-5030-5	KEY TOP : USER1		
66	A201613	N376-1036-31	KEY TOP : USER2		FOR L-KEY-75B/C
66	A611220	N376-5030-6	KEY TOP : USER2		
67	A201614	N376-1036-36	KEY TOP : CLEAR		FOR L-KEY-75B/C
67	A611221	N376-5030-7	KEY TOP : CLEAR		
68	A201615	N376-1036-42	KEY TOP : REPORT		FOR L-KEY-75B/C

INDEX 02	OPERATION PANEL	UNIT L-KEY-75*	S/N

Item	Code	Part Number	Description	Serial Number	Specification
68	A611222	N376-5030-8	KEY TOP : REPORT		
69	A201616	N376-1036-37	KEY TOP : D.D.D.		FOR L-KEY-75B/C
69	A611223	N376-5030-9	KEY TOP : D.D.D.		
70	A201617	N376-1036-38	KEY TOP : INVERT		FOR L-KEY-75B/C
70	A611224	N376-5030-10	KEY TOP : INVERT		
71	A201618	N376-1036-39	KEY TOP : STEER/ROTAT		FOR L-KEY-75B/C
71	A611225	N376-5030-11	KEY TOP : STEER/ROTAT		
72	A201619	N376-1036-29	KEY TOP : ACQUIRE		FOR L-KEY-75B/C
72	A611226	N376-5030-12	KEY TOP : ACQUIRE		
73	A201620	N376-1036-40	KEY TOP : HARMONIC ECHO		FOR L-KEY-75B/C
73	A611227	N376-5030-13	KEY TOP : HARMONIC ECHO		
74	A201621	N376-1036-41	KEY TOP : POWER FLOW		FOR L-LEY-75B/C
74	A611228	N376-5030-14	KEY TOP : POWER FLOW		
75	A201622	N376-1038-3	KEY TOP : PRINT		FOR L-KEY-75B/C
75	A611229	N376-5032-1	KEY TOP : PRINT		
76	A201623	N376-1038-1	KEY TOP : MARK REF		FOR L-KEY-75B/C
76	A611230	N376-5032-2	KEY TOP : MARK REF		
77	A201624	N376-1038-2	KEY TOP : FREEZE		FOR L-KEY-75B/C
77	A611231	N376-5032-3	KEY TOP : FREEZE		
78	A611232	N376-0510-1	KEY TOP : MAGNIFICATION		
78	A201625	N376-5033-1	KEY TOP : MAGNIFICATION		FOR L-KEY-75B/C
79	A611233	N376-0510-2	KEY TOP : DIRECTION		
79	A201626	N376-5033-2	KEY TOP : DIRECTION		FOR L-KEY-75B/C
80	A201627	SA-N376-0509	KEY TOP FULL SET		FOR L-KEY-75B/C
81	A201628	SA-N376-0522	KEY TOP B SET		FOR L-KEY-75B/C
82	A201629	SA-N376-0521	KEY TOP C SET		FOR L-KEY-75B/C

03	CABLE HANGER	MP-HA5500-1/-2	

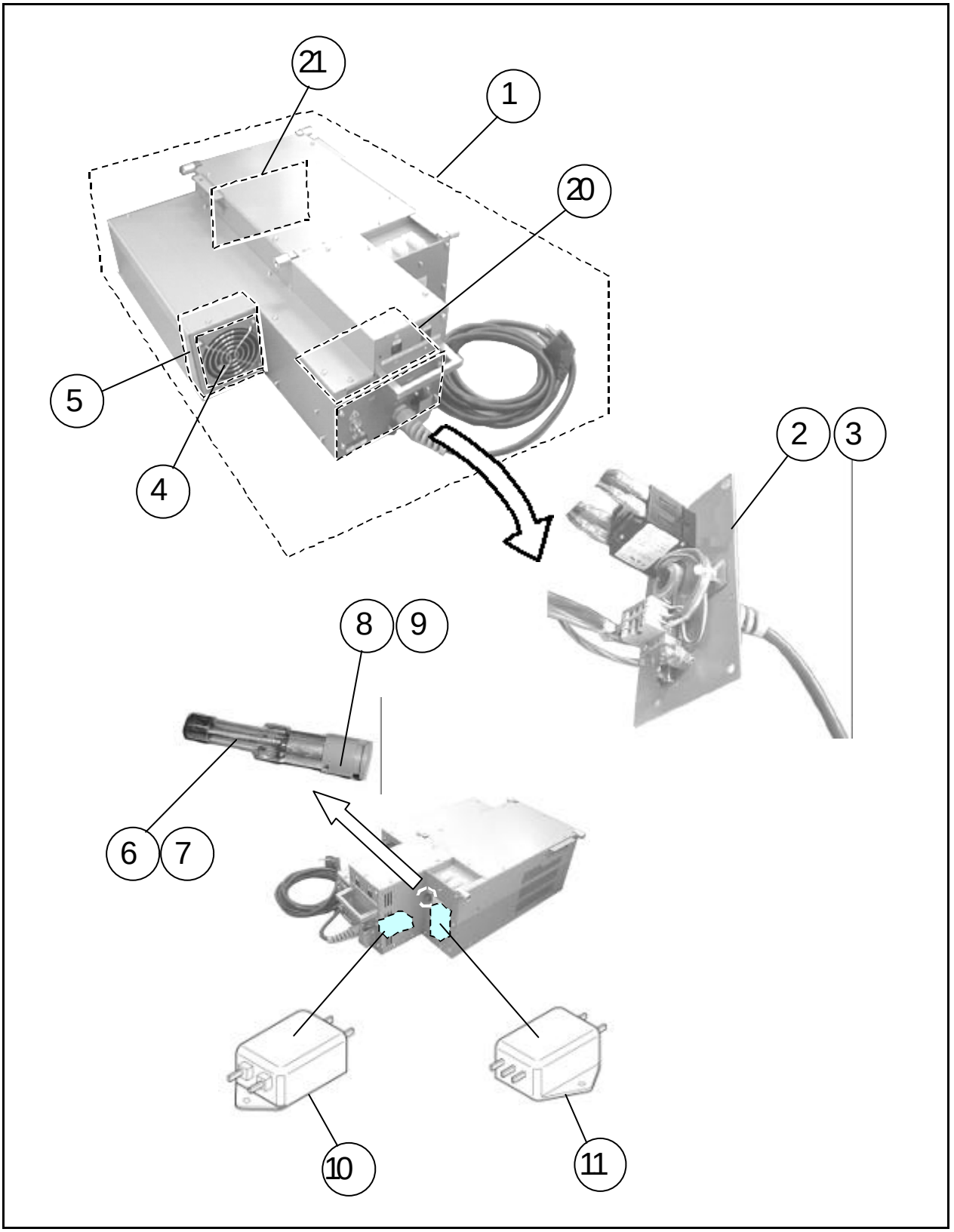




INDEX 03	CABLE HANGER	UNIT MP-HA6500-1	S/N

Item	Code	Part Number	Description	Serial Number	Specification
1	A510060	SP-0901	ARM BASE & LOCK KNOB ASSY		
3	A150162	L-Ki-630	CABLE HANGER		
4	A201575	MP-HA6500-1	CABLE HANGER ASSY		
5	A201499	SAP-5500-03-09	ARM ASSY		
6	A201500	SAP-5500-03-10	ARM BASE		
7	A201501	SAP-5500-03-11	LOCK KNOB		
8	A150173	L-Ki-630U	CABLE HANGER		
9	A150174	MP-HA5500-2	CABLE HANGER ASSY		

04	POWER SUPPLY UNIT	PSU-S4000-1	S/N M00101～M00300



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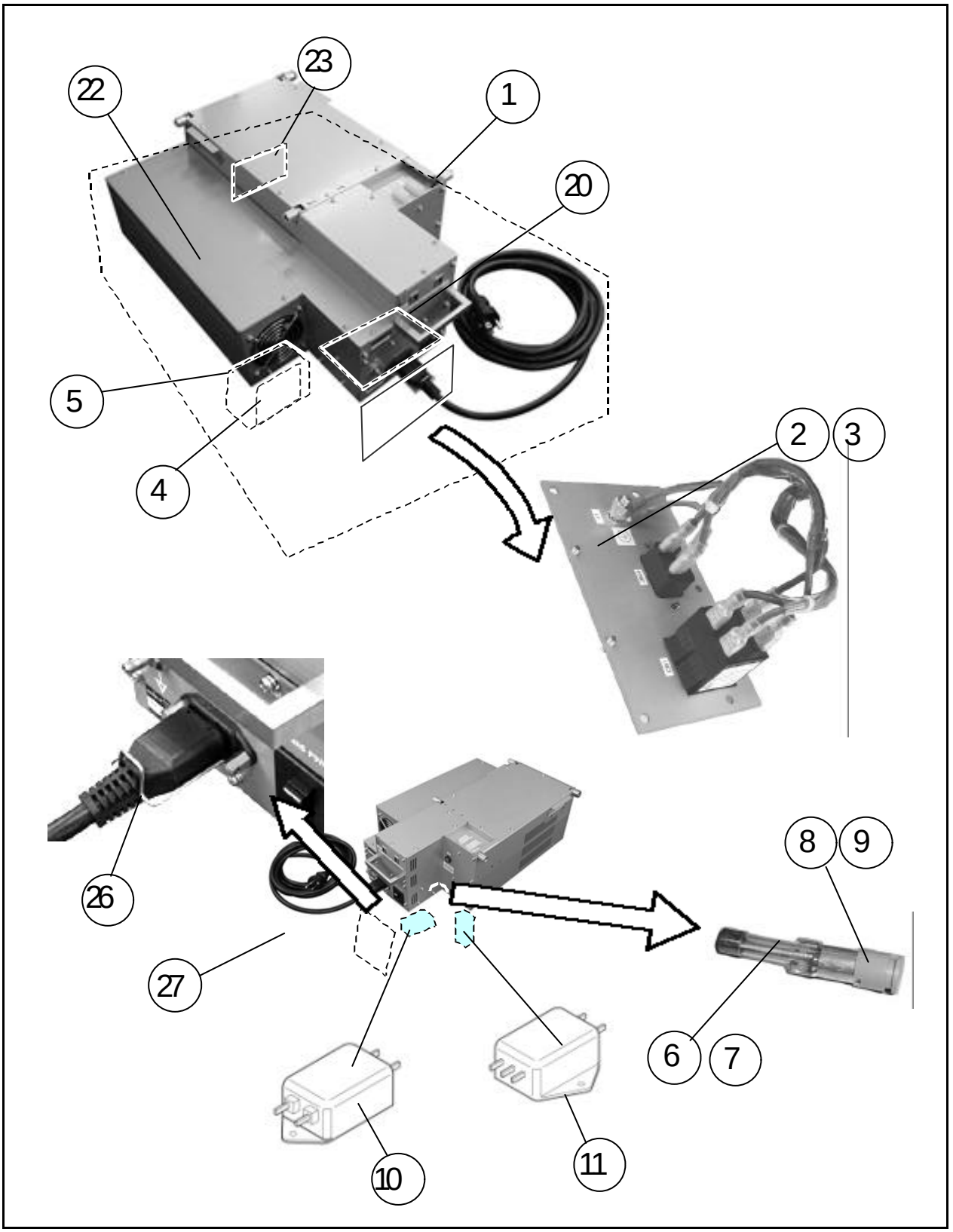

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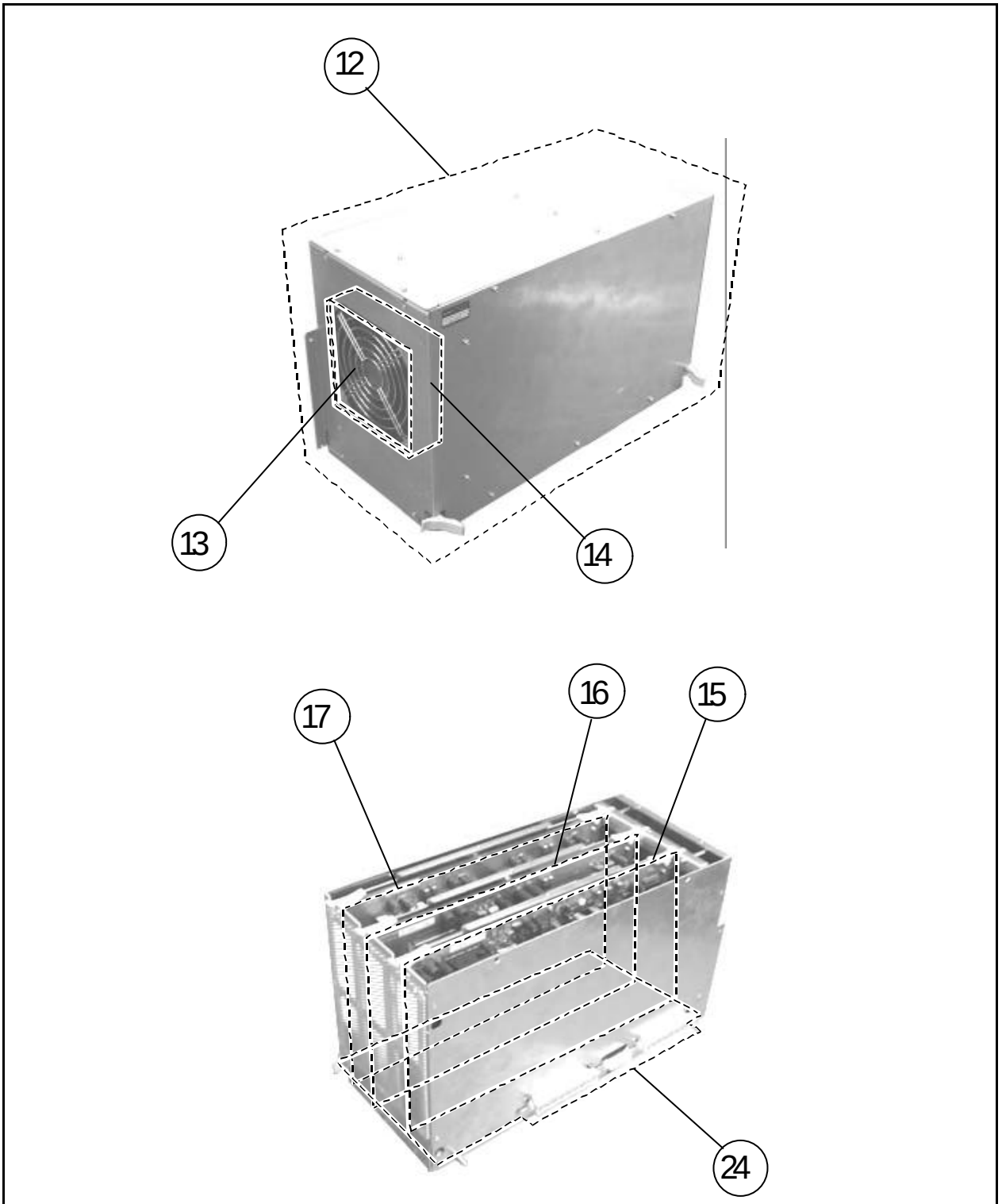

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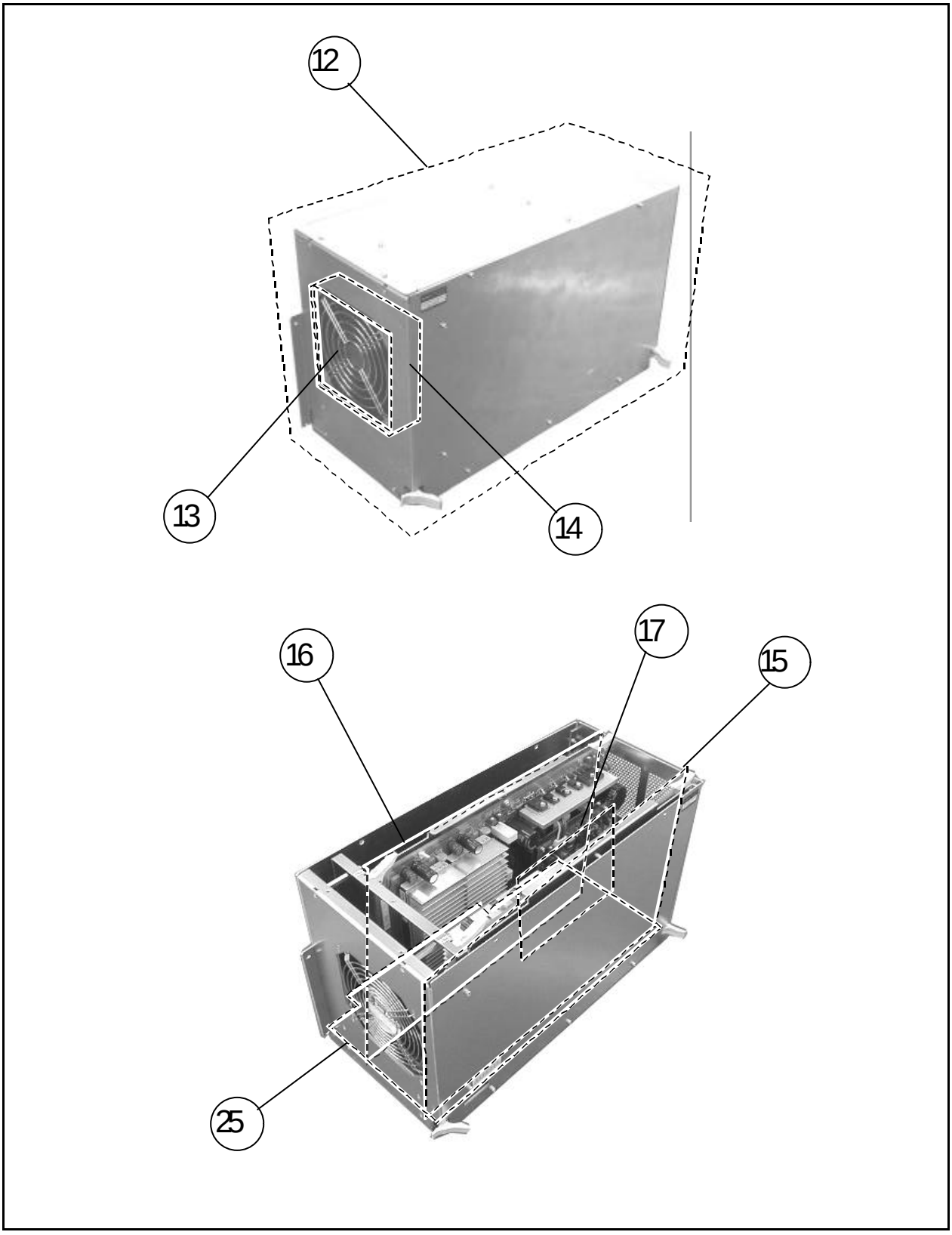
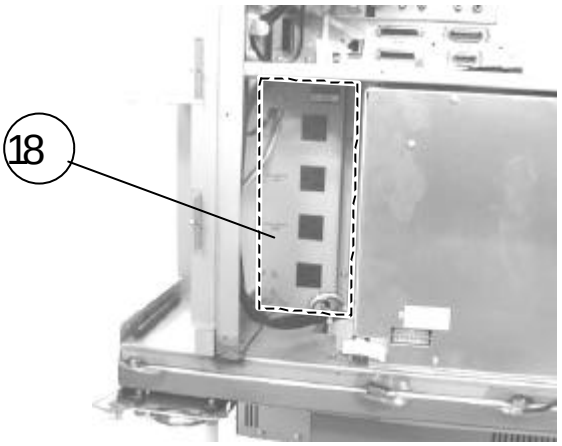
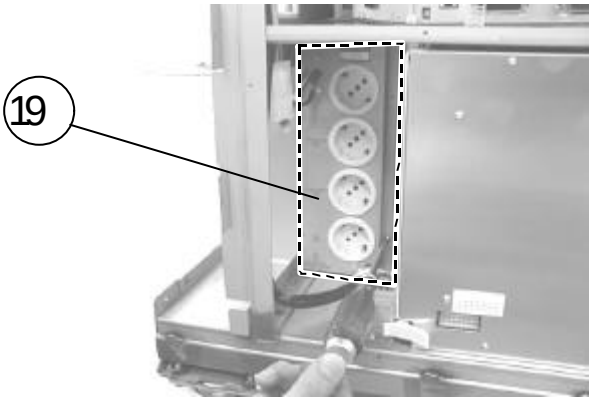


04	POWER SUPPLY UNIT	JB-260/261	S/N





INDEX 04	POWER SUPPLY UNIT	UNIT PSU-S4000	S/N

Item	Code	Part Number	Description	Serial Number	Specification
1	A030088	PSU-S4000-1	POWER SUPPLY UNIT ASSY (PRIMARY)	M00101 ~ M00300	
1	A030094	PSU-S4000B-1	POWER SUPPLY UNIT ASSY (PRIMARY)	M00301 ~	
2	A201562	JB-258	POWER CABLE UNIT	M00101 ~ M00300	FOR 100 - 120V
2	A030095	JB-258B	POWER CABLE UNIT	M00301 ~	FOR 100 - 120V
3	A201563	JB-259	POWER CABLE UNIT	M00101 ~ M00300	FOR 200 - 240V
3	A030096	JB-259B	POWER CABLE UNIT	M00301 ~	FOR 200 - 240V
4	A625050	8123	FINGER GUARD		
5	A625051	FAB08A12M1A	FAN		
6	A621090	313007	FUSE		FOR 100 -120V
7	A201242	218004	FUSE		FOR 200 - 240V
8	A621093	3453 LS1-020	FUSE CAP		FOR 100 - 120V
9	A621084	3455 LS1-020	FUSE CAP		FOR 200 - 240V
10	A621027	SUP-P15H-R-0	LINE FILTER 1		
11	A030090	PBF-1206-22	LINE FILTER2		
12	A030091	PSU-S4000-2	POWER SUPPLY UNIT (SECONDLY)	M00101 ~ M00300	
12	A030097	PSU-S4000B-2	POWER SUPPLY UNIT (SECONDLY)	M00301 ~ M01100	
12	A030102	PSU-S4000B-2B	POWER SUPPLY UNIT (SECONDLY)	M01101 ~	
13	A625006	109-019C	FINGER GUARD		
14	A625049	109P1212M402	FAN		
15	A802208	EP448500**	PCB : HV POWER SUPPLY	M00101 ~ M00300	
15	A802593	EP463100**	PCB : LV POWER SUPPLY	M00301 ~	
16	A802209	EP448300**	PCB : LV POWER SUPPLY (1)	M00101 ~ M00300	
16	A802594	EP463200**	PCB : LV AND HV POWER SUPPLY	M00301 ~	
17	A802595	EP440701**	PCB : HV POWER SUPPLY	M00301 ~ M01100	
17	A802210	EP448400**	PCB : LV POWER SUPPLY (2)	M00101 ~ M00300	
18	A030092	JB-260	JUNCTION BOX		FOR 100 - 120V

INDEX 04	POWER SUPPLY UNIT	UNIT PSU-S4000	S/N

Item	Code	Part Number	Description	Serial Number	Specification
19	A030093	JB-261	JUNCTION BOX		FOR 200 - 240V
20	A802599	EP448200**	PCB : RELAY CIRCUIT		
21	A802600	EP449500**	PCB : CONNECTOR JUNCTION	M00101 ~ M00300	
22	A802601	EP462200**	PCB : RECTIFICATION CIRCUIT	~	
23	A802602	EP463400**	PCB : OUTPUT CONNECTOR CIRCUIT	M00301 ~	
24	A802603	EP448600**	PCB : MOTHER BOARD	M00101 ~ M00300	
25	A802604	EP463300**	PCB : MOTHER BOARD	M00301 ~	
26	A030099	AT-04+AT01L	LOCK FITTINGS	M00301 ~ M00700	
26	A030098	KT0008	LOCK FITTINGS	M00701 ~	
27	A030100	CP-116	POWER SUPPLY CABLE	M00301 ~	FOR 100 - 120V
27	A030101	CP-117	POWER SUPPLY CABLE	M00301 ~	FOR 200 - 240V

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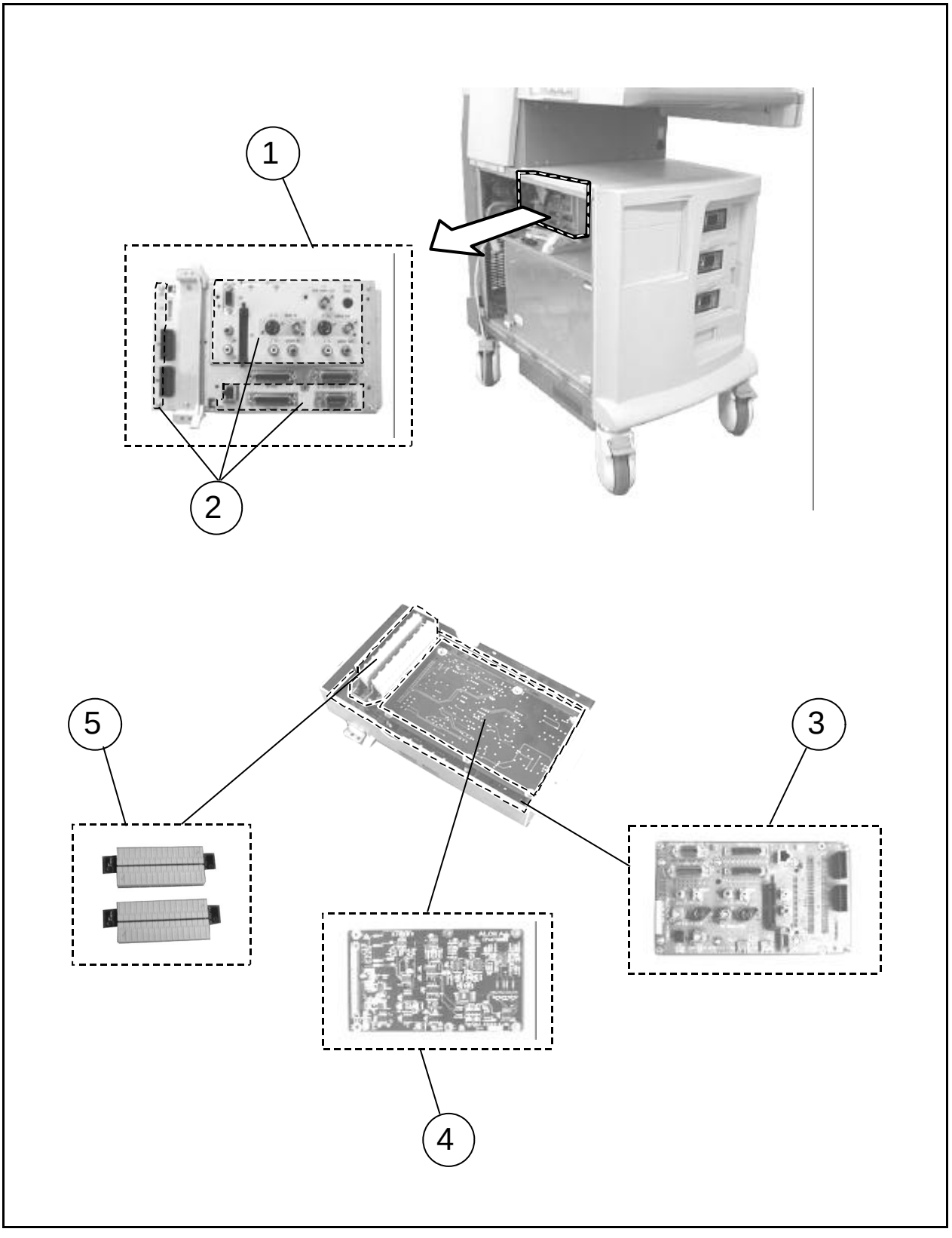
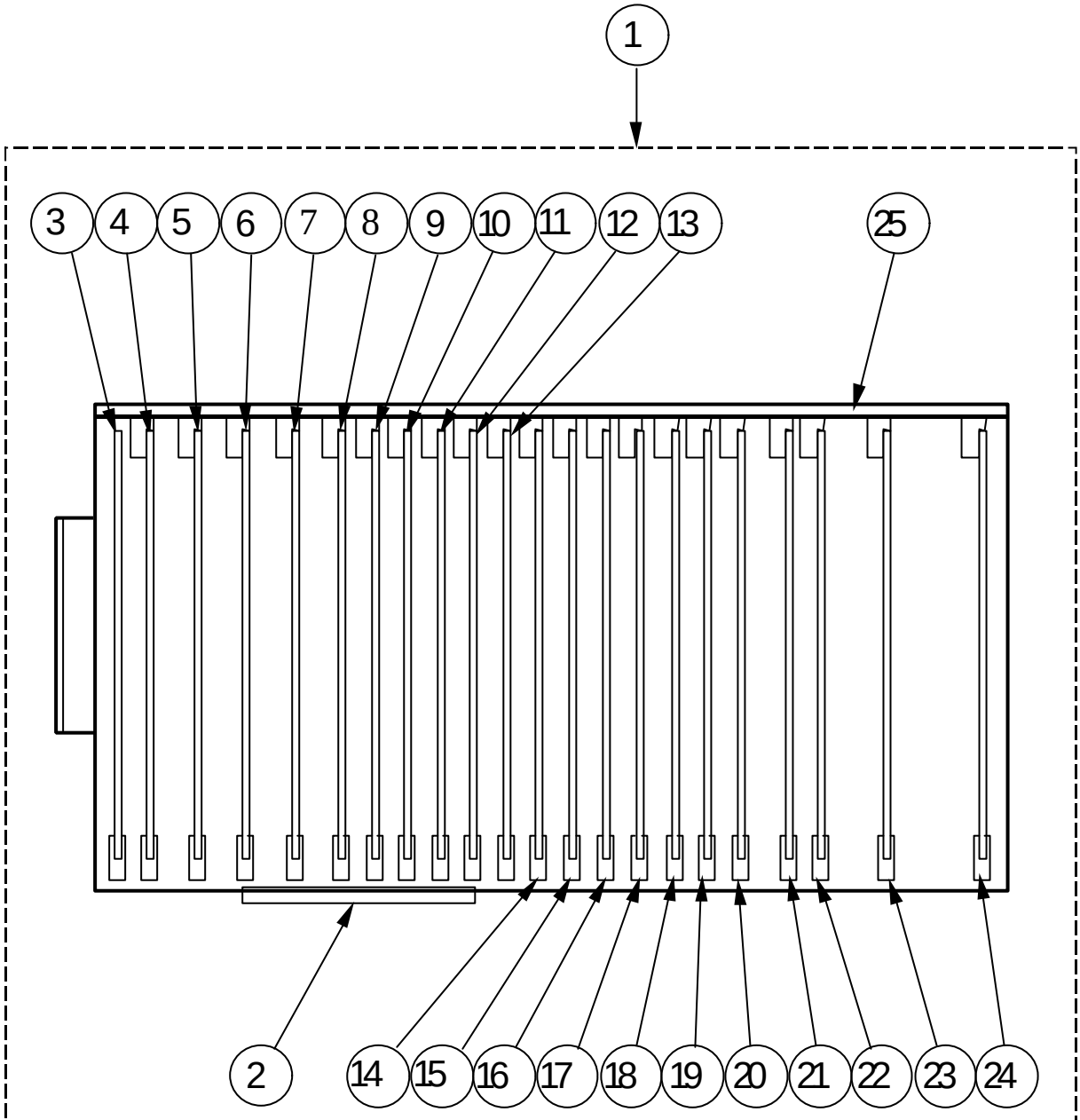
05	JUNCTION BOX	JB-263	S/N



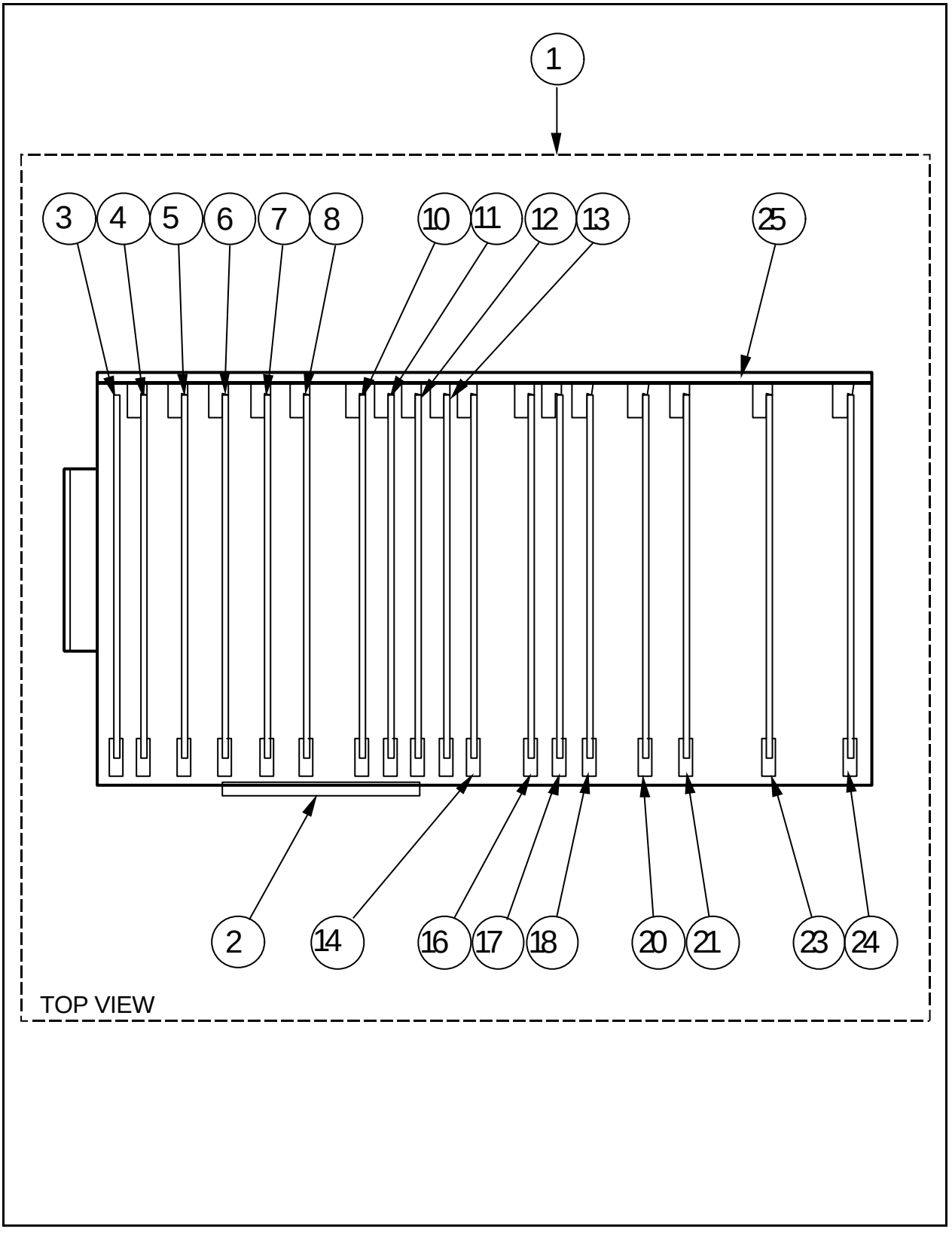
INDEX 05	JUNCTION BOX	UNIT JB-263	S/N

Item	Code	Part Number	Description	Serial Number	Specification
1	A201564	JB-263	JUNCTION BOX ASSY		
2	A600268	JB-263#13	LABEL		
3	A802211	EP447200**	PCB : DISTRIBUTOR		
4	A802212	EP447300**	PCB : AUDIO		
5	A802213	EP451100**	PCB : CONNECT		

06	USM-25* UNIT		S/N M00101～M01100



06	USM-25* UNIT		S/N M01101~



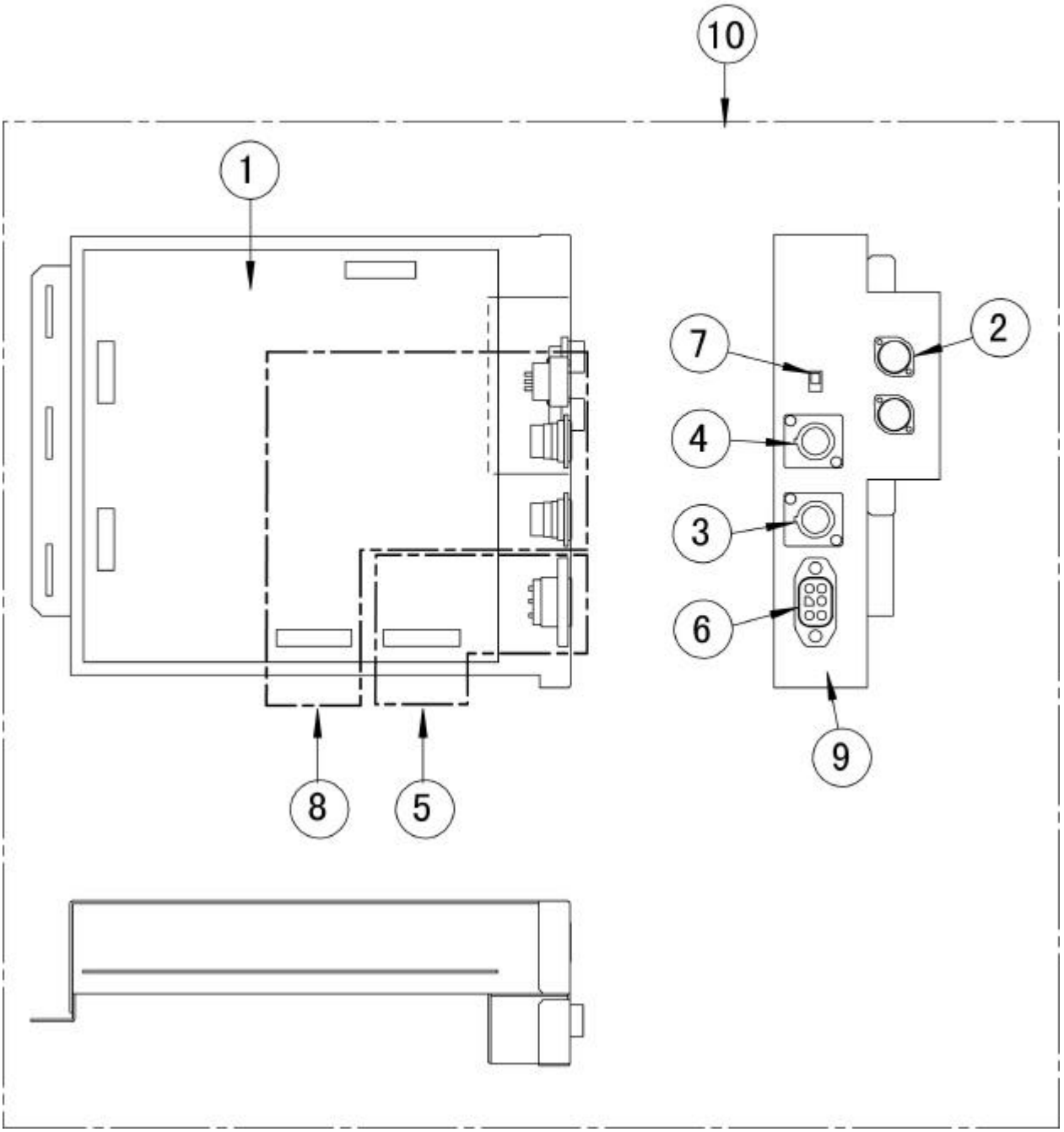
INDEX 06	USM-25 UNIT	UNIT USM-25	S/N

Item	Code	Part Number	Description	Serial Number	Specification
1	A040560	USM-25	ULTRASONIC MAIN UNIT		
2	A802214	EP443700**	PCB : RX CONNECT	M00101 ~ M00301	
2	A802598	EP463900**	PCB : RX CONNECT	M00301 ~	
3	A802215	EP443800**	PCB : PROBE SELECT 1		
4	A802216	EP443900**	PCB : PROBE SELECT 2	~ M01100	
4	A802691	EP443901**	PCB : PROBE SELECT 2	M01101 ~	
5	A802217	EP444000**	PCB : PRE AMP		
6	A802219	EP444100**	PCB : TX & TX FOCUS 2		FOR EU-9082
6	A802218	EP450000**	PCB : TX & TX FOCUS		
7	A802220	EP444200**	PCB : STCW		FOR UCW-4000
8	A802221	EP444300**	PCB : A ITF		FOR SCU-4000
9	A802222	EP442900**	PCB : RX BEAM FORMER	M00101 ~ M00300	
10	A802222	EP442900**	PCB : RX BEAM FORMER	M00101 ~ M00300	
10	A802596	EP462500**	PCB : RX BEAM FORMER	M00301 ~	
11	A802222	EP442900**	PCB : RX BEAM FORMER	M00101 ~ M00300	
11	A802596	EP462500**	PCB : RX BEAM FORMER	M00301 ~	
12	A802223	EP444400**	PCB : AD_DA		
13	A802224	EP443500**	PCB : CFP	~ M01100	
13	A802692	EP476000**	PCB : CFP	M01101 ~	
14	A802225	EP443600**	PCB : SDP	~ M01100	
14	A802693	EP476100**	PCB : SDP	M01101 ~	
16	A802226	EP443000**	PCB : TX RX CONTROL		
17	A802335	EP446900**	PCB : VOL		FOR EU-9084
18	A802227	EP446500**	PCB : CSC	~ M01100	
19	A802228	EP446400**	PCB : BSC	~ M01100	
20	A802333	EP446800**	PCB : PSC		FOR PEU-4000

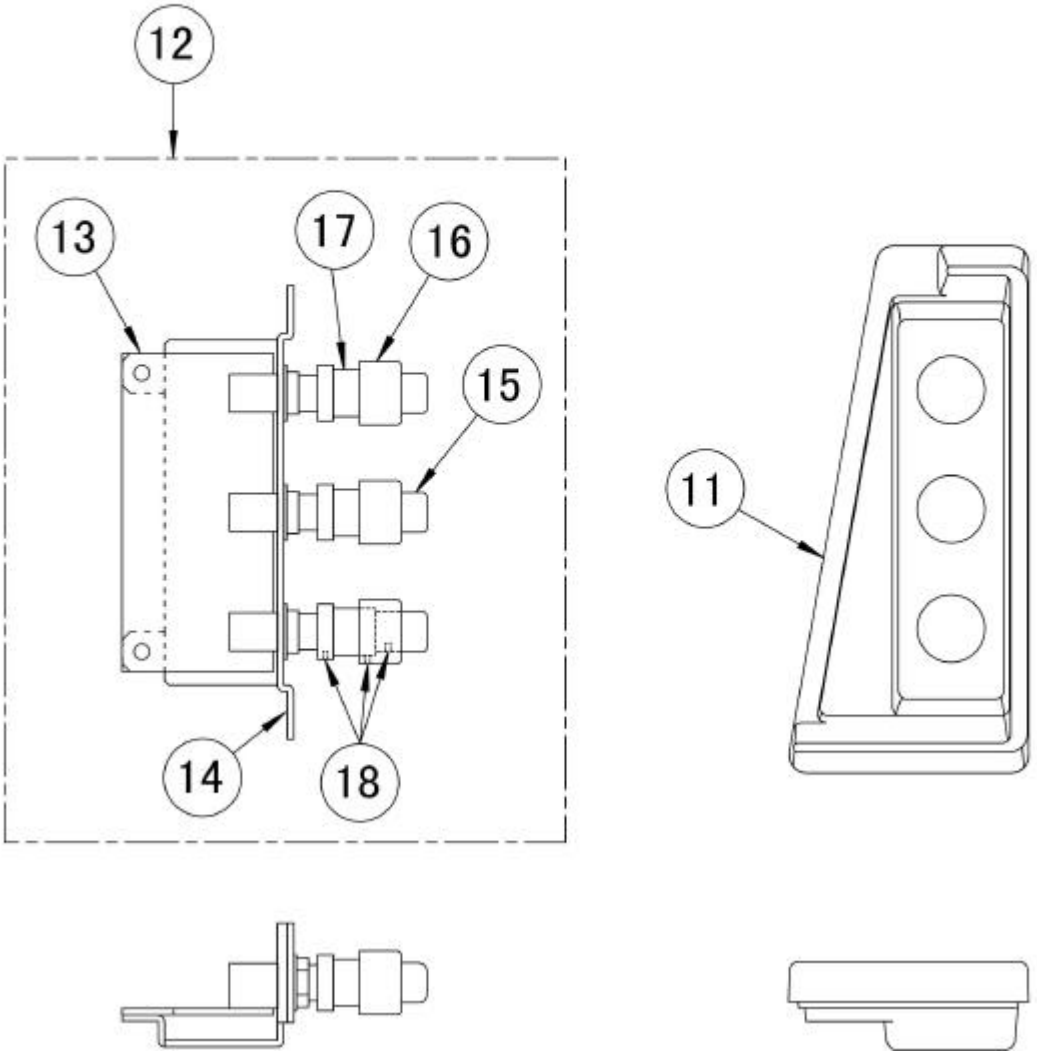
INDEX 06	USM-25 UNIT	UNIT USM-25	S/N

Item	Code	Part Number	Description	Serial Number	Specification
20	A802694	EP476800**	PCB : VPU	M01101 ~	FOR NTSC
20	A802695	EP476801**	PCB : VPU	M01101 ~	FOR PAL
21	A802229	EP446600**	PCB : VPU	~ M01100	FOR NTSC
21	A802230	EP446601**	PCB : VPU	~ M01100	FOR PAL
21	A802696	EP476900**	PCB : CMB	M01101 ~	
22	A802231	EP446700**	PCB : MGR	~ M01100	
24	A802232	EP442300**	PCB : CPU		
25	A802233	EP444500**	PCB : MOTHER	~ M01100	
25	A802697	EP481200**	PCB : MOTHER	M01101 ~	

07	PHYSIOLOGICAL SIGNAL UNIT	EU-5044	



07	PHYSIOLOGICAL SIGNAL UNIT	EU-5044	



INDEX 07	PHYSIOLOGICAL SIGNAL UNIT	UNIT EU-5044	S/N

Item	Code	Part Number	Description	Serial Number	Specification
1	A802234	EP457800**	PCB : PHYSIO. SIGNAL AMP		
2	A601133	L-CABLE-586	CABLE : DC-IN CONNECTOR CABLE		
3	A601132	MAS-8100S-G	CONNECTOR : DIN PLUG		
4	A601134	MAS-5100S	CONNECTOR : DIN PLUG		
5	A802235	CO-PEU-4000-B	CABLE : SIGNAL		
6	A801504	L-CABLE-579	CABLE : ECG CABLE UNIT		
7	A611098	S-J0282#04	SWITCH : SLIDE		
8	A802236	CO-PEU-4000-A	CABLE : POWER		
9	A600269	EU-5044#6	LABEL : INDICATION		
10	A201565	EU-5044	UNIT ASSY		
11	A140364	SAP-4000-07-01	FRAME		
13	A802237	EP453600**	PCB : PHYSIO. CONTROL		
14	A140365	EU-5044#1	PCB FIXTURE		
15	A201566	SAP-4000-07-02	KNOB(1)		
16	A201567	SAP-4000-07-03	KNOB(2)		
17	A120182	EU-5034#4	BUSH : KNOB		
18	A399200	3T2x3, SUS	SCREW		

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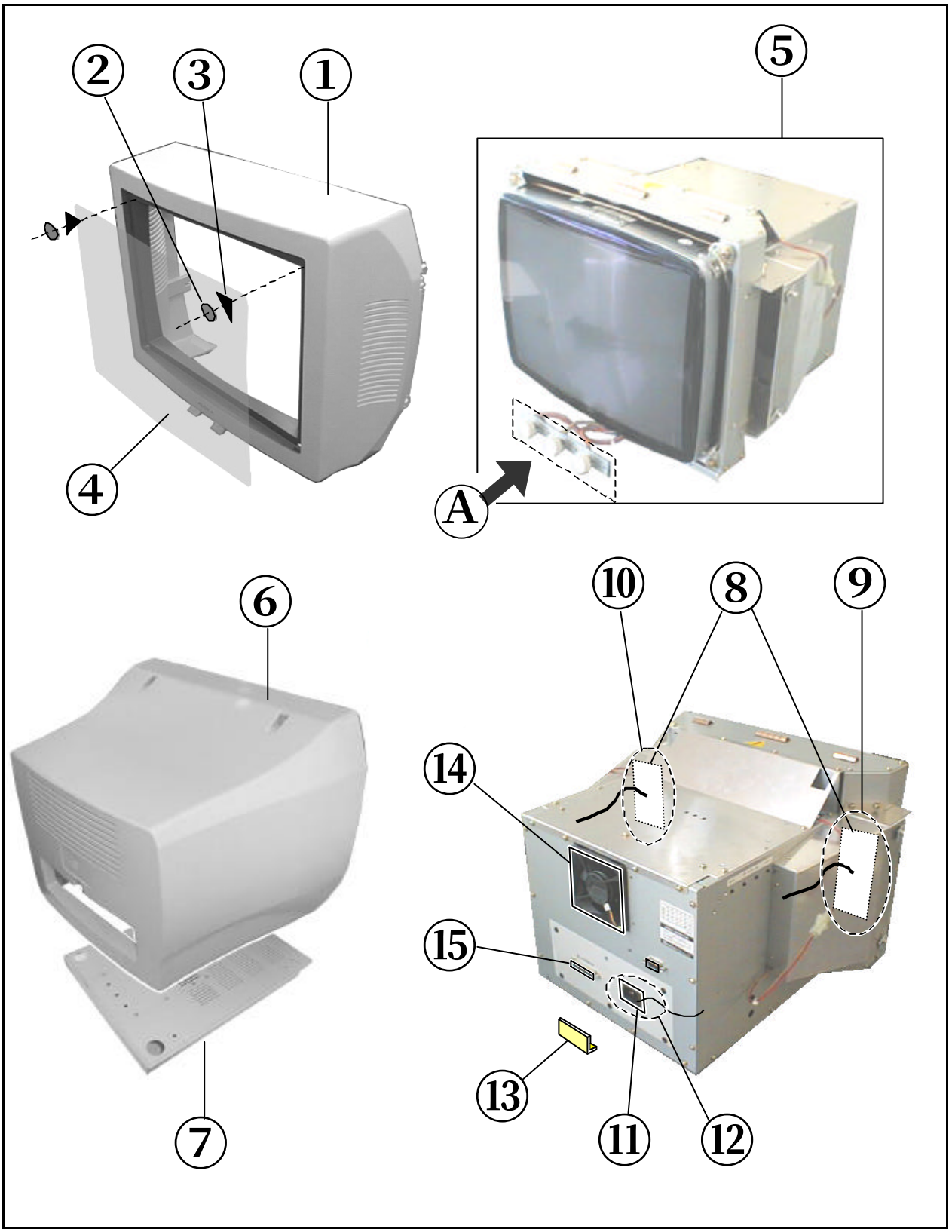
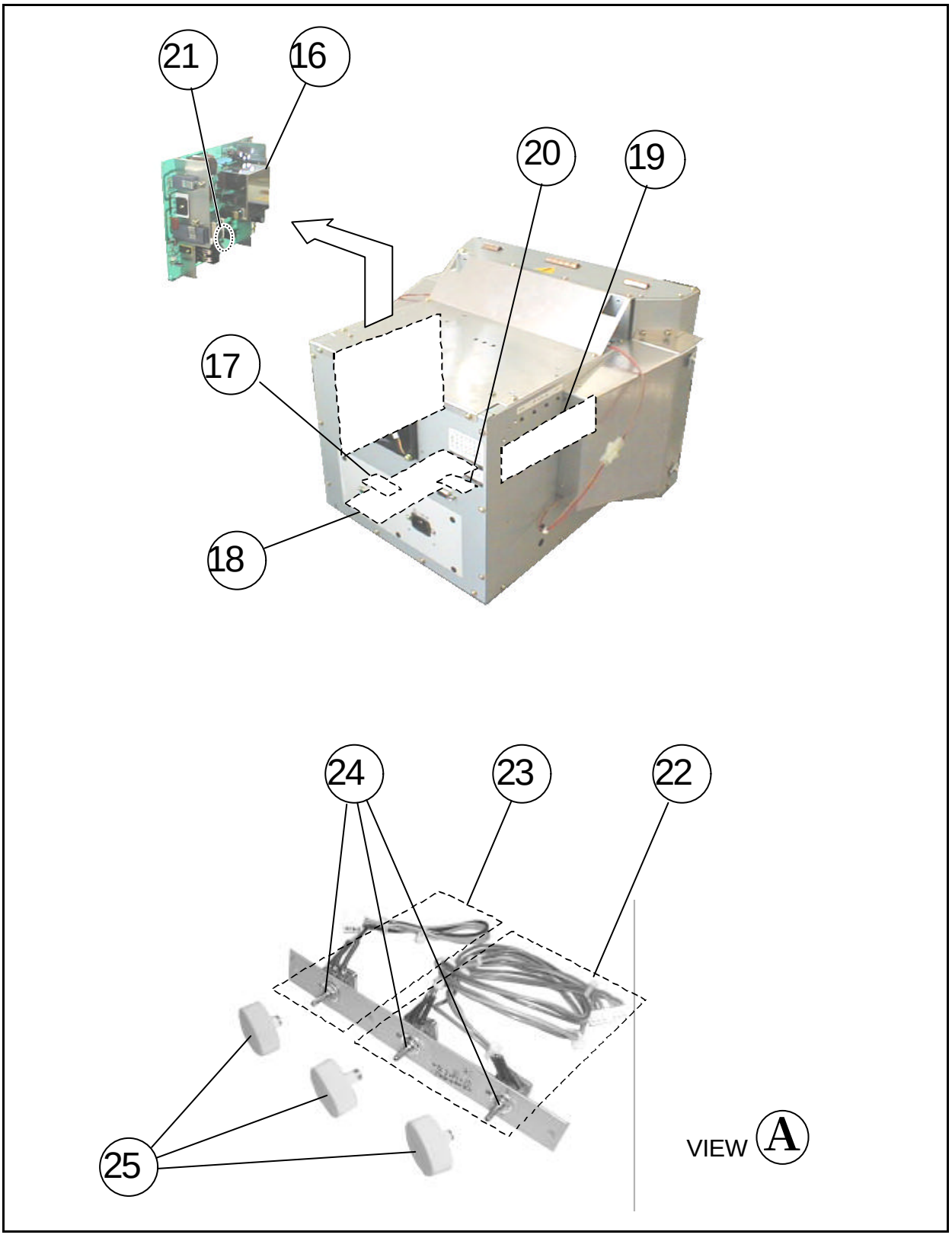
08	MONITOR	IPC-1530Q	



08	**MONITOR**	**IPC-1530Q**	



INDEX 08	MONITOR	UNIT IPC-1530Q	S/N

Item	Code	Part Number	Description	Serial Number	Specification
1	A201403	SAP-5500-09-01	ESCUTCHEON		
2	A150158	L-Ki-511	FOR FILTER FIXING		
3	A510042	SP-5231B	FILTER FIXING HOLDER		
4	A603037	MP-IP-1530-4	FILTER		
5	A603038	QA1520	BARE CHASSIS		
6	A201404	SAP-5500-09-06	COVER : REAR		
7	A201405	MP-IP13	TILT TABLE		
8	A624007	C091P03D0010	SPEAKER		
9	A201568	4J437-15	SPEAKER WITH CABLE ASSY : LEFT		
10	A201569	4J437-14	SPEAKER WITH CABLE ASSY : RIGHT		
11	A606040	03ME3(S)	AC INLET		
12	A201570	4J437-16	AC INLET WITH CABLE ASSY		
13	A619009	K1252-04-01	CABLE SLIP PREVENTIVE HARD WARE		
14	A625052	FBA08A24L1D0	FAN		
15	A201507	PK-0226A	25PIN D SUB CONNECTOR WITH CABLE ASSY		
16	A802238	PG584	PCB : POWER		
17	A802239	PG586(1/2)_ASSY	PCB : INPUT		
18	A802240	PG586(2/2)_ASSY	PCB : AUDIO AMP		
19	A802241	PG595_ASSY	PCB : CONTROL		
20	A802242	PG626_ASSY	PCB : RS-232C		
21	A621094	21802.5	FUSE		
22	A201571	4J437-12	CABLE ASSY : CONTRAST/BRIGHTNESS		
23	A201572	4J437-13	CABLE ASSY : VOLUME		
24	A623084	VB16L4N20KG_B1K	VARIABLE RESISTOR : ROTATE		
25	A201510	SAP-5500-09-19B	KNOB		

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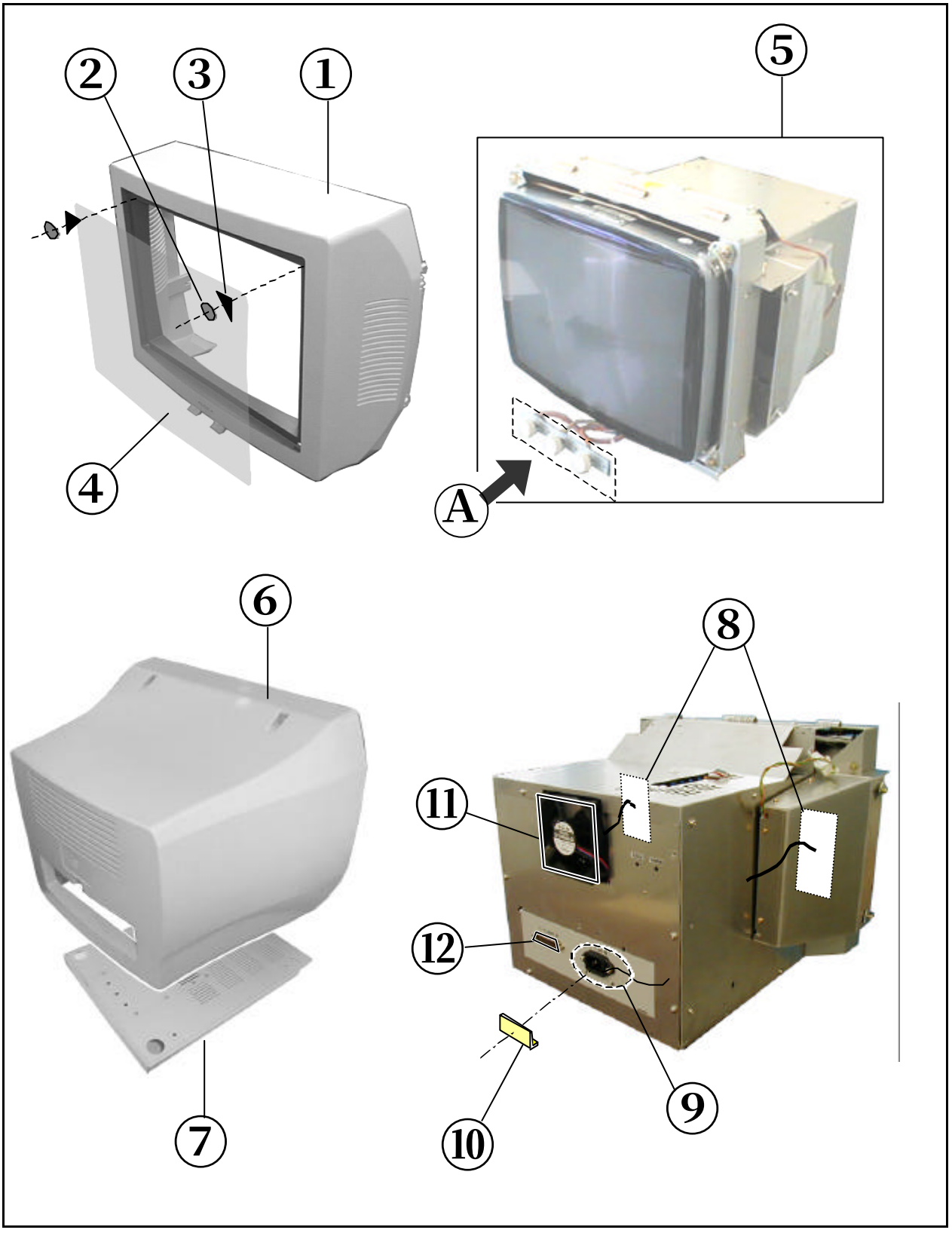
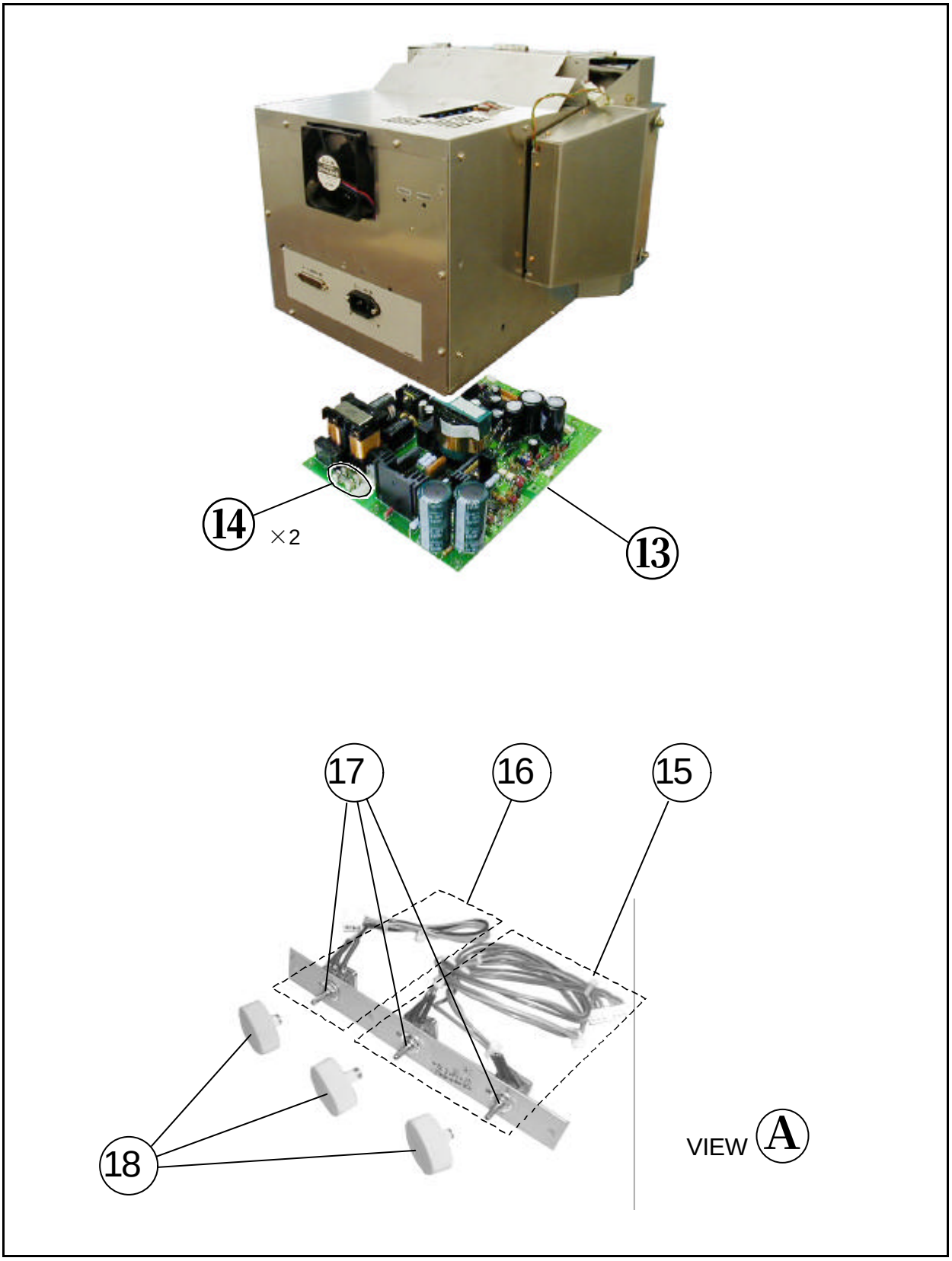
08	MONITOR	IPC-1530(U)	



08	MONITOR	IPC-1530(U)	



INDEX 08	MONITOR	UNIT IPC-1530U	S/N

Item	Code	Part Number	Description	Serial Number	Specification
1	A201403	SAP-5500-09-01	ESCUTCHEON		FOR IPC-1530U
2	A150158	L-Ki-511	FOR FILTER FIXING		FOR IPC-1530U
3	A510042	SP-5231B	FILTER FIXING HOLDER		FOR IPC-1530U
4	A150177	L-KI-797	FILTER		FOR IPC-1530U
5	A603040	PE-0048	BARE CHASSIS	M00546 ~ M00402, M00405,	FOR IPC-1530U GROUP B
5	A603039	PE-0049	BARE CHASSIS	M00101 ~ M00400 M00403, M00404,	FOR IPC-1530U GROUP A
6	A201404	SAP-5500-09-06	COVER : REAR		FOR IPC-1530U
7	A201405	MP-IP13	TILT TABLE		FOR IPC-1530U
8	A824007	C091P03D0010	SPEAKER WITHOUT CABLE	M00101 ~ M00400 M00403, M00404,	FOR IPC-1530U GROUP A
8	A824010	FA905012	SPEAKER WITHOUT CABLE	M00546 ~ M00401, M00402,	FOR IPC-1530U GROUP B
9	A201506	PK-0225A	AC INLET WITH CABLE ASSY		FOR IPC-1530U
10	A819009	K1252-04-01	CABLE SLIP PREVENTIVE HARD WARE		FOR IPC-1530U
11	A825038	109R0812M424	FAN		FOR IPC-1530U
12	A201630	PK-2665A	25PIN D SUB CONNECTOR WITH CABLE ASSY		FOR IPC-1530U
13	A802699	TB-0047A	PCB : POWER SUPPLY	M00546 ~ M00401, M00402,	FOR IPC-1530U GROUP B
13	A802698	TB-0055	PCB : POWER SUPPLY	M00101 ~ M00400 M00403, M00404,	FOR IPC-1530U GROUP A
14	A821095	218-3.15	FUSE	M00101 ~ M00400 M00403, M00404,	FOR IPC-1530U GROUP A
14	A821096	TDS 3.15A/250V	FUSE	M00546 ~ M00401, M00402,	FOR IPC-1530U GROUP B
15	A201631	PK-2664	CABLE ASSY		FOR IPC-1530U
16	A201632	PK-2219B	CABLE ASSY		FOR IPC-1530U
17	A623085	VB16L4(7X6.5)N20KCB10K	VARIABLE RESISTER : ROTATE		FOR IPC-1530U
18	A201510	SAP-5500-09-19B	KNOB		FOR IPC-1530U

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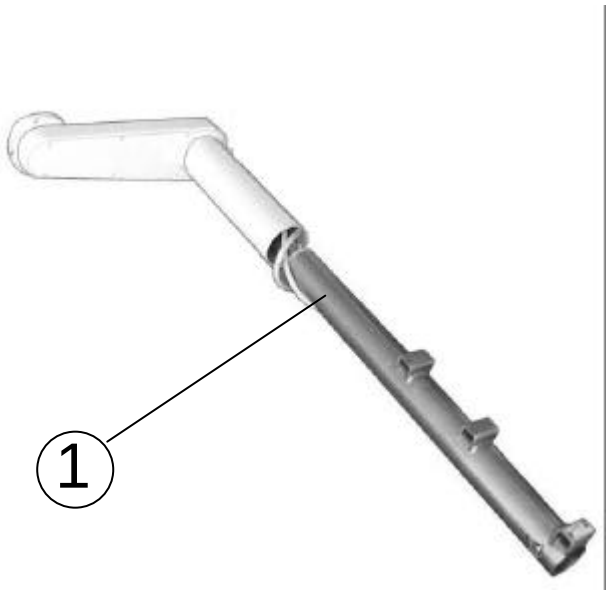
09	MONITOR ARM	L-Ki-690	S/N



INDEX 09	MONITOR ARM	UNIT L-KI-690	S/N

Item	Code	Part Number	Description	Serial Number	Specification
1	A150170	L-Ki-690	MONITOR ARM ASSY		

INDEX 10	SCREWS / SMALL PARTS / LABEL	UNIT	S/N

Item	Code	Part Number	Description	Serial Number	Specification
1	A399101	S3*6Fe, Ni	SCREW		
2	A399102	S3*8Fe, Ni	SCREW		
3	A399201	S4*6Fe, Ni	SCREW		
4	A399202	S4*40Fe, Ni	SCREW		
5	A399094	CNK3*6Fe, Ni	SCREW		
6	A399085	BNK3*6Fe, Ni	SCREW		
7	A399086	BNK3*8Fe, Ni	SCREW		
8	A399092	BNK3*12Fe,Ni	SCREW		
10	A399090	BNK4*8Fe, Ni	SCREW		
11	A399091	BNK4*10Fe, Ni	SCREW		
12	A399093	BNK4*12Fe, Ni	SCREW		
14	A347512	HB5*12	SCREW		
15	A600270	P-1211	LABEL : INDICATION		
16	A600144	P-3243B	LABEL : INDICATION		
17	A600194	P-3250	LABEL : INDICATION		
18	A600020	P-4246-UL	LABEL : INDICATION		
19	A600213	P-4232UB-UL	LABEL : INDICATION		
20	A600266	P-3324	LABEL : INDICATION		
21	A600271	P-126	LABEL : INDICATION		
22	A600272	P-1212	LABEL : INDICATION		
23	A600273	P-1210	LABEL : INDICATION		
24	A600274	P-3258B	LABEL : INDICATION		
25	A600275	P-3259C	LABEL : INDICATION		
25	A600286	P-3259D	LABEL : INDICATION		
26	A600201	P-4309	LABEL : INDICATION		
27	A600276	P-3271	LABEL : INDICATION		

INDEX 10	SCREWS / SMALL PARTS / LABEL	UNIT	S/N

Item	Code	Part Number	Description	Serial Number	Specification
28	A600277	P-32-S4000-1	LABEL : INDICATION		
29	A600195	P-3251	LABEL : INDICATION		
30	A600278	P-3319	LABEL : INDICATION		
31	A600279	P-32-S4000-2	LABEL : INDICATION	M00101 ~ M00300	
31	A600284	P-32-S4000-2B	LABEL : INDICATION	M00301 ~	
32	A600280	P-3318-100	LABEL : INDICATION		FOR 100V
33	A600281	P-3318-200	LABEL : INDICATION		FOR 200V
34	A600282	USI-150#35	LABEL : INDICATION		
35	A600283	USM-25#13	LABEL : INDICATION		
36	A600285	P-32-SSD1700-6	LABEL : CONTROL		FOR EU-9064
37	A600209	P-32-SSD1100-3B	LABEL : PROBE4		FOR SCU-4000
38	A600287	P-32-SSD5500-9	LABEL : PHD		
39	A600246	P-4239U-UL	LABEL :GROUNDING CAUTION NAMEPLATE		FOR A.A.
40	A600023	P-4237-UL	LABEL : CAUTION FOR FUSE		FOR A.A.
41	A600113	P-4229B-UL	LABEL : CAUTION		FOR A.A.
42	A600024	P-4238-UL	LABEL : CAUTION		FOR A.A.
43	A600016	P-4231B-UL	LABEL : CAUTION		FOR A.A.
44	A600288	P-52-ETL-W	LABEL : ETL		FOR A.A.
45	A600289	P-32-SSD4000-1	LABEL : CUSTOMIZED SWITCH		
46	A600290	P-32-SSD4000-3	LABEL : FUNCTION		

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SECTION 11

SERVICE INFORMATION

11-1 Introduction

This section provides information which the service engineer must know and information useful if he knows, when repairing.

11-2 Maintenance Menu

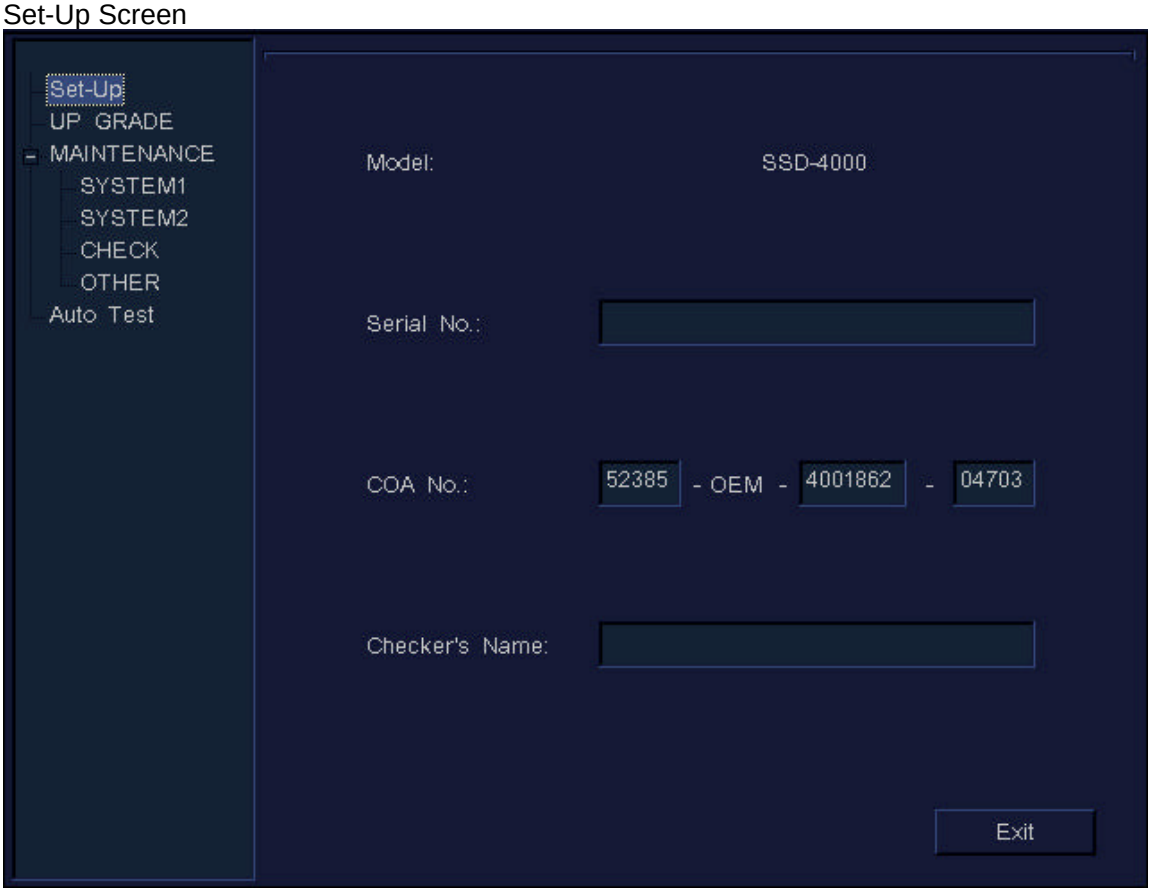
The maintenance menu offers a function to help the service personnel only repair or inspect the equipment and upgrade the software. This function is not open to the user.

●CAUTION● To make the maintenance function invalid, it is necessary to once turn off the power. After performing operation using the maintenance function, be sure to turn on the power again.

11-2-1 Starting the maintenance menu

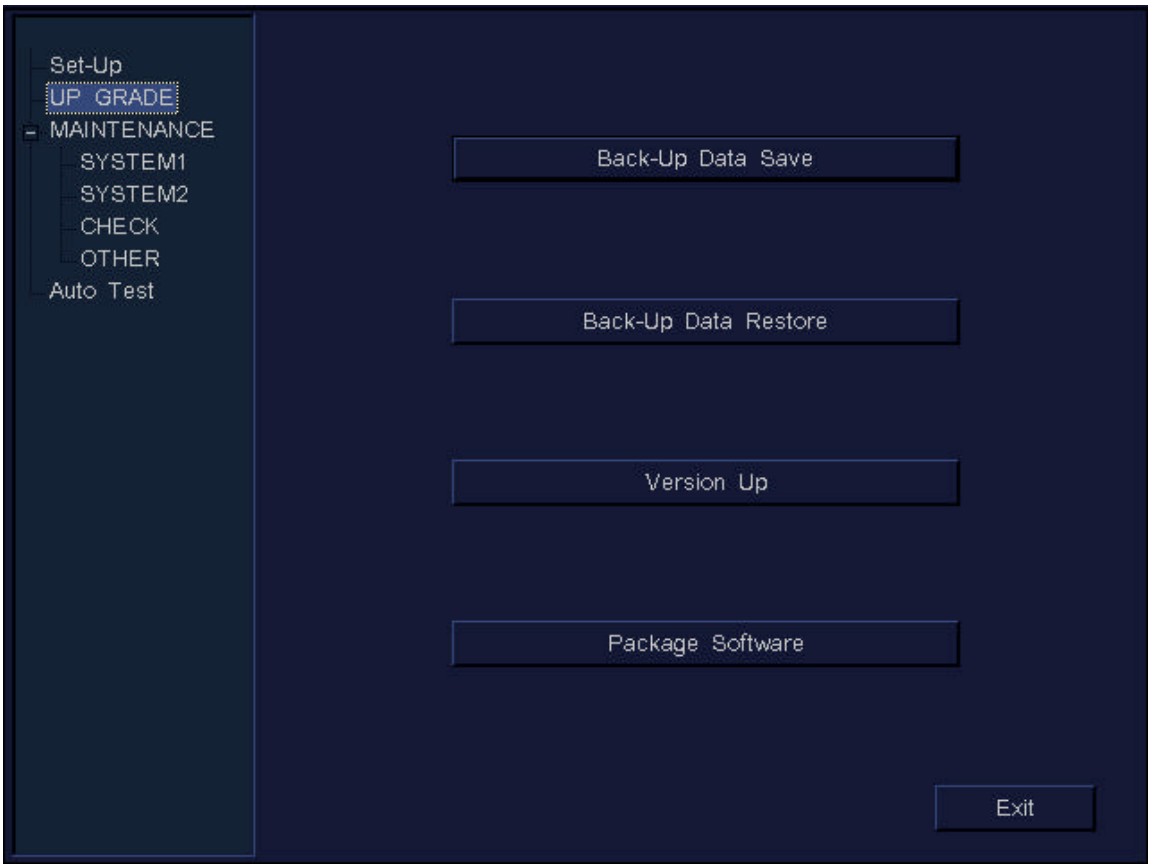
1) Press the Preset switch to display the Preset List.
2) Press CTRL + S. (The Set-Up screen of maintenance menu will be active.)

Set-Up Screen



11-2-2 The function of maintenance menu

1）UP GRADE Screen



1)–1 Back-Up Data Save

The following data can be stored in to the MO disk in one lump.

- All PRESET data
- All patient data
- All examination data
- All memorized data in the system

1)-2 Back-Up Data Restore

By using this function, the saved data in the MO disk can be restored into the system.

1)-3 Version Up

By using the MO disk or floppy disk, the software can be upgraded.

The setting of PRESET before upgrading and the setting of package software are kept after upgrading.

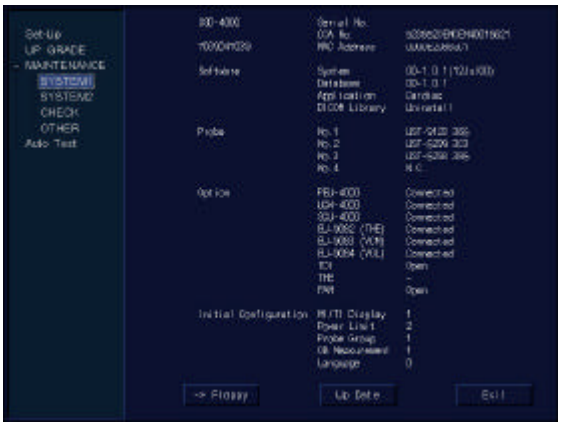
1)-4 Package Software

By using the key disk (Floppy disk), the some package software can be masked or lifted.

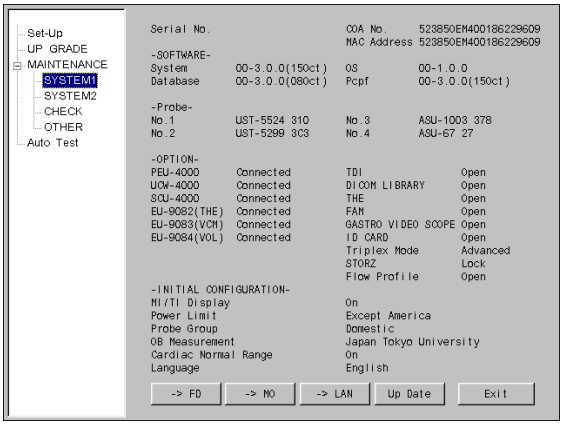
But, all of the application cannot be masked by the key disk.

2) MAINTENANCE

2)-1 SYSTEM1 Screen



Ver. 1.* ~ 2.*



Ver. 3.* ~

This screen shows the system information and probe connection.

◯System Information

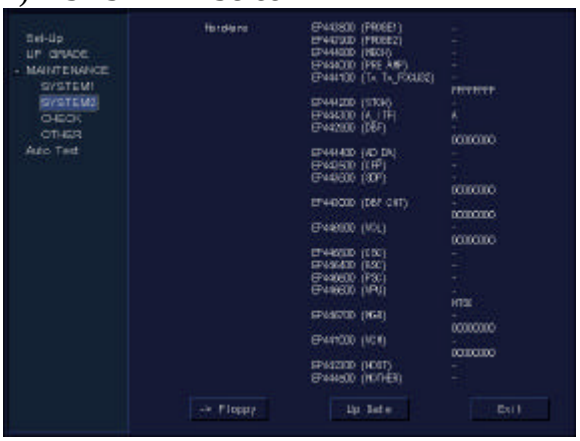
- The software version
- The connected optional unit

◯ ROBE CODE

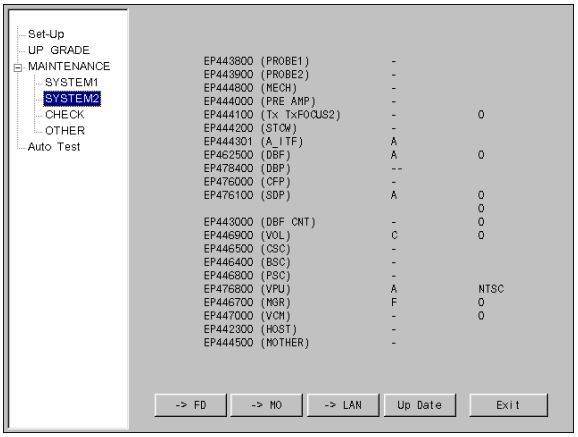
- Probe connector number
- Probe model
- Probe code

When changing the probe, the information of probe connection cannot up-date automatically. However, the probe connection can be updated by panel operation.

2)-2 SYSTEM2 Screen



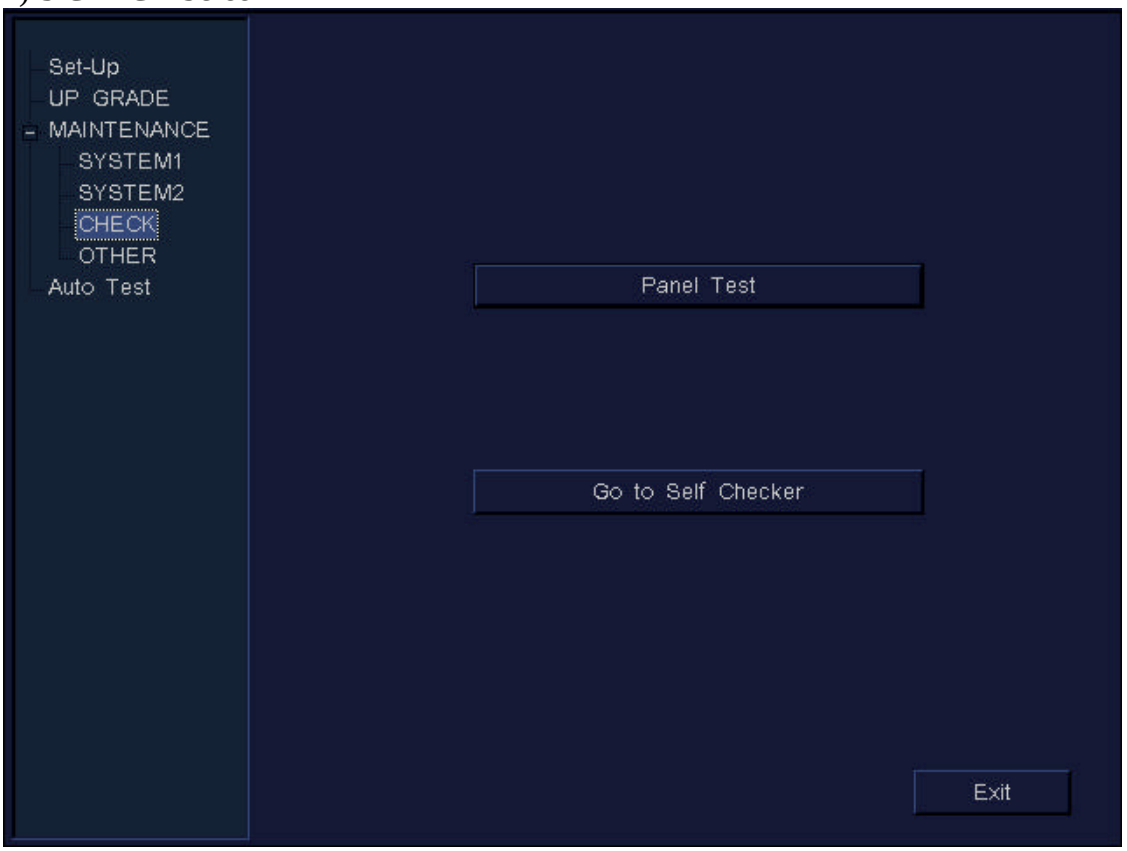
Ver. 1.* ~ 2.*



Ver. 3.* ~

This screen shows the hardware level in the system.

2)-3 CHECK Screen



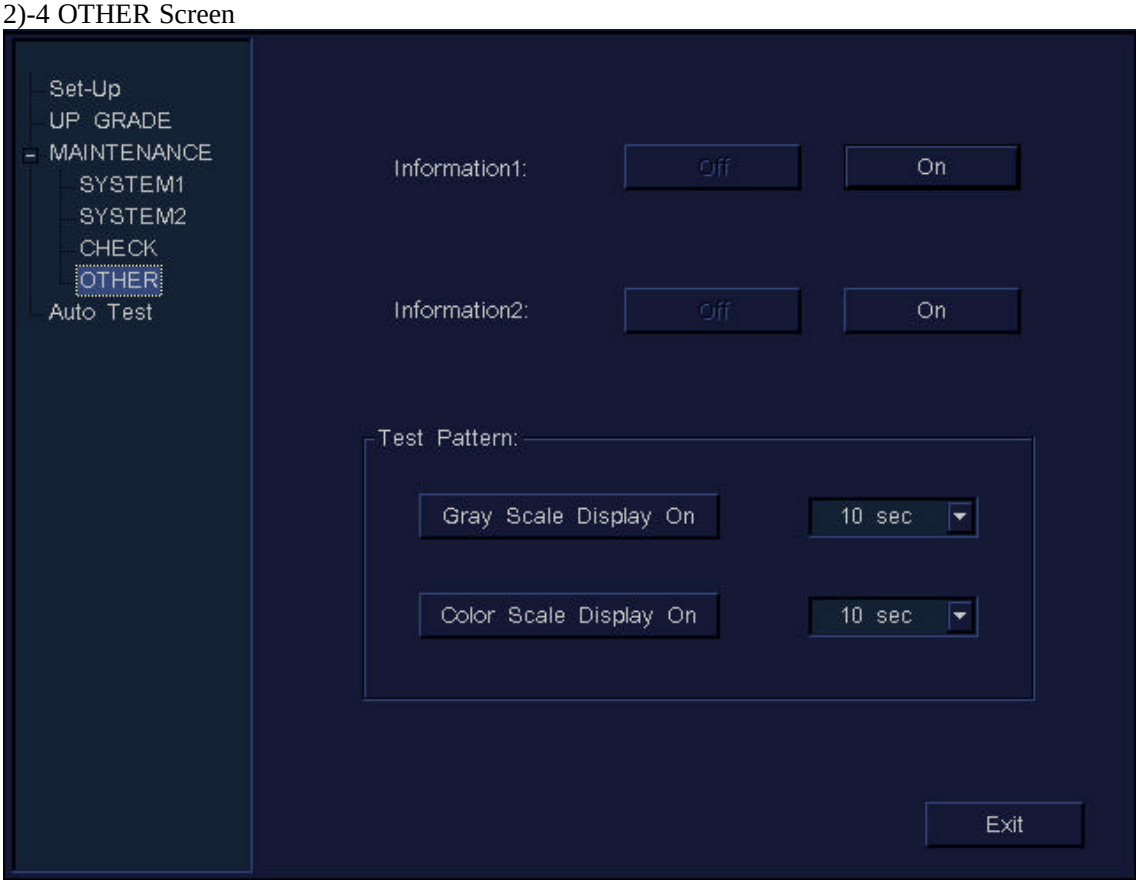
○PANEL TEST

This function can check the LED on the operation panel.

○Go to Self Checker （Not available on Ver.1.0.*）

This function checks whether a part of hardware has a problem or not, and its result is displayed on the screen.

2)-4 OTHER Screen



○ Information 1

The internal setting of the system is displayed on the screen at each display mode.

○ Information 2

The data of power control is displayed on the screen.

○ Test Pattern

Gray Scale Display On： The gray scale is displayed on the screen for adjustment of the monitor.

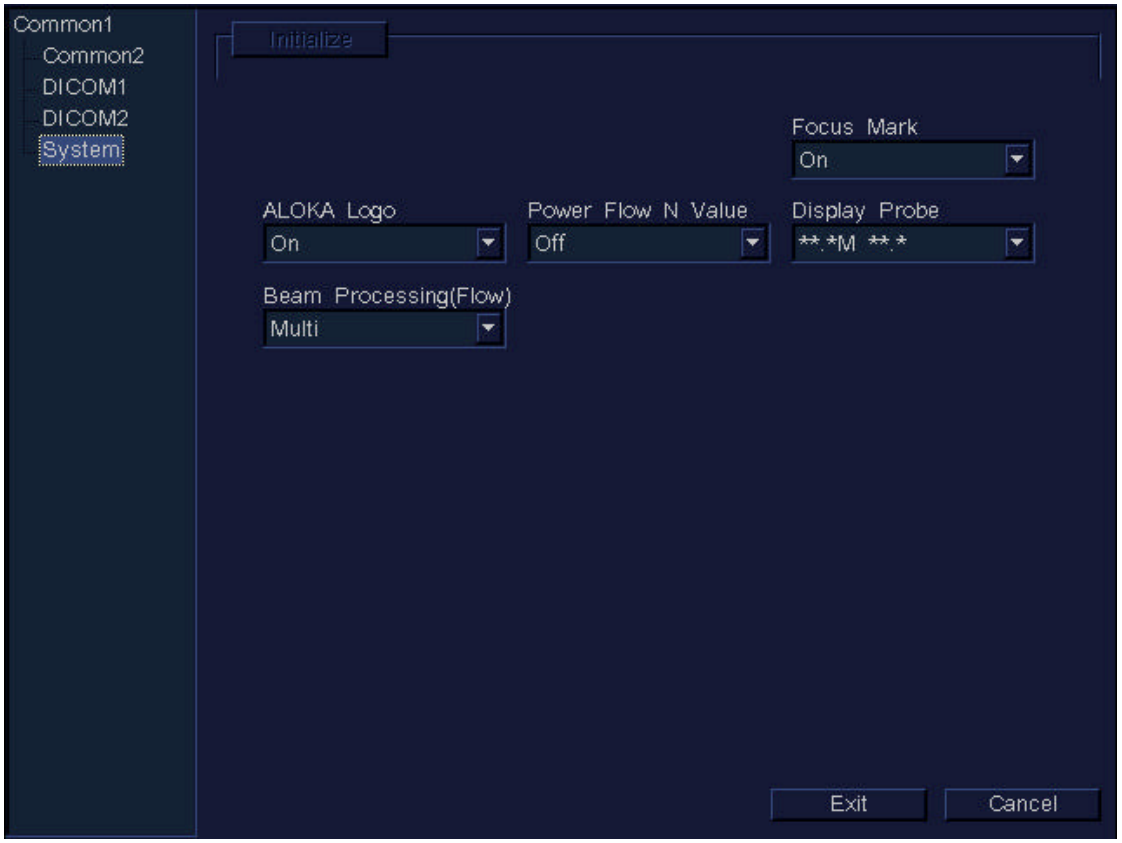
Color Scale Display On： The Color scale is displayed on the screen for adjustment of the monitor.

11-3 SYSTEM PRESET

The system preset menu offers a function to help the service personnel only for system setting. This function is not open to the user.

11-3-1 Starting the system preset menu

1) Press the Preset switch to display the Preset List.
2) Select the “Set-up of Preset” to display the Preset setting selection screen.
3) Select the “Common Preset to display the “Common Preset”.
4) Press CTRL + O (ou), the “System” in the system tree will be active.



1) Focus Mark
   Set the Focus Mark display on the screen. (ON/OFF)
2) ALOKA Logo
   Set the Aloka Logo mark display on the screen. (ON/OFF)
3) Power Flow N Value
   Set the n value display of PRF on the screen when the Power Flow mode is activated. (ON/OFF)
4) Display Probe
   Select the probe frequency displaying format on the screen.
5) Beam Processing (Flow)
   Select the beam processing method (Single/Multi) in the Color Flow mode.

11-4 Flash Memory Data Rewriting procedure

11-4-1 PURPOSE

The flash memory data rewriting floppy disk (FD) uses when the following problem happens.

① In case where the system cannot boot up caused by a failure of updating the flash memory data after carrying out the software upgrade work.

② The system cannot boot up due to the incompatible flash memory data on PC board which replaced by repair.

NOTE: On Ver. 2.0 onwards, the system automatically rewrites the flash memory data when the data is different from the hard disk data.

11-4-2 PROCEDURE:

① Turn the system off.

② Insert a flash memory data rewriting floppy disk into a floppy disk drive on the system, then turn the system on.

③ A few minutes later, the following window appears on the screen after displaying the “Aloka logo” and character of “Shutdown in progress”. Move a cursor to an affecting item in the window, and select it with pressing the "SET" switch on the operation panel.

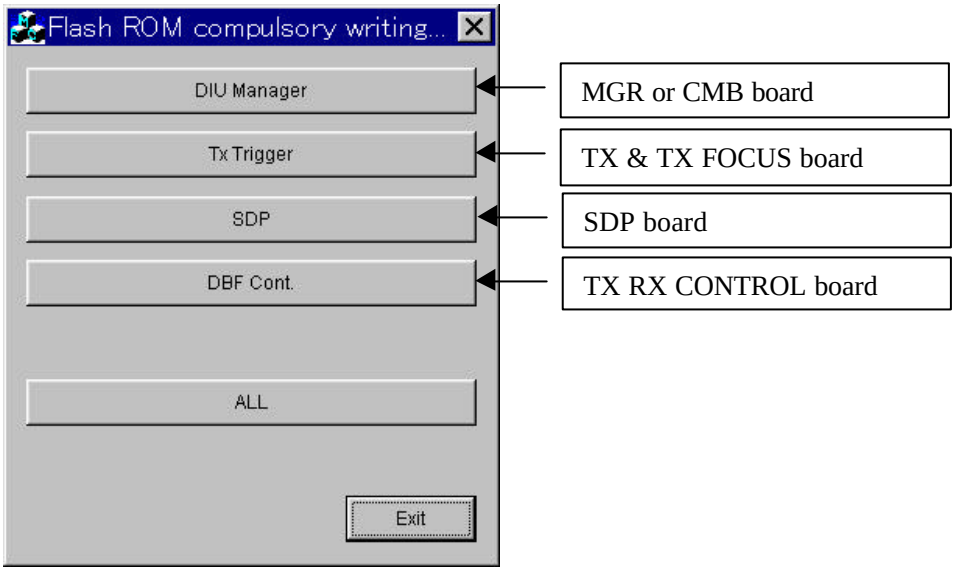
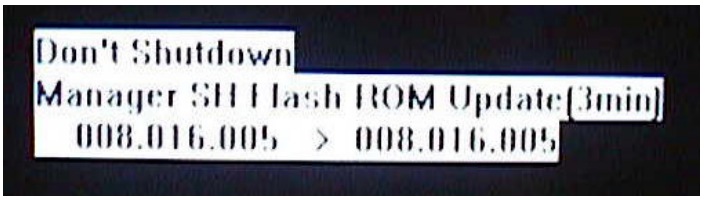
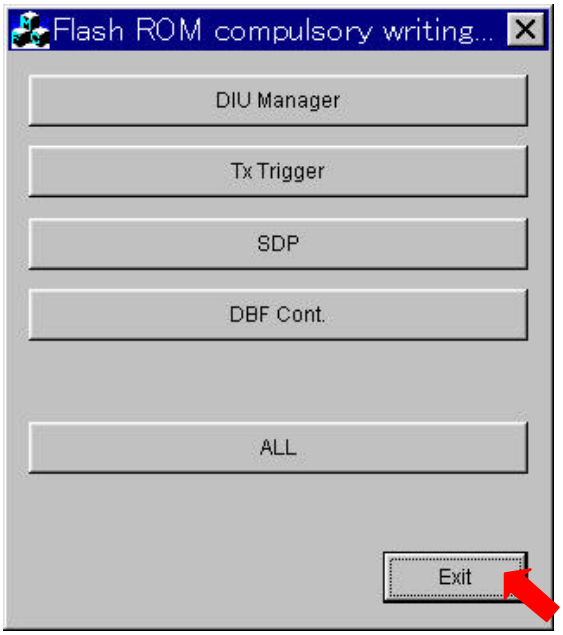


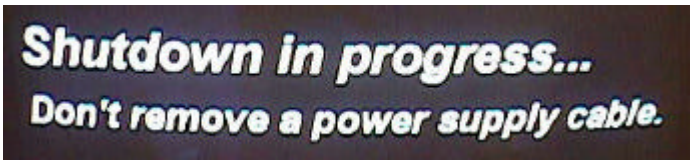
Fig. 1

④ Carrying out the update of flash memory automatically. After completing, a screen returns to the Fig.1 again.



⑤ To finish the work, click “Exit” at bottom of screen and take out a floppy disk from drive while an LED of the floppy disk drive is not lighted. And then, turn the power switch off.





⑥ Confirm that the system boot up completely by turning the power switch on again.

11-5 Probe Focus Data Erasing procedure

11-5-1 PURPOSE:

The probe focus data erasing floppy disk (FD) uses when the following problem happens on the SSD-4000 Ver 1.1.* .

① In case of the bad image quality caused by a failure of focus data.

NOTE: This FD cannot use on SSD-4000 Ver. 2.0 and higher system, because the focus data are not stored into the hard disk.

11-5-2 PROCEDURE:

① Turn the system off.

② Insert a probe focus data erasing floppy disk into a floppy disk drive on the system, and then turn the system on.

③ A few minutes later, the following window appears on the screen after displaying the “Aloka logo” and character of “Shutdown in progress”. Move a cursor to an affecting item in the window, and press “SET” switch.

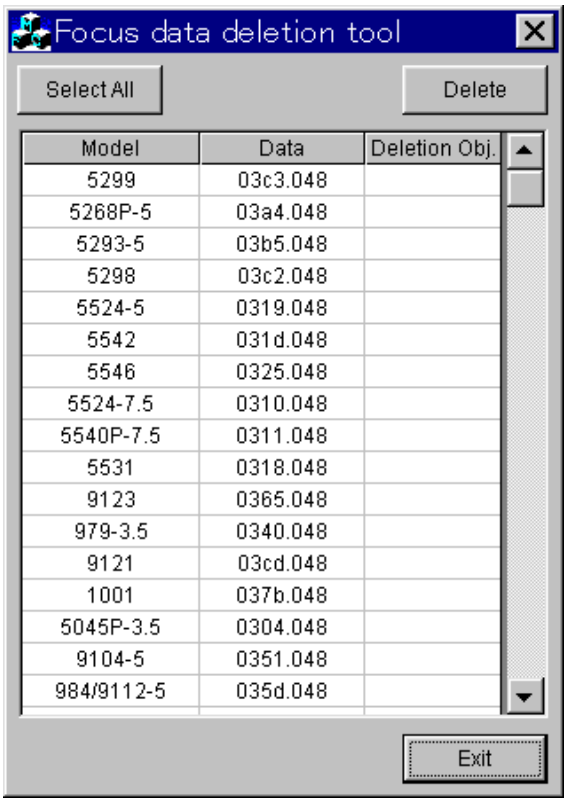


Fig. 1

④ Click a "Delete" when a star mark is displayed in the "deletion Obj."

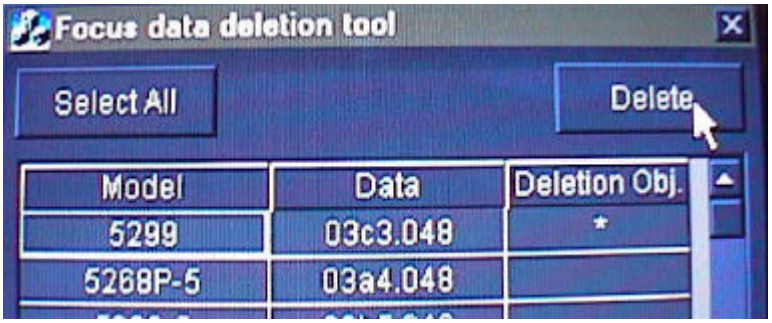


Fig. 2

⑤ Click “Yes” when the following message appears.

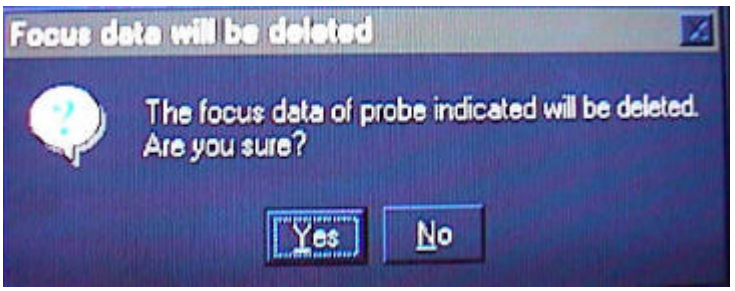


Fig. 3

⑥ After completing, a screen returns to the Fig.1 again.

⑦ To finish the work, click “Exit” at bottom of screen and take out a floppy disk from drive while an LED of the floppy disk drive is not lighted. And then, turn the power switch off.

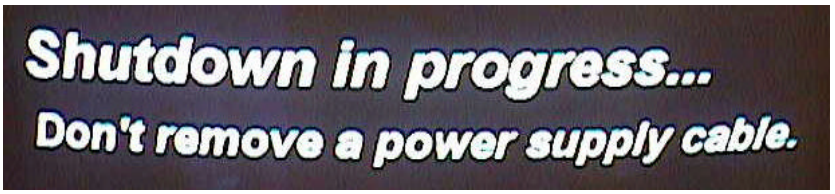
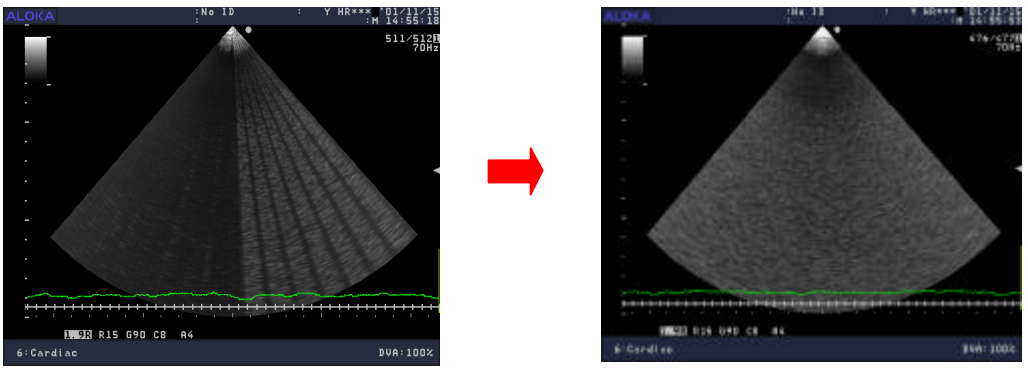


Fig 4

⑧ Turn the power switch on again and confirm whether the system starts completely. After the system start up completely, select the probe erased in step 4 to overwrite the focus data into the HDD.

⑨ After overwriting the focus data immediately, an abnormal image is displayed, and it solved by changing the display mode or freeze/unfreeze.



After overwriting the focus data after unfreezing

11-6 Assignment of CTRL key and those usage

In order to use special functions, press “CTRL” and the following key in keyboard at the same time.

Operation	1) Control & Measurement function 2) PRESET data (Body mark, position, etc.)	1) Patient Database data 2)Position of measurement menu	1) Stored image in HD	1) System rebooting 2) Initial Configuration setting window display
CTRL + R	DELETE	DELETE	DELETE	Rebooting and displaying
CTRL + E	DELETE	REMAIN	REMAIN	Rebooting and displaying
CTRL + Q	REMAIN	DELETE	REMAIN	Rebooting only
CTRL + W	REMAIN	REMAIN	DELETE	Rebooting only

APPENDIX

Appendix-1 Introduction

This appendix is described the revised history of this service manual as Manual Change Information.

Appendix-2 Manual Change Information

Rev.	Date	Revisions			Note
		Contents		Pages	
0	19-Sep.-'00	1st. issue			
1	19-Sep.-'01	Cover (1/2, 2/2)	Replaced	1/2, 2/2	
		Back cover (1/2, 2/2)	Replaced	1/2, 2/2	
		CONTENTS (1/2)	Replaced	1/6~4/6	
			Added	5/6, 6/6	
		CONTENTS (2/2)	Replaced	1/4~4/4	
		SECTION 2			
		2-10 Handling of S.M.D. PCBs	Replaced	2-4	
		SECTION 4			
		4-1 System Specifications	Replaced	4-1, 4-2, 4-5, 4-6, 4-8	
		4-2 System Configuration	Replaced	4-9	
		4-3 System Block Diagram	Replaced	4-10, 4-11, 4-13	
			Added	4-14-1~4-14-4	
		4-4-1 System Control	Replaced	4-17	
		4-4-2 Transmission and Reception block	Replaced	4-21, 4-22	
		4-4-3 Digital Imaging Unit	Replaced	4-27	
		4-5 Principle of PCB operation	Replaced	4-31, 4-32, 4-35, 4-37, 4-39, 4-43, 4-70	
			Added	4-43-1, 4-43-2, 4-87~4-96	
		SECTION 5			
		CABLE 301	Replaced	5-10	
		MOTHER BOARD EP4445	Replaced	5-15, 5-16, 5-21, 5-23	
		DISTRIBUTOR EP4472	Replaced	5-41~5-45	
		CABLE 711 CO-EU5044-B	Replaced	5-49	
		Power supply unit PSU-S4000B	Added	5-81, 5-82	
		Transformer unit circuit PSU-S4000B-1	Added	5-83, 5-84	

Rev.	Date	Revisions			Note
		Contents		Pages	
1	19-Sep.-'01	Power supply unit (2)			
		PSU-S4000B-2	Added	5-85, 5-86	
		Hi-Voltage circuit EP440701	Added	5-87	
		Rectification circuit EP4622	Added	5-88	
		Power supply circuit EP4631	Added	5-89	
		Power supply circuit EP4632	Added	5-90~5-92	
		Mother board for PSU-S4000B-2			
		EP4633	Added	5-93	
		Output connector circuit			
		EP4634	Added	5-94	
		SECTION 6			
		6-4-3 Attention of connecting optional units	Replaced	6-7	
		6-4-4-3 Preset table constitution	Replaced	6-9	
		6-4-8 Location of unit	Replaced	6-14, 6-15	
			Added	6-17-1, 6-17-2	
		6-4-10 Action to be taken if the equipment fails to be started or the panel operation is locked up	Replaced	6-24	
		6-4-11 Minimum Start-up	Replaced	6-26~6-28	
		6-5-2 Phenomenon Code Table	Replaced	6-37, 6-39, 6-40, 6-41	
		6-5-3 MAP	Replaced	6-46~6-54	
		6-5-4 PCB Check Procedure	Replaced	6-58, 6-60, 6-85~6-87, 6-91, 6-95, 6-119,	
			Added	6-62-1,6-62-2, 6-121-1~6-121-4	
		SECTION 7			
		7-4 Adjustment Procedure	Replaced	7-2~7-5	
		SECTION 9			
		SSD-4000 Disassembling Instruction	Replaced	9-1~9-64	
			Added	9-64-1~9-64-14	
		SSD-4000 InstallationProcedures	Replaced	9-65~9-76	
		EU-9082 Installation Procedures	Replaced	9-81~9-84	
		EU-9083 Installation Procedures	Added	9-93~9-96	
		EU-9084 Installation Procedures	Added	9-97~9-100	
		SCU-4000 Installation Procedures	Added	9-101~9-104	

Rev.	Date	Revisions			Note
		Contents		Pages	
1	19-Sep.-'01	**SECTION 10**			
		10-1 Contents of Parts List	Replaced	10-1	
		10-6 Parts List	Replaced	10-10, 10-11, 10-16, 10-22~10-25, 10-29, 10-41	
			Added	10-11-1, 10-11-2, 10-25-1~10-25-4, 10-29-1, 10-29-2	
		APPENDIX			
		Appendix-2 Manual Change Information	Replaced	Apndx-1, Apndx-2	
			Added	Apndx-3, Apndx-4	
2	17-May-'02	Cover (1/2, 2/2)	Replaced	1/2, 2/2	
		Back cover (1/2, 2/2)	Replaced	1/2, 2/2	
		CONTENTS (1/2)	Replaced	1/6~6/6	
		CONTENTS (2/2)	Replaced	1/4~4/4	
		SECTION 1			
		1-2 Contents of this Service Manual	Replaced	1-1	
		SECTION 4			
		4-1 System Specifications	Replaced	4-8	
		4-2 System Configuration	Replaced	4-9	
		4-3 System Block Diagram	Added	4-14-5~4-14-8	
		4-4-1 System Control	Replaced	4-15, 4-16	
			Added	4-17-1, 4-17-2	
		4-4-2 Transmission and Reception block	Replaced	4-21, 4-22	
		4-4-3 Digital Imaging Unit	Replaced	4-24, 4-26, 4-27, 4-28	
		4-4-4 Physio. signal display unit PEU-4000 (Option)	Replaced	4-29	
		4-5 Principle of PCB operation	Replaced	4-31, 4-33, 4-35, 4-57, 4-60~4-67, 4-70, 4-89	
			Added	4-96~4-102	

Rev.	Date	Revisions			Note
		Contents		Pages	
2	17-May-'02	**SECTION 5**			
		PSU-S4000B block diagram	Added	5-95	
		PSU-S4000B Wiring diagram	Added	5-96	
		PSU-S4000B-2B Secondary power unit	Added	5-97	
		PSU-S4000B-2B Wiring diagram Secondary power unit	Added	5-98	
		EP4632** Hi-voltage circuit	Added	5-99~5-102	
		EP4633** MOTHER BOARD	Added	5-103	
		EP4732** Foot SW PCB	Added	5-104	
		EP4812** Mother board	Added	5-105~5-111	
		IPC-1530(U) DWU-135B	Added	5-112	
		IPC-1530(U) TB-0047A	Added	5-113	
		IPC-1530(U) TA-0040A	Added	5-114~5-116	
		IPC-1530(U) TE-0037	Added	5-117	
		IPC-1530(U) TD-0108A	Added	5-118	
		IPC-1530(U) TM-0230A	Added	5-119~5-121	
		IPC-1530(U) TC-0130B	Added	5-122~5-128	
		IPC-1530(U) DWU-141	Added	5-129	
		IPC-1530(U) TD-0121	Added	5-130	
		IPC-1530(U) TE-0035	Added	5-131	
		IPC-1530(U) TB-0055	Added	5-132	
		IPC-1530(U) TC-0143	Added	5-133~5-139	
		IPC-1530(U) TM-0280	Added	5-140~5-142	
		IPC-1530(U) TA-0040	Added	5-143~5-146	
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		6-4-4-3 Preset table constitution	Replaced	6-9	
		6-4-7 How to reset the backup data	Replaced	6-13	
		6-4-8 Location of unit	Repalced	6-15, 6-17, 6-17-2	
		6-4-9 Location of ROMs	Added	6-22-1, 6-22-2	
		6-4-10 Action to be taken if the equipment fails to be started or …..	Replaced	6-23, 6-24	
		6-4-11 Minimum Start-up	Replaced	6-26, 6-28, 6-29, 6-30	
		6-5-3 MAP	Replaced	6-46~6-54	
		6-5-4 PCB Check Procedure	Replaced	6-62-1, 6-62-2, 6-98~6-102, 6-110~6-113, 6-115~6-117 6-119, 6-121, 6-121-1, 6-122,	

Rev.	Date	Revisions			Note
		Contents		Pages	
2	17-May-'02	**SECTION 6**			
		6-5-4 PCB Check Procedure	Replaced	6-123	
			Added	6-87-1~6-87-16,	
		SECTION 8			
		8-4-1 Function check	Replaced	8-4, 8-5	
		8-4-2 Image Quality Check	Replaced	8-12	
		SSD-4000 Check Sheet	Replaced	8-15, 8-16	
		SECTION 9			
		SSD-4000 Disassembling Instruction	Replaced	9-1~9-4, 9-10, 9-20, 9-22~9-31, 9-36, 9-37, 9-40, 9-42, 9-46, 9-54, 9-55, 9-58~9-61, 9-64, 9-64-2~9-64-14	
			Added	9-64-15~9-64-	
		SECTION 10			
		10-6 Parts List	Replaced	10-11, 10-11-1, 10-15~10-19, 10-21, 10-25-2, 10-25-3, 10-28, 10-29, 10-29-1, 10-29-2, 10-40, 10-41	
			Added	10-19-1, 10-19-2, 10-37-1~10-37-	
		SECTION 11			
		11-4 Flash Memory Data Rewriting procedure	Replaced	11-8	
		11-5 Probe Focus Data Erasing procedure	Added	11-9~11-12	

Rev.	Date	Revisions			Note
		Contents		Pages	
2	17-May-'02	**APPENDIX**			
		Appendix-2 Manual Change Information	Replaced	Apndx-3, Apndx-4	
			Added	Apndx-5, Apndx-6	
3	15-Oct.-'03	**Cover (1/2, 2/2)**	Replaced	1/2, 2/2	
		Back cover (1/2, 2/2)	Replaced	1/2, 2/2	
		CONTENTS (1/2)	Replaced	1/6~6/6	
		CONTENTS (2/2)	Replaced	1/4~4/4	
		SECTION 2			
		2-12 A combination of UCW-4000B and software version			
		2-13 A combination of SCU-4000/4000B and AD_DA "EP444400"/DBP "EP478400" board	Replaced	2-6	
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		4-2 System Configuration	Replaced	4-9	
		4-4-2 Transmission and Reception block	Added	4-22-1,4-22-2	
		4-4-3 Digital Imaging Unit	Replaced		
		4-5 Principle of PCB operation	Replaced	4-23	
		4-5-25 DBP	Added	4-31, 4-43-2	
		SECTION 5			
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		EP4633	Added	5-148	
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		SECTION 6			
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		6-4-3 Attention of connecting optional units	Replaced	6-7	
		6-4-8 Location of unit	Replaced	6-15	

Rev.	Date	Revisions		Note
		Contents	Pages	
3	15-Oct.-'03	**SECTION 6**		
		6-4-10 Action to be taken if the equipment fails to be started or the panel operation is locked up		
		4) Problem relating to various type of busses Replaced	6-24	
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		6-5-3 MAP Replaced	6-46~6-54	
		6-5-4 PCB Check Procedure Replaced	6-58, 6-60, 6-62-1, 6-95, 6-99, 6-118	
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		10-6 Parts List Replaced	10-16 ~10-19-1, 10-20, 10-21, 10-29-1, 10-29-2	
		SECTION 11		
		11-2-2 The function of maintenance menu		
		2)MAINTENANCE Replaced	11-3, 11-4	
		11-6 Assignment of CTRL key and those usage Replaced	11-12	
		APPENDIX		
		Appendix-2 Manual Change Information Replaced	Apndx-6	
		Added	Apndx-7, Apndx-8	

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