

**Aloka**

**SERVICE MANUAL**

**ECHO CAMERA**

**SSD - 500**

**English Version**

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# **SECTION 1 INTRODUCTION**

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## 1-1 Service Manual

- 1) This service manual has been prepared for persons in charge of servicing SSD-500.
- 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."

## 1-2 Best Use of Service Manual

Make the best use of this service manual, making also reference to available technical support information such as "Modification technology note."

## 1-3 Contents of Service Manual

- 1) SSD-500 is the equipment in which the surface mount technology (S.M.T.) is incorporated.

Most of the printed circuit boards (PCB) in this equipment use the surface mount devices (S.M.D.)

It is impossible to repair PCBs including S.M.C. Any trouble cause by a faulty PCB must be repaired by replacement of the PCB as a unit. From this point of view, no PCB wire connection diagram is included in this service manual.

- 2) The manual version 1.0 contains descriptions of products as of September 1989.
- 3) Later products may somewhat deviate from the description of this manual because products are subject to change in specifications and other matters.

For changes and modifications of as well as additions to specifications, if any, prompt information will be given to you by means of "Manual change information" which is to be inserted into the manual.

## 1-4 Construction of This Manual

To facilitate revisions according to the above mentioned "Manual change information," this service manual is divided into several sections.

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.

The structure of Service Manual is as follows:

- 1) Service instructions
- 2) Parts list
- 3) Principle of operation

## 1-5 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 SSD-500 and care to be taken before starting repair work.

### SECTION 4 Disassembling Procedure

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

### SECTION 5 System Block Diagram

Gives the convenience of grasping flow of major signals and mutual communication between units in the whole system.

### SECTION 6 Block Diagrams

Gives outline of individual PCBs, and block diagrams showing test points (TP) and waveforms in PCBs.

### SECTION 7 Schematic Diagrams

Gives the casing connection diagram including all cables used

### SECTION 8 Trouble Shooting

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 9 Adjustments

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



SECTION 10 Performance Check

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

SECTION 11 Maintenance Information

Provides technical information about maintenance service.

SECTION 12 History of Improvement

Describes in tabular form the history of modifications of SSD-500.

SECTION 13 Parts List

Lists the mechanical parts and electrical parts.

SECTION 14 Outline of System

Describes the structure and operation of the equipment seen in broad perspective.

SECTION 15 Principle of Operation (SYSTEM)

Describes the principle of system operation.

SECTION 16 Principle of Operation (Hardware)

Describes the microscopical views of structure and operation of the equipment.

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## **SECTION 2 PRECAUTIONS**

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### 2-1 Precautions Against Electrical Hazards to Serviceman

When disassembling the SSD-500 after checking it for 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.

### 2-2 Precautions Against Mechanical Hazards to Serviceman

When disassembling the equipment, give care to the following:

- 1) Keep the working environment neat.
- 2) Wear working gloves to protect your hands from getting injured by burrs on the unit and casing.
- 3) Use only proper tools suited to work being made.
- 4) Be sure to observe the specified disassembly procedure.
- 5) 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 SSD-500 equipment, options and/or other peripheral devices at a customer who uses body cavity probes that need sterilization, take special care to protect your hands against germs, irrespective of the usage of the SSD-500: 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 of SSD-500

- 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 leak current from outer fitting which may lead to serious damage to a patient being diagnosed.

### 2-5 Precautions for Keeping Mechanical Safety of SSD-500

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 of SSD-500

Whenever grease, oil or other chemicals is used for maintenance service of the SSD-500, 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 following:
  - [1] Name of equipment
  - [2] Serial number of equipment
  - [3] Name of hospital
  - [4] Telephone number
  - [5] Name of person in charge
  - [6] Detail of trouble symptom as far as possible
  - [7] State of connection to optional devices
- 2) Go over the "Modification technology note" 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 contents of the battery backup memory.
- 4) After working, reset the equipment according to the above mentioned contents of memory.
- 5) After completion of work, put back the peripheral devices to the original condition.

## **SECTION 3 BEFORE REPAIRING .....**

### **CONTENTS**

3-1	Handling of S.M.T. and S.M.D.	3 - 1
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## 3-1 Handling of S.M.T. (Surface Mount Technology) and S.M.D. (Surface Mount Device)

PCBs should not be repaired or modified as a rule in the field.

Do not touch ICs on PCBs unless it is necessary.

Since the pitch between leads is smaller than before, ICs involve the possibility of rusting by dirt and sweat from hands. Also, it involves the possibility of shorting due to fine solder chips jammed between leads.

Do not apply excessive shocks

When replacing ROM (read Only Memory) on a PCB, do not insert ROM into its socket forcibly. Undue force applied to ROM would cause the following various troubles:

- (1) Damage to wiring patterns on intermediate layers of PCB.
- (2) Flaking and falling of chip devices (including resistance, condenser, diode, etc.)
- (3) Damage to electrodes in chip devices.
- (4) Flaking of land which is made smaller than before.
- (5) Flaking and falling of parts on the back surface.

Also, take care to install PCBs improperly or to install warped PCBs. Although newly shipped equipment does not involve such problem as falling off of chip devices due to shocks, such a problem may occasionally arise in the reconditioned or modified equipment because of re-soldering needed.

Reuse of chip devices (including resistor, capacitor, diode, etc.) for S.M.D. is strictly avoided. Since chip devices do not have part leads such as found on conventional parts, heat caused by soldering of reuse chip device could transmit directly to the inside, without thermal damping by leads, and burn it.

PCBs have very fine wiring patterns. Handle them with special care more than before.

Be sure to observe this caution to prevent the secondary trouble caused by damage to wiring patterns.

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# **SECTION 4 DISASSEMBLING PROCEDURE**

## **CONTENTS**

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## 4-1 SSD-500 Disassembling Procedure

Refer this "Disassembling Procedure" in order to disassemble correctly in the case of repair, modification or readjustment.

SSD-500

分解要領

Disassembling Instructions

1.各部の名称	1.Parts identification
2.各ユニットの配置	2.Individual units layout
3.分解・組立上の注意点	3.Cautions on disassembling and reassembling
4.プローブホルダの取り外し方法	4.Probe holder dismounting procedure
5.コネクタカバーの取り外し方法	5.Connector cover dismounting procedure
6.リアカバーの取り外し方法	6.Rear cover dismounting procedure
7.フロントカバーの取り外し方法	7.Front cover dismounting procedure
8.PC板の取り外し方法	8.PC boards dismounting procedure
9.PC板の取り外し方法及び、 操作パネルアッセンブリー(L-KEY-14B) の取り外し方法	9.PC board dismounting procedure, and operating panel assembly dismounting procedure
10.操作パネルアッセンブリー(L-KEY-14A)の 取り外し方法	10.Operating panel assembly dismounting procedure
11.背面接栓PC板(EP-2882・EP-2881)の 取り外し方法	11.Rear blocking PC boards dismounting procedure
12.CRT-PC板(UPC-1610A)の引き出し方法	12.CRT-PC (UPC-1610A) pull-out procedure
13.電源ユニット(PSU-S500)の取り外し方法	13.Power supply unit dismounting procedure

1.各部の名称

1.Parts identification

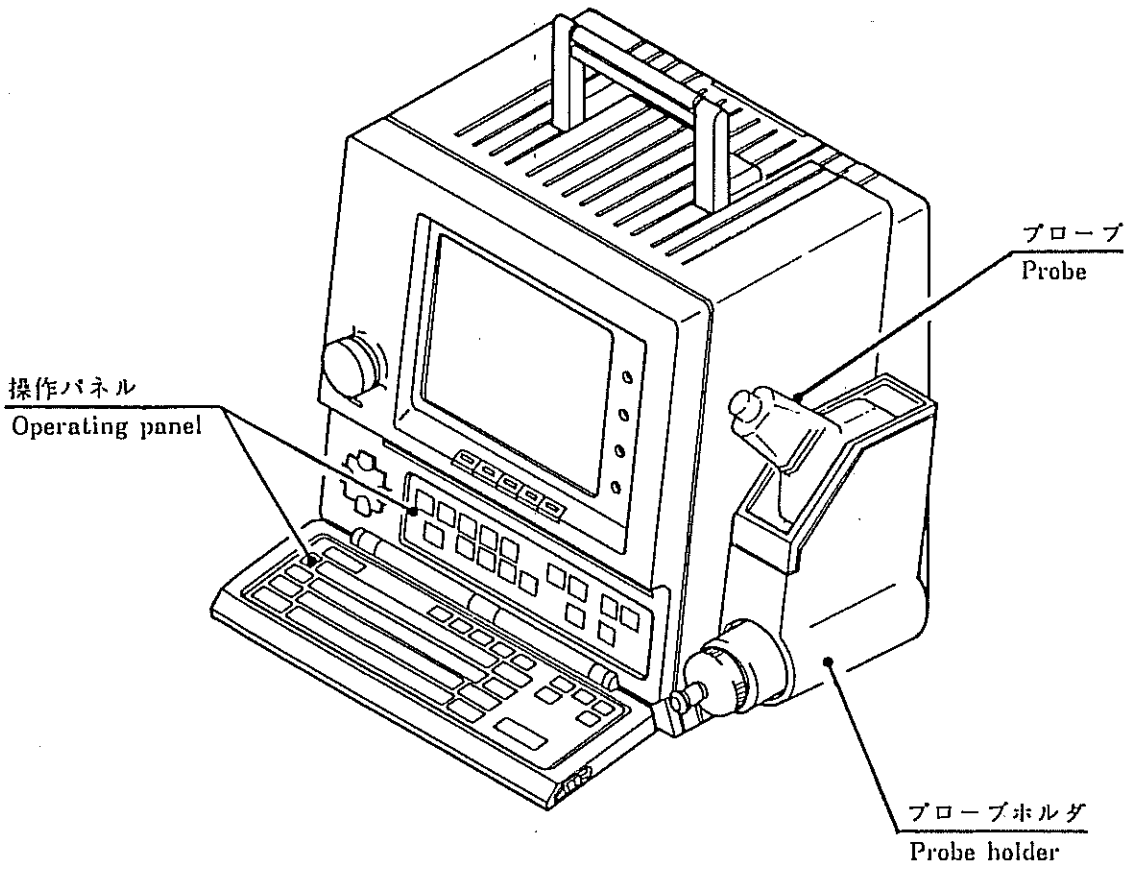


図1 Fig.1

2.各ユニットの配置

2.Individual units layout

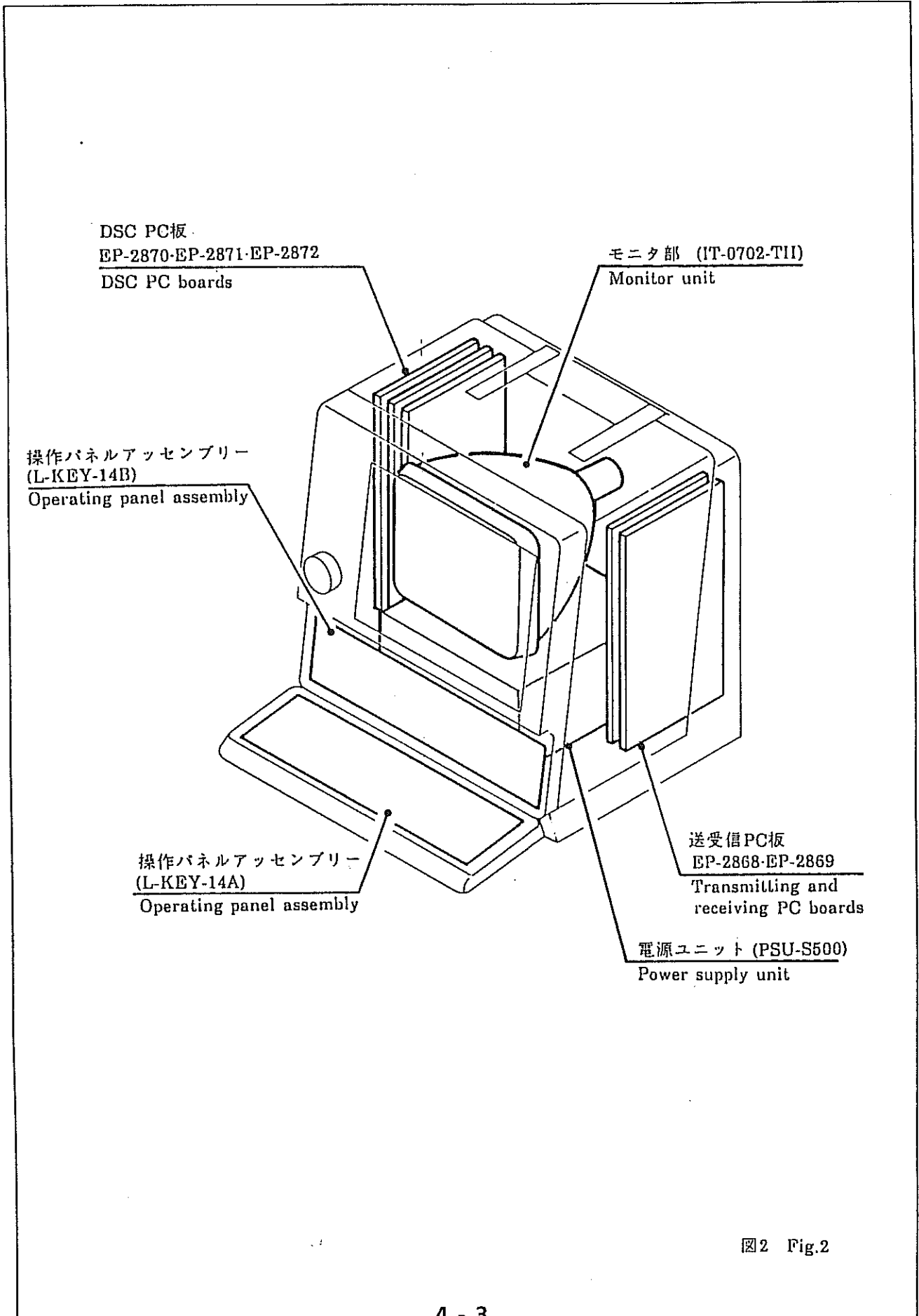


図2 Fig.2

## 3.分解・組立上の注意点

## 3.Cautions on disassembling and reassembling

## 必要な工具

M3・M4用プラスドライバー	1本
小型マイナスドライバー	1本

## 分解・組立上の注意点

カバー類はプラスチック製である為、再組立時必要以上にねじを締め付け過ぎると割れる恐れがある。ねじ締め付けは、下記を目安に実施の事。

- 指3本で締め付ける程度で固定は充分。手の平でドライバー柄を握り、締め付ける事はしない。(図3参照)

## Required Tools

Phillips type screw-driver	1
Small flat-blade screw-driver	1

## Cautions on Disassembling and Reassembling

When fastening the screws of the plastic covers, use caution so as to not apply more than adequate force in order not to damage the covers.

Use the following rule when fastening screws.

- To turn the screwdriver gripping the handle using your thumb and two fingers will provide sufficient fastening force. Do not fully grip the handle using the palm of the hand.(See Fig.3)

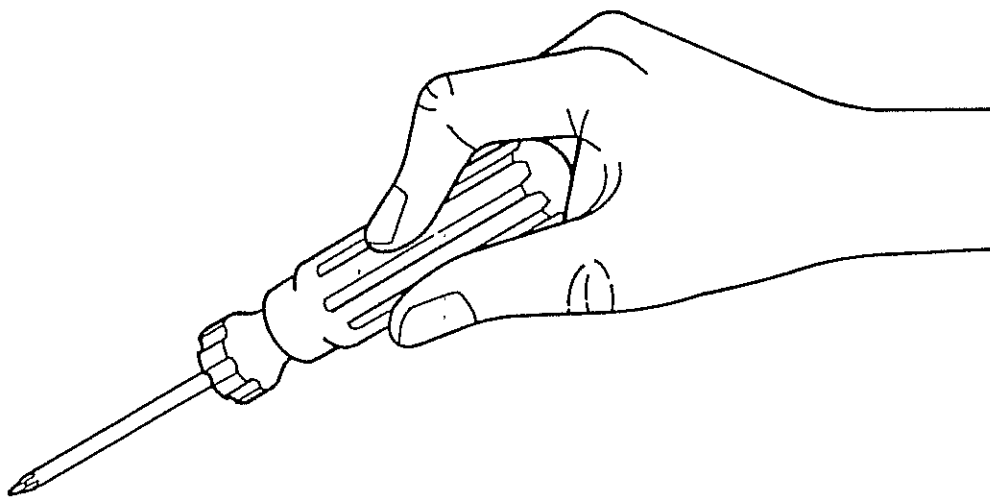


図3 Fig.3

## 4.プローブホルダの取り外し方法

## 4.Probe holder dismounting procedure

- (1) プローブホルダのツメを、引きながら上向き方向に持ち上げるとガイドピン②とダルマ穴②が外れる。(図中Ⓐ)
- (2) 装置前面側へスライドさせて、ガイドピン①とダルマ穴①を外す。(図中Ⓑ)
- (1) Lift the probe holder while pulling the claw of the holder. Then the guide pin ② is released from the gourd shaped hole ②. (Ⓐ in Fig.)
- (2) Slide the holder forward of the device and remove the guide pin ① from the gourd shaped hole ①. (Ⓑ in Fig.)

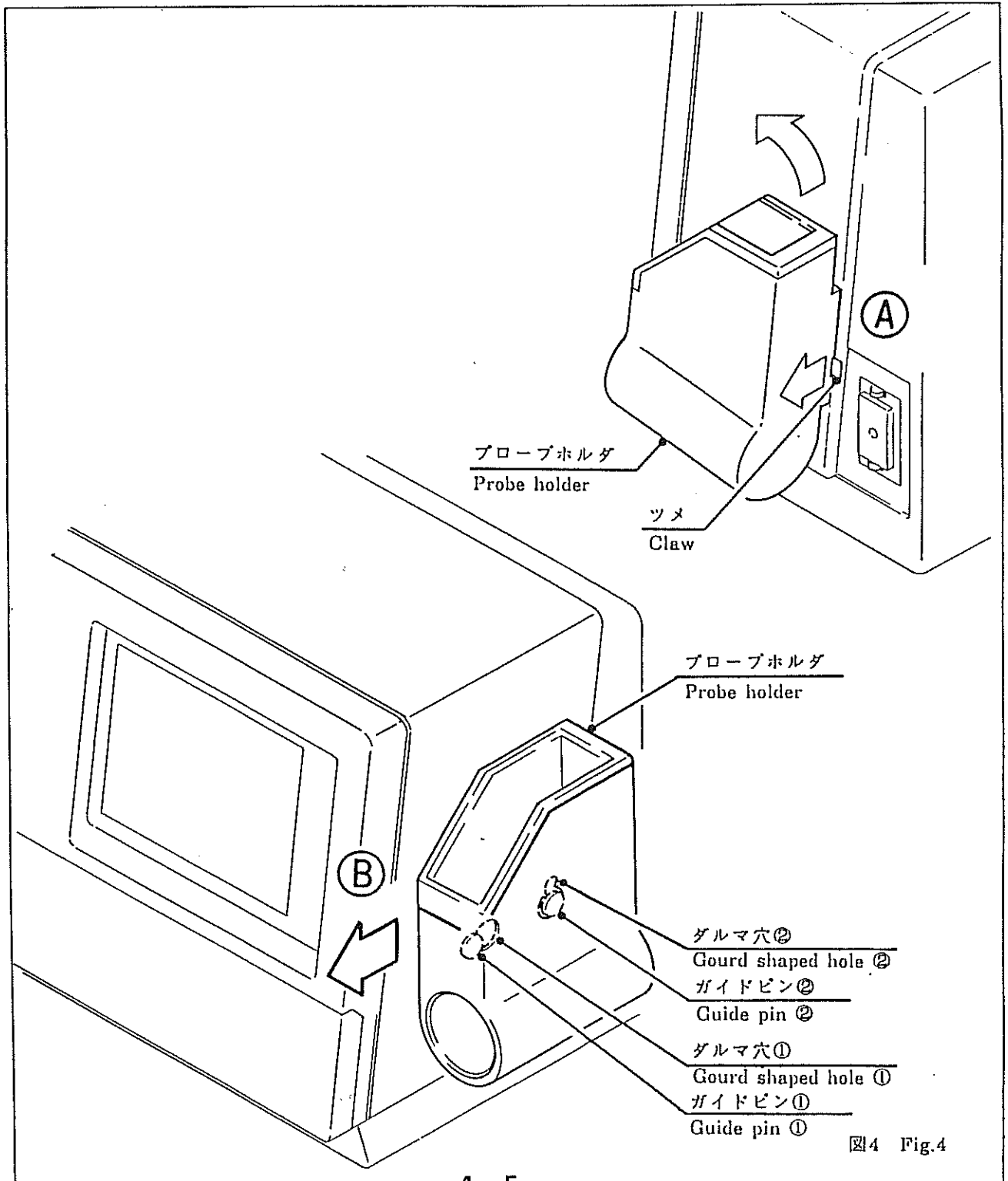


図4 Fig.4

5.コネクタカバーの取り外し方法

5.Connector cover dismounting procedure

- (1)コネクタカバーのロックツメ2カ所をマイナスドライバーで解除する。(図中Ⓐ)
- (2)マイナスドライバーをロックツメ以外の部分に差し込みリアカバーから抜き出す。(図中Ⓑ)

- (1)Loosen two locking claws of the cover with a flat-blade screw-driver. (Ⓐ in Fig.)
- (2)Insert the flat-blade screw-driver into the portion without locking claws and extract the connector cover from the rear cover. (Ⓑ in Fig.)

注意!  
この部分に指を掛けないでください!  
CAUTION!  
Do not use your fingers!

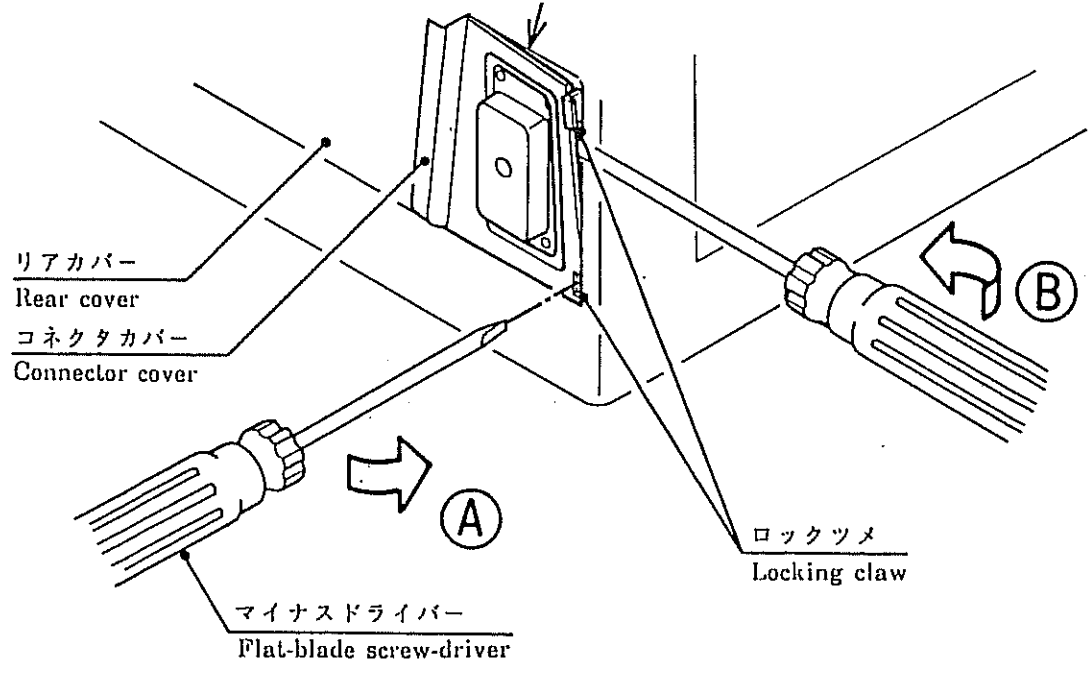


図5 Fig.5

## 6. リアカバーの取り外し方法

## 6. Rear cover dismounting procedure

(1) 本体背面のVIDEO INT/EXT切替スイッチを上側にする。(図中Ⓐ)

(2) ねじ4本を外してリアカバーを後方に引き抜く。(図中Ⓑ)

注: 再組立の際はフロントカバー とリアカバーが確実にかん合している事を確認の上  
ねじ固定する事。

(1) Turn up the VIDEO INT/EXT change-over switch on the back of the body.  
(Ⓐ in Fig.)

(2) Remove four screws and extract the rear cover backwards. (Ⓑ in Fig.)

NOTE: In reassembling, confirm that the front cover and the rear cover are  
completely engaged, and screw in Fig.

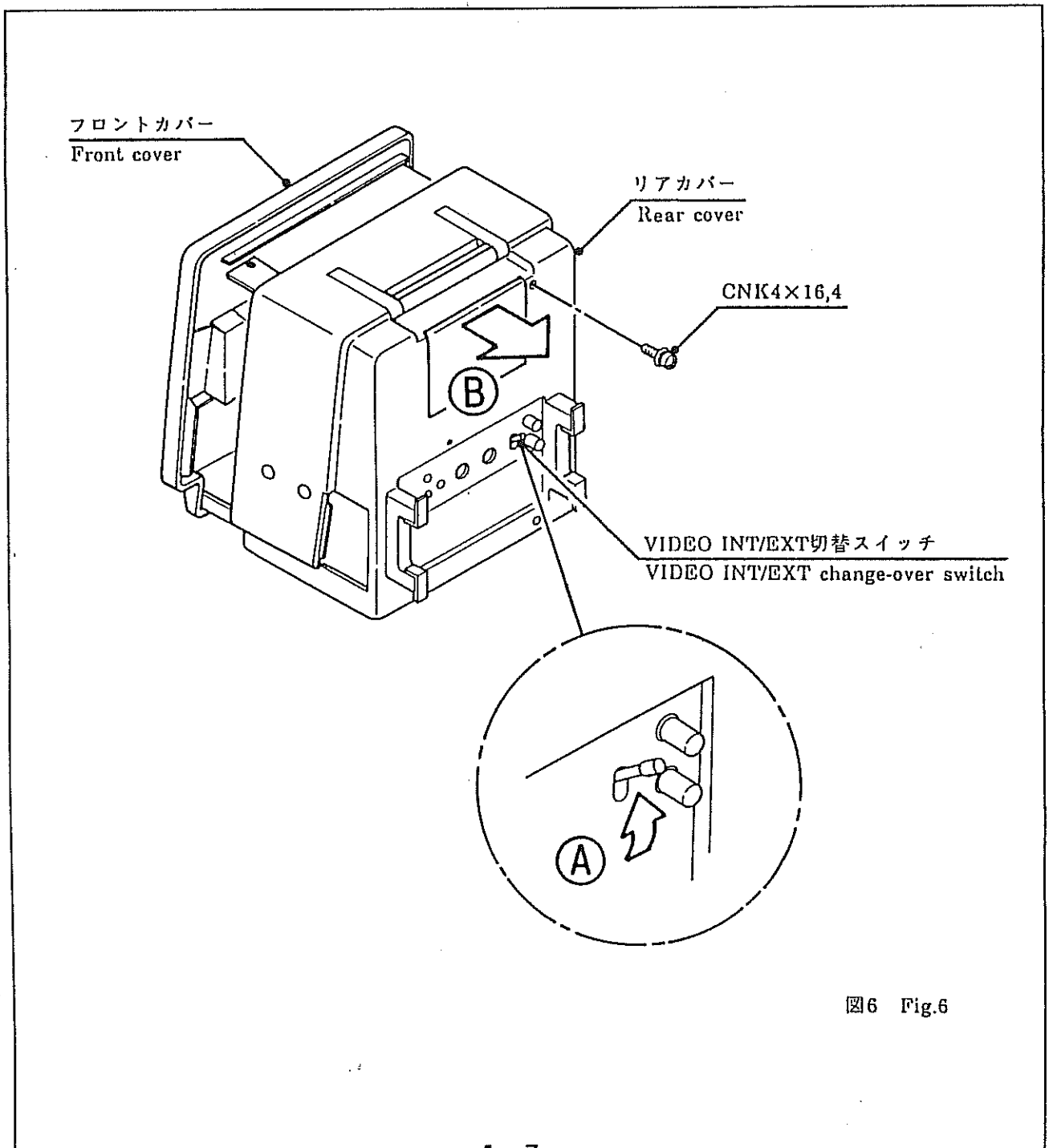


図6 Fig.6



## 7. フロントカバーの取り外し方法

## 7. Front cover dismounting procedure

- (1) フロントカバーはねじ4本でシャーシに固定されている。上側2本中1本と下側両サイド2本計3本を緩める。(図中Ⓐ)
  - (2) フロントカバーが倒れない様、手で押さえながら残る1本のねじを取り去る。(図中Ⓑ)
  - (3) フロントカバーを配線に気をつけながら前側に引き抜く。(図中Ⓒ)
- (1) The front cover is fixed with four screws to the chassis. loosen the three screws, namely one of the upper two screws and the screws on both sides at the bottom. (Ⓐ in Fig.)
  - (2) While keeping the front cover from failing downward by holding it with the hand, remove the one remaining screw. (Ⓑ in Fig.)
  - (3) Extrate the front cover forwards while looking wiring. (Ⓒ in Fig.)

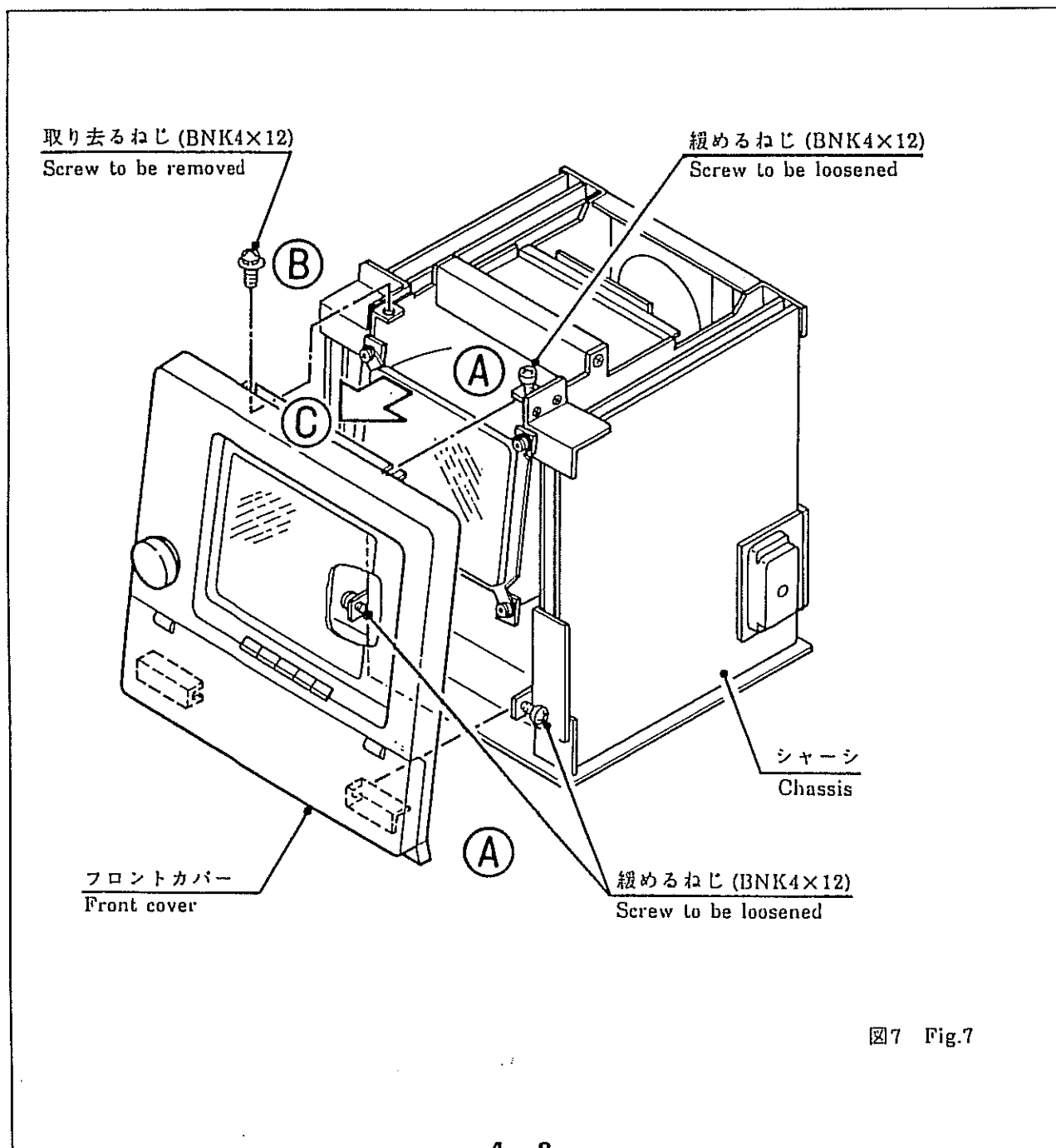


図7 Fig.7

## 8.PC板の取り外し方法

## 8.PC board dismounting procedure

## ●送受信PC板(EP-2868・EP-2869)の取り外し方法

- (1)PCガイドをねじ2本を外して取り外す。(図中Ⓐ)
- (2)PC板を固定しているねじ上方2本下方3本を外す。(図中Ⓑ)
- (3)PC板に接続されているコネクタ(P204・P208・P402・P403)4本を外す。(図中Ⓒ)
- (4)PC板を上方に持ち上げるようにして取り外す。(図中Ⓓ)

## ●Transmitting and receiving PC boards (EP-2868・EP-2869) dismounting procedure

- (1)Remove two screws and remove the PC guide. (Ⓐ in Fig.)
- (2)Remove two upper screws and three lower screws which fix the PC board. (Ⓑ in Fig.)
- (3)Remove four connectors (P204・P208・P402・P403) connected to the PC board. (Ⓒ in Fig.)
- (4)Remove the PC board so as to lift the board. (Ⓓ in Fig.)

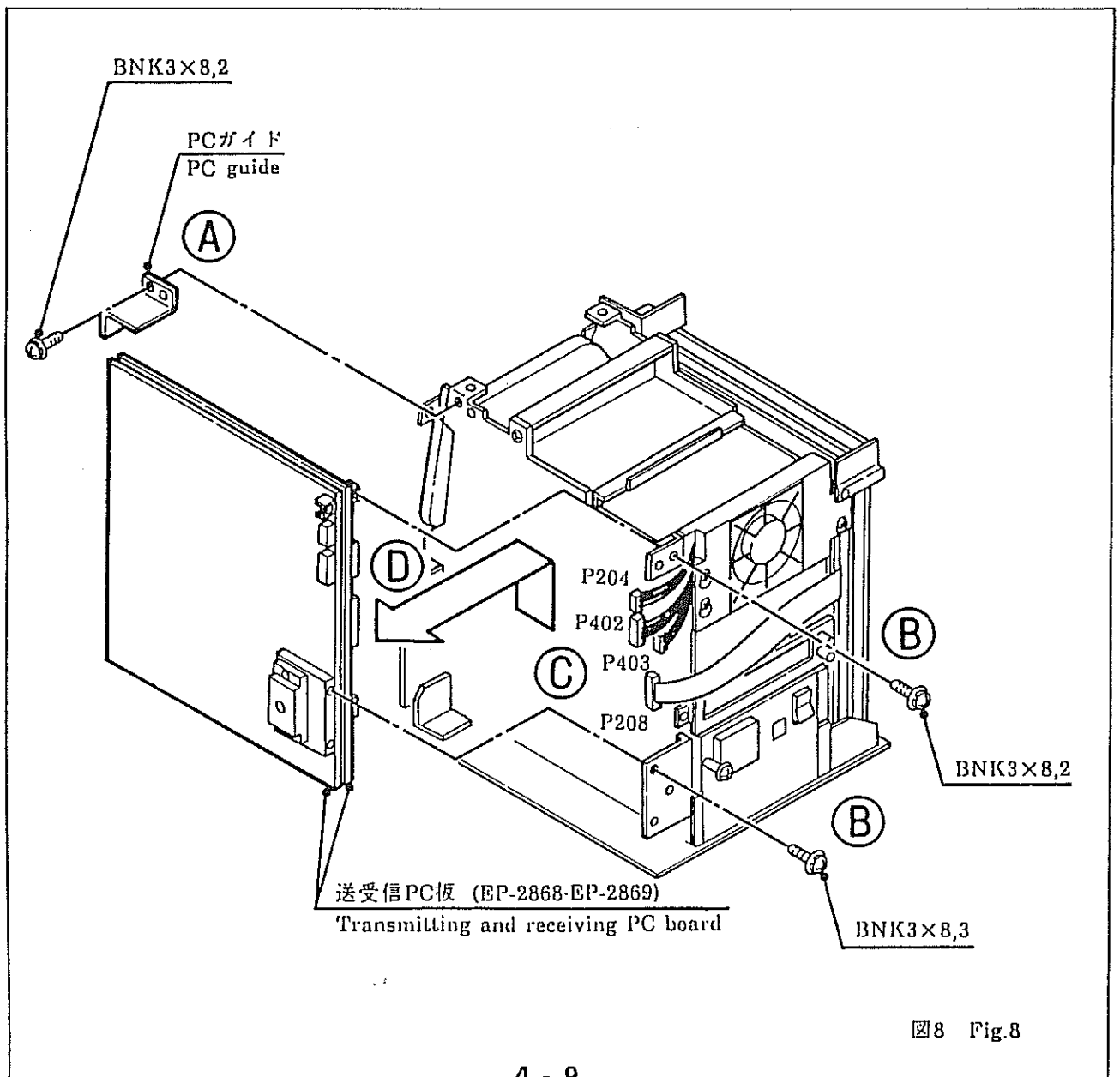


図8 Fig.8

●DSC PC板(EP-2870・EP-2871・EP-2872)の取り外し方法

- (1)PCガイドをねじ2本、PC補強金具をねじ4本でそれぞれ取り外す。(図中Ⓐ)
- (2)PC板に接続されているコネクタ3本(P213・P404・P208)をそれぞれ外す。(図中Ⓑ)
- (3)PC板を上方に持ち上げるようにして取り外す。(図中Ⓒ)

●DSC PC boards (EP-2870・EP-2871・EP-2872) dismounting procedure

- (1)Loosen two screws of the PC guide and loosen four screws of the PC reinforcing metal fitting, and remove the guide and the metal fitting respectively, (Ⓐ in Fig.)
- (2)Remove three connectors (P213・P404・P208) connected to the PC board respectively. (Ⓑ in Fig.)
- (3)Remove the PC board from the body so as to lift the board. (Ⓒ in Fig.)

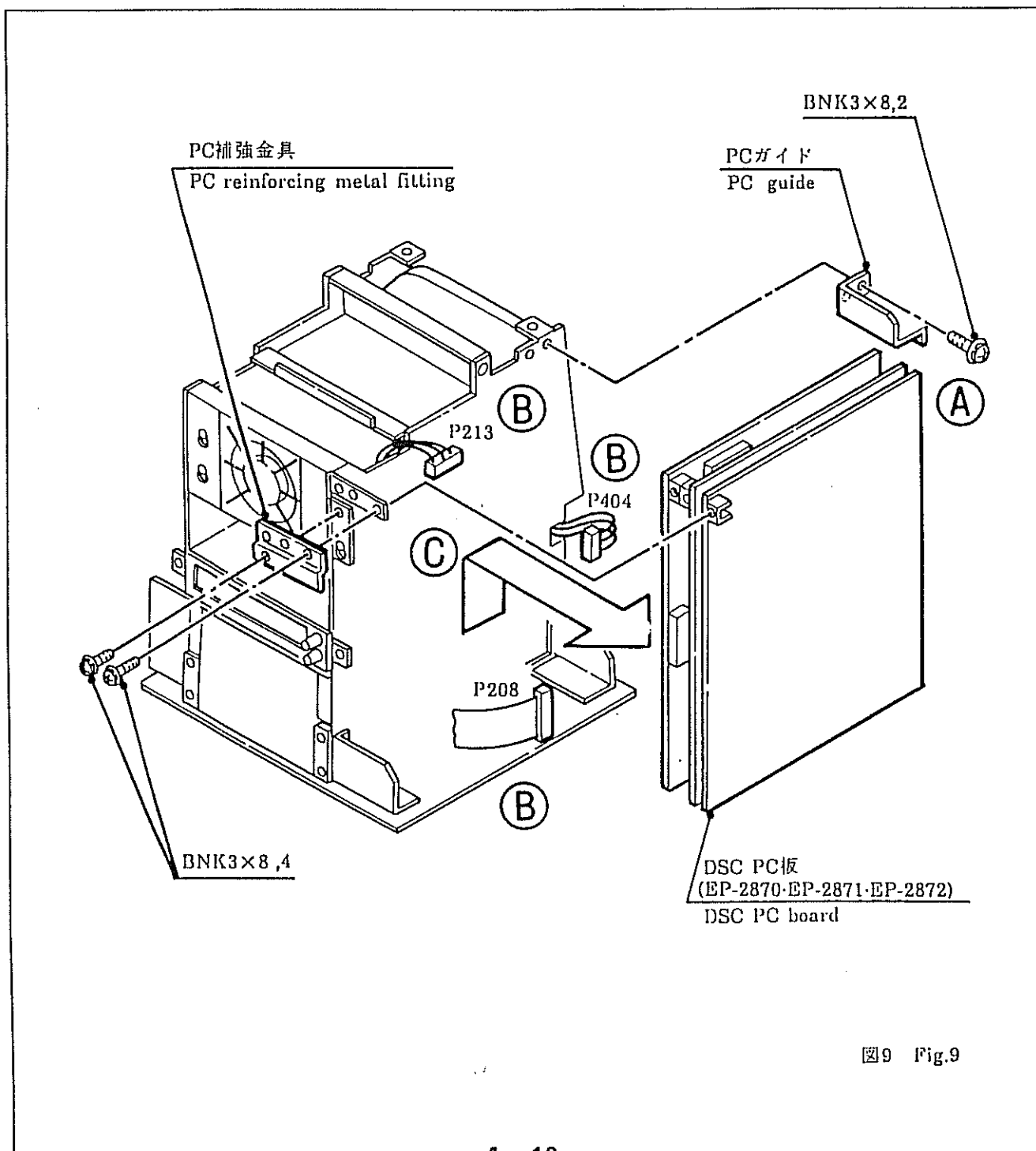
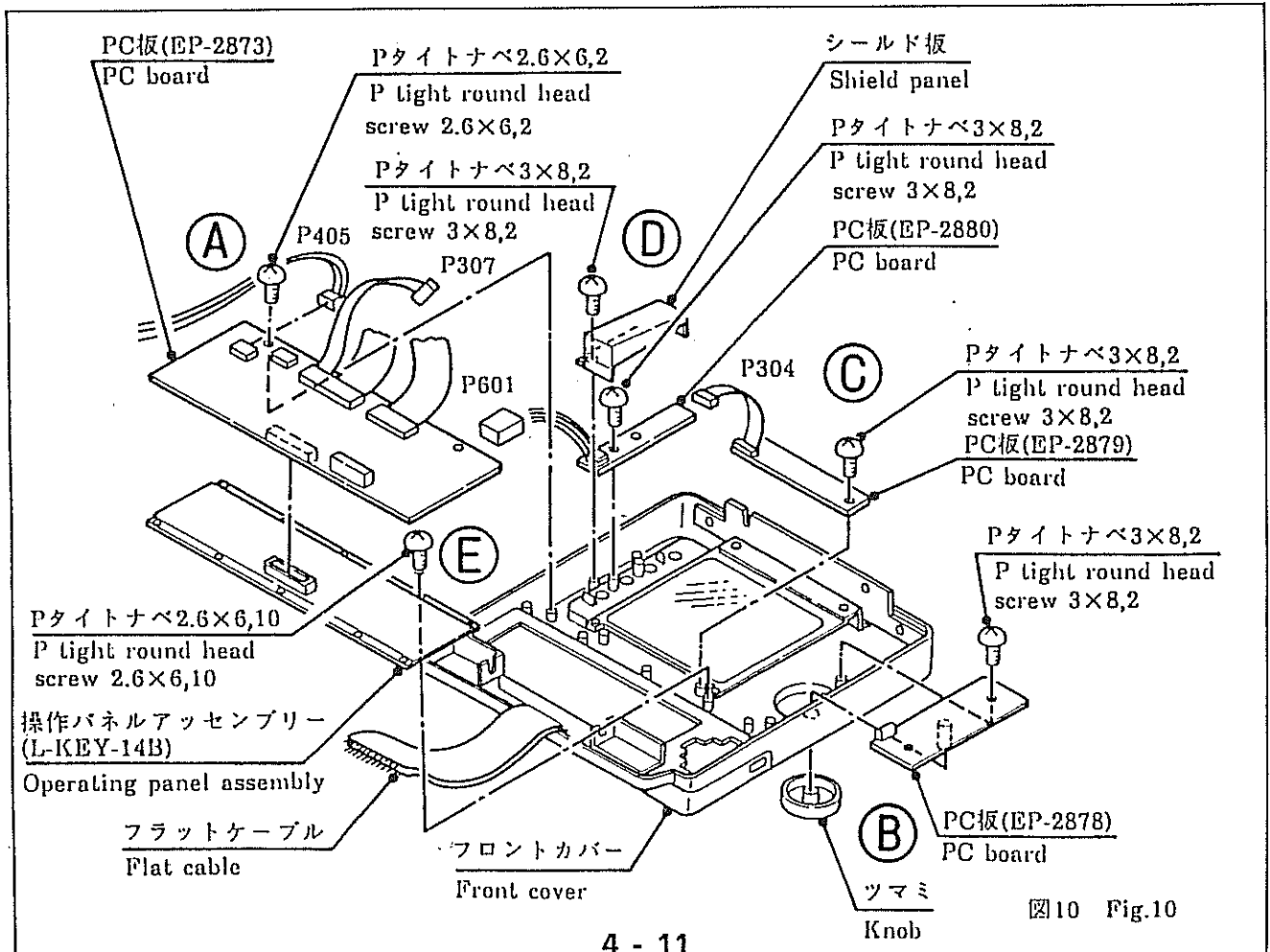


図9 Fig.9

9. PC板の取り外し方法及び、  
操作パネルアッセンブリー  
(L-KEY-14B)の取り外し方法

9. PC board dismantling procedure,  
and operating panel assembly  
dismounting procedure

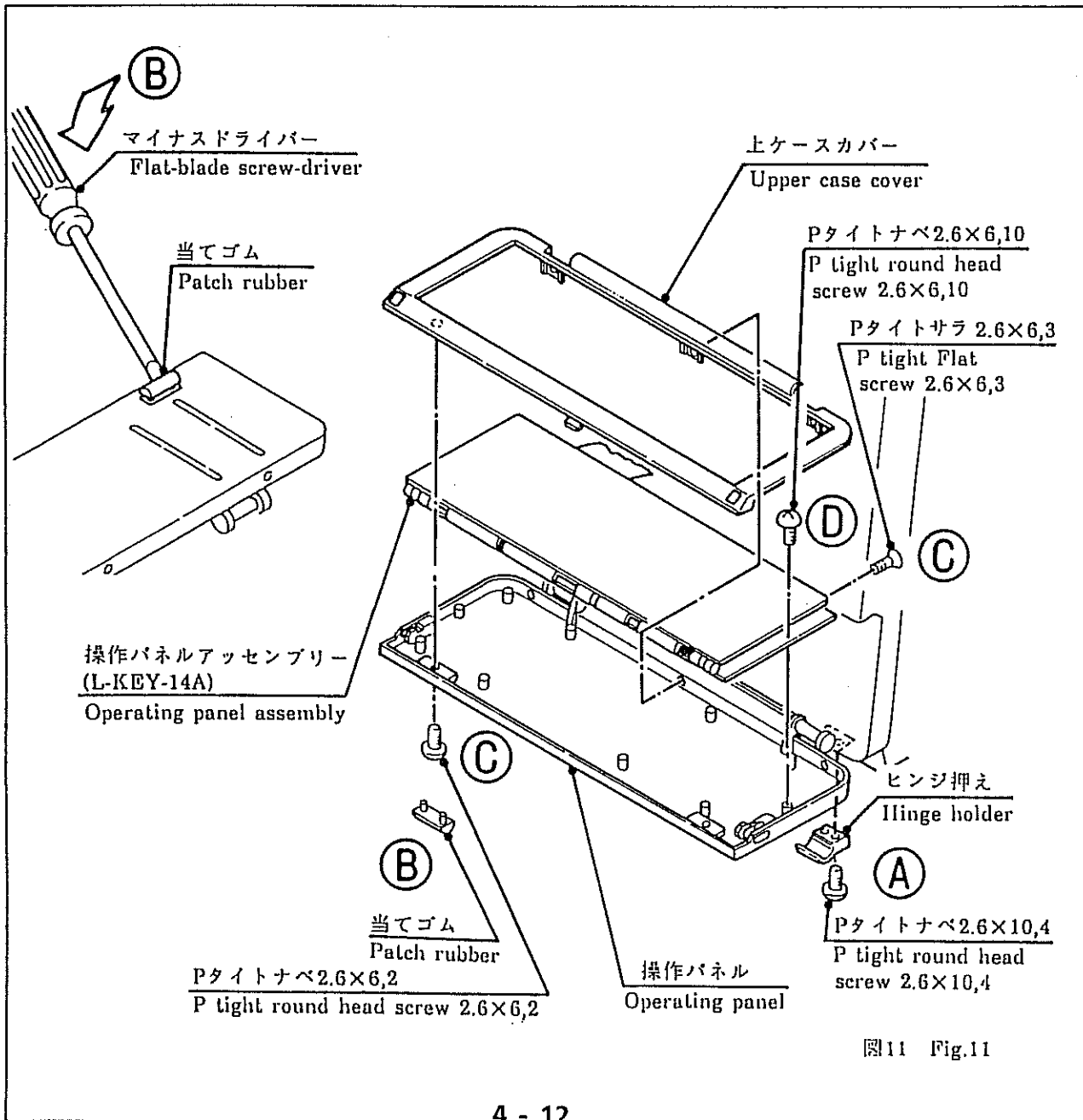
- PC板(EP-2873)取り外し方法  
PC板(PC-2873)をケーブル4本(P601・P304・P405・P307)とフラットケーブルを外しねじ2本を外して取り外す。(図中Ⓐ)
- PC板(EP-2878)取り外し方法  
PC板(EP-2878)をフロントカバー前側のツマミを外し、ねじ2本を外して取り外す。(図中Ⓑ)
- PC板(EP-2879)取り外し方法  
PC板(EP-2879)をねじ2本を外して取り外す。(図中Ⓒ)
- PC板(EP-2880)取り外し方法  
シールド板をねじ2本を外して取り外しPC板(EP-2880)をねじ2本を外して取り外す。(図中Ⓓ)
- 操作パネルアッセンブリー(L-KEY-14B)の取り外し方法  
操作パネルアッセンブリー(L-KEY-14B)をねじ10本を外して取り外す。(図中Ⓔ)
- PC board (EP-2873) dismantling procedure  
Remove four cables (P601・P304・P405・P307) and the flat cable of the PC board (PC-2873) and loosen to remove two screws, and remove the board. (Ⓐ in Fig.)
- PC board (EP-2878) dismantling procedure  
Loosen the nut on the front side of the front cover and remove, and remove two screws of the PC board (EP-2878) and remove the board. (Ⓑ in Fig.)
- PC board (EP-2879) dismantling procedure  
Remove two screws of the PC board (EP-2879) and remove the board. (Ⓒ in Fig.)
- PC board (EP-2880) dismantling procedure  
Remove two screws of the shield panel and remove the panel, and remove two screws of the PC board (EP-2880) and remove the board. (Ⓓ in Fig.)
- Operating panel assembly (L-KEY-14B) dismantling procedure  
Remove ten screws and remove the operating panel assembly (L-KEY-14B). (Ⓔ in Fig.)



10.操作パネルアッセンブリー  
(L-KEY-14A)の取り外し方法

10.operating panel assembly  
dismounting procedure

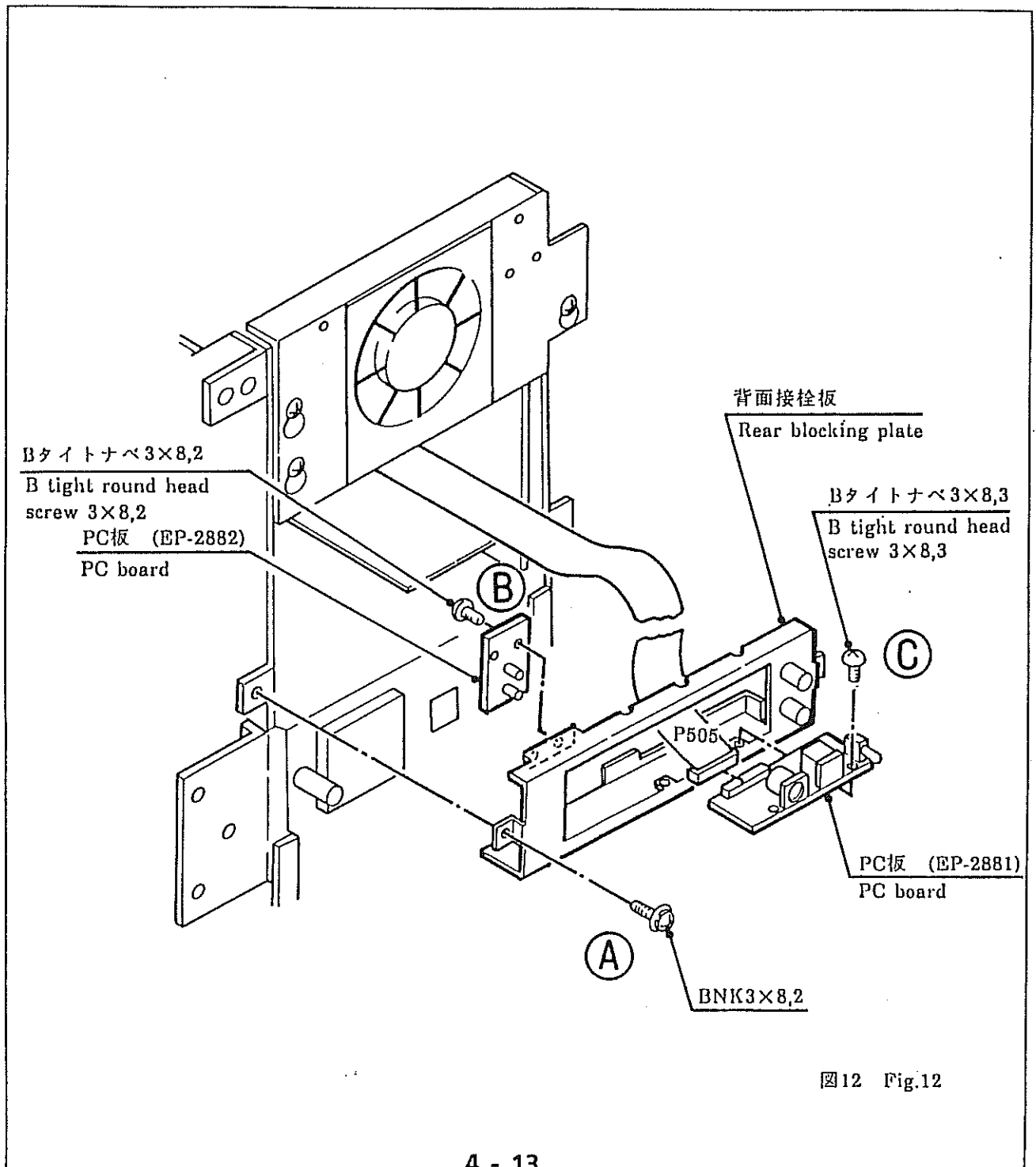
- (1)操作パネルをフロントカバーよりヒンジ押え2個をそれぞれ、ねじ2本ずつ外して取り外す。(図中Ⓐ)
  - (2)当てゴム2個をマイナスドライバーなどでこじり取る。(図中Ⓑ)
  - (3)上ケースカバーをねじ5本を外して取り外す。(図中Ⓒ)
  - (4)操作パネルアッセンブリー(L-KEY-14A)をねじ10本を外して取り外す。(図中Ⓓ)
- (1)Loosen respective two hinge holders and remove them from the front cover, and remove the operating panel. (Ⓐ in Fig.)
  - (2)Scrape our two patch rubber with a flat-blade screw-driver. (Ⓑ in Fig.)
  - (3)Remove five screws of the upper case cover and remove the cover. (Ⓒ in Fig.)
  - (4)Remove ten screws and remove the operating panel assembly (L-KEY-14A). (Ⓓ in Fig.)



11.背面接栓PC板(EP-2882・EP-2881)  
の取り外し方法

11.Rear blocking PC boards  
dismounting procedure

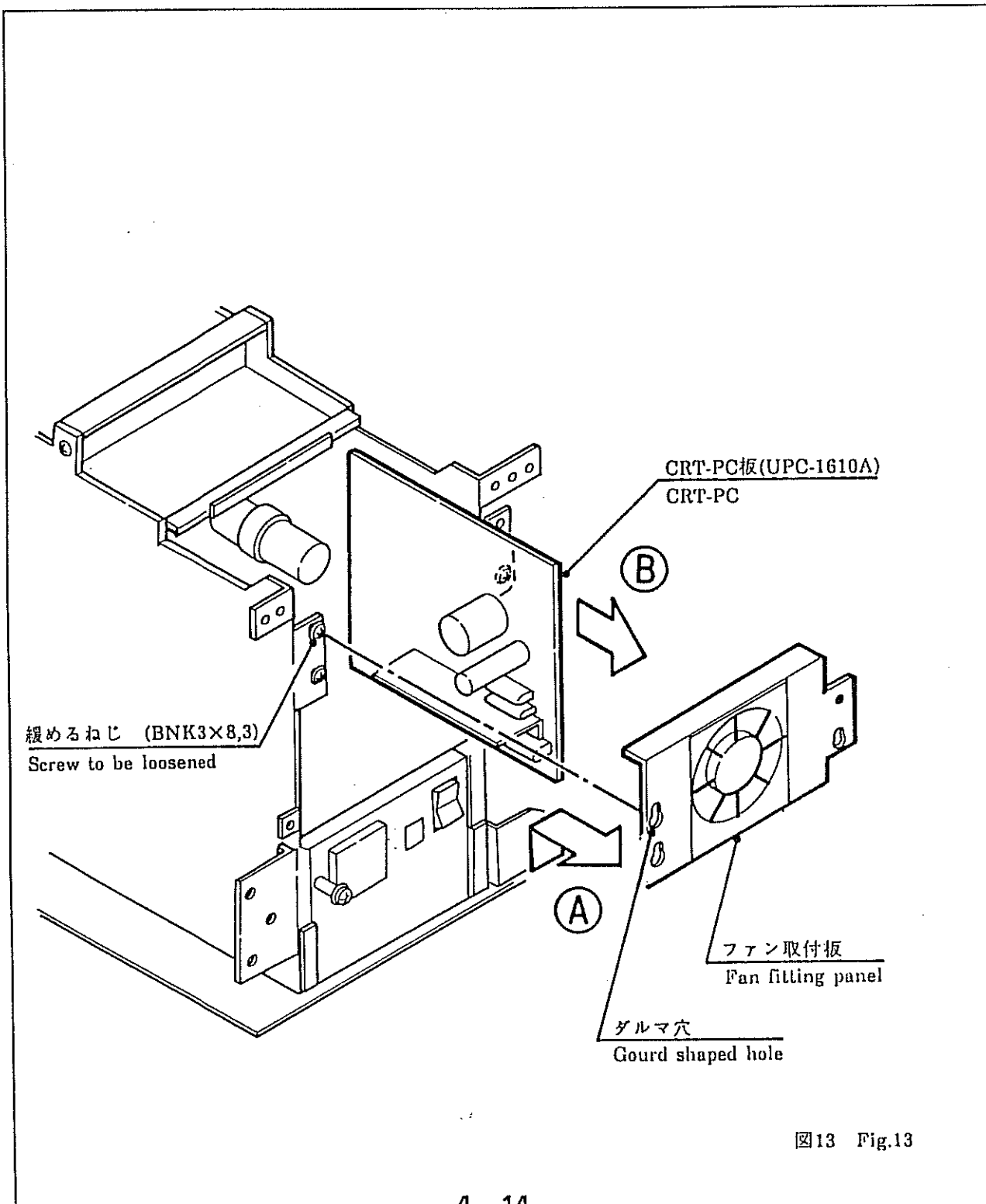
- (1)背面接栓板をねじ2本を外して取り外す。(図中Ⓐ)
  - (2)PC板(EP-2882)をねじ2本を外して取り外す。(図中Ⓑ)
  - (3)PC板(EP-2881)をねじ3本を外しコネクタ(P505)も外して取り外す。(図中Ⓒ)
- (1)Remove two screws of the rear blocking plate and remove the plate. (Ⓐ in Fig.)
  - (2)Remove two screws and remove the PC board (EP-2882). (Ⓑ in Fig.)
  - (3)Remove three screws and the connector (P505), and remove the PC board (EP-2881). (Ⓒ in Fig.)



12.CRT-PC板(UPC-1610A)  
の引き出し方法

12.CRT-PC (UPC-1610A)  
pull-out procedure

- (1) ファン取付板をねじ3本を緩めダルマ穴が外れるように上方にずらして取り外す。  
(図中Ⓐ)
  - (2) CRT-PC板(UPC-1610A)を引き出す。(図中Ⓑ)
- (1) Loosen three screws and shift the fan fitting panel upward so that the gourd-shaped holes are released, and remove the fan fitting panel. (Ⓐ in Fig.)
  - (2) pull out the CRT-PC (UPC-1610A). (Ⓑ in Fig.)



## 13.電源ユニットの取り外し方法

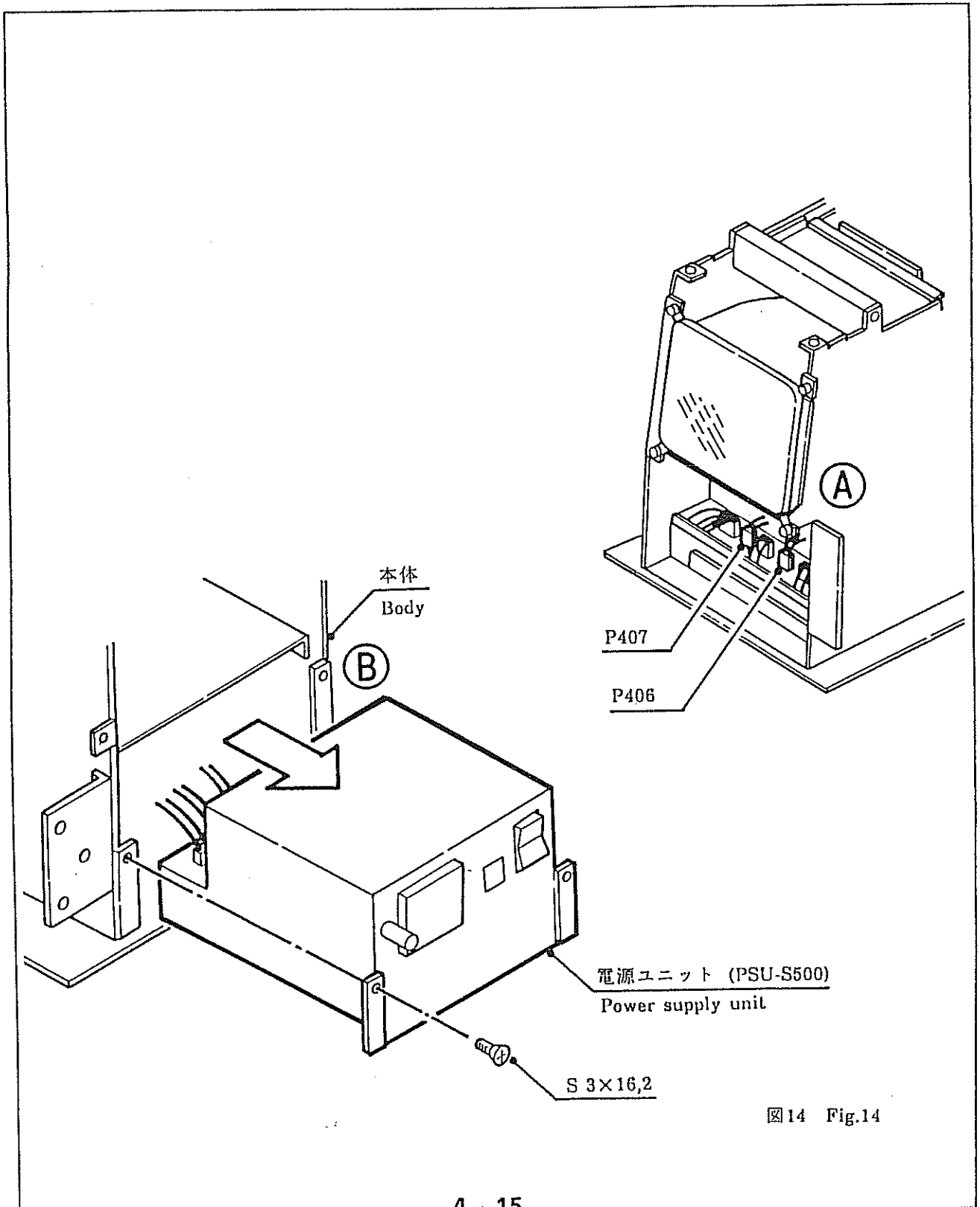
## 13. Power supply unit dismounting procedure

(1) 本体前面にあるコネクタ(P407・P406)2本を電源ユニットより取り外す。(図中Ⓐ)

(2) 電源ユニットをねじ2本を外して本体から引き出す。(図中Ⓑ)

(1) Remove two connectors (P407・P406) on the front side of the body from the power supply unit. (Ⓐ in Fig.)

(2) Remove two screws and pull out the power supply unit from the body. (Ⓑ in Fig.)





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# **SECTION 5 SYSTEM BLOCK DIAGRAM**

## **CONTENTS**

5-1	Explanation of system	5 - 1
5-2	System block diagram	5 - 3

## 5-1 Explanation of SYSTEM

This system are organized by Tx & Rx, Interface, DSC, Panel, Monitor and Power supply.

Timing signals of the electric scanning is generated in the Interface part. Tx & Rx part accept these signals and generates the pulse for transmission. This pulse vibrate the transducer element of the probe and generates the ultrasound wave. This ultrasound wave reaches to inside of human body and the echo wave returns to transducer again. After that, the echo signal is processed and is outputted to DSC part.

At DSC part, the ultrasound data which is coming from Tx & Rx part is memorized into the frame memory after passing trough the A/D converter. The memorized data is read out by the TV system timing, and pass through the Post Processor. After that, the TV Composite signal is generated by this ultrasound data, Character and Graphic. Finally, TV Composite signal is outputted to the viewing monitor.

At Panel part, any information, for example, Mode information, MAG information and so on, are gathered and outputted to the Interface part.

Monitor part is organized by 7 inch monitor and the knobs for contrast and brightness. SSD-500 has the knobs for the photograph. In the case of using ACR-500 which is prepared to take a photograph directly at the viewing monitor the setting of contrast and brightness is switched to the setting for the photograph. This switching is done by the switch which is located on EP-2880 Contrast & Brightness PCB.

This power supply unit has the protector against increasing current beyond the normal. And also, the High voltage is controlled by the switch which is mounted on EP-2870 ITF PCB.

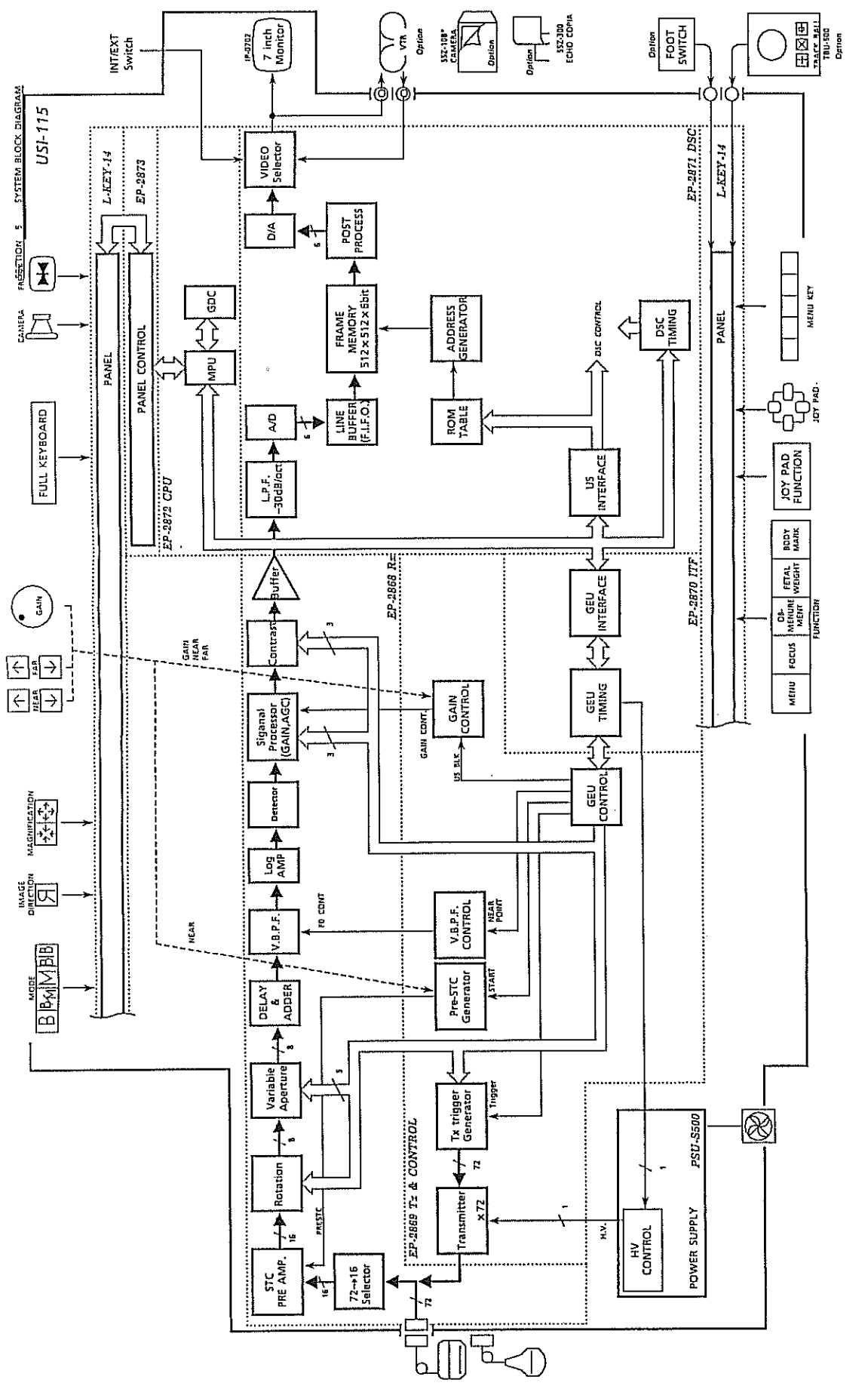
## 5-2 System block diagram

The System Block Diagram is shown on next page.  
Please use it for studying the operation of system and judgment on repairing.

Tx & Rx	:	EP-2868 EP-2869 EP-2870	Rx Tx & Control ITF
Interface	:	EP-2870	ITF
DSC	:	EP-2871	DSC
Panel	:	EP-2873 L-KEY-14 A,B EP-2878 EP-2879 EP-2880 EP-2881 EP-2882 ( EP-2872	Panel Control Panel Gain & Power LED Select Key Contrast & Brightness In / Out Photo Cont. / Bright. CPU )

Monitor                    :   IP-0702-TH    Viewing Monitor  
                                  ( EP-2880 is included in the monitor. )

Power supply                :   PSU-S500      Power supply



**Aloka** TITLE SYSTEM BLOCK DIAGRAM MODEL SSD-500  
 1 / 1

## SECTION 6 PCB BLOCK DIAGRAM

### CONTENTS

6-1	Introduction		6 - 1
6-2	Panel Control	EP-2873	6 - 2
6-3	Rx	EP-2868	6 - 4
6-4	Tx & Control	EP-2869	6 - 6
6-5	ITF	EP-2870	6 - 8
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6-13	Photo Cont. / Bright.	EP-2882	6 - 24

6-1 Introduction

In this section, the simple explanations of PCB block diagram are described.

6-2 EP-2873 Panel Control

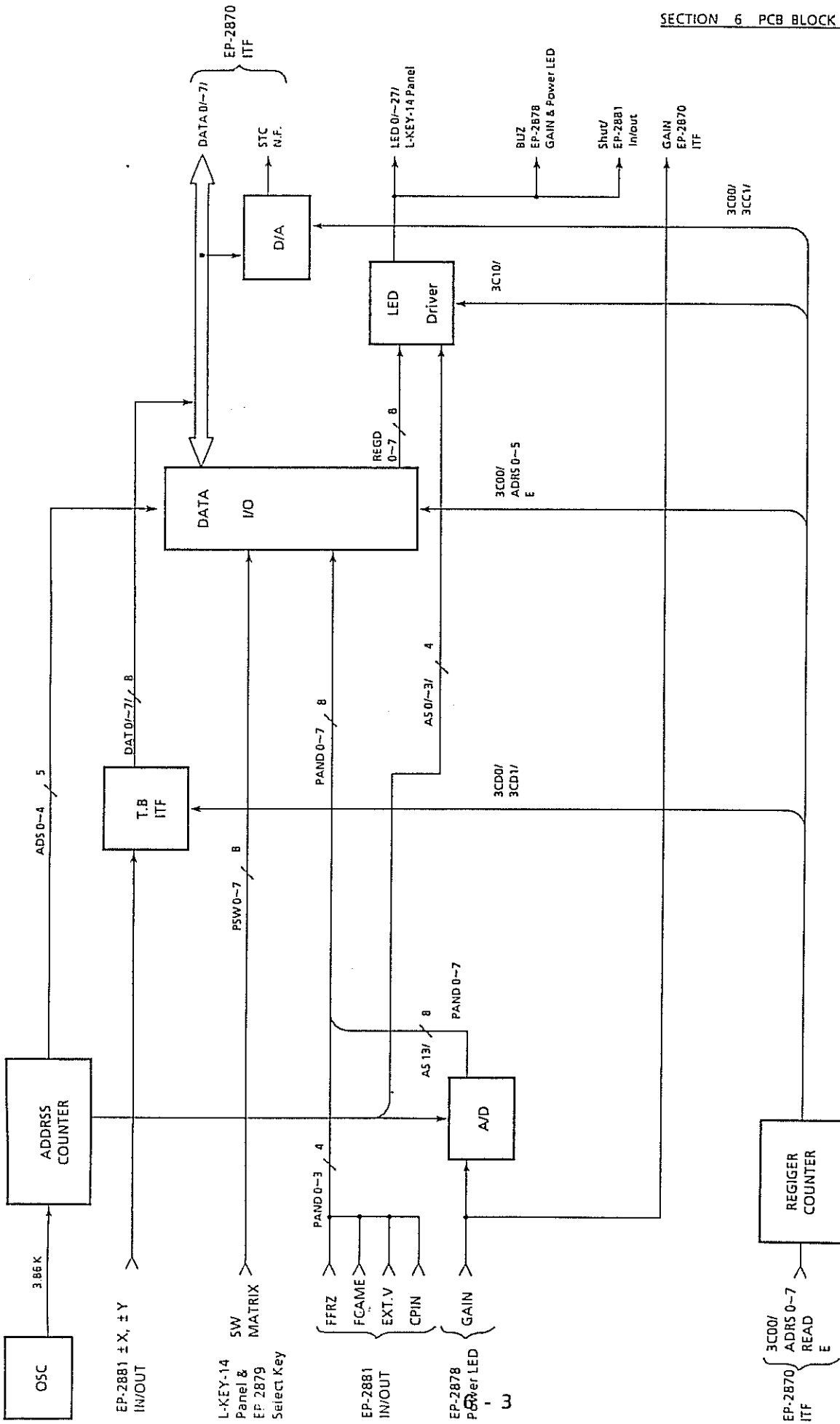
This PCB is used for the control panel and others switches.  
It acts as an interface between EP-2872 CPU and L-KEY-14 or so on.

Function which this PCB covers are as follows:

- (1) Data I/O
- (2) Clock generator
- (3) LED driver
- (4) Track ball interface



SECTION 6 PCB BLOCK DIAGRAM



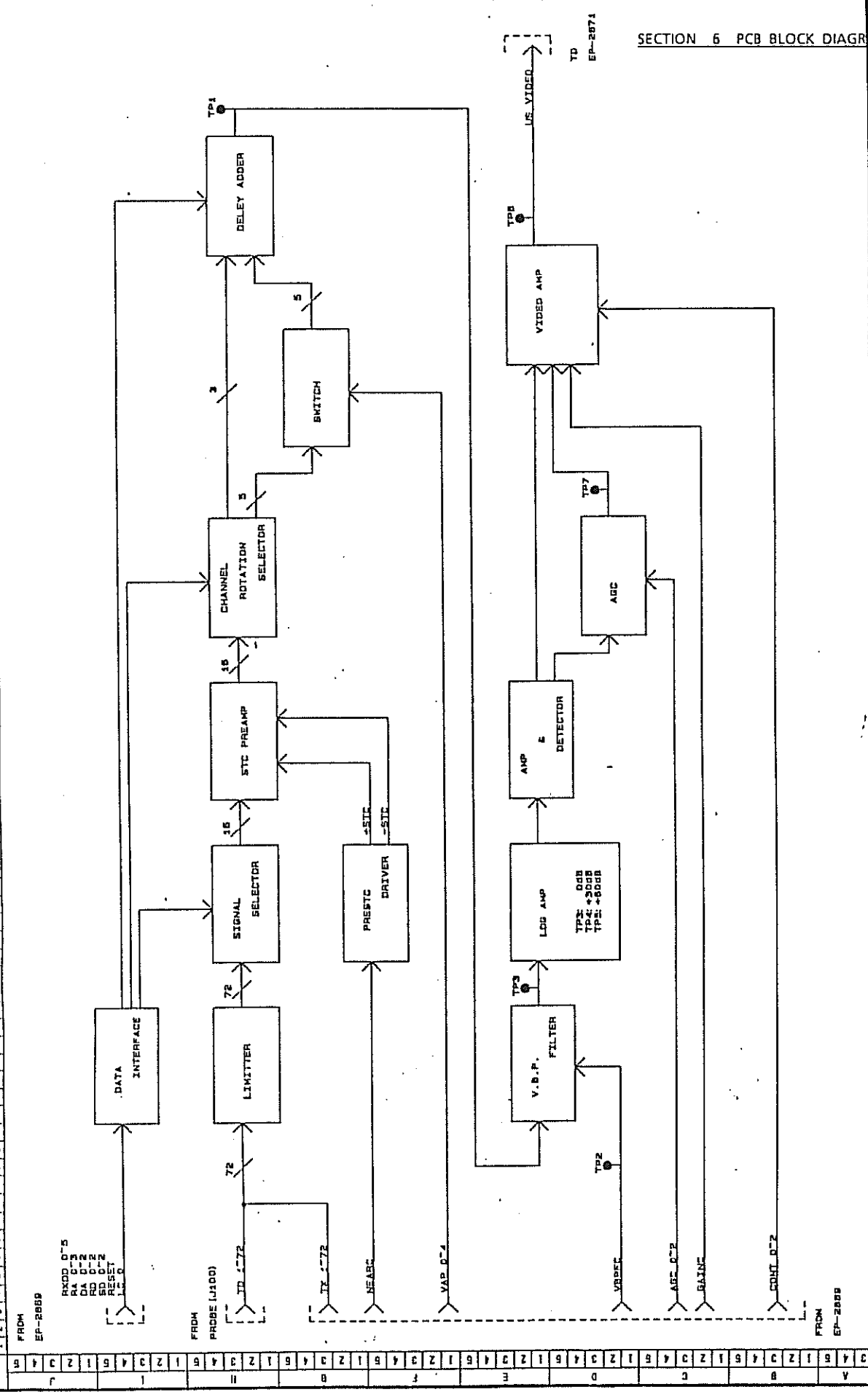
Alotta	Panel Control	EP-2873
TITLE	MODEL	1/1

6-3 EP-2868 Rx

This PCB generates ultrasound transmission signal and control signal which is used for the received signal processing circuit in EP-2868 Rx. Also, signals from various gain controls arrange on the panel and in front of equipment are sent to this PCB and converted into control signals which the receiver circuit needs. Major processes made in this PCB are as follows:

- (1) Tx/Rx system basic clock generation
- (2) Focus control
- (3) Oscillator drive circuit
- (4) Band pass filter control signal generation
- (5) PRE STC signal generation
- (6) Gain signal generation

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SECTION 6 PCB BLOCK DIAGRAM

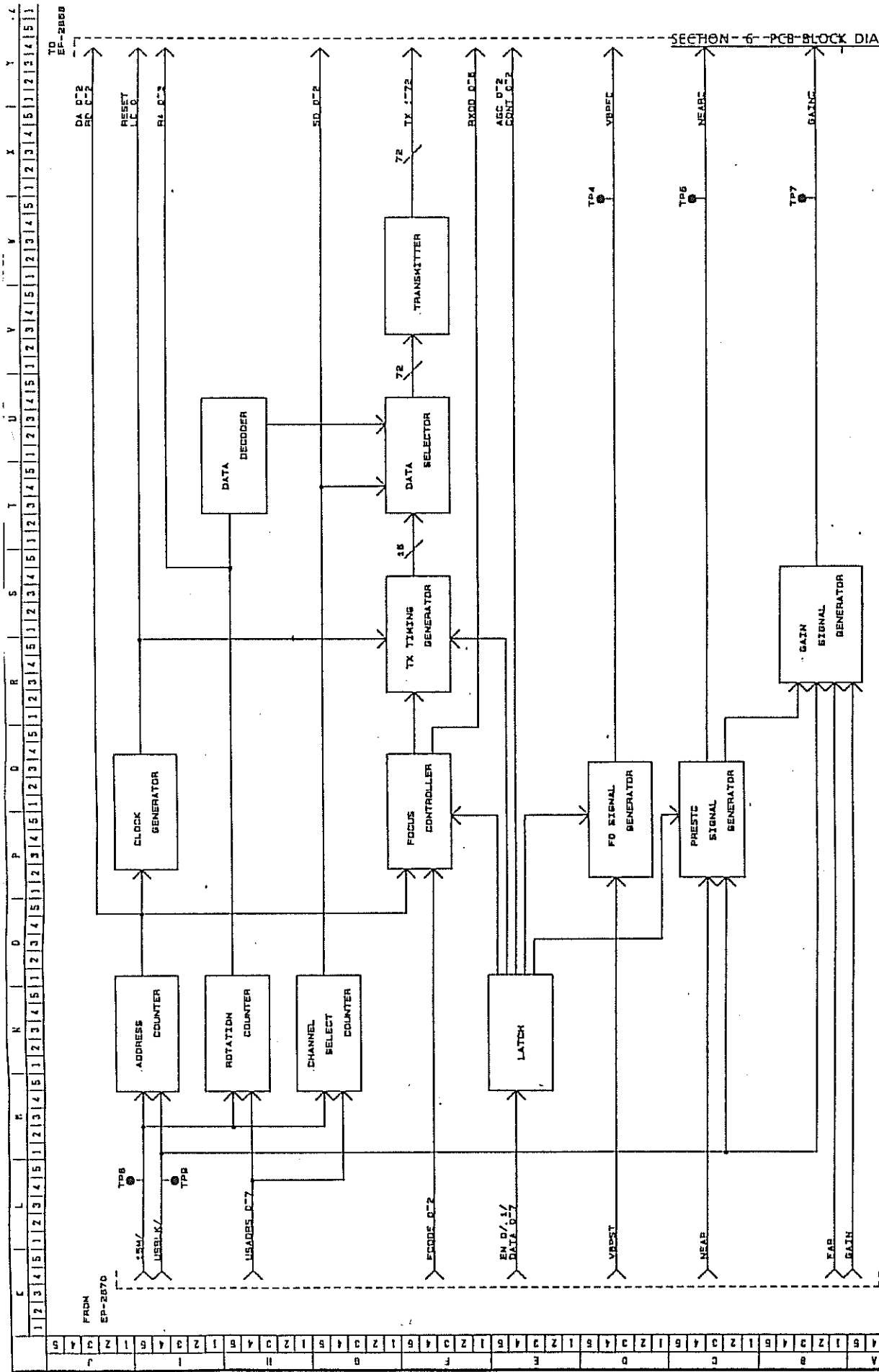
REVISEMENTS		TITLE		MODEL	
		BLOCK DIAGRAM		EP-2858*	
DRAWN		DESIGNED		CHECKED	
8/26		8/26		8/27	
SCALE		PROJECTION		DRAWING NO.	
UNIT: MM					

6-4 EP-2869 Tx & Control

This PCB generates ultrasound transmission signal and control signal which is used for the received signal processing circuit in EP-2868 Rx.

Also, signals from various gain controls arrange on the panel and in front of equipment are sent to this PCB and converted into control signals which the receiver circuit needs. Major processes made in this PCB are as follows:

- (1) Tx/Rx system basic clock generation
- (2) Focus control
- (3) Oscillator drive circuit
- (4) Band pass filter control signal generation
- (5) PRE STC signal generation
- (6) Gain signal generation



SECTION - 6 - PCB BLOCK DIAGRAM

REVISONS	TITLE <b>Aloka</b>		MODEL EP-2869*
4	DRAWN MPG		DESIGNED MPG
3	CHECKED MPG		APPROVED MPG
2	DATE 7/27		DATE 7/27
1	SCALE 1:1		DRAWING NO.
	3RD ANGLE	PROJECTION 1st	UNITS MM

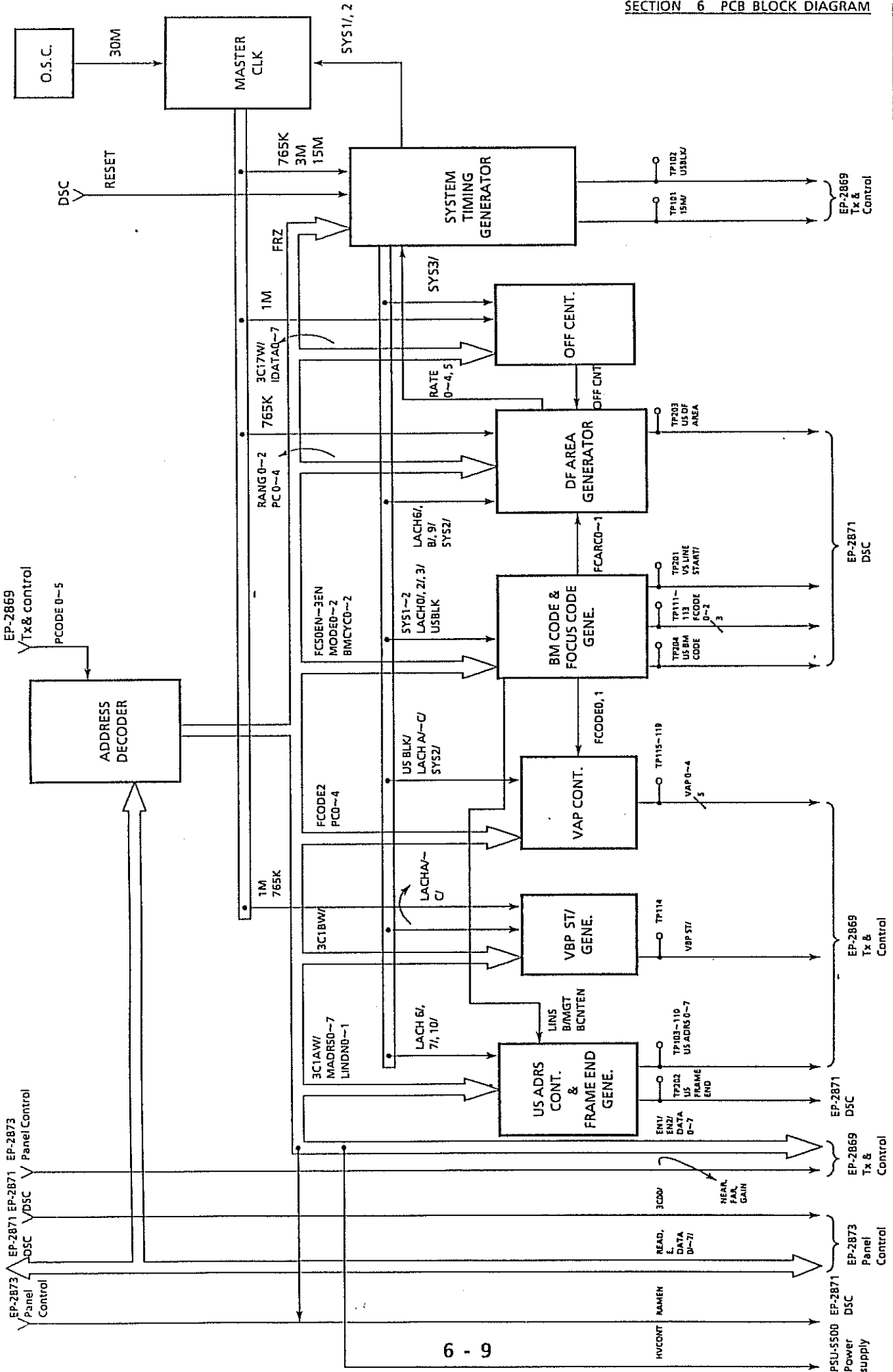
6-5 EP-2870 ITF

This PCB functions as an interface between the Tx/Rx unit, DSC and MPU. It also includes a part which generates Tx/Rx unit control signal.

Processes which this PCB carries out are as follows:

- (1) Tx/Rx unit basic clock generation
- (2) Signal interface between the Tx/Rx unit and DSC
- (3) Controlling the variable band pass filter
- (4) Generation of control signal for variable aperture

SECTION 6 PCB BLOCK DIAGRAM



6 - 9

1 / 1	EP-2870	MODEL	ITF
Alcoa		TITLE	

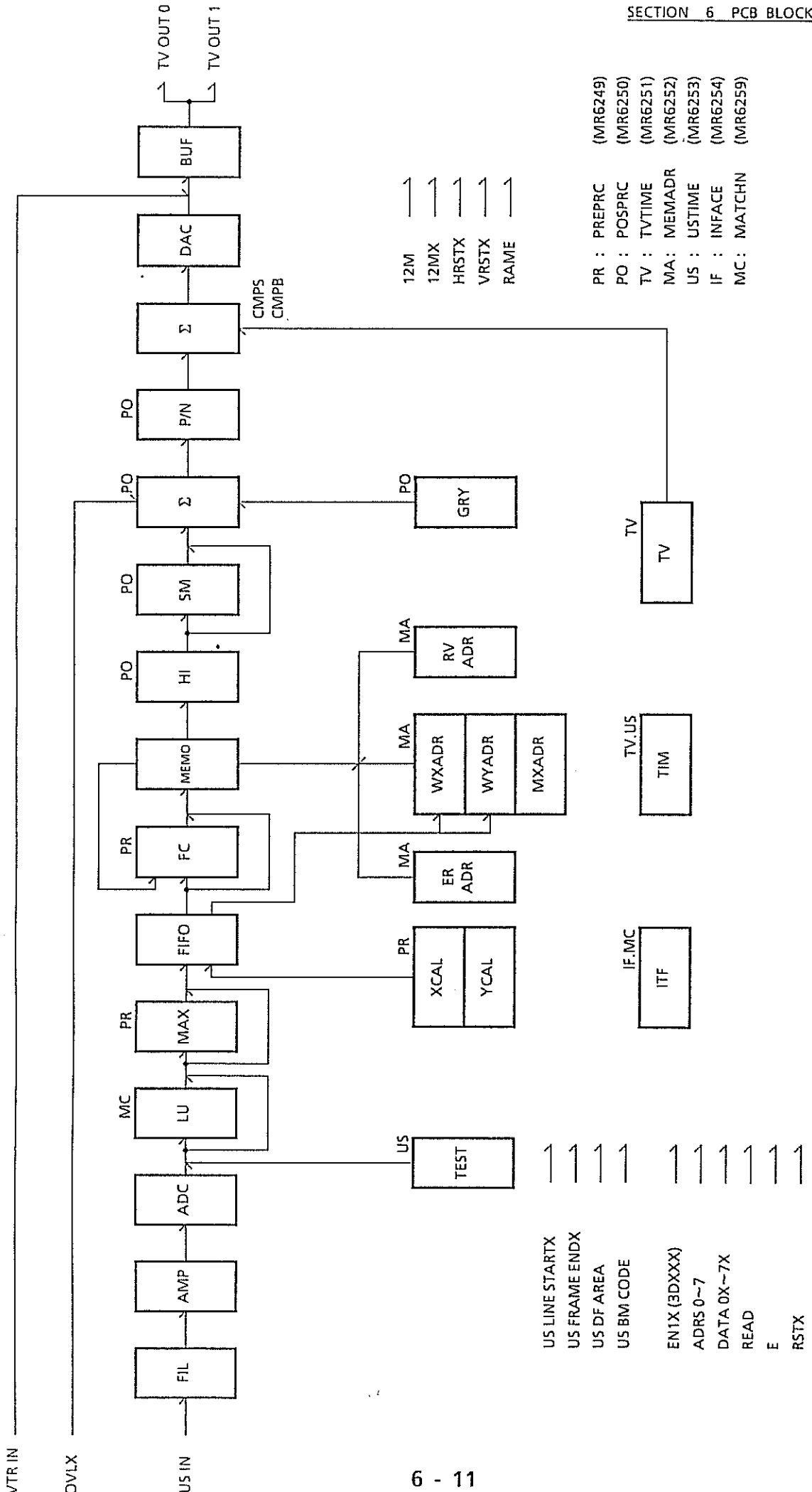
6-6 EP-2871 DSC

This PCB is used for drafting the image of ultrasound echo. In SSD-500, only one piece of this PCB serves for storage of images, TV synchronization, and display.

Ultrasound images are stored in the frame memory basically in the same method as used for SSD-620 and SSD-630. However, there is a considerably large difference as viewed in detail because of a reduction in function and in number of parts used.

Also, consolidation of DSC function is has been achieved by the use of many custom ICs.





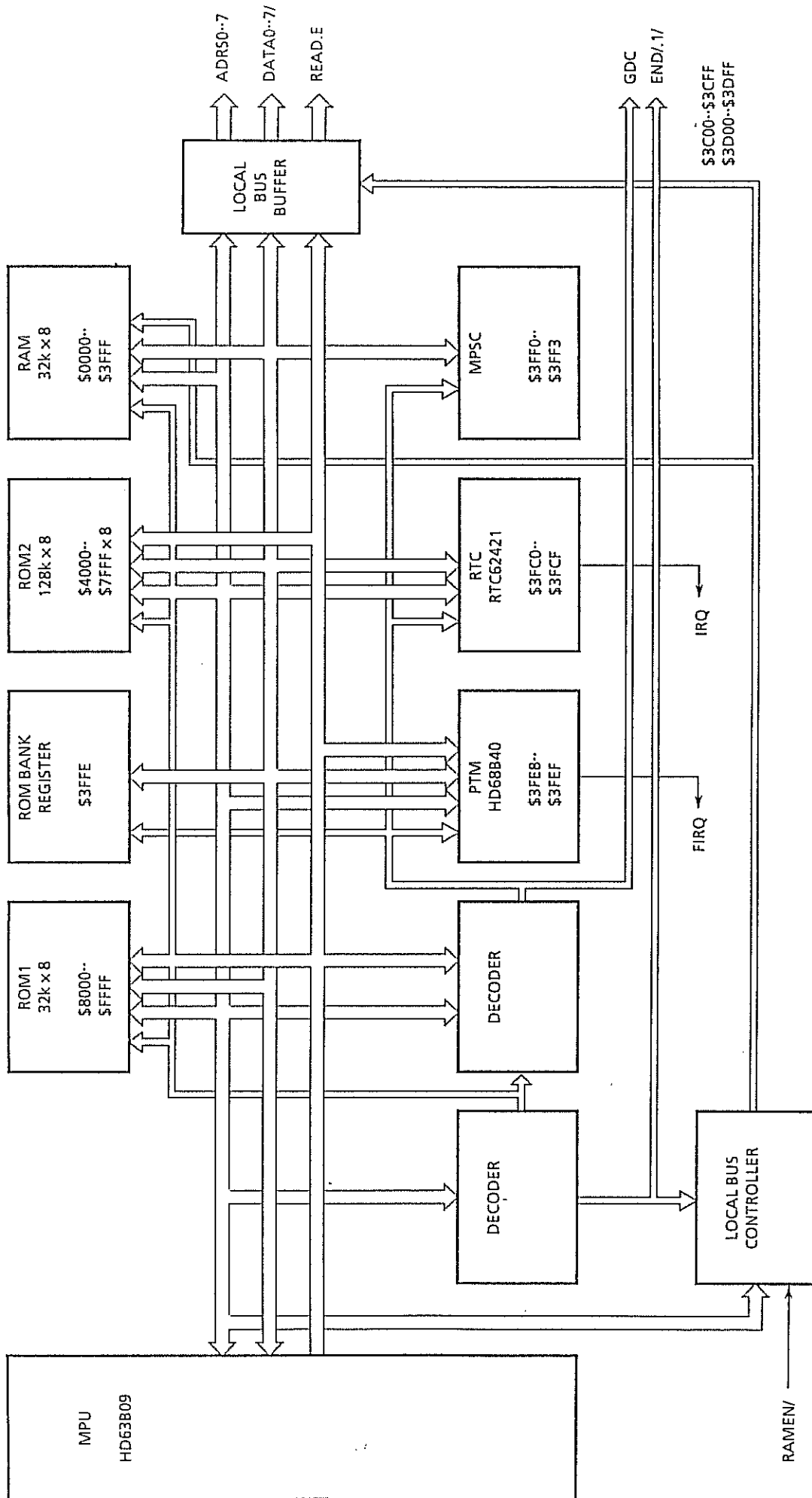
Block Diagram

1 / 1	MODEL	DSC	TITLE
			<b>Aloka</b>
			EP-2871

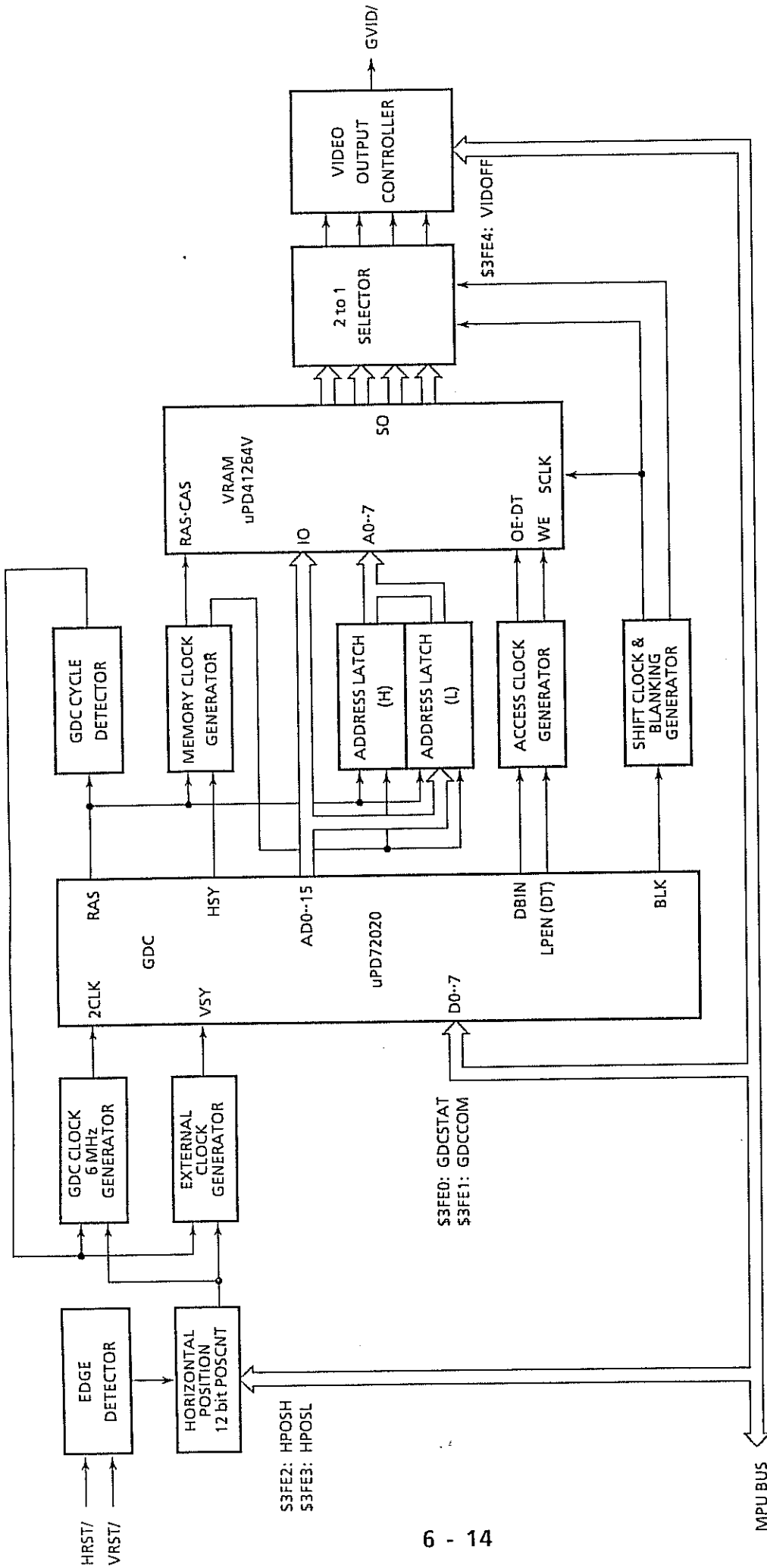
6-7 EP-2872 CPU

This PCB consists of the microprocessor, which controls the whole of SSD-500, attendant peripheral circuits, and graphic controller.

Since SSD-500 uses only one MPU (Micro processor Unit), it is not provided with any system bus. Used for graphic control the GDC (Graphic Display Controller) makes high speed drafting without eating into memory spare of MPU.



1 / 2	EP-2872	MPU	Aloka
	MODEL	TITLE	



Aloka	TITLE	MPU	MODEL	2 / 2
			EP-2872	

**6-8 L-KEY-14 A,B Panel Board**

This PCB gathers control panel switches. It is divided into two sections. L-KEY-14A is the PCB located on the moving side and it gathers the full keyboard, etc.

The PCB consists of the switch matrix, having 58 pieces of key switches, and the diode array, and is connected to EP-2873 PANEL CONTROL. Lighting of LEDs is controlled by LED 10/-17/, 20/-26/ signals.

L-KEY-14B is the PCB fixed to the SSD-500 body. The PCB consists of the switch matrix, having 15 pieces of key switches and a joy pad, and the diode array, and is connected to EP-2873 PANEL CONTROL. Lighting of LEDs is controlled by LED 0/-4/, 6/-7/ signals.

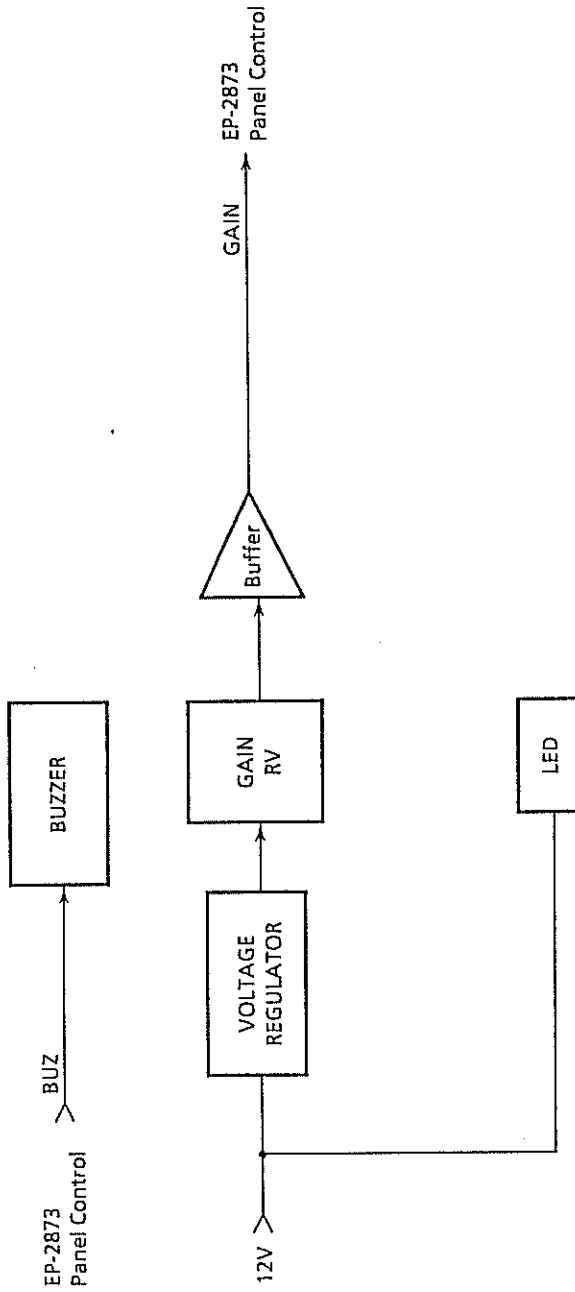
6-9 EP-2878 Gain & Power LED

Voltage applied to the volume for B MODE gain signal generation is the stabilized reference voltage of +5V stepped down from +12V power source.

Output signal is sent through a buffer to EP-2873 PANEL CONTROL and fed to the A/D converter. Also, the signal is fed to the Tx/Rx unit through EP-2870 ITF.

The LED connected to +12V power source is lit when power is ON.

The buzzer having no drive circuit is controlled by EP-2873 PANEL CONTROL.

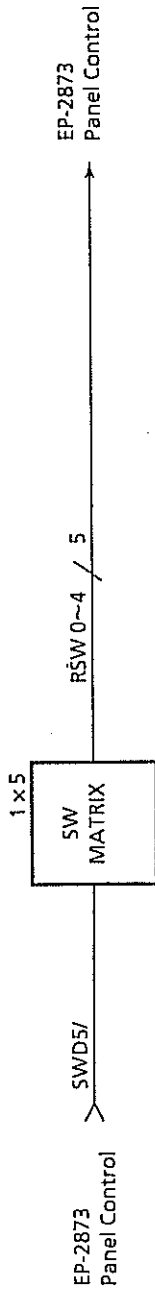


<p>TITLE</p> <p><b>Aloka</b></p>	<p>MODEL</p> <p>Gain &amp; Power LED</p>	<p>EP-2878</p> <p>1/1</p>
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6-10 EP-2879 Select Key

There are five pieces of key switches and a diode array.  
The key switches are arranged in a matrix. The row and line selection signals are controlled by EP-2873 PANEL CONTROL.



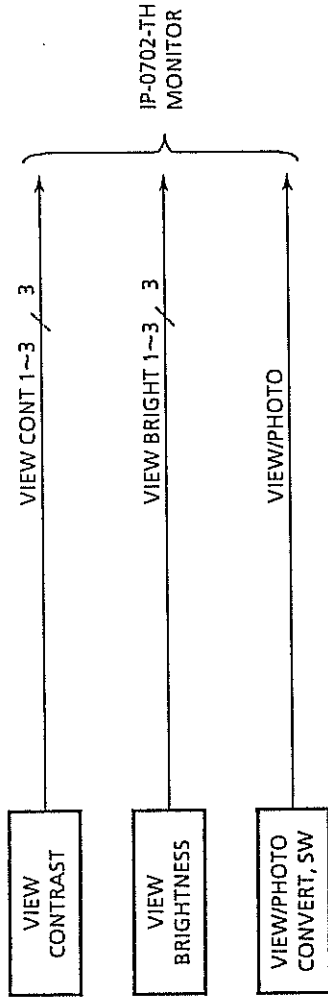


1 / 1	MODEL	TITLE	Aloka
	EP-2879	Select Key	

6-11 EP-2880 Contrast & Brightness

Parts connected to the monitor unit are the contrast and brightness volumes for the monitor screen as well as the selector switch has a position to be selected for setting of the monitor screen and another position to be selected for photography.

The photography position of the foregoing selector switch is effective only when using the photographic apparatus ACR-500. It is ineffective for other photographic apparatuses (SSZ-300, SSZ-108U, etc.)

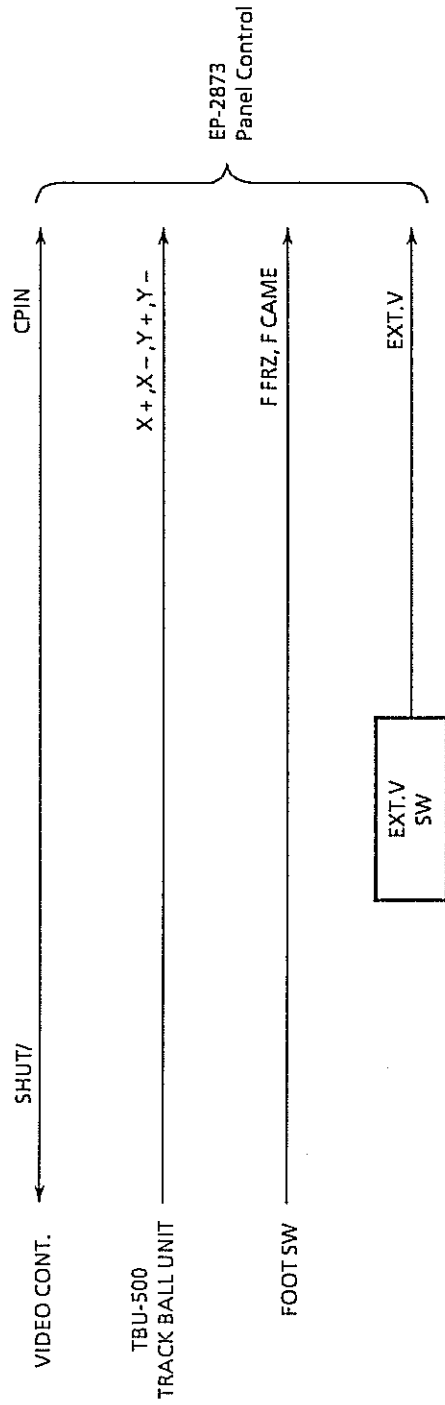


Aloka	TITLE Contrast & Brightness	MODEL EP-2880	1 / 1
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6-12 EP-2881 In / Out

The foot switch, track ball unit, video camera signal, and video signal in/out switch over signal are connected to EP-2873 PANEL CONTROL.

The foot switch, track ball unit, and video camera are optional.

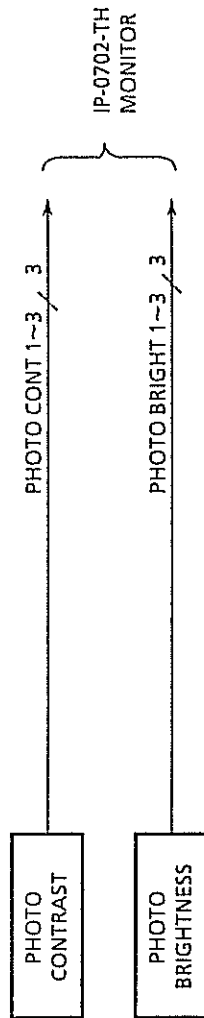


<p>TITLE</p> <p><b>Aloka</b></p>	<p>In / Out</p>	<p>MODEL</p> <p>EP-2881</p>	<p>1 / 1</p>
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6-13 EP-2882 Photo Cont. / Bright.

The contrast and brightness volumes for photography are connected to the monitor unit.

Setting with the foregoing volumes is effective only when the selector switch on EP-2880 Brightness & Contrast is set properly, that is only when ACR-500 photographic apparatus is used.



<p><b>Aloka</b></p>	<p>TITLE Photo Cont. / Bright.</p>	<p>MODEL EP2882</p>	<p>1 / 1</p>
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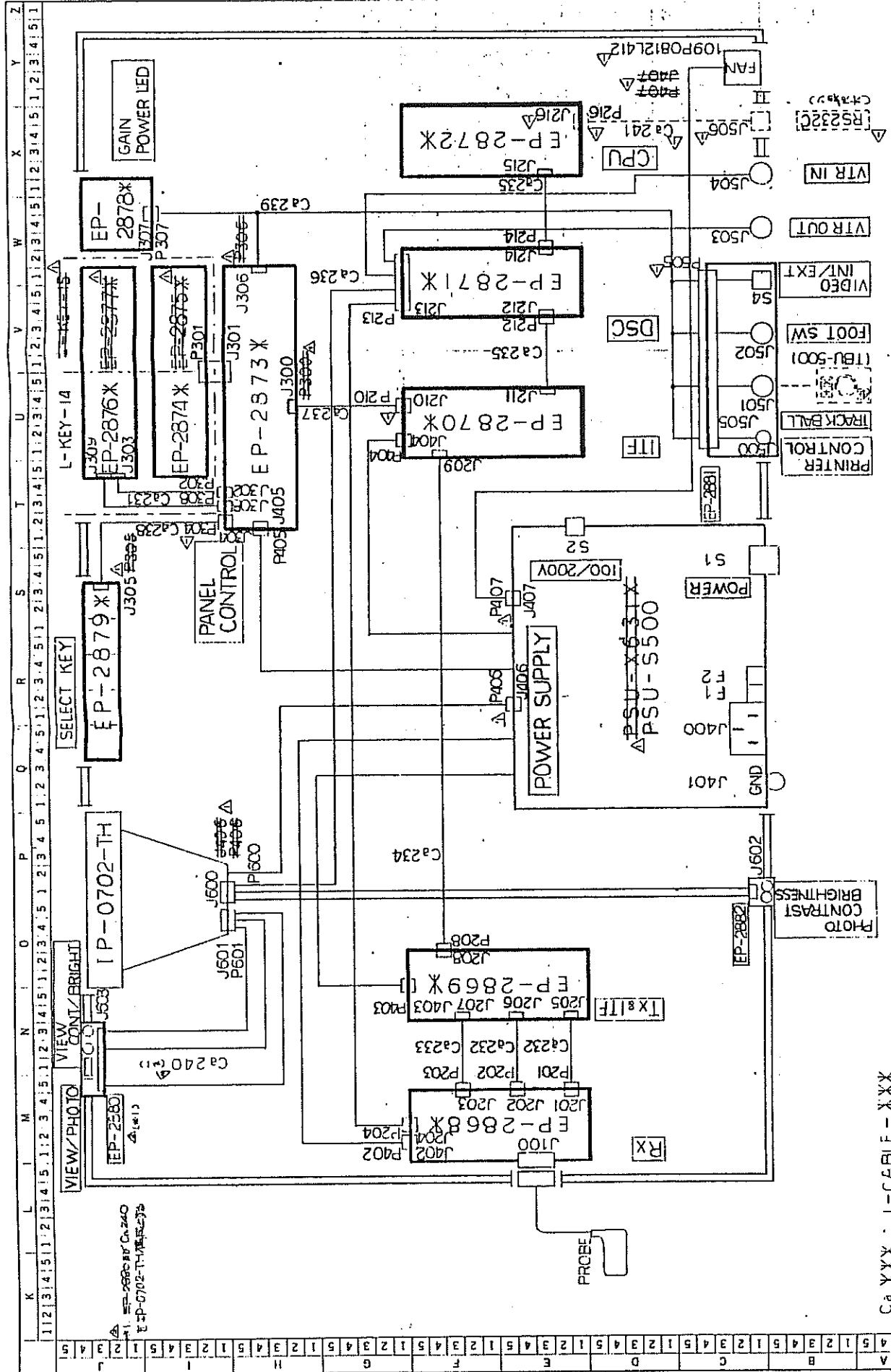
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## SECTION 7 SCHEMATIC DIAGRAM

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EP-2881	( device location )	7 - 20
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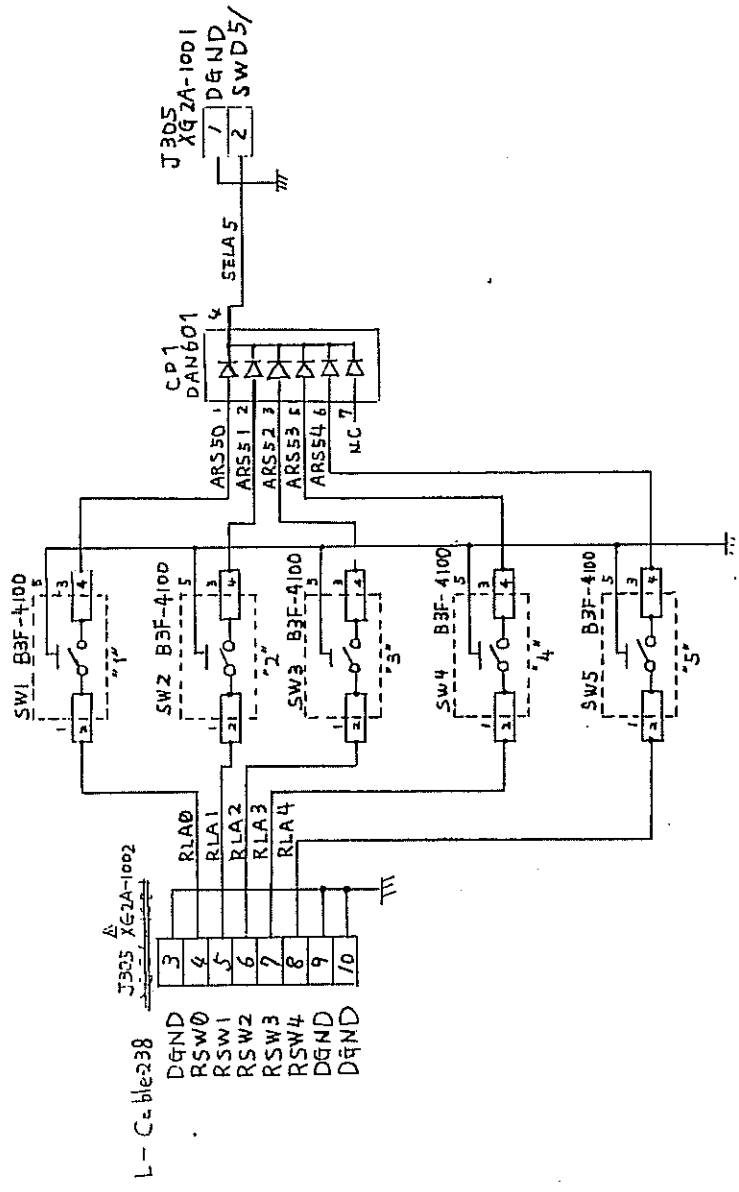
Ca XXX : L-CABLE - XXX

REVISEMENTS 80. D. 9 82. M. 10 83. B. 9 84. J. 10 85. J. 11 86. J. 12 87. J. 13 88. J. 14 89. J. 15 90. J. 16	TITLE: SSD-500	MODEL: 83-5	USI-115
	3RD ANGLE PROJECTION 第3角法 SCALE: 1:1	DESIGNED BY: [Signature] CHECKED BY: [Signature] APP. DATE: [Date]	DRAWING NO. 034 MC314015
	ALOKA	船名: 班机区	

REVISEMENTS  
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88. J. 14  
89. J. 15  
90. J. 16



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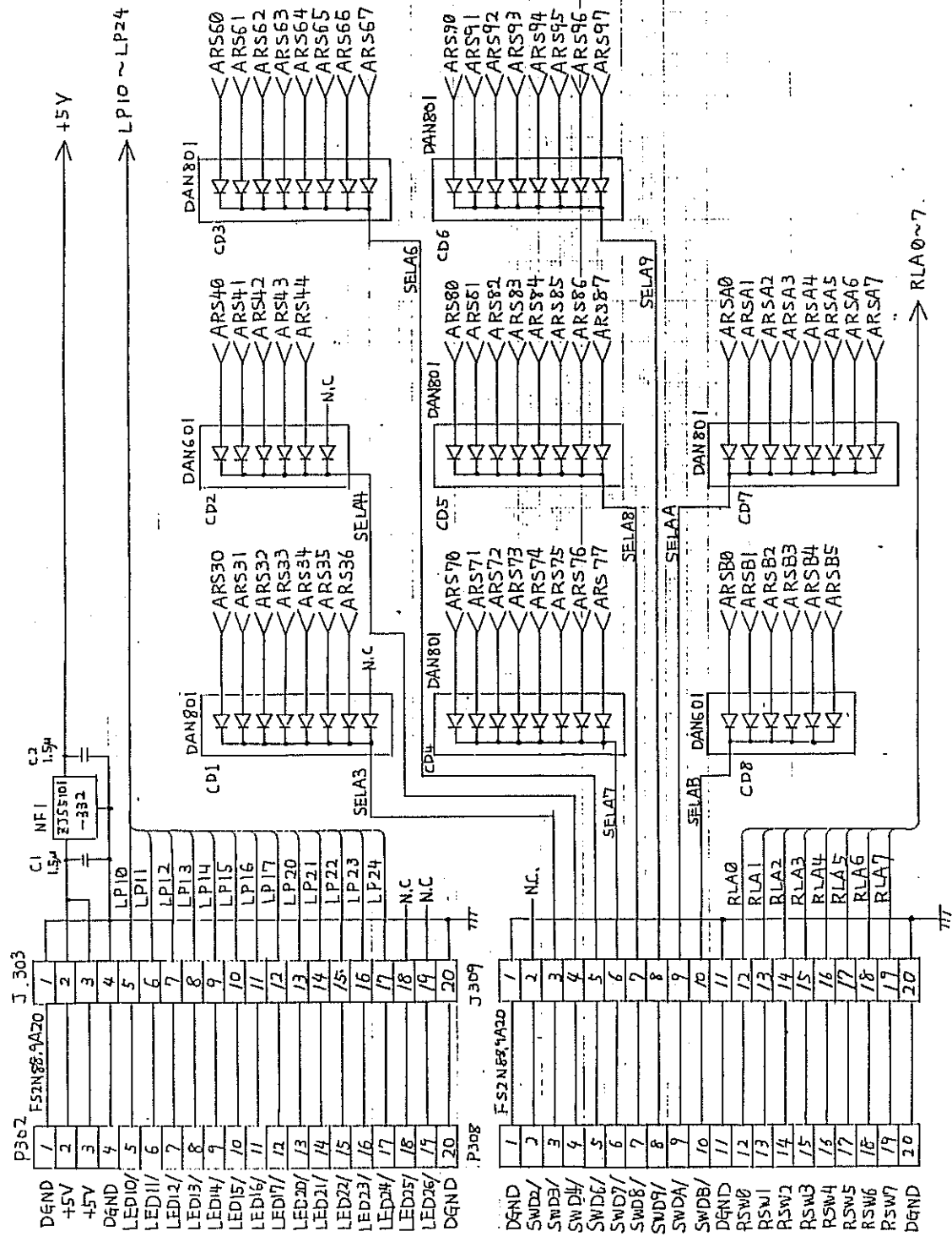
L-Cable-238

J305 XGZA-1002

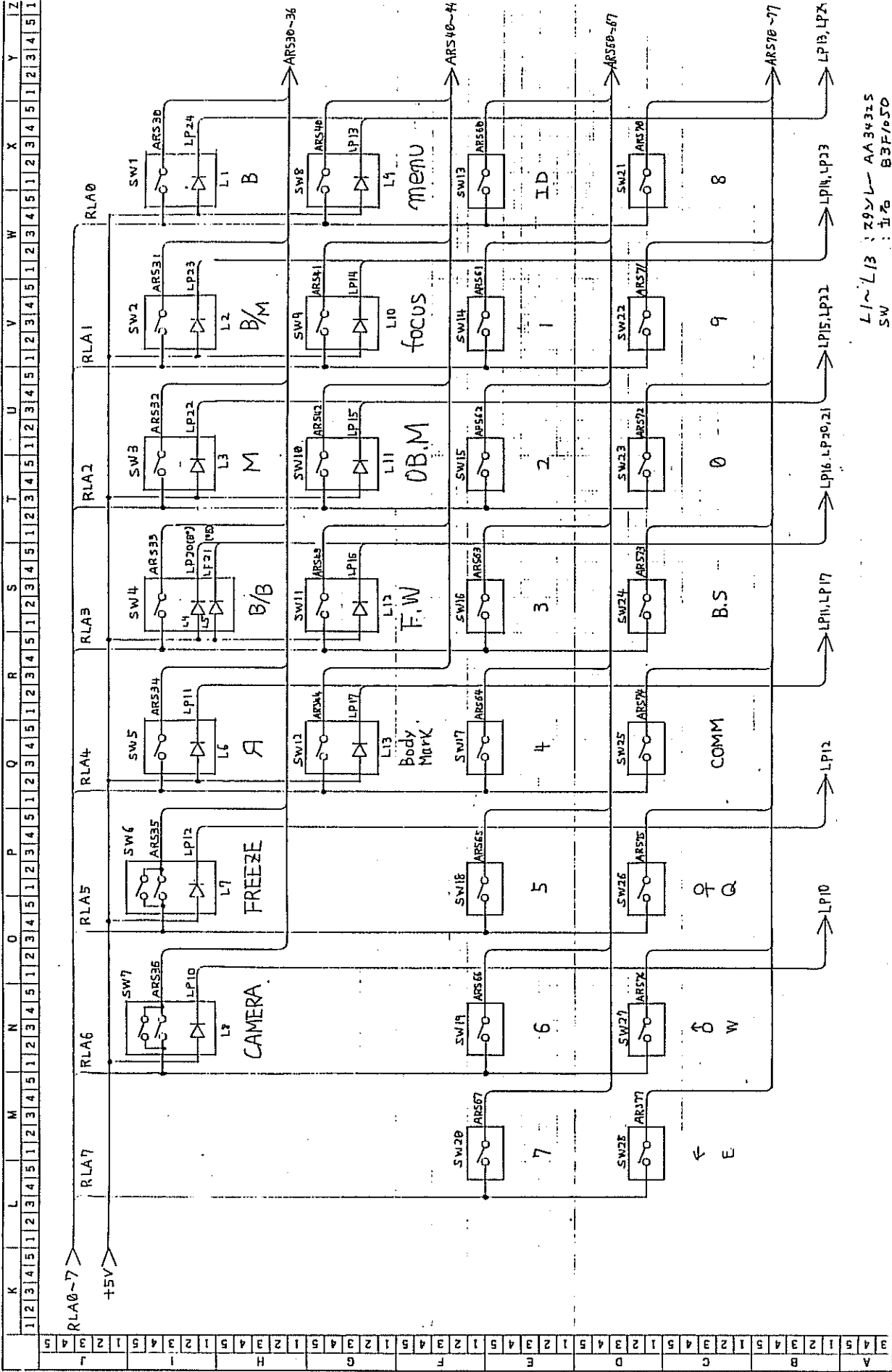
J305 XGZA-1001

REVISEMENTS	1786.12.22 10-878 44-	SCALE 1/2"	第3角法	3RD ANGLE PROJECTION	Aloka	TITLE名称 SELECT KEY	MODEL 型号 EP-2879,B	DRAWING NO. 图号 MC313613	1/1
DESIGNED BY 设计	CHECKED BY 校对	APP'D BY 审核	DRAWING NO. 图号	MODEL 型号	TITLE名称		MODEL 型号	DRAWING NO. 图号	1/1





REVISEMENTS 変更		MODEL 31-5		DRAWING NO. 図番	
TITLE 名称 L-KEY-144		DRAWING NO. 図番		DRAWING NO. 図番	
3RD ANGLE PROJECTION 第3角法		DESIGNED 設計		CHECKED 検閲	
SCALE 尺法		DATE 日付		DRAWN 描画	
UNIT 単位		mm		mm	
Aloka		L-KEY-144		1/3	



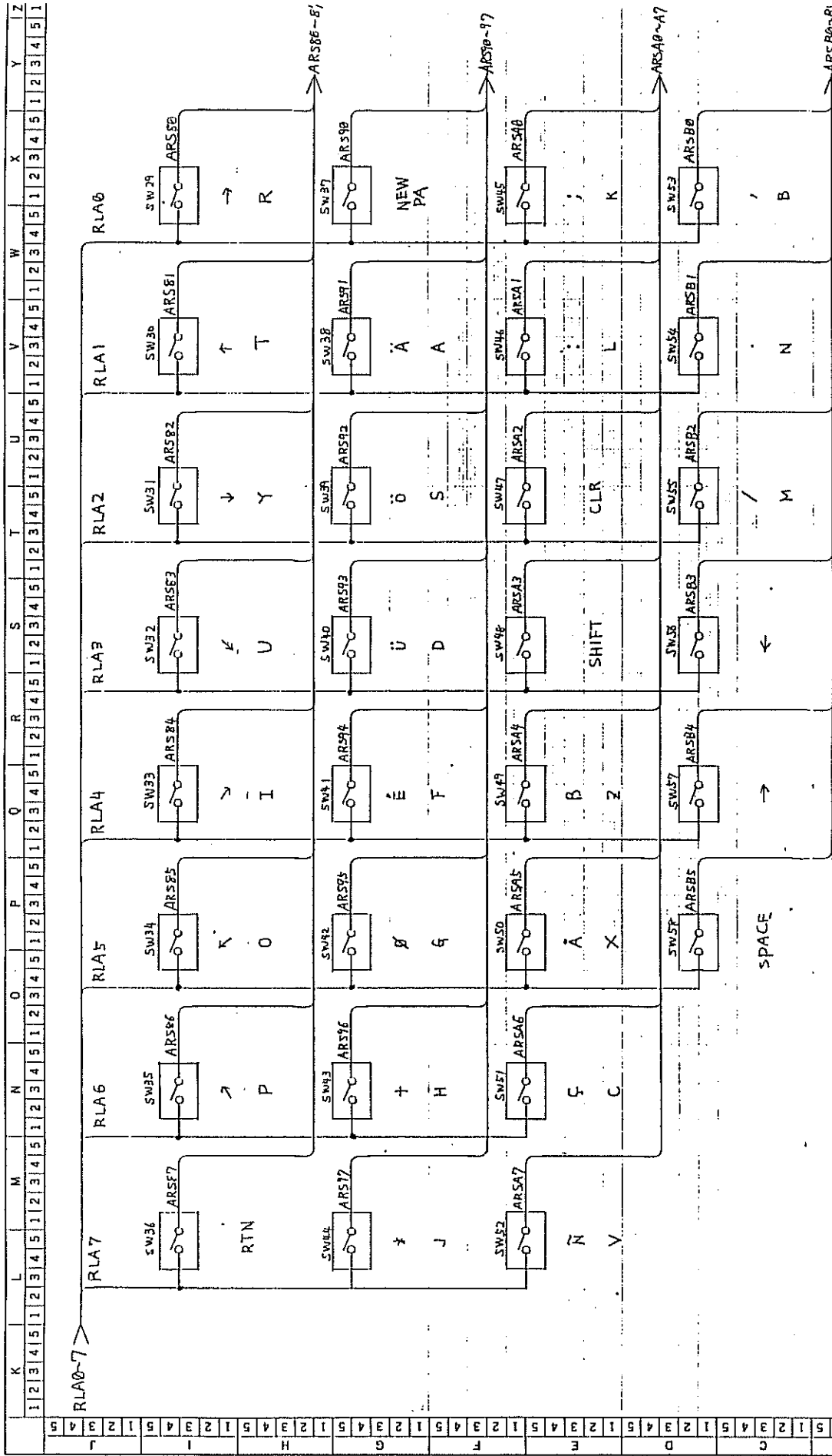
REVISIONS 変更									
3	4	5	1	2	3	4	5	1	2
A	B	C	D	E	F	G	H	I	L

<b>Aloka</b>				TITLE 名称 L-KEY-14A			
3RD ANGLE PROJECTION 第3角法	DESIGNED 設計 <i>y. Inagaki</i>	CHECKED 検校	APPD 承認	DRAWING NO. 図番			
SCALE 尺規	MODEL 記号			DRAWING NO. 図番			

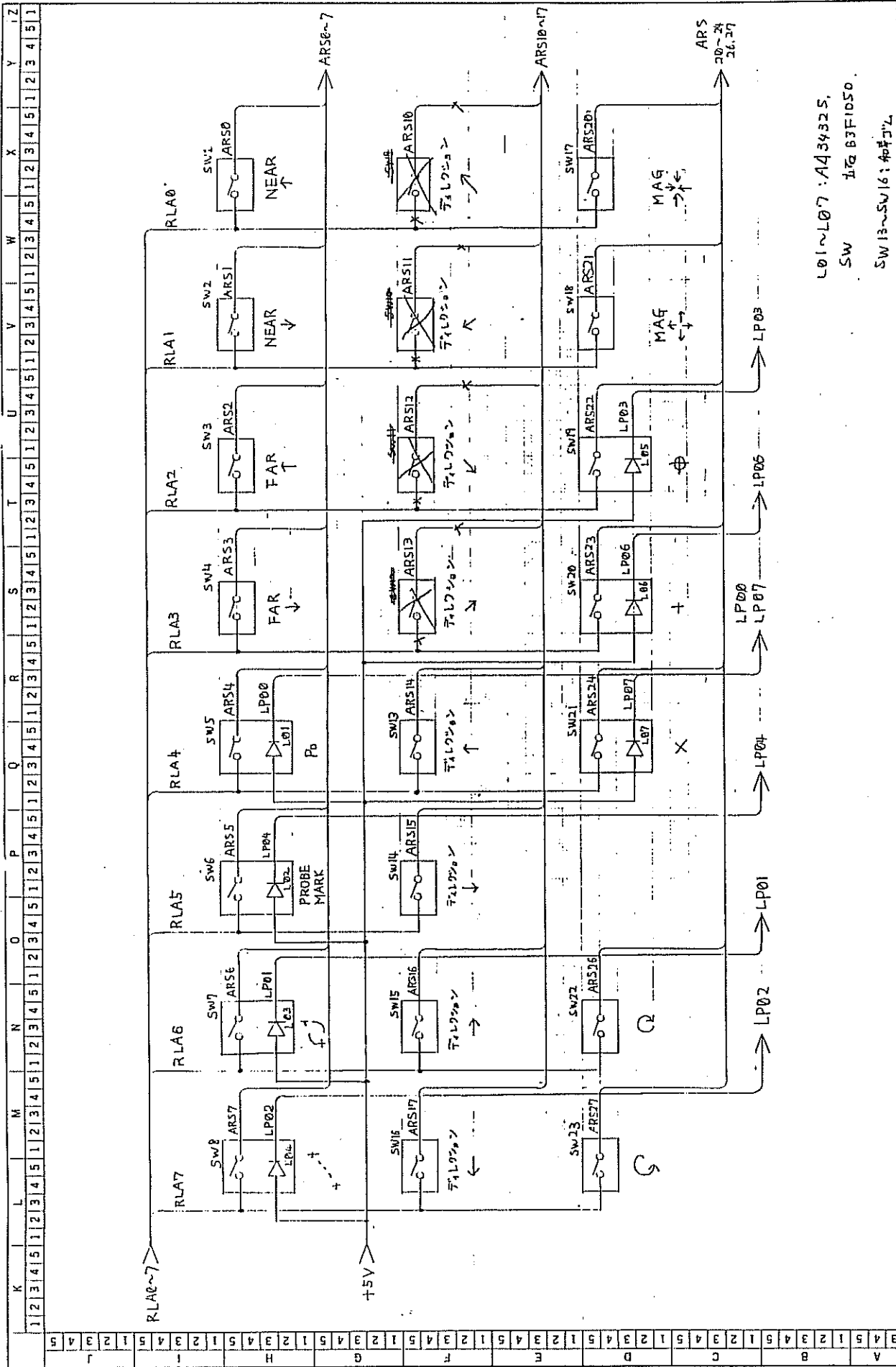
L1~L13 : 29YL-AA34325  
SW : 五右衛門 B3F/050



Aloka		TITLE 名称		L-KEY-144		MODEL 型号	
3RD ANGLE PROJECTION 第三角法		DRAWING 图号		DESIGNED 设计		CHECKED 校对	
SCALE 比例		DRAWN 制图		Y. Moriguchi		APPROVED 批准	
REVISIONS 变更		TITLE 名称		MODEL 型号		DRAWING NO. 图号	
						3/3	







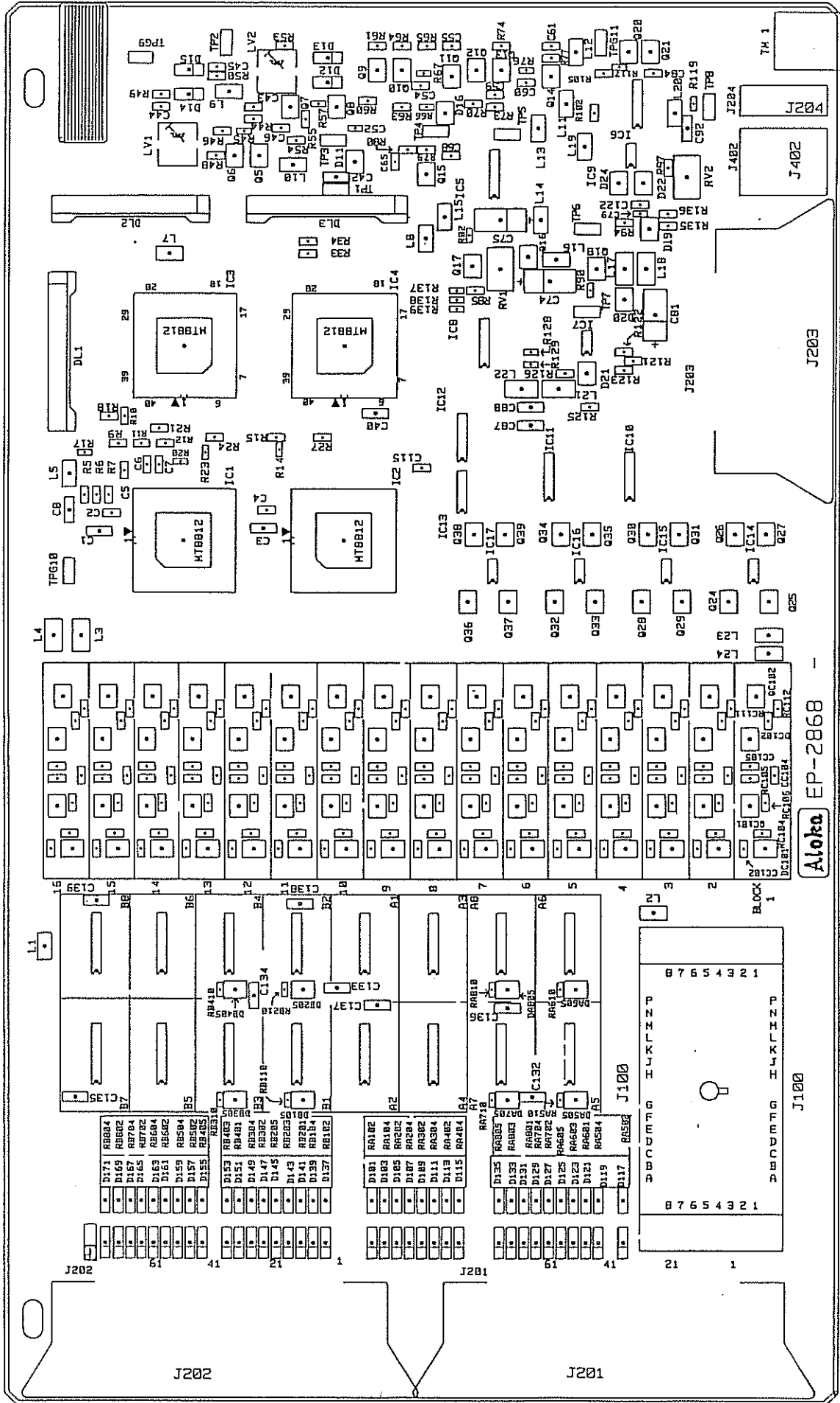
L01~L07: A43432S,  
 SW 1に B3F1050,  
 SW 13~SW 16: 40757

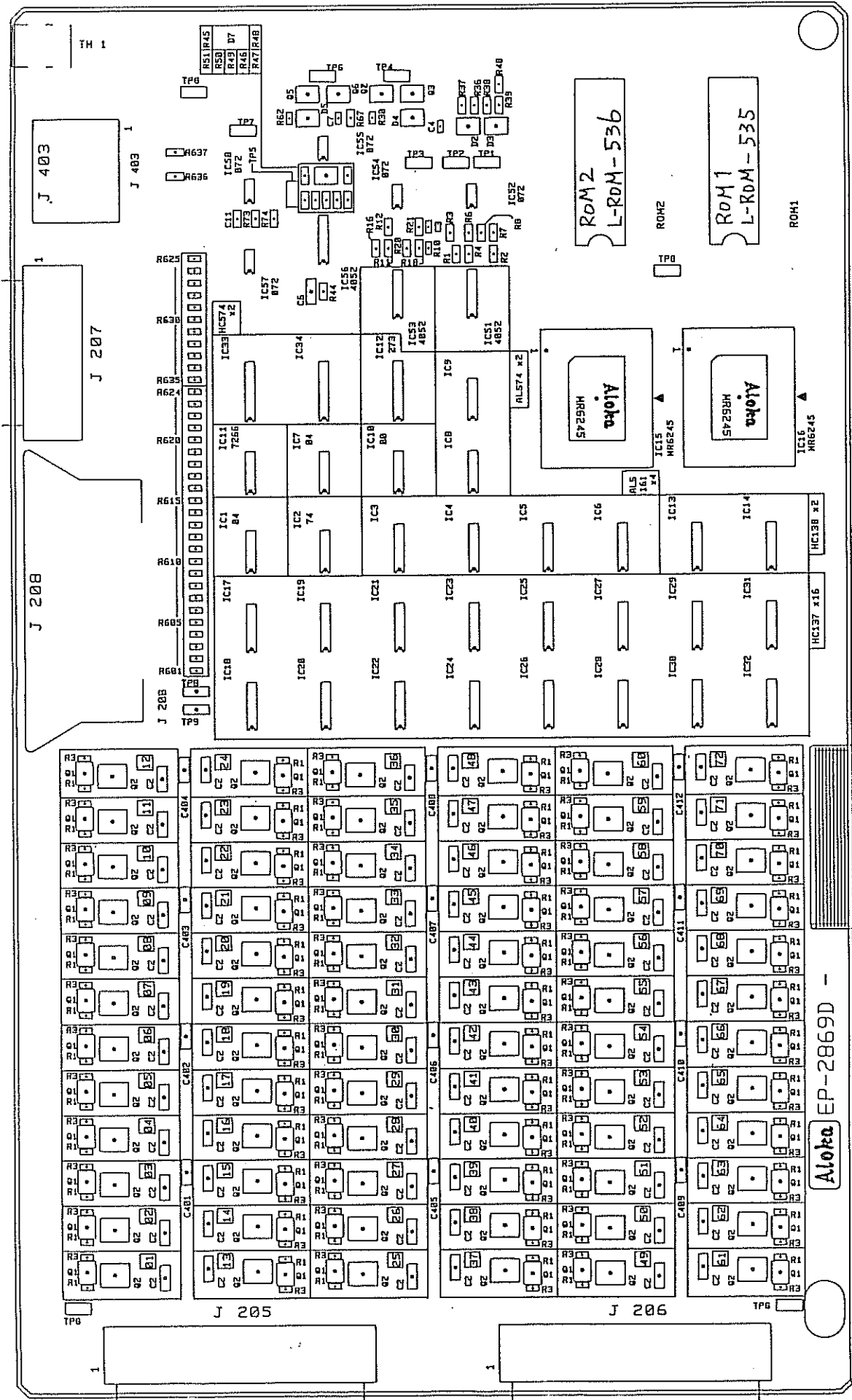
REVISED 2 次		TITLE 名称		MODEL 31-5		DRAWING NO. 図番	
Aloka		L-KEY-14B		APPRO 承認		DRAWING NO. 図番	
3RD ANGLE PROJECTION		DESIGNED 設計		CHECKED 検査		DRAWING NO. 図番	
第 3 角法		<i>Y. Yamaguchi</i>					
SCALE 尺取							
UNIT 単位							
						2/2	

EP-2868

SILK (UP)

Aloka EP-2868



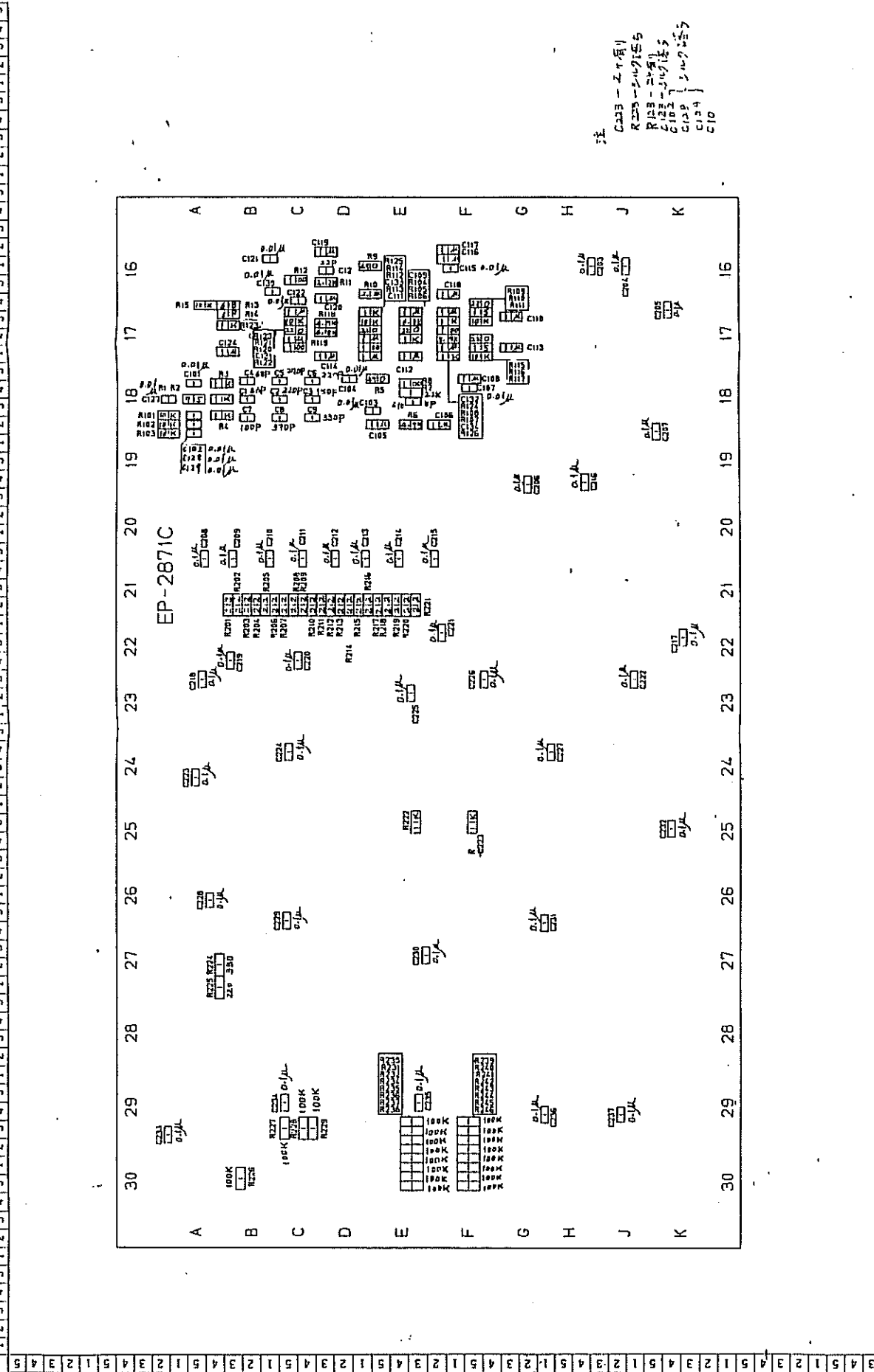


EP-2869D





K 1 2 3 4 5 I L M N O P Q R S T U V W X Y



注  
 C203 - Zr 質  
 R229 - シルベリス  
 R103 - シルベリス  
 C103 - シルベリス  
 C128 } シルベリス  
 C129 }  
 C10

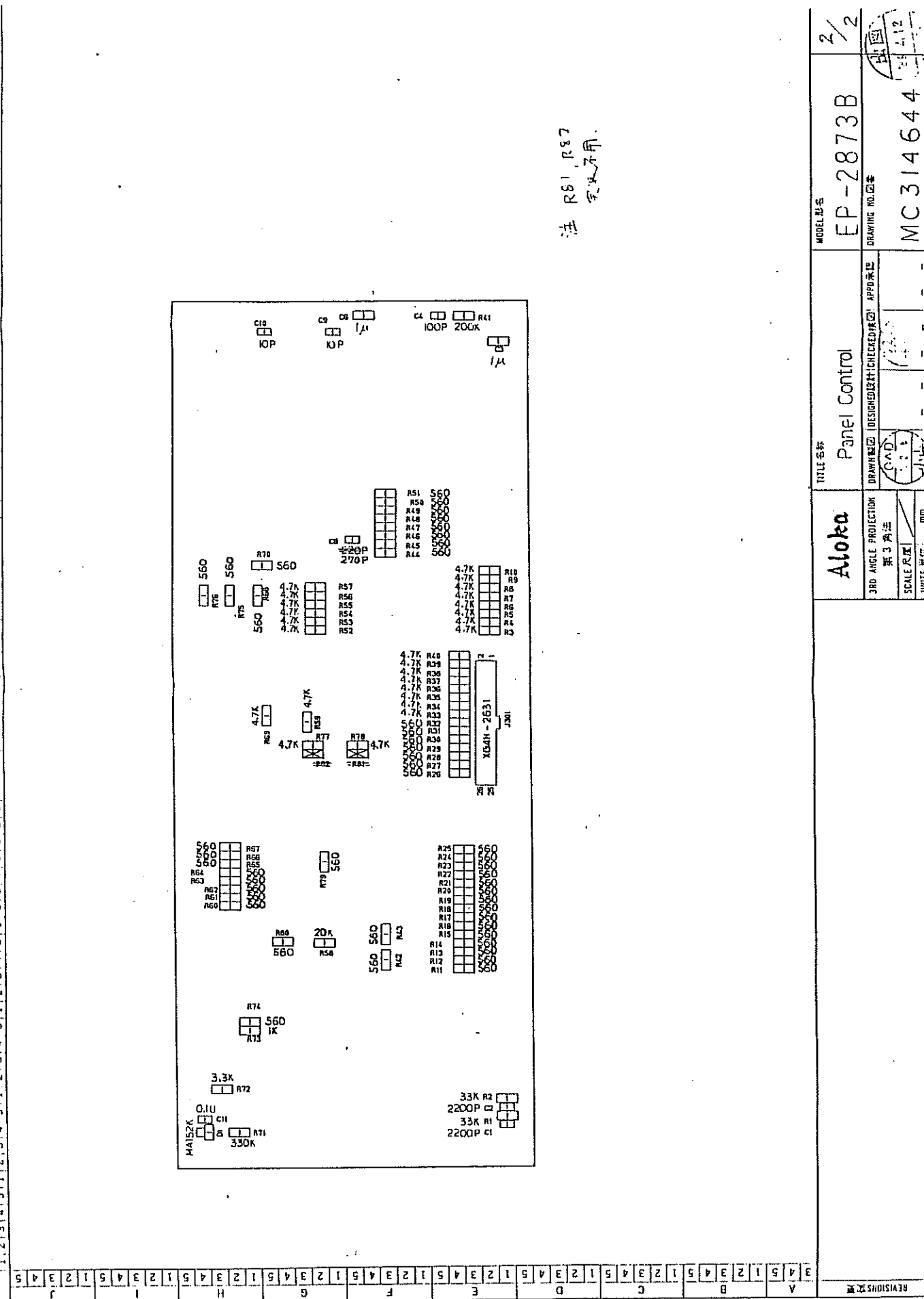
REVISEMENTS		MODEL 名称		DRAWING NO. 図番	
A	3 4 5	EP-2871C		MC315518	
B	1 2 3 4 5	DSC		2 / 2	
C	1 2 3 4 5	Aloka		DRAWING NO. 図番	
D	1 2 3 4 5	3RD ANGLE PROJECTION		CHECKED 検出	
E	1 2 3 4 5	第3角法		APPROVED 承認	
F	1 2 3 4 5	SCALE 尺度		DESIGNED 設計	
G	1 2 3 4 5	UNITS 単位		CHECKED 検出	
H	1 2 3 4 5	mm		DESIGNED 設計	
I	1 2 3 4 5	1:2.5		CHECKED 検出	
J	1 2 3 4 5			APPROVED 承認	
K	1 2 3 4 5				







K L M N O P Q R S T U V W X Y Z



注 R81, R82  
无效不用.

REVISED 2		MODEL NAME		EP-2873B		DRAWING NO. 4		MC 314644	
TITLE NAME		Panel Control		DRAWING NO.		DRAWING NO.		DRAWING NO.	
3RD ANGLE PROJECTION		第3角法		SCALE 1:1		UNITS 毫米		毫米	
Aloka		Panel Control		DRAWING NO.		DRAWING NO.		DRAWING NO.	
2/2		EP-2873B		DRAWING NO.		DRAWING NO.		DRAWING NO.	

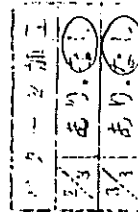
**凡例**

	CHECK PIN(CP-10B)
	BUSBAR ( )
	IC-SOCKET ( )
MOS	MOS IC ( )
ROM	ROM IC ( )
	TAPING

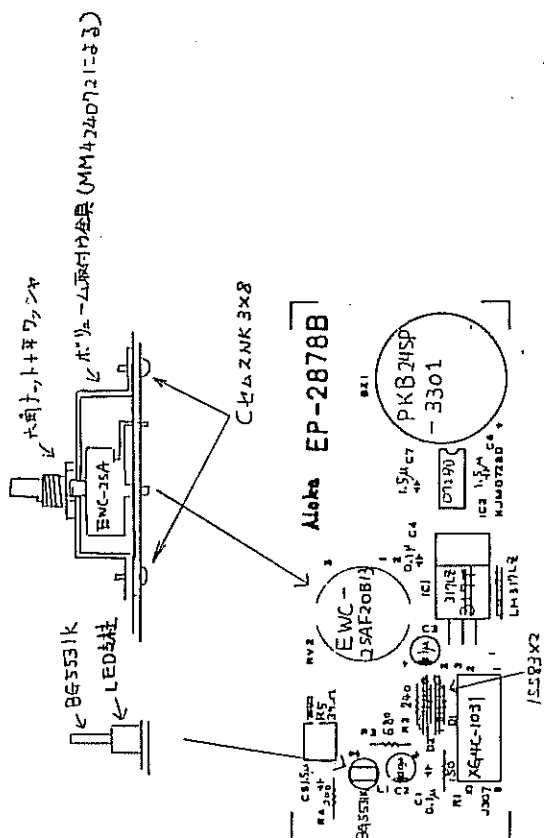
**NOTE**

○	コネクタ部及びICのスペースランドは半田時マーキングのこと
○	ダイオード、コンデンサの極性注意
／	ROMは逆込み後取付のこと
／	MOS IC使用基板につき取扱い注意
／	チェック端子の取付け方向はマーク間の方向とする
／	バスバーの折り返し、裏折 (但し足は除く)
／	部取付の長さ MAX 9mm
／	諸元書きは取付け不要
△	SN [ ] 基板貼付の単

コネクターJ307は半田面付。



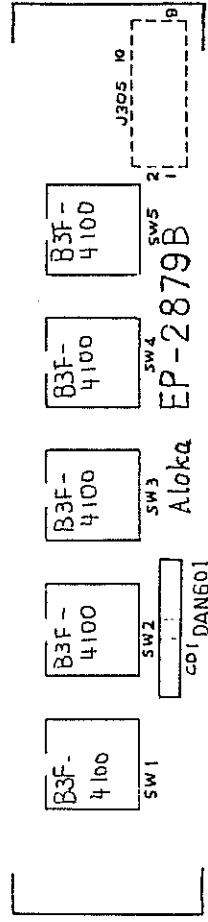
注① RV1は黒エポキシで消して下こい。そしてR5 EF 1/439.5の明確性をPの様に変更して下こい。  
 ② IC 7は LM337I カS LM317Iに交換。  
 S/LC LM317Iは黒エポキシで消して下こい。



Title: EP-2878B		DATE: 1/3	
Aloka	DESIGNER: Y. Hingigishi	APP: [ ]	DATE: 1/27
SCALE: [ ]	DESIGN: [ ]	MC314492	

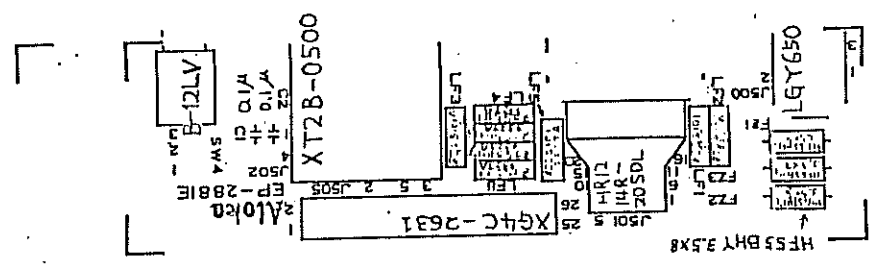
凡例	
	CHECK PIN (CP-10B)
	BUSBAR ( )
	IC SOCKET ( )
	MOS IC ( )
	ROM IC ( )
	TAPING

凡例	
	コネクタ部及びICのスペアランドは半田付テーパーングのこと
	ダイオード、コンデンサの極性注意
	ROMは各ピンは取付のこと
	MOS IC使用基板につき取扱い注意
	チャック端子の取付け方向はマーク間の線の間とする
	パネルの折り曲げ、減量組し足は除く
	部品寸法の高さ M: X 9mm
	諸元書は取付け不要
	SN ( ) 紙張貼付の事



<b>Aloka</b>	TITLE 名称	Select Key	MODEL 名称	1/1
3/40 ANGLE PULLIUM 第3巻法 1/1 R/F	DRAWING 図面	DESIGNER 設計者	EP-2879B	
	Y. Minogishi	CHECKED 検出	DRAWING NO. 図番	
	88-12-27	88-12-27	MC314495	

A 3 4 5 | B 3 4 5 | C 3 4 5 | D 3 4 5 | E 2 3 4 | F 3 4 5 | G 3 4 5 | H 2 3 4 | I 2 3 4 | J 2 3 4 | K 2 3 4 | L 2 3 4 | M 2 3 4 | N 2 3 4 | O 2 3 4 | P 2 3 4 | Q 2 3 4 | R 2 3 4 | S 2 3 4 | T 2 3 4 | U 2 3 4 | V 2 3 4 | W 2 3 4 | X 2 3 4 | Y 2 3 4 | Z 2 3 4



凡例
CHECK PINCP-10B
BUSBAR ( )
SOCKET ( )
MOS
ROM IC ( )
ROM IC ( )
TAPING

NOTE

1. マタール加工の注意  
 2. マタール加工の注意  
 3. マタール加工の注意  
 4. マタール加工の注意  
 5. マタール加工の注意  
 6. マタール加工の注意  
 7. マタール加工の注意  
 8. マタール加工の注意  
 9. マタール加工の注意  
 10. マタール加工の注意

マタール加工  
 2/3あり塗り  
 2/3あり塗り

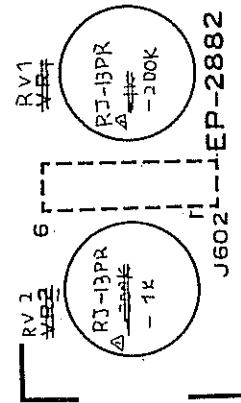
3 4 5   2 3 4   1 2 3 4   5 6 7 8   9 10 11 12   13 14 15 16   17 18 19 20   21 22 23 24   25 26 27 28   29 30 31 32   33 34 35 36   37 38 39 40   41 42 43 44   45 46 47 48   49 50 51 52   53 54 55 56   57 58 59 60   61 62 63 64   65 66 67 68   69 70 71 72   73 74 75 76   77 78 79 80   81 82 83 84   85 86 87 88   89 90 91 92   93 94 95 96   97 98 99 100	<b>Aloka</b>	TITLE 名称 In/Out	MODEL 名称 EP-2881E 1/1
	3RD ANGLE PROJECTION 第3角法	DRAWING NO. 図面番号 MC316810	DRAWING NO. 図面番号 EP-2881E 1/1
	SCALE 尺貫 UNITS 単位 mm	DESIGNED BY 設計者 CHECKED BY 検核者 APPROVED BY 承認者	DATE 日期 1985.10.13



コネクター 602 は 米田重行 氏



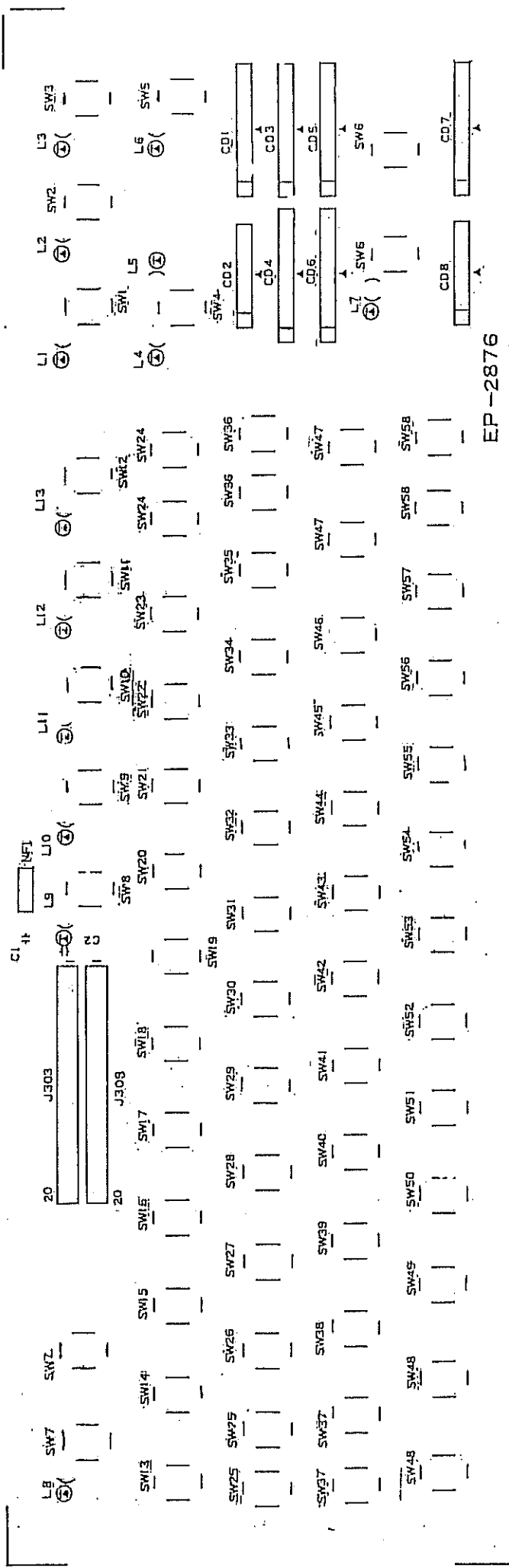
Aloka



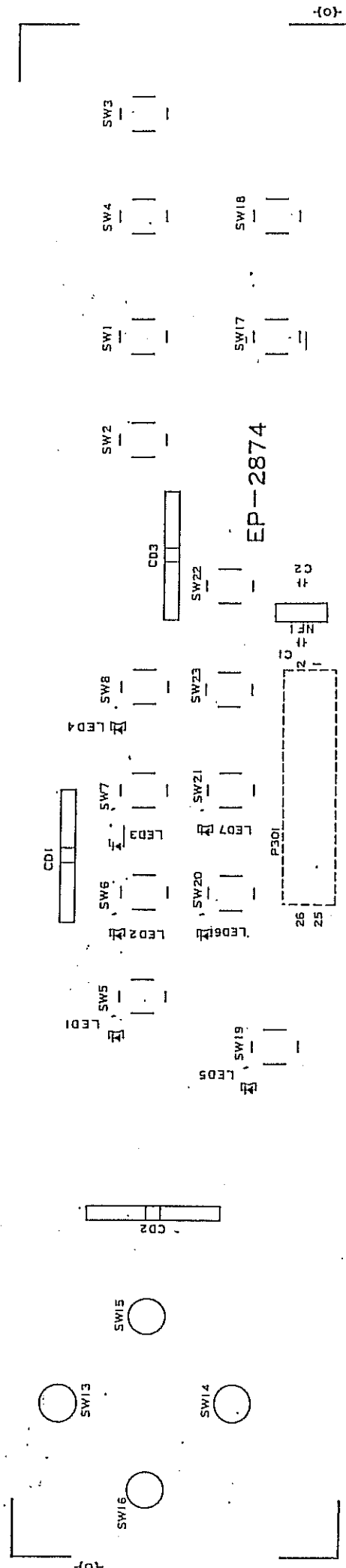
△ 1988.12.28 52 号

<p><b>Aloka</b></p> <p>ISO ANGLE PROJECTION 第 3 角法</p> <p>SCALE: 1:1 SHEET: 05</p>	<p>TITLE: 名称 Photo Cont/Bright</p> <p>DRAWN BY: J. Nishigaki CHECKED BY: [Signature] SEC. CHIEF: [Signature]</p> <p>DATE: 88.10.07</p>	<p>MODEL: 型号 EP-2882</p> <p>DRAWING NO. 図番 MC 314017</p>	<p>1/1</p>
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L-KEY-14A

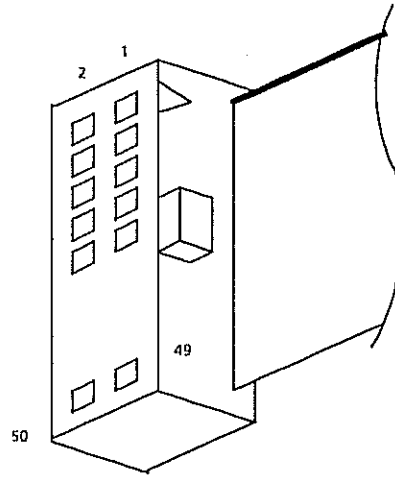
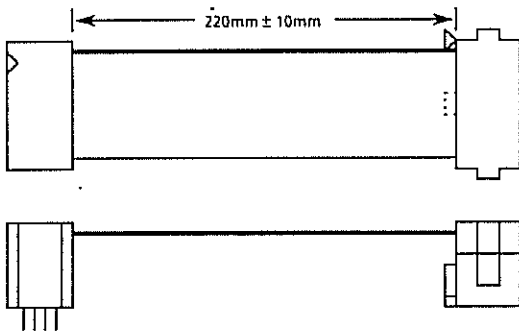


L-KEY-14B



EP-2870 ITF  
J209

EP-2869 Tx & Control  
P208



P208

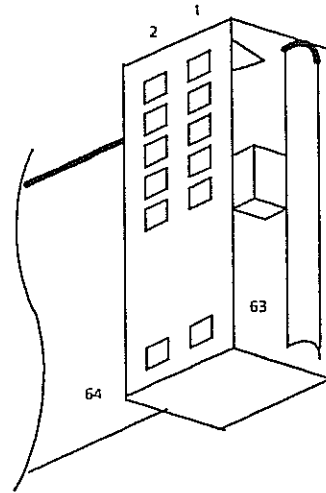
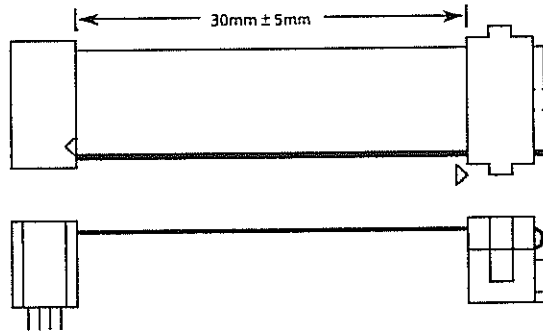
Pin No.	Signal
1	GND
2	15M/
3	15M/
4	GND
5	USBLK/
6	GND
7	USADRS 0
8	USADRS 1
9	USADRS 2
10	USADRS 3
11	USADRS 4
12	USADRS 5
13	USADRS 6
14	USADRS 7
15	FCODE 0
16	FCODE 1
17	FCODE 2
18	GND
19	EN 0/
20	GND
21	EN 1/
22	GND
23	DATA 0
24	DATA 1
25	DATA 2
26	DATA 3
27	DATA 4
28	DATA 5
29	DATA 6
30	DATA 7

Pin No.	Signal
31	VBPST
32	N.C.
33	GND
34	VAP 0
35	VAP 1
36	VAP 2
37	VAP 3
38	VAP 4
39	GND
40	N.C.
41	GAIN
42	NEAR
43	FAR
44	PC 0
45	PC 1
46	PC 2
47	PC 3
48	PC 4
49	PC 6
50	N.C.

<b>Aloka</b>	<b>L-Cable-234</b>
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EP-2870 ITF  
J211

EP-2871 DSC  
P212



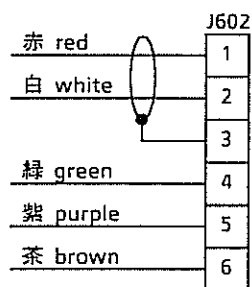
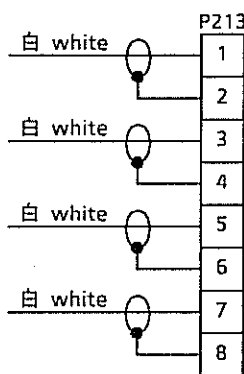
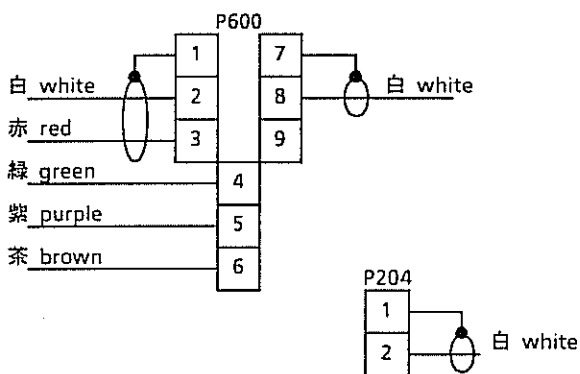
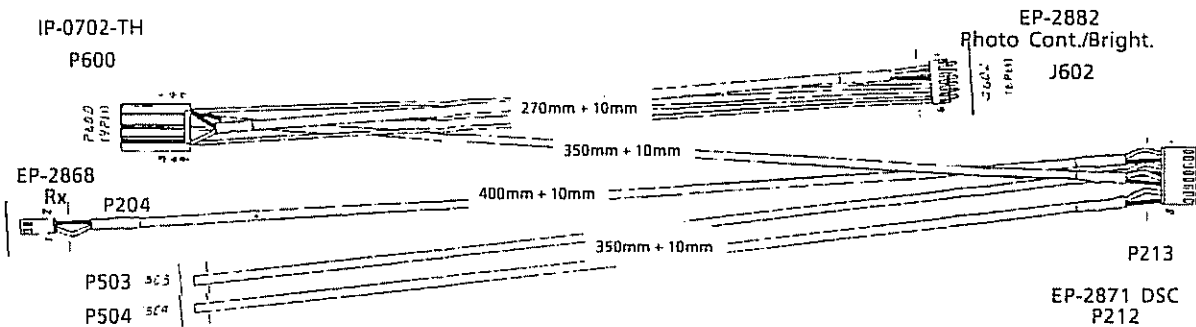
P212

Pin No.	Signal
1	GND
2	GND
3	DATA 0X
4	DATA 1X
5	DATA 2X
6	DATA 3X
7	DATA 4X
8	DATA 5X
9	DATA 6X
10	DATA 7X
11	ADRS 0
12	ADRS 1
13	ADRS 2
14	ADRS 3
15	ADRS 4
16	ADRS 5
17	ADRS 6
18	ADRS 7
19	EN 0X
20	EN 1X
21	RAME
22	RSTX
23	NMIX
24	READ
25	GND
26	E
27	GND
28	US LINE STARTX
29	GND
30	US FRAME ENDX
31	GND
32	US DF AREA
33	GND
34	US BM CODE
35	GND

Pin No.	Signal
36	GND
37	5V
38	5V
39	5V
40	5V
41	5V
42	5V
43	5V
44	5V
45	5V
46	5V
47	GND
48	GND
49	GND
50	GND
51	GND
52	GND
53	GND
54	GND
55	GND
56	GND
57	12V/
58	12V/
59	AGND
60	AGND
61	12V
62	12V
63	AGND
64	AGND

**Aloka**

**L-Cable-235**



Pin No.	Signal
1	PHOTO CONT 1
2	PHOTO CONT 2
3	PHOTO CONT 3
4	PHOTO BRIGHT 1
5	PHOTO BRIGHT 2
6	PHOTO BRIGHT 3
7	AGND
8	TV OUT 0
9	N.C.

Pin No.	Signal
1	US VIDEO
2	GND

Pin No.	Signal
1	PHOTO CONT 3
2	PHOTO CONT 2
3	PHOTO CONT 1
4	PHOTO BRIGHT 1
5	PHOTO BRIGHT 2
6	PHOTO BRIGHT 3

Pin No.	Signal
1	US IN
2	AGND
3	VTR IN
4	AGND
5	TV OUT0
6	AGND
7	TV OU1
8	AGND

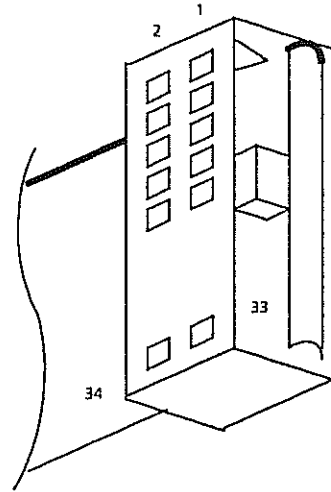
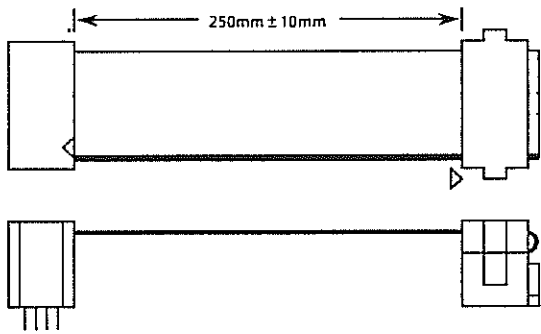
P503

P504

**Aloka** L-Cable-236

EP-2873 Panel Control  
J300

EP-2870 ITF  
P210



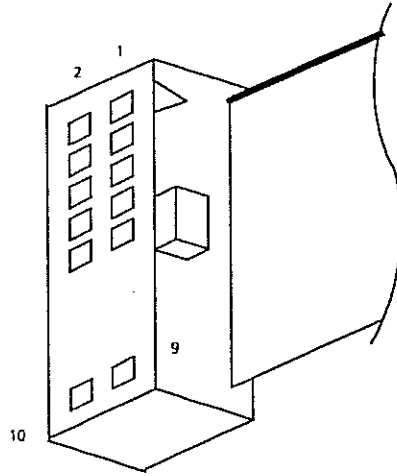
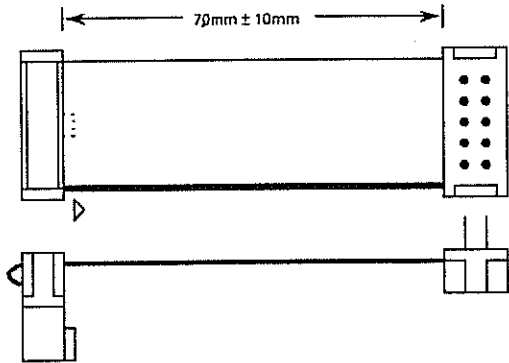
P210

Pin No.	Signal
1	GND
2	DTA 0/
3	DTA 1/
4	DTA 2/
5	DTA 3/
6	DTA 4/
7	DTA 5/
8	DTA 6/
9	DTA 7/
10	GND
11	E
12	GND
13	READ
14	RAME
15	ADRS 0
16	ADRS 1
17	ADRS 2
18	ADRS 3
19	ADRS 4
20	ADRS 5
21	ADRS 6
22	ADRS 7
23	3C00/
24	GND
25	N.C.
26	GND
27	GAIN
28	NEAR
29	FAR
30	GND
31	N.C.
32	N.C.
33	N.C.
34	N.C.

<b>Aloka</b>	<b>L-Cable-236</b>
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EP-2873 Panel Control  
P304

EP-2879  
J305



P304

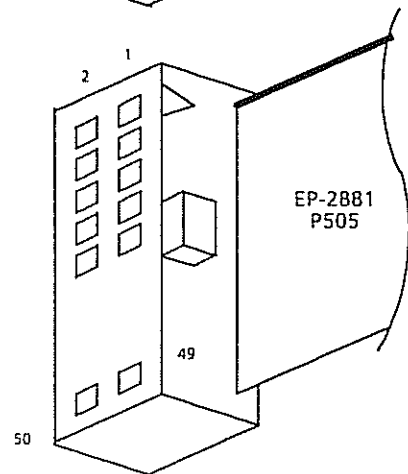
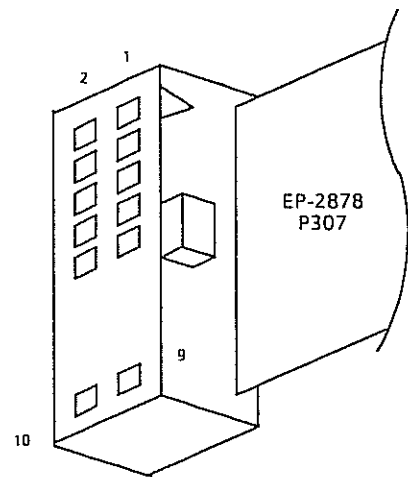
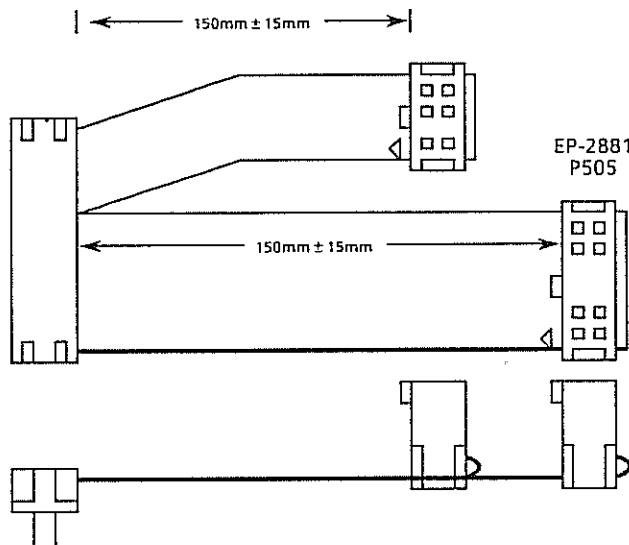
Pin No.	Signal
1	DGND
2	SWD 5/
3	DGND
4	RSW 0
5	RSW 1
6	RSW 2
7	RSW 3
8	RSW 4
9	DGND
10	DGND

**Aloka**

*L-Cable-238*

EP-2873 Panel Control  
J306

EP-2878  
P307



EP-2881 P505

Pin No.	Signal	Pin No. of J306
1	+5V	1
2	DGND	2
3	X+	3
4	X-	4
5	Y+	5
6	Y-	6
7	SWD 2/	7
8	RSW 2	8
9	RSW 3	9
10	RSW 4	10
11	N.C.	11
12	DGND	12
13	DGND	13
14	EXT. V	14
15	DGND	15
16	FFRZ	16
17	DGND	17
18	FCAME	18
19	DGND	19
20	SHUT/	20
21	CPIN	21
22	N.C.	22
23	N.C.	23
24	N.C.	24
25	N.C.	25
26	N.C.	26

EP-2878 P307

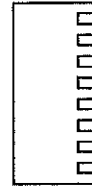
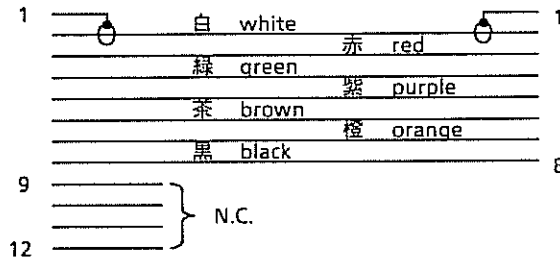
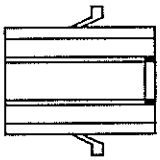
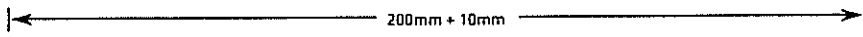
Pin No.	Signal	Pin No. of J306
1	DGND	36
2	BUZ	35
3	AGND	34
4	N.C.	33
5	+12V	32
6	-12V	31
7	AGND	30
8	GAIN	29
9	AGND	28
10	N.C.	27

Aloka

L-Cable-239

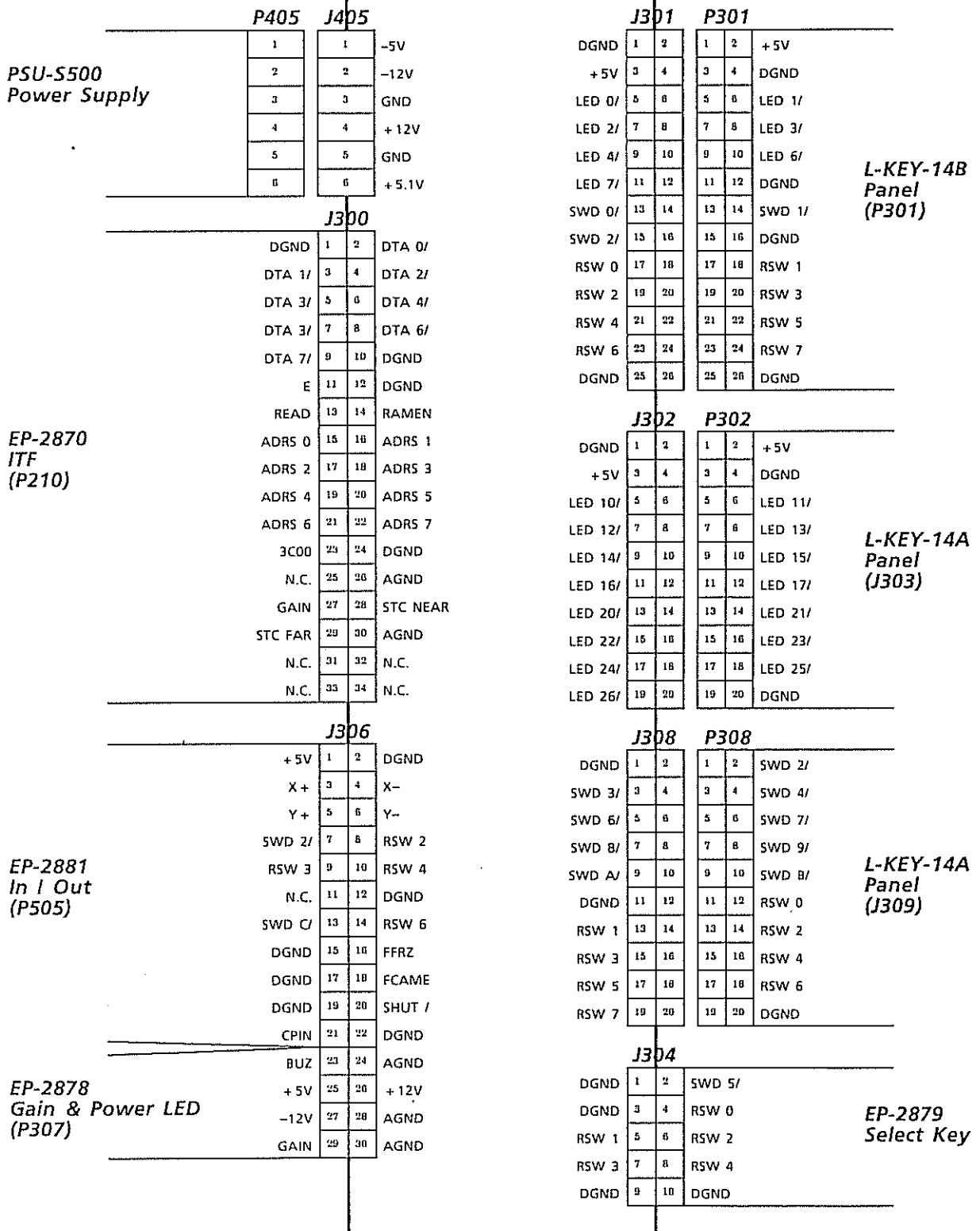
IP-0702-TH  
P601

EP-2880  
Contrast & brightness  
J603



Aloka	L-Cable-240
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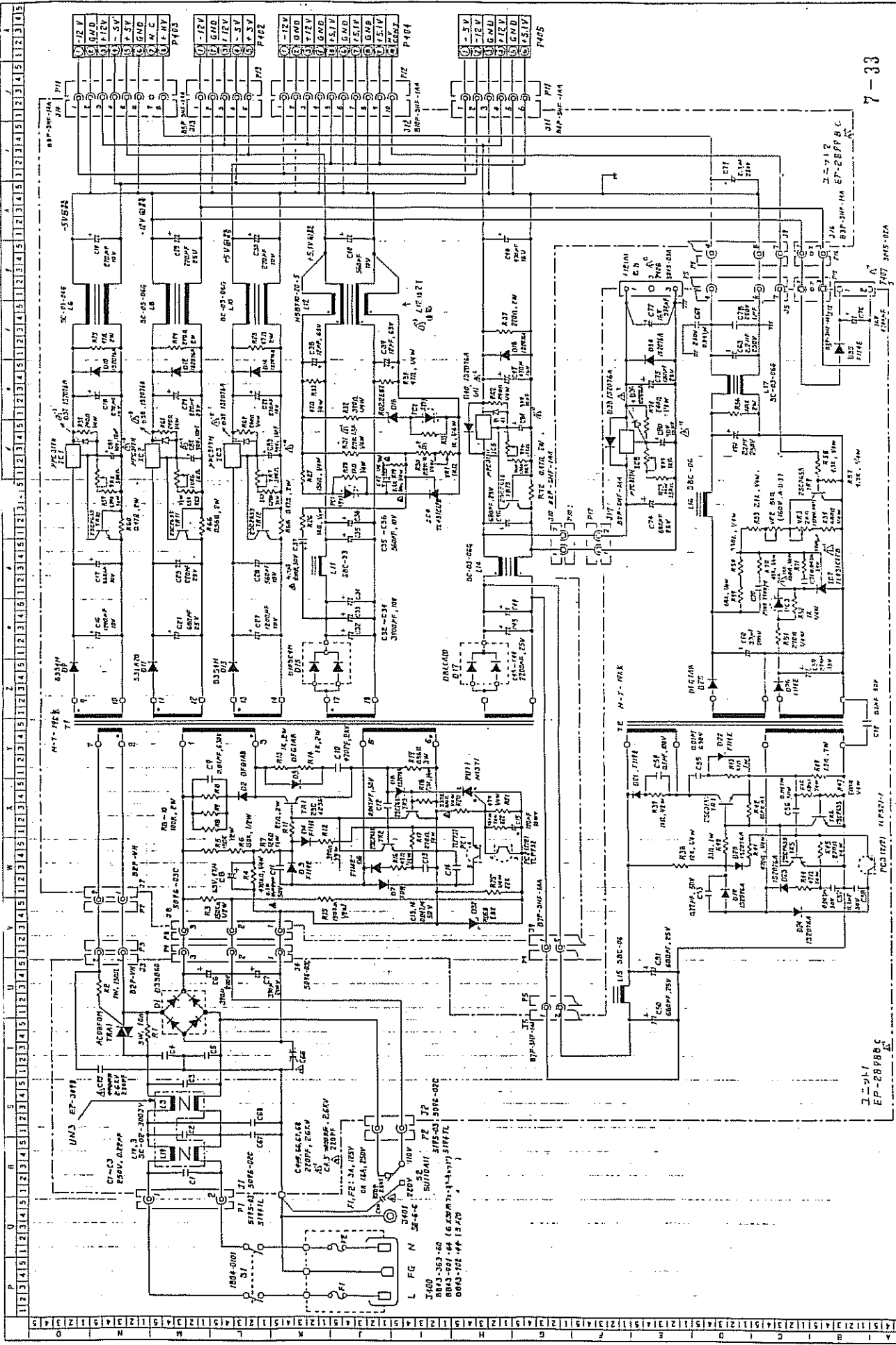
**EP-2873 Panel Control**



<b>Aloka</b>	TITLE	MODEL	<b>1 / 1</b>
	Cable Connection	of EP-2873 Panel Control	



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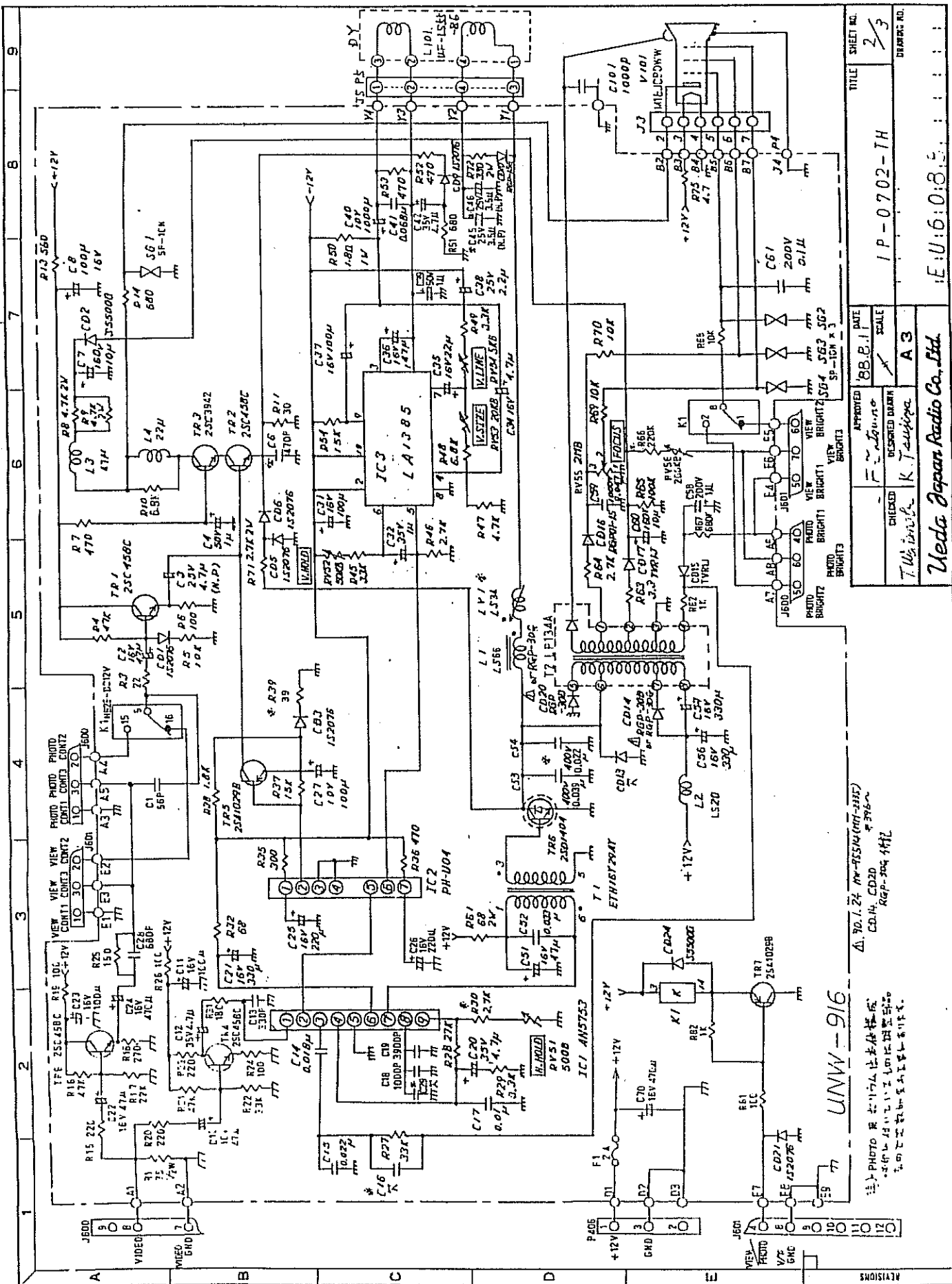
7-33

MODEL 116	REV. 05 81	DATE	REV. 05 81
Alcoa	PSU-5500B	DRAWN BY	CHECKED BY
3RD ANGLE PROJECTION	SCALE 1:1	DATE	DATE
MATERIAL	QUANTITY	BY	DATE

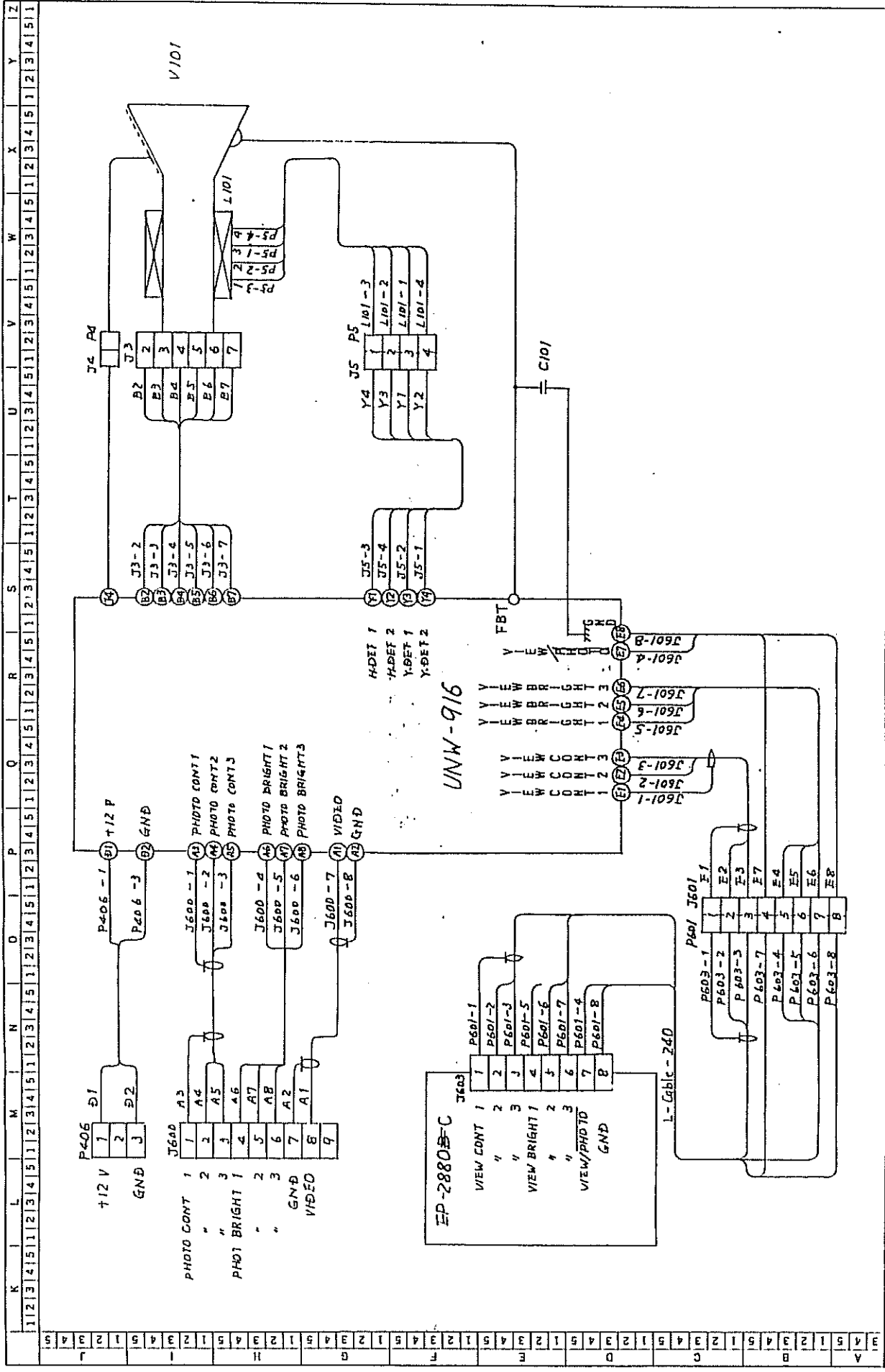
7-33

EP-28988C

1804-0101  
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 1804-0197  
 1804-0198  
 1804-0199  
 1804-0200



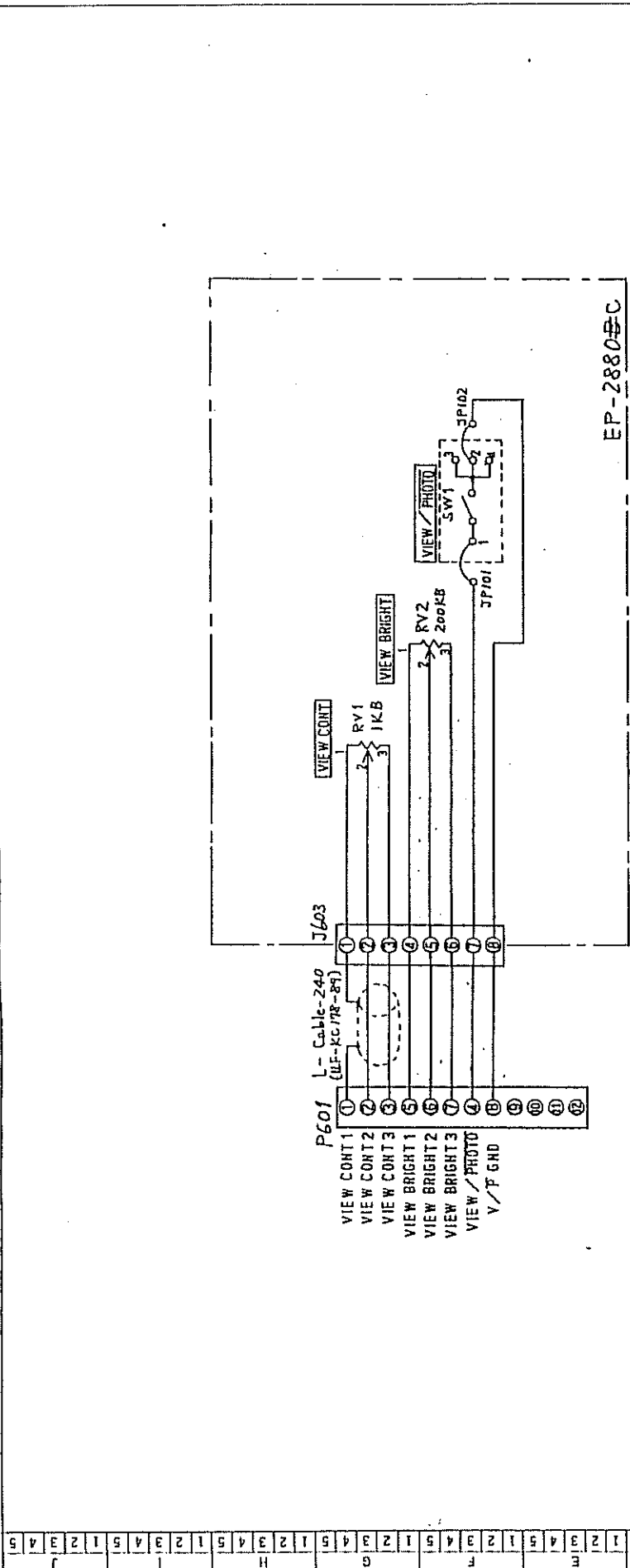
ARRANGE NO.	REVISIONS	DATE	APPROVED	CHECKED	DESIGNED DRAWN	SCALE	TITLE	SHEET NO.
		88.8.1	<i>T. Wajima</i>		<i>K. Taniyama</i>	A 3	IP-0702-TH	2/3
UNW-916						E:U:6:0:8:5		
Meda Japan Radio Co., Ltd.								
Dimension mm								



REVISIONS	TITLE		MODEL	DATE
1	Alpha		IP-0702-TH	1/3
2	3RD ANGLE PROJECTION		DRAWING NO.	EU6088
3	第3角法		DRWING NO.	EU6088
4	SCALE 尺法		CHECKED	
5	UNITS 単位		APPROVED	
6			DATE	
7			SCALE	
8			UNITS	
9			DATE	
10			SCALE	
11			UNITS	
12			DATE	
13			SCALE	
14			UNITS	
15			DATE	
16			SCALE	
17			UNITS	
18			DATE	
19			SCALE	
20			UNITS	
21			DATE	
22			SCALE	
23			UNITS	
24			DATE	
25			SCALE	
26			UNITS	
27			DATE	
28			SCALE	
29			UNITS	
30			DATE	
31			SCALE	
32			UNITS	
33			DATE	
34			SCALE	
35			UNITS	
36			DATE	
37			SCALE	
38			UNITS	
39			DATE	
40			SCALE	
41			UNITS	
42			DATE	
43			SCALE	
44			UNITS	
45			DATE	
46			SCALE	
47			UNITS	
48			DATE	
49			SCALE	
50			UNITS	

△ '90.2.1 (HW-7605 (HW-2440) 38K-9 - 第1号)  
 カメラ仕立作業 (3P1CJ P102) に従って 11.11.15 1UP  
 EP-2880E → EP-2880C

K L M N O P Q R S T U V W X Y



EP-2880C

REVISIONS

MODEL 番号 IP-0702-TH		DRAWING NO. 図番 EU6088	
TITLE 名称 EP-2880C 接続図		DRAWING DESIGNED BY / CHECKED BY / APPROVED BY	
3RD ANGLE PROJECTION 第3角法		SCALE 尺法 1:1	
UNITS 単位 mm		DATE 日付 1970.2.1	
1970.2.1 (HW-94005 UTM-2460) 訂正 (P. 10) → EP-2880C 7-11 仕様変更 (JP101, JP102) に伴って 11.10.20 → EP-2880C			

## SECTION 8 TROUBLE SHOOTING

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## 8-1 Introduction

This trouble shooting is included in this service manual. And it is made in order to assist the repair.

Further, this trouble shooting has been written on the assumption that the repair is done by replacing PCB.

## 8-2 Attention

Please take care of following items in order not to make another trouble.

- (1) Before disconnecting any electrical part ( Probe, PCB, any cable, etc ) , please turn the power switch off certainly.
- (2) In the case of disassembling, use the Disassembling Procedure certainly. Mistake of disassembling will wound and destroy the equipment.
- (3) In the case of measuring the power supply or signal, do it after read manual of the measuring device thoroughly.

[ Caution ] Mistake of operation destroys measures, diagnostic equipment or both.

- (4) The engineer must have knowledge concerning about the correct earth when use the measuring device with the earth. There are many kind of the earth, for Analog, Digital, AC, DC, High voltage and Low voltage. Confirm it.

[ Caution ] The incorrect earth prevents to observe the correct voltage and wave form. And it is possible to burn the measuring device or diagnostic equipment or both.

- (5) When the probe of measuring device contact to the check point, please turn the power switch of firstly.

[ Caution ] Especially, when measure the high voltage, it is possible to destroy the diagnostic equipment or engineer or both.

- (6) In the case of replacing PCBs, please confirm the changeability referring "Section 12 History of improvement". On the other side, if the ROM which is mounted on PCB is different from the original, use the original ROM or choice the correct one according to "History of improvement".

[ Caution ] If the PCB which is not changeability is set to diagnostic equipment, it is possible to burn it. And do not remain the no changeability ROM inside the diagnostic equipment in order to avoid to make another trouble.

- (7) If you cannot judge that the trouble is caused by the defective or not, do not touch the variable register and capacitor. It should be judged by "Section 10 Performance check". If need the readjustment, please refer "Section 9 Alignment procedure".

[ Caution ] The changing condition of volume or switch without thinking may make another trouble.

(8) In the case of contact to technical support, you must tell the following items.

- i) Model name
- ii) Serial number
- iii) History of repair and upgrade, and software version
- iv) Detail of phenomenon ( photograph )
- v) "STATUS"

### 8-3 Tools and Measuring devices

Required tools and measuring devices are followings.

#### 1. Oscilloscope

sensitivity : 5mV / div.  
 frequency width : DC~50MHz  
 maximum voltage : 400V以上

#### 2. Tester

class : 0.5  
 range : ACV, DCV, DCA, Ω

#### 3. Test piece

RMI ( made by Radiation Measurements, INC. )  
 RMI-412

Distributor in japan : ゼネレクス株式会社  
 ☎ 03-470-3970  
 FAX 03-470-5104

#### 4. Probe

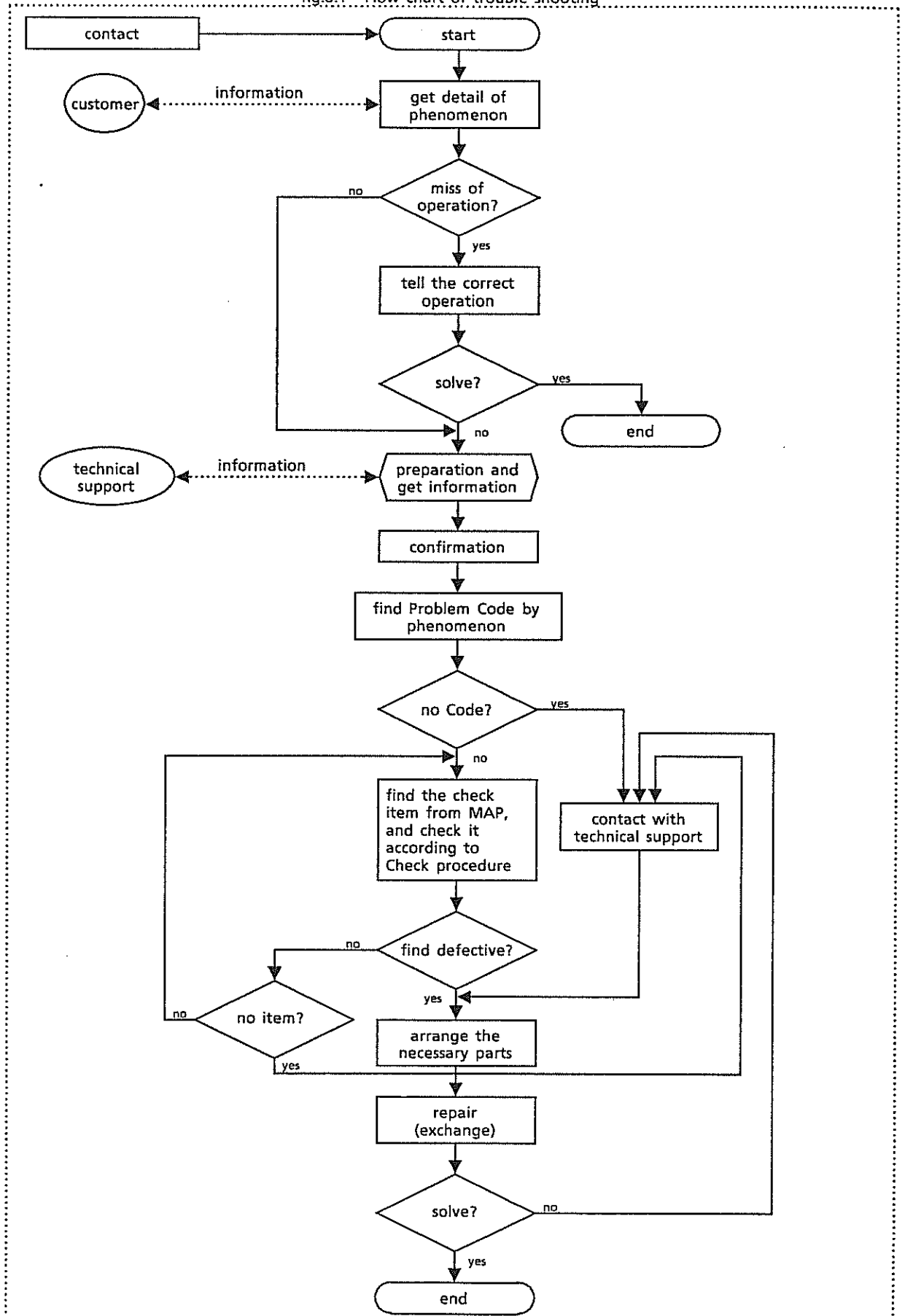
convex : UST-934N -3.5MHz or  
 linear : UST-5024N -3.5MHz

### 8-4 Using method of Trouble shooting

The method is written in fig. 8.1 using the flow chart. This flow chart has made on assumption that the repairing is done by replacing PCB.



fig.8.1 Flow chart of trouble shooting



## 8-5 Information for repairing

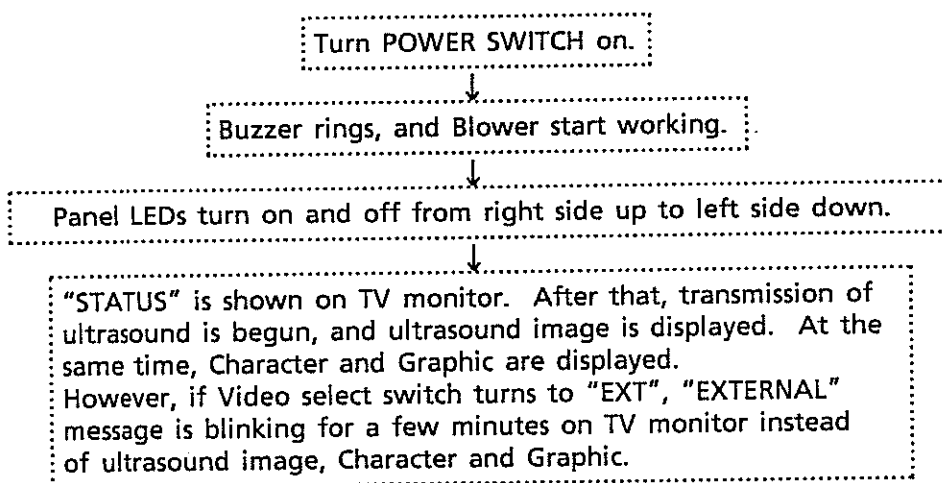
Many function are controlled by MPU (micro Processor Unit ).

The customer can set to some of them. And other can set by service engineer only.

This information has made in order to avoid to misunderstand problem of performance. Please refer this if the phenomenon seems that the problem of performance makes trouble.

### 8-5-1 Automatic setting up

After turning power switch on, MPU is begun to initialize. After this, MPU runs along the following procedure. Finally whole image is displayed.

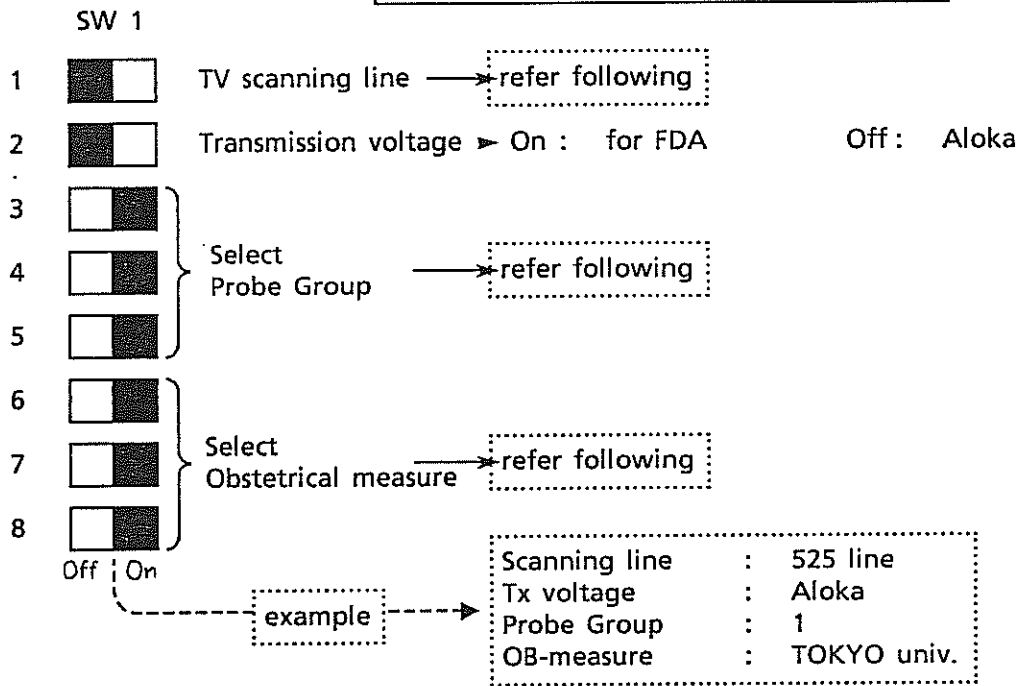


### 8-5-2 Condition of switch on PCB

Many kind of switches which are in order to apply to many kind of specification are on PCBs. Mistake of condition makes missing operation or another trouble.

If this condition has been changed, please set the correct condition referring fig. 8.2.

fig. 8.2 EP-2870 ITF Condition of SW 1



"TV scanning line"

On : 625 lines

Off : 525 lines

CAUTION : In the case of changing, it is necessary to replace EP-2871 DSC PCB which is adapted to number of scanning lines additionally. The detail is shown in "Section 11-3 Technical Information".

"Probe Group"

	Probe Group							
	1	2	3	4	5	6	7	8
3	On	Off	On	Off	On	Off	On	Off
4	On	On	Off	Off	On	On	Off	Off
5	On	On	On	On	Off	Off	Off	Off

CAUTION : In the case of changing, it is necessary to replace the ROM which is set on EP-2871 DSC additionally. The detail is shown in "Section 8-5-7 Location of ROM".

"Obstetrical Measurement"

	Obstetrical Measurement							
	Tokyo univ.	Osaka univ.	HANSMANN	Corometrics	CAMPBELL			
6	On	Off	On	Off	On	Off	On	Off
7	On	On	Off	Off	On	On	Off	Off
8	On	On	On	On	Off	Off	Off	Off

NOTE : In this case, it is not necessary to replace any more.

### 8-5-3 How to use the user function

In the case of SSD-500, the user function is only TIME and DATE. These data are memorized into RAM ( Random Access Memory ) which is back upped by backup battery. The ordinary operation does not erase these data. However, it is possible to replace or erase these data when repairing or modification is done.

If back upped data is changed, reset the RAM according to the procedure that written in 8-5-5.

[ Reference ] The backup RAM is mounted on EP-2872 CPU. And battery for backup is also mounted on same PCB.

#### HOSPITAL NAME

This function is not available.

#### DATE & TIME (FORMAT)

- 1 Push the "MENU" switch.
- 2 Change the page, and select [DATE].
- 3 If date, select [DATE]. If time, select [TIME].
- 4 Input the correct date or time from full key board.
- 5 Push [SET].

Every pushing [FORMAT], the form of date displaying changes.

#### PRESET FUNCTION

This function is not available.

#### OBSTETRICAL MEASUREMENT TABLE

The table is set by switch which is inside of equipment. The customer cannot choose which kind of table.

## 8-5-4 Attention of connecting optional units

In the case of connecting the optional units, please confirm the following table (8.1) because some optional units require other PCBs.

tbl. 8.1 SSD-500 and optional units

	Unit (option)	Content(s)
	SSD-500      Ultrasound diagnostic equipment	Diagnostic part Main body            USI-115 Cable for power supply CP-101      (100V) CP-104      (200V) CP-107      (USA) Cable for earth    NCC-0850 (except USA) Overlay sheet for operation panel MP-SH-500* ( J : Japanese ) ( E : English ) Probe Electric convex probe UST-934N-3.5 Accessory FUSE                313003      (100V) 313015      (200V) Consumption Echo jelly        GEL-SCAN-PS (domestic) Ultrasound gel 21708308 (export) Document Operation manual        MN1-0306 Installation procedure    MS5-0201 PCB list                 (only for USA)
☆	Cart	RMT-500
☆	Gun type camera	ACR-500-P
☆	ECHO COPIA	SSZ-300      ( for 525 lines ) SSZ-300E    ( for 625 lines )
☆	Camera	SSZ-108-P
☆	Camera adapter for 35mm	SSZ-108-35
☆	Track ball unit	TBU-500
☆	Plug receptacle	MP-2720      (AC 100V) MP-2720U     (AC 200V) These are for RMT-500.
☆	Foot switch	MP-2345
☆	Triple foot switch	MP-2614
☆	9 inch monitor	DIS-3                    This is for RMT-500.

☆ mark means that the unit is optional.

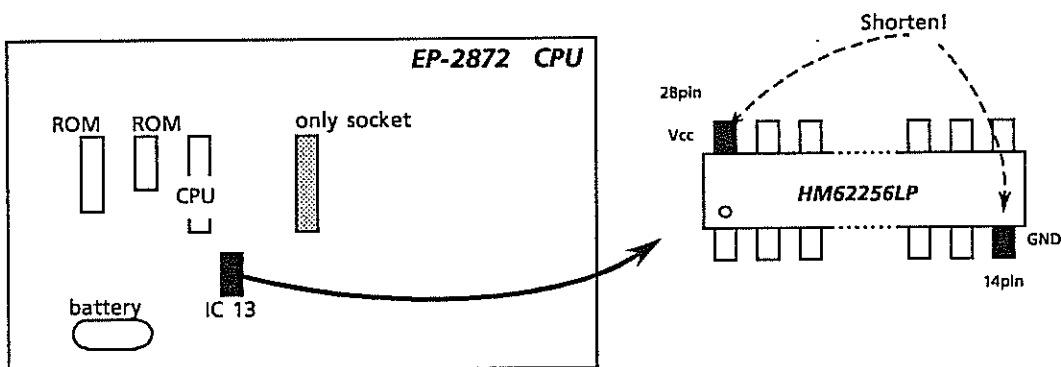
### 8-5-5 How to reset Backup RAM

SSD-500 has the backup function in order to data of time and date always. The ordinary operation never makes a necessary to reset it. However, in the case of followings, please reset it according to the procedure ( fig. 8.3 ).

[ Caution ] Before reset the RAM, memorize the data ( for example, the format of date ) .

- 1) In the case of modification of software.
- 2) In the case of unnecessary character displaying.
- 3) in the case of locking up of system.  
( This is a temporary step to solve this problem. And in this case, the previous data cannot be memorized. )

fig. 8.3 How to reset the RAM



Reset the RAM according to followings.

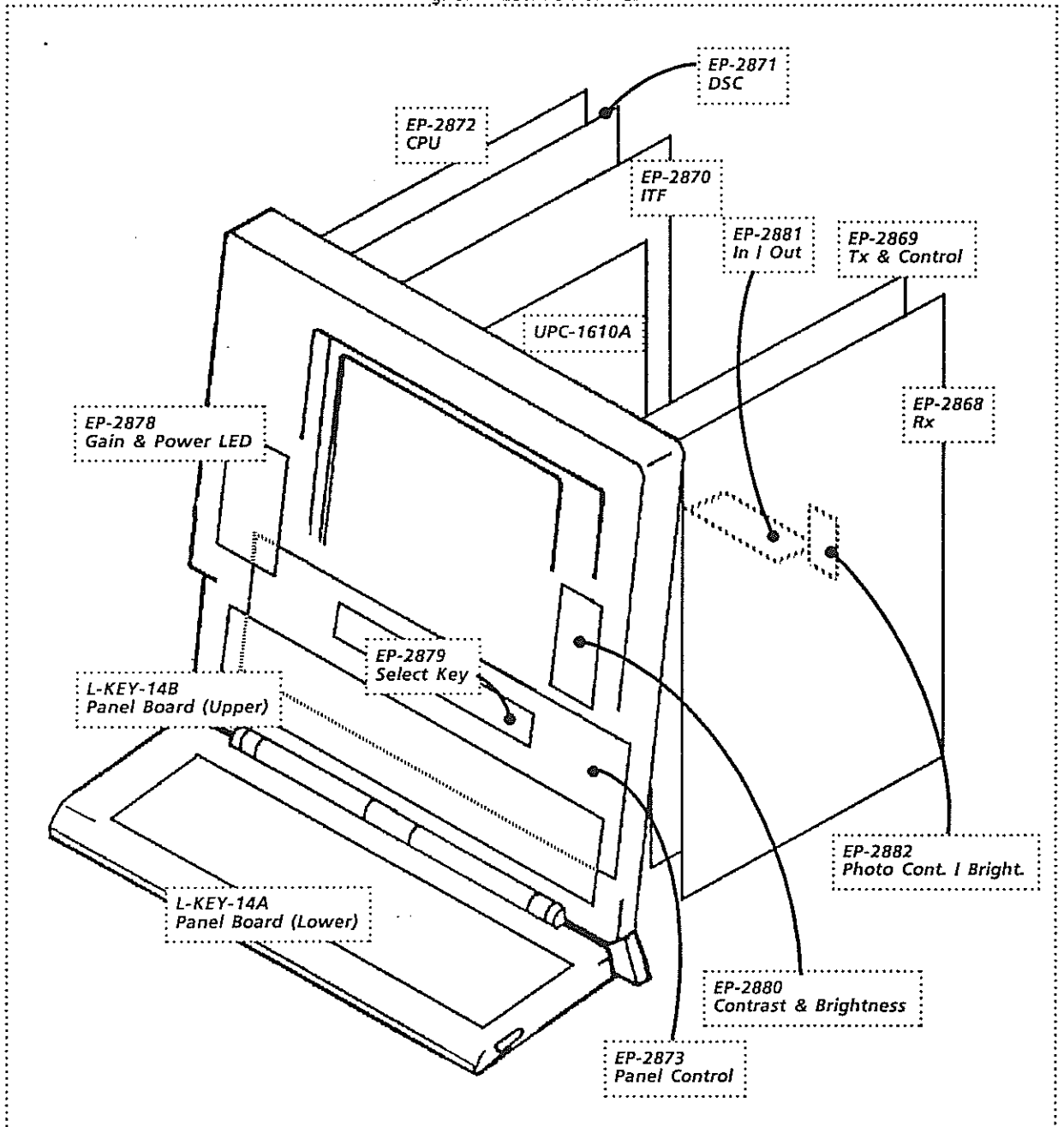
**At first, turn the power switch off.**

1. Remove the cover according to the disassembling procedure.
2. Between 14pin and 28pin of "IC 13" which is mounted on EP-2872 CPU should be shorten for a few minutes.
3. Set the cover.

## 8-5-6 Location of PCBs

The location of PCBs are shown in fig. 8.4. Please refer for repair or modification.

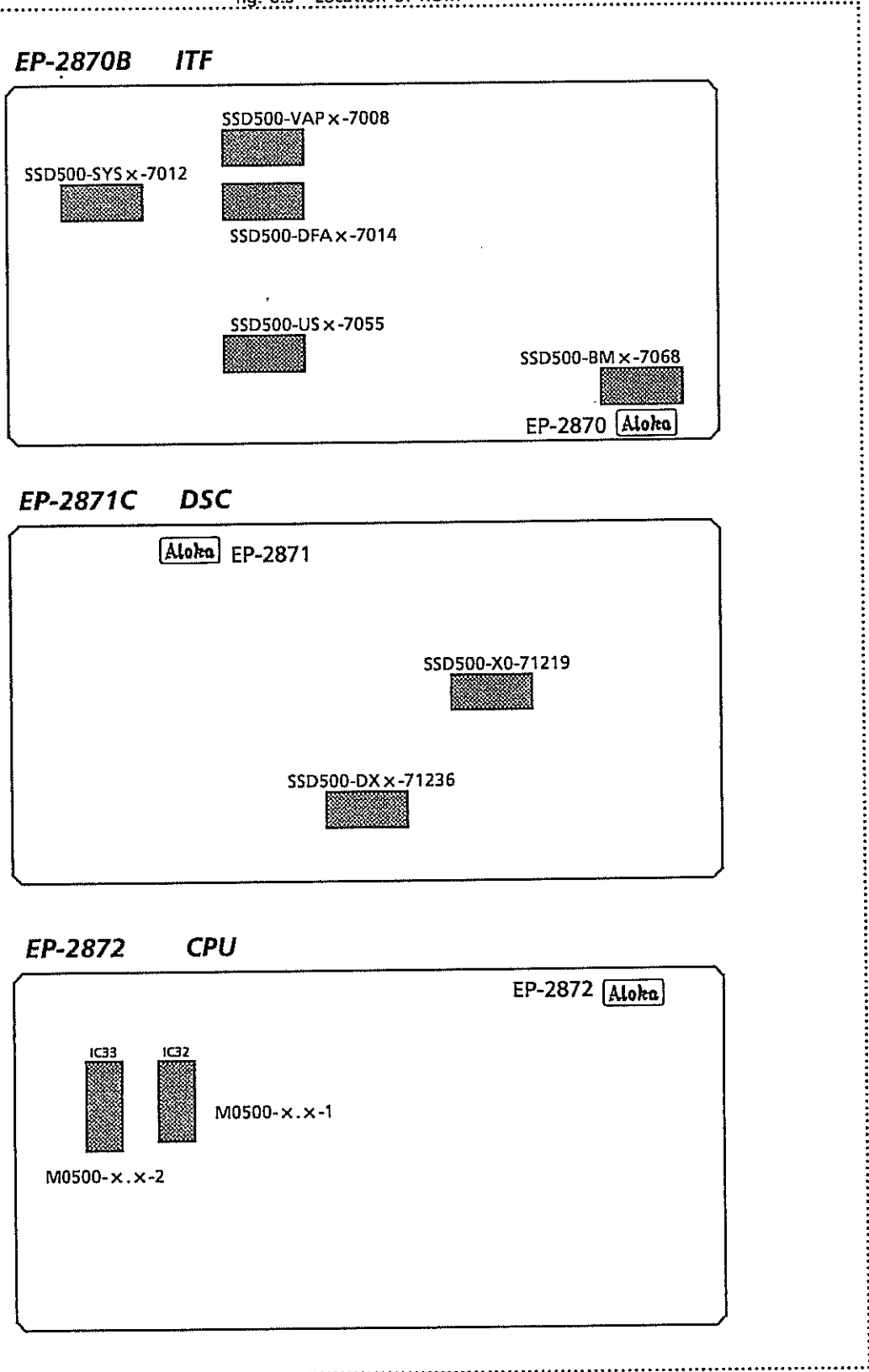
fig. 8.4 Location of PCB



8-5-7 Location of ROMs

The location of ROMs is shown in fig. 8.5. Please refer for replacing the ROMs on modification.

fig. 8.5 Location of ROM



ROMs with the socket are shown. The location will be different from the new version of PCB.



## 8-5-8 Disposition of locking up

If this system does not work or work abnormally, this trouble shooting is meaningless. In this case, referring the following items, please try to repair it.

- (1) First, check the output voltage from the power supply unit.  
The system of this equipment is controlled by MPU which is mounted on EP-2872 CPU. If +5V for MPU is not applied to MPU, it never works and whole of system also does not work.

And if the output voltage is normal, the breaking of the power supply cable can be thought. So the checking on PCB is recommend.

The PCB which has MPU is following.

EP-2872 CPU

- (2) Trouble of BUS signal  
If Bus signal seems abnormal, it is difficult to find defective point. In the case of locking up of the system, please try to repair it referring the following table (tbl. 8.2). And we advise you to contact to technical support as soon as possible.

The followings are explanation of signals which are shown in the table.

ADRS : Address bus of MPU which controls whole system.  
DATA : Data bus of MPU which controls whole system.  
DTA : Data bus for operation panel.  
GEUD : Data bus which controls Tx & Rx.

tbl. 8.2 BUS signal

PCB	Name	ADRS	DATA	DTA	GEUD
EP-2873	Panel Control			↔	
EP-2872	CPU	→	↔		
EP-2871	DSC	←	↔		
EP-2870	ITF	←	↔	↔	→
EP-2869	Tx & Control				←
EP-2868	Rx				

→ : BUS signal is outputted from this PCB.

← : BUS signal is inputted to this PCB.

↔ : BUS signal is bi directional.

## 8-6 PCB ( Check ) List Map

PCB ( Check ) List Map has four items. These are "Problem Code Table", "MAP", "Check Procedure" and "Wave form diagram".

In this "Problem Code Table", any case of trouble are coded as Problem Code. And in "MAP", that Problem Code shows PCB or check point which has possibility to make the trouble.

These should be used according to following procedure.

Find the Problem Code at "Problem Code Table".



Find the Check Code using the Problem Code at "MAP".

"Problem Code Table" is divided by followings, and each table are named after its function.

Ultrasound image	----	US
Character & Graphic	----	CG
Timing & Monitor	----	TM
Power supply, Recording and Volume	----	PM
Total function	----	FU
Physiological unit	----	EU
Doppler unit	----	DP
Color displaying	----	CD

In "Problem Code Table", mark ○ means that the phenomenon is applied to this diagnostic equipment.

And In "MAP", mark ● shows the supposed check point.

### 8-6-1 Problem Code Table

This table has some case of trouble. Some trouble which may be front of you do not exist in this table according to circumstances. In that case, using any informations that are written in this manual and your brain, try to solve the problem.

**Ultrasound Image**

Problem Code		Aply.	Problems
<b>US-1</b>	<b>1</b>	<input type="radio"/>	US Image is not all displayed.
	<b>2</b>	<input type="radio"/>	US image is not all displayed in a particular MODE.
	<b>3</b>		US image is not all displayed only for LINEAR ( or CONVEX ).
	<b>4</b>		US image is not all displayed only for MECHANICAL SECTOR.
	<b>5</b>		US image is not all displayed only for PHASED ARRAY.
	<b>6</b>		Only particular US image is not displayed in multiples US image displays.
<b>US-2</b>	<b>1</b>	<input type="radio"/>	Display of US image area become white.
<b>US-3</b>	<b>1</b>	<input type="radio"/>	Unwanted dots or lines are displayed in US image area.
	<b>2</b>	<input type="radio"/>	Regular horizontal or vertical stripes are displayed in US image area .
<b>US-4</b>	<b>1</b>	<input type="radio"/>	Lacks of ECHO are displayed in LINEAR ( or CONVEX ).
	<b>2</b>		Lacks of ECHO are displayed in MECHANICAL SECTOR.
	<b>3</b>		Lacks of ECHO are displayed in PHASED ARRAY.
<b>US-5</b>	<b>1</b>	<input type="radio"/>	Noises are seen on the US image in LINEAR ( or CONVEX )
	<b>2</b>		Noises are seen on the US image in MECHANICAL SECTOR.
	<b>3</b>		Noises are seen on the US image in PHASED ARRAY.
	<b>4</b>		Noises are seen on the US image in all US images.
<b>US-6</b>	<b>1</b>	<input type="radio"/>	Sensitivity of US image is low in LINEAR ( or CONVEX ).
	<b>2</b>		Sensitivity of US image is low in MECHANICAL SECTOR.
	<b>3</b>		Sensitivity of US image is low in PHASED ARRAY.
	<b>4</b>		Sensitivity of US image is low in all US images.
<b>US-7</b>	<b>1</b>	<input type="radio"/>	Same as depth band is difference brightness in US image.
<b>US-8</b>	<b>1</b>	<input type="radio"/>	Image varies as if enhanced, without gradation.
	<b>2</b>	<input type="radio"/>	US image becomes moire in SECTOR (MECHANICAL, PHASED ARRAY), CONVEX.
<b>US-9</b>	<b>1</b>	<input type="radio"/>	Form of US image is abnormally displayed.
<b>US-10</b>	<b>1</b>	<input type="radio"/>	Unwanted multiples of US image are displayed in LINEAR ( or CONVEX ).
	<b>2</b>		Unwanted multiples of US image are displayed in MECHANICAL SECTOR.
	<b>3</b>		Unwanted multiples of US image are displayed in PHASED ARRAY.
	<b>4</b>		Unwanted multiples of US image are displayed in all US images.

○:Marked items are effective on this system.

**Charic, Graphic**

Problem Code		Aply.	Problems
<b>CG-1</b>	<b>1</b>	<input type="radio"/>	Characters are displayed in the entire screen.
<b>CG-2</b>	<b>1</b>	<input type="radio"/>	Only Caliper, Graphic are not displayed.
	<b>2</b>	<input type="radio"/>	Only Caliper, Graphic are abnormally displayed.
<b>CG-3</b>	<b>1</b>	<input type="radio"/>	The entire screen become white.
	<b>2</b>	<input type="radio"/>	Unwanted dots or stripes are displayed in all or parts of image.
<b>CG-4</b>	<b>1</b>	<input type="radio"/>	TIME and DATE are abnormally displayed.
<b>CG-5</b>	<b>1</b>	<input type="radio"/>	Characters are not displayed, key in cannot be made.
	<b>2</b>	<input type="radio"/>	Characters are abnormally displayed.
<b>CG-6</b>	<b>1</b>	<input type="radio"/>	Measured value is not correct.

○:Marked items are effective on this system.

**Timing, Monitor**

Problem Code		Aply.	Problems
<b>TM-1</b>	<b>1</b>	<input type="radio"/>	All images are not displayed in any Monitor.
	<b>2</b>	<input type="radio"/>	Image is not displayed in a particular Monitor.
<b>TM-2</b>	<b>1</b>	<input type="radio"/>	All Image are not synchronized in any Monitor.
	<b>2</b>	<input type="radio"/>	Image is not synchronized in a particular Monitor.
<b>TM-3</b>	<b>1</b>	<input type="radio"/>	Entire image shake. Abnormality is seen when brightness varies in any Monitor.
	<b>2</b>	<input type="radio"/>	Entire image shake in a particular Monitor. Abnormality is seen.

○:Marked items are effective on this system.

**Function**

Problem Code		Aply.	Problems
<b>FU-1</b>	<b>1</b>	<input type="radio"/>	System locks up, or panel information is not accepted.

○:Marked items are effective on this system.

**Power supply, Record, Switch, Control**

Problem Code		Aply.	Problems
<b>PM-1</b>	<b>1</b>	<input type="radio"/>	Power output is not present, or abnormally outputted.
<b>PM-2</b>	<b>1</b>	<input type="radio"/>	Switches and/or Controls are inoperative.
	<b>2</b>	<input type="radio"/>	Switches and/or Controls are abnormally operated.
	<b>3</b>	<input type="radio"/>	Camera shutter is inoperative.
<b>PM-3</b>	<b>1</b>	<input type="radio"/>	Photographed picture is not normal (Monitor is normal).
	<b>2</b>	<input type="radio"/>	Played back image is abnormally displayed (usual image is normal ).
<b>PM-4</b>	<b>1</b>		All images are not recorded in Recorder ( Recorder is normal ).
	<b>2</b>		All images are not recorded in Recorder ( Recorder is abnormal ).
	<b>3</b>		Image is abnormally recorded in Recorder ( Recorder is normal ).
	<b>4</b>		Image is abnormally recorded in Recorder ( Recorder is abnormal ).

○:Marked items are effective on this system.

8-6-2 MAP

In this "Problem Code" of "MAP", the blank columns are not applied to this diagnostic equipment.

Video Casette Recorder		D7																					
Camera	SSZ-108	D6																					
9 inch monitor	DIS-3	D5																					
ECHO COPIA	SSZ-300	D4																					
Cart	RMT-500	D3																					
Gun type camera	ACR-500	D2																					
Track ball	TBU-500	D1																					
CPU	EP-2872	C5																					
DSC	EP-2871	C4	●	●							●												
ITF	EP-2870	C3	●	●								●									●		
Tx & Control	EP-2869	C2	●								●	●									●		
Rx	EP-2868	C1	●									●									●		
Panel Control	EP-2873	B7																					
Photo Cont / Bright.	EP-2882	B6																					
In / Out	EP-2881	B5																					
Contrast & Brightness	EP-2880	B4																					
Select Key	EP-2879	B3																					
Gain & Power LED	EP-2878	B2																					
Panel Board	L-KEY-14A,B	B1		●																			
Probe		A5																			●		
Viewing monitor	IP-0702-TH	A4																					
Power supply	PSU-S500	A3	●	●																			
External noise factor		A2										●	●										
Operation		A1	●																				
<i>PCB &amp; Check List</i>	<i>Check Code</i>	<i>Problem Code</i>	<b>US</b>																				
			<b>1</b>					<b>2</b>	<b>3</b>			<b>4</b>											
			<b>1</b>	<b>2</b>					<b>1</b>	<b>1</b>	<b>2</b>	<b>1</b>											

Video Cassette Recorder		D7																			
Camera	SSZ-108	D6																			
9 inch monitor	DIS-3	D5																			
ECHO COPIA	SSZ-300	D4																			
Cart	RMT-500	D3																			
Gun type camera	ACR-500	D2																			
Track ball	TBU-500	D1																			
CPU	EP-2872	C5																			
DSC	EP-2871	C4	●														●			●	
ITF	EP-2870	C3																		●	
Tx & Control	EP-2869	C2	●							●											
Rx	EP-2868	C1	●							●											
Panel Control	EP-2873	B7																			
Photo Cont / Bright.	EP-2882	B6																			
In / Out	EP-2881	B5																			
Contrast & Brightness	EP-2880	B4																			
Select Key	EP-2879	B3																			
Gain & Power LED	EP-2878	B2									●										
Panel Board	L-KEY-14A,B	B1																			
Probe		A5	●																		
Viewing monitor	IP-0702-TH	A4																			
Power supply	PSU-S500	A3										●									
External noise factor		A2	●																		
Operation		A1											●								
<b>PCB &amp; Check List</b>		<b>Check Code</b>	<b>US</b>																		
			5			6			7		8		9								
			1						1				1	1						1	
		<b>Problem Code</b>																			

Video Cassette Recorder		D7																	
Camera	SSZ-108	D6																	
9 inch monitor	DIS-3	D5																	
ECHO COPIA	SSZ-300	D4																	
Cart	RMT-500	D3																	
Gun type camera	ACR-500	D2																	
Track ball	TBU-500	D1																	
CPU	EP-2872	C5						●	●	●	●	●	●	●	●	●	●	●	●
DSC	EP-2871	C4	●																
ITF	EP-2870	C3	●																
Tx & Control	EP-2869	C2																	
Rx	EP-2868	C1																	
Panel Control	EP-2873	B7																	
Photo Cont / Bright.	EP-2882	B6																	
In / Out	EP-2881	B5																	
Contrast & Brightness	EP-2880	B4																	
Select Key	EP-2879	B3																	
Gain & Power LED	EP-2878	B2																	
Panel Board	L-KEY-14A,B	B1															●		
Probe		A5																	
Viewing monitor	IP-0702-TH	A4																	
Power supply	PSU-S500	A3																	
External noise factor		A2																	
Operation		A1															●	●	
<i>PCB &amp; Check List</i>	<i>Check Code</i>	<i>Problem Code</i>	<b>US</b>					<b>CG</b>											
			<b>10</b>					<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>							
			<b>1</b>					<b>1</b>	<b>1</b>	<b>2</b>	<b>1</b>	<b>2</b>	<b>1</b>	<b>1</b>	<b>2</b>				



Video Casette Recorder		D7												
Camera	SSZ-108	D6												●
9 inch monitor	DIS-3	D5			●		●		●					
ECHO COPIA	SSZ-300	D4												●
Cart	RMT-500	D3												
Gun type camera	ACR-500	D2												
Track ball	TBU-500	D1												
CPU	EP-2872	C5	●	●						●				
DSC	EP-2871	C4		●		●		●		●				
ITF	EP-2870	C3								●				
Tx & Control	EP-2869	C2												
Rx	EP-2868	C1												
Panel Control	EP-2873	B7								●		●	●	●
Photo Cont / Bright.	EP-2882	B6										●		
In / Out	EP-2881	B5												●
Contrast & Brightness	EP-2880	B4		●								●	●	
Select Key	EP-2879	B3										●	●	
Gain & Power LED	EP-2878	B2										●	●	
Panel Board	L-KEY-14A,B	B1										●	●	●
Probe		A5												
Viewing monitor	IP-0702-TH	A4			●		●		●					
Power supply	PSU-S500	A3		●							●	●	●	●
External noise factor		A2												
Operation		A1	●	●								●		
PCB & Check List	Check Code	Proble Code	CG	TM						FU	PM			
			6	1	2	3	1	1	2					
			1	1	2	1	2	1	1	1	2	3		

Video Cassette Recorder		D7	●	●													
Camera	SSZ-108	D6	●														
9 inch monitor	DIS-3	D5															
ECHO COPIA	SSZ-300	D4	●														
Cart	RMT-500	D3															
Gun type camera	ACR-500	D2															
Track ball	TBU-500	D1															
CPU	EP-2872	C5															
DSC	EP-2871	C4		●													
ITF	EP-2870	C3															
Tx & Control	EP-2869	C2															
Rx	EP-2868	C1															
Panel Control	EP-2873	B7															
Photo Cont / Bright.	EP-2882	B6															
In / Out	EP-2881	B5															
Contrast & Brightness	EP-2880	B4															
Select Key	EP-2879	B3															
Gain & Power LED	EP-2878	B2															
Panel Board	L-KEY-14A,B	B1															
Probe		A5															
Viewing monitor	IP-0702-TH	A4															
Power supply	PSU-S500	A3															
External noise factor		A2															
Operation		A1	●	●													
PCB & Check List	Check Code	Problem Code	PM				EU										
			3	4			1	2									
			1	2													

## 8-7 Wave form diagram for trouble shooting

### 8-7-1 Introduction

This wave form diagram is shown as reference in order to find the defective PCB in a stage of trouble shooting.

All of wave form can be observed at check point which is named "TP".

### 8-7-2 Attention

This is only reference for trouble shooting. Therefore this wave form must not be used for readjustment.

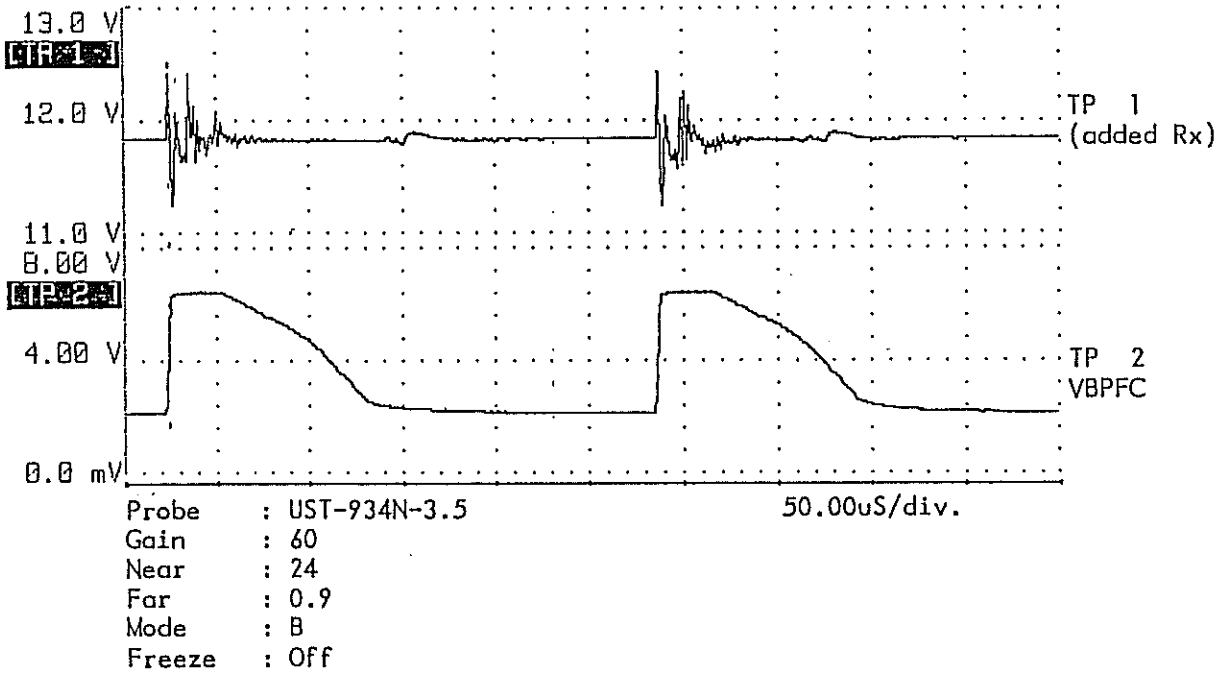
This wave form have observed by Logic Analyzer. Therefore it is different from the wave form which is observed by oscilloscope.

The location of check point is shown in "Section 13 PARTS LIST".

8-7-3 Rx

EP-2868

Condition is shown under the wave form.

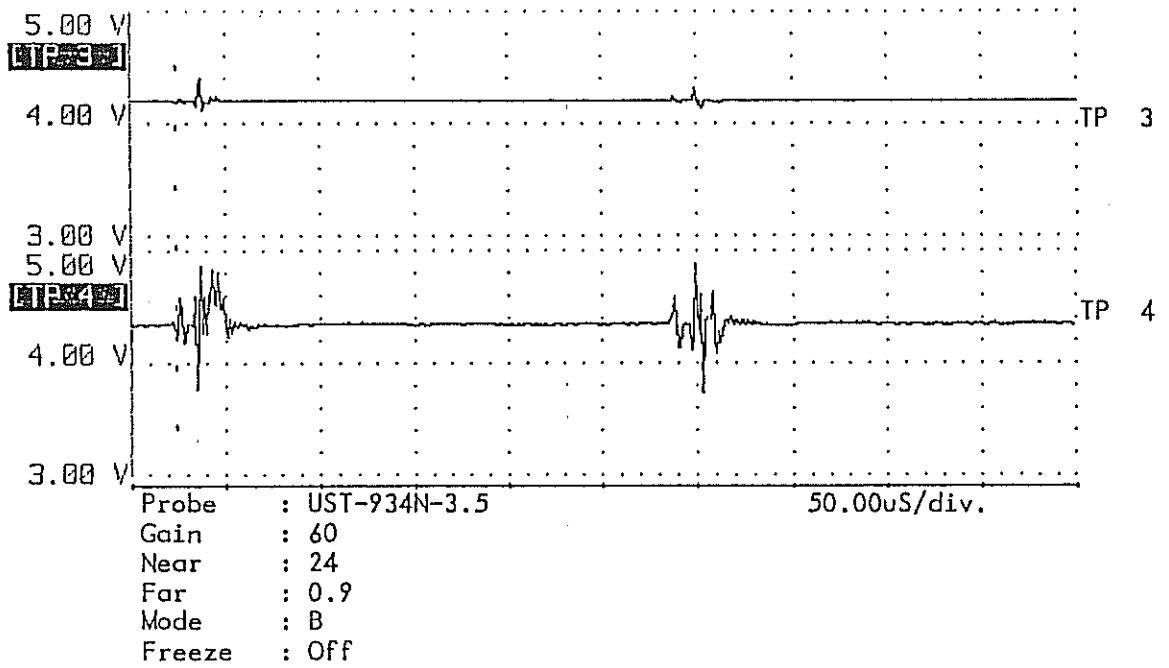


Memo.

Rx

EP-2868

Condition is shown under the wave form.

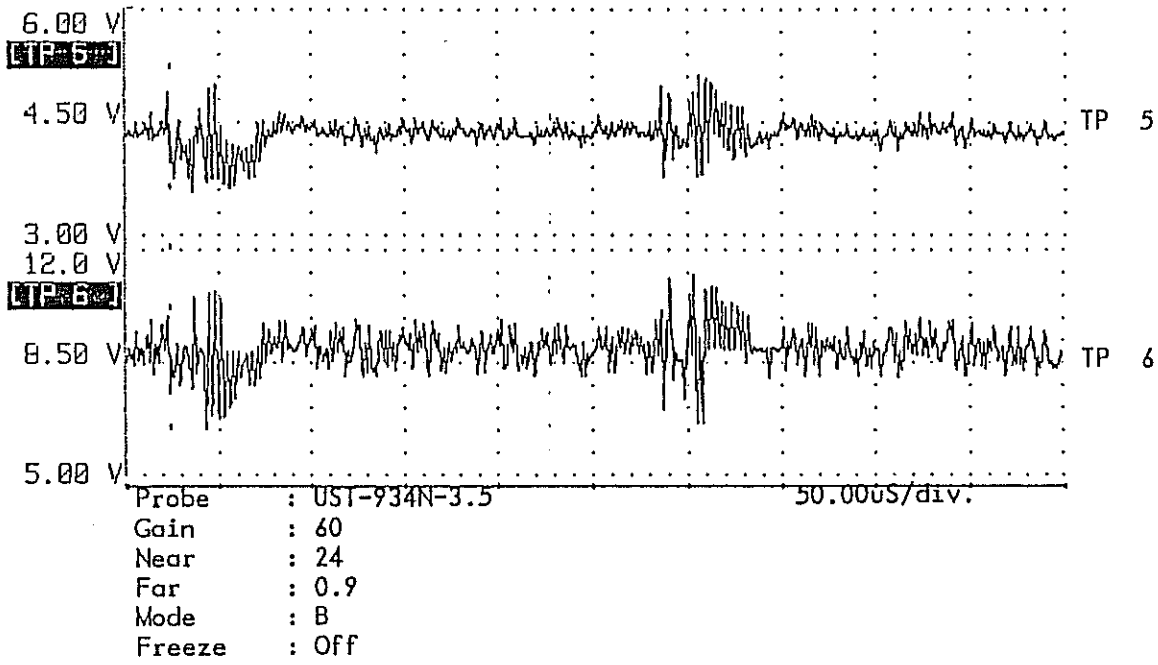


Memo.

Rx

EP-2868

Condition is shown under the wave form.

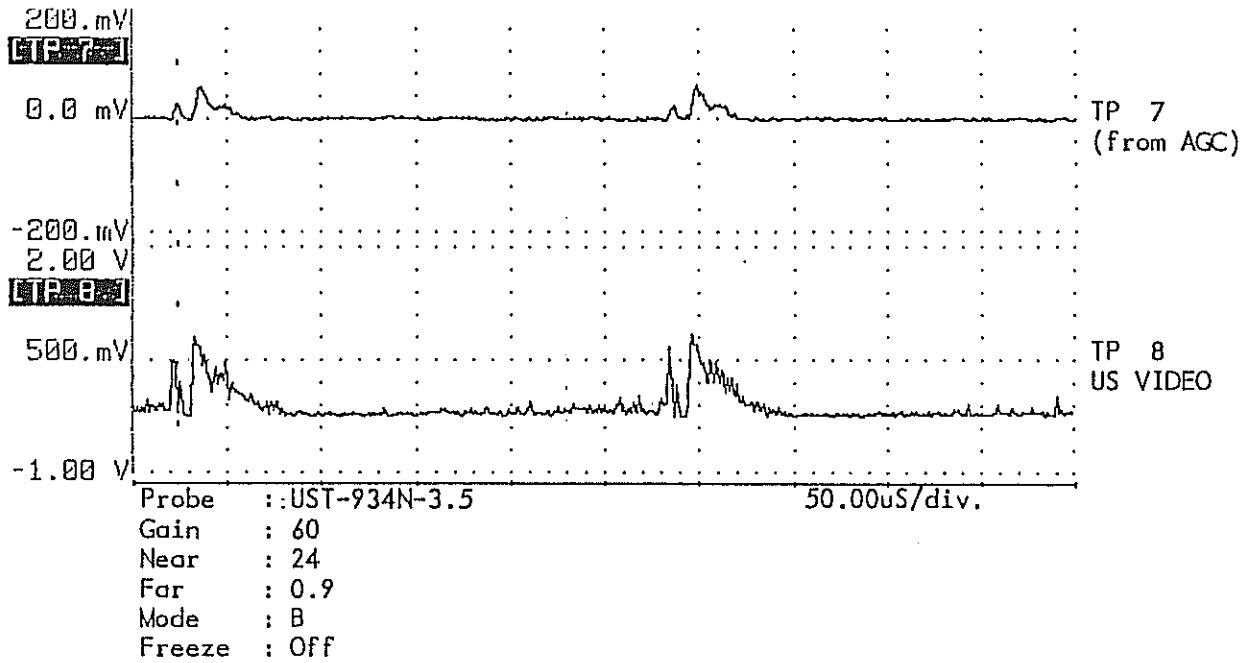


Memo.

Rx

EP-2868

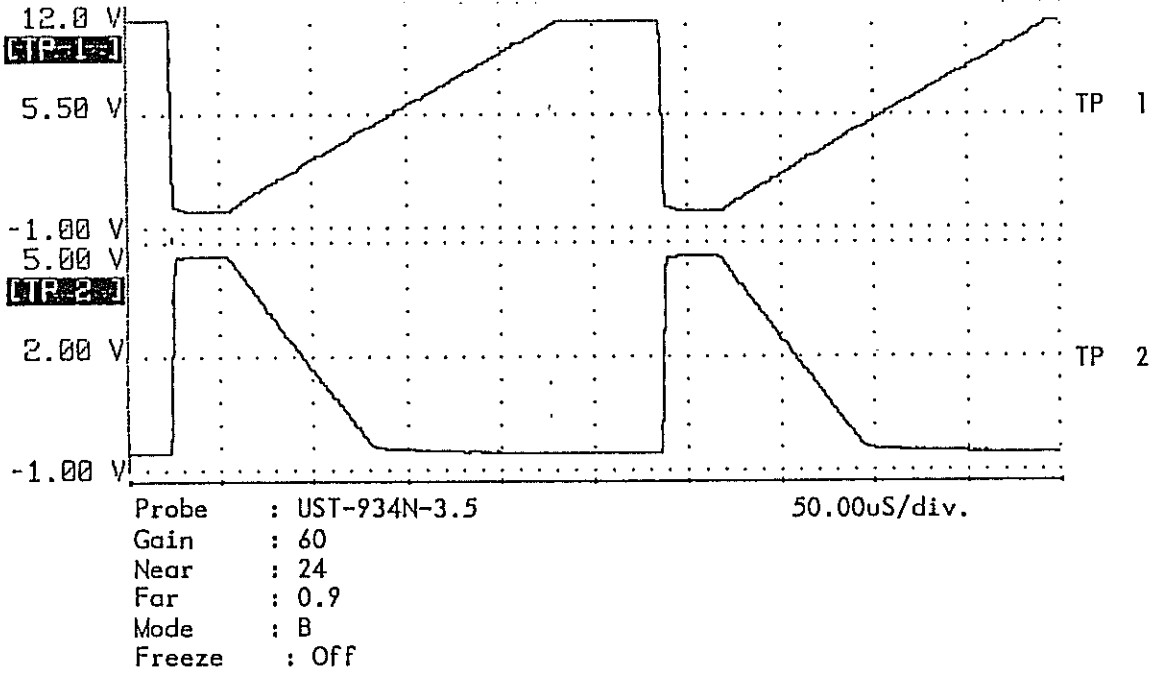
Condition is shown under the wave form.



Memo.

8-7-4 Tx & Control EP-2869

Condition is shown under the wave form.

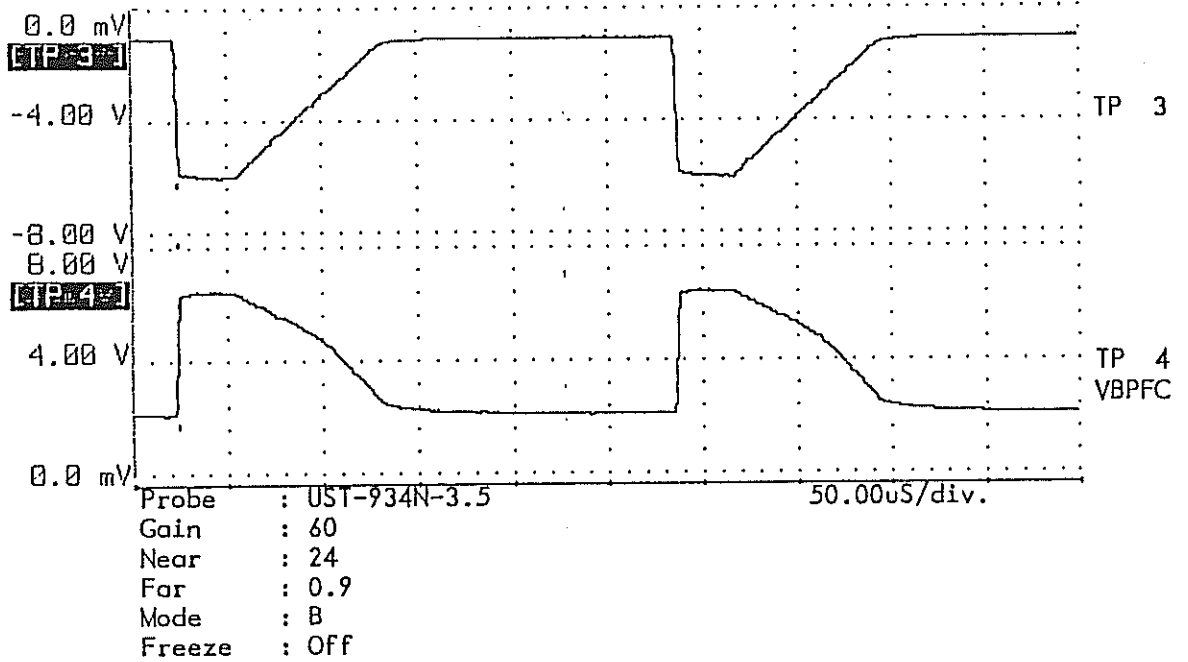


Memo.



## Tx &amp; Control EP-2869

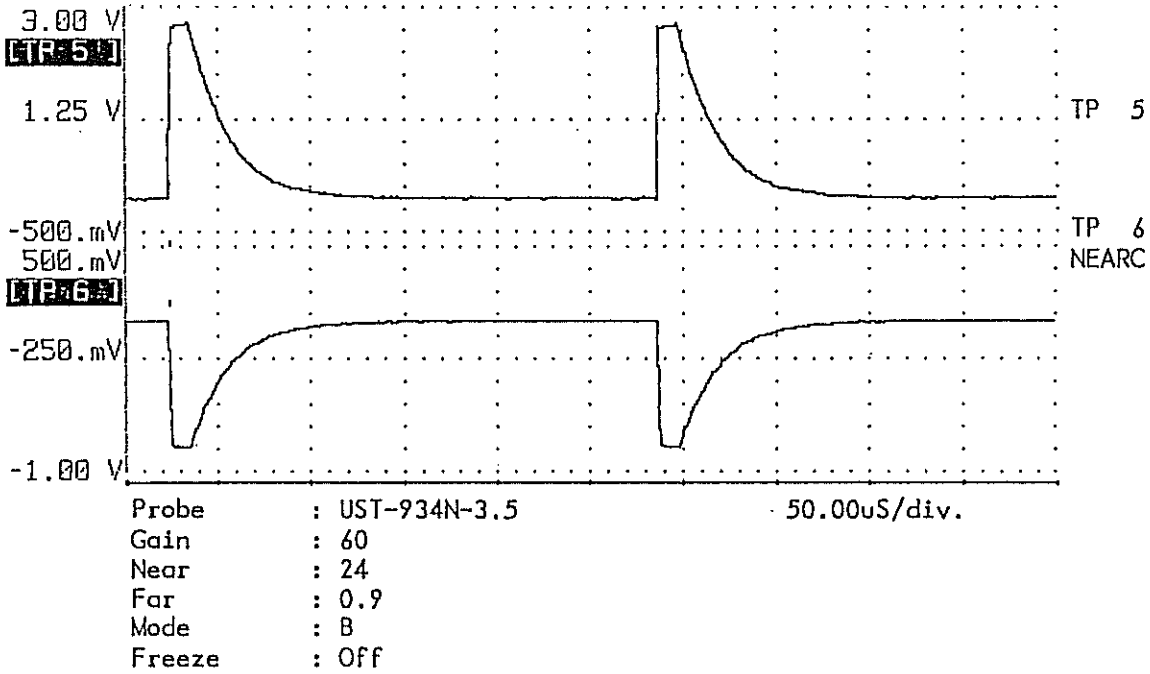
Condition is shown under the wave form.



Memo.

Tx & Control EP-2869

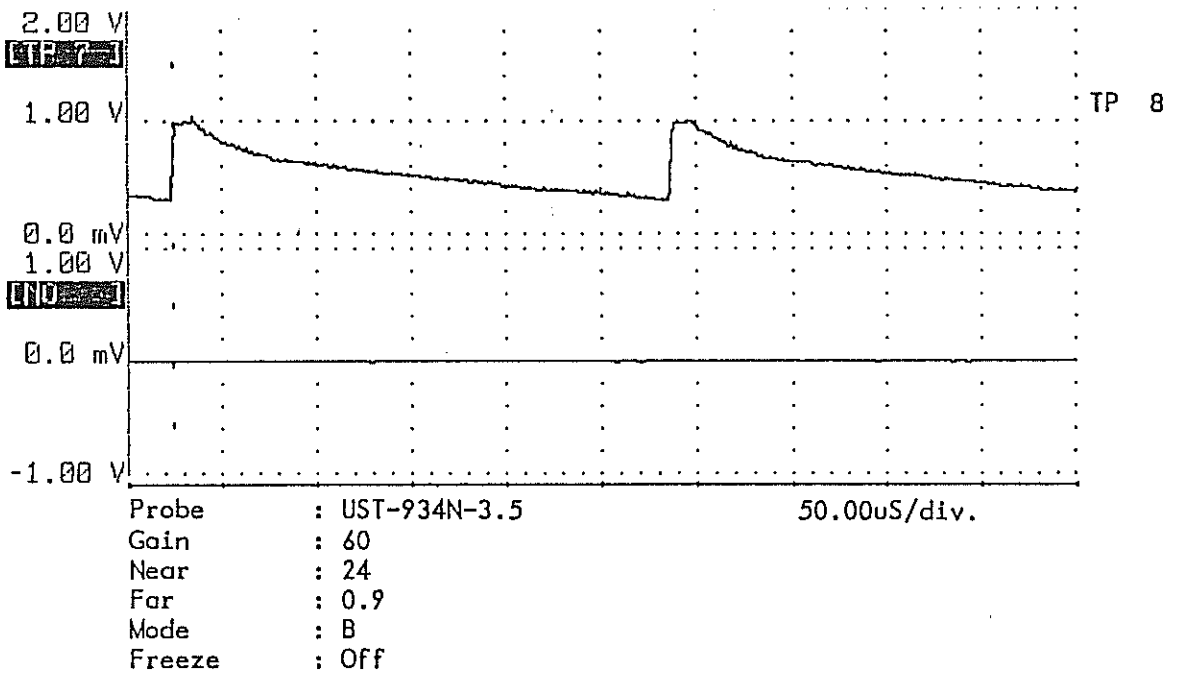
Condition is shown under the wave form.



Memo.

Tx & Control EP-2869

Condition is shown under the wave form.

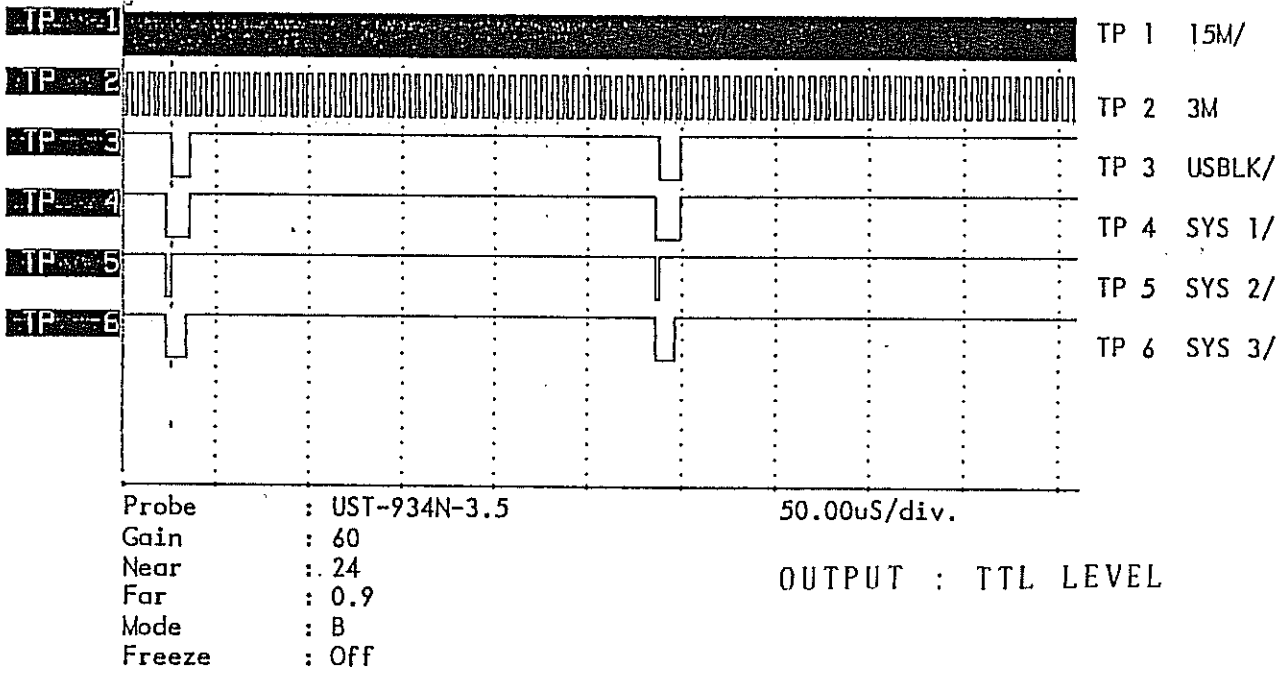


Memo.

8-7-5 ITF

EP-2870

Condition is shown under the wave form.

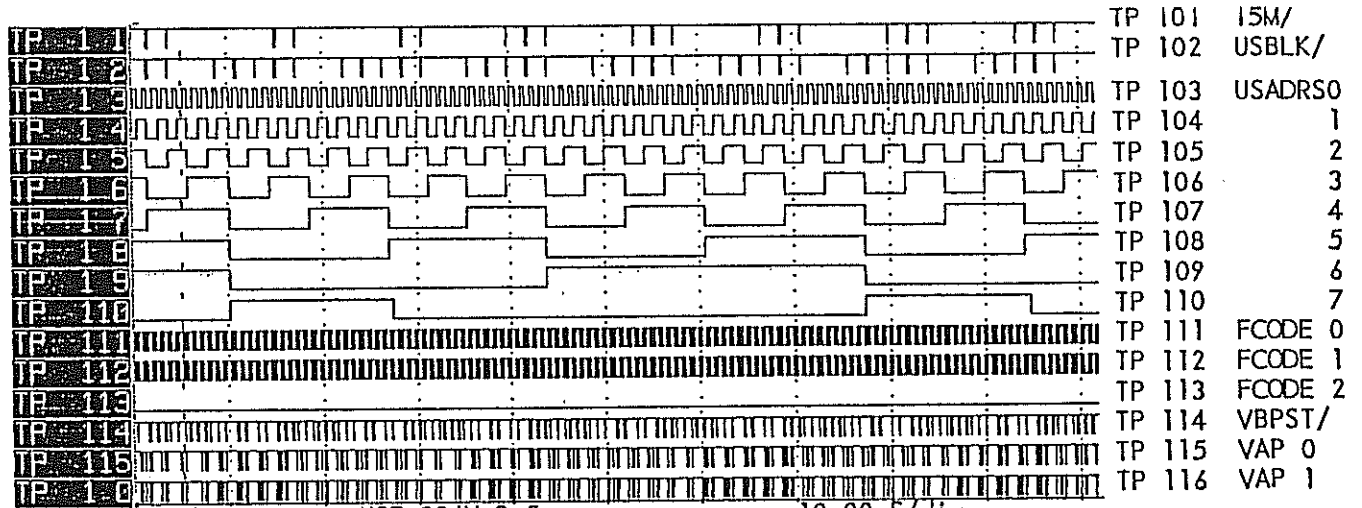


Memo.

ITF

EP-2870

Condition is shown under the wave form.



Probe : UST-934N-3.5 10.00mS/div.  
 Gain : 60  
 Near : 24  
 Far : 0.9  
 Mode : B  
 Freeze : Off  
 Focus : 2+3

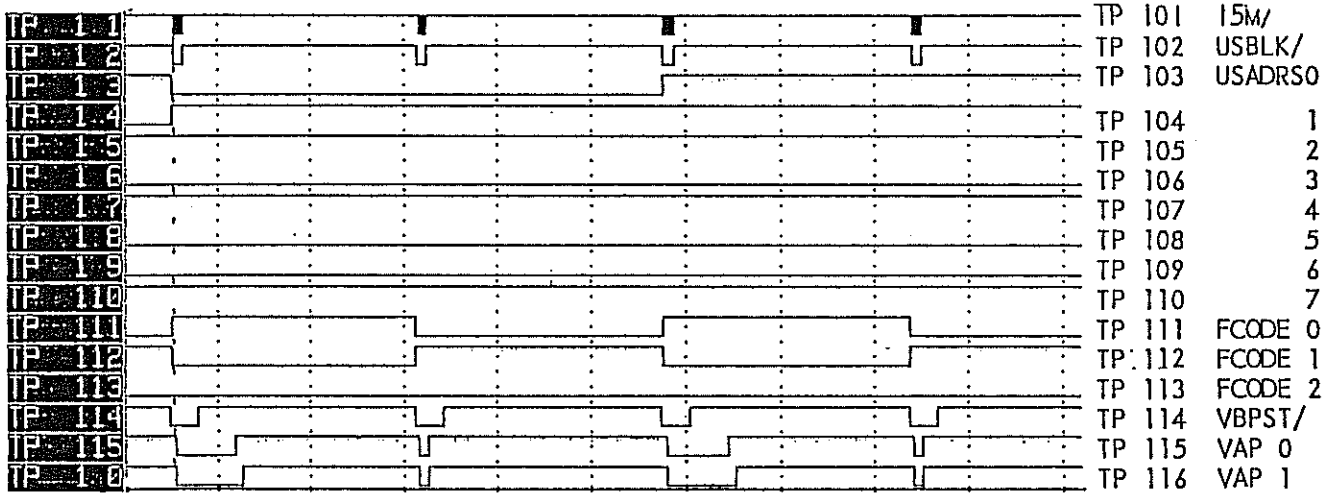
OUTPUT : TTL LEVEL

Memo.

ITF

EP-2870

Condition is shown under the wave form.



Probe : UST-934N-3.5  
 Gain : 60  
 Near : 24  
 Far : 0.9  
 Mode : B  
 Freeze : Off  
 Focus : 2+3

100.0uS/div.

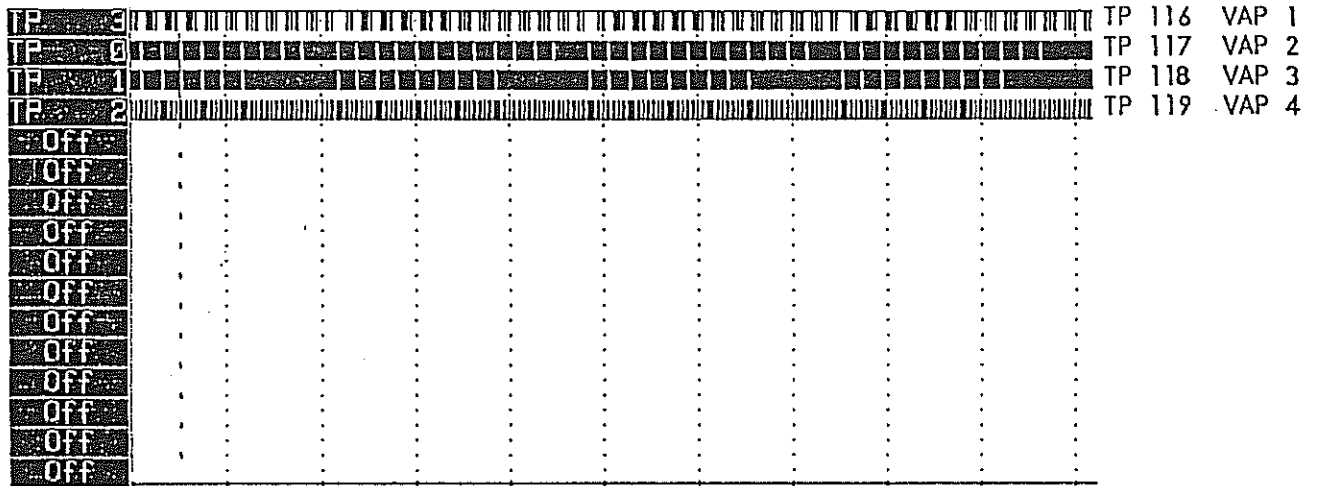
OUTPUT : TTL LEVEL

Memo.

ITF

EP-2870

Condition is shown under the wave form.



Probe : UST-934N-3.5  
 Gain : 60  
 Near : 24  
 Far : 0.9  
 Mode : B  
 Freeze : Off  
 Focus : 2+3

10.00mS/div.

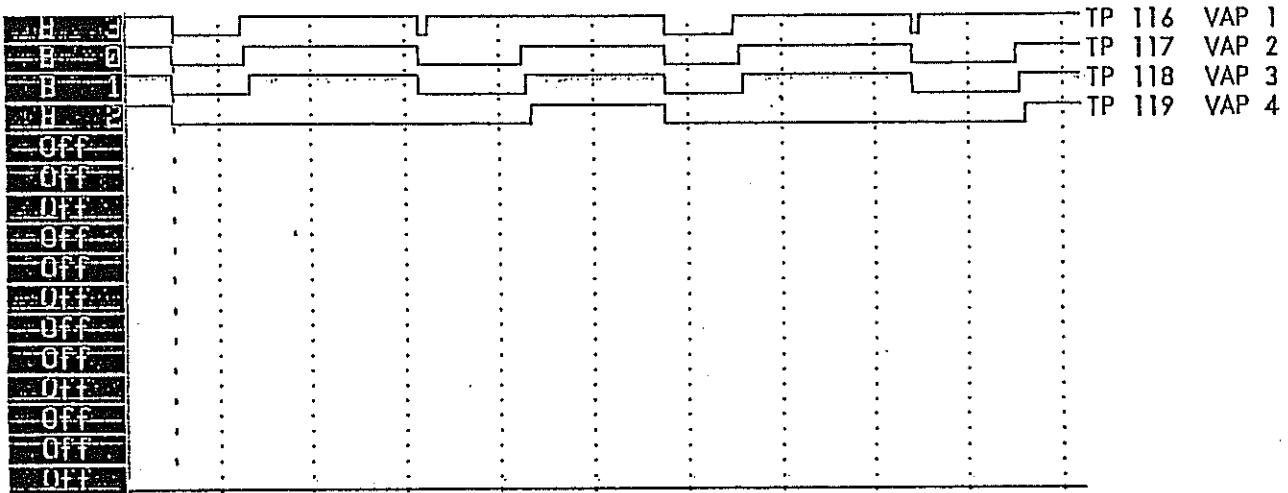
OUTPUT : TTL LEVEL

Memo.

ITF

EP-2870

Condition is shown under the wave form.



Probe : UST-934N-3.5  
 Gain : 60  
 Near : 24  
 Far : 0.9  
 Mode : B  
 Freeze : Off  
 Focus : 2+3

100.0uS/div.

OUTPUT : TTL LEVEL

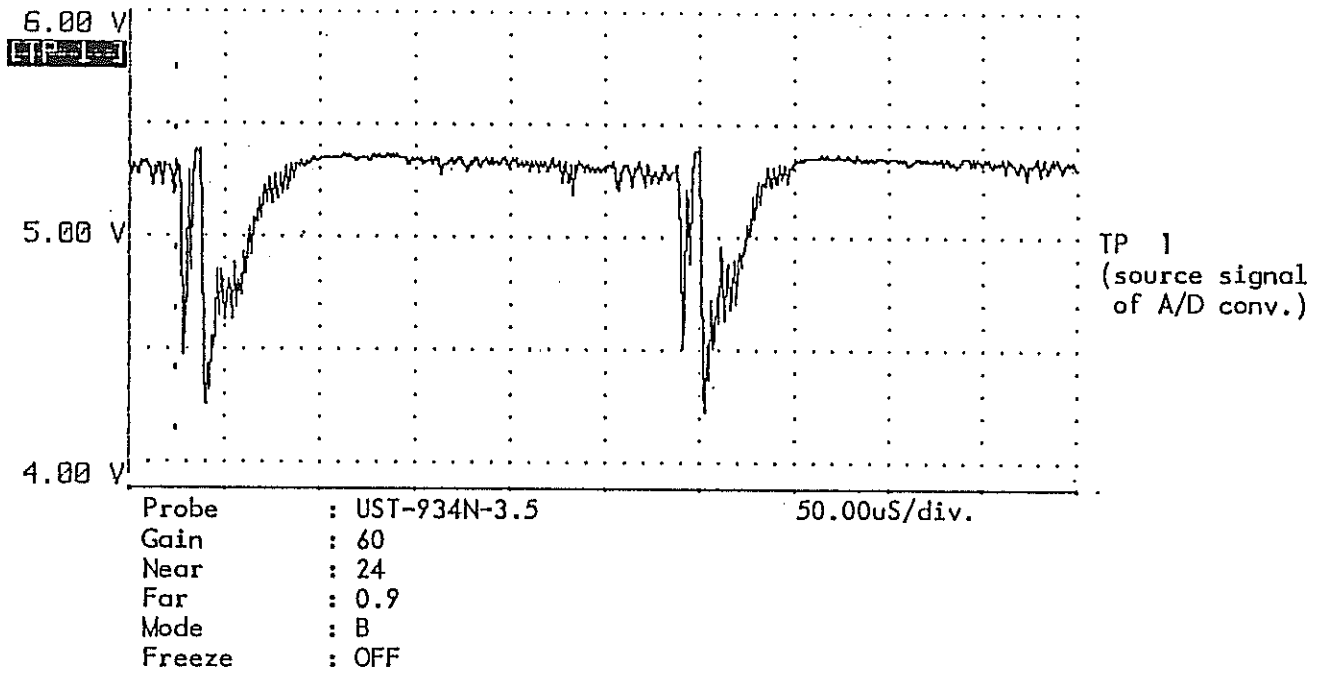
Memo.



8-7-6 DSC

EP-2871

Condition is shown under the wave form.

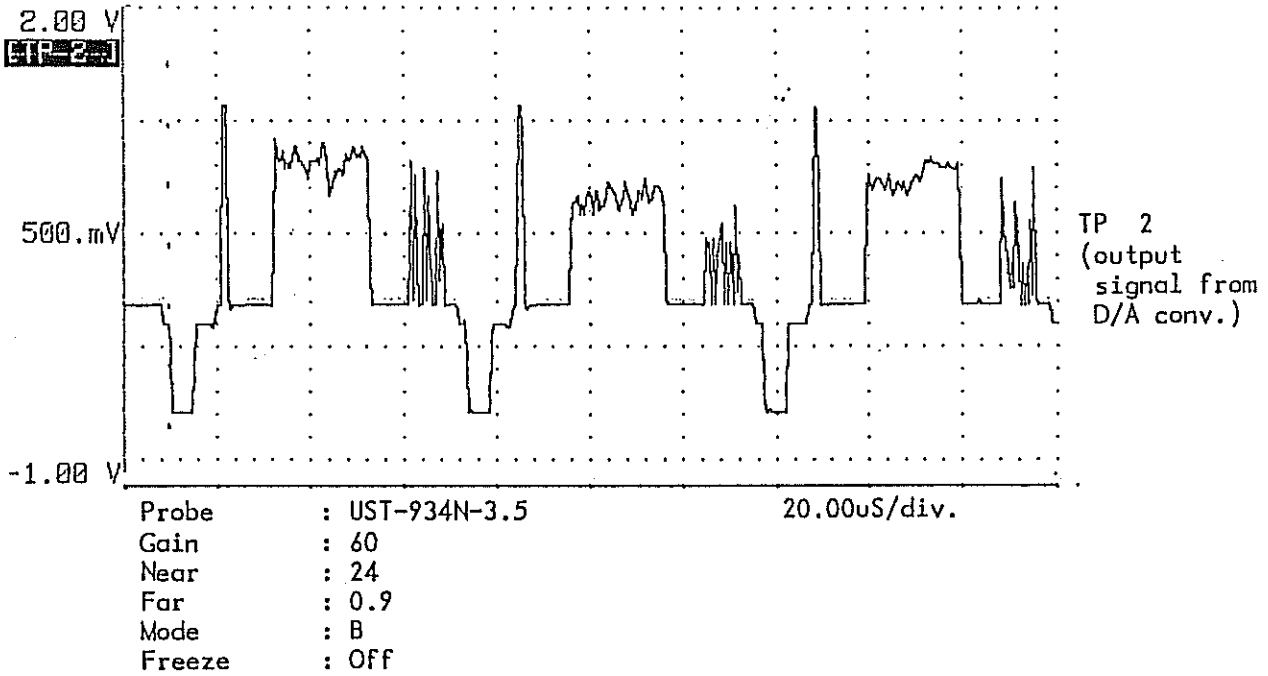


Memo.

DSC

EP-2871

Condition is shown under the wave form.



Memo.

# **SECTION 9 ALIGNMENT PROCEDURE**

## **CONTENTS**

9-1	Introduction	9 - 1
9-2	Attention	9 - 1
9-3	Tools and measures	9 - 1
9-4	Alignment procedure	9 - 1
9-4-1	EP-2868 Rx	9 - 2

## 9-1 Introduction

This Alignment procedure adjust the ultrasound image directly.

## 9-2 Attention

The engineer who has attended to Aloka's training course and has the high electronic knowledge can use this Alignment procedure.

In the case of using this Alignment procedure, please take care the following items.

- (1) It should be done, after a equipment is warm up.
- (2) The unnecessary force against to PCB may destroy it.
- (3) The small variable register and capacitor are used in the PCB according to the S.M.T. ( Surface Mount Technology ). It is necessary to be prepared the screw drivers which can vary them.
- (4) The variable register and capacitor which have never been described in this Alignment procedure must not be varied. It is possible to make another trouble which nobody can repair it.

At the our factory, almost of PCBs are adjusted by Function Checker automatically.

## 9-3 Tools and Measures

The prepared tools and measures are followings.

1. Oscilloscope
 

Sensitivity	:	5mV / div.
Frequency width	:	DC~50MHz
Input voltage	:	more than 400V
2. Digital Volt mater
 

Range	:	ACV, DCV, DCA, $\Omega$
-------	---	-------------------------
3. Probe
 

Convex	:	UST-934N -3.5	or
Linear	:	UST-5024N -3.5	
4. Screw driver
 

+ M2.6	
For adjustment screw driver	

## 9-4 Alignment Procedure

All of the adjustment should be done with Convex probe ( UST-934N-3.5 ) or Linear probe ( UST-5024N-3.5 ).

9-4-1 EP-2868 Rx

Purpose Adjust the total noise level of the image processor.

Item	Condition	Adjust point	Observation	Standard
Noise level	Connect the standard Probe. MODE : B MAG. : 1.0 GAIN : MAX. NEAR : MAX. FAR : MAX. FOCUS : F4 Frame Correlation : OFF  Brightness of monitor : The base of monitor is seen slightly.  Contrast of monitor : Immediately before the saturation of the highest level of gray scale bar.	RV2	At he ultrasound image on the monitor	The noise in the ultrasound image is seen slightly.

# **SECTION 10 PERFORMANCE CHECK**

## **CONTENTS**

10-1	Introduction	10 - 1
10-2	Attention	10 - 1
10-3	Performance check	10 - 1
10-4	Check Sheet	10 - 7

## 10-1 Introduction

This Performance Check is for checking after repairing and periodical inspection.

## 10-2 Attention

This Performance Check should be done according to the following conditions if each condition is not described.

Temperature	:	15°C~35°C
Humidity	:	35%~85%
After turning the power switch on	:	more than 30 minutes

Before use this, please confirm the following items.

- (1) PCBs should be connected normally.
- (2) Connectors should be connected normally.
- (3) The cable from power supply should be connected to the correct connectors.
- (4) Replaced ROMs are mounted on PCB certainly.  
Mistake of Vcc pin and GND pin destroy it.
- (5) Do not leave the unnecessary ROM.
- (6) Do not leave the tools and the probe of measures inside the unit.
- (7) The optional unit should be connected normally.

## 10-3 Performance Check

### (1) Confirmation of Panel switch

If the PCB and ROM which are besides the panel board is changed, please confirm the condition of the key top on the key switch. If the key top is put incorrectly, the panel works abnormally.

The LED of panel lights red color when its function is selected.

<b>POSITION</b>	:	Linear probe only
<b>BODY MARK</b>	:	by function key
<b>AREA-E</b>		
<b>DIST I VEL</b>		
<b>CALIPER</b>		
<b>LEFT TURN</b>	:	rotation for left side
<b>RIGHT TURN</b>	:	rotation for right side
<b>MARK REFERENCE</b>		
<b>NEAR STC</b>		
<b>FAR STC</b>		
<b>MAGNIFICATION</b>		
<b>MODE</b>	:	B, B/M, M, 2B
<b>IMAGE DIRECTION</b>	:	Left or Right
<b>FREEZE</b>		
<b>CAMERA</b>		
<b>FOCUS</b>	:	by function key

### (2) Confirmation of Menu

Confirm the following functions work normally.

<b>FRME-CO</b>	<b>FRAME CORRELATION</b>
----------------	--------------------------

<i>IMG-PO</i>	<i>IMAGE POLARITY</i>
<i>PUNC</i>	<i>PUNCTURE</i>
<i>BDY-MK</i>	<i>BODY MARK</i>
<i>DATE</i>	
<i>DT-DSP</i>	<i>DATA DISPLAY</i>
<i>IMG-DI</i>	<i>IMAGE DIRECTION</i>
<i>M-CURS</i>	<i>M mode CURSOR</i>
<i>H-RATE</i>	<i>HEART RATE</i>

- (3) Confirmation of FOCUS 1  
The condition of FOCUS is shown in viewing monitor. Please confirm it.  
The condition which all of FOCUS are off is called "BROAD". Then "B" lights on in the viewing monitor.  
No continuous setting of FOCUS cannot be set, for example F1 + F4, F1 + F3 and F2 + F4. And in M mode, nobody can set multi FOCUS.  
On freezing the image, the setting of FOCUS can be changed. However, after freeze off, this setting will effect.

- (4) Confirmation of Body Mark Group  
The following group can be selected.  
Confirm that each mark of a group is displayed with pushing the switch of Joy Pad Function.

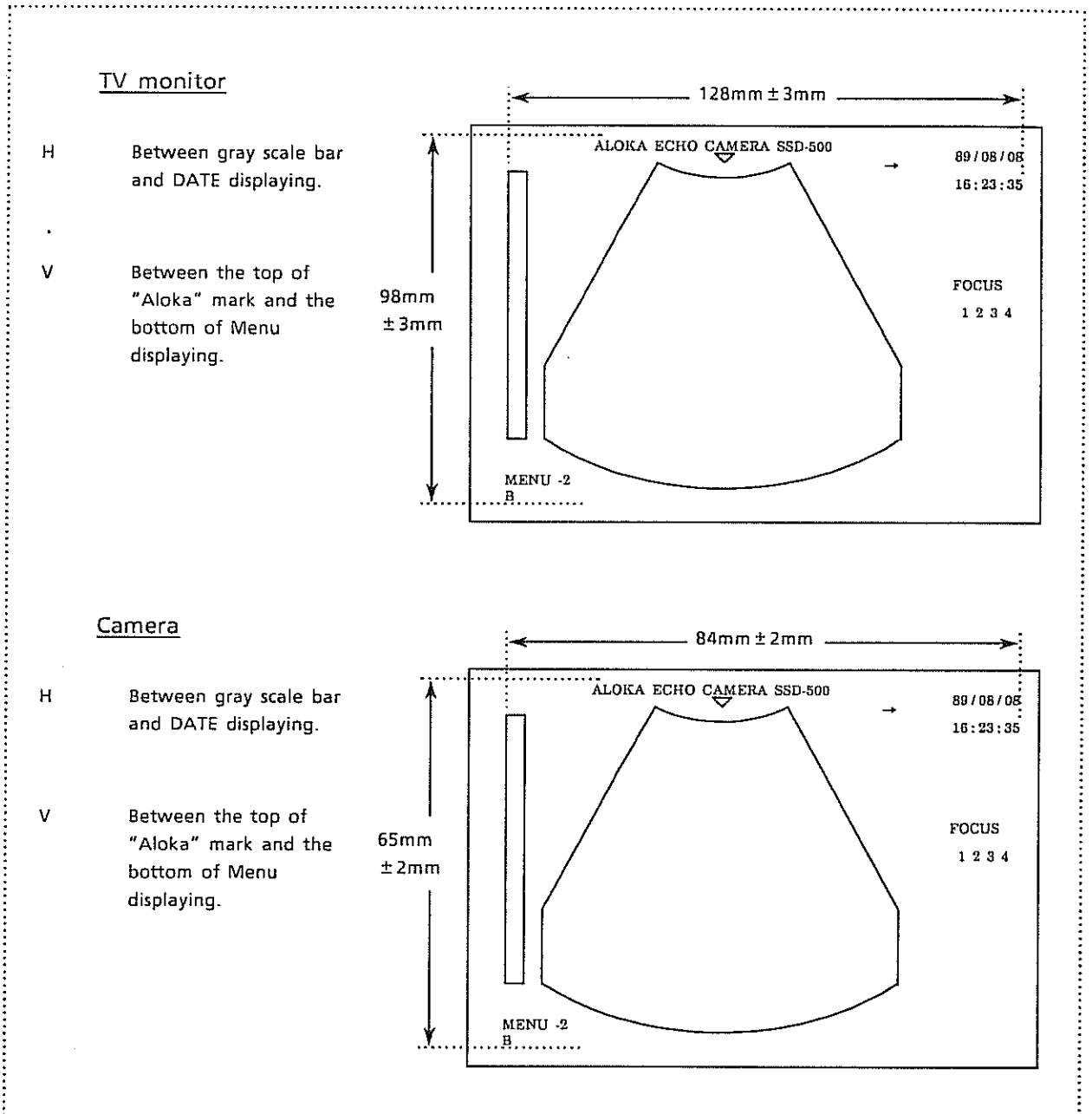
*ABDOM*  
*OBST*  
*HEAD*  
*OTHER*

- (5) Confirmation of Obstetrical Measurement  
Confirm the result of calculation using the sample value.

<i>BPD</i>	<i>Biparietal Diameter</i>
<i>CRL</i>	<i>Crown Rump Length</i>
<i>GS</i>	<i>Gestational Sac</i>
<i>LV</i>	<i>Length of Vertebrae</i>
<i>F (FL)</i>	<i>Femur Length</i>
<i>FTA</i>	<i>Fetal Trunk Cross Sectional Area</i>
<i>HL</i>	<i>Humerus Length</i>
<i>AC</i>	<i>Abdominal Circumference</i>
<i>HC</i>	<i>Head Circumference</i>

- (6) Confirmation of the size of image.  
Measure the size of TV monitor and the picture which is taken by ACR-500-P.





(7) Contrast and Brightness

The knobs of contrast and brightness for the viewing monitor are located on right side of the monitor.

And, the knobs for the photograph are located on rear side of SSD-500. These are for only using ACR-500.

(8) Coin Check

[ Condition ]      MODE        :        B  
                          MAG.        :        × 1.0  
                          FREEZE    :        OFF

[ Method ]            Put the thin metal bar on the surface of the probe and move it slowly from one side of the surface to the other side.

[ Check ] On moving it, the multi echo should not appear, and the echo should not disappear. And, the shape of echo is varied according to the condition of FOCUS.

[ Caution ] Please use the conduction wire of the register or something like that as the thin metal bar. And, do not wound the surface of the probe.

(9) Confirmation of FOCUS 2

[ Condition ]      MODE        :        B  
                  MAG.        :        × 1.0  
                  FREEZE     :        OFF  
                  Phantom    :        RMI-412

[ Method ]         Put the probe on RMI-412 to be shown the targets of 2cm division on horizontal.

[ Check ]         The clear targets are varied according to the condition of FOCUS.

(10) Confirmation of agreement both the probe and displaying

[ Condition ]      MODE        :        B  
                  MAG.        :        × 1.0  
                  Phantom    :        RMI-412

[ Method ]         Put the probe on RMI-412 to be shown the targets.

[ Check ]         The front mark of the probe is agreed with the arrow mark which is displayed on TV monitor.

(11) Confirmation of the ultrasound speed

[ Condition ]      MODE        :        B  
                  MAG.        :        × 0.7, × 1.0, × 1.5, × 2.0  
                  FOCUS       :        F2 + F3  
                  Test piece    :        STB-2 (Stainless)

[ Method ]         Put the probe on the test piece.

[ Check ]         The distance between B1 echo and B2 echo which are stronger than others should be 50mm + 1mm in every diagnostic range.

(12) Confirmation of the noise level.

[ Condition ]      MODE        :        B  
                  MAG.        :        × 1.0  
                  FOCUS       :        F4 only  
                  GAIN        :        Max.  
                  STC         :        both NEAR and FAR Maximum  
                  Frame correlation :        OFF

[ Method ]         Remain the probe on the air.

[ Check ]            The noises are shown slightly. And the noises are shown in any part of the ultrasound image at random.

(13) Confirmation of the sensitivity

[ Condition ]        MODE        :        B  
                           MAG.        :        × 1.0  
                           FOCUS      :        F1 + F2 + F3 + F4  
                           GAIN        :        Max.  
                           STC         :        both NEAR and FAR maximum  
                           Phantom    :        RMI-412

[ Method ]            Put the probe on RMI-412.

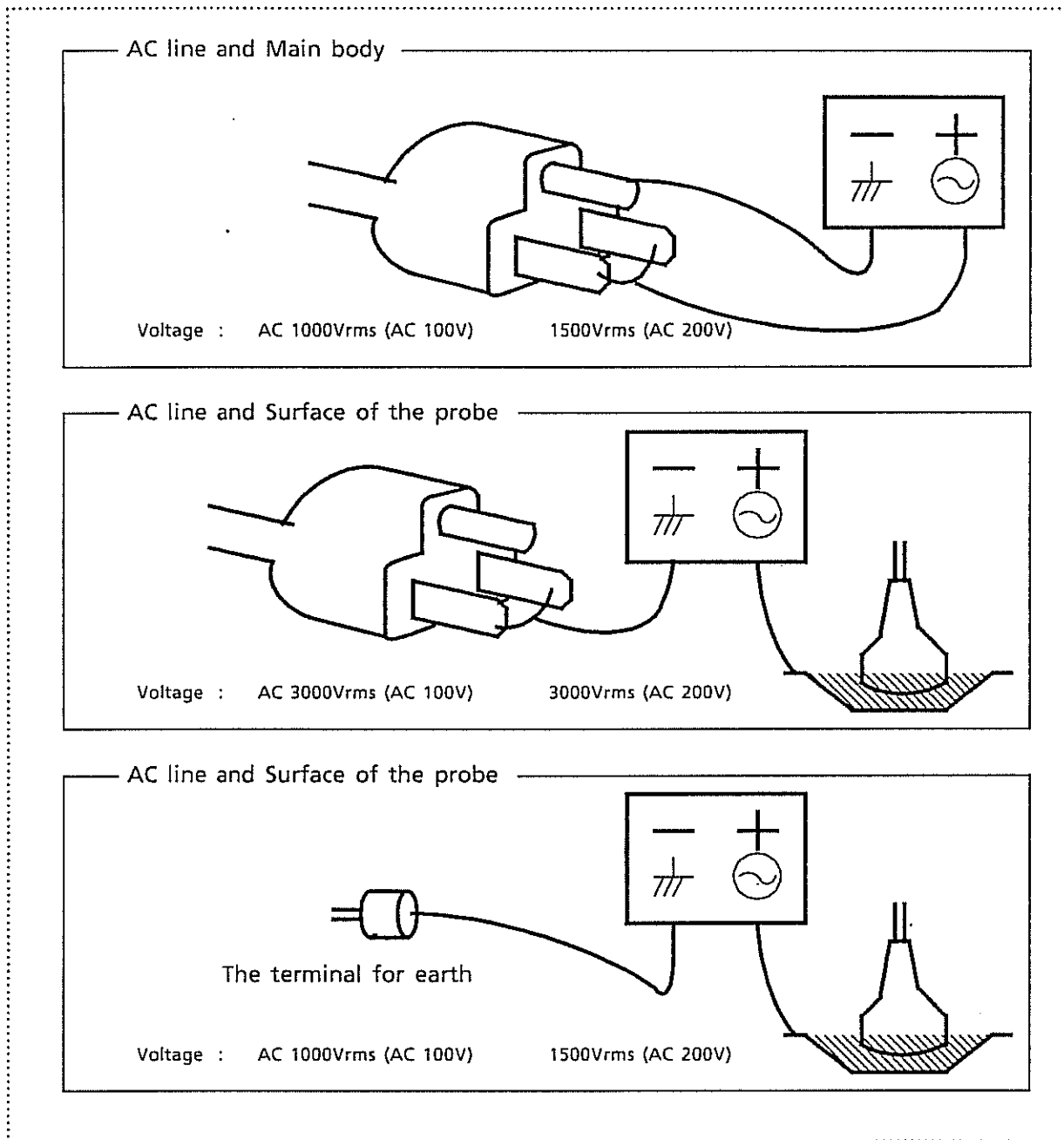
[ Check ]            The fifth echo should be shown.

(14) Dielectric withstanding voltage test

This confirmation needs the special tester. If it has been prepared, this confirmation can be done.

Check it referring the figure which is shown on next page. Please take care of yourself on the test because of using high voltage.

The power switch of SSD-500 is turned off. Please set the cut off current 10mA.



(15) Power variation

This confirmation needs the special equipment which can control the input voltage for the power supply. If it has been prepared, can be done.

Vary the supply voltage from -10% to +10% against to the input voltage of the power supply. If 100V, it is varied from 90V to 110V. If 200V, it is varied from 180V to 220V.

Then, the shaking of the monitor, the noise on the monitor and missing of panel operation should not be occurred.

(16) Power consumption

On the following condition, measure the power consumption. The standard is 130 VA  $\pm$  10%.

MODE : B/M  
GAIN : Minimum  
NEAR, FAR : Maximum  
IMAGE POLARITY : NEGA  
FOCUS : F4  
BRIGHTNESS, CONTRAST : Maximum  
FREEZE : OFF

10-4 Check Sheet

This Check Sheet is prepared for recording the performance check which is shown in 10-3.

Section 10 PERFORMANCE CHECK

No.	Confirmation	Detail	Check		Note
			1	2	
1	Panel switch	POSITION BODY MARK AREA-E DIST. / VEL. CALIPER LEFT TURN RIGHT TURN MARK REFERENCE NEAR STC FAR STC MAGNIFICATION MODE IMAGE DIRECTION ( L / R ) FREEZE CAMERA FOCUS			
2	MENU	FRAME CORRELATION IMAGE POLARITY PUNCTURE BODY MARK ( GROUP ) DATE DATA DISPLAY IMAGE DIRECTION ( UP / DOWN ) M MODE CURSOR HEART RATE			
3	FOCUS 1				
4	Body mark group				
5	Obstetrical measurement	BPD CRL GS LV F ( FL ) FTA HL AC HC			
6	Size of displaying	TV monitor Photograph			
7	Contrast & Brightness				
8	Coin Check				
9	FOCUS 2				
10	Directional agreement				
11	Ultrasound speed				
12	Noise Level				
13	Sensitivity				
14	Electrical withstand voltage	AC line and body AC line and surface of the probe AC line and surface of the probe			
15	Power Variation				
16	Power Consumption				

# **SECTION 11 MAINTENANCE INFORMATION**

## **CONTENTS**

11-1	Introduction	11 - 1
11-2	Attention	11 - 1
11-3	Technical information	11 - 1
	11-3-1 Explanation of "STATUS"	11 - 1
	11-3-2 "Probe group"	11 - 3
	11-3-3 Change of TV scanning lines	11 - 4
	11-3-4 Change of obstetrical measuring method	11 - 4
	11-3-5 Change of AC input voltage	11 - 5
11-4	Manual Change Information	11 - 7

## 11-1 Introduction

In this Maintenance Information, very useful information for repair, change of specification and so on are described.

## 11-2 Attention

The information which is described in this section are shown as the original of SSD-500. If the update or modification are done to SSD-500, it is possible not to agree with this information.

## 11-3 Technical Information

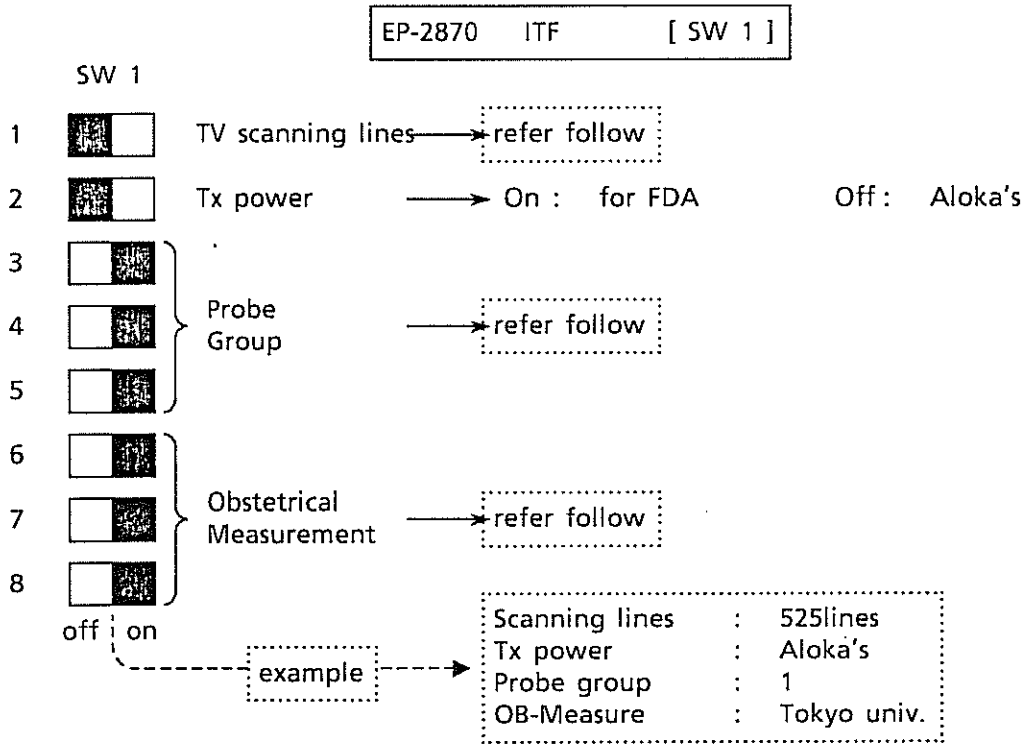
### 11-3-1 Explanation of "STATUS"

SSD-500 has "STATUS" which shows the specification of each SSD-500 .

This "STATUS" is shown on the container box and the starting message which is displayed on the monitor.

These setting are switched by a dip switch located on EP-2870 ITF PCB. And this "STATUS" is shown directly from the dip switch. The meaning of each switch are described in next page.





TV Scanning Lines      On : 625lines      Off : 525lines

Caution : If change the TV scanning lines, it is necessary to replace EP-2871 DSC PCB at the same time.  
The detail information is described in 11-3-3.

Probe Group

	Probe Group							
	1	2	3	4	5	6	7	8
3	On	Off	On	Off	On	Off	On	Off
4	On	On	Off	Off	On	On	Off	Off
5	On	On	On	On	Off	Off	Off	Off

Caution : If change this probe group, it is necessary to exchange the ROM for probe code.  
The detail information is described in 11-3-2.

Obstetrical Measurement

	Obstetrical Measurement							
	Tokyo univ.	Osaka univ.	HANSMANN	Corometrics	CAMPBELL			
6	On	Off	On	Off	On	Off	On	Off
7	On	On	Off	Off	On	On	Off	Off
8	On	On	On	On	Off	Off	Off	Off

Note : It is unnecessary to replace or exchange the other parts.

## 11-3-2 Probe Group

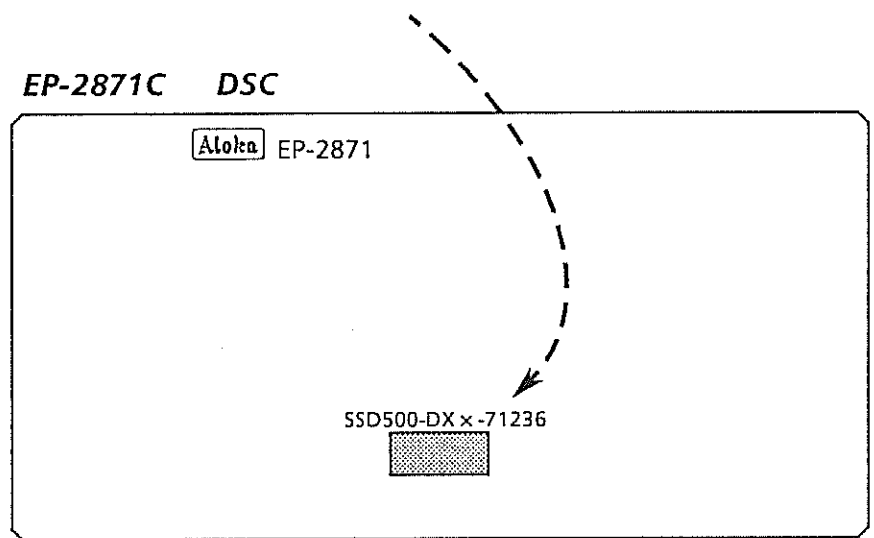
SSD-500 has many optional probe.

It is necessary to have the table of probe code to connect the many probe. Generally, equipment has some ROMs and circuits for that table. However, this prevents to make a small equipment.

Then, in SSD-500, the probes which are connected with SSD-500 at the same time are subject to restriction. This is "Probe Group". If need, all of the optional probe can be connected by selecting the "Probe Code".

"Probe Group" can be selected by a dip switch located on EP-2870 ITF PCB. If select it, please refer previous page.

It is necessary to replace the ROM which is located on EP-2871 DSC PCB because of the above explanation. Please refer the following figure to find the ROM.



In the present time, there are two kinds of "Probe Group". The table described in next page shows the probe list in each "Probe Group".

Probe		Probe Group	
for	Model	1	2
Abdom.	UST-5024N-3.5	●	●
Puncture	UST-5039P-3.5	●	●
Shallow	UST-586-5	●	●
Operation	UST-587T-5	●	●
Operation	UST-587I-5	●	●
Urology	UST-657-5	●	●
Shallow	UST-935N-5	●	●
Micro	UST-944B-3.5	●	●
T r a n s Virginal (Puncture)	UST-945BP-5	●	●
T r a n s Virginal	UST-937U-5	●	●
Operation	UST-556T-7.5	●	
Operation	UST-556TI-7.5	●	
Operation	UST-556I-7.5	●	
Urology	UST-660-7.5	●	
Wide	UST-5011U-3.5		●

● : Marked probes can be connected in each "Probe Group".

### 11-3-3 How to change the TV scanning lines

It is necessary to change the setting of a dip switch located on EP-2870 ITF PCB and replace EP-2871 DSC PCB that suffix is correct to the TV scanning lines. Please refer 11-3-1.

- Process 1 : Change the setting of the dip switch which located on EP-2870 ITF PCB.
- Process 2 : Replace EP-2871 DSC PCB that suffix is correct to the TV scanning lines.

*EP-2871 -1* : 525lines  
*EP-2871 -2* : 625lines

### 11-3-4 How to change the Obstetrical Measurement

Change the setting of the dip switch located on EP-2870 ITF PCB in order to select the method of obstetrical measurement referring 11-3-1.

It is unnecessary to replace or exchange the other parts.

### 11-3-5 How to change the AC input voltage

It is possible to change the AC input voltage by the switch which is located on rear side of the power supply.

Before it, it is necessary to remove the body cover.

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#### 11-4 Manual Change Information

Service Manual is revised properly to follow the change of specification and so on. When it is revised, the reason of revision is described into "Manual Change List" on next page. In the case of usual change, additional page or revised page is distributed. Follow the changing indication.

## SSD-500 Manual Change List ( Service Manual )

改訂 No.	改訂年月日 Date	バージョン Manual Version	改訂内容 Contents	適用機番 Serial Number	追加ページ Added Page	差し替えページ Replaced Page	備考 Note
	Nov/04/'90	1	1st. edition				
1	Jul/24/'90	2	Section 7 Schematic "Power Supply Unit" added		7-33		
2	Jul/24/'90	2	Section 7 Schematic "TV monitor" added		7-35~7-37		
3	Jul/24/'90	2	Section 13 "Parts List" added		13-15~13-56		
4	Jul/24/'90	2	Section 11 "Manual Change Information" added		11-7~11-8		

# **SECTION 12 HISTORY OF IMPROVEMENT**

## **CONTENTS**



# History of SSD-500

S/N 91M03778~11M12695

HI-0502

Ver. 1.0

15 - Nov. - 1991

1	USI-115 .....	1 - 1 ~ 1 - 3
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4	Software & Hardware ROM .....	4 - 1 ~ 4 - 2
5	Specification of software .....	5 - 1 ~ 5 - 2
6	Modification kits .....	6 - 1 ~ 6 - 4

History of SSD-500

(USI-115)

← : One directional interchangeability

↔ : Bi-directional interchangeability

≠ : No interchangeability

S/N	91M03778~ 03877	91M07865~ 08064	91M13759~ 14058	91M15147~ 15246	91M15782~ 15810	91M15832~ 15851	91M15882~ 15896	91M15949~ 15980	91M16017~ 16020	91M15811~ 15831
	USI-115									
PANEL	L-KEY-14A									
PANEL	L-KEY-14B									
RX	EP-2868C									
TX & CONTROL	EP-2869D									
ITF	EP-2870B									
DSC -1 : 525lines -2 : 625lines	EP-2871C									
CPU	EP-2872B									
PANEL CONTROL	EP-2873B									
GAIN & POWER LED	EP-2878B									
SELECT KEY	EP-2879B									
IN / OUT	EP-2881C									
Photo Cont. / Bright.	EP-2882									
TV Monitor	IP-0702									
Power Supply	PSU-S500 PSU-S500B ★10									

\* : Artwork change



# History of SSD-500

(USI-115)

← : One directional interchangeability    ⇄ : Bi-directional interchangeability    ≠ : No interchangeability

S/N	01M07401~ 08000	01M13550~ 14149	01M17450~ 18449	11M00472~ 11M01471	11M05553~ 06552	11M10687~ 11286	11M11896~ 12695	~
	USI-115							
PANEL	L-KEY-14A(Y)							
PANEL	L-KEY-14B(Y)							
RX	EP-2868C							
TX & CONTROL	EP-2869E ←★11 (11M06353~) EP-2869F							
ITF	EP-2870C							
DSC	EP-2871E							
-1 : 525lines -2 : 625lines CPU	EP-2872B ←★9 (01M17750~) EP-2872C							
PANEL CONTROL	EP-2873D							
GAIN & POWER LED	EP-2878B							
SELECT KEY	EP-2879B							
IN / OUT	EP-2881E							
Photo Cont. / Bright.	EP-2882							
TV Monitor	IP-0702							
Power Supply	PSU-5500 PSU-5500B ★10							

\* : Artwork change

## History of SSD-500

(Remarks ★)

No.	Explanations of Remark ★	Note
★ 1	Measure for EMI.	
★ 2	Addition of shadows to characters and graphics. Solution for the retrace line error of TV display with negative image.	Technical Bulletin №SSD-500-14
★ 3	Addition of Probe Group ③.	
★ 4	Measure for EMI.	
★ 5	Change of panel LED color. (Amber → Yellow)	
★ 6	Solution for the panel lock up with turning power switch on.	Technical Bulletin №SSD-500-15, SSD-500-16
★ 7	Change with IC replacement.	
★ 8	Beginning to use the detection circuit for the software locking up.	
★ 9	Correspondence for 2Mbit ROM as software.	
★ 10	PSU-S500B is used with serial number 9P72001 to reduce the radiation noise. The affected serial number of SSD-500 is not sure.	
★ 11	Correspond to connection with UST-981P-5 transvaginal / puncture probe. ( Software version 7.0. )	

History of SSD-500

(Probe Group List)

Specifications	Software Version										
	1.0	1.1	2.0	3.0	3.1	4.0	4.1	5.0	6.0	7.0	
Japan / General use	①	①	①	①	①	①	①	①	①	①	
Export / General use	①	①	①	①	①	①	①	①	①	①	
Export / Veterinary				②	③	③	③	③	③	③	

Attention) In the case of software version 5.0 and before, the ROM which has probe group information is different in each group.

# History of SSD-500

(Probe Connection : Group ①)

Model	T Y P E	Purpose	Note	Punc.	Serial Number of connectable probe	Software Version											△: Depends on note		
						1.0	1.1	2.0	3.0	3.1	4.0	4.1	5.0	6.0	7.0				
UST-5512U-5	L	Shallow			6A5660~	○	○	○	○	○	○	○	○	○	○	○	○		
UST-556T-7.5	L	Interoperation		MP-2387	6A3604~	○	○	○	○	○	○	○	○	○	○	○	○		
UST-556I-7.5	L	Interoperation			6A7865~	○	○	○	○	○	○	○	○	○	○	○	○		
UST-556TU-7.5	L	Interoperation		MP-2392	6A3215~	○	○	○	○	○	○	○	○	○	○	○	○		
UST-5512U-7.5	L	Shallow			6A6395~	○	○	○	○	○	○	○	○	○	○	○	○		
UST-660-7.5	L	Transrectal			6A3664~	○	○	○	○	○	○	○	○	○	○	○	○		
UST-586-5	L	Pediatric			6A6180~	○	○	○	○	○	○	○	○	○	○	○	○		
UST-587T-5	L	Interoperation		MP-2377	6A4885~	○	○	○	○	○	○	○	○	○	○	○	○		
UST-587I-5	L	Interoperation			6A4449~	○	○	○	○	○	○	○	○	○	○	○	○		
UST-657-5	L	Transrectal			6A4820~	○	○	○	○	○	○	○	○	○	○	○	○		
UST-588U-5	L	Cattle / Horse			from beginning	×	×	×	×	×	×	×	×	×	×	×	△ <sub>2</sub>		
UST-5024N-3.5	L	Abdom/OB/GYN			from beginning	○	○	○	○	○	○	○	○	○	○	○	○		
UST-5017U-3.5	L	Pediatric			no product	○	○	○	○	○	○	○	○	○	○	○	○		
UST-5039P-3.5	L	Puncture			from beginning	○	○	○	○	○	○	○	○	○	○	○	○		
UST-5041-2	L				from beginning	×	×	×	×	×	×	×	×	×	×	×	×		
UST-5011U-3.5	L	Abdom. wide			6A6290~	×	×	×	×	×	×	×	×	×	×	×	×		
UST-5044-3.5	L	Wide (Cattle)	△ <sub>1</sub> : export only		from beginning	×	×	×	×	×	×	×	×	×	×	×	△ <sub>1</sub>		
UST-935N-5	C	Pediatric		MP-2420	from beginning	○	○	○	○	○	○	○	○	○	○	○	○		
UST-937U-5	C	Transvaginal			from beginning	○	○	○	○	○	○	○	○	○	○	○	○		
UST-932-7.5	C	Shallow		MP-2391	6A3594~	×	×	×	×	×	×	×	×	×	×	×	×		
UST-934N-3.5	C	Abdom/OB/GYN		MP-2408	from beginning	○	○	○	○	○	○	○	○	○	○	○	○		
UST-944B-3.5	C	Cardiac		MP-2414B	from beginning	○	○	○	○	○	○	○	○	○	○	○	○		
UST-945BP-5	C	Transvaginal			from beginning	○	○	○	○	○	○	○	○	○	○	○	○		
UST-974-5	C	Neonate		MP-2467	from beginning	○	○	○	○	○	○	○	○	○	○	○	○		
UST-981P-5	C	Transvaginal			from beginning	×	×	×	×	×	×	×	×	×	×	×	×		

† Type : A: Annular array, B: Biplane, C: Convex sector, I: Independent, L: Linear array, M: Mechanical sector, P: Phased array sector, R: Radial, S: Single element

History of SSD-500

(Probe Connection : Group ②)

Model	T Y P E	Purpose	Note	Punc.	Serial Number of connectable probe	Software Version										△: Depends on note			
						1.0	1.1	2.0	3.0	3.1	4.0	4.1	5.0	6.0	7.0				
UST-5512U-5	L	Shallow			6A5660~	X	X	X	X	X	X	X	X	X	X	X	X		
UST-556T-7.5	L	Interoperation		MP-2387	6A3604~	X	X	X	X	X	X	X	X	X	X	X	X		
UST-556I-7.5	L	Interoperation			6A7865~	X	X	X	X	X	X	X	X	X	X	X	X		
UST-556TU-7.5	L	Interoperation		MP-2392	6A3215~	X	X	X	X	X	X	X	X	X	X	X	X		
UST-5512U-7.5	L	Shallow			6A6395~	X	X	X	X	X	X	X	X	X	X	X	X		
UST-660-7.5	L	Transrectal			6A3664~	X	X	X	X	X	X	X	X	X	X	X	X		
UST-586-5	L	Pediatric			6A6180~	X	X	X	X	X	X	X	X	X	X	X	X		
UST-587T-5	L	Interoperation		MP-2377	6A4885~	X	X	X	X	X	X	X	X	X	X	X	X		
UST-587I-5	L	Interoperation			6A4449~	X	X	X	X	X	X	X	X	X	X	X	X		
UST-657-5	L	Transrectal			6A4820~	X	X	X	X	X	X	X	X	X	X	X	X		
UST-588U-5	L	Cattle / Horse			from beginning	X	X	X	X	X	X	X	X	X	X	X	X		
UST-5024N-3.5	L	Abdom/OB/GYN			from beginning	X	X	X	X	X	X	X	X	X	X	X	X		
UST-5017U-3.5	L	Pediatric			no product	X	X	X	X	X	X	X	X	X	X	X	X		
UST-5039P-3.5	L	Puncture			from beginning	X	X	X	X	X	X	X	X	X	X	X	X		
UST-5041-2	L				from beginning	○	○	○	○	○	○	○	○	○	○	○	○		
UST-5011U-3.5	L	Abdom. wide			6A6290~	X	X	X	X	X	X	X	X	X	X	X	X		
UST-5044-3.5	L	Wide (Cattle)			from beginning	X	X	X	X	X	X	X	X	X	X	X	X		
UST-935N-5	C	Pediatric		MP-2420	from beginning	X	X	X	X	X	X	X	X	X	X	X	X		
UST-937U-5	C	Transvaginal			from beginning	X	X	X	X	X	X	X	X	X	X	X	X		
UST-932-7.5	C	Shallow		MP-2391	6A3594~	X	X	X	X	X	X	X	X	X	X	X	X		
UST-934N-3.5	C	Abdom/OB/GYN		MP-2408	from beginning	X	X	X	X	X	X	X	X	X	X	X	X		
UST-944B-3.5	C	Cardiac		MP-24148	from beginning	X	X	X	X	X	X	X	X	X	X	X	X		
UST-945BP-5	C	Transvaginal			from beginning	X	X	X	X	X	X	X	X	X	X	X	X		
UST-974-5	C	Neonate		MP-2467	from beginning	X	X	X	X	X	X	X	X	X	X	X	X		
UST-981P-5	C	Transvaginal			from beginning	X	X	X	X	X	X	X	X	X	X	X	X		

▶ Type : A: Annular array, B: Biplane, C: Convex sector, I: Independent, L: Linear array, M: Mechanical sector, P: Phased array sector, R: Radial, S: Single element



History of SSD-500

(Probe Connection : Group ③)

Model	TYPE	Purpose	Note	Punc.	Serial Number of connectable probe	Software Version											△: Depends on note		
						1.0	1.1	2.0	3.0	3.1	4.0	4.1	5.0	6.0	7.0				
UST-5512U-5	L	Shallow			6A5660~	-	-	-	○	○	○	○	○	○	○	○	○		
UST-5567-7.5	L	Interoperation		MP-2387	6A3604~	-	-	-	○	○	○	○	○	○	○	○	○		
UST-5561-7.5	L	Interoperation			6A7865~	-	-	-	○	○	○	○	○	○	○	○	○		
UST-5567U-7.5	L	Interoperation		MP-2392	6A3215~	-	-	-	○	○	○	○	○	○	○	○	○		
UST-5512U-7.5	L	Shallow			6A6395~	-	-	-	○	○	○	○	○	○	○	○	○		
UST-660-7.5	L	Transrectal			6A3664~	-	-	-	○	○	○	○	○	○	○	○	○		
UST-586-5	L	Pediatric			6A6180~	-	-	-	○	○	○	○	○	○	○	○	○		
UST-587T-5	L	Interoperation		MP-2377	6A4885~	-	-	-	○	○	○	○	○	○	○	○	○		
UST-587I-5	L	Interoperation			6A4449~	-	-	-	○	○	○	○	○	○	○	○	○		
UST-657-5	L	Transrectal			6A4820~	-	-	-	○	○	○	○	○	○	○	○	○		
UST-588U-5	L	Cattle / Horse			from beginning	-	-	-	○	○	○	○	○	○	○	○	○		
UST-5024N-3.5	L	Abdom/OB/GYN			from beginning	-	-	-	X	X	X	X	X	X	X	X	X		
UST-5017U-3.5	L	Pediatric			no product	-	-	-	X	X	X	X	X	X	X	X	X		
UST-5039P-3.5	L	Puncture			from beginning	-	-	-	X	X	X	X	X	X	X	X	X		
UST-5041-2	L				from beginning	-	-	-	X	X	X	X	X	X	X	X	X		
UST-5011U-3.5	L	Abdom. wide			6A6290~	-	-	-	○	○	○	○	○	○	○	○	○		
UST-5044-3.5	L	Wide (Cattle)			from beginning	-	-	-	○	○	○	○	○	○	○	○	○		
UST-935N-5	C	Pediatric		MP-2420	from beginning	-	-	-	○	○	○	○	○	○	○	○	○		
UST-937U-5	C	Transvaginal			from beginning	-	-	-	○	○	○	○	○	○	○	○	○		
UST-932-7.5	C	Shallow		MP-2391	6A3594~	-	-	-	○	○	○	○	○	○	○	○	○		
UST-934N-3.5	C	Abdom/OB/GYN		MP-2408	from beginning	-	-	-	○	○	○	○	○	○	○	○	○		
UST-944B-3.5	C	Cardiac		MP-2414B	from beginning	-	-	-	○	○	○	○	○	○	○	○	○		
UST-945BP-5	C	Transvaginal			from beginning	-	-	-	X	X	X	X	X	X	X	X	X		
UST-974-5	C	Neonate		MP-2467	from beginning	-	-	-	X	X	X	X	X	X	X	X	X		
UST-981P-5	C	Transvaginal			from beginning	-	-	-	X	X	X	X	X	X	X	X	X		

▶ Type : A: Annular array, B: Biplane, C: Convex sector, I: Independent, L: Linear array, M: Mechanical sector, P: Phased array sector, R: Radial, S: Single element

History of SSD-500

(Probe Connection : Group ④)

Model	TYPE	Purpose	Note	Punc.	Serial Number of connectable probe	Software Version										△: Depends on note								
						1.0	1.1	2.0	3.0	3.1	4.0	4.1	5.0	6.0	7.0									
UST-5512U-5	L	Shallow			6A5660~	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
UST-556T-7.5	L	Interoperation		MP-2387	6A3604~	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
UST-556I-7.5	L	Interoperation			6A7865~	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
UST-556TU-7.5	L	Interoperation		MP-2392	6A3215~	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
UST-5512U-7.5	L	Shallow			6A6395~	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
UST-660-7.5	L	Transrectal			6A3664~	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
UST-586-5	L	Pediatric			6A6180~	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
UST-587T-5	L	Interoperation		MP-2377	6A4885~	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
UST-587I-5	L	Interoperation			6A4449~	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
UST-657-5	L	Transrectal			6A4820~	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
UST-588U-5	L	Cattle / Horse			from beginning	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
UST-5024N-3.5	L	Abdom/OB/GYN			from beginning	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
UST-5017U-3.5	L	Pediatric			no product	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
UST-5039P-3.5	L	Puncture			from beginning	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
UST-5041-2	L				from beginning	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
UST-5011U-3.5	L	Abdom. wide			6A6290~	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
UST-5044-3.5	L	Wide (Cattle)			from beginning	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
UST-935N-5	C	Pediatric		MP-2420	from beginning	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
UST-937U-5	C	Transvaginal			from beginning	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
UST-932-7.5	C	Shallow		MP-2391	6A3594~	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
UST-934N-3.5	C	Abdom/OB/GYN		MP-2408	from beginning	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
UST-944B-3.5	C	Cardiac		MP-2414B	from beginning	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
UST-945BP-5	C	Transvaginal			from beginning	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
UST-974-5	C	Neonate		MP-2467	from beginning	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
UST-981P-5	C	Transvaginal			from beginning	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

▶ Type : A: Annular array, B: Biplane, C: Convex sector, I: Independent, L: Linear array, M: Mechanical sector, P: Phased array sector, R: Radial, S: Single element





HISTORY OF SSD-500 (Specification change list)

Version	Specification change (except probe connection)
1.0	1st. release
1.1	: Solution of software locking up after freezing for a long time. : After basic measurement, the circumference is chosen instead of the area with "AC" or "HC" selection.
2.0	: Solve the miss lighting of ⊕ switch LED with pressing of ⊕ switch after any measurement and change of the image polarity. : Solve the miss remaining of result with pressing . ⊕ switch after DIST with " + " mark and VEL with " x " mark. : Solve the miss remaining of result with + or . ⊕ switch after DIST with " + " mark, VEL with " x " mark and erasing of VEL result. : Solve the miss remaining of HEART RATE result and miss lighting of + or x switch LED with pressing ⊕ switch. : Solve the miss operation of ⊕, ⊕, ⊕, ⊕ and ⊕ switch with pressing same switches while printing by ⊕ switch with frozen image. : Addition of obstetrical table. European type II (Campbell) : Addition of ANGLE measurement. : Addition of RATIO measurement. : Change the usage.
3.0	: Following conditions will be memorized by turning power switch off, and it will be set up with memorized condition. <ul style="list-style-type: none"> <li>▶ Display mode</li> <li>▶ MAG</li> <li>▶ NEAR and FAR</li> <li>▶ Frame correlation</li> <li>▶ Puncture guide line display</li> <li>▶ AGC</li> <li>▶ Date format</li> <li>▶ Switch for the information display, probe frequency, gain setting and so on.</li> <li>▶ Image polarity</li> <li>▶ Image direction (UP/DOWN)</li> <li>▶ Focus setting</li> <li>▶ Selected body mark group</li> <li>▶ Selected body mark of selected group</li> <li>▶ Switch for the body mark display</li> <li>▶ 1st. row of comment area (for the hospital name)</li> </ul> : added with 5 step variation. : added with 8 step variation. : Group ⊕ is added for veterinary, "VET" is shown on the monitor and RATIO measurement is invalidated.
3.1	: Solve the mismatching between ultrasound image and position shift setting, after shifting and changing of magnification. : Solve the miss returning of panel switch LED after alternation as INT→EXT→INT on the frozen M mode image. : Solve the miss lighting of ⊕ switch LED with pressing of ⊕ switch while measuring of CGW/EDC.
4.0	: Solve the miss replacement of area with circumference in AREA-E measurement after erase or addition of DIST result. : Position shift will be reset by reconnecting the probe while position shift function is validated. : Solve the miss erasing of contrast or AGC setting in [ ] with pressing of ⊕ switch on frozen image. : "NEW PATIENT" function will be invalidated on external video. : Solve the miss selection from fetal weight calculation to basic measurement when the result of obstetrical result is selected after basic measurement. : Convex probe image will be shifted. : Change the usage.
4.1	: Correct the calculation formula of HADLOCK fetal weight calculation.

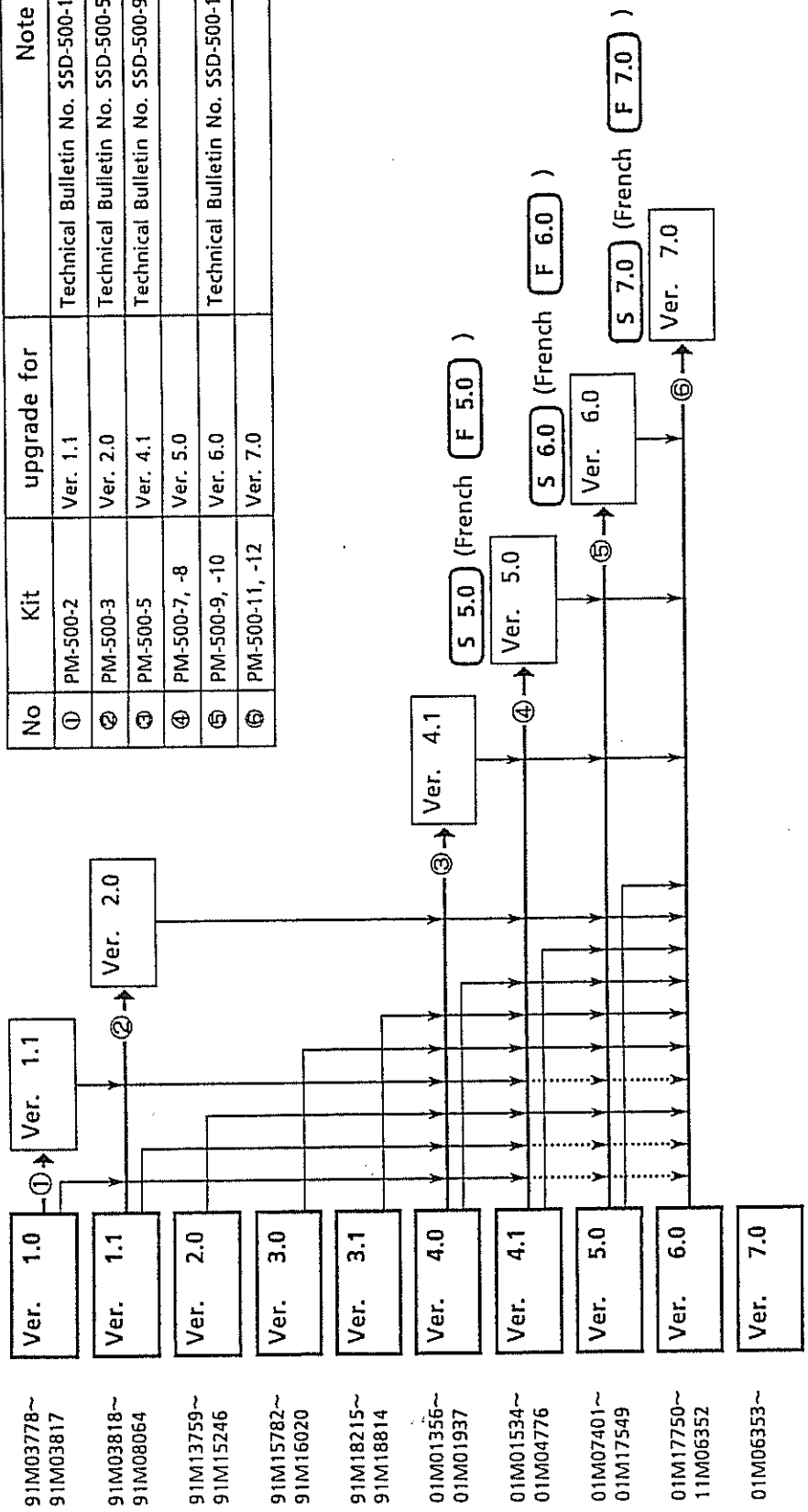
HISTORY OF SSD-500 (Specification change list)

Version	Specification change (except probe connection)
5.0	Error : Solve the miss operation of CGW/EDC calculation with european date format. Error : Solve the miss lighting of [3] switch LED on dual image display. Error : Solve the miss operation of date setting for February-29-2000. Camera : Any switches except [2] will be accepted in a printing. OB Calculation : Update HADLOCK fetal calculation formula. ANGLE : Change the usage.
6.0	Probe group : Re-organized of probe group as following, Group 1 General use (domestic and export) Group 2 Group 3 Veterinary Group 4 General use (for USA) Puncture guide : Addition of 0.5cm dot interval. (depends on the magnification) Puncture guide : "SELECT" will be displayed in the menu if the direction can be varied. ANGLE : Change the usage.
7.0	Probe : UST-981P-5 transvaginal / puncture probe can be connected. ( on probe group ① and ④. )

History of SSD-500

(Software relation)

No	Kit	upgrade for	Note
①	PM-500-2	Ver. 1.1	Technical Bulletin No. SSD-500-1
②	PM-500-3	Ver. 2.0	Technical Bulletin No. SSD-500-5
③	PM-500-5	Ver. 4.1	Technical Bulletin No. SSD-500-9
④	PM-500-7, -8	Ver. 5.0	(-8:French version)
⑤	PM-500-9, -10	Ver. 6.0	(-10:French version)
⑥	PM-500-11, -12	Ver. 7.0	(-12:French version)











History of SSD-500

(Kit)

S/N	01M07401~ 08000	01M13550~ 14149	01M17450~ 18449	11M00472~ 11M01471	11M05553~ 06552	11M10687~ 11286	11M11896~ 12695	~	~										
Software	Ver. 5.0				Ver. 6.0					Ver. 7.0									
PM-500-1																			
PM-500-2																			
PM-500-3																			
PM-500-4																			
PM-500-5																			
PM-500-6																			PCB fixing ( ~91M18294)
PM-500-9																			Upgrade for Ver. 6.0
PM-500-10																			Upgrade for Ver. 6.0 (French version)
PM-500-11																			Upgrade for Ver. 7.0
PM-500-12																			Upgrade for Ver. 7.0 (French version)



Other kit required

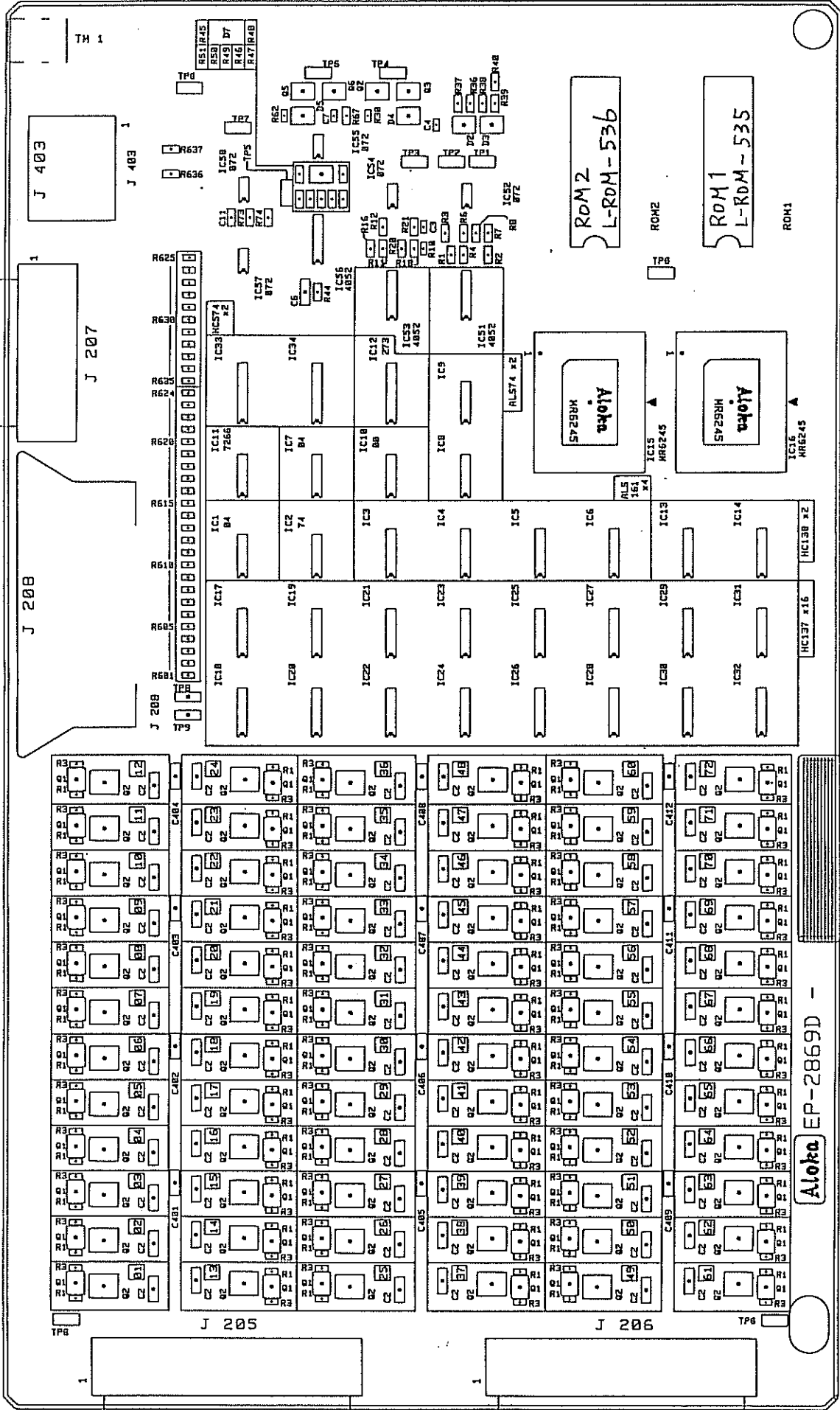


Kit applied

# **SECTION 13 PARTS LIST**

## **CONTENTS**

	Device location on PCB	13 - 1
13-1	Parts List	13 - 15



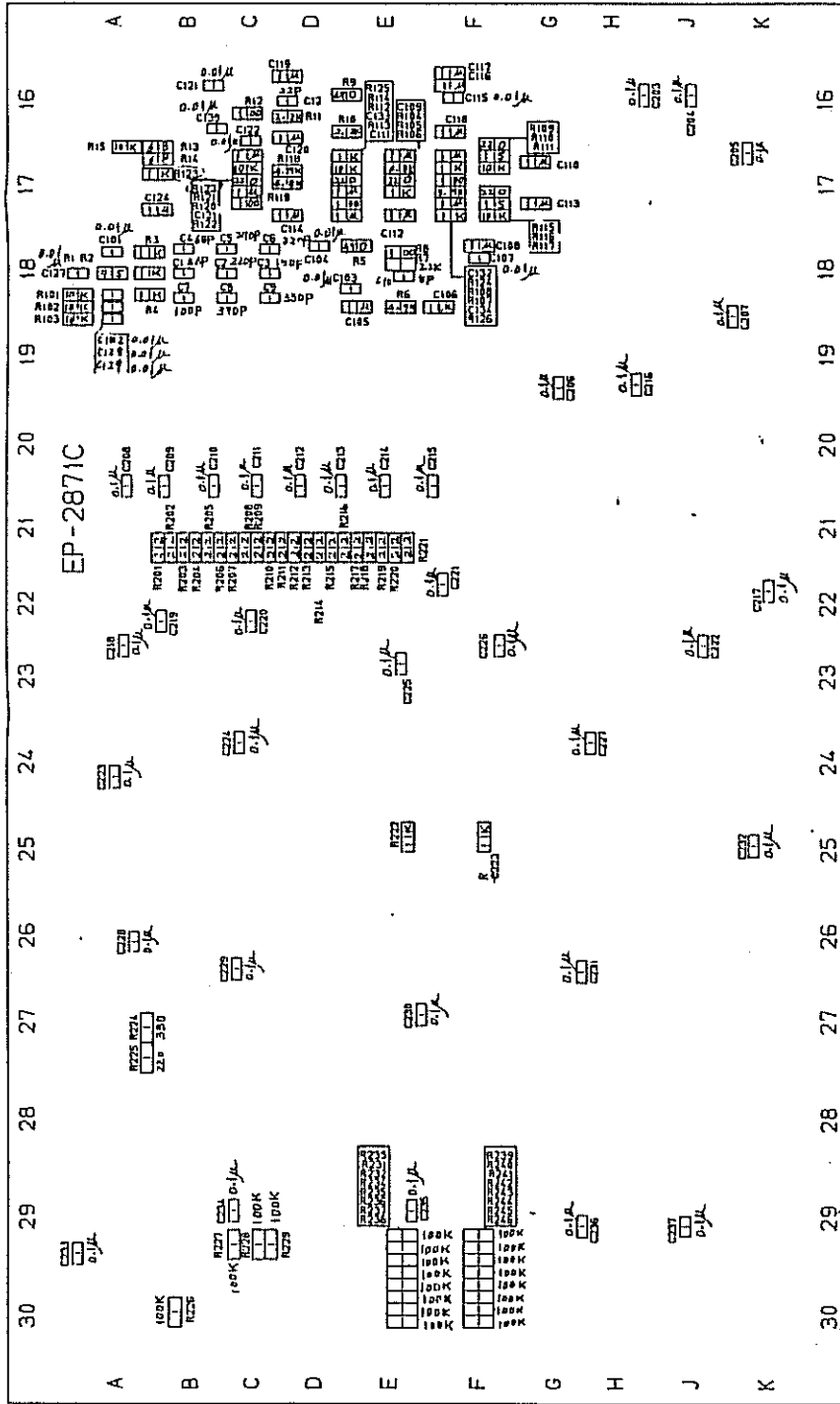
EP-2869D





K I L M N O P Q R S T U V W X Y

1 2 3 4 5 1 2 3 4 5 1 2 3 4 5 1 2 3 4 5 1 2 3 4 5 1 2 3 4 5 1 2 3 4 5



注  
 C233 - 2ヶ有り  
 R220 - 2ヶ有り  
 R102 - 2ヶ有り  
 C102 } 2ヶ有り  
 C124 }  
 C10

REVISEIONS 変更	MODEL 型号		EP-2871C	-1	2
	DRAWING NO. 図号		MC315518	-2	1
	TITLE 名称		DSC		
3RD ANGLE PROJECTION 第三角法		DRAWN 製図	DESIGNED 設計	CHECKED 検図	APPROVED 承認
SCALE 尺数		1:1.25			
UNITS 単位		mm.			









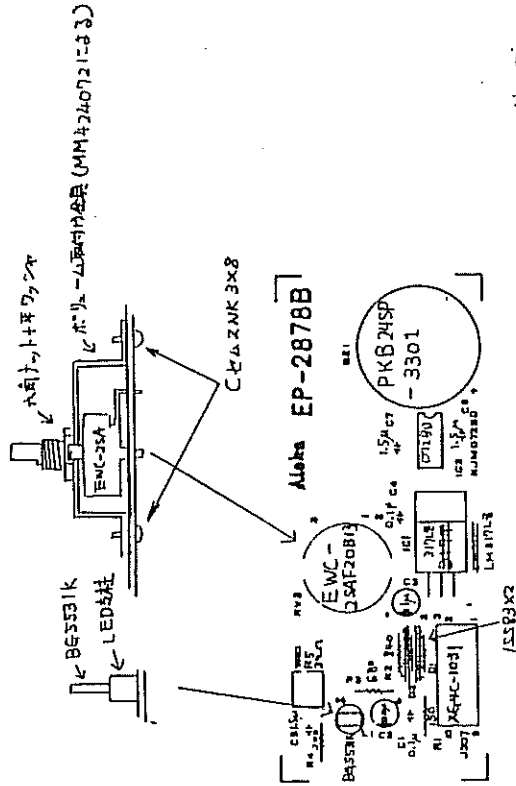
凡例	
	CHECK PIN(CP-10B)
	BUSBAR ( )
	IC SOCKET ( )
	MOS IC ( )
	ROM IC ( )
	TAPPING

NOTE	
○	コネクタ部及びICのスペアランドは半田時テーピングのこと
○	ダイオード、コンデンサの極性注意
○	ROMは逆読み後取付のこと
○	MOS IC使用基板につき取扱い注意
○	チェック端子の取付け方向はマーク間の方向とする
○	バスの折り曲げ、麻糸(出し足は除く)
○	部品取付の向き MAX 9mm
○	結露無きは取付け不要
○	SN
○	」粘板貼付の部

コネクタJ307は半田面付ナ、

ボクレー加工	
あり	あり
あり	あり

注ORV1は高圧コンポで消して下さい。そして  
EF 439.5と印地紙をPの様に要装して下さい。  
①IC 71は LMS711 カSLM317に交換。  
②IC 72は LMS711のTE高コンポで消して下さい。

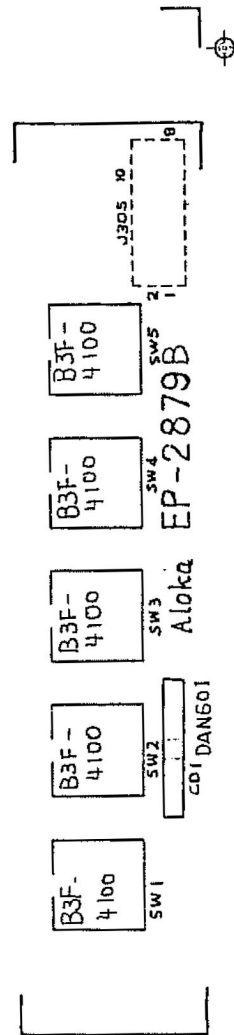


<b>Aloka</b>		Bill of Materials	EP-2878B	1/3
REV: 001	DESIGNER: Y. Higashi	DATE: 81.12.27	MC314492	
SCALE: 1:1	DR: Y. Higashi	CHK: Y. Higashi		

凡例	
	CHECK PIN (CP-10B)
	BUSBAR ( )
	IC SOCKET ( )
MOS	MOS IC ( )
ROM	ROM IC ( )
	TAPING

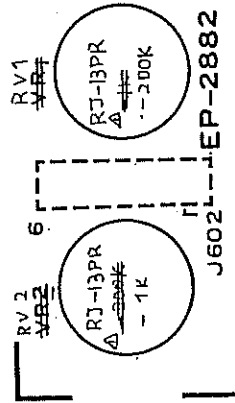
凡例	
	コネクタ部及びICのスペアランドは半田時コーピングのこと
	ダイボード、コンデンサの極性注意
	ROMは待機後取付のこと
	MOS IC使用基板につき取扱い注意
	チェック端子の取付け方向はマーク間の方向とする
	バスバーの折り曲げ半径(但し足は除く)
	部材は41gの厚さ M X Y 9mm
	諸元書きは取付け不要
	(S/N) 貼紙貼付の章

バナー	期工
2/3	あ
3/3	あ



<b>Aloka</b>	TITLE 6#	MODEL 6#	1/1
SELECT KEY	EP-2879B	DRAWING NO. 6#	MC314495
DESIGNED BY	Y. Minogishi	CHECKED BY	[Signature]
DATE	88-12-27	APPD. 3#	10/2
SCALE	1/1	REV.	1-2





Aloka

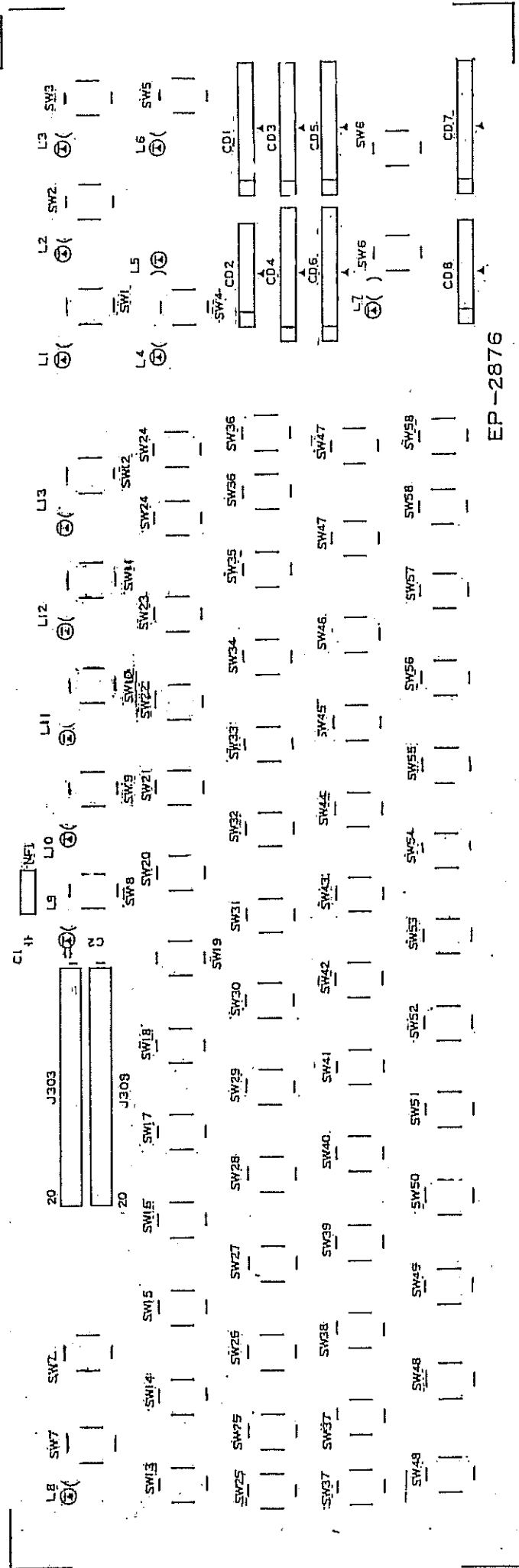
コネクター602は半田面あり。



△ 1988.12.28 52 号



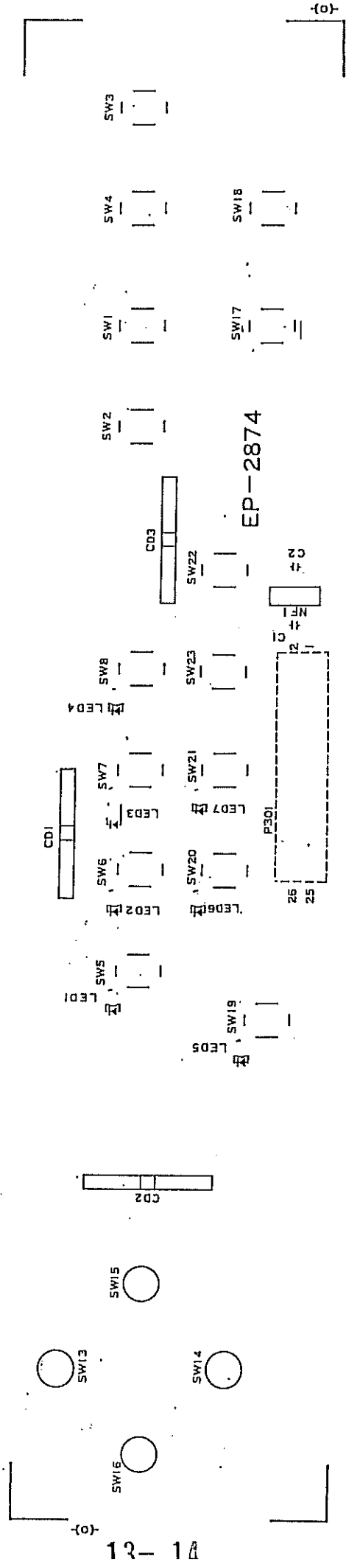
Aloka 3RD ANGLE PROJECTION 第3角法 SCALE 比率 UNITS 単位	TITLE 名称 Photo Cont./Bright	MODEL 型号 EP-2882	1/1
	DRAWN 製図 Y. Minagishi - 88 - 10 - 05 -	CHECKED 検定 [Signature] 88.10.07	DRAWING NO. 図番 MC 314017



EP -2876

L-KEY-14A





L-KEY-14B

13-1 Attention for using of Parts List

- The illustration which is included in Parts List is prepared to find out the required parts. The shape of parts may be different from the actual shape.

Kinds of following piece may be not described in the illustration.

- Cable Clump
- Cable Protector ( Edging )
- Earthing Spring
- Label

Basically, if the part requires the above kinds of piece, the part is served as one of the assembly. However, these pieces are shown in this list, please see that page.

- When the parts will be improved and there is no interchangeability, New "PARTS NO." and corresponded "SERIAL NO." will be described in the list. However, "ITEM" will be not changed.

ITEM	CODE NO.	PART NO.	DESCRIPTION	SERIAL NO.
xxx	xxxx			~xxMxxxx
	xxxx			xxMxxxx~

- When the parts will be deleted or added,  
Deleted : End of serial number will be shown in "SERIAL NO." field.

				~xxMxxxx
--	--	--	--	----------

- Added : Beginning of serial number will be shown in "SERIAL NO." field, and new "ITEM" will be also shown.

xxx				xxMxxxx~
-----	--	--	--	----------

CAUTION: No "SERIAL NO." means that the parts have not been improved from the starting in products.

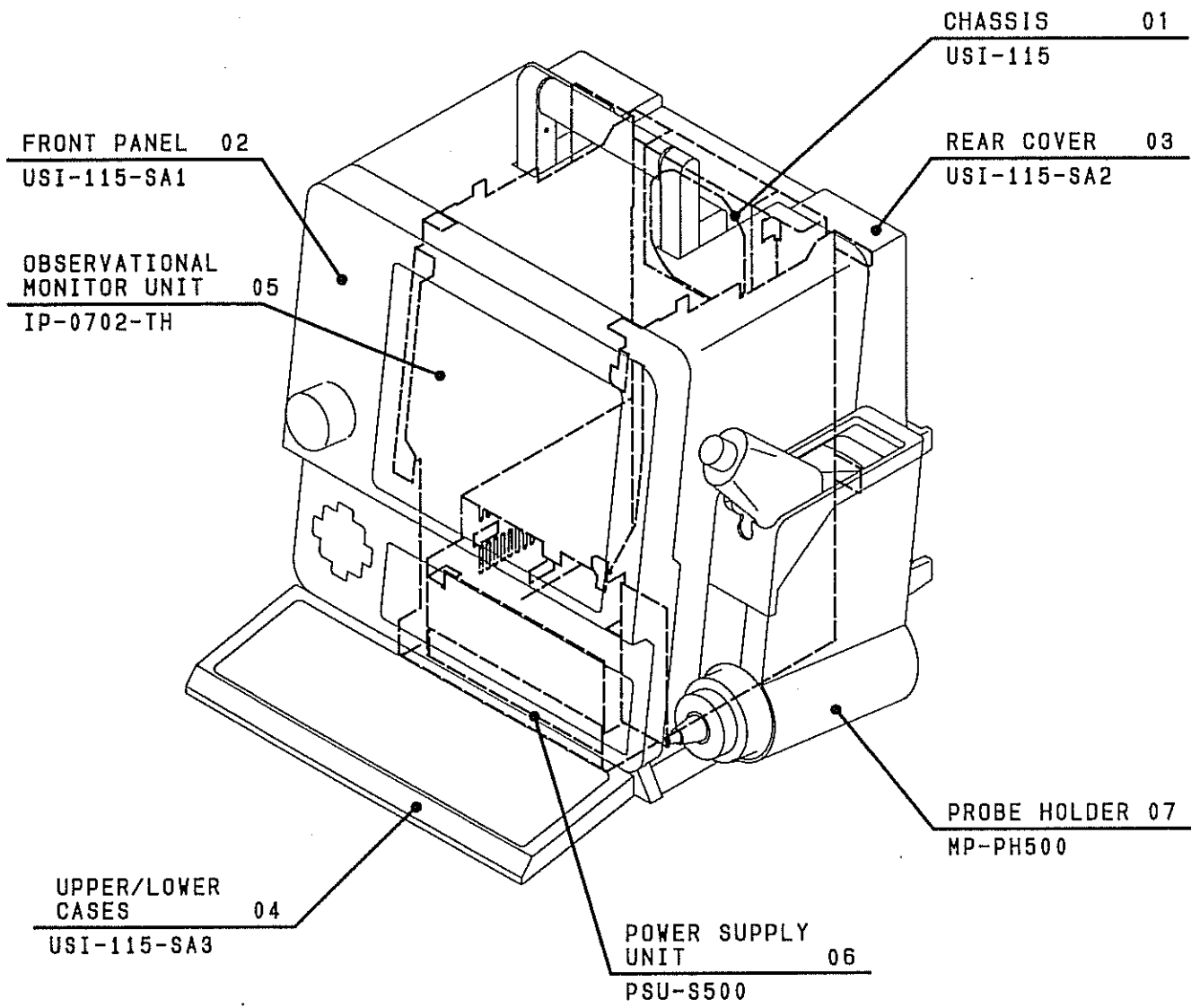
- When "UNIT NO." will be changed,  
New Parts List will be issued and added with new "UNIT NO.", if "UNIT NO." will be changed by upgrade of the equipment. However, the change will be shown in the same page at accordance with the changing.

- When the Parts List will be changed,  
Revised Parts List will be issued. Please use the newest list.

- Abbreviation  
Following abbreviations have these meaning.

- R : Right
- L : Left

- "CODE NO."  
Now, "CODE NO." is not used. ( July-18-'90 )  
The order should be done with "PARTS NO."

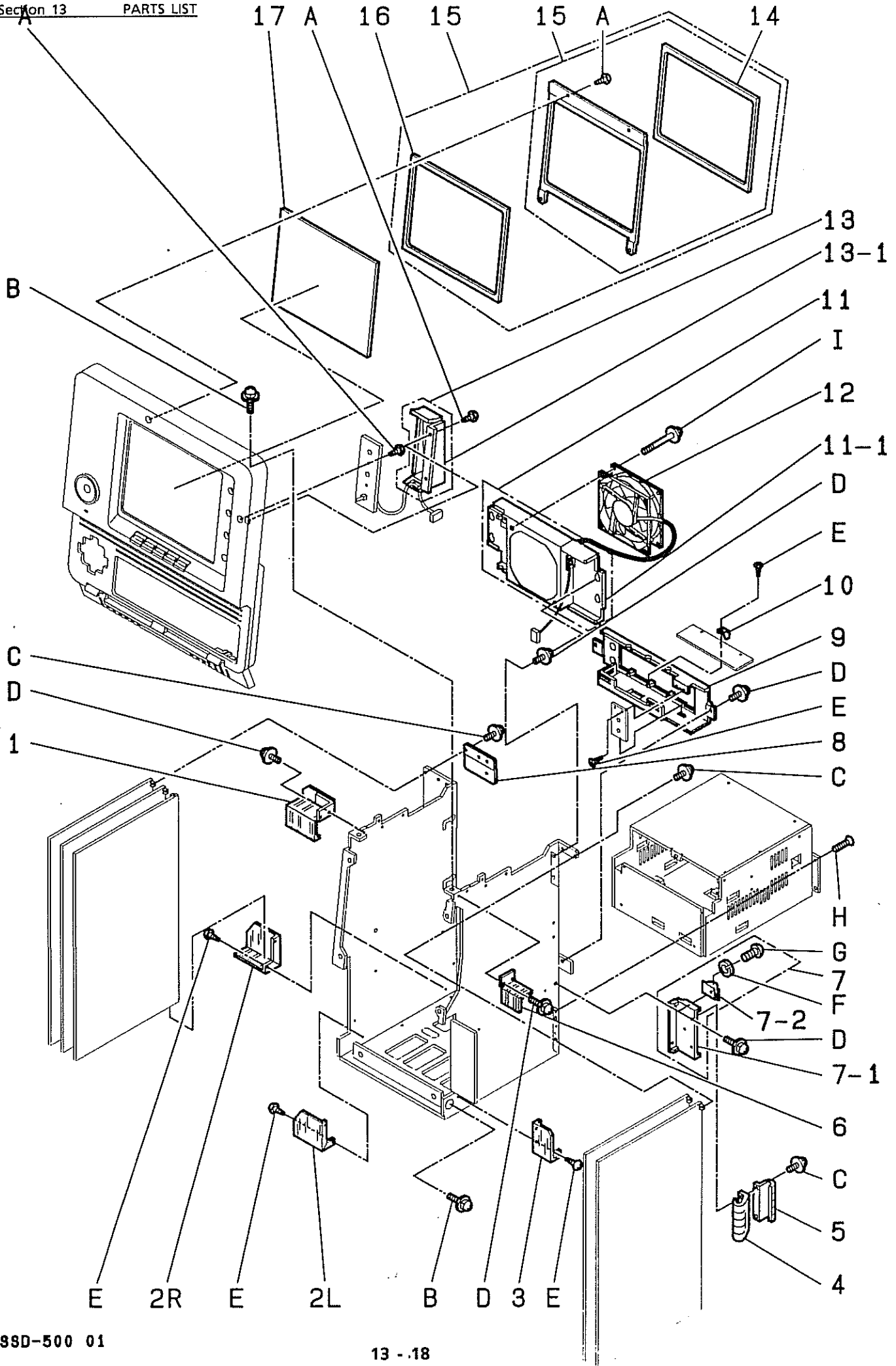


CONTENTS / TABLE OF CONSTITUTION

			INDEX NO.	SERIAL NO.
CAUTIONS ON OPERATION			00	
MAIN UNIT	USI-115	CHASSIS	01	
	USI-115-SA1	FRONT PANEL	02	
	USI-115-SA2	REAR COVER	03	
	USI-115-SA3	UPPER / LOWER CASES	04	
	IP-0702-TH	OBSERVATIONAL MONITOR UNIT	05	
POWER SUPPLY UNIT	PSU-S500		06	
PROBE HOLDER	MP-PH500		07	
CLAMP / GROUND SPRING / EDGE PROTECTOR			08	
LABEL			09	

EXCEPT MPT

MAIN PC BOARDS. NO



01	CHASSIS	UNIT USI-115	S/N
----	---------	-----------------	-----

ITEM	CODE NO.	PARTS NO.	DESCRIPTION	SERIAL NO.	SPEC.
1	A100107	USI-115-7	DSC PCB GUIDE (UPPER)		
2	A100108	USI-115-5	DSC PCB GUIDE (LOWER, LEFT/RIGHT)		
2 - L	A100153	USI-115-5T	DSC-PCB GUIDE B. L		
2 - R	A100152	USI-115-5H	DSC-PCB GUIDE B. R		
3	A100109	USI-115-6	GEU PCB GUIDE (LOWER)		
4	A100110	USI-115-15	SHIELDING SPRING B	91M13959~	
5	A100111	USI-115-14	SHIELDING SPRING A	91M13959~	
6	A100112	USI-115-8	GEU PCB GUIDE (UPPER)		
7	*A200013	USI-115-SA0101	PCB MOUNTING BRACE ASSY.		
7 - 1	A100113	USI-115-4	PCB MOUNTING BRACE		
7 - 2	A510007	SP-8302#10	GROUND SPRING 10mm		
8	A100114	USI-115-12	DSC PCB SUPPORTING BRACE		
9	A100115	USI-115-2	BACK PANEL		
10	A100116	USI-115-3	BACK EARTH PLATE		
11	*A200014	USI-115-SA0102	FAN ASSY.		
11 - 1	A100117	USI-115-1	FAN MOUNTING BRACE		
11 - [2]	A140004	KE-012#18	EDGE PROTECTOR 18mm		
11 - [3]	A620042	EDS-1	EDGE SADDLE (1)		
12	A625002	109P0812L412	FAN		
13	*A200015	USI-115-SA0103	SHIELDING PANEL- ASSY. 500		
13 - 1	A100119	USI-115-11	SHIELDING PANEL		
13 - [2]	A620042	EDS-1	EDGE SADDLE (1)		
14	A620044	USI-115-10	FILTER CUSHION		
15	*A200016	USI-115-SA0104	FILTER MOUNTING BRACE ASSY. 500		EXCEPT USA

\* ASSEMBLY PARTS. Please ask for Aloka Oversea Marketing Dept.  
日本国内は超音波TS課へ手配願います。

01	CHASSIS	UNIT USI-115	S/N
----	---------	-----------------	-----

ITEM	CODE NO.	PARTS NO.	DESCRIPTION	SERIAL NO.	SPEC.
15	*A200017	USI-115-SA0105	FILTER MOUNTING BRACE ASSY. 500		FOR USA
15 - [1]	A620044	USI-115-10	FILTER CUSHION		
15 - [2]	*A200005	USI-115-9	FILTER MOUNTING BRACE ASSEMBLY		
15 - [3]	A100120	L-ki-257-LA-2	FILTER RUBBER		FOR USA
16	A100120	L-ki-257-LA-2	FILTER RUBBER		FOR USA
17	A620045	L-ki-257	FILTER		EXCEPT USA
17	A620046	L-ki-257-LA-1	FILTER		FOR USA
A	A361308	NPT3×8	SCREW:NPT3×8		
B	A303412	BNK4×12	SCREW:BNK4×12		
C	A304308	BNK3×8Bs	SCREW:BNK3×8Bs		
D	A303308	BNK3×8	SCREW:BNK3×8		
E	A363308	NBT3×8	SCREW:NBT3×8		
F	A383302	SW2	WASHER:SW2		
H	A321312	S3×12	SCREW:S3×12		
I	A303330	BNK3×30	SCREW:BNK3×30		

\* ASSEMBLY PARTS.

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( Page for addition and revision )





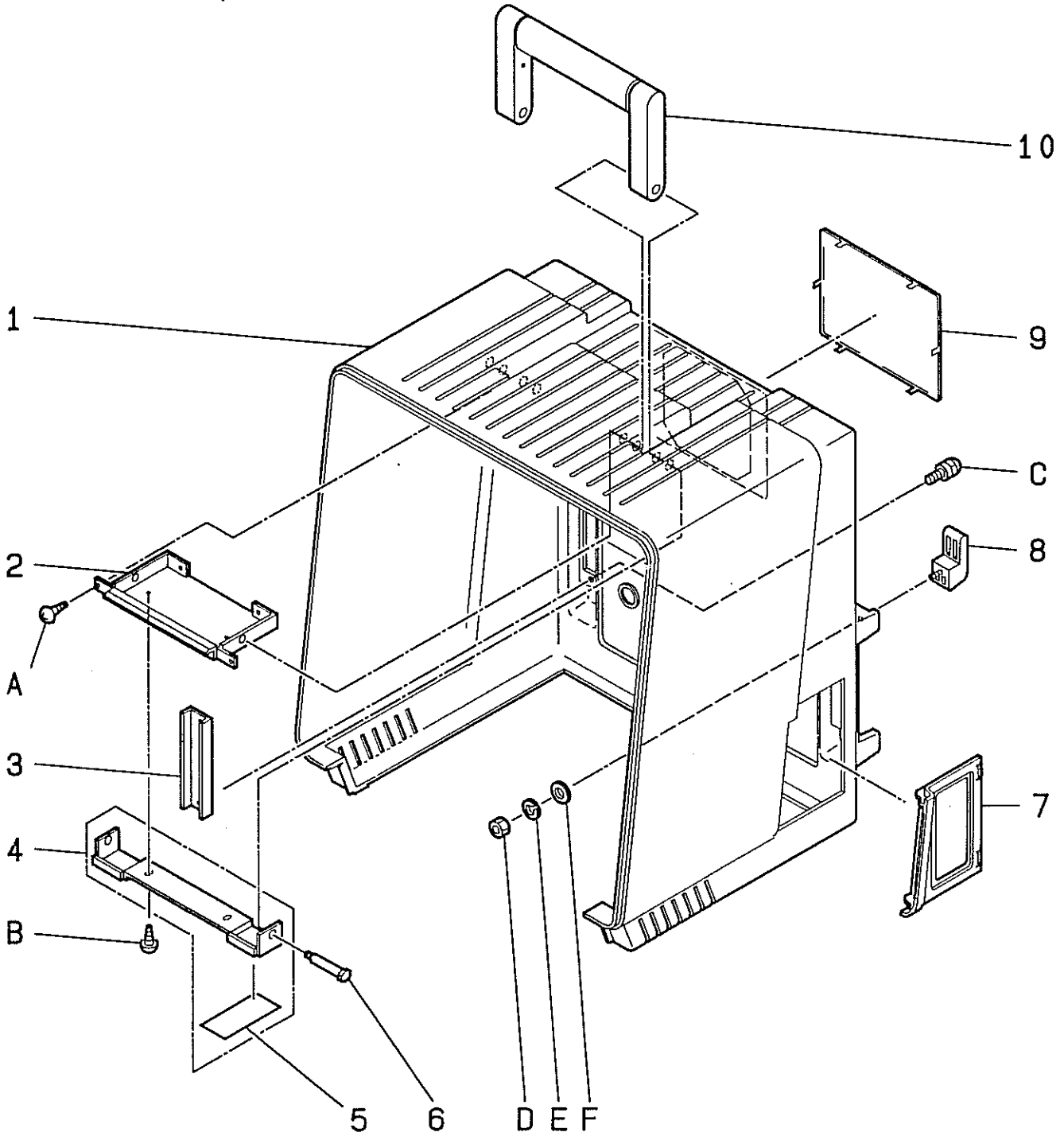
02	FRONT PANEL	UNIT USI-115-SA1	S/N
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ITEM	CODE NO.	PARTS NO.	DESCRIPTION	SERIAL NO.	SPEC.
1	*A200018	USI-115-SA1	FRONT PANEL ASSY. (500) WITHOUT NAMEPLATE		
1	*A200019	USI-115-SA1 -SA0201	FRONT PANEL ASSY. (500) WITH NAMEPLATE		FOR USA
1 - 1	*A200006	USI-115-SA1-1	FRONT PANEL		
1 - 2	A140007	EMR-15-MST#950	ELASTIC MESH 950mm		
1 - [3]	A600015	P-32-500 CORO	TITLE NAMEPLATE		FOR USA
1 - [4]	A600016	P-4231B-UL	SOUND CAUTION NAMEPLATE		FOR USA
2	A510005	USI-115-SA1-4	GAIN KNOB		
3	A100122	USI-115-SA1-9	FRONT PANEL MOUNTING BRACE		
4	A100123	USI-115-SA1-3	HINGE MOUNTING BRACE		
5	A100124	USI-115-SA1-8	FRONT PANEL MOUNTING BRACE		
6	A100125	USI-115-SA1-2	PANEL HOOK LEFT/RIGHT ASSY.		
6 - L	A100155	USI-115-SA1-2T	PANEL HOOK LEFT		
6 - R	A100154	USI-115-SA1-2H	PANEL HOOK RIGHT		
7	A620047	USI-115-SA1-5	SWITCH CAP		
8	A510006	USI-115-SA1-6	CONT, BRIGHT KNOB FOR CRT		
9	*A200007	L-KEY-14B(A)	OPERATING PANEL ASSEMBLY-B	~91M18400	
9	*A200008	L-KEY-14B(Y)	OPERATING PANEL ASSEMBLY-B	91M18401~	
10	A100126	USI-115-SA1-7	FRONT PANEL MOUNTING BRACE		
A	A361308	NPT3×8	SCREW:NPT3×8		
B	A361266	NPT2.6×6	SCREW:NPT2.6×6		
C	A361261	NPT2.6×10	SCREW:NPT2.6×10		

\* ASSEMBLY PARTS. Please ask for Aloka Oversea Marketing Dept.  
日本国内は超音波TS課へ手配願います。

( Page for addition and revision )

( Page for addition and revision )



03	REAR COVER	UNIT USI-115-SA2	S/N
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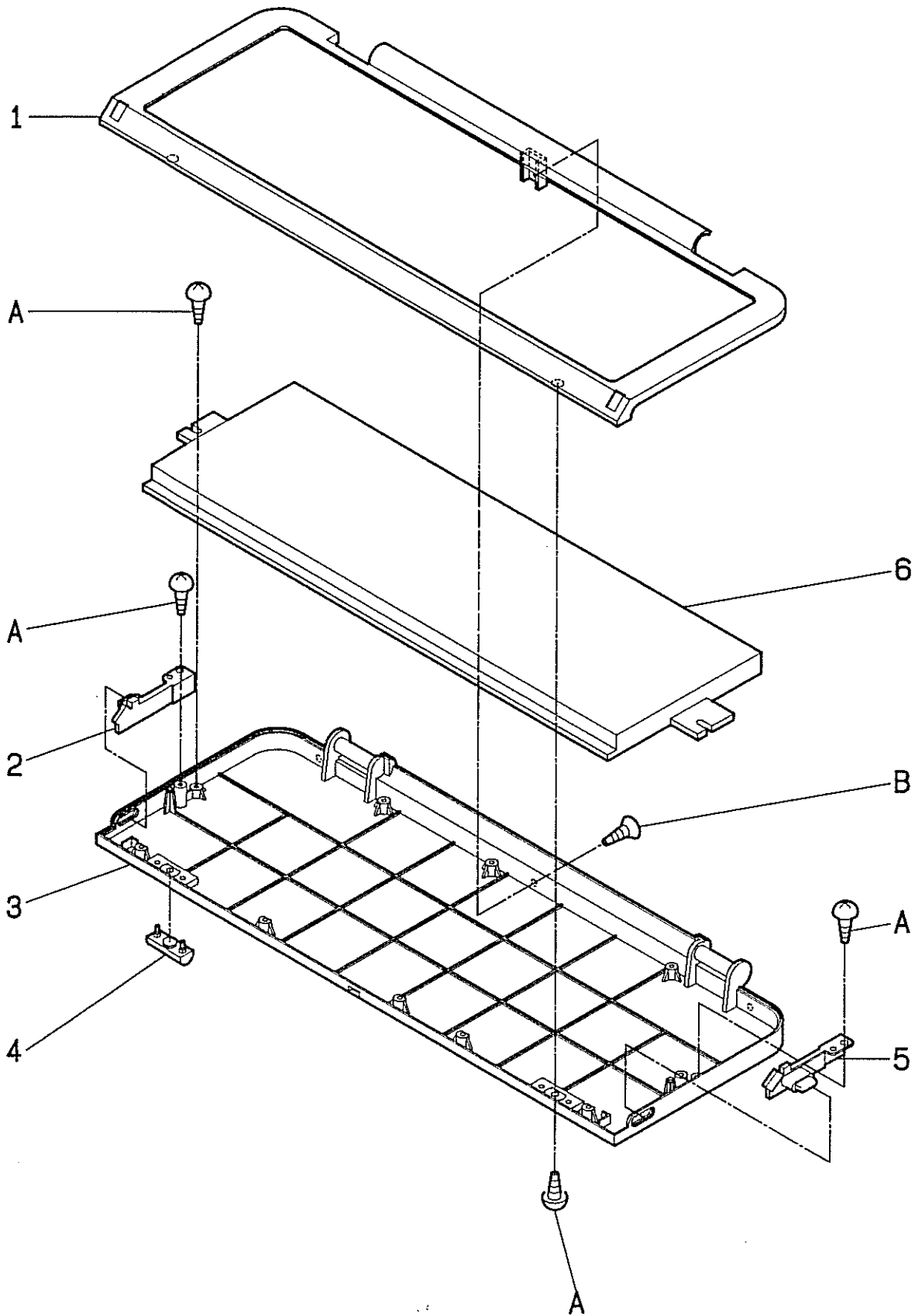
ITEM	CODE NO.	PARTS NO.	DESCRIPTION	SERIAL NO.	SPEC.
0	*A200027	USI-115-SA2	REAR COVER ASSY. 500 WITHOUT NAMEPLATE		
0	*A200020	USI-115-SA2 -SA0301	REAR COVER ASSY. 500 WITH NAMEPLATE	~91M18814	
0	*A200021	USI-115-SA2 -SA0302	REAR COVER ASSY. 500 WITH NAMEPLATE	01M1356 ~	
0	*A200028	USI-115-SA2 -SA0303	REAR COVER ASSY. 500 WITH NAMEPLATE	~91M18814	FOR USA
0	*A200029	USI-115-SA2 -SA0304	REAR COVER ASSY. 500 WITH NAMEPLATE	01M1356 ~	FOR USA
1	A620048	USI-115-SA2-1	REAR COVER		
2	A100127	USI-115-SA2-7	HANDLE MOUNTING BRACE(B)		
3	A100128	USI-115-SA2-9	BLIND PANEL		
4	A100129	USI-115-SA2-6	HANDLE MOUNTING BRACE(A)		
5	A620049	USI-115-SA2-10	CABLE PROTECTION SHEET	91M13899~	
6	A100130	USI-115-SA2-8	HANDLE SHAFT		
7	A620050	USI-115-SA2-4	CONNECTOR COVER		
8	A100131	USI-115-SA2-3	CABLE HOOK		
9	A100132	USI-115-SA2-5	FAN COVER		
10	A620051	USI-115-SA2-2	HANDLE		
A	A361308	NPT3×8	SCREW:NPT3×8		
B	A363308	NBT3×8	SCREW:NBT3×8		
C	A305308	CNK3×8Bs	SCREW:CNK3×8Bs		
D	A381103	N3	NUT:N3		
E	A383303	SW3	WASHER:SW3		
F	A383203	PW3	WASHER:PW3		

\* ASSEMBLY PARTS. Please ask for Aloka Oversea Marketing Dept.  
日本国内は超音波TS課へ手配願います。

( Page for addition and revision )

( Page for addition and revision )





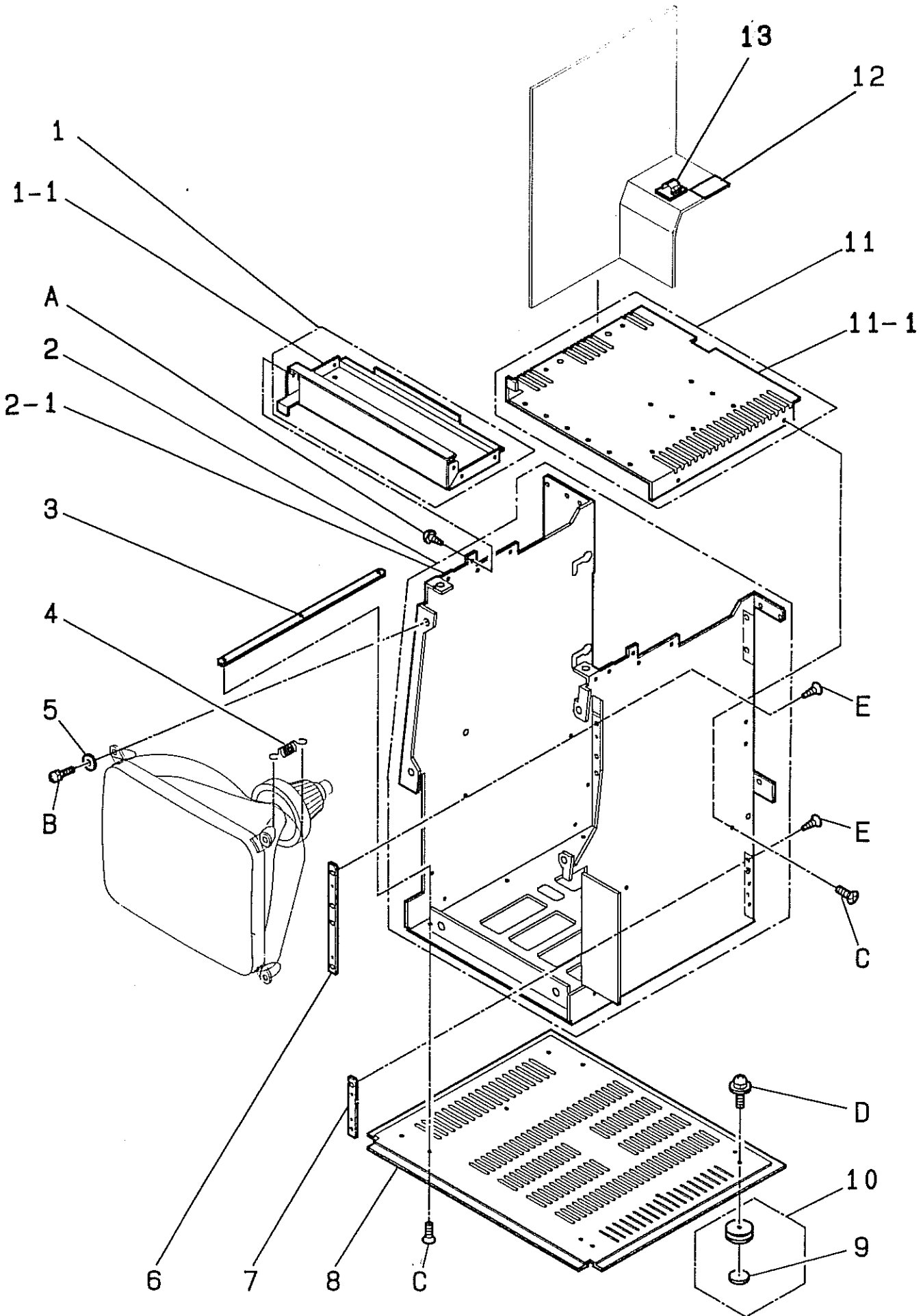
04	UPPER/LOWER CASE	UNIT USI-115-SA3	S/N
----	------------------	---------------------	-----

ITEM	CODE NO.	PARTS NO.	DESCRIPTION	SERIAL NO.	SPEC.
0	A120000	USI-115-SA3	KEY BOARD CASE ASSY. 500		
0	*A200030	USI-115-SA3 -SA0401	KEY BOARD ASSY. 500	~91M18400	
0	*A200031	USI-115-SA3 -SA0402	KEY BOARD ASSY. 500	91M18401~	
1	A620052	USI-115-SA3-4	UPPER CASE		
2	A620053	USI-115-SA3-2	HOOK		
3	A620054	USI-115-SA3-1	LOWER CASE		
4	A620055	USI-115-SA3-5	PATCH RUBBER		
5	A620056	USI-115-SA3-3	HOOK		
6	*A200009	L-KEY-14-A(A)	OPERARION PANEL ASSEMBLY-A	~91M18400	
6	*A200010	L-KEY-14-A(Y)	OPERATION PANEL ASSEMBLY-A	91M18401~	
A	A361266	NPT2. 6×6	SCREW:NPT2. 6×6		
B	A362266	SPT2. 6×6	SCREW:SPT2. 6×6		

\* ASSEMBLY PARTS. Please ask for Aloka Oversea Marketing Dept.  
日本国内は超音波TS課へ手配願います。

( Page for addition and revision )

( Page for addition and revision )



ITEM	CODE NO.	PARTS NO.	DESCRIPTION	SERIAL NO.	SPEC.
05	OBSERVATIONAL MONITOR UNIT			UNIT IP-0702-TH	S/N
0	A650002	IP-0702-TH	OBSERVATIONAL MONITOR UNIT ASSY.		
1	*A200022	IP-0702-TH-SA0501	IP-0702 STAY ASSY.		
1 - 1	A100133	IP-0702-TH-10	STAY		
1 - [2]	A100134	VD-XP2-012	PCB GUIDE (2)		
2	*A200023	IP-0702-TH-SA0502	IP-0702 MAIN CHASSIS ASSY. 500		
2 - 1	A100135	IP-0702-TH-5	MAIN CHASSIS		
2 - [2]	A100009	SP-8302	GROUNDING SPRING		
2 - [3]	A620057	EDS-1208u	EDGE SADDLE (2)		
2 - [4]	A620000	KE-016	EDGE PROTECTOR (1)		
3	A100136	IP-0702-TH-6	SQUARE NUT (BASE)		
4	A100137	IP-0501-TV-15	COIL SPRING		
5	A100138	IP-0702-TH-11	WASHER	91M16082~	
6	A100139	IP-0702-TH-8	SQUARE NUT (PSU) (2)		
7	A100140	IP-0702-TH-7	SQUARE NUT (PSU) (1)		
8	A100141	IP-0702-TH-2	BASE		
9	A620058	IP-0702-TH-4	LEG CAP		
10	*A200024	IP-0702-TH-SA0503	LEG ASSY. 500		
10 - [1]	*A200011	IP-0702-TH-3	LEG ASSEMBLY		
10 - [2]	A620058	IP-0702-TH-4	LEG CAP		
11	*A200025	IP-0702-TH-SA0504	IP-0702 SUB CHASSIS ASSY.		
11 - 1	A100142	IP-0702-TH-9	SUB CHASSIS		
11 - [2]	A100143	VD-XP2-011	PCB GUIDE (1)		
11 - [3]	A622004	UAMS-07-0	MINI CLAMP		
11 - [4]	A622000	UL-13	CLAMP (1)		

\* ASSEMBLY PARTS.

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05	OBSERVATIONAL MONITOR UNIT	UNIT IP-0702-TH	S/N
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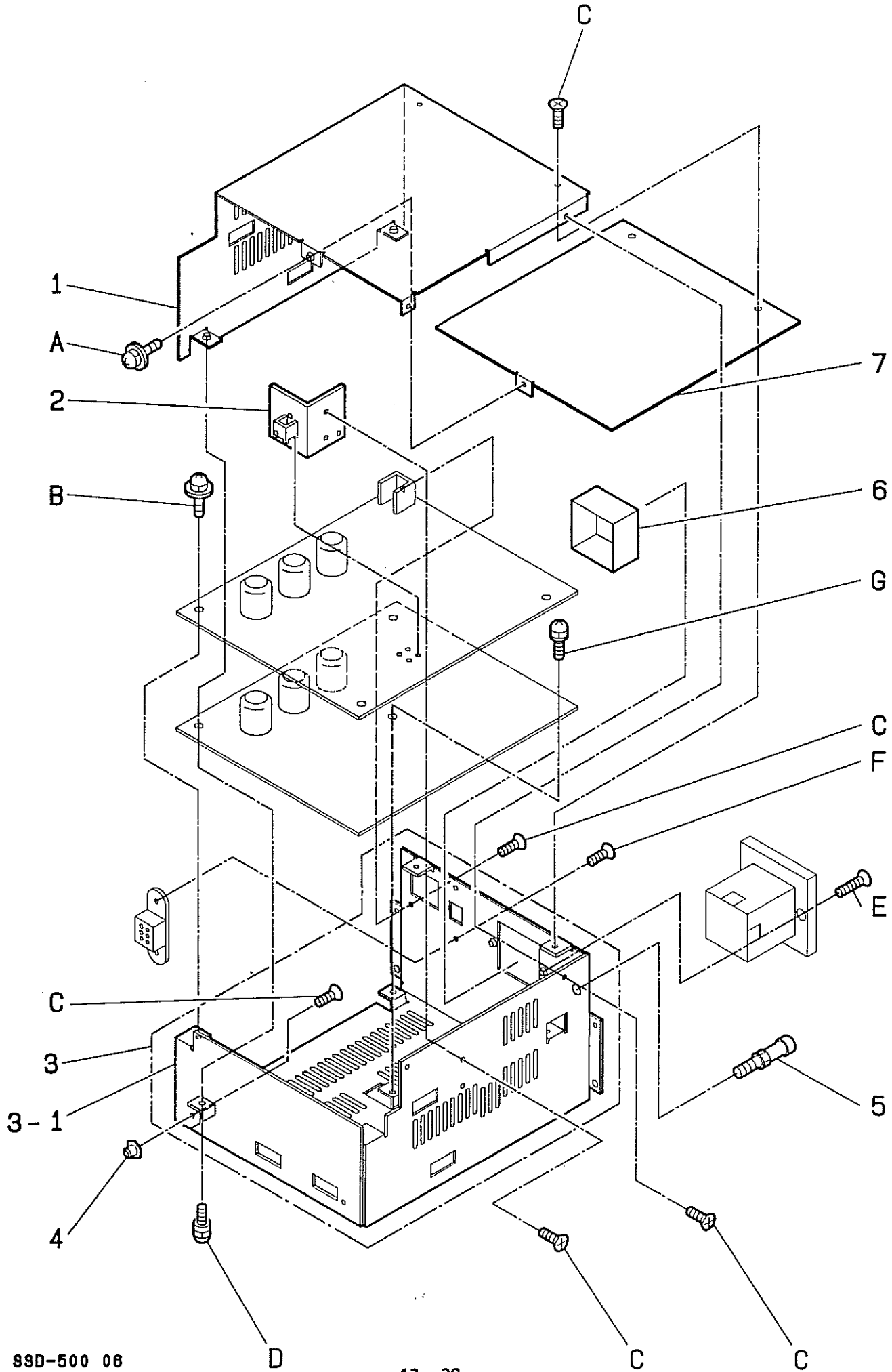
ITEM	CODE NO.	PARTS NO.	DESCRIPTION	SERIAL NO.	SPEC.
12	A600027	P-4211	HIGH VOLTAGE CAUTION LABEL		
13	A622005	CKN-05	CKN CLAMP		
A	A363308	NBT3×8	SCREW:NBT3×8		
B	A301408	ANK4×8	SCREW:ANK4×8		
C	A321308	S3×8	SCREW:S3×8		
D	A303308	BNK3×8	SCREW:BNK3×8		

\* ASSEMBLY PARTS.

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( Page for addition and revision )





06	Power Supply Unit	UNIT PSU-S500	S/N
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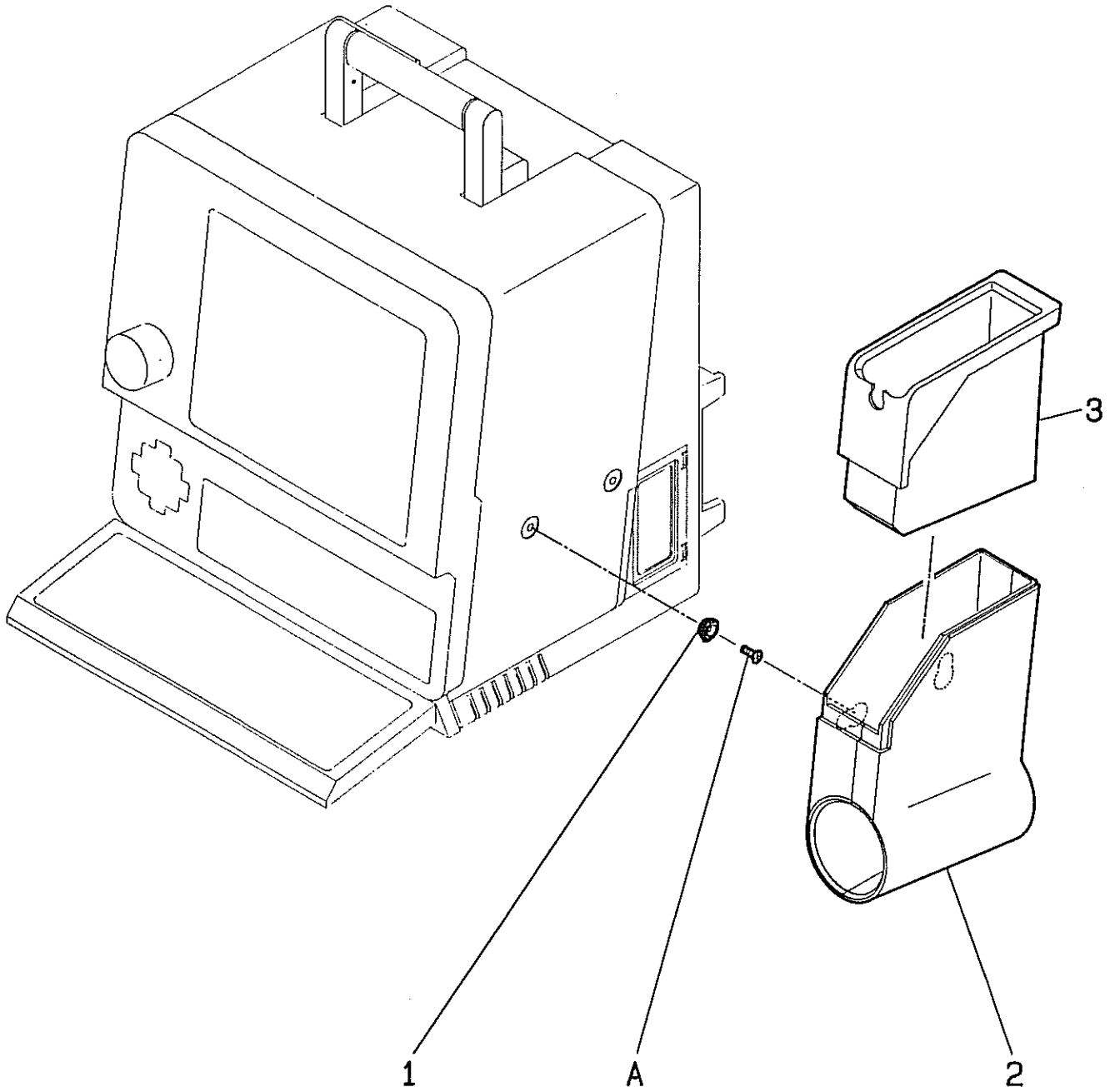
ITEM	CODE NO.	PARTS NO.	DESCRIPTION	SERIAL NO.	SPEC.
0	A030000	PSU-S500	POWER SUPPLY UNIT ASSY. 500		
1	A100144	PSU-S500-2	COVER		
2	A100145	PSU-S500-8	HEAT SINK		
3	*A200026	PSU-S500-SA0601	MAIN CHASSIS ASSY. PSU-S500		
3 - 1	A100146	PSU-S500B-1	MAIN CHASSIS		
3 - [2]	A620000	KE-016	EDGE PROTECTOR (1)		
4	A100147	PSU-S500-3	PSU GUIDE PIN		
5	A100148	SE-6-6	GROUNDING POST		
6	A100149	PSU-S500-9	INLET SHIELD PLATE		
7	A100150	PSU-S500-5	SHIELDING PLATE		
A	A304306	BNK3×6Bs	SCREW:BNK3×6Bs		
B	A304308	BNK3×8Bs	SCREW:BNK3×8Bs		
C	A322306	S3×6Bs	SCREW:S3×6Bs		
D	A305310	CNK3×10Bs	SCREW:CNK3×10Bs		
E	A322316	S3×16Bs	SCREW:S3×16Bs		
F	A322310	S3×10Bs	SCREW:S3×10Bs		
G	A305308	CNK3×8Bs	SCREW:CNK3×8Bs		

\* ASSEMBLY PARTS.

Please ask for Aloka Oversea Marketing Dept.  
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( Page for addition and revision )



07	PROBE HOLDER	UNIT MP-PH500	S/N
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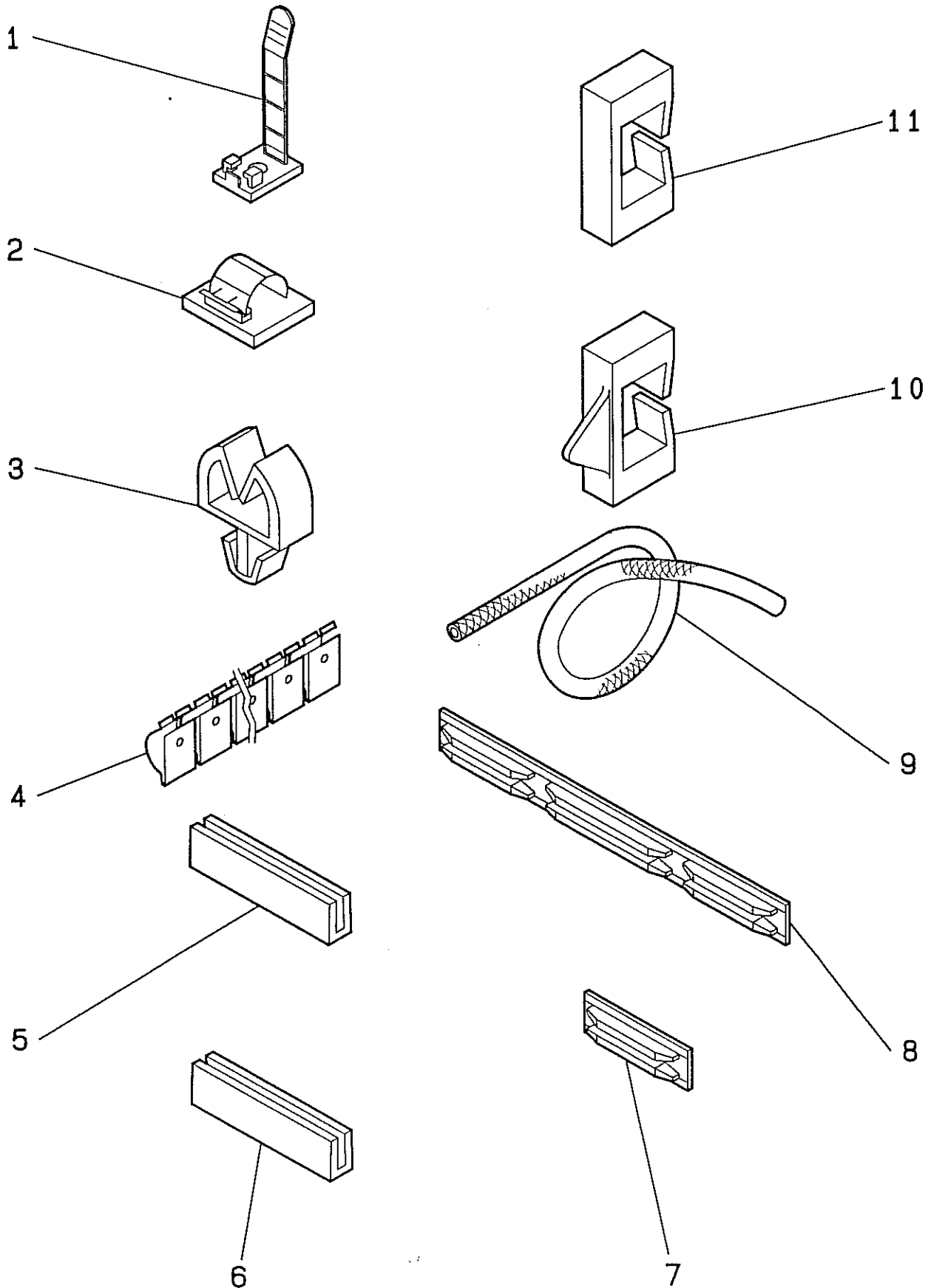
ITEM	CODE NO.	PARTS NO.	DESCRIPTION	SERIAL NO.	SPEC.
0	A120001	MP-PH500	PROBE HOLDER ASSY. 500		
1	A100151	MP-PH500-3	WASHER		
2	*A200012	MP-PH500-1	PROBE HOLDER ASSEMBLY		
3	A620059	MP-PH500-2	RUBBER CUSHION		
4	A322308	S3×8Bs	SCREW: S3×8Bs		

\* ASSEMBLY PARTS. Please ask for Aloka Oversea Marketing Dept.  
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( Page for addition and revision )





08	Clamp/Grounding Spring/etc.	UNIT SSD-500	S/N
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ITEM	CODE NO.	PARTS NO.	DESCRIPTION	SERIAL NO.	SPEC.
1	A622000	UL-13	CLAMP (1)		
2	A622005	CKN-05	CKN CLAMP		
3	A622004	UAMS-07-0	MINI CLAMP		
4	A100009	SP-8302	GROUNDING SPRING		
5	A620043	KE-012	EDGE PROTECTOR (1)		
6	A620000	KE-016	EDGE PROTECTOR (1)		
7	A100134	VD-XP2-012	PCB GUIDE (2)		
8	A100143	VD-XP2-011	PCB GUIDE (1)		
9	A100121	EMR-15-MST	ELASTIC MESH		
10	A620057	EDS-1208u	EDGE SADDLE (2)		
11	A620042	EDS-1	EDGE SADDLE (1)		

\* ASSEMBLY PARTS. Please ask for Aloka Oversea Marketing Dept.  
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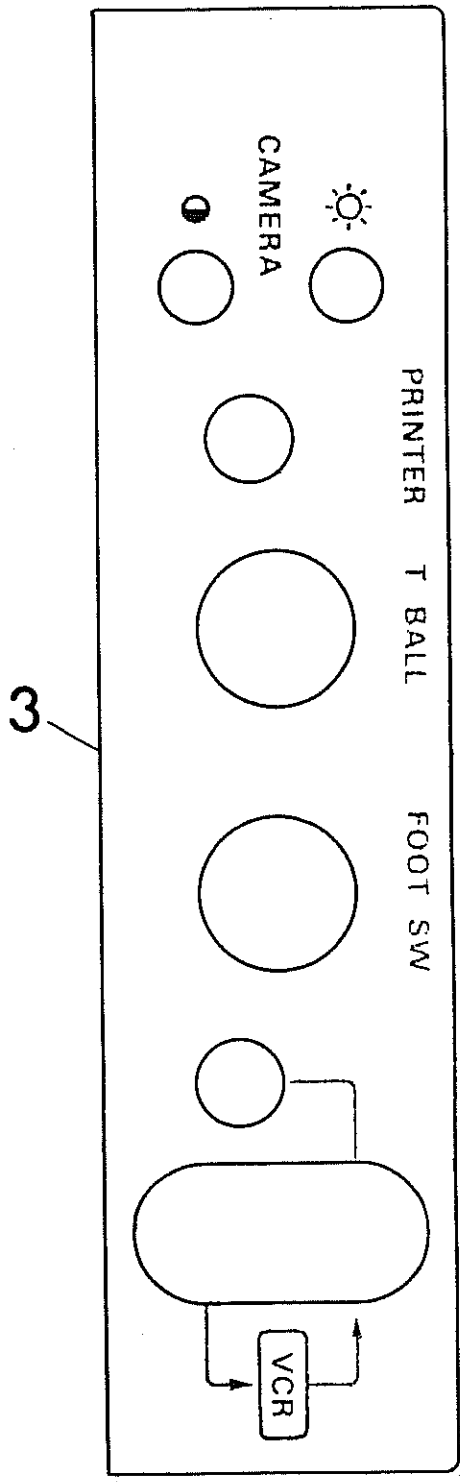
( Page for addition and revision )

1

注 意	CAUTION
探触子は衝撃に弱いので、落したりぶついたりしないようご注意ください。	A PROBE IS FRAGILE AGAINST SHOCK, SO BE CAREFUL NOT TO DROP OR STRIKE IT AGAINST ANYTHING HARD.
	<small>P-4248-UL</small>

2

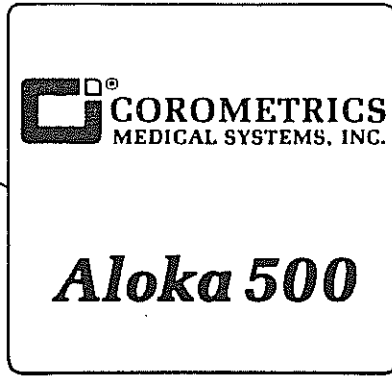
INPUT	FUSE	☐
100-120V~	T 3.0A/250V	
200-240V~	T 1.5A/250V	



4

注意
プローブの接続時には、電源を切って下さい。
CAUTION
TURN POWER OFF BEFORE CONNECTING OR DISCONNECTING PROBE.
<small>P-4232u</small>

5



10

**CAUTION**  
TO REDUCE THE RISK OF ELECTRICAL SHOCK, DO NOT REMOVE COVER. REFER SERVICING TO QUALIFIED SERVICE PERSONNEL.

P-4238-UL

6

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MEDICAL SYSTEMS, INC.  
WALLINGFORD,  
CONNECTICUT 06492 7/86  
FOR ALOKA P-32-CORO-UL

11

**WARNING**  
GROUNDING RELIABILITY CAN ONLY BE ACHIEVED WHEN THE EQUIPMENT IS CONNECTED TO AN EQUIVALENT RECEPTACLE MARKED HOSPITAL ONLY OR HOSPITAL GRADE.

P-4239-UL

7

**DANGER**  
POSSIBLE EXPLOSION HAZARD IF USED IN THE PRESENCE OF FLAMMABLE ANESTHETICS.

P-42280-UL

12

CONNECTION TO EXTERNAL ACCESSORIES MAY DEFEAT PATIENT ISOLATION. SEE OPERATOR'S MANUAL.

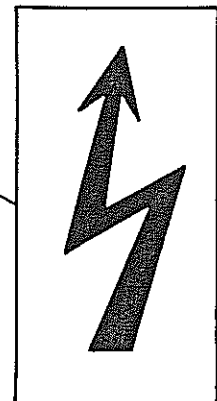
P-4240-UL

8

USE OF MINIMUM PRACTICAL ACOUSTIC EXPOSURE IS PRUDENT. SEE OPERATOR'S MANUAL.

P-42310-UL

13



9

**WARNING**  
FOR CONTINUED PROTECTION AGAINST RISK OF FIRE, REPLACE ONLY WITH SAME TYPE AND RATING OF FUSE.

P-4237-UL

## Section 13 PARTS LIST

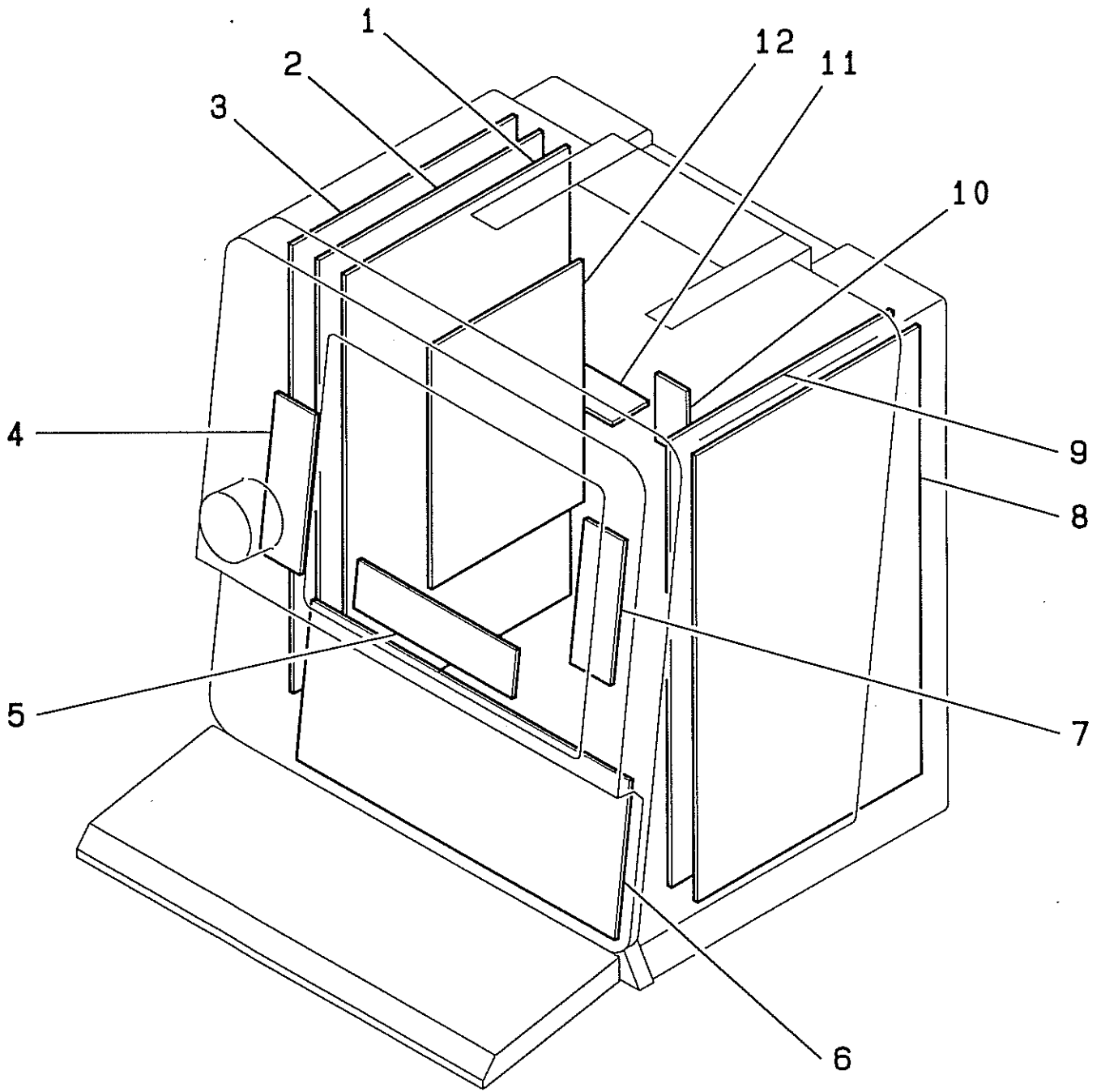
09	LABEL	UNIT SSD-500	S/N
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ITEM	CODE NO.	PARTS NO.	DESCRIPTION	SERIAL NO.	SPEC.
1	A600020	P-4246-UL	PROBE CAUTION NAMEPLATE		
2	A600018	P-32-SSD500-1UL	FUSE SPECIFICATION INDICATION CAUTION NAMEPLATE	~91M18814	
2	A600030	P-32-SSD500-1ULB	FUSE SPECIFICATION INDICATION CAUTION NAMEPLATE	01M1356 ~	
3	A600019	P-32-SSD500-2	BACK CONNECTOR BOARD LABEL	~91M8064	
4	A600017	P-4232u	PROBE CONNECTOR CAUTION NAMEPLATE		
5	A600028	P-32-500CORO	TITLE NAMEPLATE		FOR USA
6	A600021	P-32-CORO-UL	FDA LABEL		FOR USA
7	A600022	P-4299B-UL	EXPLOSION CAUTION NAMEPLATE		FOR USA
8	A600016	P-4231B-UL	SOUND CAUTION NAMEPLATE		FOR USA
9	A600023	P-4237-UL	FUSE CAUTION NAMEPLATE		FOR USA
10	A600024	P-4238-UL	ELECTRIC SHOCK CAUTION NAMEPLATE		FOR USA
11	A600029	P-4239-UL	GROUNDING CAUTION NAMEPLATE		FOR USA
12	A600026	P-4240-UL	ACCESSORY CONNECTION CAUTION NAMEPLATE		FOR USA
13	A600027	P-4211	HIGH VOLTAGE CAUTION LABEL		

\* ASSEMBLY PARTS. Please ask for Aloka Oversea Marketing Dept.  
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( Page for addition and revision )





10	MAIN PC BOARDS	UNIT SSD-500	S/N
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ITEM	CODE NO.	PARTS NO.	DESCRIPTION	SERIAL NO.	SPEC.
1	A800004	EP-2870B	2870B ITF		
1	A800116	EP-2870C	2870C ITF	01M1356 ~	
2	A800005	EP-2871C-1	2871C-1 DSC (525 LINE)	~91M8064	
2	A800119	EP-2871C-2	2871C-2 DSC (625 LINE)	~91M8064	
2	A800006	EP-2871E-1	2871E-1 DSC (525 LINE)	91M13759~	
2	A800120	EP-2871E-2	2871E-2 DSC (625 LINE)	91M13759~	
3	A800007	EP-2872B	2872B CPU		
4	A800008	EP-2878B	2878B GAIN & POWER LED		
5	A800009	EP-2879B	2879B SELECT KEY		
6	A800010	EP-2873B	2873B PANEL CONTROL		
6	A800117	EP-2873C	2873C PANEL CONTROL	91M18415~91M18614	
6	A800118	EP-2873D	2873D PANEL CONTROL	91M18615~	
7	A800011	EP-2880	2880 VIEW CONT/BRIGHT		
8	A800012	EP-2868C	2868C RX		
9	A800013	EP-2869D	2869D TX & CONTROL	~91M15246	
9	A800014	EP-2869E	2869E TX & CONTROL	91M15782~	
10	A800015	EP-2882	2882 PHOTO CONT/BRIGHT		
11	A800016	EP-2881C	2881C IN/OUT	~91M7964	
11	A800017	EP-2881D	2881D IN/OUT	~91M15246	
11	A800018	EP-2881E	2881E IN/OUT	91M15782~	
12	A800019	UPC-1610	1610 MONITOR CONTROL		

\* ASSEMBLY PARTS.

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# **SECTION 14 OUTLINE OF SYSTEM**

## **CONTENTS**

14-1	Design Policy	14 - 1
14-2	System construction	14 - 1

## 14-1 Design policy

Aloka is a leading manufacturer of Ultrasound diagnostic equipment, has marketed the electronic linear scanning system first in the world and, also, sent out the electronic convex scanning system.

SSD-500 is the compact, light weight equipment developed as the fruits Aloka's advanced technology.

### 14-1-1 Features

SSD-500, though it is the compact equipment, provides high quality of ultrasound diagnostic images comparable to those available with medium sized equipment. It is the most convenient equipment for diagnosis in the abdominal region as well as in the obstetric and gynecology region.

### 14-1-3 Easy operation

The minimum but sufficient panel switches, the easy to use large dial type gain knob, and the joy pad which makes it easy to measure distance, area and others -- Everything has been designed from a position of users.

### 14-1-4 Extensibility

SSD-500 accepts various kinds of probes, including those for abdominal region, for obstetric and gynecology region, for vaginal region, for stab, for operation, and for urology region. It is also possible to apply the SSD-500 to wide range of diagnoses, not limited to the abdominal region and obstetric and gynecology region, by connecting the micro convex probe, etc. to it. Additionally, the optional track ball unit makes measurements work easier.

Furthermore, the special cart is ready to supply. It is able to carry a 9-inch monitor.

### 14-1-5 Mobility

The compact, light weight SSD-500 can be transported easily and does not need large space for installation.

## 14-2 Construction of System

## A. Diagnostic Equipment

No.	Name	Model	Note
1	Diagnostic Equipment	USI-115	
2	Power supply cable	CP-101	AC100V
2'		CP-104	AC200V
2''		CP-107	for USA
3	Earth cable	NCC-0850	except USA
4	Holder for the probe	MP-PH500	
5	Overlay sheet	MP-SH500-J	Japanese
5'		MP-SH500-E	English

## B. Probe

No.	Name	Model	Note
1	Electric convex probe	UST-934N-3.5	with case

## C. Accessory

No.	Name	Model	Note
1	Reserved fuse	313003	AC100V
1'		313005	AC200V

## D. Consumption

No.	Name	Model	Note
1	Echo jelly	GEL-SCAN-PS	for domestic
1'	Ultrasound gel	217-083-08	for export

## E. Document

No.	Name	Model	Note
1	Operation Manual (Japanese)		
1'	Operation Manual (English)		for export except France and USA
1''	Operation Manual (English)		for USA
2	Installation Procedure	M55-0183	
3	PCB List		for USA
3'	PCB List		for export except USA

## F. Optional Probe

No.	Name	Model	Note
-1	Electrical Convex Probe		
a		UST-935N -5	Probe Group 1, 2
b		UST-944B -3.5	Probe Group 1, 2
c		UST-937U -5	Probe Group 1, 2
d		UST-945BP -5	Probe Group 1, 2
-2	Electrical Linear Probe		
a		UST-5024N -3.5	Probe Group 1, 2
b		UST-5039P -3.5	Probe Group 1, 2
c		UST-586 -5	Probe Group 1, 2
d		UST-587T -5	Probe Group 1, 2
e		UST-587I -5	Probe Group 1, 2
f		UST-657 -5	Probe Group 1, 2
g		UST-556T -7.5	Probe Group 1
h		UST-556I -7.5	Probe Group 1
i		UST-556TU -7.5	Probe Group 1
j		UST-5512U -7.5	Probe Group 1
k		UST-660 -7.5	Probe Group 1
l		UST-5011U -3.5	Probe Group 2

## G. Other optional parts

No.	Name	Model	Note
-1	Adapter for Puncture		
a		MP-2377	for UST-587T-5
b		MP-2387	for UST-556T-7.5
c		MP-2392	for UST-556TU-7.5
d		MP2414B	for UST-944B-3.5
e		MP-2408	for UST-934N-3.5
f		MP-2366	for UST-657-5
h		MP-2420	for UST-935N-5
-2	Cart	RMT-500	
-3	Gun type Camera	ACR-500-P	
-4	Echo COPIA	SSZ-300	for 525 scanning lines
-4'		SSZ-300E	for 625 scanning lines
-5	Camera	SSZ-108-P	
-6	35mm Camera Adapter	SSZ-108-35	
-7	Track ball Unit	TBU-500	
-8	AC line receptacle	MP-2720	AC100(for RMT-500)
-8'		MP-2720U	A200V(for RMT-500)
-9	Foot Switch	MP-2345	
-10	Triple Foot Switch	MP-2614	
-11	9 inch Monitor	DIS-3	with monitor arm



# SECTION 15 PRINCIPLE OF OPERATION (SYSTEM)

## CONTENTS

15-1	Specification	15 - 1
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	15-2-2 Electric Linear Scanning	15 - 3
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## 15-1 Specification of SSD-500

## 15-1-1 Tx &amp; Rx

Scanning Method	:	Electrical Convex Scanning Electrical Linear Scanning
Image Display	:	B mode M mode B/M mode
Number of Image	:	B mode ; 1 or 2 M mode ; 1 B/M mode ; 1
Standard Probe	:	Type ; Convex Model ; UST-934N-3.5 Frequency ; 3.5MHz Curve and Angle ; 60R, 60degree Max. depth ; 22cm
Simultaneous Probe	:	1
Connectable Probe	:	( refer SECTION 14 )
Image adjustment	:	GAIN ; Continuous STC ; NEAR, FAR Contrast ; fixed Image Processor ; Frame Correlation Line Interpolation Smoothing
Magnification	:	on B, 2B, M mode ×0.75, ×1.0, ×1.5 3 steps  on B/M mode ×1.0 fixed
M mode	:	Method ; Moving Bar Sweep Speed ; 4 second fixed Sample Position ; Set by MENU

## 15-1-2 DSC

Frame Memory	:	B, M mode Common use
Character & Graphic	:	ID ; 10character × 2column Date & Time ; Automatically Focus Setting ; Automatically Probe Frequency ; Automatically Gain Value ; Automatically Comment ; 40character × 28column Measurement ; Automatically Depth Position ; displayed with "cm" Scale Mark Direction Mark

Guide Line for Puncture  
M Cursor, M time mark  
Active Mark  
Body Mark

- Reverse Image : available on B mode before freezing  
up and down, right and left
- Image Polarity : available
- Measurement : Method ; by Joy Pad  
Kinds ; distance  
area, circumference  
velocity  
heart rate  
gestational week  
fetal weight

### 15-1-3 TV ( Viewing Monitor )

- TV method : B/W 525lines/60Hz or  
625lines/50Hz
- Viewing Monitor : 7 inch TV monitor

### 15-1-4 Image Recording Method

- Black and White Instant Film Camera SSZ-108-P
- 35mm Camera Adapter SSZ-108-35
- Gun Type Camera ACR-500
- ECHO COPIA SSZ-300、300E
- Video Cassette Recorder
- Multi Format Camera SSZ-111

### 15-1-5 AC Input Voltage & Consumption Current

- AC 100 / 115 / 220 V ( 50 / 60 Hz ) 90 VA

### 15-1-6 Size & Weight

- W 270mm x D 250mm x H 320mm 10 kg

## 15-2 Features of Equipment

This equipment using electronic linear scanning and electronic convex scanning is suited to diagnosis in the abdominal region and obstetric and gynecology region.

The compact, light weight equipment can be transported easily and does not need large space for installation.

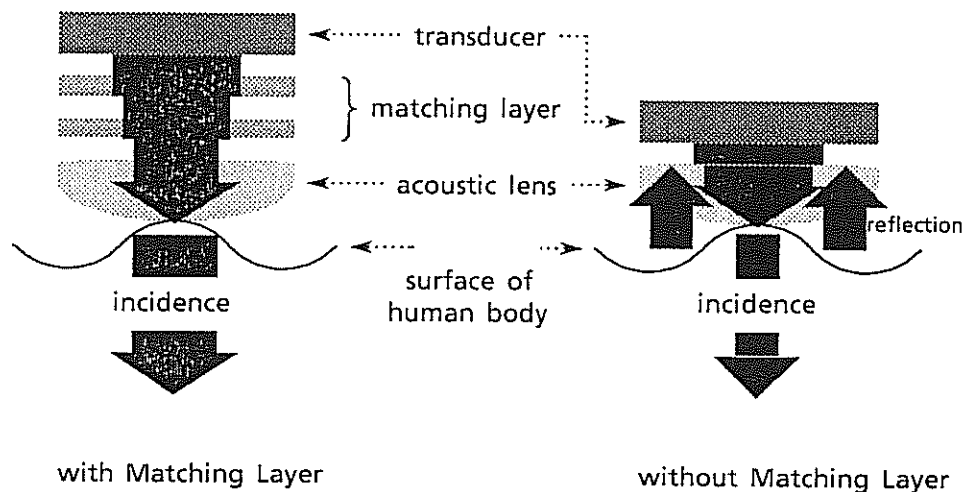
Its joy pad makes it easy to measure distance, area and others. A variety of optional probes and the complete measuring and computing functions ensure accurate diagnoses. (The track ball and the cart are also available as options.)

The equipment is able to display B mode, B-mode two images, B/M mode, and M mode; to measure distances and areas; and to process computation of the weeks gone in pregnancy and the weight of unborn child.

### 15-2-1 Multi Coated Probe

When an ordinary probe is directly put against the surface of the human body, most part of ultrasonic wave is reflected at the body surface because of a large difference in acoustic impedance between the oscillator and body.

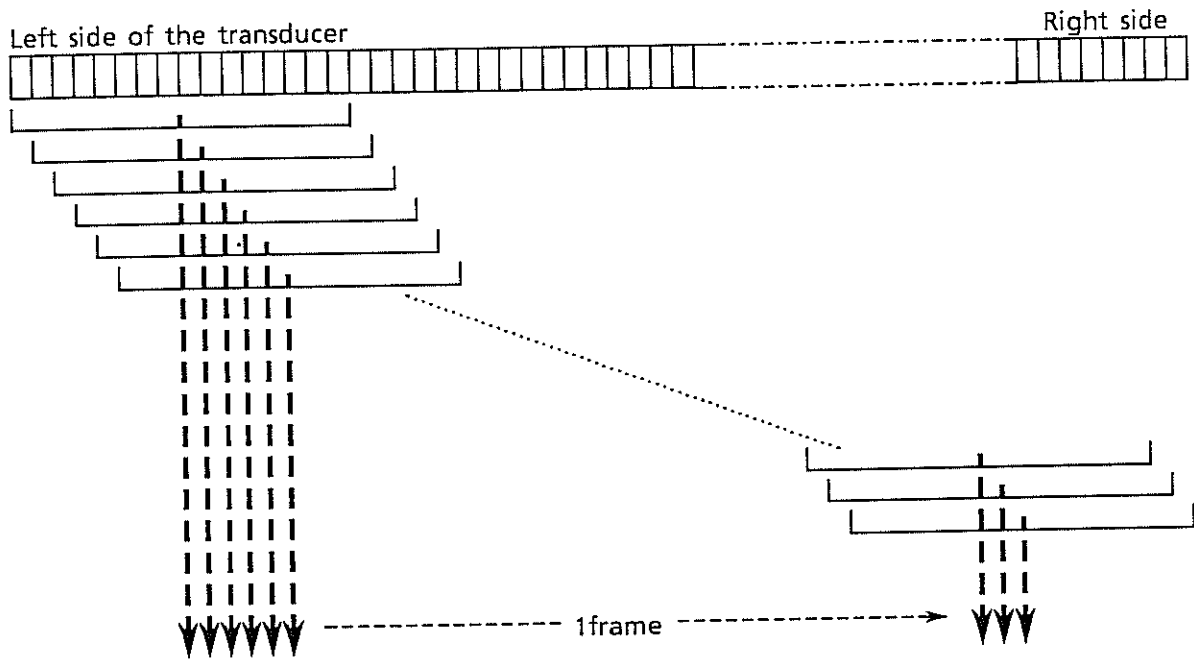
To minimize reflection loss, the multi coated probe (M.C.P.) is provided with two stages of matching layers which vary acoustic difference step by step so that ultrasonic wave can be transmitted smoothly from the body to the oscillator and from the oscillator to the body.



### 15-2-2 Electronic Linear Scanning Method

This scanning method is used when an electronic linear probe is connected to the equipment.

The probe has several oscillators arranged in line and a beam of ultrasonic wave is formed by two or more oscillators acting together. An array of oscillators is divided into several blocks from one end to another so that a fixed number of oscillators included in each block act together. Those blocks are driven one after another under electronic control to cause electronic linear scanning.



### 15-2-3 Electronic Convex Scanning Method

This scanning method is used when an electronic convex probe is connected to the equipment.

Using the same scanning manner as mentioned in the case of electronic linear scanning method, the electronic convex probe causes electronic scanning, electronic focusing, transmission dynamic focusing, receiving dynamic focusing, and dynamic frequency scanning.

Since the oscillators are arranged convexly, the beam of ultrasonic wave is in the shape of sector.

## 15-3 System of SSD-500

### 15-3-1 Explanation of System

This system consists of the transmitter/receiver unit, the interface unit, DSC unit, the panel unit including the key board, switching joy pad, etc., the monitor unit, and the power supply unit.

The interface unit generates timing signal necessary for electronic scanning. The transmitter/receiver unit generates a transmission pulse timely using the said timing pulse. This timing pulse drives the oscillator to radiate ultrasonic wave into human body. Echo signal from the body returns to the oscillator and is received and amplified, and then is output to the DSC unit.

In the DSC unit, ultrasound signal is sent through the A/D converter to the memory and stored in it. Stored ultrasound signal is read out at TV timing and processed through post processing and character indication processing to create COMPOSITE TV signal which is output to the monitor.

The panel unit gathers the switch input external conditions (MODE, MAG, etc.) and key board input character data and sends the gathered information to the interface unit.

The monitor unit consists of the 7-inch CRT, the contrast and brightness knobs for screen control, and the selector switch for getting the optimum contrast and brightness of screen for photograph.

The power supply unit is wholly composed of switching regulators. High voltage control is possible when so specified.

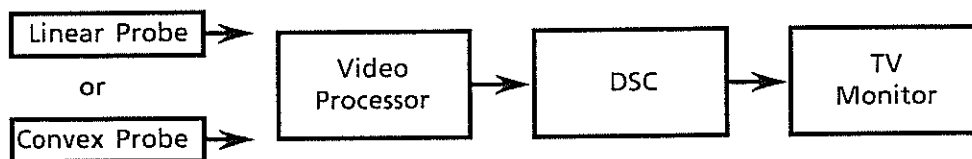
### 15-3-2 Echo Signal Flow

In the case of the Electronic Scanning Probe, the transmission pulse which is generated from the transmission trigger vibrate the transducer element.

Echo signal which is received by the probe is amplified at the receiving circuit and is sent to the video processor.

Video Processor has Filter, Logarithmic Amplifier, Detector and any processing circuits.

Finally, it is applied to DSC, and TV Composite signal is generated and outputted to the viewing monitor.



### 15-3-3 Panel Information

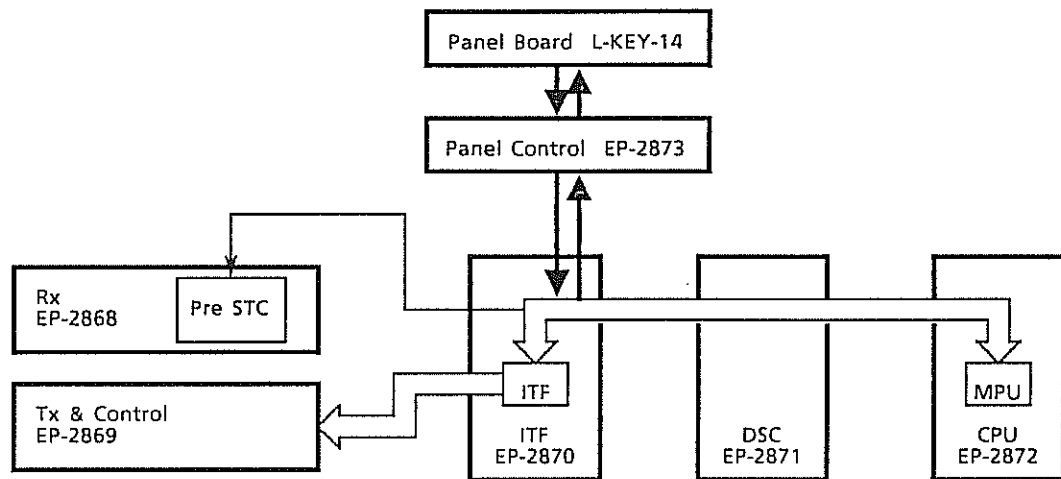
The information of panel switches, Joy Pad, Gain and full key board is applied to DATA BUS of MPU (Micro Processor Unit) which is located on EP-2872 CPU. PCB via EP-2873 Panel Control PCB.

The signals which controls to light LEDs are coming from EP-2872 CPU PCB. The drivers for LEDs are in EP-2873 Panel Control PCB.

The A/D converter for automatic displaying of Gain value is in EP-2873 Panel Control PCB. This signal is also applied to EP-2872 CPU PCB.

The setting of NEAR and FAR is also one of the panel information. These signals which control the ultrasound image directly are applied to Tx & Rx via EP-2870 ITF.

Joy Pad information has some of switches. So it is thought that this information is one of the panel information.



#### 15-3-4 Digital Scan Converter (D.S.C.)

The X-Y type DSC which can be accessed quickly is used in order to display the ultrasound image. This DSC can be written the ultrasound vector which has any factors of direction and velocity, and is read out according to the TV Scanning timing.

The memory of DSC has many Pixels which are divided something like a matrix.

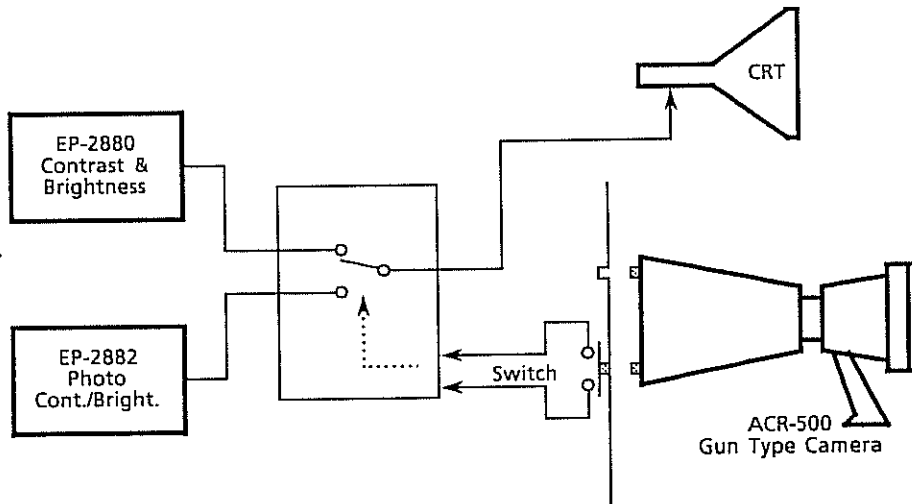
In the case of writing the information to the memory pixels, it can be defined according to choose the address of row and column. Then, the images of Linear, Convex and any mode images can be memorized into a same frame memory.

#### 15-3-5 Monitor

SSD-500 has a 7 inch monitor. This monitor unit is composed with 7 inch monitor, EP-2880 Contrast & Brightness PCB and UPC-1610A.

The switch which switches the contrast and brightness to the setting for photograph is located on EP-2880. This switch is available in using ACR-500-P.





### 15-3-6 Power Supply Unit

In this power supply unit, the +5.1V output circuit has the circuit of over current protector. If this protector is working, the output is stopped for a moment.

It can be resumed to turn the power switch on again 10 seconds later after turning it off.

The output terminals are followings.

+	5.1 V	4A
+	5.0 V	0.5A
-	5 V	0.5A
+	12 V	1.5A
-	12 V	0.3A
-	12 V	0.1A
	120 / 160 V	20mA