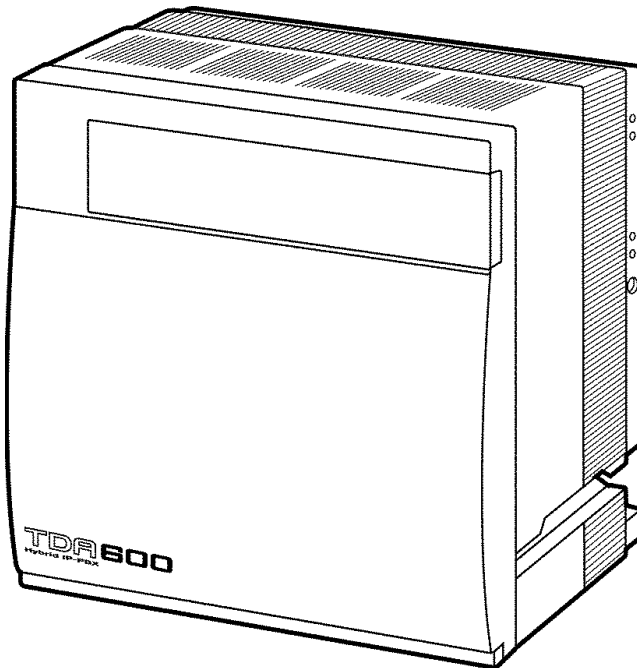


Service Manual

Hybrid IP-PBX

KX-TDA600CE

(for Europe)



WARNING

This service information is designed for experienced repair technicians only and is not designed for use by the general public. It does not contain warnings or cautions to advise non-technical individuals of potential dangers in attempting to service a product. Products powered by electricity should be serviced or repaired only by experienced professional technicians. Any attempt to service or repair the product or products dealt with in this service information by anyone else could result in serious injury or death.

When you note the serial number, write down all of the 11 digits. The serial number may be found on the unit.

IMPORTANT INFORMATION ABOUT LEAD FREE, (PbF), SOLDERING

If lead free solder was used in the manufacture of this product the printed circuit boards will be marked PbF.

Standard leaded, (Pb), solder can be used as usual on boards without the PbF mark.

When this mark does appear please read and follow the special instructions described in this manual on the use of PbF and how it might be permissible to use Pb solder during service and repair work.

Panasonic

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1 ABOUT LEAD FREE SOLDER (PbF: Pb free)

Note:

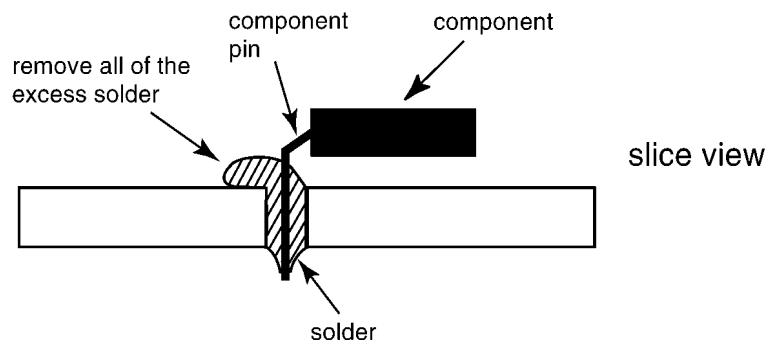
In the information below, Pb, the symbol for lead in the periodic table of elements, will refer to standard solder or solder that contains lead.

We will use PbF when discussing the lead free solder used in our manufacturing process which is made from Tin, (Sn), Silver, (Ag), and Copper, (Cu).

This model, and others like it, manufactured using lead free solder will have PbF stamped on the PCB. For service and repair work we suggest using the same type of solder although, with some precautions, standard Pb solder can also be used.

Caution

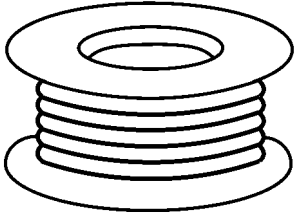
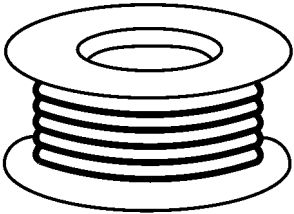
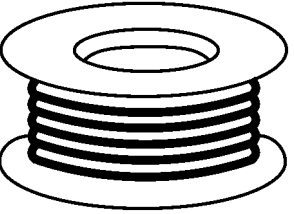
- PbF solder has a melting point that is 50° ~ 70° F, (30° ~ 40°C) higher than Pb solder. Please use a soldering iron with temperature control and adjust it to 700° ± 20° F, (370° ± 10°C). In case of using high temperature soldering iron, please be careful not to heat too long.
- PbF solder will tend to splash if it is heated much higher than its melting point, approximately 1100°F, (600°C).
- If you must use Pb solder on a PCB manufactured using PbF solder, remove as much of the original PbF solder as possible and be sure that any remaining is melted prior to applying the Pb solder.
- When applying PbF solder to double layered boards, please check the component side for excess which may flow onto the opposite side (See figure, below).



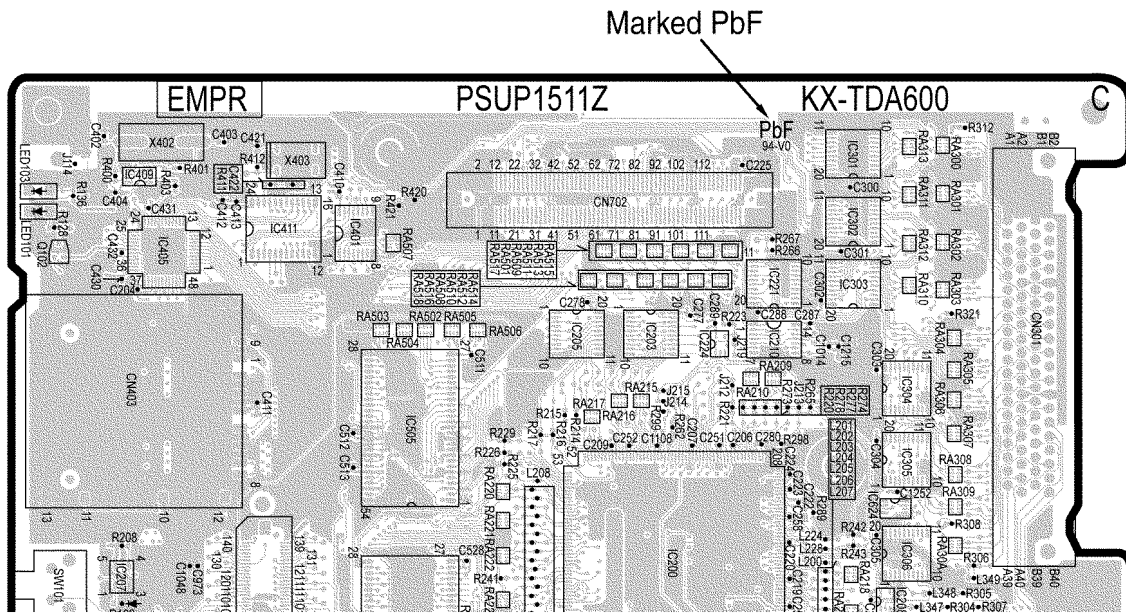
1.1. SUGGESTED PbF SOLDER

There are several types of PbF solder available commercially. While this product is manufactured using Tin, Silver, and Copper, (Sn+Ag+Cu), you can also use Tin and Copper, (Sn+Cu), or Tin, Zinc, and Bismuth, (Sn+Zn+Bi). Please check the manufacturer's specific instructions for the melting points of their products and any precautions for using their product with other materials.

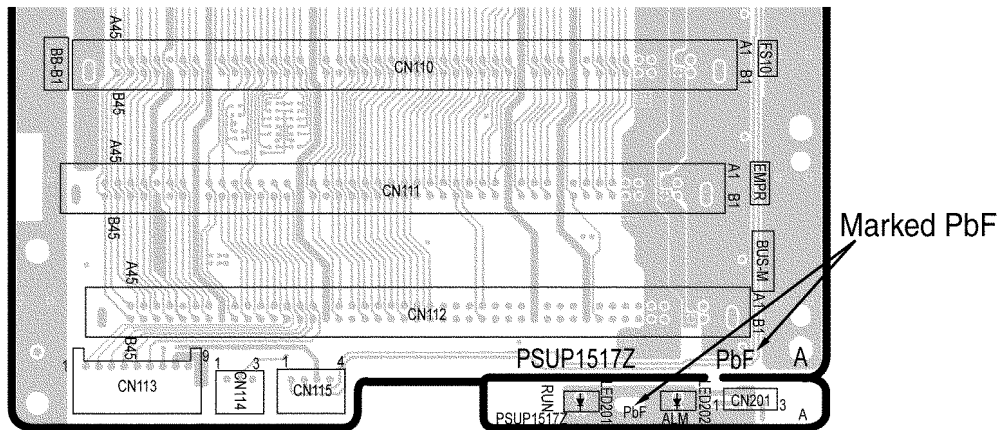
The following lead free (PbF) solder wire sizes are recommended for service of this product: 0.3mm, 0.6mm and 1.0mm.

0.3mm X 100g	0.6mm X 100g	1.0mm X 100g
		

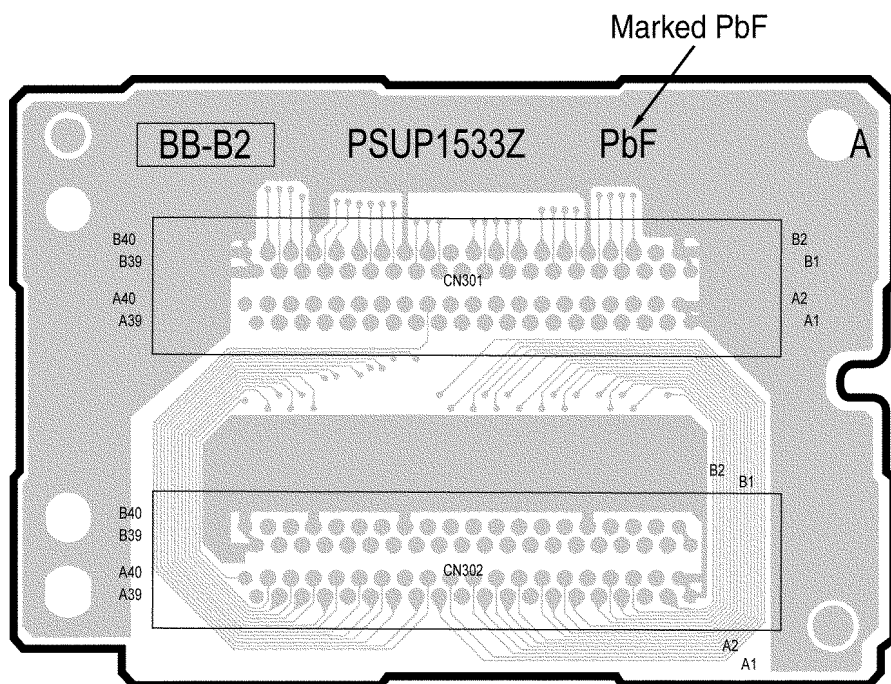
1.2. HOW TO RECOGNIZE THAT Pb FREE SOLDER IS USED



EMPR BOARD COMPONENT VIEW



BB-B1 (Back Board-Basic 1) BOARD COMPONENT VIEW



BB-B2 (Back Board-Basic 2) BOARD COMPONENT VIEW

2 FOR SERVICE TECHNICIANS

ICs and LSIs are vulnerable to static electricity.

When repairing, the following precautions will help prevent recurring malfunctions.

1. Cover the plastic parts boxes with aluminum foil.
2. Ground the soldering irons.
3. Use a conductive mat on the worktable.
4. Do not touch IC or LSI pins with bare fingers.

3 CAUTION

3.1. NOTE

When you note the serial number, write down all of the 11 digits.

The serial number may be found on the label affixed to the bottom of the unit.

3.2. SAFETY PRECAUTIONS

1. Before servicing, unplug the power cord to prevent an electric shock.
2. When replacing parts, use only the manufacturer's recommended components for safety.
3. Check the condition of the power cord. Replace if wear or damage is evident.
4. After servicing, be sure to restore the lead dress, insulation barriers, insulation papers, shields, etc.
5. Before returning the serviced equipment to the customer, be sure to perform the following insulation resistance test to prevent the customer from being exposed to shock hazards.

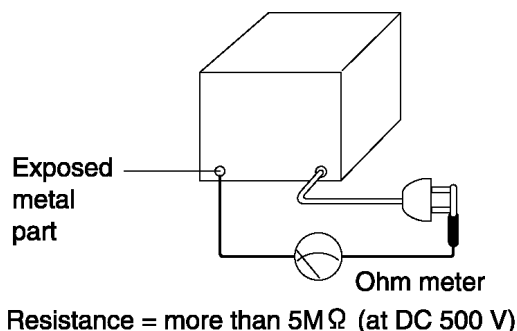
3.3. INSULATION RESISTANCE TEST

1. Unplug the power cord and short the two prongs of the plug with a jumper wire.
2. Turn on the power switch.
3. Measure the resistance value with ohmmeter between the jumpered AC plug and each exposed metal cabinet part, such as screw threads, control shafts, handle brackets, etc.

Note:

Some exposed parts may be isolated from the chassis by design. These will read infinity.

4. If the measurement is outside the specified limits, there is a possibility of shock hazard. The equipment should be repaired and rechecked before it is returned to the customer.



3.4. BATTERY CAUTION

1. Danger of explosion if battery is incorrectly replaced. Replace only with the same or equivalent type recommended by the manufacturer. Dispose of used batteries according to the manufacturer's Instructions.
2. The lithium battery is a critical component (type No.CR23541). Please observe for the proper polarity and the exact location when replacing it and soldering the replacement lithium battery in.

3.5. CAUTION

The power socket wall outlet should be located near this equipment and be easily accessible.

4 SPECIFICATIONS

4.1. GENERAL DESCRIPTION

Control Bus		Original bus (16 bit, 8 MHz,10 megabytes per second)	
Communication Bus		H.100 bus conformity (1024 time slot)	
Switching		Distributed Switching	
Power Input	PSU-M	100 V AC to 130 V AC, 2.5 A/200 V AC to 240 V AC, 1.4 A, 50 Hz/60 Hz	
	PSU-L	100 V AC to 130 V AC, 5.1 A/200 V AC to 240 V AC, 2.55 A, 50 Hz/60 Hz	
External Battery		+36 V DC (+12 V DC x 3, recommended maximum current per shelf is 28 Ah or lower)	
Maximum Power Failure Tolerance		300 ms (without using backup battery)	
Memory Backup Duration		7 years	
Dialling	Trunk	Dial Pulse (DP) 10 pps, 20 pps Tone (DTMF) Dialling	
	Extension	Dial Pulse (DP) 10 pps, 20 pps Tone (DTMF) Dialling	
Mode Conversion		DP-DTMF, DTMF-DP	
Ring Frequency		20 Hz/25 Hz (selectable)	
Trunk Loop Limit		1600 Ω maximum	
Operating Environment	Temperature	0 °C to 40 °C	
	Humidity	10%to 90% (non-condensing)	
Conference Call Trunk (per shelf)		From 10 x 3-party conference call to 4 x 8-party conference call	
Music on Hold (MOH)		2 ports (Level Control: -11 dB to +11 dB in 1 dB steps) MOH1: External Music Source port MOH2: Selectable Internal/External Music Source port	
Paging	Internal	Level Control: -15 dB to +6 dB in 3 dB steps	
	External	2 ports (Volume Control: -15 dB to +15 dB in 1 dB steps)	
Serial Interface Port	RS-232C	1 (max 115.2 kbps)	
	USB	1	
Extension Connection Cable		SLT	1 pair wire (T, R)
		DPT	1-pair wire (D1, D2) or 2-pair wire (T, R, D1, D2)
		APT	2-pair wire (T, R, D1, D2)
		PT-interface CS	1-pair wire (D1, D2)
		DSS Consoles and Add-on Key Module	1-pair wire (D1, D2)
Dimension	Basic Shelf	430 mm (W) x 415 mm (H) x 270 mm (D) (17 1/5 in x 16 3/5 in x 10 4/5 in)	
Weight (when fully mounted)	Basic Shelf	Under 16 kg (35.2 lb)	

4.2. CHARACTERISTICS

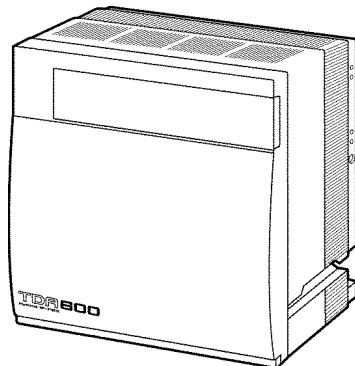
Terminal Equipment Loop Limit	- PT: KX-T7600 series DPT: 90 Ω; all other DPTs/APTs: 40 Ω - SLT: 600 Ω including set - Doorphone: 20 Ω - CS: 130 Ω; PT-interface CS: 65 Ω
Minimum Leakage Resistance	15000 Ω maximum
Maximum Number of Extension Instruments per Line	1 for PT or SLT 2 by Parallel or eXtra Device Port connection of an APT/DPT and an SLT 3 by Digital eXtra Device Port connection of 2 DPTs and an SLT
Ring Voltage	75 Vrms at 20 Hz/25 Hz depending on the Ringing Load
Trunk Loop Limit	1600 Ω maximum
Hookswitch Flash/Recall Timing Range	24 ms to 2032 ms
BRI Cards Internal ISDN Mode	Supply Voltage: 40 V Power Supply (BRI4): 4.5 W per 1 line, 10 W per 4 lines Power Supply (BRI8): 4.5 W per 1 line, 20 W per 8 lines Power Supply Method: Phantom Power Supply
Door Opener Current Limit	24 V DC/30 V AC, 1 A maximum
External Relay Current Limit	24 V DC/30 V AC, 1 A maximum
External Sensor Current Limit	Power to the external sensor is provided from the EIO4 card and must be grounded through the EIO4 card. The Hybrid IP-PBX detects input from the sensor when the signal is under 100 Ω
Paging Terminal Impedance	600 Ω
MOH (Music on Hold) Terminal Impedance	10000 Ω

4.3. SYSTEM CONSTRUCTION

4.3.1. Basic System

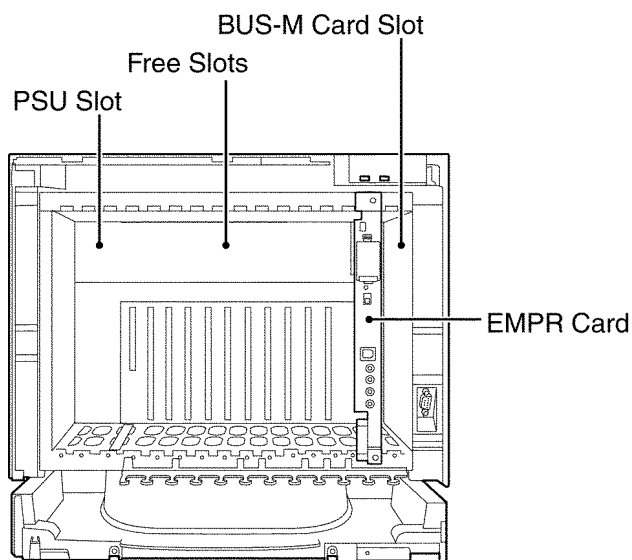
Basic Shelf

The Basic Shelf contains an EMPR card for controlling the Hybrid IP-PBX. To use the basic system, install a power supply unit (PSU) in the PSU Slot and optional service cards in Free Slots. To expand to a multiple-shelf system, you also need to install a BUS-M card in the BUS-M Card Slot.



Basic Shelf

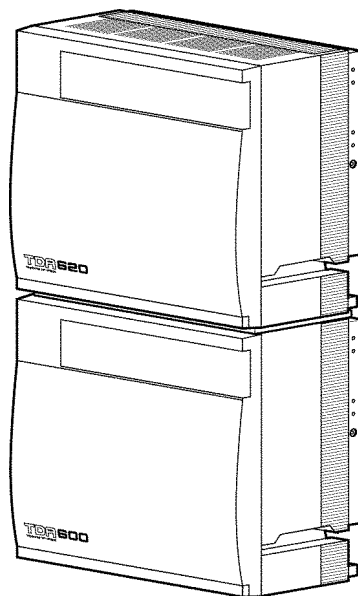
Construction of the Basic Shelf



Basic Shelf

2-shelf System

Expanded system (Basic Shelf + 1 Expansion Shelf). Expansion Shelf 1 is mounted on the Basic Shelf.

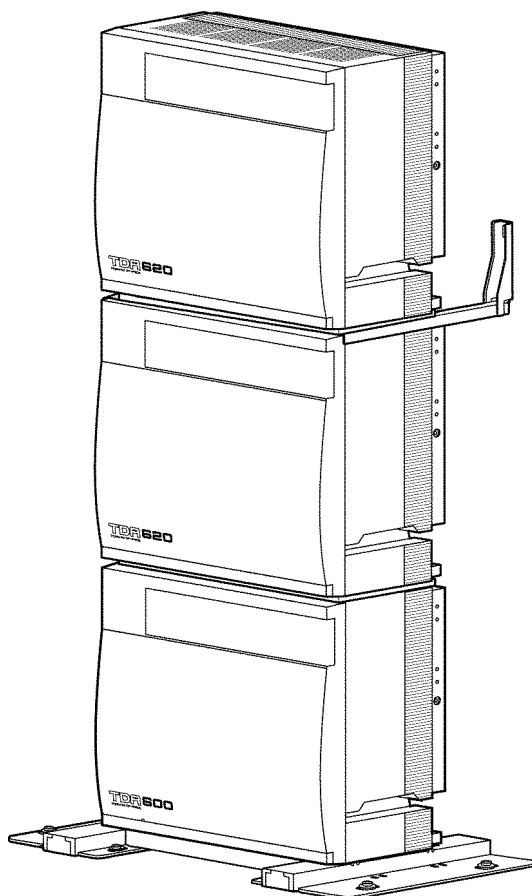


Note

If you are installing a 2-shelf system in an area prone to earthquakes, make sure to fix the system to the wall using the wall brackets (supplied with an optional Mounting Kit).

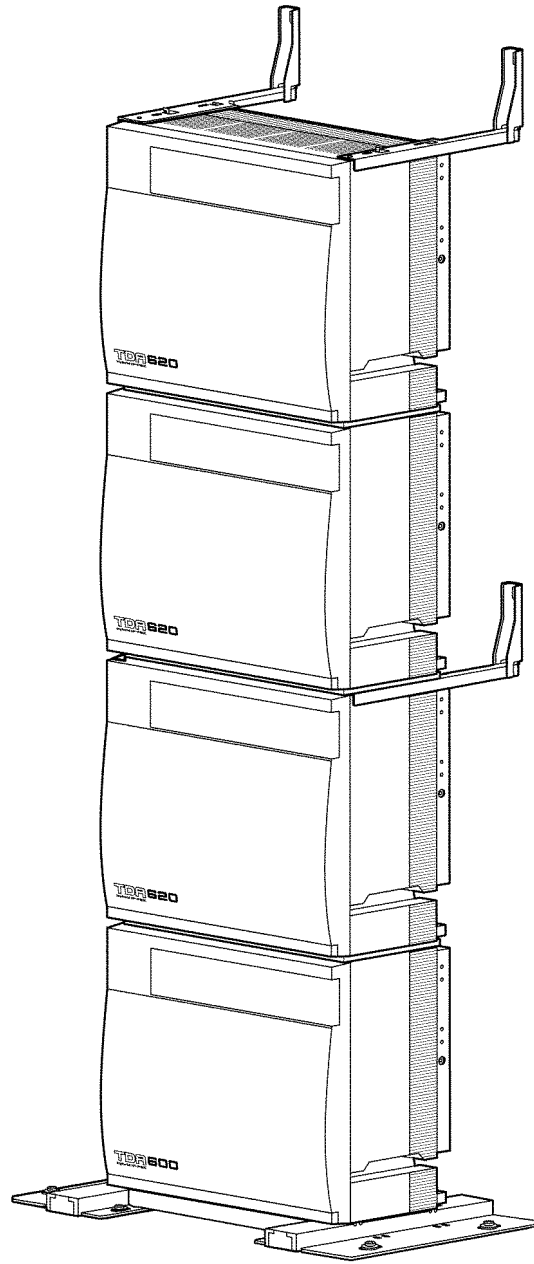
3-shelf System (Tower Type)

Expanded system (Basic Shelf + 2 Expansion Shelves). Expansion Shelves 1 and 2 are mounted on the Basic Shelf. A Mounting Kit is required for the 3-shelf system.



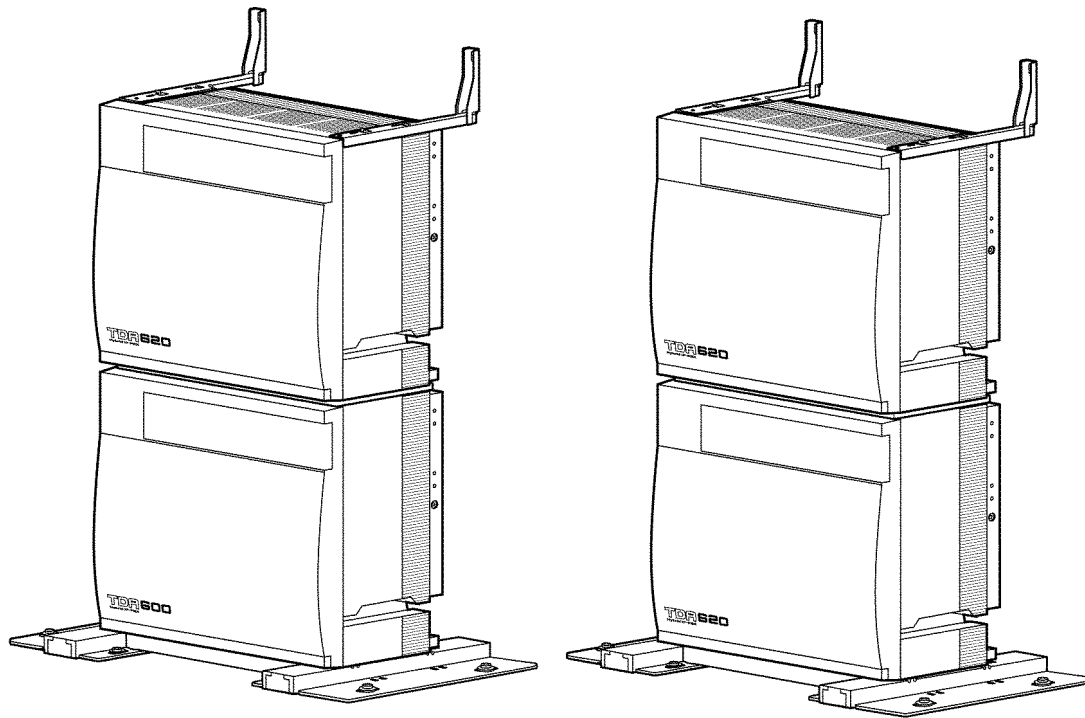
4-shelf System (Tower Type)

Fully expanded system (Basic Shelf + 3 Expansion Shelves). Expansion Shelves 1 to 3 are mounted on the Basic Shelf. A Mounting Kit is required for the 4-shelf system.



4-shelf System (Side-by-side Type)

When vertical space is limited, it is possible to install a fully expanded system (Basic Shelf + Expansion Shelf 1, and Expansion Shelf 2 + Expansion Shelf 3) in a side-by-side configuration. Expansion Shelf 1 is mounted on the Basic Shelf, and Expansion Shelf 3 is mounted on Expansion Shelf 2. Installing the system using base stands (supplied with an optional Mounting Kit) makes it easy to reinstall shelves in a different place.



4.4. SYSTEM CAPACITY

4.4.1. Maximum Trunk Port and Extension Port

The Hybrid IP-PBX supports the following number of trunk ports and extension ports.

Port Type		Basic System	2-shelf System	3-shelf System	4-shelf System
Trunk		160	320	480	640
Extension	DPT Port	160	320	480	640
	SLT Port	160	320	480	640

Maximum Optional Service Cards

There are 2 types of optional service cards for installation:

- Cards installed in the slots of the Hybrid IP-PBX
- Cards mounted on other optional service cards

Note:

- Any card that exceeds the capacity of the Hybrid IP-PBX will be ignored.
- When the Hybrid IP-PBX starts up with an invalid configuration, some cards will be ignored.

Card Type		Basic System	2-shelf System	3-shelf System	4-shelf System
Trunk Card		10*1	20*1	30*1	40*1
	ELCOT16	10	20	30	40
	DID8				
	E&M8				
	BRI4				
	BRI8				
	T1	5	10	15	20
	E1				
	PRI23				
	PRI30				
	IP-GW4E	10	20	30	40
	IP-GW16				
Extension Card		10	20	30	40
	DHLC8	10	20	30	40
	DLC8				
	DLC16				
	SLC8				
	ESLC16				
	EMSLC16				
	IP-EXT16				
	CSIF4	4	8	12	16
	CSIF8				
	OPB3	4	8	12	16
	CTI-LINK*2	1			
	EECHO16	2	4	6	8

*1 One T1, E1, PRI30, or PRI23 card counts as 2 cards.

*2 Can be installed in the Basic Shelf only.

Cards Mounted on Other Optional Service Cards

The following number of optional service cards can be mounted on the specified other optional service cards.

Card Type	Basic System	2-shelf System	3-shelf System	4-shelf System	Mounted on
EMEC	1				EMPR Card
RMT	1				
CID/PAY8	20	40	60	80	ELCOT16 Card
CID8					
EXT-CID	10	20	30	40	SLC8 Card
DPH4	4	8	12	16	OPB3 Card
DPH2	8	16	24	32	
MSG4	4	8	12	16	
EIO4	4	8	12	16	
BUS-ME	-		1	2	BUS-M Card

4.4.2. Maximum Terminal Equipment

The following number of items of terminal equipment can be supported by the Hybrid IP-PBX.

Terminal Equipment Type	Basic System	2-shelf System	3-shelf System	4-shelf System
Telephone (using Digital XDP)	160 (240)*1	320 (480)*1	480 (720)*1	640 (960)*1
SLT	160	320	480	640
KX-T7600 series DPT	160	320	480	640
Other DPT	128	256	384	512
APT	80	160	240	320
IP-PT	160	320	480	640
DSS console	64			
CS	32	64	96	128
PS (without an EMEC card)	256			
PS (with an EMEC card)	512			
Voice Processing System (VPS)*2	8			
Doorphone	16	32	48	64
Door Opener	16	32	48	64
External Sensor	16	32	48	64
External Relay	16	32	48	64
Add-on Key Module	160	320	480	640
USB Module	160	320	480	640

*1 Even when Digital XDP is used, each shelf supports a maximum of 160 KX-T7600 series DPTs.

*2 Only a single VPS can be connected to one optional service card.

4.4.3. Power Supply Unit Selection for Each Shelf

The Hybrid IP-PBX needs a power supply unit (PSU) suitable for its configuration. For each shelf, calculate the load figure from the type and number of items of equipment to be connected, and then determine the type of PSU that will be required.

Load Figure Calculation

Equipment Type		Load Figure
PT	KX-T7600 series DPT/KX-T7600 series DSS console	1
	KX-T7560/KX-T7565 DPT	1
	Other DPT/Other DSS console	4
	APT	4
	IP-PT	0
Extension Card *1	DHLC8	8
	SLC8	8
	ESLC16	16
	EMSLC16	16
CS (1 unit)		4
PT-interface CS (1 unit)		4
ISDN Extension		2
VPS (1 port)		1

*1 Only the extension cards that can support SLTs count for the load figures.

PSU Capability

Each PSU supports a different load figure.

PSU Type	Maximum Load Figure
PSU-M	128
PSU-L	512

If the total load figure is greater than 128, you must install the PSU-L. If the total load figure is less than 128, but you expect expansion in the future, it may be better to install the PSU-L instead of the PSU-M. There is no harm in installing a PSU that is larger than is required for the current configuration.

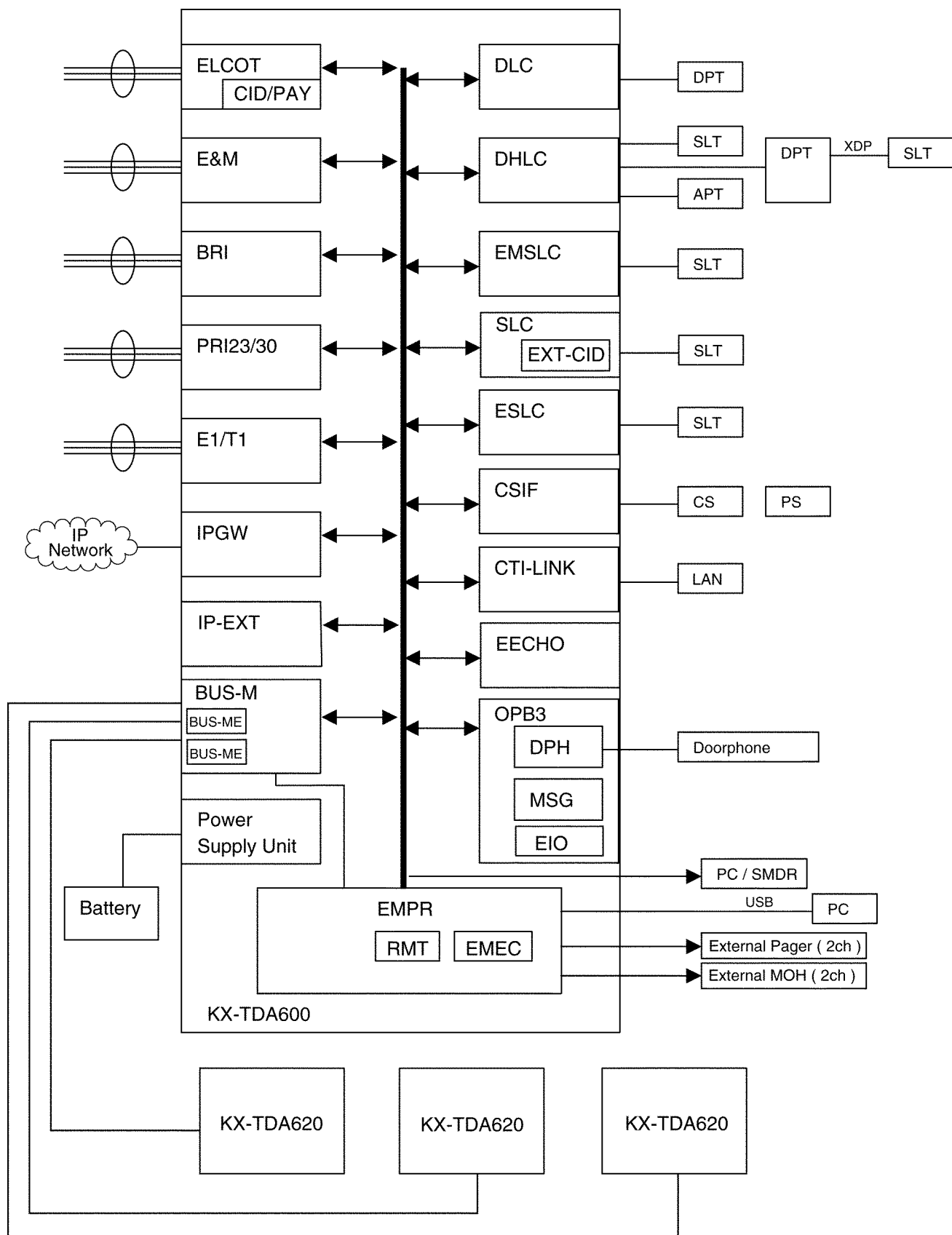
Calculation Example

Equipment Type		Load Figure
KX-T7600 series DPT	48 units	48
Other DPT	4 units	16
ESLC16	1 card	16
EMSLC16	3 cards	48
VPS	8 ports	8
Total		136

The total load figure is 136. As this is between 128 and 512, you must install the PSU-L.

5 SYSTEM OVERVIEW

5.1. SYSTEM CONFIGURATIONS



5.2. SYSTEM COMPONENTS

	Model	Card Name	Description
Basic Shelf	KX-TDA600CE		Basic Shelf
Main Processing Card		EMPR	Main Processing Card
EMPR Option Card	KX-TDA6105XJ KX-TDA0196XJ	EMEC RMT	Memory Expansion Card Remote Card
Optional Shelf Expansion Cards	KX-TDA6110XJ KX-TDA6111XJ	BUS-M BUS-ME	Bus Master Card Bus Master Expansion Card
Expansion Shelf	KX-TDA620BX		Expansion Shelf
Built-in Shelf Expansion Card		BUS-S	Bus Slave Card
Trunk Cards	KX-TDA0184XJ KX-TDA0187X KX-TDA0188CE KX-TDA0189XJ KX-TDA0193XJ KX-TDA0284CE KX-TDA0288CE KX-TDA0290CE KX-TDA0484XJ KX-TDA0490XJ KX-TDA6181X	E&M8 T1 E1 CID/PAY8 CID8 BRI4 BRI8 PRI23 IP-GW4E IP-GW16 ELCOT16	8-Port E & M Trunk Card T-1 Trunk Card E-1 Trunk Card 8-Port Caller ID/Pay Tone Card 8-Port Caller ID Card 4-Port BRI Card 8-Port BRI Card PRI Card 4-Channel VoIP Gateway Card 16-Channel VoIP Gateway Card 16-Port Analogue Trunk Card
Extension Cards	KX-TDA0143XJ KX-TDA0144XJ KX-TDA0170XJ KX-TDA0171XJ KX-TDA0172XJ KX-TDA0173XJ KX-TDA0470XJ KX-TDA6174XJ KX-TDA6175XJ	CSIF4 CSIF8 DHLC8 DLC8 DLC16 SLC8 IP-EXT16 ESLC16 EMSLC16	4 Cell Station Interface Card 8 Cell Station Interface Card 8-Port Digital Hybrid Extension Card 8-Port Digital Extension Card 16-Port Digital Extension Card 8-Port Single Line Telephone Extension Card 16-Channel VoIP Extension Card 16-Port Single Line Telephone Extension Card 16-Port Single Line Telephone Extension with Message Lamp Card
Other Cards	KX-TDA0161XJ KX-TDA0164XJ KX-TDA0168XJ KX-TDA0190XJ KX-TDA0191XJ KX-TDA0410XJ KX-TDA6166XJ	DPH4 EIO4 EXT-CID OPB3 MSG4 CTI-LINK EECHO16	4-Port Doorphone Card 4-Port External Input/Output Card Extension Caller ID Card Optional 3-Slot Base Card 4-Channel Message Card CTI Link Card 16-Channel Echo Canceller Card
Power Supply Units (PSUs)	KX-TDA0103XJ KX-TDA0104XJ	PSU-L PSU-M	L-Type Power Supply Unit M-Type Power Supply Unit
Cell Stations (CS's)	KX-TDA0141CE KX-TDA0142CE		2-Channel Cell Station Unit Using a DHLC/DLC Card (PT-interface CS) for DECT Portable Station. 3-Channel Cell Station Unit Using a CSIF Card for DECT Portable Station.
Proprietary Equipment	KX-A228XJ KX-A229XJ KX-A258XJ		S/M-type Back-up Battery Cable L-type Back-up Battery Cable Blank Slot Cover

Available Telephones

The Hybrid IP-PBX supports Panasonic KX-T7000, KX-TD7000, KX-TCA, and KX-NT series Telephones:

- Digital/Analog/IP proprietary telephones (e.g., KX-T7625, KX-T7630, KX-T7633, KX-T7636, KX-NT136)
- Portable stations (e.g., KX-TCA155, KX-TCA255, KX-TD7690)
- DSS consoles (e.g., KX-T7640)
- Single line telephones (e.g., KX-T7710)

Note

The Hybrid IP-PBX does not support the following telephones:

- KX-T30800 series Proprietary Telephones and DSS consoles
- KX-T61600 series Proprietary Telephones and DSS consoles
- KX-T123200 series Proprietary Telephones and DSS consoles
- KX-TD7500 DECT Portable Station

For the equipment (e.g., Add-on Key Module, USB Module, Headset*1) that can be connected to a particular telephone, refer to the telephone's manual.

*1 The KX-T7090 headset can be connected to the KX-T7000, KX-T7200, KX-T7300, KX-T7400, and KX-T7500 (except for KX-T7560/KX-T7565) series telephones.

Abbreviations in this manual

Proprietary telephone: PT

Digital proprietary telephone: DPT

Analog proprietary telephone: APT

IP proprietary telephone: IP-PT

Portable station: PS

Single line telephone: SLT

Note:

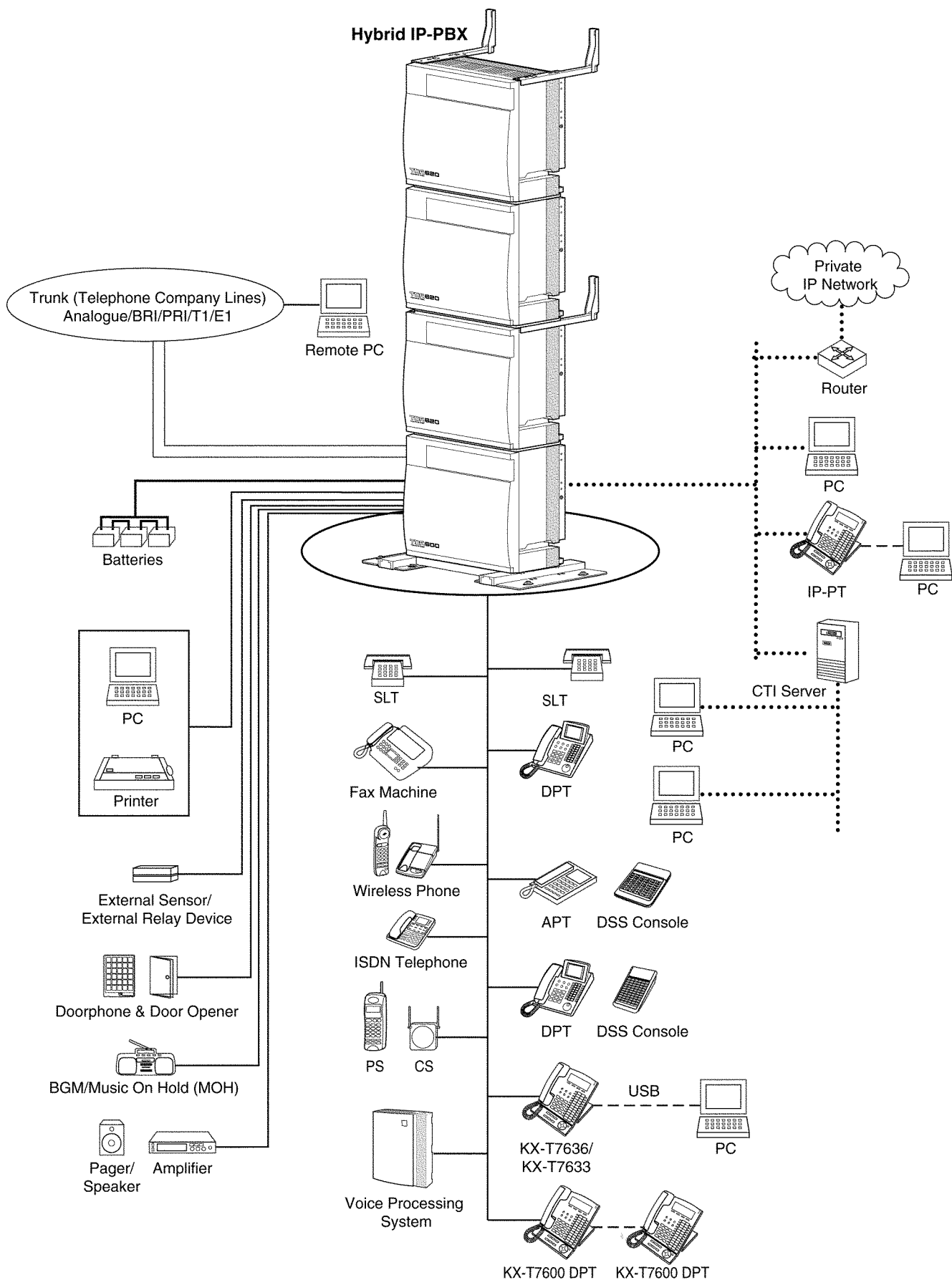
Some optional service cards and features are not available for certain countries/areas. Consult your certified Panasonic dealer for detailed instructions.

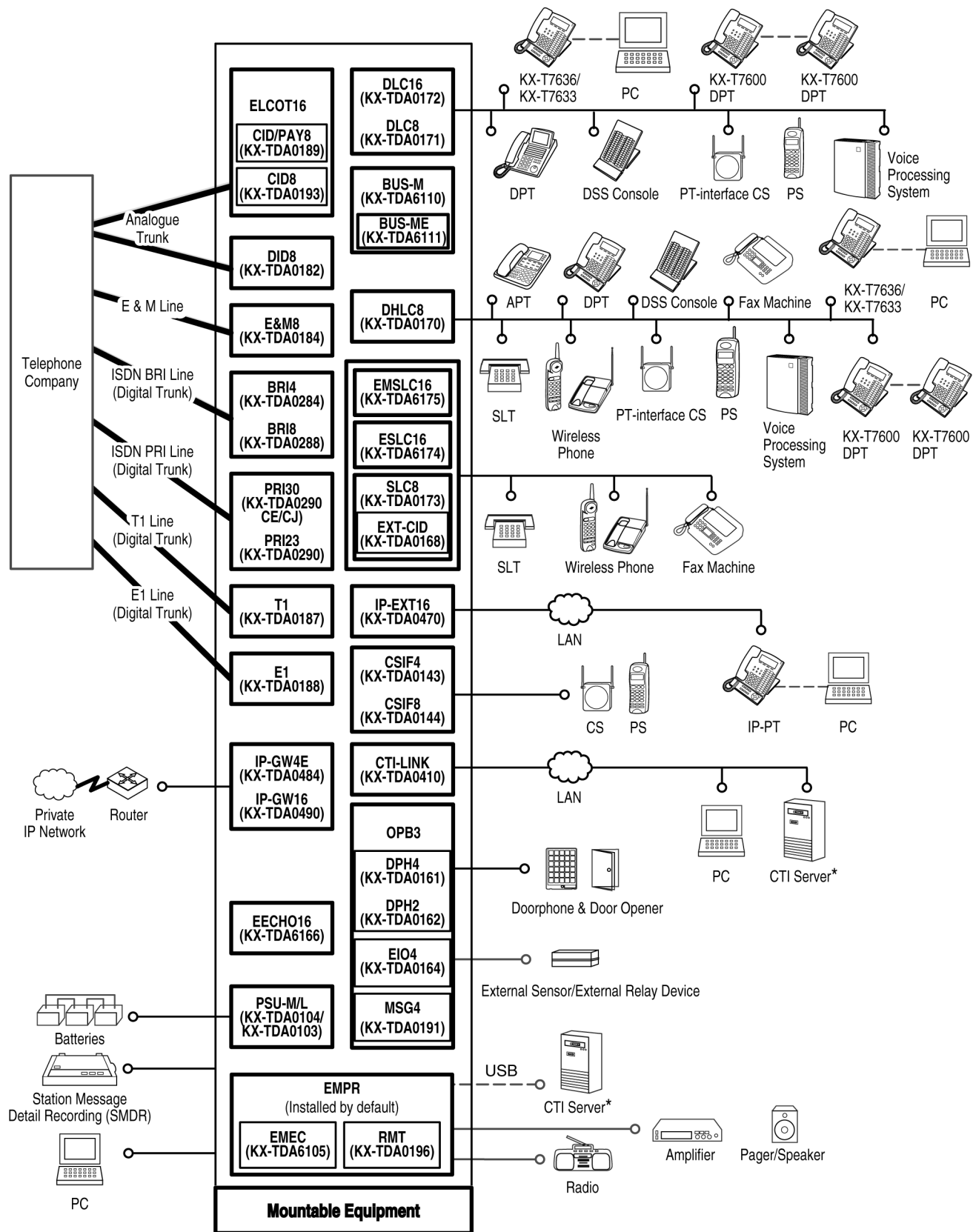
Important Notice

Prior to connection of this product, please verify that the intended operating environment is supported. Satisfactory performance cannot be guaranteed for the following:

- interoperability and compatibility with all devices and systems connected to this product.
- proper operation and compatibility with services provided by telecommunications companies over connected networks.

5.3. SYSTEM CONNECTION DIAGRAM



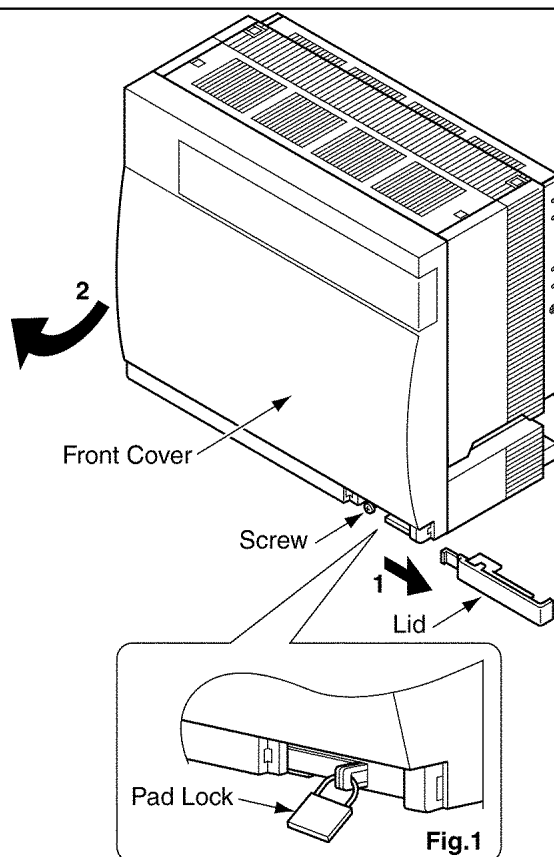


*Only 1 Server PC can be connected to the Hybrid IP-PBX. Two or more Server PCs cannot be used simultaneously.

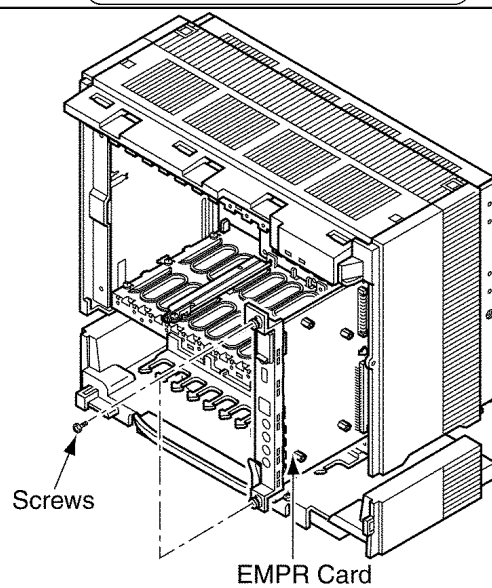
6 DISASSEMBLY INSTRUCTIONS

6.1. DISASSEMBLY INSTRUCTION (EMPR CARD)

1. Remove the Lid by sliding it in the direction of the arrow 1.
2. This will be removed if the user attaches the Pad Lock as shown in a Fig.1.
3. Loosen the Screw.
4. Front Cover is removed in the direction of an arrow 2.

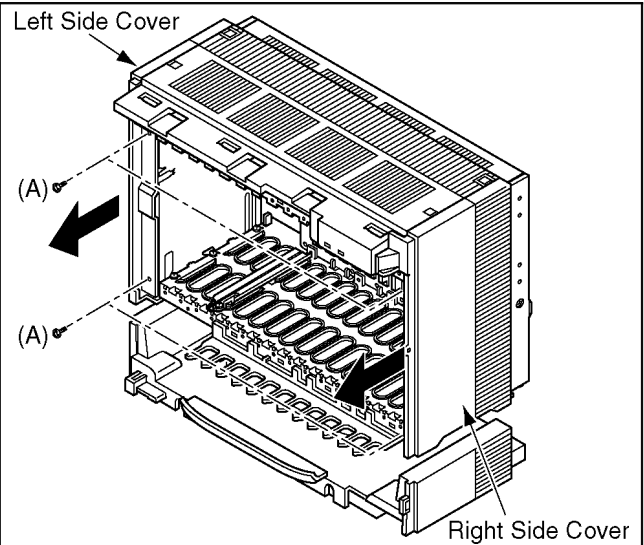


5. Loosen the two Screws.
6. Remove the EMPR Card.

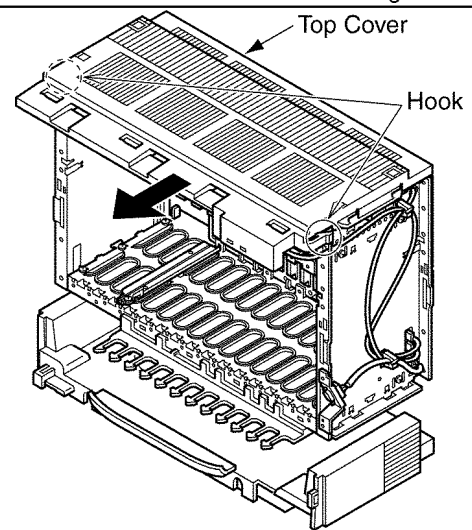


6.2. DISASSEMBLY INSTRUCTION (BACK BOARD)

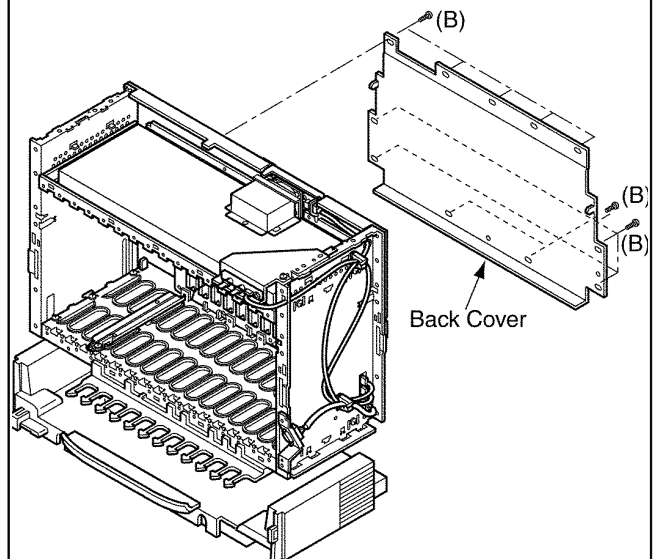
1. Remove four Screws (A).
2. Remove the Left Side Cover and the Right Side Cover.



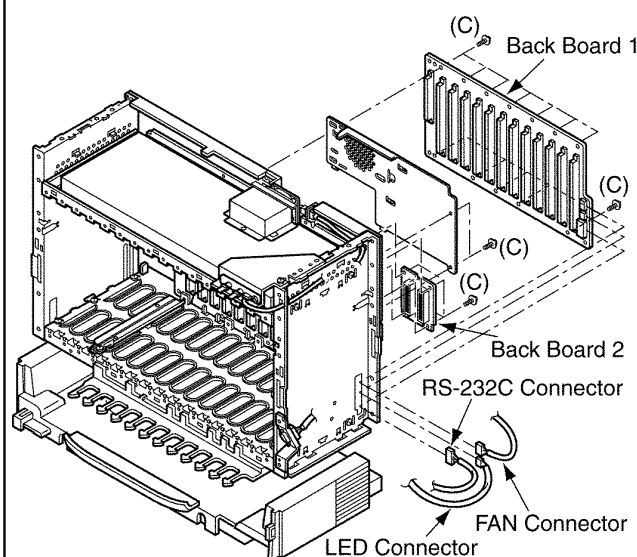
3. Release the Hook and remove the Top Cover.



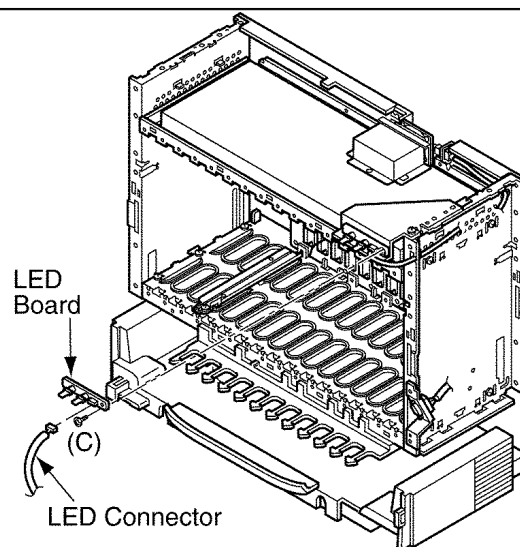
4. Remove nine Screws (B).
5. Remove the Back Cover.



6. Remove the FAN Connector and LED Connector from the Back Board 1.
7. Remove eight Screws (C).
8. Remove the Back Board 1.
9. Remove the Back Board 2.
10. Remove the RS-232C Connector.



11. Remove the LED Connector from the LED Board.
12. Remove the Screw (C).
13. Remove the LED Board.



7 OUTLINE

7.1. GENERAL DESCRIPTION

The control system of this unit is composed of the main control section (EMPR) controlling the entire system, exchanging voice data, the circuit control section (LPR) controlling various telephone lines, connecting bus lines between basic shelf and expansion shelf (BUS-M) and the power supply section (POWER).

EMPR, LPR, BUS-M and POWER are connected to each other through the System BUS (ADDRESS BUS, DATA BUS and CONTROL BUS). LPRs are under the I/O control (I/O Read/Write) of EMPR.

EMPR controls LPR which has a microprocessor by the Inter-Microprocessor Communication System supported by ASIC. That is, EMPR and LPR exchange controlling messages through bi-directional buffer and CPU controls LPR so that it can manage multiple telephone lines.

I/O address for LPR access is fixed per each free slot. CPU discriminates the sort of LPR through the inter-processor communication system.

POWER detects the voltage drop of the AC input and the DC output and transfers it to EMPR.

7.1.1. EMPR Card

This card is the main control section of this unit. It controls all the cards mounted on the free slots, and communication of RS-232C ports.

The front of the EMPR card is equipped with two LEDs (LED1 and LED2) that indicate the operating status of this card, slide switches used to decide a system operation mode, and a push switch used to execute the system reset.

This control circuit executes the control signals for the exchange process, and this card is composed of the following

- (A) 32bit CPU (32bit data bus)
- (B) SDRAMs, SRAMs
- (C) Flash memorys
- (D) Lithium Battery for back-up of clock IC and Static RAMs

7.1.2. Back Board

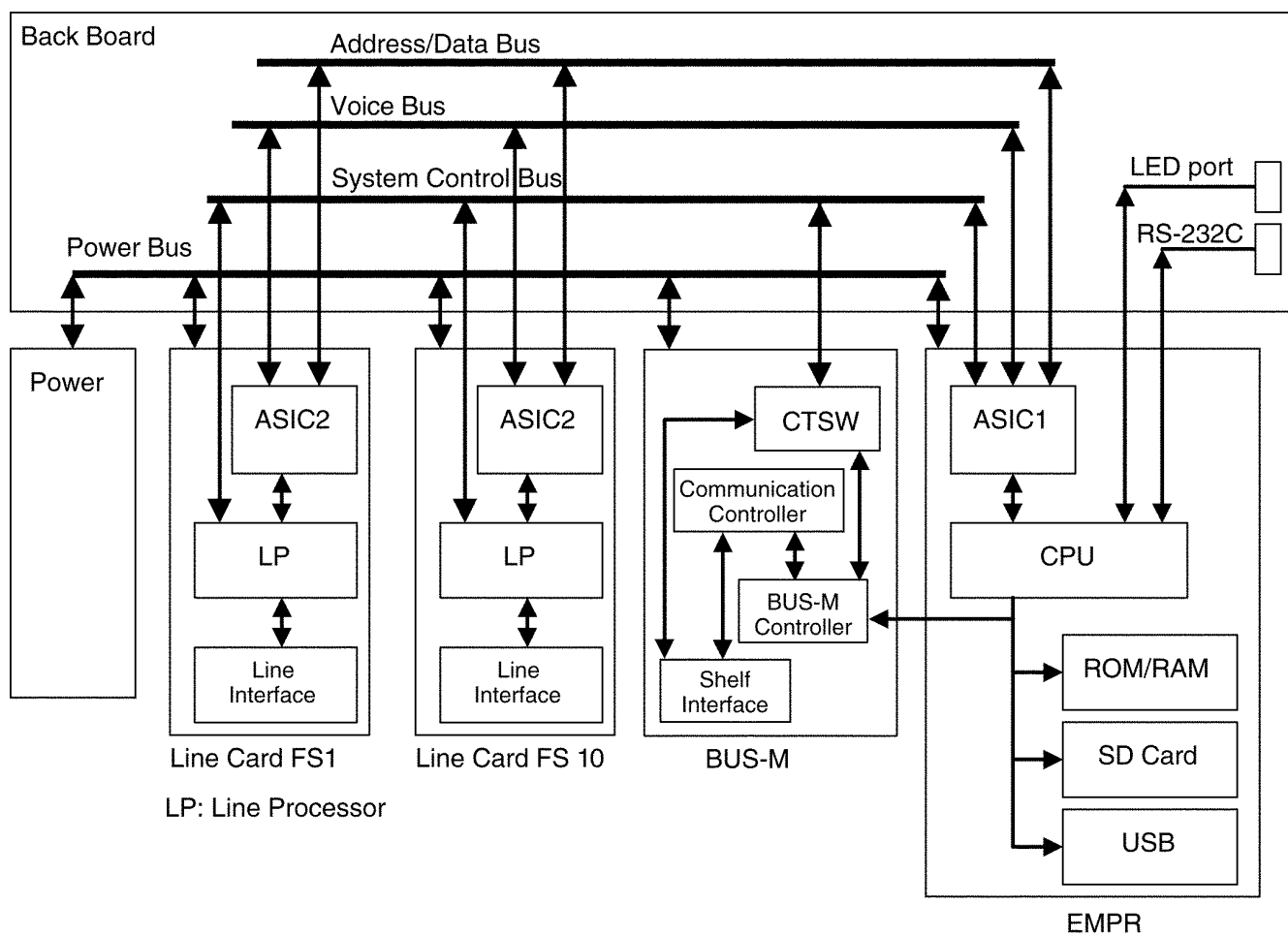
BB (back board) is the mother board of the basic shelf. This board connects each card (POWER, EMPR, BUS-M and optional cards) together. This board has one RS-232C connector.

7.1.3. Power Supply Unit

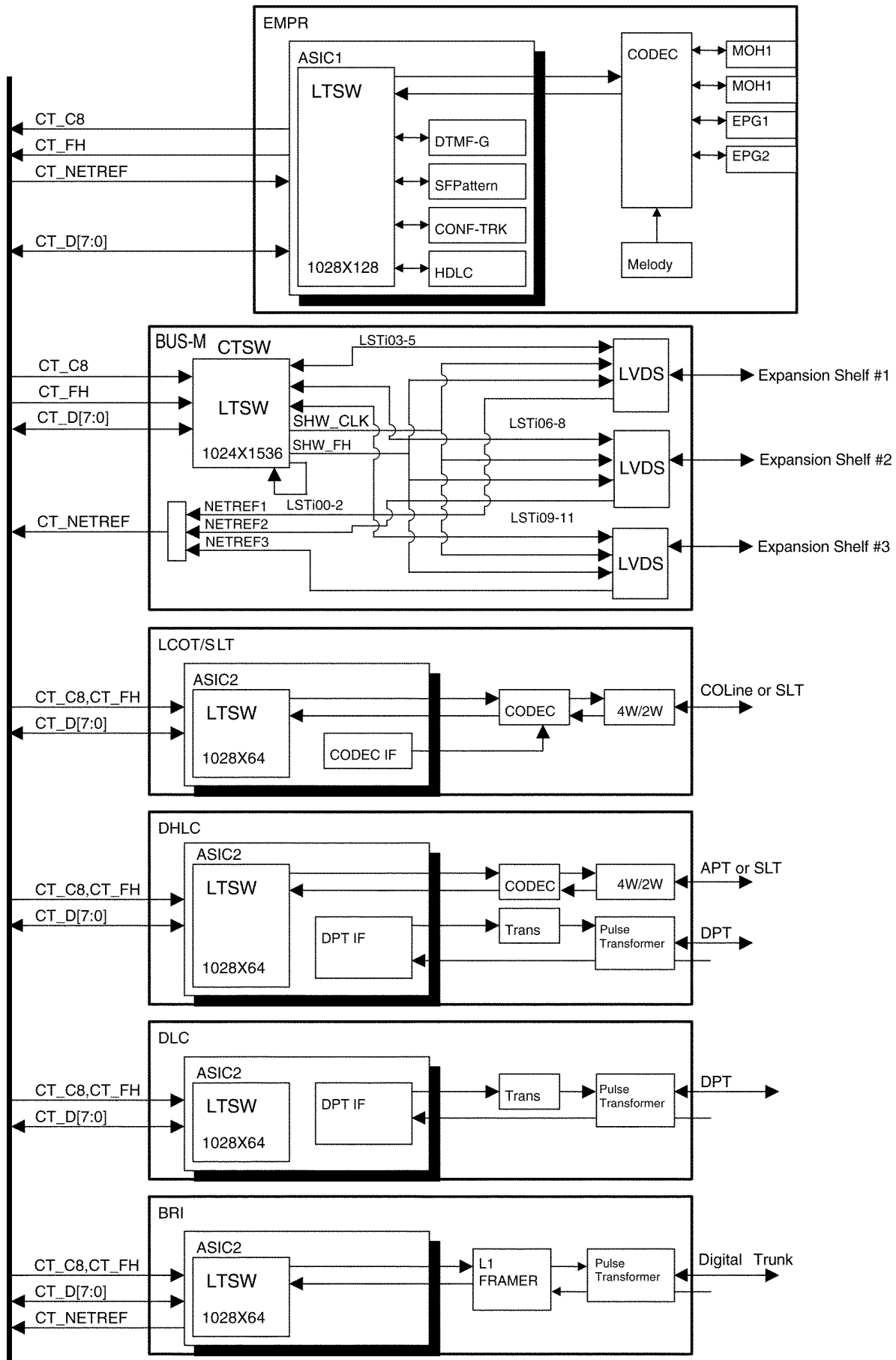
This unit is switching regulator power supply and supplies DC voltages to EMPR card, optional card (free slot).

7.2. SYSTEM CONTROL

7.2.1. System Control Block Diagram



7.2.2. Voice (TDM Highway) Bus Block Diagram



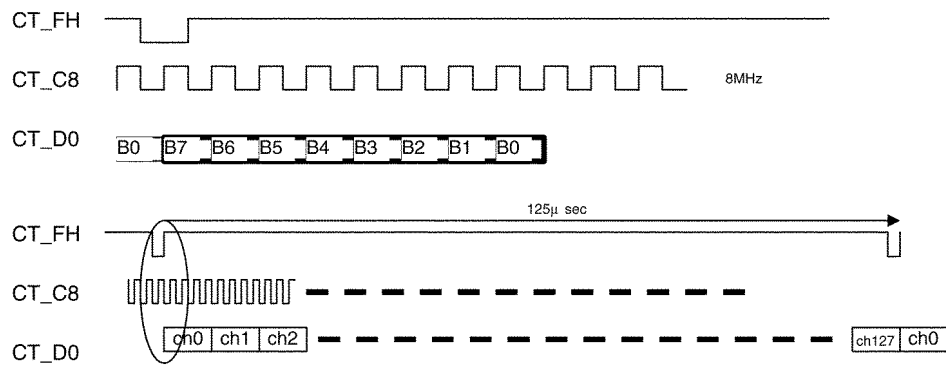
7.2.3. Voice Bus Logical Assignment

	CT_D0	CT_D1	CT_D2	CT_D3	CT_D4	CT_D5	CT_D6	CT_D7
TS0	EMPR LHW	EMPR LHW	FS1	FS5	FS9	BUS System TSW	BUS System TSW	BUS System TSW
TS31			FS2	FS6	FS10			
TS63								
TS95	HDLC	CONF	FS3	FS7	FS11			
TS127	DTMF		FS4	FS8				

In the line card, the CT_D line number, which is output in accordance with the inserted slot, and the time slot are assigned on a software base.

For the detail of output slot for each card, refer to the service manual of card.

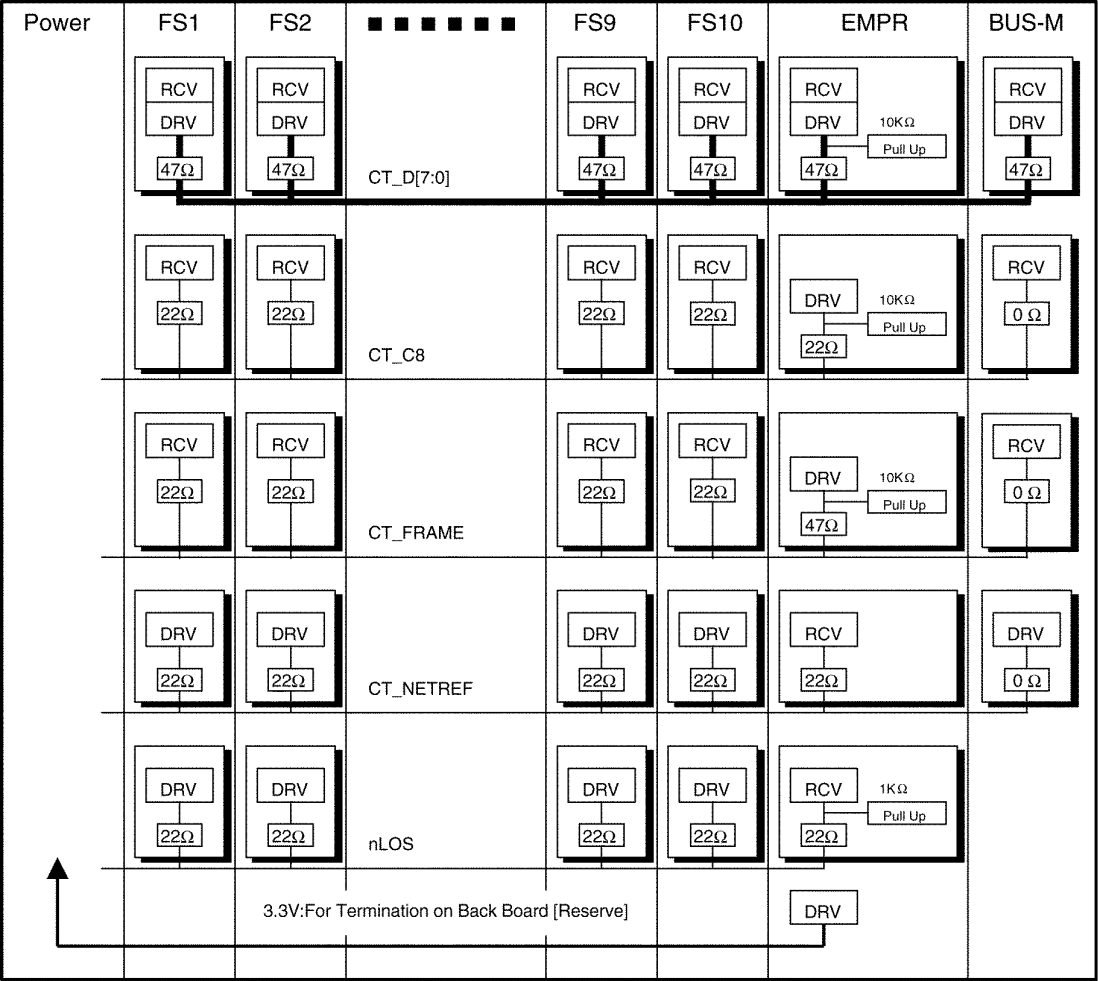
7.2.4. Back Board Signaling



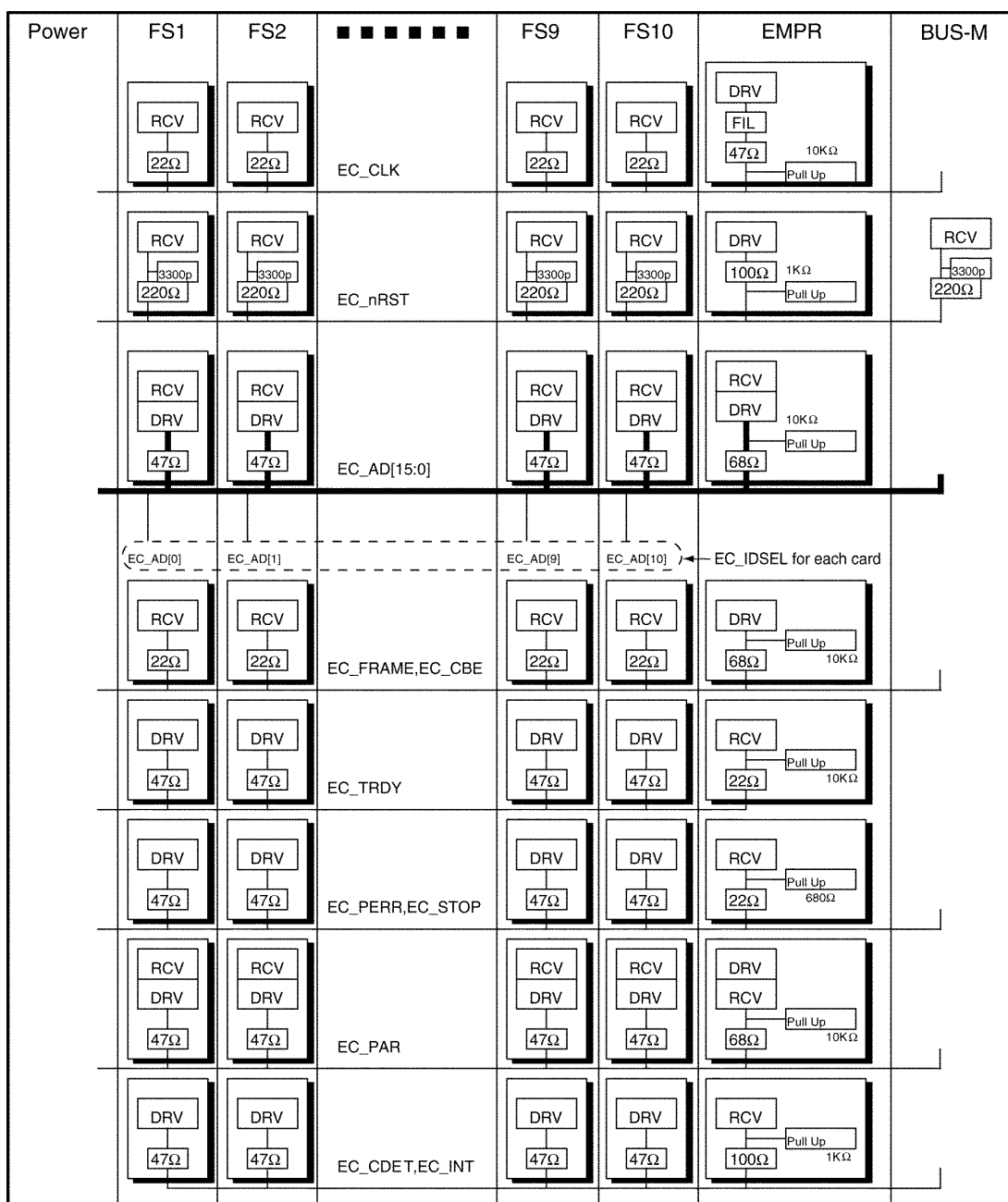
Back board waveform of TDM bus for voice

7.3. BACK BOARD SIGNAL CONNECTION DIAGRAM

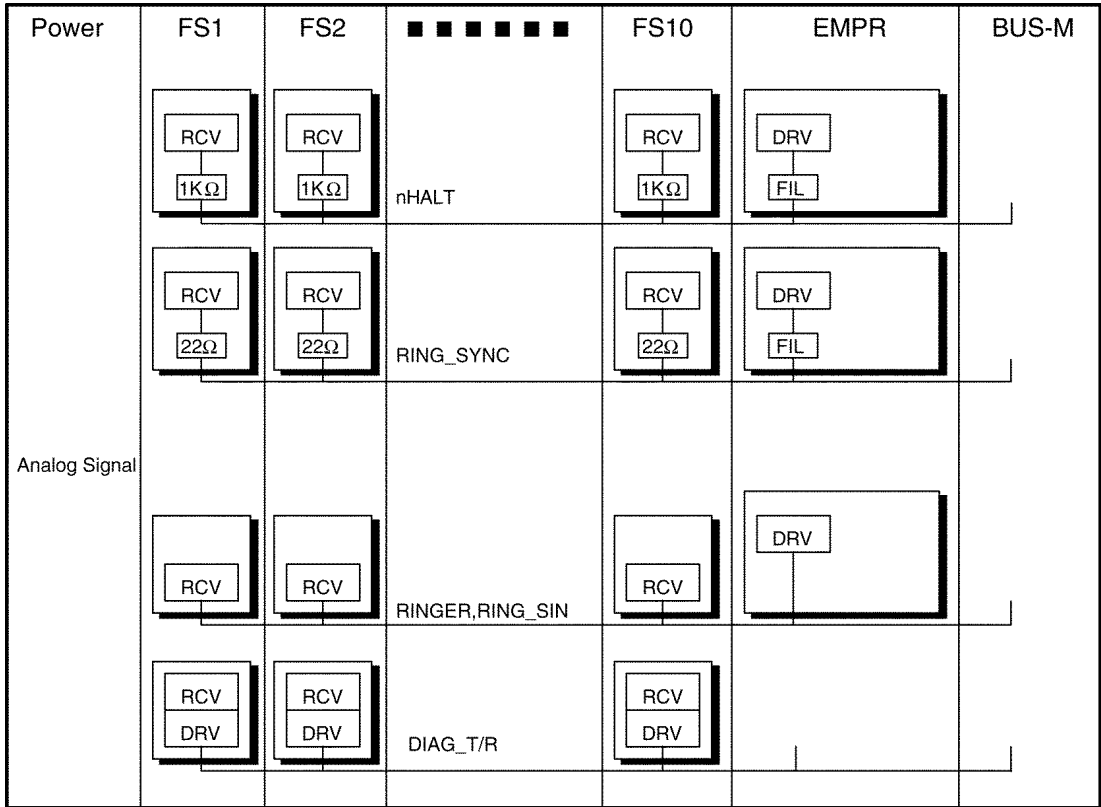
7.3.1. CT Bus System Connection Diagram



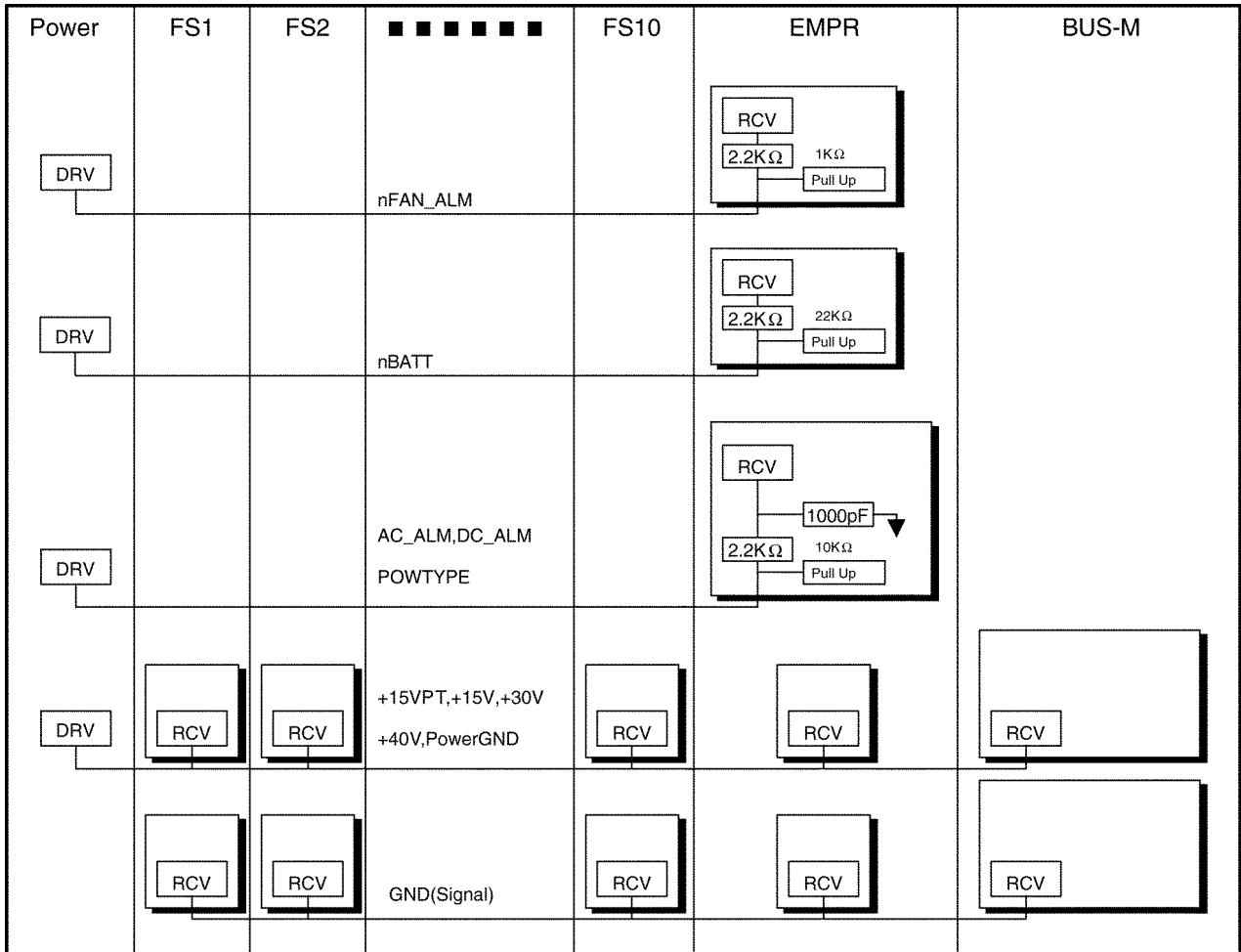
7.3.2. EC Bus System Connection Diagram



7.3.3. System Control and Analog Signal Connection Diagram



7.3.4. Power Supply System Connection Diagram



8 EMPR CARD CIRCUIT OPERATION

8.1. EMPR CARD

8.1.1. Outline

1) Function

- System Control
- Circuit Switching (includes gain adjustment function)
- Conference Call (3 people x 8 ~ 8 people x 3)
- MOH
- PAGING
- Clock

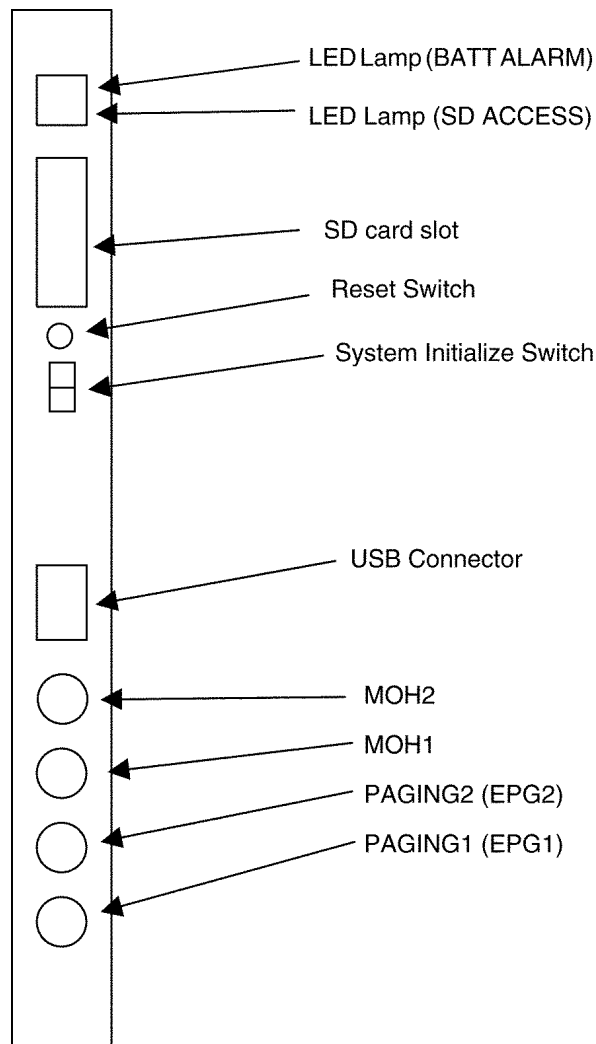
2) Configuration

- Power Supply: DC/DC Converter
- CPU: HITACHI SH7750R (200MHz)
- ASIC: Our own products
- ROM: 8Mbit x 1 (for boot programs)
- SDRAM: 256Mbit x 2 (for work area)
- SRAM: 16Mbit x 2 (for user data backup)
- SD card I/F (for operating programs) x 1
- USB I/F (for PC programming) x 1
- MOH: External sound input x 2
- PAGING: External output x 2
- Expanded memory connector x 1
- Modem card connector x 1

3) Operation Rating

- Power Input : +15V
- Internal Voltage
 - +15V (for MOH)
 - +3.3V (for I/O)
 - +3.3VBB (back board signal line pull-up)
 - +3.3VB (for SRAM, RTC backup)
 - +1.5V (for CPU core)

8.1.2. Description of Each Part



LED light (BATT ALARM): Turns on to indicate the dropping of the lithium battery voltage (less than 2.8V).

LED light (SD ACCESS): Turns on when the SD card is accessing.

SD card slot: Mounts the system program SD card.

Reset Switch: Press at the system reset.

System Initialize Switch:

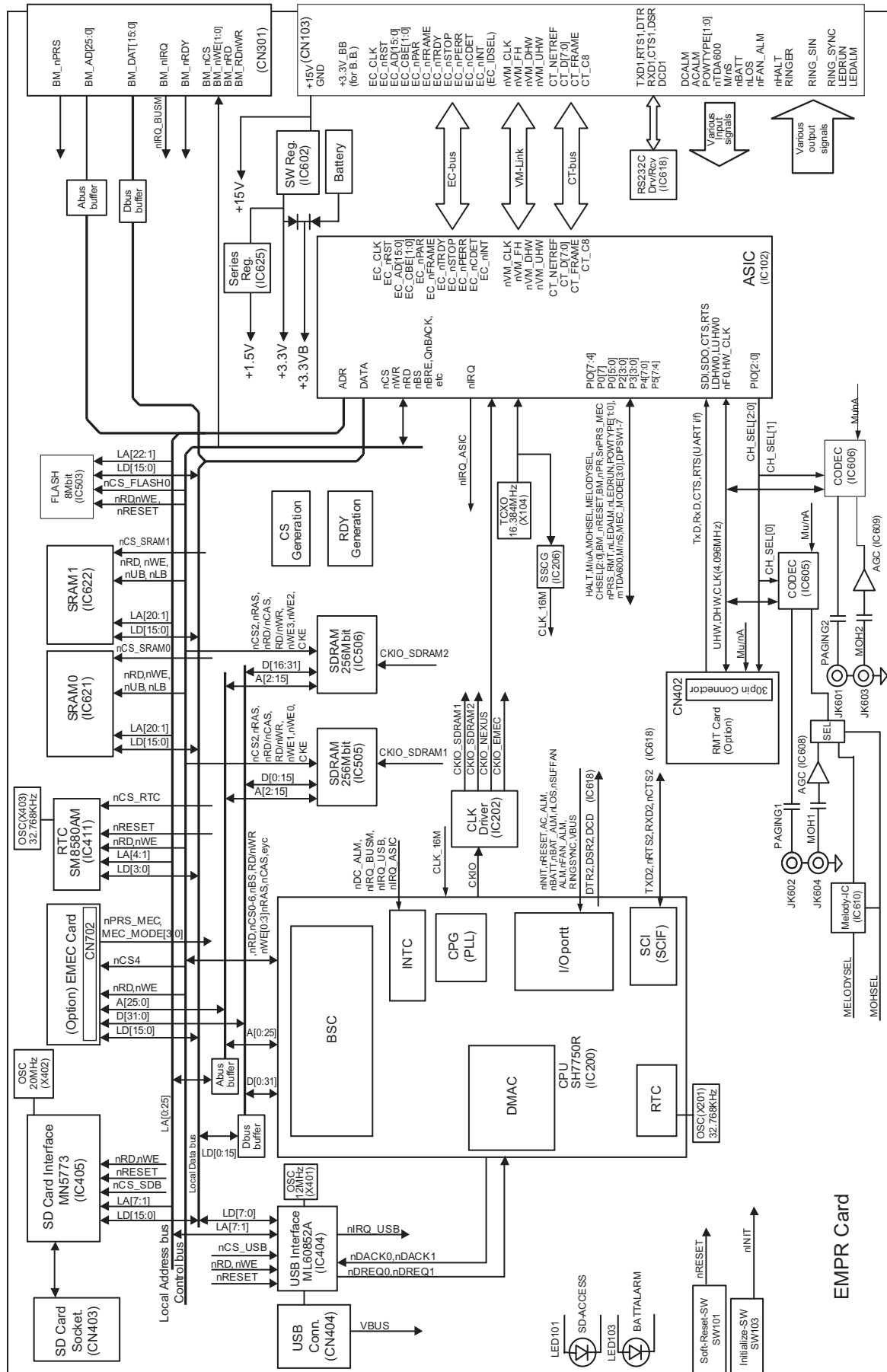
On default startup, set the switch to the "SYSTEM INITIALIZE" position for the power ON. Return the switch to the "NORMAL" position when the main power switch starts to flash. On normal startup, turn the power ON with the "NORMAL" position.

USB connector: B type connector. Used for the PC programming.

PAGING 1, 2: External PAGING output. Connect to the device with the built-in amplifier.

MOH 1, 2: External music on-hold input.

8.1.3. EMPR Block Diagram



KX-TDA600CE EMPR CARD BLOCK DIAGRAM

8.1.4. Circuit Description

8.1.4.1. Outline of Block Description

- CPU block

This block operates the main unit control. Besides this operates various controls, select signal generation, DMA control and serial port control. This contains the built-in clock function.

- ASIC block

This provides the communication function between each option card, call control (TSW function), conference call, tone generation and gain control function.

- Memory block

This is a work area and the main unit control program storage or the system boot program storage or the user configuration data storage area.

- USB block

This provides the USB I/F function. Connects to the PC to be used for the PC programming or the system data load/store.

- SD card block

This provides the SD card I/F function and loads the main unit program and the system data from the SD card storing the main unit control program.

- MOH/PAGING block

This provides the external music on-hold input x 2, the external paging output x 2 port. And also this provides the external music on-hold input 1 system and exclusively the internal music on-hold output.

- Power block

This consists of DC/DC converter circuit and various regulators.

- RTC block

This provides the Real time clock function when system stops.

- BUS-M interface block

This provides the control interface between EMPR Card and BUS-M Card.

8.1.4.2. Detail of Block Description

- CPU block

Configuration: IC200 (CPU), IC207 (reset IC), IC206 (spread spectrum clock IC), X201 (clocking clock) and so on.

Function:

(IC200) Generates the select signal in accordance with the memory map and operates Readout/Storage of data between each peripheral.

Controls the DMA transfer between USB I/F or built-in serial controller and memory.

Operates input/output control of each I/O signal in accordance with the program.

Contains the built-in clock function with the source clock X201 (32.768 kHz).

(IC207) Monitoring the power voltage, it generates the reset signal when the voltage drops to under the constant value (2.9Vtyp).

(IC206) To reduce the unnecessary radiation, it generates the clock with the constant blurring mainly X104 clock output (16.384 MHz).

Signal Name	Function
+15VIN	+15V DC
+15V	+15V DC for MOH circuit
3.3V_BB	+3.3V DC For pull-up of back board signal line (not in use)
+3.3VB	+3.3V DC Backup by a battery For SRAM (IC621, IC622) RTC
1.5V	+1.5V DC for CPU (IC200) core
A[0]-A[25]	Address bus
nAC_ALM	AC alarm signal: This indicates AC voltage cutoff. (L: Alarm condition)
nBACK	Bus Acknowledge
nBATT	This indicates whether external battery is connected or not.L: Connected
nBAT_ALM	Battery Alarm Signal: This indicates the declined voltage of lithium battery. (L: Alarm condition)
nBREQ	Bus Request
nBS	Bus Cycle Start
nRD/nCAS	Column Address Strobe: CAS signal for SDRAM
nRAS	Row Address Strobe: RAS signal for SDRAM

Signal Name	Function
CH_SEL[0]	Synchronous Signal for CODEC (For MOH#1/Page#1)
CH_SEL[1]	Synchronous Signal for CODEC (For MOH#2/Page#2)
CH_SEL[2]	Synchronous Signal for CODEC (For RMT)
CKE	Clock Enable: CKE signal for SDRAM
CKIO	Clock I/O For bus clock of SDRAM (IC505, IC506) and ASIC (IC102). CPU (IC200) outputs the clock of four times frequency as many as Source clock (16.384MHz).
nCS0	Chip Select 0: Chip select signal for flash memory
nCS1	Chip Select 1: Chip select signal for BUS-M Card
nCS2	Chip Select 2: Chip select signal for SDRAM
nCS3	Chip Select 3: Chip select signal for the expanded SDRAM (Future Option, Reserve at present.)
nCS4	Chip Select 4: Chip select signal for SRAM
nCS5	Chip Select 5: Chip select signal for ASIC
nCS6	Chip Select 6: Chip select signal for USB I/F, SD card I/F and SD card I/F
nCS_FLASH	Chip Select for Flash memory CS signal for IC503
nCS_SDB	Chip Select for SD card I/F
nCS_SRAM0	Chip Select for SRAM0: CS signal for IC621
nCS_SRAM1	Chip Select for SRAM1: CS signal for IC622
nCS_USB	Chip Select for USB I/F
nCTS2	Clear To Send from RS-232C connector
CTS_RMT	Clear to Send: Flow signal for modem
CT_C8	Clock8.192MHz clock outputted from ASIC (IC102)
CT_D[7:0]	CT Data Bus: Two-way serial data bus to which the drive from any card is possible in the system.
CT_FRAME	Frame Signal: 8KHz frame signal outputted from ASIC (IC102)
CT_NETREF	Backup Synchronous Signal (MAX 2MHz) 8KHz signal output from
C_CS[0]	Chip Select For RMT (Reserved)
D[31:0]	Data Bus
nDACK0-1	DMA Acknowledge: For USB I/F
DCD	Data Carrier Detect
DCLK_RMT	Codec Clock (8MHz): For RMT
nDC_ALM	DC ALARM:DC alarm signal; Indicates the declined DC voltage. (L: Alarm condition)
DIN_RMT	Codec Data Input: For RMT (Reserved)
DOUT_RMT	Codec Data Output: For RMT (Reserved)
nWE[0:3]	Data Input/Output Mask (Write Enable): DQM signal for SDRAM and WE signal for each memory IC and ASIC nWE1, nWE2, nWE3
nDREQ0-1	DMA Request: For USB I/F
DSR2	Data Set Ready from RS-232C connector
DSR_RMT	Data Set Ready from RS-232C connector
DTR2	Data Terminal Ready to RS-232C connector
EC_AD[15:0]	Address of EC Synchronous Bus, Data Bus (4MHz)
EC_nCBE[1:0]	EC Bus Command/Byte Enable: The initiator drives as bus command in the address phase and as byte enable in the data phase.
EC_nCDET	EC Line Card Detection Signal Asynchronous interrupting signal
EC_CLK	Clock of EC Synchronous Bus (8MHz) All the EC bus signal except nRESET/EC_INT operates in sync with this signal.
EC_nFRAME	EC Cycle Frame Signal: This indicates the drive by initiator and the execution of ECI bus cycle.
EC_nINT	EC Interrupting Signal: This is asserted, when slave interrupt occurs.
EC_PAR	Parity Bit of EC Synchronous Bus: Drive by applying even parity to AD[15:0] and CBE[1:0]. (4MHz)
EC_nPERR	EC Parity Error: Flag indicating error status by parity flag
EC_nRST	EC Reset Input: System reset input signal
EC_nSTOP	EC Bus Stop Signal: This is asserted, when target requests transaction halt to initiator.
EC_nTRDY	EC Target Ready Signal: This indicates the drive by target and the possible data transfer.
nFAN_ALM	Fan Alarm: It goes Low at the error of the L Power Supply's FAN. It goes High when the FAN is normal and, Power Supply M, which does not carry the FAN, are used.
HALT	This alarms the occurrence of the declined DC voltage to line card. H: Active L: Normal
nINIT	System Initialization Switch Input: L: At system initialization, H: At normal start-up
nIRQ_ASIC	Interrupt Request from ASIC: This indicates ASIC requests interrupt.
nIRQ_SDB	Interrupt Request from SD card I/F: This indicates SD card I/F requests interrupt.
nIRQ_BUSM	Interrupt Request from BUS-M card I/F: This indicates BUS-M card I/F requests interrupt.
nIRQ_USB	Interrupt Request from USB I/F: This indicates USB I/F requests interrupt.
LA[22:1]	Address bus
nLB	Lower Byte Select: This indicates Lower byte select signal of SRAM
LD[15:0]	Data Bus
LDHW[1:0]	Down Highway: Data output terminal connected to codec etc. as down data signal of local highway
nLEDALM	Alarm display L: On
nLEDRUN	RUN display L: On
nLOS	Loss of synchronous signal: Reserve at present
LHWCLK[0]	Highway Clock Signal (8MHz): Bit clock of local highway.
LUHW[1:0]	Up Highway: Data input terminal connected to codec etc. as up data signal of local highway.

Signal Name	Function
M/nS	Master/slave identification signal when SIC card (Future Option) as intersystem connection card is mounted. EMPR inputs this signal and detects which the EMPR will be. H: Master L: Slave
MD0-2	Mode Control Terminal: Clock operation mode of CPU is set.MD2: L, MD1: L, MD0: H Fixed
MELODYSEL	Melody IC Tune Name Select L: Ju te veux H: Minuet
MEC_MODE[3:0]	Information Bit to know the memory mounting capacity etc. of EMEC card.Reserve at present.
MOHSEL	Switching Signal between internal hold sound source and external hold sound H: Internal L: External
Mu/nA	Switching Signal of Sound Compression Law H: Mu-Law, L: A-Law
nTDA600	TDA600, TDA620 Identification Signal set on the back board. The EMPR inputs this signal and detects which the EMPR will be. H: TDA200, L: TDA600
POWTYPE[0] -[1]	Power Supply Type: POWTYPE [1] [0] M Power Supply attached L H L Power Supply attached H L
nPRS_MEC	Press MEC: Information of EMEC Card Attachment L: Attached, H: Not attached
nPRS_RMT	Press RMT: Information of RMT Card Attachment L: Attached, H: Not attached
nPRS_SDB	Press SD card: Information of SD Card Attachment L: Attached, H: Not attached
nRD	Read: USB I/F, SD card I/F, ASIC, SRAM, Read signal for flash memory
RD/nWR	Read/nWrite: Read/Write signal for SDRAM, BUS-M card.
nRESOUT	Reset Out: Reset from CPU (IC200) to each card
nRESET	Reset: Power-on reset signal
nRESETM	Manual Reset (Software reset): Manual reset request signal for CPU
RINGER	Ringer Signal: Outputs square-wave of 16Hz/20Hz/25Hz as source signal of ringer
RING_SYNC	Trigger Signal of Ringer Signal generation timing to each internal line card
nRTS2	Request To Send to RS-232C connector
RTS_RMT	Request to Send: Flow signal for modem
RXD2	Receive Data from RS-232C connector
RXD_RMT	Serial Data Output Terminal: ASIC
SDCD	SD Card Detect Input
SDCLK	SD Card Clock Out
SDCMD	SD Command
SDDAT0-3	SD Card Data
SDWP	SD Card Write Protect Input
SHW_CLK	Intersystem Highway Clock Signal (4MHz) Bit clock of intersystem highway.
SHW_FH	Intersystem Highway Synchronous Signal (8KHz) 8KHz frame synchronous signal of intersystem highway
TXD2	Transmit Data to RS-232C connector
TXD_RMT	Serial Data Input Terminal: Data receiving terminal from RMT to UART in the ASIC
nUB	Upper Byte Select: SRAM
USB_D+	USB Data +
USB_D-	USB Data -
VBUS	Bit indicating that power source is supplied to USB bus [Host (PC etc.) is connected.] H: Host connected L: Host not connected
VREF	Reference Voltage for MOH Circuit Intermediate potential of +15V
nWAIT	Wait: Hardware wait request signal for bus timing between CPU and ASIC
nWE	Write Enable: WE signal of SRAM

- ASIC block

Configuration: IC102 (ASIC), IC111, X103 and so on.

Function:

(IC102) This functions as the bus master of EC bus (synchronous bus with 16 bit width, transmission rate max.10Mbps). Communicates with ASIC mounted to each option card via EC bus and controls the option card.

Controls CT bus (HW clock 8.192MHz, 8 highway, 128 timeslot) for TSW function.

Controls the conference call for 3 people x ~8 parties ~ 8 people x ~3 parties.

Generates single and DTMF tone in any highway and timeslot.

Provides the digital gain control function by data conversion.

Provides some I/O ports for CODEC channel pulse generation, modem encoding rule setting and music on-hold switching and is controlled by CPU.

- Memory block

Configuration: IC621, IC622 (SRAM), IC503 (Flash ROM), IC505, IC506 (SDRAM), IC509, IC511 (logic IC) and so on.

Function:

(IC621, IC622) Saves the user configuration data (such as key assign data per PT).

The memory is maintained by the onboard battery back-up.

(IC503) Saves (some of) the system boot program and the system data.

(IC505, IC506) The main program is loaded from the SD card on the system start-up.

Used as the program area and the CPU work area after start-up.

Makes a direct bus connection to CPU due to high-speed action (bus clock 66MHz).

(IC509, IC511) Generates each memory select signal from the memory area select signal and upper address. Generates the write signal and upper/lower byte select signal.

- USB block

Configuration:

IC404 (USB I/F), X401 (source clock: 12.000MHz), CN404 (USB connector) and so on.

Function:

Connects to the USB host system (mainly PC) via CN404 (B type connector) as a USB device and makes data transfer by max.11Mbps. DMA function of CPU is utilized to transfer the data.

- SD card block

Configuration:

IC405 (SD card I/F), IC409, X402(20MHz), CN403 (SD card connector) and so on.

Function:

Loads the main program and the system data from the SD card connected to CN403 by 10Mbps. Restores the system data periodically.

- MOH/PAGING block

Configuration:

IC605, IC606 (CODEC), IC608, IC609 (OP Amp), IC610 (Melody IC), Q603~Q607 (transistor), JK601~JK604 (pin jack) and so on.

Function:

The external music on-hold 1 is input from JK604 and is A/D converted in IC605 via AGC (Auto Gain Control) circuit, which consists of IC608, Q605, Q607 and other CR, this is then connected to the call line HW. Likewise, the external music on-hold 2 is input from JK603 and is made A/D conversion in IC606 via AGC (Auto Gain Control) circuit, which consists of IC609, Q606, Q608 and other CR, this is then connected to the call line HW. The external music on-hold 2 and IC610 is exclusively connected to IC606 input (by software control).

The various tones & DTMF tone and the voice data generated in IC102 (ASIC) are made D/A conversion in IC605 and IC606. They are output via JK602, JK601 respectively.

- Power Supply block

Configuration:

IC602 (DC/DC converter), IC625 (1.5V regulator), IC611 (Comparator), Q601, Q610, Q611 (transistor, FET), L601, L603, C600, C643, C641, C642, D602, D605, D607~D609, BAT600, IP601, IP602 (circuit protection device) and so on.

Function:

+15V input is stepped down to +3.3V by DC/DC converter circuit which consists of IC602, L601, Q611, C600 and C643, and is supplied to each IC power. And, it monitors +3.3V output voltage and turns ON Q611 to block +15V input when over

voltage is supplied.

+3.3V is generated by the DC/DC converter is converted to +1.5V and supplied to IC200 core power.

BAT600, which is a lithium battery for memory backup, is connected to the power supply of IC621, IC622 (SRAM), IC411 (RTC) via D608, D609.

IC611 compares BAT600 output voltage to the reference voltage (about +2.7V) and drives LED (BATT ALARM) that indicates dropping of backup voltage.

IP601 and IP602 block the line respectively when excess current flows to +15V and +3.3V line.

IP601 also functions as a voltage surge protector of +3.3V for the circuits Q610, D605 and so on.

9 BACK BOARD CIRCUIT OPERATION

The back board (BB) connects signals between all cards in KX-TDA600. It also supplies power from the power supply unit to the cards.

CONNECTORS EXPLANATION

(1) Power Supply Unit Connector: CN100

(2) Free Slot Connectors: CN101-CN110

(3) EMPR Card Slot Connector: CN111

(4) BUS-M Card Connector: CN112

(5) RS-232C Connector: CN113

CN113 is connected to the connector in front of the product.

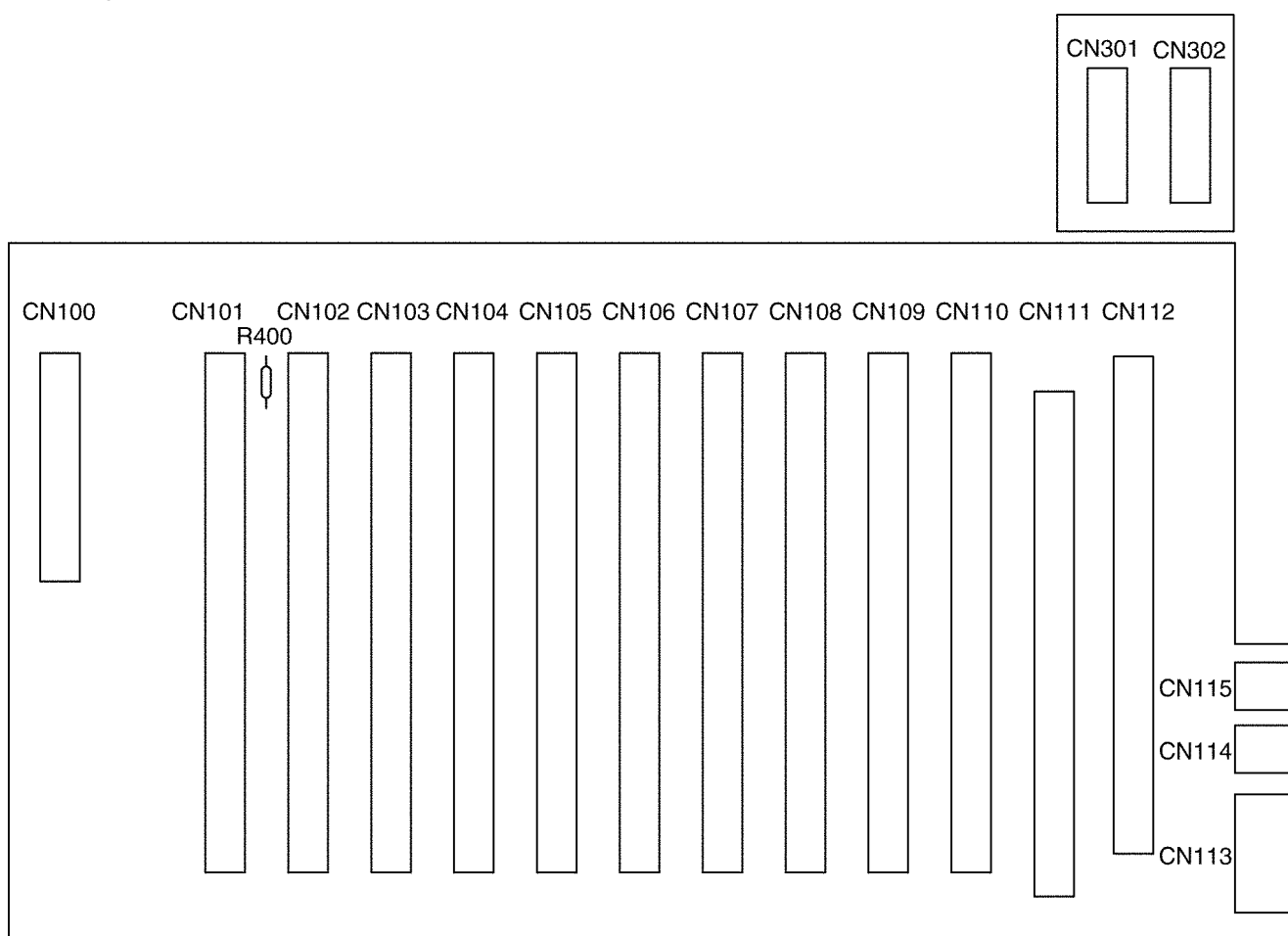
(6) LED Connector: CN114

CN114 is connected to the Board on the product.

(7) FAN Connector: CN115

(8) BUS Connector: CN301, CN302

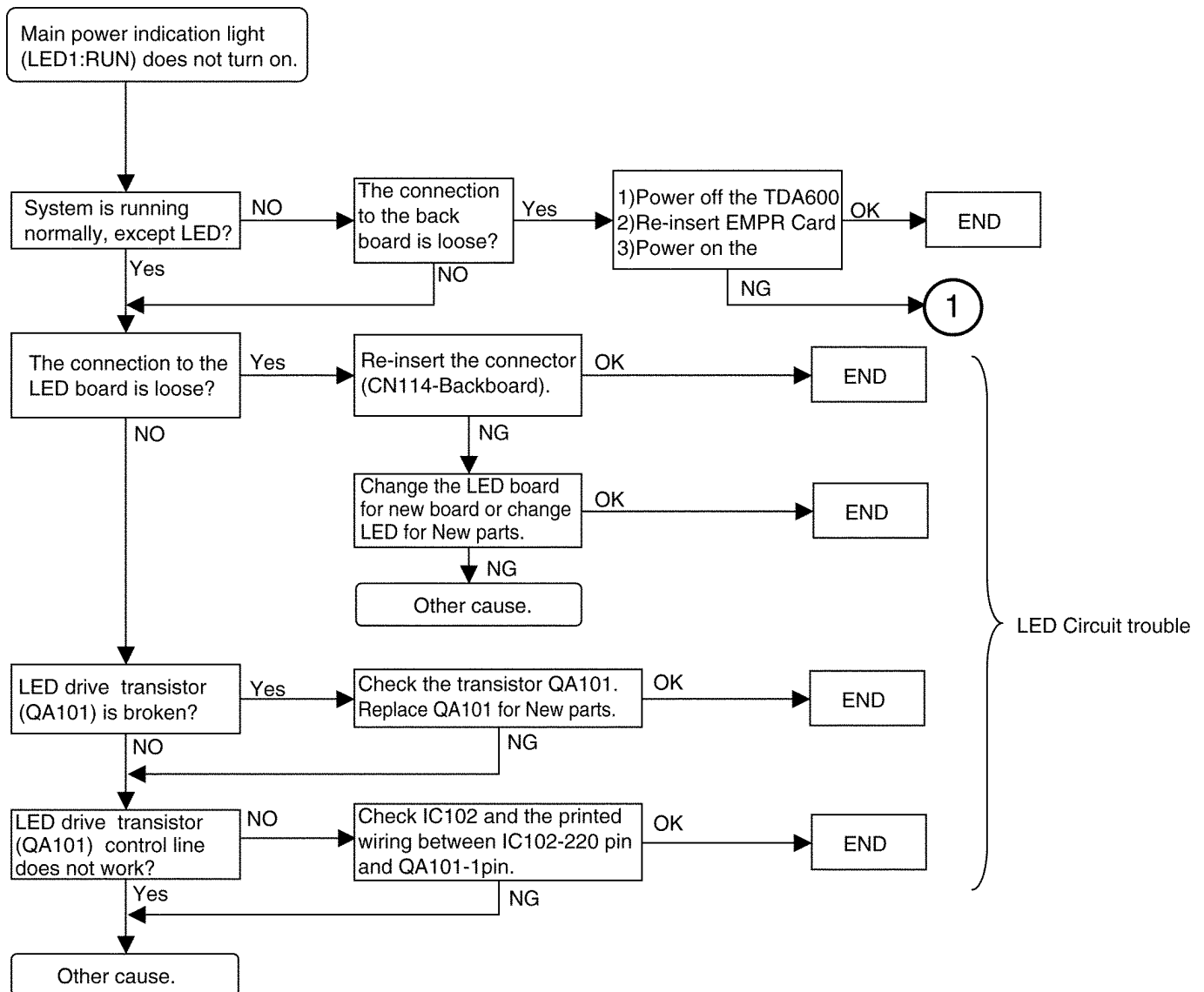
(9) Voltage drop Resistor for Fan Control

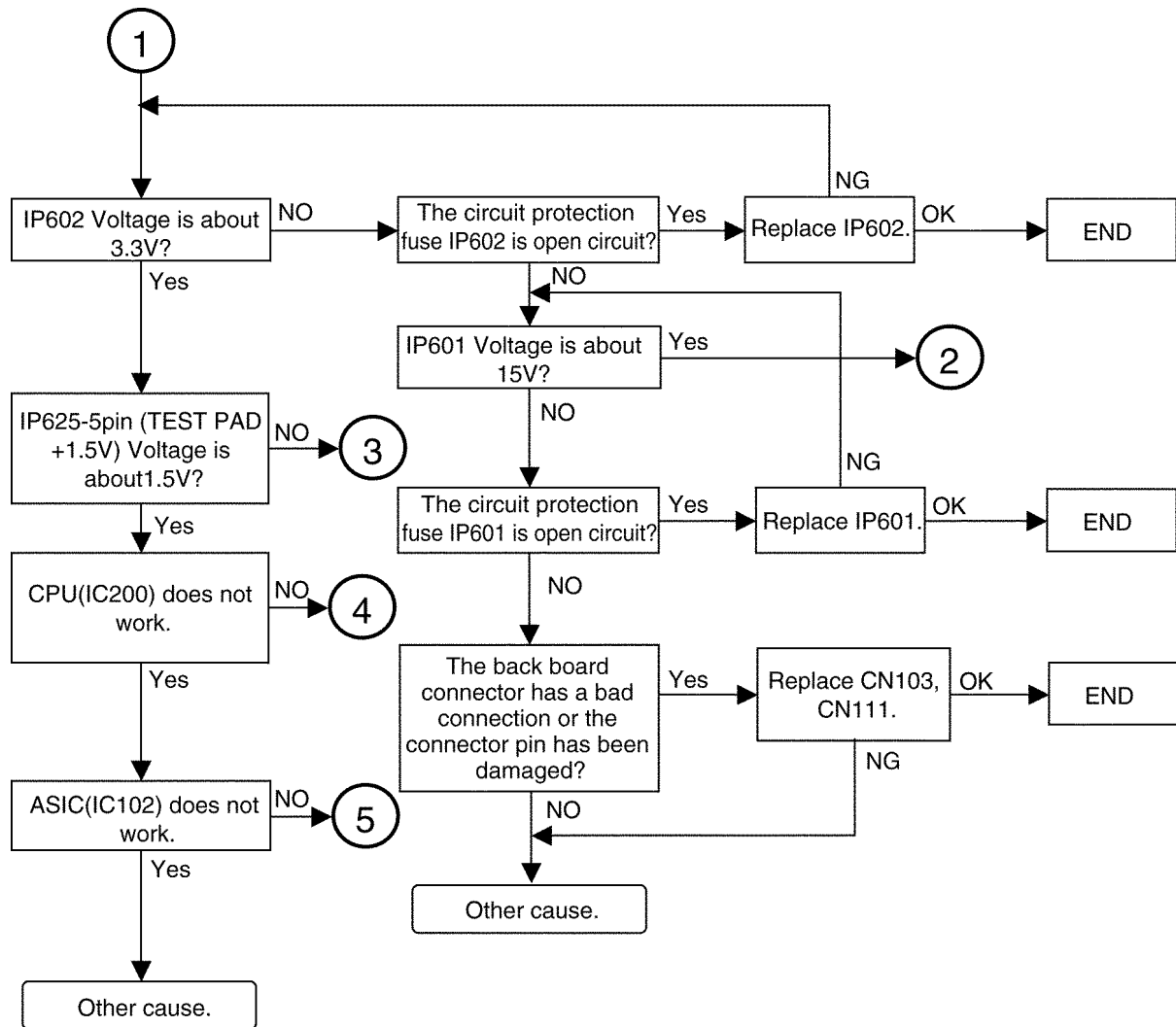


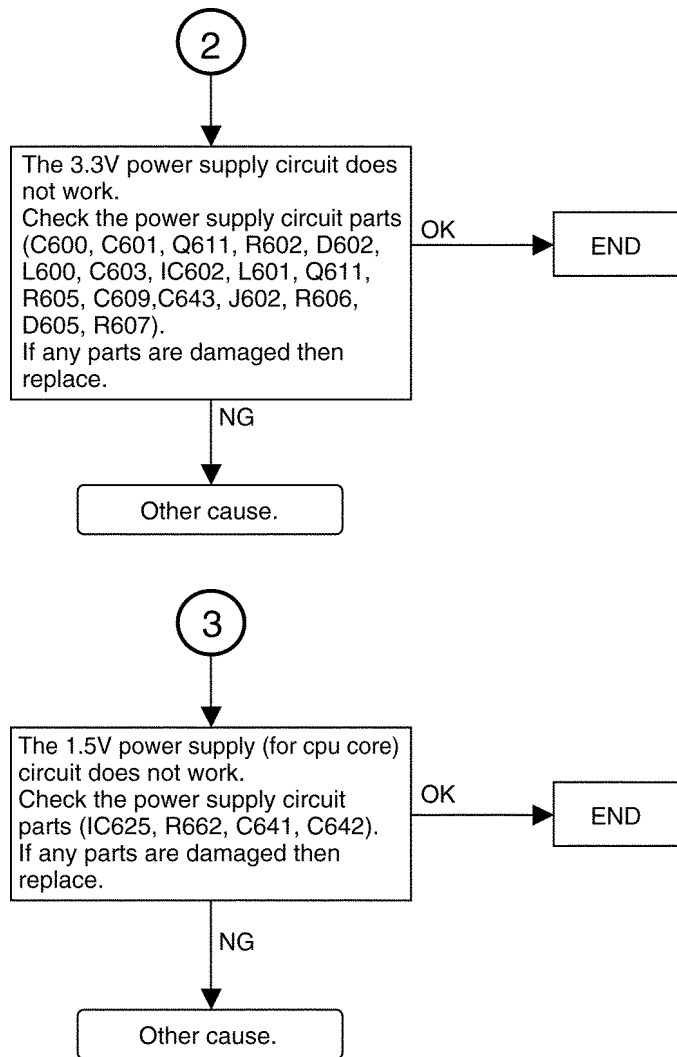
10 TROUBLESHOOTING GUIDE

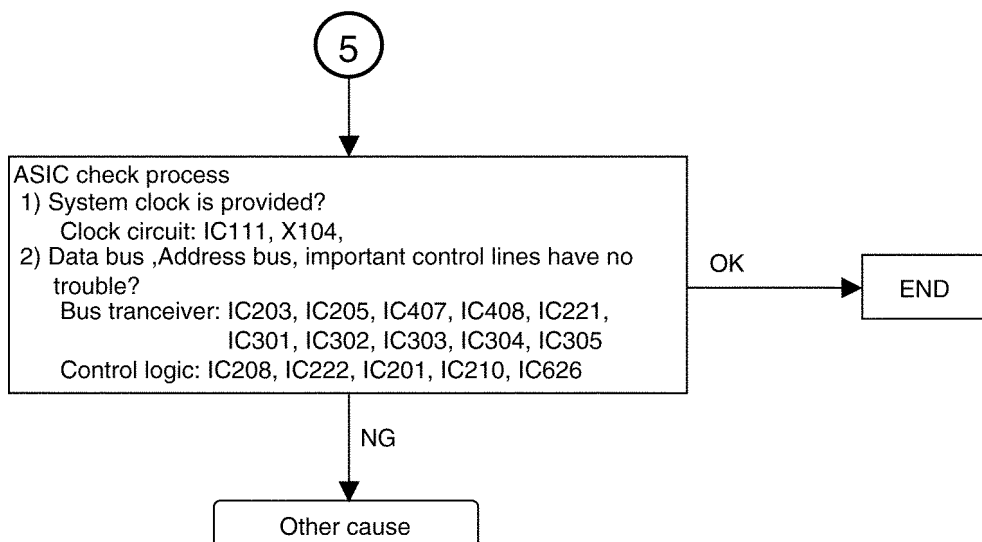
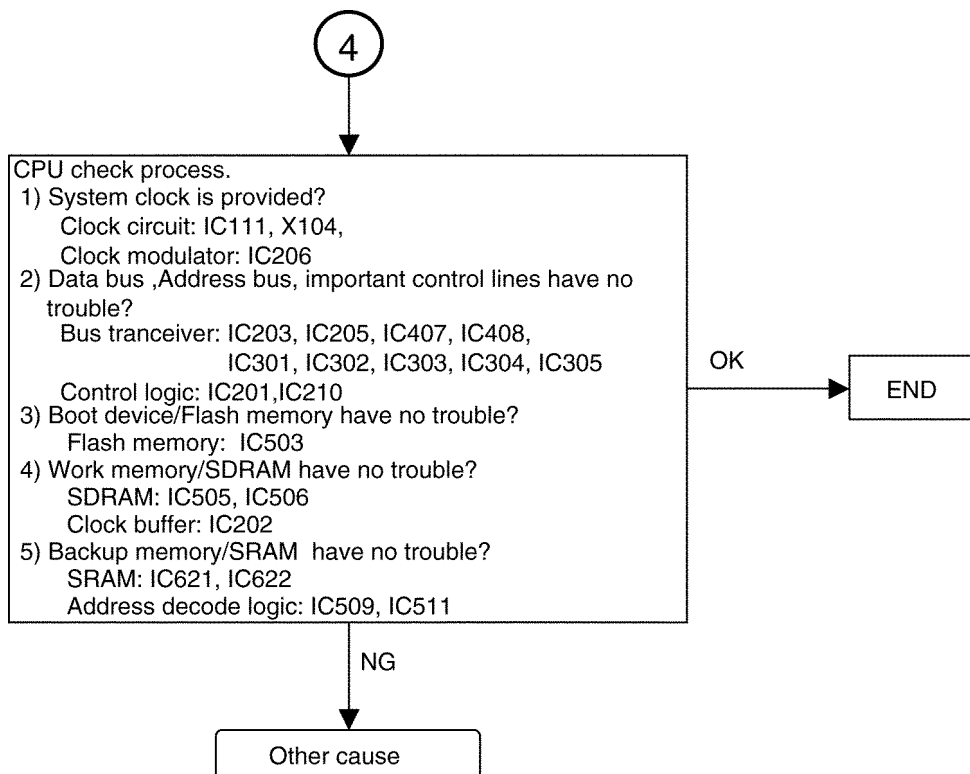
10.1. EMPR

10.1.1. Startup

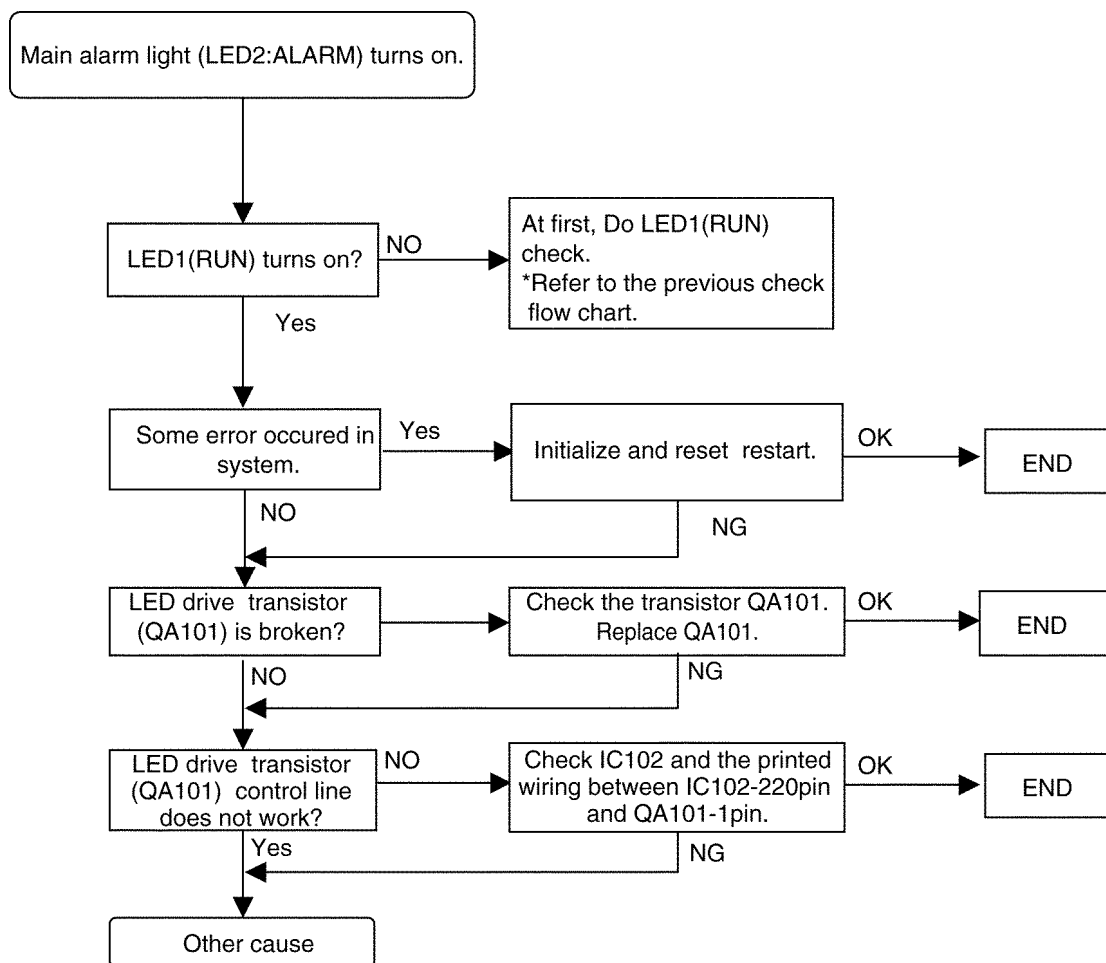




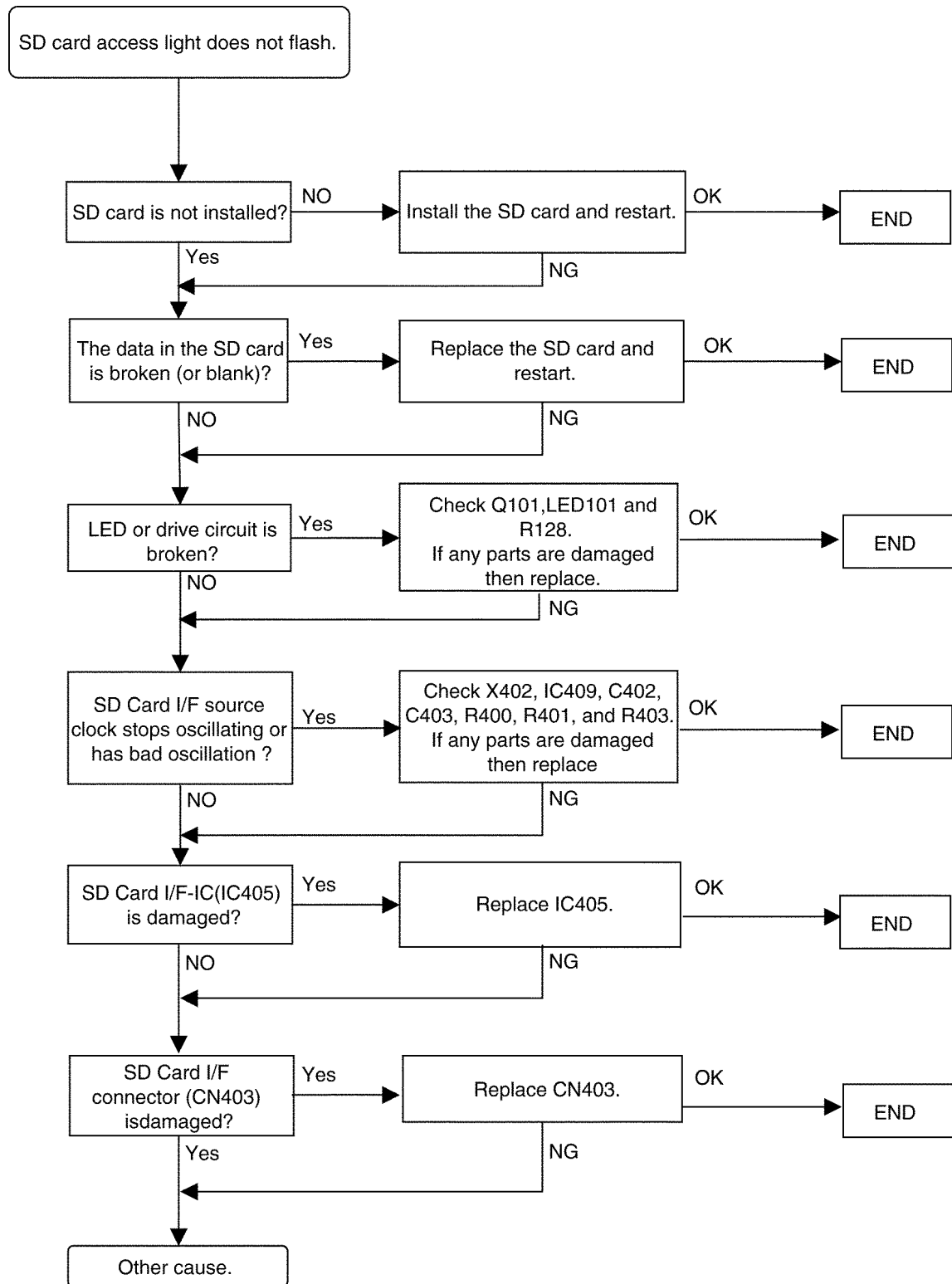




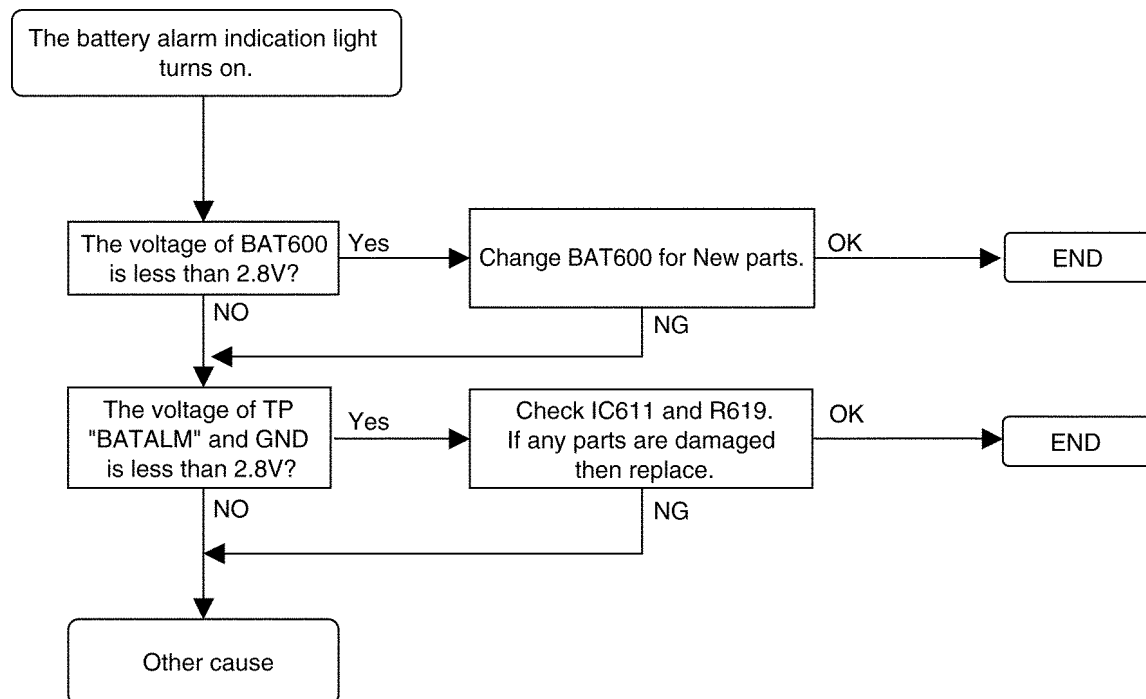
10.1.1.1. Main alarm light turns on



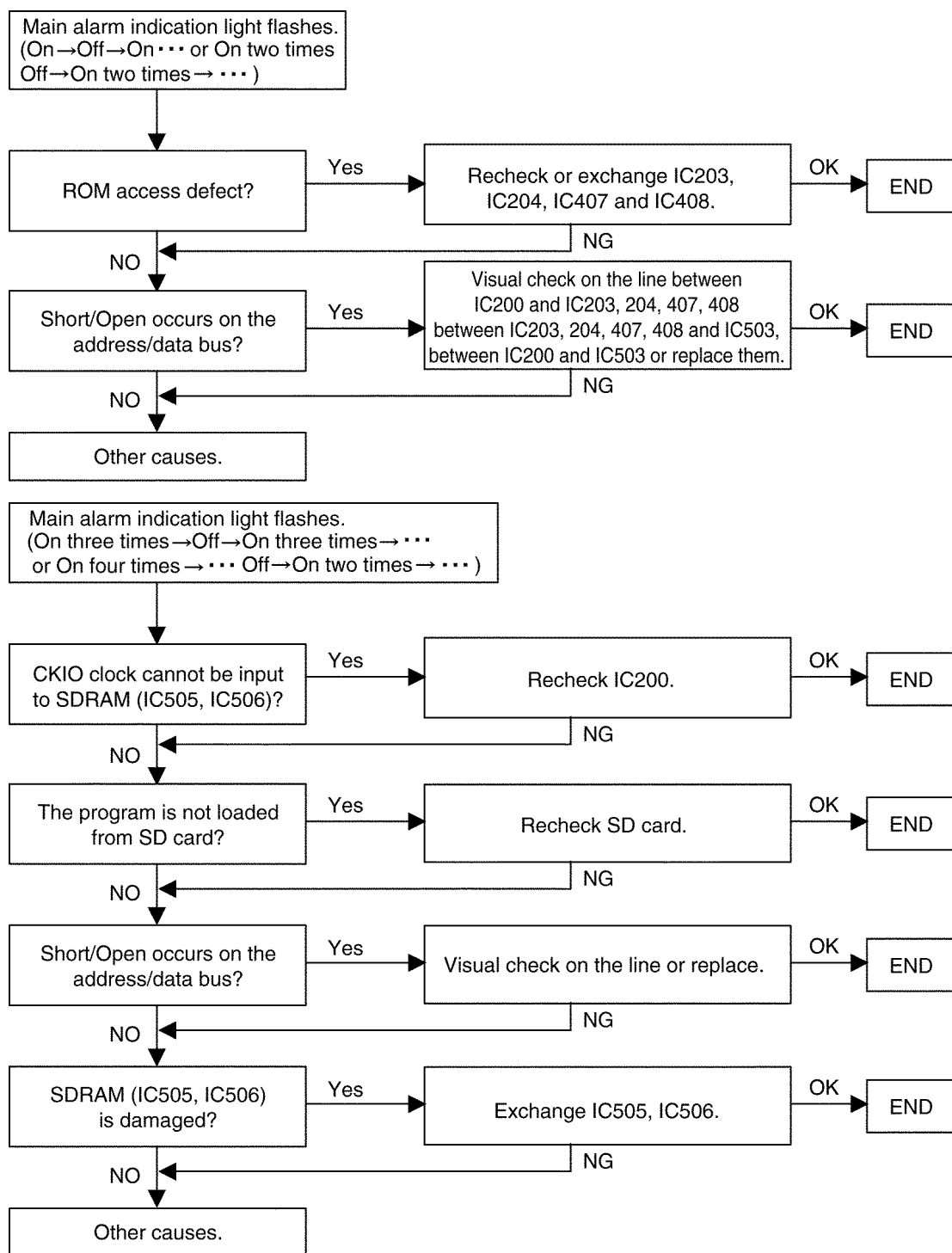
10.1.1.2. SD card access light does not flash



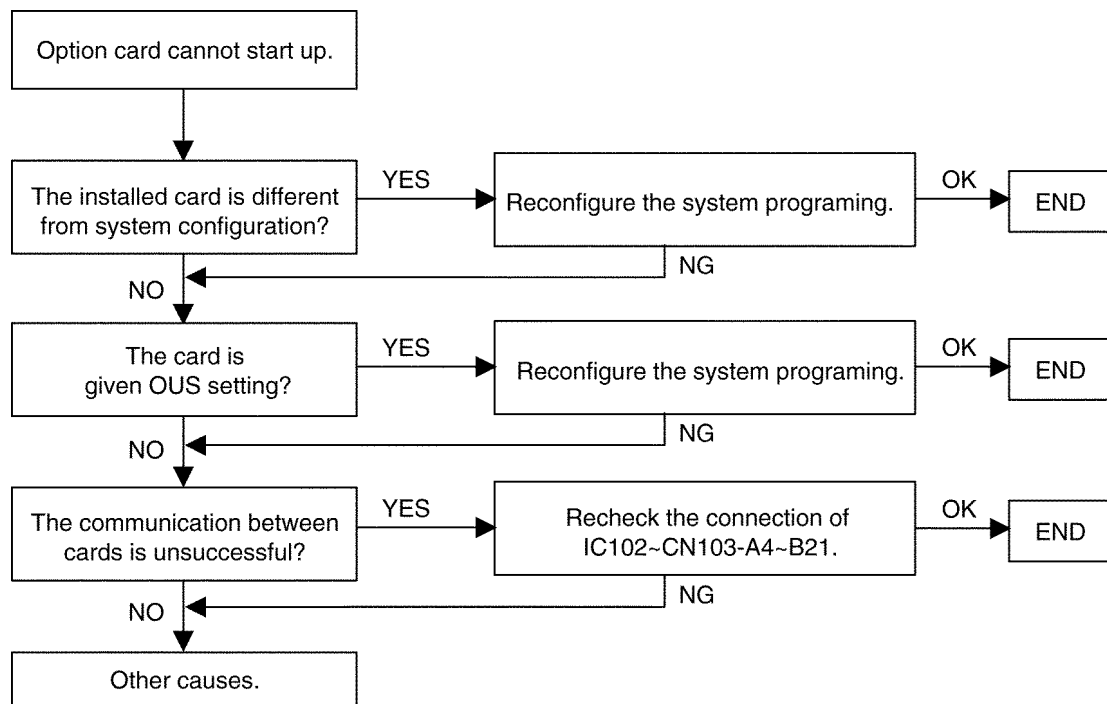
10.1.1.3. The battery alarm indication light turns on



10.1.1.4. Main alarm indication light flashes

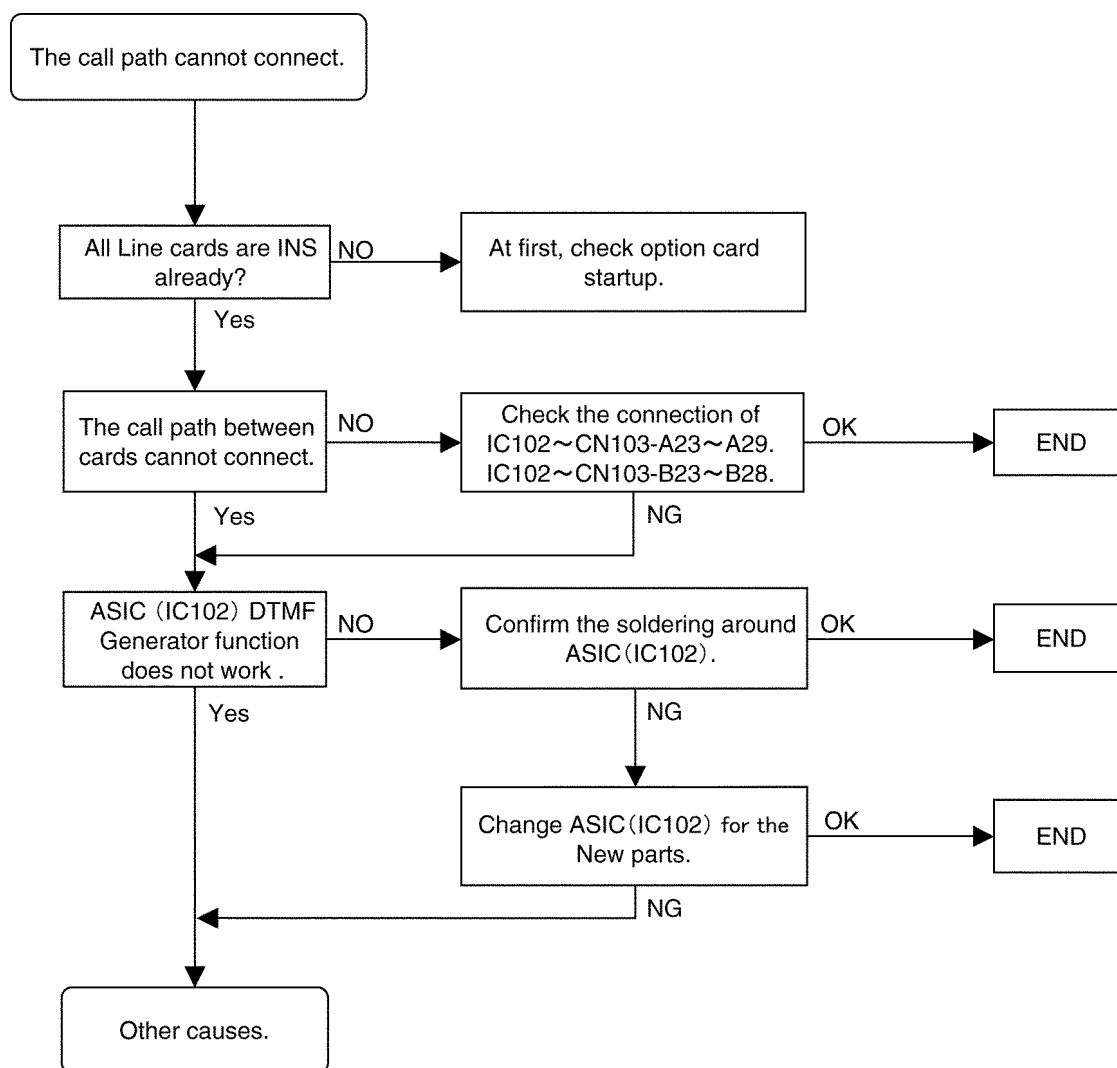


10.1.1.5. Option card cannot start up

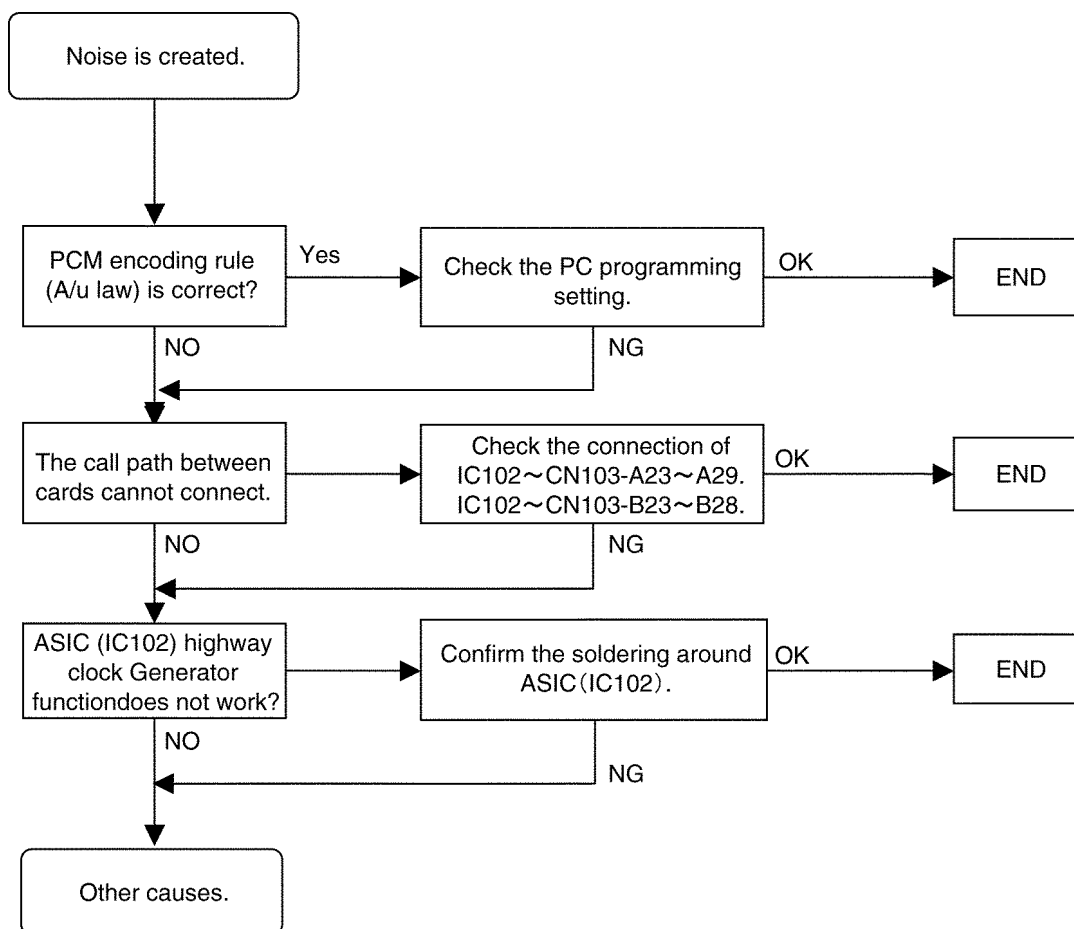


10.1.2. Phone Call

10.1.2.1. The path cannot connect

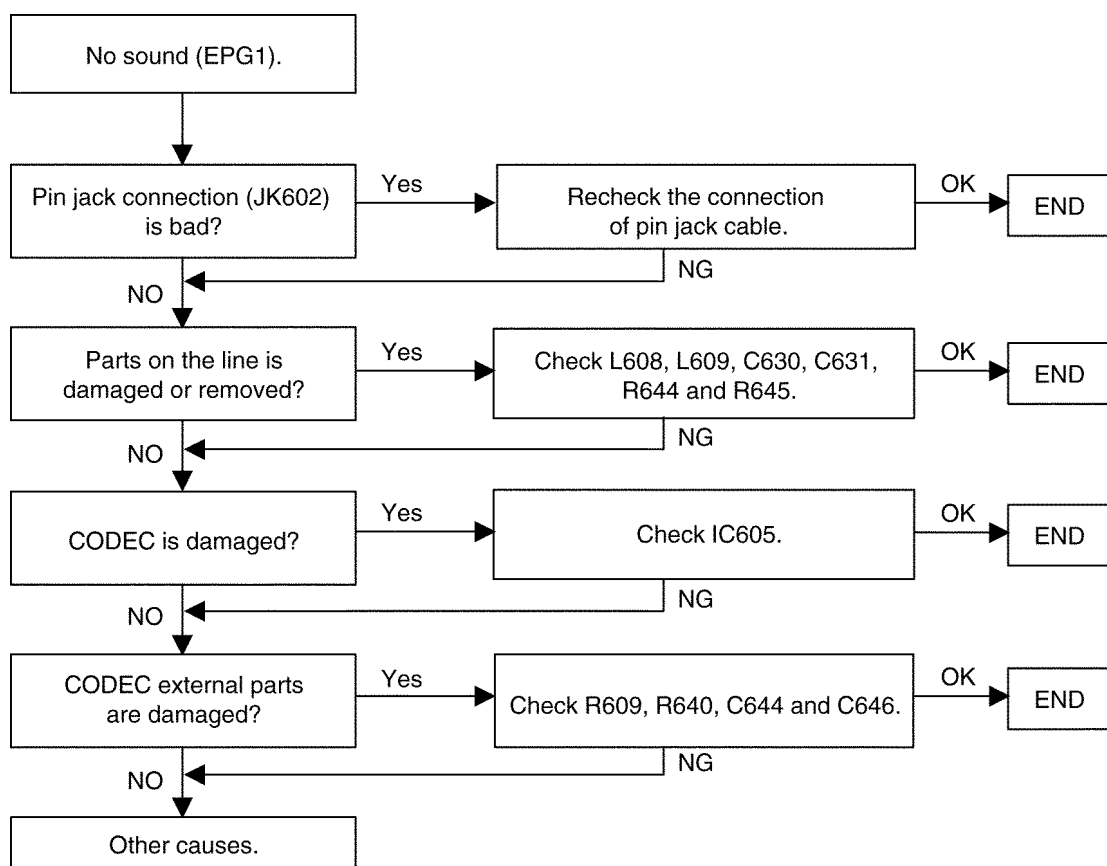


10.1.2.2. Noise is created

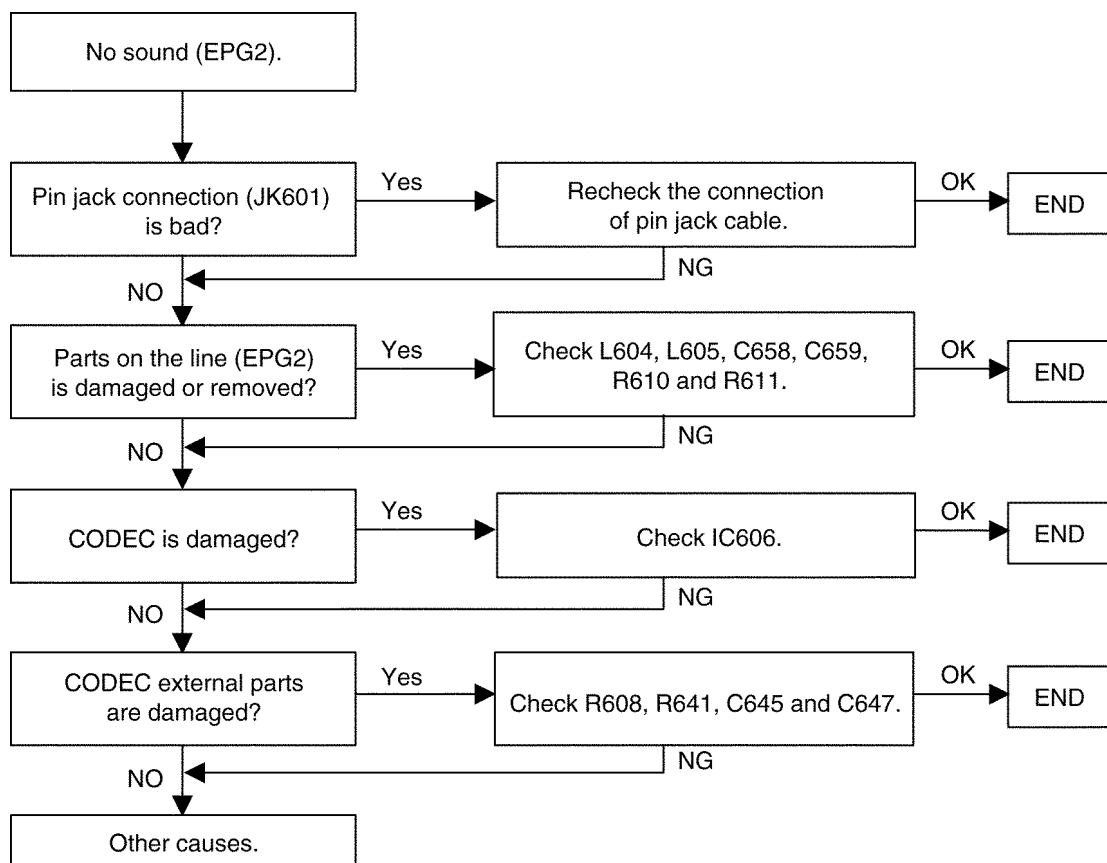


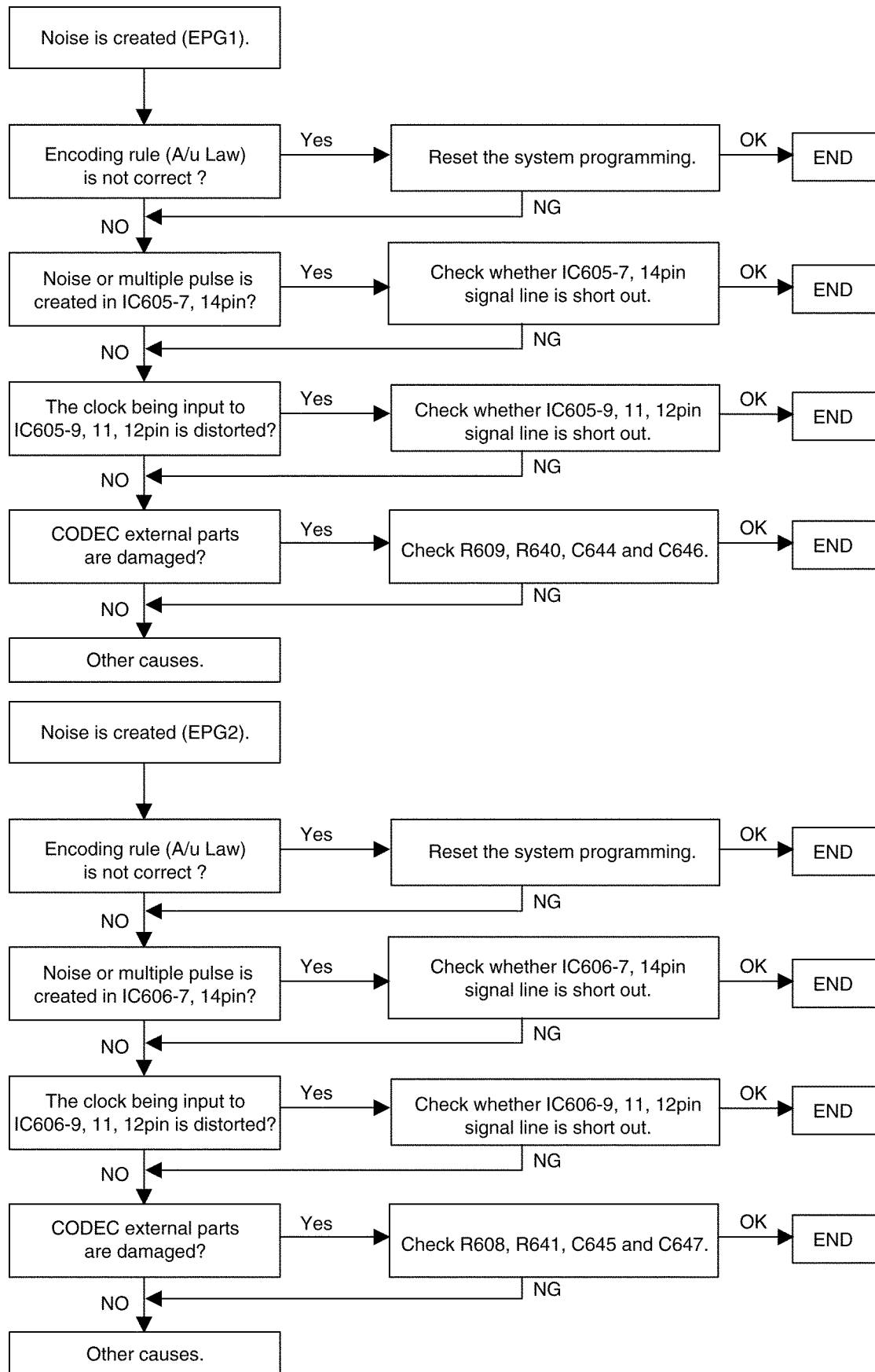
10.1.3. Paging

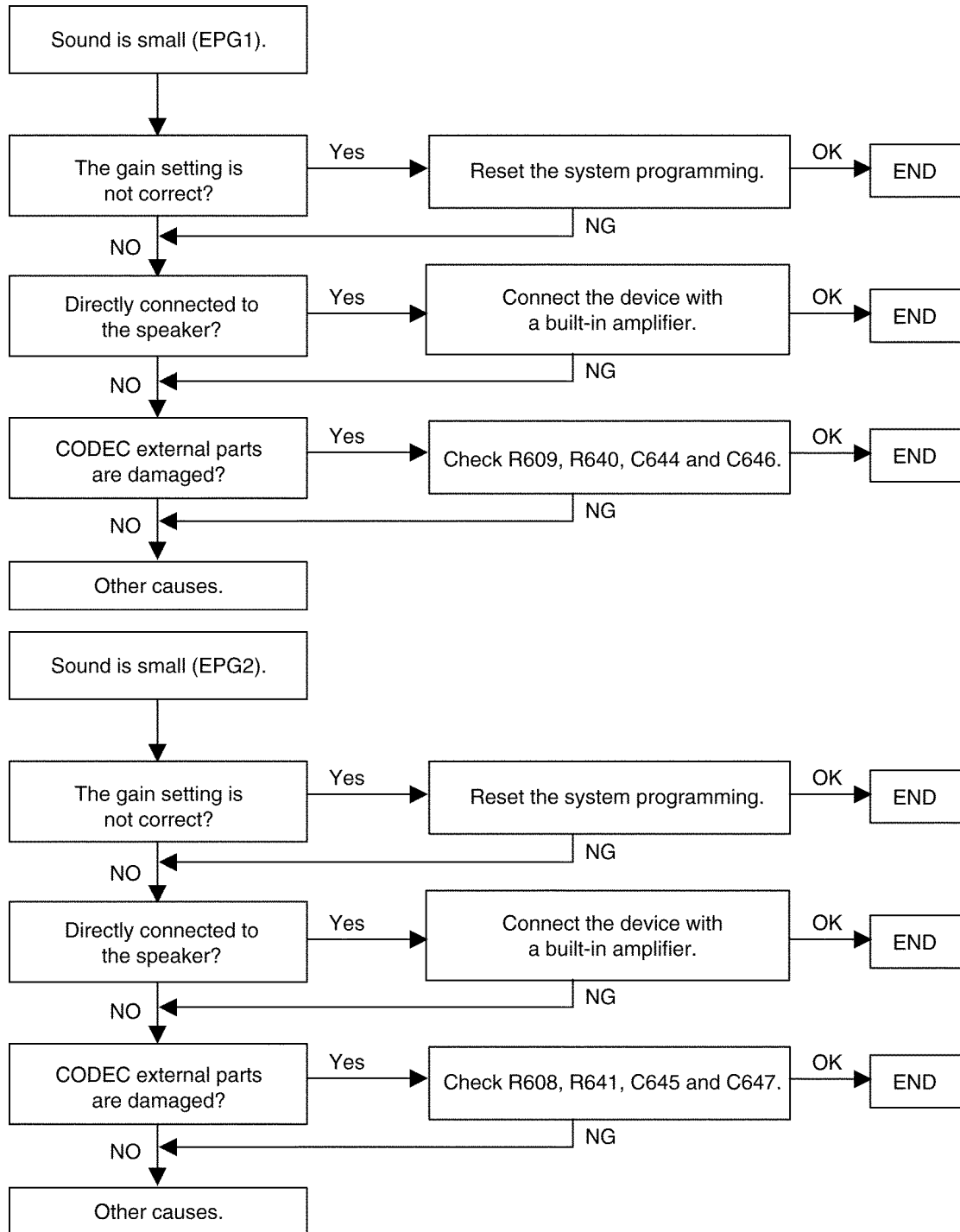
10.1.3.1. The path cannot connect



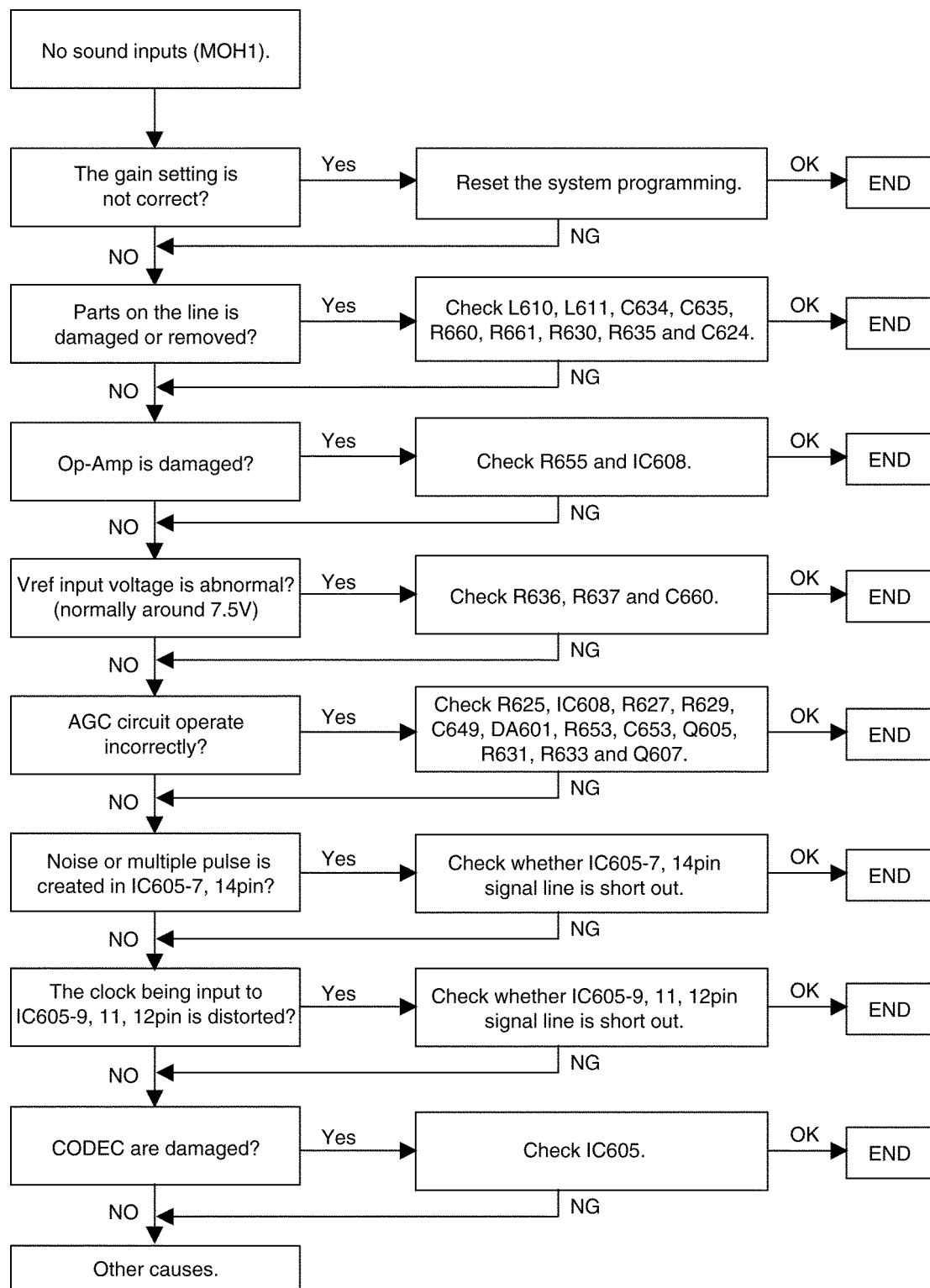
10.1.3.2. Noise is created

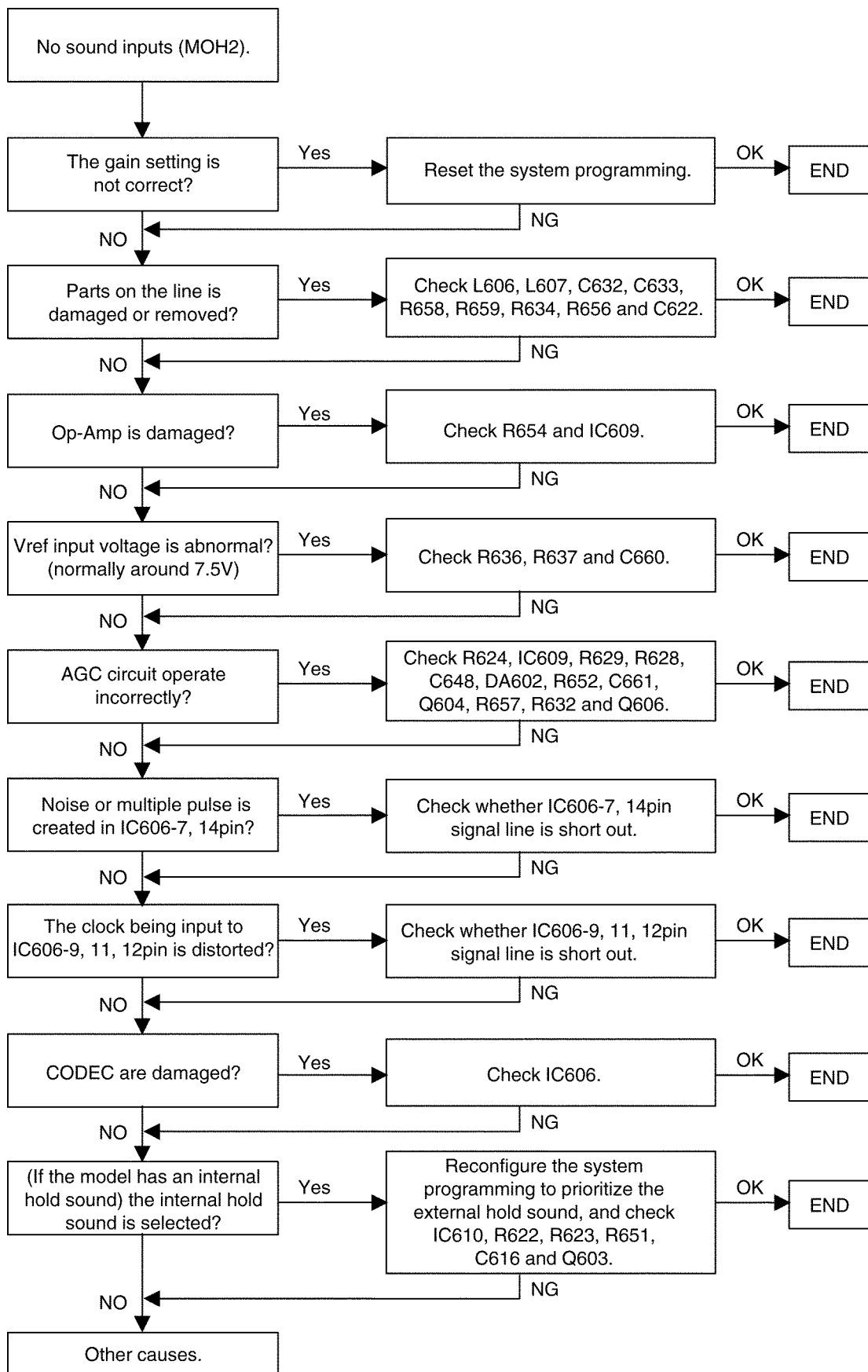


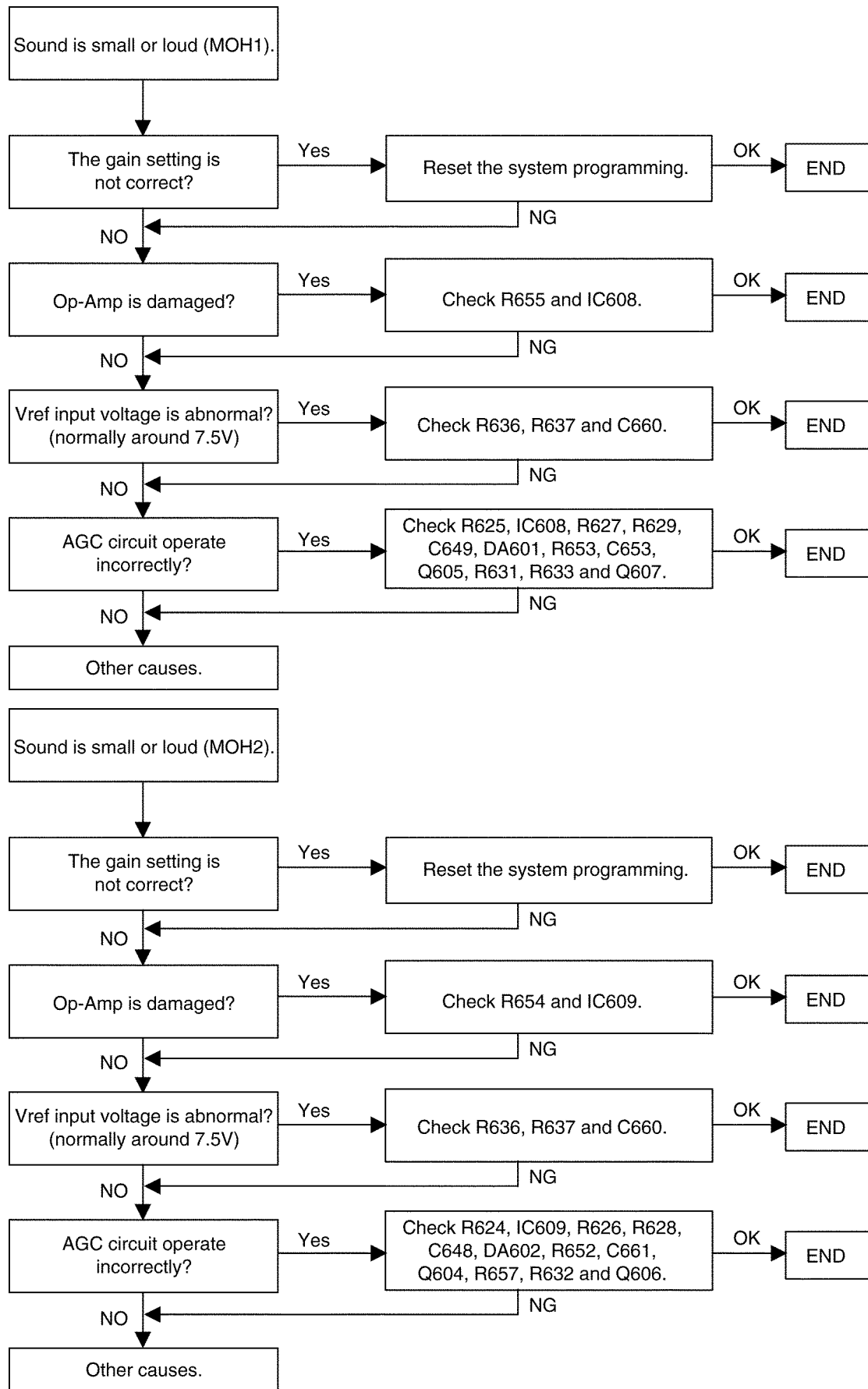




10.1.4. Using MOH

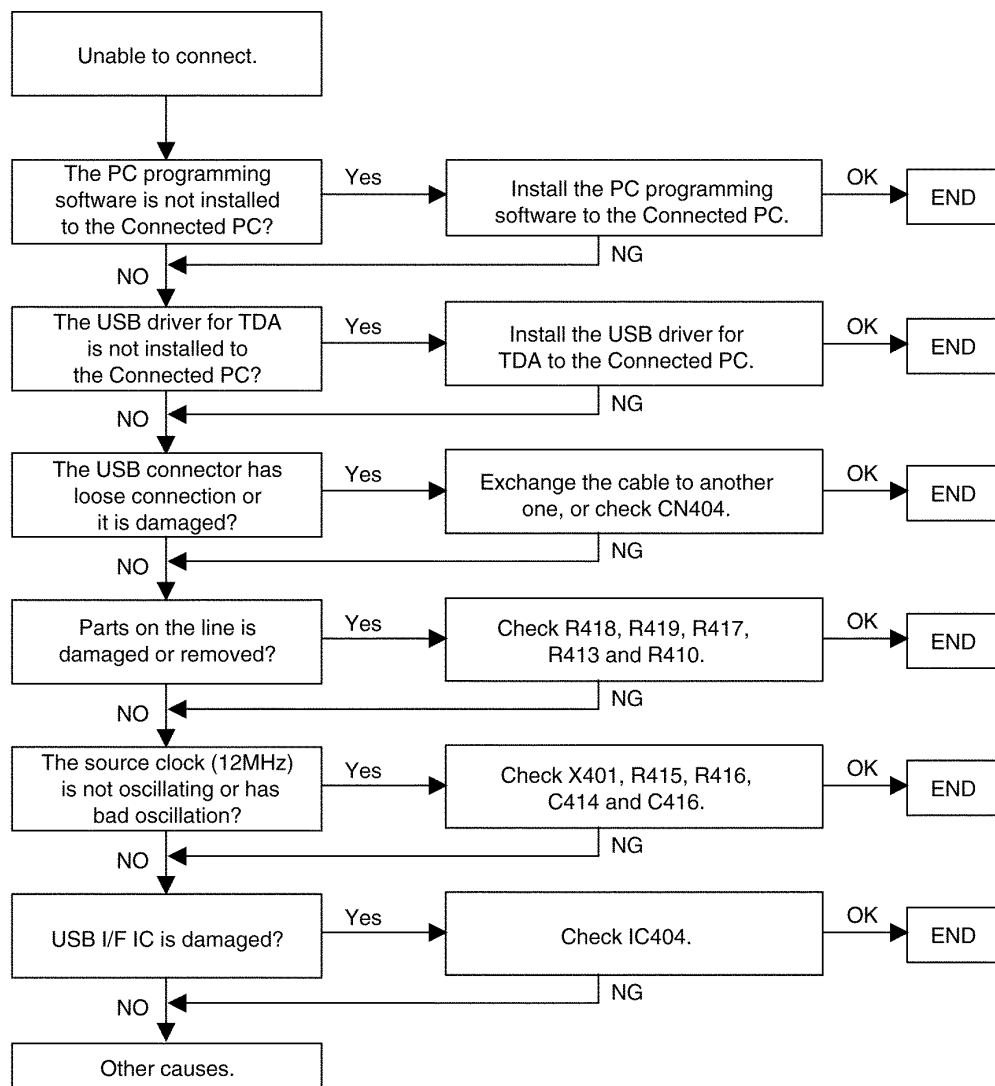


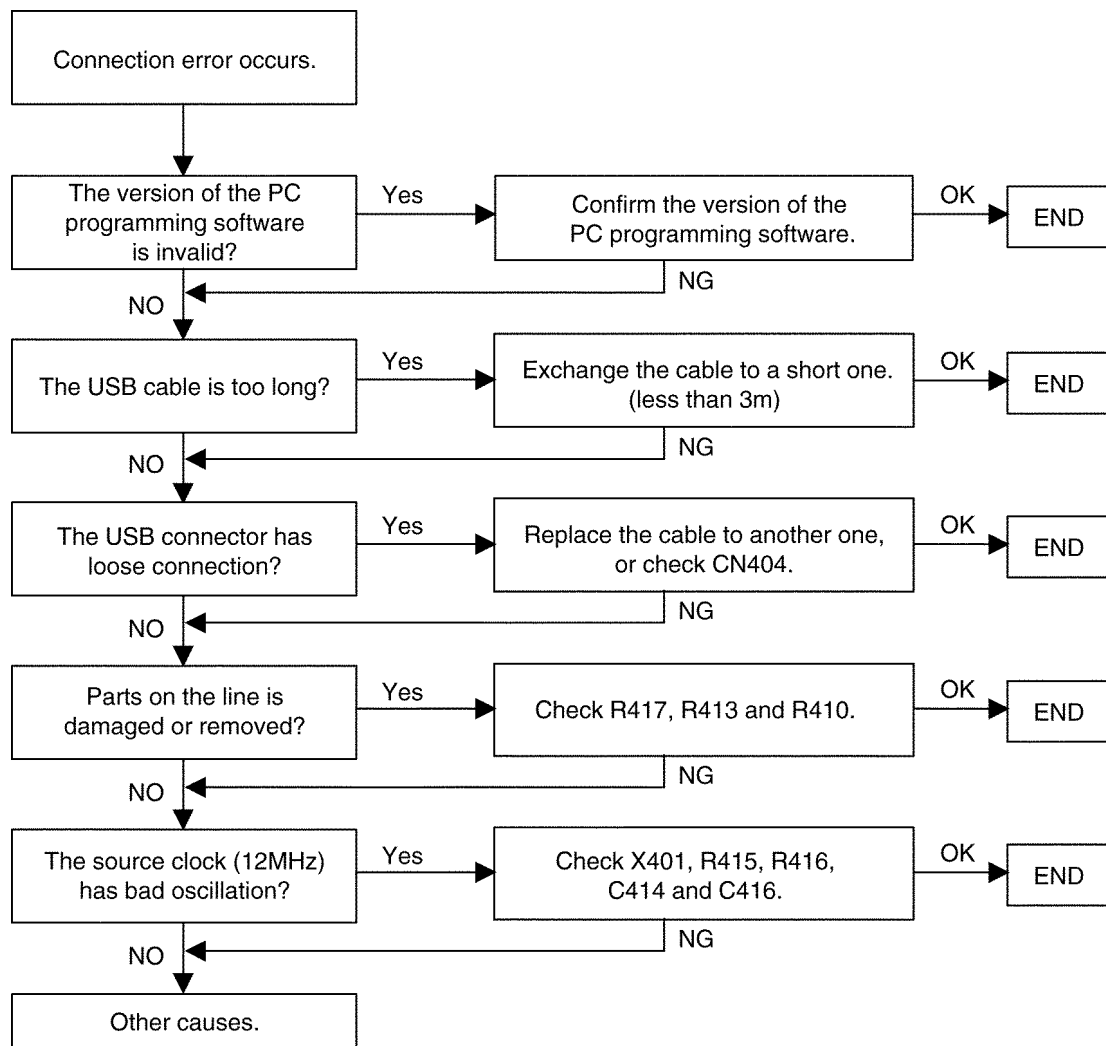




10.1.5. USB

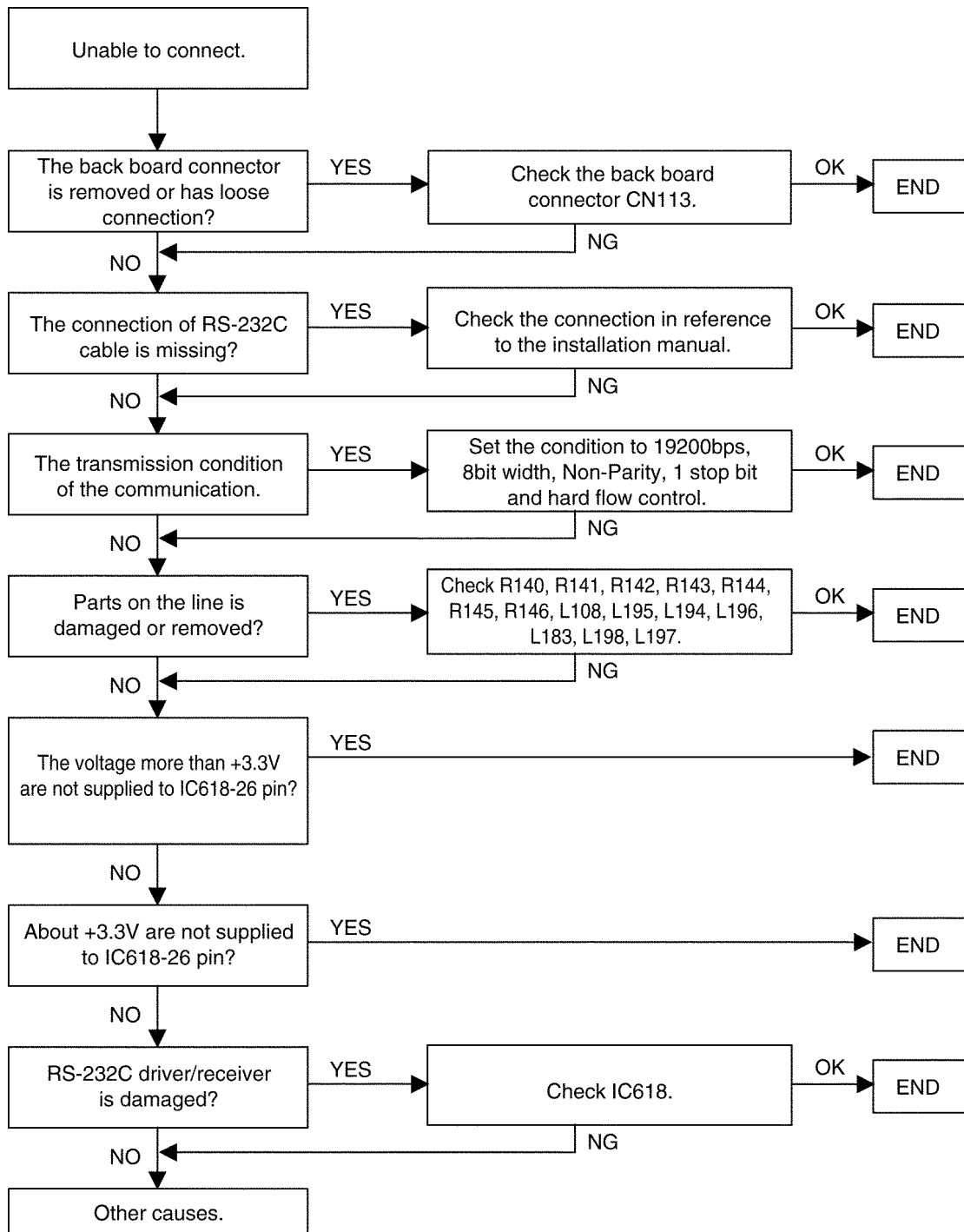
10.1.5.1. USB Connection

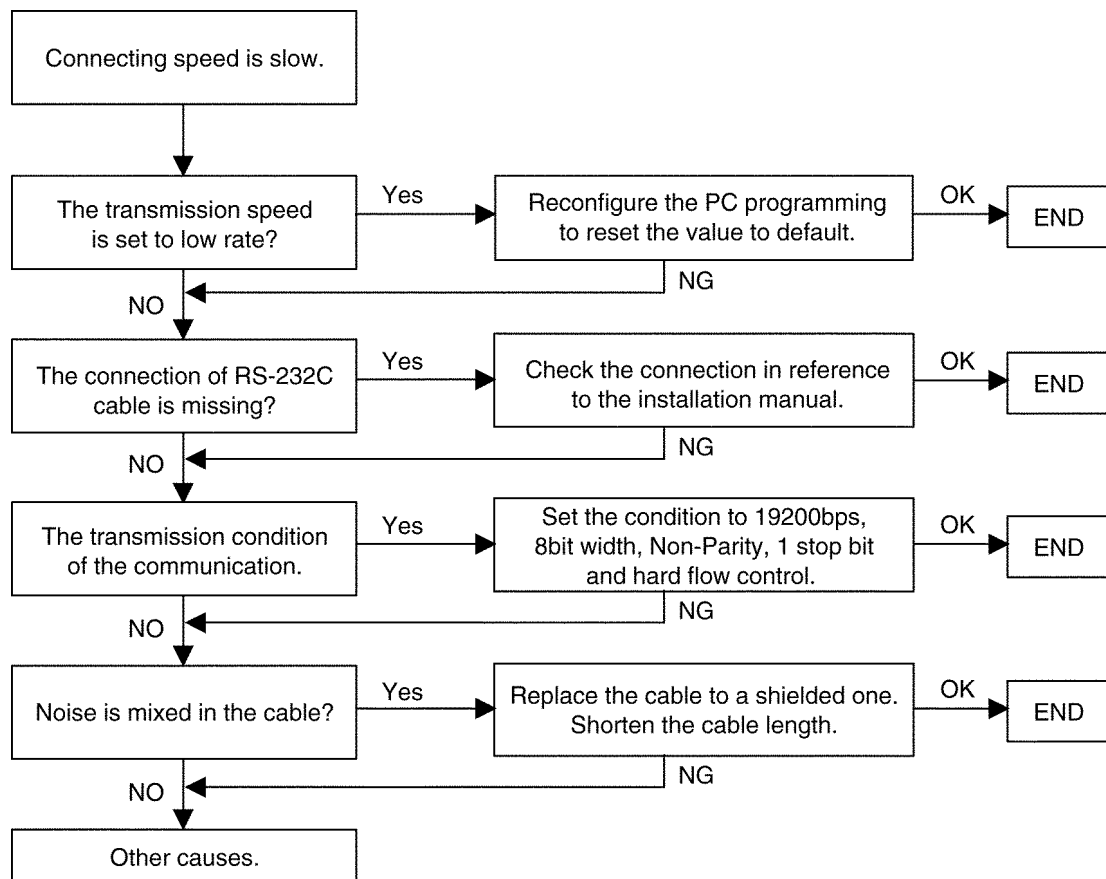




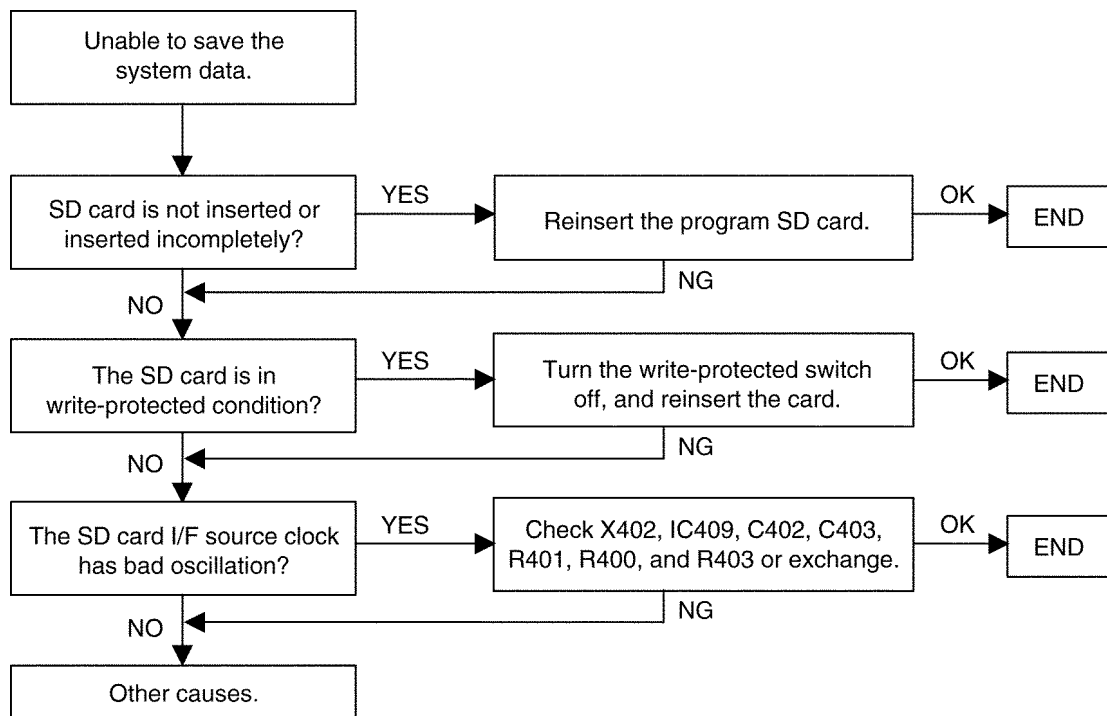
10.1.6. RS-232C

10.1.6.1. RS-232C Connection

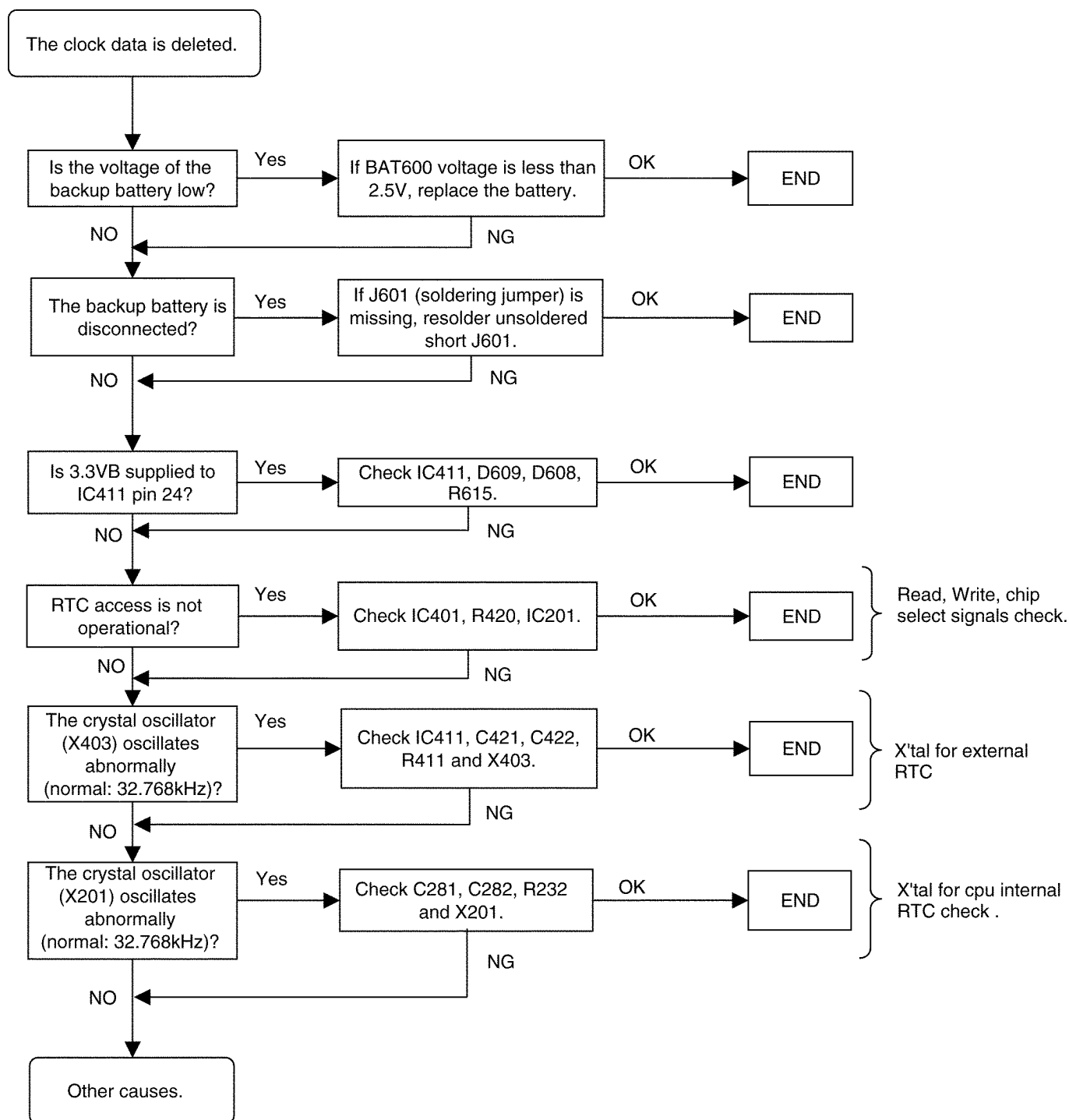


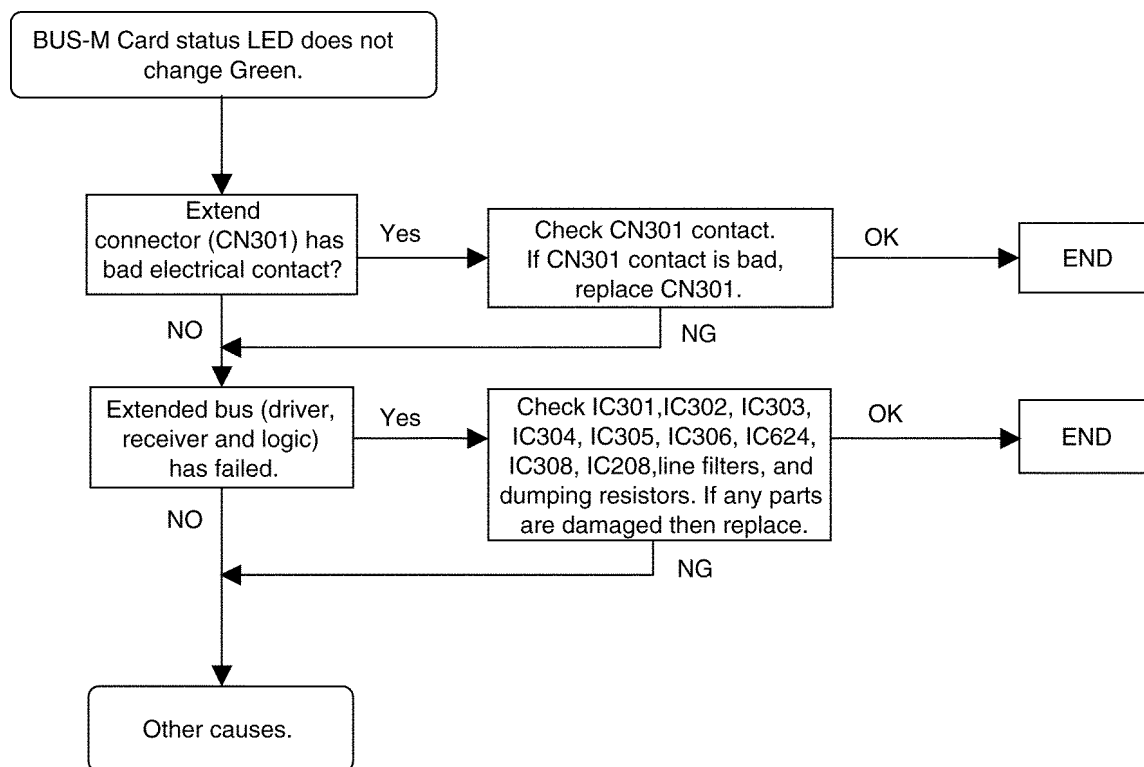


10.1.7. SD Card IF



10.1.8. Other





11 DIAGNOSIS

11.1. DIAGNOSIS FEATURES

Card Test and Pair Port Test is in Diagnosis Features.

11.1.1. Card Test

Card Test -SUMMARY

Description

Diagnose all kind of Cards.

Parallel of Diagnose item of Card Tests and every Cards

	DHLC	DLC	SLC8	ESLC16/ EMSLC16	CSIF	ELCOT	T1	E1	BRI	PRI	OPB	E&M	CTI- LINK	DID	IP- GW4 (TDA 0484)	IP- GW16	IP- EXT
Local loop back diagnosis	X	X	X	X	X	X	X	X	X	X	X	X		X			X
DTMF receive test	X		X	X								X		X			
PT loop back diagnosis	X	X															
Caller IC card DTMF sending out Diagnosis			X														
DSP DTMF generator/ receiver diagnosis							X	X									
DSP DTMF receiver diagnosis							X	X									
Framer IC alarm signal detection diagnosis							X	X		X							
Framer IC error detection diagnosis							X	X		X							
CS-INF loop back diagnosis					X												
Super frame synchronization diagnosis					X												
Caller ID card loop back diagnosis						X											
Extension mode setting test									X								
CTI-LINK loop back diagnosis													X				
IP-GW H.323 call simulate diagnosis															X	X	
LAN loop back diagnosis															X		

11.1.1.1. Local Loop Back Diagnosis

Diagnose faults by transmission of the data from the EMPR to the Option Card and back using the Loop back test. Since loopback points differ from each card, they consist of loopback tests of the following items:

Local loop back diagnosis test

Primary circuit	Primary circuit loop back test
Framer IC ST path (Analog)	IC Analog I/F loop back test
Framer IC (Digital)	IC Digital I/F loop back test
ASIC CODEC (PITS)	PITS I/F test loop back
Local HW I/F point	Local HW I/F loop back test
Local TSW point	Local TSW loop back test

Local loop back diagnosis test of every Cards

	DHLC	DLC	SLC8	ESLC16/ EMSLC16	CSIF	ELCOT	T1	E1	BRI	PRI	OPB	E&M	CTI- LINK	DID	IP- GW4 (TDA 0484)	IP- GW16	IP- EXT
Primary circuit							X	X		X							
Framer IC ST path (Analog)							X	X									
Framer IC (Digital)							X	X	X	X							
ASIC CODEC (PITS)																	
Local HW I/F point			X	X		X	X	X	X	X	X	X					X
Local TSW point	X	X	X	X	X	X	X	X	X	X	X	X					X
TDM I/F point																	X
IP I/F point																	X

Diagnosis result of every test points

OK	loop back diagnosis OK
NG	loop back diagnosis NG

11.1.1.2. DTMF Receive Test

Diagnostic test for DTMF receiver

	DHLC	DLC	SLC8	ESLC16/ EMSLC16	CSIF	ELCOT	T1	E1	BRI	PRI	OPB	E&M	CTI- LINK	DID	IP- GW4 (TDA 0484)	IP- GW16	IP- EXT
Object of Card	X		X	X								X		X			

Diagnosis result

OK	DTMF receive test OK
NG	DTMF receive test NG

11.1.1.3. PT Loop Back Diagnosis

Diagnostic test for PT by Loop back test

	DHLC	DLC	SLC8	ESLC16/ EMSLC16	CSIF	ELCOT	T1	E1	BRI	PRI	OPB	E&M	CTI- LINK	DID	IP- GW4 (TDA 0484)	IP- GW16	IP- EXT
Object of Card	X	X															

PT loop back diagnostic test channel

Cch port xx	C channel Port No.xx test
Dch port xx	D channel Port No. xx test
Bch port xx	B channel Port No. xx test

PT loop back diagnostic test

Primary circuit	Primary circuit loopback test
ASIC (PT I/F)	PT I/F loopback test

Diagnosis result

OK	PT loop back diagnosis OK
NG	PT loop back diagnosis NG

11.1.1.4. DSP DTMF Generator / Receiver Diagnosis

Diagnostic test for DTMF generator/receiver of DSP in the Card

	DHLC	DLC	SLC8	ESLC16/ EMSLC16	CSIF	ELCOT	T1	E1	BRI	PRI	OPB	E&M	CTI- LINK	DID	IP- GW4 (TDA 0484)	IP- GW16	IP- EXT
Object of Card							X	X									

diagnosis point

Time slot	Time slot test
Primary circuit	Primary circuit loop back test
DSP ST loop back	DSP ST point loop back test
DSP digital loop back	DSP digital point loop back test

Diagnosis result

OK	DSP DTMF generator/receiver diagnosis OK
NG	DSP DTMF generator/receiver diagnosis NG

11.1.1.5. DSP DTMF Receiver Diagnosis

Diagnostic test for DTMF receiver of DSP in the Card to use DTMF generator of DSP

	DHLC	DLC	SLC8	ESLC16/ EMSLC16	CSIF	ELCOT	T1	E1	BRI	PRI	OPB	E&M	CTI- LINK	DID	IP- GW4 (TDA 0484)	IP- GW16	IP- EXT
Object of Card							X	X									

Diagnosis point

Time slot	Time slot test
Primary circuit	Primary circuit loop back test
DSP ST loop back	DSP ST point loop back test
DSP digital loop back	DSP digital point loop back test

Diagnosis result

OK	DSP DTMF generator/receiver diagnosis OK
NG	DSP DTMF generator/receiver diagnosis NG

11.1.1.6. Framer IC Alarm Signal Detection Diagnosis

Diagnostic the feature to detect the alarm signal of Framer IC is operating correctly.

	DHLC	DLC	SLC8	ESLC16/ EMSLC16	CSIF	ELCOT	T1	E1	BRI	PRI	OPB	E&M	CTI- LINK	DID	IP- GW4 (TDA 0484)	IP- GW16	IP- EXT
Object of Card							X	X		X							

Diagnosis point

RAI	Yellow alarm signal detection test
AIS	Blue alarm signal detection test
Primary circuit	Primary circuit alarm signal detection test

Diagnosis result

OK	Framer IC alarm signal detection diagnosis OK
NG	Framer IC alarm signal detection diagnosis NG

11.1.1.7. Framer IC Error Detection Diagnosis

Diagnostic the feature to detect the alarm signal of Framer IC is operating correctly.

	DHLC	DLC	SLC8	ESLC16/ EMSLC16	CSIF	ELCOT	T1	E1	BRI	PRI	OPB	E&M	CTI- LINK	DID	IP- GW4 (TDA 0484)	IP- GW16	IP- EXT
Object of Card							X	X		X							

Diagnosis point

Bipolar violation error	Bipolar violation error detection test
CRC error	CRC error detection test
Framing error	Framing error detection test
Primary circuit	Primary circuit error detection test

Diagnosis result

OK	DSP DTMF generator/receiver diagnosis OK
NG	DSP DTMF generator/receiver diagnosis NG

11.1.1.8. CSIF Loop Back Diagnosis

Diagnostic by Loop back test to CSIF

	DHLC	DLC	SLC8	ESLC16/ EMSLC16	CSIF	ELCOT	T1	E1	BRI	PRI	OPB	E&M	CTI- LINK	DID	IP- GW4 (TDA 0484)	IP- GW16	IP- EXT
Object of Card					X												

CS-INF loop back diagnosis test channel

Dch port xx	D channel Port No. xx test
Bch port xx	B channel Port No. xx test

Diagnosis point

DNIC analog	DNIC analog loop back test
DNIC digital	DNIC digital loop back test

Diagnosis result

OK	CS-INF loop back diagnosis OK
NG	CS-INF loop back diagnosis NG

11.1.1.9. Super Frame Synchronization Diagnosis

Diagnostic Super frame synchronization feature of the CSIF card.

	DHLC	DLC	SLC8	ESLC16/ EMSLC16	CSIF	ELCOT	T1	E1	BRI	PRI	OPB	E&M	CTI- LINK	DID	IP- GW4 (TDA 0484)	IP- GW16	IP- EXT
Object of Card					X												

Diagnosis point

DECT	DECT super frame synchronization test
SS	SS super frame synchronization test

Diagnosis result

OK	Super frame synchronization diagnosis OK
NG	Super frame synchronization diagnosis NG

11.1.1.10. Caller ID Card Loop Back Diagnosis

Diagnostic by Loop back test to the Caller ID card (Optional Card of ELCOT)

	DHLC	DLC	SLC8	ESLC16/ EMSLC16	CSIF	ELCOT	T1	E1	BRI	PRI	OPB	E&M	CTI- LINK	DID	IP- GW4 (TDA 0484)	IP- GW16	IP- EXT
Object of Card						X											

Diagnosis result

OK	Caller ID card loop back diagnosis OK
NG	Caller ID card loop back diagnosis NG

11.1.1.11. Extension Mode Setting Test

Diagnostic the normal change from outside line mode to inside line mode

	DHLC	DLC	SLC8	ESLC16/ EMSLC16	CSIF	ELCOT	T1	E1	BRI	PRI	OPB	E&M	CTI- LINK	DID	IP- GW4 (TDA 0484)	IP- GW16	IP- EXT
Object of Card									X								

Diagnosis result

OK	Extension mode setting test OK
NG	Extension mode setting test NG

11.1.1.12. CTI-LINK Loop Back Diagnosis

Diagnostic by Loop back test to CTI_LINK CARD

	DHLC	DLC	SLC8	ESLC16/ EMSLC16	CSIF	ELCOT	T1	E1	BRI	PRI	OPB	E&M	CTI- LINK	DID	IP- GW4 (TDA 0484)	IP- GW16	IP- EXT
Object of Card													X				

Diagnosis result

OK	CTI-LINK loop back diagnosis OK
NG	CTI-LINK loop back diagnosis NG

11.1.1.13. H.323 call simulate diagnosis

	DHLC	DLC	SLC8	ESLC16/ EMSLC16	CSIF	ELCOT	T1	E1	BRI	PRI	OPB	E&M	CTI- LINK	DID	IP- GW4 (TDA 0484)	IP- GW16	IP- EXT
Object of Card															X	X	

Diagnosis result

OK	H.323 call simulate diagnosis OK
NG	H.323 call simulate diagnosis NG

11.1.1.14. LAN loop back diagnosis

	DHLC	DLC	SLC8	ESLC16/ EMSLC16	CSIF	ELCOT	T1	E1	BRI	PRI	OPB	E&M	CTI- LINK	DID	IP- GW4 (TDA 0484)	IP- GW16	IP- EXT
Object of Card															X		

Diagnosis result

OK	LAN loop back diagnosis OK
NG	LAN loop back diagnosis NG

11.1.2. Pair Port Test

Pair Port Test -SUMMARY

Description

Diagnostic Test to enable the connection of Ports for Internal and External Lines.

	DHLC	DLC	SLC8	ESLC/EMSLC16	CS-INF	ELCOT	T1	E1	BRI	PRI	OPB3	E&M	CTI-LINK
Object of Card	X		X	X		X							

Diagnosis result

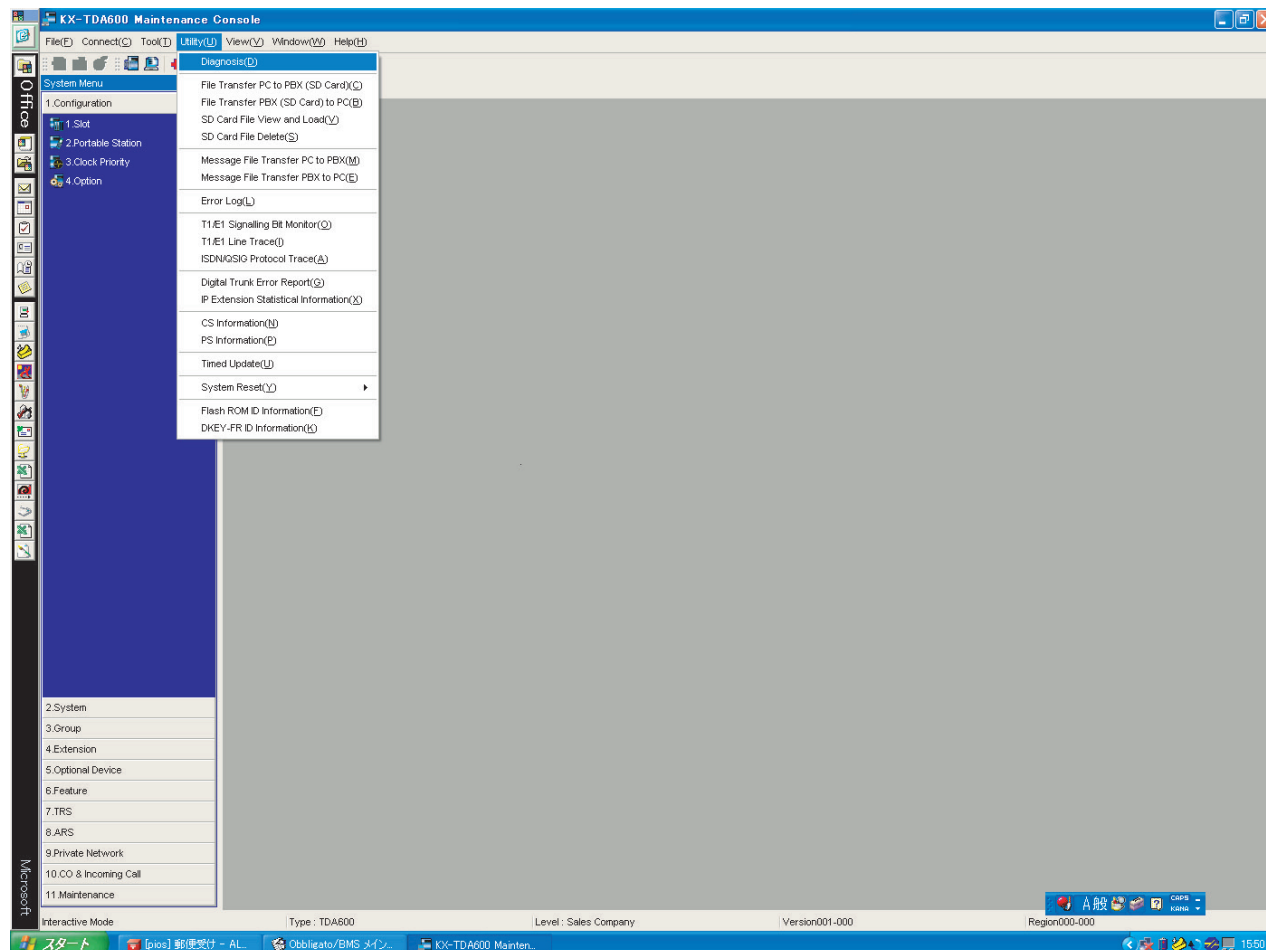
OK	Pair Port Test OK
NG	Pair Port Test NG

Detail Diagnosis result

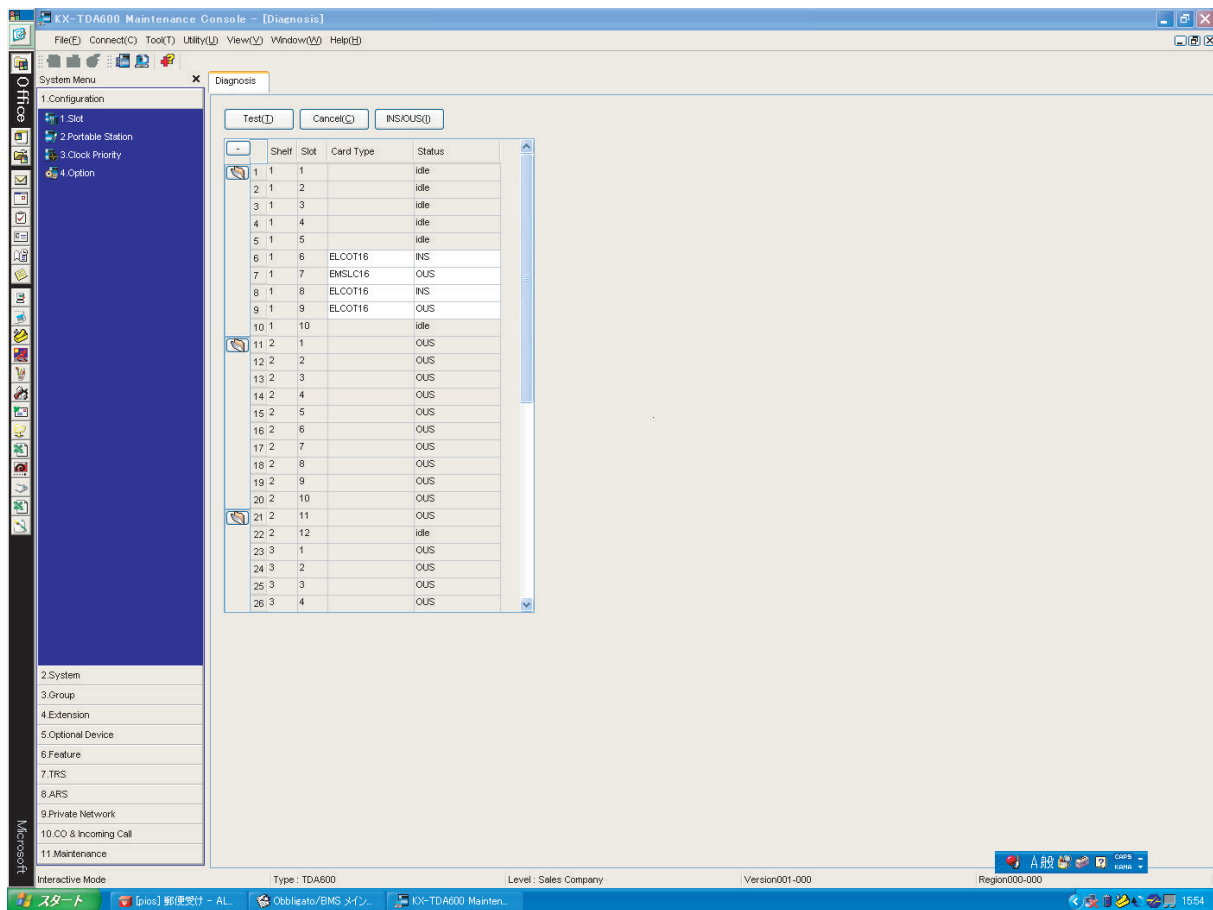
Line current OFF (Ext->CO)	There is no local current from inside line to outside line
Line current ON (Ext->CO)	There is local current from inside line to outside line
Off hook detection (CO->Ext)	Off-hook detection from outside line to inside line
DTMF detection (CO->Ext)	DTMF transmission/detection from outside line to inside line
DP detection (CO->Ext)	SP transmission/detection from outside line to inside line
BELL detection (Ext->CO)	Bell transmission/detection from inside line to outside line
Speech path (Ext->CO)	Call lime from inside line to outside line
Speech path (CO->Ext)	Call lime from outside line to inside line

11.2. DIAGNOSIS TEST

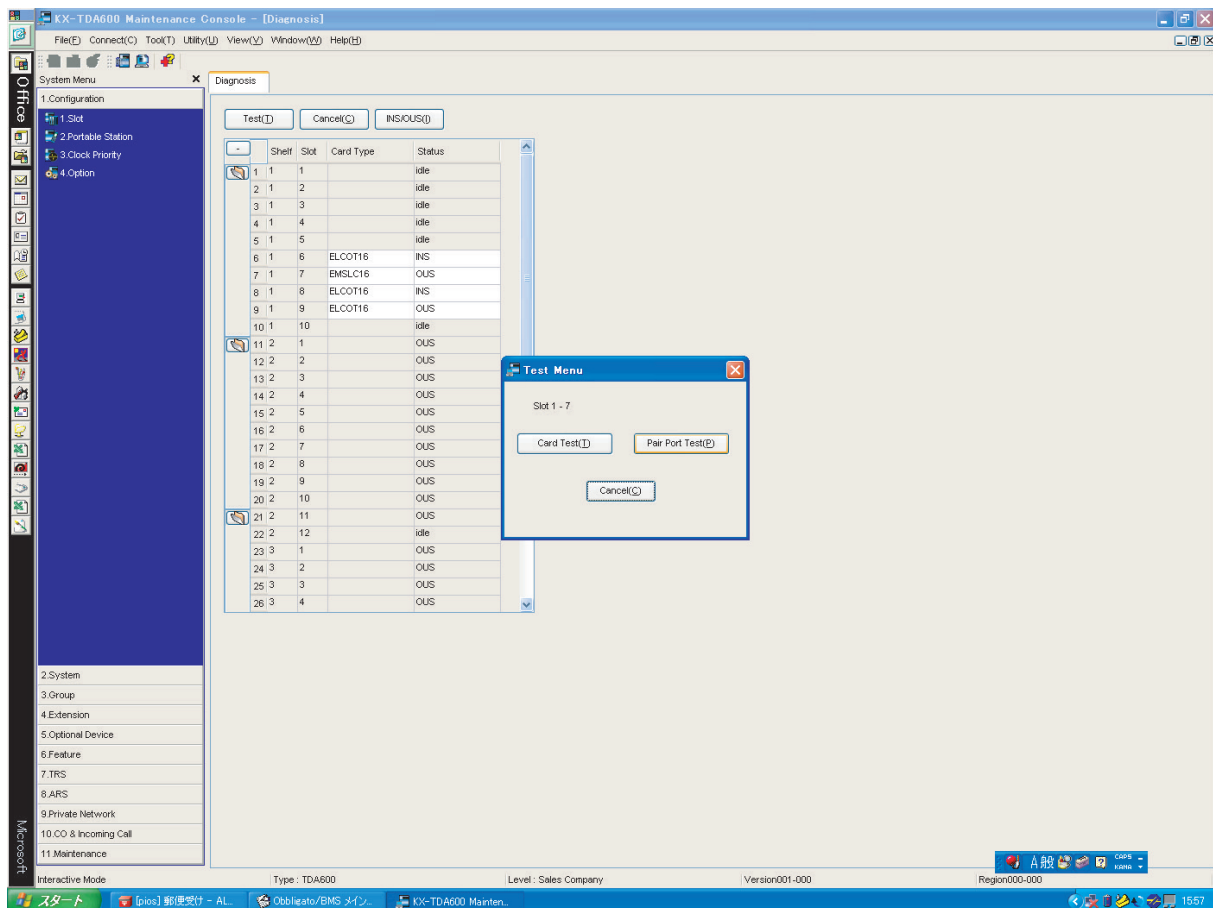
1. Click [Diagnosis] of [Utility].



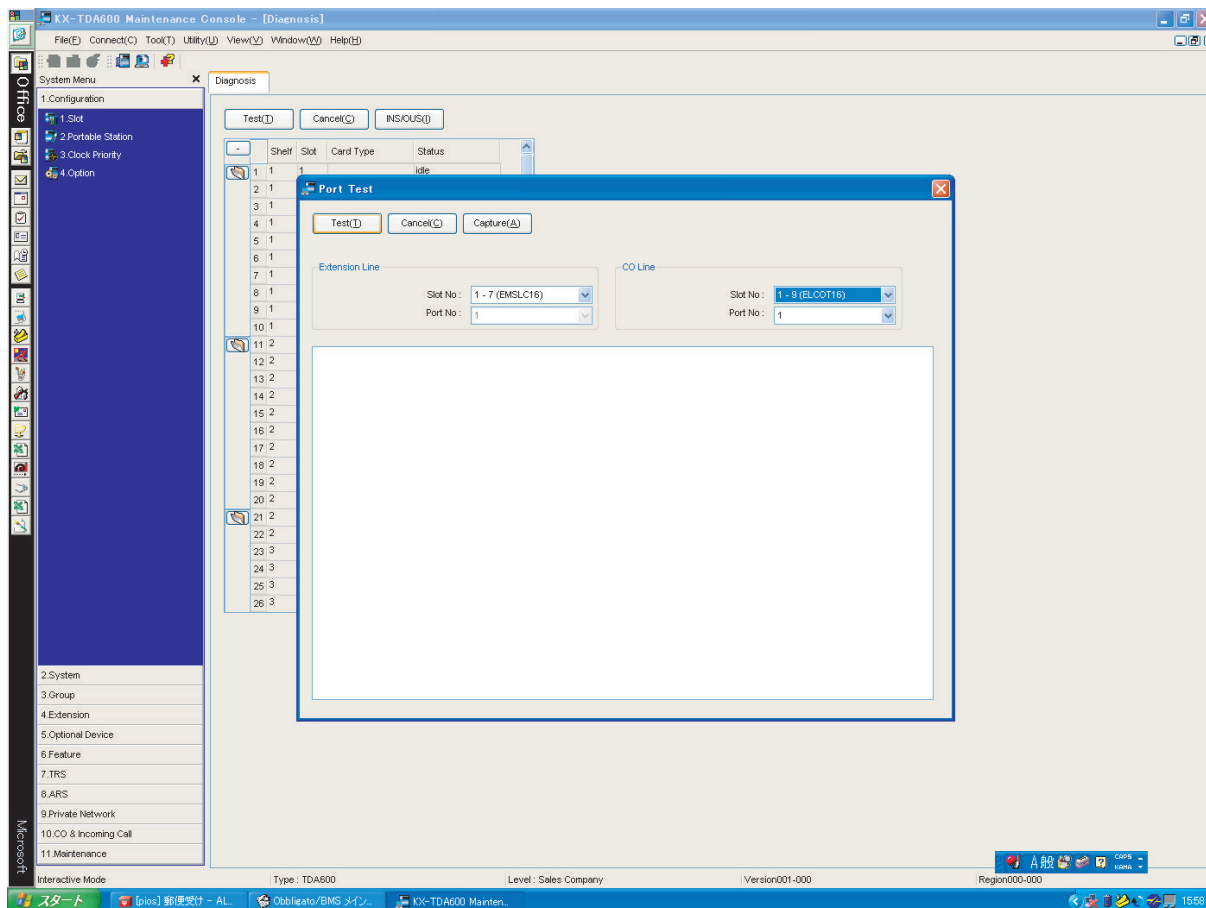
2. Pair Port Test operation Select card for Test.



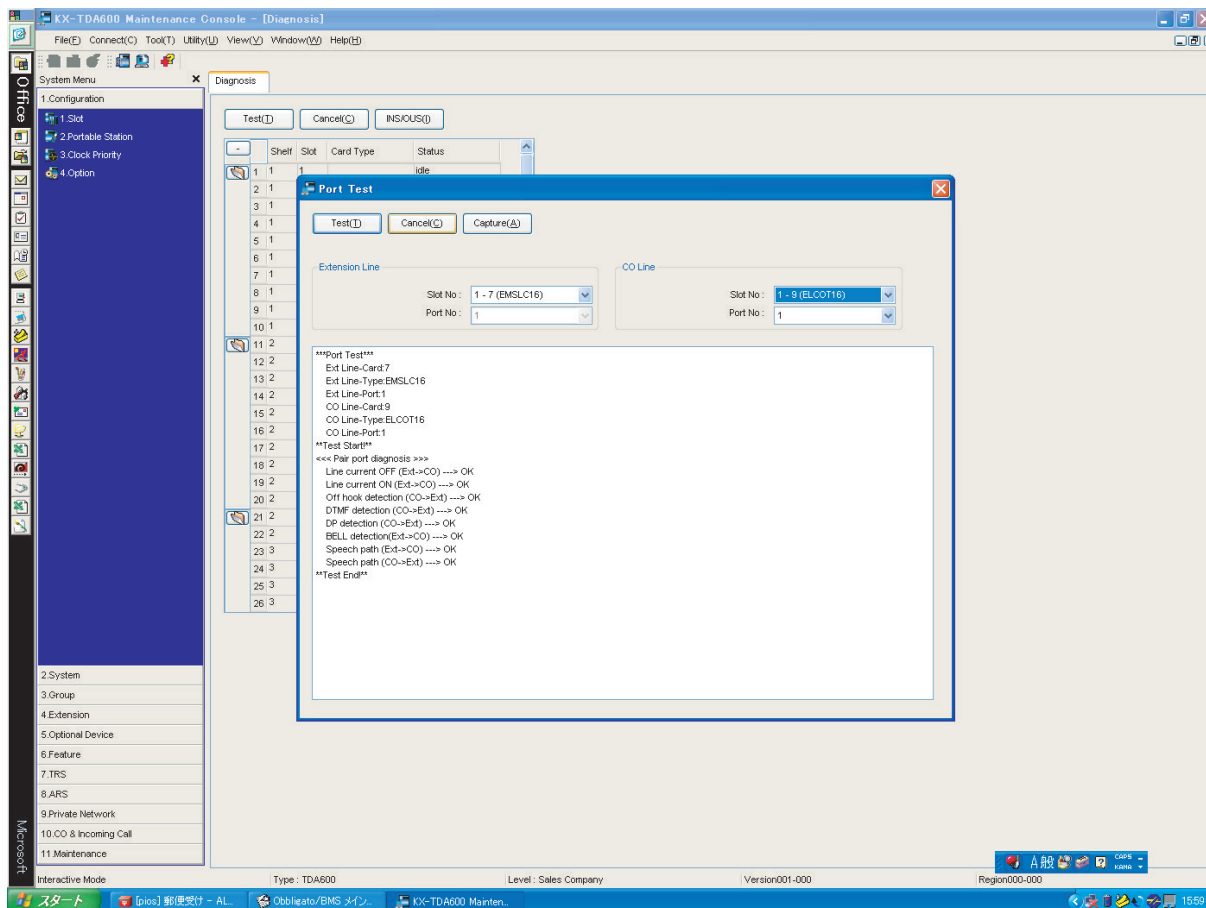
3. Click [Pair Port Test].



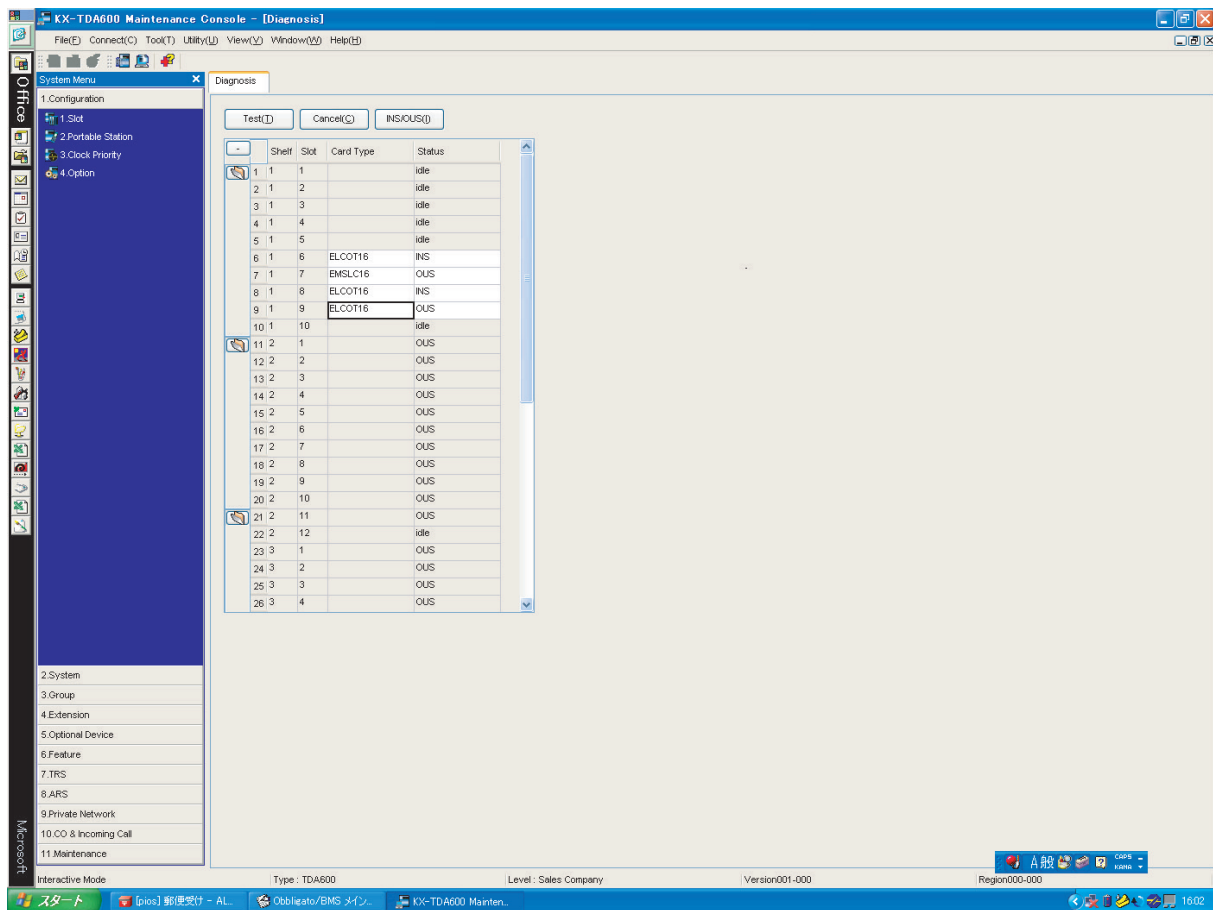
4. Test [OK].



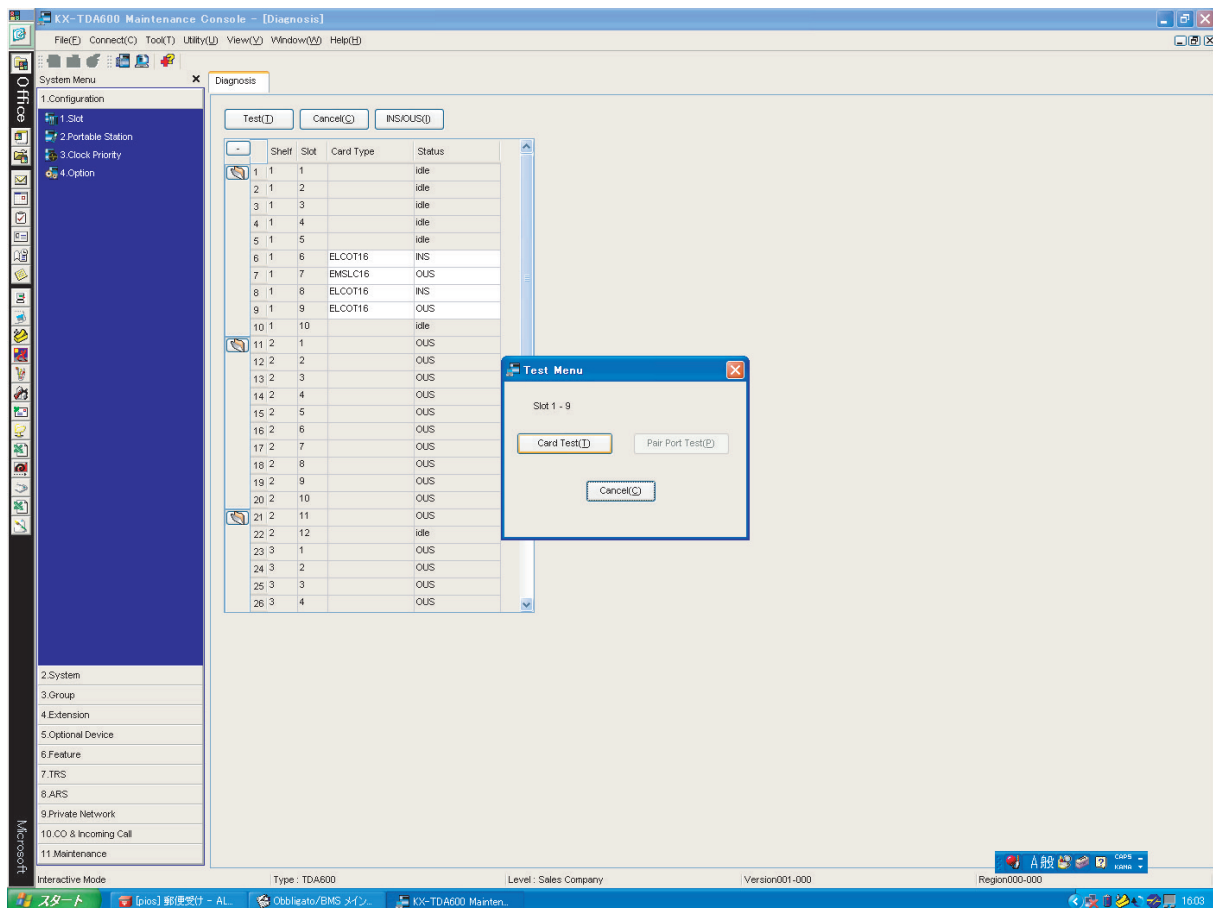
5. Click [Cancel].



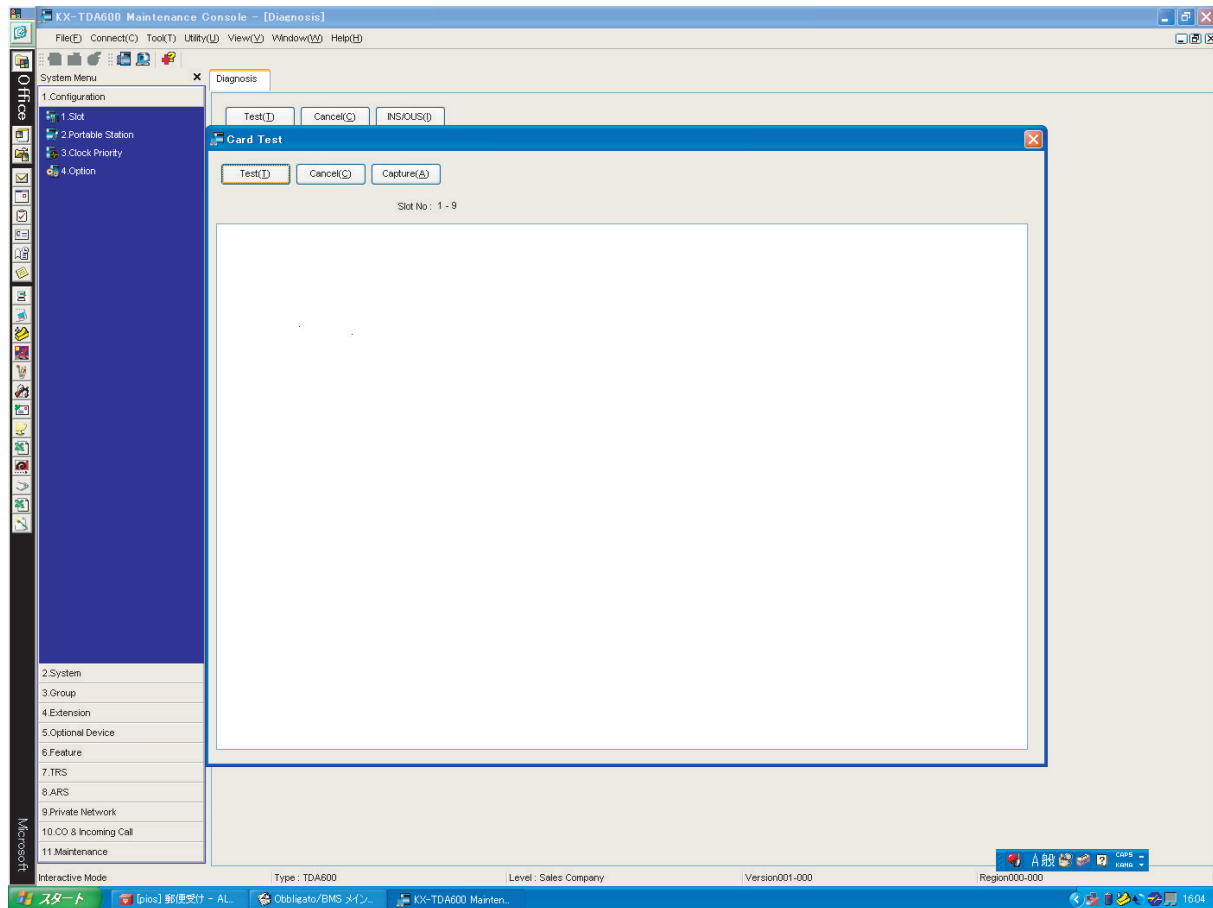
6. Card Test operation Select card for Test.



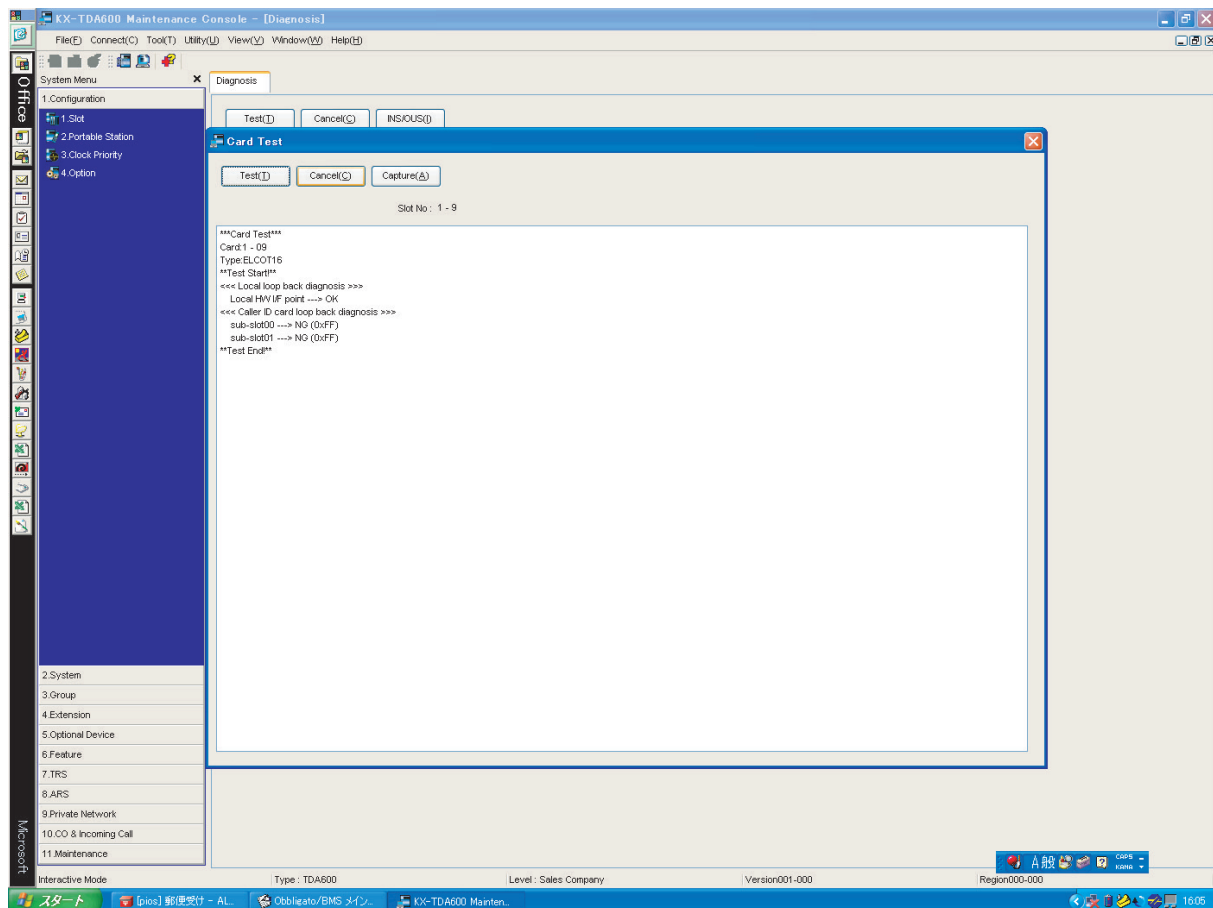
7. Click [Card Test].



8. Click [Test].

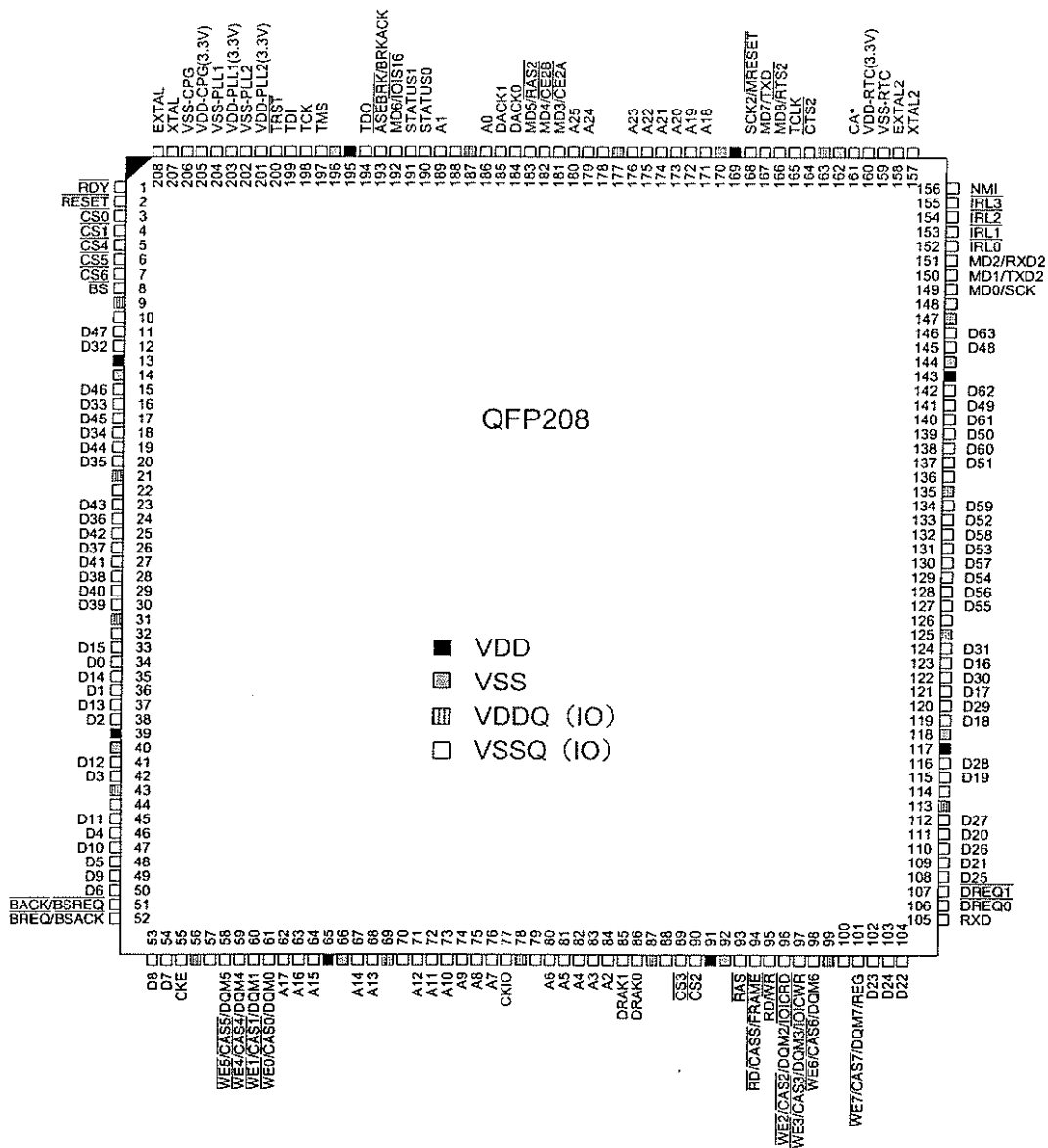


9. Click [Cancel].



12 IC DATA

12.1. CPU (IC200)



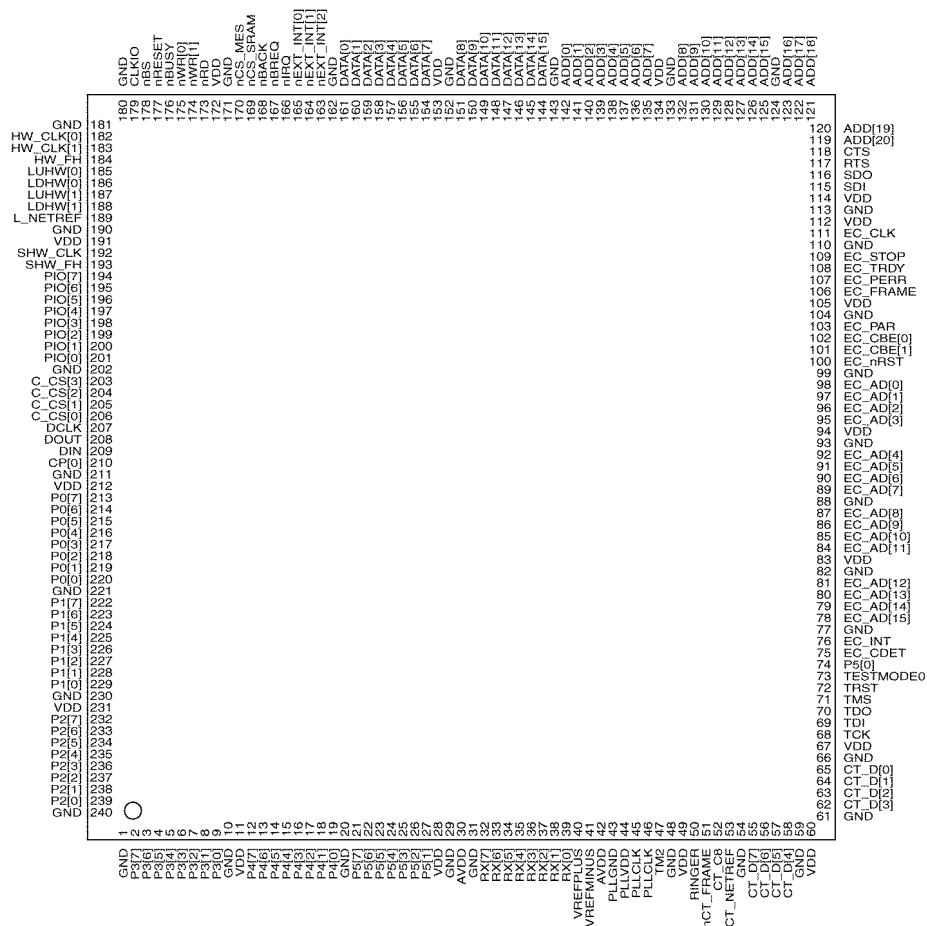
Pin No.	Pin Name	I/O	Description
1	nRDY	I	CPU bus ready signal
2	nRESET	I	CPU power on reset input port
3	nCS0	O	Chip select 0 for Flash memory
4	nCS1	O	Chip select 1 for BUS-M Card
5	nCS4	O	Chip select 4 for SRAM
6	nCS5	O	Chip select 5 for ASIC
7	nCS6	O	Chip select 6 for RTC USB interface SD card interface
8	nBS	O	CPU bus start signal
9	VDDQ1		Power supply for IO(3.3V)
10	VSSQ1		Power supply for IO(GND)
11	D47/P15	I	nFAN_ALM (FAN alarm signal input port)
12	D32/P0	I	nCTS1 for debug port
13	VDD1		Power supply for CORE(1.5V)
14	VSS1		Power supply for CORE(GND)
15	D46/P14	O	RING_SYNC(Ringer sync signal output port)
16	D33/P1	O	nRTS1 for debug port
17	D45/P13	I	VBUS(USB Cable detect port)
18	D34/P2	O	nDTR2 for RS232C port
19	D44/P12	I	nINIT(initialize switch input port)

Pin No.	Pin Name	I/O	Description
20	D35/P3	O	nDSR2 for RS232C port
21	VDDQ2		Power supply for IO(3.3V)
22	VSSQ2		Power supply for IO(GND)
23	D43/P11	I	nDC_ALM(DC alarm signal input port)
24	D36/P4	I	DCD2 for RS232C port
25	D42/P10	I	nAC_ALM(AC alarm signal input port)
26	D37/P5	O	nDSR_RMT(Data strobe for RMT Card)
27	D41/P9	I	nBAT_ALM(On board battery alarm signal input port)
28	D38/P6	I	(Pull up) reserved
29	D40/P8	I	n_BATT(Battery detect port)
30	D39/P7	O	RESOUT (System reset output port)
31	VDDQ3		Power supply for IO(3.3V)
32	VSSQ3		Power supply for IO(GND)
33	D15	IO	Data Bus [15]
34	D0	IO	Data Bus [0]
35	D14	IO	Data Bus [14]
36	D1	IO	Data Bus [1]
37	D13	IO	Data Bus [13]
38	D2	IO	Data Bus [2]
39	VDD2		Power supply for CORE(1.5V)
40	VSS2		Power supply for CORE(GND)
41	D12	IO	Data Bus [12]
42	D3	IO	Data Bus [3]
43	VDDQ4		Power supply for IO(3.3V)
44	VSSQ4		Power supply for IO(GND)
45	D11	IO	Data Bus [11]
46	D4	IO	Data Bus [4]
47	D10	IO	Data Bus [10]
48	D5	IO	Data Bus [5]
49	D9	IO	Data Bus [9]
50	D6	IO	Data Bus [6]
51	nBACK/nBSREQ	O	Bus Acknowledge for ASIC
52	nBREQ/nBSACK	I	Bus Request from ASIC
53	D8	IO	Data Bus [8]
54	D7	IO	Data Bus [7]
55	CKE	O	SDRAM CKIO enable
56	VDDQ5		Power supply for IO(3.3V)
57	VSSQ5		Power supply for IO(GND)
58	nWE5/nCAS5/DQM5	O	D40-47 write enable NOT USE
59	nWE4/nCAS4/DQM4	O	D32-39 write enable NOT USE
60	nWE1/nCAS1/DQM1	O	nWE1/DQM1
61	nWE0/nCAS0/DQM0	O	nWE2/DQM2
62	A17	O	Address Bus [17]
63	A16	O	Address Bus [16]
64	A15	O	Address Bus [15]
65	VDD3		Power supply for CORE(1.5V)
66	VSS3		Power supply for CORE(GND)
67	A14	O	Address Bus [14]
68	A13	O	Address Bus [13]
69	VDDQ6		Power supply for IO(3.3V)
70	VSSQ6		Power supply for IO(GND)
71	A12	O	Address Bus [12]
72	A11	O	Address Bus [11]
73	A10	O	Address Bus [10]
74	A9	O	Address Bus [9]
75	A8	O	Address Bus [8]
76	A7	O	Address Bus [7]
77	CKIO	O	I/O clock for SDRAM ASIC
78	VDDQ7		Power supply for IO(3.3V)
79	VSSQ7		Power supply for IO(GND)
80	A6	O	Address Bus [6]
81	A5	O	Address Bus [5]
82	A4	O	Address Bus [4]
83	A3	O	Address Bus [3]
84	A2	O	Address Bus [2]
85	DRAK1	O	DMA Request acknowledge 1 NOT USE
86	DRAK0	O	DMA Request acknowledge 0 NOT USE

Pin No.	Pin Name	I/O	Description
87	VDDQ8		Power supply for IO(3.3V)
88	VSSQ8		Power supply for IO(GND)
89	nCS3	O	Chip select signal 3 for SDRAM on EMEC Card (reserved)
90	nCS2	O	Chip select signal 2 for SDRAM on board
91	VDD4		Power supply for CORE(1.5V)
92	VSS4		Power supply for CORE(GND)
93	nRAS	O	RAS signal for SDRAM
94	nRD/nCASS/nFRAME	O	Read signal (nRD/nCAS)
95	RD/nWR	O	Read_write signal (RD/nWR)
96	nWE2/nCAS2/DQM2/n ICIORD	O	D16-23 write enable/CAS2 for SDRAM/nWE2/DQM2
97	nWE3/nCAS3/DQM3/n ICIORD	O	D24-31 write enable/CAS3 for SDRAM/nWE3/DQM3
98	nWE6/nCAS6/DQM6	O	D48-55 write enable NOT USE
99	VDDQ9		Power supply for IO(3.3V)
100	VSSQ9		Power supply for IO(GND)
101	nWE7/nCAS7/DQM7/n REG	O	D56-63 write enable NOT USE
102	D23	IO	Data Bus [23]
103	D24	IO	Data Bus [24]
104	D22	IO	Data Bus [22]
105	RXD	IO	Serial RX data 1 for debug port
106	nDREQ0	IO	DMA Request 0 from USB Controller
107	nDREQ1	IO	DMA Request 1 from USB Controller
108	D25	IO	Data Bus [25]
109	D21	IO	Data Bus [21]
110	D26	IO	Data Bus [26]
111	D20	IO	Data Bus [20]
112	D27	IO	Data Bus [27]
113	VDDQ10		Power supply for IO(3.3V)
114	VSSQ10		Power supply for IO(GND)
115	D19	IO	Data Bus [19]
116	D28	IO	Data Bus [28]
117	VDD5		Power supply for CORE(1.5V)
118	VSS5		Power supply for CORE(GND)
119	D18	IO	Data Bus [18]
120	D29	IO	Data Bus [29]
121	D17	IO	Data Bus [17]
122	D30	IO	Data Bus [30]
123	D16	IO	Data Bus [16]
124	D31	IO	Data Bus [31]
125	VDDQ11		Power supply for IO(3.3V)
126	VSSQ11		Power supply for IO(GND)
127	D55	IO	Data Bus (Pull up) NOT USE
128	D56	IO	Data Bus (Pull up) NOT USE
129	D54	IO	Data Bus (Pull up) NOT USE
130	D57	IO	Data Bus (Pull up) NOT USE
131	D53	IO	Data Bus (Pull up) NOT USE
132	D58	IO	Data Bus (Pull up) NOT USE
133	D52	IO	Data Bus (Pull up) NOT USE
134	D59	IO	Data Bus (Pull up) NOT USE
135	VDDQ12		Power supply for IO(3.3V)
136	VSSQ12		Power supply for IO(GND)
137	D51/P19	I	RESET (Reset switch input port)
138	D60	IO	Data Bus (Pull up) NOT USE
139	D50/P18	I	nLOS (Loss of sync signal input port)
140	D61	IO	Data Bus (Pull up) NOT USE
141	D49/P17	I	nSLFANALM (Shelf fan alarm input port)
142	D62	IO	Data Bus (Pull up) NOT USE
143	VDD6		Power supply for CORE(1.5V)
144	VSS6		Power supply for CORE(GND)
145	D48/P16	O	nRXD2sel
146	D63	IO	Data Bus (Pull up) NOT USE
147	VDDQ13		Power supply for IO(3.3V)
148	VSSQ13		Power supply for IO(GND)
149	MD0/SCK	I	CPU Mode
150	MD1/TXD2	I	CPU Mode Serial interface for RS232C Port

Pin No.	Pin Name	I/O	Description
151	MD2/RXD2	I	CPU Mode Serial interface for RS232C Port
152	nIRL0	I	nIRQ_ASIC (Interrupt signal from ASIC)
153	nIRL1	I	nIRQ_USB (Interrupt signal from USB controller)
154	nIRL2	I	nIRQ_BUSM (Interrupt signal from BUS-M Card)
155	nIRL3	I	nDC_ALM (DC Alarm Interrupt signal)
156	NMI	I	Non Maskable Interrupt (Pull up) NOT USE
157	XTAL2	O	Clock oscillator terminal 2 for internal RTC module
158	EXTAL2	I	External Clock oscillator terminal 2 for internal RTC module
159	VSS-RTC		Power supply for RTC(GND)
160	VDD-RTC		Power supply for RTC(3.3V)
161	CA	I	Hardware standby (Pull up) NOT USE
162	VSS9		Power supply for CORE(GND)
163	VDDQ16		Power supply for IO(3.3V)
164	nCTS2	IO	SCIF Data flow control nCS2 for RS232C Port
165	TCLK	IO	RTC clock output(for factory test use only)
166	MD8/nRTS2	I	CPU Mode Data flow control for RS232C Port
167	MD7/TXP	I	CPU Mode
168	SCK2/nMRRESET	I	SCIF clock (Pull up) NOT USE
169	VDD7		Power supply for CORE(1.5V)
170	VSS7		Power supply for CORE(GND)
171	A18	O	Address Bus [18]
172	A19	O	Address Bus [19]
173	A20	O	Address Bus [20]
174	A21	O	Address Bus [21]
175	A22	O	Address Bus [22]
176	A23	O	Address Bus [23]
177	VDDQ14		Power supply for IO(3.3V)
178	VSSQ14		Power supply for IO(GND)
179	A24	O	Address Bus [24]
180	A25	O	Address Bus [25]
181	MD3/nCE2A	I	CPU Mode
182	MD4/nCE2B	I	CPU Mode
183	MD5/nRAS2	I	CPU Mode
184	DACK0	O	DMA Controller Bus acknowledge 0 for USB Controller
185	DACK1	O	DMA Controller Bus acknowledge 1 for USB Controller
186	A0	O	Address Bus [0]
187	VDDQ15		Power supply for IO(3.3V)
188	VSSQ15		Power supply for IO(GND)
189	A1	O	Address Bus [1]
190	STATUS0	O	CPU Status (NC) NOT USE
191	STATUS1	O	CPU Status (NC) NOT USE
192	MD6/nIOISi6	I	CPU Mode
193	nASEBRK/BRKACK	IO	JTAG Break for debugger
194	TDO	O	JTAG Data out for debugger
195	VDD8		Power supply for CORE(1.5V)
196	VSS8		Power supply for CORE(GND)
197	TMS	I	JTAG Mode switch for debugger
198	TCK	I	JTAG clock for debugger
199	TDI	I	JTAG test data in port for debugger
200	nTRST	I	JTAG reset for debugger
201	VDD-PLL2		Power supply for Internal PLL2(3.3V)
202	VDD-PLL2		Power supply for Internal PLL2(GND)
203	VDD-PLL1		Power supply for Internal PLL1(3.3V)
204	VDD-PLL1		Power supply for Internal PLL1(GND)
205	VDD-CPG		Power supply for CPG(3.3V)
206	VSS-CPG		Power supply for CPG(GND)
207	XTAL	O	Clock oscillator terminal NC NOT USE
208	EXTAL	I	External Clock oscillator terminal 16.384MHz(System clock)

12.2. ASIC (IC102)



Pin No.	Pin Name	I/O	Description
1	GND		Power Supply(GND)
2	P3[7]/TXB[7]	IO	Pull up
3	P3[6]/TXB[6]	IO	Pull up
4	P3[5]/TXB[5]	IO	Pull up
5	P3[4]/TXB[4]	IO	Pull up
6	P3[3]/TXB[3]	IO	MASTER/nS
7	P3[2]/TXB[2]	IO	M/nS
8	P3[1]/TXB[1]	IO	POWTYPE[0]
9	P3[0]/TXB[0]	IO	POWTYPE[1]
10	GND		Power Supply(GND)
11	VDD		Power Supply(3.3V)
12	P4[7]	IO	DIPSW7 fix"1"
13	P4[6]	IO	DIPSW6 fix"1"
14	P4[5]	IO	DIPSW5 fix"1"
15	P4[4]	IO	DIPSW4 fix"1"
16	P4[3]	IO	DIPSW3 fix"1"
17	P4[2]	IO	DIPSW2 fix"0"
18	P4[1]	IO	DIPSW1 fix"1"
19	P4[0]	IO	DIPSW0 fix"1"
20	GND		Power Supply(GND)
21	P5[7]	IO	MEC_MODE[3]
22	P5[6]	IO	MEC_MODE[2]
23	P5[5]	IO	MEC_MODE[1]
24	P5[4]	IO	MEC_MODE[0]
25	P5[3]	IO	Pull up
26	P5[2]	IO	Pull up
27	P5[1]	IO	Pull up
28	VDD		Power Supply(3.3V)
29	GND		Power Supply(GND)
30	VDD		Power Supply(3.3V)
31	AVDD		Power Supply(GND)
32	RX[7]	I	Connect to GND

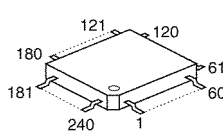
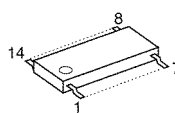
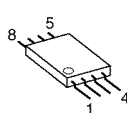
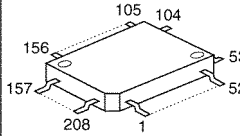
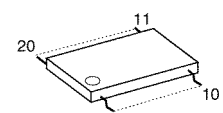
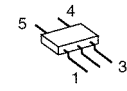
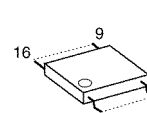
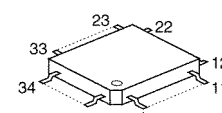
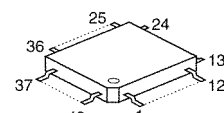
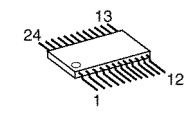
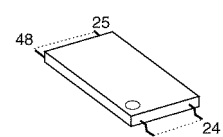
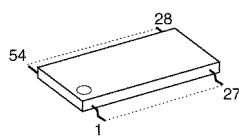
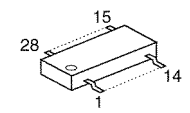
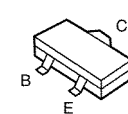
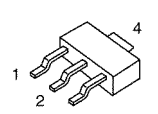
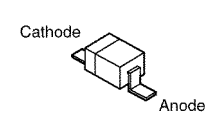
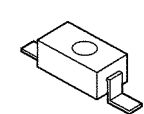
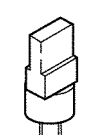
Pin No.	Pin Name	I/O	Description
33	RX[6]	I	Connect to GND
34	RX[5]	I	Connect to GND
35	RX[4]	I	Connect to GND
36	RX[3]	I	Connect to GND
37	RX[2]	I	Connect to GND
38	RX[1]	I	Connect to GND
39	RX[0]	I	Connect to GND
40	VREF_PLUS	I	Connect to GND
41	VREF_MINUS	I	Connect to GND
42	VDD		Power Supply(3.3V)
43	PLL_GND		Power Supply for PLL(GND)
44	PLL_VDD		Power Supply for PLL(3.3V)
45	PLL_CLK		Connect to GND
46	PLL_ATI	I	Clock source for ASIC (16.384MHz)
47	NC47	I	JTAG Test Mode(Connect to GND)
48	GND		Power Supply(GND)
49	VDD		Power Supply(3.3V)
50	RINGER	O	Ringer signal
51	nCT_FRAME	O	CT Bus Frame signal
52	CT_C8	O	CT Bus Clock (8.192MHz)
53	CT_NETREF	I	CT Bus Network reference clock
54	GND		Power Supply(GND)
55	CT_D[7]	IO	CT Data Bus[7]
56	CT_D[6]	IO	CT Data Bus[6]
57	CT_D[5]	IO	CT Data Bus[5]
58	CT_D[4]	IO	CT Data Bus[4]
59	GND		Power Supply(GND)
60	VDD		Power Supply(3.3V)
61	GND		Power Supply(GND)
62	CT_D[3]	IO	CT Data Bus[3]
63	CT_D[2]	IO	CT Data Bus[2]
64	CT_D[1]	IO	CT Data Bus[1]
65	CT_D[0]	IO	CT Data Bus[0]
66	GND		Power Supply(GND)
67	VDD		Power Supply(3.3V)
68	TCK	I	JTAG clock(Pull up)
69	TDI	I	JTAG Data in(Pull up)
70	TDO	O	JTAG Data out(Pull up)
71	TMS	I	JTAG Mode pin(Pull down)
72	TRST	I	JTAG Reset pin(Pull down)
73	TESTMODE0	I	ASIC Test Mode(Connect to GND)
74	TESTMODE1	IO	General IO Port(Pull up)
75	EC_CDET	I	EC Bus card detect signal
76	EC_INT	I	EC Bus Interrupt
77	GND		Power Supply(GND)
78	EC_AD[15]	IO	EC Bus Data/Address[15]
79	EC_AD[14]	IO	EC Bus Data/Address[14]
80	EC_AD[13]	IO	EC Bus Data/Address[13]
81	EC_AD[12]	IO	EC Bus Data/Address[12]
82	GND		Power Supply(GND)
83	VDD		Power Supply(3.3V)
84	EC_AD[11]	IO	EC Bus Data/Address[11]
85	EC_AD[10]	IO	EC Bus Data/Address[10]
86	EC_AD[9]	IO	EC Bus Data/Address[9]
87	EC_AD[8]	IO	EC Bus Data/Address[8]
88	GND		Power Supply(GND)
89	EC_AD[7]	IO	EC Bus Data/Address[7]
90	EC_AD[6]	IO	EC Bus Data/Address[6]
91	EC_AD[5]	IO	EC Bus Data/Address[5]
92	EC_AD[4]	IO	EC Bus Data/Address[4]
93	GND		Power Supply(GND)
94	VDD		Power Supply(3.3V)
95	EC_AD[3]	IO	EC Bus Data/Address[3]
96	EC_AD[2]	IO	EC Bus Data/Address[2]
97	EC_AD[1]	IO	EC Bus Data/Address[1]
98	EC_AD[0]	IO	EC Bus Data/Address[0]
99	GND		Power Supply(GND)

Pin No.	Pin Name	I/O	Description
100	EC_nRST	O	EC Bus Reset
101	EC_BE[1]	O	EC Bus Command[1]
102	EC_BE[0]	O	EC Bus Command[2]
103	EC_PAR	O	EC Bus parity
104	GND		Power Supply(GND)
105	VDD		Power Supply(3.3V)
106	EC_FRAME	O	EC_Bus Frame signal
107	EC_PERR	I	EC Bus parity error detect
108	EC_TRDY	I	EC Bus Target ready
109	EC_STOP	I	EC Bus access stop signal
110	GND		Power Supply(GND)
111	EC_CLK	O	EC_Bus Clock (8.192MHz)
112	NC112		Power Supply(3.3V)
113	GND		Power Supply(GND)
114	VDD		Power Supply(3.3V)
115	SDI	I	TXD_RMT
116	SDO	O	RXD_RMT
117	RTS	O	RTS_RMT
118	CTS	I	CTS_RMT
119	ADD[20]	I	Address Bus[20]
120	ADD[19]	I	Address Bus[19]
121	ADD[18]	I	Address Bus[18]
122	ADD[17]	I	Address Bus[17]
123	ADD[16]	I	Address Bus[16]
124	GND		Power Supply(GND)
125	ADD[15]	I	Address Bus[15]
126	ADD[14]	I	Address Bus[14]
127	ADD[13]	I	Address Bus[13]
128	ADD[12]	I	Address Bus[12]
129	ADD[11]	I	Address Bus[11]
130	ADD[10]	I	Address Bus[10]
131	ADD[9]	I	Address Bus[9]
132	ADD[8]	I	Address Bus[8]
133	GND		Power Supply(GND)
134	VDD		Power Supply(3.3V)
135	ADD[7]	I	Address Bus[7]
136	ADD[6]	I	Address Bus[6]
137	ADD[5]	I	Address Bus[5]
138	ADD[4]	I	Address Bus[4]
139	ADD[3]	I	Address Bus[3]
140	ADD[2]	I	Address Bus[2]
141	ADD[1]	I	Address Bus[1]
142	ADD[0]	I	Address Bus[0]
143	GND		Power Supply(GND)
144	DATA[15]	IO	Data Bus[15]
145	DATA[14]	IO	Data Bus[14]
146	DATA[13]	IO	Data Bus[13]
147	DATA[12]	IO	Data Bus[12]
148	DATA[11]	IO	Data Bus[11]
149	DATA[10]	IO	Data Bus[10]
150	DATA[9]	IO	Data Bus[9]
151	DATA[8]	IO	Data Bus[8]
152	GND		Power Supply(GND)
153	VDD		Power Supply(3.3V)
154	DATA[7]	IO	Data Bus[7]
155	DATA[6]	IO	Data Bus[6]
156	DATA[5]	IO	Data Bus[5]
157	DATA[4]	IO	Data Bus[4]
158	DATA[3]	IO	Data Bus[3]
159	DATA[2]	IO	Data Bus[2]
160	DATA[1]	IO	Data Bus[1]
161	DATA[0]	IO	Data Bus[0]
162	GND		Power Supply(GND)
163	nEXTINT[2]	I	External Interrupt2(Pull up)
164	nEXTINT[1]	I	External Interrupt1(Pull up)
165	nEXTINT[0]	I	External Interrupt0(Pull up)
166	nIRQ	O	ASIC Interrupt request(nIRQ_ASIC)

Pin No.	Pin Name	I/O	Description
167	nBREQ	O	Bus request(NBREQ)
168	nBACK	I	Bus acknowledge(nBACK_NEXUS)
169	nCS_SRAM	O	SRAM chip select(nCS4_NEXDMA)
170	nCS_MES	I	ASIC chip select(nCS5)
171	GND		Power Supply(GND)
172	VDD		Power Supply(3.3V)
173	nRD	I	Read signal(nRD/nCAS)
174	nWR[1]	I	Write signal upper byte(nWE1/DQM1)
175	nWR[0]	I	Write signal lower byte(nWE0/DQM0)
176	nBUSY	O	ASIC Access Busy(nWAIT_ASIC1)
177	nRESET	I	Reset signal(nRESET)
178	nBS	I	CPU Bus start signal(nBS)
179	CLKIO	I	Bus clock (65.536MHz CKIO_NEXUS)
180	GND		Power Supply(GND)
181	GND		Power Supply(GND)
182	HW_CLK[0]	O	PCM Highway clock LHWCLK[0]
183	HW_CLK[1]	O	PCM Highway clock
184	HW_FH	O	PCM Highway Frame-Head
185	LUHW[0]	I	LUHW[0]
186	LDHW[0]	O	LDHW[0]
187	LUHW[1]	I	LUHW[1]
188	LDHW[1]	O	LDHW[1]
189	L_NETRED	I	Connect to GND
190	GND		Power Supply(GND)
191	VDD		Power Supply(3.3V)
192	SHW_CLK	IO	SHW_CLK
193	SHW_FH	IO	SHW_FH
194	PID[7]/CHP[7]	IO	HALT
195	PID[6]/CHP[6]	IO	Mu/nA
196	PID[5]/CHP[5]	IO	MOHSEL
197	PID[4]/CHP[4]	IO	MERODYSEL
198	PID[3]/CHP[3]	IO	Pull up
199	PID[2]/CHP[2]	IO	CH_SEL[2]
200	PID[1]/CHP[1]	IO	CH_SEL[1]
201	PID[0]/CHP[0]	IO	CH_SEL[0]
202	GND		Power Supply(GND)
203	C_CS[3]	O	NC
204	C_CS[2]	O	NC
205	C_CS[1]	O	NC
206	C_CS[0]	O	NC
207	DCLK	O	NC
208	DOUT	O	NC
209	DIN	I	Pull up
210	CP[0]	IO	NC
211	GND		Power Supply(GND)
212	VDD		Power Supply(3.3V)
213	P0[7]	O	BM_nRESET
214	P0[6]	I	Pull up
215	P0[5]	I	BM_nRESET
216	P0[4]	O	nLED_SDB
217	P0[3]	I	nPRS_MEC
218	P0[2]	I	nPRS_RMT
219	P0[1]	O	nLEDALM
220	P0[0]	O	nLEDALM
221	GND		Power Supply(GND)
222	P1[7]/TXA[7]	I	Pull up
223	P1[6]/TXA[6]	I	Pull up
224	P1[5]/TXA[5]	I	Pull up
225	P1[4]/TXA[4]	I	Pull up
226	P1[3]/TXA[3]	I	Pull up
227	P1[2]/TXA[2]	I	Pull up
228	P1[1]/TXA[1]	I	Pull up
229	P1[0]/TXA[0]	I	Pull up
230	GND		Power Supply(GND)
231	VDD		Power Supply(3.3V)
232	P2[7]232	I	Pull up
233	P2[6]233	I	Pull up

Pin No.	Pin Name	I/O	Description
234	P2[5]234	I	Pull up
235	P2[4]235	I	Pull up
236	P2[3]236	I	Pull up
237	P2[2]237	I	nINVALID_RS
238	P2[1]238	I	nFORCEOFF_RS
239	P2[0]239	I	FORCEON_RS
240	GND		Power Supply(GND)

13 TERMINAL GUIDE OF ICS, TRANSISTORS AND DIODES

 C1CB00001395	 C0JBAB000407 C0JBAA000244 C0JBAB000408 C0JBAA000174	 C0JBAB000535, C0ZBZ0001141 C1CB00001775, C0JBAF000484 C0ABBB000179, C1ZBZ0002907 YNJM2903MTE1, C0JBAZ001914	 C2DBYF000008	
 C0JBAZ001539 C0JBAZ001466 C0ZBZ0001169	 C0EBE0000176 C0JBAC000310 C0JBAA000319 C0DBAGZ00029 C0DBAFF00016	 C0JBAZ001876 PSVISNLV138A C0JBAN000187	 C1CB00001839	 MN5773
 C1AB00002318	 PSWITDA600CE C3BBMG000012	 C3ABRG000037	 C0ZBZ0000740	 B1GBCFEH0003 PQVTDTA114YU UN5213 2SC4081R B1ABEC000010 PQVTDTC143E
 2SB1132R B1DFDC000002 B1DHCD000018	 B1GHCFJJ0007	 MA110 MA8051 MA1070400L MA728 B0JCND000009	 MA143	 PSVD1VGCT PSVD1SRCT
 LN316GP LN216RP				

14 HOW TO REPLACE A FLAT PACKAGE IC

Even if you do not have the special tools (for example, a spot heater) to remove the Flat IC, with some solder (large amount), a soldering iron and a cutter knife, you can easily remove the ICs that have more than 100 pins.

14.1. PREPARATION

- PbF (: Pb free) Solder
- Soldering Iron

Tip Temperature of 700°F ± 20°F (370°C ± 10°C)

Note: We recommend a 30 to 40 Watt soldering iron. An expert may be able to use a 60 to 80 Watt iron where someone with less experience could overheat and damage the PCB foil.

- Flux

Recommended Flux: Specific Gravity → 0.82.

Type → RMA (lower residue, non-cleaning type)

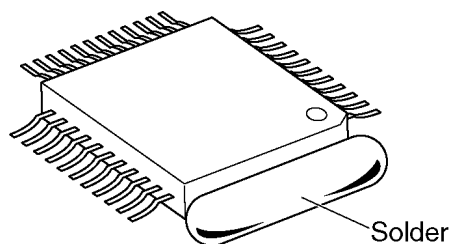
Note: See **ABOUT LEAD FREE SOLDER (PbF: Pb free)** (P.3).

14.2. REMOVAL PROCEDURE

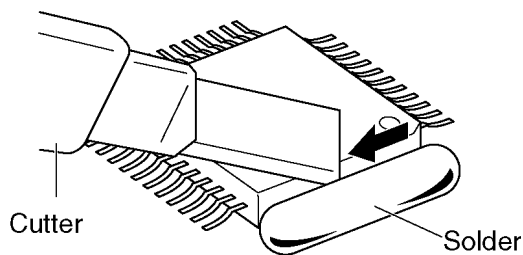
1. Put plenty of solder on the IC pins so that the pins can be completely covered.

Note:

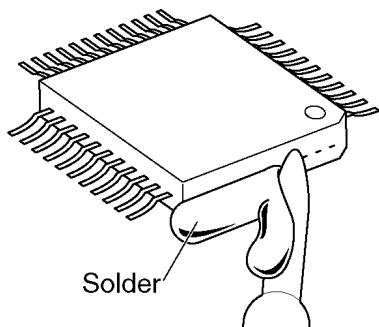
If the IC pins are not soldered enough, you may give pressure to the P.C. board when cutting the pins with a cutter.



2. Make a few cuts into the joint (between the IC and its pins) first and then cut off the pins thoroughly.



3. While the solder melts, remove it together with the IC pins.

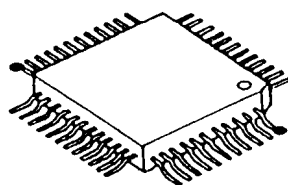


When you attach a new IC to the board, remove all solder left on the land with some tools like a soldering wire. If some

solder is left at the joint on the board, the new IC will not be attached properly.

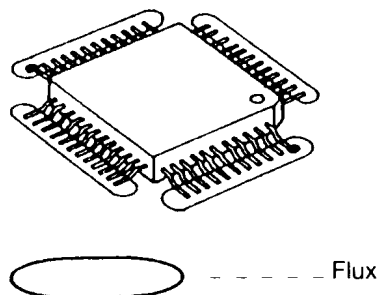
14.3. INSTALLATION PROCEDURE

1. Tack the flat pack IC to the PCB by temporarily soldering two diagonally opposite pins in the correct positions on the PCB.

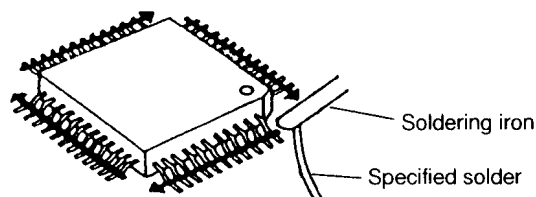


Be certain each pin is located over the correct pad on the PCB.

2. Apply flux to all of the pins on the IC.

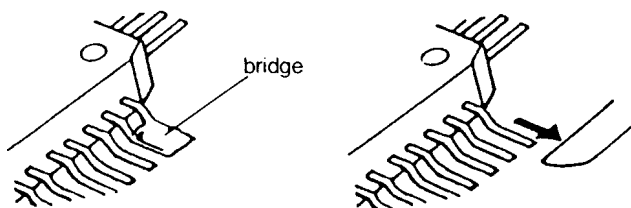


3. Being careful to not unsolder the tack points, slide the soldering iron along the tips of the pins while feeding enough solder to the tip so that it flows under the pins as they are heated.

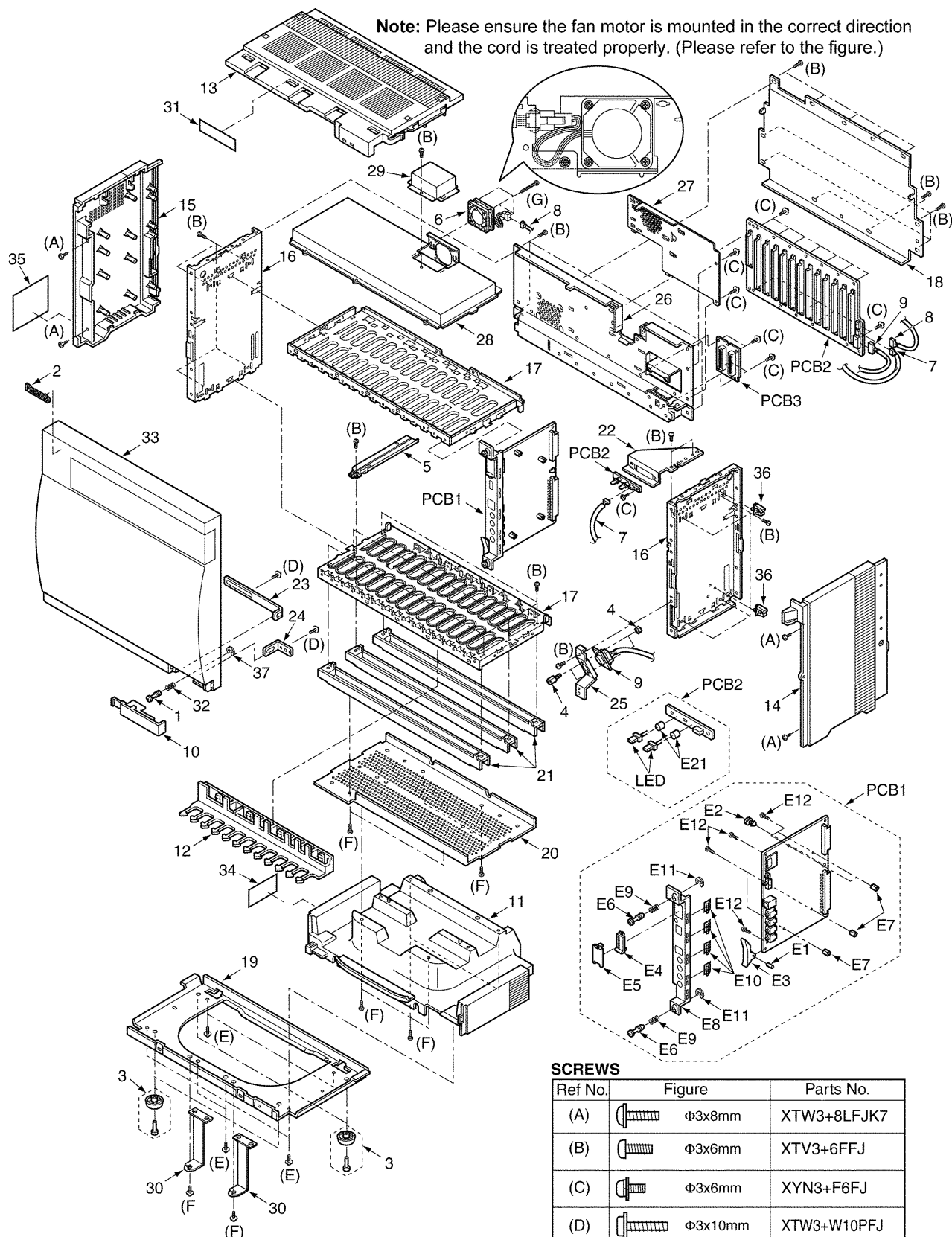


14.4. REMOVING SOLDER FROM BETWEEN PINS

1. Add a small amount of solder to the bridged pins.
2. With a hot iron, use a sweeping motion along the flat part of the pin to draw the solder from between the adjacent pads.



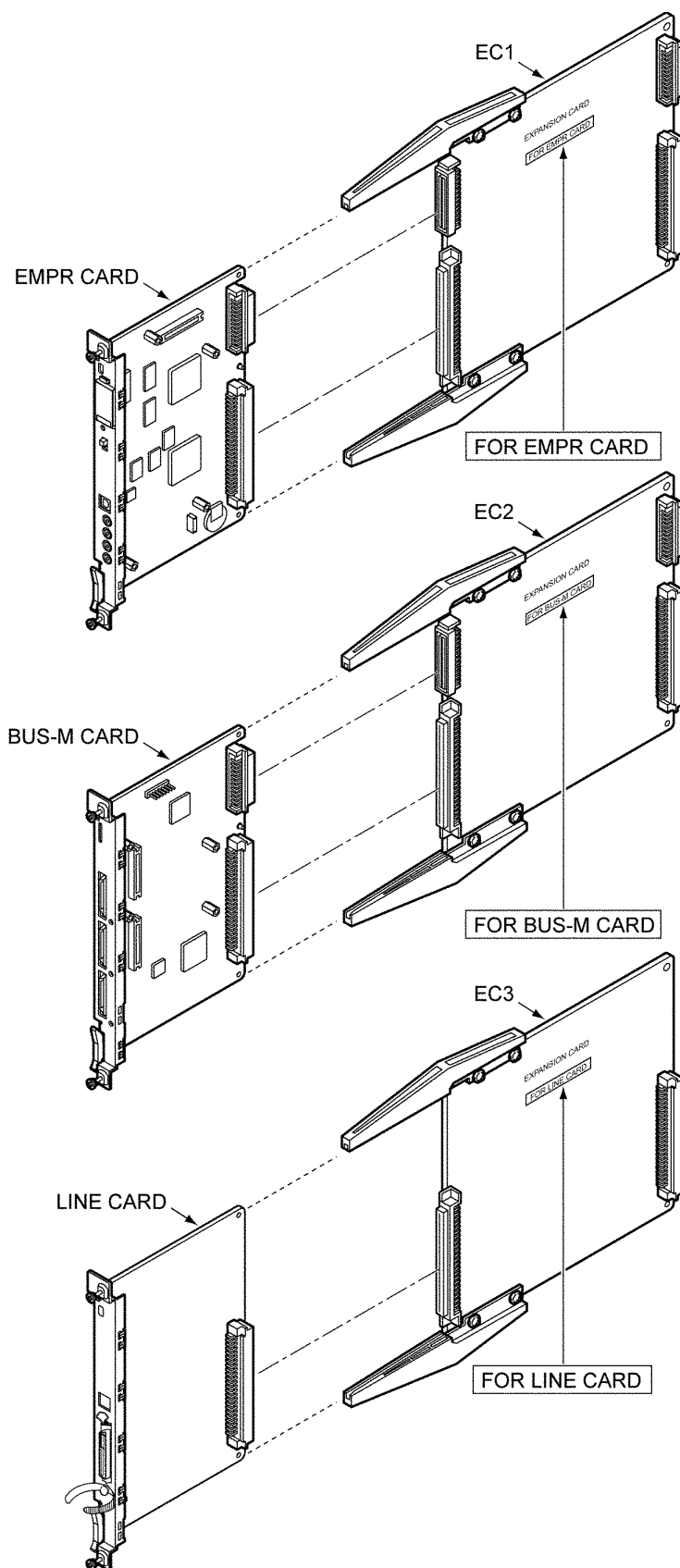
15 CABINET AND ELECTRICAL PARTS LOCATION



SCREWS

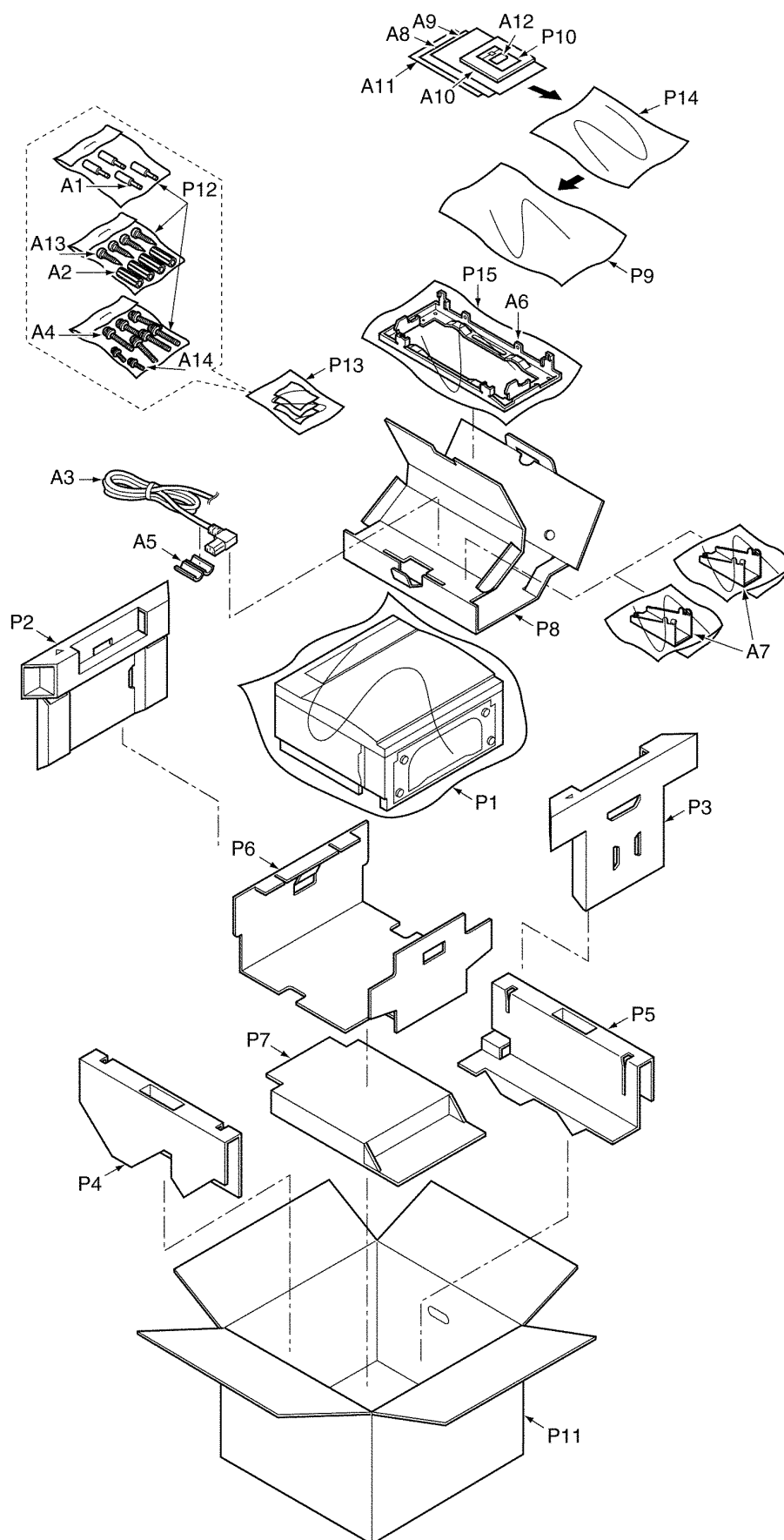
Ref No.	Figure	Parts No.
(A)	 $\Phi 3 \times 8 \text{mm}$	XTW3+8LFJK7
(B)	 $\Phi 3 \times 6 \text{mm}$	XTV3+6FFJ
(C)	 $\Phi 3 \times 6 \text{mm}$	XYN3+F6FJ
(D)	 $\Phi 3 \times 10 \text{mm}$	XTW3+W10PFJ
(E)	 $\Phi 4 \times 12 \text{mm}$	XTW4+12PFJ
(F)	 $\Phi 4 \times 10 \text{mm}$	XTV4+10FFJ
(G)	 $\Phi 3 \times 25 \text{mm}$	XYN3+F25FN

15.1. EXTENSION BOARDS FOR SERVICING



- Do not use more than one of these extension boards at the same time (proper operation cannot be guaranteed).
- Do not use more than 6 line cards at the time one of these extension boards (proper operation can not be guaranteed).

16 ACCESSORIES AND PACKING MATERIALS



17 REPLACEMENT PARTS LIST

Note:

1. RTL (Retention Time Limited)

The marking (RTL) indicates that the Retention Time is limited for this item.

After the discontinuation of this assembly in production, the item will continue to be available for a specific period of time. The retention period of availability depends on the type of assembly and the laws governing parts and product retention. At the end of this period, the assembly will no longer be available.

2. Important safety notice

Components identified by the Δ mark indicates special characteristics important for safety. When replacing any of these components, only use specified manufacture's parts.

3. The S mark means the part is one of some identical parts.

For that reason, it may be different from the installed part.

4. ISO code (Example : ABS-94HB) of the remarks column shows quality of the material and a flame resisting grade about plastics.

5. RESISTORS & CAPACITORS

Unless otherwise specified;

All resistors are in ohms (Ω), k=1000 Ω , M=1000k Ω

All capacitors are in MICRO FARADS (μ F), p= μ (μ F)

*Type & Wattage of Resistor

Type

ERC:Solid ERD:Carbon PQRD:Carbon	ERX,ERG,ER0,ERJ :Metal Film Oxide	PQ4R:Carbon ERS:Fusible Resistor ERF:Cement Resistor
--	--------------------------------------	--

Wattege

10,16:1/8W	14,25:1/4W	12:1/2W	1:1W	2:2W	3:3W
------------	------------	---------	------	------	------

*Type & Voltage of Capacitor

Type

ECFD:Semi-Conductor ECQS:Styrol PQCUV,ECUV:Chip ECQMS:Mica	ECCD,ECKD,ECBT,PQCBC: Ceramic ECQE,ECQV,ECQG: Polyester ECEA,ECSZ,F2G,PSCSZ: Electlytic ECQP: Polypropylene
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Voltage

ECQ Type	ECQG ECQV Type	ECSZ Type	Others		
1H:50V 2A:100V 2E:250V 2H:500V	05:50V 1:100V 2:200V	0F:3.15V 1A:10V 1V:35V 0J:6.3V	0J :6.3V 1A :10V 1C :16V 1E,25:25V	1V :35V 50,1H:50V 1J :63V 2A :100V	

17.1. CABINET AND ELECTRICAL PARTS

Ref. No.	Part No.	Part Name & Description	Remarks
1	PQHD10011U	SCREW	
2	PSGB1001Z	BADGE, PANASONIC	PS (HB)
3	PSHA1008Z	RUBBER PARTS, FOOT	
4	PSHD1091Z	BOLT WITH NUT	
5	PSHR1235Z	GUIDE, RAIL	PC+ABS (5V)
6	PSJQ1007Z	DC MOTOR	
7	PSJS03P13Z	CORD, LED CABLE	
8	PSJS03P33Z	CORD, FAN CABLE	
9	PSJS09P12Z	CORD, RS232C	

Ref. No.	Part No.	Part Name & Description	Remarks
10	PSKK1035Z1	DOOR-LID, SCREW COVER	PC+ABS (5V)
11	PSKL1013Y1	STAND	ABS (HB)
12	PSKR1001X1	GUIDE, CABLE	PC+ABS (5V)
13	PSKV1015Y1	COVER, TOP	PC+ABS (5V)
14	PSKV1016Z1	COVER, SIDE (R)	ABS (HB)
15	PSKV1017Z1	COVER, SIDE (L)	ABS (HB)
16	PSMD1035Y	FRAME, SIDE	
17	PSMD1036X	FRAME, BASE	
18	PSMD1037Z	COVER, BACK	
19	PSMD1038Y	FRAME, PEDESTAL	
20	PSMH1198Z	FRAME, PUNCHING	
21	PSMH1201Z	ANGLE, BASE	
22	PSMH1205Z	CHASSIS, LED BOARD	
23	PSMH1206Y	ANGLE, PADLOCK FIXED	
24	PSMH1207Z	ANGLE, PADLOCK FIXED	
25	PSMH1222Z	ANGLE, RS232C FIXED	
26	PSMH1295Z	ANGLE, BACK BOARD	
27	PSMH1296Z	ANGLE, BACK COVER SMALL	
28	PSMH1298Z	ANGLE, SHIELD METAL (BIG)	
29	PSMH1299Z	ANGLE, SHIELD METAL (SMALL)	
30	PSMH1318Z	ANGLE, FG	
31	PSQT1977Z	LABEL, CAUTION	
32	PSUS1022Z	COIL SPRING	
33	PSYCTDA600BX	COVER, FRONT	PC+ABS (5V), PC (V0)
34	PSYETDA600CE	NAME PLATE	
35	PSQT2030Z	LABEL, CAUTION	
36	WS-2NS	WIRE CLAMPER	
37	XUC3VWP	RETAINING RING	

17.2. ACCESSORIES AND PACKING MATERIALS

Ref. No.	Part No.	Part Name & Description	Remarks
A1	PSJP01S02Z	PLUG	
A2	PSHE1188Z	PLUG	
A3	PSJA1108Z	POWER CORD	Δ
A4	XYN4+J18FN	SCREW WITH WASHER	
A5	PSLB5D1	INSULATOR, CORE	
A6	PSMD1039Y	ANGLE	
A7	PSMH1300Z	ANGLE, FAN	
A8	PSQW2211Z	LEAFLET	
A9	PSQW2356Z	LEAFLET	
A10	PSQX3645ZCD	INSTRUCTION BOOK, CD-ROM	
A11	PSQW2402Z	LEAFLET	
A12	PSZETDA600CE	MEMORY PARTS, SD CARD	
A13	XTB5+20AFJ	TAPPING SCREW	
A14	XYN3+F6FJ	SCREW WITH WASHER	
P1	PQPP143Z	PROTECTION COVER	
P2	PSPD1151Y	CUSHION	
P3	PSPD1152Z	CUSHION	
P4	PSPD1157Z	CUSHION	
P5	PSPD1158Z	CUSHION	
P6	PSPD1180Z	CUSHION	
P7	PSPD1181Z	CUSHION	
P8	PSPN1125Y	ACCESSORY BOX	
P9	PSPP1069Z	PROTECTION COVER	
P10	PSPP1070Z	PROTECTION COVER	
P11	PSZKTDA600CE	GIFT BOX	
P12	XZB05X08A03	PROTECTION COVER	
P13	XZB10X15A04	PROTECTION COVER	
P14	XZB18X27A04	PROTECTION COVER	
P15	XZB50X30A06	PROTECTION COVER	

17.3. EMPR BOARD PARTS

Ref. No.	Part No.	Part Name & Description	Remarks
PCB1	PSWP1DA600CE	EMPR BOARD ASS'Y (RTL)	
		(ICS)	
IC102	C1CB00001395	IC	
IC110	C0JBAB000407	IC	
IC111	C0JBAB000535	IC	
IC131	C0JBAB000407	IC	
IC200	C2DBYF000008	IC	
IC201	C0JBAZ001876	IC	
IC202	C0ZBZ0001141	IC	
IC203	C0JBAZ001539	IC	
IC205	C0JBAZ001539	IC	
IC206	C1CB00001775	IC	
IC207	C0EBE0000176	IC	
IC208	C0JBAC000310	IC	
IC210	C0JBAA000244	IC	
IC221	C0JBAZ001466	IC	
IC222	C0JBAF000484	IC	
IC223	C0JBAB000535	IC	
IC225	C0JBAB000408	IC	
IC301	C0JBAZ001539	IC	
IC302	C0JBAZ001539	IC	
IC303	C0JBAZ001466	IC	
IC304	C0JBAZ001466	IC	
IC305	C0JBAZ001466	IC	
IC306	C0JBAZ001466	IC	
IC308	C0JBAA000319	IC	
IC401	PSVISNLV138A	IC	S
IC404	C1CB00001839	IC	
IC405	MN5773	IC	
IC407	C0JBAZ001466	IC	
IC408	C0JBAZ001466	IC	
IC409	C0JBAB000535	IC	
IC411	C1AB00002318	IC	
IC503	PSWITDA600CE	IC	
IC505	C3ABRG000037	IC	
IC506	C3ABRG000037	IC	
IC509	C0JBAN000187	IC	
IC511	C0JBAA000174	IC	
IC602	C0DBAGZ00029	IC	
IC605	C0ZBZ0001169	IC	
IC606	C0ZBZ0001169	IC	
IC608	C0ABBB000179	IC	
IC609	C0ABBB000179	IC	
IC610	C1ZBZ0002907	IC	
IC611	YNJM2903MTE1	IC	△ S
IC618	C0ZBZ0000740	IC	
IC621	C3BBMG000012	IC	
IC622	C3BBMG000012	IC	
IC624	C0JBAZ001914	IC	
IC625	C0DBAFF00016	IC	
IC626	C0JBAA000319	IC	
		(TRANSISTORS)	
Q101	B1GBCFEH0003	TRANSISTOR (SI)	
Q102	PQVTDTA114YU	TRANSISTOR (SI)	S
Q601	2SB1132R	TRANSISTOR (SI)	S
Q603	UN5213	TRANSISTOR (SI)	S
Q604	2SC4081R	TRANSISTOR (SI)	S
Q605	2SC4081R	TRANSISTOR (SI)	S
Q606	B1ABEC000010	TRANSISTOR (SI)	
Q607	B1ABEC000010	TRANSISTOR (SI)	
Q610	B1DFDC000002	TRANSISTOR (SI)	
Q611	B1DHCD000018	TRANSISTOR (SI)	
Q612	PQVTDTC143E	TRANSISTOR (SI)	S
QA101	B1GHCFJJ0007	TRANSISTOR (SI)	S
		(DIODES)	
D102	MA110	DIODE (SI)	S
D602	B0JCND000009	DIODE (SI)	
D605	MA8051	DIODE (SI)	S
D607	MA1070400L	DIODE (SI)	S
D608	MA728	DIODE (SI)	S
D609	MA728	DIODE (SI)	S

Ref. No.	Part No.	Part Name & Description	Remarks
DA601	MA143	DIODE (SI)	S
DA602	MA143	DIODE (SI)	S
LED101	PSVD1VGCT	LED	S
LED103	PSVD1SRCT	LED	S
		(BATTERY)	
BAT600	CR23541GUF	LITHIUM BATTERY	
		(CONNECTORS)	
CN103	K1KA90B00009	CONNECTOR, 90P	
CN301	K1KB80B00027	CONNECTOR, 80P	
CN402	K1KB30A00175	CONNECTOR, 30P	
CN403	K1NA09E00022	CONNECTOR, 9P	
CN404	K1FB104B0053	CONNECTOR, 104P	
CN702	K1KAC0A00052	CONNECTOR	
		(COMPONENTS PARTS)	
RA30A	D1H84704A024	RESISTOR ARRAY, 47	
RA110	D1H81034A024	RESISTOR ARRAY, 10K	
RA111	D1H81034A024	RESISTOR ARRAY, 10K	
RA112	D1H81034A024	RESISTOR ARRAY, 10K	
RA113	D1H81034A024	RESISTOR ARRAY, 10K	
RA114	D1H81034A024	RESISTOR ARRAY, 10K	
RA115	D1H81034A024	RESISTOR ARRAY, 10K	
RA123	D1H86804A024	RESISTOR ARRAY, 68	
RA124	D1H86804A024	RESISTOR ARRAY, 68	
RA125	D1H86804A024	RESISTOR ARRAY, 68	
RA126	D1H86804A024	RESISTOR ARRAY, 68	
RA127	D1H86804A024	RESISTOR ARRAY, 68	
RA128	D1H84704A024	RESISTOR ARRAY, 47	
RA129	D1H84704A024	RESISTOR ARRAY, 47	
RA136	D1H82224A024	RESISTOR ARRAY, 2.2K	
RA137	D1H81034A024	RESISTOR ARRAY, 10K	
RA141	D1H81034A024	RESISTOR ARRAY, 10K	
RA142	D1H81034A024	RESISTOR ARRAY, 10K	
RA143	D1H81034A024	RESISTOR ARRAY, 10K	
RA144	D1H81034A024	RESISTOR ARRAY, 10K	
RA145	D1H81034A024	RESISTOR ARRAY, 10K	
RA146	D1H81034A024	RESISTOR ARRAY, 10K	
RA147	D1H81034A024	RESISTOR ARRAY, 10K	
RA148	D1H81034A024	RESISTOR ARRAY, 10K	
RA149	D1H81034A024	RESISTOR ARRAY, 10K	
RA200	D1H81034A024	RESISTOR ARRAY, 10K	
RA201	D1H81034A024	RESISTOR ARRAY, 10K	
RA202	D1H81034A024	RESISTOR ARRAY, 10K	
RA208	D1H81034A024	RESISTOR ARRAY, 10K	
RA209	D1H81034A024	RESISTOR ARRAY, 10K	
RA210	D1H81034A024	RESISTOR ARRAY, 10K	
RA211	D1H86804A024	RESISTOR ARRAY, 68	
RA212	D1H86804A024	RESISTOR ARRAY, 68	
RA213	D1H86804A024	RESISTOR ARRAY, 68	
RA214	D1H86804A024	RESISTOR ARRAY, 68	
RA215	D1H86804A024	RESISTOR ARRAY, 68	
RA216	D1H86804A024	RESISTOR ARRAY, 68	
RA217	D1H86804A024	RESISTOR ARRAY, 68	
RA218	D1H86804A024	RESISTOR ARRAY, 68	
RA219	D1H86804A024	RESISTOR ARRAY, 68	
RA220	D1H86804A024	RESISTOR ARRAY, 68	
RA221	D1H86804A024	RESISTOR ARRAY, 68	
RA222	D1H86804A024	RESISTOR ARRAY, 68	
RA223	D1H86804A024	RESISTOR ARRAY, 68	
RA224	D1H84724A024	RESISTOR ARRAY, 4.7K	
RA300	D1H84704A024	RESISTOR ARRAY, 47	
RA301	D1H84704A024	RESISTOR ARRAY, 47	
RA302	D1H84704A024	RESISTOR ARRAY, 47	
RA303	D1H84704A024	RESISTOR ARRAY, 47	
RA304	D1H84704A024	RESISTOR ARRAY, 47	
RA305	D1H84704A024	RESISTOR ARRAY, 47	
RA306	D1H84704A024	RESISTOR ARRAY, 47	
RA307	D1H84704A024	RESISTOR ARRAY, 47	
RA308	D1H84704A024	RESISTOR ARRAY, 47	
RA309	D1H84704A024	RESISTOR ARRAY, 47	
RA310	D1H81034A024	RESISTOR ARRAY, 10K	
RA311	D1H81034A024	RESISTOR ARRAY, 10K	
RA312	D1H81034A024	RESISTOR ARRAY, 10K	
RA313	D1H81034A024	RESISTOR ARRAY, 10K	

Ref. No.	Part No.	Part Name & Description	Remarks
RA400	D1H82204A024	RESISTOR ARRAY, 22	
RA401	D1H82204A024	RESISTOR ARRAY, 22	
RA402	D1H82204A024	RESISTOR ARRAY, 22	
RA403	D1H82204A024	RESISTOR ARRAY, 22	
RA404	D1H82204A024	RESISTOR ARRAY, 22	
RA405	D1H82204A024	RESISTOR ARRAY, 22	
RA406	D1H84734A024	RESISTOR ARRAY, 47K	
RA407	D1H84734A024	RESISTOR ARRAY, 47K	
RA408	D1H84734A024	RESISTOR ARRAY, 47K	
RA501	D1H81034A024	RESISTOR ARRAY, 10K	
RA502	D1H81034A024	RESISTOR ARRAY, 10K	
RA503	D1H81034A024	RESISTOR ARRAY, 10K	
RA504	D1H81034A024	RESISTOR ARRAY, 10K	
RA505	D1H81034A024	RESISTOR ARRAY, 10K	
RA506	D1H81024A024	RESISTOR ARRAY, 1K	
RA507	D1H81024A024	RESISTOR ARRAY, 1K	
RA508	D1H81034A024	RESISTOR ARRAY, 10K	
RA509	D1H81034A024	RESISTOR ARRAY, 10K	
RA510	D1H81034A024	RESISTOR ARRAY, 10K	
RA511	D1H81034A024	RESISTOR ARRAY, 10K	
RA512	D1H81034A024	RESISTOR ARRAY, 10K	
RA513	D1H81034A024	RESISTOR ARRAY, 2.2K	
RA514	D1H81034A024	RESISTOR ARRAY, 10K	
RA515	D1H81034A024	RESISTOR ARRAY, 10K	
RA516	D1H81034A024	RESISTOR ARRAY, 10K	
RA517	D1H81034A024	RESISTOR ARRAY, 10K	
RA518	D1H81034A024	RESISTOR ARRAY, 10K	
RA520	D1H81034A024	RESISTOR ARRAY, 10K	
RA521	D1H81034A024	RESISTOR ARRAY, 10K	
RA522	D1H81034A024	RESISTOR ARRAY, 10K	
RA523	D1H81034A024	RESISTOR ARRAY, 10K	
		(COILS)	
L601	G1A330G00008	COIL	
		(CRYSTAL OSCILLATORS)	
X104	H1B1635B0019	CRYSTAL OSCILLATOR	
X201	H0J327200143	CRYSTAL OSCILLATOR	
X401	H0J120500019	CRYSTAL OSCILLATOR	
X402	H0J200500030	CRYSTAL OSCILLATOR	
X403	H0J327200143	CRYSTAL OSCILLATOR	
		(FILTERS)	
FIL105	J0HAAB000020	IC FILTER	
FIL106	J0HAAB000020	IC FILTER	
FIL107	J0HAAH000003	IC FILTER	
FIL110	J0HAAB000020	IC FILTER	
FIL111	J0HAAH000003	IC FILTER	
FIL200	J0HAAB000020	IC FILTER	
FIL201	J0HAAH000003	IC FILTER	
L108	PFVF1A471SG	CERAMIC FILTER	S
L148	J0JCC0000275	IC FILTER	
L149	J0JCC0000275	IC FILTER	
L150	J0JCC0000275	IC FILTER	
L151	J0JCC0000275	IC FILTER	
L152	J0JCC0000275	IC FILTER	
L153	J0JCC0000275	IC FILTER	
L154	J0JCC0000275	IC FILTER	
L155	J0JCC0000275	IC FILTER	
L156	J0JCC0000275	IC FILTER	
L157	J0JCC0000275	IC FILTER	
L158	J0JCC0000275	IC FILTER	
L159	J0JCC0000275	IC FILTER	
L160	J0JCC0000275	IC FILTER	
L161	J0JCC0000275	IC FILTER	
L162	J0JCC0000275	IC FILTER	
L163	J0JCC0000275	IC FILTER	
L164	J0JCC0000275	IC FILTER	
L165	J0JCC0000275	IC FILTER	
L166	J0JCC0000275	IC FILTER	
L167	J0JCC0000275	IC FILTER	
L168	J0JCC0000275	IC FILTER	
L169	J0JCC0000275	IC FILTER	
L170	J0JCC0000275	IC FILTER	
L171	J0JCC0000275	IC FILTER	
L172	J0JCC0000275	IC FILTER	

Ref. No.	Part No.	Part Name & Description	Remarks
L173	J0JCC0000275	IC FILTER	
L174	J0JCC0000275	IC FILTER	
L175	J0JCC0000275	IC FILTER	
L176	J0JCC0000275	IC FILTER	
L177	J0JCC0000275	IC FILTER	
L179	PFVF1A471SG	CERAMIC FILTER	S
L183	PFVF1A471SG	CERAMIC FILTER	S
L184	PFVF1A471SG	CERAMIC FILTER	S
L185	PFVF1A471SG	CERAMIC FILTER	S
L186	PFVF1A471SG	CERAMIC FILTER	S
L187	PFVF1A471SG	CERAMIC FILTER	S
L194	PFVF1A471SG	CERAMIC FILTER	S
L195	PFVF1A471SG	CERAMIC FILTER	S
L196	PFVF1A471SG	CERAMIC FILTER	S
L197	PFVF1A471SG	CERAMIC FILTER	S
L198	PFVF1A471SG	CERAMIC FILTER	S
L199	PFVF1A471SG	CERAMIC FILTER	S
L200	J0JCC0000274	IC FILTER	
L201	J0JCC0000274	IC FILTER	
L202	J0JCC0000274	IC FILTER	
L203	J0JCC0000274	IC FILTER	
L204	J0JCC0000274	IC FILTER	
L205	J0JCC0000274	IC FILTER	
L206	J0JCC0000274	IC FILTER	
L207	J0JCC0000274	IC FILTER	
L208	J0JCC0000274	IC FILTER	
L209	J0JCC0000274	IC FILTER	
L210	J0JCC0000274	IC FILTER	
L211	J0JCC0000274	IC FILTER	
L212	J0JCC0000274	IC FILTER	
L213	J0JCC0000274	IC FILTER	
L214	J0JCC0000274	IC FILTER	
L215	J0JCC0000274	IC FILTER	
L216	J0JCC0000274	IC FILTER	
L217	J0JCC0000274	IC FILTER	
L218	J0JCC0000274	IC FILTER	
L219	J0JCC0000274	IC FILTER	
L220	J0JCC0000274	IC FILTER	
L221	J0JCC0000274	IC FILTER	
L222	J0JCC0000274	IC FILTER	
L223	J0JCC0000274	IC FILTER	
L224	J0JCC0000274	IC FILTER	
L228	J0JCC0000274	IC FILTER	
L300	PFVF1B221SB	CERAMIC FILTER	S
L301	PFVF1B221SB	CERAMIC FILTER	S
L302	PFVF1B221SB	CERAMIC FILTER	S
L303	PFVF1B221SB	CERAMIC FILTER	S
L304	PFVF1B221SB	CERAMIC FILTER	S
L305	PFVF1B221SB	CERAMIC FILTER	S
L306	PFVF1B221SB	CERAMIC FILTER	S
L307	PFVF1B221SB	CERAMIC FILTER	S
L308	PFVF1B221SB	CERAMIC FILTER	S
L309	PFVF1B221SB	CERAMIC FILTER	S
L327	PFVF1B221SB	CERAMIC FILTER	S
L328	PFVF1B221SB	CERAMIC FILTER	S
L329	PFVF1B221SB	CERAMIC FILTER	S
L333	PFVF1B221SB	CERAMIC FILTER	S
L334	PFVF1B221SB	CERAMIC FILTER	S
L335	PFVF1B221SB	CERAMIC FILTER	S
L336	PFVF1B221SB	CERAMIC FILTER	S
L337	PFVF1B221SB	CERAMIC FILTER	S
L338	PFVF1B221SB	CERAMIC FILTER	S
L345	PFVF1B221SB	CERAMIC FILTER	S
L346	PFVF1B221SB	CERAMIC FILTER	S
L347	PFVF1B221SB	CERAMIC FILTER	S
L348	PFVF1B221SB	CERAMIC FILTER	S
L413	PFVF1B470SB	CERAMIC FILTER	S
L414	PFVF1B470SB	CERAMIC FILTER	S
L600	PFVF2P600SG	CERAMIC FILTER	S
L603	J0JHC0000035	CERAMIC FILTER	
L604	PFVF1A471SG	CERAMIC FILTER	S
L605	PFVF1A471SG	CERAMIC FILTER	S
L606	PFVF1A471SG	CERAMIC FILTER	S

Ref. No.	Part No.	Part Name & Description	Remarks
L607	PFVFLA471SG	CERAMIC FILTER	S
L608	PFVFLA471SG	CERAMIC FILTER	S
L609	PFVFLA471SG	CERAMIC FILTER	S
L610	PFVFLA471SG	CERAMIC FILTER	S
L611	PFVFLA471SG	CERAMIC FILTER	S
R510	J0JCC0000275	IC FILTER	
		(FUSES)	
IP601	K5H502Z00003	FUSE	
IP602	K5H252Z00003	FUSE	
		(JACKS)	
JK601	K2HC102B0065	JACK	
JK602	K2HC102B0065	JACK	
JK603	K2HC102B0065	JACK	
JK604	K2HC102B0065	JACK	
		(SWITCHES)	
SW101	EVQPF106K	PUSH SWITCH	
SW103	PQSS2A26Y	SLIDE SWITCH	S
		(CAPACITORS)	
C101	FlG1C1030008	0.01	
C102	FlG1C1030008	0.01	
C103	FlG1C1030008	0.01	
C104	FlG1C1030008	0.01	
C105	FlG1C1030008	0.01	
C106	F1H1A1050029	1	
C107	FlG1C1030008	0.01	
C109	FlG1C1030008	0.01	
C110	FlG1C1030008	0.01	
C114	ECUV1H102KBV	0.001	S
C115	FlG1C1030008	0.01	
C116	F1H1A1050029	1	
C117	ECJ1VB1H102K	0.001	
C118	ECJ1VB1H102K	0.001	
C121	ECUV1C104ZFF	0.1	
C122	ECUV1C104ZFF	0.1	
C123	ECUV1C104ZFF	0.1	
C124	ECUV1C104ZFF	0.1	
C125	ECUV1C104ZFF	0.1	
C131	FlG1C1030008	0.01	
C132	FlG1C1030008	0.01	
C133	FlG1C1030008	0.01	
C134	FlG1C1030008	0.01	
C135	FlG1C1030008	0.01	
C136	FlG1C1030008	0.01	
C137	FlG1C1030008	0.01	
C138	FlG1C1030008	0.01	
C139	FlG1C1030008	0.01	
C140	FlG1C1030008	0.01	
C141	FlG1C1030008	0.01	
C142	FlG1C1030008	0.01	
C143	FlG1C1030008	0.01	
C145	F1H1A1050029	1	
C202	ECUV1A105ZFV	1	
C203	ECUV1A105ZFV	1	
C204	FlG1C1030008	0.01	
C206	FlG1C1030008	0.01	
C207	FlG1C1030008	0.01	
C209	FlG1C1030008	0.01	
C210	FlG1C1030008	0.01	
C211	FlG1C1030008	0.01	
C212	FlG1C1030008	0.01	
C213	FlG1C1030008	0.01	
C214	FlG1C1030008	0.01	
C215	FlG1C1030008	0.01	
C216	FlG1C1030008	0.01	
C217	FlG1C1030008	0.01	
C218	FlG1C1030008	0.01	
C219	FlG1C1030008	0.01	
C220	FlG1C1030008	0.01	
C221	FlG1C1030008	0.01	
C222	FlG1C1030008	0.01	
C223	FlG1C1030008	0.01	
C224	FlG1C1030008	0.01	
C225	FlG1C1030008	0.01	

Ref. No.	Part No.	Part Name & Description	Remarks
C226	FlG1C1030008	0.01	
C251	FlG1C1030008	0.01	
C252	FlG1C1030008	0.01	
C253	FlG1C1030008	0.01	
C254	FlG1C1030008	0.01	
C255	FlG1C1030008	0.01	
C256	FlG1C1030008	0.01	
C257	FlG1C1030008	0.01	
C258	FlG1C1030008	0.01	
C265	ECUV1A105ZFV	1	
C271	FlG1C1030008	0.01	
C272	FlG1C1030008	0.01	
C273	FlG1C1030008	0.01	
C274	PQCUV1H105JC	1	S
C275	FlG1C1030008	0.01	
C277	FlG1C1030008	0.01	
C278	FlG1C1030008	0.01	
C279	FlG1C1030008	0.01	
C280	ECUV1H103KBV	0.01	
C281	ECUV1H180JCV	18P	
C282	ECUV1H150JCV	15P	
C283	FlG1C1030008	0.01	
C284	FlG1C1030008	0.01	
C287	FlG1C1030008	0.01	
C288	FlG1C1030008	0.01	
C289	FlG1C1030008	0.01	
C290	FlG1C1030008	0.01	
C291	ECUV1C104ZFV	0.1	
C300	FlG1C1030008	0.01	
C301	FlG1C1030008	0.01	
C302	FlG1C1030008	0.01	
C303	FlG1C1030008	0.01	
C304	FlG1C1030008	0.01	
C305	FlG1C1030008	0.01	
C310	FlG1C1030008	0.01	
C400	ECUV1C104ZFV	0.1	
C402	ECUV1H180JCV	18P	
C403	ECUV1H150JCV	15P	
C404	ECUV1H103KBV	0.01	
C405	ECUV1C104ZFV	0.1	
C410	ECUV1C104ZFV	0.1	
C411	ECUV1C105ZFV	1	
C412	PQCUV1A225ZF	2.2	S
C413	F1H1A1050029	1	
C414	ECUV1H220JCV	22P	
C416	ECUV1H220JCV	22P	
C421	ECUV1H100DCV	10P	S
C422	ECUV1H080CCV	8P	
C430	FlG1C1030008	0.01	
C431	FlG1C1030008	0.01	
C432	FlG1C1030008	0.01	
C433	FlG1C1030008	0.01	
C434	FlG1C1030008	0.01	
C500	ECUV1H102KBV	0.001	
C505	FlG1C1030008	0.01	
C506	FlG1C1030008	0.01	
C507	FlG1C1030008	0.01	
C510	FlG1C1030008	0.01	
C511	FlG1C1030008	0.01	
C512	FlG1C1030008	0.01	
C513	FlG1C1030008	0.01	
C514	ECUV1A105ZFV	1	
C516	FlG1C1030008	0.01	
C517	FlG1C1030008	0.01	
C518	FlG1C1030008	0.01	
C519	FlG1C1030008	0.01	
C520	FlG1C1030008	0.01	
C522	FlG1C1030008	0.01	
C524	FlG1C1030008	0.01	
C525	FlG1C1030008	0.01	
C526	FlG1C1030008	0.01	
C527	FlG1C1030008	0.01	
C528	FlG1C1030008	0.01	

Ref. No.	Part No.	Part Name & Description	Remarks
C529	F1G1C1030008	0.01	
C530	F1G1C1030008	0.01	
C531	ECUV1A105ZFV	1	
C600	F2G1E3310005	330	
C601	ECUV1E104ZFV	0.1	
C603	ECUV1E104ZFV	0.1	
C605	ECUV1C104ZFV	0.1	
C606	ECUV1H103KBV	0.01	
C607	ECUV1C104ZFV	0.1	
C608	ECUV1H103KBV	0.01	
C609	ECUV1C104ZFV	0.1	
C611	ECUV1C104ZFV	0.1	
C612	ECUV1C104ZFV	0.1	
C615	F1H1A1050029	1	
C616	ECUV1C104ZFV	0.1	
C617	ECUV1C104ZFV	0.1	
C618	ECUV1C104ZFV	0.1	
C619	ECUV1C104ZFV	0.1	
C620	ECJ1VB1H102K	0.001	
C622	ECUV1C333KBV	0.033	
C624	ECUV1C333KBV	0.033	
C625	ECJ1VB1H102K	0.001	
C626	ECJ1VB1H102K	0.001	
C627	ECJ1VB1H102K	0.001	
C629	ECUV1H332KBV	0.0033	
C630	ECUV1H105ZF	1	S
C631	ECUV1H105ZF	1	S
C632	ECUV1H105ZF	1	S
C633	ECUV1H105ZF	1	S
C634	ECUV1H105ZF	1	S
C635	ECUV1H105ZF	1	S
C641	F1K1A4750013	4.7	
C642	F1K1A4750013	4.7	
C643	F2G1A4710013	470	
C644	ECUV1H121JCV	120P	
C645	ECUV1H121JCV	120P	
C646	ECUV1C104ZFV	0.1	
C647	ECUV1C104ZFV	0.1	
C648	ECUV1H153KBV	0.015	
C649	ECUV1H153KBV	0.015	
C653	F1H1C105A118	1	
C654	ECUV1H101JCV	100P	
C655	ECUV1H101JCV	100P	
C656	ECUV1H101JCV	100P	
C657	ECJ1VB1H102K	0.001	
C658	ECUV1H105ZF	1	S
C659	ECUV1H105ZF	1	S
C660	ECUV1C105ZFV	1	
C661	F1H1C105A118	1	
C662	ECUV1H101JCV	100P	
C663	ECJ1VB1H102K	0.001	
C664	ECUV1H332KBV	0.0033	
C951	ECJ0EC1H221J	220P	
C952	ECJ0EC1H221J	220P	
C954	ECJ0EC1H221J	220P	
C957	ECJ0EC1H221J	220P	
C958	ECJ0EC1H221J	220P	
C959	ECJ0EC1H221J	220P	
C962	ECJ0EC1H221J	220P	
C963	ECJ0EC1H221J	220P	
C964	ECJ0EC1H221J	220P	
C966	ECJ0EC1H221J	220P	
C969	ECJ0EC1H221J	220P	
C970	ECJ0EC1H221J	220P	
C972	ECJ0EC1H221J	220P	
C973	ECJ0EC1H221J	220P	
C974	ECJ0EC1H221J	220P	
C975	ECJ0EC1H221J	220P	
C976	ECJ0EC1H221J	220P	
C995	ECJ0EC1H221J	220P	
C1001	F1G1C1030008	0.01	
C1002	F1G1C1030008	0.01	
C1003	F1G1C1030008	0.01	

Ref. No.	Part No.	Part Name & Description	Remarks
C1004	F1G1C1030008	0.01	
C1005	F1G1C1030008	0.01	
C1006	F1G1C1030008	0.01	
C1007	F1G1C1030008	0.01	
C1008	F1G1C1030008	0.01	
C1009	F1G1C1030008	0.01	
C1010	F1G1C1030008	0.01	
C1011	F1G1C1030008	0.01	
C1012	F1G1C1030008	0.01	
C1013	F1G1C1030008	0.01	
C1014	F1G1C1030008	0.01	
C1025	F1G1C1030008	0.01	
C1026	F1G1C1030008	0.01	
C1027	F1G1C1030008	0.01	
C1028	F1G1C1030008	0.01	
C1029	F1G1C1030008	0.01	
C1030	F1G1C1030008	0.01	
C1031	F1G1C1030008	0.01	
C1032	F1G1C1030008	0.01	
C1033	F1G1C1030008	0.01	
C1034	F1G1C1030008	0.01	
C1035	F1G1C1030008	0.01	
C1036	F1G1C1030008	0.01	
C1037	F1G1C1030008	0.01	
C1038	F1G1C1030008	0.01	
C1039	F1G1C1030008	0.01	
C1040	F1G1C1030008	0.01	
C1041	F1G1C1030008	0.01	
C1042	F1G1C1030008	0.01	
C1043	F1G1C1030008	0.01	
C1044	F1G1C1030008	0.01	
C1045	F1G1C1030008	0.01	
C1046	F1G1C1030008	0.01	
C1047	F1G1C1030008	0.01	
C1048	F1G1C1030008	0.01	
C1049	F1G1C1030008	0.01	
C1050	F1G1C1030008	0.01	
C1051	F1G1C1030008	0.01	
C1108	ECJ0EC1H221J	220P	
C1119	ECJ0EC1H221J	220P	
C1120	ECJ0EC1H221J	220P	
C1121	ECJ0EC1H221J	220P	
C1122	ECJ0EC1H221J	220P	
C1123	ECJ0EC1H221J	220P	
C1124	ECJ0EC1H221J	220P	
C1125	ECJ0EC1H221J	220P	
C1126	ECJ0EC1H221J	220P	
C1127	ECJ0EC1H221J	220P	
C1128	ECJ0EC1H221J	220P	
C1203	ECJ0EC1H221J	220P	
C1205	ECJ0EC1H221J	220P	
C1206	ECJ0EC1H221J	220P	
C1210	ECJ0EC1H221J	220P	
C1211	ECJ0EC1H221J	220P	
C1213	ECJ0EC1H221J	220P	
C1214	ECJ0EC1H221J	220P	
C1215	ECJ0EC1H221J	220P	
C1216	ECJ0EC1H221J	220P	
C1217	ECJ0EC1H221J	220P	
C1218	ECJ0EC1H221J	220P	
C1219	ECJ0EC1H221J	220P	
C1220	ECJ0EC1H221J	220P	
C1221	ECJ0EC1H221J	220P	
C1222	ECJ0EC1H221J	220P	
C1223	ECJ0EC1H221J	220P	
C1224	ECJ0EC1H221J	220P	
C1225	ECJ0EC1H221J	220P	
C1226	ECJ0EC1H221J	220P	
C1227	ECJ0EC1H221J	220P	
C1228	ECJ0EC1H221J	220P	
C1229	ECJ0EC1H221J	220P	
C1230	ECJ0EC1H221J	220P	
C1231	ECJ0EC1H221J	220P	

Ref. No.	Part No.	Part Name & Description	Remarks
C1232	ECJ0EC1H221J	220P	
C1249	ECJ0EC1H221J	220P	
C1250	ECJ0EC1H221J	220P	
C1251	ECJ0EC1H221J	220P	
C1252	F1G1C1030008	0.01	
		(RESISTORS)	
J102	ERJ3GEY0R00	0	
J113	PQ4R18XJ000	0	S
J114	PQ4R18XJ000	0	S
J115	PQ4R18XJ000	0	S
J116	PQ4R18XJ000	0	S
J117	ERJ3GEY0R00	0	
J137	ERJ3GEY0R00	0	
J203	ERJ3GEY0R00	0	
J205	ERJ3GEY0R00	0	
J209	ERJ3GEY0R00	0	
J211	ERJ3GEY0R00	0	
J212	ERJ3GEY0R00	0	
J213	ERJ3GEY0R00	0	
J214	ERJ3GEY0R00	0	
J217	ERJ3GEY0R00	0	
J219	ERJ3GEY0R00	0	
J301	ERJ3GEY0R00	0	
J501	ERJ3GEY0R00	0	
J502	ERJ3GEY0R00	0	
J504	ERJ3GEY0R00	0	
J506	ERJ3GEY0R00	0	
J510	ERJ3GEY0R00	0	
J520	ERJ3GEY0R00	0	
L225	ERJ3GEY0R00	0	
L226	ERJ3GEY0R00	0	
L227	ERJ3GEY0R00	0	
L229	ERJ3GEY0R00	0	
R103	ERJ3GEYJ330	33	
R107	ERJ3GEYJ330	33	
R109	ERJ3GEYJ103	10K	
R110	ERJ3GEYJ470	47	
R111	ERJ3GEYJ680	68	
R112	ERJ3GEYJ101	100	
R113	ERJ3GEYJ101	100	
R115	ERJ3GEYJ103	10K	
R116	ERJ3GEYJ330	33	
R119	ERJ3GEYJ103	10K	
R120	ERJ3GEYJ681	680	
R121	ERJ3GEYJ681	680	
R128	ERJ3GEYJ470	47	
R133	ERJ3GEYJ470	47	
R134	ERJ3GEYJ680	68	
R135	ERJ3GEYJ102	1K	
R136	ERJ3GEYJ681	680	
R137	ERJ3GEYJ102	1K	
R138	ERJ3GEYJ222	2.2K	
R139	ERJ3GEYJ222	2.2K	
R140	ERJ3GEYJ821	820	
R141	ERJ3GEYJ821	820	
R142	ERJ3GEYJ821	820	
R143	ERJ3GEYJ821	820	
R144	ERJ3GEYJ821	820	
R145	ERJ3GEYJ821	820	
R146	ERJ3GEYJ821	820	
R147	ERJ3GEYJ220	22	
R148	ERJ3GEYJ101	100	
R149	ERJ3GEYJ101	100	
R150	ERJ3GEY0R00	0	
R152	ERJ3GEYJ103	10K	
R153	ERJ3GEYJ103	10K	
R154	ERJ3GEYJ103	10K	
R155	ERJ3GEYJ103	10K	
R156	ERJ3GEYJ103	10K	
R157	ERJ3GEYJ103	10K	
R158	ERJ3GEYJ103	10K	
R159	ERJ3GEYJ103	10K	
R160	ERJ3GEYJ103	10K	

Ref. No.	Part No.	Part Name & Description	Remarks
R161	ERJ3GEYJ103	10K	
R162	ERJ3GEYJ103	10K	
R163	ERJ3GEY0R00	0	
R164	ERJ3GEYJ220	22	
R165	ERJ3GEYJ220	22	
R166	ERJ3GEYJ220	22	
R167	ERJ3GEYJ680	68	
R168	ERJ3GEYJ103	10K	
R169	ERJ3GEYJ102	1K	
R170	ERJ3GEYJ103	10K	
R171	ERJ3GEYJ103	10K	
R172	ERJ3GEYJ102	1K	
R173	ERJ3GEYJ102	1K	
R174	ERJ3GEYJ102	1K	
R175	ERJ3GEYJ222	2.2K	
R176	ERJ3GEYJ223	22K	
R177	ERJ3GEYJ102	1K	
R178	ERJ3GEYJ102	1K	
R179	ERJ3GEYJ101	100	
R180	ERJ3GEYJ470	47	
R181	ERJ3GEYJ101	100	
R185	ERJ3GEYJ101	100	
R186	ERJ3GEYJ103	10K	
R200	ERJ3GEYJ680	68	
R201	ERJ3GEYJ680	68	
R202	ERJ3GEYJ680	68	
R203	ERJ3GEYJ103	10K	
R204	ERJ3GEYJ100	10	
R205	ERJ3GEYJ680	68	
R206	ERJ3GEYJ680	68	
R207	ERJ3GEYJ680	68	
R208	ERJ3GEYJ471	470	
R209	ERJ3GEYJ103	10K	
R210	ERJ3GEYJ103	10K	
R211	ERJ3GEYJ103	10K	
R213	ERJ3GEYJ680	68	
R214	ERJ3GEYJ680	68	
R215	ERJ3GEYJ680	68	
R216	ERJ3GEYJ680	68	
R217	ERJ3GEYJ680	68	
R218	ERJ3GEYJ680	68	
R219	ERJ3GEYJ103	10K	
R220	ERJ3GEYJ680	68	
R221	ERJ3GEYJ680	68	
R222	ERJ3GEYJ470	47	
R223	ERJ3GEYJ680	68	
R224	ERJ3GEYJ680	68	
R225	ERJ3GEYJ470	47	
R226	ERJ3GEYJ470	47	
R227	ERJ3GEYJ680	68	
R228	ERJ3GEYJ680	68	
R229	ERJ3GEYJ680	68	
R230	ERJ3GEYJ103	10K	
R232	ERJ3GEY0R00	0	
R233	ERJ3GEY0R00	0	
R234	ERJ3GEYJ103	10K	
R235	ERJ3GEYJ220	22	
R236	ERJ3GEYJ103	10K	
R237	ERJ3GEYJ220	22	
R239	ERJ3GEYJ102	1K	
R241	ERJ3GEYJ680	68	
R242	ERJ3GEYJ680	68	
R243	ERJ3GEYJ680	68	
R246	ERJ3GEYJ103	10K	
R247	ERJ3GEYJ103	10K	
R250	ERJ3GEYJ330	33	
R251	ERJ3GEYJ472	4.7K	
R252	ERJ3GEYJ472	4.7K	
R253	ERJ3GEYJ220	22	
R254	ERJ3GEY0R00	0	
R255	ERJ3GEYJ220	22	
R256	ERJ3GEYJ220	22	
R257	ERJ3GEYJ100	10	

Ref. No.	Part No.	Part Name & Description	Remarks
R259	ERJ3GEYJ103	10K	
R261	ERJ3GEYJ103	10K	
R262	ERJ3GEYJ103	10K	
R264	ERJ3GEYJ100	10	
R265	ERJ3GEYJ103	10K	
R267	ERJ3GEYJ103	10K	
R270	ERJ3GEYJ103	10K	
R273	ERJ3GEYJ680	68	
R274	ERJ3GEYJ680	68	
R275	ERJ3GEYJ680	68	
R276	ERJ3GEYJ680	68	
R277	ERJ3GEYJ680	68	
R278	ERJ3GEYJ680	68	
R279	ERJ3GEYJ103	10K	
R280	ERJ3GEYJ103	10K	
R281	ERJ3GEYJ103	10K	
R282	ERJ3GEYJ220	22	
R283	ERJ3GEY0R00	0	
R284	ERJ3GEYJ103	10K	
R287	ERJ3GEYJ102	1K	
R288	ERJ3GEYJ103	10K	
R289	ERJ3GEY0R00	0	
R290	ERJ3GEY0R00	0	
R291	ERJ3GEYJ472	4.7K	
R294	ERJ3GEYJ330	33	
R295	ERJ3GEYJ330	33	
R296	ERJ3GEYJ330	33	
R297	ERJ3GEYJ470	47	
R299	ERJ3GEYJ103	10K	
R302	ERJ3GEYJ470	47	
R303	ERJ3GEYJ470	47	
R304	ERJ3GEYJ470	47	
R305	ERJ3GEYJ470	47	
R307	ERJ3GEYJ102	1K	
R308	ERJ3GEYJ102	1K	
R312	ERJ3GEYJ103	10K	
R313	ERJ3GEYJ332	3.3K	
R321	ERJ3GEYJ470	47	
R322	ERJ3GEYJ470	47	
R323	ERJ3GEYJ470	47	
R400	ERJ3GEYJ105	1M	
R401	ERJ3GEYJ102	1K	
R403	ERJ3GEYJ330	33	
R407	ERJ3GEYJ104	100K	
R409	ERJ3GEYJ473	47K	
R410	ERJ3GEYJ103	10K	
R411	ERJ3GEY0R00	0	
R413	ERJ3GEYJ562	5.6K	
R414	ERJ3GEYJ104	100K	
R415	ERJ3GEYJ105	1M	
R416	ERJ3GEYJ100	10	
R417	ERJ3GEYJ152	1.5K	
R418	ERJ3GEYJ220	22	
R419	ERJ3GEYJ220	22	
R420	ERJ3GEY0R00	0	
R501	ERJ3GEYJ103	10K	
R502	ERJ3GEYJ103	10K	
R503	ERJ3GEYJ103	10K	
R504	ERJ3GEYJ103	10K	
R505	ERJ3GEYJ103	10K	
R506	ERJ3GEYJ103	10K	
R507	ERJ3GEYJ103	10K	
R508	ERJ3GEYJ103	10K	
R509	ERJ3GEYJ472	4.7K	
R600	ERJ3GEYJ103	10K	
R602	ERJ3GEYJ560	56	
R603	ERJ3GEYJ222	2.2K	
R604	ERJ3GEYJ222	2.2K	
R605	ERJ3GEY0R00	0	
R606	ERJ3GEYJ681	680	
R607	ERJ3GEYJ681	680	
R608	ERJ3GEYJ563	56K	
R609	ERJ3GEYJ563	56K	

Ref. No.	Part No.	Part Name & Description	Remarks
R610	ERJ3GEYJ561	560	
R611	ERJ3GEYJ561	560	
R612	ERJ3GEYJ104	100K	
R613	ERJ3GEYJ473	47K	
R614	ERJ3GEYJ682	6.8K	
R615	ERJ3GEYJ102	1K	
R617	ERJ3GEYJ106	10M	
R619	ERJ3GEYJ222	2.2K	
R620	ERJ3GEYJ333	33K	
R621	ERJ3GEYJ223	22K	
R622	ERJ3GEYJ223	22K	
R623	ERJ3GEYJ223	22K	
R624	ERJ3GEYJ103	10K	
R625	ERJ3GEYJ103	10K	
R626	ERJ3GEYJ823	82K	
R627	ERJ3GEYJ823	82K	
R628	ERJ3GEYJ103	10K	
R629	ERJ3GEYJ103	10K	
R630	ERJ3GEYJ222	2.2K	
R631	ERJ3GEYJ223	22K	
R632	ERJ3GEYJ223	22K	
R633	ERJ3GEYJ223	22K	
R634	ERJ3GEYJ472	4.7K	
R635	ERJ3GEYJ472	4.7K	
R636	ERJ3GEYJ224	220K	
R637	ERJ3GEYJ224	220K	
R638	ERJ3GEYJ222	2.2K	
R639	ERJ3GEYJ222	2.2K	
R640	ERJ3GEYJ563	56K	
R641	ERJ3GEYJ563	56K	
R642	ERJ3GEYJ104	100K	
R643	ERJ3GEYJ104	100K	
R644	ERJ3GEYJ561	560	
R645	ERJ3GEYJ561	560	
R646	ERJ3GEYJ103	10K	
R647	ERJ3GEYJ103	10K	
R648	ERJ3GEYJ106	10M	
R649	ERJ3GEYJ472	4.7K	
R651	ERJ3GEYJ333	33K	
R652	ERJ3GEYJ105	1M	
R653	ERJ3GEYJ105	1M	
R654	ERJ3GEYJ823	82K	
R655	ERJ3GEYJ823	82K	
R656	ERJ3GEYJ222	2.2K	
R657	ERJ3GEYJ223	22K	
R658	ERJ3GEYJ473	47K	
R659	ERJ3GEYJ0R00	0	
R660	ERJ3GEYJ473	47K	
R661	ERJ3GEYJ0R00	0	
R662	ERJ3GEYJ103	10K	
R723	ERJ3GEYJ103	10K	
R732	ERJ3GEY0R00	0	
		(OTHERS)	
E1	PQDF996Z	SHAFT	
E2	PQHR10005Z	SPACER	
E3	PQUB14Z2	LEVER	PA (V0)
E4	PSGE1005Z	COVER, SD	ABS (HB)
E5	PSGE1006Z	COVER, SD	ABS (HB)
E6	PSHD1088Z	SCREW	
E7	PSHE1122Z	SPACER	
E8	PSMH1208Y	PANEL, FRONT	
E9	PSUS1020Z	TORSION SPRING	
E10	PSUS1021Y	TORSION SPRING	
E11	XUC25VW	RETAINING RING	
E12	XYN3+F6FJ	SCREW	

17.4. BB-B1 BOARD PARTS

Ref. No.	Part No.	Part Name & Description	Remarks
PCB2	PSWP2DA600BX	BB-B1 (BACK/LED) ASS'Y (RTL)	
		(DIODES)	
LED201	LN316GP	LED	

Ref. No.	Part No.	Part Name & Description	Remarks
LED202	LN216RP	LED	
		(CONNECTORS)	
CN100	K1KB44AA0147	CONNECTOR, 44P	
CN101	K1KB90A00020	CONNECTOR, 90P	
CN102	K1KB90A00020	CONNECTOR, 90P	
CN103	K1KB90A00020	CONNECTOR, 90P	
CN104	K1KB90A00020	CONNECTOR, 90P	
CN105	K1KB90A00020	CONNECTOR, 90P	
CN106	K1KB90A00020	CONNECTOR, 90P	
CN107	K1KB90A00020	CONNECTOR, 90P	
CN108	K1KB90A00020	CONNECTOR, 90P	
CN109	K1KB90A00020	CONNECTOR, 90P	
CN110	K1KB90A00020	CONNECTOR, 90P	
CN111	K1KB90A00020	CONNECTOR, 90P	
CN112	K1KB90A00020	CONNECTOR, 90P	
CN113	K1KA09B00121	CONNECTOR, 9P	
CN114	K1KA03BA0055	CONNECTOR, 3P	
CN115	K1KA04BA0055	CONNECTOR, 4P	
CN201	K1KA03AA0258	CONNECTOR, 3P	
		(RESISTOR)	
R400	ERG2SJ220	22	
		(OTHER)	
E21	PSHRL276Z	SPACER, LED	

17.5. BB-B2 BOARD PARTS

Ref. No.	Part No.	Part Name & Description	Remarks
PCB3	PSWP3DA600BX	BB-B2 BOARD ASS'Y (RTL)	
		(CONNECTORS)	
CN301	K1KA80A00132	CONNECTOR, 80P	
CN302	K1KA80A00132	CONNECTOR, 80P	

17.6. FIXTURES AND TOOLS

Ref. No.	Part No.	Part Name & Description	Remarks
EC1	PSZZ1TDA600BX	EXTENSION BOARD (FOR EMPR CARD)	
EC2	PSZZ2TDA600BX	EXTENSION BOARD (FOR BUS-S CARD)	
EC3	PSZZ2TDA100M	EXTENSION BOARD (FOR LINE CARD)	

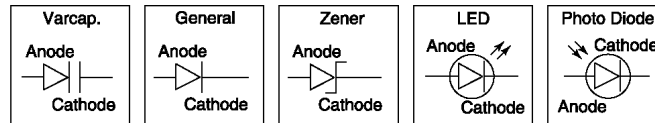
Note:

EC1, EC2 and EC3 are necessity for servicing.

18 FOR THE SCHEMATIC DIAGRAM

Note:

1. DC voltage measurements are taken with an oscilloscope or a tester with a ground.
2. The schematic diagrams and circuit board may be modified at any time with the development of new technology.

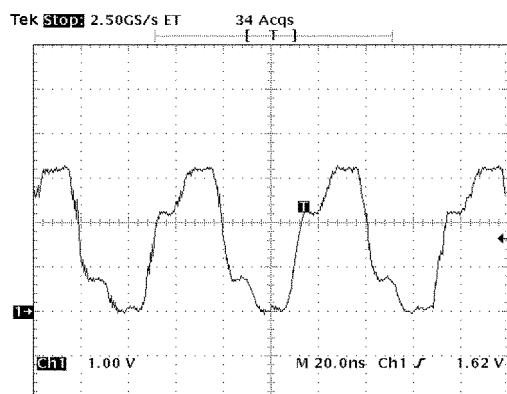


Important safety notice

Components identified by ⚠ mark have special characteristics important for safety. When replacing any of these components, use only manufacturer's specified parts.

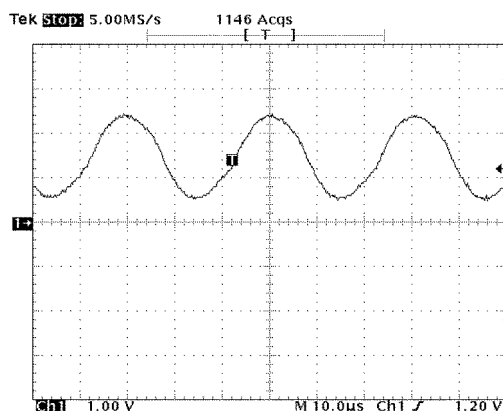
18.1. WAVEFORM

Waveform ①



16.384MHz

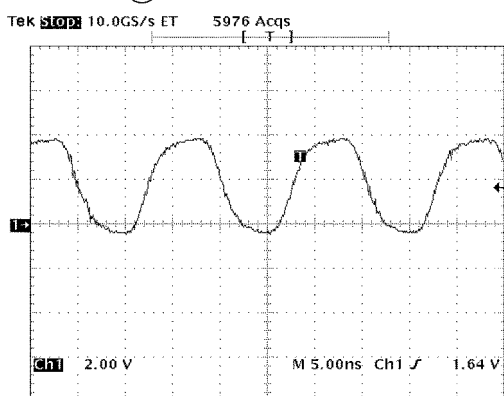
Waveform ②



32.768kHz

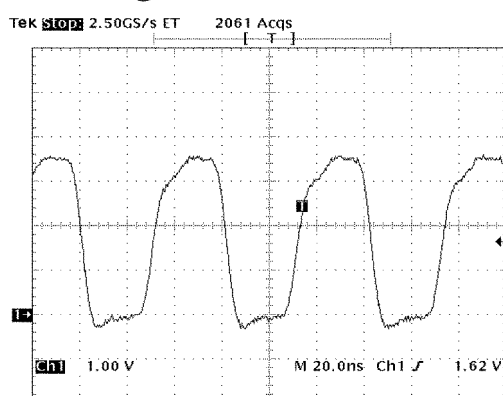
19 Aug 2005
13:02:20

Waveform ③



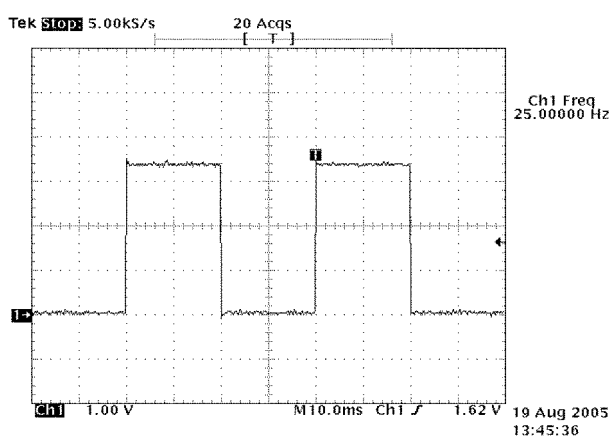
65.536MHz

Waveform ④



16.384MHz

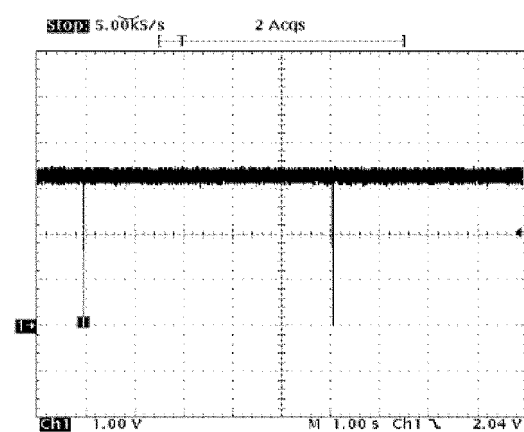
Waveform ⑤

19 Aug 2005
13:45:36

Switching the frequency of 20Hz/25Hz is possible by the soft setting.

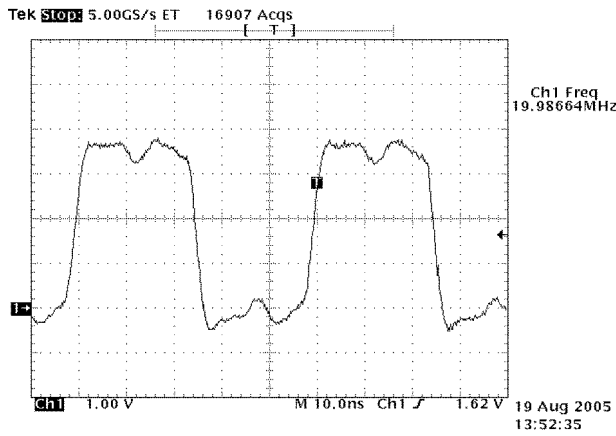
The above-mentioned waveform is the example of 20Hz.

Waveform ⑥



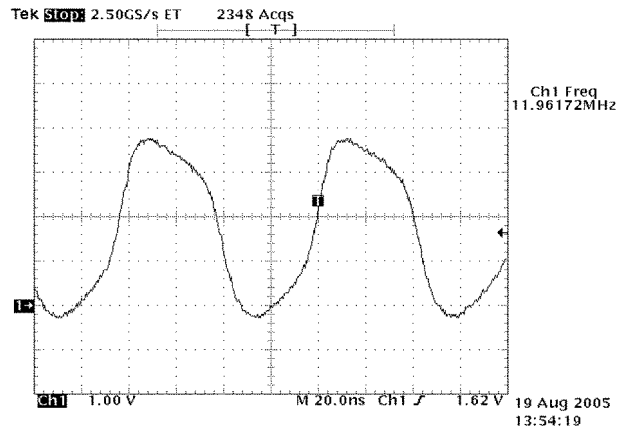
Switching the pulse spacing of 2976msec/3840msec /4992msec/5120msec is possible by the soft setting.
The above-mentioned waveform is the example of 5120msec.

Waveform ⑦



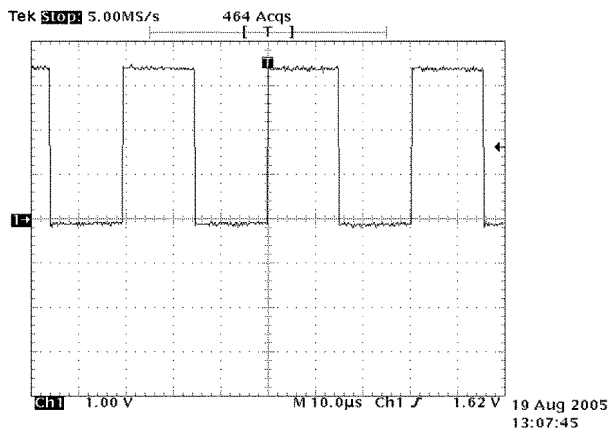
20MHz

Waveform ⑧



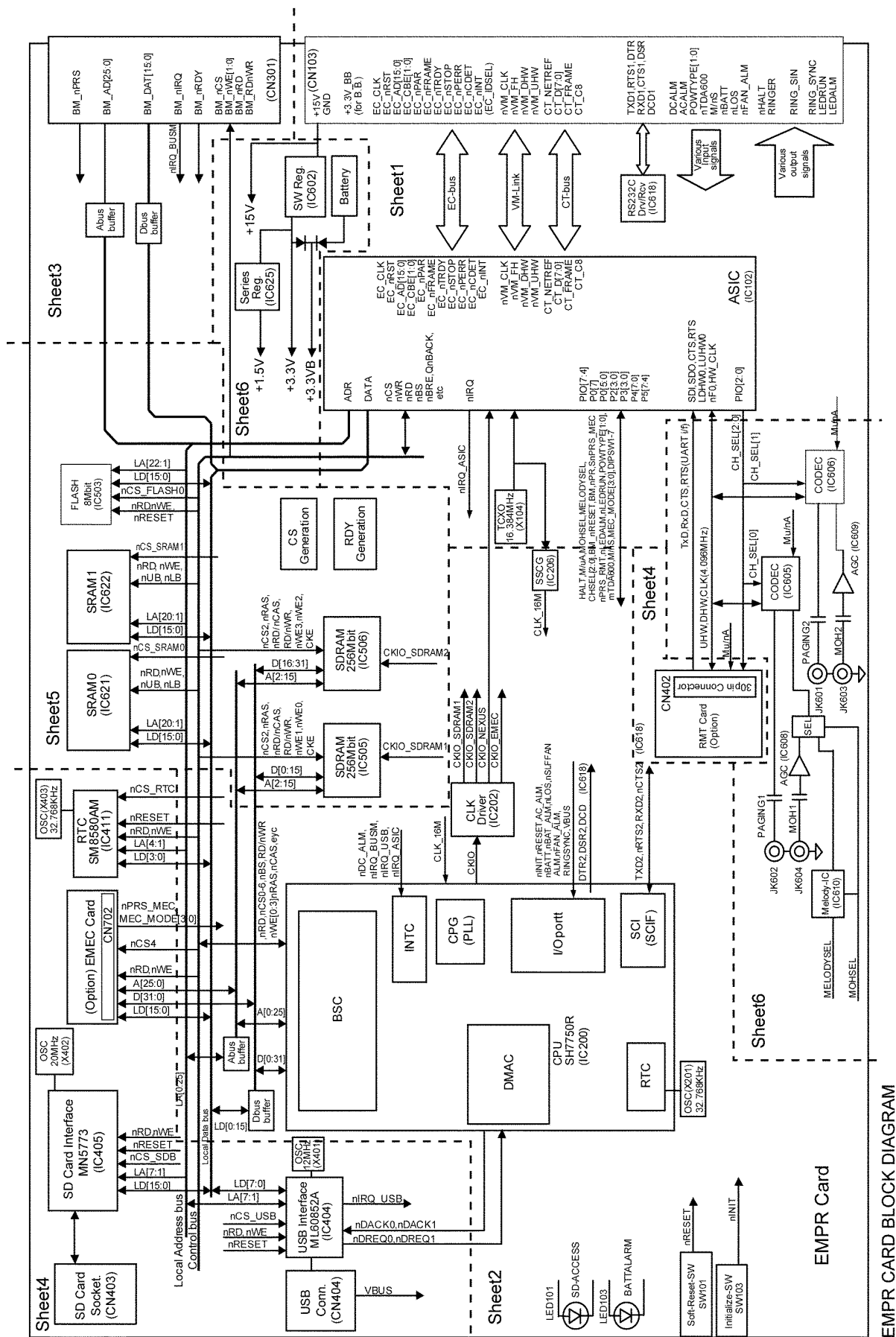
12MHz

Waveform ⑨



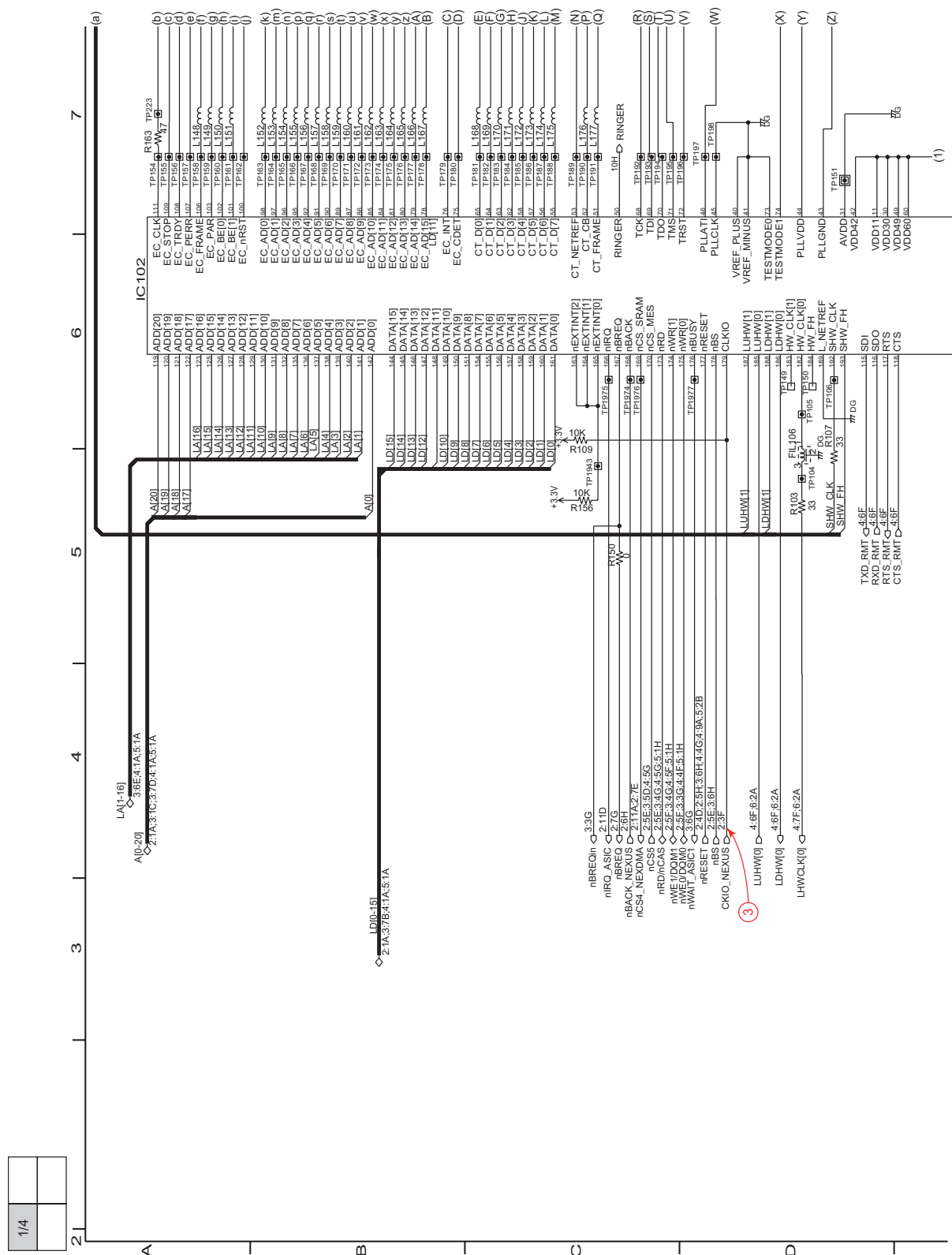
32.768kHz

18.2. EMPR BLOCK DIAGRAM

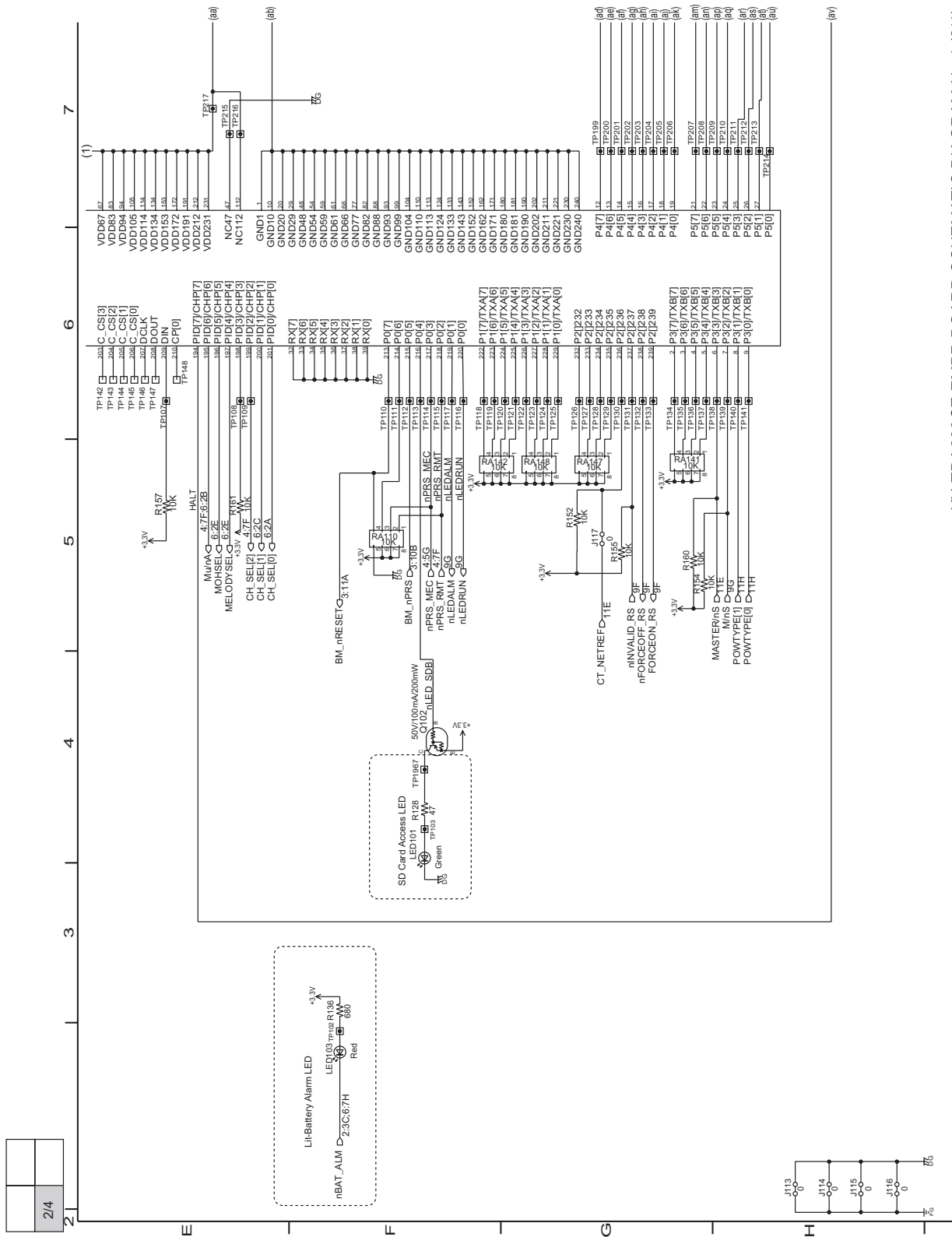


19 SCHEMATIC DIAGRAM

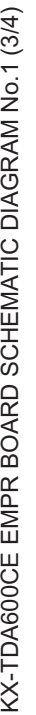
19.1. EMPR CARD No.1



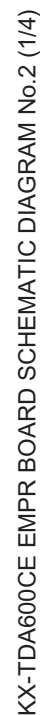
KX-TDA600CE EMPR BOARD SCHEMATIC DIAGRAM No.1 (1/4)

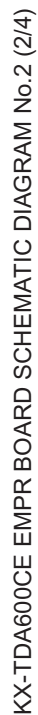


KX-TDA600CE EMPR BOARD SCHEMATIC DIAGRAM No.1 (2/4)

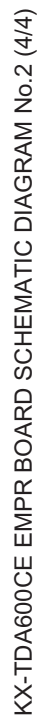




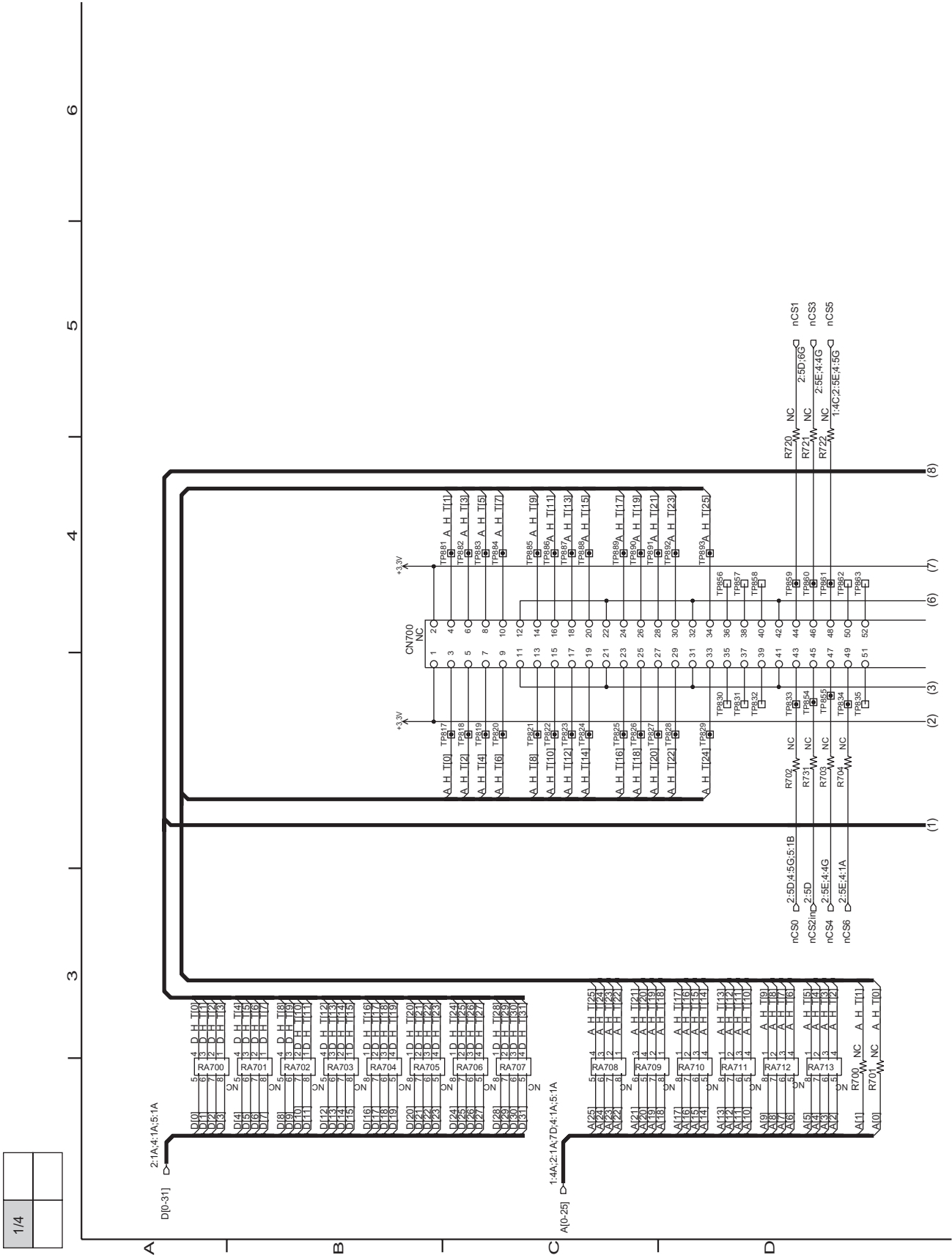




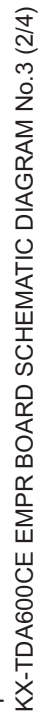


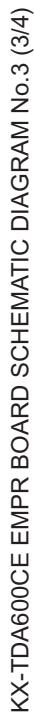


19.3. EMPR CARD No.3



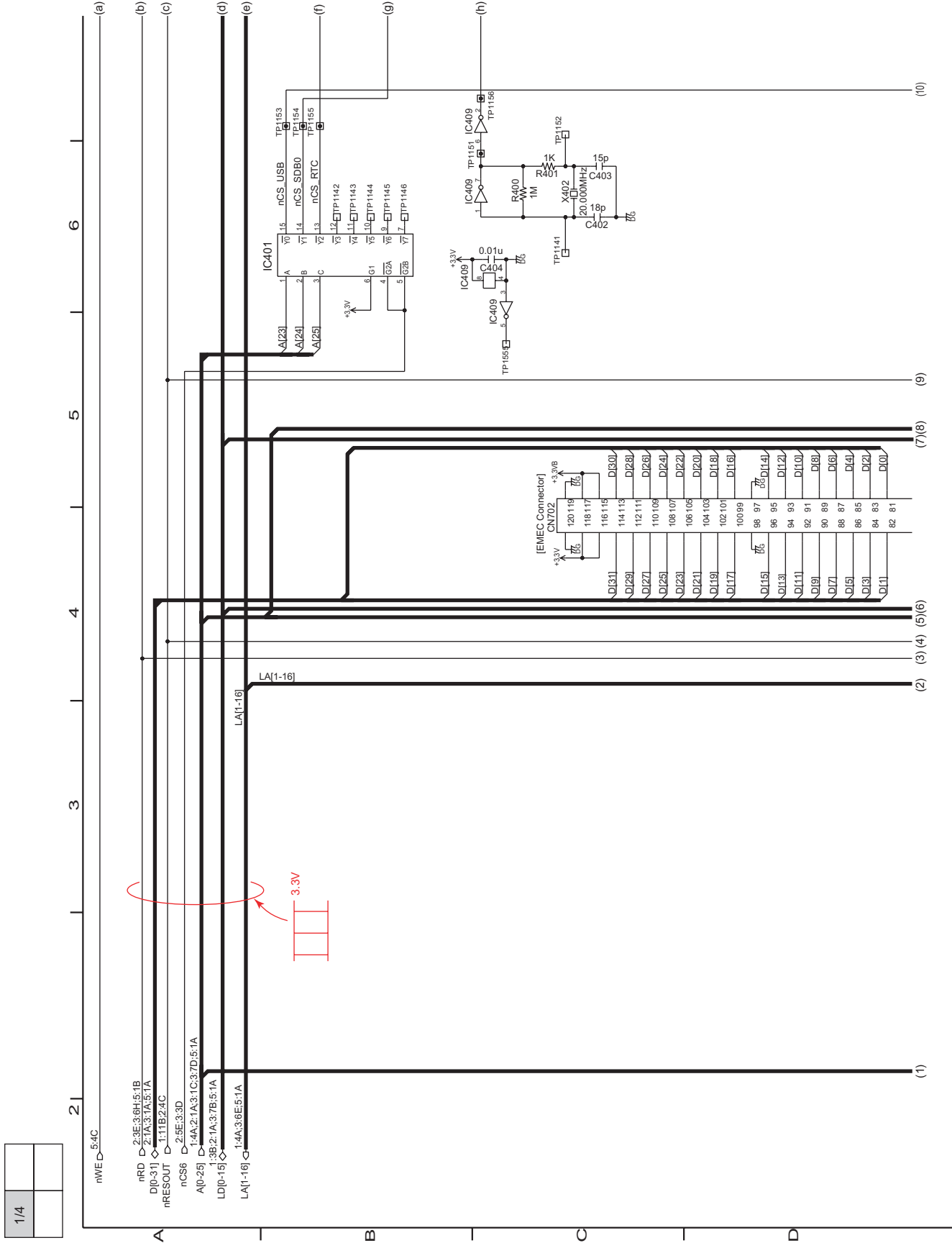
KX-TDA600CE EMPR BOARD SCHEMATIC DIAGRAM No.3 (1/4)



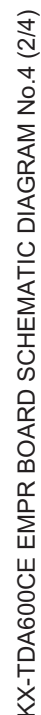




19.4. EMPR CARD No.4

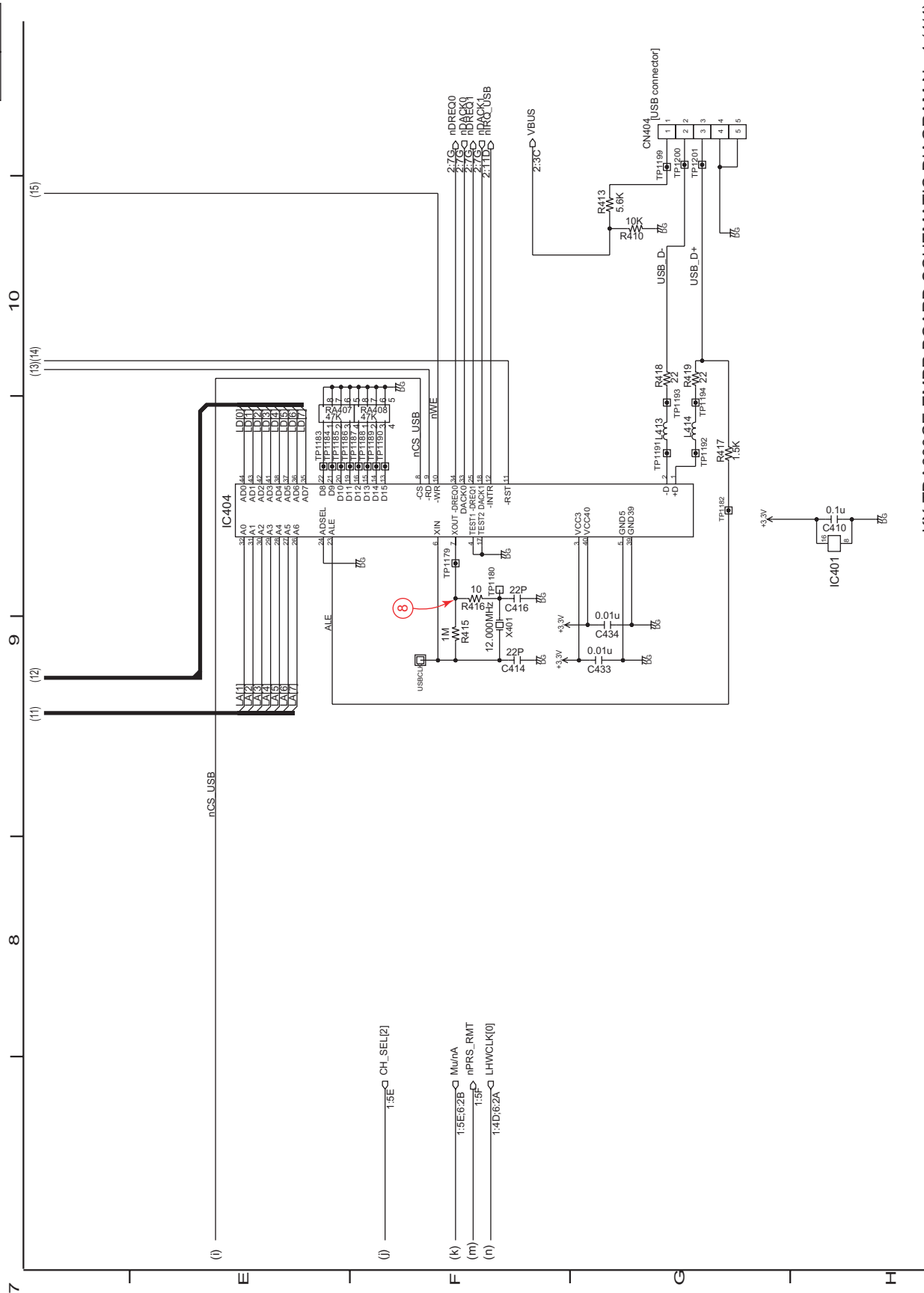


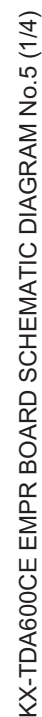
KX-TDA600CE EMPR BOARD SCHEMATIC DIAGRAM No.4 (1/4)



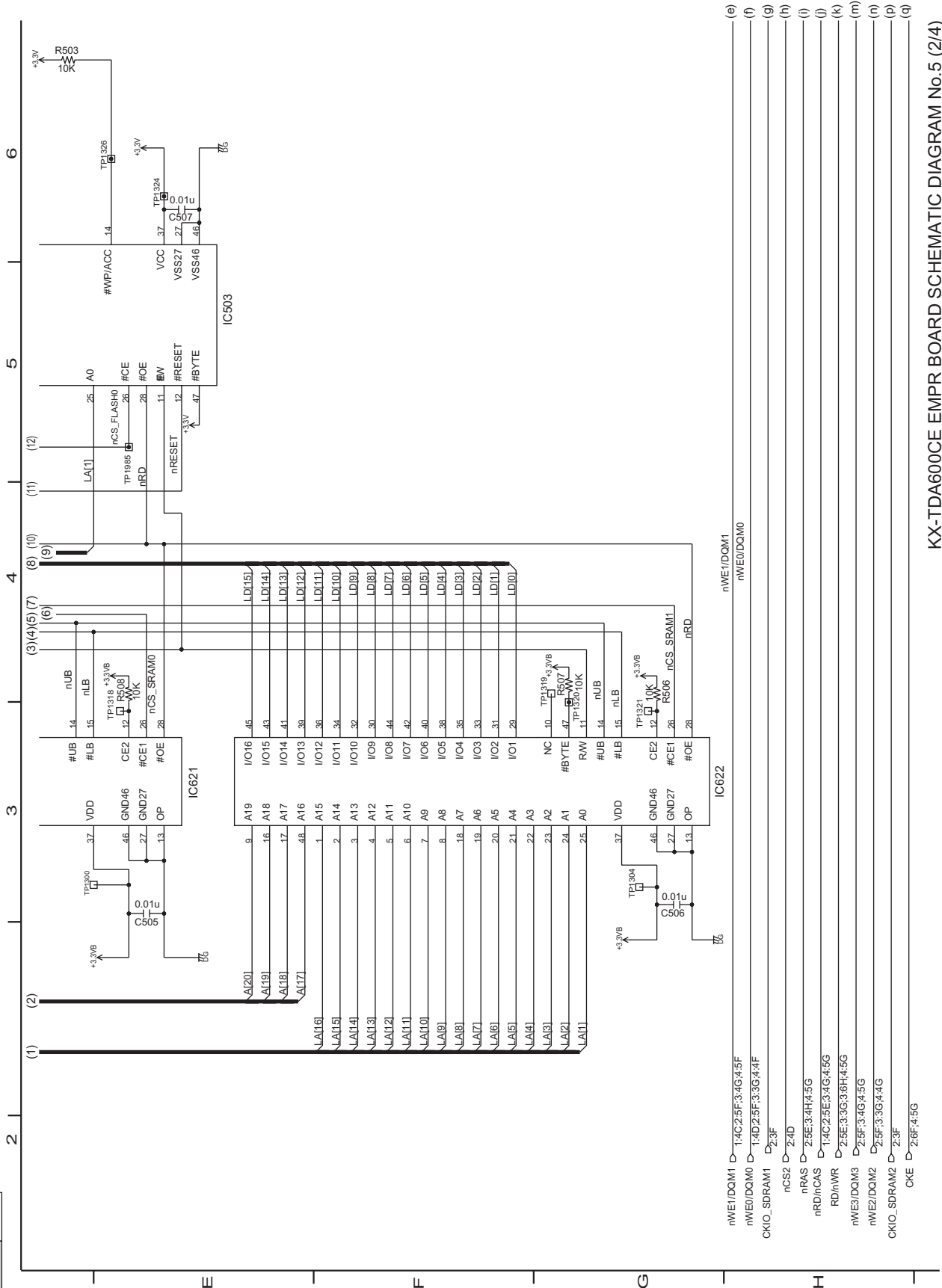


KX-TDA600CE EMPR BOARD SCHEMATIC DIAGRAM No.4 (3/4)

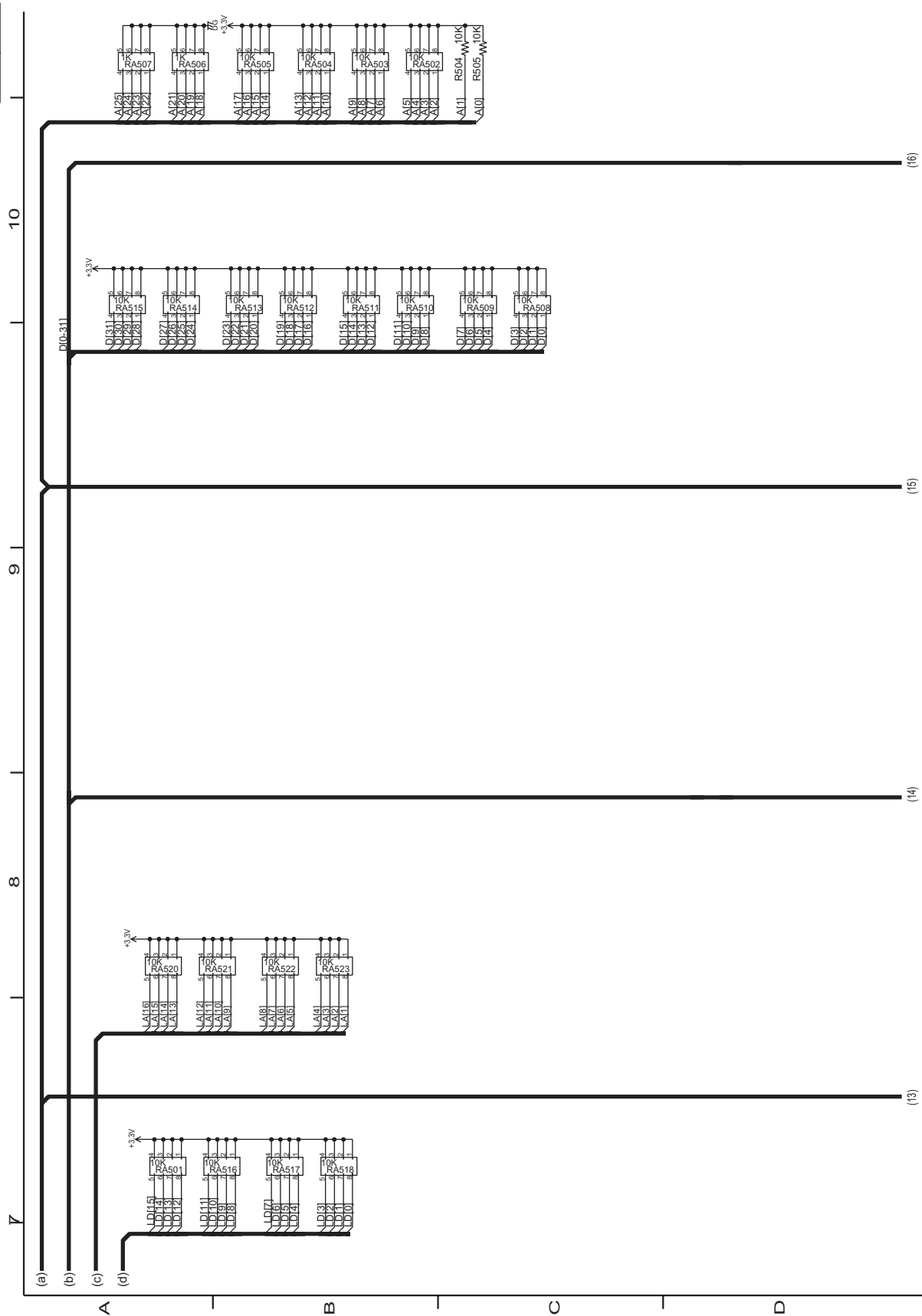




2/4	



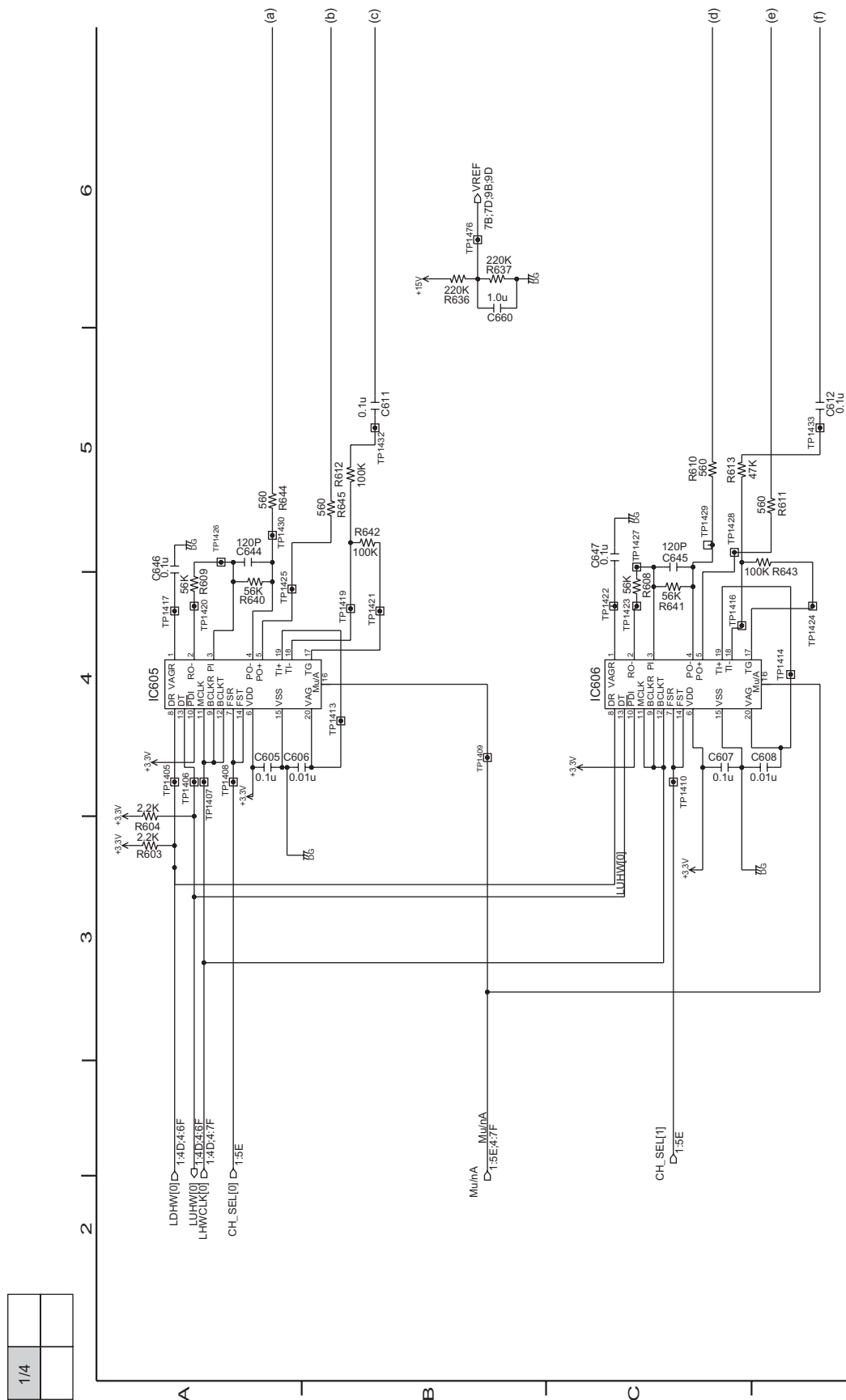
KX-TDA600CE EMPR BOARD SCHEMATIC DIAGRAM No.5 (2/4)



KX-TDA600CE EMPR BOARD SCHEMATIC DIAGRAM No.5 (3/4)



19.6. EMPR CARD No.6

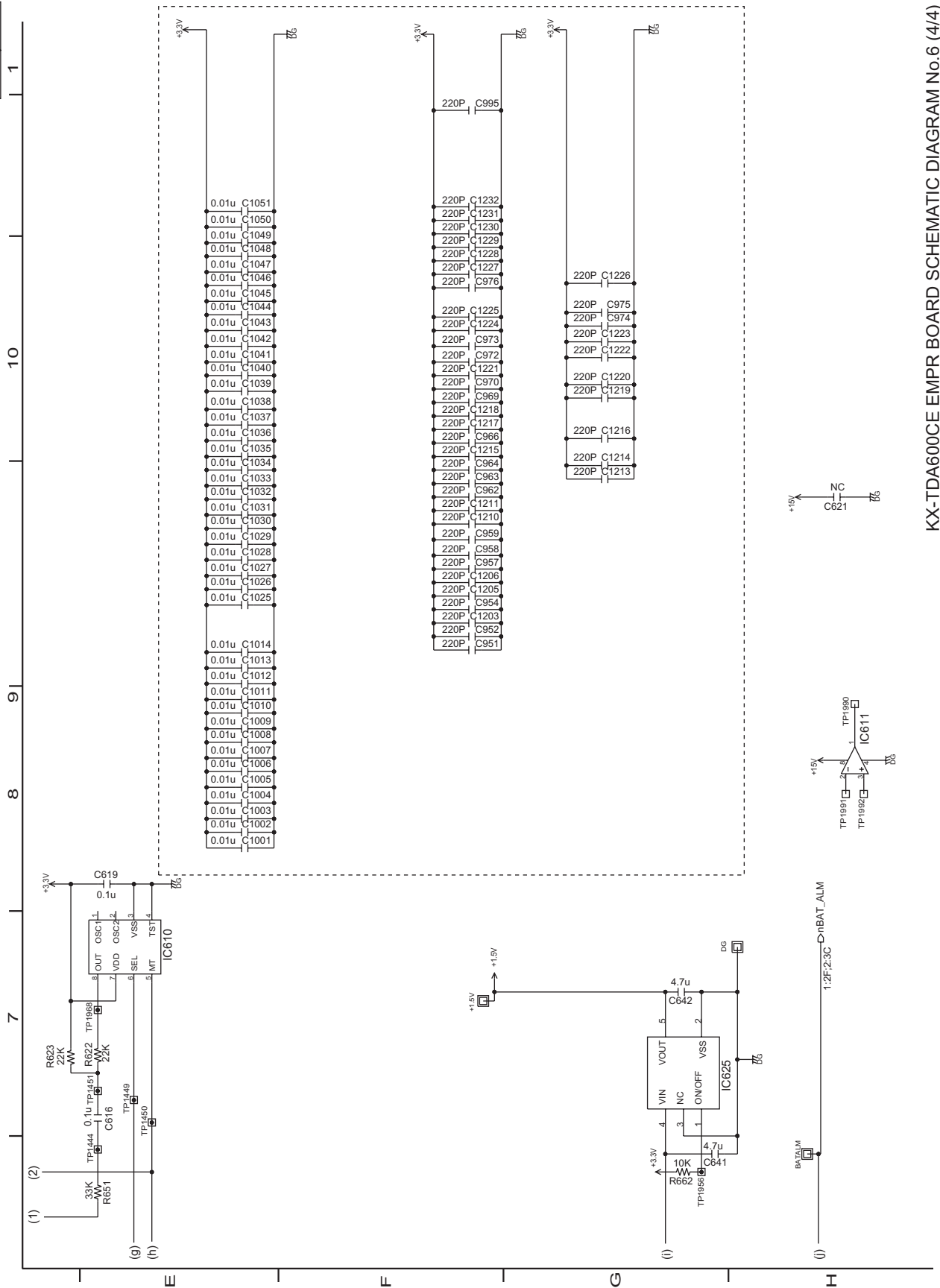


KXX-TDA600CE EMPR BOARD SCHEMATIC DIAGRAM No.6 (1/4)

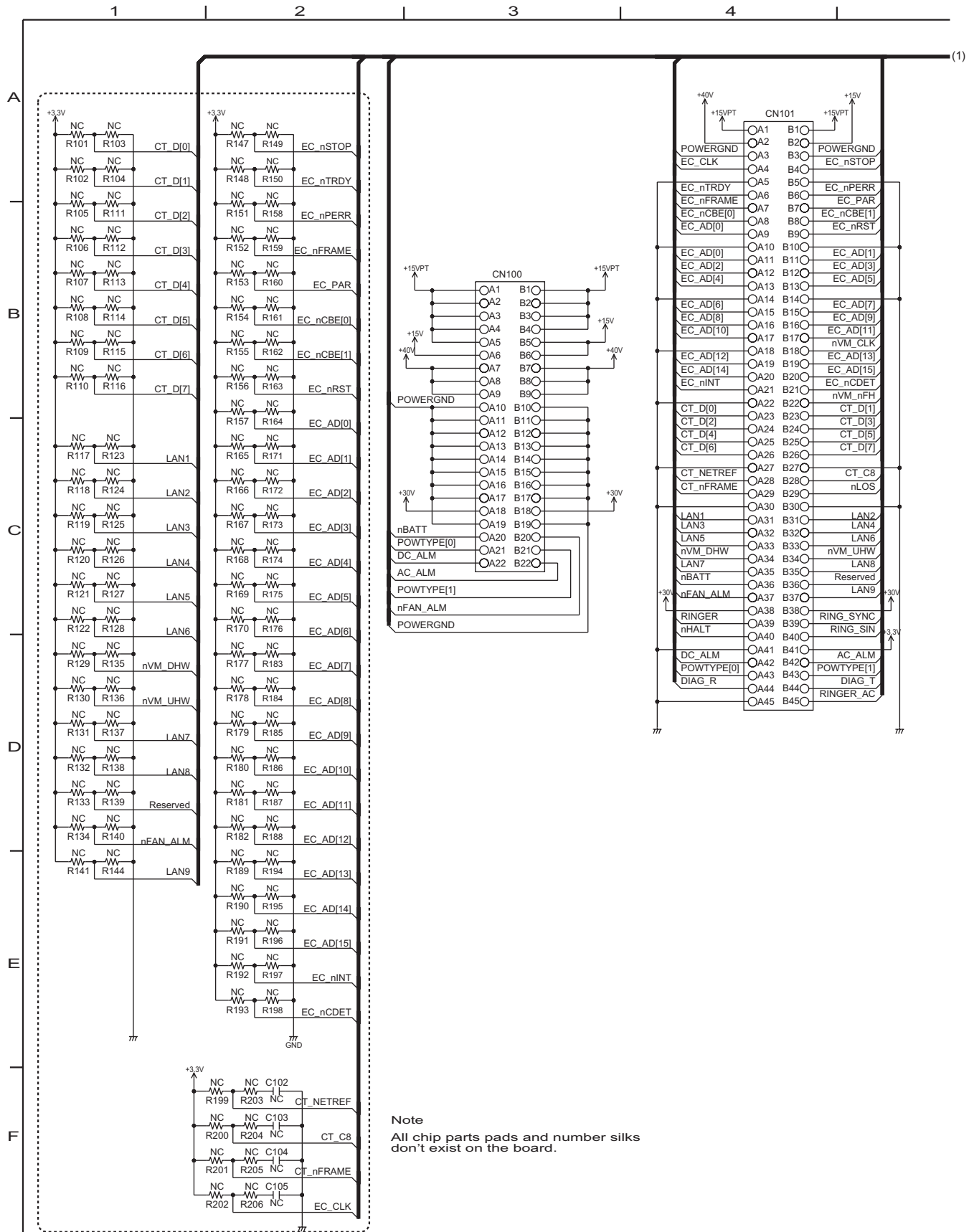




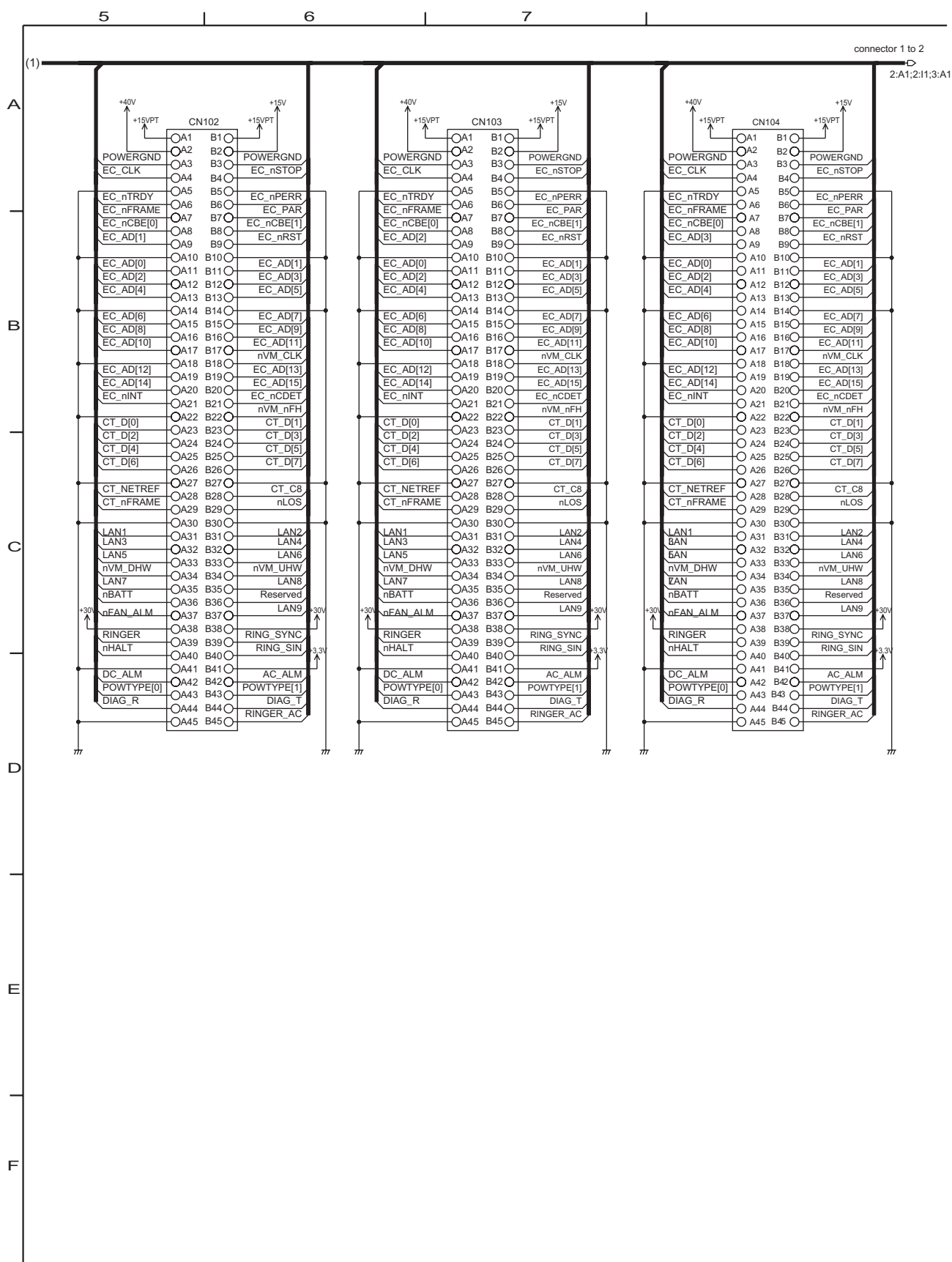
		4/4
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19.7. BB-B1 BOARD No.1

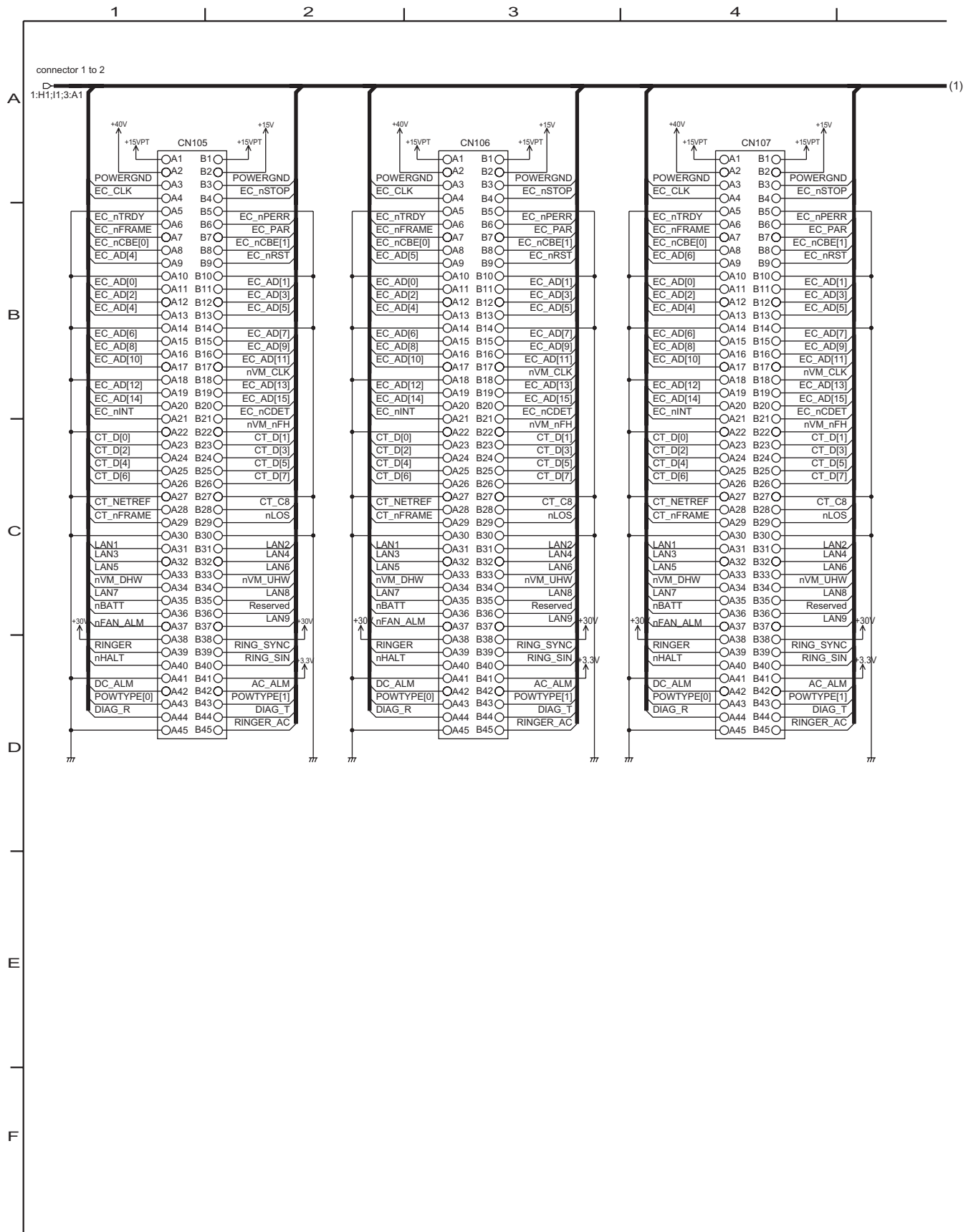


KX-TDA600CE BB-B1 BOARD SCHEMATIC DIAGRAM No.1 (1/2)

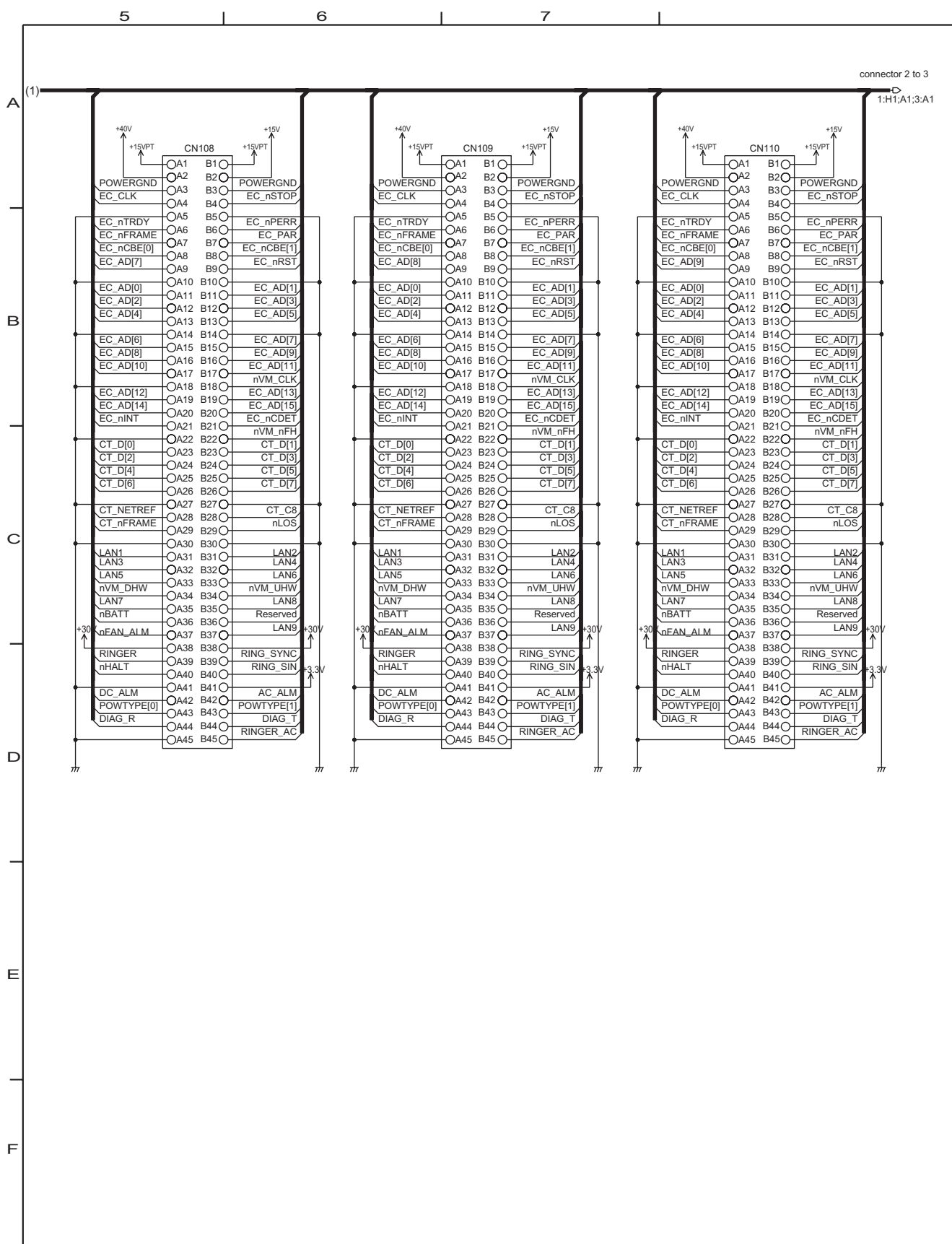


KX-TDA600CE BB-B1 BOARD SCHEMATIC DIAGRAM No.1 (2/2)

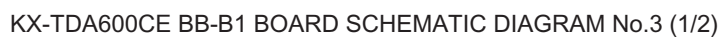
19.8. BB-B1 BOARD No.2

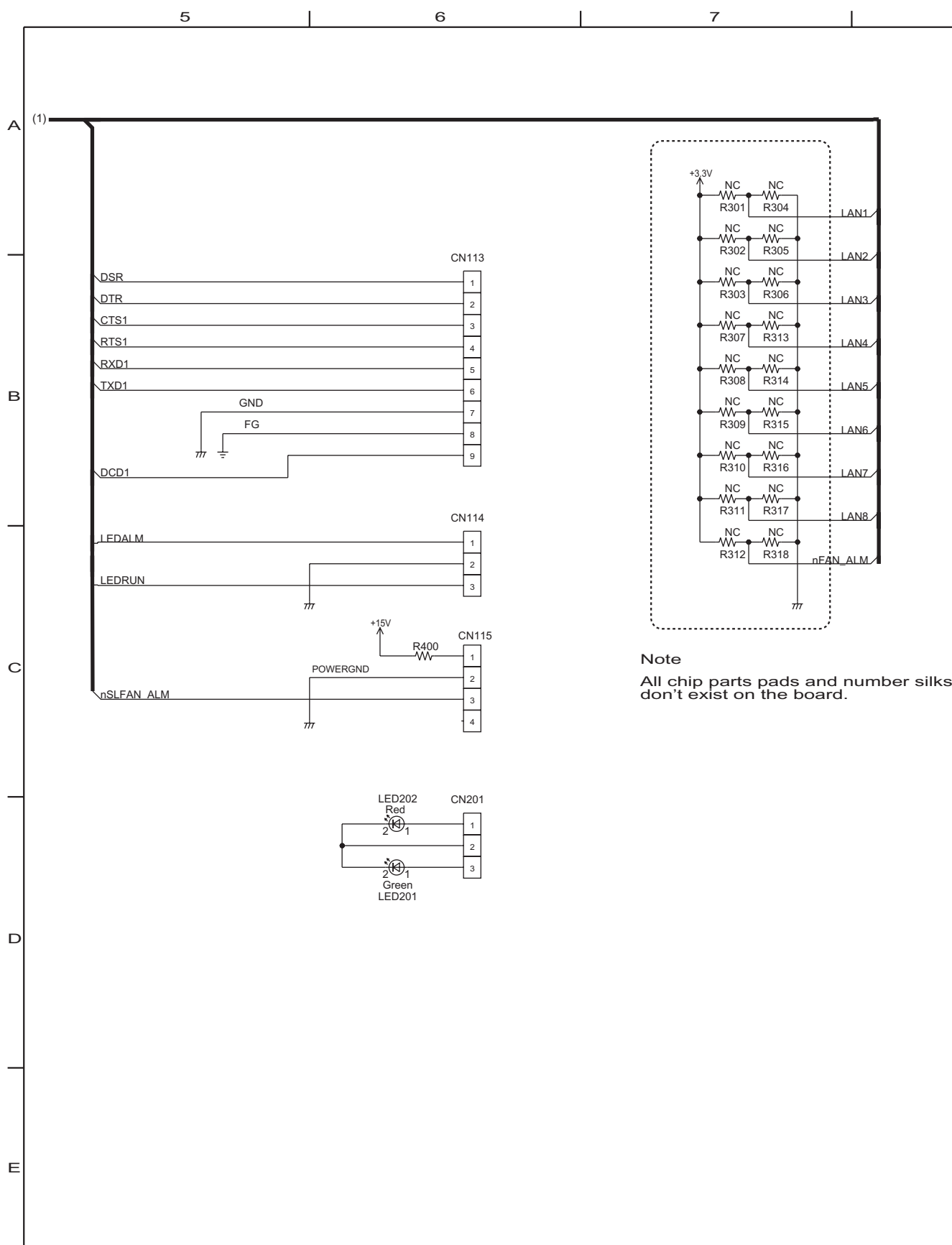


KX-TDA600CE BB-B1 BOARD SCHEMATIC DIAGRAM No.2 (1/2)

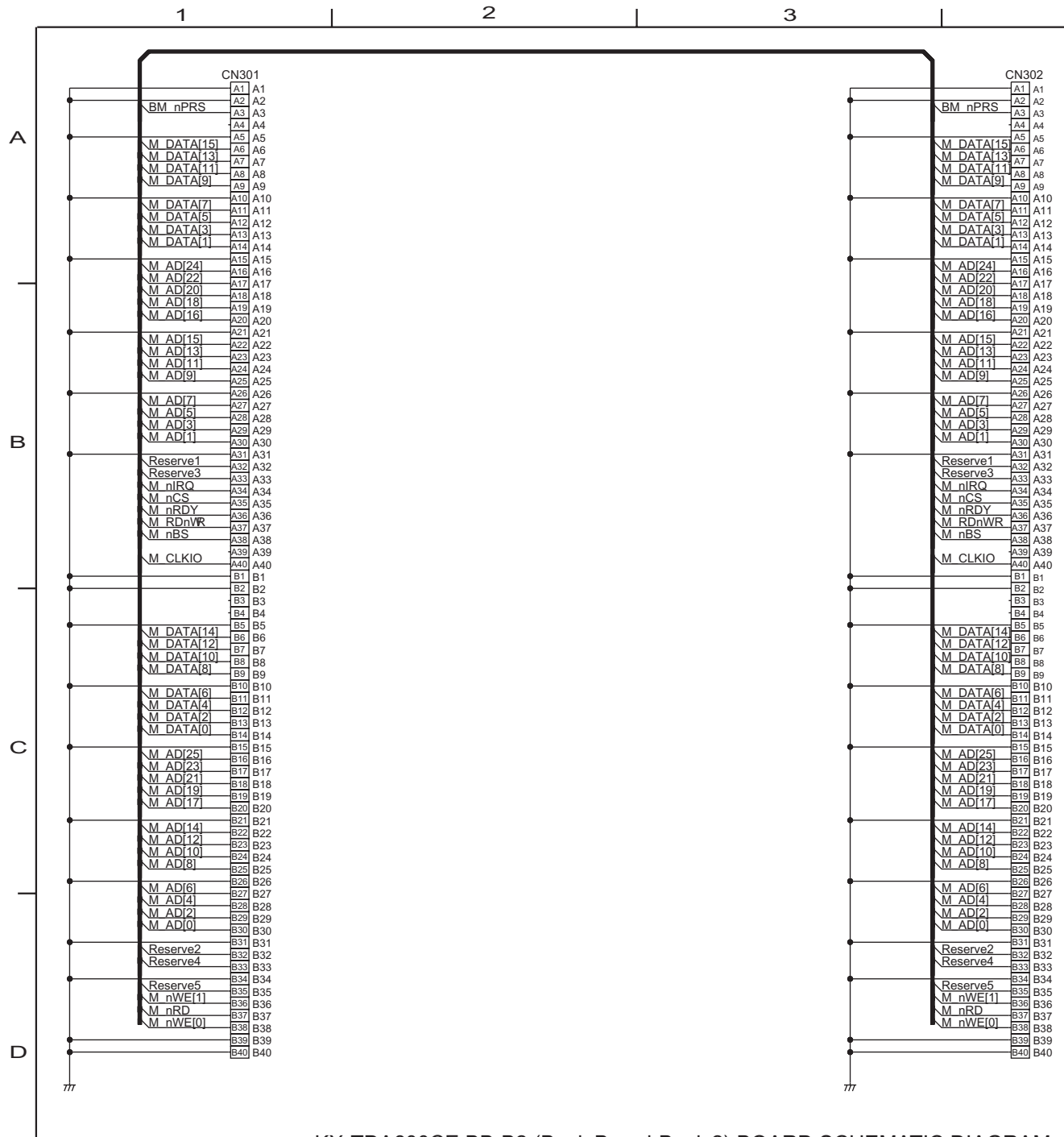


KX-TDA600CE BB-B1 BOARD SCHEMATIC DIAGRAM No.2 (2/2)





KX-TDA600CE BB-B1 BOARD SCHEMATIC DIAGRAM No.3 (2/2)

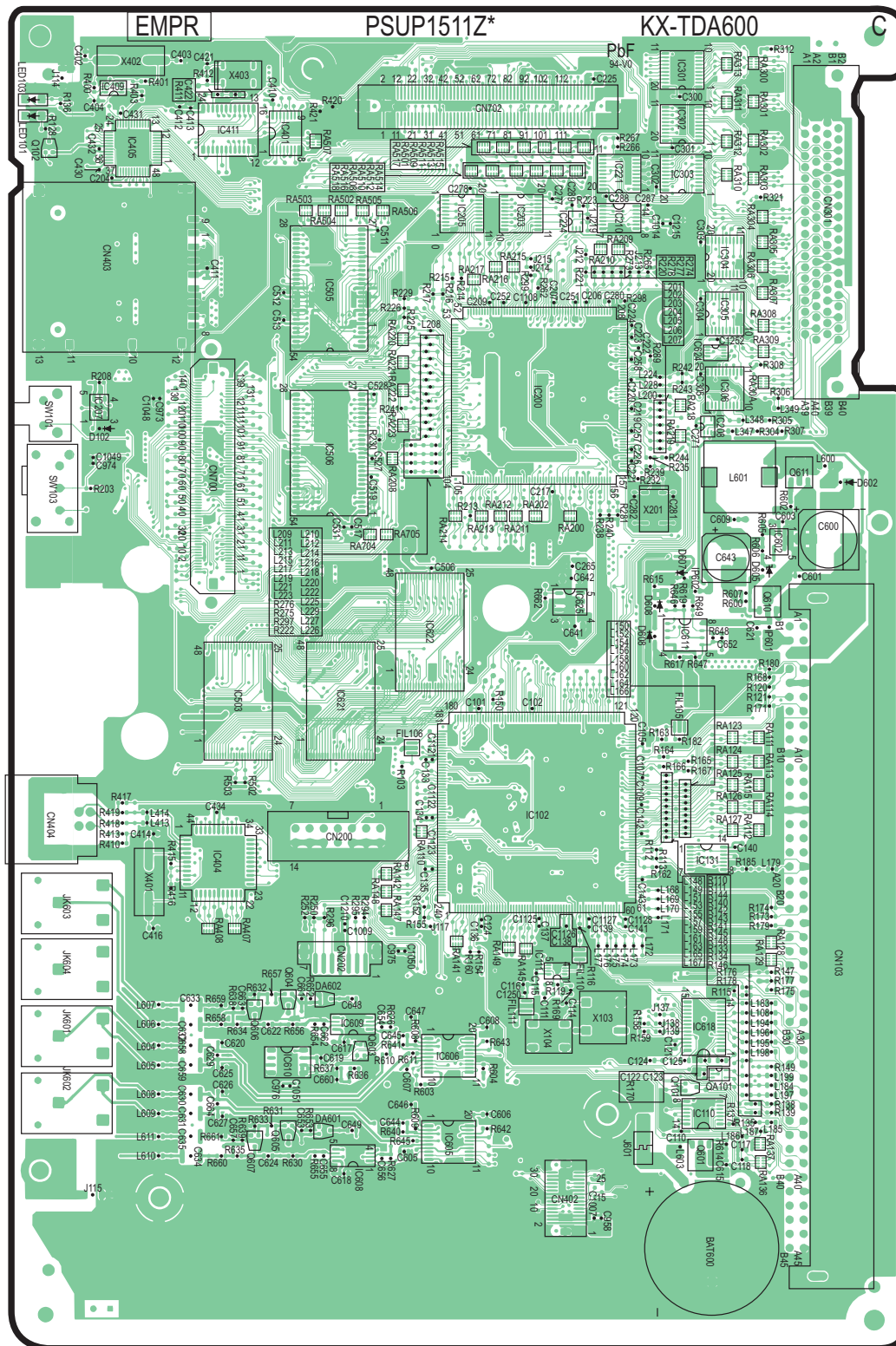


19.11. MEMO

20 PRINTED CIRCUIT BOARD

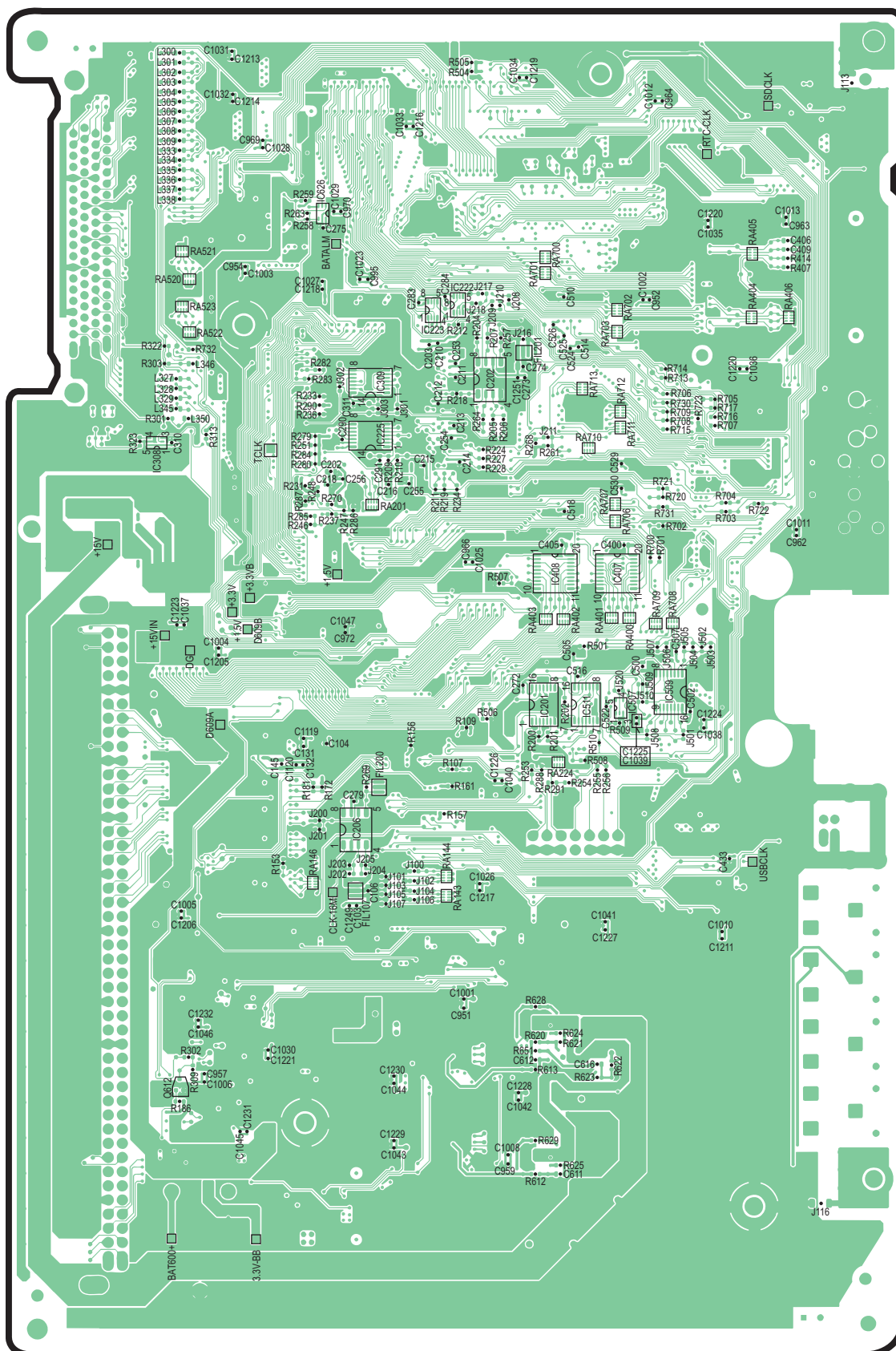
20.1. EMPR BOARD

20.1.1. COMPONENT VIEW



KX-TDA600CE EMPR BOARD COMPONENT VIEW

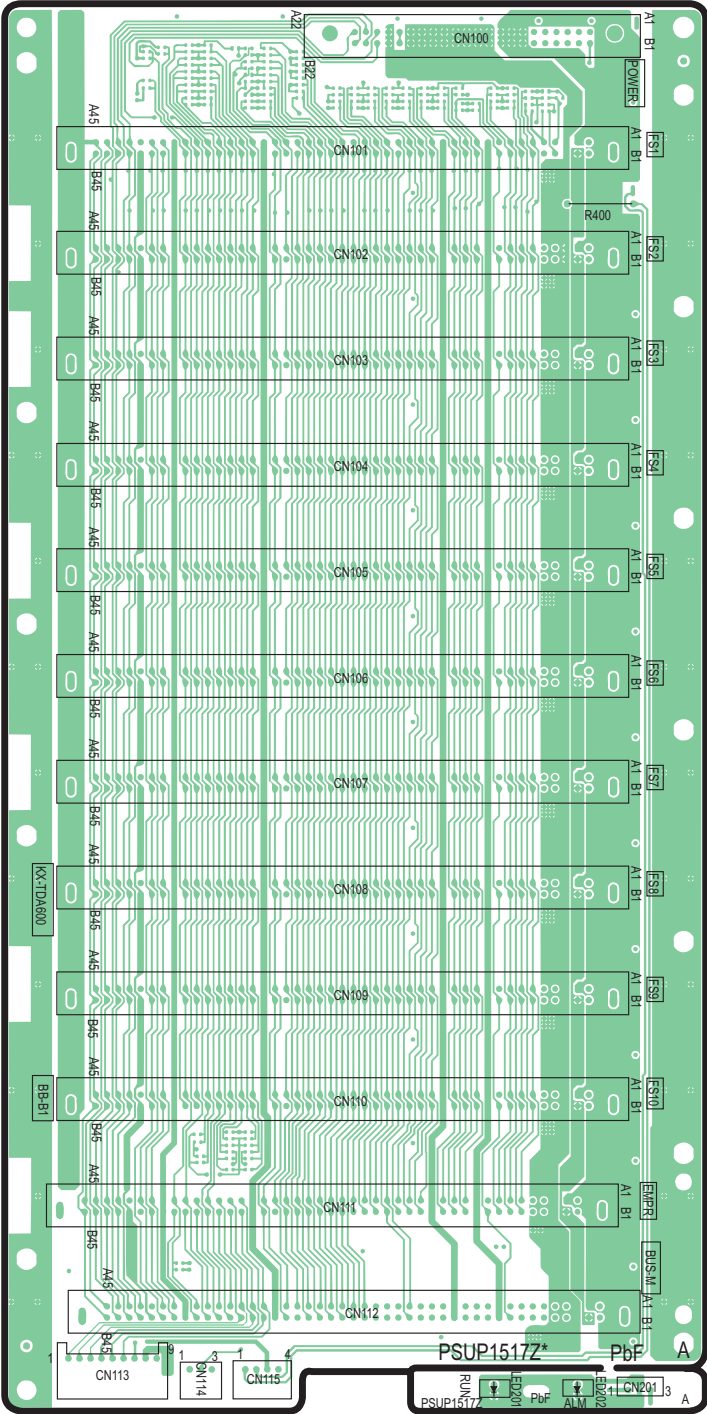
20.1.2. BOTTOM VIEW



KX-TDA600CE EMPR BOARD BOTTOM VIEW

20.2. BB-B1 BOARD

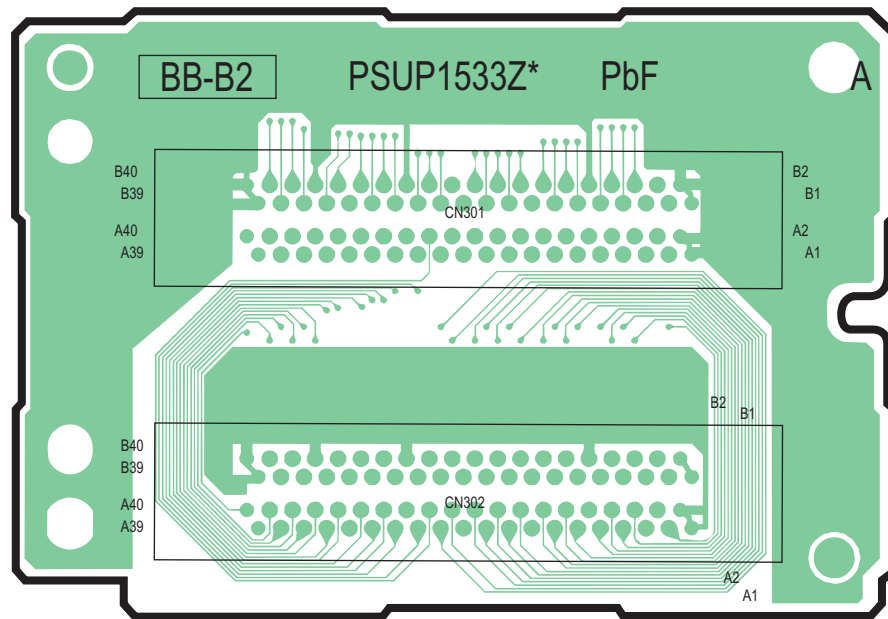
20.2.1. COMPONENT VIEW



KX-TDA600CE BB-B1 (Back Board-Basic 1) BOARD COMPONENT VIEW

20.3. BB-B2 BOARD

20.3.1. COMPONENT VIEW



KX-TDA600CE BB-B2 (Back Board-Basic 2) BOARD COMPONENT VIEW