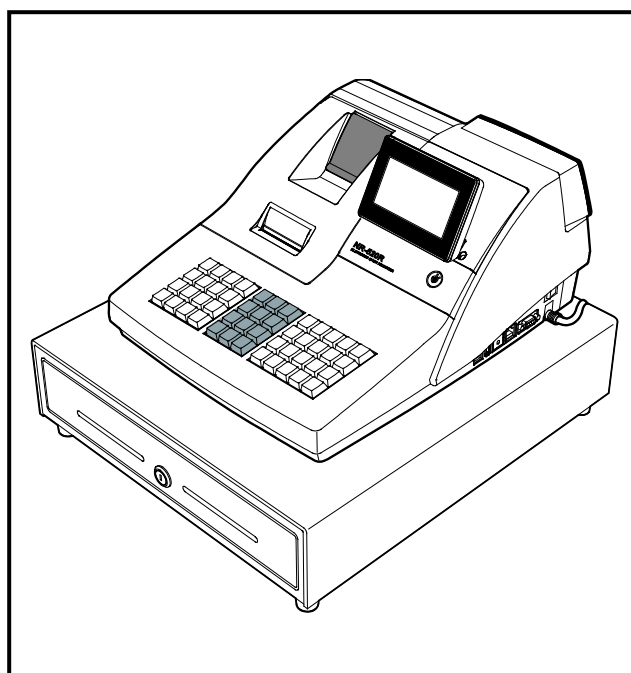


SAM4S

ELECTRONIC CASH REGISTER NR-500 Series

***SERVICE** Manual*

ELECTRONIC CASH REGISTER



C O N T E N T S

1. Precaution Statements
2. Product Specifications
3. Installation and Operation
4. Disassembly and Assembly
5. Maintenance and Adjustment
6. Exploded Views and Parts List
7. PCB Layout and Parts List
8. Troubleshooting
9. Block diagram
10. Wiring Diagram
11. Schematic Diagrams

About this Manual

This service manual describes how to perform hardware service maintenance for the SAM4S NR-500 Series Electronic Cash Register.

Notes

Notes may appear anywhere in the manual. They describe additional information about the item.

Precaution symbols

 . Indicates a Safety Precaution that applies to this part component.

 . Indicates the part or component is an electro-statically sensitive device. Use caution when handling these parts.

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SAM4S NR-500 SERIES

Overview of this ECR

This service manual provides the technical information for many individual component systems, circuits and gives an analysis of the operations performed by the circuits. If you need more technical information, please contact our service branch or R&D center. Schematics and specifications provide the needed information for the accurate troubleshooting.

All information in this manual is subject to change without prior notice. Therefore, you must check the correspondence of your manual with your machine. No part of this manual may be copied or reproduced in any form or by any means, without the prior written consent of Shin Heung Precision .

Note: Before using this Electronic Cash Register (ECR) for the first time, leave it powered on in the REG mode for at least twenty-four hours. This allows the MS Lithium battery, which maintains the memory of the ECR while the power is off, to charge completely.

“Proper disposal of batteries is required. Refer to your local codes for disposal requirements.”

Note: The socket outlet shall be installed near the equipment and shall be easily accessible.

1 Precaution Statements

Follow these safety, servicing and ESD precautions to prevent damage and to protect against potential hazards such as electrical shock.

1-1 Safety Precautions

1. Be sure that all built-in protective devices are replaced. Restore any missing protective shields.
2. When reinstalling the chassis and its assemblies, be sure to restore all protective devices, including nonmetallic control knobs and compartment covers.
3. Make sure there are no cabinet openings through which people - particularly children - might insert fingers and contact dangerous voltages. Such openings include excessively wide cabinet ventilation slots and improperly fitted covers and drawers.
4. Design Alteration Warning:
Never alter or add to the mechanical or electrical design of the ECR. Unauthorized alterations might create a safety hazard. Also, any design changes or additions will void the manufacturer's warranty.
5. Components, parts and wiring that appear to have overheated or that are otherwise damaged should be replaced with parts that meet the original specifications. Always determine the cause of damage or over- heating, and correct any potential hazards.
6. Observe the original lead dress, especially near the following areas : sharp edges, and especially the AC and high voltage supplies.
Always inspect for pinched, out-of-place, or frayed wiring. Do not change the spacing between components and the printed circuit board. Check the AC power cord for damage. Make sure that leads and components do not touch thermally hot parts.
7. Product Safety Notice:
Some electrical and mechanical parts have special safety-related characteristics which might not be obvious from visual inspection.
These safety features and the protection they give might be lost if the replacement component differs from the original - even if the replacement is rated for higher voltage, wattage, etc.
Components that are critical for safety are indicated in the circuit diagram by shading, (⚠) or (⚡).
Use replacement components that have the same ratings, especially for flame resistance and dielectric strength specifications. A replacement part that does not have the same safety characteristics as the original might create shock, fire or other hazards.

CAUTION

Danger of explosion if battery is incorrectly replaced.

Replace only with the same or equivalent type recommended by the manufacturer.

Dispose used batteries according to the manufacturer's instructions.

ATTENTION

Il y a danger d'explosion s'il y a remplacement incorrect de la batterie.

Remplacer uniquement avec une batterie du même type ou d'un type équivalent recommandé par le constructeur.

Mettre au rebut les batteries usagées conformément aux instructions du fabricant.

1 Precaution Statements

1-2 Servicing Precautions

WARNING: First read the-Safety Precautions-section of this manual. If some unforeseen circumstance creates a conflict between the servicing and safety precautions, always follow the safety precautions.

WARNING: An electrolytic capacitor installed with the wrong polarity might explode.

1. Servicing precautions are printed on the cabinet. Follow them.
2. Always unplug the units AC power cord from the AC power source before attempting to:
 - (a) Remove or reinstall any component or assembly
 - (b) Disconnect an electrical plug or connector
 - (c) Connect a test component in parallel with an electrolytic capacitor
3. Some components are raised above the printed circuit board for safety. An insulation tube or tape is sometimes used. The internal wiring is sometimes clamped to prevent contact with thermally hot components. Reinstall all such elements to their original position.
4. After servicing, always check that the screws, components and wiring have been correctly reinstalled. Make sure that the portion around the serviced part has not been damaged.
5. Check the insulation between the blades of the AC plug and accessible conductive parts (examples : metal panels and input terminals).
6. Insulation Checking Procedure:

Disconnect the power cord from the AC source and turn the power switch ON. Connect an insulation resistance meter (500V) to the blades of AC plug.

The insulation resistance between each blade of the AC plug and accessible conductive parts (see above) should be greater than 1 mega ohm.
7. Never defeat any of the B+ voltage interlocks. Do not apply AC power to the unit (or any of its assemblies) unless all solid-state heat sinks are correctly installed.
8. Always connect an instrument's ground lead to the instrument chassis ground before connecting the positive lead ; always remove the instrument's ground lead last.

1-3 Precautions for Electrostatic Sensitive Devices (ESDs)

1. Some semiconductor (solid state) devices are easily damaged by static electricity. Such components are called Electrostatic Sensitive Devices (ESDs); examples include integrated circuits and some field-effect transistors. The following techniques will reduce the occurrence of component damage caused by static electricity.
2. Immediately before handling any semiconductor components or assemblies, drain the electrostatic charge from your body by touching a known earth ground. Alternatively, wear a discharging wrist-strap device. (Be sure to remove it prior to applying power - this is an electric shock precaution.)
3. After removing an ESD-equipped assembly, place it on a conductive surface such as aluminum foil to prevent accumulation of electrostatic charge.
4. Do not use freon-propelled chemicals. These can generate electrical charges that damage ESDs.
5. Use only a grounded-tip soldering iron when soldering or unsoldering ESDs.
6. Use only an anti-static solder removal device. Many solder removal devices are not rated as anti-static; these can accumulate sufficient electrical charge to damage ESDs.
7. Do not remove a replacement ESD from its protective package until you are ready to install it. Most replacement ESDs are packaged with leads that are electrically shorted together by conductive foam, aluminum foil or other conductive materials.
8. Immediately before removing the protective material from the leads of a replacement ESD, touch the protective material to the chassis or circuit assembly into which the device will be installed.
9. Minimize body motions when handling unpackaged replacement ESDs. Motions such as brushing clothes together, or lifting a foot from a carpeted floor can generate enough static electricity to damage an ESD.

2 Product Specifications

Specifications are correct at the time of printing. Product specifications are subject to change without notice. See below for product specifications.

2-1 General Specification

Item	Description	Remark
Processor	• RENESAS CPU R5F5631ECDFB (RX-631 , 32-Bit)	
Memory	• RAM(DATA) SRAM (R1LV0408DSP-5SI) : 4Mbits SRAM (R1LV0408DSP-5SI) : 4Mbits (Option) • ROM(PGM) CPU ON CHIP FLASH ROM : 16Mbits • FISCAL ROM OTP-ROM(AT27LV020A) : 2Mbits (Default) OTP-ROM(AT27LV040A) : 4Mbits (Option)	Selectable Selectable
	• Type : MS Lithium, 3.0V 11mAh • Part Name : MS920S • Charging Time : 24 Hours • Life : 3 Years	
Data Storage	• 180 Days	When battery is Full charged
Interface Serial (RS-232C)	• Flow Control : ① DTR / DSR : H/W Flow Control ② XON / XOFF : S/W Flow Control • Baud Rate : 1200 / 2400 / 4800 / 9600 / 19200 / 115200 Bps • Connector : Serial#1 / DSUB9F (Female) Serial#2 / RJ45 Serial#3 / RJ45 • Voltage Supply : +5V/150mA supplies at #9-Pin of DSUB9 Connector, #1-pin RJ45 Connector.	
USB	• USB A-Type and USB B-Type (Default) Transfer Type : BULK Speed : 12 Mbps (Full-Speed) Power : Self-Powered (A-Type Only)	Can not be used simultaneously
ETHERNET	• 10/100 base-T (Option)	
GPRS	• Built-in type (Option)	
SD CARD	• 1-Slot [MICRO SD CARD (Internal)] (Option) • 1-Slot [SD CARD (external)] (Option)	
Printer	• Model : LTP01-245-11 • Print Speed : 70mm/sec, 15 Lines/sec • Type : Thermal Dot Line Printing • Resolution: W 8 dots/mm x H 16 dots/mm • Paper End Sensor (Reflecting Photo Sensor)	Detail Spec refer to Next Page
Display	• Operator : 192 x 64 dot, Graphic LCD, Blue backlight(White LED) • Customer : 16set x 2 line + Icon , Negative , Blue backlight(White LED)	
Key Board	• Raised Key : 48 key (with CAP), NR-500R • Flat Key : 90 key (with water proof), NR-500	
Drawer	• 24V / 15 Ω Solenoid (Recommend)	
Power Consumption	• Regularity : Approx. 10W	
Power Source	• AC/DC Adapter : 9V / 2.5A	
Environment Condition	• Temperature : 0℃ ~ 35℃ • humidity : 30% ~ 80% RH	
Dimensions(mm)	• 400(W) x 450(D) x 266(H)	with Drawer
Weight	• 11.5 Kg (Set Only)	

Table2-1 General Specification

2-2 Appearance

2-2 A. Appearance Dimensions (mm)

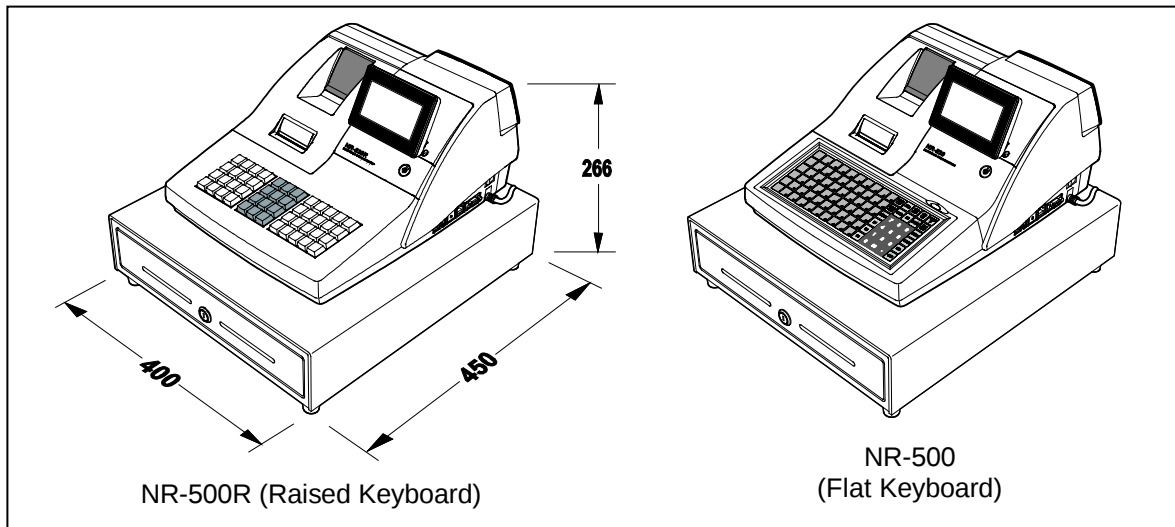


Figure2-1 Dimensions

2-2 B. Location Feature

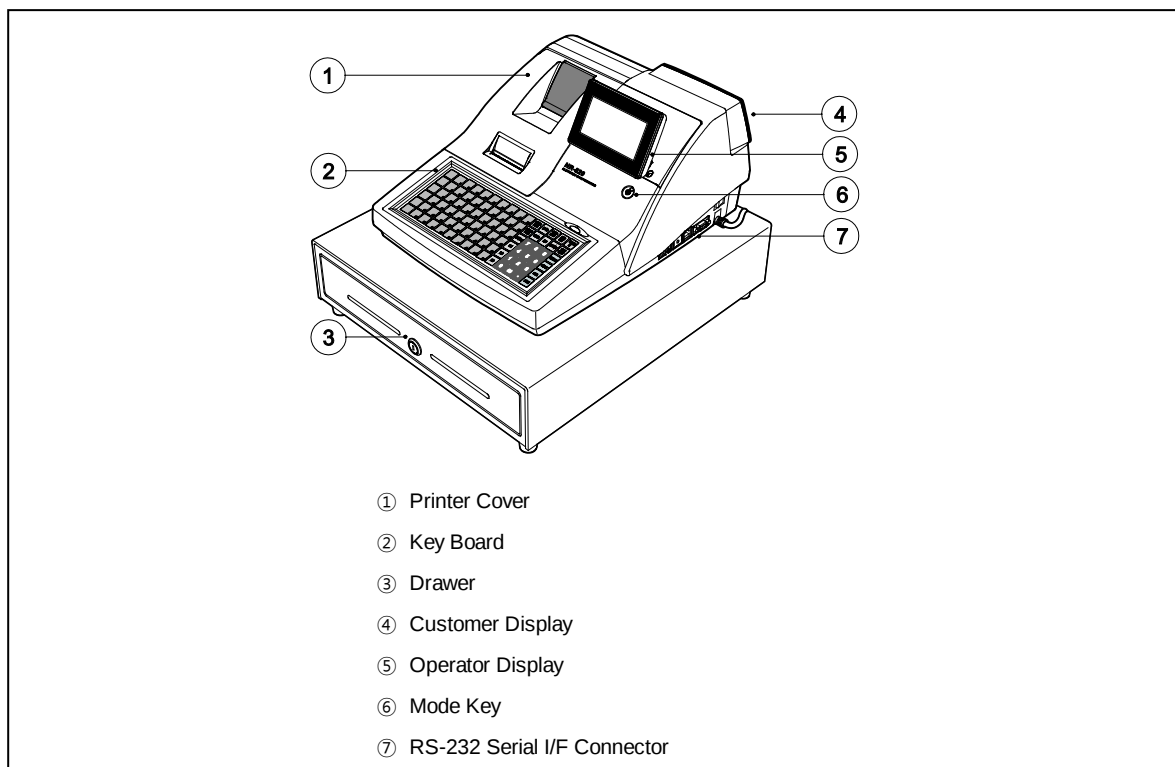


Figure2-2 Location Feature

2-3 Thermal Printer Specification

2-3 A. Printer Specification (58mm*1station or 2station)

Item		Description	Remark
Model		• LTP01-245-11	
Print Method		• Thermal Dot Line Printing	
Printing Format	Total Dots Per Line	• 384 Dots	
	Dot Pitch	• Vertical : 0.125 mm • Horizontal : 0.125 mm	
Printing Speed		• 70mm/sec, 15 Lines/sec	
Printing Direction		• Unidirectional Friction Feed	
Paper Feeding	Feeding Method	• Friction Feed	
	Minimum Feed Pitch	• 0.0625 mm	
	Maximum Feeding Speed	• 75 mm/sec (At 8.5V of Motor Voltage)	
Power Supply Volt	Power Voltage	• 4.2~9.5V (Recommend)	TPH / Motor
	Circuit Input Voltage	• 3.3V	Head Control / Sensor
Printer Head	Heat Element Density	• 8 Dots/mm (0.125mm/Dot)	(1step 0.0625mm)
	Total Head Elements	• 384 Dots/Dot Line	
	Available Printing Width	• 48 mm (384 Dots)	
Line Feed Motor		• 1-2 Phase Bi-Polar Stepping Motor	
Sensor	Head Temperature	• Thermistor	
	Out-of-paper Detection	• Reflection type photo interrupter	
	Platen Position Detection	• Mechanical Switch	(Option)
Reliability	Life	• 50km or more	
Dimension (mm)		• 70.3 (W) ×32.7 (D) ×15.3 (H)	
Weight		• Approx. 44 g	

Table2-2 Thermal Printer Specification

2 Product Specifications

2-3 B. Paper Specification

Item	Description	Remark
Paper Type	• Single-ply Thermal Paper Roll	
Paper Size	• 57.5 mm±0.5 (Width) × Ø 70 mm or less	
Specified Paper	• Original Paper No : HPK-110 (Hansol paper XT)	

Table2-3 Paper Specifications

Note: The following paper can be used instead of the specified paper above.

TF50KS-E2D: Nippon paper industries Co.,Ltd.

PD 150R, PD160R-N : Oji paper Co.,Ltd.

F380 : Kansaki specialty papers, Inc. (USA)

2-3 C. Character Specification.

Item	Description	Remark
Character Structure	• 12(W) × 24(H) Font	
Character Size	• 1.25 mm(W) × 3.0 mm(H)	
Column Pitch	• 1.5 mm	
Line Pitch	• 4mm (Including 8-dot line spacing) • 3.75 mm (Including 6-dot line spacing)	SPEED 40mm/s SPEED 30mm/s
Number of Column	• 32(12×24 Dots/Character)	

Table2-4 Character Specification

2-4 Power Specification

Item	Description	Remark
Input Voltage	• AC 100-240V, 50-60Hz (Min : 90V, Max : 265V)	
Power Consumption	• Regularity : Approx. 10W	
Output Voltage	• DC 9V / 2.5A	Power Adapter Output

Table2-5 Power Specification

2-5 Interface Specification

2-5 A. RS-232C Serial Interface

2-5 A-(a) Specification

Item	Description	Remark
Data Transmission	• Serial	
Synchronization	• Asynchronous	
Hand Shaking (Flow Control)	• H/W : DTR / DSR • S/W : XON / XOFF	XON : ASC Code 11h XOFF : ASC Code 13h
Signal Level	• Logic"1" (MARK) : -3V ~ -15V • Logic"0" (SPACE) : +3V ~ +15V	
Baud Rate	• 1200 / 2400 / 4800 / 9600 / 115200 bps	
Data Word Length	• 8 Bit	
Parity	• None	
Connector	• DSUB9F (Female) / RJ45	
Voltage Supply	• +5V/150mA is supplied at #9-Pin of D-SUB Connector, #1-Pin of RJ45 Connector.	For Bar Code Reader or other devices

Table2-11 RS-232C Specification

2-5 A-(b) Cable Connection

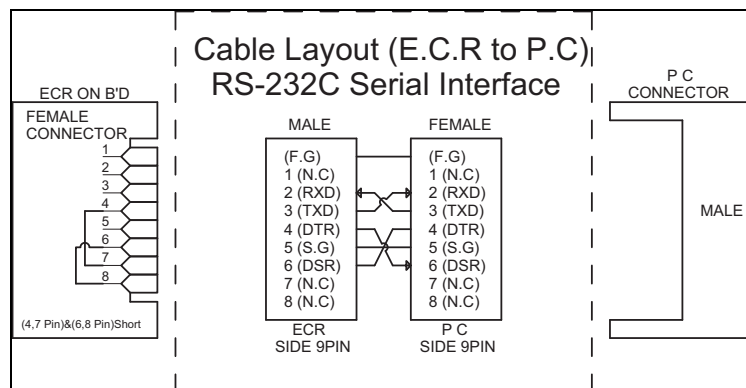


Figure2-4 RS232C Cable Connection (9Pin to 9Pin)

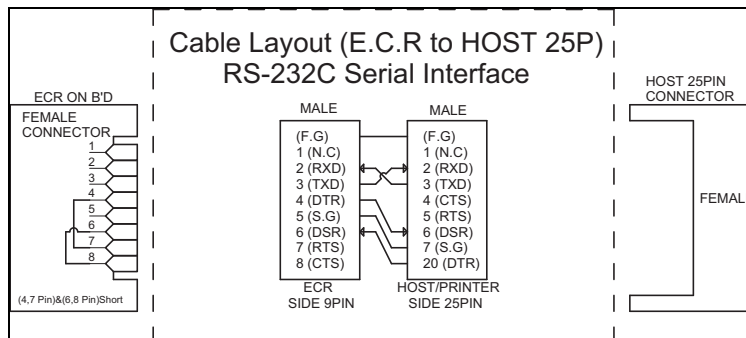


Figure2-5 RS232C Cable Connection (9Pin to 25Pin)

2 Product Specifications

2-5 A-(c) RS-232C I/F Cable (DSUB 9 PIN MALE TYPE)

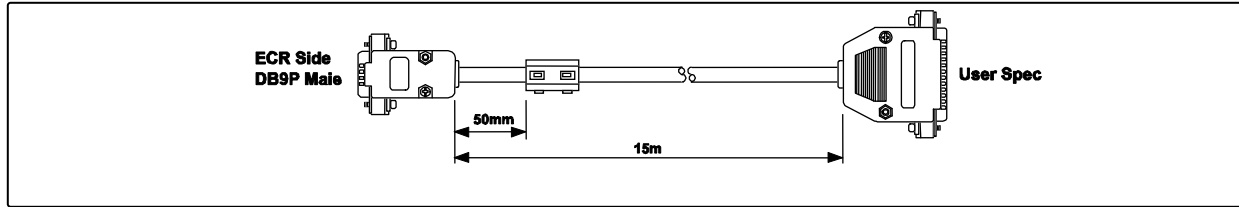


Figure2-6 RS-232C Cable

2-5 A-(d) Signal Description (DSUB Connector)

Pin No.	Signal Name	Signal Direction	Function
BODY	Frame GND	-	Frame Ground
2	RXD	Input	Receive Data
3	TXD	Output	Transmit Data
4	DTR	Output	This Signal indicates whether the ECR(NR-500) is busy. (H/W flow control) ① MARK(Logic1) : The ECR is busy ② SPACE(Logic0) : The ECR is not busy The host transmits a data to the ECR, after confirming this signal. When XON/XOFF flow control is selected, the host does not check this signal.
5	Signal GND	-	Signal Ground
6	DSR	Input	This signal indicates whether the host computer or receipt printer can receive data. (H/W flow control) ① MARK(Logic1) : The host can receive a data. ② SPACE(Logic0) : The host can not receive a data The ECR transmits a data to the host or receipt printer, after confirming this signal. When XON/XOFF flow control is selected, the printer does not check this signal.
9	VCC	Output	VCC(+5V/150mA) is supplied at #9-Pin of DSUB9 Connector. *CAUTION*

Table2-12 RS-232C Signal Description

2-5 A-(e) Signal Description (RJ-45 Connector)

Pin No.	Signal Name	Signal Direction	Function
1	VCC	Output	VCC(+5V/150mA) is supplied at #1-Pin of RJ-45 Connector. *CAUTION*
2	DSR	Input	This signal indicates whether the host computer or receipt printer can receive data. (H/W flow control) ① MARK(Logic1) : The host can receive a data. ② SPACE(Logic0) : The host can not receive a data The ECR transmits a data to the host or receipt printer, after confirming this signal.
3	TXD	Output	Transmit Data
4	RXD	Input	Receive Data
7	Signal GND	-	Signal Ground
8	DTR	Output	This Signal indicates whether the ECR(NR-500) is busy. (H/W flow control) ① MARK(Logic1) : The ECR is busy ② SPACE(Logic0) : The ECR is not busy The host transmits a data to the ECR, after confirming this signal.

Table2-13 RS-232C Signal Description

2-5 A-(f) RS-232C I/F Cable (RJ-45 CONNECTOR TYPE)

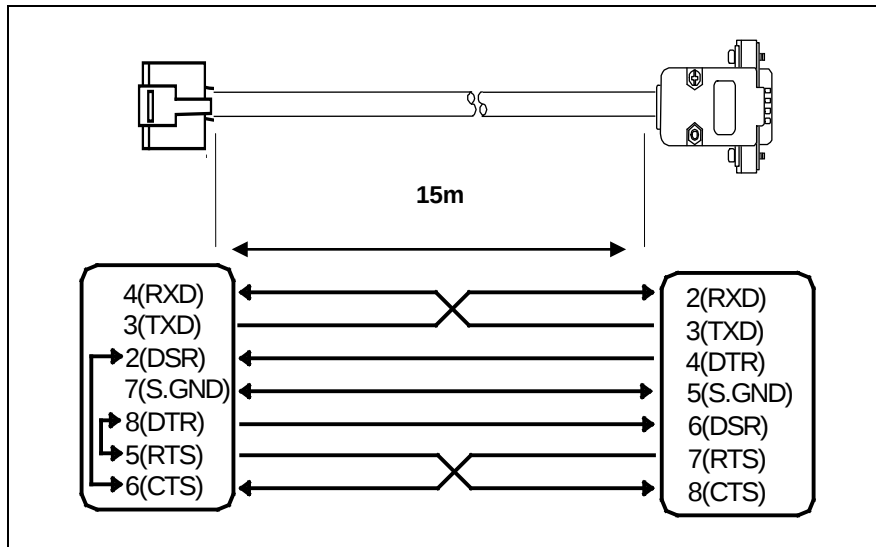


Figure2-7 RS232C Cable Connection (RJ-45 to DSUB 9Pin)

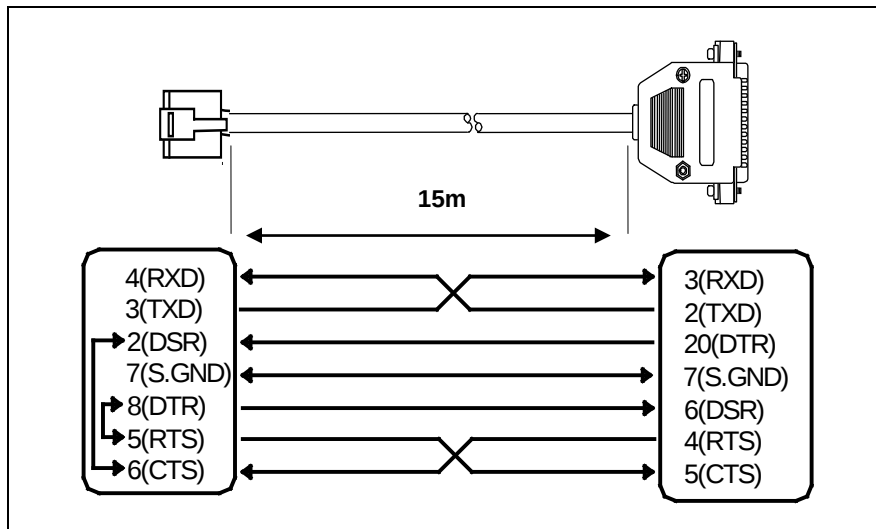


Figure2-8 RS232C Cable Connection (RJ-45 to DSUB 25Pin)

Caution: The VCC is supplied for the barcode or device power source. The Supply Current 150mA is total value including Serial #1 and Serial #2 Power Consumption. If the Total Power Consumption of the attached devices is exceeded the specification(150mA), the system stops the VCC of D-SUB & RJ45 Connector

Caution: If the device with 5V/150mA is connected to Serial #1, the VCC of Serial #2 can not use.
If the device with 100mA is connected to Serial #1, Other device with 50mA can be connected to Serial #2 Port.

2-5 A-(g) H/W Flow Control Timing

When DTR/DSR flow control is select, before transmitting a data, the ECR checks whether the host is BUSY or not.

If the host is BUSY, ECR does not transmit a data to the host. If the host is not BUSY, ECR transmits a data to the Host. The host is the same. Refer to the Interface Part of Chapter 7(Special Circuit Diagrams).

2-5 A-(h) S/W Flow Control Timing

When XON/XOFF flow control is selected, the ECR transmits XON(ASCII 11h) or XOFF(ASCII 13h) signal through the Serial Data Line. If the ECR is busy, the printer transmits XOFF(ASCII 13h) to host through the Serial Data Line. Then the host recognizes that the ECR is busy. So, the host does not transmit a data to the ECR. If the ECR is released from busy, the ECR transmits XON(ASCII 11h) to host through the Serial Data Line. Then the host recognizes that the ECR is not busy. And the host transmits a data to the ECR.

2-5 Interface Specification

2-5 B. USB Interface

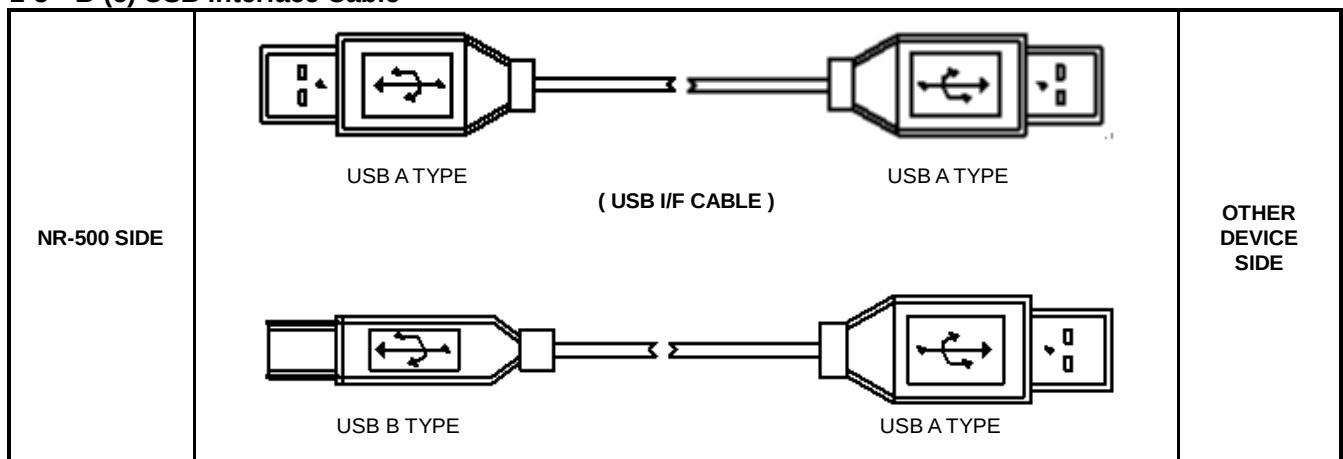
2-5 B-(a) USB Specification

Item	Description	Remark
Transfer Type	• BULK	
Data Signal	• Bi-Direction, Half-Duplex • Differential Signal Pair (D+ / D-)	
Data Format	• NRZI Format • Zero Bit Stuffing after 6 Ones	
Transceiver	• Differential Common Mode Range : 0.8 ~ 2.5[V] • Differential Receive Sensitivity : 200[mV] • Single End Receive Threshold : 0.8 ~ 2.5[V]	
Speed	• 12 Mbps	
Power	• Supply Self Power	
Cable & Connector	• Cable : 5m / 2m • Connector : A-type and B-type	
Support Spec	• USB Spec Version 2.0	

2-5 B-(b) USB Signal Description

Pin No	Signal Name	Color	Function
SHELL	Shield	Drain Wire	Frame GND
1	VBUS	Red	-
2	D-	White	Differential Data Line
3	D+	Green	Differential Data Line
4	GND	Black	Signal GND

2-5 B-(c) USB Interface Cable



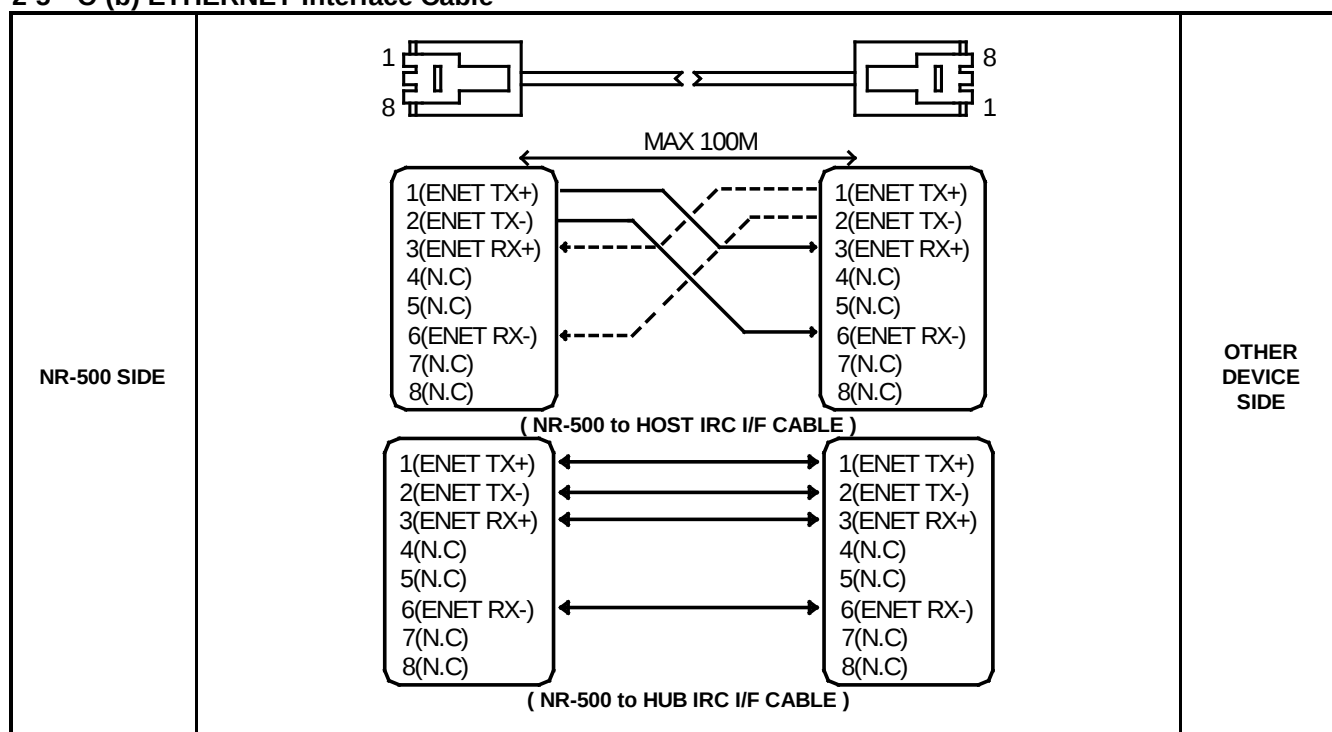
2-5 Interface Specification

2-5 C. ETHERNET Interface (Option)

2-5 C-(a) ETHERNET Signal Specification

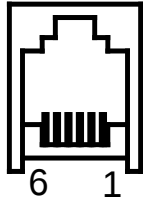
Pin No	Signal Name	Signal Direction	Function
1	ENET TX+	OUT	Ethernet Transmit Data Line(+)
2	ENET TX-	OUT	Ethernet Transmit Data Line(-)
3	ENET RX+	IN	Ethernet Receive Data Line(+)
4	N.C	-	-
5	N.C	-	-
6	ENET RX-	IN	Ethernet Receive Data Line(-)
7	N.C	-	-
8	N.C	-	-

2-5 C-(b) ETHERNET Interface Cable



2-6 Drawer Kick-Out Specification

2-6 A. Drawer Signal Description

Pin No	Signal Name	Direction	Function
1	S.G	-	Signal GND
2	DRAWER	OUT	Drawer Kick-Out Driver Signal
3	DRA_COMP	IN	Drawer Open / Close Signal
4	+24V	-	Supply DC +24V
5	-	-	N.C
6	F.G	-	Frame GND
 (DRAWER CONNECTOR)			Recommend : 24V/15Ω Solenoid

MEMO

3 Installation and Operation

3-1 System Configuration

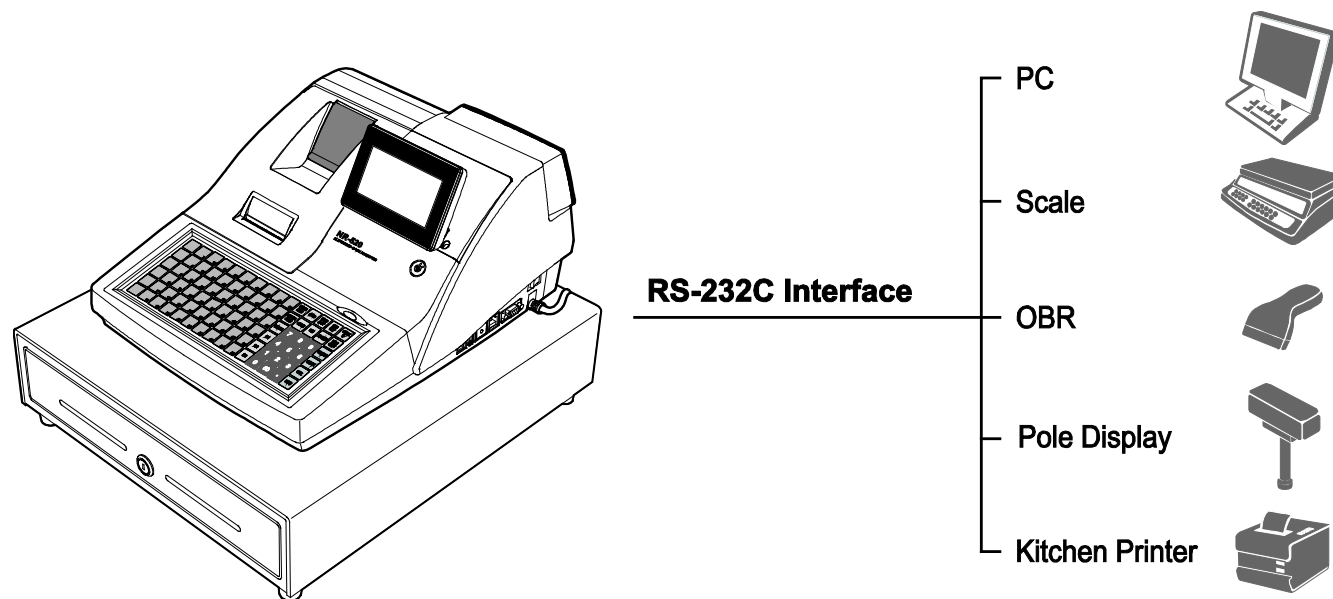


Figure 3-1 System Configuration

3-2 Installation

3-2 A. Paper Roll Installation

1. Remove the printer cover. (Fig 3-2 (A),(B))
2. Open the housing cover. (Fig 3-2 (C))
3. Insert the paper roll as shown. (Fig 3-2 (D))
4. Be sure to note the correct direction that the paper comes off the roll. (Fig 3-2 (D))
5. Pull out a small amount of paper as shown. Then close the housing cover. (Fig 3-2 (E))
6. Passing the leading edge of the paper through the cutter slot. Tear off the excess paper.(Fig 3-2(F))
7. In case of 2station feed the leading edge of the paper in about 150mm and fold the tip in 20mm. Insert the leading edge of the paper into the slot on the Spool Winding. (Fig 3-2(G))
8. Insert the Spool Winding in 2~3 turns and place it on the Paper Supply. If it loosen, turn to tighten it. (Fig 3-2(H))
9. Replace the printer cover. (Fig 3-2 (I))

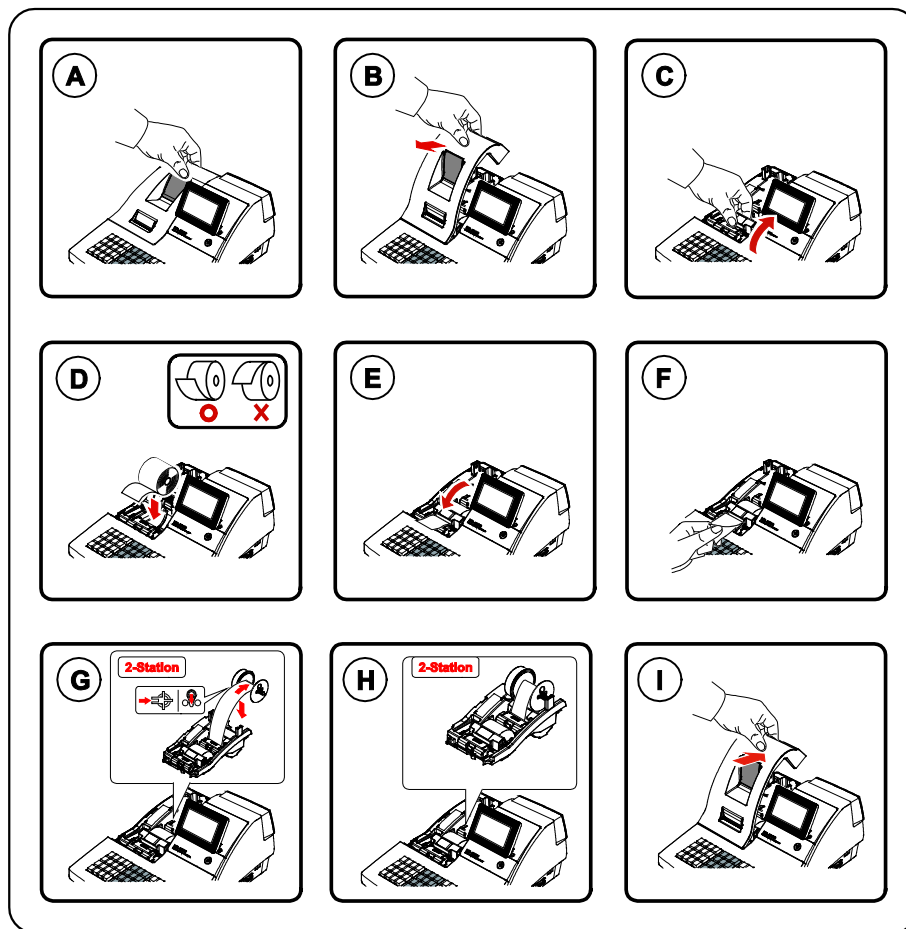


Figure 3-2 Paper Installation

3-2 B. RS-232C Serial Cable Installation

1. Connect the RS-232C serial cable to the RS-232C serial port on the right side of ECR.
2. Secure the serial cable with screws.
3. Connector the other end of the RS-232C serial Cable to your host computer.

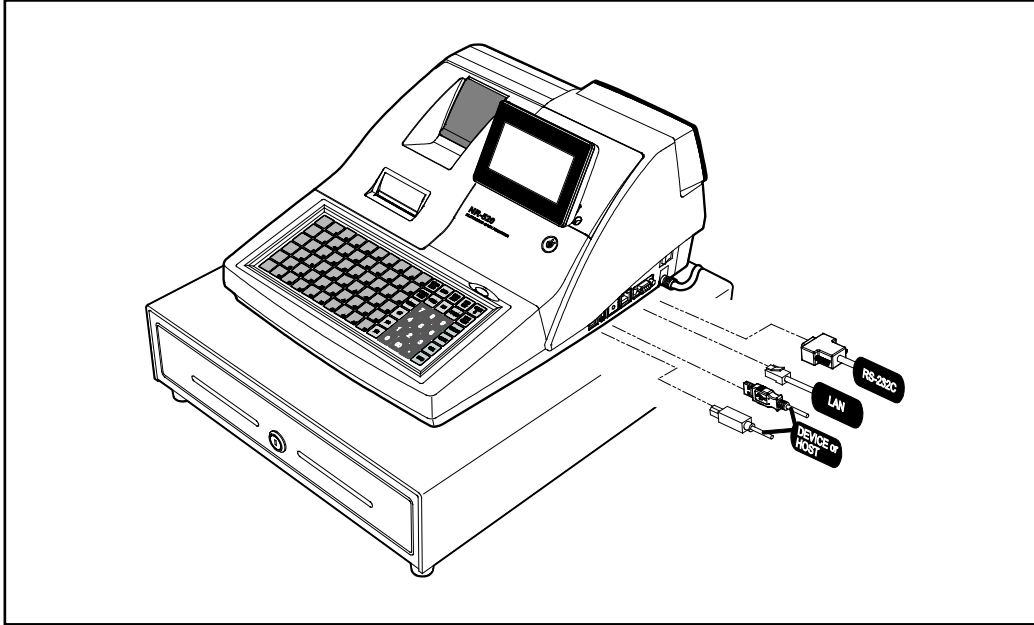


Figure 3-3 Cable Installation

3-2 C. Options

No.	Item	Description	Remark
1	Water Proof	Raised Keyboard (Option)	
2	Memory	SRAM 4MBITs (4MBITs * 1) (On Main PBA)	Factory option
3	Pulley Winding	Spool motor & Pulley	Factory option

Table 3-1 Option

3-2 D. Supplies

No.	Item	Description	Remark
1	Paper Roll	1 EA (1-station) 2 EA (2-station)	
2	Mode Key	VD, REG, Z, P, C	
3	User Manual	1 EA	
4	Spool	1 EA (2-station only)	

Table 3-2 Supplies

3-3 Operation

Note: Before using this Electronic Cash Register (ECR) for the first time, leave it powered ON in the REG mode for a at least 24 hours. This allows the MS-Lithium Rechargeable battery, which maintains the ECR's memory while the power is OFF, to fully charge.

3-3 A. Mode Switch

The position of the Mode Key determines the action of the ECR. The modes are as shown in Table 3-3.

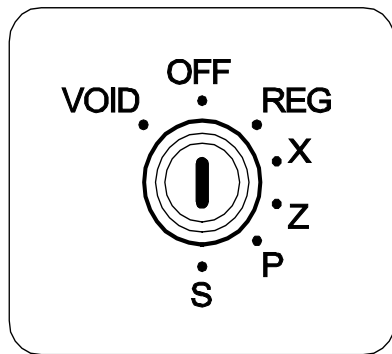


Figure3-4 Mode Switch

Mode	Function
VOID	Use to void (correct) items outside of a sale.
OFF	The Register is inoperable.
REG	Use for normal registrations.
X	Use to read register reports and perform other manager functions.
Z	Use to read register reports and reset totals to zero.
PGM	Use to program the register.
S	Use for H/W tests and special setting. The S position is hidden position reserved for dealer access.

Table3-3 Mode Switch Function

The mode switch can be used to access the following key lock positions.

KEY	Accessible Position	Remark
VOID	VOID, OFF, Register(REG), Manager(X)	
REG	OFF, Register(REG)	
Z	VOID, OFF, Register(REG), Manager(X), Clear Totals(Z)	
P	VOID, OFF, Register(REG), Manager(X), Clear Totals(Z), Program(PGM)	
C	VOID, OFF, Register(REG), Manager(X), Clear Totals(Z), Program(PGM), Service Mode(S)	ALL POSITIONS

Table3-4 Key Function

Note : The Key can be removed from the key lock in the OFF or REG position.

3-3 B. Key Board Matrix

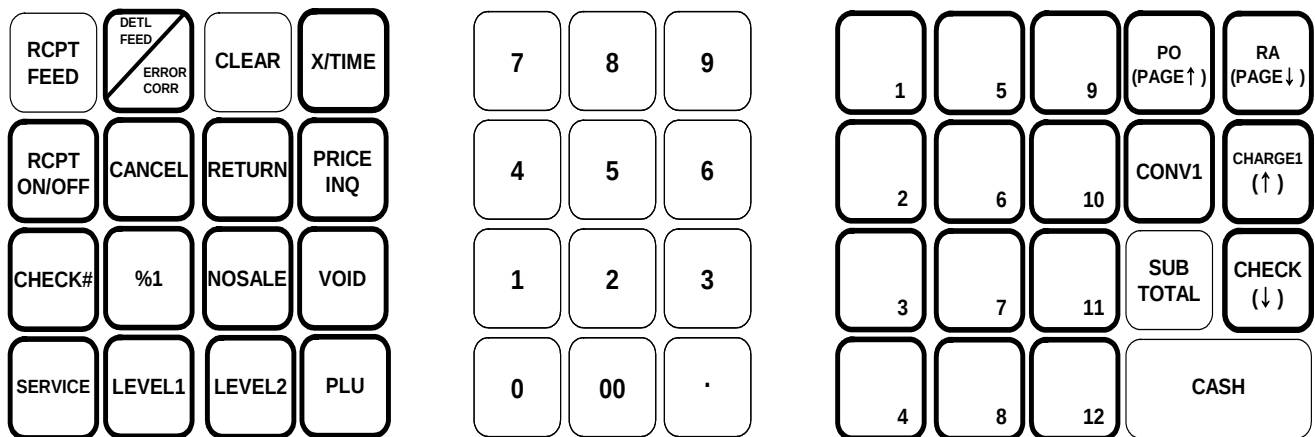


Figure3-5 Raised Keyboard (NR-510R / NR-520R)

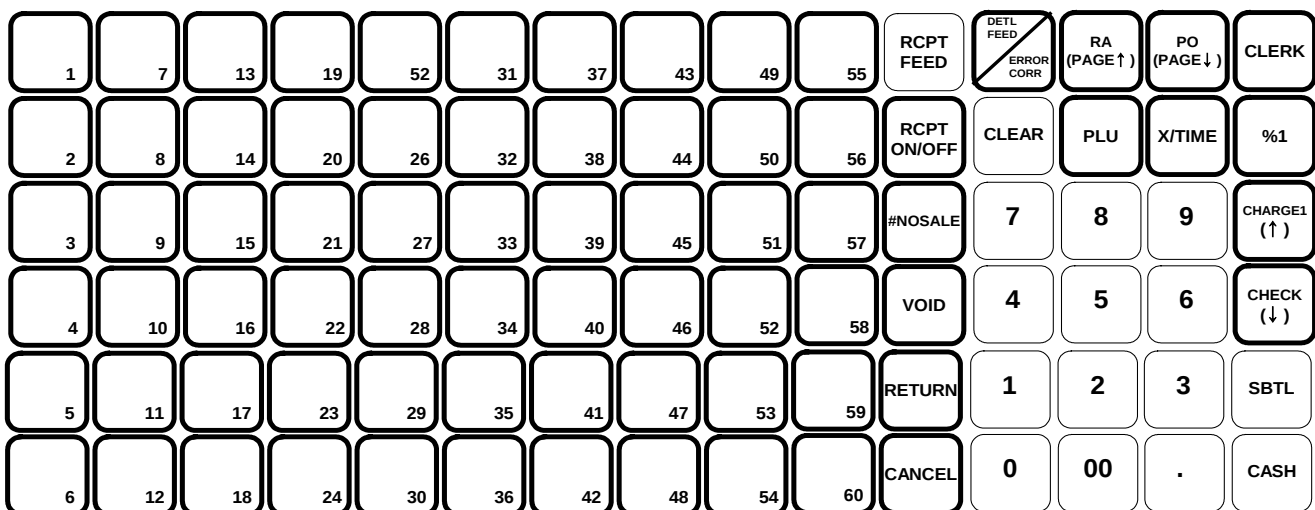


Figure3-6 Flat Keyboard (NR-510 / NR-520)

3-3 C. Initial Clear

The initial clear function allows you to exit any register activity and return to a beginning or cleared state. Any transaction that is in progress will be exited and totals for that transaction will not be updated.

1. Move to the **PROGRAM MODE**.
2. Turn the power switch located on the right side of the register to the **OFF** position.
3. Press and hold the key position where the **SUBTOTAL** key is located on the default keyboard layout.

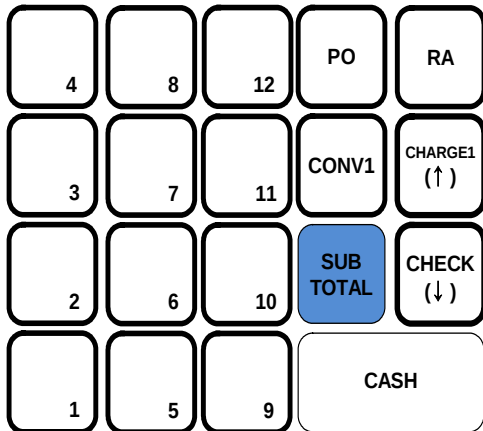


Figure3-7 Initial Clear Key for NR-510R/NR-520R

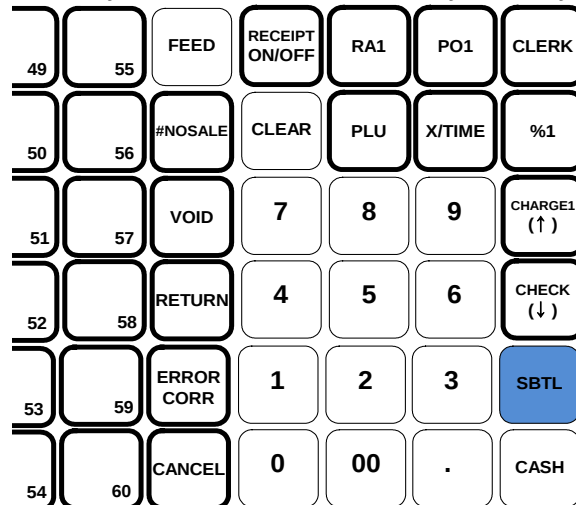


Figure3-8 Initial Clear Key for NR-510/NR-520

4. While continuing to hold the **SUBTOTAL** key, turn the power switch to the ON position. When the "INITIAL CLEAR" message displays release the **SUBTOTAL** key.

INITIAL CLEAR
ENTER CASH KEY

5. Press the **CASH** key.

ARE YOU SURE?
Y=CASH N=CLEAR

6. Press the **CASH** key. The message "INITIAL CLEAR OK" prints when the initial clear is complete. To resume operations, you will need to sign on a clerk.

3-3 D. All Clear

This step insures that the cash register is cleared of any totals or programming. After this procedure, the cash register is ready for programming and operation.

WARNING: This is a one time procedure. Do not repeat this procedure after the cash register is programmed, it causes all programs and totals to be erased and to be default.

Note : You need “ C Key ” to execute a **SERVICE MODE**.

1. Move to the **SERVICE MODE**.
2. Turn the power switch located on the right side of the register to the **OFF** position.
3. Press and hold the key position where the **A(CHECK)** key is located on the default keyboard layout.
4. Continue to hold the appropriate key while turning the power switch to the ON position. The message “RAM ALL CLEAR” displays.
5. Press the upper left key of the keyboard, then the lower left key, then the upper right key, and finally press the lower right key.

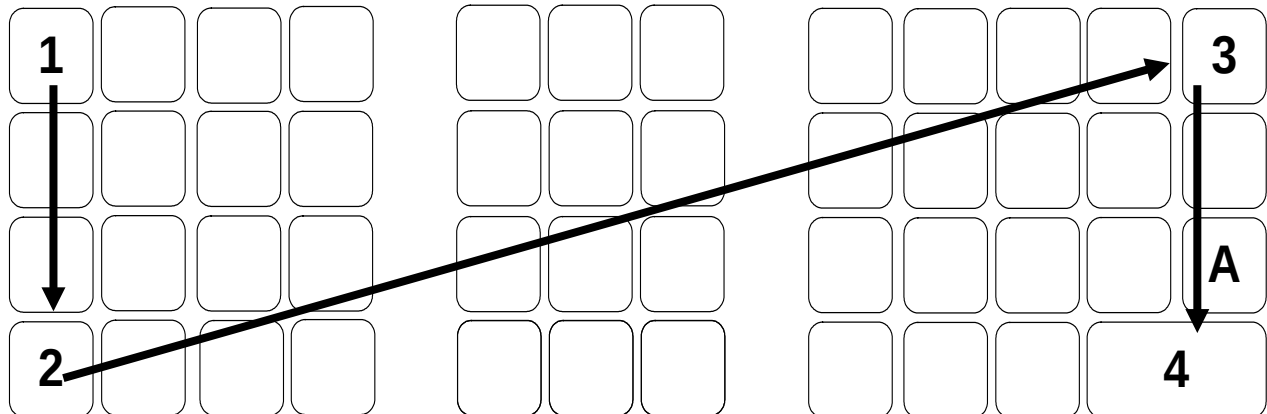


Figure3-9 <Raised Keyboard – NR-510R / NR-520R>

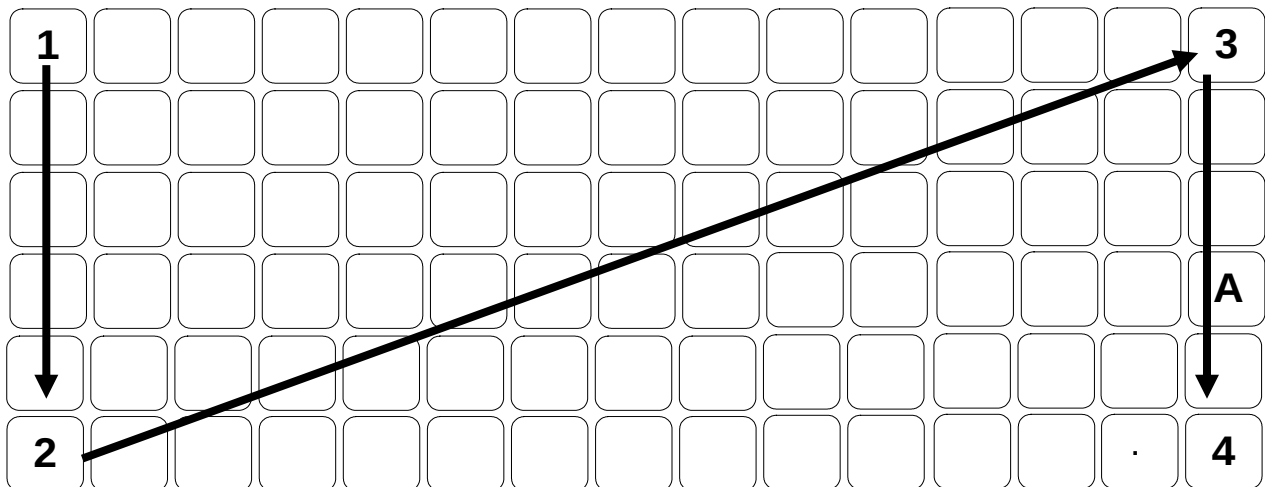


Figure3-10 <Flat Keyboard – NR-510 / NR-520>

6. The SERVICE MODE menu displays. The RAM Clear procedure is complete and the receipt prints.

```
2014/05/12  MON                09:00

* * * * *
MEMORY ALL CLEAR OK
* * * * *

MEMORY ALLOCATION
RAM 8Mbits OK

RAM 1 OK
RAM 2 OK
TTL AVAIL : 851968 Bytes
TTL USED : 327850 Bytes
= = = = =
VERSION INFORMATION
= = = = =
VERSION   : NR-500 : STD 00.001
CHECKSUM  : 084F
BOOT/APP  : BFBC/4893
PLUs USED : 60/2000
KEYBOARD  : 90 KEYS
03.27 2014

CLERK 00      No.000001  00000
```

Figure3-11 All Clear Key Sequence & Print Sheet

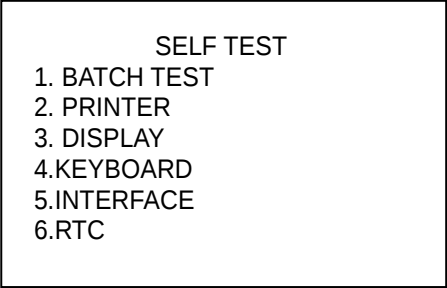
3-3 E. Self Test

Before the test. You will find 'SELF TEST' menu.

1. Move to the **SERVICE MODE**.
2. Press the **'1'** to select 'SELF TEST'.

3-3 E-(a) Test Printer

1. From the SELF TEST menu, Press **'2'** to select PRINTER.
2. From the PRINTER menu, Press **'1'** to select PRINT TEST.
3. After printing, The drawer is opened. Then the printer test is finished.
4. Press the **'CLEAR'** key to return to SELF TEST menu.



SELF TEST

1. BATCH TEST
2. PRINTER
3. DISPLAY
4. KEYBOARD
5. INTERFACE
6. RTC

Figure3-11 SELF TEST MENU

3-3 E-(b) Test Display

1. From the SELF TEST menu, Press **'3'** to select DISPLAY.
2. From the DISPLAY menu, Press **'1'** to select LCD TEST.
3. Press the **'CASH'** key 2 times to finish LCD TEST.
4. Press the **'CLEAR'** key to return to SELF TEST menu.

3-3 E-(c) Test Key Board

1. From the SELF TEST menu, Press **'4'** to select KEYBOARD.
2. From the KEYBOARD menu, Press **'1'** to select KEYBOARD TEST.
3. Press any key you want on the key board.
4. The key name of pressed key will be showed on the LCD.
5. Press the **'CLEAR'** key to return to SELF TEST menu.

3-3 E-(d) Test Mode Switch

1. From the SELF TEST menu, Press **'4'** to select KEYBOARD.
2. From the KEYBOARD menu, Press **'2'** to select MODE KEY TEST.
3. Turn the mode switch to any position.
4. The corresponding Mode name will be showed on the LCD.
5. Press the **'CLEAR'** key to return to SELF TEST menu.

3-3 E-(e) Test SERIAL1 (COM1)

1. From the SELF TEST menu, Press **'5'** to select INTERFACE.
2. Install the serial loop back test jig. (Short "pin 2 , 3" , " pin 4 , 6") of DSUB connector.
3. From the INTERFACE menu, Press **'1'** to select SERIAL 1.
4. If error occurs, the message " ** NG ** " is displayed on LCD and the Buzzer beep.
5. Press the **'CLEAR'** key to return to SELF TEST menu.

3-3 E-(f) Test SERIAL2 (COM2)

1. From the SELF TEST menu, Press **'5'** to select INTERFACE.
2. Install the serial loop back test jig. (Short "pin 3 , 4" , " pin 2 , 8") of RJ-45 connector.
3. From the INTERFACE menu, Press **'2'** to select SERIAL 2.
4. If error occurs, the message " ** NG ** " is displayed on LCD and the Buzzer beep.
5. Press the **'CLEAR'** key to return to SELF TEST menu.

3-3 E-(g) Test SERIAL3 (COM3)

1. From the SELF TEST menu, Press '5' to select INTERFACE.
2. Install the serial loop back test jig. (Short "pin 3 , 4" , " pin 2 , 8") of RJ-45 connector.
3. From the INTERFACE menu, Press '3' to select SERIAL 3.
4. If error occurs, the message " ** NG ** " is displayed on LCD and the Buzzer beep.
5. Press the 'CLEAR' key to return to SELF TEST menu.

3-3 E-(h) USB HOST TEST

1. From the SELF TEST menu, Press '5' to select INTERFACE.
2. Put the USB Memory Stick to the USB Host port.
3. From the INTERFACE menu, Press '3' to select USB HOST.
4. If USB is OK, " ** OK ** " message will be displayed.
5. Press the 'CLEAR' key to return to SELF TEST menu.

Note : When the ports is unconnected with the cable , the Error occur.

3-3 E-(i) EXTERNAL SD TEST

1. From the SELF TEST menu, Press '5' to select INTERFACE.
2. Put the External SD card.
3. From the INTERFACE menu, Press '4' to select EXTERNAL SD.
4. If EXTERNAL SD card is OK, " ** OK ** " message will be displayed.
5. Press the 'CLEAR' key to return to SELF TEST menu.

3-3 E-(j) MICRO SD TEST

1. From the SELF TEST menu, Press the '5' to select INTERFACE.
2. Put the MICRO SD card.
3. From the INTERFACE menu, Press '5' to select MICRO SD.
4. If MICRO SD card is OK, " ** OK ** " message will be displayed.
5. Press the 'CLEAR' key to return to SELF TEST menu.

3-3 F. Flash ROM Updated by SD

The NR-500 Series Flash ROM program is contained in a binary file. This file contains both the Boot program area and the Application program area.

1. Copy binary file to the root of the SD card. : SD:/update/
2. Insert the SD card into the register. (The SD slot is located inside the printer compartment. Remove the security screw and open the flap securing the SD slot. Insert the SD card until you hear a click sound and the SD card is locked in.)

Boot Area Update

3. At the NR-500 Series, move to the **SERVICE MODE**.
4. Press the ↑ key and the ↓ key to select menu and press the CASH key to confirm. Select the **7.PROGRAM BACKUP** menu.
5. Select the **1.SD** menu.
6. Select the **6.BOOT UP SD** menu.
7. After a short pause, the register will display confirmation of the successful download with the message "DOWNLOAD 100 % FINISHED! !.
8. Turn the ECR power switch OFF/ON and proceed directly to the next step: Application Update.

Program Area Update

9. Set the **SERVICE MODE**.
10. Press the upper right key and the lower right key. A rapid beep-beep-beep sound will be heard. Release the upper right key and the lower right key.
11. Press the ↑ key and the ↓ key to select menu and press the **CASH** key to confirm. Select the **2.SD CARD** menu.
12. The display will flash (Current program is being erased), after a few seconds, the display will continue to flash, but at a slower rate. This continues for about 1-minute while the new program is being loaded. When the load is complete, a rapid beep-beep-beep sound will be heard again the display will stop flashing and display a blue color to confirm update completion.
13. Power the register **OFF**. The FLASH ROM update is complete.
14. Remove the SD card from the register.
15. Perform a memory all clear on the ECR. The ECR is now ready to program or to load a previously saved end-user program.

3-3 G. Flash ROM Updated by PC

Update Files

To complete the firmware update, you will be supplied with the following files:

- DownLoad.exe (The update utility program)
- Binary file

PC Connection Cable

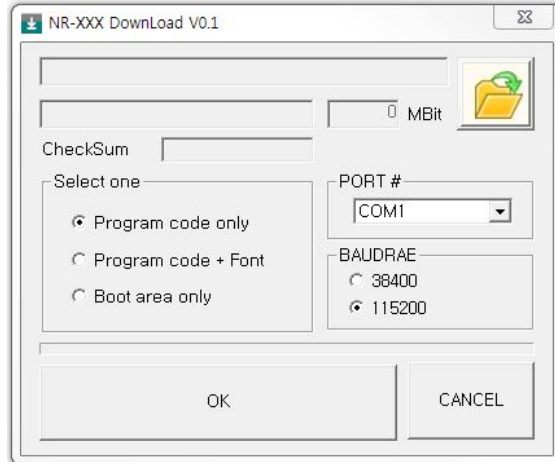
YOU MUST USE Port #1. Use the following cable:

- Part # 522120 (Register DB-9MF COM 1 to PC DB-9F)

Boot Area Update

1. Connect the Serial Cable From ECR to PC.
2. At the register, move to the **SERVICE MODE**.

3. Press the ↓ key and the ↑ key to select menu and press the **CASH** key to confirm. Select the **7.PROGRAM BACKUP** menu.
4. Select the **1.SD** menu.
5. Select the **7.BOOT UP COM** menu.
6. At the PC, execute the program “DownLoad.exe”. The Download dialog box displays.



7. Select the appropriate com port connection at your PC at the PORT# option buttons.
8. Click  find the folder where the update files are located and select binary file.
9. Select **Boot Area Only** in the Select One option buttons.
10. Press **OK** Button. The download takes about 30 seconds; the scroll bar will track the progress of the download. At the ECR, the display will flash slowly while the update is taking place.
11. When complete, the message **Completed** displays on the PC. Click **OK** and the Download program will close. At the ECR, the display will change to a blue color indicating the update is complete. Turn the power switch to the OFF.

Program Area Update

1. Connect the Serial Cable From ECR to PC.
2. At the register, move to the **SERVICE MODE**.
3. Turn the power switch to the **OFF** position.
4. Press the upper right key and the lower right key. A rapid beep-beep-beep sound will be heard. Release the upper right key and the lower right key.
5. Press the ↑ key and the ↓ key to select menu and press the **CASH** key to confirm. Select the **1.SERIAL1** menu.
6. At the PC, execute the program “Download.exe”. The Download dialog box displays.
7. Select the appropriate com port connection at your PC at the PORT# option buttons.
8. Click  find the folder where the update files are located and select binary file.
9. Select **Program code + Font** in the Select One option buttons.
10. Press **OK** Button. The download takes about 3 minutes. At the PC, the scroll bar will track the progress of the download. At the ECR, The display will flash (Current program is being erased), after a few seconds, the display will continue to flash, but at a slower rate. This continues for about 3 minutes while the new program is being loaded.
11. When complete, the message **Completed** displays at the PC. Click **OK** and the Download program will close. At the ECR, when the load is complete, a rapid beep-beep-beep will be heard, and the display will flash rapidly. Turn the power switch to **OFF**, the program update is complete.
12. Disconnect the PC cable.

3 Installation and Operation

13. Perform a memory all clear on the ECR. The ECR is now ready to program or to load a previously saved end-user program.

4 Disassembly and Assembly

Caution :

- Before installation, be sure to turn off the power switch.
- Use gloves to protect your hand from being cut by the angle and the chassis.
- Connect all the cables correctly. When connecting or disconnecting the cables, be careful not to apply stress to the cables. (It may cause disconnection)
- Be careful not to bind interface cables and AC power cord together.

Note : Before disassembling, first of all separate the ASS'Y CASE UPPER(B) from the ASS'Y CASE LOWER(E)

4-1 Disassembling the Case Upper Block

4-1 A. Ass'y Case Upper

1. Open the ASS'Y COVER PRINTER(A) and lift it off. (Page6-1,Page6-2)
2. Remove the four screws(B15:3pcs, B16:1pcs) from the ASS'Y CASE LOWER(E).(Page6-1, 6-3)
3. Separate the three harnesses(Ⓐ,Ⓑ,Ⓒ) from the PBA-MAIN BOARD(E4). (Page6-1, 6-3, 6-13)
4. Lift off the ASS'Y CASE UPPER(B) from the ASS'Y CASE LOWER(E). (Page6-1, 6-3, 6-13)

4-1 B. Ass'y Front Display(LCD)

1. Separate the harness(Ⓑ) from the PBA-MAIN BOARD(E4). (Page 6-13)
2. Remove the two screws(B29) from the ASS'Y CASE UPPER(B).(Page6-3)
3. Separate the ASS'Y LCD(B6) from the ASS'Y CASE UPPER(B).(Page6-3)
4. Remove the four screws(B7) from the ASS'Y LCD(B6).(Page6-3)
5. Separate the PMO-FRONT LCD(B15) and the LCD(B14) from the ASS'Y LCD(B6).(Page6-3)
6. Separate the harness(Ⓑ) from the LCD(B14) .(Page6-3)
7. Remove the two screws(B11,B13) from ASS'Y LCD(B6). (Page6-3)
8. Separate the PMO-REAR LCD(B9), the PMO-HOLDER LCD(B17) and the HINGE(B12).(Page6-3)

4-1 C. Ass'y Rear (Turret) Display

1. Separate the harness(Ⓒ) from the PBA-MAIN BOARD(E4). (Page 6-13)
2. Separate the PMO-TURRET BODY (B24) from the ASS'Y CASE UPPER (B). (Page6-3)
3. Remove the two screws(B20) PMO-HOLDER LCD REAR(B23).(Page6-3)
4. Separate the LCD(B21), PMO-HOLDER LCD REAR(B23) from the PMO-TURRET BODY (B24). (Page6-3)
5. Separate the harness(Ⓑ) from the LCD(B21).(Page6-3)

4-1 D. Ass'y Cover Mode Switch

1. Separate the ASS'Y COVER MODE S/W(B1) from ASS'Y CASE UPPER(B).(Page6-3)
2. Remove the two screws(B5) on the ASS'Y COVER MODE S/W(B1) and separate the MODE KEY ASS'Y(B4) from the PMO-COVER MODE S/W(B1). (Page6-3)
3. Remove the two screws(B2) on the MODE KEY ASS'Y(B4) and separate the IPR-BRKT MODE S/W(B3) and the MODE KEY ASS'Y(B4). (Page6-3)

4-2 Disassembling the Case Lower Block

4-2 A. Ass'y Printer

1. Separate the two harnesses(㉔,㉚) from the PBA-MAIN BOARD(E4). (Page6-13)
2. Remove the four screws(E1,E2) from the PMO-CASE LOWER(E30).(Page6-13)
3. Separate the ASS'Y PRINTER(C) from the ASS'Y CASE LOWER(E). (Page6-13)

4-2 B. Ass'y Main PBA, I/F PBA

1. Separate the fourteen harnesses(㉑,㉒,㉓,㉔,㉕,㉖,㉗,㉘,㉙,㉚,㉛,㉜,㉝,㉞) and remove the three screws(E3). Lift up the PBA-MAIN BOARD(E4).(Page6-13)
2. Separate the harness(㉟) from the PBA-I/F BOARD(E21). (Page6-13)
3. Lift up the PBA-I/F BOARD(E21).(Page6-13)

4-2 C. Ass'y Adapter

1. Separate the harness(㊱) from the PBA-MAIN BOARD(E4). (Page6-13)
2. Remove the two screws(E15) from the IPR-BRKT TRANS(E25). (Page6-13)
3. Separate the PMO-HOLDER ADAPTER(E16) from the PMO-CASE LOWER(E30).(Page6-13)
4. Separate the harness(㊲) and Remove the ADAPTER(E16). (Page6-13)

5 Maintenance and Adjustment

5-1 Cleaning the Printer Head

Paper dust on the heating elements may lower the print quality. In this case, clean the print head as follows. After printing, the printer head can be very hot. Be careful not to touch it. Also let it cool before you clean it. Do not damage the printer head by touching it with your fingers or any hard object.

1. Turn power off.
2. Open the housing cover.
3. Clean the Printer Head Thermal Element with a cotton swab moistened with alcohol solvent.
(ethanol, methanol or IPA)
4. After confirming that alcohol solvent has been dried up completely, close the housing cover.
5. If you don't use it for a long time, place a piece of paper between TPH and platen roller to protect the printer.

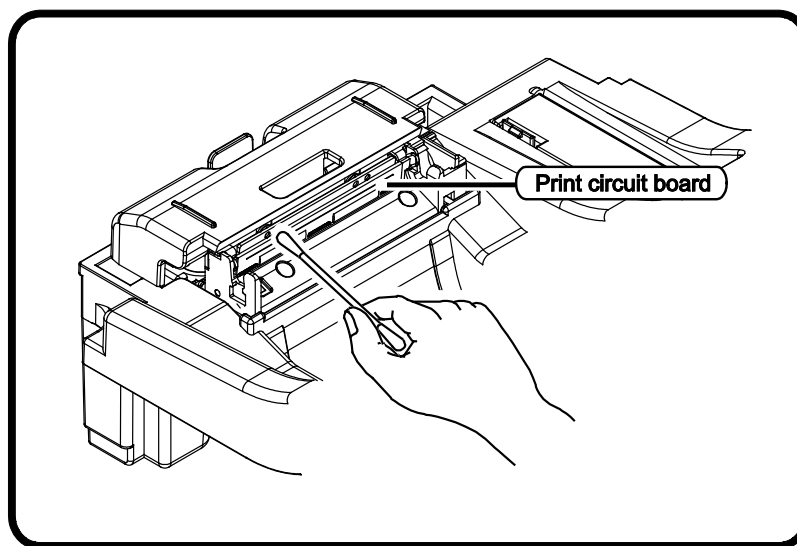


Figure 5-1 Clean the Printer Head

Caution: Note that the thermal head(Thermal Element and Radiation Plate) becomes very hot during normal operation. To prevent the danger of burn injury from thermal, be sure to wait for about 10 minutes after turning power off before beginning the cleaning.

Warning

The products are designed for use in a standard environment and not in any special environments. Application of the products in a special environment can deteriorate product performance. Accordingly, verification and confirmation of product performance, prior to use, is recommended if used under the following conditions

- a. Use in various type of liquid, including water, oils, chemicals and organic solvents
- b. Use outdoors where the products are exposed to direct sunlight, or in dusty places.
- c. Use in places where the products are exposed to sea winds or corrosive gases, including Cl_2 , H_2S , SO_2 , NH_3 and NO_2
- d. Use in places where the products are exposed to static electricity or electromagnetic waves
- e. Use of the products in places subject to dew condensation.

MEMO

6. Exploded Views and Parts List

6-1. Exploded View (NR-520R)

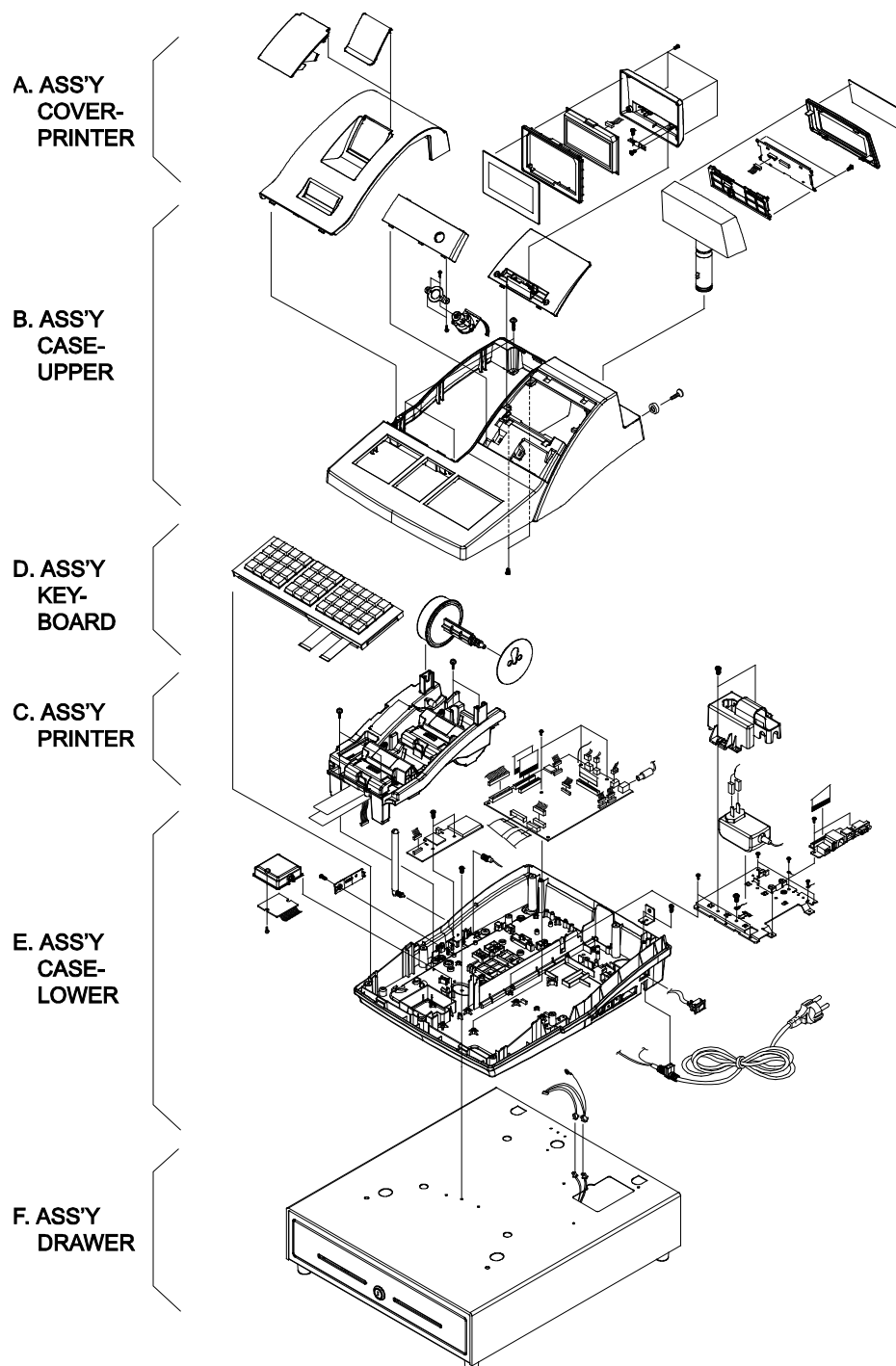


Figure 6-1 Total Disassembly (NR-520R)

6-1. Exploded View (NR-520)

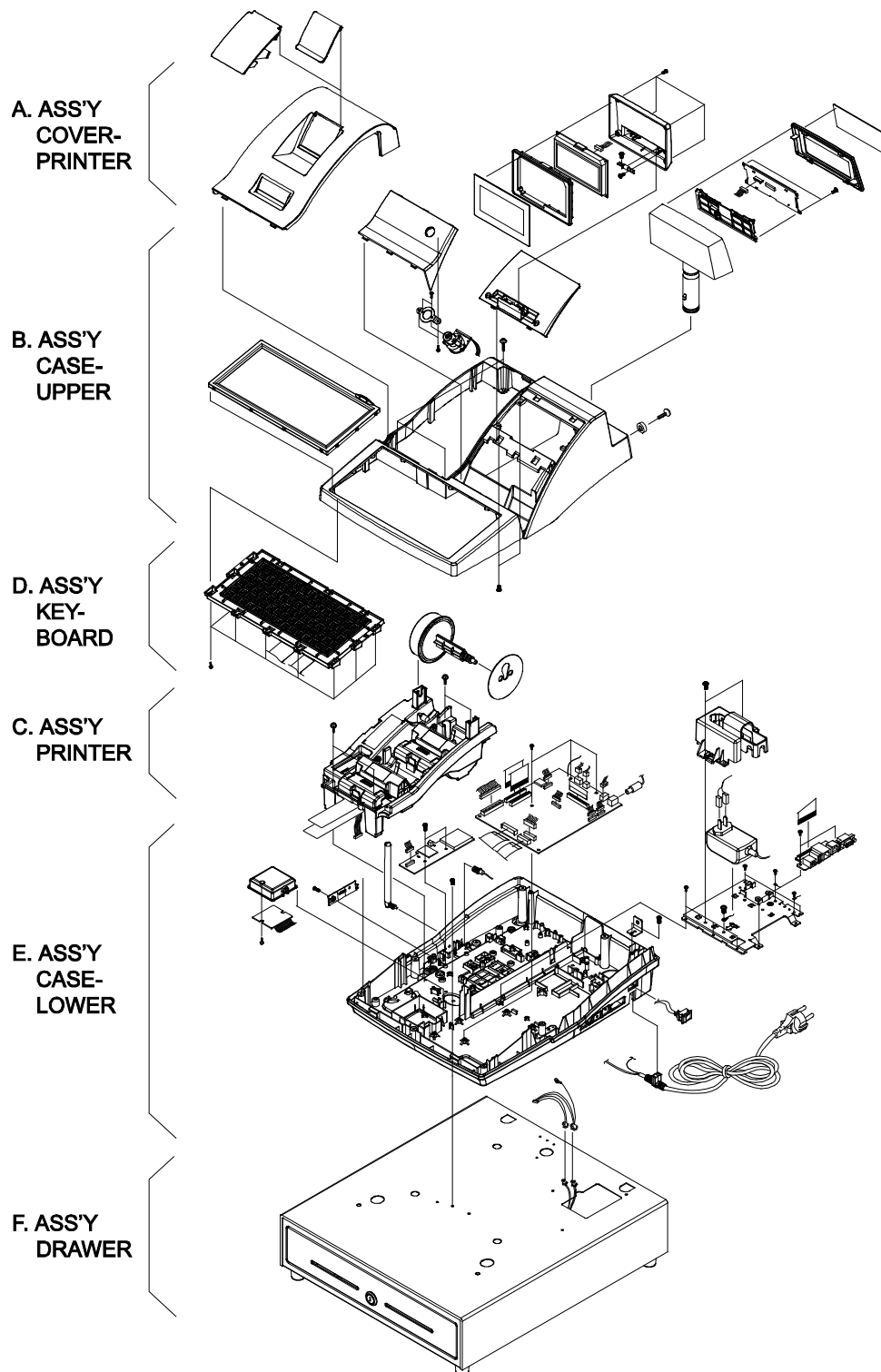


Figure 6-2 Total Disassembly (NR-520)

6-2 A. ASS'Y COVER-PRINTER

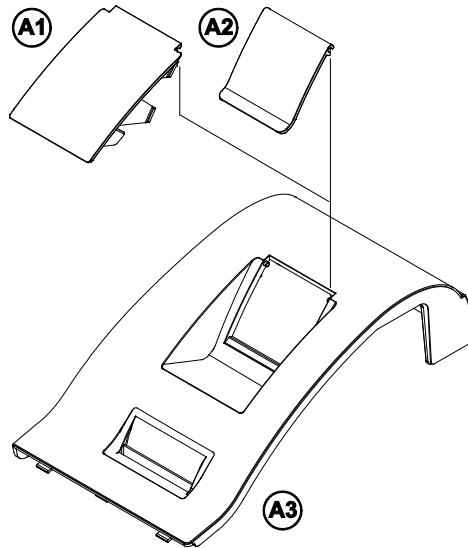


Figure 6-2 ASS'Y COVER-PRINTER

A. ASS'Y COVER-PRINTER

No.	Parts No.	Description / Specification	Q'ty	Design-Location	Serviceable	Remark
A	JK95-70675A	MEA-COVER PRINTER:NR-510	1		Y	IVORY
	JK95-70675B	MEA-COVER PRINTER:NR-520	1		Y	IVORY
	JK95-70675C	MEA-COVER PRINTER:NR-510B	1		Y	BLACK
	JK95-70675D	MEA-COVER PRINTER:NR-520B	1		Y	BLACK
A1	JK72-20980A	PMO-COVER DUMMY	1	NR-510	Y	IVORY
	JK72-20980B	PMO-COVER DUMMY	1	NR-510	Y	BLACK
A2	JK72-20026A	PMO WINDOW JOURNAL	1	NR-520	Y	
A3	JK72-20977A	PMO-COVER PRINTER	1		Y	IVORY
	JK72-20977B	PMO-COVER PRINTER	1		Y	BLACK
A4	JK70-20304A	IPR-CUTTER PAPER	1		N	

B. ASS'Y CASE-UPPER(NR-500R)

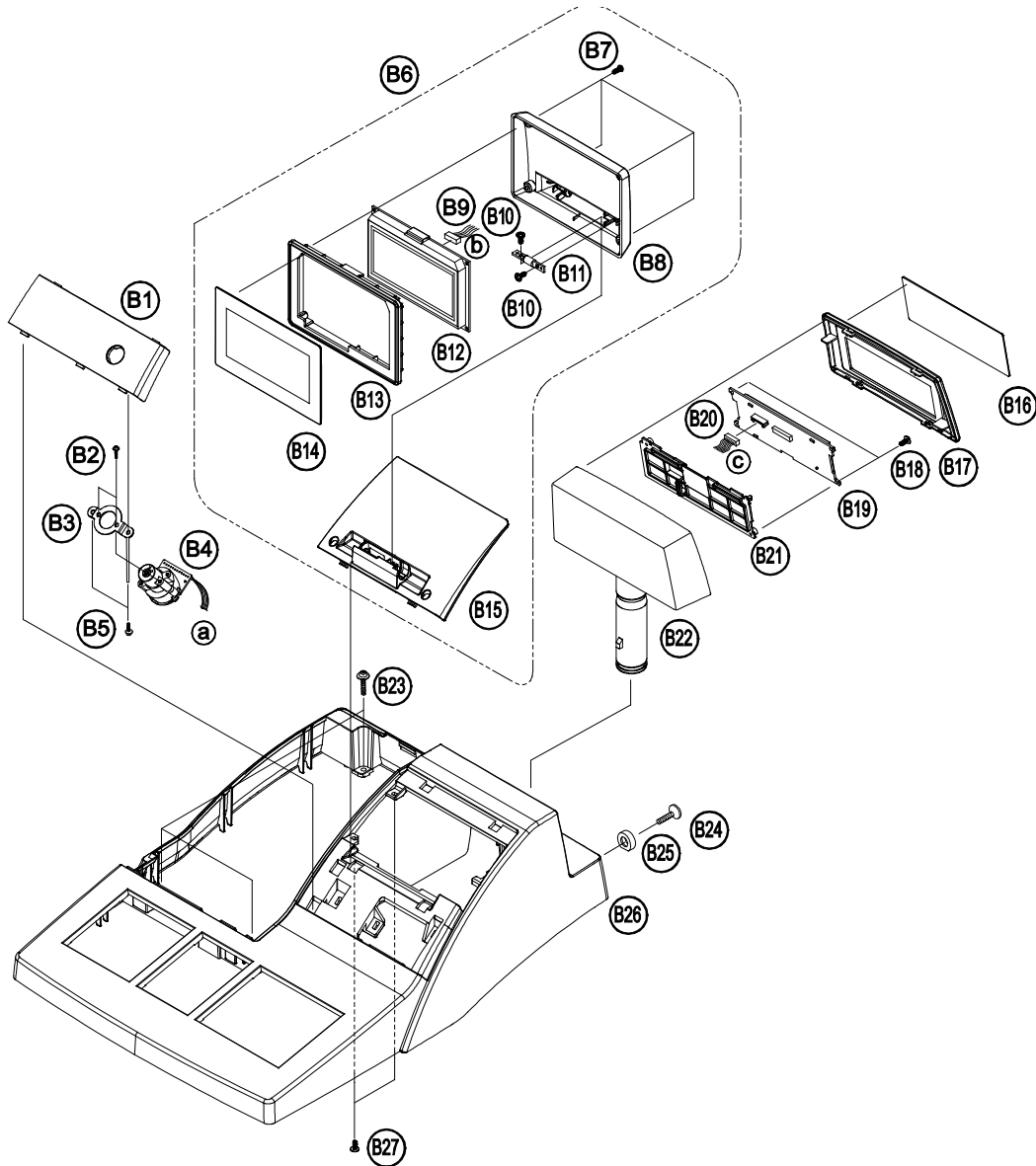


Figure 6-3 ASS'Y CASE-UPPER(NR-500R)

6-2. B. ASS'Y UPPER(NR-500R)

No.	Parts No.	Description / Specification	Q'ty	Design-Location	Serviceable	Remark
B1	JK72-21005G	PMO-COVER MODE S/W: NR-500RB,STD,HIPS(V0),BLK,SPRAY	1		Y	BLACK
B2	S600200011A	SCREW-TAPPING:PH,M3,L8	2		Y	
B3	JK70-20309A	IPR-BRKT MODE_S/W	1		Y	
B4	JK95-70098A	MODE KEY ASSY	1		Y	
B5	S600200011A	SCREW-TAPPING:PH,M3,L8	2		Y	
B6	JK95-70596C	ELA-LCD FRONT	1		Y	IVORY
	JK95-70596D	ELA-LCD FRONT	1		Y	BLACK
B7	S600200011A	SCREW-TAPPING:PH,M3,L8	4		Y	WHITE
	S600300020A	SCREW-TAPTITE:BH,+,M3,L10,BLK	4		Y	BLACK
B8	JK72-20337C	PMO-LCD REAR	1		Y	IVORY
	JK72-20337D	PMO-LCD REAR:NR-500B,HIPS(V0),BLK,SPRAY	1		Y	BLACK
B9	JK39-40756F	HARNESS-LCD:NR-500,10P,450mm,AT TAPE	1		Y	
B10	S600300016A	SCREW-DELTA PT;M3X8(BH)	2		Y	
B11	JK75-40006A	MEC-HINGE ASS'Y	1		Y	
B12	JK07-70003A	LCD:NR-400,192*64,NEGATIVE	1		Y	
B13	JK72-20336C	PMO-LCD FRONT	1		Y	IVORY
	JK72-20336D	PMO-LCD FRONT:NR-500B,HIPS(V0),BLK,SPRAY	1		Y	BLACK
B14	JK72-20825B	PMO-WINDOW VIEW	1		Y	
B15	JK72-20891A	PMO-HOLDER LCD	1		Y	IVORY
	JK72-20891C	PMO-HOLDER LCD:NR-500B,HIPS(V0),BLK,SPRAY	1		Y	BLACK
B16	JK72-20349A	PMO-WINDOW VIEW_R	1		Y	
B17	JK72-20630A	MO-WINDOW TURRET	1		Y	
B18	S600200006A	SCREW-TAPPING:PW,H,M3,L8	2		Y	
B19	JK07-70002A	DISPLAY-LCD:16Char*2line	1		Y	
B20	JK39-80007B	HARNESS-DISPLAY:8P,450mm	1		Y	
B21	JK72-20629A	PMO-HOLDER LCD REAR	1		Y	
B22	JK72-20703D	PMO-TURRET BODY	1		Y	IVORY
	JK72-20703E	PMO-TURRET BODY:ER-350,HIPS(V0),BLK,SPRAY	1		Y	BLACK
B23	S600200004A	SCREW-TAPPING:PH,M4,L15	3		Y	WHITE
	S600200029A	SCREW-TAPPING:PH,M4,L14	3		Y	BLACK
B24	S600100010A	SCREW-MACHINE:FH,M4,L10	1		Y	WHITE
	S600100040A	SCREW-MACHINE:FH,M4,L10	1		Y	BLACK
B25	JK70-70073A	ICT-SHAFT MOLDING	1		Y	
B26	JK72-20963C	PMO-CASE UPPER:NR-500	1		Y	IVORY
	JK72-20963D	PMO-CASE UPPER:NR-500F	1		Y	IVORY
	JK72-20963N	PMO-CASE UPPER: ER-350II,2 차,48KEY,BLK,SPRAY	1		Y	BLACK
	JK72-20963P	PMO-CASE UPPER: ER-350IIF,2 차,48KEY,BLK,SPRAY	1		Y	BLACK
B27	S600200006A	SCREW-TAPPING:PW,H,M3,L8	2		Y	

6-2 B. ASS'Y CASE-UPPER(NR-500)

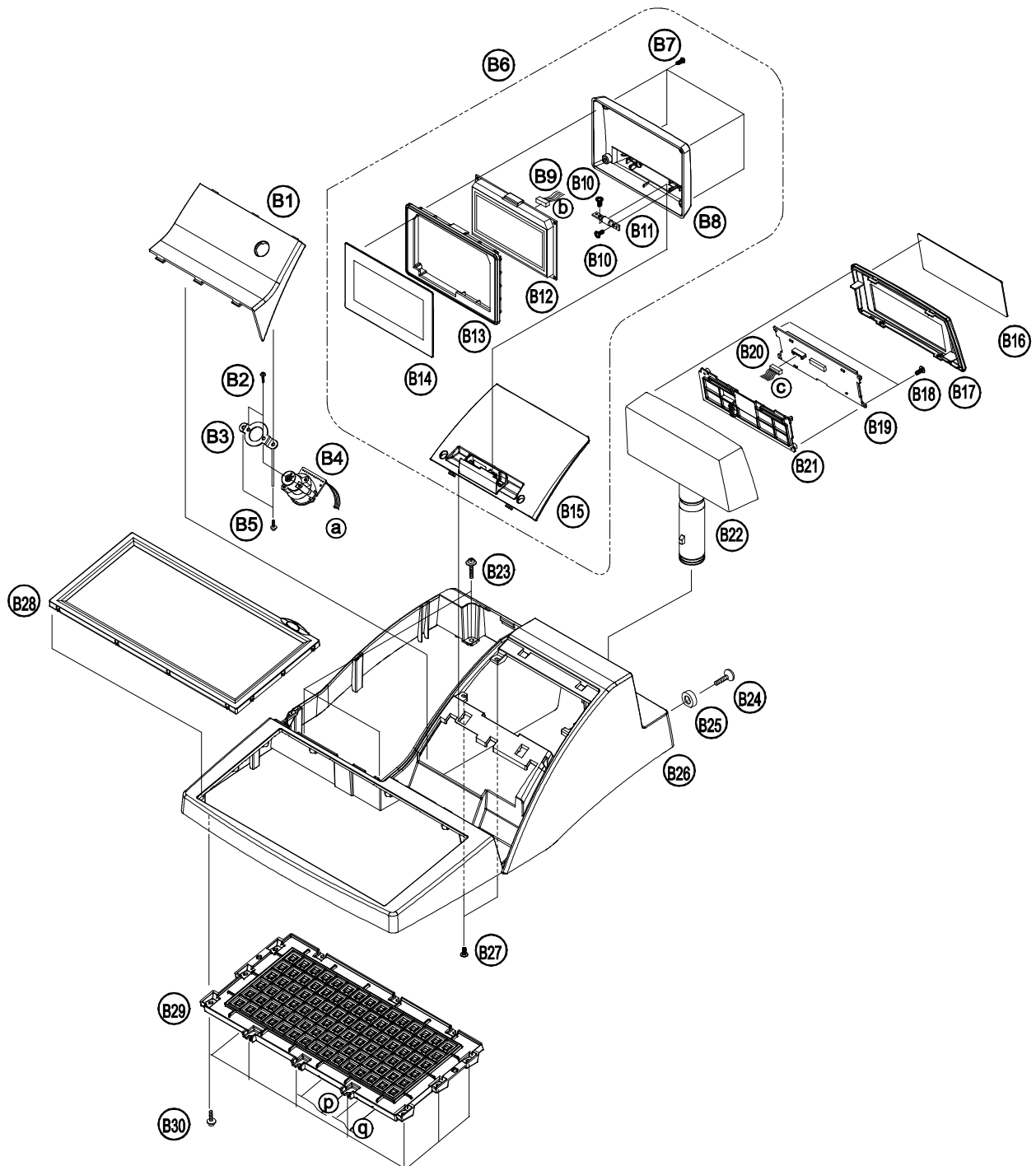


Figure 6-4 ASS'Y CASE-UPPER(NR-500)

6-2. B. ASS'Y UPPER(NR-500)

No.	Parts No.	Description / Specification	Q'ty	Design-Location	Serviceable	Remark
B1	JK72-20214K	PMO-COVER MODE S/W:NR-510	1		Y	IVORY
	JK72-20214L	PMO-COVER MODE S/W:NR-520	1		Y	IVORY
	JK72-21005G	PMO-COVER MODE S/W: NR-500RB,STD,HIPS(V0),BLK,SPRAY	1		Y	BLACK
B2	S600200011A	SCREW-TAPPING:PH,M3,L8	2		Y	
B3	JK70-20309A	IPR-BRKT MODE_S/W	1		Y	
B4	JK95-70098A	MODE KEY ASSY	1		Y	
B5	S600200011A	SCREW-TAPPING:PH,M3,L8	2		Y	
B6	JK95-70596C	ELA-LCD FRONT	1		Y	IVORY
	JK95-70596D	ELA-LCD FRONT	1		Y	BLACK
B7	S600200011A	SCREW-TAPPING:PH,M3,L8	4		Y	WHITE
	S600300017A	SCREW-TAPTITE:BH,M3,L8	4		Y	BLACK
B8	JK72-20337C	PMO-LCD REAR	1		Y	IVORY
	JK72-20337D	PMO-LCD REAR:NR-500B,HIPS(V0),BLK,SPRAY	1		Y	BLACK
B9	JK39-40756F	HARNESS-LCD:NR-500,10P,450mm,AT TAPE	1		Y	
B10	S600300016A	SCREW-DELTA PT;M3X8(BH)	2		Y	
B11	JK75-40006A	MEC-HINGE ASS'Y	1		Y	
B12	JK07-70003A	LCD:NR-400,192*64,NEGATIVE	1		Y	
B13	JK72-20336C	PMO-LCD FRONT	1		Y	IVORY
	JK72-20336D	PMO-LCD FRONT:NR-500B,HIPS(V0),BLK,SPRAY	1		Y	BLACK
B14	JK72-20825B	PMO-WINDOW VIEW	1		Y	
B15	JK72-20891A	PMO-HOLDER LCD	1		Y	IVORY
	JK72-20891C	PMO-HOLDER LCD:NR-500B,HIPS(V0),BLK,SPRAY	1		Y	BLACK
B16	JK72-20349A	PMO-WINDOW VIEW_R	1		Y	
B17	JK72-20630A	MO-WINDOW TURRET	1		Y	
B18	S600200006A	SCREW-TAPPING:PW,H,M3,L8	2		Y	
B19	JK07-70002A	DISPLAY-LCD:16Char*2line	1		Y	
B20	JK39-80007B	HARNESS-DISPLAY:8P,450mm	1		Y	
B21	JK72-20629A	PMO-HOLDER LCD REAR	1		Y	
B22	JK72-20703D	PMO-TURRET BODY	1		Y	IVORY
	JK72-20703E	PMO-TURRET BODY:ER-350,HIPS(V0),BLK,SPRAY	1		Y	BLACK
B23	S600200004A	SCREW-TAPPING:PH,M4,L15	3		Y	WHITE
	S600200029A	SCREW-TAPPING:PH,M4,L14	3		Y	BLACK
B24	S600100010A	SCREW-MACHINE:FH,M4,L10	1		Y	WHITE
	S600100040A	SCREW-MACHINE:FH,M4,L10	1		Y	BLACK
B25	JK70-70073A	ICT-SHAFT MOLDING	1		Y	
B26	JK72-20213A	PMO-CASE UPPER:NR-500	1		Y	IVORY
	JK72-20213B	PMO-CASE UPPER:NR-500F	1		Y	IVORY
	JK72-20213F	PMO-CASE UPPER:ER-390B,BLK,SPRAY	1		Y	BLACK
	JK72-20213G	PMO-CASE UPPER:ER-390BF,BLK,SPRAY	1		Y	BLACK
B27	S600200006A	SCREW-TAPPING:PW,H,M3,L8	2		Y	
B28	JK75-20033A	ASSY-KBD HOUSING	1		Y	IVORY
	JK75-20033C	ASSY-KBD HOUSING:90FLAT(WITH W/PO), BLK,SPRAY	1		Y	BLACK
B29	JK59-30027A	UNIT-KEYBOARD:ER-390,90 KEY,FLAT,IVORY	1		Y	IVORY
	JK59-30027B	UNIT-KEYBOARD:NR-510B/520B, 90 KEY,FLAT,BLACK	1		Y	BLACK
B30	S600200006A	SCREW-TAPPING:PW,H,M3,L8	12		Y	

6-2 C. ASS'Y PRINTER

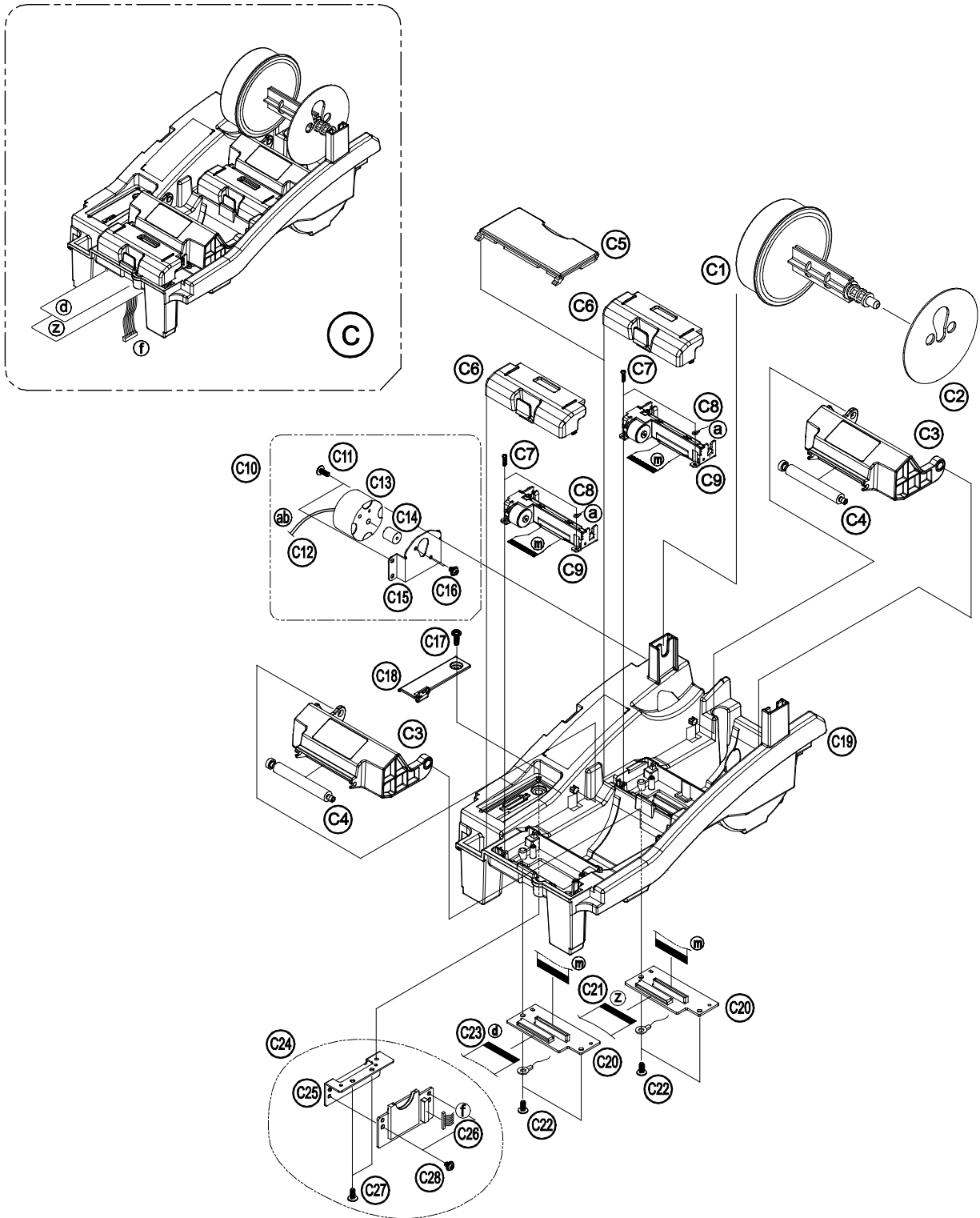


Figure 6-5 ASS'Y PRINTER

6 Exploded Views and Parts List

6-2. C. ASS'Y PRINTER

No.	Code No.	Description / Specification	Q'TY	Design-Location	Serviceable	Remarks
C	JK95-70674A	ELA_UNIT-PRINTER:NR-510	1		Y	
	JK95-70674B	ELA_UNIT-PRINTER:NR-520	1		Y	
C1	JK72-20979A	PMO-SPOOL WINDING	1		Y	
C2	JK72-20093A	PMO-GUIDE WINDING	1		Y	
C3	JK72-20797B	PMO-HOUSING CLAM(2INCH): NR-300,ABS+GF20%,NEW	2		Y	
C4	JK81-20004A	PLATEN-ROLLER:2INCH	2		Y	
C5	JK72-20234C	PMO-COVER 1STATION:NR-510,HIPS(V0),BLACK	1		Y	NR-510
C6	JK72-20272A	PMO-CAP PRINTER	2		Y	
C7	S600200032A	SCREW-TAPPING:PH,M2,L8	4		Y	
C8	JK39-50002B	GND-WIRE:ER-180T,150mm,UL1007,GRN, RING-RING,2.7pi	2		Y	
C9	JK59-20003A	UNIT-PRINTER:LTP01-245-11(SII)	2		Y	
C10	JK95-70690A	ASSY SPOOL MOTOR	1		Y	NR-520
C11	S600200006A	SCREW-TAPPING:PWH,M3,L8	2		Y	NR-520
C12	JK39-40686C	HARNESS-SPOOL:NR-500,3P,400mm,AT TAPE	1		Y	
C13	S310100012A	MOTOR-DC	1		Y	NR-520
C14	JK73-30200A	RCT-MOTOR	1		Y	
C15	JK70-20024A	IPR-BRKT SPOOL MOTOR	1		Y	NR-520
C16	S600100023A	SCREW-MACHINE:BH,,M2.6,L3	2		Y	
C17	S600100034A	SCREW-MACHINE:PWH,M3,L14	1		Y	
C18	JK72-20316A	PMO-COVER_SD	1		Y	
C19	JK72-20978A	PMO-HOLDER PRINTER	1		Y	
C20	JK92-10059J	PBA PRT JOINT:NR-500,SVC	2		Y	
C21	JK39-40565A	CABLE-FFC:ER-260,30P,1.0mm,300mm	1		Y	JOURNAL
C22	S600200006A	SCREW-TAPPING:PWH,M3,L8	4		Y	
C23	JK39-50005A	CABLE-FFC:ER-230,30P,1.0mm,160mm	1		Y	RECEIPT
C24	JK92-10039A	PBA SUB:SD CARD	1		Y	
C25	JK70-20122A	IPR-BRKT SD	1		Y	
C26	JK39-40756B	HARNESS-SD:ER-230,10P,220mm,AT TAPE	1		Y	
C27	S600200006A	SCREW-TAPPING:PWH,M3,L8	2		Y	
C28	S600100016A	SCREW-MACHINE:PWH,M3,L4	2		Y	

6-2 D. ASS'Y KBD(48KEY RAISED)

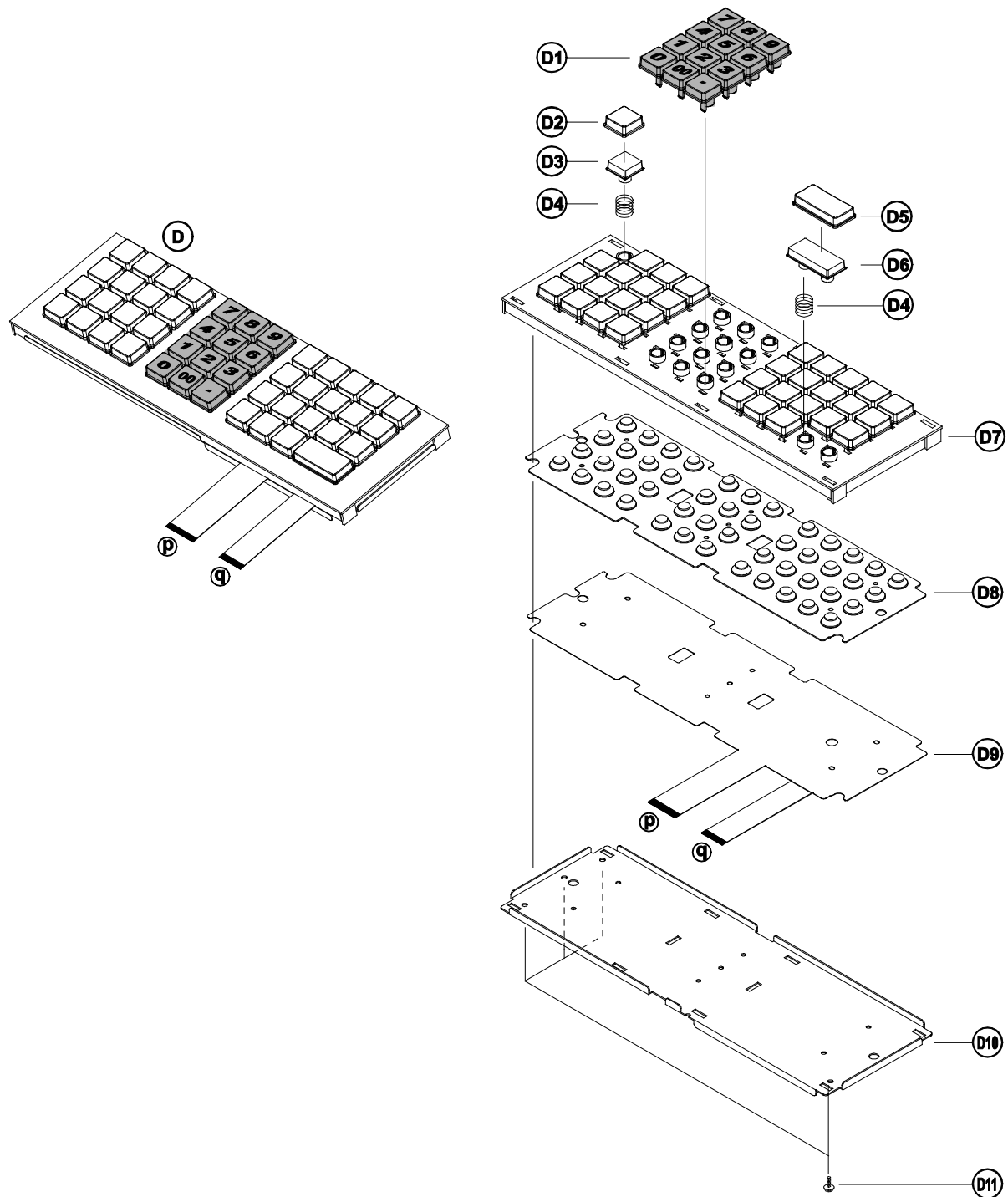


Figure 6-6 ASS'Y-KEYBOARD (48 Key)

6 Exploded Views and Parts List

6-2. D. ASS'Y KBD(48KEY RAISED)

No.	Parts No.	Description / Specification	Q'ty	Design-Location	Serviceable	Remark
D	JK59-30077A	UNIT-KEYBOARD:NR-510R,RAISED,48KEY	1		Y	IVORY
	JK59-30077B	UNIT-KEYBOARD:NR-510RB,RAISED,48KEY	1		Y	BLACK
	JK59-30077C	UNIT-KEYBOARD:NR-520R,RAISED,48KEY	1		Y	IVORY
	JK59-30077D	UNIT-KEYBOARD:NR-520RB,RAISED,48KEY	1		Y	BLACK
D1	JK72-20483A	KEY NUMBER SET	1		Y	
D2	JK72-20476A	PMO-KEY CAP_1X1	32		Y	
D3	JK72-20479A	PMO-KEY TOP_1X1	32		Y	
D4	JK81-20061A	RETURN-SPRING	36		Y	
D5	JK72-20477A	PMO-KEY CAP_1X2	2		Y	
D6	JK72-20480A	PMO-KEY TOP_1X2	1		Y	
D7	JK81-20052A	PMO-KBD FRAME_48,RAISED	1		Y	
D8	JK81-20052D	CONTACT-RUBBER_48	1		Y	
D9	JK81-20052C	ASSY-FPC,48KEY,RAISED	1		Y	
D10	JK81-20052B	IPR-BOTTOM PLATE_48	1		Y	
D11	S600200006A	SCREW-TAPPING:PW,H,M3,L8	4		Y	

6-2 D. ASS'Y KBD(90KEY FLAT)

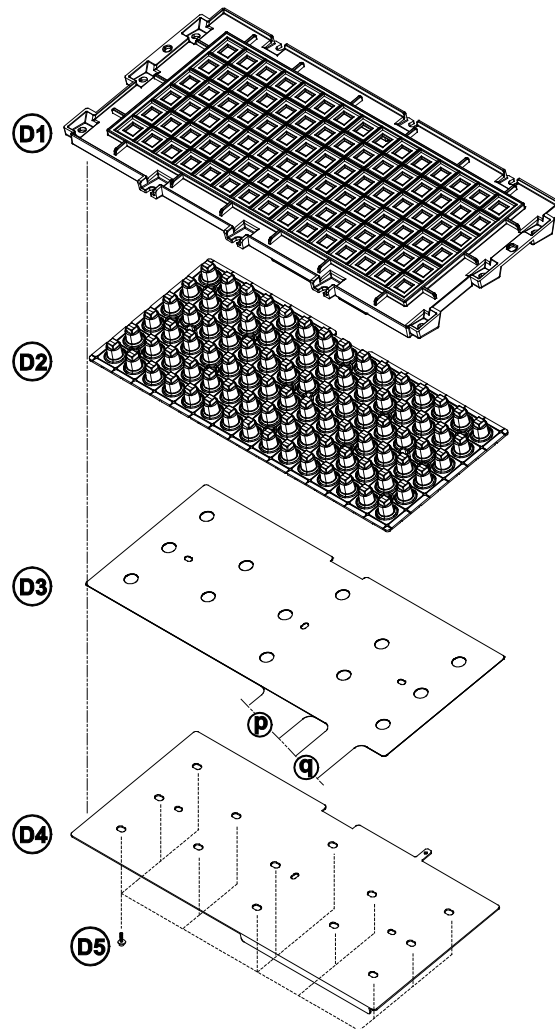


Figure 6-7 ASS'Y-KEYBOARD (90 Key)

6-2. D. ASS'Y KBD(90KEY FLAT)

No.	Parts No.	Description / Specification	Q'ty	Design-Location	Serviceable	Remark
D	JK59-30027A	UNIT-KEYBOARD:ER-390,90 KEY,FLAT	1		Y	IVORY
	JK59-30027B	UNIT-KEYBOARD:ER-390B,90 KEY,FLAT	1		Y	BLACK
D1	JK81-20049A	FRAME:90 KEY	1		N	
D2	JK81-20049B	KEY-RUBBER:90 KEY	1		N	
D3	JK81-20049C	FPC-ASSY:90 KEY	1		Y	
D4	JK81-20049D	BASE-PLATE:90 KEY	1		N	
D5	JK81-20049E	SCREW-TAPPING:M2.6X8	13		N	

6-2 E. ASS'Y CASE-LOWER

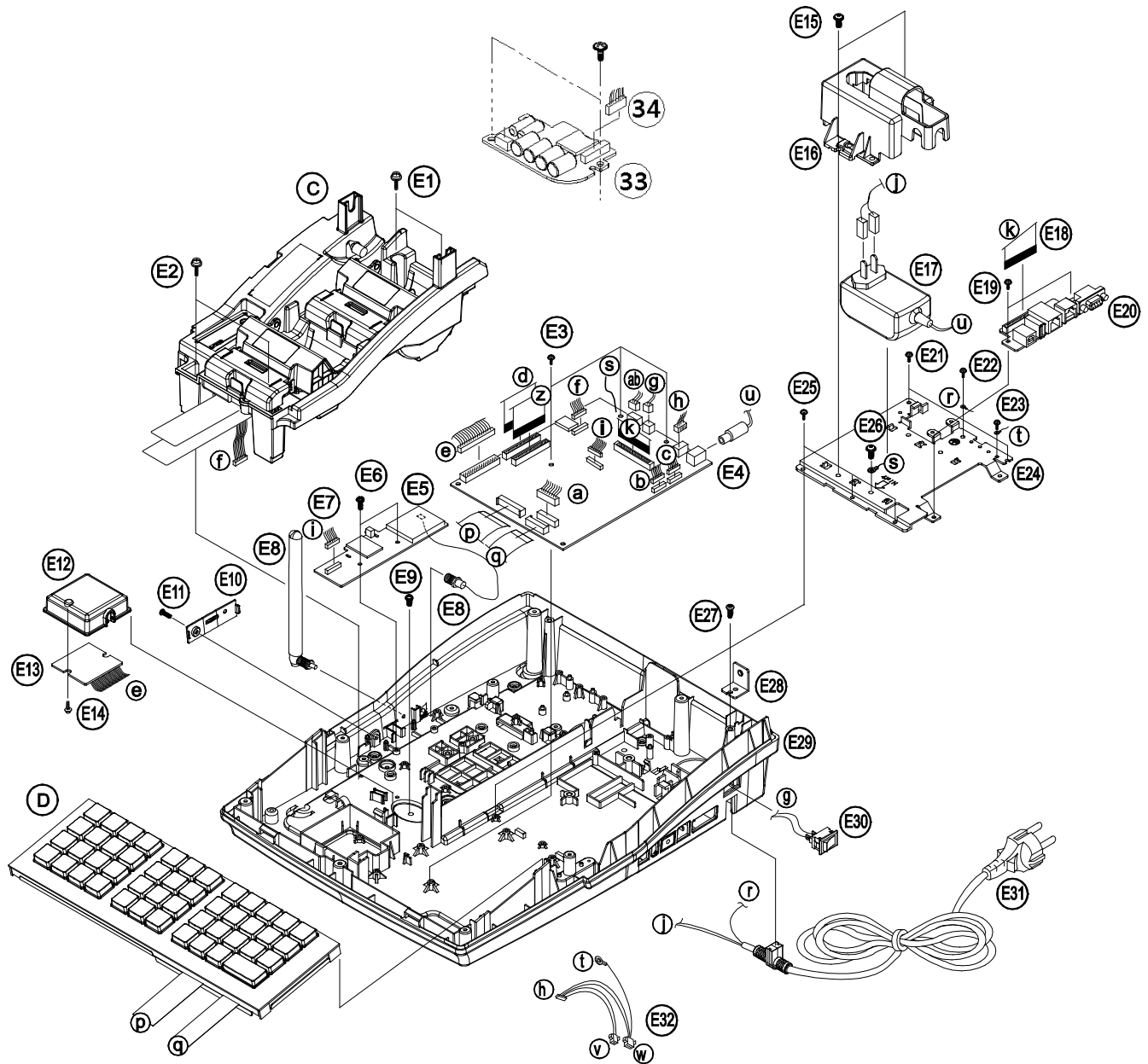


Figure 6-8 ASS'Y CASE-LOWER

6 Exploded Views and Parts List

6-2. E. ASS'Y CASE-LOWER

No.	Parts No.	Description / Specification	Q'ty	Design-Location	Serviceable	Remark
E1	S600200005A	SCREW-TAPPING: PWH,M3,L10	2		Y	
E2	S600200005A	SCREW-TAPPING: PWH,M3,L10	2		Y	
E3	S600200005A	SCREW-TAPPING: PWH,M3,L10	3		Y	
E4	JK92-10119A	PBA MAIN:NR-520,90KEY,8Mb,M/SD	1		Y	2-Station
	JK92-10146A	PBA MAIN:NR-510,90KEY,8Mb,M/SD, W/O ETHERNET&FISCAL	1		Y	1-Station
	JK92-10146B	PBA MAIN:NR-510,90KEY,8Mb,ETHERNET, W/O M/SD&FISCAL	1		Y	1-Station
	JK92-10146C	PBA MAIN:NR-510,90KEY,4Mb, W/O M/SDÐERNET&FISCAL	1		Y	1-Station
	JK92-10146D	PBA MAIN:NR-510,90KEY,8Mb,M/SD&CARD, W/O ETHERNET&FISCAL	1		Y	1-Station
	JK92-10146F	PBA MAIN:NR-510,90KEY,4Mb,ETHERNET, W/O M/SD&FISCAL	1		Y	1-Station
E5	JK92-10064A	PBA GPRS:ER-420EJ	1		N	
E6	S600200005A	SCREW-TAPPING: PWH,M3,L10	2		Y	
E7	JK39-80007A	HARNESS-GPRS: 8P,200mm	1		Y	
E8	S421000001A	Dipole Antenna : GPRS, Quad Band, 900Mhz	1	ANTENA CABLE NUT WASHER	Y	
E9	S600300011A	SCREW-TAPTITE:PWH,M4,L10,	1		Y	
E10	JK72-20627A	PMO-COVER GPRS	1		Y	IVORY
	JK72-20627B	PMO-COVER GPRS	1		Y	BLACK
E11	S600200011A	SCREW-TAPPING:PH,M3,L8	1		Y	WHITE
	S600300016A	SCREW-DELTA PT;M3X8(BH)	1		Y	BLACK
E12	JK72-20730A	PMO-CASE FISCAL BOARD	1	STD	Y	
	JK72-20118A	PMO-COVER FISCAL	1	GREECE	Y	
E13	JK92-01284K	PBA SUB-FISCAL:ER-230,34P,2MBIT,3.3V	1	2Mbit	N	
	JK92-10037A	PBA SUB-FISCAL:ER-230,34P,4MBIT,3.3V	1	4Mbit	Y	
E14	S600200028A	SCREW-TAPPING: PWH,M3,L6	1		Y	
E15	S600600005A	SCREW-ASSY TAPT: BH,M4,L8	2		Y	
E16	JK72-20628A	PMO-HOLDER ADAPTER	1		Y	
E17	JK95-70582A	ASSY-ADAPTOR: 9V/2.5A,USA	1		Y	
E18	JK39-50005A	CABLE-FFC: 30P,1.0mm,150mm	1		Y	
E19	S600100017A	SCREW-MACHINE:PWH, M3,L6,	2		Y	
E20	JK92-10059K	PBA INTERFACE:NR-500(2),232*2, W/O ETHERNET,SVC	1		Y	OLD
	JK92-10059Q	PBA INTERFACE:NR-500(3),232*2, W/O ETHERNET,SVC	1	SERIAL 2-PORT	Y	NEW (Jan.2016~)
	JK92-10059R	PBA INTERFACE:NR-500(3),232*3, W/O ETHERNET,SVC	1	SERIAL 3-PORT	Y	
E21	S600200005A	SCREW-TAPPING: PWH,M3,L10	2		Y	
E22	S600600002A	SCREW-ASS'Y MACH:WT,BH,+,M4,L6	1		Y	
E23	S600600006A	SCREW-ASSY TAPTITE:SWRCH18A,M3,L8	1		Y	
E24	JK70-20018B	IPR-BRKT TRANS	1		Y	
E25	S600200006A	SCREW-TAPPING: PWH,M3,L8	3		Y	
E26	S600600005A	SCREW-ASSY TAPT: BH,M4,L8	1		Y	
E27	S600200003A	SCREW-TAPPING:PH,M4,L10	1		Y	
E28	JK70-20307A	IPR-BRKT CASING	1		Y	
E29	JK72-20964P	PMO-CASE LOWER	1		Y	IVORY
	JK72-20964W	PMO-CASE LOWER:NR-500,2SERIAL, NO HOLE,BLK,SPRAY	1		Y	BLACK
E30	JK39-40688D	HARNESS-POWER S/W:NR-500, 2P,270mm,SOLTEAM,OR-L-11D,DOT MARK,DC	1		Y	
E31	JK39-30002A	POWER-CORD:NR-500,EUROPE,220V,IVORY	1	EUROPE USA AUSTRALIA UK	Y	IVORY
	JK39-30002B	POWER-CORD:NR-500,USA,110V,IVORY				
	JK39-30002C	POWER-CORD:NR-500,AUSTRALIA,240V,IVORY				
	JK39-30002D	POWER-CORD:NR-500,UK,240V,IVORY				
	JK39-30001A	POWER-CORD:NR-500,EUROPE,220V,BLACK	1	EUROPE	Y	BLACK

6 Exploded Views and Parts List

	JK39-30001B JK39-30001C JK39-30001D	POWER-CORD:NR-500,USA,110V,BLACK POWER-CORD:NR-500,AUSTRALIA,240V,BLACK POWER-CORD:NR-500,UK,240V,BLACK		USA AUSTRALIA UK		
E32	JK39-40603A	HARNESS DRA/COM;4PIN,180mm	1		Y	
E33	JK92-10139A	PBA MICRO-SD:NR-300F,W/O STARCAP	1		Y	
E34	JK39-40756B	HARNESS-SD:ER-230,10P,220mm,AT TAPE	1		Y	

6-2 F. ASS'Y-DRAWER(G-DRAWER:4B8C,5B6C)

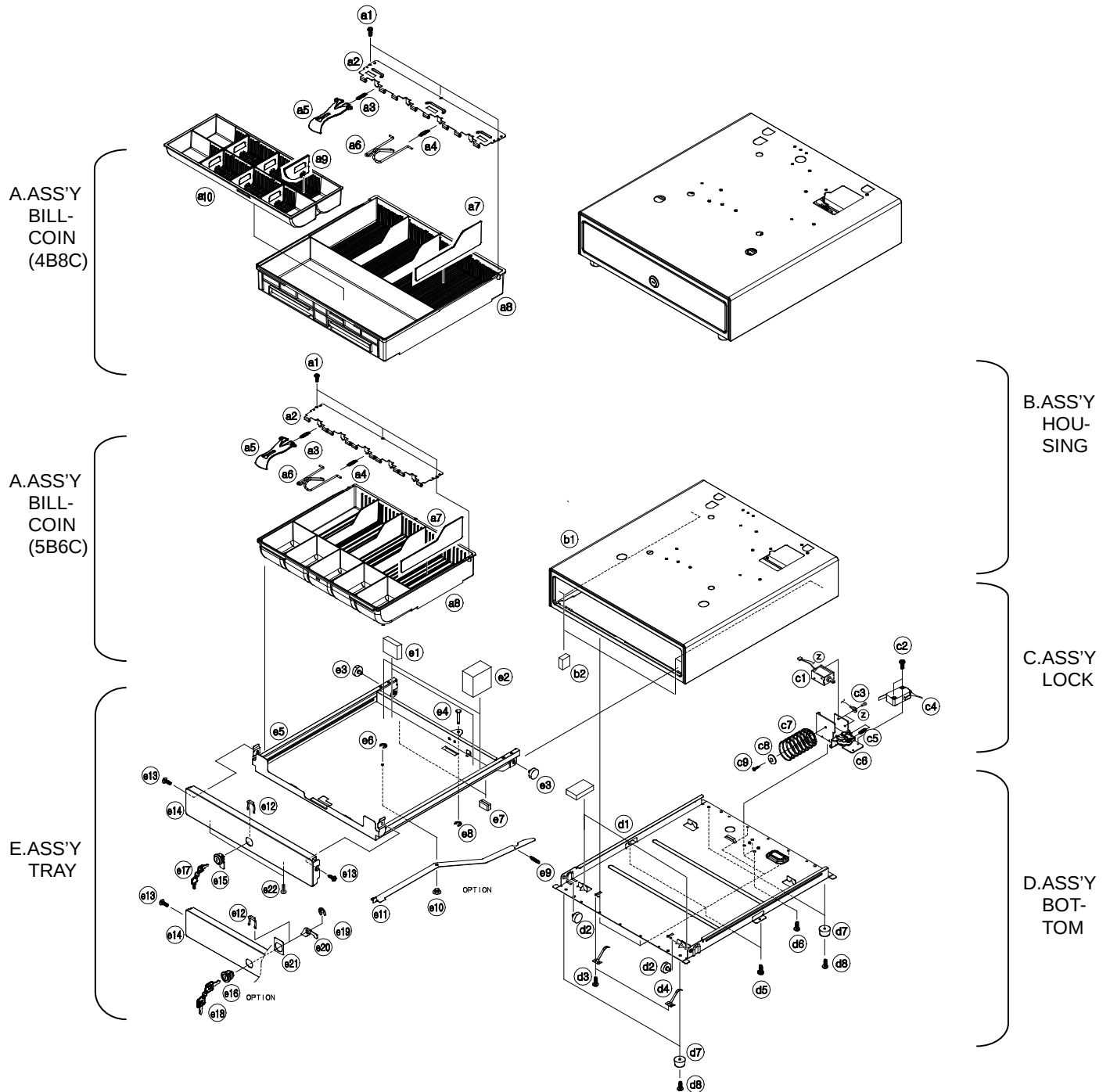


Figure 6-9 ASS'Y-DRAWER (G-DRAWER:4B8C,5B6C)

6-2 F. ASS'Y-DRAWER(G-DRAWER:4B8C,5B6C)

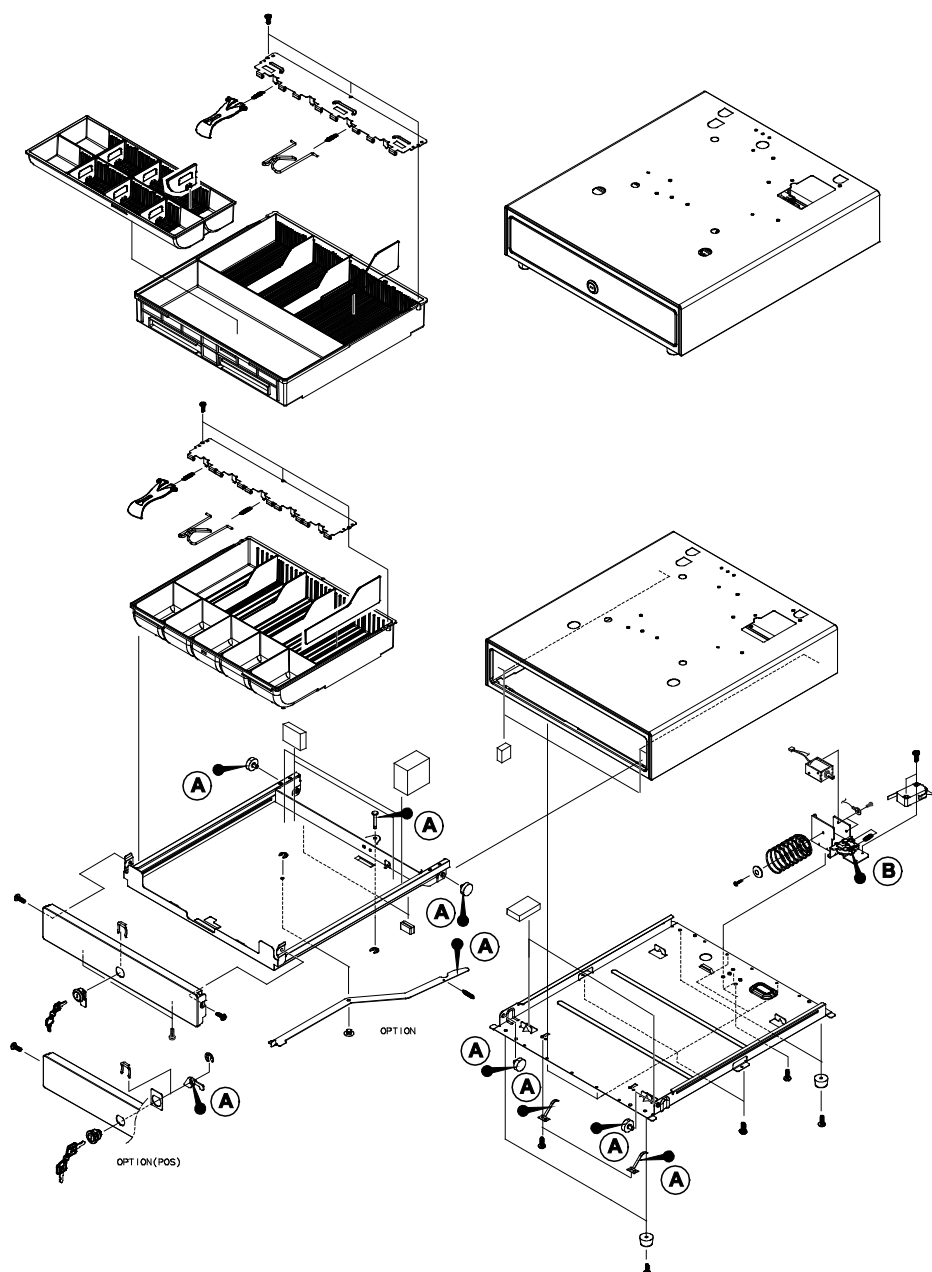


Figure 6-10 Lubrication Points of the G-Drawer(4B8C,5B6C)

No.	Code No.	Description / Specification	Q'ty	Serviceable	Remark
A	0201-002010	GREASE-N2	-	Y	Minimum Serviceable Packing Weight : 40g
B	0201-002009	GREASE-N1	-	Y	Minimum Serviceable Packing Weight : 40g

6-2 F. ASS'Y-DRAWER(G-DRAWER:4B8C,5B6C)

a. ASS'Y BILL-COIN (4B8C)

No.	Code No.	Description / Specification	Q'ty	Design-Location	Serviceable	Remark
a	JK97-20094B	MEA-UNIT BILL COIN(4B8C,PLASTIC)	1		Y	
a1	6002-000175	SCREW-TAPPING : M3,L8	3		Y	
a2	JK70-20114A	IPR-HOLDER PLATE(4B8C)	1		Y	
a3	JK70-30014A	SPRING-LEVER PRESS(MD)	4		Y	
a4	JK70-30015A	SPRING-LEVER PRESS(PD)	4		Y	OPTION
a5	JK72-20259A	PMO-LEVER PRESS(PLASTIC)	4		Y	
a6	JK70-20067A	IPR-LEVER PRESS(STEEL)	4		Y	OPTION
a7	JK72-40269A	PMO-BILL PARTITION	3		Y	
a8	JK72-20088A	PMO-BILL COIN TILL : 4B8C	1		Y	
a9	JK72-20090A	PMO-COIN PARTITION	6		Y	
a10	JK72-20089A	PMO-COIN TILL	1		Y	

a. ASS'Y BILL-COIN (5B6C)

No.	Code No.	Description / Specification	Q'ty	Design-Location	Serviceable	Remark
a	JK97-20094A	MEA-UNIT BILL COIN(5B5C)	1		Y	
a1	6002-000175	SCREW-TAPTITE : M3,L8	3		Y	
a2	JK70-20113A	IPR-HOLDER PLATE(5B5C)	1		Y	
a3	JK70-30014A	SPRING-LEVER PRESS(MD)	5		Y	
a4	JK70-30015A	SPRING-LEVER PRESS(PD)	5		Y	OPTION
a5	JK72-20259A	PMO-LEVER PRESS(PLASTIC)	5		Y	
a6	JK70-20067A	IPR-LEVER PRESS(STEEL)	5		Y	OPTION
a7	JK72-40269A	PMO-BILL PARTITION	4		Y	
a8	JK72-40268A	PMO-BILL COIN TILL : 5B5C	1		Y	

b. ASS'Y HOUSING

No.	Code No.	Description / Specification	Q'ty	Design-Location	Serviceable	Remark
b	JK97-20095A	MEA-UNIT HOUSING(STD,WHT)	1		N	
	JK97-20095B	MEA-UNIT HOUSING(NON,WHT)	1		N	
	JK97-20095E	MEA-UNIT HOUSING(STD,BLK)	1		N	
	JK97-20095F	MEA-UNIT HOUSING(NON,BLK)	1		N	

c. ASS'Y LOCK

No.	Code No.	Description / Specification	Q'ty	Design-Location	Serviceable	Remark
c	JK97-20093C	MEA-UNIT LOCK(12V,COM)	1		Y	
	JK97-20093D	MEA-UNIT LOCK(24V,COM)	1		Y	
c1	JK33-10500A	SOLENOID-DC: 24V	1		Y	
	JK33-10500D	SOLENOID-DC: 12V	1		Y	
c2	6001-000525	SCREW-TAPTITE: M3,L14	2		Y	
c3	JK70-50079A	SCREW-TAPTITE: M3,L5	2		Y	
c4	JK39-40301R	CBF HARNESS : MICRO S/W	1		Y	
c5	6107-001041	SPRING-LOCK LEVER	1		Y	
c6	JK97-01080B	MEC-SUB LOCK	1		N	
c7	JK70-30019A	SPRING-PUSH	1		Y	
c8	JK70-50090A	PLAIN-WASHER	1		Y	
c9	JK70-50092A	SCREW-TAPTITE: M5,L10	1		Y	

6 Exploded Views and Parts List

6-2 F. ASS'Y-DRAWER(G-DRAWER:4B8C,5B6C)

d. ASS'Y BOTTOM

No.	Code No.	Description / Specification	Q'ty	Design-Location	Serviceable	Remark
d	JK97-20096C	MEA-UNIT BOTTOM(5B5C,UNV)	1		N	
d1	JK70-20115B	IPR-BOTTOM PLATE	1		N	
d2	JK75-20068A	MEC-ROLLER(Φ 22)	2		Y	
d3	6003-000266	SCREW-TAPTITE: M3,L6	2		Y	
d4	JK70-10401A	IPR-PLATE GROUND	2		Y	
d5	6003-000266	SCREW-TAPTITE: M3,L6	6		Y	
d6	JK70-50092A	SCREW-TAPTITE: M5,L10	3		Y	
d7	JK61-40200A	FOOT-RUBBER:WHITE	4		Y	
	JK61-40200B	FOOT-RUBBER: BALCK	4		Y	
d8	6002-000234	SCREW-TAPTITE: M4,L16	4		Y	

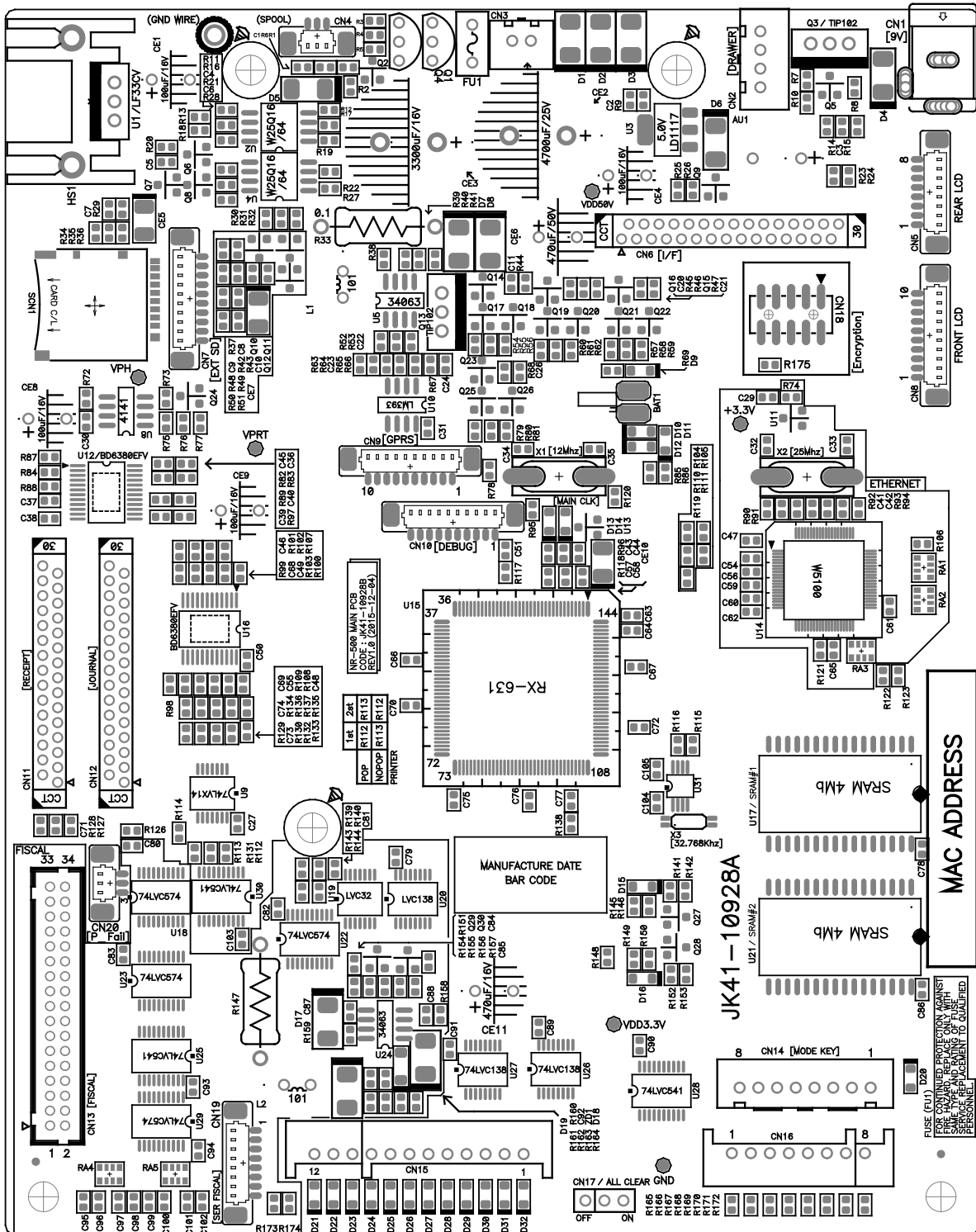
e. ASS'Y TRAY

No.	Code No.	Description / Specification	Q'ty	Design-Location	Serviceable	Remark
e	JK97-20097E	MEA-UNIT TRAY TILL(BLK,UNV)	1		N	
	JK97-20097F	MEA-UNIT TRAY TILL(BLK,PUSH,UNV)	1		N	
e1	JK70-60041A	RMO-RUBBER STOPPER	2		Y	
e2	JK70-60042A	RMO-PAD UNIVERSAL	2		Y	
e3	JK75-20068A	MEC-ROLLER	2		Y	
e4	JK70-40302A	ICT-SHAFT PIN	1		Y	
e5	JK97-20100A	MEA-TRAY TILL	1		N	
e6	6044-000124	RING-E: ID3	1		Y	
e7	JK70-60041A	RMO-RUBBER STOPPER	2		Y	
e8	6044-000124	RING-E: ID3	1		Y	
e9	JK70-30020A	SPRING-LEVER PUSH	1		Y	
e10	JK70-40905A	ICT-SHAFT LEVER PUSH	1		Y	
e11	JK70-20116A	IPR-LEVER PUSH	1		Y	
e12	JK70-10323A	IPR-PLATE CLIP	1		Y	
e13	6003-000266	SCREW-TAPTITE: M3,L6	2		Y	
e14	JK70-20108A	IPR-FRONT PANEL(5B5C,WHT)	1		Y	
	JK70-20108B	IPR-FRONT PANEL(5B5C,BLK)	1		Y	
	JK70-20108C	IPR-FRONT PANEL(4B8C,WHT)	1		Y	
	JK70-20108D	IPR-FRONT PANEL(4B8C,BLK)	1		Y	
e15	JK75-20067A	MEC-KEY LOCK	1		Y	
e16	JK75-20041A	MEC-KEY LOCK: #2424	1		Y	OPTION
e17	JK70-20025B	IPR-KEY DRAWER	1SET		Y	
e18	JK70-20075A	IPR-KEY DRAWER: #2424	1SET		Y	OPTION
e19	6044-000231	RING-E: ID5	1		Y	
e20	JK70-20074A	IPR-LEVER LOCK	1		Y	
e21	JK70-20120A	IPR-DUMMY KEY	1		Y	
e22	JK70-50094A	SCREW-TAPTITE: M3,L8	2		Y	

MEMO

7 PCB Layout and Parts List

7-1 Main PCB Layout

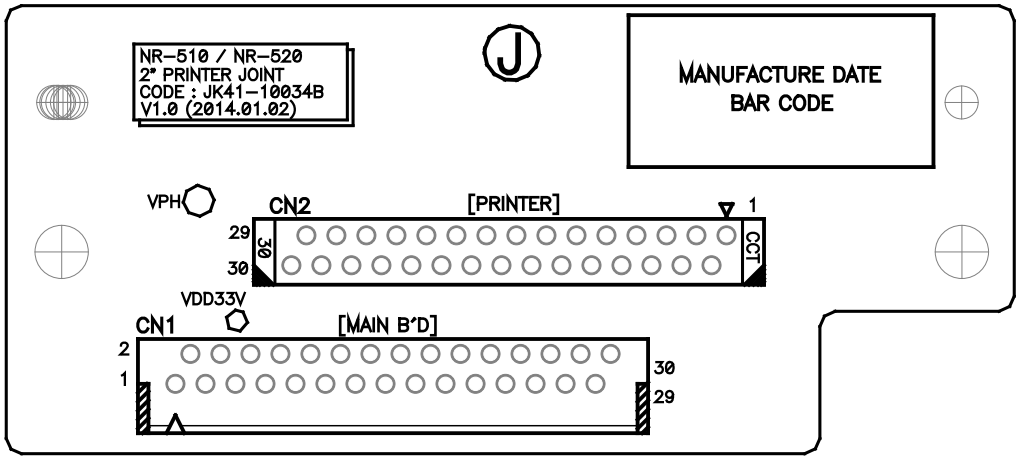


7 PCB Layout and Parts List

No	Part-No	Description / Specification	Q'TY	Design Location	Serviceable	Remarks
-	JK92-10119A	PBA MAIN:NR-520,90KEY,8Mb,MICRO SD SOCKET, W/O ETHERNET&FISCAL	1	ASSY	Y	
-	JK27-60101A	COIL-CHOCK:100uH,10mmXφ 8,DIP,5mm PIT	1	L1	Y	
-	JK39-40541C	CBF HARNESS-GND:ER-850,UL1015#18,60mm	1	GND-WIRE	Y	
-	S0501000294	TR-SMALL SIGNAL:KSA708Y,PNP,800mW,TO-92	2	Q1,Q4	Y	
-	S0502000401	TR-POWER:TIP102,DARLINGTON,NPN,TO-220	2	Q3,Q13	Y	
-	S1203001752	IC-REGULATOR:LF33CV,TO-220,3P,DIP,RoHS	1	U1	Y	
-	S2005001001	R-WIRE WOUND:0.1ohm,5%,1W,WRIT1W0.1Ω -J	1	R33	Y	
-	S2401000042	C-AL:100uF,16V,RADIAL,φ 6.3*7L,RoHS	4	CE1,CE4,CE8,CE9	Y	
-	S2401001049	C-AL:3300uF,16V,RADIAL,φ 16*25L,RoHS	1	CE3	Y	
-	S2401001314	C-AL:4700uF,20%,25V,RADIAL,φ 16*25L,RoHS	1	CE2	Y	
-	S2401001429	C-AL:470uF,20%,50V,RADIAL,Ø10×20L	1	CE6	Y	
-	S3002001027	BUZZER-PIEZO:85dB,1.5V,24mA,2.048KHz,BK	1	AU1	Y	
-	S3601000420	FUSE:250V,4A,SS-5,DIP,2P	1	FU1	Y	
-	S3708000147	CONNECTOR-FFC:12P,1R,2.54mm,ST,BLACK	1	CN15	Y	
-	S3708000327	CONNECTOR-FFC:8P,1R,2.54mm,ST,BLACK	1	CN16	Y	
-	S3708001395	CONNECTOR-FPC/FFC/PIC:30P,1mm,ST,DIP,TOP	3	CN6,CN11,CN12	Y	
-	S3711004100	WAFER;BOX-HEADER,1R,2P,2.5mm,ST,WHITE,	1	CN3	Y	
-	S3711004105	WAFER;BOX-HEADER,1R,4P,2.5mm,ST,WHITE,	1	CN2	Y	
-	S3711004109	WAFER;BOX-HEADER,1R,8P,2.5mm,ST,WHITE	1	CN14	Y	
-	S3722001035	JACK-DC POWER:3P,6.3mm,NOLOCK,AN	1	CN1	Y	
-	S4301000121	BATTERY:3.0V,11mAh,MS920S-FL27E	1	BAT1	Y	
-	S620300002A	HEAT SINK:NONE,T2,W17,L22,H45,DEGRE,AL60	1	HS1	Y	
-	S0402001189	DIODE-RECTIFIER:S1G-E3,M4,400V	3	D4,D5,D6	Y	
-	S0404001051	DIODE-SCHOTTKY:SK14,40V,1A,DO-214AA,	5	D1,D2,D3,D7,D8	Y	
-	S0404001052	DIODE-SCHOTTKY:BAT43WS,BAT54WS,30V	20	D10,D11,D12,D13,D14,D15,D16,D20,D21,D22,D23,D24,D25,D26,D27,D28,D29,D30,D31,D32	Y	
-	S0501000279	TR-SMALL SIGNAL:KSA1182Y,PNP,150mW,SOT23	10	Q7,Q8,Q11,Q12,Q14,Q15,Q16,Q17,Q19,Q21	Y	
-	S0501000457	TR-SMALL SIGNAL:MMBT2222A,NPN,350MW,SOT-	11	Q2,Q5,Q6,Q9,Q10,Q18,Q20,Q22,Q24,Q27,Q28	Y	
-	S0505000148	POWER MOSFET:FDS4141,SOIC,8P	1	U8	Y	
-	S0801001105	IC-CMOS;SN74LVC138A,DECODER,TSOP,16P	3	U20,U26,U27	Y	
-	S0801001110	IC-CMOS;74LV14A,INVERTER,TSOP,14P	1	U9	Y	
-	S0801001123	IC-CMOS LOGIC:74LVC541AP,BUFFER,TSSOP20P	2	U28,U30	Y	
-	S0903001181	IC-CPU:R5F5631ECDFB,LQFP144P	1	U15	Y	
-	S0909000138	IC-REAL TIME CLOCK:PCF8563,I2C,TSSOP,8P	1	U31	Y	
-	S1003001237	IC-MOTOR DRIVER;BD6380EFV,TSSOP,24P	2	U12,U16	Y	
-	S1106000247	IC-SRAM:BS62LV4006,512Kx8BIT,SOP,32P,4M	2	U17,U21	Y	
-	S1202000164	IC-VOLTAGE COMPARATOR:KA393,SOP,8P,1.27m	1	U10	Y	
-	S1203000404	IC-DC/DC CONVERTER:34063,SOP,8P,150MIL,P	1	U5	Y	
-	S1203000500	IC-RESET;AME8500AEETAE29Z,SOT-23,3P,3.3V	1	U13	Y	
-	S1203001774	IC-REGULATOR;SE1117-5.0V,SOT-223,4P	1	U3	Y	
-	S2008000001	R-CHIP:0 OHM,5%,1/10W,1608	1	R114	N	
-	S2008000005	R-CHIP:33 OHM,5%,1/10W,1608	2	R104,R105	N	
-	S2008000008	R-CHIP:100 OHM,5%,1/10W,1608	1	R38	N	
-	S2008000012	R-CHIP:200 OHM,5%,1/10W,1608	4	R4,R5,R23,R24	N	
-	S2008000013	R-CHIP:220 OHM,5%,1/10W,1608	2	R127,R130	N	
-	S2008000016	R-CHIP:300 OHM,5%,1/10W,1608	10	R15,R28,R32,R54,R57,R60,R85,R86,R101,R134	N	
-	S2008000020	R-CHIP:470 OHM,5%,1/10W,1608	2	R146,R150	N	
-	S2008000026	R-CHIP:1KOHM,1%,1/10W,1608,1%	16	R2,R10,R13,R25,R31,R44,R56,R58,R61,R77,R115,R116,R141,R145,R149,R152	N	
-	S2008000028	R-CHIP:1.5KOHM,1%,1/10W,1608,1%	1	R111	N	
-	S2008000030	R-CHIP:2KOHM,5%,1/10W,1608	2	R52,R53	N	
-	S2008000031	R-CHIP:2.2KOHM,5%,1/10W,1608	2	R83,R107	N	
-	S2008000037	R-CHIP:4.7KOHM,1%,1/10W,1608,1%	13	R73,R78,R87,R100,R118,R165,R166,R167,R168,R169,R170,R171,R172	N	

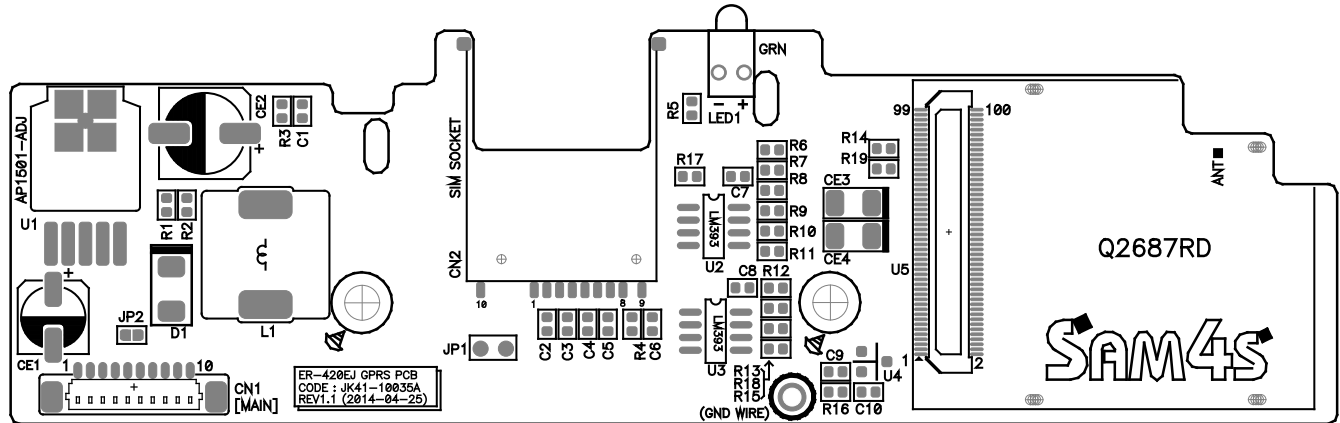
-	S2008000044	R-CHIP:10KOHM,1%,1/10W,1608,1%	44	R1,R6,R7,R9,R11,R12,R14,R16,R17,R18,R19,R20,R21,R22,R26,R27,R30,R37,R42,R43,R45,R46,R55,R59,R62,R65,R66,R67,R72,R76,R82,R96,R102,R108,R113,R117,R120,R122,R123,R126,R131,R136,R142,R153	N	
-	S2008000045	R-CHIP:12KOHM,1%,1/10W,1608,1%	1	R64	N	
-	S2008000046	R-CHIP:15KOHM,5%,1/10W,1608	6	R8,R39,R110,R119,R132,R137	N	
-	S2008000047	R-CHIP:18KOHM,1%,1/10W,1608,1%	5	R40,R88,R89,R103,R109	N	
-	S2008000049	R-CHIP:22KOHM,1%,1/10W,1608,1%	1	R63	N	
-	S2008000056	R-CHIP:47KOHM,1%,1/10W,1608,1%	12	R29,R34,R35,R36,R47,R48,R49,R50,R51,R75,R128,R129	N	
-	S2008000065	R-CHIP:150KOHM,1%,1/10W,1608,1%	3	R41,R133,R135	N	
-	S2008000074	R-CHIP:1MOHM,5%,1/10W,1608	1	R95	N	
-	S2008000082	R-CHIP:0.5 OHM,1%,1/10W,1608 (0603±1%)	4	R84,R97,R98,R99	N	
-	S2204000003	C-CERAMIC,CHIP:15pF,5%,50V,1608	1	C104	N	
-	S2204000004	C-CERAMIC,CHIP:22pF,5%,50V,1608	2	C34,C35	N	
-	S2204000010	C-CERAMIC,CHIP:100pF,5%,50V,1608	6	C1,C22,C38,C39,C68,C69	N	
-	S2204000015	C-CERAMIC,CHIP:470pF,5%,50V,1608	2	C71,C73	N	
-	S2204000016	C-CERAMIC,CHIP:680pF,5%,50V,1608	4	C37,C40,C49,C55	N	
-	S2204000028	C-CERAMIC,CHIP:100nF,+80-20%,25V,Y5V,1608	45	C2,C3,C4,C5,C6,C7,C8,C9,C10,C11,C20,C21,C23,C24,C27,C30,C31,C36,C43,C44,C45,C46,C48,C50,C51,C57,C58,C63,C64,C66,C67,C70,C72,C74,C75,C76,C77,C78,C79,C86,C89,C90,C91,C103,C105	N	
-	S2205000002	C-TANTAL:10uF,16V,3528	3	CE5,CE7,CE10	Y	
-	S280100018A	CRYSTAL-SMD:32.768KHz,20PPM,MC-146	1	X3	Y	
-	S2801003388	CRYSTAL-SMD:12MHz,SX-1,16pF	1	X1	Y	
-	S3711004118	WAFER;BOX-HEADER,1R, 3P,1.25mm,SMD	1	CN4	Y	
-	S3711004123	WAFER;BOX-HEADER,1R, 8P,1.25mm,SMD	1	CN5	Y	
-	S3711004125	WAFER;BOX-HEADER,1R,10P,1.25mm,SMD	4	CN7,CN8,CN9,CN10	Y	
-	S371200009A	CONNECTOR-MICRO SD:9P,PUSH PUSH,DM3AT-SF-PEJM5,HIROSE	1	SCN1	Y	
-	JK41-10928B	PCB-MAIN:NR-500,3SERIAL,FR-4,2L,T1.6mm	1	PCB	N	
-	JK39-40541C	CBF HARNESS-GND:ER-850,UL1015#18,60mm	1	GND-WIRE	Y	

7-2 Printer Joint PCB Layout



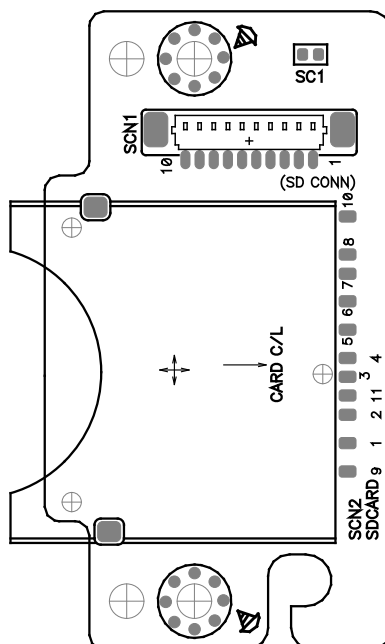
No	Part-No	Description / Specification	Q'TY	Design Location	Serviceable	Remarks
-	JK92-10059J	PBA PRT JOINT:NR-500,SVC	1	ASSY	Y	
-	S3708001395	CONNECTOR-FPC/FFC/PIC:30P,1mm,ST,DIP,TOP	1	JCN2	Y	
-	S3708001397	CONNECTOR-FPC/FFC/PIC:30P,1mmAN,DIP,SIDE	1	JCN1	Y	
-	JK41-10034B	PCB-I/F & PRT JOINT:NR-500,FR-4,2L,T1.6	1	PCB	N	

7-3 GPRS PCB Layout



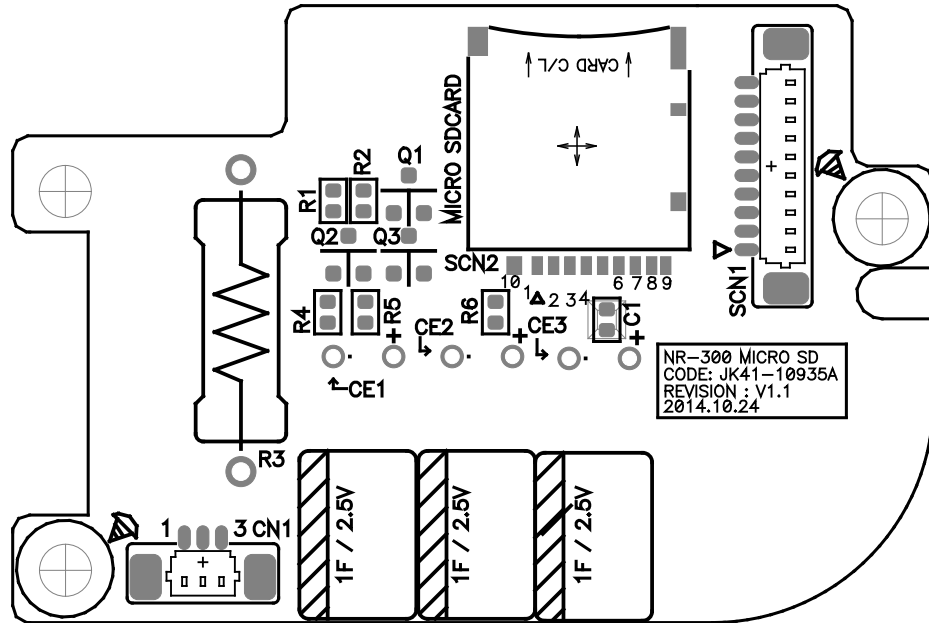
No	Part-No	Description / Specification	Q'TY	Design Location	Serviceable	Remarks
-	JK92-10064A	PBA GPRS:ER-420EJ,STD	1	ASSY	N	
-	JK39-80007A	HARNESS-GPRS:ER-230F,8P,200mm	1	HARNESS (CN1)	Y	
-	S0601000277	LED;3PI,2P,DIP,ANGLE,GREEN,BA2-G01	1	LED1	Y	
-	S480100020A	MODULE_Q2687RD_GSM	1	U5	Y	
-	JK27-60102A	L-COIL:BDS-1055R,33uH,SMD,IND-330M-SM-12	1	L1	Y	
-	S0404001051	DIODE-SCHOTTKY:SK14,40V,1A,DO-214AA,	1	D1	Y	
-	S1202000164	IC-VOLTAGE COMPARATOR:KA393,SOP,8P	2	U2,U3	Y	
-	S1203000500	IC-RESET;AME8500AEETAE29Z,SOT-23,3P	1	U4	Y	
-	S1203001776	IC-REGULATOR:AP1501-K5L,TO263-5L,ADJ	1	U1	Y	
-	S2008000017	R-CHIP:330 OHM,5%,1/10W,1608	1	R5	N	
-	S2008000026	R-CHIP:1KOHM,1%,1/10W,1608,1%	5	R1,R10,R11,R14,R15	N	
-	S2008000030	R-CHIP:2KOHM,5%,1/10W,1608	1	R2	N	
-	S2008000037	R-CHIP:4.7KOHM,1%,1/10W,1608,1%	4	R8,R9,R12,R13	N	
-	S2008000044	R-CHIP:10KOHM,1%,1/10W,1608,1%	3	R3,R6,R16	N	
-	S2008000063	R-CHIP:100KOHM,5%,1/10W,1608	1	R4	N	
-	S2204000004	C-CERAMIC,CHIP:22pF,5%,50V,1608	2	C4,C5	N	
-	S2204000018	C-CERAMIC,CHIP:1nF,10%,50V,X7R,1608	1	C3	N	
-	S2204000028	C-CERAMIC,CHIP:100nF,+80-20%,25V,Y5V,1608	7	C1,C2,C6,C7,C8,C9,C10	N	
-	S2205000002	C-TANTAL:10uF,16V,3528	2	CE3,CE4	Y	
-	S2402000168	C-AL,SMD:100uF,20%,16V,F60,Ø6.3×5.7L	1	CE1	Y	
-	S2402000180	C-AL,SMD,470uF,16V,MVG	1	CE2	Y	
-	S370400001A	SOCKET-SIM CARD:SMD,8P	1	CN2	Y	
-	S371200035A	SMD_CONNECTOR_AXK500147YG_100PIN	1	U5	Y	
-	S3711004123	WAFER;BOX-HEADER,1R, 8P,1.25mm,SMD	1	CN1	Y	
-	JK41-10035A	PCB-GPRS:ER-420EJ,FR-4,2L,T1.6	1	PCB	N	

7-4 SD CARD PCB Layout



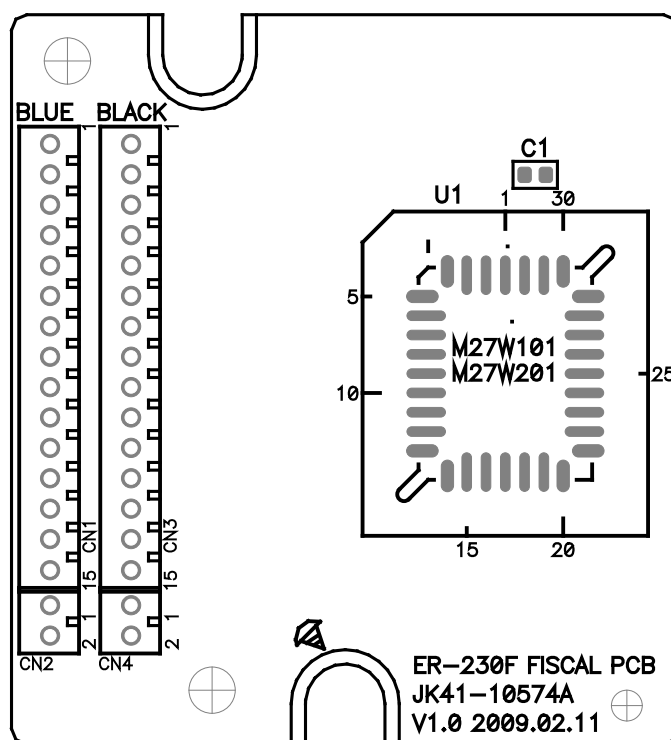
No	Part-No	Description / Specification	Q'TY	Design Location	Serviceable	Remarks
-	JK92-10039A	PBA SUB:NR-300,SD CARD	1	ASSY	Y	
-	JK46-00016C	UNIT-SDHC CARD: ER-230EJ,4GB,SANDISK,MLC,CLASS4	1	SD CARD	Y	SD CARD
-	JK39-40756D	HARNESS-SD:NR-300/ER-230EJ,10P,220mm	1	HARNESS	Y	
-	JK70-20122A	IPR-BRKT SD;NEX1,SECC T1.0	1	BRACKET	Y	
-	S2204000004	C-CERAMIC,CHIP:22pF,5%,50V,1608	1	SC1	N	
-	S3711004125	WAFER;BOX-HEADER,1R,10P,1.25mm,SMD	1	SCN1	Y	
-	S3712000060	CONNECTOR-SD CARD:SMD,12P,RoHS	1	SCN2	Y	
-	JK41-10019A	PCB-SD CARD:NR-300,FR-4,2L,T1.6	1	PCB	N	

7-5 MICRO SD CARD PCB Layout



No	Part-No	Description / Specification	Q'TY	Design-location	Serviceable	Remark
-	JK92-10139A	PBA MICRO-SD:NR-300F,W/O STARCAP	1	MICRO SD B'D	Y	
-	JK39-40756B	HARNESS-SD:ER-230,10P,150mm,AT TAPE	1	SCN1 (SD HARNESS)	Y	
-	S110900004A	UNIT-MICRO SD CARD:SDHC,4GB,SANDISK,CLASS4,MLC	1	MICRO SD 4GB	Y	
-	S3711004125	WAFER;BOX-HEADER,1R,10P,1.25mm,SMD	1	SCN1	Y	
-	S371200009A	CONNECTOR-MICRO SD:9P,PUSH PUSH	1	SCN2	Y	
-	JK41-10935A	PCB-MICRO SD:NR-300(SER),FR-4,2L,T1.6mm	1	PCB	N	

7-6 Fiscal PCB Layout



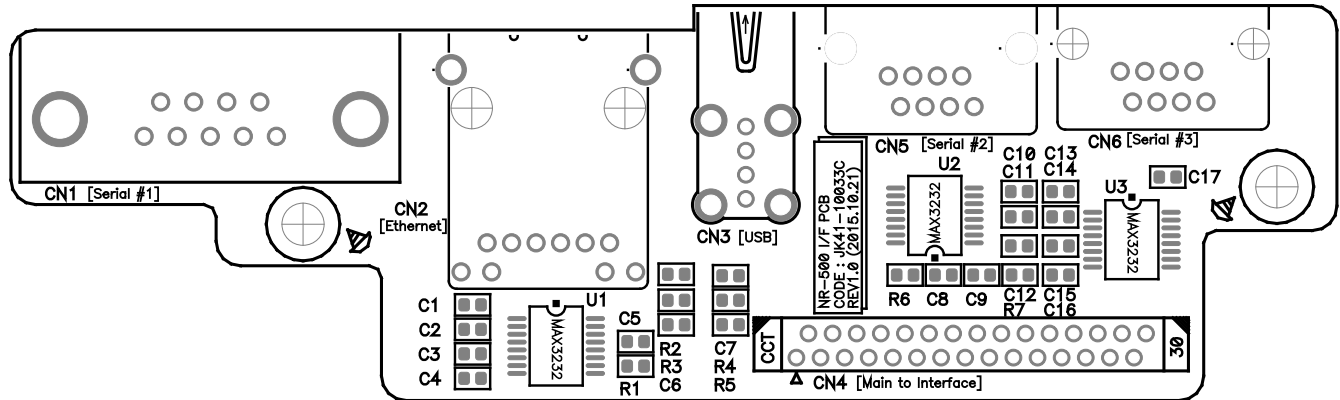
7-6-1 Memory Size = 2MBITs

No	Part-No	Description / Specification	Q'TY	Design Location	Serviceable	Remarks
-	JK92-01284K	PBA SUB-FISCAL:ER-230,34P,2MBIT,3.3V	1	ASS'Y	N	
-	S110200001A	IC-OTP ROM:AT27LV020A-12JU,256Kx8BIT	1	U1 (2MBITs)	Y	
-	JK39-40771A	HARNESS-FISCAL:34P,130mm,2mm,AT TAPE	1	HARNESS	Y	
-	S2204000028	C-CERAMIC,CHIP:100nF,+80-20%,25V,Y5V,1608	1	C1	N	
-	JK41-10574A	PCB-FISCAL:PLCC32,34P,FR-4,2L,BOARD-IN	1	PCB	N	

7-6-2 Memory Size = 4MBITs

No	Part-No	Description / Specification	Q'TY	Design Location	Serviceable	Remarks
-	JK92-10037A	PBA SUB-FISCAL:ER-230,34P,4MBIT,3.3V	1	ASS'Y	Y	
-	S110200002A	IC-OTP ROM:AT27LV040A-90JU,512Kx8BIT	1	U1 (4MBITs)	Y	
-	JK39-40771A	HARNESS-FISCAL:34P,130mm,2mm,AT TAPE	1	HARNESS	Y	
-	S2204000028	C-CERAMIC,CHIP:100nF,+80-20%,25V,Y5V,1608	1	C1	N	
-	JK41-10574A	PCB-FISCAL:PLCC32,34P,FR-4,2L,BOARD-IN	1	PCB	N	

7-7 Interface PCB Layout



7-7-1 NEW SERIAL 2-PORT (Jan. 2016~) Max. 3-PORT

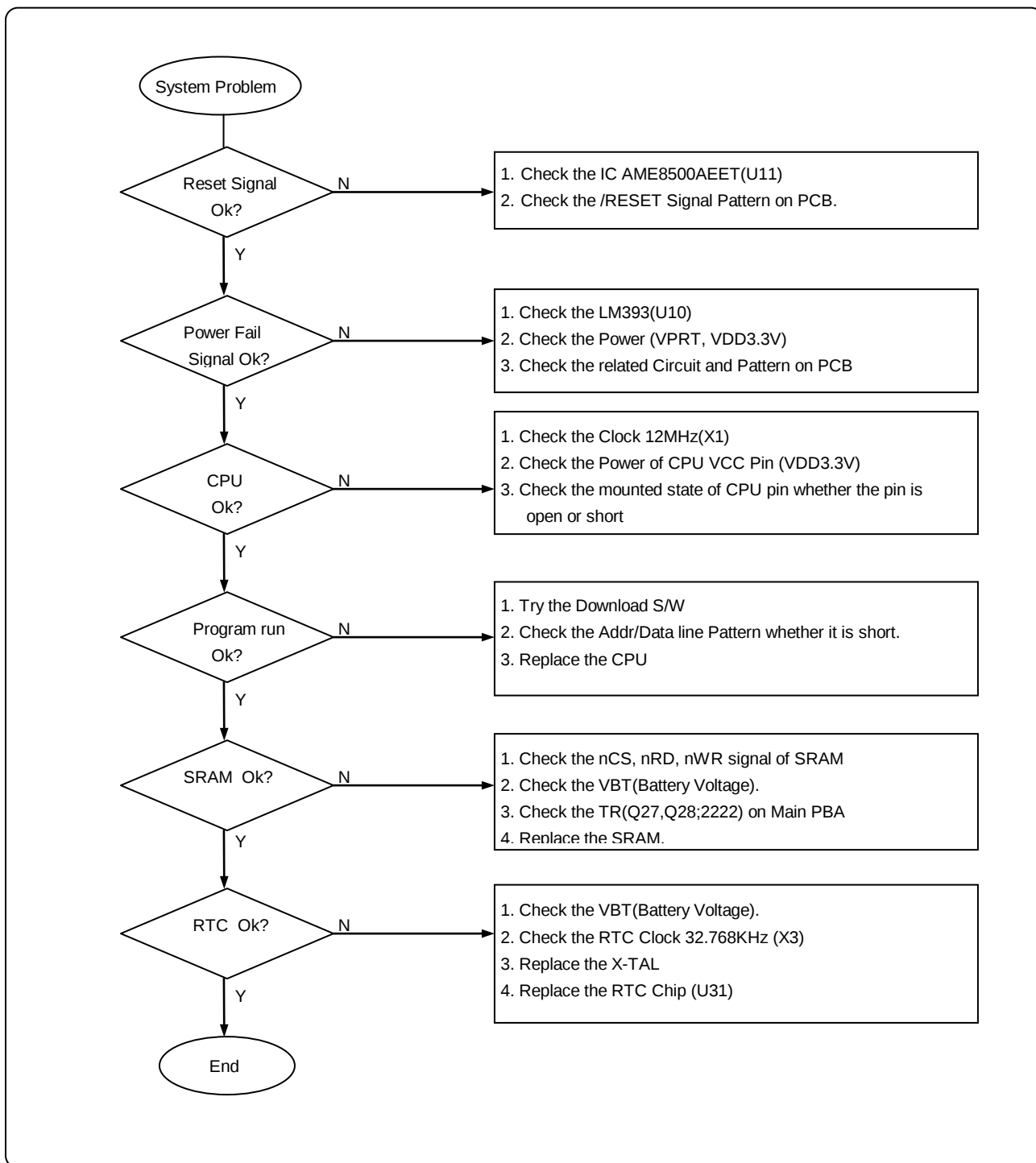
No	Part-No	Description / Specification	Q'TY	Design Location	Serviceable	Remarks
-	JK92-10059Q	PBA INTERFACE:NR-500(3),232*2,W/O ETHERNET,SVC	1	ASSY	Y	
-	S3701000232	CONNECTOR-DSUB:9P,2R,FEMALE,ANGLE,AUF	1	CN1	Y	
-	S3708001395	CONNECTOR-FPC/FFC/PIC:30P,1mm,ST,DIP,TOP	1	CN4	Y	
-	S3712000048	CONNECTOR-USB HOST:USB A TYPE,DIP,AN	1	CN3	Y	
-	S3722000212	JACK-MODULAR:8P/8C,-,N,ANGLE,-,N,GRY,AU5	1	CN5	Y	
-	S1006000134	IC-DRIVER/RECEIVER:3232,TSSOP,16P,26MIL	2	U1,U2	Y	
-	S2008000044	R-CHIP:10KOHM,1%,1/10W,1608,1%	2	R1,R6	N	
-	S2204000028	C-CERAMIC,CHIP:100nF,+80-20%,25V,Y5V,1608	10	C1,C2,C3,C4,C5, C8,C9,C10,C11,C12	N	
-	JK41-10033C	PCB-INTERFACE&JOINT:NR-500,3SERIAL,FR-4,2L,T1.6	1	PCB	N	

7-7-2 OLD SERIAL 2-PORT (~Dec. 2015) Max. 2-PORT (SVC only)

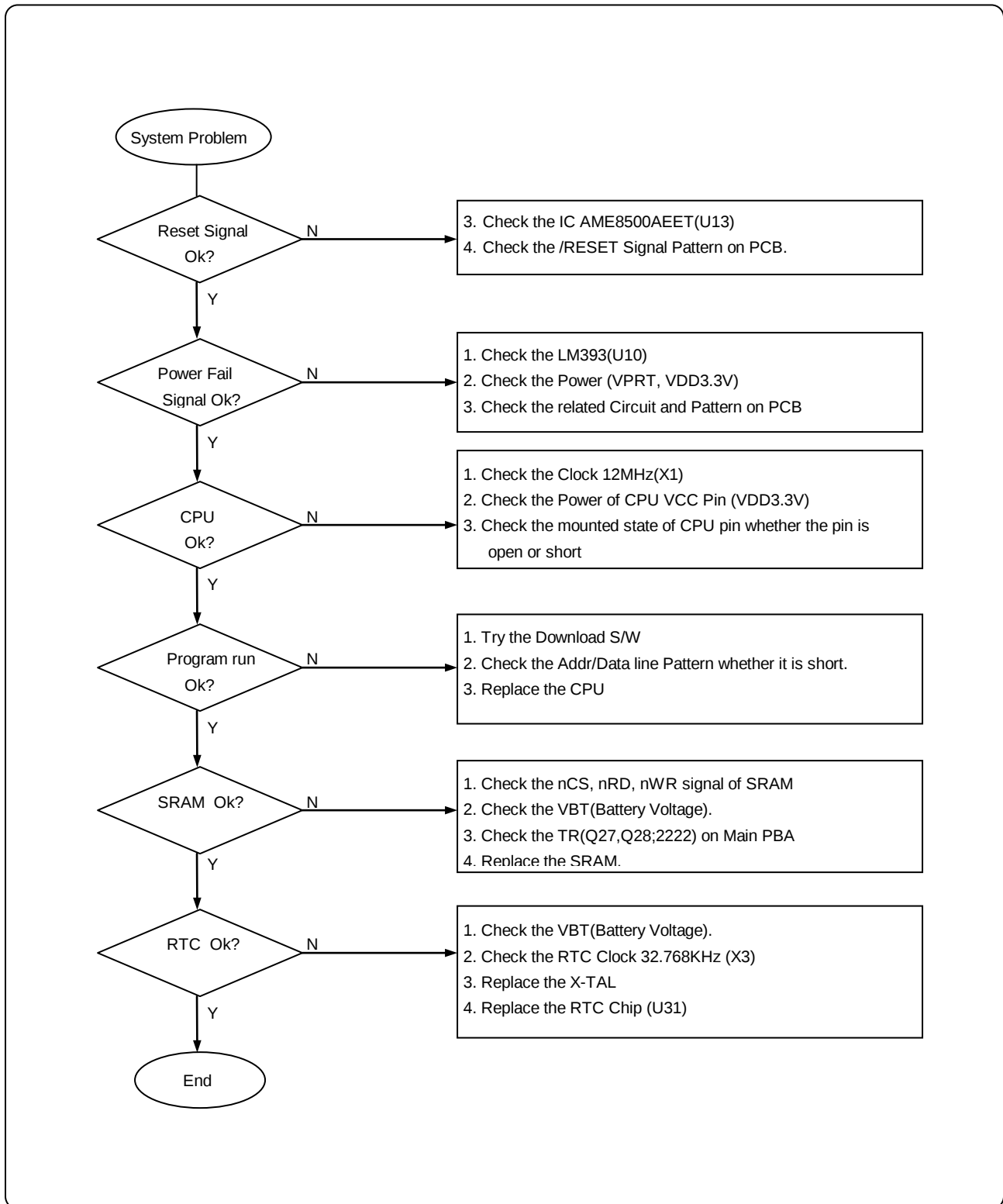
No	Part-No	Description / Specification	Q'TY	Design Location	Serviceable	Remarks
-	JK92-10059K	PBA INTERFACE:NR-500(2),232*2,W/O ETHERNET,SVC	1	ASSY	Y	
-	S3701000232	CONNECTOR-DSUB:9P,2R,FEMALE,ANGLE,AUF	1	CN4	Y	
-	S3708001395	CONNECTOR-FPC/FFC/PIC:30P,1mm,ST,DIP,TOP	1	CN1	Y	
-	S3712000048	CONNECTOR-USB HOST:USB A TYPE,DIP,AN	1	CN3	Y	
-	S3712000051	CONNECTOR-USB;B-TYPE,4P,2R,AN,DIP	1	CN5	Y	
-	S3722000212	JACK-MODULAR:8P/8C,-,N,ANGLE,-,N,GRY,AU5	1	CN6	Y	
-	JK41-10033B	PCB-INTERFACE:NR-500,FR-4,2L,T1.6	1	PCB	N	

8 Troubleshooting

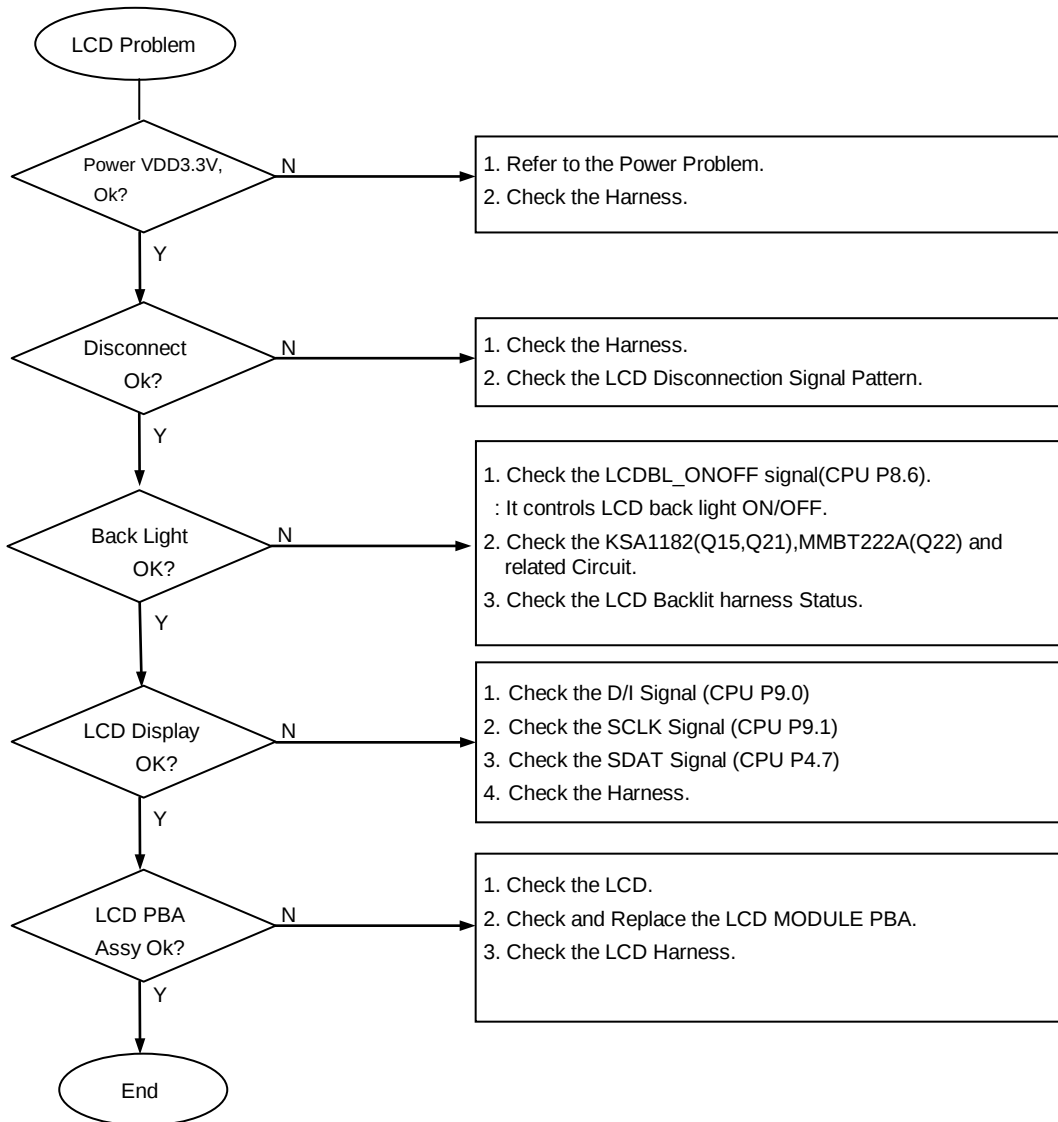
8-1. Power Problem



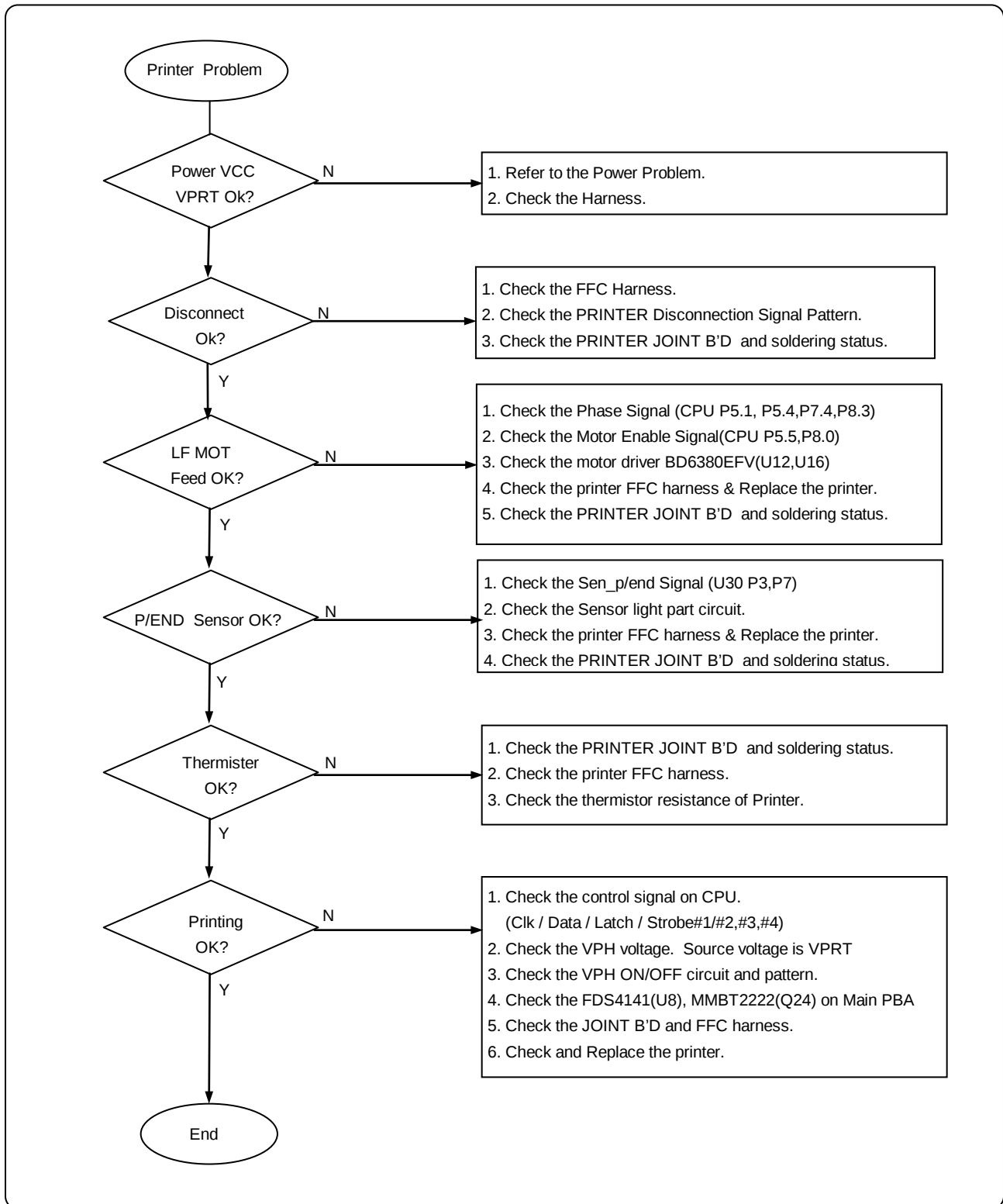
8-2 System Problem



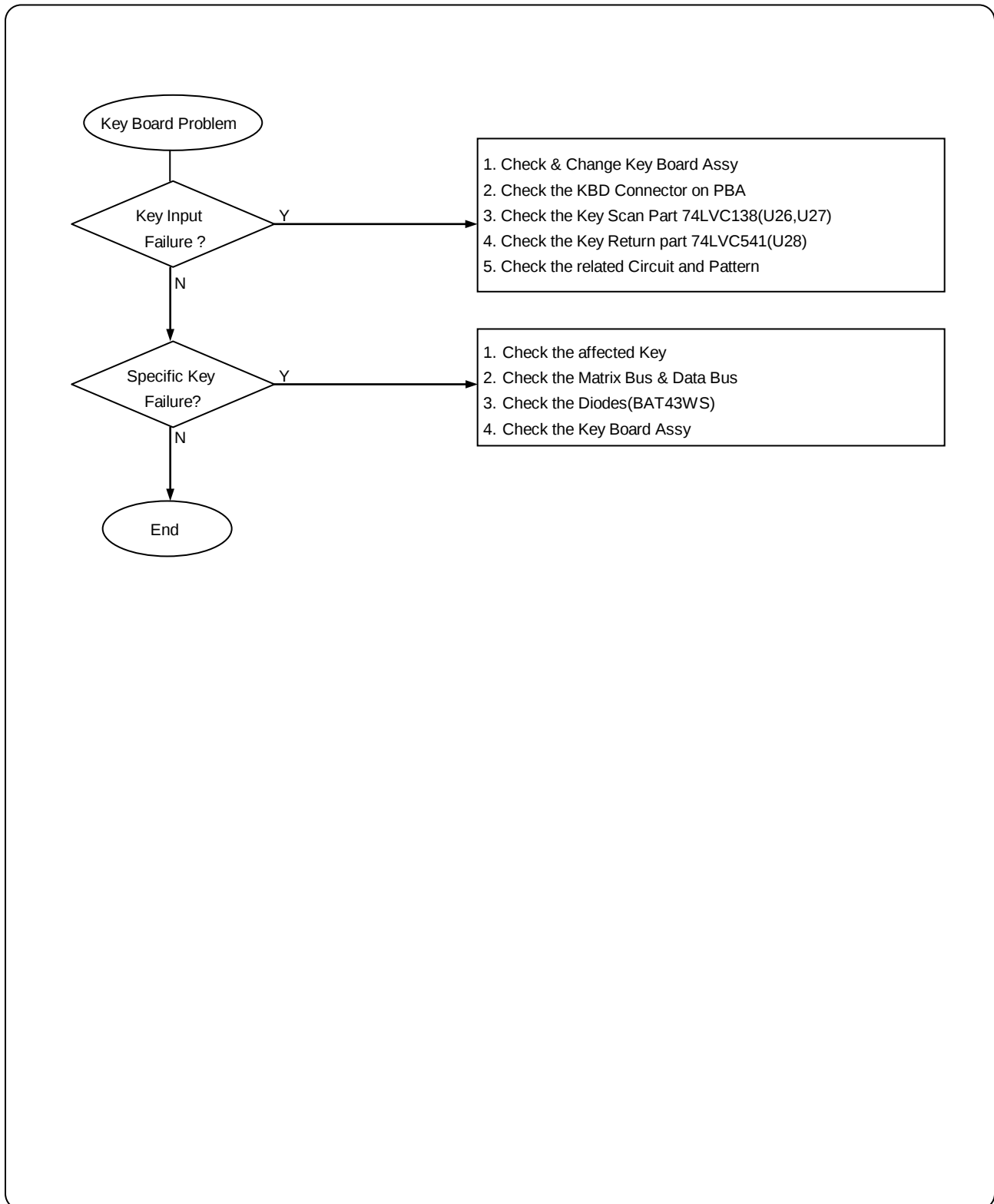
8-3 LCD Display Problem



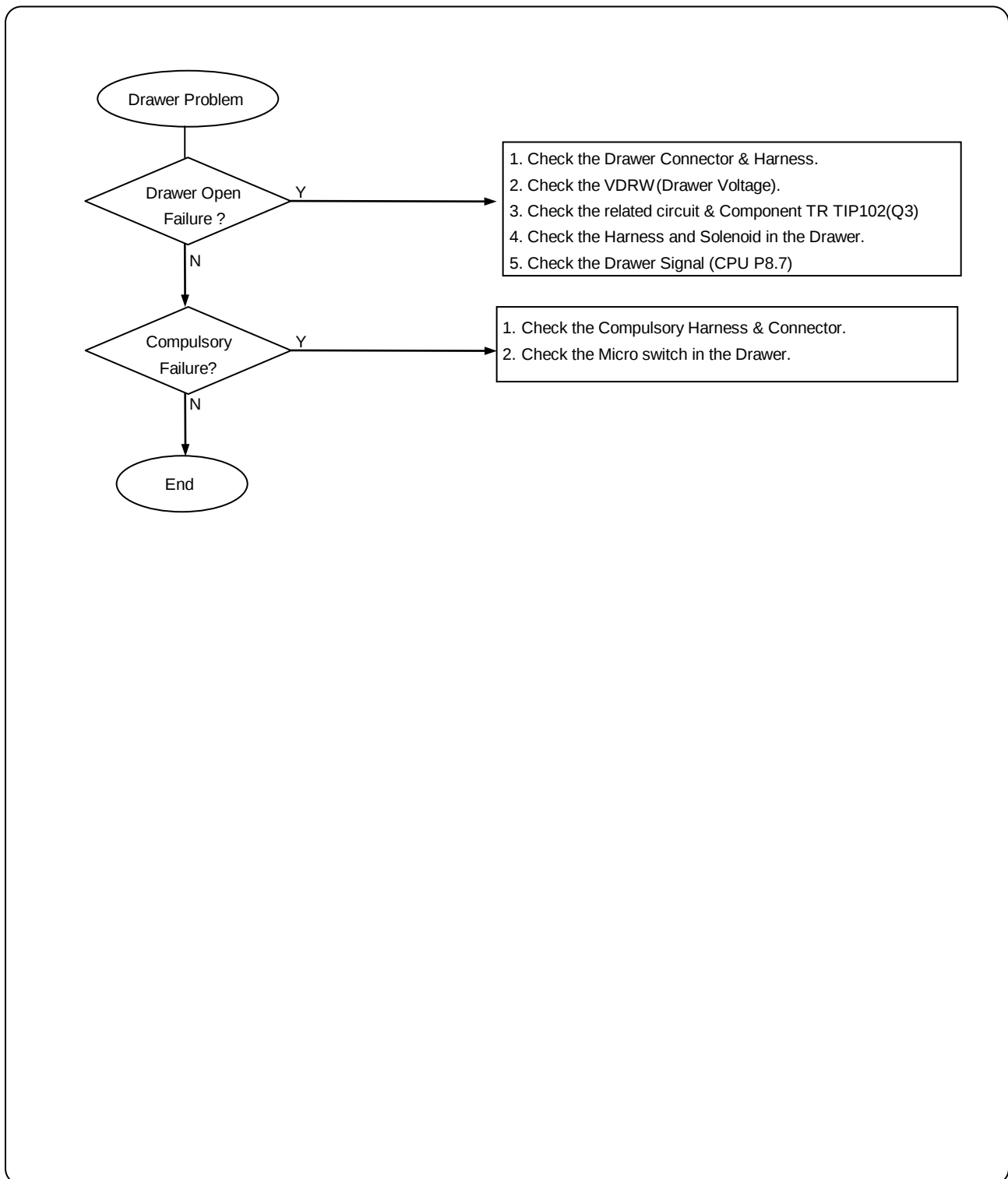
8-4 Thermal Printer Problem



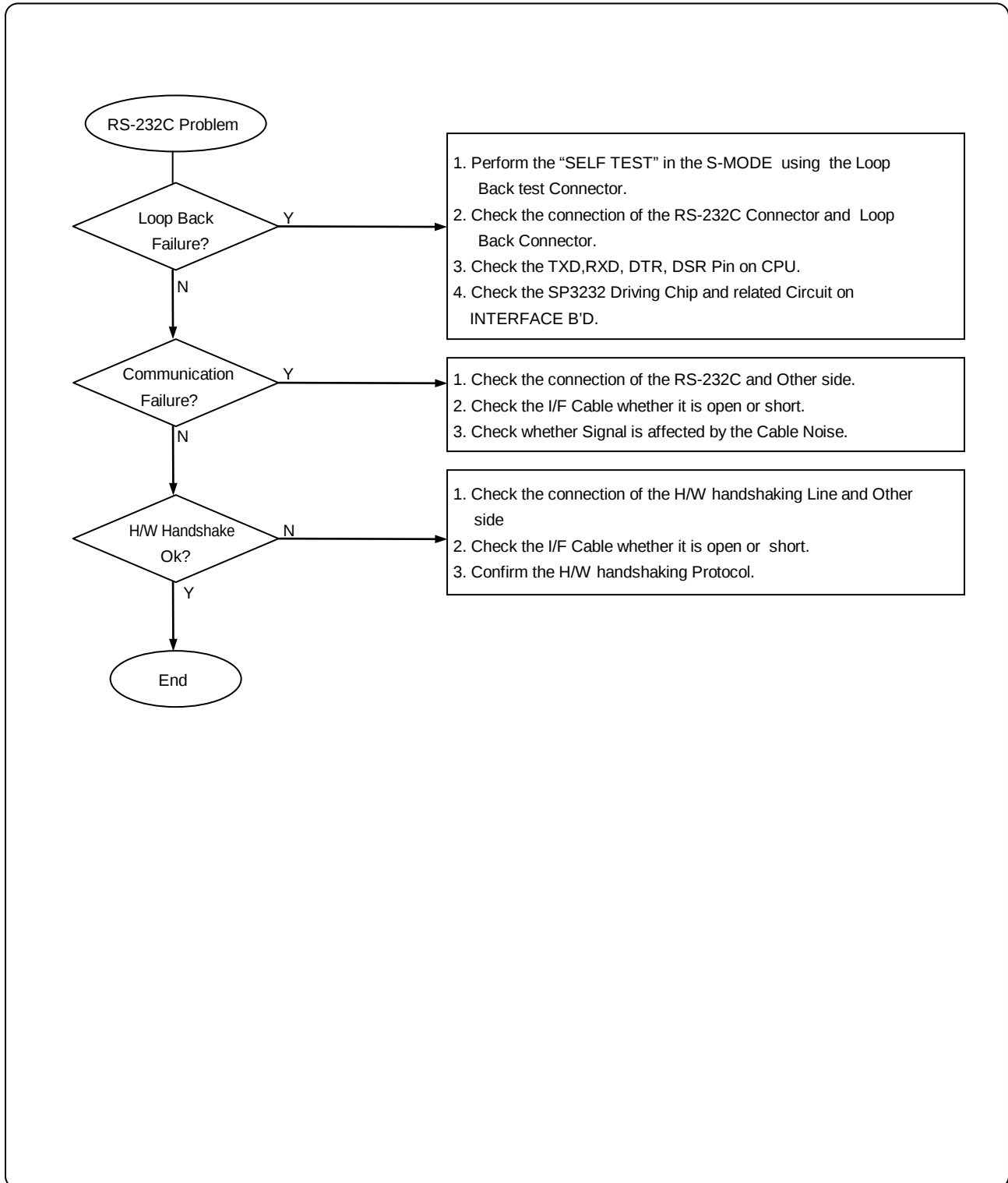
8-5 Key Board Problem



8-6 Drawer Problem



8-7 RS-232C Serial Communication Problem



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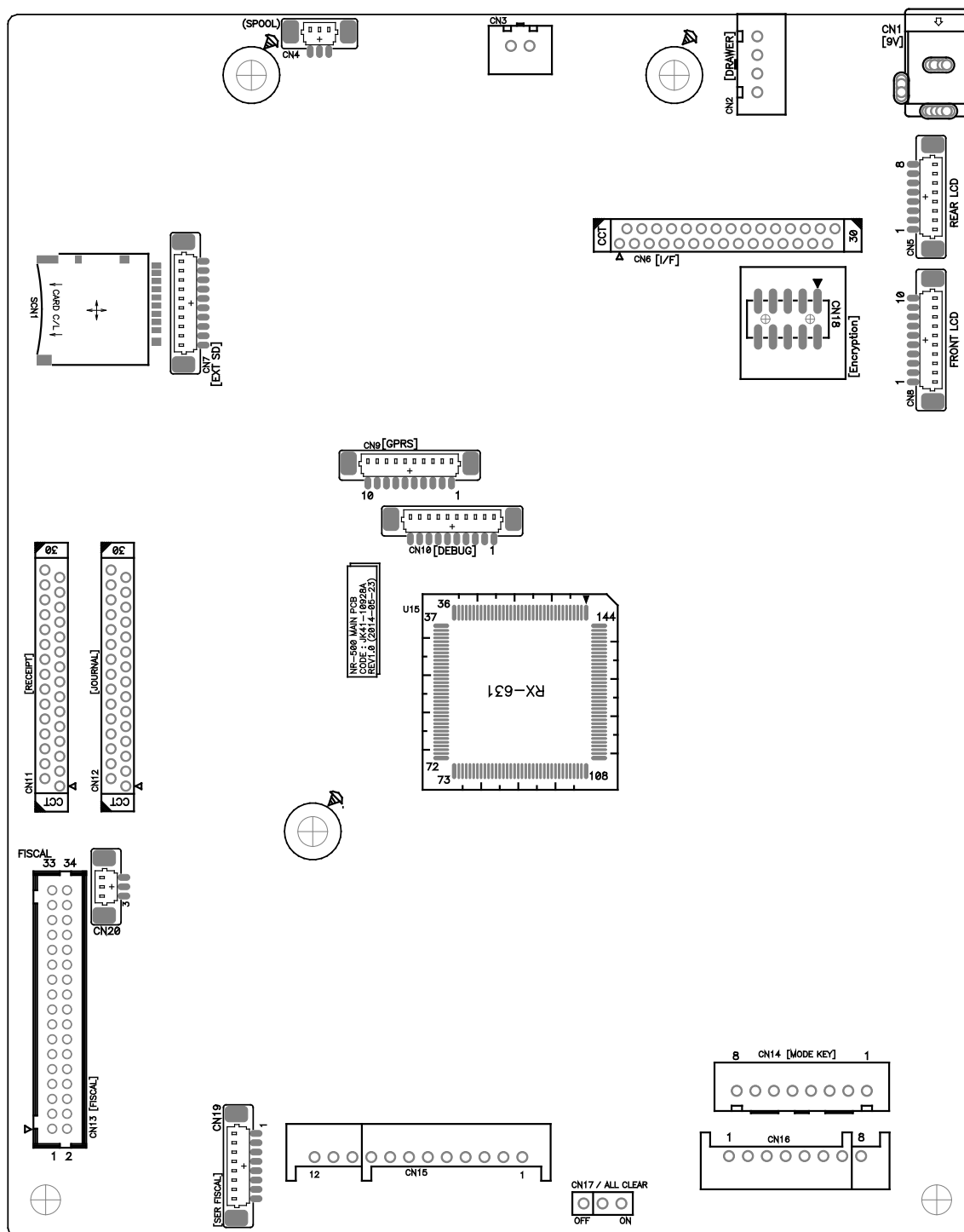
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10 Wiring Diagram

10-1 Wiring Pin Connection



10 Wiring Diagram

No.	Signal Name	No.	Signal Name	No.	Signal Name
CN4 = Spool motor		CN8 = Front display		CN11 = Printer Connector	
1	SPOOL_MOT	1	GND	10	TPH_CLK
2	NC	2	NC	11	TPH_DATA
3	VPRT	3	GND	12	VPH
		4	FRONT_LCD_RESET	13	OTOUT_B
CN1 = DC Jack		5	2LINE_FRONT_LCD_EN	14	VPH
1	+9V (VADP)	6	LCD_DI	15	OTOUT_B
2	GND	7	LCD_SDAT	16	VPH
3	GND	8	LCD_SCLK	17	OTOUT_A
CN2 = Drawer		9	VLCD (+3.3V)	18	VPH
1	GND	10	VDD33V	19	OTOUT_A
2	SEN_DWRCOMP	CN7 = SD card Board		20	VPH
3	DRAWER OUTPUT	1	GND	21	SEN_COVEROPEN_IN
4	+24V (VDRW)	2	SDC_CD2	22	VPH
CN5 = Rear display		3	-	23	VDD33V (+3.3V)
1	GND	4	-	24	GND
2	REAR_LCD_RESET	5	SPI1_DI	25	GND
3	2LINE_REAR_LCD_EN	6	SPI1_CLK	26	GND
4	LCD_DI	7	VSDCARD2 (+3.3V)	27	GND
5	LCD_SDAT	8	SPI1_DO	28	GND
6	LCD_SCLK	9	SPI1_CS_OUTSD	29	GND
7	VLCD (3.3V)	10	-	30	GND
8	VDD33V	CN9 = GPRS Board		CN13 = Fiscal board Connector	
CN6 = Interface Connector		1	DTR	1	EPROM VCC
1	NC	2	RI	2	FISEEPROM_PGM
2	NC	3	VPRT	3	GND
3	NC	4	GND	4	FISEEPROM_OE
4	NC	5	TRSTN	5	FD(2)
5	VSERIAL (+5V)	6	TDI (RXD)	6	FD(1)
6	VSERIAL (+5V)	7	TDO (TXD)	7	FD(7)
7	NC	8	TMS	8	FD(0)
8	GND	9	GND	9	FD(6)
9	TX+	10	GND	10	FA(11)
10	TX-	CN10 = Emulator Connector		11	FD(5)
11	GND	1	VDD33V	12	FA(10)
12	RX+	2	EMLE	13	FD(4)
13	RX-	3	NC	14	FA(9)
14	GND	4	/RESET	15	FD(3)
15	SPD_LED	5	TRSTN	16	FA(8)
16	LINK_LED	6	TMS	17	EPROM VPP (+12.75V)
17	+3.3V	7	TDI	18	FA(12)
18	NC	8	TCK	19	EPROM VCC
19	DSR0_IN	9	TDO	20	FA(13)
20	TXD0_OUT	10	GND	21	GND
21	RXD0_IN	CN11 / CN12 = Printer Connector		22	FA(14)
22	DTR0_OUT	1	TPH_STB(J)#	23	FISEEPROM_CE
23	DSR1_IN	2	TPH_STB(J)#1	24	FA(15)
24	TXD1_OUT	3	SEN_THERMIST_IN	25	FA(4)
25	RXD1_IN	4	TPH_STB(R)#2	26	FA(0)
26	DTR1_OUT	5	TPH_STB(R)#1	27	FA(5)
27	VUSB	6	TPH_LAT	28	FA(1)
28	GND	7	SEN_PEND_2INCH	29	FA(6)
29	USB_DM / USB_DRPD	8	SEN_PRTDISCON	30	FA(2)
30	USB_DP / USB_DRPD / USB_DPUPE	9	SEN_PEND_PS	31	FA(7)
				32	FA(3)
				33	FA(17)
				34	FA(16)

13 Schematic Diagrams

No.	Signal Name	No.	Signal Name	No.	Signal Name
CN14 = MODE Switch Connector		CN15 = KEY Board (Scan)		CN17 = All clear Switch	
1	MODESCAN_COMMON	1	SCAN-1	1	NC
2	RETURN-7	2	SCAN-2	2	ALL_CLEAR
3	RETURN-6	3	SCAN-3	3	GND
4	RETURN-5	4	SCAN-4	CN18 = Encryption Connector	
5	RETURN-4	5	SCAN-5	1	VAULT_SDA&GPRS_TXD
6	RETURN-3	6	SCAN-6	2	VAULT_SDA&GPRS_TXD
7	RETURN-2	7	SCAN-7	3	VAULT_SCL&GPRS_RXD
8	RETURN-1	8	SCAN-8	4	VAULT_SCL&GPRS_RXD
CN3 = Power Switch Connector		9	SCAN-9	5	GND
1	VADAP(9V)	10	SCAN-10	6	GND
2	VPRT	11	SCAN-11	7	EXT_RESET
		12	SCAN-12	8	EXT_RESET
		CN16 = KEY Board (Return)		9	VDD33V
		1	RETURN-1	10	VDD33V
		2	RETURN-2	CN19 = Flash memory Connector	
		3	RETURN-3	1	VDD33V
		4	RETURN-4	2	SPI0_SF_CS1
		5	RETURN-5	3	SPI1_DO
		6	RETURN-6	4	SPI1_CLK
		7	RETURN-7	5	SPI1_DI
		8	RETURN-8	6	SERIAL_FLASH_WP (Pull up)
				7	SERIAL_FLASH_HOLD (Pull up)
				8	GND
				CN20 = Power fail Connector	
				1	VDD33V
				2	GND
				3	Not connection

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11 Schematic Diagrams

[Schematics Sheet Content]

1. Main PCB Schematics.

1) CPU Block -----	11-2
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3) Key Scan, Buzzer, Battery Block -----	11-4
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12) Serial Interface Block -----	11-13

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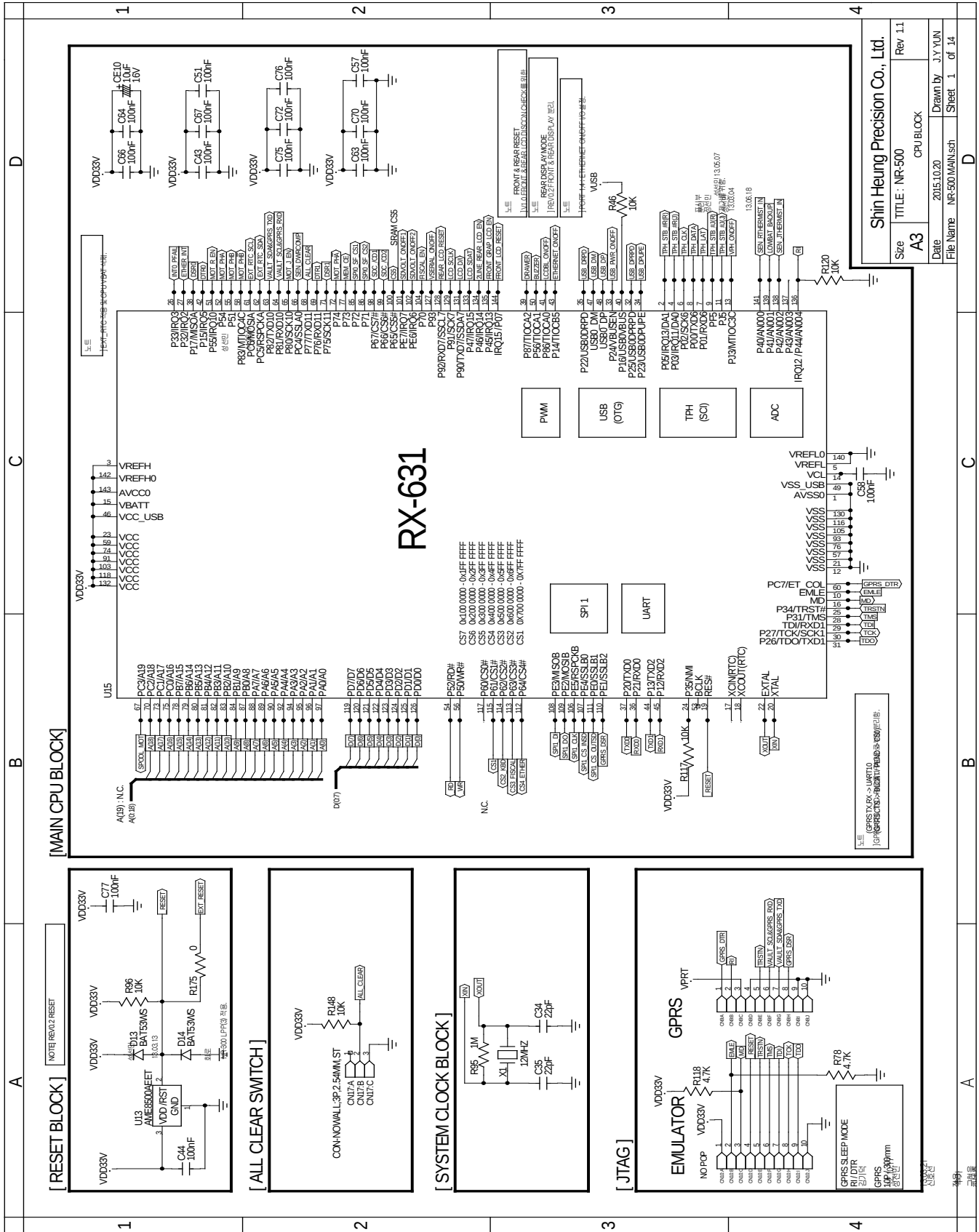
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5. GPRS PCB Schematics. -----	11-17
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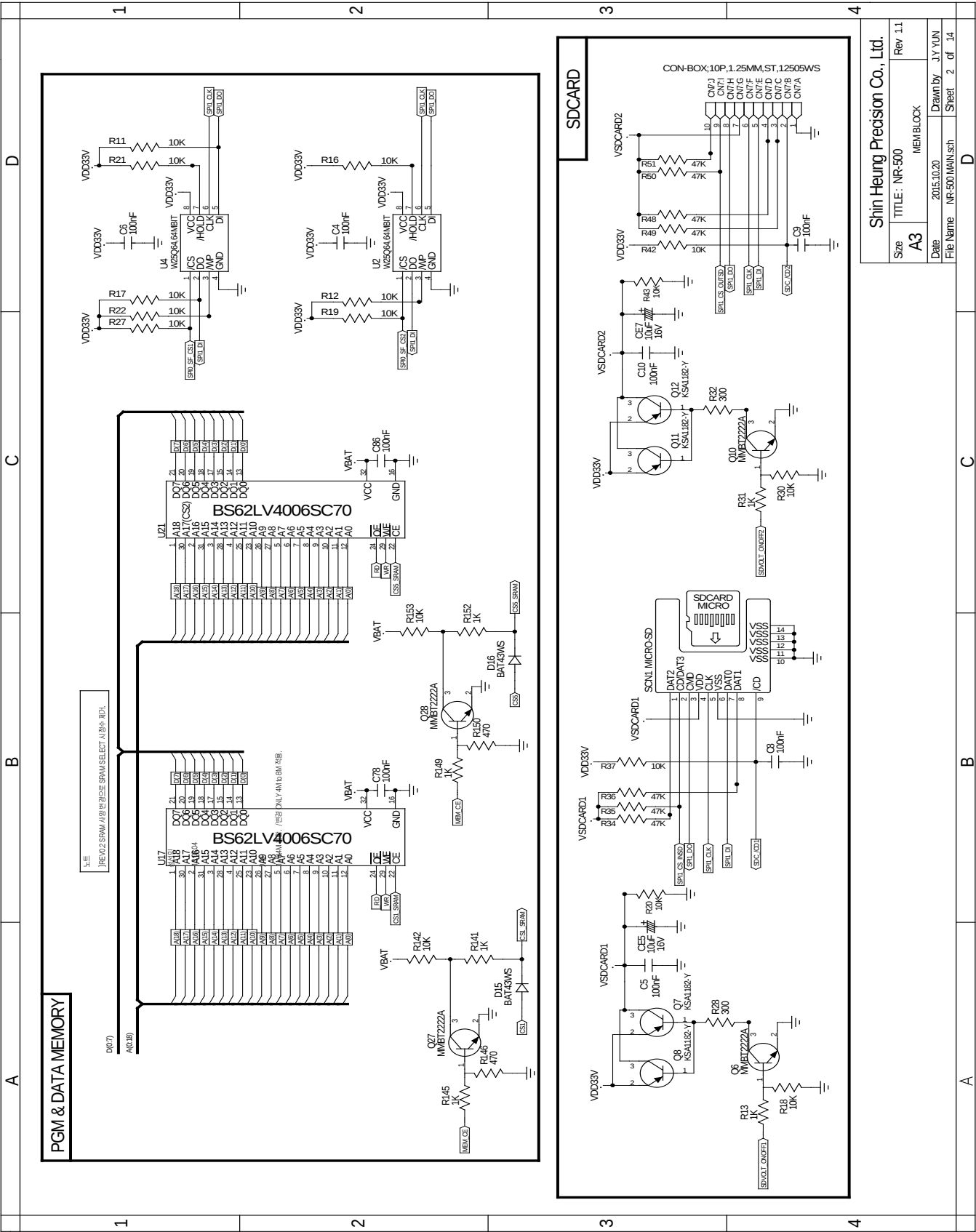
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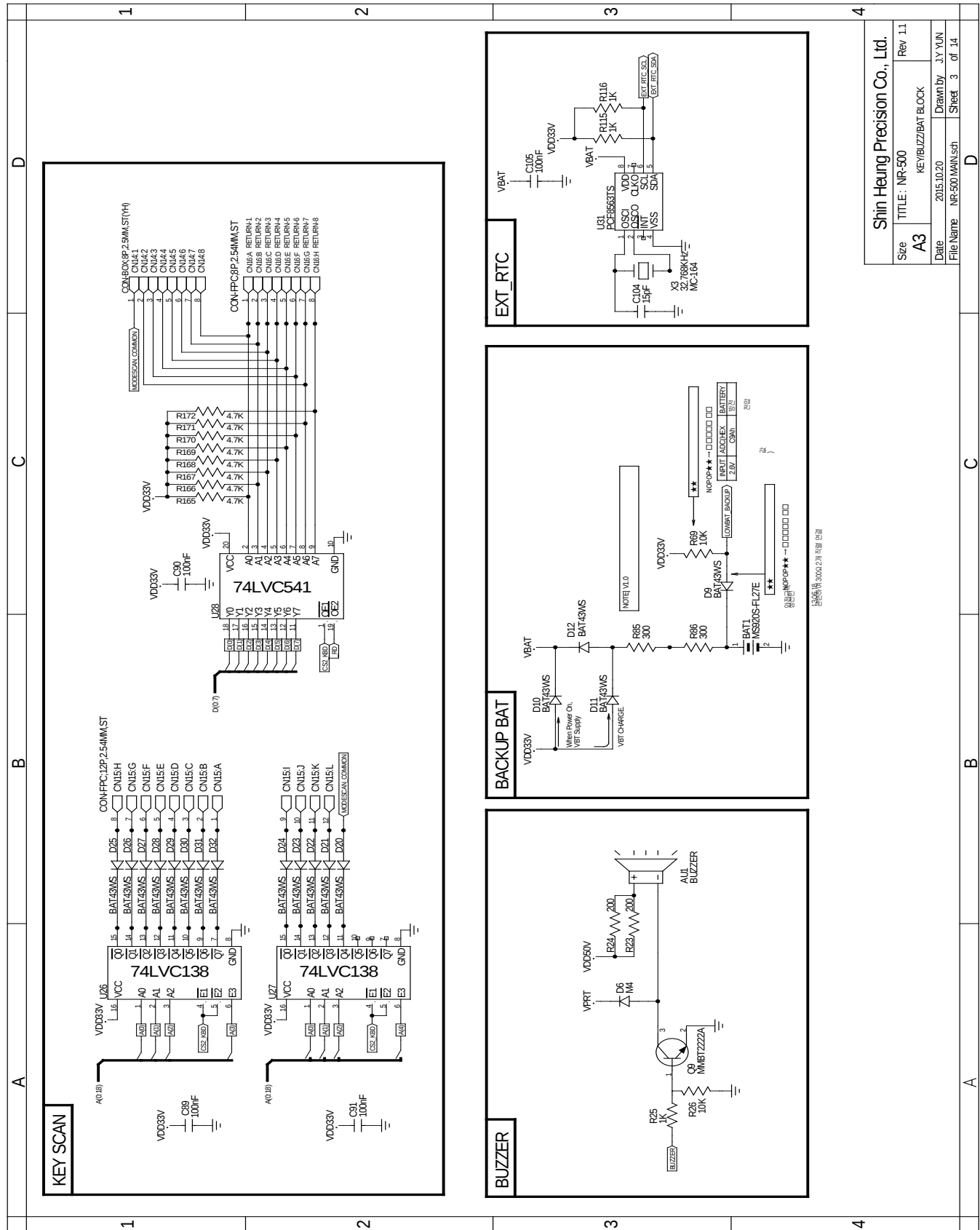
7. Micro SD Card PCB Schematics. -----	11-19
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11-2 CPU PART



11-3 MEMORY, SD, MICRO SD PART

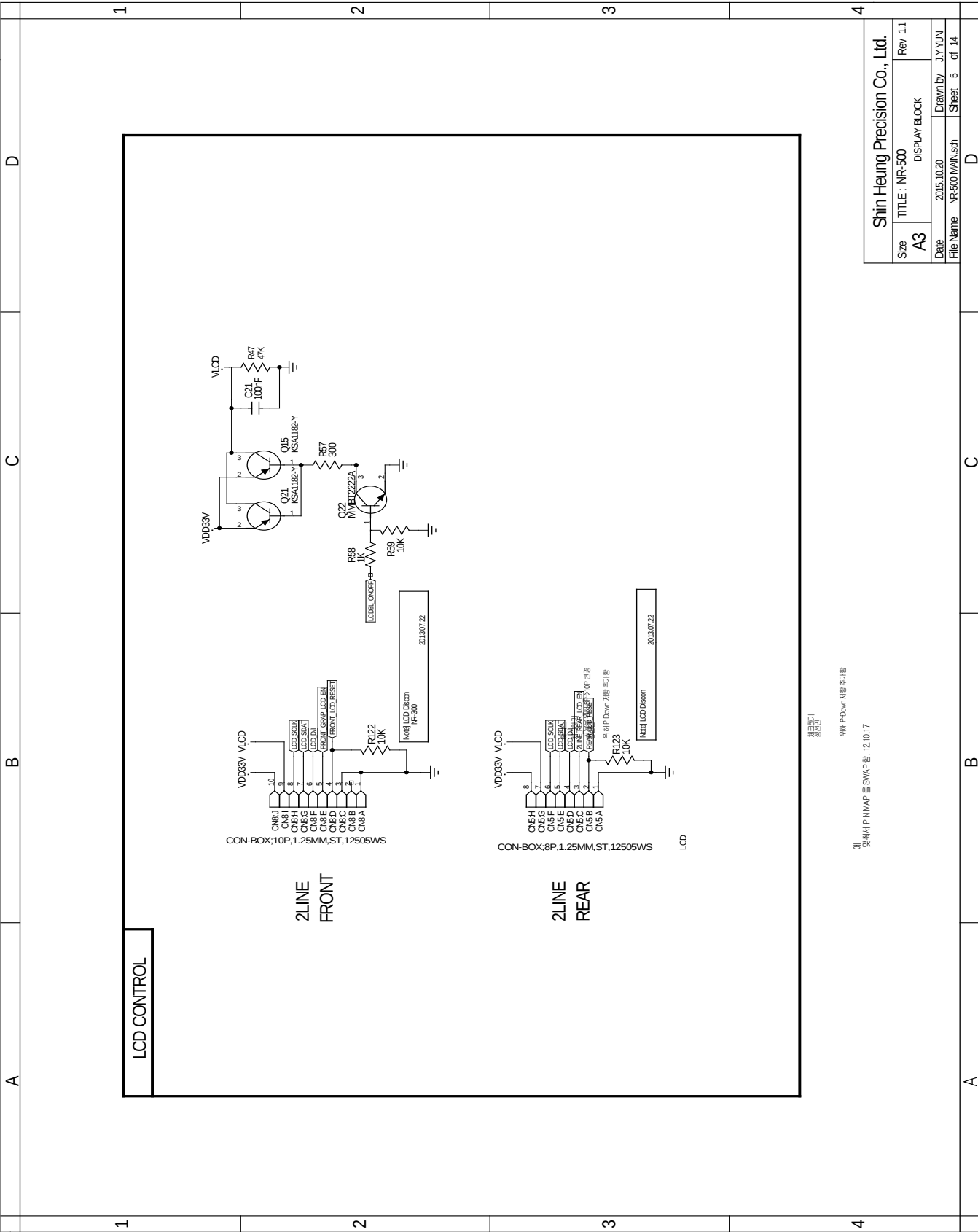




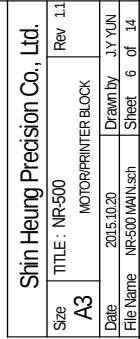
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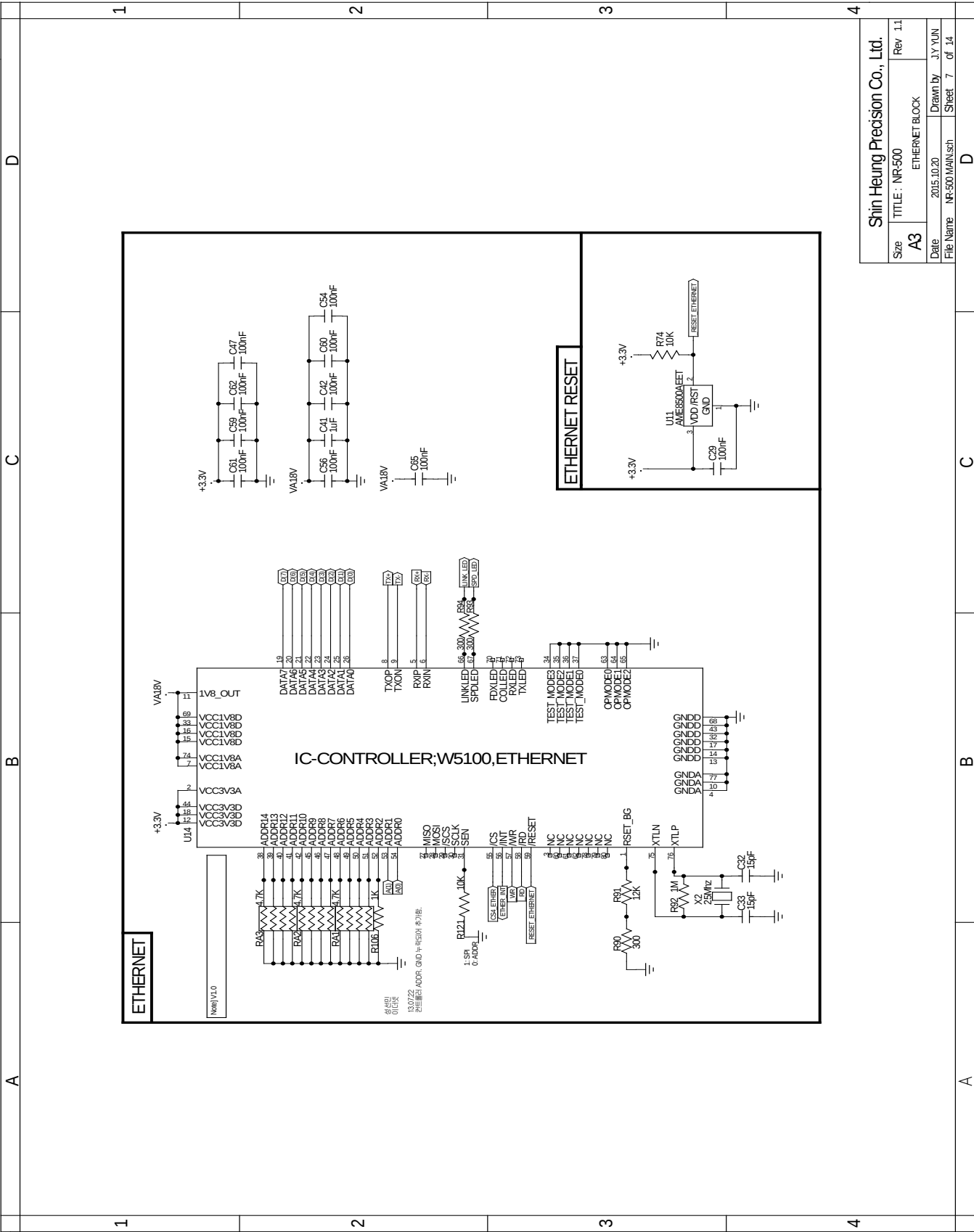
11-6 LCD DISPLAY PART



11-7

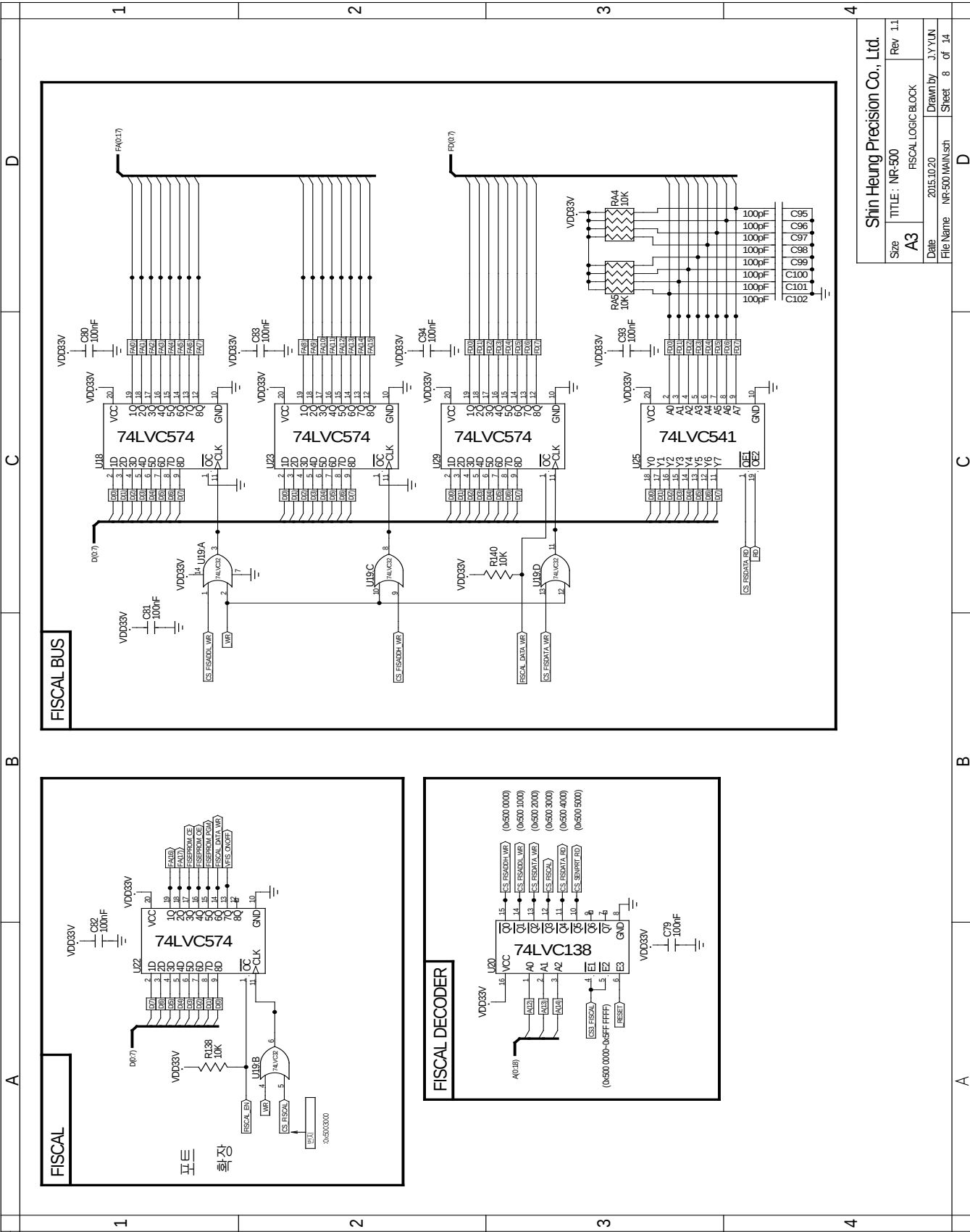


11-8 ETHERNET CONTROLLER PART



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A3	ETHERNET BLOCK	Drawn by	J.Y. YUN
Date	2015.10.20	Sheet	7 of 14
File Name	NR-500 MAIN.sch		

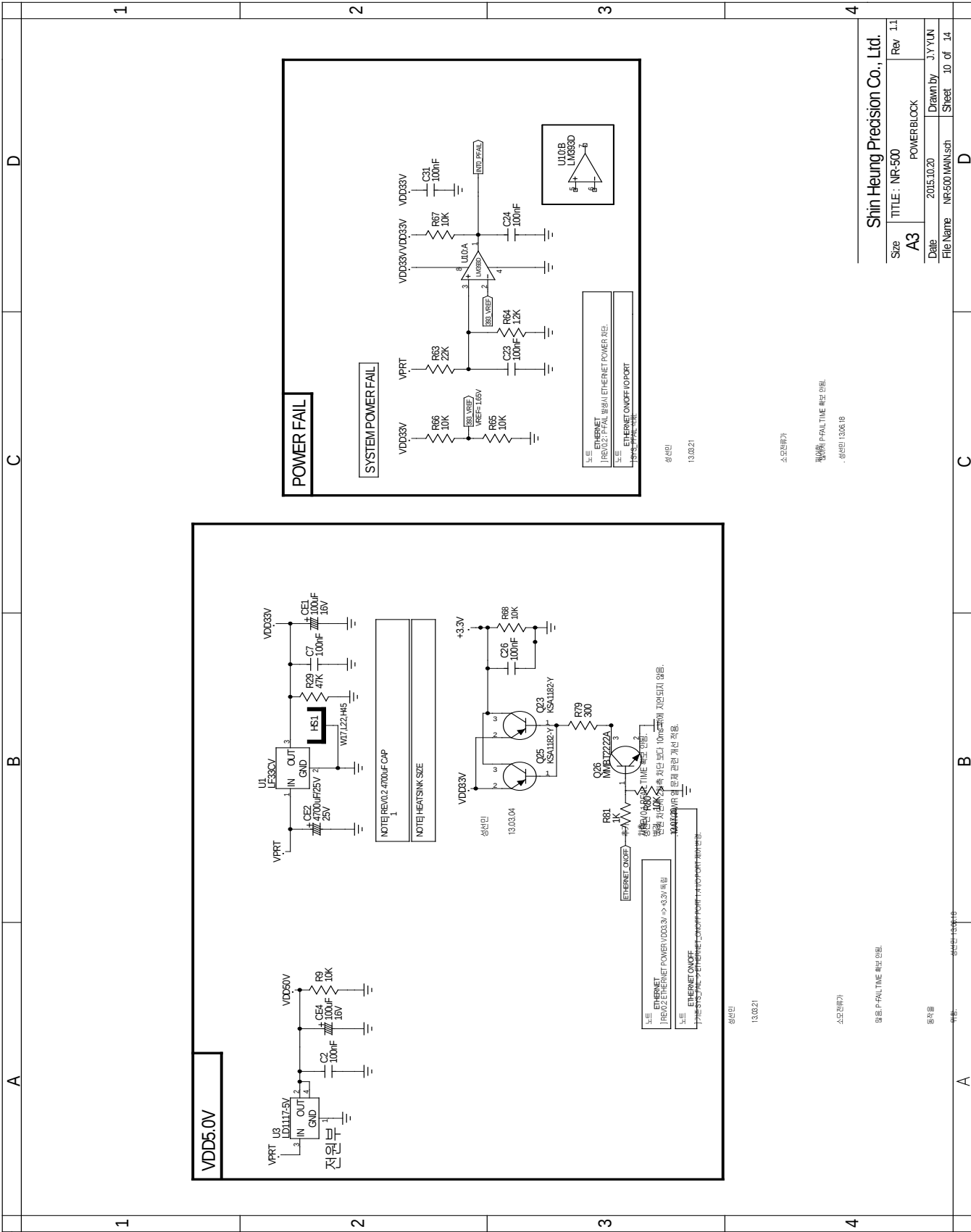
11-9 FISCAL LOGIC PART



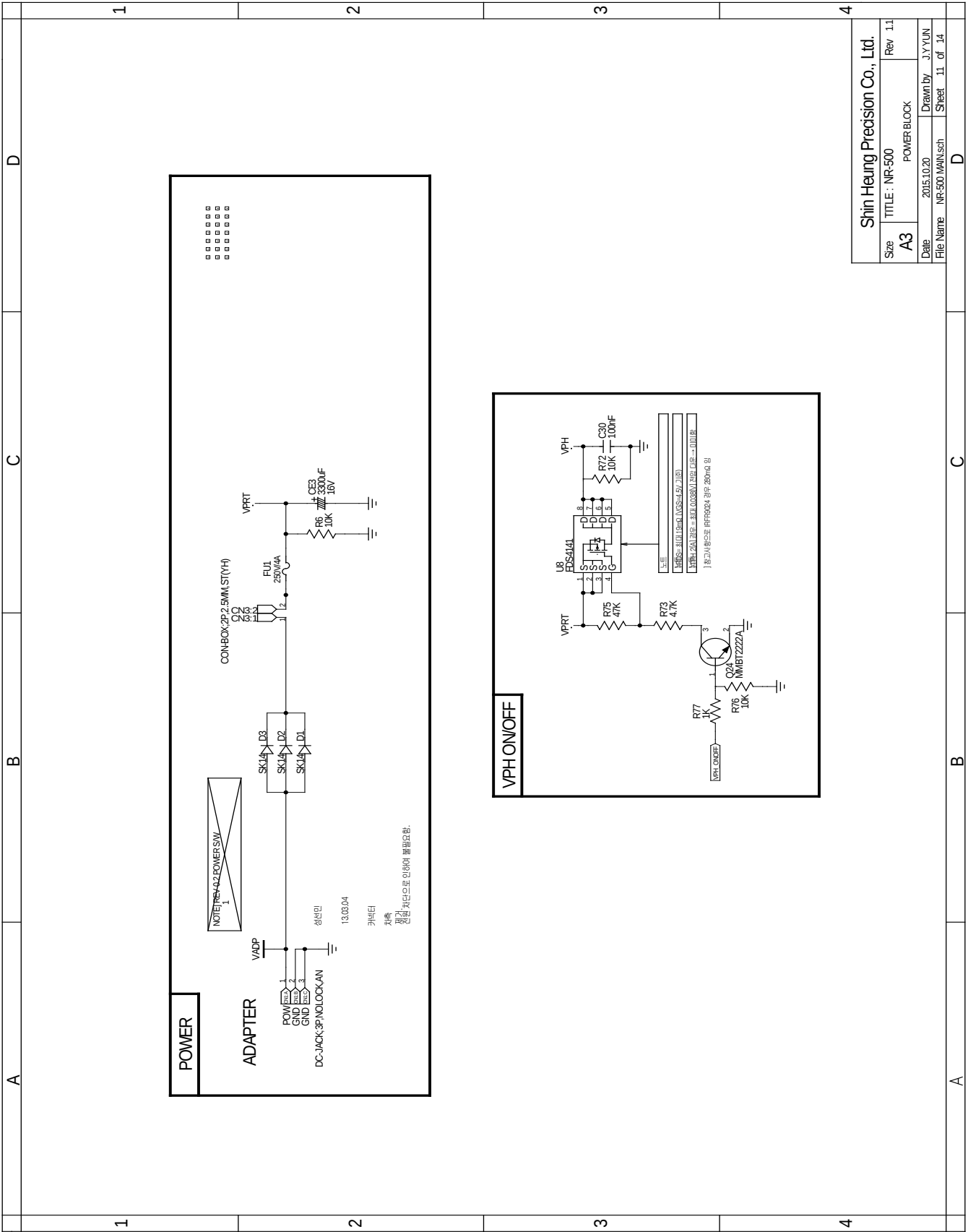
11-10



11-11 POWER, POWER FAIL PART



11-12 ADAPTOR INPUT, VPH PART



Shin Heung Precision Co., Ltd.	
Size	TITLE : NR-500
A3	POWER BLOCK
Date	2015.10.20
File Name	NR-500 MAIN.sch
Sheet	11 of 14
Rev	11
Drawn by	J.Y.YUN
Sheet	11 of 14

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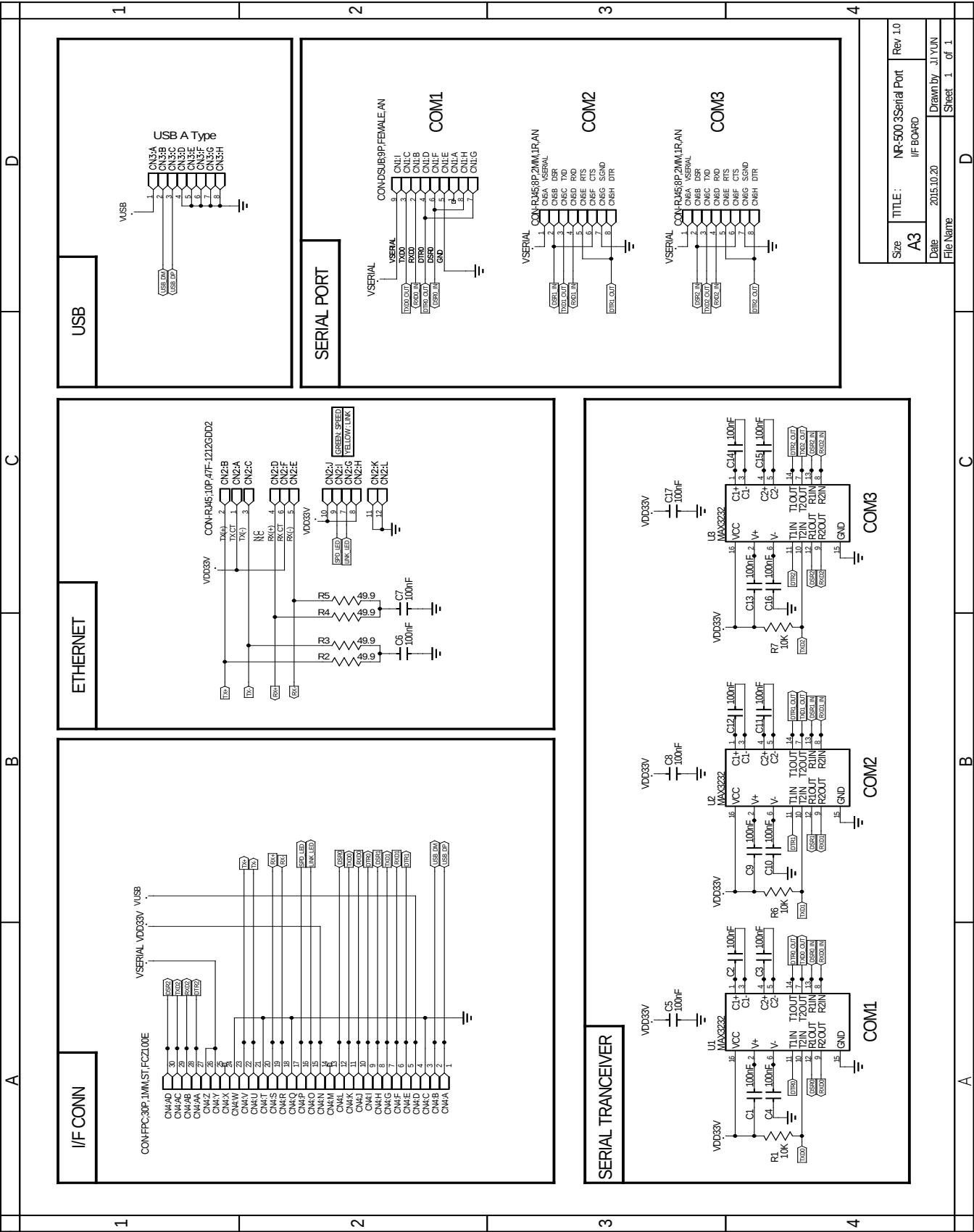
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11-15



11-16 SERIAL INTERFACE PCB



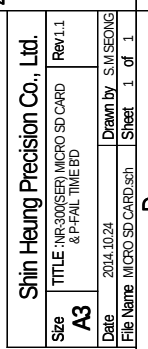
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11-18



11-19



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Use this page to record any special servicing information such as Service Bulletins or Supplements.
When possible, record changes to Code numbers directly on the actual Parts List.
Always records Service Bulletin numbers and Application Dates on this log to ensure that your data is as current as possible.

SAM4S

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