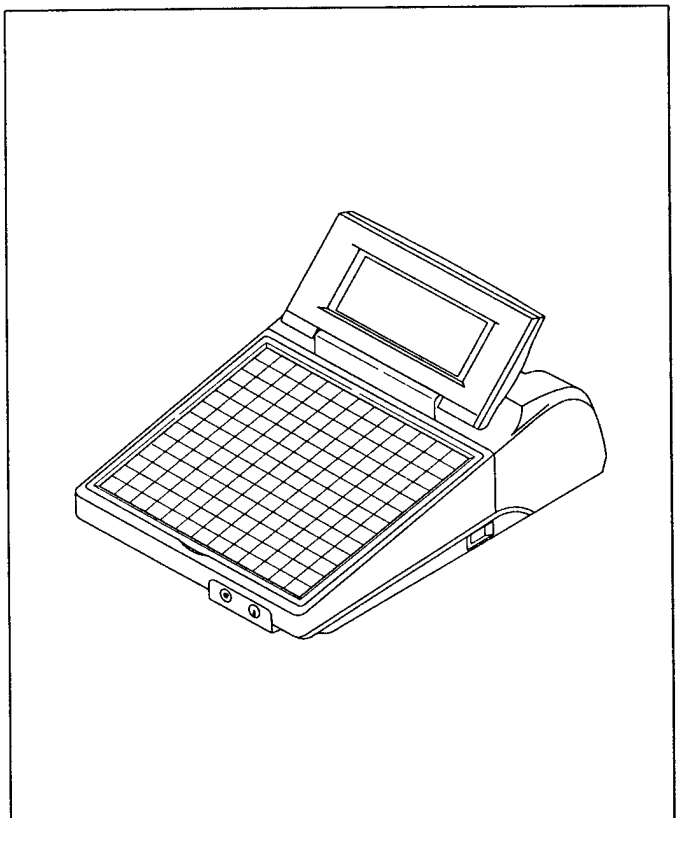
SAMSUNG

ELECTRONIC CASH REGISTER

SPS-1000 / SPS-1000V

SERVICE Manual

ELECTRONIC CASH REGISTER



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Overview of this System ECR

This System ECR is a microprocessor-based system, using a 32 bit-microprocessor and a 8 bit-microprocessor.

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.

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

About this Manual

This service manual describes how to perform hardware service maintenance for the Samsung SPS-1000 System Electronic Cash Register.

Notes

Note: Notes may appear anywhere in the manual. They draw your attention to 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.

SPS-1000 Service Manual First edition.

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V1.0

Printed in Korea

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 non-metallic 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 SECR. 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.

1-2 Servicing Precautions

Warning 1: 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 2: 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 megohm.
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 Electrostatically Sensitive Devices (ESDs)

1. Some semiconductor (solid state) devices are easily damaged by static electricity. Such components are called Electrostatically 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 Specifications

Item	Description	Remark
Processor	MOTORORA MC68EN302 (32bit) INTEL 80C32 / WINBOND 78C32 (8bit)	
Memory	• MC68EN302 Default : SRAM (KM6164000B*1) : 4Mbits FLASH MEMORY (AM29F800B*1) : 8Mbits Option : SRAM (KM6164000B*4) : 16Mbits (Max) • 80C32 / 78C32 SRAM (KM62256*1) : 256Kbits EPROM (27C512*1) : 512Kbits • VIDEO RAM (KM62256*2) : 256Kbits*2	
Data Storage	90 Days	When battery is fully charged
Battery	Ni-Cad, 3.6V, 600mAh Charging time : 24 Hours Life : 3 Years	
Display	• SPS-1000 : Front - LCD display (320X240 dots) Rear - LCD display (20charsx1line) • SPS-1000V : Front - VFD display (20charsx2lines) Rear - VFD display (10 digits)	
Keyboard	Flat Rubber Key : 169Keys	
Interface	Default : RS-232C : 3 ports IRC : 1port Cash Drawer : 3 ports Option : RS-232C : 4 ports	
IRC	Mode : ETHERNET Speed : 10Mbps	

2-2 Ratings

External Dimensions	387mm(L)×291mm(W) ×219mm(H)
Weight	5.1kg
Power Source	U.S.A : AC120V, 60HZ, 0.2A EUROPE : AC230V, 50HZ, 0.1A
Power Consumption	Stand-by : 15W (Max) Operating : 18W (Max)
Working Temperatures	0 to 40°c
Working Humidity	10 to 90%

2-3 Appearance

2-3-1 External View

1) Front View

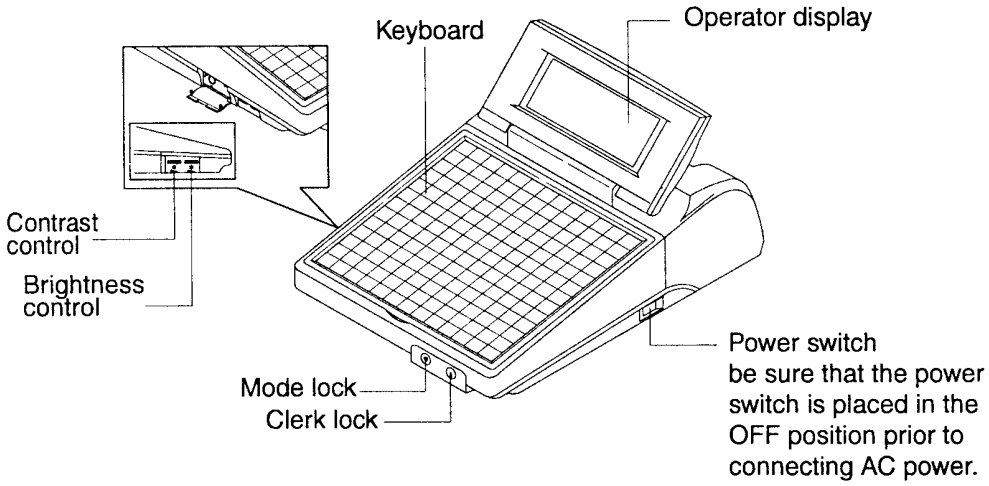


Figure 2-1.

2) Rear View

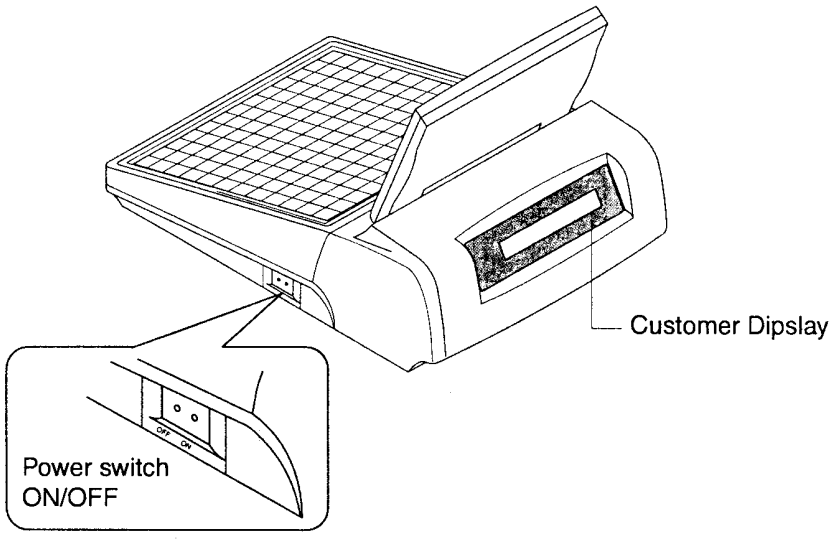
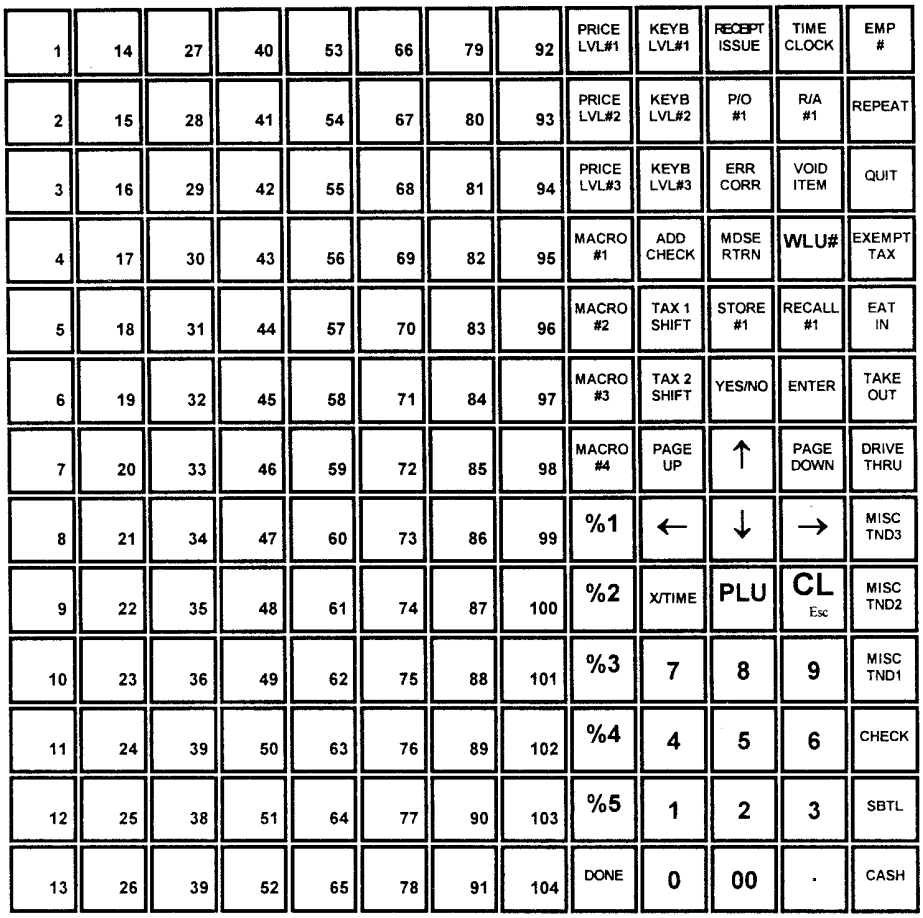


Figure 2-2.

2-4 Keyboard

2-4-1 Standard Keyboard Layout



2-4-2 Key Descriptions

1) Standard Key

KEY	DESCRIPTION
0~9, 00	Numeric keys
•	Decimal point key
1~104	Direct price look up keys
PRICE LVL#1~3	Price level keys
KEYB LVL#1~3	Keyboard level keys
RECEIPT ISSUE	Receipt issue key
TIME CLOCK	Used to record start and stop work times for the registered employees
EMP #	Employee # key
P/O #1	Used to remove cash, check or miscellaneous media from the drawer

R/A #1	Used to Add cash, check or miscellaneous media to the drawer
REPEAT	Used to quickly re-order a set of items
ERR CORR	Used to correct the previous incorrect entry
VOID ITEM	Used to remove an item from a transaction
QUIT	Used to automatically sign off the current clerk
MACRO #1~4	Used to execute the preprogrammed key sequences
ADD CHECK	Used to add multiple guest checks for payment together
MDSE RTRN	Used to return an entry
WLU #	Used to activate the WLU menu
EXEMPT TAX	Used to exempt specific taxes from a sale
TAX1~2 SHIFT	Used to reverse the tax status of an item
STORE #1	Used to temporarily close the opened check
RECALL #1	Used to begin or recall a tracking transaction
EAT IN	Used to designate the order as Eat-in order
YES/NO	Yes/No selection key
ENTER	Enter key
TAKE OUT	Used to designate the order as Take-out order
PAGE UP, DOWN	Page up/down keys
↑,↓,←,→	Cursor control keys
%1~5	Discount keys
DRIVE THRU	Used to designate the order as Drive-thru order
MISC TND1~3	Used to finalize or tender sales paid by various charges
CHECK	Used to finalize or tender check sales
SBTL	Subtotal key
PLU	Used to register a PLU
X/TIME	Used to multiply or split pricing
CL/ESC	Used to clear numeric entries or error conditions
CASH	Used to finalize or tender cash sales
DONE	Used to exit a WLU screen

2-5 Display

2-5-1 Operator Display

1) LCD Display (SPS-1000 Only)

Device Type	LCD display
Display Format	320 (W) × 240(H) Full dot
Dot size	0.33mm × 0.33 mm
Outer Dimensions	167.1mm(W) × 109.0mm(H) × 10mm(T) Max
LCD Type	FSTN (B/W)
Backlight	CCFL
Backlight Color	White

2) VFD Display (SPS-1000V Only)

Device Type	VFD display
Device Format	20Chars×2Lines
Color of Display	Green
Character Size	5.25mm(W) ×9.0mm(H)

2-5-2 Customer Display

1) LCD Display (SPS-1000 Only)

Device Type	LCD display
Display Format	20Characters(W) × 1 Lines(H)
Character Size	6.0mm(W) × 14.54mm(H)
Outer Dimensions	180mm(W) × 40mm(H) × 14.5mm(T) Max
LCD type	STN Gray
Backlight	LED
Backlight Color	Yellow Green

2) VFD Display (SPS-1000V Only)

Device Type	VFD display
Device Format	10digits
Color of Display	Green
Character Size	6.9mm(W) ×13mm(H)

2-5-3 Operator Display Adjustment

You can adjust the view angle of the Operator Display and the brightness/contrast of the Operator Display by using the corresponding controls.

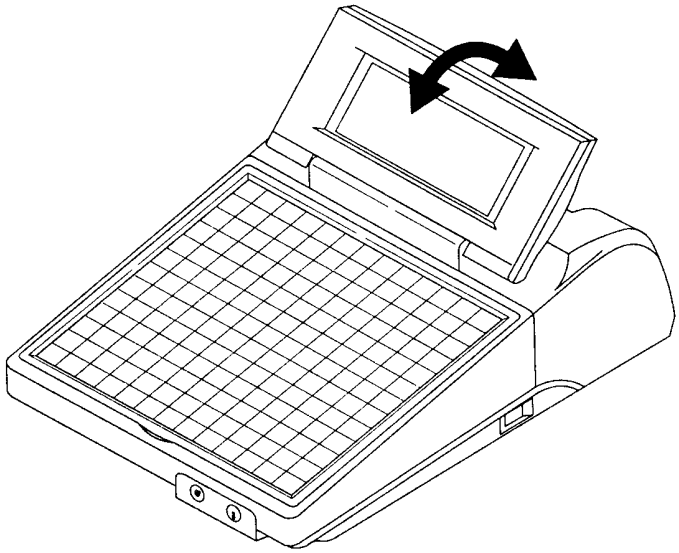


Figure 2-3. Adjustment of the View Angle

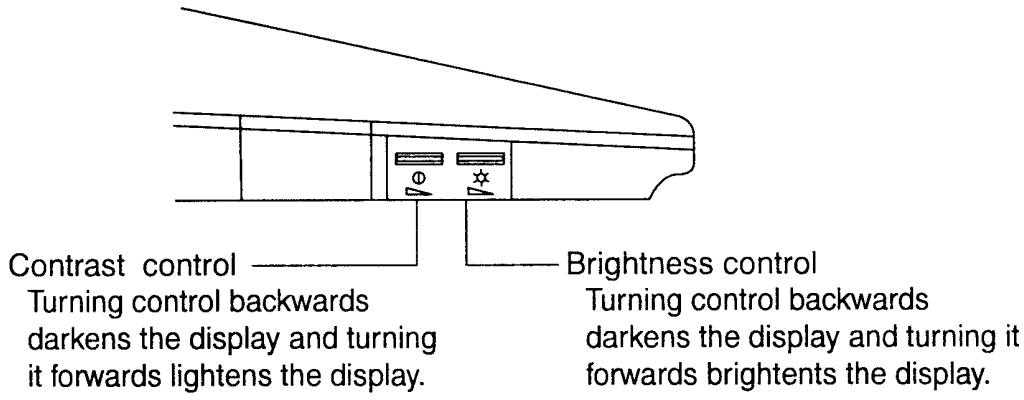
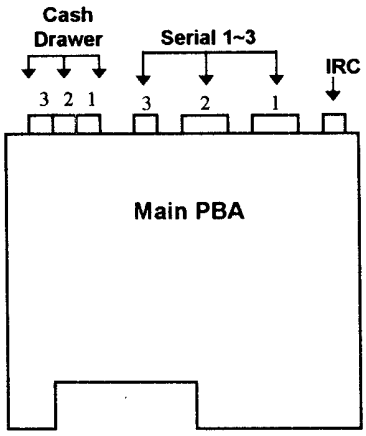
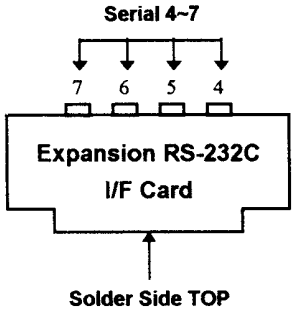


Fig 2-4. Adjustment of the Contrast/Brightness Control

2-6 RS-232C, IRC and Cash Drawer Ports

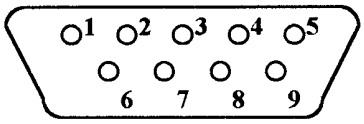
2-6-1 Port Locations



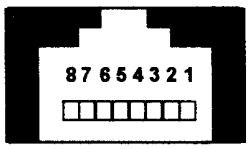


2-6-2 RS-232C, IRC and Cash Drawer Pin Locations and Descriptions

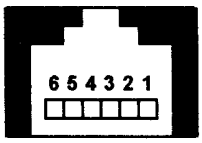
1) Pin Locations



Serial 1, 2 (D-sub Male)



Serial 3~7, IRC (RJ-45)

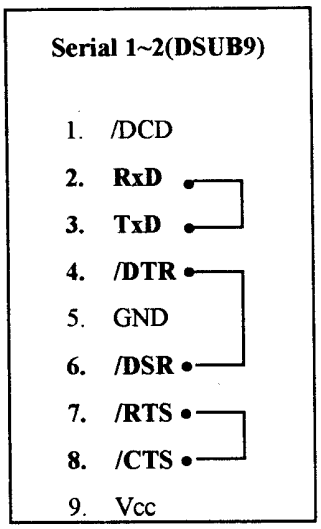


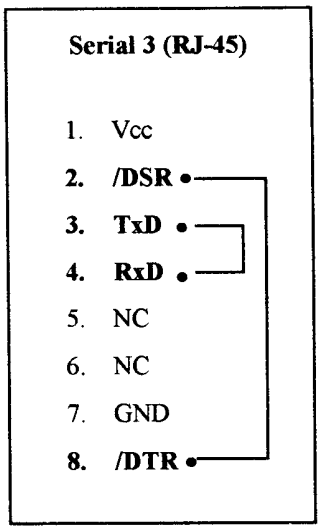
Cash Drawer 1~3 (RJ-11)

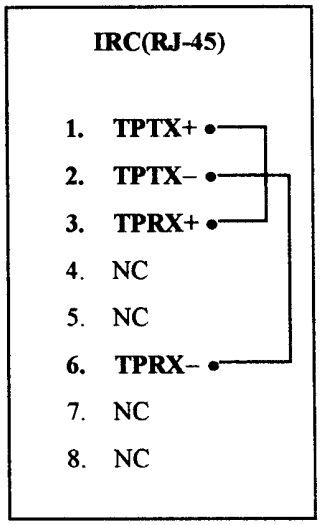
2) Pin Descriptions

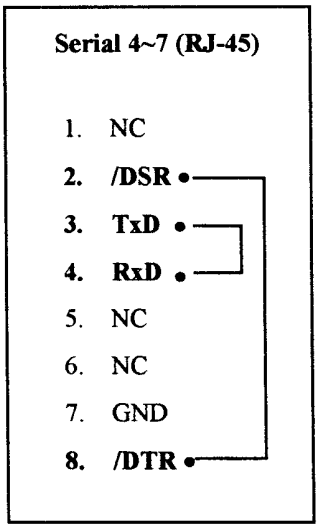
	SIGNALS							
PIN#	Serial Port 1	Serial Port 2	Serial Port 3	Serial Port 4~7	IRC Port	Drawer Port 1	Drawer Port 2	Drawer Port 3
1	/DCD	NC	Vcc	NC	TPTx+	FGND	FGND	FGND
2	RxD	RxD	/DSR	/DSR	TPTx-	Solenoid(-)	Solenoid(-)	Solenoid(-)
3	TxD	TxD	TxD	TxD	TPRx+	COMP1	COMP2	COMP3
4	/DTR	/DTR	RxD	RxD	NC	24V	24V	24V
5	GND	GND	NC	NC	NC	Solenoid(-)	Solenoid(-)	Solenoid(-)
6	/DSR	/DSR	NC	NC	TPRx-	GND	GND	GND
7	/RTS	/RTS	GND	GND	NC	RJ-11 (Modular 6Pin)		
8	/CTS	/CTS	/DTR	/DTR	NC			
9	Vcc	Vcc	RJ-45 (Modular 8Pin)					
CONN.	D-SUB9(Male)							

2-6-3 Loop Back Connections (RS-232C, IRC)



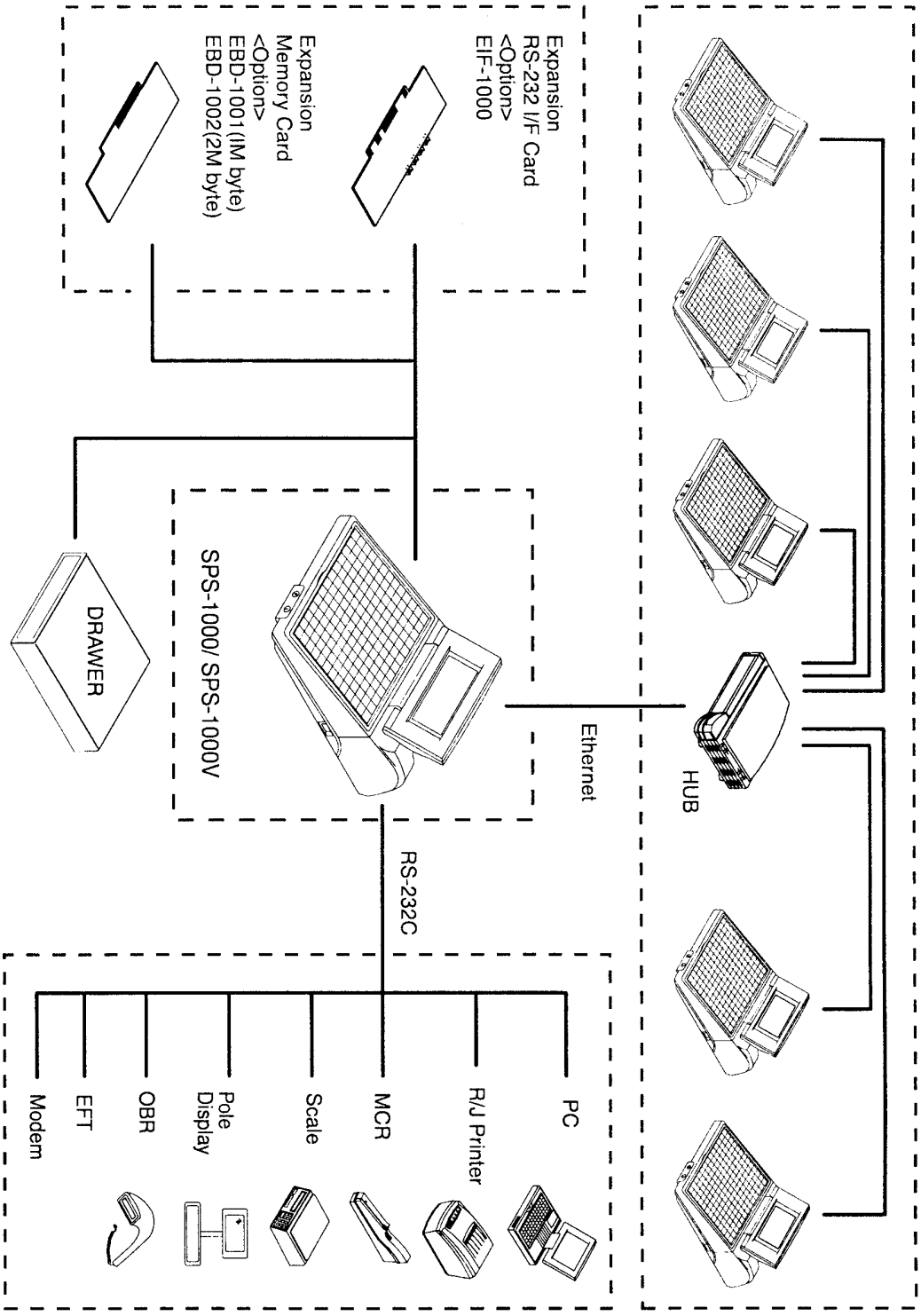






3 OPTIONS

3-1 System configuration



3-2 Options and Supplies

3-2-1 Options

NO.	NAME	MODEL	DESCRIPTION
1	Receipt Printer	SRP-250 (Impact Dot Matrix)	Via RS-232C
		SRP-300S (Thermal)	
2	Cash Drawer	DR-84 (4B8C)	
		DR-55 (5B5C)	
3	Expansion Memory Card	EBD-1001	1Mbyte SRAM
		EBD-1002	2Mbyte SRAM
4	Expansion RS-232 I/F Card	EIF-1000	4-Ports
5	Clerk Lock	ECK-1005, ECK-1015	Clerk Lock + Clerk Key
6	Clerk Key	ECL-1005, ECL-1015	

3-2-2 Supplies

NO.	NAME	DESCRIPTION
1	Mode Key	VD, REG, Z, P, C
2	Cable Tie	DA100 : 10EA
3	Ferrite Core	BNF-18 : 2EA RING-TR29A : 3EA
4	User Manual	

4 Installation

Precautions

- 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.
- When assembling the LCD, use a discharge blower to prevent the introduction of dust.

4-1 Disassembling the Rear Cover

1) Remove the two screws(①) fixed on the Lower Case.
2) Remove the Rear Cover(②).

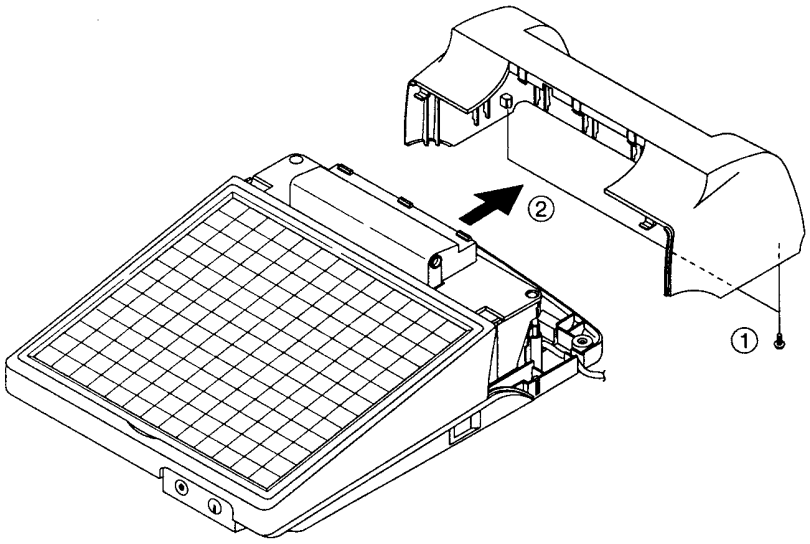


Figure 4-1.

4-2 Reassembling the Rear Cover

Install the Rear Cover in the reverse order of disassembling.

4-3 Disassembling the Customer Display

1) Remove the screw(①) fixed on the Customer Display.
2) Push down the Lower Case Pawl (②) to release the lock and pull out the Customer Display in the direction of arrow '③' at the same time.

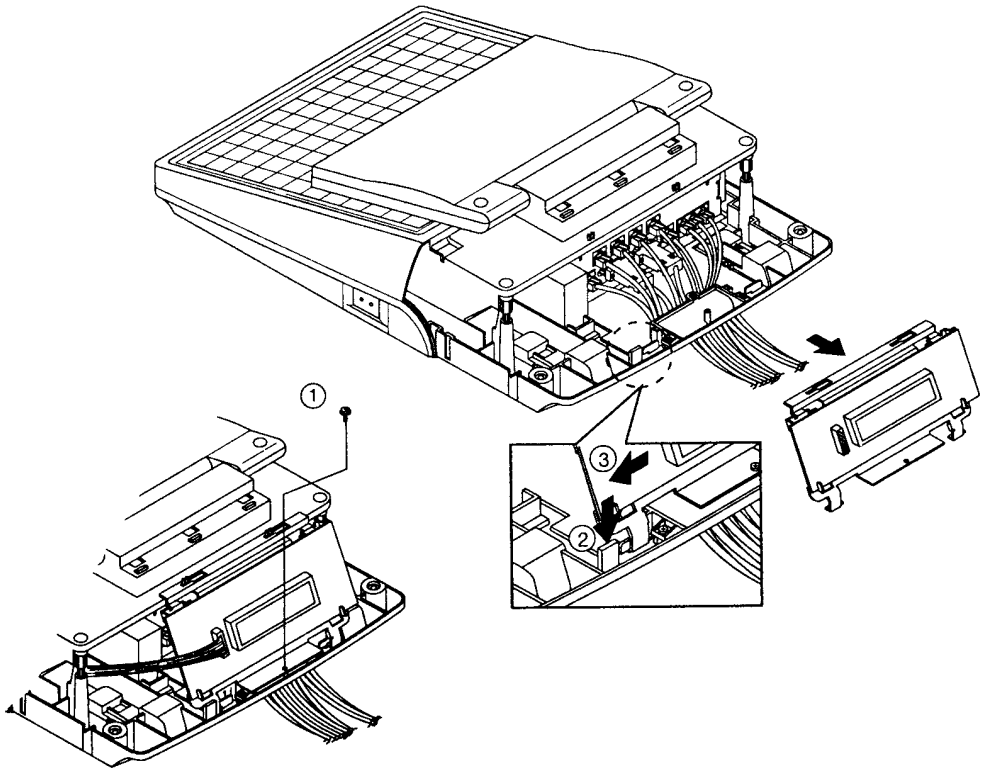


Figure 4-2.

4-4 Disassembling the Upper Case

1) Remove the two screws fixed on the Upper Case.
2) Remove the Upper Case.
   a) Lift the rear edge of the Upper Case in the direction of arrow '①'.
   b) Slide the Upper Case in the direction of arrow '②' and Release the three pawls from the Lower Case at the same time. (Be careful not to break the pawls)
   (Refer to Figure 4-3.)
   c) Lift the Upper Case and put it straight.
   (Be careful not to pull the cables between the Upper Case and the Main PBA)
   d) Pull and remove the following cables between Upper Case and the Main PBA.
      - Cables between the Main PBA and the Front LCD(VFD) : CN13, CN14.(CN17)
      - Cable between the Main PBA and the Keyboard : CN16.
   e) Remove the screw and Ground wire.
   (Refer to Figure 4-4.)

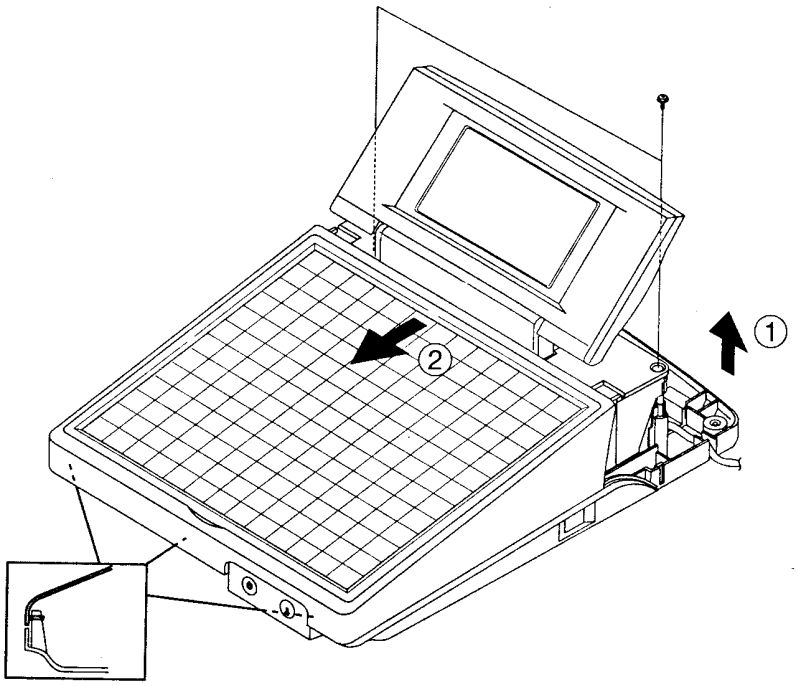


Figure 4-3.

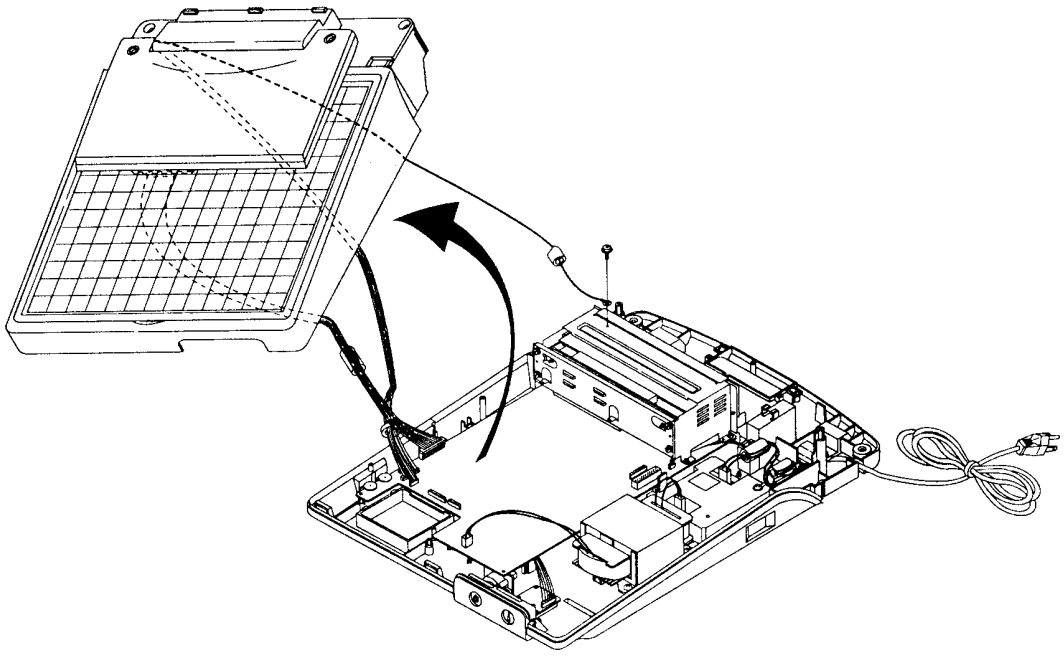


Figure 4-4.

4-5 Reassembling the upper case

Install the Upper Case in the reverse order of disassembling. Before installing, make sure that each connector is connected correctly.

4-6 Disassembling the Operator Display Unit

1) Remove the two Rubber Caps and the two fixing screws (①) from the Operator Display Unit.
2) The Operator Display Unit is assembled with seven pawls. Release the pawls and pull out the Cover-Rear of the Operator Display Unit. (Be careful not to break Cover-Rear of the Operator Display Unit)
3) Disconnect the cables on the Front LCD and on the Inverter PBA.
4) Remove the four screws fixed on the Plate Shield and Ground wire (②)
5) Pull out the Plate shield and the Front LCD.
6) Remove the two screws and the Inverter PBA (③)
7) Remove the four screws on the Hinge (④) and Pull out the Cover-Front of the Operator Display Unit.

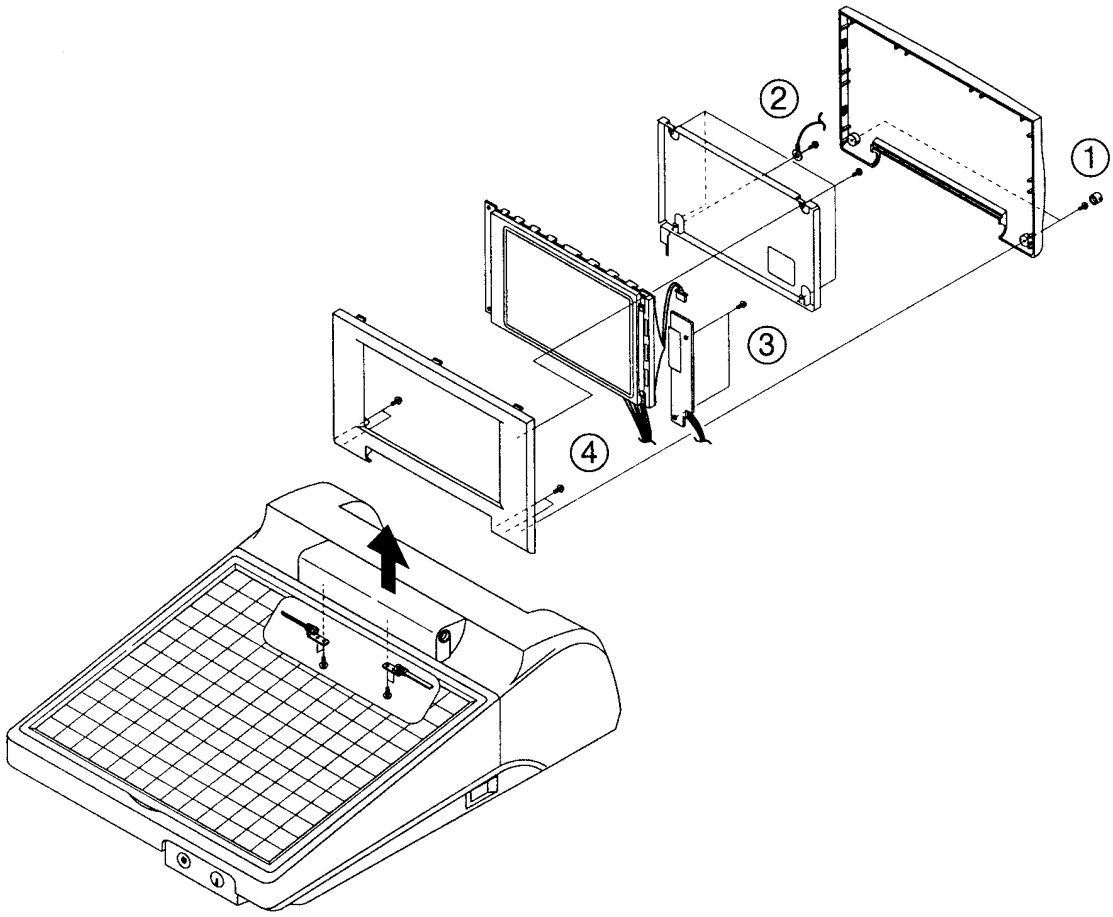


Figure 4-5.

4-7 Installing the Expansion Memory Card and RS-232C I/F Card

1) Remove the Rear Cover.
2) Remove the Customer Display.
3) Remove the screw and the Interface Bracket (①).
4) Insert the Expansion RS-232 I/F Card (②, EIF-1000) and Expansion Memory Card (③, EBD-1001/EBD-1002) into the Bus Slot. (* Be sure that the Solder Side face upward.)
5) Fasten the Interface Bracket to the Option Bracket Board using the screw.

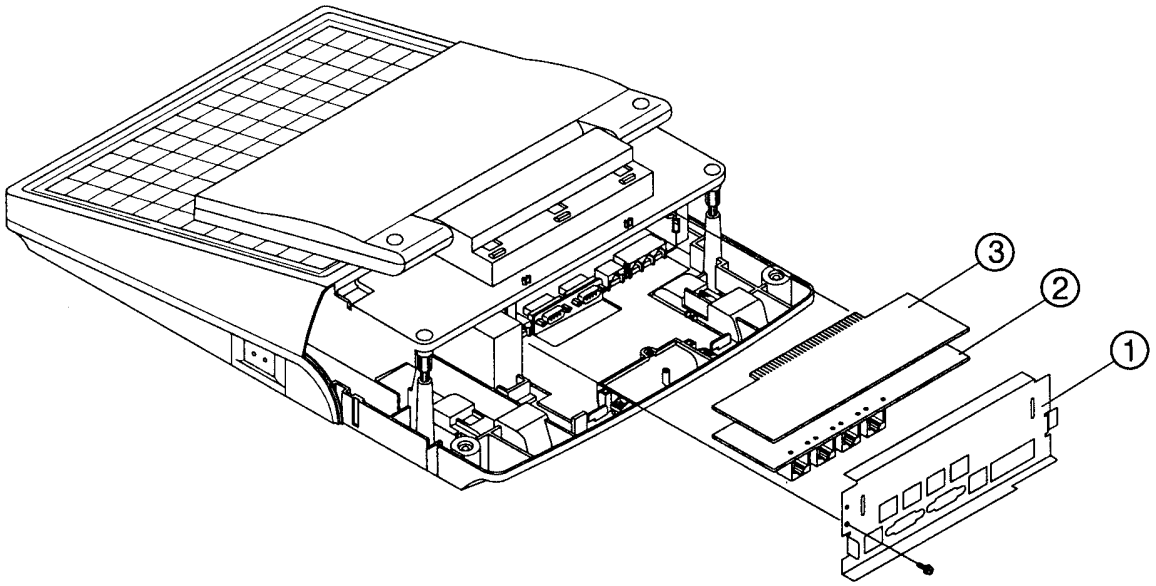


Figure 4-6.

4-8 Connecting the RS-232C, IRC and Cash Drawer Cables

1) Remove the Rear Cover and the Customer Display.
2) Connect all the interface cables to the each port correctly.

Note: When connecting the interface cables, attach the Ferrite Core in the accessories to the each cable as shown in the Figure 4-7.

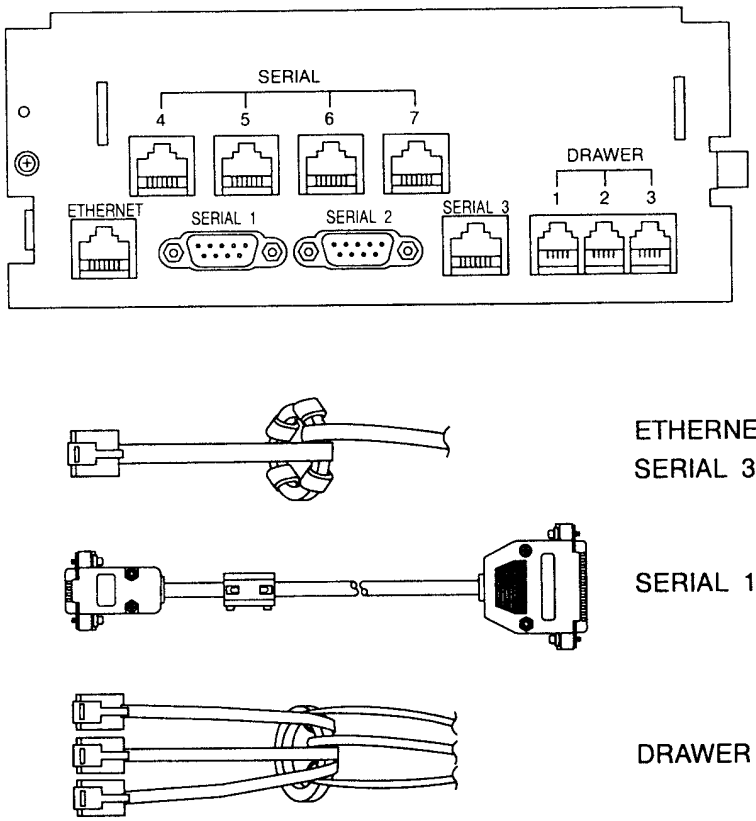


Figure 4-7.

4-9 Cable Wiring

1) Remove the three screws (①) and the Cable-Guide (②).
2) Connect all the interface cables to the each port correctly.
3) Pull out the interface cables through the Guide hole.
4) Fasten the Cable-Guide using the screws.

WARNING: Be careful not to bind the interface cables and the AC power cord together.

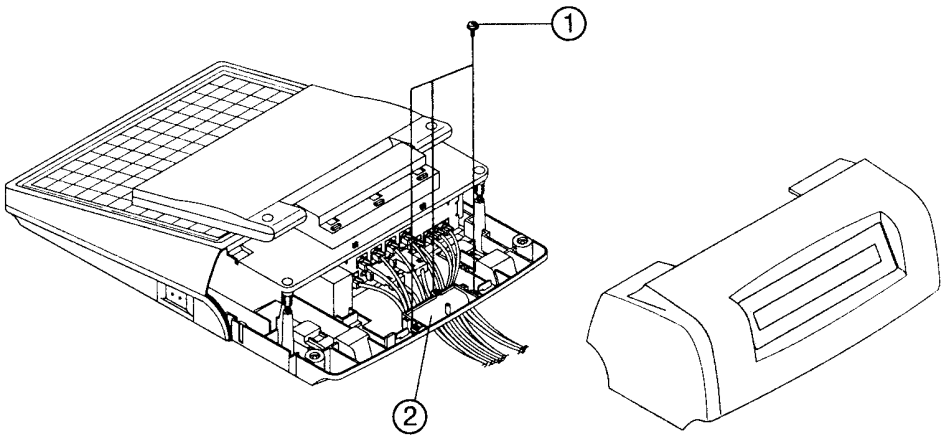


Figure 4-8.

4-10 Replacing the Battery

The Label Rating is attached to the bottom surface of the set. The Label has the "BAT.-NEXT: " line to show the battery replacement date.

Caution: When the time Written "BAT.-NEXT: " line comes, ask your dealer for a replacement of the battery. (The battery life is about 3 years after replacement)

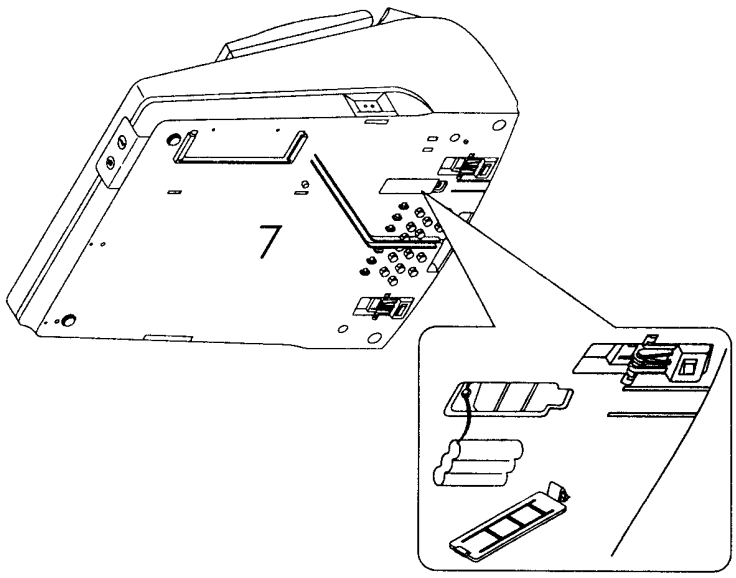


Figure 4-9.

5 Operations

Note: Before using this System Electronic Cash Register (SECR) for the first time, leave it powered ON in the REG Mode for at least twenty-four hours. This allows the Ni-Cad battery, which maintains the SECR's memory while the power is OFF, to fully charge.

5-1 Mode Switch

The position of the Mode Switch determines the action of the SECR. The Mode Switch is as shown in Figure 5-1.

Table 5-1. SECR Modes

Mode	Function
VOID	Cancel operation
OFF	Operation stop
REG	Sales Operation
X	X-level report generation
Z	Z-level report generation
PGM	Program mode
S	Service mode

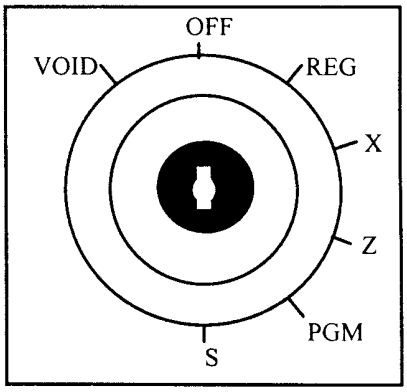
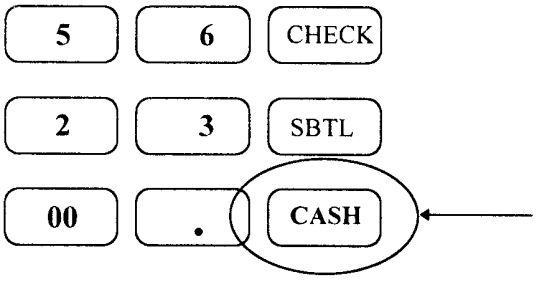


Figure 5-1. Mode Switch

5-2 Initial Clear

1. Turn off the power switch.
2. Turn the Mode Key marked 'C' to P-Mode
3. Hold down the right-end lower key on keyboard and turn on the power switch at the same time.

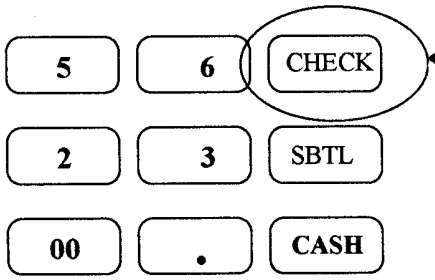


Use this key for "Initial Clear" regardless of what key function is programmed at that position.

5-3 All Clear

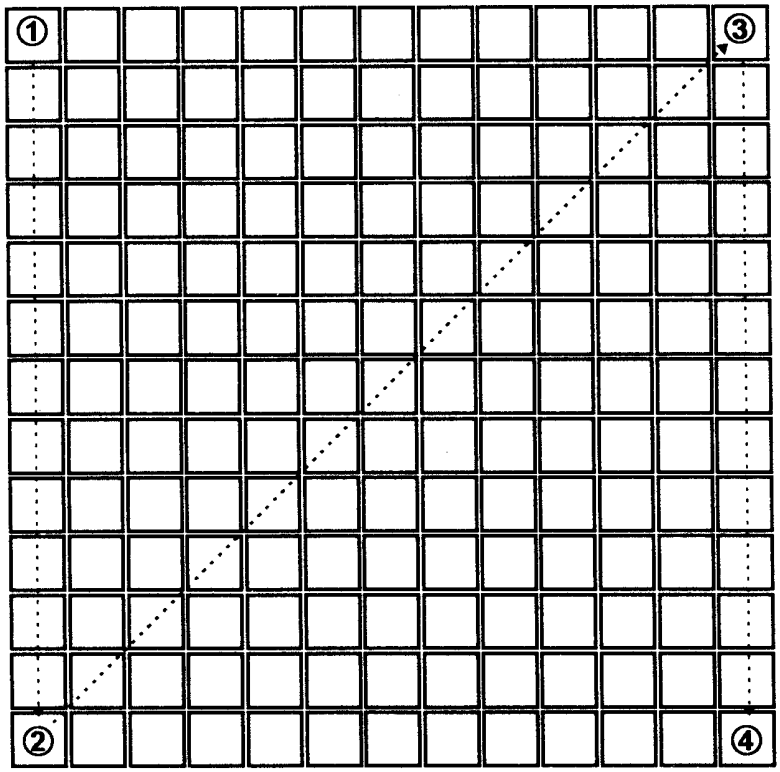
All Clear is used to clear all memory and keyboard contents. This procedure returns all programming back to defaults.

1. Turn off the power switch.
2. Turn the Mode Key marked 'C' to S-Mode.
3. Hold down the third key up from the right-end lower key on keyboard and turn on the power switch at the same time. (The black screen is just displayed.)



Use this key for "All Clear" regardless of what key function is programmed at that position.

4. Press ①the left-end upper key, ②the left-end lower key, ③the right-end upper key, ④the right-end lower key on the keyboard in turn.



5. RAM testing and ROM checksum will be processed and then other information of this register will be displayed on the screen.
6. Enter the register number (1~32).

5-4 Program Downloading

5-4-1 Booting Area Downloading

1. Turn off the power switch.
2. Place the download EPROM in the blank 40 pin socket.
3. Shift the jumper of CN22, CN23 from "ON" to "OFF " position.
4. Connect the serial 1 cable of the set to PC.
5. Turn the Mode Key marked 'C' to S-Mode.
6. Hold down the CASH key on keyboard and turn on the power switch at the same time.
7. Press ①the left-end upper key, ②the left-end lower key, ③the right-end upper key, ④the right-end lower key on the keyboard in turn.
8. Type "G_ERASE ***port*** 99" and press ENTER on PC. *(**port** : Enter the port number for the PC)*
9. Wait! - It takes about 6 seconds.
10. Type "G_DOWN ***port filename*** oxd00000" and press ENTER on PC. *(**filename** : Enter the filename for the latest version of SPS-1000)*
11. Wait! - It takes a few minutes.
12. Turn off the power switch.
13. Remove the download EPROM in the 40 pin socket.
14. Shift the jumper of CN22, CN23 from "OFF" to "ON" position.
15. Perform All Clear. (Refer to 5-3.)

5-4-2 Application Area Downloading

1. Turn off the power switch.
2. Connect the serial 1 cable of the set to PC.
3. Turn the Mode Key marked 'C' to S-Mode.
4. Hold down the CASH key on keyboard and turn on the power switch at the same time.
5. Press ①the left-end upper key, ②the left-end lower key, ③the right-end upper key, ④the right-end lower key on the keyboard in turn.
6. Type "G_ERASE ***port*** 5" and press ENTER on PC. *(**port** : Enter the port number for the PC)*
7. Wait! - It takes about 6 seconds.
8. Type "G_DOWN ***port filename*** oxc20000" and press ENTER on PC. *(**filename** : Enter the filename for the latest version of SPS-1000)*
9. Wait! - It takes a few minutes.
10. Turn off the power switch.
11. Perform All Clear. (Refer to 5-3.)

5-5 Self Test

1. Turn the Mode Key marked 'C' to S-Mode.
2. Select "1. SELF TEST" from the menu and press ENTER key.
3. H/W Test menu will be displayed.
4. Select the number from the menu and press ENTER key.

5-5-1 RS-232C & IRC LOOP BACK TEST

1) Turn off the power switch before entering this test menu.
2) Fit the Loop-Back connector into the Serial Port(1~7) and Ethernet Port.
3) Turn on the power switch.
4) Testing success will display "SUCC" for each port.
5) Testing fail will display "FAIL" for each port.

5-5-2 DRAWER

1) Turn off the power switch before entering this test menu.
2) Fit the drawer cable into the Cash Drawer Port (1~3).
3) Turn on the power switch.
4) Testing will display "FIRST DRAWER" , "SECOND DRAWER" and "THIRD DRAWER" step by step.
5) Whenever the each message is displayed, each drawer connected to the cable will be opened in each step.

5-5-3 RTC SETTING

1) Input the appropriate number for year, month, day, hour, minute and second. And press ENTER key.

5-5-4 DISPLAY

1) This test will fill a black screen from the edge of both sides to center of LCD and a blank screen from the center to the edge of both sides. And also displays some lines or messages with Rear LCD Test.
2) When "Rear LCD Test" is displayed, some characters are displayed on the Rear LCD.
3) Press any key to end display test.

5-5-5 KEYBOARD

1) Press any key you want on the keyboard.
2) Already pressed key will be showed on the screen on that position of key pressed with a black square.
3) Turn the Mode-Key to any position to end this test.

5-5-6 MODE & CLERK KEY

1) Turn the Mode-Key to any position or put the Clerk-Key into the Clerk position.
2) Appropriate message will be displayed on the screen.

5-5-7 RAM

This test calculate RAM capacity installed on this register and will display the followings.

- BASE RAM OK
- EXT. RAM SIZE *(#)

  (* : Extended Ram Size currently installed)

  (# : Extended Ram # currently installed)

5-5-8 IRC

Select the menu for the test (1-5)

1) REGISTER # SETTING
   - Input this register number.
2) INTERNAL LOOP BACK(CHIP)
   - S : Testing is success.
   - F : Testing is failed.
   - Number : the number of successing or failing for test.
3) INTERNAL LOOP BACK(DRIVER)
   - S : Testing is success.
   - F : Testing is failed.
   - Number : the number of successing or failing for test.
4) EXTERNAL LOOP BACK
   - Refer to 5-4-1.
5) IRC SYSTEM TEST
   - Input the start and the destination register number to send a packet.

5-5-9 PRINTER

1) Turn off the power switch.
2) Fit the serial cable of printer into the serial port you will use.
3) Turn the power on.
4) Enter the port number currently connected by printer.
5) Test page will be displayed by the printer currently connected.

5-5-10 RAM CHECKSUM

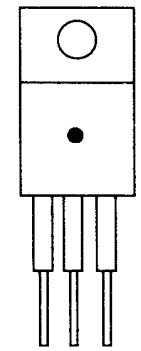
This operation will display "RAM Checksum".

5-5-11 VERSION CHECK

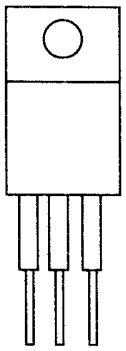
This operation will display "Software Version Number", "Base RAM Size", "Extended RAM Size" and "ROM Checksum" currently installed.

6 Reference Information

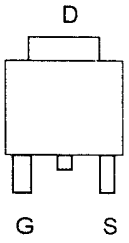
6-1 Semiconductor base diagram



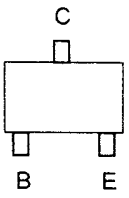
KSA-1010Y
KSC-2335Y



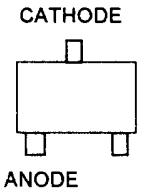
7824



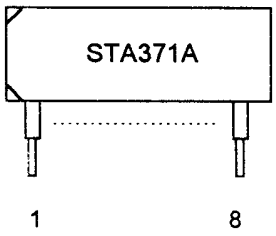
IRFR9024



MMBT2222A

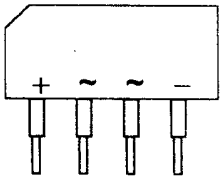


MMBD6050L

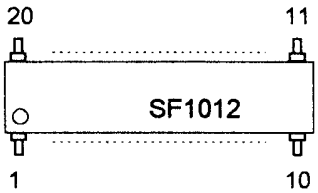


STA371A

Bridge Diode

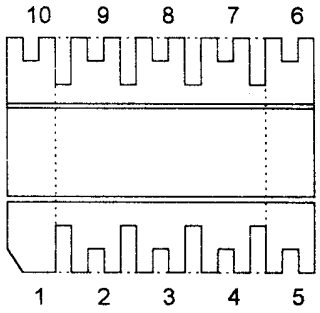


GBL01



SF1012

Top View



T42
INVERTER

6-2 Main Board Wiring Diagram

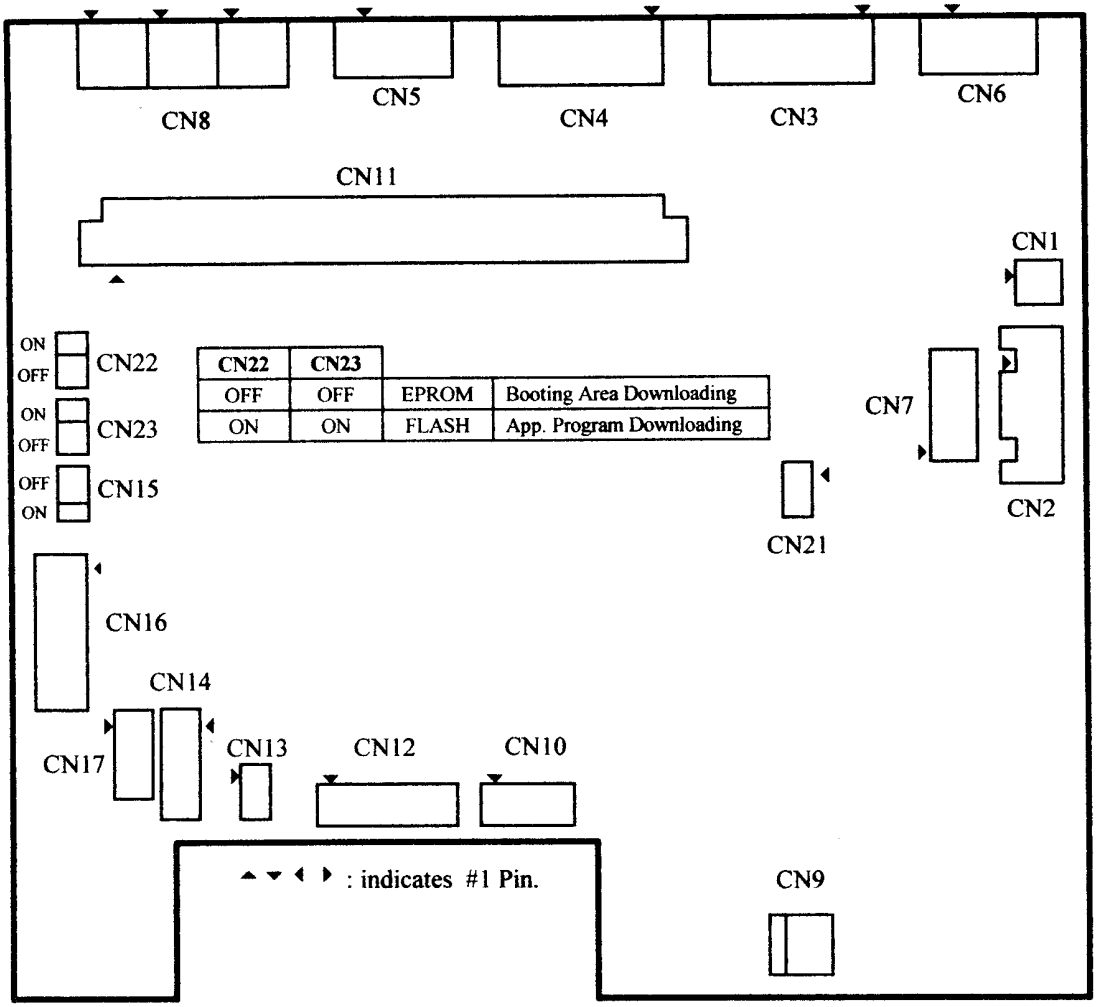
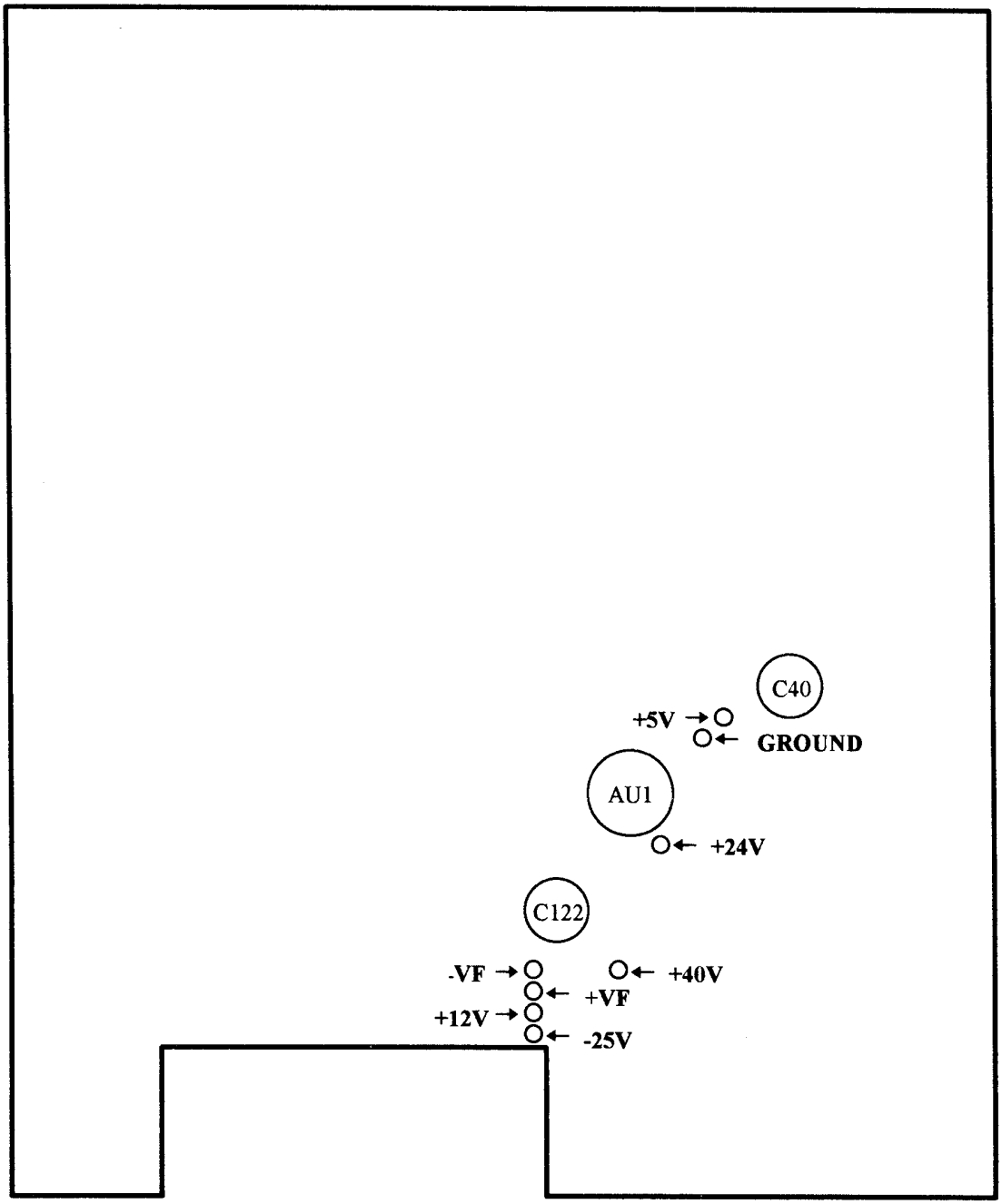


Table 2-1 Wiring Pin Descriptions

Name	Description	Pin #	Remark	Name	Description	Pin #	Remark
CN1	Battery	2		CN12	Mode Lock	8	
CN2	Rear LCD	16	SPS-1000 Only	CN13	Inverter LCD	6	SPS-1000 Only
CN3	Serial 1	9		CN14	Front LCD	14	SPS-1000 Only
CN4	Serial 2	9		CN15	All Clear	3	
CN5	Serial 3	8		CN16	Keyboard	30	
CN6	IRC	8		CN17	Front VFD	12	SPS-1000V Only
CN7	Rear VFD	8	SPS-1000V Only	CN21	General I/O Port	2	
CN8	Cash Drawer	18	3-Ports				
CN9	Power	2		CN22	CN23	FUNCTION	
CN10	Clerk Lock	5		OFF	OFF	EPROM	Booting Area Downloading
CN11	Bus Card	64		ON	ON	FLASH	App. Program Downloading

6-3 Main Board Voltage Check Points



7 Special Circuit Descriptions

7-1 Power Circuit

This system is operated under 120Vac or 230Vac, all data is saved by the Battery when the Main power is turned off. The power circuit supplies the seven different DC voltage sources and one AC voltage source.

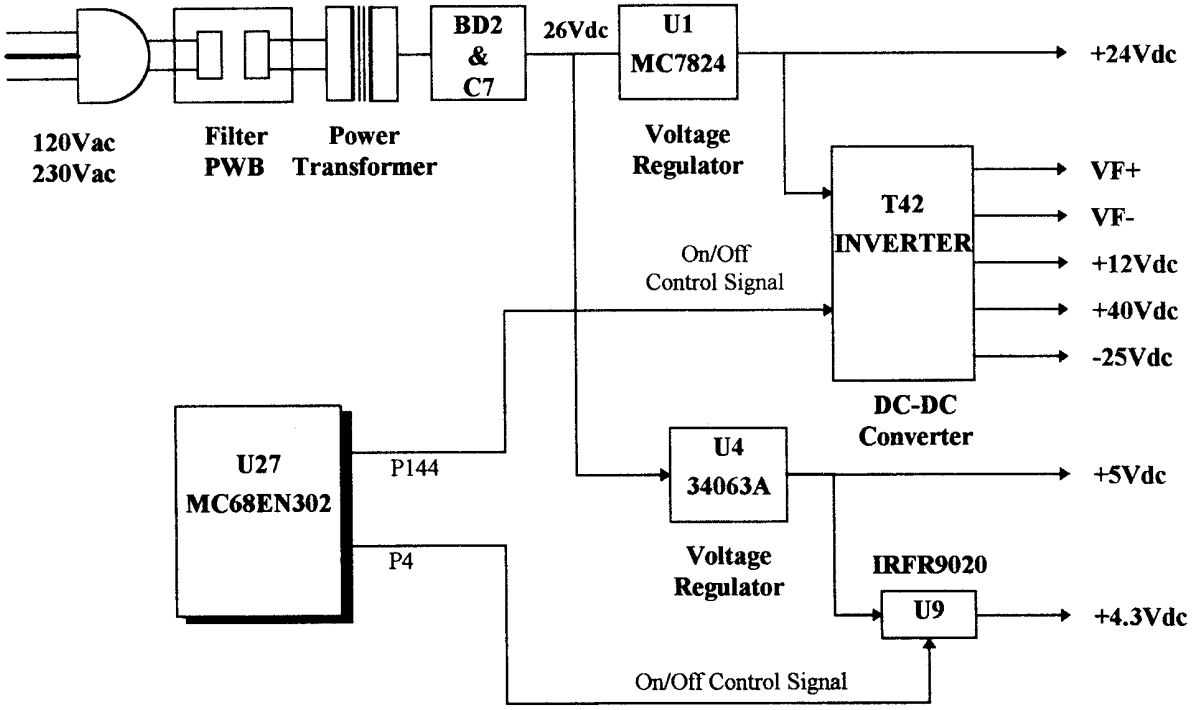


Figure 7-1. Power Block Diagram

No.	Voltage	Description
1	+24Vdc	Cash Drawer Solenoid Driving Voltage
2	VF (7Vac)	Front VFD Filament Driving Voltage
3	+12Vdc	Front LCD Backlit Driving Voltage
4	+40Vdc	Front/Rear VFD Grid/Anode Driving Voltage
5	-25Vdc	Front LCD Contrast Driving Voltage
6	+5Vdc	Logic IC Driving Voltage
7	+4.3Vdc	Rear LCD Backlit Driving Voltage
8	+3.6Vdc	Battery Voltage

Table 7-1. Power Source Voltage Descriptions

7-1-1 Cash Drawer Solenoid Driving Voltage : +24Vdc

+26Vdc is produced by the bridge diode (BD2) and the capacitor(C7). The voltage regulator U1(7824) produces +24Vdc using +26Vdc. This voltage is used as a Cash Drawer Solenoid driving voltage and a source voltage of the other voltage sources.

7-1-2 Logic IC Driving Voltage: +5V

+5Vdc Logic driving voltage is produced by the step-down dc-dc converter U4(34063A). That is, U4 produces rectangular wave at the collector of Q1(A1010) by switching Q1 using +26Vdc. This makes D5(IN5822) and L65 store energy. The voltage is smoothed by C40(470uF) and then +5Vdc Logic voltage is produced .

7-1-3 Rear LCD Backlit Driving Voltage: +4.3Vdc

U9(9020) is turned on by P4 signal on CPU(U27) and then +5Vdc drops +4.3Vdc by D4(M4). This +4.3Vdc drives Rear LCD Backlit.

7-1-4 Front VFD Filament Driving Voltage : 7Vac

Q2 (C2335) produces rectangular wave at the collector using +24Vdc by on/off control signal (P144) on CPU(U27). This Q2 collector voltage is transformed 7Vac by T42(Inverter Transformer) at T42.3(VF+) Pin , T42.5(VF-) Pin. This 7Vac drives Front VFD Filament.

7-1-5 Front /Rear VFD Grid/Anode Driving Voltage : +40Vdc

Q2 (C2335) produces rectangular wave at the collector using +24Vdc by on/off control signal (P144) on CPU(U27). This Q2 collector voltage is transformed 40Vac by T42(Inverter Transformer) at T42.6 Pin. This 40Vac is half-rectified by D8(SS16) and then +40Vdc Front/Rear VFD Grid/Anode driving voltage is produced.

7-1-6 Front LCD Backlit Driving Voltage : +12Vdc

Q2 (C2335) produces rectangular wave at the collector using +24Vdc by on/off control signal (P144) on CPU(U27). This Q2 collector voltage is transformed 12Vac by T42(Inverter Transformer) at T42.7 Pin. This 12Vac is half-rectified by D9(SK14) and then +12Vdc Front LCD Backlit Driving voltage is produced.

7-1-7 Front LCD Contrast Driving Voltage : -25Vdc

Q2 (C2335) produces rectangular wave at the collector using +24Vdc by on/off control signal (P144) on CPU(U27). This Q2 collector voltage is transformed 25Vac by T42(Inverter Transformer) at T42.10 Pin. This 25Vac is half-rectified by D10(SK14) and then -25Vdc Front LCD Contrast Driving voltage is produced

7-1-8 Battery Voltage : +3.6Vdc

Vcc is supplied to SRAM and the Clock IC (U43, RF5C15) through the D2(SK14) under the Power-on state. and 3.6Vdc is supplied to SRAM and Clock IC(U43, RF5C15) when the power is off.

7-2 RESET and Power Fail circuits

7-2-1 Reset Circuit

Reset signal is a signal in order to start-up CPU under Power-on. Reset Circuit uses a reset IC TL7705ACD(U3). When +5Vdc is fallen under 4.3Vdc by Power-off, reset signal prohibits the system from misoperating by lowering down to 0V.

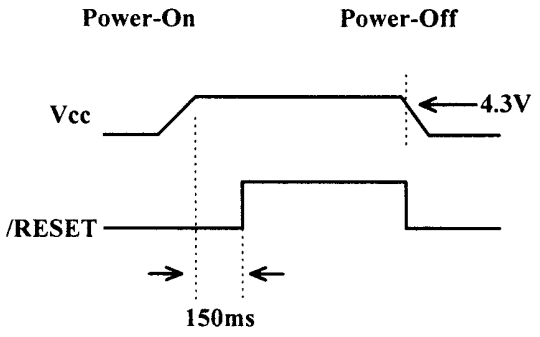


Figure 7-2. Reset Waveform

7-2-2 Power Fail Sensing Circuit

Power Fail Sensing Circuit detects sudden power-off to backup the needed data and current CPU status into RAM before 35ms just before +5V drops. When power is turned on, the CPU does the operations which were working before power-off. This system is designed to sense the time when the AC Line voltage is goes down to 89Vac(USA) or 170Vac(Europe) . That is, when +24Vdc goes down to +10Vdc.

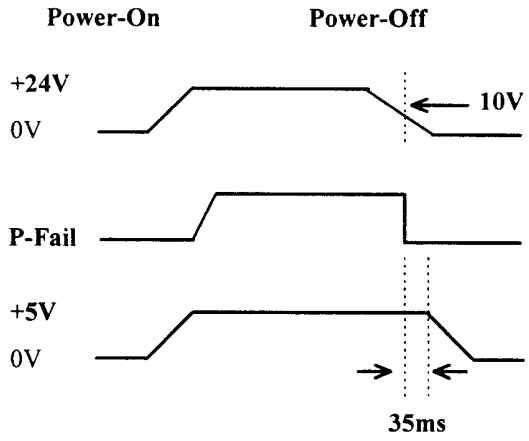


Figure 7-3. Power Fail Waveform

7-3 Battery, RTC(Clock), Buzzer and Cash Drawer circuits

7-3-1 Battery Circuit

Battery Circuit supplies SRAM, 74HC138 (U28) and RTC (U43, RF5C15) with voltage source and is used to drive clock and to save data when the main Power is turned off. When the Power is turned on, Vcc source(+5Vdc) is supplied to SRAM and RTC through the D2, and the Battery is charged. When the Power is turned off, D2 is shut and the source charged in the Battery is supplied to SRAM and RTC.

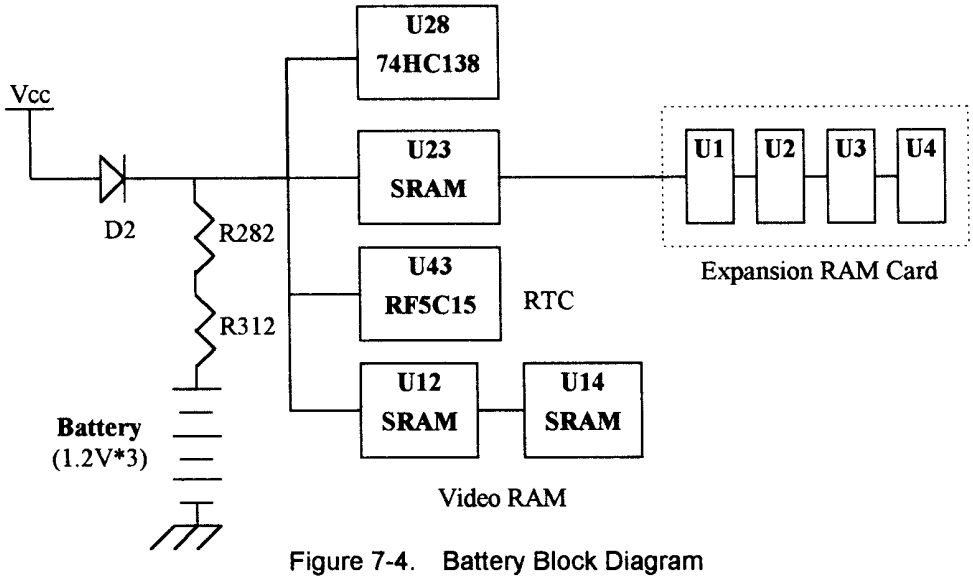


Figure 7-4. Battery Block Diagram

7-3-2 RTC(Clock) Circuit

This uses an Clock IC RF5C15, is driven by the Battery when the main Power is turned off.

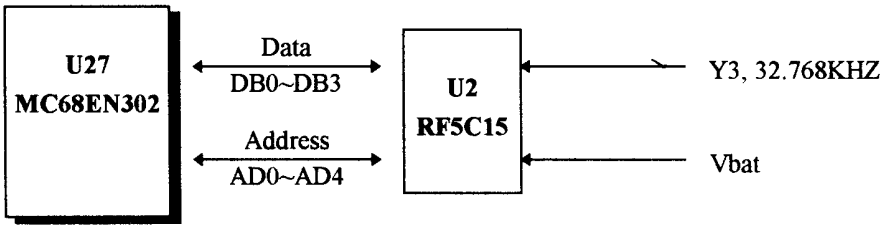


Figure 7-5. RTC Block Diagram

7-3-3 Buzzer Driving Circuit

The Buzzer is used to inform several kinds of states which occur under system operating and gives some information to users by controlling the P1.0 pin of CPU(U24,80C32).

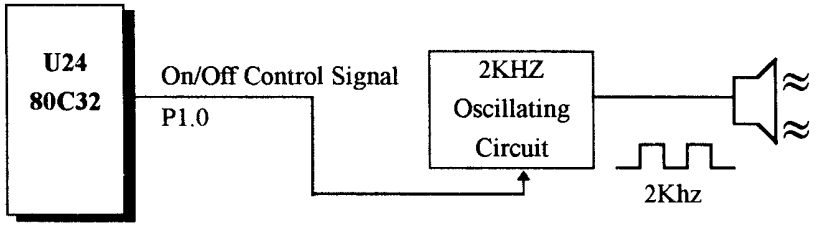


Figure 7-6. Buzzer Block Diagram

7-3-4 Cash Drawer Driving Circuit

The circuit is used for opening cash drawer and driven by the signals of pin 17~19 of U27. When its state is high level signal, U39 (STA371A) drive the solenoid to open the cash drawer. As an optional item, we provide sensor switch (we call it a compulsory switch) which checks the drawer whether it is opened or not. This sensor switch turns on for the drawer open condition, and turns off for the other.

Caution: make sure that the Cash Drawer solenoid resistance is more than 20Ω

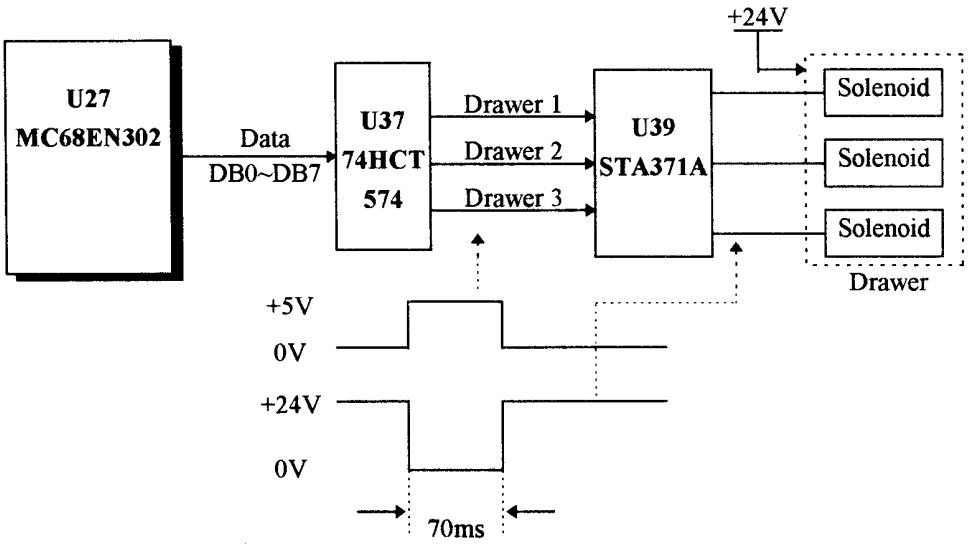


Figure 7-7. Cash Drawer Block Diagram

7-4 Display Block Diagram

7-4-1 Front LCD Display Block Diagram

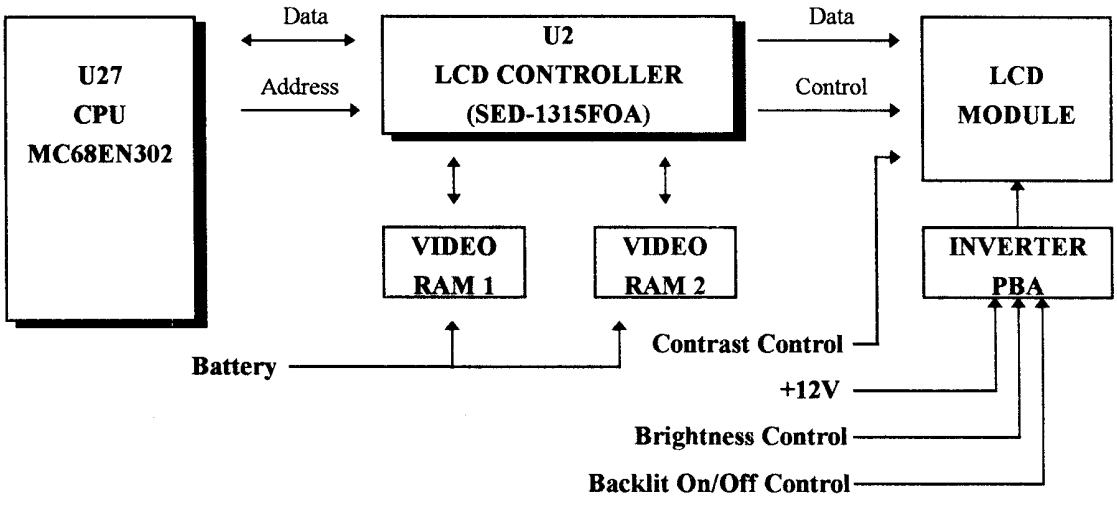


Figure 7-8. Front LCD Block Diagram

7-4-2 Rear LCD Display Block Diagram

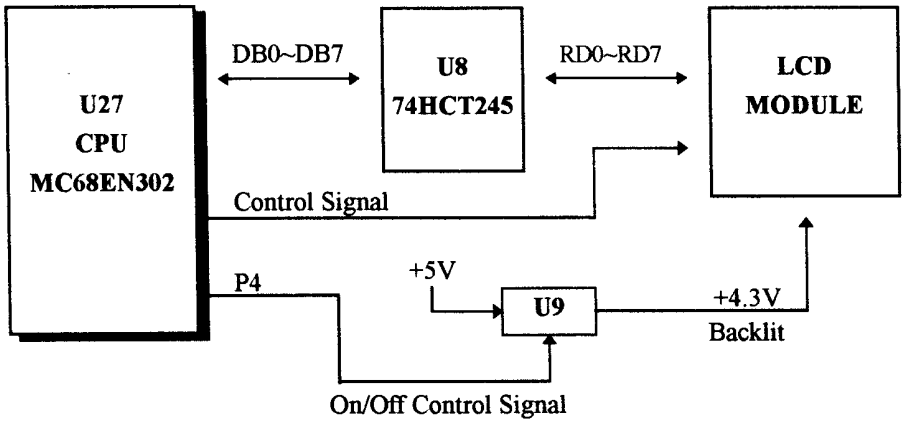


Figure 7-9. Rear LCD Block Diagram

7-4-3 Front VFD Display Block Diagram

This uses 20chars ×2line Fluorescent Display and uses two Built-in Driver for Grid data and Anode data, each consists of 96 bits shift registers, 96 latches and 96 level shifters. U24(80C32) sends display data to the driver repeatedly having given time interval in series. This serial data enter shift register on the low to high transition of Clock signal, while Latch Enable is high, the parallel data is transferred to each Grid and Anode and then fluorescent Display is operated.

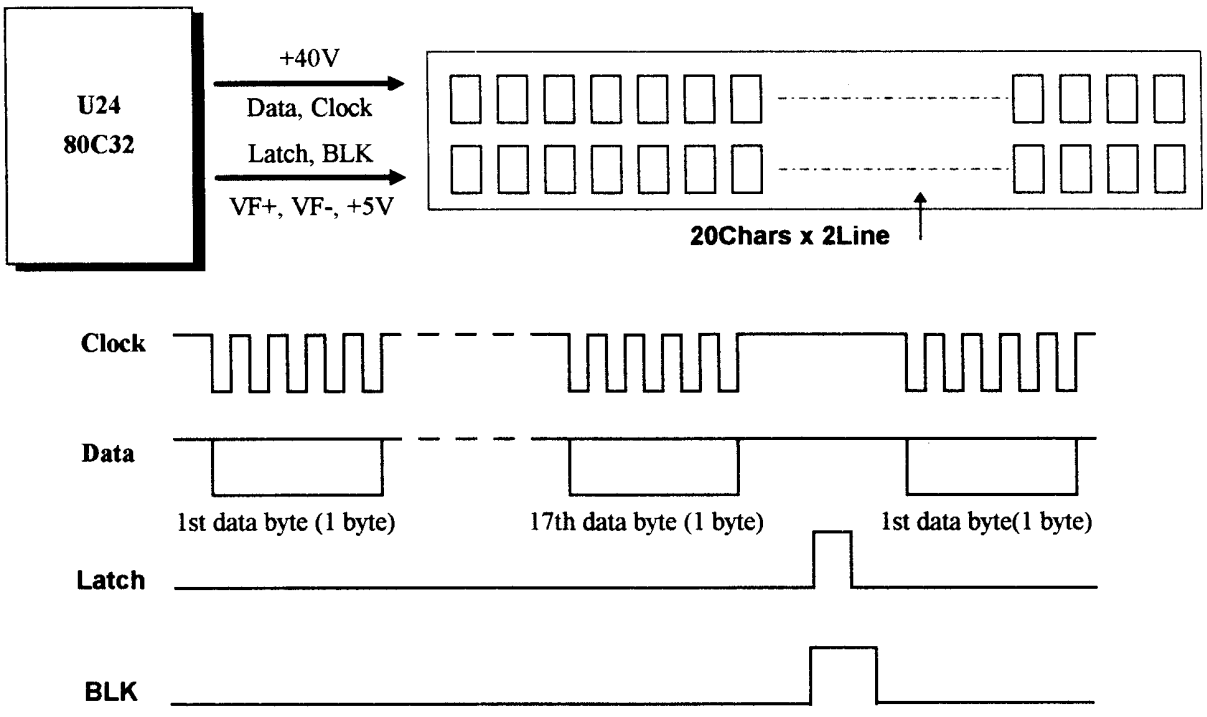


Figure 7-10. Front VFD Block Diagram

7-4-4 Rear VFD Display Block Diagram

This uses 10digit Fluorescent Display and uses UCN5812AF (is located on the Rear VFD PCB) for the driver. U24(80C32) sends Display data to the driver repeatedly having given time interval in series and then Fluorescent Display is operated.

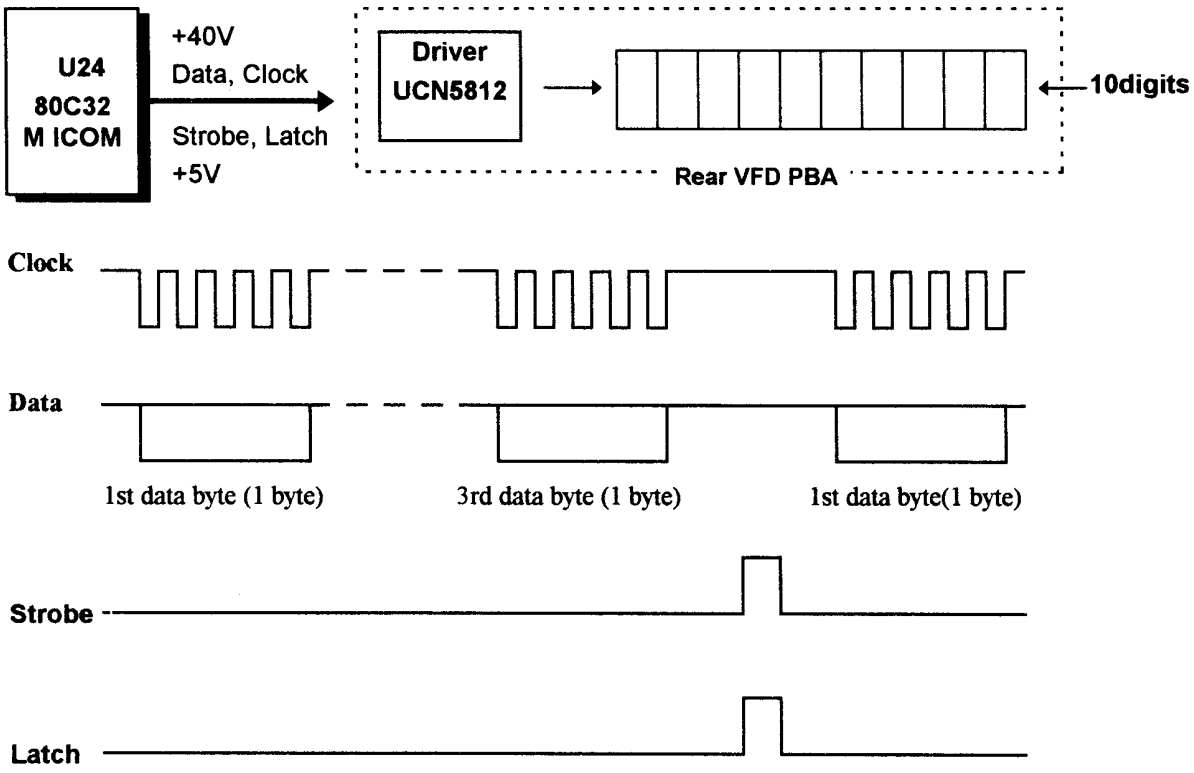


Figure 7-11. Rear VFD Block Diagram

7-5 RS-232C Communication Block Diagram for serial 1 ~ 7

The TL16C452, RS-232C Controller, is used to communicate serial 4 ~ 7. And also used Max232, RS-232C Driver, is used to communicate serial 1 ~ 7. Show following block diagram

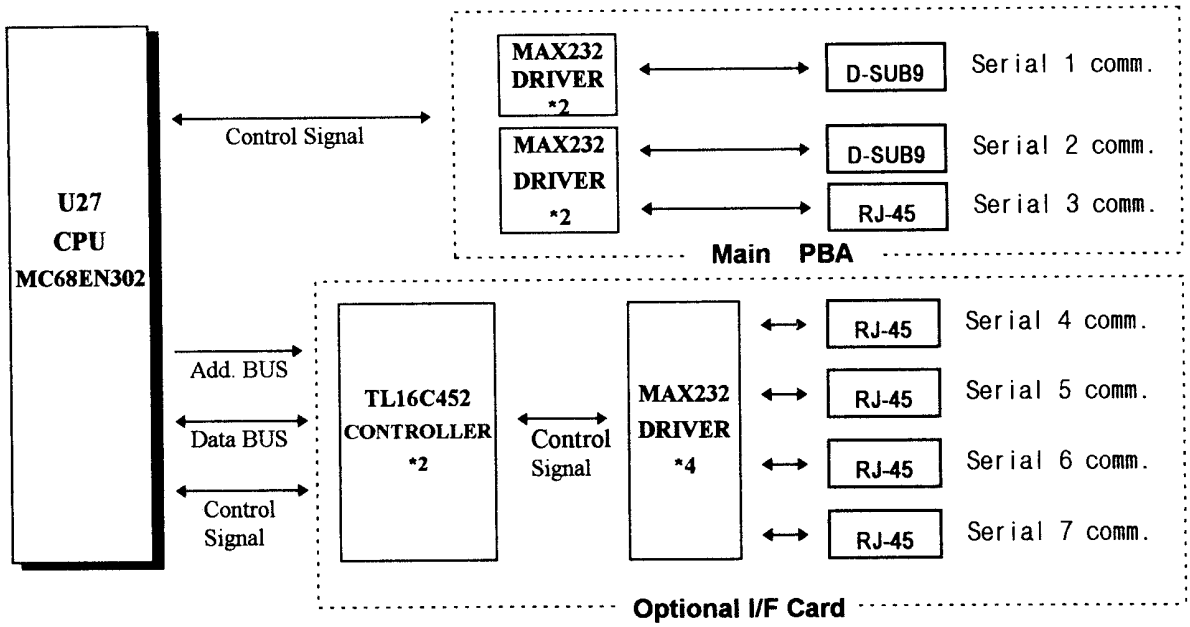


Figure 7-12. RS-232C Block diagram

7-6 IRC Communication Block Diagram

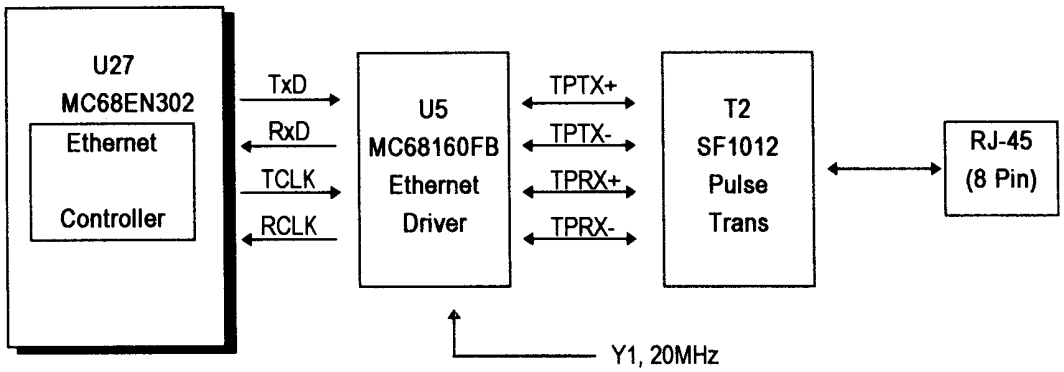


Figure 7-13. IRC Communication Block Diagram

7-7 Keyboard Circuit

The key Board Circuit consist of the scan signal of 22 lines and the return signal of 8-line. The U24(80C32) sends repeatedly and continuously the scan data S0-S21 through the 74HCT138(U33-U35). The key information input in the return signal if the specific key is pressed during the given time. The U24(80C32) reads the data through U38(HCT541) and analyzes what key is pressed and transmits this information to the CPU(U27), then performs the selected function. The U24(80C32) sends the mode scan signal to the Key-lock switch and takes the return data through the U38(HCT541) and transmits this to the U27(MC68EN302) and performs the selected function.

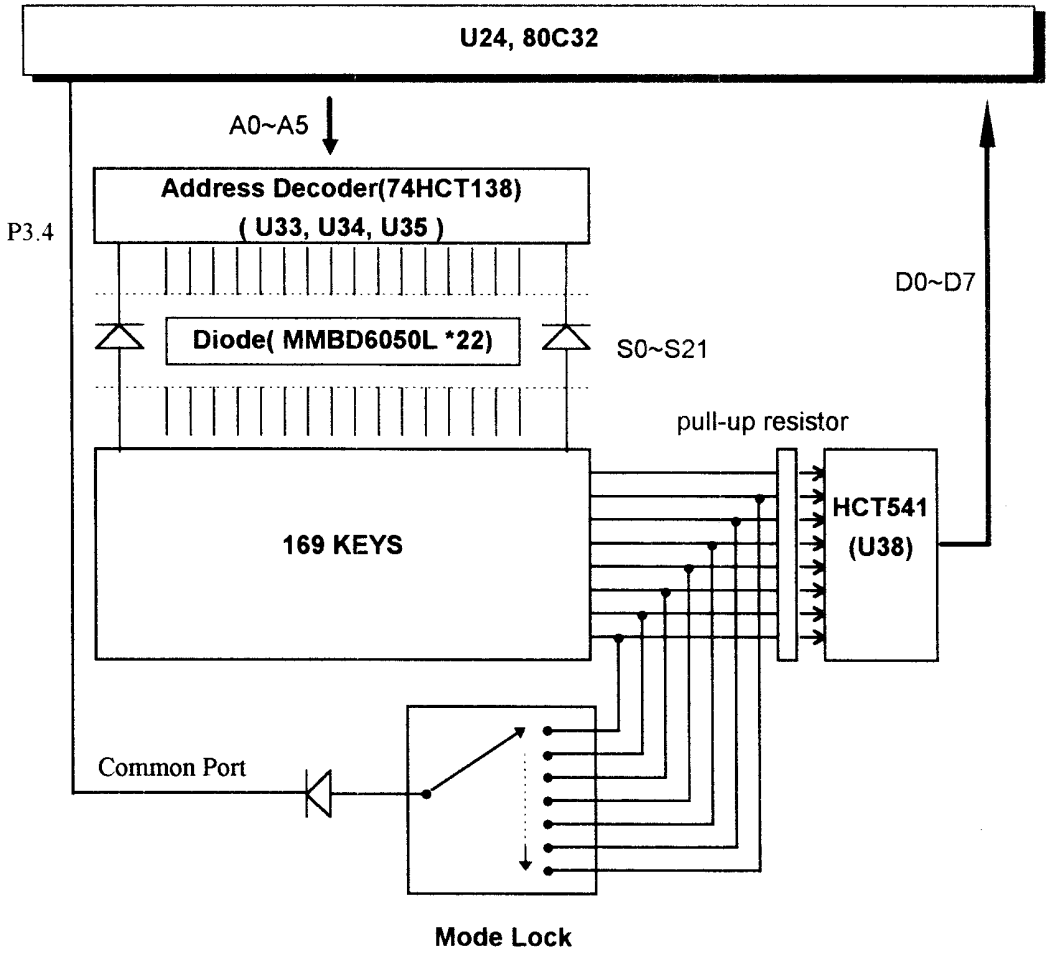
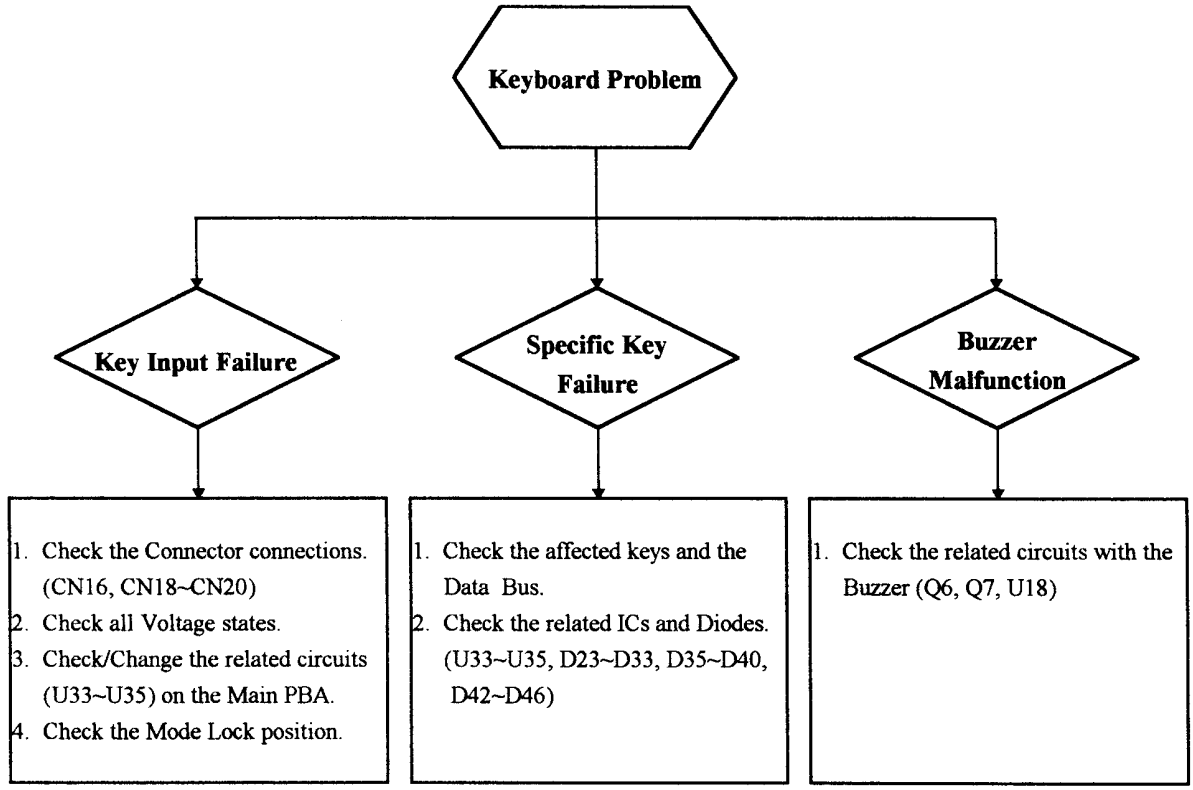


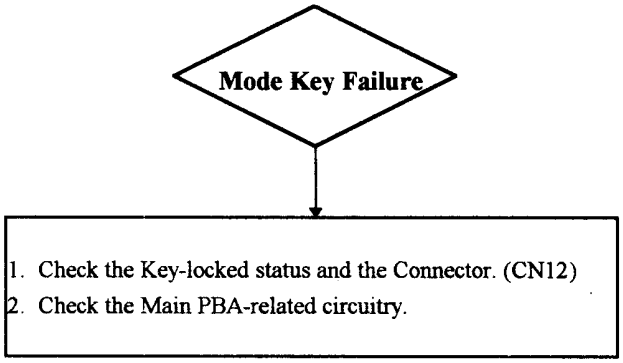
Figure 7-14. Keyboard Block Diagram

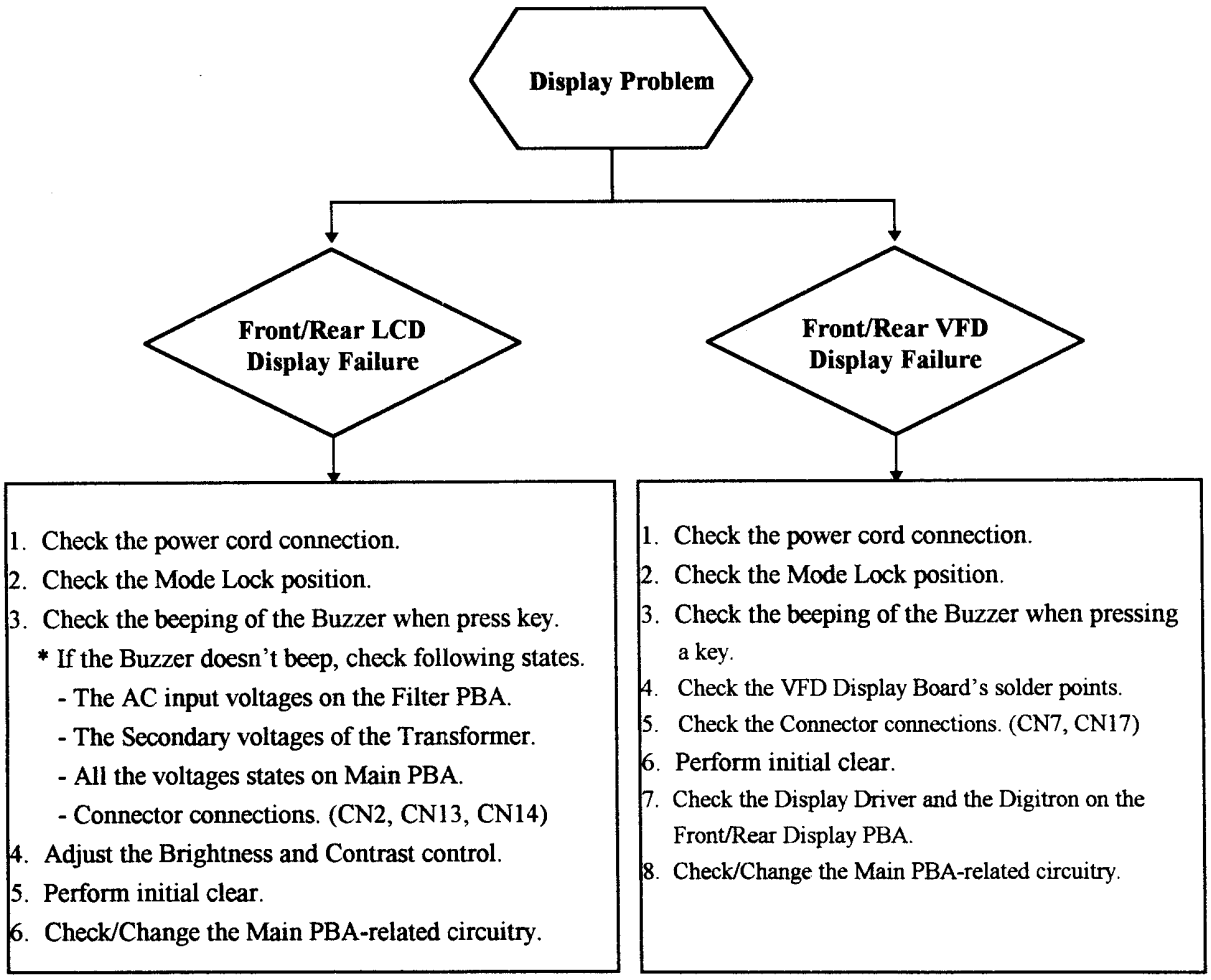
8 Troubleshooting

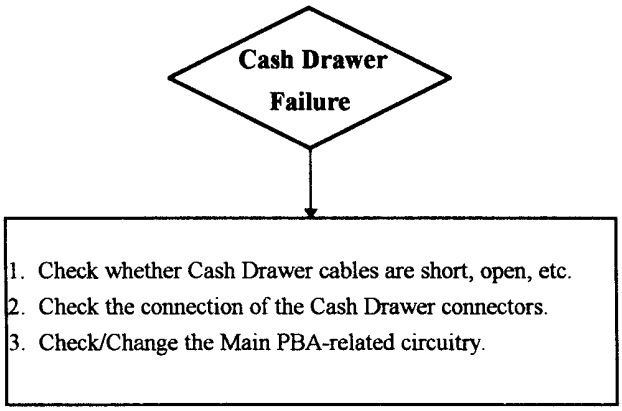
This chapter describes the methods for determining the source of malfunction in this SECR.

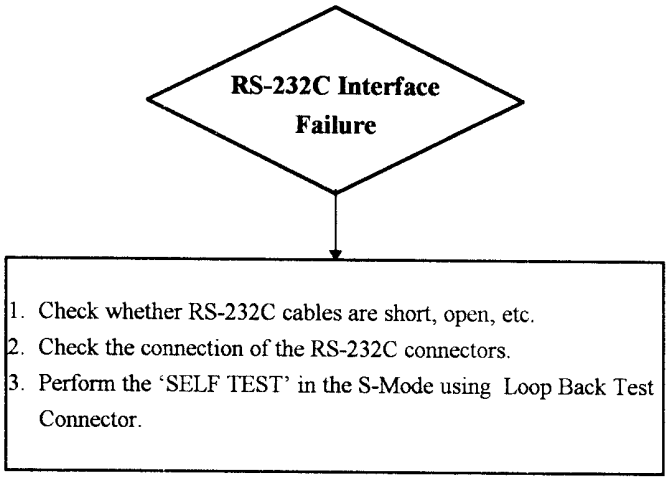
8-1. Troubleshooting

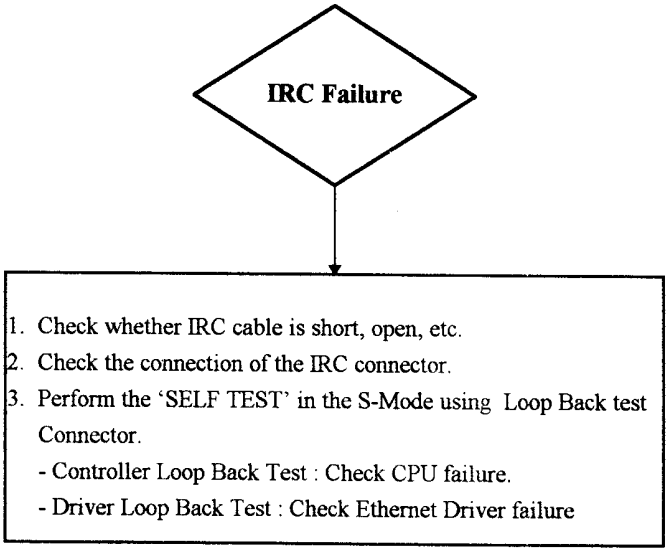


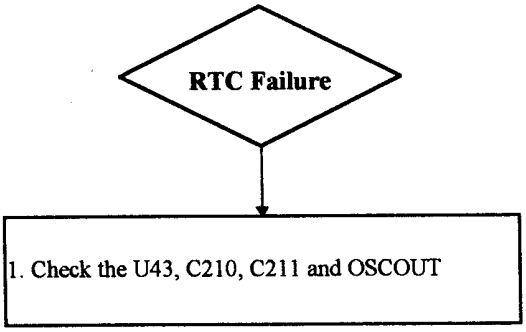


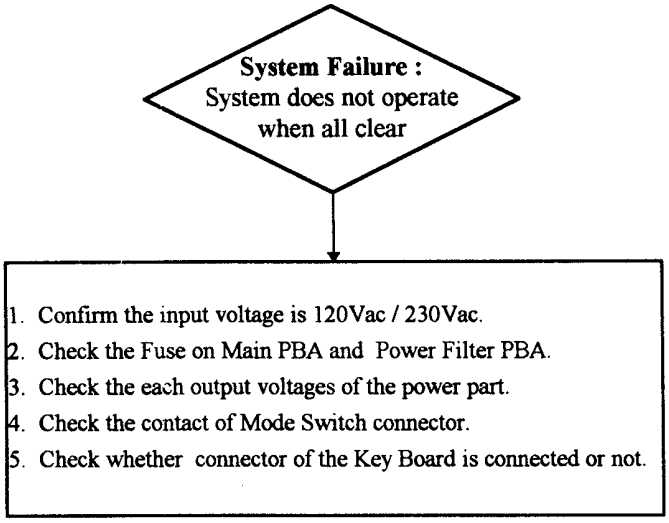

Display Problem
Front/Rear LCD Display Failure
Front/Rear VFD Display Failure
1. Check the power cord connection.
2. Check the Mode Lock position.
3. Check the beeping of the Buzzer when press key.
* If the Buzzer doesn't beep, check following states.
- The AC input voltages on the Filter PBA.
- The Secondary voltages of the Transformer.
- All the voltages states on Main PBA.
- Connector connections. (CN2, CN13, CN14)
4. Adjust the Brightness and Contrast control.
5. Perform initial clear.
6. Check/Change the Main PBA-related circuitry.
1. Check the power cord connection.
2. Check the Mode Lock position.
3. Check the beeping of the Buzzer when pressing a key.
4. Check the VFD Display Board's solder points.
5. Check the Connector connections. (CN7, CN17)
6. Perform initial clear.
7. Check the Display Driver and the Digitron on the Front/Rear Display PBA.
8. Check/Change the Main PBA-related circuitry.


Cash Drawer Failure
1. Check whether Cash Drawer cables are short, open, etc.
2. Check the connection of the Cash Drawer connectors.
3. Check/Change the Main PBA-related circuitry.


RS-232C Interface
Failure
1. Check whether RS-232C cables are short, open, etc.
2. Check the connection of the RS-232C connectors.
3. Perform the 'SELF TEST' in the S-Mode using Loop Back Test Connector.


IRC Failure
1. Check whether IRC cable is short, open, etc.
2. Check the connection of the IRC connector.
3. Perform the 'SELF TEST' in the S-Mode using Loop Back test Connector.
- Controller Loop Back Test : Check CPU failure.
- Driver Loop Back Test : Check Ethernet Driver failure

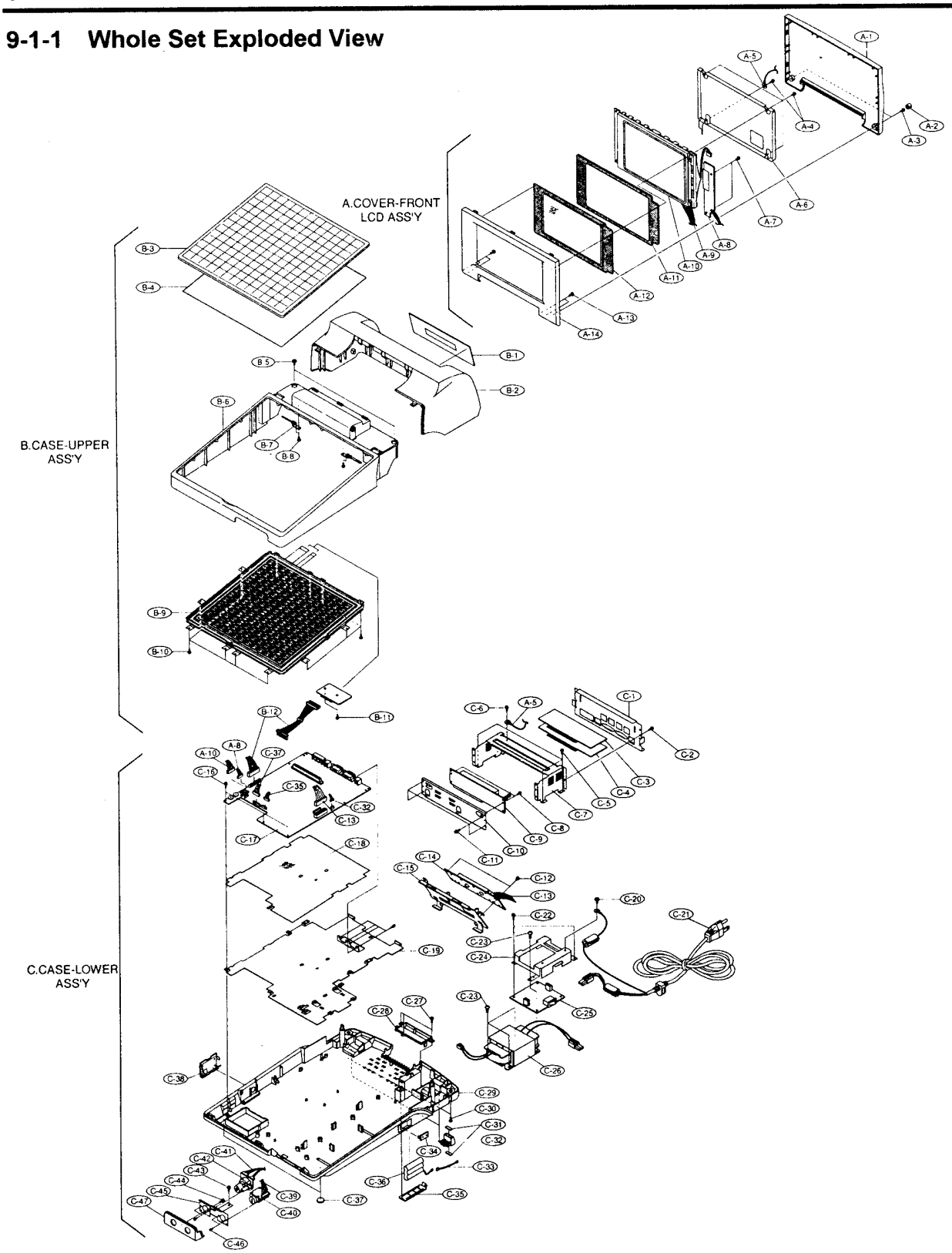

RTC Failure
1. Check the U43, C210, C211 and OSCOUT


System Failure :
System does not operate
when all clear
1. Confirm the input voltage is 120Vac / 230Vac.
2. Check the Fuse on Main PBA and Power Filter PBA.
3. Check the each output voltages of the power part.
4. Check the contact of Mode Switch connector.
5. Check whether connector of the Key Board is connected or not.

9 Exploded Views and Parts List

9-1 SPS-1000

9-1-1 Whole Set Exploded View



9-1-2 Parts List of the Whole Set Exploded View

1) Cover-Front LCD Assembly

Loc. No.	Code No.	Description	Specification	Quality	Remarks
A-1	JK72-41008A	COVER REAR L/V	SPS-1000,ABS,IV16,V0,VH-0800D	1	
A-2	JK73-40903A	CAP-RUBBER	SPS-1000,CR50,C7425	2	
A-3	6002-000175	SCREW-TAPPING	PWH,+,2,M3,L8,ZPC(YEL),SM20C	2	
A-4	6002-000175	SCREW-TAPPING	PWH,+,2,M3,L8,ZPC(YEL),SM20C	4	
A-5	JK39-00023A	CBF HARNESS GROUND	SPS-1000,GROUND WIRE	1	
A-6	JK70-10957A	PLATE SHIELD LCD	SPS-1000,SECC T0.8	1	
A-7	6002-000175	SCREW-TAPPING	PWH,+,2,M3,L8,ZPC(YEL),SM20C	2	
A-8	4401-001167	CONVERTER-DC/AC	SPS-1000,13.2V,1.35KV	1	
A-9	JK39-00013A	CBF HARNESS FRONT	SPS-1000,FRONT LCD	1	
A-10	JK07-00001A	FRONT LCD	SPS-1000,VHX3224AFNCW	1	
A-11	JK74-00001A	SPONGE LCD	SPS-1000,SPONGE T1.5	1	
A-12	JK68-30926A	FILTER DISPLAY LCD	SPS-1000,PC T1.0	1	
A-13	6001-000666	SCREW-MACHINE	PWH,+,2,M3,L6,ZPC(YEL),SM20C	4	
A-14	JK72-41009A	COVER-FRONT LCD	SPS-1000,ABS,IV16,V0,VH-0800D	1	

2) Case-Upper Assembly

Loc. No.	Code No.	Description	Specification	Quality	Remarks
B-1	JK68-30923A	WINDOW-REAR VFD	SPS-1000,PC T1.0	1	
B-2	JK72-00008A	CASE-REAR	SPS-1000,ABS,IV16,V0,VH-0800D	1	
B-3	JK73-00004A	WATER-PROOF SILICON	SPS-1000,SILICON	1	
B-4	JK68-10917A	LABEL-KBD	SPS-1000,ENGLISH	1	
B-5	6002-000174	SCREW-TAPPING	PWH,+,2,M3,L10,ZPC(YEL),SM20C	2	
B-6	JK72-00006A	CASE-UPPER	SPS-1000,ABS,IV16,V0,VH-0800D	1	
B-7	JK75-00002A	HINGE	SPS-1000	2	
B-8	6002-000175	SCREW-TAPPING	PWH,+,2,M3,L8,ZPC(YEL),SM20C	4	
B-9	JK59-10536A	KBD ASS'Y	SPS-1000,169 KEY,RUBBER	1	
B-10	6002-000319	SCREW-TAPPING	PH,+,2,M3,L8,ZPC(YEL),SM20C	12	
B-11	6002-000175	SCREW-TAPPING	PWH,+,2,M3,L8,ZPC(YEL),SM20C	2	
B-12	JK39-00012A	CBF HARNESS	SPS-1000,KEY OPTION	1	

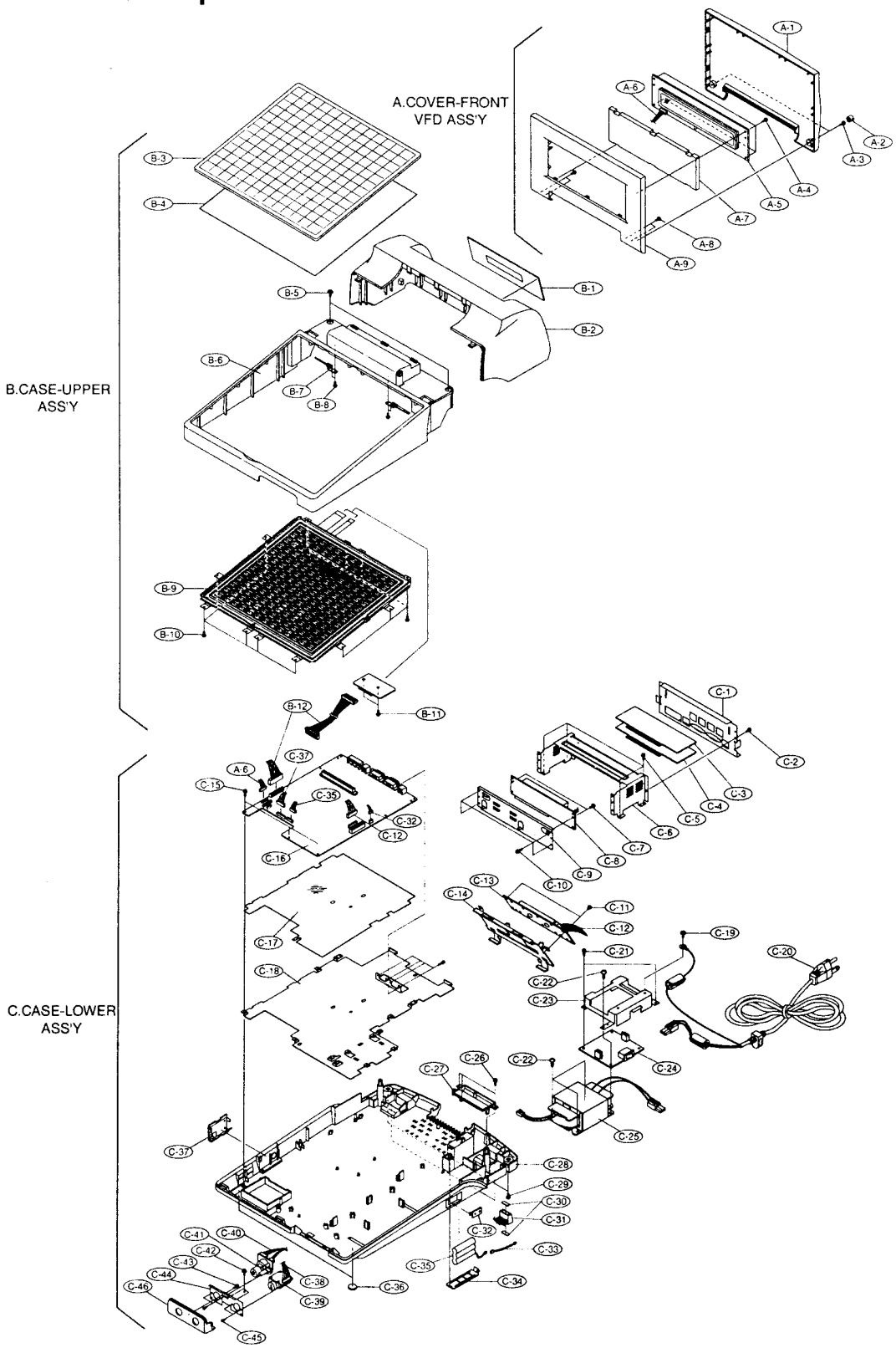
3) Case-Lower Assembly

Loc. No.	Code No.	Description	Specification	Quality	Remarks
C-1	JK70-10955A	BRKT INTERFACE	SPS-1000,SECC T1.0	1	
C-2	6003-000266	SCREW-TAPTITE	PWH,+,2,M3,L6,ZPC(YEL),SM20C	1	
C-3	JK92-00929A	MEMORY OPTION	SPS-1000,1M BYTE	1	
	JK92-00939A	MEMORY OPTION	SPS-1000,2M BYTE	1	
C-4	JK92-00935A	IINTERFACE OPTION	SPS-1000,INTERFACE	1	
C-5	6002-000174	SCREW-TAPPING	PH,+,2,M3,L8,ZPC(YEL),SM20C	4	
C-6	6003-000266	SCREW-TAPTITE	PWH,+,2,M3,L6,ZPC(YEL),SM20C	1	
C-7	JK70-10951A	BRKT OPTION BOARD	SPS-1000,SECC T1.0	1	
C-8	6003-000266	SCREW-TAPTITE	PWH,+,2,M3,L6,ZPC(YEL),SM20C	2	
C-9	JK92-00936A	BUS CARD ASSY	SPS-1000,ASS'Y	1	
C-10	JK70-10952A	BRKT BUS HOLDER	SPS-1000,SECC T1.0	1	
C-11	6003-000266	SCREW-TAPTITE	PWH,+,2,M3,L6,ZPC(YEL),SM20C	4	
C-12	6003-000266	SCREW-TAPTITE	PWH,+,2,M3,L6,ZPC(YEL),SM20C	2	
C-13	JK39-00016A	CBF HARNESS	SPS-1000,REAR LCD	1	
C-14	JK07-00002A	REAR LCD	SPS-1000,VHX2011ASLY	1	
C-15	JK70-10953A	BRKT REAR L/V	SPS-1000,SECC T1.0	1	
C-16	6002-000174	SCREW-TAPPING	PW,+,2,M3,L10,ZPC(YEL),SM20C	3	
C-17	JK92-00928A	MAIN BOARD ASSY	SPS-1000,MAIN BOARD	1	
C-18	JK68-30925A	INSULATION SHEET	SPS-1000,PVC T0.3	1	
C-19	JK70-10946A	PLATE SHIELD MAIN	SPS-1000,SECC T1.0	1	
C-20	6006-000199	SCREW-TAPTITE	ASS'Y,+,2,M4,L8,ZPC(YEL),SM20C	1	
C-21	JK39-10003A	POWER-CORD	SPS-1000,USA	1	
	JK39-10501A	POWER-CORD	SPS-1000,EUROPE	1	
	JK39-10002A	POWER-CORD	SPS-1000,AUSTRALIA	1	
	JK39-10008A	POWER-CORD	SPS-1000,UK	1	
	JK39-10506A	POWER-CORD	SPS-1000,CHINA	1	
	JK39-10303D	POWER-CORD	SPS-1000,CHILE	1	
	JK39-10508A	POWER-CORD	SPS-1000,URUGUAY	1	
	JK39-00020A	POWER-CORD	SPS-1000,SOUTH AFRICA	1	
	JK39-00022A	POWER-CORD	SPS-1000,ARGENTINA	1	
C-22	6002-000174	SCREW-TAPPING	PWH+,2,M3,L10,ZPC(YEL),SM20C	2	
C-23	6002-000171	SCREW-TAPPING	PH,+,2,M4,L10,ZPC(YEL),SM20C	4	
C-24	JK70-10954A	BRKT POWER GND	SPS-1000,SECC T1.0	1	
C-25	JK92-00930A	POWER PCB ASS'Y	SPS-1000,POWER BOARD	1	
C-26	JK26-00002A	POWER TRANS	SPS-1000,120V 60Hz 20V 1.5A	1	
	JK26-00001A	POWER TRANS	SPS-1000,230V 50Hz 20V 1.5A	1	
C-27	6003-000267	SCREW-TAPTITE	PWH,+,2,M3,L8,ZPC(YEL),SM20C	3	

C-28	JK72-41006A	GUIDE-CABLE	SPS-1000,ABS,IV16,V0,VH-0800D	1	
C-29	JK72-00007A	CASE-LOWER	SPS-1000,ABS,IV16,V0,VH-0800D	1	
C-30	6002-000174	SCREW-TAPPING	PWH+,2,M3,L10,ZPC(YEL),SM20C	2	
C-31	JB61-40001A	FOOT-RUBBER	SPS-1000,NR 50	4	
C-32	JK72-41003A	LEG-TILT	SPS-1000,ABS,IV16,V0,VH-0800D	2	
C-33	JK39-00015A	CBF HARNESS	SPS-1000,BATTERY HARNESS	1	
C-34	JK72-41011A	CAP POWER S/W	SPS-1000,ABS,IV16,V0,VH-0800D	1	
C-35	JK72-00009A	COVER BATTERY	SPS-1000,ABS,IV16,V0,VH-0800D	1	
C-36	JK43-00001A	BATTERY-NI CD	SPS-1000,3.6V 600mAhr	1	
C-37	JK61-40902A	FOOT	SPS-1000,3M	2	
C-38	JK72-41004A	DOOR IR	SPS-1000,ABS,IV16,V0,VH-0800D	1	
C-39	JK39-00017A	CBF HARNESS	SPS-1000,CLERK WIRE	1	
C-40	3406-000001	CLERK	SPS-1000	1	
C-41	JK39-00010A	CBF HARNESS	SPS-1000,MODE WIRE	1	
C-42	3406-000116	ROTARY SWITCH	SPS-1000,12V 30mA SP9T	1	
C-43	6002-000175	SCREW-TAPPING	PW,+,2,M3,L10,ZPC(YEL),SM20C	1	
C-44	6002-000319	SCREW-TAPPING	PH,+,2,M3,L8ZPC(YEL),SM20C	1	
C-45	JK70-10956A	BRKT CLERK MODE	SPS-1000,SECC T1.0	1	
C-46	6002-000319	SCREW-TAPPING	PH,+,2,M3,L8ZPC(YEL),SM20C	4	
C-47	JK72-00011A	COVER-MODE	SPS-1000,ABS,IV16,V0,VH-0800D	1	

9-2 SPS-1000V

9-2-1 Whole Set Exploded View



9-2-2 Parts list of the Whole Set Exploded View

1) Cover-Front VFD Assembly

Loc. No.	Code No.	Description	Specification	Quality	Remarks
A-1	JK72-41008A	COVER REAR L/V	SPS-1000,ABS,IV16,V0,VH-0800D	1	
A-2	JK73-40903A	CAP-RUBBER	SPS-1000,CR50,C7425	2	
A-3	6002-000175	SCREW-TAPPING	PWH,+,2,M3,L8,ZPC(YEL),SM20C	2	
A-4	6002-000175	SCREW-TAPPING	PWH,+,2,M3,L8,ZPC(YEL),SM20C	4	
A-5	JK92-00931A	FRONT VFD	SPS-1000V,FRONT VFD ASSY	1	
A-6	JK39-00014A	CBF HARNESS	SPS-1000,FRONT VFD	1	
A-7	JK72-41012A	WINDOW-DISPLAY VFD	SPS-1000,PC, LEXAN141	1	
A-8	6001-000666	SCREW-MACHINE	PWH,+,2,M3,L6,ZPC(YEL),SM20C	4	
A-9	JK72-41007A	COVER-FRONT VFD	SPS-1000,ABS,IV16,V0,VH-0800D	1	

2) Case-Upper Assembly

Loc. No.	Code No.	Description	Specification	Quality	Remarks
B-1	JK68-30923A	WINDOW-REAR VFD	SPS-1000,PC T1.0	1	
B-2	JK72-00008A	CASE-REAR	SPS-1000,ABS,IV16,V0,VH-0800D	1	
B-3	JK73-00004A	WATER-PROOF SILICON	SPS-1000,SILICON	1	
B-4	JK68-10917A	LABEL-KBD	SPS-1000,ENGLISH	1	
B-5	6002-000174	SCREW-TAPPING	PWH,+,2,M3,L10,ZPC(YEL),SM20C	2	
B-6	JK72-00006A	CASE-UPPER	SPS-1000,ABS,IV16,V0,VH-0800D	1	
B-7	JK75-00002A	HINGE	SPS-1000	2	
B-8	6002-000175	SCREW-TAPPING	PWH,+,2,M3,L8,ZPC(YEL),SM20C	4	
B-9	JK59-10536A	KBD ASS'Y	SPS-1000,169 KEY,RUBBER	1	
B-10	6002-000319	SCREW-TAPPING	PH,+,2,M3,L8,ZPC(YEL),SM20C	12	
B-11	6002-000175	SCREW-TAPPING	PWH,+,2,M3,L8,ZPC(YEL),SM20C	2	
B-12	JK39-00012A	CBF HARNESS	SPS-1000,KEY OPTION	1	

3) Case-Lower Assembly

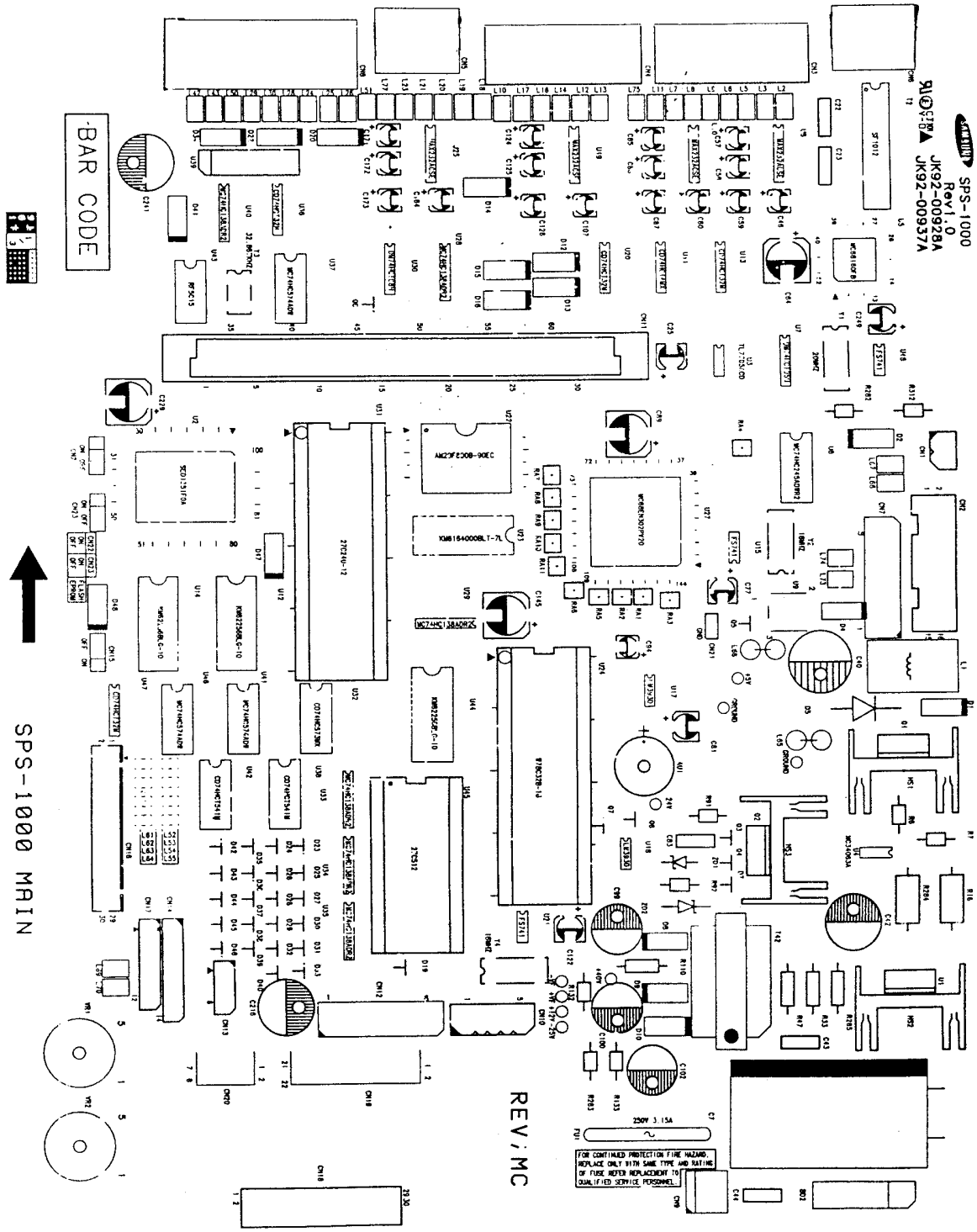
Loc. No.	Code No.	Description	Specification	Quality	Remarks
C-1	JK70-10955A	BRKT INTERFACE	SPS-1000,SECC T1.0	1	
C-2	6003-000266	SCREW-TAPTITE	PWH,+,2,M3,L6,ZPC(YEL),SM20C	1	
C-3	JK92-00929A	MEMORY OPTION	SPS-1000,1M BYTE	1	
	JK92-00939A	MEMORY OPTION	SPS-1000,2M BYTE	1	
C-4	JK92-00935A	IINTERFACE OPTION	SPS-1000,INTERFACE	1	
C-5	6002-000174	SCREW-TAPPING	PH,+,2,M3,L10,ZPC(YEL),SM20C	1	
C-6	JK70-10951A	BRKT OPTION BOARD	SPS-1000,SECC T1.0	1	
C-7	6003-000266	SCREW-TAPTITE	PWH,+,2,M3,L6,ZPC(YEL),SM20C	2	
C-8	JK92-00936A	BUS CARD ASSY	SPS-1000,ASS'Y	1	
C-9	JK70-10952A	BRKT BUS HOLDER	SPS-1000,SECC T1.0	1	
C-10	6003-000266	SCREW-TAPTITE	PWH,+,2,M3,L6,ZPC(YEL),SM20C	4	
C-11	6003-000266	SCREW-TAPTITE	PWH,+,2,M3,L6,ZPC(YEL),SM20C	2	
C-12	JK39-00011A	CBF HARNESS	SPS-1000V,REAR VFD	1	
C-13	JK92-00932A	REAR VFD ASS'Y	SPS-1000V,REAR VFD BOARD	1	
C-14	JK70-10953A	BRKT REAR L/V	SPS-1000,SECC T1.0	1	
C-15	6002-000174	SCREW-TAPPING	PW,+,2,M3,L10,ZPC(YEL),SM20C	3	
C-16	JK92-00937A	MAIN BOARD ASSY	SPS-1000V,MAIN BOARD	1	
C-17	JK68-30925A	INSULATION SHEET	SPS-1000,PVC T0.3	1	
C-18	JK70-10946A	PLATE SHIELD MAIN	SPS-1000,SECC T1.0	1	
C-19	6006-000199	SCREW-TAPTITE	ASS'Y,+,2,M4,L8,ZPC(YEL),SM20C	1	
C-20	JK39-10003A	POWER-CORD	SPS-1000,USA	1	
	JK39-10501A	POWER-CORD	SPS-1000,EUROPE	1	
	JK39-10002A	POWER-CORD	SPS-1000,AUSTRALIA	1	
	JK39-10008A	POWER-CORD	SPS-1000,UK	1	
	JK39-10506A	POWER-CORD	SPS-1000,CHINA	1	
	JK39-10303D	POWER-CORD	SPS-1000,CHILE	1	
	JK39-10508A	POWER-CORD	SPS-1000,URUGUAY	1	
	JK39-00020A	POWER-CORD	SPS-1000,SOUTH AFRICA	1	
	JK39-00022A	POWER-CORD	SPS-1000,ARGENTINA	1	
C-21	6002-000174	SCREW-TAPPING	PWH+,2,M3,L10,ZPC(YEL),SM20C	2	
C-22	6002-000171	SCREW-TAPPING	PH,+,2,M4,L10,ZPC(YEL),SM20C	4	
C-23	JK70-10954A	BRKT POWER GND	SPS-1000,SECC T1.0	1	
C-24	JK92-00930A	POWER PCB ASS'Y	SPS-1000,POWER BOARD	1	
C-25	JK26-00002A	POWER TRANS	SPS-1000,120V 60Hz 20V 1.5A	1	
	JK26-00001A	POWER TRANS	SPS-1000,230V 50Hz 20V 1.5A	1	
C-26	6003-000267	SCREW-TAPTITE	PWH,+,2,M3,L8,ZPC(YEL),SM20C	3	
C-27	JK72-41006A	GUIDE-CABLE	SPS-1000,ABS,IV16,V0,VH-0800D	1	
C-28	JK72-00007A	CASE-LOWER	SPS-1000,ABS,IV16,V0,VH-0800D	1	

C-29	6002-000174	SCREW-TAPPING	PWH+,2,M3,L10,ZPC(YEL),SM20C	2	
C-30	JB61-40001A	FOOT-RUBBER	SPS-1000,NR 50	4	
C-31	JK72-41003A	LEG-TILT	SPS-1000,ABS,IV16,V0,VH-0800D	2	
C-32	JK72-41011A	CAP POWER S/W	SPS-1000,ABS,IV16,V0,VH-0800D	1	
C-33	JK39-00015A	CBF HARNESS	SPS-1000,BATTERY HARNESS	1	
C-34	JK72-00009A	COVER BATTERY	SPS-1000,ABS,IV16,V0,VH-0800D	1	
C-35	JK43-00001A	BATTERY NI-CD	SPS-1000,3.6V 600mAhr	1	
C-36	JK61-40902A	FOOT	SPS-1000,3M	2	
C-37	JK72-41004A	DOOR IR	SPS-1000,ABS,IV16,V0,VH-0800D	1	
C-38	JK39-00017A	CBF HARNESS	SPS-1000,CLERK WIRE	1	
C-39	3406-000001	CLERK	SPS-1000	1	
C-40	JK39-00010A	CBF HARNESS	SPS-1000,MODE WIRE	1	
C-41	3406-000116	ROTARY SWITCH	SPS-1000,12V 30mA SP9T	1	
C-42	6002-000175	SCREW-TAPPING	PW,+,2,M3,L10,ZPC(YEL),SM20C	1	
C-43	6002-000319	SCREW-TAPPING	PH,+,2,M3,L8ZPC(YEL),SM20C	1	
C-44	JK70-10956A	BRKT CLERK MODE	SPS-1000,SECC T1.0	1	
C-45	6002-000319	SCREW-TAPPING	PH,+,2,M3,L8ZPC(YEL),SM20C	4	
C-46	JK72-00011A	COVER-MODE	SPS-1000,ABS,IV16,V0,VH-0800D	1	

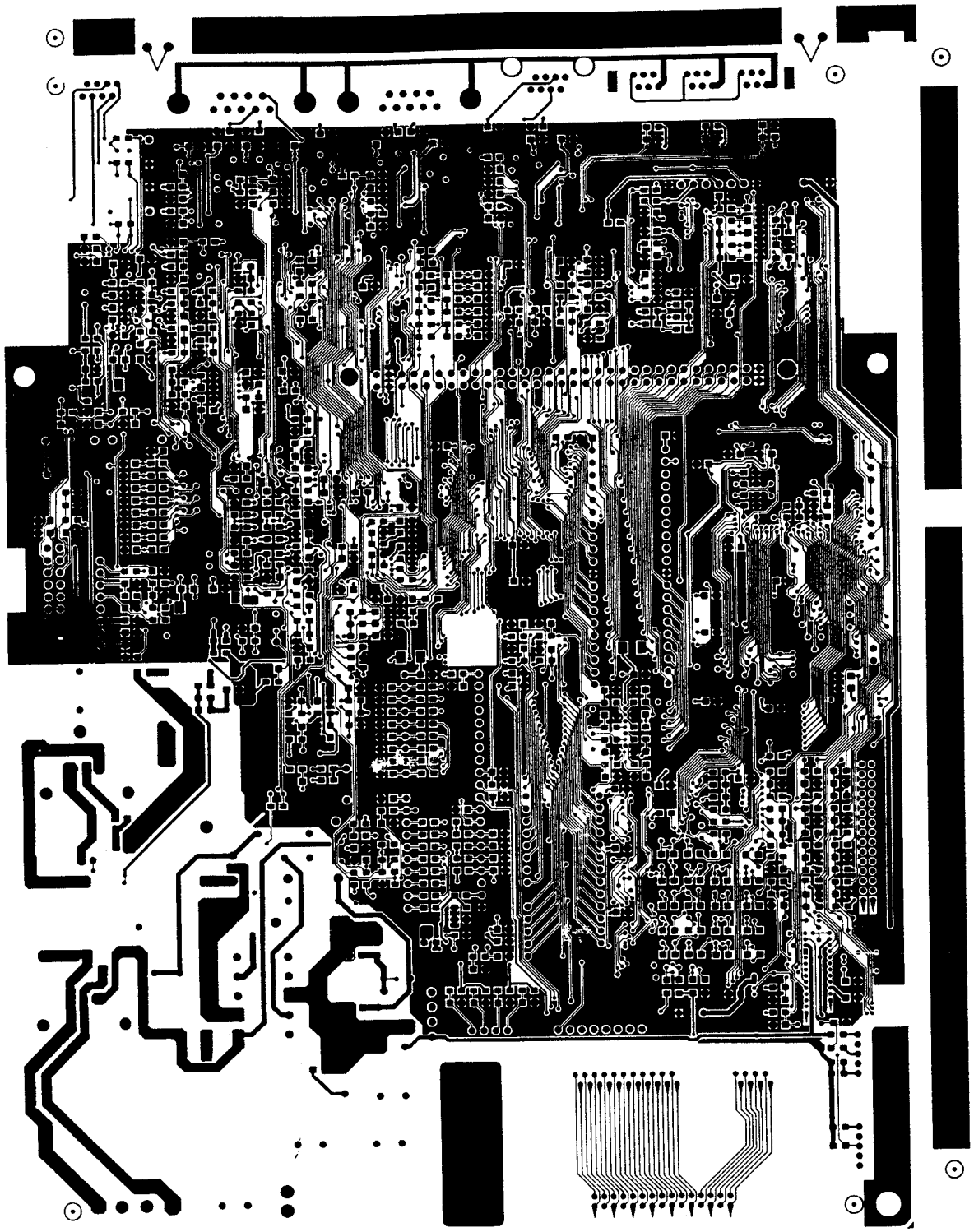
10 PCB Layout and Parts List

10-1 Main PCB Layout

1) Component Side



2) Solder Side



10-1-1 Main Board Assembly Parts List (Manual Part)

* : SPS-1000 Only; # : SPS-1000V Only

Code No.	Specification/Description	Q'TY	Remark	Serviceable
JK92-00928A	**PBA MAIN ASS'Y-LCD;SPS-1000,BA,W**	**1**	*	**Y**
JK92-00937A	**PBA MAIN ASS'Y-VFD;SPS-1000V,BA,W**	**1**	#	**Y**
0402-000168	DIODE-RECTIFIER;1N5822,40V,3A,	1	D5	Y
0402-000287	DIODE-BRIDGE;GBL01,100V,3A,SIP	1	BD2	Y
0506-001026	TR-ARRAY;STA371A,NPN,3,3W,SIP-	1	U39	Y
0903-001083	IC-MICROCONTROLLER;78C32B,8BIT	1	U24	Y
1102-000227	IC-EPROM;27C512,64Kx8BIT,DIP,2	1	U45	Y
2101-001023	VR-ROTARY;10Kohm,30%,0.03W,BUT	2	VR1,VR2	Y
2401-001312	C-AL;4700uF,20%,50V,GP,BK,22x4	1	C7	Y
3002-001027	BUZZER-PIEZO;85dB,1.5V,24mA,2.	1	AU1	Y
3601-000261	FUSE-FERRULE;250V,3.15A,TIME L	1	FU1-1	Y
3701-001138	CONNECTOR-DSUB;9P,2R,MALE,ANGL	2	CN3,CN4	Y
3703-000184	CONNECTOR-DIN;64P,2R,FEMALE,ST	1	CN11	Y
3704-000235	SOCKET-IC;28P,DIP,SN,2.54mm	1	U45	Y
3704-000443	SOCKET-IC;40P,DIP,SN,2.54mm	1	U31	Y
3708-001350	CONNECTOR-FPC/FC/PIC;22P,1MM,A	1	CN19	Y
3708-001351	CONNECTOR-FPC/FC/PIC;8P,1MM,AN	1	CN20	Y
3710-000111	CONNECTOR-SHUNT;2P,1R,2.54mm,-	3	CN15, CN22, CN23	Y
3711-000183	CONNECTOR-HEADER;1WALL,2P,1R,3	1	CN9	Y
3711-000635	CONNECTOR-HEADER;BOX,12P,1R,1.	1	CN17 (#)	Y
3711-000840	CONNECTOR-HEADER;BOX,30P,2R,2m	1	CN16	Y
3711-001011	CONNECTOR-HEADER;BOX,5P,1R,2.5	1	CN10	Y
3711-001026	CONNECTOR-HEADER;BOX,6P,1R,1.2	1	CN13 (*)	Y
3711-001133	CONNECTOR-HEADER;BOX,8P,1R,2.5	2	CN7 (#),CN12	Y
3711-001475	CONNECTOR-HEADER;NOWALL,3P,1R,	3	CN15,CN22,CN23	Y
3711-002088	CONNECTOR-HEADER;BOX,16P,2R,2.	1	CN2 (*)	Y
3711-002633	CONNECTOR-HEADER;NOWALL,2P,1R,	1	CN21	Y
3711-003969	CONNECTOR-HEADER;BOX,2P,1R,2.5	1	CN1	Y
3711-004056	CONNECTOR-HEADER;BOX,14P,1R,1.	1	CN14 (*)	Y
3711-004059	CONNECTOR-HEADER;BOX,30P,2R,2m	1	CN18	Y
3722-000212	JACK-MODULAR;8P/8C,-,SN,GRAY,-	2	CN5,CN6	Y
3722-000274	JACK-PIN;18P/18C,-,AU,GRAY,-	1	CN8	Y
JK26-30506A	TRANS POWER-INVERTER;SPS-1000,	1	T42	Y
JK27-60100D	COIL FILTER-;ER-350,140 UH,-,-	1	L1	Y
JK96-01048A	ELA ETC-HEAT SINK;SPS-1000,BAS	1	Q2	Y
0502-000265	TR-POWER;KSC2335-Y,NPN,1.5W,TO	1	Q2-1	Y
6002-000175	SCREW-TAPPING;PWH,+,2,M3,L8,ZP	1	Q2-2	Y

JK62-30901A	HEAT SINK-KBD ASS'Y;SRP-1000A,	1	Q2-3	Y
JK96-01049A	ELA ETC-HEAT SINK;SPS-1000,BAS	1	U1	Y
1203-000263	IC-POSI.FIXED REG.;7824,TO-220	1	U1-1	Y
6002-000175	SCREW-TAPPING;PWH, + ,2,M3,L8,ZP	1	U1-2	Y
6203-000106	HEAT SINK;NONE,T2,W17,L22,H30,	1	U1-3	Y
JK96-01053A	ELA ETC-HEAT SINK;SPS-1000,BAS	1	Q1	Y
0502-000234	TR-POWER;KSA1010Y,PNP,40W,TO-2	1	Q1-1	Y
6002-000175	SCREW-TAPPING;PWH, + ,2,M3,L8,ZP	1	Q1-3	Y
6203-000106	HEAT SINK;NONE,T2,W17,L22,H30,	1	Q1-2	Y

10-1-2 Main Board Assembly Parts List (Auto Part)

* : SPS-1000 Only; # : SPS-1000V Only

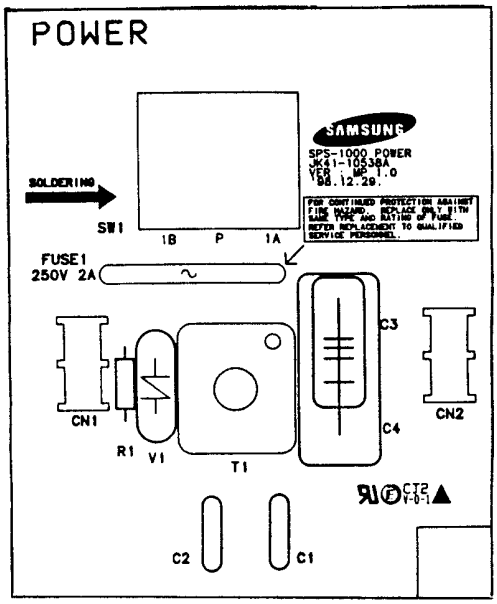
Code No.	Specification/Description	Q'TY	Remark	Serviceable
JK94-00010A	**PHANTOM AU JK92-00928A**	**1**	*	**N**
JK94-00017A	**PHANTOM AU JK92-00937A**	**1**	#	**N**
0401-001003	DIODE-SWITCHING;MMBD6050LT1,70	24	D7,D19,D23~33,D35~40,D42~46	Y
0402-000512	DIODE-RECTIFIER;SS16,60V,1.0A,	1	D8	Y
0402-001189	DIODE-RECTIFIER;M4,400V,1A,SMD	5	D1,D4(*),D20,D22,D34	Y
0403-000141	DIODE-ZENER;1N4735A,6.2V,5%,1W	1	ZD2	Y
0403-000149	DIODE-ZENER;1N4742A,12V,5%,1W,	1	ZD1	Y
0404-001051	DIODE-SCHOTTKY;SK14,40V,1A,DO-	11	D2,D9~10,D12~16,D41,D47~48(*)	Y
0501-000457	TR-SMALL SIGNAL;MMBT2222A,NPN,	6	Q3~8	Y
0505-000145	FET-SILICON;IRFR9024,P,-60V,1.	1	U9 (*)	Y
0801-000002	IC-CMOS LOGIC;74HC573,D LATCH,	1	U32	Y
0801-000523	IC-CMOS LOGIC;74HCT541,BUFFER/	2	U38,U42	Y
0801-000642	IC-CMOS LOGIC;74HC138,3-TO-8 D	6	U28,U29,U33~35,U40	Y
0801-000696	IC-CMOS LOGIC;74HC245,TRANSCEI	1	U8 (*)	Y
0801-000719	IC-CMOS LOGIC;74HC574,D FLIP-F	3	U37,U41,U46	Y
0801-000887	IC-CMOS LOGIC;74HCT08,AND GATE	1	U30	Y
0801-000891	IC-CMOS LOGIC;74HCT32,OR GATE,	4	U13,U20,U36,U47	Y
0801-001063	IC-CMOS LOGIC;74HCT05,INVERTER	1	U7	Y
0801-001090	IC-CMOS LOGIC;74HC14,SCHIMITT	1	U11	Y
0902-001134	IC-MICROPROCESSOR;68EN302,16,T	1	U27	Y
0909-000136	IC-REAL TIME CLOCK;5C15,16BIT,	1	U43	Y
1003-001196	IC-LCD CONTROLLER;SED-1351FOA,	1	U2 (*)	Y
1006-000133	IC-DRIVER/RECEIVER;232,SOP,16P	4	U6,U10,U19,U25	Y
1106-000197	IC-SRAM;62256,32Kx8BIT,SOP,28P	3	U12(*), U14(*),U44	Y
1106-001227	IC-SRAM;6164000,256Kx16BIT,TSO	1	U23	Y
1107-001046	IC-FLASH MEMORY;29F800,512Kx16	1	U22	Y

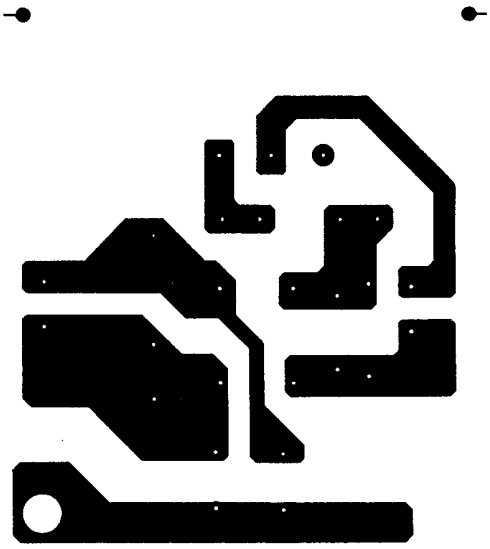
1202-000164	IC-VOLTAGE COMP.;393,SOP,8P,15	2	U17,U18	Y
1203-000346	IC-VOL. SUPERVISORY;7705,SOP,8	1	U3	Y
1203-000404	IC-DC/DC CONVERTER;34063,SOP,8	1	U4	Y
1205-001190	IC-TRANSCEIVER;MC68160FB,QFP,5	1	U5	Y
2001-000042	R-CARBON;1KOHM,5%,1/4W,AA,TP,2	3	R6,R92,R283	Y
2001-000055	R-CARBON;4.7KOHM,5%,1/4W,AA,TP	2	R33,R285	Y
2001-000065	R-CARBON;10KOHM,5%,1/4W,AA,TP,	2	R132,R133	Y
2001-000276	R-CARBON;100OHM,2%,1/4W,AA,TP,	1	R91	Y
2001-000561	R-CARBON;27KOHM,5%,1/4W,AA,TP,	1	R110	Y
2001-000638	R-CARBON;30OHM,5%,1/4W,AA,TP,2	1	R47	Y
2001-000855	R-CARBON;560OHM,5%,1/4W,AA,TP,	1	R7	Y
2001-000867	R-CARBON;56OHM,5%,1/4W,AA,TP,2	2	R282,R312	Y
2005-001001	R-WIRE WOUND;0.1ohm,5%,1W,AA,T	2	R16,R284	Y
2007-000001	R-CHIP;68KOHM,5%,1/10W,DA,TP,2	5	R109,R130,R131,R277,R293	Y
2007-000028	R-CHIP;39OHM,5%,1/10W,DA,TP,20	2	R8,R9	Y
2007-000030	R-CHIP;560OHM,5%,1/10W,DA,TP,2	4	R4,R73,R167,R291	Y
2007-000290	R-CHIP;100OHM,5%,1/10W,DA,TP,2	56	R10,R19~26,R52,R71,R78,R79,R83, R105,R116,R127,R148~155,R157, R158,R160,R163,R164,R166,R168, R169,R172,R181,R185,R246~247,R250 R255,R258,R262,R264,R266,R268, R276,R289,R313~321	Y
2007-000300	R-CHIP;10KOHM,5%,1/10W,DA,TP,2	57	R15,R17,R18,R34~39,R42,R56,R58, R59,R60,R62~69,R75,R77,R80,R81, R84~86,R88,R94,R117,R182,R184, R186,R191,R193,R194,R204~209, R216~219,R223~230,R288	Y
2007-000352	R-CHIP;12KOHM,1%,1/10W,DA,TP,2	1	R45	Y
2007-000468	R-CHIP;1KOHM,5%,1/10W,DA,TP,20	7	R40,R41,R82,R102,R106,R286,R287	Y
2007-000493	R-CHIP;2.2KOHM,5%,1/10W,DA,TP,	3	R72,R178,R301	Y
2007-000572	R-CHIP;220OHM,5%,1/10W,DA,TP,2	11	R27,R29~32,R270,R272~274,R278, R322	Y
2007-000671	R-CHIP;2KOHM,5%,1/10W,DA,TP,20	3	R90,R275,R292	Y
2007-000686	R-CHIP;3.3KOHM,5%,1/10W,DA,TP,	1	R104	Y
2007-000728	R-CHIP;300OHM,5%,1/10W,DA,TP,2	1	R11	Y
2007-000804	R-CHIP;36KOHM,5%,1/10W,DA,TP,2	1	R44	Y
2007-000872	R-CHIP;4.7KOHM,5%,1/10W,DA,TP,	116	R5,R12,R13,R28,R43,R46,R48~51, R53,R54,R70,R87,R89,R93,R96,R98 R99,R100,R107,R111~115,R119, R120~126,R128,R134~147,R156, R159,R161,R162,R165,R173~177,	Y

			R179,R180,R183,R187~189,R195, R196,R197,R202,R215,R222,R231, R232~245,R248,R249,R251~254, R256,R257,R259~261,R263,R265, R267,R269,R271,R279~281,R298, R299,R300,R304~311	
2007-000941	R-CHIP;47KOHM,5%,1/10W,DA,TP,2	6	R74,R76,R170,R171,R302,R303	Y
2007-000981	R-CHIP;5.6KOHM,5%,1/10W,DA,TP,	1	R103	Y
2007-001013	R-CHIP;51OHM,5%,1/10W,DA,TP,20	8	R198~201,R211~214	Y
2007-001113	R-CHIP;680KOHM,5%,1/10W,DA,TP,	1	R108	Y
2007-001118	R-CHIP;680OHM,5%,1/10W,DA,TP,2	1	R129	Y
2007-001124	R-CHIP;68KOHM,1%,1/10W,DA,TP,2	1	R14	Y
2011-001093	R-NETWORK;100OHM,5%,1/16W,L,CH	11	RA1~RA11	Y
2203-000192	C-CERAMIC,CHIP;100nF,+80-20%,5	87	C6,C8~12,C15~17,C20,C24,C26, C41,C47,C61,C62,C69,C72,C74~76 C79,C80,C82,C88,C90,C91,C93, C95~96,C98,C101,C103,C108,C111 C112,C114,C127,C128,C131,C134, C142,C143,C147~150,C165,C174, C175,C176,C181~C185,C188,C189, C194~196,C199,C201~203,C209, C212~215,C218,C219,C221,C223, C240,C243,C244,C250,C257~265	Y
2203-000239	C-CERAMIC,CHIP;100pF,5%,50V,NP	41	C27~34,C36,C39,C78,C120,C135, C136~141,C144,C146,C154,C155, C166~168,C204~208,C220,C226~228, C231~234,C238,C239	Y
2203-000260	C-CERAMIC,CHIP;10nF,10%,50V,X7	2	C48,C49	Y
2203-000634	C-CERAMIC,CHIP;22pF,5%,50V,NPO	8	C50,C51,C73,C156~158,C251~252	Y
2203-000748	C-CERAMIC,CHIP;30pF,5%,50V,NPO	29	C3~5,C13,C65~68,C70,C116~119 C121,C177~180,C186,C187,C190, C191~C193,C210,C211,C224, C270~271	Y
2203-000784	C-CERAMIC,CHIP;330pF,5%,50V,NP	1	C14	Y
2203-000938	C-CERAMIC,CHIP;470pF,5%,50V,NP	56	C19,C35,C37,C38,C45,C52~56,C71 C84,C92,C97,C104~106,C109,C110 C113,C115,C123,C129,C130,C132, C133,C152,C153,C159~163,C169, C170,C225,C235~237,C242,C272, C273~287	Y
2301-000010	C-FILM,PEF;100nF,5%,100V,TP,11	1	C44	Y

2301-000335	C-FILM,PEF;10nF,5%,50V,TP,6.8x	3	C22,C23,C83	Y
2301-000342	C-FILM,PEF;2.2nF,5%,50V,TP,7.4	1	C43	Y
2401-000032	C-AL;100uF,20%,50V,GP,TP,8x12,	3	C42,C216,C241	Y
2401-000899	C-AL;22uF,20%,100V,GP,TP,8x11m	1	C99	Y
2401-001363	C-AL;470uF,20%,16V,GP,TP,10x12	1	C40	Y
2401-001585	C-AL;47uF,20%,50V,WT,TP,8x11.5	2	C100,C102	Y
2402-000117	C-AL,SMD;10uF,20%,35V,GP,TP,5x	5	C25,C77,C81,C122,C249	Y
2402-000168	C-AL,SMD;100uF,20%,16V,-,TP,8x	4	C64,C89,C145,C229	Y
2402-000170	C-AL,SMD;1uF,20%,50V,GP,TP,4.3	17	C46,C57~60,C85~87,C94,C107, C124~126,C164,C171~173	Y
2601-001023	TRANS-SMD,PULSE;-,-,-,25.65x7.	1	T2	Y
2801-000108	CRYSTAL-SMD;20MHz,50ppm,28-AAW	1	Y1	Y
2801-000111	CRYSTAL-SMD;32.768KHz,20ppm,28	1	Y3	Y
2801-003315	CRYSTAL-SMD;16MHz,50ppm,28-AAV	2	Y2,Y4	Y
3301-000325	CORE-FERRITE BEAD;AB,3.2x2.5x1	41	L2~21,L23~30,L42,L43,L50,L51, L67~70,L73~77	Y
3301-000344	CORE-FERRITE BEAD;ZZ,3.5x6.5mm	2	L65,L66	Y
3301-001074	CORE-FERRITE BEAD;AB,2.0*1.25*	30	L31~41,L44~49,L52~64	Y
3602-000001	FUSE-CLIP;-,-,30mohm	1	FU1	Y
4701-001020	FREQ-ATTENUATOR;5-80MHz,15dB,-	3	U15,U21,U48	Y
JK41-10532A	PCB-MAIN;SPS-1000,FR-4,4L,T1.6	1		Y

10-2 Power Filter PCB Layout





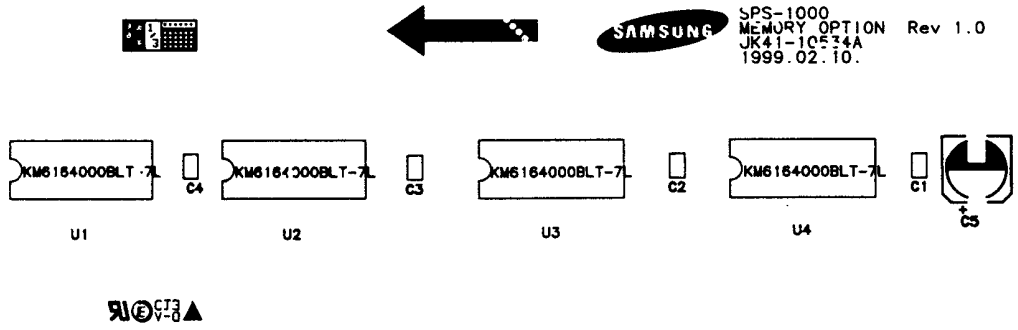
10-2-1 Power Filter Board Assembly Parts List

Code No.	Specification/Description	Q'TY	Remark	Serviceable
JK92-00930A	PBA PWR-POWER ASSY';SPS-1000,B	1		Y
1405-000147	VARISTOR;470V,4500A,17x12mm,BK	1	V1	Y
3402-000132	SWITCH-ROCKER;250V,3A,SPDT,ON-	1	SW1	Y
3601-000246	FUSE-FERRULE;250V,2A,TIME LAG,	1	FUSE1-1	Y
3711-000829	CONNECTOR-HEADER;BOX,2P,1R,6.2	2	CN1,CN2	Y
JC27-60503A	COIL FILTER-3mH;ML5500,3.0mH,0	1	T1	Y
JK41-10538A	PCB-POWER;SPS-1000,FR-1,1L,T1.	1		Y
JK72-40286A	PMO-COVER FUSE;ER-100,PVC,BLU,	1	FUSE1-2	Y
2001-000092	R-CARBON;470KOHM,5%,1/4W,AA,TP	1	R1	Y
2201-000023	C-CERAMIC,DISC;2.2nF,20%,125V,	2	C1,C2	Y
2501-000203	C-PAPER;470nF,20%,275VAC,TP,26	1	C4	Y
3602-000001	FUSE-CLIP;-,-,30mohm	1	FUSE1	Y

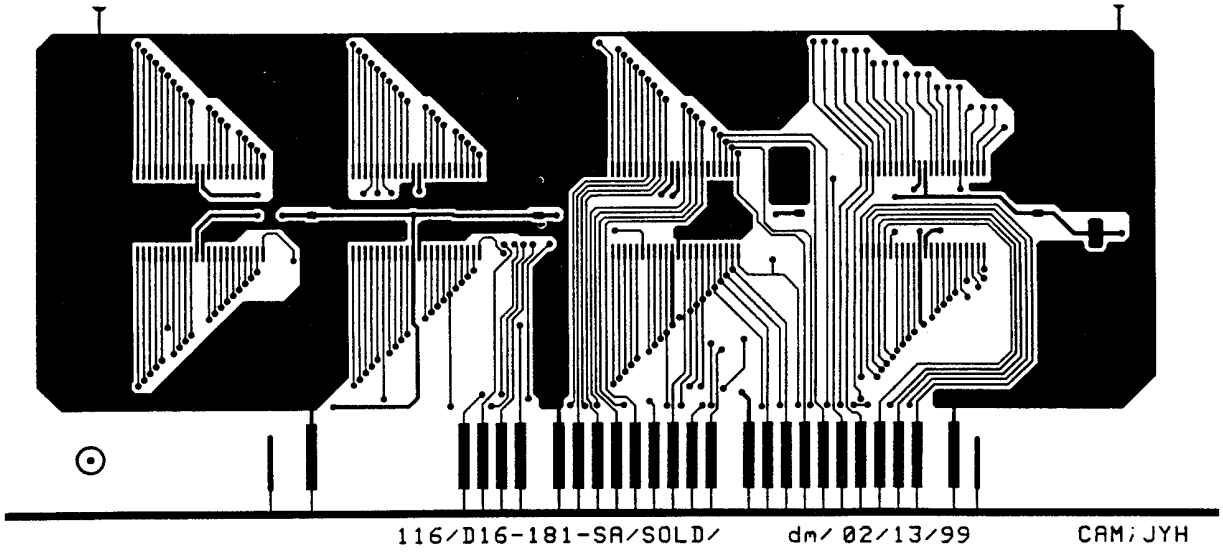
10-3 Option PCB Layout

10-3-1 Memory Option Card

1) Component Side



2) Solder Side



3) Assembly Parts List

A) EBD1001 (1Mbyte)

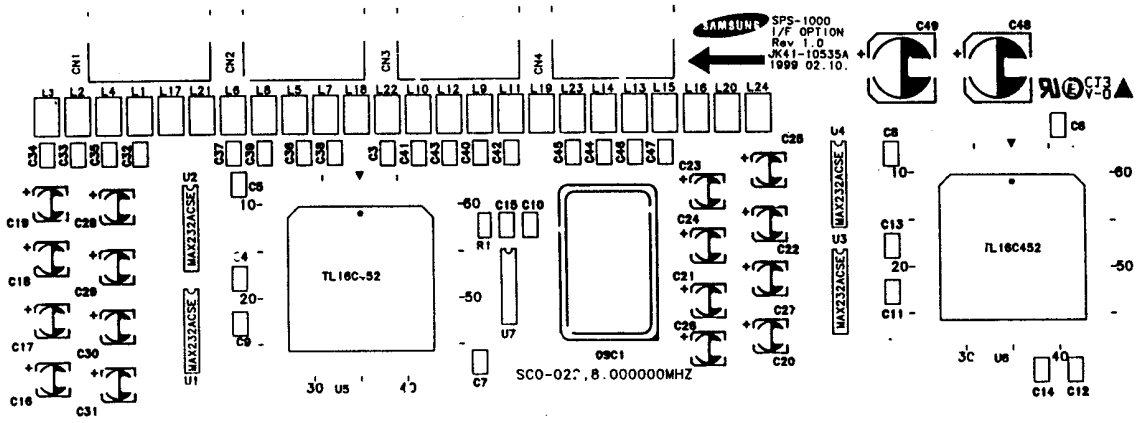
Code No.	Specification/Description	Q'TY	Remark	Serviceable
JK92-00929A	PBA SUB MEM-MEMORY OPTION;SPS-	1		Y
1106-001227	IC-SRAM;6164000,256Kx16BIT,TSO	2	U1,U2	Y
2203-000192	C-CERAMIC,CHIP;100nF,+80-20%,5	4	C1~C4	Y
2402-000168	C-AL,SMD;100uF,20%,16V,-,TP,8x	1	C5	Y
JK41-10534A	PCB-MEMORY CARD;SPS-1000,FR-4,	1		Y

B) EBD1002 (2Mbyte)

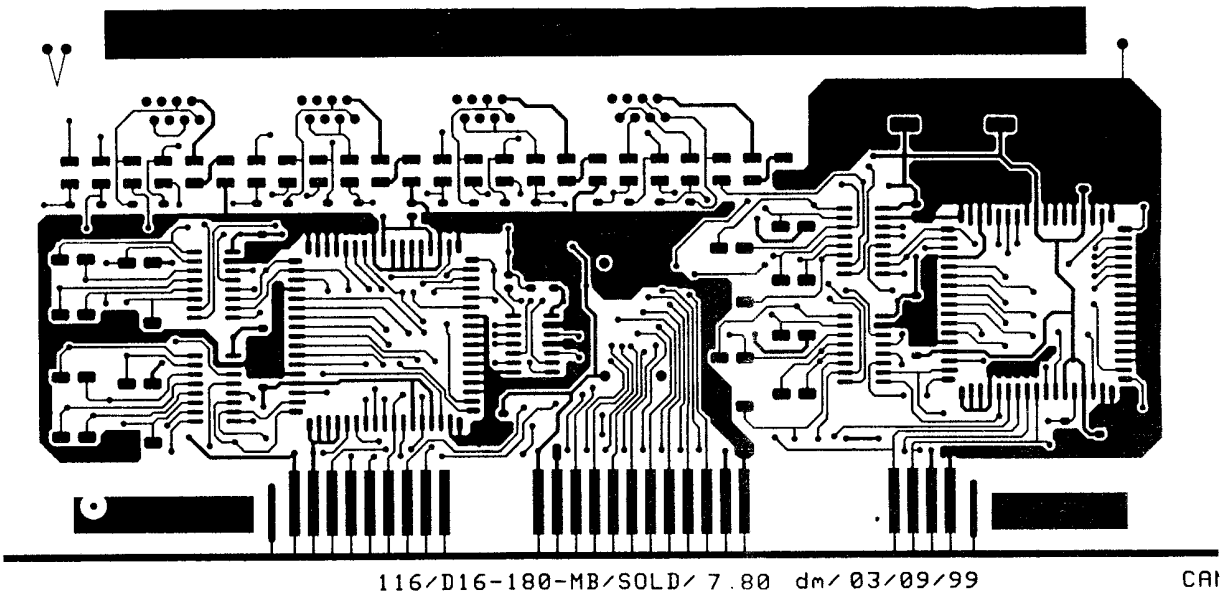
Code No.	Specification/Description	Q'TY	Remark	Serviceable
JK92-00929A	PBA SUB MEM-MEMORY OPTION;SPS-	1		Y
1106-001227	IC-SRAM;6164000,256Kx16BIT,TSO	4	U1,U2,U3,U4	Y
2203-000192	C-CERAMIC,CHIP;100nF,+80-20%,5	4	C1~C4	Y
2402-000168	C-AL,SMD;100uF,20%,16V,-,TP,8x	1	C5	Y
JK41-10534A	PCB-MEMORY CARD;SPS-1000,FR-4,	1		Y

10-3-2 RS-232C Option Card

1) Component Side



2) Solder Side

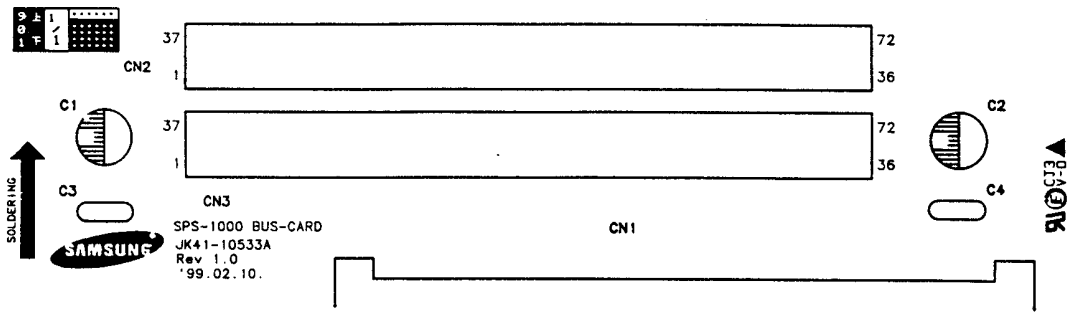


3) Assembly Parts List (EIF-1000)

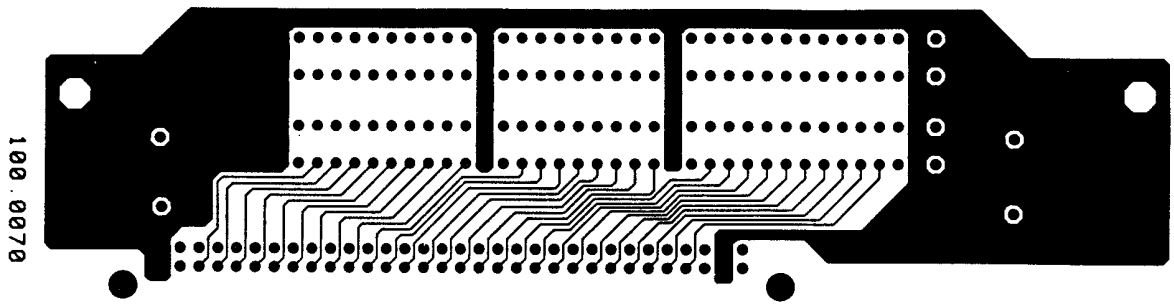
Code No.	Specification/Description	Q'TY	Remark	Serviceable
JK92-00935A	PBA SUB I/F;SPS-1000,BASIC,WOR	1		Y
2804-000325	OSCILLATOR-CLOCK;8MHz,100ppm,1	1	OSC1	Y
3722-000212	JACK-MODULAR;8P/8C,-,SN,GRAY,-	4	CN1~CN4	Y
0801-001090	IC-CMOS LOGIC;74HC14,SCHIMITT	1	U7	Y
0904-000519	IC-PERIPHERAL;82C452A,8BIT,PLC	2	U5,U6	Y
1006-000133	IC-DRIVER/RECEIVER;232,SOP,16P	4	U1~U4	Y
2007-000290	R-CHIP;100OHM,5%,1/10W,DA,TP,2	1	R1	Y
2203-000192	C-CERAMIC,CHIP;100nF,+80-20%,5	11	C3~C13	Y
2203-000239	C-CERAMIC,CHIP;100pF,5%,50V,NP	1	C15	Y
2203-000938	C-CERAMIC,CHIP;470pF,5%,50V,NP	17	C14,C32~C47	Y
2402-000168	C-AL,SMD;100uF,20%,16V,-,TP,8x	2	C48,C49	Y
2402-000170	C-AL,SMD;1uF,20%,50V,GP,TP,4.3	16	C16~C31	Y
3301-000325	CORE-FERRITE BEAD;AB,3.2x2.5x1	24	L1~L24	Y
JK41-10535A	PCB-OPTION CARD;SPS-1000,FR-4,	1		Y

10-3-3 Bus Card

1) Component Side



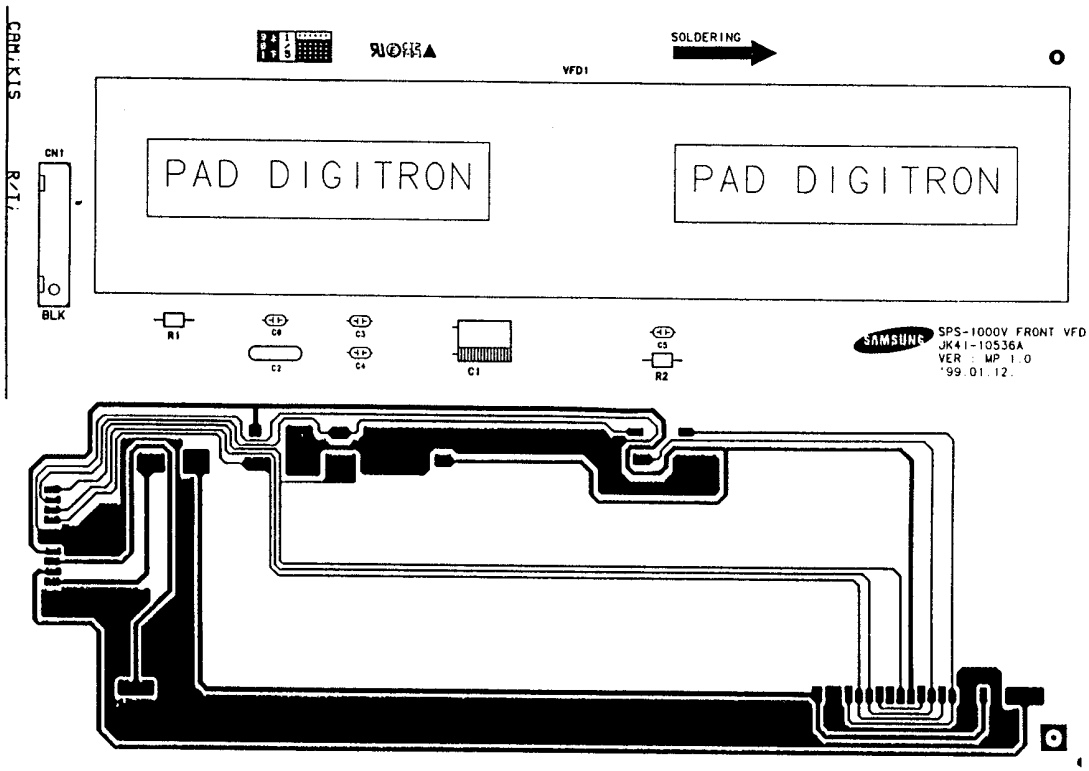
2) Solder Side



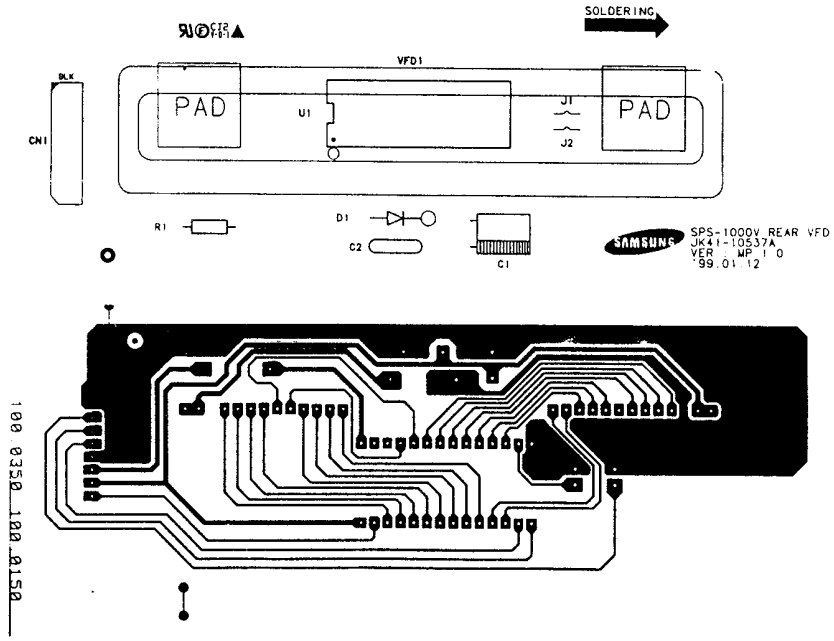
3) Assembly Parts List

Code No.	Specification/Description	Q'TY	Remark	Serviceable
JK92-00936A	PBA SUB ETC-BUS CARD ASSY';SPS	1		Y
3703-000192	CONNECTOR-DIN;64P,2R,MALE,ANGL	1	CN1	Y
3709-000179	CONNECTOR-CARD EDGE;72P,2.54mm	2	CN2, CN3	Y
JK41-10533A	PCB-BUS CARD;SPS-1000,FR-4,2L,	1		Y
2201-000119	C-CERAMIC,DISC;100nF,+80-20%,5	2	C3, C4	Y
2401-000308	C-AL;100uF,20%,25V,GP,TP,6.3x7	2	C1, C2	Y

10-4 Operator Display PCB Layout



SPS-1000 REAR VFD



10-4-1 Front LCD Assembly Parts List

Code No.	Specification/Description	Q'TY	Remark	Serviceable
JK96-01037A	ELA UNIT-FRONT LCD ASSY;SPS-1000	1		N
4401-001167	CONVERTER-DC/DC;13.2V,1.35KV,3	1		Y
JK07-00001A	LCD-FRONT;SPS-1000,VHX3224AFNC	1		Y
JK39-00013A	CBF-HARNESS-FRONT LCD;SPS-1000	1		Y
JK39-00023A	CBF-HARNESS-GND WIRE;SPS-1000	1		Y

10-4-2 Front VFD Assembly Parts List

Code No.	Specification/Description	Q'TY	Remark	Serviceable
JK92-00931A	PBA SUB DISP-FRONT VFD ASSY';S	1		Y
3711-002813	CONNECTOR-HEADER;BOX,12P,1R,2m	1	CN1	Y
JK07-10501A	DISPLAY VFD;SPS-1000,DN2029A,B	1	VFD1	Y
JK39-00014A	CBF-HARNESS-FRONT VFD;SPS-1000	1		Y
JK41-10536A	PCB-FRONT VFD;SPS-1000,FR-1,1L	1		Y
2001-000061	R-CARBON;33ohm,5%,1/4W,AA,TP,2	2	R1, R2	Y
2202-000632	C-CERAMIC,MLC-AXIAL;100Nf,20%,	1	C2	Y
2401-001509	C-AL;47Uf,20%,16V,GP,TP,5x7,2.	1	C1	Y

10-5 Customer Display PCB Layout

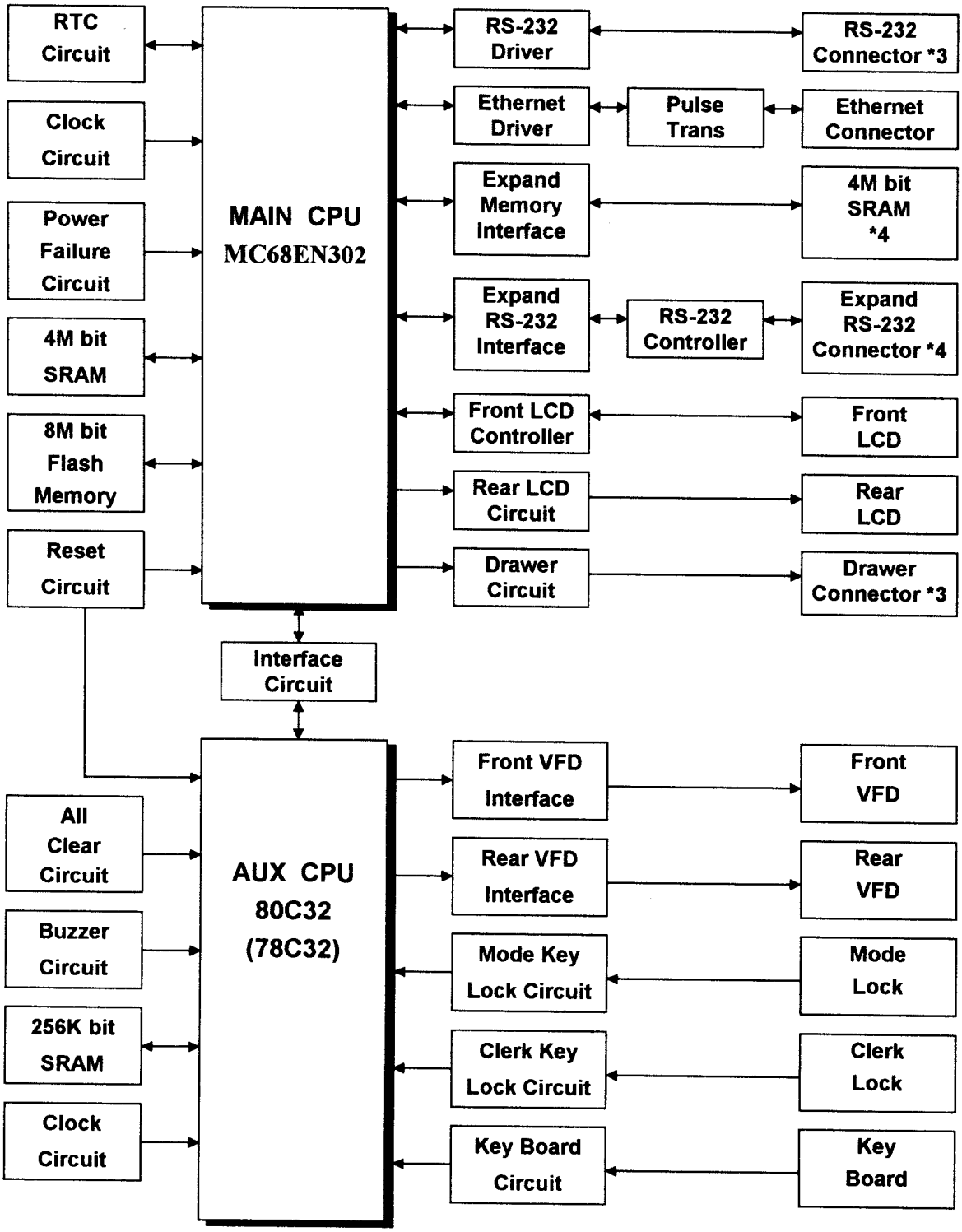
10-5-1 Rear LCD Assembly Parts List

Code No.	Specification/Description	Q'TY	Remark	Serviceable
JK96-01036A	ELA UNIT-REAR LCD ASSY;SPS-1000	1		N
JK07-00002A	LCD-REAR;SPS-1000,VHX2011ASLY	1		Y
JK39-00016A	CBF-HARNESS-REAR LCD;SPS-1000	1		Y

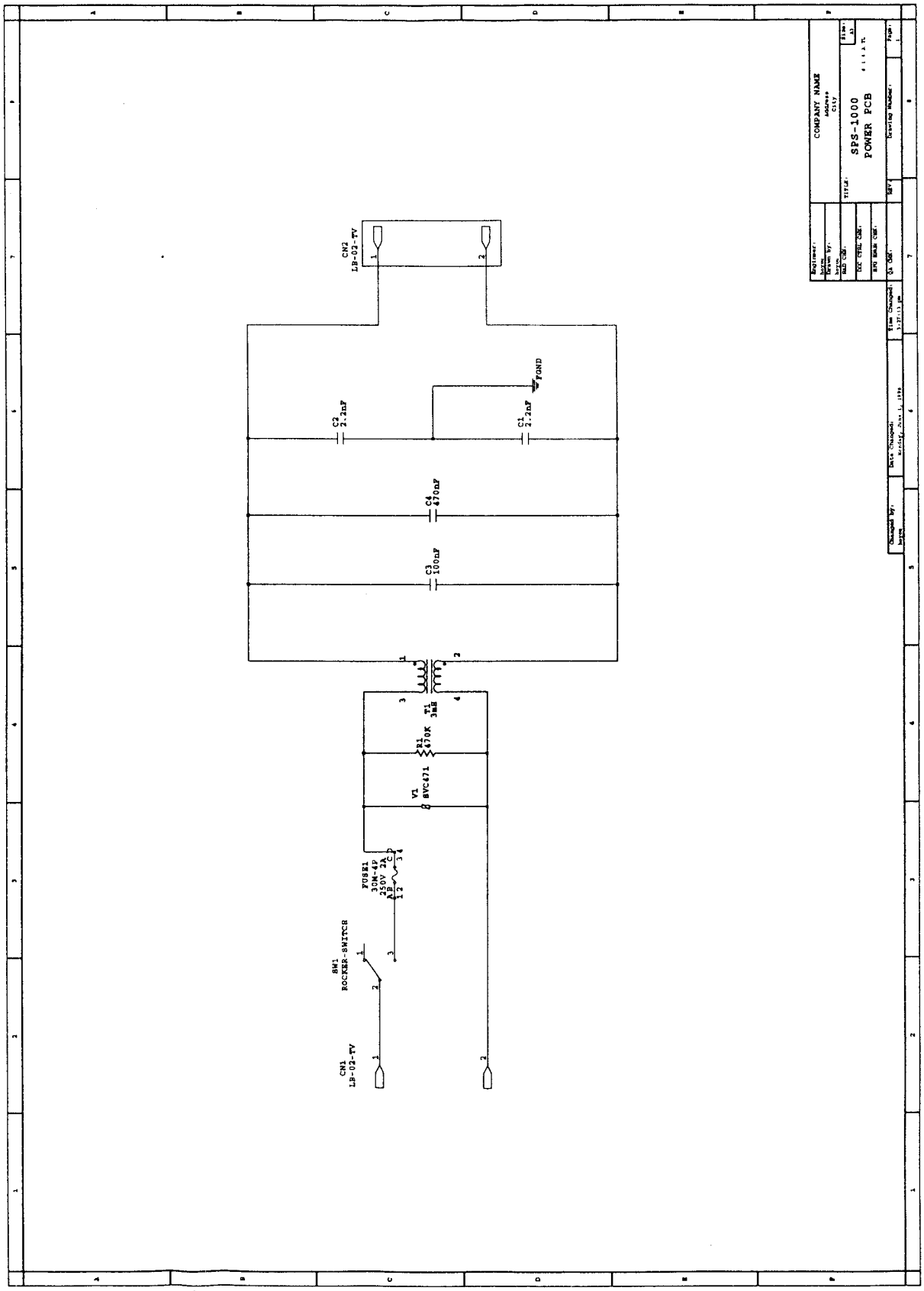
10-5-2 Rear VFD Assembly Parts List

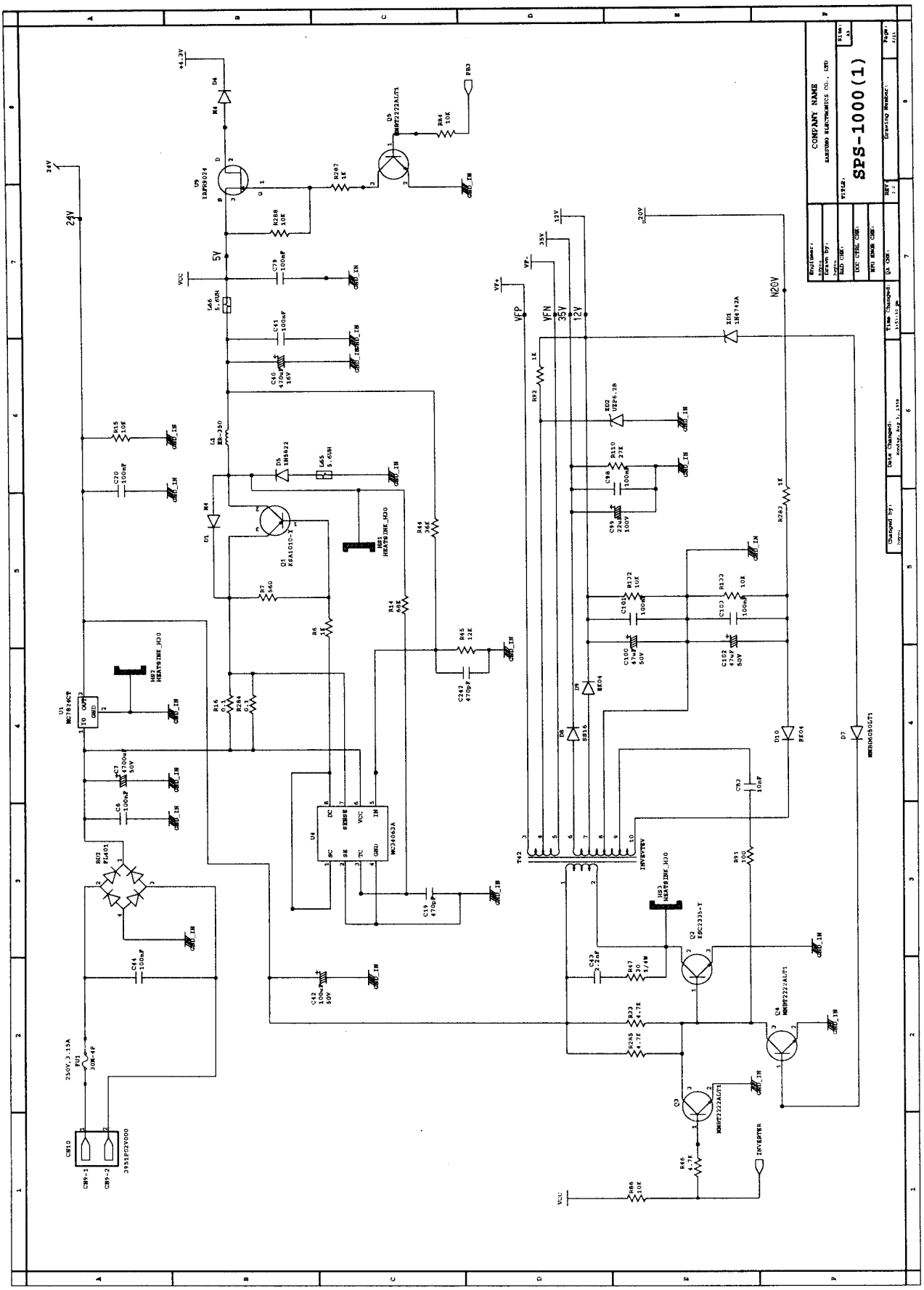
Code No.	Specification/Description	Q'TY	Remark	Serviceable
JK92-00932A	PBA SUB DISP-REAR VFD ASSY';SP	1		Y
1003-001101	IC-LATCHED DRIVER;UCN5812AF,DI	1	U1	Y
3711-001133	CONNECTOR-HEADER;BOX,8P,1R,2.5	1	CN1	Y
JK07-10101A	DISPLAY-VFD;ECR,SVE-10MS02,BLU	1	VFD1	Y
JK39-00011A	CBF-HARNESS-REAR VFD;SPS-1000	1		Y
JK41-10537A	PCB-REAR VFD;SPS-1000,FR-1,1L,	1		Y
0402-000129	DIODE-RECTIFIER;1N4003,200V,1A	1	D1	Y
2001-000042	R-CARBON;1KOHM,5%,1/4W,AA,TP,-	1	R1	Y
2202-000632	C-CERAMIC,MLC-AXIAL;100nF,20%,	1	C2	Y
2401-001509	C-AL;47uF,20%,16V,GP,TP,5x7,2.	1	C1	Y
JC39-40511A	CBF-HARNESS;ML-80,JUMPER,AWG22	2	J1,J2	Y

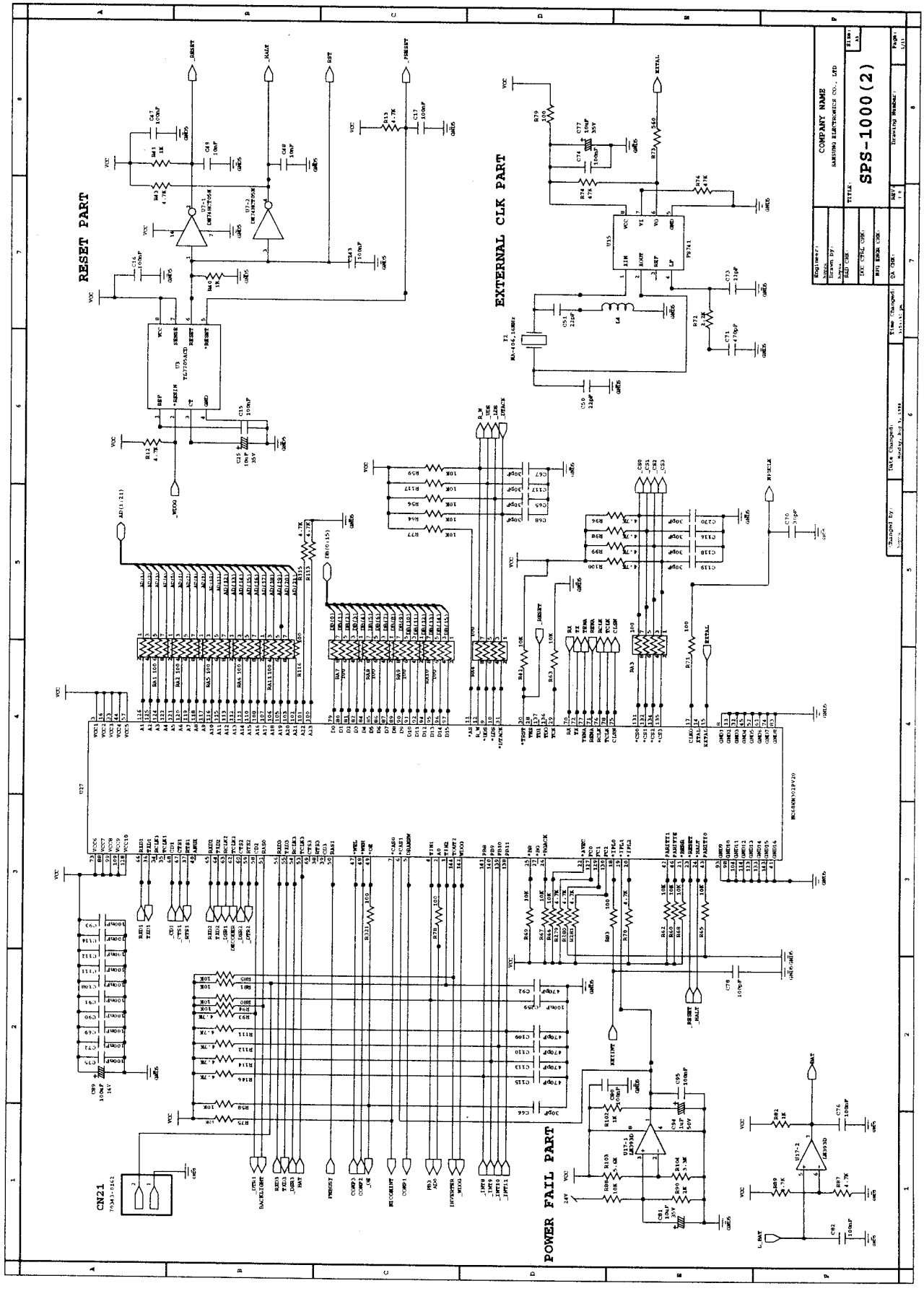
11 Block Diagram

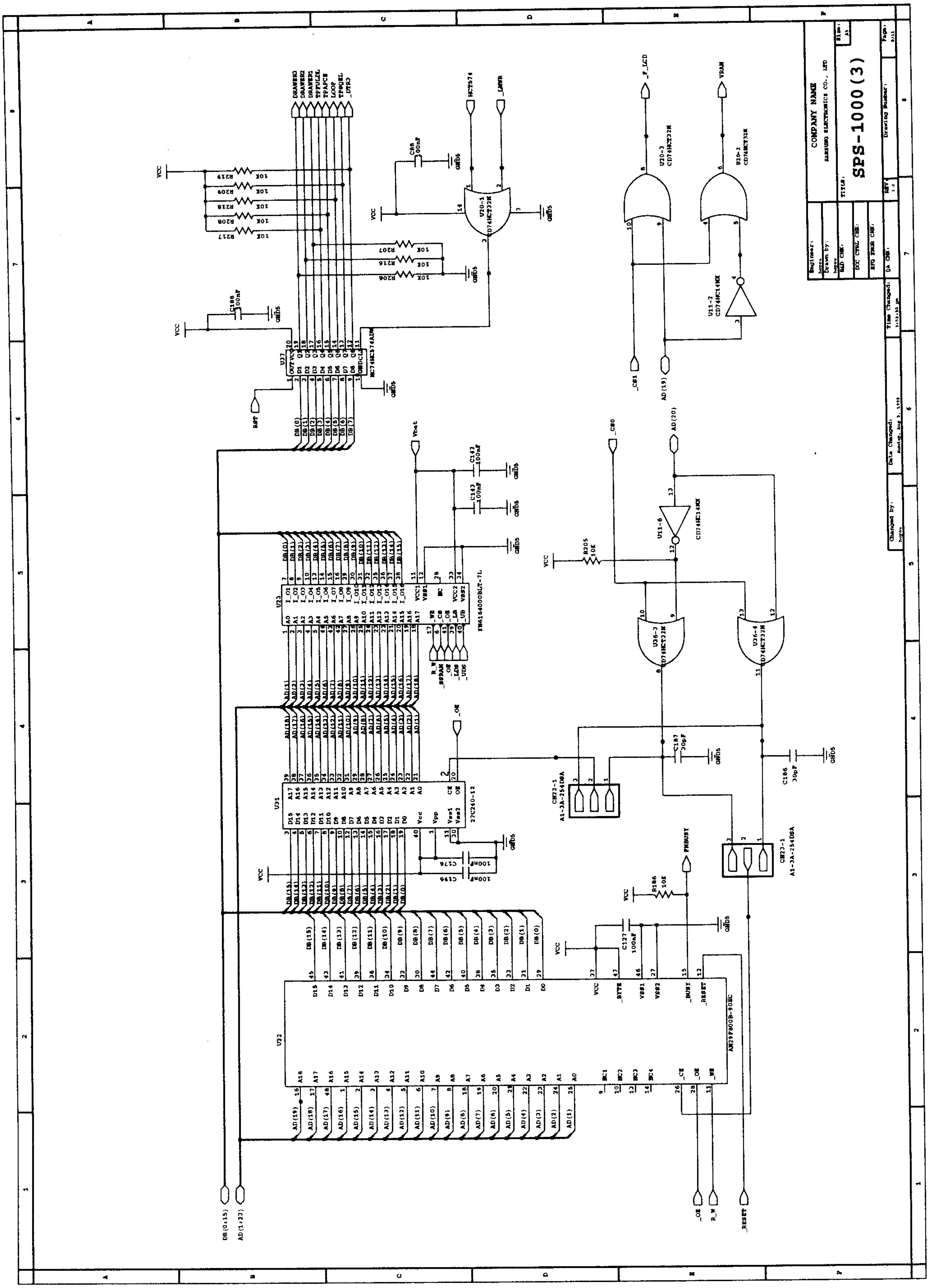


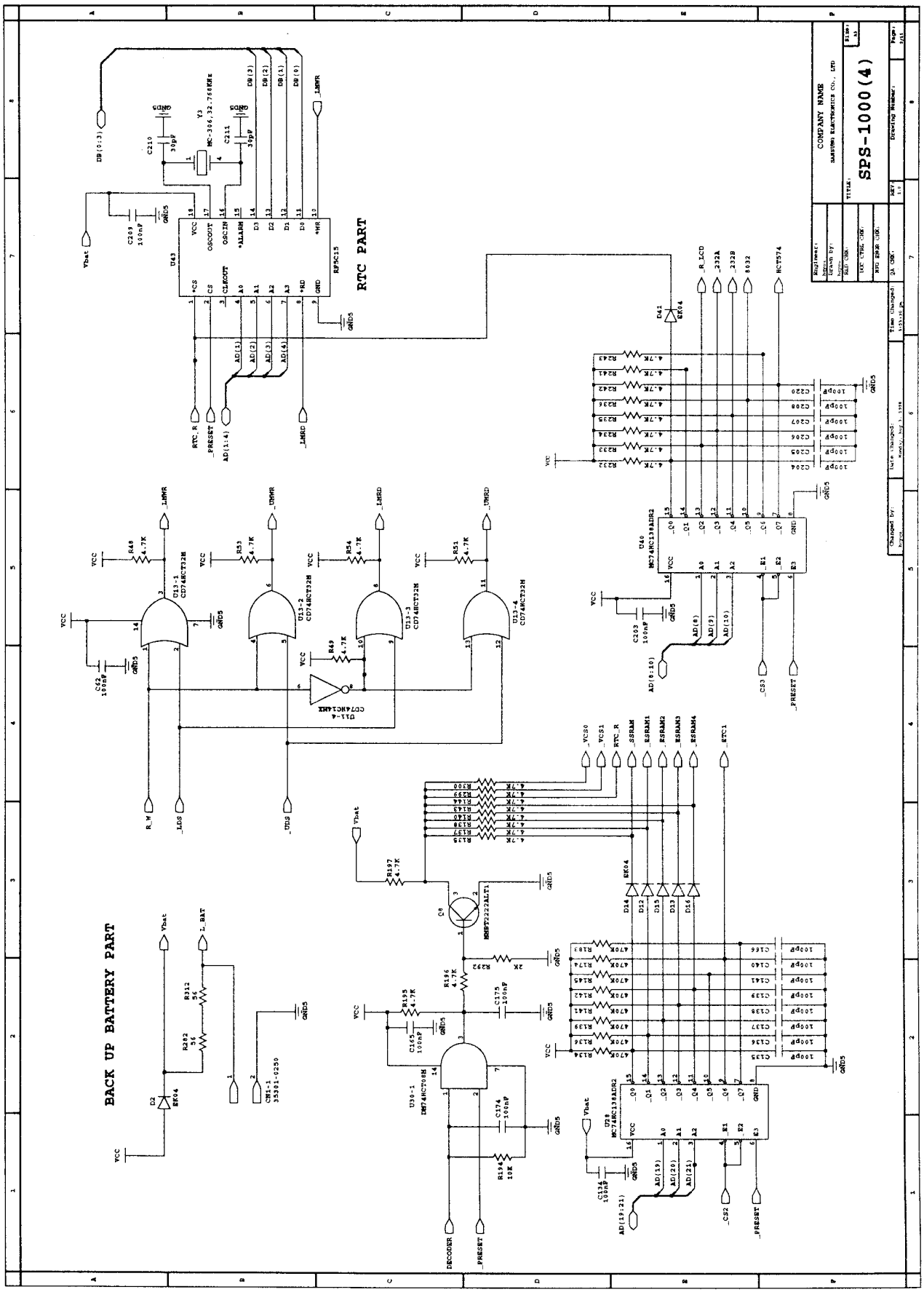
12. Schematic Diagrams

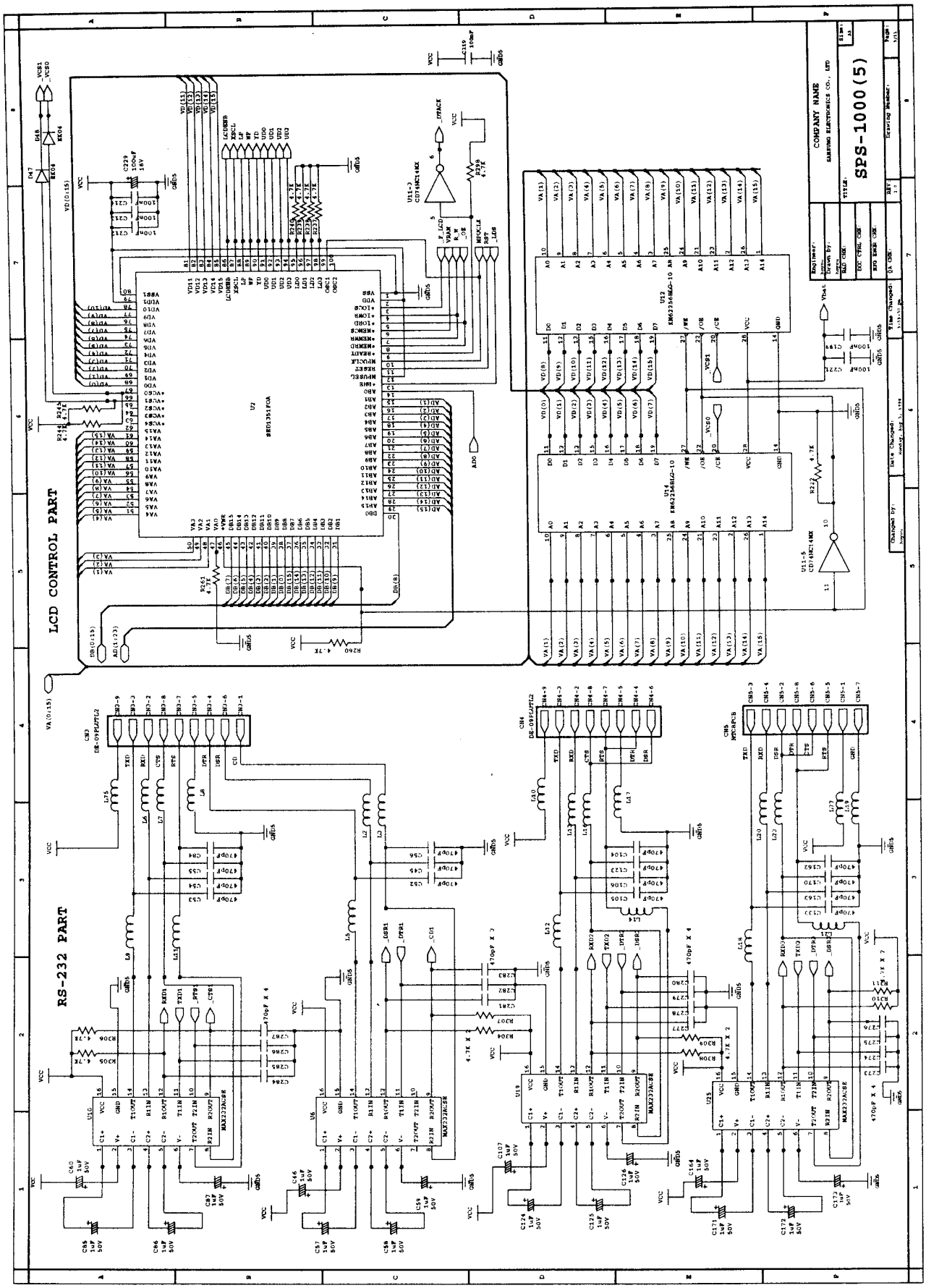


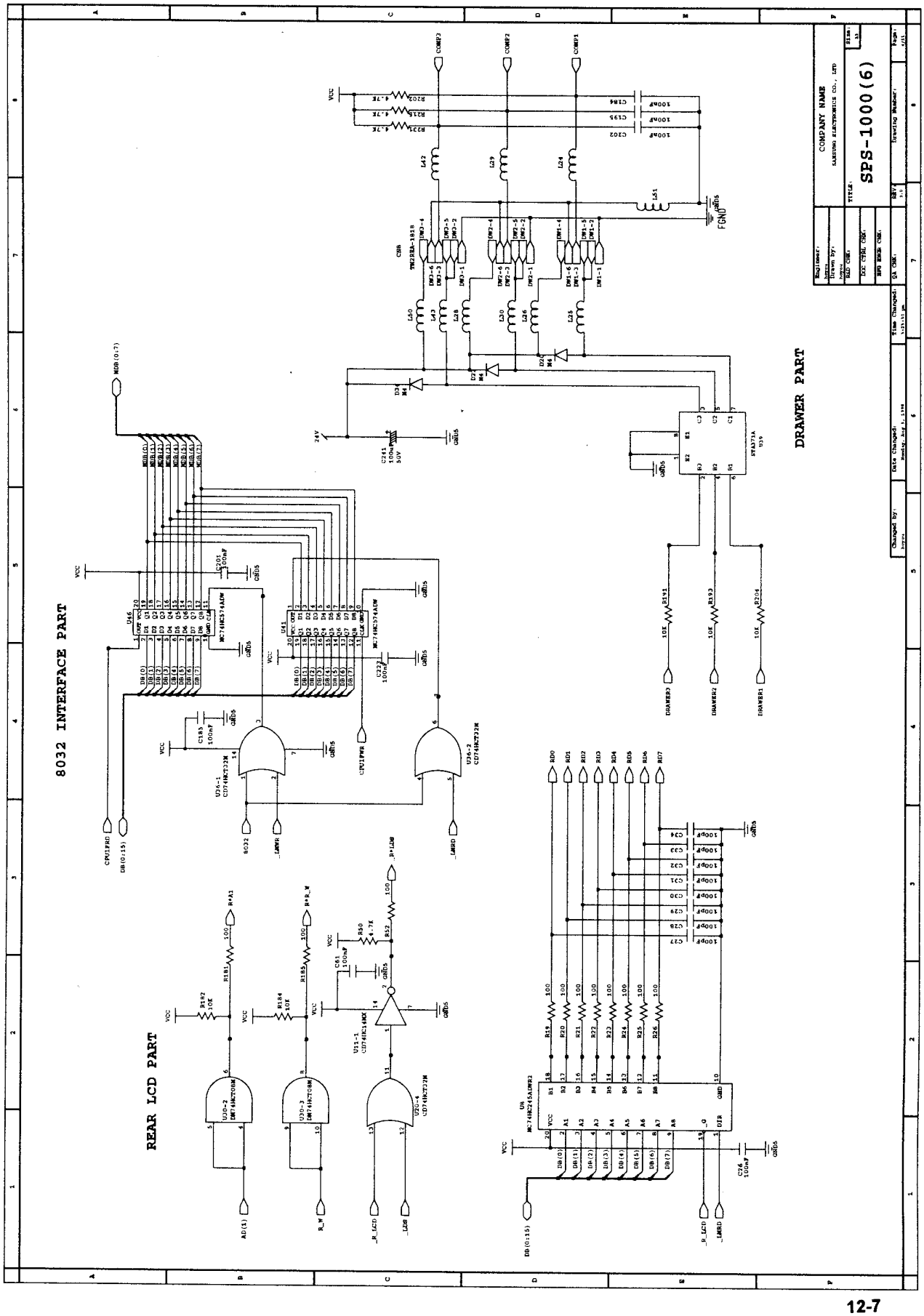

SPS-1000(1)
COMPANY NAME
SAMSUNG ELECTRONICS CO., LTD
24V
5V
12V
35V
20V
VFP
VFN
N20V
INVERTER
HEATSINK_H30
HEATSINK_H50
HEATSINK_H90

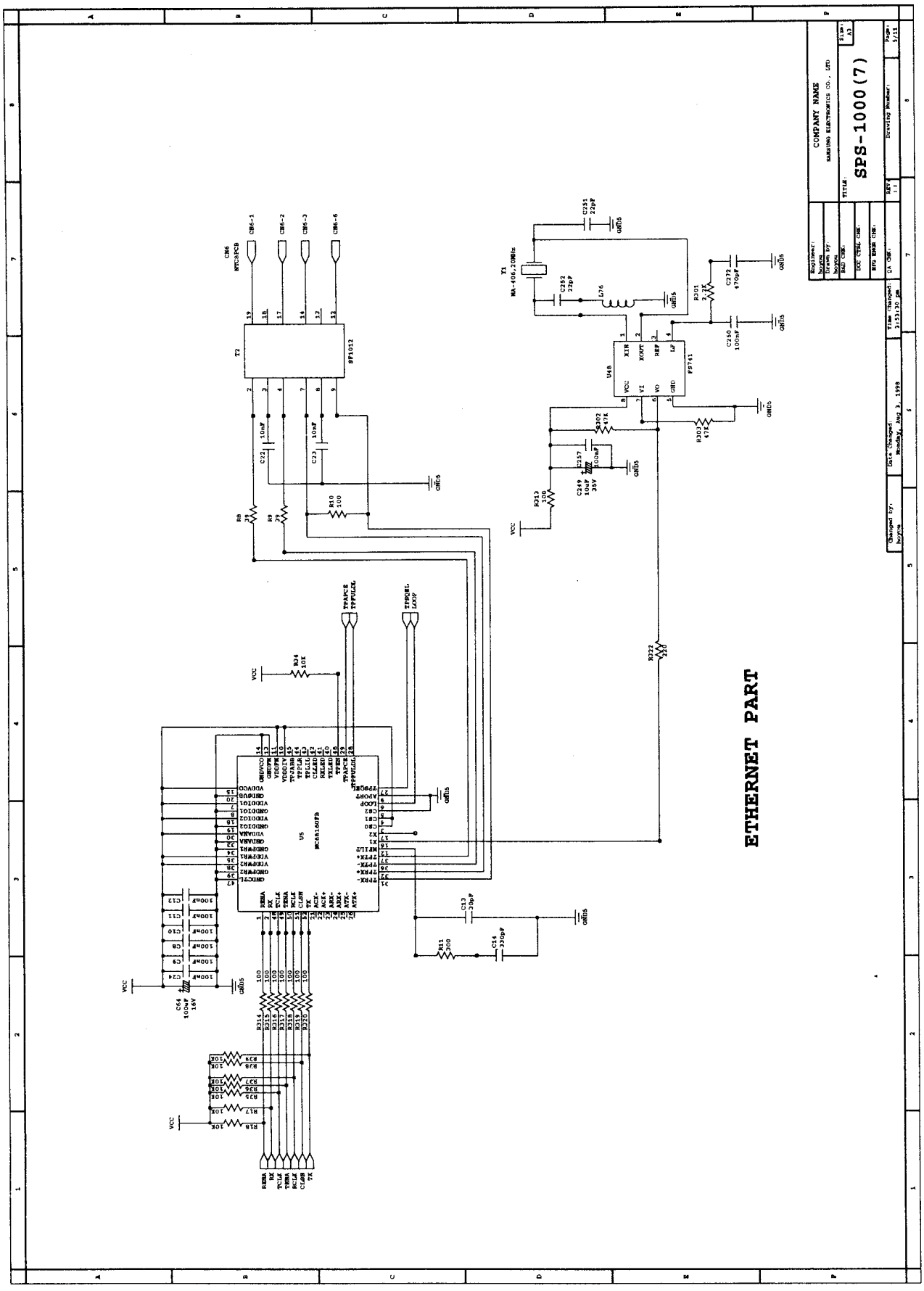

RESET PART
EXTERNAL CLK PART
POWER FAIL PART
CN21
COMPANY NAME
SAMSUNG ELECTRONICS CO., LTD
SPS-1000(2)

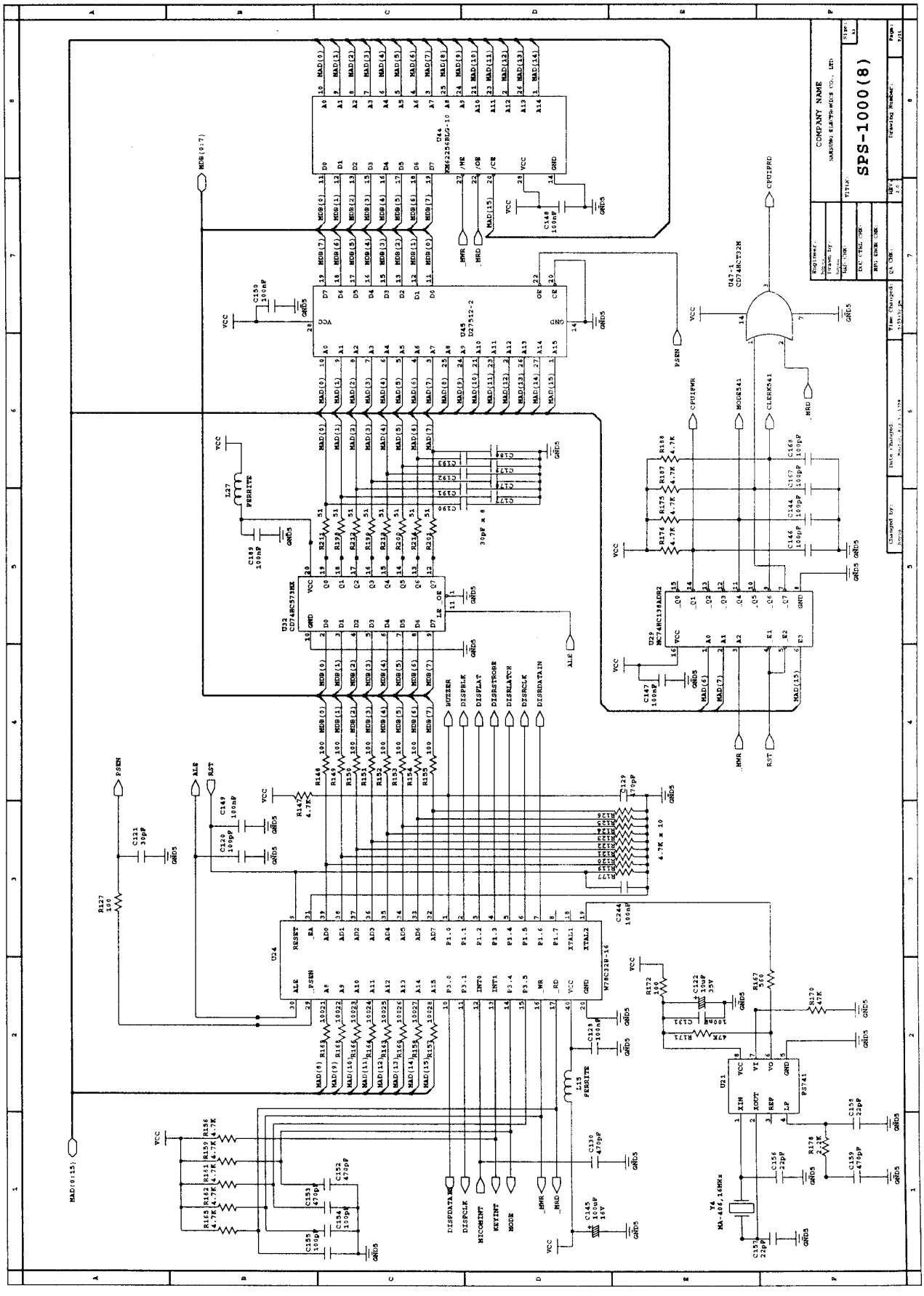

COMPANY NAME
SAMSUNG ELECTRONICS CO., LTD
SPS-1000(3)

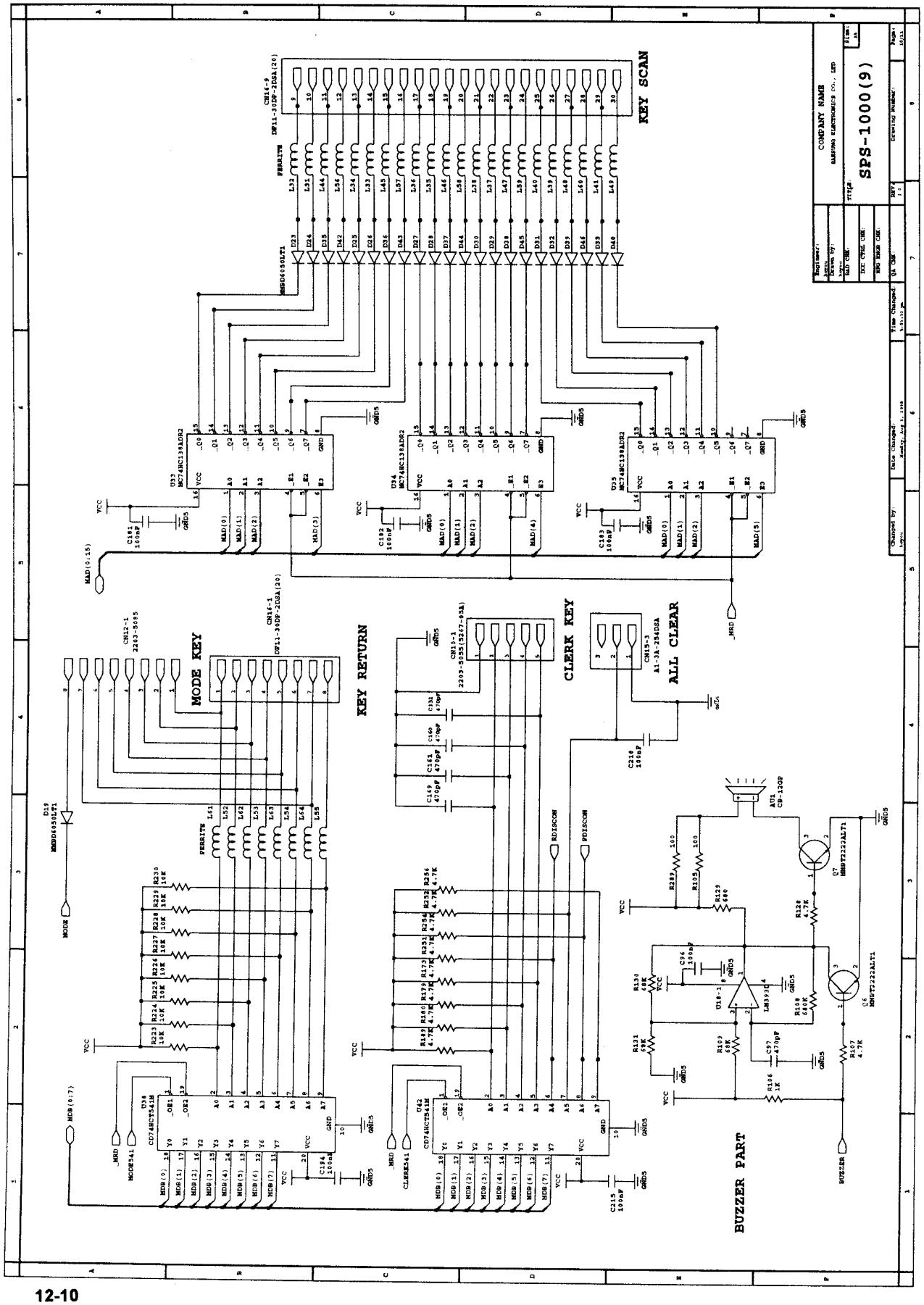

RTC PART
BACK UP BATTERY PART
SPS-1000(4)
COMPANY NAME
SAMSUNG ELECTRONICS CO., LTD

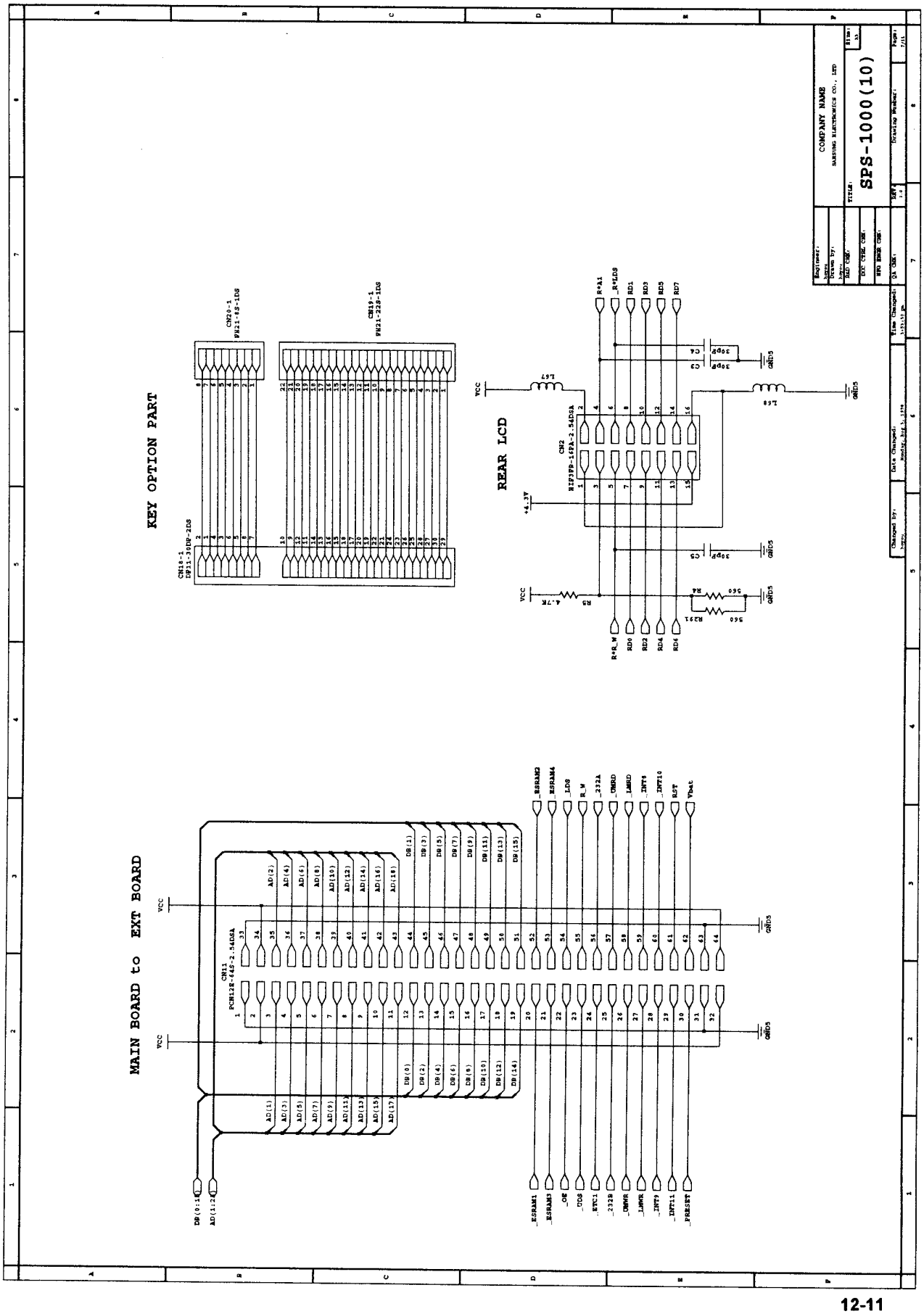

LCD CONTROL PART
RS-232 PART
SPS-1000(5)

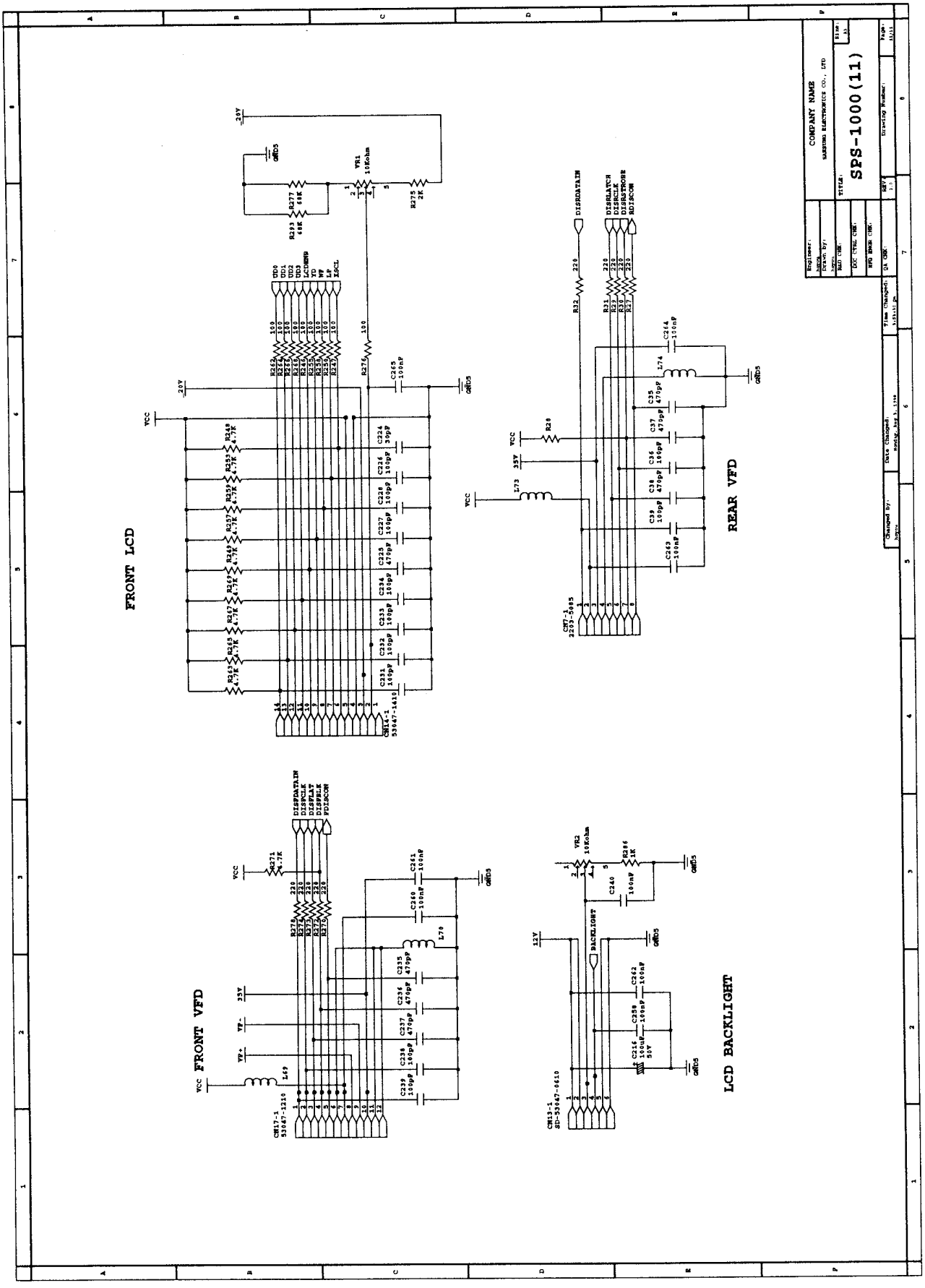

8032 INTERFACE PART
REAR LCD PART
DRAWER PART
COMPANY NAME
SAMSUNG ELECTRONICS CO., LTD
SPS-1000(6)

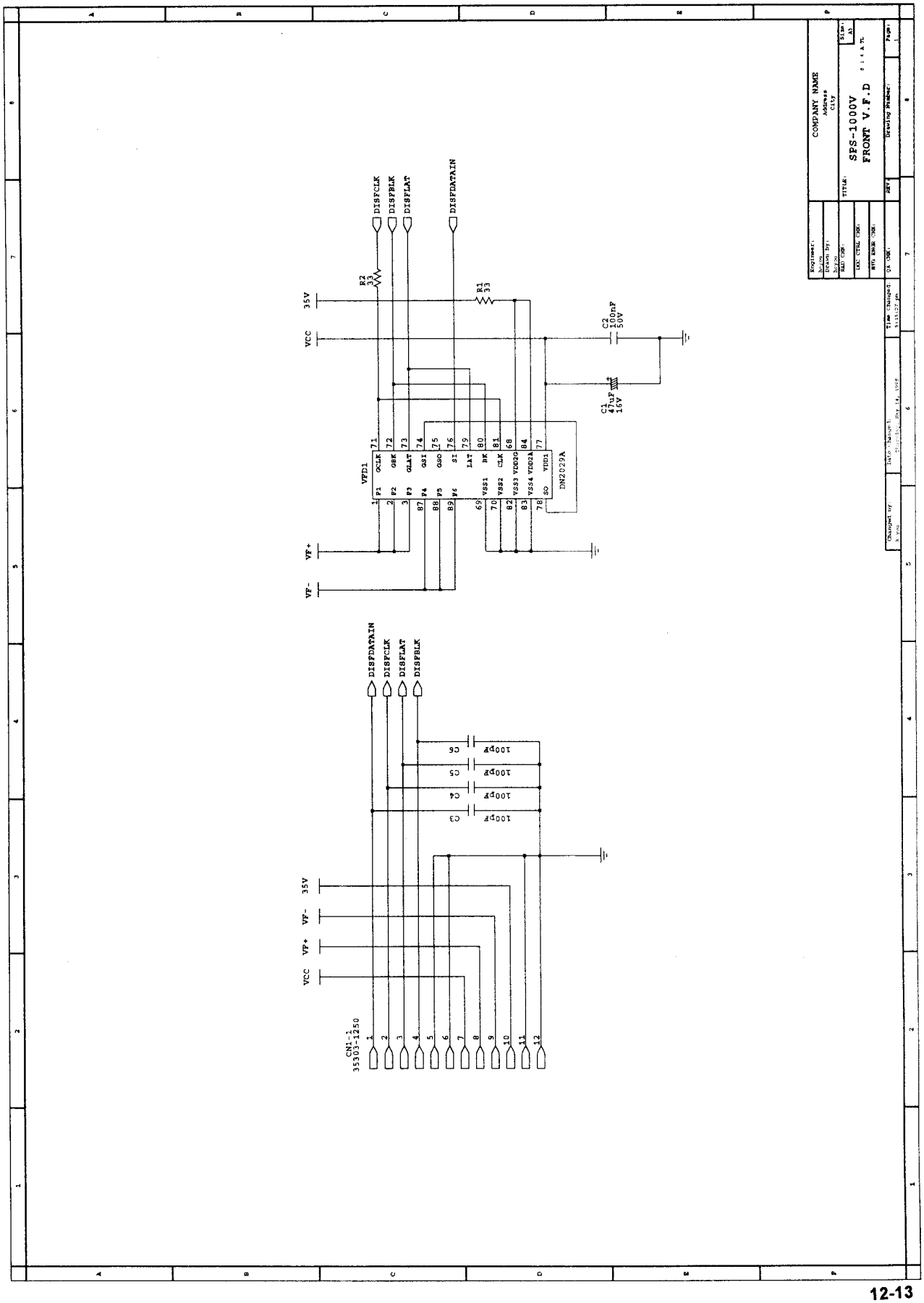

ETHERNET PART
SPS-1000(7)
COMPANY NAME

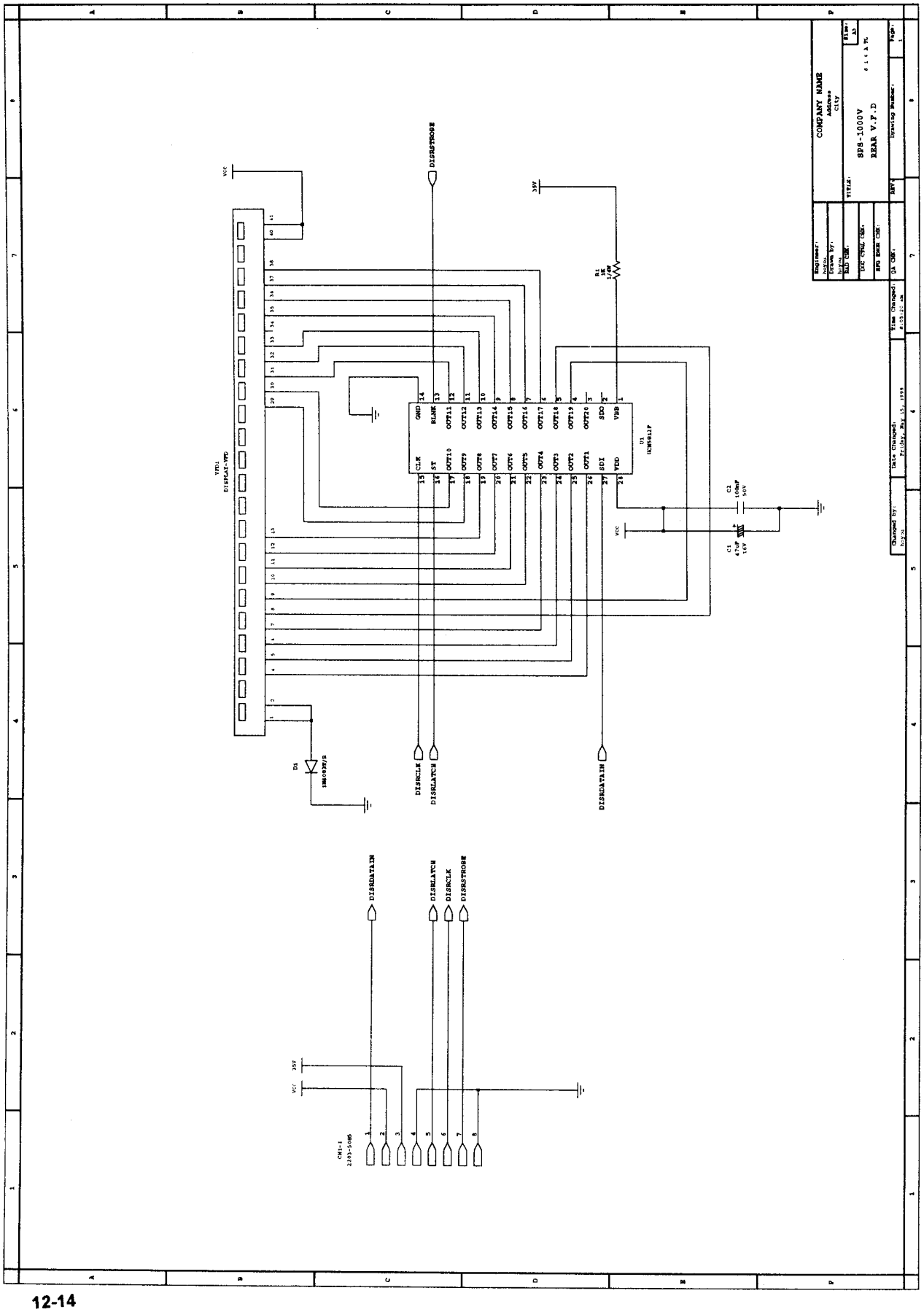

SPS-1000(8)
COMPANY NAME
U24
W78C328-16
U45
D27512-2
U44
XM62256BLG-10
U32
CD74HC573MX
U29
MC74HC139ADR2
U47-1
CD74HCT32M
U21
PST741
Y4
MA-406,16MHz
MAD(0:15)
MDB(0:7)
PSEN
ALE
RST
BUZZER
DISPBLK
DISPLAT
DISRSTROBE
DISLATCH
DISRCLK
DISDATAIN
DISPDATAIN
DISPCLK
MICOMINT
KEYINT
MOUSE
_MWR
_MRD
CPUIFRD
CPUIFWR
MOUSE41
CLERK541
VCC
GND5

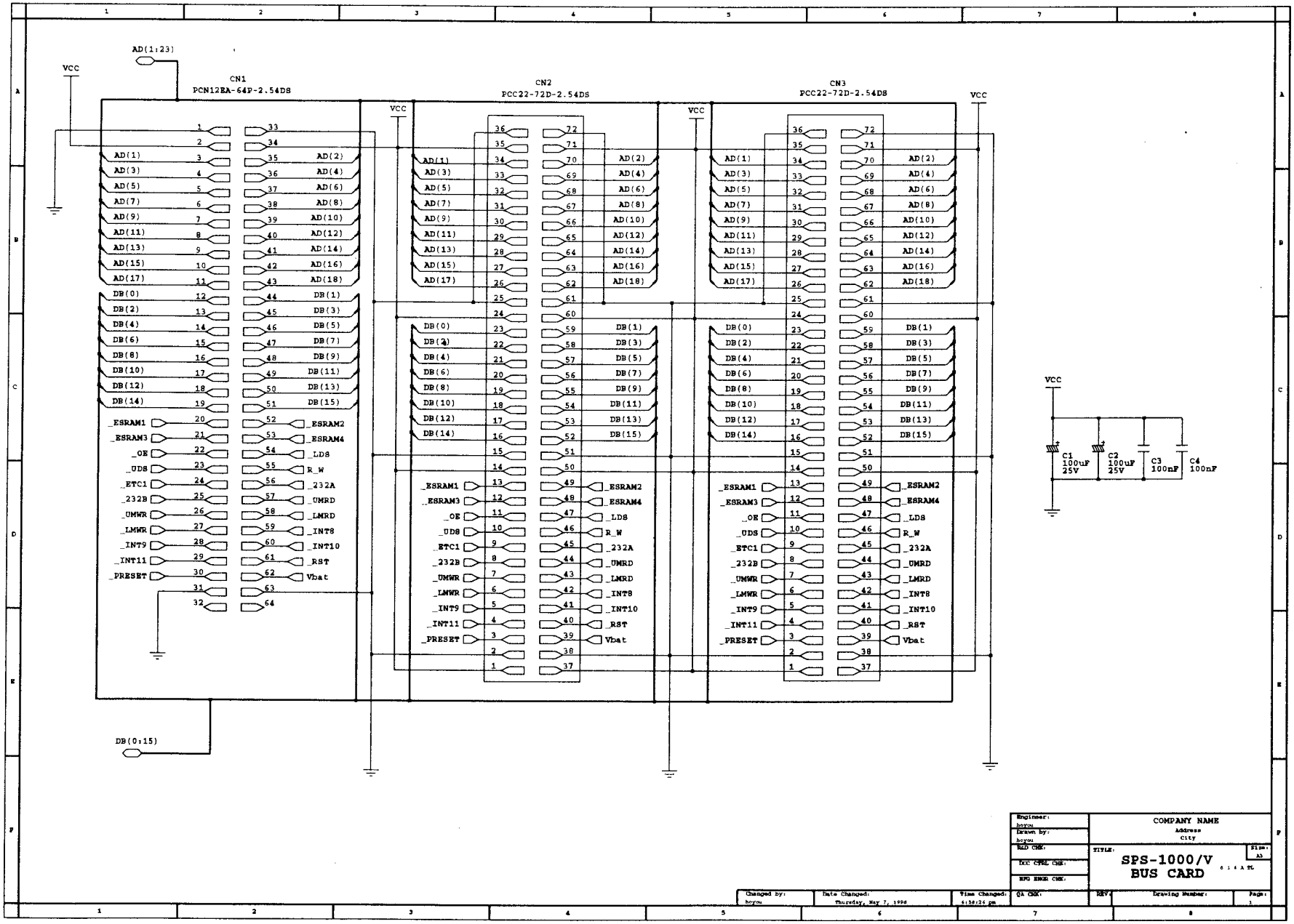

KEY SCAN
MODE KEY
KEY RETURN
CLERK KEY
ALL CLEAR
BUZZER PART
SPS-1000(9)

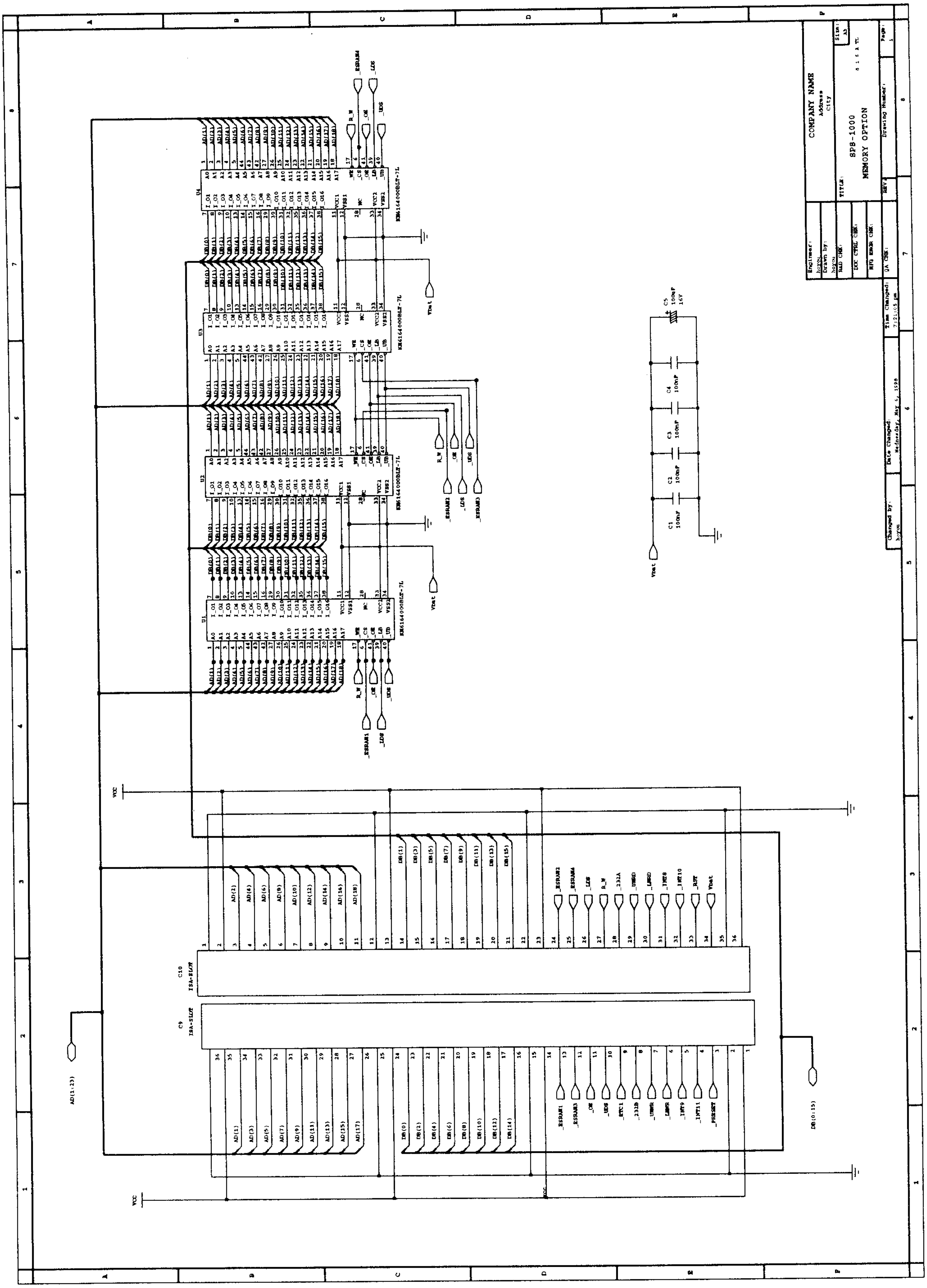

MAIN BOARD to EXT BOARD
KEY OPTION PART
REAR LCD
SPS-1000(10)
COMPANY NAME

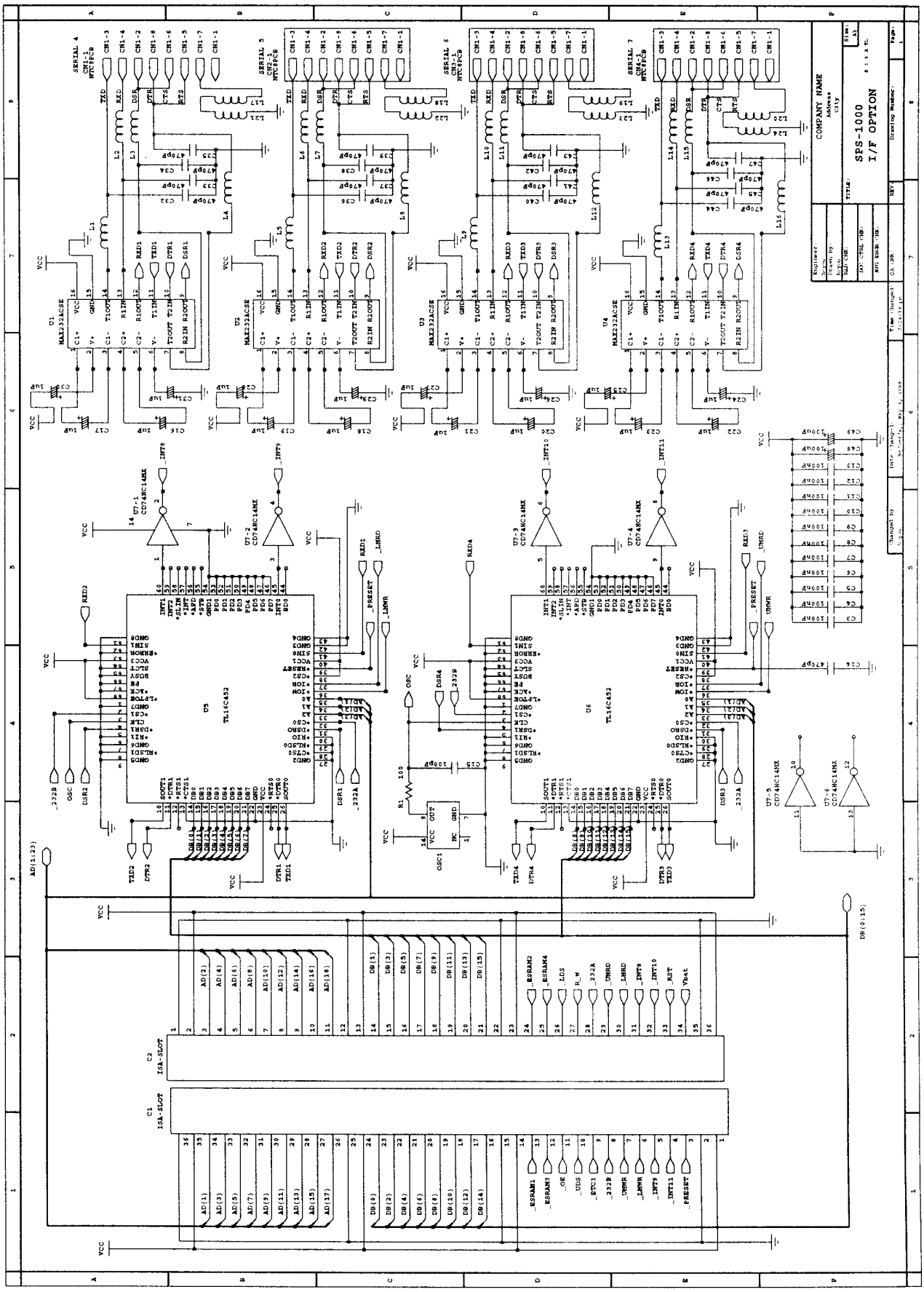

FRONT LCD
REAR VFD
FRONT VFD
LCD BACKLIGHT
COMPANY NAME
SAMSUNG ELECTRONICS CO., LTD
SPS-1000(11)


COMPANY NAME
Address
City
SPS-1000V
FRONT V.F.D
DISFDATAIN
DISFCLK
DISFBLK
DISFLAT
R2
33
R1
33
35V
VCC
C2
100nP
50V
C1
47uF
16V
VFD1
DN2029A
VF+
VF-
CN1-1
35303-1250
100pF
C3
C4
C5
C6


COMPANY NAME
SPS-1000V
REAR V.F.D
DISRSTROBE
DISRDATAIN
DISRLATCH
DISRCLK
DISRSTROBE
DISRDATAIN
DISRLATCH
DISRCLK


AD(1:23)
VCC
CN1
PCN12EA-64P-2.54DS
CN2
PCC22-72D-2.54DS
CN3
PCC22-72D-2.54DS
AD(1) AD(2) AD(3) AD(4) AD(5) AD(6) AD(7) AD(8) AD(9) AD(10) AD(11) AD(12) AD(13) AD(14) AD(15) AD(16) AD(17) AD(18)
DB(0) DB(1) DB(2) DB(3) DB(4) DB(5) DB(6) DB(7) DB(8) DB(9) DB(10) DB(11) DB(12) DB(13) DB(14) DB(15)
_ESRAM1 _ESRAM2 _ESRAM3 _ESRAM4 _OE _LDS _UDS R_W _ETC1 _232A _232B _UMRD _UMWR _LMRD _LMWR _INT8 _INT9 _INT10 _INT11 _RST _PRESET Vbat
DB(0:15)
C1 100uF 25V
C2 100uF 25V
C3 100nF
C4 100nF
COMPANY NAME
Address
City
TITLE:
SPS-1000/V
BUS CARD
Size: A3
Engineer: boyou
Drawn by: boyou
Changed by: boyou
Date Changed: Thursday, May 7, 1998
Time Changed: 4:38:24 pm


COMPANY NAME
SP8-1000
MEMORY OPTION
C10 ISA-SLOT
C9 ISA-SLOT
AD(1:23)
DB(0:15)
VCC
Vbat


SPS-1000
I/F OPTION
COMPANY NAME
Address
City
SERIAL 4
SERIAL 5
SERIAL 6
SERIAL 7
U1
U2
U3
U4
MAX232ACSE
U5
U6
TL16C452
U7-1
U7-2
U7-3
U7-4
U7-5
U7-6
CD74HC14MX
OSC1
C1
ISA-SLOT
C2
ISA-SLOT
AD(1:23)
DB(0:15)

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