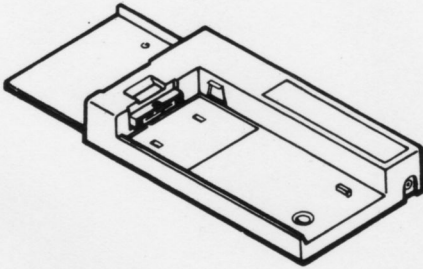


CODE : 00ZCE1600ESME



MODEL CE-1600E

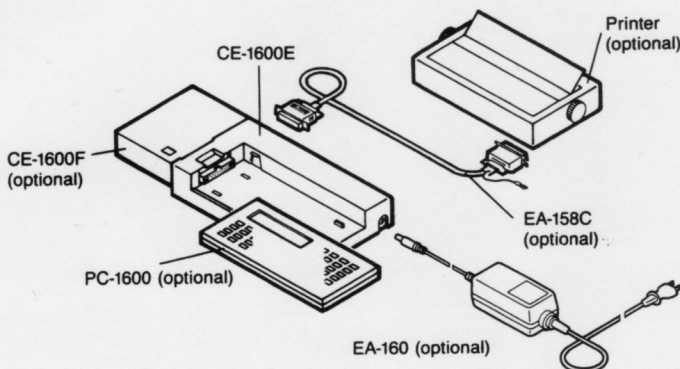
PARALLEL AND POCKET DISK INTERFACE
(FOR PC-1600)

1. SPECIFICATIONS

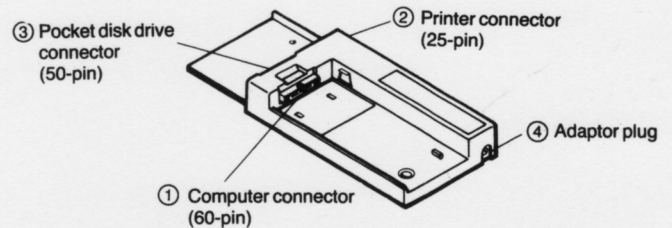
Model:	CE-1600E
Product name:	Parallel and pocket disk interface
Power source:	7.5V DC supplied by five AA batteries or optional AC adaptor (EA-160)
Power required:	2.8W
Battery operating time:	approx. 50 minutes using manganese batteries approx. 120 minutes using alkaline batteries (at 20°C with a CE-1600F connected while continuously writing and reading a 4 K-byte program at 5 second intervals)
Temperature:	10°C ~ 35°C
Dimensions:	320mm(W) × 123mm(D) × 40mm(H)
Weight:	approx. 640g (includes batteries)
Accessories:	AA batteries (5), screws (XBBSD20P 05000, PRICE RANK: AA) (2), Operation Manual (1)
Optional Accessories:	EA-158C (printer cable) EA-160 (AC adaptor) CE-1600F (pocket disk drive)
Usable Printers:	SHARP CE-515P, CE-516P, CE-700P EPSON FX-80 See the operation manual for your printer for information on electrical requirements and printable characters. Be sure to confirm compatibility (e.g. by referring to the printer's manual) before use for any printer no listed above.

2. SYSTEM ORGANIZATION

The entire system is shown below.



3. NAME OF EACH PART AND ITS USE



Note: The interface does not have a power switch. The power is switched together with the power switch of the connected computer. Disconnecting the computer turns off the power for the interface.

- ① Computer connector
Connects the computer (PC-1600).
- ② Printer connector
Connects a printer through the printer cable (EA-158C).
- ③ Pocket disk drive connector
Connects the pocket disk drive (CE-1600F)
- ④ Adaptor plug
Connects the AC adaptor (EA-160)

4. POWER SUPPLY

Size AA batteries (or an adaptor) are required in the interface to operate the disk drive.

When the **BATT** symbol is shown on the top right of the computer's display, the battery voltage is low. Replace the batteries in the interface early.

Note: The interface and computer both supply power alternately. Thus, operation is possible if power is available from either one. However, the disk drive's motor operates from the power supplied by the interface.

5. ERROR CODES

The interface issues error code 69 during an error.

Error Code	Description
69	Printer is not connected. Printer is not on. Printer is out of paper. Other printer related error conditions.

If the printer takes 10 seconds or more for the new page operation, an error occurs when an attempt is made to output data following the new page code (LPRINT CHR\$(12);). If an error occurs, add the following command.

```
1 ON ERROR GOTO 60000
```

```
60000 IF ERN = 69 THEN RESUME
```

Lines 1 and 60000 are repeated until the new page operation is completed.

6. END OF LINE CODES AND PROGRAM LISTING FORMATS

Output of the end of line code at the end of a line can be turned on and off if the amount of data exceeds the number of columns per line specified in the PCONSOLE statement. Also, when outputting a program listing, printing of the 2nd and subsequent lines can be started from the first column or the 8th column.

End of Line Code Output

Problems may arise if the number of print columns per line set in the PCONSOLE statement is not the same as the number of printable columns for the printer. Furthermore, most printers automatically perform a line feed after receiving an entire line of printable characters.

- (1) Select "do not output end of line code" from below if the value 132 is set in the PCONSOLE statement and the number of printable columns for the printer is 80.
If "output end of line code" is selected, the printer will automatically perform a line feed after the 80th column and again after the 132nd column.
- (2) Select "output end of line code" from below if the value 80 is set in the PCONSOLE statement and the number of printable columns for the printer is 132.
If "do not output end of line code" is selected, the 81st column will be output on the same line. Furthermore, if "print from the 8th column" has been selected, 7 spaces will be inserted between the 80th and 81st columns.

Selection of the Start Printing Position

Since the line number is printed from the first column, long program lines that require 2 or more printed lines can be printed with 2nd and subsequent printed lines starting from the 8th column to make the overall program listing easier to read. Select this indentation feature for easier to red program listings.

Key Entry: POKE & FE79, X

(X denotes the value 0-3 as shown in the table below.)

X	Output End of Line Code	Listing Format
0	No	Print from 8th column
1	Yes	Print from 8th column
2	No	Print from 1st column
3	Yes	Print from 1st column

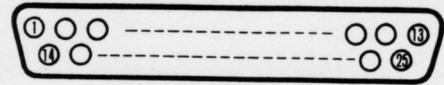
When the PC-1600 is connected to interface for the first time or when the reset button is pressed, X = 0 will be selected. Furthermore, whenever the power is turned on again, the previous values that were specified before the power was turned off are retained.

Note: The end of line code referred to on the previous page is specified in the PCONSOLE statement. However, if a program line is less than the number of columns per line specified in the PCONSOLE statement, the end of line code specified in the PCONSOLE statement will be output.

7. PRINTER INTERFACE

The interface can connect with most Centronics compatible printers. The interface uses handshaking through the BUSY signal. For your reference, the printer interface connector signals, printer cable wiring, signal timing chart, and electrical requirements are given in the following. The information is not necessary if a SHARP recommended printer and cable are used.

(1) Printer Interface Connector Signals

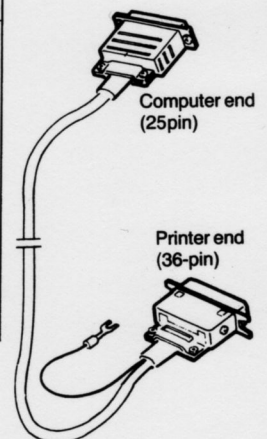


Pin Number	Signal Name	Direction of signal as seen from the interface	Description
1	STROBE	Output	Strobe pulse used to output data.
2	DATA 1	Output	
3	DATA 2	Output	8 bit data signals with the signal high when the data is "1". The MSB is DATA 8. The LSB is DATA 1.
4	DATA 3	Output	
5	DATA 4	Output	
6	DATA 5	Output	
7	DATA 6	Output	The printer is ready to receive data when low. Signal used to initialize the printer. A low pulse is output when the computer is turned on (except when <input type="checkbox"/> ON is pressed after an auto-power off) or when the reset button is pressed.
8	DATA 7	Output	
9	DATA 8	Output	
10	BUSY	Input	Not used Not used
11	EXPRM	Output	
12	N.C.		Not used Ground
13	N.C.		
14 ~ 25	GND		

(2) Printer Cable Wiring

The EA-158C is wired as shown below.

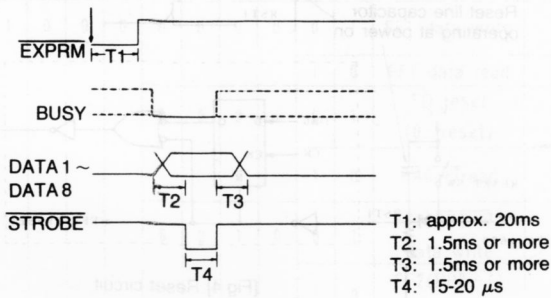
Computer end	Printer end
1	1
2	2
3	3
4	4
5	5
6	6
7	7
8	8
9	9
10	11
11	31
14 ~ 25	16, 17, 19 ~ 27, 29, 30



Pin 36 at the printer is not connected in the EA-158C. Some printers use pin 36 for the SELECT IN signal which must be in the SELECT state. See the operation manual for your printer. Also some printers provide a switch for the SELECT state.

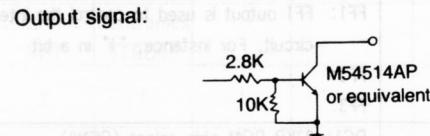
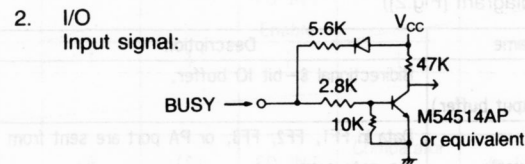
(3) Signal Timing Chart

Moment when the power is turned on or when the reset button is pressed (except when **ON** is pressed after an auto-power off.)



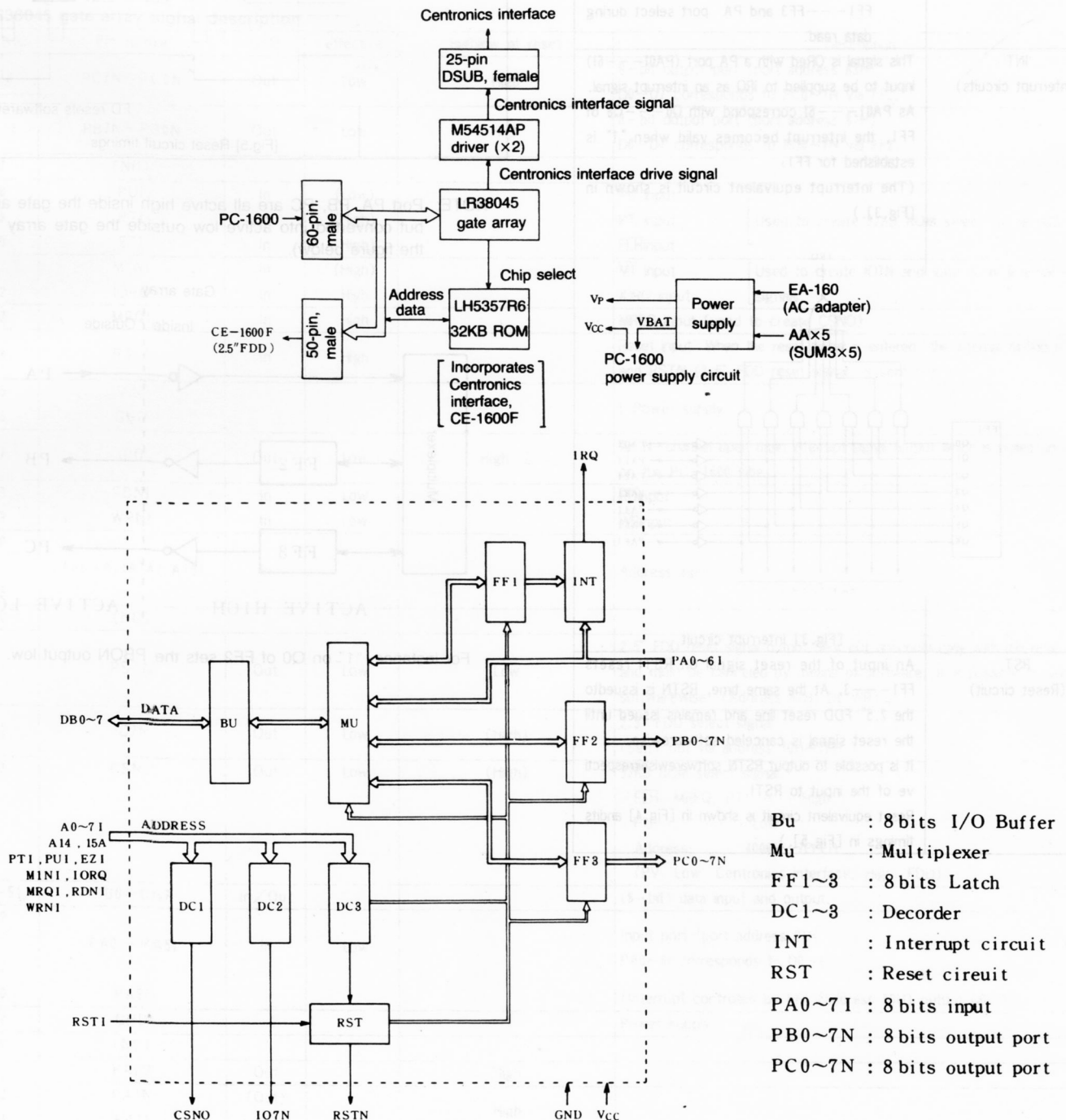
(4) Electrical Requirements

- Signal Levels
 Input signal: TTL level
 Output signal: TTL level (capable of driving one TTL IC)



Since all the outputs are through an open-collector, a pull-up resistor (approx. 1k Ω ~ 10k Ω) at the printer is required. SHARP recommended printers already include a pull-up resistor.

8. Block diagram



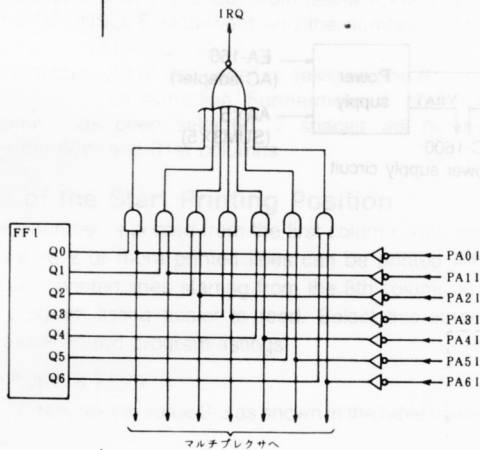
[Fig.2] LR38045 block diagram gate array

9. Description of each block

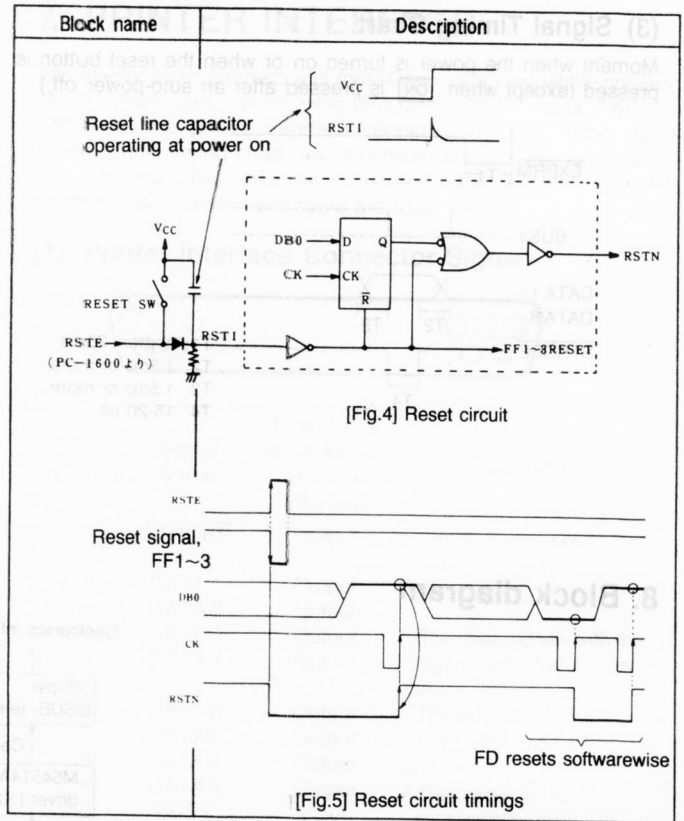
9-1. LR38045 gate array

Table-1 describes the gate array internal blocks and port addresses (see block diagram [Fig.2]).

Block name	Description
Bu (8-bit input/output buffer)	Bidirectional 8-bit IO buffer.
Mu (Multiplexer)	Data in FF1, FF2, FF3, or PA port are sent from the gate array.
FF1~FF3 (8-bit latch)	FF1: FF1 output is used to control the interrupt circuit. For instance, "1" in a bit FF2: FF3:
DC1~3 (Decoder)	DC1: 32KB ROM chip select (CSN0) DC2: 2.5" FDD select signal (IO7N) DC3: FF1---FF3 and FDD reset latch select during data write. FF1---FF3 and PA port select during data read.
INT (Interrupt circuits)	This signal is ORed with a PA port (PA01---61) input to be supplied to IRQ as an interrupt signal. As PA01---61 correspond with Q0---Q6 of FF1, the interrupt becomes valid when "1" is established for FF1. (The interrupt equivalent circuit is shown in [Fig.3].)
RST (Reset circuit)	An input of the reset signal on RST1 resets FF1---3. At the same time, RSTN is issued to the 2.5" FDD reset line and remains issued until the reset signal is canceled softwarewise. It is possible to output RSTN softwarewise irrespective of the input to RST1. Reset equivalent circuit is shown in [Fig.4] and its timings in [Fig.5].)



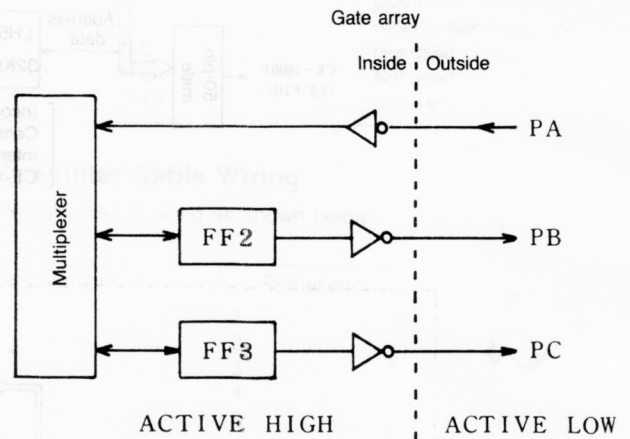
[Fig.3] Interrupt circuit



[Fig.4] Reset circuit

[Fig.5] Reset circuit timings

NOTE: Port PA, PB, PC are all active high inside the gate array, but converted into active low outside the gate array (see the figure below).



For instance, "1" on Q0 of FF2 sets the PBON output low.

IORQ	Address										Data																		
	MT	A7	A6	A5	A4	A3	A2	A1	A0	WR	RD	Operation	D7	D6	D5	D4	D3	D2	D1	D0									
1	1	0	0	0	0	0	0	0	0	0	0 1	FF1 data write	0	*	FD INT Enable														
											1 0	FF1 data read	↑	↑						↑	↑	↑	↑	↑					
											0 0	0 1	0 0	0 1	0 0	0 1	0 0	0 1	0 0	0 1	FD reset (0: reset)	FD Reset							
											1 0	PA0~7 read	(0)	(0)	(0)	FD INT	Comparator LB	Vp LB	Centronics BUSY										
											0 0	0 1	0 0	0 1	0 0	0 1	0 0	0 1	0 0	0 1	FF2(PB0~7) data write	Pullup	Centronics INIT	Centronics STROBE	Centronics				
											1 0	FF2(PB0~7) data read	↑	↑	↑	↑	↑	↑	↑	↑									
											0 0	0 1	0 1	0 1	0 1	0 1	0 1	0 1	0 1	0 1	FF3(PC0~7) data write	Centronics DATA1	Centronics DATA2	Centronics DATA3	Centronics DATA4	Centronics DATA5	Centronics DATA6	Centronics DATA7	Centronics DATA8
1 0	FF3(PC0~7) data read	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑											

NOTE: All are active high (1: active, 0: inactive) as seen from the CPU, except for FD reset (0: active).

© LR38045 gate array signal description

PIN No.	Pin name	I/O	effective	Highlow at reset	Description
1~8	PC7N~PC0N	Out	Low	High	8-bit output port (port address 83H) D0~D7 corresponds to PC0~7N via FF3.
9~16	PB7N~PB0N	Out	Low	High	8-bit output port (port address 82H) D0~D7 corresponds to PC0~7N via FF2.
17	(NC)				
18	PUI	In	(Low)		PU input PT input ELHinput [Used to create 32KB ROM select signal (CSNO).]
19	PTI	In	(High)		
20	EZI	In	(High)		
21	M1NI	In	(High)		M1 input IORQ input [Used to create IO7N and gate array internal enable signals.]
22	IORQ	In	High		
23	MRQI	In	High		MREQ input (used to create CSNO).
24	RSTI	In	High		Reset input. When the reset signal is entered, the internal flipflop is reset and RSTN (2.5" FDD reset signal) is sent out.
25	Vcc				Power supply
26	GND				
27	IRQ	Out	Low	High Z	An N-channel open drain interrupt signal output which is pulled up to VCC on the PC-1600 side.
28	RDNI	In	Low		RDinput
29	WRNI	In	Low		WRinput
30	A01~A7IA14I, A15I	In			Address input
39					
40	(NC)				
41	RSTN	Out	Low	Low	2.5" FDD reset signal output. Sent out unconditionally with the reset signal and must be canceled by means of software. It is possible to send out softwarewise. (Address 81H, D0, WR)
42	IO7N	Out	Low	(High)	2.5" FDD select signal. (Sent out via address 70H~7FH.)
43	CSNO	Out	Low	(High)	32KB ROM select signal. ELH, MREQ, PT.....High PU.....Low Address.....4000H~7FFFH (PV...Low; Centronics interface, High; FDD)
44~51	DB0~DB7	In/Out			(8-bit) data input and output.
52	PA01~PA5I	In	Low		Input port (port address 81H) PA0~6I corresponds to D0~6.
57					
60	PA6I				(Interrupt controlled by FF1 (address 80H) output Q0~6.)
58	GND				Power supply
59	(NC)				
61	PA7B	Out		High	
62	PA7N	(Out)		High	
64	PA7I	In			
63	(NC)				

9-2. Centronics interface

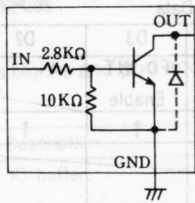
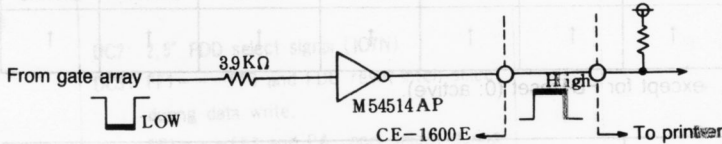


Fig. M54514AP driver equivalent circuit

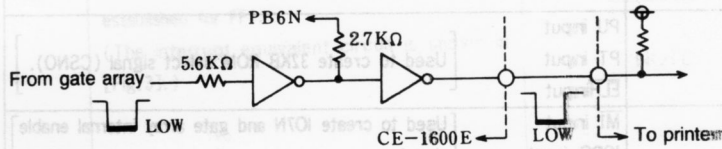
Seven above circuits are implemented on a single chip of the driver and two chips are used in the CE-1600E. Among 14 circuits (7 circuits×2), 8 circuits are used for data output and 4 for STROBE and INIT outputs, 1 for BUSY input, and remaining one circuit is not used.

① Data output



② STROBE, INIT outputs

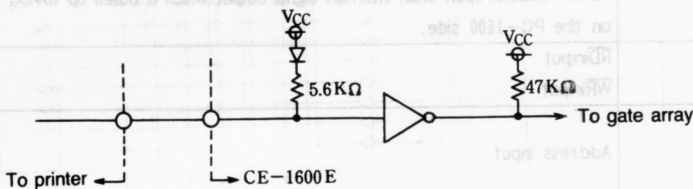
Because both signals are active low and the gate array goes high during reset, a non-inversion buffer is provided between port and Centronics interface.



To prevent malfunction at power on and off, a pullup resistor is inserted to PB6N.

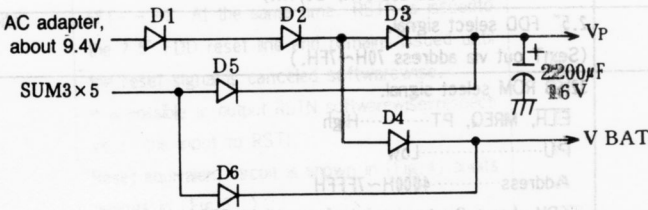
③ BUSY input

When the printer is not in connection, a pullup resistor is used to set it in the busy state. A diode is used to prevent intrusion of the power supply when off.



9-3. Power supply circuit

VP, VBAT circuit

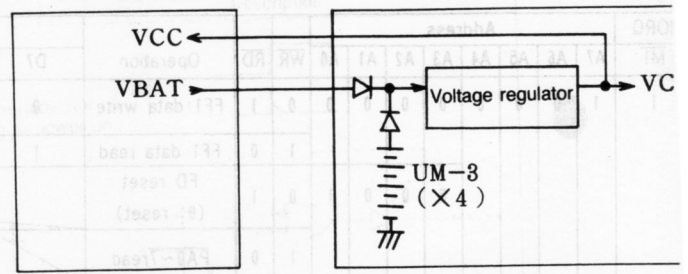


D1, D5, D6 : 11DQ03
D2, D3, D4 : 10E1N

- D1: For prevention of counter current flow from the battery to the adapter.
- D2, D3: To drop the voltage from the adapter to the floppy disk drive voltage, 7.5V, maximum.
- D4: For prevention of counter current flow from VBAT (main unit) to VP (floppy disk).
- D5, D6: For prevention of counter current flow to the battery when the adapter is in use.

CE-1600E

PC-1600 (本体)

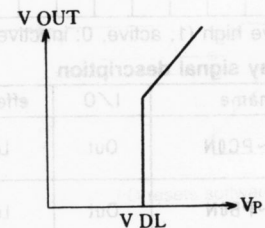


After the battery power supply is ORed with VBAT of the CE-1600E, VCC is regulated to 4.7V before supplied to the CE-1600P. (See the figure below.)

When the main power is off, VCC is not supplied.

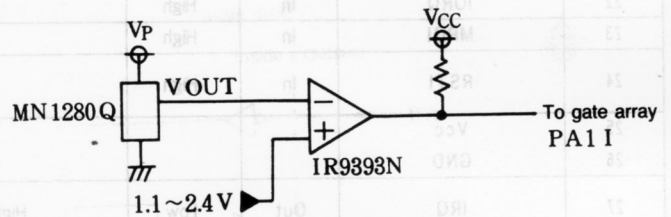
9-4. Low battery detect circuit

① VP low battery detect circuit



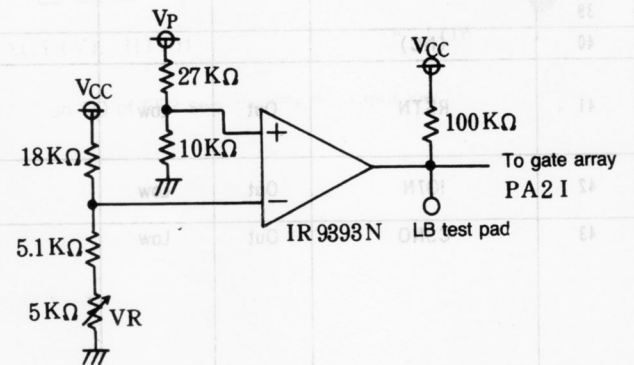
MN1280 output characteristics

The MN1280Q low battery detect IC is used in the VP low battery detect circuit. (Rank Q=VDL: 3.8~4.1V) VOUT must be inverted in the comparator before supplied to the gate array.



② VP, VCC comparator circuit

As it is necessary to satisfy the condition of VP>VCC+0.1V in order to 5VC inside the CE-1600F, the condition is monitored by means of the comparator.



⟨Potentiometer adjusting method⟩

- 1) Add 4.5 to 5V to the VCC pad.
- 2) Add VCC+0.1V to the VP pad.
- 3) Rotate VR counterclockwise and set the LB test pad voltage to 0V.
- 4) Slowly rotate VR clockwise and stop it when the LB test pad voltage came to be VCC. (See the parts and signal description for the location of test pad.)

10. Operational tests by diagnosis

The diagnostic program is used to test basic performance of the CE-1600E.

10-1. Kinds of tests

- Sum check (entire 32KB)
- Gate array
Read/write of each port (address 82H, 83H)
- Floppy disk interface
Read/write of all track 1 sectors
- Printer interface
Ten bytes of 55H and AAH are issued alternately and 0DH is issued at the end.
- Low battery signal
 - Low battery should not be established when sufficient power is being supplied from the AC adapter.
 - Low battery must be established when sufficient power is not being supplied from the AC adapter.

10-2. Tools required

- Floppy disk (UKOGC3027CSZZ, price rank at BD, with RAM module diagnostic) that contains the diagnostic program (floppy disk A).
 - In addition, the following two programs must be provided. (Side A)
 - CE-1600E.BAS ... BASIC program file
 - CE-1600E.SVC ... Machine language program file
 - CE-1600E to be tested
 - PC-1600(K) (must be operated by the battery power).
 - CE-1600P or normally functioning CE-1600E
 - CE-1600F (pocket disk drive)
 - EA-158C (printer cable)
 - CE-515P (color plot printer) or CE-516P
 - EA-160 (adapter)
 - One piece of pocket disk, formatted blank disk...floppy disk (B)
- The contents of disk are destroyed after test.

10-3. Before starting test

- The diagnostic program must be loaded to the PC-1600(K) in the following manner.
- Only the standard memory chips must be set in the PC-1600(K). (Do not install the RAM module in two option slots.)
- Connect the PC-1600(K), CE-1600P (or normally functioning CE-1600E), and CE-1600F, and turn power on to the PC-1600(K). (Do not insert the floppy disk in the CE-1600F.)
 - Type NEW"Sp;"&200[ENTER] in the PRO mode to secure the machine language area.
 - Insert the test program contained floppy disk (A) in the CE-1600F.
 - Type BLOAD"X:CE-1600E.SVC" [ENTER] to load the machine language program.
 - Type LOAD"X:CE-1600E.BAS [ENTER] to load the BASIC

10-5. Significance of error number and possible cause

Error No.	Error description	Possible cause
ERROR.....1	Improper ROM access	<ul style="list-style-type: none"> Check the ROM if properly soldered. Direction of ROM installation Separation of solder Lines interferred by solder Soldering fault in 60-pin connector or flexible cable.
ERROR.....2	Gate array not accessed	<ul style="list-style-type: none"> Check the gate array if properly soldered. Direction gate array installation Separation of solder Lines interferred by solder Soldering fault in 60-pin connector or flexible cable.
ERROR.....3 - x x	Error encountered during accessing the floppy disk. The cause is indicates by hexadecimal "xx"; each bit representing the following significance. If all are 0, a data verify error is indicated. If all are 1, a drive connector error is indicated. Bit 0: Drive not ready or time out. Bit 1 } Access error Bit 2 } Bit 3: The specified sector not found. Bit 4: Head seek error	<ul style="list-style-type: none"> Error may be on the floppy disk (B) or the CE-1600F side. The CE-1600F may not be properly connected. Check the CE-1600F if properly connect ed. <p>Floppy disk interface or CE-1600F side. Especially, power supply, RD, WR, IO7N, A0 --- A2, D0 --- D7, and DSTN.</p> <ul style="list-style-type: none"> Check the floppy disk (B) if formatted. Check the floppy disk (B) inserted in the CE-1600F if write protected. The AC adapter is not connected. Failure in the low battery detect circuit. Improper soldering around the gateway. Power supply (VP, VCC). Check the floppy disk is inserted. Check the CE-1600F lid if closed. Check the printer if properly connected. Check the printer power if on. Check the motor dis switch if correctly.
ERROR.....4	Printer output error. (BUSY continues to be high.)	Bit 5: Write protected Bit 6: Low battery Bit 7: Others

4. Type BLOAD"X:CE-1600E.SVC" [ENTER] to load the machine language program.
 5. Type LOAD"X:CE-1600E.BAS [ENTER] to load the BASIC program.
- After loading the program, turn power off to the PC-1600(K) and disconnect those connected at 1.

10-4. Test procedure

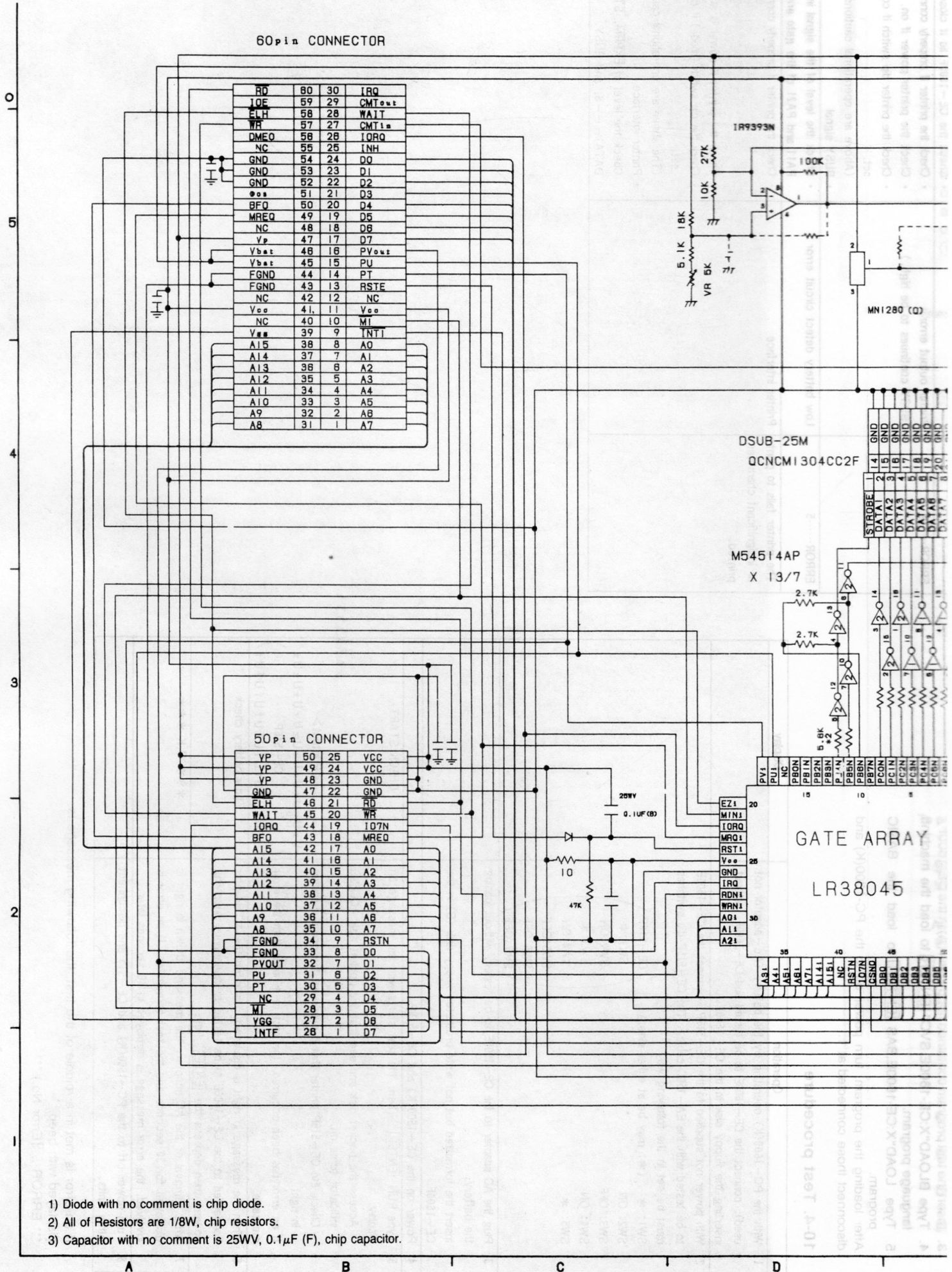
Operation	Display
<p>1. With the PC-1600(K) operating by the battery (Ac-adaptor not used), connect the CE-1600E to be tested and CE-1600F, without inserting the floppy disk in the CE-1600F.</p> <p>2. With power not supplied to the CE-515P, connect the CE-1600E to be tested with the EA-158C cable. The CE-515P dip switches must be set in the following way.</p> <p>SW1: * (*: may be at either side.) SW2: ON SW3: OFF SW4: ON SW5: *</p> <div style="border: 1px solid black; border-radius: 50%; padding: 10px; width: fit-content; margin: 10px auto;"> <p>(CE-516P) SW1: * SW2: ON SW3: * SW4: ON SW5: OFF SW6: OFF SW7: OFF</p> </div>	
<p>3. Plug the AC adaptor to the CE-1600E to be tested, without loading the battery.</p> <p>Insert the formatted but not write protected floppy disk (B) in the CE-1600F.</p>	
<p>4. Power on the CE-1600(K) and CE-515P.</p>	
<p>5. Type RUN [ENTER]. Then, the test starts with the message on display.</p> <ul style="list-style-type: none"> • Access the pocket disk and see that the pocket disk ACCESS indicator turns on. • Check the CE-515P printer that it produced the printout shown in right. <p>If an error has been occurred, the test terminates with the error message.</p>	<p>CHECK START</p> <p><Printout></p> <p>UxUxUxUxUxUxUxUxUxUx CE-516P UfUfUfUfUfUfUfUfUfUf</p> <p>Low battery check</p> <p>*** O.K ***</p>
<p>6. When the message in right is displayed, unfasten the AC adapter connected to the CE-1600E to be tested to discontinue supplying power, then depress the [ENTER] key.</p>	
<p>7. After removal of the AC adapter, the message shown in right is displayed for 30 seconds and the test terminates. If an error is involved, the error message is displayed in 40 seconds later.</p>	
<p>8. Turn power off to the PC-1600(K) and CE-515 and disconnect other units.</p>	

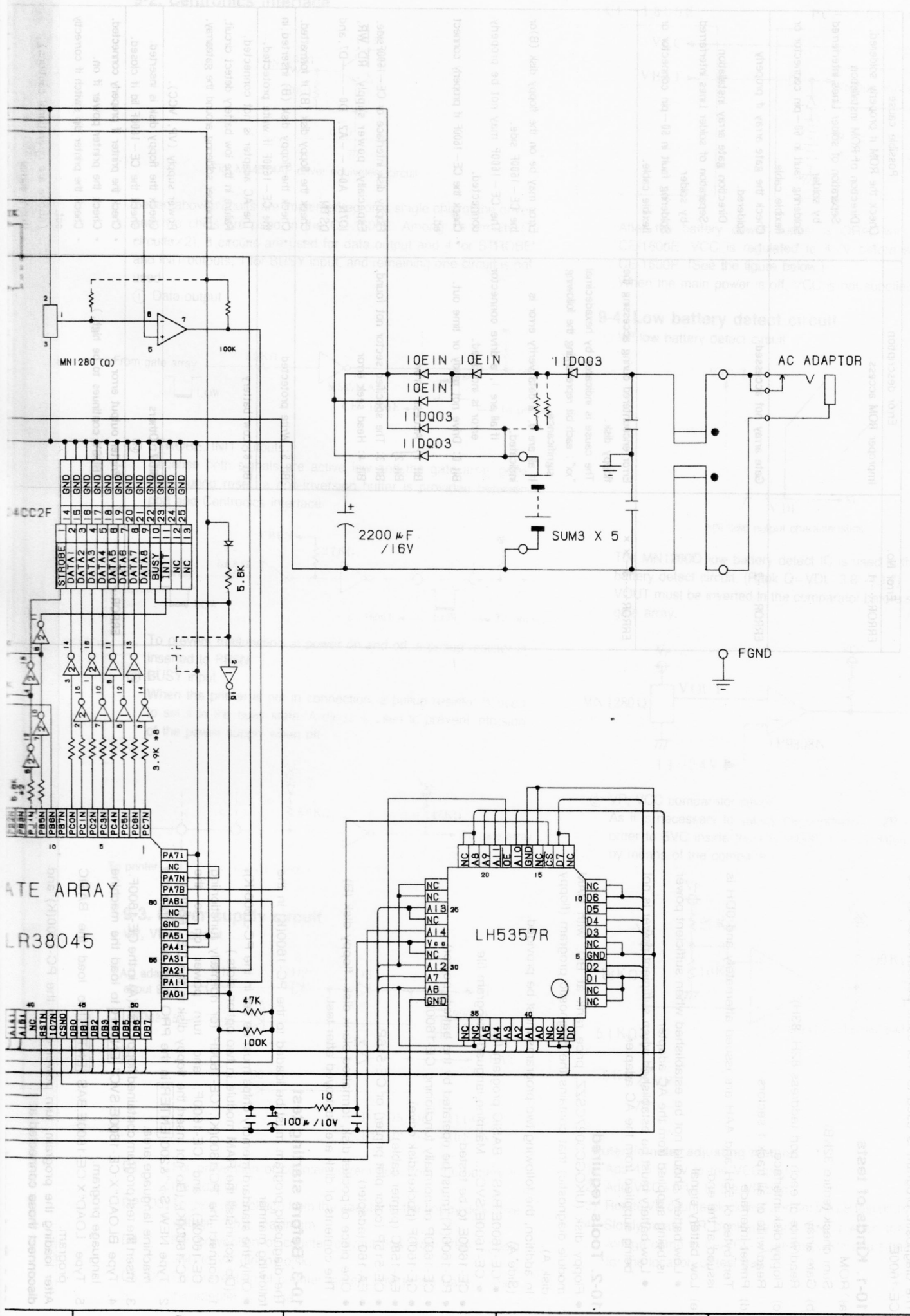
If an error is met in a middle of the test, the following message is displayed with beep.

*** ERROR ... (Error No.) ***

ERROR.....4	Printer output error. (BUSY continues to be high.)	<ul style="list-style-type: none"> • Check the printer if properly connected. • Check the printer power if on. • Check the printer dip switch if correctly set. <p>(Above are operational cautions)</p> <ul style="list-style-type: none"> • BUSY signal
ERROR.....5	Low battery detect circuit error	<ul style="list-style-type: none"> • Check the level of the signal input to PA11 and PA21 of the gate array.
The printer fails to print or insignificant character printed.	Printer interface	<ul style="list-style-type: none"> • Check the printer if power is supplied. • Check the dip switch (mode) if correctly set. <p>(The above are operational cautions)</p> <ul style="list-style-type: none"> • Printer interface <p>Check the level of EXPRM, STROBE, DATA1---8, and BUSY.</p>

11. Circuit Diagram





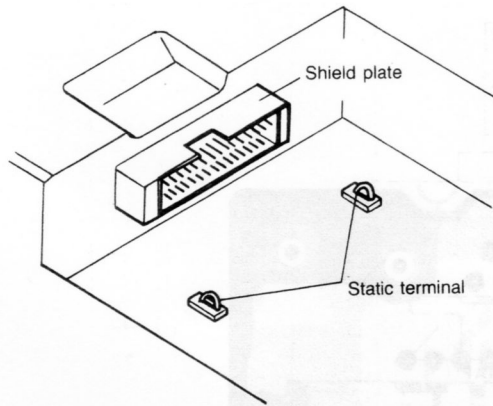
DATE ARRAY
LR38045

5
4
3
2

13. Service precautions

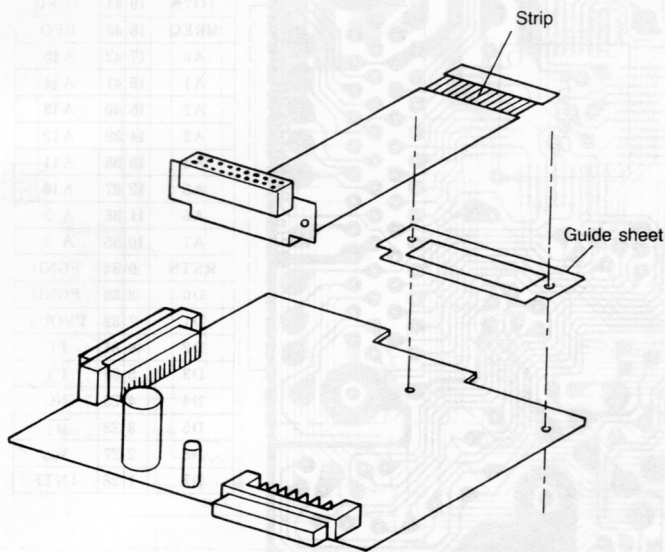
13-1. Frame ground continuity test

Check continuity between the shield plate of the 60-pin connector and the static terminals and make sure that it is not more than 10Ω.

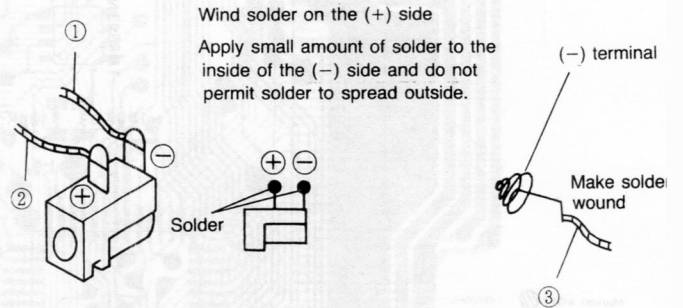
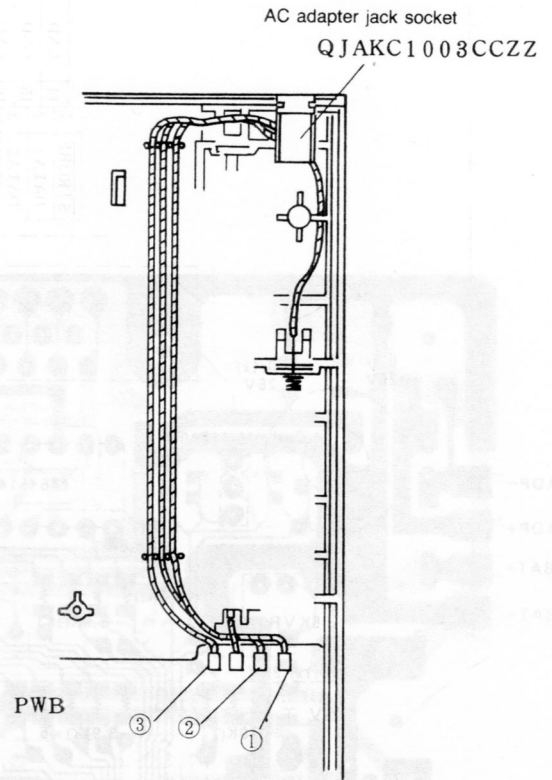


13-2. Square jumper installation

- ① Make preliminary solder coating on the PWB.
- ② Remove the back paper of the guide sheet, match the holes of the PWB with the holes of the sheet, then bond the sheet over the PWB.
- ③ Remove the back paper of the double tack tape on the reverse side of the guide sheet.
- ④ Remove the protect sheet of the strip of the jumper, match the circuit pattern with the jumper position, and attach the covered portion of the jumper to the double tack tape.
- ⑤ Apply the soldering pencil over the strip of each jumper and melt solder on the pattern.
- ⑥ Then, stroke the soldered portion with the tip of the soldering pencil to ensure that it has been completely soldered.



13-3. Wire routing



	Name	Length
①	Jumper (Black)	200mm
②	Jumper (Red)	200mm
③	Jumper (Gray)	260mm

13-4.

After completion of troubleshooting, it is necessary to adjust the potentiometer for the low battery detect circuit, in reference to "Potentiometer adjusting method" in this service manual.

14. Character Codes

Some characters that are displayed on the PC-1600 may be different from those printed on the printer. Furthermore, codes &00-&1F are usually control codes on most printers and will differ from the displayed characters. See the operation manual for your printer. The character fonts may also differ depending on your printer.

Mode 0 Character Code Table

In Mode 0, the PC-1600 character set includes graphic and Greek symbols and international characters in addition to the normal upper and lower case letters, numbers and symbols. This character set is similar to the IBM PC character set.

Hex	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0	NUL		0	@	P	'	p	Ç	É	á	⋮	⊥	⊥	α	≡	
1		!	1	A	Q	a	q	ü	æ	í	⋮	⊥	⊥	β	±	
2		"	2	B	R	b	r	é	Æ	ó	⋮	⊥	⊥	Γ	≥	
3		#	3	C	S	c	s	â	ô	ú	⋮	⊥	⊥	π	≤	
4		\$	4	D	T	d	t	ä	ö	ñ	⋮	⊥	⊥	Σ	∫	
5		%	5	E	U	e	u	à	ò	Ñ	⋮	⊥	⊥	σ	∫	
6		&	6	F	V	f	v	â	û	ä	⋮	⊥	⊥	π	μ	÷
7	BEL		'	7	G	W	g	w	ç	ü	⋮	⊥	⊥	τ	≈	
8	BS	(	8	H	X	h	x	ê	ÿ	¿	⋮	⊥	⊥	Φ	°	
9	HT	)	9	I	Y	i	y	ë	Ö	∩	⋮	⊥	⊥	θ	.	
A	LF	*	:	J	Z	j	z	è	Ü	∩	⋮	⊥	⊥	Ω	.	
B	VT	+	;	K	[	k	{	ï	¼	∩	⋮	⊥	⊥	∞	ⁿ	
C	FF	,	<	L	\	l	!	£	¼	∩	⋮	⊥	⊥	∞	ⁿ	
D	CR	-	=	M	]	m	|	¥	½	∩	⋮	⊥	⊥	∞	²	φ
E	SO	.	>	N	^	n	~	Ä	R	<	∩	⋮	⊥	∞	²	ε
F	SI	/	?	O	_	o	~	Å	f	>	∩	⋮	⊥	∞	²	η

Mode 1 Character Code Table

In Mode 1, the PC-1600 character set is modified to make it compatible with the more limited character set in the PC-1500. The table below gives the hexadecimal value of the character position, and the corresponding character for Mode 1.

HEX CODE	27	5B	5C	5D	5E	5F	60	7B	7C	7D	7E	7F
MODE 0	°	[	\	\]	^	_	°	{	|	}	~	⋮
MODE 1	√	¥	∩	∧							~	⋮

CE-515P

Lower 4 bits	Upper 4 bits															
	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0		SP	0	@	P	'	p									
1		!	1	A	Q	a	q									
2		"	2	B	R	b	r									
3		#	3	C	S	c	s									
4		\$	4	D	T	d	t									
5		%	5	E	U	e	u									
6		&	6	F	V	f	v									
7		'	7	G	W	g	w									
8	BS	(	8	H	X	h	x									
9		)	9	I	Y	i	y									
A	LF	*	:	J	Z	j	z									
B	LU	ESC	+	;	K	[	k	{	ï	¼	∩	⋮	⊥	⊥	∞	ⁿ
C		,	<	L	\	l	!	£	¼	∩	⋮	⊥	⊥	∞	ⁿ	
D	CR	-	=	M	]	m	|	¥	½	∩	⋮	⊥	⊥	∞	²	φ
E	SO	.	>	N	^	n	~	Ä	R	<	∩	⋮	⊥	∞	²	ε
F	SI	/	?	O	_	o	~	Å	f	>	∩	⋮	⊥	∞	²	η

- "SP" means space. The pen proceeds to the next position without plotting any characters.
- Blank means "not defined" and nothing is plotted.

- When you create a program for the plotter, be sure to use its unique character code commands.
- SO (&0E) and SI (&0F) are special purpose characters and should not be used.
- ¥ (&5C) and characters from &A0 to &DF are for Japanese letters. (Shaded area)

CE-516P (IBM PC (USA) MODE)

ESC + R + 0																
Upper 4 bits																
	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0			0	@	P	'	p	Ç	É	á	⋮	⊥	⊥	α	≡	
1		!	1	A	Q	a	q	ü	æ	í	⋮	⊥	⊥	β	±	
2		"	2	B	R	b	r	é	Æ	ó	⋮	⊥	⊥	Γ	≥	
3	♥	#	3	C	S	c	s	â	ô	ú	⋮	⊥	⊥	π	≤	
4	◇	\$	4	D	T	d	t	ä	ö	ñ	⋮	⊥	⊥	Σ	∫	
5	♠	%	5	E	U	e	u	à	ò	Ñ	⋮	⊥	⊥	σ	∫	
6	♣	&	6	F	V	f	v	â	û	ä	⋮	⊥	⊥	π	μ	÷
7		'	7	G	W	g	w	ç	ü	°	⋮	⊥	⊥	τ	≈	
8		<	8	H	X	h	x	ê	ÿ	¿	⋮	⊥	⊥	Φ	°	
9		)	9	I	Y	i	y	ë	Ö	∩	⋮	⊥	⊥	θ	.	
A		*	:	J	Z	j	z	è	Ü	∩	⋮	⊥	⊥	Ω	.	
B		+	;	K	[	k	{	ï	¼	∩	⋮	⊥	⊥	∞	ⁿ	∫
C		,	<	L	\	l	!	£	¼	∩	⋮	⊥	⊥	∞	ⁿ	
D		-	=	M	]	m	|	¥	½	∩	⋮	⊥	⊥	∞	²	φ
E		.	>	N	^	n	~	Ä	R	<	∩	⋮	⊥	∞	²	ε
F		/	?	O	_	o	~	Å	f	>	∩	⋮	⊥	∞	²	η

When the CE-516P is used in the IBM-PC mode, the character set is the same with that for mode 0 except for &7F.

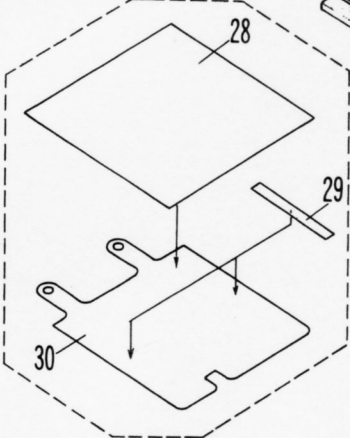
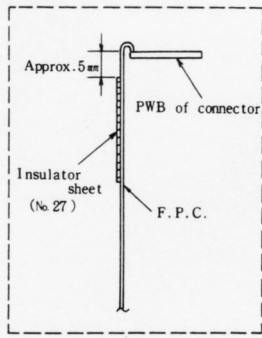
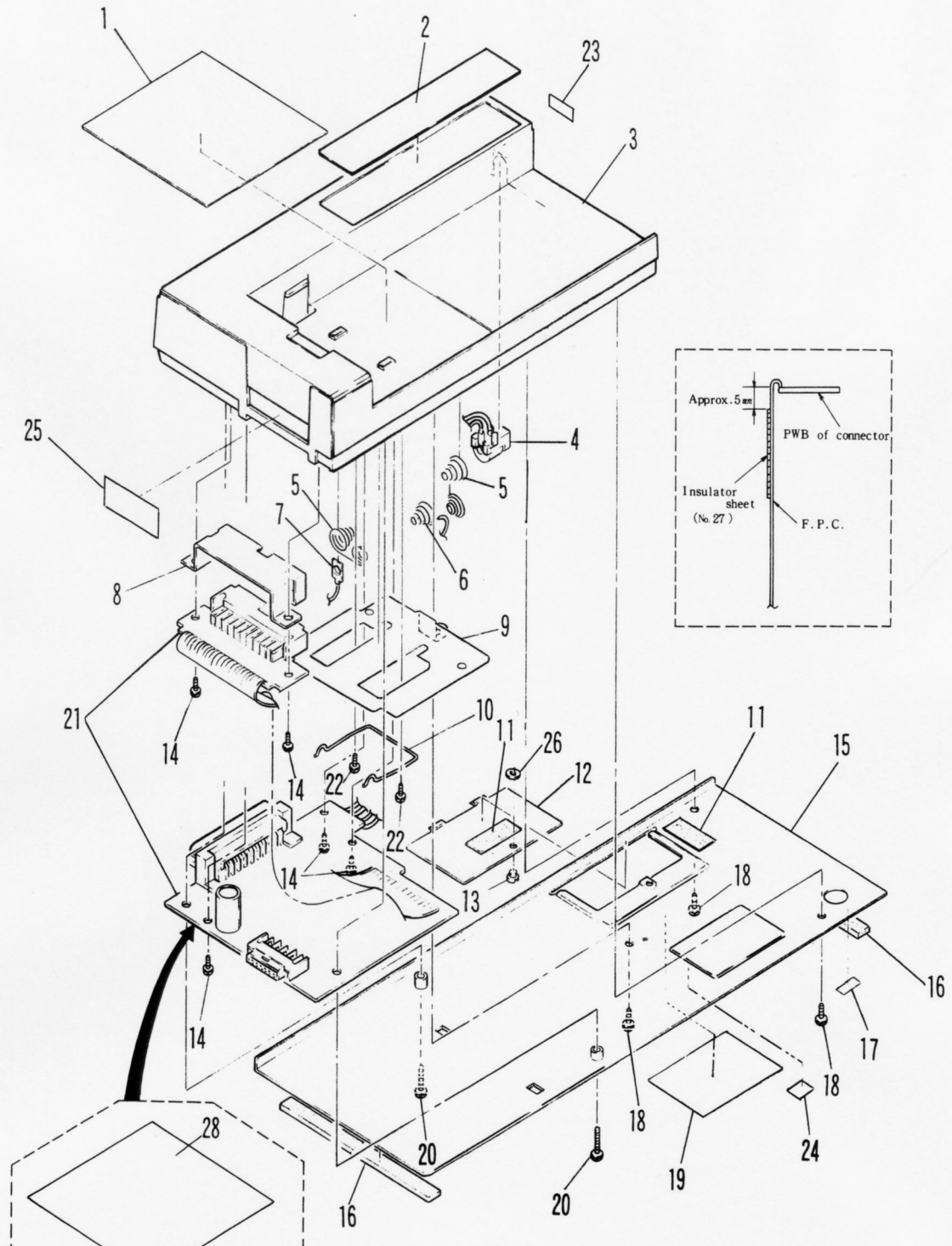
CE-700P, FX-80 (USA character set)

U.S.A.																
	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0	NUL	(SP)	0	@	P	'	p		(SP)	0	@	P	'	p		
1		!	1	A	Q	a	q		!	1	A	Q	a	q		
2	DC2	"	2	B	R	b	r		DC2	"	2	B	R	b	r	
3		#	3	C	S	c	s		#	3	C	S	c	s		
4	DC4	\$	4	D	T	d	t		DC4	\$	4	D	T	d	t	
5		%	5	E	U	e	u		%	5	E	U	e	u		
6		&	6	F	V	f	v		&	6	F	V	f	v		
7	BEL	'	7	G	W	g	w		BEL	'	7	G	W	g	w	
8	BS	(	8	H	X	h	x		BS	(	8	H	X	h	x	
9		)	9	I	Y	i	y			)	9	I	Y	i	y	
A	LF	*	:	J	Z	j	z		LF	*	:	J	Z	j	z	
B	VT	ESC	+	;	K	[	k	{	ESC	+	;	K	[	k	{	
C	FF	,	<	L	\	l	!	!	FF	,	<	L	\	l	!	!
D	CR	-	=	M	]	m	|		CR	-	=	M	]	m	|	
E	SO	.	>	N	^	n	~		SO	.	>	N	^	n	~	
F	SI	/	?	O	_	o	~		SI	/	?	O	_	o	~	

Characters for &20 - &7F are the same with those for mode 0.

15. PARTS GUIDE

NO.	PARTS CODE	PRICE RANK	NEW MARK	PART RANK	DESCRIPTION
1	TLABH1126ECZZ	AE		D	Caution label
2	TLABM1120ECZZ	AD		D	Decoration label
3	GCABB1025ECZZ	AK		D	Top cabinet
4	QJAKC1003CCZZ	AD		B	Jack for AC adaptor
5	QTANZ1006ECZZ	AA		C	Battery terminal B
6	QTANZ1377CCZZ	AB		C	Battery terminal ⊖
7	QTANZ1124CCZZ	AA		C	Battery terminal ⊕
8	PSLDC1008ECZZ	AE		C	Connector shield plate
9	PTPEH1020ECZZ	AD	N	C	Static tape
10	QTANZ1003ECZZ	AC		C	Static terminal
11	PCUSS1227CCZZ	AA		C	Cushion
12	GFTAB1011ECZZ	AD	N	D	Lid for battery
13	LX-BZ1017ECZZ	AB		C	Screw
14	XUBSD20P06000	AA	-	C	Screw (2×6)
15	GCABA1026ECZZ	AP	N	D	Bottom cabinet
16	GLEGG1001ECZZ	AC		C	Rubber foot
17	TLABZ2121CCZZ	AC	N	D	Reset label
18	XUBSD26P06000	AA		C	Screw (2.6×6)
19	TLABP1140ECZZ	AC		D	Label for battery
20	XUBSD26P12000	AA		C	Screw (2.6×12)
21	DUNTK1210ECZA	BR	N	E	Main PWB unit (U.S.A.,Canada)
	DUNTK1210ECZZ	BR	N	E	Main PWB unit (Other countries)
22	LX-BZ1155CCZZ	AA		C	Screw (2×3.5)
23	TLABP1150ECZZ	AA	N	C	Parallel label
25	TLABZ1153ECZZ	AA	N	D	Label for static
26	LX-WZ1001CCZZ	AA		C	Washer
27	PZETL1028ECZZ	AA		C	Insulator sheet
28	PZETL1034ECZZ	AD	N	C	Insulator sheet (U.S.A.)
29	PTPEH1278CCZZ	AA	N	C	Tape (for No.28,30) (U.S.A.)
30	PSHEZ1021ECZZ	AE	N	C	Sheet (U.S.A.)
101	PSHEZ1017ECZZ	AB		C	Sheet (U.S.A.)
102	PSHEG1041CCZZ	AA		C	Sheet
103	QCNCM1014EC2E	AL	N	C	Connector (25pin) (except U.S.A.,Canada)
	QCNCM1015EC2E	AL	N	C	Connector (25pin) (U.S.A.,Canada)
104	QCNCM1295CC6J	AV		C	Connector (60pin)
105	QCNCW1004EC5J	AS		C	Connector (50pin)
106	QCNCW-1023ECZZ	AU	N	C	F.P.C. (62pin)
107	RFLN1008CCZZ	AH		C	Filter (ESD-H-14B)
108	VCKYTP1EF104Z	AA		C	Capacitor (25WV 0.10μF)
109	RVR-M5310QCZZ	AD	N	B	Variable resistor
110	VCEAGU1AW107M	AB		C	Capacitor (10WV 100μF)
111	VCEAGU1CW228M	AE		C	Capacitor (16WV 2200μF)
112	VCKYTP1EB104K	AA		C	Capacitor (25WV 0.1μF)
113	VHDDAP202K/-1	AB		B	Diode (DAP202K)
114	VHD10E1N///-1	AB		B	Diode (10E1)
115	VHD11DQ03///-1	AE		B	Diode (11DQ03)
116	VHiR9393N/-1	AD		B	IC (IR9393N)
118	VHiLH5357R6-1	AU		B	IC (LH5357R6)
119	VHiLR38045/-1	AQ		B	IC (LR38045)
120	VHiMN1280Q/-1	AE		B	IC (MN1280Q)
121	VHiM54514AP-1	AF		B	IC (M54514AP)
122	VRS-TP2BD100J	AA		C	Resistor (1/8W 10Ω ±5%)
123	VRS-TP2BD103J	AA		C	Resistor (1/8W 10KΩ ±5%)
124	VRS-TP2BD104J	AA		C	Resistor (1/8W 100KΩ ±5%)
125	VRS-TP2BD183J	AA		C	Resistor (1/8W 18KΩ ±5%)
126	VRS-TP2BD272J	AA		C	Resistor (1/8W 27KΩ ±5%)
127	VRS-TP2BD273J	AA		C	Resistor (1/8W 27KΩ ±5%)
128	VRS-TP2BD392J	AA		C	Resistor (1/8W 39KΩ ±5%)
129	VRS-TP2BD473J	AA		C	Resistor (1/8W 47KΩ ±5%)
130	VRS-TP2BD512J	AA		C	Resistor (1/8W 5.1KΩ ±5%)
131	VRS-TP2BD562J	AA		C	Resistor (1/8W 5.6KΩ ±5%)
132	XBBSD20P08000	AA		C	Screw (2×8) (for 50pin connector)
133	XBBSD20P10000	AA		C	Screw (2×10) (for 60pin connector)
134	XBBSD30P06000	AA		C	Screw (3×6) (for 25pin connector)
135	XNESD20-16000	AA		C	Nut (M2) (for 50,60pin connector)
201	TiNSM1121ECZZ	AS	N	D	Instruction book
204	SPAKA0267ECZZ	AK		D	Packing cushion for set
206	SPAKC0271ECZZ	AG	N	D	Packing case
207	PCAPH1013CCZZ	AD		C	Connector cap (for 60pin connector)
208	XBBSD20P05000	AA		C	Screw (2×5) (for option CE-1600F)
209	PCAPH1014CCZZ	AD		C	Connector cap (for 25pin connector)
210	DUNT-1271ECZZ	AD	N	C	FCC wire (U.S.A.)
211	TLABH1168ECZZ	AB	N	D	Instruction label (U.S.A.)
212	PTPEH1228CCZZ	AA		C	Tape (for No.211) (U.S.A.)

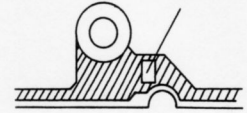


NOTE

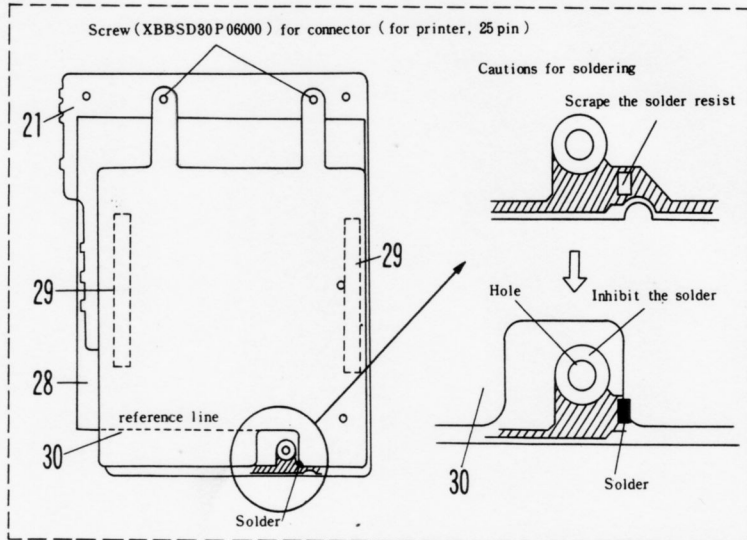
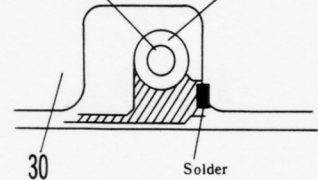
Screw (XBBSD30 P06000) for connector (for printer, 25 pin)

Cautions for soldering

Scrape the solder resist



Hole Inhibit the solder



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