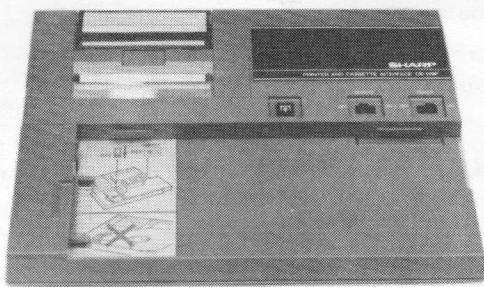


# SHARP SERVICE MANUAL

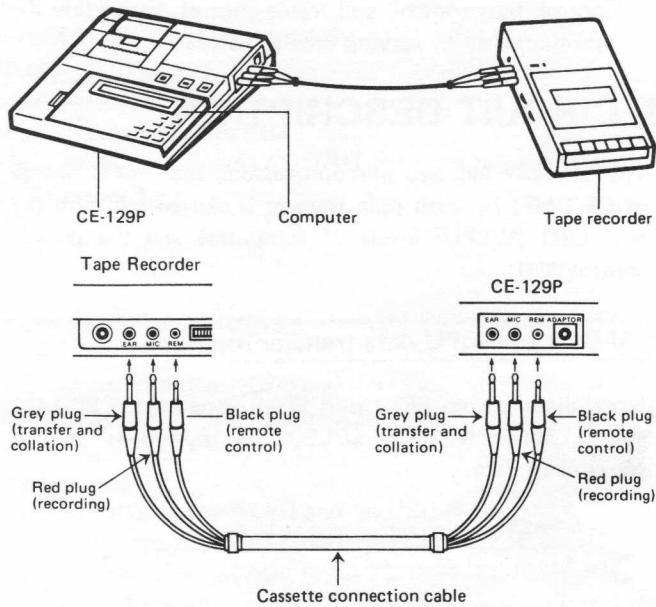


CODE : 00ZCE129PSM/E

## MODEL CE-129P

- Printer/Cassette Interface

### 3. TAPE RECORDER INTERFACING METHOD



#### Cassette Tape Recorder

The following is a description of the minimum tape recorder specifications necessary for interfacing with the CE-129P.

| Item                   | Requirements                                                                                                                     |
|------------------------|----------------------------------------------------------------------------------------------------------------------------------|
| 1. Recorder Type       | Any tape recorder, standard cassette or micro-cassette recorder, may be used in accordance with the requirements outlined below. |
| 2. Input Jack          | The recorder should have a minijack input labeled "MIC". Never use the "AUX" jack.                                               |
| 3. Input Impedance     | The input jack should be a low impedance input (200 ~ 1,000 OHM.)                                                                |
| 4. Minimum Input Level | Below 3mV or -50 dB.                                                                                                             |
| 5. Output jack         | Should be a minijack labeled "EXT. (EXternal speaker)", "MONITOR", "EAR (EAR-phone)", or equivalent.                             |
| 6. Output impedance    | Should be below 10 OHM.                                                                                                          |
| 7. Output level        | Should be above 1V (practical maximum output above 100 mW)                                                                       |
| 8. Distortion          | Should be within 15% within a range of 2 kHz through 4 kHz.                                                                      |
| 9. Wow and Flutter     | 0.3% maximum (W.R.M.S)                                                                                                           |
| 10. Other              | Recorder motor should not fluctuate speed.                                                                                       |

### 1. PRODUCTS OUTLINE

The CE-129P printer is an optional printer with the cassette interface designed for use with the pocket computer models EL-5500, PC-1401(EL-5500II), PC-1402, PC-1421 (EL-5510), and PC-1430 (EL-5400).

### 2. SPECIFICATIONS

|                        |                                                                                                                                                                                                                                                                                  |
|------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Printer type:          | Dot matrix thermal printer (MTP-201), identical to the one used for the CE-125                                                                                                                                                                                                   |
| Printing digit:        | 24 digits/line                                                                                                                                                                                                                                                                   |
| Printing speed:        | Approx. 0.8 line/second<br>(Printing speed varies with the number of printing digits per line.)                                                                                                                                                                                  |
| Paper feed speed:      | Approx. 0.8 line/second                                                                                                                                                                                                                                                          |
| Paper:                 | Thermal paper (heat sensitive paper), EA-1250P<br>18mm (23/32")<br>roll outer diameter (max.)<br>58mm (2-9/32") wide                                                                                                                                                             |
| Power source:          | 6V DC:<br>Heavy duty manganese battery, size AA (or R6) x 4<br>AC:<br>Local voltage with AC adaptor EA-23E (Option)                                                                                                                                                              |
| Operation:             | Heavy duty manganese battery, size AA (or R6):<br>Approx. 3,000 lines<br>UM-3: Approx. 2,000 lines<br>(Condition: 555555555555. is on continuous printing at an operating temperature of 20°C, this number of printing lines varies with the type of battery or the way of use.) |
| Power consumption:     | 3.0W                                                                                                                                                                                                                                                                             |
| Operating temperature: | 0°C ~ 40°C (32°F ~ 104°F)                                                                                                                                                                                                                                                        |
| Dimensions:            | 198(W) x 156(D) x 34(H)mm<br>7-25/32"(W) x 6-5/32"(D) x<br>1-11/32"(H)                                                                                                                                                                                                           |
| Weight:                | 385g (0.85 lbs.) (with batteries)                                                                                                                                                                                                                                                |
| Accessories:           | Hard case, Dry battery x 4, Paper roll x 3, Cassette cable, and Operation manual                                                                                                                                                                                                 |

**NOTES:**

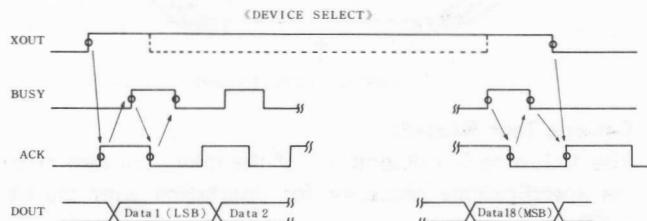
- Some of tape recorders may not operate properly owing to different specification or electrical characteristics affected by signal distortion, electrical noise, level drop-out caused after long years of use.
- When using the tape recorder fitted with the mixing feature, it needs to disable the mixing function for both recording and playback.
- Depending on the tape recorder used, better reading result may be attained when the red plug is unplugged from the MIC jack.
- As it may impede proper data transfer and verification depending on the position of the volume control, tone control, bass control, and treble control, try to find the optimum level by varying their positions.

**4. CIRCUIT DESCRIPTION**

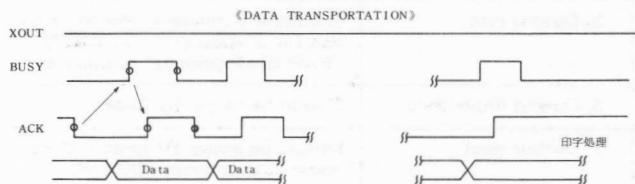
The CE-129P has two microprocessors; the P-CPU (inside of CE-129P) by with data transfer is carried out with the host CPU (M-CPU: inside of computer) and the printer control PCU.

**M-CPU to P-CPU data transfer method**

Since there are no SEL1 and SEL2 used for the PC-1401 and EL5500, DEVICE SELECT is dependent on the contents of data.

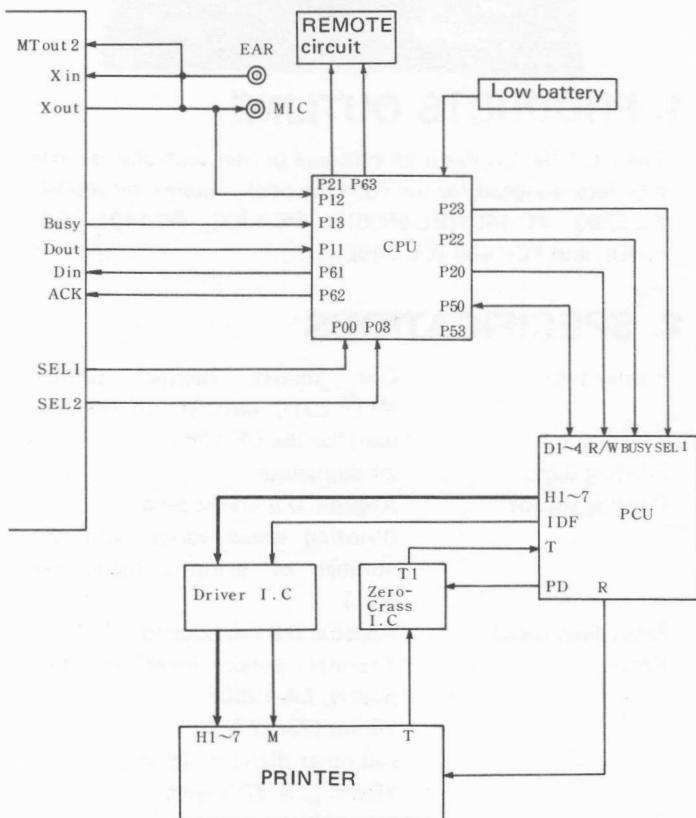


- (1) For DEVICE SELECT, XOUT becomes high.
- (2) As the P-CPU receives a high state of XOUT, it sends ACK to the M-CPU.
- (3) As the M-CPU receives ACK, it sends back BUSY.
- (4) Data is received to the P-CPU with a high state of BUSY. ACK, REMOTE ON, CPU select actions is carried out depending on the contents of data.

**Print data transfer**

- (1) XOUT goes low when the print data is transferred.
- (2) BUSY from the M-CPU turns high level.
- (3) Upon receipt of BUSY, ACK of the P-CPU is set high and the data is received to the P-CPU.

Since the data is transferred in bit by bit serial mode, above steps (2) and (3) are repeated eight times to complete transfer of one data. For instance, those steps are repeated for 192 times ( $24 \times 8$ ) in order to transfer a 24 digits data. The print commands, however, is sent out to the P-CPU at the end of the data in a form of the code "OD".

**5. BLOCK DIAGRAM**

## 6. P-CPU (MPD75060515, 516 SIGNAL DESCRIPTION)

C-MOS 1 chip 4 bit micro-computer

| Terminal No. | Terminal name | Signal name | Input/Output   | Description                                                                                        |
|--------------|---------------|-------------|----------------|----------------------------------------------------------------------------------------------------|
| 1            | NC            | —           | —              |                                                                                                    |
| 2            | NC            | —           | —              |                                                                                                    |
| 3            | CL1           | —           | —              |                                                                                                    |
| 4            | NC            | —           | —              |                                                                                                    |
| 5            | CL2           | —           | —              | System clock Oscillation frequency —— approx. 200 KHz                                              |
| 6            | NC            | —           | —              |                                                                                                    |
| 7            | GND           | GND         | —              | System clock                                                                                       |
| 8            | RST           | —           | Input          | Power supply, 0V<br>P-CPU reset input: when power supply is ON, reset operation.<br>Min 30 $\mu$ s |
| 9            | P10           | VDD         | Input/(Output) | Setting VDD (-4 ~ -6V)                                                                             |
| 10           | P11           | DOUT        | Input/(Output) | Device select data and print data                                                                  |
| 11           | P12           | XOUT        | Input/(Output) | Identification of the contents of DOUT (whether it is device select data or print data.)           |
| 12           | NC            | —           | —              |                                                                                                    |
| ~            | ~             | ~           | ~              |                                                                                                    |
| 15           | NC            | —           | —              |                                                                                                    |
| 16           | P13           | BUSY        | Input/(Output) | Handshake signal. Latch signal by which the P-CPU abtains DOUT data.                               |
| 17           | P50           | D1          | Input/Output   | Data bus line between the P-CPU and the PCU.                                                       |
| 18           | P51           | D2          | Input/Output   | Data bus line between the P-CPU and the PCU.                                                       |
| 19           | NC            | —           | —              |                                                                                                    |
| 20           | NC            | —           | —              |                                                                                                    |
| 21           | P52           | D3          | Input/Output   | Data bus line between the P-CPU and the PCU.                                                       |
| 22           | P53           | D4          | Input/Output   | Data bus line between the P-CPU and the PCU.                                                       |
| 23           | P00           | SEL1        | Input          | Select input signal. It is not used in the PC-1400, EL-5500 series.                                |
| 24           | P40           | VDD         | Input/Output   | Setting VDD (-4 ~ -6V).                                                                            |
| 25           | NC            | —           | —              |                                                                                                    |
| ~            | ~             | ~           | ~              |                                                                                                    |
| 28           | NC            | —           | —              |                                                                                                    |
| 29           | P41           | L.B         | Input/(Output) | Low battery detection signal. Normal high.                                                         |
| 30           | P42           | VDD         | Input/(Output) | Setting VDD (-4 ~ -6V).                                                                            |
| 31           | VDD           | VDD         | —              | Power supply VDD (-4 ~ -6V)                                                                        |
| 32           | NC            | —           | —              |                                                                                                    |
| 33           | GND           | GND         | —              | Power supply 0V                                                                                    |
| 34           | P43           | GND         | Input/Output   | Setting GND (0V)                                                                                   |
| 35           | NC            | —           | —              |                                                                                                    |
| 36           | X2            | NOT USE     | —              |                                                                                                    |
| 37           | NC            | —           | —              |                                                                                                    |
| ~            | ~             | ~           | ~              |                                                                                                    |
| 40           | NC            | —           | —              |                                                                                                    |
| 41           | P03           | SEL2        | Input          | Select input signal. It is not used in the PC-1400, EL-5500 series.                                |
| 42           | P20           | R/W         | Output         | Read/write signal for the PCU. High: read High-Low: write                                          |
| 43           | P21           | REM2        | Output         | Remove OFF pulse signal                                                                            |
| 44           | P22           | (SEL2)      | Output         | PCU chip select signal. High: selected, Low: non select                                            |
| 45           | P23           | (SEL1)      | Output         | PCU clear signal. High: ACL active Low: normal                                                     |
| 46           | NC            | —           | —              |                                                                                                    |
| 47           | P60           | JN          | (Input)/Output | Paper feed key strobe signal when CPU: MPD7506G516 is used.                                        |
| 48           | P61           | DIN         | (Input)/Output | Print Error signal to host CPU. High: printer Error. Low: Normal                                   |
| 49           | P62           | ACK         | (Input)/Output | Handshake signal P-CPU to host CPU.                                                                |
| 50           | P63           | REM1        | (Input/Output) | Remoto ON pulse signal.                                                                            |
| 51           | NC            | —           | —              |                                                                                                    |
| 52           | NC            | —           | —              |                                                                                                    |

## 7. PCU (SC6994) SIGNAL DESCRIPTION

| Pin No. | Signal Name | In/Out | Description                                                                                                           |
|---------|-------------|--------|-----------------------------------------------------------------------------------------------------------------------|
| 1       | SEL2        | In     | Select                                                                                                                |
| 2       | SEL1        | In     | Select                                                                                                                |
| 3       | VDD         | Out    | Power supply                                                                                                          |
| 4       | ACL         |        | Not used                                                                                                              |
| 5       | BUSY        | In     | High: chip select ----- Low: Non-select                                                                               |
| 6       | R/W         | In     | High: read<br>High to low transition: write                                                                           |
| 7 ~ 10  | D4 ~ 1      | In     | Data input                                                                                                            |
| 11      | STP         |        | Not used                                                                                                              |
| 12      | S           | In     | Data transfer mode select line<br>High: serial input ----- Low: parallel input/output                                 |
| 13      | 24          | In     | Print digit select line<br>High: 24 digits (GND connected) Low: 16 digits                                             |
| 14      | IDF         | Out    | Printer motor drive signal                                                                                            |
| 15      | H7          | Out    | Printhead element on pulse                                                                                            |
| 16      | H6          | Out    | Printhead element on pulse                                                                                            |
| 17      | GND         | In     | Power supply                                                                                                          |
| 18 ~ 22 | H5 ~ H1     | Out    | Printhead element on pulse                                                                                            |
| 23      | R           | In     | Printer reset (printhead home position detect)                                                                        |
| 24      | PD          | Out    | Power down (in supply during printer operating cycle, otherwise, power is not supplied to the printer drive circuit.) |
| 25      | T           | In     | Printer timing (generated from the tachogenerator of the motor)                                                       |
| 26 ~ 28 | TS1 ~ 3     | In     | Test pins                                                                                                             |
| 29      | VP1         | Out    | Printer control circuit supply power                                                                                  |
| 30 ~ 32 | BC1 ~ 3     | In/Out | PCU frequency control                                                                                                 |
| 33      | CCK         | Out    | Clock test pin                                                                                                        |
| 34      | HA          | In     | (Print density adjust pin...JA and JB pin connection varies according to the printhead rank).                         |
| 35      | HB          | In     |                                                                                                                       |
| 36      | HC          | In     |                                                                                                                       |
| 37, 38  | CL1, 2      | In     | Basic clock pulse control resistor fitting pin                                                                        |
| 39      | PF          | In     | Paper feed key input                                                                                                  |
| 40      | NP          | In     | GND Connected                                                                                                         |
| 41      | ACL         | In     | All clear input                                                                                                       |
| 42      | OP3         | Out    | ACL select (high when on)                                                                                             |
| 43      | OP2         |        | Not used.                                                                                                             |
| 44      | OP1         |        | Not used.                                                                                                             |

## 8. SERVICE CAUTIONS

### Cautions in exchanging the printer unit

In order to prevent print density variation caused by thermal head resistance variation, the printhead is classified into three ranks of A, B, and C, and the rank is indicated on the reverse side of the printer unit F.P.C. After exchange of the printer unit, relevant circuit change must be observed in accordance with the procedure mentioned below.

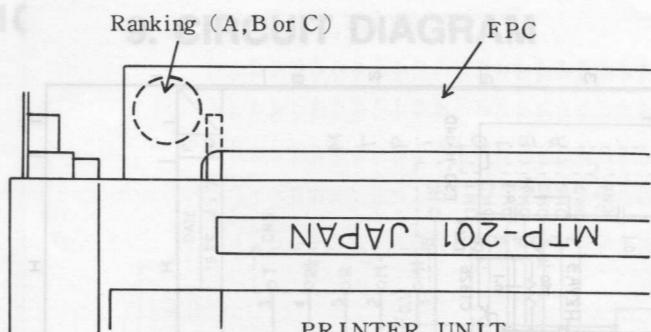
Short JA when the rank A printer is used.

Leave all open when the rank B printer is used.

Shrt JC when the rank C printer is used.

Table-1





< Printer head ranking position >

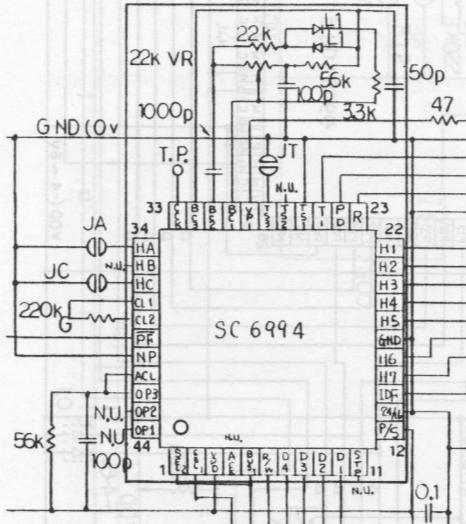
After the above procedure, adjust by means of the 22-Kohms potentiometer so that an optimum print quality is obtained. The circuit has been so designed as to attain the best result with the potentiometer set at its midway.

Therefore, existence of a remarkable print density variation might involve the following problems:

1. Drop in head performance
2. Quality change in the termal recording paper
3. Throuble in the thermal control circuit

#### 1. When VR density adjustment is needed

- A) After replacement has been made in some electronic component parts inside the solid line.
- B) When service request is placed from the user claiming that print density is too low or high.



#### 2. Print density control method

- Before the print density adjustment, make sure that the jumper pad is properly connected in a manner as described in Table-1.
- The VR should necessarily be set to the position mentioned in Fig. 1. If set too much counterclockwise, it may damage the printhead which may also cause dot omission.



Fig. 1

- Ensure before the operation of the oscilloscope that the time axle control knob is set at CALIBRATION.

Adjust the print density in the following sequence, step 1 thru step 5.

#### Step 1.

Short the TEST3 jumper pad with a soldering.

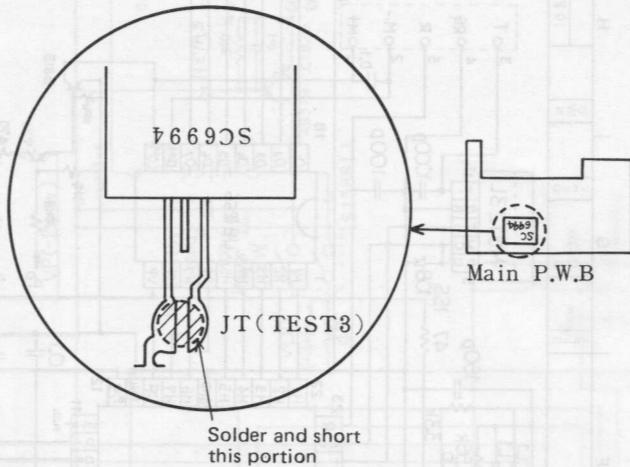


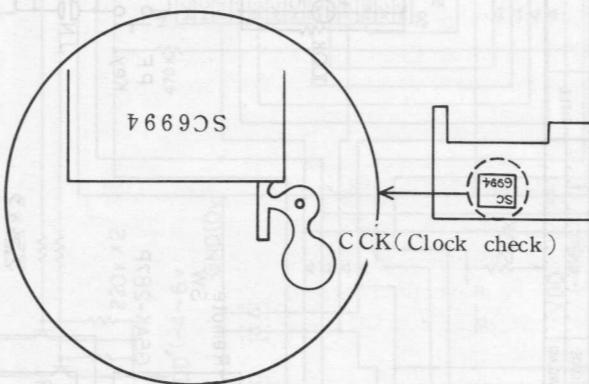
Fig. 2

#### Step 2.

Connect the EA-23E AC adaptor with the CE-129P after the TEST3 pad temperature came down to the room temperature, and check the voltage between the JT pad and #9 pin of the LB1256 (Vp) using the voltmeter. (Vp: check)

#### Step 3.

While observing a pulse waveform on the oscilloscope came from the CLOCK CHECK terminal, adjust the 22Kohms VR so that the pulse period (T) should become the value shown in the graph below.



#### • Pulse waveform

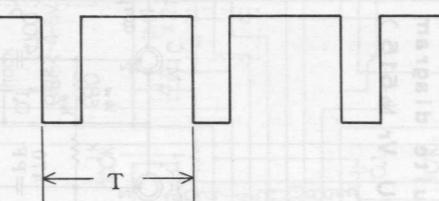
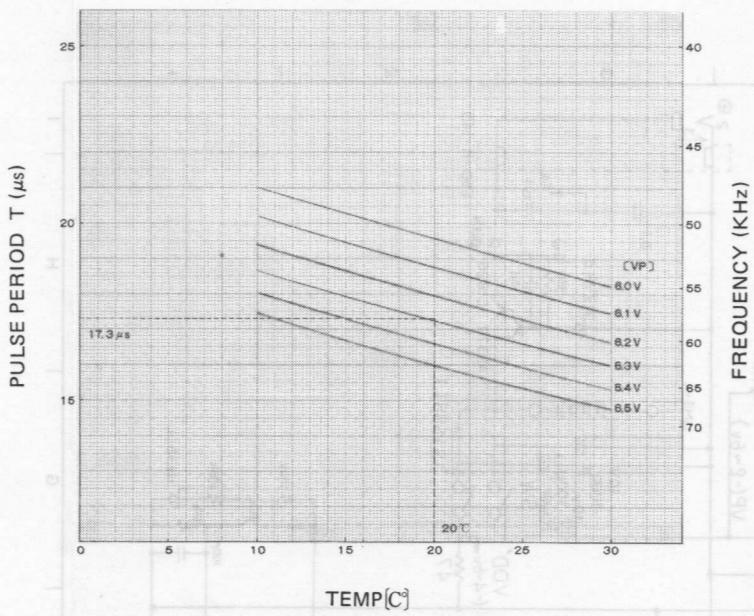


Fig. 3



### (An adjustment example)

When  $V_p$  is 6.2V under the room temperature of  $20^\circ\text{C}$ . It should be adjusted to  $T = 17.3\mu\text{s}$ , according to the above graph.

- In case the frequency counter is used

Frequency counter may be used instead of the oscilloscope. In this case, connect the frequency counter to the CLOCK CHECK terminal and adjust the VR so that it should be the frequency range shown in the above graph.

#### Step 4

Have the printer worked to check the actual print density. Among other things, let the capital "I" printed and ensure that there is no vertical dot omission.

### Step 5

After the check of the print result, remove the solder on the TEST3 terminal (Step (1)) and replace the cabinet back in the unit with care not to seize any lead wire with the cabinet.

CE-129P OFF CURRENT CHECK

1. Operate the paper feed key when a computer is not connected to the CE-129P, and check if paper feed operation (ON, OFF) is executed normally.
  2. Supply  $-5.0V$  from stabilized DC power supply to V<sub>p</sub> line. (GND = 0V: standard).
  3. Measure the current on V<sub>p</sub> line when the power switch is OFF. If it is  $20\mu A$  or less, it may be recognized that the used power while the power supply is OFF is normal.

## **Current check during printing**

1. Connect a computer to the CE-129P circuit.
  2. Supply  $-5.0V$  from stabilized DC power supply tp V<sub>P</sub> line. (GND = 0V; standard).
  3. Set the power switches in the computer and the CE-129P to ON to execute check program 1. (REF [A])

— Print sample —

### – Check program 1 –

```
100;"A" FOR I=1 TO 5  
110:LPRINT "4444444444444444  
        444444444444"  
120:NEXT I  
130:END
```

4. Measure the current on the V<sub>p</sub> line in printing, if it is 500mA or less, it may be recognized that the used power during printing is normal.

### **Low battery detection circuit**

A circuit constant is defined so that low battery detection may be executed when V<sub>p</sub> voltage is -3.8V or less. When checkprogram is executed after applying -3.8V to the V<sub>p</sub> line, if display of **ERROR 8** appears on the computer display without printer operation, it may be recognized that the low battery detection circuit is normal.

### Character printing grade check

Check the printing grade by executing the check program 2. ( [DEP] [B] )

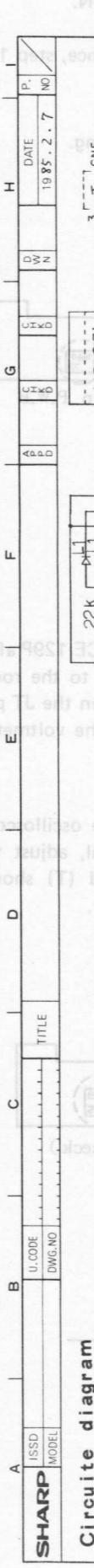
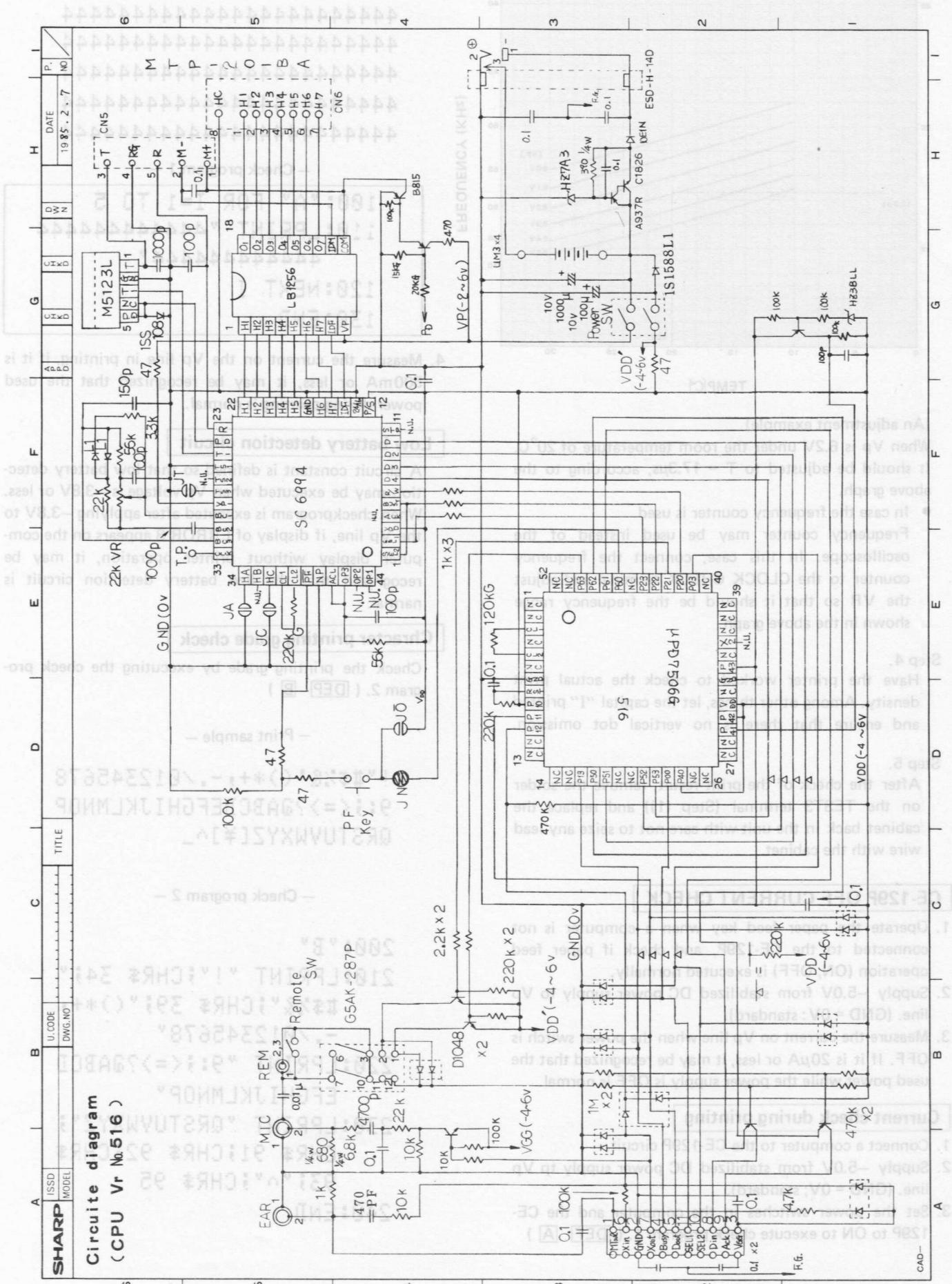
– Print sample –

! "#\$%&^()\*\*+, -./012345678  
9:@;<=>@ABCDEFGHIJKLMNP  
ORSTUVWXYZ[¥]@

**- Check program 2 -**

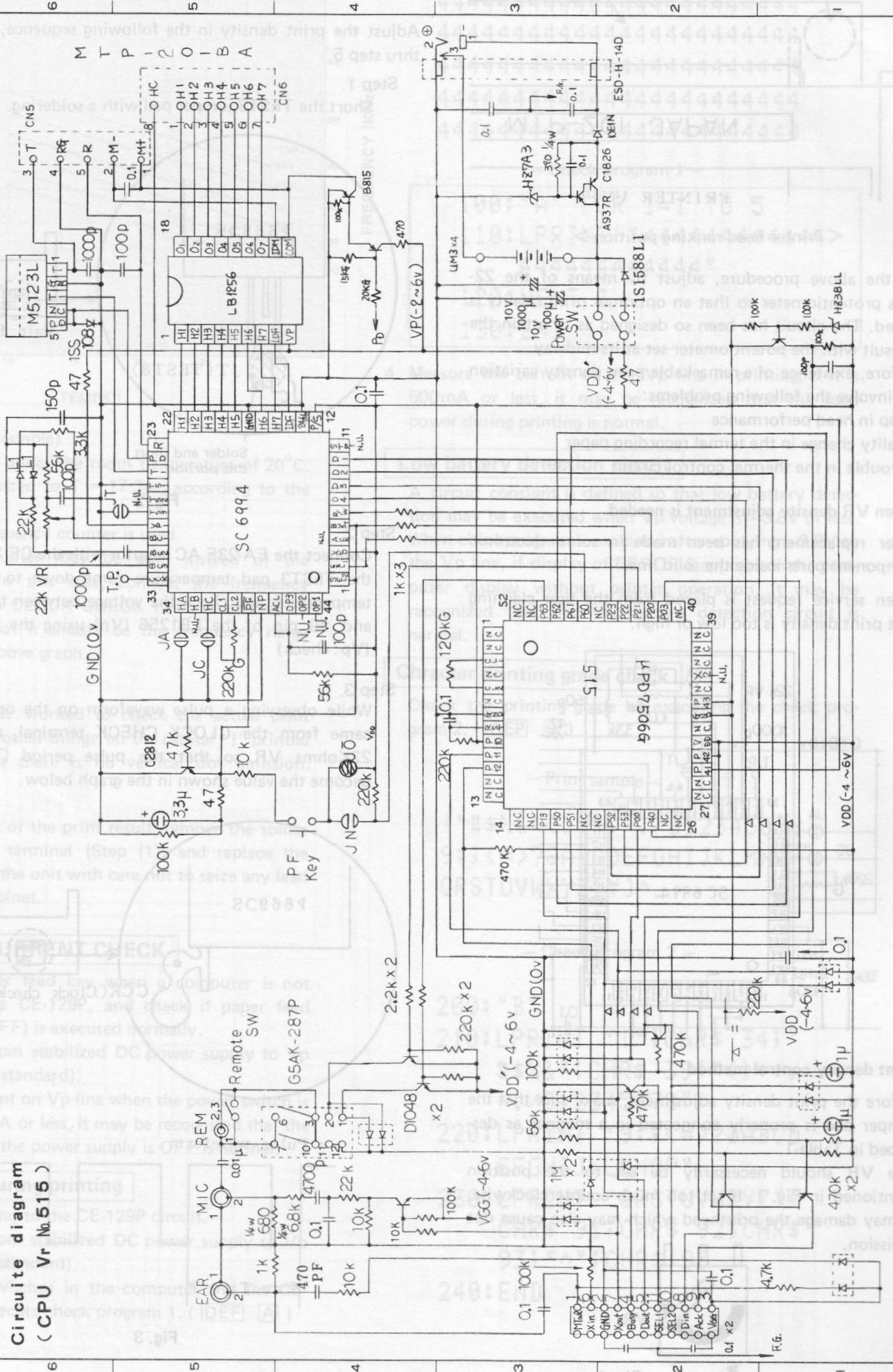
```
200;"B"
210:LPRINT "!"&CHR$ 34;""
    ##%&"&CHR$ 39;"()**+,
    -./012345678"
220:LPRINT "9:<=>?@ABCD
    EFGHIJKLMNOP"
230:LPRINT "QRSTUWVXYZ";
    CHR$ 91;&CHR$ 92;&CHR$ 93;"^"&CHR$ 95
240:END
```

## 9. CIRCUIT DIAGRAM

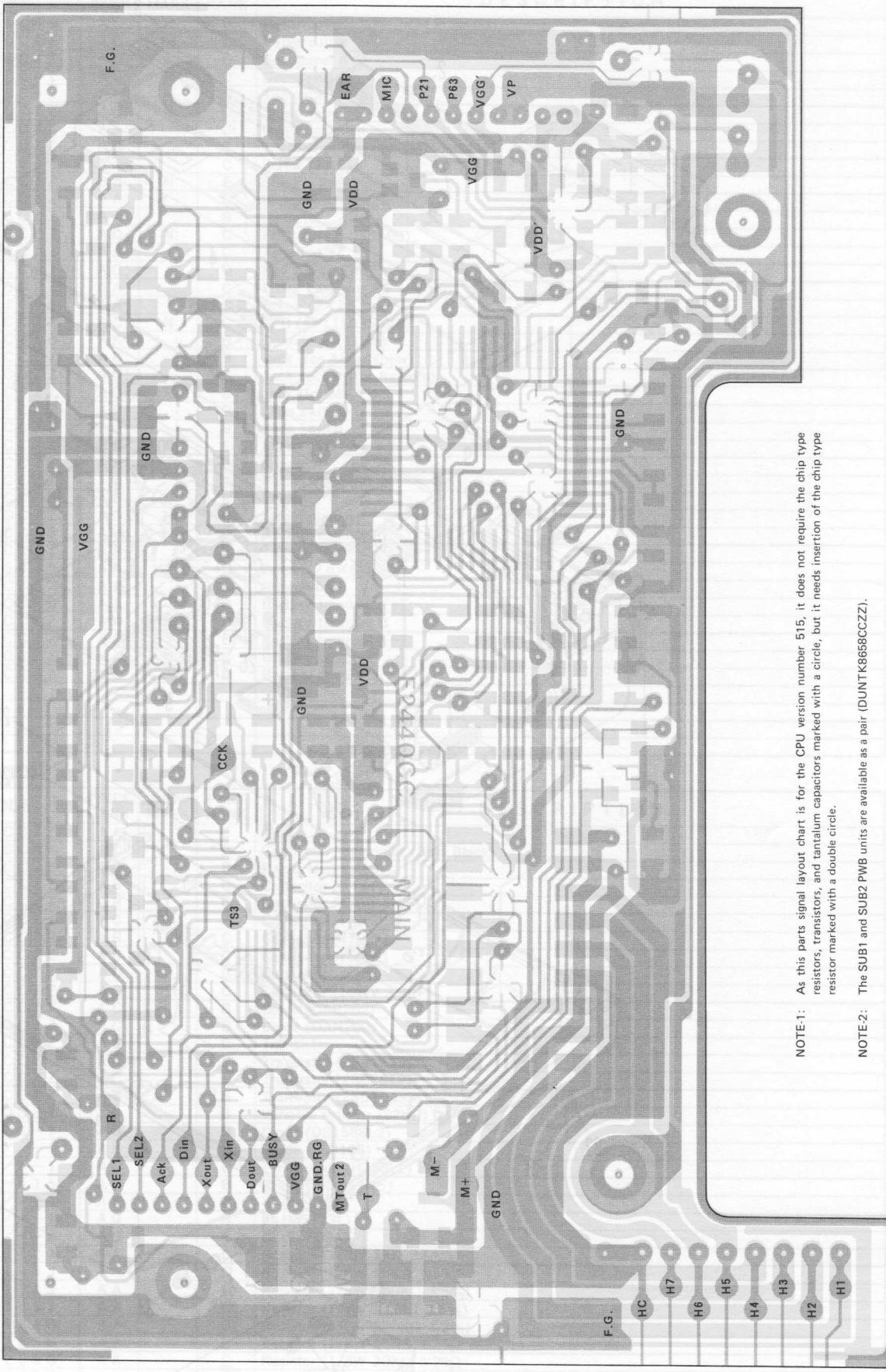


|   |       |               |                  |
|---|-------|---------------|------------------|
| A | SHARP | ISSD<br>MODEL | U.CODE<br>DWG.NO |
| B |       |               |                  |

### Circuit diagram (CPU Vr № 515)



## 10. MAIN P.W.B



NOTE-1: As this parts signal layout chart is for the CPU version number 515, it does not require the chip type resistors, transistors, and tantalum capacitors marked with a circle, but it needs insertion of the chip type resistor marked with a double circle.

NOTE-2: The SUB1 and SUB2 PWB units are available as a pair (DUNTK8658CCZZ).

NOTE-3: A1179 (RH-TX1010CCN1) M6  
B815 (RH-TX1009CCCN1) B6, B7  
C2812 (RH-TX1012CCN1) L5, L6  
D1048 (RH-TX1014CCCN1) X6, X7

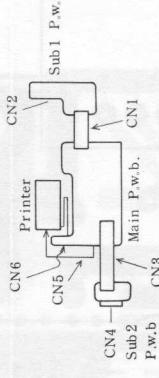
NOTE-4: CN6 Printer

resistors, transistors, and tantalum capacitors marked with a circle, but it needs insertion of the chip type resistor marked with a double circle.

## NOTE 2: The SUB1 and SUB2 PWB units are available as a pair (DUNTRK8658CCZZ).

NOTE 3: A1179 (RH-TX1010CCN1) M6  
B815 (RH-TX1009CCN1) B6, B7  
C2812 (RH-TX1012CCN1) L5, L6  
D1048 (RH-TX1014CCN1) X6, X7

## NOTE 4:

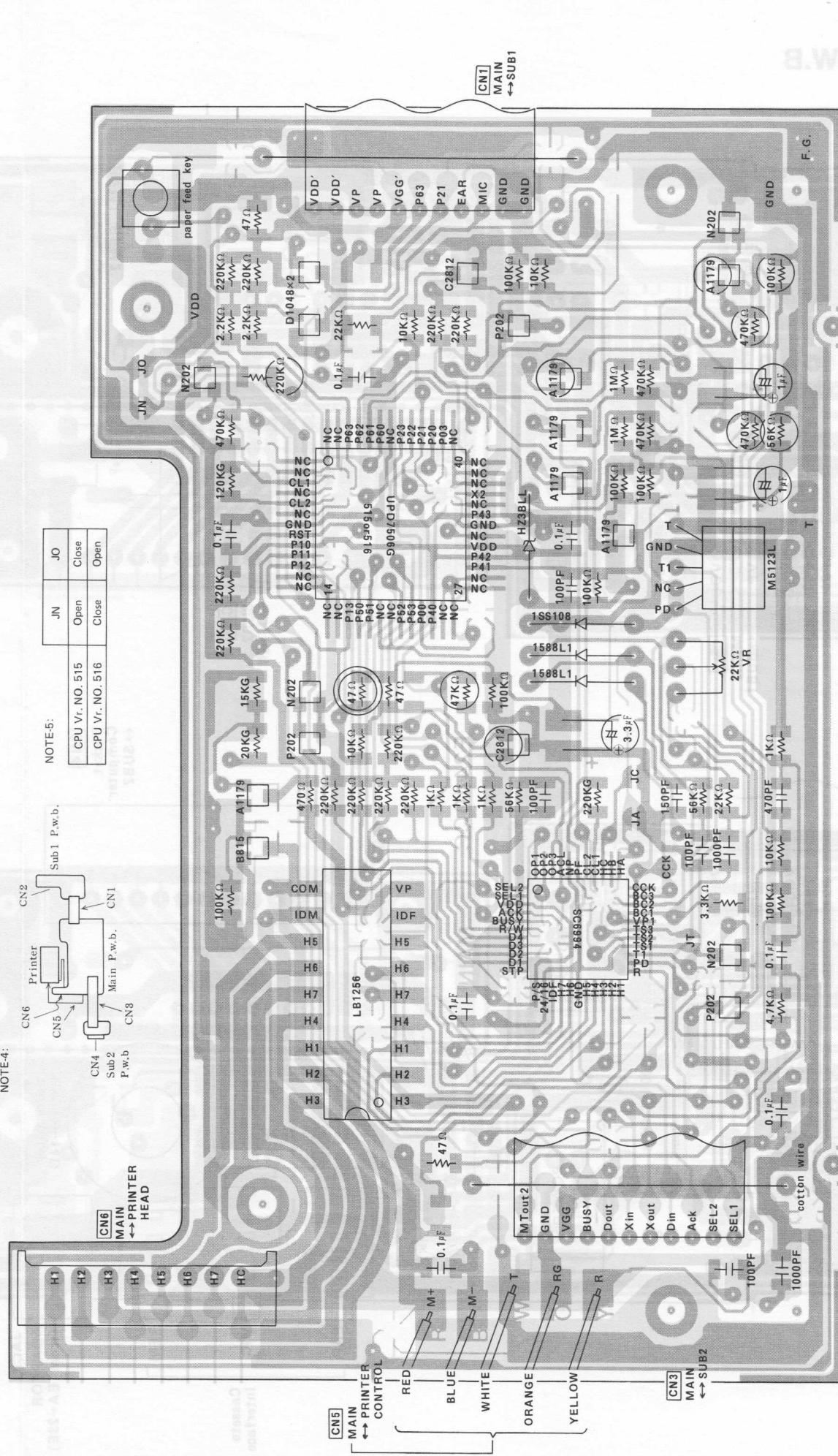


|                 | JN    | JO    |
|-----------------|-------|-------|
| CPU Vr. NO. 515 | Open  | Close |
| CPU Vr. NO. 516 | Close | Open  |

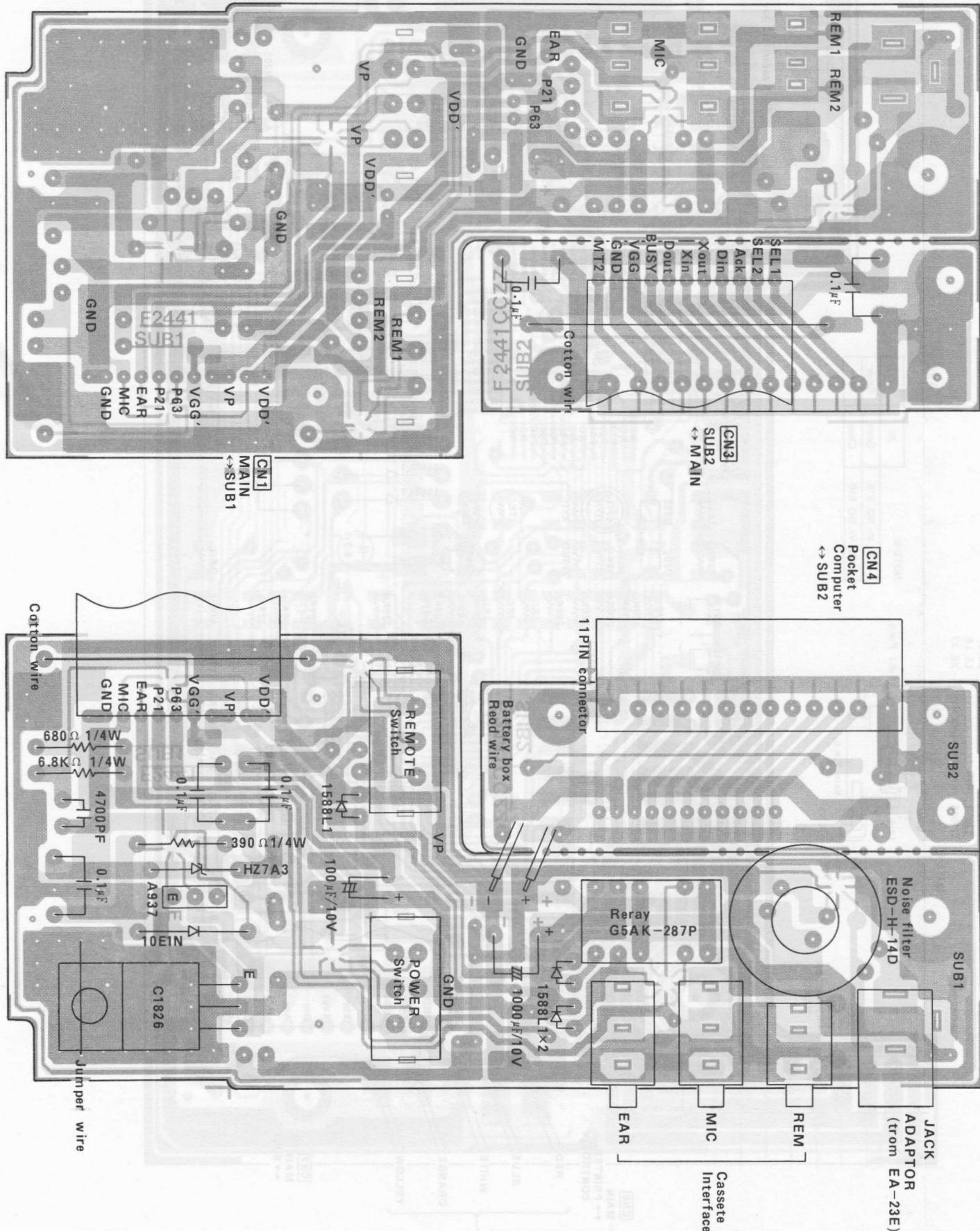
## NOTE 5:

CPU Vr. NO. 515

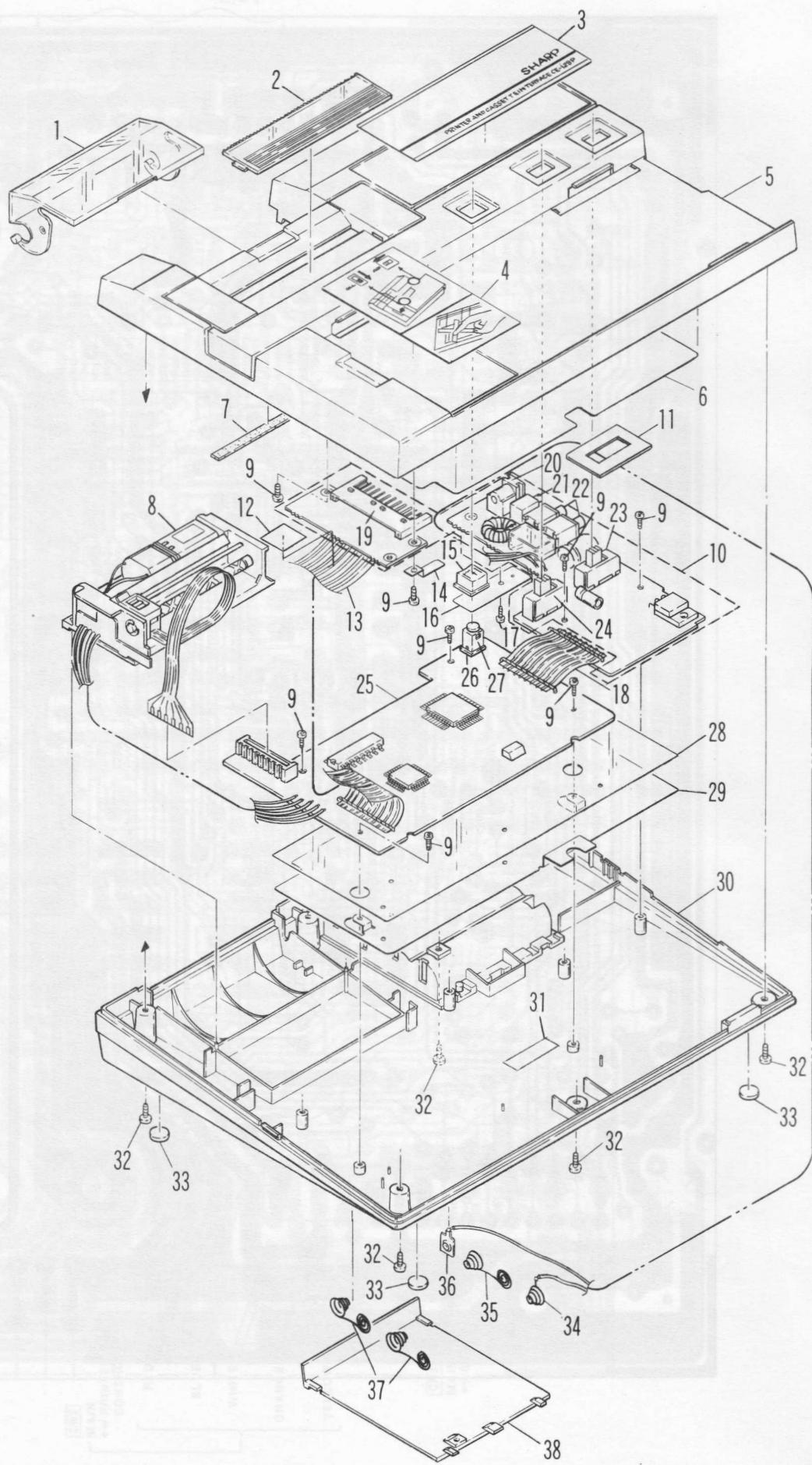
CPU Vr. NO. 516



## 11. SUB P.W.B



## 12. PARTS LIST & GUIDE



## 1 Exteriors

| NO. | PARTS CODE     | PRICE RANK | NEW MARK | PART RANK | DESCRIPTION                    |
|-----|----------------|------------|----------|-----------|--------------------------------|
| 1   | GCOVA1360CC01  | A C        | N        | D         | Paper cover                    |
| 2   | PCUT-1025CCZZ  | A C        |          | D         | Paper cutter                   |
| 3   | HDECA2189CCZZ  | A D        | N        | D         | Dec. panel A                   |
| 4   | HDECA2089CC01  | A C        | N        | D         | Dec. panel B                   |
| 5   | CCABB2863CC01  | A L        | N        | D         | Top cabinet                    |
| 6   | PTPEH1303CCZZ  | A D        | N        | C         | Shield tape                    |
| 7   | PCUSS1218CCZZ  | A A        |          | C         | Printer cushion                |
| 8   | Ki-OB0081CCZZ  | B G        |          | E         | Thermal printer unit (MTP-201) |
| 9   | XUBSD20P05000  | A A        |          | C         | Screw (2×5)                    |
| 10  | DUNTK8658CCZZ  | B G        | N        | E         | Sub PWB unit                   |
| 11  | PSHEP1108CCZZ  | A A        |          | C         | Slide switch spacer            |
| 12  | PZETL1161CCZZ  | A A        |          | B         | Insulator                      |
| 13  | QCNW-1329CCZZ  | A D        | N        | C         | FPC (AP11L085A05)              |
| 14  | QTANZ1426CCZZ  | A B        |          | C         | Terminal                       |
| 15  | JKNBZ1808CC01  | A G        |          | D         | Key top (P.F)                  |
| 16  | LFI X-1147CCZZ | A A        |          | C         | Fixing plate for P.F key top   |
| 17  | XUBSD20P04000  | A A        |          | C         | Screw (2×4)                    |
| 18  | QCNW-1328CCZZ  | A C        | N        | C         | FPC (AP11L035A05)              |
| 19  | QCNCM1307CC1B  | A K        |          | B         | Connector (11pin)              |
| 20  | QJAKC1003CCZZ  | A D        |          | B         | Jack (for AC adaptor)          |
| 21  | QJAKC1016CCZZ  | A C        |          | C         | Jack socket (for Remote)       |
| 22  | QJAKC1013CCZZ  | A C        |          | B         | Jack (for MIC)                 |
| 23  | QSW-S0075FCZZ  | A F        |          | B         | Slide switch                   |
| 24  | QSW-S1255CCZZ  | A G        |          | B         | Slide switch                   |
| 25  | DUNTK8655CCZZ  | B G        | N        | E         | Main PWB unit                  |
| 26  | PSPAP1230CCZZ  | A A        |          | C         | Spacer                         |
| 27  | QSW-K1295CCZZ  | A D        |          | B         | Paper feed switch              |
| 28  | PZETL1586CCZZ  | A B        | N        | C         | Insulator sheet                |
| 29  | PSLDC1511CCZZ  | A D        | N        | C         | Shield plate                   |
| 30  | GCABA2862CCZZ  | A H        | N        | D         | Bottom cabinet                 |
| 31  | PTPEH1084CCZZ  | A A        |          | C         | Tape                           |
| 32  | XUBSF26P06000  | A A        |          | C         | Screw (2.6×6)                  |
| 33  | GLEGPI009CCZZ  | A A        |          | C         | Rubber foot                    |
| 34  | QTANZ1055CCZZ  | A A        |          | B         | Battery terminal (⊖)           |
| 35  | QTANZ1506CCZZ  | A A        | N        | C         | Battery terminal B             |
| 36  | QTANZ1186CCZZ  | A A        |          | B         | Battery terminal (+)           |
| 37  | QTANZ1505CCZZ  | A A        | N        | C         | Battery terminal               |
| 38  | GFTAB1321CCZZ  | A C        | N        | D         | Battery cover                  |
|     |                |            |          |           |                                |
|     |                |            |          |           |                                |
|     |                |            |          |           |                                |
|     |                |            |          |           |                                |
|     |                |            |          |           |                                |

## 2 Main PWB unit

| NO. | PARTS CODE     | PRICE RANK | NEW MARK | PART RANK | DESCRIPTION                        |
|-----|----------------|------------|----------|-----------|------------------------------------|
| 1   | PSPAP1230CCZZ  | A A        |          | C         | Spacer                             |
| 2   | QCNCW1308CCAi  | A C        |          | B         | Connector for printer (8pin Black) |
| 3   | QSW-K1295CCZZ  | A D        |          | B         | Paper feed switch                  |
| 4   | RC-CZ1021CCZZ  | A B        |          | C         | Capacitor (0.1μF)                  |
| 5   | RC-CZ1031CCZZ  | A B        |          | C         | Capacitor (1000pF)                 |
| 6   | RC-CZ1035CCZZ  | A C        |          | C         | Capacitor (100pF)                  |
| 7   | RC-CZ1038CCZZ  | A B        |          | C         | Capacitor (470pF)                  |
| 8   | RC-CZ1052CCZZ  | A B        |          | C         | Capacitor (150pF)                  |
| 9   | RC-SZ1018CCZZ  | A D        |          | C         | Capacitor                          |
| 10  | RC-SZ1021CCZZ  | A C        |          | C         | Capacitor (10WV 3.3μF)             |
| 11  | RH-DZ1005CCZZ  | A C        |          | B         | Diode (DAP202)                     |
| 12  | RH-DZ1008CCZZ  | A C        |          | B         | Diode (DAN202)                     |
| 13  | RH-TX1009CCZZ  | A C        |          | C         | Transistor                         |
| 14  | RH-TX1010CCZZ  | A C        |          | B         | Transistor (2SA1179)               |
| 15  | RH-TX1012CCZZ  | A C        |          | B         | Transistor (2SC2812)               |
| 16  | RH-TX1014CCZZ  | A C        |          | B         | Transistor (2SD1048)               |
| 17  | RVR-MB410QCZZ  | A D        |          | B         | Variable resistor (22KΩ)           |
| 18  | VHDDS1588L2-1  | A B        |          | B         | Diode (DS1588L2)                   |
| 19  | VHD1SS108///-1 | A B        |          | B         | Diode (1SS108)                     |
| 20  | VHEHZ3BLL///-1 | A C        |          | B         | Zener diode (HZ3BLL)               |
| 21  | VHiD7506G-515  | A U        |          | B         | IC (D7506G-515)                    |
| 22  | VHiLB1256///-1 | A K        |          | B         | IC (LB1256)                        |
| 23  | VHiM5123L///-1 | A G        |          | B         | IC (M5123L)                        |
| 24  | VHiSC6994///-1 | A S        |          | B         | IC (SC6994)                        |
| 25  | VRS-TP2BD102J  | A A        |          | C         | Resistor (1/8W 1KΩ ±5%)            |
| 26  | VRS-TP2BD103J  | A A        |          | C         | Resistor (1/8W 10KΩ ±5%)           |
| 27  | VRS-TP2BD104J  | A A        |          | C         | Resistor (1/8W 100KΩ ±5%)          |
| 28  | VRS-TP2BD105J  | A A        |          | C         | Resistor (1/8W 1.0MΩ ±5%)          |
| 29  | VRS-TP2BD124G  | A A        |          | C         | Resistor (1/8W 120KΩ ±2%)          |
| 30  | VRS-TP2BD153G  | A A        |          | C         | Resistor (1/8W 15KΩ ±2%)           |
| 31  | VRS-TP2BD203G  | A A        |          | C         | Resistor (1/8W 20KΩ ±2%)           |
| 32  | VRS-TP2BD222J  | A A        |          | C         | Resistor (1/8W 2.2KΩ ±5%)          |
| 33  | VRS-TP2BD223J  | A A        |          | C         | Resistor (1/8W 22KΩ ±5%)           |
| 34  | VRS-TP2BD224G  | A A        |          | C         | Resistor (1/8W 220KΩ ±2%)          |

**2 Main PWB unit**

| NO. | PARTS CODE    | PRICE RANK | NEW MARK | PART RANK | DESCRIPTION               |
|-----|---------------|------------|----------|-----------|---------------------------|
| 35  | VRS-TP2BD224J | A A        |          | C         | Resistor (1/8W 220KΩ ±5%) |
| 36  | VRS-TP2BD332J | A A        |          | C         | Resistor (1/8W 3.3KΩ ±5%) |
| 37  | VRS-TP2BD470J | A A        |          | C         | Resistor (1/8W 47Ω ±5%)   |
| 38  | VRS-TP2BD471J | A A        |          | C         | Resistor (1/8W 470Ω ±5%)  |
| 39  | VRS-TP2BD472J | A A        |          | C         | Resistor (1/8W 4.7KΩ ±5%) |
| 40  | VRS-TP2BD473J | A A        |          | C         | Resistor (1/8W 47KΩ ±5%)  |
| 41  | VRS-TP2BD474J | A A        |          | C         | Resistor (1/8W 470KΩ ±5%) |
| 42  | VRS-TP2BD563J | A A        |          | C         | Resistor (1/8W 56KΩ ±5%)  |
|     | (Unit)        |            |          |           |                           |
| 901 | DUNTK8655CCZZ | B G        | N        | E         | Main PWB unit             |
|     |               |            |          |           |                           |
|     |               |            |          |           |                           |
|     |               |            |          |           |                           |

**3 Sub PWB unit**

| NO. | PARTS CODE     | PRICE RANK | NEW MARK | PART RANK | DESCRIPTION               |
|-----|----------------|------------|----------|-----------|---------------------------|
| 1   | QCNCM1307CC1B  | A K        |          | B         | Connector (11pin)         |
| 2   | QJAKC1003CCZZ  | A D        |          | B         | Jack (for AC adaptor)     |
| 3   | QJAKC1013CCZZ  | A C        |          | B         | Jack (for MIC)            |
| 4   | QJAKC1016CCZZ  | A C        |          | C         | Jack socket (for Remote)  |
| 5   | QSW-S0075FCZZ  | A F        |          | B         | Slide switch              |
| 6   | QSW-S1255CCZZ  | A G        |          | B         | Slide switch              |
| 7   | QTANS1408CCZZ  | A B        |          | C         | Spring                    |
| 8   | VCTYPU1NX104M  | A B        |          | C         | Capacitor (12WV 0.10μF)   |
| 9   | RFILN1008CCZZ  | A H        |          | C         | Filter (ESD-H-14B)        |
| 10  | RRLYZ24000QCZZ | A P        |          | B         | Relay                     |
| 11  | VCEAGU1AW107M  | A B        |          | C         | Capacitor (10WV 100μF)    |
| 12  | VCEAGU1AW108M  | A C        |          | C         | Capacitor (10WV 1000μF)   |
| 13  | VCTYPU1EX472M  | A A        |          | C         | Capacitor (25WV 4700pF)   |
| 14  | VHDDS1588L2-1  | A B        |          | B         | Diode (DS1588L2)          |
| 15  | VHD10E1N///-1  | A B        |          | B         | Diode (10E1N)             |
| 16  | VHEHZ7A3///-1  | A B        |          | B         | Zener diode (HZ7A3)       |
| 17  | VRD-ST2EY391J  | A A        |          | C         | Resistor (1/4W 390Ω ±5%)  |
| 18  | VRD-ST2EY681J  | A A        |          | C         | Resistor (1/4W 680Ω ±5%)  |
| 19  | VRD-ST2EY682J  | A A        |          | C         | Resistor (1/2W 6.8KΩ ±5%) |
| 20  | VS2SA937-R/-1  | A C        |          | B         | Transistor (2SA937-R)     |
| 21  | VS2SC1826-GBC  | A F        |          | B         | Transistor (2SC1826-GBC)  |
|     | (Unit)         |            |          |           |                           |
| 901 | DUNTK8658CCZZ  | B G        | N        | E         | Sub PWB unit              |
|     |                |            |          |           |                           |
|     |                |            |          |           |                           |
|     |                |            |          |           |                           |

**4 Packing material & Accessories**

| NO. | PARTS CODE    | PRICE RANK | NEW MARK | PART RANK | DESCRIPTION                                          |
|-----|---------------|------------|----------|-----------|------------------------------------------------------|
| 1   | PHOG-1093CCZZ | A B        |          | C         | Rubber cap for 11pin connector cable                 |
| 2   | QPLGJ1022CCZZ | A Q        |          | C         | Cassette cable                                       |
| 3   | TCAUK1198CCZZ | A A        |          | C         | Caution card for 11pin connector rubber cap (Export) |
| 4   | UBAGC1438CCZZ | A U        | N        | D         | Carrying case                                        |
| 5   | TINSE4456CCZZ | A L        | N        | D         | Instruction book (USA only)                          |
| 5   | TINSM4478CCZZ | A V        | N        | D         | Instruction book (E,F,G,I,S)                         |
| 6   | SPAKA517ACCZZ | A F        | N        | D         | Packing cushion for set                              |
| 7   | SPAKC518ACCZZ | A H        | N        | D         | Packing case (USA only)                              |
| 7   | SPAKC519ACCZZ | A H        | N        | D         | Packing case (Except USA)                            |
| 8   | TLABP1002ECZZ | A B        | N        | C         | Bar cord label (USA only)                            |
|     |               |            |          |           |                                                      |
|     |               |            |          |           |                                                      |
|     |               |            |          |           |                                                      |

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