TM-2480/81/82

Printer Terminal

MAINTENANCE MANUAL

WT:PD400091

A&D Company, Limited

Contents

Technical information

1. Introduction

1-1 About this Manual

This maintenance manual describes inspecting and repairing the TM-2480, TM-2481, and TM-2482 printer terminals, when a fault or failure has occurred for some reason.

The contents and expressions used in this manual may include some special terms. Special test jigs and measuring instruments are required to implement the contents of this maintenance manual.

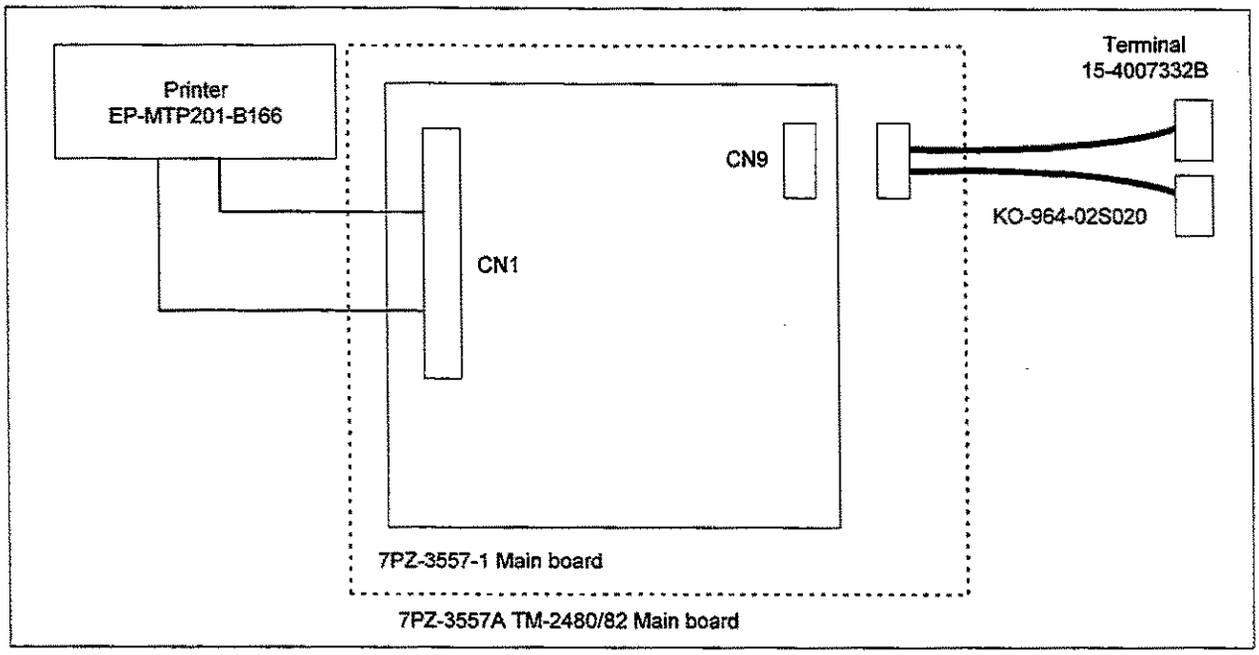
Before starting any work on this product, read through the entire owner's instruction manual.

1-2 Equipment and tools required

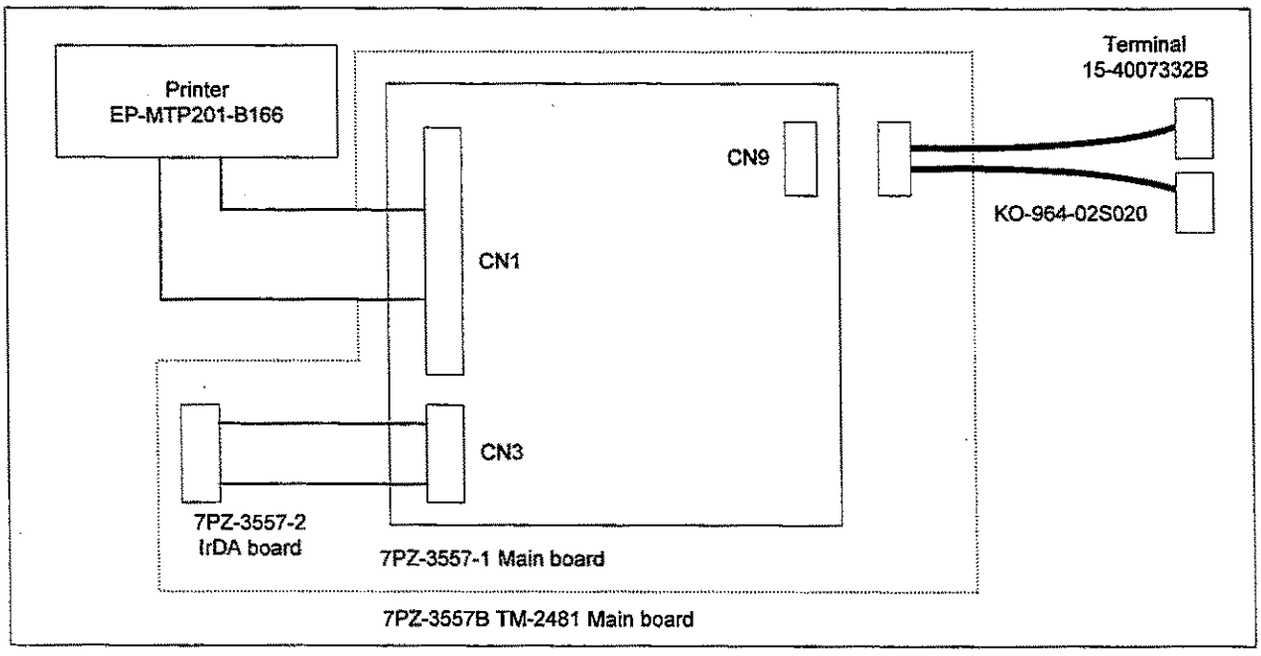
Name	Description	Purpose
DC power source	Output: 10VDC, 3 A (maximum)	To inspect voltage on the PCB.
Voltmeter	Input: 10VDC/100mA (maximum) Resolution: 1mV, 0.1mA	
TM-2430 or TM-2431	A&D product (TM-2431 for an IrDA model, TM-2481)	To inspect the RS-232C communication and the IrDA function (TM-2481)
AC adapter	Provided with the TM-2480/81/82.	To power the TM-2480/81/82
Printer paper		To inspect the printer function
Communication cable		To inspect the RS-232C function

1-3 Block Diagram

TM-2480/82



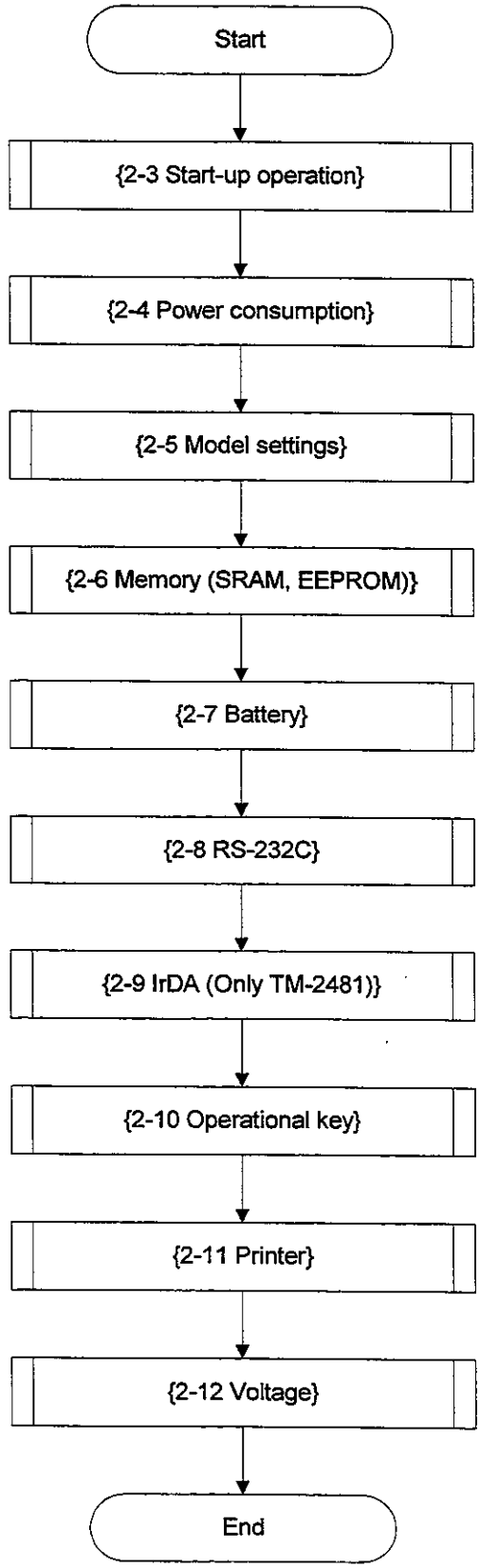
TM-2481



2. Inspection

2-1 Inspection flow

* Inspect the TM-2480/81/82 following each section below.



2-2 Test mode

Test mode is a special mode to inspect functions or set parameters on the TM-2480/81/82. This mode is used only for maintenance purposes. Entering the test mode (see the procedures below), the display will change to "F-XX" indicating that you are in the test mode.

Entering the test mode

Step 1 Press and hold the [MENU], [□], and [□], keys - while continuing to hold them, press [POWER] until "F-00" appears on the display.

Step 2. Press [□] to select the number corresponding to the inspection you will perform. (See the table below) The display cycles through "F-00", "F-01", "F-03", "F-20", "F-30".

Step 3 Press [ENTER] to start the selected inspection.

Step 4. Perform inspections.
** [POWER] will not work while inspecting.*

Step 5 When completed, press [ENTER] to go back to Step 2. To continue inspection, repeat from Step 2. To go back to normal mode, press [POWER].

Test modes

Test mode #	Display	Inspection	Description
00	F-00	Program version	Version number is displayed (Example "233"), and version number, date, and model name are printed out. Example: Ver-2.33 Nov 9 2000 18:07:46 TM2481
01	F-01	Memory (SRAM and EEPROM)	"1" blinks while inspecting SRAM, "2" blinks for EEPROM. Result will be shown as "000" (OK) or "Err (Err).
03	F-03	Pulse count (Print darkness)	Displays the count of the pulse which controls print darkness.
20	F-20	RS-232C communication	Result will be shown as "000" (OK) or "Err" (Error)
30	F-30	Model setting	Used to set a type of model

2-3 Start-up operation

Inspection

Step 1. Plug in the AC adapter.

Step 2. Press [POWER] to turn the power on.

Step 3. Check the operation. The TM-2480/81/82 should;

- Display all segments on the display
- Sound buzzer.
- Feed the paper.
- Display "1-----", "2-----", "3-----", or "1----1" (Only TM-2481) depending on your model.

Solution

- Check voltage the main board following the procedure in {2-12 Voltage}. If a failure is found, replace the board.
- Check the display for a defective segment. If a failure is found, replace the LCD.
- If the problem persists, try replacing the main board.

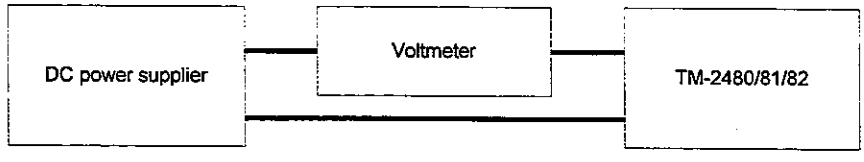
2-4 Power consumption

Inspection

Step 1. Unplug the AC adapter and remove the batteries.

Step 2. Set the output voltage of the DC power source to 9.0±0.2V

Step 3. Connect the DC power source, TM-2480/81/82, and voltmeter measuring current as shown below.



Step 4. Check current. The current reading should be;

- 2mA or less with the display OFF.
- 100mA or less with the display ON.

Solution

- Check for a damaged cable or a short circuit. If a problem is found, replace the cables or the main board.

2-5 Model settings

Inspection

Check the settings on your TM-2480/81/82 to see if they meet your model's.

TM-2480/82

Step 1. Plug in the AC adapter.

Step 2. Press [POWER] to turn the power on.

Step 3. Press [MODEL] to select "1——" (The number cycles through "1", "2", "3")

Step 4. Press [□] to see no change on the display ("1——" on the display) The TM-2480/82 should display "1——" only.

TM-2481

Step 1. Plug in the AC adapter.

Step 2. Press [POWER] to turn the power on.

Step 3. Press [MODEL] to select "1——" or "1——1" (The number cycles through "1", "2", "3")

Step 4. Press [□] to see the display alternates between "1——" and "1——1".
The TM-2481should display either "1——" or "1——1"

Models with CPU program version "2.31" or later.

Step 1. Referring to {2-2. Test mode}, enter Test mode #00.

Step 2. Pressing [ENTER], CPU program version and model settings will be printed out.

Step 3. Verify your model and the settings.

Solution

If any incorrect settings are found, correct them referring to the following {Setting model} and {Factory settings}.

Setting model

Step 1. Referring to {2-2. Test mode}, enter Test mode #30. "F-81", Either "F-82", or "F-83" will be displayed.

Step 2. Press [□] to select the display corresponding to your model.

Model	Display
TM-2480	F-80
TM-2481	F-81
TM-2482	F-82
Not in use	F-83

Step 3. Press [ENTER] to set your model to the selected model. The display will show "F-30".

Step 4. Press [POWER] to turn the power off.

Factory settings

The following procedures are required only when it is necessary to change all the settings on your TM-2480/80/82 back to the initial settings (Factory settings);

Item	Parameter
Print format	1
Trend start time	Auto
Sleep time	22
Awake time	7
BP (Blood pressure) limit (mmHg)	Systolic: 140 (awake), 140 (sleep) Diastolic: 90 (awake), 90 (sleep)

Step 1. Plug in the AC adapter.

Step 2. Press [POWER] to turn the power on.

Step 3. Press [MODEL] and [□] to select the "1-----" display (model 1, RS-232C mode)

Step 4. Press [POWER] to turn the power off.

Step 5. Press [POWER] to turn the power on again. The display will be "1-----".

Step 6. Press [PRINT FORMAT]. Check that the display is "1 PRINT X" (X: 1 to 7).

Step 7. Press [MENU] several times to select "1 PRINT 9".

Step 8. Press [ENTER]. The setting information will be printed out and the display will be "1-----".

```
TYPE: MODEL 1 (ABPM)
--------------------
PRINT FORM                1
TREND START TIME       AUTO
SLEEP TIME               22
AWAKE TIME                7

BP. LIMIT [mmHg]
        AWAKE       SLEEP
SYS       140         140
DIA        90          90
```

Step 9. Press [POWER] to turn the power off.

2-6 Memory (SRAM, EEPROM)

Inspection

Check the SRAM/EEPROM function to see if they store and hold information as you set.

Step 1. Plug in the AC adapter.

Step 2. Press [POWER] to turn the power on.

Step 3. Press [MODEL] to select the "2-----" display (model 2).

Step 4. Press [POWER] to turn the power off.

Step 5. Press [POWER] to turn the power on again. The display will be "2-----".

Step 6. Press [MODEL to select the "3-----" display (model 3).

Step 7. Press [POWER] to turn the power off.

Step 8. Press [POWER] to turn the power on again. The display will be "3-----".

Step 9. Referring to {2-2. Test mode}, enter Test mode #01.

Step 10. Press [ENTER] to start SRAM/EEPROM inspection.

SRAM inspection:

The "1" digit of the "1-----" display blinks during the SRAM check routine.

If the SRAM is not defective, the display will automatically become "12-000" and "2" will start blinking.

EEPROM inspection

The "2" digit of the "12-000" display blinks during the EEPROM check routine.

If the EEPROM is not defective, blinking will stop.

Solution

If "Err" appears, the SRAM/EEPROM may be defective. Replace the main board with a new one.

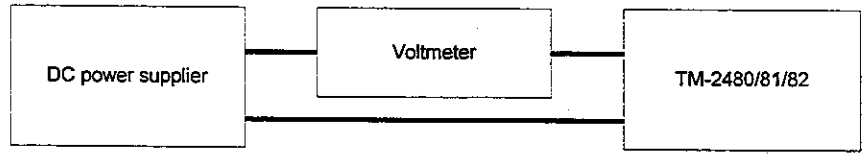
2-7 Battery

Inspection

Step 1. Unplug the AC adapter and remove the batteries.

Step 2. Set the output voltage of the DC power source to 9.0±0.2V

Step 3. Connect the DC power source, TM-2480/81/82, and voltmeter measuring voltage as shown below.



Step 4. Press [POWER] to turn the power on.

Step 5. Lower the output voltage of the DC power source gradually until "⌧" (low battery indicator) appears in the upper left corner of the display with "Lb".

Step 6. Read the voltmeter. Voltage should be 7.5V±0.7V.

Step 7. Lower the output voltage of the DC power source further until the display turns off.

Step 8. Read the voltmeter. Voltage should be 6.8V±0.7V.

Solution

Check for a short circuit or damage to the cables. If the problem persists, replace the main board with a new one.

2-8 RS-232C

Inspection

Step 1. Plug in the AC adapter.

Step 2. Press [POWER] to turn the power on.

Step 3. Press [MODEL] and [□] to select the "1——" display (model 1, RS-232C mode).

Step 4. Connect the TM-2480/81/82 to a TM-2431 or a TM-2430 with an RS-232C cable.

Step 5. Set the clock on the TM-2430/31. Check that the TM-2480/81/82 shows the same time on the display.

Solution

If the inspection failed, replace the main board with a new one.

2-9 IrDA (Only TM-2481)

Inspection

Step 1. Plug in the AC adapter.

Step 2. Press [POWER] to turn the power on.

Step 3. Press [MODEL] and [▯] to select the "1——1" display (model 1, IrDA mode).

Step 4. Set up the TM-2431 for the IrDA.

Step 5. Set the clock on the TM-2431. Check that the TM-2481 shows the same time on the display.

Solution

- Check for a bad connection between the TM-2481 and TM-2431.
- Check that the IrDA window is clean. A smudged or dusty window may disturb communication.
- If the problem persists, replace the main board with a new one.

2-10 Operational key

Inspection

Follow the steps below to check the key functions.

Step 1. Plug in the AC adapter.

Step 2. Press [POWER] to turn the power on.

Step 3. Press [MODEL] repeatedly to see that the display cycles through "1——" ("1——1" for TM-2481), "2——", "3——".

Step 4. TM-2480/82:

Press [MODEL] to select the "1——" display (model 1, RS-232C mode).

TM-2481:

Press [MODEL] and [▯] to select the "1——" display (model 1, RS-232C mode).

Step 5. Connect the TM-2480/81/82 to a TM-2431 or a TM-2430 with an RS-232C cable.

Step 6. Press [TIME/ID] to see that the display shows "TIME1 1" or "TIME1 0.

Step 7. Press [MENU] repeatedly to see that the left digit of the display cycles through "1——", "2——", "3——"... "9——".

Step 8. Press [▯] to see that the number of the right digit increments.

Step 9. Press [▯] to see that the number of the right digit decrements.

Step 10. Press [ENTER] to return to the "1——" display. Setting information will be printed out.

Step 11. Press [INTERVAL] to see that the display shows "COND1 ".

Step 12. Press [CANCEL] to see that the display changes to "1—— " (no "COND")

Step 13. Press [MEMORY CLEAR] for several seconds until the reset tone sounds. "MEMORY CLEARED" message will be printed out.

Step 14. Press [UPLOAD/PRINT]. "No DATA!" message will be printed out".

Step 15. Press [PRINT FORMAT] to see that the display shows ""1 TIME X" (X: 1 to 7)

Step 16. Press [CANCEL].

Step 17. Press [FEED] to let the printer feed the paper.

Solution

If any key function is incorrect, replace the main board with a new one.

2-11 Printer

Inspection

Follow the steps below to check the darkness of print out.

Step 1. Plug in the AC adapter.

Step 2. Referring to {2-2. Test mode}, enter Test mode #03.

Step 3. Press [ENTER] to display a value corresponding to the darkness of printout

Make sure that the value is 200±5.

Solution

- If the value is out of the range of 200±5, set the darkness with the VR1 adjustment to 200±2.
- If the problem persists, replace the main board with a new one.

2-12 Voltage

Follow the steps below to check the voltage at the main board

Step 1. Open the case referring to the exploded view schematics in this manual.

Step 2. Set the output voltage of the DC power source to 9.0±0.2V.

Step 3. Apply the output voltage to connector CN9 on the main board.

Step 4. Press [POWER] to turn the power on.

Step 5. Check voltage. It should be;

- 5.0±0.5V between pin TP6 and TP7
- 5.0±0.5V between pin TP10 and TP7

3. Troubleshooting

Note: It is recommended that you perform inspection thoroughly following the procedures in {2. Inspection} when you have opened the case.

Problem		Problem solutions
No display	AC Adaptor use	● Adapter jack is broken. ● The power voltage is too low. ● The power switch is broken. ● LCD is not connected firmly. ● LCD is defective.
	Battery use	● Battery cables are damaged. ● Battery cables aren't connected firmly. ● Battery connectors are damaged. ● Battery terminals are not clean.
Incorrect display		● Try to turn the power on again. ● LCD is not connected firmly. ● LCD is defective. ● PCB is broken.
The paper does not feed No printout or bad printout		● Printer cables are damaged. ● Printer connectors aren't connected firmly. ● Printer connectors are damaged. ● Foreign objects stuck inside of the printer mechanism. ● PCB is broken.
RS-232C problem		● RS-232C connectors are damaged. ● PCB is broken.
IrDA problem (TM-2481)		● IrDA cables are damaged. ● IrDA cables aren't connected firmly. ● IrDA connectors are damaged. ● IrDA windows are not clean.
Keys won't work.		● Cables are not connected firmly.

Technical information

TM-2480/81/82 Maintenance manual

Contents

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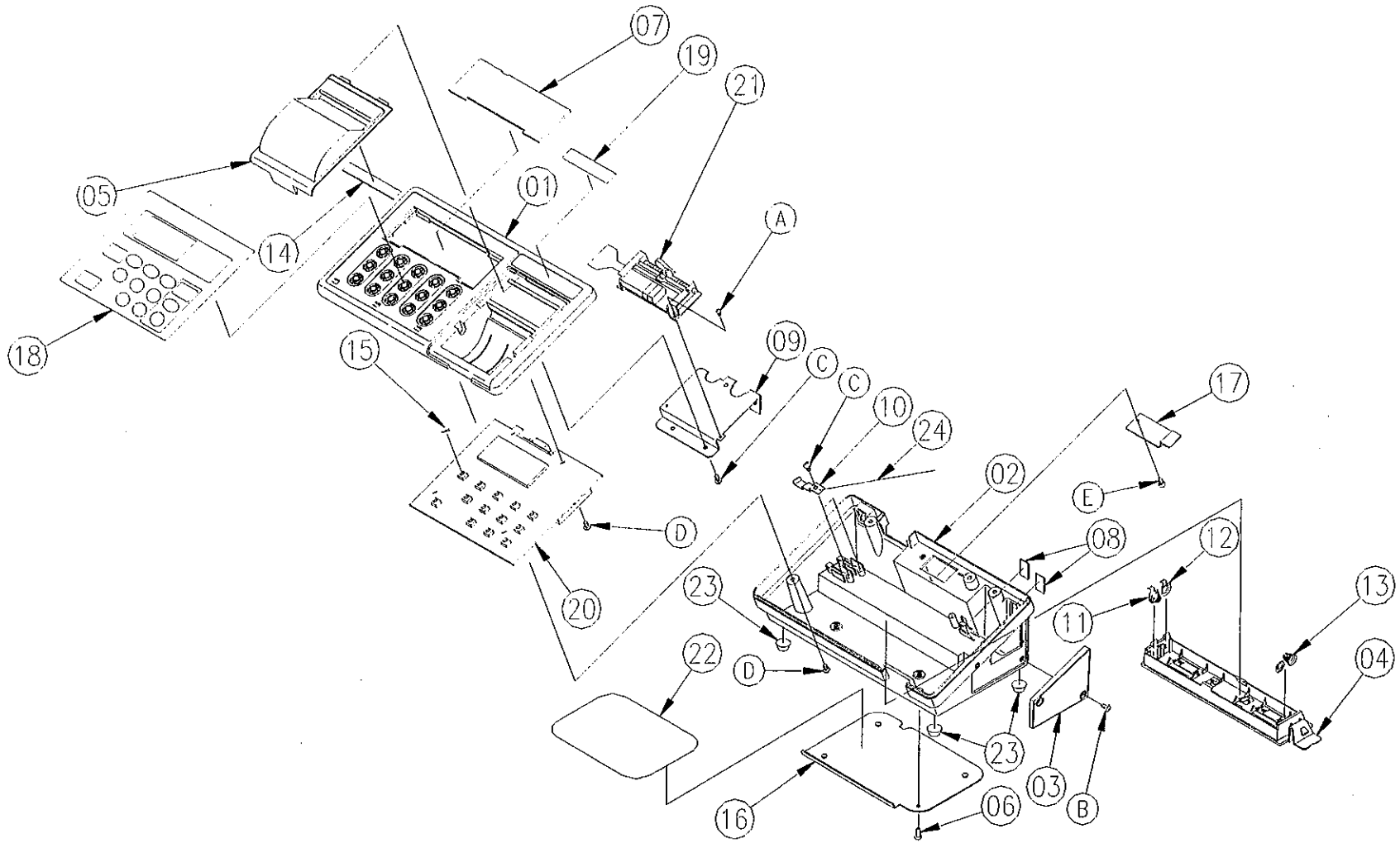
1. Exploded view and part list

TM-2480 Exploded view

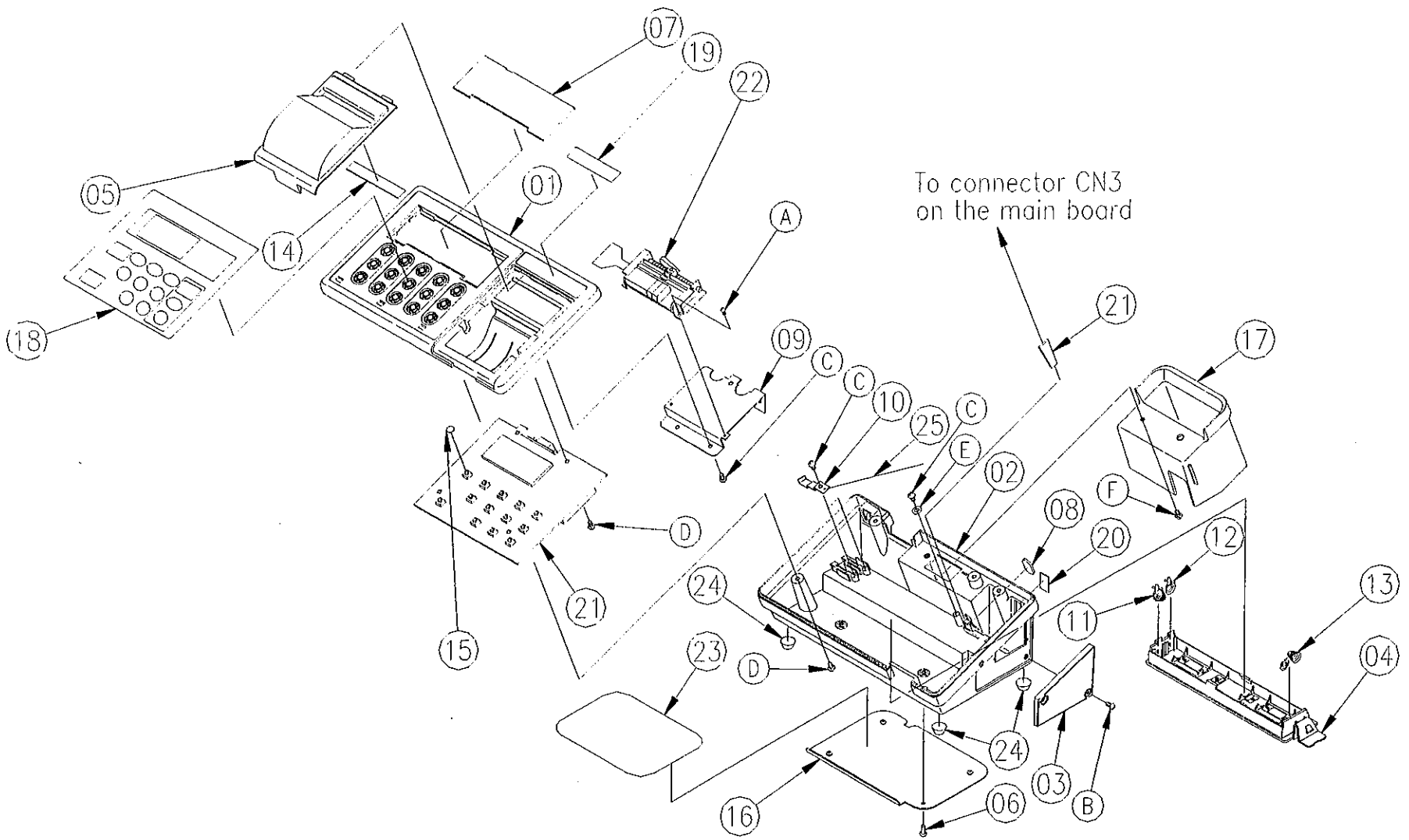


TM-2480 Exploded view part list

No.	Part number	Part name	QTY
1	07-1000100	Top Case	1
2	07-1000101A	Under Case	1
3	07-3003416	Blank Panel A	1
4	07-2000427	Battery Case	1
5	07-3003193	Paper Cover	1
6	10-NRP-505WHITE	Nylon rivet (NRP-505)	1
7	07-B49741	Filter	1
8	08-4007661A	Earth Sheet	1
9	04-4007330	Printer Holder	1
10	15-4007332B	Electrode Plate	2
11	15-4007334A	Electrode 1	1
12	15-4007335A	Electrode 2	1
13	00-C40884	Battery terminal A	1
14	04-4007333	Blade	1
15	08-4007428A	Switch Plate	13
16	07-3003198A	Fly Panel	1
17	04-4007637A	CAL Cover	1
18	08-2000435A	Key Sheet (English)	1
18	08-2000436A	Key Sheet (Japanese)	1
19	08-4007429-1	TM-2480 Sheet	1
20	PZ-3357A	Main board	1
21	EP-MTP201-B166	Printer	1
22	08-3003458B	TM-2430 E-Reference	1
22	08-3003527A	TM-2430 J-Reference	1
23	10-SJ-5012	Rubber foot, 3M 57	4
24	KO-964-02S020	Cable	1

No.	Part number	Part name	QTY
A		Bind screw, M2X4	2
B		Bind screw, M3X4	2
C		Screw, M3X6	5
D		Bind screw, M3x8	7
E		Bind screw, M3x8	1

TM-2481 Exploded view

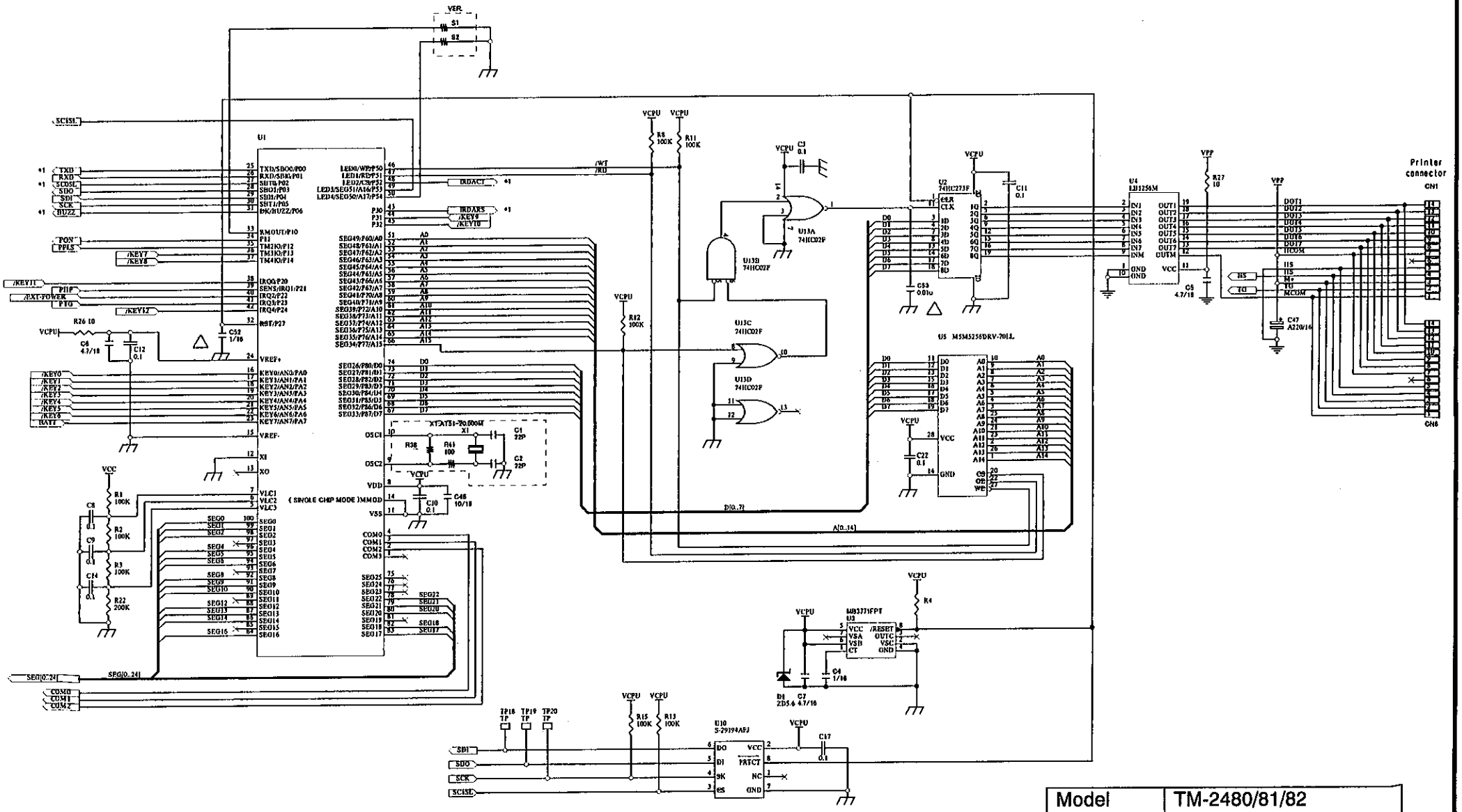


TM-2481 Exploded view part list

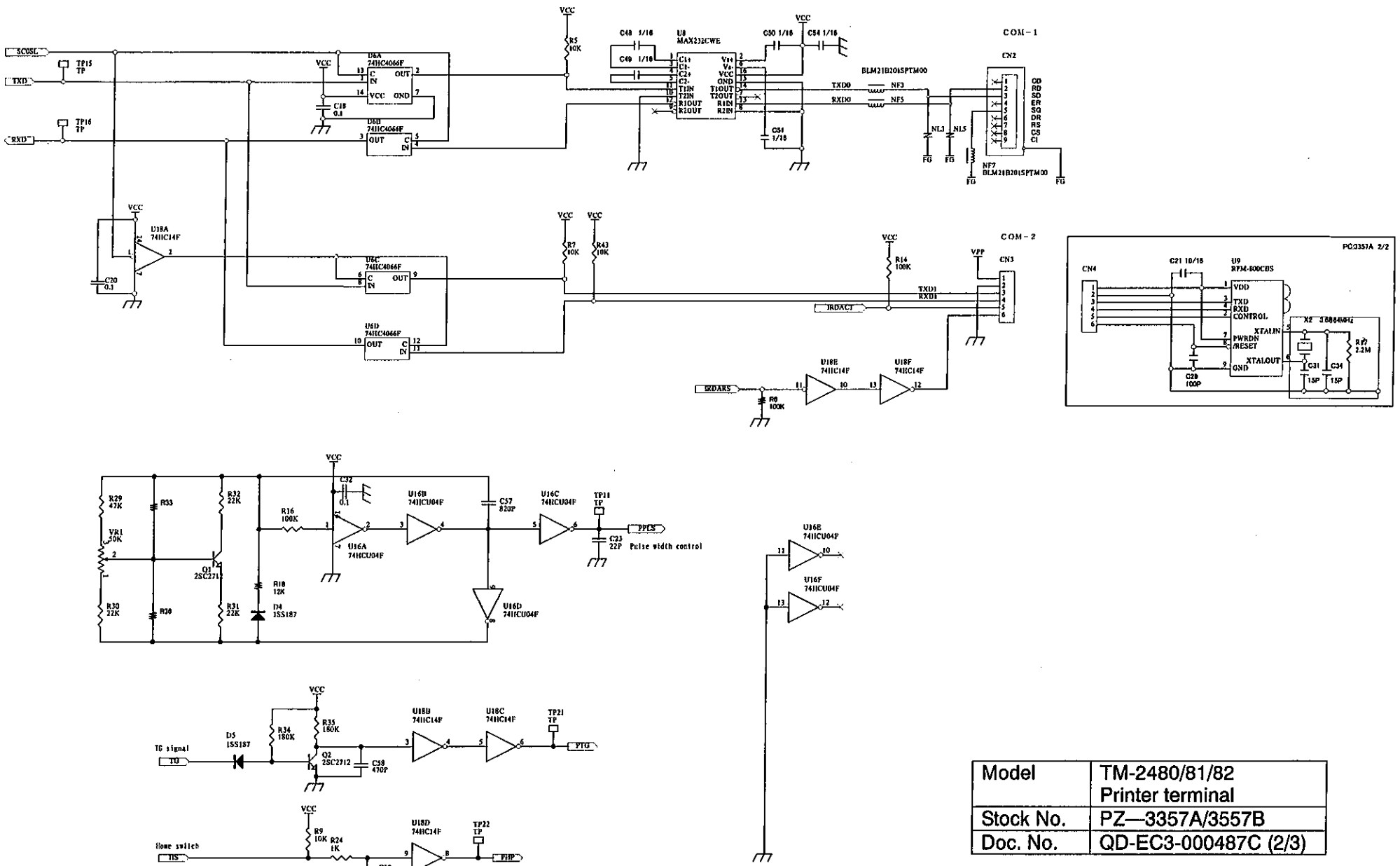
No.	Part number	Part name	QTY
1	07-1000100	Top Case	1
2	07-1000101A	Under Case	1
3	07-3003416	Blank Panel A	1
4	07-2000427	Battery Case	1
5	07-3003193	Paper Cover	1
6	10-NRP-505WHITE	Nylon rivet (NRP-505)	1
7	07-B49741	Filter	1
8	07-4004844	IrDA cover	1
9	04-4007330	Printer Holder	1
10	15-4007332B	Electrode Plate	2
11	15-4007334A	Electrode 1	1
12	15-4007335A	Electrode 2	1
13	00-C40884	Battery terminal A	1
14	04-4007333	Blade	1
15	08-4007428A	Switch Plate	13
16	07-3003198A	Fly Panel	1
17	07-3003195	AD2430 Holder	1
18	08-2000435A	Key Sheet (English)	1
18	08-2000436A	Key Sheet (Japanese)	1
19	08-4007429-2	TM-2481 Sheet	1
20	08-4007661A	Earth Sheet	1
21	PZ-3357B	Main board	1
22	EP-MTP201-B166	Printer	1
23	08-3003458B	TM-2430 E-Reference	1
23	08-3003527A	TM-2430 J-Reference	1
24	10-SJ-5012	Rubber foot, 3M 57	4
25	KO-964-02S020	Cable	1

No.	Part number	Part name	QTY
A		Bind screw, M2X4	2
B		Bind screw, M3X4	2
C		Screw, M3X6	6
D		Bind screw, M3x8	7
E		Flat washer, M4	1
F		Bind screw, M3x6	1

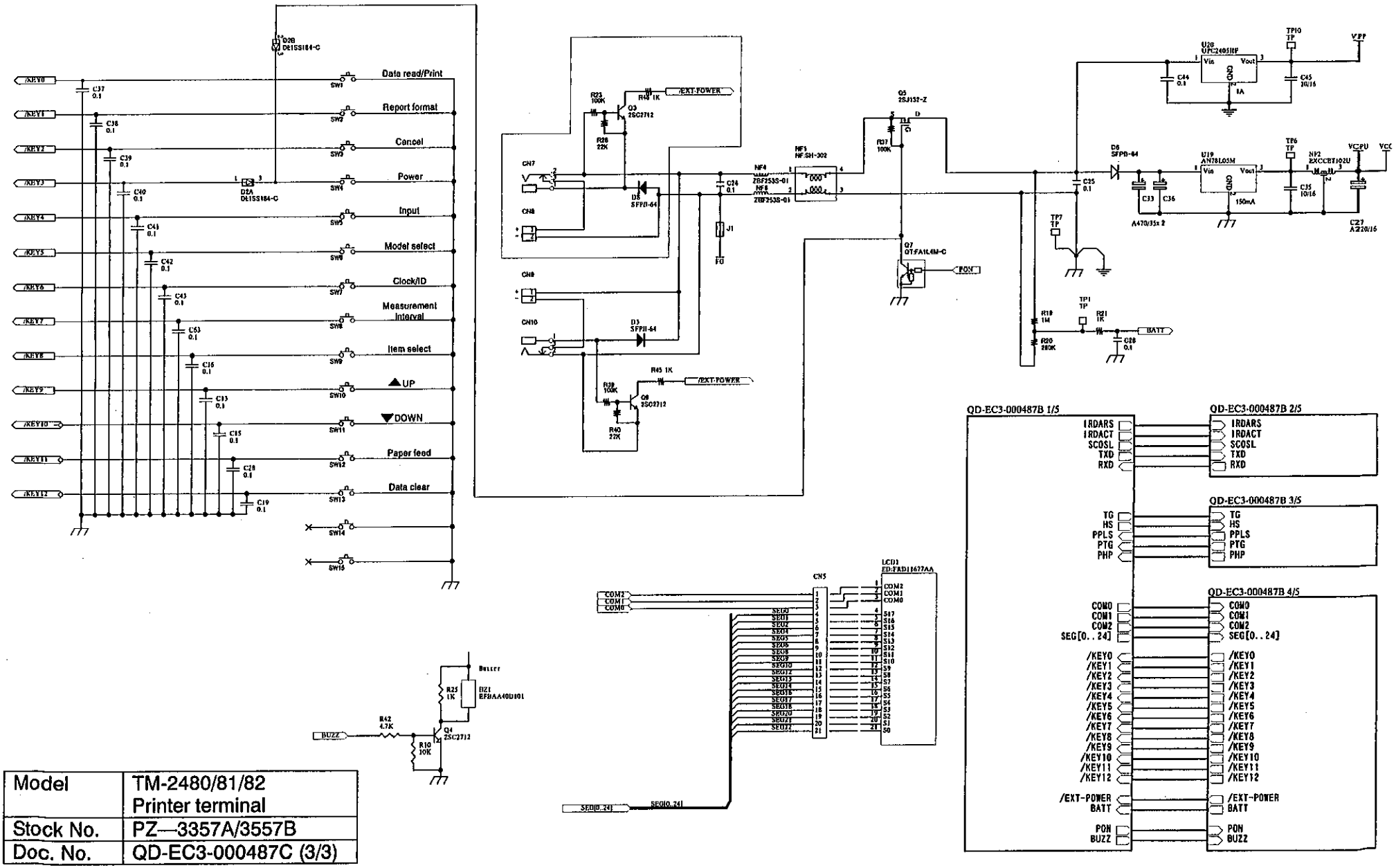
2. Circuit diagram



Model	TM-2480/81/82 Printer terminal
Stock No.	PZ—3357A/3557B
Doc. No.	QD-EC3-000487C (1/3)

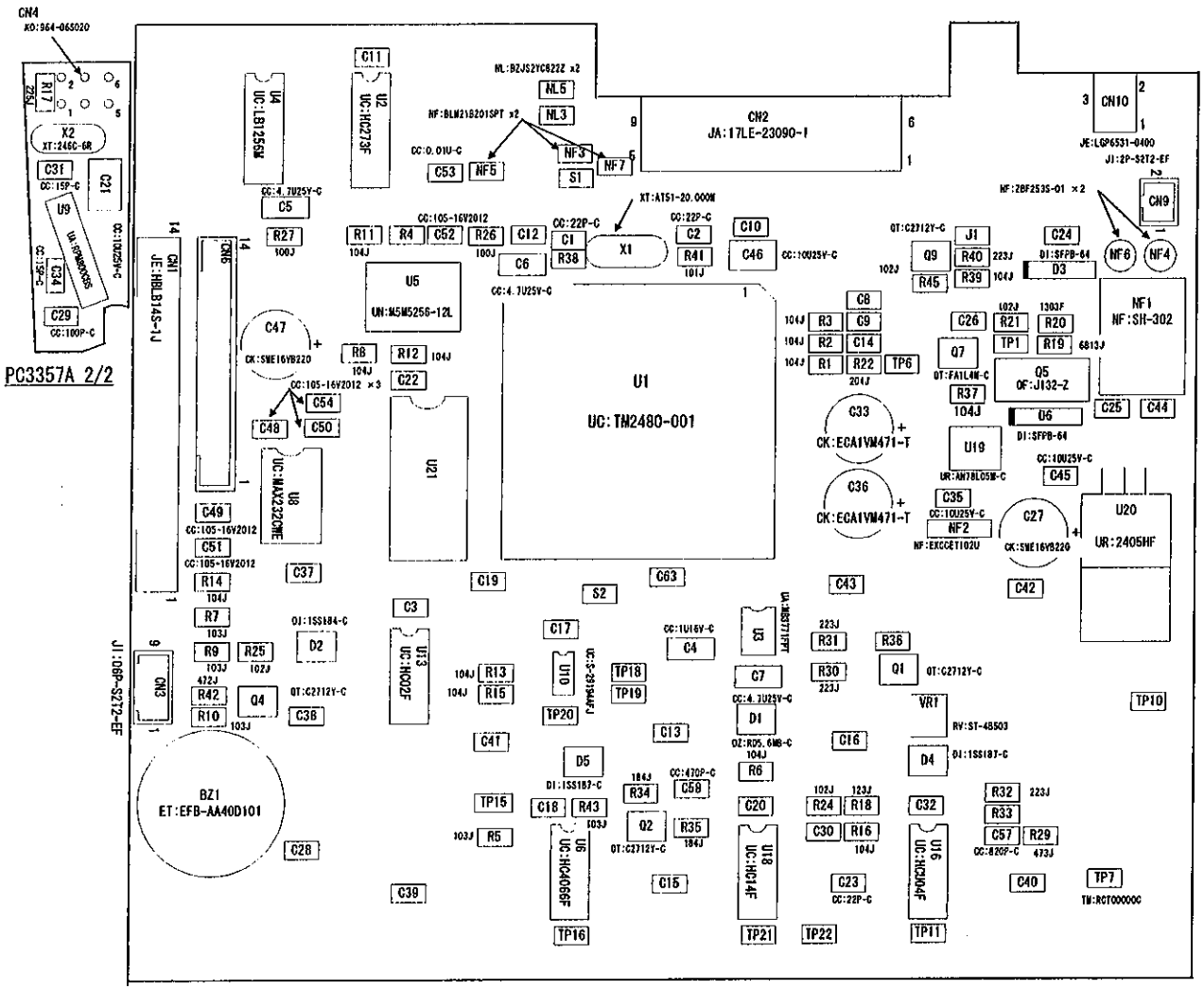


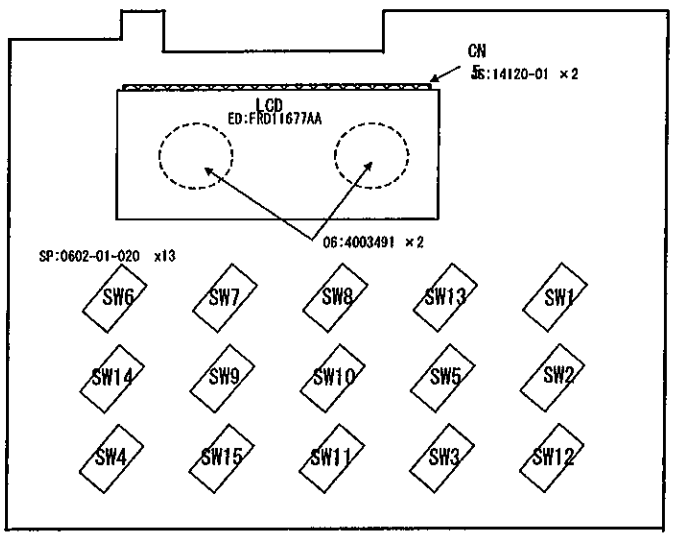
Model	TM-2480/81/82 Printer terminal
Stock No.	PZ—3357A/3557B
Doc. No.	QD-EC3-000487C (2/3)



Model	TM-2480/81/82 Printer terminal
Stock No.	PZ—3357A/3557B
Doc. No.	QD-EC3-000487C (3/3)

3. Part layout





4. Part list for PCB

Main board: 7PZ-3557A (TM-2480/82) / 7PZ-3557B (TM-2481)

*: 7PZ-3557B (TM-2481) Only

Note	Symbol	Part Number	Part Name	QTY
	BZ1	ET-EFB-AA40D101	BUZZER	1
	C1,2,23	CC-22P-C	CAPACITOR	3
*	C21	CC-10U25V-C	CAPACITOR	1
	C27,47	CK-SME16VB220	CAPACITOR	2
*	C29	CC-100P-C	CAPACITOR	1
	C3,8,9,10,11,12,13,14,15,16,17,18,19,20,22,24,25,26,28,30,32,37,38,39,40,41,42,43,44,63	CC-0.1U25V-C	CAPACITOR	30
*	C31,34	CC-15P-C	CAPACITOR	2
	C33,36	CK-ECA1VM471-T	CAPACITOR	2
	C35,45,46	CC-10U25V-C	CAPACITOR	3
	C48,49,50,51,52,54,4	CC-105-16V2012	CAPACITOR	7
	C5,6,7	CC-4.7U25V-C	CAPACITOR	3
	C53	CC-0.01U-C	CAPACITOR	1
	C57	CC-820P-C	CAPACITOR	1
	C58	CC-470P-C	CAPACITOR	1
	CN1	JE-HBLB14S-1J	CONNECTOR	1
	CN10	JE-LGP6531-0400	CONNECTOR	1
	CN2	JA-17LE-23090-I	CONNECTOR	1
	CN3	JI-06P-S2T2-EF	CONNECTOR	1
*	CN4	KO-964-06S020	CABLE	1
	CN5	JS-14120-01	CONNECTOR	2
	CN9	JI-2P-S2T2-EF	CONNECTOR	1
	D1	DZ-RD5.6MB-C	ZENER DIODE	1
	D2	DI-1SS184-C	DIODE	1
	D3,6	DI-SFPB-64	DIODE	2
	D4,5	DI-1SS187-C	DIODE	2
	LCD	ED-FRD11677AA	LCD	1
	NF1	NF-SH-302	NOISE FILTER	1
	NF2	NF-EXCCET102U	NOISE FILTER	1
	NF3,5,7	NF-BLM21B201SPT	NOISE FILTER	3
	NF4,6	NF-ZBF253S-01	NOISE FILTER	2
	NL3,5	NL-EZJS2YC822Z	NOISE FILTER	2
	Q1,2,4,9	QT-C2712Y-C	TRANSISTOR	4
	Q5	QF-J132-Z	TRANSISTOR	1
	Q7	QT-FA1L4M-C	TRANSISTOR	1
	R1,2,3,6,8,11-16,37,39	RC-1/10W104J	RESISTOR	13
*	R17	RC-1/10W225J	RESISTOR	1
	R18	RC-1/10W123J	RESISTOR	1
	R19	RC-1/10W105J	RESISTOR	1
*	R19	RC-1/10W105J	RESISTOR	1
	R20	RC-1/10W2803F	RESISTOR	1
	R21,24,25,45	RC-1/10W102J	RESISTOR	4
	R22	RC-1/10W204J	RESISTOR	1
	R26,27	RC-1/10W100J	RESISTOR	2
	R29	RC-1/10W473J	RESISTOR	1

*: 7PZ-3557B (TM-2481) Only

Note	Symbol	Part Number	Part Name	QTY
	R30,31,32,40	RC-1/10W223J	RESISTOR	4
	R34,35	RC-1/10W184J	RESISTOR	2
	R41	RC-1/10W101J	RESISTOR	1
	R42	RC-1/10W472J	RESISTOR	1
	R5,7,9,10,43	RC-1/10W103J	RESISTOR	5
	SW1-13	SP-0602-01-020	SWITCH	13
	TP7	TM-RCT00000C	TEST PIN	1
	U1	UC-TM2480-001	CPU	1
	U10	UC-S-29194AFJ	MEMORY	1
	U13	UC-HC02F	CMOS IC	1
	U16	UC-HCU04F	CMOS IC	1
	U18	UC-HC14F	CMOS IC	1
	U19	UR-AN78L05M-C	VOLTAGE REGULATOR	1
	U2	UC-HC273F	CMOS IC	1
	U20	UR-2405HF	VOLTAGE REGULATOR	1
	U3	UA-MB3771FPT	VOLTAGE DETECTOR	1
	U4	UC-LB1256M	DRIVER IC	1
	U5	UN-M5M5256-12L	MEMORY	1
	U6	UC-4066F	CMOS IC	1
	U7	UR-RH5RL36AA-C	VOLTAGE REGULATOR	1
	U8	UC-MAX232CWE	DRIVER IC	1
*	U9	UA-RPM800CBS	IrDA CONTROLLER IC	1
	VR1	RV-ST-4B503	POTENTIOMETER	1

Note	Symbol	Part Number	Part Name	QTY
	X1	XT-AT51-20.000M	QUARTZ CRYSTAL UNIT	1
		PC-3357C	Printed Wiring Board	1
		06-4003491	LCD PILLOW	2

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