

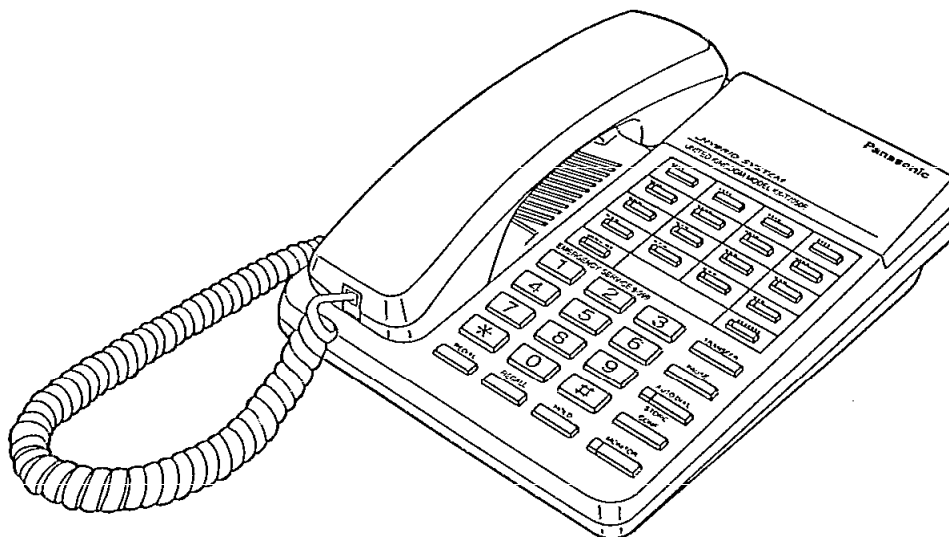
# Service Manual

## and Technical Guide

PROPRIETARY TELEPHONE FOR  
ELECTRONIC MODULAR SWITCHING SYSTEM

# KX-T7050E

(for United Kingdom)



### ■ SPECIFICATIONS

Station Loop Limit:	40 ohms
Cabling Method:	2 pair wire
Jacks:	EMSS, Handset
Dimensions:	172 (W)×90 (H)×240 (D) mm with handset (6 <sup>25</sup> / <sub>32</sub> "×3 <sup>17</sup> / <sub>32</sub> "×9 <sup>7</sup> / <sub>16</sub> "
Weight:	850 g (1 lb 14 oz)

Design and specifications are subject to change without notice.

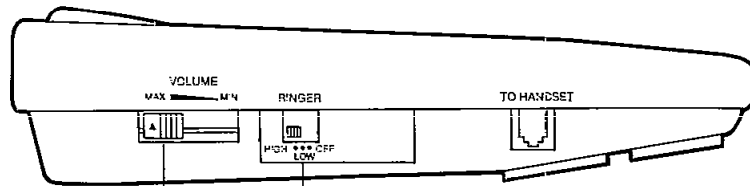
# Panasonic

When you mention the serial number, write down the 11 digits. The serial number may be found on the label affixed to the bottom of the unit.

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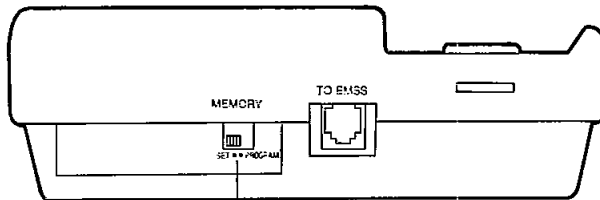
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## LOCATION OF CONTROLS



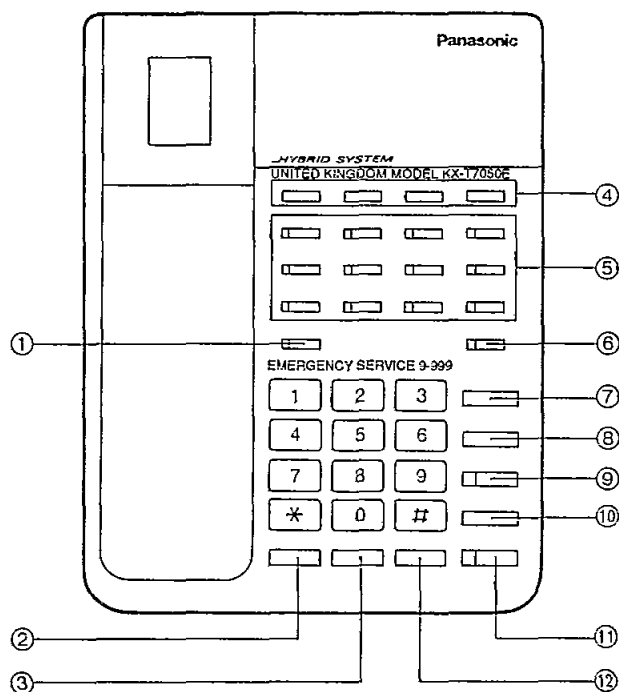
**RINGER VOLUME Selector:**  
 HIGH: The ringing sound will be loud.  
 LOW: The ringing sound will be soft.  
 OFF: The telephone will not ring.

**VOLUME Control:**  
 MAX: The volume will be loud.  
 MIN: The volume will be soft.



**MEMORY Switch:**  
 Set to "SET".  
 For station programming, set to "PROGRAM".

Fig. 1



KX-T7050E is compatible with the Panasonic Electronic Modular Switching Systems and can perform most functions within each system.

Fig. 2

- ① **INTERCOM Button and Indicator:**  
Used to make or receive an intercom call.
- ② **REDIAL Button:**  
Used to redial the last dialed number.
- ③ **RECALL Button:**  
Used to send a recall signal to a Central Office line.
- ④ **Programmable Feature Buttons:**  
Can be used as One-Touch Dialling buttons or system feature buttons.
- ⑤ **Flexible CO Line Buttons and Indicator:**  
Can be used as CO, Direct Station Selection, or One-Touch Dialling buttons.
- ⑥ **Flexible MESSAGE Button and Indicator:**  
Can be used as Message Waiting, Direct Station Selection, or One-Touch Dialling button.
- ⑦ **TRANSFER Button:**  
Used to transfer and outside or intercom call to another extension.
- ⑧ **PAUSE Button:**  
Used to insert a pause in a speed dial number.
- ⑨ **AUTO DIAL/STORE Button and Indicator:**  
Used before dialling a speed dial number/In "PROGRAM" mode, used to store a station programming procedure in the memory at the end of operation.
- ⑩ **CONFERENCE Button and indicator:**  
Used to perform a three-party conference.
- ⑪ **MONITOR Button and Indicator:**  
Used to make a phone call without using the handset.
- ⑫ **HOLD Button:**  
Used to place a call on hold.

## FOR SERVICE TECHNICIANS

Note the following items when exchanging the LEDs (Ref. No. D617~635) of Dial P.C.Board.

1. Do not use LED again which is removed from P.C.Board.
2. Use soldering iron (less than 15 W) for exchanging LED.
3. Do not heat LED more than 2 seconds.
4. Do not move LED after solder.

# MEMO

# DISASSEMBLY INSTRUCTIONS

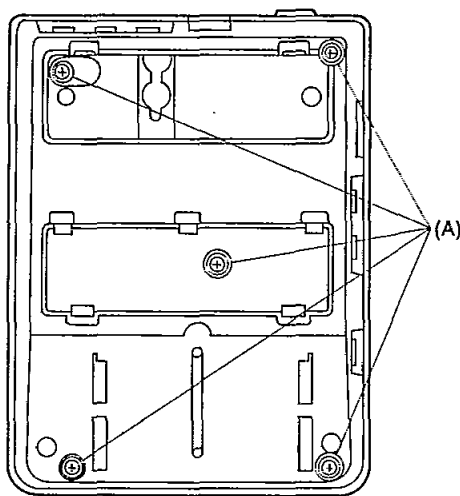


Fig. 4

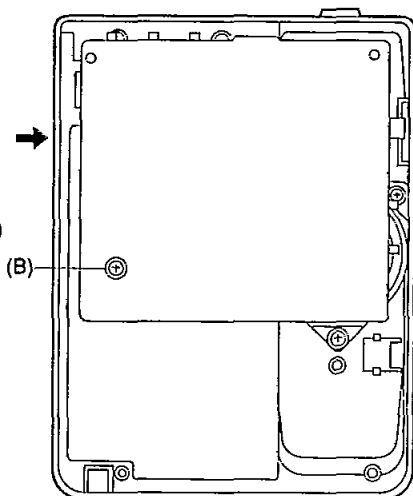


Fig. 5

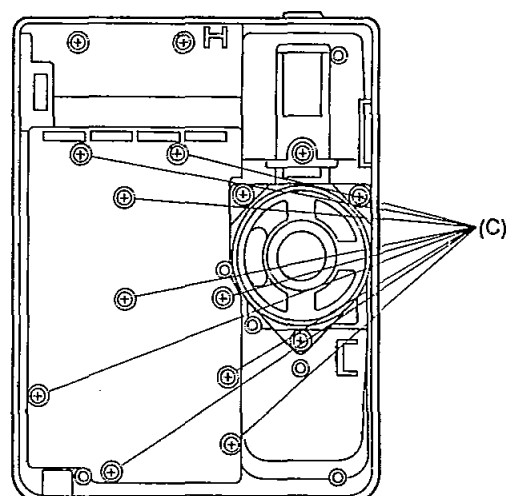


Fig. 6

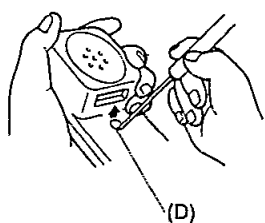


Fig. 7

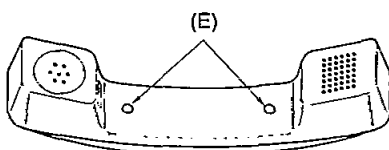


Fig. 8

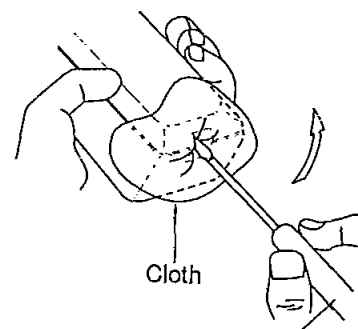


Fig. 9

Ref. No.	Procedure	Shown in Fig.—	To remove—	Remove—
1	1	4	Lower Cabinet	Screw (3×14) ..... (A)×5
2	1-3	5	Main Board	Screw (3×10) ..... (B)×1
3				Remove the Main Board. (Read Note 1)
4	1-5	6	Operation Board	Screw (2.3×8) ..... (C)×9
5				Remove the Operation Board.
6	6-8	7	Handset Cabinet	Rubbers ..... (D)×2
7		8		Screws (3×10) ..... (E)×2
8		9		Remove the cabinet.

**Note 1:**  
When removing the Main P.C. Board, remove from direction of the arrow.



Pin No.	Mark	Function	High	Low
24	R50	Key Scan Output	Normal	Active
25	R51	Key Scan Output	Normal	Active
26	R52	Key Scan Output	Normal	Active
27	R53	Key Scan Output	Normal	Active
28	R60	DTMF Control	Normal	Active
29	R61	DTMF Control	Normal	Active
30	R62	DTMF Control	Normal	Active
31	R63	Not Used	-----	-----
32	Vcc	(+) Power Source Terminal	-----	-----
33	SCK/R40	Interrupt Output	Disable	Enable
34	SI/R41	Key Input	Disable	Enable
35	SO/R42	Key Input	Disable	Enable
36	R43	Key Input	Disable	Enable
37	R70	DTMF Control	Normal	Active
38	R71	DTMF Control	Normal	Active
39	R72	DTMF Control	Normal	Active
40	R73	DTMF Control	Normal	Active
41	R80	Not Used	-----	-----
42	R81	SP-Phone Chip Select Control Output	OFF	ON
43	R82	Not Used	-----	-----
44	R83	Not Used	-----	-----
45	R90	Key Input	Disable	Enable
46	R91	Key Input	Disable	Enable
47	R92	Power Fail Detect Input	Power Down	Normal
48	R93	Hook Data Input	Off-Hook	On-Hook
49	RESET	System Reset Input	-----	-----
50	TEST	-----	-----	-----
51	OSC1	System Clock	-----	-----
52	OSC2	System Clock	-----	-----
53	GND	Ground	-----	-----
54	D0	Not Used	-----	-----
55	D1	Key Input	Disable	Enable
56	D2	LED Reset Signal Output	Active	Normal
57	D3	Data Input Control	Normal	Active
58	D4	Data Input	Disable	Enable
59	D5	Data Output	Active	Normal
60	D6	Automatic Redial Signal Input	Disable	Enable
61	D7	SP-Phone Path Control	ON	OFF
62	D8	OHCA Path Control	ON	OFF
63	D9	LED Control Output	ON	OFF
64	D10	LED Control Output	ON	OFF

## ADJUSTMENT

Perform the following adjustment after replacing IC1 and VR3, VR4.

### Test Equipment:

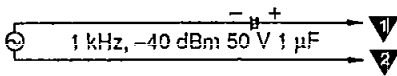
Loop Simulator  
RC Oscillator  
VTVM  
DC Power Supply

### Preparation:

- Set unit's controls as follows:
  - SP-PHONE SWITCH... "ON"
  - VOLUME CONTROL... "MAX"
- Set the variable resistor of the Loop Simulator to maximum resistance (fully counterclockwise.)
- Connect the unit to the Loop Simulator.
- Make adjustment in a quiet room.

### Transmission Level Adjustment (for Handset)

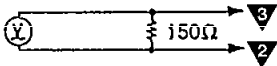
- Set the Loop Simulator selector switch to "TX".
- Connect the Oscillator to Test Point  $\nabla$  (+) -  $\nabla$  (-), as shown below.
- Set RC Oscillator to 1 kHz, -40 dBm.



- Connect the VTVM.
- Adjust VR4 for a reading of  $-9 \pm 1$  dBm, on the VTVM.

### Reception Level Adjustment (for Handset)

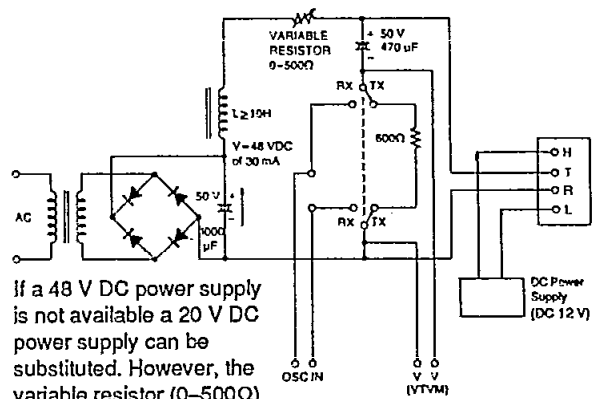
- Set the Loop Simulator selector switch to "RX".
- Apply the 1 kHz, -20 dBm for the Oscillator.
- Connect the resistor  $150 \Omega$  to the test point  $\nabla$  -  $\nabla$ , and connect the VTVM to the both ends.



- Adjust VR4 for a reading of  $-28 \pm 1$  dBm, on the VTVM.

Please refer to Printed Circuit Board which is located test points ( $\nabla$ ).

### Schematic Diagram of Loop Simulator



If a 48 V DC power supply is not available a 20 V DC power supply can be substituted. However, the variable resistor (0-500 $\Omega$ ) must be set to 0 ohms

Fig. 12



# BLOCK DIAGRAM

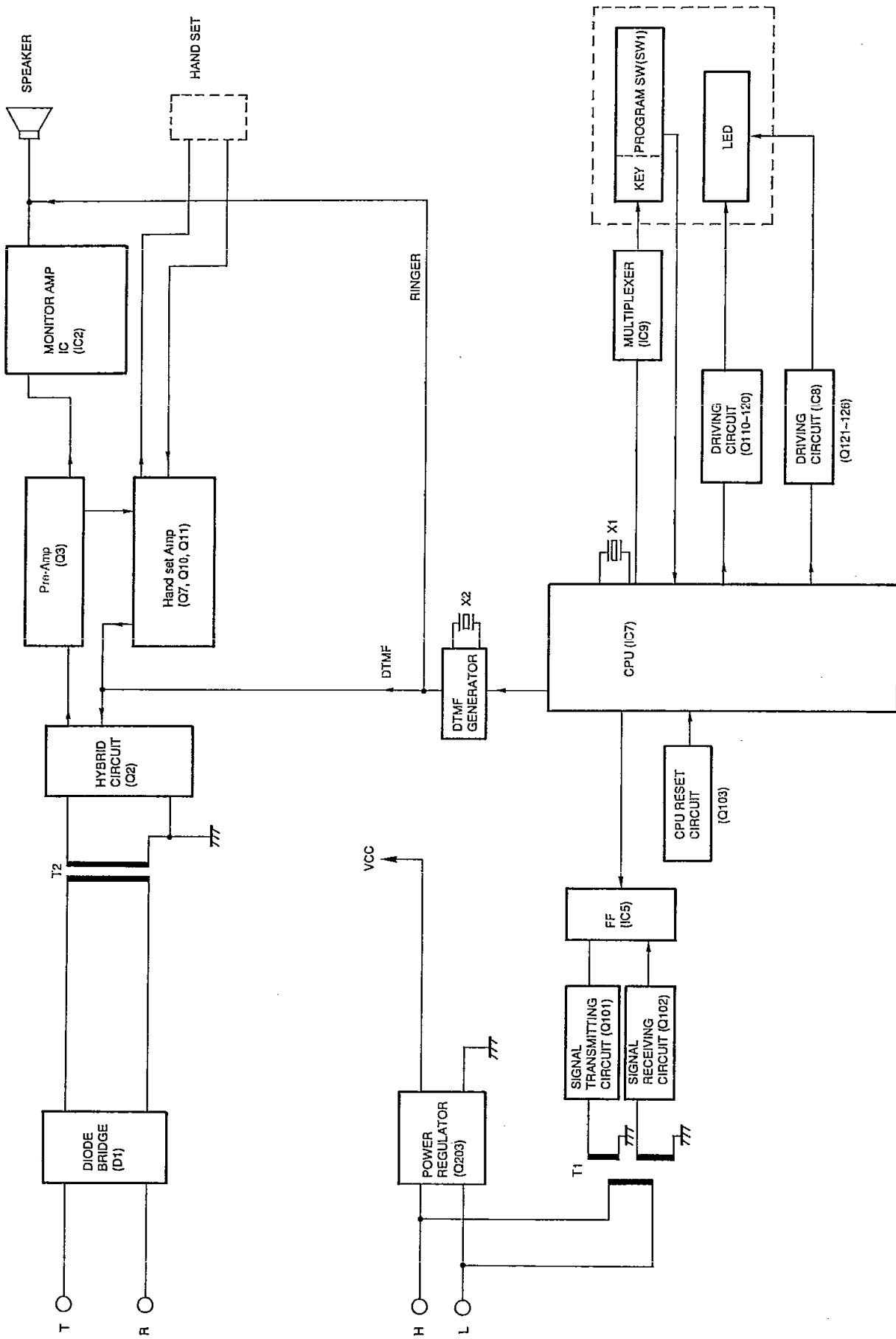


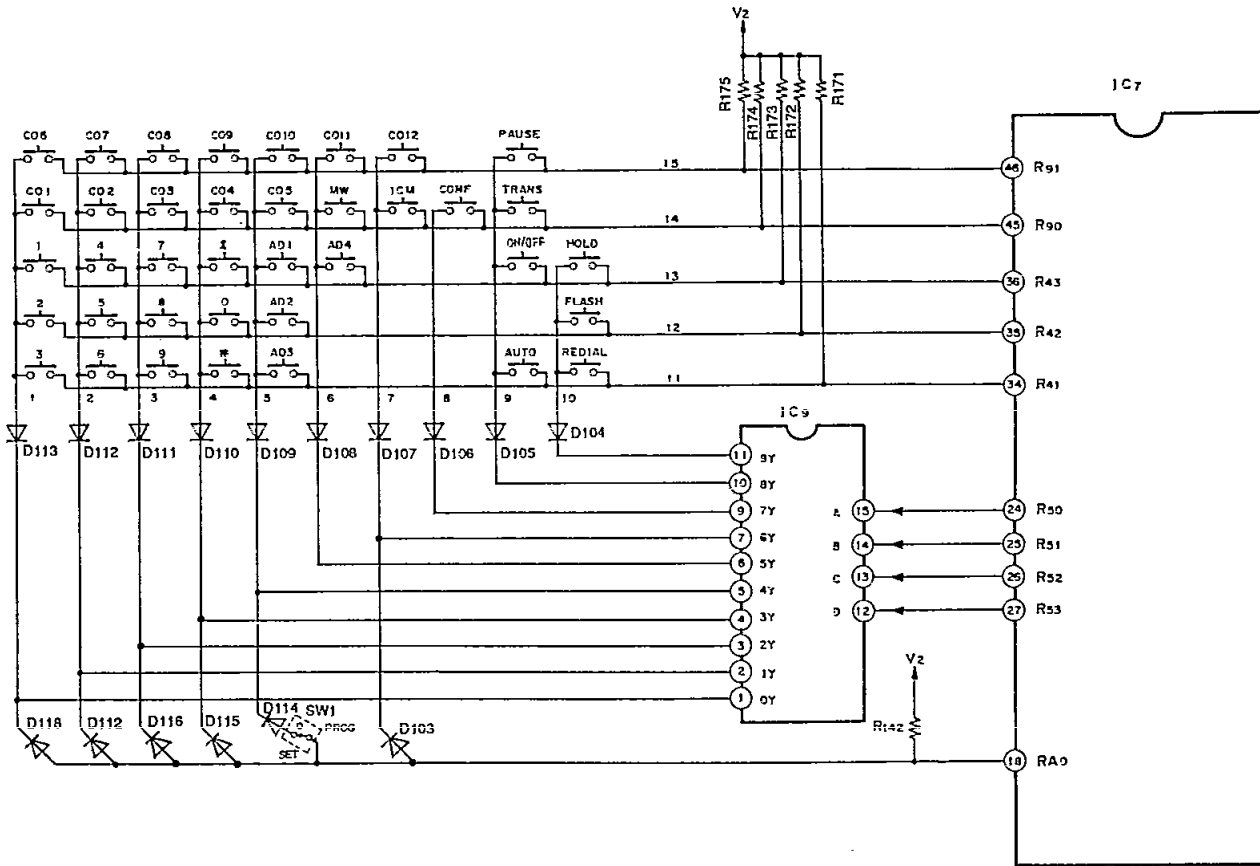
Fig. 10

# CIRCUIT OPEARTIONS

## KEY INPUT CONTROL CIRCUIT

Data output from IC7 (R50 to R53) is decoded by IC9 as shown in the table below. This decoded data is used to scan the key matrix. The key matrix is read by IC7 according to the timing shown. If a key is pressed, the input corresponding to the row in which the key is located will be brought low during scanning and will be detected by IC7.

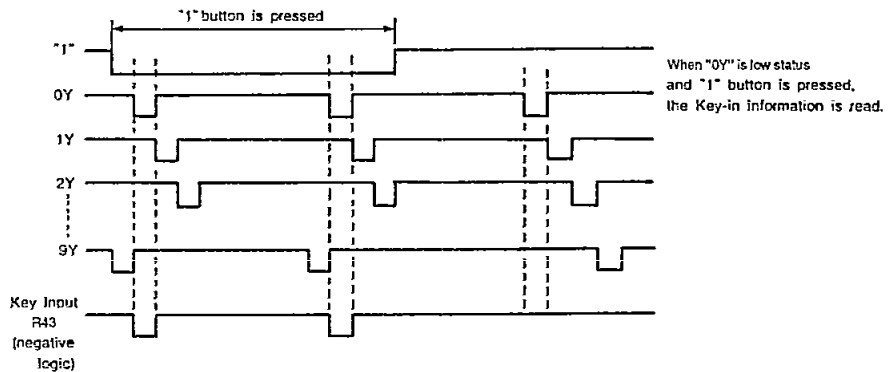
Circuit Diagram



Key Input Control Timing Chart

Logic of IC9

No.	INPUT				OUTPUT									
	A	B	C	D	0Y	1Y	2Y	3Y	4Y	5Y	6Y	7Y	8Y	9Y
0	L	L	L	L	L	H	H	H	H	H	H	H	H	H
1	H	L	L	L	L	H	H	H	H	H	H	H	H	H
2	L	H	L	L	L	H	H	H	H	H	H	H	H	H
3	H	H	L	L	L	H	H	L	H	H	H	H	H	H
4	L	L	H	L	L	H	H	H	L	H	H	H	H	H
5	H	L	H	L	L	H	H	H	H	L	H	H	H	H
6	L	H	H	L	L	H	H	H	H	H	L	H	H	H
7	H	H	H	L	L	H	H	H	H	H	H	L	H	H
8	L	L	L	H	L	H	H	H	H	H	H	H	L	H
9	H	L	L	H	L	H	H	H	H	H	H	H	H	L

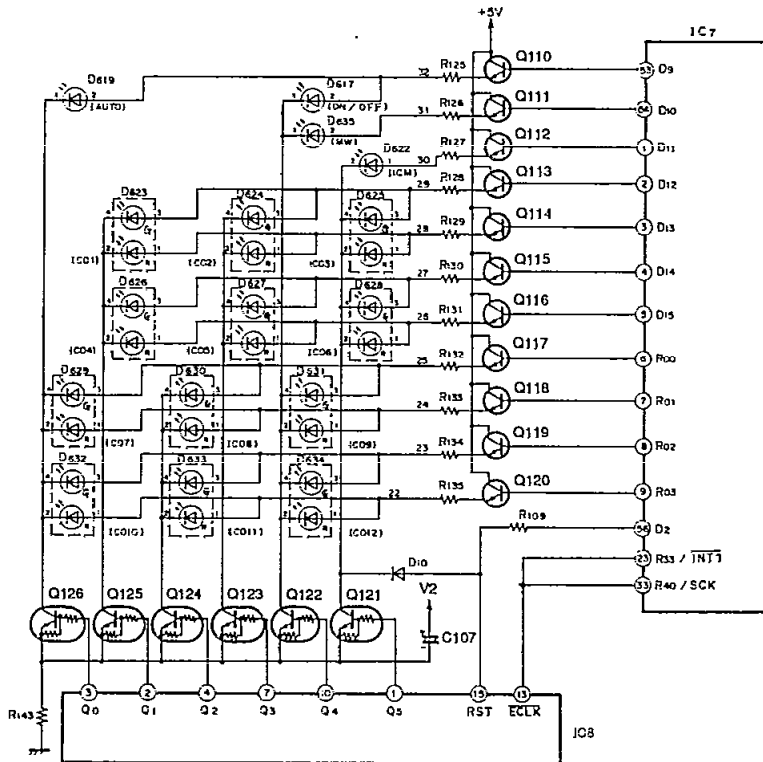


LED CIRCUIT

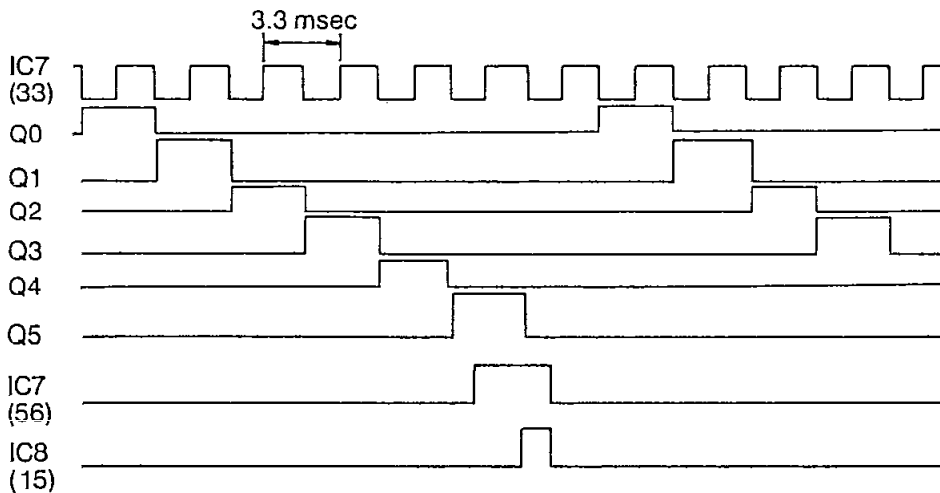
Circuit Operation:

The status of the LED's in the matrix is controlled by the outputs of IC7 and IC8. Transistors Q121–Q126 are sequentially turned on by IC8 which is reset every 6 clock cycles using port D2 from IC7. This is shown in timing chart below. To illuminate an LED, a high level is output from the relevant port of IC7 (port D9–D15, R01–R03) at the same time as the corresponding column is taken low by IC8, Q121–126.

Circuit Diagram



Timing Chart



■ DATA COMMUNICATION CIRCUIT

**Function:**

The data communication circuit provides a path for information exchange between the EMSS and EMSS proprietary telephone, which is used for transmitting such items as key input information and LED/LCD control.

**Circuit Operation:**

After receiving an IRQ signal from the EMSS, the EMSS proprietary telephone sends key input information (max. 19 pulses). The EMSS proprietary telephone then receives LED control information etc. from the EMSS and returns an acknowledge signal.

**1) Reception**

The data from the EMSS is received via the H and L line along the path shown below.

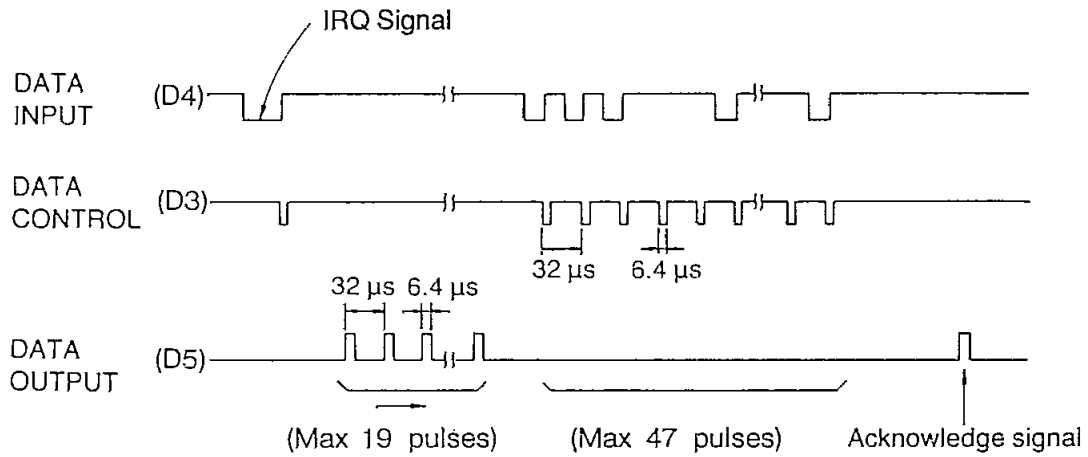
H, L Line → T1 → R166 → Q102 → IC5 → IC7 pin 58

**2) Transmssion**

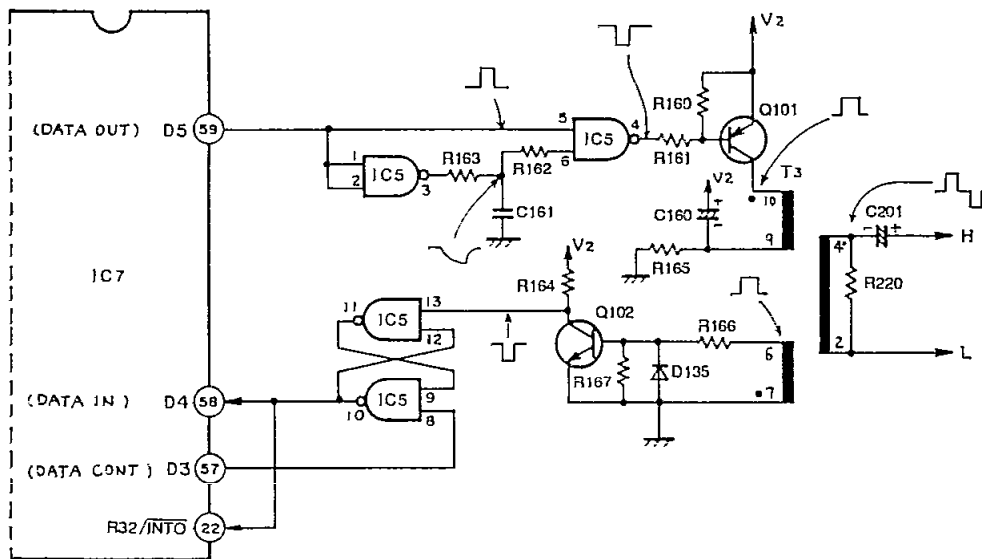
The data to the EMSS proprietary telephone is transmitted along the following path.

IC7 pin 59 → IC5 → R161 → Q101 → T1 → H, L Line

Timing Chart



Circuit Diagram



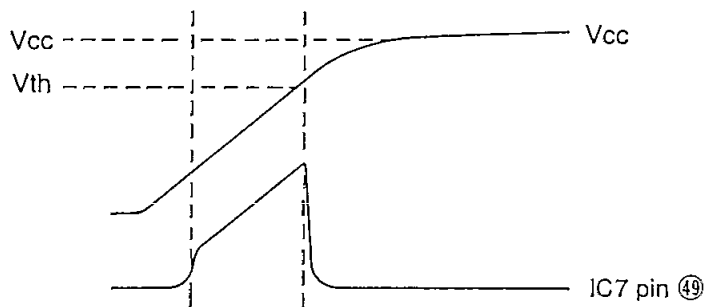
## ■ RESET CIRCUIT

### Circuit Operation:

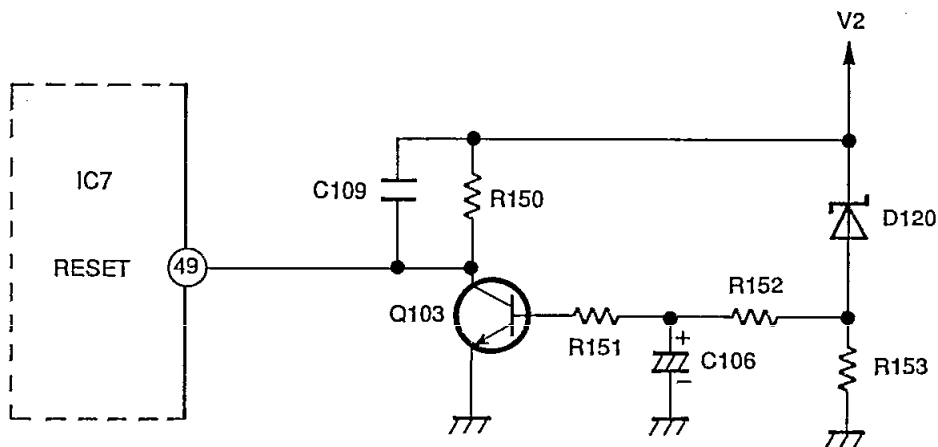
This circuit is used for transmission of a reset pulse to the CPU (IC7) at the following times, connecting the telephone line jack, and switch on EMSS. The timing chart is shown below.

Power ON → Q103 OFF → IC7 (pin 49) high level → Q103 ON → IC7 (pin 49) low level

Timing Chart



Circuit Diagram



**■ TONE GENERATION CIRCUIT**

**Function:**

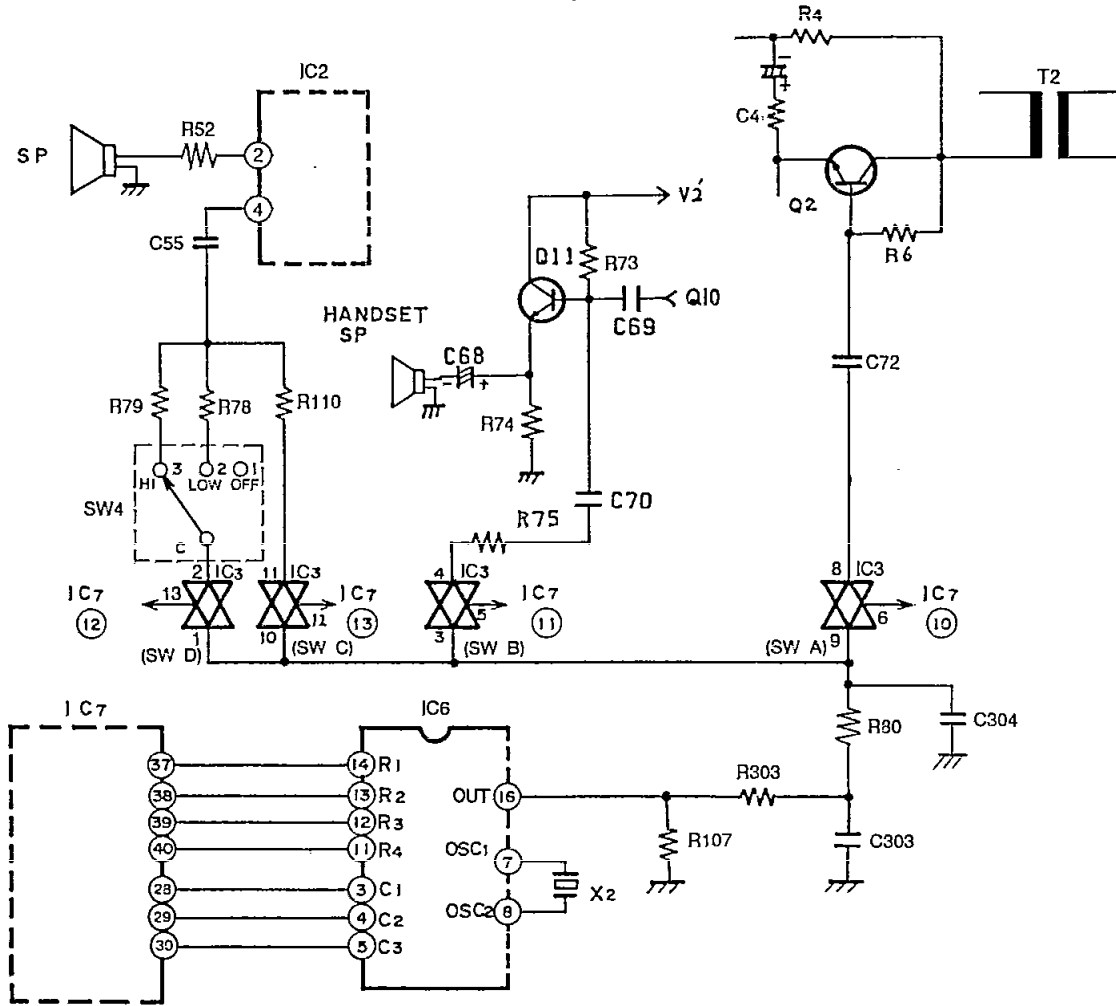
This circuit generates all system tones including COL, extension, busy, DTMF signals and key in confirmation tones during the power failure mode and is comprised of IC6 (DTMF Generator IC) and IC3 (Analog Switch).

**Circuit Operation:**

IC10 is the DTMF generator IC.

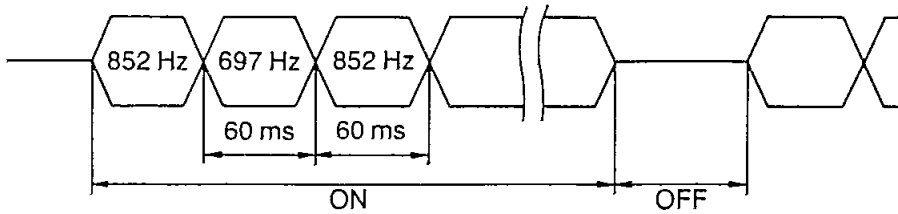
For an output of a single row tone, the row terminal (R1 to R4) and the each column terminals (C1 to C3) intersecting with it are brought a low state. For a dual tone output, one row terminal and one column terminal are brought to low state.

**Circuit Diagram**



**1) Calling Tones from COL and EXT.**

For a calling tone from a CO line or extension, pin 13 of IC3 (Analogue Switch) is brought to a high state and the single row tone signal shown below is output from IC6. The tone volume is controlled by SW4.



IC6 pin 16 → IC3 pin 1-2 → SW4 → C55 → IC2 pin 4 → IC2 pin 2 → R52 → SP

**2) Busy Station Calling Tone**

Pin 12 of IC3 (Analogue Switch) is brought to a high state.

852 Hz and 697 Hz signals are outputted from IC6 alternately at intervals of 60 ms.

The signal flow is;

IC6 pin 16 → IC3 pin 10-11 → R110 → C55 → IC2 pin 4 → IC2 pin 2 → R52 → SP

**3) DTMF Signal**

Pins 5, 6 and 12 of IC3 are brought to a high state, a DTMF tone is generated as shown below.

The signal flow is shown below;

IC6 pin 16 → IC3 pin 9-8 → C72 → Q2 → T2 → Telephone Line  
 IC6 pin 16 → IC3 pin 3-4 → R75 → C70 → Q11 → C68 → Handset Speaker  
 (IC3 pin 10-11 → R110 → C55 → IC2 pin 4 → IC2 pin 2 → R52 → SP)

**DTMF Frequency Table**

		High Group		
		1209 Hz	1336 Hz	1477 Hz
Low Group	697 Hz	1	2	3
	770 Hz	4	5	6
	852 Hz	7	8	9
	941 Hz	*	0	#

**Truth Table**

	C1	C2	C3	R1	R2	R3	R4
1	L	H	H	L	H	H	H
2	H	L	H	L	H	H	H
3	H	H	L	L	H	H	H
4	L	H	H	H	L	H	H
5	H	L	H	H	L	H	H
6	H	H	L	H	L	H	H
7	L	H	H	H	H	L	H
8	H	L	H	H	H	L	H
9	H	H	L	H	H	L	H
*	L	H	H	H	H	H	L
0	H	L	H	H	H	H	L
#	H	H	L	H	H	H	L

**4) Key-in Tone**

An 852 Hz single tone is used as the key-in tone. When pins 5 and 12 of IC3 are brought to a high state, a tone is generated from IC6 and is heard at the speaker.

The signal flow is shown below.

IC6 pin 16 → IC3 pin 3-4 → R75 → C70 → Q11 → C68 → Handset Speaker  
 IC6 pin 16 → IC3 pin 10-11 → R110 → C55 → IC2 pin 4 → IC2 pin 2 → R52 → SP

CONDITION	IC7 pin 10	IC3 SWA	IC7 pin 11	IC3 SWB	IC7 pin 13	IC3 SWC	IC7 pin 12	IC3 SWD
Ringing	L	OFF	L	OFF	L	OFF	H	ON
Call Waiting	L	OFF	L	OFF	H	ON	L	OFF
Tone Dial (Handset)	H	ON	H	ON	L	OFF	L	OFF
Tone Dial (Speakerphone)	H	ON	L	OFF	H	ON	L	OFF

■ HANDSET CIRCUIT

1) Transmission Signal Path

The input signal for the handset microphone is sent to the telephone line via the following path:

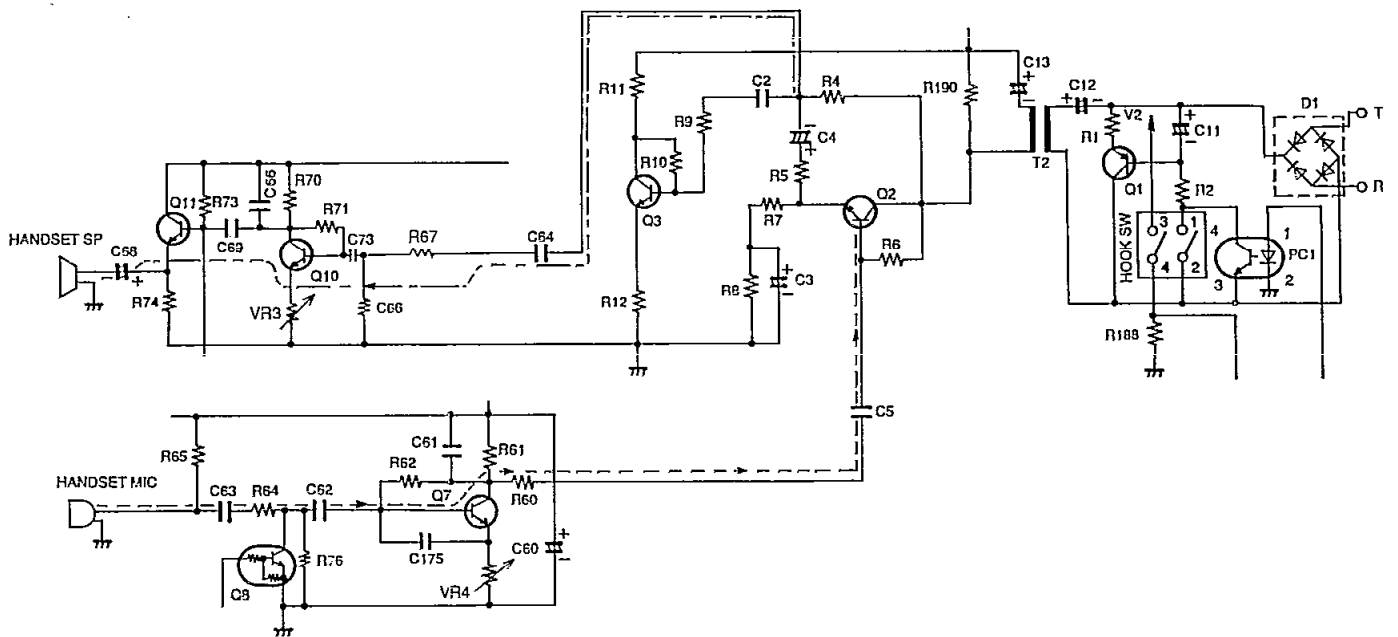
Handset MIC → C63 → R64 → C62 → Q7 → R60 → C5 → Q2 → T2 → D1 → Telephone Line

2) Reception Signal Path

The input signal from the telephone line is sent to the receiver through the following path:

Telephone Line → D1 → T2 → R4 → C64 → R67 → C73 → Q10 → C69 → Q11 → C68 → Handset Speaker

Circuit Diagram





TROUBLE SHOOTING GUIDE

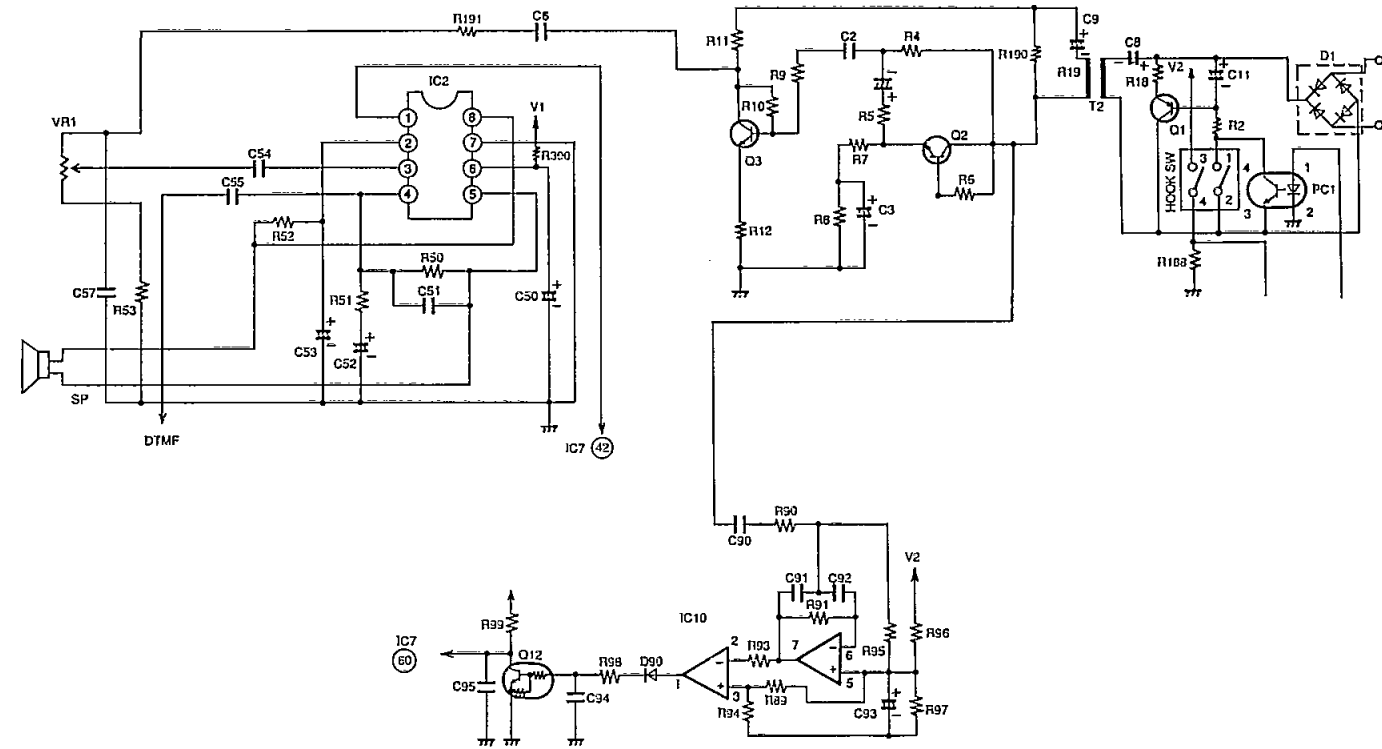
MONITOR CIRCUIT

Circuit Operation:

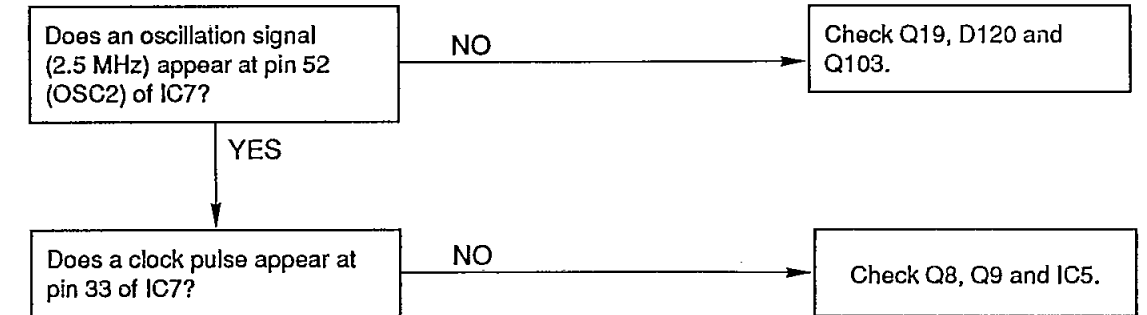
Signals received from the telephone line are outputted at the speaker via the following path:

Telephone Line → D1 → T1 → R4 → C2 → R9 → Q3 → C6 → R191 → VR1 → IC2 pin ③ → IC2 pin ⑧ → SP

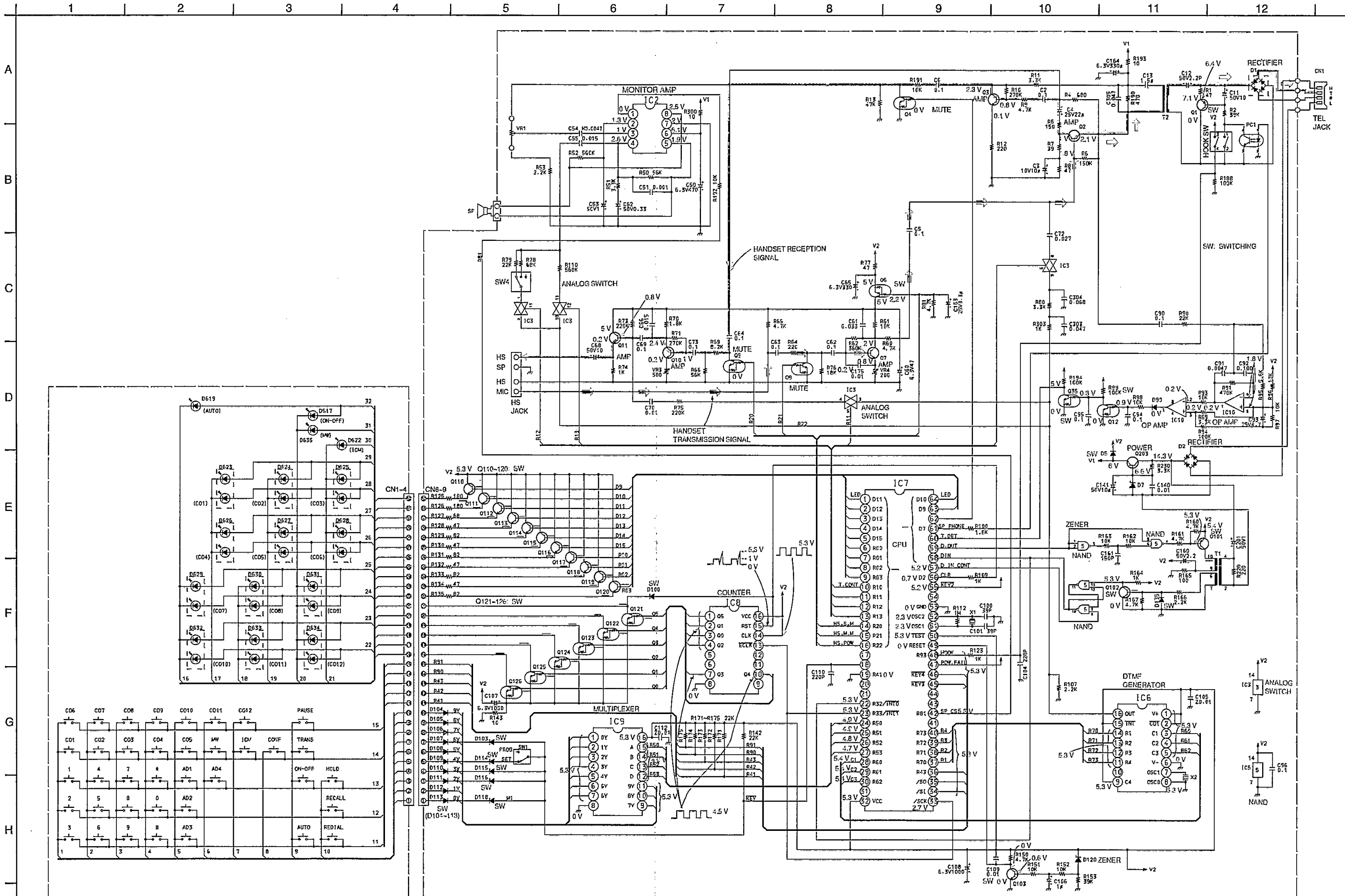
Circuit Diagram



1) NO OPERATION

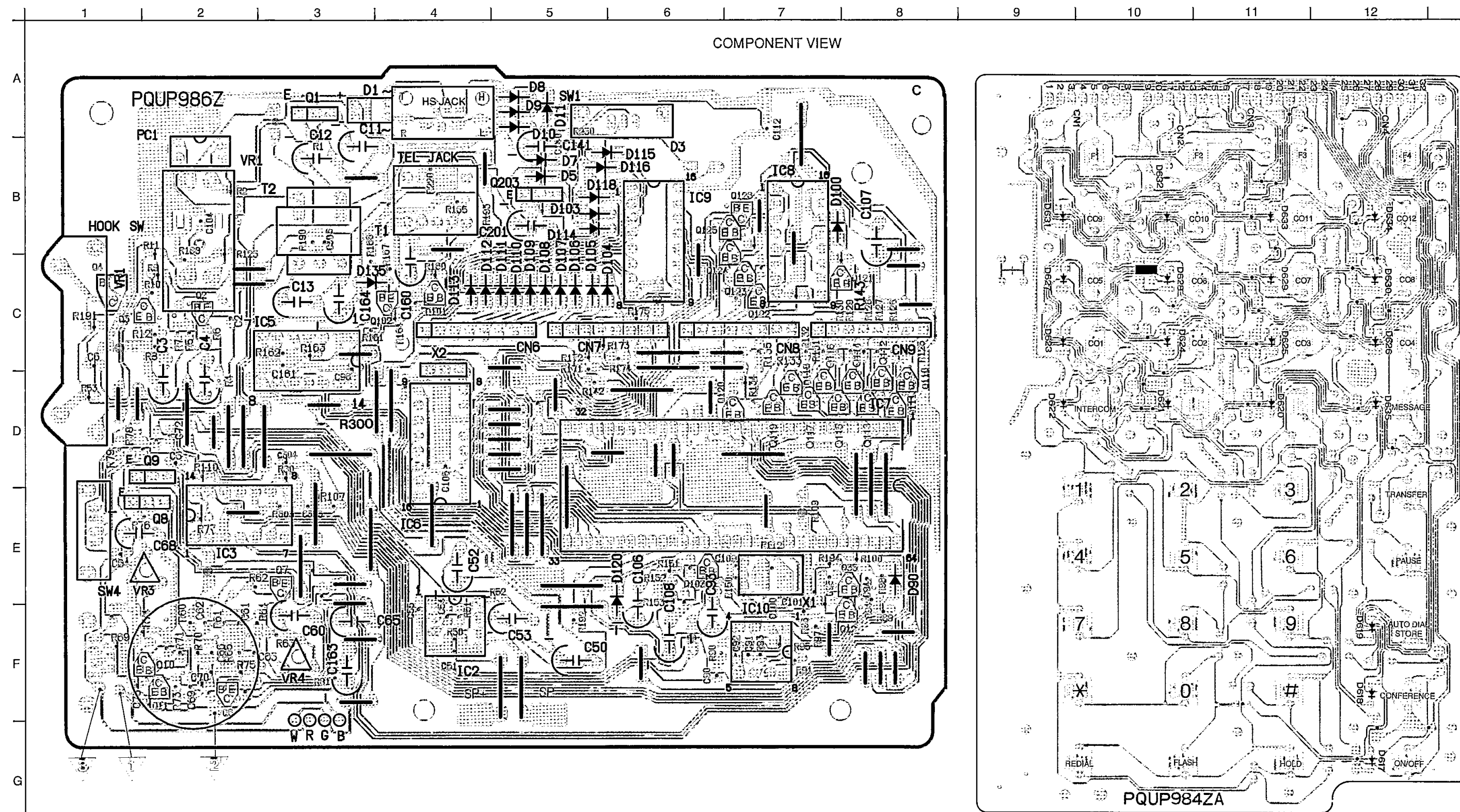


SCHEMATIC DIAGRAM



PRINTED CIRCUIT BOARD

COMPONENT VIEW



■ FOR SCHEMATIC DIAGRAM

Notes:

1. SW1: Memory switch in "SET" position.
2. SW4: Ringer volume selector switch in "HIGH" position.
3. Hook SW: Hook switch.
4. DC voltage measurements are taken with electronic voltmeter or oscilloscope from ground.  
(Off-Hook condition  
IC1 ...Speakerphone ON condition)
5. This schematic diagram may be modified at any time with the development of new technology.

- Notes:
1. The circuit shown in [ ] on the conductor indicates printed circuit on the back side of the printed circuit board.
  2. The circuit shown in [ ] on the conductor indicates printed circuit on the front side of the printed circuit board.

3. This printed circuit board may be modified at any time with the development of new technology.

### EXTENSION CORD CONNECTING METHOD

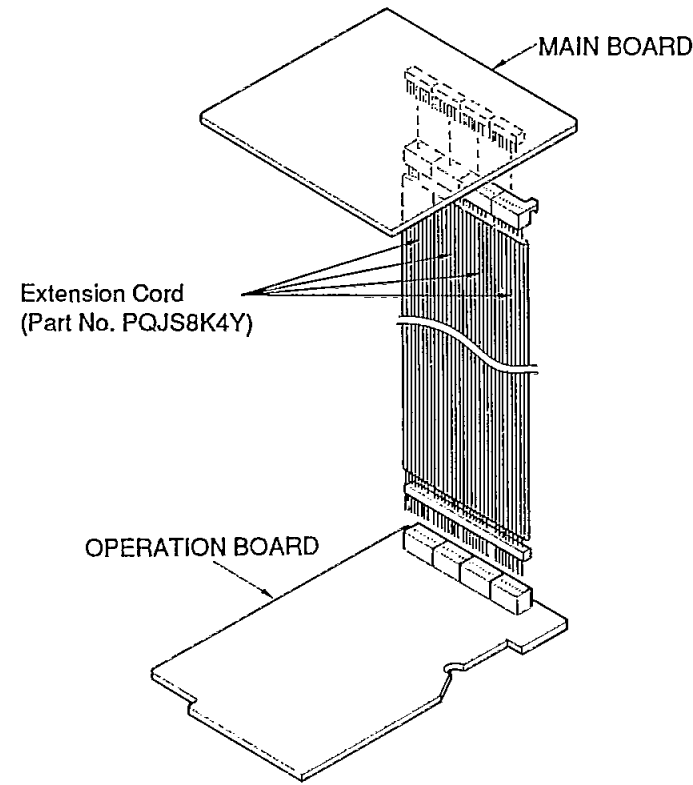


Fig. 11

### ACCESSORIES AND PACKING MATERIALS

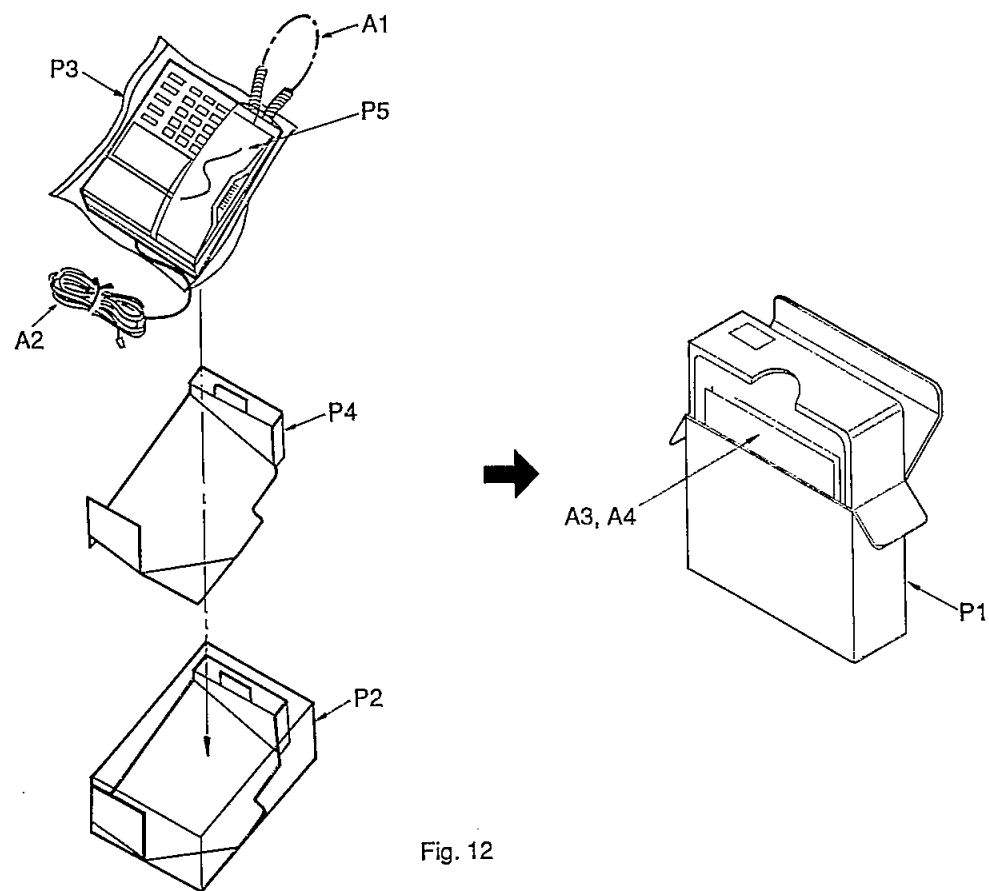
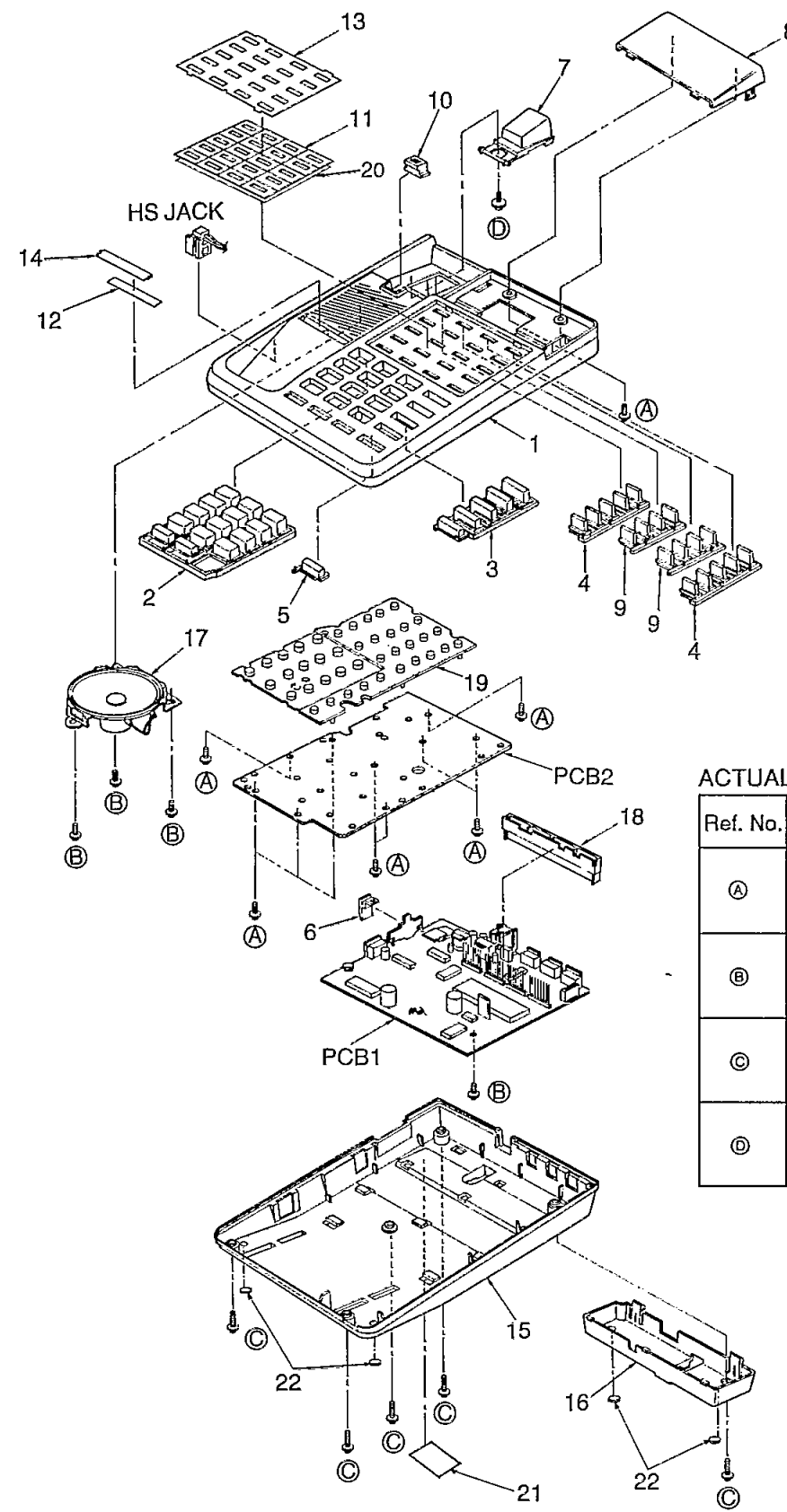


Fig. 12

### CABINET AND ELECTRICAL PARTS LOCATION



ACTUAL SIZE OF SCREWS

Ref. No.	Figure	Part No.
Ⓐ		XTW26+S8F
Ⓑ		XTW3+S10P
Ⓒ		XTW3+S14P
Ⓓ		XTW3+W6F

Fig. 13

# HANDSET PARTS LOCATION

## ACTUAL SIZE OF SCREWS

Ref. No.	Figure	Part No.
Ⓐ		XTN3+10G
Ⓑ		XTW3+W8P

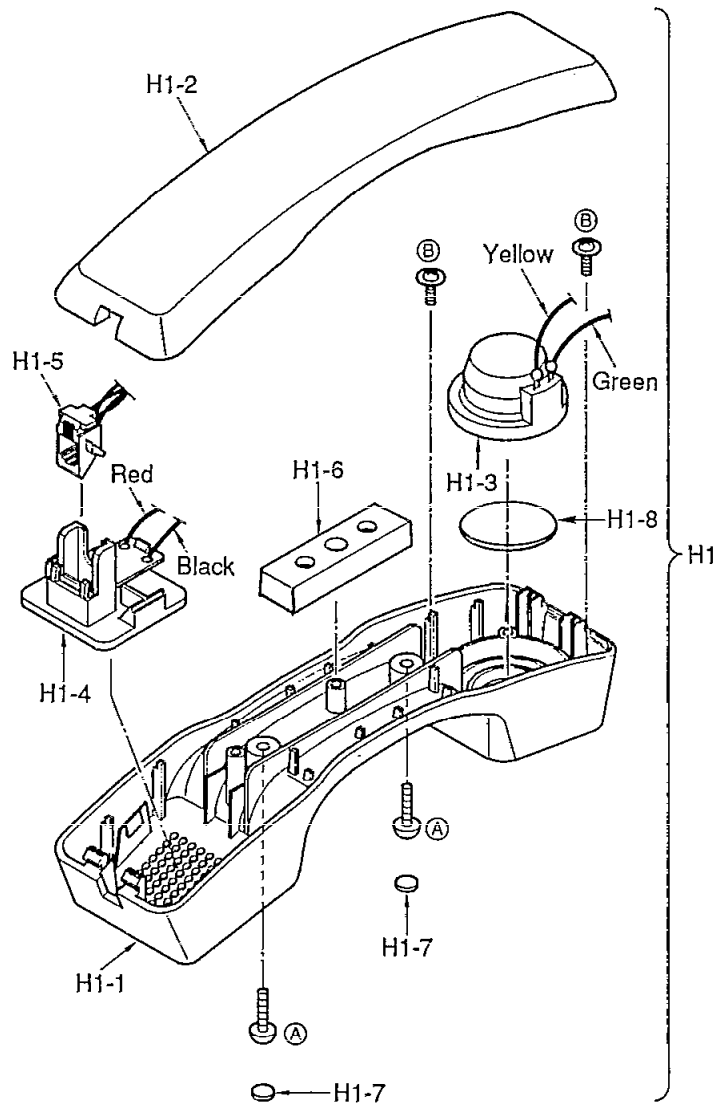


Fig. 14

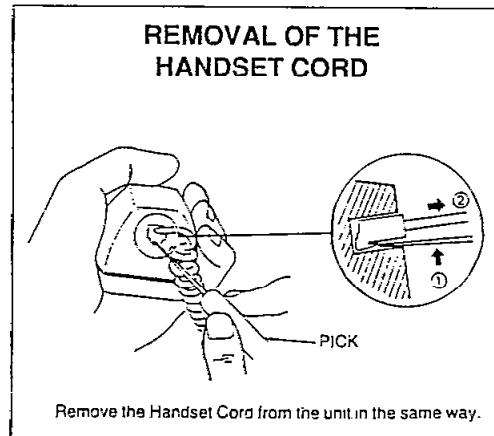


Fig. 15

REPLACEMENT PARTS LIST

Model KX-T7050E

Notes:

- The marking (RTL) indicates that the Retention Time is limited for this item. After the discontinuation of this assembly in production, the item will continue to be available for a specific period of time. The retention period of availability is dependent on the type of assembly, and in accordance with the laws governing part and product retention. After the end of this period, the assembly will no longer be available.
- Important safety notice. Components identified by the  $\Delta$  mark special characteristics important for safety. When replacing any of these components, use only manufacturer's specified parts.
- The S mark indicates service standard parts and may differ from production parts.

4. RESISTORS & CAPACITORS

Unless otherwise specified,  
 All resistors are in ohms(  $\Omega$  ) k=1000 $\Omega$ , M=1000k $\Omega$   
 All capacitors are in MICRO FARADS(  $\mu$ F ) P= $\mu$ F

\*Type & Wattage of Resistor

ERC:Solid	ERX: Metal Film	PQ4R: Carbon
ERD:Carbon	ERG: Metal Oxide	ERS: Fusible Resistor
PQRD:Carbon	ERQ: Metal Film	ERF: Cement Resistor

Wattage

10,16:1/8W	14,25:1/4W	12:1/2W	1:1W	2:2W	3:3W
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\*Type & Voltage of Capacitor

Type		Voltage	
ECFD: Semi-Conductor	ECCD, ECKD, ECBT, PQCBC : Ceramic	ECQ Type	ECQV Type
ECQS: Styrol	ECQE, ECQV, ECQG : Polyester	ECSZ Type	Others
PQCUV: Chip	ECEA, ECSZ : Electrolytic	1H: 50V	05: 50V
ECQMS: Mica	ECQP : Polypropylene	2A: 100V	1: 100V
		2E: 250V	2: 200V
		2H: 500V	0J: 6.3V
			0J: 6.3V
			1A: 10V
			1A: 10V
			50, 1H: 50V
			1V: 35V
			1C: 16V
			1J: 63V
			2A: 100V

Ref. No.	Part No.	Part Name & Description	Pcs
CABINET AND ELECTRICAL PARTS			
1	PQKM208S81	UPPER CABINET	1
2	PQBCX198Z1	BUTTON, DIA/REDIAL/FLASH	1
3	PQBCX206Z1	BUTTON, TRANS/PAUSE/AUTO etc.	1
4	PQBCX200Z1	BUTTON, INTERCOM/CONF etc.	2
5	PQBC282Z	BUTTON, HOLD	1
6	PQBD166X1	KNOB, VOLUME	1
7	PQBE37Z1	BUTTON, HOOK	1
8	PQGG90R	GRILLE	1
9	PQBCX200Y1	BUTTON, CO LINE	2
10	PQKE82Z1	HANGER	1
11	PQGD10023Y1	TEL. NO. CARD (LARGE) (B)	1
12	PQHP532X	TEL. NO. CARD (SMALL)	1
13	PQHR5392Z	TRANSPARENT PLATE [TEL. NO. CARD (LARGE)]	1
14	PQHR576Z	TRANSPARENT PLATE [TEL. NO. CARD (SMALL)]	1
15	PQKF188T81	LOWER CABINET	1
16	PQKL37Z81	STAND	1
17	PQAS65P06V	SPEAKER	1
18	PQHR9597Z	SPACER	1
19	PQSE118Z	KEY SWITCH	1
20	PQGD10023Z1	TEL. NO. CARD (LARGE) (with CO)	1
21	PQGT10295Z	NAME PLATE	1
22	PQHG316Z	FOOT RUBBER	4
HANDSET PARTS			
H1	PQJX2PSL05Z	HANDSET ASSEMBLY	1
H1-1	PQKM211P81	LOWER CABINET	1
H1-2	PQKF192Y81	UPPER CABINET	1
H1-3	PQAX4P03Y	SPEAKER	1
H1-4	PQWMJ2PYL02Y	MICROPHONE ASS'Y	1
H1-5	PQJJ1TB17X	JACK	1
H1-6	PQHMG7Z	WEIGHT	1
H1-7	PQHG695W	RUBBER PARTS, CAP	2
H1-8	PQHS277Z	FELT PART	1

Ref. No.	Part No.	Part Name & Description	Pcs
ACCESSORIES AND PACKING MATERIALS			
A1	PQWAT7020EUK	HANDSET CORD	1
A2	PQJA87T	TELEPHONE CORD	1
A3	PQOX10148Y	INSTRUCTION BOOK	1
A4	PQQW10534Z	LEAFLET	1
P1	PQPK10234Z	GIFT BOX	1
P2	PQPN10122Z	CUSHION	1
P3	XZB30X25A01	PROTECTION COVER (FOR UN1)	1
P4	PQPN10123Z	ACCESSORY BOX	1
P5	PQPH75Z	PROTECTION COVER (FOR HANDSET)	1
MAIN BOARD PARTS			
PCB1	PQWP1T7050EU	MAIN BOARD ASS'Y (RTL)	1
IC2	PQVIMC34119P	(ICs)	1
IC3	PQVITC4066BP	IC	1
IC4	Not Used	IC	S
IC5	PQVITC4011BP	IC	S
IC6	PQVITP5089N	IC	1
IC7	PQVJ4046SA92	IC	1
IC8	PQVITC4017BP	IC	S
IC9	PQVITC7H42P	IC	S
IC10	PQVIUFC358C	IC	S
Q1	2SA1626	(TRANSISTORS)	1
Q2,3	2SD1819A	TRANSISTOR(SI)	1
Q4	FQVTFB1J3P	TRANSISTOR(SI)	S
Q5	Not Used	TRANSISTOR(SI)	1
Q6	FQVTDTA143XU	TRANSISTOR(SI)	1
Q7	2SD1819A	TRANSISTOR(SI)	S
Q8,9	FQVTBB1J3P	TRANSISTOR(SI)	2
Q10,11	2SD1819A	TRANSISTOR(SI)	S
Q12	PQVTDTC143E	TRANSISTOR(SI)	1
Q35	UN5213	TRANSISTOR(SI)	S
Q101	2SB1218A	TRANSISTOR(SI)	S
Q102,103	2SD1819A	TRANSISTOR(SI)	S
Q110-120	2SD1819A	TRANSISTOR(SI)	S
Q121	PQVTDTC123E	TRANSISTOR(SI)	1
Q122-126	PQVTDTC143E	TRANSISTOR(SI)	5
Q203	2SD2136	TRANSISTOR(SI)	1
D1	PQVDS1YB40F1	(DIODES)	1
D2,3,4	Not Used	DIODE(SI)	1
D5	1SS131	DIODE(SI)	1
D6	Not Used	DIODE(SI)	1
D7	MA4068	DIODE(SI)	1
D8-11	1SS131	DIODE(SI)	4
D90	1SS131	DIODE(SI)	1
D100	1SS131	DIODE(SI)	1
D101,102	Not Used	DIODE(SI)	14
D103-116	1SS131	DIODE(SI)	1
D117	Not Used	DIODE(SI)	1
D118	1SS131	DIODE(SI)	1
D119	Not Used	DIODE(SI)	1
D120	MA4039	DIODE(SI)	1
D135	1SS131	DIODE(SI)	1
PC1	PQVITLP627	(PHOTO ELECTRIC TRANSDUCER) PHOTO COUPLER	S
SW1	PQSS2A27Y	(SWITCHES) SWITCH, MEMORY	1
SW2,3	Not Used	SWITCH, RINGER	1
SW4	PQSS3A17Y	SWITCH, HOOK	1
HCOK SW	ESE14A211		1

Ref. No.	Part No.	Part Name & Description	Pcs	Ref. No.	Part No.	Part Name & Description (Value)	Pcs
T1	ETE13K24AY	(TRANSFORMERS) PULSE TRANSFORMER	1	C160	ECEA1HKS2R2	2.2	1
T2	PQLT8D2A	COMMUNICATION TRANSFORMER	1	C161	PQCUV1H151JC	150P	1
				C162	Not Used		
				C163	ECEA1HKS3R3	3.3	1
				C164	ECEA0JU331	330	1
		(VARIABLE RESISTORS)					
VR1	PQVAL204B24A	VOLUME CONTROL, 20kΩ (B)	S 1	C175	PQCUV1H103KB	0.01	1
VR2	Not Used						
VR3	PQNB3A00B52M	SEMI-FIXED, 500Ω (B)	S 1	C201	ECEA1HKS010	1	1
VR4	PQNB3A00B22M	SEMI-FIXED, 200Ω (B)	S 1				
		(CRYSTAL OSCILLATOR & CERAMIC FILTER)		C303	PQCUV1E473MD	0.047	1
X1	PQVCX2500N9	CRYSTAL OSCILLATOR	1	C304	PQCUV1H683MD	0.068	1
X2	PQVBT3.58G7	CERAMIC FILTER	1	C305	PQCUV1E473MD	0.047	1
		(CAPACITORS)				(RESISTORS)	
C1	Not Used			R1	PQ4R10XJ470	47	1
C2	PQCUV1E104MD	0.1	1	R2	PQ4R10XJ393	39K	1
C3	ECEA1HKS100	10	S 1	R3	Not Used		
C4	ECEA1HK220	22	1	R4	PQ4R10XJ681	680	1
C5	PQCUV1E104MD	22	1	R5	PQ4R10XJ151	150	1
C6	PQCUV1E104MD	0.1	1	R6	PQ4R10XJ154	150K	1
C7	Not Used			R7	PQ4R10XJ390	39	1
C8	Not Used			R8	PQ4R10XJ470	47	1
C9	Not Used			R9	PQ4R10XJ472	4.7K	1
C10	Not Used			R10	PQ4R10XJ274	270K	1
C11	ECEA1HKS100	10	1	R11	PQ4R10XJ332	3.3K	1
C12	ECEA2CU2R2	2.2	1	R12	PQ4R10XJ221	220	1
C13	ECQV1H155JL3	1.5	1				
				R50	PQ4R10XJ563	56K	1
C50	ECEA0JU471	470	1	R51	PQ4R10XJ332	3.3K	1
C51	PQCUV1H102J	0.001	1	R52	PQ4R10XJ564	560K	1
C52	ECEA1HKS3R3	0.33	1	R53	PQ4R10XJ222	2.2K	1
C53	ECEA1HKS010	1	1				
C54	PQCUV1H472KB	0.0047	1	R60	PQ4R10XJ472	4.7K	1
C55	PQCUV1H153KB	0.015	1	R61	PQ4R10XJ103	10K	1
				R62	PQ4R10XJ364	360K	1
C60	ECEA1CK5470	47	S 1	R63	Not Used		
C61	PQCUV1H333JC	0.033	S 1	R64	PQ4R10XJ221	220	1
C62	PQCUV1E104MD	0.1	1	R65	PQ4R10XJ472	4.7K	1
C63	PQCUV1E104MD	0.1	1	R66	PQ4R10XJ563	56K	1
C64	PQCUV1E104MD	0.1	1	R67	Not Used		
C65	ECEA0JU331	330	1	R68	Not Used		
C66	PQCUV1H153KB	0.015	1	R69	PQ4R10XJ822	8.2K	1
C67	Not Used			R70	PQ4R10XJ182	1.8K	1
C68	ECEA1HKS100	10	1	R71	PQ4R10XJ274	270K	1
C69	PQCUV1E104MD	0.1	1	R72	Not Used		
C70	PQCUV1H103KB	0.01	1	R73	PQ4R10XJ224	220K	1
C71	Not Used			R74	PQ4R10XJ102	1K	1
C72	PQCUV1E273MD	0.027	1	R75	PQ4R10XJ224	220K	1
C73	PQCUV1E104MD	0.1	1	R76	PQ4R10XJ183	18K	1
				R77	PQ4R10XJ470	47	1
C90	PQCUV1E104MD	0.1	1	R78	PQ4R10XJ683	68K	1
C91	PQCUV1H472KB	0.0047	1	R79	PQ4R10XJ223	22K	1
C92	PQCUV1E104MD	0.1	1	R80	PQ4R10XJ332	3.3K	1
C93	ECEA1HKS4R7	4.7	S 1	R81	PQ4R10XJ472	4.7K	1
C94	PQCUV1E104MD	0.1	1				
C95	PQCUV1E104MD	0.1	1	R89	PQ4R10XJ332	3.3K	1
C96	PQCUV1E104MD	0.1	1	R90	PQ4R10XJ223	22K	1
C97	Not Used			R91	PQ4R10XJ474	470K	1
C98	Not Used			R92	Not Used		
C99	Not Used			R93	PQ4R10XJ103	10K	1
C100	PQCUV1H390JC	39P	1	R94	PQ4R10XJ104	100K	1
C101	PQCUV1H390JC	39P	1	R95	PQ4R10XJ562	5.6K	1
C102	Not Used			R96	PQ4R10XJ183	18K	1
C103	Not Used			R97	PQ4R10XJ103	10K	1
C104	PQCUV1H221JC	220P	1	R98	PQ4R10XJ103	10K	1
C105	PQCUV1H103KB	0.01	1	R99	PQ4R10XJ104	100K	1
C106	ECEA1HKS010	1	1	R100	PQ4R10XJ182	1.8K	1
C107	ECEA0JU102	1000	1				
C108	ECEA0JU102	1000	1	R107	PQ4R10XJ222	2.2K	1
C109	PQCUV1H103KB	0.01	1	R108	Not Used		
C110	Not Used			R109	PQ4R18XJ102	1K	1
C111	Not Used			R110	PQ4R10XJ224	220K	1
C112	PQCUV1H103KB	0.01	1	R111	Not Used		
				R112	PQ4R10XJ105	1M	1
C140	PQCUV1H103KB	0.01	1				
C141	ECEA1HKS100	10	1	R123	PQ4R10XJ102	1K	1
				R124	Not Used		
				R125	PQ4R10XJ181	180	1
				R126	PQ4R10XJ181	180	1

Ref. No.	Part No.	Part Name & Description (Value)	Pcs
R127	PQ4R10XJ680	68	1
R128	PQ4R10XJ330	33	1
R129	PQ4R10XJ820	82	1
R130	PQ4R10XJ330	33	1
R131	PQ4R10XJ820	82	1
R132	PQ4R10XJ330	33	1
R133	PQ4R10XJ820	82	1
R134	PQ4R10XJ330	33	1
R135	PQ4R10XJ820	82	1
R142	PQ4R10XJ223	22K	1
R143	ERDS2TJ100	10	1
R150	PQ4R10XJ472	4.7K	1
R151	PQ4R10XJ103	10K	1
R152	PQ4R10XJ103	10K	1
R153	PQ4R10XJ392	3.9K	1
R160	PQ4R10XJ472	4.7K	1
R161	PQ4R10XJ472	4.7K	1
R162	PQ4R10XJ103	10K	1
R163	PQ4R10XJ103	10K	1
R164	PQ4R10XJ102	1K	1
R165	PQ4R10XJ101	100	1
R166	PQ4R10XJ222	2.2K	1
R167	PQ4R10XJ472	4.7K	1
R168	Not Used		
R169	Not Used		
R170	Not Used		
R171	PQ4R10XJ223	22k	1
R172	PQ4R10XJ223	22k	1
R173	PQ4R10XJ223	22k	1
R174	PQ4R10XJ223	22k	1
R175	PQ4R10XJ223	22k	1
R188	PQ4R10XJ104	100K	1
R189	Not Used		
R190	PQ4R10XJ471	470	1
R191	PQ4R10XJ103	10K	1
R192	PQ4R10XJ103	10K	1
R193	PQ4R10XJ100	10	1
R194	PQ4R10XJ104	100K	1
R220	PQ4R10XJ221	220	1
R230	PQ4R10XJ332	3.3K	1
R303	PQ4R10XJ102	1K	1
CN6-9	PQJP8D113Z	(CONNECTORS & JACKS) CONNECTOR, 8P	4
HS	PQJJ1TB2T	JACK, HANDSET	1
JACK			
TEL	PQJJ1TB26Z	JACK, EMSS	1
JACK			
OPERATION BOARD PARTS			
PCB2	PQWP2T7050EU	OPERATION BOARD ASS'Y (RTL)	1
D617	LN1261C	(DIODES) LED	1
D618	Not Used		
D619	LN1261C	LED	1
D620.621	Not Used		
D622	LN1361C	LED	1
D623-634	LN2162C13TR	LED	12
D635	LN1261C	LED	1
CN1-4	PQJS8B30Z	(CONNECTOR) CONNECTOR, 8P	4