ORDER NO. KMS0104564C1
F5

DIGITAL PROPRIETARY TELEPHONE

KX-T7456 / KX-T7456B

White Version
Black Version
(for U.S.A.)

SPECIFICATIONS

■ **SPECIFICATIONS**

Station Loop Limit:	40 ohms
Cabling Method:	2 pair wire
Jacks:	Main Unit, Handset/Headset, Telephone
Display:	24 digits (max.)
Dimensions:	208 (W) x 105 (H) x 264(D) mm with handset
Weight:	1.08 kg

Design and specifications are subject to change without notice.

Panasonic®

1. CAUTION

Note:
When you note the serial number, write down all 11 digitals.
The serial number may be found on the bottom of the unit.

2. FOR SERVICE TECHNICIANS

1. Note the following items when exchanging the LEDs (Ref. No.

D100-130, D201, D202) of Main Board, LCD Board.

1) Do not reuse a LED which is removed from the P.C. Board.

2) Use a soldering iron (less than 15 W) for exchanging LED.

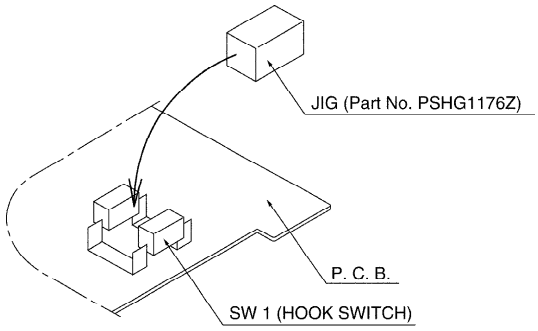
3) Do not heat the LED for more than 2 seconds.

4) Do not move the LED after soldering.

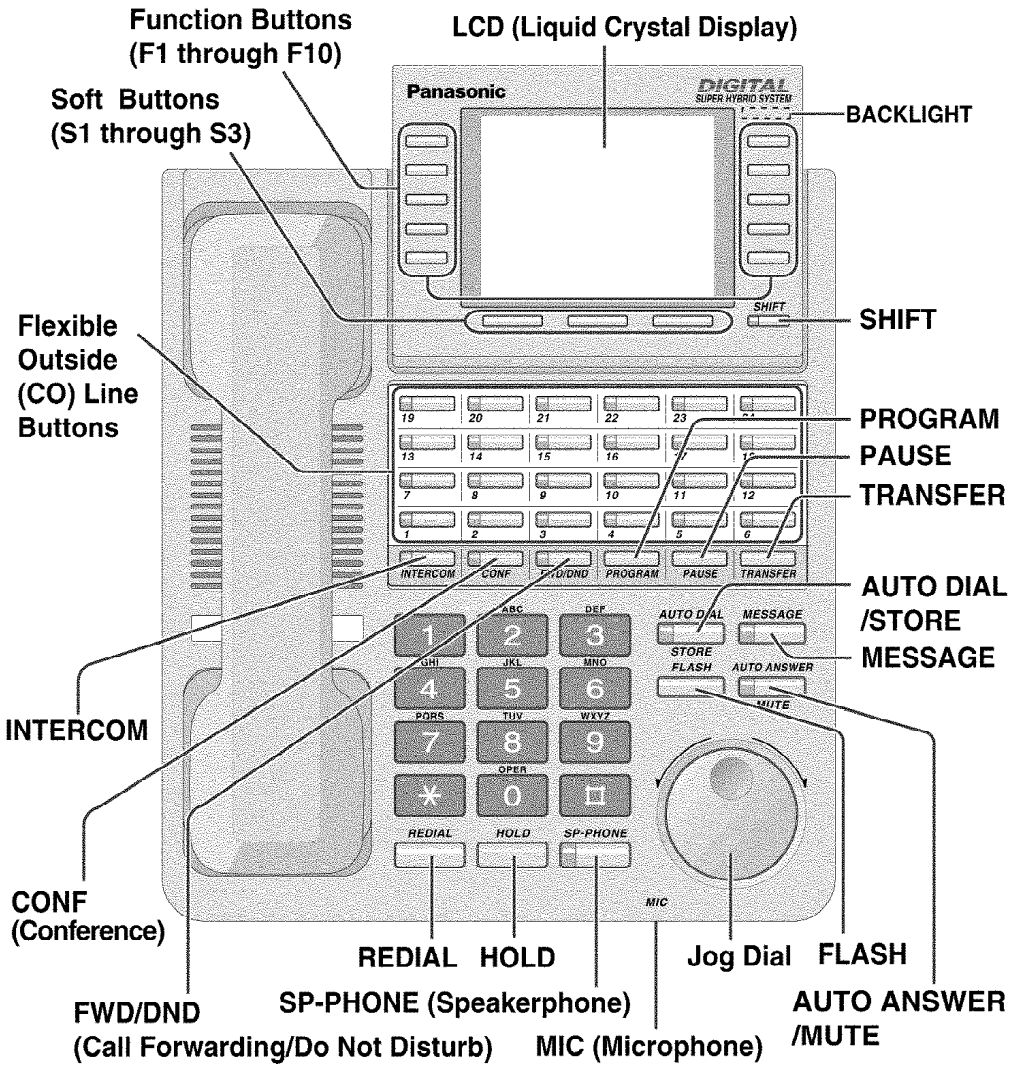
2. This unit employs the switch which is influenced by the light for the hook switch.

When you open the cabinet to repair the unit in the bright light, the hook switch might work improperly.

Therefore, take care not to shine the hook switch directly, or use the jig as shown below.



3. LOCATION OF CONTROLS

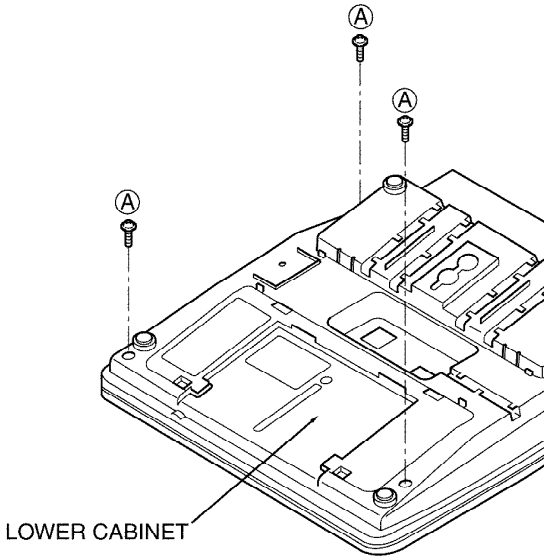


4. DISASSEMBLY INSTRUCTIONS

4.1. HOW TO REMOVE THE LOWER CABINET

(Procedure 1)

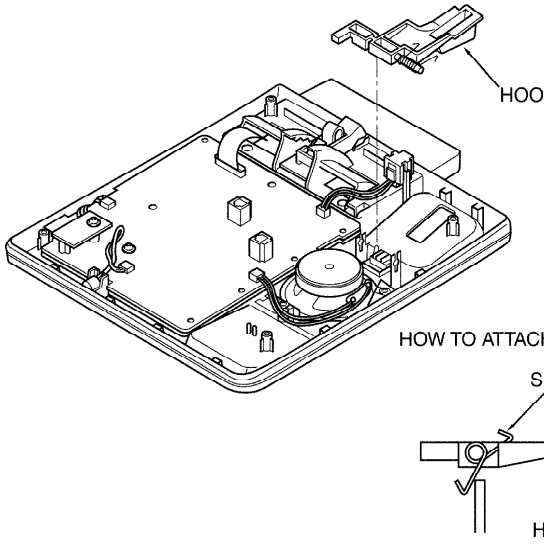
(1) Remove the 4 screws A.
(2) Remove the lower cabinet.



4.2. HOW TO REMOVE THE HOOK BUTTON

(Procedure 1 → 2)

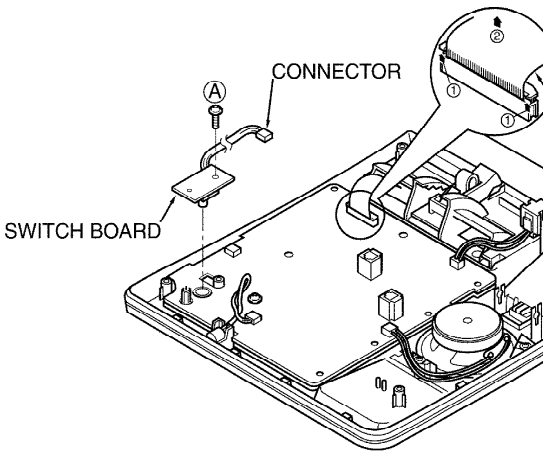
(1) Remove the hook button.

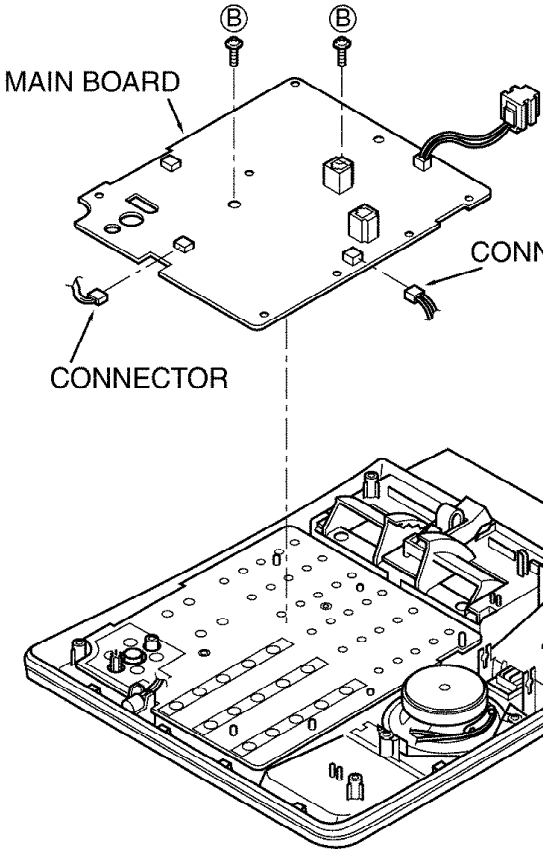


4.3. HOW TO REMOVE THE SWITCH AND MAIN BOARDS

(Procedure 1 → 2 → 3)

(1) Remove the screws A.
(2) Pull out the switch board connector.
(3) Remove the switch board.
(4) Pull out the flat cable. (See Fig. 1)
(5) Remove the 2 screws B.
(6) Pull out the speaker and microphone connectors.
(7) Remove the main board.



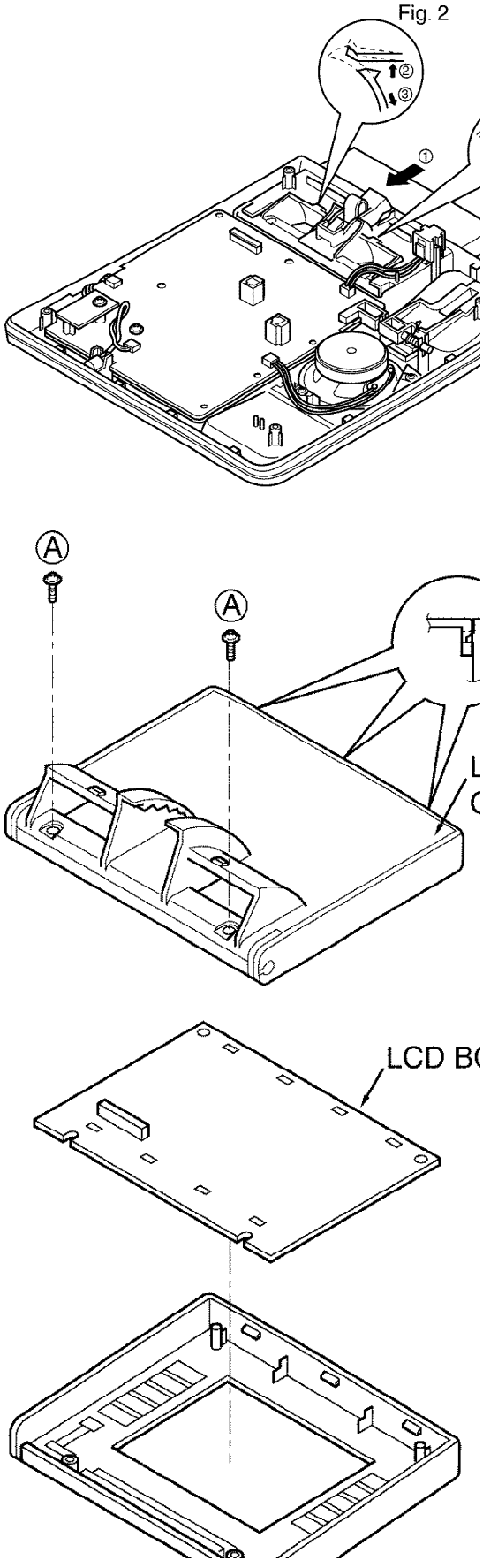


4.4. HOW TO REMOVE THE LCD BOARD

(Procedure 1 → 4)

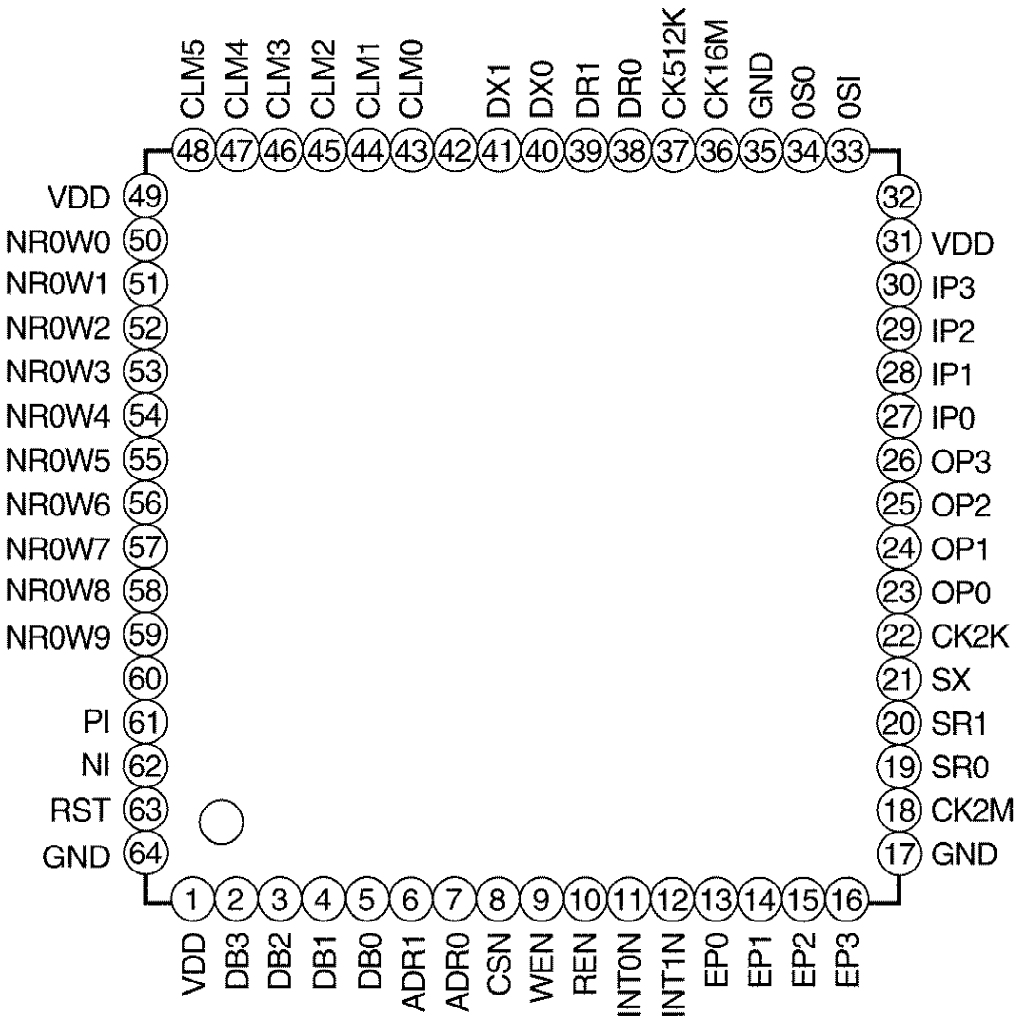
(1) Pull out the flat cable. (See Fig. 1)
(2) Remove the LCD block. (See Fig. 2)
(3) Remove the 2 screws A.
(4) Remove the lower cabinet.
(5) Remove the LCD board.

Fig. 2



5. IC DATA

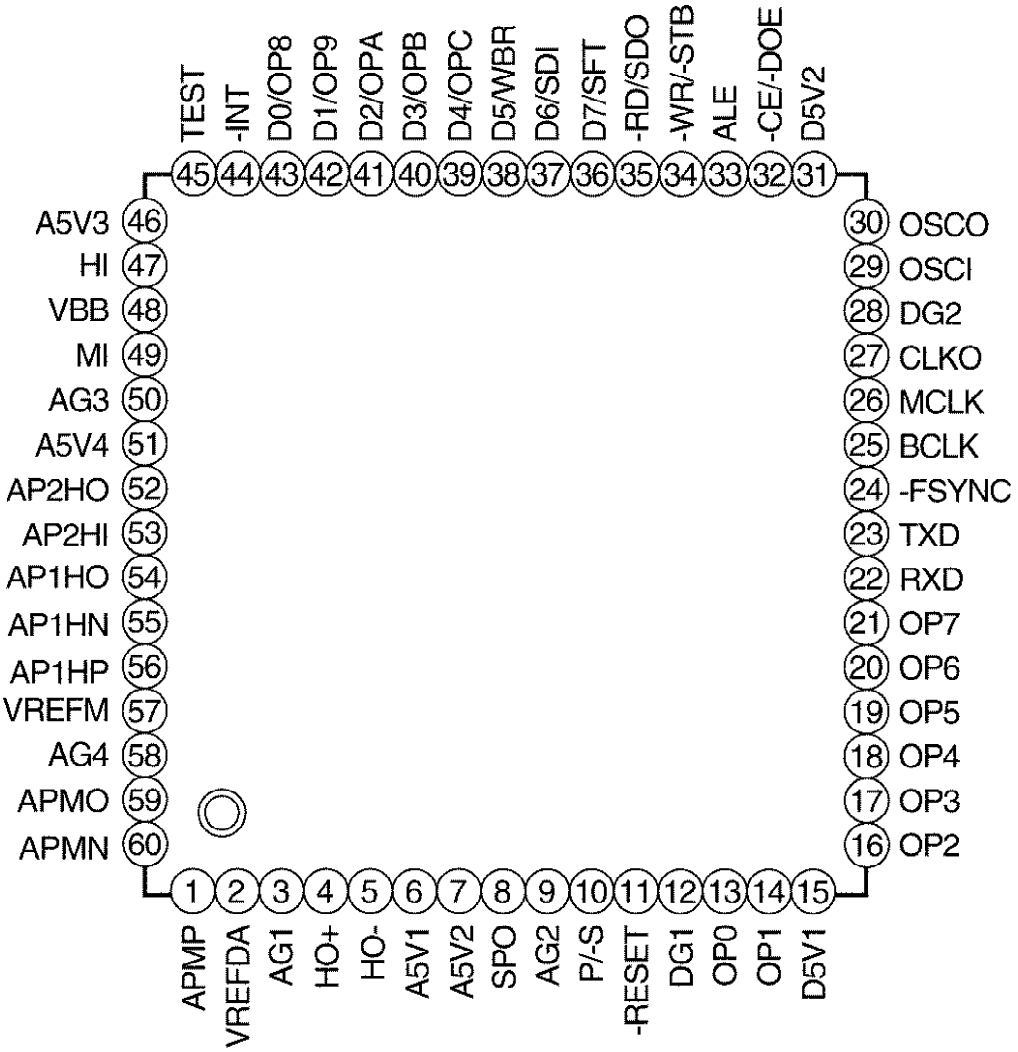
5.1. IC1



Name	Pin	Dir.	Pull Up	Type	Io	Act.	Block	MHz	Description
DB3	2	bidir	---	TTL	8.0mA	high	PT5B03	2.0	Data Bus [3]
DB2	3	bidir	---	TTL	8.0mA	high	PT5B03	2.0	Data Bus [2]
DB1	4	bidir	---	TTL	8.0mA	high	PT5B03	2.0	Data Bus [1]
DB0	5	bidir	---	TTL	8.0mA	high	PT5B03	2.0	Data Bus [0]
ADR1	6	input	12-38k	TTL	---	high	PT5D01U	2.0	Address Bus [1]
ADR0	7	input	12-38k	TTL	---	high	PT5D01U	2.0	Address Bus [0]
CSN	8	input	---	TTL	---	low	PT5D01	1.0	Chip Select
REN	10	input	12-38k	TTL	---	low	PT5D01U	2.0	Read Enable Com
WEN	9	input	12-38k	TTL	---	low	PT5D01U	2.0	Write Enable Com
RST	63	input	---	CMOS schmidt	---	high	PC5D21	0.01	Asynchronous Re
INT0N	11	output	---	CMOS	2.0mA	low	PC5O01	0.01	Interrupt Request
INT1N	12	output	---	CMOS	2.0mA	low	PC5O01	0.01	Interrupt Request
DR0	38	input	---	CMOS	---	low	PC5D01	0.6	Dpits Receive Dat
DR1	39	input	---	CMOS	---	low	PC5D01	0.6	Dpits Receive Dat
DX0	40	output	---	CMOS	4.0mA	low	PC5O02	0.6	Dpits Transmit Da
DX1	41	output	---	CMOS	4.0mA	low	PC5O02	0.6	Dpits Transmit Da
CK512K	37	output	---	CMOS	2.0mA	high	PC5O01	0.6	Dpits Bit Rate Clo
SR0	19	input	12-38k	TTL	---	high	PT5D01U	0.1	Serial Receive Dat Stream [0]
SR1	20	input	12-38k	TTL	---	high	PT5D01U	0.1	Serial Receive Dat Stream [1]
SX	21	output	---	CMOS	4.0mA	high	PC5O02	0.1	Serial Transmit Da Stream
CK2M	18	output	---	CMOS	4.0mA	high	PC5O02	2.1	Serial Stream Cloc
EP0	13	output	---	CMOS	2.0mA	high	PC5O01	0.01	External Channel
EP1	14	output	---	CMOS	2.0mA	high	PC5O01	0.01	External Channel
EP2	15	output	---	CMOS	2.0mA	high	PC5O01	0.01	External Channel
EP3	16	output	---	CMOS	2.0mA	high	PC5O01	0.01	External Channel
PI	61	input	---	CMOS schmidt	---	high	PC5D21	0.01	Rotary Encoder In [Pos]
NI	62	input	---	CMOS schmidt	---	high	PC5D21	0.01	Rotary Encoder In [Neg]
CLM0	43	output	---	CMOS	4.0mA	high	PC5O02	0.01	LED Column Drive
CLM1	44	output	---	CMOS	4.0mA	high	PC5O02	0.01	LED Column Drive
CLM2	45	output	---	CMOS	4.0mA	high	PC5O02	0.01	LED Column Drive
CLM3	46	output	---	CMOS	4.0mA	high	PC5O02	0.01	LED Column Drive
CLM4	47	output	---	CMOS	4.0mA	high	PC5O02	0.01	LED Column Drive
CLM5	48	output	---	CMOS	4.0mA	high	PC5O02	0.01	LED Column Drive
NROW0	50	output	---	CMOS	4.0mA	low	PC5O02	0.01	LED Row Drive [0]
NROW1	51	output	---	CMOS	4.0mA	low	PC5O02	0.01	LED Row Drive [1]
NROW2	52	output	---	CMOS	4.0mA	low	PC5O02	0.01	LED Row Drive [2]
NROW3	53	output	---	CMOS	4.0mA	low	PC5O02	0.01	LED Row Drive [3]
NROW4	54	output	---	CMOS	4.0mA	low	PC5O02	0.01	LED Row Drive [4]

NROW5	55	output	---	CMOS	4.0mA	low	PC5O02	0.01	LED Row Drive [5]
NROW6	56	output	---	CMOS	4.0mA	low	PC5O02	0.01	LED Row Drive [6]
NROW7	57	output	---	CMOS	4.0mA	low	PC5O02	0.01	LED Row Drive [7]
NROW8	58	output	---	CMOS	4.0mA	low	PC5O02	0.01	LED Row Drive [8]
NROW9	59	output	---	CMOS	4.0mA	low	PC5O02	0.01	LED Row Drive [9]
IP0	27	input	12-38k	CMOS	---	high	PC5D01U	0.01	Input Port [0]
IP1	28	input	12-38k	CMOS	---	high	PC5D01U	0.01	Input Port [1]
IP2	29	input	12-38k	CMOS	---	high	PC5D01U	0.01	Input Port [2]
IP3	30	input	12-38k	CMOS	---	high	PC5D01U	0.01	Input Port [3]
OP0	23	output		CMOS	4.0mA	high	PC5O02	0.01	Output Port [0]
OP1	24	output		CMOS	4.0mA	high	PC5O02	0.01	Output Port [1]
OP2	25	output		CMOS	4.0mA	high	PC5O02	0.01	Output Port [2]
OP3	26	output		CMOS	4.0mA	high	PC5O02	0.01	Output Port [3]
CK2K	22	output		CMOS	4.0mA	high	PC5O02	0.20	2kHz Clock Outpu 25%)
CK16M	36	output	---	CMOS	2.0mA	high	PC5O01	16.4	Master Clock Out
OSI	33	input	---	Analog	---	---	PC5X02	16.4	X'tal In (XIN)
OSO	34	output	---	Analog	---	---	PC5X02	16.4	X'tal Out (XOUT)
N.C.	32								not used
N.C.	42								not used
N.C.	60								not used
VDD1	1	vdd							Vdd (5V)
VDD2	31	vdd							Vdd (5V)
VDD3	49	vdd							Vdd (5V)
VSS1	17	vss							Vss (GND)
VSS2	35	vss							Vss (GND)
VSS3	64	vss							Vss (GND)

5.2. IC2

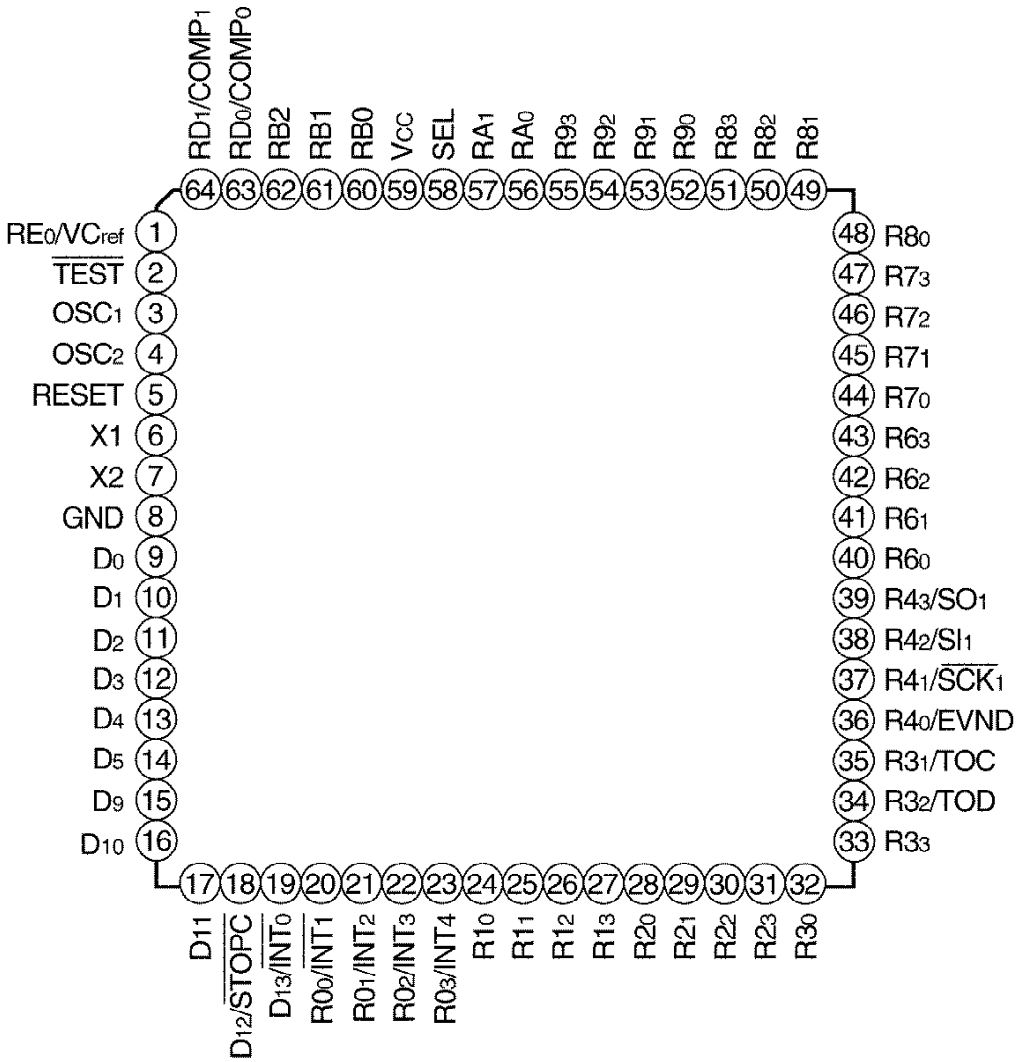

TEST 45
-INT 44
D0/OP8 43
D1/OP9 42
D2/OPA 41
D3/OPB 40
D4/OPC 39
D5/WBR 38
D6/SDI 37
D7/SFT 36
-RD/SDO 35
-WR/-STB 34
ALE 33
-CE/-DOE 32
D5V2 31
A5V3 46
HI 47
VBB 48
MI 49
AG3 50
A5V4 51
AP2HO 52
AP2HI 53
AP1HO 54
AP1HN 55
AP1HP 56
VREFM 57
AG4 58
APMO 59
APMN 60
30 OSCO
29 OSCI
28 DG2
27 CLKO
26 MCLK
25 BCLK
24 -FSYNC
23 TXD
22 RXD
21 OP7
20 OP6
19 OP5
18 OP4
17 OP3
16 OP2
1 APMP
2 VREFDA
3 AG1
4 HO+
5 HO-
6 A5V1
7 A5V2
8 SPO
9 AG2
10 P/-S
11 -RESET
12 DG1
13 OP0
14 OP1
15 D5V1

Name	NO.	I/O	Classification	Function
APMP	1	Analog input	Analog	Non-invering input terminal of microphone amplifier M1 Connect to the microphone.
VREFDA	2	---	Power supply, etc.	Reference voltage teminal of DAC. Connect the capacitor of 40 μ F between this terminal (AG2).
AG1	3			Ground terminal of the analog circuit.
HO+	4	Analog output	Analog	Output terminal for the handset receiver.
HO-	5			HO+ terminal and HO- terminal are biased to Vdd/2 volt HO- terminal is the inverse porality output terminal for +). Connect the capacitor in series between the handset ar terminals to cut the DC. Use the nonpolar type capacitor.
A5V1	6	---	Power supply, etc.	5V power supply terminal of analog circuit.
A5V2	7			
SPO	8	Analog output	Analog	Output treminal for the speaker amplifier. Connect to the external speaker amplifier input termina SPO terminal is biased to Vdd/2 voltage. Connect the capacitor of 0.1 μ F in series between the speaker amplifier input terminal and this terminal.
AG2	9	---	Power supply, etc.	Ground terminal of the analog circuit.
P/-S	10	CMOS inout	Micro-computer interface	Mode selection terminal of microcomputer interface. Inputting “0“ selects the serial mode, and “1“ selects th parallel mode.
-RESET	11			System reset terminal. The system is reset when “0“ is pressed.
DG1	12	---	Power supply, etc.	Ground terminal of the analog circuit.
OP0	13	3 states output	Output port	Outputs BIT0 signal of OPORT1 resistor.
OP1	14			Outputs BIT1 signal of OPORT1 resistor.
D5V1	15	---	Power supply, etc.	5V power supply terminal of analog circuit.
OP2	16	3 states output	Output	Outputs BIT2 signal of OPORT1 resistor.
OP3	17			Outputs BIT3 signal of OPORT1 resistor.
OP4	18			Outputs BIT4 signal of OPORT1 resistor.
OP5	19			Outputs BIT5 signal of OPORT1 resistor.
OP6	20			Outputs BIT6 signal of OPORT1 resistor.
OP7	21			Outputs BIT7 signal of OPORT1 resistor.

RXD	22	TTL input	PCM interface	Input terminal for PCM data
TXD	23	Output		Output terminal for PCM data
-FSYNC	24	TTL input		Input terminal of Sync. signal for PCM interface. The fre of input sync. signal is 8 kHz.
BCLK	25			Input terminal of shift clock pulse for PCM deta. Input p frequency renge is 64 kHz~2.048 kHz. PCM data (TXD termianl signal) is output st the positive PCM data (RXD terminal signal) is sampled at the negat The sameling is performed inside LSI.
MCLK	26	Output	Clock	Clock pulse output terminal. Output pulse frequency is 6.144MHz. System reset (inputting "0" to -RESET terminal) doesn'
CLKO	27			this output. Clock pulse output terminal which has selective freque The following 4 frequencies can be selected by resistor 12.228, 4.096, 2.048, 1.536 (MHz). System reset (inputting "0" to -RESET terminal) selects frequency of 1.536MHz and doesn't stop this output.
DG2	28	---	Power supply, etc.	Ground terminal of digital circuit.
OSCI	29	---	Clock	Input terminal of oscillation circuit. Connect the oscillator and resistor berween this termin pin 30 (OSCO), moreover, connect the capacitor betwee terminal and digital ground to make the oscillation circ
OSCO	30	---		Output terminal of oscillation circuit. Connect the oscillator and resistor berween this termin pin 29 (OSCI), moreover, connect the capacitor betwee terminal and digital ground to make the oscillation circ
D5V2	31	---	Power supply, etc.	5V power supply terminal of digital circuit.
-INT	44	Output	Micro-computer interface	Outputs 8 kHz clock pulse which is synchronized with -
TEST	45	CMOS input	Power supply, etc.	Test terminal Connect to the digital ground.
A5V3	46	---		5V power supply terminal of analog circuit.
HI	47	Analog input	Analog	Input terminal of TX handset signal. Either this signal or the signal supplied to pin 49 (HI) is AD converter.
VBB	48	---	Power supply, etc.	Reference voltage terminal of AD converter. Connect the capacitor of 10 μF between VBB termina 50 (AG3).

MI	49	Analog input	Analog	Input terminal of TX microphone signal. Either this signal or the signal supplied to pin 47 (HI) is AD converter.
AG3	50	---	Power supply, etc.	Ground terminal of analog circuit.
A5V4	51			5V power terminal of analog circuit.
AP2HO	52	Analog output	Analog	Output terminal of microphone amplofier H2. Connect the capacitor of 0.1 μ F to this terminal to cut
AP2HI	53	Analog input		Inverting input terminal of microphone amplofier H2. Connect the capacitor of 0.1 μ F to this terminal to cut
AP1HO	54	Analog output		Output terminal of microphone amplofier H1. Connect the capacitor of 0.1 μ F to this terminal to cut
AP1HN	55	Analog input		Inverting input terminal of microphone amplofier H1. Connect to the handset.
AP1HP	56	Analog input	Analog	Non-inverting input terminal of microphone amplofier H
VREFM	57	---	Power supply, etc.	Reference voltage terminal of microphone amplifier. Connect the capacitor of 40 μ F between this terminal 56 (MCG).
AG4	58			Ground terminal of the analog circuit.
APMO	59	Analog input	Analog	Output terminal of microphone amplifier. Connect the capacitor of 0.1 μ F to this terminal to cut
APMN	60	Analog input		Non-inverting input terminal of microphone amplofier M

5.3. IC5


RD1/COMP1 64
RD0/COMP0 63
RB2 62
RB1 61
RB0 60
VCC 59
SEL 58
RA1 57
RA0 56
R93 55
R92 54
R91 53
R90 52
R83 51
R82 50
R81 49
RE0/VCref 1
TEST 2
OSC1 3
OSC2 4
RESET 5
X1 6
X2 7
GND 8
D0 9
D1 10
D2 11
D3 12
D4 13
D5 14
D9 15
D10 16
48 R80
47 R73
46 R72
45 R71
44 R70
43 R63
42 R62
41 R61
40 R60
39 R43/SO1
38 R42/SI1
37 R41/SCK1
36 R40/EVND
35 R31/TOC
34 R32/TOD
33 R33
17 D11
18 D12/STOPC
19 D13/INT0
20 R00/INT1
21 R01/INT2
22 R02/INT3
23 R03/INT4
24 R10
25 R11
26 R12
27 R13
28 R20
29 R21
30 R22
31 R23
32 R30

Classification	Terminal	Pin No.	Input/ Output	Function
Power supply	Vcc	59	---	Power supply terminal
	GND	8	---	Ground terminal
Test	$\overline{TEST}$	2	Input	Not the user's terminal. Connect to the Vcc ter
Reset	RESET	5	Input	Reset terminal for MCU.
Oscillation	OSC1	3	Input	Input/output terminal to the main oscillator. Co
	OSC2	4	Output	the ceramic oscillator, crystal oscillator, or ext oscillation circuit.
	X1	6	Input	Input/output terminal to the sub oscillator. Con
	X2	7	Output	the 32.768kHz crystal oscillator. If not, fix X1 te Vcc and open X2 terminal.
ResetTestPort	D0~D5 D9~D11	9~17	Input/ output	Input/output terminal which is adressed every The terminal D0~D3 are the source large curre output terminal, which supplies the current of 10mA to each terminal. The terminal D4, D5, D9~D11 are sink iarge cur output terminal, which supplies the current of 15mA to each terminal.
	D12, D13	18, 19	Input	Input terminal which is adressed every 1 bit.
	R00,~R43 R60,~RA1	20~57	Input/ output	Input/output terminal which is adressed every
	RB0~2, RD0~1, RE0	60~64, 1	Input	Input terminal which is adressed every 4 bit.
Interrupt	$\overline{INT_0}$, $\overline{INT_1}$, INT2 ~ INT4,	19~23	Input	Input terminal for external interrupt.
Stop clear	$\overline{STOPC}$	18	Input	Input terminal used for the transfer from stop active mode
Serial interface	$\overline{SCK_1}$	37	Input/ output	Clock input/output terminal for serial interface.
	SI1	38	Input	RX data input terminal for serial interface.
	SO1	39	Output	TX data output terminal for serial interface.
Timer	TOC, TOD	35, 34	Output	Timer output treminal.
	EVND	36	Input	Event input terminal.
Voltage comparator	COMP0, COMP1	63, 64	Input	Analog input terminal for comparator.
	VCref	1	---	Reference level voltage terminal for threshold analog input terminal.
Divide ratio selection	SEL	58	Input	The terminal which selects the divide ratio of s clock right after the reset and when returned to mode from stop mode. Connect to Vcc voltage when selecting the divi and connect to GND voltage when selecting th by-32.

6. BLOCK DIAGRAM

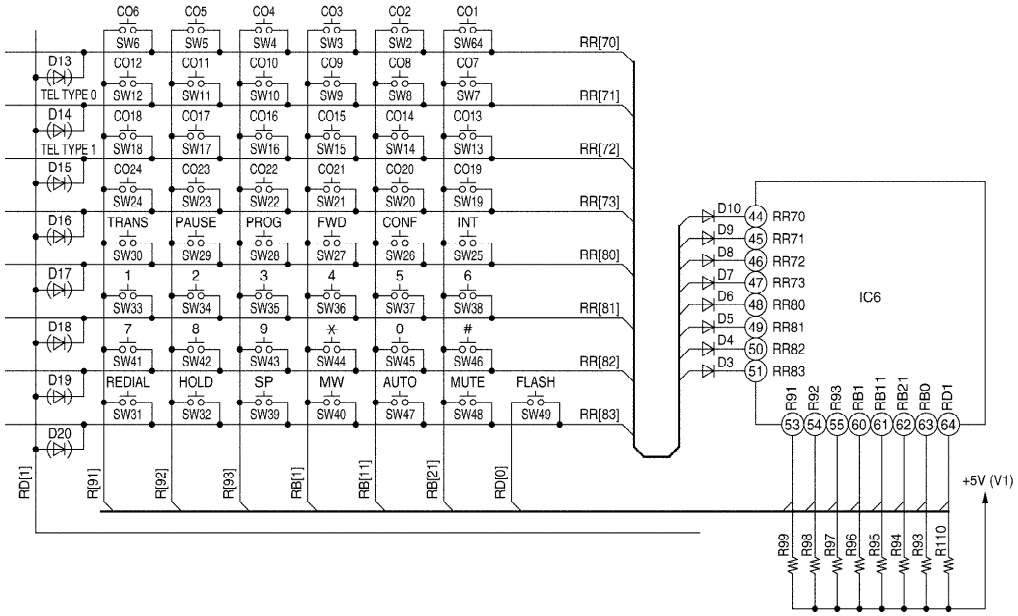
7. CIRCUIT OPERATIONS

7.1. KEY INPUT CONTROL CIRCUIT

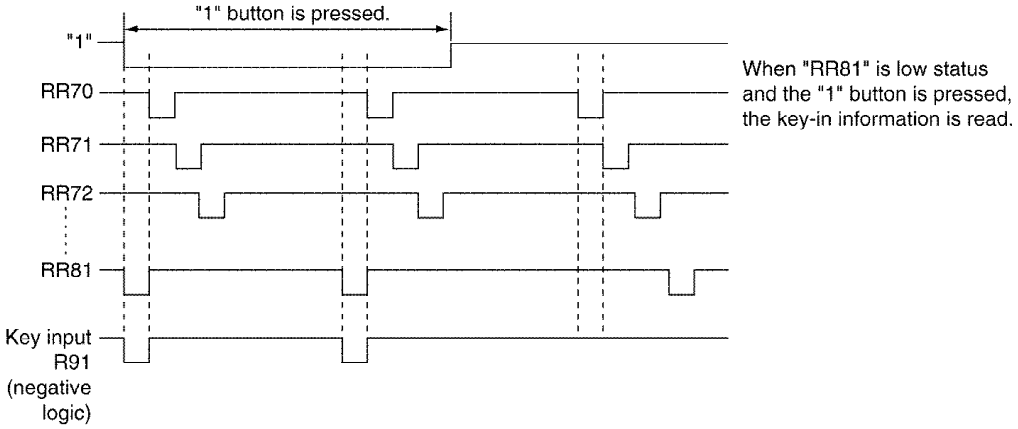
1) Circuit Operation

Sequential input information (negative logic) from the DSHS proprietary telephone is executed by dynamic scanning.
The ports RR70 to RR73, RR80 to RR83 of IC6 are brought to low status consecutively.
If a key is pressed, the key-in information input is executed by ports R91 to R93, RB1, RB11, RB21, RB0, RD1.

Circuit Diagram



Key Input Control Timing Chart

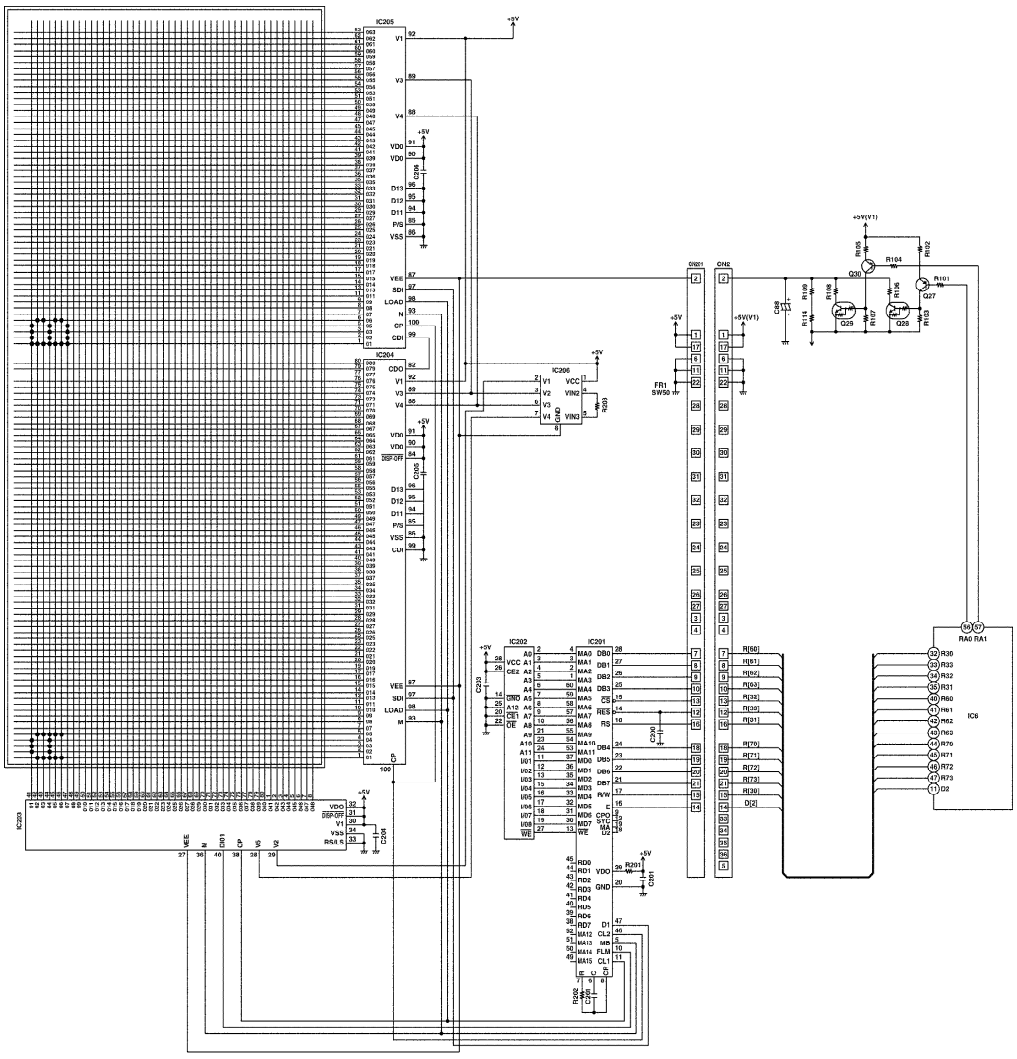


7.2. LCD CONTROL CIRCUIT

1) Circuit Operation

The LCD data is output from pins 32 to 35, 40 to 47 and 11 of IC6.
LCD contrast adjustment is performed by the circuit composed of Q28, Q29, R109, R108 and R106.
The contrast is determined only by the voltage level between V5 and VEE of IC203, IC204 and IC205.
Higher potential makes the contrast high.

Circuit Diagram



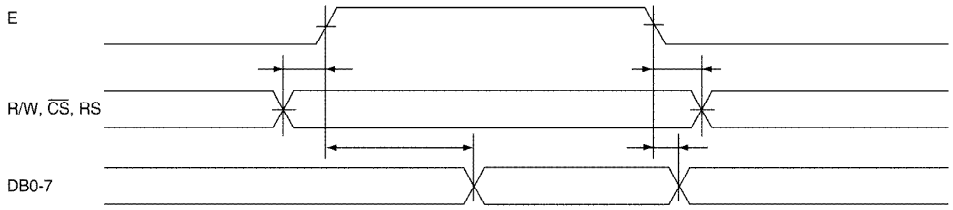
LCD Contrast Control

CONTRAST	IC9 Pin 56	IC9 Pin 57
HIGH	H	L
MIDDLE	L	H
LOW	H	H

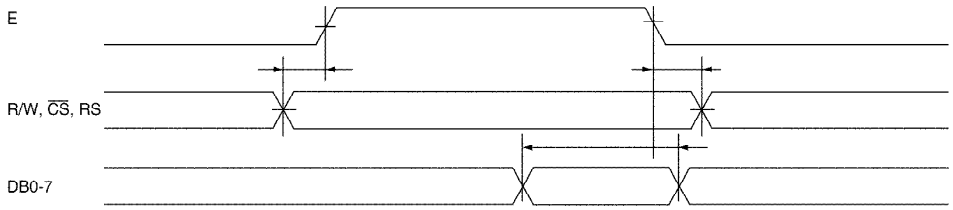
4-bit Data Transfer Timing Sequence

Data Transfer Timing Sequence

READ CYCLE



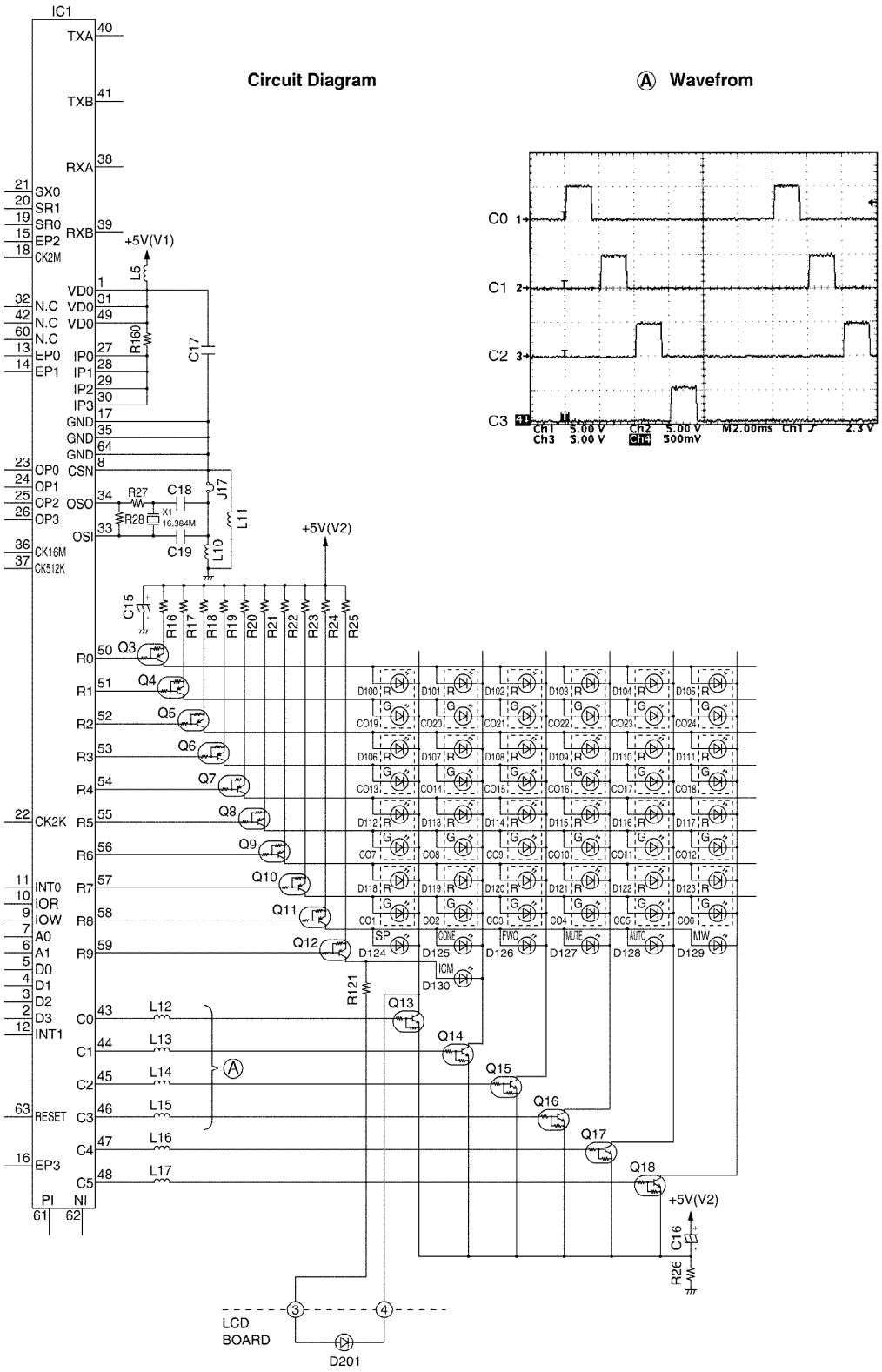
WRITE CYCLE



7.3. LED CIRCUIT

1) Circuit Operation

The LED executes dynamic lighting for the status indicators, and control is executed by the output ports C0 to C5 (column) and R0 to R9 of IC1.
A fixed pulse (T=1.82 msec) is output continuously from the/SCK1 terminal of IC9. This pulse is counted and the output of IC1 is shifted sequentially from C0 to C5.
R0 to R7 of IC1 also output pulses, and the lighting of the LED is controlled by the timing of the output ports C0 to C5.



7.4. DATA COMMUNICATION CIRCUIT

1) Function

The data communication circuit serves the following functions:
Information exchanger between the DSHS and DSHS proprietary telephone, key input information as well as data for the LED control, LCD control, etc. This information is continuously exchanged at all times.

2) Circuit Operation

When the DSHS propritary telephone receives an IRQ signal from the DSHS and after sending the key input information to the DSHS and receiving data for the LED control, etc., the DSHS proprietary telephone will return to the DSHS an acknowledge signal.

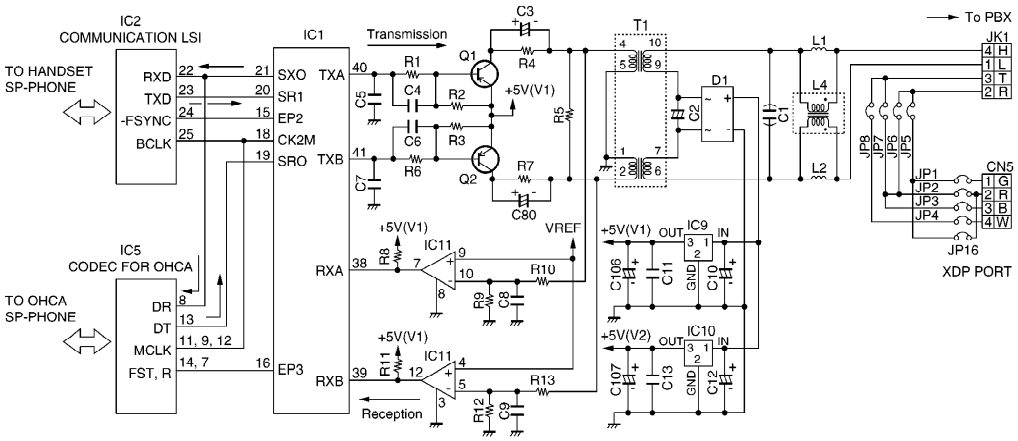
3) Reception

The data from the DSHS is received via the H and L lines along the path shown below.
H, L Line → T1 → IC11 Pin 5, 10 → IC1 Pin 38, 39 → IC1 Pin 21 → IC2 Pin 22 (IC5 Pin 8)

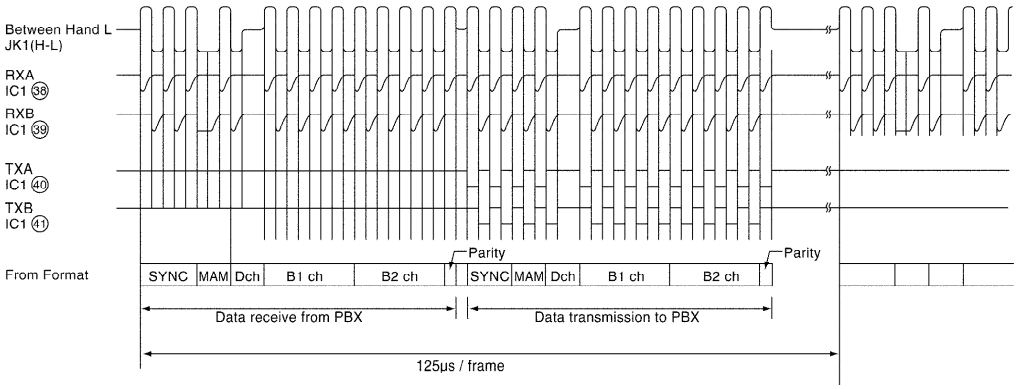
4) Transmission

The data to the DSHS proprietary telephone is transmitted along the following path.
IC2 Pin 23 (IC5 Pin 13) → IC1 Pin 20 (IC1 Pin 19) → IC1 Pin 40, 41 → Q1, Q2 → T1 → H, L Line

Circuit Diagram



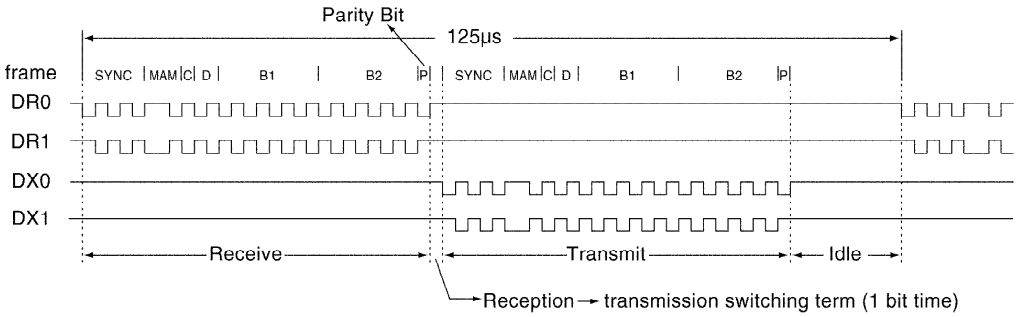
Timing Chart for D-PITS Transmission



5) IC1 (GATE ARRAY) DPITS Interface

DPITS Layer 1 interface. DR [1:0] is receiving input and DX [1:0] is transmitting output. Layer 1 is the transmission method of Ping-Pong type which is AMI encoded. "SYNC/MAM/C/D/ B1/B2/P" data is received in the first half at 125us/frame. After 1 bit time has passed since receiving P data, "SYNC/MAM/C/D/B1/B2/P" is transmitted. 1 bit time is 512kHz. 7-bit time idle term comes after receiving P data.

Dpits FrameTiming



6) PCM interface (between IC1 and IC2)

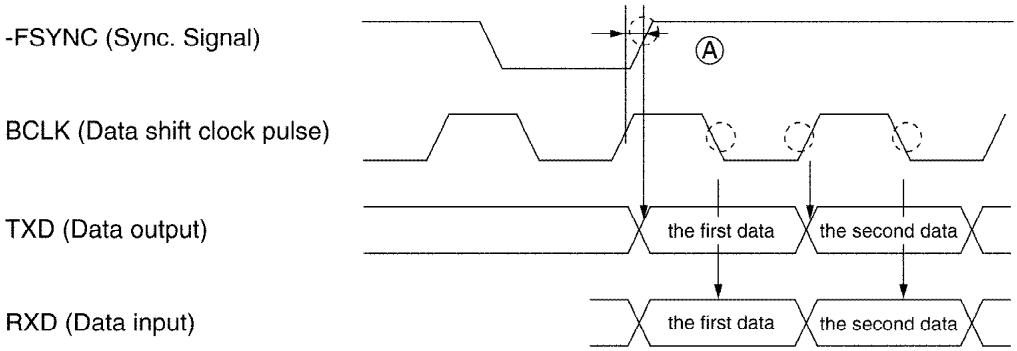
PCM interface consists of following 4 terminals.

PCM interface terminal

-FSYNC	8kHz sync. signal input terminal	BCLK	PCM data shift clock input terminal
TXD	TXD data output terminal	RXD	PCM data input terminal

The first PCM data is output from TXD at the positive edge of -FSYNC. The second data and the followings are output at the positive edge of BCLK. After all data of 8 bit are output, the last data is kept until the positive edge of next -FSYNC. The positive edge of BCLK should be within ± 100ns from the positive edge of -FSYNC.
The PCM data input from RXD is sampled at the negative edge of BCLK inside LSI. The sampling of the first data is performed between the positive edge of -FSYNC and the first negative edge of BCLK. After completing the sampling of all data of 8 bit, this sampling pauses until the next positive edge of -FSYNC.

Pulse Timing



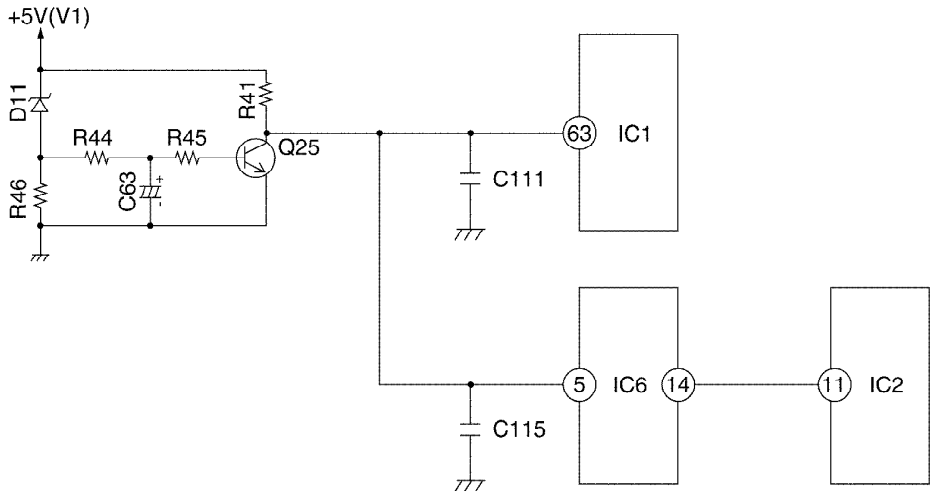
(-100ns≦ Ⓐ ≦ +100ns)

7.5. RESET CIRCUIT

1) Circuit Operation

This circuit is used for transmission of a reset pulse to the CPU (IC6) at the following times, connecting the telephone line jack and circuit operation.
The timing chart is shown below.

Circuit Diagram



Power ON

Q25 OFF
The reset signal goes up with the power voltage.

D11 Zener Diode ON

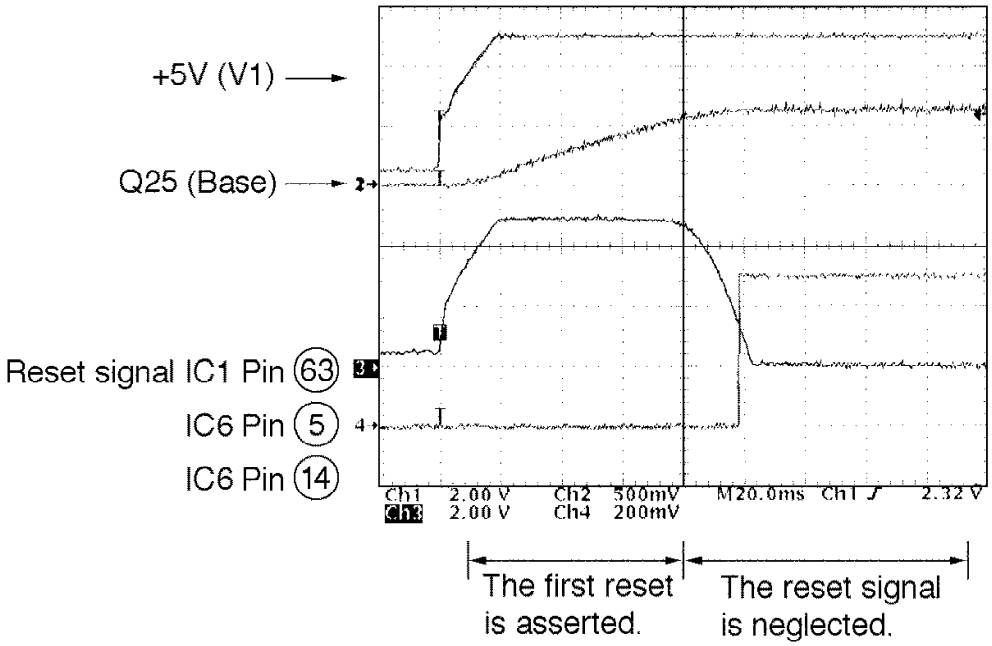
Charging C63 is started.
The base voltage of Q25 goes up.

Reset signal is asserted.

Q25 ON

The reset signal is negledted.

Timing Chart

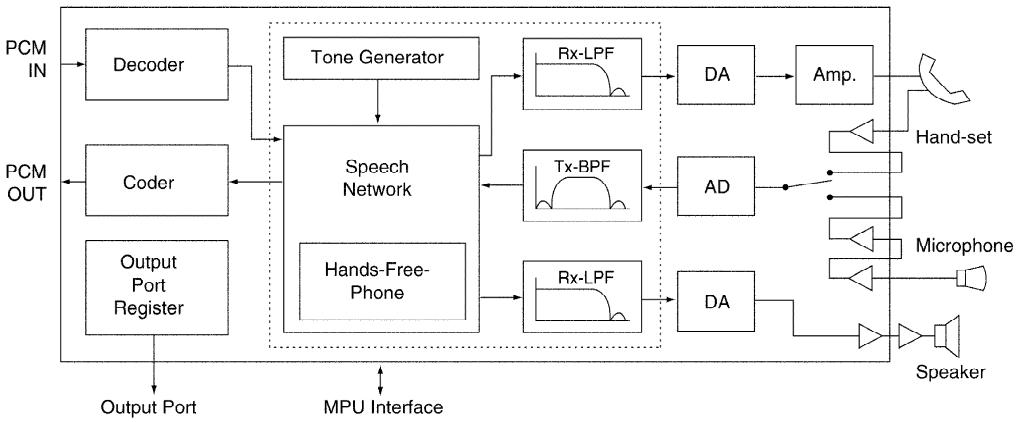


7.6. TONE GENERATION CIRCUIT

1) Function

Calling tones, Busy tone, DTMF signal and Key in tone are generated in IC2.

IC2 Block Diagram



DTMF Frequency Table

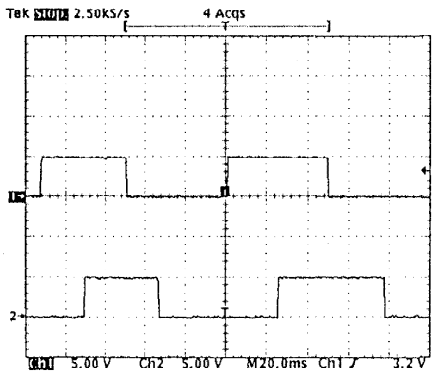
		High Group (IC9 Pin 77)		
		1209 Hz	1336 Hz	1477 Hz
Low Group (IC9 Pin 78)	697 Hz	1	2	3
	770 Hz	4	5	6
	852 Hz	7	8	9
	941 Hz	*	0	#

7.7. JOG DIAL CIRCUIT

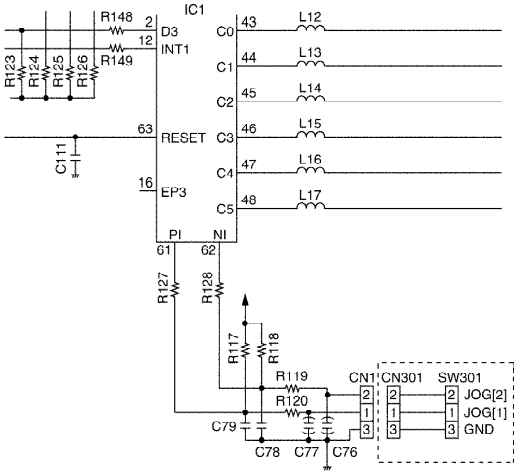
1) Circuit Operation

This unit is equipped with the JOG switch, which makes the settings of the volume, function selection speed dial, etc. easy and convenient. This JOG switch consists of 2-phase rotary encoder, and the gate array of IC1 counts the number of the rotation to control. The sampling cycle is 1ms and provided with the chattering protective circuit whose available pulse width is 1ms or more.

JOG Dial Input Signal

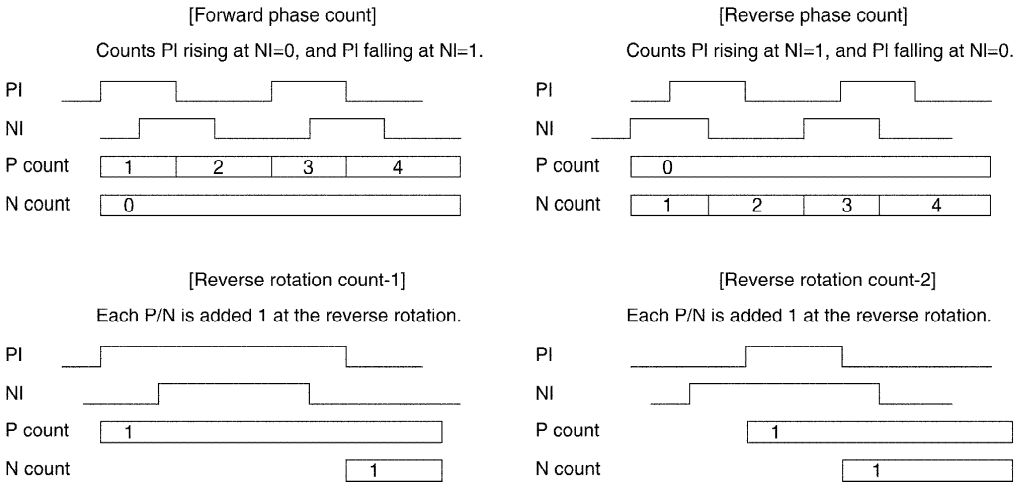


Circuit Diagram



These are the rotary encoder inputs, and sampled 1 kHz (1 msec)/cycle. The built-in chattering protective circuit neglects the input pulse of 1 msec or less. The high pulse of 2 msec or more is available. The availability of the pulse with the width of 1~2 msec is not ensured.
The changed number of these 2-phase inputs is counted cumulatively. The maximum counting

value is 255.

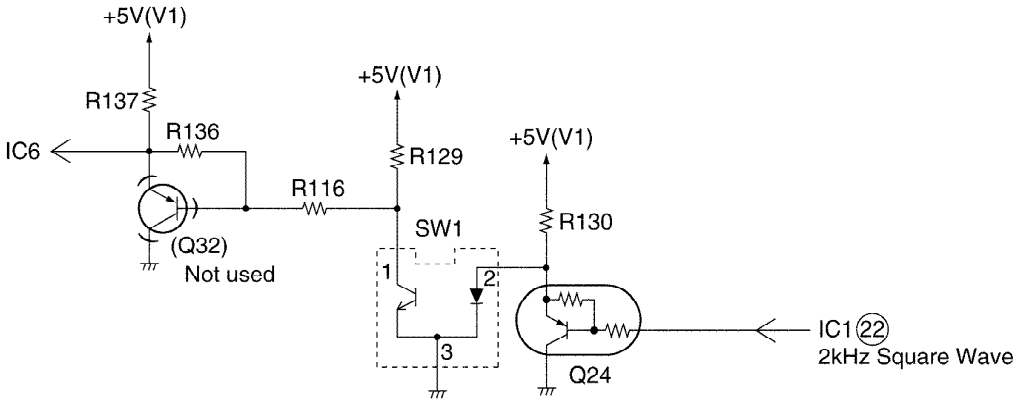


7.8. HOOK SWITCH CIRCUIT

1) Circuit Operation

The hook switch of this unit employs the photo switch consisting of LED and photo transistor. The 2kHz pulse from the gate array of IC2 causes the LED to emit the light. The light is interrupted at ON-HOOK and passes through at OFF-HOOK by the hooking bar,so that the hooking is performed controlling the light of the photo transistor. The detection signal is determined by the microcomputer of IC6.

Circuit Diagram



7.9. HANDSET CIRCUIT

1) Transmission signal path

The analog input signal from the handset microphone is input to the communication LSI through the IC2 built-in analog amplifier. In this LSI the network control based on A/D conversion and the handset software and the gain control based on the down load data from the PBX are performed. The voice data is sent to IC1 by the serial transmission. The voice data is transmitted between PBX and DPITS with the protocol originated by KME.

2) Reception signal path

The voice serial data transmitted from PBX is sent to IC1 or IC2 by the serial data. The network control, gain control , A/D conversion is performed in IC2, then the data is output from the handset speaker. Q31 of the handset speaker performs the mute operation by controlling IC6.

3) Corcuit diagram for transmission/reception signal path

Refer to page SCHEMATIC DIAGRAM ().

7.10. SP-PHONE CIRCUIT

1) Transmission signal path

The analog input signal from SP-phone microphone is input the communication LSI through the IC2 built-in analog amplifier. In this LSI the network control based on A/D conversion and the handset software and the gain control based on the down load data from the PBX are performed. The voice data is sent to IC1 by the serial transmission. The voice data is transmitted between PBX and DPITS with the protocol originated by KME. IC3 is the SP-phone amplifier, which turns ON/OFF using the port of IC2. The analog switch of IC12 interrupts the input signal. Also the OHCA voice signal from the speakerphone IC1 of IC4 is output from the SP -phone amplifier IC3.

2) Reception siganl path

The voice serial data transmitted from PBX is sent to IC2 by the serial transmission. Then the signal is output from the handset speakerphone after performing the network control, gain control, and A/D conversion in IC2. The SP-phone microphone has the mute function, which interrupts the input signal with the analog switch and controls the port of IC2 with Q26.

3) Circuit diagram for transmission/reception signal path

Refer to page SCHEMATIC DIAGRAM ().

7.11. OHCA CIRCUIT

1) Circuit operation

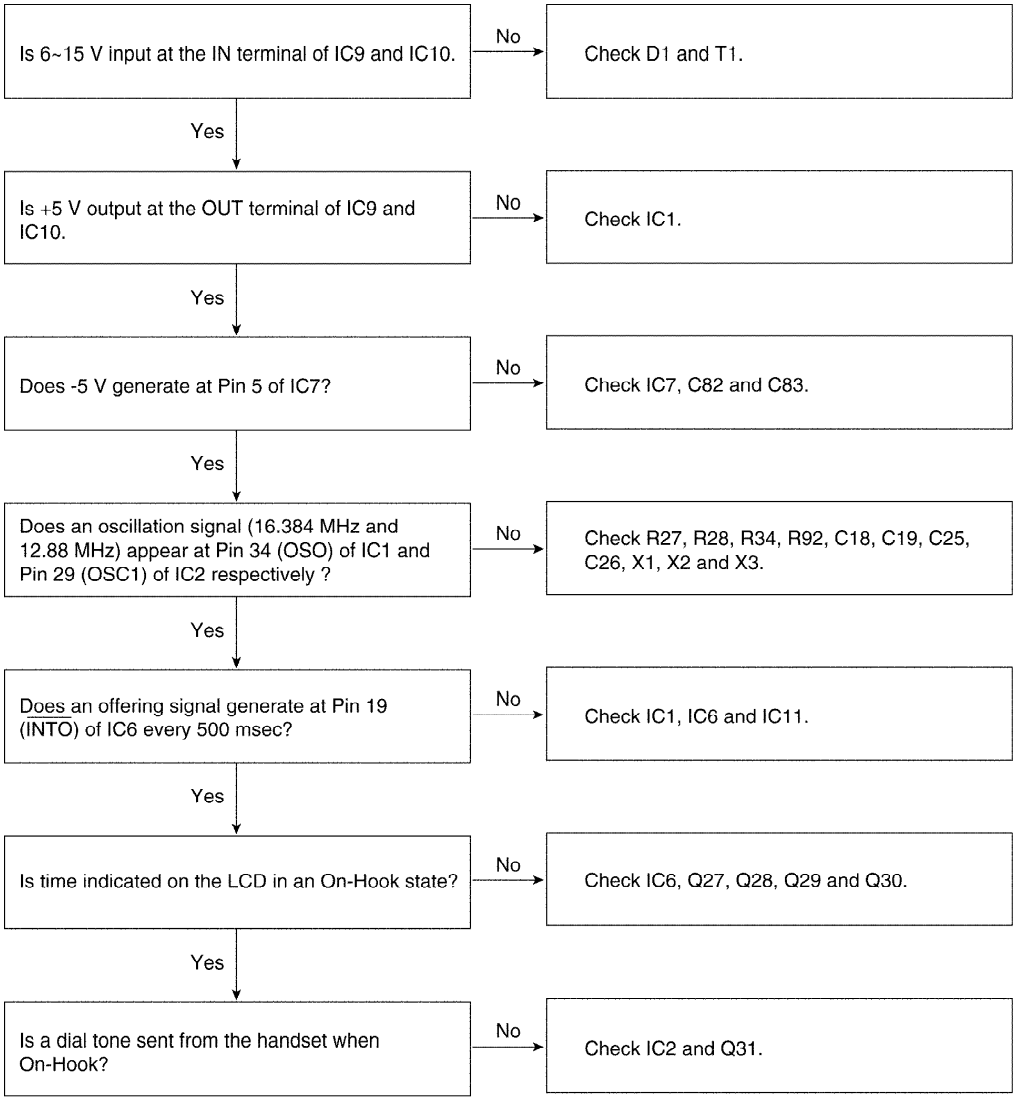
In the OHCA mode, the voice serial data output from IC1 is converted to the analog signal through IC5, then input to the SP-phone IC1 of IC4. The signal is input to the SP-phone amplifier of IC3 and output from the speaker, resulting the OHCA operation with independent circuit which is different from the voice transmission/reception circuit through the ordinay IC2 communication IC.

2) Circuit diagram for signal path

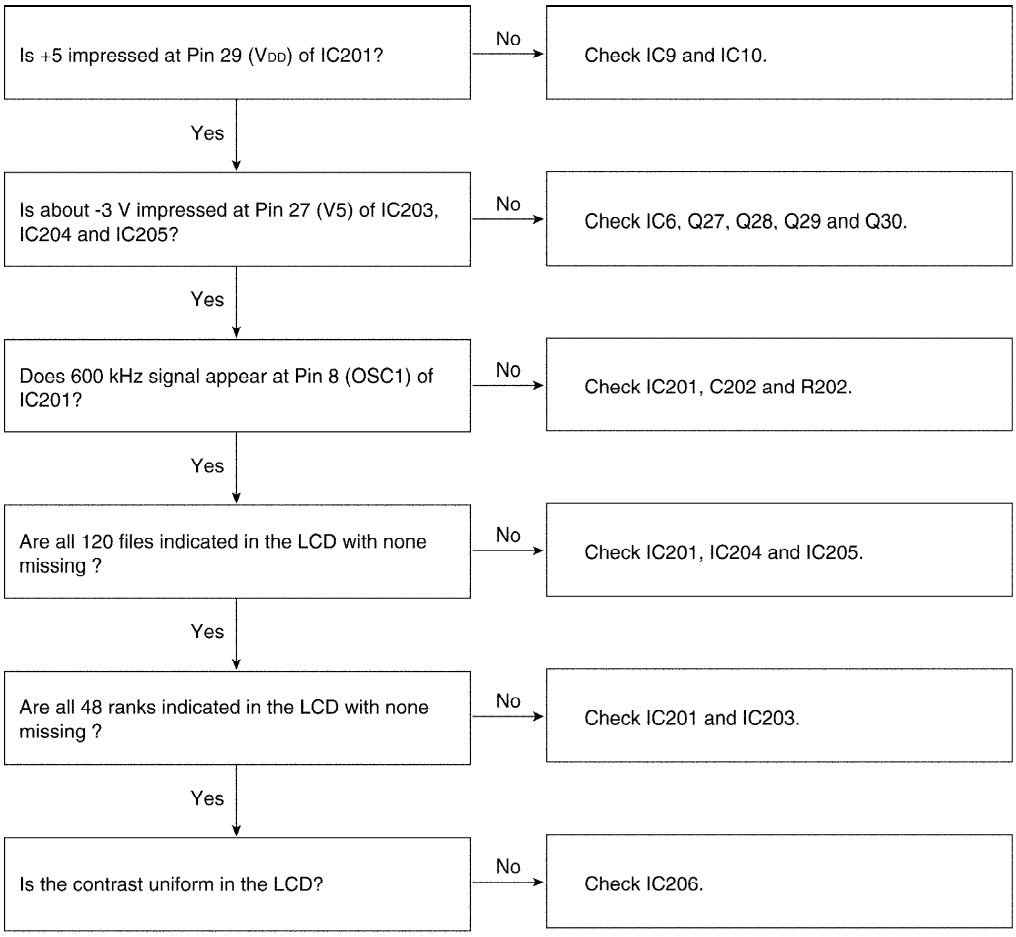
Refer to page SCHEMATIC DIAGRAM ().

8. TROUBLESHOOTING GUIDE

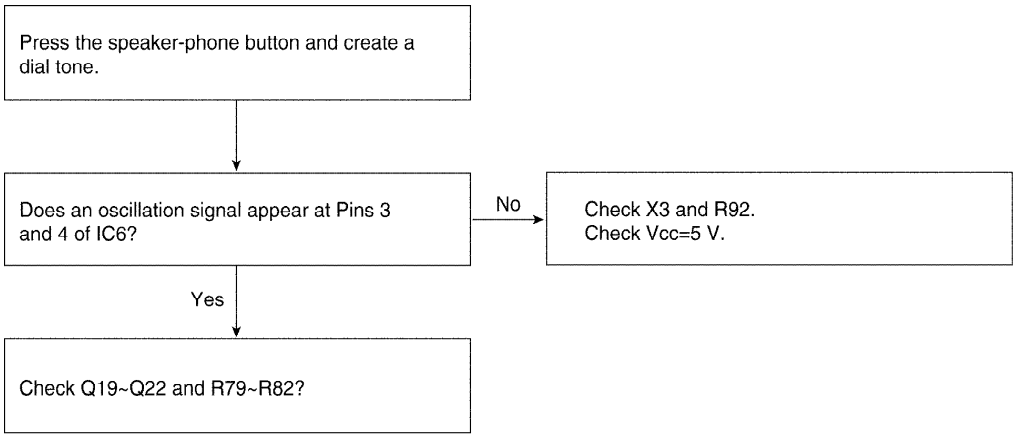
8.1. NO OPERATION.



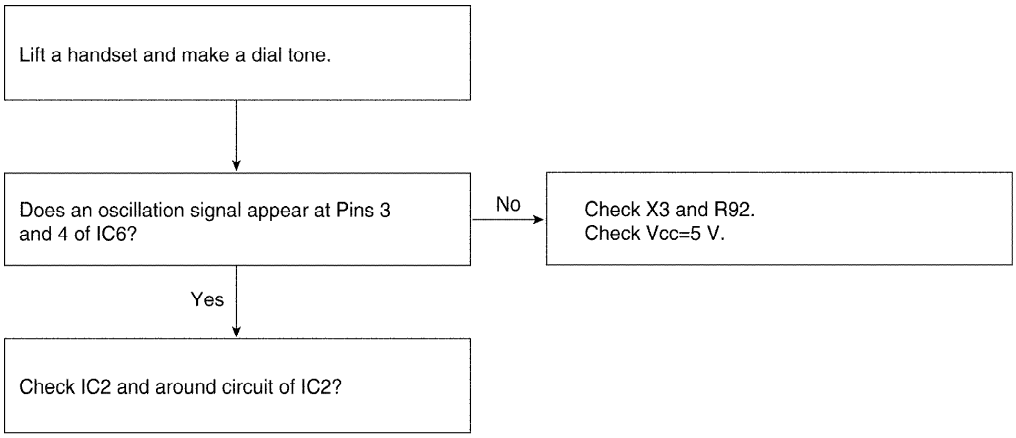
8.2. THE LCD DOES NOT OPERATE.



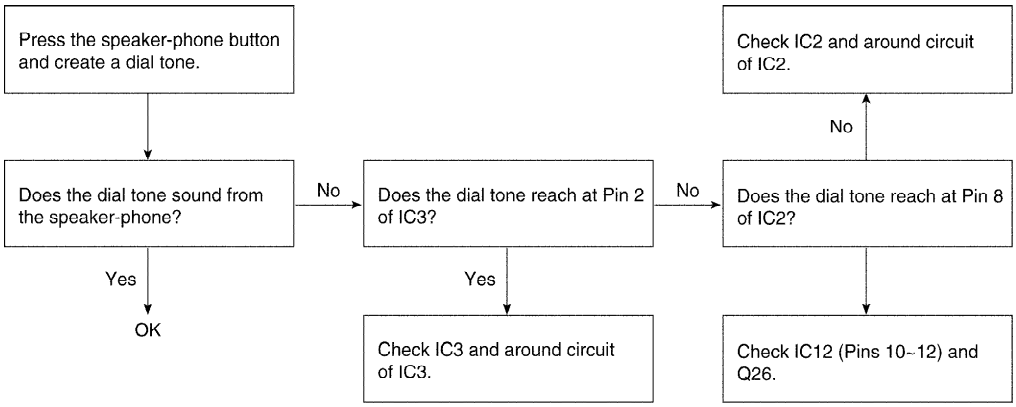
8.3. THE ELECTRONIC VOLUME OF THE SPEAKER-PHONE DOES NOT WORK.



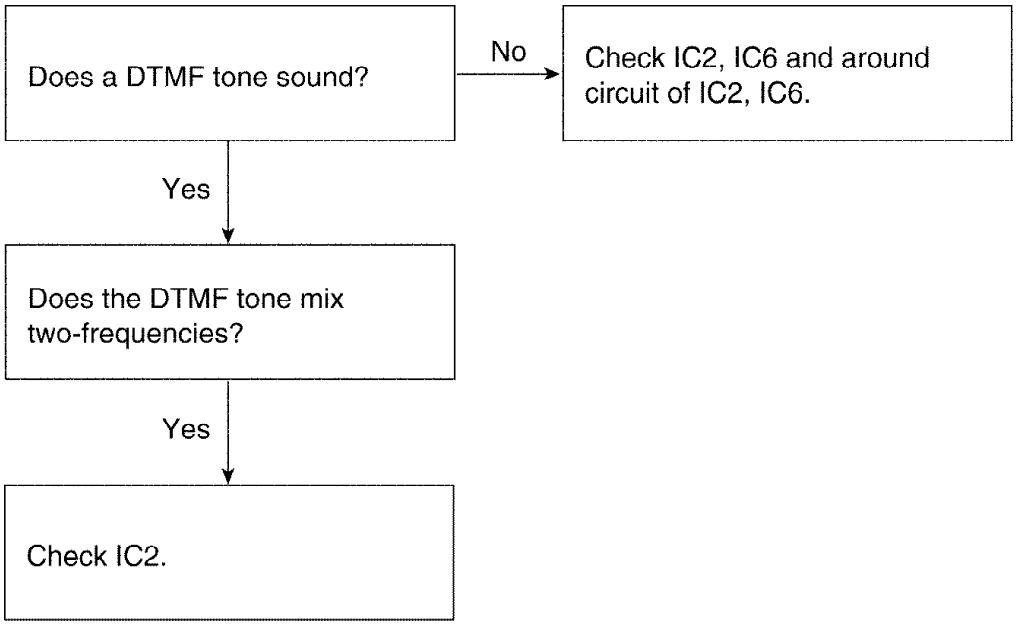
8.4. THE ELECTRONIC VOLUME OF THE HANDSET DOES NOT WORK.



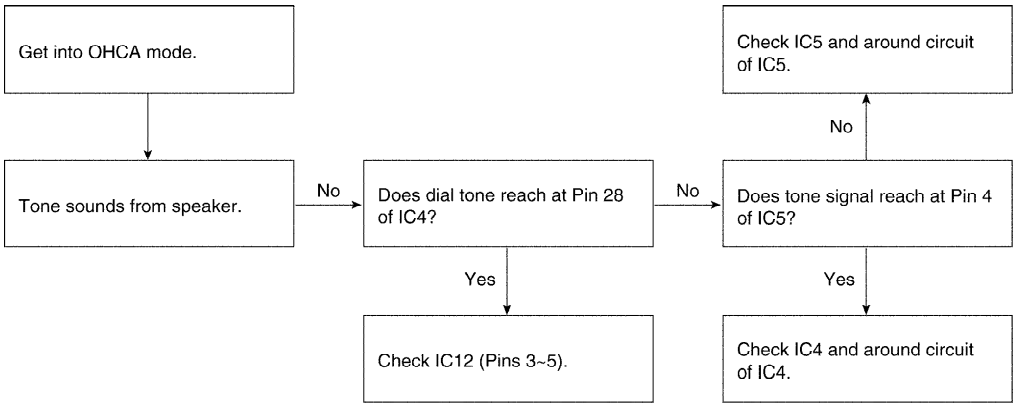
8.5. SPEAKER-PHONE TROUBLE.



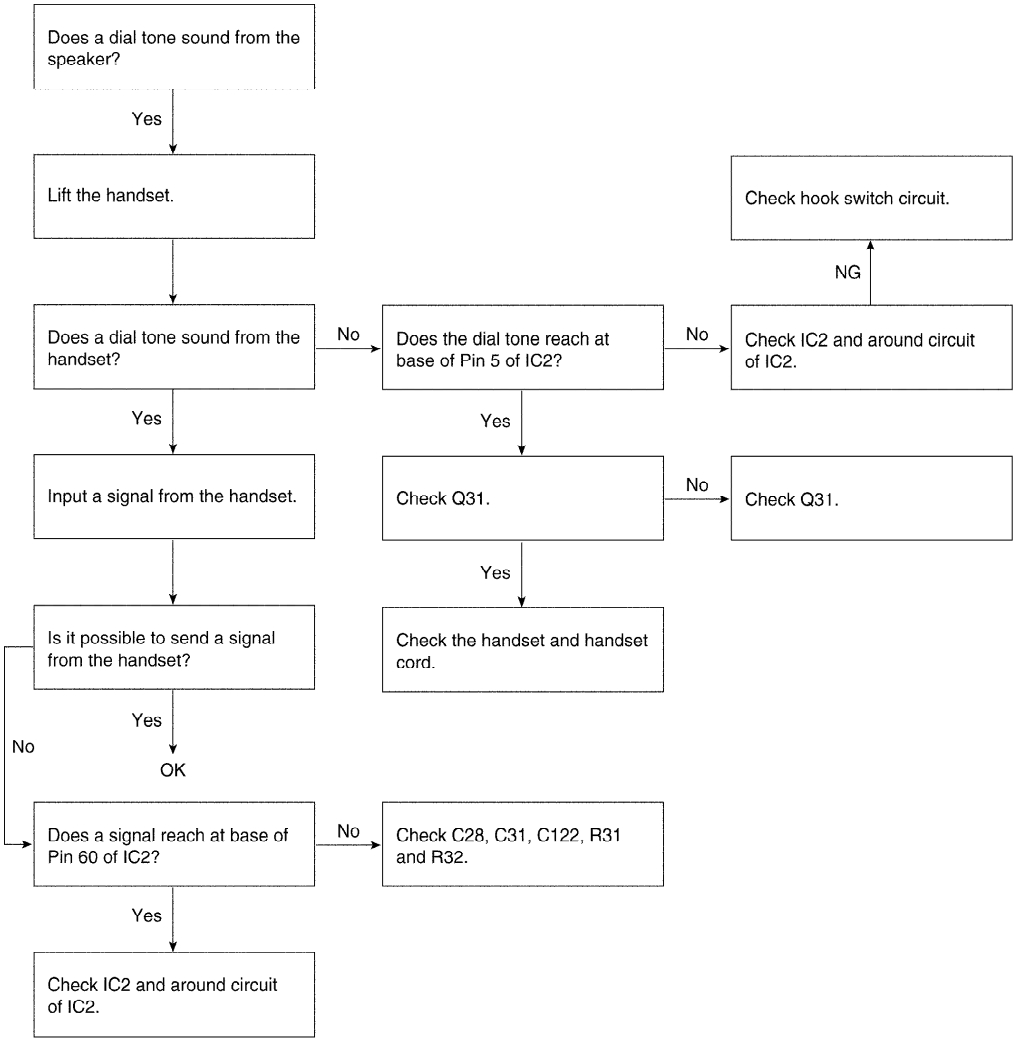
8.6. TONE DIAL TROUBLE.



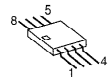
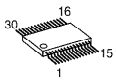
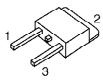
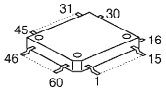
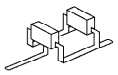
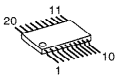
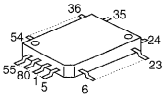
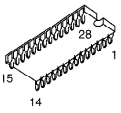
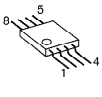
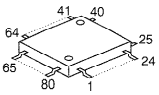
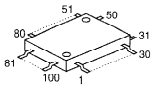
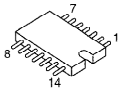
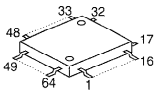
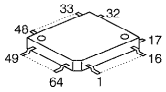
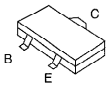
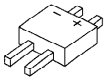
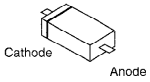
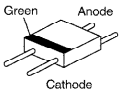
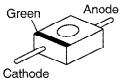
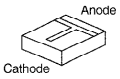
8.7. TROUBLE OF OHCA.



8.8. HANDSET TROUBLE.



9. TERMINAL GUIDE OF ICS, TRANSISTORS AND DIODES

 PQVIMC34119D	 PQVISC77655V	 PSVIBA05FP	 PSVITC5324F2	 PSVII24019T1
 PSVIMC5480DW	 PQVINJM319V	 PQVILC7981	 PSVIBR665BSD	 PQVINJM2904F PQVILA5311M PQVINJU7660M
 PSVILC7942ND	 PSVILC7940ND	 PQVITC4066BF	 PSVIBU65050D	 PSVI40612A04
 2SA1576Q, PQVTFB1J3P PQVTDTA143XU, UN5213 PQVTDTD133HK, 2SC4081Q		 PQVDS1ZB60F1	 RLS71	 PSVDUDZ39B
 PQVDPY1204	 PQVDBR1102W PQVDPY1102	 PSVD111R820R		

10. HOW TO REPLACE THE FLAT PACKAGE IC

If you do not have the special tools (for example: SPOT HEATER) to remove the SPOT HEATER'S Flat IC, If you have solder (large amount) a soldering iron and a cutter knife, you can easily remove IC's even though large than 100 pin.

10.1. PREPARATION

- SOLDER

Sparkle Solder 115A-1, 115B-1 or Almit Solder KR-19, KR-19RMA

- Soldering iron

Recommended power consumption is between 30 W to 40 W.
Temperature of Copper Rod 662 ± 50°F (350 ± 10°C)
(An expert may handle a 60~80 W iron, but beginner might damage foil by overheating.)

- Flux

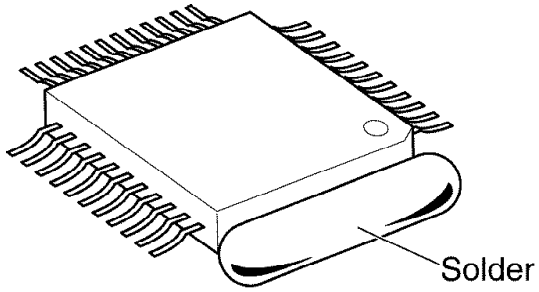
HI115 Specific gravity 0.863

(Original flux should be replaced daily.)

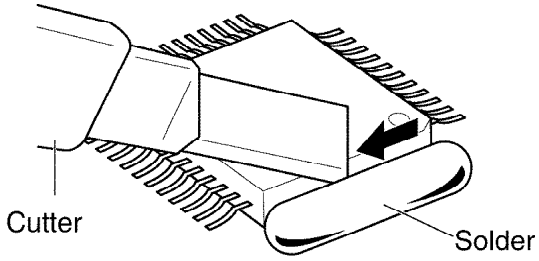
10.2. FLAT PACKAGE IC REMOVE PROCEDURE

1. When all of the IC lead can not been seen at the standard degree, fill with large quantities of solder.

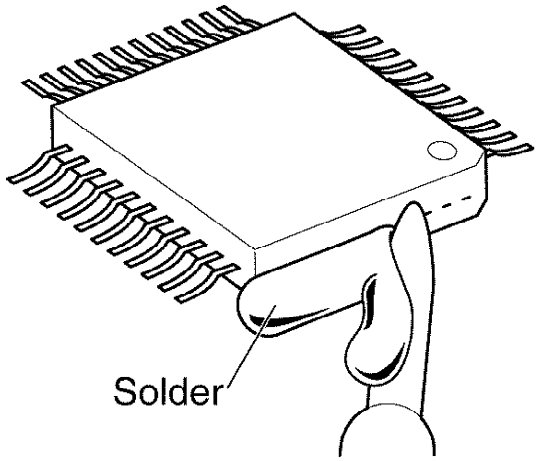
Note:
If you do not fill with solder and directly cut the IC lead with the cutter, stress may build up directly in the P.C.board's pattern. If you do not fill with large quantities of solder as in step 1 the P.C.board pattern may be removed.



2. Using a cutter, cut the lead at the source. (Cut the contents with the cutter lightly 5 or 6 times.)



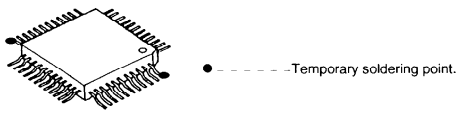
3. Remove when the solder melts. (Remove the lead at the same time.)



After removing the Flat IC and when attaching the new IC, remove any of the excess solder on the land using the soldering wire, etc. If the excess solder is not removed from the land, the IC will slip and not be attached properly.

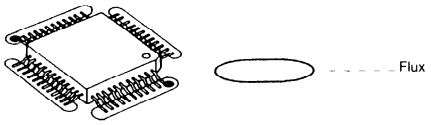
10.3. FLAT PACKAGE IC INSTALLATION PROCEDURE

1. Temporary fix FLAT PACKAGE IC by soldering on two marked pins.

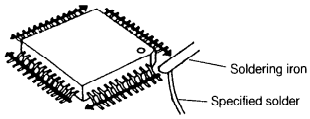


***Check the accuracy of the IC setting with the corresponding soldering foil.**

2. Apply flux for all pins of FLAT PACKAGE IC.



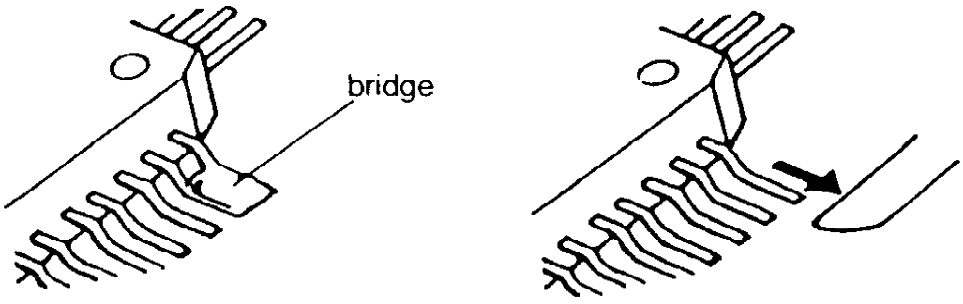
3. Solder using the specified solder, in the direction of the arrow, by sliding the soldering iron.



10.4. BRIDGE MODIFICATION PROCEDURE

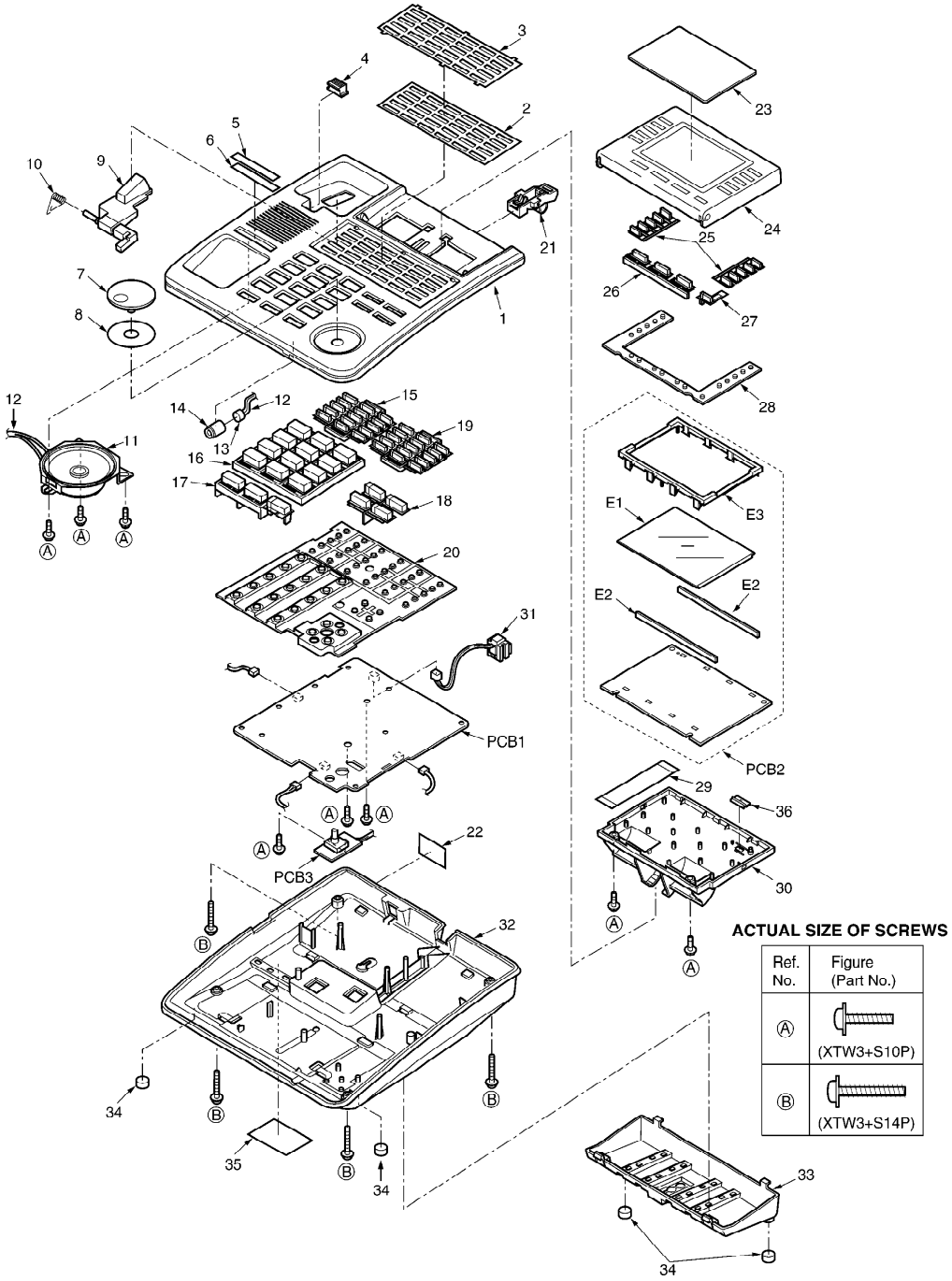
1. Lightly re-solder the bridged portion.

2. Remove the remaining solder along pins using a soldering iron as shown in the figure below.

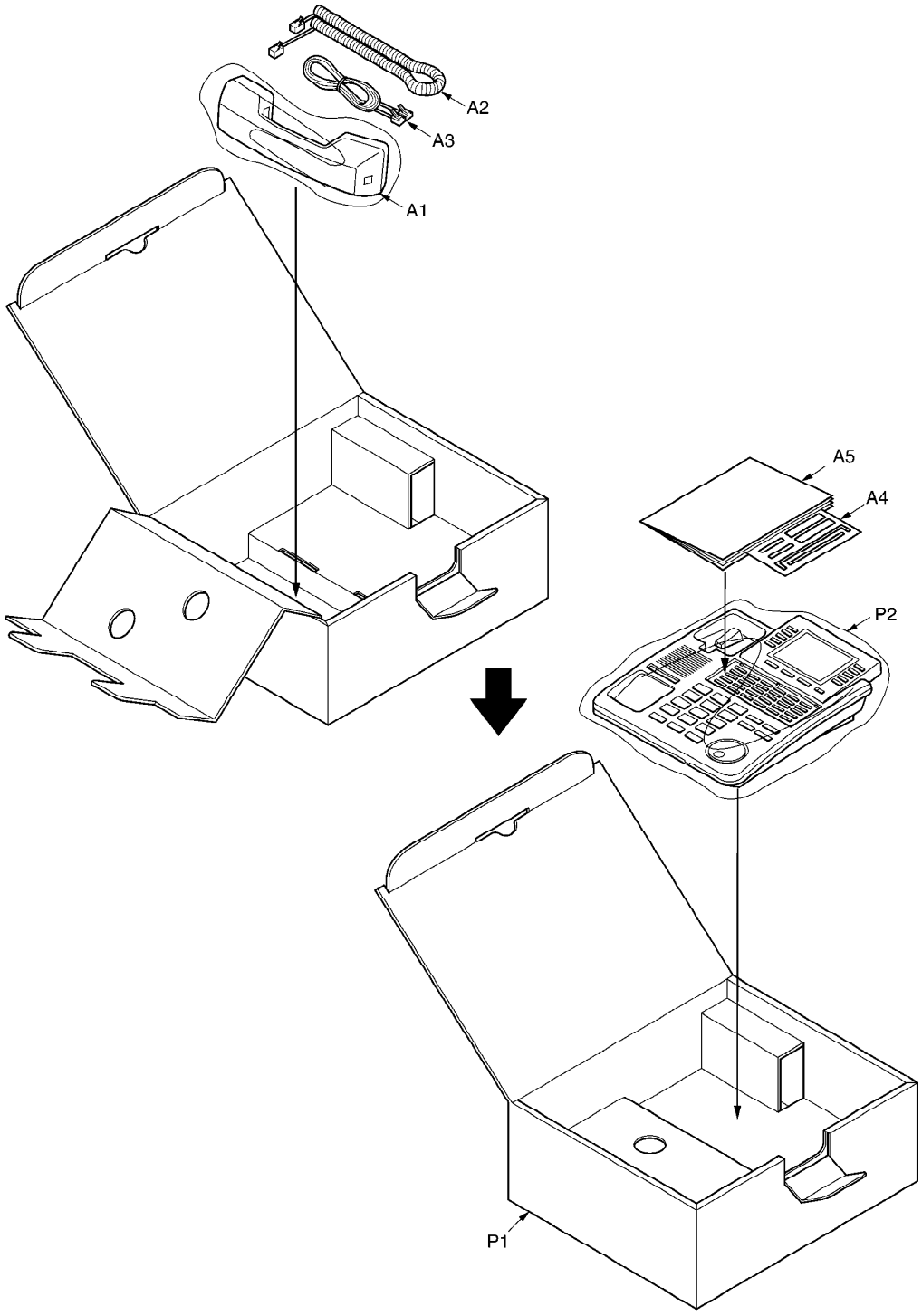


11. WAVEFORM

12. CABINET AND ELECTRICAL PARTS LOCATION



13. ACCESSORIES AND PACKING MATERIALS



14. REPLACEMENT PARTS LIST

Note:

1. 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 depends on the type of assembly and the laws governing parts and product retention. After the end of this period, the assembly will no longer be available.

2. **The S mark indicates service standard parts and may differ from production.**

3. **RESISTORS & CAPACITORS**
   Unless otherwise specified;
   All resistors are in ohms (Ω) K=1000 Ω , M=1000k Ω
   All capacitors are in MICRO FARADS (μ F) P= μ μ F
   ***Type & Wattage of Resistor**

Type

ERC:Solid ERD:Carbon PQRD:Carbon	ERX:Metal Film ERG:Metal Oxide ER0:Metal Film	PQ4R:Carbon ERS:Fusible Resistor ERF:Cement Resistor

Wattage

10,16:1/8W	14,25:1/4W	12:1/2W	1:1W	2:2W	3:3W

*Type & Voltage of Capacitor

Type

ECFD:Semi-Conductor ECQS:Styrol PQCUV:Chip ECQMS:Mica	ECCD,ECKD,ECBT,PQCBC:Ceramic ECQE,ECQV,ECQG:Polyester ECEA,ECSZ:Electlytic ECQP:Polypropylene

Voltage

ECQ Type	ECQG ECQV Type	ECSZ Type	Others	
1H:50V 2A:100V 2E:250V 2H:500V	05:50V 1:100V 2:200V	0F:3.15V 1A:10V 1V:35V 0J:6.3V	0J :6.3V 1A :10V 1C :16V 1E,25:25V	1V :35V 50,1H:50V 1J :63V 2A :100V

14.1. CABINET AND ELECTRICAL PARTS

Ref. No.	Part No.	Part Name & Description	Remarks
1	PSKM1052T1	CABINET, UPPER (WHITE VERSION)	
1	PSKM1052T3	CABINET, UPPER (BLACK VERSION)	
2	PSGD1026Z	CARD, DIAL (WHITE VERSION)	
2	PSGD1033Z	CARD, DIAL (BLACK VERSION)	
3	PSHR1134Z	COVER, TEL CARD	
4	PQKE82X1	HANGER (WHITE VERSION)	
4	PQKE82X2	HANGER (BLACK VERSION)	
5	PQHR576Z	COVER, TEL NO.	
6	PQHP532X	CARD, TEL NO.	
7	PSBC1012Z1	BUTTON, JOG DIAL (WHITE VERSION)	
7	PSBC1012Z2	BUTTON, JOG DIAL (BLACK VERSION)	
8	PSHR1164Y	SPACER, JOG DIAL	
9	PSBH1002Y1	BUTTON, HOOK (WHITE VERSION)	
9	PSBH1002Y2	BUTTON, HOOK (BLACK VERSION)	
10	PSUS1006Z	SPRING	
11	PQAS65P28Z	SPEAKER	
12	PSJS02Q35Z	CONNECTOR, 2P	
13	RJM142Z	MICROPHONE	S
14	PSHG1122Z	RUBBER PARTS, MIC COVER	
15	PSBX1041Z3	BUTTON, 15KEY (WHITE VERSION)	
15	PSBX1041Z2	BUTTON, 15KEY (BLACK VERSION)	
16	PSBX1039Z1	BUTTON, DIAL (WHITE VERSION)	
16	PSBX1039Z2	BUTTON, DIAL (BLACK VERSION)	
17	PSYX1001Z1	BUTTON, 3KEY (WHITE VERSION)	
17	PSYX1001Z2	BUTTON, 3KEY (BLACK VERSION)	
18	PSBX1042Z1	BUTTON, 4KEY (WHITE VERSION)	
18	PSBX1042Z2	BUTTON, 4KEY (BLACK VERSION)	
19	PSBX1052Z3	BUTTON, 15KEY (WHITE VERSION)	
19	PSBX1052Z4	BUTTON, 15KEY (BLACK VERSION)	
20	PSSX1006Y	KEY SWITCH	
21	PSBE1001Z1	BUTTON, ADJUST (WHITE VERSION)	
21	PSBE1001Z2	BUTTON, ADJUST (BLACK VERSION)	
22	PSQA2021Z	LABEL, NOTE	
23	PSGP1025Z1	PANEL, LCD (WHITE VERSION)	
23	PSGP1025Z2	PANEL, LCD (BLACK VERSION)	
24	PSGG1007Y1	GRILLE (WHITE VERSION)	
24	PSGG1007Y3	GRILLE (BLACK VERSION)	
25	PSBX1046Z1	BUTTON, 5KEY (WHITE VERSION)	
25	PSBX1046Z2	BUTTON, 5KEY (BLACK VERSION)	
26	PSBX1045Z1	BUTTON, 3KEY (WHITE VERSION)	
26	PSBX1045Z2	BUTTON, 3KEY (BLACK VERSION)	
27	PSBC1013Z1	BUTTON, SHIFT (WHITE VERSION)	
27	PSBC1013Z2	BUTTON, SHIFT (BLACK VERSION)	
28	PSSX1008Y	KEY SWITCH	
29	PSJE1011Z	FLAT CABLE	
30	PSKF1026Y1	CABINET, GRILL LOWER (WHITE VERSION)	
30	PSKF1026Y2	CABINET, GRILL LOWER (BLACK VERSION)	
31	PSJJ1T017Z	JACK, TEL.	
32	PSKF1024M1	CABINET, LOWER (WHITE VERSION)	
32	PSKF1024M2	CABINET, LOWER (BLACK VERSION)	
33	PSKL1005X1	STAND (WHITE VERSION)	
33	PSKL1005X2	STAND (BLACK VERSION)	
34	PSHA1002Z	RUBBER PARTS, FOOT	
35	PSGT2175Z	NAME PLATE (WHITE VERSION)	

Ref. No.	Part No.	Part Name & Description	Remarks
35	PSGT2177Z	NAME PLATE (BLACK VERSION)	
36	PSBD1012Z1	COVER, SWITCH	

14.2. ACCESSORIES AND PACKING MATERIALS

Ref. No.	Part No.	Part Name & Description	Remarks
A1	PQJX2PS409Z	HANDSET (WHITE VERSION)	
A1	PQJX2PM409Z	HANDSET (BLACK VERSION)	
A2	PSJA1043Z	CORD, HANDSET (WHITE VERSION)	
A2	PSJA1043Y	CORD, HANDSET (BLACK VERSION)	
A3	PQJA48W	CORD, TEL.	
A4	PSGD1040Z	CARD, VERLAY	S
A5	PSQX1525X	INSTRUCTION BOOK	
P1	PSPK1907Z	GIFT BOX (WHITE VERSION)	
P1	PSPK1910Z	GIFT BOX (BLACK VERSION)	
P2	PQPP170Z	PROTECTION COVER	

14.3. MAIN BOARD PARTS

Ref. No.	Part No.	Part Name & Description	Remarks
PCB1	PSWP1T7456UK	MAIN BOARD ASS'Y (RTL)	
		(ICS)	
IC1	PSVIBU65050D	IC	
IC2	PSVITC5324F2	IC	
IC3	PQVIMC34119D	IC	
IC4	PQVISC77655V	IC	S
IC5	PSVIMC5480DW	IC	S
IC6	PSVI40612A04	IC	
IC7	PQVINJU7660M	IC	S
IC8	PQVINJM2904M	IC	
IC9	PSVIBA05FP	IC	
IC10	PSVIBA05FP	IC	
IC11	PQVINJM319V	IC	
IC12	PQVITC4066BF	IC	
SW1	PSVII24015T	IC	
		(TRANSISTORS)	
Q1	2SA1576Q	TRANSISTOR(SI)	
Q2	2SA1576Q	TRANSISTOR(SI)	
Q3	PQVTDTA143XU	TRANSISTOR(SI)	
Q4	PQVTDTA143XU	TRANSISTOR(SI)	
Q5	PQVTDTA143XU	TRANSISTOR(SI)	
Q6	PQVTDTA143XU	TRANSISTOR(SI)	
Q7	PQVTDTA143XU	TRANSISTOR(SI)	
Q8	PQVTDTA143XU	TRANSISTOR(SI)	
Q9	PQVTDTA143XU	TRANSISTOR(SI)	
Q10	PQVTDTA143XU	TRANSISTOR(SI)	
Q11	PQVTDTA143XU	TRANSISTOR(SI)	
Q12	PQVTDTA143XU	TRANSISTOR(SI)	
Q13	PQVTDTD133HK	TRANSISTOR(SI)	
Q14	PQVTDTD133HK	TRANSISTOR(SI)	

Ref. No.	Part No.	Part Name & Description	Remarks
Q15	PQVTDTD133HK	TRANSISTOR(SI)	
Q16	PQVTDTD133HK	TRANSISTOR(SI)	
Q17	PQVTDTD133HK	TRANSISTOR(SI)	
Q18	PQVTDTD133HK	TRANSISTOR(SI)	
Q19	UN5213	TRANSISTOR(SI)	S
Q20	UN5213	TRANSISTOR(SI)	S
Q21	UN5213	TRANSISTOR(SI)	S
Q22	UN5213	TRANSISTOR(SI)	S
Q23	UN5213	TRANSISTOR(SI)	S
Q24	PQVTDTA143XU	TRANSISTOR(SI)	
Q25	2SC4081Q	TRANSISTOR(SI)	
Q26	UN5213	TRANSISTOR(SI)	S
Q27	2SA1576Q	TRANSISTOR(SI)	
Q28	UN5213	TRANSISTOR(SI)	S
Q29	UN5213	TRANSISTOR(SI)	S
Q30	2SA1576Q	TRANSISTOR(SI)	
Q31	PQVTFB1J3P	TRANSISTOR(SI)	
		(DIODES)	
D1	PQVDS1ZB60F1	DIODE(SI)	
D3	RLS71	DIODE(SI)	
D4	RLS71	DIODE(SI)	
D5	RLS71	DIODE(SI)	
D6	RLS71	DIODE(SI)	
D7	RLS71	DIODE(SI)	
D8	RLS71	DIODE(SI)	
D9	RLS71	DIODE(SI)	
D10	RLS71	DIODE(SI)	
D11	PSVDUDZ39B	DIODE(SI)	
D12	RLS71	DIODE(SI)	
D13	RLS71	DIODE(SI)	
D17	RLS71	DIODE(SI)	
		(LEDS)	
D100	PSVD2SRVGCT	LED	
D101	PSVD2SRVGCT	LED	
D102	PSVD2SRVGCT	LED	
D103	PSVD2SRVGCT	LED	
D104	PSVD2SRVGCT	LED	
D105	PSVD2SRVGCT	LED	
D106	PSVD2SRVGCT	LED	
D107	PSVD2SRVGCT	LED	
D108	PSVD2SRVGCT	LED	
D109	PSVD2SRVGCT	LED	
D110	PSVD2SRVGCT	LED	
D111	PSVD2SRVGCT	LED	
D112	PSVD2SRVGCT	LED	
D113	PSVD2SRVGCT	LED	
D114	PSVD2SRVGCT	LED	
D115	PSVD2SRVGCT	LED	
D116	PSVD2SRVGCT	LED	
D117	PSVD2SRVGCT	LED	
D118	PSVD2SRVGCT	LED	
D119	PSVD2SRVGCT	LED	
D120	PSVD2SRVGCT	LED	
D121	PSVD2SRVGCT	LED	

Ref. No.	Part No.	Part Name & Description	Remarks
D122	PSVD2SRVGCT	LED	
D123	PSVD2SRVGCT	LED	
D124	PSVD1SRCT	LED	
D125	PSVD1SRCT	LED	
D126	PSVD1SRCT	LED	
D127	PSVD1SRCT	LED	
D128	PSVD1SRCT	LED	
D129	PSVD1SRCT	LED	
D130	PSVD1VGCT	LED	
		(CONNECTORS)	
CN1	PSJP03A05Z	CONNECTOR, 3P	
CN2	PSJS36A61Z	CONNECTOR, 36P	
CN3	PSJP02A05Z	CONNECTOR, 2P	
CN4	PSJP02A05Z	CONNECTOR, 2P	
CN5	PSJP04A05Z	CONNECTOR, 4P	
		(CERAMIC FILTER)	
X3	PQVBTCS4.00M	CERAMIC FILTER	
		(COIL)	
L1	PQLQR1LT	COIL	
L2	PQLQR1LT	COIL	
L5	PQLQR1RM601	COIL	
L6	PQLQR1RM601	COIL	
L9	PQLQR1LT	COIL	
		(CRYSTAL OSCILLATORS)	
X1	PSVCCR1638B7	CRYSTAL OSCILLATOR	
X2	PSVCCR1228B7	CRYSTAL OSCILLATOR	
		(JACKS)	
JK1	PSJJ1T011Z	JACK	
JK2	PSJJ1T012Z	JACK	
		(TRANSFORMER)	
T1	PSLT9Z4A	TRANSFORMER	
		(RESISTORS)	
JP3	PQ4R18XJ000	0	
JP5	PQ4R18XJ000	0	
JP7	PQ4R18XJ000	0	
JP16	PQ4R18XJ000	0	
J17	ERJ3GEY0R00	0	
L7	PQ4R10XJ000	0	
L8	PQ4R10XJ000	0	
L10	ERJ3GEY0R00	0	
L11	ERJ3GEY0R00	0	
L12	ERJ3GEY0R00	0	
L13	ERJ3GEY0R00	0	
L14	ERJ3GEY0R00	0	
L15	ERJ3GEY0R00	0	
L16	ERJ3GEY0R00	0	
L17	ERJ3GEY0R00	0	
R1	ERJ3GEYJ472	4.7K	
R2	ERJ3GEYJ472	4.7K	
R3	ERJ3GEYJ472	4.7K	
R4	ERJ3GEYJ330	33	
R5	ERJ3GEYJ471	470	
R6	ERJ3GEYJ472	4.7K	

Ref. No.	Part No.	Part Name & Description	Remarks
R7	ERJ3GEYJ330	33	
R8	ERJ3GEYJ472	4.7K	
R9	ERJ3GEYJ472	4.7K	
R10	ERJ3GEYJ472	4.7K	
R11	ERJ3GEYJ472	4.7K	
R12	ERJ3GEYJ472	4.7K	
R13	ERJ3GEYJ472	4.7K	
R14	ERJ3GEYJ122	1.2K	
R15	ERJ3GEYJ682	6.8K	
R16	ERJ3GEYJ470	47	
R17	ERJ3GEYJ221	220	
R18	ERJ3GEYJ470	47	
R19	ERJ3GEYJ221	220	
R20	ERJ3GEYJ470	47	
R21	ERJ3GEYJ221	220	
R22	ERJ3GEYJ470	42	
R23	ERJ3GEYJ221	220	
R24	ERJ3GEYJ221	220	
R25	ERJ3GEYJ470	47	
R26	PQ4R18XJ100	10	
R27	ERJ3GEYJ102	1K	
R28	ERJ3GEYJ105	1M	
R29	ERJ3GEYJ561	560	
R30	ERJ3GEYJ151	150	
R31	ERJ3GEYJ103	10K	
R32	ERJ3EKF9102	91K	
R34	ERJ3GEYJ105	1M	
R35	ERJ3GEYJ822	8.2K	
R36	ERJ3GEYJ222	2.2K	
R37	ERJ3GEYJ225	2.2M	
R38	ERJ3GEYJ222	2.2K	
R39	ERJ3GEYJ224	220K	
R40	ERJ3GEYJ222	2.2K	
R41	ERJ3GEYJ472	4.7K	
R42	ERJ3GEYJ103	10K	
R43	ERJ3GEYJ102	1K	
R44	ERJ3GEYJ183	18K	
R45	ERJ3GEYJ103	10K	
R46	ERJ3GEYJ392	3.9K	
R47	ERJ3GEYJ683	68K	
R48	ERJ3GEYJ683	68K	
R49	ERJ3GEYJ563	56K	
R50	ERJ3GEYJ124	120K	
R51	ERJ3GEYJ124	120K	
R52	ERJ3GEYJ223	22K	
R53	ERJ3GEYJ103	10K	
R54	ERJ3GEYJ472	4.7K	
R55	ERJ3GEYJ273	27K	
R56	PQ4R18XJ390	39	
R57	ERJ3GEYJ124	120K	
R58	ERJ3GEYJ564	560K	
R59	ERJ3GEYJ332	3.3K	
R60	ERJ3GEYJ151	150	
R61	ERJ3GEYJ104	100K	

Ref. No.	Part No.	Part Name & Description	Remarks
R62	ERJ3GEYJ222	2.2K	
R63	ERJ3GEYJ183	18K	
R64	ERJ3GEYJ120	12	
R65	ERJ3GEYJ154	150K	
R66	ERJ3GEYJ123	12K	
R67	ERJ3GEYJ222	2.2K	
R68	ERJ3GEYJ222	2.2K	
R69	PQ4R18XJ3R3	3.3	
R70	ERJ3GEYJ472	4.7K	
R71	ERJ3GEY0R00	0	
R72	ERJ3GEYJ562	5.6K	
R73	ERJ3GEYJ104	100K	
R74	ERJ3GEYJ275	2.7M	
R75	ERJ3GEYJ562	5.6K	
R76	ERJ3GEYJ682	6.8K	
R77	ERJ3GEYJ683	68K	
R78	ERJ3GEYJ303	30K	
R79	ERJ3GEYJ563	56K	
R80	ERJ3GEYJ273	27K	
R81	ERJ3GEYJ124	120K	
R82	ERJ3GEYJ224	220K	
R83	ERJ3GEYJ104	100K	
R84	ERJ3GEYJ103	10K	
R85	ERJ3GEYJ103	10K	
R86	ERJ3GEYJ103	10K	
R87	ERJ3GEYJ104	100K	
R88	ERJ3GEYJ333	33K	
R89	ERJ3GEYJ223	22K	
R90	ERJ3GEYJ183	18K	
R91	ERJ3GEYJ103	10K	
R92	ERJ3GEYJ105	1M	
R93	ERJ3GEYJ223	22K	
R94	ERJ3GEYJ223	22K	
R95	ERJ3GEYJ223	22K	
R96	ERJ3GEYJ223	22K	
R97	ERJ3GEYJ223	22K	
R98	ERJ3GEYJ223	22K	
R99	ERJ3GEYJ223	22K	
R100	ERJ3GEYJ223	22K	
R101	ERJ3GEYJ472	4.7K	
R102	ERJ3GEYJ472	4.7K	
R103	ERJ3GEYJ104	100K	
R104	ERJ3GEYJ472	4.7K	
R105	ERJ3GEYJ472	4.7K	
R106	ERJ3GEYJ183	18K	
R107	ERJ3GEYJ104	100K	
R108	ERJ3GEYJ103	10K	
R109	ERJ3GEYJ332	3.3K	
R110	ERJ3GEYJ223	22K	
R111	ERJ3GEYJ104	100K	
R113	ERJ3GEYJ680	68	
R114	ERJ3GEY0R00	0	
R115	ERJ3GEYJ330	33	
R116	ERJ3GEY0R00	0	

Ref. No.	Part No.	Part Name & Description	Remarks
R117	ERJ3GEYJ473	47K	
R118	ERJ3GEYJ473	47K	
R119	ERJ3GEY0R00	0	
R120	ERJ3GEY0R00	0	
R121	ERJ3GEYJ101	100	
R122	ERJ3GEYJ103	10K	
R123	ERJ3GEYJ223	22K	
R124	ERJ3GEYJ223	22K	
R125	ERJ3GEYJ223	22K	
R126	ERJ3GEYJ223	22K	
R127	ERJ3GEYJ102	1K	
R128	ERJ3GEYJ102	1K	
R129	ERJ3GEYJ473	47K	
R130	ERJ3GEYJ182	1.8K	
R131	ERJ3GEYJ330	33	
R132	ERJ3GEYJ330	33	
R133	PQ4R18XJ100	10	
R134	ERJ3GEYJ330	33	
R135	ERJ3GEYJ330	33	
R136	ERJ3GEY0R00	0	
R138	ERJ3GEYJ104	100K	
R139	ERJ3GEYJ103	10K	
R140	ERJ3GEYJ103	10K	
R141	ERJ3GEYJ271	270	
R144	ERJ3GEYJ330	33	
R145	ERJ3GEYJ330	33	
R146	ERJ3GEYJ330	33	
R147	ERJ3GEYJ330	33	
R148	ERJ3GEYJ330	33	
R149	ERJ3GEYJ330	33	
R150	ERJ3GEYJ330	33	
R151	ERJ3GEYJ330	33	
R152	ERJ3GEYJ330	33	
R153	ERJ3GEYJ330	33	
R160	ERJ3GEYJ104	100K	
		(CAPACITORS)	
C2	ECEV1HA2R2N	2.2	
C3	PSCEV1HA010	1	
C4	ECUV1H680JCV	68P	
C5	ECUV1H101JCV	100P	
C6	ECUV1H680JCV	68P	
C7	ECUV1H101JCV	100P	
C8	ECUV1H470JCV	47P	
C9	ECUV1H470JCV	47P	
C10	PSCEV1EA101	100	
C11	PQCUV1E104MD	0.1	S
C12	PSCEV1EA101	100	
C13	PQCUV1E104MD	0.1	S
C14	PSCEV1HA010	1	
C15	PSCEV0JA102	1000	
C16	PSCEV0JA102	1000	
C17	PQCUV1E104MD	0.1	S
C18	ECUV1H080DCV	8P	
C19	ECUV1H470JCV	47P	

Ref. No.	Part No.	Part Name & Description	Remarks
C21	ECUV1H104ZFV	0.1	S
C22	ECUV1H104ZFV	0.1	S
C23	PSCEV0JA470	47	
C25	ECUV1H470JCV	47P	
C26	ECUV1H080DCV	8P	
C27	ECUV1H104ZFV	0.1	S
C28	PQCUV1C334ZF	0.33	
C31	PQCUV1C334ZF	0.33	
C32	PSCEV0JA220	22	
C33	PQCUV1E104MD	0.1	
C34	PSCEV0JA470	47	
C35	PSCEV0JA470	47	
C36	PSCEV1HA100	10	
C37	PSCEV0JA220	22	
C38	PSCEV0JA470	47	
C39	PSCEV0JA471	470	
C40	PQCUV1E681MB	680	
C41	PQCUV1C334KB	0.33	
C42	PSCEV1HA010	1	
C43	PQCUV1E473MD	0.047	S
C45	PQCUV1C224KB	0.22	
C46	PQCUV1H104ZF	0.1	S
C47	PQCUV1E104MD	0.1	
C48	PQCUV1H153KB	0.015	
C49	PQCUV1H473MD	0.047	S
C50	PSCEV1HA010	1	
C51	PSCEV1HA010	1	
C52	PSCEV1EA4R7	4.7	S
C53	PQCUV1H683KB	0.068	
C55	PSCEV1HA010	1	
C56	PSCEV0JA470	47	
C57	PQCUV1H682KB	0.0068	
C58	PSCEV0JA101	100	S
C59	PQCUV1E104MD	0.1	
C60	PSCEV0JA101	100	
C61	PSCEV0JA102	1000	
C62	PQCUV1E104MD	0.1	
C63	PSCEV1HA100	10	
C64	PQCUV1E104MD	0.1	S
C66	ECUV1E102JCV	0.001	
C68	PSCEV1AA331	330	
C69	PQCUV1E104MD	0.1	
C71	PQCUV1E473MD	0.047	S
C72	PQCUV1E473MD	0.047	S
C73	PSCEV1EA4R7	4.7	
C74	PQCUV1E104MD	0.1	S
C78	ECUV1E102JCV	0.001	
C79	ECUV1E102JCV	0.001	
C80	PSCEV1HA010	1	
C81	PSCEV0JA220	22	
C82	PSCEV0JA101	100	
C83	PSCEV0JA101	100	
C84	PSCEV0JA220	22	
C85	ECUV1H683MD	0.68	

Ref. No.	Part No.	Part Name & Description	Remarks
C86	PQCUV1H473MD	0.047	S
C88	PSCEV1HA100	10	
C89	PSCEV0JA220	22	
C106	PSCEV0JA101	100	
C107	PSCEV0JA101	100	
C108	ECUV1H471JCV	470P	
C111	ECUV1H104ZFV	0.1	
C115	ECUV1H104ZFV	0.1	S
C117	ECUV1H104ZFV	0.1	S
C118	ECUV1H104ZFV	0.1	S
C119	ECUV1H104ZFV	0.1	S
C120	PSCEV0JA470	47	
C121	PQCUV1C474ZF	0.47	
C122	ECUV1H151JCV	150P	

14.4. LCD BOARD PARTS

Ref. No.	Part No.	Part Name & Description	Remarks
PCB2	PSWP2T7456UK	LCD BOARD ASS'Y (RTL)	
		(ICS)	
IC201	PQVILC7981	IC	
IC202	PSVIBR665BSD	IC	
IC203	PSVILC7942ND	IC	
IC204	PSVILC7940ND	IC	
IC205	PSVILC7940ND	IC	
IC206	PQVILA5311M	IC	
		(LED)	
D201	PSVD111R820R	LED	
D202	PSWE1014Z	BACKLIGHT	
		(CONNECTOR)	
CN201	PSJS36A61Z	CONNECTOR, 36P	
		(SWITCH)	
SW1	PSWE1014Z	SWITCH, BACKLIGHT	
		(RESISTORS)	
R201	PQ4R10XJ100	10	
R202	PQ4R10XJ393	39K	
R203	PQ4R10XJ393	39K	
R204	PQ4R10XJ102	1K	
R205	PQ4R10XJ471	470	
		(CAPACITORS)	
C200	PQCUV1E104MD	0.1	S
C201	PQCUV1E104MD	0.1	S
C202	PQCUV1H150JC	15P	S
C203	PQCUV1E104MD	0.1	S
C204	PQCUV1E104MD	0.1	S
C205	PQCUV1E104MD	0.1	S
C206	PQCUV1E104MD	0.1	S
		(OTHERS)	
E1	L5ADBJG00001	LIQUID CRYSTAL DISPLAY	
E2	PSSE1012Z	CONNECTOR	
E3	PSHR1133Y	GUIDE	

14.5. SWITCH BOARD PARTS

Ref. No.	Part No.	Part Name & Description	Remarks
PCB3	PSWP3T7431UK	SWITCH BOARD ASS'Y (RTL)	
		(SWITCH)	
SW301	PSSRCA101Z	SWITCH, JOG DIAL	
		(CONNECTOR)	
CN301	PSJS03Q36Z	CONNECTOR, 3P	

15. PRINTED CIRCUIT BOARD

15.1. MAIN BOARD (COMPONENT VIEW)

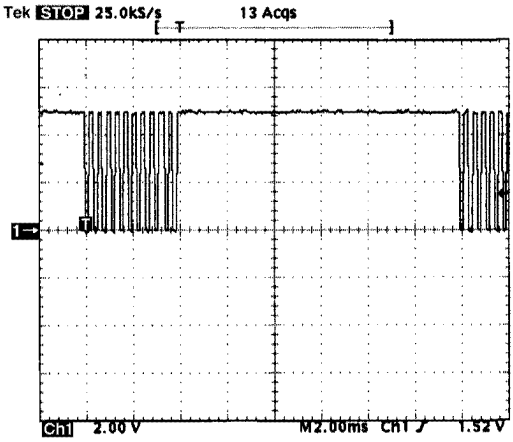
15.2. MAIN BOARD (BOTTOM VIEW)

16. SCHEMATIC DIAGRAM

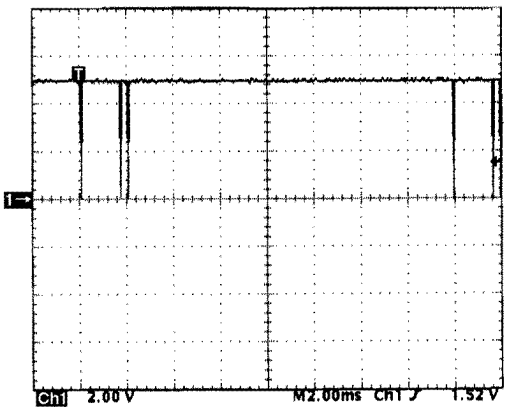
17. PRINTED CIRCUIT BOARD

H KXT7456MUK / KXT7456MBUK

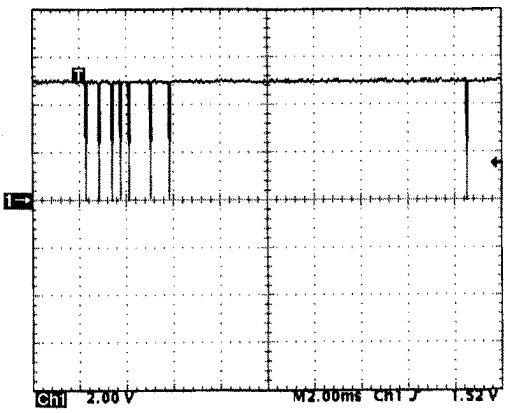
㉝ALE



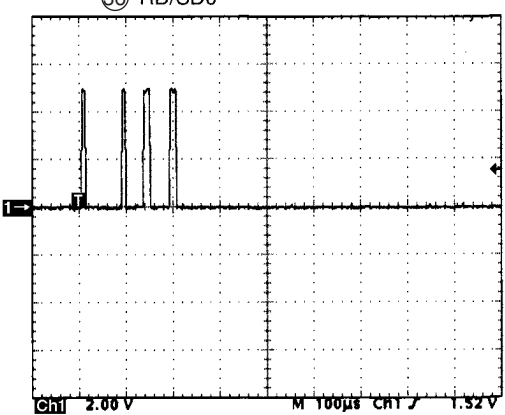
㉞INT



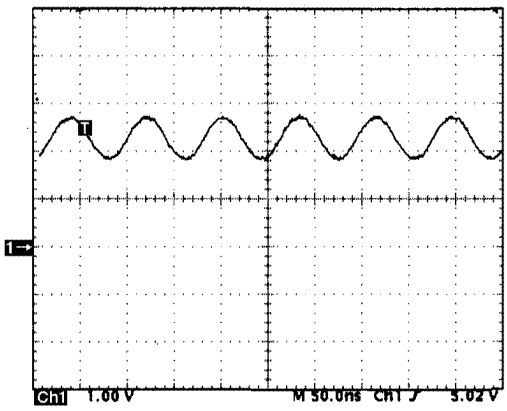
㉟ -WR/STB



㊱-RD/SD0

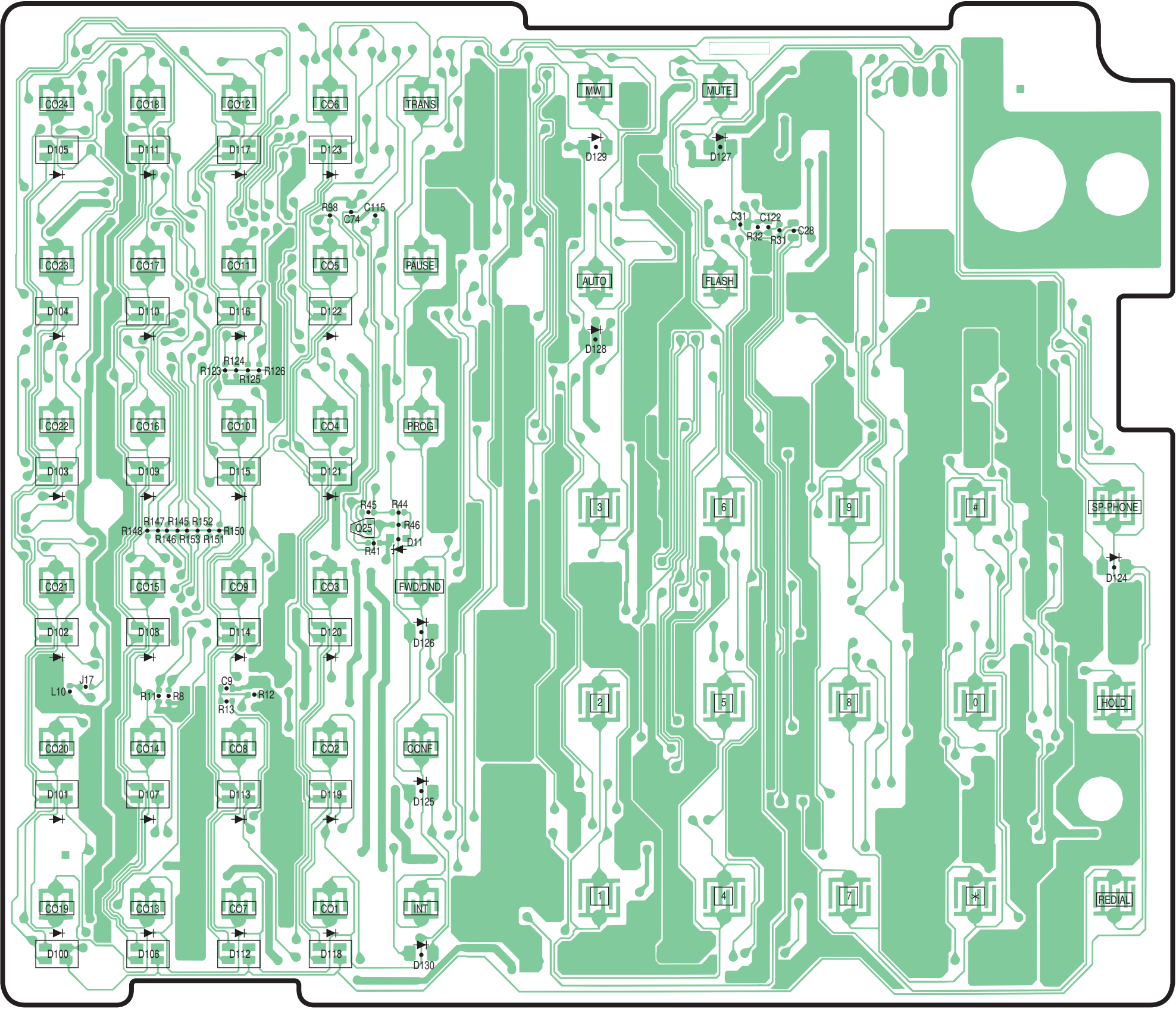


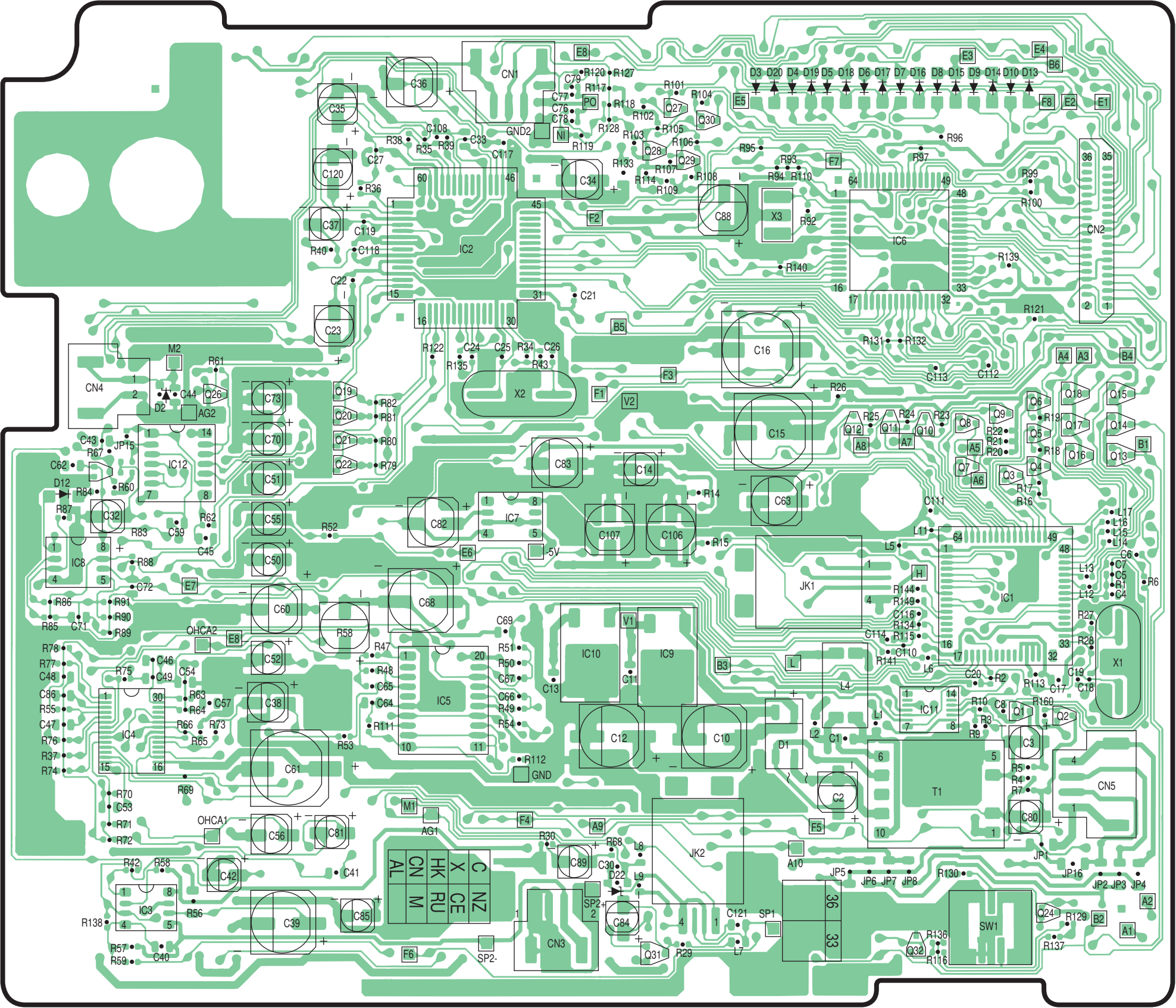
㊲OSC1

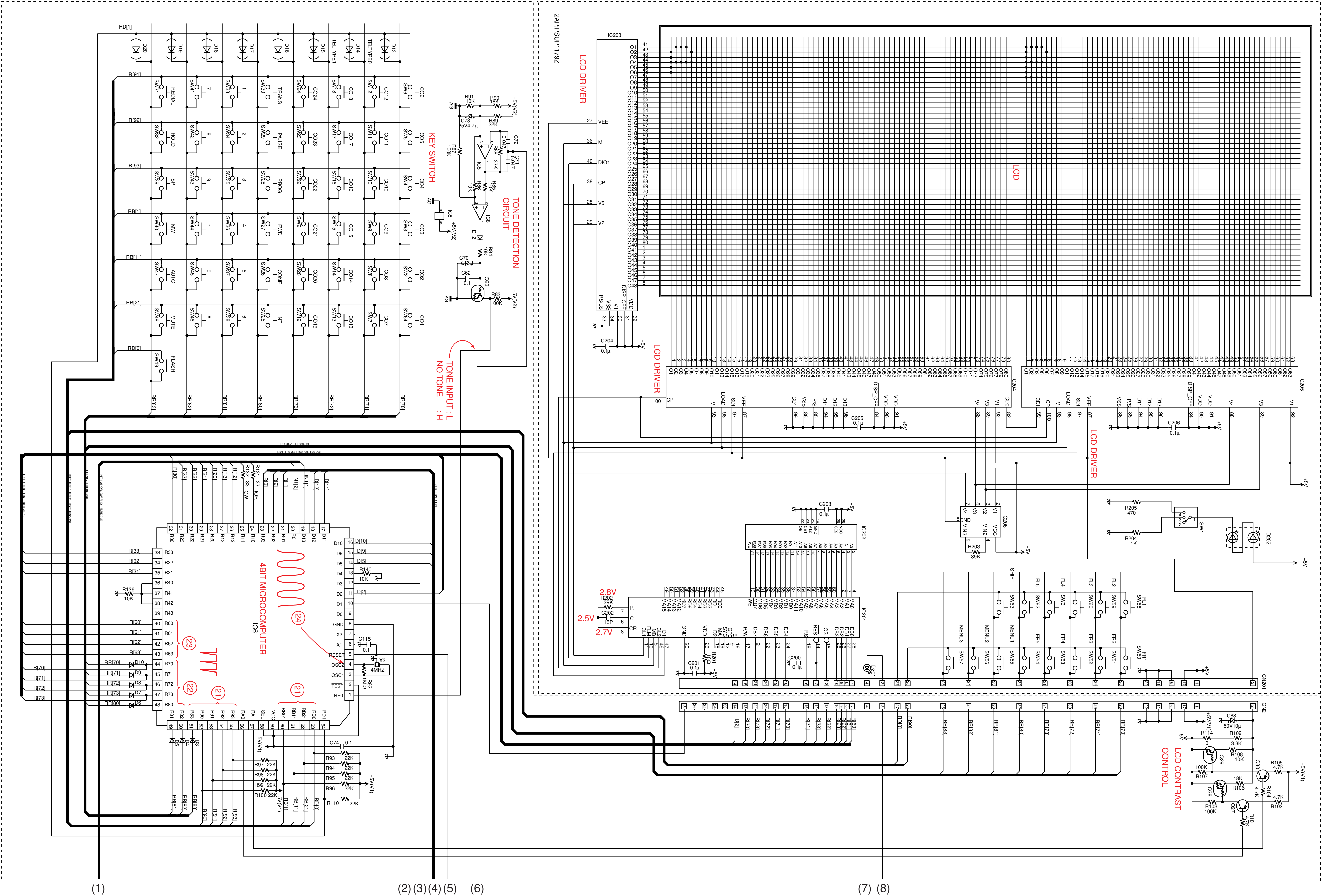


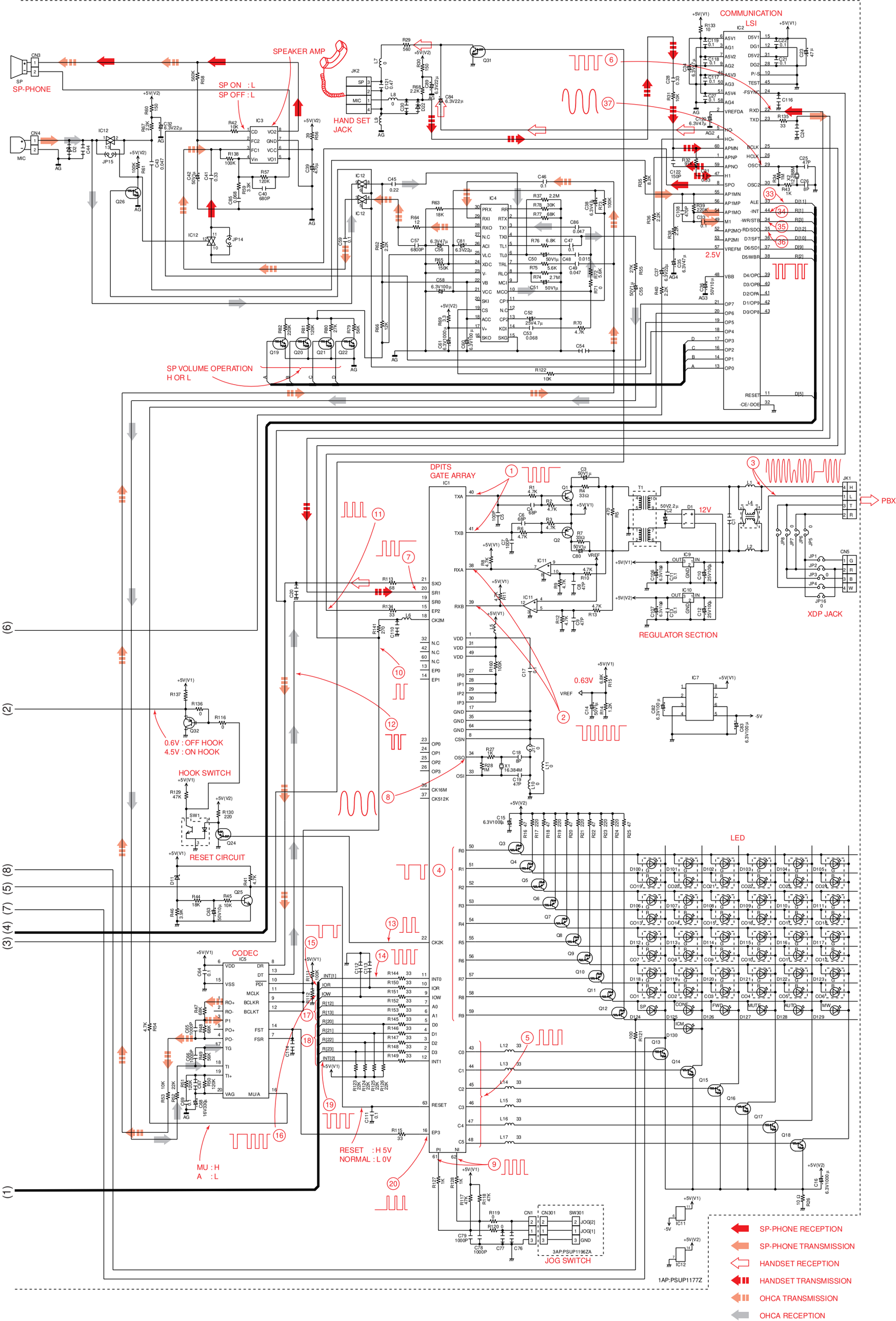
Note:

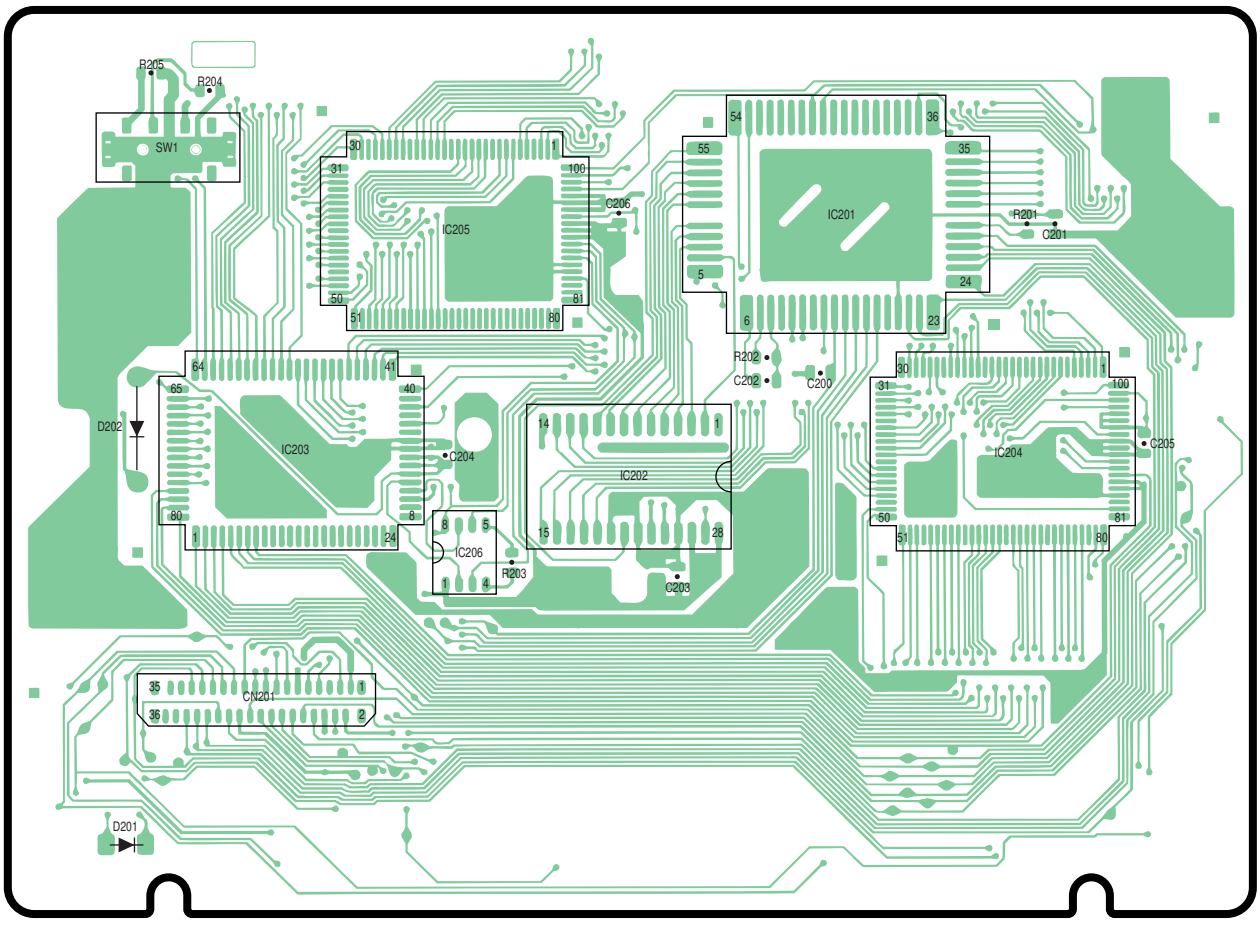
㉕~ ㉜Note used

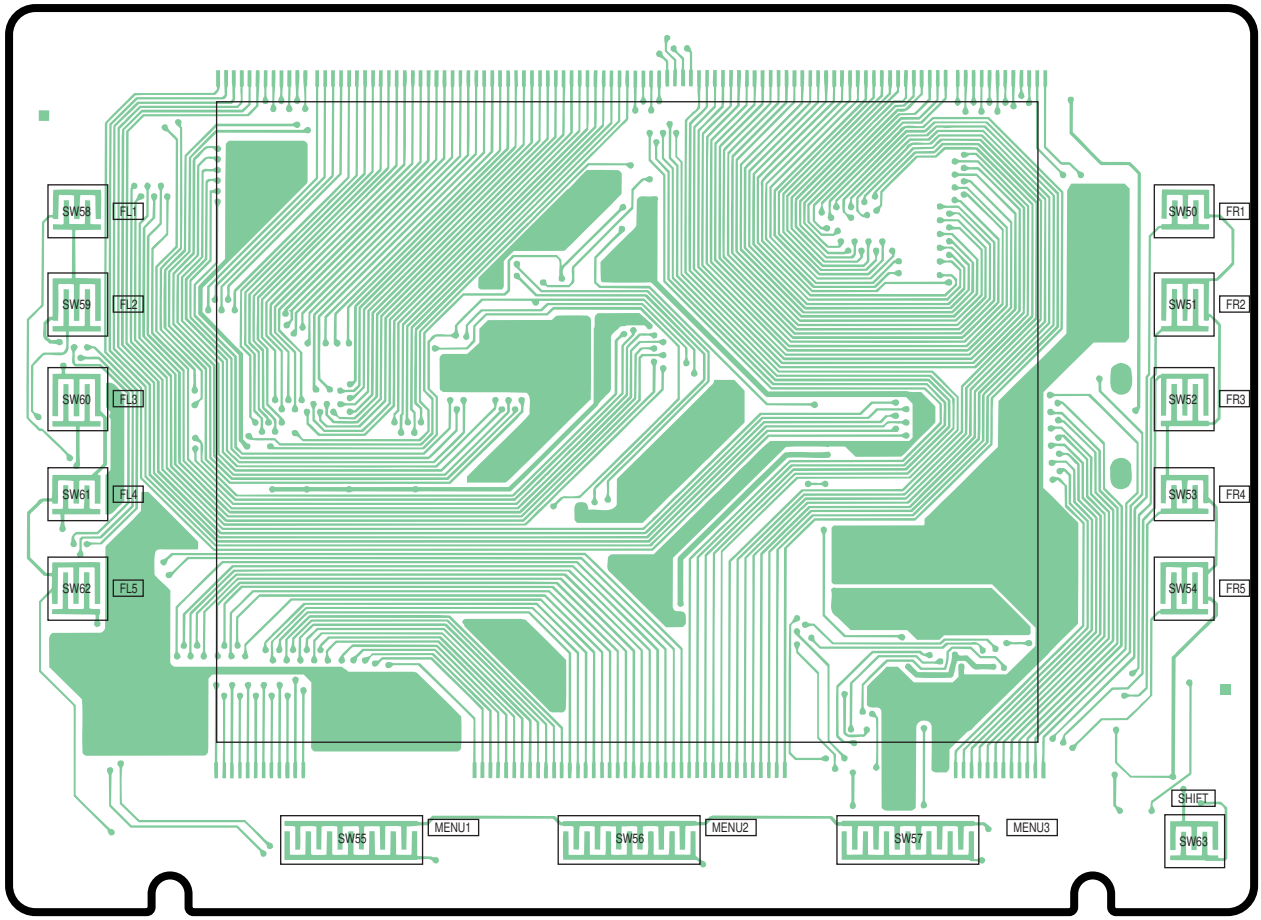

CO24
CO18
CO12
CO6
TRANS
MW
MUTE
D105
D111
D117
D123
D129
D127
R98
C74
C115
C31
C122
R32
R31
C28
CO23
CO17
CO11
CO5
PAUSE
AUTO
FLASH
D104
D110
D116
D122
D128
R124
R123
R125
R126
CO22
CO16
CO10
CO4
PROG
D103
D109
D115
D121
R45
R44
3
6
9
#
SP-PHONE
R147 R145 R152
R148
R146 R153 R151
R150
Q25
R46
D11
R41
CO21
CO15
CO9
CO3
FWD/DND
D124
D102
D108
D114
D120
D126
J17
L10
C9
R11
R8
R12
R13
2
5
8
0
HOLD
CO20
CO14
CO8
CO2
CONF
D101
D107
D113
D119
D125
1
4
7
*
REDIAL
CO19
CO13
CO7
CO1
INT
D100
D106
D112
D118
D130

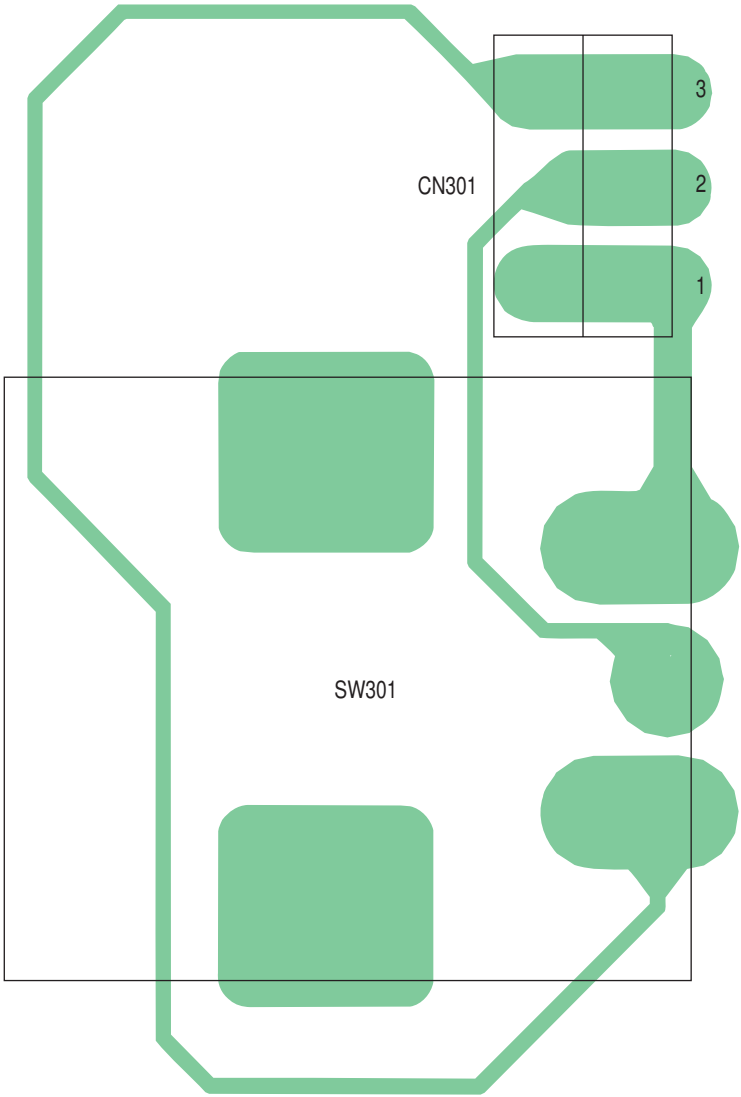

CN1
CN2
CN3
CN4
CN5
IC1
IC2
IC3
IC4
IC5
IC6
IC7
IC8
IC9
IC10
IC11
IC12
JK1
JK2
T1
SW1
X1
X2
X3
D1
D2
D3 D20 D4 D19 D5 D18 D6 D17 D7 D16 D8 D15 D9 D14 D10 D13
GND
GND2
-5V
SP1
SP2+
SP2-
OHCA1
OHCA2
AG1
AG2
AL
CN
M
HK
RU
X
CE
C
NZ

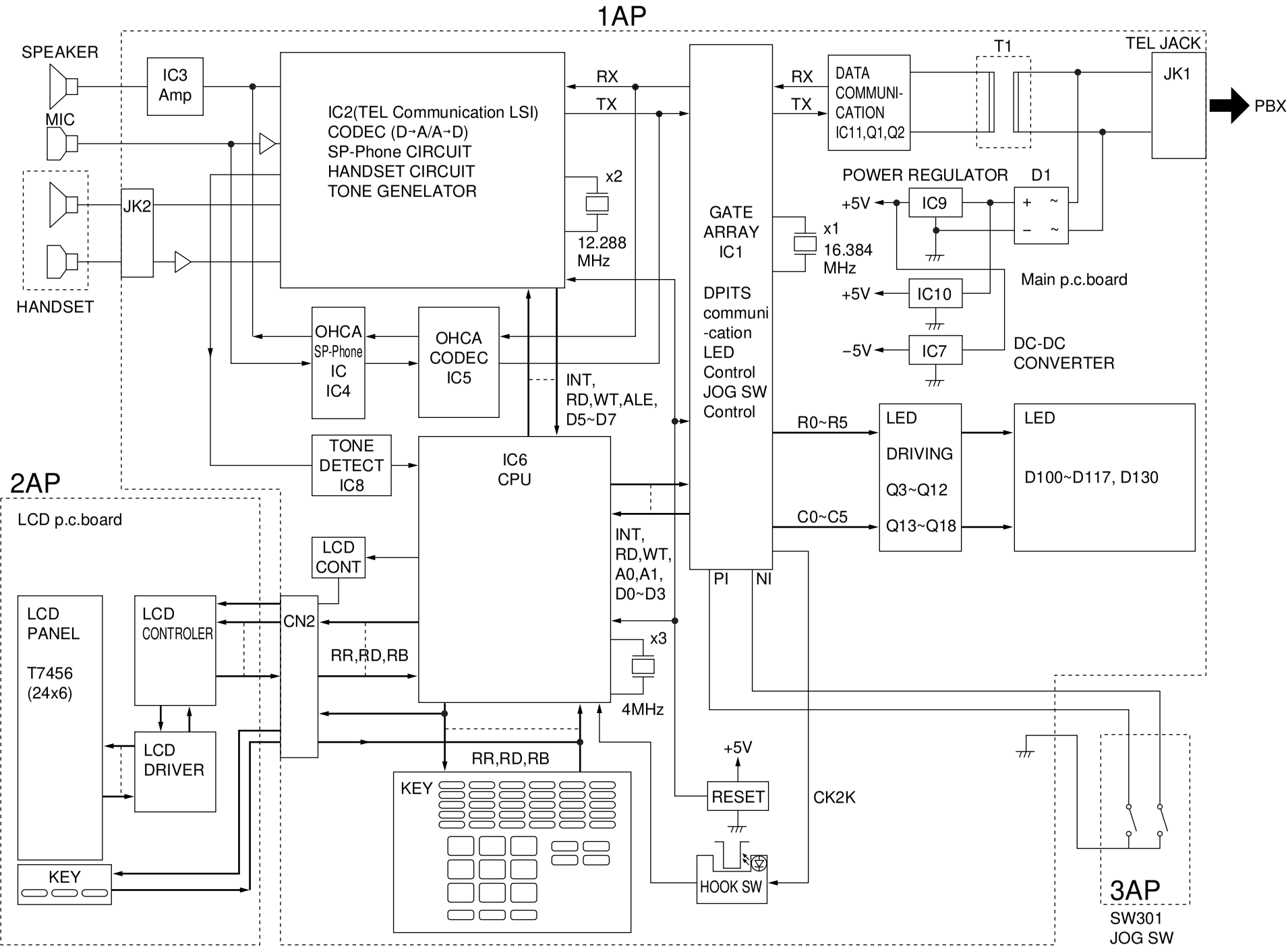

KEY SWITCH
TONE DETECTION CIRCUIT
TONE INPUT : L
NO TONE : H
LCD DRIVER
LCD
4BIT MICROCOMPUTER
IC6
IC203
IC204
IC205
IC201
IC202
IC206
LCD CONTRAST CONTROL
2.8V
2.5V
2.7V
4MHZ
(1)
(2)
(3)
(4)
(5)
(6)
(7)
(8)


SP-PHONE
SPEAKER AMP
SP ON : L
SP OFF : L
HAND SET JACK
MIC
COMMUNICATION LSI
SP VOLUME OPERATION H OR L
DPITS GATE ARRAY
REGULATOR SECTION
12V
2.5V
0.63V
PBX
XDP JACK
0.6V : OFF HOOK
4.5V : ON HOOK
HOOK SWITCH
RESET CIRCUIT
CODEC
MU : H
A : L
RESET : H 5V
NORMAL : L 0V
LED
JOG SWITCH
3AP:PSUP1196ZA
1AP:PSUP1177Z
SP-PHONE RECEPTION
SP-PHONE TRANSMISSION
HANDSET RECEPTION
HANDSET TRANSMISSION
OHCA TRANSMISSION
OHCA RECEPTION

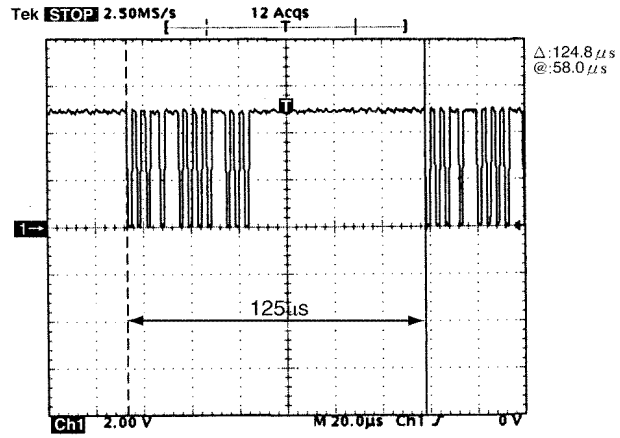

R205
R204
SW1
IC205
C206
IC201
R201
C201
R202
C202
C200
D202
IC203
C204
IC202
IC204
C205
IC206
R203
C203
CN201
D201


SW58
FL1
SW59
FL2
SW60
FL3
SW61
FL4
SW62
FL5
SW50
FR1
SW51
FR2
SW52
FR3
SW53
FR4
SW54
FR5
SW55
MENU1
SW56
MENU2
SW57
MENU3
SHIFT
SW63

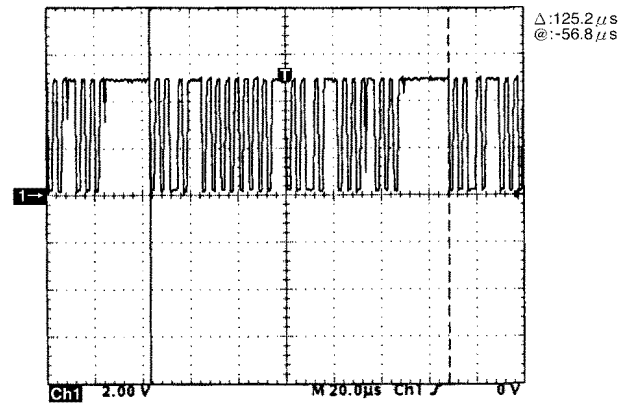

3
CN301
2
1
SW301


1AP
SPEAKER
MIC
HANDSET
IC3
Amp
JK2
IC2(TEL Communication LSI)
CODEC (D→A/A→D)
SP-Phone CIRCUIT
HANDSET CIRCUIT
TONE GENELATOR
RX
TX
x2
12.288
MHz
OHCA
SP-Phone
IC
IC4
OHCA
CODEC
IC5
INT,
RD,WT,ALE,
D5~D7
TONE
DETECT
IC8
IC6
CPU
GATE
ARRAY
IC1
DPITS
communi
-cation
LED
Control
JOG SW
Control
RX
TX
DATA
COMMUNI-
CATION
IC11,Q1,Q2
T1
TEL JACK
JK1
PBX
POWER REGULATOR
D1
+5V
IC9
x1
16.384
MHz
Main p.c.board
+5V
IC10
−5V
IC7
DC-DC
CONVERTER
R0~R5
LED
DRIVING
Q3~Q12
Q13~Q18
LED
D100~D117, D130
C0~C5
INT,
RD,WT,
A0,A1,
D0~D3
PI
NI
2AP
LCD p.c.board
LCD
CONT
LCD
PANEL
T7456
(24x6)
LCD
CONTROLER
CN2
LCD
DRIVER
RR,RD,RB
x3
4MHz
RR,RD,RB
KEY
+5V
RESET
CK2K
HOOK SW
KEY
3AP
SW301
JOG SW

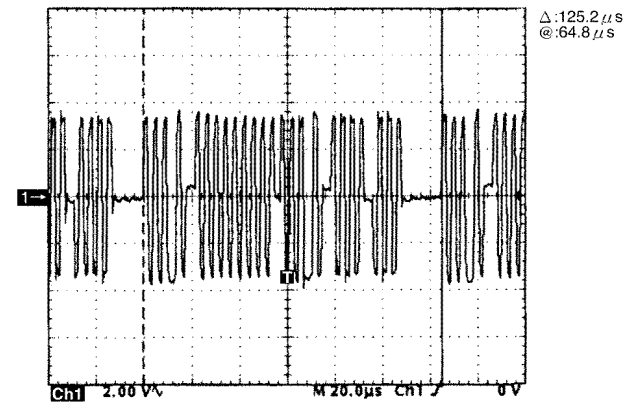
① TX DATA TRANSFER



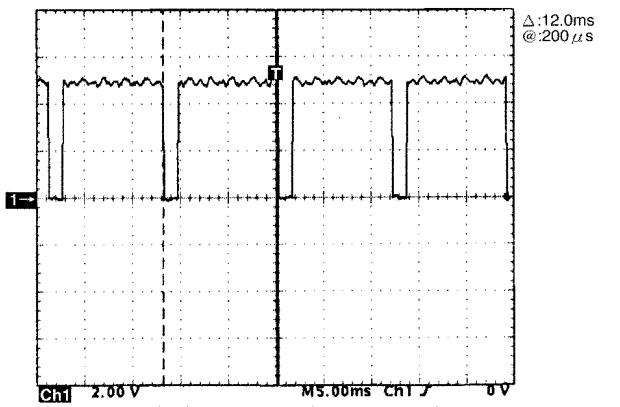
② RX DATA TRANSFER



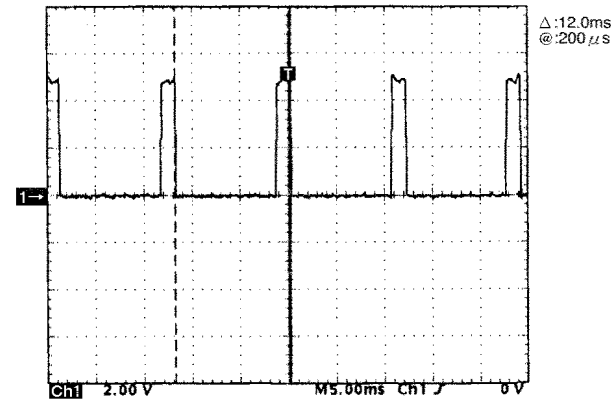
③ H-L DAT



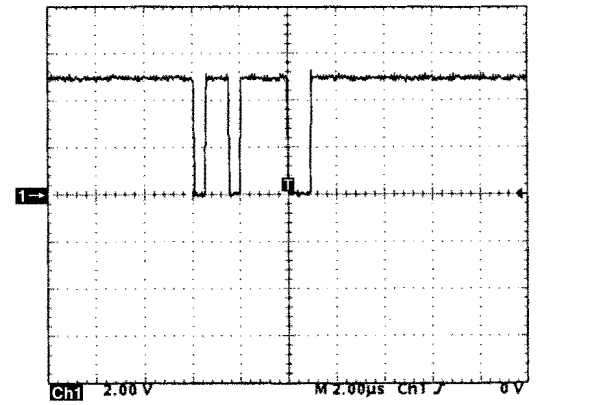
④ LED CONTROL DATA



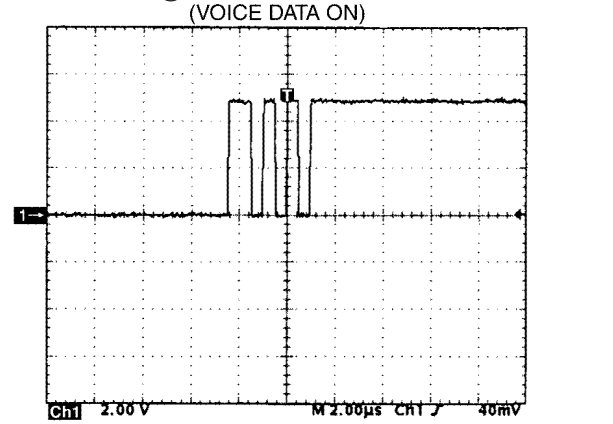
⑤ LED CONTROL DATA



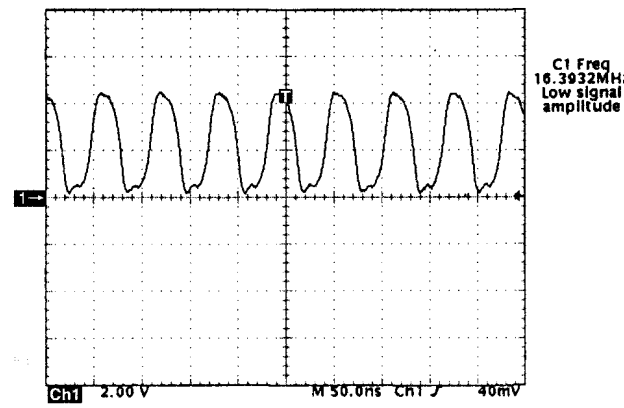
⑥ RX VOICE SERIAL DATA
(VOICE DATA ON)



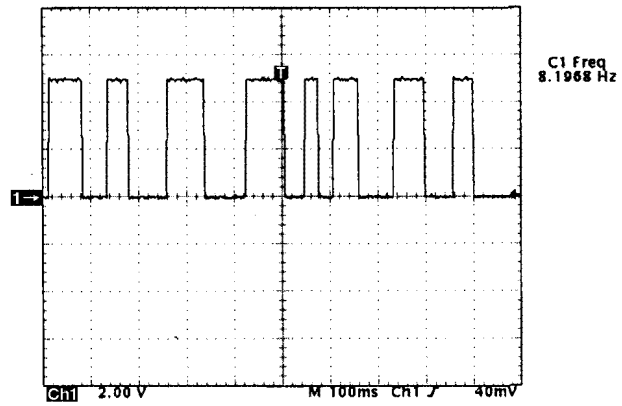
⑦ TX VOICE SERIAL DATA
(VOICE DATA ON)



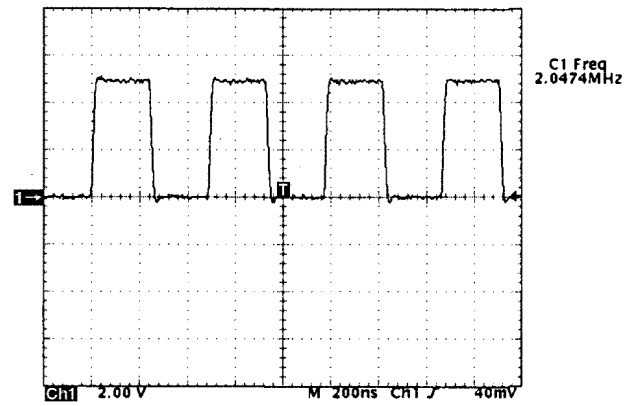
⑧ 16.38MHz CRYATAL OUTPUT



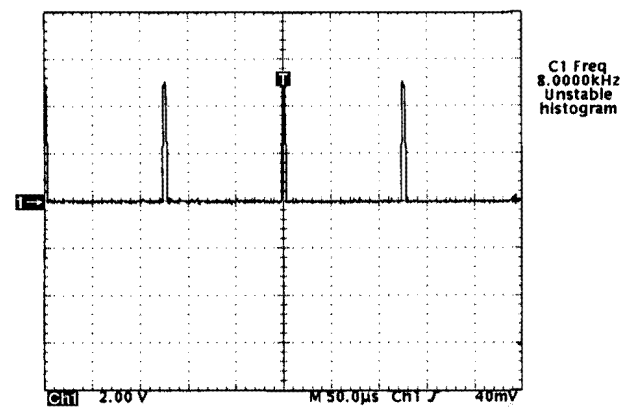
⑨ JOG DIAL
(JOG OPERATION)



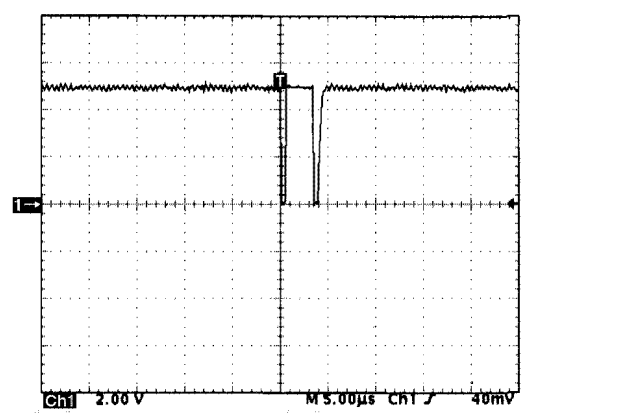
⑩ CK2M



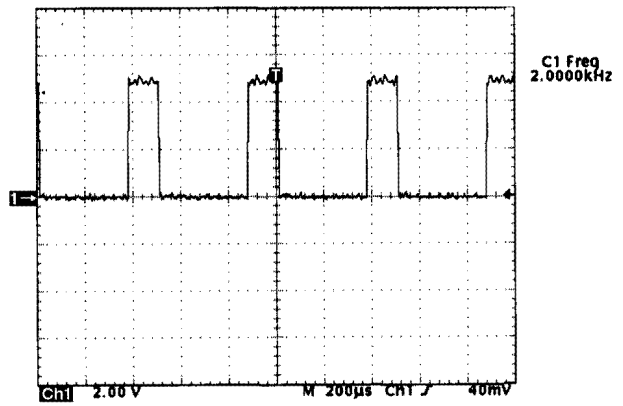
⑪ EP2



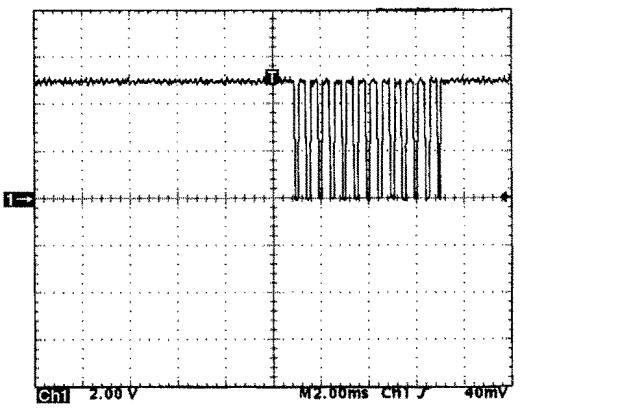
⑫ SAO



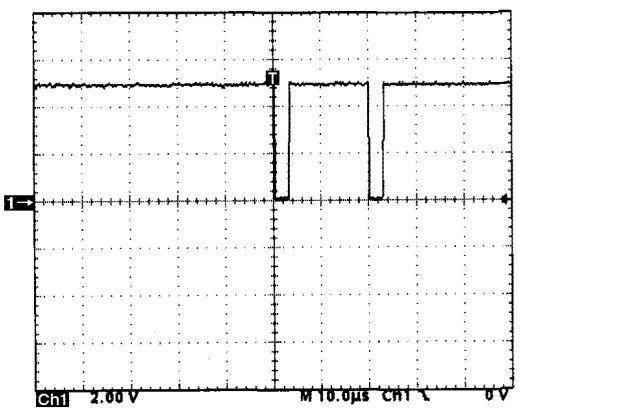
⑬ CK2K



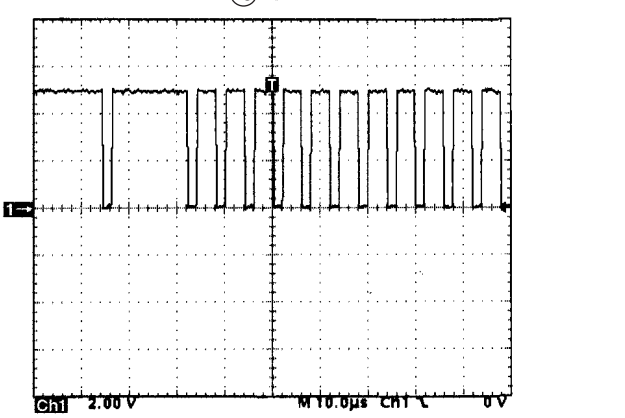
⑭ INT



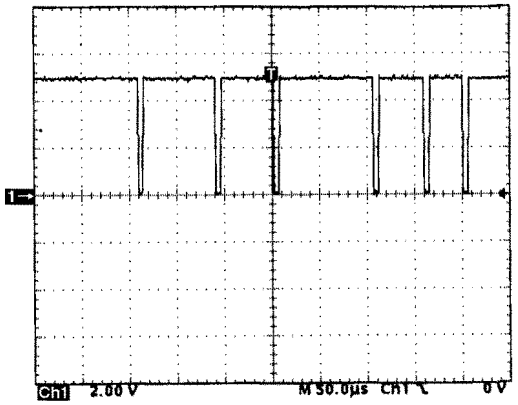
⑮ IOR



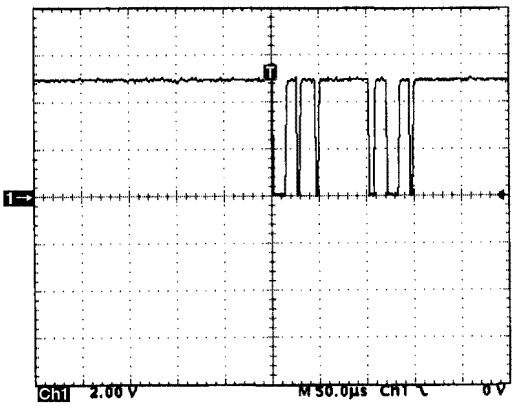
⑯ IOW



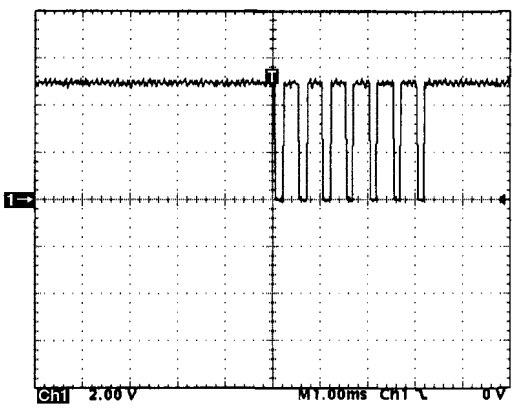
⑰ A0~A1



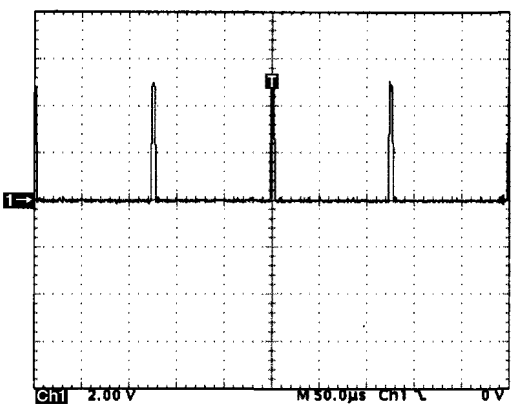
⑱ D0~D3



⑲ INT2

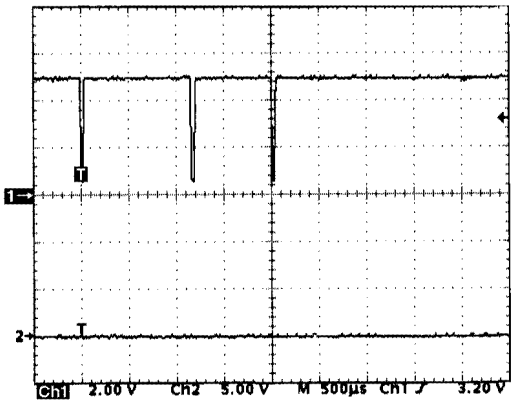


⑳ EP3

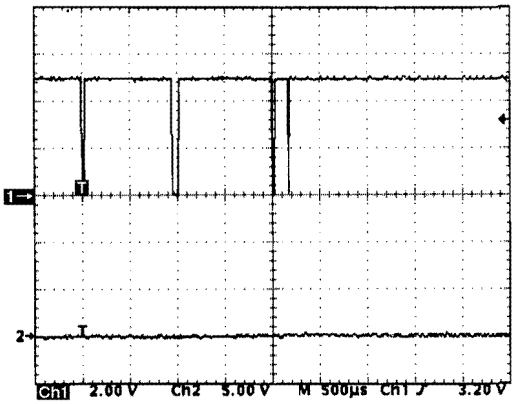


C1 Freq
8.0000kHz
Unstable
histogram

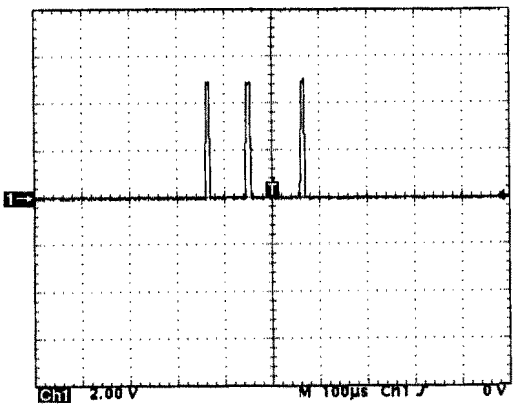
㉑ CKEY INPUT SIGNAL
(KEY ON, KEY OFF:5V)



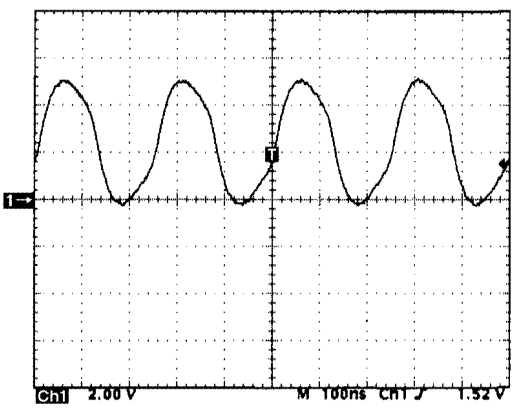
㉒ KEY CONTROL SIGNAL



㉓ LCD DATA



㉔ 4MHz CLOCK



C1 Freq
4.0160MHz