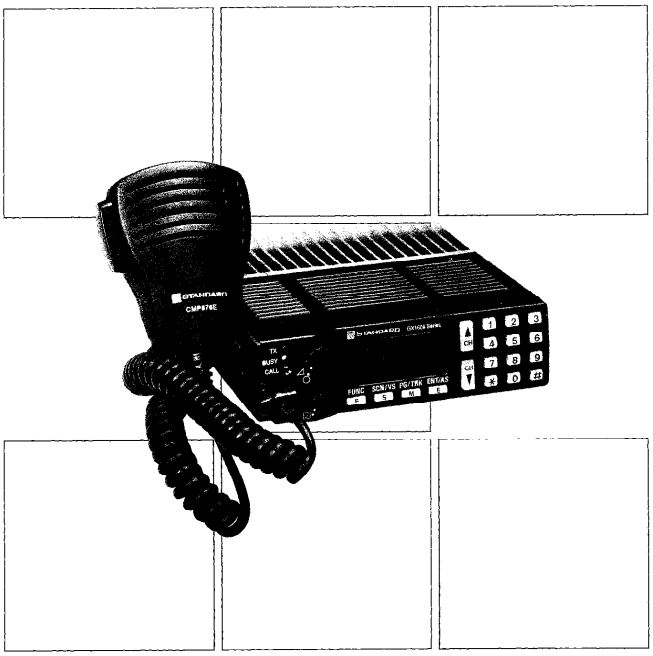
STANDARD

40 WATT UHF/FM LAND MOBILE TRANSCEIVER

GX1608U(EA)

SERVICE MANUAL

Model: GX1608U (EA)



MARANTZ JAPAN, INC.
35-1, 7-chome, Sagamiono, Sagamihara-shi,
Kanagawa, 228 Japan.

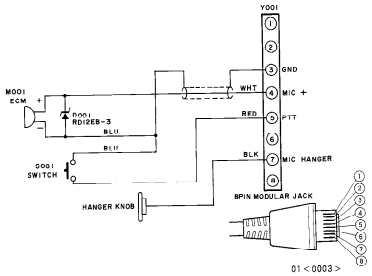
GX1608UEA131

Printed in Japan

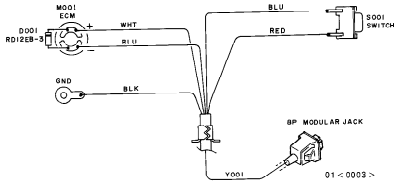
129B855010
1994/3

11.7 CMP876E SCHEMATIC DIAGRAM/WIRING DIAGRAM

SCHEMATIC DIAGRAM



WIRING DIAGRAM



1. CONTROLS AND CONNECTIONS

1.1 Front Panel

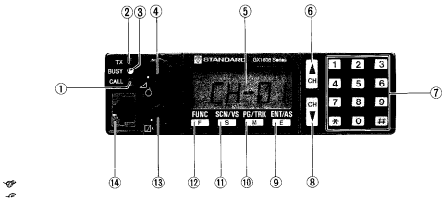


Figure 1-1 Front Panel

① CALL INDICATOR
In the paging mode, this indicator lights upon entering the squelch defeat state. The squelch defeat state is the state in which DTMF mute is cancelled and communication is possible

② TRANSMISSION INDICATOR
Lights when the transceiver is transmitting

③ RECEPTION INDICATOR
Lights when the transceiver is receiving

④ POWER SWITCH/VOLUME CONTROL
Turning all the way in the counterclockwise direction switches off the power to the transceiver. Turning in the clockwise direction switches on the power. When the power is on, turning further in the clockwise direction increases the volume

⑤ LCD DISPLAY

⑥ UP (▲) KEY
Increases the channel, programming mode, or tuning mode

⑦ 10 KEY
Carries out direct input or programming of the DTMF code

⑧ DOWN (▼) KEY
Decreases the channel, programming mode, or tuning mode

⑨ ENTER (E) KEY
Scans the priority channel
Pressing for 1.5 seconds or longer allows the priority channel to be set. Also used to confirm entered data during programming and alignment
Pressing this key together with the F key causes the transceiver to enter the cloning setting mode

⑩ MONITOR (M) KEY
Pressing this key cancels squelch
Pressing this key together with the F key causes the transceiver to enter the paging mode

⑪ SCAN (S) KEY
Pressing this key causes the scan operation to begin
Holding it down allows scan memory to be set on and off.
Pressing this key together with the F key allows use of the voice scrambler unit (when the CVS240 is attached)

⑫ FUNCTION (F) KEY
Pressing together with the E key, M key, or S key allows use of the special function associated with these respective keys

⑬ SQUELCH CONTROL
Turning all the way in the counterclockwise direction switches squelch off, causing white noise to be output from the speaker
Turning in the clockwise direction switches squelch on, causing white noise to disappear

⑭ MICROPHONE CONNECTOR
The microphone connector is the connector into which the 8-pin jack of the provided microphone (CMP876E) is plugged

1.2 Rear Panel

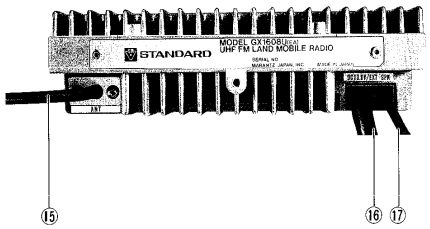
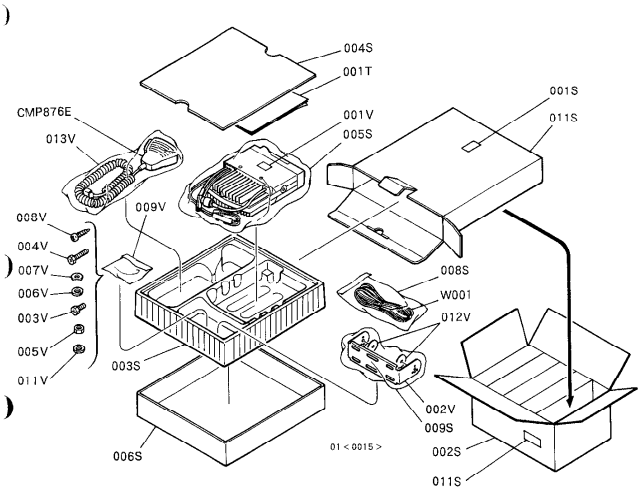


Figure 1-2 Rear Panel

⑮ ANTENNA CABLE
⑯ DC POWER CORD
⑰ EXTERNAL SPEAKER CORD

8. PACKING DIAGRAM AND PARTS LIST

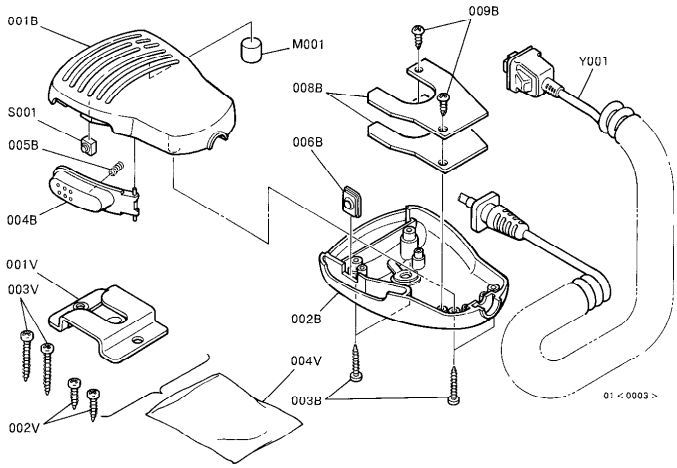
NOTES.



REF DESIG	QTY	PART NO	DESCRIPTION
			PACKING
001S	1	129B801010	PACKING CASE
002S	1	129B805010	MASTER CARTON
003S	1	130B809010	CUSHION
004S	1	130B807010	REINFORCING FOR CUSHION
005S	1	146B811010	POLYETHYLENE BAG
006S	1	130B807020	REINFORCING FOR CUSHION
008S	1	9011025010	POLYETHYLENE BAG FOR DC CORD
009S	1	9013025010	POLYETHYLENE BAG FOR MOBILE BRACKET
010S	1	159C881020	OUTSIDE F CHART LABEL
011S	2	9524520010	SERIAL NUMBER LABEL
001T	1	130B851210	USER MANUAL

REF DESIG	QTY	PART NO	DESCRIPTION
			PACKING
001V	1	241C881010	CHANNEL LABEL
002V	1	130D160030	MOBILE BRACKET
003V	2	130B010010	SCREW (MOBILE BRACKET + GX1608)
004V	4	52030520A9	H HEAD BOLT,P5X20
005V	4	93110503E9	HEXAGON NUT M5X3
006V	4	54040502N0	SPRING WASHER M5X2
007V	8	54020501E0	FLAT WASHER, P0 5X1
008V	4	51380515A0	P.H TAP SCREW P5X15
009V	1	9011010010	POLYETHYLENE BAG
011V	2	54040502N0	SPRING WASHER M5X2
012V	2	130B118020	SPACER FOR MOBILE BRACKET
013V	1	011C811010	POLYETHYLENE BAG FOR MICROPHONE
W001	1	YC02000660	2 m DC CABLE 01 < 0015 >

7.2 Microphone (CMP876E)



REF DESIG	Q'TY	PART NO	DESCRIPTION
			MECHANISM
001B	1	244X084010	FRONT CASE
002B	1	244X084020	REAR CASE WITH HANGER KNOB
003B	4	51330315U0	F H TAP.SCREW P3X15
004B	1	244X270010	PTT BUTTON
005B	1	244X115010	SPRING FOR PTT
006B	1	244X116010	SPACER FOR PTT SWITCH
008B	2	244X008010	WEIGHT FOR REAR CASE
009B	2	51280308A0	B H.TAP SCREW B3X8
001V	1	244X155010	HANGER BRACKET
002V	2	51380412K0	P.H.TAP.SCREW P4X12
003V	2	51380430K0	P.H TAP SCREW P4X30
004V	1	9010510010	POLYETHYLENE BAG
			01 < 0003 >

1.3 Microphone (CMP876E)

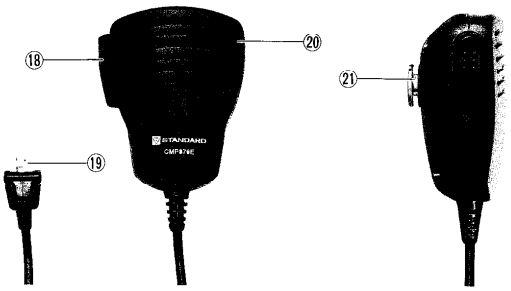


Figure 1-3 Microphone

⑱ PTT SWITCH
When the microphone is attached to the transceiver, this switch is used to alternate between transmission and reception

⑲ 8-PIN MODULAR JACK

⑳ MICROPHONE

㉑ MICROPHONE HANGER
When the microphone is mounted in the mounting bracket, transmission will not be performed even if the PTT switch is pressed. When performing the scan operation as well, removing the microphone from the mounting bracket causes the scan to be halted

CAUTION: *When using the microphone hanger function, be sure to connect the microphone ground to the microphone hanger.*

2. THEORY OF OPERATION

2.1 PLL Synthesizer

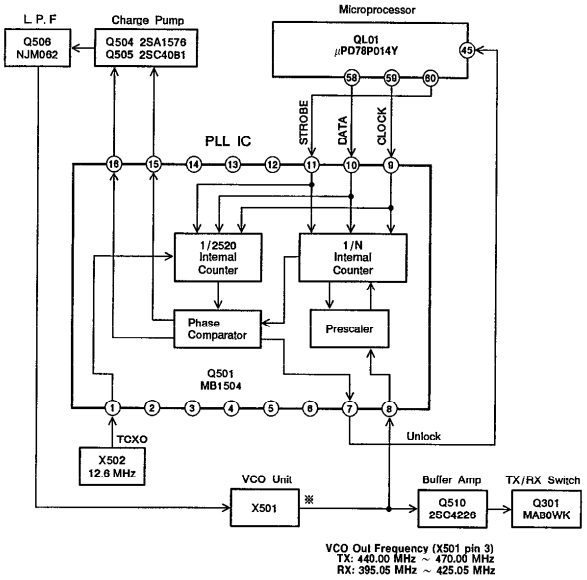
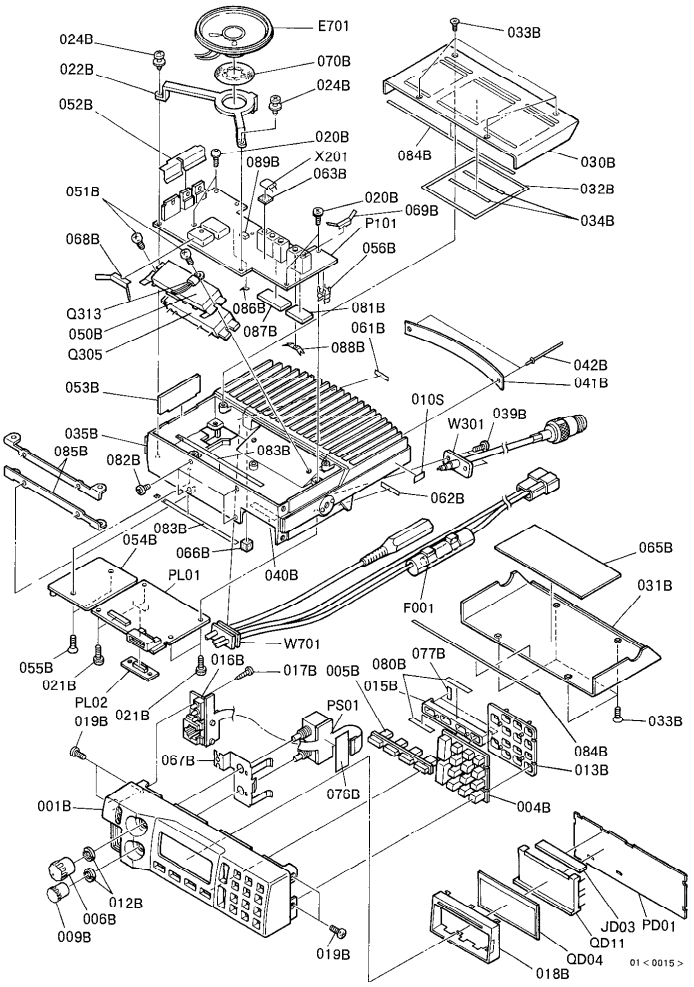


Figure 2-1 PLL Block Diagram

7. EXPLODED PARTS VIEW

7.1 Transceiver



REF DESIG	Q'TY	PART NO.	DESCRIPTION
			P101 TX/RX P.C.BOARD
Q301	1	HZ20039020	DIODE MA80WK
Q302	1	HX333571C0	TRANSISTOR 2SC3357
Q303	1	HT800741O0	TRANSISTOR MRF559
Q304	1	HZ20018020	DIODE MA141A
Q305	1	HC10170200	IC M58703H(440 - 470MHZ RF MODULE)
Q306	1	HD20001450	DIODE UM9401
Q307	1	HZ20008200	DIODE MI809
Q308	1	HZ20008200	DIODE MI809
Q309	1	HZ20031020	DIODE MA742
Q310	1	HT209452B0	TRANSISTOR SB945
Q311	1	HX409992A0	TRANSISTOR 2SD999
Q312	1	HC10338050	IC TA75S01F(OP - AMP)
Q313	1	HP00004230	VARISTOR PTH487A01BE222
Q501	1	HC10031180	IC MB1504
Q502	1	HZ20029050	DIODE 1SS314
Q504	1	HX115761C0	TRANSISTOR 2SA1576
Q505	1	HX340811C0	TRANSISTOR 2SC4081
Q506	1	HC10054090	IC MJM062
Q509	1	HX413831B0	TRANSISTOR 2SD1383 K
Q510	1	HX342261A0	TRANSISTOIR 2SC4226 (R24)
Q511	1	BA20057210	DIGITAL TRANSISTOR UMG5
Q512	1	HZ30015050	ZENER DIODE 02CZ6.8Z
Q601	1	HC31909320	IC PQ09RF01
Q602	1	HZ20002000	DIODE 1SS187
Q603	1	HX213021B0	TRANSISTOR 2SB1302
Q604	1	BA20030210	DIGITAL TRANSISTOR DTC114YU
Q605	1	BA10027210	DIGITAL TRANSISTOR DTA143XU
Q606	1	HX207982A0	TRANSISTOR 2SB798
Q607	1	BA20057210	DIGITAL TRANSISTOR UMG5
Q608	1	HX413831B0	TRANSISTOR 2SD1383 K
Q609	1	HC10018420	IC TK11806M
Q610	1	HC90005090	IC NJM78L05A
Q611	1	HD20007290	DIODE S3Y - 10
Q701	1	HC10120050	IC TA7252AP
R101	1	NN05273610	27 k Ω ± 5 % 1/16 W
R103	1	NN05470610	47 Ω ± 5 % 1/16 W
R104	1	NN05101610	100 Ω ± 5 % 1/16 W
R105	1	NN05273610	27 k Ω ± 5 % 1/16 W
R108	1	NN05470610	47 Ω ± 5 % 1/16 W
R108	1	NN05101610	100 Ω ± 5 % 1/16 W
R109	1	NN05271610	270 Ω ± 5 % 1/16 W
R110	1	NN05180610	18 Ω ± 5 % 1/16 W
R111	1	NN05271610	270 Ω ± 5 % 1/16 W
R112	1	NN05101610	100 Ω ± 5 % 1/16 W
R113	1	NN05273610	27 k Ω ± 5 % 1/16 W
R114	1	NN05101610	100 Ω ± 5 % 1/16 W
R116	1	NN05221610	220 Ω ± 5 % 1/16 W
R119	1	NN05102810	1 k Ω ± 5 % 1/16 W
R204	1	NN05151610	150 Ω ± 5 % 1/16 W
R205	1	NN05473610	47 k Ω ± 5 % 1/16 W
R206	1	NN05470610	47 Ω ± 5 % 1/16 W
R207	1	NN05681610	680 Ω ± 5 % 1/16 W
R208	1	NN05103610	10 k Ω + 5 % 1/16 W
R209	1	NN05222610	2 2 k Ω ± 5 % 1/16 W

REF DESIG	Q'TY	PART NO	DESCRIPTION
			P101 TX/RX P.C.BOARD
R211	1	NN05274610	270 k Ω ± 5 % 1/16 W
R212	1	NN05824610	820 k Ω ± 5 % 1/16 W
R213	1	NN05561610	560 Ω ± 5 % 1/16 W
R214	1	NN05472610	4 7 k Ω ± 5 % 1/16 W
R215	1	NN05182610	1 8 k Ω ± 5 % 1/16 W
R216	1	NN05473610	47 k Ω ± 5 % 1/16 W
R219	1	NN05333610	33 k Ω ± 5 % 1/16 W
R220	1	NN05102610	1 k Ω ± 5 % 1/16 W
R221	1	NN05152610	1 5 k Ω ± 5 % 1/16 W
R223	1	NN05101610	100 Ω ± 5 % 1/16 W
R224	1	NN05101610	100 Ω ± 5 % 1/16 W
R230	1	NN05221610	220 Ω ± 5 % 1/16 W
R231	1	NN05473610	47 k Ω ± 5 % 1/16 W
R232	1	NN05470610	47 Ω ± 5 % 1/16 W
R233	1	NN05681610	680 Ω ± 5 % 1/16 W
R234	1	NN05221610	220 Ω ± 5 % 1/16 W
R301	1	NN05122610	1 2 k Ω ± 5 % 1/16 W
R303	1	NN05153610	15 k Ω ± 5 % 1/16 W
R304	1	NN05332610	3 3 k Ω ± 5 % 1/16 W
R305	1	RI05150140	15 Ω ± 5 % 1/4 W
R308	1	RI05470140	47 Ω ± 5 % 1/4 W
R307	1	NN05561610	560 Ω ± 5 % 1/16 W
R308	1	NN05102610	1 k Ω ± 5 % 1/16 W
R309	1	NN05101610	100 Ω ± 5 % 1/16 W
R310	1	NN05561610	560 Ω ± 5 % 1/16 W
R311	1	RI05680010	68 Ω ± 5 % 1 W
R312	1	NN05472610	4.7 k Ω ± 5 % 1/16 W
R313	1	RI05121120	120 Ω ± 5 % 1/2 W
R314	1	NN05332610	3 3 k Ω ± 5 % 1/16 W
R315	1	RI05561120	560 Ω ± 5 % 1/2 W
R316	1	NN05682610	6 8 k Ω ± 5 % 1/16 W
R317	1	NI05682110	6 8 k Ω +- 5 % 1/10 W
R318	1	NN05103610	10 k Ω ± 5 % 1/16 W
R319	1	NN05101610	100 Ω ± 5 % 1/16 W
R320	1	NN05332610	3 3 k Ω ± 5 % 1/16 W
R321	1	NN05223610	22 k Ω ± 5 % 1/16 W
R322	1	NN05103610	10 k Ω ± 5 % 1/16 W
R323	1	NN05222610	2 2 k Ω ± 5 % 1/16 W
R324	1	NI05000110	0 Ω ± 5 % 1/10 W
R326	1	GJ05022010	2 2 Ω ± 5 % 1 W
R501	1	NN05101610	100 Ω + 5 % 1/16 W
R502	1	NN05471610	470 Ω ± 5 % 1/16 W
R508	1	NN05472610	4 7 k Ω ± 5 % 1/16 W
R509	1	NN05103610	10 k Ω ± 5 % 1/16 W
R510	1	NN05332610	3 3 k Ω ± 5 % 1/16 W
R511	1	NN05103610	10 k Ω + 5 % 1/16 W
R512	1	NN05682610	6 8 k Ω ± 5 % 1/16 W
R513	1	NN05331610	330 Ω ± 5 % 1/16 W
R514	1	NN05273610	27 k Ω + 5 % 1/16 W
R515	1	NN05472610	4 7 k Ω ± 5 % 1/16 W
R516	1	NN05273610	27 k Ω ± 5 % 1/16 W
R518	1	NN05332610	3 3 k Ω ± 5 % 1/16 W
R519	1	NN05472610	4 7 k Ω ± 5 % 1/16 W

2.5 Power Supply

2.5.1 Power Supply Circuit

Power supply circuit is comprised of three blocks: a display block, a control block, and a TX/RX block. The display block's power supply circuit is for the backlight of the display P C B When power switch RS01 is turned on, the power supply voltage to the transceiver passes through DC 8 V regulator QD03, and 8 V is supplied to QD10 through QD22

The control block utilizes two types of regulator When power switch RS01 is turned on, the power supply voltage supplied to the transceiver is added to 8 V regulator QL10, and is utilized for D/A converter output The power supply voltage is also supplied to 5 V regulator QL08

The TX/RX block's power supply circuit is for the TX/RX P C B's power supply.

Regardless of whether power switch RS01 is in the ON or OFF position, a DC power supply voltage of 13.6 V is supplied to Q305, Q601, and Q603 If power switch RS01 is in the on state, a power supply voltage of 13 6 V, passing through RS01, is supplied to 5 V regulator Q610

2.5.2 Voltage Protect Circuit

The voltage protect circuit protects the transceiver in the event that the voltage supplied to the transceiver becomes abnormally high

If power switch RS01 is turned on, the voltage supplied to the power supply cable passes though power switch RS01 and is supplied to voltage protect QL05 At that point, if the voltage supplied to the QL05 exceeds approximately 17 V, a high level (5 V) is output from pin 2 of QL05. This high output is input to pin 38 of microprocessor QL01, which in turn ascertains that the power supply is abnormal.

Subsequently, microprocessor QL01 outputs a low level from pin 4, and this is input to pin 4 of 9 V regulator Q601 Based on this low output, Q601's 9 V output is interrupted, and the transceiver can no longer be used At that point, the transceiver indicates the abnormality by displaying "DC-CHK" on its LCD display.

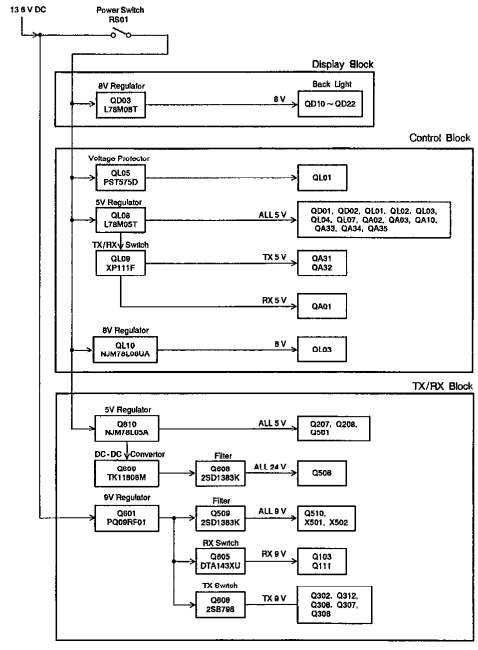


Figure 2-2 Power Supply Block Diagram

2.6 Display

Data and clock signals are sent from pins 63 and 64 of microprocessor QL01 to LCD driver QD01. In accordance with these data and clock signals, LCD driver QD01 drives LCD QD04. The display method makes use of 35 segment terminals and 3 common terminals. The LCD segments are illustrated in the following diagram.

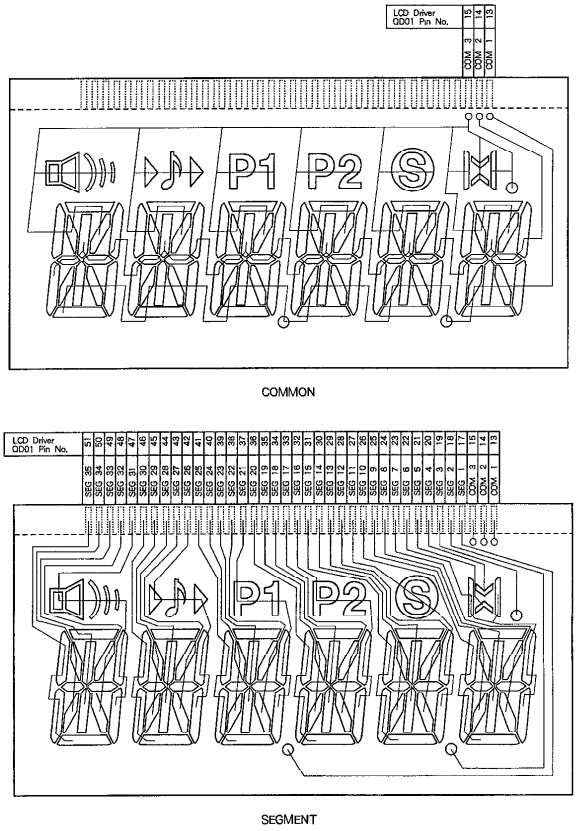


Figure 2-3 Common and segment displays

REF. DESIG	Q'TY	PART NO	DESCRIPTION
			P101 TX/RX P C.BOARD
C521	1	DD90030300	3 pF ± 0.25 pF (CJ)
C522	1	DK96471300	470 pF ± 10 %
C523	1	DK96471300	470 pF ± 10 %
C524	1	DD91070300	7 pF ± 0.5 pF (CH)
C525	1	EY22501630	TANTAL CAP 2.2 μF/16 V
C526	1	EY22501630	TANTAL CAP 2.2 μF/16 V
C527	1	EY47501630	TANTAL CAP 4.7 μF/10 V
C528	1	DD95101300	100 pF ± 5 % (CG)
C529	1	DD95101300	100 pF ± 5 % (CG)
C530	1	DD95101300	100 pF ± 5 % (CG)
C531	1	DK98333200	0.033 μF
C532	1	DK96102300	1000 pF ± 10 %
C534	1	DK96103200	0.01 μF ± 10 %
C535	1	EY68501030	TANTAL CAP 6.8 μF/10 V
C601	1	EY47403530	TANTAL CAP 0.47 μF/35 V
C602	1	DK96102300	1000 pF ± 10 %
C603	1	DK96102300	1000 pF ± 10 %
C604	1	EY10501610	TANTAL CAP 1 μF/16 V
C605	1	DK96102300	1000 pF ± 10 %
C606	1	DK96471300	470 pF ± 10 %
C607	1	DK96102300	1000 pF ± 10 %
C608	1	DK96102300	1000 pF ± 10 %
C609	1	EY10501610	TANTAL CAP 1 μF/16 V
C610	1	EY10501610	TANTAL CAP 1 μF/16 V
C611	1	DK96102300	1000 pF ± 10 %
C612	1	DD95101300	100 pF ± 5 % (CG)
C613	1	DD95101300	100 pF ± 5 % (CG)
C614	1	EY68403530	TANTAL CAP 0.68 μF/35 V
C615	1	EY22503530	TANTAL CAP 2.2 μF/35 V
C616	1	EY10503530	TANTAL CAP 1 μF/35 V
C617	1	EY10503530	TANTAL CAP 1 μF/35 V
C618	1	EY22403510	TANTAL CAP 0.22 μF/35 V
C619	1	EY10801030	TANTAL CAP 10 μF/10 V
C620	1	DK96102300	1000 pF ± 10 %
C621	1	EY33403510	TANTAL CAP 0.33 μF/35 V
C622	1	EY33403510	TANTAL CAP 0.33 μF/35 V
C623	1	DK96102300	1000 pF ± 10 %
C624	1	EG10802540	ELECT CAP 1000 μF/25 V
C625	1	DK96102300	1000 pF ± 10 %
C626	1	DK96102300	1000 pF ± 10 %
C627	1	EY68501030	TANTAL CAP 6.8 μF/10 V
C701	1	EY22501630	TANTAL CAP 2.2 μF/16 V
C702	1	EY10801030	TANTAL CAP. 10 μF/10 V
C703	1	EY47601020	TANTAL CAP 47 μF/10 V
C704	1	EA47702510	ELECT CAP 470 μF/25 V
C705	1	EA47702510	ELECT CAP 470 μF/25 V
C706	1	EA10702510	ELECT CAP 100 μF/25 V
C707	1	DF18154310	FILM CAP 0.15 μF ± 10 % 50 V
C708	1	DD95101300	100 pF ± 5 % (CG)
C709	1	DD95101300	100 pF ± 5 % (CG)
C710	1	DK98223200	0.022 μF ± 10 %
E701	1	QK00577010	SPEAKER VS 57G0817
F001	1	FS11500040	FUSE MF60NM15 250 V/15 A
F201	1	XU744950N3	CRYSTAL FILTER 44.95 MHz
F202	1	XU744950N3	CRYSTAL FILTER 44.95 MHz
F203	1	FG455304E3	CERAMIC FILTER CFUM455E
F204	1	FG455304D2	CERAMIC FILTER CFUM455D
F205	1	FH455302D3	CERAMIC CDBM455C7

REF. DESIG	Q'TY	PART NO	DESCRIPTION
			P101 TX/RX P C.BOARD
J101	1	YJ90000900	COAXIAL SOCKET MM4329 - 2700
J102	1	YJ07007870	20 PIN SOCKET
J701	1	YJ06019800	EXTERNAL SPEAKER 3 PIN SOCKET
J702	1	YJ06019790	INTERNAL SPEAKER 2 PIN SOCKET
L101	1	LA70808010	HERICAL FILTER 440 - 470MHZ 2POLE
L102	1	LA70808010	HERICAL FILTER 440 - 470MHZ 2POLE
L103	1	LA70808020	HERICAL FILTER 440 - 470MHZ 3POLE
L104	1	LA70808020	HERICAL FILTER 440 - 470MHZ 3POLE
L105	1	LA70808020	HERICAL FILTER 440 - 470MHZ 3POLE
L106	1	LU24150010	INDUCTOR 15 nH LQN1A15N
L107	1	LU24090010	INDUCTOR 8.8 nH LQN1A8N8
L108	1	LU24150010	INDUCTOR 15 nH LQN1A15N
L109	1	LU24090010	INDUCTOR 8.8 nH LQN1A8N8
L110	1	LF50060010	ANTENNA COIL U 5R/33333
L111	1	LF50060010	ANTENNA COIL U 5R/33333
L112	1	LU24170010	INDUCTOR 17 nH LQN1A17N
L113	1	LU24170010	INDUCTOR 17 nH LQN1A17N
L114	1	LU24330010	INDUCTOR 0.033 μH ± 5 % LQN1A
L201	1	LU15681010	INDUCTOR 0.68 μH
L202	1	LU15102010	INDUCTOR 1.0 μH
L203	1	LU15103010	INDUCTOR NL252018 10 μH
L204	1	LU15102010	INDUCTOR 1.0 μH
L301	1	LU28350010	COIL 33.1 nH 36CSL-7
L302	1	LL835003A0	COIL 3T
L303	1	LU25220010	COIL 21.6 nH 33CSL-4
L304	1	LL835002A0	COIL 2T
L305	1	LU25150010	COIL 15.8 nH 33CSL-3
L306	1	LL835007A0	COIL 7T
L307	1	LC11510090	CHOKE COIL 10 T
L308	1	ML04010010	COIL 1.5 T
L309	1	ML04010010	COIL 1.5 T
L310	1	ML04010010	COIL 1.5 T
L313	1	LU15103010	INDUCTOR NL252018 10 μH
L314	1	ML03508020	COIL 5.1 & FJ01(FERRITE CORE)
L501	1	LU15103010	INDUCTOR NL252018 10 μH
L503	1	LU15180010	INDUCTOR 18 nH ± 10 %
L601	1	LU81125020	INDUCTOR 1.2 MH
L602	1	LU15103010	INDUCTOR NL252018 10 μH
Q101	1	HZ20018050	DIODE 1SS302
Q102	1	HX342261A0	TRANSISTOR 2SC4226 (R24)
Q103	1	HX342261A0	TRANSISTOR 2SC4226 (R24)
Q104	1	HE20001010	DIODE HSB88WS
Q105	1	HX342261A0	TRANSISTOR 2SC4226 (R24)
Q201	1	HX340992B0	TRANSISTOR 2SC4099
Q202	1	HX340992B0	TRANSISTOR 2SC4099
Q204	1	HX346172A0	TRANSISTOR 2SC4617
Q205	1	HX340811C0	TRANSISTOR 2SC4081
Q206	1	HZ20001020	DIODE MA742
Q207	1	HC10020420	IC TK10487M (B)
Q208	1	HC10338050	IC TA75S01F

REF DESIG	Q'TY	PART NO	DESCRIPTION
			P101 TX/RX P.C.BOARD
P101	1	**WG129B2010**	**TX/RX P.C.BOARD**
C101	1	DK98102300	1000 pF ± 10 %
C102	1	DD90005300	0.5 pF ± 0.25 pF (CK)
C103	1	DK98102300	1000 pF ± 10 %
C104	1	DD95180300	18 pF ± 5 % (CG)
C105	1	DK98102300	1000 pF ± 10 %
C106	1	DD90020300	2 pF ± 0.25 pF (CK)
C107	1	DD95180300	18 pF ± 5 % (CG)
C108	1	DD90020300	2 pF ± 0.25 pF (CK)
C109	1	DD95180300	18 pF ± 5 % (CG)
C110	1	DK98102300	1000 pF ± 10 %
C111	1	DD90020300	2 pF ± 0.25 pF (CK)
C112	1	DD95180300	18 pF ± 5 % (CG)
C113	1	DD90040300	4 pF ± 0.25 pF (CH)
C114	1	DD91080300	8 pF ± 0.25 pF (CH)
C115	1	DD95120300	12 pF ± 5 % (CG)
C116	1	DD91080300	8 pF ± 0.25 pF (CH)
C117	1	DD90020300	2 pF ± 0.25 pF (CK)
C118	1	DK98102300	1000 pF ± 10 %
C119	1	DK98102300	1000 pF ± 10 %
C120	1	DD90020300	2 pF ± 0.25 pF (CK)
C122	1	DK98102300	1000 pF ± 10 %
C124	1	DK98102300	1000 pF ± 10 %
C126	1	DK98102300	1000 pF ± 10 %
C127	1	DD90040300	4 pF ± 0.25 pF (CH)
C202	1	DD95270300	27 pF ± 5 % (CG)
C203	1	DD95180300	18 pF ± 5 % (CG)
C204	1	DK98102300	1000 pF ± 10 %
C205	1	DK98102300	1000 pF ± 10 %
C206	1	DD95470300	47 pF ± 5 % (CG)
C207	1	DD95470300	47 pF ± 5 % (CG)
C208	1	DK98103200	0.01 μF ± 10 %
C209	1	DK96332300	3300 pF ± 10 %
C210	1	DD95390300	39 pF ± 5 % (CG)
C211	1	DK98102300	1000 pF ± 10 %
C212	1	DK98103200	0.01 μF ± 10 %
C213	1	EY10501610	TANTAL CAP 1 μF/16 V
C216	1	DD90040300	4 pF ± 0.25 pF (CH)
C217	1	DD90040300	4 pF ± 0.25 pF (CH)
C218	1	EY10601030	TANTAL CAP 10 μF/10 V
C219	1	DK56104200	0.1 μF ± 10 %
C220	1	DK56104200	0.1 μF ± 10 %
C221	1	DD95820300	82 pF ± 5 % (CG)
C222	1	DK98103200	0.01 μF ± 10 %
C223	1	DK98102300	1000 pF ± 10 %
C224	1	DK98103200	0.01 μF ± 10 %
C225	1	DK98103200	0.01 μF ± 10 %
C226	1	DK98103200	0.01 μF ± 10 %
C227	1	EY47501030	TANTAL CAP 4.7 μF/10 V
C228	1	EY47501030	TANTAL CAP 4.7 μF/10 V
C229	1	DK98102300	1000 pF ± 10 %
C230	1	DK98102300	1000 pF ± 10 %
C231	1	DK98102300	1000 pF ± 10 %

REF DESIG	Q'TY	PART NO	DESCRIPTION
			P101 TX/RX P.C.BOARD
C301	1	DK98102300	1000 pF ± 10 %
C302	1	DD91080300	8 pF ± 0.25 pF (CH)
C303	1	DD90010300	1 pF ± 0.25 pF (CK)
C304	1	DK98102300	1000 pF ± 10 %
C305	1	DK98471300	470 pF ± 10 %
C306	1	DK98471300	470 pF ± 10 %
C307	1	DD91080300	8 pF ± 0.25 pF (CH)
C308	1	DD91080300	8 pF ± 0.5 pF (CH)
C309	1	DK98102300	1000 pF ± 10 %
C310	1	DK98471300	470 pF ± 10 %
C311	1	DK98471300	470 pF ± 10 %
C312	1	DD95150300	15 pF ± 5 % (CG)
C313	1	DD90030300	3 pF ± 0.25 pF (CJ)
C314	1	DD90020300	2 pF ± 0.25 pF (CK)
C315	1	DK98102300	1000 pF ± 10 %
C316	1	EY10602520	TANTAL CAP 10 μF/25 V
C317	1	DK46102300	1000 pF ± 10 %
C318	1	EY10602520	TANTAL CAP 10 μF/25 V
C319	1	DD95101300	100 pF ± 5 % (CG)
C320	1	DD90005300	0.5 pF ± 0.25 pF (CK)
C321	1	DF95471500	MICA CAP 470 pF ± 5 %
C322	1	DD90040300	4 pF ± 0.25 pF (CH)
C323	1	DD91080300	8 pF ± 0.25 pF (CH)
C324	1	DF91080500	MICA CAP 8 pF ± 0.5 pF
C325	1	DF95120500	MICA CAP 12 pF ± 5 %
C326	1	DF91080500	MICA CAP 8 pF ± 0.5 pF
C326	1	DF91080500	MICA CAP 8 pF ± 0.5 pF
C327	1	DD90020300	2 pF ± 0.25 pF (CK)
C328	1	DD90005300	0.5 pF ± 0.25 pF (CK)
C329	1	DK98471300	470 pF ± 10 %
C330	1	EA10702510	ELECT CAP 100 μF/25 V
C331	1	DK98102300	1000 pF ± 10 %
C332	1	DD95101300	100 pF ± 5 % (CG)
C333	1	EY68501030	TANTAL CAP 6.8 μF/10 V
C334	1	DK98102300	1000 pF ± 10 %
C335	1	EY22501630	TANTAL CAP 2.2 μF/16 V
C336	1	DD95101300	100 pF ± 5 % (CG)
C337	1	DD95470300	47 pF ± 5 % (CG)
C338	1	DK98102300	1000 pF ± 10 %
C339	1	DK98102300	1000 pF ± 10 %
C340	1	DD95101300	100 pF ± 5 % (CG)
C341	1	DD95101300	100 pF ± 5 % (CG)
C342	1	DD95101300	100 pF ± 5 % (CG)
C343	1	DK98102300	1000 pF ± 10 %
C344	1	EY22503530	TANTAL CAP 2.2 μF/35 V
C348	1	DK98102300	1000 pF ± 10 %
C349	1	DK98102300	1000 pF ± 10 %
C501	1	EY10501610	TANTAL CAP 1 μF/16 V
C502	1	EY10501610	TANTAL CAP 1 μF/16 V
C503	1	DK98102300	1000 pF ± 10 %
C504	1	DK98104200	0.1 μF
C506	1	DD90030300	3 pF ± 0.25 pF (CJ)
C509	1	DK98102300	1000 pF ± 10 %
C510	1	EY47300630	TANTAL CAP 4.7 μF/6.3 V
C511	1	DK98104200	0.1 μF
C512	1	DK98682300	6800 pF ± 10 %
C513	1	DK98102300	1000 pF ± 10 %
C514	1	DK98103200	0.01 μF ± 10 %
C516	1	EY10503530	TANTAL CAP 1 μF/35 V
C517	1	EY10503530	TANTAL CAP 1 μF/35 V
C518	1	EY10601030	TANTAL CAP 10 μF/10 V

3. DISASSEMBLY OF PARTS

3.1 Disassembly of Parts

3.1.1 Removing the top lid and bottom lid

CAUTION: *(1) Turn the transceiver's power switch off before removing the screws.*

(a) When the eight screws Ⓐ are removed, the top lid and bottom lid can be removed

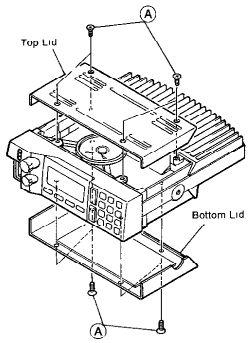


Figure 3-1

3.1.2 Removing the front case

(a) When the four screws Ⓑ are removed, the front case can be removed.

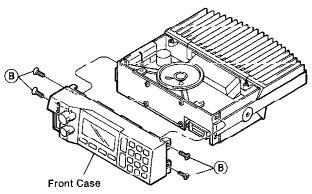


Figure 3-2

3.1.3 Removing the Display P.C.B

(a) As shown in Figure 3-3, take off the volume and squelch knobs in the direction of the arrows

(b) Using a slotted round screwdriver, remove the two slotted round nuts Ⓒ

(c) Remove the screw Ⓓ, remove the Flexible P.C.B, and then remove the Display P.C.B.

CAUTION: *(1) When removing the Display P.C.B, do not pull on the Flexible P.C.B, as this may cause damage to the Flexible P.C.B*

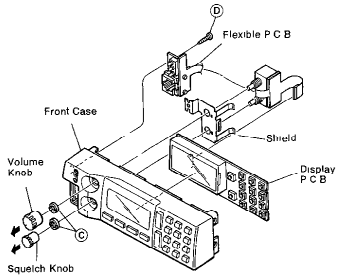


Figure 3-3

3.1.4 Removing the Control P.C.B

(a) When the four screws Ⓔ are removed, the Control P.C.B can be removed

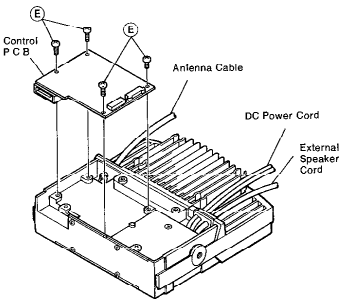


Figure 3-4

3.1.5 Removing the TX/RX P.C.B

CAUTION: *(1) Before removing the screws, disconnect the jack of the external speaker cord from connector J701.*
(2) Next, remove the solder from parts ① and ② as shown in Figure 3-5 below, and then remove the antenna cable and power cable.

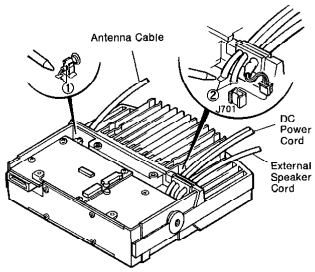


Figure 3-5

(a) When the two screws Ⓕ are removed, the bracket can be removed
(b) When the two screws Ⓖ and the four screws Ⓗ are removed, the TX/RX P.C.B can be removed

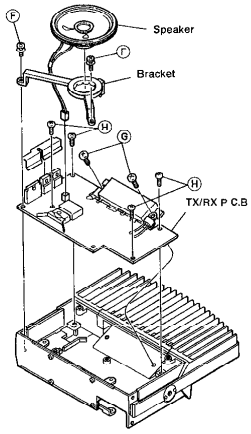


Figure 3-6

6. PARTS LIST

- Parts List
  Information on electrical and mechanical parts is given in the parts list
  Electrical parts are listed first, followed by mechanical parts
- Chip Parts
  Parts numbers whose first three characters correspond to the following indicate chip parts.

– Capacitors –	– Resistors –	– Semiconductors —	— Inductors —
DD4	RI	BA . .	I U. ..
DD5 .	NI . .	HX ..	
DD9 . . .	NN .	HY . .	
DK4.....	NY	HZ.	
DK5			
DK9. ..			
EY . .			

- Ordering Replacement Parts
  Please specify the following information when ordering
  Part reference symbol (4 characters)
  Description
  Part number (10 characters)
  Unit model and serial number

5. SPECIFICATIONS

5.1 General

Frequency Range	(F3) 440 000 MHz to 470 000 MHz
Channels	Max. 16 ch
Input Voltage	13.6 V DC ±20%
Current Drain	
Standby	300 mA
Receive	0.9 A
Transmit	11 A (at 40 W)
Dimensions	6 inch (H) x 5.5 inch (W) x 7.1 inch (D) (40 mm x 140 mm x 180 mm)
Weight	Approx. 1 kg

5.2 Transmitter

RF Output	40 W
Conducted Spurious Emissions	–75 dB
Audio Response	within +2/–6 of a 6 dB/octave pre-emphasis characteristic at 300 to 3000 Hz
Audio Distortion	5%
Modulation	16F3
Frequency Stability (–30°C to +60°C)	±5 ppm
FM Hum and Noise Ratio	40 dB

5.3 Receiver — Measurements are made in accordance with EIA Standard RS204D —

Sensitivity:	
12 dB SINAD	0.2 µV
Acceptable Radio Frequency Displacement	±3.0 to ±5.5 kHz
Selectivity	70 dB (2 signal method)
Image Rejection	80 dB (2 signal method)
Intermodulation	68 dB (3 signal method)
Audio Power Output (at 5% Distortion)	4.5 W
Audio Response	within +2/–8 of a 6 dB/octave de-emphasis characteristic at 300 to 3000 Hz
Frequency Stability (–30°C to +60°C)	±2.5 kHz
Channel Spacing	25 kHz

5.4 Microphone (CMP876E)

Microphone Unit	Omni-directional electret condenser type
Microphone Impedance	2.2 kΩ ±30% (at 1 kHz)
Weight	200 g

- Performance specifications are nominal, unless otherwise indicated, and are subject to change without notice

4. MAINTENANCE

4.1 Alignment Connection Diagram

Make sure all test equipment is properly calibrated
Allow sufficient time after powering on equipment for it to warm up before performing adjustments

— Standard Test Conditions —

Power supply voltage	13.6 V (DC)
Audio output	2 W
Audio load	4 Ω
Transmission output	40 W
Transmission load	50 Ω
Standard deviation	±3 kHz
Maximum deviation	±5 kHz
Frequency modulation	1 kHz
Channel spacing	25 kHz
Alignment frequencies	See Table 4-1
Test method	Reception (EIA RS-204D) Transmission (EIA RS-152C)

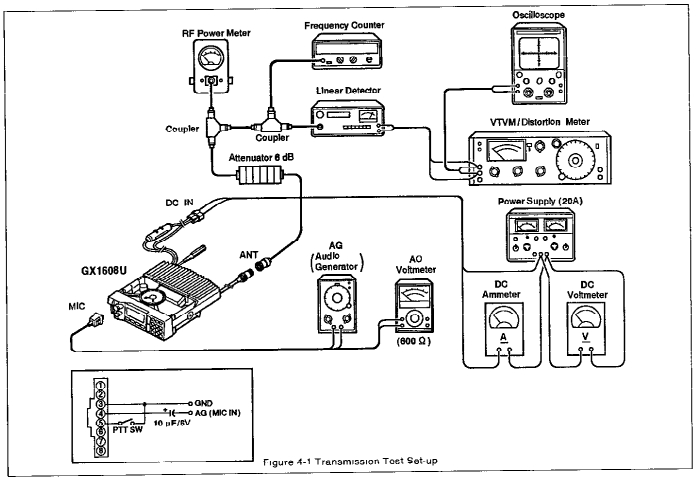


Figure 4-1 Transmission Test Set-up

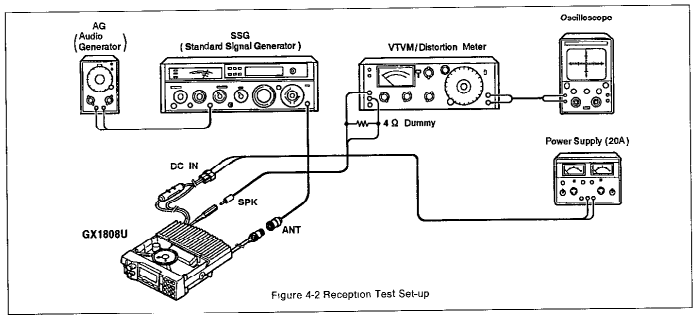


Figure 4-2 Reception Test Set-up

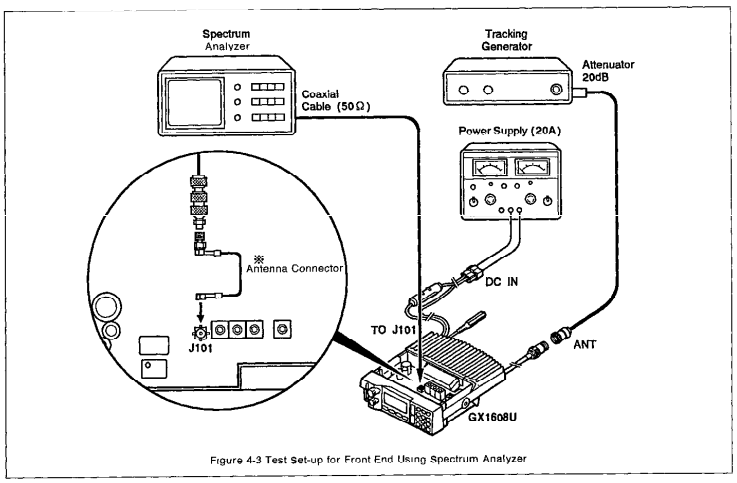


Figure 4-3 Test Set-up for Front End Using Spectrum Analyzer

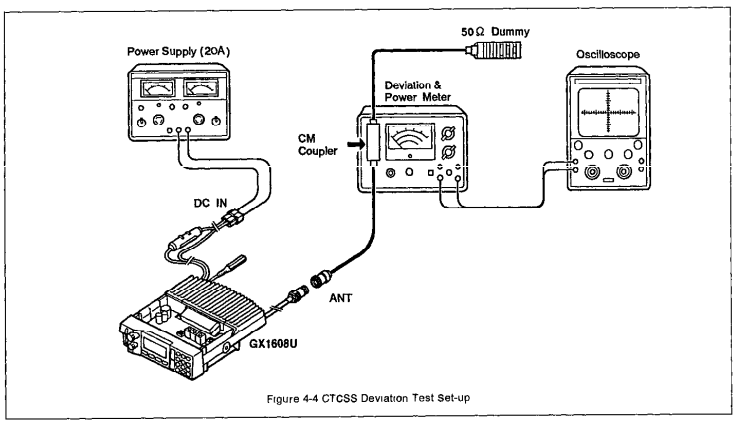
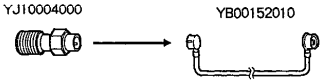


Figure 4-4 CTCSS Deviation Test Set-up

※ For the antenna connector, used part numbers shown below

YJ10004000 YB00152010



4.6 Settings when Shipped from Factory

Table 4-4

Item	Setting Value
Individual Channel	CH-01
F chart	F3
TX Frequency	455 000 MHz
TX Tone	OFF
RX Frequency	455 000 MHz
RX Tone	OFF
RF Power	High
TOT (Time Out Time)	0.0
BLO (Busy Lock Out)	OFF
TLO (Tone Busy Lock Out)	OFF
SCR (Scan Resume)	ON
PSC (PTT Scan Clear)	ON
DWP (Dual Watch)	00
MHG (MIC Hang Control)	OFF
SDI	OFF
DIP Switch (SL01) No.1 — No.6	OFF

4.4.2 Receiver

— Front End Initial Adjustment —

(a) Connect as shown in Figure 4-3, and turn on the power switch.
Check that the tuning mode has started
At this point, set the tracking generator and spectrum analyzer as follows.
Tracking generator
Output level . –20 dBm
Spectrum analyzer
Center frequency · 455.000 MHz (CH-02)
Reference level . 0 dBm
Frequency span 100 MHz

NOTE: When connecting the tracking generator and spectrum analyzer together directly, make sure that the display level of the spectrum analyzer is approximately –25 dBm

(b) Pressing the ▲ key or ▼ key on the transceiver, make "RXFRNT" appear on the LCD display
(c) Press the M key on the transceiver "CH-01" appears on the LCD display
(d) Pressing the ▲ key or ▼ key on the transceiver, make "CH-02" appear on the LCD display
(e) With the adjustment rod, adjust L101, L102, L103, L104, and L105 in order such that the display level of the spectrum analyzer is between –15 dBm and –25 dBm (as shown in Figure 4-9)

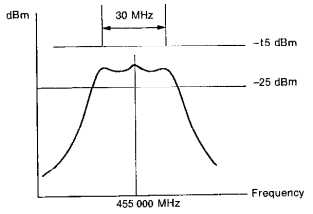


Figure 4-9

4.4.3 Voltage Protect Alignment

(a) Set the power supply voltage to DC 18 V, and turn on the power switch
(b) Adjust RL29 with the adjustment rod, setting the point at which the transceiver's power is turned off.
When "DC-CHK" appears on the LCD display, this is the point at which the transceiver's power is turned off

4.4.4 CTCSS Deviation Alignment

— Standard Test Conditions —

Power supply voltage . . . . . 13 6 V (DC)
Tone adjustment frequency . . . . . 179.9 Hz
Adjustment frequency . . . . . 455.000 MHz

NOTE: (1) If CTN190 is installed, perform "TX Deviation Adjustment" in "4 4 1 Transmitter" again
(2) After TX deviation adjustment, perform CTCSS deviation adjustment

(a) Remove the short P C B on JL02 in Figure 4-6 Then attach tone squelch unit CTN190
(b) Connect as shown in Figure 4-4, and turn on the power switch.
(c) Set to the CTCSS-specified channel (normal operating state)
(d) Turn on the PTT switch, putting the transceiver in transmit mode
(e) Turn on the deviation meter's 3 kHz low-pass filter
(f) With the adjustment rod, adjust RA59 such that the deviation is ±0 7 kHz

4.5 Cloning Method

Cloning mode includes master mode (data output mode) and slave mode (data input mode)

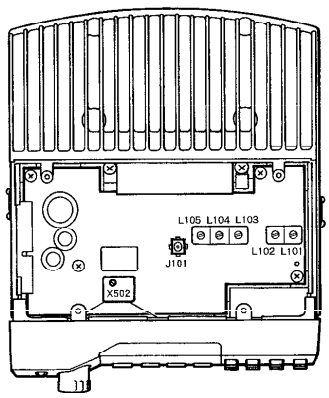
4.5.1 Master Mode

(a) While pressing the F and M keys on the transceiver at the same time, turn on the power display
(b) "MASTER" appears on the transceiver's LCD display
(c) Connect the cloning cable to microphone jack JS01 on the transceiver
(d) Prepare the other transceiver (i e , the transceiver in the slave mode state) on which to perform cloning Connect the cloning cable to this other transceiver's microphone connector.
(e) Press the E key on the transceiver on which "MASTER" is displayed
While data is being transmitted, the TX LED blinks
(f) At the point when cloning is definitely completed, the RX LED lights.

4.5.2 Slave Mode

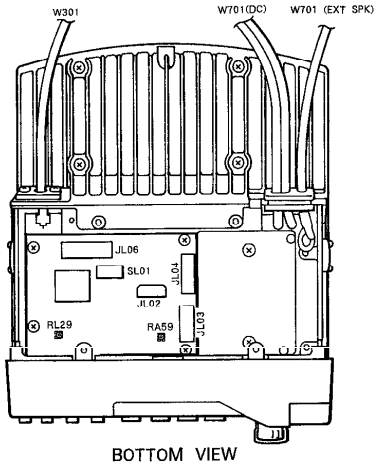
(a) While pressing the F and E keys on the transceiver at the same time, turn on the power switch
(b) When in the state in which data reception is possible, "SLAVE" appears on the transceiver's LCD display
(c) Connect the cloning cable to microphone connector JS01 on the transceiver
At that point, reception of data is possible

4.2 Alignment Reference Points



TOP VIEW

Figure 4-5 Top View



BOTTOM VIEW

Figure 4-6 Bottom View

4.3 Tuning Mode Start-Up Method and Adjustment Frequency Setting

4.3.1 Tuning Mode Start-Up Method

(a) To start tuning mode, from DIP switch SL01 in figure 4-7, switch on only No. 4 Switch off all others

(b) Turn off the power switch, and then turn it on again "CHDATA" is shown on the LCD display, indicating that the tuning mode has started

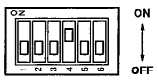


Figure 4-7

— Description of DIP Switch SL01 —

Table 4-1

Switch No	Function	Description of Operation when Switch is Turned On
1	Test Mode	Program for testing performance and operation during production starts up
2	Program Mode	All channel, individual channel, and DTMF dealer program modes start up
3	Not Used	No change in functionality
4	Tuning Mode	Allows adjustment of frequency, deviation, RF power, and front end
5	V/S Mode	The voice scrambler starts up. Valid when CVS240 is installed.
6	Not Used	No change in functionality.

4.3.2 Adjustment Frequency Setting

(a) Check that the tuning mode has started.
(b) Pressing the ▲key or ▼key on the transceiver, make "CHDATA" appear on the LCD display
(c) Press the M key on the transceiver "CH-01" appears on the LCD display, and the channel 01 frequency setting mode is entered
(d) Press the M key on the transceiver again The))) indicator lights on the LCD display, and the reception frequency input mode is entered
(e) Input the reception frequency (440 000 MHz) on the numeric keypad.
Note Refer to Table 4-2 when setting the alignment frequency
(f) Press the E key on the transceiver to confirm the input At that point, the))) indicator disappears from the LCD display, and the transmission frequency input mode is entered
(g) Input the transmission frequency (440 000 MHz) on the numeric keypad
(h) Press the E key on the transceiver again to confirm the input At that point, "CH-02" appears on the LCD display, and the channel 02 frequency setting is entered
(i) Repeating operations (d) through (g), perform frequency setting for channel 02
(j) "CH-03" appears on the LCD display, and the channel 03 frequency setting is entered
(k) Repeating operations (d) through (g), perform frequency setting for channel 03
(l) "CH-01" appears on the LCD display, and alignment frequency setting is completed
(m) Press the F key on the transceiver, and the LCD display returns to "CHDATA"

Table 4-2 Alignment Frequencies

Frequency Range	TX/RX	CH-01	CH-02	CH-03
F3	RX	444.000 MHz	455 000 MHz	470 000 MHz
	TX	440.000 MHz	455.000 MHz	470.000 MHz

4.4 Alignment and Confirmation

In performing alignment in the GX1608 series, three items are adjusted by the transceiver's internal microprocessor QL01. TX deviation adjustment, TX power adjustment, and RX front end adjustment Adjustment frequencies are divided into three channels, each of which can be separately adjusted.

4.4.1 Transmitter

— TX Power Adjustment —

(a) Connect as shown in Figure 4-1, and turn on the power switch.
Check that the tuning mode has started
(b) Pressing the ▲key or ▼key on the transceiver, make "TX PWCT" appear on the LCD display
(c) Press the M key on the transceiver "CH-01" appears on the LCD display
(d) Press the M key on the transceiver again "HP----" appears on the LCD display, and the high power adjustment mode is entered.
(e) Turn on the PTT switch, putting the transceiver in transmit mode
(f) Using the ▲key or ▼key on the transceiver, adjust the RF power output level to 43 W ± 1 W
Note: Refer to Table 4-3 when setting the RF power
(g) Press the E key on the transceiver again to confirm the input At that point, "LP----" appears on the LCD display, and the low power adjustment mode is entered.
(h) Using the ▲key or ▼key on the transceiver, adjust the RF power output level to 25 W ± 1 W
(i) Turn off the PTT switch, putting the transceiver in receive mode
(j) Press the E key on the transceiver to confirm the RF power adjustment. At that point, "CH-02" appears on the LCD display.
(k) Repeating operations (d) through (i), perform RF power adjustment for channel 02
(l) Press the E key on the transceiver to confirm the RF power adjustment. At that point, "CH-03" appears on the LCD display
(m) Repeating operations (d) through (i), perform RF power adjustment for channel 03.
(n) Press the E key on the transceiver to confirm the RF power adjustment At that point, the LCD display returns to "CH-01."

Table 4-3 RF Power Adjustment

	CH-01	CH-02	CH-03
High power	43 W ± 1 W	43 W ± 1 W	43 W ± 1 W
Low power	25 W ± 1 W	25 W ± 1 W	25 W ± 1 W

— RF Frequency Adjustment —

(a) Check that the LCD display shows "CH-01."
(b) Turn on the PTT switch, putting the transceiver in transmit mode.
(c) Use the adjustment rod to adjust X502 such that the frequency for channel 01 is 440.000 MHz ± 100 Hz
(d) Turn off the PTT switch, putting the transceiver in receive mode.
Press the F key. "TXPWCT" appears on the LCD display.

— TX Deviation Adjustment —

(a) Connect as shown in Figure 4-1, and turn on the power switch
Check that the tuning mode has started.
The audio generator (AG) output must be set to 300 Hz at 500 mV rms
(b) Pressing the ▲key or ▼key on the transceiver, make "TX DEVI" appear on the LCD display.
(c) Press the M key on the transceiver. "CH-01" appears on the LCD display
(d) Press the M key on the transceiver again "RD----" appears on the LCD display, and the reference deviation adjustment mode is entered
(e) Turn on the PTT switch, putting the transceiver in transmit mode.
(f) Using the ▲key or ▼key on the transceiver, adjust such that the deviation balance is as shown in figure 4-8.

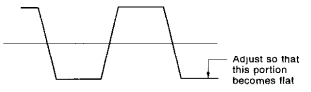
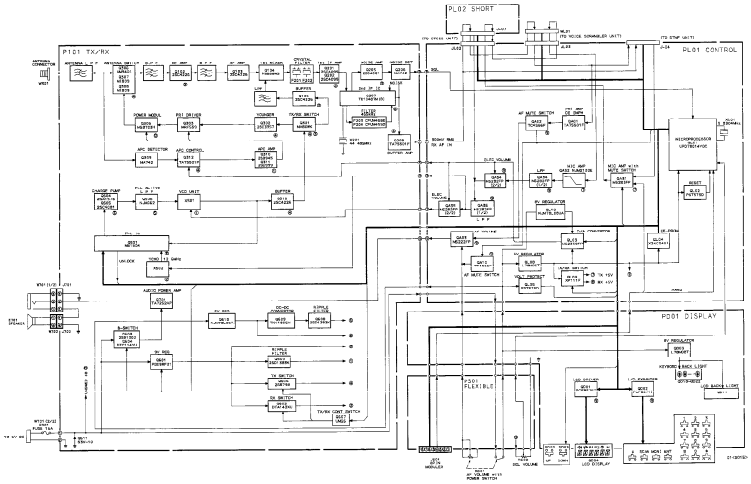


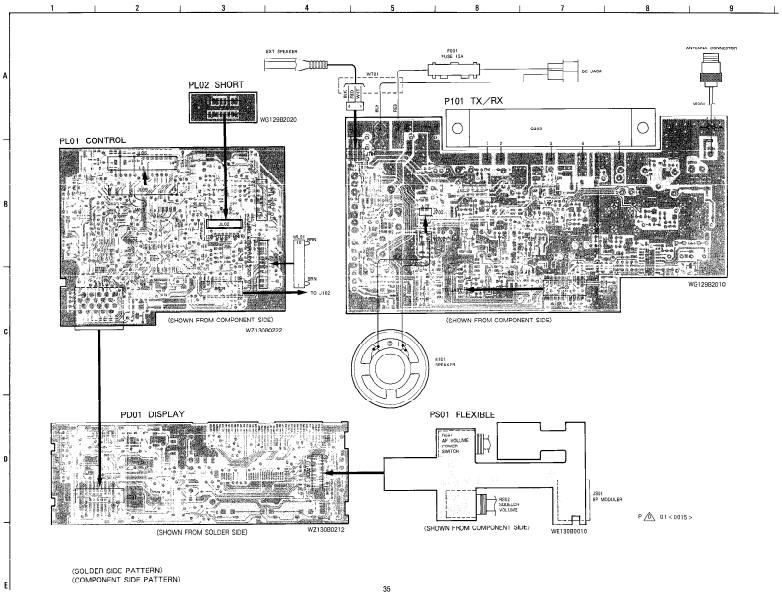
Figure 4-8

(g) Press the E key on the transceiver to confirm the reference deviation adjustment At that point, "AD----" appears on the LCD display, and the audio frequency (AF) deviation adjustment mode is entered
(h) Fix the AG output frequency to 1 kHz, and use the ▲key or ▼key to adjust such that the AF deviation balance is ±4.5 kHz ± 0 1 kHz.
(i) Turn off the PTT switch, putting the transceiver in receive mode
(j) Press the E key on the transceiver to confirm the AF deviation adjustment At that point, "CH-02" appears on the LCD display
(k) Repeating operations (d) through (i), perform deviation adjustment for channel 02.
(l) Press the E key on the transceiver to confirm the AF deviation adjustment At that point, "CH-03" appears on the LCD display
(m) Repeating operations (d) through (i), perform deviation adjustment for channel 03.
(n) Press the E key on the transceiver to confirm the AF deviation adjustment At that point, "CH-01" appears on the LCD display
(o) Press the F key on the transceiver, and the LCD display returns to "TXDEVI"

9. BLOCK DIAGRAM

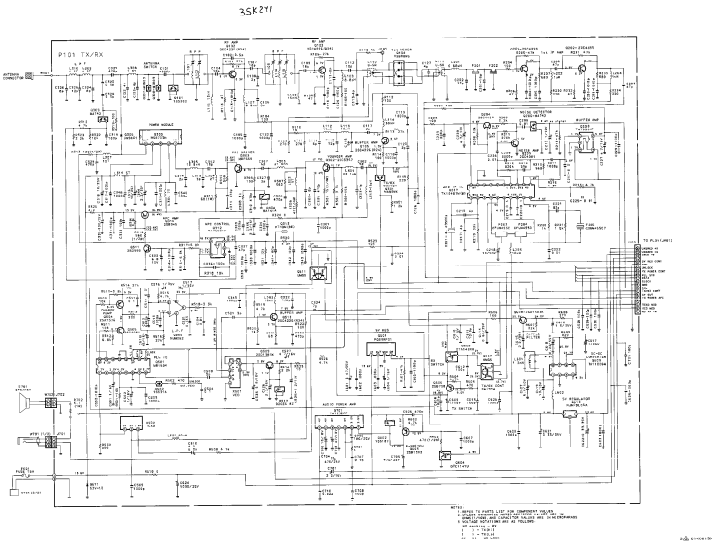


10. COMPREHENSIVE WIRING DIAGRAM

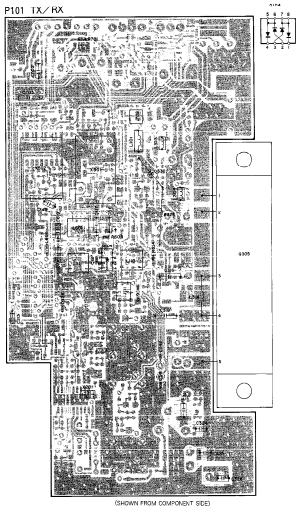


11. SCHEMATIC DIAGRAM/COMPONENT OVERLAY DIAGRAM

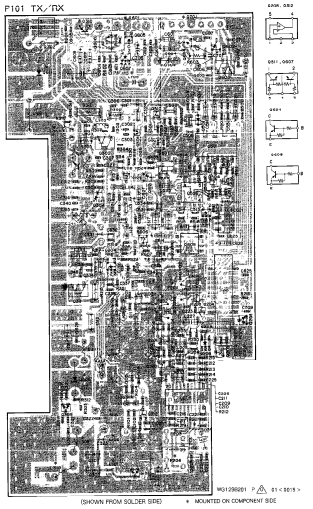
11.1 TX/RX SCHEMATIC DIAGRAM



11.2 TX/RX COMPONENT OVERLAY DIAGRAM



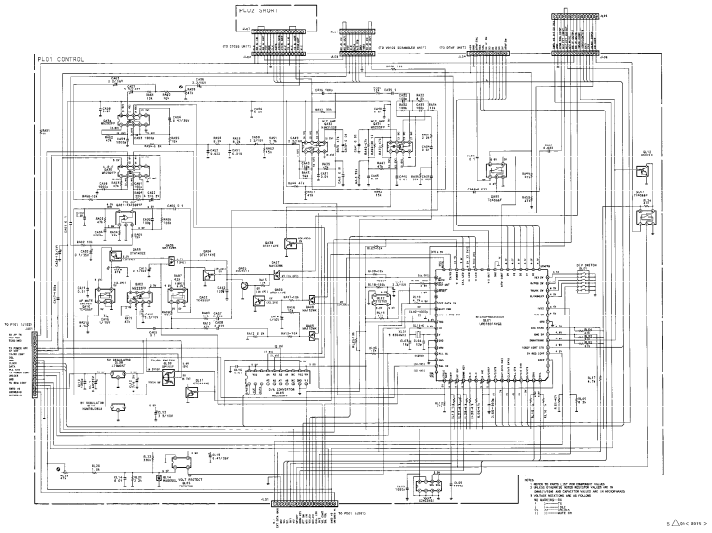
(SHOWN FROM COMPONENT SIDE)



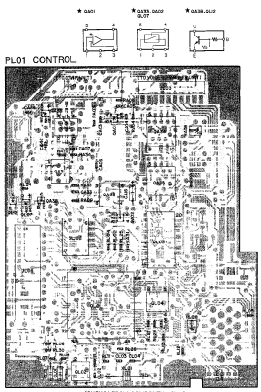
(SHOWN FROM SOLDER SIDE)

(SOLDER SIDE PATTERN)
(COMPONENT SIDE PATTERN)

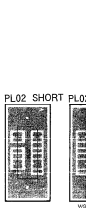
11.3 CONTROL SCHEMATIC DIAGRAM



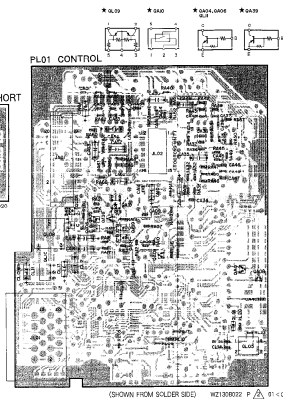
11.4 CONTROL COMPONENT OVERLAY DIAGRAM



(SHOWN FROM COMPONENT SIDE)



WG13080200

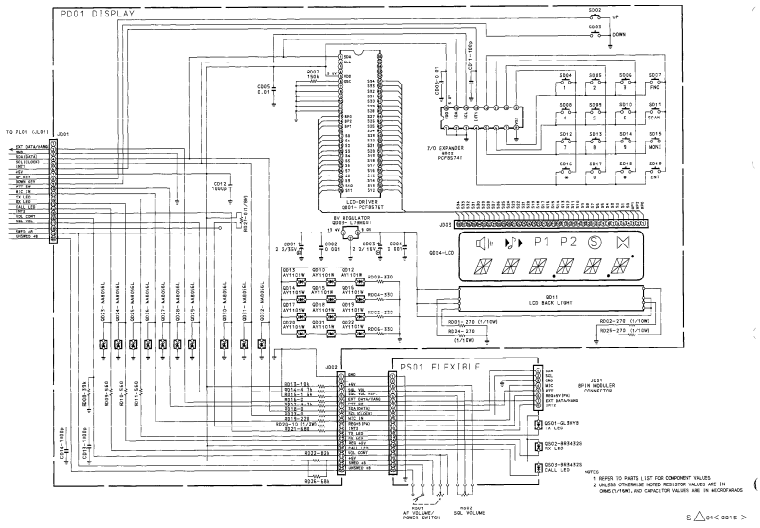


(SHOWN FROM SOLDER SIDE) WZ13080022 P ⚠ 01 < 0015 >

* MOUNTED ON COMPONENT SIDE

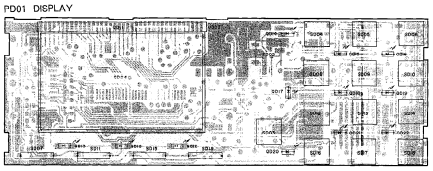
(SOLDER SIDE PATTERN)
(COMPONENT SIDE PATTERN)

11.5 DISPLAY SCHEMATIC DIAGRAM



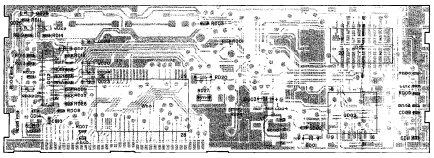
11.6 DISPLAY COMPONENT OVERLAY DIAGRAM

PD01 DISPLAY



(SHOWN FROM COMPONENT SIDE)

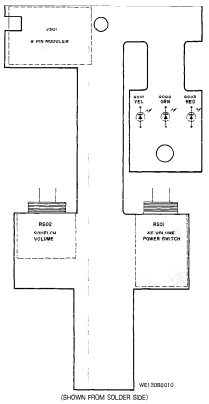
PD01 DISPLAY



(SHOWN FROM SOLDER SIDE)

(SOLDER SIDE PATTERN)
(COMPONENT SIDE PATTERN)

PS01 FLEXIBLE



(SHOWN FROM SOLDER SIDE)