



SERVICE MANUAL

UHF TRANSCEIVER

IC-F610
IC-F620
IC-F621

INTRODUCTION

This service manual describes the latest service information for the **IC-F610**, **IC-F620** and **IC-F621** UHF TRANSCEIVERS at the time of publication.

To upgrade quality, any electrical or mechanical parts and internal circuits are subject to change without notice or obligation.

DANGER

NEVER connect the transceiver to an AC outlet or to a DC power supply that uses more than 16 V. This will ruin the transceiver.

DO NOT expose the transceiver to rain, snow or any liquids.

DO NOT reverse the polarities of the power supply when connecting the transceiver.

DO NOT apply an RF signal of more than 20 dBm (100 mW) to the antenna connector. This could damage the transceiver's front end.

MODEL	VERSION	SYMBOL
IC-F610	Europe	EUR
	Europe (MPT)	MTE
	Europe (BIIS)	EUR
	General	GEN
	General (MPT)	MTG
	General (LTR)	TRG
IC-F620	U.S.A.	USA
	U.S.A. (MPT)	MTU
	U.S.A. (LTR)	TRU
	U.S.A. (BIIS)	USA
IC-F621	U.S.A.	USA
	U.S.A. (LTR)	TRU
	U.S.A. (BIIS)	USA
	General	GEN
	General (LTR)	TRG



ORDERING PARTS

Be sure to include the following four points when ordering replacement parts:

1. 10-digit order numbers
2. Component part number and name
3. Equipment model name and unit name
4. Quantity required

<SAMPLE ORDER>

1110003490 S.IC TA31136FN IC-F610 MAIN UNIT 5 pieces
 8810009990 Screw PH BT M3x8 ZK IC-F620 Bottom cover 10 pieces

Addresses are provided on the inside back cover for your convenience.

REPAIR NOTES

1. Make sure a problem is internal before disassembling the transceiver.
2. **DO NOT** open the transceiver until the transceiver is disconnected from its power source.
3. **DO NOT** force any of the variable components. Turn them slowly and smoothly.
4. **DO NOT** short any circuits or electronic parts. An insulated tuning tool **MUST** be used for all adjustments.
5. **DO NOT** keep power ON for a long time when the transceiver is defective.
6. **DO NOT** transmit power into a signal generator or a sweep generator.
7. **ALWAYS** connect a 50 dB to 60 dB attenuator between the transceiver and a deviation meter or spectrum analyzer when using such test equipment.
8. **READ** the instructions of test equipment thoroughly before connecting equipment to the transceiver.

EXPLICIT DEFINITIONS

FREQUENCY COVERAGE

L-band		400 – 430 MHz
M-band		440 – 490 MHz
H-band	H1-band	480 – 512 MHz
	H2-band	480 – 520 MHz

CHANNEL SPACING

Narrow/Wide-type	12.5 kHz / 25 kHz
Narrow/Middle-type	12.5 kHz / 20 kHz

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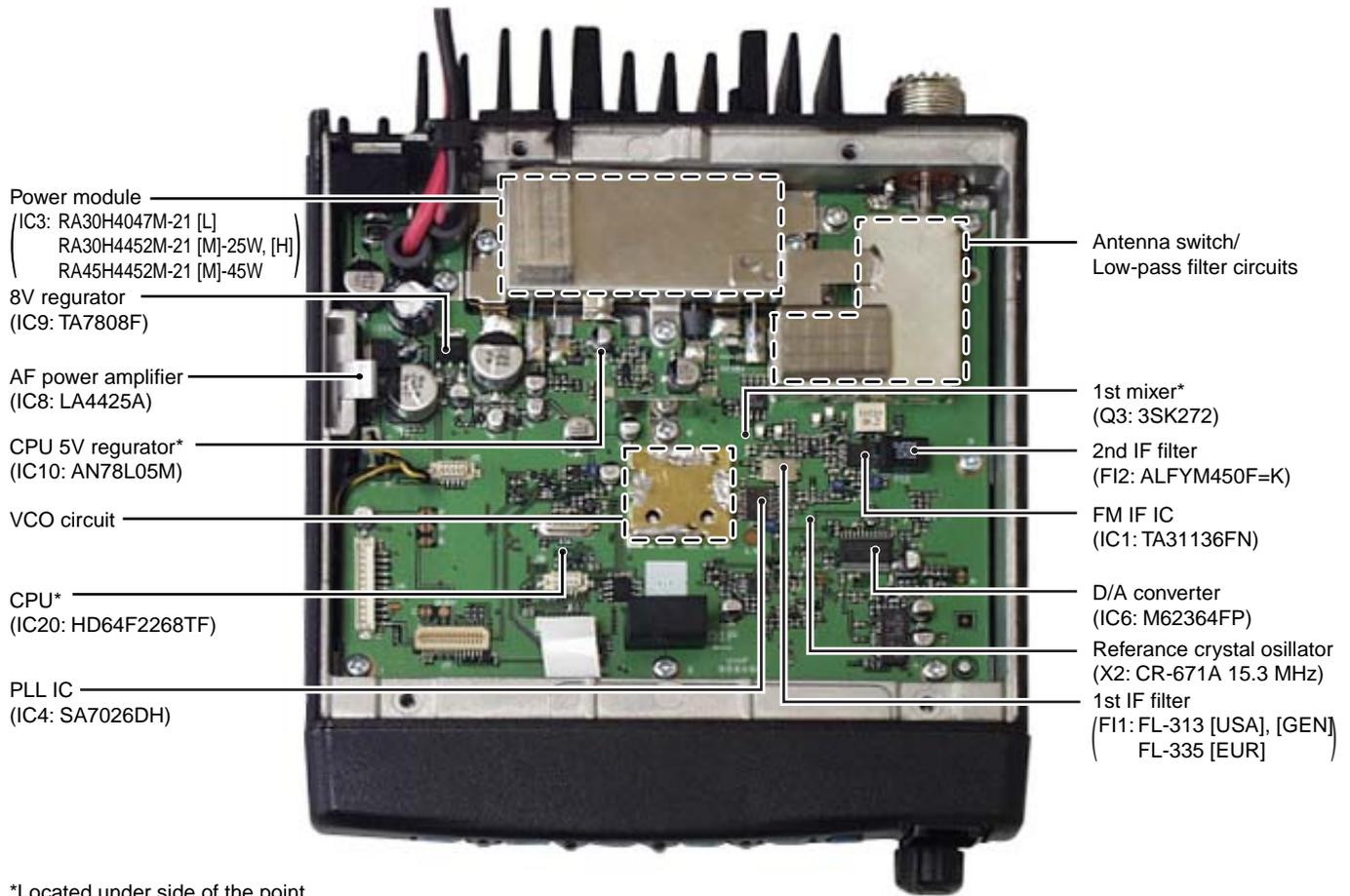
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SECTION 1 SPECIFICATIONS

		USA/GEN	EUR												
GENERAL	Measurement method	EIA-152/204D or TIA-603													
	Frequency coverage	[L-band]: 400.000–430.000 MHz [M-band]: 440.000–490.000 MHz [H-band]: 480.000–512.000 MHz [USA], 480.000–520.000 MHz [EUR]/[GEN]													
	Type of emission	[N/W]: 8K50F3E/16K0F3E (12.5 kHz; Narrow/25 kHz; Wide) [N/M]: 8K50F3E/14K0F3E (12.5 kHz; Narrow/20 kHz; Middle)													
	Number of conventional channels	Max. 256 ch (16 channels × 16 banks) Max. 32 ch (MPT Trnking) Max. 256 ch (LTR/Passport Trnking)													
	Power supply voltage (negative ground)	13.6 V DC nominal	13.2 V DC nominal												
	Current drain (approx.)	<table border="1" style="width: 100%; text-align: center;"> <thead> <tr> <th colspan="2">RECEIVING</th> <th colspan="2">TRANSMITTING</th> </tr> </thead> <tbody> <tr> <td>Stand-by</td> <td>Max. audio</td> <td>45 W</td> <td>25 W</td> </tr> <tr> <td>300 mA</td> <td>1200 mA</td> <td>13.0 A</td> <td>7.0 A</td> </tr> </tbody> </table>		RECEIVING		TRANSMITTING		Stand-by	Max. audio	45 W	25 W	300 mA	1200 mA	13.0 A	7.0 A
	RECEIVING		TRANSMITTING												
	Stand-by	Max. audio	45 W	25 W											
	300 mA	1200 mA	13.0 A	7.0 A											
	Frequency error	2.5 ppm	±1.5 kHz												
Usable temperature range	–30°C to +60°C (–22°F to +140°F)	–25°C to +55°C													
Dimensions (proj. not included)	140(W) × 40(H) × 170(D) mm; 5 ¹ / ₂ (W) × 1 ⁹ / ₁₆ (H) × 6 ¹¹ / ₁₆ (D)														
Weight	1.2 kg; 2 lb 10 oz														
TRANSMITTER	RF output power	High/Low2/Low1: 25 W/10 W/2.5 W [25W], 45 W/25 W/4.5 W [45W]													
	Modulation system	Variable reactance frequency modulation													
	Maximum permissible deviation	±2.5 kHz [Narrow], ±4.0 kHz [Middle], ±5.0 kHz [Wide]													
	Spurious emissions	70 dB typical	0.25 μW ≤ 1 GHz, 1.0 μW > 1 GHz												
	Adjacent channel power	60 dB [Narrow], 70 dB [Middle]/[Wide]													
	Audio frequency response	+2 dB to –5 dB of 6 dB/octarve range from 300 Hz to 2550 Hz [Narrow]/3000Hz [Middle]/[Wide]													
	Audio harmonic distortion	3% typical at 1 kHz, 40% deviation													
	FM hum and noise (typical) (without CCITT filter)	34 dB min (40 dB typical) [Narrow] 40 dB min (46 dB typical) [Wide]	—												
	Residual modulation (typical) (with CCITT filter)	—	40 dB min (50 dB typical) [Narrow] 43 dB min (53 dB typical) [Middle] 45 dB min (55 dB typical) [Wide]												
	Limiting charact of modulator	60–100% of max. deviation													
	Microphone connector	8-pin modular (600 Ω)													
	RECEIVER	Receive system	Double-conversion superheterodyne system												
Intermediate frequencies		1st: 46.345 MHz, 2nd: 450 kHz													
Sensitivity (typical)		0.25 μV at 12 dB SINAD	–4 dBμV (emf) at 20 dB SINAD												
Squelch sensitivity (typical)		0.25 μV	–4 dBμV (emf)												
Adjacent channel selectivity (typical)		65 dB [Narrow], 75 dB [Middle/Wide]													
Spurious response		75 dB													
Intermodulation (typical)		70 dB min (75 dB typical) [Wide]	65 dB min (67 dB typical)												
Hum and noise (typical)		(without CCITT filter)	34 dB min (40 dB typical) [Narrow] 40 dB min (46 dB typical) [Wide]	—											
		(with CCITT filter)	—	40 dB min (50 dB typical) [Narrow], 43 dB min (53 dB typical) [Middle], 45 dB min (55 dB typical) [Wide]											
Audio output power		4 W typical at 10% distortion with a 4 Ω load													
External SP connector	2-conductor 3.5 (d) mm (1/8")/4 Ω														

All stated specifications are subject to change without notice or obligation.

SECTION 2 INSIDE VIEW

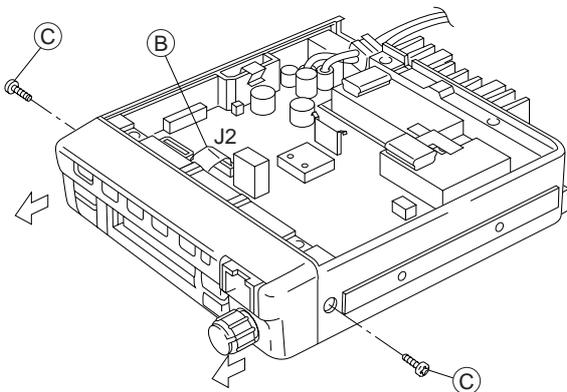
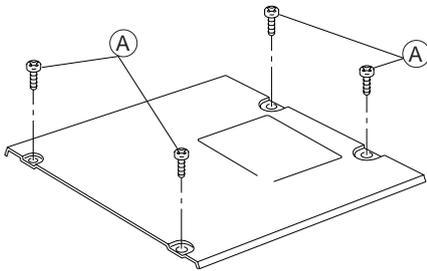


*Located under side of the point.

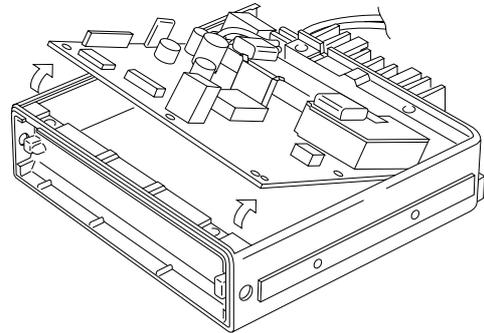
SECTION 3 DISASSEMBLY INSTRUCTIONS

• Removing the front unit

- ① Unscrew 4 screws (A), and remove the bottom cover.
- ② Disconnect the flat cable (B) from J2.
- ③ Unscrew 2 screws (C), and remove the front unit.



- ⑥ Lift up the front part of the main unit and remove it.



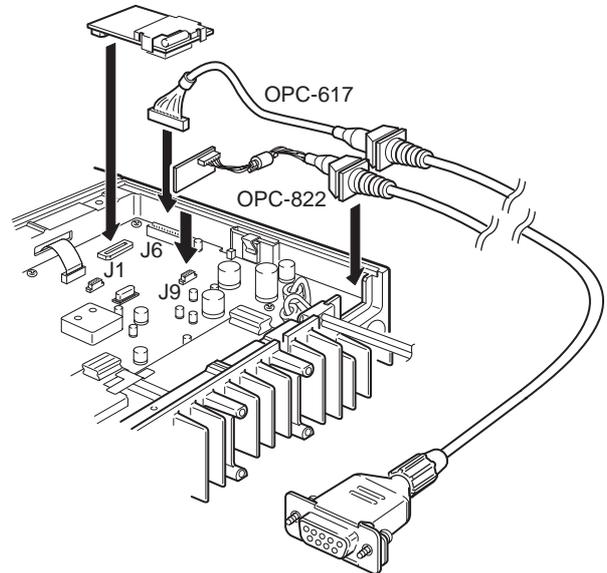
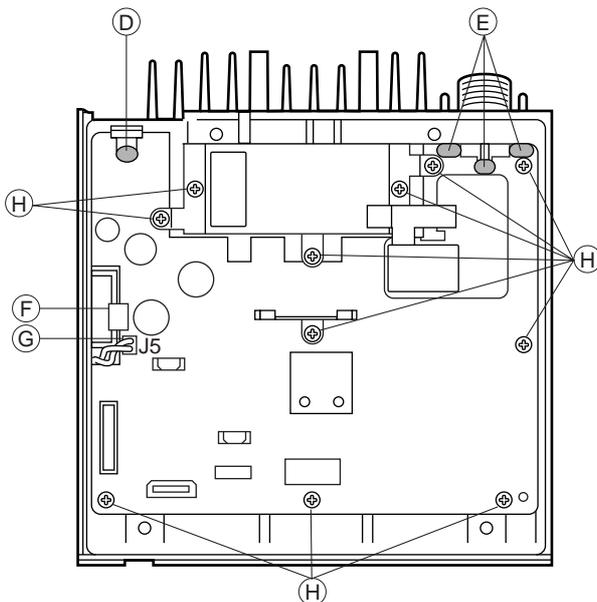
• Optional unit and cable installation location

UT-105	SmarTrankII™ Logic Board
UT-108	DTMF decoder unit
UT-109	Voice scrambler unit (non-rolling type)
UT-110	Voice scrambler unit (rolling type)
UT-111	Trunking unit
OPC-617	ACC cable
OPC-822	Interface cable

UT-105, UT-108
 UT-109, UT-110
 UT-111

• Removing the main unit

- ① Unsolder 1 point (D) from the plate, and remove the plate.
- ② Unsolder 3 points (E) from the antenna connector.
- ③ Remove the clip (F).
- ④ Disconnect the cable (G) from J5.
- ⑤ Unscrew 11 screws (H).



Continue to right above.

SECTION 4

CIRCUIT DESCRIPTION

4-1 RECEIVER CIRCUITS

4-1-1 ANTENNA SWITCHING CIRCUIT (MAIN UNIT)

The antenna switching circuit functions as a low-pass filter while receiving and as resonator circuit while transmitting. The circuit does not allow transmit signals to enter receiver circuits.

Received signals from the antenna connector (CHASSIS; J1) are passed through the low-pass filter (L1–L3, C1, C2, C6–C8, C16) and then applied to the ¼ type antenna switching circuit (D2, D3, D5).

While receiving, no voltage is applied to D2, D3 and D5. Thus, the receive line and the ground are disconnected and received signals are applied to the RF circuits.

4-1-2 RF CIRCUIT (MAIN UNIT)

The RF circuit amplifies signals within the range of frequency coverage and filters out-of-band signals.

The signals from the antenna switching circuit pass through the two-stage tunable bandpass filters (D4, D8). The filtered signals are amplified at the RF amplifier (Q2) and then passed through another two-stage bandpass filters (D9, D10) to suppress unwanted signals. The filtered signals are applied to the 1st mixer circuit (Q3).

The tunable bandpass filters (D4, D8–D10) employ varactor diodes to tune the center frequency of the RF passband for wide bandwidth receiving and good image response rejection. These diodes are controlled by the CPU (IC20) via the D/A converter (IC7, pins 1–4).

4-1-3 1ST MIXER AND 1ST IF CIRCUITS (MAIN UNIT)

The 1st mixer circuit converts the received signals to a fixed frequency of the 1st IF signal with the PLL output frequency. By changing the PLL frequency, only the desired frequency will pass through a MCF (Monolithic Crystal Filter; F11) at the next stage of the 1st mixer.

The RF signals from the bandpass filter are applied to the 1st mixer circuit (Q3). The applied signals are mixed with the 1st LO signal coming from the RX VCO circuit (Q13) to produce a 46.35 MHz 1st IF signal. The 1st IF signal passes through a MCF (F11) to suppress out-of-band signals. The filtered signal is amplified at the 1st IF amplifier (Q4) and is then applied to the 2nd IF circuit.

4-1-4 2ND IF AND DEMODULATOR CIRCUITS (MAIN UNIT)

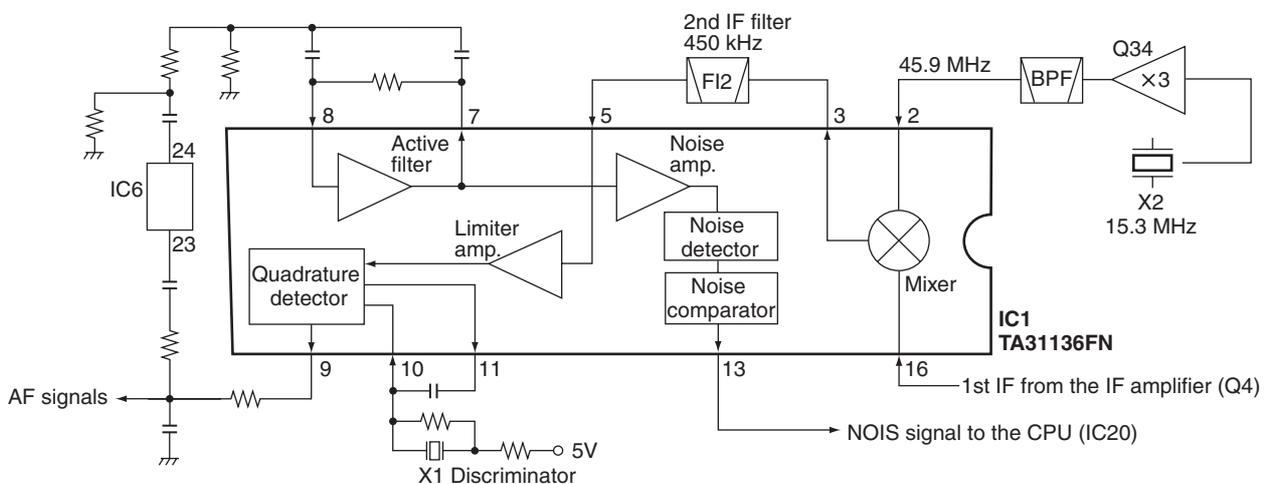
The 2nd mixer circuit converts the 1st IF signal to a 2nd IF signal. A double-conversion superheterodyne system improves the image rejection ratio and obtains stable receiver gain.

The 1st IF signal from the 1st IF amplifier (Q4) is applied to the 2nd mixer section of the FM IF IC (IC1, pin 16) and is then mixed with the 2nd LO signal to be converted into a 450 kHz 2nd IF signal.

The FM IF IC (IC1) contains the 2nd mixer, limiter amplifier, quadrature detector, active filter and noise amplifier etc.

A 2nd LO signal (45.9 MHz) is produced at PLL circuit by tripling it's reference frequency (15.3 MHz).

• 2ND IF DEMODULATOR CIRCUIT



The 2nd IF signal from the 2nd mixer section (IC1, pin 3) passes through a ceramic filter (FI2) to remove unwanted heterodyned frequencies. It is then amplified at the limiter amplifier section (IC1, pin 5) and applied to the quadrature detector section (IC1, pins 10, 11) to demodulate the AF signals.

The AF signals are output from pin 9 (IC1) and are then applied to the AF amplifier circuit.

4-1-5 AF AMPLIFIER CIRCUIT (MAIN UNIT)

The AF amplifier circuit amplifies the demodulated AF signals to drive a speaker.

The AF signals from the FM IF IC (IC1, pin 9) are passed through the high-pass filter (IC21, pins 5, 7) and then applied to the de-emphasis section of the compander IC (IC14, pin 3) with frequency characteristics of -6 dB/octave. The signals are passed through the low-pass filter, high-pass filter, expander sections in the compander IC (IC14). The signal output from pin 38 (IC14) and then applied to the D/A converter (IC6, pins 1, 2).

The output AF signals from the D/A converter (IC6, pin 2) are applied to the AF amplifier (IC18, pins 3, 4) and AF power amplifier (IC8, pins 1, 4).

The power amplified AF signals are applied to the internal speaker that is connected to J5 via [EXT SP] jack (J4).

4-1-6 RECEIVER MUTE CIRCUITS (MAIN UNIT)

• NOISE SQUELCH

The noise squelch circuit cuts out AF signals when no RF signals are received. By detecting noise components in the AF signals, the squelch circuit switches the AF mute switch.

Some noise components in the AF signals from the FM IF IC (IC1, pin 9) are passed through the D/A converter (IC6, pins 23, 24). The signals are applied to the active filter section in the FM IF IC (IC1, pin 8). The active filter section filters and amplifies noise components only. The amplified noise signals are converted into the pulse-type signals at the noise detector section. The detected signals output from pin 13 (NOIS) via the noise comparator section.

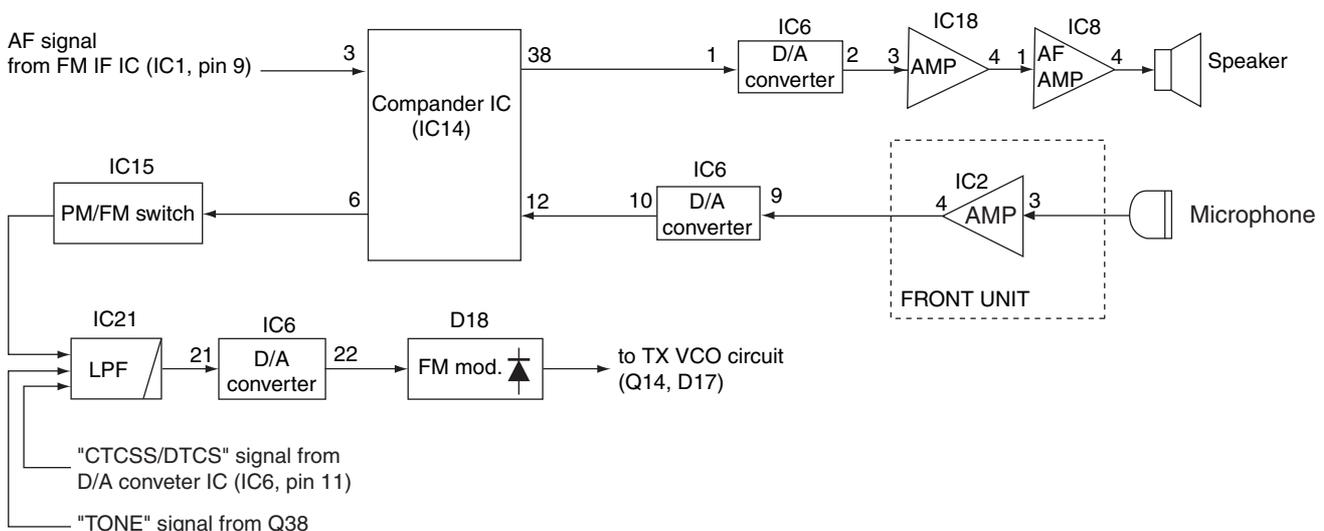
The NOIS signal from the FM IF IC (IC1, pin 13) is applied to the CPU (IC20, pin 37). Then the CPU analyzes the noise condition and outputs the AF mute signal as "AFON" from the pin 18 to the AF power controller (Q39, Q40, D30, D31).

• CTCSS AND DTCS

The tone squelch circuit detects AF signals and opens the squelch only when receiving a signal containing a matching subaudible tone (CTCSS or DTCS). When tone squelch is in use, and a signal with a mismatched or no subaudible tone is received, the tone squelch circuit mutes the AF signals even when the noise squelch is open.

A portion of the AF signals from the FM IF IC (IC1, pin 9) passes through the low-pass filters (IC5 pins, 1, 2, 5, 7) to remove AF (voice) signals and is applied to the CTCSS or DTCS decoder inside the CPU (IC20, pin 46) as the "CDEC" signal. The CPU outputs the AF mute signal as "AFON" from the pin 18 to the AF power controller (Q39, Q40, D30, D31).

• AF AND MIC AMPLIFIER CIRCUIT



4-2 TRANSMITTER CIRCUITS

4-2-1 MICROPHONE AMPLIFIER CIRCUIT (MAIN UNIT)

The microphone amplifier circuit amplifies audio signals within +6 dB/octave pre-emphasis characteristics from the microphone to a level needed for the modulation circuit.

The AF signals (MIC) from the microphone (FRONT unit; J1, pin 6) are applied to the microphone amplifier (FRONT unit; IC2, pins 3, 4) and then applied to the MAIN unit via J2 (pin 1).

The amplified signals are passed through the D/A converter (IC6, pins 9, 10) and are then applied to the microphone amplifier section of the compander IC (IC14, pin 12). The amplified signals are passed through the compressor, low-pass filter and high-pass filter sections and then output from pin 9 (IC14).

The filtered AF signals are amplified at the buffer amplifier (Q21) and pre-emphasized with +6dB/octave at the pre-emphasis circuit (R122, C187), and are then applied to the IDC amplifier section in IC14 (pin 8).

The amplified AF signals are passed through the limiter amplifier, low-pass filter, smoothing filter sections after being passed through the AF mute switch and is then output from pin 7 (IC14).

The output signals from (IC14) are passed through the PM/FM switch (IC15, pins 1, 6, 7), splatter filter (IC21, pins 12, 14) and are then applied to the D/A converter (IC6, pins 21, 22). The signals are applied to modulation circuit.

4-2-2 MODULATION CIRCUIT (MAIN UNIT)

The modulation circuit modulates the VCO oscillating signal (RF signal) using the microphone audio signals.

The AF signals from the D/A converter (IC6, pin 22) change the reactance of varactor diode (D18) to modulate the oscillated signal at the TX VCO circuit (Q14, D17). The modulated VCO signal is amplified at the buffer amplifiers (Q10, Q11) and is then applied to the drive amplifier circuit via the T/R switch (D14).

The CTCSS/DTCS signals ("CENC0," "CENC1," "CENC2") from the CPU (IC20, pins 89–91) are combined at resistors (R267–R269) and are then passed through the low-pass filter (Q37), D/A converter (IC6, pins 11, 12) and mixer (IC21, pins 1, 2). The signals are mixed with the AF signals from the

FM/PM switch (IC15, pin 1) and are then applied to the VCO circuit via the splatter filter (IC21, pins 12, 14).

4-2-3 DRIVE AMPLIFIER CIRCUIT (MAIN UNIT)

The drive amplifier circuit amplifies the VCO oscillating signal to the level needed at the power amplifier.

The RF signal from the buffer amplifier (Q10) passes through the T/R switch (D14) and is amplified at the YGR (Q9) and drive (Q8) amplifiers. The amplified signal is applied to the power amplifier circuit.

4-2-4 POWER AMPLIFIER CIRCUIT (MAIN UNIT)

The power amplifier circuit amplifies the driver signals to an output power level.

The RF signal from the drive amplifier (Q8) is applied to the power module (IC3) to obtain 25 W (for IC-F610/F620, 45 W; for IC-F621) of RF power.

The amplified signal is passed through the antenna switching circuit (D2, D3), low-pass filter (L2, L3, C6–C8) and APC detector (D1, D11), low-pass filter (L1, C1, C2) and is then applied to the antenna connector (CHASSIS; J1).

Control voltage for the power amplifier (IC3, pin 3) comes from the APC amplifier (IC2, pin 4) to stabilize the output power. The transmit mute switch (D32) controls the APC amplifier when transmit mute is necessary.

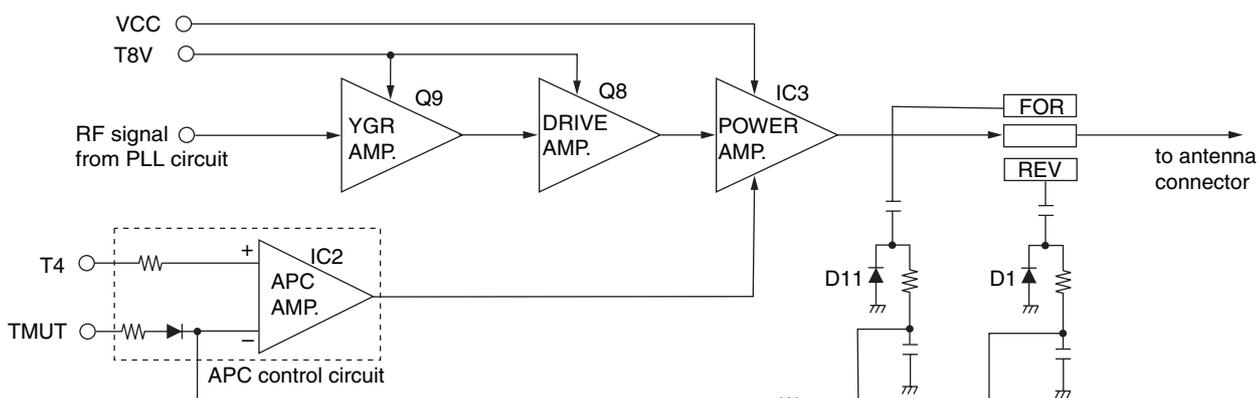
4-2-5 APC CIRCUIT (MAIN UNIT)

The APC circuit protects the power amplifier from a mismatched output load and stabilizes the output power.

The power detector circuit (D1, D11) detects forward signals and reflection signals and converts it into DC voltage. The detected voltage is at minimum level when the antenna impedance is matched at 50 Ω , and is increased when it is mismatched.

The detected voltage is applied to the APC amplifier (IC2, pin 3), and the power setting "T4" signal from the D/A converter (IC7, pin 4), controlled by the CPU (IC20), is applied to the another input for reference. When antenna impedance is mismatched, the detected voltage exceeds the power setting voltage. Then the output voltage of the APC amplifier (IC2, pin 4) controls the input voltage of the power module (IC3) to reduce the output power.

• APC CIRCUIT



4-3 PLL CIRCUITS

4-3-1 PLL CIRCUIT

A PLL circuit provides stable oscillation of the transmit frequency and receive 1st LO frequency. The PLL output compares the phase of the divided VCO frequency to the reference frequency. The PLL output frequency is controlled by the divided ratio (N-data) of a programmable divider.

The PLL circuit contains the RX VCO (Q13, D16) and TX VCO (Q14, D17). The oscillated signal is amplified at the buffer amplifiers (Q11, Q12) and then applied to the PLL IC (IC4, pin 5) via the low-pass filter (L32, C298, C299).

The PLL IC (IC4) contains a prescaler, programmable counter, programmable divider and phase detector, etc. The applied signal is divided at the prescaler and programmable counter section by the N-data ratio from the CPU (IC20). The reference signal is generated at the reference oscillator (X2) and is applied to the PLL IC. The PLL IC detects the out-of-step phase using the reference frequency and outputs it from pin 8. The output signal is passed through the loop filter and is then applied to the VCO circuit as the lock voltage.

If the oscillated signal drifts, its phase changes from that of the reference frequency, causing a lock voltage change to compensate for the drift in the oscillated frequency.

4-3-2 VCO CIRCUIT

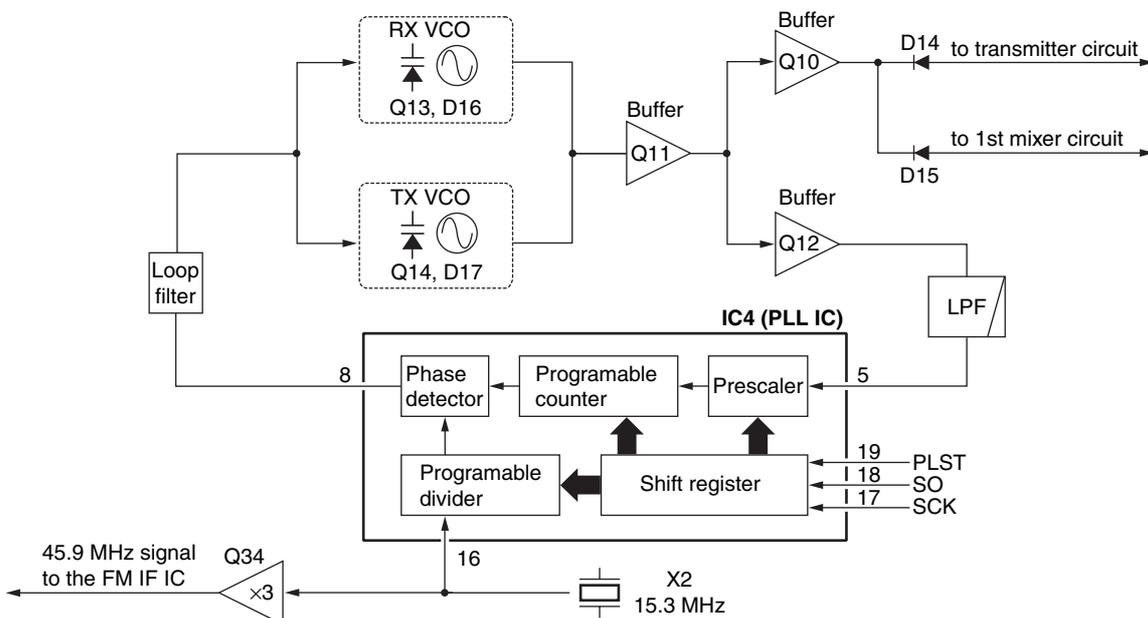
The VCO circuit contains a separate RX VCO (Q13, D16) and TX VCO (Q14, D17). The oscillated signal is amplified at the buffer amplifiers (Q11, Q10) and is then applied to the T/R switch circuit (D14, D15). Then the receive 1st LO (Rx) signal is applied to the 1st mixer (Q3) and the transmit (Tx) signal to the YGR amplifier circuit (Q9).

A portion of the signal from the buffer amplifier (Q11) is fed back to the PLL IC (IC4, pin 5) via the buffer amplifier (Q12) and low-pass filter (L32, C298, C299) as the comparison signal.

4-4 POWER SUPPLY CIRCUITS

LINE	DESCRIPTION
HV	The voltage from a DC power supply.
VCC	The same voltage as the HV line which is controlled by the power switching circuit (Q23, Q24). When the [⊕] switch is pushed, the CPU outputs the "PWR" control signal to the power switching circuit to turn the circuit ON.
CPU5V	Common 5 V converted from the HV line at the CPU5V regulator circuit (IC10). The output voltage is applied to the CPU (IC20), EEPROM (IC23), etc.
5V	Common 5 V converted from the VCC line at the 5 V regulator circuit (Q27, Q28). The output voltage is applied to the FM IF IC (IC1), PLL IC (IC4), etc.
8V	Common 8 V converted from the VCC line at the 8 V regulator circuit (IC9). The output voltage is applied to the buffer amplifier (Q11), AF amplifier (IC16), etc.
T8V	Transmit 8 V controlled by the T8V regulator circuit (Q25, Q29, D23) using the "TMUT" signal from the CPU (IC20, pin 17). The output voltage is applied to the YGR amplifier (Q9), driver amplifier (Q10), etc.
R8V	Receive 8 V controlled by the R8V regulator circuit (Q26, Q30, D24) using the "TxC" signal from the CPU (IC20, pin 16). The output voltage is applied to the RF amplifier (Q2), 1st IF amplifier (Q4), etc.

• PLL CIRCUIT



4-5 OTHER CIRCUITS

4-5-1 COMPANDER CIRCUIT (MAIN UNIT)

IC-F610 series have compander circuit which can improve S/N ratio and become wide dynamic range. The circuit is composed in the compander IC (IC14).

(1) IN CASE OF RECEIVING

The demodulated AF signals from the FM IF IC (IC1, pin 9) are applied to the amplifier section in the compander IC (IC14, pin 3), and then pass through the low-pass filter and high-pass filter sections to suppress unwanted signals. The filtered signals are applied to the expander circuit to expand AF signals.

The output signals from the compander IC (IC14, pin 38) is applied to the AF amplifier circuit after amplified at the amplifier section.

(2) IN CASE OF TRANSMITTING

The audio signals from the microphone amplifier (FRONT UNIT; IC2) are applied to the compander IC (IC14, pin 12) via the D/A converter (IC6, pins 9, 10). The signals are amplified at the amplifier section, and are then applied to the compressor circuit to compress the audio signals. The signals are pass through the low-pass filter and high-pass filter sections and are then applied to the limiter amplifier section after being passed through the high-pass filter section.

The filtered signals pass through the splatter filter section, and are then applied to the modulation circuit (D18) via the PM/FM switch (IC15, pins 1, 6, 7) and D/A converter (IC6, pins 21, 22).

4-6 PORT ALLOCATIONS

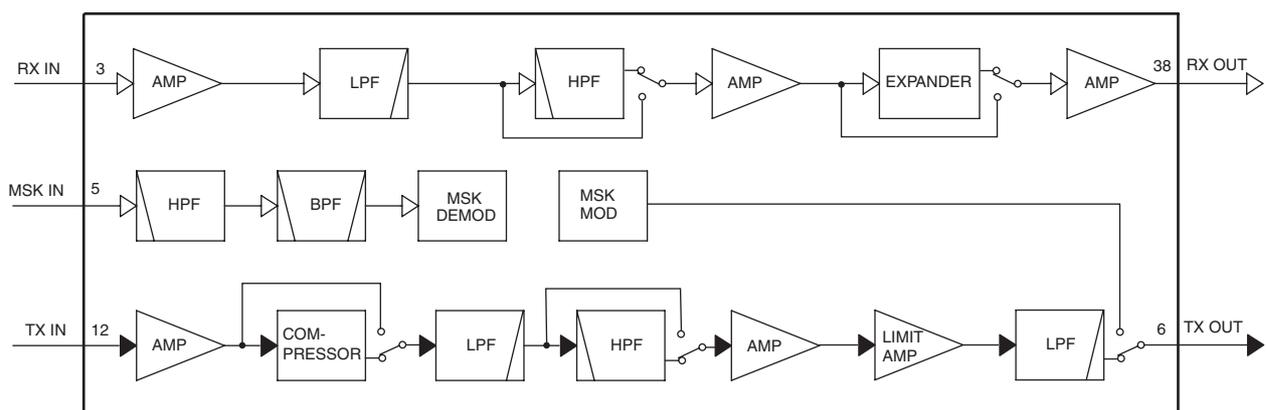
4-6-1 OUTPUT EXPANDER (FRONT UNIT; IC1)

Pin number	Port name	Description															
1-3	KS0-KS2	Output ports for the programmable function keys (P0-P4, ▲, ▼, ▲, ▼).															
4, 5	DIM1, DIM2	Output LCD backlight control signals.															
		<table border="1"> <thead> <tr> <th>DIM1</th> <th>DIM2</th> <th>LIGHT</th> </tr> </thead> <tbody> <tr> <td>HIGH</td> <td>HIGH</td> <td>ON</td> </tr> <tr> <td>HIGH</td> <td>LOW</td> <td>OFF</td> </tr> <tr> <td>LOW</td> <td>HIGH</td> <td>DIM</td> </tr> <tr> <td>LOW</td> <td>LOW</td> <td>OFF</td> </tr> </tbody> </table>	DIM1	DIM2	LIGHT	HIGH	HIGH	ON	HIGH	LOW	OFF	LOW	HIGH	DIM	LOW	LOW	OFF
		DIM1	DIM2	LIGHT													
		HIGH	HIGH	ON													
		HIGH	LOW	OFF													
LOW	HIGH	DIM															
LOW	LOW	OFF															
7	HORN	Outputs external device control signal. High: When matched 2/5 tone signals are received.															

4-6-2 D/A CONVERTER (MAIN UNIT; IC7)

Pin number	Port name	Description
1-3	T1-T3	Output the bandpass filters (D4, D8, D9) tuning signals.
4	T4	<ul style="list-style-type: none"> Outputs the bandpass filter (D10) tuning signal while receiving. Outputs the TX power control signal which selects High, Low1, Low2 of TX power while transmitting. The output signal is applied to the APC amplifier (IC2, pin 1).

• COMPANDER IC BLOCK DIAGRAM



4-6-3 CPU (MAIN UNIT; IC2)

Pin number	Port name	Description
1	DSDA	I/O port for data signal to the D/A converter (IC7).
2	DAST	Outputs strobe signals to the D/A converter (IC6).
8, 9	LINH, LCS	Output LCD control signals to the LCD driver (FRONT unit; IC1).
10	LSCK	Outputs clock signal to the LCD driver (FRONT unit; IC1).
11	LSO	Outputs data signal to the LCD driver (FRONT unit; IC1).
13	PLST	Outputs strobe signal to the PLL IC (IC4).
16	TXC	Outputs the R8 regulator circuit (Q26, Q30, Q24) control signal. Low: During receive.
17	TMUT	Outputs the T8 regulator circuit (Q25, Q29, D23) control signal. Low: During transmit.
18	AFON	Outputs control signal for AF mute circuit (Q39, Q40, D31). High: While AF amplifier (IC8) is activated.
19	NWC	Outputs IF band width control signal. High: While IF bandwidth is narrow.
20	DDSD	Input port for data signal from the DTMF decoder IC (IC19, pin 9).
21	DDAC	Outputs clock signal to the DTMF decoder IC (IC19, pin 10).
22	SO	Outputs data signal to the PLL IC (IC4), D/A converter (IC6), compander IC (IC14) and optional unit (connect to J1), etc.
23	SI	Input port for clock signal from the optional unit via J1.
24	SCK	Outputs clock signal to the PLL IC (IC4), D/A converter (IC6), D/A converter (IC7), compander IC (IC14) and optional unit (connect to J1), etc.
25	CCS	Outputs chip select signal for the optional unit via J1.
26–28	KR0–KR2	Input ports for the programmable function keys (P0–P4, ▲, ▼, ▲, ▼).
29	PTTO	Input port for the PTT switch from the optional unit via J1. Low: External PTT switch is ON.
30	HANG	Input port for the microphone hanger detection signal. Low: When microphone is on the hook.
31	BUSY	Outputs BUSY detection signal for the optional unit via J1.
32	RMUT	Input port for the AF mute signal from the optional unit via J1. Low: While RX audio is muted.

Pin number	Port name	Description
33	MMUT	Input port for the microphone mute signal from the optional unit via J1. Low: The microphone audio is muted.
34–36	OPT1–OPT3	I/O ports for the optional unit.
37	NOIS	Input port for the noise signal from the FM IF IC (IC1, pin 13).
38	POSW	Input port for the [⓪] switch. Low: The [⓪] switch is pushed.
39	DDST	Input port for DTMF detection signal from the DTMF decoder IC (IC19).
40	IGSW	Input port for the remote power control signal from external connector (J8).
41	PWON	Outputs control signal for the power switch circuit (Q23, Q24) via D28. High: While power ON.
43	SENC	Output single tone signal.
44	BEEP	Outputs beep audio signal.
45	SDEC	Input port for single tone signal from the LPF (IC21, pin 8).
46	CDEC	Input port for CTCSS/DTCS signal from the LPF (IC5, pin 1).
47	ULCK	Input port for the PLL unlock signal from the PLL IC (IC4). Low: The PLL circuit is unlocked.
48	BATV	Input port for the connected battery for the low battery detection.
49	LVIN	Input port for the PLL lock voltage.
50	RSSI	Input port for the S-meter signal from the FM IF IC (IC1, pin 12).
51	TEMP	Input port for the transceiver's internal temperature detecting signal.
52	AFVI	Input port for the AF volume control (FRONT unit; R12). High: [AF VOLUME] is maximum clockwise.
55	EPTT	Input port for the PTT switch from the external connector (J6). Low: External PTT switch is ON.
59	RES	Input port for the reset signal.
68	CLO	Outputs the cloning signal.
69	CLI	Input port for the cloning signal.
71	DUSE	Outputs cut-off frequency control signal to the low-pass filter (IC5) for CTCSS/DTCS switch.
74	XCTS	Input port for the connected modem unit via external connector (J9).
75	XRTS	Output port for the connected modem unit via external connector (J9).

Pin number	Port name	Description
76	XTXD	Input port for the MAP27 data signals from the connected unit via the external connector (J9).
77	XRXD	Outputs the MAP27 data signals for the connected unit via the external connector (J9).
79	NTXD	Outputs the NMEA data signals for the connected unit via external connector (J8).
80	NRXD	Input port for the NMEA data signals from the connected unit via external connector (J8).
88	DIM	Input port for the LCD backlight control signal from the external connector (J6). Low: While LCD backlight is dimmed.
89–91	CENC1–CENC3	Output the CTCSS/DTCS signals.
92	AFCL	Outputs reset signal for the compander IC (IC14).
96	APST	Outputs strobe signal to the compander IC (IC14).
97	PMFM	Outputs the control signal for the MSK PM/FM switch circuit (IC15). Low: While PM is selected.
98	ESDA	I/O port for data signals from/to the EEPROM (IC23).
99	ESCL	Outputs clock signal to the EEPROM (IC23).

SECTION 5 ADJUSTMENT PROCEDURES

5-1 PREPARATION

When adjusting IC-F610, IC-F620 or IC-F621, one of the following optional adjustment software and JIG CABLE (modified OPC-1122 CLONING CABLE; see illustration page 5-5) are required.

- CS-F500 ADJ (Rev. 2.0 or later): [CONV], [BIIS] versions:
- CS-F600(MPT) ADJ (Rev. 1.0 or later): [MPT] version
- CS-F620TR ADJ (Rev. 1.0 or later): [LTR] version

■ REQUIRED TEST EQUIPMENT

EQUIPMENT	GRADE AND RANGE	EQUIPMENT	GRADE AND RANGE
DC power supply	Output voltage : 13.6 (13.2) V DC Current capacity : 20 A or more	Audio generator	Frequency range : 300–3000 Hz Measuring range : 1–500 mV
FM deviation meter	Frequency range : DC–600 MHz Measuring range : 0 to ± 10 kHz	Attenuator	Power attenuation : 50 or 60 dB Capacity : 100 W
Frequency counter	Frequency range : 0.1–600 MHz Frequency accuracy : ± 1 ppm or better Sensitivity : 100 mV or better	Standard signal generator (SSG)	Frequency range : 0.1–600 MHz Output level : 0.1 μ V to 32 mV (–127 to –17 dBm)
Digital multimeter	Input impedance : 10 M Ω /V DC or more	AC millivoltmeter	Measuring range : 10 mV to 10 V
RF power meter	Measuring range : 1–75 W Frequency range : 100–800 MHz Impedance : 50 Ω SWR : Better than 1.2 : 1	Oscilloscope	Frequency rang : DC–20 MHz Measuring range : 0.01–20 V
		External speaker	Input impedance : 4 Ω Capacity : 7 W or more

■ SYSTEM REQUIREMENTS

- Microsoft® Windows® 95/98/Me [CONV], [MPT], [BIIS]
Microsoft® Windows® 98/Me/XP [LTR]
- RS-232C serial port (D-sub 9 pin)

■ ADJUSTMENT SOFTWARE INSTALLATION

- Quit all applications when Windows is running.
- Insert the CD into the appropriate CD drive.
- Double-click the “Setup.exe” contained in the adjustment software folder in the CD drive.
- The “Welcome to the InstallShield Wizard for adjustment software will appear. Click [Next>].
- The “Choose Destination Location” will appear. Then click [Next>] to install the software to the destination folder.
- After the installation is completed, the “InstallShield Wizard Complete” will appear. Then click [Finish].
- Eject the CD.
- The adjustment software icon appears on the desk top screen.

■ BEFORE STARTING SOFTWARE ADJUSTMENT

Program the adjustment frequencies into the transceiver using with the cloning software before starting the software adjustment. Otherwise, the transceiver can not start software adjustment.

CAUTION: BACK UP the originally programmed memory data in the transceiver before programming the adjustment frequencies. When program the adjustment frequencies into the transceiver, the transceiver’s memory data will be overwritten and lose original memory data at the same time.

Microsoft and Windows are registered trademarks of Microsoft Corporation in the U.S.A. and other countries.

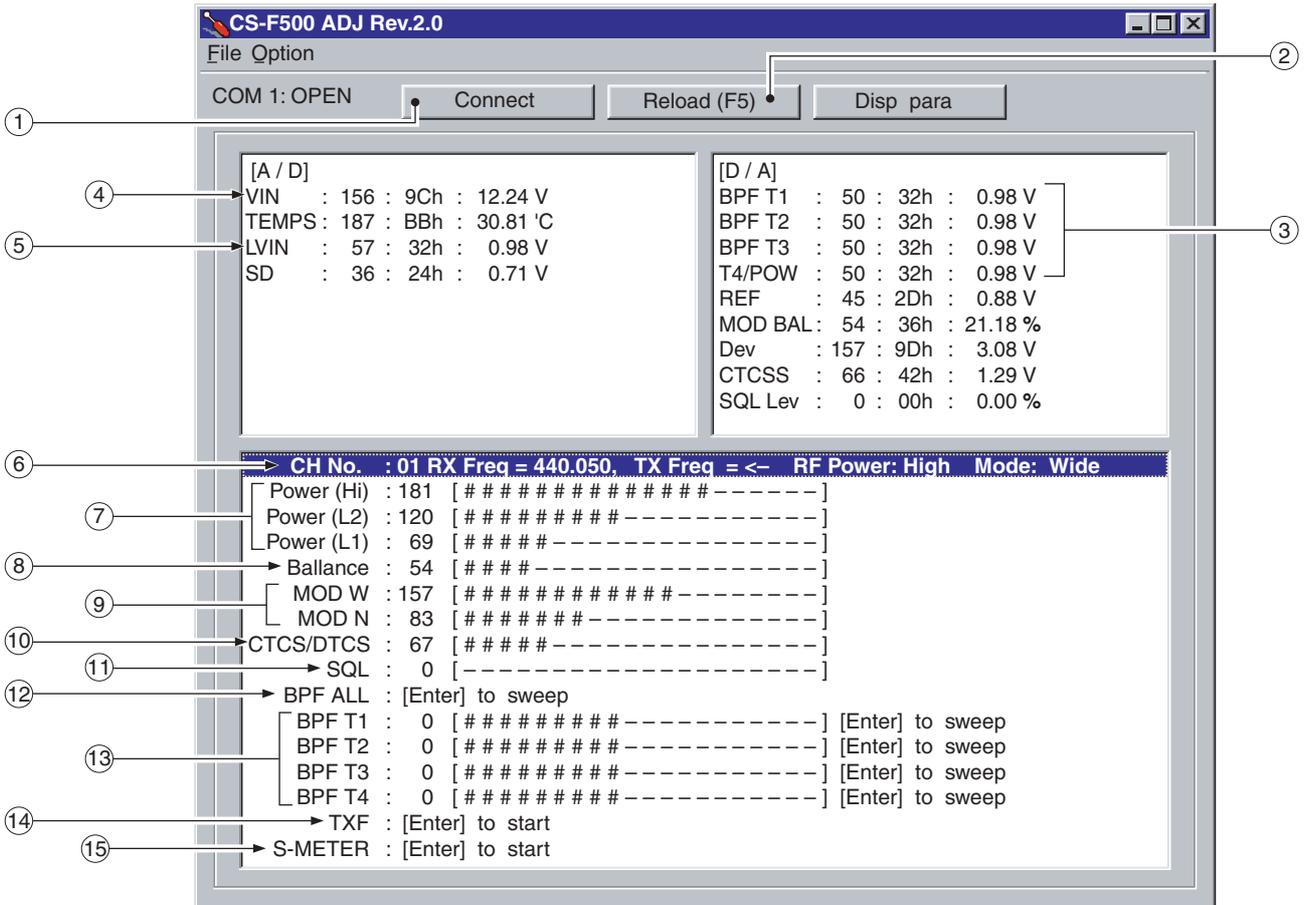
■ STARTING SOFTWARE ADJUSTMENT

- Connect the transceiver and PC with the JIG CABLE.
- Turn the transceiver power ON.
- Boot up Windows, and click the adjustment soft ware icon on the desk top screen.
- Click ‘Connect’ on the adjustment software window, then appears the transceiver’s adjustment screen.
- Set or modify adjustment data as desired.

• ADJUSTMENT FREQUENCY LIST

CH	FREQUENCY	CONDITION
1	400.000 MHz [L] 440.000 MHz [M] 480.000 MHz [H]	TX power : Low1 Mode : Wide
2	400.000 MHz [L] 440.000 MHz [M] 480.000 MHz [H]	TX power : Low2 Mode : Wide
3	400.000 MHz [L] 440.000 MHz [M] 480.000 MHz [H]	TX power : High Mode : Wide
4	415.000 MHz [L] 465.000 MHz [M] 500.000 MHz [H]	TX power : Low1 Mode : Wide
5	415.000 MHz [L] 465.000 MHz [M] 500.000 MHz [H]	TX power : Low1 Mode : Narrow
6	415.000 MHz [L] 465.000 MHz [M] 500.000 MHz [H]	TX power : Low1 Mode : Wide CTCSS : 88.5 Hz DTCS code : 007
7	430.000 MHz [L] 490.000 MHz [M] 520.000 MHz [H]	TX power : Low1 Mode : Wide
8	430.000 MHz [L] 490.000 MHz [M] 520.000 MHz [H]	TX power : Low1 Mode : Narrow

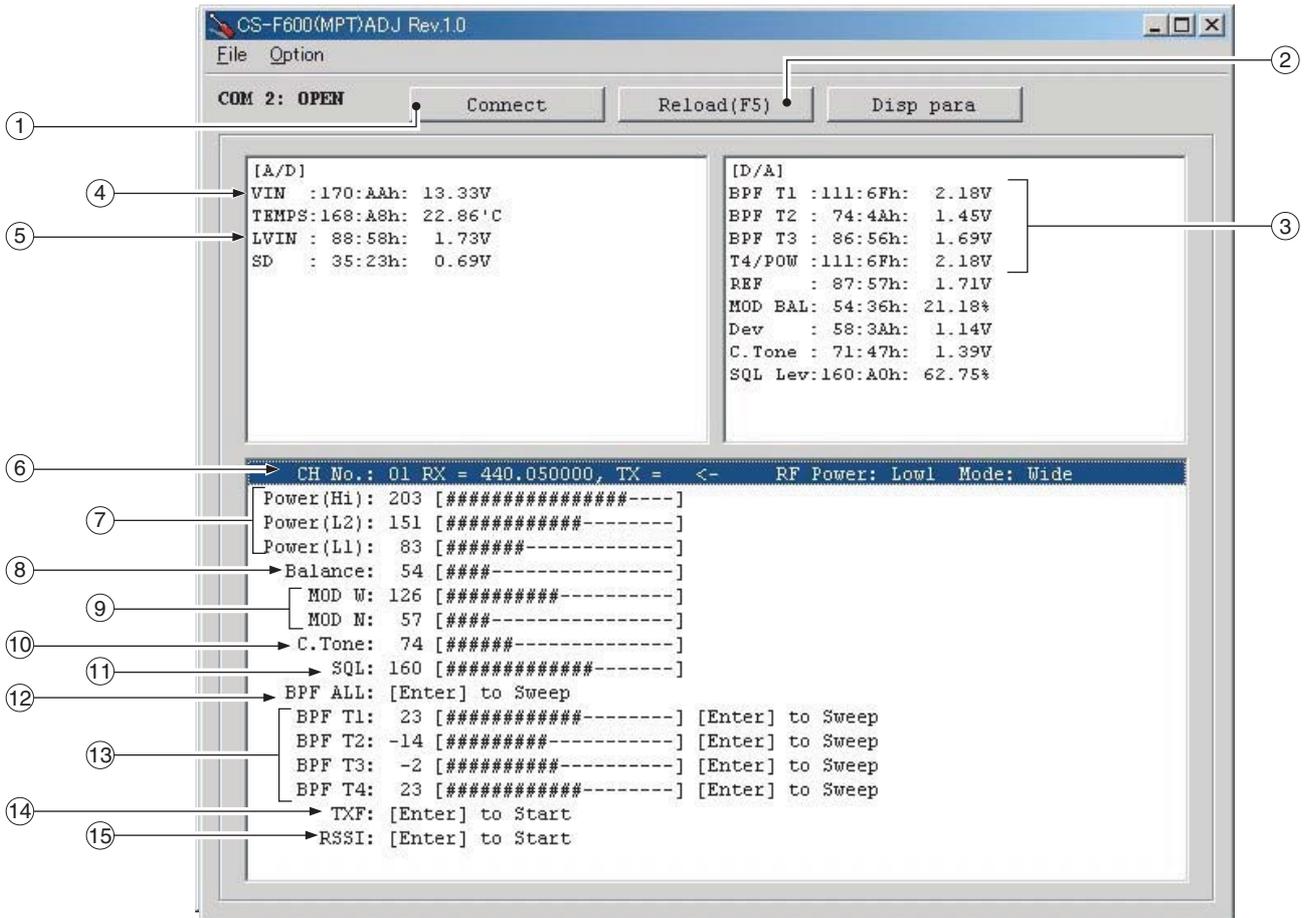
• CS-F500 ADJ'S SCREEN EXAMPLE



NOTE: The above values for settings are example only.
Each transceiver has its own specific values for each setting.

- | | | | |
|-------------------------------------|------------------------------|---|------------------------------------|
| ① : Transceiver's connection state | ⑤ : PLL lock voltage | ⑨ : FM deviation | ⑬ : Receive sensitivity (manually) |
| ② : Reload adjustment data | ⑥ : Operating channel select | ⑩ : CTCSS/DTCS deviation | ⑭ : Reference frequency |
| ③ : Receive sensitivity measurement | ⑦ : RF output power | ⑪ : Squelch level | ⑮ : S-meter |
| ④ : Connected DC voltage | ⑧ : Modulation balance | ⑫ : Receive sensitivity (automatically) | |

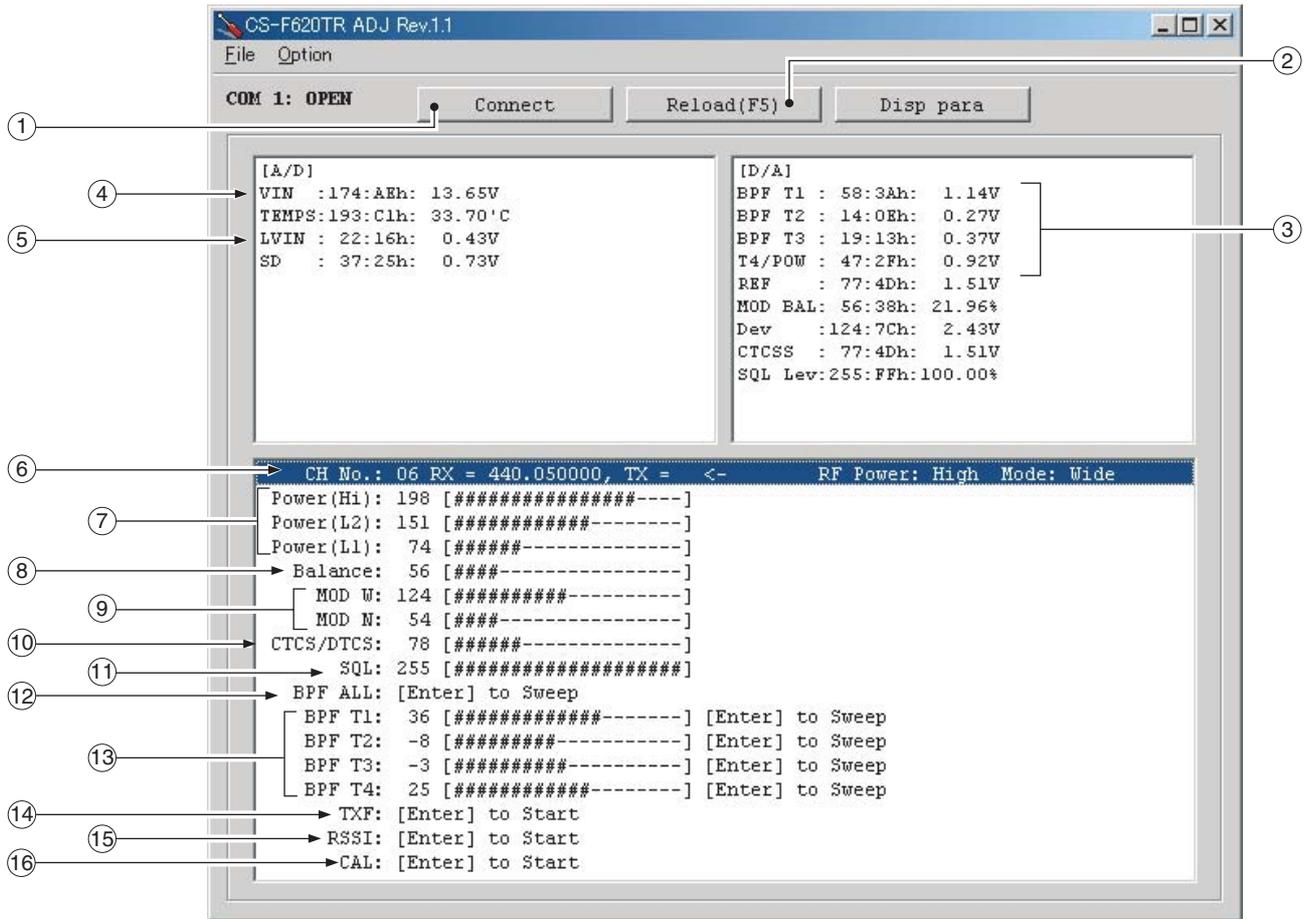
• CS-F600(MPT) ADJ'S SCREEN EXAMPLE



NOTE: The above values for settings are example only.
 Each transceiver has its own specific values for each setting.

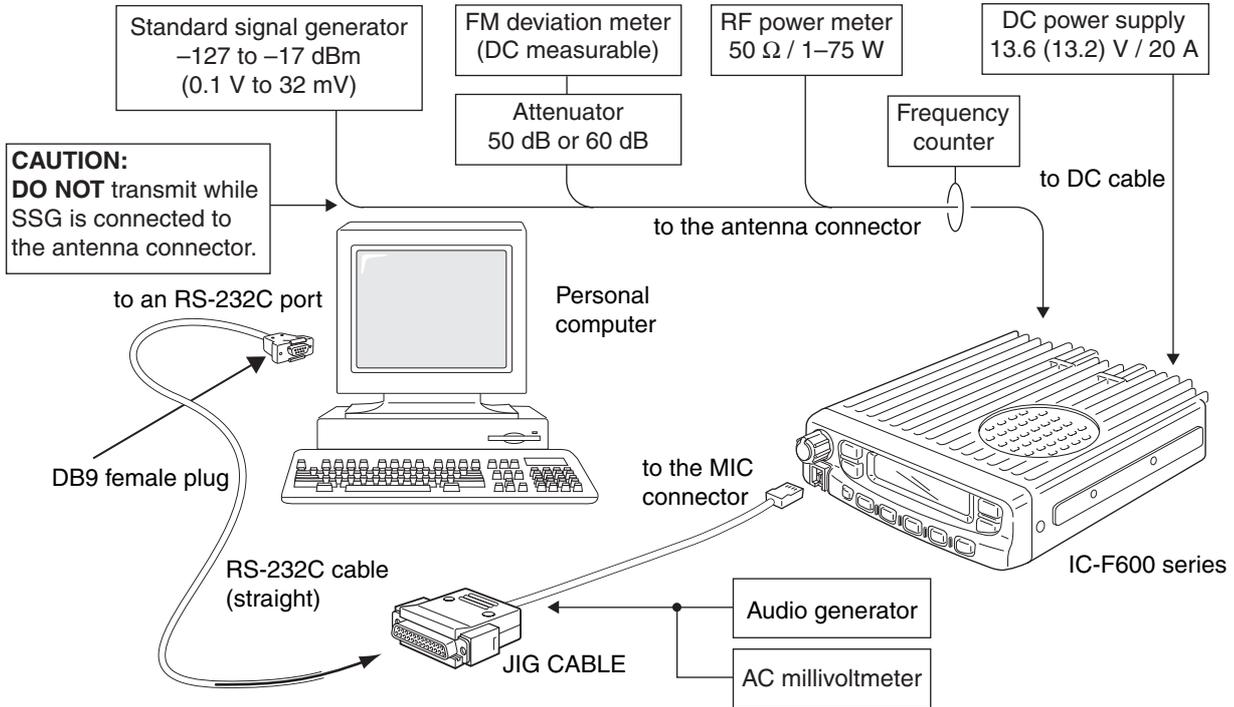
- | | | | |
|-------------------------------------|------------------------------|---|------------------------------------|
| ① : Transceiver's connection state | ⑤ : PLL lock voltage | ⑨ : FM deviation | ⑬ : Receive sensitivity (manually) |
| ② : Reload adjustment data | ⑥ : Operating channel select | ⑩ : CTCSS/DTCS deviation | ⑭ : Reference frequency |
| ③ : Receive sensitivity measurement | ⑦ : RF output power | ⑪ : Squelch level | ⑮ : S-meter |
| ④ : Connected DC voltage | ⑧ : Modulation balance | ⑫ : Receive sensitivity (automatically) | |

• CS-F620TR ADJ'S SCREEN EXAMPLE

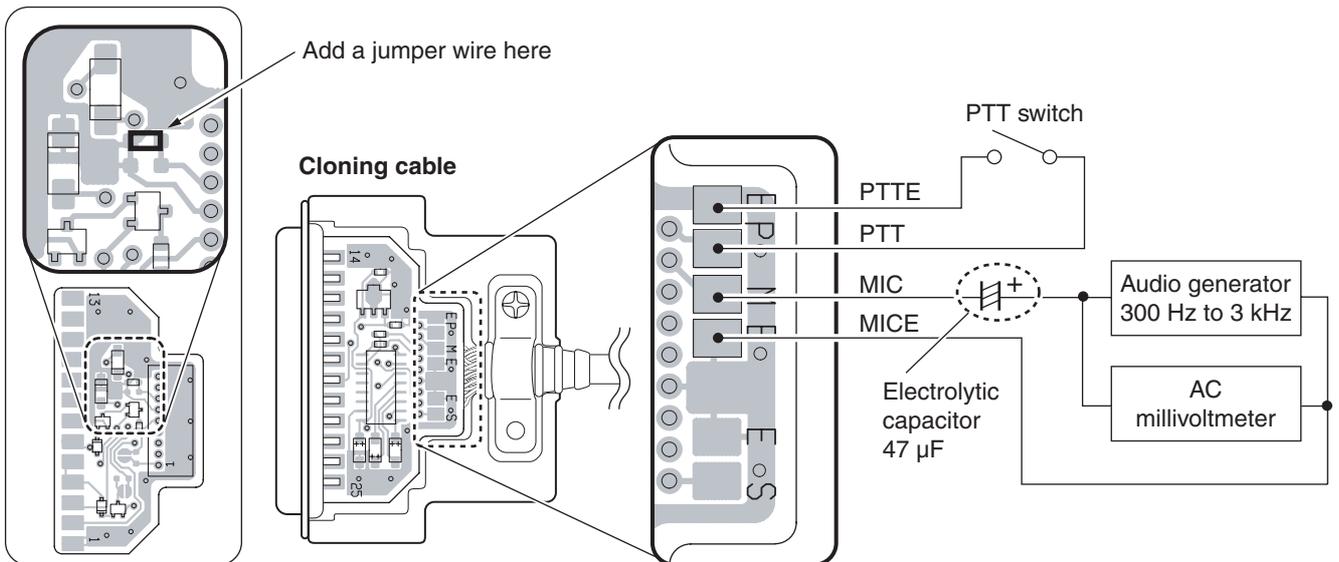


NOTE: The above values for settings are example only.
Each transceiver has its own specific values for each setting.

- | | | | |
|-------------------------------------|------------------------------|---|-------------------------------------|
| ① : Transceiver's connection state | ⑤ : PLL lock voltage | ⑨ : FM deviation | ⑬ : Receive sensitivity (manually) |
| ② : Reload adjustment data | ⑥ : Operating channel select | ⑩ : CTCSS/DTCS deviation | ⑭ : Reference frequency |
| ③ : Receive sensitivity measurement | ⑦ : RF output power | ⑪ : Squelch level | ⑮ : S-meter |
| ④ : Connected DC voltage | ⑧ : Modulation balance | ⑫ : Receive sensitivity (automatically) | ⑯ : LSD calibration (automatically) |

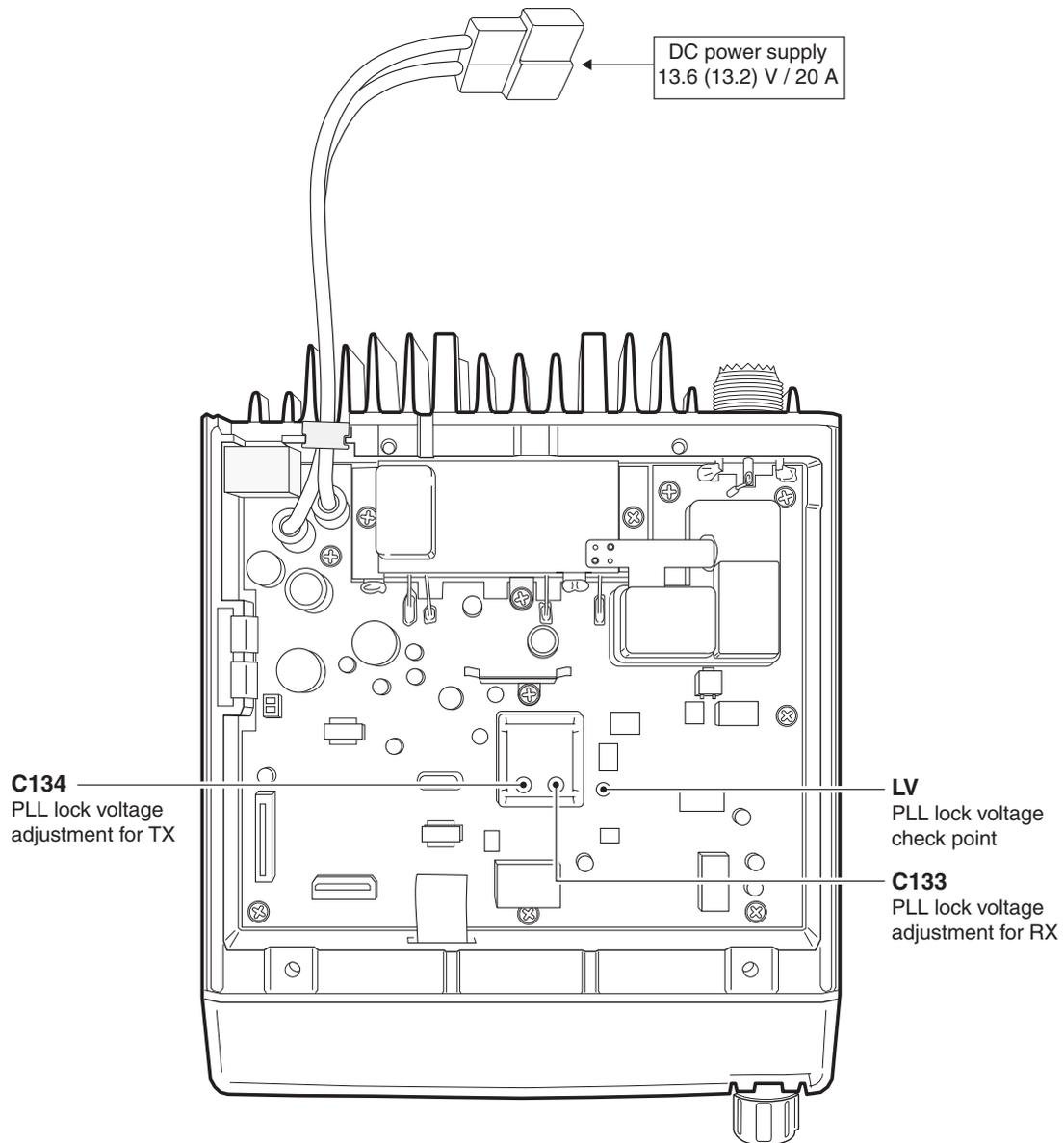


• JIG CABLE



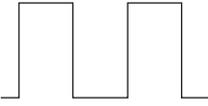
5-2 PLL ADJUSTMENT

ADJUSTMENT	ADJUSTMENT CONDITION	MEASUREMENT		VALUE	ADJUSTMENT	
		UNIT	LOCATION		UNIT	ADJUST
PLL LOCK VOLTAGE	1 • Operating CH : CH1 • Receiving	MAIN	Connect a digital multimeter or an oscilloscope to the check point, "LV".	1.0 V	MAIN	C133
	2 • Transmitting			1.1 V		C134
	3 • Operating CH : CH7 • Receiving			3.0–4.4 V [L] 3.3–4.5 V [M] 3.3–4.5 V [H]		Verify
	4 • Transmitting					



5-3 SOFTWARE ADJUSTMENT (TRANSMITTING)

Select an operation using [↑] / [↓] keys, then set specified value using [←] / [→] keys on the connected computer keyboard.

ADJUSTMENT	ADJUSTMENT CONDITION	MEASUREMENT		VALUE
		UNIT	LOCATION	
REFERENCE FREQUENCY [TXF]	1 <ul style="list-style-type: none"> Operating CH : CH7 Connect an RF power meter or 50 Ω dummy load to the antenna connector. Transmitting 	Rear panel	Loosely couple a frequency counter to the antenna connector.	430.0000 MHz [L] 490.0000 MHz [M] 520.0000 MHz [H]
OUTPUT POWER [Power (Hi)]	1 <ul style="list-style-type: none"> Operating CH : CH3 Transmitting 	Rear panel	Connect an RF power meter to the antenna connector.	25.0 W [25W] 45.0 W [45W]
[Power (L2)]	2 <ul style="list-style-type: none"> Operating CH : CH2 Transmitting 			10.0 W [25W] 25.0 W [45W]
[Power (L1)]	3 <ul style="list-style-type: none"> Operating CH : CH1 Transmitting 			2.5 W [25W] 4.5 W [45W]
MODULATION BALANCE [Balance]	1 <ul style="list-style-type: none"> Operating CH : CH4 Preset [MOD W] : 100 No audio is applied to the [MIC] connector. Set an FM deviation meter as: <ul style="list-style-type: none"> HPF : OFF LPF : 20 kHz De-emphasis : OFF Detector : (P-P)/2 Push [P0] while transmitting 	Rear panel	Connect an FM deviation meter with an oscilloscope to the antenna connector through an attenuator.	Set to square wave form 
FM DEVIATION [MOD W]	1 <ul style="list-style-type: none"> Operating CH : CH4 Connect an audio generator to the [MIC] connector through the JIG cable and set as <ul style="list-style-type: none"> : 1.0 kHz/40 mVrms Set an FM deviation meter as: <ul style="list-style-type: none"> HPF : OFF LPF : 20 kHz De-emphasis : OFF Detector : (P-P)/2 Transmitting 	Rear panel	Connect an FM deviation meter to the antenna connector through an attenuator.	±4.10 kHz [W/N] ±3.30 kHz [M/N] ±3.50 kHz [LTR]
[MOD N]	2 <ul style="list-style-type: none"> Operating CH : CH5 Transmitting 			±2.10 kHz [W/N] ±2.10 kHz [M/N] ±1.50 kHz [LTR]
CTCSS/DTCS DEVIATION [CTCSS/DTCS]	1 <ul style="list-style-type: none"> Operating CH : CH6 No audio is applied to the [MIC] connector. Set an FM deviation meter as: <ul style="list-style-type: none"> HPF : OFF LPF : 20 kHz De-emphasis : OFF Detector : (P-P)/2 Transmitting 	Rear panel	Connect an FM deviation meter to the antenna connector through an attenuator.	±0.70 kHz [N/W] ±0.56 kHz [N/M]

SOFTWARE ADJUSTMENT (RECEIVING)

- Select an operation using [↑] / [↓] keys, then set specified value using [←] / [→] keys on the connected computer keyboard.
- Need to adjust "S-METER ADJUSTMENT" after "RX SENSITIVITY ADJUSTMENT" is adjusted. Otherwise, "S-METER ADJUSTMENT" will not be adjusted properly.

ADJUSTMENT	ADJUSTMENT CONDITION	MEASUREMENT		VALUE
		UNIT	LOCATION	
RX SENSITIVITY [BPF T1]– [BPF T4]	1 <ul style="list-style-type: none"> • Operating CH : CH1 • Connect an SSG to the antenna connector and set as: <ul style="list-style-type: none"> Frequency : 400.000 MHz [L] 440.000 MHz [M] 480.000 MHz [H] Level : 10 μV* (–87 dBm) Modulation : 1 kHz Deviation : \pm3.5 kHz [W/N] \pm2.8 kHz [M/N] • Receiving 	Rear panel	Connect a SINAD meter with a 4 Ω load to the external [SP] jack.	Minimum distortion level
	CONVENIENT: The BPF T1– BPF T4 can be adjustment automatically. ①-1: Set the cursor to "BPF ALL" and then push [ENTER] key. ①-2: The connected PC tunes BPF T1–BPF T4 to peak levels. or ②-1: Set the cursor to one of BPF T1, T2, T3 or T4 as desired. ②-2: Push [ENTER] key to start tuning. ②-3: Repeat ②-1 and ②-2 to perform additional BPF tuning.			
S-METER [S-METER] ([RSSI] for [MPT] and [LTR])	1 <ul style="list-style-type: none"> • Operating CH : CH1 • Connect an SSG to the antenna connector and set as: <ul style="list-style-type: none"> Frequency : 400.000 MHz [L] 440.000 MHz [M] 480.000 MHz [H] Level : 14 μV* (–84 dBm) Modulation : 1 kHz Deviation : \pm3.5 kHz [W/N] \pm2.8 kHz [M/N] • Receiving 		<ul style="list-style-type: none"> • Push the [ENTER] key on the connected computer's keyboard to set "S3" level. • Push the [ENTER] key on the connected computer's keyboard to set "L2" level. (for [MPT] and [LTR]) 	
	2 <ul style="list-style-type: none"> Set an SSG as: <ul style="list-style-type: none"> Level : 0.45 μV* (–114 dBm) Deviation : \pm3.5 kHz [W/N] \pm2.8 kHz [M/N] • Receiving 		<ul style="list-style-type: none"> • Push the [ENTER] key on the connected computer's keyboard to set "S1" level. • Push the [ENTER] key on the connected computer's keyboard to set "L0" level. (for [MPT] and [LTR] version) 	
SQUELCH LEVEL [SQL]	1 <ul style="list-style-type: none"> • Operating CH : CH5 • Connect an SSG to the antenna connector and set as: <ul style="list-style-type: none"> Frequency : 415.000 MHz [L] 465.000 MHz [M] 500.000 MHz [H] Level : 0.2 μV* (–121 dBm) Modulation : 1 kHz Deviation : \pm1.75 kHz • Receiving 	Rear panel	Connect a speaker to the external [SP] jack.	Set SQL level to close squelch. Then set SQL level at the point where the audio signals just appears.

*The output level of the standard signal generator (SSG) is indicated as the SSG's open circuit.

SECTION 6 PARTS LIST

[FRONT UNIT]

REF NO.	ORDER NO.	DESCRIPTION	M.	H/V LOCATION
IC1	1130010800	S.IC LC75824W	B	80.9/24.4
IC2	1130008560	S.IC TC75S51F (TE85L)	B	25.4/22.7
Q1	1590000720	S.TR DTA144EUA T106	B	52.8/22.4
Q2	1590000430	S.TR DTC144EUA T106	B	55.8/22.3
Q3	1590000430	S.TR DTC144EUA T106	B	55.9/25.4
Q4	1590000720	S.TR DTA144EUA T106	B	52.8/25.5
D1	1790001670	S.DIO RB706F-40T106	T	9.8/6.4
D2	1790001670	S.DIO RB706F-40T106	B	11/27.2
D3	1790001670	S.DIO RB706F-40T106	B	16.1/21.2
D4	1790001250	S.DIO MA2S111-(TX)	B	56.6/17.4
D5	1790001250	S.DIO MA2S111-(TX)	B	62.1/18
D6	1790001250	S.DIO MA2S111-(TX)	B	62.7/15
L1	6200003960	S.COL MLF1608A 1R0K-T	T	13.7/17.6
R1	7030003440	S.RES ERJ3GEYJ 102 V (1 kΩ)	T	7.1/17.6
R2	7030003440	S.RES ERJ3GEYJ 102 V (1 kΩ)	B	15.5/18.2
R3	7030003390	S.RES ERJ3GEYJ 391 V (390 Ω)	B	48.1/21
R4	7030003390	S.RES ERJ3GEYJ 391 V (390 Ω)	B	101.6/21.2
R5	7030003520	S.RES ERJ3GEYJ 472 V (4.7 kΩ)	B	31.4/23.2
R6	7030003440	S.RES ERJ3GEYJ 102 V (1 kΩ)	B	65.9/5.5
R7	7030000330	S.RES MCR10EZJH 390 Ω (391)	B	53.4/20.2
R8	7410000950	S.ARY EXB-V8V 102JV	B	72.6/20.5
R9	7410000770	S.ARY EXB-V4V 102JV (1 kΩ)	B	54.8/27.8
R10	7030003680	S.RES ERJ3GEYJ 104 V (100 kΩ)	B	18.1/18.2
R11	7030003680	S.RES ERJ3GEYJ 104 V (100 kΩ)	B	11/25.3
R12	7210003020	VAR EVU-F2KFK1 B14 (10KB)		
R13	7030003730	S.RES ERJ3GEYJ 274 V (270 kΩ)	B	76.5/14
R14	7030003680	S.RES ERJ3GEYJ 104 V (100 kΩ)	T	11.8/6.4
R16	7030003440	S.RES ERJ3GEYJ 102 V (1 kΩ)	B	32.3/10.1
R17	7030003560	S.RES ERJ3GEYJ 103 V (10 kΩ)	B	82.3/14
R18	7030003560	S.RES ERJ3GEYJ 103 V (10 kΩ)	B	80.3/16
R19	7030003560	S.RES ERJ3GEYJ 103 V (10 kΩ)	B	78.4/14
R20	7030003510	S.RES ERJ3GEYJ 392 V (3.9 kΩ)	B	21.7/20.4
R21	7030003800	S.RES ERJ3GEYJ 105 V (1 MΩ)	B	23/23.2
R22	7030003560	S.RES ERJ3GEYJ 103 V (10 kΩ)	B	28.5/20.2
R23	7030003560	S.RES ERJ3GEYJ 103 V (10 kΩ)	B	25.8/20.2
R24	7030003480	S.RES ERJ3GEYJ 222 V (2.2 kΩ)	B	19.8/25.5
R25	7030003640	S.RES ERJ3GEYJ 473 V (47 kΩ)	T	18.2/20
C1	4030007090	S.CER C1608 CH 1H 470J-T	B	69.6/30.3
C2	4030007090	S.CER C1608 CH 1H 470J-T	B	68.3/30.3
C3	4030007090	S.CER C1608 CH 1H 470J-T	B	67/30.3
C4	4030007090	S.CER C1608 CH 1H 470J-T	B	65.7/30.3
C5	4030007090	S.CER C1608 CH 1H 470J-T	B	64.4/30.3
C6	4030007090	S.CER C1608 CH 1H 470J-T	B	63.1/30.3
C7	4030007090	S.CER C1608 CH 1H 470J-T	B	61.8/30.3
C8	4030007090	S.CER C1608 CH 1H 470J-T	B	60.5/30.3
C9	4030007090	S.CER C1608 CH 1H 470J-T	B	59.2/30.3
C10	4030007090	S.CER C1608 CH 1H 470J-T	B	59.5/21.5
C11	4030007090	S.CER C1608 CH 1H 470J-T	B	60.8/21.5
C12	4030007090	S.CER C1608 CH 1H 470J-T	B	62.1/21.5
C13	4030007090	S.CER C1608 CH 1H 470J-T	B	63.4/21.5
C14	4030007090	S.CER C1608 CH 1H 470J-T	B	64.7/21.5
C15	4030007090	S.CER C1608 CH 1H 470J-T	B	66/21.5
C16	4030007090	S.CER C1608 CH 1H 470J-T	B	67.3/21.5
C17	4030007090	S.CER C1608 CH 1H 470J-T	B	68.6/21.5
C18	4030007090	S.CER C1608 CH 1H 470J-T	B	16.8/18.2
C19	4030006860	S.CER C1608 JB 1H 102K-T	T	16.3/17.6
C20	4030006860	S.CER C1608 JB 1H 102K-T	B	9.3/17.2
C21	4030007090	S.CER C1608 CH 1H 470J-T	B	9/9.9
C22	4030007090	S.CER C1608 CH 1H 470J-T	T	4.5/17.6
C23	4030007090	S.CER C1608 CH 1H 470J-T	B	6.5/9.9
C24	4030007090	S.CER C1608 CH 1H 470J-T	B	72.1/5.5
C25	4030007090	S.CER C1608 CH 1H 470J-T	B	90.8/7.4
C26	4030007090	S.CER C1608 CH 1H 470J-T	B	122.6/25.6
C27	4030007090	S.CER C1608 CH 1H 470J-T	B	122.6/30.4
C28	4030007090	S.CER C1608 CH 1H 470J-T	B	122.6/15.6
C29	4030007090	S.CER C1608 CH 1H 470J-T	B	110.6/2.8
C30	4030011600	S.CER C1608 JB 1E 104K-T	B	79.7/14
C31	4030011600	S.CER C1608 JB 1E 104K-T	B	83.6/14
C32	4030011600	S.CER C1608 JB 1E 104K-T	B	81/14
C33	4030007130	S.CER C1608 CH 1H 101J-T	B	76.5/15.3
C34	4030007090	S.CER C1608 CH 1H 470J-T	B	29.5/10.1
C35	4030007090	S.CER C1608 CH 1H 470J-T	B	70.9/30.3
C37	4550000550	S.TAN TEESVA 1V 224M8L	B	19.8/22.1
C39	4030006900	S.CER C1608 JB 1H 103K-T	B	27.8/24.2
C40	4550005980	S.TAN TEESVA 1A 475M8L	B	20.8/28.6

[FRONT UNIT]

REF NO.	ORDER NO.	DESCRIPTION	M.	H/V LOCATION
C41	4030006860	S.CER C1608 JB 1H 102K-T	B	19/27.4
J1	6450002210	CNR 3017-8821 <KIN>		
J2	6510023090	S.CNR 20FLT-SM1-TB	B	64.5/25.9
DS1	5040002310	S.LED SML-311YTT86	T	46.1/22.8
DS2	5040002310	S.LED SML-311YTT86	T	57.7/22.8
DS3	5040002310	S.LED SML-311YTT86	T	69.3/22.8
DS4	5040002310	S.LED SML-311YTT86	T	104.1/22.8
DS5	5040002310	S.LED SML-311YTT86	T	92.5/22.8
DS6	5040002310	S.LED SML-311YTT86	T	81/22.8
DS7	5040002310	S.LED SML-311YTT86	T	28.2/23.2
DS8	5040002310	S.LED SML-311YTT86	T	35/5.3
DS9	5040002310	S.LED SML-311YTT86	T	66.5/4.7
DS10	5040002310	S.LED SML-311YTT86	T	100.5/4.7
DS11	5040002310	S.LED SML-311YTT86	T	122/23.2
DS12	5030002780	LCD L-0483TAT-1	T	
W1	8900010950	CBL OPC-1126 (P=0.5 N=20 L=90)		
EP2	8930057820	LCT SRCN-2526-SP-N-W		

[MAIN UNIT]

REF NO.	ORDER NO.	DESCRIPTION	M.	H/V LOCATION
IC1	1110003490	S.IC TA31136FN (D,EL)	T	101.7/49.9
IC2	1130008560	S.IC TC75S51F (TE85L)	T	55.9/67.4
IC3	1150002031	IC RA30H4452M-21 [M-25W], [H]		
	1150002061	IC RA45H4452M-21 [M-45W]		
	1150002091	IC RA30H4047M-21 [L]		
IC4	1130010810	S.IC SA7026DH-T	T	82.1/39.4
IC5	1110005330	S.IC NJM12904V-TE1	T	82.2/21.9
IC6	1190001350	S.IC M62364FP 600D	T	103.2/29.5
IC7	1190001340	S.IC M62334FP 600C	T	81.4/61.1
IC8	1110003090	IC LA4425A		
IC9	1180001250	S.IC TA7808F (TE16L)	T	21.4/71.1
IC10	1180000970	S.IC AN78L05M-(E1)	B	49.7/74
IC11	1130008560	S.IC TC75S51F (TE85L)	B	106.7/40.7
IC14	1130009330	S.IC TC35453F (BR,DRY)	B	108.1/11.6
IC15	1130006220	S.IC TC4W53FU (TE12L)	B	113.5/21.7
IC18	1110002750	S.IC TA75S01F (TE85R)	B	18.1/57.2
IC19	1130009700	S.IC LC73872M-TRM	B	93.2/9
IC20	1140010190	S.IC HD64F2268TF	B	44.1/34.4
IC21	1110005340	S.IC NJM12902V-TE1	B	101.4/27.6
IC22	1130004200	S.IC TC4S66F (TE85R)	T	75.2/23.7
IC23	1140009240	S.IC HN58X24128FPI	T	55.4/20.6
IC24	1110005770	S.IC S-80942CNMC-G9C-T2	T	46.2/45.8
IC25	1130004200	S.IC TC4S66F (TE85R)	T	92.2/30
Q1	1560000840	S.FET 2SK1829 (TE85R)	T	92.5/50.8
Q2	1580000730	S.FET 3SK293 (TE85L)	B	90.4/53.1
Q3	1580000660	S.FET 3SK272-(TX)	B	78.3/52.5
Q4	1530002600	S.TR 2SC4215-O (TE85R)	B	93.2/48.6
Q5	1530002850	S.TR 2SC4116-BL (TE85R)	T	97.7/55.7
Q6	1590000720	S.TR DTA144EUA T106	B	92.7/32.6
Q8	1530000372	S.TR 2SC3356-T1B R (R24)	B	47.3/62.9
Q9	1530003310	S.TR 2SC5107-O (TE85R)	B	52.5/62
Q10	1530003310	S.TR 2SC5107-O (TE85R)	T	61.1/47.4
Q11	1530003310	S.TR 2SC5107-O (TE85R)	T	68.3/43.3
Q12	1530003310	S.TR 2SC5107-O (TE85R)	T	71/44.8
Q13	1530002920	S.TR 2SC4226-T1 R25	T	71.6/41.1
Q14	1530002920	S.TR 2SC4226-T1 R25	T	61.9/41.1
Q15	1590001400	S.TR XP1214 (TX)	B	68.5/38.5
Q16	1590000430	S.TR DTC144EUA T106	B	73.1/25.6
Q17	1530002850	S.TR 2SC4116-BL (TE85R)	B	55.7/47.2
Q18	1560000540	S.FET 2SK880-Y (TE85R)	B	79.7/30.1
Q19	1530002600	S.TR 2SC4215-O (TE85R)	B	96.3/42.2
Q20	1530003090	S.TR 2SC4213-B (TE85R)	B	114.1/25
Q21	1530002850	S.TR 2SC4116-BL (TE85R)	T	114.3/22.9
Q22	1590000430	S.TR DTC144EUA T106	B	92.4/29.9
Q23	1550000200	S.FET 2SJ377 (TE16L)	T	10/70.3

M.=Mounted side (T: Mounted on the Top side, B: Mounted on the Bottom side)
S.=Surface mount

[MAIN UNIT]

REF NO.	ORDER NO.	DESCRIPTION	M.	H/V LOCATION
Q24	1590000430	S.TR DTC144EUA T106	T	16.7/68.3
Q25	1540000550	S.TR 2SD1664 T100Q	B	26.2/58.6
Q26	1540000550	S.TR 2SD1664 T100Q	B	31.2/58.6
Q27	1520000460	S.TR 2SB1132 T100 R	B	36.2/58.6
Q28	1590001190	S.TR XP6501-(TX) .AB	B	39.2/61.9
Q29	1590000430	S.TR DTC144EUA T106	T	26.5/56.9
Q30	1590000430	S.TR DTC144EUA T106	T	34.7/56.3
Q31	1590001450	S.FET 2SJ144-GR (TE85R)	B	13.7/28.7
Q32	1590000430	S.TR DTC144EUA T106	B	11.4/16.6
Q33	1590000430	S.TR DTC144EUA T106	B	11.1/13.9
Q34	1530002850	S.TR 2SC4116-BL (TE85R)	T	100.7/41.7
Q35	1590001400	S.TR XP1214 (TX)	T	84.7/27.1
Q36	1530002850	S.TR 2SC4116-BL (TE85R)	T	113.5/37.4
Q37	1530002850	S.TR 2SC4116-BL (TE85R)	T	89.4/15.8
Q38	1590000430	S.TR DTC144EUA T106	T	92/18.2
Q39	1590000990	S.TR DTC363EK T146	B	12/56.2
Q40	1590000430	S.TR DTC144EUA T106	B	12.9/50.6
Q41	1590000720	S.TR DTA144EUA T106	T	40.6/43.4
Q42	1590000430	S.TR DTC144EUA T106	T	37.9/45.2
Q43	1590000430	S.TR DTC144EUA T106	B	85.8/7.2
Q44	1590000430	S.TR DTC144EUA T106	T	46.8/27.1
Q48	1590000430	S.TR DTC144EUA T106	B	3.5/18.6
Q49	1590000430	S.TR DTC144EUA T106	B	90.3/26.5
Q50	1590000430	S.TR DTC144EUA T106	B	87.1/19.8
Q51	1530002850	S.TR 2SC4116-BL (TE85R) [45W] only	T	61/61.5
D1	1790000660	S.DIO MA728 (TX)	B	113.6/88.8
D2	1750000510	S.DIO UM9401F [25W] only	T	100/69.7
D3	1710001060	DIO XB15A407 [45W] only		
D4	1750000710	S.VCP HVC350BTRF	B	91.2/56.9
D5	1750000510	S.DIO UM9401F	T	95.7/65.6
D6	1790000620	S.DIO MA77 (TX)	T	88/63.8
D8	1750000710	S.VCP HVC350BTRF	B	94.7/59.4
D9	1750000710	S.VCP HVC350BTRF	B	85.9/57.3
D10	1750000710	S.VCP HVC350BTRF	B	83.5/56.1
D11	1790000660	S.DIO MA728 (TX)	B	108.6/74
D14	1790000620	S.DIO MA77 (TX)	B	57.9/57.8
D15	1790000620	S.DIO MA77 (TX)	B	61.9/48.2
D16	1750000710	S.VCP HVC350BTRF	T	73.9/32.7
D17	1750000710	S.VCP HVC350BTRF	T	59.4/32.7
D18	1720000570	S.VCP MA368 (TX)	B	63.1/37.4
D19	1790001250	S.DIO MA2S111-(TX)	B	55.8/50.4
D20	1790001250	S.DIO MA2S111-(TX)	B	94.3/37
D21	1750000830	S.VCP HVC362TRF	B	104.2/37.8
D22	1790000700	DIO DSA3A1		
D23	1750000370	S.DIO DA221 TL	B	26.2/63.4
D24	1750000370	S.DIO DA221 TL	B	31.2/63.4
D25	1790001250	S.DIO MA2S111-(TX)	T	94.5/53.5
D26	1790001250	S.DIO MA2S111-(TX)	B	11.9/30.6
D27	1790000620	S.DIO MA77 (TX)	T	49.4/38.9
D28	1750000520	S.DIO DAN222TL	T	34.1/41.8
D30	1790001250	S.DIO MA2S111-(TX)	B	13.1/53.3
D31	1750000520	S.DIO DAN222TL	B	13.5/47.5
D32	1790001250	S.DIO MA2S111-(TX)	T	57.5/72.4
D33	1790001250	S.DIO MA2S111-(TX)	T	60.3/63.4
D34	1790001250	S.DIO MA2S111-(TX)	T	49.8/8.2
D35	1750000520	S.DIO DAN222TL	T	44.4/27.1
D36	1750000520	S.DIO DAN222TL	T	36.8/18.6
D37	1750000520	S.DIO DAN222TL	T	36.9/20.8
FI1	2010002450	S.XTL FL-313 (46.35 MHz) [USA], [GEN]	T	86.2/46.6
	2030000150	S.MLH FL-335 (46.350 MHz) [EUR]	T	86.2/46.6
FI2	2020001840	CER ALFYM450F-K		
FI3	2040001440	S.LC NFE31PT152Z1E9L	B	65.3/70
FI4	2040001440	S.LC NFE31PT152Z1E9L	B	65.3/66.7
FI5	2040001440	S.LC NFE31PT152Z1E9L [45W] only	B	65.3/63.4
X1	6070000190	S.DCR CDBC450KAY24-R0	T	104.1/57.4
X2	6050011120	S.XTL CR-671A (15.300 MHz)	B	98.6/37.5
X3	6050009910	S.XTL CR-563 (3.579545 MHz)	T	108.7/10.9
X4	6050009520	S.XTL CR-520 (19.6608 MHz)	T	44.1/34.4
L1	6110001520	COL LA-232 [25W]		
	6110002110	COL LA-382 [45W]		
L2	6110001520	COL LA-232		
L3	6110002110	COL LA-382		
L4	6200008330	S.COL 0.45-1.4-4TL 15N	T	99.6/66.6
L5	6170000230	COL LW-25		
L6	6200008330	S.COL 0.45-1.4-4TL 15N	T	92.7/64.9
L7	6200007230	S.COL LQW2BHN10NJ01L [L]	T	96.1/59
	6200007670	S.COL LQW2BHN10NJ01L [M], [H]	T	96.1/59
L8	6200007670	S.COL LQW2BHN10NJ01L [M], [H]	T	93.5/57.6
	6200007680	S.COL LQW2BHN10NJ01L [L]	T	93.5/57.6
L9	6200007670	S.COL LQW2BHN10NJ01L [M], [H]	T	86.1/55
	6200007680	S.COL LQW2BHN10NJ01L [L]	T	86.1/55
L11	6200007670	S.COL LQW2BHN10NJ01L [M], [H]	T	82.4/55
	6200007680	S.COL LQW2BHN10NJ01L [L]	T	82.4/55
L12	6200005700	S.COL ELJRE 22NG-F [EUR-M]	B	77.7/55.2
	6200005720	S.COL ELJRE 33NG-F except [EUR-M]	B	77.7/55.2

[MAIN UNIT]

REF NO.	ORDER NO.	DESCRIPTION	M.	H/V LOCATION	
L13	6200003350	S.COL ELJNC R27K-F			
L16	6110001520	COL LA-232 [25W]	B	81.2/49.7	
	6110002110	COL LA-382 [45W]			
L18	6200005680	S.COL ELJRE 15NG-F [M], [H]	T	40.3/67.5	
	6200005690	S.COL ELJRE 18NG-F [L]	T	40.3/67.5	
L19	6200005680	S.COL ELJRE 15NG-F [M], [H]	B	46.5/59.9	
	6200005690	S.COL ELJRE 18NG-F [L]	B	46.5/59.9	
L20	6200005700	S.COL ELJRE 22NG-F [M], [H]	B	51.8/60.1	
	6200005710	S.COL ELJRE 27NG-F [L]	B	51.8/60.1	
L21	6200005700	S.COL ELJRE 22NG-F [M], [H]	T	58.7/44.7	
	6200005710	S.COL ELJRE 27NG-F [L]	T	58.7/44.7	
L22	6200005710	S.COL ELJRE 27NG-F			
L23	6200004950	S.COL NL 252018T-1R8J	B	63/39.7	
L24	6200004950	S.COL NL 252018T-1R8J	B	71.3/40.7	
L25	6200009360	S.COL 0.45-1.4-3TL 11N	T	67.9/36.1	
L26	6200009360	S.COL 0.45-1.4-3TL 11N	T	65.2/33.2	
L27	6200004950	S.COL NL 252018T-1R8J	T	60.4/32.7	
L28	6200004950	S.COL NL 252018T-1R8J	B	62.9/32.7	
L29	6200004950	S.COL NL 252018T-1R8J	T	84.6/34.6	
L31	6200007740	S.COL LQW2BHN47NJ01L	B	94.8/65	
L32	6200005680	S.COL ELJRE 15NG-F [M], [H]	B	75.5/42.8	
	6200005690	S.COL ELJRE 18NG-F [L]	B	75.5/42.8	
L33	6200002850	S.COL NL 252018T-R82J	T	105.3/44.1	
L35	6200002840	S.COL NL 252018T-R22J	T	97.8/43.2	
L36	6200002860	S.COL NL 252018T-4R7J	T	49.2/46	
L37	6200006980	S.COL ELJRE R10G-F	T	46.6/71.2	
L38	6200005690	S.COL ELJRE 18NG-F	B	71/48.6	
L39	6200007720	S.COL LQW2BHN33NJ01L [EUR] only	B	99/59.8	
R1	7030000620	S.RES MCR10EZHZH 100 kΩ	B	107.3/98.2	
R2	7030000260	S.RES MCR10EZHZH 100 Ω (101)	B	102.5/87.9	
R3	7030000220	S.RES MCR10EZHZH 47 Ω (470) [25W]	B	119.5/75.1	
	7030000280	S.RES MCR10EZHZH 150 Ω (151) [45W]	B	119.5/75.1	
R4	7030003320	S.RES ERJ3GEYJ 101 V (100 Ω)	B	111.5/89.8	
R5	7030003320	S.RES ERJ3GEYJ 101 V (100 Ω)	B	115.7/89.8	
R6	7030003320	S.RES ERJ3GEYJ 101 V (100 Ω)	B	106.5/73	
R7	7030003320	S.RES ERJ3GEYJ 101 V (100 Ω)	B	110.7/73	
	7030003340	S.RES ERJ3GEYJ 151 V (150 Ω) [25W]	B	110.7/73	
	7030001170	S.RES MCR50JZHZH 220 Ω (221) [45W]	B	83.5/67.1	
R8	7030001170	S.RES MCR50JZHZH 220 Ω (221)	B	83.5/64.1	
R10	7030003470	S.RES ERJ3GEYJ 182 V (1.8 kΩ)	T	93.2/53.3	
R11	7030003720	S.RES ERJ3GEYJ 224 V (220 kΩ)	B	93.4/59.3	
R12	7030003560	S.RES ERJ3GEYJ 103 V (10 kΩ)	B	91.5/61.1	
R13	7030003720	S.RES ERJ3GEYJ 224 V (220 kΩ)	B	89.9/56.9	
R14	7030003560	S.RES ERJ3GEYJ 103 V (10 kΩ)	B	88.8/59.6	
R15	7030003670	S.RES ERJ3GEYJ 823 V (82 kΩ)	B	93.1/53.5	
R16	7030003340	S.RES ERJ3GEYJ 151 V (150 Ω)	B	87.8/55	
R17	7030004050	S.RES ERJ3GEYJ 1R0 V (1 Ω)	B	87.7/52.3	
R18	7030003560	S.RES ERJ3GEYJ 103 V (10 kΩ)	T	89.2/50.7	
R19	7030003720	S.RES ERJ3GEYJ 224 V (220 kΩ)	B	92.3/51.6	
R20	7030003440	S.RES ERJ3GEYJ 102 V (1 kΩ)	T	84.4/55	
R21	7030003720	S.RES ERJ3GEYJ 224 V (220 kΩ)	B	84.6/58	
R22	7030003560	S.RES ERJ3GEYJ 103 V (10 kΩ)	B	83.8/59.9	
R23	7030003720	S.RES ERJ3GEYJ 224 V (220 kΩ)	B	83.3/58	
R24	7030003560	S.RES ERJ3GEYJ 103 V (10 kΩ)	B	80.1/58.8	
R25	7030003520	S.RES ERJ3GEYJ 472 V (4.7 kΩ)	B	80.8/54.7	
R29	7030003330	S.RES ERJ3GEYJ 121 V (120 Ω)	[W/N]	B	75.8/51.7
	7030003360	S.RES ERJ3GEYJ 221 V (220 Ω)	[M/N]	B	75.8/51.7
R30	7030003440	S.RES ERJ3GEYJ 102 V (1 kΩ)	B	81.6/47.8	
R31	7030003320	S.RES ERJ3GEYJ 101 V (100 Ω)	T	84.6/51.4	
R32	7030003320	S.RES ERJ3GEYJ 101 V (100 Ω)	T	80.5/48.2	
R33	7030003340	S.RES ERJ3GEYJ 151 V (150 Ω)	B	89.7/45.9	
R34	7030003690	S.RES ERJ3GEYJ 124 V (120 kΩ)	B	94.2/46.7	
R35	7030003440	S.RES ERJ3GEYJ 102 V (1 kΩ)	B	94.2/51.8	
R36	7030003510	S.RES ERJ3GEYJ 392 V (3.9 kΩ)	T	108.2/53.4	
R37	7030003500	S.RES ERJ3GEYJ 332 V (3.3 kΩ)	[W/N]	T	95.8/53.7
	7030003520	S.RES ERJ3GEYJ 472 V (4.7 kΩ)	[M/N]	T	95.8/53.7
R38	7030003680	S.RES ERJ3GEYJ 104 V (100 kΩ)	B	100.1/47.5	
R39	7030003280	S.RES ERJ3GEYJ 470 V (47 Ω)	T	101.5/45.1	
R40	7030003460	S.RES ERJ3GEYJ 152 V (1.5 kΩ)	T	103/46.4	
R41	7030003640	S.RES ERJ3GEYJ 473 V (47 kΩ)	B	93.8/55.7	
R42	7030003640	S.RES ERJ3GEYJ 473 V (47 kΩ)	B	99.8/57.5	
R43	7030003400	S.RES ERJ3GEYJ 471 V (470 Ω)	B	99.8/53.7	
R44	7030003640	S.RES ERJ3GEYJ 473 V (47 kΩ)	B	103.7/52	
R45	7030003620	S.RES ERJ3GEYJ 333 V (33 kΩ)	B	103.7/55.4	
R46	7030003460	S.RES ERJ3GEYJ 152 V (1.5 kΩ)	B	107.1/54.5	
R47	7030003500	S.RES ERJ3GEYJ 332 V (3.3 kΩ)	B	107/57.7	
R50	7030003560	S.RES ERJ3GEYJ 103 V (10 kΩ)	B	64.2/45.9	
R52	7030003560	S.RES ERJ3GEYJ 103 V (10 kΩ)	T	60.3/65.3	
R53	7030003320	S.RES ERJ3GEYJ 101 V (100 Ω)	T	54.6/65	
R54	7030003560	S.RES ERJ3GEYJ 103 V (10 kΩ)	T	58.3/69.2	
R55	7030003440	S.RES ERJ3GEYJ 102 V (1 kΩ)	[M], [H]	T	54.9/72.4
	7030003480	S.RES ERJ3GEYJ 222 V (2.2 kΩ)	[L]	T	54.9/72.4
R56	7030003700	S.RES ERJ3GEYJ 154 V (150 kΩ)	T	56.2/69.8	
R57	7030003560	S.RES ERJ3GEYJ 103 V (10 kΩ)	T	58.8/71.1	
R58	7030003280	S.RES ERJ3GEYJ 470 V (47 Ω)	[L]	T	53.6/69.8
	7030003320	S.RES ERJ3GEYJ 101 V (100 Ω)	[M], [H]	T	53.6/69.8
R59	7030003560	S.RES ERJ3GEYJ 103 V (10 kΩ)	[25W]	T	60.3/66.6
	7030003570	S.RES ERJ3GEYJ 123 V (12 kΩ)	[45W]	T	60.3/66.6
R61	7030003290	S.RES ERJ3GEYJ 560 V (56 Ω)	[25W]	B	49.1/56.9
	7030003340	S.RES ERJ3GEYJ 151 V (150 Ω)	[45W]	B	49.1/56.9

M.=Mounted side (T: Mounted on the Top side, B: Mounted on the Bottom side)
S.=Surface mount

[MAIN UNIT]

REF NO.	ORDER NO.	DESCRIPTION	M.	H/V LOCATION
R62	7030003570	S.RES ERJ3GEYJ 123 V (12 kΩ)	[25W] T	50/64.7
	7030003600	S.RES ERJ3GEYJ 223 V (22 kΩ)	[45W] T	50/64.7
R65	7030003340	S.RES ERJ3GEYJ 151 V (150 Ω)	[45W] B	52.6/56.9
	7030003360	S.RES ERJ3GEYJ 221 V (220 Ω)	[25W] B	52.6/56.9
R66	7030003680	S.RES ERJ3GEYJ 104 V (100 kΩ)	B	53.1/63.9
R67	7030003560	S.RES ERJ3GEYJ 103 V (10 kΩ)	B	57.1/60
R68	7030003440	S.RES ERJ3GEYJ 102 V (1 kΩ)	B	56.3/58.1
R69	7030003520	S.RES ERJ3GEYJ 472 V (4.7 kΩ)	B	58.6/53.4
R70	7030003320	S.RES ERJ3GEYJ 101 V (100 Ω)	T	63.2/44.1
R71	7030003260	S.RES ERJ3GEYJ 330 V (33 Ω)	T	63.9/46.7
R72	7030003400	S.RES ERJ3GEYJ 471 V (470 Ω)	T	66.5/45.4
R73	7030003360	S.RES ERJ3GEYJ 221 V (220 Ω)	T	63.9/45.4
R74	7030003660	S.RES ERJ3GEYJ 683 V (68 kΩ)	[M], [H] T	65.1/42.8
	7030003680	S.RES ERJ3GEYJ 104 V (100 kΩ)	[L] T	65.1/42.8
R75	7030003700	S.RES ERJ3GEYJ 154 V (150 kΩ)	T	69.7/47.3
R76	7030003360	S.RES ERJ3GEYJ 221 V (220 Ω)	T	67.8/48
R77	7030003560	S.RES ERJ3GEYJ 103 V (10 kΩ)	B	75.2/25.7
R78	7030003410	S.RES ERJ3GEYJ 561 V (560 Ω)	B	66/39.7
R79	7030005341	S.RES ERA3YED 332V	T	64.5/38.6
R80	7030003440	S.RES ERJ3GEYJ 102 V (1 kΩ)	B	68.8/40.5
R81	7030003200	S.RES ERJ3GEYJ 100 V (10 Ω)	T	62.1/39.1
R82	7030004040	S.RES ERJ3GEYJ 4R7 V (4.7 Ω)	T	69.7/39.7
R83	7030005341	S.RES ERA3YED 332V	T	68.4/40.5
R84	7030005341	S.RES ERA3YED 332V	T	67.8/38.2
R85	7030005341	S.RES ERA3YED 332V	T	65.8/36.7
R86	7030003720	S.RES ERJ3GEYJ 224 V (220 kΩ)	B	66.6/36.6
R88	7030003580	S.RES ERJ3GEYJ 153 V (15 kΩ)	T	86.5/37
R89	7030003560	S.RES ERJ3GEYJ 103 V (10 kΩ)	B	76.8/30.1
R90	7030003680	S.RES ERJ3GEYJ 104 V (100 kΩ)	B	66.2/29
R91	7030003600	S.RES ERJ3GEYJ 223 V (22 kΩ)	B	69.4/27.6
	7030003640	S.RES ERJ3GEYJ 473 V (47 kΩ)	[M], [H] B	69.4/27.6
	7030003690	S.RES ERJ3GEYJ 124 V (120 kΩ)	[L] B	78.9/28.2
R92	7030003280	S.RES ERJ3GEYJ 470 V (47 Ω)	B	68.1/32
R93	7030003280	S.RES ERJ3GEYJ 470 V (47 Ω)	B	66/32.7
R94	7030003400	S.RES ERJ3GEYJ 471 V (470 Ω)	B	75.8/38
R95	7030003520	S.RES ERJ3GEYJ 472 V (4.7 kΩ)	B	75.5/36
R96	7030003200	S.RES ERJ3GEYJ 100 V (10 Ω)	B	76.8/36
R97	7030003480	S.RES ERJ3GEYJ 222 V (2.2 kΩ)	B	55.8/49.1
R98	7030003440	S.RES ERJ3GEYJ 102 V (1 kΩ)	B	81.7/31.5
R99	7030003640	S.RES ERJ3GEYJ 473 V (47 kΩ)	B	83/31.5
R100	7030003440	S.RES ERJ3GEYJ 102 V (1 kΩ)	B	83.6/29.5
R101	7030003580	S.RES ERJ3GEYJ 153 V (15 kΩ)	T	89.1/37
R102	7030003450	S.RES ERJ3GEYJ 122 V (1.2 kΩ)	B	93/42.2
R103	7030003640	S.RES ERJ3GEYJ 473 V (47 kΩ)	B	94.3/39.6
R104	7030003670	S.RES ERJ3GEYJ 823 V (82 kΩ)	B	96.3/40.3
R105	7030003640	S.RES ERJ3GEYJ 473 V (47 kΩ)	B	106.3/37
R106	7030003640	S.RES ERJ3GEYJ 473 V (47 kΩ)	B	110.5/40.7
R107	7030003600	S.RES ERJ3GEYJ 223 V (22 kΩ)	B	87.3/41.5
R108	7410000950	S.ARY EXB-V8V 102JV	T	99.1/42.2
R109	7030003280	S.RES ERJ3GEYJ 470 V (47 Ω)	T	99.2/20.3
R110	7030003600	S.RES ERJ3GEYJ 223 V (22 kΩ)	T	101.8/20.3
R111	7030003560	S.RES ERJ3GEYJ 103 V (10 kΩ)	T	106.5/17.7
R112	7030003750	S.RES ERJ3GEYJ 394 V (390 kΩ)	B	108.4/22.5
R113	7030003570	S.RES ERJ3GEYJ 123 V (12 kΩ)	B	107.7/25.7
R114	7030003460	S.RES ERJ3GEYJ 152 V (1.5 kΩ)	B	105.8/25.1
R115	7030003530	S.RES ERJ3GEYJ 562 V (5.6 kΩ)	B	111.6/25.4
R116	7030003660	S.RES ERJ3GEYJ 683 V (68 kΩ)	B	111.6/24.1
R117	7030003710	S.RES ERJ3GEYJ 184 V (180 kΩ)	B	116.6/24.1
R118	7030003680	S.RES ERJ3GEYJ 104 V (100 kΩ)	T	118.4/24.9
R119	7030003560	S.RES ERJ3GEYJ 103 V (10 kΩ)	T	115.8/26.2
R120	7030003640	S.RES ERJ3GEYJ 103 V (10 kΩ)	T	118.2/21.3
R121	7030003560	S.RES ERJ3GEYJ 103 V (10 kΩ)	T	114.4/20.8
R122	7030003600	S.RES ERJ3GEYJ 223 V (22 kΩ)	T	111/23.1
R123	7030003600	S.RES ERJ3GEYJ 223 V (22 kΩ)	B	118.7/19.4
R124	7030003600	S.RES ERJ3GEYJ 223 V (22 kΩ)	B	115.4/15.6
R125	7030003640	S.RES ERJ3GEYJ 473 V (47 kΩ)	T	111/21.7
R126	7030003760	S.RES ERJ3GEYJ 474 V (470 kΩ)	T	109.1/17.7
R127	7030003610	S.RES ERJ3GEYJ 273 V (27 kΩ)	B	106.4/19.9
R128	7030003660	S.RES ERJ3GEYJ 683 V (68 kΩ)	T	104.6/17
R129	7030003650	S.RES ERJ3GEYJ 563 V (56 kΩ)	B	102.4/17.5
R130	7030003720	S.RES ERJ3GEYJ 224 V (220 kΩ)	B	100.7/15.6
R131	7030003700	S.RES ERJ3GEYJ 154 V (150 kΩ)	B	98.1/12.6
R132	7030003680	S.RES ERJ3GEYJ 104 V (100 kΩ)	B	100.7/11.5
R133	7030003440	S.RES ERJ3GEYJ 102 V (1 kΩ)	T	102.1/10.8
R134	7410000770	S.ARY EXB-V4V 102JV (1 kΩ)	T	104.1/5.8
R135	7030003640	S.RES ERJ3GEYJ 473 V (47 kΩ)	T	27.7/15.8
R136	7030003640	S.RES ERJ3GEYJ 473 V (47 kΩ)	T	26.4/15.8
R137	7030003640	S.RES ERJ3GEYJ 473 V (47 kΩ)	T	25.1/15.8
R138	7410000750	S.ARY EXB-V4V 104JV (100 kΩ)	B	21.7/7.6
R139	7410000750	S.ARY EXB-V4V 104JV (100 kΩ)	T	25/10.7
R140	7410000750	S.ARY EXB-V4V 104JV (100 kΩ)	T	45.8/17
R141	7410000750	S.ARY EXB-V4V 104JV (100 kΩ)	T	41.7/8
R142	7410000750	S.ARY EXB-V4V 104JV (100 kΩ)	T	43.8/8
R143	7030003680	S.RES ERJ3GEYJ 104 V (100 kΩ)	B	88/5.4
R144	7410000750	S.ARY EXB-V4V 104JV (100 kΩ)	T	40.6/41.1
R145	7030003680	S.RES ERJ3GEYJ 104 V (100 kΩ)	T	40/30.1
R146	7030003680	S.RES ERJ3GEYJ 103 V (10 kΩ)	B	89.7/23.9
R147	7030003680	S.RES ERJ3GEYJ 104 V (100 kΩ)	T	72.3/26.5
R148	7410000750	S.ARY EXB-V4V 104JV (100 kΩ)	T	49.8/26.6
R149	7410000750	S.ARY EXB-V4V 104JV (100 kΩ)	T	37/16.1
R150	7030003680	S.RES ERJ3GEYJ 104 V (100 kΩ)	T	49.3/29.1
R151	7410000750	S.ARY EXB-V4V 104JV (100 kΩ)	T	23.1/41.1
R152	7410000750	S.ARY EXB-V4V 104JV (100 kΩ)	B	23.4/46.2

[MAIN UNIT]

REF NO.	ORDER NO.	DESCRIPTION	M.	H/V LOCATION
R156	7030003520	S.RES ERJ3GEYJ 472 V (4.7 kΩ)	B	40.9/63.8
R157	7030003560	S.RES ERJ3GEYJ 103 V (10 kΩ)	T	41.4/18.7
R158	7030003560	S.RES ERJ3GEYJ 103 V (10 kΩ)	T	42.4/26.6
R159	7030003560	S.RES ERJ3GEYJ 103 V (10 kΩ)	T	15.1/54.6
R173	7030003800	S.RES ERJ3GEYJ 105 V (1 MΩ)	B	22/14
R174	7030003800	S.RES ERJ3GEYJ 105 V (1 MΩ)	B	23.3/12.7
R175	7030003800	S.RES ERJ3GEYJ 105 V (1 MΩ)	B	25.4/13.4
R176	7030003740	S.RES ERJ3GEYJ 334 V (330 kΩ)	B	27.3/14
R177	7030003740	S.RES ERJ3GEYJ 334 V (330 kΩ)	B	27.3/12.7
R178	7030003740	S.RES ERJ3GEYJ 334 V (330 kΩ)	B	27.3/11.4
R179	7030003620	S.RES ERJ3GEYJ 333 V (33 kΩ)	B	109/20.6
R180	7030003530	S.RES ERJ3GEYJ 562 V (5.6 kΩ)	B	111.6/19.3
R181	7030003660	S.RES ERJ3GEYJ 683 V (68 kΩ)	B	101.3/31
R182	7030003660	S.RES ERJ3GEYJ 683 V (68 kΩ)	B	96.8/30.9
R185	7030003620	S.RES ERJ3GEYJ 333 V (33 kΩ)	B	103.9/31
R186	7030003630	S.RES ERJ3GEYJ 393 V (39 kΩ)	B	105.8/29.8
R187	7030003650	S.RES ERJ3GEYJ 563 V (56 kΩ)	B	110.3/30.9
R188	7030003590	S.RES ERJ3GEYJ 183 V (18 kΩ)	B	110.3/28.3
R189	7030003610	S.RES ERJ3GEYJ 273 V (27 kΩ)	B	110.3/29.6
R190	7030004040	S.RES ERJ3GEYJ 4R7 V (4.7 Ω)	B	108.4/29.2
R191	7030003720	S.RES ERJ3GEYJ 224 V (220 kΩ)	B	20.5/56.8
R192	7030003720	S.RES ERJ3GEYJ 224 V (220 kΩ)	B	18.4/54.9
R193	7030003680	S.RES ERJ3GEYJ 104 V (100 kΩ)	B	15.7/56.5
R194	7030003480	S.RES ERJ3GEYJ 222 V (2.2 kΩ)	B	21.2/59.5
R195	7030003440	S.RES ERJ3GEYJ 102 V (1 kΩ)	B	14.1/58.4
R196	7030003600	S.RES ERJ3GEYJ 223 V (22 kΩ)	B	9.6/57.7
R197	7030003560	S.RES ERJ3GEYJ 103 V (10 kΩ)	B	9.1/55.4
R198	7030003560	S.RES ERJ3GEYJ 103 V (10 kΩ)	B	7/62.2
R199	7030003560	S.RES ERJ3GEYJ 103 V (10 kΩ)	T	3.6/89.6
R200	7030003560	S.RES ERJ3GEYJ 103 V (10 kΩ)	T	15.4/72.1
R201	7030003400	S.RES ERJ3GEYJ 471 V (470 Ω)	T	16.7/71.2
R202	7030000460	S.RES MCR10EZJH 4.7 kΩ	T	26.6/60.1
R203	7030000460	S.RES MCR10EZJH 4.7 kΩ	T	28.4/60.1
R204	7030000460	S.RES MCR10EZJH 4.7 kΩ	T	32/60.1
R205	7030000460	S.RES MCR10EZJH 4.7 kΩ	T	33.8/60.1
R206	7030003760	S.RES ERJ3GEYJ 474 V (470 kΩ)	T	94.5/50.9
R207	7030003720	S.RES ERJ3GEYJ 224 V (220 kΩ)	T	96.4/50.5
R208	7030004040	S.RES ERJ3GEYJ 4R7 V (4.7 Ω)	T	90.5/50.7
R209	7510001470	S.TMR NTCG20 4AG 473JT	B	91.6/35.5
R210	7030005871	S.RES ERA3YKD 104V (100 kΩ)	B	91.8/38.5
R215	7030003510	S.RES ERJ3GEYJ 392 V (3.9 kΩ)	T	96.3/27.3
R216	7030003620	S.RES ERJ3GEYJ 333 V (33 kΩ)	T	96.3/28.8
R217	7030003610	S.RES ERJ3GEYJ 273 V (27 kΩ)	T	34.4/43.7
R218	7030003610	S.RES ERJ3GEYJ 273 V (27 kΩ)	B	37.8/43.5
R219	7030003600	S.RES ERJ3GEYJ 223 V (22 kΩ)	T	110.6/32.8
R220	7030003650	S.RES ERJ3GEYJ 563 V (56 kΩ)	T	106.8/36
R222	7030003400	S.RES ERJ3GEYJ 471 V (470 Ω)	T	77.1/61.2
R223	7030003440	S.RES ERJ3GEYJ 102 V (1 kΩ)	B	10.3/29.3
R224	7030003280	S.RES ERJ3GEYJ 470 V (47 Ω)	B	13.8/26.8
R225	7030003560	S.RES ERJ3GEYJ 103 V (10 kΩ)	B	14/21.2
R226	7030003680	S.RES ERJ3GEYJ 104 V (100 kΩ)	B	12.9/31.9
R227	7030003800	S.RES ERJ3GEYJ 105 V (1 MΩ)	B	15.3/30.6
R228	7030003680	S.RES ERJ3GEYJ 104 V (100 kΩ)	B	13.8/25.5
R229	7030003800	S.RES ERJ3GEYJ 105 V (1 MΩ)	B	10.3/31.9
R230	7030003560	S.RES ERJ3GEYJ 103 V (10 kΩ)	T	111/20.3
R231	7030003440	S.RES ERJ3GEYJ 102 V (1 kΩ)	T	97/35.7
R232	7030003290	S.RES ERJ3GEYJ 560 V (56 Ω)	B	79.3/39.7
R233	7030003680	S.RES ERJ3GEYJ 104 V (100 kΩ)	B	117.4/22.2
R234	7030003640	S.RES ERJ3GEYJ 473 V (47 kΩ)	T	61.3/44.9
R235	7030003440	S.RES ERJ3GEYJ 102 V (1 kΩ)	B	67.4/45.3
R236	7030003450	S.RES ERJ3GEYJ 122 V (1.2 kΩ)	T	97.5/45.1
R237	7030003780	S.RES ERJ3GEYJ 684 V (680 kΩ)	T	95.6/41.1
R238	7030003680	S.RES ERJ3GEYJ 104 V (100 kΩ)	T	88.7/6.3
R239	7030003520	S.RES ERJ3GEYJ 472 V (4.7 kΩ)	T	23.9/56
R240	7030003680	S.RES ERJ3GEYJ 104 V (100 kΩ)	B	89.7/22.6
R241	7030003680	S.RES ERJ3GEYJ 104 V (100 kΩ)	B	93.4/21.3
R242	7030003630	S.RES ERJ3GEYJ 393 V (39 kΩ)	B	93.4/22.6

[MAIN UNIT]

REF NO.	ORDER NO.	DESCRIPTION	M.	H/V LOCATION
R267	7030003600	S.RES ERJ3GEYJ 223 V (22 kΩ)	B	53.1/28.8
R268	7030003650	S.RES ERJ3GEYJ 563 V (56 kΩ)	B	53.1/27.5
R269	7030003710	S.RES ERJ3GEYJ 184 V (180 kΩ)	B	51.3/26.2
R270	7030003640	S.RES ERJ3GEYJ 473 V (47 kΩ)	T	84.9/14.1
R271	7030003640	S.RES ERJ3GEYJ 473 V (47 kΩ)	T	86.2/14.1
R272	7030003640	S.RES ERJ3GEYJ 473 V (47 kΩ)	T	87.5/14.1
R273	7030003520	S.RES ERJ3GEYJ 472 V (4.7 kΩ)	T	92.1/13.8
R274	7030003640	S.RES ERJ3GEYJ 473 V (47 kΩ)	T	91.4/15.7
R275	7030003610	S.RES ERJ3GEYJ 273 V (27 kΩ)	T	92.9/15.7
		except [LTR]	T	50.5/36.8
R276	7030003570	S.RES ERJ3GEYJ 123 V (12 kΩ)	T	49/40.8
R277	7030003570	S.RES ERJ3GEYJ 123 V (12 kΩ)	T	45.8/39.7
R278	7030003570	S.RES ERJ3GEYJ 123 V (12 kΩ)	T	42.8/39
R280	7030003200	S.RES ERJ3GEYJ 100 V (10 Ω)	T	53.5/24.1
R281	7030003560	S.RES ERJ3GEYJ 103 V (10 kΩ)	T	51.1/20
R282	7030003680	S.RES ERJ3GEYJ 104 V (100 kΩ)	T	29.4/16.1
R284	7030003440	S.RES ERJ3GEYJ 102 V (1 kΩ)	T	94.5/20.9
R285	7030003520	S.RES ERJ3GEYJ 472 V (4.7 kΩ)	T	52.8/9
R286	7030003440	S.RES ERJ3GEYJ 102 V (1 kΩ)	B	15.4/51.3
R287	7030003560	S.RES ERJ3GEYJ 103 V (10 kΩ)	T	50.5/42.1
R288	7030003560	S.RES ERJ3GEYJ 103 V (10 kΩ)	T	89.1/54.1
R289	7030003320	S.RES ERJ3GEYJ 101 V (100 Ω)	B	95.2/48.6
R290	7030003400	S.RES ERJ3GEYJ 471 V (470 Ω)	B	64/26.8
R291	7030003680	S.RES ERJ3GEYJ 104 V (100 kΩ)	B	62.4/29.6
R292	7030003550	S.RES ERJ3GEYJ 822 V (8.2 kΩ)	B	42.5/8
R293	7410000950	S.ARY EXB-V8V 102JV	T	46.7/8
R294	7410000950	S.ARY EXB-V8V 102JV	T	43/17.4
R295	7410000950	S.ARY EXB-V8V 102JV	B	46/17.4
R296	7410000770	S.ARY EXB-V4V 102JV (1 kΩ)	B	35.5/55.1
R297	7030005651	S.RES ERA3YKD 304V (300 kΩ)	B	40.7/47.2
R298	7030005871	S.RES ERA3YKD 104V (100 kΩ)	T	43.9/43
R299	7030003680	S.RES ERJ3GEYJ 104 V (100 kΩ)	T	76.6/59.3
R302	7030003560	S.RES ERJ3GEYJ 103 V (10 kΩ)	T	11.1/10.4
R303	7030003680	S.RES ERJ3GEYJ 104 V (100 kΩ)	B	18.4/53.6
R304	7030003650	S.RES ERJ3GEYJ 563 V (56 kΩ)	B	107.2/38.3
R305	7030003720	S.RES ERJ3GEYJ 224 V (220 kΩ)	B	106.3/43.3
R306	7030003320	S.RES ERJ3GEYJ 101 V (100 Ω)	B	109.3/37.9
R307	7030003600	S.RES ERJ3GEYJ 223 V (22 kΩ)	B	104.4/59
R308	7030003380	S.RES ERJ3GEYJ 331 V (330 Ω)	T	43.8/64.3
R309	7030003380	S.RES ERJ3GEYJ 331 V (330 Ω)	[25W] T	43.8/64.3
	7030003430	S.RES ERJ3GEYJ 821 V (820 Ω)	[45W] T	43.8/64.3
R310	7030003230	S.RES ERJ3GEYJ 180 V (18 Ω)	[25W] T	43/66.2
	7030004030	S.RES ERJ3GEYJ 5R6 V (5.6 Ω)	[45W] T	42.5/64.3
R311	7030003380	S.RES ERJ3GEYJ 331 V (330 Ω)	[25W] T	42.5/64.3
	7030003430	S.RES ERJ3GEYJ 821 V (820 Ω)	[45W] T	83.6/11.5
R312	7030003510	S.RES ERJ3GEYJ 392 V (3.9 kΩ)	B	44.5/21.2
R316	7030003680	S.RES ERJ3GEYJ 104 V (100 kΩ)	T	89.1/29
R317	7030003680	S.RES ERJ3GEYJ 104 V (100 kΩ)	T	14.4/53.9
R318	7030003570	S.RES ERJ3GEYJ 123 V (12 kΩ)	B	96.3/17.8
R319	7030003640	S.RES ERJ3GEYJ 473 V (47 kΩ)	B	97.1/15.7
R320	7030003500	S.RES ERJ3GEYJ 332 V (3.3 kΩ)	B	86.5/22.4
R321	7030003660	S.RES ERJ3GEYJ 683 V (68 kΩ)	T	34.1/40.1
R322	7030003680	S.RES ERJ3GEYJ 104 V (100 kΩ)	T	57.8/64
R323	7030003680	S.RES ERJ3GEYJ 104 V (100 kΩ)	[45W] only T	60.9/69.2
R324	7030003640	S.RES ERJ3GEYJ 473 V (47 kΩ)	B	74.7/75.1
R325	7520000160	S.POS PRF21BD471QB3RA	[45W] only B	62.7/26.8
R326	7030003730	S.RES ERJ3GEYJ 274 V (270 kΩ)	B	106.9/100.2
C1	4030011090	S.CER GRM31M2C2H7R0DV01L	B	101/94.5
C2	4030011090	S.CER GRM31M2C2H7R0DV01L	B	109.6/89.1
C3	4030006860	S.CER C1608 JB 1H 102K-T	B	111.9/75.6
C4	4030011770	S.CER C1608 CH 1H 060B-T	B	112.6/73.7
C5	4030006860	S.CER C1608 JB 1H 102K-T	T	114.9/71
C6	4030011050	S.CER GRM31M3C2H3R0CY21L	T	113.4/69
C7	4030011080	S.CER GRM31M2C2H6R0DV01L	[M], [H] B	113.4/69
	4030011090	S.CER GRM31M2C2H7R0DV01L	[L] B	108.9/70
C8	4030011040	S.CER GRM31M4C2H2R0CY21L	T	99.7/64.1
C9	4030011080	S.CER GRM31M2C2H6R0DV01L	B	117.6/89
C10	4030006860	S.CER C1608 JB 1H 102K-T	B	104.6/73.8
C11	4030006860	S.CER C1608 JB 1H 102K-T	B	88.8/66.4
C12	4030006850	S.CER C1608 JB 1H 471K-T	B	79/63
C13	4030007090	S.CER C1608 CH 1H 470J-T	B	105.5/63.5
C14	4030011240	S.CER GRM31M2C2H470JV01L	[25W] only B	88.8/65.9
C15	4030011100	S.CER GRM31M2C2H8R0DV01L	T	111.5/62.5
C16	4030011020	S.CER GRM31M4C2H1R0CY21L	[M], [H] B	111.5/62.5
	4030011040	S.CER GRM31M4C2H2R0CY21L	[L] B	89/63
C17	4030007000	S.CER C1608 CH 1H 090D-T	[45W] B	89/63
	4030007010	S.CER C1608 CH 1H 100D-T	[25W] B	92.6/65.8
C18	4030009530	S.CER C1608 CH 1H 030B-T	[M], [H] B	92.6/65.8
	4030009910	S.CER C1608 CH 1H 040B-T	[L] B	92.6/63.8
C19	4030006860	S.CER C1608 JB 1H 102K-T	B	96.6/58.9
	4030007010	S.CER C1608 CH 1H 100D-T	[M], [H] B	96.6/58.9
	4030009920	S.CER C1608 CH 1H 050B-T	[L] B	96.6/60.2
C21	4030009540	S.CER C1608 CH 1H 1R5B-T	[M], [H] B	96.6/60.2
	4030009560	S.CER C1608 CH 1H 1R75B-T	[L] B	93.7/61.9
C22	4030009560	S.CER C1608 CH 1H 1R75B-T	B	95.4/57.6
C23	4030006860	S.CER C1608 JB 1H 102K-T	B	83.3/66.2
C24	4030006860	S.CER C1608 JB 1H 102K-T	T	97.3/62.1
C25	4030009550	S.CER C1608 CH 1H 2R5B-T	B	93.1/56.1
C26	4030006990	S.CER C1608 CH 1H 080D-T	[L] B	93.1/56.1
	4030007010	S.CER C1608 CH 1H 100D-T	[M], [H] B	

[MAIN UNIT]

REF NO.	ORDER NO.	DESCRIPTION	M.	H/V LOCATION
C27	4030006860	S.CER C1608 JB 1H 102K-T	B	90.7/58.8
C28	4030006860	S.CER C1608 JB 1H 102K-T	T	82/66.2
C29	4030009510	S.CER C1608 CH 1H 010B-T	[M], [H] B	93.1/57.4
	4030009530	S.CER C1608 CH 1H 030B-T	[L] B	93.1/57.4
C30	4030009920	S.CER C1608 CH 1H 050B-T	B	93.1/54.8
C32	4030006860	S.CER C1608 JB 1H 102K-T	B	87.7/53.7
C33	4030007090	S.CER C1608 CH 1H 470J-T	T	90.4/53.3
C34	4030006860	S.CER C1608 JB 1H 102K-T	T	91.7/53.3
C35	4030006860	S.CER C1608 JB 1H 102K-T	B	90.5/50.7
C36	4030009520	S.CER C1608 CH 1H 020B-T	[M], [H] T	87.8/54.1
	4030009530	S.CER C1608 CH 1H 030B-T	[L] T	87.8/54.1
C37	4030006860	S.CER C1608 JB 1H 102K-T	T	87.8/56.7
C38	4030006860	S.CER C1608 JB 1H 102K-T	B	73.3/46.4
C39	4030006990	S.CER C1608 CH 1H 080D-T	[L] B	85.8/54.7
	4030007010	S.CER C1608 CH 1H 100D-T	[M], [H] B	85.8/54.7
C40	4030009500	S.CER C1608 CH 1H 0R5B-T	[L], [H] B	85.1/52.3
	4030009560	S.CER C1608 CH 1H 0R75B-T	[M] B	85.1/52.3
C41	4030007050	S.CER C1608 CH 1H 220J-T	B	80.8/53.4
C42	4030006860	S.CER C1608 JB 1H 102K-T	B	86.5/59.1
C43	4030006860	S.CER C1608 JB 1H 102K-T	T	80.7/66.2
C44	4030009350	S.CER C1608 CH 1H 3R5B-T	[L] B	82.7/54.2
	4030009550	S.CER C1608 CH 1H 2R5B-T	[M], [H] B	82.7/54.2
C45	4030006990	S.CER C1608 CH 1H 080D-T	[L] B	84.3/54.2
	4030007010	S.CER C1608 CH 1H 100D-T	[M], [H] B	84.3/54.2
C46	4030006860	S.CER C1608 JB 1H 102K-T	T	79.4/66.2
C47	4030006860	S.CER C1608 JB 1H 102K-T	B	82/58
C48	4030007050	S.CER C1608 CH 1H 220J-T	B	77.6/49.8
C49	4030009920	S.CER C1608 CH 1H 050B-T	B	72.8/54.3
C50	4030006860	S.CER C1608 JB 1H 102K-T	B	76.3/49.8
C51	4030006860	S.CER C1608 JB 1H 102K-T	B	78.9/49.8
C52	4030007090	S.CER C1608 CH 1H 470J-T	B	80.8/51.6
C53	4030006900	S.CER C1608 JB 1H 103K-T	T	80.8/51.6
C54	4030006860	S.CER C1608 JB 1H 102K-T	T	80.8/50.3
C56	4030007050	S.CER C1608 CH 1H 220J-T	T	84.2/50.1
C58	4030006860	S.CER C1608 JB 1H 102K-T	B	91.6/46.7
C59	4030011600	S.CER C1608 JB 1E 104K-T	T	87.9/50.0
C60	4030006860	S.CER C1608 JB 1H 102K-T	B	94.2/50.5
C61	4030007130	S.CER C1608 CH 1H 101J-T	T	97.4/46.7
C62	4030007120	S.CER C1608 CH 1H 080D-T	T	99/53.7
C63	4030006860	S.CER C1608 JB 1H 102K-T	T	96.4/51.8
C64	4030011340	S.CER C1608 CH 1H 471J-T	T	99.1/58.5
C65	4030006860	S.CER C1608 JB 1H 102K-T	T	95.8/48.6
C66	4030006860	S.CER C1608 JB 1H 102K-T	B	99.8/51.8
C67	4030006860	S.CER C1608 JB 1H 102K-T	T	100.4/46.4
C69	4030007170	S.CER C1608 CH 1H 221J-T	B	102.4/53.9
C70	4030007170	S.CER C1608 CH 1H 221J-T	B	105/53.9
C71	4030011600	S.CER C1608 JB 1E 104K-T	B	102.5/49.9
C72	4030011600	S.CER C1608 JB 1E 104K-T	B	95.7/32.8
C74	4030011600	S.CER C1608 JB 1E 104K-T	B	89.7/31.8
C75	4550006050	S.TAN TEESVA 0J 106M8L	T	109.8/57
C76	4030006900	S.CER C1608 JB 1H 103K-T	T	53.6/67.2
C77	4030006860	S.CER C1608 JB 1H 102K-T	T	54.6/63.7
C78	4030006860	S.CER C1608 JB 1H 102K-T	T	59.6/69.2
C79	4030011600	S.CER C1608 JB 1E 104K-T	[M], [H] T	56.2/71.1
	4030011810	S.CER C1608 JB 1A 224K-T	[L] T	56.2/71.1
C80	4030008920	S.CER C1608 JB 1H 473K-T	[L] T	58.3/66.6
	4030011600	S.CER C1608 JB 1E 104K-T	[M], [H] T	58.3/66.6
C81	4030006860	S.CER C1608 JB 1H 102K-T	T	50.5/70.2
C82	4030011060	S.CER GRM31M2C2H4R0CY21L	[25W] only T	95.8/74
C83	4030011050	S.CER GRM31M3C2H3R0CY21L	[25W] only T	76.8/73.9
C84	4030007090	S.CER C1608 CH 1H 470J-T	T	65.9/70.9
C85	4030006860	S.CER C1608 JB 1H 102K-T	T	65.9/69.6
C86	4030007090	S.CER C1608 CH 1H 470J-T	T	46.6/73.8
C87	4030006860	S.CER C1608 JB 1H 102K-T	T	46.6/72.5
C89	4030006980	S.CER C1608 CH 1H 070D-T	[L] T	38.8/68.8
	4030011770	S.CER C1608 CH 1H 060B-T	[M], [H] T	38.8/68.8
C90	4030006980	S.CER C1608 CH 1H 070D-T	[L] T	41.2/64.3
	4030011770	S.CER C1608 CH 1H 060B-T	[M], [H] T	41.2/64.3
C91	4510005630	S.ELE ECEV1EA330SP	[L] T	67.1/65.4
	4510005750	S.ELE ECEV1EA220SP	[M], [H] T	67.1/65.4
C92	4030009920	S.CER C1608 CH 1H 050B-T	T	45.7/65
C93	4030009350	S.CER C1608 CH 1H 3R5B-T	[45W] B	50.4/63.1
	4030009910	S.CER C1608 CH 1H 040B-T	[25W] B	50.4/63.1
C94	4030007090	S.CER C1608 CH 1H 470J-T	T	50.9/62.3
C95	4030006860	S.CER C1608 JB 1H 102K-T	T	52.2/62.3
C96	4030006860	S.CER C1608 JB 1H 102K-T	B	47.8/59.9
C97	4030007090	S.CER C1608 CH 1H 470J-T	B	49.1/59.9
C98	4030009520	S.CER C1608 CH 1H 020B-T	[25W] B	55.3/62.6
	4030009920	S.CER C1608 CH 1H 050B-T	[45W] B	55.3/62.6
C99	4030006860	S.CER C1608 JB 1H 102K-T	B	55.6/61.3
C100	4030009920	S.CER C1608 CH 1H 050B-T	T	58.7/47.3
C101	4030006860	S.CER C1608 JB 1H 102K-T	B	53.7/59.5
C102	4030007020	S.CER C1608 CH 1H 120J-T	T	66.5/46.7
C103	4030009520	S.CER C1608 CH 1H 020B-T	T	68.4/46.1
C104	4030006860	S.CER C1608 JB 1H 102K-T	T	66.4/43.5
C105	4030006860	S.CER C1608 JB 1H 102K-T	T	

[MAIN UNIT]

REF NO.	ORDER NO.	DESCRIPTION	M.	H/V LOCATION
C114	4030006990	S.CER C1608 CH 1H 080D-T	[L], [H]	T 62.6/37.8
	4030007010	S.CER C1608 CH 1H 100D-T	[M]	T 62.6/37.8
C115	4030011770	S.CER C1608 CH 1H 060B-T		T 59.4/37.8
C116	4030006860	S.CER C1608 JB 1H 102K-T		T 65.8/40.1
C117	4030006850	S.CER C1608 JB 1H 471K-T		T 67.1/40.1
C118	4030009500	S.CER C1608 CH 1H 0R5B-T		B 68.8/41.8
C119	4030006860	S.CER C1608 JB 1H 102K-T		T 58.7/39.7
C120	4030007090	S.CER C1608 CH 1H 470J-T		T 60/39.7
C121	4030006990	S.CER C1608 CH 1H 080D-T	[L]	T 71.7/39.1
	4030007010	S.CER C1608 CH 1H 100D-T	[M], [H]	T 71.7/39.1
C122	4030006980	S.CER C1608 CH 1H 070D-T	[M]	T 73.3/37.8
	4030009920	S.CER C1608 CH 1H 050B-T	[L]	T 73.3/37.8
	4030011770	S.CER C1608 CH 1H 060B-T	[H]	T 73.3/37.8
C123	4030006990	S.CER C1608 CH 1H 080D-T	[M], [H]	T 70.6/37.8
	4030007020	S.CER C1608 CH 1H 120J-T	[L]	T 70.6/37.8
C124	4030009520	S.CER C1608 CH 1H 020B-T	[M], [H]	T 68.9/33.3
	4030011770	S.CER C1608 CH 1H 060B-T	[L]	T 68.9/33.3
C125	4030008220	S.CER C1608 UJ 1H 070D-T		T 70.8/32.7
C126	4030011770	S.CER C1608 CH 1H 060B-T		B 64.5/36
C127	4030009350	S.CER C1608 CH 1H 3R5B-T	[L] only	B 63.7/34.6
C128	4030008220	S.CER C1608 UJ 1H 070D-T		T 62.5/32.7
C129	4030009500	S.CER C1608 CH 1H 0R5B-T		B 65.3/36.6
C130	4030007130	S.CER C1608 CH 1H 101J-T		B 76.3/34.1
C132	4030006860	S.CER C1608 JB 1H 102K-T		B 68.1/29.4
C133	4610001590	S.TRI TZC3R100A110R00		T 72.1/35.3
C134	4610001920	S.TRI TZC3Z060A110R00		T 61.2/35.3
C136	4030006860	S.CER C1608 JB 1H 102K-T		T 87.8/37
C137	4030006860	S.CER C1608 JB 1H 102K-T		T 86.4/32.6
C138	4030006860	S.CER C1608 JB 1H 102K-T		T 79.1/44.2
C139	4030011600	S.CER C1608 JB 1E 104K-T		B 61/44.3
C140	4030011600	S.CER C1608 JB 1E 104K-T		T 77.7/41
C141	4030006860	S.CER C1608 JB 1H 102K-T		B 82.3/33.4
C142	4030006860	S.CER C1608 JB 1H 102K-T		B 100.6/44.2
C143	4030006860	S.CER C1608 JB 1H 102K-T		B 81.7/28.7
C144	4030006900	S.CER C1608 JB 1H 103K-T		T 87.3/38.9
C145	4030007090	S.CER C1608 CH 1H 470J-T		B 67.4/34.7
C146	4550000510	S.TAN TEESVA 1V 473M8L		B 72.5/30.4
C147	4550000560	S.TAN TEESVA 1V 334M-8L		B 67.7/32.4
C148	4510004630	S.ELE ECEV1CA100SR		T 56.6/54.5
C150	4030007090	S.CER C1608 CH 1H 470J-T		T 81.6/35.2
C151	4030007090	S.CER C1608 CH 1H 470J-T		T 90.5/38.9
C152	4030007090	S.CER C1608 CH 1H 470J-T		B 87.3/42
C153	4030007090	S.CER C1608 CH 1H 470J-T		B 91.1/41.2
C154	4030007090	S.CER C1608 CH 1H 470J-T		B 87.3/40.4
C155	4030011600	S.CER C1608 JB 1E 104K-T		B 91.1/42.8
C156	4030007090	S.CER C1608 CH 1H 470J-T		T 93/42.2
C157	4030007130	S.CER C1608 CH 1H 101J-T		B 94.3/42.2
C158	4030007130	S.CER C1608 CH 1H 101J-T		B 96.2/44.1
C159	4030011600	S.CER C1608 JB 1E 104K-T		B 99.1/40.9
C160	4030007000	S.CER C1608 CH 1H 090D-T		B 102.9/37.8
C161	4030007130	S.CER C1608 CH 1H 101J-T		B 103.6/35.9
C162	4030006860	S.CER C1608 JB 1H 102K-T		B 108.2/44
C164	4030006860	S.CER C1608 JB 1H 102K-T		T 101.8/19
C165	4030006860	S.CER C1608 JB 1H 102K-T		T 105.1/19.5
C166	4030006860	S.CER C1608 JB 1H 102K-T		T 107.5/20.9
C167	4030008890	S.CER C1608 JB 1H 273K-T		B 107.1/22.5
C168	4030008910	S.CER C1608 JB 1H 393K-T		B 107.7/24.4
C169	4030008910	S.CER C1608 JB 1H 393K-T		B 109.7/25.1
C170	4030008900	S.CER C1608 JB 1H 333K-T		B 105.8/22.5
C171	4030006880	S.CER C1608 JB 1H 472K-T		B 104.5/23.6
C173	4510004650	S.ELE ECEV1EA4R7SR		T 114.1/10.6
C174	4030011600	S.CER C1608 JB 1E 104K-T		T 118.9/10.9
C176	4510006090	S.ELE ECEV0GA470SR		T 114.1/16.5
C177	4030007030	S.CER C1608 CH 1H 150J-T		T 105/12.2
C178	4030007040	S.CER C1608 CH 1H 180J-T		T 105/9.6
C179	4030006850	S.CER C1608 JB 1H 471K-T		B 116.2/8.6
C180	4030011600	S.CER C1608 JB 1E 104K-T		B 116.2/10
C181	4030011600	S.CER C1608 JB 1E 104K-T		B 116.2/12.4
C182	4030011600	S.CER C1608 JB 1E 104K-T		B 118.7/22.1
C183	4030008920	S.CER C1608 JB 1H 473K-T		B 117.5/16.6
C184	4030011600	S.CER C1608 JB 1E 104K-T		T 111/18.4
C185	4030011600	S.CER C1608 JB 1E 104K-T		T 116.2/22.7
C186	4030006870	S.CER C1608 JB 1H 222K-T		T 115.8/24.9
C187	4030006870	S.CER C1608 JB 1H 222K-T		T 118.4/26.2
C188	4030011600	S.CER C1608 JB 1E 104K-T		T 118.2/22.7
C189	4030011600	S.CER C1608 JB 1E 104K-T		B 113.5/18.2
C190	4030007130	S.CER C1608 CH 1H 101J-T		T 109.1/19
C191	4030008910	S.CER C1608 JB 1H 393K-T		B 99.8/17.5
C192	4030006880	S.CER C1608 JB 1H 472K-T		B 99.4/15.6
C193	4030011600	S.CER C1608 JB 1E 104K-T		B 100/13.4
C194	4030007140	S.CER C1608 CH 1H 121J-T		B 99.4/11.5
C195	4030011600	S.CER C1608 JB 1E 104K-T		T 102.2/14
C196	4030006900	S.CER C1608 JB 1H 103K-T		B 100.7/8.6
C199	4030007090	S.CER C1608 CH 1H 470J-T		B 43.4/14
C200	4030011600	S.CER C1608 JB 1E 104K-T		B 43.6/47.2
C201	4030011600	S.CER C1608 JB 1E 104K-T		B 42.3/43.9
C202	4030011600	S.CER C1608 JB 1E 104K-T		B 43.6/45.9
C203	4030011600	S.CER C1608 JB 1E 104K-T		B 44.9/44.6
C204	4030007090	S.CER C1608 CH 1H 470J-T		B 48.3/16.6
C205	4030007090	S.CER C1608 CH 1H 470J-T		B 40.8/14
C206	4030007090	S.CER C1608 CH 1H 470J-T		B 46/14
C207	4030011600	S.CER C1608 JB 1E 104K-T		B 46.2/45.9
C209	4030007090	S.CER C1608 CH 1H 470J-T		B 44.7/14

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REF NO.	ORDER NO.	DESCRIPTION	M.	H/V LOCATION
C214	4030007090	S.CER C1608 CH 1H 470J-T		B 48.6/14
C215	4030007090	S.CER C1608 CH 1H 470J-T		B 39.5/14
C217	4030007090	S.CER C1608 CH 1H 470J-T		B 42.1/14
C219	4030007090	S.CER C1608 CH 1H 470J-T		B 39.9/11.4
C220	4030007090	S.CER C1608 CH 1H 470J-T		B 42.5/11.4
C224	4030007090	S.CER C1608 CH 1H 470J-T		B 46.4/11.4
C227	4030007090	S.CER C1608 CH 1H 470J-T		B 39.9/16.6
C228	4030007090	S.CER C1608 CH 1H 470J-T		B 41.2/11.4
C229	4030007090	S.CER C1608 CH 1H 470J-T		B 43.8/11.4
C231	4030007090	S.CER C1608 CH 1H 470J-T		B 45.1/11.4
C235	4030007090	S.CER C1608 CH 1H 470J-T		B 47.3/14
C236	4030007090	S.CER C1608 CH 1H 470J-T		B 17.7/12.1
C237	4030007090	S.CER C1608 CH 1H 470J-T		B 19/12.1
C238	4030006860	S.CER C1608 JB 1H 102K-T		B 16.4/5.5
C239	4030006860	S.CER C1608 JB 1H 102K-T		T 17.2/5.4
C240	4030008880	S.CER C1608 JB 1H 223K-T		B 109/19.3
C241	4030006860	S.CER C1608 JB 1H 102K-T		B 109.7/22.5
C242	4030010020	S.CER C1608 JB 1H 122K-T		B 98.7/31
C243	4030011280	S.CER C1608 CH 1H 271J-T		B 96.8/28.3
C244	4030007100	S.CER C1608 CH 1H 560J-T		B 94.9/29
C246	4030010760	S.CER C1608 CH 1H 331J-T		B 107.1/29.8
C247	4030006860	S.CER C1608 JB 1H 102K-T		T 30.7/6.4
C248	4030006860	S.CER C1608 JB 1H 102K-T		B 102.2/24.2
C249	4030006850	S.CER C1608 JB 1H 471K-T		B 14.4/56.5
C250	4030011600	S.CER C1608 JB 1E 104K-T		B 18.6/59.5
C251	4030011600	S.CER C1608 JB 1E 104K-T		B 11.5/58.4
C252	4030011600	S.CER C1608 JB 1E 104K-T		B 8.6/54.1
C253	4030011600	S.CER C1608 JB 1E 104K-T		B 6.4/55.4
C254	4030006860	S.CER C1608 JB 1H 102K-T		T 3.6/90.9
C255	4510005290	S.ELE ECEV1EA221P		T 14/61
C256	4510006260	S.ELE ECEV1AA471UP		T 4.7/83.3
C257	4030007090	S.CER C1608 CH 1H 470J-T		B 8.1/51.6
C258	4510004510	ELE 25 MV 470 HC		
C259	4030006860	S.CER C1608 JB 1H 102K-T		B 15.4/84.6
C260	4030007090	S.CER C1608 CH 1H 470J-T		B 15.4/85.9
C261	4030004760	S.CER C2012 JF 1H 104Z-T		T 21.2/65.3
C262	4030011600	S.CER C1608 JB 1E 104K-T		B 22.4/63.4
C263	4030004760	S.CER C2012 JF 1H 104Z-T		B 53.2/72.4
C264	4030011600	S.CER C1608 JB 1E 104K-T		B 53.1/75.4
C265	4510005290	S.ELE ECEV1EA221P		T 30.2/67.9
C266	4510004630	S.ELE ECEV1CA100SR		T 23.3/61.2
C268	4510004630	S.ELE ECEV1CA100SR		T 51/73.7
C269	4030006860	S.CER C1608 JB 1H 102K-T		B 23.9/55.3
C270	4030006860	S.CER C1608 JB 1H 102K-T		B 28.9/55.3
C271	4510005860	S.ELE ECEV1HA2R2SR		T 38.4/58.6
C272	4510005860	S.ELE ECEV1HA2R2SR		T 30.6/56.1
C273	4030006860	S.CER C1608 JB 1H 102K-T		B 34.5/63.1
C274	4510004650	S.ELE ECEV1EA4R7SR		T 38/64
C278	4030011600	S.CER C1608 JB 1E 104K-T		T 96.3/26
C279	4030011600	S.CER C1608 JB 1E 104K-T		T 98.8/23.6
C280	4510004650	S.ELE ECEV1EA4R7SR		T 111.5/26.7
C281	4030011340	S.CER C1608 CH 1H 471J-T		T 108.4/23.6
C282	4030011600	S.CER C1608 JB 1E 104K-T		T 101.3/24.2
C283	4030006860	S.CER C1608 JB 1H 102K-T		T 97.7/33.8
C284	4030006900	S.CER C1608 JB 1H 103K-T		T 102/35.2
C286	4030011600	S.CER C1608 JB 1E 104K-T		T 77.9/59.3
C287	4030006860	S.CER C1608 JB 1H 102K-T		B 20.2/37
C288	4030011600	S.CER C1608 JB 1E 104K-T		B 11.2/21.2
C289	4030011600	S.CER C1608 JB 1E 104K-T		B 11.2/26.8
C290	4030006860	S.CER C1608 JB 1H 102K-T		B 11.2/22.5
C291	4030006860	S.CER C1608 JB 1H 102K-T		B 11.2/25.5
C292	4030007090	S.CER C1608 CH 1H 470J-T		B 5.4/17.9
C293	4030006860	S.CER C1608 JB 1H 102K-T		T 7.9/11.5
C294	4030006860	S.CER C1608 JB 1H 102K-T		T 7.9/30.5
C295	4510004630	S.ELE ECEV1CA100SR		T 4.7/35.3
C296	4030011600	S.CER C1608 JB 1E 104K-T		T 108.7/33.9
C297	4030007020	S.CER C1608 CH 1H 120J-T	[M], [H]	T 73.6/45.8
	4030009910	S.CER C1608 CH 1H 040B-T	[L]	T 73.6/45.8
C298	4030006980	S.CER C1608 CH 1H 070D-T	[L]	T 73.1/43.7
	4030011770	S.CER C1608 CH 1H 060B-T	[M], [H]	T 73.1/43.7
C299	4030006980	S.CER C1608 CH 1H 070D-T	[L]	B 77.9/41
	4030011770	S.CER C1608 CH 1H 060B-T	[M], [H]	B 77.9/41
C300	4030006860	S.CER C1608 JB 1H 102K-T		B 79.3/37.1
C301	4030011340	S.CER C1608 CH 1H 471J-T		T 60/44.9
C302	4030007010	S.CER C1608 CH 1H 100D-T	[W/N]	B 66.1/46.6
	4030009530	S.CER C1608 CH 1H 030B-T	[M/N]	B 66.1/46.6
C303	4030006860	S.CER C1608 JB 1H 102K-T		B 65.5/44.5
C304	4030007010	S.CER C1608 CH 1H 100D-T		T 93.7/40.3
C305	4030007100	S.CER C1608 CH 1H 560J-T		T 102.6/41.8
C306	4030009910	S.CER C1608 CH 1H 040B-T		T 101.5/43.8
C307	4030006980	S.CER C1608 CH 1H 070D-T		T 107.3/44.5
C308	4030009530	S.CER C1608 CH 1H 030B-T		T 103.4/44.4
C309	4030006900	S.CER C1608 JB 1H 103K-T		T 97.5/41.3
C310	4030011600	S.CER C1608 JB 1E 104K-T		B 96.

[MAIN UNIT]

REF NO.	ORDER NO.	DESCRIPTION	M.	H/V LOCATION
C321	4030011600	S.CER C1608 JB 1E 104K-T	T	86.7/22.5
C322	4030006900	S.CER C1608 JB 1H 103K-T	T	87.3/26.2
C323	4030009880	S.CER C1608 JB 1H 682K-T	T	89.3/22.2
C324	4030011600	S.CER C1608 JB 1E 104K-T	T	83.2/19.2
	4030018520	S.CER C1608 JB 0J 225M-T	T	83.2/19.2
C325	4030008650	S.CER C1608 JB 1H 332K-T	T	79.9/17.3
C327	4510004650	S.ELE ECEV1EA4R7SR	T	76.8/16.3
C328	4030017490	S.CER C1608 JB 1A 105K-T	T	113.2/41.9
C329	4030008870	S.CER C1608 JB 1H 183K-T	T	114.1/40
C330	4030007110	S.CER C1608 CH 1H 680J-T	T	116.3/36.7
C331	4030006900	S.CER C1608 JB 1H 103K-T	T	111.5/36.9
C332	4030017490	S.CER C1608 JB 1A 105K-T	T	113.5/34.5
C333	4030006860	S.CER C1608 JB 1H 102K-T	T	113.5/30.9
C334	4030009630	S.CER C1608 JB 1H 822K-T	T	86.2/16.7
C335	4030008920	S.CER C1608 JB 1H 473K-T	T	89.4/13.8
C336	4030009490	S.CER C1608 JB 1H 821K-T	T	87.5/16.7
C337	4030011600	S.CER C1608 JB 1E 104K-T	T	94.2/15.7
	4030017480	S.CER C1608 JB 1A 474K-T	T	94.2/15.7
C338	4030006900	S.CER C1608 JB 1H 103K-T	T	88.9/18.7
C339	4030007060	S.CER C1608 CH 1H 270J-T	T	47.1/39.7
C340	4030006900	S.CER C1608 JB 1H 103K-T	T	51.8/38.8
C341	4030007020	S.CER C1608 CH 1H 120J-T	T	45.4/37.7
C342	4030007050	S.CER C1608 CH 1H 220J-T	T	42.8/37.7
C343	4030011600	S.CER C1608 JB 1E 104K-T	T	56.1/24.1
C344	4030008890	S.CER C1608 JB 1H 273K-T	T	43.9/45.6
C345	4030011600	S.CER C1608 JB 1E 104K-T	B	37.4/28.6
C347	4510006260	S.ELE ECEV1AA471UP	T	63.7/24.4
C348	4030006860	S.CER C1608 JB 1H 102K-T	T	97.1/48.6
C349	4030011600	S.CER C1608 JB 1E 104K-T	T	83.4/25.1
C350	4030017490	S.CER C1608 JB 1A 105K-T	B	64/29.8
C351	4030008920	S.CER C1608 JB 1H 473K-T	B	8.3/57.7
C352	4510005430	S.ELE ECEV0JA220SR	T	52.9/45.2
C353	4030007090	S.CER C1608 CH 1H 470J-T	B	47.7/11.4
C354	4030006850	S.CER C1608 JB 1H 471K-T	B	49/11.4
C355	4010005420	CER HM60SJ CH 040C 500V	[45W] only	
C356	4010005450	CER HM60SJ CH 070D 500V	[45W] only	
C357	4010005730	CER HM60SJ SL 470J 500V	[45W] only	
C358	4030007090	S.CER C1608 CH 1H 470J-T	B	69.4/30.2
C359	4030011600	S.CER C1608 JB 1E 104K-T	T	13/53.9
C360	4030011600	S.CER C1608 JB 1E 104K-T	B	36.9/46.1
C361	4030010020	S.CER C1608 JB 1H 122K-T	B	117.5/15.3
C362	4030011600	S.CER C1608 JB 1E 104K-T	B	18.4/52.3
C363	4030006980	S.CER C1608 CH 1H 070D-T	B	69.2/47.4
C364	4030006980	S.CER C1608 CH 1H 070D-T	B	72.8/53
C365	4030009920	S.CER C1608 CH 1H 050B-T	B	60.3/49.8
C366	4030011600	S.CER C1608 JB 1E 104K-T	B	104.4/44
C367	4030007090	S.CER C1608 CH 1H 470J-T	B	109.2/40.7
C368	4550002890	S.TAN TEESVA 1A 225M8L	T	46/69.5
C369	4030007090	S.CER C1608 CH 1H 470J-T	T	89.1/56.7
C370	4030007090	S.CER C1608 CH 1H 470J-T	B	88.6/56.9
C371	4030006900	S.CER C1608 JB 1H 103K-T	B	104.4/57.7
C372	4550002890	S.TAN TEESVA 1A 225M8L	T	104.4/37.8
C373	4030006860	S.CER C1608 JB 1H 102K-T	T	43.4/57.8
C374	4030009920	S.CER C1608 CH 1H 050B-T	T	49.2/62.3
C375	4030006860	S.CER C1608 JB 1H 102K-T	T	74.4/62.4
C376	4030006860	S.CER C1608 JB 1H 102K-T	T	49/57.8
C377	4030011600	S.CER C1608 JB 1E 104K-T	T	91.3/27.1
C378	4030006860	S.CER C1608 JB 1H 102K-T	B	107/35.1
C379	4030007050	S.CER C1608 CH 1H 220J-T	T	73.1/67.7
C380	4030006860	S.CER C1608 JB 1H 102K-T	T	73.1/66.4
C381	4030007050	S.CER C1608 CH 1H 220J-T	B	69.4/71.7
C382	4030006860	S.CER C1608 JB 1H 102K-T	B	68.1/71.7
C383	4030007050	S.CER C1608 CH 1H 220J-T	B	57.8/71.7
C384	4030007050	S.CER C1608 CH 1H 220J-T	B	42.1/71.7
C385	4030006860	S.CER C1608 JB 1H 102K-T	B	40.8/71.7
C386	4030011600	S.CER C1608 JB 1E 104K-T	B	15.7/53.9
C387	4030011600	S.CER C1608 JB 1E 104K-T	B	73.2/23.6
C388	4030017490	S.CER C1608 JB 1A 105K-T	T	57.5/73.7
C389	4510005630	S.ELE ECEV1EA330SP	[L]	46.7/53.4
	4510005750	S.ELE ECEV1EA220SP	[M], [H]	46.7/53.4
C390	4030007050	S.CER C1608 CH 1H 220J-T	B	9/86.4
C391	4030007170	S.CER C1608 CH 1H 221J-T	B	9/87.7
C392	4030006860	S.CER C1608 JB 1H 102K-T	B	9/89
C393	4030007050	S.CER C1608 CH 1H 220J-T	B	14.8/70.2
C394	4030007170	S.CER C1608 CH 1H 221J-T	B	13.4/71.5
C395	4030006860	S.CER C1608 JB 1H 102K-T	B	12.2/72.8
C396	4030007050	S.CER C1608 CH 1H 220J-T	B	29.3/71.7
C397	4030007170	S.CER C1608 CH 1H 221J-T	B	27.7/71.7
C398	4030006860	S.CER C1608 JB 1H 102K-T	B	26.1/71.7
C399	4030011600	S.CER C1608 JB 1E 104K-T	B	87.8/22.4
C400	4030009500	S.CER C1608 CH 1H 0R5B-T	B	47.4/65.3
C401	4030007050	S.CER C1608 CH 1H 220J-T	T	73/73.9
C402	4030017480	S.CER C1608 JB 1A 474K-T	B	11.2/53.6
C403	4030006860	S.CER C1608 JB 1H 102K-T	B	72.4/73.4
C404	4030007110	S.CER C1608 CH 1H 680J-T	[45W] only [EUR] only	98.7/62.8
J1	6510018430	S.CNR AXN330C038P	T	22/10
J2	6510023090	S.CNR 20FLT-SM1-TB	T	44/12.8
J4	6450000140	CNR HSJ0807-01-010		
J5	6510007080	CNR PI28A-02M		
J6	6510019250	S.CNR B11B-ZR-SM3-TF	T	5/21
J8	6510021300	S.CNR 52365-1091	T	44.2/22.2

[MAIN UNIT]

REF NO.	ORDER NO.	DESCRIPTION	M.	H/V LOCATION
J9	6510021300	S.CNR 52365-1091	T	21.9/45.7
W1	7120000470	JMP ERDS2T0		
W2	8900004540	CBL OPC-453		
EP1	6910013370	S.BEA BLM18BB221SN1D	T	60/42.3
EP2	6910011560	BEA HF70BB4.5X5X1.6		
EP3	6910010280	BEA HF70BB9.5X10.4X4.9		
EP5	Optional product	UBD UT-108	[LTR] only	

[CHASSIS UNIT]

REF NO.	ORDER NO.	DESCRIPTION	M.	H/V LOCATION
J1	6510004880	CNR MR-DS-E 01		
SP1	2510001030	SP VS-57-0837A		
WS1	8600036860	FX2527 P01CH		

M.=Mounted side (T: Mounted on the Top side, B: Mounted on the Bottom side)
S.=Surface mount

SECTION 7 MECHANICAL PARTS

[CHASSIS PARTS]

REF. NO.	ORDER NO.	DESCRIPTION	QTY.
J1	6510004880	Connector MR-DS-E 01	1
SP1	2510001030	Speaker VS-57-0837A	1
WS1	8600036860	Cable FX2527 P01CH	1
MP1	8010018880	2526 chassis	1
MP2	8010018902	2055 cover (A)-2	1
MP3	8210018571	2526 front panel-1	1
MP4	8930057090	2526 front key	1
MP5	8610011180	Knob N292	1
MP6	8610007420	Knob spring	1
MP7	8930044761	2055 SP net-1	1
MP8	8930044100	2055 SP plate	1
MP9	8930027480	1126 TR-A clip	1
MP11	8810008660	Screw PH BT M3 × 8 NI-ZU	15
MP12	8810008760	Screw PH BT M2 × 8 NI-ZU	4
MP13	8810009990	Screw PH BT M3 × 8 ZK	6
MP14	8930057890	Non-woven sheet (CF)	1
MP15	8930057940	Shield sponge (N)	[EUR] only 2
MP17	8930058990	Shield sponge (V)	[EUR] only 1

[MAIN UNIT]

REF. NO.	ORDER NO.	DESCRIPTION	QTY.
J4	6450000140	Connector HSJ0807-01-010	1
W2	8900004540	Cable OPC-453	1
EP5	Optional product	UT-108 [LTR] only	1
MP1	8930045070	2055 M-plate	1
MP2	8510011111	1922 VCO case-1	1
MP3	8510011180	1923 VCO cover	1
MP4	8510011460	2055 filter case	1
MP5	8510011610	2055 filter cover (A)	1
MP6	8930057900	2526 module holder assembly	1
MP8	8930045390	Sponge (FL)	1
MP11	8510014220	2055 SP-A plate [EUR] only	1
MP12	8930056510	2055 shield plate	1
MP13	8510005070	599 sheild plate	1
MP14	8930046150	Rubber sheet (AK)-1	1
MP15	8930057730	Shield sponge (J)	1
MP16	8930057730	Shield sponge (J)	1
MP17	8930057830	Shield sponge (L)	1
MP19	8930046771	Thermally sheet (G)-1 [45W] only	1
MP20	8930058610	Insulate plate (HD)	1

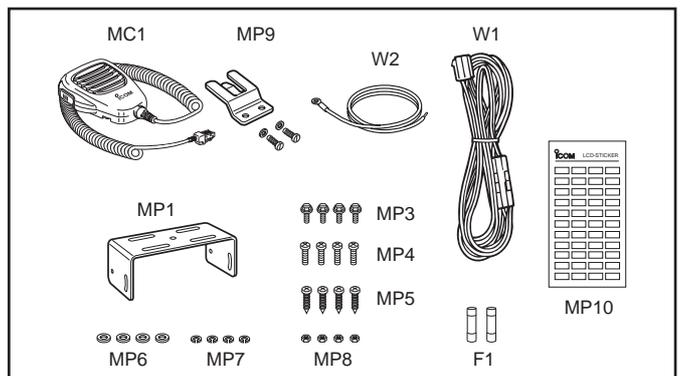
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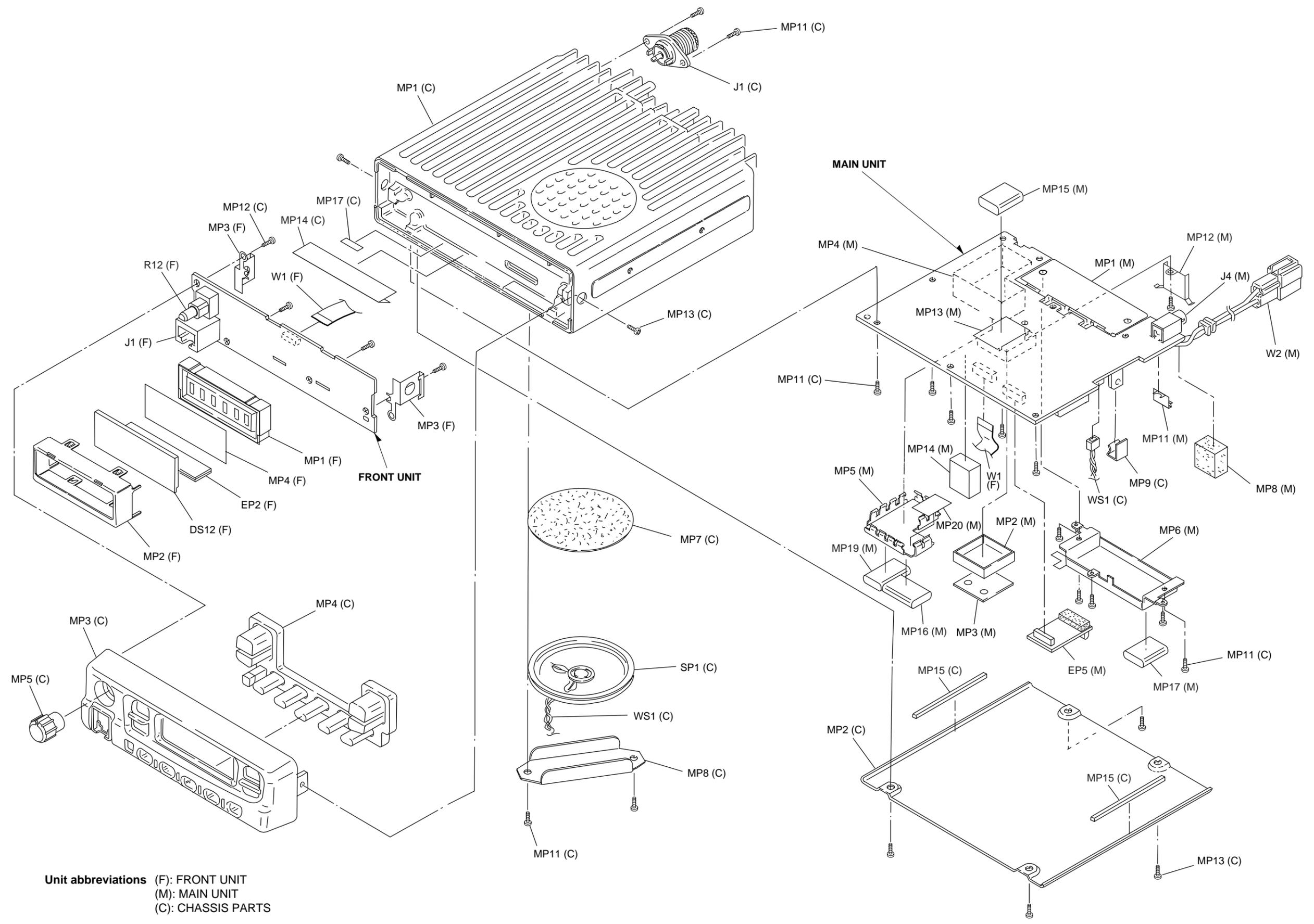
REF. NO.	ORDER NO.	DESCRIPTION	QTY.
R12	7210003020	Variable resistor EVU-F2KFK1	1
J1	6450002210	Connector 3017-8821	1
DS12	5030002780	LCD L1-0483TAT-1	1
W1	8900010950	Cable OPC-1126	1
EP2	8930057820	LCD contact SRCN-2526-SP-N-W	1
MP1	8210018630	2526 reflector	1
MP2	8930057150	2526 LCD holder	1
MP3	8930057140	2526 earth plate	2
MP4	8930057650	2526 LCD filter	1

[ACCESSORY PARTS]

REF. NO.	ORDER NO.	DESCRIPTION	QTY.
F1	5210000120	Fuse FGB 15A [25W]	2
	5210000080	Fuse FGB 20A [45W]	2
MC1	Optional product	Microphone HM-100N	1
W1	Optional product	Cable OPC-345 [25W]	1
	Optional product	Cable OPC-1132 [45W]	1
W2	8930000730	Cable OPC-049	1
MP1	8010019260	2633 mobil bracket	1
MP3	8820000530	Flange volt M4 × 8 NI	4
MP4	8810000470	Screw PH M5 × 12 (+-)	4
MP5	8810005840	Screw PH A M5 × 20	4
MP6	8850000150	Flat washer M5 NI BS	4
MP7	8850000390	Springe washer M5	4
MP8	8830000120	Nut M5	4
MP9	6910004210	731 mic hanger set	1
MP10	8310057570	Label 1705 LCD seal (I) [CONV], [BIIS]	1
	8310057150	Label 1705 LCD seal (H) [LTR]	1
	8310054140	Label 1705 LCD seal (E) [MP1]	1

Screw abbreviations A, BT: Self-tapping
 PH: Pan head ZK: Black
 BS: Brass NI: Nickel
 NI-ZU: Nickel-Zinc

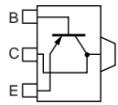
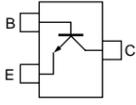
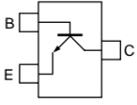
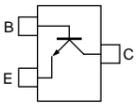
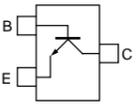
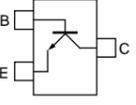
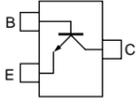
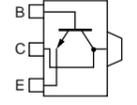
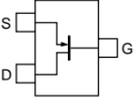
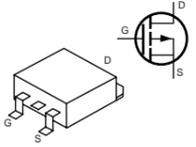
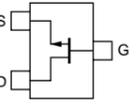
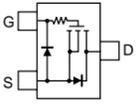
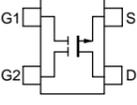
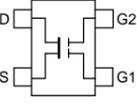
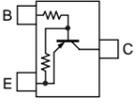
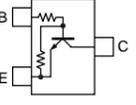
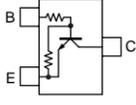
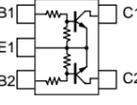
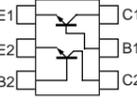




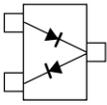
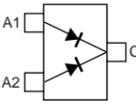
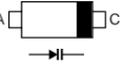
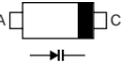
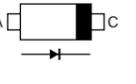
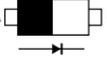
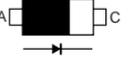
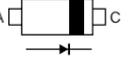
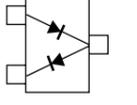
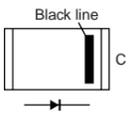
Unit abbreviations (F): FRONT UNIT
 (M): MAIN UNIT
 (C): CHASSIS PARTS

SECTION 8 SEMI-CONDUCTOR INFORMATION

• TRANSISTORS AND FET'S

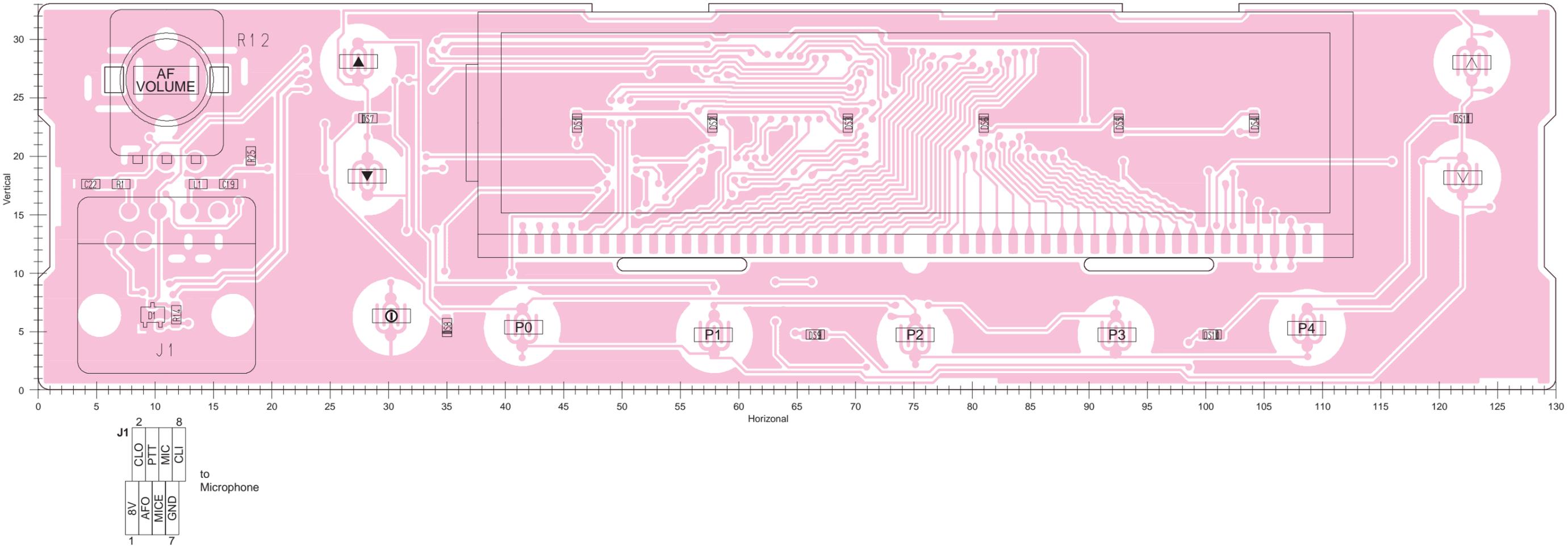
2SB1132 T100 R (Symbol: BAR) 	2SC3356 R24 T2B (Symbol: R24) 	2SC4116 BL (Symbol: LL) 	2SC4213 B (Symbol: AB) 	2SC4215 O (Symbol: QO) 
2SC4226 T1 R25 (Symbol: R25) 	2SC5107 O (Symbol: MFO) 	2SD1664 T100Q (Symbol: DAQ) 	2SJ144 GR (Symbol: VG) 	2SJ377 (Symbol: 4L) 
2SK880 Y (Symbol: XY) 	2SK1829 (Symbol: K1) 	3SK272 (Symbol: K) 	3SK293 (Symbol: UF) 	DTA144EUA T106 (Symbol: 16) 
DTC144EUA T106 (Symbol: 26) 	DTC363 EK (Symbol: H27) 	XP1214 (Symbol: 9H) 	XP6501 AB (Symbol: 5N) 	

• DIODES

DA221 TL (Symbol: K) 	DAN222TL (Symbol: N) 	HVC350B (Symbol: B0) 	HVC362 (Symbol: V2) 	MA2S111 (Symbol: A) 
MA77 (Symbol: 4B) 	MA368 (Symbol: 6L) 	MA728 (Symbol: 2A) 	RB706F-40 T106 (Symbol: 3J) 	UM9401F (Symbol: None) 

SECTION 9 BOARD LAYOUTS

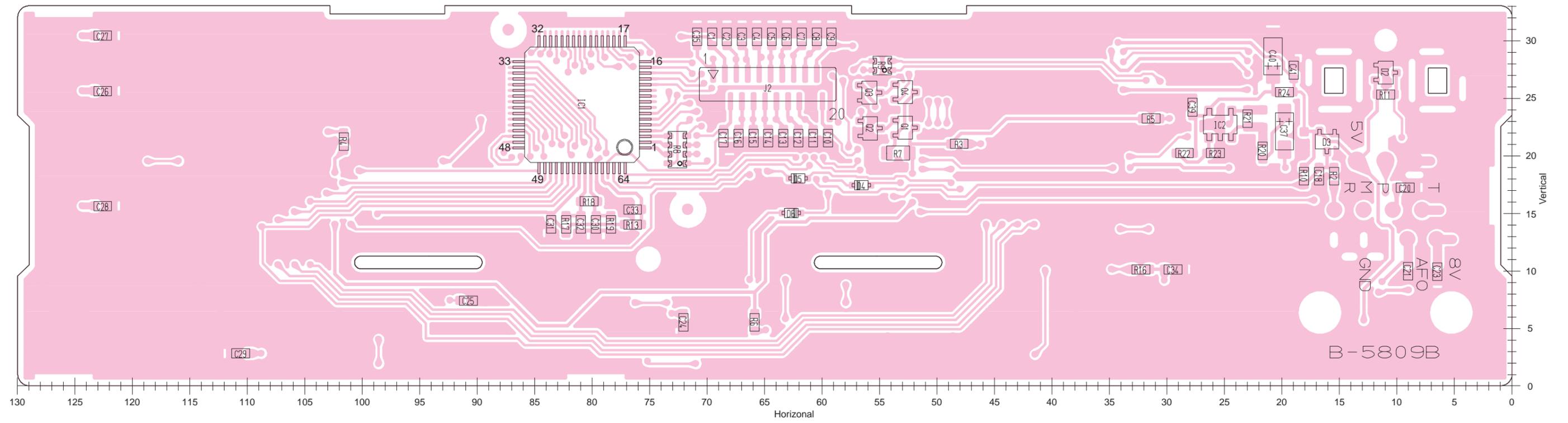
9-1 FRONT UNIT • TOP VIEW



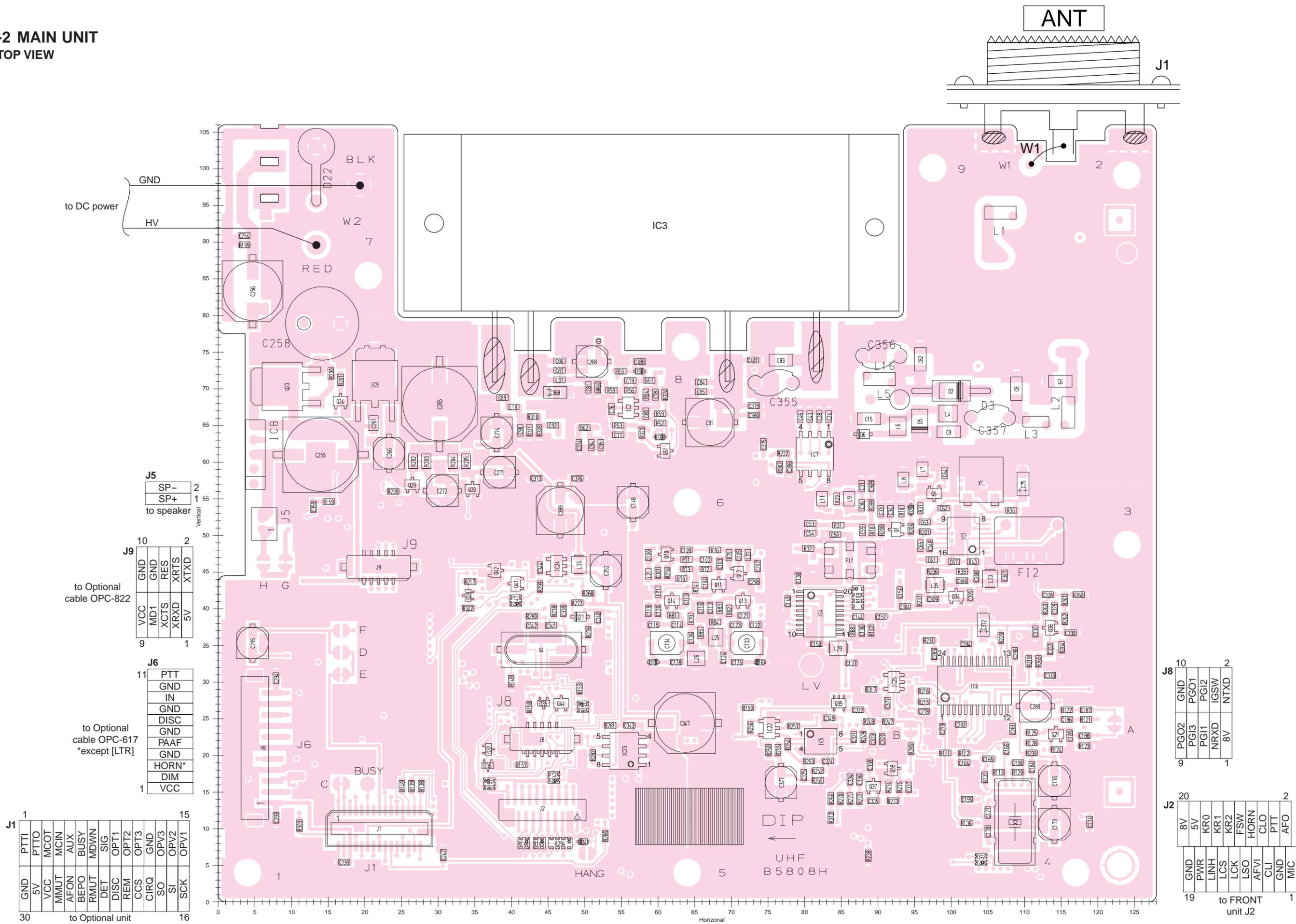
• BOTTOM VIEW (FRONT UNIT)

to MAIN unit J2

1	8V	19
2	GND	20
	PWR	
	LINH	
	KR1	
	LCS	
	LCK	
	LSO	
	AFVI	
	CLI	
	GND	
	MIC	



9-2 MAIN UNIT
• TOP VIEW



J1

1	GND	PTTI	15
2	5V	PTTO	
3	VCC	MCOT	
4	MMUT	MCIN	
5	AFON	AUX	
6	BEPO	BUSY	
7	RMUT	MDWN	
8	DET	SIG	
9	DISC	OPT1	
10	REM	OPT2	
11	CCS	OPT3	
12	CIRQ	GND	
13	SO	OPV3	
14	SI	OPV2	
15	SCK	OPV1	

to Optional unit

J5

1	SP-	2
2	SP+	

to speaker

J9

1	XTXD	2
2	XRTS	
3	RES	
4	GND	
5	GND	
6	GND	
7	MD1	
8	VCC	
9	5V	
10	XTXD	

to Optional cable OPC-822

J6

1	VCC	
2	DIM	
3	HORN*	
4	GND	
5	PAAF	
6	GND	
7	DISC	
8	GND	
9	IN	
10	GND	
11	PTT	

to Optional cable OPC-617
*except [LTR]

J8

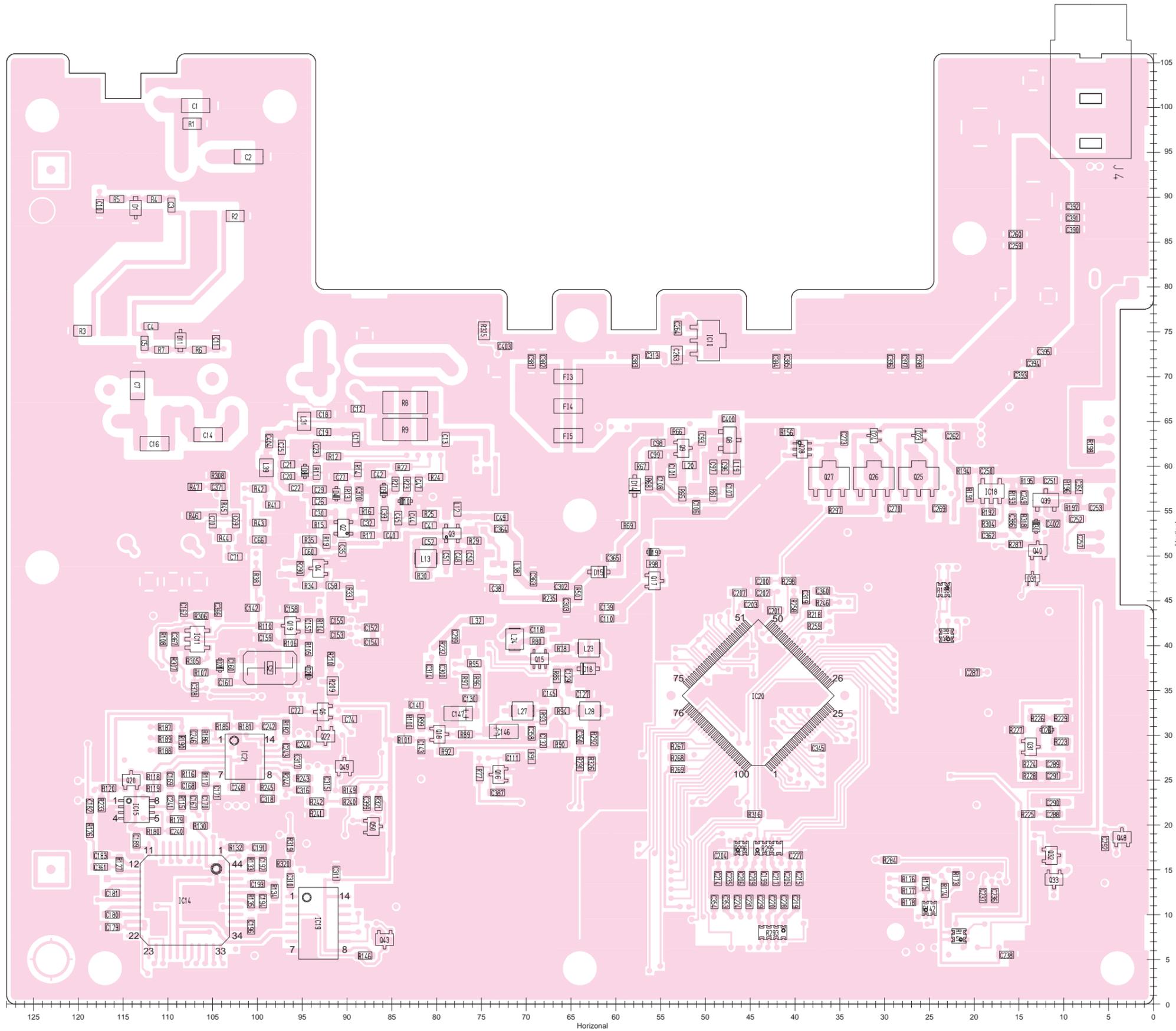
1	NTXD	2
2	IGSW	
3	PGI2	
4	PGI1	
5	NRXD	
6	8V	
7	GND	
8	PGO2	
9	PGO1	
10	GND	

J2

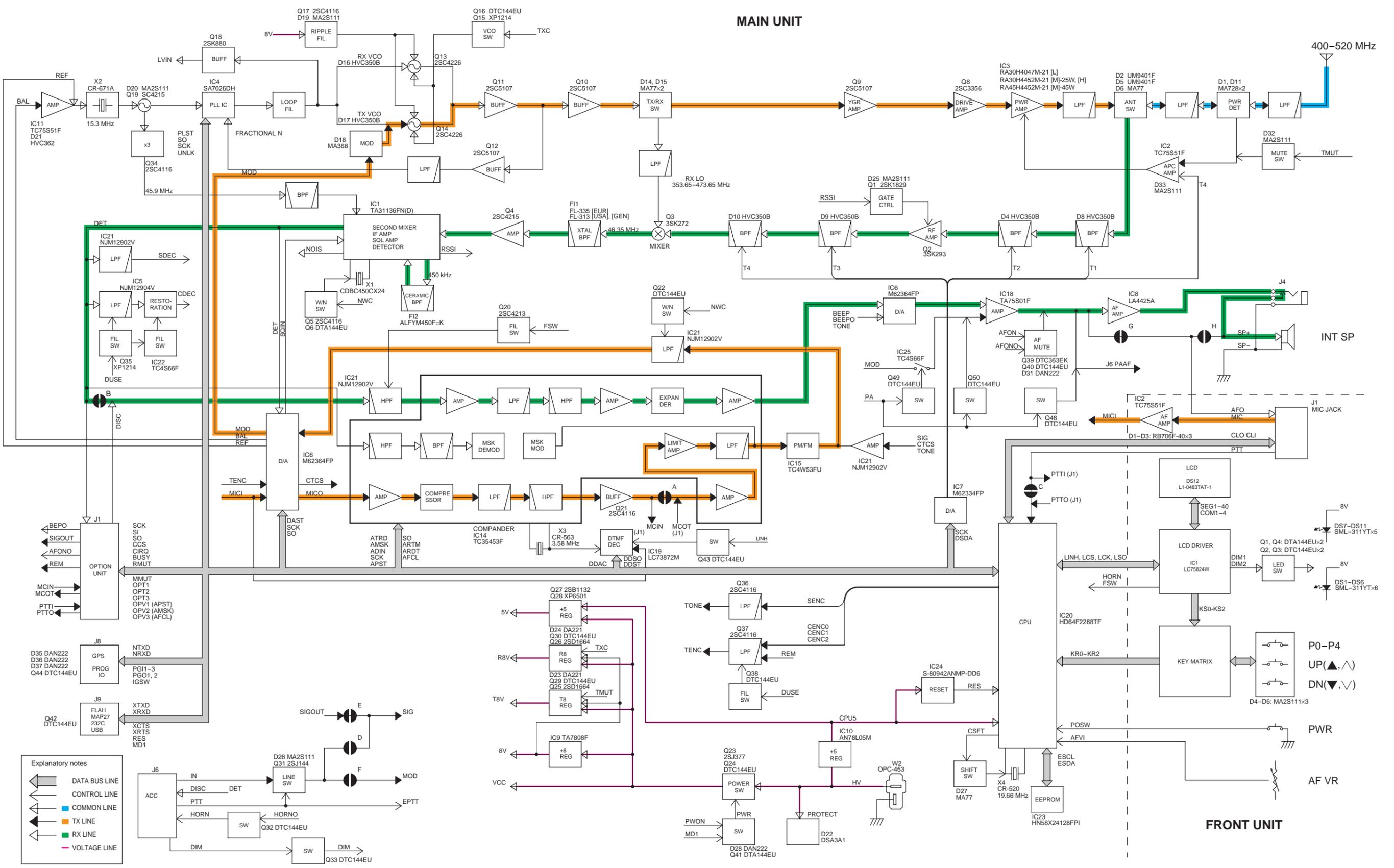
1	MIC	2
2	AFO	
3	PTT	
4	CLI	
5	AFVI	
6	LSO	
7	LCK	
8	LCS	
9	LNH	
10	PWR	
11	8V	

to FRONT unit J2

• BOTTOM VIEW (MAIN UNIT)

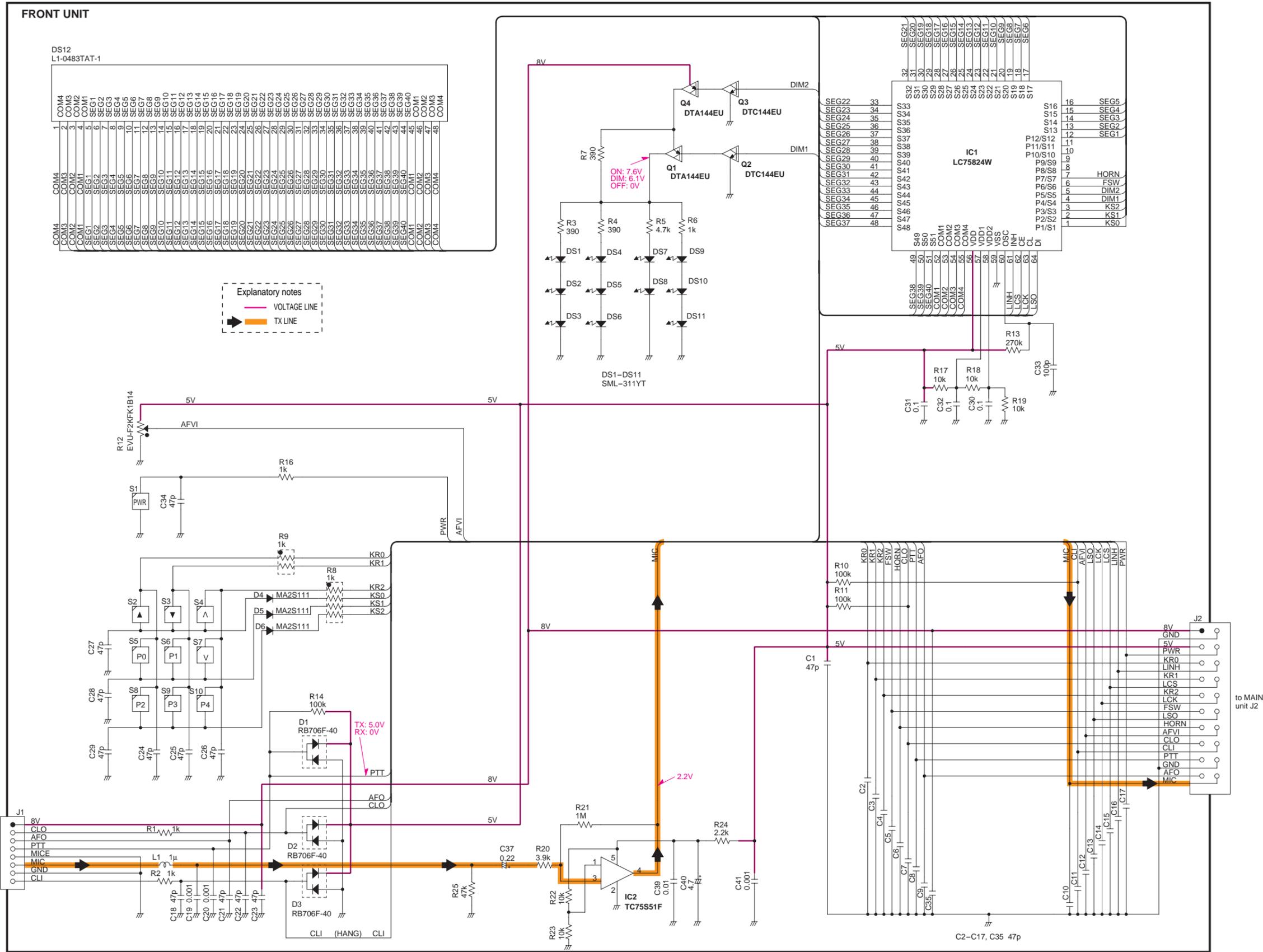


SECTION 10 BLOCK DIAGRAM

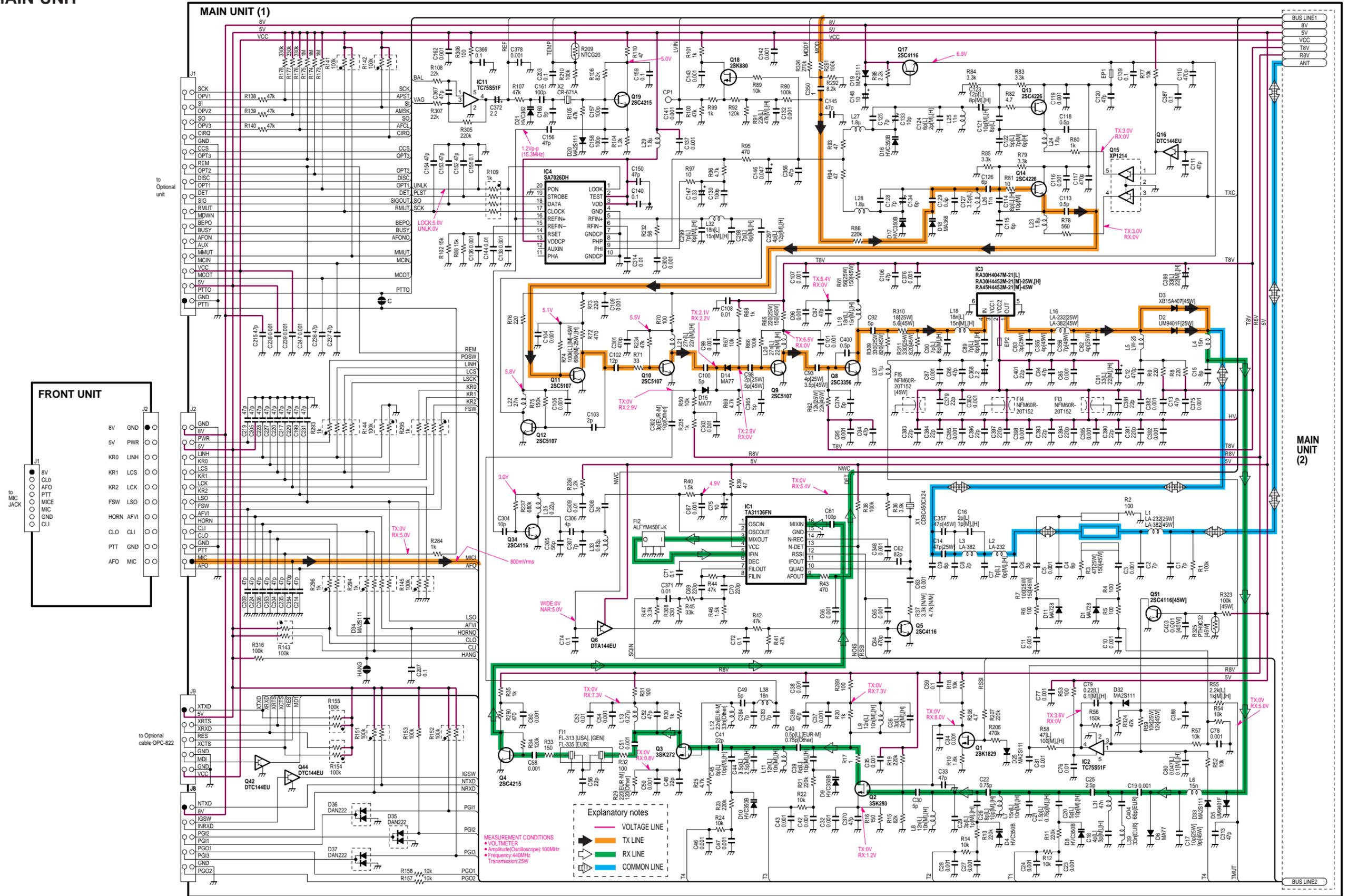


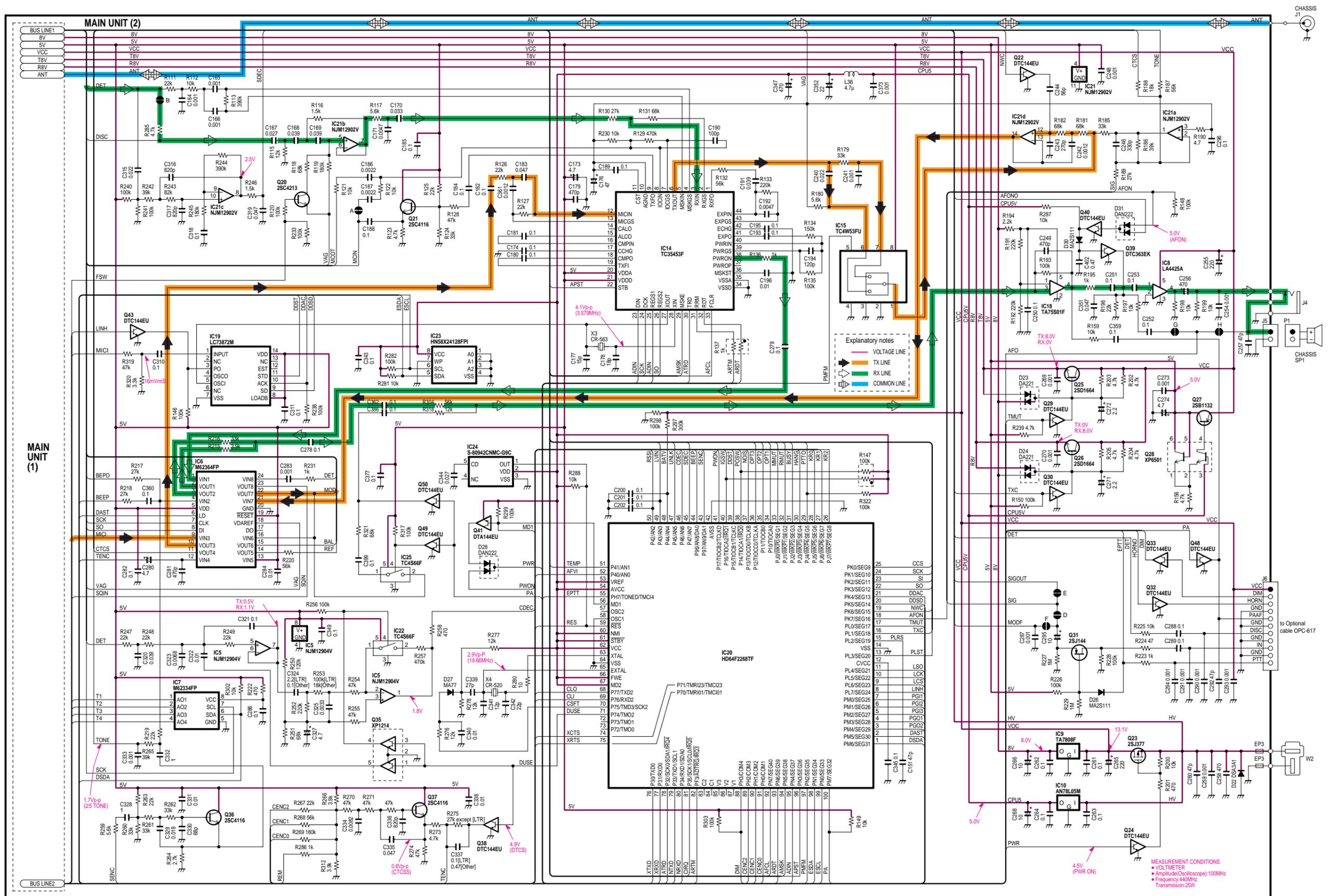
SECTION 11 VOLTAGE DIAGRAMS

11-1 FRONT UNIT



11-2 MAIN UNIT





Explanatory notes

- VOLTAGE LINE
- TX LINE
- RX LINE
- COMMON LINE

MEASUREMENT CONDITIONS

- VOLTMETER
- Amplitude(Oscilloscope):100MHz
- Frequency:440kHz
- Transmission:25W

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