

**ICOM**

**SERVICE  
MANUAL**

HF/VHF TRANSCEIVER

**IC-706**

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## INTRODUCTION

This service manual describes the latest service information for the **IC-706 HF/VHF TRANSCEIVER** at the time of publication.

VERSION NO.	VERSION	SYMBOL
#02	Europe	EUR
#03	France	FRA
#04	Denmark	DEN
#05	U.S.A.	USA

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.



## 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>

1110004080 S.IC  $\mu$ PC2709T-E3 IC-706 MAIN UNIT 5 pieces  
8810008960 Screw OH M2.6 x 5 ZK IC-706 Top 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.

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# SECTION 1 SPECIFICATIONS

## GENERAL

- Frequency coverage : Receive
    - 30 kHz–200 MHz
    - Range restricted in some versions
    - Specifications guaranteed:
      - 500 kHz–4.00 MHz
      - 4.50 MHz–8.00 MHz
      - 9.0 MHz–29.955 MHz
      - 50 MHz–54 MHz
      - 144 MHz–148 MHz
    - Transmit
      - 1.800–1.99999 MHz\*<sup>1</sup>
      - 3.500–3.9999 MHz\*<sup>2</sup>
      - 7.000–7.300 MHz\*<sup>3</sup>
      - 10.100–10.150 MHz
      - 14.000–14.350 MHz
      - 18.068–18.168 MHz
      - 21.000–21.450 MHz
      - 24.890–24.990 MHz
      - 28.000–29.700 MHz
      - 50.000–50.400 MHz\*<sup>4</sup>
      - 144.000–148.000 MHz\*<sup>5</sup>
      - \*<sup>1</sup> 1.810–1.850 MHz France version
      - \*<sup>2</sup> 3.500–3.800 MHz France version
      - \*<sup>3</sup> 7.000–7.100 MHz France version
      - \*<sup>4</sup> 5.000–5.200 MHz Denmark version
      - \*<sup>5</sup> 144.000–146.000 MHz all European versions
  - Mode : SSB, CW, AM, FM, WFM, RTTY (WFM is for receiver only)
  - Number of memory : 102 (split memory: 99; scan edge: 2; channels call channel: 1)
  - Antenna impedance : 50 Ω nominal
  - Usable temperature : –10°C to +60°C (+14°F to +140°F) range
  - Frequency stability : Less than ±0.0007% from 1 min. to 60 min. after power ON. After that, rate of stability change is less than ±0.0001%/hr. at +25°C (+77°F). Temperature fluctuations (0°C to +50°C; +32°F to +122°F) less than ±0.0005%.
  - Power supply requirement : 13.8 V DC ± 15% (20 A)
  - Current drain : Transmit 20 A  
Receiver squelched 1.7 A  
max. audio 1.9 A
  - Dimensions : 167(W) × 200(D) × 58(H) mm  
6<sup>9</sup>/<sub>16</sub>(W) × 7<sup>7</sup>/<sub>8</sub>(D) × 2<sup>9</sup>/<sub>32</sub>(H) in (projections not included)
  - Weight : 2.5 kg (5.5 lb)
- ## TRANSMITTER
- Output power :
 

HF, 50 MHz	SSB, CW, FM, RTTY	5–100 W
	AM	2–40 W
144 MHz	SSB, CW, FM, RTTY	1–10 W
	AM	1–4 W
  - Spurious emissions :
 

HF	Less than –50 dB
50 MHz	Less than –60 dB
144 MHz	Less than –60 dB
  - Carrier suppression : More than 40 dB
  - Unwanted sideband : More than 50 dB
  - Microphone impedance : 600 Ω

## RECEIVER

- Receive system :
  - SSB, CW, AM, RTTY, Double-conversion superheterodyne WFM
  - FM Triple-conversion superheterodyne
- Intermediate frequencies:
 

MODE	1st	2nd	3rd
SSB	69.0115 MHz	9.0115 MHz	–
AM	69.0100 MHz	9.0100 MHz	–
CW	69.0106 MHz	9.0106 MHz	–
FM	69.0115 MHz	9.0115 MHz	455 kHz
RTTY	69.0105 MHz	9.0105 MHz	–
WFM	70.7000 MHz	10.0115 MHz	–
- Sensitivity (preamp ON):
 

SSB, CW	1.8–29.9950 MHz*
(for 10 dB S/N)	Less than 0.16 μV
	50–54 MHz
	Less than 0.16 μV
	144–148 MHz
	Less than 0.16 μV
AM	0.5–1.8 MHz
(for 10 dB S/N)	Less than 31.6 μV
	1.8–29.9950 MHz*
	Less than 2.0 μV
	50–54 MHz
	Less than 2.0 μV
	144–148 MHz
	Less than 2.0 μV
FM	28.0–29.7 MHz
(for 12 dB SINAD)	Less than 0.5 μV
	50–54 MHz
	Less than 0.3 μV
	144–148 MHz
	Less than 0.3 μV
WFM	76–108 MHz
(for 12 dB SINAD)	Less than 10.0 μV

\*Some frequency ranges outside of the ham bands are not guaranteed.
- Squelch sensitivity (preamp ON) :
 

SSB	Less than 5.6 μV at threshold
FM	Less than 0.5 μV at threshold
- Selectivity (normal filter selection) :
 

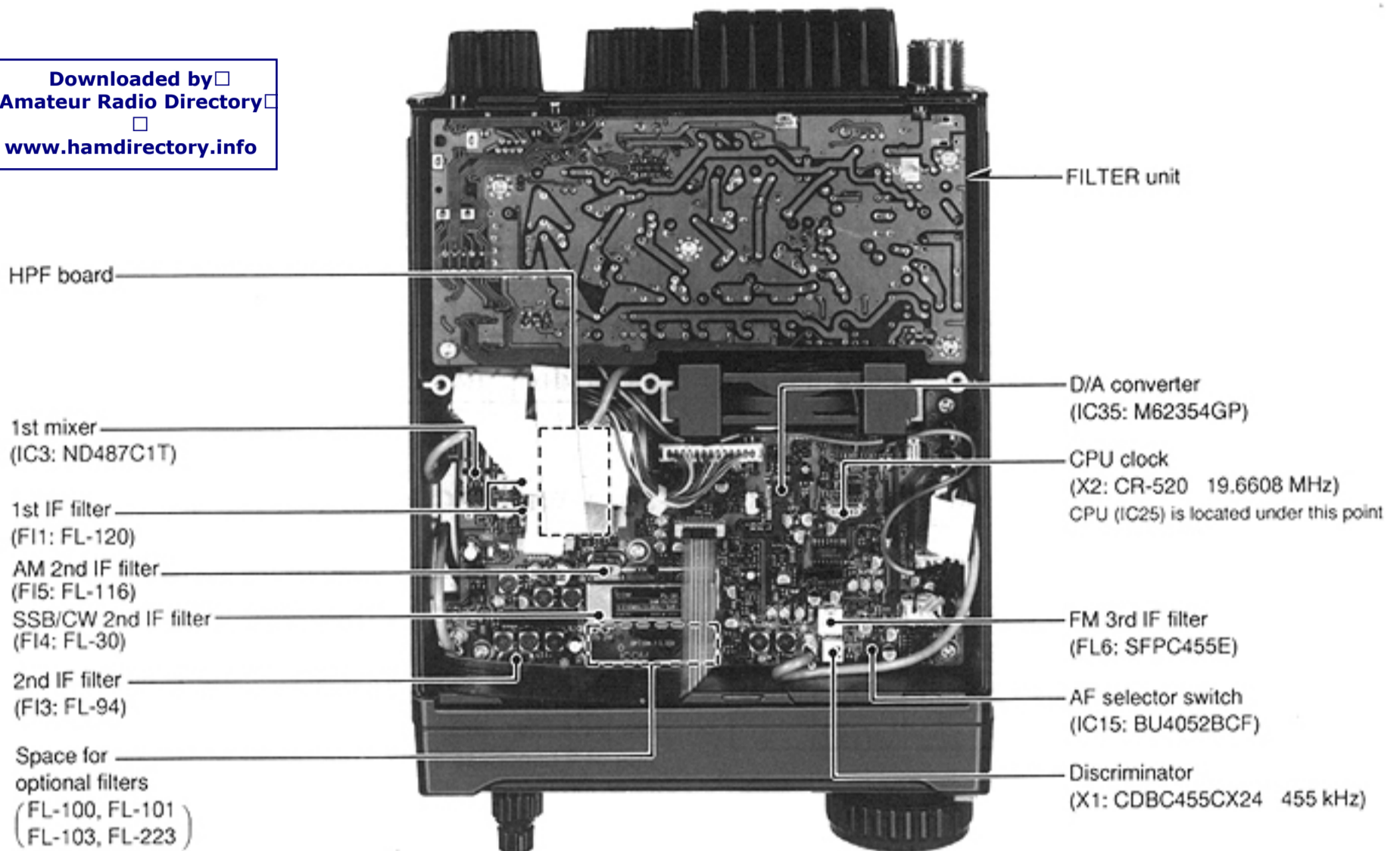
SSB, CW, RTTY	More than 2.3 kHz/–6 dB
	Less than 4.0 kHz/–60 dB
AM	More than 6.0 kHz/–6 dB
	Less than 20.0 kHz/–40 dB
FM	More than 12.0 kHz/–6 dB
	Less than 30.0 kHz/–50 dB
FM narrow	More than 8.0 kHz/–6 dB
- Spurious and image rejection ratio : More than 70 dB (HF bands only)
- Audio output power : More than 2.0 W (at 10% distortion with an 8 Ω load)
- RIT variable range : ±1.0 kHz max.

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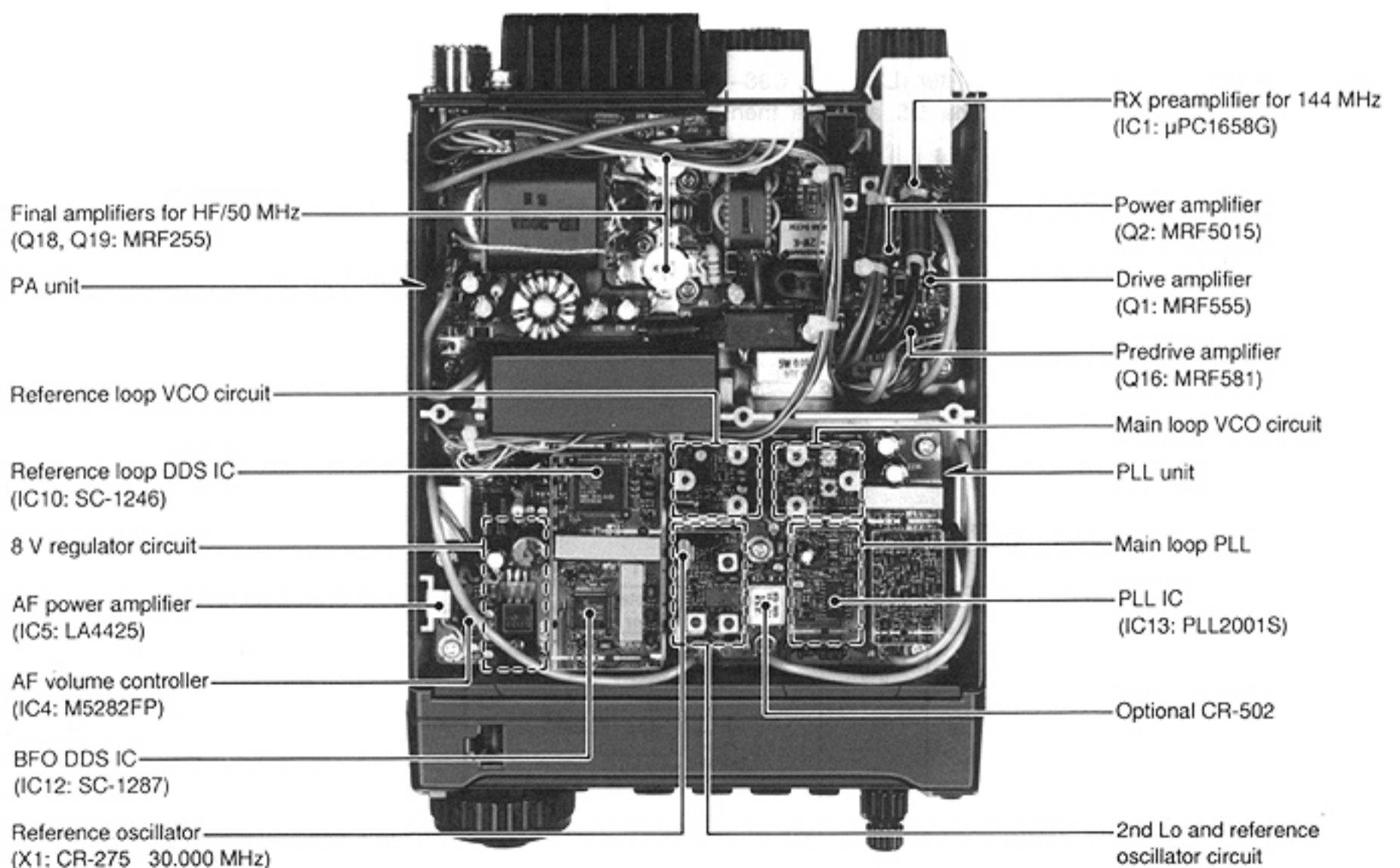
## SECTION 2 INSIDE VIEWS

### ● MAIN UNIT

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### ● PA AND PLL UNITS



# SECTION 3 CIRCUIT DESCRIPTION

## 3-1 RECEIVER CIRCUITS

### 3-1-1 HF/50 MHz RF CIRCUIT (FILTER AND MAIN UNITS, HPF BOARD)

HF/50 MHz RF filters pass only the desired band signals and suppress any undesired band signals. The HF/50 MHz RF circuit has 7 low-pass filters and 6 high-pass filters for specified band use.

HF/50 MHz RF signals from the [ANT1] connector, pass through one of 7 low-pass filters as below, the transmit/receive switching relay (RL1) and low-pass filter (L1, L2, C1-C5), and are then applied to the MAIN unit via P1 (MAIN unit J1).

#### Used RF low-pass filter (FILTER unit)

Band	Control signal	Input relay	Band	Control signal	Input relay
0.03-2 MHz	L1	RL15	15-22 MHz	L5	RL11
2-4 MHz	L2	RL13	22-30 MHz	L6	RL7
4-8 MHz	L3	RL5	30-60 MHz	L7	RL3
8-15 MHz	L4	RL9			

The signals from the FILTER unit are applied to or bypass the 20 dB attenuator (R3, R4, Q1, D1). The signals pass through the high-pass filter (L3-L7, C3-C7, R5-R7) to suppress strong signals below 1.6 MHz and are then applied to the HPF board via the "TOAT" terminal.

#### (1) 0.03-2 MHz and 30-40 MHz

The signals pass through a low-pass filter (L23, L24, C38-C42), bypass the high-pass filters via D5 and are then applied to the preamplifier circuit.

#### (2) 2-30 MHz

The signals pass through the low-pass filter (L23, L24, C38-C42). The filtered signals are applied to one of 5 high-pass filters as at right above and are then applied to the preamplifier circuit.

#### (3) 40-60 MHz

The signals pass through the high-pass filter (L29-L31, C47-C51) via D12 and are then applied to the preamplifier circuit.

#### Used RF high-pass filter (HPF board)

Band	Control signal	Input diode	Band	Control signal	Input diode
0.03-2 MHz	TH	D5	15-22 MHz	H5	D21
2-4 MHz	H2	D16	22-30 MHz	H6	D7
4-8 MHz	H3	D20	30-40 MHz	TH	D5
8-15 MHz	H4	D17	40-60 MHz	BV, T8	D12

### 3-1-2 VHF RF CIRCUIT (PA UNIT)

VHF RF bandpass filters pass only the desired band signals and suppress any undesired band signals. The VHF RF circuit has 2 bandpass filters.

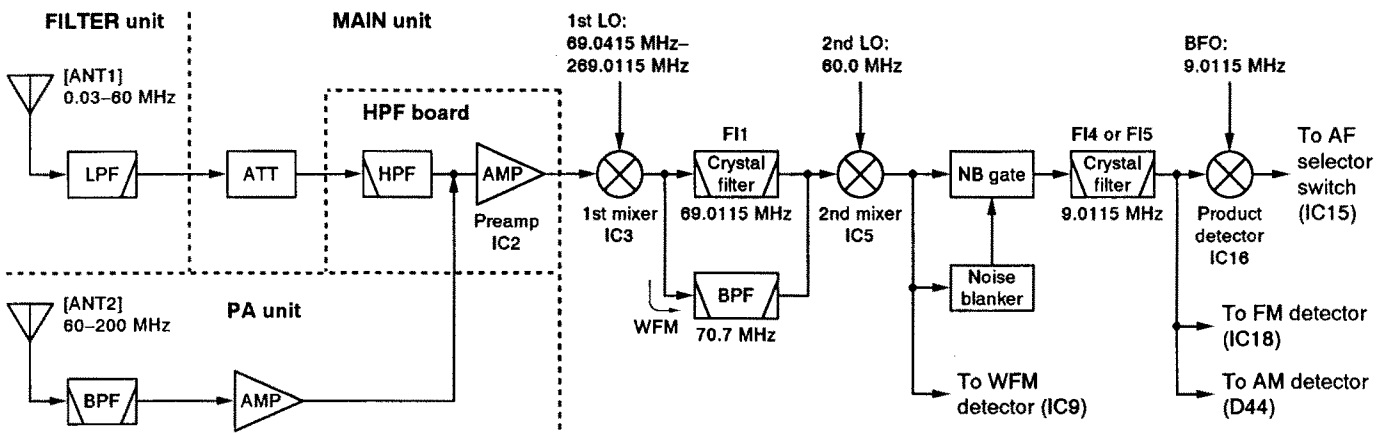
VHF RF signals from the [ANT2] connector, pass through a low-pass filter, antenna switching circuit (D4, D14, D15) and one of 2 bandpass filters. The signals within 144-148 MHz pass through one bandpass filter (L29, L30, C45-C49) and the signals within 60-144 MHz or 148-200 MHz pass through another bandpass filter (L25, L26, L40, L49, C52-C57, C151-C154).

The filtered signals pass through the RF attenuator (R27, Q24), are amplified at the RF amplifier (IC1), applied to the MAIN unit via P2 (MAIN unit J3) and are then applied to the preamplifier circuit in the HPF board.

### 3-1-3 PREAMPLIFIER CIRCUIT (HPF BOARD)

The preamplifier circuit in the IC-706 has approx. 15 dB gain over a wideband frequency range.

## • RECEIVER CONSTRUCTION



When the preamplifier is turned ON, the signals from the RF circuit are applied to the preamplifier (IC1) via D25. Amplified or bypassed signals enter the MAIN unit via the "AMPI" terminal and are applied to the 1st mixer circuit (IC3).

### 3-1-4 1st MIXER CIRCUIT (MAIN UNIT)

The 1st mixer circuit mixes the receive signals with the 1st LO signal to convert the receive signal frequencies to a 69 or 70.7 MHz 1st IF.

The signals from the preamplifier circuit, or signals which bypass the preamplifier, are applied to a low-pass filter and then to the 1st mixer (IC3).

The 1st LO signal (69.0415–269.0115 MHz) enters the MAIN unit from the PLL unit via J4. The LO signal is amplified at Q4, filtered by a low-pass filter, and then, applied to the 1st mixer.

**1st IF frequency**

Mode	Frequency
SSB, FM	69.0115 MHz
CW, RTTY	69.0106 MHz
AM	69.0100 MHz
WFM	70.7000 MHz

### 3-1-5 1st IF CIRCUIT (MAIN UNIT)

The 1st IF circuit filters and amplifies the 1st IF signals. The 1st IF signals are applied to an MCF (Monolithic Crystal Filter; F11a, F11b) to suppress out-of-band signals.

While in non-WFM modes, the 69 MHz 1st IF signals pass through the pair of MCF's (F11) and are applied to the IF amplifier (IC4). While in WFM mode, the 70.7 MHz 1st IF signal pass through a bandpass filter (L104–L108, C358–C361) and are applied to the IF amplifier (IC4).

The AGC voltage is supplied to the transmit/receive switching circuit (D13, D14) and D13/D14 function as PIN attenuators for AGC operation.

The amplified signals are then applied to the 2nd mixer (IC5).

### 3-1-6 2nd MIXER CIRCUIT (MAIN UNIT)

The 2nd mixer circuit mixes the amplified 1st IF signals and 2nd LO signal (60.00 MHz) to convert the 1st IF to a 2nd IF.

The 1st IF signals from IC4 are converted to 9 MHz or 10.7 MHz 2nd IF signals at the 2nd mixer (IC5).

The 2nd IF signals are applied to F13 to suppress undesired signals such as the 2nd LO signal, and are then applied to the noise blanker gate (D20, D21).

**2nd IF frequency**

Mode	Frequency
SSB, FM	9.0115 MHz
CW, RTTY	9.0106 MHz
AM	9.0100 MHz
WFM	10.7000 MHz

While in FM (normal) mode, the IF signals pass through the low-pass filter (L52, C82–C84) bypassing F11 and the noise blanker gate and are then applied to the 2nd IF circuit.

While in WFM mode, the IF signals pass through the low-pass filter (L52, C82–C84), IF amplifier (Q5), ceramic filter (F12) and IF amplifier (Q52). The signals are then applied to the FM IF IC (IC9) for demodulation into AF signals.

### 3-1-7 NOISE BLANKER CIRCUIT (MAIN UNIT)

The noise blanker circuit detects pulse type noise, and turns OFF the signal line when noise appears.

The 2nd IF signals from F13 are applied to the noise blanker gate (D20, D21). A portion of the signals from F13 are amplified at the noise amplifiers (Q10, Q12, amplifier section of IC9), then detected at the noise detector (D39) to convert the noise components to DC voltages.

The signals are then applied to the noise blanker switch (Q13, Q14). At the moment the detected voltage exceeds the Q13's threshold level, Q14 outputs a blanking signal to close the noise blanker gate (D20, D21) by applying reverse-biased voltage.

The detected voltage from D39 is also applied to the noise blanker AGC circuit (Q11, Q16) and is then fed back to the amplifier (IC9) as a bias voltage. The noise AGC circuit prevents closure of the noise blanker gate for long periods by non-pulse-type noise. The time constant of the noise blanker AGC circuit is determined by R143 and C459.

The signals from the noise blanker gate are then applied to the 2nd IF circuit.

### 3-1-8 2nd IF CIRCUIT (MAIN UNIT)

The 2nd IF circuit amplifies and filters the 2nd IF signals.

Both the signals passed through and bypassing the noise blanker gate (D20, D21) are amplified at IC6 via D22 and applied to a 2nd IF filter as shown in the following table.

**2nd IF filters**

Mode	Used filter	Control signal
SSB med., CW med., RTTY med., AM nar.	FL-30 (F14)	2F23
AM	FL-116 (F15)	2F60
FM, FM nar.	Bypassed	2NTH
SSB nar.	Optional FL-223	2FOP
CW nar., RTTY nar.	Optional FL-100, FL-101, FL-223	2FOP
SSB wide, CW wide, RTTY wide	Optional FL-103	2FOP

The AGC voltage is supplied to the transmit/receive switching circuit (D22, D23) and D22/D23 function as PIN attenuators for AGC operation.

The filtered or bypassed signals are applied to the buffer amplifier (Q65), IF amplifiers (Q42, Q43) and buffer amplifier (Q44) to obtain a detectable level. The AGC voltage is supplied to the 2nd gate of Q42 for AGC operation.

Output signals from Q44 are shared between the SSB/CW/RTTY detector (IC16), AM detector (D44) and AGC detector (D43). Output signals from Q65 are applied to the FM IF IC (IC18).

### 3-1-9 IF SHIFT CIRCUIT (MAIN UNIT)

The IF shift circuit shifts the center frequency of IF signals to electronically shift the center frequency.

The IF shift circuit shifts the 1st LO and BFO within  $\pm 1.2$  kHz in SSB/CW/RTTY modes or  $\pm 250$  Hz in CW-N/RTTY-N modes. As a result, the 2nd IF (also 1st IF) is shifted from the center frequency of the 2nd IF filter (F14, F15 or an optional IF filter). This means 2nd IF signals do not pass through the center of the 2nd IF filter because the passband width is fixed in the 2nd IF filter. Therefore, the higher or lower frequency components of the IF are cut out. Since the BFO frequency is also shifted the same value as the 1st IF, frequency is corrected at the detector.

In the IC-706, the 1st LO frequency is shifted to change the 2nd IF because a fixed 2nd LO frequency (60 MHz) is used. The 1st IF filter (F11) and crystal filter (F13) have 15 kHz and 8 kHz passband widths, respectively, and do not affect IF shift operation.

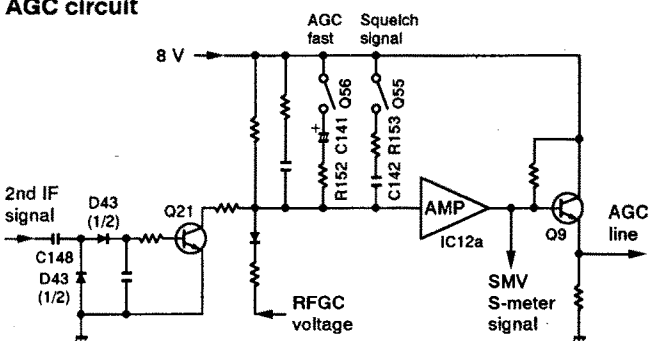
### 3-1-10 AGC CIRCUIT (MAIN UNIT)

The AGC (Automatic Gain Control) circuit reduces IF amplifier gain to keep the audio output at a constant level. The receiver gain is determined by the voltage on the AGC line (Q9 collector).

The 2nd IF signal from the buffer amplifier (Q44) is detected at the AGC detector (D43) and applied to the AGC amplifiers (Q21, IC12a, Q9). IC12a sets the receiver gain with the [RF/SQL] control via the "RFGC" signal line.

When receiving strong signals, the detected voltage increases and the AGC voltage decreases via the DC amplifier (Q9). The AGC voltage is used for the bias voltage of the transmit/receive switching PIN diodes (D13/14, D22/D23) to attenuate the received signals.

AGC circuit



When AGC slow is selected, C141 and R152 are connected in parallel to obtain appropriate AGC characteristics.

### 3-1-11 S-METER CIRCUIT (MAIN UNIT)

The S-meter circuit indicates the relative received signal strength while receiving by utilizing the AGC voltage which changes depending on the received signal strength.

The output voltage of the AGC amplifier (IC12a pin 1) is applied to the main CPU (IC25 pin 30) as an S-meter signal via the "SMV" signal line. The FM S-meter signal from the FM IF IC (IC18 pin 12) is also applied to the "SMV" signal line via Q68.

The S-meter signal is applied to the sub CPU and is then displayed on the S-meter readout.

### 3-1-12 SQUELCH CIRCUIT (MAIN UNIT)

The squelch circuit mutes audio output when the S-meter signal is lower than the [RF/SQL] control setting level.

The S-meter signal is applied to the main CPU (IC25 pin 30) and is compared with the threshold level set by the [RF/SQL] control. The [RF/SQL] setting is picked up at the sub CPU (DISPLAY unit IC1 pin 99). The CPU compares the S-meter signal and [RF/SQL] setting to close or open the squelch.

In addition, the noise squelch signal from the FM IF IC (IC18 pin 14) is applied to the main CPU (pin 31) in FM mode. A portion of the AF signals from the FM IF IC (IC18 pin 9) are applied to the active filter section (pin 8) where noise components above 20 kHz are amplified. The signals are rectified at the noise detector section and then output from pin 14. The resulting signal is applied to the main CPU via the "NSQV" signal line.

### 3-1-13 DEMODULATOR CIRCUITS (MAIN UNIT)

#### (1) SSB/CW/RTTY modes

The 2nd IF signals from Q44 are mixed with the BFO signal from the PLL unit at the product detector (IC16 pin 6). The detected AF signal from IC16 (pin 3) is applied to the AF selector switch (IC15 pin 12).

#### (2) AM mode

The 2nd IF signals from Q44 are detected at D44. The detected AF signal is applied to the AF selector switch (IC15 pin 14).

#### (3) FM/FM narrow modes

The 2nd IF signals from the buffer amplifier (Q65) are applied to the FM IF IC (IC15 pin 16) where the IF signals are converted into 455 kHz IF signals. The signals pass through F16 and are applied to the quadrature detector section. X1 is used for quadrature detector. The detected AF signals from pin 9 are then applied to the AF selector switch (IC15 pin 15) via the de-emphasis circuit (IC12b).



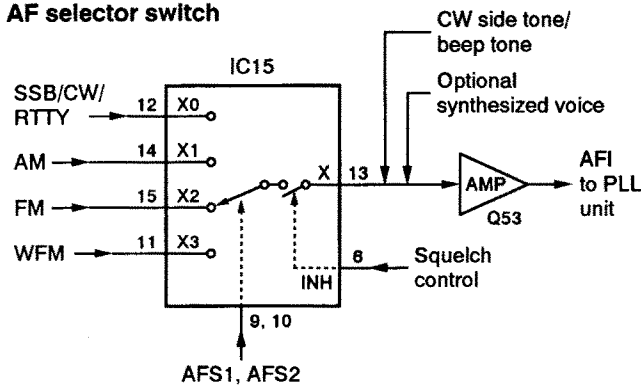
#### (4) WFM mode

The 2nd IF signals from the IF amplifier (Q5) pass through FI2, are amplified at Q52 and are then applied to the FM IF IC (IC9 pins 2, 3) where the IF signals are converted into AF signals. The detected AF signals from pin 8 are then applied to the AF selector switch (IC15 pin 11).

### 3-1-14 AF SELECTOR SWITCH (MAIN UNIT)

The AF signal from one of the detector circuits is applied to the AF selector switch (IC15). IC15 consists of dual 4-channel analog switches which are selected with a mode signal and the squelch control signal.

#### AF selector switch



### 3-1-15 AF AMPLIFIER CIRCUIT (MAIN AND PLL UNITS)

The AF amplifier amplifies the AF input signal to a suitable driving level for the speaker.

The AF signal from the AF selector switch (IC15) is applied to the AF amplifier (Q53). The CW side tone/beep tone and optional synthesized voice are also applied to Q53. The amplified signal is then applied to the PLL unit.

The signals from the MAIN unit are applied to the VCA (Voltage Controlled Amplifier, IC4) circuit. The AF gain setting from the main CPU is converted to DC voltage at the D/A converter (MAIN unit IC35) and applied to the VCA control terminal (IC4 pin 8) via the "AFGC" signal line. The AF signal from IC4 (pin 9) is power-amplified at IC5 to drive the speaker.

## 3-2 TRANSMITTER CIRCUITS

### 3-2-1 MICROPHONE AMPLIFIER CIRCUIT (MAIN UNIT)

The microphone amplifier circuit amplifies microphone input signals and outputs the amplified signals to the balanced modulator or FM modulation circuit.

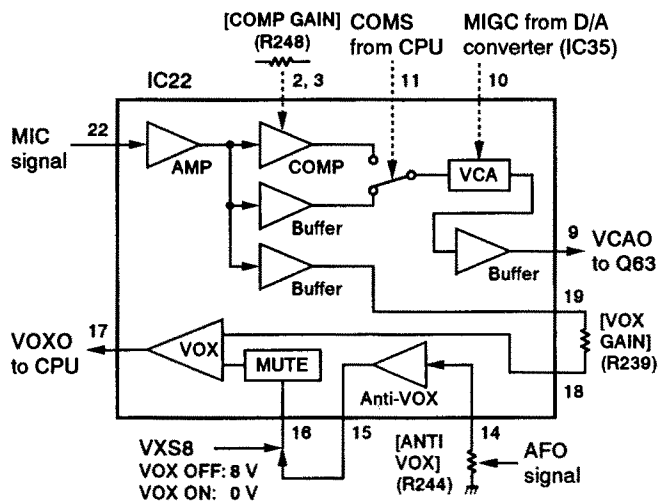
Audio signals from the front or rear panel [MIC] connector enter the microphone amplifier IC (IC22 pin 22) and are then amplified at the microphone amplifier or speech compressor section. Compression level is adjusted with the [COMP GAIN] control (R248).

The amplified or compressed signals are applied to the VCA section of IC22. The microphone gain setting from the D/A converter (IC35 pin 11) is applied to the VCA control terminal (IC22 pin 10). The resulting signals from pin 9 are then applied to the buffer amplifier (Q63). External modulation input from the [ACC] socket (pin 11) is also applied to Q63.

While in SSB mode, the amplified signals from Q63 are applied to the AF selector switch (IC23) and then to the balanced modulator (IC17).

While in FM/AM mode, the amplified signals from Q63 are applied to the limiter amplifier (IC24a) and splatter filter (IC24b). The signals are then applied to the AF selector switch (IC23) in AM mode or to the varactor diode (D67) in FM mode.

#### Microphone amplifier



### 3-2-2 VOX CIRCUIT (MAIN UNIT)

The VOX (Voice-Operated-Transmission) circuit sets transmitting conditions according to voice input. The microphone amplifier IC (IC22) includes the VOX circuit.

The microphone signals from IC22 (pin 19) pass through the [VOX GAIN] control (R239) and are then applied to the VOX comparator section (IC22 pin 18) to switch the keying input of the main CPU (IC25 pin 14). When voice levels exceed the reference level, the VOX circuit sets the transceiver to transmit.

On the other hand, a speaker drive signal from the AF power amplifier (PLL unit IC5) is applied to the anti-VOX comparator section (IC22 pin 14) via the [ANTI VOX] control (R244). When the audio output level increases, this comparator cuts out the VOX comparator via the MUTE terminal (IC22 pin 16).

### 3-2-3 BALANCED MODULATOR (MAIN UNIT)

The balanced modulator converts the AF signal from the microphone amplifier to a 9 MHz IF signal with a BFO (Beat Frequency Oscillator) signal.

Microphone signals from the AF selector switch (IC23) are applied to the balanced modulator (IC17 pin 6). The BFO signal from the PLL unit is applied to IC17 (pin 8) as a carrier signal.

IC17 is a double balanced mixer IC and outputs a double side band (DSB) signal with -40 dB of carrier suppression. R191 and R193 adjust the balanced level of IC17 for maximum carrier suppression. The resulting signal passes through a 9 MHz IF filter (FI4 in SSB/CW/RTTY modes) to suppress unwanted sideband signals.

In AM mode, R195 is connected to upset the balance of IC17 via Q23 for leaking the BFO signal as a carrier signal. The CW keying/RTTY TX signal is applied to IC17 pin 6.

### 3-2-4 FM MODULATION CIRCUIT (MAIN UNIT)

The microphone signals from Q63 are applied to the limiter amplifier (IC24a) and the splatter filter (IC24b). The 1750 Hz European tone signal from the main CPU (IC25 pin 40) is also applied to IC24a pin 2 for European repeaters. The subaudible tone signal (67.0-254.1 Hz) from the main CPU (IC25 pin 37) is also applied to IC24b pin 2 for repeater use.

The resulting signals are applied to the VCO circuit (Q40, D67) via R274 to change the reactance of the varactor diode (D67) for FM modulation. The modulated signal is buffer-amplified at Q41 and bypasses the 9 MHz IF filter.

### 3-2-5 IF AMPLIFIER (MAIN UNIT)

The 9 MHz IF signal from a modulation circuit passes through the 9 MHz IF filter (FI4 in SSB/CW/RTTY modes; FI5 in AM mode; through in FM mode). The signal is amplified at IC6, passes through R511 and L55, and the low-pass filter (L52, C82-C84) in non-FM modes or FI3 in FM mode. The signal is then applied to the mixer (IC5).

The signal is mixed with the 2nd LO signal (60 MHz) and converted to a 69 MHz IF signal at IC5. The 69 MHz IF signal passes through a bandpass filter, the IF amplifier (IC4) and the 69 MHz IF filter (FI1) and is then converted to the displayed frequency at the balanced mixer (IC3) with the 1st LO signal. The mixers (IC3, IC5) and IF amplifiers (IC4, IC6) are used in both receiving and transmitting commonly.

The ALC voltage is supplied to the transmit/receive switching circuit (D13/D14 and D22/D23) of IF amplifiers. D13/D14 and D22/D23 function as PIN attenuators for ALC operation.

### 3-2-6 RF CIRCUIT (MAIN AND PA UNITS, HPF BOARD)

The RF circuit amplifies the displayed frequency signal to obtain 100 W of RF output power for HF/50 MHz bands and 10 W for 144 MHz band.

The HF/50 MHz RF signal from the balanced mixer (IC3) enters the HPF board and then passes through one of 6 high-pass filters. (Refer to p. 3-1 for used RF high-pass filter.) The 50 MHz RF signal passes through a low-pass filter additionally. The filtered signal returns to the MAIN unit, is amplified at IC1, and is then applied to the PA unit.

The 144 MHz RF signal from the balanced mixer (IC3) bypasses the filters in the HPF board via "TOTR" line and passes through the bandpass filter (L99-L101, C329-C333) in the MAIN unit. The signal is amplified at IC38 and IC1 and is then applied to the PA unit.

The signal from IC1 enters the PA unit and is amplified at the predrive amplifiers (Q16, Q1) and drive amplifier (Q2) in sequence. For the 144 MHz RF signal, 10 W of RF output power is obtained at Q2 and the signal is applied to the low-pass filter circuit via RL1.

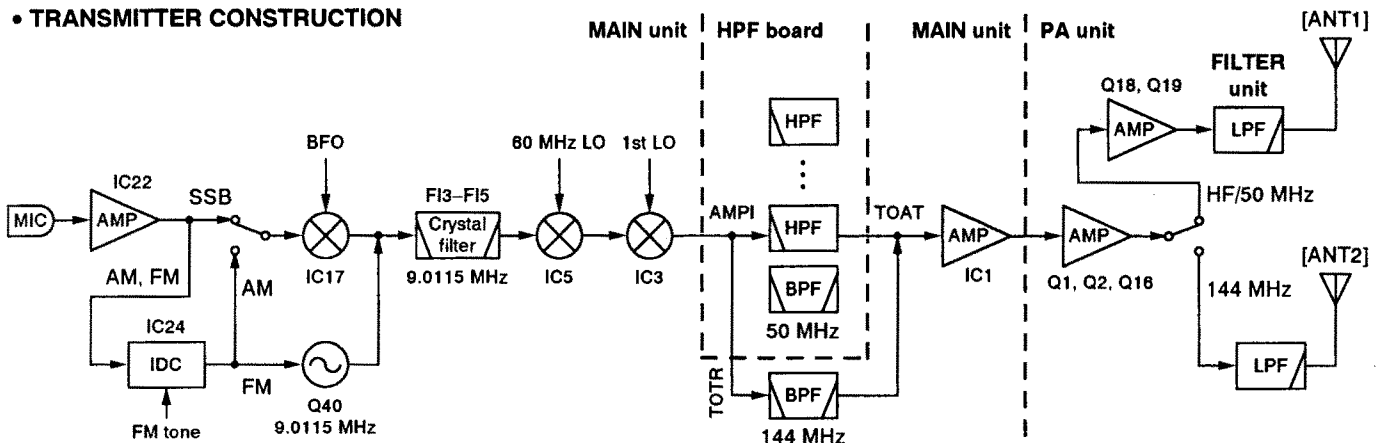
The HF/50 MHz RF signal from Q2 is amplified at power amplifier (Q18, Q19) to obtain a stable 100 W of RF output power. The signal is then applied to one of the low-pass filters in the FILTER unit.

### 3-2-7 LOW-PASS FILTER CIRCUIT (FILTER AND PA UNITS)

The low-pass filter circuit consists of 8 Chebyshev low-pass filters to suppress the higher harmonic components.

The HF/50 MHz RF signal from the power amplifier passes through the transmit/receive switching circuit (FILTER unit RL1) is applied to one of the 7 low-pass filters. According to the operating frequency, the band signals (L1-L7) from the MAIN unit select a low-pass filter. The filtered signal is then applied to the [ANT1] connector.

## • TRANSMITTER CONSTRUCTION



The 144 MHz RF signal from Q2 (PA unit) passes through the band selector relay (RL1), the RF power detector circuit (L12, D2, D3), transmit/receive switching circuit (D4, D14, D15) and is then applied to the low-pass filter (L16, L17, C35–C39). The filtered signal is then applied to the [ANT2] connector.

### 3-2-8 ALC CIRCUIT (MAIN UNIT)

The ALC (Automatic Level Control) circuit reduces the gain of IF amplifiers in order for the transceiver to output a constant RF power set by the RF power setting even when the supplied voltage shifts, etc.

The HF/50 MHz RF power signal level is detected at D9 (FILTER unit), buffer-amplified at IC1b and applied to the MAIN unit as the "FOR" voltage. The 144 MHz RF power signal level is detected at D2 and D3 (PA unit) and applied to the MAIN unit as the "VFOR" voltage.

The "FOR" and "VFOR" voltages are combined to "FORV" voltage and it is then applied to IC7b (pin 6). The "POC" voltage from the D/A converter (IC35 pin 12), determined by the RF power setting, is applied to IC7b (pin 5) as the reference voltage.

When the "FORV" voltage exceeds the "POC" voltage, ALC bias voltage from IC7a (pin 1) controls the PIN diodes (D13, D14, D22, D23) using Q39. This adjusts the output power to the determined level by the RF power setting until the "FORV" and "POC" voltages are equalized.

In AM mode, IC7a operates as an averaging ALC amplifier with Q7 and C116. Q64 turns ON and the "POC" voltage is shifted for 40 W AM output power (maximum, 4 W for 144 MHz band) through R499.

The ALC bias voltage from IC7a is also applied to the main CPU (IC25 pin 34) as "ALCV" voltage for ALC meter indication.

An external ALC input (minus voltage) from the [ACC] socket (pin 6) is shifted to plus voltage at D70 and is applied to the buffer amplifier (Q8). External ALC operation is identical to that of the internal ALC.

### 3-2-9 APC CIRCUIT (MAIN UNIT)

The APC (Automatic Power Control) circuit protects the power amplifiers on the PA unit from high SWR and excessive current for HF/50 MHz bands.

The reflected wave signal appears and increases on the antenna connector when the antenna is mismatched. The HF/50 MHz reflected signal level is detected at D10 (FILTER unit), buffer-amplified at IC1a and applied to the MAIN unit as the "REFV" voltage.

When the "REFV" signal level increases, IC7c decreases the ALC voltage via IC7a to activate the ALC.

For the current APC, the power transistor current is obtained by detecting the voltages ("ICH" and "ICL") which appear at both terminals of a 0.012  $\Omega$  resistor (R35) on the PA unit. The detected voltage is applied to the differential amplifier (IC7d pins 12, 13). When the current of the final transistors is more than 22 A, IC7d controls the ALC line via IC7a to prevent excessive current flow.

### 3-2-10 RF, ALC, SWR METER CIRCUITS (MAIN UNIT)

While transmitting, RF, ALC or SWR meter readings are available and can be selected with the [MET] switch.

#### (1) Power meter

The "FOR" and "VFOR" voltages are combined to "FORV" voltage and it is then applied to the main CPU (IC25 pin 32) for indicating the output power.

#### (2) ALC meter

The ALC bias voltage from IC7a pin 1 is applied to the main CPU (IC25 pin 34) for indicating the ALC level.

#### (3) SWR meter

The "FORV" and "REFV" voltages are applied to the main CPU pins 32 and 33, respectively. The main CPU compares the ratio of "FORV" to "REFV" voltage and indicates the SWR for the [ANT1] connector.

## 3-3 PLL CIRCUITS

### 3-3-1 GENERAL

The PLL unit generates a 1st LO frequency (69.0415–269.0115 MHz), a 2nd LO frequency (60 MHz), a BFO frequency (9.01 MHz), FM 3rd LO frequency (9.4665/9.4650 MHz) and a TX FM PLL reference frequency (9.0115/9.0100 MHz).

The 1st LO PLL adopts a mixerless dual loop PLL system and has 2 VCO circuits. The BFO uses a DDS and the 2nd LO uses a fixed frequency double that of the crystal oscillator.

### 3-3-2 1ST LO PLL CIRCUIT (PLL UNIT)

The 1st LO PLL contains a main loop and reference loop forming a dual loop system.

The reference loop generates a 10.6605 to 10.683 MHz frequency using a DDS circuit, and the main loop generates a 69.0415 to 134.50575 MHz frequency using the reference loop frequency.

While operating on 60 MHz and above, the output is doubled by 2 at D8 for oscillating a wide frequency range.

### (1) REFERENCE LOOP PLL

The oscillated signal at the reference VCO (Q12, D13) is amplified at the amplifiers (Q13, Q16) and is then applied to the DDS IC (IC10 pin 46). The signal is then divided and detected on phase with the DDS generated frequency.

The detected signal output from IC10 (pin 56) is converted into a DC voltage (lock voltage) at the loop filter (R88, R203, C132) and then fed back to the varactor diode (D13) in the VCO circuit.

### (2) MAIN LOOP PLL

The oscillated signal at one of the main loop VCOs (Q6, Q8) is amplified at the buffer amplifiers (Q10, Q36) and is then applied to the PLL IC (IC13 pin 8). The signal is then divided and detected on phase with the reference loop output frequency.

The detected signal output from IC13 (pin 12) is converted into a DC voltage (lock voltage) at the active loop filter (Q47-Q49) and then fed back to one of the varactor diodes (D4, D6) in the VCO circuits. While operating on 60 MHz and above, the VCO output is doubled by 2 at D8 and amplified at Q37.

The oscillated signal passes through a low-pass or band-pass filter and is then applied to the MAIN unit as a 1st LO signal.

### 3-3-3 2ND LO AND REFERENCE OSCILLATOR CIRCUITS

The reference oscillator (X1, Q14) generates a 30.0 MHz frequency used for the 2 DDS ICs as a system clock and for the LO output. The oscillated signal is buffer-amplified at Q27, doubled by 2 at Q15 and the 60 MHz frequency is picked up at the bandpass filter (L37, L38). The 60 MHz signal is applied to the IF unit as a 2nd LO signal.

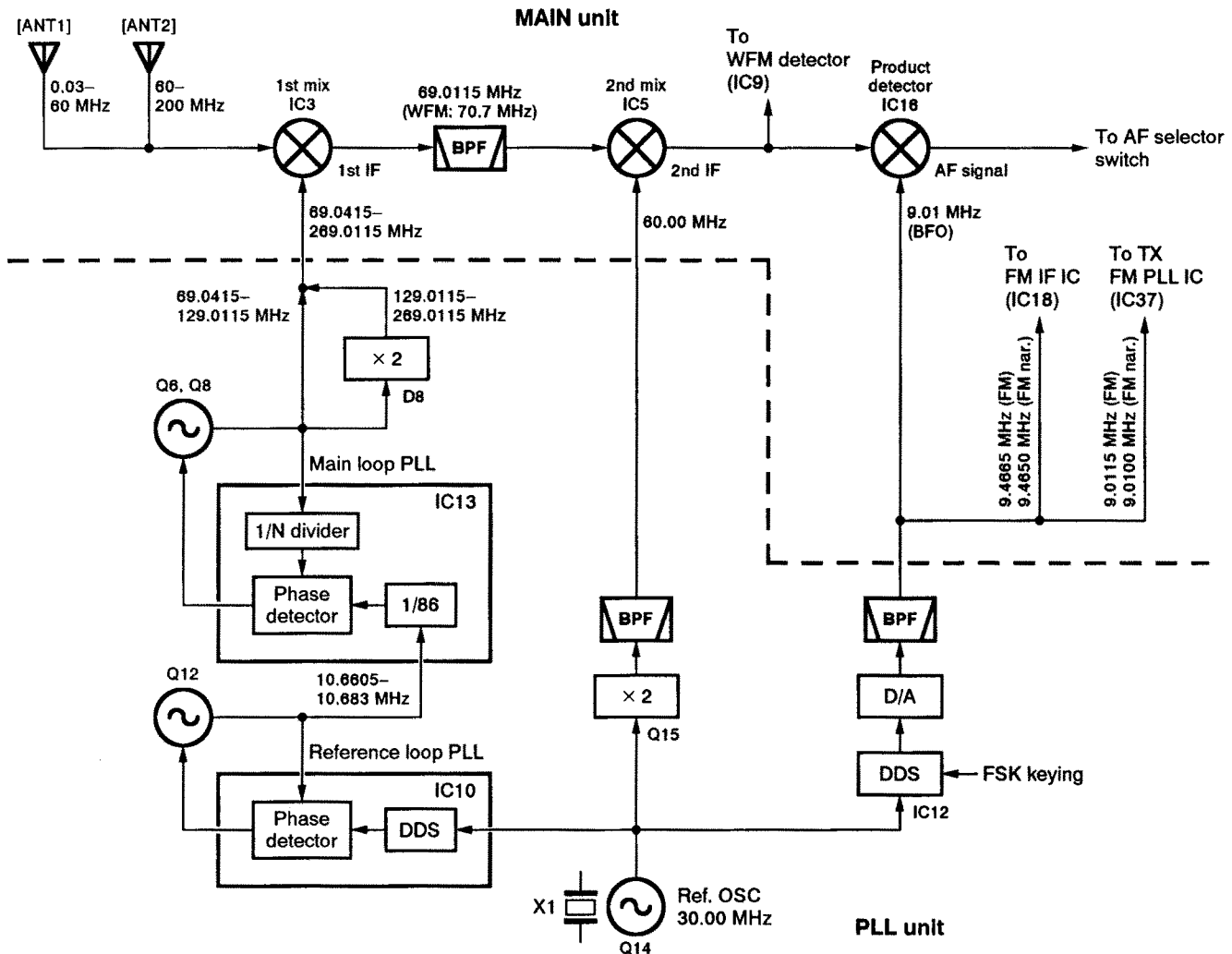
### 3-3-4 BFO CIRCUIT

The DDS IC (IC12) generates a 10-bit digital signal. The signal is converted to an analog wave signal at the D/A converter. The analog wave is passed through the high-pass filter and low-pass filter. The 9 MHz BFO signal passes through the bandpass filter and is then applied to the MAIN unit via the "BFO" signal line.

While transmitting in RTTY mode, the RTTY keying signal is applied to IC12 pin 3 to shift the generated frequency and to obtain 2 frequencies for FSK operation.

While receiving in FM or FM narrow mode, the BFO circuit generates a 9.4665 MHz or 9.4650 MHz frequency as the 3rd LO signal, respectively.

### Frequency construction



While transmitting in FM or FM narrow mode, the BFO circuit generates a 9.0115 MHz or 9.0100 MHz frequency as the TX FM PLL reference frequency, respectively.

Mode	RX BFO/3rd LO frequency [MHz]	TX BFO/FM PLL ref. frequency [MHz]
USB	9.0130	9.0130
LSB	9.0100	9.0100
CW	9.0106 (- CW pitch frequency)	9.0106 (- CW pitch frequency)
CW-R	9.0106 (+ CW pitch frequency)	9.0106 (+ CW pitch frequency)
RTTY	9.008375 (2125 Hz tone) 9.008885 (1615 Hz tone)	9.0105 (MARK)
AM	No output	9.0100
FM	9.4665 (3rd LO)	9.0115 (PLL ref.)
FM nar.	9.4650 (3rd LO)	9.0100 (PLL ref.)
WFM	No output	No output

IF shift: Center RTTY: Normal polarity

### 3-4 LOGIC CIRCUITS

#### 3-4-1 BAND SELECTION DATA (MAIN AND PLL UNITS)

To select the correct RF low-pass filter, high-pass filter and VCOs on the PLL unit, the CPU outputs the following band selection data from the I/O expander (MAIN unit IC31, IC32), the A/D converter (MAIN unit IC35) or DDS IC (PLL unit IC10) depending on the displayed frequency.

The A/D converter output from IC35 pin 5 is doubled by 2 at IC34a to obtain the band voltage for external equipment.

##### Band selection data

Frequency (MHz)	IC31, IC32 (MAIN)		IC35 (MAIN)	IC10 (PLL)	
	HPF BPF	LPF	1/2 band voltage	VCO	LPF BPF
0.03-1.999	L1	L1	3.76 V	VCO1	LOF1
2.0-3.999	L2	L2	3.08 V		
4.0-7.999	L3	L3	2.57 V		
8.0-10.999	L4	L4	0 V		
11.0-14.999			2.06 V		
15.0-21.999	L5	L5	1.61 V		
22.0-29.999	L6	L6	1.12 V	VCO2	LOF2
30.0-39.999	B7W	L7	0.61 V		
40.0-59.999	B7				
60.0-128.999	B8W	L8		VCO1	LOF3
129.0-143.999				LOF4	
144.0-148.000	B8			VCO2	LOF5
148.000001-200.000000	B8W			LOF4	

#### 3-4-2 MAIN CPU PORT ALLOCATIONS (MAIN UNIT IC25)

Pin number	Port name	Description
9	SPS (P52)	Outputs a mute signal for AF power amplifier according to the [PHONES] jack.
13	DASH (P97)	Input port for DASH signal of the paddle to the internal keyer.
14	DOT (P96)	Input port for DOT signal of the paddle to the internal keyer.
15	SNDL (P95)	Input port for transmit/receive switching signals. This port becomes "High" while transmitting.
16	TKEY (P94)	Input port for the keying signal of optional AT-180/AH-3 antenna tuners.
17	TCON (P93)	Input port for the optional AH-3 antenna tuner.
19	PWK (P91)	Input port for the [POWER] switch.
20	POWS (P90)	Outputs a power ON signal.
21	ATST (P60)	Outputs start signal for the optional AT-180 antenna tuner.
22	BEEP (P61)	Outputs beep tone and CW side tone signals.
23	AHST (P62)	Outputs start signal for the optional AH-3 antenna tuner.
24	SQSS (P63)	Outputs a squelch control signal.
30	SMV (P70)	S-meter level input for squelch control.
31	NSQV (P71)	FM noise level input for squelch control.
32	FORV (P72)	Forward RF power level input for Po and SWR meter indications.
33	REFV (P73)	Reflected RF power level input for SWR meter indication.
34	ALCV (P74)	ALC level input for ALC meter indication.
37	TONE (P77)	Outputs subaudible tone signals.
39	BUSY (P40)	Input port for the optional UT-102 busy signal. This port becomes "High" during speech synthesis.
40	ETON (P40)	Outputs tone burst signals for European repeaters.
41	SPST (P42)	Outputs a strobe signal for the optional UT-102.
42	IDT (P43)	Outputs serial data for the I/O expanders, optional AT-180/UT-102.
43	ICK (P44)	Outputs a clock signal for the I/O expanders, optional AT-180/UT-102.

### MAIN CPU PORT ALLOCATIONS (Continued)

Pin number	Port name	Description
44	IBST (P45)	Outputs a strobe signal for the I/O expander ICs (IC31, IC32).
45	IMST (P46)	Outputs a strobe signal for the I/O expander IC (IC30).
46	IAST (P47)	Outputs a strobe signal for the D/A converter IC (IC35).
48	PBST (P27)	Outputs a strobe signal for the BFO DDS IC (IC12).
49–51	CON2–CON0 (P26–P24)	Output mode control signals for the 1st LO DDS IC (IC10).
52	PDST (P23)	Outputs a strobe signal for the 1st LO DDS IC (IC10).
53	PCE (P22)	Outputs a strobe signal for the 1st LO PLL IC (IC13).
54	PDT (P21)	Outputs serial data for the DDS ICs and PLL IC.
55	PCK (P20)	Outputs a clock signal for the DDS ICs and PLL IC.
65	MCK (P30)	Inputs a clock signal for microphone up/down switches.
66	MUD (P31)	Input port for microphone up/down switches.
74	SNDS (P80)	Input port for transmit/receive switching signals for the [ACC] socket. This port becomes "Low" while transmitting.
75	KDS (P81)	Outputs a CW keying signal or RTTY TX signal.
78	TXD1 (P84)	Output port for CI-V bus line.
79	RXD1 (P85)	Input port for CI-V bus line.

### 3-4-3 SUB CPU PORT ALLOCATIONS (DISPLAY UNIT IC1)

Pin number	Port name	Description
1	SFTV (PC3)	Input port for the [SHIFT] control.
18	PTTS (P27)	Outputs a PTT signal. Becomes "Low" while transmitting.
19	AMBS (P30)	Outputs a control signal for backlighting.
20	DIMS (P31)	Outputs a dimmer control signal for backlighting.
80	PHNL (P13)	Input port for the connection signal of the [PHONES] jack.

### SUB CPU PORT ALLOCATIONS (Continued)

Pin number	Port name	Description
81	RITK (P14)	Input port for the [RIT] switch.
90–95	KI0–KI5 (PB0–PB5)	Input ports for the [P.AMP/ATT], [TUNER/CALL], [MENU], [F-1]–[F-3], [DISP], [LOCK], [MODE], [TS], [UP] and [DN] switches on the front panel.
96	PTTV (PB6)	Input port for the [PTT] switch on the microphone.
97	MUDV (PB7)	Input port for the up/down switches on the microphone.
98	AFGV (PC0)	Input port for the [AF] control.
99	SQLV (PC1)	Input port for the [RF/SQL] control.
100	RITV (PC2)	Input port for the [RIT] control.

### 3-4-4 I/O EXPANDER PORT ALLOCATIONS

#### (1) Output ports (MAIN unit IC30)

Pin number	Port name	Description
4	MODS (Q1)	Outputs selection signal for the modulation signal.
5	AMS (Q2)	Outputs selection signal for AM mode.
6	FMS (Q3)	Outputs selection signal for FM and FM narrow modes.
7	WFMS (Q3)	Outputs selection signal for WFM mode.
11, 12	AFS1, AFS2 (Q8, Q7)	Output selection signals for the AF signal.
13	UNFM (Q6)	Outputs selection signal for SSB/CW/RTTY/AM modes.
14	MINH (Q5)	Outputs an inhibit signal for the microphone mute circuit (IC23).

#### (2) Output ports (MAIN unit IC31)

Pin number	Port name	Description
6, 7, 13, 14	B7, B7W, B8W, B8 (Q3, Q4, Q6, Q5)	Output selection signals for the bandpass filters.
11, 12	2N80, 1S15 (Q8, Q7)	Output selection signals for the IF filters.

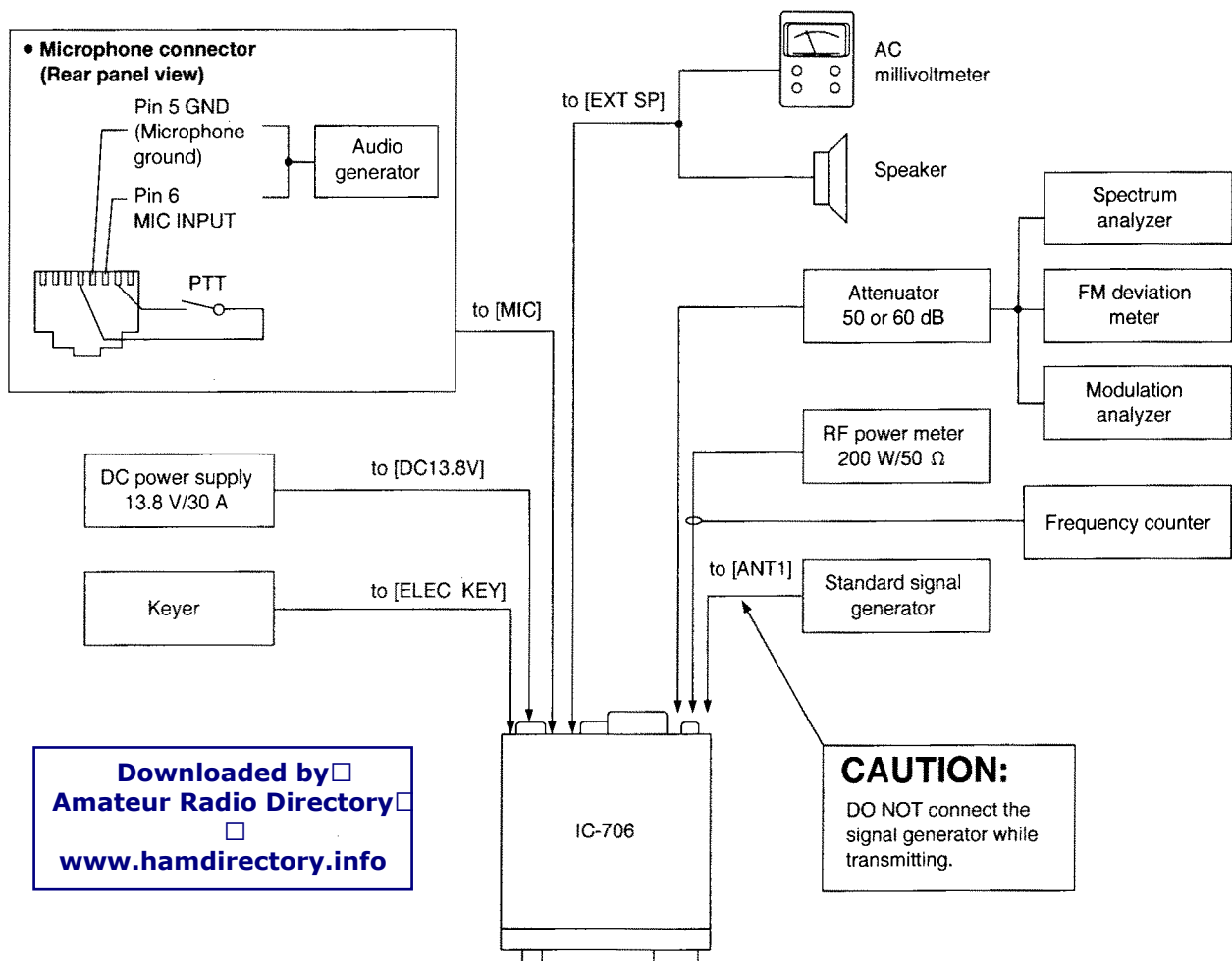
# SECTION 4 ADJUSTMENT PROCEDURES

## 4-1 PREPARATION BEFORE SERVICING

### REQUIRED TEST EQUIPMENT

EQUIPMENT	GRADE AND RANGE	EQUIPMENT	GRADE AND RANGE
DC power supply	Output voltage : 13.8 V DC	AC millivoltmeter	Measuring range : 10 mV—10 V
	Current capacity : 30 A or more	DC voltmeter	Input Impedance : 50 k $\Omega$ /DC or better
RF power meter (terminated type)	Measuring range : 10—200 W	Ammeter	Measurement capability : 1 A and 30 A
	Frequency range : 1.8—30 MHz	Audio generator	Frequency range : 300—3000 Hz
	Impedance : 50 $\Omega$	Output level : 1—500 mV	
	SWR : Less than 1.2:1		
Frequency counter	Frequency range : 0.1—100 MHz	Attenuator	Power attenuation : 50 or 60 dB
	Frequency accuracy : $\pm 1$ ppm or better	Capacity : 150 W or more	
RF voltmeter	Frequency range : 0.1—100 MHz	Spectrum analyzer	Frequency range : At least 400 MHz
	Measuring range : 0.01—10 V	Spectrum bandwidth : $\pm 100$ MHz or more	
Digital multimeter	Input impedance : 10 M $\Omega$ /DC or better	FM deviation meter	Frequency range : At least 200 MHz
Standard signal generator (SSG)	Frequency range : 0.1—100 MHz	Measuring range : 0 to $\pm 10$ kHz	
	Output level : 0.1 $\mu$ V—32 mV (-127 to -17 dBm)	Modulation analyzer	Frequency range : At least 150 MHz
Distortion meter	Frequency range : 1 kHz $\pm 10\%$	Measuring range : 0—100%	
	Measuring range : 1—100%	External speaker	Impedance : 8 $\Omega$
Oscilloscope	Frequency range : DC—20 MHz	Max. Input power : 5 W	
	Measuring range : 0.01—10 V		

### CONNECTION



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## 4-2 PLL ADJUSTMENT

ADJUSTMENT	ADJUSTMENT CONDITIONS	MEASUREMENT		VALUE	ADJUSTMENT POINT	
		UNIT	LOCATION		UNIT	ADJUST
REFERENCE FREQUENCY	<ul style="list-style-type: none"> <li>Displayed frequency: Any</li> <li>L36 (PLL unit) : Center</li> <li>Receiving</li> </ul>	PLL	Connect an RF voltmeter to P3.	Maximum level (0 dBm or more)	PLL	L37, L38
			Connect a frequency counter to P3.			60.000000 MHz
REFERENCE LOOP LOCK VOLTAGE	<ul style="list-style-type: none"> <li>Displayed frequency: 0.03000 MHz</li> <li>Mode : USB</li> <li>Receiving</li> </ul>	PLL	Connect a digital multimeter or oscilloscope to LV1.	2.0 V	PLL	C104
MAIN LOOP LOCK VOLTAGE	<ul style="list-style-type: none"> <li>Displayed frequency: 30.00000 MHz</li> <li>Mode : USB</li> <li>Receiving</li> </ul>	PLL	Connect a digital multimeter or oscilloscope to LV2.	1.1 V	PLL	L6
	<ul style="list-style-type: none"> <li>Displayed frequency: 60.00000 MHz</li> </ul>			1.1 V		L3

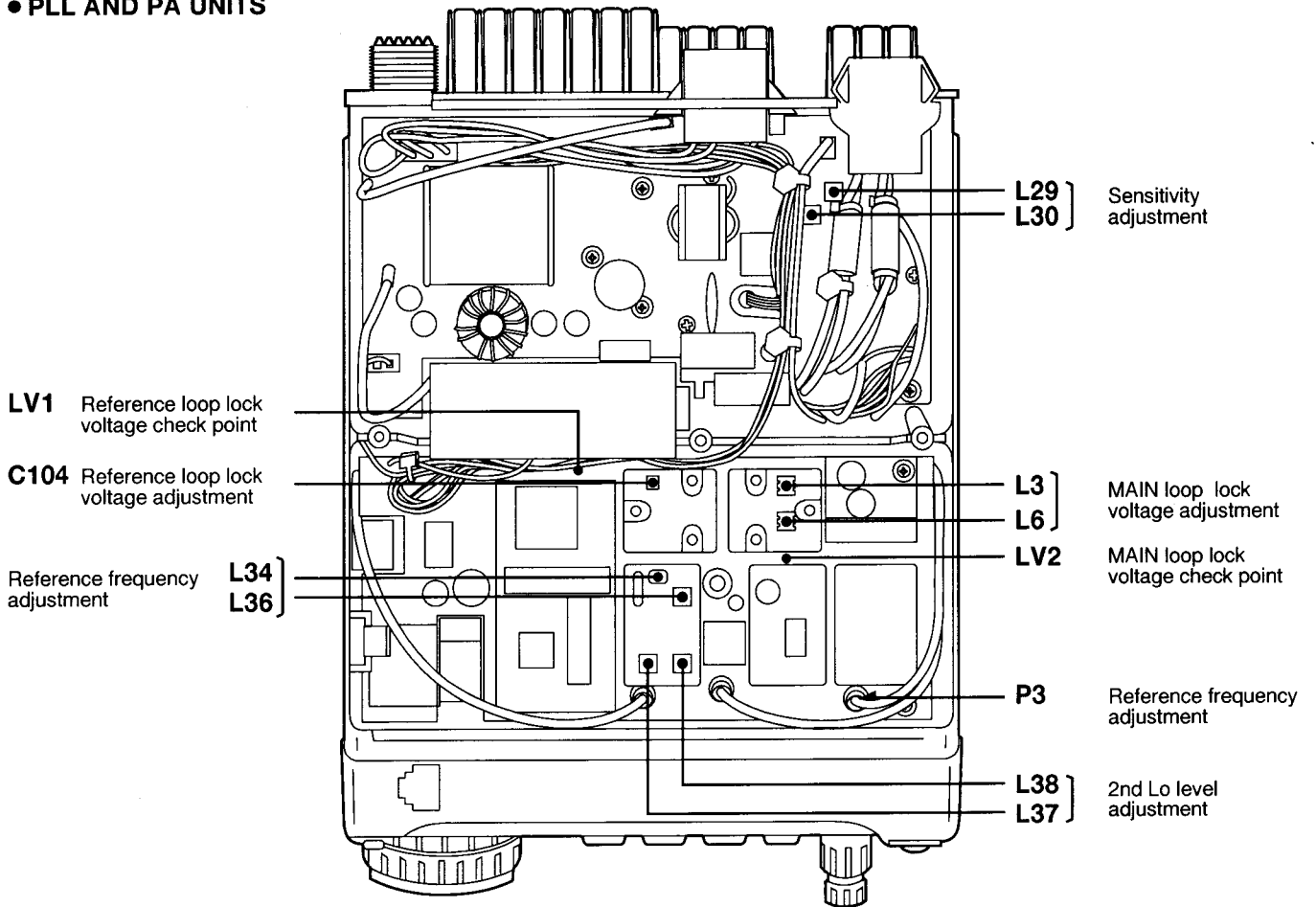
## 4-3 RECEIVER ADJUSTMENT

ADJUSTMENT	ADJUSTMENT CONDITIONS	MEASUREMENT		VALUE	ADJUSTMENT POINT			
		UNIT	LOCATION		UNIT	ADJUST		
SENSITIVITY	<ul style="list-style-type: none"> <li>Displayed frequency: 14.10000 MHz</li> <li>Mode : USB</li> <li>[RIT] : OFF</li> <li>[M4 AGC] : Fast (F AGC)</li> <li>[M3 NB] : OFF</li> <li>[P.AMP/ATT] : Preamp</li> <li>[COMP GAIN] : Center</li> <li>[BEEP/SIDE T] : Center</li> <li>[VOX GAIN] : Center</li> <li>[ANTI VOX] : Max. counterclockwise</li> <li>R126 (MAIN unit): Max. counterclockwise</li> <li>Connect a standard signal generator to [ANT 1] and set as: <ul style="list-style-type: none"> <li>Frequency : 14.10150 MHz</li> <li>Level : 0.5 <math>\mu</math>V * (-113 dBm)</li> <li>Modulation: OFF</li> </ul> </li> <li>Receiving</li> </ul>	Rear panel	Connect an AC millivoltmeter to [EXT SP] jack with an 8 $\Omega$ dummy load.	Maximum output level	MAIN	Adjust repeatedly L47, L48, L49, L53, L54, L55, L84, L85		
	<ul style="list-style-type: none"> <li>Mode : FM</li> <li>[M3 NAR] : OFF</li> <li>Set the standard signal generator as: <ul style="list-style-type: none"> <li>Frequency : 14.10000 MHz</li> <li>Level : 0.5 mV * (-53 dBm)</li> <li>Modulation: 1 kHz</li> <li>Deviation : <math>\pm</math>5 kHz</li> </ul> </li> </ul>		Connect a distortion meter to [EXT SP] jack.				Minimum distortion level	Adjust repeatedly L47, L48, L49
	<ul style="list-style-type: none"> <li>[M3 NAR] : ON</li> <li>Set the standard signal generator as: <ul style="list-style-type: none"> <li>Deviation : <math>\pm</math>4 kHz</li> </ul> </li> </ul>							Adjust repeatedly L53, L54
	<ul style="list-style-type: none"> <li>Displayed frequency: 146.00000 MHz</li> <li>[M3 NAR] : OFF</li> <li>Connect the standard signal generator to [ANT 2] and set as: <ul style="list-style-type: none"> <li>Frequency : 146.00000 MHz</li> <li>Deviation : <math>\pm</math>3.5 kHz</li> </ul> </li> </ul>						PA	Adjust repeatedly L29, L30

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

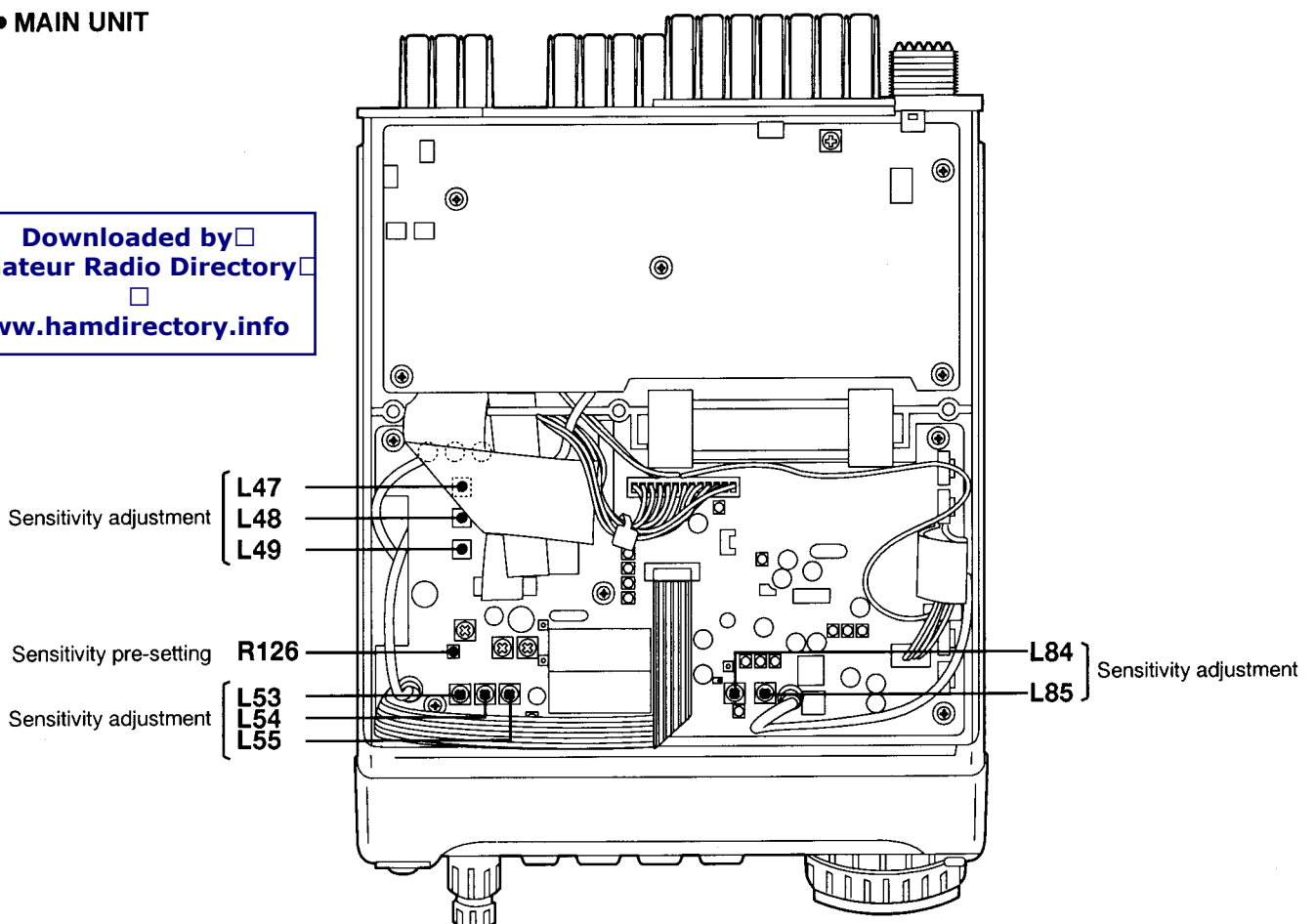


● PLL AND PA UNITS



● MAIN UNIT

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## RECEIVER ADJUSTMENT (CONTINUED)

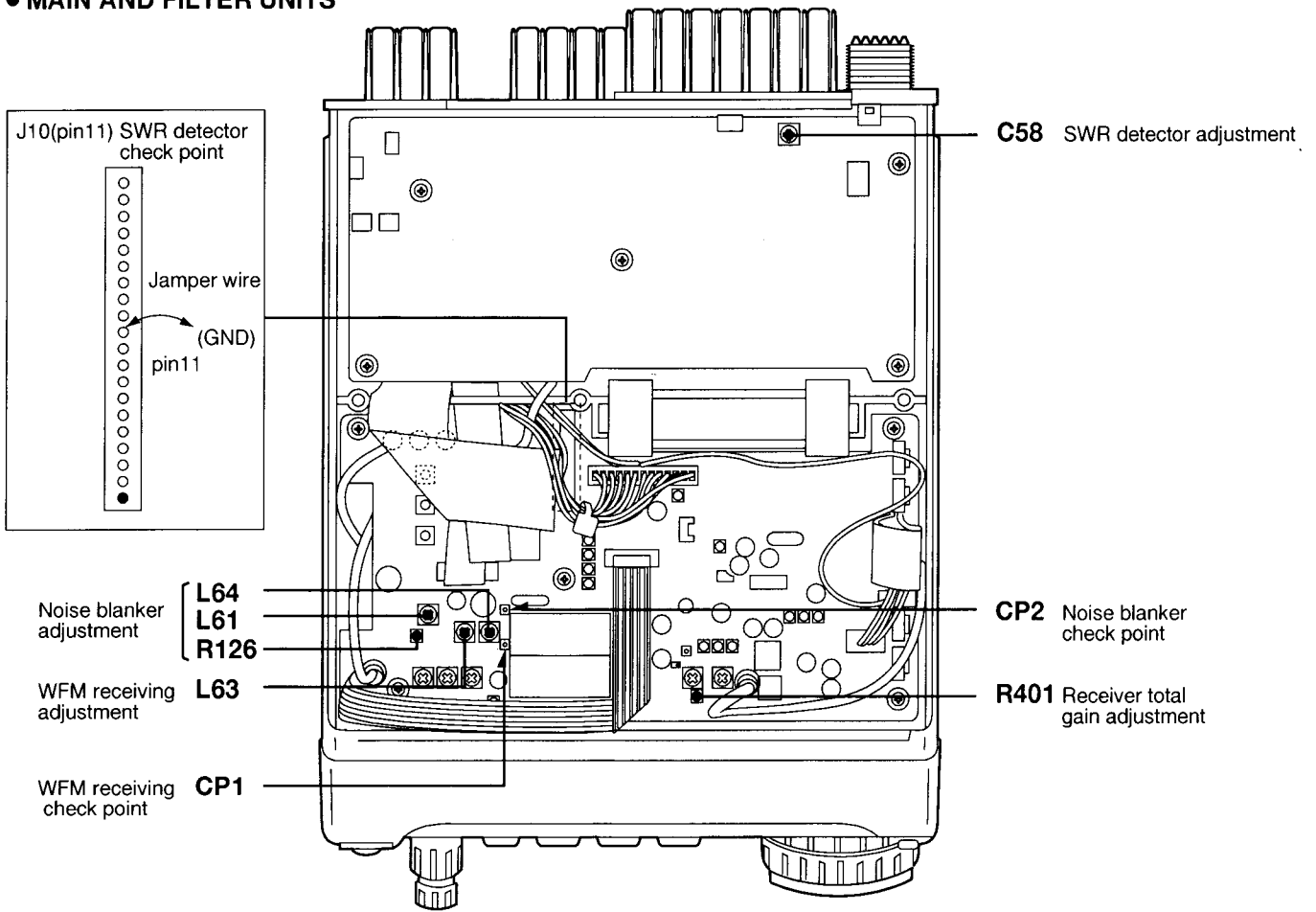
ADJUSTMENT	ADJUSTMENT CONDITIONS	MEASUREMENT		VALUE	ADJUSTMENT POINT	
		UNIT	LOCATION		UNIT	ADJUST
RECEIVER TOTAL GAIN	1 <ul style="list-style-type: none"> <li>• Displayed frequency: 14.1000 MHz</li> <li>• Mode : USB</li> <li>• [P.AMP/ATT] : OFF</li> <li>• Connect a standard signal generator to [ANT 1] and set as:               <ul style="list-style-type: none"> <li>Frequency: 14.1015 MHz</li> <li>Level : 0.5 mV * (-53 dBm) and OFF</li> <li>Modulation: OFF</li> </ul> </li> </ul>	Rear panel	Connect an AC millivoltmeter to [EXT SP] jack with an 8 Ω dummy load.	30 dB of AF level difference	MAIN	R401
WFM RECEIVING	1 <ul style="list-style-type: none"> <li>• Displayed frequency: 80.00000 MHz</li> <li>• Mode : WFM</li> <li>• Connect a standard signal generator to [ANT 2] and set as:               <ul style="list-style-type: none"> <li>Frequency: 80.00000 MHz</li> <li>Level : 0.5 mV * (-53 dBm)</li> </ul> </li> <li>• Receiving</li> </ul>	MAIN	Connect a digital multimeter or oscilloscope to CP1.	4.0 V	MAIN	L63
NOISE BLANKER	1 <ul style="list-style-type: none"> <li>• Displayed frequency: 14.10000 MHz</li> <li>• Mode : USB</li> <li>• [M3 NB] : OFF</li> <li>• [P.AMP/ATT] : Preamp</li> <li>• R126 (MAIN unit): Center</li> <li>• Connect a standard signal generator to [ANT 1] and set as:               <ul style="list-style-type: none"> <li>Frequency: 14.1015 MHz</li> <li>Level : 1.8 μV * (-82 dBm)</li> </ul> </li> </ul>	MAIN	Connect an oscilloscope to CP2.	Maximum voltage	MAIN	L61, L64
	2 <ul style="list-style-type: none"> <li>• [M3 NB] : ON</li> </ul>			Noise just reduces.		
S-METER	See p. 4-9 METER ADJUSTMENT					

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

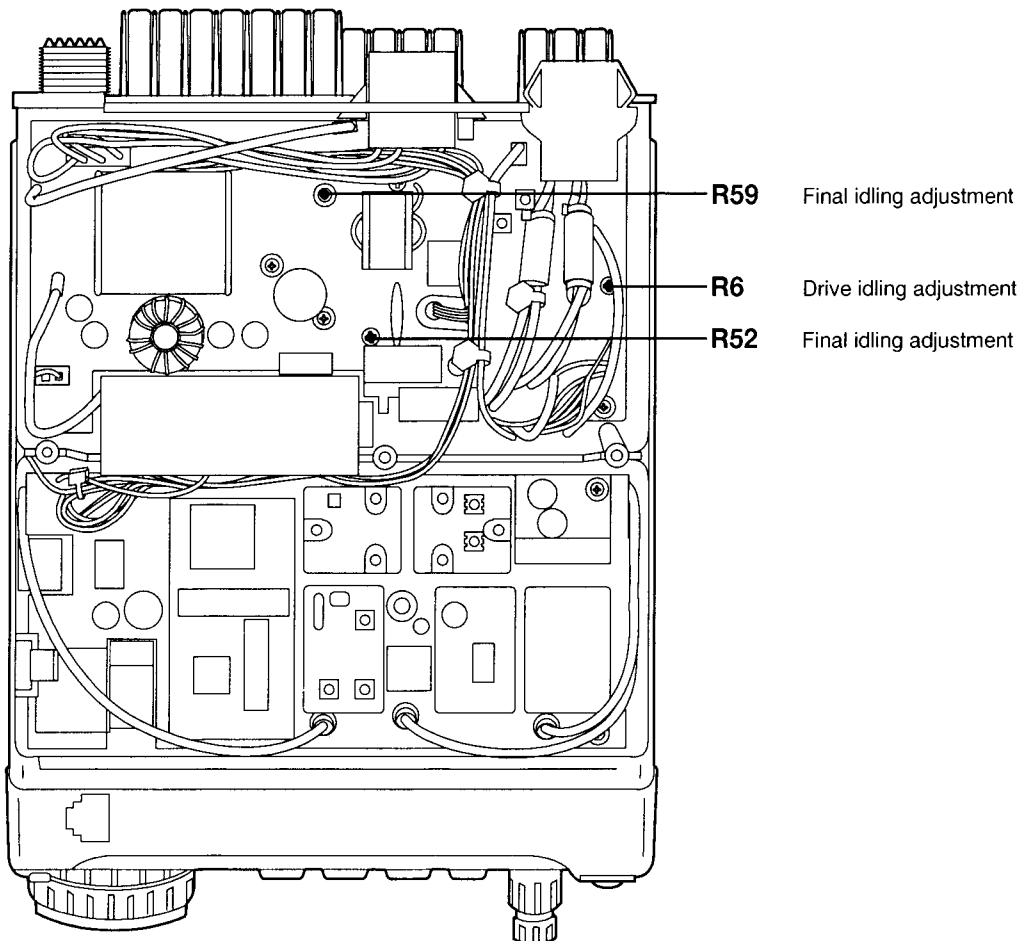
## 4-4 TRANSMITTER ADJUSTMENT

ADJUSTMENT	ADJUSTMENT CONDITIONS	MEASUREMENT		VALUE	ADJUSTMENT POINT				
		UNIT	LOCATION		UNIT	ADJUST			
IDLING CURRENT (for drive amplifiers)	1 <ul style="list-style-type: none"> <li>• Displayed frequency: 14.10000 MHz</li> <li>• Mode : USB</li> <li>• [Q2 MIC GAIN] : 1 (minimum)</li> <li>• R6 (PA unit) : Max. counterclockwise</li> <li>• R52 (PA unit) : Max. counterclockwise</li> </ul>	Rear panel	Connect a DC ammeter between the DC power supply and transceiver's DC power socket.	1 A increase from that R6 is in max. counterclockwise	PA	R6			
				(for final amplifiers)			2 <ul style="list-style-type: none"> <li>• R59 (PA unit) : Max. counterclockwise</li> <li>• Transmitting</li> </ul>	0.5 A increase from step 1	R52
				3			0.5 A increase from step 2	R59	
SWR DETECTOR	1 <ul style="list-style-type: none"> <li>• Displayed frequency: 14.10000 MHz</li> <li>• Mode : USB</li> <li>• Ground pin 11 of J10 (MAIN unit).</li> <li>• Connect an audio generator to [MIC] connector and set as:               <ul style="list-style-type: none"> <li>10 mV / 1.5 kHz</li> </ul> </li> </ul>	Rear panel	Connect an RF power meter to [ANT 1] connector.	100 W	Quick set mode	Q2 MIC GAIN			
	2 <ul style="list-style-type: none"> <li>• Transmitting</li> </ul>	MAIN	Connect a digital multimeter to pin 1 of J7.	Minimum voltage	FILTER	C58			
After adjustment, remove the jumper wire from J10.									

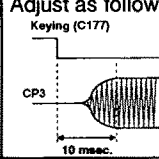
● MAIN AND FILTER UNITS



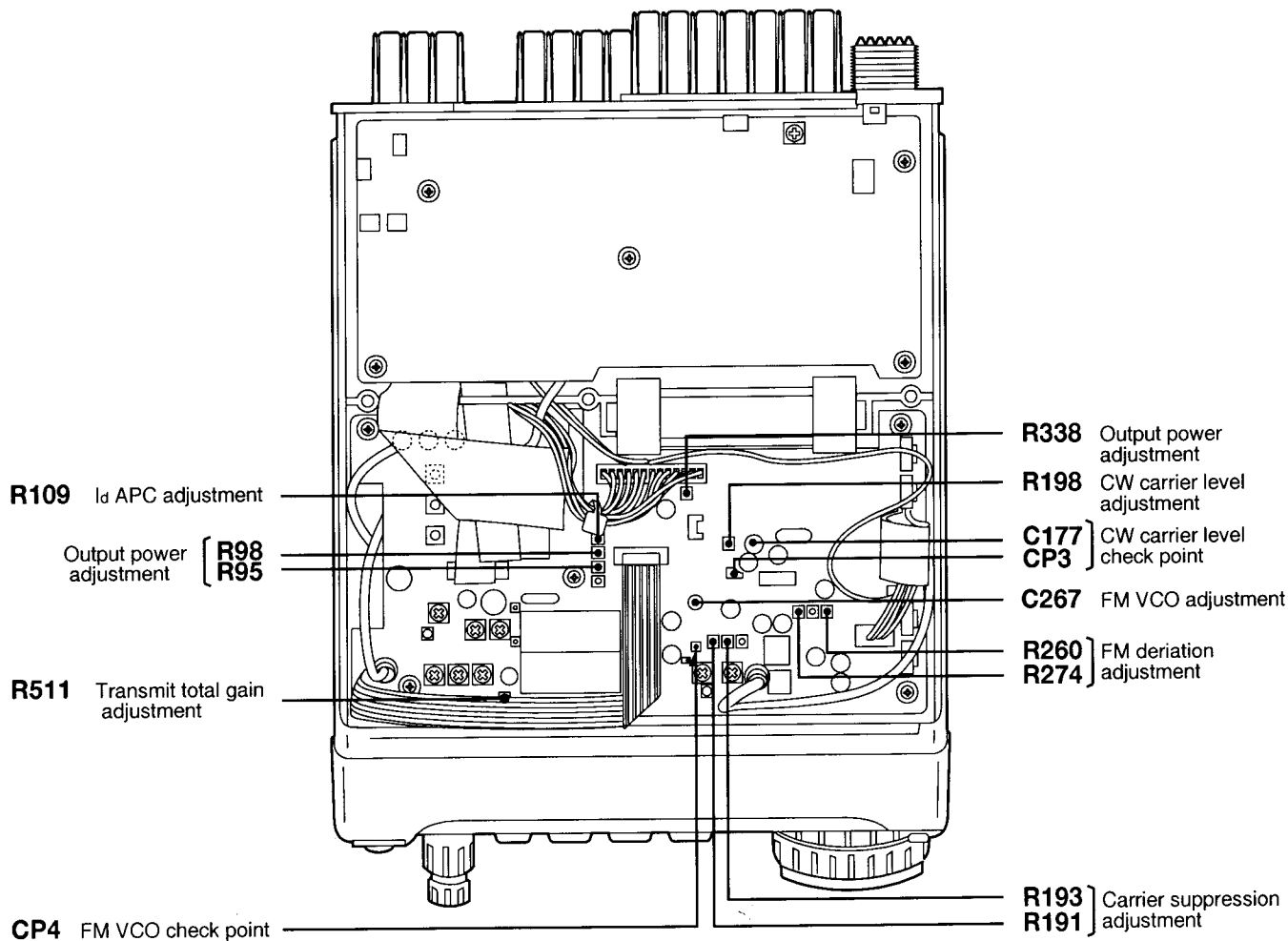
● PA UNIT



## TRANSMITTER ADJUSTMENT (CONTINUED)

ADJUSTMENT	ADJUSTMENT CONDITIONS	MEASUREMENT		VALUE	ADJUSTMENT POINT	
		UNIT	LOCATION		UNIT	ADJUST
Id APC	1 <ul style="list-style-type: none"> <li>Displayed frequency : 3.50000 MHz</li> <li>Mode : RTTY</li> <li>[Q1 RF POWER] : H</li> <li>R95 (MAIN unit) : 3 o'clock position</li> <li>R109 (MAIN unit) : 3 o'clock position</li> <li>R198 (MAIN unit) : Max. clockwise</li> <li>Ground CP6 with a jumper wire.</li> <li>Transmitting</li> </ul>	Rear panel	Ammeter on the DC power supply	22 A	MAIN	R109
After adjustment, remove the jumper wire from CP6.						
TRANSMIT TOTAL GAIN	1 <ul style="list-style-type: none"> <li>Displayed frequency : 14.10000 MHz</li> <li>Mode : USB</li> <li>[Q1 RF POWER] : H</li> <li>[Q2 MIC GAIN] : 5</li> <li>Connect an audio generator to [MIC] connector and set as: 10 mV / 1.5 kHz</li> <li>Transmitting</li> </ul>	Rear panel	Connect an RF power meter to [ANT 1] connector.	50 W	MAIN	R511
CARRIER SUPPRESSION	1 <ul style="list-style-type: none"> <li>Displayed frequency : 14.10000 MHz</li> <li>Mode : USB and LSB</li> <li>Apply no signal to [MIC] connector.</li> <li>Transmitting</li> </ul>	Rear panel	Connect a spectrum analyzer to [ANT 1] via an attenuator.	Minimum carrier level	MAIN	Adjust repeatedly R191, R193
OUTPUT POWER	1 <ul style="list-style-type: none"> <li>Displayed frequency : 14.10000 MHz</li> <li>Mode : USB</li> <li>[Q2 MIC GAIN] : 5</li> <li>Connect an audio generator to [MIC] connector and set as: 100 mV / 1.5 kHz</li> <li>Transmitting</li> </ul>	Rear panel	Connect an RF power meter to [ANT 1] connector.	100 W	MAIN	R95
	2 <ul style="list-style-type: none"> <li>Displayed frequency : 52.00000 MHz</li> </ul>			100 W		R98
	3 <ul style="list-style-type: none"> <li>Displayed frequency : 145.00000 MHz</li> </ul>		Connect an RF power meter to [ANT 2] connector.	10 W		R338
CW CARRIER LEVEL	1 <ul style="list-style-type: none"> <li>Displayed frequency : 14.10000 MHz</li> <li>Mode : CW</li> <li>[Q1 RF POWER] : H</li> <li>[Q5 KEY SPEED] : 60</li> <li>[M4 BRK] : BK (semi break-in)</li> <li>Transmit dots for a while using a paddle.</li> </ul>	MAIN	Connect an oscilloscope to CP3 and C177.	Adjust as follows: Keying (C177) 	MAIN	R198
FM VCO	1 <ul style="list-style-type: none"> <li>Displayed frequency : 29.10000 MHz</li> <li>Mode : FM</li> <li>[M4 TON] : OFF</li> <li>[Q1 RF POWER] : H</li> <li>Apply no signal to [MIC] connector.</li> <li>Transmitting</li> </ul>	MAIN	Connect a digital multi-meter to CP4.	1.5 V	MAIN	C267
FM DEVIATION	1 <ul style="list-style-type: none"> <li>Displayed frequency : 29.10000 MHz</li> <li>Mode : FM</li> <li>[M4 TON] : OFF</li> <li>[Q1 RF POWER] : H</li> <li>[Q2 MIC GAIN] : 5</li> <li>R260 (MAIN unit) : Center</li> <li>Connect an audio generator to [MIC] connector and set as: 300 mV / 1 kHz</li> <li>Transmitting</li> </ul>	Rear panel	Connect an FM deviation meter to [ANT1] via an attenuator.	± 4.8 kHz	MAIN	R274
	2 <ul style="list-style-type: none"> <li>Set the audio generator as: 10 mV / 1 kHz</li> </ul>			± 3.5 kHz		R260

● MAIN UNIT

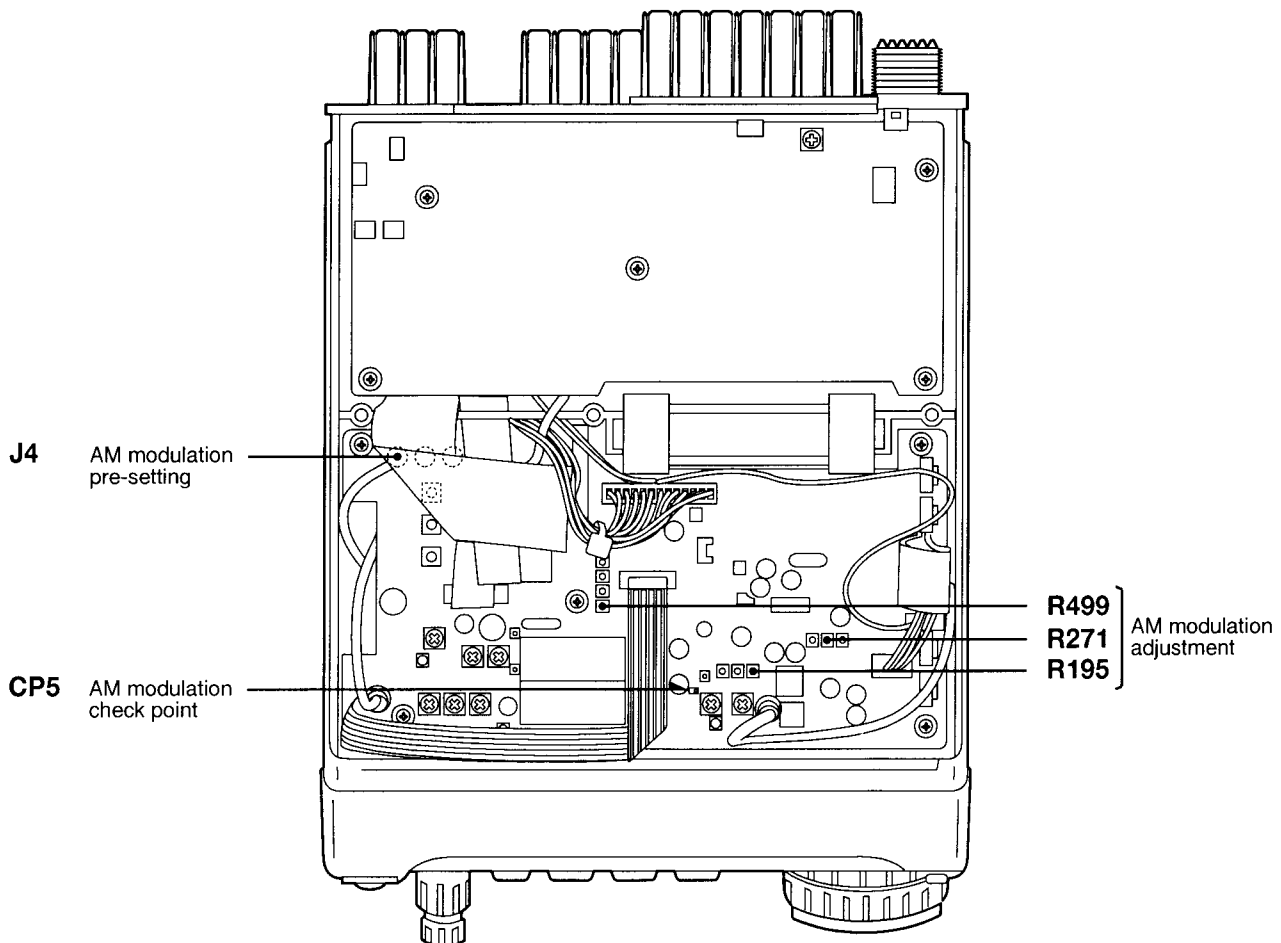


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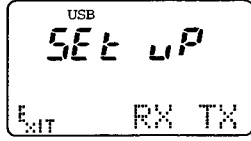
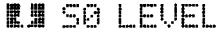
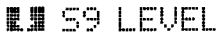

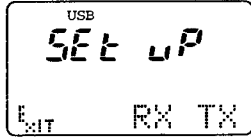


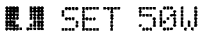
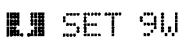
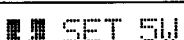
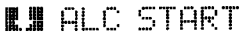

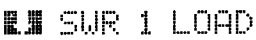
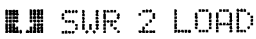
## TRANSMITTER ADJUSTMENT (CONTINUED)

ADJUSTMENT	ADJUSTMENT CONDITIONS	MEASUREMENT		VALUE	ADJUSTMENT POINT	
		UNIT	LOCATION		UNIT	ADJUST
AM MODULATION	1 <ul style="list-style-type: none"> <li>• Displayed frequency: 14.10000 MHz</li> <li>• Mode : AM</li> <li>• [Q1 RF POWER] : H</li> <li>• [Q2 MIC GAIN] : 5</li> <li>• Disconnect the plug from J4 (MAIN unit).</li> </ul>	MAIN	Connect an oscilloscope to CP5.	200 mVp-p	MAIN	R195
	2 <ul style="list-style-type: none"> <li>• Connect the plug to J4 (MAIN unit).</li> <li>• Apply no signal to [MIC] connector.</li> <li>• Transmitting</li> </ul>	Rear panel	Connect an RF power meter to [ANT 1] connector.	35 W		R499
	3 <ul style="list-style-type: none"> <li>• Connect an audio generator to [MIC] connector and set as: 100 mV / 1 kHz</li> </ul>		Connect a modulation analyzer to [ANT1] via an attenuator.	85% modulation		R271

### • MAIN UNIT



## 4-5 METER ADJUSTMENT (METER SET MODE)

ADJUSTMENT	ADJUSTMENT CONDITIONS	DISPLAY	OPERATION	
S-METER	1	<ul style="list-style-type: none"> <li>Enter Meter set mode:                             <ul style="list-style-type: none"> <li>Turn power OFF.</li> <li>Terminate the [REMOTE] jack with a 3.5(d) mm mini-plug.</li> <li>While pushing [P.AMP/ATT] and [TUNE/CALL], turn power ON.</li> </ul> </li> </ul>		Push [F-2(RX)] to enter S-meter setting mode.  Then advance to the following setting, or push [UP]/[DN] to scroll the display.
	2	<ul style="list-style-type: none"> <li>Connect a standard signal generator to [ANT 1] and set as:                             <ul style="list-style-type: none"> <li>Frequency : 14.15150 MHz</li> <li>Level : OFF</li> </ul> </li> </ul>		Push [MENU] to set the "S0" level.
	3	<ul style="list-style-type: none"> <li>Set the standard signal generator as:                             <ul style="list-style-type: none"> <li>Level : 50 μV * (-73 dBm)</li> <li>Modulation: OFF</li> </ul> </li> </ul>		Push [MENU] to set the "S9" level.
	4	<ul style="list-style-type: none"> <li>Set the standard signal generator as:                             <ul style="list-style-type: none"> <li>Level : 50 mV * (-13 dBm)</li> </ul> </li> </ul>		Push [MENU] to set the "+60 dB" level. The display returns to the same as that in step 1.
	5	Push [MENU (EXIT)] to exit meter set mode, or advance to transmit meter setting from step 2 below.		
TRANSMIT METERS	1	<ul style="list-style-type: none"> <li>Enter Meter set mode:                             <ul style="list-style-type: none"> <li>See "S-METER" item, step 1 above.</li> </ul> </li> </ul>		Push [F-3(TX)] to enter transmit meter setting mode.  Then advance to the following setting, or push [UP]/[DN] to scroll the display.
Filter calibration	2	<ul style="list-style-type: none"> <li>Connect an RF power meter to [ANT 1].</li> </ul>		Push [MENU(GO)] to make the calibration. Transceiver transmits for a while.
Power meter	3	<ul style="list-style-type: none"> <li>Transmit using an external PTT switch.</li> </ul>		Set to <b>90 W</b> using main dial, then push [MENU].
	4	<ul style="list-style-type: none"> <li>Transmit using an external PTT switch.</li> </ul>		Set to <b>50 W</b> using main dial, then push [MENU].
	5	<ul style="list-style-type: none"> <li>Connect the RF power meter to [ANT 2].</li> <li>Transmit using an external PTT switch.</li> </ul>		Set to <b>9 W</b> using main dial, then push [MENU].
	6	<ul style="list-style-type: none"> <li>Transmit using an external PTT switch.</li> </ul>		Set to <b>5 W</b> using main dial, then push [MENU].
ALC meter	7	<ul style="list-style-type: none"> <li>Connect the RF power meter to [ANT 1].</li> <li>Wait for 2 sec. while receiving for the ALC function to engage.</li> </ul>		Push [MENU] to set ALC reference level. Transceiver transmits for a while.
	8	<ul style="list-style-type: none"> <li>Connect an audio generator to [MIC] connector and set as:                             <ul style="list-style-type: none"> <li>Level : 100 mV / 1.5 kHz</li> </ul> </li> <li>Transmit using an external PTT switch.</li> </ul>		Push [MENU] to set ALC zone level.
SWR meter	9	<ul style="list-style-type: none"> <li>Connect a 50 Ω dummy load or power meter to [ANT 1].</li> </ul>		Push [MENU] to set SWR reference level. Transceiver transmits for a while.
	9	<ul style="list-style-type: none"> <li>Connect a 100 Ω or 25 Ω dummy load to [ANT 1].</li> </ul>		Push [MENU] to set SWR 2 level. Transceiver transmits for a while. The display returns to the same as that in step 1.
	10	Push [F-1 (EXIT)] to exit Meter set mode.		

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





[DISPLAY UNIT]

REF. NO.	ORDER NO.	DESCRIPTION	
C1	4030006880	S.CERAMIC	C1808 JB 1H 472K-T-A
C2	4030006880	S.CERAMIC	C1808 JB 1H 472K-T-A
C3	4030006880	S.CERAMIC	C1808 JB 1H 472K-T-A
C4	4030006880	S.CERAMIC	C1808 JB 1H 472K-T-A
C5	4030009110	S.CERAMIC	C3216 JB 1C 474K-T-A
C7	4030006880	S.CERAMIC	C1808 JB 1H 472K-T-A
C8	4030006880	S.CERAMIC	C1808 JB 1H 472K-T-A
C9	4030006880	S.CERAMIC	C1808 JB 1H 472K-T-A
C10	4030007020	S.CERAMIC	C1808 CH 1H 120J-T-A
C11	4030007020	S.CERAMIC	C1808 CH 1H 120J-T-A
C12	4030010070	S.CERAMIC	C1808 X7S 1C 104K-T-A
C13	4030010070	S.CERAMIC	C1808 X7S 1C 104K-T-A
C14	4030010070	S.CERAMIC	C1808 X7S 1C 104K-T-A
C15	4030006860	S.CERAMIC	C1808 JB 1H 102K-T-A
C16	4030006860	S.CERAMIC	C1808 JB 1H 102K-T-A
C17	4030009660	S.CERAMIC	C1808 JF 1C 224Z-T-A
C18	4030009590	S.CERAMIC	C2012 JF 1C 225Z-T-A
C19	4030010070	S.CERAMIC	C1808 X7S 1C 104K-T-A
C20	4030009590	S.CERAMIC	C2012 JF 1C 225Z-T-A
C21	4510004630	S.ELECTROLITIC	ECEV1CA100SR
C22	4030010070	S.CERAMIC	C1808 X7S 1C 104K-T-A
C23	4030010070	S.CERAMIC	C1808 X7S 1C 104K-T-A
C24	4510004630	S.ELECTROLITIC	ECEV1CA100SR
C25	4030010070	S.CERAMIC	C1808 X7S 1C 104K-T-A
C26	4030010070	S.CERAMIC	C1808 X7S 1C 104K-T-A
C27	4030009590	S.CERAMIC	C2012 JF 1C 225Z-T-A
C28	4030009590	S.CERAMIC	C2012 JF 1C 225Z-T-A
C29	4030010070	S.CERAMIC	C1808 X7S 1C 104K-T-A
C30	4030006880	S.CERAMIC	C1808 JB 1H 472K-T-A
C31	4030006880	S.CERAMIC	C1808 JB 1H 472K-T-A
C32	4030006880	S.CERAMIC	C1808 JB 1H 472K-T-A
C33	4030006880	S.CERAMIC	C1808 JB 1H 472K-T-A
C34	4030006850	S.CERAMIC	C1808 JB 1H 471K-T-A
DS1	5040002020	S.LED	CL-170UR-CD-T
DS2	5040002010	S.LED	CL-170PG-CD-T
DS3	5040002020	S.LED	CL-170UR-CD-T
DS4	5010000171	LCD	DLC-7973YBGF-1
DS5	5030001290	LED	D2264
S1	2260002250	S.SWITCH	LS22BB-2SD-PG-T
S2	2260002240	S.SWITCH	LS21BB-2SD-T
S3	2260001890	S.SWITCH	SKQDPA
S4	2260001890	S.SWITCH	SKQDPA
S5	2260001890	S.SWITCH	SKQDPA
S6	2260001890	S.SWITCH	SKQDPA
S7	2260001890	S.SWITCH	SKQDPA
S8	2260001890	S.SWITCH	SKQDPA
S9	2260001890	S.SWITCH	SKQDPA
S10	2260001890	S.SWITCH	SKQDPA
S11	2260001890	S.SWITCH	SKQDPA
S12	2260001890	S.SWITCH	SKQDPA
S13	2260002240	S.SWITCH	LS21BB-2SD-T
S14	2260001890	S.SWITCH	SKQDPA
J1	6510019120	S.CONNECTOR	S8B-PH-SM3-TB
J2	6450001630	CONNECTOR	HSJ1406-01-050
J3	6510018890	S.CONNECTOR	52559-1390
W1	7030003860	S.JUMPER	ERJ3GE JPW V
EP1	0910045817	PCB	B 4558G
EP2	8930037591	LCD CONTACT	SRCN-1691-ZNN-505-1

[VR UNIT]

REF. NO.	ORDER NO.	DESCRIPTION	
R1	7210002780	VARIABLE	RV-300 (RK0972210) 10KB/10KB
R2	7210002790	VARIABLE	RV-301 (RK097221) 10KB/10KB
S1	2220000540	SWITCH	SW-162 (SSSS22-2-11)
J1	6510018890	S.CONNECTOR	52559-1390
EP1	0910045822	PCB	B 4559B

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S.=Surface mount

[MAIN UNIT]

REF. NO.	ORDER NO.	DESCRIPTION	
IC1	1110004080	S.IC	μPC2709T-E3
IC3	1110003280	S.IC	ND487C1T-E3
IC4	1110003310	S.IC	μPC1688G-T1
IC5	1110003280	S.IC	ND487C1T-E3
IC6	1110003960	S.IC	μPC2713T-E3
IC7	1110003780	S.IC	NJM2902V-TE1
IC9	1110003140	IC	LA1150N
IC10	1160000130	S.IC	TD82783AF (TP1)
IC11	1160000130	S.IC	TD82783AF (TP1)
IC12	1110002700	S.IC	NJM2904M-T1
IC15	1130007820	S.IC	BU4052BCF-T1
IC16	1110003350	S.IC	μPC1037GR-E1(MS)
IC17	1110003350	S.IC	μPC1037GR-E1(MS)
IC18	1110003200	S.IC	TA31136FN(EL)
IC22	1140005280	S.IC	μPC5023GS-077-E1
IC23	1130006220	S.IC	TC4W53FU (TE12L)
IC24	1110002490	S.IC	M5218FP-73A
IC25	1140005700	S.IC	HD6433378A77F
IC26	1110001550	S.IC	S-8054ALB-LM-T1
IC27	1130005720	S.IC	TC7W04F (TE12L)
IC28	1140004620	S.IC	X24C16S8-2.7
IC29	1140004620	S.IC	X24C16S8-2.7
IC30	1130000830	S.IC	μPD4094BG-T1
IC31	1130000830	S.IC	μPD4094BG-T1
IC32	1130000830	S.IC	μPD4094BG-T1
IC33	1130003780	S.IC	TC4S81F (TE85R)
IC34	1110002700	S.IC	NJM2904M-T1
IC35	1110003690	S.IC	M62354GP 75EC
IC36	1160000130	S.IC	TD82783AF (TP1)
IC37	1130007660	S.IC	LC7153M-TLM
IC38	1110004100	S.IC	TA4001F (TE85L)
Q1	1590001940	S.TRANSISTOR	DTC144EE TL
Q2	1590001150	S.TRANSISTOR	UN9211(TX)
Q3	1590001150	S.TRANSISTOR	UN9211(TX)
Q4	1530003150	S.TRANSISTOR	2SC4673D-TD
Q5	1530002060	S.TRANSISTOR	2SC4081 T107 R
Q6	1590001940	S.TRANSISTOR	DTC144EE TL
Q7	1590001940	S.TRANSISTOR	DTC144EE TL
Q8	1510000510	S.TRANSISTOR	2SA1576 T107 R
Q9	1530002060	S.TRANSISTOR	2SC4081 T107 R
Q10	1560000560	S.FET	2SK882-GR (TE85L)
Q11	1510000510	S.TRANSISTOR	2SA1576 T107 R
Q12	1560000560	S.FET	2SK882-GR (TE85L)
Q13	1530002060	S.TRANSISTOR	2SC4081 T107 R
Q14	1590001870	S.TRANSISTOR	DTA114EE TL
Q15	1590001940	S.TRANSISTOR	DTC144EE TL
Q16	1530002060	S.TRANSISTOR	2SC4081 T107 R
Q21	1530002060	S.TRANSISTOR	2SC4081 T107 R
Q23	1590001940	S.TRANSISTOR	DTC144EE TL
Q27	1530003090	S.TRANSISTOR	2SC4213-B (TE85R)
Q28	1530002060	S.TRANSISTOR	2SC4081 T107 R
Q29	1510000510	S.TRANSISTOR	2SA1576 T107 R
Q30	1590001940	S.TRANSISTOR	DTC144EE TL
Q31	1590001870	S.TRANSISTOR	DTA114EE TL
Q32	1540000450	S.TRANSISTOR	2SD1623-T-TD
Q33	1530002060	S.TRANSISTOR	2SC4081 T107 R
Q34	1530002060	S.TRANSISTOR	2SC4081 T107 R
Q35	1510000510	S.TRANSISTOR	2SA1576 T107 R
Q36	1530002060	S.TRANSISTOR	2SC4081 T107 R
Q37	1590001940	S.TRANSISTOR	DTC144EE TL
Q38	1510000510	S.TRANSISTOR	2SA1576 T107 R
Q39	1530002060	S.TRANSISTOR	2SC4081 T107 R
Q40	1560000330	S.FET	2SK210-GR (TE85R)
Q41	1530002060	S.TRANSISTOR	2SC4081 T107 R
Q42	1580000620	S.FET	3SK131-T2 MAS
Q43	1560000560	S.FET	2SK882-GR (TE85L)
Q44	1530002060	S.TRANSISTOR	2SC4081 T107 R
Q45	1590001940	S.TRANSISTOR	DTC144EE TL
Q46	1590001150	S.TRANSISTOR	UN9211(TX)
Q47	1590001150	S.TRANSISTOR	UN9211(TX)
Q48	1530002060	S.TRANSISTOR	2SC4081 T107 R
Q49	1590001150	S.TRANSISTOR	UN9211(TX)
Q50	1590001940	S.TRANSISTOR	DTC144EE TL
Q51	1590001870	S.TRANSISTOR	DTA114EE TL

[MAIN UNIT]

REF. NO.	ORDER NO.	DESCRIPTION	
Q52	1530002060	S.TRANSISTOR	2SC4081 T107 R
Q53	1530002060	S.TRANSISTOR	2SC4081 T107 R
Q55	1590001540	S.TRANSISTOR	UMD6 TL
Q56	1590001540	S.TRANSISTOR	UMD6 TL
Q83	1530002060	S.TRANSISTOR	2SC4081 T107 R
Q84	1590001940	S.TRANSISTOR	DTC144EE TL
Q85	1530002060	S.TRANSISTOR	2SC4081 T107 R
Q86	1590001940	S.TRANSISTOR	DTC144EE TL
Q87	1590001920	S.TRANSISTOR	UN911F(TX)
Q88	1530002060	S.TRANSISTOR	2SC4081 T107 R
D1	1750000450	S.DIODE	1SV285-TR
D2	1750000210	S.DIODE	1SV237 (TE85R)
D13	1750000450	S.DIODE	1SV285-TR
D14	1750000450	S.DIODE	1SV285-TR
D15	1750000210	S.DIODE	1SV237 (TE85R)
D16	1790000450	S.DIODE	MA862(TX)
D17	1790000450	S.DIODE	MA862(TX)
D18	1790000450	S.DIODE	MA862(TX)
D19	1790000620	S.DIODE	MA77(TW)
D20	1790000450	S.DIODE	MA862(TX)
D21	1790000450	S.DIODE	MA862(TX)
D22	1750000450	S.DIODE	1SV285-TR
D23	1750000450	S.DIODE	1SV265-TR
D24	1790000450	S.DIODE	MA862(TX)
D25	1790000450	S.DIODE	MA862(TX)
D26	1790000450	S.DIODE	MA862(TX)
D27	1790000450	S.DIODE	MA862(TX)
D28	1790000450	S.DIODE	MA862(TX)
D29	1790000450	S.DIODE	MA862(TX)
D30	1790000450	S.DIODE	MA862(TX)
D31	1790000450	S.DIODE	MA862(TX)
D36	1160000140	S.DIODE	DAP222 TL
D37	1160000140	S.DIODE	DAP222 TL
D38	1790000450	S.DIODE	MA862(TX)
D39	1790000490	S.DIODE	HSM88AS-TR
D42	1160000140	S.DIODE	DAP222 TL
D43	1790000490	S.DIODE	HSM88AS-TR
D44	1790000490	S.DIODE	HSM88AS-TR
D46	1790000450	S.DIODE	MA862(TX)
D47	1160000140	S.DIODE	DAP222 TL
D48	1790000450	S.DIODE	MA862(TX)
D50	1750000520	S.DIODE	DAN222TL
D51	1750000370	S.DIODE	DA221 TL
D52	1160000140	S.DIODE	DAP222 TL
D53	1750000520	S.DIODE	DAN222TL
D54	1160000140	S.DIODE	DAP222 TL
D55	1160000140	S.DIODE	DAP222 TL
D57	1750000520	S.DIODE	DAN222TL
D58	1750000520	S.DIODE	[FRA], [DEN] only DAN222TL [EUR], [FRA] only DAN222TL [USA] only
D59	1750000520	S.DIODE	DAN222TL
D60	1750000520	S.DIODE	DAN222TL [USA] only
D61	1750000520	S.DIODE	DAN222TL
D62	1750000520	S.DIODE	DAN222TL
D63	1790000490	S.DIODE	HSM88AS-TR
D64	1790000490	S.DIODE	HSM88AS-TR
D65	1750000520	S.DIODE	DAN222TL
D66	1750000520	S.DIODE	DAN222TL
D67	1720000490	S.VARICAP	SVC252-TA
D68	1790000490	S.DIODE	HSM88AS-TR
D69	1790000490	S.DIODE	HSM88AS-TR
D70	1730000620	S.ZENER	RD3.6M-T2B2
D71	1160000140	S.DIODE	DAP222 TL
D72	1750000520	S.DIODE	DAN222TL
D75	1790000620	S.DIODE	MA77(TW)
D76	1790000620	S.DIODE	MA77(TW)
D78	1750000520	S.DIODE	DAN222TL
D80	1750000520	S.DIODE	DAN222TL
D81	1750000520	S.DIODE	DAN222TL
D82	1750000520	S.DIODE	DAN222TL
D83	1750000520	S.DIODE	DAN222TL
D84	1750000520	S.DIODE	DAN222TL [FRA] only
D85	1750000520	S.DIODE	DAN222TL [FRA] only

S.=Surface mount











[MAIN UNIT]

Table with columns: REF. NO., ORDER NO., DESCRIPTION. Contains component list for the main unit, including various ceramic capacitors, electrolytic capacitors, and tantalum capacitors.

[MAIN UNIT]

Table with columns: REF. NO., ORDER NO., DESCRIPTION. Contains component list for the main unit, including connectors, jumpers, and a PCB.

S.=Surface mount





[PLL UNIT]

REF. NO.	ORDER NO.	DESCRIPTION	
IC1	1180000420	S.IC	TA78L05F (TE12R)
IC2	1180001070	S.IC	TA7805F(TE16L)
IC3	1180001540	S.IC	TA78L08F (TE12R)
IC4	1110003300	S.IC	M5282FP 70CD
IC5	1110003090	IC	LA4425A
IC8	1130003830	S.IC	TC7S04F (TE85R)
IC9	1130003830	S.IC	TC7S04F (TE85R)
IC10	1140003841	S.IC	SC-1248
IC11	1130003830	S.IC	TC7S04F (TE85R)
IC12	1140004550	S.IC	SC-1287
IC13	1130003850	S.IC	PLL2001S-ET
Q5	1590000680	S.TRANSISTOR	DTC114EU T107
Q6	1560000720	S.FET	2SK2171-4-TD
Q7	1530003090	S.TRANSISTOR	2SC4213-B (TE85R)
Q8	1560000720	S.FET	2SK2171-4-TD
Q9	1530003090	S.TRANSISTOR	2SC4213-B (TE85R)
Q10	1530002570	S.TRANSISTOR	2SC4405-3-TR
Q12	1560000330	S.FET	2SK210-GR (TE85R)
Q13	1530002060	S.TRANSISTOR	2SC4081 T107 R
Q14	1530002560	S.TRANSISTOR	2SC4403-3-TR
Q15	1530002560	S.TRANSISTOR	2SC4403-3-TR
Q16	1530002060	S.TRANSISTOR	2SC4081 T107 R
Q18	1590001330	S.TRANSISTOR	DTA114EU T107
Q19	1590001330	S.TRANSISTOR	DTA114EU T107
Q20	1590001330	S.TRANSISTOR	DTA114EU T107
Q21	1590001330	S.TRANSISTOR	DTA114EU T107
Q22	1590000680	S.TRANSISTOR	DTC114EU T107
Q23	1590001330	S.TRANSISTOR	DTA114EU T107
Q24	1530002060	S.TRANSISTOR	2SC4081 T107 R
Q26	1590001330	S.TRANSISTOR	DTA114EU T107
Q27	1530002560	S.TRANSISTOR	2SC4403-3-TR
Q30	1530002690	S.TRANSISTOR	2SC4118-GR (TE85R)
Q36	1530002560	S.TRANSISTOR	2SC4403-3-TR
Q37	1530002920	S.TRANSISTOR	2SC4228-T2 R25
Q43	1590000650	S.TRANSISTOR	DTA144TU T107
Q44	1590000650	S.TRANSISTOR	DTA144TU T107
Q45	1520000510	TRANSISTOR	2SB1133 R
Q46	1530002280	S.TRANSISTOR	2SC4081 T107 S
Q47	1560000540	S.FET	2SK880-Y (TE85R)
Q48	1530003000	S.TRANSISTOR	2SC4117-BL (TE85R)
Q49	1530003000	S.TRANSISTOR	2SC4117-BL (TE85R)
D3	1750000130	S.DIODE	DA204U T107
D4	1720000540	S.VARICAP	HVM17-01TR
D5	1790000620	S.DIODE	MA77(TW)
D6	1720000540	S.VARICAP	HVM17-01TR
D7	1790000620	S.DIODE	MA77(TW)
D8	1750000200	S.DIODE	1SS319 (TE85R)
D9	1790000450	S.DIODE	MA862(TX)
D11	1790000450	S.DIODE	MA862(TX)
D12	1790000450	S.DIODE	MA862(TX)
D13	1720000590	S.VARICAP	MA357(TX)
D16	1790000620	S.DIODE	MA77(TW)
D17	1790000450	S.DIODE	MA862(TX)
D19	1790000450	S.DIODE	MA862(TX)
D20	1750000130	S.DIODE	DA204U T107
D21	1790000590	S.DIODE	MA110(TW)
D22	1750000160	S.DIODE	DA114 T107
F11	2020001140	S.CERAMIC	SFECA10.7MA-5-A
X1	6050005710	XTAL	CR-275
L1	6170000140	COIL	LW-15
L3	6130002900	COIL	LB-332
L4	6180000830	COIL	LAL 03NA 3R3K
L6	6130002830	COIL	LB-325
L7	6180000850	COIL	LAL 03NA 4R7K
L8	6200001830	S.COIL	NL 322522T-100J
L10	6200002160	S.COIL	ELJNC 82NK-F

[PLL UNIT]

REF. NO.	ORDER NO.	DESCRIPTION	
L12	6200001470	S.COIL	NL 322522T-R12J-3
L13	6200001630	S.COIL	ELJNC R10K-F
L15	6140002810	S.COIL	LR-317
L16	6200001630	S.COIL	ELJNC R10K-F
L17	6200002160	S.COIL	ELJNC 82NK-F
L18	6200003670	S.COIL	ELJNC 68NK-F
L19	6200003670	S.COIL	ELJNC 68NK-F
L21	6200002160	S.COIL	ELJNC 82NK-F
L22	6200001770	S.COIL	ELJNC 47NK-F
L23	6200002120	S.COIL	ELJNC 33NK-F
L25	6200002150	S.COIL	ELJNC 56NK-F
L26	6200001940	S.COIL	ELJNC 27NK-F
L27	6200002120	S.COIL	ELJNC 33NK-F
L28	6200001830	S.COIL	NL 322522T-100J
L29	6200001830	S.COIL	NL 322522T-100J
L30	6200003260	S.COIL	NL 322522T-101J
L31	6130001850	COIL	LB-185
L32	6200001830	S.COIL	NL 322522T-100J
L34	6130001090	COIL	LB-145
L35	6180000900	COIL	LAL 03NA 101K
L36	6150004520	S.COIL	LS-508
L37	6150004830	S.COIL	LS-509
L38	6150004830	S.COIL	LS-509
L39	6200003260	S.COIL	NL 322522T-101J
L40	6200003260	S.COIL	NL 322522T-101J
L41	6200003260	S.COIL	NL 322522T-101J
L42	6200001830	S.COIL	NL 322522T-100J
L43	6200003260	S.COIL	NL 322522T-101J
L44	6200001830	S.COIL	NL 322522T-100J
L45	6200003170	S.COIL	NL 322522T-330J
L46	6200003130	S.COIL	NL 322522T-120J
L47	6200003140	S.COIL	NL 322522T-150J
L48	6200003670	S.COIL	ELJNC 68NK-F
L49	6200003670	S.COIL	ELJNC 68NK-F
L50	6200002150	S.COIL	ELJNC 56NK-F
L51	6200001940	S.COIL	ELJNC 27NK-F
L52	6200003320	S.COIL	NL 322522T-3R3J-3
L53	6200003100	S.COIL	NL 322522T-3R9J-3
L54	6200002980	S.COIL	NL 322522T-4R7J-3
L56	6200001760	S.COIL	ELJNC 22NK-F
L57	6200003960	S.COIL	MLF1608A 1R0K-T
L62	6180001510	COIL	LAL 02NA 101K
L63	6200003260	S.COIL	NL 322522T-101J
L64	6200003260	S.COIL	NL 322522T-101J
L65	6200003540	S.COIL	MLF1608D R22K-T
L66	6200002160	S.COIL	ELJNC 82NK-F
R3	7030003440	S.RESISTOR	ERJ3GEYJ 102 V (1 kΩ)
R4	7030003440	S.RESISTOR	ERJ3GEYJ 102 V (1 kΩ)
R5	7030003440	S.RESISTOR	ERJ3GEYJ 102 V (1 kΩ)
R6	7030003440	S.RESISTOR	ERJ3GEYJ 102 V (1 kΩ)
R7	7030003440	S.RESISTOR	ERJ3GEYJ 102 V (1 kΩ)
R8	7030003440	S.RESISTOR	ERJ3GEYJ 102 V (1 kΩ)
R9	7030003440	S.RESISTOR	ERJ3GEYJ 102 V (1 kΩ)
R10	7030003440	S.RESISTOR	ERJ3GEYJ 102 V (1 kΩ)
R11	7030003440	S.RESISTOR	ERJ3GEYJ 102 V (1 kΩ)
R12	7030003440	S.RESISTOR	ERJ3GEYJ 102 V (1 kΩ)
R13	7030003440	S.RESISTOR	ERJ3GEYJ 102 V (1 kΩ)
R18	7070000440	RESISTOR	CRH200 R-02J 15 Ω
R24	7030003640	S.RESISTOR	ERJ3GEYJ 473 V (47 kΩ)
R25	7030003580	S.RESISTOR	ERJ3GEYJ 103 V (10 kΩ)
R26	7030003640	S.RESISTOR	ERJ3GEYJ 473 V (47 kΩ)
R28	7030003580	S.RESISTOR	ERJ3GEYJ 103 V (10 kΩ)
R29	7030003430	S.RESISTOR	ERJ3GEYJ 821 V (820 Ω)
R30	7030000100	S.RESISTOR	MCR10EZHJ 4.7 Ω (4R7)
R32	7030003240	S.RESISTOR	ERJ3GEYJ 220 V (22 Ω)
R33	7030003440	S.RESISTOR	ERJ3GEYJ 102 V (1 kΩ)
R34	7030003240	S.RESISTOR	ERJ3GEYJ 220 V (22 Ω)
R37	7030003550	S.RESISTOR	ERJ3GEYJ 822 V (8.2 kΩ)
R38	7030003320	S.RESISTOR	ERJ3GEYJ 101 V (100 Ω)
R39	7030003260	S.RESISTOR	ERJ3GEYJ 330 V (33 Ω)
R48	7030003440	S.RESISTOR	ERJ3GEYJ 102 V (1 kΩ)
R49	7030003440	S.RESISTOR	ERJ3GEYJ 102 V (1 kΩ)
R50	7030003440	S.RESISTOR	ERJ3GEYJ 102 V (1 kΩ)
R51	7030003440	S.RESISTOR	ERJ3GEYJ 102 V (1 kΩ)

S.=Surface mount



## [PLL UNIT]

REF. NO.	ORDER NO.	DESCRIPTION
C8	4030009590	S.CERAMIC C2012 JF 1C 225Z-T-A
C9	4030009590	S.CERAMIC C2012 JF 1C 225Z-T-A
C10	4030008880	S.CERAMIC C1808 JB 1H 472K-T-A
C11	4030006880	S.CERAMIC C1808 JB 1H 472K-T-A
C12	4030009590	S.CERAMIC C2012 JF 1C 225Z-T-A
C15	4510005600	S.ELECTROLITIC ECEV1CS100SR
C16	4030009110	S.CERAMIC C3216 JB 1C 474K-T-A
C17	4030010070	S.CERAMIC C1808 X7S 1C 104K-T-A
C18	4030008850	S.CERAMIC C1808 JB 1H 471K-T-A
C19	4030009110	S.CERAMIC C3216 JB 1C 474K-T-A
C20	4510005600	S.ELECTROLITIC ECEV1CS100SR
C21	4510005600	S.ELECTROLITIC ECEV1CS100SR
C22	4510005600	S.ELECTROLITIC ECEV1CS100SR
C23	4030008880	S.CERAMIC C1808 JB 1H 472K-T-A
C24	4510005600	S.ELECTROLITIC ECEV1CS100SR
C25	4030010070	S.CERAMIC C1808 X7S 1C 104K-T-A
C26	4510004590	ELECTROLITIC 16 MV 470 HC
C27	4510004590	ELECTROLITIC 16 MV 470 HC
C28	4030010070	S.CERAMIC C1808 X7S 1C 104K-T-A
C29	4030008880	S.CERAMIC C1808 JB 1H 472K-T-A
C32	4030008560	S.CERAMIC C1808 CH 1H 300J-T-A
C33	4030008880	S.CERAMIC C1808 JB 1H 472K-T-A
C34	4030009510	S.CERAMIC C1808 CH 1H 010B-T-A
C35	4030008880	S.CERAMIC C1808 JB 1H 472K-T-A
C36	4030008880	S.CERAMIC C1808 JB 1H 472K-T-A
C37	4030008850	S.CERAMIC C1808 JB 1H 471K-T-A
C40	4030007110	S.CERAMIC C1808 CH 1H 880J-T-A
C41	4030008880	S.CERAMIC C1808 JB 1H 472K-T-A
C42	4030009510	S.CERAMIC C1808 CH 1H 010B-T-A
C43	4030008880	S.CERAMIC C1808 JB 1H 472K-T-A
C44	4030008880	S.CERAMIC C1808 JB 1H 472K-T-A
C45	4030008850	S.CERAMIC C1808 JB 1H 471K-T-A
C46	4030008880	S.CERAMIC C1808 JB 1H 472K-T-A
C51	4510004590	ELECTROLITIC 16 MV 470 HC
C52	4030008880	S.CERAMIC C1808 JB 1H 472K-T-A
C53	4030008880	S.CERAMIC C1808 JB 1H 472K-T-A
C54	4030008880	S.CERAMIC C1808 JB 1H 472K-T-A
C57	4030007120	S.CERAMIC C1808 CH 1H 820J-T-A
C58	4030007110	S.CERAMIC C1808 CH 1H 221J-T-A
C59	4030007120	S.CERAMIC C1808 CH 1H 820J-T-A
C60	4030008880	S.CERAMIC C1808 JB 1H 472K-T-A
C61	4030008880	S.CERAMIC C1808 JB 1H 472K-T-A
C62	4030008880	S.CERAMIC C1808 JB 1H 472K-T-A
C64	4030008880	S.CERAMIC C1808 JB 1H 472K-T-A
C65	4030007070	S.CERAMIC C1808 CH 1H 330J-T-A
C66	4030007020	S.CERAMIC C1808 CH 1H 120J-T-A
C67	4030007090	S.CERAMIC C1808 CH 1H 470J-T-A
C68	4030006980	S.CERAMIC C1808 CH 1H 070D-T-A
C69	4030007060	S.CERAMIC C1808 CH 1H 270J-T-A
C70	4030008580	S.CERAMIC C1808 CH 1H 300J-T-A
C71	4030007000	S.CERAMIC C1808 CH 1H 090D-T-A
C72	4030007070	S.CERAMIC C1808 CH 1H 330J-T-A
C73	4030008980	S.CERAMIC C1808 CH 1H 050C-T-A
C74	4030007040	S.CERAMIC C1808 CH 1H 180J-T-A
C75	4030008930	S.CERAMIC C1808 CH 1H 020C-T-A
C76	4030007110	S.CERAMIC C1808 CH 1H 880J-T-A
C77	4030007030	S.CERAMIC C1808 CH 1H 150J-T-A
C78	4030007030	S.CERAMIC C1808 CH 1H 150J-T-A
C79	4030008940	S.CERAMIC C1808 CH 1H 030C-T-A
C80	4030007060	S.CERAMIC C1808 CH 1H 270J-T-A
C81	4030008990	S.CERAMIC C1808 CH 1H 080D-T-A
C82	4030007020	S.CERAMIC C1808 CH 1H 120J-T-A
C83	4030007050	S.CERAMIC C1808 CH 1H 220J-T-A
C84	4030008560	S.CERAMIC C1808 CH 1H 300J-T-A
C85	4030007050	S.CERAMIC C1808 CH 1H 220J-T-A
C86	4030008990	S.CERAMIC C1808 CH 1H 080D-T-A
C87	4030008970	S.CERAMIC C1808 CH 1H 080D-T-A
C88	4030007040	S.CERAMIC C1808 CH 1H 180J-T-A
C89	4030008930	S.CERAMIC C1808 CH 1H 020C-T-A
C90	4030007020	S.CERAMIC C1808 CH 1H 120J-T-A
C91	4030008880	S.CERAMIC C1808 JB 1H 472K-T-A
C94	4030008880	S.CERAMIC C1808 JB 1H 472K-T-A
C95	4510005600	S.ELECTROLITIC ECEV1CS100SR
C96	4030008880	S.CERAMIC C1808 JB 1H 472K-T-A
C98	4030008880	S.CERAMIC C1808 JB 1H 472K-T-A
C99	4030008880	S.CERAMIC C1808 JB 1H 472K-T-A

## [PLL UNIT]

REF. NO.	ORDER NO.	DESCRIPTION
C100	4510005600	S.ELECTROLITIC ECEV1CS100SR
C101	4040000190	BARRIERLAYR UAT 05X 103K
C102	4030007080	S.CERAMIC C1808 CH 1H 390J-T-A
C103	4030011570	S.CERAMIC CM105 CH 101G 50AT
C104	4810001280	S.TRIMMER ECR-JA020 E12W
C105	4030007150	S.CERAMIC C1808 CH 1H 151J-T-A
C106	4030007150	S.CERAMIC C1808 CH 1H 151J-T-A
C107	4030007150	S.CERAMIC C1808 CH 1H 151J-T-A
C108	4030008880	S.CERAMIC C1808 JB 1H 472K-T-A
C109	4030008980	S.CERAMIC C1808 CH 1H 050C-T-A
C110	4030010070	S.CERAMIC C1808 X7S 1C 104K-T-A
C111	4510005600	S.ELECTROLITIC ECEV1CS100SR
C112	4030008880	S.CERAMIC C1808 JB 1H 472K-T-A
C113	4030008880	S.CERAMIC C1808 JB 1H 472K-T-A
C114	4030008880	S.CERAMIC C1808 JB 1H 472K-T-A
C115	4030007100	S.CERAMIC C1808 CH 1H 560J-T-A
C116	4030007120	S.CERAMIC C1808 CH 1H 472K-T-A
C117	4030008880	S.CERAMIC C1808 JB 1H 472K-T-A
C118	4030007110	S.CERAMIC C1808 CH 1H 880J-T-A
C119	4030008880	S.CERAMIC C1808 JB 1H 472K-T-A
C120	4030008880	S.CERAMIC C1808 CH 1H 010C-T-A
C121	4030008880	S.CERAMIC C1808 JB 1H 472K-T-A
C122	4030007060	S.CERAMIC C1808 CH 1H 270J-T-A
C123	4030008880	S.CERAMIC C1808 JB 1H 472K-T-A
C124	4030008920	S.CERAMIC C1808 CH 1H 010C-T-A
C125	4030007060	S.CERAMIC C1808 CH 1H 270J-T-A
C126	4030008880	S.CERAMIC C1808 JB 1H 472K-T-A
C127	4030008880	S.CERAMIC C1808 JB 1H 472K-T-A
C128	4030008880	S.CERAMIC C1808 JB 1H 472K-T-A
C130	4030008880	S.CERAMIC C1808 JB 1H 472K-T-A
C132	4550000460	S.TANTALUM TESVA 1C 105M1-8L
C133	4030008880	S.CERAMIC C1808 JB 1H 472K-T-A
C134	4030010070	S.CERAMIC C1808 X7S 1C 104K-T-A
C135	4030010070	S.CERAMIC C1808 X7S 1C 104K-T-A
C136	4030010070	S.CERAMIC C1808 X7S 1C 104K-T-A
C137	4030010070	S.CERAMIC C1808 X7S 1C 104K-T-A
C138	4030010070	S.CERAMIC C1808 X7S 1C 104K-T-A
C139	4030010070	S.CERAMIC C1808 X7S 1C 104K-T-A
C140	4030010070	S.CERAMIC C1808 X7S 1C 104K-T-A
C141	4030010070	S.CERAMIC C1808 X7S 1C 104K-T-A
C142	4030010070	S.CERAMIC C1808 X7S 1C 104K-T-A
C143	4030010070	S.CERAMIC C1808 X7S 1C 104K-T-A
C144	4030010070	S.CERAMIC C1808 X7S 1C 104K-T-A
C145	4030010070	S.CERAMIC C1808 X7S 1C 104K-T-A
C146	4030010070	S.CERAMIC C1808 X7S 1C 104K-T-A
C147	4030010070	S.CERAMIC C1808 X7S 1C 104K-T-A
C148	4030010070	S.CERAMIC C1808 X7S 1C 104K-T-A
C149	4030008880	S.CERAMIC C1808 X7S 1C 104K-T-A
C150	4030010070	S.CERAMIC C1808 X7S 1C 104K-T-A
C151	4030010070	S.CERAMIC C1808 X7S 1C 104K-T-A
C152	4030010070	S.CERAMIC C1808 X7S 1C 104K-T-A
C153	4030010070	S.CERAMIC C1808 X7S 1C 104K-T-A
C154	4030010070	S.CERAMIC C1808 X7S 1C 104K-T-A
C155	4030010070	S.CERAMIC C1808 X7S 1C 104K-T-A
C156	4030010070	S.CERAMIC C1808 X7S 1C 104K-T-A
C157	4030007040	S.CERAMIC C1808 CH 1H 180J-T-A
C158	4030007090	S.CERAMIC C1808 CH 1H 470J-T-A
C159	4030007040	S.CERAMIC C1808 CH 1H 180J-T-A
C160	4030007040	S.CERAMIC C1808 CH 1H 180J-T-A
C161	4030008980	S.CERAMIC C1808 CH 1H 050C-T-A
C162	4030007070	S.CERAMIC C1808 CH 1H 330J-T-A
C163	4030008930	S.CERAMIC C1808 CH 1H 020C-T-A
C164	4030007040	S.CERAMIC C1808 CH 1H 180J-T-A
C165	4030008880	S.CERAMIC C1808 JB 1H 472K-T-A
C166	4550000460	S.TANTALUM TESVA 1C 105M1-8L
C167	4030010070	S.CERAMIC C1808 X7S 1C 104K-T-A
C169	4030008920	S.CERAMIC C1808 CH 1H 010C-T-A
C170	4030007030	S.CERAMIC C1808 CH 1H 150J-T-A
C171	4030007010	S.CERAMIC C1808 CH 1H 100D-T-A
C172	4030007010	S.CERAMIC C1808 CH 1H 100D-T-A
C173	4030008880	S.CERAMIC C1808 JB 1H 472K-T-A
C174	4030008880	S.CERAMIC C1808 JB 1H 472K-T-A
C175	4030008880	S.CERAMIC C1808 JB 1H 472K-T-A
C176	4030008880	S.CERAMIC C1808 JB 1H 472K-T-A
C177	4030008980	S.CERAMIC C1808 CH 1H 070D-T-A
C178	4030008930	S.CERAMIC C1808 CH 1H 020C-T-A

S.=Surface mount

## [PLL UNIT]

REF. NO.	ORDER NO.	DESCRIPTION	
C179	4030007010	S.CERAMIC	C1608 CH 1H 100D-T-A
C180	4030009470	S.CERAMIC	C1608 CH 1H R75C-T-A
C181	4030008990	S.CERAMIC	C1608 CH 1H 080D-T-A
C182	4030008880	S.CERAMIC	C1608 JB 1H 472K-T-A
C183	4030008880	S.CERAMIC	C1608 JB 1H 472K-T-A
C184	4030008880	S.CERAMIC	C1608 JB 1H 102K-T-A
C185	4030008850	S.CERAMIC	C1608 JB 1H 471K-T-A
C186	4510004990	ELECTROLITIC	16 MV 100 HC
C188	4030006850	S.CERAMIC	C1608 JB 1H 471K-T-A
C195	4030008880	S.CERAMIC	C1608 JB 1H 472K-T-A
C196	4030008880	S.CERAMIC	C1608 JB 1H 472K-T-A
C197	4030008880	S.CERAMIC	C1608 JB 1H 102K-T-A
C198	4030007010	S.CERAMIC	C1608 CH 1H 100D-T-A
C200	4510005600	S.ELECTROLITIC	ECEV1CS100SR
C201	4510005600	S.ELECTROLITIC	ECEV1CS100SR
C202	4510005600	S.ELECTROLITIC	ECEV1CS100SR
C204	4030006980	S.CERAMIC	C1608 CH 1H 070D-T-A
C205	4030006980	S.CERAMIC	C1608 CH 1H 070D-T-A
C206	4030007030	S.CERAMIC	C1608 CH 1H 150J-T-A
C207	4030008880	S.CERAMIC	C1608 JB 1H 472K-T-A
C212	4030008880	S.CERAMIC	C1608 JB 1H 472K-T-A
C213	4030008880	S.CERAMIC	C1608 JB 1H 472K-T-A
C217	4030007030	S.CERAMIC	C1608 CH 1H 150J-T-A
C218	4030006990	S.CERAMIC	C1608 CH 1H 080D-T-A
C219	4030007030	S.CERAMIC	C1608 CH 1H 150J-T-A
C220	4030008880	S.CERAMIC	C1608 JB 1H 472K-T-A
C223	4040000690	BARRIERLAYR	UAT 08X 473K
C224	4510005000	ELECTROLITIC	16 MV 220 HC
C225	4030008880	S.CERAMIC	C1608 JB 1H 472K-T-A
C226	4030010070	S.CERAMIC	C1608 X7S 1C 104K-T-A
C227	4030010070	S.CERAMIC	C1608 X7S 1C 104K-T-A
C228	4030010070	S.CERAMIC	C1608 X7S 1C 104K-T-A
C233	4030008880	S.CERAMIC	C1608 JB 1H 472K-T-A
C236	4510004590	ELECTROLITIC	16 MV 470 HC
C237	4030008920	S.CERAMIC	C1608 CH 1H 010C-T-A
C238	4030008850	S.CERAMIC	C1608 JB 1H 471K-T-A
C239	4030008850	S.CERAMIC	C1608 JB 1H 471K-T-A
C240	4030008880	S.CERAMIC	C1608 JB 1H 472K-T-A
C241	4550008080	S.TANTALUM	TEMSVB2 1C 106M-8L
C242	4550008080	S.TANTALUM	TEMSVB2 1C 106M-8L
C243	4040000690	BARRIERLAYR	UAT 08X 473K
C244	4030008880	S.CERAMIC	C1608 JB 1H 472K-T-A
C245	4030008880	S.CERAMIC	C1608 JB 1H 472K-T-A
C246	4550000460	S.TANTALUM	TESVA 1C 105M1-8L
C247	4030007100	S.CERAMIC	C1608 CH 1H 580J-T-A
C248	4030008880	S.CERAMIC	C1608 JB 1H 472K-T-A
C249	4030007030	S.CERAMIC	C1608 CH 1H 150J-T-A
C250	4030008880	S.CERAMIC	C1608 JB 1H 472K-T-A
C251	4030008880	S.CERAMIC	C1608 JB 1H 472K-T-A
C252	4030008880	S.CERAMIC	C1608 JB 1H 472K-T-A
C253	4030008880	S.CERAMIC	C1608 JB 1H 472K-T-A
C254	4030008880	S.CERAMIC	C1608 JB 1H 472K-T-A
C255	4030008880	S.CERAMIC	C1608 JB 1H 472K-T-A
C256	4030008880	S.CERAMIC	C1608 JB 1H 472K-T-A
C257	4030010070	S.CERAMIC	C1608 X7S 1C 104K-T-A
C258	4030010070	S.CERAMIC	C1608 X7S 1C 104K-T-A
C259	4030007050	S.CERAMIC	C1608 CH 1H 220J-T-A
C260	4030007050	S.CERAMIC	C1608 CH 1H 220J-T-A
C261	4030007050	S.CERAMIC	C1608 CH 1H 220J-T-A
RL1	6330001320	RELAY	AHY103
J1	6510018950	S.CONNECTOR	B7B-PH-SM3-TB
J2	6510019070	S.CONNECTOR	52559-3092
J5	6510018960	S.CONNECTOR	B2B-PH-SM3-TB
WS1	8600034620	CABLE	1891 P01 *J04PL
WS2	8970022090	CABLE	1891 1.5D COAXIAL (3)/PL
EP1	0910045448	PCB	B 4561H

## [PA UNIT]

REF. NO.	ORDER NO.	DESCRIPTION	
IC1	1110003970	S.IC	µPC1658G-E1
Q1	1590002020	TRANSISTOR	MRF555
Q2	1590002260	TRANSISTOR	MRF5015
Q5	1590001940	S.TRANSISTOR	DTC144EE TL
Q8	1590001870	S.TRANSISTOR	DTA114EE TL
Q7	1590001940	S.TRANSISTOR	DTC144EE TL
Q8	1590001940	S.TRANSISTOR	DTC144EE TL
Q9	1590001870	S.TRANSISTOR	DTA114EE TL
Q10	1590000680	S.TRANSISTOR	DTC114EU T107
Q11	1590001940	S.TRANSISTOR	DTC144EE TL
Q12	1590001870	S.TRANSISTOR	DTA114EE TL
Q14	1590001150	S.TRANSISTOR	UN9211 (TX)
Q15	1540000250	S.TRANSISTOR	2SD999-T2 CK
Q18	1590002360	TRANSISTOR	MRF581
Q17	1590001940	S.TRANSISTOR	DTC144EE TL
Q18	1590002280	FET	MRF255
Q19	1590002280	FET	MRF255
Q20	1590001940	S.TRANSISTOR	DTC144EE TL
Q21	1590001870	S.TRANSISTOR	DTA114EE TL
Q22	1590001940	S.TRANSISTOR	DTC144EE TL
Q23	1590001870	S.TRANSISTOR	DTA114EE TL
Q24	1590001940	S.TRANSISTOR	DTC144EE TL
Q25	1590001940	S.TRANSISTOR	DTC144EE TL
D1	1160000140	S.DIODE	DAP222 TL
D2	1790000490	S.DIODE	HSM88AS-TR
D3	1790000490	S.DIODE	HSM88AS-TR
D4	1710000730	S.DIODE	MI809-T11
D6	1790000450	S.DIODE	MA862(TX)
D7	1750000450	S.DIODE	1SV265-TR
D11	1160000140	S.DIODE	DAP222 TL
D12	1790000700	DIODE	DSA3A1
D13	1790000700	DIODE	DSA3A1
D14	1710000730	S.DIODE	MI809-T11
D15	1710000730	S.DIODE	MI809-T11
D16	1750000270	S.DIODE	1SS301 (TE85R)
D17	1750000270	S.DIODE	1SS301 (TE85R)
D18	1750000520	S.DIODE	DAN222TL
L3	6140002220	COIL	LR-270 (TR6X3X2 3A9)
L4	6140003030	COIL	LR-321B
L5	6140003040	COIL	LR-322B
L9	6140002030	COIL	LR-230 (SK-10M-15Y 120)
L10	6110001570	COIL	LA-237
L11	6110002150	COIL	LA-385
L12	6110002070	COIL	LA-227
L13	6200004740	S.COIL	NL 252018T-1R2J
L14	6200004740	S.COIL	NL 252018T-1R2J
L16	6110002120	COIL	LA-228
L17	6110002070	COIL	LA-227
L18	6110002070	COIL	LA-227
L19	6110002070	COIL	LA-227
L20	6200004740	S.COIL	NL 252018T-1R2J
L22	6200004740	S.COIL	NL 252018T-1R2J
L25	6200002640	S.COIL	NL 252018T-R15J
L26	6200002650	S.COIL	NL 252018T-R18J
L27	6200004740	S.COIL	NL 252018T-1R2J
L29	6150002780	COIL	LS-295
L30	6150002780	COIL	LS-295
L31	6200004740	S.COIL	NL 252018T-1R2J
L33	6200004740	S.COIL	NL 252018T-1R2J
L35	6200002410	S.COIL	NL 252018T-056J
L37	6200003950	S.COIL	HF50ACC 322513-T
L40	6200002420	S.COIL	NL 252018T-068J
L41	6200003590	S.COIL	EXCCL3225U1
L42	6180000900	COIL	LAL 03NA 101K
L43	6140003060	COIL	LR-324
L44	6140003060	COIL	LR-324
L45	6140000610	COIL	LR-83
L46	6140003051	COIL	LR-323B
L48	6200002630	S.COIL	NL 252018T-R10J
L49	6200002430	S.COIL	NL 252018T-082J

S.=Surface mount



## [PA UNIT]

REF. NO.	ORDER NO.	DESCRIPTION	
C119	4030001370	S.CERAMIC	GR44 CH 682K
C120	4030001370	S.CERAMIC	GR44 CH 682K
C126	4030010070	S.CERAMIC	C1608 X7S 1C 104K-T-A
C127	4030010070	S.CERAMIC	C1608 X7S 1C 104K-T-A
C128	4030010070	S.CERAMIC	C1608 X7S 1C 104K-T-A
C130	4030006880	S.CERAMIC	C1608 JB 1H 472K-T-A
C131	4030006880	S.CERAMIC	C1608 JB 1H 472K-T-A
C134	4030006880	S.CERAMIC	C1608 JB 1H 102K-T-A
C136	4030006880	S.CERAMIC	C1608 JB 1H 102K-T-A
C137	4030006880	S.CERAMIC	C1608 JB 1H 102K-T-A
C138	4320001060	S.MICA	UC342H 3900J
C139	4320001060	S.MICA	UC342H 3900J
C141	4030010070	S.CERAMIC	C1608 X7S 1C 104K-T-A
C142	4030010070	S.CERAMIC	C1608 X7S 1C 104K-T-A
C143	4030010070	S.CERAMIC	C1608 X7S 1C 104K-T-A
C144	4030010070	S.CERAMIC	C1608 X7S 1C 104K-T-A
C145	4030010070	S.CERAMIC	C1608 X7S 1C 104K-T-A
C146	4030010070	S.CERAMIC	C1608 X7S 1C 104K-T-A
C148	4030010070	S.CERAMIC	C1608 X7S 1C 104K-T-A
C149	4030010070	S.CERAMIC	C1608 X7S 1C 104K-T-A
C150	4030006880	S.CERAMIC	C1608 JB 1H 472K-T-A
C151	4030009850	S.CERAMIC	C1608 CH 1H 240J-T-A
C152	4030009990	S.CERAMIC	C1608 CH 1H 200J-T-A
C153	4030007020	S.CERAMIC	C1608 CH 1H 120J-T-A
C154	4030009990	S.CERAMIC	C1608 CH 1H 200J-T-A
C155	4320001070	S.MICA	UC342H 3300J-T
C157	4030010760	S.CERAMIC	C1608 CH 1H 331J-T-A
C158	4030010070	S.CERAMIC	C1608 X7S 1C 104K-T-A
C159	4510004590	ELECTROLITIC	16 MV 470 HC
C160	4030006880	S.CERAMIC	C1608 JB 1H 102K-T-A
C161	4030010070	S.CERAMIC	C1608 X7S 1C 104K-T-A
C162	4030010070	S.CERAMIC	C1608 X7S 1C 104K-T-A
C163	4030006880	S.CERAMIC	C1608 JB 1H 102K-T-A
C164	4030006880	S.CERAMIC	C1608 JB 1H 472K-T-A
C165	4030006880	S.CERAMIC	C1608 JB 1H 472K-T-A
C166	4030010070	S.CERAMIC	C1608 X7S 1C 104K-T-A
C167	4030001420	S.CERAMIC	GR44 Y5V 684Z
C170	4010005740	CERAMIC	HM60SJ SL 580J 500V
C171	4010005860	CERAMIC	HM95SJ SL 201J 500V
C172	4010005860	CERAMIC	HM95SJ SL 201J 500V
RL1	6330001300	RELAY	UM1-12W-K
RL2	6330001060	RELAY	APQ 3311
F1	5210000130	FUSE	FGB 4A
F2	5220000020	HOLDER	S-N5051
F3	5220000020	HOLDER	S-N5051
J1	6510003250	CONNECTOR	TMP-J01X-A2
J3	6510003400	CONNECTOR	B04B-EH-S
J8	6450000140	CONNECTOR	HSJ0807-01-010
J13	6510003250	CONNECTOR	TMP-J01X-A2
J14	6510018960	S.CONNECTOR	B2B-PH-SM3-TB
J15	6510003080	CONNECTOR	RT01T-1.0B
W32	9045201001	WIRE	74/98/040/X98/X98
W35	9045201001	WIRE	74/98/040/X98/X98
WS1	8970022130	CABLE	1691 J-BOARD SET (1)/PA
WS2	8600034632	CABLE	1691 J10PA-2
WS3	8600034470	CABLE	1691 P04*J02*04PA
WS4	8600034650	CABLE	1691 P05*J05PA
WS5	8970022141	CABLE	1691 1.5D COAXIAL-1 (2)/PA
WS6	8600034490	CABLE	1691 P07*J07PA
WS7	8600034700	CABLE	1691 P03*J06PA
EP1	0910045887	PCB	B 4562G
EP2	6910000610	BEAD	FSOH050RN01
EP6	6910000630	BEAD	FSOH070RN

## [FILTER UNIT]

REF. NO.	ORDER NO.	DESCRIPTION	
IC1	1110002700	S.IC	NJM2904M-T1
Q1	1530002060	S.TRANSISTOR	2SC4081 T107 R
Q2	1590000680	S.TRANSISTOR	DTC114EU T107
Q3	1590000680	S.TRANSISTOR	DTC114EU T107
Q4	1590000680	S.TRANSISTOR	DTC114EU T107
Q5	1590000680	S.TRANSISTOR	DTC114EU T107
Q6	1590000680	S.TRANSISTOR	DTC114EU T107
Q7	1590000680	S.TRANSISTOR	DTC114EU T107
Q8	1530002060	S.TRANSISTOR	2SC4081 T107 R
Q9	1530003090	S.TRANSISTOR	2SC4213-B (TE85R)
D1	1160000140	S.DIODE	DAP222 TL
D2	1160000140	S.DIODE	DAP222 TL
D3	1160000140	S.DIODE	DAP222 TL
D4	1160000140	S.DIODE	DAP222 TL
D5	1160000140	S.DIODE	DAP222 TL
D6	1160000140	S.DIODE	DAP222 TL
D7	1160000140	S.DIODE	DAP222 TL
D8	1160000140	S.DIODE	DAP222 TL
D9	1790000490	S.DIODE	HSM88AS-TR
D10	1790000490	S.DIODE	HSM88AS-TR
D11	1160000140	S.DIODE	DAP222 TL
D12	1160000140	S.DIODE	DAP222 TL
D13	1160000140	S.DIODE	DAP222 TL
D14	1160000140	S.DIODE	DAP222 TL
D15	1160000140	S.DIODE	DAP222 TL
D16	1160000140	S.DIODE	DAP222 TL
D17	1160000140	S.DIODE	DAP222 TL
D18	1160000140	S.DIODE	DAP222 TL
D19	1160000140	S.DIODE	DAP222 TL
D20	1160000140	S.DIODE	DAP222 TL
D21	1160000140	S.DIODE	DAP222 TL
D22	1160000140	S.DIODE	DAP222 TL
L1	6110001560	COIL	LA-236
L2	6110001630	COIL	LA-246
L3	6180000900	COIL	LAL 03NA 101K
L4	6180000900	COIL	LAL 03NA 101K
L5	6110002230	COIL	LA-215
L6	6110002230	COIL	LA-215
L7	6110002220	COIL	LA-214
L8	6180000900	COIL	LAL 03NA 101K
L9	6200003260	S.COIL	NL 322522T-101J
L10	6140001800	COIL	LR-216 (T50-2)
L11	6140001800	COIL	LR-216 (T50-2)
L12	6200003260	S.COIL	NL 322522T-101J
L13	6200003260	S.COIL	NL 322522T-101J
L14	6110002900	COIL	LA-479
L15	6110002890	COIL	LA-478
L16	6200003260	S.COIL	NL 322522T-101J
L17	6200003260	S.COIL	NL 322522T-101J
L18	6140002580	COIL	LR-293 (T50-10)
L19	6140002580	COIL	LR-293 (T50-10)
L20	6200003260	S.COIL	NL 322522T-101J
L21	6200003260	S.COIL	NL 322522T-101J
L22	6110002920	COIL	LA-481
L23	6110002910	COIL	LA-480
L24	6200003260	S.COIL	NL 322522T-101J
L25	6200003260	S.COIL	NL 322522T-101J
L26	6140001780	COIL	LR-214 (T50-2)
L27	6140001790	COIL	LR-215 (T50-2)
L28	6200003260	S.COIL	NL 322522T-101J
L29	6200003260	S.COIL	NL 322522T-101J
L30	6140002570	COIL	LR-294 (T50-2)
L31	6140002580	COIL	LR-295 (T50-2)
L32	6200003260	S.COIL	NL 322522T-101J
L33	6140002600	COIL	LR-297 (TR10X5X5 3A8)
L34	6200003260	S.COIL	NL 322522T-101J
L35	2040000490	COIL	EXC-ELDR25C
L36	6200003260	S.COIL	NL 322522T-101J
L37	6200003260	S.COIL	NL 322522T-101J
L39	2040000490	COIL	EXC-ELDR25C

S.=Surface mount





[FILTER UNIT]

REF. NO.	ORDER NO.	DESCRIPTION	
C121	4030008880	S.CERAMIC	C1808 JB 1H 472K-T-A
C122	4030008880	S.CERAMIC	C1808 JB 1H 472K-T-A
C123	4030009110	S.CERAMIC	C3216 JB 1C 474K-T-A
C124	4030010070	S.CERAMIC	C1808 X7S 1C 104K-T-A
C125	4030010070	S.CERAMIC	C1808 X7S 1C 104K-T-A
C126	4030010070	S.CERAMIC	C1808 X7S 1C 104K-T-A
C127	4030010070	S.CERAMIC	C1808 X7S 1C 104K-T-A
C128	4030008880	S.CERAMIC	C1808 JB 1H 472K-T-A
C131	4010005370	CERAMIC	HM11SJ SL 331J 500V
C132	4010005590	CERAMIC	HM60SJ SL 080D 500V
C133	4030010070	S.CERAMIC	C1808 X7S 1C 104K-T-A
C134	4010005820	CERAMIC	HM74SJ SL 121J 500V
C135	4010005820	CERAMIC	HM74SJ SL 121J 500V
C136	4030001420	S.CERAMIC	GR44 Y5V 684Z
C137	4010005730	CERAMIC	HM60SJ SL 470J 500V
C138	4010005730	CERAMIC	HM60SJ SL 470J 500V
RL1	6330000720	RELAY	DS1-M-DC12V (AG2013)
RL2	6330000720	RELAY	DS1-M-DC12V (AG2013)
RL3	6330000720	RELAY	DS1-M-DC12V (AG2013)
RL4	6330001320	RELAY	AHY103
RL5	6330001320	RELAY	AHY103
RL6	6330001320	RELAY	AHY103
RL7	6330001320	RELAY	AHY103
RL8	6330001320	RELAY	AHY103
RL9	6330001320	RELAY	AHY103
RL10	6330001320	RELAY	AHY103
RL11	6330001320	RELAY	AHY103
RL12	6330001320	RELAY	AHY103
RL13	6330001320	RELAY	AHY103
RL14	6330001320	RELAY	AHY103
RL15	6330001320	RELAY	AHY103
J4	6450001490	CONNECTOR	HLJ7001-01-3010
J5	6450001640	CONNECTOR	TCS5044-01-4111
J7	6450001650	CONNECTOR	HSJ0836-01-500
J8	6450001660	CONNECTOR	EX345GLB
J9	6510019160	S.CONNECTOR	52810-2090
J11	6510016170	CONNECTOR	52018-8835
J12	6510019140	S.CONNECTOR	52810-1090
J13	6510003250	CONNECTOR	TMP-J01X-A2
W1	7120000010	JUMPER	JPW 02A
W8	7030003860	S.JUMPER	ERJ3GE JPW V
W9	7030003860	S.JUMPER	ERJ3GE JPW V
W10	7030003860	S.JUMPER	ERJ3GE JPW V
W11	7030003860	S.JUMPER	ERJ3GE JPW V
W12	7030003860	S.JUMPER	ERJ3GE JPW V
W13	7030003860	S.JUMPER	ERJ3GE JPW V
W14	7030003860	S.JUMPER	ERJ3GE JPW V
W15	7030003860	S.JUMPER	ERJ3GE JPW V
W16	7030003860	S.JUMPER	ERJ3GE JPW V
W17	7030003860	S.JUMPER	ERJ3GE JPW V
WS1	8970022150	CABLE	1691 1.5D COAXIAL (2)/FI
WS2	8600034510	CABLE	1691 P03-J10FI
EP1	0910045636	PCB	B 4563F

[FRONT PARTS]

REF. NO.	ORDER NO.	DESCRIPTION	
S1	2250000290	ENCODER	SW-159 (EC24B50B)
W1	8900006040	CABLE	OPC-593 (N:13 L:50)
W2	8900006250	CABLE	OPC-610

[CHASSIS PARTS]

REF. NO.	ORDER NO.	DESCRIPTION	
MF1	2710000580	FAN	FBA06T12HF
J3	6510000370	CONNECTOR	MR-DS
J4	6510000370	CONNECTOR	MR-DS
W1	8900006050	CABLE	OPC-584 (N:30 L:100)
W2	8900006060	CABLE	OPC-595 (N:20 L:150)
W3	8900006150	CABLE	OPC-602 (N:10 L:150)
WS1	8600034603	CABLE	1691 P03CH-3
WS2	8600034440	CABLE	1691 P01-J02CH
WS3	8970022084	CABLE	1691 1.5D COAXIAL-4
(2)/CH			
SP1	2510000670	SPEAKER	VS-50-0827
EP1	8930021010	PLUG	DOMED PLUG DP-500
EP2	0910045921	FPC	B 4598A
EP8	9016910500	TUBE	

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S.=Surface mount

## 5-2 AT-180

### [TUNER UNIT]

REF. NO.	ORDER NO.	DESCRIPTION	
IC1	1120000970	IC	M54582P
IC2	1120000970	IC	M54582P
L1	8110003010	COIL	LA-488
L2	8110003020	COIL	LA-489
L3	8110003020	COIL	LA-489
L4	8110003030	COIL	LA-490
L5	8110003020	COIL	LA-489
L6	8110003030	COIL	LA-490
L7	8140002700	COIL	LR-307 (T130-2)
L8	8140002690	COIL	LR-308 (T88-6)
L9	8140002690	COIL	LR-308 (T88-6)
L10	8140002690	COIL	LR-308 (T88-6)
L11	8140002690	COIL	LR-308 (T88-6)
L13	2040000490	COIL	EXC-ELDR25C
R1	7410000170	ARRAY	RMX- 8 102K
R2	7410000170	ARRAY	RMX- 8 102K
C1	4620000110	VARIABLE	UV35 150P
C2	4010004260	CERAMIC	DE0907 SL 820J 3KV
C3	4010004280	CERAMIC	DE1207 SL 151J 3KV
C4	4010004250	CERAMIC	DE1007 SL 101J 3KV
C5	4620000110	VARIABLE	UV35 150P
C6	4010004250	CERAMIC	DE1007 SL 101J 3KV
C7	4010004280	CERAMIC	DE1207 SL 151J 3KV
C8	4010004250	CERAMIC	DE1007 SL 101J 3KV
C9	4040000150	BARRIERLAYR	UAT 05X 472K
C10	4040000150	BARRIERLAYR	UAT 05X 472K
C11	4040000150	BARRIERLAYR	UAT 05X 472K
C12	4040000150	BARRIERLAYR	UAT 05X 472K
C13	4040000150	BARRIERLAYR	UAT 05X 472K
C14	4040000150	BARRIERLAYR	UAT 05X 472K
C15	4040000150	BARRIERLAYR	UAT 05X 472K
C16	4040000150	BARRIERLAYR	UAT 05X 472K
C17	4040000150	BARRIERLAYR	UAT 05X 472K
C18	4040000150	BARRIERLAYR	UAT 05X 472K
C19	4040000150	BARRIERLAYR	UAT 05X 472K
C20	4040000150	BARRIERLAYR	UAT 05X 472K
C21	4040000150	BARRIERLAYR	UAT 05X 472K
C22	4010000520	CERAMIC	DD107-601 B 472K 50V
C23	4040000150	BARRIERLAYR	UAT 05X 472K
C24	4010004250	CERAMIC	DE1007 SL 101J 3KV
C25	4530000250	ARRAY	B8XC0112-32N
C26	4530000250	ARRAY	B8XC0112-32N
C27	4010005070	CERAMIC	DE0707 SL 390J 3KV
C28	4010005070	CERAMIC	DE0707 SL 390J 3KV
C29	4010004250	CERAMIC	DE1007 SL 101J 3KV
C30	4010000500	CERAMIC	DD104 B 102K 50V
RL1	8330001110	RELAY	NY-12W-K
RL2	8330001110	RELAY	NY-12W-K
RL3	8330001110	RELAY	NY-12W-K
RL4	8330001110	RELAY	NY-12W-K
RL5	8330001110	RELAY	NY-12W-K
RL6	8330001110	RELAY	NY-12W-K
RL7	8330001110	RELAY	NY-12W-K
RL8	8330001110	RELAY	NY-12W-K
RL9	8330001110	RELAY	NY-12W-K
RL10	8330001110	RELAY	NY-12W-K
RL11	8330001110	RELAY	NY-12W-K
RL12	8330001110	RELAY	NY-12W-K
RL13	8330001110	RELAY	NY-12W-K
RL14	8330001110	RELAY	NY-12W-K
RL15	8330001110	RELAY	NY-12W-K
J5	8510003100	CONNECTOR	RT01T-1.3B
J6	8510003100	CONNECTOR	RT01T-1.3B

### [TUNER UNIT]

REF. NO.	ORDER NO.	DESCRIPTION	
WS1	8970022230	CABLE	1732 1.5D Coaxial (2)/TU
WS2	8600034870	CABLE	1732 P01 *J01TU
WS3	8600034880	CABLE	1732 P02 *J02TU
EP1	0910046761	PCB	B 4739A
MP1	8930030100	ANGLE	1414 ANGLE
MP2	8810003160	SCREW	Set screw A M3 X 6 [2 pcs]
MP3	8810003160	SCREW	Set screw A M3 X 6 [4 pcs]

### [CTRL UNIT]

REF. NO.	ORDER NO.	DESCRIPTION	
IC1	1110000980	S.IC	NJM4558M(T1)
IC2	1110001850	IC	MC10116 L
IC3	1110001860	IC	MC10125 L
IC4	1120002251	S.IC	TC74ACT32F(TP1)
IC5	1120002241	S.IC	TC74AC112F(TP1)
IC6	1110000980	S.IC	NJM4558M(T1)
IC7	1180001070	S.IC	TA7805F(TE16L)
IC8	1180001140	S.IC	S-8437AF-ZA-T1
IC9	1180000110	S.IC	TD82164AF(TP1)
IC10	1180000110	S.IC	TD82164AF(TP1)
IC11	1140003610	S.IC	X24C04S8-2.7
IC12	1140004120	S.IC	M38022M2-138FP
IC13	1110001550	S.IC	S-8054ALB-LM-T1
IC14	1130003920	S.IC	TC4S69F (TE85R)
IC16	1130003920	S.IC	TC4S69F (TE85R)
IC17	1180000040	IC	TA78L009AP
IC18	1110002690	S.IC	NJM2903M-T1
Q1	1580000040	FET	2SK30ATM-Y
Q2	1520000530	S.TRANSISTOR	2SB1119S-TD
Q3	1590001220	S.TRANSISTOR	RN1302 (TE85R)
Q8	1530002690	S.TRANSISTOR	2SC4116-GR (TE85R)
Q9	1530002690	S.TRANSISTOR	2SC4116-GR (TE85R)
Q10	1510000780	S.TRANSISTOR	2SA1586-Y (TE85R)
Q11	1590001220	S.TRANSISTOR	RN1302 (TE85R)
Q12	1510000780	S.TRANSISTOR	2SA1586-Y (TE85R)
Q15	1530002690	S.TRANSISTOR	2SC4116-GR (TE85R)
D1	1790000070	DIODE	1SS237
D2	1790000070	DIODE	1SS237
D3	1710000580	DIODE	1SS265
D4	1710000580	DIODE	1SS265
D5	1710000580	DIODE	1SS265
D6	1710000580	DIODE	1SS265
D7	1750000220	S.DIODE	DA113W T107
D8	1750000220	S.DIODE	DA113W T107
D9	1790000240	DIODE	1SS99
D10	1790000240	DIODE	1SS99
D11	1790000070	DIODE	1SS237
D12	1790000070	DIODE	1SS237
D13	1750000220	S.DIODE	DA113W T107
D14	1750000220	S.DIODE	DA113W T107
D20	1710000550	DIODE	1S954
D21	1790001130	S.DIODE	D2FS4-4083
D24	1750000220	S.DIODE	DA113W T107
D25	1730000410	S.ZENER	RD5.1M-T2B2
D26	1730000410	S.ZENER	RD5.1M-T2B2
D29	1750000120	S.DIODE	DWA010-TE
D30	1750000120	S.DIODE	DWA010-TE
D31	1750000200	S.DIODE	1SS319 (TE85R)
D32	1790000070	DIODE	1SS237

S.=Surface mount

**[MAIN UNIT]**

REF. NO.	ORDER NO.	DESCRIPTION	
X1	6050009080	XTAL	AT-49 (6.144MHz)
L1	6180000450	COIL	RFC L6 222K
L2	6140000100	COIL	LR-22A
L3	6200003260	S.COIL	NL 322522T-101J
L4	6200003260	S.COIL	NL 322522T-101J
L5	6200001830	S.COIL	NL 322522T-100J
L6	6180000960	COIL	LAL 03NA 102K
L7	6140002660	COIL	LR-299
L8	6180000960	COIL	LAL 03NA 102K
L9	6200003260	S.COIL	NL 322522T-101J
L10	6140002650	COIL	LR-298
L11	6200003260	S.COIL	NL 322522T-101J
L12	6200003260	S.COIL	NL 322522T-101J
L13	6200003260	S.COIL	NL 322522T-101J
L16	6180000990	COIL	LAL 04NA 101K
L18	6180000900	COIL	LAL 03NA 101K
L19	6180000900	COIL	LAL 03NA 101K
L20	6180000900	COIL	LAL 03NA 101K
L21	6180000900	COIL	LAL 03NA 101K
L23	6180000900	COIL	LAL 03NA 101K
L24	6180000900	COIL	LAL 03NA 101K
L25	6180000900	COIL	LAL 03NA 101K
L26	6180000900	COIL	LAL 03NA 101K
L27	6910000670	COIL	BL01RN1-A62-001
L28	6200003260	S.COIL	NL 322522T-101J
L29	6200003260	S.COIL	NL 322522T-101J
L30	6200003260	S.COIL	NL 322522T-101J
L31	6200003260	S.COIL	NL 322522T-101J
L32	6200003260	S.COIL	NL 322522T-101J
L33	6200003260	S.COIL	NL 322522T-101J
L34	6200003260	S.COIL	NL 322522T-101J
L35	6200003260	S.COIL	NL 322522T-101J
L36	6200003260	S.COIL	NL 322522T-101J
L37	6200003260	S.COIL	NL 322522T-101J
L38	6200003260	S.COIL	NL 322522T-101J
L39	6200003260	S.COIL	NL 322522T-101J
L40	6200003260	S.COIL	NL 322522T-101J
L41	6200003260	S.COIL	NL 322522T-101J
L42	6180000450	COIL	RFC L6 222K
L43	6200003260	S.COIL	NL 322522T-101J
L44	6190000220	COIL	S0971136-101K
L45	6180000990	COIL	LAL 04NA 101K
L46	6180000990	COIL	LAL 04NA 101K
L47	6140002660	COIL	LR-299
L48	6910000670	COIL	BL01RN1-A62-001
L49	6910000670	COIL	BL01RN1-A62-001
L50	6200003260	S.COIL	NL 322522T-101J
R2	7030003560	S.RESISTOR	ERJ3GEYJ 103 V (10 kΩ)
R3	7030003640	S.RESISTOR	ERJ3GEYJ 473 V (47 kΩ)
R4	7030003720	S.RESISTOR	ERJ3GEYJ 224 V (220 kΩ)
R5	7030003670	S.RESISTOR	ERJ3GEYJ 823 V (82 kΩ)
R7	7030003720	S.RESISTOR	ERJ3GEYJ 224 V (220 kΩ)
R8	7030003670	S.RESISTOR	ERJ3GEYJ 823 V (82 kΩ)
R9	7030003730	S.RESISTOR	ERJ3GEYJ 274 V (270 kΩ)
R10	7030003560	S.RESISTOR	ERJ3GEYJ 103 V (10 kΩ)
R11	7030003640	S.RESISTOR	ERJ3GEYJ 473 V (47 kΩ)
R12	7030003720	S.RESISTOR	ERJ3GEYJ 224 V (220 kΩ)
R13	7030003720	S.RESISTOR	ERJ3GEYJ 224 V (220 kΩ)
R14	7030003720	S.RESISTOR	ERJ3GEYJ 224 V (220 kΩ)
R16	7030003430	S.RESISTOR	ERJ3GEYJ 821 V (820 Ω)
R17	7030000080	S.RESISTOR	MCR10EZHZ 3.3 Ω (3R3)
R19	7030003330	S.RESISTOR	ERJ3GEYJ 121 V (120 Ω)
R20	7030003280	S.RESISTOR	ERJ3GEYJ 470 V (47 Ω)
R22	7030003410	S.RESISTOR	ERJ3GEYJ 561 V (560 Ω)
R23	7030001070	S.RESISTOR	MCR50JZHJ 33 Ω (330)
R24	7030000080	S.RESISTOR	MCR10EZHZ 3.3 Ω (3R3)
R25	7030003330	S.RESISTOR	ERJ3GEYJ 121 V (120 Ω)
R26	7030003280	S.RESISTOR	ERJ3GEYJ 470 V (47 Ω)
R27	7030003480	S.RESISTOR	ERJ3GEYJ 222 V (2.2 kΩ)
R28	7030003360	S.RESISTOR	ERJ3GEYJ 221 V (220 Ω)
R30	7030001100	S.RESISTOR	MCR50JZHJ 56 Ω (560)
R31	7030003560	S.RESISTOR	ERJ3GEYJ 103 V (10 kΩ)

**[MAIN UNIT]**

REF. NO.	ORDER NO.	DESCRIPTION	
R32	7030003800	S.RESISTOR	ERJ3GEYJ 105 V (1 MΩ)
R33	7030003560	S.RESISTOR	ERJ3GEYJ 103 V (10 kΩ)
R34	7030003560	S.RESISTOR	ERJ3GEYJ 103 V (10 kΩ)
R35	7030003520	S.RESISTOR	ERJ3GEYJ 472 V (4.7 kΩ)
R36	7030003440	S.RESISTOR	ERJ3GEYJ 102 V (1 kΩ)
R37	7030003560	S.RESISTOR	ERJ3GEYJ 103 V (10 kΩ)
R38	7030003670	S.RESISTOR	ERJ3GEYJ 823 V (82 kΩ)
R39	7030003480	S.RESISTOR	ERJ3GEYJ 222 V (2.2 kΩ)
R40	7030003680	S.RESISTOR	ERJ3GEYJ 104 V (100 kΩ)
R41	7030003780	S.RESISTOR	ERJ3GEYJ 684 V (680 kΩ)
R42	7030003560	S.RESISTOR	ERJ3GEYJ 103 V (10 kΩ)
R43	7030003590	S.RESISTOR	ERJ3GEYJ 183 V (18 kΩ)
R44	7030003680	S.RESISTOR	ERJ3GEYJ 104 V (100 kΩ)
R45	7030003560	S.RESISTOR	ERJ3GEYJ 103 V (10 kΩ)
R46	7030003680	S.RESISTOR	ERJ3GEYJ 104 V (100 kΩ)
R47	7030003780	S.RESISTOR	ERJ3GEYJ 684 V (680 kΩ)
R48	7030003560	S.RESISTOR	ERJ3GEYJ 103 V (10 kΩ)
R50	7030003560	S.RESISTOR	ERJ3GEYJ 103 V (10 kΩ)
R51	7030003440	S.RESISTOR	ERJ3GEYJ 102 V (1 kΩ)
R57	7070000510	RESISTOR	CRH100X R-02J 18 Ω
R62	7030003560	S.RESISTOR	ERJ3GEYJ 103 V (10 kΩ)
R63	7030003560	S.RESISTOR	ERJ3GEYJ 102 V (1 kΩ)
R64	7030003680	S.RESISTOR	ERJ3GEYJ 104 V (100 kΩ)
R65	7030003680	S.RESISTOR	ERJ3GEYJ 104 V (100 kΩ)
R66	7030003680	S.RESISTOR	ERJ3GEYJ 104 V (100 kΩ)
R67	7030003680	S.RESISTOR	ERJ3GEYJ 104 V (100 kΩ)
R68	7030003440	S.RESISTOR	ERJ3GEYJ 102 V (1 kΩ)
R69	7030003440	S.RESISTOR	ERJ3GEYJ 102 V (1 kΩ)
R70	7030003440	S.RESISTOR	ERJ3GEYJ 102 V (1 kΩ)
R71	7030003440	S.RESISTOR	ERJ3GEYJ 102 V (1 kΩ)
R72	7030003440	S.RESISTOR	ERJ3GEYJ 102 V (1 kΩ)
R73	7030003440	S.RESISTOR	ERJ3GEYJ 102 V (1 kΩ)
R74	7030003440	S.RESISTOR	ERJ3GEYJ 102 V (1 kΩ)
R75	7030003440	S.RESISTOR	ERJ3GEYJ 102 V (1 kΩ)
R76	7030003440	S.RESISTOR	ERJ3GEYJ 102 V (1 kΩ)
R77	7030003440	S.RESISTOR	ERJ3GEYJ 102 V (1 kΩ)
R78	7030003440	S.RESISTOR	ERJ3GEYJ 102 V (1 kΩ)
R79	7030003440	S.RESISTOR	ERJ3GEYJ 102 V (1 kΩ)
R80	7030003440	S.RESISTOR	ERJ3GEYJ 102 V (1 kΩ)
R81	7030003680	S.RESISTOR	ERJ3GEYJ 104 V (100 kΩ)
R82	7030003720	S.RESISTOR	ERJ3GEYJ 224 V (220 kΩ)
R83	7030003720	S.RESISTOR	ERJ3GEYJ 224 V (220 kΩ)
R84	7030003760	S.RESISTOR	ERJ3GEYJ 474 V (470 kΩ)
R85	7030003440	S.RESISTOR	ERJ3GEYJ 102 V (1 kΩ)
R86	7030003560	S.RESISTOR	ERJ3GEYJ 103 V (10 kΩ)
R87	7030003410	S.RESISTOR	ERJ3GEYJ 561 V (560 Ω)
R88	7030003640	S.RESISTOR	ERJ3GEYJ 473 V (47 kΩ)
R89	7030003410	S.RESISTOR	ERJ3GEYJ 561 V (560 Ω)
R90	7030003560	S.RESISTOR	ERJ3GEYJ 103 V (10 kΩ)
R92	7030003640	S.RESISTOR	ERJ3GEYJ 473 V (47 kΩ)
R93	7030003680	S.RESISTOR	ERJ3GEYJ 104 V (100 kΩ)
R94	7030003440	S.RESISTOR	ERJ3GEYJ 102 V (1 kΩ)
R95	7030003650	S.RESISTOR	ERJ3GEYJ 563 V (56 kΩ)
R96	7030003440	S.RESISTOR	ERJ3GEYJ 102 V (1 kΩ)
R97	7030003440	S.RESISTOR	ERJ3GEYJ 102 V (1 kΩ)
R100	7030003440	S.RESISTOR	ERJ3GEYJ 102 V (1 kΩ)
R101	7030003440	S.RESISTOR	ERJ3GEYJ 102 V (1 kΩ)
R102	7030003560	S.RESISTOR	ERJ3GEYJ 103 V (10 kΩ)
R103	7030003560	S.RESISTOR	ERJ3GEYJ 103 V (10 kΩ)
R104	7030003640	S.RESISTOR	ERJ3GEYJ 473 V (47 kΩ)
R105	7030003440	S.RESISTOR	ERJ3GEYJ 102 V (1 kΩ)
R106	7030003440	S.RESISTOR	ERJ3GEYJ 102 V (1 kΩ)
R107	7030003640	S.RESISTOR	ERJ3GEYJ 473 V (47 kΩ)
R108	7030003500	S.RESISTOR	ERJ3GEYJ 332 V (3.3 kΩ)
R109	7030003580	S.RESISTOR	ERJ3GEYJ 153 V (15 kΩ)
R110	7030003570	S.RESISTOR	ERJ3GEYJ 123 V (12 kΩ)
R111	7540000100	ABSORBER	SRVH-350L
R112	7030003410	S.RESISTOR	ERJ3GEYJ 561 V (560 Ω)
R113	7030003680	S.RESISTOR	ERJ3GEYJ 104 V (100 kΩ)
R116	7030001090	S.RESISTOR	MCR50JZHJ 47 Ω (470)
R117	7030001090	S.RESISTOR	MCR50JZHJ 47 Ω (470)
R118	7030003440	S.RESISTOR	ERJ3GEYJ 102 V (1 kΩ)
R119	7030003440	S.RESISTOR	ERJ3GEYJ 102 V (1 kΩ)
R120	7030003440	S.RESISTOR	ERJ3GEYJ 102 V (1 kΩ)
R121	7030003560	S.RESISTOR	ERJ3GEYJ 103 V (10 kΩ)
R122	7030003560	S.RESISTOR	ERJ3GEYJ 103 V (10 kΩ)

S.=Surface mount

## [CTRL UNIT]

REF. NO.	ORDER NO.	DESCRIPTION	
R123	7030001070	S.RESISTOR	MCR50JZHJ 33 Ω (330)
R124	7030003690	S.RESISTOR	ERJ3GEYJ 124 V (120 kΩ)
R127	7030003720	S.RESISTOR	ERJ3GEYJ 224 V (220 kΩ)
R129	7030003720	S.RESISTOR	ERJ3GEYJ 224 V (220 kΩ)
R129	7030003760	S.RESISTOR	ERJ3GEYJ 474 V (470 kΩ)
R130	7030003670	S.RESISTOR	ERJ3GEYJ 823 V (82 kΩ)
R130	7030003690	S.RESISTOR	ERJ3GEYJ 124 V (120 kΩ)
R131	7030003440	S.RESISTOR	ERJ3GEYJ 102 V (1 kΩ)
R132	7030003560	S.RESISTOR	ERJ3GEYJ 103 V (10 kΩ)
R133	7030003560	S.RESISTOR	ERJ3GEYJ 103 V (10 kΩ)
R134	7030003560	S.RESISTOR	ERJ3GEYJ 103 V (10 kΩ)
R135	7030003560	S.RESISTOR	ERJ3GEYJ 103 V (10 kΩ)
R136	7030003680	S.RESISTOR	ERJ3GEYJ 104 V (100 kΩ)
R137	7030003680	S.RESISTOR	ERJ3GEYJ 104 V (100 kΩ)
R138	7030003680	S.RESISTOR	ERJ3GEYJ 104 V (100 kΩ)
R139	7030003680	S.RESISTOR	ERJ3GEYJ 104 V (100 kΩ)
R140	7030003640	S.RESISTOR	ERJ3GEYJ 473 V (47 kΩ)
C1	4030008560	S.CERAMIC	C1608 CH 1H 300J-T-A
C2	4030006880	S.CERAMIC	C1608 JB 1H 102K-T-A
C3	4010005540	CERAMIC	HM60SJ SL 030C 500V
C4	4030006880	S.CERAMIC	C1608 JB 1H 102K-T-A
C5	4030008920	S.CERAMIC	C1608 JB 1C 473K-T-A
C6	4510003790	ELECTROLITIC	16 MV 10 SW
C8	4030008920	S.CERAMIC	C1608 JB 1C 473K-T-A
C9	4510003790	ELECTROLITIC	16 MV 10 SW
C11	4010005530	CERAMIC	HM60SJ SL 020C 500V
C12	4030007040	S.CERAMIC	C1608 CH 1H 180J-T-A
C13	4030007040	S.CERAMIC	C1608 CH 1H 180J-T-A
C14	4030007080	S.CERAMIC	C1608 CH 1H 390J-T-A
C15	4030008920	S.CERAMIC	C1608 JB 1C 473K-T-A
C16	4510003790	ELECTROLITIC	16 MV 10 SW
C18	4030007170	S.CERAMIC	C1608 CH 1H 221J-T-A
C19	4030007080	S.CERAMIC	C1608 CH 1H 390J-T-A
C20	4030006880	S.CERAMIC	C1608 JB 1H 472K-T-A
C21	4030007170	S.CERAMIC	C1608 CH 1H 221J-T-A
C22	4030006880	S.CERAMIC	C1608 JB 1H 472K-T-A
C24	4510003790	ELECTROLITIC	16 MV 10 SW
C25	4030008920	S.CERAMIC	C1608 JB 1C 473K-T-A
C26	4030008920	S.CERAMIC	C1608 JB 1C 473K-T-A
C27	4030007170	S.CERAMIC	C1608 CH 1H 221J-T-A
C28	4030006850	S.CERAMIC	C1608 JB 1H 471K-T-A
C29	4030008920	S.CERAMIC	C1608 JB 1C 473K-T-A
C30	4010005540	CERAMIC	HM60SJ SL 030C 500V
C31	4030007130	S.CERAMIC	C1608 CH 1H 101J-T-A
C32	4030007130	S.CERAMIC	C1608 CH 1H 101J-T-A
C33	4030006880	S.CERAMIC	C1608 JB 1H 472K-T-A
C34	4030006880	S.CERAMIC	C1608 JB 1H 472K-T-A
C35	4030006880	S.CERAMIC	C1608 JB 1H 102K-T-A
C36	4030006880	S.CERAMIC	C1608 JB 1H 472K-T-A
C37	4030008920	S.CERAMIC	C1608 JB 1C 473K-T-A
C38	4030007170	S.CERAMIC	C1608 CH 1H 221J-T-A
C39	4030006850	S.CERAMIC	C1608 JB 1H 471K-T-A
C40	4030008920	S.CERAMIC	C1608 JB 1C 473K-T-A
C41	4510003790	ELECTROLITIC	16 MV 10 SW
C43	4030008920	S.CERAMIC	C1608 JB 1C 473K-T-A
C44	4030008920	S.CERAMIC	C1608 JB 1C 473K-T-A
C45	4030008920	S.CERAMIC	C1608 JB 1C 473K-T-A
C51	4510004590	ELECTROLITIC	16 MV 470 HC
C52	4030010070	S.CERAMIC	C1608 X7S 1C 104K-T-A
C53	4030010070	S.CERAMIC	C1608 X7S 1C 104K-T-A
C54	4510003790	ELECTROLITIC	16 MV 10 SW
C55	4510004590	ELECTROLITIC	16 MV 470 HC
C56	4510005000	ELECTROLITIC	16 MV 220 HC
C57	4510003910	ELECTROLITIC	16 MV 47 HW
C73	4030010070	S.CERAMIC	C1608 X7S 1C 104K-T-A
C74	4030010070	S.CERAMIC	C1608 X7S 1C 104K-T-A
C75	4030009990	S.CERAMIC	C1608 CH 1H 200J-T-A
C76	4030009990	S.CERAMIC	C1608 CH 1H 200J-T-A
C77	4030008920	S.CERAMIC	C1608 JB 1C 473K-T-A
C78	4030008920	S.CERAMIC	C1608 JB 1C 473K-T-A
C79	4030008920	S.CERAMIC	C1608 JB 1C 473K-T-A
C80	4030008920	S.CERAMIC	C1608 JB 1C 473K-T-A
C81	4030008920	S.CERAMIC	C1608 JB 1C 473K-T-A
C82	4030008920	S.CERAMIC	C1608 JB 1C 473K-T-A

## [CTRL UNIT]

REF. NO.	ORDER NO.	DESCRIPTION	
C83	4030008920	S.CERAMIC	C1608 JB 1C 473K-T-A
C84	4030008920	S.CERAMIC	C1608 JB 1C 473K-T-A
C85	4030008920	S.CERAMIC	C1608 JB 1C 473K-T-A
C86	4030008920	S.CERAMIC	C1608 JB 1C 473K-T-A
C87	4030008920	S.CERAMIC	C1608 JB 1C 473K-T-A
C88	4030008920	S.CERAMIC	C1608 JB 1C 473K-T-A
C89	4030008920	S.CERAMIC	C1608 JB 1C 473K-T-A
C90	4030006880	S.CERAMIC	C1608 JB 1H 472K-T-A
C91	4030006880	S.CERAMIC	C1608 JB 1H 472K-T-A
C92	4030006880	S.CERAMIC	C1608 JB 1H 102K-T-A
C93	4550002860	S.TANTALUM	TESVA 1V 224K1-8L
C94	4030006880	S.CERAMIC	C1608 JB 1H 472K-T-A
C95	4030008920	S.CERAMIC	C1608 JB 1C 473K-T-A
C96	4030008920	S.CERAMIC	C1608 JB 1C 473K-T-A
C97	4030008920	S.CERAMIC	C1608 JB 1C 473K-T-A
C98	4030006880	S.CERAMIC	C1608 JB 1H 472K-T-A
C101	4030008920	S.CERAMIC	C1608 JB 1C 473K-T-A
C102	4030008920	S.CERAMIC	C1608 JB 1C 473K-T-A
C103	4030008920	S.CERAMIC	C1608 JB 1C 473K-T-A
C106	4030008920	S.CERAMIC	C1608 JB 1C 473K-T-A
C108	4030006900	S.CERAMIC	C1608 JB 1E 103K-T-A
C109	4030006900	S.CERAMIC	C1608 JB 1E 103K-T-A
C110	4030007070	S.CERAMIC	C1608 CH 1H 330J-T-A
C111	4030007100	S.CERAMIC	C1608 CH 1H 560J-T-A
C112	4030007100	S.CERAMIC	C1608 CH 1H 560J-T-A
C113	4030008920	S.CERAMIC	C1608 JB 1C 473K-T-A
C114	4030008920	S.CERAMIC	C1608 JB 1C 473K-T-A
C115	4510003790	ELECTROLITIC	16 MV 10 SW
C120	4030006880	S.CERAMIC	C1608 JB 1H 102K-T-A
C122	4030006880	S.CERAMIC	C1608 JB 1H 472K-T-A
RL1	6330001090	RELAY	FXE-12
RL2	6330001090	RELAY	FXE-12
DS1	5040001720	LED	TLG221
S1	2220000420	SWITCH	ESD-11H120
S2	2220000420	SWITCH	ESD-11H120
J2	6510007020	CONNECTOR	TMP-J01X-V6
J4	6510007020	CONNECTOR	TMP-J01X-V6
J5	6510003530	CONNECTOR	S05B-EH-S
J6	6510003530	CONNECTOR	S05B-EH-S
J7	6510003530	CONNECTOR	S05B-EH-S
J8	6510003420	CONNECTOR	B06B-EH-S
J9	6510003460	CONNECTOR	B10B-EH-S
J11	6510003080	CONNECTOR	RT01T-1.0B
W1	7120000010	JUMPER	JPW 02A
W2	7120000010	JUMPER	JPW 02A
W3	7120000010	JUMPER	JPW 02A
W8	7030003860	S.JUMPER	ERJ3GE JPW V
W12	7120000010	JUMPER	JPW 02A
W13	7120000380	JUMPER	JPW 01 R-01
W14	7120000380	JUMPER	JPW 01 R-01
WS1	8970022240	CABLE	1732 1.5D Coaxial (2)/CT
EP1	0910040207	PCB	B 3932G
MP1	8510004470	CASE	331 VCO Case
MP2	8510008790	COVER	VCO Case cover (B) 1414
MP3	8930005410	SHEET	Insulator A

S.=Surface mount

[CON-A BOARD]

REF. NO.	ORDER NO.	DESCRIPTION
J1	6450001670	CONNECTOR TCS5093-10-4151
J2	6510018890	S.CONNECTOR 52559-1390
EP1	0910046642	PCB B 4658B

[CON-B BOARD]

REF. NO.	ORDER NO.	DESCRIPTION
Q1	1510000510	S.TRANSISTOR 2SA1578 T107 R
Q2	1540000450	S.TRANSISTOR 2SD1623-T-TD
Q3	1590000680	S.TRANSISTOR DTC114EU T107
D1	1750000270	S.DIODE 1SS301 (TE85R)
L1	2040000490	COIL EXC-ELDR25C
L2	6200000150	S.COIL NL 322522T-1R0M
L3	6200000150	S.COIL NL 322522T-1R0M
L4	2040000490	COIL EXC-ELDR25C
R1	7030007510	S.RESISTOR ERJ12YJ270H (27 Ω)
R2	7010003440	RESISTOR ELR20J 2.2 kΩ
R3	7030003410	S.RESISTOR ERJ3GEYJ 581 V (580 Ω)
R4	7030003440	S.RESISTOR ERJ3GEYJ 102 V (1 kΩ)
R5	7030003530	S.RESISTOR ERJ3GEYJ 582 V (5.8 kΩ)
R6	7030003680	S.RESISTOR ERJ3GEYJ 104 V (100 kΩ)
R7	7030003780	S.RESISTOR ERJ3GEYJ 474 V (470 kΩ)
C1	4510003910	ELECTROLITIC 16 MV 47 HW
C2	4510003790	ELECTROLITIC 16 MV 10 SW
C3	4030006880	S.CERAMIC C1608 JB 1H 472K-T-A
C4	4030006880	S.CERAMIC C1608 JB 1H 472K-T-A
C5	4510004990	ELECTROLITIC 16 MV 100 HC
C8	4030006880	S.CERAMIC C1608 JB 1H 472K-T-A
C9	4030006880	S.CERAMIC C1608 JB 1H 472K-T-A
C10	4030006880	S.CERAMIC C1608 JB 1H 472K-T-A
C11	4030006880	S.CERAMIC C1608 JB 1H 472K-T-A
C12	4030006880	S.CERAMIC C1608 JB 1H 472K-T-A
C13	4030006880	S.CERAMIC C1608 JB 1H 472K-T-A
C14	4030006880	S.CERAMIC C1608 JB 1H 472K-T-A
J3	6510018890	S.CONNECTOR 52559-1390
J4	6450000160	CONNECTOR TCS4470-01-1111
J5	6450001670	CONNECTOR TCS5093-10-4151
J7	6510018960	S.CONNECTOR B2B-PH-SM3-TB
WS1	8600034850	CABLE 1732 P01 *J06CO-B
EP2	0910046652	PCB B 4657B

[CON-C BOARD]

REF. NO.	ORDER NO.	DESCRIPTION
J8	6510007020	CONNECTOR TMP-J01X-V8
J9	6510007020	CONNECTOR TMP-J01X-V8
W3	7120000010	JUMPER JPW 02A
WS1	8970022220	CABLE 1732 1.5D Coaxial (1)/CO-C
EP3	0910046662	PCB B 4658B

[CHASSIS PARTS]

REF. NO.	ORDER NO.	DESCRIPTION
MF1	2710000580	FAN FBA06T12HF
MF2	2710000460	MOTOR MP28GA
MF3	2710000460	MOTOR MP28GA
J10	6510000370	CONNECTOR MR-DS
J11	6510000370	CONNECTOR MR-DS
P2	6510018980	CONNECTOR PHR-2
W9	8900006040	CABLE OPC-593 (N:13 L:50)
MP1	8210012880	PANEL 1732 Front panel
MP2	8010016390	CHASSIS 1732 Chassis
MP3	8110005660	COVER 1732 Cover
MP4	8930038260	ANGLE 1732 Angle
MP5	8930037010	RUBBER 1691 Fan rubber
MP7	8930005230	STAND Rubber foot (D) [2 pcs]
MP8	8930005790	STAND Foot (A)
MP9	8930005800	STAND Foot (B)
MP10	8010001490	STAND Stand (D)
MP11	8930037000	PLATE 1691 Grounding plate [2 pcs]
MP12	8810008660	SCREW PH BT M3 X 8 NI-ZU [2 pcs]
MP13	8810009030	SCREW RFH M3 X 8 ZK [2 pcs]
MP14	8810009030	SCREW RFH M3 X 8 ZK [2 pcs]
MP15	8810009030	SCREW RFH M3 X 8 ZK
MP16	8810009030	SCREW RFH M3 X 8 ZK [4 pcs]
MP17	8810008450	SCREW BiH M4 X 8 ZK [4 pcs]
MP18	8820000530	SCREW Flange bolt M4 X 8 NI
MP19	8850000140	WASHER Flat washer M 4 NI BS
MP20	8850001560	WASHER Int. tooth washer M 4
MP21	8810008660	SCREW PH BT M3 X 8 NI-ZU [2 pcs]
MP22	8810008660	SCREW PH BT M3 X 8 NI-ZU [2 pcs]
MP23	8810008660	SCREW PH BT M3 X 8 NI-ZU
MP24	8810008660	SCREW PH BT M3 X 8 NI-ZU [2 pcs]
MP25	8810008660	SCREW PH BT M3 X 8 NI-ZU [2 pcs]
MP26	8930038280	SHEET 1732 Sheet
MP27	8930038290	SHEET Insulator EA
MP29	8010015141	CHASSIS 1414 U-Chassis-1
MP30	8010015151	CHASSIS 1414 L-Chassis-1
MP31	8510008592	PLATE 1414 Shield plate-2
MP32	8930030111	PLATE 1414 Plate-1 [2 pcs]
MP33	8820000811	SCREW 1414 Screw-1 [4 pcs]
MP34	8810008630	SCREW PH BT M3 X 6 NI-ZU [2 pcs]
MP35	8810008630	SCREW PH BT M3 X 6 NI-ZU [2 pcs]
MP36	8810008630	SCREW PH BT M3 X 6 NI-ZU [3 pcs]
MP37	8810008630	SCREW PH BT M3 X 6 NI-ZU [5 pcs]
MP38	8810007840	SCREW RFH B1 M3 X 8 ZK [4 pcs]
MP39	8810007840	SCREW RFH B1 M3 X 8 ZK [3 pcs]
MP40	8810007840	SCREW RFH B1 M3 X 8 ZK
MP41	8810007840	SCREW RFH B1 M3 X 8 ZK
MP42	8950003200	Coupling UJ6-5 [2 pcs]
MP43	8510008750	PLATE 1414 A-Shield plate
MP44	8930038760	SHEET Insulating seet (H)
MP45	8310037080	PLATE 1732 Name plate

[UNPACKING]

REF. NO.	ORDER NO.	DESCRIPTION
W1	8900001160	CABLE OPC-125
W2	8900006120	CABLE OPC-597

S.=Surface mount

# SECTION 6

# MECHANICAL PARTS AND DISASSEMBLY

## [CHASSIS PARTS]

REF. NO.	ORDER NO.	DESCRIPTION	QTY.
J2	6510001920	Connector 1490R [TUNER]	1
J3	6510000370	Connector MR-DS [ANT1]	1
J4	6510000370	Connector MR-DS [ANT2]	1
W1	8900006050	Flat cable OPC-594 (N: 30, L: 100)	1
W2	8900006060	Flat cable OPC-595 (N: 20, L: 150)	1
W3	8900006150	Flat cable OPC-602 (N: 10, L: 150)	1
EP1	8930021010	Domed plug DP-500	1
EP2	0910045921	Flexible PCB B-4598A	1
MF1	2710000580	Fan FBA06T12HF	1
MP1	8410002022	1691 heatsink -2	1
MP2	8110005600	1691 upper cover	1
MP3	8110005610	1691 lower cover	1
MP4	8010001490	Stand (D)	1
MP5	8930005790	Plastic foot (A)	1
MP6	8930005800	Plastic foot (B)	1
MP7	8930037010	1691 fan rubber	1
MP8	8820000530	Flange bolt M4 x 8 NI	1
MP9	8930002820	Rubber foot (D)	2
MP10	8930014980	SP net	1
MP11	8930018520	Tr. clip (A)	1
MP12	8950004180	1691 contact base (A)	1
MP13	8930036950	1691 SP rubber	1
MP14	8930036960	1691 SP plate	1
MP15	8930036980	1691 ground spring	1
MP16	8930036990	1691 fan guard	1
MP17	8930037000	1691 ground plate	1
MP19	8810008630	Screw PH BT M3 x 6 NI-ZU	5
MP20	8810007410	Screw PH M3 x 6 NI	2
MP21	8810008960	Screw OH M2.6 x 5 ZK	5
MP22	8850000140	Flat washer M4 NI BS	1
MP23	8310036490	Serial No. label (AU) 706 FCC (USA)	1
	8310036500	Serial No. label (AU) 706 (other versions)	1
MP24	8810008990	Screw PH BT M2 x 10 ZK	1
MP25	8850001560	Star washer M4	1
MP26	8810008630	Screw PH BT M3 x 6 NI-ZU	4
MP27	8810008630	Screw PH BT M3 x 6 NI-ZU	5
MP28	8810008630	Screw PH BT M3 x 6 NI-ZU	5
MP29	8810004430	Screw PH M3 x 6 ZK (for MP9)	2
MP30	8810004430	Screw PH M3 x 6 ZK (for MP5)	2
MP31	8810004430	Screw PH M3 x 6 ZK (for MP6)	2
MP32	8810007410	Screw PH M3 x 6 NI	2
MP33	8810003170	Setscrew A M3 x 8	2
MP34	8810009040	Setscrew H M2.6 x 10 NI	2
MP35	8810009040	Setscrew H M2.6 x 10 NI	2
MP36	8810008960	Screw OH M2.6 x 5 ZK	5
MP37	8810003170	Setscrew A M3 x 8	1
MP38	8930038650	Sheet (BE)	1
MP39	8310037390	1691 display label (B)	1
MP40	8930038820	Aluminum sheet V	1
MP41	8950000180	Cable tie -80	2
MP42	8310029180	FCC part 15 label (A) (USA only)	1
MP43	8930001180	Ground plate	1
MP44	8950000010	Tape 9510 12 x 50000 mm	1
MP45	8950000010	Tape 9510 12 x 50000 mm	1
MP46	8930028840	Sponge (DF)	1
MP47	8930028840	Sponge (DF)	2
MP48	8930028390	Sheet (AH)	4
MP49	8930039420	1691 A-sheet	4
MP50	8930037890	Sheet (BA)	2
MP51	8930039430	1691 B-sheet	2
MP52	8930039440	1691 SP plate sheet	1
MP53	8930039450	1691 cover sheet	1
MP54	8930032450	1346 SP-T sponge	1
MP55	8930001180	Ground plate	1
SP1	2510000670	Speaker VS-50-0827	1

## [FRONT PARTS]

REF. NO.	ORDER NO.	DESCRIPTION	QTY.
S1	2250000290	Encoder SW-159 (incl. nut, washer)	1
W1	8900006040	Flat cable OPC-593 (N: 13, L: 50)	1
W2	8900006250	Cable OPC-610	1
MP1	8210012982	1691 front panel (A) -2 (incl. MP4, 5, 17, 18)	1
MP2	8210012580	1691 rear panel	1
MP3	8930036720	1691 8-key	1
MP4	8930036680	1691 UP/DOWN key	1
MP5	8930036731	1691 4-key -1	1
MP8	8930036751	Spring (Y) -1	1
MP9	8930032340	1424 N-spring	1
MP10	8830001010	Hex nut (A)	2
MP11	8610010000	Knob N237	2
MP12	8610010010	Knob N238	2
MP13	8610010021	Knob N239 base -1	1
MP14	8610010030	Knob N239 cover	1
MP15	8610010040	Knob N239 finger rest	1
MP16	8930036690	1691 release button	1
MP17	8930036700	1691 lens	3
MP18	8310036280	1691 window plate	1
MP19	8310036272	1691 brake plate -2	1
MP20	8950004190	1691 contact base (B)	1
MP21	8930036740	1691 brake pad	2
MP22	8930037111	1691 brake sheet -1	1
MP23	8310036583	1691 caution label (S) -3	1
MP24	8810008990	Screw PH BT M2 x 10 ZK	2
MP25	8930038940	Sponge (EF)	1
MP26	8830001100	Nut (for tube) M9 B11-H2	1

## [DISPLAY UNIT]

REF. NO.	ORDER NO.	DESCRIPTION	QTY.
J2	6450001630	Connector HSJ1406-01-050 [PHONES]	1
DS4	5010000171	LCD DLC-7973YBGF-1	1
DS5	5030001290	LED D2264	1
EP2	8930037591	LCD contact SRCN-1691-ZNN-505-1	2
MP1	8930036710	1691 LCD holder	1
MP3	8810009040	Setscrew H M2.6 x 10 NI	1
MP4	8830000180	Nut M2.6 NI BS	1
MP5	8930038770	1691 front plate	1
MP7	8930028380	Embossed tape (C)	1

## [MAIN UNIT]

REF. NO.	ORDER NO.	DESCRIPTION	QTY.
MP1	8930014140	Ground spring (D)	1
MP2	8930024170	Ground spring (G)	1
MP3	8510010150	1691 D/A case	1
MP4	8510010330	1691 amp. shield plate	1
MP5	8510010321	1691 connector plate -1	1
MP6	8930034550	Insulation sheet DO	1
MP8	8930020980	Shield plate	2
MP9	8930008680	Insulation sheet AH	2
MP10	8930024170	Ground spring (G)	1

## [HPF BOARD]

REF. NO.	ORDER NO.	DESCRIPTION	QTY.
MP1	8510009180	1346 VCO case	1

**[PLL UNIT]**

REF. NO.	ORDER NO.	DESCRIPTION	QTY.
MP1	8510010050	1691 shield case	1
MP2	8510010060	1691 shield cover	1
MP3	8510005980	724 shield case	1
MP4	8510005990	724 shield case cover	1
MP5	8510005980	724 shield case	1
MP6	8510005990	724 shield case cover	1
MP7	8510010050	1691 shield case	1
MP8	8510010060	1691 shield cover	1
MP9	8510005980	724 shield case	1
MP10	8510005990	724 shield case cover	1
MP11	8510010070	1691 DDS case	1
MP12	8510003510	406 shield case cover	1
MP13	8510005330	Coil case	1
MP14	8510010150	1691 D/A case	1
MP15	8810003960	Setscrew A M2.6 x 5	3
MP16	8810003960	Setscrew A M2.6 x 5	3
MP17	8510010150	1691 D/A case	1
MP18	8930014140	Ground spring (D)	1
MP19	8820000900	1691 screw	1
MP20	8930014140	Ground spring (D)	1
MP21	8930001160	Ground spring	1
MP22	8930028840	Sponge (DF)	1

**[PA UNIT]**

REF. NO.	ORDER NO.	DESCRIPTION	QTY.
J8	6450000140	Connector HSJ0807-01-010 [EXT SP]	1
J10	6510003780	Connector LLR-06 [DC 13.8V]	1
MP1	8950000180	Cable tie -80	1
MP3	8950000180	Cable tie -80	1
MP5	8860000100	Ground lug B 2 (M2.6) AG BS	1
MP6	6910008240	Clip 59TN4772	1
MP7	8860000100	Ground lug B 2 (M2.6) AG BS	1

**[FILTER UNIT]**

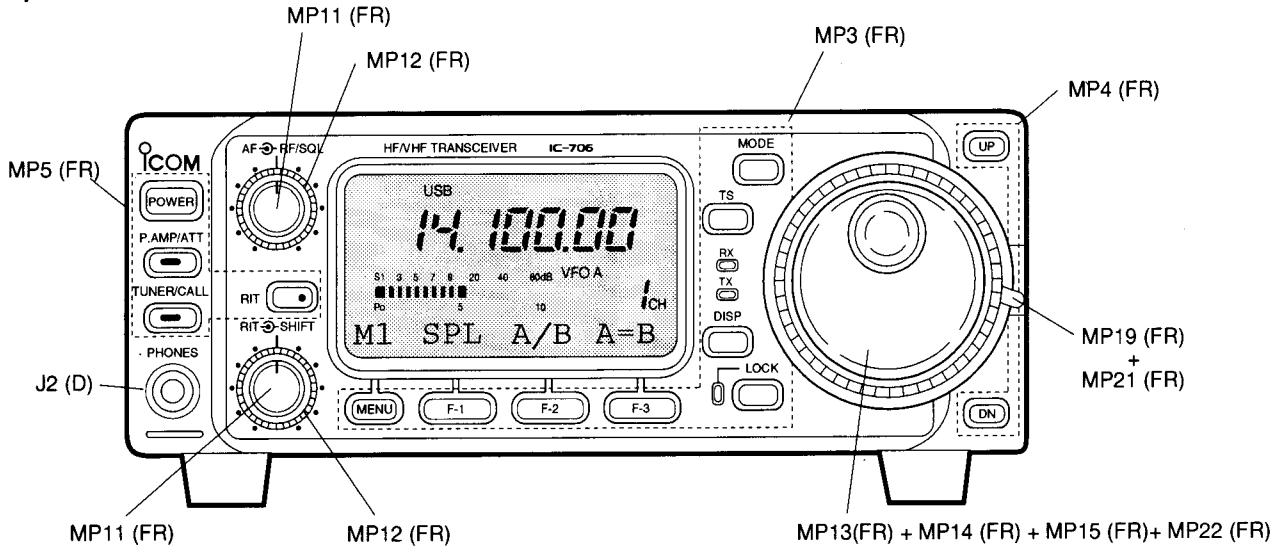
REF. NO.	ORDER NO.	DESCRIPTION	QTY.
J4	6450001490	Connector HLJ7001-01-3010 [ELEC-KEY]	1
J5	6450001640	Connector TCS5044-01-4111 [ACC]	1
J7	6450001650	Connector HSJ0836-01-500 [REMOTE]	1
J8	6450001660	Connector EX345GLB [RTTY]	1
J11	6510016170	Connector 52018-8835 [MIC]	1
MP1	8930001160	Ground spring	1
MP2	8930014140	Ground spring (D)	1

**[UNPACKING]**

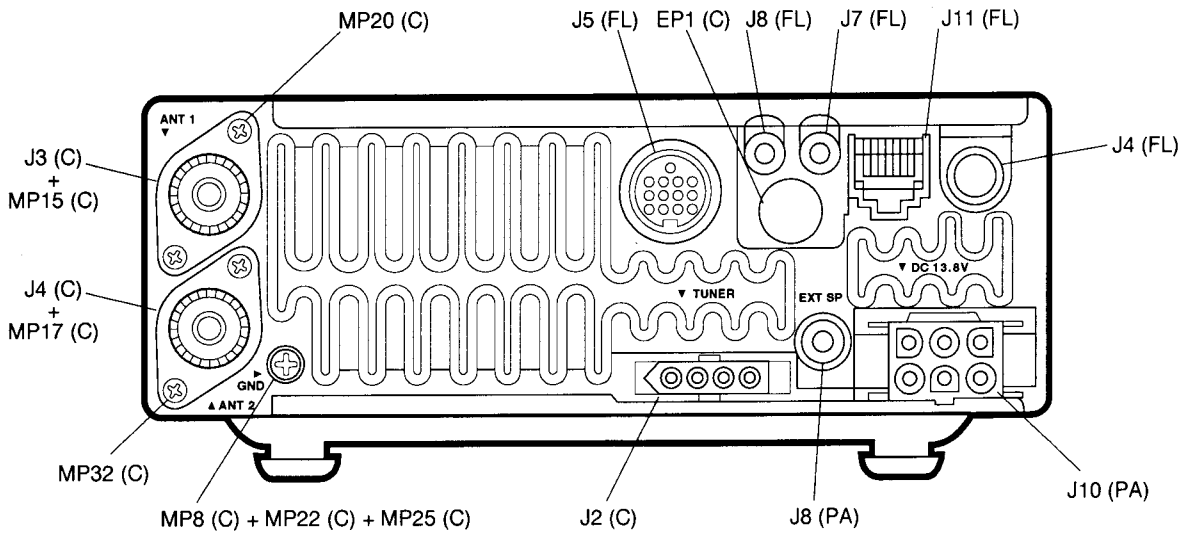
REF. NO.	ORDER NO.	DESCRIPTION	QTY.
F1	5210000090	Spare fuse FGB (30 A)	2
F2	5210000130	Spare fuse FGB (4 A)	1
P1	5610000050	Electronic keyer plug AP330	1
P2	5610000170	RTTY key plug AP370B	1
W1	8900006490	DC power cable OPC-025 D	1
W2	8900006110	ACC cable OPC-596	1
MC1	7700002000	Hand microphone HM-103	1

**Screw abbreviations**    BT: Self-tapping    PH: Pan head  
                                   OH: Oval countersunk head  
                                   NI: Nickel    NI-ZU: Nickel-zinc  
                                   BS: Brass    ZK: Black

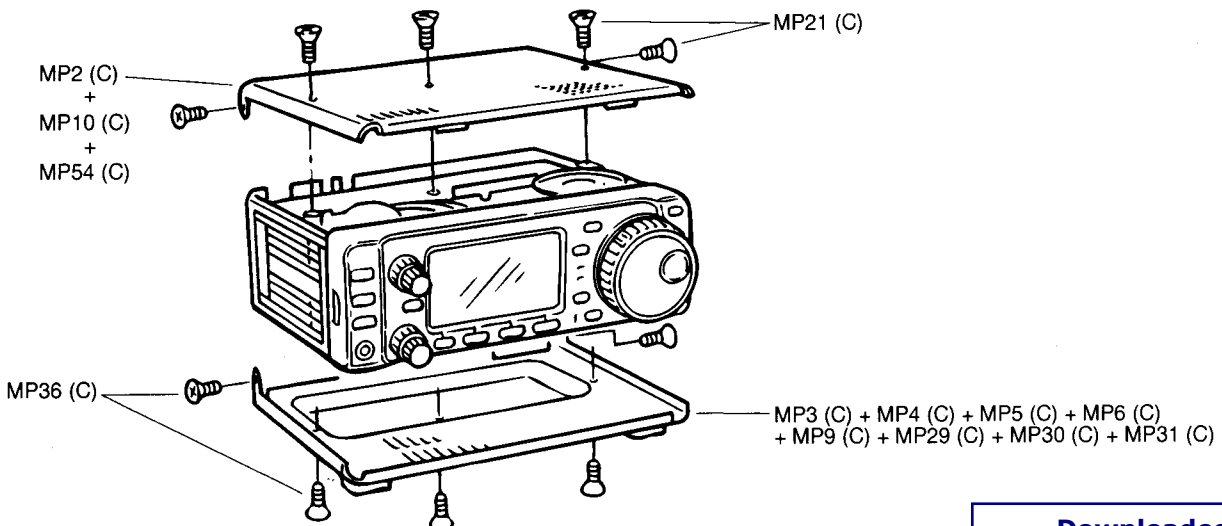
● Front panel



● Rear panel



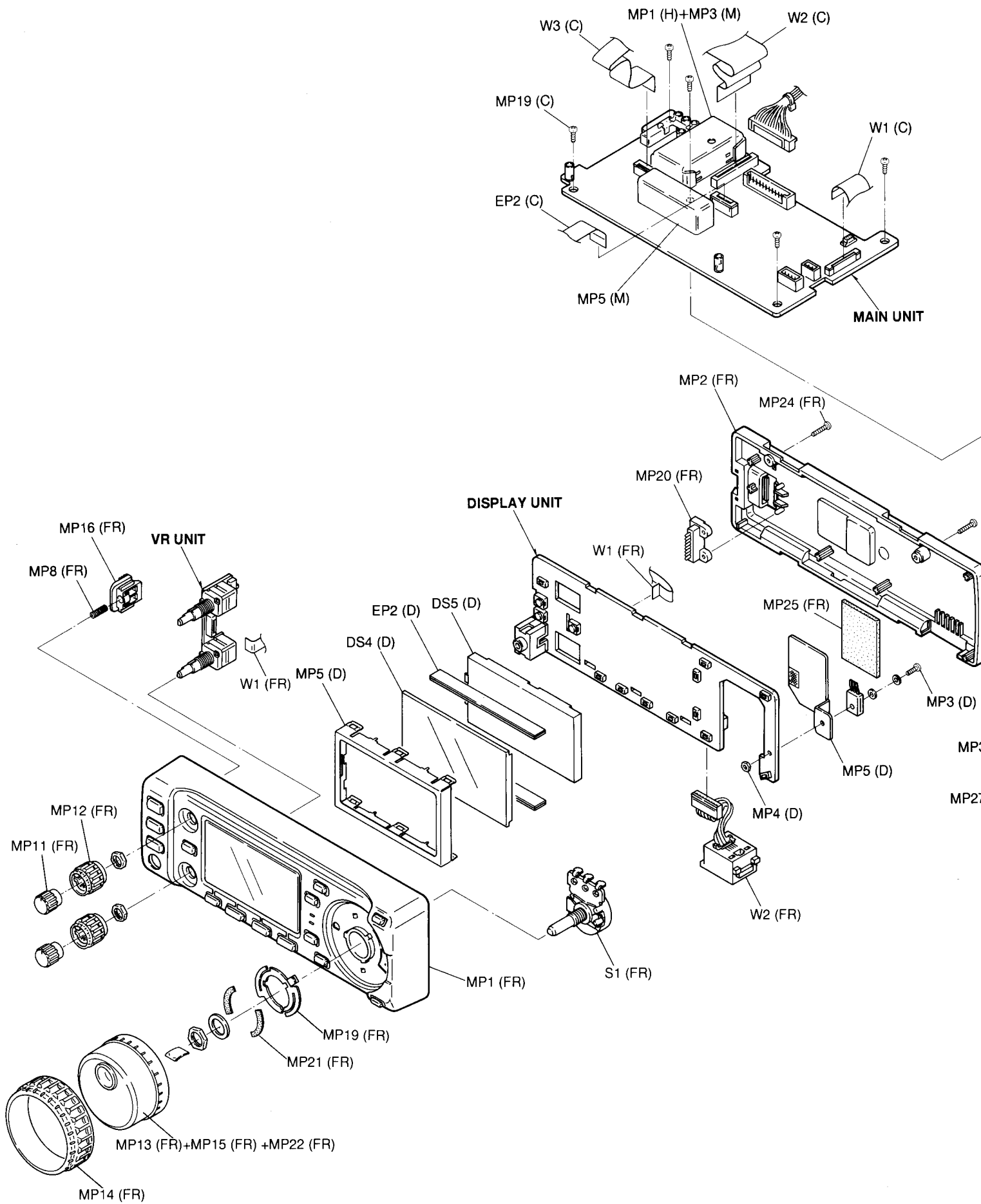
● Top and bottom covers



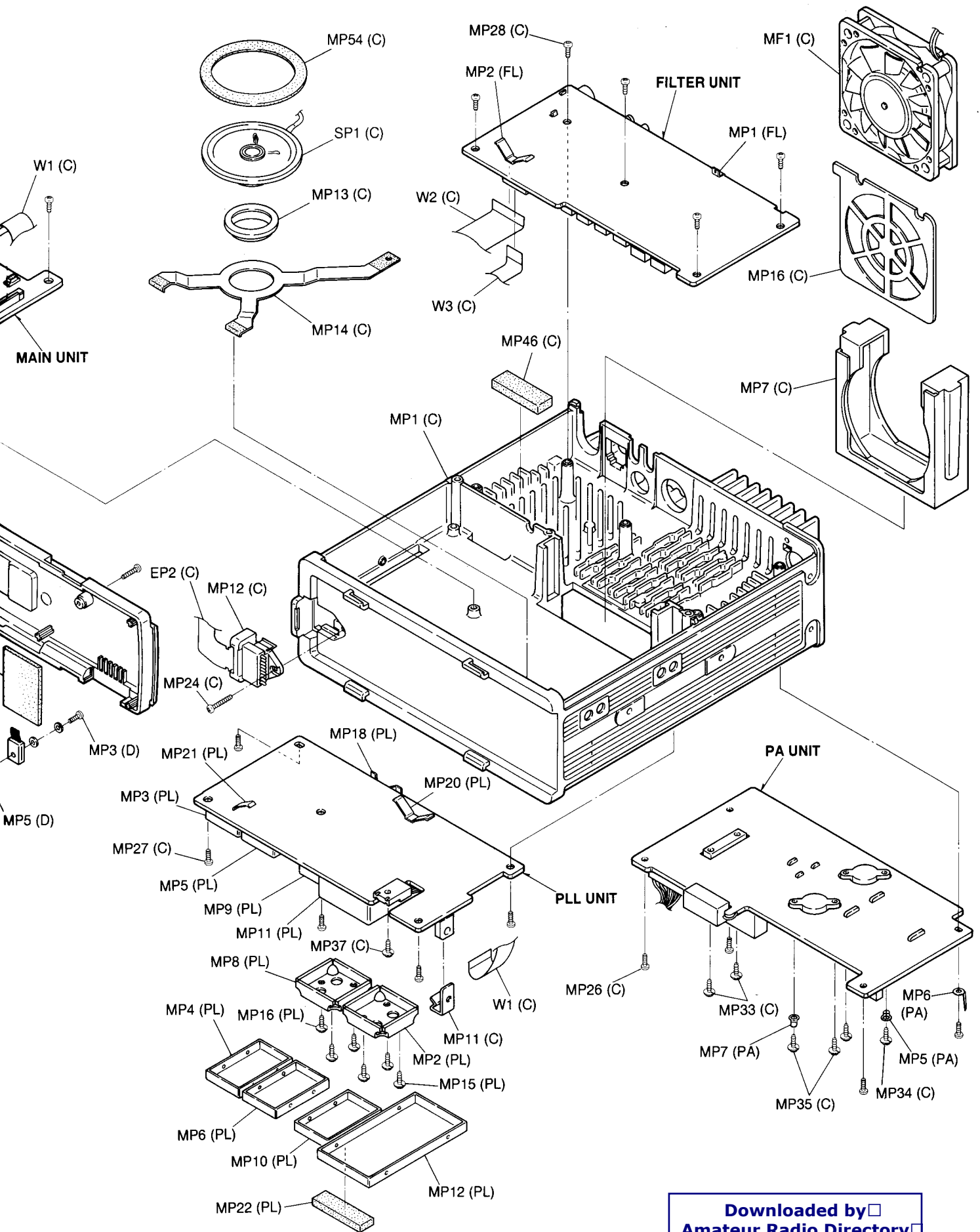
Unit abbreviations: (C) : CHASSIS PARTS (FR) : FRONT PARTS (D) : DISPLAY UNIT  
(PA) : PA UNIT (FL) : FILTER UNIT

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**Unit abbreviations:** (C) : CHASSIS PARTS (FR) : FRONT PARTS (D) : DISPLAY UNIT (M) : MAIN UNIT (H) : HPF BOARD


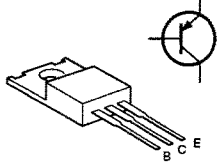
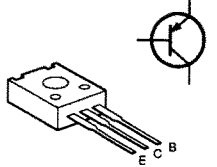












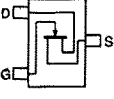
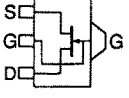
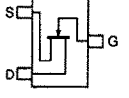
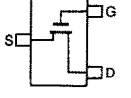
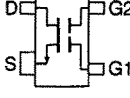








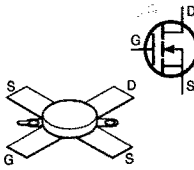

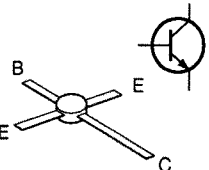
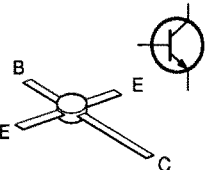



(M) : MAIN UNIT (PL) : PLL UNIT (PA) : PA UNIT (FL) : FILTER UNIT

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














# SECTION 7 SEMI-CONDUCTOR INFORMATION

## • TRANSISTORS AND FET'S

<p><b>2SA1576 R</b> (Symbol: FR)</p> 	<p><b>2SB1133 R</b></p> 	<p><b>2SB1143 S</b></p> 	<p><b>2SB798 DK</b> (Symbol: DK)</p> 
<p><b>2SC4081 R / S</b> (Symbol: BR / BS)</p> 	<p><b>2SC4116 GR</b> (Symbol: LG)</p> 	<p><b>2SC4117 BL</b> (Symbol: DL)</p> 	<p><b>2SC4213 B</b> (Symbol: AB)</p> 
<p><b>2SC4226 R25</b> (Symbol: R25)</p> 	<p><b>2SC4403 3</b> (Symbol: LY3)</p> 	<p><b>2SC4405 3</b> (Symbol: OY3)</p> 	<p><b>2SC4673D</b> (Symbol: CO)</p> 
<p><b>2SD1619 TD</b> (Symbol: DB)</p> 	<p><b>2SD1623 TD</b> (Symbol: DF)</p> 	<p><b>2SD999 CK</b> (Symbol: CK)</p> 	<p><b>2SK210 GR</b> (Symbol: YG)</p> 
<p><b>2SK2171</b> (No symbol)</p> 	<p><b>2SK880 Y</b> (Symbol: XY)</p> 	<p><b>2SK882 GR</b> (Symbol: TG)</p> 	<p><b>3SK131 MAS</b> (Symbol: V11)</p> 
<p><b>DTA114 EE / EU</b> (Symbol: 14 / 14)</p> 	<p><b>DTA144TU</b> (Symbol: 96)</p> 	<p><b>DTC114EU</b> (Symbol: 24)</p> 	<p><b>DTC143TU</b> (Symbol: 03)</p> 

<p><b>DTC144 EE / TU</b> (Symbol: 26 / 06)</p> 	<p><b>IMH3</b> (Symbol: H3)</p> 	<p><b>MRF255</b></p> 	<p><b>MRF5015</b> (No symbol)</p> 
<p><b>MRF555</b></p> 	<p><b>MRF581</b></p> 	<p><b>UMD6</b> (Symbol: D6)</p> 	<p><b>UN911F</b> (Symbol: 60)</p> 
<p><b>UN9211</b> (Symbol: 8A)</p> 			

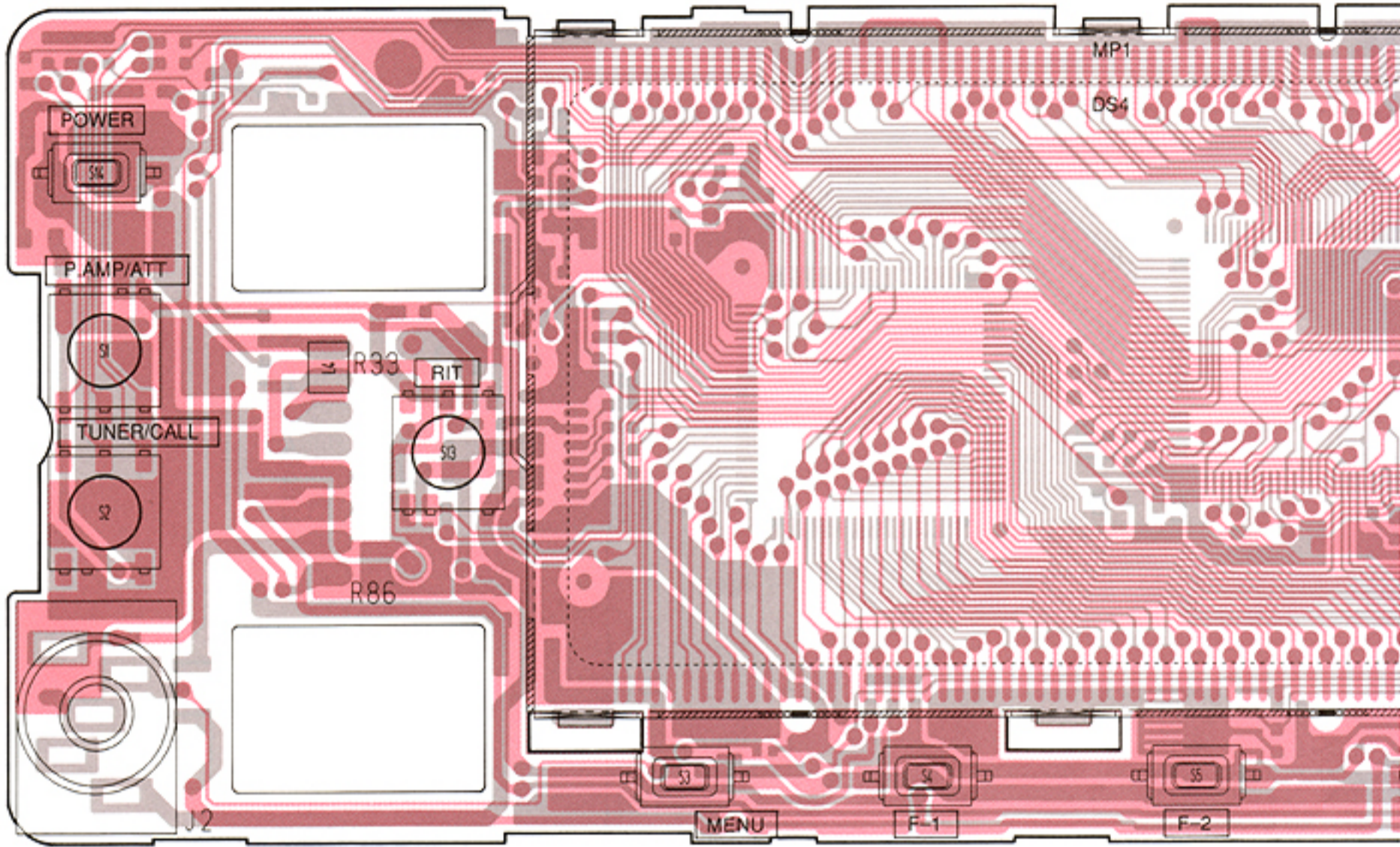
• DIODES

<p><b>1SS301</b> (Symbol: B3)</p> 	<p><b>1SS319</b> (Symbol: A4)</p> 	<p><b>1SV237</b> (Symbol: BB)</p> 	<p><b>1SV265</b> (Symbol: D9)</p> 
<p><b>DA114</b> (Symbol: AV)</p> 	<p><b>DA204U</b> (Symbol: K)</p> 	<p><b>DA221</b> (Symbol: K)</p> 	<p><b>DAN222</b> (Symbol: N)</p> 
<p><b>DAP222</b> (Symbol: FR)</p> 	<p><b>HSM88AS</b> (Symbol: C1)</p> 	<p><b>HVM17-01</b> (Symbol: KM 4Q)</p> 	<p><b>MA357</b> (Symbol: NL)</p> 
<p><b>MA862</b> (Symbol: M11)</p> 	<p><b>RD3.6M B2 / RD5.6M B2 / RD9.1M B2</b> (Symbol: 362 / 562 / 912)</p> 		<p><b>SVC252</b> (Symbol: HV)</p> 

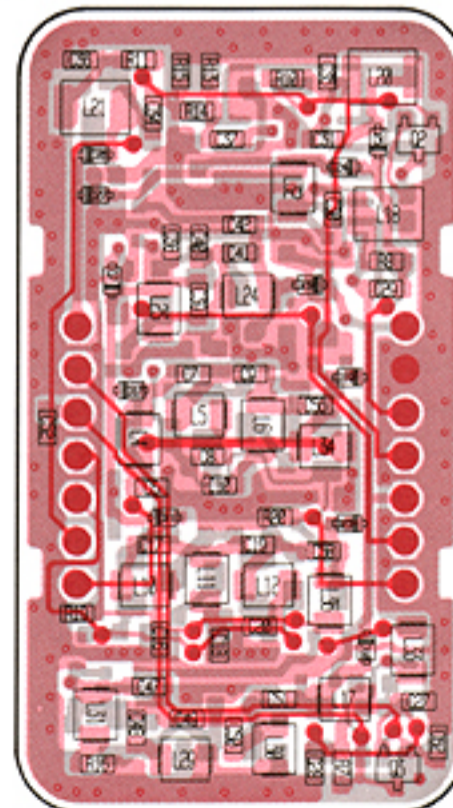
# SECTION 8 BOARD LAYOUTS

## 8-1 DISPLAY UNIT

### • DISPLAY UNIT

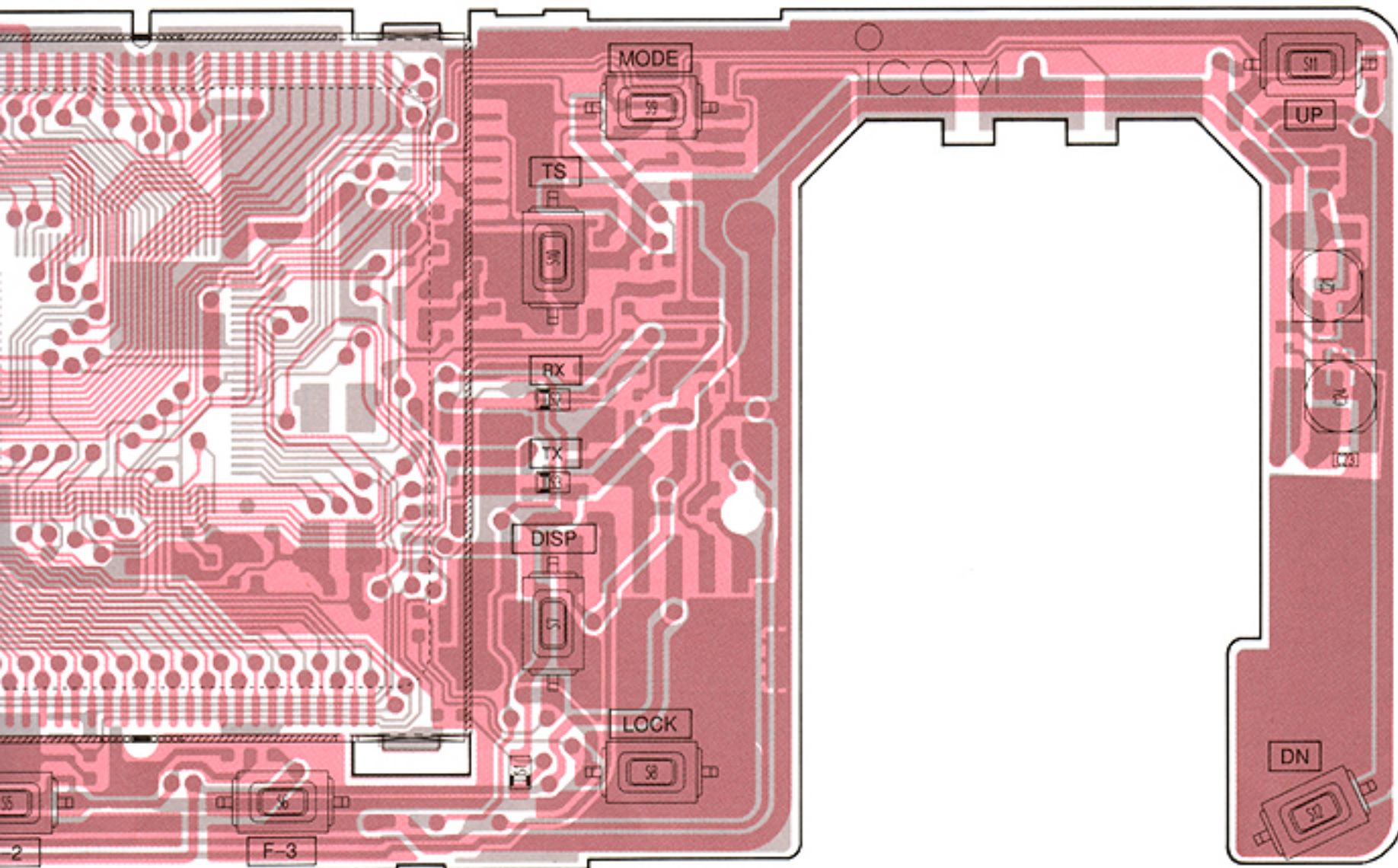


### • HPF BOARD

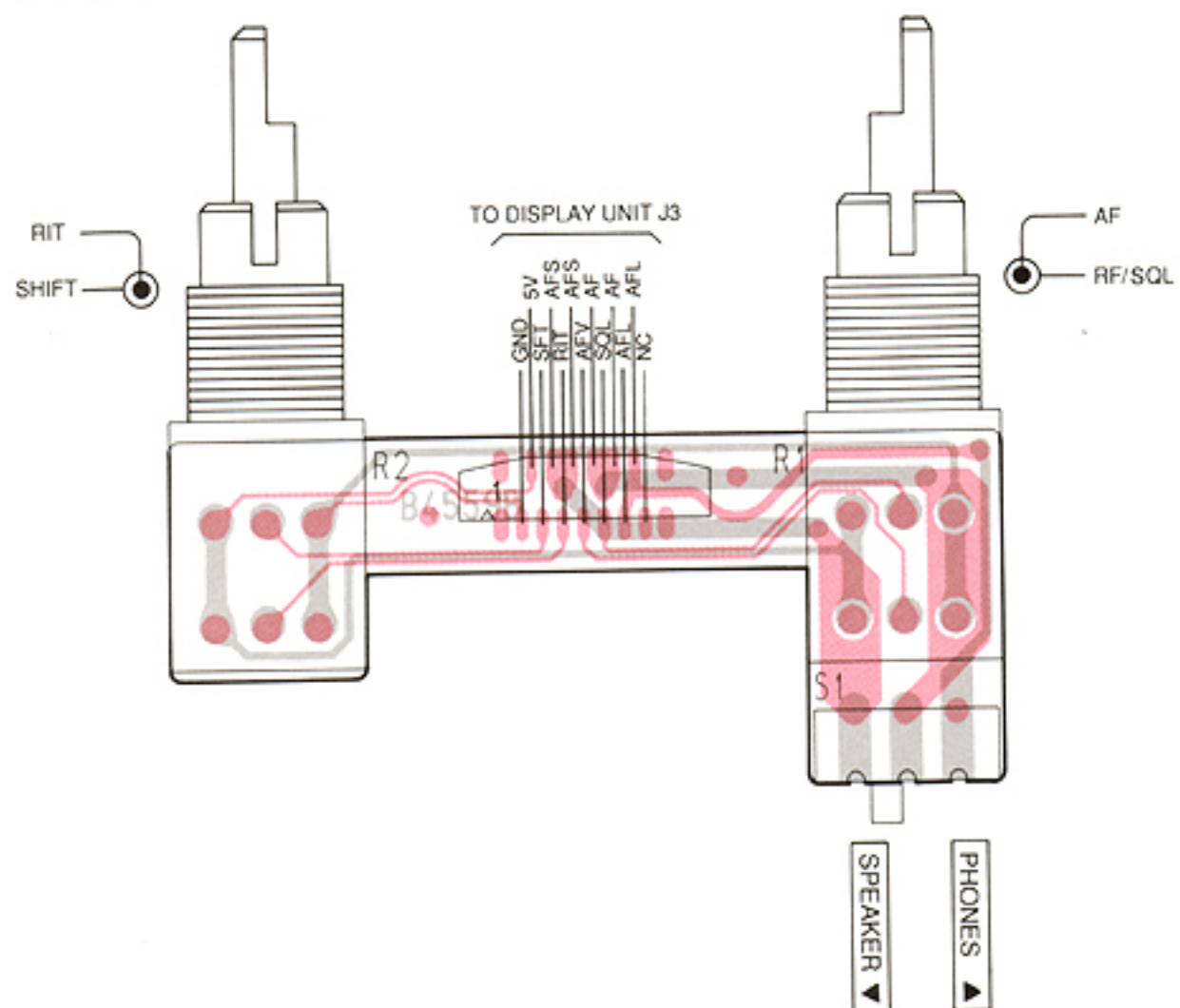


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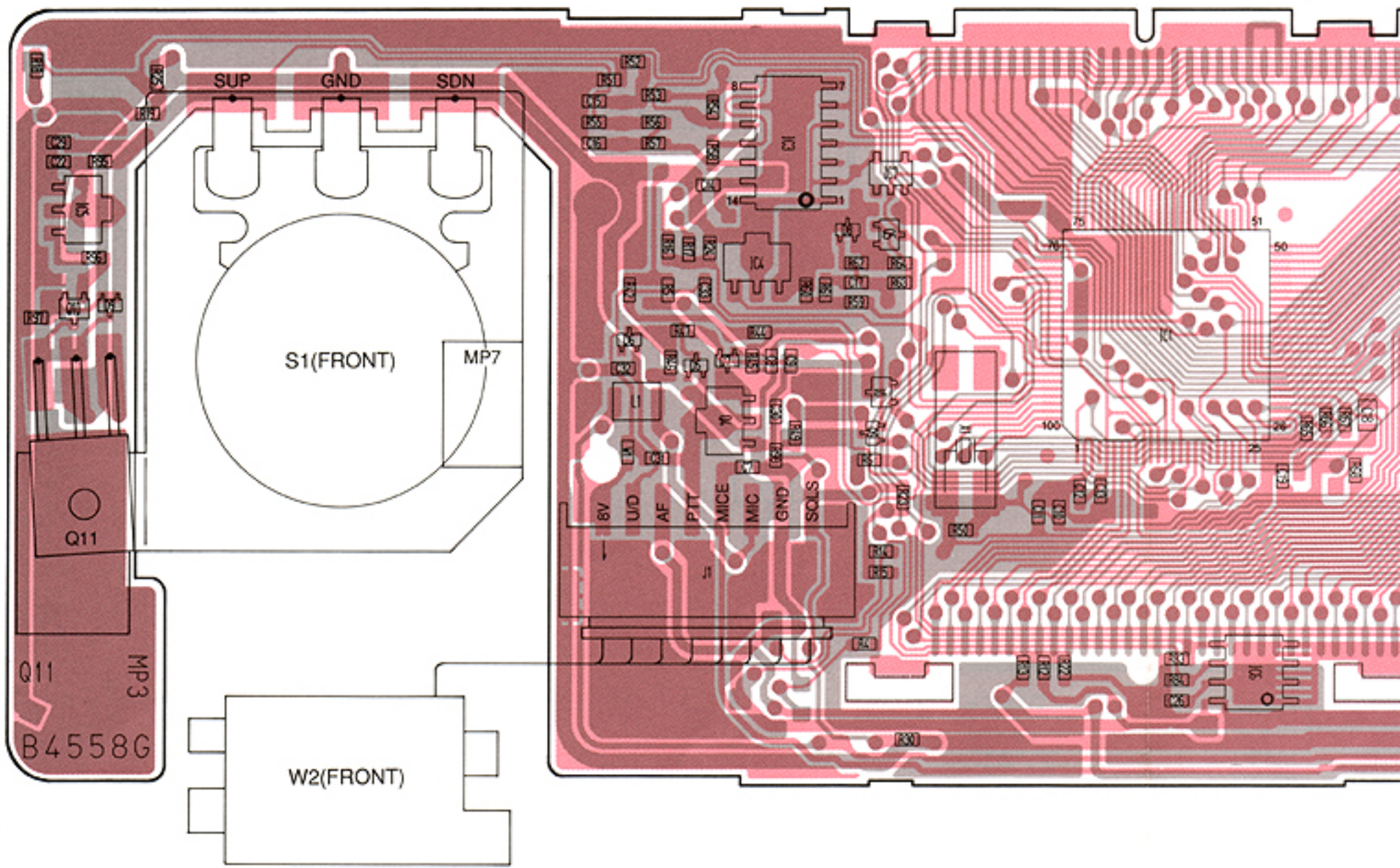
The combination of this page and the next page show the unit layout in the same configuration as the actual P. C. Board.



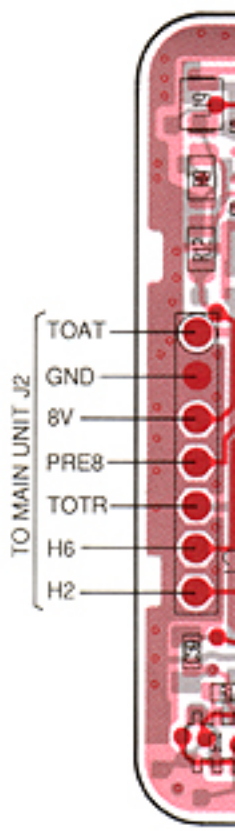
• VR UNIT

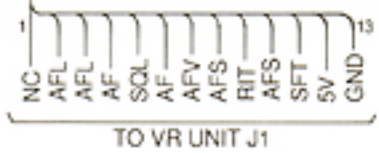
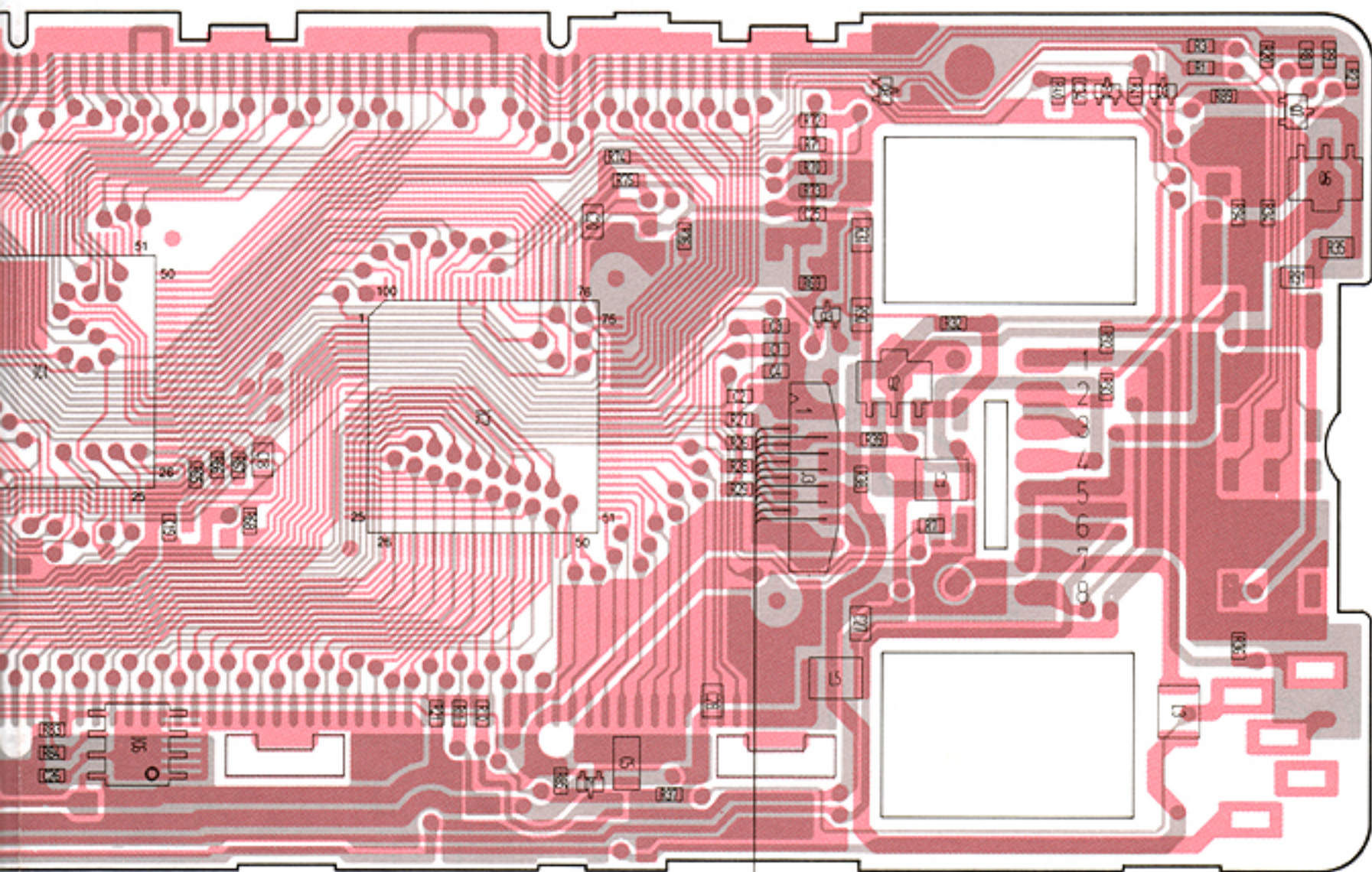


DISPLAY UNIT

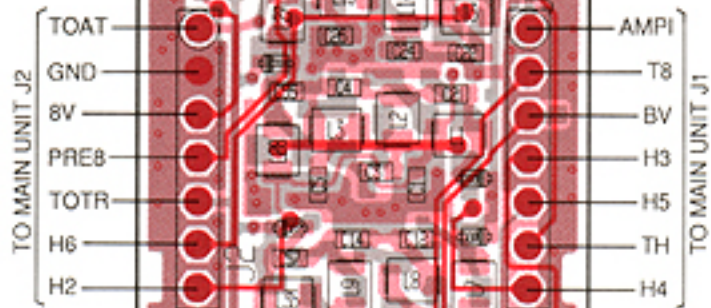
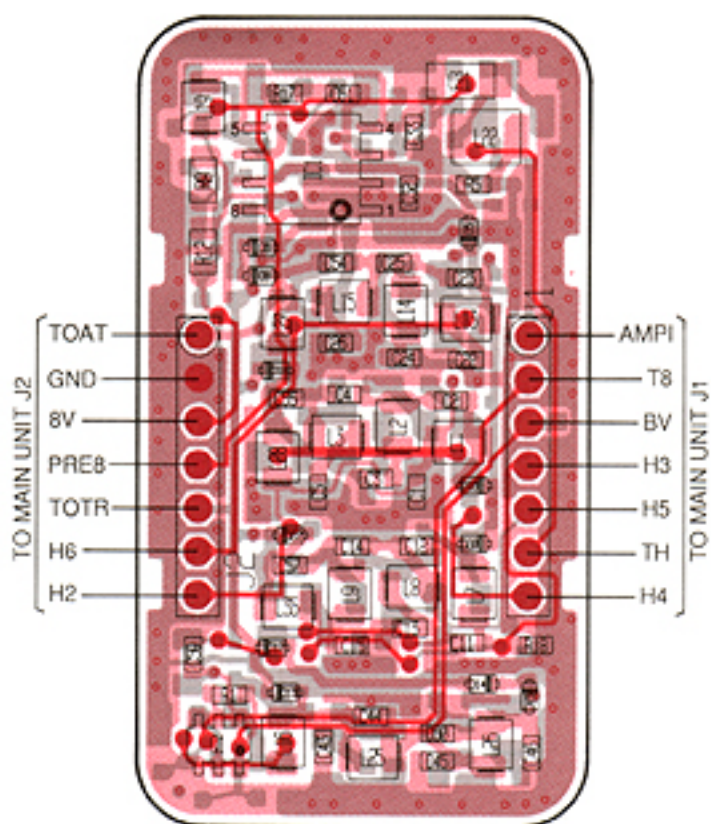


● HPF BOARD





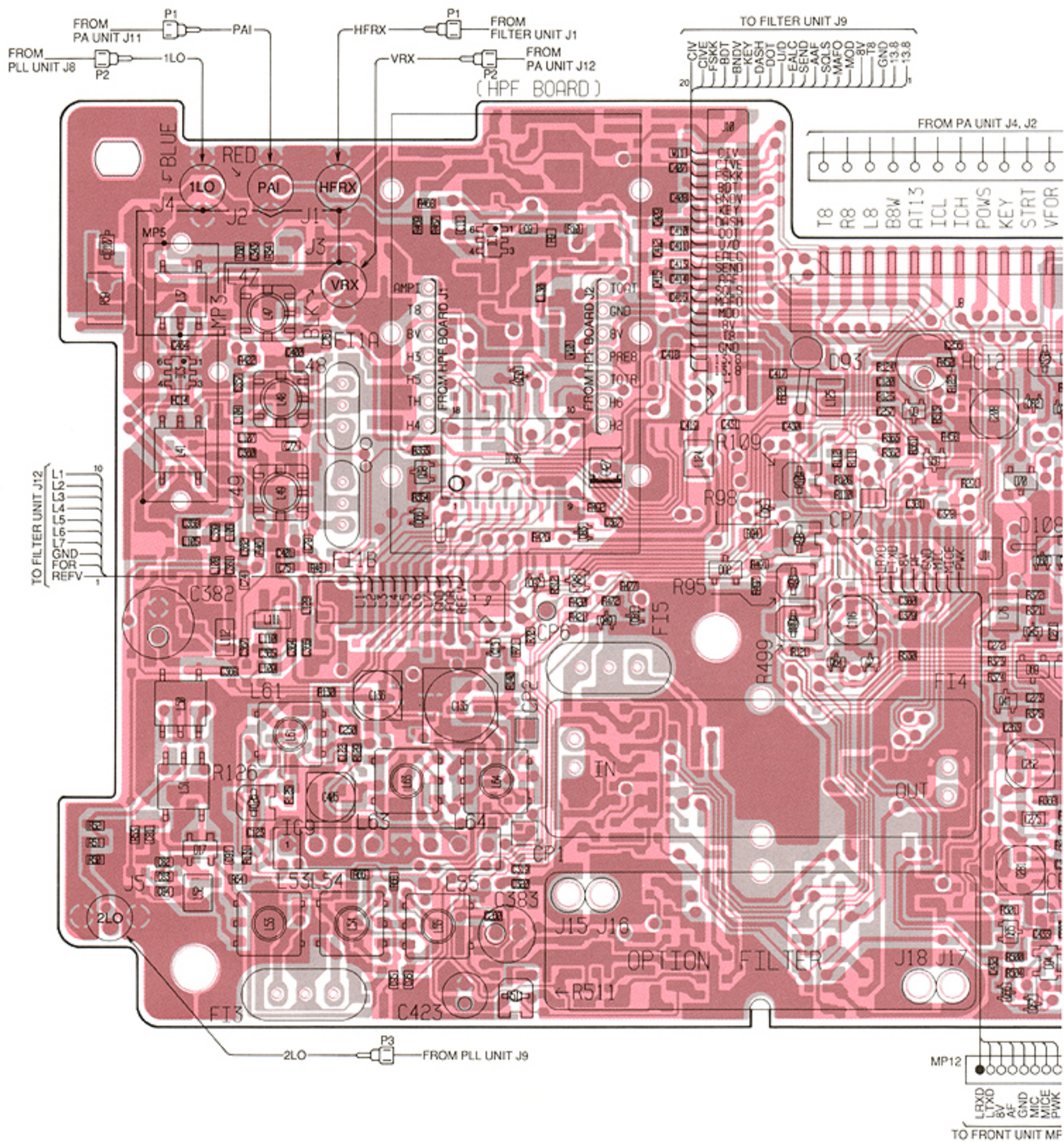
● HPF BOARD



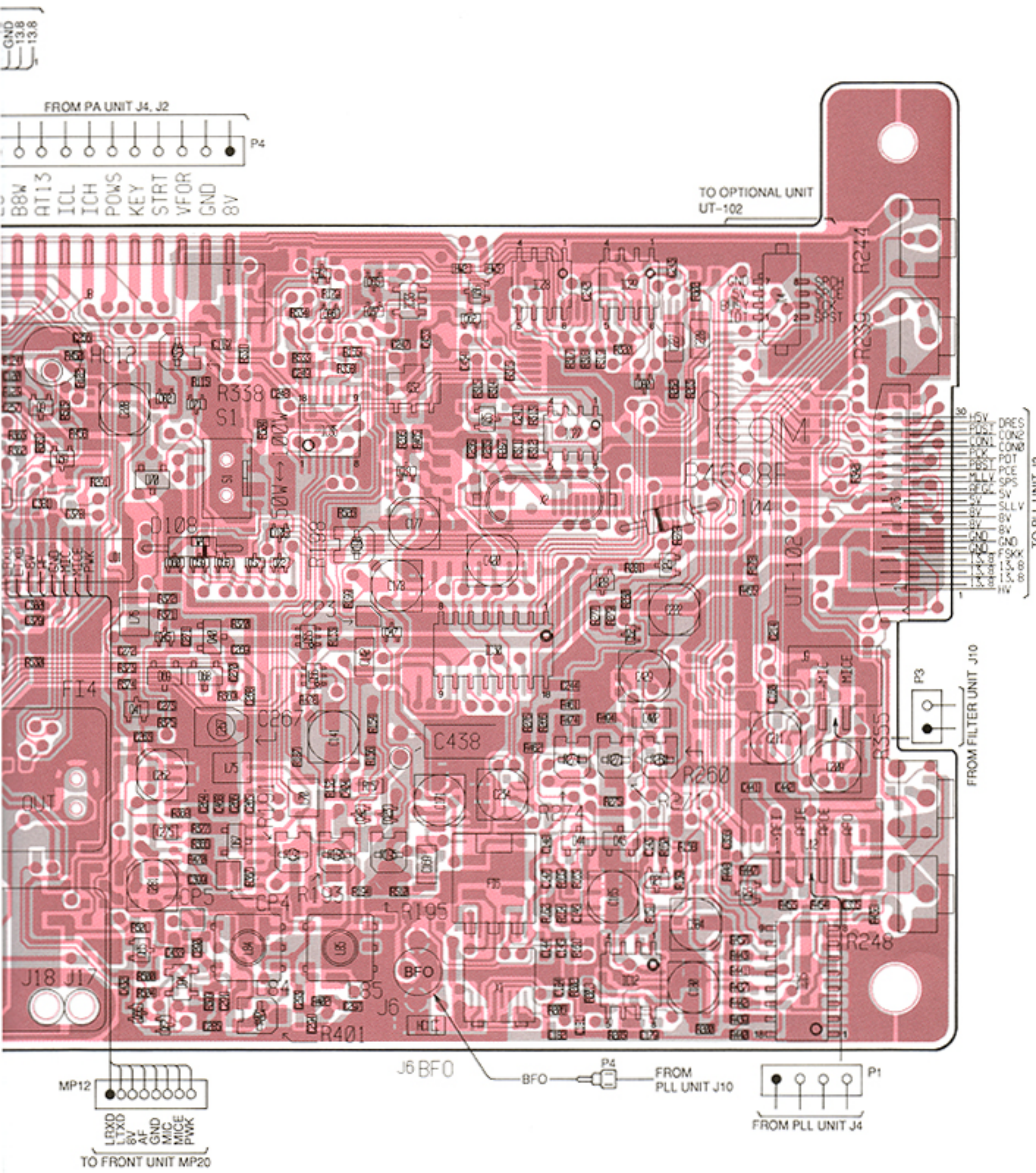
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# 8-2 MAIN UNIT

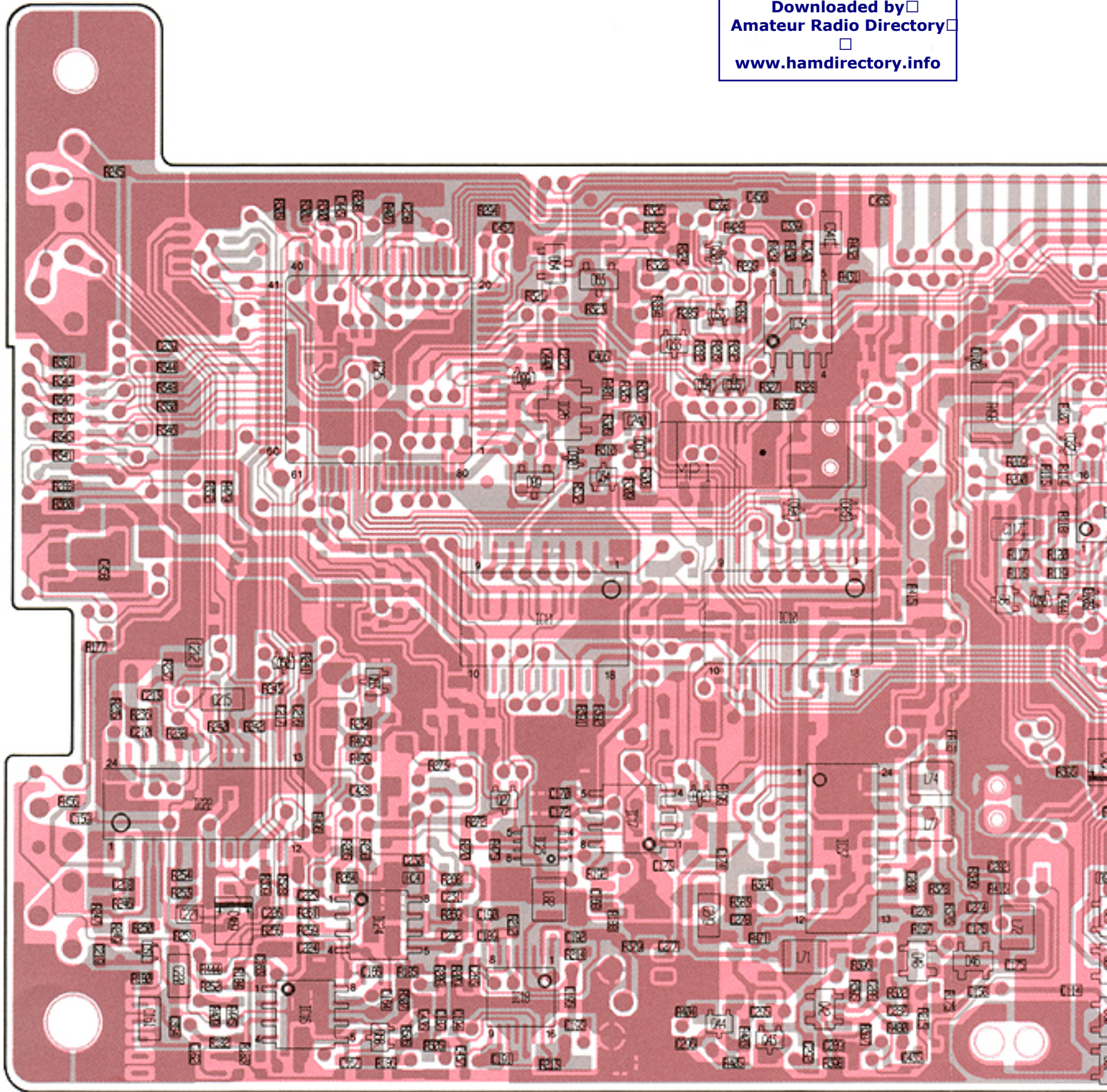


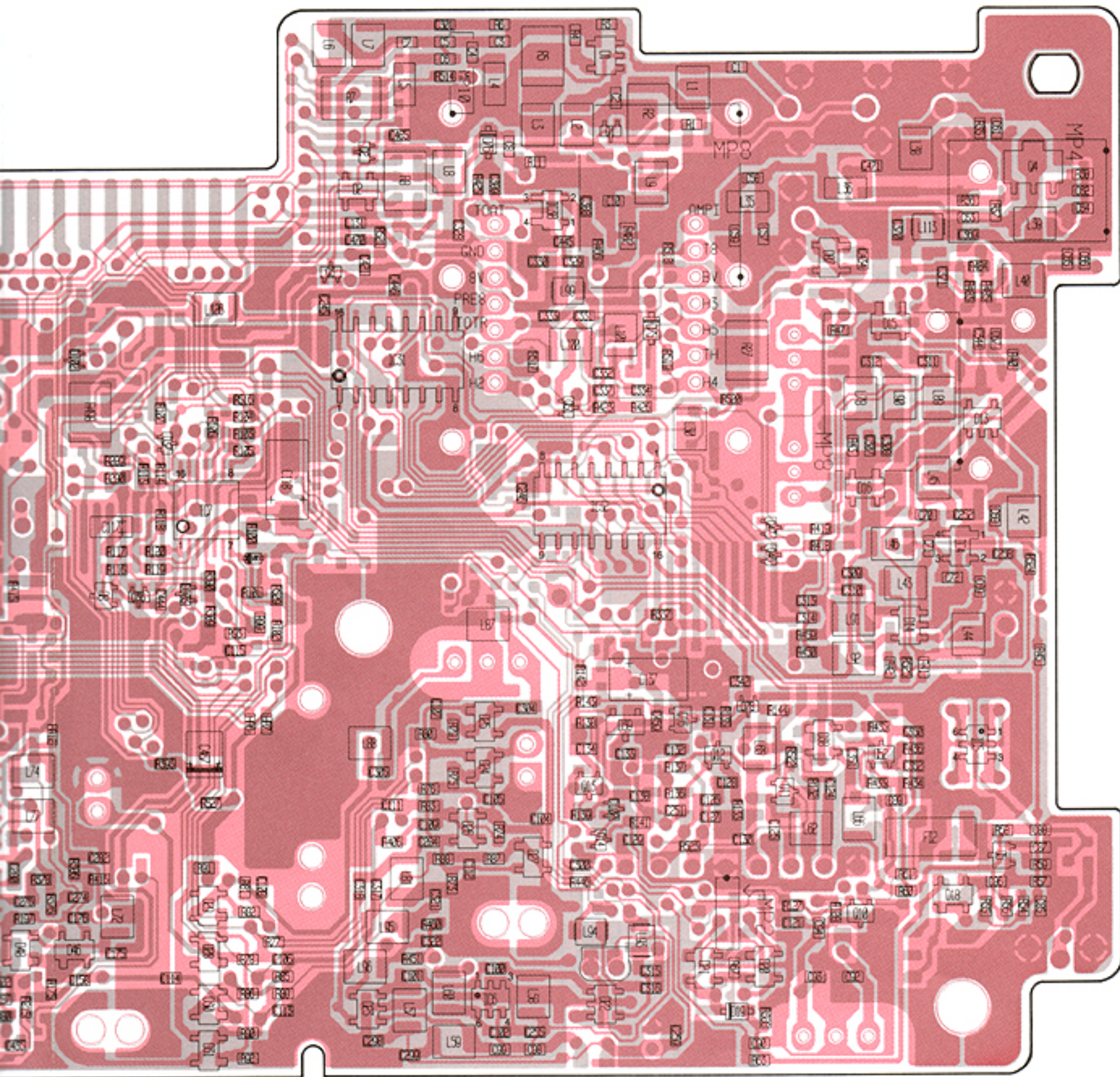
The combination of this page and the next page show the unit layout in the same configuration as the actual P. C. Board.



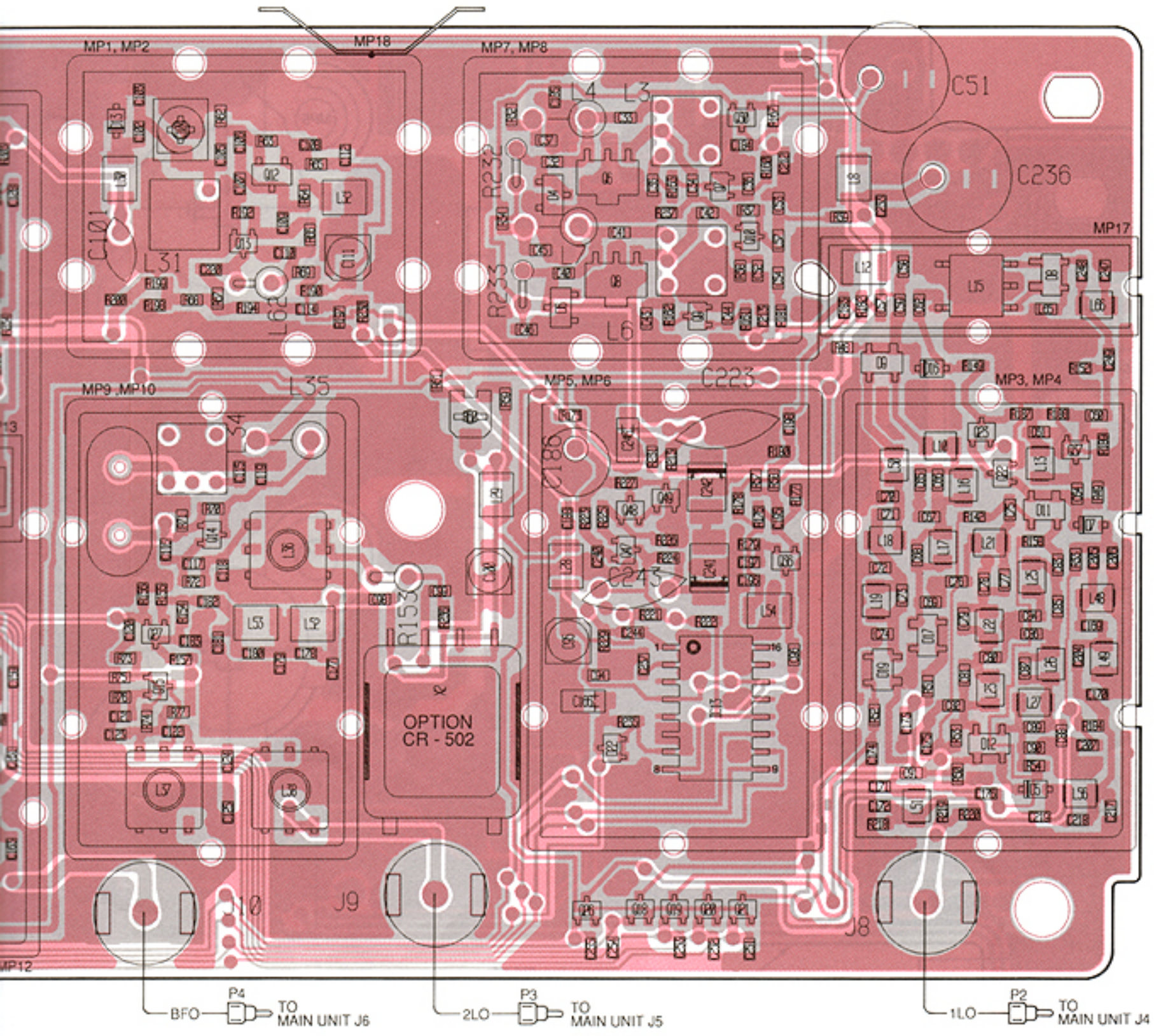
● MAIN UNIT

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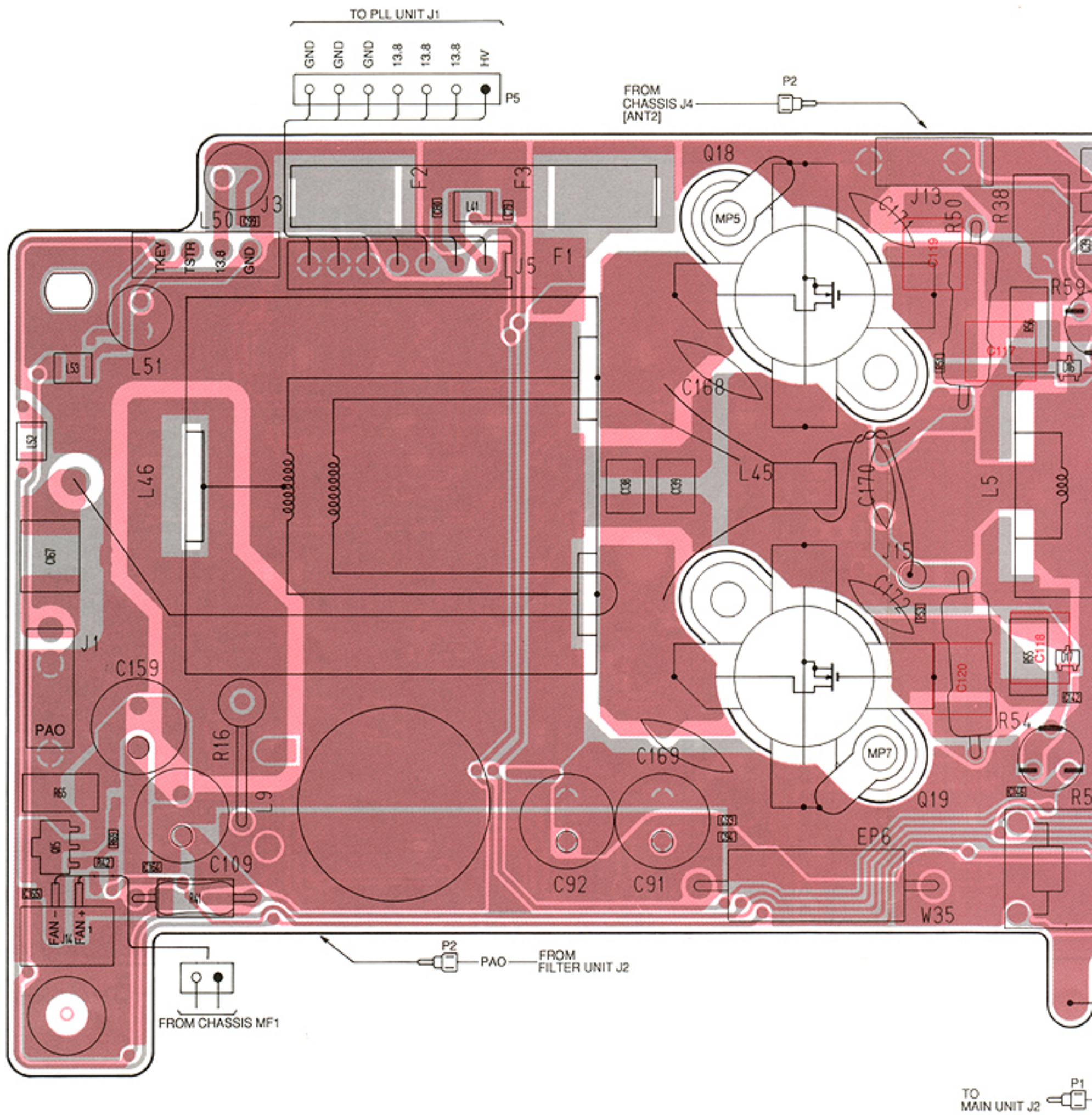


BFO — P4 TO MAIN UNIT J6

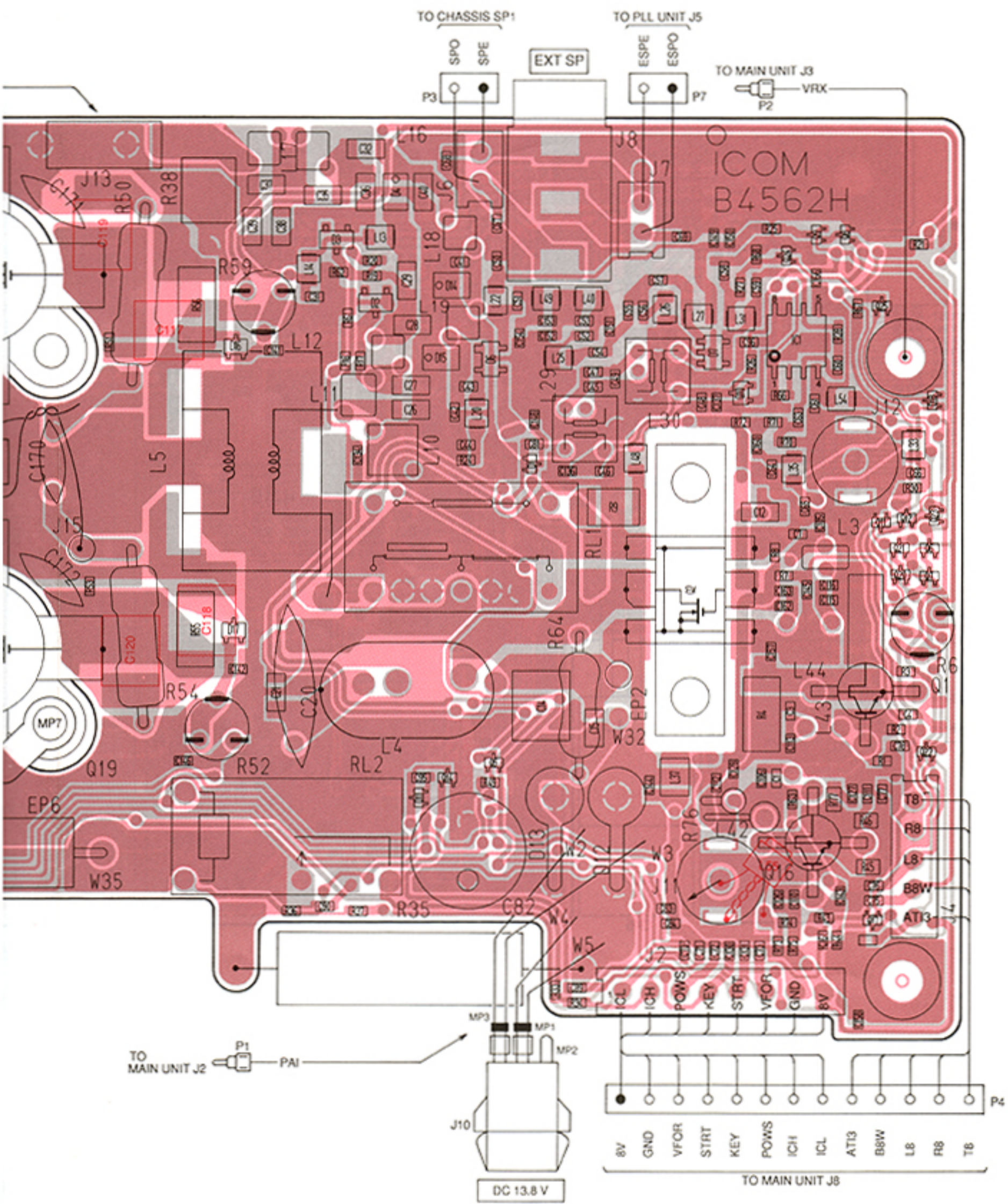
2LO — P3 TO MAIN UNIT J5

1LO — P2 TO MAIN UNIT J4

# 4 PA UNIT

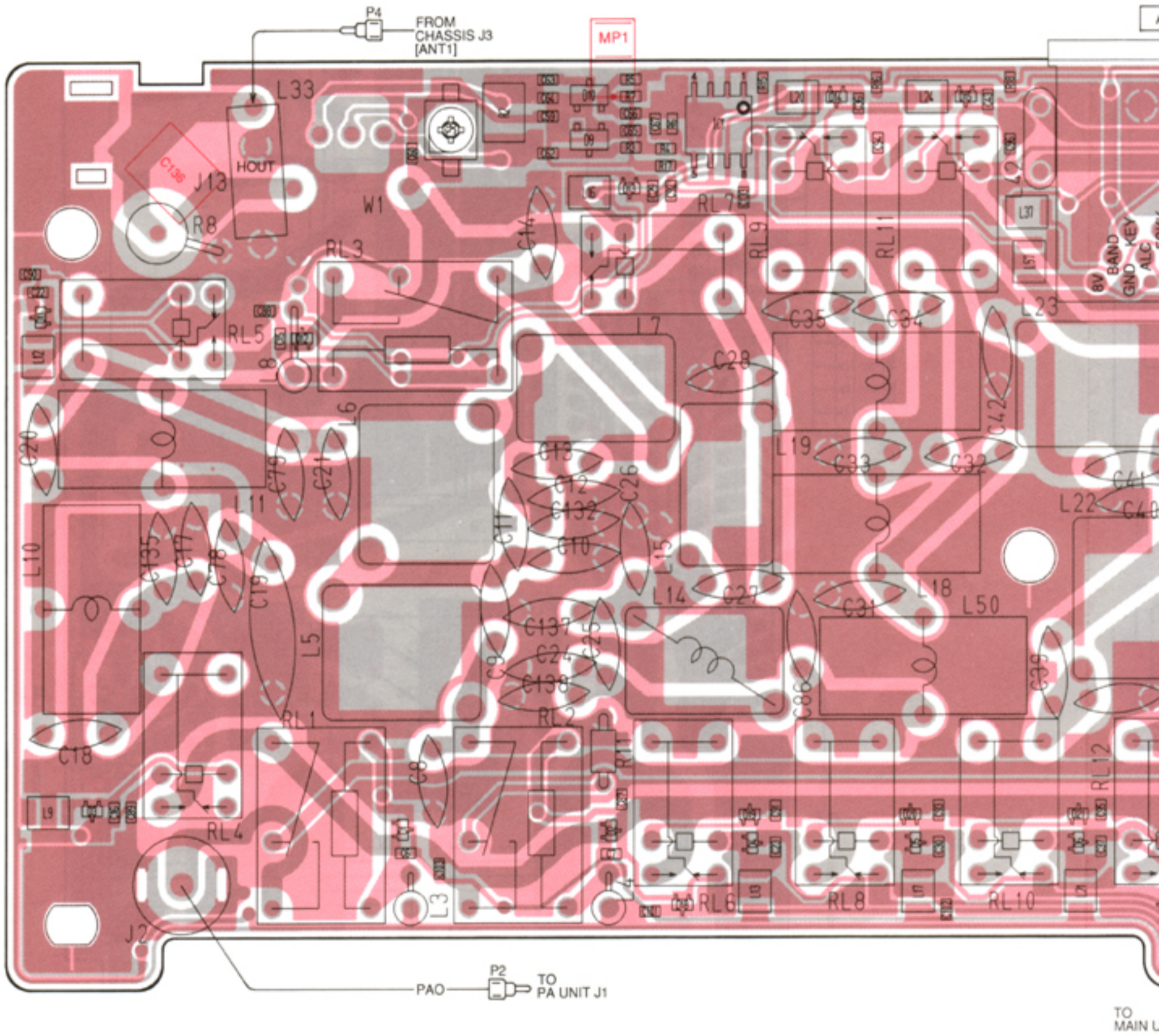


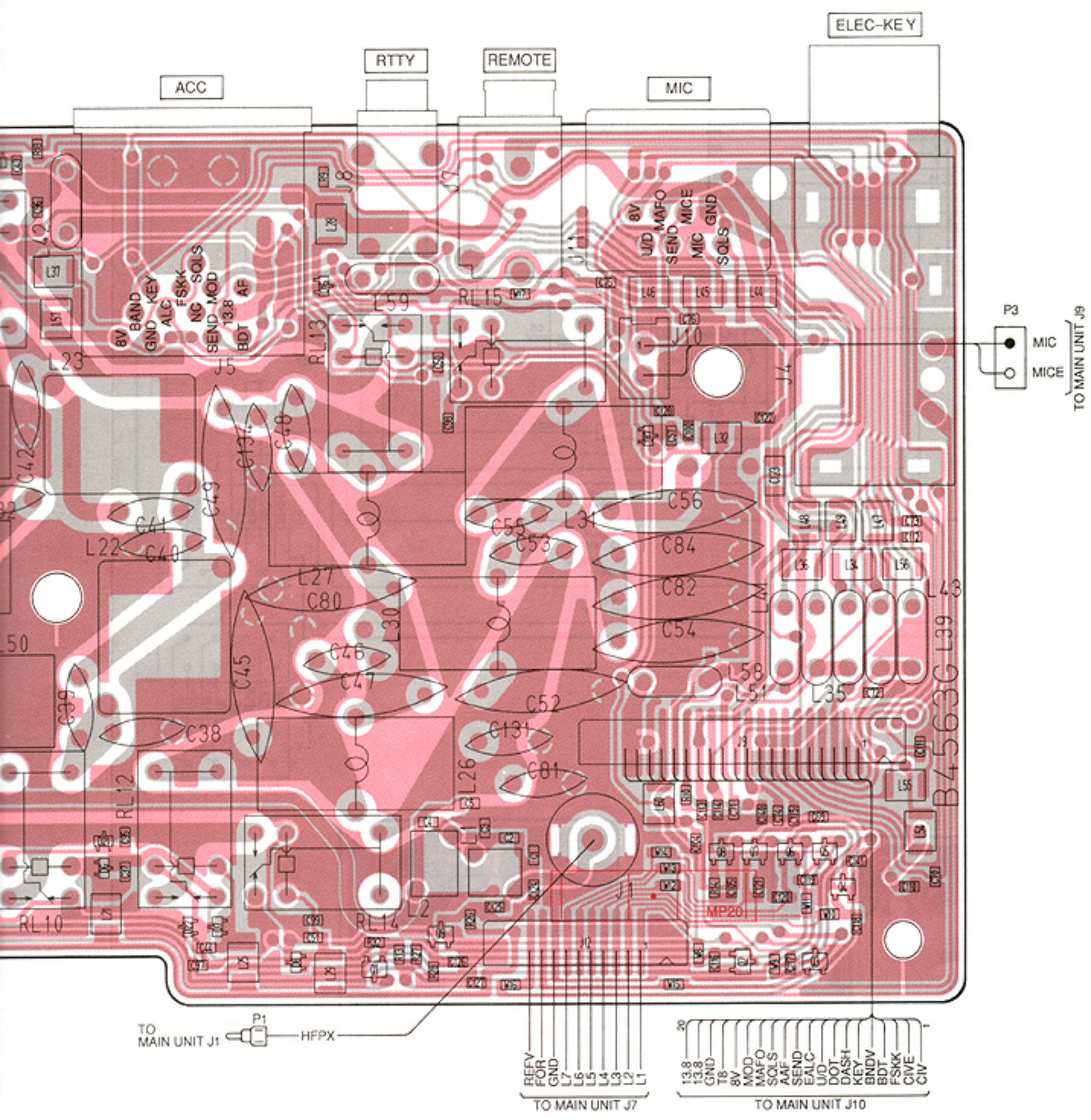
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# 8-5 FILTER UNIT





TO MAIN UNIT J1 P1 HFPX

REFV FOR GND L7 L6 L5 L4 L3 L2 L1  
TO MAIN UNIT J7

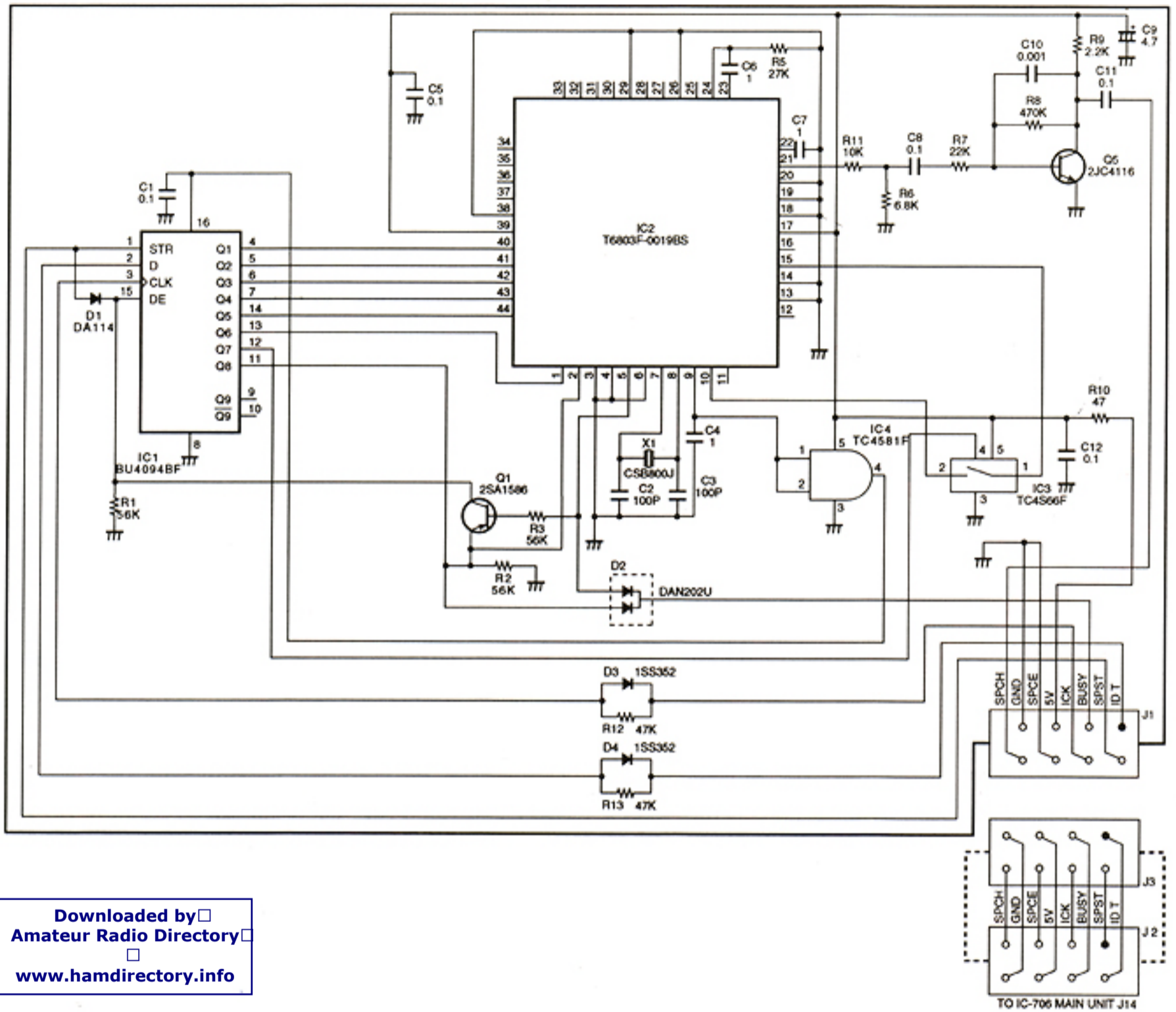
13.8 13.8 GND TB 8V MOD MAFO SOLS AAF SEND EALC U/D DOT DASH KEY BNDV BDT FSKK CIVE CIV  
TO MAIN UNIT J10

P3 MIC MICE  
TO MAIN UNIT J9

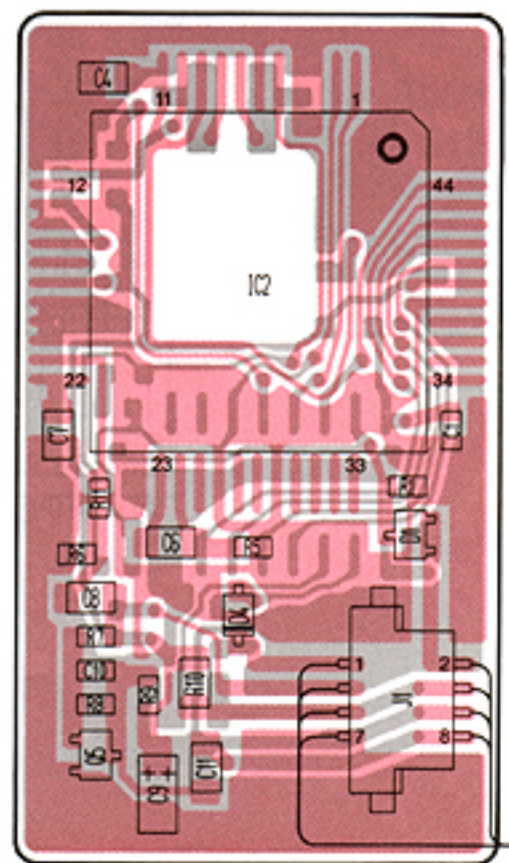
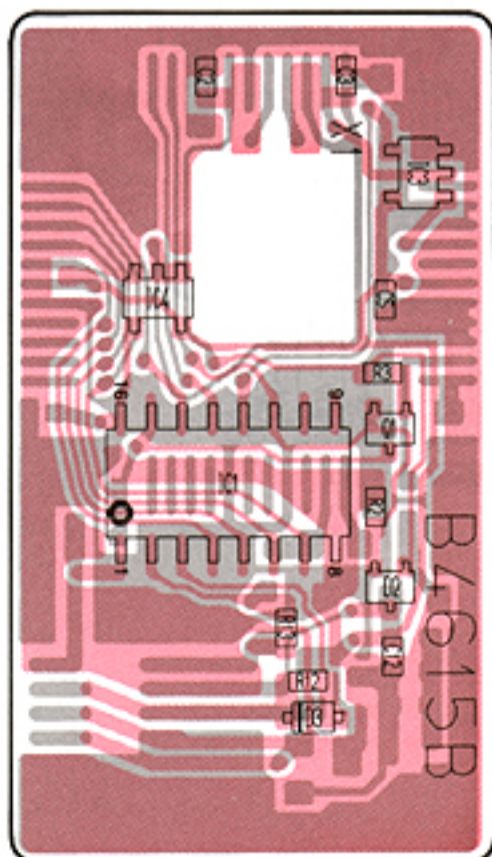
B4563G L39

# SECTION 9 OPTIONAL UNITS

## 9-1 UT-102 VOICE SYNTHESIZER UNIT



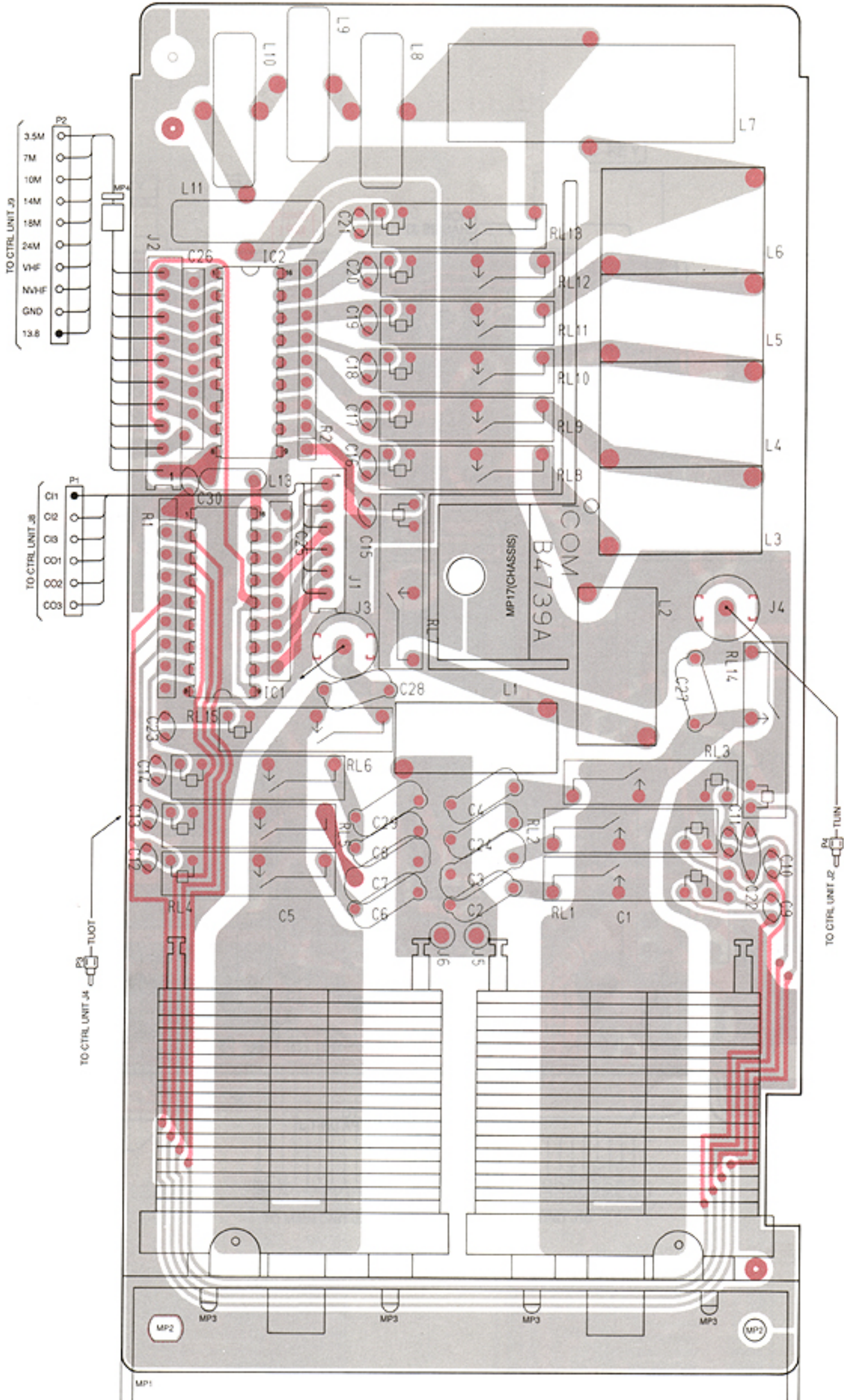
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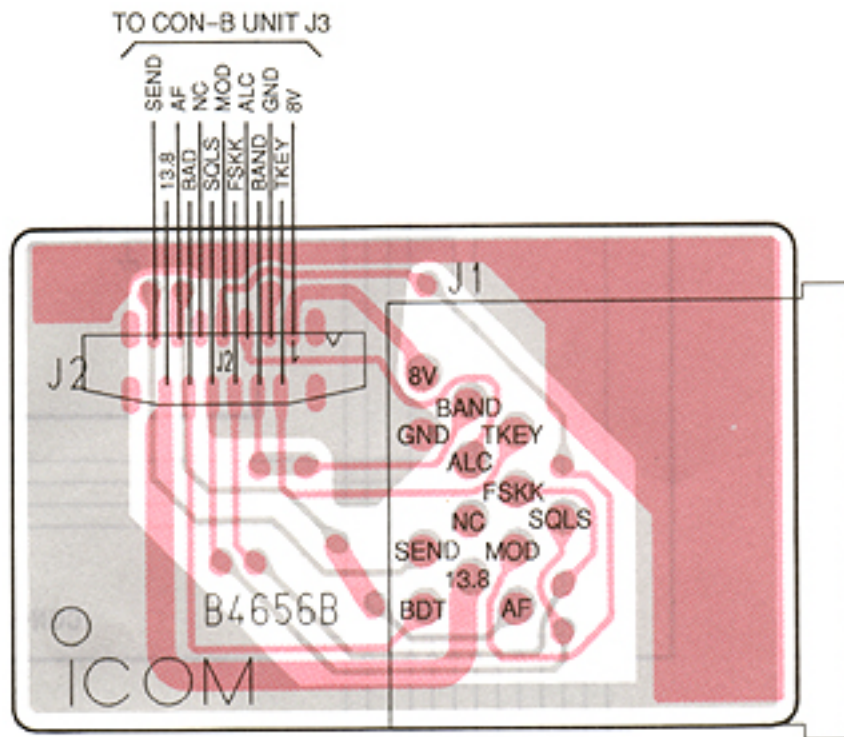
TO IC-706 MAIN UNIT J14

## 9-2 AT-180 HF/50 MHz AUTOMATIC ANTENNA TUNER

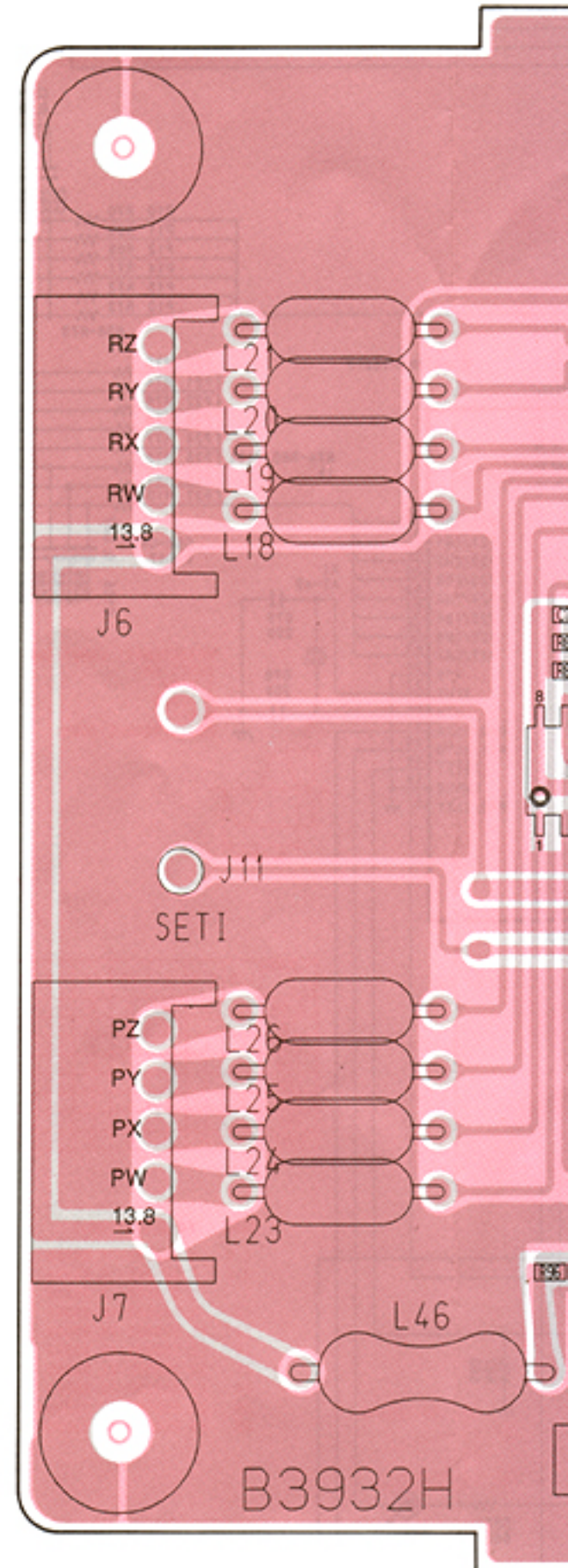
### • TUNER UNIT



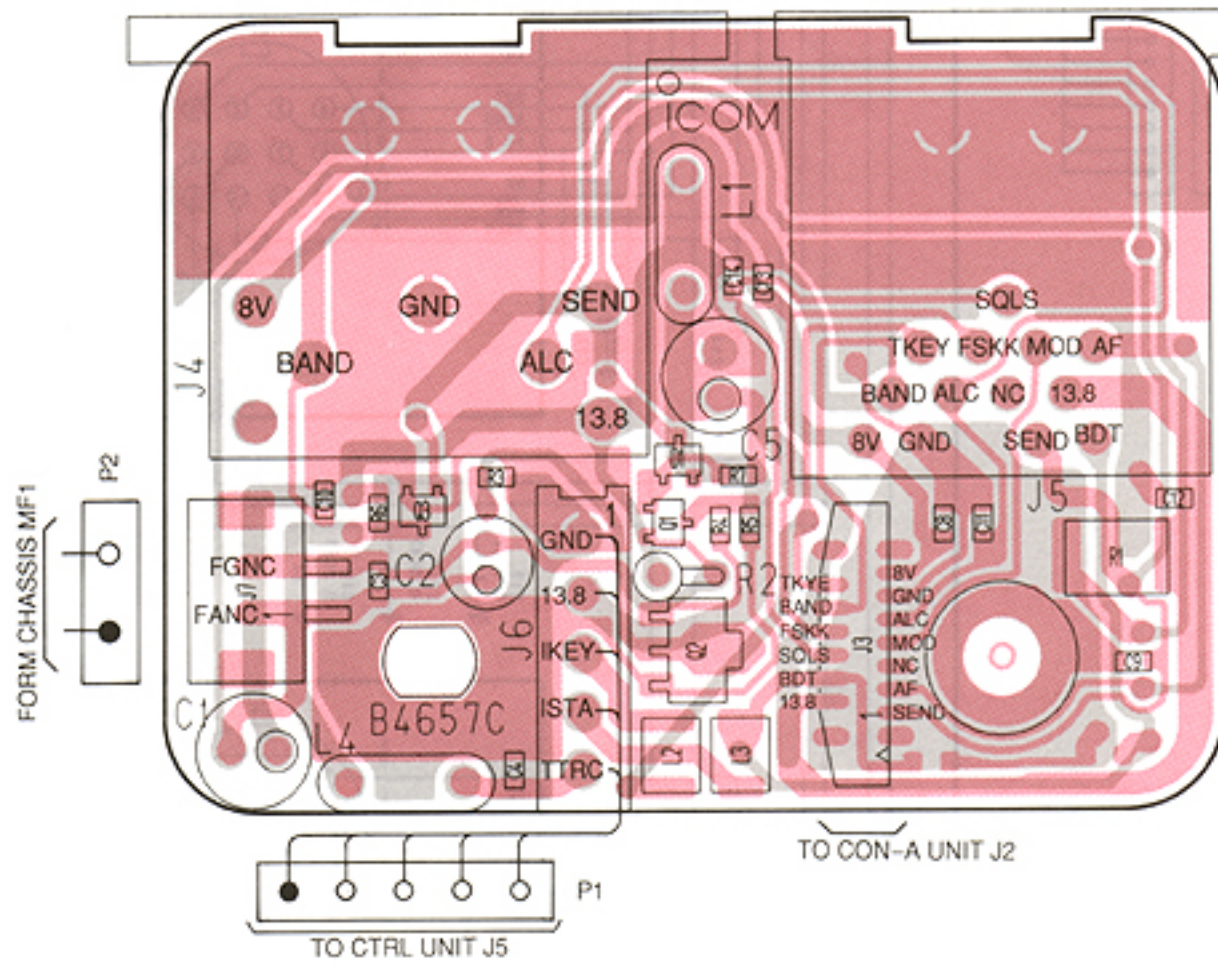
● CON-A UNIT



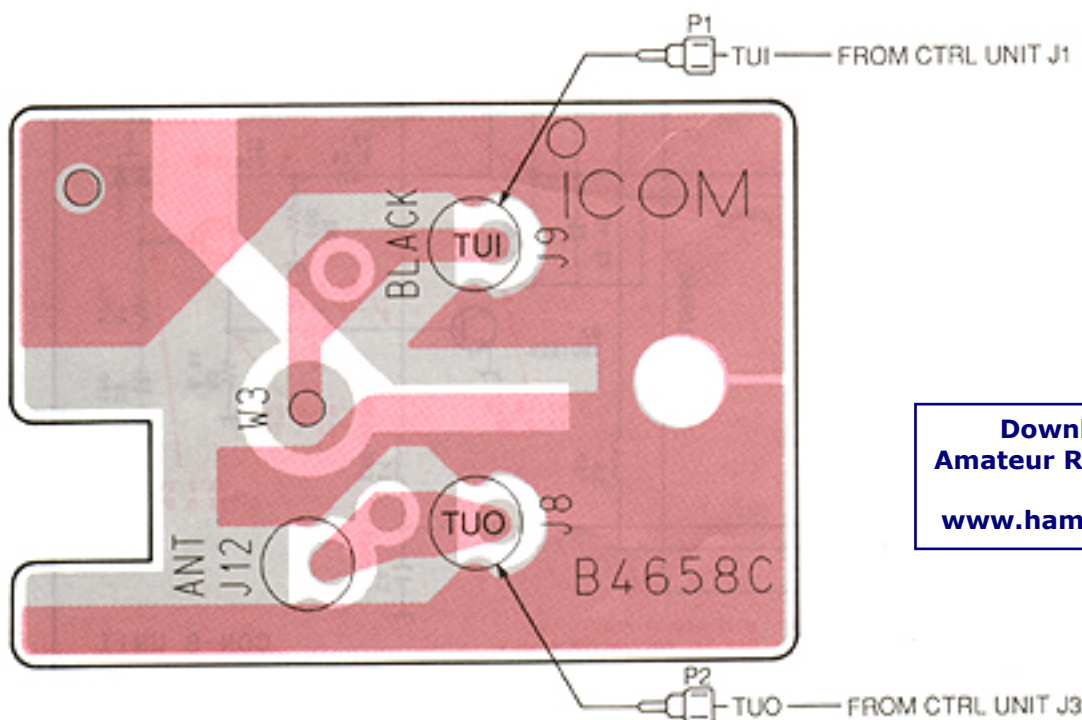
● CTRL UNIT



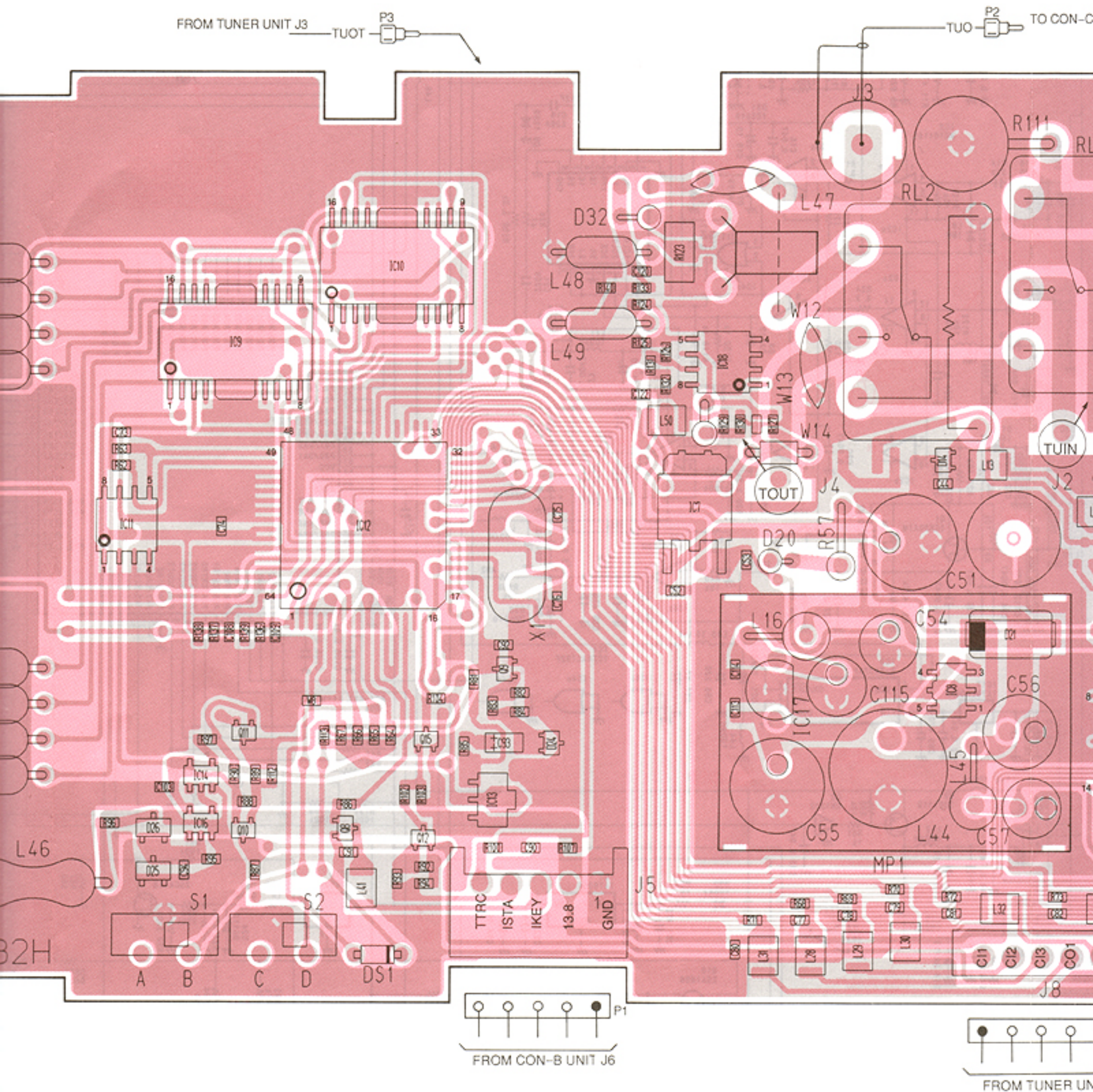
● CON-B UNIT



● CON-C UNIT

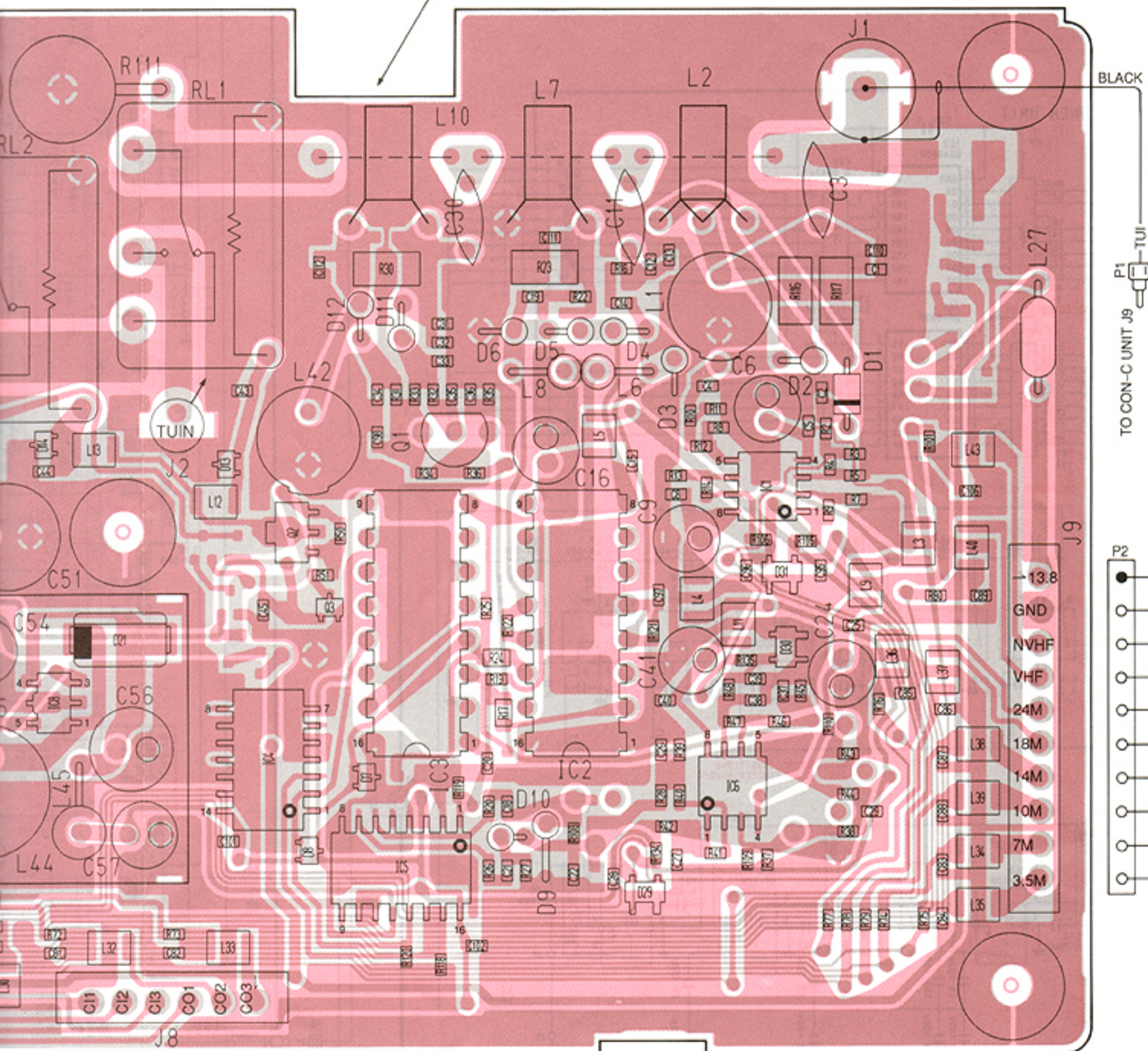


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TUO P2 TO CON-C UNIT J8

P4 TUIN FROM TUNER UNIT J4

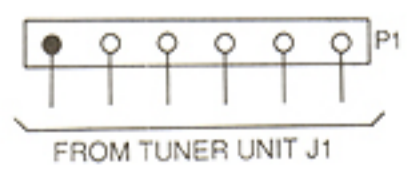


BLACK

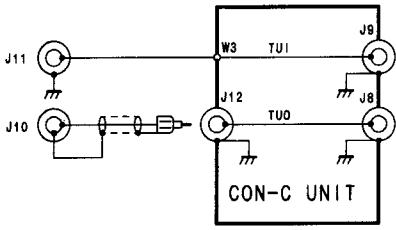
P1 TUIN TO CON-C UNIT J9

P2 13.8 GND NVHF VHF 24M 18M 14M 10M 7M 3.5M

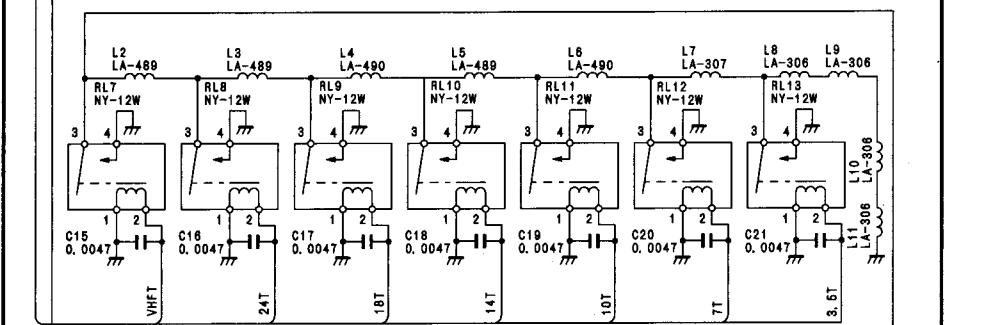
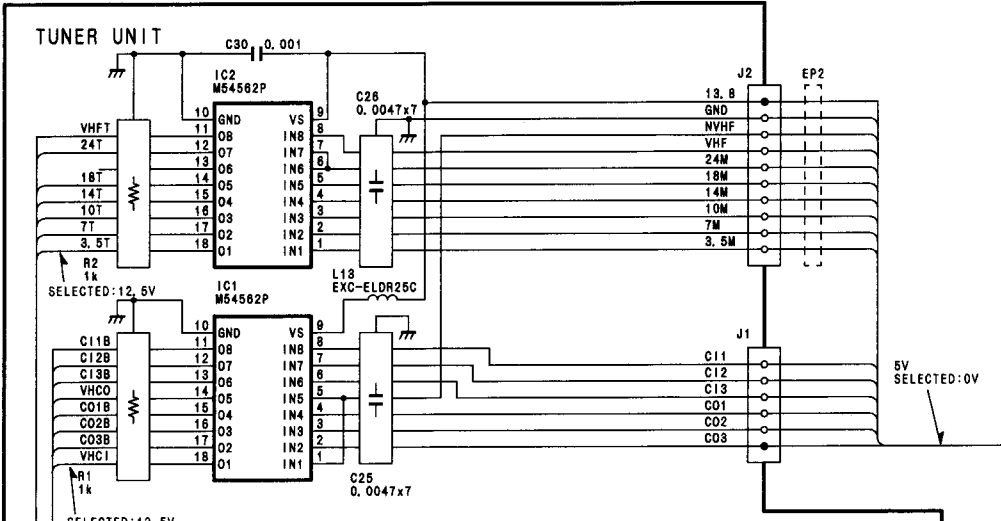
FROM TUNER UNIT J2



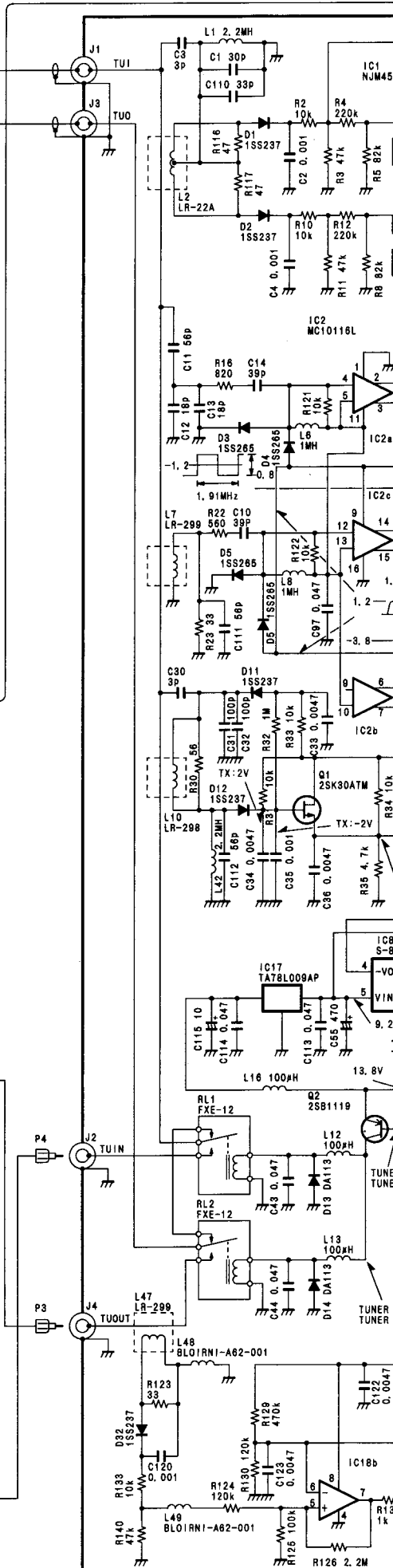
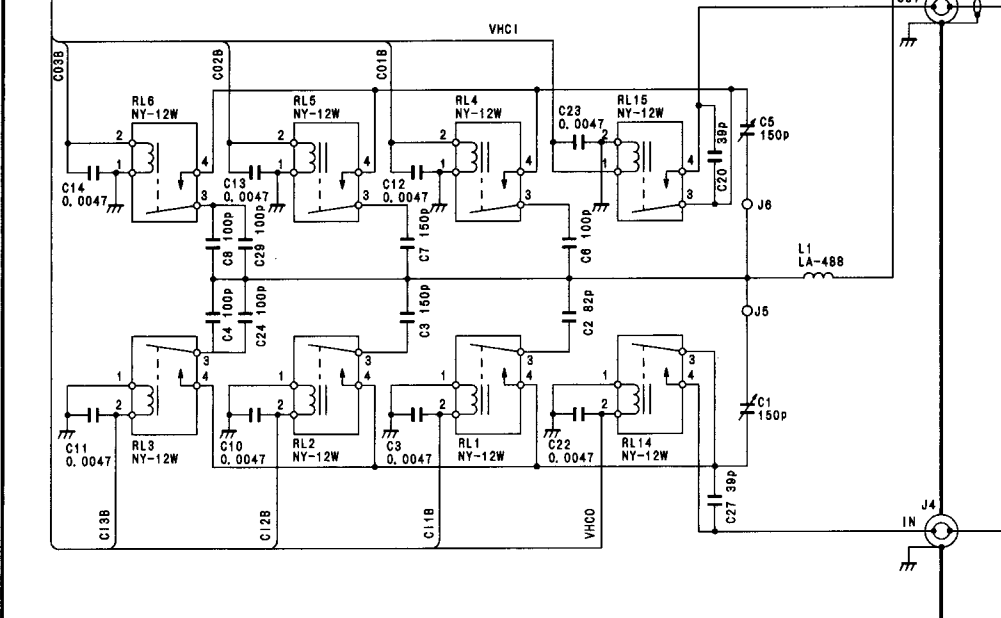
FROM TUNER UNIT J1



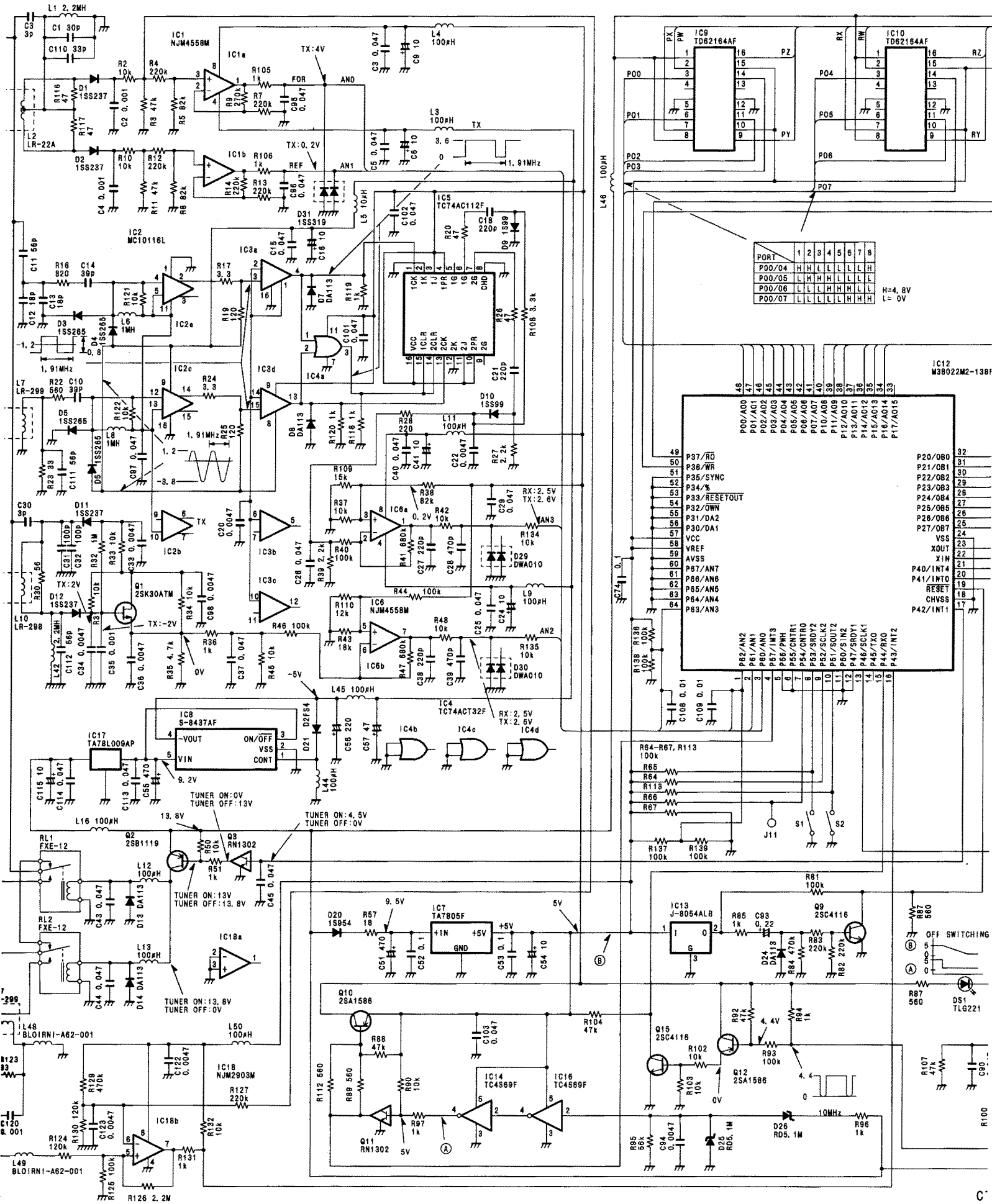
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MEASUREMENT CONDITIONS  
 DIGITAL MULTIMETER-50kΩ/V

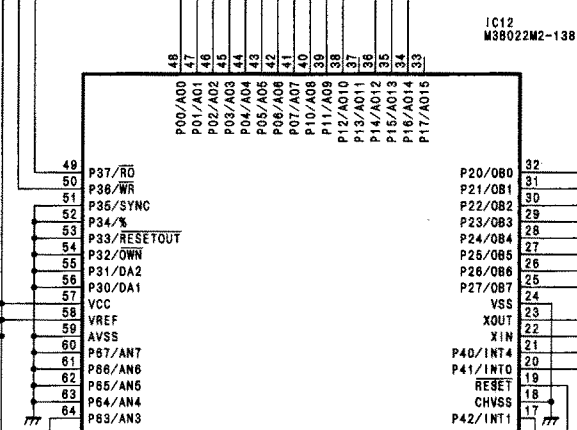


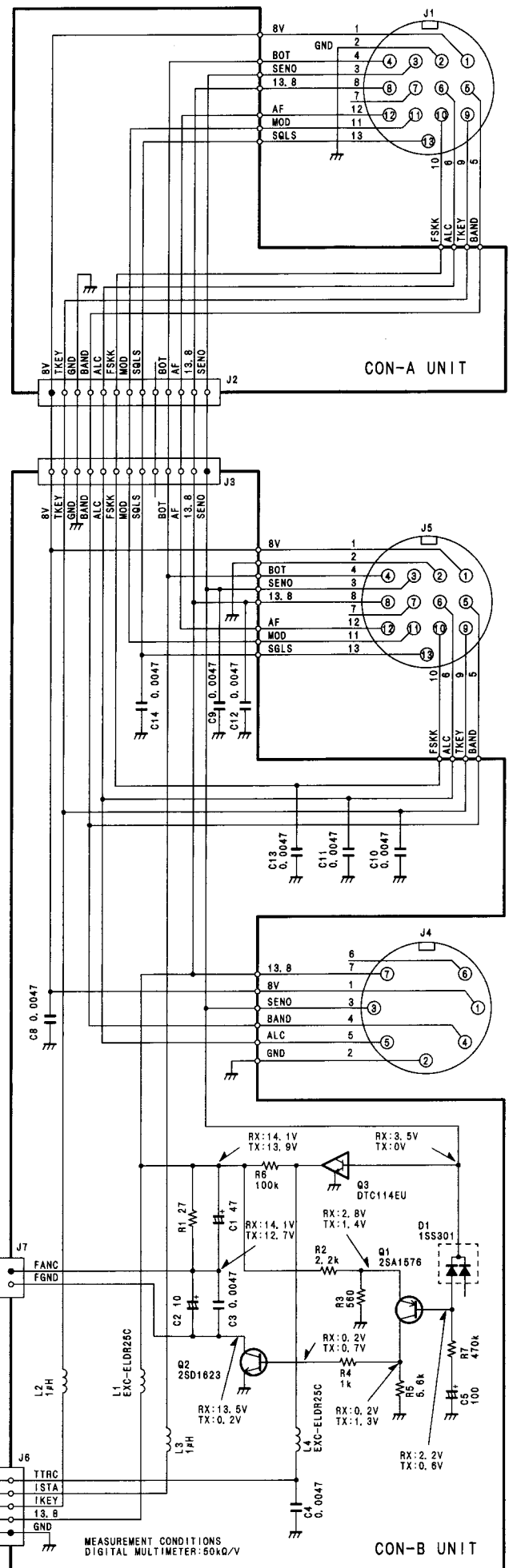
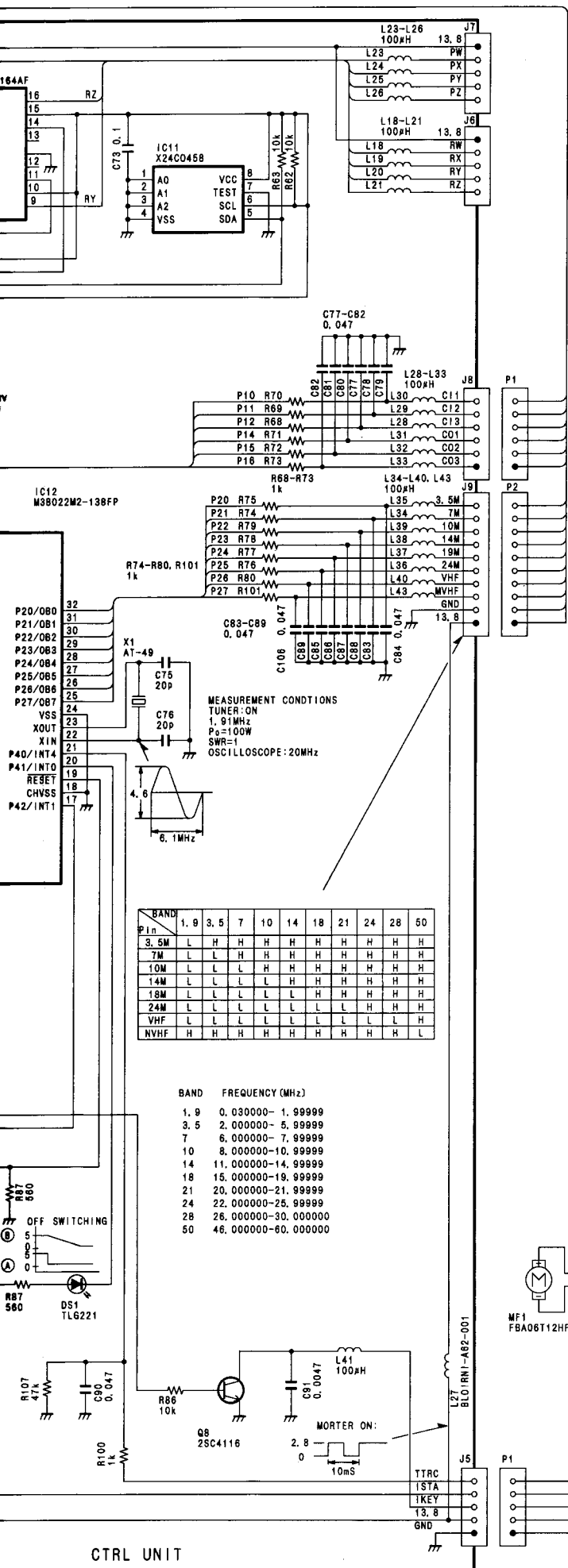




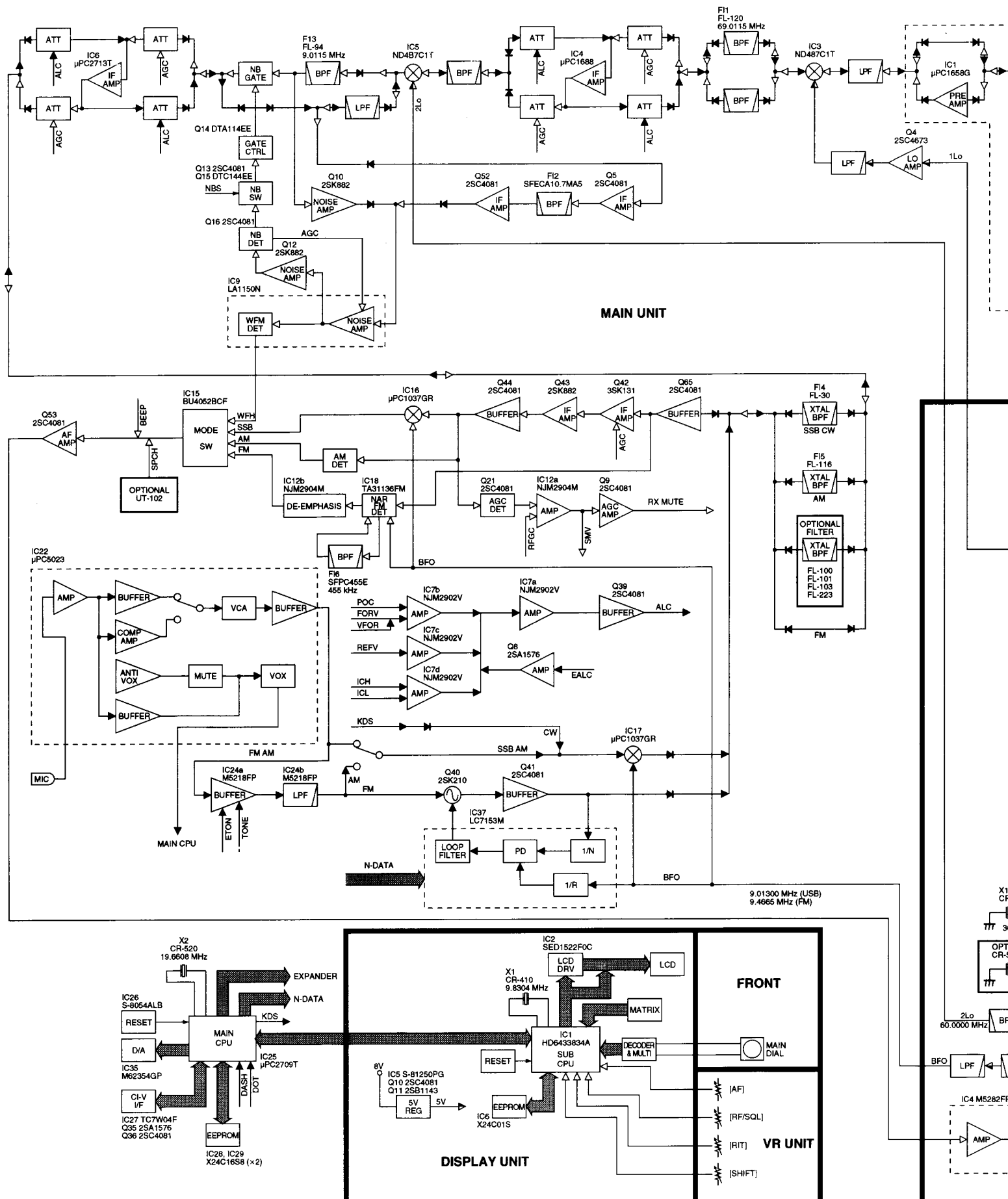
PORT	1	2	3	4	5	6	7	8
P00/04	L	H	L	L	L	L	L	L
P00/05	L	H	H	L	L	L	L	L
P00/06	L	L	L	H	H	L	L	L
P00/07	L	L	L	L	L	H	H	L

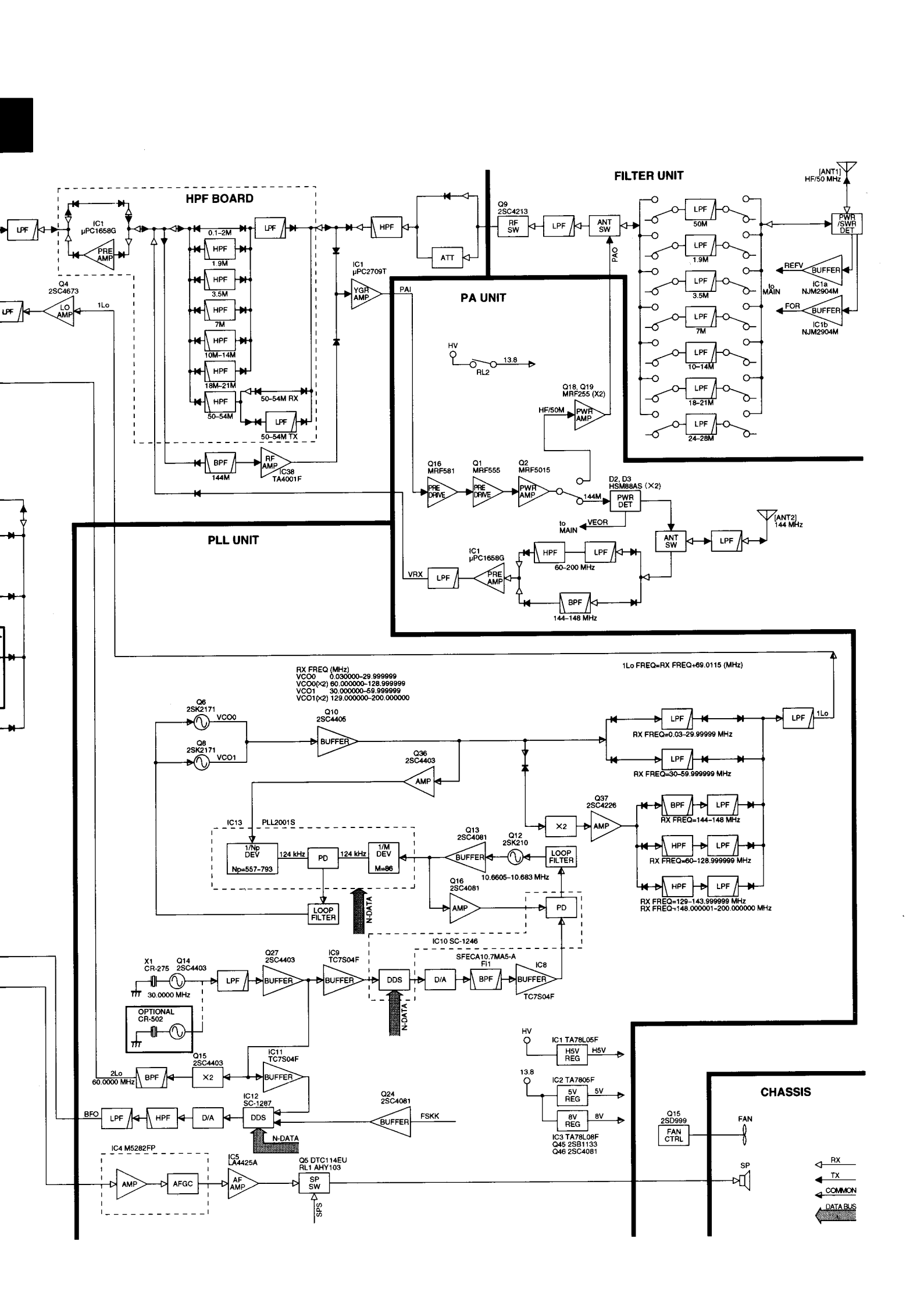
H=4, 8V  
L= 0V





# SECTION 10 BLOCK DIAGRAM





**HPF BOARD**

**PLL UNIT**

**PA UNIT**

**FILTER UNIT**

**CHASSIS**

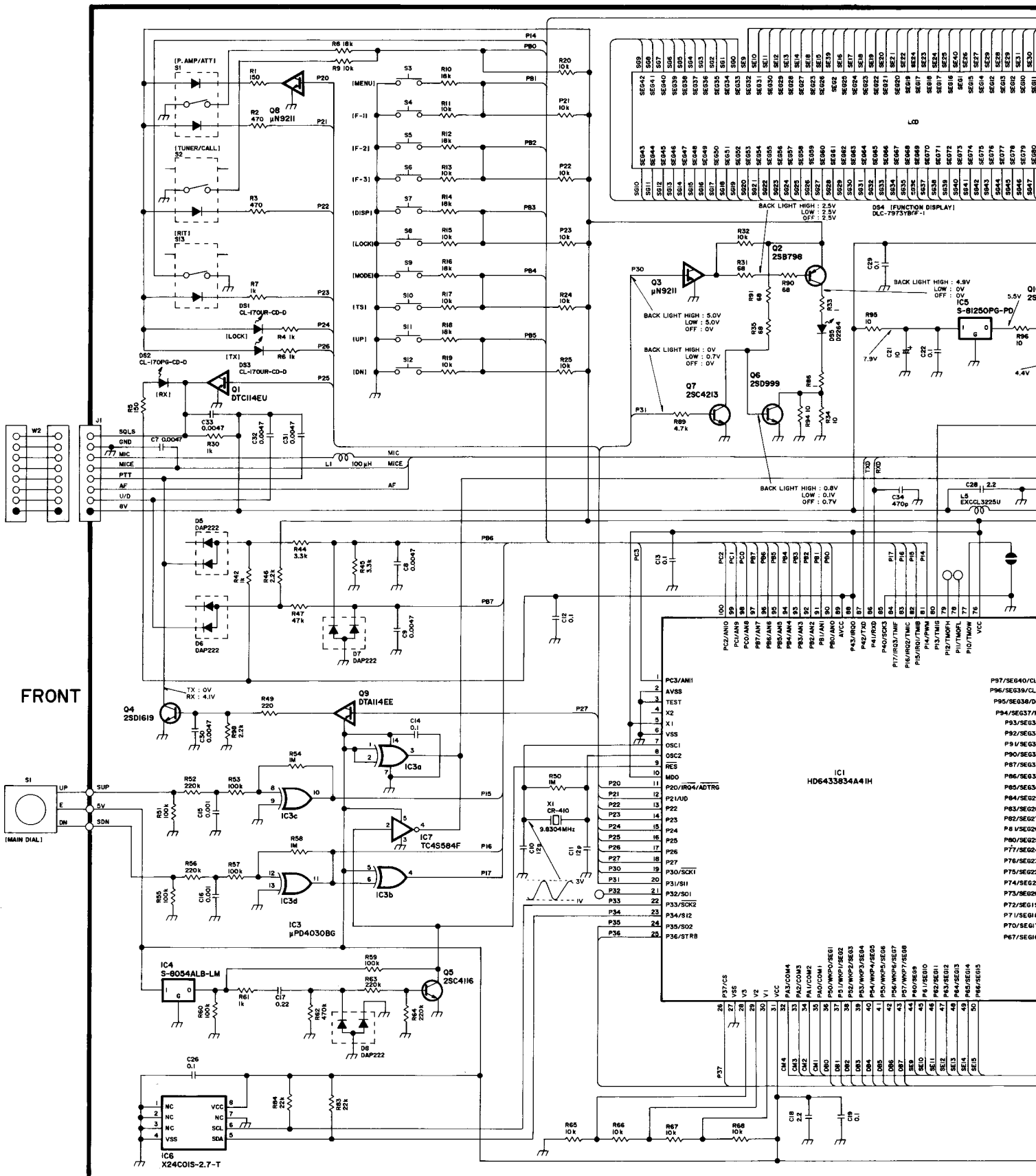
RX FREQ (MHz)  
 VCO0 0.030000-29.999999  
 VCO0(x2) 60.000000-128.999999  
 VCO1 30.000000-59.999999  
 VCO1(x2) 129.000000-200.000000

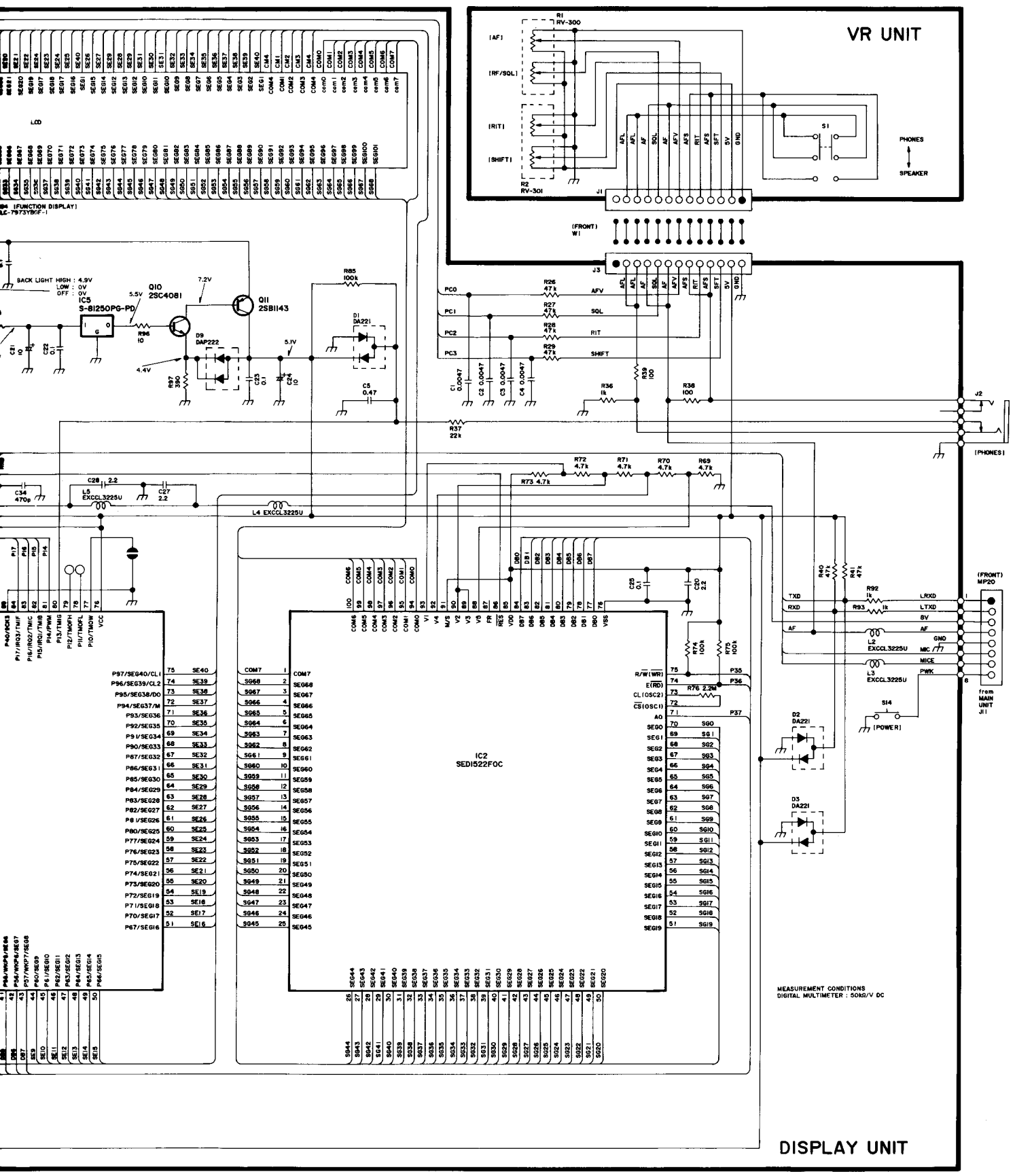
1Lo FREQ=RX FREQ+69.0115 (MHz)

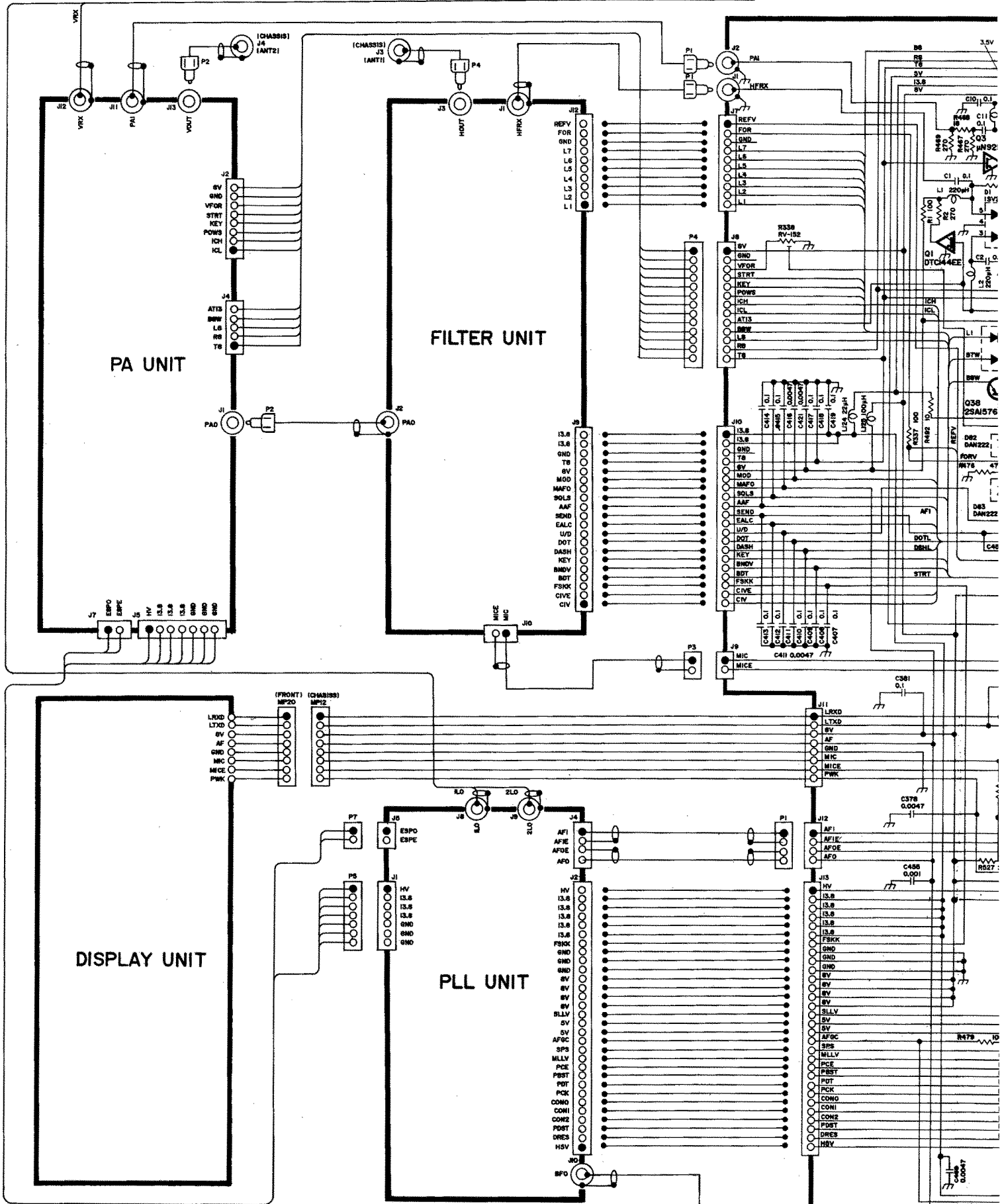
RX FREQ=0.03-29.99999 MHz  
 RX FREQ=30-59.99999 MHz  
 RX FREQ=144-148 MHz  
 RX FREQ=60-128.99999 MHz  
 RX FREQ=129-143.99999 MHz  
 RX FREQ=148.000001-200.000000 MHz

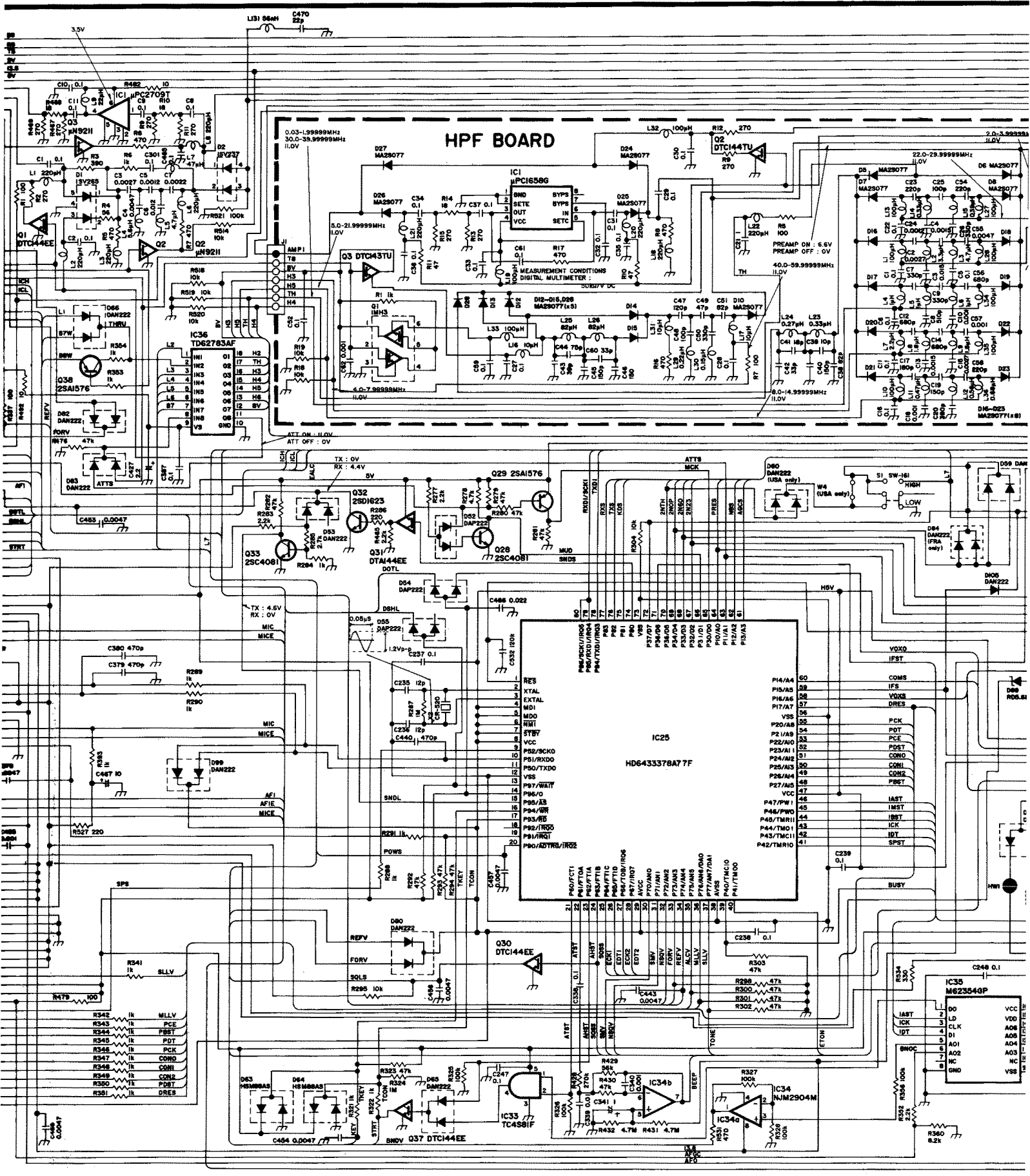
← RX  
 ← TX  
 ← COMMON  
 ← DATA BUS

# SECTION 11 VOLTAGE DIAGRAM

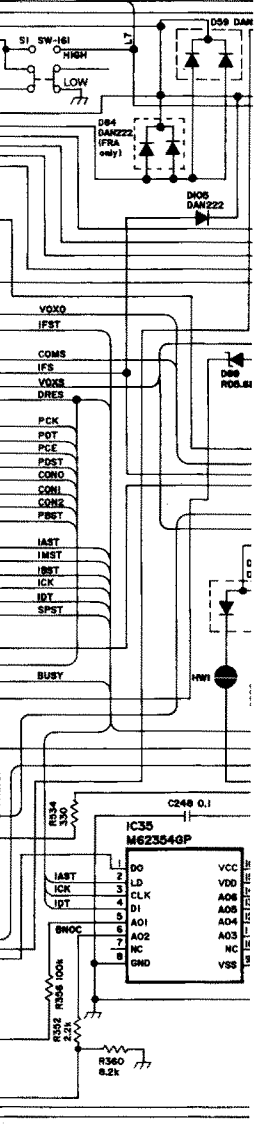
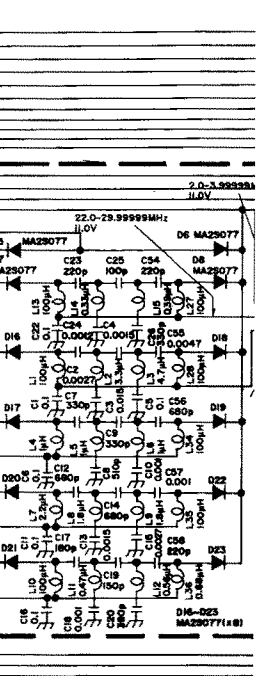
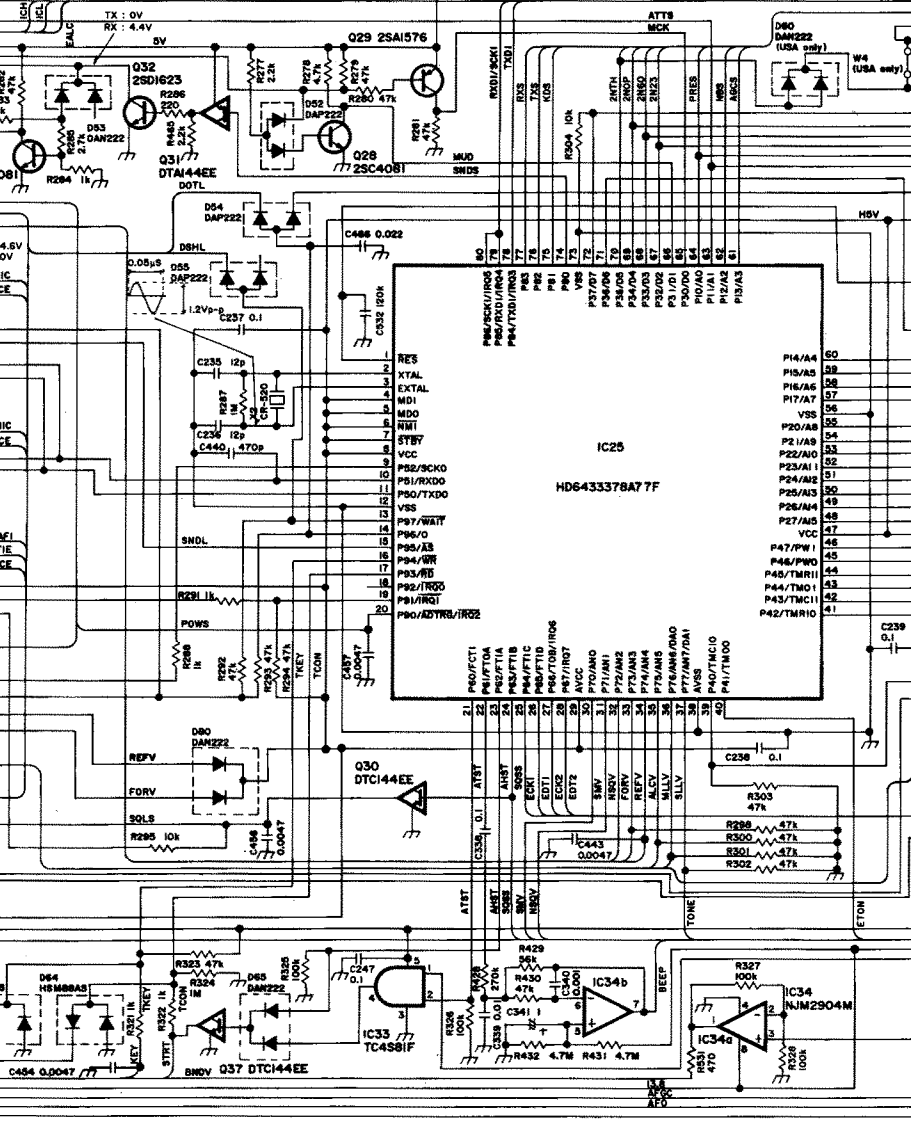
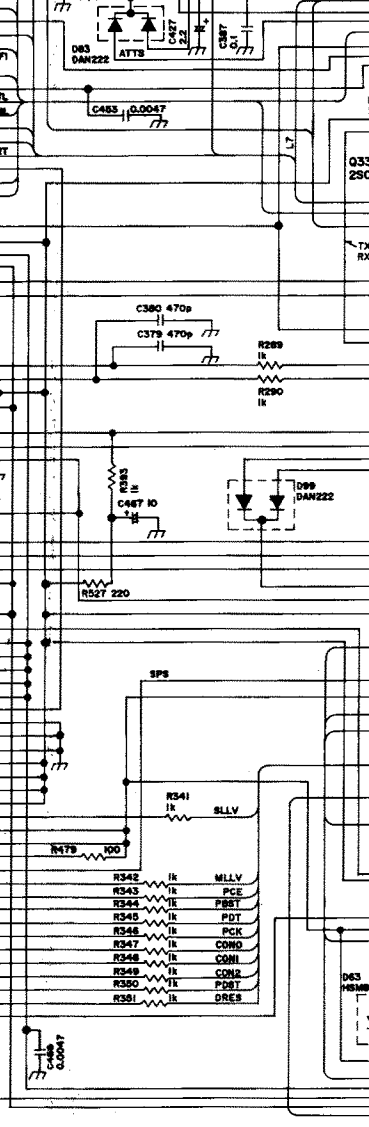
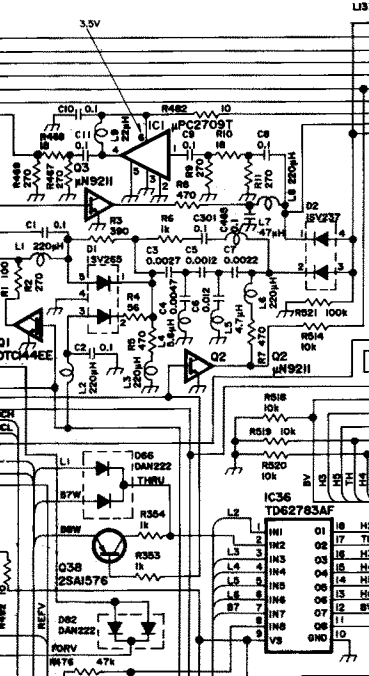
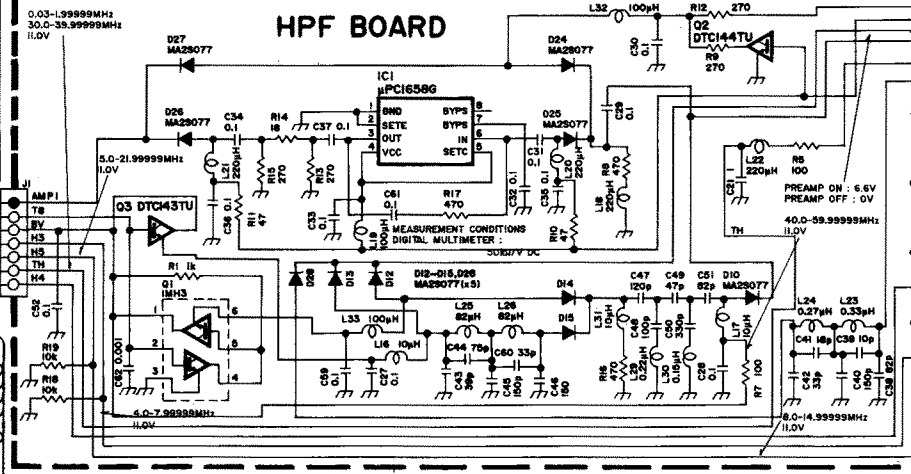








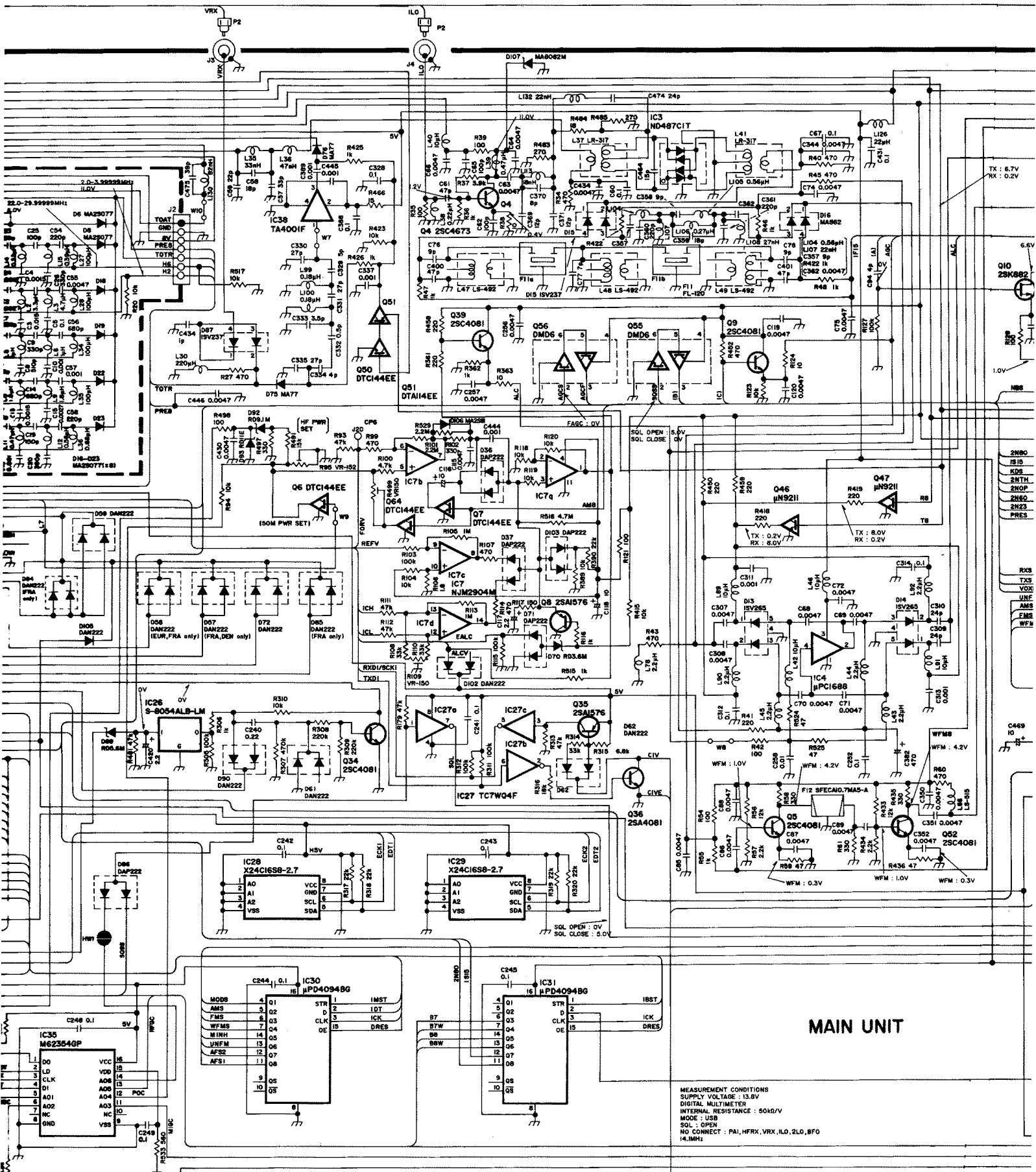
**HPF BOARD**



**COMPONENT LIST**

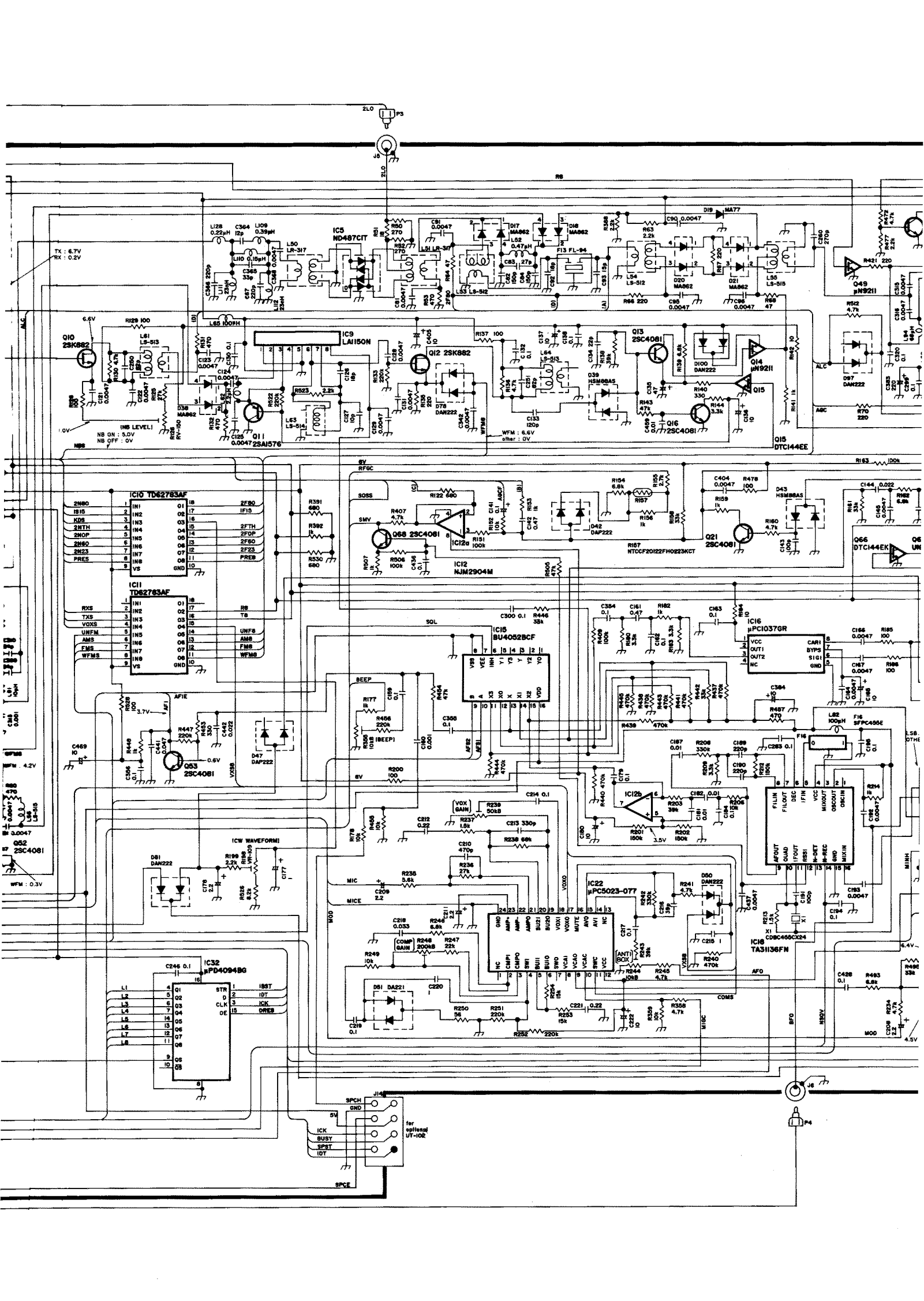
R342	1K	MLLV
R343	1K	PCE
R344	1K	FRET
R345	1K	POT
R346	1K	PCK
R347	1K	CONQ
R348	1K	CONI
R349	1K	CON2
R350	1K	PST
R351	1K	DRES





**MAIN UNIT**

MEASUREMENT CONDITIONS  
 SUPPLY VOLTAGE : 13.0V  
 DIGITAL MULTIMETER  
 INTERNAL RESISTANCE : 50kΩ/V  
 MODE : USB  
 SOL : OPEN  
 NO CONNECT : PAI, HFRX, VRX, ILO, 2LO, BFO  
 14.1MHz



TX : 6.7V  
RX : 0.2V

6.6V

0.6V  
NB ON : 5.0V  
NB OFF : 0V

WFM : 0.3V

4.2V

0.6V

3.7V

0.3V

0.3V

0.3V

0.3V

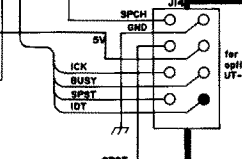
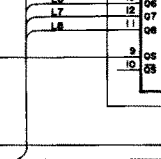
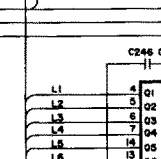
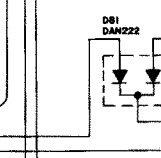
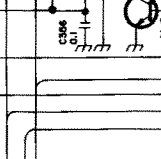
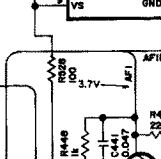
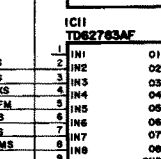
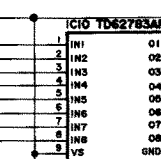
0.3V

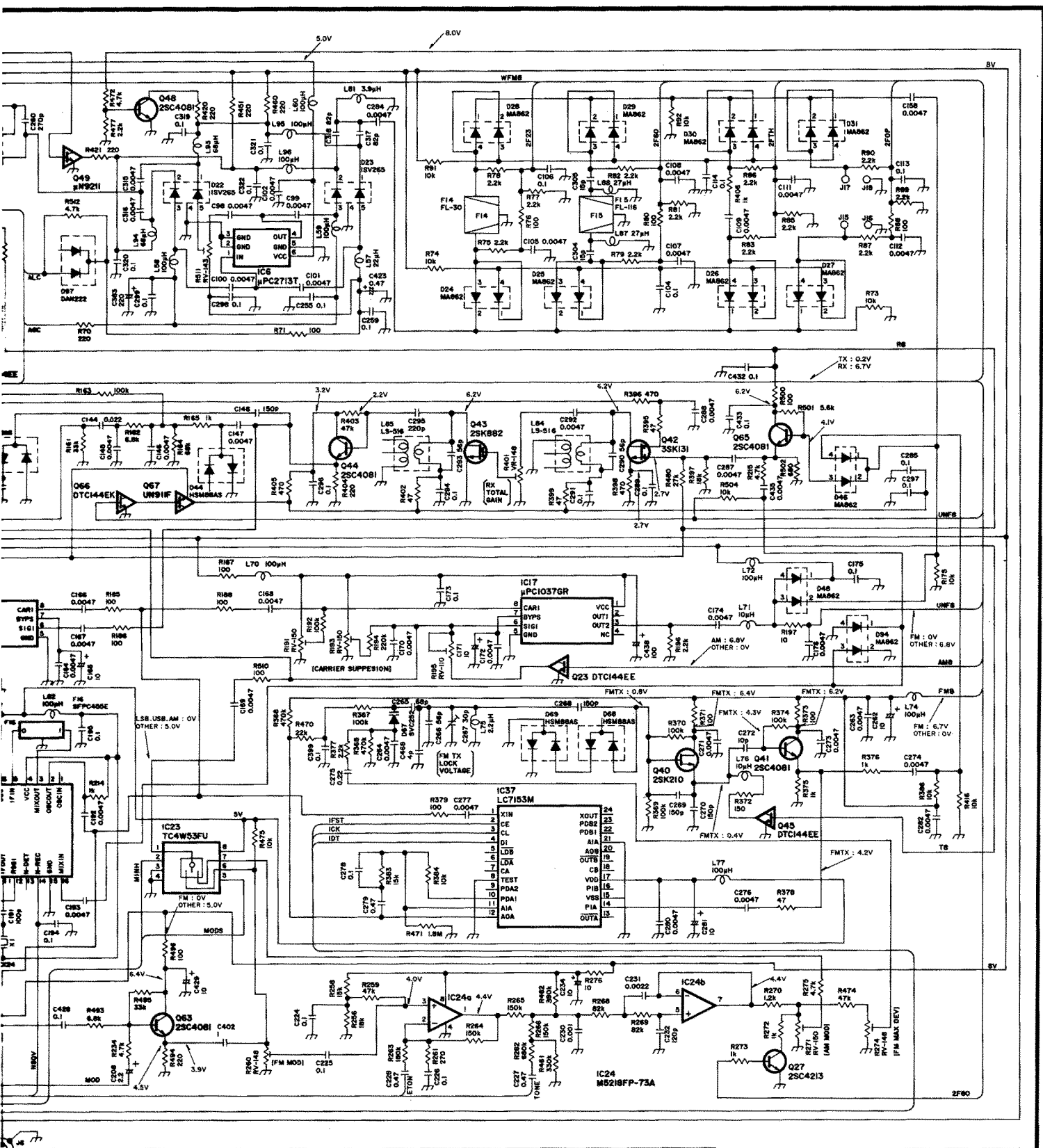
0.3V

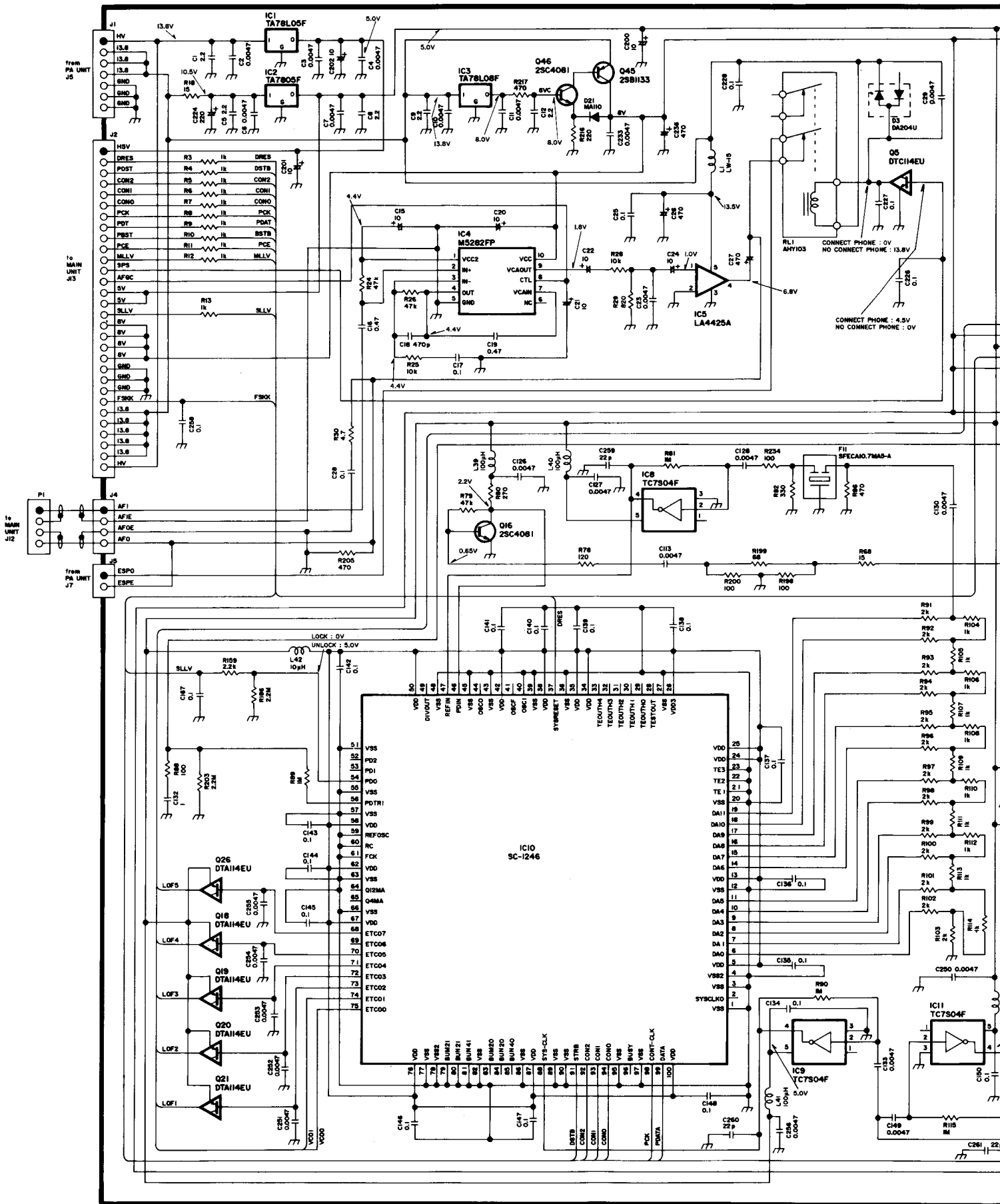
0.3V

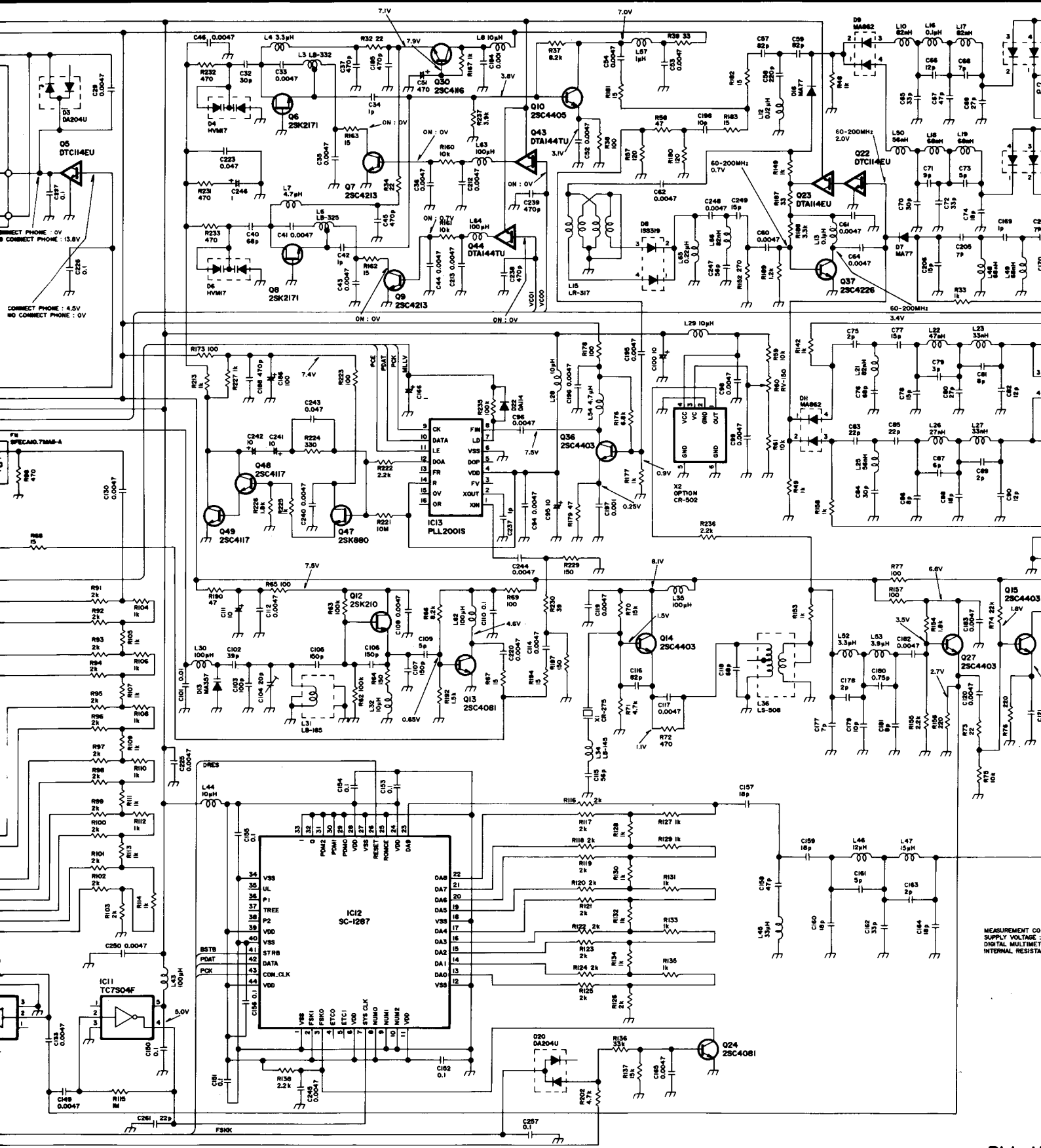
0.3V

0.3V

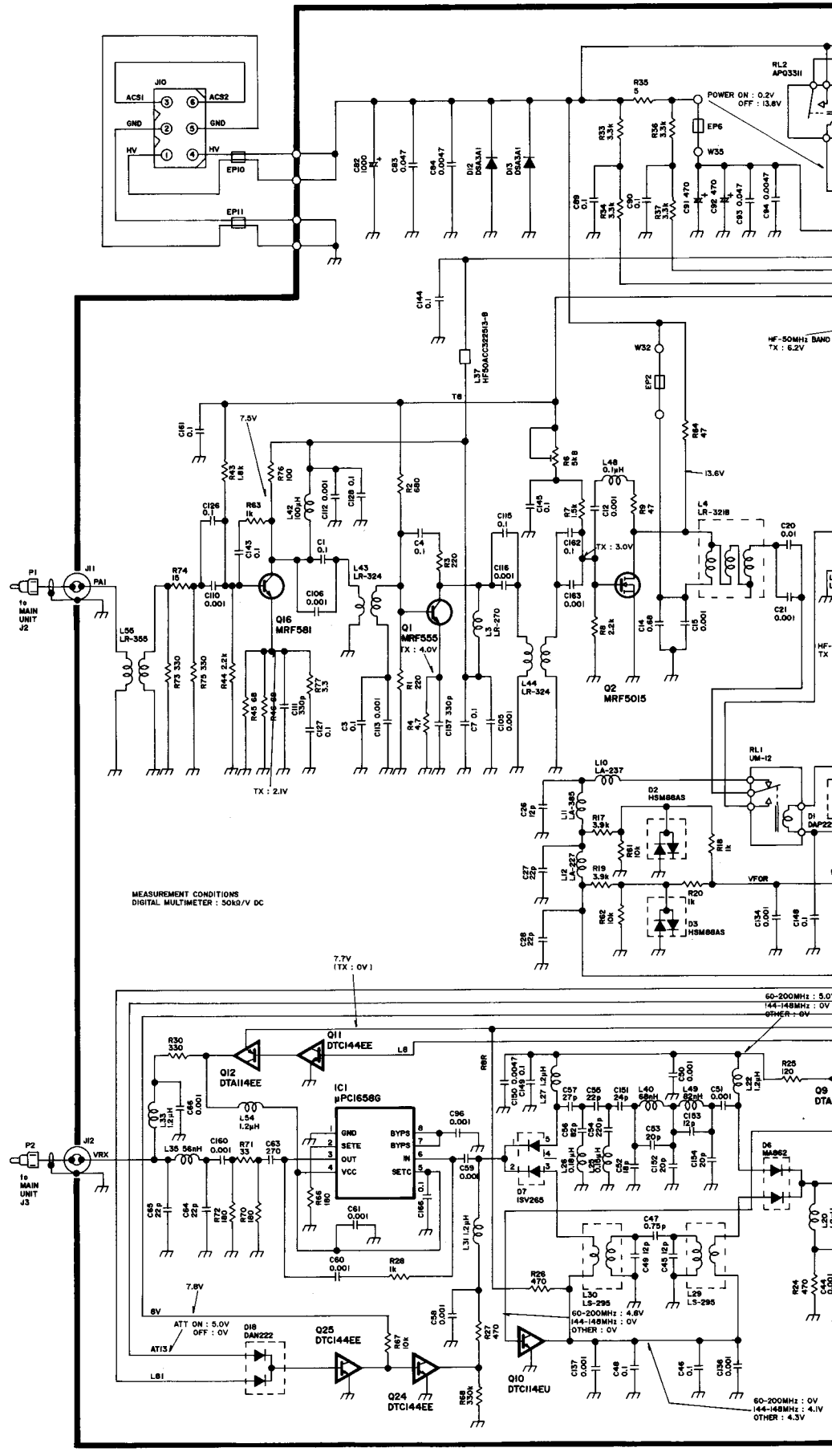
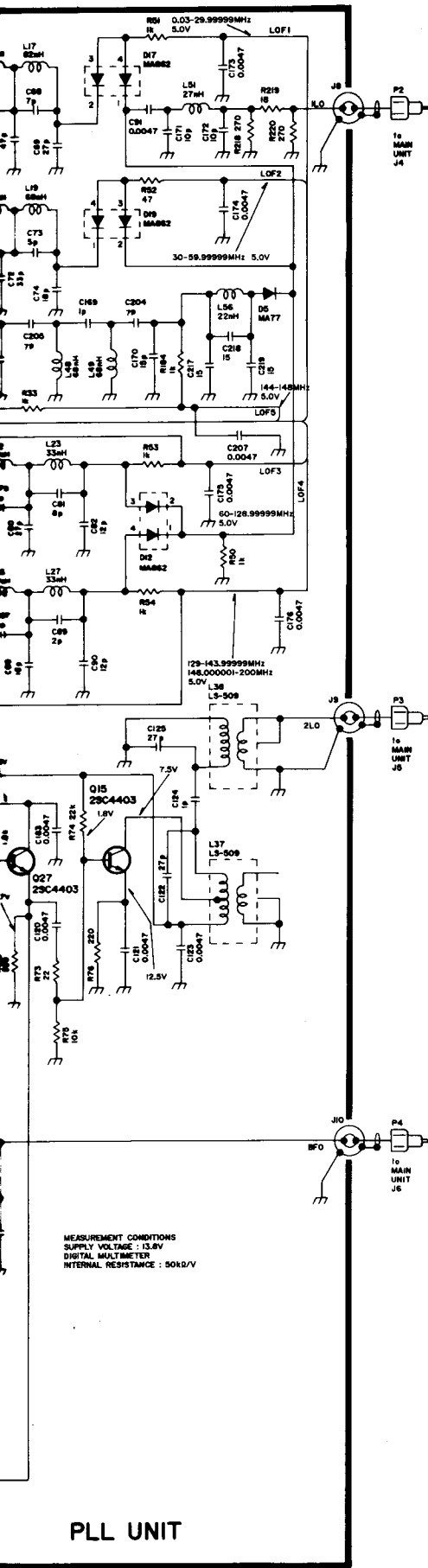




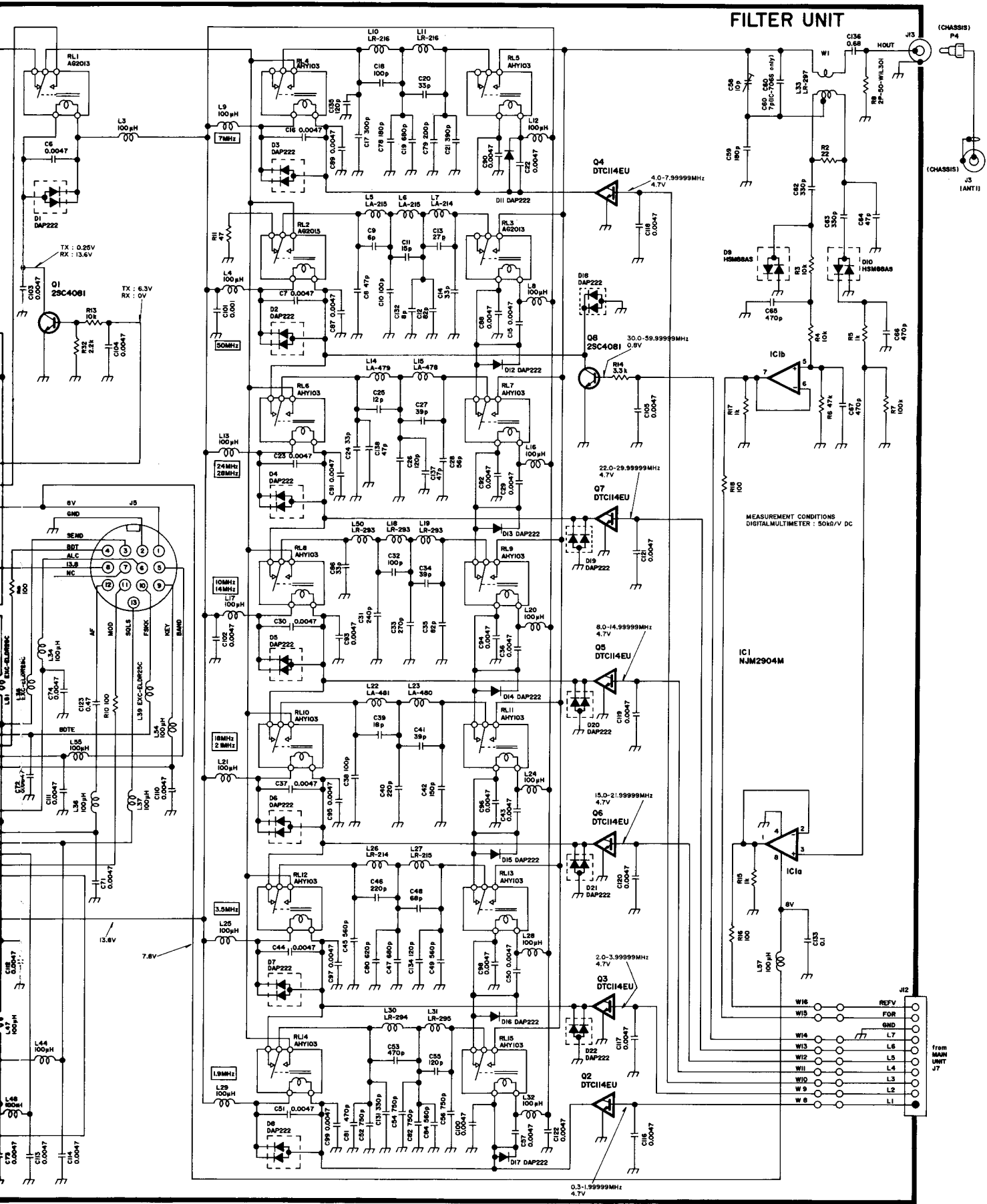




PLL U







**FILTER UNIT**

MEASUREMENT CONDITIONS  
DIGITAL MULTIMETER : 50kΩ/V DC

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