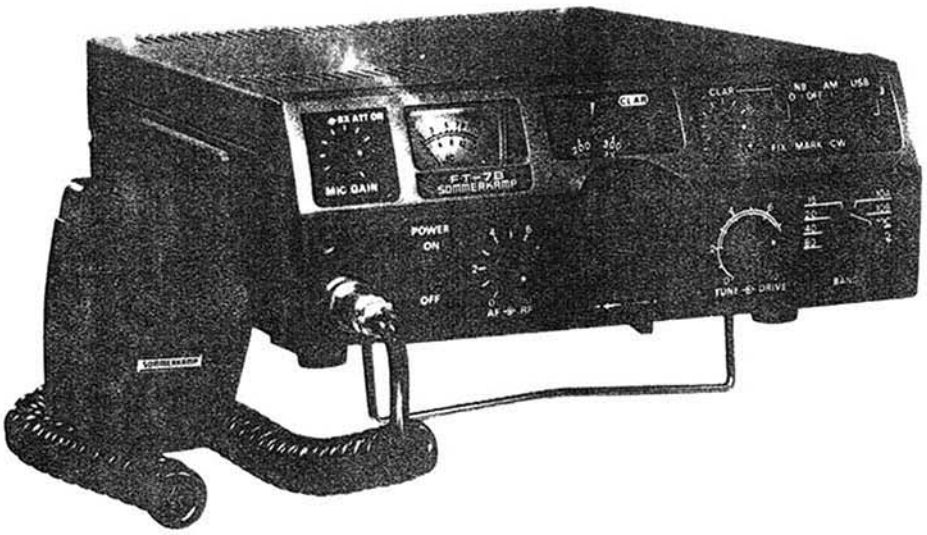
HF MOBILE TRANSCEIVER
FT-7B



GENERAL

The all-solid-state FT-7B mobile transceiver provides high performance on the 80 through 10 meter bands. The operator may select upper or lower sideband (USB, LSB), AM, or CW operation, and the compact package contains many features engineered for maximum convenience during mobile operation.

The TUNE control provides single-knob peaking of all transceiver circuits, thus eliminating inconvenient plate and load controls. Transmitter final amplifier input power is adjustable, up to a level of 100 watts. A high performance noise blanker minimizes impulse-type noise such as that found in mobile applications. Also built-in are a 100 kHz crystal calibrator and receiver offset tuning (clarifier). For CW operation, an audio peak filter plus semi-break-in with sidetone are provided.

The receiver front end utilizes MOS FET and Schottky diode circuitry for maximum sensitivity and immunity from overload.

The FT-7B operates directly from a 13.5 VDC power source. For base station operation, the FP-12 power supply may be used to provide the necessary voltage.

In order to derive the maximum satisfaction from your new FT-7B, we recommend that you read this instruction manual carefully, so as to understand fully the functions of the controls and switches.

The YC-7B outboard digital frequency display unit is an available option for your FT-7B, providing versatile digital readout of your operating frequency. The YC-7B may be situated on the dash board, steering column, or other convenient location, for maximum visibility and driving safety.

CW OPERATION

(1) Plug the key line into the rear apron KEY jack. CAUTION: When using an electronic keyer, the operator should be sure that the keyer output transistor or relay is rated for the current and voltage present at the key jack. The key line is +8V at 300 μA key down current.

(2) Set the MODE switch to CW.

(3) Automatic semi-break-in CW is utilized in the FT-7B. When the key is closed, the transmitter is automatically activated, and when the key is opened, the transceiver returns to the receive condition after a slight delay. The length of the delay may be varied by adjustment of VR_{702}.

(4) In the key down condition, at maximum drive, the IC meter should read approximately "12," and it should read "0" while in the transmit mode, key up.

(5) To ensure accurate keying, a sidetone monitor is built in. When the transmitter is keyed, the sidetone will be heard on the internal speaker or headphones. The sidetone volume level may be adjusted by varying VR_{701}.

(6) When the keying speed is very slow, the keying relay in the transceiver may return to receive in the middle of a letter or word. If this is the case, it may be to the advantage of the operator to use the PTT switch to activate the transmitter.

(7) An effective audio peak filter is included, for a significant reduction in signal-to-noise ratio. Adjustment of the audio filter center frequency is made by varying VR_{2601}.

AM OPERATION

(1) Set the MODE switch to AM, and press the microphone PTT switch.

(2) Without modulating the transmitter, advance the DRIVE control until the meter reads "S3" on the S-meter scale.

(3) Speak into the microphone in a normal voice, and advance the MIC GAIN control until a slight downward deflection of the meter is observed on voice peaks.

(4) Do not readjust the DRIVE control to compensate for the downward deflection of the meter on voice peaks, or the ratings of the final transistors will be exceeded. Adjustment of the DRIVE level described in step (2) must be made with no speech input to the microphone.

IMPORTANT NOTE:

When using this transceiver on RTTY, please do not exceed the ratings described for AM operation. Failure to observe this precaution will result in destruction of the final transistors.

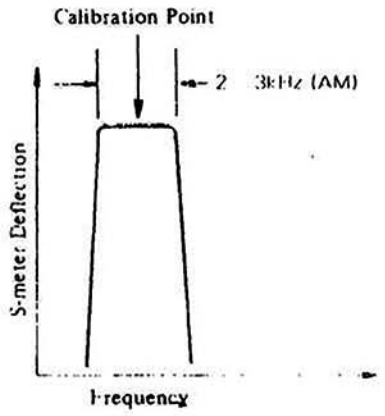
DIAL CALIBRATION

(1) Set the NB/MARK switch to MARK and VFO/FIX switch to VFO position.

(2) Set the main tuning dial to the 100 kHz position nearest the desired operating frequency.

(3) Adjust the lever underneath the main tuning knob for zero beat against the marker signal. On AM, adjust the lever for a maximum S-meter reading.

(4) On CW, adjust the dial for a frequency 800 Hz lower than the zero beat frequency. For example, set the analog display for 6999.2 kHz, then adjust for a zero beat on the marker signal, using the calibration lever. The CW frequency is shifted 800 Hz lower in frequency on transmit, and the frequency displayed will be the transmit carrier frequency.



SPECIFICATIONS

GENERAL

Frequency coverage:

80m	3.5 – 4.0 MHz
40m	7.0 – 7.5 MHz
20m	14.0 – 14.5 MHz
15m	21.0 – 21.5 MHz
10mA	28.0 – 28.5 MHz **
10mB	28.5 – 29.0 MHz
10mC	29.0 – 29.5 MHz **
10mD	29.5 – 29.9 MHz **

** 28.5 – 29.0 MHz crystal installed, other crystals available as options.

Power requirements:
13.5 VDC ±10% @ 10A transmit, 0.6A receive.

Dimensions:
230(W) x 80(H) x 320(D) mm including heat sink.

Weight:
5.5 kg.

TRANSMITTER

Emission:
SSB, CW, AM

Input power:
SSB, CW 100 watts DC, AM 25 watts DC.

Carrier suppression:
Better than 50 dB below rated output.

Unwanted sideband suppression:
Better than 50 dB @ 1000Hz.

Spurious emission:
Better than 40 dB.

Distortion products:
Better than –31 dB.

Transmitter frequency response:
350 – 2700 Hz (–6 dB)

Frequency stability:
Less than 300 Hz drift from a cold start, less than 100 Hz drift over a 30 minute period after warmup.

Antenna output impedance:
50 ohms nominal.

Microphone input impedance:
500 ohms nominal.

RECEIVER

Sensitivity:
0.25 μV for S/N 10 dB.

Image rejection:
Better than 60 dB 80 – 15 meters.
Better than 50 dB 10 meters.

IF rejection:
Better than 50 dB.

Selectivity:
2.4 kHz (–6 dB), 4.0 kHz (–60 dB)
CW audio peak filter: 80 Hz (–6 dB), adjustable.

Audio output:
3 watts @ 10% THD

Audio output impedance:
4 ohms

SEMICONDUCTORS

Silicon transistors:

2SA628A	1
2SC372Y	16
2SC373	1
2SC535A	1
2SC735Y	1
2SC784R	1
2SC1000GR	2
2SC2099	2
2SC2395	1
2SC1589	1
2N4427	2
MPSA13	1
2SD235Y	1
2SD636Q	1

FET:

2SK19GR	9
2SK19Y	4
3SK40L1	1
3SK51-03	8
JF1033B	1
3SK59GR	1

IC:

F4024PC	1
MC1496G	1
MC1741	1
MC14011BCP	1
MC14016B	1
TA7063P	1
TA7205AP	1
μPC14308	1

Schottky Diodes:

1SS16	4

Germanium diodes:

1N60	5
1N270	4
1S1007	24

Silicon Diodes:

1S1555	43
10D1	4
10D10	3

Varactor diode:

1S2236	1

Zener diodes:

WZ090	1
YZ033	1

Light emitting diode:

GD-4-203SRD	1

ACCESSORIES

The following accessories are packaged along with your transceiver.

(1) POWER CORD

The red and black power cord is three meters long, and it comes equipped with a 6-prong connector at one end. In the cord there is a holder for the 15 amp fuse for the DC line. The red wire should be connected to the positive side of the vehicle battery, and the black lead is connected to the negative side of the battery. DO NOT CONNECT THE POWER CABLE TO AN AC POWER SOURCE, OR PERMANENT DAMAGE WILL RESULT. WARRANTY DOES NOT COVER DAMAGE CAUSED BY DIRECT APPLICATION OF AC TO THE TRANSCEIVER.

(2) MICROPHONE

The microphone connections are as follows: pin 1 is the COMMON connection; pin 2 is the MIC lead; pin 3 is the PTT (push to talk) connection.

(3) COAXIAL CONNECTOR

Standard M-type ("UHF") coax connector.

(4) MINIATURE PHONE PLUGS

Two miniature phone plugs are included for installation on (1) the headphone cable, and (2) the key lead.

(5) PLUG ADAPTER

When the key lead or headphones already have a ¼" phone plug installed, this adapter allows the lead to be used without modification to a miniature plug.

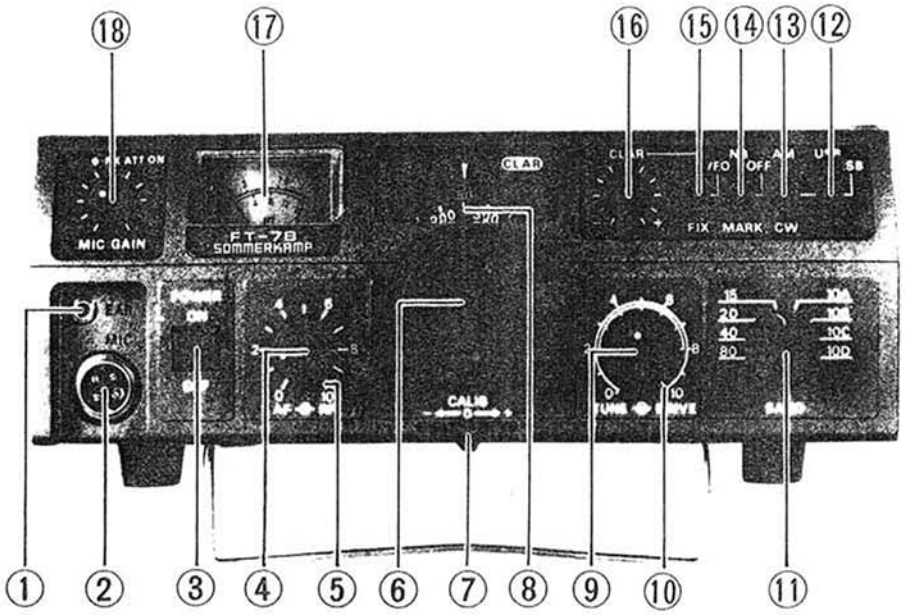
(6) MOBILE MOUNTING BRACKET

Universal bracket for quick mobile installation.

(7) EXTRA FUSE

An extra 15 amp fuse for the DC lead is included in the event that the original fuse blows. When replacing fuses, be absolutely certain to use a fuse of the proper rating. OUR WARRANTY DOES NOT COVER DAMAGE CAUSED BY IMPROPER FUSE REPLACEMENT.

FRONT PANEL CONTROLS



(1) EAR

This jack accommodates a 4 – 8 ohm headphone through a miniature phone jack. When the headphone plug is inserted into this jack, the internal and external speakers are disconnected.

(2) MIC

A four-pin socket accommodates the mic plug for microphone and PTT (push-to-talk) input. Microphone impedance is 500 ohms (low impedance).

(3) POWER

This is the main ON/OFF switch for the transceiver.

(4) AF GAIN

The AF GAIN control varies the audio output level at the speaker and earphone jacks. Clockwise rotation increases the gain level.

(5) RF GAIN

The RF GAIN control varies the gain of the receiver IF and RF stages. Clockwise rotation increases the gain level.

(6) TUNING KNOB

This knob controls the VFO frequency. One revolution covers approximately 16 kHz of bandspread.

(7) CALIB

When the MARK switch is activated, the 100 kHz calibrator becomes operational, and the CALIB control allows zeroing of the calibrator signal with the tuning dial calibration mark.

(8) DIAL

The main tuning dial has numerical calibrations every 10 kHz, and marks every 1 kHz. The subdial is numerically calibrated every 100 kHz, with an additional mark every 50 kHz.

(9) TUNE

This control peaks all transceiver signal circuits for the frequency being used.

(10) DRIVE

This control is used to vary the power output from about 5 watts to maximum.

(11) BAND

The BAND switch selects the frequency band desired. Coverage of 80 through 10 meters is provided.

(12) SIDEBAND SELECTOR

When the MODE switch is in the SSB position, this switch selects between USB and LSB.

(13) MODE

This switch selects the desired mode: SSB, CW, or AM.

(14) NB/MARK

In the NB position, this switch activates the noise blanker. In the MARK position, the 100 kHz crystal calibrator is activated.

(15) CLAR/VFO/FIX

This switch determines the means of frequency control. In the VFO position, the main tuning dial controls the frequency. In the CLAR position, the main dial controls the operating frequency, but the clarifier will allow ±2 kHz offset of the receive frequency. In the FIX position, an optional crystal may be used for control of the transceive frequency.

(16) CLARIFIER

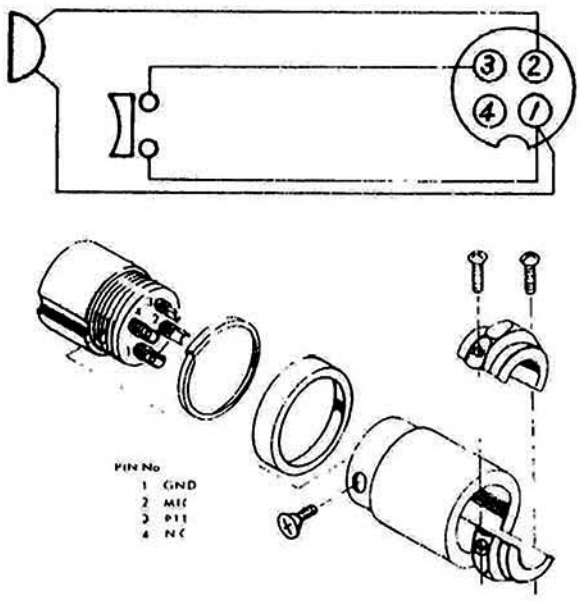
When switch (15) is placed in the CLAR position, this knob allows ±2 kHz offset of the receive frequency.

(17) METER

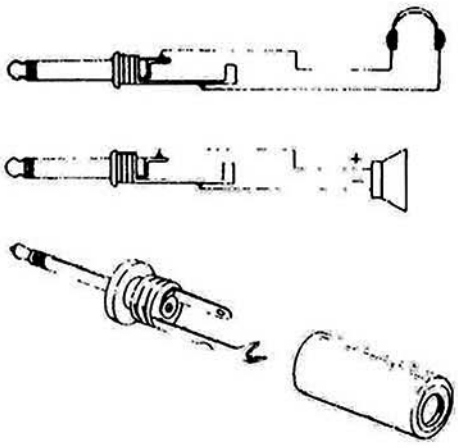
On receive, the meter functions as an S-meter. On transmit, the meter reads collector current for the final amplifier transistors on a scale of 0 - 16 amps.

(18) MIC GAIN/ATT

This is a push-push type switch. When the switch is pushed, a 20 dB attenuator will be placed in the receive line. Whether pushed or not, this switch controls the gain of the microphone amplifier stage. An LED indicates when the attenuator is in use.

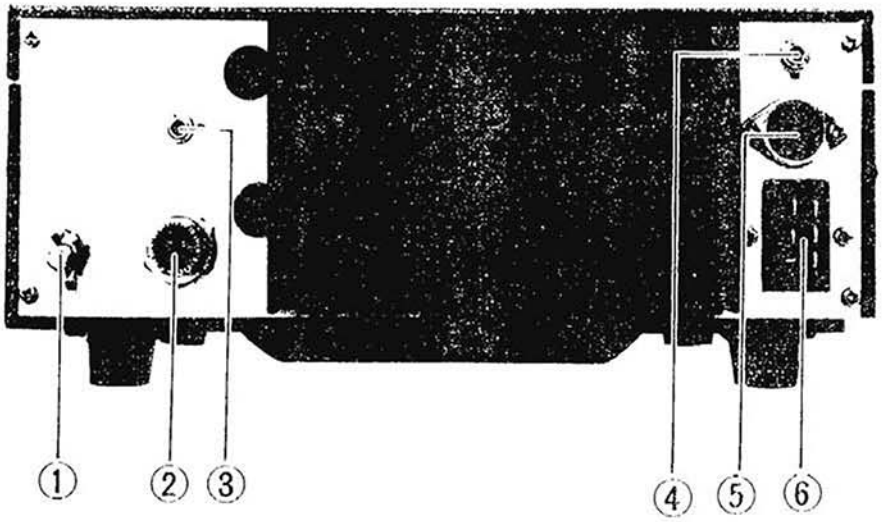


Mic plug connections



Headphone and external speaker connections

REAR APRON CONNECTIONS



(1) GND

Ground connection to car body or earth ground.

(2) ANT

Standard M-type ("UHF") female coax connector.

(3) KEY

For CW operation, the key plug is inserted here.

(4) EXT SP

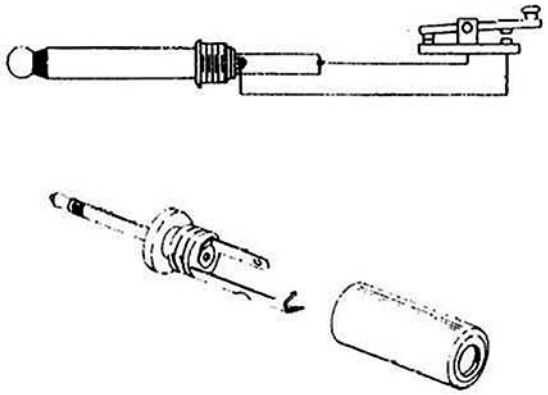
An external 4 ohm speaker may be connected to this jack. Insertion of a plug here automatically cuts off the internal speaker.

(5) EXT DISPLAY

For connection of the optional YC-7B outboard digital display unit.

(6) POWER

The power cord is connected at this point.



Key plug connections

INSTALLATION

MOBILE INSTALLATION

For mobile service, the FT-7B should be installed where the controls, indicators, and microphone are easily visible and accessible for operation. The unit may be installed in any position without loss of performance. Suitable locations are under the dash, atop the transmission tunnel, etc. A universal mounting bracket is supplied with the transceiver for this purpose. Install the FT-7B as follows:

1. Use the universal mounting bracket as a template to locate the mounting holes. Use a 3/16" diameter drill for these holes, and allow clearance for the transceiver, its controls, and all connecting cables. Secure the mounting bracket with the screws, washers, and nuts supplied, as shown in the drawing.

2. Install the transceiver on the mounting bracket, using four screws (two on each side). The angle of the transceiver with respect to the bracket may be varied by changing mounting holes.

3. The microphone hanger may be affixed to any convenient place for access to the microphone.

4. The supplied power cable must not be connected to the vehicle cigarette lighter receptacle, but should be routed directly to the vehicle battery. The RED power lead should be connected to the POSITIVE battery terminal, and the BLACK lead should be connected to the NEGATIVE terminal. If it is necessary to extend the power lead over a considerable distance, use #16 AWG insulated copper wire, and do not extend the leads further than necessary (to avoid excessive voltage drop).

CAUTION

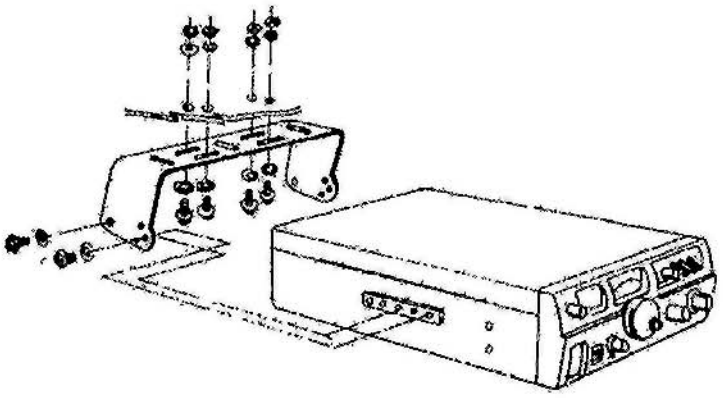
BEFORE CONNECTING THE POWER CABLE TO THE TRANSCEIVER, CHECK THE BATTERY VOLTAGE WITH THE ENGINE RUNNING (BATTERY CHARGING). IF THE VOLTAGE EXCEEDS 15 VOLTS DC, THE REGULATOR SHOULD BE ADJUSTED SO THAT THE HIGHEST CHARGING RATE DOES NOT EXCEED 15 VOLTS. BE CERTAIN TO OBSERVE PROPER POLARITY WHEN MAKING BATTERY CONNECTIONS. REVERSED POLARITY WILL NOT DAMAGE YOUR FT-7B, BECAUSE OF THE PROTECTIVE CIRCUITRY INCORPORATED IN DESIGN, BUT THE TRANSCEIVER WILL NOT OPERATE UNDER THIS CONDITION.

UNDER NO CIRCUMSTANCES SHOULD AC POWER EVER BE CONNECTED TO THE POWER CABLE.

5. Connect the power cable to the POWER receptacle on the rear panel.

6. Connect a 50 ohm feedline to the rear panel ANT receptacle.

7. An external 4 ohm speaker may be connected to the SP receptacle on the rear panel. The internal speaker will be disconnected when a plug is inserted into this jack.



BASE STATION INSTALLATION

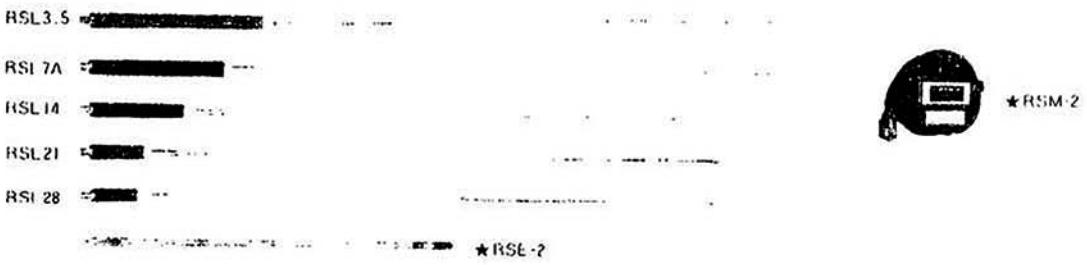
As a base station, the FT-7B requires a power supply capable of providing 13.8 VDC at 10 amperes. The FP-12, FP-301, and FP-301D AC power supplies will provide the necessary power.

ANTENNA CONSIDERATIONS

For full transmitter output power, the antenna system must present a resistive impedance of very close to 50 ohms. The protective circuitry for the final transistors will automatically reduce the transistor collector current and, hence, the power output, if a high SWR condition exists. If the SWR cannot be held below 1.5 : 1 with respect to 50 ohms, an antenna coupler such as the FC-301 or the FC-901 should be used to secure a 50 ohm load impedance.

When the SWR is 1 : 1, 100% output power is produced. With a 1.5 : 1 SWR, 80% output power is produced. At 2 : 1 SWR, the power is reduced to 50%, and at 3 : 1 SWR, the output is 20% of the full rated power.

The Yaesu RS-series of mobile antennas is designed for use with the FT-7B. See your Yaesu dealer for details.



OPERATION

Before attempting operation of your new FT-7B, please read the following sections dealing with operation carefully. While operation of the FT-7B is extremely straightforward, the operator may be unfamiliar with the functions of some of the controls, and improper adjustment thereof may produce reduced transceiver performance.

ADVANCE PREPARATION

(1) Confirm that power connections have been made correctly. The red power lead should be connected to the positive battery terminal, and the black lead should be connected to the negative terminal.

(2) The supplied microphone, or any quality low-impedance (500 - 600 ohm) microphone, may be connected to the microphone jack on the front panel.

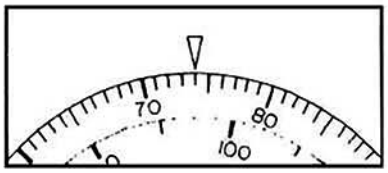
(3) For CW operation, a key may be inserted via the rear panel KEY jack.

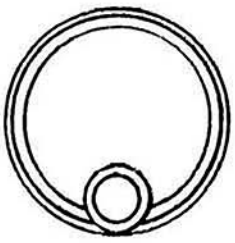
(4) When initial tune-up is attempted, it is very desirable to use a dummy load of 50 ohms impedance, so as to prevent any confusion caused by SWR on the antenna feedline (and possible power output reduction). When an antenna is connected to the rear panel receptacle, it should be pre-tuned to 50 ohms with a separate transmitter, to avoid similarly confusing results.

MAIN TUNING DIAL FREQUENCY READOUT

(1) Coarse frequency determination is made by referring to the lower of the two analog dials. This dial has numerical calibrations every 100 kHz, and a calibration mark every 50 kHz. The upper dial, used for precise frequency determination, has numerical calibrations every 10 kHz, with resolution marks every kHz.

(2) Frequency readout on all bands is determined by adding the frequency on the main dial to the frequency of the lower band edge. For 40m, 20m, 15m, and 10m segments A and C, the band edge starts at 000 (for example, 7000 kHz on 40m). On 80m, as well as 10m segments B and D, the lower band edge begins with 500 (for example, 28500 kHz on 10m B). Thus, a reading of 074 on the main tuning dial will represent 3574 kHz, 7074 kHz, 14074 kHz, 21074 kHz, 28074 kHz, 28574 kHz, 29074 kHz, or 29574 kHz, depending on the position of the BAND switch.





OPERATING INSTRUCTIONS

With the POWER switch in the OFF position, connect the power cord to the 6-pin power receptacle on the back panel of the transceiver.

(1) Preset the controls as follows:

MODE:	Desired mode
NB/MARK:	OFF
VFO/FIX/CLAR:	VFO
DIAL:	Desired frequency
TUNE:	12 o'clock position
BAND:	Desired band
AF GAIN:	Fully counterclockwise
RF GAIN:	Fully clockwise
ATT:	OFF

(2) Flip the FT-7B POWER switch to ON. If using the AC power supply, flip the FP-12 power switch to ON. The FT-7B dial light should be illuminated with the power on.

(3) Adjust the AF GAIN control for a comfortable listening level.

(4) Vary the TUNE control for maximum receiver background noise.

(5) Rotate the main tuning dial to the desired frequency.

(6) The VFO/FIX CLAR switch may be placed in the CLAR position to allow offset of ±2 kHz for the receive frequency, without changing the transmit frequency.

(7) The NB/MARK control may be placed in the NB position to minimize impulse-type noise, such as that encountered in mobile situations.

(8) The ATT switch may be depressed to attenuate the incoming signal by 20 dB. Another press of the ATT switch will remove the attenuator from the line.

TUNE-UP

(1) Activate the MARK switch, and rotate the main dial to the 100 kHz point nearest the desired operating frequency.

(2) Watch the S-meter while tuned to the marker signal. Carefully adjust the TUNE control for a maximum S-meter indication. The transceiver circuits are now peaked for the frequency in use.

(3) Set the main dial for precise alignment with the 100 kHz calibration mark. Adjust the lever beneath the main tuning dial for a zero beat of the marker signal.

(4) An alternative method of peaking the transceiver is as follows. Rotate the DRIVE control fully counter-clockwise, and place the MODE switch in the AM position. Press the microphone PTT switch, and advance the DRIVE control until a slight meter deflection is observed. Rotate the TUNE control for a maximum meter deflection. If the meter deflection exceeds 4 on the IC scale, reduce the setting of the DRIVE control.

SSB OPERATION

(1) Following the initial tune-up procedure, place the MODE switch in the SSB position, and place the SIDEBAND SELECTOR in the USB position (20, 15, and 10 meters) or the LSB position (40 and 80 meters), as appropriate for the band in use.

(2) Rotate the DRIVE control fully clockwise.

(3) Press the microphone PTT switch, and speak into the microphone in a normal voice. While speaking a long syllable, such as the number "four," advance the MIC GAIN control to the point where the meter deflection does not increase with further advancement of the control. Do not exceed this point, as excessive mic gain will only waste power in distortion products, thus reducing intelligibility.

(d) Remove the dummy load from the antenna receptacle and connect a signal generator to the antenna receptacle. While receiving, zero the signal generator output to the frequency to be adjusted (3750, 7250, etc.) and adjust the transformer cores below for maximum deflection of the S-meter:

BAND	CORE ADJUSTMENT
80	T_{1921}
40	T_{1922}
20	T_{1923}
15	T_{1924}
10	T_{1925}

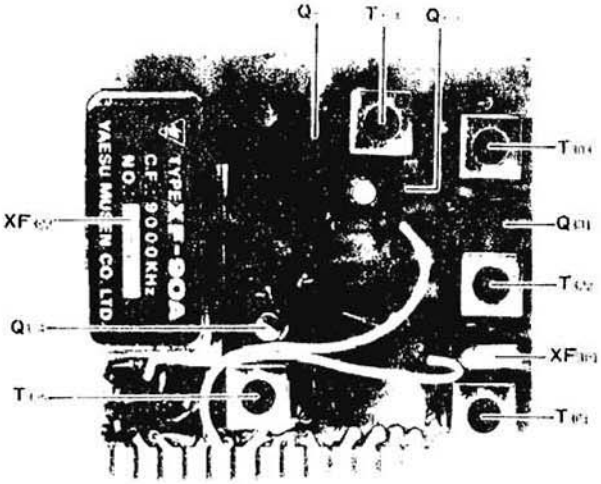
(e) Other coils:

UNIT	COIL	PROCEDURE
FILTER	T_{301} – T_{304}	Peak to 9MHz on receive
	T_{305}	Peak to 9MHz on transmit
IF	T_{401} , T_{402}	Peak to 9MHz on receive
MOD/ DEM	T_{501}	Peak to 9MHz on transmit
NB	T_{801}	Peak to 9MHz on receive, NB ON
	T_{802} , T_{803}	Peak to 455 kHz on receive, NB ON
	T_{804}	Peak to 8545 kHz on receive, NB ON

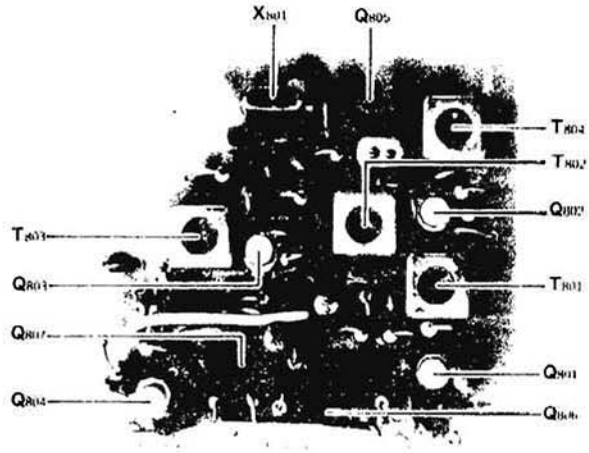
ALC UNIT (PB-1881)

(a) Connect a 50 ohm dummy load/wattmeter to the antenna receptacle. Set VR_{1501} to the fully clockwise position. Set the BAND switch to 10B, set the MODE switch to LSB, and peak the TUNE control for maximum background noise. Apply a 1 kHz 6 mV tone to the microphone jack, and advance the MIC GAIN control until a power output of 40 watts is achieved.

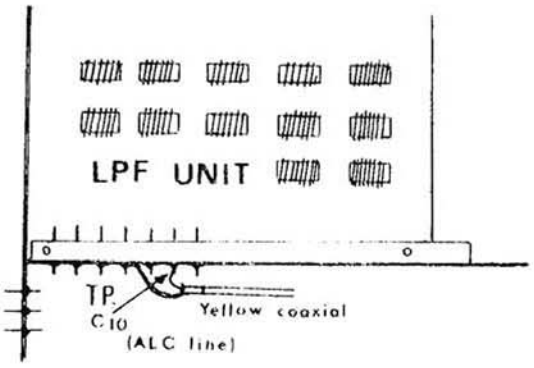
(b) Connect the VTVM, set to a DC 1.5 volt scale, to TP (thru capacitor C_{10}). Adjust TC_{1501} for a minimum VTVM indication while transmitting.

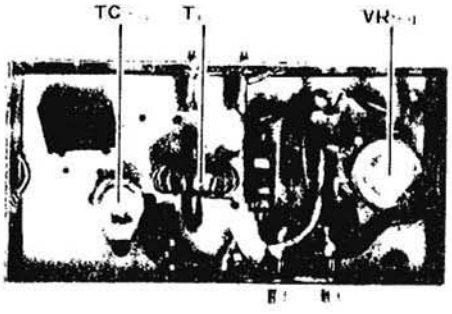


FILTER UNIT (PB-1873)



NB UNIT (PB-1627)





ALC UNIT (PB-1881)

FIX (CRYSTAL CONTROLLED) OPERATION

Fixed channel operation is possible by using crystals installed in the FIX UNIT. The VFO/FIX switch must be placed in the FIX position. There is only one crystal controlled channel available per band with the FT-7B. Crystals are optional.

Crystals used in the FT-7B must meet the specifications shown in Fig. 2, and they are available through your Yaesu dealer. Crystal frequencies must fall between 5500 – 5000 kHz. Frequency calculation is made from the formula

$$F_x = F_1 - F_0,$$

where F_x is the crystal frequency, F_0 is the desired operating frequency, and F_1 is a constant derived from Fig. 1.

For example, let us say that it is desired to operate on 7199 kHz LSB. Referring to Fig. 1, we see that for 40-meter LSB, F_1 is 12501.5. Subtract F_0 (7199 kHz) from F_1 (12501.5) to equal 5302.5 kHz (F_x). For example, let us say it is desired to operate on 21420 kHz USB. From Fig. 1, F_1 is 26498.5; subtract 21420 from 26498.5 to equal F_x of 5078.5 kHz.

Inspection of the values of F_1 in Fig. 1 will reveal that the 7199 kHz crystal for LSB will work on 14199 kHz, 21199 kHz, etc. Of course, LSB is not normally used on these bands. If the operator switches to USB, the operating frequency (in this case 7199, 14199, etc.) will be moved 3 kHz down to 7196, 14196, etc. If the move is made from LSB to CW, the frequency moves down 800 Hz (to 7198.2, 14198.2, etc.) except on 80 meters, where the shift is 1.2 kHz down.

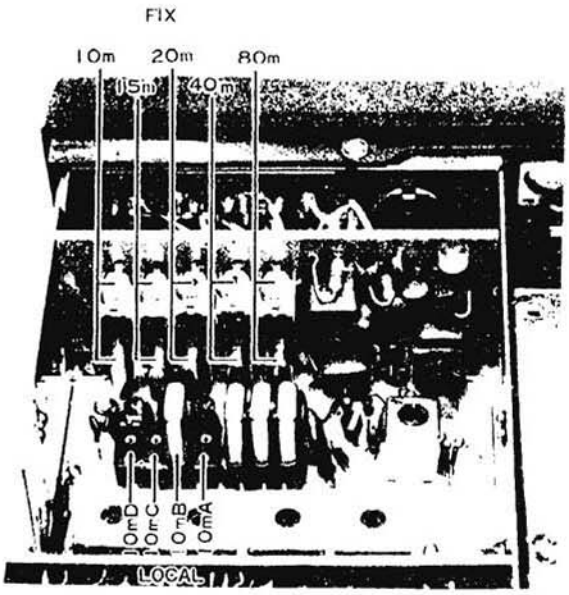
MODE / BAND	USB	LSB	CW
80m	8998.5	9001.5	8999.3
40m	12498.5	12501.5	12500.7
20m	19498.5	19501.5	19500.7
15m	26498.5	26501.5	26500.7
10mA	33498.5	33501.5	33500.7
10mB	33998.5	34001.5	34000.7
10mC	34498.5	34501.5	34500.7
10mD	34998.5	35001.5	35000.7

F_1

Figure 1 (kHz)

Type	HC-25/U
Load Capacitance	30pF
Series Resistance	25 Ohms or less
Static Capacitance	7pF or less
Drive Level	5mW

Figure 2



FIX and LOCAL CRYSTAL INSTALL

CIRCUIT DESCRIPTION

The FT-7B utilizes plug-in circuit modules, providing efficient use of space, as well as ease of servicing. The transceiver is all solid state, and the receiver and transmitter operate in a single-conversion configuration, with a 9 MHz intermediate frequency. A premix heterodyne technique is used, providing spurious-free operation on both transmit and receive.

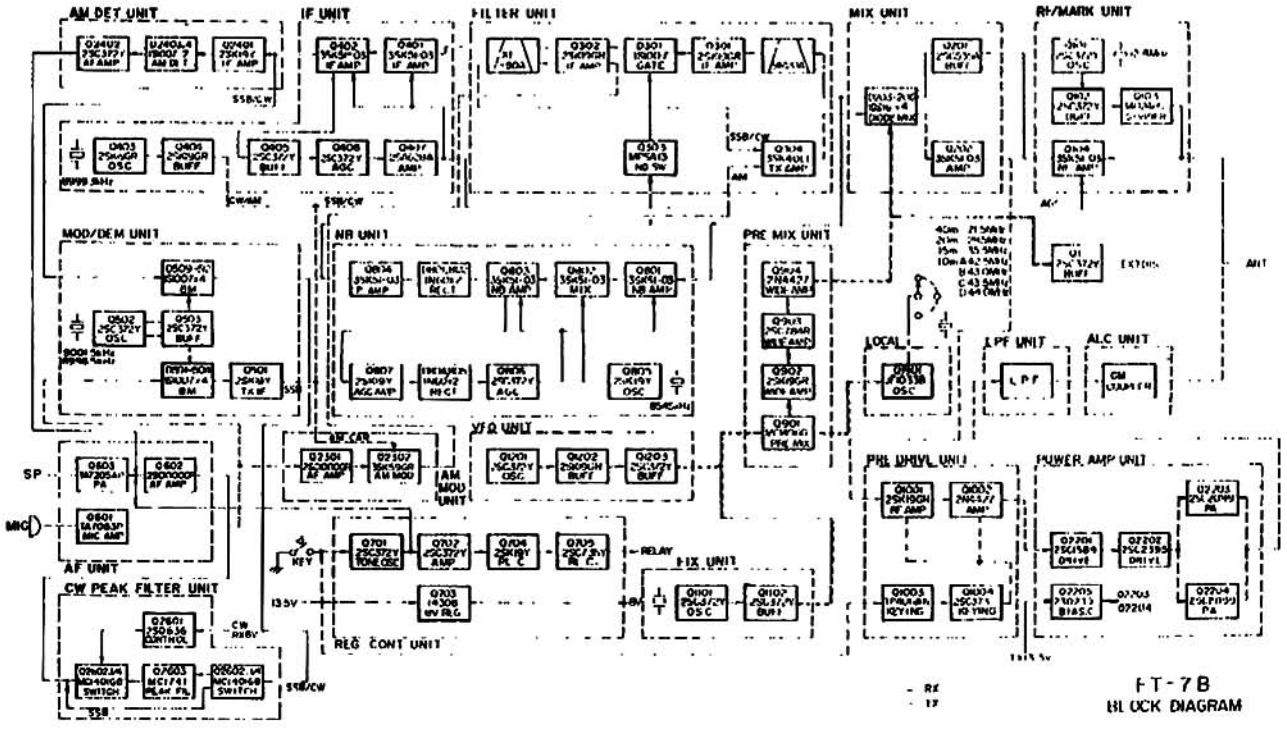
RECEIVER

The signal from the antenna is fed through a low-pass filter consisting of L_{2701}, C_{2701}, and C_{2702}, is switched through RL_1, and is fed to the RF ATT UNIT (PB-1883). Here, 20 dB of attenuation may be placed in the antenna line by activating the front panel attenuator switch, which places R_{2101} – R_{2103} in the incoming signal path. The signal then passes through a tuning circuit consisting of T_{1921} – T_{1925} and VC_{1901}, and is delivered to pin 9 of the RF/MARK UNIT (PB-1884).

The signal is applied to gate 1 of the RF amplifier, Q_{104} (3SK51-03), a dual-gate MOS FET. AGC (Automatic Gain Control) voltage is applied to gate 2 of Q_{104} to control the gain of this stage, thus preventing overload in succeeding stages. The amplified signal is then fed through the passband tuning circuit to the MIX UNIT (PB-1631). Buffer amplifier Q_{201} (**2SC535A**) is used to accomplish impedance matching between the RF amplifier and the diode mixer. The incoming signal is mixed by the diode mixer, consisting of D_{203} – D_{206} (**1SS16**), with the signal from the premix circuit. Schottky barrier diodes are used to secure high dynamic range with low noise characteristics.

The mixer produces a 9 MHz IF at the output of T_{201}. The IF signal is fed through a low pass filter consisting of L_{201}, C_{201}, and C_{202}, passed through diode switch D_{201}, and delivered to the FILTER UNIT (PB-1873). The IF signal is passed through a monolithic filter, XF_{301}, and is amplified by IF amplifiers Q_{301} and Q_{302} (**2SK19GR**). Noise blanker diode D_{301} (**1S1007**) is controlled by Q_{303} (**MPSA13**) to eliminate noise pulses.

The output from Q_{302} passes through a 6-pole crystal filter and diode switch D_{303} (**1N60**), and is fed to the IF UNIT (PB-1625). The IF signal is further amplified by Q_{401} and Q_{402} (both 3SK51-03). On SSB and CW, the amplified signal is fed to the ring demodulator, D_{509} – D_{512} (**1S1007**); also fed to the ring demodulator is the carrier signal from buffer amplifier Q_{503} (**2SC372Y**).



An AM signal is amplified by Q_{2401} (2SK19GR), detected by AM detector D_{2403} – D_{2404} (1S1007), and the resulting audio signal is amplified by Q_{2402} (2SC372Y) and delivered to the AF UNIT.

When the MODE switch is placed in the CW position, Q_{2601} (2SD636) causes Q_{2602} (MC14016B) to switch a highly selective audio peak filter into the circuit. Q_{2604} (MC1741) and associated shaping circuitry provide a bandwidth of approximately 80 Hz at 6 dB down, thus improving dramatically the system signal-to-noise ratio. VR_{2601} provides adjustment of the center frequency of the audio filter. The signal is then passed to the AF UNIT.

On SSB and CW, the audio signal from the ring demodulator or audio filter, respectively, is amplified by Q_{602} (2SC1000GR) and Q_{603} (TA7205AP), to deliver 3 watts of audio output to the speaker. On AM, the output from the AM DET UNIT is fed directly to Q_{603} for amplification.

A portion of the 9 MHz IF signal is fed to pin 2 of the NB UNIT. When the NB/MARK switch is placed in the NB (noise blanker) position, the signal is amplified by Q_{801} (3SK51-03) and fed to the gate of noise blanker mixer Q_{802} (3SK51-03), where an 8545 kHz signal generated by Q_{805} (2SK19Y) is mixed with the incoming IF signal, producing a 455 kHz noise blanker IF. This IF signal is then amplified by Q_{803} (3SK51-03).

When a carrier or noise-free modulated signal is received, the 455 kHz signal is rectified by D_{801} and D_{802} (1N60), and the voltage is used to charge C_{813}. There is no discharge loop for C_{813}; therefore, a signal which exceeds the charged voltage established by the reference voltage on C_{813} will not pass through D_{801} and D_{802}. Accordingly, there will be no voltage drop across R_{819}, and Q_{804} (3SK51-03) will conduct as the gate voltage approaches zero, causing the drain to drop.

The drain of Q_{804} is connected directly to the base of noise gate controller Q_{303} (MPSA13), located on the FILTER UNIT. The voltage drop of the drain will turn off Q_{303}, causing a forward bias to D_{301}. As D_{301} conducts, the signal will pass through the circuit.

When impulse noise is received which exceeds the charged reference voltage on C_{813}, D_{801} and D_{802} will permit negative-going pulses to turn off Q_{804}. Thus, Q_{303} will conduct, and D_{301} will be biased to block the signal passage.

The signal amplified by Q_{807} (2SK19GR) is rectified by D_{804} and D_{805} (1N60). The rectified DC voltage is amplified by DC amplifier Q_{806} (2SC372Y) and fed to the gates of Q_{801} and Q_{803} to control the gain of these stages.

The crystal controlled marker generator, Q_{101} (2SC372Y), located on the RF/MARK UNIT, generates a fundamental 12.8 MHz signal. The 12.8 MHz signal is fed through buffer amplifier Q_{107} (2SC372Y) to frequency divider Q_{103} (F4024PC), which produces a 100 kHz marker signal. The 100 kHz marker signal is fed through pin 4 and pin 9 to the receiver front end.

TRANSMITTER

Speech input from the microphone jack J_7 is fed through the MIC GAIN control VR_3 to pin 2 if the AF UNIT for SSB. The speech signal is amplified by Q_{601} (TA7063P) and fed to the ring modulator, D_{501} – D_{504} (1S1007) in the MOD/DEM UNIT. The signal modulates the carrier signal delivered from Q_{503}, and the resulting 9 MHz double sideband signal is amplified by Q_{501} (2SK19Y) and fed through diode switch D_{505} (1S1555) to the FILTER UNIT.

The signal is amplified by a buffer, Q_{302} (2SK19GR), and fed to crystal filter XF_{302}, where the unwanted sideband is rejected. The 9 MHz SSB signal is then fed through diode switch D_{303} – D_{304} (1S1007) to Q_{304} (3SK40LI), and the amplified signal is fed to pin 4 of the MIX UNIT. The 9 MHz SSB signal is heterodyned to the desired RF frequency by injection of the local signal supplied from the PREMIX UNIT.

The RF output from the diode mixer is amplified by Q_{202} (3SK51-03) and fed through diode switch D_{208} (1S1555) and bandpass transformers T_{1906} – T_{1915} to the PRE DRIVE UNIT. The bandpass transformers are used on both transmit and receive to provide extremely high selectivity.

In the AM mode, the speech signal is amplified by Q_{2301} (2SC1000GR) and fed to the AM modulator, Q_{2302} (3SK59GR), where the speech signal modulates the 8999.3 MHz carrier signal generated by Q_{403} (2SK19GR) and delivered from Q_{404} (2SK19GR). The modulated signal is delivered to Q_{304}, and from there its path is identical to that of the SSB signal.

In the CW mode, the carrier signal from Q_{404} passes through XF_{302} and is fed to Q_{304}. The tone oscillator, Q_{701} (2SC373), operates when the MODE switch is in the CW position. It consists of a phase shift oscillator operating at approximately 800 Hz. The tone output is activated by the keying circuit, and is coupled to Q_{702} (2SC372Y) for semi-break-in CW operation. The relay delay hold time is adjusted by VR_{702}.

The emitter voltage of Q_{1001} and Q_{1002} is controlled by keying switch transistor Q_{1004} (2SC373). A flip-flop circuit utilizing Q_{1003} (MC14011B) is employed to secure a perfectly-shaped waveform for CW transmission, free of clicks at any keying speed.

The RF signal on all modes is amplified by Q_{1001} (2SK19GR) and Q_{1002} (2N4427), and delivered to the POWER AMP UNIT. The signal is amplified by drivers Q_{2201} (2SC1589) and Q_{2202} (2SC2395), and the resulting output drives the push-pull power amplifier, consisting of Q_{2203} and Q_{2204} (2SC2099), producing a nominal power output of 50 watts. The RF signal passes through the low-pass filter, as well as the CM coupler, and is delivered through antenna relay RL_1 to the antenna. Q_{2205} (2SD235), as well as diodes D_{2203} – D_{2204} (10D10), provide bias compensation and thermal runaway protection for the final transistors.

T_{1501} detects the forward and reflected waves of the transmit signal. The forward wave is rectified by D_{1502} (1S1555), and the reflected wave by D_{1501} (1S1007), to generate ALC voltage. The ALC threshold level of the forward wave is set by VR_{1501}.

When there is an excessive amount of reflected power, the reflected wave is rectified by D_{1501}, producing minus voltage on the ALC line. The ALC voltage reduces the gain of Q_{304} to prevent overloading or distortion.

COMMON CIRCUITS

The carrier oscillator Q_{502} (2SC372Y) is followed by buffer amplifier Q_{503} (2SC372Y). Oscillation is at either 8998.5 kHz (40 10 meters LSB, 80 meters USB) via X_{501}, or 9001.5 kHz (40 10 meters USB, 80 meters LSB) via X_{502}, depending on the mode of operation. Crystal selection is made by diode switches D_{507} and D_{508} (1S1555). The carrier is then fed through relay RL_{501} to the ring modulator/demodulator.

The LSB crystal is used for CW reception on all bands. For CW transmission, the oscillator in the IF UNIT oscillates with X_{401}.

A modified Colpitts type oscillator is used to generate a 5.0 – 5.5 MHz signal to produce a stable 500 kHz tuning range. The frequency is varied by VC_{1201}, which is geared to a precision-built dial tuning mechanism.

Varactor diode D_{1201} (1S2236) is in series with C_{1207}, and the combination is in parallel with VC_{1201}. By activating the clarifier switch, the clarifier control shifts the receiver ±3 kHz.

The VFO output signal is fed through amplifier/buffer stages Q_{1202} (2SK19GR) and Q_{1203} (2SC372Y), the low-pass filter, and diode switch D_{1202} (1S1555) to the PREMIX UNIT.

In addition to normal VFO operation, one crystal controlled channel per band may be used. Crystal oscillator Q_{1101} (2SC372Y) is followed by buffer amplifier Q_{1102} (2SC372Y), and its output is fed through the low-pass filter and diode switch D_{1901} (1S1555) to the PREMIX UNIT. Trimmer capacitors TC_{1101} – TC_{1105} are used for fine adjustment of the crystal frequency.

Crystal oscillator Q_{1901} (JF-1033) produces a heterodyne signal selected by the band switch. The signal is fed to the double balanced mixer Q_{901} (MC1496G) in the PREMIX UNIT, where the signal is mixed with the VFO signal. The output from the mixer is fed through bandpass transformers T_{1902} – T_{1905}, to the broadband amplifier Q_{902} (2SK19GR), Q_{903} (2SC784R), and Q_{904} (2N4427). The premix output signal is then applied to the diode mixer in the MIX UNIT.

A portion of the premix signal is fed through buffer Q_1 (2SC372Y) to the EXT DIS jack, for use with the optional YC-7B digital frequency display unit.

GENERAL

This transceiver has been carefully aligned and tested at the factory prior to shipment. The reliability of the solid state devices used in the FT-7B should provide years of trouble-free service if the equipment is not abused and the proper routine maintenance is carried out.

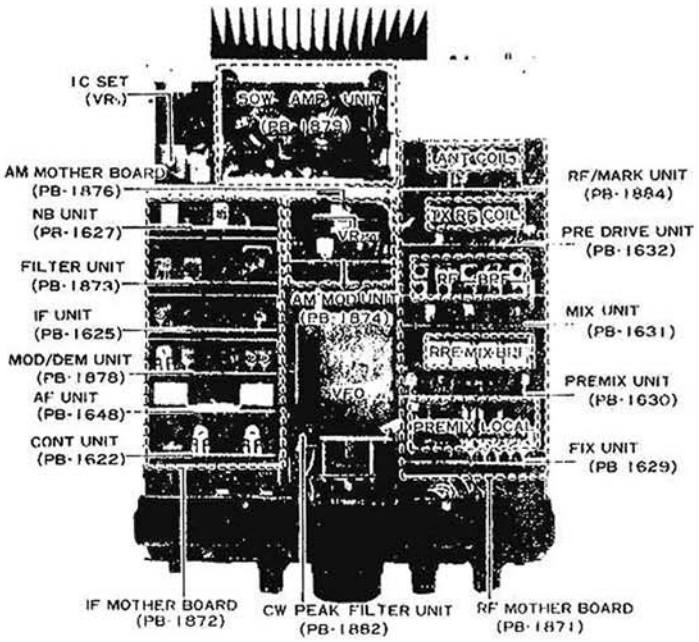
Do not attempt to align the transmitter without having a proper dummy load or antenna connected to the transceiver. We highly recommend off-the-air testing using a dummy load as a courtesy to other operators.

The following alignment procedure requires certain test equipment such as an RF signal generator, an audio oscillator, a sweep generator, an oscilloscope, and a VTVM. Without proper test equipment, do not attempt to adjust cores or potentiometers.

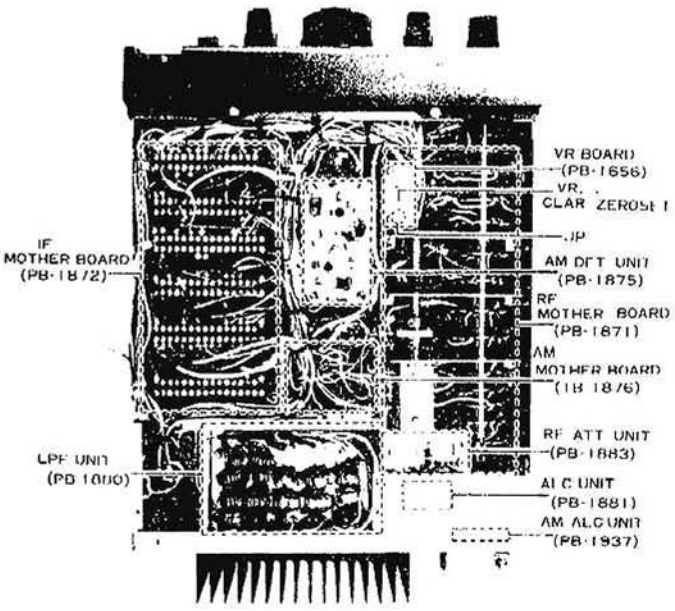
CONTROL UNIT (PB-1622)

(1) CW relay delay adjustment (VR_{702}):
   (a) Connect a dummy load or matched antenna to the ANT connector. Connect a key to the KEY jack, and place the MODE switch in the CW position.
   (b) When the key is closed and then opened again, it will be observed that there is a delay between the instant the transceiver returns to "receive." The length of the delay may be varied by adjustment of VR_{702}, in order to provide the proper delay for the keying speed used and/or the preferences of the individual operator.

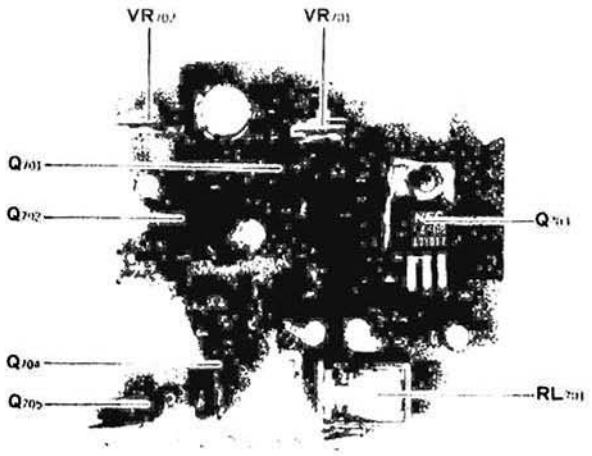
(2) Sidetone level adjustment (VR_{701}):
   (a) The level of the CW sidetone may be adjusted by varying VR_{701} while the key is closed.



TOP VIEW



BOTTOM VIEW



CONTROL UNIT (PB-1622)

MOD/DEM UNIT (PB-1878)

(1) SSB carrier point (TC_{502}, TC_{503}):

(a) Settings: BAND 20
DIAL . . . . . 14.25 MHz
MODE . . . . . CW
Peak the TUNE control to secure maximum output.

(b) Place the MODE switch in the USB position. Connect the output of an audio oscillator to the microphone input. Set the frequency to 1 kHz and transmit on USB. Adjust the MIC GAIN control for 40 watts RF output to the dummy load.

(c) Shift the audio frequency to 300 Hz without changing the audio output level or MIC GAIN control.

(d) Switch between USB and LSB while adjusting TC_{502} for USB and TC_{503} for LSB to obtain 10 watts output on each sideband.
(Note: For the 80 meter band, TC_{502} will adjust LSB and TC_{503} will adjust USB, but the alignment here is taking place on 20 meters.

(e) Return to the receive mode. Switch the MODE selector back and forth between USB and LSB. The tone quality of the background noise on the two sideband modes should sound alike.

(2) CARRIER BALANCE (TX):

(a) Settings: BAND 20
DIAL . . . . . 14.25 MHz
MODE . . . . . USB
No input to the mike jack.

(b) Connect a dummy load to the antenna receptacle and the RF probe of a VTVM to the antenna receptacle, J_1. Adjust TC_{501} and VR_{501} alternately to minimize the VTVM reading.

(c) If no VTVM is available, use a monitor receiver and adjust TC_{501} and VR_{501} for the minimum S meter reading.

(3) CARRIER BALANCE (RX):

(a) Peak the TUNE control for maximum background noise, then reduce the RF GAIN control until an S-meter reading of 5 is achieved.

(b) Adjust TC_{504} and VR_{502} for a minimum S-meter reading.

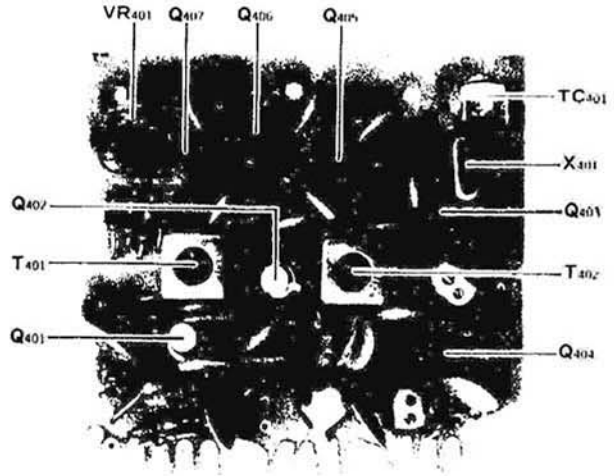
(c) Switch between USB and LSB, and confirm that the background noise does not change in pitch.

MOD/DEM UNIT (PB-1878)

IF UNIT (PB-1625)

(1) CW carrier level adjustment (TC_{401}):
   (a) Connect the RF probe of a VTVM to pin 2 of the IF UNIT, (PB-1625). With the MODE switch in the CW position and the key closed, adjust TC_{401} for a reading of 75 mV ±10 mV.

(2) S-meter calibration (VR_{401}):
   (a) Place the band switch on 20 meters, set the VFO to 250, and the MODE switch to USB. Connect a signal generator to the antenna receptacle, and set the generator frequency to the receiver frequency.
   (b) Adjust the signal generator output to 87 dB. Adjust VR_{401} for full scale S-meter deflection.



IF UNIT (PB-1625)

40m	X_{1901}	21.5MHz	HC 25/U
20m	X_{1902}	28.5MHz	HC-25/U
15m	X_{1903}	35.5MHz	HC 25/U
10mA	X_{1904}	42.5MHz	HC 25/U
10mB	X_{1905}	43.0MHz	HC-25/U
10mC	X_{1906}	43.5MHz	HC 25/U
10mD	X_{1907}	44.0MHz	HC 25/U

LOCAL UNIT

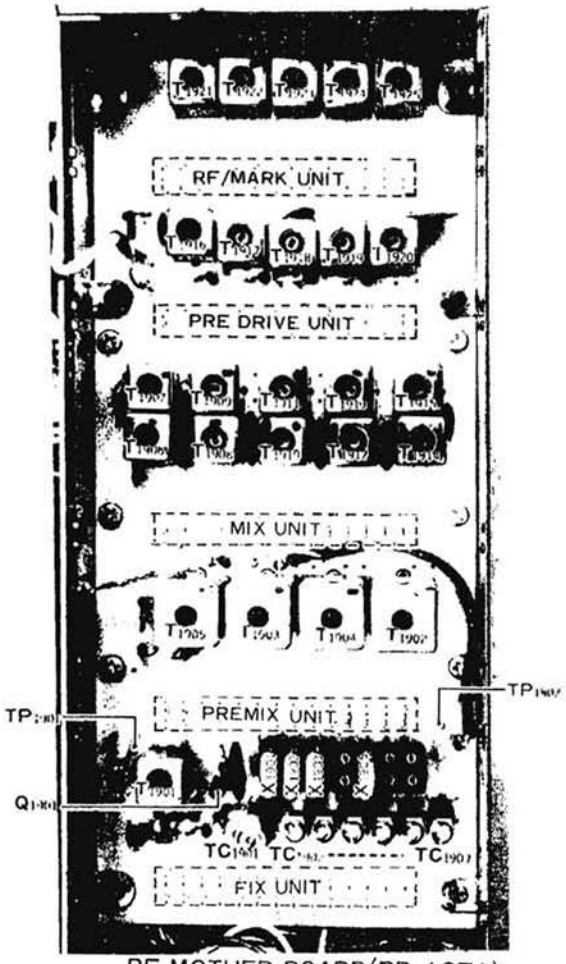
(1) Local oscillator level adjustment
   (a) Connect the RF probe of a VTVM to TP_{1901}. Place a 44 MHz crystal in the socket for the 10mD band. Place the BAND switch in the 10D position, and adjust the core of T_{1901} for a reading of 50 mV on the VTVM.
   (b) Place a 43 MHz crystal in the socket for the 10mB band. Place the BAND switch in the 10B position. Adjust TC_{1905} for a reading of 50 mV on the VTVM.
   (c) Place a 42.5 MHz crystal in the 10A socket. Place the BAND switch in the 10A position, and adjust TC_{1904} for a 50 mV reading on the VTVM.
   (d) Place a 43.5 MHz crystal in the 10C socket. Place the BAND switch in the 10C position, and adjust TC_{1906} for a 50 mV reading on the VTVM.
   (e) Switch to the 15 meter band. Adjust TC_{1903} for a reading of 50 mV on the VTVM.
   (f) Switch to the 20 meter band. Adjust TC_{1902} for a reading of 50 mV on the VTVM.
   (g) Switch to the 40 meter band. Adjust TC_{1901} for a reading of 50 mV on the VTVM.

(2) Premix bandpass filter adjustment (T_{1902} T_{1905}):
The adjustment of the bandpass filters is critical with respect to spurious response. A sweep generator and a scope are required for proper alignment.
   (a) Locate PB-1656, which can be found on the bottom side of the RF mother board (see photo on page 16.)
   Locate JP on PB-1656. For this alignment, remove the solder on the shorting device, breaking the connection.
   (b) Connect the output of a sweep generator to TP_{1901} and the RF probe of a scope to TP_{1902}. Monitor the wave patterns on the scope by offsetting the balancing potentiometer VR_{901} on the PREMIX unit.
   (c) Set the VFO/FIX switch to FIX to disconnect the VFO from the circuit. Apply 30 dB sweep output to TP_{1901}. Set the BAND switch to 40m

(d) Adjust the bandpass filter transformer cores as follows, so that the passband characteristics become as flat as possible within the passband range specified, and maximum attenuation out of range.

BAND	PASSBAND	CORE ADJUSTMENT
40	16.0 – 16.5 MHz	T_{1902}
20	23.0 – 23.5 MHz	T_{1903}
15	30.0 – 30.5 MHz	T_{1904}
10	37.0 – 37.5 MHz	T_{1905}

(c) Replace the solder bridge on shorting device JP on PB-1656.



RF MOTHER BOARD(PB-1871)

PREMIX UNIT (PB-1630)

(1) Premix balance (VR_{901}):
Connect the RF probe of a VTVM to TP_{1902}. Place the VFO/FIX switch in the FIX position. Adjust VR_{901} for a minimum reading on the VTVM.

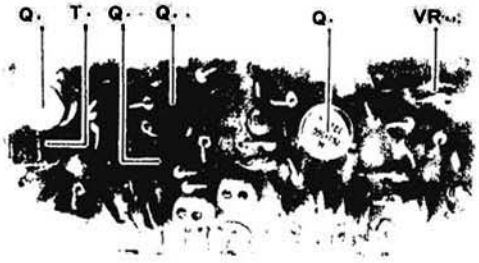
(2) Transmit/receiver frequency bandpass filter adjustment (T_{1906} – T_{1915}):

(a) Connect the output of the sweep generator to the antenna receptacle, and the scope input to the emitter of Q_{201} on the MIX unit. Remove the IF unit, and cut off the AGC voltage. Connect a jumper between pin 10 and pin 11 of the RF unit, and connect a 100 Ohm resistor between pin 8 and pin 9 of the RF unit to reduce the input Q of the circuit.

(b) Adjust the transformer cores as follows, to secure the most flat response possible over the passband indicated:

80m Band	3.5MHz – 4.0MHz	(T_{1906}, T_{1907})
40m Band	7.0MHz – 7.5MHz	(T_{1908}, T_{1909})
20m Band	14.0MHz – 14.5MHz	(T_{1910}, T_{1911})
15m Band	21.0MHz – 21.5MHz	(T_{1912}, T_{1913})
10m Band	28.0MHz – 30.0MHz	(T_{1914}, T_{1915})

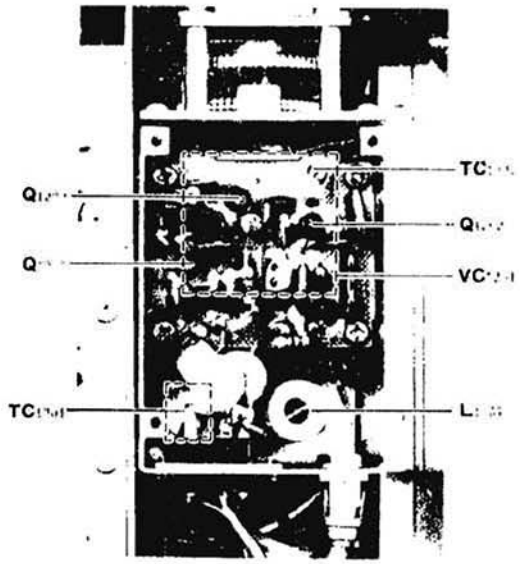
(c) After making the necessary adjustments, return the circuitry to its original condition: remove the 100 Ohm resistor and jumper from the RF unit, restore the AGC voltage, and replace the IF unit.


PREMIX UNIT (PB-1630)

(3) VFO unit (PB-1440B-3400):
Skilled technique is required as well as advanced knowledge to align the VFO unit. It is, therefore, recommended that all VFO work be referred to qualified personnel should a case develop where a repair is needed on the VFO unit.

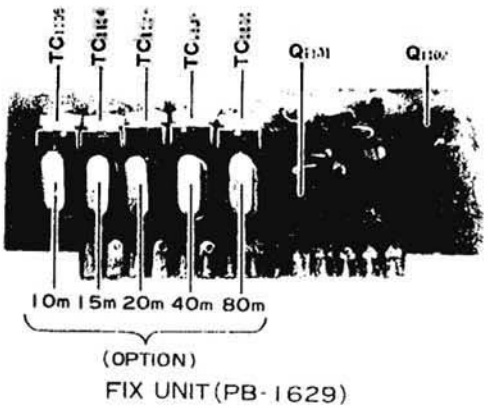
TC_{1201} : Band setting trimmer capacitor.

TC_{1202} : A split-type trimmer capacitor for output level adjustment.



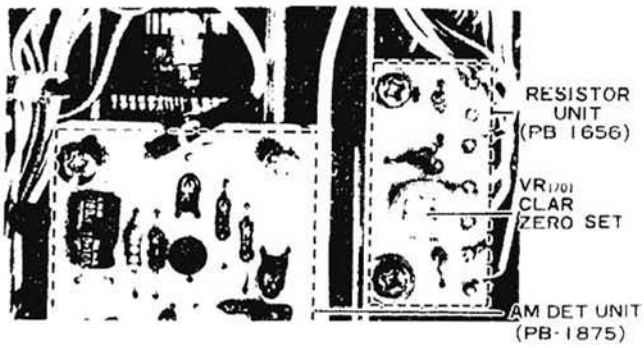
VFO COMPARTMENT

(4) FIX unit (PB-1629)
It is possible to use one crystal controlled channel per band with the FT-7B. The crystal should be inserted in the socket appropriate for the band to be used, and TC_{1101}, TC_{1102}, TC_{1103}, TC_{1104}, and TC_{1105} provide fine frequency tuning for the 80, 40, 20, 15, and 10 meter bands, respectively.



FIX UNIT (PB-1629)

(5) Clarifier zero setting (VR_{1701}):
(a) Tune the transceiver to the marker or a signal generator on any band.
(b) Set the CLAR control to the 12 o'clock position. Turn on the CLAR switch, and tune the main dial for a zero beat to the marker or signal generator.
(c) Now turn the CLAR switch to VFO, and if the tone of the marker or signal generator is changed (away from zero beat) secure zero beat by adjusting VR_{1701}.



(6) RF tracking (T_{1916} T_{1925}):
(a) Connect a dummy load or matched antenna to the antenna receptacle on the rear panel. Set the transceiver controls as follows:
MODE . . . . . CW
DIAL 250
TUNE 4.5 (80m, 40m)
5 (20m, 15m, 10m)
(b) Set the band switch to 80. While transmitting, adjust T_{1916} for maximum power output into the dummy load.
(c) Repeat this procedure on each band, adjusting the transformers appropriate for the bands selected:

BAND	CORE ADJUSTMENT
40	T_{1917}
20	T_{1918}
15	T_{1919}
10	T_{1920}

		CAPACITOR
C1108	31820100	Ceramic 50WV CH10PF
C1109	31820150	" " " 15PF
C1110–1112	30820103	" " 0.01μF
C1101–1105	33824150	Dipped Mica " 15PF
C1106	33824151	" " " 150PF
C1107	33824301	" " " 300PF
C1113, 1115	33824471	" " " 470PF
C1114	33824821	" " " 820PF
		TRIMMER CAPACITOR
TC1101–1105	39000009	ECV1ZW 50x40 50PF
		INDUCTOR
L1101	53020001	Micro Inductor FL5H-102J 1mH
L1102, 1103	53020014	" " FL4H-1R8M 1.8μH
		CRYSTAL SOCKET
	69010012	SD0105

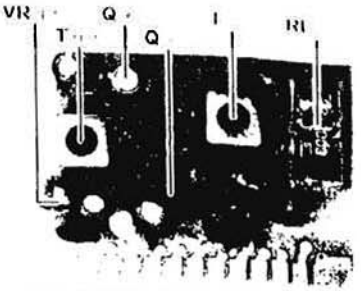
VFO UNIT (3400)

Symbol Number	Parts No.	Description
PB-1440B-3400	60414402	Printed Circuit Board
	014402AZ	PCB with Components
		FET & TRANSISTOR
Q1202	22800195	FET 2SK19GR
Q1201, 1203	22303724	Transistor 2SC372Y
		DIODE
D1202	21015550	Silicon Diode 1S1555
D1201	21022360	Varactor " 1S2236
		RESISTOR
R1209, 1221	40143101	Carbon Film ¼W VJ 100Ω
R1207	40143221	" " " " 220Ω
R1212	40143471	" " " " 470Ω
R1205, 1208	40143222	" " " " 2.2KΩ
R1202	40143332	" " " " 3.3KΩ
R1201	40143103	" " " " 10KΩ
R1203	40143183	" " " " 18KΩ
R1204	40143333	" " " " 33KΩ
R1206, 1210	40143104	" " " " 100KΩ
		CAPACITOR
C1203	31827120	Ceramic 50WV UJ 10PF
C1201	31827080	" " " 8PF
C1206	31820020	" " CH 2PF
C1204	31820160	" " " 16PF
C1205	31820390	" " " 39PF
C1209, 1210, 1212, 1215, 1219, 1220	30820103	" " 0.01μF
C1206, 1222	30820473	" " 0.047μF
C1207	33824080	Dipped Mica " 8PF
C1208, 1214, 1218	33824330	" " " 33PF
C1211	33824181	Dipped Mica 50WV 180PF
C1213	33824431	" " " 430PF
C1221, 1223	33824471	" " " 470PF
C1202, 1222	33824102	" " " 1000PF
C1224, 1225	32821102	Feed Thru " 0.001μF
		VARIABLE CAPACITOR
VC1201	39000027	CS21C112A
		TRIMMER CAPACITOR
TC1202	39000005	ECV1ZW 50x32 50PF
TC1201	39000070	TSN-100D15 15PF
		INDUCTOR
L1201	53003184	#220268
L1205, 1206	53020014	Micro Inductor FL4H1R8M 1.8μH
L1202, 1203	53010003	" " 250μH
L1204	53020001	" " FL5H-102J 1mH
		RECEPTACLE
J1201	67020001	CN3561
		TERMINAL
	90000000	1P Lighthouse Type
	91100003	TP B

LPF UNIT

Symbol Number	Parts No.	Description
PB-1880	60418800	Printed Circuit Board
	018800AZ	PCB with Components
		CAPACITOR
C1423, 1429	33834100	Dipped Mica 500WV 10PF
C1418	33834180	" " " 18PF
	33834330	" " " 33PF
C1425	33834390	" " " 39PF
C1426	33834510	" " " 51PF
C1420	33834560	" " " 56PF
C1408	33834680	" " " 68PF
C1422	33834700	" " " 70PF
C1421	33834750	" " " 75PF
C1415, 1417 1426	33834820	" " " 82PF
C1424, 1402	33834101	" " " 100PF
C1419	33834131	" " " 130PF
C1412, 1416, 1427	33834151	" " " 150PF
C1410	33834181	" " " 180PF
C1428	33834201	" " " 200PF
C1404	33834221	" " " 220PF
C1407	33834241	" " " 240PF
C1414	33834271	" " " 270PF
C1405, 1411	33834331	" " " 330PF
C1409	33834391	" " " 390PF
C1401, 1403	33834561	" " " 560PF
C1406	33834621	" " " 620PF

(c) Peak transceiver for maximum output on 80 meters, CW mode. While transmitting, slowly rotate VR_{1501} until the power output just starts to fall; the power output should be 50 - 55 watts. Do not make this adjustment with other than a 50 ohm dummy load; a high SWR condition on the transmission line will cause an improper setting of VR_{1501}.

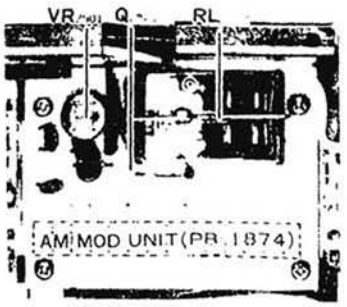


AM MOD UNIT (PB-1874)

AM MOD UNIT (PB-1874)

(1) For proper adjustment of the carrier and modulation levels, set VR_{2501} fully clockwise (no ALC action). Transmit on AM in the 10B band, and set VR_{2301} for a power output of 15 watts into a dummy load.

(2) Apply a 1 kHz, 6 mV audio signal to the mic jack. Connect an oscilloscope to the antenna jack and the dummy load, for monitoring of the output a waveform. For proper operation, a setting of between 5 and 8 should produce 100% modulation of the waveform.



AM MOTHER BOARD(PB-1876)

AM ALC UNIT (PB-1937)

The AM ALC UNIT is located on the AM Mother Board.

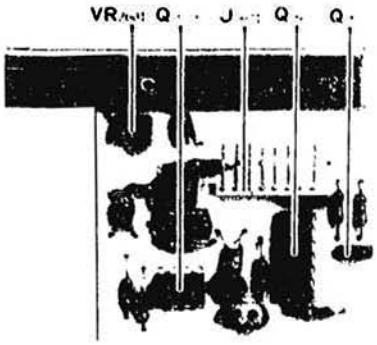
(1) While transmitting into a dummy load on AM, with on modulation applied, adjust VR_{2501} for a power output of 12.5 watts. This adjustment must be made after the adjustment of VR_{2301} described above.

AM ALC UNIT(PB-1937)

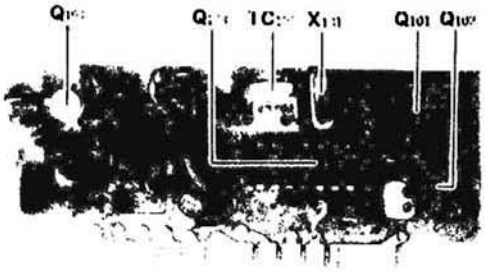
CW PEAK FILTER (PB-1882)

(1) Tune the receiver to the marker signal on 20 meters, LSB mode. Tune for a beat note of 800 Hz.

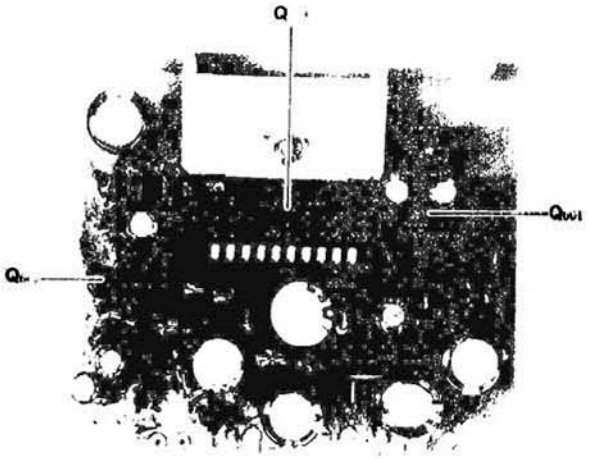
(2) Place the MODE switch in the CW position. Adjust VR_{2601} for maximum audio output on the marker signal.



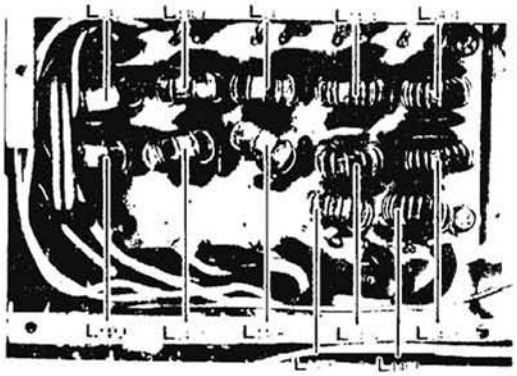
CW PEAK FILTER UNIT(PB-1882)



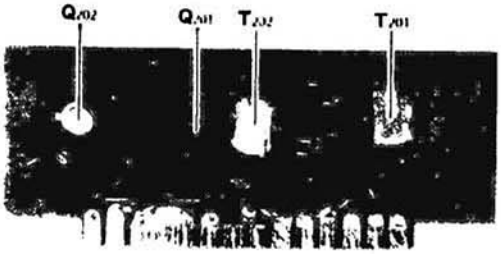
RF/MARK UNIT (PB-1884)



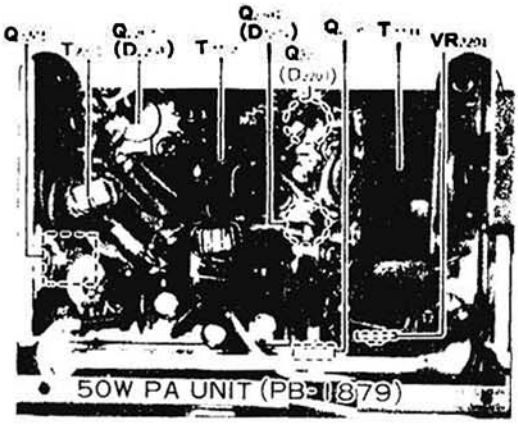
AF UNIT (PB-1648)



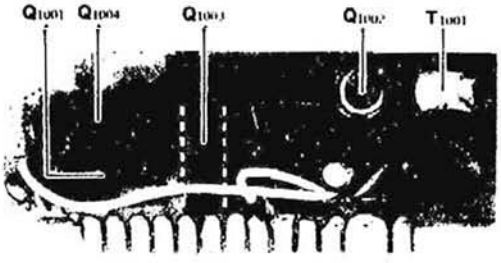
LPF UNIT(PB-1880)



MIX UNIT (PB-1631)



50W PA UNIT (PB-1879)



PREDRIVE UNIT (PB-1632)

AM DET UNIT (PB-1875)

MAIN CHASSIS

Symbol Number	Parts No.	Description
		TRANSISTOR
Q1	22303724	Transistor 2SC372Y
Q2	22800195	FET 2SK19GR
		DIODE
D1–3	21090011	Silicon Diode 10D1
D5, 6	21090107	Germanium 1N270
D7	21010070	" 1S1007
D4	21090140	LED GD4-203SRD
		RESISTOR
R4	40143101	Carbon Film ¼ VJ 100Ω
R5	40143102	" " " " 1.2KΩ
R7	40143152	" " " " 1.5KΩ
R11	40143222	" " " " 2.2KΩ
R6	40143124	" " " " 120KΩ
R8	41143390	" " ¼ TJ 39Ω
R9	41143101	" " " " 100Ω
R12		" " " " 1KΩ
R13	41143223	" " " " 22KΩ
R14	41143154	" " " " 150KΩ
R1	42124100	" Composition ½ GK 10Ω
R2	42124101	" " " " 100Ω
R3	–	Meter Shunt 0.011252Ω
		POTENTIOMETER
VR5	49800072	EVHB0AS 10B13 1KΩB
VR1	49800094	EVKA2AR 15313 5KΩA/1KΩB
VR2	49800095	EVHB0AK 30B54 50KΩB
VR3 (with S3)	49800117	EVHYVHK 330A14 10KΩB
VR4	49800097	EVAL04DA AB54 50KΩB
VR6	49800118	EW15YAS 01A14 10KΩA
		CAPACITOR
C47	36526334	Tantalum 35WV 0.33μF
C4, 6, 26, 30 33–41, 47	30820103	Ceramic 50WV 0.01μF
C1–3, 5, 25, 27 28, 42, 43, 45 46	30820473	" " 0.047μF
C8–23	32821102	Ceramic Feed Thru ECK-Y1H
C7	35220108	Electrolytic 16WV T 1000μF
C31	34220108	" " RE 1000μF
C29	34220227	" " " " 2200μF
C44	34220107	" " " " 100μF
C32	33834390	Dipped mica 500WV 39PF
		METER
M1 (R3)	74000360	#250029 (with Shunt Resistor)
		SPEAKER
SP1	76000019	SA-92 4Ω 3W
		RELAY
RL1	70000002	MX-2P
RL2	70000038	FRL 263 D012/02CK-0E
		RELAY SOCKET
RLS1	69000003	PX-08
		SWITCH
S1	64000052	8H2011
S2 (b)	62000030	(BS) 2-2-8 #250030-(b)
S3 (VR3)	–	
		PLUG
P1	67020007	SQ4052
		CONNECTOR
J1	68000011	MBR-06D
J2–4	68020013	SG-8018
J7	68040003	FM144S
J5	68070027	D7-701B-00
J6	68060004	QMS-AB6M
		LAMP HOLDER
FH1	69000007	F3265
		FUSE LAMP
PL1	14000027	14V BF311-04071A
		TERMINAL BOARD
TB2	90030002	11.5P 3-0-2
TB1	90030001	11.4P 3-0-1
TB3	90040005	11.6P 3-0-3
TB4	90030000	11.3P 3-0
	96000103	Speaker Cord #240030
		INDUCTOR
L1	55003001	SN8S-500
L2	53020035	Micro inductor 1μH
L3–7	53020001	" " 1mH

SW BOARD

Symbol Number	Parts No.	Description
PB1877	60418770	Printed Circuit Board
	018770AZ	PCB with Components
		RESISTOR
R1601	40183223	Carbon Film 1/8W VJ 2.2KΩ
		SWITCH
S1602	64000101	Lever Switch SLE62301
S1601, 1603	64000102	" " SLE64301
S1604	64000100	" " SLE62201
	91100008	Wrapping Terminal C
		DIODE
D1601–1605	21015550	Silicon Diode 1S1555

RESISTOR BOARD

Symbol Number	Parts No.	Description
PB-2042	60420420	Printed Circuit Board
	020420AZ	PCB with Components
		DIODE
D1702, 1703	21090107	Germanium 1N270
D1704	21010070	" (GB) 1S1007
D1701	21015550	Silicon 1S1555
		RESISTOR
R1705	40143152	Carbon Film ¼W VJ 1.5KΩ
R1704	40143392	" " " " 3.9KΩ
R1703	40143103	" " " " 10KΩ
R1702	40143183	" " " " 18KΩ
R1701	40143333	" " " " 33KΩ
		POTENTIOMETER
VR1701	49905473	SR-19R 47KΩB
	91100008	Wrapping Terminal C

LAMP BOARD

Symbol Number	Parts No.	Description
PB-1665A	60416651	Printed Circuit Board
	016651AZ	PCB with Components

PL1801–1804	14000035	LAMP BQ041-32704A 12V 40mA	

RF MOTHER BOARD

Symbol Number	Parts No.	Description	
PB1871A	60418711	Printed Circuit Board	
	018711AZ	PCB with Components	
		FET	
Q1901	22890017	FET JF1033B	
		DIODE	
D1901	21015550	Silicon Diode 1S1555	
		CRYSTAL	
X1901 (40m)	71800096	HC-18/U	21.5MHz
X1902 (20m)	71800097	HC-18/U	28.5MHz
X1903 (15m)	71800098	"	35.5MHz
X1904 (10mA)	71500174	HC 25/U (OPTION)	42.5MHz
X1905 (10mB)	71500175	"	43.0MHz
X1906 (10mC)	71500176	" (OPTION)	43.5MHz
X1907 (10mD)	71500177	" (")	44.0MHz
		RESISTOR	
R1907	40143330	Carbon Film ¼ VJ	33Ω
R1908	40143680	" " " "	68Ω
R1903, 1909, 1912	40143101	" " " "	100Ω
R1904	40143221	" " " "	220Ω
R1902	40143331	" " " "	330Ω
R1905, 1906	40143102	" " " "	1KΩ
R1911, 1916	40143103	" " " "	10KΩ
R1915, 1917	40143153	" " " "	15KΩ
R1918, 1919	40143183	" " " "	18KΩ
R1910	40143223	" " " "	22KΩ
R1901	40143333	" " " "	33KΩ
R1913	40143124	" " " "	120KΩ
		VARIABLE CAPACITOR	
VC1901	39000074	C343C 121A	
		CAPACITOR	
C1902	30820102	Ceramic 50WV	0.001μF
C1910, 1912, 1913, 1920	30820103	" "	0.01μF
C1911	30820473	" "	0.047μF
C1919, 1921	33824030	Dipped Mica "	3PF
C1907 1909	33824100	" " "	10PF
C1906	33824120	" " "	12PF
C1905	33824220	" " "	22PF
C1918	33824470	" " "	47PF
C1904	33824560	" " "	56PF
C1903	33824101	" " "	100PF
C1917	33824251	" " "	250PF
C1914	33824391	" " "	390PF
C1901, 1916	33824431	" " "	430PF
C1915	33824651	" " "	650PF

TC1902–1907	39000010	TRIMMER CAPACITOR ECV-1ZW 10x53	10PF
TC1901	39000003	" 30x32	30PF
		TRANSFORMER	
T1901	54165870	R12 6587	#220017
T1902	55003236		#220262
T1903	55003237		#220263
T1904	55003238		#220264
T1905	55003239		#220265
T1906, 1907	55003240		#220279
T1908, 1909	55003241		#220280
T1910, 1911	55003242		#220281
T1912, 1913	55003243		#220282
T1914, 1915	55003244		#220283
T1916, 1921	55003245		#220284
T1917, 1922	55003246		#220285
T1918, 1923	55003247		#220286
T1919, 1924	55003248		#220287
T1920, 1925	55003249		#220288
		SWITCH	
S1901	61000470	Band Switch 13-13-8	
		CRYSTAL SOCKET	
XS1901	69010015	S-14 (HC-25/U4P)	
XS1902	69010005	S-14 (" 3P)	
	91100008	Wrapping terminal	
	91000010	Digi Klip (10x7)	
	80037621	VC Holder #003762	

IF MOTHER BOARD

Symbol Number	Parts No.	Description	
PB1872	60418720	Printed Circuit Board	
	018720AZ	PCB with Components	
		RESISTOR	
R2002	42124229	Carbon Composition	½W GK 2.2Ω
R2001	41143331	" Film ¼W TJ	330Ω
		CAPACITOR	
C2003	30820102	Ceramic 50WV	0.001μF
C2001, 2005	30820103	" "	0.01μF
C2002, 2004	36825473	" "	0.047μF
	91100008	Wrapping terminal C	
	91100010	Digi klip 16x6	

RF-MARKER UNIT

Symbol Number	Parts No.	Description
PB1884B	60418842	Printed Circuit Board
	018842AZ	PCB with Components

		IC. FET & TRANSISTOR
Q103	25000108	IC 34024PC
Q104	23800513	FET 3SK51-03
Q101, 102	22303724	Transistor 2SC372Y
		DIODE
D102–105	21015550	Silicon Diode 1S1555
D101	21090115	Gerumanium 1N60FM
		CRYSTAL
X101	71800108	HC-18/U 12.8MHz
		RESISTOR
R116	40143100	Carbon Film ¼W VJ 10Ω
R107	40143101	" " " " 100Ω
R108	40143151	" " " " 150Ω
R114	40143681	" " " " 680Ω
R103, 105	40143102	" " " " 1KΩ
R109	40143182	" " " " 1.8KΩ
R115	40143222	" " " " 2.2KΩ
R101	40143103	" " " " 10KΩ
R102	40143223	" " " " 22KΩ
R111, 112, 113	40143104	" " " " 100KΩ
R110	40143154	" " " " 150KΩ
R104	40143204	" " " " 200KΩ
R106	40143105	" " " " 1MΩ
		CAPACITOR
C108	31829100	Ceramic 50WV SL 10PF
C104	31820221	" " CH 220PF
C105–107, 112, 113, 115, 117–119	30820103	" " 0.01μF
C109	30820473	" " 0.047μF
C101, 114	33824220	Dipped Mica " 22PF
C110	33824101	" " " 100PF
C102	33824221	" " " 220PF
C116	36226335	Tantalum 16WV 3.3μF
		TRIMMER CAPACITOR
TC101	39000007	ECV1ZW 20x40 20PF
		INDUCTOR
L101	53010003	Micro Inductor 250μH
L102	53020001	" " FL5H-102J 1mH

MIX UNIT

Symbol Number	Parts No.	Description
PB1631E	60416315	Printed Circuit Board
	016315AZ	PCB with Components
		FET & TRANSISTOR
Q202	23800513	FET 3SK51-03
Q201	22305351	Transistor 2SC535A
D201, 202, 207 208	21015550	**DIODE** Silicon Diode 1S1555
D203–206	21090134	Schottky barier 1SS16
		RESISTOR
R207	40143120	Carbon Film ¼ VJ 12Ω
R217	40143220	" " " " 22Ω
R202, 215	40143101	" " " " 100Ω
R206, 208, 213	40143151	" " " " 150Ω
R201	40143331	" " " " 330Ω
R209	40143471	" " " " 470Ω
R216	40143182	" " " " 1.8KΩ
R205	40143332	" " " " 3.3KΩ
R203, R204	40143472	" " " " 4.7KΩ
	40143562	" " " " 5.6KΩ
	40143103	" " " " 10KΩ
R212	40143223	" " " " 22KΩ
	40143333	" " " " 33KΩ
		CAPACITOR
C203, 206, 207, 209, 210, 212, 214, 217	30820103	Ceramic 50WV 0.01μF
	33824180	Dipped Mica " 18PF
C204, 205, 208	33824101	" " " 100PF
C201, 202	33824241	" " " 240PF
	36226106	Tantalum 16WV 10μF
		TRIMMER CAPACITOR
TC201	39000007	ECV-1ZW 20x40 20PF
		INDUCTOR
L202–204	53020001	Micro Inductor FL5H102J 1mH
L201	53020012	" " FL4H 1R2M 1.2μH
		TRANSFORMER
T201	55003232	#220278
T202	55003233	#220277

FILTER UNIT

Symbol Number	Parts No.	Description
PB1873A	60418731	Printed Circuit Board
	018731AZ	PCB with Components
		FET & TRANSISTOR
Q301, 302	22800195	FET 2SK19GR
Q304	23800406	" 3SK40L1(R)
Q303	22390001	Transistor MPSA13
		DIODE
D301–305	21010070	Germanium Diode 1S1007
D306–309	21015550	Silicon " 1S1555
		MONOLITHIC FILTER
XF301	71200018	9M20A
		CRYSTAL FILTER
XF302	71000010	XF90A
		RESISTOR
R301, 304, 305, 309, 324, 325	40143101	Carbon Film ¼ VJ 100Ω
	41143101	" " " " 100Ω
R303	40143221	" " " " 220Ω

R323	40143331	Carbon Film ¼ VJ	330Ω	R430	40143561	Carbon Film ¼ VJ	560Ω
R308	40143561	" " " "	560Ω	R423	40143102	" " " "	1KΩ
	40143821	" " " "	820Ω	R429	40143182	" " " "	1.8KΩ
R306, 310, 313, 314, 315	40143102	" " " "	1KΩ	R425, 433	40143222	" " " "	2.2KΩ
				R421, 426, 427, 428	40143103	" " " "	10KΩ
R312, 316, 322	40143122	" " " "	1.2KΩ				
R302	40143332	" " " "	3.3KΩ	R403	40143223	" " " "	22KΩ
	40143822	" " " "	8.2KΩ	R410	41143223	" " " "	22KΩ
R311	40143103	" " " "	10KΩ	R401, 402, 408, 409	40143563	" " " "	56KΩ
R307	40143153	" " " "	15KΩ				
	40143333	" " " "	33KΩ	R405, 412, 419, 424	40143104	" " " "	100KΩ
	40143393	" " " "	39KΩ				
R319	40143104	" " " TJ	100KΩ	R411	40143124	" " " "	120KΩ
	40143225	" " " VJ	2.2MΩ	R404	41143124	" " " "	120KΩ
		CAPACITOR				POTENTIOMETER	
C312	33824510	Dipped Mica 50WV	51PF	VR401	49917501	V8K 11	500ΩB
C310	30820102	Ceramic "	0.001μF			CAPACITOR	
C301–303, 306–309, 311, 313, 316–320	30820103	" "	0.01μF	C401	31820330	Ceramic 50WV	33pF (CH)
				C407	31820101	" "	100PF(CH)
				C404, 405, 408–410, 414, 418, 421–423, 426, 428, 432, 433, 434	30820103	" "	0.01μF
C324	30820104	" "	0.1μF				
C304	36526334	Tantalum "	0.33μF				
C325	36526474	" "	0.47μF				
C321, 322	36226106	" "	10μF	C402, 403, 406, 412, 429–431	30820473	" "	0.047μF
C305	34220106	Electrolytic 16WV	10μF				
		INDUCTOR		C419	33824100	Dipped Mica 50WV	10PF
L301–304	53020001	Micro Inductor FL5H102J 1mH		C411	33824120	" " "	12PF
				C415	33824330	" " "	33PF
				C425	33824470	" " "	47PF
		TRANSFORMER		C420	33824101	" " "	100PF
T301, 303, 305	55003234		#220275	C417	33824121	" " "	120PF
T304	55003235		#220276	C416	33824271	" " "	270PF
T302	54141710	R12-4171	#220141	C427	36226225	Tantalum 16WV	2.2μF
				C424	36226475	" " "	4.7μF
					34826476	Electrolytic 50WV	47μF
						TRIMMER CAPACITOR	
				TC401	39000007	ECV1ZW 20x40	20PF
						INDUCTOR	
				L401	53010002	Micro Inductor	22μH
				L404, 405	53010003	" "	250μH
				L402, 403	53020001	" "	FL5H-102J 1mH
						TRANSFORMER	
				T401	54141700	R12-4170	#220140
				T402	54141710	R12-4171	#220141

IF UNIT

Symbol Number	Parts No.	Description	
PB-1625D	60416254	Printed Circuit Board	
	016254AZ	PCB with Components	
		FET & TRANSISTOR	
Q403, 404	28900195	FET	2SK19GR
Q401, 402	23800513	"	3SK51-03
Q407	22106281	Transistor	2SA628A
Q405, 406	22303724	"	2SC372Y
		DIODE	
D401–403	21015550	Silicon Diode	1S1555
D404	21010070	Germanium "	1S1007
		CRYSTAL	
X401	71800107	HC-18/U	8999.3KHz
		RESISTOR	
R415	41143479	Carbon Film ¼ TJ	4.7Ω
R435	41143100	" " " "	10Ω
R432	40143820	" " " VJ	82Ω
R407, 414, 436	40143101	" " " "	100Ω
R416, 418, 436	41143101	" " " "	100Ω
R420	40143151	" " " "	150Ω
R406, 413	40143221	" " " "	220Ω
R417	40143331	" " " "	330Ω
R422	40143471	" " " "	470Ω

MOD/DEM UNIT

Symbol Number	Parts No.	Description	
PB-1878A	60418781	Printed Circuit Board	
	018781AZ	PCB with Components	
		FET & TRANSISTOR	
Q501	22800194	FET	2SK19Y
Q502, 503	22303724	Transistor	2SC372Y

		DIODE	
D501–504, 507, 508, 509–512	21010070	Germanium Diode	1S1007
D505–506, 513	21015550	Silicon Diode	1SI555
		CRYSTAL	
X501	71800094	HC-18/U	8998.5KHz
X502	71800095	HC-18/U	9001.5KHz
		RESISTOR	
R506, 510, 516	40143101	Carbon Film ¼ VJ	100Ω
R502, 517, 518	40143151	" " " "	150Ω
R501, 503, 513	40143331	" " " "	330Ω
R505, 515	40143471	" " " "	470Ω
R508, 509, 518	41143471	" " ¼ TJ	470Ω
R507	40143222	" " ¼ VJ	2.2KΩ
R504, 511, 512	40143103	" " " "	10KΩ
R514, 517	40143104	" " " "	100KΩ
		POTENTIOMETER	
VR501	49912501	V10K 8-1-2	500ΩB
VR502	49917501	V8K 1-1	500ΩB
		CAPACITOR	
C505, 508	31820101	Ceramic 50WV CH	100PF
C502, 503, 505, 507, 509–511, 514, 518–520, 522, 525	30820103	" "	0.01μF
C523, 524	36825104	Mylar "	0.1μF
C504	33824180	Dipped Mica "	18PF
C521	33824240	" " "	24PF
C512, 513	33824270	" " "	27PF
C517	33824470	" " "	47PF
C515	33824151	" " "	150PF
C516	33824471	" " "	470PF
C501	34220105	Electrolytic 16WV	1μF
C526	34120476	" 10WV	47μF
		TRIMMER CAPACITOR	
TC502-504	39000007	ECV1ZW 20x40	20PF
TC501	39000008	" 50x40	50PF
		INDUCTOR	
L501–505	53020001	Micro Inductor FL5III02J	1mH
L506	53020030	" " FL11H683J	68mH
L507	53020021		220μH
		TRANSFORMER	
T501	54141710	R12-4171	#220141
T502	55003174		#220209
		RELAY	
RL501	70000034	BR211 AD 009M	DC9V

AF UNIT

Symbol Number	Parts No.	Description
PB1648B	60416482	Printed Circuit Board
	016482AZ	PCB with Components
		IC & TRANSISTOR
Q601	25000134	IC TA7063P
Q603	25000162	" TA7205AP
Q602	22310005	Transistor 2SC1000GR
		DIODE
D601	21055550	Silicon Diode 1SI555
		RESISTOR
R605, 612	40143331	Carbon Film ¼ VJ 330Ω
R607	40143391	" " " " 390Ω
	40143561	" " " " 560Ω
R618	40143681	" " " " 680Ω
R619	40143102	" " " " 1KΩ
R614	40143222	" " " " 2.2KΩ
R615	40143272	" " " " 2.7KΩ
R613	40143332	" " " " 3.3KΩ
R601	40143472	" " " " 4.7KΩ
R611	40143562	" " " " 5.6KΩ
R604, 609, 616	40143103	" " " " 10KΩ
R606	40143223	" " " " 22KΩ
R603	40143393	" " " " 39KΩ
R610	40143563	" " " " 56KΩ
R602, 617	40143154	" " " " 150KΩ
		CAPACITOR
C625	30820473	Ceramic 50WV 0.047μF
	36825222	Mylar " 0.0022μF
C607	36825472	" " 0.0047μF
C601, 613, 616, 621	36825473	" " 0.047μF
C627	36825153	" " 0.015μF
C624	36825104	" " 0.1μF
C610	34220105	Electrolytic 16WV 1μF
C605	34220225	" " 2.2μF
C608, 611, 612	34220106	" " 10μF
C618	34220226	" " 22μF
C622	34220476	" " 47μF
C604, 606, 619, 626	34220107	" " 100μF
C626	34220207	" 16WV RE 220μF
C614	34220337	" " " 330μF
C617, 623	33824500	Dipped Mica 50WV 50PF
C603	33824271	" " " 270PF
C620	33824391	" " " 390PF
		HEAT SINK
	80019512	D001951A

REG CONT UNIT

Symbol Number	Parts No.	Description
PB-1622C	60416223	Printed Circuit Board
	016223AZ	PCB with Components

		IC, FET & TRANSISTOR			**FET & TRANSISTOR**
Q703	26000023	IC μPC14308	Q805	22800194	FET 2SK19Y
Q704	22800194	FET 2SK19Y	Q807	22800195	FET 2SK19GR
Q701, 702	22303724	Transistor 2SC372Y	Q801--804	23800513	" 3SK51-03
Q705	22307354	" 2SC735Y	Q806	22303724	Transistor 2SC372Y
		DIODE			**DIODE**
D702--704	21015550	Silicon Diode 1S1555	D801--804	21090115	Germanium 1N60
D701	21010070	Germanium 1S1007			
					CRYSTAL
		RESISTOR	X801	71800093	HC-18/U 8545kHz
R713	40143101	Carbon Film ¼ VJ 100Ω			
R716	40143681	" " " " 680Ω			**RESISTOR**
R706, 711	40143102	" " " " 1KΩ	R817	40143100	Carbon Film ¼W VJ 10Ω
R710	40143222	" " " " 2.2KΩ	R806, 811, 816, 824	40143101	" " " " 100Ω
R705	40143392	" " " " 3.9KΩ			
R701, 702, 708	40143472	" " " " 4.7KΩ	R804, 815, 823	40143151	" " " " 150Ω
R703	40143562	" " " " 5.6KΩ	R810	40143331	" " " " 330Ω
R717	40143103	" " " " 10KΩ	R826, 828, 814	40143102	" " " " 1KΩ
R709	40143153	" " " " 15KΩ	R805	40143562	" " " " 5.6KΩ
R704	40143223	" " " " 22KΩ	R830	40143682	" " " " 6.8KΩ
R707	40143473	" " " " 47KΩ	R818, 820	40143103	" " " " 10KΩ
R712	40143104	" " " " 100KΩ	R827	40143183	" " " " 18KΩ
R714	42143475	Carbon Composition ¼ GK 4.7MΩ	R821	40143223	" " " " 22KΩ
			R808	40143333	" " " " 33KΩ
				40143823	" " " " 82KΩ
			R801--803, 809, 812, 813, 822	40143104	" " " " 100KΩ
		THERMISTOR			
TH701	29090001	SDT-250	R819, 829	40143334	" " " " 330KΩ
		POTENTIOMETER			**CAPACITOR**
VR701	49912103	V10K 8-1 2 10KΩB			
VR702	49912205	V10K " 2MΩB	C821	31820120	Ceramic 50WV CH 12PF
			C813	31820240	" " 24PF
			C823	31820510	" " 51PF
		CAPACITOR	C801, 806, 807, 824	31820101	" " 100PF
C706, 707, 709, 716	30820103	Ceramic 50WV 0.01μF	C810	31820271	" " 270PF
C717	30820473	" " 0.047μF	C802--804, 808, 809, 812, 814, 815, 819, 820, 822, 825, 827	30820103	" " 0.01μF
C713, 715	36825103	Mylar Film " 0.01μF			
C701--703	36825223	" " " 0.022μF			
C710	34526684	Tantalum 35WV 0.68μF			
C714	34220105	Electrolytic 16WV 1μF	C811	30820473	" " 0.047μF
C708, 712	34220106	" " 10μF	C816	33824470	Dipped Mica " 47PF
C711	34220107	" " 100μF	C818	33824121	" " " 120PF
C705	34220225	" " 2.2μF	C817	33824271	" " " 270PF
C704	32440475	" " 4.7μF	C826	36226106	Tantalum 16WV 10μF
			C805	36825473	Mylar 50WV 0.047μF
		RELAY			
RL701	70000031	BR211AD012M DC12V			**INDUCTOR**
			L802	53010002	Micro Inductor 22μH
			L801, 803	53020001	" " ELSH-102J 1mH
		HEAT SINK			
	0019512	D001951A			
					TRANSFORMER
			T802, 803	54140970	R12-4097 #220101
			T801, 804	54141700	R12-4170 #220140

NB UNIT

Symbol Number	Parts No.	Description
PB-1627D	60416274	Printed Circuit Board
	016274AZ	PCB with Components

PREMIX UNIT

Symbol Number	Parts No.	Description
PB2044	60420440	Printed Circuit Board
	020440AE	PCB with Components
		IC. FET & TRANSISTOR
Q901	25000101	IC MC1496G
Q902	22800195	FET 2SK19GR
Q903	22307842	Transistor 2SC784R
Q904	22390006	" 2N4427
		RESISTOR
R921	40143100	Carbon Film ¼ VJ 10Ω
R905	40143560	" " " " 56Ω
R922	40143151	" " " " 150Ω
R917	40143221	" " " " 220Ω
R914	40143681	" " " " 680Ω
R901–903, 911, 919, 920	40143102	" " " " 1KΩ
R908	40143122	" " " " 1.2KΩ
R907	40143182	" " " " 1.8KΩ
R909, 918	40143222	" " " " 2.2KΩ
R916	40143472	" " " " 4.7KΩ
R904, 906, 910	40143103	" " " " 10KΩ
R913	40143153	" " " " 15KΩ
R915	40143223	" " " " 22KΩ
R912	40143273	" " " " 27KΩ
		POTENTIOMETER
VR901	49917103	V8K 1-1 10KΩB
		CAPACITOR
C901–908, 911–914, 917, 918	30820103	Ceramic 50WV 0.01μF
C915	30820473	" " 0.047μF
C909, 910	31820101	" " CH 100PF
C916	33824241	Dipped Mica " 240PF
		INDUCTOR
L902, 903	53010003	Micro Inductor 250μH
L901, 904	53020001	" " FL5H-102J 1mH
		TRANSFORMER
T901	55003231	#220269
		FERRATE BEADS
FB901	56000024	4A-R1 3x3x1H

PRE DRIVE UNIT

Symbol Number	Parts No.	Description
PB-1632C	60416323	Printed Circuit Board
	016323AZ	PCB with Components
		IC. FET & TRANSISTOR
Q1003	25000114	IC MC14011BCP
Q1001	22800195	FET 2SK19GR
Q1004	22303730	Transistor 2SC373
Q1002	22390006	Transistor 2N4427
		DIODE
D1001	21015550	Silicon Diode 1S1555
D1002	21090034	Zener " WZ090
		RESISTOR
R1005, 1009	40143100	Carbon Film ¼ VJ 10Ω
R1010	40143151	" " " " 150Ω
R1011	41143221	" " ¼ TJ 220Ω
R1003	40143391	" " ¼ VJ 390Ω
R1007	40143102	" " " " 1KΩ
R1008	40143182	" " " " 1.8KΩ
R1004	40143222	" " " " 2.2KΩ
R1001	40143332	" " " " 3.3KΩ
R1012, 1014	40143103	" " " " 10KΩ
R1013	40143333	" " " " 33KΩ
R1015	40143473	" " " " 47KΩ
R1002	40143104	" " " " 100KΩ
R1006	42184101	Carbon Composition 1-8 GK 100Ω
		CAPACITOR
C1004	31820101	Ceramic 50WV CH100PF
C1002, 1008	30820102	" " 0.001μF
C1001, 1003, 1007, 1013, 1014	30820103	" " 0.01μF
C1005, 1009, 1010	30820473	" " 0.047μF
C1006	33824241	Dipped Mica " 240PF
	36226105	Tantalum 16WV 1μF
C1012	36226334	" " 0.33μF
C1011	34220226	Electrolytic " 22μF
		INDUCTOR
L1001	53020001	Micro Inductor FL5H-102J 1mH
		TRANSFORMER
T1001	55003176	#220210
		FERRATE BEADS
FB1001, 1002	56000024	4A-R1 3x3-1H

FIX UNIT

Symbol Number	Parts No.	Description
PB-1629C	60416293	Printed Circuit Board
	016293AZ	PCB with Components
		TRANSISTOR
Q1101, 1102	22303724	Transistor 2SC372Y
		RESISTOR
R1105, 1106	40143101	Carbon Film ¼ VJ 100Ω
R1103	40143102	" " " " 1KΩ
R1101	40143103	" " " " 10KΩ
R1104	40143223	" " " " 22KΩ
R1102	40143333	" " " " 33KΩ

		INDUCTOR
L1401	55003337	#220398A
L1402	55003349	#220576
L1403	55003350	#220577
L1404	55003338	#220399
L1405	55003351	#220578
L1406	55003352	#220579
L1407	55003339	#220400
L1408	55003353	#220580
L1409	55003340	#220401
L1410	55003354	#220581
L1411	55003341	#220402
L1412	55003355	#220582
	91100008	Wrapping terminal

ALC UNIT

Symbol Number	Parts No.	Description
PB-1881A	60418811	Printed Circuit Board
	018811AZ	PCB with Components
		DIODE
D1505	21010070	Germanium 1S1007
D1501 - 1504	21015550	Silicon 1S1555
		RESISTOR
R1501	40143470	Carbon Film ¼W VJ 47Ω
R1502	40143331	" " " " 330Ω
R1503, 1504	40143471	" " " " 470Ω
		POTENTIOMETER
VR1501	49919103	SR19D 10KΩB
		CAPACITOR
C1502–1505, 1507	30820103	Ceramic 50WV 0.01μF
C1501	33824271	Dipped Mica " 270PF
C1506	33824621	" " " 620PF
C1508, 1509	32821102	Feed thru " 0.001μF
		TRIMMER CAPACITOR
TC1501	39000001	ECV-1ZW 10x32 10PF

RF ATT UNIT

Symbol Number	Parts No.	Description
PB-1883A	60418831	Printed Circuit Board
	018831AZ	PCB with Components
		DIODE
D2101	21015550	Silicon 1S1555
		RESISTOR
R2101, 2103	40143560	Carbon Film ¼W VJ 56Ω
R2102	40143221	" " " " 220Ω
		CAPACITOR
C2101	30820103	Ceramic 50WV 0.01μF
		RELAY
RL2101	70000031	BR221D012 12V
		LAMP FUSE
PL2101	14000036	BQ041-22803A

	91100008	Wrapping Terminal

50W AMP UNIT

Symbol Number	Parts No.	Description
PB-1879A	60418791	Printed Circuit Board
	018791AZ	PCB with Components
		TRANSISTOR
Q2201	22315890	2SC1589
Q2203, 2204	22320990	2SC2099
Q2202	22323950	2SC2395
Q2205	22402354	2SD235Y
		DIODE
D2205	21090011	Silicon 10D1
D2201, 2203, 2204	21090019	" 10D10
D2202	21009930	Zener VZ033
		RESISTOR
R2202	41143330	Carbon Film ¼W TJ 33Ω
R2201	41143121	" " " " 120Ω
R2220, 2221	42124119	" Composition ½W GK 1.2Ω
R2206	42124479	" " " 4.7Ω
R2213, 2215	42124100	" " " 10Ω
R2209	42124150	" " " 15Ω
R2208	42124470	" " " 47Ω
R2210	42124101	" " " 100Ω
R2211	42124151	" " " 150Ω
R2204	42124331	" " " 330Ω
R2203	42124391	" " " 390Ω
R2207	42124821	" " " 820Ω
R2218	42124102	" " " 1KΩ
R2205	42124152	" " " 1.5KΩ
R2212, 2214, 2216	43204390	Metallic Film 2W 39Ω
R2217	43204680	" " " 68Ω
		POTENTIOMETER
VR2201	49906102	EVL S0AA00B23 2KΩB
		CAPACITOR
C2230	30830472	Ceramic 500WV 0.0047μF
C2202, 2206, 2207	30820103	" 50WV 0.01μF
C2201, 2203, 2209, 2213, 2214, 2221, 2224	30820473	" " 0.047μF
C2225, 2226	30830473	" 500WV 0.047μF
C2208, 2218	30820104	" 50WV 0.1μF
C2205, 2211	30825104	" Chip " 0.1μF
C2227	33834700	Dipped Mica 500WV 70PF
C2217	33824681	" " 50WV 680PF
C2216	33824621	" " " 620PF
C2228, 2229	33834821	" " 500WV 820PF
C2210	36825104	Mylar 50WV 0.1μF
C2220	36825394	" " 0.39μF
C2213, 2222, 2223	34320106	" 16WV 10μF
C2215	34320336	Electrolytic " 33μF
C2219	34320477	" " RE 470μF

		INDUCTOR	
L2201	55003342	RFC	#220392
L2202	55003343	"	#220393
L2203	55003344	"	#220394
L2204	55003345	"	#220395
		TRANSFORMER	
T2201	55003346		#220396
T2202	55003348		#220468
T2203	55003347		#220397
	90000000	Lighthouse Terminal	
	91100008	Wrapping Terminal	

AM MOD UNIT

Symbol Number	Parts No.	Description
PB-1874A	60418741	Printed Circuit Board
	018741AZ	PCB with Components
		FET & TRANSISTOR
Q2302	23800595	FET 3SK59GR
Q2301	22310005	Transistor 2SC1000GR
		DIODE
D2301–2306	21015550	Silicon 1S1555
		RESISTOR
R2314	40143101	Carbon Film ¼W VJ 100Ω
R2304, 2307, 2308	40143102	" " " " 1KΩ
R2306, 2313	40143222	" " " " 2.2KΩ
R2305	40143332	" " " " 3.3KΩ
R2301	40143103	" " " " 10KΩ
R2303	40143333	" " " " 33KΩ
R2311	40143393	" " " " 39KΩ
R2309	40143473	" " " " 47KΩ
R2302, 2310	40143823	" " " " 82KΩ
R2312	40143104	" " " " 100KΩ
		POTENTIOMETER
VR2301		V8K-1-1 5KΩB
		CAPACITOR
C2303, 2306, 2307, 2309, 2312, 2314–2316	30820103	Ceramic 50WV 0.01μF
C2308	33824020	Dipped Mica " 2PF
C2313	33824101	" " " 100PF
C2305	36825472	Mylar " 0.0047μF
C2304	36825473	" " 0.047μF
C2301	34220105	Electrolytic 16WV 1μF
C2302	34220225	" " 2.2μF
C2310	34220226	" " 22μF
C2311	34220336	" " 33μF

		INDUCTOR
L2303	53020024	Micro Inductor FL-5H-271J 270μH
L2301, 2302, 2304	53020001	" " FL5H102J 1mH
		TRANSFORMER
T2301, 2302	54141700	R12 4170 #220140
		RELAY
RL2301	70000034	BR211AD009-M 9V

AM DET UNIT

Symbol Number	Parts No.	Description
PB-1875A	60418751	Printed Circuit Board
	018751AZ	PCB with Components
		FET & TRANSISTOR
Q2401	22800194	FET 2SK19Y
Q2402	22303724	Transistor 2SC372Y
		DIODE
D2401, 2402	21010070	Germanium 1S1007
		RESISTOR
R2402	40143470	Carbon Film ¼W VJ 47Ω
R2406	40143101	" " " " 100Ω
R2403	40143471	" " " " 470Ω
R2409	40143102	" " " " 1KΩ
R2405, 2411	40143222	" " " " 2.2KΩ
R2410	40143332	" " " " 3.3KΩ
R2407	40143472	" " " " 4.7KΩ
R2404	40143562	" " " " 5.6KΩ
R2408	40143223	" " " " 22KΩ
R2401	40143473	" " " " 47KΩ
		CAPACITOR
C2402–2404, 2410	30820103	Ceramic 50WV 0.01μF
C2405	33824120	Dipped Mica " 12PF
C2401	33824101	" " " 100PF
C2407	36825472	Mylar " 0.0047μF
C2406	36825103	" " 0.01μF
C2408, 2412	36226105	Tantalum 16WV 1μF
C2409	36226475	" " 4.7μF
C2411	34120107	Electrolytic 10WV RE 100μF

AM MOTHER BOARD

Symbol Number	Parts No.	Description
PB-1876A	60418761	Printed Circuit Board
	018761AZ	PCB with Components
		TRANSISTOR
Q2501	22303724	2SC372Y

		DIODE	
D2501	21015550	Silicon	1S1555
		THERMISTOR	
TH2501	29090006	D-33A	
		RESISTOR	
R2501	40143392	Carbon Film ¼W VJ	3.9KΩ
R2503	40143103	" " " "	10KΩ
R2502	40143105	" " " "	1MΩ
R2504	42143682	" Composition ¼W GK	6.8KΩ
		POTENTIOMETER	
VR2501	49905103	SR-19R	10KΩB
		CAPACITOR	
C2502, 2503	30820103	Ceramic 50WV	0.01μF
C2501	30820473	" "	0.047μF
C2504		Tantalum 16WV	10μF
		RELAY	
RL2501	70000013	AE 3244	
		RELAY SOCKET	
RLS2501	69000011	AE-3845	
	91100010	DIGI-KLIP	

CW PEAK FILTER UNIT

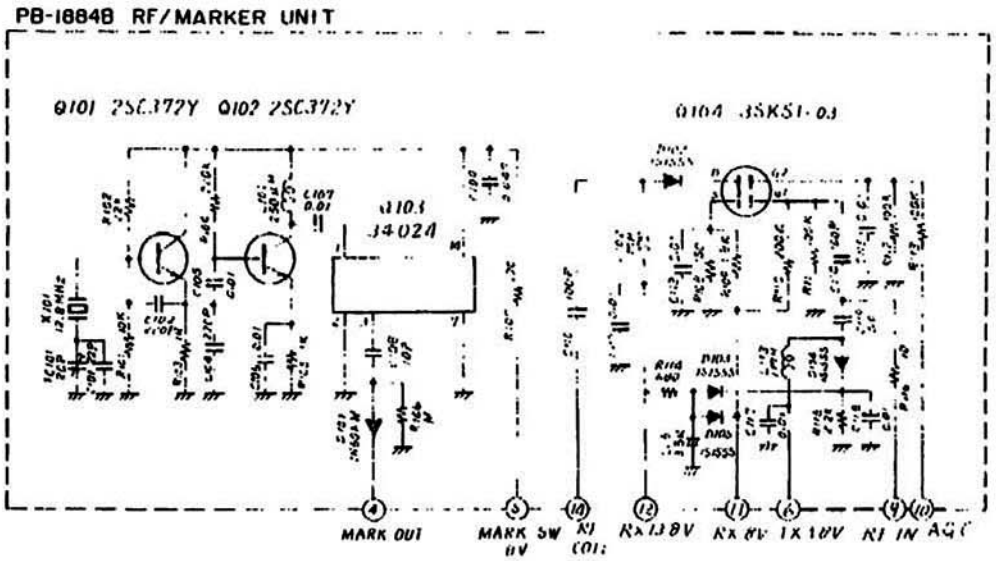
Symbol Number	Parts No.	Description
PB-1882	60418820	Printed Circuit Board
	018820AZ	PCB with Components
		IC & TRANSISTOR
Q2602	25000176	IC MC14016B
Q2603	25000202	IC MC1741
Q2601	22406363	Transistor 2SD636Q
		RESISTOR
R2605	40143820	Carbon Film ¼W VJ 82Ω
R2601	40143682	" " " " 6.8KΩ
R2607–2609	40143103	" " " " 10KΩ
R2604	40143473	" " " " 47KΩ
R2610	40143104	" " " " 100KΩ
R2602	40143124	" " " " 120KΩ
		POTENTIOMETER
VR2601	49800119	PN822H 202V 2KΩB
		CAPACITOR
C2605, 2607	30820103	Ceramic 50WV 0.01μF
C2602, 2603	36825223	Mylar " 0.022μF
C2601, 2606	36226105	Tantalum 16WV 1μF
C2604	36226106	" " 10μF
		INDUCTOR
L2601	53010003	Micro Inductor 250μH
		MINI CONNECTOR
J2601	67070007	5049-07A

AM ALC UNIT

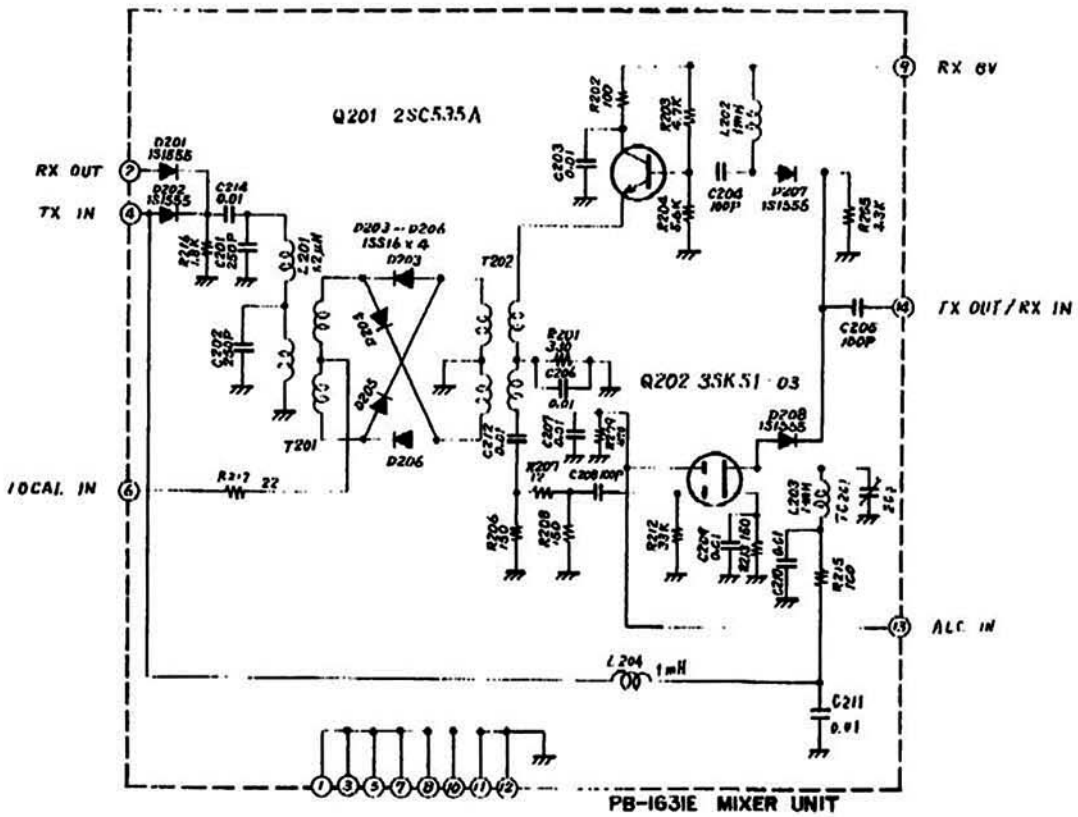
Symbol Number	Parts No.	Description
PB-1937	60419370	Printed Circuit Board
	019370AZ	PCB with Components
		DIODE
D2701, 2702	21010070	Germanium 1S1007
		RESISTOR
R2701	41143392	Carbon Film ¼W TJ 3.9KΩ
R2702	41143682	" " " " 6.8KΩ
		CAPACITOR
C2706	30820103	Ceramic 50WV 0.01μF
C2703	33824100	Dipped Mica " 10PF
C2702	33834700	" " 500WV 70PF
C2701	33834800	" " " 80PF
C2704	33824331	" " 50WV 330PF
C2705	36825472	Mylar " 0.0047μF
C2707	36226106	Tantalum 16WV 10μF
		INDUCTOR
L2701	55003341	#220583
	91100008	Wrapping Terminal

ACCESSORIES

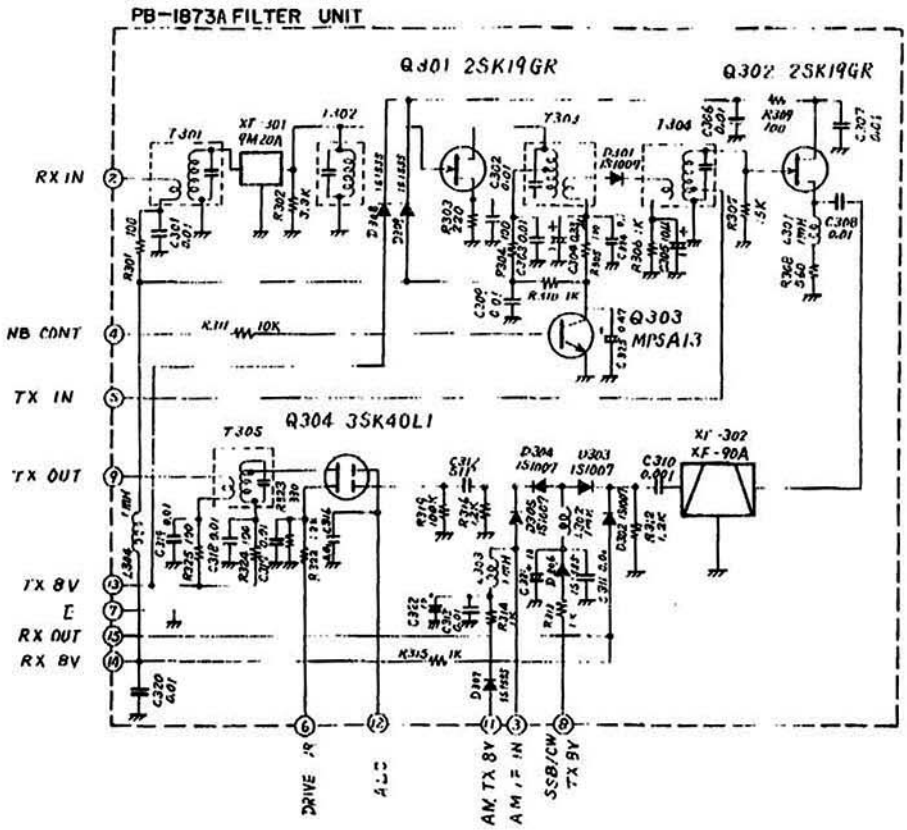
Symbol Number	Parts No.	Description
	77000008	Microphone Assembly YE-7A with Microphone Hanger Screws
	67040001	Microphone Plug FM-144P
	96000036	Power Cord Assembly #240081A
	68060012	Power Plug QMS P6FK
	69030002	Fuse Holder SN 1101
	73000006	Fuse 15A
	73000006	Spare Fuse 15A
	80037871	Mobile Bracket with Screw
	67020005	Coaxial Plug PL-259
	67020003	Phone Plug P-2240
	67030002	Plug Adaptor PD-101



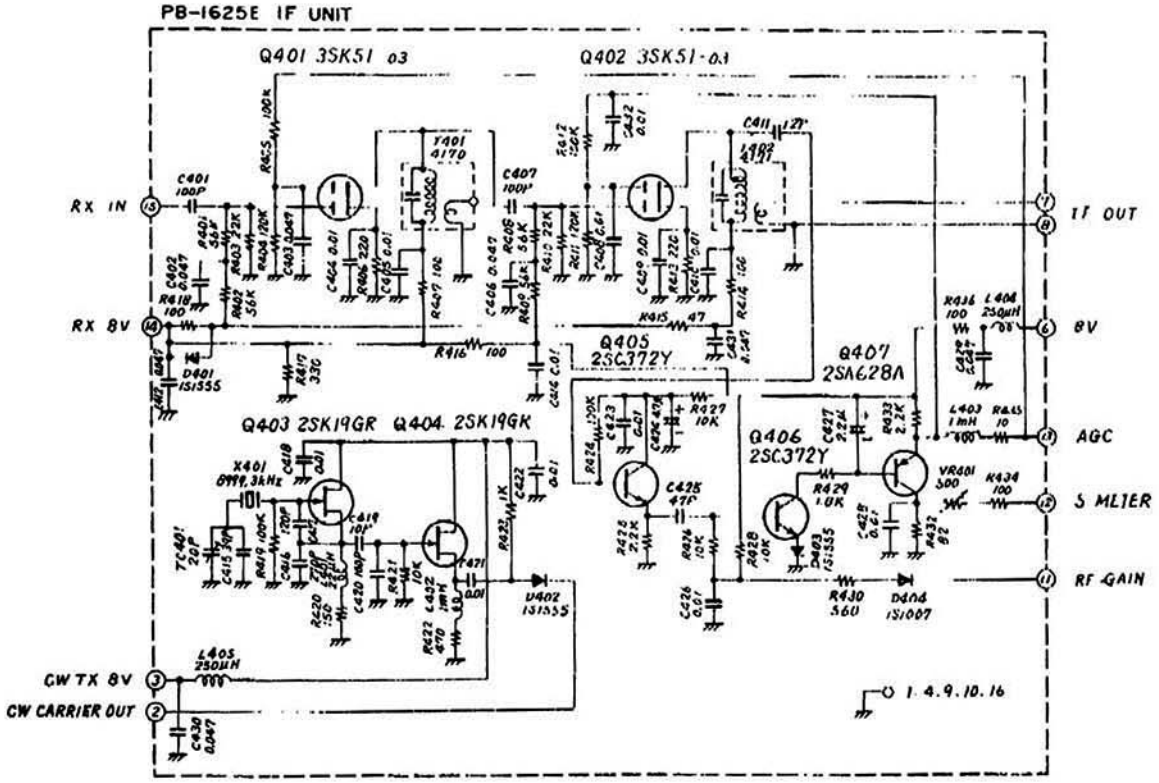
RF/MARKER UNIT(PB-1884B)



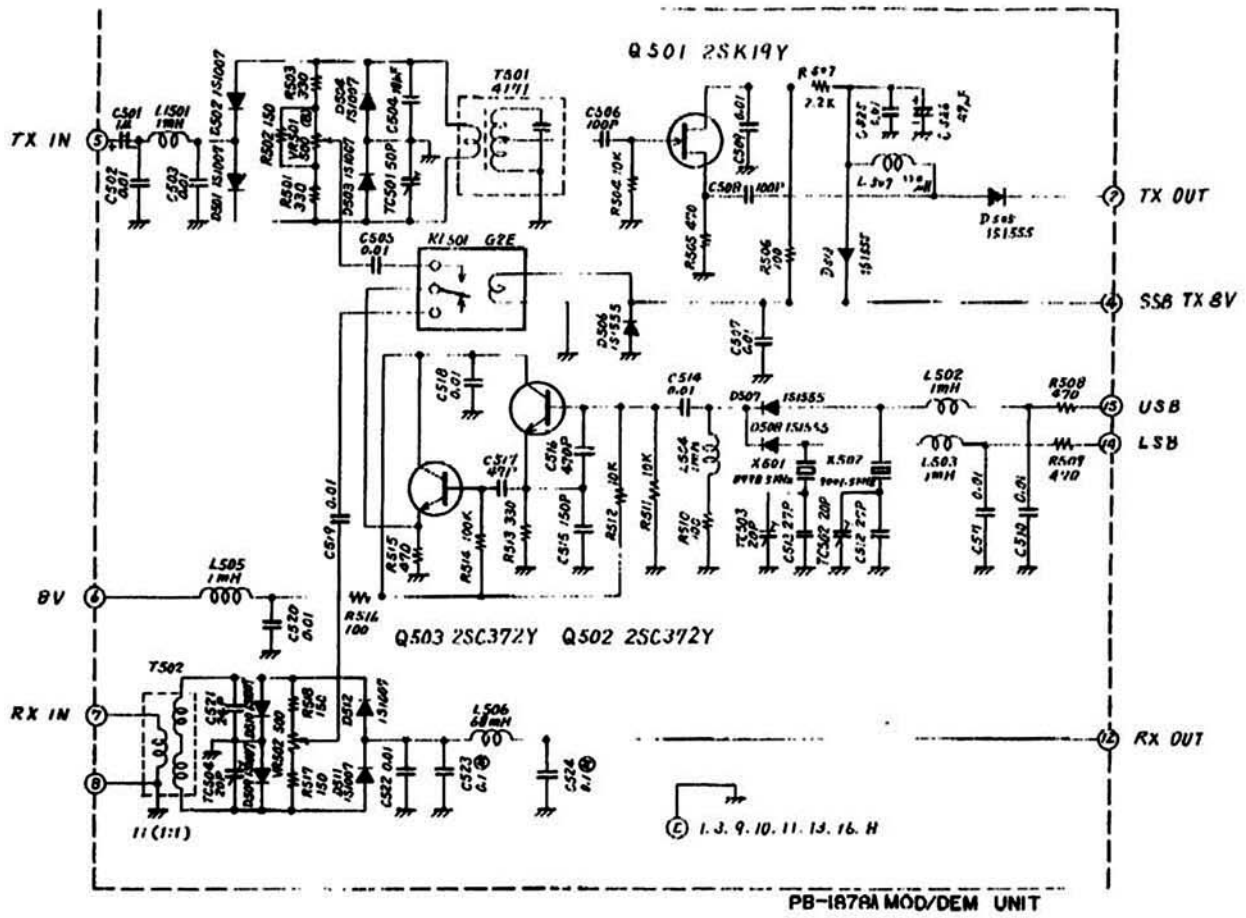
MIXER UNIT(PB-1631E)



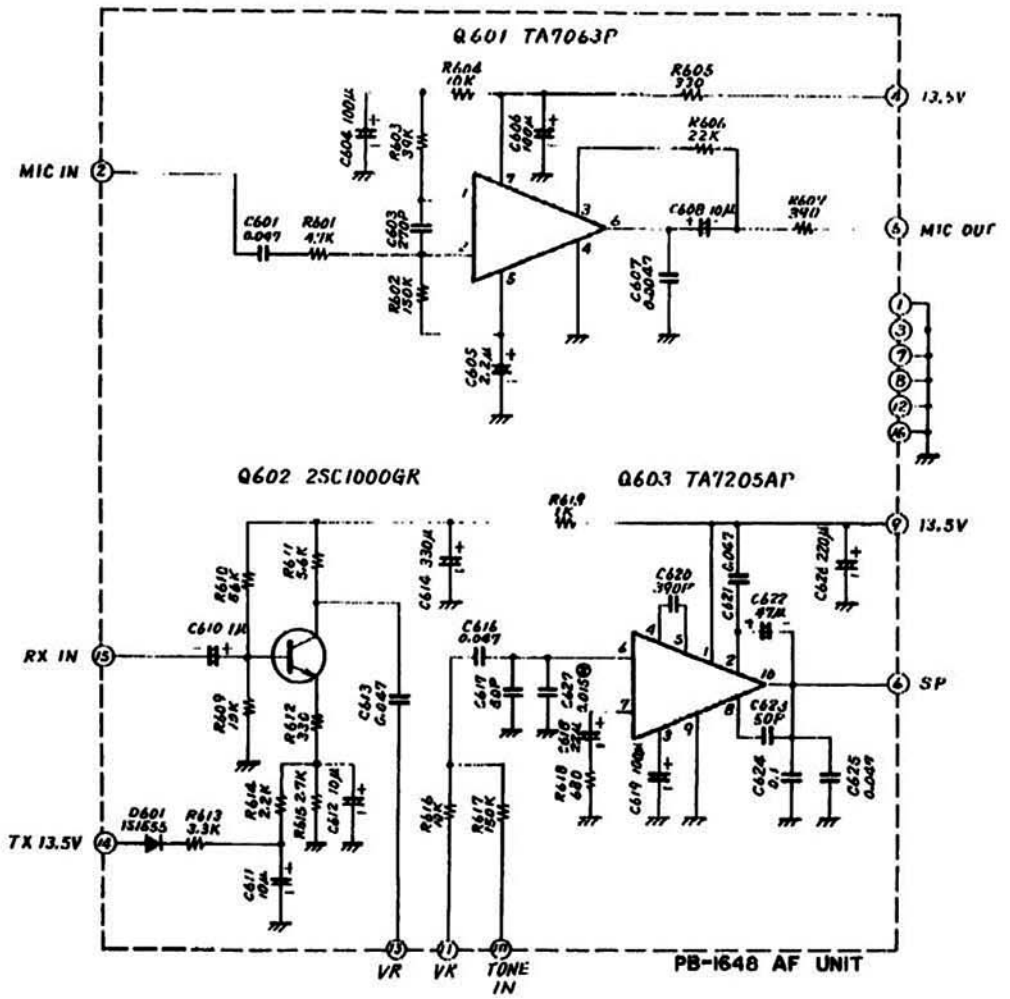
FILTER UNIT(PB-1873A)



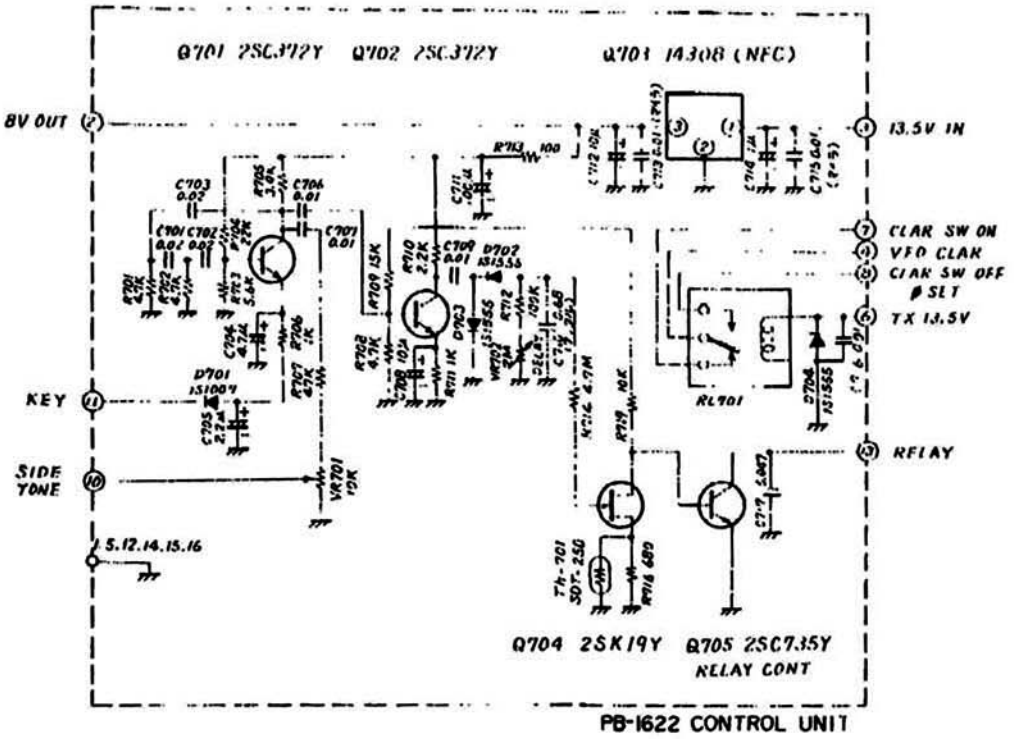
IF UNIT(PB-1625E)



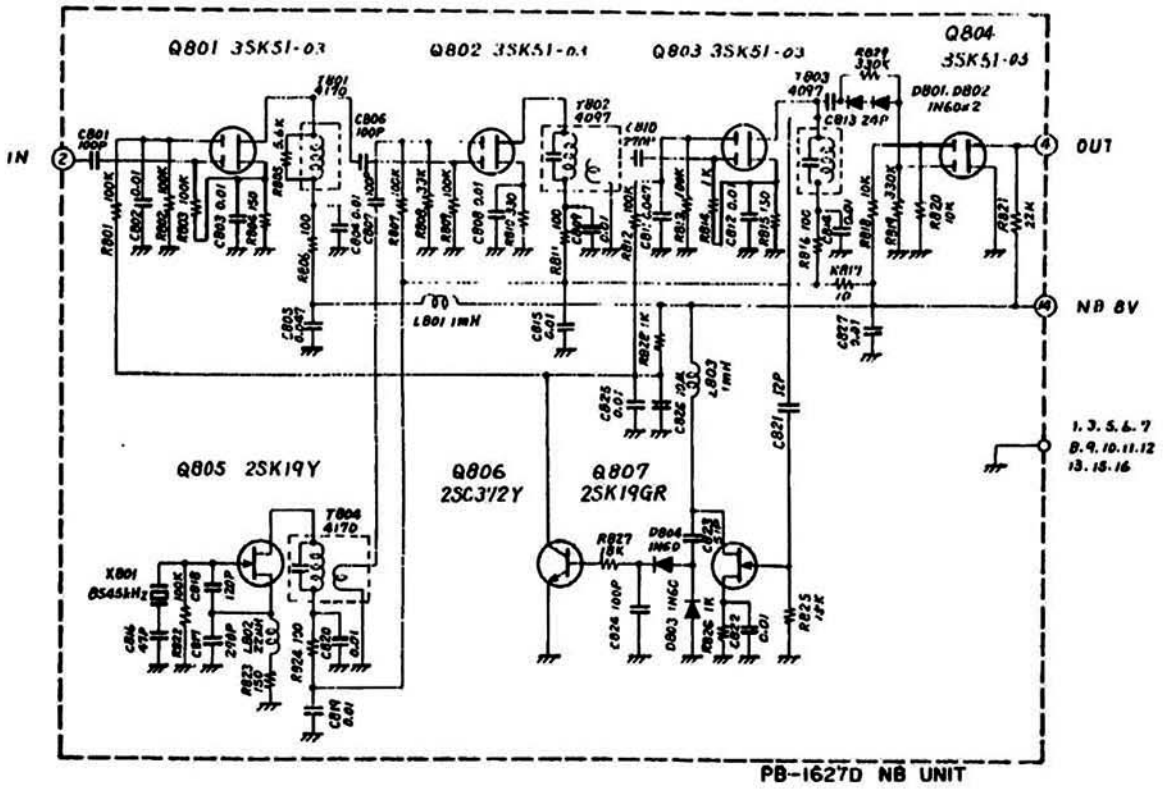
MOD/DEM UNIT(PB-1878A)



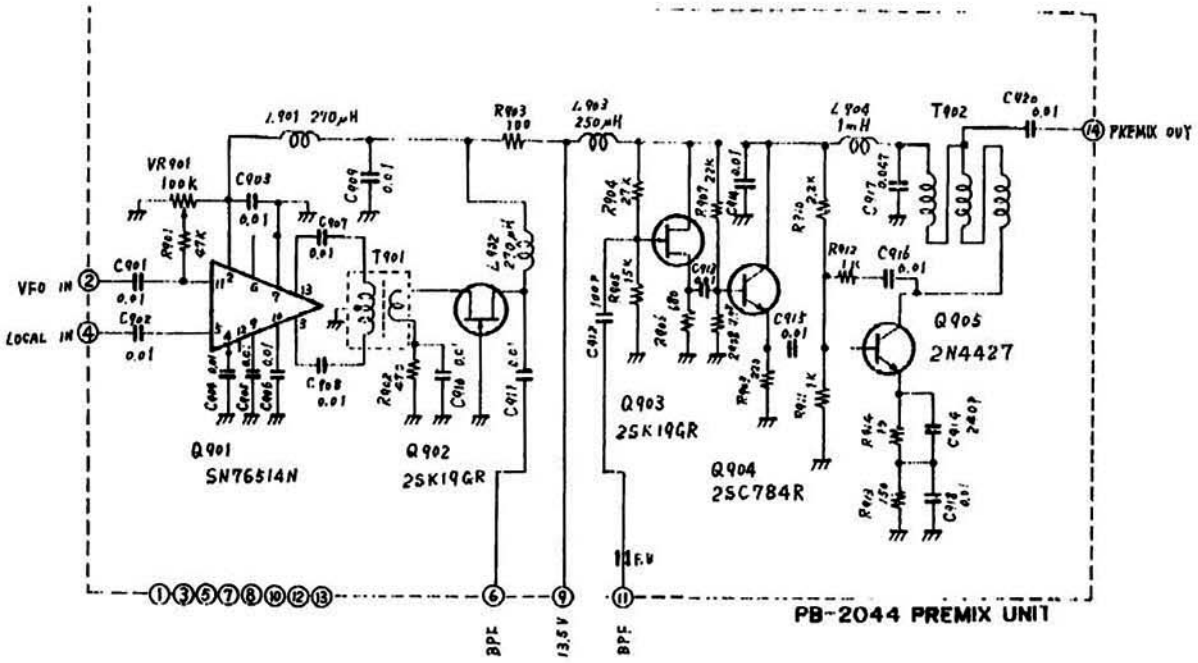
AF UNIT(PB-1648)



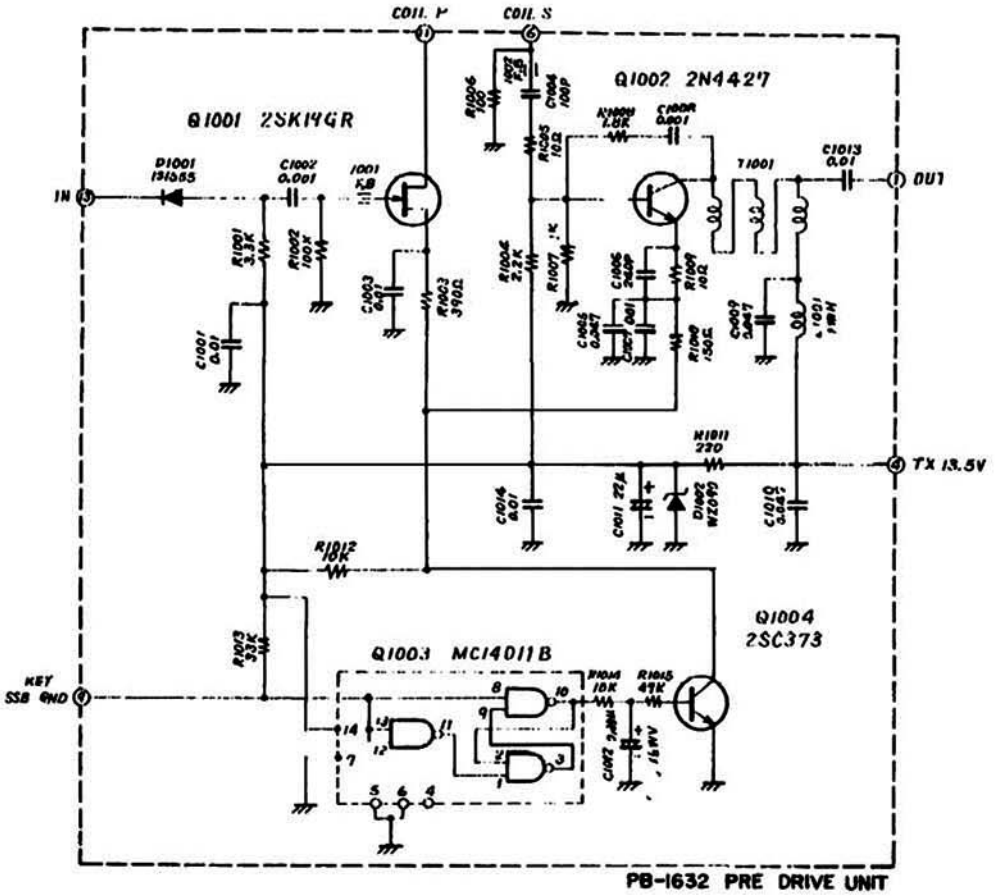
CONTROL UNIT(PB-1622)



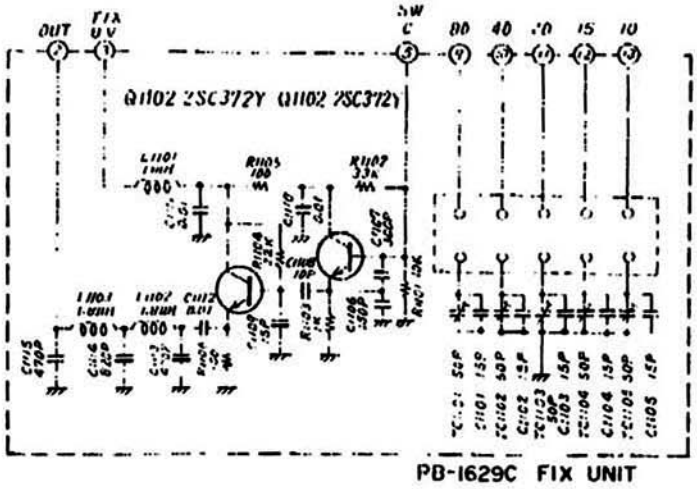
NB UNIT(PB-1627D)



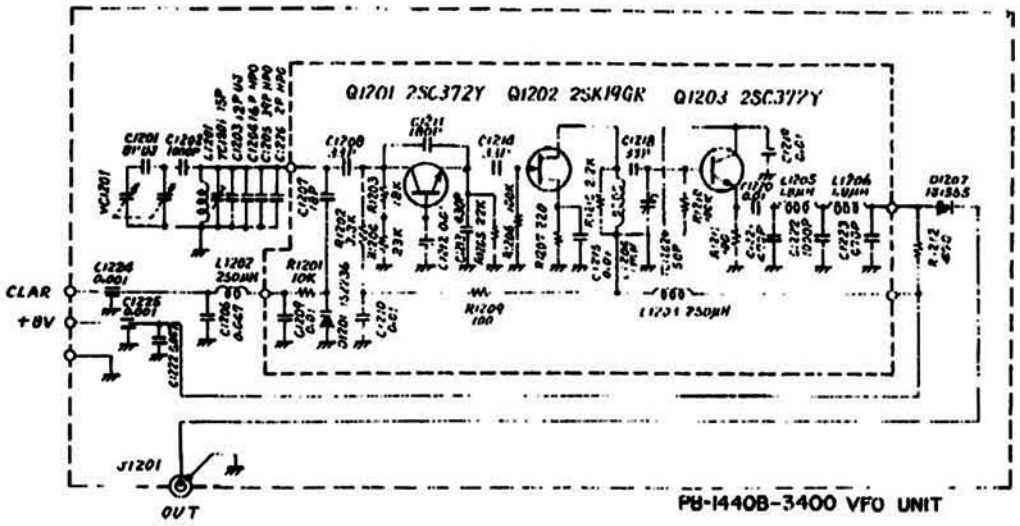
PREMIX UNIT(PB-2044)



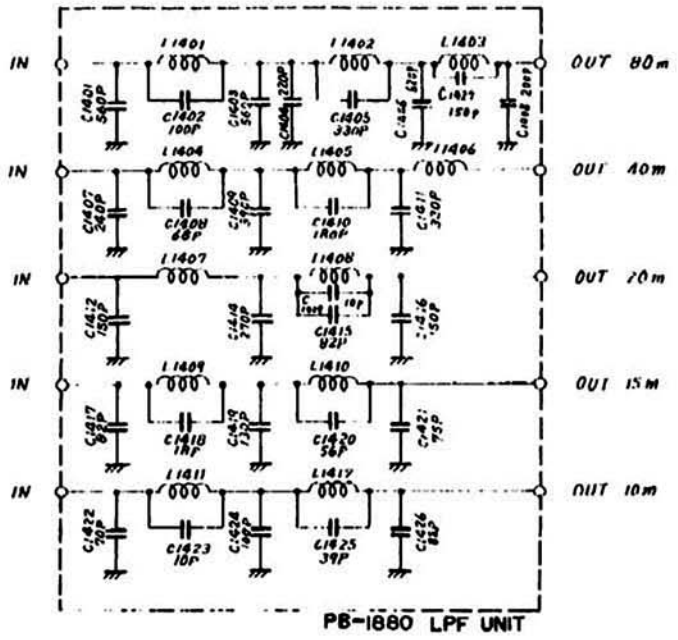
PREDRIVE UNIT(PB-1632)



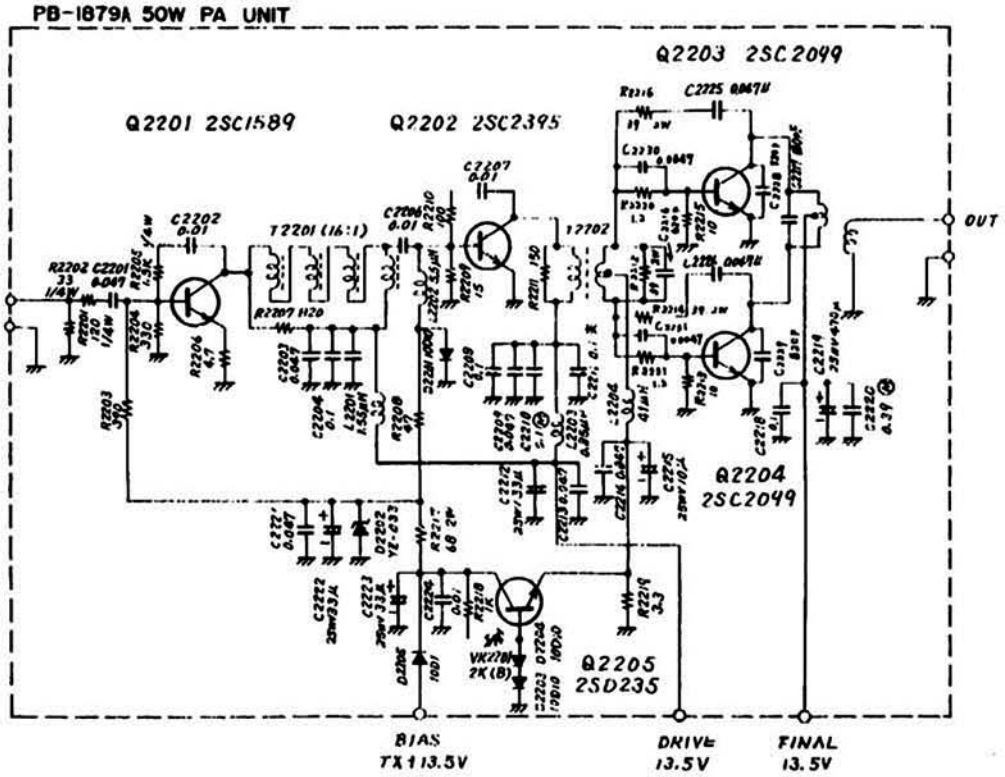
FIX UNIT(PB-1629)



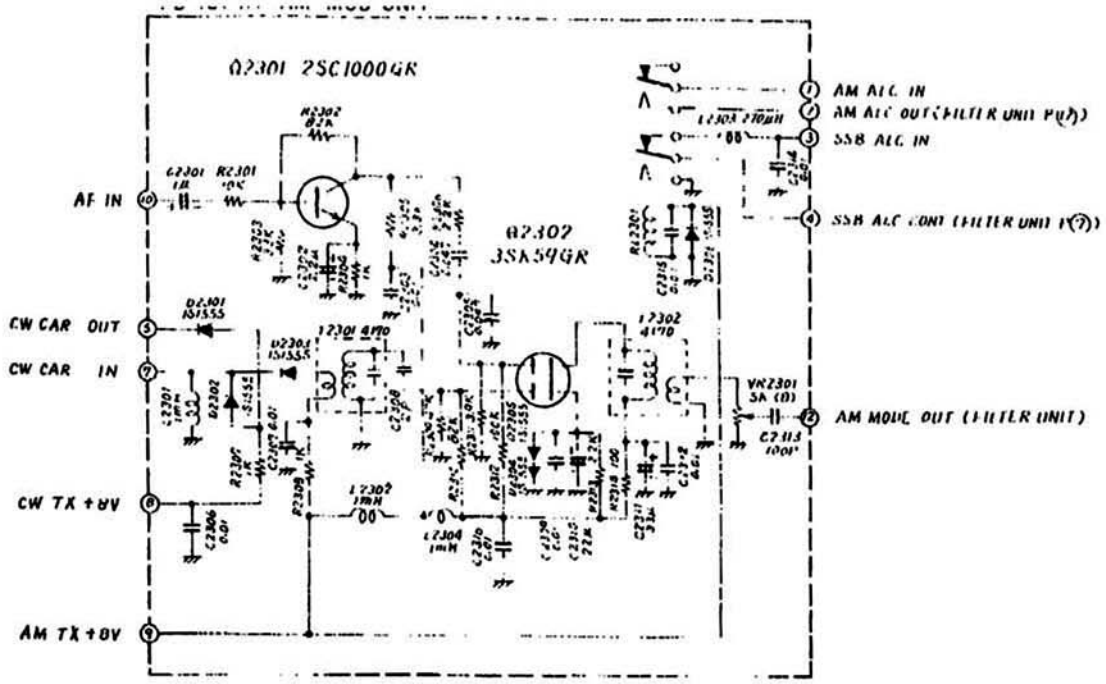
VFO UNIT(PB-1440B-3400)



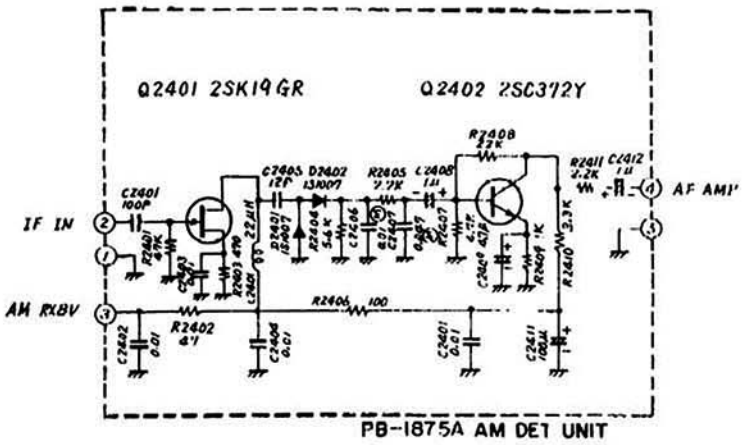
LPF UNIT(PB-1880)



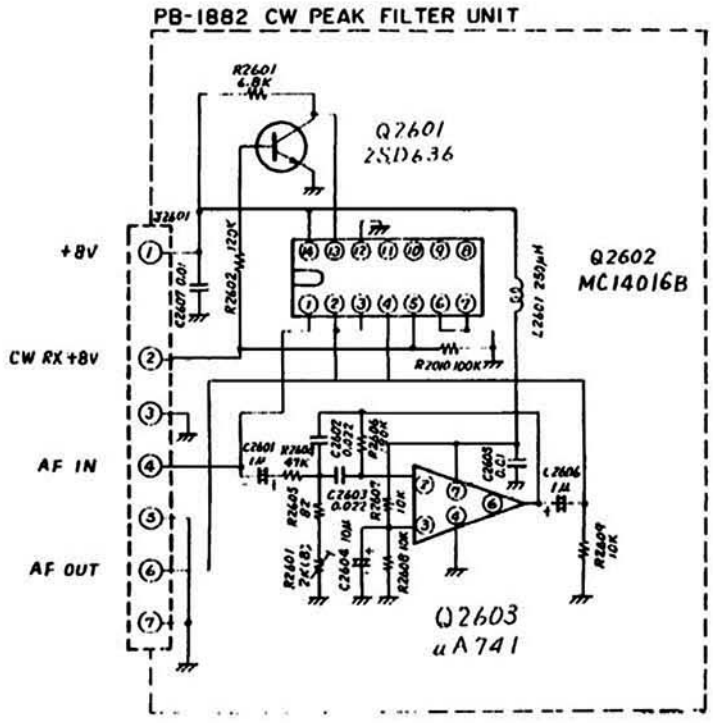
50W PA UNIT(PB-1879A)



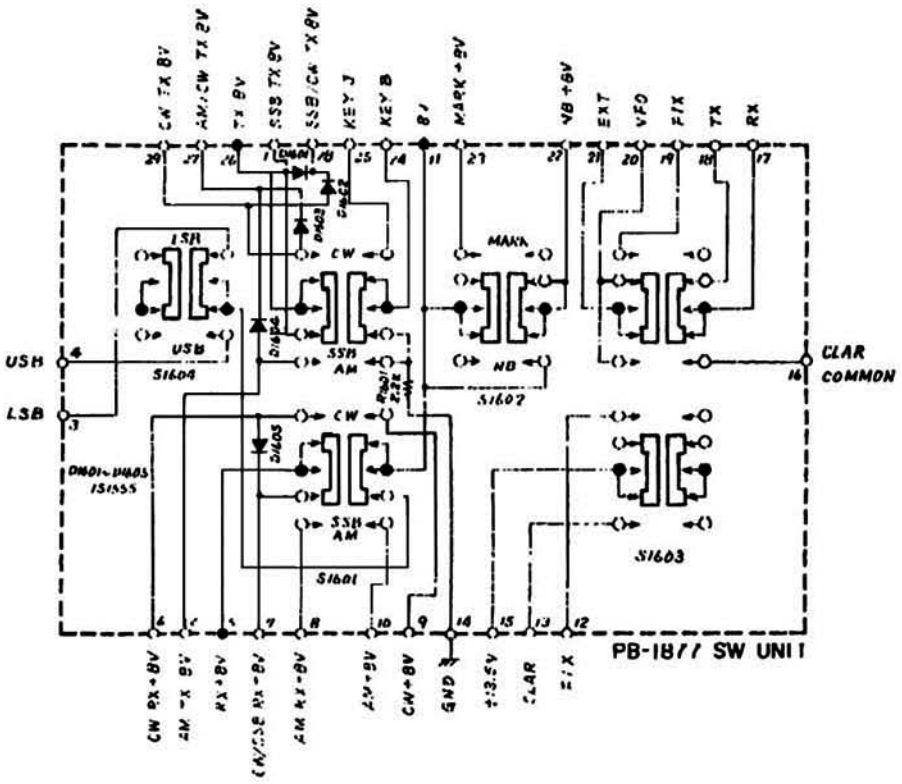
AM MOD UNIT(PB-1874)



AM DET UNIT(PB-1875)

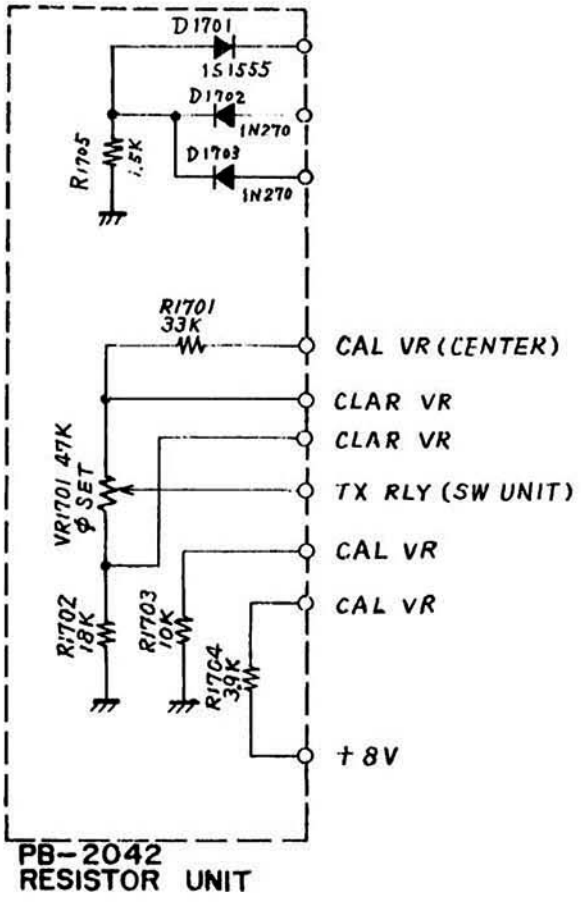


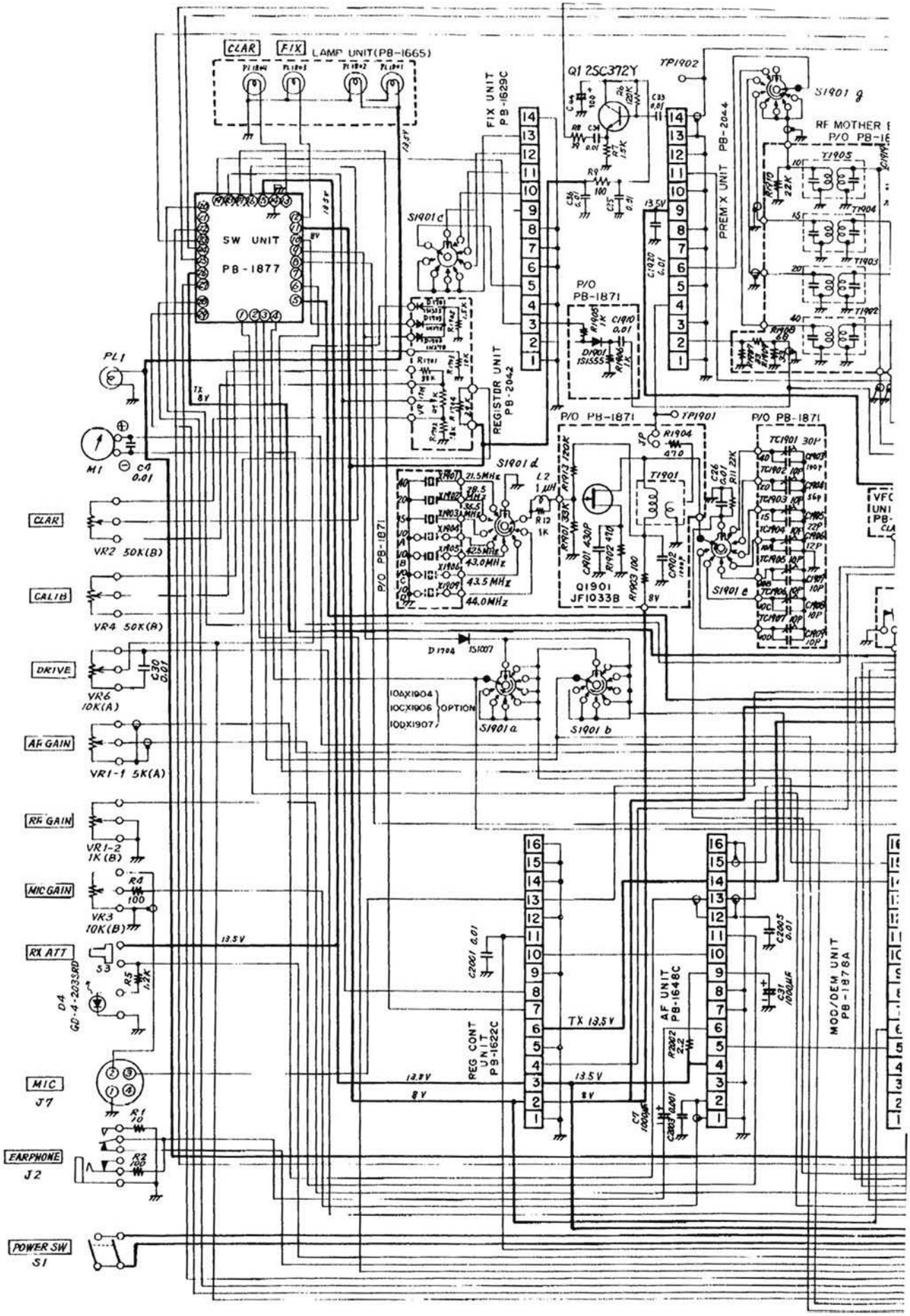
CW PEAK FILTER UNIT(PB-1882)

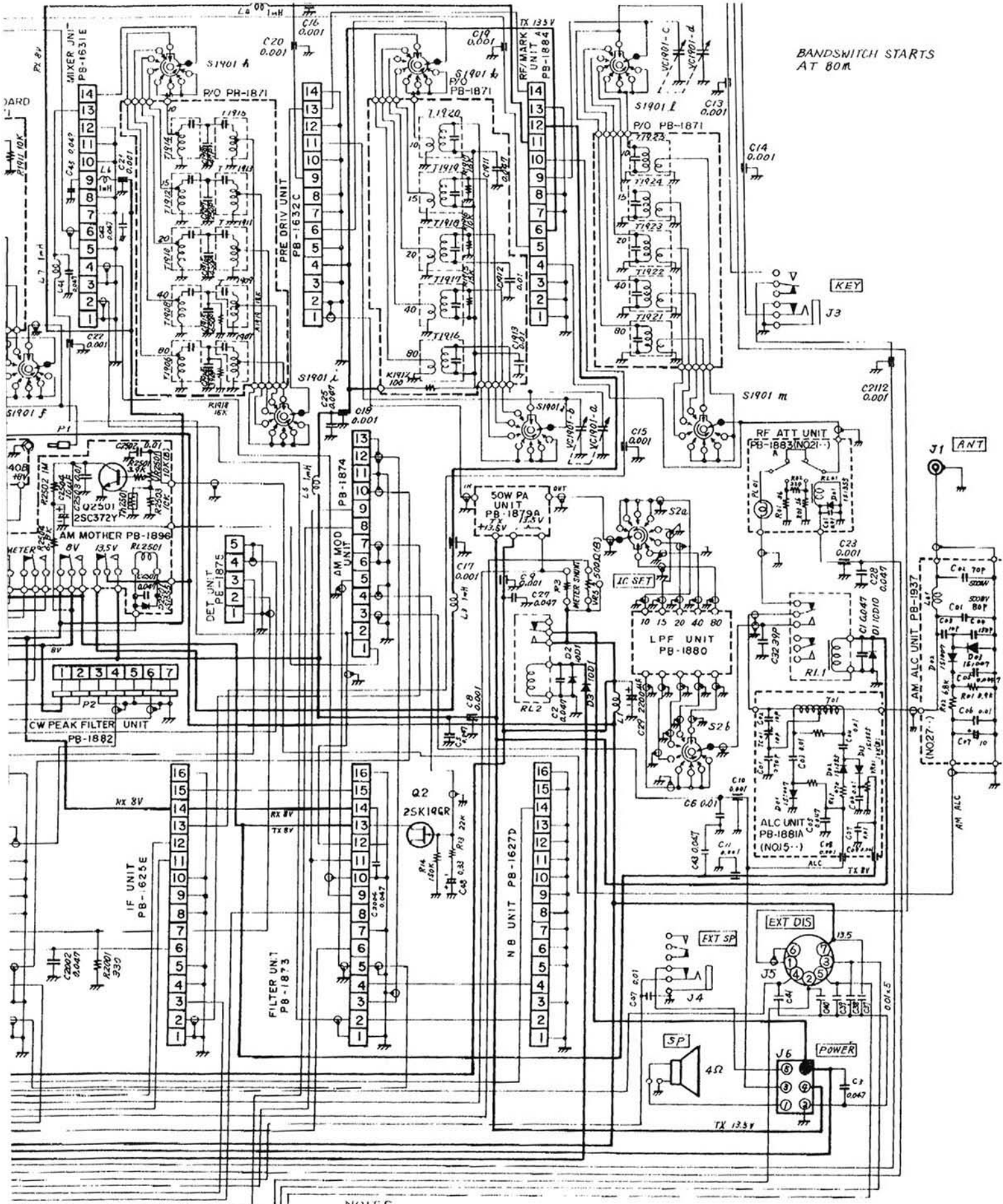


S1601	MODE	SW	AM · SSB · CW	
S1602	NB	SW	NB	OFF MARK
S1603	VIO	SW	CLAR	VIO · FIX
S1604	LSB-USB	SW	USB	LSB

SW UNIT(PB-1877)




CLAR
FIX
LAMP UNIT(PB-1665)
SW UNIT
PB-1877
FIX UNIT
PB-1629C
REGISTOR UNIT
PB-2042
Q1 2SC372Y
PREMIX UNIT PB-2044
P/O PB-1871
Q1901
JF1033B
S1901 a
S1901 b
S1901 c
S1901 d
S1901 e
S1901 g
PL1
M1
CLAR
VR2 50K(B)
CALIB
VR4 50K(B)
DRIVE
VR6
10K(A)
AF GAIN
VR1-1 5K(A)
RF GAIN
VR1-2
1K(B)
MIC GAIN
VR3
10K(B)
RX ATT
D4
GD-4-203SRD
MIC
J7
EARPHONE
J2
POWER SW
S1
10AX1904
10CX1906
10DX1907
OPTION
REG CONT UNIT
PB-1622C
AF UNIT
PB-1648C
MOD/DEM UNIT
PB-1878A
TX 13.5V
13.5V
8V



NOTES

1 ALL RESISTORS IN Ω 1/4 W ±10% UNLESS OTHERWISE NOTED

2 ALL CAPACITORS IN μF 50WV UNLESS OTHERWISE NOTED

FT-7B

CONNECTION DIAGRAM