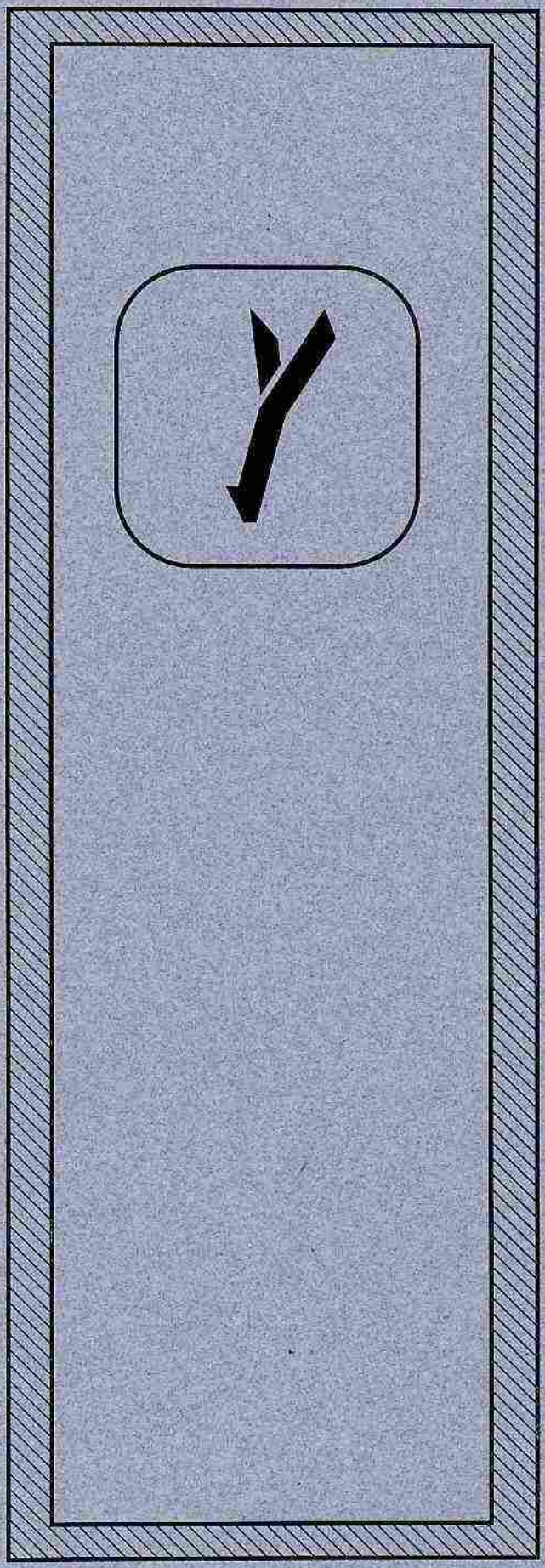


YAESU

INSTRUCTION MANUAL

FT-627RA

SCANNING MEMORIZER 6 METER FM TRANSCEIVER

YAESU MUSEN CO., LTD.
TOKYO JAPAN

TABLE OF CONTENTS

FT-627RA SCANNING MEMORIZER
6 METER FM TRANSCEIVER

The FT-627RA is a PLL synthesized FM transceiver, designed to provide high performance for the discriminating 6 meter operator.

Channel selection is by means of a photo-interrupter scheme, providing selection of as many as 600 PLL channels between 51 and 54 MHz. This optical coupling system eliminates noisy, unreliable rotary switches used in other makes of equipment. Digital display of the last four digits of the operating frequency is provided.

A memory circuit allows storage and recall of two simplex and four repeater channels, with the press of a switch. The memorized frequency may be held when the power switch is turned off, via the backup circuitry.

For repeater operation, ±1 MHz split is provided, and auxiliary splits may be programmed using the memory system. Tone burst generation is provided, and a subaudible tone squelch (CTCSS) encoder/decoder is an available option for your FT-627RA.

Superb operating convenience is provided by the PLL scanner, allowing up/down scanning control from the microphone, without rotation of the main tuning dial.

Your FT-627RA represents the latest developments in solid-state technology. With proper care, and if the directions to follow are observed without fail, your FT-627RA will provide many years of trouble-free operation. The owner is encouraged to read this manual in its entirety, so as to become better acquainted with the exciting new FT-627RA, the latest development from the hams at YAESU.

SPECIFICATIONS

GENERAL

Frequency Coverage
51—54 MHz

Number of Channels
600 channels

Speaker
Internal 3" dynamic speaker with provision for connecting an external 8 ohm dynamic speaker.

Microphone
Dynamic push-to-talk microphone with retractable coiled cord. Impedance is 600 ohms.

Power Requirement
13.8 Volts DC, ± 10%.

Current Consumption
0.5 Amps Receive.
2.5 Amps Transmit.

Metering
Illuminated front panel meter indicates relative received signal strength and transmitter power output.

Dimensions
180 (W) x 60 (H) x 220 (D) mm

Weight
2.7 kg.

TRANSMITTER

RF Input
20 Watts DC at 13.8 Volts DC

Modulation
F3

Deviation
±5 kHz.

Audio Response
+1, −3 dB of 6 dB/Octave pre-emphasis characteristic from 300 to 2500 Hz.

Spurious Emissions
60 dB below carrier minimum

Tone Burst
Nominally one second at 1800 Hz.

Repeater Split
±1 MHz or any frequency in 5 kHz increments

RECEIVER

Type
Double conversion super-heterodyne

Intermediate Frequency
10.81 MHz first IF; 455 kHz second IF

Sensitivity
0.3 μV for 20 dB quieting.

Selectivity
± 6 kHz at 6 dB; ±12 kHz at 60 dB

Audio Output
1.5 Watts at 8 ohms

SPECIFICATIONS SUBJECT TO CHANGE WITHOUT NOTICE.

SEMICONDUCTOR COMPLEMENT

FET

2SK19BL	1	3SK51-03	6
2SK19GR	2		

TRANSISTORS

2SA496(O)	1	2SC1815Y	5
2SA564	1	2SC2053	1
2SC372Y	28	2SD235(O)	1
2SC373	1	MPSA13	1
2SC535A	2	MRF237	1
2SC785BN	1	MRF479	1

IC

CD4039AE	2	MSM561	3
MC14011B	2	TC5081P	1
MC14013B	1	μPC575C2	1
MC14028B	1	μPC577H	1
MC14069B	2	μPC14305	1
MC14081B	1	μPC14308	1
MC14510B	3	μPD857C	1
MC14584B	1		

PHOTO INTERRUPTERS

ON1105	2

GERMANIUM DIODES

1S188FM	10

SILICON DIODES

1S1555	59	MI301	3
1SS53	8	U05B	1

VARACTOR DIODES

1S2209	7	MV104	1
1SV50	1		

VARISTOR DIODE

MV103	1

ZENER DIODE

RD6.8EB	1	WZ050	3

DISPLAY LED

TLR312D	4

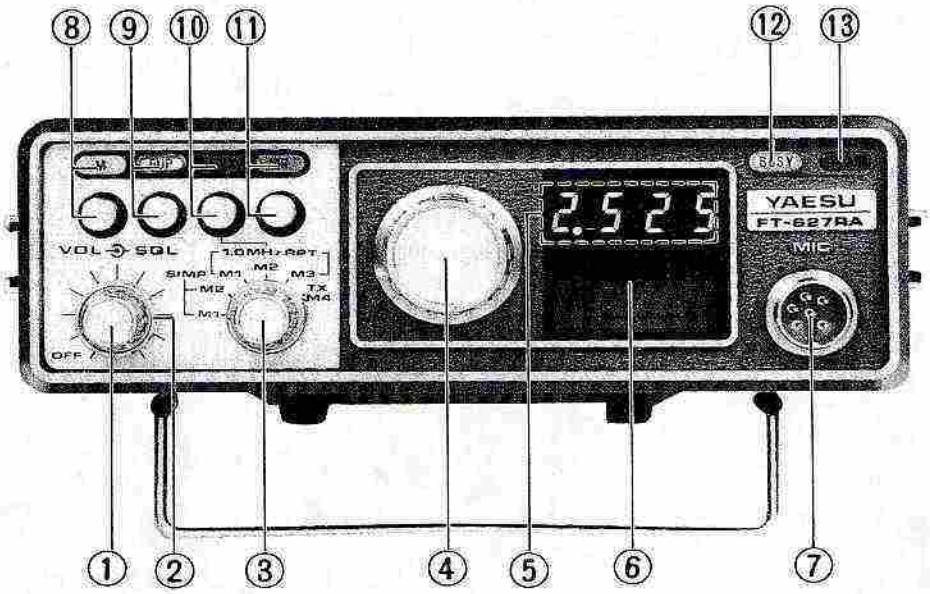
ACCESSORIES

The following accessories are included with this transceiver:

1. Dynamic microphone with retractable, coiled cord.
2. Mobile mounting bracket with hardware.
3. DC power cable.
4. Cigarette lighter adapter.
5. Spare fuses.
6. Microphone hanger.
7. Miniature phone plug for external speaker.
8. Accessory plug (must be inserted in rear of transceiver at all times).

CONTROLS & SWITCHES

The FT-627RA has been designed for ease of operation. However, the operator may not be familiar with some controls, since it utilizes modern computer technology. Be sure you thoroughly understand the function of each control and indicator before operating the equipment.



(1) Vol inner control

The VOLUME control adjusts the receiver audio output level and turns power off when rotated to and extreme CCW position.

(2) SQL Outer control

The SQUELCH control adjusts the receiver squelch threshold sensitivity.

(3) FUNCTION switch

This switch selects the transmit frequency. Positions M1 and M2 (SIMP) can be used for simplex operation. Positions M1 — M3 can be used for ± 1 MHz split, for repeater operation. M4 is used for programming an auxiliary split of up to 3 MHz. Refer to the section on operation for details.

(4) Channel Selector

Endless optical coupling selects 600 channels.

(5) DIAL Display

The digital display indicates the operating frequency.

(6) METER

The meter indicates the signal strength on receiver and the relative power output on transmit.

(7) MIC receptacle

Six pin connector is used for microphone input and push-to-talk relay actuation.

(8) MEMORY switch

When pressed, the frequency on the dial is memorized, and the M lamp lights up. To release the memorized frequency, press the switch a second time.

(9) 5UP switch

Press this switch to shift the channel frequency 5 kHz up.

(10) +TX

This switch is used to select the direction of the repeater split. When the switch is not pushed, repeater split of −1 MHz is selected. With the switch pushed, repeater split of +1 MHz is selected. Refer to the section on repeater operation.

(11) MEMORY RECALL switch

When switch is pressed, the memorized frequency is recalled, and the MR lamp lights up.

(12) BUSY indicator

The lamp lights up when a signal is received.

(13) ON AIR indicator

The lamp lights up when in the transmit mode.

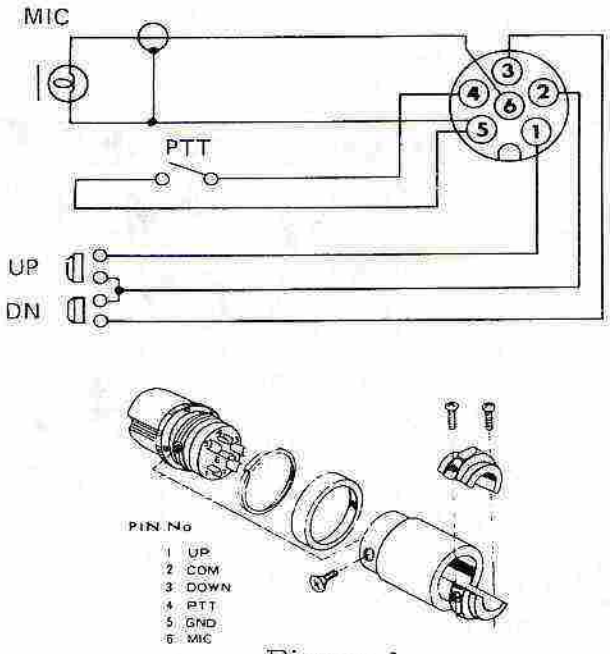


Figure 1
Microphone Connections

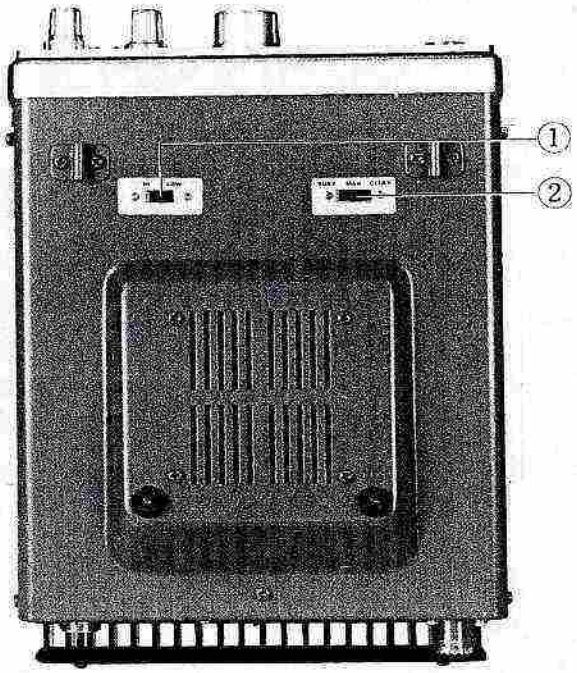
CABINET BOTTOM

(1) BURST

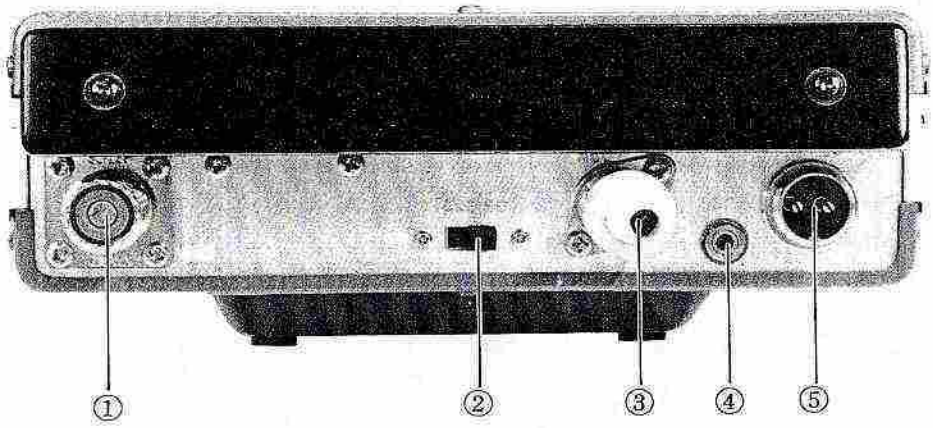
When this switch is in the ON position, a short duration audio tone of 1800 Hz will be superimposed on the transmitted signal. This is normally used only with repeaters requiring tone access.

(2) BUSY/MAN/CLEAR

This switch selects the mode of the PLL scanner. In the BUSY position, the scanner will search until it finds an occupied channel (one containing a signal strong enough to trip the FT-627RA squelch). In the MAN position, scanner stop commands come exclusively from the microphone. In the CLEAR position, the scanner will search until it finds a channel which has no signal present.



REAR PANEL



(1) ANT receptacle

UHF type coaxial receptacle for connection of antenna.

(2) TONE SQUELCH switch

An optional TONE SQUELCH circuit is activated when switch is placed in ON position.

(3) ACC socket

The ACCESSORY socket is used for external control of the transceiver.

(4) SP receptacle

Audio output is provided at this receptacle for an external speaker (output impedance is 8 ohms, and the internal speaker will be disabled when a plug is inserted).

(5) POWER receptacle

A two-pin connector is used for connection to 13.8 Volt DC (negative ground) power source, vehicle battery, or AC power supply.

CAUTION

IMPROPER FUSE REPLACEMENT CAN CAUSE PERMANENT DAMAGE IN THE EVENT OF UNUSUAL OPERATING CONDITIONS. OUR WARRANTY DOES NOT COVER DAMAGE CAUSED BY IMPROPER FUSE REPLACEMENT USE ONLY A 3 AMPERE FUSE.

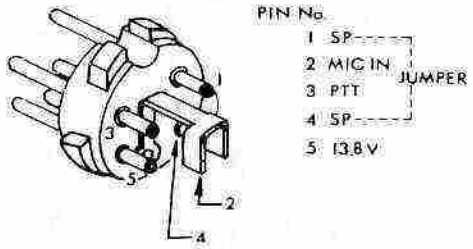


Figure 2

ACC (TONE IN) PLUG CONNECTIONS

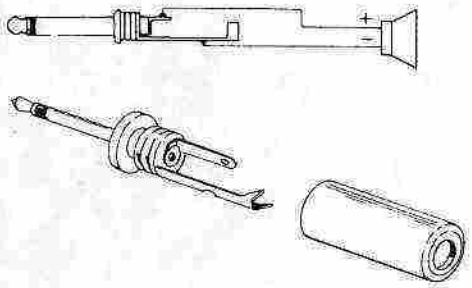


Figure 3

EXTERNAL SPEAKER PLUG CONNECTIONS

INSTALLATION

The FT-627RA transceiver is designed primarily for mobile service, requiring only an antenna and 13.8 volt DC power source for operation. The transceiver has been pre-tuned at the factory, and requires no further adjustment for normal operation into a 50 ohm load.

Under no circumstances should the power cable ever be connected to AC power. OUR WARRANTY DOES NOT COVER DAMAGE CAUSED BY APPLICATION OF AC POWER TO THE POWER JACK ON THE REAR APRON OF THE TRANSCEIVER.

ANTENNA CONSIDERATIONS

In antenna installations, it is desirable that the antenna be located as high and in the clear as possible. In addition, be certain that the SWR on the feedline is less than 1.5 : 1. A higher SWR may cause a reduction in power output, because of the protective circuitry incorporated in design. As well, high SWR will increase the feedline losses.

In all installations, do not economize on coaxial cable. For mobile applications, in which the feedline length is 20 feet or less, type RG-58A/U cable is satisfactory, and the foam types are preferred, because of their lower loss. For base station systems, type RG8A/U may be used for moderate lengths; for very long cable installations, we recommend the use of type RG-17A/U, air-dielectric "heliax" cable, or aluminum-jacketed "foamflex" coax. Beware of "bargain" coax, as the shield coverage may be very poor, and this can seriously degrade system performance.

BASE STATION INSTALLATION

As base station, the FT-627RA requires a power source of 13.8 volts DC at 2.5 amperes. A base station stand is included with your transceiver, for easy viewing.

MOBILE INSTALLATION

For mobile service, the FT-627RA may be installed where the controls, indicators, and microphone are easily visible and accessible for operation. The unit may be mounted in any position without loss of performance. Suitable locations are atop the transmission tunnel, under the dash, etc. A universal bracket is supplied with the transceiver for this purpose. Install the FT-627RA as follows (refer to Figure 4):

1. Use the universal mounting bracket as a template to locate the mounting holes. Use a 3/16" diameter drill bit 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 Figure 4 .

2. Install the transceiver in the mounting bracket, sliding it into the guide rail of the bracket. Tighten the screws on both sides.

3. The microphone hanger may be affixed in any convenient place for handling the microphone.

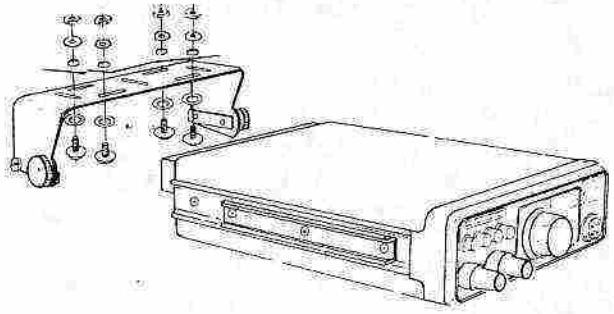


Figure 4

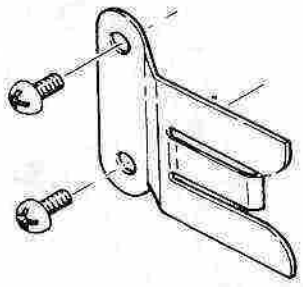


Figure 5

4. The supplied power cable may be plugged directly into the vehicle's cigarette lighter receptacle, for casual use. For permanent installation, the lighter plug may be removed, and the leads routed directly to the battery (red to positive, black to negative or ground). Alternatively, the power leads may be routed to the nearest power terminal, e.g. ignition switch, fuse block, etc. If it is necessary to extend the power leads, use the shortest length possible, and use only #16 AWG insulated copper wire (or larger) to avoid excessive voltage drop.

CAUTION

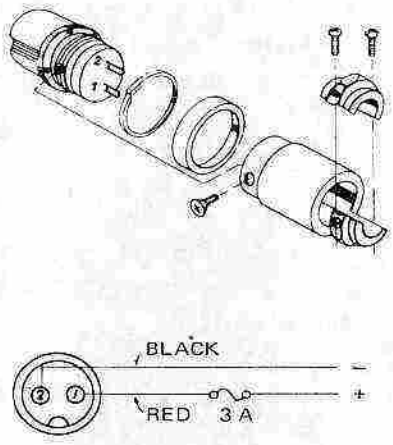
BEFORE CONNECTING THE POWER CONNECTOR TO THE TRANSCEIVER, CHECK THE BATTERY VOLTAGE WITH THE ENGINE RUNNING (BATTERY CHARGING). IF THE VOLTAGE EXCEEDS 15 VOLTS DC, THE VEHICLE VOLTAGE REGULATOR SHOULD BE ADJUSTED TO PROVIDE A MAXIMUM CHARGING RATE OF LESS THAN 15 VOLTS DC. ALSO, BE CERTAIN TO OBSERVE PROPER POLARITY WHEN MAKING BATTERY CONNECTIONS. THE RED LEAD IS CONNECTED TO THE POSITIVE BATTERY TERMINAL, WHILE THE BLACK LEAD IS CONNECTED TO THE NEGATIVE TERMINAL. REVERSED POLARITY WILL NOT DAMAGE THE FT-627RA BECAUSE OF THE PROTECTIVE CIRCUITRY INCORPORATED; HOWEVER, THE TRANSCEIVER WILL NOT OPERATE UNDER THESE CONDITIONS.

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

6. Connect the 50 ohm antenna cable to the ANT receptacle on the rear apron of the transceiver.

7. Connect the microphone cable to the 6-pin microphone receptacle on the front panel of the transceiver.

8. An external 8 ohm speaker may be connected at the SP receptacle on the rear panel, if desired. This will automatically disconnect the internal speaker. Use the external speaker plug supplied.



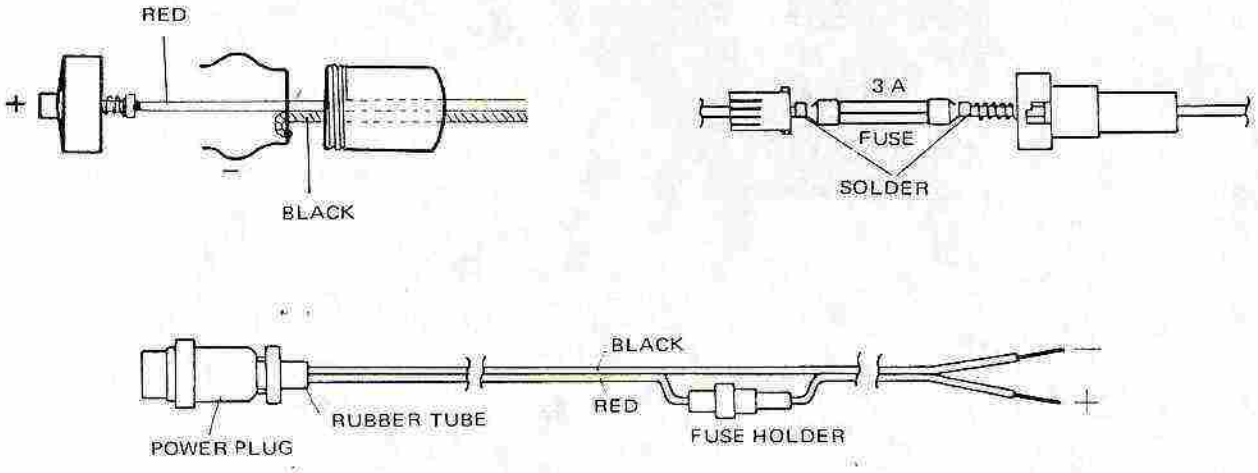


Figure 6

POWER CABLE CONNECTIONS

OPERATION

INITIAL CHECK

1. Rotate the VOLUME control in a clockwise direction to apply power. The meter will become illuminated, and the digital display will indicate "3.000" initially. With the 5 UP button pressed, the display will indicate "3.005".

2. Rotate the SQUELCH control fully counterwise.

3. Adjust the VOLUME control for a normal listening level on an incoming signal or the background noise.

4. Rotate the main tuning dial to find a clear channel (background noise only). Advance the SQUELCH control clockwise until the receiver is just silenced and the BUSY lamp turns off. Perform this step carefully so as not to go beyond the threshold point; if you do, the receiver will not respond to weak signals.

FREQUENCY SELECTION

The channel selection knob selects the operating frequency in 10 kHz steps. Clockwise rotation of the main dial increases the frequency up to 54.000 MHz, while counterclockwise rotation lowers the frequency to 50.990 MHz. On 50.990 and 54.000 MHz, the transmitter is disabled, preventing out-of-range operation. This protection applies, as well, to memorized frequencies, in addition to dial frequencies.

CAUTION

CHANNEL SELECTION MUST NOT BE MADE WHILE THE PUSH-TO-TALK SWITCH IS ACTIVATED FOR TRANSMISSION.

SCANNER OPERATION

The PLL scanner will allow remote scanning for easy frequency change. Set the BUSY/MAN/CLEAR switch to MAN. Now, pressing the UP switch on the microphone for an instant will shift the operating frequency up 10 kHz. Pressing the DN switch will, likewise, lower the operating frequency 10 kHz.

Now, press the UP switch, and hold it in the depressed position. After an initial shift of 10 kHz, and a delay of approximately 1 second, the scanner will be activated, and the frequency will be shifted rapidly upward until the UP or DN switch is pressed again, at which time the scan will be halted. When the upper band edge is reached, the scan will reverse itself, and will begin scanning in a lower direction.

The same relations apply when the DN switch is pressed, except that when the lower band edge is reached, the scanner will reverse itself and begin scanning upward.

To set the scanner for searching for an occupied channel, set the BUSY/MAN/CLEAR switch to BUSY. Now, when the scanner is activated, the scan will be halted whenever the squelch is activated by an incoming signal. If the squelch is not adjusted to silence the receiver (with no signal present), the scanner will advance only 10 kHz per press, thinking that an occupied channel has been found.

To set the scanner for searching for a clear channel, set the BUSY/MAN/CLEAR switch to CLEAR. Now, the scanner will halt when the squelch is silenced (no signal present).

Whether in the BUSY, MAN, or CLEAR modes, the scan may be halted at any time by pressing either the UP or DN switches while scanning. If the PTT switch is pressed while scanning, the scan will be halted and transmission will occur on the frequency on which the scan was halted.

MEMORY OPERATION

Select the channel desired with the main dial or scanner controls. Set the FUNCTION switch to M1 (SIMP), and press the M (Memory) switch. Now the frequency on the dial is memorized, and both TX and RX will occur on the memorized frequency. For instant recall to the memorized frequency, press MR (Memory Recall). In like fashion, another frequency may be memorized for simplex operation, by setting the FUNCTION switch to M2 (SIMP), and pressing the M button.

Rotation of the FUNCTION switch to positions M1—M3 (1 MHz RPT) automatically shifts the transmit frequency 1 MHz down from the memorized frequency. For example, if you memorize 53.04 MHz in the M1 (SIMP) position, you will be operating transceive on that frequency. Now, rotate the FUNCTION switch to M1 (1 MHz RPT). You will be transmitting on 52.04 MHz, while receiving on 53.04 MHz.

The M4 position may be used for split frequency operation, with a split of up to 3 MHz possible. Rotate the main dial or scan to the desired transmit frequency, and press the M button. Now rotate the dial or scan to the desired receive frequency. You will transmit on the memory frequency, while receiving on the dial frequency. The position of the MR button is not important in the case of the M4 position of the FUNCTION switch.

REPEATER OPERATION

A frequency shift of 1 MHz will be applied to the dial frequency when the FUNCTION switch is placed in the 1 MHz RPT position.

When the FUNCTION switch is set to positions M1—M3 (1 MHz RPT), and the MR switch is not pushed, automatic split of —1 MHz will be applied to the dial frequency. With the FUNCTION switch set to M1—M3 (1 MHz RPT), and the MR switch **pushed**, the —1 MHz split will be applied to the memorized frequency.

When operating in the repeater mode, the repeater shift may be made +1 MHz, by pressing the +TX button.

Be careful not to transmit outside the amateur band when using the repeater shift feature.

Remember: placing the FUNCTION switch in the M1—M2 (SIMP) position will provide simplex operation.

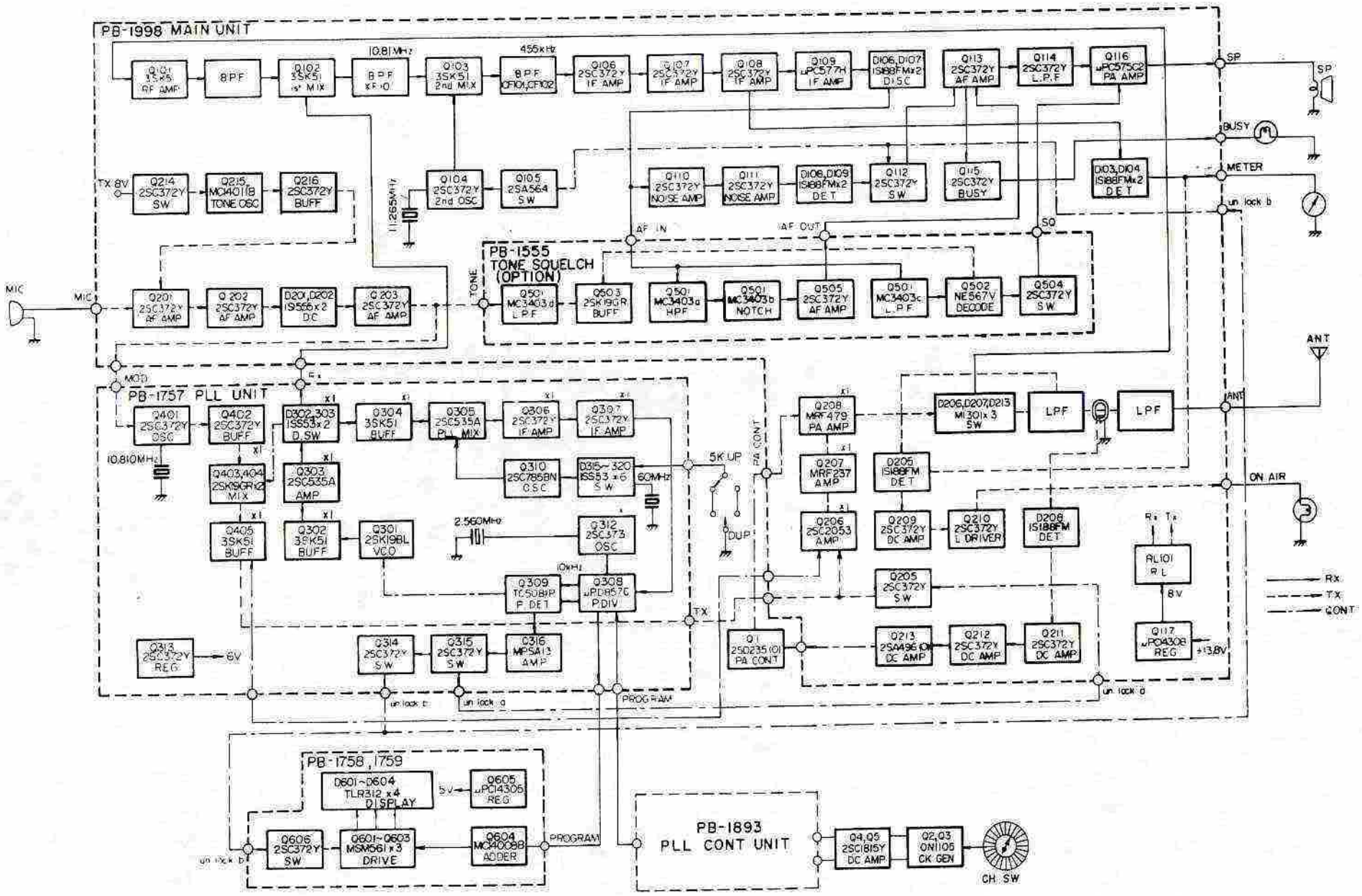
When the BURST switch on the bottom of the transceiver is placed in the ON position, a tone of 1800 Hz of approximately 1 second duration will be superimposed on the speech signal. This tone is normally used only with "tone access" repeaters, and the BURST switch should be turned OFF when using repeaters not requiring this access tone.

OPTIONAL TONE SQUELCH OPERATION

The tone squelch option allows silent monitoring of busy channels. When the tone squelch unit is installed, and the TONE SQ button pushed, a subaudible tone will be superimposed on the transmitted signal. On receive, the squelch will not open unless a subaudible tone is superimposed on the transmitted signal of the other station. The tone frequency can be set to any frequency between 70 and 250 Hz, as shown in the Alignment section of this manual.

To install the tone squelch option, remove the transceiver from its case. Locate the space provided for the tone squelch circuit board, and align the board so that it fits down over the pins, as shown. Solder the connections shown, and remove the red jumper wire shown in the illustration.

With the tone squelch option installed, the BUSY lamp will light up when **any** signal is received, but the squelch will open only when a subaudible tone is received on an incoming signal. The operator should check the BUSY lamp before transmitting, out of courtesy to other operators who may be using the channel. The tone squelch system is designed to allow silent monitoring of busy channels; it is **not** designed to allow two operators so equipped to have priority use of a channel.



FT-627RA MEMORIZER BLOCK DIAGRAM

THEORY OF OPERATION

The block diagram, as well as the following circuit description, will provide you with a better understanding of this transceiver. Refer to the schematic diagram for circuit details.

The FT-627RA transceiver consists of a transmitter and a double conversion superheterodyne receiver. A digital phase lock loop synthesizer provides operation on any of the 600 channels within the frequency range of 51–54 MHz. Solid state circuitry is employed throughout, and computer theory is utilized for frequency selection. The transceiver is designed for use from a 13.8 volt DC power source.

TRANSMITTER

The transmitter produces a Frequency Modulated (FM) signal. The audio signal from the microphone is set to the proper level by VR_{201}, and is amplified by Q_{201}, Q_{202}, and Q_{203} (2SC372Y). The audio output from Q_{202} is coupled to the Instantaneous Deviation Control (IDC) circuit, where both positive and negative peaks are clipped by diodes D_{201} and D_{202} (1S1555). The output from the last amplifier (Q_{203}) is fed through a low-pass filter, which attenuates frequencies above the speech range caused by clipping at the IDC; the deviation level is set by VR_{202}. This control is normally set for a deviation of ± 5 kHz. The speech signal is then applied to the phase modulator varactor diode, D_{401} (1SV50), which varies the frequency of the 10.81 MHz crystal controlled oscillator, Q_{401} (2SC372Y). The frequency modulated 10.81 MHz signal is then amplified by a buffer amplifier, Q_{402} (2SC372Y), and fed to the balanced mixer, Q_{403} and Q_{404} (2SK19GR), where the signal is converted up to 51–54 MHz by mixing with the 61.81–64.81 MHz signal delivered from the Voltage Controlled Oscillator (VCO). The output from the balanced mixer is fed through the tuned circuits, consisting of T_{404}–T_{407}, to a MOSFET amplifier, Q_{405} (3SK51-03). T_{404}–T_{407} are tuned to the transmitting frequency by varactor diodes D_{403}–D_{406}, whose capacitances are varied in accordance with the DC output voltage from the PLL unit. The 51–54 MHz signal is then amplified by amplifier stages Q_{206} (2SC2053), Q_{207} (MRF237), and Q_{208} (MRF479), which deliver 10 watts of RF energy, through a diode switch and low pass filter, to the antenna.

Diodes D_{205} and D_{211} (1S188FM) rectify a small portion of the RF output and apply the resultant DC voltage to the meter, which indicates relative transmitter power output.

The DC output from D_{205} is also delivered to the lamp driver, Q_{209}–Q_{210} (2SC372Y), turning the ON AIR lamp on during transmission.

If the transmitter is keyed without an antenna being connected, or if a high SWR exists in the antenna system, the reflected power is detected through T_{202} and a diode, D_{208} (1S188FM), which produces a DC voltage. Q_{211} (2SC372Y) conducts with the application of the DC voltage through VR_{205}, causing a decrease in the collector current of Q_{212} (2SC372Y).

Thus, the collector voltage of Q_{213} (2SA496) drops, causing Q_1 (2SD235) to decrease current and supply voltage to the PA amplifier, preventing damage to the transistor. The threshold level is set by VR_{205}.

The antenna changeover circuit consists of switching diodes D_{206} and D_{207} (MI1301).

The tone burst circuit consists of a timing generator and a gated multivibrator. With the BURST switch in the ON position, a DC voltage is applied to the tone burst circuit. When the transmitter is keyed, Q_{214} (2SC372Y) conducts, triggering the one-shot multivibrator, Q_{215} (MC14011B). The other half of Q_{215} generates a tone signal, which is amplified by buffer Q_{216} (2SC372Y), and applied to the microphone circuit of the transmitter.

The tone frequency is adjusted by VR_{207}, while the output level of the burst signal is adjusted by VR_{209}. The burst duration is set by VR_{208}.

RECEIVER

The input signal from the antenna is fed through the low-pass filter, consisting of L_1, L_{213}, L_{214}, C_1, and C_{243}–C_{245}, the diode changeover switch D_{206}–D_{207}, and L_{212}, to the RF amplifier, Q_{101} (3SK51). The amplified signal is then applied, through a four-stage high-Q coaxial resonator system, to the first mixer, Q_{102} (3SK51). The use of MOSFET components, in conjunction with the high-Q resonator, minimizes the effects of intermodulation, as well as other spurious responses; a low noise figure is also secured for the receiver system.

The 51–54 MHz signal is heterodyned with the local oscillator signal from the VCO circuit, producing a 10.81 MHz first IF signal. The first IF signal is fed through crystal filter XF_{101}, which has a passband of ± 7.5 kHz, to the second mixer, Q_{103} (3SK40M), resulting in a second IF of 455 kHz. The second local oscillator signal of 11.265 MHz is generated by Q_{104} (2SC372Y). Q_{105} (2SA564) works as a switch which disconnects the supply voltage to Q_{104} when the PLL circuit is unlocked.

The IF signal is amplified by Q_{106}, Q_{107}, and Q_{108} (2SC372Y), and Q_{109} (μPC577H). Cascade-connected ceramic filters CF_{101} and CF_{102} provide narrow band selectivity for the receiver, and the limiting action of Q_{109} removes any amplitude variation in the IF signal, which is subsequently fed to the discriminator, CD_{101}, D_{106}, and D_{107} (1S188FM).

The discriminator produces an audio output in response to a corresponding frequency shift in the IF signal. The output audio signal is amplified by Q_{113} and Q_{114} (2SC372Y), and applied across volume control VR_1 to the input of audio amplifier Q_{116} (μPC575C2). The output from Q_{116} is applied in series through the ACC socket to the internal speaker. The low-pass filter between Q_{113} and Q_{114} attenuates the audio spectrum above 3 kHz, to increase readability of the incoming signal.

A portion of the 455 kHz IF signal is rectified by D_{103} and D_{104} (1S188FM) for S-meter indication. VR_{101} is used to set the meter sensitivity.

When no carrier is present in the 455 kHz IF, the high frequency noise at the discriminator output is amplified by Q_{110} and Q_{111} (2SC372Y), and then detected by D_{108} and D_{109} (1S188FM), producing a DC voltage. This voltage is then applied to turn Q_{112} (2SC372Y) ON. With the conduction of Q_{112}, the base of Q_{113} is grounded, squelching the audio amplifier. When a carrier is present in the 455 kHz IF, the noise is removed from the discriminator output, and the audio amplifier recovers normal operation.

The opening of the squelch circuit causes Q_{113} to conduct, causing lamp driver Q_{115} (2SC372Y) to draw current, lighting up the BUSY lamp. The squelch controls, VR_2 and VR_{102}, set the squelch threshold level.

HETERODYNE OSCILLATOR

The heterodyne signal is generated by a Phase Locked Loop (PLL) circuit, comprised of a VCO, reference crystal oscillator, programmable divider, and phase comparator.

The VCO transistor, Q_{301} (2SK19GR), generates a signal of 61.81–64.81 MHz. The oscillator frequency is controlled by varactor diode D_{301} (1S2209), which varies the capacitance of a tuned circuit consisting of L_{301}, TC_{301}, and C_{304}, in accordance with a DC voltage supplied from phase comparator Q_{309} (TC5081P).

The output signal from Q_{301} is amplified by buffer amplifier Q_{302} (3SK51-03). The signal is further amplified by Q_{303} (2SC535A), and fed through diode switches D_{302} and D_{303} (1S1555), to the transmitter and receiver mixers.

A portion of the output from Q_{303} is fed through buffer amplifier Q_{304} (3SK51-03) to PLL mixer Q_{305} (2SC535A), producing a 1–4 MHz PLL IF signal, through mixing with the PLL heterodyne signal. The latter signal is generated by an overtone crystal-controlled oscillator, Q_{310} (2SC372Y). The amplified signal is then fed to a programmable divider, Q_{308} (μPC857C).

Crystal oscillator Q_{312} (2SC373) generates a 2.56 MHz signal, and its output is fed to scaler/divider Q_{308} (μPC857C), where the 2.56 MHz signal is divided into a 10 kHz reference signal.

The digital phase comparator, Q_{309} (TC5081P), compares the phase of the PLL IF signal with that of the reference signal, and any difference is converted into an error-correcting voltage. This error-correcting voltage is fed to varactor diode D_{301}, which changes the output signal phase to lock with that of the reference signal.

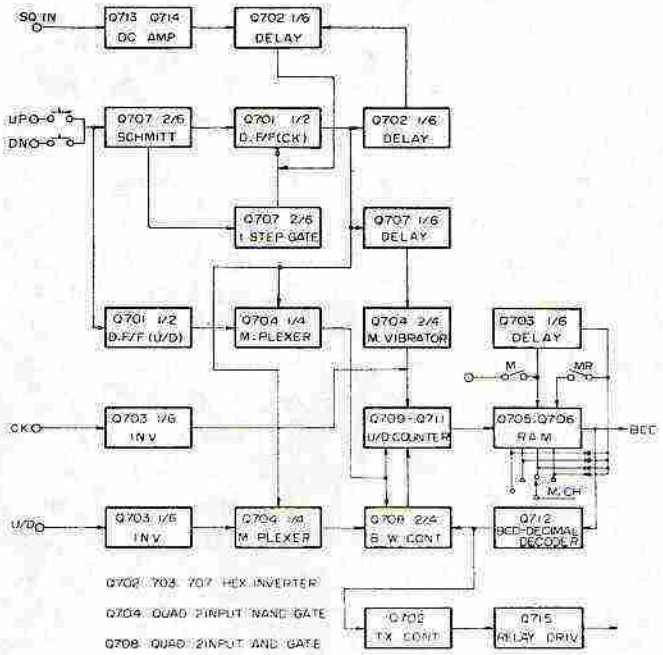
When the VCO is locked, the constant voltage at pin 4 of Q_{309} is applied to Q_{316} (MPSA13), causing it to conduct; in turn, Q_{315} (2SC372Y) cuts off. The H voltage at the collector of Q_{315} causes Q_{205} (2SC372Y) to conduct, supplying DC voltage to exciter stages Q_{204} and Q_{206}. When the VCO is unlocked, the DC voltage at the emitter of Q_{205} drops, preventing normal operation of Q_{204} and Q_{206}.

The output voltage from Q_{315} is reversed in polarity by Q_{314} (2SC372Y), and applied to Q_{606} (2SC372Y), keeping the collector of Q_{606} at the H level, in order to drive Q_{601}–Q_{603} (MSM561) for the display of the channel frequency. The voltage is also applied to Q_{105} (2SA564), which supplies DC voltage to the second heterodyne oscillator, Q_{104} (2SC372Y).

When the VCO is unlocked, the collector of DC voltage drops, causing the LEDs to turn off. Simultaneously, the second heterodyne oscillator ceases to oscillate. The receiver is thus muted until VCO lock occurs.

PLL CONTROL UNIT

Please refer to the PLL Control Unit logic diagram for questions regarding the operation of this circuitry. A complete treatment of every logic state is beyond the scope of this manual.



Crystal	PLL Het. Freq.	Remarks
X_{301}	60.81 MHz	Simplex
X_{302}	59.81 "	TX –1 MHz shift
X_{303}	61.81 "	TX +1 MHz shift
X_{304}	60.815 "	Simplex 5 kHz up
X_{305}	59.815 "	TX –1 MHz, 5 kHz up
X_{306}	61.815 "	TX +1 MHz, 5 kHz up

Table 1

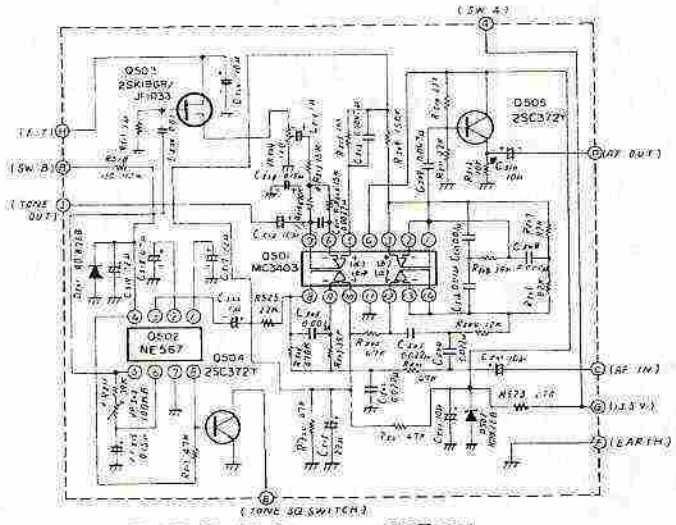
POWER SUPPLY

A 13.8 volt DC supply is used for the audio power amplifier, Q_{116}, as well as the relay and lamps. The supply voltage for the final amplifier is fed through voltage regulator Q_1 (2SD235D), which is controlled by the automatic final protection unit.

Voltage regulator Q_{605} (μPC14305) regulates the supply voltage at 5 volts, to supply Q_{308} and the display unit. Q_{313} (2SC372Y) and D_{301} (RD6.8EB) regulates the supply voltage at 6 volts for the VCO and phase comparator. The 5 volt supply for the PLL control unit is regulated by zener diode D_3 (WZ050), and is connected directly (not via the power switch) for memory backup purposes.

A regulated 8 volt circuit using Q_{117} (μPC14308) is used for all other circuits.

When the transceiver is used in the memory mode, D_4 and D_5 (WZ050) supply 5 volts to the receiver and transmitter, respectively.



TONE SQUELCH (PB-1555A) OPTION

	C 516 *	R 516 *	R 513 *	R 514 *	R 524 *
70Hz ~ 160Hz	0.15μF	39KΩ	15KΩ	470KΩ	15KΩ
160Hz ~ 250Hz	0.1μF	33KΩ	8.2KΩ	270KΩ	8.2KΩ

Table 2

TONE SQUELCH UNIT (OPTION)

The tone squelch circuit disables the audio circuit of the receiver until a preset, subaudible tone is received. On transmit, a subaudible tone is superimposed on the output audio signal. The frequency of this tone can be set to any frequency between 70 Hz and 250 Hz.

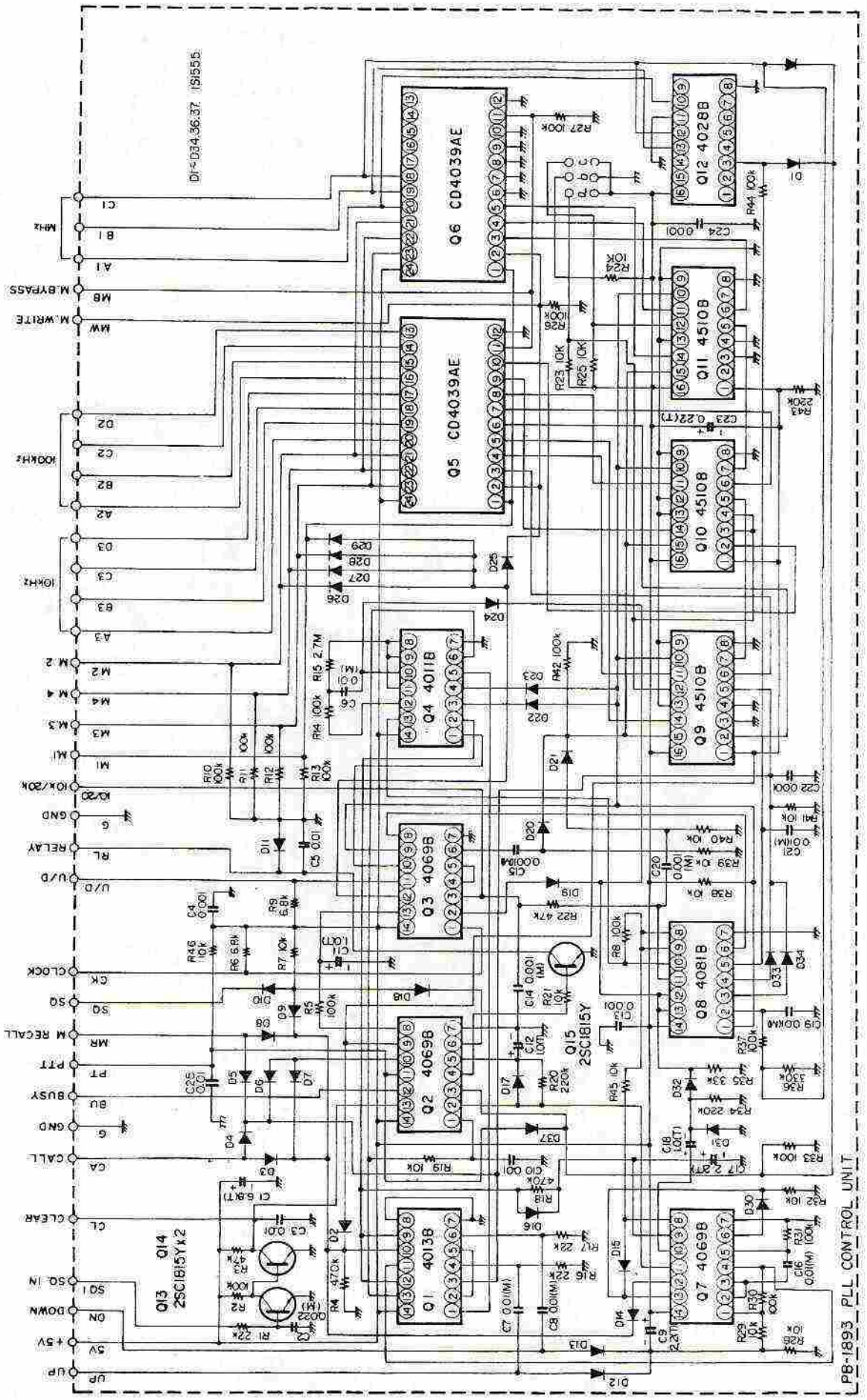
The tone signal is generated by Q_{502} (NE567), and its frequency is set by R_{516}, VR_{502}, and C_{516}. The level of the tone signal is set by VR_{504}, and the signal is subsequently fed through buffer amplifier Q_{503} (2SK19GR) to a low pass filter on unit "d" of operational amplifier Q_{501} (MC3403). The tone signal is then superimposed on the speech signal at Q_{202}. The constants for setting the subaudible tone frequency are shown in Table 2.

The audio output signal from the receiver discriminator is fed to unit "a" of Q_{501}. Unit "a" of Q_{501} acts as a high-pass filter, while unit "b" acts as a T-notch filter. These filters remove the subaudible tone from the audio signal, which is then fed through audio amplifier Q_{505} (2SC372Y) to amplifier Q_{113}.

The subaudible tone then passes through a low-pass filter at unit "c" of Q_{501}, and is fed to Q_{502}. When the tone frequency is the same as that preset for transmission, the voltage at pin 8 of Q_{502} becomes low, causing Q_{504} (2SC372Y) to turn off. In turn, proper bias voltage is applied to Q_{119}, allowing normal operation.

When the proper tone signal is not present, Q_{504} conducts, removing the bias from Q_{119}, thus disabling the audio circuit.

As the conventional carrier-controlled squelch is still in operation, irrespective of the condition of the tone squelch, the BUSY lamp will light up when any carrier is received. This feature alerts the operator that the channel is occupied, though no signal may be heard.



PLL CONTROL UNIT PB-1893

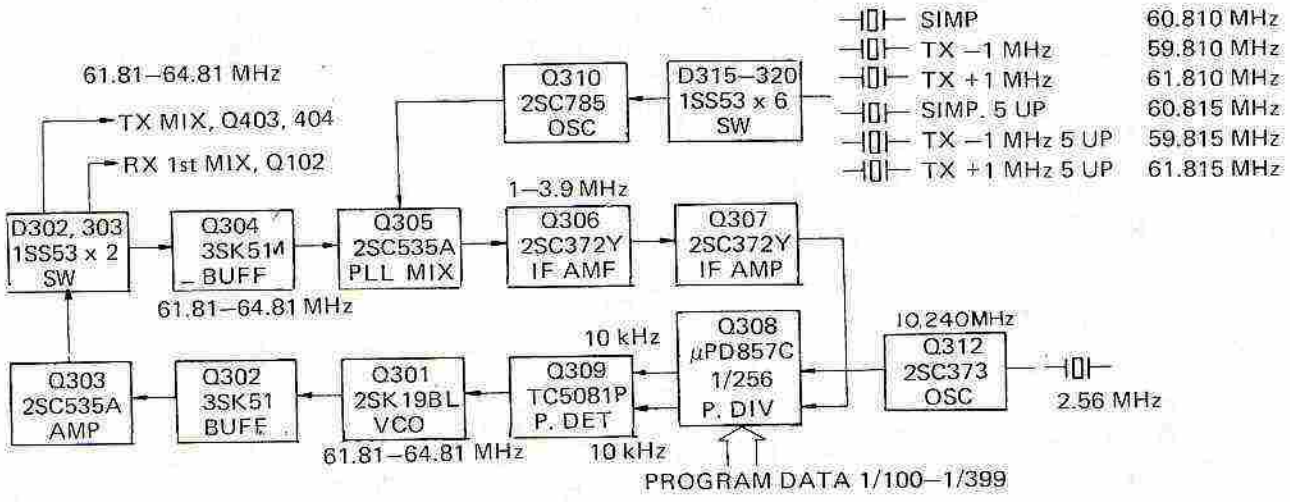
CRYSTAL DATA FT-627RA

FUNCTION		HOLDER	RANGE (MHz)	MODE	PARALLEL C	EFFECTIVE R	DRIVE LEVEL
REFERENCE	(X_{307})	HC-18/U	2.560	Fundamental	(LOAD C) 32 pF	500 Ω	2 mW
2nd Local	(X_{101})	HC-18/U	11.265	Fundamental	5 pF	25 Ω	2 mW
Carrier	(X_{401})	*HC-18/U	**10.810	Fundamental	7.5 pF	20 Ω	2 mW
PLL Local	(X_{301})	HC-18/U	60.8100	Series resonance 3rd overtone	7 pF	30 Ω	0.5 mW
	(X_{302})		59.8100				
	(X_{303})		61.8100				
	(X_{304})		60.8150				
	(X_{305})		59.8150				
	(X_{306})		61.8150				

* Grounded Case type.

** ACTUAL FREQUENCY: 10.850 MHz
Parallel capacitor 7.5 pF, 40 kHz UP (Decided by circuit)

PLL CIRCUIT FREQUENCY RELATIONS



Q308 (μPD857C) PROGRAMMABLE DIVIDER CODE

Q308 PROGRAMMABLE INPUT PIN →			1	2	3	4	5	6	7	8	9	10	11
P/J305 →			4	5	6	7	8	9	10	11	12	13	14
P/J304 →			11	10	9	8	7	6	5	4	3	2	1
FREQUENCY ↓	DIAL DISPLAY ↓	PROGRAMMABLE DIVIDER RATIO ↓	P_1	P_2	P_3	P_4	P_5	P_6	P_7	P_8	P_9	P_{10}	P_{11}
51.00	1.000	1/100	0	0	0	0	0	0	0	0	1	0	0
51.01	1.010	1/101	1	0	0	0	0	0	0	0	1	0	0
51.02	1.020	1/102	0	1	0	0	0	0	0	0	1	0	0
51.03	1.030	1/103	1	1	0	0	0	0	0	0	1	0	0
51.04	1.040	1/104	0	0	1	0	0	0	0	0	1	0	0
51.05	1.050	1/105	1	0	1	0	0	0	0	0	1	0	0
51.06	1.060	1/106	0	1	1	0	0	0	0	0	1	0	0
51.07	1.070	1/107	1	1	1	0	0	0	0	0	1	0	0
51.08	1.080	1/108	0	0	0	1	0	0	0	0	1	0	0
51.09	1.090	1/109	1	0	0	1	0	0	0	0	1	0	0
51.10	1.100	1/110	0	0	0	0	1	0	0	0	1	0	0
51.11	1.110	1/111	1	0	0	0	1	0	0	0	1	0	0
51.12	1.120	1/112	0	1	0	0	1	0	0	0	1	0	0
51.13	1.130	1/113	1	1	0	0	1	0	0	0	1	0	0
51.14	1.140	1/114	0	0	1	0	1	0	0	0	1	0	0
51.15	1.150	1/115	1	0	1	0	1	0	0	0	1	0	0
51.16	1.160	1/116	0	1	1	0	1	0	0	0	1	0	0
51.17	1.170	1/117	1	1	1	0	1	0	0	0	1	0	0
51.18	1.180	1/118	0	0	0	1	1	0	0	0	1	0	0
51.19	1.190	1/119	1	0	0	1	1	0	0	0	1	0	0
51.20	1.200	1/120	0	0	0	0	0	1	0	0	1	0	0
51.30	1.300	1/130	0	0	0	0	1	1	0	0	1	0	0
51.40	1.400	1/140	0	0	0	0	0	0	1	0	1	0	0
51.50	1.500	1/150	0	0	0	0	1	0	1	0	1	0	0
51.60	1.600	1/160	0	0	0	0	0	1	1	0	1	0	0
51.70	1.700	1/170	0	0	0	0	1	1	1	0	1	0	0
51.80	1.800	1/180	0	0	0	0	0	0	0	1	1	0	0
51.90	1.900	1/190	0	0	0	0	1	0	0	1	1	0	0
52.00	2.000	1/200	0	0	0	0	0	0	0	0	0	1	0
52.01	2.010	1/201	1	0	0	0	0	0	0	0	0	1	0
52.02	2.020	1/202	0	1	0	0	0	0	0	0	0	1	0
52.03	2.030	1/203	1	1	0	0	0	0	0	0	0	1	0
52.04	2.040	1/204	0	0	1	0	0	0	0	0	0	1	0
52.05	2.050	1/205	1	0	1	0	0	0	0	0	0	1	0
52.06	2.060	1/206	0	1	1	0	0	0	0	0	0	1	0
52.07	2.070	1/207	1	1	1	0	0	0	0	0	0	1	0
52.08	2.080	1/208	0	0	0	1	0	0	0	0	0	1	0
52.09	2.090	1/209	1	0	0	1	0	0	0	0	0	1	0
52.10	2.100	1/210	0	0	0	0	1	0	0	0	0	1	0
52.20	2.200	1/220	0	0	0	0	0	1	0	0	0	1	0
52.30	2.300	1/230	0	0	0	0	1	1	0	0	0	1	0
52.40	2.400	1/240	0	0	0	0	0	0	1	0	0	1	0
52.50	2.500	1/250	0	0	0	0	1	0	1	0	0	1	0
52.60	2.600	1/260	0	0	0	0	0	1	1	0	0	1	0
52.70	2.700	1/270	0	0	0	0	1	1	1	0	0	1	0
52.80	2.800	1/280	0	0	0	0	0	0	0	1	0	1	0
52.90	2.900	1/290	0	0	0	0	1	0	0	1	0	1	0
53.00	3.000	1/300	0	0	0	0	0	0	0	0	1	1	0
53.99	3.999	1/399	1	0	0	1	1	0	0	1	0	0	1

※1 HIGH LEVEL (5V)
※0 LOW LEVEL (0V)

MAINTENANCE & ALIGNMENT

GENERAL

The model FT-627RA transceiver has been carefully aligned and tested at the factory prior to shipment. The reliability of the solid-state device used in the FT-627RA should provide years of trouble free service if the transceiver is not abused and normal, routine maintenance is carried out.

THE FOLLOWING PRECAUTIONS SHOULD BE OBSERVED TO PREVENT DAMAGE TO THE TRANSCEIVER.

(1) Do not exceed 14 Volts DC, at the POWER receptacle.
When operating mobile, check the battery voltage under the load (transmitter "keyed" in FM mode) with the engine running fast enough so the ammeter shows a "charge". In addition, do not operate the FT-627RA if the supply voltage is below 12 Volts DC.

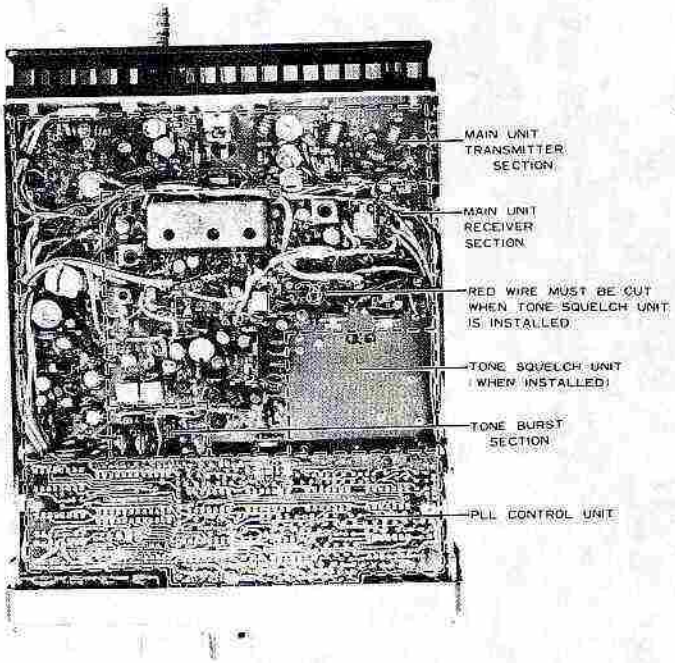
(2) Avoid direct exposure to sunshine or water.

ROUTINE MAINTENANCE

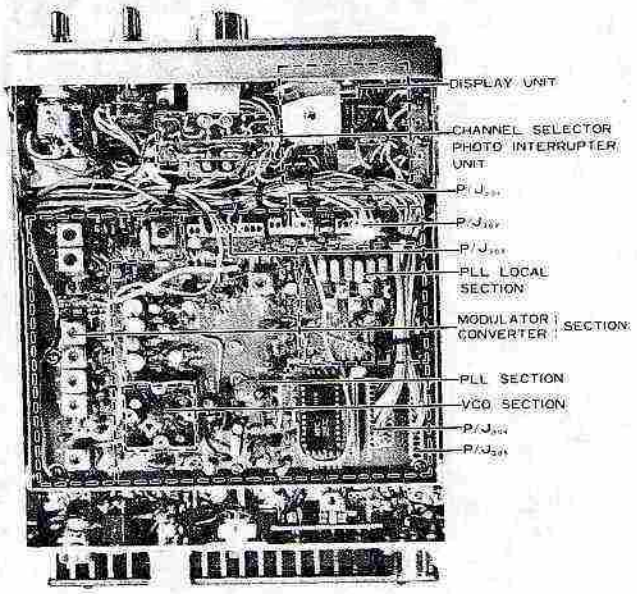
Routine maintenance should be limited to keeping the transceiver clean, and periodic performance checks of the transmitter RF power output and the receiver sensitivity.

Cleaning:

When the transceiver has been used in dusty or sandy areas, the interior should be periodically cleaned. A vacuum cleaner should be used, while any caked or accumulated dirt may be removed with a soft brush. Check the interior to make sure that it is thoroughly dry before replacing the case and/or operating equipment. Wipe the exterior with a damp cloth whenever required.



TOP VIEW



BOTTOM VIEW

PERFORMANCE CHECKS

Make all performance checks at 13.5 Volts DC (under load).

Check the transmitter output as follows:

(a) Connect a suitable 50 ohm dummy load/RF wattmeter to the ANT receptacle.

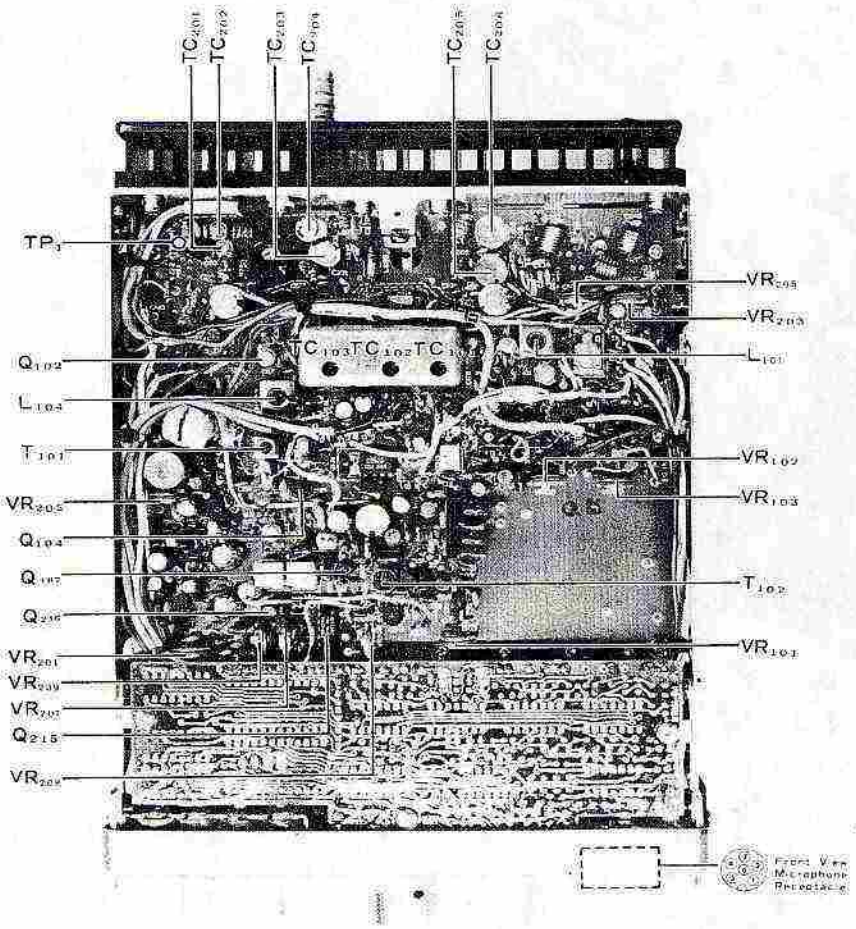
(b) Set the channel selector to any channel and key the transmitter while observing the power output. The power should be approximately 10 watts, and the S-meter should read between 6 and 8 relative power output.

Check the receiver sensitivity as follows:

(a) Connect an AC VTVM to the SP receptacle, and set the SQUELCH control fully counter-clockwise.

(b) Connect the RF output of a precision VHF signal generator to the ANT receptacle and with no signal input note the VTVM reading. Adjust the VOLUME control and VTVM range, as required, to obtain an approximate full scale reading (DO NOT change the VOLUME control setting after this adjustment is made).

(c) Set the signal generator to the receiving frequency of the transceiver and adjust the output amplitude of the signal generator until the VTVM reads 1/100th (20 dB decrease) of the reading in step (b). The signal generator output voltage at this point is the 20 dB quieting sensitivity, and should be approximately 0.3 μV.



ALIGNMENT POINT

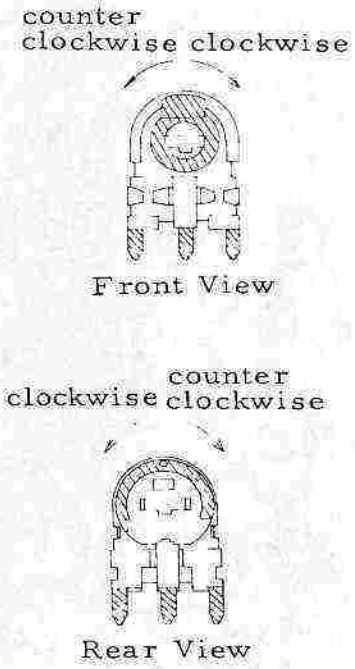


Figure 7

ALIGNMENT

SOME OF THE FOLLOWING ALIGNMENT PROCEDURES REQUIRE SPECIAL TEST EQUIPMENT AND TECHNIQUES, AND SHOULD ONLY BE PERFORMED BY AN EXPERT TECHNICIAN.

TRANSMITTER

(1) RF Power Amplifier

a) Set the channel selector to 52.50 MHz, and connect a YP-150 dummy load/wattmeter to the antenna jack. Connect a VTVM between TP_1 and ground (1 V DC range). Set VR_{205} fully counter-clockwise, and set TC_{201}–TC_{206} to the centers of their ranges.

b) Key the transmitter, and confirm that the VTVM reading is approximately 0.5 V, indicating adequate drive.

(2) PO Meter

a) Set VR_{203} to the point where the S-meter shows 8 on its scale at full output into a dummy load.

(3) AFP (Automatic Final Protection) Circuit

a) Connect the YP-150 dummy load/ wattmeter to the antenna jack. Set VR_{205} to the fully counter-clockwise position. Connect the VTVM between the cathode (+) of D_{801} and ground (–). Adjust VR_{801} for a minimum VTVM reading.

b) While transmitting into the dummy load, slowly rotate VR_{205} clockwise until the power output just begins to fall off. Now disconnect the dummy load, and key the transmitter, while monitoring the total current consumption of the transceiver (use ammeter in DC line). The reading should be approximately 1 ampere.

(4) Modulation & Adjustments

a) Connect the YP-150 dummy load/ wattmeter to the antenna jack. Connect the output of an audio oscillator between pin 6 (mic in) and pin 5 (ground). Connect a deviation meter as shown in Fig. 8.

b) Connect a frequency counter between TP_3 of the PLL unit and ground.

c) Key the transmitter (short pin 4 of the mic jack to ground), and adjust T_{401} for a 10.81 MHz counter reading.

d) Set the output level of the audio generator to 25 mV at 1 kHz, and adjust VR_{202} for ±4.5 kHz deviation.

e) Now set the audio generator output level to 2.5 mV. Adjust VR_{201} for a deviation of ±3.5 kHz.

(5) Tone Burst

a) Connect a YP-150 dummy load/wattmeter to the antenna jack, and disconnect the microphone and any audio generators (in order to prevent modulation of the transmitter signal).

b) Temporarily connect pin 5 of Q_{215} to pin 14.

c) Connect a YC-500 frequency counter to the emitter of Q_{216}, and set the TONE BURST switch to the ON position.

d) Key the transmitter, and adjust VR_{207} to the desired burst frequency.

e) Connect a VTVM to the MIC IN terminal of the MAIN unit, and adjust VR_{209} for a 2.5 mV reading on the VTVM.

f) Remove the wire which was temporarily connected in step (b). Key the transmitter, and adjust VR_{208} for the desired burst duration.

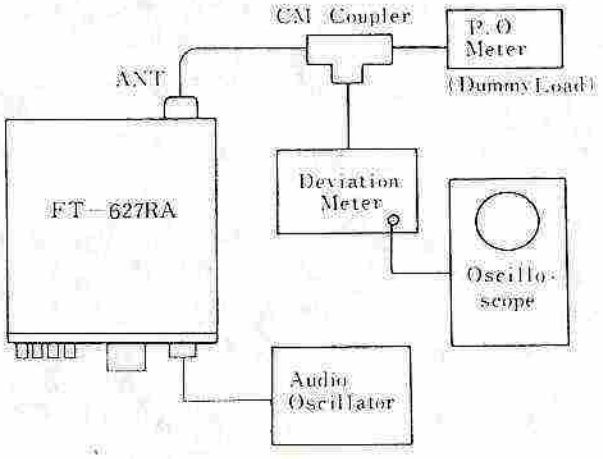


Figure 8

RECEIVER

(1) First IF Amplifier

a) Connect a sweep generator to gate 1 of Q_{102}. Connect an oscilloscope through a detector to the drain of Q_{103}.

b) Set the frequency of the sweep generator to 10.81 MHz, and apply its output. Adjust T_{101} until the scope pattern shown in Fig. 9 is available.

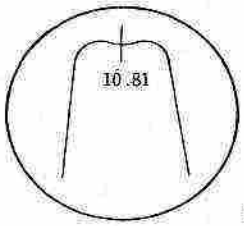


Figure 9

c) Disconnect the sweep generator and scope. Measure the RF injection voltage to gate 2 of Q_{103}. A nominal value is 0.5 volts RMS.

(2) RF Amplifier Stage

a) Connect a signal generator to the antenna jack, and set the channel selector to 52.5 MHz. Set TC_{101}–TC_{103} to the centers of their ranges.

b) Tune the generator signal to the receive frequency, and peak L_{101}, L_{103}, and T_{102} for maximum indication on the S-meter.

(3) S-Meter Sensitivity

a) Set the output level of the signal generator to +20 dB, and adjust VR_{101} for an exactly full scale deflection of the S-meter.

(4) Squelch Threshold

a) Receive a 0 dB signal from the signal generator.

b) Set the SQL control on the front panel fully clockwise. Now adjust VR_{102} to the point where the squelch just opens.

c) Set the generator level to –10 dB. Press the TONE SQ button, and adjust VR_{103} to the point where the BUSY lamp just turns on.

d) Turn off the signal generator, and turn off the tone squelch. Check to see that the front panel SQL control causes the squelch to open when the knob is turned approximately to the 9 to 10 o'clock position.

PLL CIRCUIT

a) Set the channel frequency to 52.5 MHz.

b) Connect a frequency counter to TP_1 on the PLL unit. Adjust TC_{309} for a reading of exactly 2.5600 MHz. Make sure that the RF voltage at the emitter of Q_{312} is approximately 0.5 volts RMS.

c) Connect the VTVM to the emitter of Q_{310}, and peak TC_{308} for a maximum VTVM indication. Now slowly rotate TC_{308} in the direction of increasing capacitance until the VTVM reading becomes 20% lower than the peak reading.

d) Connect an oscilloscope to TP_2. Key the transmitter, and adjust T_{302} for a maximum scope reading (approx. 5 V p-p).

e) Connect the frequency counter between the cathode of D_{302} and ground. Set the function switch to either of the SIMP channels. Set TC_{302}–TC_{307} to the centers of their ranges. Now adjust L_{307} for a counter reading of exactly 63.310 MHz.

f) Set the function switch to one of the TX –1 MHz positions. Key the transmitter, and adjust TC_{303} for a reading of 62.310 MHz. Now press the +TX button, and adjust TC_{304} for a reading of 64.310 MHz.

g) Set the function switch to SIMP, and press the 5 UP switch. Adjust TC305 for a reading of 63.315 MHz in the receive mode. Now set the function switch to TX –1 MHz, and key the transmitter. Adjust TC_{306} for a reading of 62.315 MHz on the counter. Now press the +TX button, and key the transmitter. Adjust TC_{307} for a reading of 64.315 MHz.

h) Connect the VTVM (10 V DC range) between the cathode of D_{324} and ground. Adjust TC_{301} for a reading of 5.0 volts with the channel selector at 54.0 MHz.

i) Connect the VTVM to TP_3. Peak T_{402} and T_{403} for a maximum VTVM reading (approx. 60 mV RMS).

j) Connect the RF probe of the VTVM between the TX OUT terminal of the PLL unit and ground. Peak T_{404}–T_{408} for a maximum reading on the VTVM (approx. 1.5 V RMS).

k) Connect the VTVM to the cathode of D_{302}/D_{303}. Peak T_{301} for a maximum reading on the VTVM (approx. 2 V RMS).

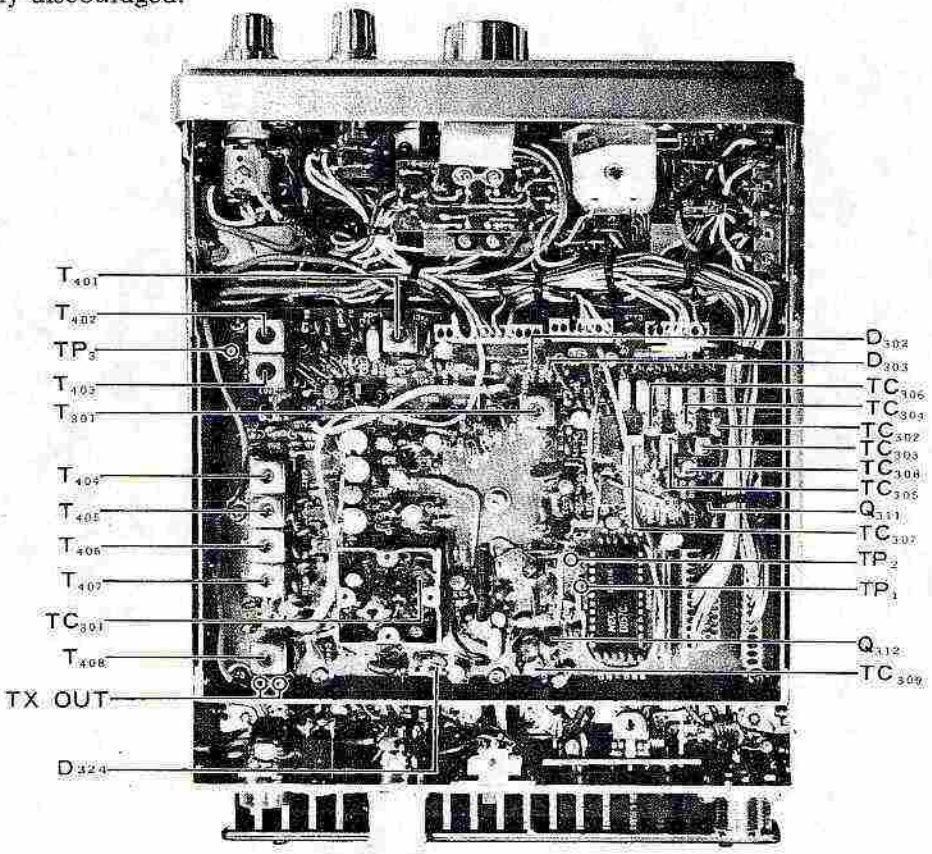
PLL CONTROL UNIT

As this unit requires no alignment, trouble in this unit should be referred to a qualified Yaesu service center for fault detection and parts replacement. This unit is highly sophisticated, and any attempt to service this circuitry without the proper knowledge is highly discouraged.

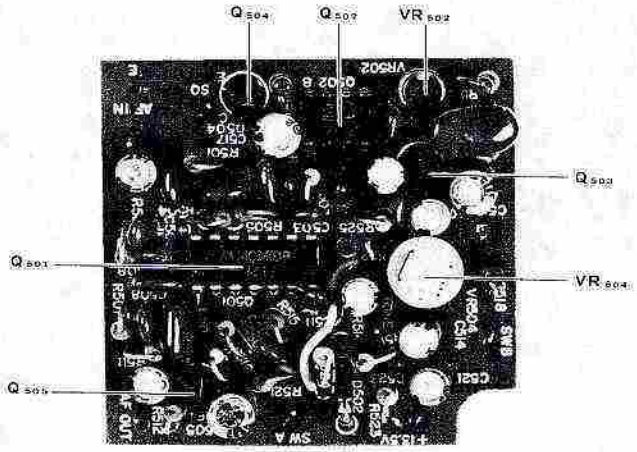
TONE SQUELCH UNIT (OPTION)

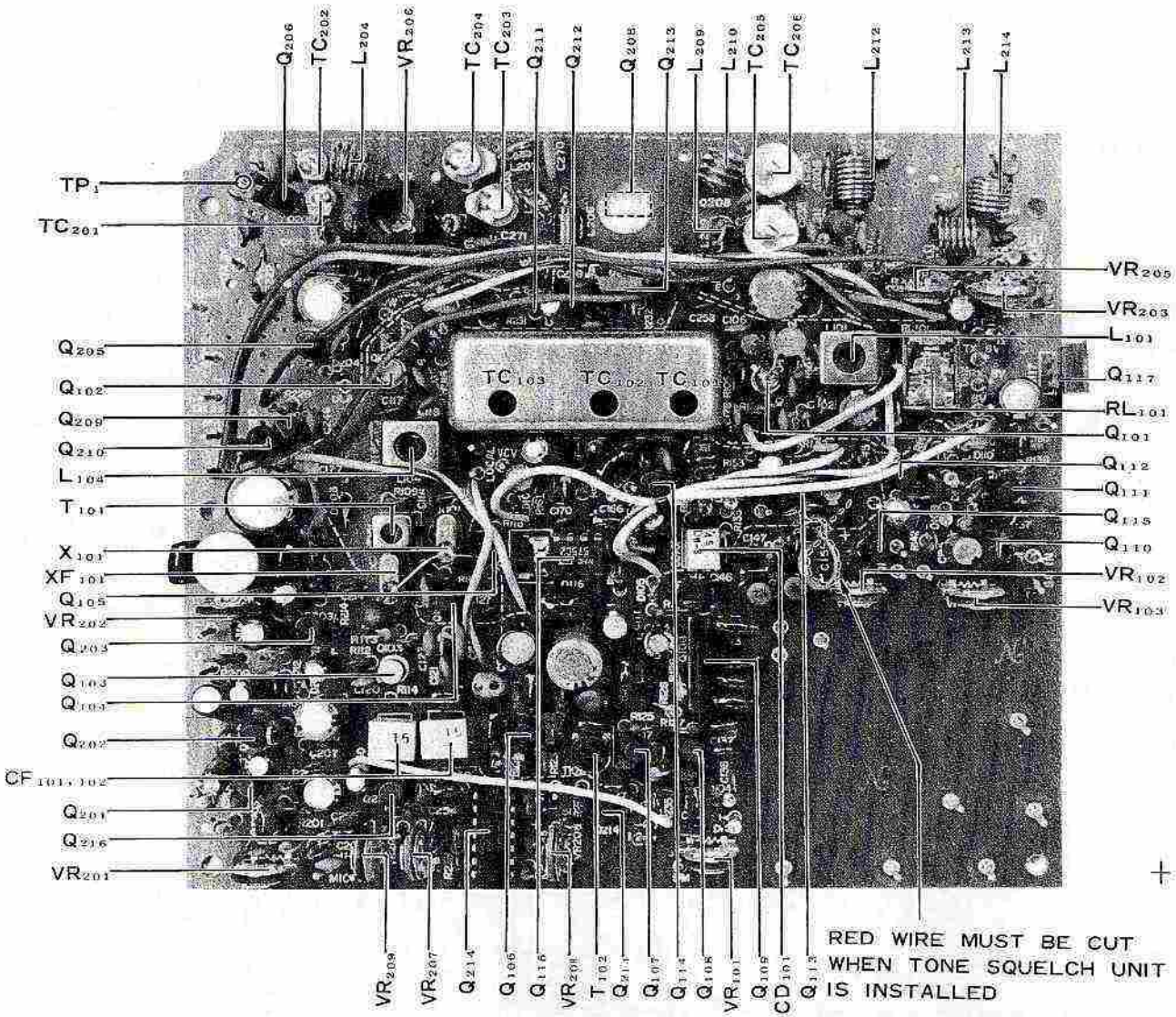
The optional tone squelch unit has been preset to 77 Hz center frequency at the factory. However, the frequency can be set to any frequency between 70 Hz and 250 Hz by referring to Table 2, located on page 15, and by adjustment of VR_{502}.

The tone output level adjustment is made at VR_{504}.

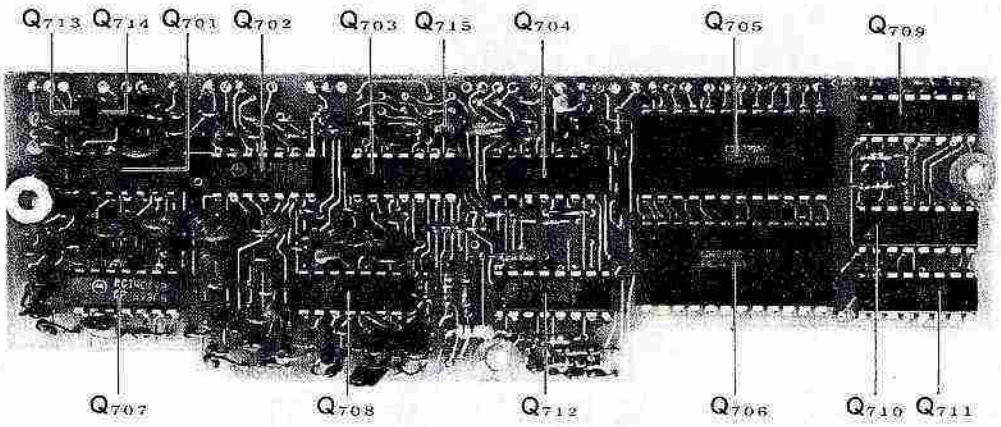


ALIGNMENT POINTS

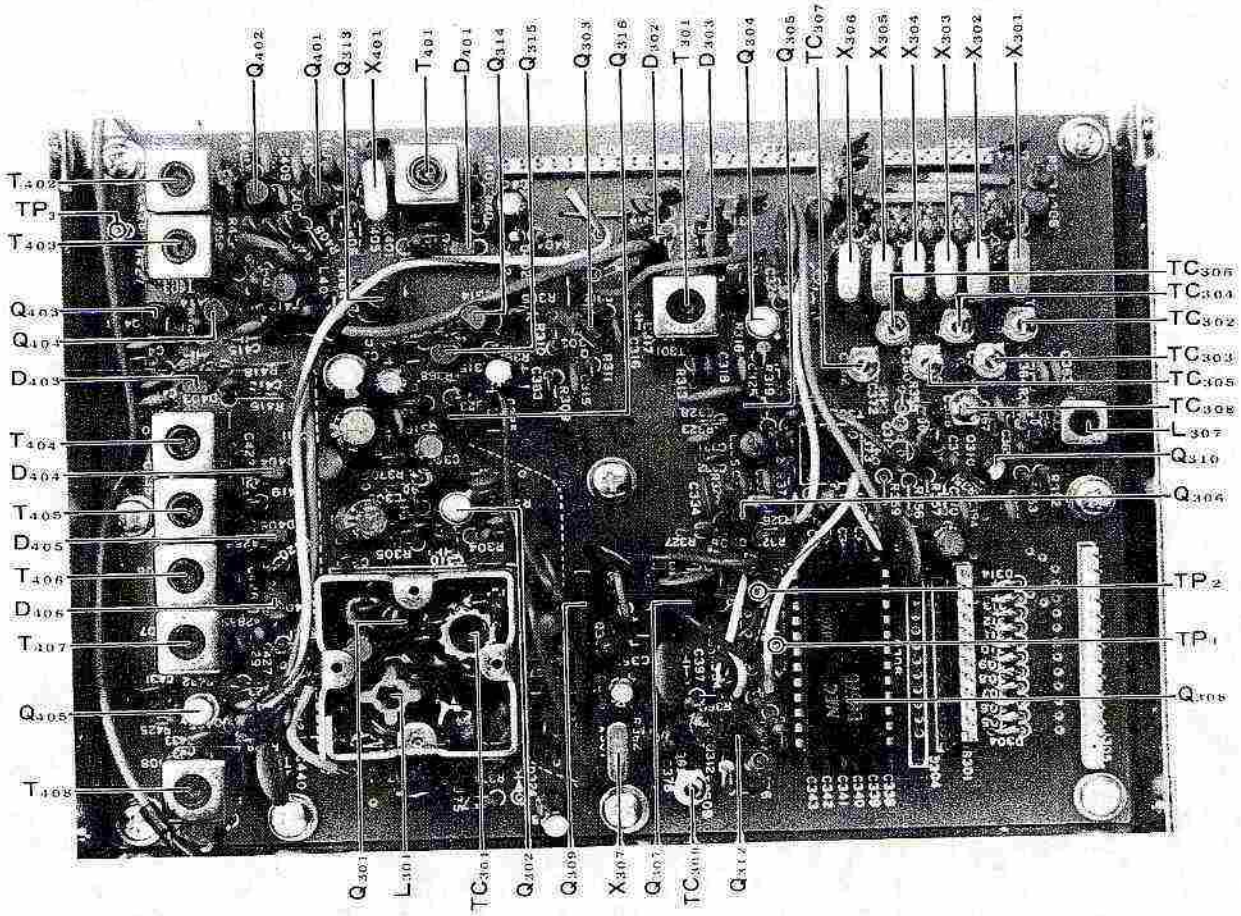




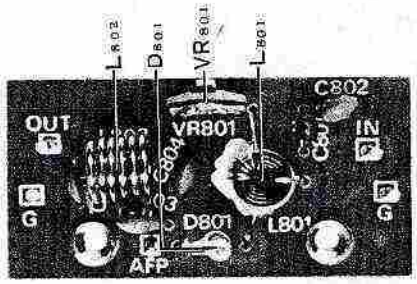
MAIN UNIT



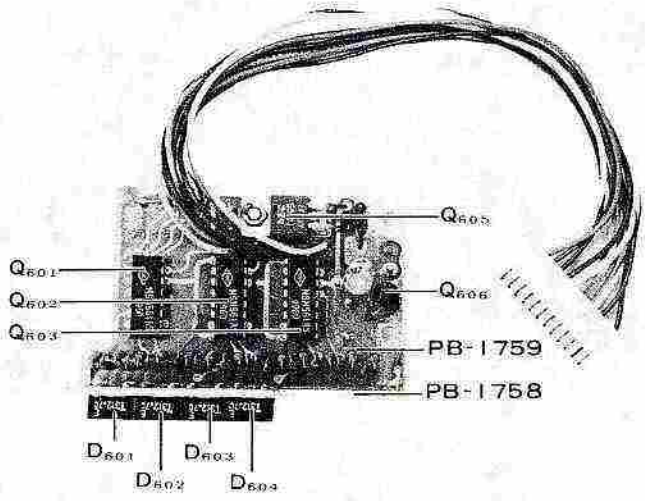
PLL CONTROL UNIT



PLL UNIT

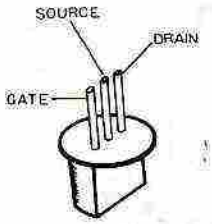


AFP UNIT

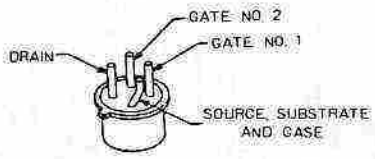


DISPLAY UNIT

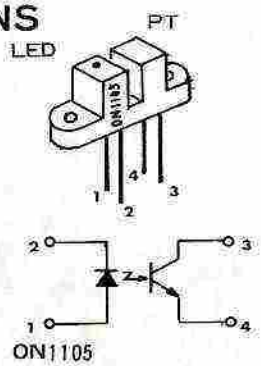
TRANSISTOR & IC CONNECTIONS



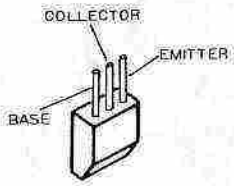
2SK19BL
2SK19GR



3SK51



ON1105



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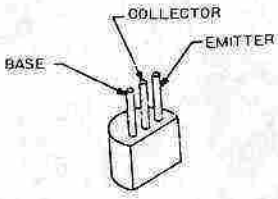

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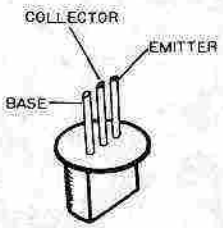

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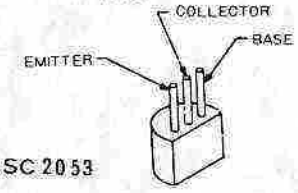

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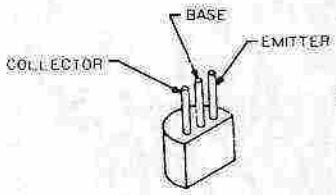

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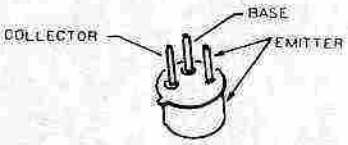

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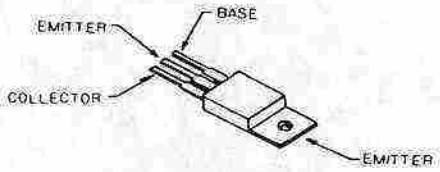

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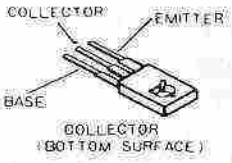

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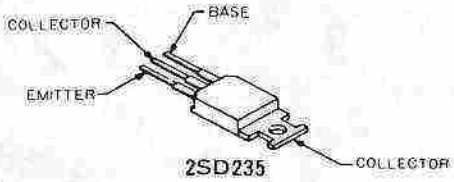

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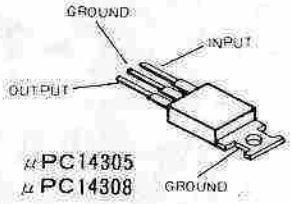

μPC14305
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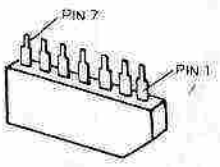

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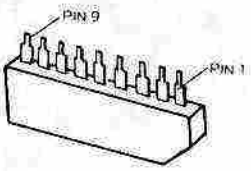

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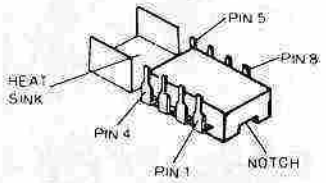
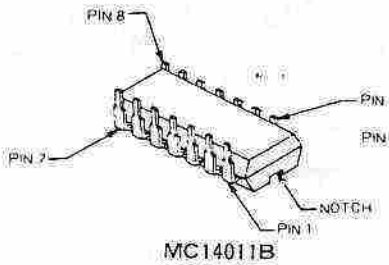
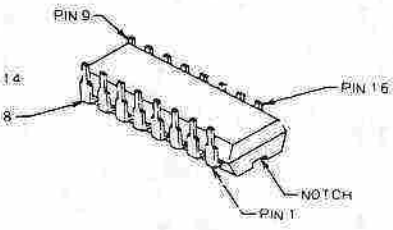


μPC575C2



MC14011B
MC14013B
MC14069B
MC14081B
MC14584B



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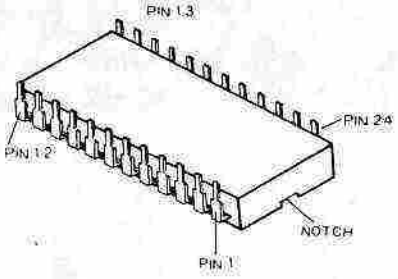
MC14510B



μPD857C
CD4039AE

FT-627RA PARTS LIST

MAIN CHASSIS

Symbol Number	Parts Number	Description
		TRANSISTOR
Q1	G3402350O	2SD235
		DIODE
D8	C2015550	Silicon 1S1555
D1	G2090034	〃 U05B
D2	G2090025	Zener WZ050
		RESISTOR
R2	J01245100	Carbon film ¼W TJ 10Ω
R1	J01245821	〃 〃 〃 〃 820Ω
R7	J10246220	〃 Composition ½W GK 22Ω
		POTENTIOMETER
VR1(with S1)	J62800031	DM11A744-5M1111 10KΩB/10KΩA
		CAPACITOR
C1	K06175470	Ceramic disc 50WV 47PF(SL)
C10	K12171102	〃 〃 〃 0.001μF
C2,3	K13170103	〃 〃 〃 0.01μF
C7	K40100107	Electrolytic 10WV 100μF
C6,8,9	K40120106	〃 16WV 10μF
C5	K40120226	〃 〃 22μF
C4,7	K40120107	〃 〃 100μF
		INDUCTOR
L1	L0020592	#220592
		AF CHOKE
CH1	L2030012	#230012
		METER
M1(with PL6)	M0290012	AP-120 8Ω 1W
		SPEAKER
SP1	M4090010	SM-77K-Y
		SWITCH
S6,7	N6090004	SSF-22-08B
S8	N0190014	SRN2046N
S1(with VR1)	—	
S9	N6090002	SSH-23-08
		RECEPTACLE
J1	P0090010	FM142S
J2	P0090012	FM146S
J3	P1090031	CS250
J4	P1090026	JSO239
J5	P1090005	SG8050
J6	T9201130A	1625-06R-1 #240113A
P6	T9201140	1625-06P-1 #240114A
		LAMP
PL1~5,7	Q1000033	BQ054-32732B 14V 40mA
PL6(with M1)	—	
	Q6000011	Terminal Board TL4PS(2-0-2)

PHOTO INTERRUPTER BOARD

Symbol Number	Parts Number	Description
	C0019810	Photo interrupter board with components
PB-1981	F0001981	P.C. Board
		TRANSISTOR
Q4,5	G3318150Y	2SC1815Y
		PHOTO INTERRUPTER
Q2,3	G0090001	ON1105
		RESISTOR
R11,13	J10246221	Carbon film ¼W VJ 220Ω
R12,14	J10246103	〃 〃 〃 〃 10KΩ

SWITCH BOARD

Symbol Number	Parts Number	Description
	C0018960	Switch Board with components
PB-1896	F0001896	P.C. Board
		DIODE
D5,7	G2015550	Silicon 1S1555
D3,4	G2090025	Zener WZ050
		RESISTOR
R4,5	J00245821	Carbon film ¼W VJ 820Ω
R6	J00245562	〃 〃 〃 〃 5.6KΩ
R3	J00245103	〃 〃 〃 〃 10KΩ
		CAPACITOR
C8,9	K40120106	Electrolytic 16WV 10μF
		SWITCH
S2,3,5	N4090015	2U-EE-20
S4	N4090010	2U-OA-20

MAIN UNIT

Symbol Number	Parts Number	Description
	C0019980	Main Unit with components
PB-1998	F0001998	Main Board (P.C.B)
PB-2024	F0002024	Resonator Board (P.C.B)
	C0020240	〃 〃 with components
		IC, FET & Transistor
Q109	G1090072	IC μPC577H
Q116	G1090073	〃 μPC575C2
Q117	G1090070	〃 μPC14308
Q215	G1090068	〃 MC14011B
Q101,102,103	G4800510C	FET 3SK51-03
Q213	G3104960O	Transistor 2SA496O
Q105	G3105640	〃 2SA564
Q104,106~108,110 111~115,201~203 205,209~212,214 216	G3303720Y	〃 2SC372Y
Q207	G3090001	〃 MRF237
Q206	G3320530	〃 2SC2053
Q208	G3090026	〃 MRF479
		DIODE
D103,104,106~109 205,209,211	G2001880F	Germanium Diode 1S188FM

FT-627RA PARTS LIST

D101,102,105,110 111~113,201~204 210	G2015550	Silicon Diode 1S1555			THERMISTOR
			TH101	G9090001	SDT-250
D206,207,213	G2090033	〃 〃 M1301			POTENTIOMETER
D114~116	G2022090	Varactor 〃 1S2209	VR202,209	J50701102	TR-11R3 1KΩB
			VR201	J50701502	〃 5KΩB
		CRYSTAL	VR101,102,103,205	J50701103	〃 10KΩB
X101	H0101100	HC-18/U 11.265MHz	VR203	J50701503	〃 50KΩB
			VR207	J50701104	〃 100KΩB
		MONOLITHIC FILTER	VR208	J50701205	〃 2MΩB
XF101	H1101980	108M15A			
		CERAMIC FILTER			CAPACITOR
CF101,102	H3900030	LFB-15	C233	K00172010	Ceramic 50WV SL 1pF
			C119	K00172050	〃 〃 SL 5pF
		CERAMIC DISCRIMINATOR	C239	K00173070	〃 〃 SL 7pF
CD101	H7900040	SFD455S4	C239	K00173070	〃 〃 CH 10pF
			C118	K00175150	〃 〃 SL 15pF
		RESISTOR	C180	K00179005	〃 〃 SL 20pF
R224	J00245100	Carbon Film 1/4W VJ 10Ω	C222,102	K00175270	〃 〃 SL 27pF
R248	J01245220	〃 〃 〃 TJ 22Ω	C269	K00179007	〃 〃 SL 30pF
R225	J01245560	〃 〃 〃 TJ 56Ω	C108,110,112	K06175390	〃 〃 UJ 39pF
R102,105,107,112	J00245560	〃 〃 〃 VJ 56Ω	C243,245	K00175470	〃 〃 SL 47pF
R110,124,131,157 201,208	J00245101	〃 〃 〃 VJ 100Ω	C124	K02175470	〃 〃 CH 47pF
			C271,272	K00175560	〃 〃 SL 56pF
R162	J00245121	〃 〃 〃 VJ 120Ω	C107,109,111,157,185,244	K00175101	〃 〃 SL 100pF
R228	J00245181	〃 〃 〃 VJ 180Ω	C125,126	K00175151	〃 〃 SL 150pF
R147,215	J00245221	〃 〃 〃 VJ 220Ω	C270	K00175271	〃 〃 SL 270pF
R123	J00245331	〃 〃 〃 VJ 330Ω	C123,138,167,170,176 207,217,223,226,228 247,258,259	K12171102	〃 〃 0.001μF
R126,128,129,163,165 223,232	J00245471	〃 〃 〃 VJ 470Ω			
R209	J00245561	〃 〃 〃 VJ 560Ω	C201,202,204,232	K10179016	〃 〃 0.001μF
R206,216	J00245102	〃 〃 〃 VJ 1KΩ	C101,103~106,115 120,121,178,181,182 184,219,224,225,235 237,240,257,260	K13170103	〃 〃 0.01μF
R114,142,151	J00245152	〃 〃 〃 VJ 1.5KΩ			
R202	J00245182	〃 〃 〃 VJ 1.8KΩ			
R149,161,221,233	J00245222	〃 〃 〃 VJ 2.2KΩ			
R120,210,222	J00245272	〃 〃 〃 VJ 2.7KΩ	C116,117,127,139,214 227,231,234,236,242 261	K14179002	〃 〃 0.01μF
R111,117,138,140,204	J00245332	〃 〃 〃 VJ 3.3KΩ			
R122	J00245392	〃 〃 〃 VJ 3.9KΩ			
R156,229,231,235,236 244	J00245472	〃 〃 〃 VJ 4.7KΩ	C273	K23140001	Ceramic Chip 25WV 0.01μF
			C128,131~133,135 147,179,251,252	K50177102	Mylar Film 50WV 0.001μF
R132,133,141,203,217 230	J00245562	〃 〃 〃 VJ 5.6KΩ			
			C162	K50177472	〃 〃 〃 0.0047μF
R154,155	J00245822	〃 〃 〃 VJ 8.2KΩ	C137,146,151,152,154 161,246,254,264,255	K50177103	〃 〃 〃 0.01μF
R109,115,116,118,119 134,143,205,211,213	J00245103	〃 〃 〃 VJ 10KΩ			
			C148~150,164,166 203	K50177223	〃 〃 〃 0.022μF
R121	J00245183	〃 〃 〃 VJ 18KΩ			
R103,104,135,234,249	J00245223	〃 〃 〃 VJ 22KΩ	C122,129,130,134,136 140~143,215,216 234,236	K50177473	〃 〃 〃 0.047μF
R101,106,108,113,125 127,146,158	J00245473	〃 〃 〃 VJ 47KΩ			
R144	J00245563	〃 〃 〃 VJ 56KΩ	C153,172	K50177104	〃 〃 〃 0.1μF
R145,152	J00245823	〃 〃 〃 VJ 82KΩ	C159	K70167475	Tantalum 35WV 4.7μF
R153,242,243 166~168	J00245104	〃 〃 〃 VJ 100KΩ	C205	K70127106	〃 16WV 10μF
			C253	K70167474	〃 35WV 0.47μF
R160	J00245124	〃 〃 〃 VJ 120KΩ	C144,169,171,209	K40100476	Electrolytic 10WV R 47μF
R137,139,159,212,214	J00245154	〃 〃 〃 VJ 150KΩ	C165,173,175,206,213	K40100107	〃 〃 R 100μF
R239	J00245184	〃 〃 〃 VJ 180KΩ	C158,160,208,210,262	K40170105	〃 50WV R 1μF
R207	J00245274	〃 〃 〃 VJ 270KΩ	C266	K40089001	〃 6.3WV 100μF
R238	J00245824	〃 〃 〃 VJ 820KΩ	C155,156,159,168	K40120475	〃 25WV R 4.7μF
R237,240,241	J00245105	〃 〃 〃 VJ 1MΩ	C163,183,211,212,250	K40120106	〃 16WV R 10μF
R226	J10276100	〃 Composition 1/2W GK10Ω	C174,229,263	K40120107	〃 〃 R 100μF
R254	J10276150	〃 〃 〃 GK15Ω	C177	K40120108	〃 〃 R 1000μF
R246	J10276101	〃 〃 〃 GK100Ω			
R255(1.206)	J10276471	〃 〃 〃 GK470Ω			

FT-627RA PARTS LIST

		TRIMMER CAPACITOR				DIODE	
TC201,202	K91000030	ECV-1ZW 40×53N	40pF	D322~324,327	G2015550	Silicon Diode	1S1555
TC101~103	K91000029	〃 20×53N	20pF	D302,303,315~320	G2090027	〃 〃	1SS53
TC203,204	K91000031	〃 90×32	90pF	D402	G9090005	Varistor 〃	MV-103
TC205,206	K91000048	2222-808-32809	80pF	D321	G2090035	Zener Diode	RD6.8EB
				D403~406	G2022090	Varactor Diode	1S2209
				D401	G2090023	〃 〃	1SV50
		INDUCTOR		D301	G2090043	〃 〃	MV104
L101,104	L0020585		#220585				
L103	L0020586		#220586				
L203,209	L1020590		#220590			CRYSTAL	
L204,210	L0020593		#220593	X301	H0101870	HC-18/U	60.810MHz
L206	L0020206		#220206	X302	H0101880	〃	59.810MHz
L207,216	L0020594		#220594	X303	H0101890	〃	61.810MHz
L208	L1020589		#220589	X304	H0101900	〃	60.815MHz
L211	L1190013	Micro Inductor FL4H-6R8M	6.8μH	X305	H0101910	〃	59.815MHz
				X306	H0101920	〃	61.815MHz
L212	L0020591		#220591	X307	H0101840	〃	2.56MHz
L213,214	L0020527		#220527	X401	H0101020	〃	10.81MHz
L102	L1190070	Micro Inductor	8.2μH				
L105	L1190068	〃 〃	220μH			RESISTOR	
L106,108,109	L1190017	〃 〃 FL5H-102K	1mH	R364,425,428	J00245560	Carbon Film	¼W-VJ 56Ω
L201	L1190075	〃 〃 L10-104J	100mH	R303,307,312,351,360 371,378,379,408,418	J00245101	〃 〃 〃	VJ 100Ω
L110	L1190073	〃 〃 FL5H-270K	27mH				
				R311,412~415	J00245221	〃 〃 〃	VJ 220Ω
				R385	J00245391	〃 〃 〃	VJ 390Ω
		TRANSFORMER		R302,354	J00245471	〃 〃 〃	VJ 470Ω
T101	L0020187	IFT	#220187	R361	J00245561	〃 〃 〃	VJ 560Ω
T102	L0190002	〃	#220188	R373,319	J00245681	〃 〃 〃	VJ 680Ω
				R355	J00245821	〃 〃 〃	VJ 820Ω
				R324,327,365,367,369 407,411	J00245102	〃 〃 〃	VJ 1KΩ
		RELAY					
RL101	M1190002	FBR211ADO12M 12V DC		R334	J00245122	〃 〃 〃	VJ 1.2KΩ
				R323,372,375	J00245152	〃 〃 〃	VJ 1.5KΩ
	L9190001	Ferrite Beads 4A-RI 3×3-1		R313,328,349,350,381	J00245222	〃 〃 〃	VJ 2.2KΩ
	Q5000011	Wrapping Terminal C		R382,383	J01245222	〃 〃 〃	TJ 2.2KΩ
	Q5000020	Pin Terminal MS-60121		R314,315,343~348 384	J00245332	〃 〃 〃	VJ 3.3KΩ
	R5047912B	Heat Sink C To-5 ℓ=15mm					
	R0052890	Resonator Case		R404		〃 〃 〃	VJ 5.6KΩ
				R309,321,325,335~ 337,352,363,409,426 427	J00245103	〃 〃 〃	VJ 10KΩ
PLL UNIT							
Symbol Number	Parts Number	Description		R353	J00245123	〃 〃 〃	VJ 12KΩ
	C0017570	PLL Unit with components		R368,374	J00245153	〃 〃 〃	VJ 15KΩ
PB-1757B	F0001757B	PLL Main Board (P.C.B)		R317,362,366,401,406 410	J00245223	〃 〃 〃	VJ 22KΩ
PB-1830A	F0001830A	VCO Board (P.C.B)					
	C0018300	〃 〃 with components		R326	J00245273	〃 〃 〃	VJ 27KΩ
				R310,318,402,424	J00245333	〃 〃 〃	VJ 33KΩ
		IC, FET & Transistor		R322,423	J00245393	〃 〃 〃	VJ 39KΩ
Q309	G1090048	IC	TC5081P	R405	J00245473	〃 〃 〃	VJ 47KΩ
Q308	G1090047	〃	μPD857C	R301	J00245563	〃 〃 〃	VJ 56KΩ
Q403,404	G3800190G	FET	2SK19GR	R304~306,316,342 370,377,380,416,417 419~422,429	J00245104	〃 〃 〃	VJ 100KΩ
Q301	G3800190B	〃	2SK19BL				
Q302,304,405	G4800510C	MOS FET	3SK51-03				
Q306,307,313~315 401,402	G3303720Y	Transistor	2SC372Y	R376	J00245154	〃 〃 〃	VJ 150KΩ
				R308,320(L303,304)	J10246220	Carbon Composition	½W GK 470Ω
Q312	G3303730	〃	2SC373				
Q303,305	G3305350A	〃	2SC535A				
Q310	G3307850B	〃	2SC785BX				
Q316	G3090005	〃	MPSA13				
						BLOCK RESISTOR	
				RB301	J40900004		11×100KΩ
		IC SOCKET					
QS301	P3090034	116-24-30-114					

FT-627RA PARTS LIST

		CAPACITOR		
C324,327	K00179001	Ceramic	50WV	SL 0.5pF
C323,326,369,423,426	K00172010	〃	〃	SL 1pF
C407	K00172020	〃	〃	SL 2pF
C404	K02172040	〃	〃	CH 4pF
C427	K06175040	〃	〃	UJ 4pF
C310	K00172050	〃	〃	SL 5pF
C317	K02172050	〃	〃	CH 5pF
	K02173060	〃	〃	CH 6pF
C420	K06175060	〃	〃	UJ 6pF
C422,424	K02173070	〃	〃	CH 7pF
	K06175080	〃	〃	UJ 8pF
C332,433	K00173100	〃	〃	SL 10pF
C357~362	K02173100	〃	〃	CH 10pF
C435	K00175120	〃	〃	SL 12pF
C421,425,428	K06179002	〃	〃	UJ 13pF
C302	K06179003	〃	〃	UJ 16pF
C304,331	K00175180	〃	〃	SL 18pF
C306	K02175180	〃	〃	CH 18pF
C413,414	K02179008	〃	〃	CH 20pF
C368	K02179009	〃	〃	CH 22pF
C365,368,378	K06175220	〃	〃	UJ 22pF
C307	K02179010	〃	〃	CH 24pF
C305	K02175270	〃	〃	CH 27pF
C417,418	K06175270	〃	〃	UJ 27pF
C429	K00175330	〃	〃	SL 33pF
C301	K02175330	〃	〃	CH 33pF
C392,438	K00172020	〃	〃	SL 47pF
C314,352	K00175101	〃	〃	SL 100pF
	K02175101	〃	〃	CH 100pF
C403,405,406	K06175101	〃	〃	UJ 100pF
C313,319,320,338~348,354~356,380 402,438	K12171102	〃	〃	0.001μF
C374	K10179016	〃	〃	0.001μF
C319,320,432,441	K14179002	〃	〃	0.01μF
C308,311,312,315,316 318,321,325,330,333 335,363,364,366,367 375,384,394,395 408~410,415,416 419,430,431,442	K13170103	〃	〃	0.01μF
C334	K13170223	〃	〃	0.022μF
C322,328,329,336,350 351,391,393,397,399 436,439,440	K13170473	〃	〃	0.047μF
C388	K50177473	Mylar Film	〃	0.047μF
C376	K51176391	Styrol	〃	390pF
C377	K51176102	〃	〃	1000pF
C385	K70167104	Tantalum	35WV	0.1μF
C387	K70127475	〃	〃	4.7μF
C353	K70127106	〃	〃	10μF
C349	K40100476	Electrolytic	10WV-R	47μF
C379,381,389	K40100107	〃	〃 R	100μF
C309,382,396	K40120106	〃	16WV-R	10μF
C383,386,398,401	K40170105	〃	50WV-R	1μF

		TRIMMER CAPACITOR		
TC301	K91000049	TZ03Z070A		7pF
TC308	K91000028	ECV-1ZW	10×53N	10pF
TC302-307,309	K91000029	〃	20×53N	20pF

		INDUCTOR	
L301	L0020587	VCO Coil	#220587
L309	L0020205		#220205
L303,304	L0020206		#220206
L307	L0020417		#220417
L302	L1190005	Micro Inductor	FL4H-1R0M 1μH
L306,308,313	L1190014	〃 〃	FL4H-100K 10μH
L305	L1190025	〃 〃	FL5H-330K 33μH
		〃 〃	47μH
L312	L1190024	〃 〃	FL5H-221K 220μH
L311,401	L1190017	〃 〃	FL5H-102K 1mH
L310	L1190035	〃 〃	FL7H-392J 3.9mH

		TRANSFORMER	
T301,404~408	L0020408		#220408
T401	L0020319		#220319
T402,403	L0020149	R12-4073	#220149

		MINI CONNECTOR	
J301,302	P0090051	5048-06A	
J303,304	P0090053	5048-11A	
J305	P0090036	5048-14A	
P301	T9200460B	5047-06 with Wire	#240046B
P302	T9200470B	〃	#240047B
P303	T9201150	5047-11	#240115
P304	T9200490	〃	#240049
P305	T9200500	5047-14	#240050
	R7052100A	Spacer	
	R0041040B	VCO Case	
	R0041050B	VCO Case Cover	
	Q5000011	Wrapping Terminal C	

PLL CONTROL UNIT

Symbol Number	Parts Number	Description
	C0018930	PLL Control Unit with components
PB-1893A	F0001893A	P.C. Board

		IC & TRANSISTOR	
Q704	G1090068	IC	MC14011B
Q701	G1090067	〃	MC14013B
Q712	G1090088	〃	MC14028B
Q702,707	G1090126	〃	MC14069B
Q708	G1090053	〃	MC14081B
Q709~711	G1090149	〃	MC14510B
Q703	G1090224	〃	MC14584B
Q705,706	G1090140	〃	CD4039AE
Q713~715	G3318150Y	Transistor	2SC1815Y

		DIODE	
D701~737	G2015550	Silicon	1S1555

		RESISTOR		
R706,709	J00245682	Carbon Film	¼W VJ	6.8KΩ
R707,719,728,729,732 738,741,746	J00245103	〃 〃	〃 VJ	10KΩ
R721,725,739,740,745	J01245103	〃 〃	〃 TJ	10KΩ
R701,716,717	J00245223	〃 〃	〃 VJ	22KΩ
R735	J01245333	〃 〃	〃 TJ	33KΩ

FT-627RA PARTS LIST

R703,722	J00245473	Carbon Film	¼W	VJ	47KΩ
R702,705,708,730,731 733,737,744	J00245104	〃 〃	〃	VJ	100KΩ
R710~714,723,724 726,727,742	J01245104	〃 〃	〃	TJ	100KΩ
R720,734	J00245224	〃 〃	〃	VJ	220KΩ
R743	J01245224	〃 〃	〃	TJ	220KΩ
R736	J00245334	〃 〃	〃	VJ	330KΩ
R704,718	J00245474	〃 〃	〃	VJ	470KΩ
R715	J10246275	〃 composition	〃	GK	2.7MΩ

CAPACITOR				
C704,713,722,724	K12171102	Ceramic disc	50WV	0.001μF
C703,705	K13170103	〃 〃	〃	0.01μF
C714,715,720	K50177102	Mylar	〃	0.001μF
C706~708,716,719 721	K50177103	〃	〃	0.01μF
C702	K50177223	〃	〃	0.022μF
C710	K70167104	Tantalum	35WV	0.1μF
C723	K70167224	〃	〃	0.22μF
C711,712,718	K70147105	〃	25WV	1μF
C709,717	K70127225	〃	16WV	2.2μF
C701	K71137685	〃 (N.L)	20WV	6.8μF

DISPLAY UNIT

Symbol Number	Parts Number	Description
	C0017590	Display Unit with components
PB-1759	F0001759	Driver Board (P.C.B)
	C0017590	〃 〃 with components
PB-1758	F0001758	Display Board (P.C.B)
	C0017580	〃 〃 with components

IC & TRANSISTOR			
Q605	Q1090065	IC	μPC14305
Q601~603	Q1090046	〃	MSM561
Q606	Q3303720Y	Transistor	2SC372Y

DISPLAY LED		
DS601~604	G2090056	TLR312D

RESISTOR					
R623	J00245181	Carbon Film	¼W	VJ	180Ω
R625	J00245331	〃 〃	⅛W	VJ	330Ω
R601~622	J00245471	〃 〃	〃	VJ	470Ω
R624	J00245681	〃 〃	〃	VJ	680Ω
R626	J00245103	〃 〃	¼W	VJ	10KΩ

CAPACITOR				
C601	K12171102	Ceramic	50WV	0.001μF
C602	K70167474	Tantalum	35WV	0.47μF
C603	K40100476	Electrolytic	10WV-R	47μF

	R0039530	Heat Sink A			
	Q5000007	Board Joint 163740			
	Q5000011	Wrapping Terminal C			

AFP UNIT

Symbol Number	Parts Number	Description
	C0020230	AFP Unit with components
PB-2023	F0002023	P.C. Board

DIODE			
D801	G2001880F	Ge	1S188FM

POTENTIOMETER			
VR801	J50704501	EVN-K0AA00B52	500ΩB

CAPACITOR				
C801	K00172010	Ceramic	50WV	SL 1pF
C802	K00172030	〃	〃	SL 3pF
C804	K00175470	〃	〃	SL 47pF
C805	K00175101	〃	〃	SL 100pF
C803	K13170103	〃	〃	0.01μF

INDUCTOR		
L801	L0020588	#220588
L802	L0020527	#220527

TONE SQUELCH UNIT

Symbol Number	Parts Number	Description
	C0015550	Tone Squelch Board with Components
PB-1555A	F0001555A	Printed Circuit Board

IC, FET & TRANSISTOR			
Q501	G1090077	IC	MC3403
Q502	G1090154	〃	NE567
Q503	G3800190G	FET	2SK19GR
Q504,505	G3303720Y	Tr	2SC372Y

DIODE			
D501	G2090042	Zener Diode	RD8.2EB

RESISTOR					
R518	J00245101	Carbon Film	¼W	VJ	100Ω
R512	J00245103	〃 〃	〃	VJ	10KΩ
R504	J00245123	〃 〃	〃	VJ	12KΩ
R510,511,517	J00245223	〃 〃	〃	VJ	22KΩ
R502,508	J00245393	〃 〃	〃	VJ	39KΩ
R501,505,521,522	J00245473	〃 〃	〃	VJ	47KΩ
R506,507	J00245823	〃 〃	〃	VJ	82KΩ
R509,514※	J00245154	〃 〃	〃	VJ	150KΩ
R503	J00245474	〃 〃	〃	VJ	470KΩ
R515,519	J00245105	〃 〃	〃	VJ	1MΩ
R513※,524※	J00245153	〃 〃	〃	VJ	15KΩ
R516※	J00245393	〃 〃	〃	VJ	39KΩ
R513※,524※	J00245822	〃 〃	〃	VJ	8.2KΩ
R514※	J00245274	〃 〃	〃	VJ	270KΩ
R516※	J00245333	〃 〃	〃	VJ	33KΩ

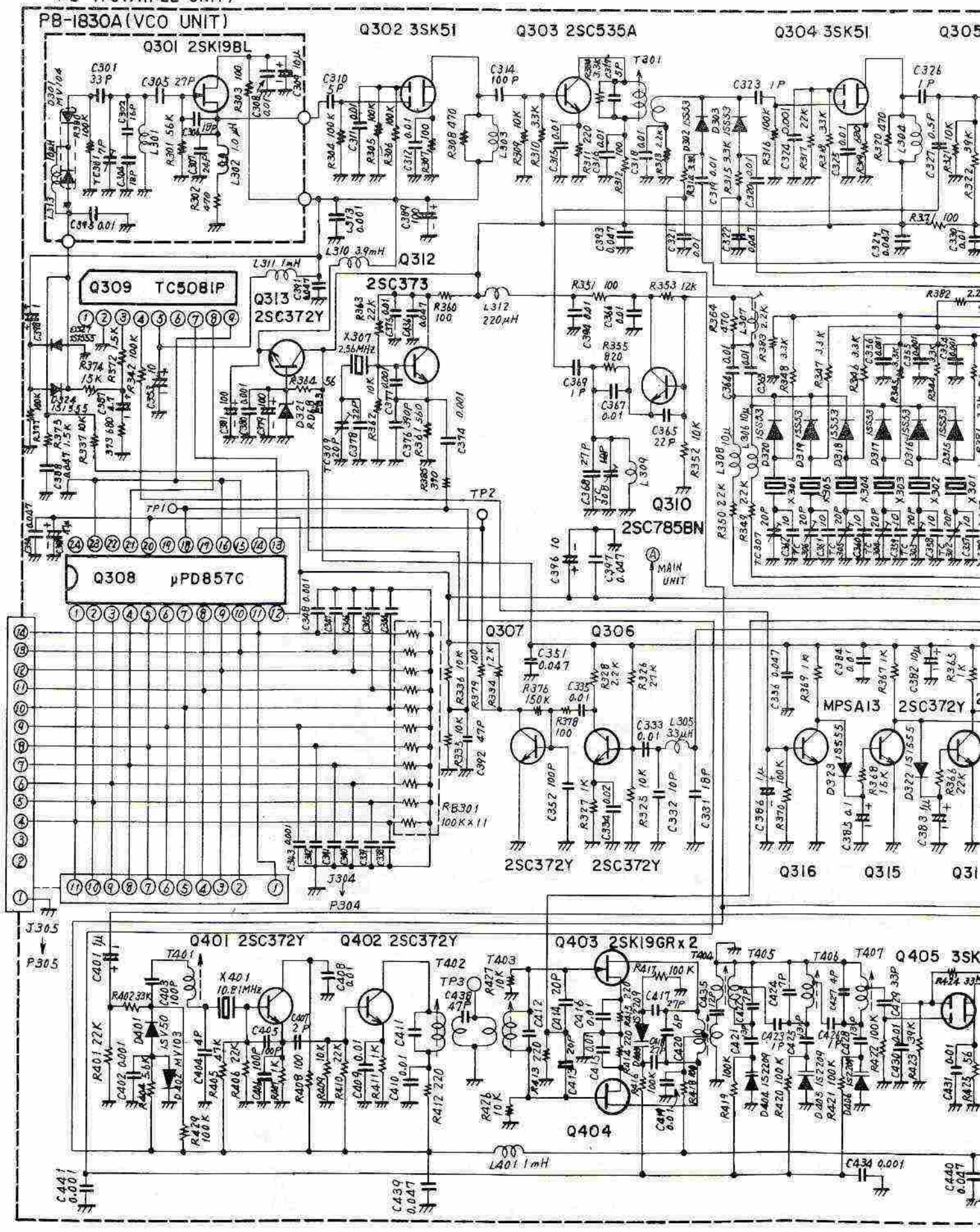
※ See table 2

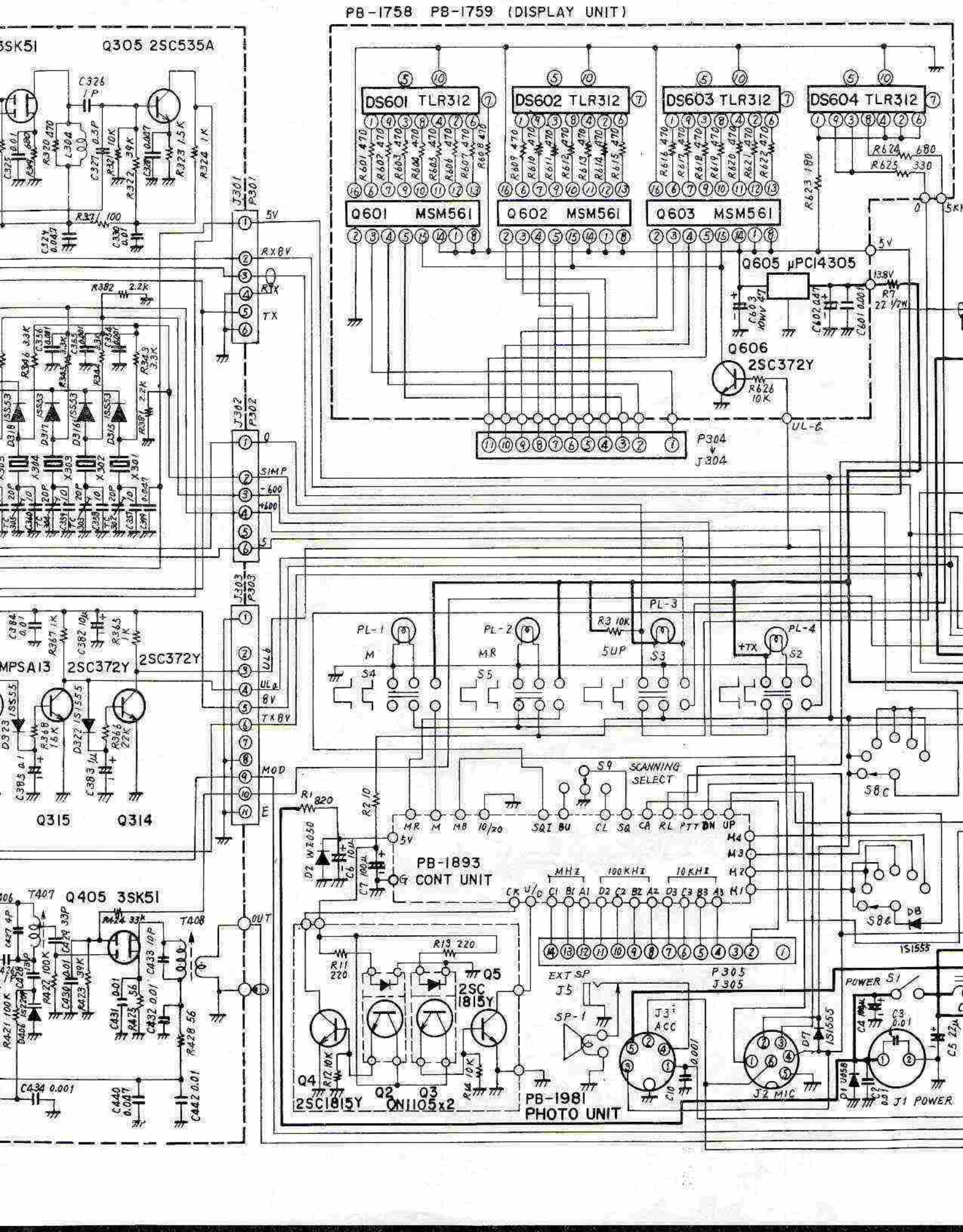
FT-627RA PARTS LIST

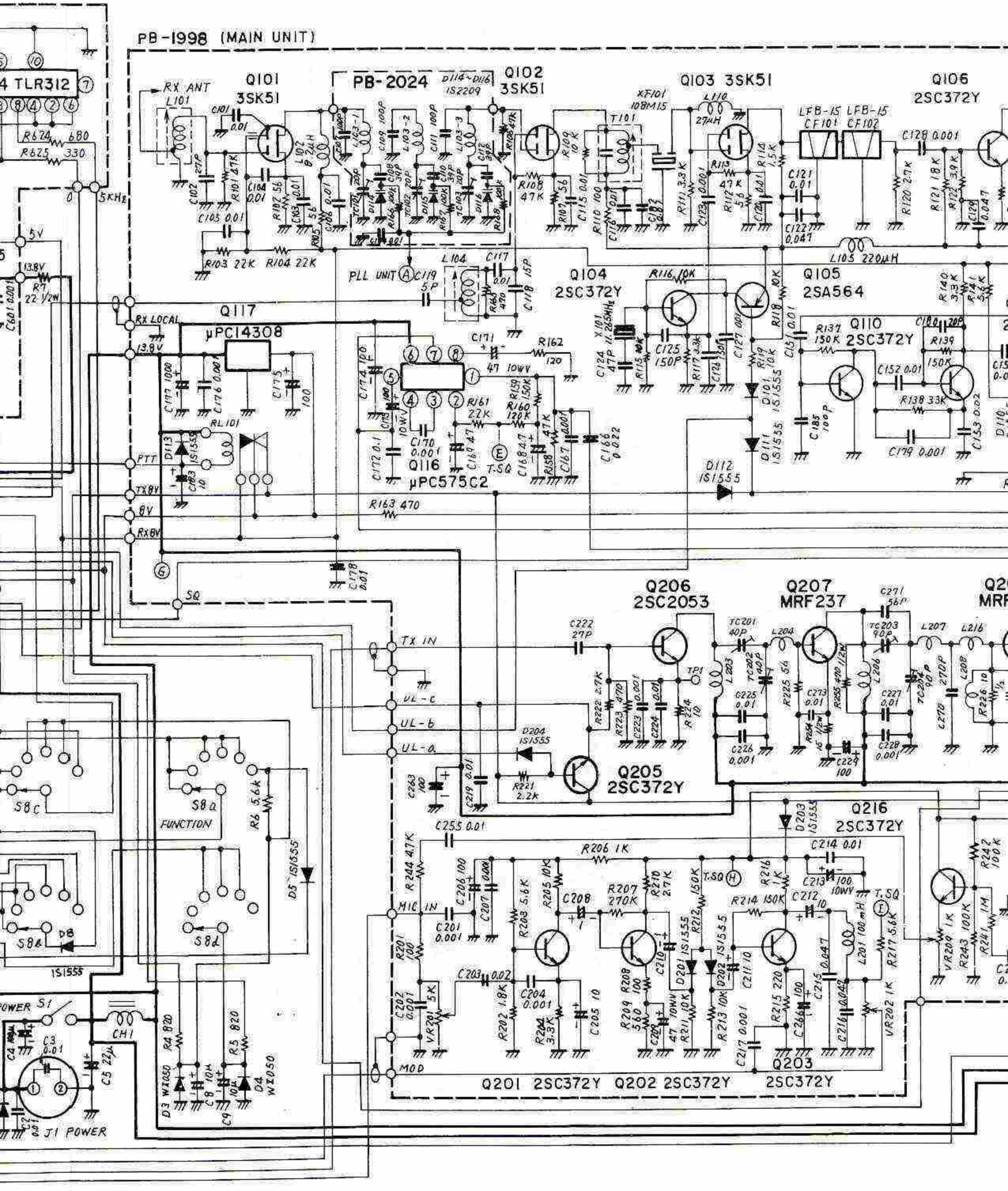
		POTENTIOMETER		
VR501,504	J51723102	SR-19R		1KΩB
VR502	J51725104	TM065P		100KΩB
		CAPACITOR		
C503	K50177102	Mylar	50WV	0.001μF
C512	K50177472	〃	〃	0.0047μF
C506,507,520	K50177103	〃	〃	0.01μF
C502,504,505,508,511	K50177223	〃	〃	0.022μF
C509	K50177473	〃	〃	0.047μF
C516	K50177154	〃	〃	0.15μF
C516※	K50177104	〃	〃	0.1μF
C514,522	K40170105	Electrolytic	50WV	1μF
C501,510,513,521,524	K40120106	〃	16WV	10μF
C515,517,519	K40120226	〃	〃	22μF
C523	K70167154	Tantalum	35WV	0.15μF
C518	K70127475	〃	〃	4.7μF

ACCESSORIES		
Symbol Number	Parts Number	Description
	M3090008	Microphone Assembly YE-17
		with Microphone hanger, screws
	P1090021	Microphone plug FM-146P
	P1090031	ACC Plug CP0084
	T9002803	Power cord Assembly #240028
	P1090019	Power plug FM142P
	Q2000001	Fuse Holder SN1101
	Q0000004	Fuse 3A
	P0090068	Cigarette Lighter Adapter
	Q0000004	Fuse 3A
	P0090034	External Speaker plug P-2240
	R0038630	Stand
		Mobile Bracket Assembly
		with Set Screws

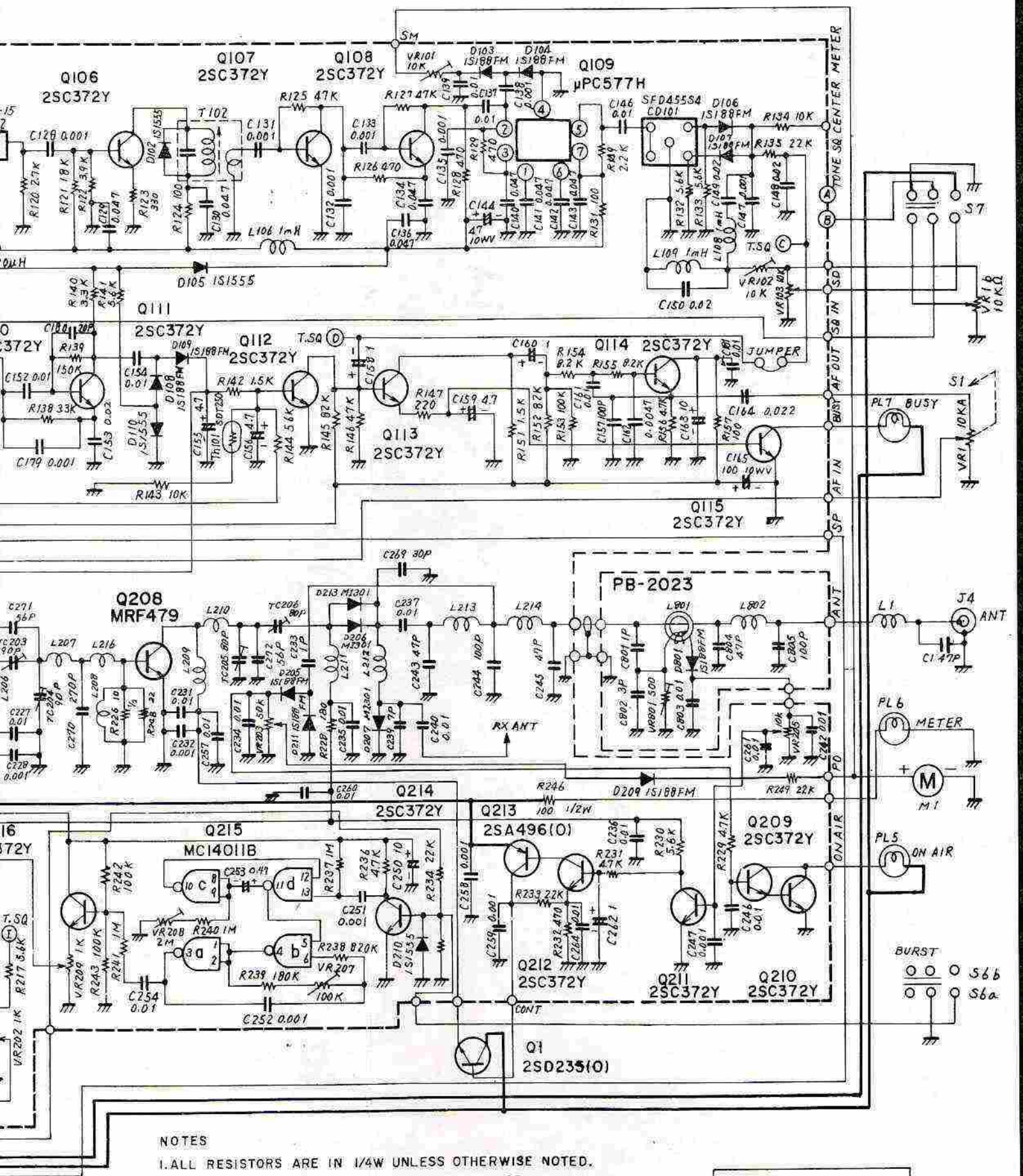
PB-1757A(PLL UNIT)




PB-1758 PB-1759 (DISPLAY UNIT)
DS601 TLR312
DS602 TLR312
DS603 TLR312
DS604 TLR312
Q601 MSM561
Q602 MSM561
Q603 MSM561
Q605 μPC14305
Q606 2SC372Y
P304 J304
PB-1893 G CONT UNIT
PB-1981 PHOTO UNIT
Q405 3SK51
Q315
Q314
PL-1
PL-2
PL-3
PL-4
S1 POWER
J1 POWER
J2 MIC
J3 ACC
J5 EXT SP
SP-1
S9 SCANNING SELECT



PB-1998 (MAIN UNIT)
TLR312
Q101 3SK51
PB-2024
D114~D116 1S2209
Q102 3SK51
Q103 3SK51
XF101 10BM15
LFB-15 CF101
LFB-15 CF102
Q106 2SC372Y
RX ANT
L101
L102 0.24μH
L103-1
L103-2
L103-3
T101
L110 27μH
L105 220μH
PLL UNIT
L104
Q104 2SC372Y
X101 11.265MHz
Q105 2SA564
Q110 2SC372Y
D101 1S1555
D111 1S1555
D112 1S1555
Q117 μPC14308
Q116 μPC575C2
RL101
D113 1S1555
T.SQ
RX LOCAL
13.8V
PTT
TX8V
8V
RX8V
SQ
5V
5KHz
Q206 2SC2053
Q207 MRF237
TX IN
UL-c
UL-b
UL-a
TP1
D204 1S1555
Q205 2SC372Y
MIC IN
MOD
Q216 2SC372Y
D203 1S1555
D201 1S1555
D202 1S1555
Q201 2SC372Y
Q202 2SC372Y
Q203 2SC372Y
VR201 5K
VR202 1K
VR203 1K
L201 100mH
FUNCTION
S8a
S8b
S8c
S8d
D5 1S1555
D8
1S1555
POWER S1
CH1
C3 0.01
C5 22μ
J1 POWER
D3 WZ030
D4 WZ050
R4 820
R5 820
R6 5.6k
R7 22 1/2W



NOTES

1. ALL RESISTORS ARE IN 1/4W UNLESS OTHERWISE NOTED.
2. ALL CAPACITORS ARE IN μF UNLESS OTHERWISE NOTED.
3. ALL ELECTROLYTIC CAPACITORS ARE 16WV UNLESS OTHERWISE NOTED
4. * VALUE IS NOMINAL.

FT-627RA
CIRCUIT DIAGRAM

MANUALMAN
P. A. Markavage Phone (732) 238-8964
27 Walling St., Sayreville, NJ 08872-1818
Web http://www.manualman.com
e-mail manualman@juno.com
Quality Is The Number 1 Customer Priority