

SECTION 5 -- LATE MODEL UPDATE

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HIGH—PERFORMANCE HF TRANSCEIVER

YAESU FT-101ZD



GENERAL DESCRIPTION

The FT-101ZD is a precision engineered, high-performance HF transceiver of advanced design, providing all band (160 - 10 meters) operation on SSB, CW, and AM* or FM*. This transceiver operates at an input power of 180 watts.

Advanced features include digital plus analog frequency display, continuously variable IF bandwidth (300 Hz - 2.4 kHz), a superb noise blanker with threshold adjustment, and an effective RF speech processor. The receiver boasts excellent dynamic range, despite its high sensitivity, for reliable operation in the presence of strong signals.

Built into every FT-101ZD are VOX, semi-break-in CW with sidetone, a 25 kHz crystal calibrator, selectable AGC, and a 10 dB/20 dB RF attenuator in the incoming signal path.

The FT-101ZD has been engineered for use. Controls and switches are laid out in an efficient and logical manner, so you won't have to fumble for a switch or knob when you need it quickly. And Yaesu designers have now made it possible for you to switch sidebands without recalibrating the display.

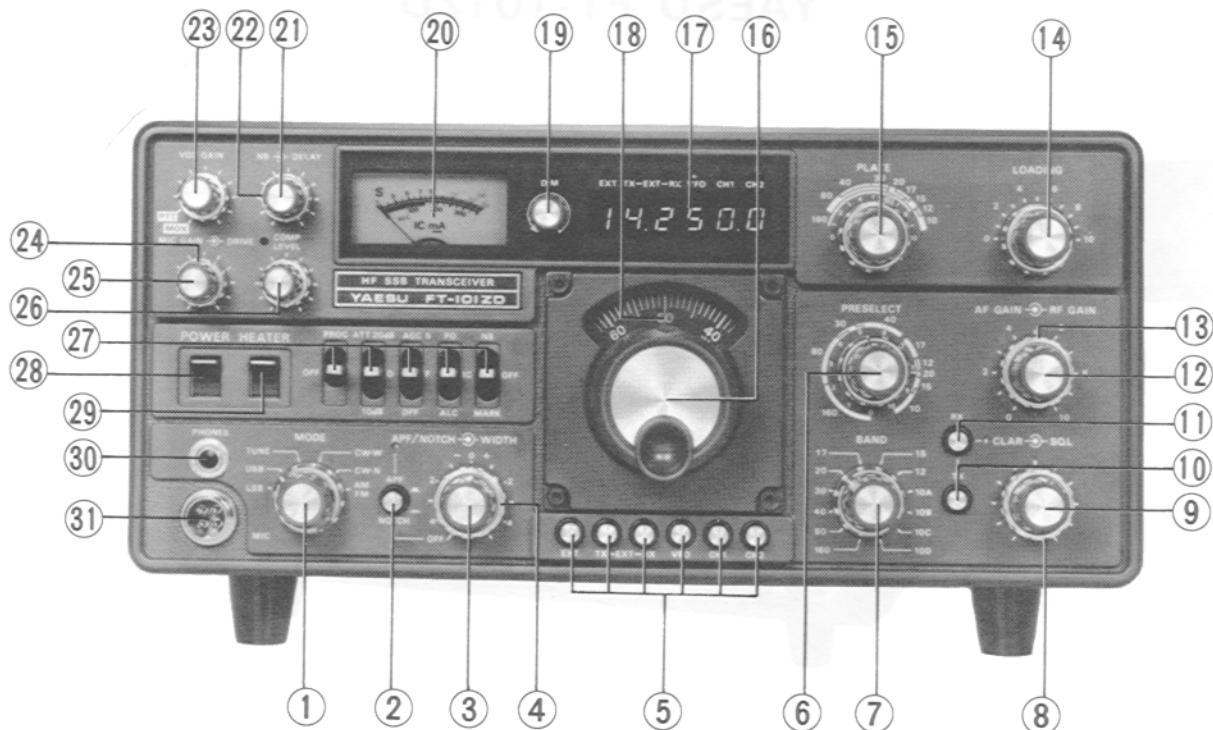
* option

All circuits, except the transmitter driver and final amplifier stages, are solid state. Solid state devices provide extremely high reliability and high component density, along with low power drain. The FT-101ZD may be operated from a variety of AC voltages, from 100 to 234 volts. A DC-DC converter, providing operation from a 13.5 VDC power source, is an available option.

For the economy FT-101Z, the counter unit is an available option, providing digital display capability, should you want to upgrade your transceiver at a later date. Optional equipment on both models FT-101ZD and FT-101Z are the cooling fan, DC-DC converter, 600 Hz/350 Hz CW filter, AM unit, FM unit, and microphone.

A diecast front panel, and the heavy-duty case, provide maximum protection for your transceiver. If the ratings of this unit are not exceeded, it will provide the owner with many years of satisfying operation. Please read this manual carefully before commencing operation, in order to derive maximum satisfaction from your new YAESU transceiver.

CONTROLS AND SWITCHES



(1) **MODE**

Selection of LSB, USB, CW-W (SSB filter), CW-N (optional CW filter) and AM* or FM* is provided.

(2) APF/NOTCH switch

This switch selects either the Audio Peak Filter (APF) or the Audio Notch Filter. When pressed, the Audio Notch Filter function is activated.

(3) APF/NOTCH

The APF/NOTCH control varies the frequency response of the audio peak/notch filter. The peak/notch filter may be varied over the range 350 Hz – 1500 Hz. When rotated into the OFF position, the APF/NOTCH function is switched off.

(4) WIDTH

This control varies IF bandwidth (except on AM and FM) from 2.4 kHz down to 600 Hz.

(5) SELECT switches

When using the optional FV-101DM synthesized, scanning external VFO, these switches determine which component will control the transmit, receive, or transceive frequency.

EXT..... This switch, when pressed, shifts control of the transceiver frequency to the external VFO.

* with optional unit

TX EXT... This switch, when pressed, shifts control of the transmit frequency to the external VFO.

RX EXT... This switch, when pressed, shifts control of the receive frequency to the external VFO.

VFO..... This switch selects control of the transceive frequency on the FT-101ZD internal VFO.

CH1, CH2. . These switches select optional fixed channels, transceive only.

(6) PRESELECT

The preselector control peaks the RF and IF stages for the frequency in use.

(7) BAND

The bandswitch selects the frequency band in use:
160 - 10 meters.

(8) SQL

The SQL (Squelch) control will silence the receiver until a signal is received. The SQL control can be used only when the FM unit is installed.

(9) CLARIFIER

The clarifier control allows offset of ± 2.5 kHz from the frequency established by the main tuning dial.

(10) (11) CLARIFIER SELECT switches

Press the RX button for offset of the receive frequency.

Press the TX button for offset of the transmit frequency.

Press both buttons for offset of the transceive frequency.

(12) AF GAIN

The AF GAIN control varies the output level of the audio amplifier stages. Clockwise rotation increases the audio output level.

(13) RF GAIN

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

(14) LOADING

This control tunes the output circuit of the final amplifier pi network to match the feedpoint impedance of the load.

(15) PLATE

This control tunes the plate circuit of the final amplifier.

(16) MAIN TUNING KNOB

Rotation of this knob selects the operating frequency, in conjunction with the setting of the bandswitch. One revolution of the dial produces a frequency change of approximately 17 kHz.

(17) DIGITAL DISPLAY

The digital display reads out the operating frequency, with resolution to 100 Hz. The display unit is built into the FT-101ZD, and is an available option for the FT-101Z.

(18) ANALOG DIAL

The analog dial allows readout of the operating frequency to better than 1 kHz. The combination of the precision dial mechanism and drive unit provides zero backlash at slow tuning rates.

(19) DIM

This control allows dimming of the meter and dial lamps.

(20) METER

The meter displays final amplifier cathode current (IC), relative power output (PO), and ALC feedback voltage.

(21) NB

This control varies the threshold point for the noise blanker, and should be set to the minimum point that provides the desired blanking action.

(22) DELAY

This control sets the delay time for the VOX relay. For voice-actuated SSB, or semi-break-in CW, the operator may select the delay time most suitable for his or her operating habits.

(23) VOX GAIN

The threshold level for the VOX (voice operated relay) system can be varied using this control. In the PTT position, PTT (push to talk) control is provided, for relay control via the microphone PTT switch or footswitch.

(24) DRIVE

This control sets the carrier level for CW/AM and tuning purposes. When the RF processor is ON, this control varies the RF output on SSB, as well.

(25) MIC GAIN

This control sets the output level of the microphone amplifier stage. Clockwise rotation increases the mic gain level.

(26) COMP LEVEL

This control varies the compression level for the built-in RF speech processor. The processor does not function in the AM/FM mode.

(27) FUNCTION switches

PROC This switch activates the RF speech processor.

ATT This switch allows the insertion of 10 or 20 dB attenuators in the incoming signal path.

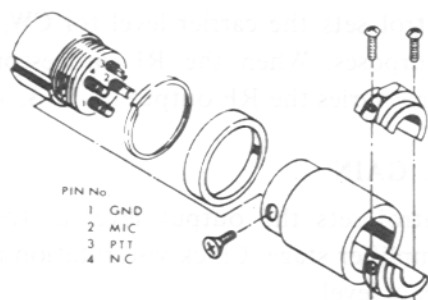
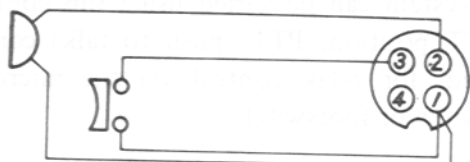
AGC S/F/OFF . . This switch allows selection of the desired AGC decay time. In the OFF position, the AGC is switched off, and the S-meter will not function.

PO/IC/ALC In the PO position, relative power output is displayed on the meter. In the IC position, final amplifier cathode current is displayed. In the ALC position, ALC voltage is displayed. Regardless of the setting of the meter switch, the meter functions as an S-meter on receive.

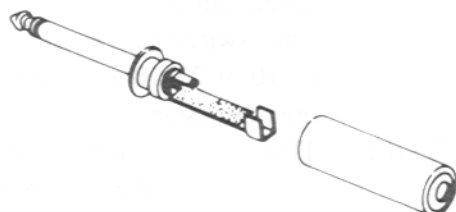
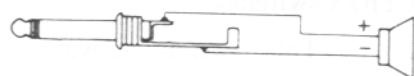
NB/MARK In the NB position, the noise blander is activated. In the MARK position, the internal crystal calibrator is activated.

(28) POWER

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



Mic plug



Headphone and external speaker plug

(29) HEATER

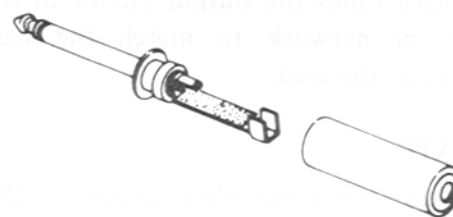
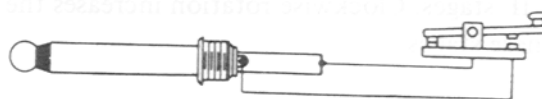
With the HEATER switch on, heater voltage is applied to the driver and final amplifier tubes. This switch may be turned off during periods of RX, when energy conservation is critical.

(30) PHONES

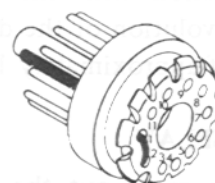
This is a standard 1/4" phone jack for use with headphones.

(31) MIC

This is a 4 conductor jack for microphone and PTT input.

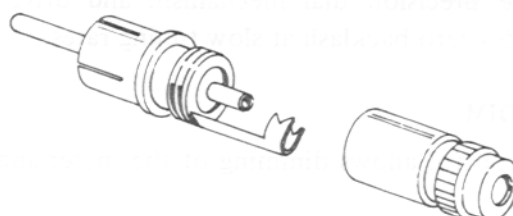
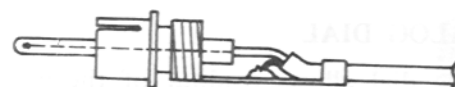


Key plug



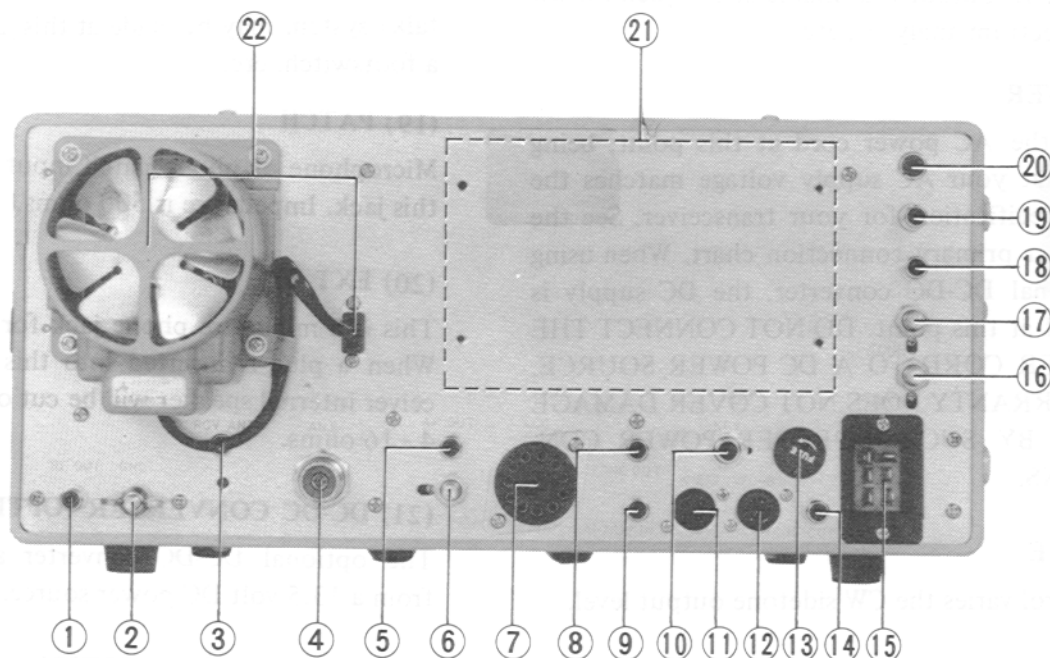
ACC plug

PIN No.
1 HEATER
2 HEATER
3 NC
4 NC
5 NC
6 NC
7 ALC
8 GND
9 TX GND
10 RX GND
11 NC



Pin plug

REAR APRON



(1) RF OUT

RF output of 3 volts RMS is available at this jack for use with a transverter. Output is from the driver stage.

(2) GND

For best transceiver performance, as well as protection from electrical shock, a good ground connection should be made at this point, using a heavy, braided wire of the shortest length possible.

(3) RCV ANT

This jack is switched in parallel with the ANT jack on receive, for use with an external receiver.

(4) ANT

Standard "UHF" connector for the antenna.

(5) AF OUT

This is an audio output jack, providing 200 mV of audio output for recording purposes. This jack is not disabled by insertion of a headphone or speaker plug into their respective jacks.

(6) PO ADJ

This control adjusts the relative power output meter.

(7) ACC

ALC voltage and relay connections can be made through the accessory jack.

Please insert the ACC plug at all times, to provide heater voltage for the final amplifier tubes.

(8) TONE OUT

The CW sidetone may be fed to an external receiver through this jack.

(9) A TRIP IN

Anti-trip input from an external receiver may be made via this jack, to prevent the receiver audio output from tripping the FT-101ZD VOX.

(10) KEY

The CW key may be connected at this point. Key-up voltage is 7 volts, and key-down current is 1.5 mA. Be sure your electronic keyer's output switch will handle these levels.

(11) EXT VFO A

This is a 8 pin DIN jack for interconnection to the FV-101DM external digital VFO.

(12) EXT VFO B

This is a 6 pin DIN jack for interconnection to the FV-101Z, FV-901DM and FV-101DM external VFO.

(13) FUSE

This is the fuse holder. For 100 - 117 volts, replace with only a 5 amp fuse. For 200 - 234 volts, use a 3 amp fuse. Replace fuses only with a fuse of the proper rating.

(14) IF OUT

Wideband IF output is available at this jack for use with a spectrum analyzer, etc.

(15) POWER

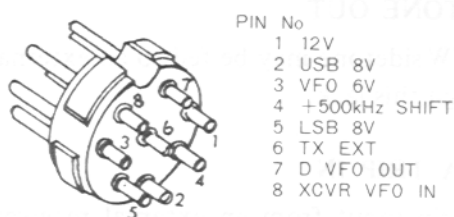
Connect the AC power cord at this point, being certain that your AC supply voltage matches the voltage specification for your transceiver. See the transformer primary connection chart. When using the optional DC-DC converter, the DC supply is connected at this point. **DO NOT CONNECT THE AC POWER CORD TO A DC POWER SOURCE. OUR WARRANTY DOES NOT COVER DAMAGE CAUSED BY SUCH IMPROPER POWER CONNECTIONS.**

(16) TONE

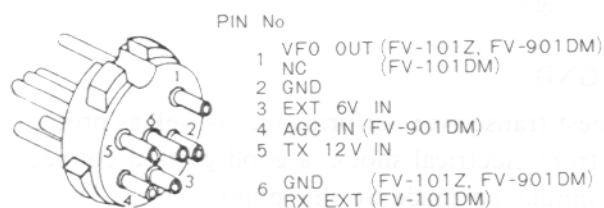
This control varies the CW sidetone output level.

(17) A TRIP

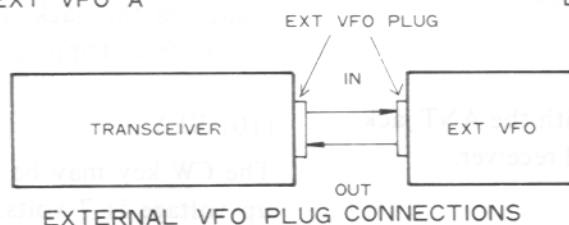
This control varies the level of the VOX anti-trip circuit.



EXT VFO A



EXT VFO B



(18) PTT

External control of the transceiver PTT (push to talk) system may be made at this jack, for use with a footswitch, etc.

(19) PATCH

Microphone or phone patch input may be made at this jack. Impedance is 500 ohms.

(20) EXT SP

This is a miniature phone jack for speaker output. When a plug is inserted into this jack, the transceiver internal speaker will be cut off. Impedance is 4 - 16 ohms.

(21) DC-DC CONVERTER (OPTION)

The optional DC-DC converter allows operation from a 13.5 volt DC power source.

(22) COOLING FAN (OPTION)

The optional cooling fan keeps the tubes at a safe operating temperature, when they are used in a hot environment. The 2 pin fan power jack supplies 100 volts to the fan.

The following accessories are included with your new transceiver:

(1) AC POWER CORD 1 pc.

The power cord comes equipped with a 6-prong connector for connection to the AC supply.

(2) ACC PLUG 1 pc.

The accessory plug allows access to relay contacts and ALC voltage. The ACC plug must be inserted in the accessory socket for proper operation of the transceiver, whether or not external connections are being made.

(3) PHONO PLUG 2 pcs.

Use these plugs for interface with station equipment via the FT-101ZD rear panel.

(4) SPARE FUSES 5A (3A) 1 pc. each

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.** For 100 - 117 volt AC operation, use a 5 amp fuse. For 200 - 234 volt operation, use a 3 amp fuse.

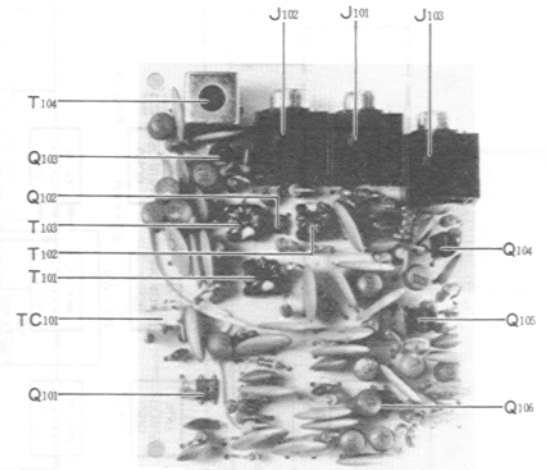


CIRCUIT DESCRIPTION

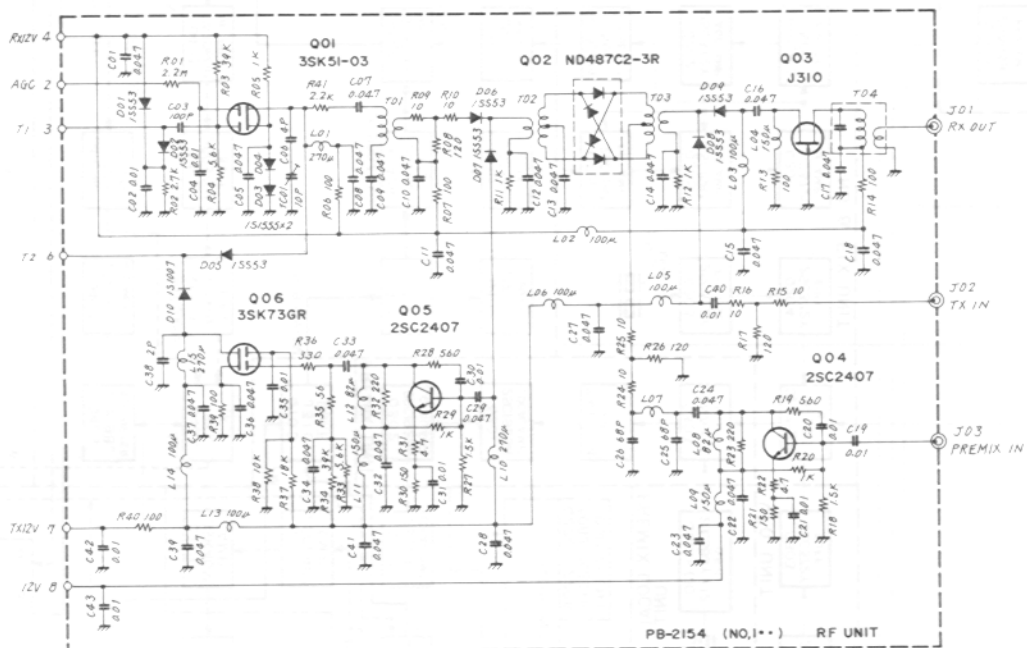
RECEIVER

RF UNIT (PB-2154)

The incoming signal is amplified by the RF amplifier, Q₁₀₁ (3SK51-03), a dual-gate MOS FET with excellent rejection of cross modulation and inter-modulation. The amplified signal is fed to the Schottky barrier diode module, Q₁₀₂ (ND487C2-3R), where the RF signal is mixed with a local signal delivered from Q₁₀₄ (2SC2407), resulting in a first IF of 8.9875 MHz. The IF signal is then amplified by Q₁₀₃ (J310) and fed to J₁₀₁.



RF UNIT (PB-2154)



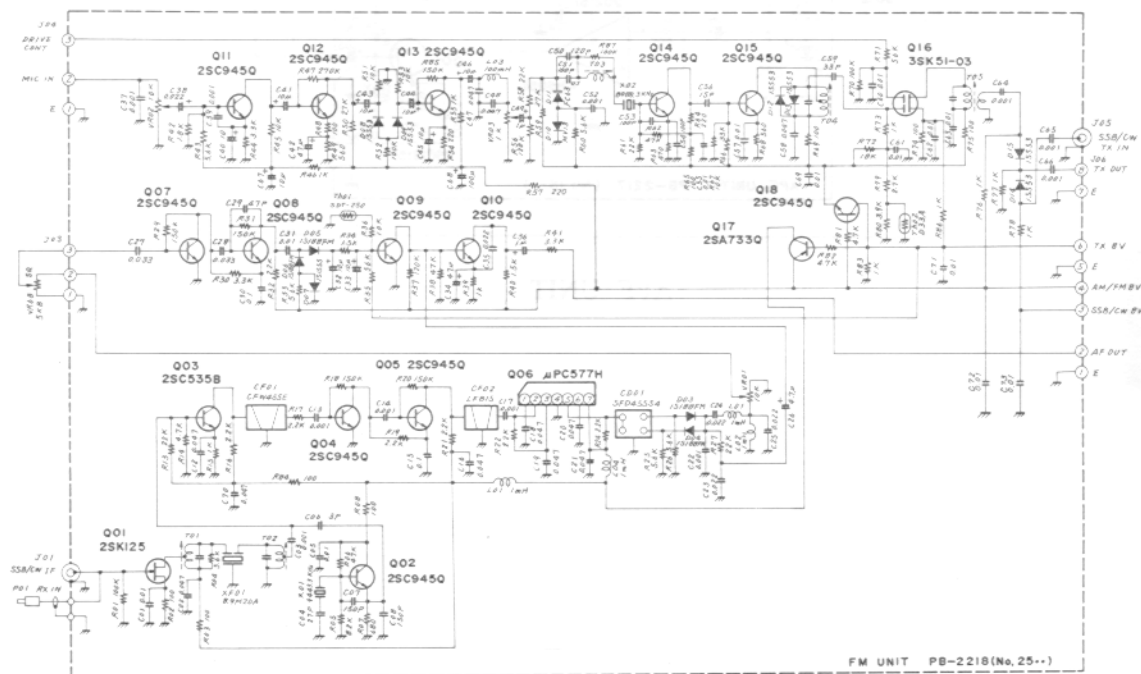
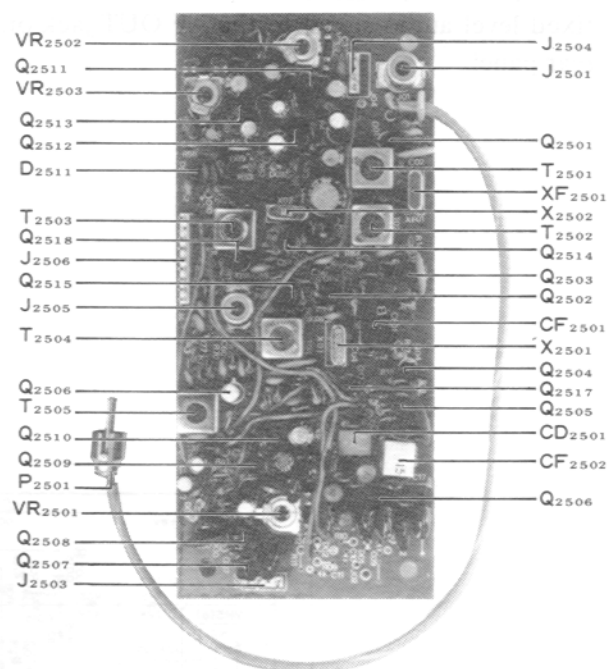
FM UNIT (PB-2219) OPTION

In the FM mode, the IF signal from the RF unit is fed to Q₂₅₀₁ (2SK125), where it is buffered and delivered through a 20 kHz band width monolytic filter, XF₂₅₀₁ (8.9M20A) to a mixer, Q₂₅₀₃ (2SC535B). The IF signal applied to Q₂₅₀₃ is heterodyned with the 8532.5 kHz signal delivered from the local signal oscillator, Q₂₅₀₂ (2SC945Q), thus producing a 455 kHz IF signal. Next the 455 kHz IF signal passes through a ceramic filter, CF₂₅₀₁ (CFW455E) and is amplified by a two-stage amplifier, Q₂₅₀₄, Q₂₅₀₅ (2SC945Q), and then is fed through another ceramic filter, CF₂₅₀₂ (LFB15) to an amplifier limiter, Q₂₅₀₆ (μ PC577H), where any amplified variations in the signal are removed.

A frequency discriminator consisting of CD₂₅₀₁ (SFD455S4) and D₂₅₀₃, D₂₅₀₄ (1S188FM) produces an audio output in response to a corresponding frequency shift in the 455 kHz IF signal. The discriminator output is first delivered through a de-emphasis circuit consisting of R₂₅₂₇, R₂₅₂₈ and C₂₅₂₃, and then sent to Q₂₅₁₀ (2SC945Q).

When no carrier is present in the 455 kHz IF, the noise at the discriminator output is amplified by Q₂₅₀₇ and Q₂₅₀₈, and detected by D₂₅₀₅, D₂₅₀₆ and D₂₅₀₇ (1S188FM) to produce a DC voltage. This voltage is applied to turn “on” Q₂₅₀₉ (2SC-945Q). The thermistor, TH₂₅₀₁ (STD-250) maintains the threshold level of the squelch control, corresponding to temperature changes.

While Q_{2509} is “on”, the base of Q_{2510} (2SC-945Q) is grounded to quiet the audio amplifier. When a carrier is present the noise from the discriminator output is suppressed to turn “off” Q_{2509} , preventing normal action of Q_{2510} . The squelch control, VR_{6b} , sets the squelch threshold level.

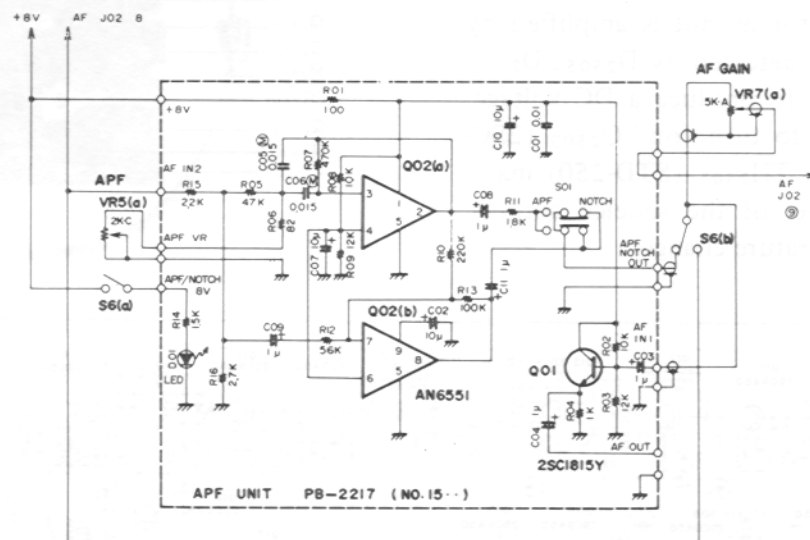


APF UNIT (PB-2217)

The APF UNIT is placed in the audio circuit by the APF/NOTCH switch on the front panel. For APF operation, a selective active filter is formed by Q_{1502(a)}, and the output is delivered to the AF UNIT through the AF GAIN control.

The sections of Q_{1502(b)}, are also used for the high-Q notch filter. APF VR provides for adjustment of the center frequency of the audio peak and notch filter.

A portion of the audio signal at AF GAIN control is amplified by Q₁₅₀₁ (2SC1815Y) to provide a fixed level audio signal to the AF OUT jack on the rear panel.



APF UNIT

RF UNIT (PB-2154)

The IF signal from J₁₀₂ is delivered to the Schottky barrier diode module Q₁₀₂ (ND487C2-3R), where the IF signal is mixed with a local signal delivered from Q₁₀₄ (2SC2407), producing the RF output signal. The RF signal is then amplified by Q₁₀₅ (2SC2407) and Q₁₀₆ (3SK40M), and fed through diode switch D₁₁₀ (1S1007) to the DRIVE UNIT.

FM MODE

The speech signal from the AF unit is fed through two stages of amplifier, consisting of Q₂₅₁₁ and Q₂₅₁₂ (2SC945Q), and this amplified signal is passed to the instantaneous deviation control (IDC) circuit, where both positive and negative peaks are clipped by D₂₅₀₈ and D₂₅₀₉ (1SS53). The output from the IDC is fed through Q₂₅₁₃ (2SC945Q), where the signal is amplified and then fed to the de-emphasis circuit, consisting of C₂₅₄₇, C₂₅₄₈ and L₂₅₀₃. This signal passes through VR₂₅₀₃, where determines the maximum deviation, to the modulator D₂₅₁₁ (FC63) while Q₂₅₁₄ (2SC945Q) oscillates at a crystal frequency of 8988.3 kHz, and its frequency is modulated by variable capacitance diode D₂₅₁₁. The output from Q₂₅₁₄ is amplified by Q₂₅₁₅ (2SC945) and Q₂₅₁₆ (2SK51-03) and then fed through a diode switch D₂₅₁₅ (1SS53) to pin 6 of J₂₅₀₆. The output from the terminal is delivered to the IF unit.

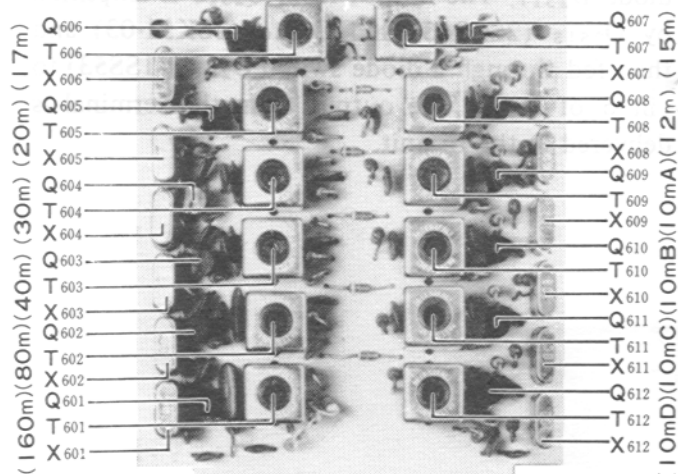
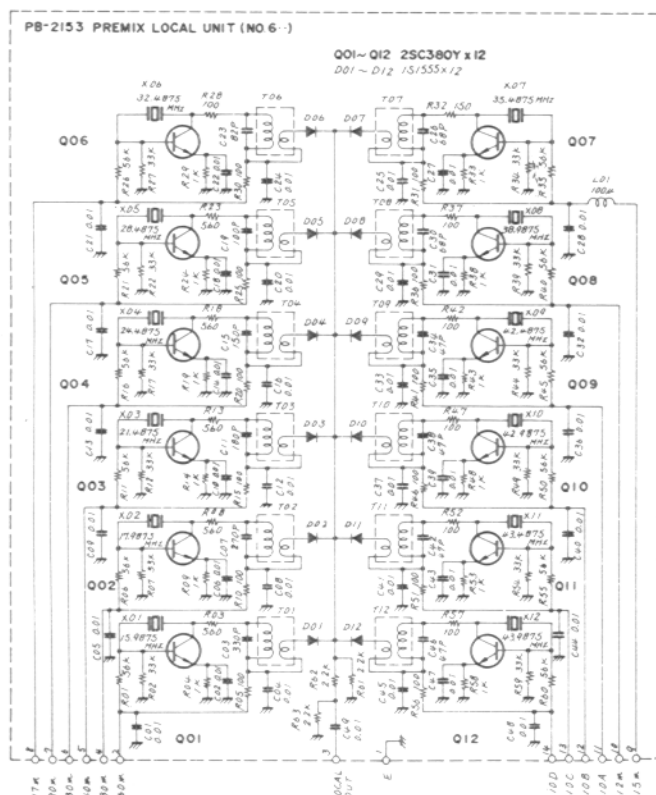
COMMON CIRCUITS

PREMIX LOCAL UNIT (PB-2153)

Crystal oscillators Q601—Q612 (2SC380Y) generate the premix local signal at the frequencies shown in Table 3. Diode switches D601—D612 (1S1555) select the proper local signal for the band in use. The local signal is then delivered to the PREMIX UNIT.

		XCO Frequency	PREMIX OUT Frequency
160m	X ₆₀₁	15.9875MHz	10.4875~10.9875MHz
80m	X ₆₀₂	17.9875MHz	12.4875~12.9875MHz
40m	X ₆₀₃	21.4875MHz	15.9875~16.4875MHz
30m	X ₆₀₄	24.4875MHz	18.9875~19.4875MHz
20m	X ₆₀₅	28.4875MHz	22.9875~23.4875MHz
17m	X ₆₀₆	32.4875MHz	26.9875~27.4875MHz
15m	X ₆₀₇	35.4875MHz	29.9875~30.4875MHz
12m	X ₆₀₈	38.9875MHz	33.4875~33.9875MHz
10m A	X ₆₀₉	42.4875MHz	36.9875~37.4875MHz
10m B	X ₆₁₀	42.9875MHz	37.4875~37.9875MHz
10m C	X ₆₁₁	43.4875MHz	37.9875~38.4875MHz
10m D	X ₆₁₂	43.9875MHz	38.4875~38.9875MHz

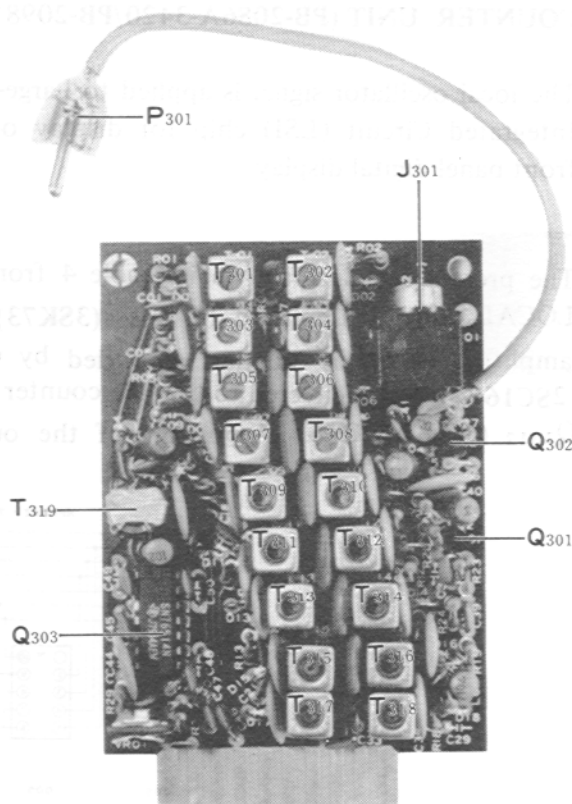
Table 3



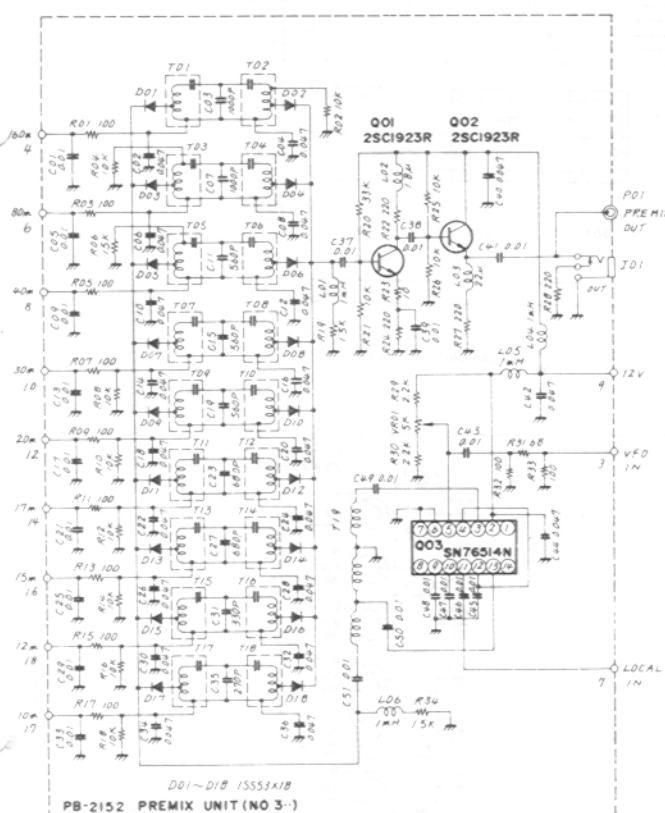
PREMIX LOCAL (XTAL) UNIT (PB-2153)

PREMIX UNIT (PB-2152)

The premix signal is produced at Q303 (SN76514N), a double-balanced mixer, where the premix local signal from Q601—Q612 is mixed with the VFO or crystal controlled 5 MHz signal. The premix output frequencies are shown in Table 3. The premix signal is passed through bandpass filter T301—T318, and amplified by Q301, Q302 (2SC1923R). The amplified signal is then fed to the RF UNIT, where the signal is further amplified by Q102 for delivery to the transmitter and receiver mixers.



PREMIX UNIT (PB-2152)



	Nominal Premix Local Frequency	L S B	U S B	CW, AM/FM
160m	10.4875—10.9875(MHz)	10.486—10.986(MHz)	10.489—10.989(MHz)	10.4883—12.9883(MHz)
80m	12.4875—12.9875	12.486—12.986	12.489—12.989	12.4883—12.9883
40m	15.9875—16.4875	15.986—16.486	15.989—16.489	15.9883—16.4883
30m	18.9875—19.4875	18.986—19.486	18.989—19.489	18.9883—19.4883
20m	22.9875—23.4875	22.986—23.486	22.989—23.489	22.9883—23.4883
17m	26.9875—27.4875	26.986—27.486	26.989—27.489	26.9883—27.4883
15m	29.9875—30.4875	29.986—30.486	29.989—30.489	29.9883—30.4883
12m	33.4875—33.9875	33.486—33.986	33.489—33.989	33.4883—33.9883
10m A	36.9875—37.4875	36.986—37.486	36.989—37.489	36.9883—37.4883
10m B	37.4875—37.9875	37.486—37.986	37.489—37.989	37.4883—37.9883
10m C	37.9875—38.4875	37.986—38.486	37.989—38.489	37.9883—38.4883
10m D	38.4875—38.9875	38.486—38.986	38.489—38.989	38.4883—38.9883

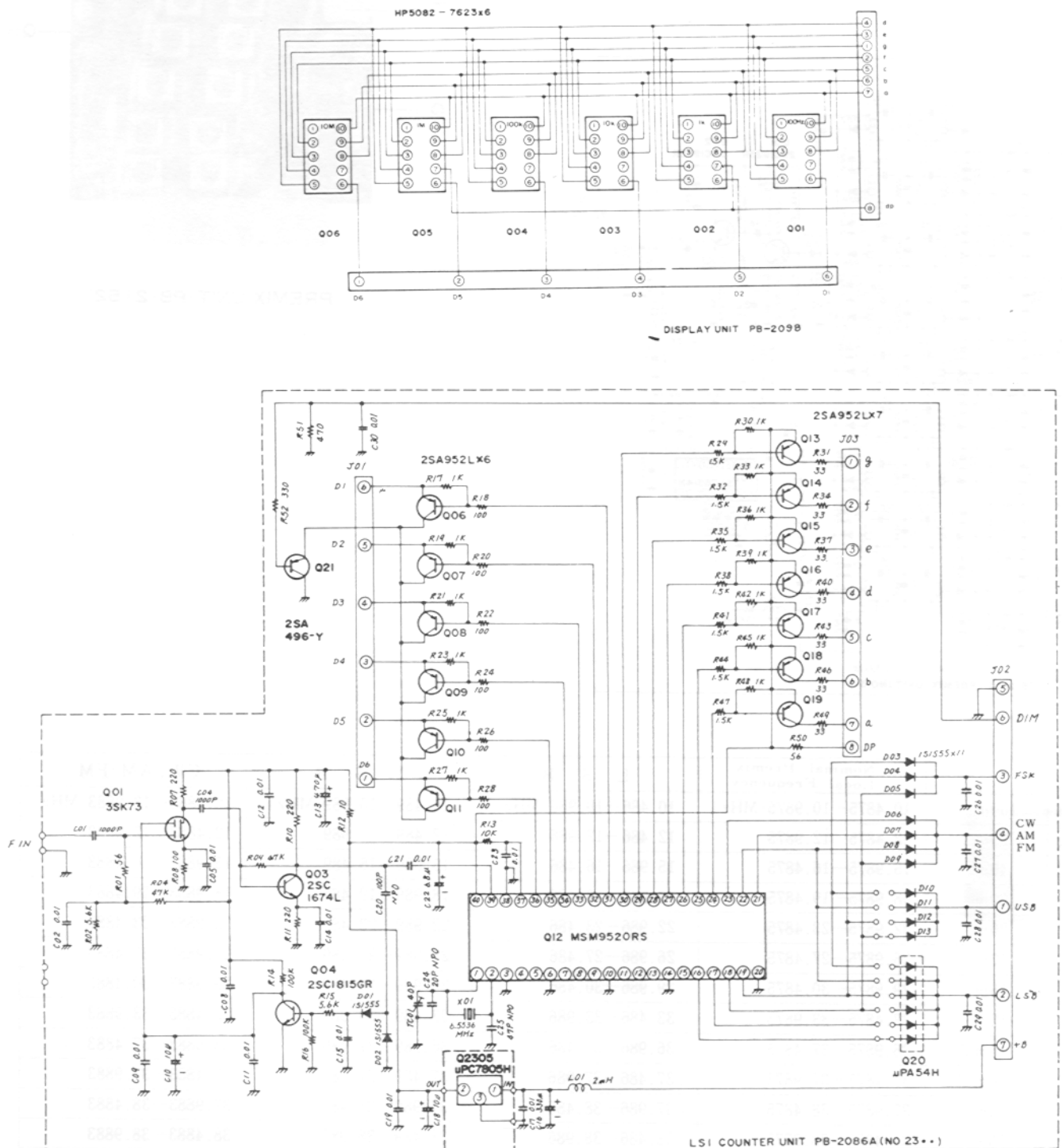
COUNTER UNIT (PB-2086A-3420/PB-2098)

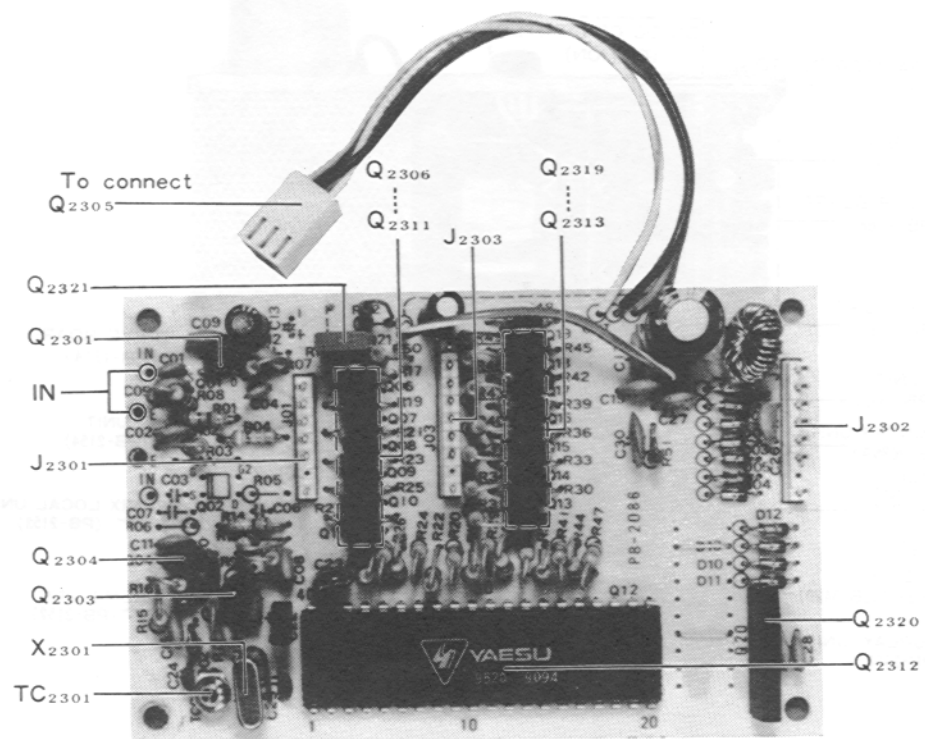
The local oscillator signal is applied to Large-Scale Integrated Circuit (LSI) chip for display on the front panel digital display.

The premix signal as shown in Table 4 from the LOCAL unit, is amplified by Q2301 (3SK73). The amplified signal is further amplified by Q2303 (2SC1674) and delivered to the LSI counter chip, Q2312 (MSM9520RS). A portion of the output

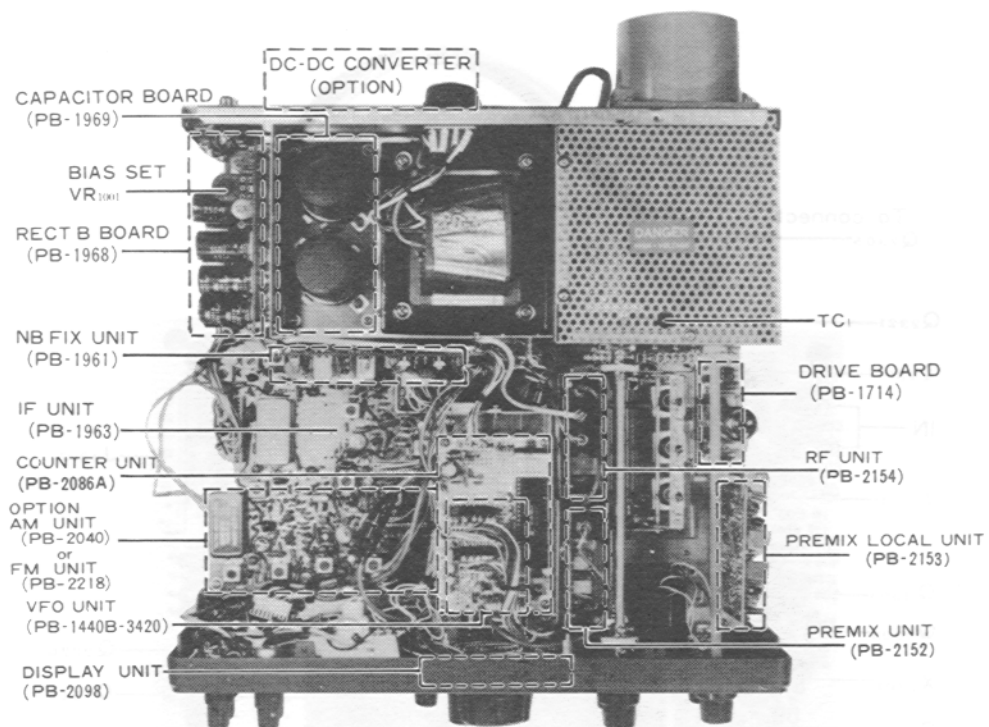
from Q2303 is amplified by Q2304 (2SC1815Y) and fed to gate 2 of Q2301 controlling the gain of this amplifier.

The output from the LSI is fed to the display. The output from pins 24 through 30 is delivered to segment drivers Q2313–Q2319 (2SA952L) and digit drivers Q2306–Q2311 (2SA952L) through a dynamic drive configuration. Display is performed by D2201–D2206 (HP5082-7623), seven-segment light-emitting diodes.

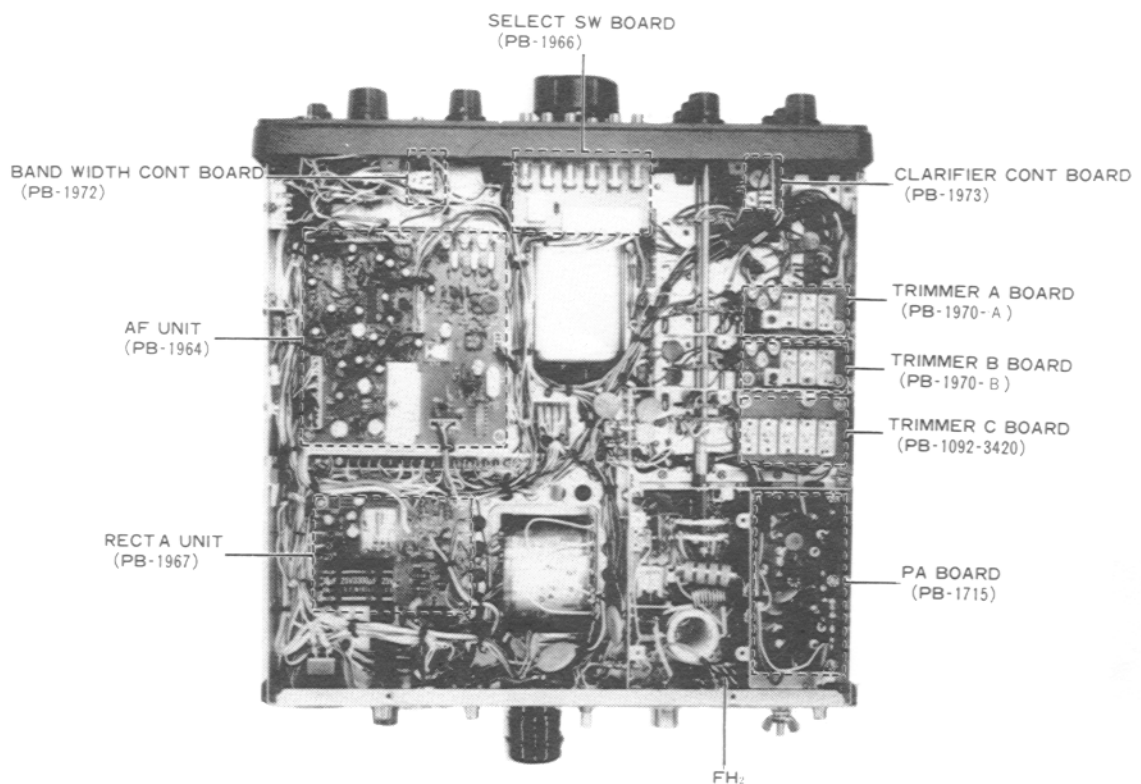




COUNTER UNIT (PB-2086A)



TOP VIEW



BOTTOM VIEW

MAINTENANCE AND ALIGNMENT

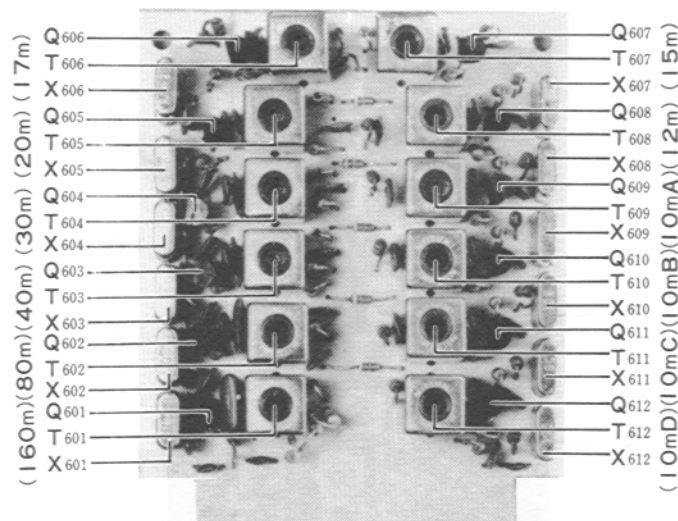
PREMIX LOCAL UNIT

Premix Local Alignment

1. Connect the RF probe of the VTVM to pin 3 of MJ₃.
2. Refer to Table 6, and adjust the appropriate transformer for a level of 300 mV for each band and crystal, as shown in the table.

BAND	CRYSTAL	FREQUENCY	TRANS FORMER
160m	X ₆₀₁	15.9875MHz	T ₆₀₁
80m	X ₆₀₂	17.9875	T ₆₀₂
40m	X ₆₀₃	21.4875	T ₆₀₃
30m	X ₆₀₄	24.4875	T ₆₀₄
20m	X ₆₀₅	28.4875	T ₆₀₅
17m	X ₆₀₆	32.4875	T ₆₀₆
15m	X ₆₀₇	35.4875	T ₆₀₇
12m	X ₆₀₈	38.9875	T ₆₀₈
10m A	X ₆₀₉	42.4875	T ₆₀₉
10m B	X ₆₁₀	42.9875	T ₆₁₀
10m C	X ₆₁₁	43.4875	T ₆₁₁
10m D	X ₆₁₂	43.9875	T ₆₁₂

Table 6.



PREMIX LOCAL (XTAL) UNIT (PB-2153)

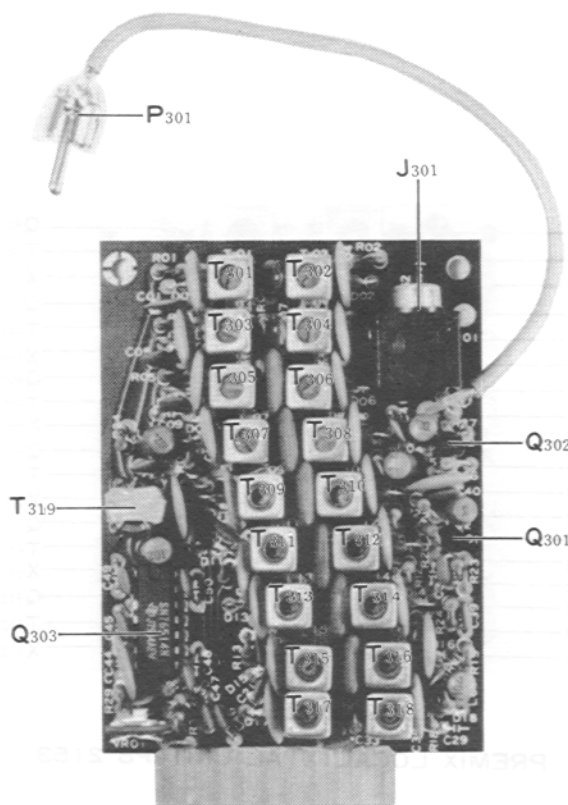
PREMIX UNIT

For this alignment, a wideband (not peak) sweep generator, as well as an oscilloscope, should be used.

1. Press the EXT select switch. Apply 5.0 - 5.5 MHz sweep output to the VFO output terminal at the rear apron external VFO jack. Connect a high-impedance probe of an oscilloscope to J₃₀₁.
2. Adjust the transformers shown in Table 7 for a flat response across the entire passband. If you have never adjusted a bandpass filter previously, this may take some practice. Perform the adjustments on each band, according to the chart.

BAND	TRANS-FORMER	PASSBAND
160m	T ₃₀₁ , T ₃₀₂	10.4—11.0(MHz)
80m	T ₃₀₃ , T ₃₀₄	12.4—13.0
40m	T ₃₀₅ , T ₃₀₆	15.9—16.5
30m	T ₃₀₇ , T ₃₀₈	18.9—19.5
20m	T ₃₀₉ , T ₃₁₀	22.9—23.5
17m	T ₃₁₁ , T ₃₁₂	26.9—27.5
15m	T ₃₁₃ , T ₃₁₄	29.9—30.5
12m	T ₃₁₅ , T ₃₁₆	33.5—34.0
10m	T ₃₁₇ , T ₃₁₈	36.9—39.0

Table 7



PREMIX UNIT (PB-2152)

FM UNIT

Set the transceiver to operate at 29.0 MHz (10 mC).

RX IF Adjustment

Turn the SQL control fully counterclockwise, and adjust T_{2501} and T_{2502} for maximum receiver noise from the speaker, with no signal applied to the ANT connector.

Squelch Threshold Adjustment

Set the SQL control at the 10 o'clock position, and adjust VR_{2501} to the point where the receiver noise just disappears.

Carrier Frequency Adjustment

Connect a frequency counter to pin 8 of J_{2501} , and set the MIC GAIN control fully counterclockwise.

Adjust T_{2501} for a reading of exactly 8988.3 kHz.

TX IF Adjustment

Connect the probe of a VTVM to pin 8 of J_{2506} , and adjust T_{2504} and T_{2505} for a maximum reading on the VTVM. While this adjustment is being made, the DRIVE control should be adjusted so as not to clip the signal in the IF stage. If the DRIVE control is set too excessively high, the peak cannot be accurately obtained.

It may be necessary to perform this adjustment a few times in order to obtain a definite reading.

Deviation Adjustment

Connect a deviation meter to the antenna jack, and connect an audio signal generator to the microphone input terminal, as shown in Figure 17.

Set the MIC GAIN control fully clockwise, and set VR_{2502} at the 9 o'clock position. Apply a 1 kHz, 15 mV signal to the microphone terminal, and adjust VR_{2503} for a deviation of ± 4.5 kHz, as shown on the deviation meter.

Set the MIC GAIN control at the 2 o'clock position, and reduce the output of the signal generator to 2 mV. Now adjust VR_{2502} for a deviation of ± 3.5 kHz on the deviation meter.

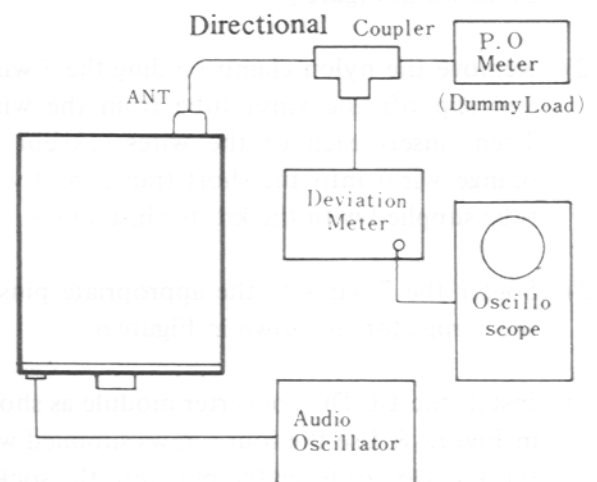
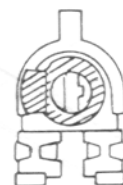
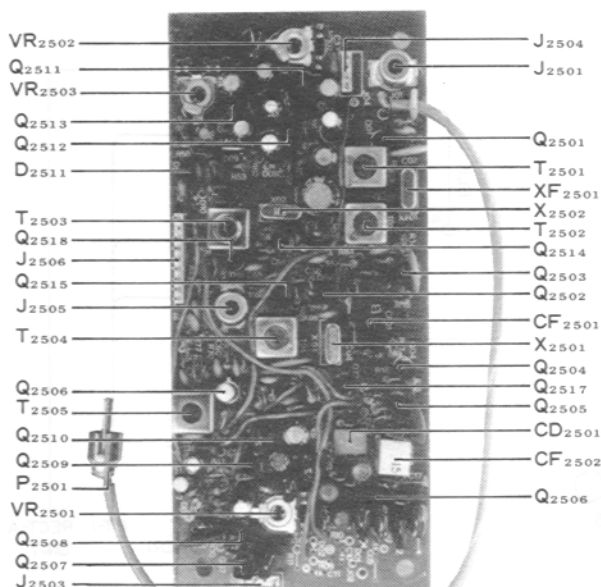


Figure 17



VR_{2502} at the 9 o'clock position.

OPTIONAL INSTALLATIONS

FT-101ZD DC-DC CONVERTER INSTALLATION

The optional DC-DC converter can be installed in a matter of minutes. Please follow the instructions carefully, in order to make the proper connections.

INSTALLATION

- (1) Remove the seal covering the chassis cutout for the DC-DC converter installation on the rear panel, and install the 9 pin connector supplied with the kit on the chassis cutout, as shown in Figure 5.
- (2) Remove the nylon clamp binding the 7 wires, and slip off the vinyl tube from the wires. Then, insert each of the wires (except the orange wire) into the short transparent vinyl tube supplied with the kit, for insulation.
- (3) Solder the 7 wires to the appropriate pins of the connector, as shown in Figure 6.
- (4) Install the DC-DC converter module as shown in Figure 8. Use the four screws supplied with the kit. Do not force the plug into the socket, as the connection should be smooth, yet solid.
- (5) Check the DC cable fuse socket, located in the positive (red) lead, to be certain that a 20 amp fuse is installed.
- (6) When making connections to the battery, be absolutely certain that the proper polarity is observed. The RED lead should be connected to the POSITIVE (+) battery terminal, and the BLACK lead should be connected to the NEGATIVE (-) terminal. OUR WARRANTY DOES NOT COVER DAMAGE CAUSED BY REVERSED POLARITY CONNECTIONS.
- (7) Before connecting the DC power cable to the transceiver, check the automobile voltage regulator level with the engine running (battery charging). The maximum charging rate should be 15 volts or less. If the voltage is higher than this level, please adjust the voltage regulator for a maximum of 15 volts. This precaution also applies to bench power supplies, which should be adjusted in the same fashion. Caution should also be taken so that the transceiver is not operated from a supply voltage of less than 12 volts.
- (8) Connect the DC cable to the transceiver. Power connections are made automatically when the DC cable is connected to the POWER jack.

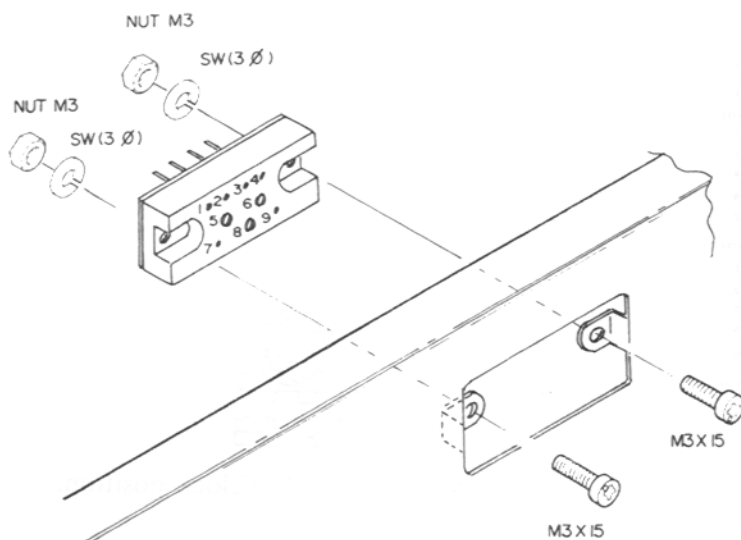


Figure 5

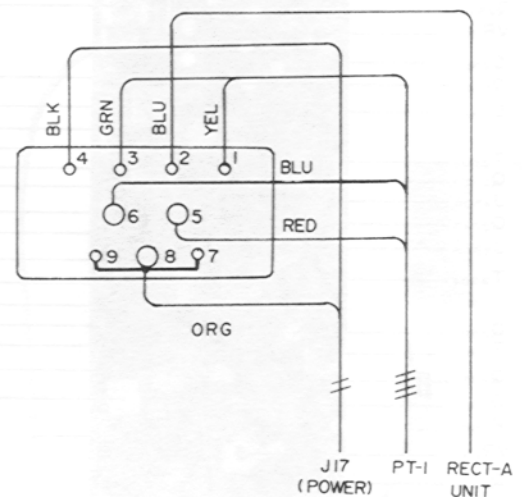


Figure 6

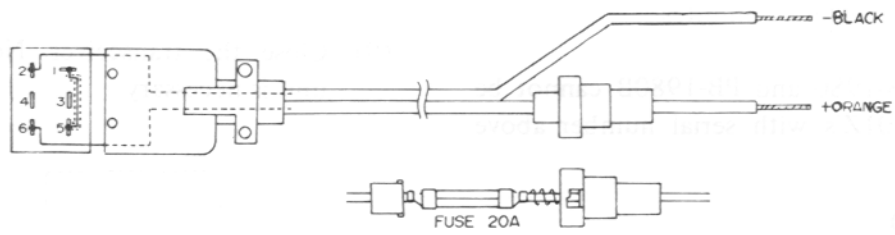


Figure 7

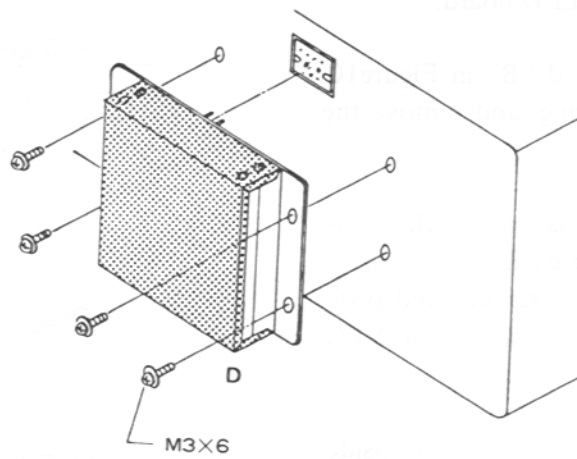


Figure 8

COUNTER UNIT (PB-2086A) INSTALLATION ON FT-101Z

The installation of the New Counter unit (PB-2086A) to the FT-101Z economy can be easily accomplished in a matter of minutes.

Counter units PB-1980 and PB-1980B cannot be installed in FT-101Z's with serial number above XX160001.

PARTS NEEDED

Optical Filter with double-face tape	(1)
Counter Module	(1)
Guide Pins	(2)
Support Tower	(1)
Vinyl Tubes	(2)

- (1) Remove the top cover of the transceiver, according to the drawing on page 3-5.
- (2) Remove the screws marked "A" in Figure 10. These screws support the LED board.
- (3) Remove the screws marked "B" in Figure 10 as well as the tension spring, and remove the analog display panel.
- (4) Locate the analog display lamp. Cut the leads to this lamp, insert 1 lead each into the vinyl tube supplied with the counter kit, and position these leads out of the way of the VFO gears, etc.
- (5) Install the orange optical filter on the inside of the front panel of the transceiver, in the position formerly occupied by the analog display panel. Be sure that it is correctly centered. The filter is held in place by the double-face tape included with the filter.
- (6) Replace the LED board with "A" screws. Install the support tower into the hole marked "C" in Fig. 10.
- (7) Install the Counter unit with the screw previously installed at "B" for securing the counter module at point "C". Use the two plastic screws supplied with the kit for securing at point "B". Connect the Molex plug into the board connector J2302 on the Counter unit (if your transceiver bears a serial number smaller than XX159999, use the supplied connector assembly for this connection). The co-

axial cable from the Counter unit is connected to point "F" in Fig. 10.

- (8) Remove the 820 ohm (Gray-Red-Brown) resistor from the terminal strip marked "E" in Figures 10 and 11.
- (9) Close the transceiver. No alignment of the unit is necessary.

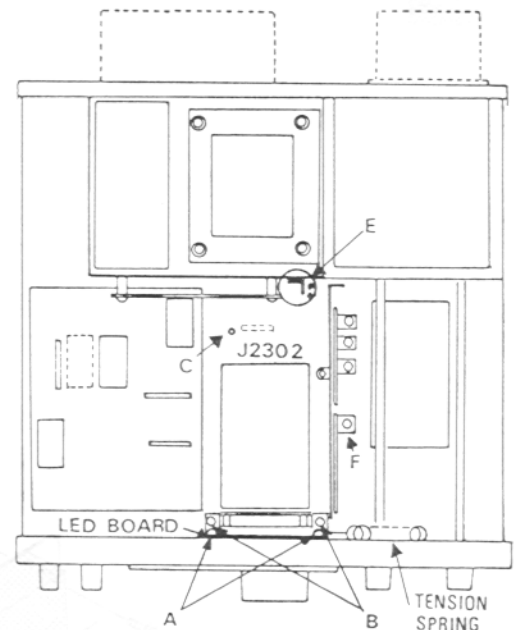
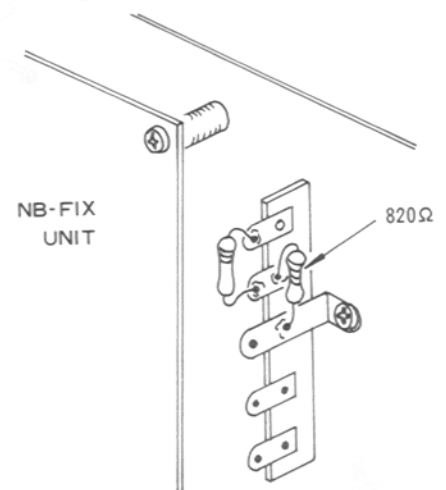


Figure 10



(Enlarged) Part E

Figure 11

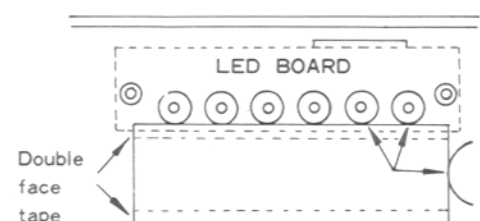


Figure 12

FM UNIT INSTALLATION

1. Remove the top cover of the transceiver, as shown in Figure 1 on page 3-5.
2. Remove the two screws (shown as "C" on Figure 13) from the IF unit, and replace with the two post screws supplied.
3. Install the FM unit in the space over the IF unit, and secure it with the mounting screws previously removed from the IF unit.
4. Connect P19 (3 pin) to J2504; P32 (3 pin) to J2503; and P20 (8 pin) to J2506. During this procedure, be sure not to press too heavily on the connector, so as not to damage the unit.
5. Unplug P14 (yellow shielded cable) from J101 on the RF unit, and connect it to J101 on the FM unit. Then connect P2501 (yellow shielded cable) to J101, by referring to Figure 15.
6. On the RF unit, unplug P11 (red shielded cable) from J102, and connect it to J2505 on the FM unit. Connect P22 (red shielded cable) from P20 (connected to J2506) on the FM unit, to J102 on the RF unit, as shown in Figure 15.

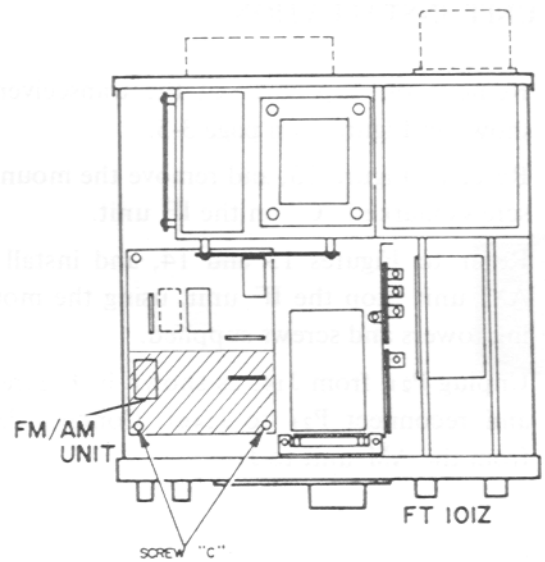


Figure 13

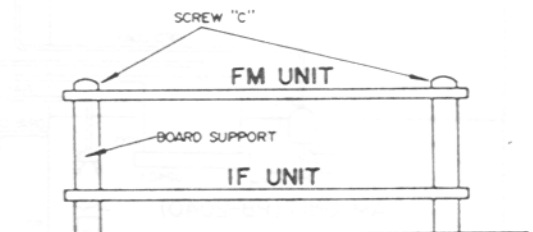


Figure 14

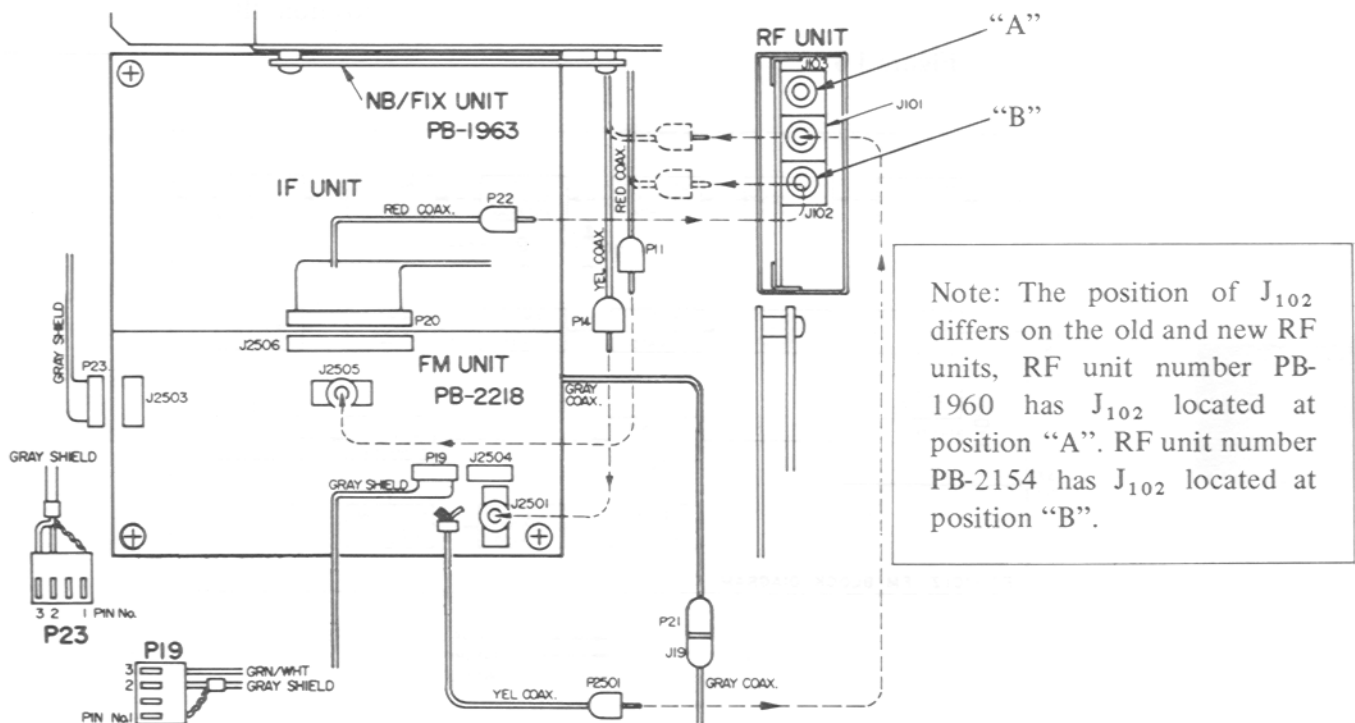


Figure 15

AM UNIT INSTALLATION

- (1) Remove the top cover of the transceiver, as shown in Figure 1 on page 3-5.
- (2) Refer to Figure 13, and remove the mounting screws marked "C" on the IF unit.
- (3) Refer to Figures 13 and 14, and install the AM unit atop the IF unit, using the mounting towers and screws supplied.
- (4) Unplug P21 from J19, as shown in Figure 16, and reconnect P21 to J2401. Connect P2401 from the AM unit to J19.
- (5) Locate the 3-pin and 8-pin Molex connectors in the vicinity of the IF unit. Loosen their cables, as necessary, from the harness restraints, in order to make the following connections. The 8-pin connector P20 connects to J2403; the 3-pin P19 connects to J2402; RCA plug P22 (from P20) connects to J102 on the RF unit (remove P11 from J102, and very carefully insert it into J2404 on the AM unit).

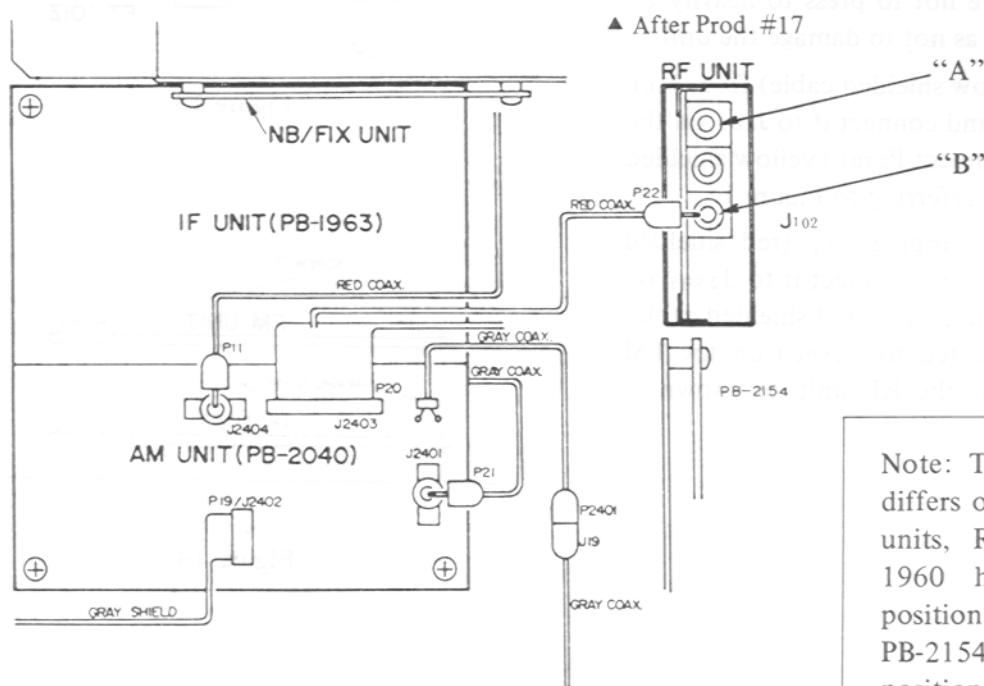
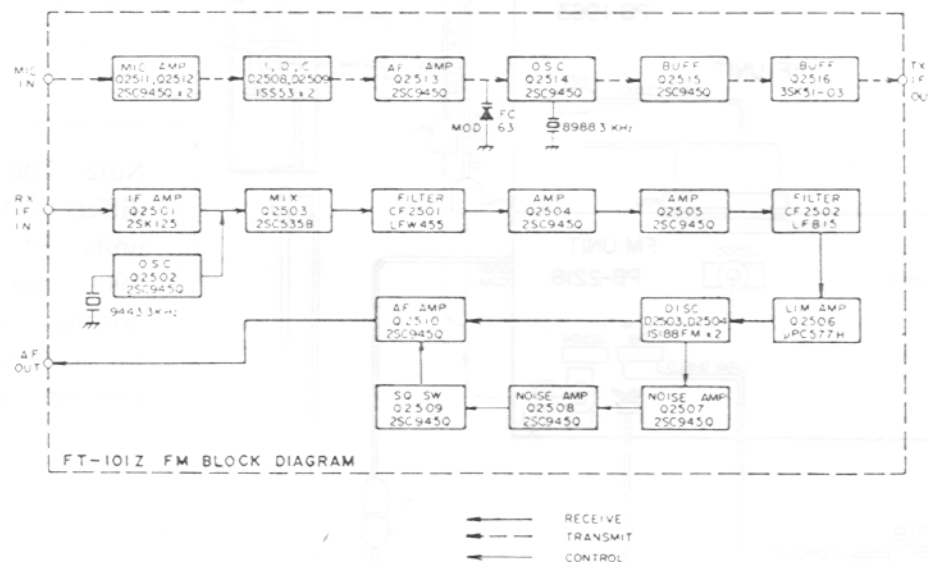


Figure 16



MAIN CHASSIS									
Symbol No.	Part No.	Description				C6	K30279052	Dipped mica	500 WV 1100 pF (DM19D-112K5)
		IC, TRANSISTOR							
Q2	G3104960Y	TR	2SA496(Y)			C5	K30279062	" "	500 WV 3000 pF (DM19D-302K5)
Q1	G3206160R	"	2SB616R(S)						
Q4	G3408800	"	2SD880(O)			C59, 66	K31306800	Moulded mica	1 KWV 80 pF
Q3	G1090070	IC	μPC14308			C17	K02279001	Ceramic	500 WV 1 pF
	G1090080	"	μPC78L08			C10	K02279002	"	" 5 pF
						C18	K02279003	"	" 47 pF
						C11	K00279001	"	" 200 pF
						C20	K00279002	"	" 470 pF
		DIODE				C16	K00359003	"	1 KV 3 pF
D1	G2090029	Ge	1N60			C15	K02309002	"	" 5 pF
D2-5,10-14	G2015550	Si	1S1555			C14	K02309003	"	" 100 pF
D6	G2090001	"	10D1			C3	K00329002	"	1.5 KWV 460 pF
						C9	K00359001	"	3 KV 100 pF
						C1	K12359001	"	" 1000 pF
						C74, 75	K13170102	"	50 WV 0.001 μF
		RESISTOR				C29,34,35,41, 73,76-81	K13170103	"	" 0.01 μF
R22, 24	J01245220	Carbon film	1/4W	TJ	22 Ω				
R23	J01245330	" "	" "	" "	33 Ω				
R14	J01245560	" "	" "	" "	56 Ω	C12, 22-24, 39,40,56,58, 60,68,69,82, 84	K13170473	"	" 0.047 μF
R7, 11	J01245101	" "	" "	" "	100 Ω				
R18, 26	J01245821	" "	" "	" "	820 Ω				
R4, 5	J01245102	" "	" "	" "	1 kΩ	C27, 28, 36	K12279004	"	500 WV 0.0047 μF
R6, 19	J01245152	" "	" "	" "	1.5 kΩ	C54, 55, 61	K12279002	"	" 0.01 μF
	J01245182	" "	" "	" "	1.8 kΩ	C2, 25, 26	K12329002	"	1.4 KV 0.0047 μF
R17	J01245222	" "	" "	" "	2.2 kΩ	C37, 64	K12329001	"	" 0.01 μF
R20	J01245474	" "	" "	" "	470 kΩ	C42-51	K21270002	Feed thru	500 WV 0.001 μF (ECK-L2H102PE)
R2	J10276100	Carbon composition	1/2W	GK	10 Ω				
R9, 10 (with L5, L6)	—	" "	" "	1W	56 Ω	C63	K40120476	Electrolytic	16 WV 47 μF
						C72	K40120107	"	50 WV 100 μF
R3	J10276101	" "	" "	" "	100 Ω	C65	K40120337	"	" 330 μF
R1, 8	J10276222	" "	" "	" "	2.2 kΩ	C70	K40120106	"	" 10 μF
R25	J30356150	Cement	3W 15 Ω			C67	K40109011	"	10 WV 33 μF
							K50177104	Mylar	50 WV 0.1 μF
		POTENTIOMETER							
VR1	J60800078	VM11AX46E	5M1112 10 kΩB					VARIABLE CAPACITOR	
VR2	J62800053	K16BA004C	500 kΩB/20 kΩB			VC1	K90000026	YB-250	250 pF
VR3	J62800052	K16BA004C	5 kΩA/5 k B			VC2	K90000016	C134E125	
VR4	J60800079	K1611000HE	5 kΩA						
VR5	J62800056	K16BA1A05	5 kΩB/2 k C						
VR6	J62800054	EVHCOAS15B23	5 kΩB x 2						
VR7	J62800055	EVHCOAS15B24	5 kΩB/5 k A					TRIMMER CAPACITOR	
VR8	J60800037	VM10A654A	1 kΩB			TC1	K91000007	TSN120C	10P x 2
VR9, 10	J60800038	VM10A654A	5 kΩB						
VR11	J60800077	K1611000AZE	5 kΩB						
		CAPACITOR				L1	L0020534C		
						L2	L0020611B		
		Dipped mica	500 WV	5 pF		L3	L1020690		
C13, 19, 21	K30276271	" "	270 pF (LCQ17271K5)			L4	L1020064		
						L5, L6	L1020308B		
C8	K30276331	" "	500 WV 330 pF (LCQ17331K5)			(R9, R10)			
						L7	L1190001	EL0710-251K	250 μH
C7	K30276621	" "	500 WV 620 pF (LCQ18621K5)			L8	L1190017	FL-5H-102K	1 mH
						L9	L0020705		

REPAIR PARTS

		TRANSFORMER	J19	P1090111	J-7015
T1	L0020544A		J20	P1090152	D8-703B-11
T2, T3	L0020074				
					MULTI JACK
		METER	MJ1	P4090001	121S-10B-105A
M1	M0090002	Y-45-02	MJ2	P4090007	220D-20B-205A
			MJ3	P4090002	121S-14B-105A
		SPEAKER			
SP1	M4090024	SE-92B 4 Ω 3 W			PLUG
			P1	P1090079	5047-12A (with wire T9201410C)
			P2	P1090080	5047-13A (" " T9201300F)
			P3	P1090082	5047-15A (" " T9201310E)
		POWER TRANSFORMER	P4	P1090086	5047-19A
PT1	L3030028	52-74	P5	P1090082	5047-15A (with wire T9201330E)
			P6	P1090075	5047-08A
			P7	P1090072	5047-05A (with wire T9201350A)
			P8	P1090075	5047-08A (" " T9201310E)
		RELAY	P9	P1090079	5047-12A (" " T9201310D)
RL1	M1190004	FRL-263 D012/04CS01	P10	P1090083	5047-16A (" " T921370D)
RL2	M1090002	MX2P	P18	P1090070	5047-03A (" " T9201420C)
			P11, 14, 22	P0090045	SQ4052
			P15	P0090002	SI5908
			P16	P0090005	SI-7502
		RELAY SOCKET	P19, 23	P1090070	5047-03A
RLS1	M1490010	263H204	P20	P1090075	5047-08A
RLS2	M1490001	PX08-1	P21	P0090075	P-7015P
		SWITCH			FUSE
S1	N0190070B		F1	Q0000005	5 A (100V-117V)
S2	N0190090			Q0000004	3 A (200V-234V)
S3* (Lot 1-7)	N0190025	ESR-E485R20			
S3* (Lot 8-)	N0190037	ESR-E486R20			
S4, 5	N7090005	WD9223			
					FUSE HOLDER
			FH1	P2000012	SN2059
			FH2	P2000003	F3265
		COOLING FAN			
FAN1	M2090001	2SB10A			
					PILOT LAMP
			PL1	Q1000010	BQ041-22803A
		RECEPTACLE	PL2-5	Q1000033	K0252-6-8 (BQ054-32732B)
J1	P1090004	SG7814			
J3	P1090134	SG7627			
J2	P0090011	FM144S			
J4	P1090033	D6-701B00		Q5000010	Thru terminal FT-SM1
J5	P1090075	5047-08 (with wire T9203200A)		Q4000002	" A339 (HV)
J6	P1090014	SI7501-1		Q6000042	Terminal block ML-3182 20 P
J7	P1090028	M-BR-06D		Q6000004	" 1L2PS (2-0)
J8	P1090040	SA607B00		Q6000007	" 1L3PS (2-0-1)
J9-14, 18, 21	P1090133	STR-01-H		Q6000016	" 1L5PS (4-0-1)
J15	P1090230	SG-8022		Q6000003	" 1L2PS (1-0-1)
	P1090045	AC9-PF		Q6000008	" 1L3P (3-0)
J17	P0090047	QS-DB6-ML		Q6000011	" 1L4P (2-0-2)

[illegible]

REPAIR PARTS

		DIODE					CRYSTAL SOCKET		
D201-204	G2090029	Ge	1N60		XS201	P3090025	S-14	2P	
D205-209	G2015550	Si	1S1555						
		RESISTOR			J201	P0090037	MINI CONNECTOR		
R208,216,224,230,238,239	J00245101	Carbon film	1/4W VJ	100 Ω	J202	P0090038	5048-08A		
R204	J00245221	" "	" "	220 Ω					
R222, 236	J00245471	" "	" "	470 Ω					
R231-233,235	J00245561	" "	" "	560 Ω					
R206,215,221,234,237	J00245102	" "	" "	1 kΩ					
		PREMIX UNIT							
R207	J00245222	" "	" "	2.2 kΩ	Symbol No.	Part No.	Description		
R240	J10245472	" "	" TJ	4.7 kΩ		C0021520	PREMIX unit with components		
R210	J00245472	" "	" VJ	4.7 kΩ	PB-2152C	F0002152C	P.C. Board		
R205,209,218	J00245562	" "	" "	5.6 kΩ					
R202,203,212,214,225,226	J00245103	" "	" "	10 kΩ					
R201,220,223	J00245153	" "	" "	15 kΩ	Q303	G1090062	IC, FET, TRANSISTOR		
R211,213,219	J00245223	" "	" "	22 kΩ	Q301, 302	G3319230R	IC SN76514N		
R217	J00245683	" "	" "	68 kΩ			TR 2SC1923R		
		CAPACITOR			D301-318	G2090027	Si	1SS53	
C216-218	K30176331	Dipped mica	50WV	330 pF					
C234, 236	K30176471	" "	" "	470 pF					
C235	K30176821	" "	" "	820 pF					
C208, 209	K02175150	Ceramic	50WV NPO	15 pF			RESISTOR		
C206	K00179005	" "	" SL	20 pF	R323	J00245100	Carbon film	1/4W VJ	10 Ω
C204	K00175101	" "	" "	100 pF	R331	J00245680	" "	" "	68 Ω
C201	K00175331	Ceramic disc	" "	330 pF	R301,303,305,307,309,311,313,315,332,333	J00245101	" "	" "	100 Ω
C202,203,205,211,212,221,225-227,229-233	K13170103	Ceramic	" "	0.01 μF	R317	J02245101	" "	" SJ	100 Ω
C207,210,213,215,219,220,223,224,228,237	K13170473	" "	" "	0.047 μF	R322,324,327,328,336	J00245221	" "	" VJ	220 Ω
					R337	J02245102	" "	" SJ	1 kΩ
					R319, 334	J00245152	" "	" VJ	1.5 kΩ
C214	K40170105	Electrolytic	" "	1 μF	R335	J00245182	" "	" "	1.8 kΩ
C238	K40140475		10WV	4.7 μF	R329, 330	J00245222	" "	" "	2.2 kΩ
					R302,304,308,310,312,314,316,318,321,325,326	J00245103	" "	" "	10 kΩ
		TRIMMER CAPACITOR							
TC201, 202	K91000016	ECV-1ZW	50 x 32	50 pF	R320	J00245333	" "	" "	33 kΩ
		INDUCTOR					POTENTIOMETER		
L207, 208	L1190007	FL-4H 1R8K		1.8 μH	VR301	J50710502	V10K-8-1-2		5 kΩB
L204-206	L1190016	FL-5H 101K		100 μH					
L201-203	L1190017	FL-5H 102K		1 mH					
		TRANSFORMER			C335	K30176271	Dipped mica	50WV	270 pF
T201, 202	L0020140	R12-4170			C331	K30176331	" "	" "	330 pF

REPAIR PARTS

R443	J00245471	Carbon film 1/4W VJ	470 Ω			CAPACITOR	
R474, 480, 0522	J00245561	" " " "	560 Ω	C477	K30176221	Dipped mica 50WV	220 pF
R467, 468	J00245681	" " " "	680 Ω	C445, 472	K02173100	Ceramic " CH	10 pF
	J00245821	" " " "	820 Ω	C488, 492	K06175330	" " UJ	33 pF
R406,416,428, 440,442,449, 453,457,459, 462,488,494, 0504, 0506, 0515	J00245102	" " " "	1 kΩ	C489	K06175390	" " "	39 pF
				C404,421,432	K02175470	" " CH	47 pF
				C487	K06175101	" " UJ	100 pF
				C459,464,475	K02175101	" " CH	100 pF
				C401,405,406, 411,413,415, 417,419,420, 423,424,428, 430,431,433, 435,440,442, 443,446,448, 451-455, 460,465,482, 484-486, 490,491,493, 494,497	K13170103	" " "	0.01 μF
R429	J00245122	" " " "	1.2 kΩ				
R495, 0516	J00245152	" " " "	1.5 kΩ				
	J01245152	" " " TJ	1.5 kΩ				
R454,455,458, 0510	J00245222	" " " VJ	2.2 kΩ				
R460	J00245272	" " " "	2.7 kΩ				
R401,409,412, 413,431,456, 496, 0511	J00245332	" " " "	3.3 kΩ				
R426,427,476	J00245472	" " " "	4.7 kΩ	C402,403,407, 408,410,412, 414,416,418, 422,425-427, 429,436-438, 441,444,447, 457,458,462, 463,468-471 473,474,495, 498	K13170473	" " "	0.047 μF
R403,455,481, 489	J00245562	" " " "	5.6 kΩ				
R434, 450	J00245682	" " " "	6.8 kΩ				
R404,407,420, 421,424,436, 471,477,484, 485,491,492, 0501, 0509, 0512	J00245103	" " " "	10 kΩ				
R433	J01245103	" " " TJ	10 kΩ	C449	K14179003	" " "	0.1 μF
R470	J00245123	" " " VJ	12 kΩ	C461, 467	K50177103	Mylar " "	0.01 μF
R415,438,498, 499	J00245153	" " " "	15 kΩ	C478	K50177223	" " "	0.022 μF
R414	J00245273	" " " "	27 kΩ	C409,439,456, 466,480,481, 483	K50177473	" " "	0.047 μF
R461,472,478, 0500	J00245473	" " " "	47 kΩ	C434	K70167224	Tantalum 35WV	0.22 μF
R405,465,466	J00245104	" " " "	100 kΩ	C479	K70127225	" " "	2.2 μF
R493	J00245154	" " " "	150 kΩ	C450,476,496	K40120106	Electrolytic 16WV	10 μF
R448,452,487, 0503, 0505	J00245184	" " " "	180 kΩ				
	J00245334	" " " "	330 kΩ				
R0521	J01245274	" " " TJ	270 kΩ			INDUCTOR	
R432	J00245684	" " " VJ	680 kΩ	L401-408, 410, 413	L1190016	FL-5H 101K	100 μH
R490	J00245105	" " " "	1 MΩ	L411, 412	L1190038	FL-5H 271K	270 μH
	J00245225	" " " "	2.2 MΩ				
R0519	J10246565	" composition " GK	5.6 MΩ	L409	L0020145	5.2 μH 220145	
		POTENTIOMETER				TRANSFORMER	
VR401, 402	J51723102	SR-19R	1 kΩB	T410	L0020150	R12-4074	
VR403, 404	J51723103	"	10 kΩB	T402,403,404, 407,409,413, 414	L0020140	R12-4170	
VR405	J51723473	"	47 kΩB				
VR407	J50705502	EVN-A1A-A00B53	5 kΩB				
VR406	J50705504	EVN-A1A-A00B55	500 kΩB				

T401,406,408, 415	L0020141	R12-4171	X503	H0100422	HC-18/U	8988.3 kHz
			X504	H0100423	"	8989 kHz
T405	L0020221					
T411	L0020460					
T412	L0020209					
					RESISTOR	
				J00245560	Carbon film 1/4W VJ	56 Ω
			R509,539,557	J00245101	" " " "	100 Ω
		MINI CONNECTOR	R511	J00245121	" " " "	120 Ω
J401	P0090038	5048-12A	R533, 546	J00245151	" " " "	150 Ω
J402	P0090039	5048-13A	R503,513,524, 525	J00245221	" " " "	220 Ω
J403	P0090040	5048-15A				
			R512,522,538	J00245471	" " " "	470 Ω
			R504,514,520, 523,548,561	J00245102	" " " "	1 k Ω
TP401-412	Q5000011	Wrapping terminal C				
			R515	J00245222	" " " "	2.2 k Ω
			R534,535,565	J00245272	" " " "	2.7 k Ω
			R510,562,569, 578-580	J00245332	" " " "	3.3 k Ω
				J01245472	" " " TJ	4.7 k Ω
AF UNIT			R510,506,531, 536,537,544, 545,549,550, 563,566,575, 576,581	J00245472	" " " VJ	4.7 k Ω
Symbol No.	Part No.	Description				
	C0019640	AF unit with components				
PB-1964A	F0001964A	P.C. Board				
			R521,527,532	J00245562	" " " "	5.6 k Ω
			R541,542,568, 570	J00245682	" " " "	6.8 k Ω
		IC, FET, TRANSISTOR				
Q503	G1090077	IC MC3403P (μ PC324C)	R501,507,519, 529,555,556, 558,571,572	J00245103	" " " "	10 k Ω
Q506	G1090064	" MC14024B				
Q504	G1090100	" SN74LS123N				
Q502	G1090086	" TA7063P	R517, 551	J00245153	" " " "	15 k Ω
Q501	G1090164	" μ PC2002H	R508,518,528, 540,554,573	J00245223	" " " "	22 k Ω
Q505	G1090120	" NJM78L05				
Q514	G3090035	FET 2SK19TM-GR	R584	J01245223	" " " TJ	22 k Ω
Q515	G3105641	TR 2SA564A	R559	J00245393	" " " VJ	39 k Ω
	G3303730	" 2SC373	R567	J00245473	" " " "	47 k Ω
Q507, 508	G3307320G	" 2SC732TM-GR	R516	J00245563	" " " "	56 k Ω
	G3310000G	" 2SC1000GR	R547, 574	J00245104	" " " "	100 k Ω
Q512	G3313830	" 2SC1383	R560	J00245154	" " " "	150 k Ω
Q509,510,513, 516	G3318150Y	" 2SC1815Y	R553	J00245224	" " " "	220 k Ω
			R526	J00245274	" " " "	270 k Ω
Q511	G3318150G	" 2SC1815GR	R552,564,577	J00245474	" " " "	470 k Ω
			R582	J00245824	" " " "	820 k Ω
			R505	J10276229	composition 1/2W GK	2.2 Ω
			R502	J32276010	Wire wound 1W	1 Ω
		DIODE				
D510, 511	G2090029	Ge 1N60				
D502-505	G2090118	" 1SS97				
D507-509, 512-517, 519-522	G2015550	Si 1S1555			POTENTIOMETER	
			VR501	J51727101	CR-19R	100 Ω B
D501, 518	G2090001	" 10D1				
D506	G2090027	" 1SS53				
					CAPACITOR	
			C513	K30176511	Dipped mica 50WV	510 pF
			C511	K02172050	Ceramic " CH	5 pF
		CRYSTAL	C522	K02173100	" " "	10 pF
X501	H0100260	HC-6/W 3200 kHz	C514	K06175270	" " VJ	27 pF
X502	H0100421	HC-18/U 8986 kHz	C546-548	K02175390	" " CH	39 pF

REPAIR PARTS

CS10,532,534,555,566	K02175101	Ceramic	50WV CH	100 pF	J503	P0090037	5048-08A
CS33	K02175151	"	"	150 pF	J504	P0090042	5048-05A
CS58,559	K00179020	"	SL	240 pF	J505	P0090041	5048-03A
CS12	K06175271	"	UJ	270 pF			
CS04,519-521,523,531,535,542-545,570	K13170103	"	"	0.01 μ F		R0042800A	HEAT SINK
CS09,537,574	K13170473	"	"	0.047 μ F			
CS16	K50177102	Mylar	50WV	0.001 μ F			
CS26	K50177472	"	"	0.0047 μ F			
CS18,529,530,572	K50177103	"	"	0.01 μ F			
PREMIX LOCAL UNIT							
CS25,539-541	K50177223	"	"	0.022 μ F	Symbol No.	Part No.	Description
CS28,556,569,573	K50177473	"	"	0.047 μ F		C0021530	PREMIX LOCAL unit with components
CS03	K50177104	"	"	0.1 μ F	PB-2153A	F0002153A	P.C. Board
CS07,517,527,550,551,560,567,568,571	K40170105	Electrolytic	"	1 μ F			
CS57	K40170225	"	"	2.2 μ F			TRANSISTOR
CS61	K40170335	"	"	3.3 μ F	Q601-612	G3303800Y	2SC380TMY
CS36	K40140475	"	25WV	4.7 μ F			
CS05,515,538,552,554,564,565	K40120106	"	16WV	10 μ F			
CS24,553,563	K40120226	"	"	22 μ F			DIODE
CS08	K40120476	"	"	47 μ F	D601-612	G2015550	Si 1S1555
CS01	K40120107	"	"	100 μ F			
CS06	K40120227	"	"	220 μ F			
CS02	K40120477	"	"	470 μ F			RESISTOR
CS62	K40120336	"	"	33 μ F	R605,610,615,620,625,628,630,631,636,637,641,642,646,647,651,652,656,657	J00245101	Carbon film 1/4W VJ 100 Ω
TRIMMER CAPACITOR							
TC501-505	K91000013	ECV-1ZW	20 x 32	20 pF			
					R632	J00245151	" " " " 150 Ω
					R618	J00245221	" " " " 220 Ω
					R623	J00245271	" " " " 270 Ω
INDUCTOR					R603,608,613	J00245561	" " " " 560 Ω
L502	L1190023	FL-5H 220K		22 μ H	R604,609,614,619,624,629,633,638,643,648,653,658	J00245102	" " " " 1 k Ω
L501	L1190038	FL-5H 271K		270 μ H			
L503-506	L1190017	FL-5H 102K		1 mH			
					R662	J00245182	" " " " 1.8 k Ω
					R661,663	J00245222	" " " " 2.2 k Ω
TRANSFORMER					R602,607,612,617,622,627,634,639,644,649,654,659	J00245333	" " " " 33 k Ω
T501	L0020209				R601,606,611,616,621,626,635,640,645,650,655,660	J00245563	" " " " 56 k Ω
RELAY							
RL501	M1190002	FBR211A D012M					
MINI CONNECTOR							CAPACITOR
J501	P0090043	5048-19A			C607	K30176271	Dipped mica 50WV 270 pF
J502	P0090040	5048-15A			C603	K30176331	" " " " 330 pF

REPAIR PARTS

C811	K02179023	Ceramic disc 50WV CH	180 pF			RESISTOR
C821, 823	K00175471	" " " "	470 pF	R908	J01245560	Carbon film 1/4W TJ 56 Ω
C809,810,812, 815,819,820, 824,826	K13170103	" " " "	0.01 μ F	R905	J10276220	" composition 1/2W GK 22 Ω
				R901-904	J10276474	" " " " 470 k Ω
				R907	J20339001	Metallic film 2W 0.4 Ω
C813	K30176431	Dipped mica "	430 pF			
C802, 822	K30209001	" " " "	1000 pF			
C825	K70167334	Tantalum 10WV	0.33 μ F			
						CAPACITOR
				C901-905	K13170103	Ceramic 50WV 0.01 μ F
				C908-911	K40140106	Electrolytic 25WV 10 μ F
		VARIABLE CAPACITOR		C907	K40140107	" " 100 μ F
VC801	K90000024	C521 R112		C906	K41140338	" " 3300 μ F
		TRIMMER CAPACITOR				RELAY
TC801	K90000001	TSN-100D15	15 pF	RL901	M1190003	FRL-264 D012/04CS-01
TC802	K91000016	ECV-1ZW 50 x 32	50 pF			
					Q5000011	Wrapping terminal C
					Q5000004	Test point D
		INDUCTOR				
L801	L0020268A					
L804, 805	L1190007	Micro inductor FL-4H	1.8 μ H			
L803, 806	L1190001	" " EL0710	250 μ H			
L802	L1190040	" " S4 102K	1 mH			
						RECT. B UNIT
				Symbol No.	Part No.	Description
					C0019680	RECT. B unit with components
		RECEPTACLE		PB-1968C	F0001968C	P.C. Board
J801	P1090012	SI-6303-1				
						TRANSISTOR
		TERMINAL		Q1003	G3106390	2SA639
	Q5000005	Lighthouse type		Q1001	G3107330	2SA733
	Q5000011	Wrapping terminal C		Q1002	G3303720Y	2SC372Y
						DIODE
				D1004, 1005, 1008-1011	G2015550	Si 1S1555
		RECT. A UNIT				
Symbol No.	Part No.	Description				
	C0019670	RECT. A unit with components	D1002, 1003, 1012	G2090002	"	10D10
PB-1967	F0001967	P.C. Board	D1006, 1007	G2090001	"	10D1
			D1001	G2090081	"	SM1-12
		IC, TRANSISTOR				
Q901	G1090162	IC μ PC78L12				RESISTOR
Q903	G3110150Y	TR 2SA1015Y	R1021	J00245681	Carbon film 1/4W VJ	680 Ω
			R1011, 1016, 1020	J00245472	" " " "	4.7 k Ω
		DIODE	R1013, 1015	J00245103	" " " "	10 k Ω
D907	G2090001	Si 10D1	R1014	J00245123	" " " "	12 k Ω
D901-904	G2090002	" 10D10	R1017-1019	J00245223	" " " "	22 k Ω
D905, 906	G2090003	" V06B	R1012	J00245563	" " " "	56 k Ω
D908	G2090007	Zener WZ061	R1010	J20306562	Metallic film 1W	5.6 k Ω

R1022	J20306390	Metallic film 1W	39 Ω	C1206	K02173100	Ceramic 50WV CH	10 pF
R1005	J20336391	" " 2W	390 Ω	C1205, 1210	K02179012	" " "	30 pF
R1006	J20336471	" " "	470 Ω	C1204, 1209	K02175820	" " "	82 pF
R1008	J20336222	" " "	2.2 k Ω				
R1007	J20336332	" " "	3.3 k Ω				
R1009	J20336473	" " "	47 k Ω				
R1023	J10276474	Carbon composition 1/2W GK 470 k Ω				TRIMMER CAPACITOR	
				TC1203	K91000032	B2PY	100 pF
				TC1202	K91000079	BW3P-2	210 pF
					K91000033	B7PY	470 pF
		POTENTIOMETER		TC1206	K91000013	ECV-1ZW 20 x 32	20 pF
VR1001	J50708103	V18K3-2 10 k Ω B		TC1204, 1205, 1208, 1209	K91000016	" 50 x 32	50 pF
				TC1201	K91000078	BW6P-1	420 pF
				TC1207	K91000015	ECV-1ZW 40 x 32	40 pF
		CAPACITOR					
C1017	K13170473	Ceramic 50WV	0.047 μ F				
C1016	K12279003	" 500WV	0.0022 μ F				
C1005, 1006, 1013, 1018	K12279004	" "	0.0047 μ F			INDUCTOR	
C1010, 1014, 1015	K12279002	" "	0.01 μ F	L1201	L0020545	Trap coil	
C1009	K40240106	Electrolytic 250WV	10 μ F				
C1011	K40240336	" "	33 μ F				
C1012	K40240476	" "	47 μ F				
C1001-1004	K40270106	" 450WV	10 μ F			TRIMMER B BOARD	
C1007, 1008	K40260226	" 350WV	22 μ F	Symbol No.	Part No.	Description	
C1019	K50177103	Mylar 50WV	0.01 μ F		C0021920	TRIMMER B unit with components	
				PB-2192B	F0002192B	P.C. Board	
	Q5000011	Wrapping terminal C					
						CAPACITOR	
				C1303	K30176271	Dipped mica 50WV	270 pF
					K30176391		390 pF
				C1302	K30176621		620 pF
				C1301	K30209004		2000 pF
				C1307	K02172050	Ceramic 50WV CH	5 pF
				C1304, 1308	K02175680		68 pF
						TRIMMER CAPACITOR	
					K91000032	B2PY	100 pF
				TC1302	K91000079	BW3P-2	210 pF
				TC1301	K91000078	BW6P-1	420 pF
				TC1306	K91000028	ECV-1ZW 10 x 53	10 pF
				TC1303-1305, 1308, 1309	K91000016	" 50 x 32	50 pF
				TC1307	K91000029	" 20 x 53	20 pF
						RESISTOR	
				R1303	J00245562	Carbon film 1/4W VJ	5.6 k Ω
C1203	K30176271	Dipped mica 50WV	270 pF				
	K30176391	" " "	390 pF				
C1202	K30176651	" " "	650 pF				
C1207	K30209001	" " "	1000 pF				
C1201	K30209004	DM19D202K1 50WV	2000 pF				

REPAIR PARTS

TRIMMER C BOARD						CAPACITOR	
Symbol No.	Part No.	Description					
	C0010920	TRIMMER C unit with components		C1501	K13170103	Ceramic 50WV	0.01 μ F
PB-1092	F1001092	P.C. Board		C1505, 1506	K50177153	Mylar 50WV	0.015 μ F
						(50F2U153M)	
				C1503, 1504, 1508, 1509, 1511	K40179001	Electrolytic 50WV	1 μ F
		CAPACITOR				(50RC2-1)	
C1406	K30275180	Dipped mica	500WV 18 pF	C1502, 1507, 1510	K40129004	Electrolytic 16WV	10 μ F
C1405	K30276820	" "	82 pF			(16RE10)	
C1403	K30276221	" "	220 pF				
	K30276391	" "	390 pF				
C1402	K30279123	" "	710 pF				
C1401	K30279058	" "	2000 pF			SWITCH	
				S1501	N4090008	1B0001AC2060	
		TRIMMER CAPACITOR					
TC1404, 1405	K91000031	B1PY	40 pF				
TC1402, 1403	K91000032	B2PY	100 pF				
TC1401	K91000078	BW6P-1	420 pF	DRIVER BOARD			
				Symbol No.	Part No.	Description	
					C0017140	Driver board with components (without vacuum tube)	
				PB-1714B	F0001714	P.C. Board	
APF UNIT							
Symbol No.	Part No.	Description					
	C0022170	PCB with components				VACUUM TUBE	
PB-2217	F0002217	Printed Circuit Board		V1601	G6090002	12BY7A	
		IC & TRANSISTOR				VACUUM TUBE SOCKET	
Q1502	G1090248	IC	AN6551	VS1601	P3090022	SB-9403	
Q1501	G3318150Y	TR	2SC1815Y				
		DIODE				RESISTOR	
D1501	G2090060	LED	GD4-203SRD	R1605	J10276470	Carbon composition 1/2W GK 47 Ω	
				R1602, 1604	J10276560	" " " " 56 Ω	
				R1603	J10276101	" " " " 100 Ω	
				R1601	J10276473	" " " " 47 k Ω	
		RESISTOR					
R1506	J00245820	Carbon film	1/4W VJ 82 Ω				
R1501	J00245101	" "	100 Ω			CAPACITOR	
R1504	J00245102	" "	1 k Ω	C1601, 1602	K12279002	Ceramic disc	500WV 0.01 μ F
R1514	J00245152	" "	1.5 k Ω	C1603, 1604, 1606	K13170473	" "	50WV 0.047 μ F
R1511, 1515, 1517	J00245222	" "	2.2 k Ω	C1605	K30279051	Dipped mica	500WV 1000 pF
R1516	J00245272	" "	2.7 k Ω				
	J00245472	" "	4.7 k Ω				
R1502, 1508	J00245103	" "	10 k Ω				
R1503, 1509	J00245123	" "	12 k Ω			INDUCTOR	
R1505	J00245473	" "	47 k Ω	L1601	L1190020	Micro inductor	FL5H 150 μ H
R1512	J00245563	" "	56 k Ω	L1602(R1602)	L1020307		
R1513	J00245104	" "	100 k Ω				
R1510	J00245224	" "	220 k Ω				
R1507	J00245474	" "	470 k Ω		Q5000011	Wrapping terminal C	

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REPAIR PARTS

		RESISTOR			CRYSTAL
R2006	J01245560	Carbon film 1/4W TJ 56 Ω	X2301	H0102272	HC-18/U 6.5536 MHz
R2005	J01245101	" " " " 100 Ω			
R2001	J01245121	" " " " 120 Ω			
R2002	J01245391	" " " " 390 Ω			
R2008	J00245562	" " " VJ 5.6 k Ω			RESISTOR
R2004	J01245683	" " " TJ 68 k Ω	R2312	J00245100	Carbon film 1/4W VJ 10 Ω
			R2331, 2334, 2337, 2340, 2343, 2346, 2349	J01245330	" " " TJ 33 Ω
		SWITCH			
S2001-2004	N3090002	SLE62301	R2350	J00245560	" " " VJ 56 Ω
S2005	N3090008	SLE64251	R2308, 2318, 2320, 2322, 2324, 2326, 2328	J00245101	" " " " 100 Ω
			R2301	J01245221	" " " TJ 220 Ω
			R2307, 2310, 2311	J00245221	" " " VJ 220 Ω
DISPLAY UNIT (3420)			R2352	J00245331	" " " " 330 Ω
Symbol No.	Part No.	Description	R2351	J00245471	" " " " 470 Ω
	C0020982	P.C.B. with components	R2317, 2319, 2321, 2323, 2325, 2327	J01245102	" " " TJ 1 k Ω
PB-2098A	F0002098A	Printed Circuit Board	R2330, 2333, 2336, 2339, 2342, 2345, 2348	J00245102	" " " VJ 1 k Ω
		DISPLAY LED	R2329, 2332, 2335, 2338, 2341, 2344, 2347	J00245152	" " " " 1.5 k Ω
D2201-2206	G2090069	HP5082-7623	R2302, 2315	J00245562	" " " " 5.6 k Ω
		PLUG	R2313	J00245103	" " " " 10 k Ω
P2201	P1090073	5047-06 (with wire T9202430)	R2309	J00245473	" " " " 47 k Ω
P2202	P1090075	5047-08 (" " T9202440A)	R2304	J01245473	" " " TJ 47 k Ω
			R2314	J01245104	" " " " 100 k Ω
			R2316	J00245104	" " " VJ 100 k Ω
COUNTER UNIT (3420)					
Symbol No.	Part No.	Description			
	C0020862	P.C.B. with components			
PB-2086B	F0002086B	Printed Circuit Board			CAPACITOR
			C2324	K02179008	Ceramic 50WV CH 20 pF
			C2325	K02175820	" " " " 82 pF
			C2320	K02175101	Electrolytic 16WV " 100 pF
		IC, FET & TRANSISTOR	C2301, 2304	K13170102	Ceramic 50WV CH 0.001 μ F
Q2312	G1090249	IC MSM9520RS	C2302, 2305, 2308, 2309, 2311, 2312, 2314, 2315, 2317, 2319, 2321, 2326- 2330	K13170103	" " " " 0.01 μ F
Q2320	G1090079	" μ PA54H			
Q2305	G1090299	" μ PC7805H			
Q2301	G4800730G	FET 3SK73GR			
Q2321	G3104960Y	TR 2SA496Y			
Q2306-2311, 2313-2319	G3109520L	" 2SA952L			
Q2303	G3316740L	" 2SC1674L	C2323	K50177103	Mylar " 0.01 μ F
Q2304	G3318150G	" 2SC1815GR	C2322	K71137685	Tantalum 20WV 6.8 μ F
			C2310, 2318	K40120106	Electrolytic 16WV 10 μ F
			C2313	K40109011	" 10WV 33 μ F
			C2316	K40129001	" 16WV 330 μ F
		DIODE			
D2301-2313	G2015550	Si 1S1555			

REPAIR PARTS

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		CRYSTAL		R2504, 2525, 2526, 2533, 2543, 2560	J00245562	Carbon film 1/4W VJ	5.6 kΩ
X2501	H0100431A	HC-18/U	8532.5 kHz				
X2502	H0100440A	"	8988.3 kHz				
				R2505	J00245822	" " " "	8.2 kΩ
				R2536, 2545, 2551, 2553, 2567	J00245103	" " " "	10 kΩ
		CRYSTAL FILTER					
XF2501	H1100470	8.9M20A		R2572	J00245183	" " " "	18 kΩ
				R2513, 2527, 2558, 2561	J00245223	" " " "	22 kΩ
				R2559	J00245273	" " " "	27 kΩ
		CERAMIC FILTER		R2566	J00245333	" " " "	33 kΩ
CF2501	H3900200	CFW455E		R2506, 2538, 2562	J00245473	" " " "	47 kΩ
CF2502	H3900030	LF-B15					
				R2535, 2571	J00245563	" " " "	56 kΩ
				R2501, 2552, 2570, 2587	J00245104	" " " "	100 kΩ
		CERAMIC DISCRIMINATOR		R2537, 2556	J00245124	" " " "	120 kΩ
CD2501	H7900040	SFD455-S4		R2518, 2520, 2529, 2531, 2585	J00245154	" " " "	150 kΩ
				R2547	J00245274	" " " "	270 kΩ
		THERMISTOR					
TH2501	G9090001	SDT-250					
TH2502	G9090003	D-33A					
						POTENTIOMETER	
				VR2503	J51721102	EVL-S3A A00B13	1 kΩB
				VR2501, 2502	J51721103	EVL-S3A A00B14	10 kΩB
					J51721503	EVL-S3A A00B54	50 kΩB
		RESISTOR					
R2588	J01254470	Carbon film 1/4W TJ	47 Ω				
	J00245560	" " " VJ	56 Ω				
	J00245820	" " " "	82 Ω				
R2502, 2503, 2508, 2548, 2565, 2569, 2574, 2575, 2584	J00245101	" " " "	100 Ω			CAPACITOR	
				C2506	K02179004	Ceramic 50WV CH (DD104CH030J50V02)	3 pF
				C2556	K00175150	Ceramic 50WV SL (DD104SL150J50V02)	15 pF
R2554, 2564	J00245221	" " " "	220 Ω	C2504	K02179011	Ceramic 50WV CH (DD104CH270J50V02)	27 pF
R2557	J01245221	" " " TJ	220 Ω				
R2563	J00245471	" " " VJ	470 Ω	C2559	K00175330	Ceramic 50WV SL (DD104SL330J50V02)	33 pF
R2549, 2568	J00245561	" " " "	560 Ω				
R2507	J00245681	" " " "	680 Ω	C2529	K00175470	Ceramic 50WV SL (DD104SL470J50V02)	47 pF
R2515, 2546, 2555, 2573, 2577, 2581, 2583, 2586	J00245102	" " " "	1 kΩ	C2551, 2553, 2554	K06175101	Ceramic 50WV UJ (DD106UJ101J50V02)	100 pF
				C2550	K06175121	Ceramic 50WV UJ (ECC-D1H121UJ2)	120 pF
R2539, 2576, 2578	J01245102	" " " TJ	1 kΩ				
R2534, 2540	J00245152	" " " VJ	1.5 kΩ	C2507, 2508	K02175151	Ceramic 50WV UJ (DD109CH151J50V02)	150 pF
R2542	J00245182	" " " "	1.8 kΩ				
R2516, 2517, 2519, 2521, 2522, 2524, 2532	J00245222	" " " "	2.2 kΩ	C2503, 2537, 2552, 2564-2566	K13170102	Ceramic 50WV (DB201YF102Z5L2)	0.001 μF
				C2501, 2505, 2555, 2557, 2560-2563, 2569, 2571, 2572, 2573	K13170103	Ceramic 50WV (DB201ZF103Z5L5)	0.01 μF
R2550, 2579	J00245272	" " " "	2.7 kΩ				
R2530, 2541, 2544	J00245332	" " " "	3.3 kΩ				
R2580	J00245392	" " " "	3.9 kΩ				
R2514, 1582	J00245472	" " " "	4.7 kΩ	C2502, 2512, 2558, 2574	K13170473	Ceramic 50WV (DB207YF473Z5L5)	0.047 μF

REPAIR PARTS

C2548	K19149021	Ceramic 25WV 0.047 F (UAT08X473KL46AE)			
C2515, 2530	K19149025	Ceramic 25WV 0.1 F (UAT13X104K-L46AE)			
	K51176101	Styrol 100 pF (50SU101K)			
C2513, 2514, 2517, 2522, 2539	K50177102	Mylar 50WV 0.001 μ F (50F2U102M)			
	K50177152	Mylar 50 WV 0.0015 μ F (50F2U102M)			
C2531	K50177103	Mylar 50WV 0.01 μ F (50F2U103M)			
C2523-2525, 2535, 2538	K50177223	Mylar 50WV 0.022 μ F (50F2U223M)			
C2527, 2528	K50177333	Mylar 50WV 0.033 μ F (50F2U333M)			
C2516, 2518- 2521, 2547, 2570	K50177473	Mylar 50WV 0.047 μ F			
C2536, 2549	K40170105	Electrolytic 50WV 1 μ F (50RL105)			
C2526	K40140475	Electrolytic 25WV 4.7 μ F (25RL475)			
C2532, 2533, 2540, 2541, 2543, 2544, 2546, 2567	K40120106	Electrolytic 16WV 10 μ F (16RL106)			
C2534, 2542	K40129002	Electrolytic 16WV 47 μ F (16RE476)			
C2568	K40120107	Electrolytic 16WV 100 μ F (16RL107)			
C2545	K40109001	Electrolytic 16WV 100 μ F (16RE107)			
		INDUCTOR			
L2501, 2502, 2504	L1190017	FL-5H102K 1 mH			
L2503	L1190102	S8-104K 100 mH			
		TRANSFORMER			
T2501, 2502, 2504	L0020140				
T2503	L0020319				
T2504	L0020221				
		CONNECTOR			
J2501, 2505	P1090016	SQ3056			
J2503, 2504	P0090041	5048-03A			
J2506	P0090037	5048-08A			
P2501	P0090075	P-7015P			
	P0090045	SQ4052			

