MAINTENANCE SERVICE MANUAL FT-101ZD

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SECTION 1 – GENERAL

HIGH-PERFORMANCE HF TRANSCEIVER
YAESU FT-101ZD

GENERAL DESCRIPTION

The FT-101Z series was introduced early in 1979 as the culmination of a decade of experience with the FT-101 series. Borrowing heavily from the highly regarded FT-901 series, the FT-101Z series brings together a number of "top of the line" features at a "bottom of the line" price.

As with the FT-901, the receiver section of the FT-101Z is particularly impressive. Careful gain distribution has produced wide dynamic range, without compromising sensitivity. Variable IF bandwidth allows continuous adjustment of the width of the IF passband from 300 Hz to 2.4 kHz, and an all-new noise blanker provides significantly improved blanking capability.

The transmit side includes a high-performance RF speech processor, which provides a significant increase in average power without the distortion found in some AF clipping systems used in other makes of equipment. The final tubes utilize RF negative feedback, for improved linearity.

Built into every FT-101ZD transceiver are digital plus analog readout of the operating frequency, VOX, semi-break-in CW with sidetone, a 25 kHz crystal calibrator, selectable AGC, and a 10 dB/ 20 dB attenuator in the receive line. For the economy FT-101Z model, the counter and display units are options, which may easily be added at a later date, should you decide to upgrade your station.

Compatibility with the FT-901DM series accessories lets you take advantage of such advanced features as the scanning and memory of the FV-901DM external synthesized VFO; the FTV-901R VHF/UHF transverter; and the YO-901 Multiscope. Read on for details of these accessories and their use with the FT-101Z.

All circuits, except for the driver and final amplifier tubes, are solid state. If the ratings of the solid state devices are not exceeded, they will exhibit practically infinite lifetimes. The FT-101Z series may be operated from AC supplies of 100/110/117/200/220/234 volts, and a DC-DC converter is an available option.

The pages to follow will describe more fully the high-performance features and ease of operation of the FT-101ZD. For today's active amateur, the 101Z series is, indeed, "THE RADIO."

SPECIFICATIONS

Frequency coverage:

160 m	1.8 - 2.0 MHz
80 m	3.5 - 4.0 MHz
40 m	7.0 - 7.5 MHz
▲ 30 m	10.0 - 10.5 MHz
20 m	14.0 - 14.5 MHz
▲ 17 m	18.0 - 18.5 MHz
15 m	21.0 - 21.5 MHz
▲ 12 m	24.5 - 25.0 MHz
10 m	28.0 - 29.9 MHz

(▲ After Prod. #17)

Power requirements:

AC 100/110/117/200/220/234 volts, 50/60 Hz

DC 13.5 volts ± 10%
(DC-DC converter optional)

Power consumption:

AC 85 VA receive
(73 VA HEATER OFF)
330 VA transmit

DC 5.5 amps receive
(1.1 amps HEATER OFF)
21 amps transmit

Size:

345 (W) x 157 (H) x 326 (D) mm

Weight:

Approx. 15 kg.

TRANSMITTER

Emission type:
LSB, USB, CW, ▲▲AM, ▲▲FM
(AM... After Prod. #8, AM or FM... After Prod. #24)

Power input:

180 watts DC (SSB, CW)
50 watts DC (AM, FM)

Carrier suppression:

Better than 40 dB

Unwanted sideband suppression:

Better than 40 dB (14 MHz, 1 kHz)

Spurious radiation:

Better than 40 dB down

Transmitter frequency response:

300 - 2700 Hz (−6 dB)

Third order distortion products:

Better than 31 dB down

Transmitter frequency stability:

Less than 300 Hz after 10 minute warmup; less than 100 Hz after 30 minute warmup.

Antenna output impedance:

50 - 75 ohms, unbalanced

Modulation:

A3J : Balanced modulator

A3 : Amplitude modulation of a low power stage

F3 : Variable-reactance frequency modulation, max. deviation ± 5 kHz.

Microphone input impedance:

500 - 600 ohms (low impedance)

RECEIVER

Sensitivity:

0.25 μV for S/N 10 dB (SSB, CW)
0.5 μV for S/N 10 dB (AM)
0.3 μV for 20 dB noise quieting (FM)

Image rejection:

Better than 60 dB (160 - 12 m)
Better than 50 dB (10 m)

IF rejection:

Better than 70 dB (160, 80, 20 - 10 m)
Better than 60 dB (40 m, 30 m)

Selectivity:

SSB	2.4 kHz (−6 dB); 4.0 kHz (−60 dB)
CW*	0.6 kHz (−6 dB); 1.2 kHz (−60 dB)
CW**	350 Hz (−6 dB); 1.2 kHz (−60 dB)
AM***	3.6 kHz (−6 dB); 6.8 kHz (−60 dB)
FM***	12 kHz (−6 dB); 24 kHz (−60 dB)

Bandwidth control:

Continuous from 2.4 kHz to 300 Hz

Audio output impedance:

4 - 16 ohms

Audio output:

3 watts at 10% THD, 4 ohm load

* with optional 600 Hz CW filter
** with optional 350 Hz CW filter
*** with optional unit

Specifications subject to change without notice.

TUBES AND SEMICONDUCTORS

Vacuum Tubes

12BY7A	1
6146B	2

Transistors

T20A6*	2
2SA495	1
2SA496Y	2
2SA564A	3
2SA639	1
2SA733	1
2SA952L	13
2SB616	1
2SC372Y	25
2SC373	2
2SC380TMY	3
2SC535A	1
2SC732TMGR	1
2SC1000GR	2
2SC1383	1
2SC1583	2
2SC1674L	1
2SC1815Y	6
2SC1815GR	1
2SC2407	2
MPSA13	1

Field Effect Transistors

2SK19GR	9
2SK19BL	1
3SK40M	1
3SK51-03	7
3SK73	1
J310	2

Integrated Circuits (IC)

μPA54H	1
μPC78L05	1
μPC78L12	1
μPC7805H	1
μPC14308	1
μPC2002H	1
MC3403P	1
MC14024B	1
MSM9520RS	1
SN76514N	1
SN74LS123N	1
TA7060P	1
TA7063P	1

Germanium Diodes

1N60	11
1S1007(GB)	11

Schottky Barrier Diode

ND487C2-3R	1

Silicon Diodes

1S1555	80
10D1	8
10D10	8
V06B	2
1SS53	6

Varactor Diodes

1S2209	1
1S2236	1
FC63	1

Zener Diodes

WZ061	1
WZ090	2

Light Emitting Diodes

GD4-203SRD	9

LED Display

HP5082-7623	6

FM Unit

IC

μPC577H	1

Field Effect Transistors

2SK125	1
3SK51-03	1

Transistors

2SA733Q	1
2SC535B	1
2SC945Q	13

Diodes

1S188FM	4
1S1555	1
1SS53	8
FC63	1
MV103	1

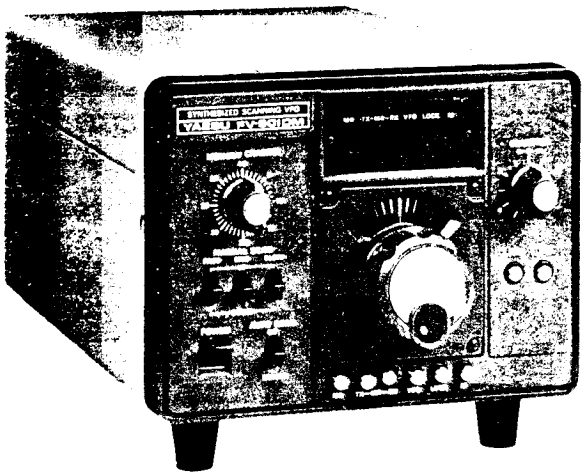
FT-101ZD SERIES MODEL CHART

○ = BUILT-IN FEATURE X = AVAILABLE OPTION

FEATURE	FT-101ZD	FT-101Z
ALL BAND CRYSTALS	○	○
COUNTER UNIT	○	X
DC-DC CONVERTER	X	X
CW FILTER	X	X
MICROPHONE	X	X
RF PROCESSOR	○	○
COOLING FAN	X	X
*AM UNIT (After Prod. #8)	X	X
*FM UNIT (After Prod. #24)	X	X

*Either FM or AM Unit can be installed in your FT-101ZD.

RECOMMENDED ACCESSORIES



FV-901DM

FTV-901R

FV-901DM SYNTHESIZED, SCANNING REMOTE VFO

The FV-901DM external VFO provides a synthesized control system for your FT-101ZD station. A three-speed scanner will take you anywhere in the band instantly, and the auto-scan feature will sweep the band until it finds a signal.

The 100 Hz steps of the synthesizer are coupled with a 40-frequency memory bank, allowing wide versatility for contest, DX, or net operation. The TX/RX clarifier allows offset from either dial or memory frequencies, for precise tuning.

Because there is no display provided on the FV-901DM, it is not readily possible to use this unit with the analog FT-101Z, as the operating frequency cannot be determined.

FTV-901 VHF/UHF/OSCAR TRANSVERTER

In another Yaesu "first," the FTV-901R brings together three bands in the VHF and UHF regions, all in one compact case. The basic FTV-901R comes equipped for 144–148 MHz, and the 6 meter and 70 cm modules may be added as options.

The satellite 1–3 bands provide operation on OSCAR Modes A/B/J, on full duplex, when an external receiver is used. Of course, the FT-221R or FT-225RD transceivers may be used for transmission on the OSCAR 145 MHz uplink. In this case, your FTV-901R can be used for instant QSY between 29 MHz, 145 MHz, and 435 MHz.

Repeater split is provided on 6 and 2 meters.

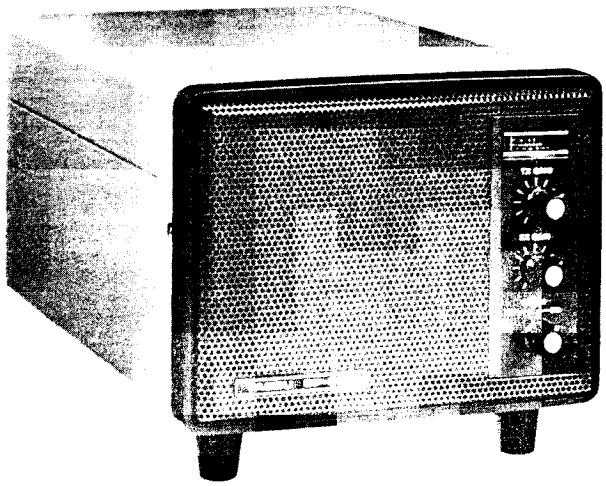
YO-901

YO-901 MULTISCOPE

The YO-901 Multiscope provides superb monitoring capability, with instant interface to your FT-101ZD station. Output signal monitoring, trapezoidal and two-tone tests, and general oscilloscope measurements are made with ease with the YO-901.

A panoramic adapter, known as the Band Scope, is an available option, allowing quick examination of the band for activity.

IF TX and RX monitoring is not possible with the FT-101ZD/YO-901 combination.



SP-901P

SP-901P SPEAKER/HYBRID PHONE PATCH

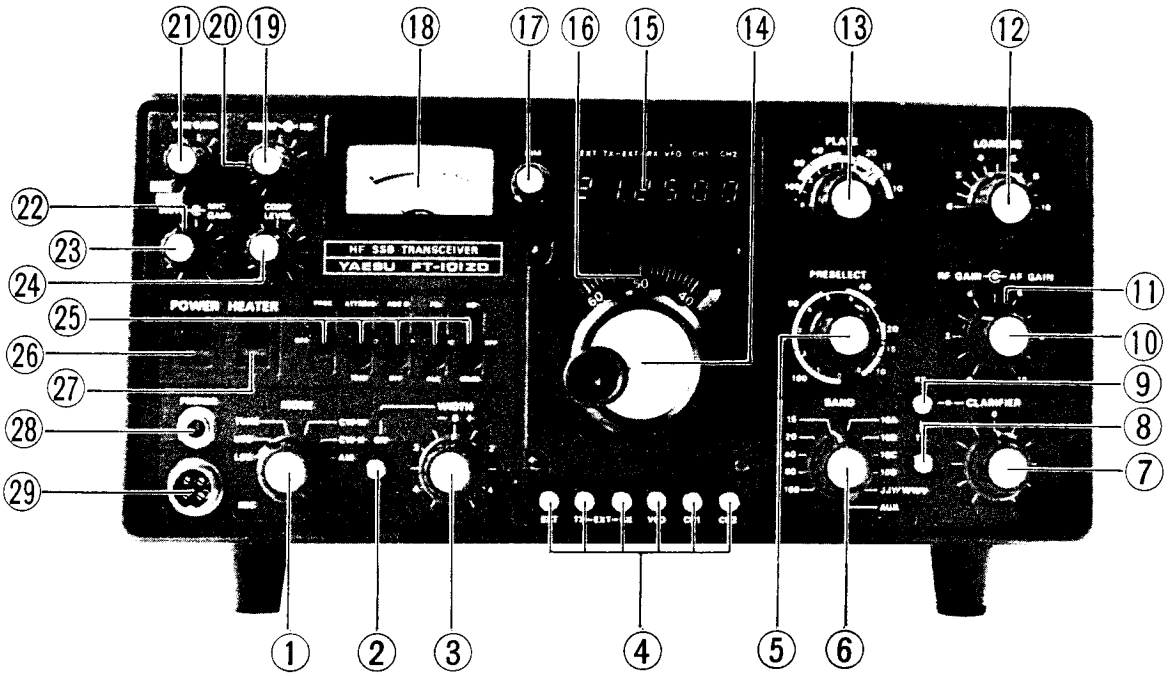
The SP-901P features a shaped-response loudspeaker, and the hybrid phone patch allows efficient operation during patches. Styling and size match the FT-101Z series.

FC-901

FC-901 ANTENNA COUPLER

Present a 50 ohm load to your FT-101ZD transceiver all across the band with the FC-901 antenna coupler. As many as three coax-fed antennas, and one random wire antenna, may be accommodated. SWR and power metering allow quick determination of proper matching conditions.

CONTROLS AND SWITCHES



(1) MODE

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

(2) WIDTH ON

When this button is pressed, the variable bandwidth function is activated.

(3) WIDTH

This control varies the IF bandwidth from 2.4 kHz down to 300 Hz. When the WIDTH switch is OFF, the bandwidth is fixed by the filter selected at the MODE switch.

(4) SELECT switches

When using the optional FV-901DM 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 transceive frequency to the external VFO.

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.

(5) PRESELECT

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

(6) BAND

The bandswitch selects the frequency band in use: 160 - 10 meters, plus WWV/JJY 5 MHz.

(7) CLARIFIER

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

(8) (9) 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.

(10) AF GAIN

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

(11) RF GAIN

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

(12) LOADING

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

(13) PLATE

This control tunes the plate circuit of the final amplifier.

(14) 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.

(15) 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.

(16) 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.

(17) DIM

This control allows dimming of the meter and dial lamps.

(18) METER

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

(19) 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.

(20) 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.

(21) 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.

(22) 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.

(23) MIC GAIN

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

(24) COMP LEVEL

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

(25) 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 blanker is activated. In the MARK position, the internal crystal calibrator is activated.

(26) POWER

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

(27) HEATER

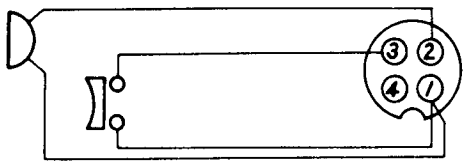
With the HEATER switch on, heater voltage is applied to the driver and final amplifier tubes. This switch may be turned off during periods of RX, when energy conservation is critical.

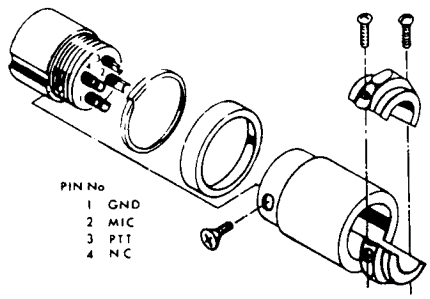
(28) PHONES

This is a standard ¼" phone jack for use with headphones.

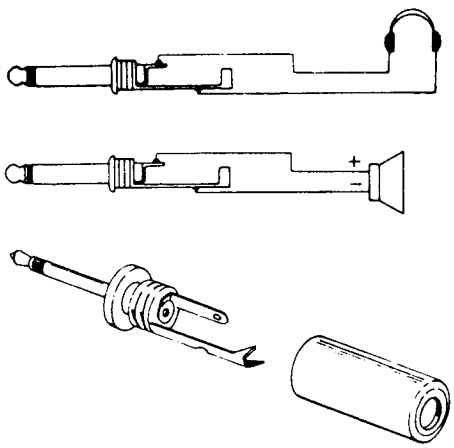
(29) MIC

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

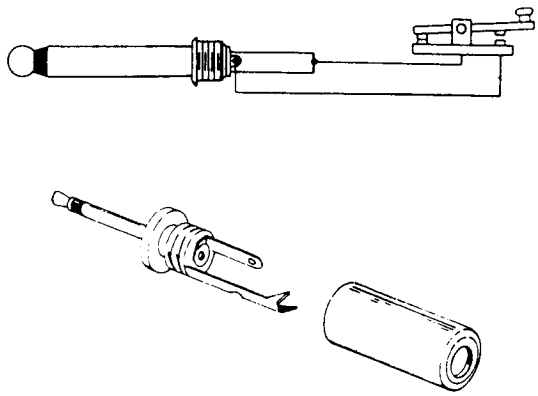




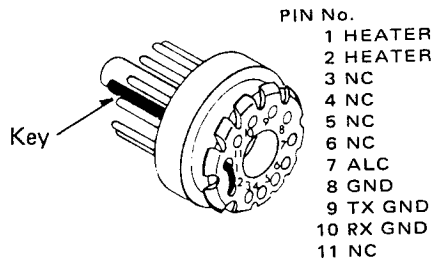
Mic plug



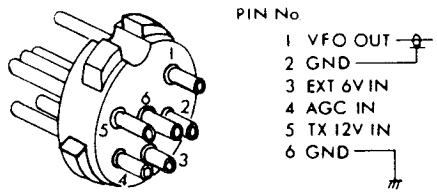
Headphone and external speaker plug



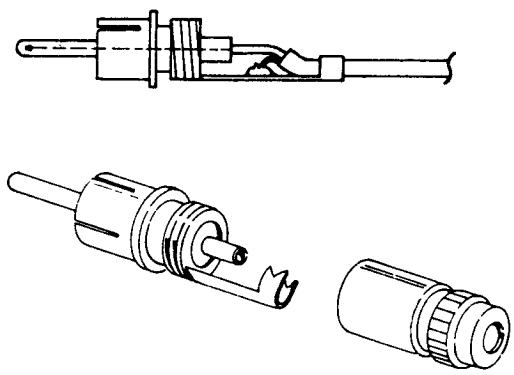
Key plug



ACC plug (After Prod. #24)

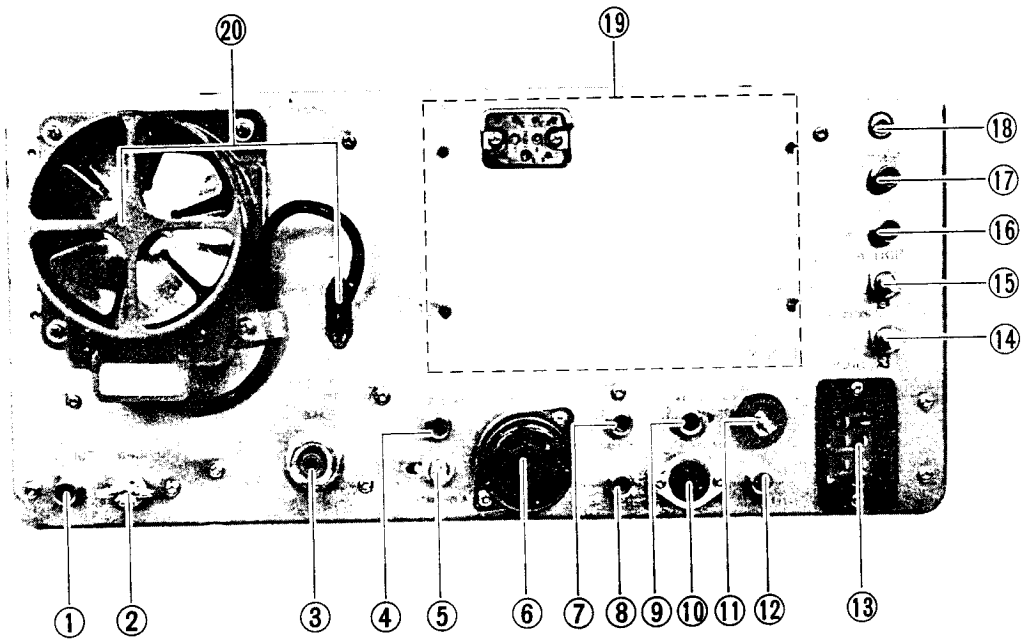


VFO Plug



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) ANT

Standard "UHF" connector for the antenna.

(4) RCV ANT

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

(5) PO ADJ

This control adjusts the relative power output meter.

(6) ACC

Transceiver operating voltages and relay connections can be accessed through the accessory jack. Please insert the ACC plug at all times, to provide heater voltage for the driver and final amplifier tubes.

(7) TONE OUT

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

(8) 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.

(9) 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.

(10) EXT VFO

Connection of an external VFO, such as the FV-901DM, can be made at this jack.

(11) FUSE

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

(12) IF OUT

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

(13) 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.

(14) TONE

This control varies the CW sidetone output level.

(15) A TRIP

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

(16) PTT

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

(17) PATCH

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

(18) 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.

(19) DC-DC CONVERTER (OPTION)

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

(20) 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.

ACCESSORIES

The following accessories are included with your new transceiver:

(1) AC POWER CORD 1

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

(2) ACC PLUG 1

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

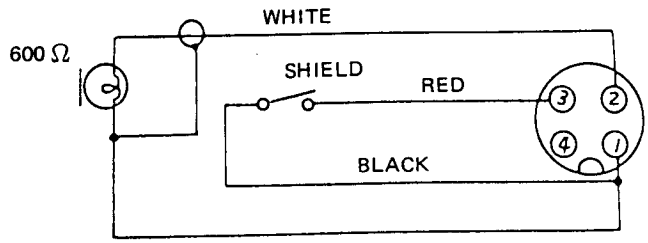
(3) PHONO PLUG 2

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

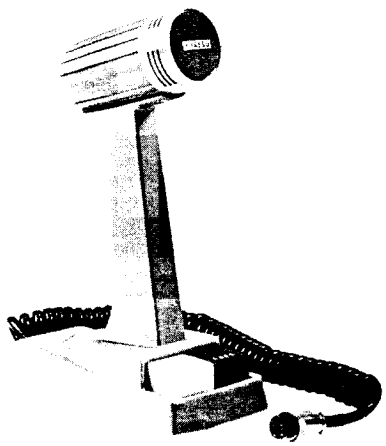
(4) SPARE FUSES 5A (3A) 1 each

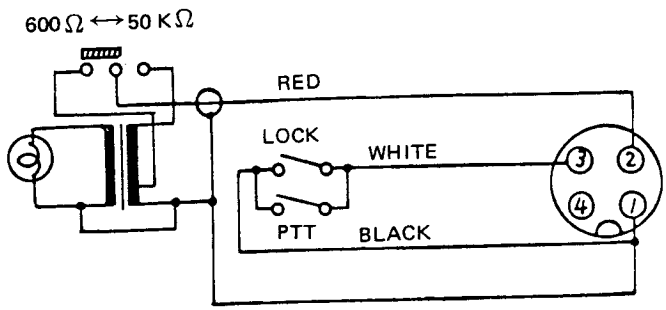
When replacing fuses, be absolutely certain to use a fuse of the proper rating. OUR WARRANTY DOES NOT COVER DAMAGE CAUSED BY IMPROPER FUSE REPLACEMENT. For 100 - 117 volt AC operation, use a 5 amp fuse. For 200 - 234 volt operation, use a 3 amp fuse.

MICROPHONE CONNECTIONS

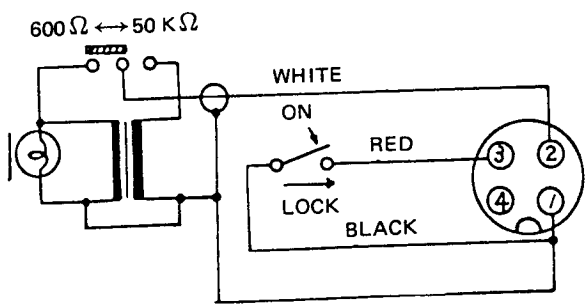


YE-7A



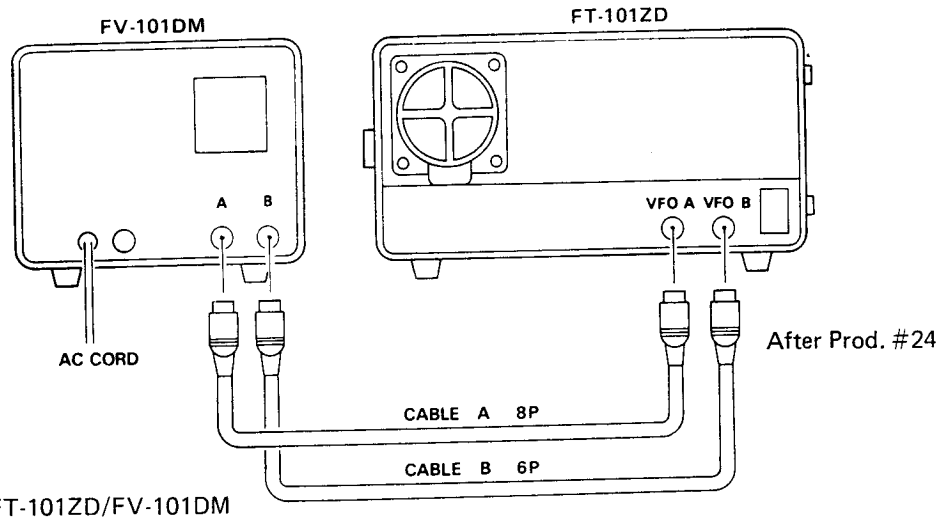


YD-844A

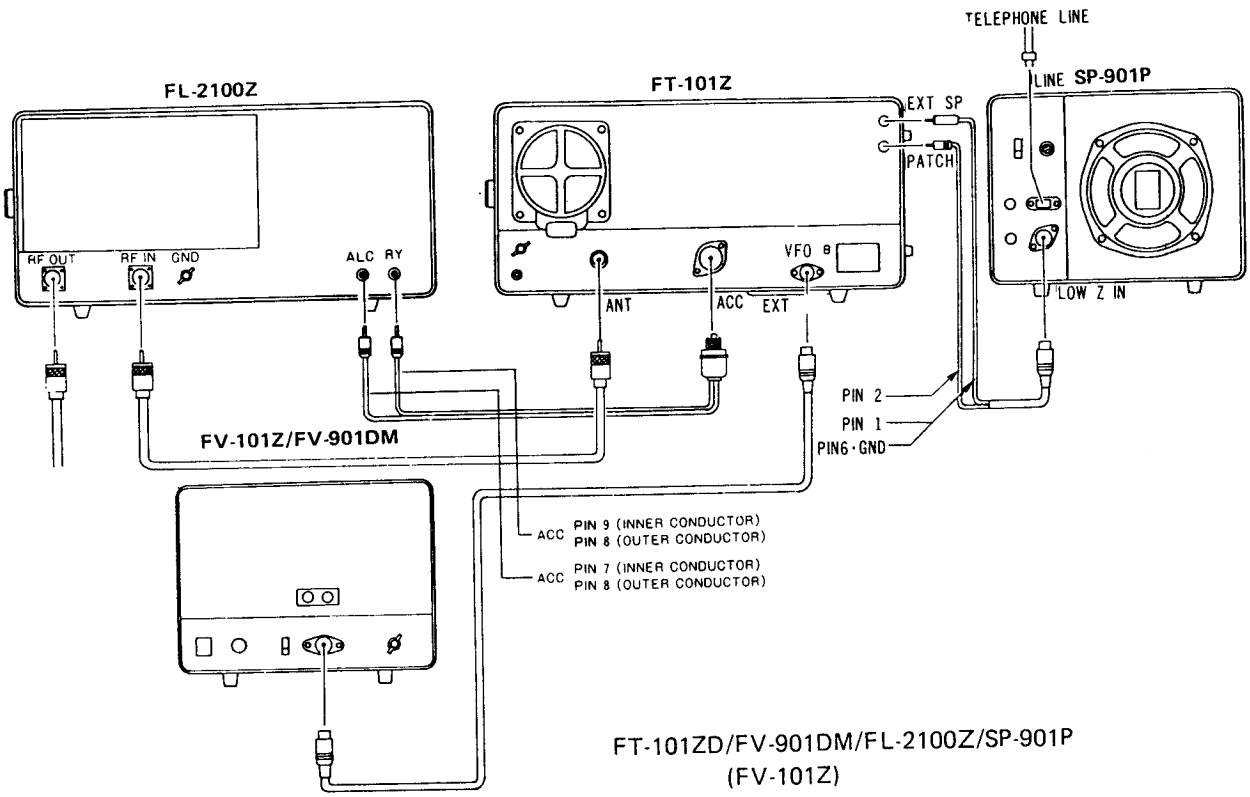


YD-148

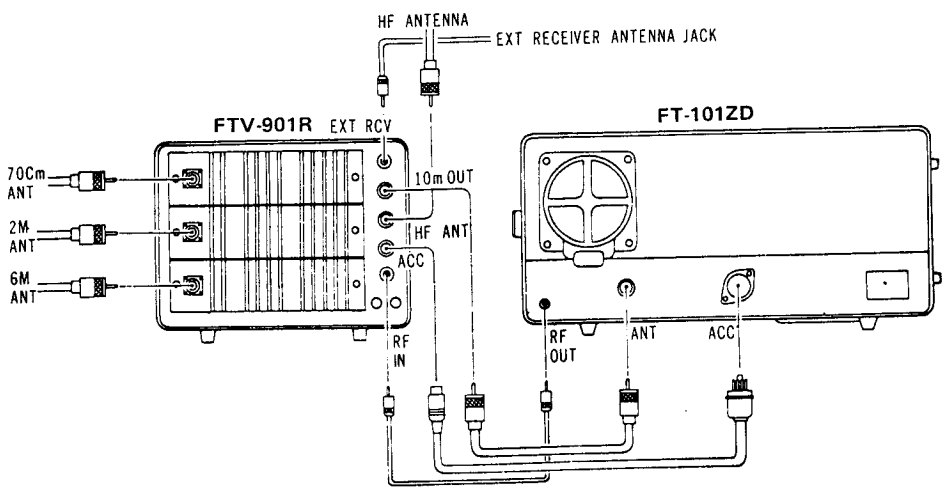
INTERCONNECTIONS



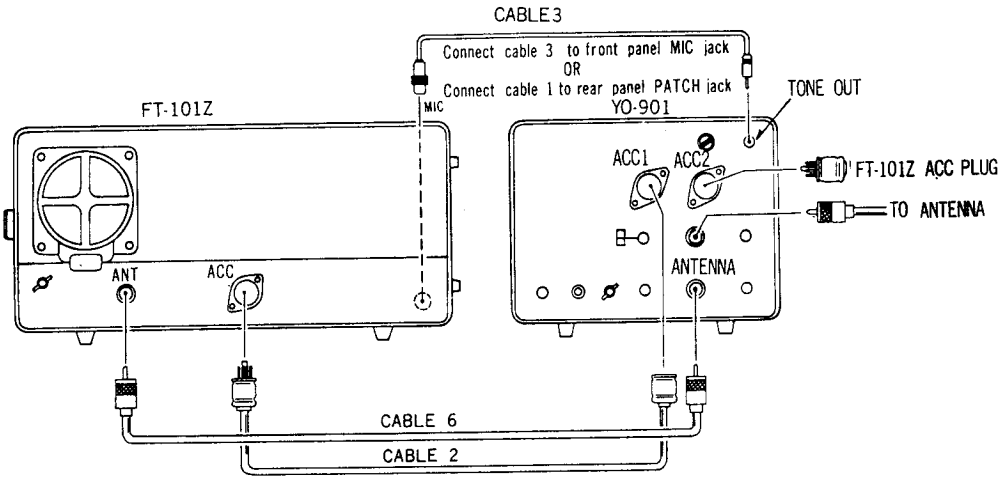
FT-101ZD/FV-101DM



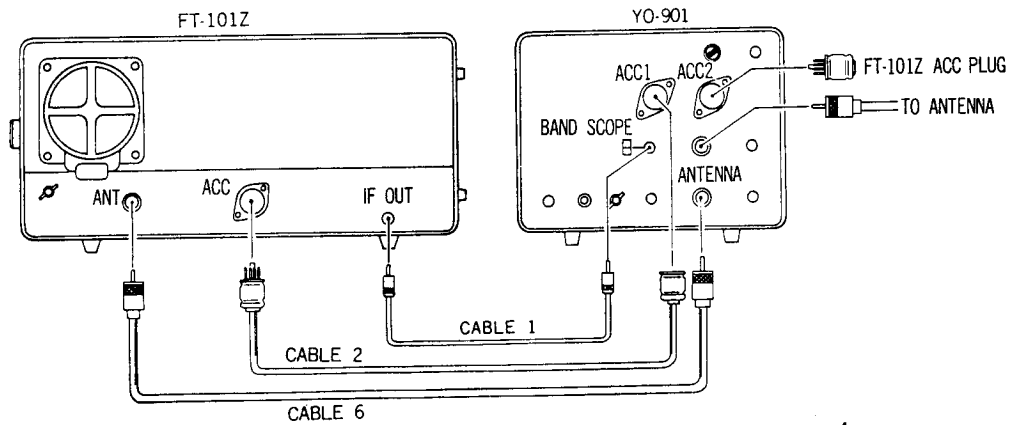
FT-101ZD/FV-901DM/FL-2100Z/SP-901P
(FV-101Z)



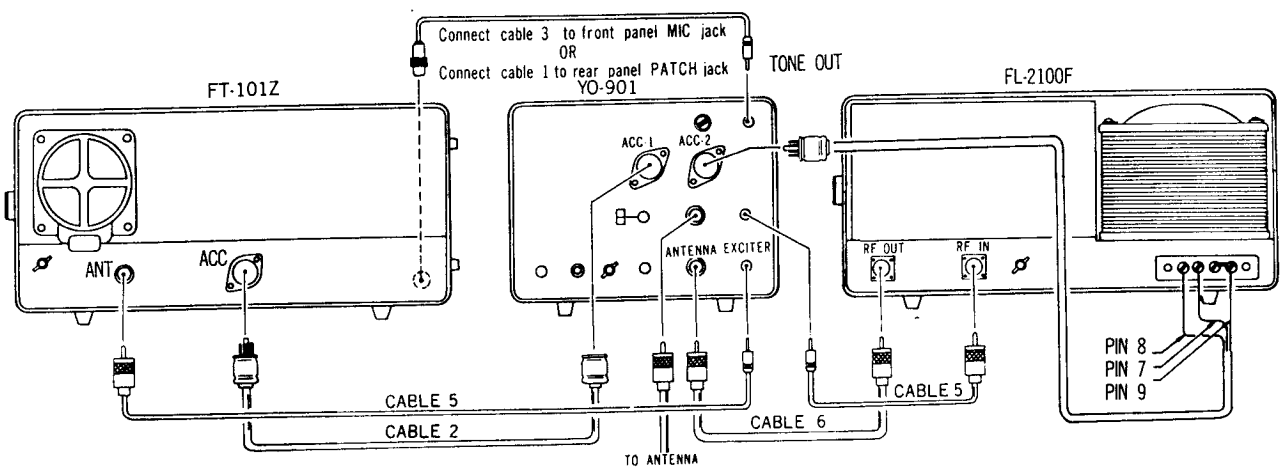
FT-101ZD/FTV-901R



FT-101ZD/YO-901
(monitorscope mode)



FT-101ZD/YO-901
(Band scope mode)



FT-101ZD/YO-901/FL-2100F

INSTALLATION

The FT-101ZD is designed to be a single-unit station for fixed or portable operation from AC power. Power supply connections providing for operation from a variety of source voltages are available. Please read the following sections carefully, so as to ensure proper installation of your new transceiver.

PRELIMINARY INSPECTION

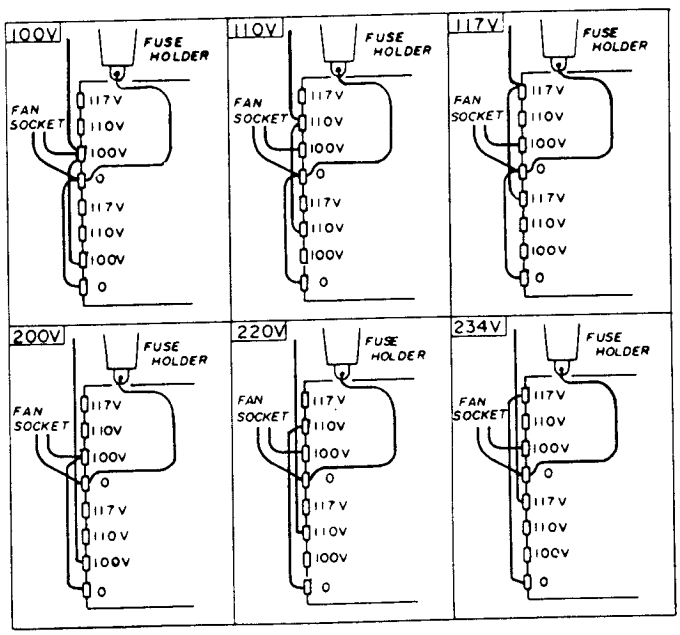
Upon opening the packing carton, immediately give the transceiver a thorough visual inspection. Check to see that all controls and switches are working freely, and inspect the cabinet for any signs of damage. If any damage has been sustained, immediately contact the shipping company, and document the damage completely. Save the packing carton and foam packing material for possible use at a later date.

BASE STATION INSTALLATION

The FT-101ZD is designed for use in many areas of the world, using supply voltages that may differ from your local supply voltage. For this reason, be absolutely certain that the voltage specification marked on the rear of the transceiver agrees with the local AC supply voltage. THIS INSPECTION MUST BE MADE BEFORE CONNECTING THE AC POWER CORD TO THE REAR APRON OF THE TRANSCEIVER.

CAUTION

PERMANENT DAMAGE WILL RESULT IF IMPROPER AC SUPPLY VOLTAGE IS APPLIED TO THE TRANSCEIVER. OUR WARRANTY DOES NOT COVER DAMAGE CAUSED BY APPLICATION OF IMPROPER SUPPLY VOLTAGE. DO NOT CONNECT THE AC POWER CORD TO A DC POWER SOURCE.



The transceiver should be connected to a good earth ground. The ground lead should be made of a heavy, braided wire, and should be connected to the GND terminal on the rear apron of the transceiver.

MOBILE INSTALLATION

(Note: The DC-DC converter described herein is optional equipment. See your Yaesu dealer.)

When the optional DC-DC converter is installed, the FT-101ZD will operate satisfactorily from a 13.5 volt DC power source capable of providing the required current. The DC power cord is included with the DC-DC converter kit.

For under-dash mobile mounting, a special mobile mounting bracket is an available option for your transceiver. The FT-101ZD should be located away from heater ducts, and a minimum of two inches of air space on all sides is recommended, to allow proper air flow around the cabinet. Never stack other units above or below the FT-101ZD, as the accumulated heat from both units could cause damage.

The transceiver requires an average of 14 amps on transmit, with 20 amps on voice peaks. The DC power cable comes equipped with a 20 amp fuse. Be certain to use only a 20 amp fuse when making replacements.

When making battery connections, be absolutely certain that the RED lead is connected to the POSITIVE battery terminal, and the BLACK lead is connected to the NEGATIVE battery terminal. Reversed connections could cause permanent damage to the transceiver. OUR WARRANTY DOES NOT COVER DAMAGE CAUSED BY IMPROPER SUPPLY CONNECTIONS.

It is recommended that the power connections be made directly to the battery, instead of to the ignition switch, etc. The battery provides considerable filtering action against ignition noise, and connection to the ignition switch can place the power line in a noisy circuit. Keep the power lead as short as possible, and keep the lead away from ignition cables.

Before connecting the DC power cable 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, so as to limit the highest charging rate to less than 15 volts. As well, do not operate the transceiver if the DC supply voltage is less than 12 volts. The transceiver should always be turned off when the car is started, to prevent voltage transients from damaging the power supply components.

ANTENNA CONSIDERATIONS

The FT-101ZD is designed for use with an antenna system presenting a 50 - 75 ohm resistive load at the antenna jack. While the transmitter output circuitry is designed for uniform response within this impedance range, significant departures from the 50 - 75 ohm specification will result in seriously degraded transceiver performance, and may result in damage to the final amplifier tubes.

If an open-wire feedline is used, or if the input impedance of the antenna system presents a higher or lower impedance than specified, some sort of antenna tuner must be used to provide the proper impedance for the transceiver. See your Yaesu dealer for details of the FC-901 antenna coupler.

For mobile operation, most of the commercially-available antennas will provide satisfactory results, if care is taken to tune the antenna for minimum SWR. The outer conductor of the coaxial cable should be securely grounded to the automobile chassis at the antenna mount. See your Yaesu dealer for details on the RSL series of mobile antennas.

OPERATION

The tuning procedure for this transceiver is not complicated. However, care should be exercised when tuning so that peak performance of the equipment is secured. The following paragraphs describe the procedure for receiver and transmitter tuning.

INITIAL CHECK

Before connecting the transceiver to the power source, be certain that the voltage specification marked on the rear of the transceiver matches your local supply voltage, and also confirm that a fuse of the proper rating is being used.

FREQUENCY SELECTION

Frequency readout on the FT-101ZD is by digital as well as analog displays. The FT-101Z uses analog display only. The analog readout dial provides resolution to 1 kHz, while the FT-101ZD digital display provides resolution to 100 Hz. The digital display may be added to the FT-101Z as an option. See your Yaesu dealer for details.

RECEIVE OPERATION

(1) Preset the controls and switches as follows:

POWER . . . . . OFF
HEATER . . . . OFF
VFO. . . . . Switch pushed
VOX GAIN . . PTT position
RF GAIN . . . . Fully clockwise
AF GAIN . . . Adjust later for comfortable level
BAND . . . . . Desired band
MODE . . . . . Desired mode
PRESELECT . Desired band segment
AGC. . . . . OFF
ATT . . . . . OFF
MARK/NB . . . OFF
▲ APF/NOTCH . Fully counterclockwise

(2) Turn the power switch to ON. The meter will light up, and the operating frequency will be displayed on the dial window (FT-101ZD). Adjust the AF GAIN control for a comfortable listening level, and adjust the PRESELECT control for maximum receiver noise or signal level. The PRESELECT control may require repeaking as the transceiver is tuned across the band.

(3) The RX CLARIFIER may be utilized if the received signal is drifting. Push the RX button, and rotate the CLARIFIER control for offset of up to 2.5 kHz. A red LED indicator will light up when the clarifier is in use.

(4) When pulse-type noise is encountered, the NB (Noise Blanker) switch should be activated. Advance the noise blanker level control (located on the front panel) to the point which provides the desired blanking. Do not advance the level control beyond the point required to eliminate the noise pulses.

(5) For varying the width of the IF passband, rotate the WIDTH control. In the IF, two 8-pole crystal filters are used. One filter is fixed, and presents a boundary for the bandwidth. The center frequency is then varied across the passband of the second filter, using a mixing scheme that provides no change of pitch in the received signal.

The result is a continuously variable bandwidth, from 2.4 kHz down to approximately 300 Hz. With the WIDTH control in the "0" position, the second IF filter is instantly aligned with the first filter, returning the receiver to a 2.4 kHz bandwidth.

(6) For extremely strong signals, the ATT (attenuator) switch may be activated, providing 10 dB or 20 dB of attenuation on the incoming signal path, depending on the position of the ATT switch.

▲ (7) Under conditions of very heavy QRM, while operating CW, the APF (Audio Peak Filter) may be activated. Push the APF/NOTCH botton to APF, and tune the APF/NOTCH control for maximum enhancement of the desired signal. The operator will observe that the background noise will be reduced dramatically, resulting in excellent signal to noise ratio.

▲ (8) For elimination of an interfering carrier within the AF passband, set the APF/NOTCH switch to NOTCH. Then rotate the APF/NOTCH control carefully for the best nulling of the offending carrier. The notch is extremely sharp, so tuning is critical, but the excellent notch depth is extremely effective in eliminating interference.

▲ After Prod. #24

TRANSMITTER TUNING

The following tuning procedure must be performed prior to commencing operation on the desired mode. See the paragraphs relating to the specific mode after basic transmitter tune-up has been accomplished.

Be certain that a dummy load or matched antenna is connected to the antenna receptacle on the rear apron of the transceiver. It is possible to damage the final amplifier components of this equipment if this simple precaution is not followed prior to commencing transmission.

Do not exceed 10 seconds of key-down time while tuning.

As well, be certain that the ACC plug is inserted into the rear apron ACC jack. Without this plug, there will be no power applied to the tube heaters. Heater voltage is applied through pins 1 and 2 of the accessory socket.

(1) Preset the controls and switches as follows:
MODE . . . . . TUNE
DRIVE . . . . . Fully counterclockwise
DELAY . . . . . Fully counterclockwise
MIC GAIN. . . . . Fully counterclockwise
COMP LEVEL . . . Fully counterclockwise
HEATER . . . . . ON
PROC . . . . . OFF
PO/IC/ALC IC
PLATE . . . . . Set to desired band segment
LOADING 0
PRESELECT . . . . . Peaked on receive for maximum response
TX CLARIFIER . . OFF (button not pushed)

(2) Turn the HEATER switch ON, and wait 1 minute for the tube heaters to warm up.

(3) Set the VOX GAIN switch to the MOX position. Observe the reading on the IC meter: it should read 50 mA with no drive applied. If it is not, adjust the PB-1968 BIAS control for a resting current of 50 mA on the IC meter. Refer to the BIAS Adjustment in Page 41. Be certain that the DRIVE control is fully counterclockwise for this adjustment.

(4) Set the VOX GAIN switch to MOX. Advance the DRIVE control for a reading of 150 mA.

(5) Peak the PRESELECT control for a maximum meter reading. If the meter reading exceeds 150 mA, reduce the setting of the DRIVE control.

(6) Rotate the PLATE control for a minimum reading ("dip") on the IC meter. Return the transceiver to the receive mode by rotating the VOX GAIN switch out of the MOX position.

LOADING POSITIONS

BAND	FREQUENCY	POSITION
160m	1.8MHz	2.5
	2.0MHz	6.0
80m	3.5MHz	3.0
	4.0MHz	6.0
40m	7.0MHz	6.0
	7.5MHz	6.5
▲ 30m	10.0MHz	7.0
	10.5MHz	7.8
20m	14.0MHz	3.0
	14.5MHz	4.0
▲ 17m	18.0MHz	2.0
	18.5MHz	2.0
15m	21.0MHz	2.0
	21.5MHz	2.5
▲ 12m	24.5MHz	3.0
	25.0MHz	3.0
10m A	28.0MHz	2.0
10m B	28.5MHz	2.0
10m C	29.0MHz	2.0
10m D	29.5MHz	2.0

▲ After Prod. #17

NOTE: LOADING positions are nominal. Minor variations from positions shown are to be expected.

FINAL TUNING

Final transmitter tuning uses the relative power output setting of the METER switch. At full rated output, using a 50 ohm load, the PO meter will indicate between 1/2 and 2/3 of full scale deflection. If the PO reading is too high (off scale) or too low (1/4 scale or less), and if the load impedance is very close to 50 ohms, the PO ADJ control on the rear apron may be varied to provide the proper deflection. Once the PO meter is calibrated, off-scale deflections are the result of reflected power (high SWR), and corrective action may be required in the antenna system.

Set the controls as follows for final tuning:

(1) Set the METER switch to PO. Rotate the DRIVE control to the 9 o'clock position.

(2) Rotate the VOX GAIN control to the MOX position, and rotate the PRESELECT control for a maximum meter reading.

(3) Rotate the LOADING control for a maximum meter reading. Rotate the PLATE control for a maximum meter reading.

(4) Again rotate the LOADING control and PLATE control, each time advancing the DRIVE control approximately 2 steps, until the DRIVE control is fully clockwise. The transmitter is now tuned for maximum power output. Do not exceed the maximum tuning time stipulated previously. Return the VOX GAIN switch to the VOX position (out of the MOX position), return the METER switch to IC, and return the DRIVE control to the fully counterclockwise position.

SSB OPERATION

After completing the above tuning procedure, set the MODE switch to USB or LSB as desired. Set the VOX GAIN control to PTT, and activate the transmitter by pushing the microphone PTT switch or the footswitch, if used. With the METER switch set to the ALC position, speak into the microphone in a normal voice. Advance the MIC GAIN control until the meter kicks up to the midscale of the green-colored portion of the meter scale.

Note: When the METER switch is set to IC, voice modulation peaks will indicate 150 - 200 mA. Actual peak current, though, is approximately 2 times the indicated value.

To set the sensitivity of the VOX (voice-operated T/R switching) system, advance the VOX GAIN control slowly while speaking into the microphone. Advance the VOX GAIN control to the point where the speech signal activates the transmitter.

Set the antitrip potentiometer on the rear apron to the minimum point which prevents the speaker output from tripping the VOX. Do not use more VOX gain nor antitrip than is necessary. Adjust the front panel DELAY control for the desired relay recovery time.

RF SPEECH PROCESSOR ADJUSTMENT

The FT-101ZD RF speech processor, when correctly adjusted, will improve the intelligibility threshold at the receiving end, by increasing the average SSB power output. RF clipping is applied to the IF signal, which is then filtered to remove harmonics and out of band intermodulation products. RF envelope clipping causes much less distortion than that caused by an equivalent amount of AF clipping, and the result is an output signal with more "punch".

Set the PROC switch to OFF, and set the MIC GAIN control as described previously (voice peaks falling within the green zone of the ALC meter scale). Now set the PROC switch to ON, and set the COMP LEVEL control to the 10 o'clock position. Advance the DRIVE control so that the desired power output is obtained, and be sure that the ALC meter indication is within the green zone.

With the RF speech processor activated, the ALC meter indication may not be quite as high as when the processor is off. This is entirely normal, because the average power output is higher with the processor, although the **peaks** are being clipped.

Setting the COMP LEVEL control up to the 3 o'clock position will provide up to 10 dB of compression. Advancing the control beyond the 10 o'clock point may, however, degrade the voice-to-noise ratio, so caution is recommended.

CW OPERATION

After completing the tuning procedure, insert the key line into the KEY jack on the rear panel.

The operator may select any power output desired by advancing the DRIVE control. Once the maximum power output level has been reached, the DRIVE control should not be advanced further.

The transmitter may be activated by the VOX circuit, or by the PTT or MOX systems. The TONE control on the rear apron of the transceiver sets the CW sidetone level.

The key-up voltage at the key jack is 7 volts, and the key-down current is 1.5 mA.

For receiving, two positions of selectivity are provided. When the optional CW filter is installed, the operator may select between the 600 Hz bandwidth of the CW filter and the 2.4 kHz bandwidth of the SSB filter. The WIDTH control may be used with either position of the MODE switch: CW-W or CW-N.

AM OPERATION (with optional AM unit) (After Prod. #8)

AM operation of the transmitter is accomplished by setting the MODE switch to the AM/FM position and inserting the proper amount of carrier with the DRIVE control.

After completing basic transmitter tune-up, place the MODE switch in the AM/FM position. Activate the transmitter, and rotate the DRIVE control until the meter reads .10 (100 mA) in the IC position of the METER switch. While speaking into the microphone in a normal voice, increase the MIC GAIN control until the meter indicates very slight movement with voice peaks. Care must be exercised that the DRIVE control is not advanced too far. Do not exceed .10 (100 mA) meter indication during AM operation or damage to the transmitter final amplifier tubes may result.

FM OPERATION (with optional FM unit) (After Prod. #24)

After completing the basic transmitter tune-up, set the CARR control for 100 mA carrier level with the MODE switch in the AM/FM position.
Speak into the microphone in a normal voice. The MIC GAIN and COMP LEVEL controls have no effect on the FM mode.

For FM reception, the SQL control on the front panel should be advanced only as far as required to silence background noise. When adjusted just past the silencing threshold, the squelch circuitry will provide noise-free reception with maximum sensitivity to weak FM signals.

Note: Either AM unit or FM unit can be installed in your FT-101ZD.

SELECT SWITCHES

The SELECT switches allow selection of internal or external VFO frequency control, as well as selection of up to 2 optional crystal-controlled channels.

When the crystal-controlled channels are installed, they may be selected by pressing CH1 or CH2, as desired. See the crystal information elsewhere for full information on crystal requirements.

The external VFO, FV-101Z, FV-101DM and FV-901DM, which provide versatile operations with your FT-101ZD, are available from your Yaesu dealer.
Because there is no calibrated dial for the FV-901DM, it can't be used with the analog FT-101Z.

For transceive frequency control on the external VFO, press EXT. For external VFO control of the transmit frequency, with receive frequency control on the FT-101ZD, press TX EXT. For receive frequency control on the external VFO, and transmit frequency control on the FT-101ZD, press RX EXT. For full transceive control on the FT-101ZD, press VFO.

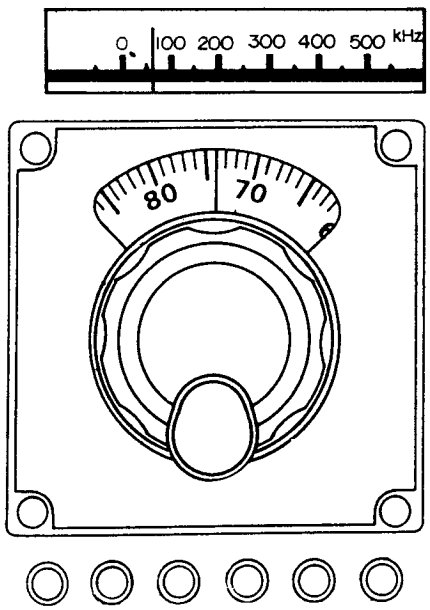
DIAL CALIBRATION AND FREQUENCY DETERMINATION

The FT-101ZD mixing scheme accounts for the difference in carrier frequencies between USB and LSB. For this reason, no recalibration is required. Once the calibration is properly aligned (at the factory, or in shop), no further adjustment is required for accurate frequency derivation. The 25 kHz calibrator is included largely for alignment purposes, as it provides a useful reference signal for signal peaking, etc.

Frequency readout on the FT-101ZD digital display is straightforward. The full operating frequency is displayed, with resolution to 100 Hz.

The analog display on the FT-101Z and FT-101ZD transceivers provides easy determination of the operating frequency. The frequency displayed on the analog sub dial (and the main display window, for the FT-101Z) is added to the lower band edge frequency.

For example, if the analog dial indicates 074, as shown in the example, and the BAND switch is on 40 meters (lower band edge: 7000 kHz), the operating frequency will be 7074 kHz. By rotating the BAND switch, this position of the analog display will produce 14074 kHz for 20 meters, 21074 for 15 meters, etc. For 80 and 12meters,the lower band edges are 3500 kHz and 24500 kHz while for 160 meters the band edge is 1.5 MHz. Therefore, the dial should read 074 to produce 3574 kHz, but 374 for 1874kHz. Be careful so as not to operate outside the amateur bands.



FIXED CHANNEL CRYSTAL INFORMATION

Two fixed channels may be used with your FT-101ZD, using optional crystals. Crystals are available from your Yaesu dealer. Crystals must meet the specifications shown in Table 2 , and must fall within the operating range 5500 - 5000 kHz. Frequency calculation is made from the formula

$$F_X = F_1 - F_0$$

where F_X is the crystal frequency
F_1 is a constant derived from Table 1
F_0 is the operating frequency.

For example, let us say it is desired to operate on 7199 kHz LSB. Referring to Table 1, we see that for 40 meter LSB, F_1 is 12501.5 kHz. Subtracting F_0 (7199 kHz) from F_1 (12501.5 kHz) yields 5302.5 kHz, the crystal frequency (F_X).

For operation on 21420 kHz USB, compute the crystal frequency as follows:
$F_X = 26498.5 - 21420 = 5078.5$ kHz.

Inspection of the values of F_1 in Table 1 will reveal that the 7199 kHz crystal for LSB will work on 14199 kHz, 21199 kHz, etc. Of course, LSB is not normally used on these bands. If the operator switches to USB, the operating frequency will be moved $\overline{+}$ kHz (in this case, to 14196 kHz, 21196 kHz, etc.). If the move is made from LSB to CW, the frequency will move 2.3 kHz down.

MODE / BAND	U S B	L S B	CW/AM,FM
160m	6998.5	7001.5	6999.2
80m	8998.5	9001.5	8999.2
40m	12498.5	12501.5	12499.2
▲ 30m	15498.5	15501.5	15499.2
20m	19498.5	19501.5	19499.2
▲ 17m	23498.5	23501.5	23499.2
15m	26498.5	26501.5	26499.2
▲ 12m	29998.5	30001.5	29999.2
10m A	33498.5	33501.5	33499.2
10m B	33998.5	34001.5	33999.2
10m C	34498.5	34501.5	34499.2
10m D	34998.5	35001.5	34999.2

Table 1

(▲ After Prod. #17)

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

Table 2

SECTION 2 – TECHNICAL NOTES

PART DESIGNATIONS ON CIRCUIT BOARDS

FT-101Z CIRCUIT BOARDS

The FT-101Z series integrates the "mother board" concept and the "plug-in" type of circuit card. Each circuit board used in the FT-101Z has a code number assigned to it, and each part within the transceiver has a part number assigned to it (e.g. Q_{502}).

Parts numbers 01–99 (e.g. R_{12}) are located on the main chassis. Other parts, located on the circuit boards, are assigned a three or four digit part number; the last two digits are the part number for that particular board, while the first one or two digits are the code number for the board.

Thus, Q_{301} is transistor number 01, located on circuit board number 3, which is the PREMIX UNIT. Refer to the accompanying chart for a tabulation of the code numbers assigned to the various circuit boards used in the FT-101Z series.

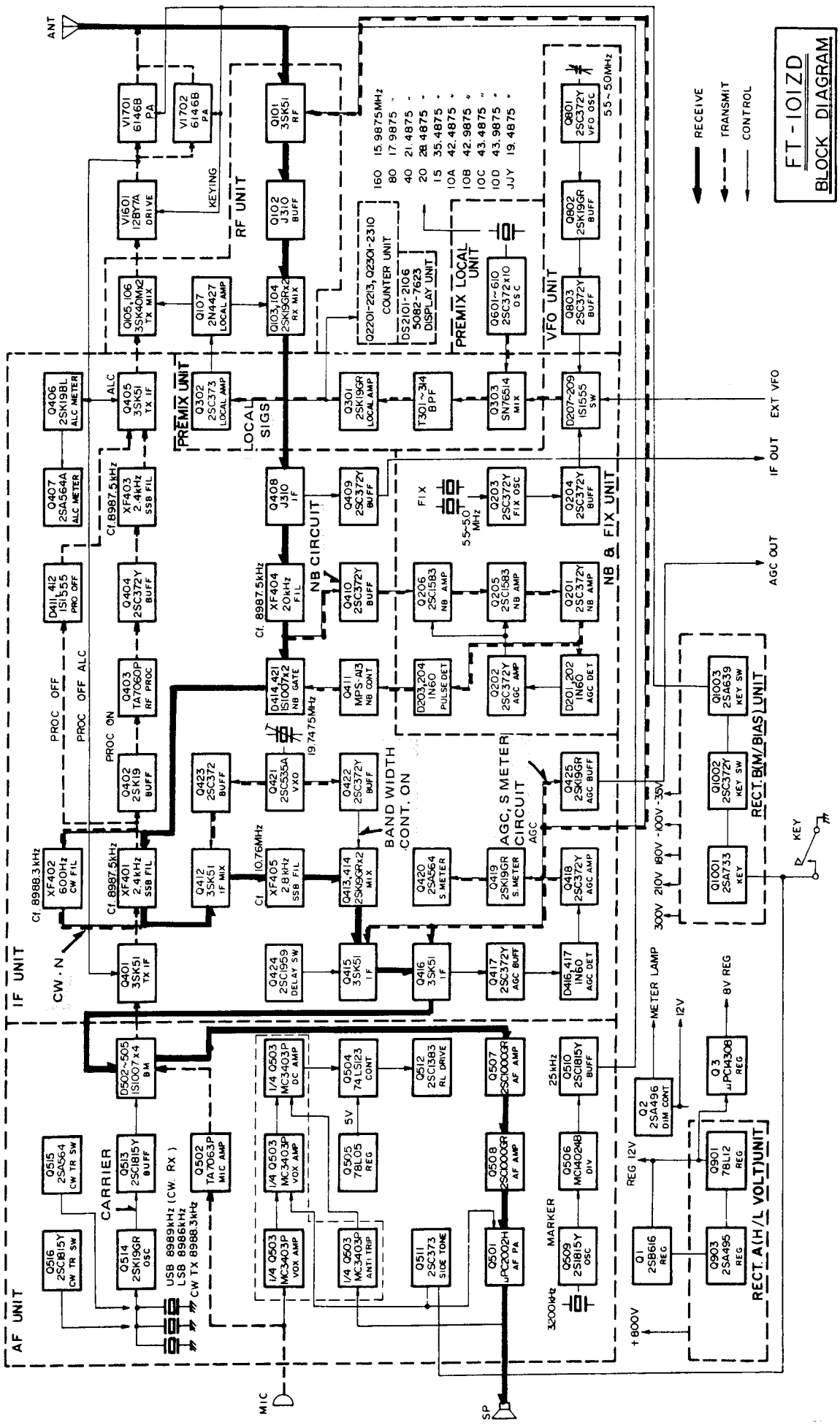
Code #	Unit	Board Designation
1	RF	PB-1960A (PB-2154)
2	NB/FIX	PB-1961B
3	PREMIX	PB-1962A (PB-2152)
4	IF	PB-1963B
5	AF	PB-1964A
6	PREMIX LOCAL	PB-1965 (PB-2153)
7	SELECT SW.	PB-1966C
8	VFO	PB-1440B-3420
9	RECT A	PB-1967
10	RECT B	PB-1968A
11	CAPACITOR	PB-1969A
12	TRIMMER A	PB-1970 (PB-2193B)
13	TRIMMER B	PB-1970 (PB-2192B)
14	TRIMMER C	PB-1092
15	BW CONT (APF)	PB-1972 (PB-2217)
16	DRIVER	PB-1714A
17	FINAL	PB-1715A
18	CLAR CONT	PB-1973A
19	LED	PB-1974A
20	LEVER SW	PB-1975A
21	DISPLAY	PB-1978 (PB-2098A)
22	COUNT/DECODE	PB-1979
23	COUNTER MAIN	PB-1980 (PB-2086A)
24	AM	PB-2040
25	FM	– (PB-2218)
32	DC-DC CONV	–

SIGNAL TRACING IN THE FT-101ZD

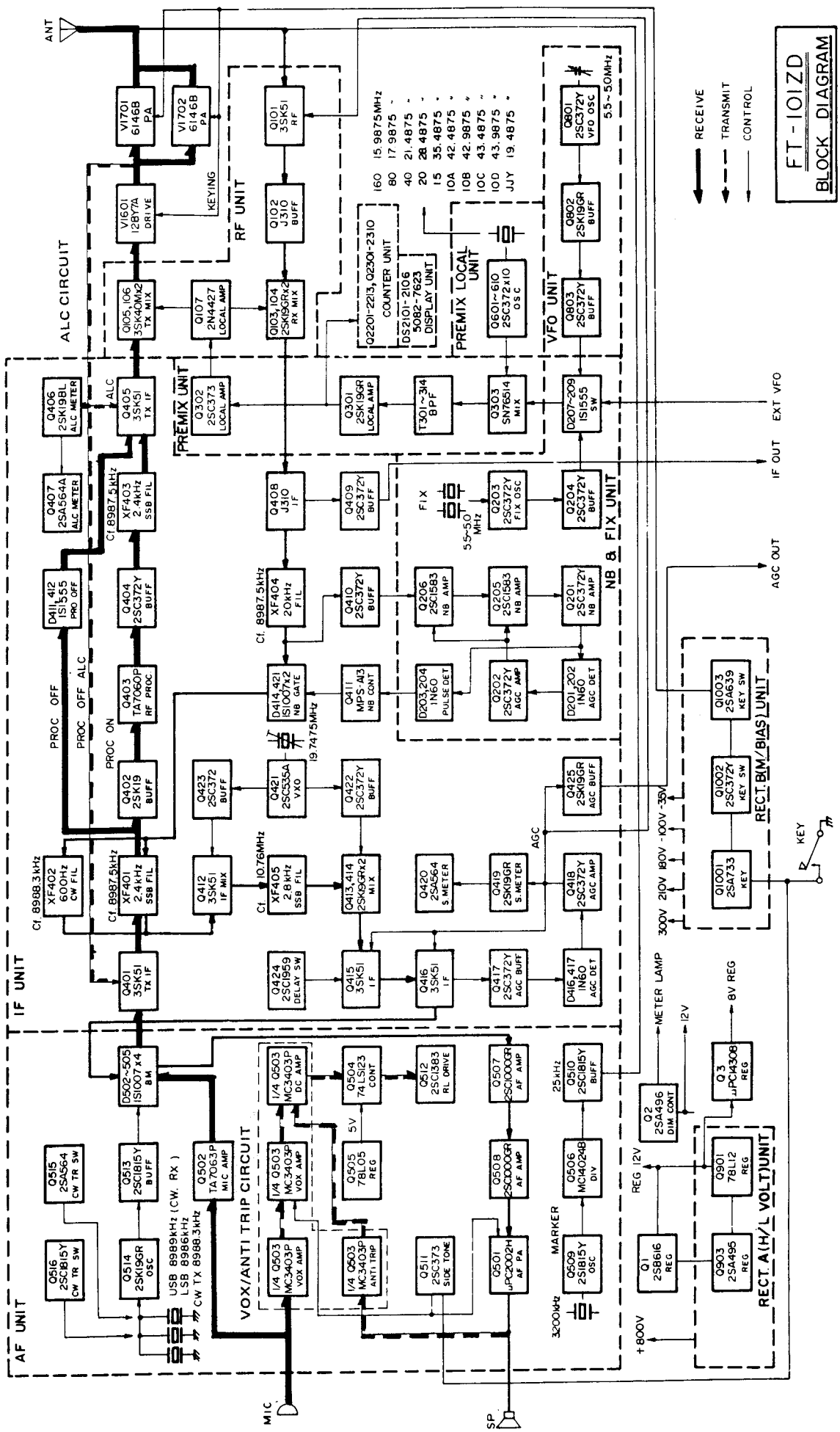
A highly useful signal in the FT-101ZD, one that can be used for most receiver alignment steps, is the internal calibrator. Fed into the receive line right at the antenna terminal, the calibrator signal should read about S9 + 10 dB, with the preselector peaked, at 14.200 MHz, SSB mode. While minor variations from this figure are no cause for alarm, a blown RF amplifier FET will cause this reading to be practically nil.

In the following section, we have presented augmented block diagrams which should help you in tracing the signal paths throughout the FT-101ZD. Armed with a couple of alignment wands and the calibrator signal, receiver peaking can be completed in short order, leaving you free to diagnose problems on the TX side.

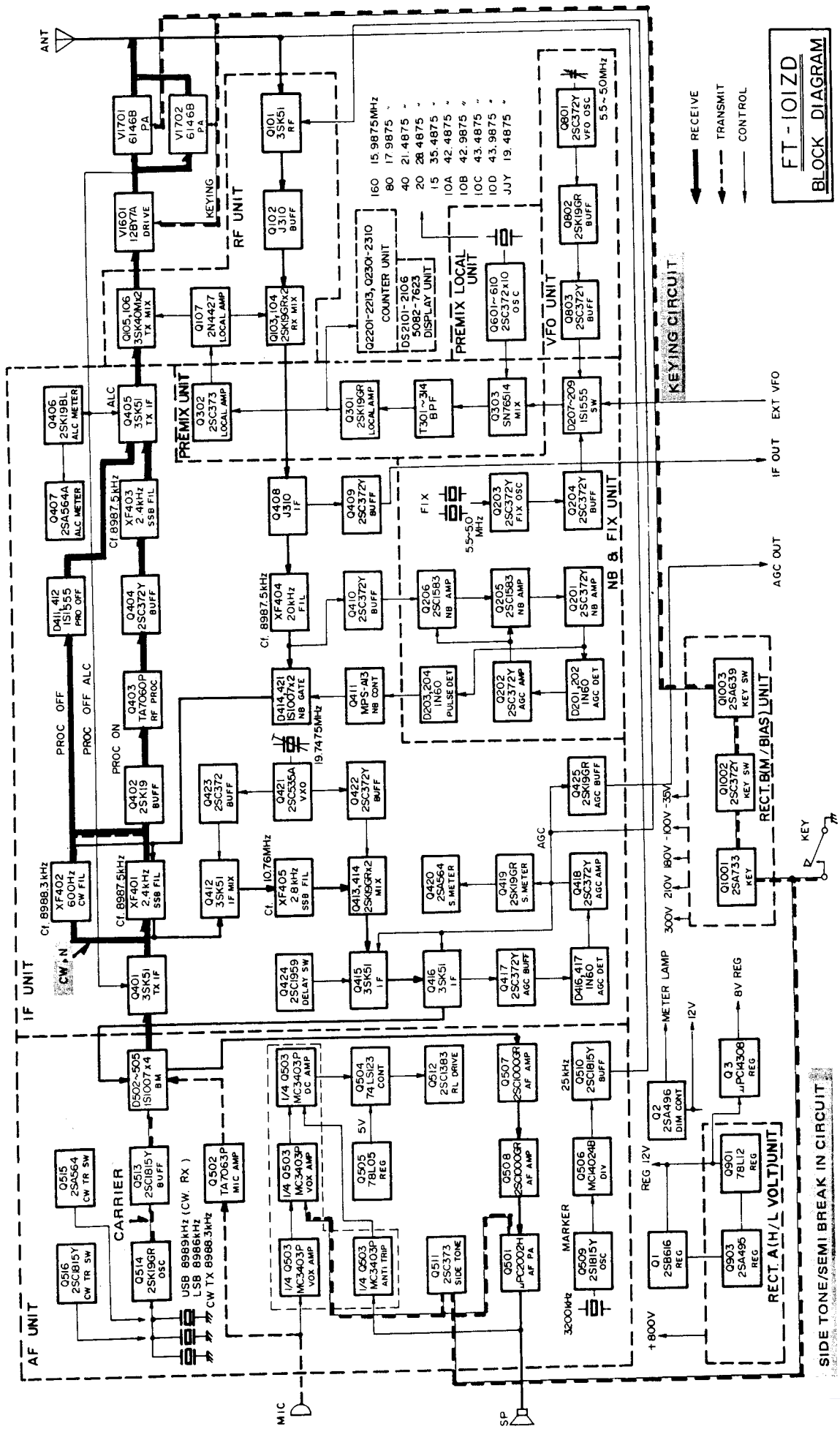
SSB/CW MODE RX

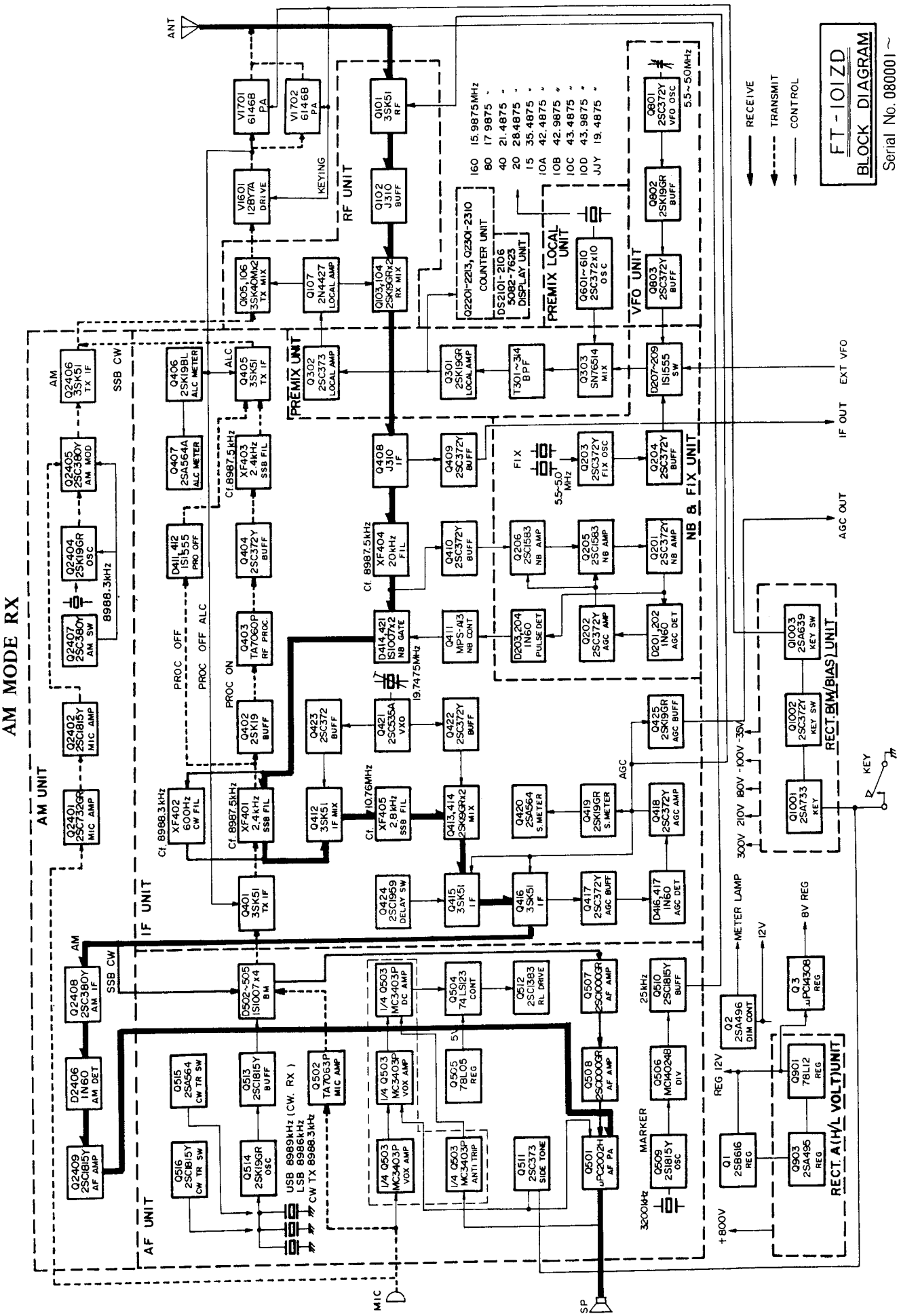


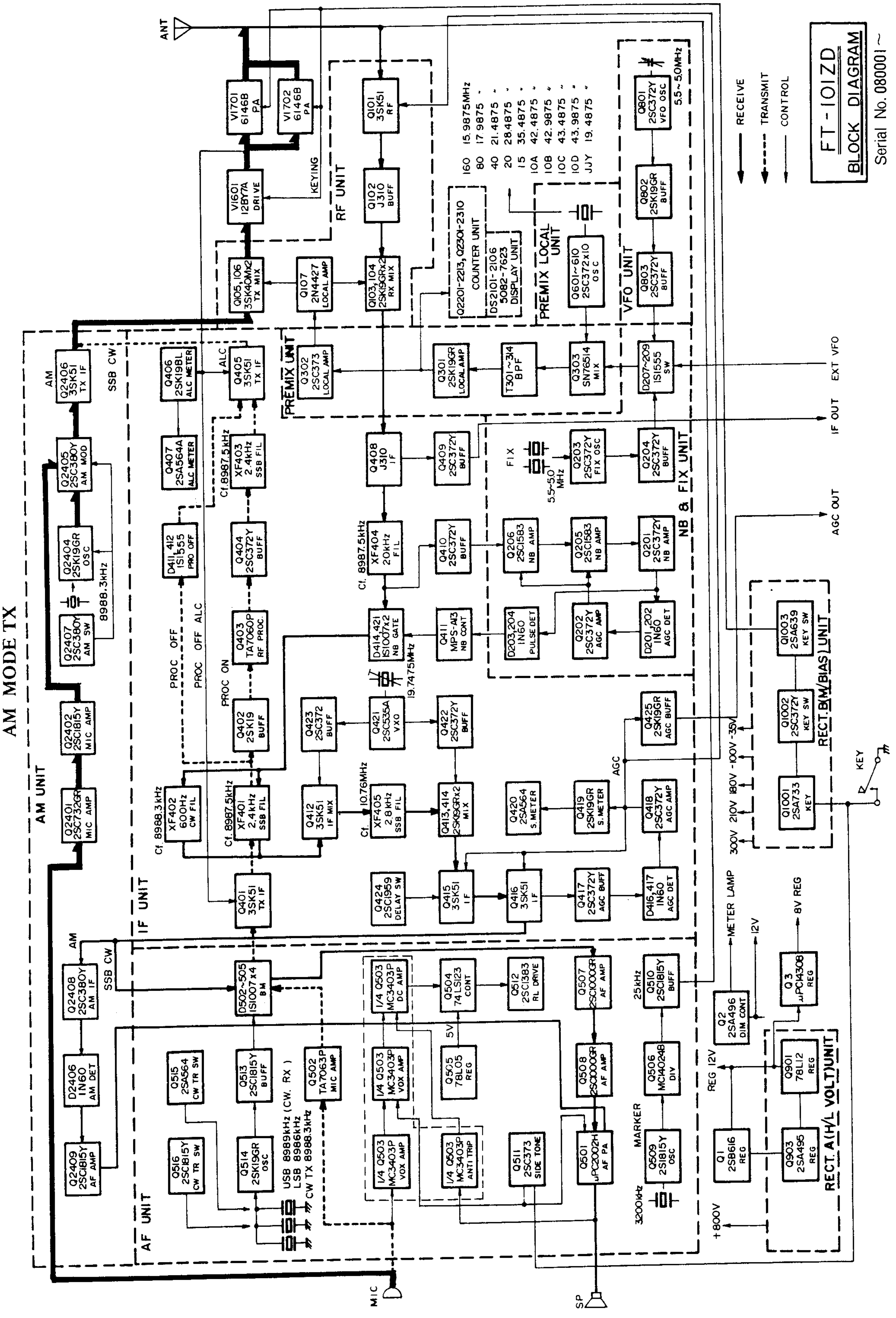
SSB MODE TX


FT-101ZD
BLOCK DIAGRAM
RECEIVE
TRANSMIT
CONTROL
AF UNIT
IF UNIT
RF UNIT
PREMIX UNIT
PREMIX LOCAL UNIT
VFO UNIT
NB & FIX UNIT
RECT.B/M/BIAS UNIT
RECT.A(H/L VOLT)UNIT
ALC CIRCUIT
VOX/ANTI TRIP CIRCUIT
ANT
MIC
SP
KEY
KEYING
METER LAMP
IF OUT
EXT VFO
AGC OUT
PROC OFF
PROC ON
ALC
FIX
MARKER
REG 12V
+800V
300V 210V 180V -100V -35V
USB 8989kHz (CW, RX)
LSB 8986kHz
CW TX 8988.3kHz
160 15.9875MHz
80 17.9875 -
40 21.4875 -
20 28.4875 -
15 35.4875 -
10A 42.4875 -
10B 42.9875 +
10C 43.4875 +
10D 43.9875 +
JJY 19.4875 +
5.5~5.0MHz
8V REG
5V
12V

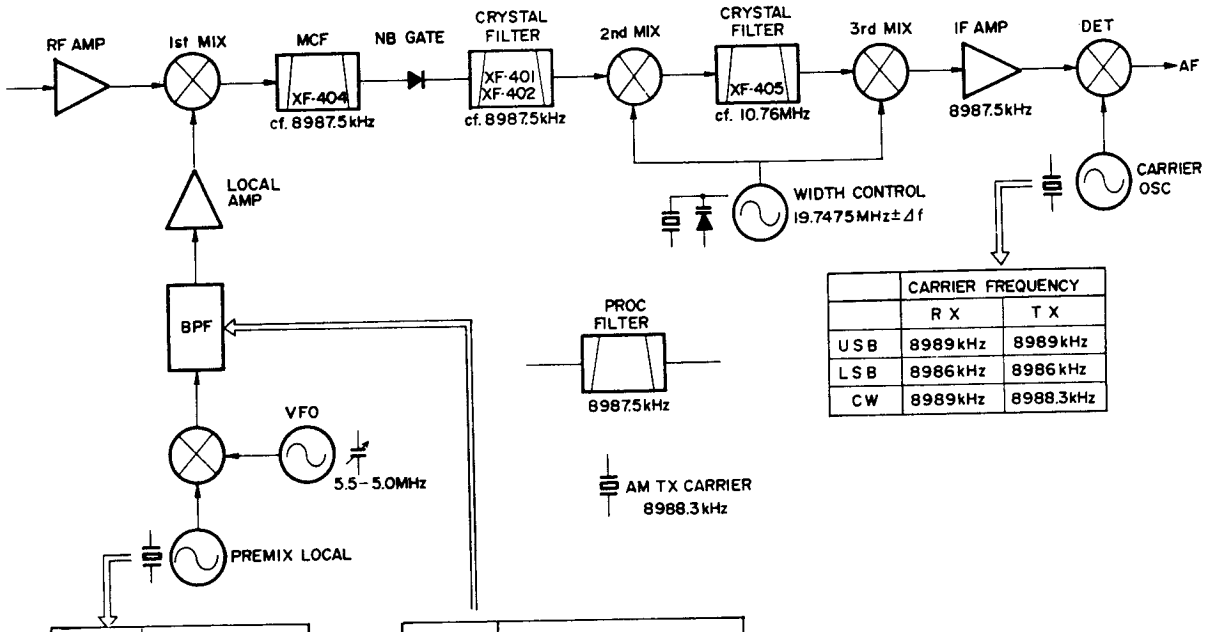
CW MODE TX


FT-101ZD
BLOCK DIAGRAM
RECEIVE
TRANSMIT
CONTROL
KEYING CIRCUIT
AF UNIT
IF UNIT
RF UNIT
PREMIX UNIT
PREMIX LOCAL UNIT
VFO UNIT
NB & FIX UNIT
RECT B/M/BIAS UNIT
RECT A(H/L VOLT)UNIT
SIDE TONE/SEMI BREAK IN CIRCUIT
ANT
MIC
SP
KEY
METER LAMP
EXT VFO
IF OUT
AGC OUT
CARRIER
MARKER
PROC OFF
PROC OFF ALC
PROC ON
ALC
KEYING
FIX
CW TX 8988.3kHz
LSB 8986kHz
USB 8989kHz (CW. RX)
Cf. 8988.3kHz
Cf. 8987.5kHz
Cf. 10.76MHz
19.7475MHz
25kHz
3200kHz
5V
12V
8V REG
REG 12V
+800V
AGC
160 15.9875MHz
80 17.9875 "
40 21.4875 "
20 28.4875 "
15 35.4875 "
10A 42.4875 "
10B 42.9875 "
10C 43.4875 "
10D 43.9875 "
JJY 19.4875 "
5.5~50MHz
5.5~50 MHz
300V 210V 180V -100V -35V
V1701 6146B PA
V1702 6146B PA
V1601 12BY7A DRIVE
Q101 3SK51 RF
Q102 J310 BUFF
Q105,106 3SK40M×2 TX MIX
Q107 2N4427 LOCAL AMP
Q103,104 2SK19GR×2 RX MIX
Q2201~2213, Q2301~2310 COUNTER UNIT
DS2101~2106 5082-7623 DISPLAY UNIT
Q601~610 2SC372×10 OSC
Q801 2SC372Y VFO OSC
Q802 2SK19GR BUFF
Q803 2SC372Y BUFF
D207~209 1S1555 SW
Q406 2SK19BL ALC METER
Q407 2SA564A ALC METER
Q405 3SK51 TX IF
Q302 2SC373 LOCAL AMP
Q301 2SK19GR LOCAL AMP
T301~314 BPF
Q303 SN76514 MIX
Q408 J310 IF
Q409 2SC372Y BUFF
Q203 2SC372Y FIX OSC
Q204 2SC372Y BUFF
D411,412 1S1555 PRO OFF
Q404 2SC372Y BUFF
XF403 2.4kHz SSB FIL
XF404 20kHz FIL
Q410 2SC372Y BUFF
Q206 2SC1583 NB AMP
Q205 2SC1583 NB AMP
Q201 2SC372Y NB AMP
Q403 TA7060P RF PROC
D414,421 1S1007×2 NB GATE
Q411 MPS-A13 NB CONT
D203,204 1N60 PULSE DET
Q202 2SC372Y AGC AMP
D201,202 1N60 AGC DET
Q402 2SK19 BUFF
Q423 2SC372 BUFF
Q421 2SC535A VXO
Q422 2SC372Y BUFF
Q425 2SK19GR AGC BUFF
XF402 600Hz CW FIL
XF401 2.4kHz SSB FIL
Q412 3SK51 IF MIX
XF405 2.8kHz SSB FIL
Q413,414 2SK19GR×2 MIX
Q420 2SA564 S METER
Q419 2SK19GR S METER
Q418 2SC372Y AGC AMP
Q1003 2SA639 KEY SW
Q1002 2SC372Y KEY SW
Q1001 2SA733 KEY
Q424 2SC1959 DELAY SW
Q415 3SK51 IF
Q416 3SK51 IF
Q417 2SC372Y AGC BUFF
D416,417 1N60 AGC DET
Q401 3SK51 TX IF
D502~505 1S1007×4 BM
Q515 2SA564 CW TR SW
Q513 2SC1815Y BUFF
Q516 2SC1815Y CW TR SW
Q514 2SK19GR OSC
Q502 TA7063P MIC AMP
1/4 Q503 MC3403P VOX AMP
1/4 Q503 MC3403P DC AMP
1/4 Q503 MC3403P ANTI TRIP
Q504 74LS123 CONT
Q505 78L05 REG
Q512 2SC1383 RL DRIVE
Q511 2SC373 SIDE TONE
Q507 2SC1000GR AF AMP
Q508 2SC1000GR AF AMP
Q501 μPC2002H AF PA
Q510 2SC1815Y BUFF
Q506 MC4024B DIV
Q509 2SC1815Y OSC
Q2 2SA496 DIM CONT
Q3 μPC1430B REG
Q1 2SB616 REG
Q901 78L12 REG
Q903 2SA495 REG


AM MODE RX
FT-101ZD
BLOCK DIAGRAM
Serial No. 080001~
RECEIVE
TRANSMIT
CONTROL
AM UNIT
IF UNIT
AF UNIT
RF UNIT
PREMIX UNIT
VFO UNIT
PREMIX LOCAL UNIT
NB & FIX UNIT
RECT. BM(BIAS) UNIT
RECT. A(H/L VOLT)UNIT
ANT
MIC
SP
KEY
KEYING
METER LAMP
EXT VFO
IF OUT
AGC OUT
PROC OFF
PROC ON
ALC
AM
SSB CW
AGC
MARKER
REG 12V
+800V
8V REG
12V
300V 210V 180V -100V -35V
160 15.9875MHz
80 17.9875 "
40 21.4875 "
20 28.4875 "
15 35.4875 "
10A 42.4875 "
10B 42.9875 "
10C 43.4875 "
10D 43.9875 "
JUY 19.4875 "
5.5~5.0MHz
USB 8989kHz (CW. RX)
LSB 8986kHz
CW TX 8988.3kHz
8988.3kHz
19.7475MHz
10.76MHz
55~50 MHz
32000kHz
Cf. 8987.5kHz
Cf. 8988.3kHz


FT-101ZD
BLOCK DIAGRAM
Serial No. 080001~
AM MODE TX
RECEIVE
TRANSMIT
CONTROL
ANT
MIC
SP
KEY
AM UNIT
IF UNIT
AF UNIT
RF UNIT
PREMIX UNIT
PREMIX LOCAL UNIT
VFO UNIT
NB & FIX UNIT
RECT. B(M/BIAS) UNIT
RECT. A(H/L VOLT) UNIT
COUNTER UNIT
DISPLAY UNIT
V1701 6146B PA
V1702 6146B PA
V1601 12BY7A DRIVE
Q101 3SK51 RF
Q102 J310 BUFF
Q103,104 2SK19GRx2 RX MIX
Q105,106 3SK40Mx2 TX MIX
Q107 2N4427 LOCAL AMP
Q801 2SC372Y VFO OSC
Q802 2SK19GR BUFF
Q803 2SC372Y BUFF
Q601~610 2SC372x10 OSC
160 15.9875MHz
80 17.9875
40 21.4875
20 28.4875
15 35.4875
10A 42.4875
10B 42.9875
10C 43.4875
10D 43.9875
JJY 19.4875
5.5~5.0MHz
IF OUT
EXT VFO
AGC OUT
KEYING
ALC
FIX
5.5~5.0 MHz
19.7475MHz
8988.3kHz
10.76MHz
25kHz
3200kHz
MARKER
METER LAMP
12V
8V REG
REG 12V
+800V
300V 210V 180V -100V -35V
USB 8989kHz (CW. RX)
LSB 8986kHz
CW TX 8988.3kHz
PROC OFF
PROC ON
SSB CW
AM

FREQUENCY RELATIONSHIPS



	CARRIER FREQUENCY	
	R X	T X
USB	8989kHz	8989kHz
LSB	8986kHz	8986kHz
CW	8989kHz	8988.3kHz

BAND	FREQUENCY
160 m	15.9875 MHz
80	17.9875
40	21.4875
30▲	24.4875
20	28.4875
17▲	32.4875
15	35.4875
12▲	38.9875
10A	42.4875
10B	42.9875
10C	43.4875
10D	43.9875

BAND	RANGE
160 m	10.4875–10.9875 MHz
80	12.4875–12.9875
40	15.9875–16.4875
30▲	18.9875–19.4875
20	22.9875–23.4875
17▲	26.9875–27.9875
15	29.9875–30.4875
12▲	33.4875–33.9875
10	36.9875–38.9875

▲ After Prod. #17)

CRYSTAL DATA FT-101ZD

UNIT	FUNCTION	HOLDER	FREQUENCY (kHz)	MODE	LOAD C (pF)	EFFECTIVE RESISTANCE	DRIVE LEVEL
CRYSTAL	160 m	HC-18/U	15987.5	3rd overtone	30	80 (Ω)	2 mW
	80 m	"	17987.5	"	"	60	"
	40 m	"	21487.5	"	"	45	"
	▲ 30 m	"	24487.5	"	"	45	"
	20 m	"	28487.5	"	"	40	"
	▲ 17 m	"	32487.5	"	"	40	"
	15 m	"	35487.5	"	"	40	"
	▲ 12 m	"	38987.5	"	"	40	"
	10 m(A)	"	42487.5	"	"	40	"
	10 m(B)	"	42987.5	"	"	40	"
	10 m(C)	"	43487.5	"	"	40	"
	10 m(D)	"	43987.5	"	"	40	"
	WWV (5 MHz)	"	19487.5	"	"	40	"
CARRIER	LSB	HC-18/U	8986	Fundamental	35	30	10 mW
	USB	"	8989	"	"	35	"
	CW	"	8988.3	"	"	35	"
	AM	"	8988.3	"	"	35	"
IF	Width	"	★cf. 19747.5	Fundamental	"	15	2 mW
COUNTER	Local	"	18000	"	"	15	10 mW
	Local	"	18500	"	"	15	"
	Clock	HC-14/W	655.36	"	23	7K	2 mW
VOX/MARK	Marker	HC-6/W	3200	"	"	50	5 mW

★XCO FREQUENCY : 19743–19753 kHz (▲After Prod. #17)
Decided by circuit

CIRCUIT DESCRIPTION

The block diagram and following circuit description will provide you with a better understanding of the design of this transceiver. The circuit description is tailored to the full-feature FT-101ZD, and the reader should note that the counter unit and digital display are optional features for the FT-101Z.

The FT-101ZD consists of a premix-type single conversion system, using a 9 MHz IF for all modes of operation.

RECEIVER

The RF input signal from the antenna is fed through antenna relay RL_2, lamp fuse FH_2, attenuator switch S_{2004} (located on the LEVER SW unit, PB-1975), 9 MHz trap L_{2101} and C_{1207} (located on the TRIMMER A UNIT), and input transformer T_1 to pin 3 of the RF UNIT.

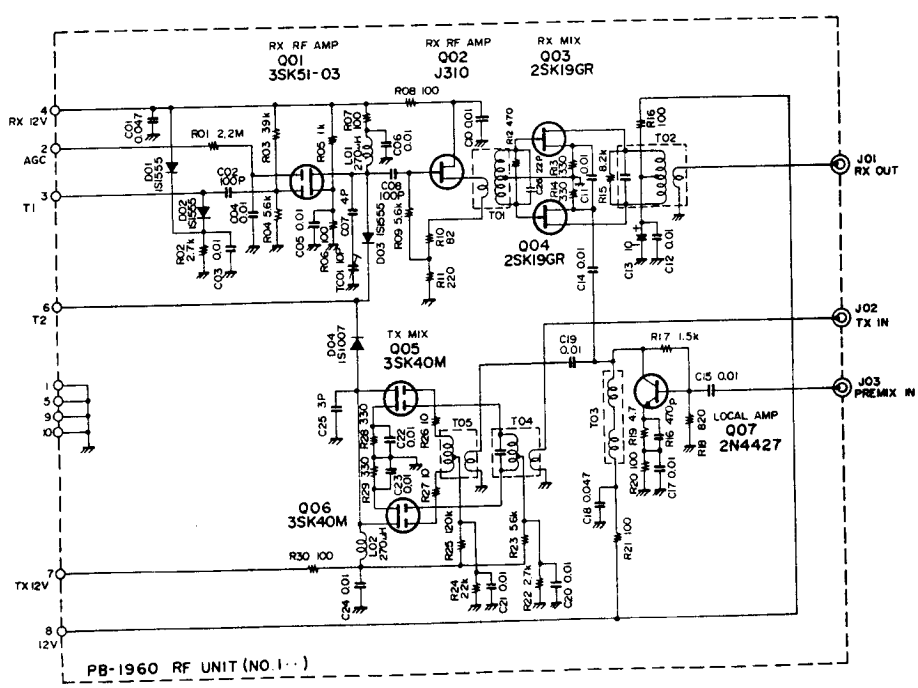
RF UNIT (PB-1960) Early model (before Prod. #17)

The incoming signal is amplified by the RF amplifier, Q_{101} **(3SK51-03)**, a dual-gate MOSFET used in a grounded source configuration. This transistor has superior immunity from intermodulation distortion. The amplified signal is then fed through a source follower, Q_{102} **(J310)**, to the balanced mixer consisting of Q_{103} and Q_{104} **(2SK19GR)**, where the input signal is heterodyned with the local oscillator signal. The local signal is delivered from buffer amplifier Q_{107} **(2N4427)**, and the resulting IF signal of 8.9875 MHz is fed through T_{102} to J_{101}.

The input and output of the RF amplifier are permeability-tuned circuits, resulting in high sensitivity and excellent rejection of unwanted out-of-band signals.

IF UNIT (PB-1963)

The IF signal at pin 9 of J_{403} is amplified by Q_{408} **(J310)** and passed through a monolithic filter, XF_{404}, which has a ±10 kHz bandwidth. The monolythic filter provides early protection from IMD, while providing a wide-bandwidth point for noise blanking. The IF signal is then fed to noise blanker gate D_{414}, D_{412} **(1S1007)**, which functions as an ON/OFF switch controlled by noise blanker driver Q_{411}**(MPSA13)**.



The IF signal is then passed through the SSB filter XF_{401} (or optional CW filter XF_{402}). Selection of the filter to be used is made by diodes D_{405} - D_{408} (1S1007), depending on the mode of operation.

The IF signal is then fed to the IF first mixer, Q_{412} (3SK51-03), where the incoming signal is heterodyned with a 19.7475 MHz ±Δf local signal delivered from crystal oscillator Q_{421} (2SC535A) and buffer amplifier Q_{423} (2SC372Y), resulting in a signal of 10.76 MHz ±Δf.

The new 10.76 MHz ±Δf signal is fed through filter XF_{405} to the IF second mixer, Q_{413}/Q_{414} (2SK19GR), where the filtered signal is heterodyned with the 19.7475 MHz ±Δf signal delivered from Q_{422} (2SC372Y), resulting in an 8.9875 MHz IF signal, the same as the original IF.

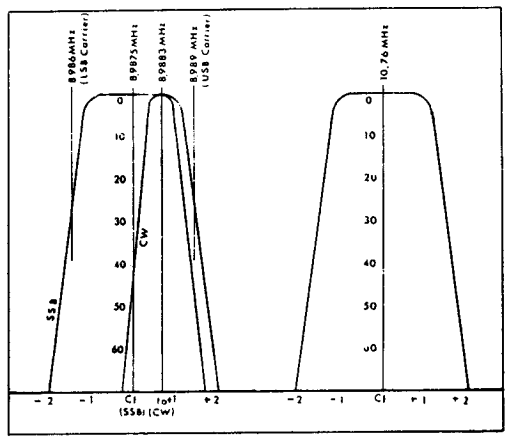
This process varies the IF signal across the passband of the second IF filter. The combination of the two filters, XF_{401} and XF_{405}, provides continuously variable width of the IF passband. The frequency of crystal oscillator Q_{421} is varied by varactor diode D_{418} (1S2209).

The output from the IF second mixer is fed to a two-stage IF amplifier, consisting of Q_{415} and Q_{416} (3SK51-03), and delivered through diode switch D_{401} (1S1555) to the AF UNIT.

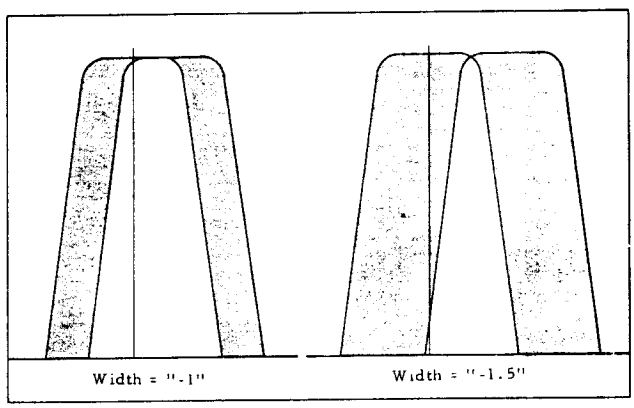
A portion of the output from Q_{416} is rectified by D_{416} and D_{417} (1N60) to produce AGC voltage. Q_{417} (2SC372Y) provides the necessary buffering between the IF and AGC circuits. The AGC voltage is amplified by Q_{418} (2SC372Y), and applied to gate 2 of the RF and IF amplifiers, to control the gain of these stages. The AGC voltage is also amplified by Q_{419} (2SK19GR) for S-meter indication.

For use with the FV-901DM scanning VFO, or other optional equipment, the AGC voltage is fed through buffer Q_{425} (2SK19GR) and fed to the AGC OUT terminal on the EXT VFO jack, located on the rear panel.

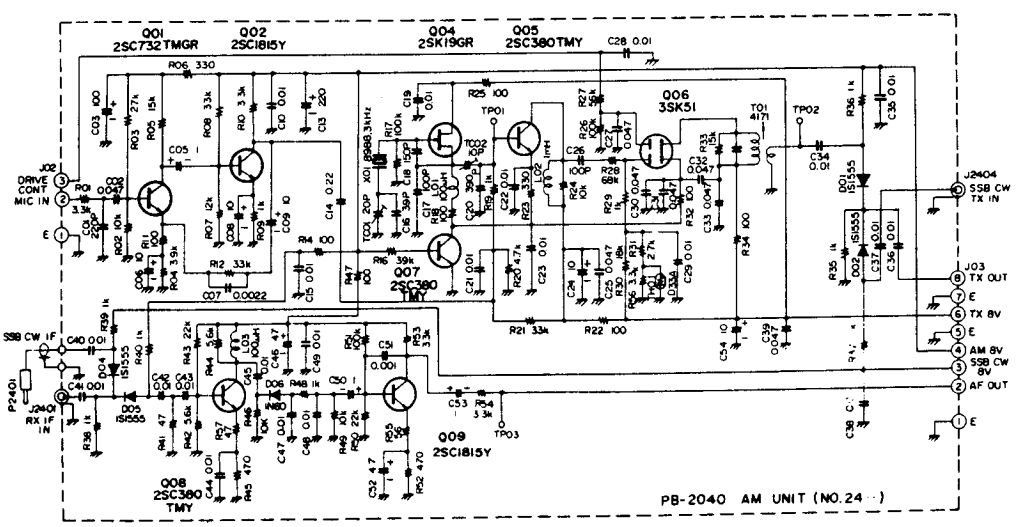
On AM, the output signal from Q_{416} is amplified by Q_{2408} (2SC380Y) and passed to the AM detector, D_{2406} (1N60). The resulting audio signal is amplified by Q_{2409} (2SC1815Y) and delivered to the final audio stage.

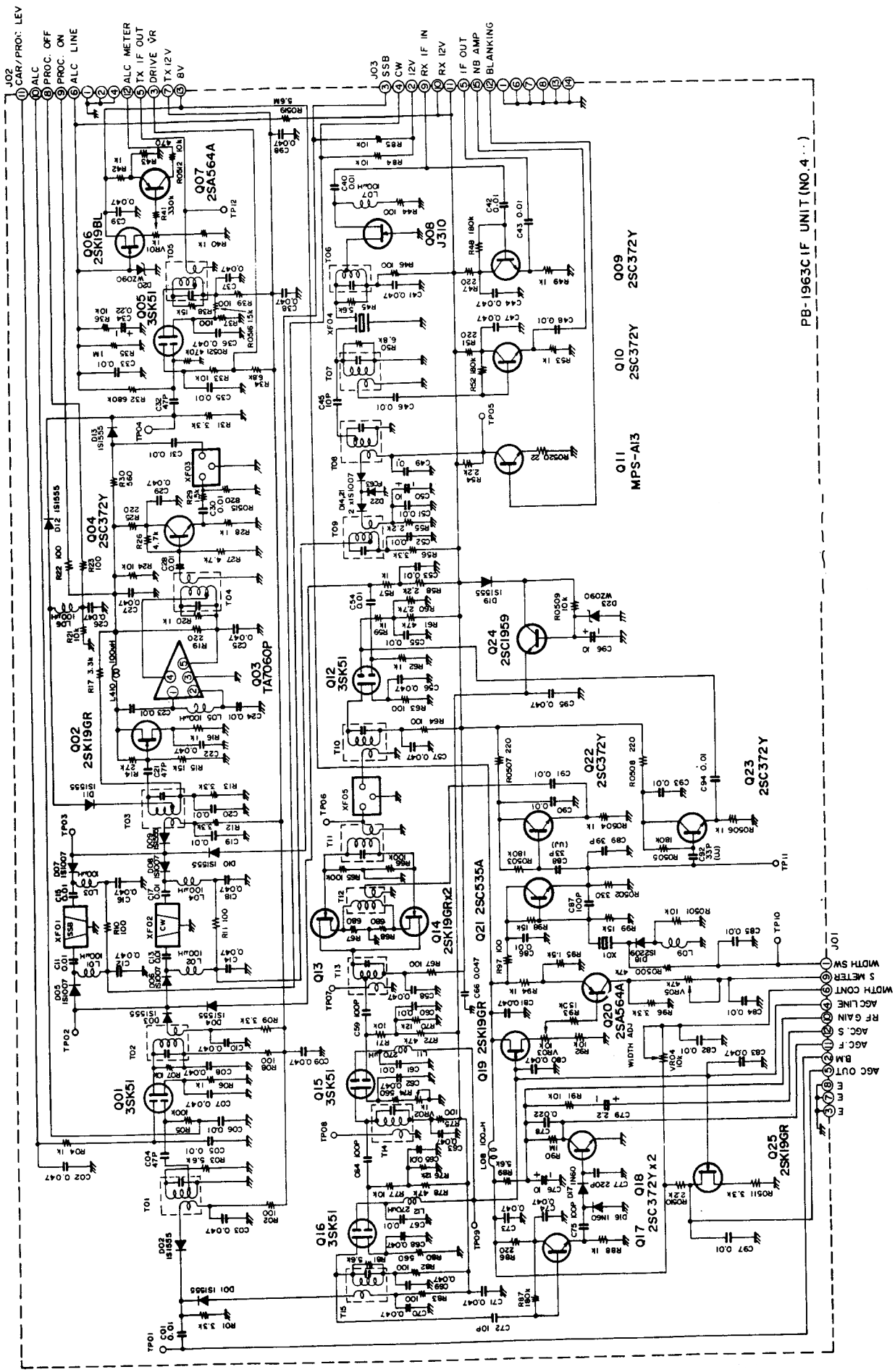


SSB, CW Filters **WIDTH Filter**



Width Control Action




PB-1963C IF UNIT (NO.4 · ·)
J02
CAR/PROC LEV
ALC
PROC. OFF
PROC. ON
ALC LINE
ALC METER
TX IF OUT
DRIVE VR
TX 12V
8V
J03
SSB
CW
12V
RX IF IN
RX 12V
IF OUT
NB AMP
BLANKING
J01
WIDTH SW
S METER
WIDTH CONT
AGC LINE
RF GAIN
AGC: S
AGC: F
B.M
AGC OUT
Q01 3SK51
Q02 2SK19GR
Q03 TA7060P
Q04 2SC372Y
Q05 3SK51
Q06 2SK19BL
Q07 2SA564A
Q08 J310
Q09 2SC372Y
Q10 2SC372Y
Q11 MPS-A13
Q12 3SK51
Q13
Q14 2SK19GRx2
Q15 3SK51
Q16 3SK51
Q17 2SC372Yx2
Q18
Q19 2SK19GR
Q20 2SA564A
Q21 2SC535A
Q22 2SC372Y
Q23 2SC372Y
Q24 2SC1959
Q25 2SK19GR

NB-FIX UNIT (PB-1961)

A portion of the 8.9 MHz IF signal is fed through buffer Q_{410} (2SC372Y) and amplified by Q_{206} and Q_{205} (2SC1583).

When a carrier of noise-free modulated signal is received, the IF signal is rectified by D_{201} and D_{202} (1N60), producing a DC voltage. This DC voltage is amplified by Q_{202} (2SC372Y), which charges C_{214}, for AGC purposes. The AGC voltage is used to control the gain of Q_{206} and Q_{205}.

When impulse-type noise is received, D_{203} and D_{204} (1N60) rectify the IF signal, producing a DC voltage which controls the NB switch Q_{411} (MPS-A13).

Noise pulses have a very short duration, but high amplitude. Because of the very slow time constant of the C_{214}/R_{212} discharge path, AGC voltage is not induced by these short-duration pulses. Therefore, Q_{206} and Q_{205} operate at full gain, providing maximum voltage to the base of Q_{411}. When a pulse is received, Q_{411} biases D_{414} to block the signal path momentarily. When a desired signal and a noise pulse are received simultaneously, the blanking action is not impaired, because the relative amplitude difference between the desired signal and the noise pulse is still high. The front panel noise blanker level control varies the DC voltage applied to the base of Q_{411}.

AF UNIT (PB-1964)

The IF signal from pin 2 is fed through T_{501} to the ring demodulator, consisting of D_{502} - D_{505} (1S1007), where the IF signal is demodulated into audio, using the carrier signal delivered from Q_{513} (2SC1815Y). The carrier signal is generated by oscillator Q_{514} (2SK19GR), and it oscillates at one of the following frequencies:

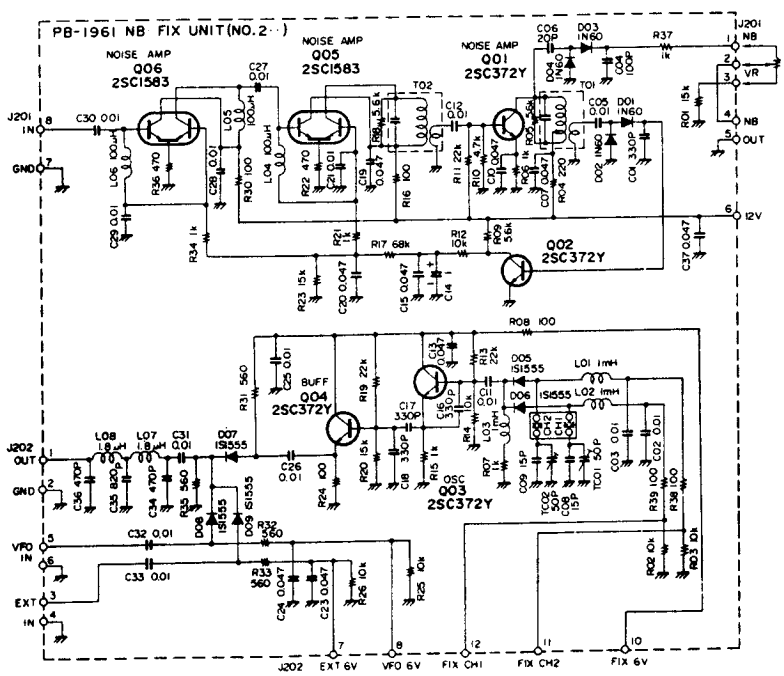
USB, CW·RX	8989 KHz
LSB	8986 KHz
CW·TX	8988.3 KHz

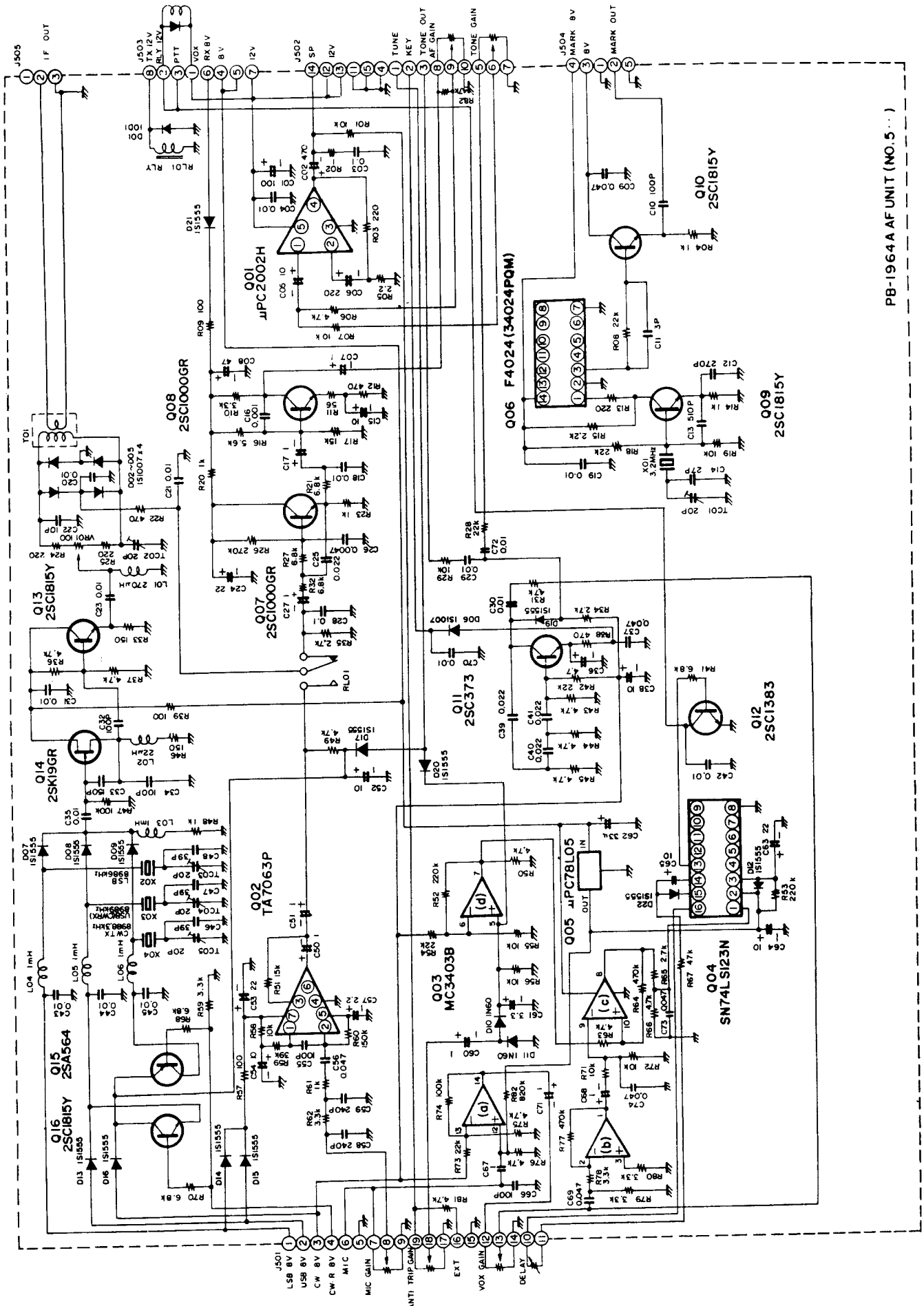
The audio signal is then amplified by audio amplifiers Q_{507}, Q_{508} (2SC1000GR), and Q_{509} (μPC2002), delivering 3 watts of audio output to the speaker.

The audio spectrum is shaped by an active low-pass filter of f_0 = 2.7 kHz, −12 dB/octave.

MARKER GENERATOR

A 25 kHz marker signal is provided, for alignment and testing purposes. Marker generator Q_{509} (2SC1815Y) generates a basic 3200 kHz signal, which is divided into 25 kHz multiples by Q_{506} (MC14024B), a binary counter.




PB-1964A AF UNIT (NO.5 · ·)
Q01 μPC2002H
Q02 TA7063P
Q03 MC3403B
Q04 SN74LS123N
Q05 μPC78L05
Q06 F4024(34024PQM)
Q07 2SC1000GR
Q08 2SC1000GR
Q09 2SC1815Y
Q10 2SC1815Y
Q11 2SC373
Q12 2SC1383
Q13 2SC1815Y
Q14 2SK19GR
Q15 2SA564
Q16 2SC1815Y
J501
J502
J503
J504
J505
LSB 8V
USB 8V
CW 8V
CW R 8V
MIC
MIC GAIN
ANTI TRIP GAIN
EXT
VOX GAIN
DELAY
IF OUT
TX 12V
RLY 12V
PTT
VOX
RX 8V
12V
SP
TUNE
KEY
TONE OUT
AF GAIN
TONE GAIN
MARK 8V
MARK OUT

TRANSMIT CIRCUIT

SSB MODE

The output from microphone jack J_2 is fed through the MIC GAIN control VR_{3a} to pin 8 of the AF UNIT.

AF UNIT (PB-1964)

The speech signal from pin 8 is amplified by microphone amplifier Q_{502} **(TA7063P)** and fed through relay RL_{501} to the ring modulator, D_{502} - D_{505}, where the speech signal modulates the carrier signal delivered from Q_{513}. The resulting double sideband signal is fed to the IF UNIT.

IF UNIT (PB-1963)

The 8.9875 MHz double sideband signal is amplified by Q_{401} **(3SK51-03)** and passed through sideband filter XF_{401} by diode switches D_{403}, D_{409} **(1S1555)**, D_{405}, and D_{407} **(1S1007)**. Here the signal is converted to a single sideband signal by removal of the unwanted sideband.

The signal is then fed to buffer amplifier Q_{402} **(2SK19GR)**. When the RF speech processor is OFF, diode switches D_{411} and D_{412} **(1S1555)** feed the IF signal to IF amplifier Q_{405} **(3SK51-03)**. When the RF speech processor is ON, the SSB signal is amplified by buffer amplifier Q_{402} **(2SK19GR)** and further amplified by limiter Q_{403} **(TA7060P)**, where signals that exceed the preset clipping level are sliced out.

This highly clipped SSB signal is amplified by buffer amplifier Q_{404} **(2SC372Y)** and passed through a selective filter, XF_{403}, which removes RF harmonics that result from signal clipping. The signal is then fed to IF amplifier Q_{405}, and subsequently delivered to the RF UNIT. The front panel COMP LEVEL control, VR_4, controls the voltage at gate 2 of Q_{401}, thus setting the processor level.

The return of the grid circuit of the final amplifier tubes is fed to Q_{406} **(2SK19BL)**, which produces ALC voltage. This voltage is fed to gate 1 of Q_{405}, controlling the gain of this stage. When the RF processor is off, ALC voltage is also fed to gate 1 of Q_{401}. Q_{407} **(2SA564)** amplifies the ALC voltage for indication on the front panel meter.

RF UNIT (PB-1960) Early model (before Prod. #17)

The IF signal is fed through T_{104} to the transmit mixer, consisting of parallel-connected Q_{105} and Q_{106} **(3SK40M)**, where the IF signal at gate 1 is mixed with the local signal fed to gate 2, producing the RF output signal. The RF signal is then fed through diode switch D_{104} **(1S1007)** to the DRIVE UNIT.

DRIVE UNIT (PB-1714), PA UNIT (PB-1715)

The RF signal is amplified by driver V_{1601} **(12BY7A)**, and delivered to PA UNIT final amplifier tubes V_{1701} and V_{1702} **(6146B)**. The output from the final tubes is fed to the antenna jack.

A portion of the RF signal is coupled through C_{14} to the cathode of the 12BY7A driver, for the purpose of improving the linearity of the final amplifier. This technique is known as RF negative feedback.

CW MODE

For CW, the 8.9883 MHz carrier is generated by oscillator Q_{514} at the frequency set by X_{504}. The carrier signal is fed through buffer Q_{513} and fed to the ring modulator. The same carrier frequency is used in the tune mode.

DC voltage is applied through diode switch D_{517} **(1S1555)** and relay RL_{501}, unbalancing the ring modulator for CW operation. The carrier signal is then fed to the IF UNIT. The signal path is identical to that on SSB, up to the DRIVE UNIT.

DRIVE UNIT (PB-1714), PA UNIT (PB-1715)

Keying of the transmitter is accomplished by changing the bias voltage to the driver and final tubes. During "key up," the tubes are cut off by application of −35 volts to V_{1601} and −110 volts to V_{1701} and V_{1702}. These cutoff voltages are

reduced to −0.1 volt and −60 volts, respectively, during "key down" conditions.

The key is connected to the KEY 2 terminal on the RECT B board, PB-1968. When the key is closed, the base of Q_{1001} **(2SA733)** is grounded, causing Q_{1002} **(2SC372Y)** to conduct. The base of Q_{1003} **(2SA639)** is thus set to 0 when the transistor conducts. Under these circumstances, the bias voltage applied to V_{1601}, V_{1701}, and V_{1702} places these tubes in the normal operating condition.

VOX circuit

A portion of the microphone input signal is amplified by three stages of Q_{503} **(MC3403P)**, which drive the VOX control gate, Q_{504} **(SN74LS123N)**. The output from pin 13 of Q_{504} is fed to the base of Q_{512} **(2SC1383)**, switching the VOX relay on and off according to the presence or absence of a speech signal.

A portion of the speaker output is detected by D_{510} and D_{511} **(1N60)**, providing a bucking voltage which is fed to Q_{503}, preventing the speaker output from tripping the VOX.

The VOX delay may be set by adjusting VR_{2b} for the desired delay time.

CW SIDETONE

CW sidetone oscillator Q_{511} **(2SC373)** oscillates at a frequency of approximately 800 Hz. The output from Q_{511} is amplified by the final audio amplifier, Q_{501}, for delivery to the speaker. The output from the sidetone oscillator is also fed to VOX amplifier Q_{503}, providing semi-break-in operation for CW.

AM MODE

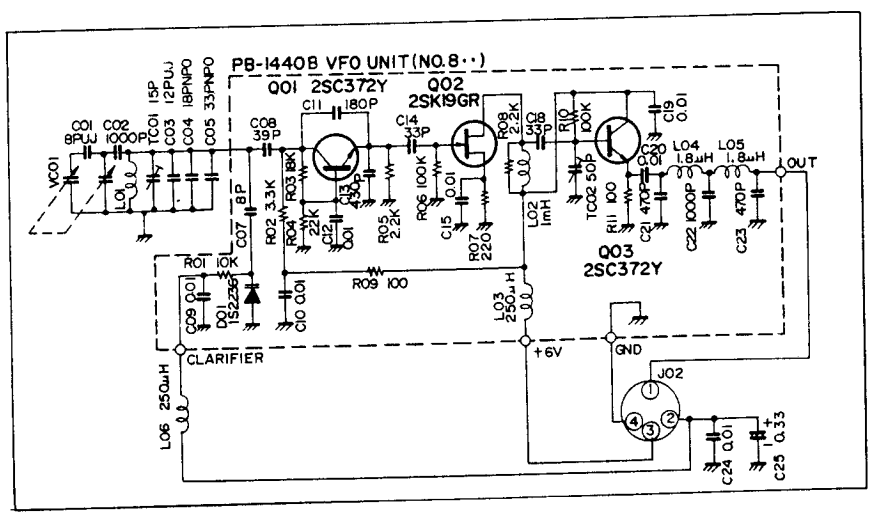
The speech signal from the microphone is amplified by Q_{2401} **(2SC732GR)** and Q_{2402} **(2SC1815Y)** and passed to modulator Q_{2405} **(2SC380Y)**, where the speech signal modulates the AM carrier signal at 8988.3 kHz delivered from Q_{2404} **(2SK19GR)**. The modulated signal is amplified by Q_{2406} **(3SK51)** and delivered to transmit mixer Q_{105}/ Q_{106}.

COMMON CIRCUITS

VFO UNIT (PB-1440B-3420)

A modified Colpitts-type oscillator is used to generate a 5.0 - 5.5 MHz VFO signal, thus producing a 500 kHz tuning range. The oscillator signal generated by Q_{801} **(2SC372Y)** is varied by VC_{801}, which is geared to a precision-built dial tuning mechanism. VC_{801} consists of two sections; the sub-blades compensate for the capacitance variation of the main blades, which may result from extreme temperature change.

Varactor diode D_{801} **(1S2236)** may be varied by tuning L_{806}, providing ±2.5 kHz offset from the dial frequency (clarifier).



The VFO signal is amplified by buffer amplifiers Q_{802} (2SK19GR) and Q_{803} (2SC372Y), and passed to the PREMIX UNIT.

NB & FIX UNIT (PB-1961)

Two crystal-controlled channels are provided for operation with this transceiver. The oscillator signal is generated by Q_{203} (2SC372Y) and amplified by Q_{204} (2SC372Y), and delivered to the PREMIX UNIT. Crystals X_{201} and X_{202} oscillate in the 5.0 - 5.5 MHz range.

PREMIX LOCAL UNIT (PB-1711) (before Prod. #17)

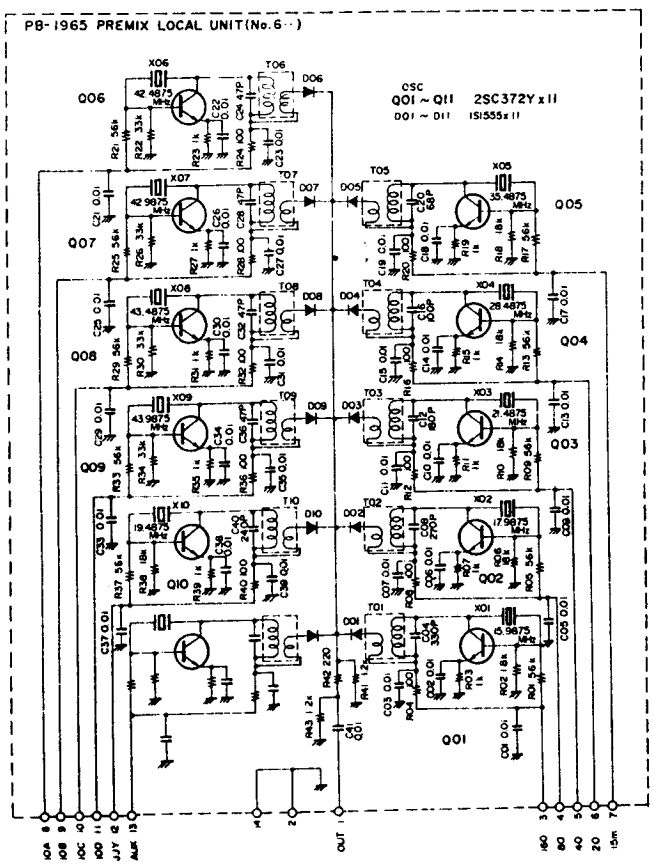
Crystal oscillators Q_{601} - Q_{610} (2SC372Y) generate the premix local signal at the frequencies shown in Table 3. Diode switches D_{601} - D_{610} (1S1555) select the proper local signal for the band in use. The local signal is then delivered to the PREMIX UNIT.

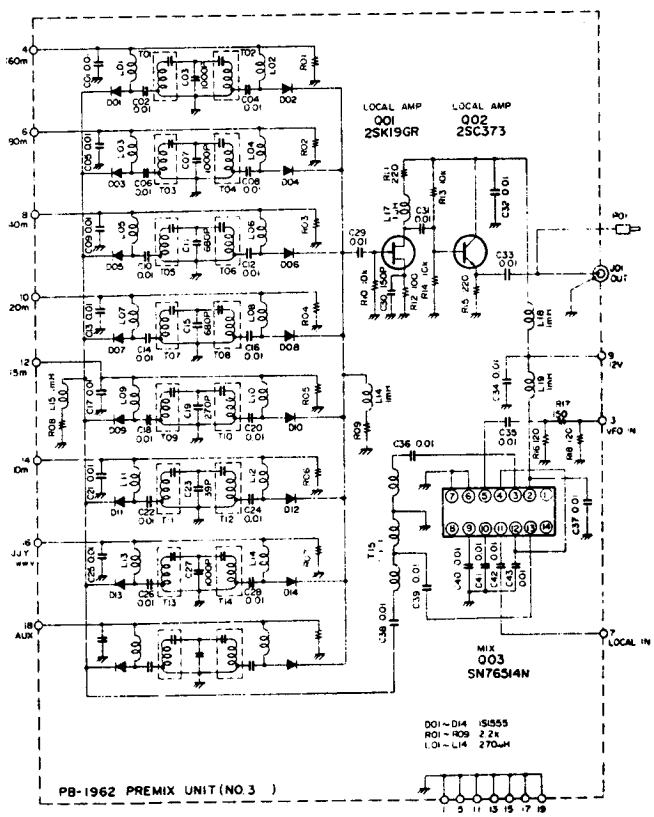
PREMIX UNIT (PB-1962) (before Prod. #17)

The premix signal is produced at Q_{303} (SN76514N), a double-balanced mixer, where the premix local signal from Q_{601} - Q_{610} 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 T_{301} - T_{314}, and amplified by Q_{301} (2SK19GR) and Q_{302} (2SC373). The amplified signal is then fed to the RF UNIT, where the signal is further amplified by Q_{107} for delivery to the transmitter and receiver mixers.

		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
20m	X_{604}	28.4875MHz	22.9875~23.4875MHz
15m	X_{605}	35.4875MHz	29.9875~30.4875MHz
10mA	X_{606}	42.4875MHz	36.9875~37.4875MHz
10mB	X_{607}	42.9875MHz	37.4875~37.9875MHz
10mC	X_{608}	43.4875MHz	37.9875~38.4875MHz
10mD	X_{609}	43.9875MHz	38.4875~38.9875MHz
JJY/ WWV	X_{610}	19.4875MHz	13.9875~14.4875MHz

Table 3





COUNTER UNIT (PB-1978, PB-1979, PB-1980) (before Prod. #16)

The premix local signal from the PREMIX LOCAL circuit is fed to amplifier Q_{2301} (3SK51-03), located on PB-1980. The amplified signal is then fed to waveshaper Q_{2302} (MC10116). Q_{2303} (MPS3640) acts as an interface between Q_{2302} and the TTL circuitry. The signal is then fed to the counter gate, Q_{2304} (SN74S00N).

The clock pulses are generated by Q_{2305} (MSM5564), which produces a 655.36 MHz signal. The signal is divided by a factor of 2^{17}, producing a 5 Hz signal which is fed to the counter gate.

The pulses which pass through the gate are fed to decade counter Q_{2309} (SN74196N), which counts 10 Hz digits. In turn, Q_{2202} - Q_{2207} (SN74LS196N) count 100 Hz, 1 kHz, 10 kHz, 100 kHz, 1 MHz, and 10 MHz digits. The BCD output signal from Q_{2202} - Q_{2207} is fed through drivers Q_{2208} - Q_{2213} (MSM561) to the display digits, DS_{2101} - DS_{2106} (HP 5082-7623).

The system of presetting the counter can best be explained by example. For a frequency of 3.500 MHz LSB, the premix local frequency is 12.486 MHz. The LSB preset code is 91.014.0. 12.486 + 91.0140.0 = 103.500. The "1" digit on the left-hand side is dropped (overflow), and the "0" preceeding the "3" causes a blanking signal to be sent to the 10 MHz digit. The result is a frequency of 3.500 MHz, and this number is displayed.

For USB, the preset number is 91.011.0. For a frequency of 14.000 MHz USB, the manipulation is as follows: 91.011 + 22.989 (Premix freq.) = 114.000. The first digit is the overflow digit, and the remaining digits are displayed. Note that the second digit from the left is not zero, so no blanking signal is sent to the 10 MHz digit.

For a CW or AM frequency of 21.000 MHz, the premix frequency is 29.9883, and the preset frequency is 91.011.7. The manipulation is: 91.011.7 + 29.9883 = 121.0000. The first digit is dropped, and the remaining digits are displayed.

The preset frequencies are programmed by Q_{2307} and Q_{2308} (μPA54H) and diode matrix D_{2306} - D_{2312} (1S1555). Please refer to Table 5 for definition of the premix frequencies for the various bands.

The 5 volt supply is regulated by Q_{2310} (μPC 14305) for the TTL circuitry. The DIM control controls the emitter/collector voltage at Q_{2201} (2SA496Y), to control the brightness of the digital display and lamps.

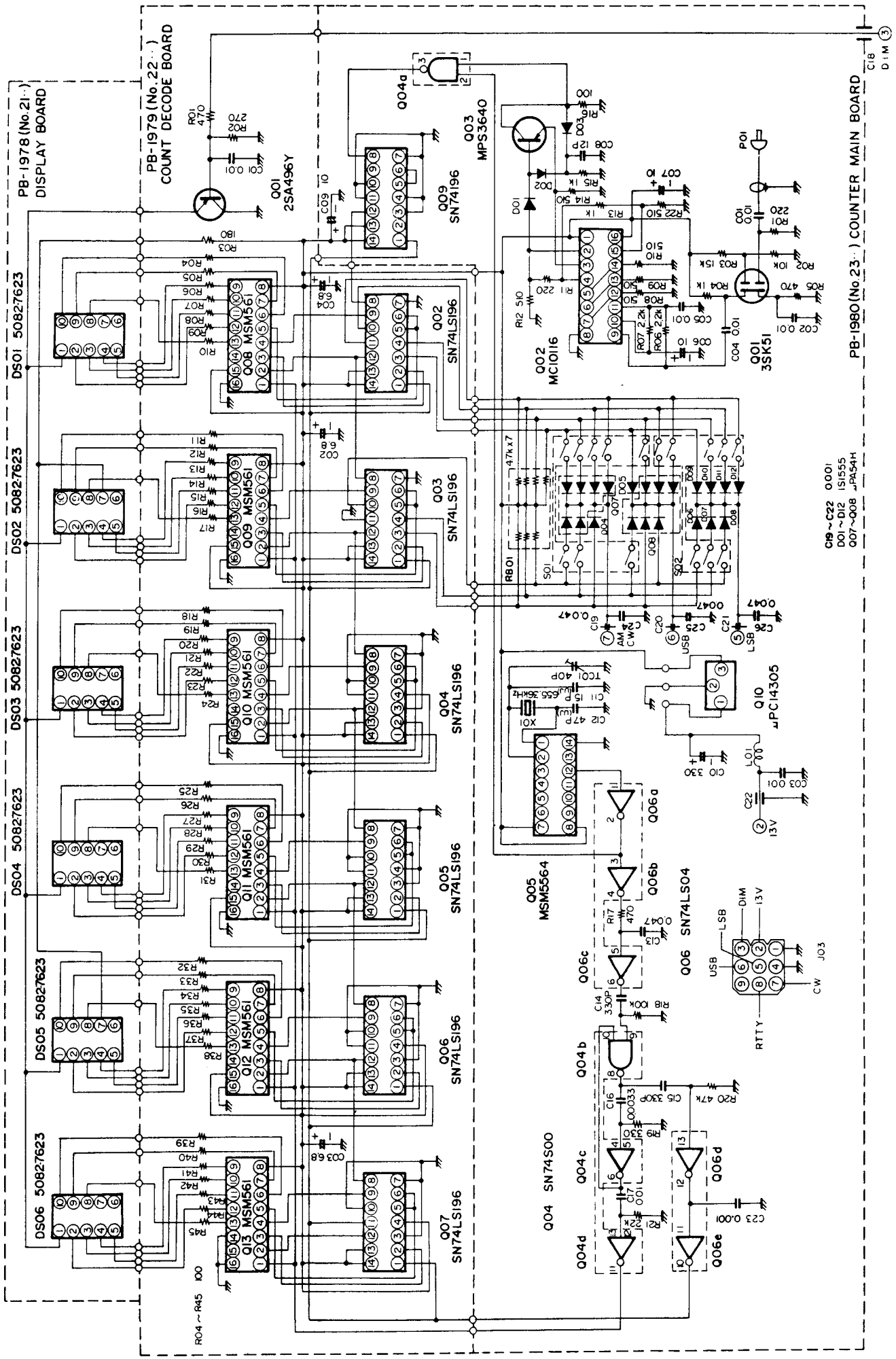
	10MHz	1MHz	100kHz	10kHz	1kHz	100Hz
	(Q_{2207})	(Q_{2206})	(Q_{2205})	(Q_{2204})	(Q_{2203})	(Q_{2202})
LSB	9	1	0	1	4	0
USB	9	1	0	1	1	0
CW AM	9	1	0	1	1	7

Preset Number

Table 4

	Nominal Premix Local Frequency	LSB	USB	CW / AM
160m	10.4875 – 10.9875(MHz)	10.486 – 10.986(MHz)	10.489 – 10.989(MHz)	10.4883 – 10.9883(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
20m	22.9875 – 23.4875	22.986 – 23.486	22.989 – 23.489	22.9883 – 23.4883
15m	29.9875 – 30.4875	29.986 – 30.486	29.989 – 30.489	29.9883 – 30.4883
10mA	36.9875 – 37.4875	36.986 – 37.486	36.989 – 37.489	36.9883 – 37.4883
10mB	37.4875 – 37.9875	37.486 – 37.986	37.489 – 37.989	37.4883 – 37.9883
10mC	37.9875 – 38.4875	37.986 – 38.486	37.989 – 38.489	37.9883 – 38.4883
10mD	38.4875 – 38.9875	38.486 – 38.986	38.489 – 38.989	38.4883 – 38.9883

Table 5


PB-1978 (No.21··)
DISPLAY BOARD
PB-1979 (No.22··)
COUNT DECODE BOARD
PB-1980 (No.23··) COUNTER MAIN BOARD
DS01 50827623
DS02 50827623
DS03 50827623
DS04 50827623
DS05 50827623
DS06 50827623
Q01 2SA496Y
Q02 MC10116
Q01 3SK51
Q03 MPS3640
Q09 SN74196
Q02 SN74LS196
Q03 SN74LS196
Q04 SN74LS196
Q05 SN74LS196
Q06 SN74LS196
Q07 SN74LS196
Q08 MSM561
Q09 MSM561
Q10 MSM561
Q11 MSM561
Q12 MSM561
Q13 MSM561
Q04 SN74S00
Q05 MSM5564
Q06 SN74LS04
Q10 μPC14305
RB01 47kx7
X01 655.36kHz
C19~C22 0.001
D01~D12 1SI555
Q07~Q08 μPA54H
AM CW
USB
LSB
RTTY
CW
DIM
13V

POWER SUPPLY

The power supply is designed to operate from 100/110/117/200/220/234 volts AC. A DC-DC converter is an available option, providing operation from 13.5 volts DC. Insertion of the appropriate power plug into the rear panel receptacle makes the necessary connections for AC or DC operation.

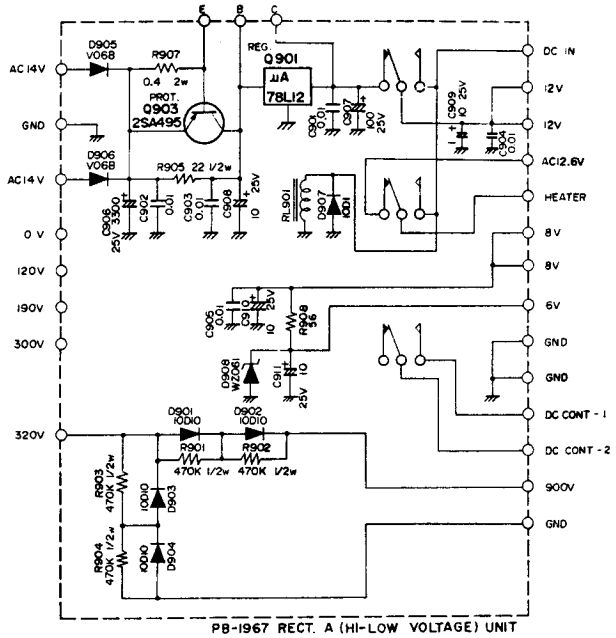
When the transceiver is operated from a DC 13.5 volt power source, using the optional DC-DC converter, transistors Q_{3201} and Q_{3202} **(T20A6)** function as a low frequency oscillator, providing AC voltage at approximately 80 Hz to the power transformer. All of the tube heaters receive their power through the HEATER switch on the front panel. When the HEATER switch is OFF, voltage is still supplied to the receiver section, thus allowing continuous reception with reduced power consumption. The heaters of the two 6146B are connected in series to operate at 12 volts DC.

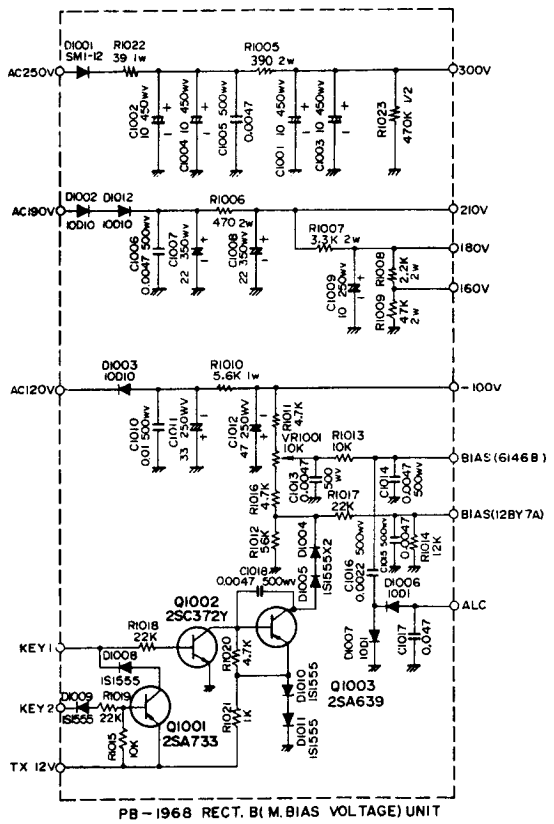
The 14 volt AC power delivered from the secondary winding of the power transformer is rectified by D_{905} and D_{906} **(V06B)**. Voltage regulators Q_1 **(2SB616)**, Q_{901} **(78L12)**, and Q_{903} **(2SA495)** stabilize the DC supply at 12 volts. The supply voltage is further stabilized at 8 volts by Q_3 **(μPC14308)** for delivery to the counter, AF, and other units. The 6 volt supply for the VFO is provided through zener diode D_{908} **(WZ061)**, while the 5 volt supply for the TTL integrated circuits is provided by Q_{505} **(78L05)**.

The power amplifier plate voltage of +800 volts is supplied from the bridge-controlled doubler, located on the RECT. A UNIT, and consisting of D_{901} - D_{904} **(10D10)**.

AC 190 volts is rectified by D_{1002} **(10D10)**, producing 210 volts for the screen grid supply of the power amplifier tubes. The screen grid voltage for the driver tube is obtained by rectifying 250 volts AC at D_{1001} **(10D10)**, producing 300 volts. This voltage is dropped to 180 volts by a resistor for delivery to the driver tube screen grid.

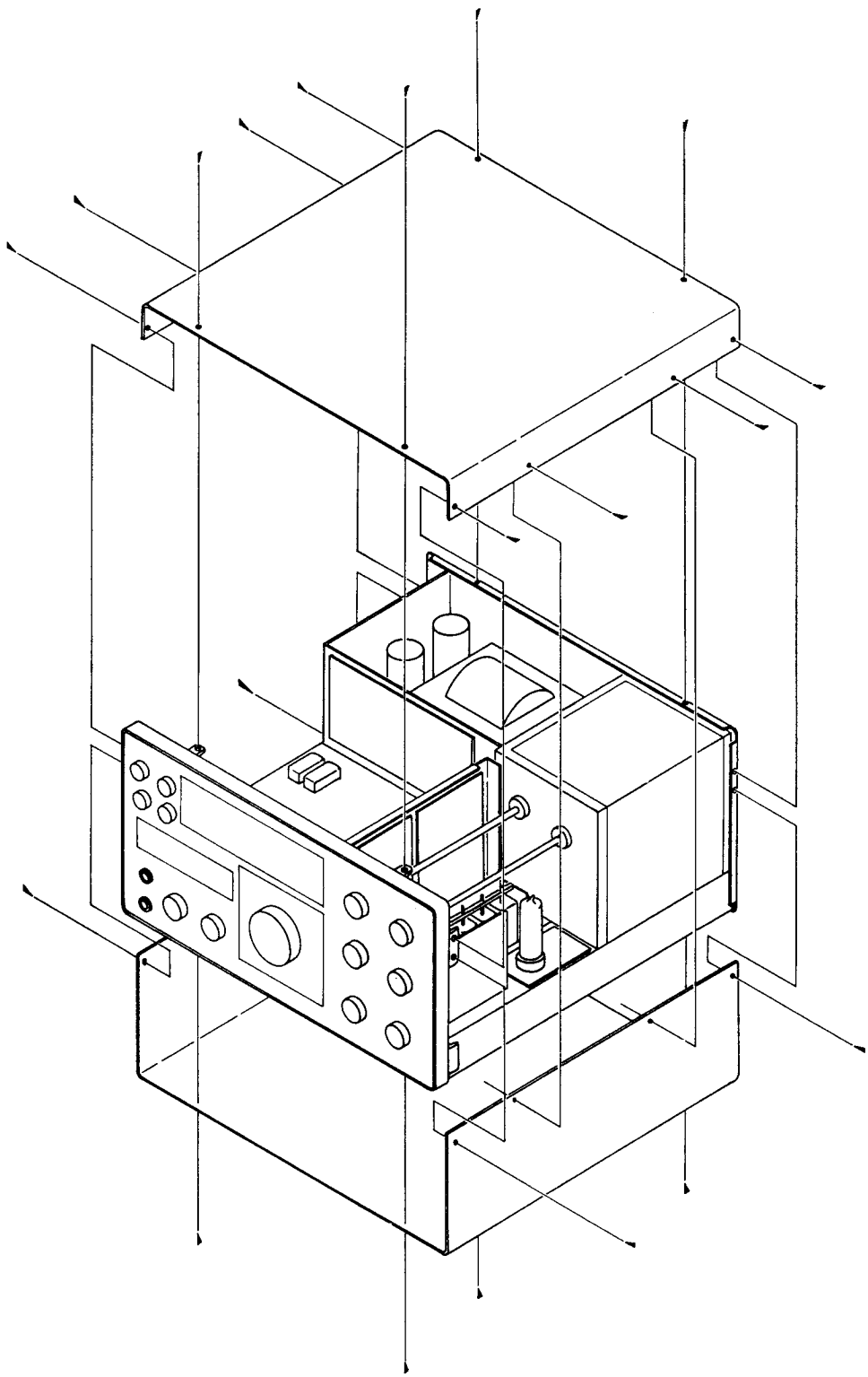
The 120 volt AC power from the transformer secondary winding is rectified by D_{1003} **(10D10)** in order to obtain −140 volts for the driver and final amplifier tube grid bias.



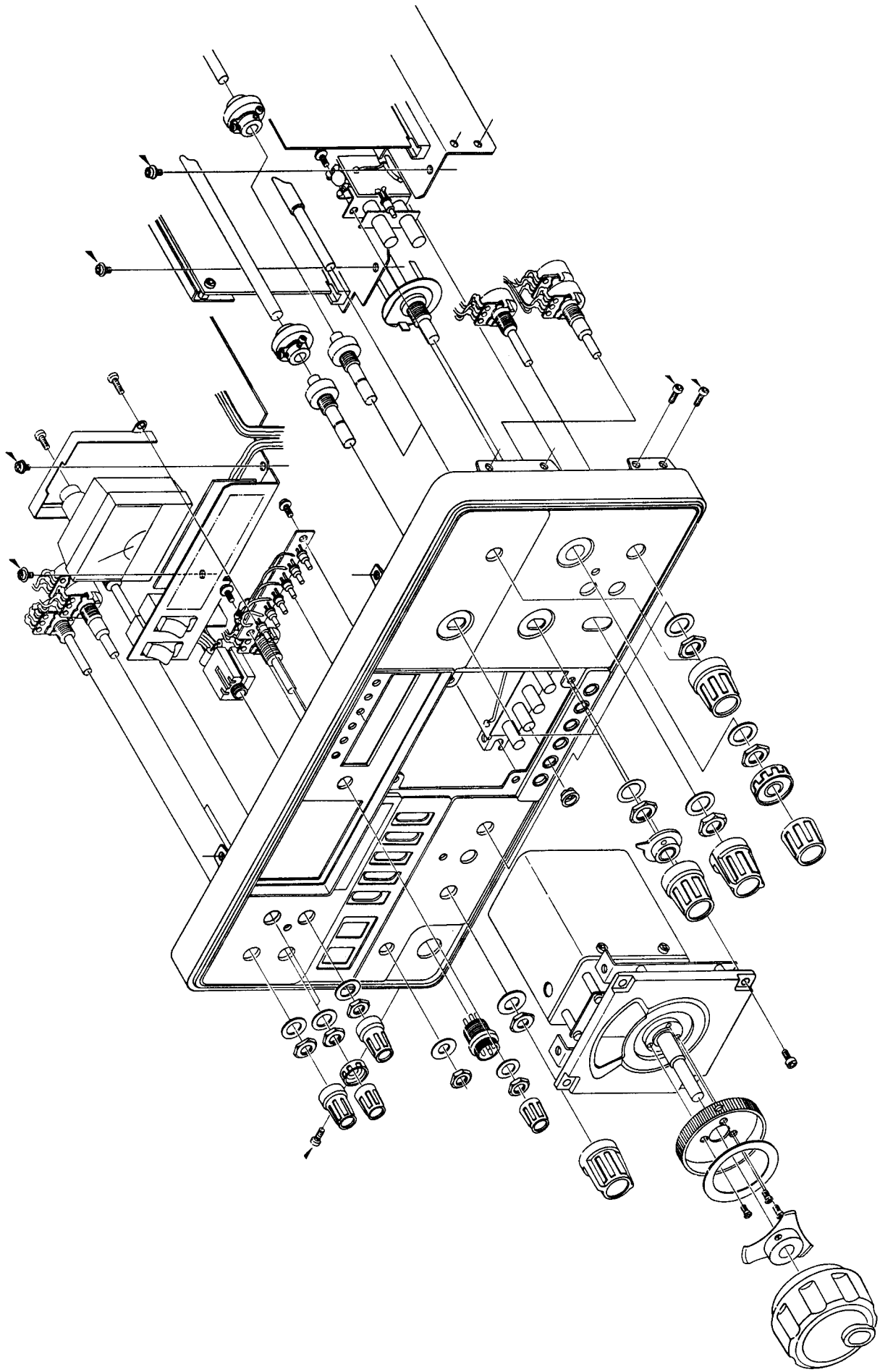


SECTION 3 – SERVICING

OUTER COVER REMOVAL

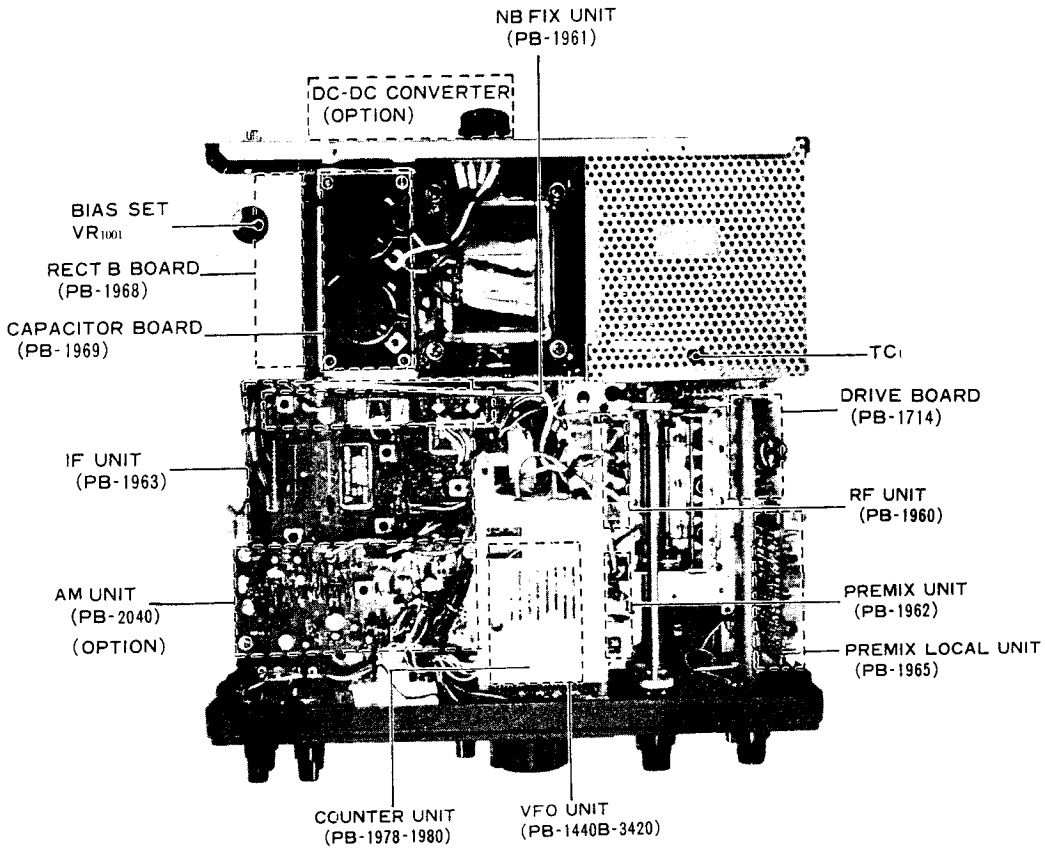


FRONT PANEL REMOVAL

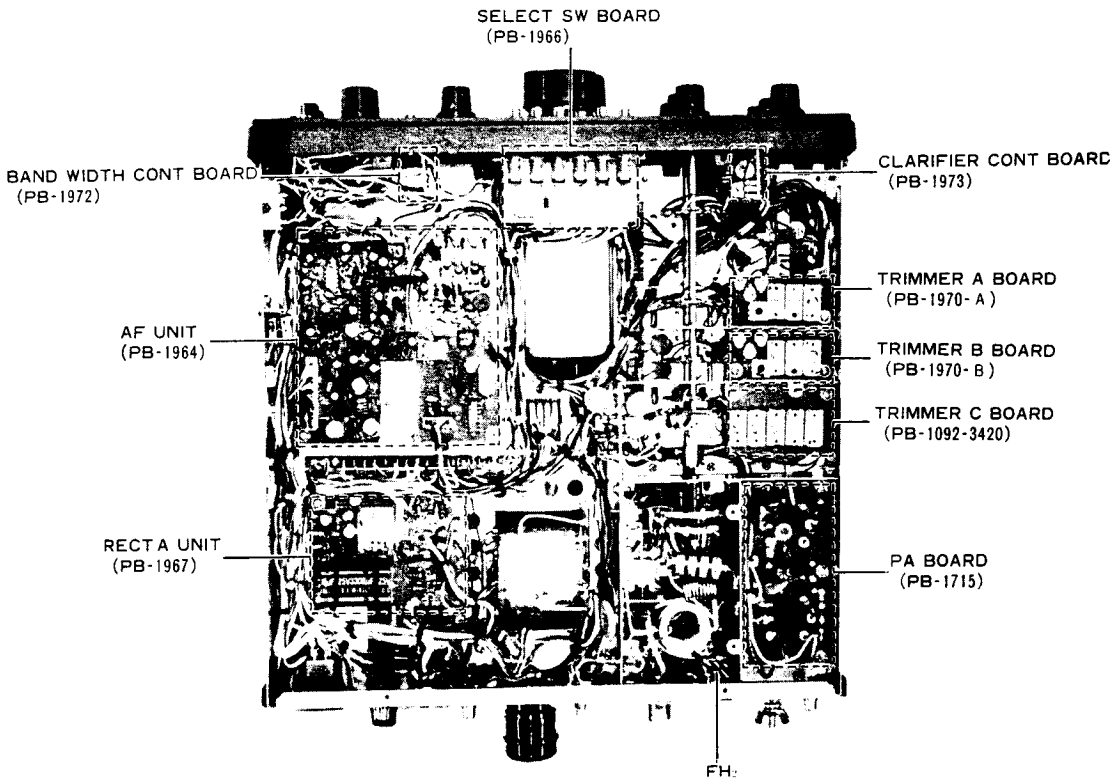


BOARD LAYOUT

Early model (before Prod. #15)

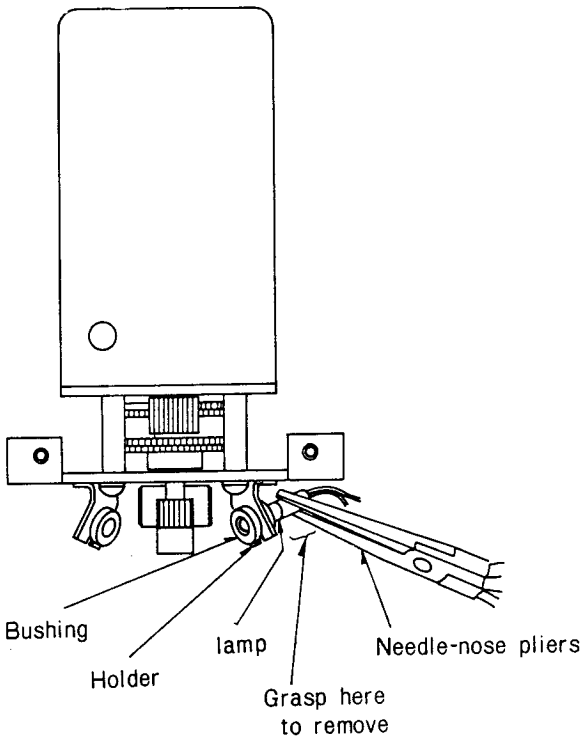


TOP VIEW



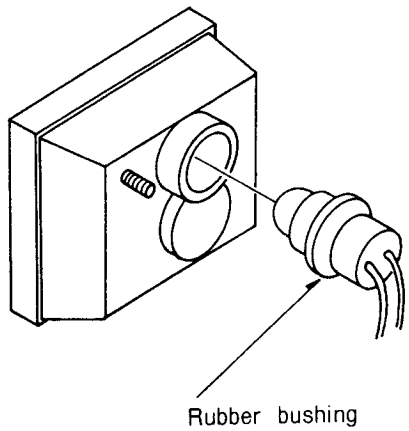
BOTTOM VIEW

PILOT LIGHT REPLACEMENT



The VFO pilot lamps are easily removed, but a little caution is called for. Carefully grasp the rear portion of the shaft with needle nose pliers and ease the lamp out of its mounting holder.

The pilot lamp for the front panel meter may be removed with your fingers.



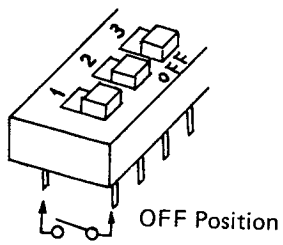
COUNTER PRESET SWITCH REPLACEMENT

Early model (before Prod. #15)

Two types of counter presetting switches are used in the FT-101ZD, and you should take care to install new switches correctly.

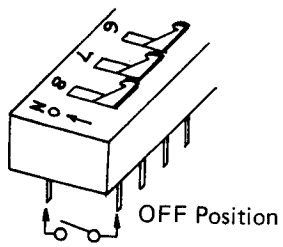
The two switches are the DSS208 type (Yaesu part #N7090016) and the A10040-008 type (Yaesu part #66000005). Referring to the drawing, note that when the switch modules are installed so that the numbering is on the same physical side of the switch lever (although reversed in order and upside down), the lever ON/OFF direction will be the same.

Or if you install the switch so that the numbering is in the same direction as the other switch (1-2-3-4-5-6-7-8), the physical direction of the lever action will be reversed.



DSS208

P.N. (N7090016)



A10040-008

P.N. (66000005)

CW FILTER INSTALLATION(OPTION)

(1) Remove the top cover of the transceiver case, as shown in Fig. 1.

(2) Refer to Fig. 2, and locate the NB-FIX circuit board. Remove its mounting screws, because this board is obstructing the removal of the IF unit.

(3) Remove the 12-pin, 13-pin, and 15-pin plugs from their sockets on the IF unit. Remove the IF unit mounting screws, and remove the IF unit from the transceiver case.

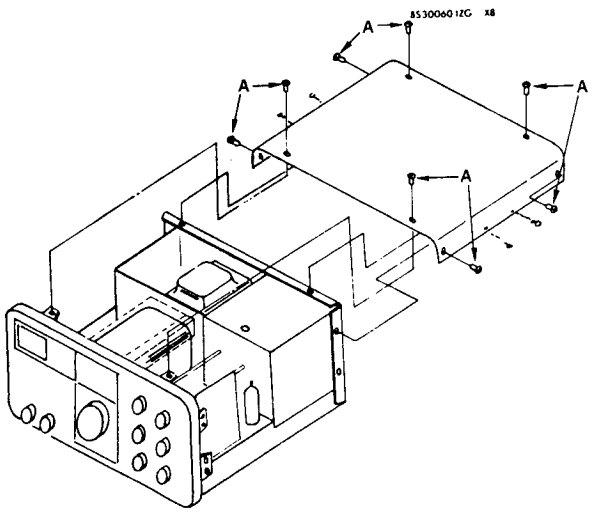


Figure 1

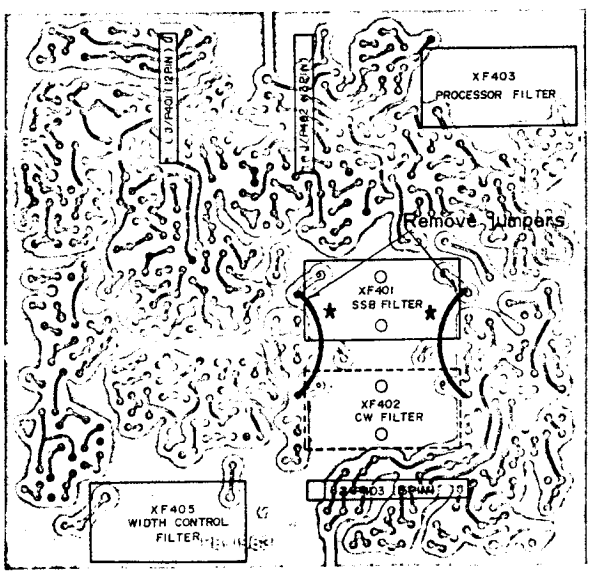


Figure 3

(4) Install the optional CW filter as shown in the foil side view of the IF unit (Fig. 3). Make the fastening nuts snug, and solder the pins of the filter to the circuit board, and remove the 2 jumper wires shown in Figure 3.

(5) Re-install the IF unit, being careful to connect the 12-pin, 13-pin, and 15-pin plugs in the correct sockets. Refer to Fig. 3 to be sure. Re-install the NB-FIX unit, and replace the top cover of the transceiver.

(6) When the optional CW filter is installed, the CW-N position of the mode switch will activate this filter. In the CW-W position, the SSB 2.4 kHz filter will be in use. The WIDTH control is usable in all modes.

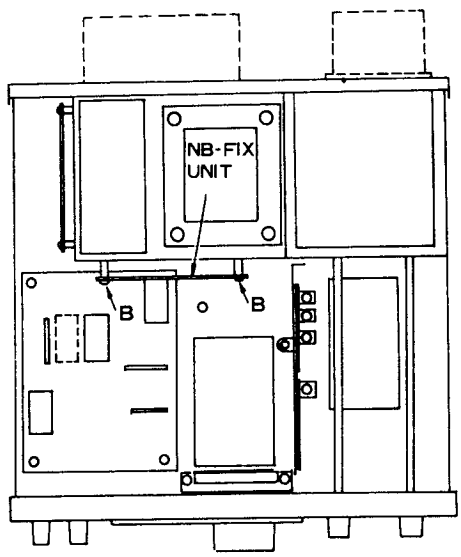


Figure 2

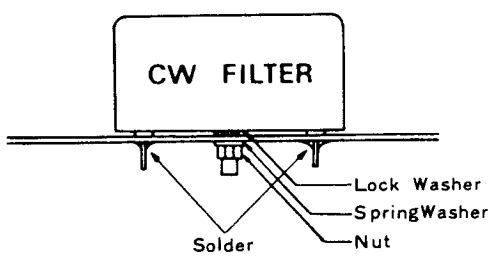


Figure 4

COUNTER UNIT INSTALLATION ON FT-101Z

Early model (before Prod. #15)

This section will deal with the installation of the COUNTER UNIT and digital display, which are optional equipment for the economy FT-101Z model.

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 5. These screws support the LED board.

(3) Remove the screws marked "B" in Figure 5, 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) Install the two guide pins into the holes previously occupied by the "A" screws. When doing this, install the LED board in its previous position. Install the support tower into the hole marked "C" in Figure 5.

(7) Remove the 820 ohm (Gray-Red-Brown) resistor from the terminal strip marked "E" in Figures 5 and 6.

(8) Install the COUNTER UNIT. The connection to the guide pins should not be forced. Use the screws previously installed at "A" for securing the counter module at points "C" (support) and "D" in Figure 5. Connect the COUNTER UNIT 9-pin plug into the 9-pin socket on the transceiver at point "G" in the drawing. The coaxial cable from the COUNTER UNIT is connected to point "F" in Figure 5.

(9) Close the transceiver. No alignment of the unit is necessary, unless some change in the preset carrier frequencies is required for a special application. In this case, refer to the section on the COUNTER UNIT in the "ALIGNMENT" chapter of this manual.

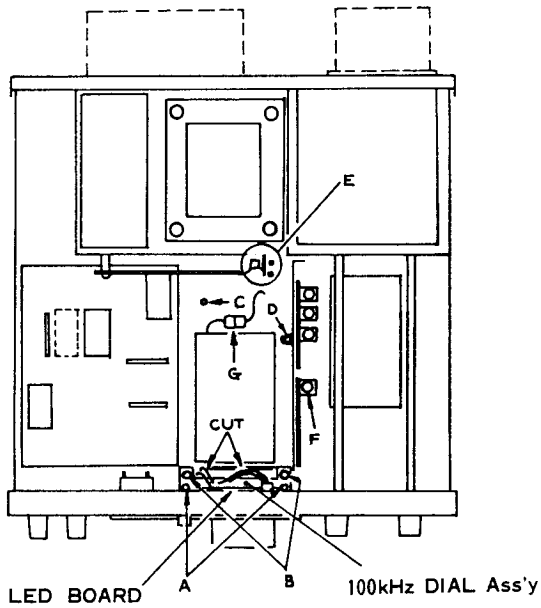
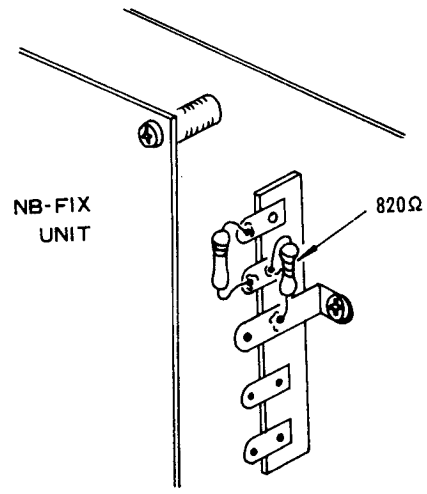


Figure 5.



(Enlarged) Part E

Figure 6.

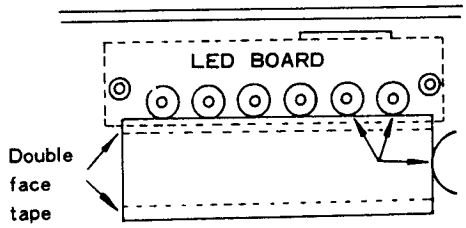


Figure 7.

FT-101Z/ZD AUX BAND INSTALLATION

Early model (before Prod. #16)

The installation of a non-standard frequency band may be accomplished in an hour or two, using the AUX position on the bandswitch. Some alignment is required, but this is not a difficult procedure.

However, please be advised that AUX band installations by someone other than an authorized Yaesu representative will void any warranties in force. As well, Yaesu cannot guarantee that published specifications for operation on the amateur bands will be met during operation on a non-standard band. Of special note are those bands containing, and immediately adjacent to, the IF and VFO frequencies.

The modification process begins with the insertion of the required parts on the PREMIX and PREMIX LOCAL circuit boards, as the AUX band parts were not factory installed. Then the necessary wiring changes are performed, and then the new band is aligned for peak performance on transmit and receive.

PARTS NEEDED

For PREMIX UNIT (PB-1962)

Silicon diodes, type 1S1555, 2 ea. (D_{315}/D_{316})
Carbon film resistor, 2.2 K ohms, ¼ watt, 1 ea. (R_{319})
Disc ceramic capacitors, 0.01 μF, 50 WV, 3 ea. ($C_{344}/C_{345}/C_{347}$)
Disc ceramic capacitor, 50 WV, 1 ea. (C_{346} – see Table 6 on page 3-9.)
Micro inductors, 270 μH, 2 ea. (L_{320}/L_{321})
Bandpass coil, see Table 6 on page 3-9 for desired BPF coil among T_{301}–T_{314} (for T_{316}/T_{317}).

For PREMIX LOCAL (XTAL) UNIT (PB-1965)

Transistor, type 2SC372Y, 1 ea. (Q_{611})
Silicon diode, type 1S1555, 1 ea. (D_{611})
Carbon film resistor, 56K ohms, ¼ watt, 1 ea. (R_{644})
Carbon film resistor, 18 K ohms, ¼ watt, 1 ea. (R_{645}) (28 MHz: 33 K)
Carbon film resistor, 1 K ohm, ¼ watt, 1 ea. (R_{646}).
Carbon film resistor, 100 ohms, ¼ watt, 1 ea. (R_{647})
Disc ceramic capacitors, 0.01 μF, 50 WV, 3 ea. ($C_{642}/C_{643}/C_{644}$)
Disc ceramic capacitor, 50 WV, 1 ea. (C_{645} – see Table 6)
Local crystal, 1 ea. (X_{611} – see Table 6)
Oscillator transformer, #220017, 1 ea. (T_{611})

MODIFICATION PROCEDURE

(1) Refer to Figures 8 and 9, and install the above parts on PB-1962 and PB-1965.

(2) Refer to Figure10, and locate the bandswitch wafers S1B and S1C. Cut the lead from AUX to COMMON, and re-install the lead so as to run from AUX to the post corresponding to column 6 of Table 6, "BAND." For example, for 2.0–2.5 MHz operation, the lead goes from AUX to 160. Do this on both wafers S1B and S1C.

(3) Refer to Figure 4. and install the jumper wire shown, between the AUX terminal and the terminal of the "BAND" column in Table 6, on bandswitch wafer S2D. Note that this is a "double" wafer; S2C is the side facing the front of the transceiver, while S2D is the rear face of this wafer.

(4) Normally, no change in the tank coil tap will be required, as inspection of Table 6 will verify. However, if harmonics or other non-satisfactory transmitter performance characteristics result, use linear interpolation of the values in Table 6, "Tank Coil Tap" column. Note that this will affect the performance in the original amateur band, so beware.

ALIGNMENT AFTER MODIFICATION

(1) Connect an RF VTVM to pin 1 of MJ_3. Adjust T_{611} for maximum indication on the VTVM (Nom. 300 mV).

(2) Temporarily remove the plug from output jack J_{301} of the PREMIX Unit, PB-1962. Connect the RF VTVM to J301. Set the VFO to 250 (band center), and peak the bandpass filter coils for maximum deflection on the VTVM (nom. 100–150 mV). Now check the response from 000 on the VFO to 500. If the response is not flat within 3 dB across the band, retune the bandpass filter coils for a somewhat staggered response.

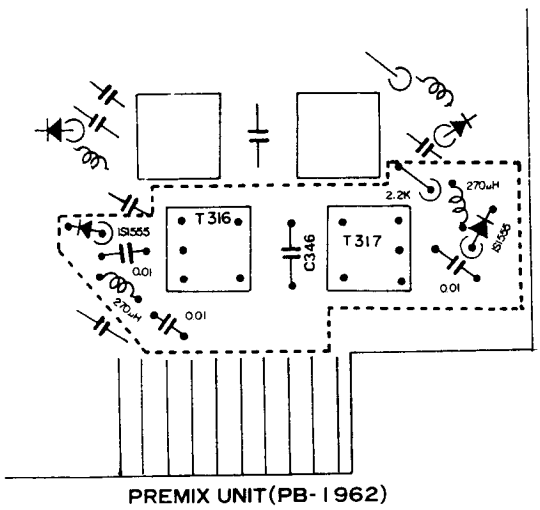


Figure 8.

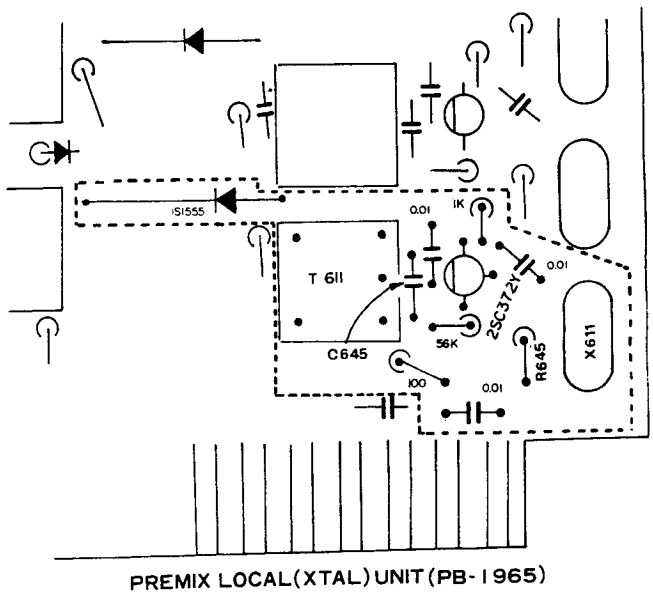
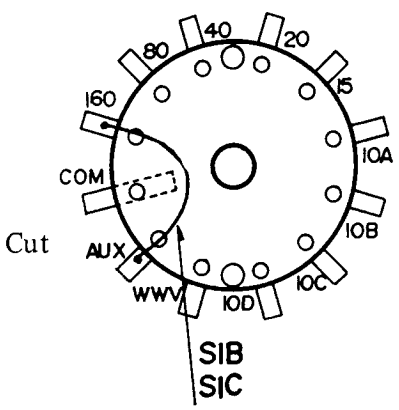


Figure 9



Example for 2.0–2.5 MHz wiring

Figure 10.

Example for 2.0–2.5 MHz wiring

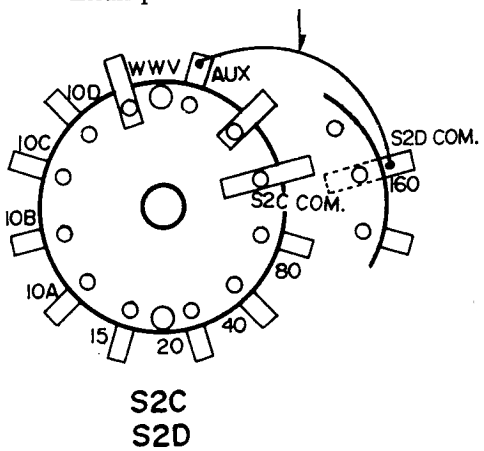


Figure 11.

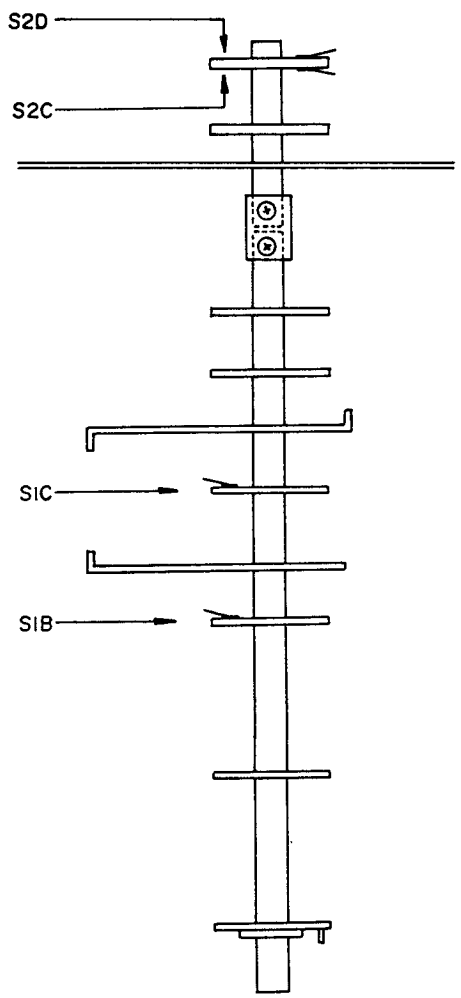


Figure 12.

FT101Z AUX BAND

FREQ(MHz)	XTAL(MHz)	OSC CAP(pF)	BPF COIL NUMBER	PREMIX OUT FREQ(MHz)	BAND	PRESELECT	TANK COIL TAP	LOAD CAP(pF)	PLATE CONTROL	LOAD CONTROL	REMARKS
1.8— 2.0	15.9875	330	T301,302	10.4875—10.9875	160	0—2.0	38	3000	3.0	0	
2.0— 2.5	16.4875		T303,304	10.9875—11.4875	〃	2.0—4.5					
2.5— 3.0	16.9875		〃	11.4875—11.9875	〃	4.5—6.5					
3.0— 3.5	17.4875		〃	11.9875—12.4875	80	0.5—2.5					
3.5— 4.0	17.9875	270	〃	12.4875—12.9875	〃	2.5—4.0	26	1100	2.8	0	
4.0— 4.5	18.4875		〃	12.9875—13.4875	〃	4.0—5.5					
4.5— 5.0	18.9875		T313,314	13.4875—13.9875	40	1.2—2.8					
5.0— 5.5	19.4875	240	〃	13.9875—14.4875	〃	2.8—3.8					※(VFO RANGE)
5.5— 6.0	19.9875		〃	14.4875—14.9875	〃	3.8—4.8					
6.0— 6.5	20.4875		T305,306	14.9875—15.4875	〃	4.8—5.5					
6.5— 7.0	20.9875		〃	15.4875—15.9875	〃	5.5—6.0					
7.0— 7.5	21.4875	180	〃	15.9875—16.4875	〃	6.0—7.0	16	620	3.9	4.5	
7.5— 8.0	21.9875		〃	16.4875—16.9875	〃	7.0—7.5					
8.0— 8.5	22.4875		〃	16.9875—17.4875	〃	7.5—8.0					※(IF)
8.5— 9.0	—	—	—	—	—	—	—	—	—	—	※(IF)
9.0— 9.5	—	—	—	—	—	—	—	—	—	—	※(IF)
9.5—10.0	23.9875		T307,308	18.4875—18.9875	20	4.0—4.7					※(IF)
10.0—10.5	24.4875		〃	18.9875—19.4875	〃	4.7—5.1					※(IF)
10.5—11.0	24.9875		〃	19.4875—19.9875	〃	5.1—5.5					※(WIDTH IF)
11.0—11.5	25.4875		〃	19.9875—20.4875	〃	5.5—6.0					
11.5—12.0	25.9875		〃	20.4875—20.9875	〃	6.0—6.4					
12.0—12.5	26.4875		〃	20.9875—21.4875	〃	6.4—6.9					
12.5—13.0	26.9875		〃	21.4875—21.9875	〃	6.9—7.2					
13.0—13.5	27.4875		〃	21.9875—22.4875	〃	7.2—7.5					
13.5—14.0	27.9875		〃	22.4875—22.9875	〃	7.5—7.9					
14.0—14.5	28.4875	100	〃	22.9875—23.4875	〃	7.9—8.1	10	330	6.6	3.3	
14.5—15.0	28.9875		〃	23.4875—23.9875	〃	8.1—8.3					
15.0—15.5	29.4875		T307,308	23.9875—24.4875	15	5.5—5.8					
15.5—16.0	29.9875		〃	24.4875—24.9875	〃	5.8—6.0					
16.0—16.5	30.4875		〃	24.9875—25.4875	〃	6.0—6.3					
16.5—17.0	30.9875		〃	25.4875—25.9875	〃	6.3—6.7					
17.0—17.5	31.4875		〃	25.9875—26.4875	〃	6.7—7.0					
17.5—18.0	31.9875		T309,310	26.4875—26.9875	〃	7.0—7.2					※(IF HARMONIC)
18.0—18.5	32.4875		〃	26.9875—27.4875	〃	7.2—7.4					※(〃)
18.5—19.0	32.9875		〃	27.4875—27.9875	〃	7.4—7.6					※(〃)
19.0—19.5	33.4875		〃	27.9875—28.4875	〃	7.6—7.8					
19.5—20.0	33.9875		〃	28.4875—28.9875	〃	7.8—8.0					※(WIDTH CARRIER)
20.0—20.5	34.4875		〃	28.9875—29.4875	〃	8.0—8.3					
20.5—21.0	34.9875		〃	29.4875—29.9875	〃	8.3—8.5					
21.0—21.5	35.4875	68	〃	29.9875—30.4875	〃	8.5—8.7	7	—	7.5	2.0	
21.5—22.0	35.9875		〃	30.4875—30.9875	〃	8.7—9.0					
22.0—22.5	36.4875		〃	30.9875—31.4875	10	7.0—7.3					
22.5—23.0	36.9875		〃	31.4875—31.9875	〃	7.3—7.5					
23.0—23.5	37.4875		〃	31.9875—32.4875	〃	7.5—7.6					
23.5—24.0	37.9875		T311,312	32.4875—32.9875	〃	7.6—7.8					
24.0—24.5	38.4875		〃	32.9875—33.4875	〃	7.8—8.0					
24.5—25.0	38.9875		〃	33.4875—33.9875	〃	8.0—8.2					
25.0—25.5	39.4875		〃	33.9875—34.4875	〃	8.2—8.3					
25.5—26.0	39.9875		〃	34.4875—34.9875	〃	8.3—8.4					
26.0—26.5	40.4875		〃	34.9875—35.4875	〃	8.4—8.6					
28.0—28.5	42.4875	47	〃	36.9875—37.4875	〃	9.0—9.2	5		8.1	1.5	
28.5—29.0	42.9875	47	〃	37.4875—37.9875	〃	9.2—9.4	5		8.2	1.5	
29.0—29.5	43.4875	47	〃	37.9875—38.4875	〃	9.4—9.6	5		8.5	1.5	
29.5—30.0	43.9875	47	〃	38.4875—38.9875	〃	9.6—9.8	5		8.8	1.7	

※ QUESTIONABLE PERFORMANCE
(Modifications to be provided for possible WARC expansion at 10 and 18 MHz)

Table 6

DC-DC CONVERTER INSTALLATION (OPTION) Early model (before Prod. #23)

The optional DC-DC converter is easy to install in a matter of minutes. Please follow the instructions carefully, in order to make the proper connections.

(1) Install the DC-DC converter module as shown in the drawing. Use the four screws supplied with the kit. Do not force the plug into the socket, as the connection should be smooth, yet solid.

(2) Check the DC cable fuse socket, located in the positive (red) lead, to be certain that a 20 amp fuse is installed.

(3) 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.

(4) 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 applies, as well, to bench power supplies, which should be adjusted in the same fashion. Also, the transceiver should not be operated from a supply voltage of less than 12 volts.

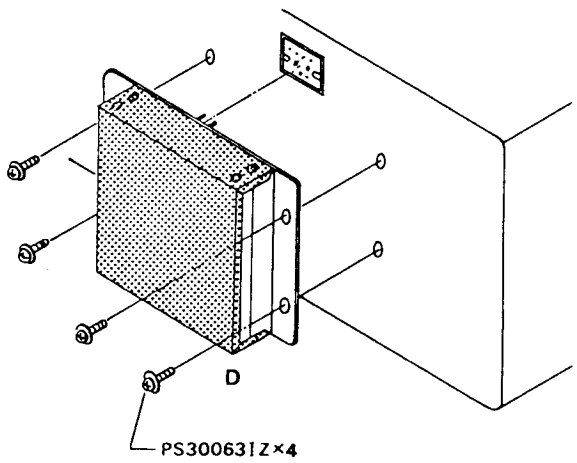
(5) Connect the DC cable to the transceiver. Power connections are made automatically when the DC cable is connected to the POWER jack.

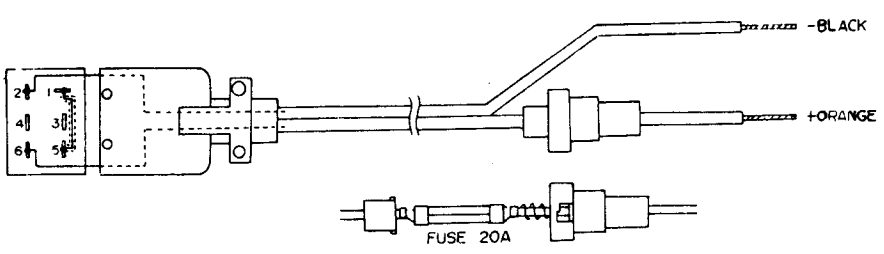
NOTES ON MOBILE INSTALLATION

Be certain that sufficient room is provided for free air circulation around the transceiver. If the transceiver must be placed on the car seat, set it on a board or other rigid object, in order to provide the necessary air circulation (and to avoid possible heat damage to the uphoulstery.

A special mobile mounting bracket is available from your YAESU dealer.

The DC supply should be capable of providing 20 amps on voice peaks, 14 amps continuous. The HEATER switch may be turned off during long periods of reception, for energy conservation.



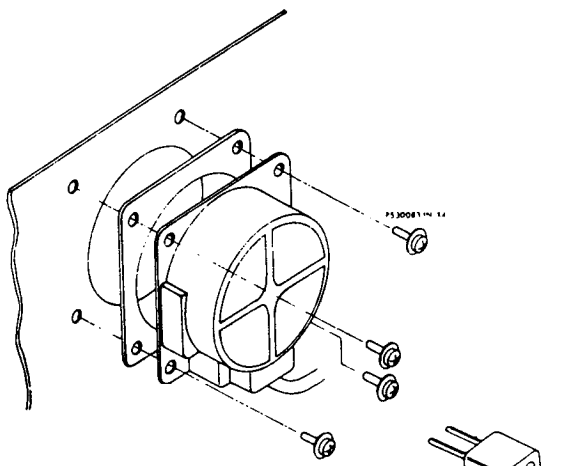


COOLING FAN INSTALLATION (OPTION)

The FT-101ZD cooling fan may be used with other models of Yaesu equipment. Installation is easily accomplished in minutes.

Hold the fan up to the rear panel in its proper location. Determine the proper length of the two-wire power lead to the motor. Solder the leads to the 2-pin plug supplied with the fan. The 4-pin plug is not needed for FT-101ZD installation.

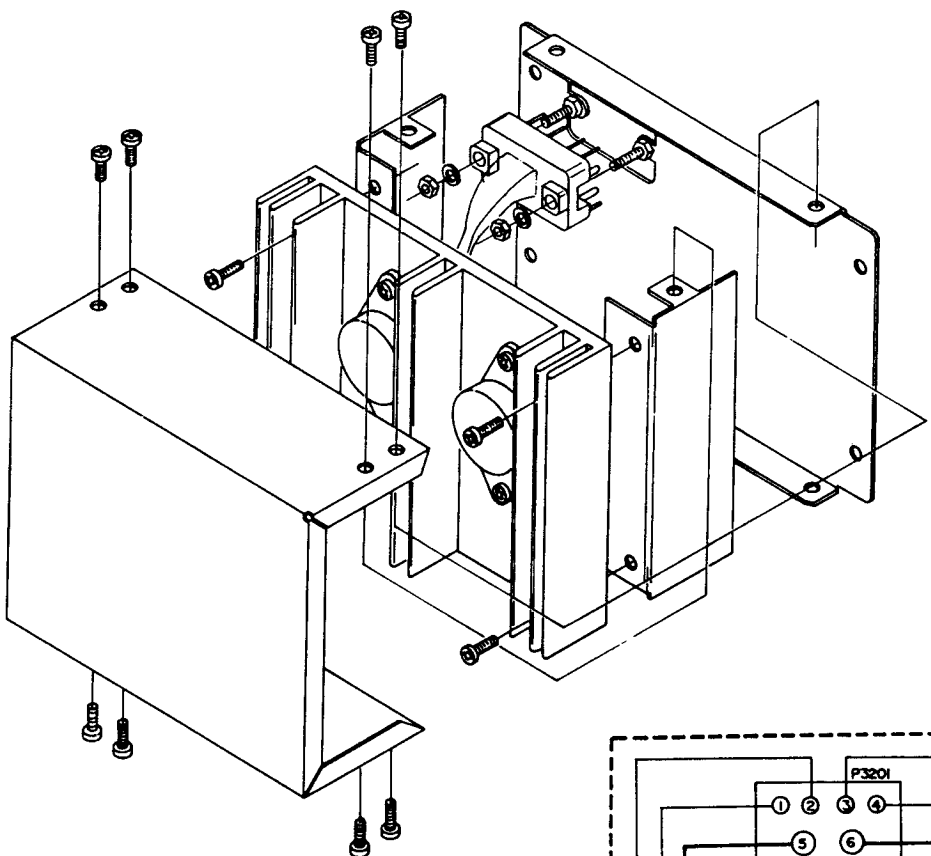
Install the fan onto the rear panel of the transceiver, as shown in the drawing. Insert the power lead from the fan into the fan socket on the rear panel.

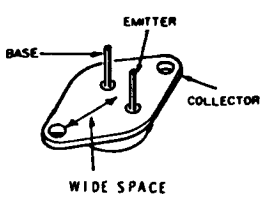


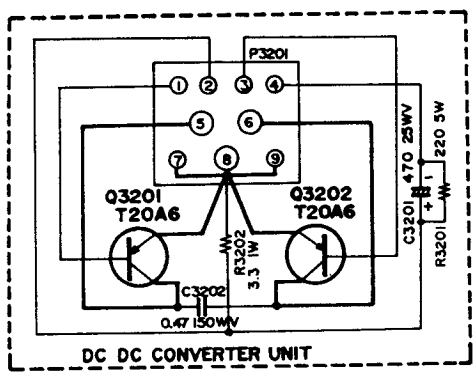
Cooling fan

Fan plug

DC-DC CONVERTER (EXPLODED VIEW)







SOLDERING AND DESOLDERING TECHNIQUE ON PRINTED CIRCUIT BOARDS

The FT-101Z circuit boards are tough, but mishandling during soldering can cause circuit traces to "lift". While this does not cause permanent damage to the board, much servicing trouble can result, because of the tendency for this lifted trace to break. A few simple precautions will keep your circuit boards in A-1 condition.

1. Use only a 12 to 30 watt chisel-tip soldering iron. Yes, some "repairmen" have been known to use small blowtorches on cards.

2. Use only a soldering iron equipped with a three-wire cord, with the tip grounded. Also acceptable is a soldering iron isolated through a transformer. An old soldering iron or gun may have 117 volts on the tip, and will certainly cause more damage than it repairs!

3. USE ONLY 60/40 ROSIN CORE SOLDER. Acid core solder should be thrown away if you find it in your radio shop!

4. Use a solder sucker and solder tape to ensure a professional repair job.

5 If you do lift a trace, don't worry! Read on to find out how to repair traces like a pro.

NOTES ON USE OF CMOS IC's:

As CMOS devices are extremely sensitive to damage from static electricity, special precautions must be observed.

In storage, use only sponge specially designed for CMOS components.

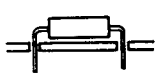
When installing a CMOS IC in a socket, or on a circuit board, be certain that the power is off. In addition, the technician should rest his hand on the chassis as the component is inserted, so as to place his hand at the same potential as the chassis (better to discharge small amounts of static electricity through your fingers than through a $5 IC !).

When soldering a CMOS IC onto a circuit board, use a low wattage iron, and be sure to ground the tip with a clip lead, if the tip is not grounded through a three-wire power cord.

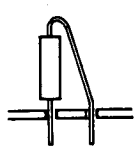
INSERTION OF PARTS ON CIRCUIT BOARDS

All of the below are acceptable ways of inserting components into circuit board mounting holes.

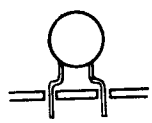
(a) Bend leads slightly



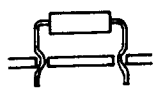
(b) Straight-in mounting



(c) Vertical mounting

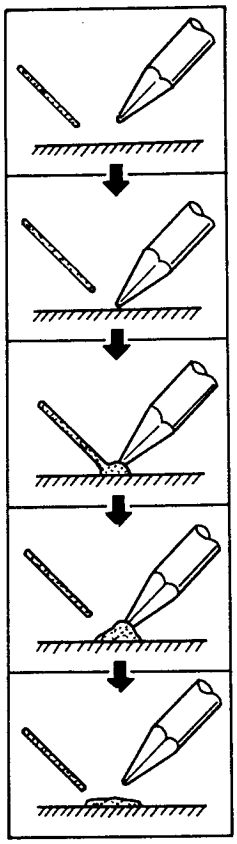


(d) Preformed disc ceramic capacitor



(e) Preformed resistor, diode, etc.

BASIC SOLDERING PRACTICE



(1) Prepare soldering iron and solder.

(2) Apply soldering iron to surface to be soldered.

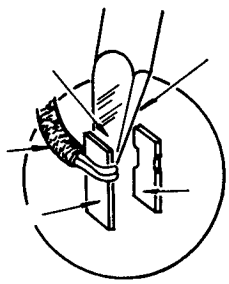
(3) Apply solder to heated surface.

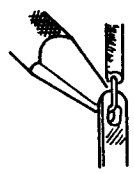
(4) When enough solder is applied, remove solder. Continue to apply heat until solder flows cleanly.

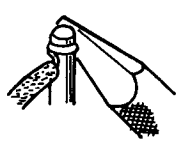
(5) Remove iron from work. Do not apply more heat than necessary for good solder flow.

Soldering to terminal posts:

(Be certain to apply heat to both post and wire.)

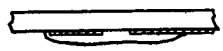




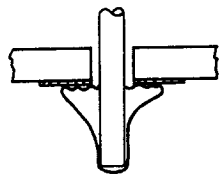


EXAMPLES OF POOR SOLDERING PRACTICE

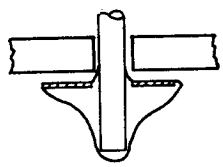
Solder bridge (caused by use of too much solder)



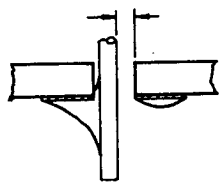
"Cold joint" (caused by insufficient heat to part of work, resulting in poor solder flow)



Lifted trace (caused by too much heat on circuit board foil)

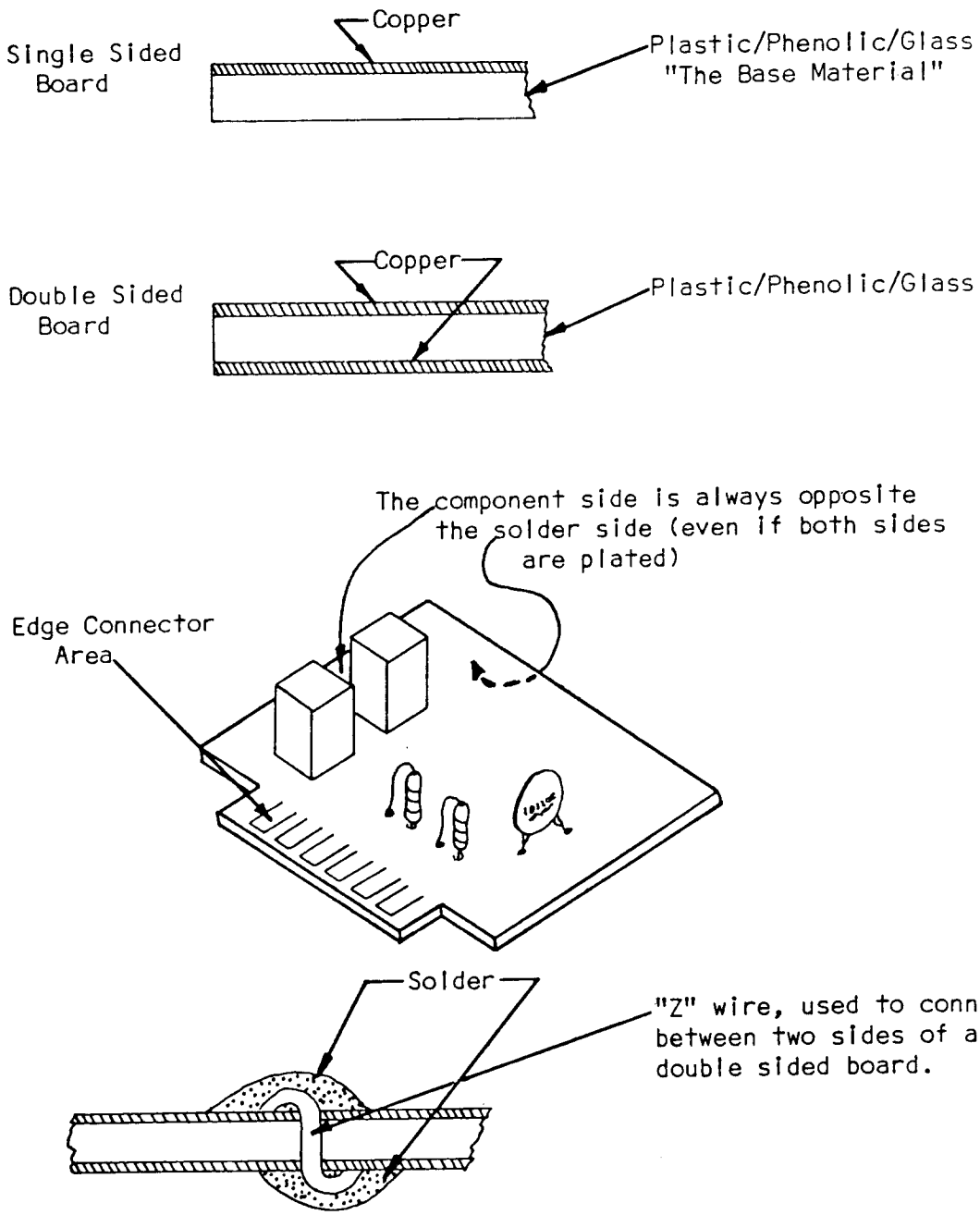


Unstable joint (caused by insufficient heat or solder)



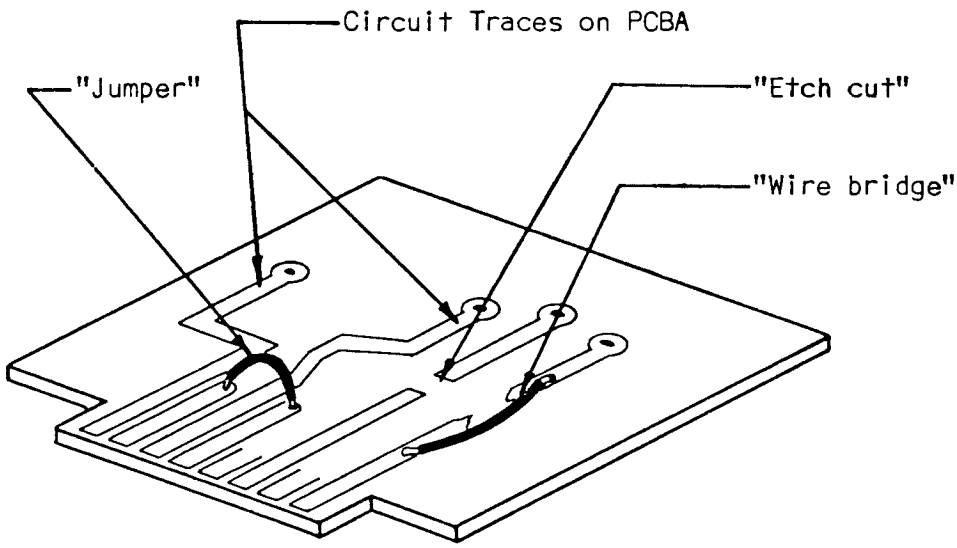
CIRCUIT TRACE REPAIR

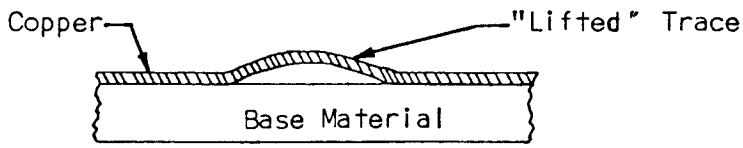
Most of the printed circuit boards used in the FT-101Zare single sided boards. However, occasionally a double-sided board is used, in situations where high shielding is required. A comparison of the two types is shown below.



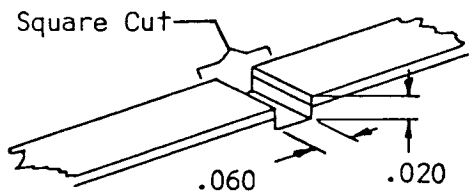
Sometimes, after the design and drafting of a board are completed, a board is produced with an error in it. Though non-technical managers sometimes suffer a stroke at hearing of this situation, it is not unheard of in engineering circles. Thus, should you encounter etch cuts and jumpers on a board, be assured that the modifications were made in the interest of securing optimum performance. Unless you consider your expertise to be superior to that of the design engineer, please leave these mods in place.

However, in service work the occasion does arise when a trace must be cut. Proceed as follows.





If you have previously lifted a trace, make an etch cut on each side of the lifted trace, and install a wire bridge as shown in the drawing.



Coat Cut Area With Eastman 910

MODIFICATIONS

MODIFICATION OF FV-901DM FOR USE WITH FT-101ZD

The tuning dial for the FT-101ZD turns in reversed sense with respect to the FV-901DM synthesized scanning VFO main dial. If it is desired to have both dials rotate in the same direction for a given change in frequency, the modification below will allow this facility. It should be noted that this modification is not required to achieve full functioning of the FV-901DM; however, clockwise rotation of the FV-901DM will correspond with counterclockwise rotation of the FT-101ZD dial.

Modification Procedure:

(1) Remove the top and bottom covers of the FV-901DM, removing the screws as shown in Figure 13.

(2) Locate PB-1848 and PB-1849, which can be seen at "A" in Figure 14.

(3) Referring to Figure 15, locate the white/green wire connected between pin 4 of P_1 and PB-1848; also locate the green wire connected between pin 5 of P_1 and PB-1849. Reverse these wires by unsoldering them from the circuit boards and installing the green wire to PB-1848, the white/green wire to PB-1849. The corrected schematic is shown in Figure 16.

(4) Locate the CLARIFIER potentiometer inside the front panel of the case. Refer to Figure 17, and locate the yellow and green wires, as well as the 1.5 K ohm resistor. Rewire the connections as shown in Figure 18 for proper CLARIFIER operation. Modification is now complete.

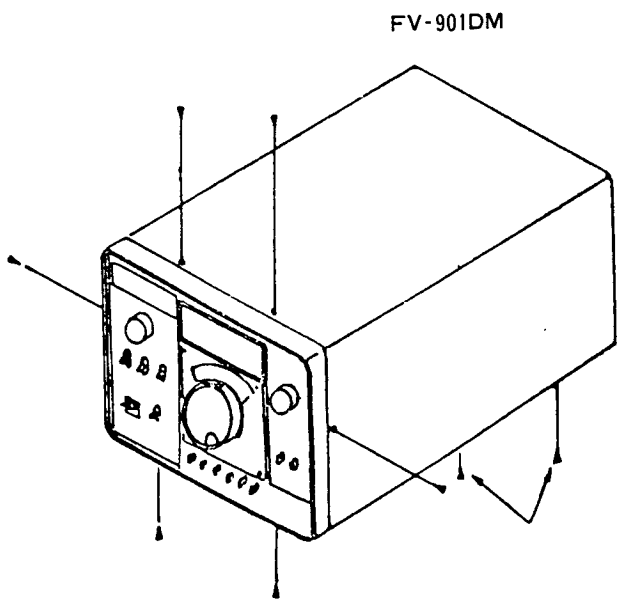


Figure 13.

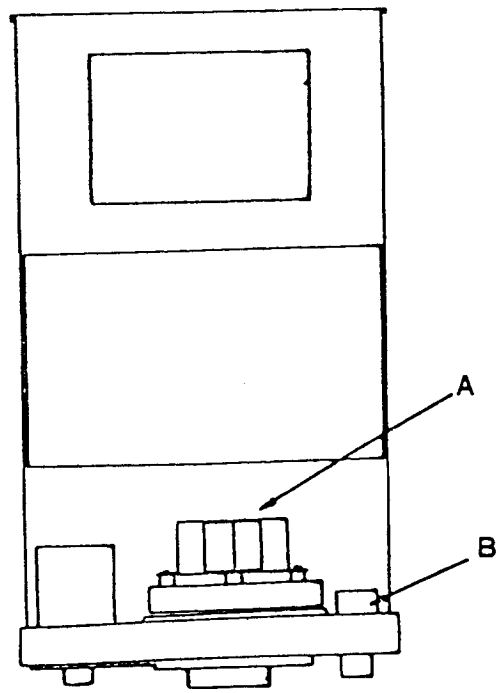


Figure 14

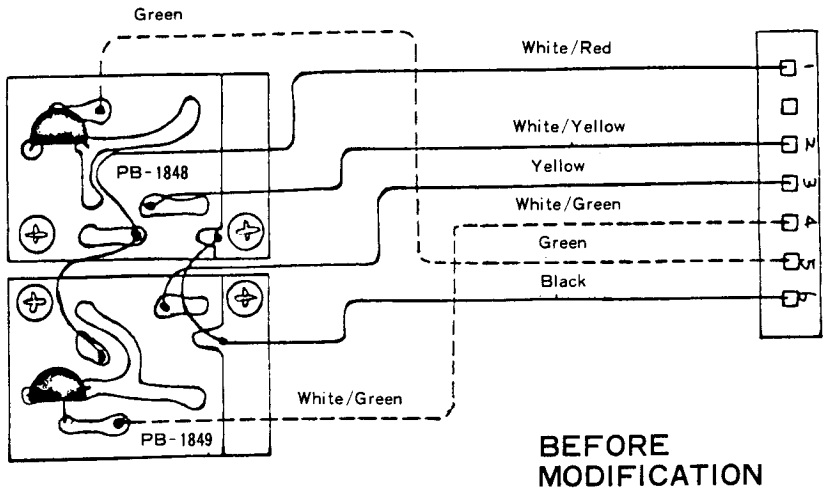


Figure 15.

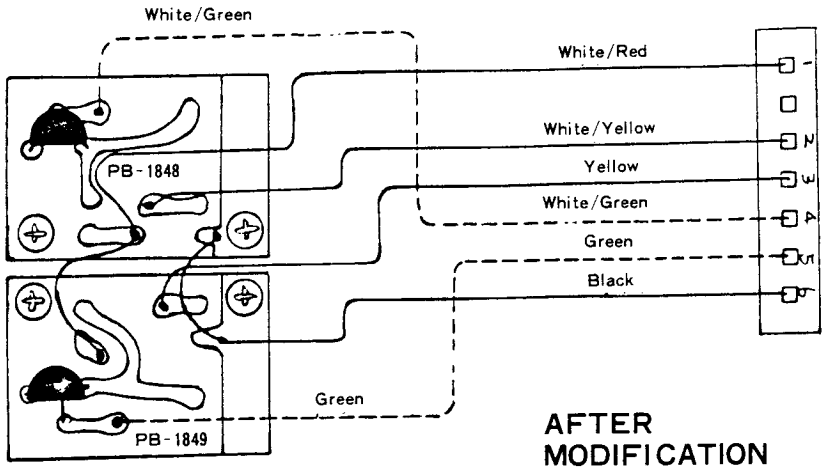


Figure 16.

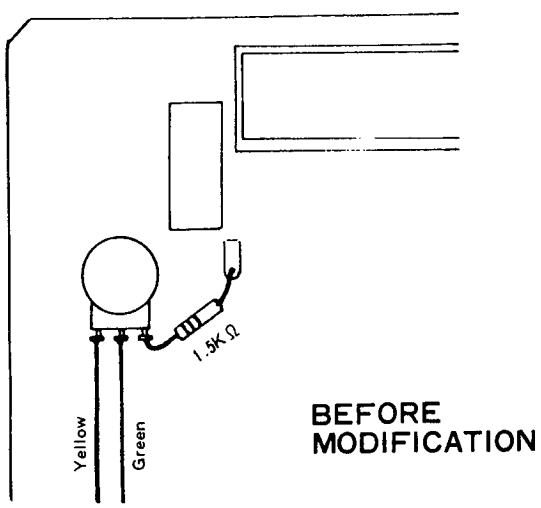


Figure 17.

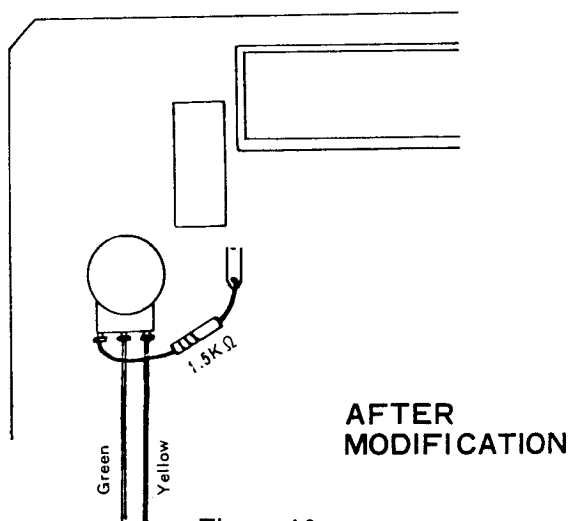


Figure 18.

RECTIFIER B UNIT MODIFICATIONS

In order to provide additional protection for the power supply circuitry, several changes were adopted in the RECTIFIER B Unit circuit. At A in the schematics is the circuit used for production lots 1 through 4. At B is the circuit modification used for production lots 5 and 6. The modification procedure is described below.

(1) Add a 270 k ohm, ½ watt resistor in parallel with each of the following: R_{1001}, R_{1002}, R_{1003}, and R_{1004}.
Alternatively, you may change each of the above resistors to a value of 180 k ohms, ½ watt.

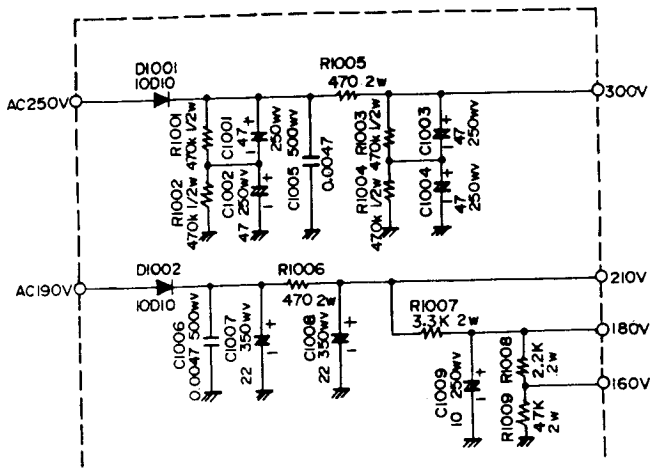
(2) Change R_{1005} to 390 ohms, 2 watts.

(3) Add a new R_{1022} (39 ohms, 1 watt) in series with D_{1001}, as shown.

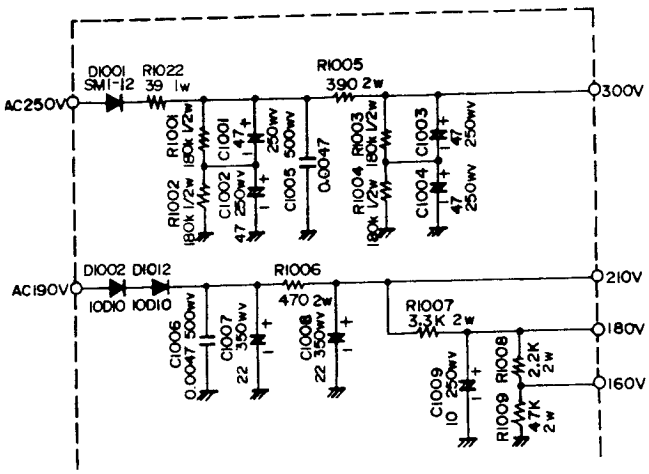
(4) Add a new 10D10 diode in series with D_{1002}.

(5) D_{1001} is being changed in production to type SM1–12, but field modification is not required.

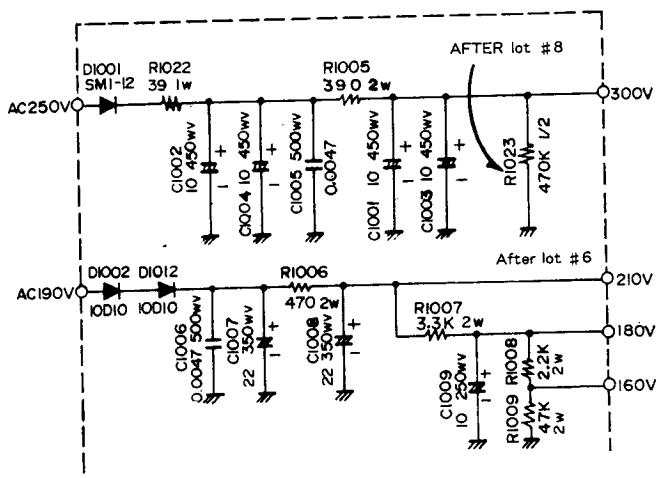
Beginning with production lot 6, the circuit was consolidated. The circuit used after lot 6 is shown at C, with the following exception: R_{1023} was not installed in lots 6 and 7, and we recommend that it be installed in the field the next time you perform service. The purpose of R_{1023} is to provide a bleeder path for the filter capacitors.



A: BEFORE MODIFICATION

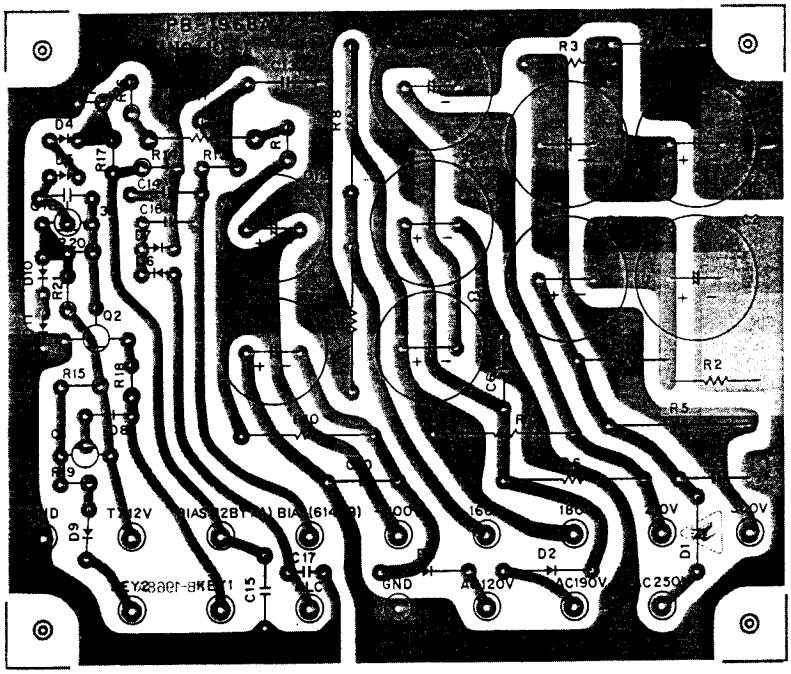


B: AFTER MODIFICATION

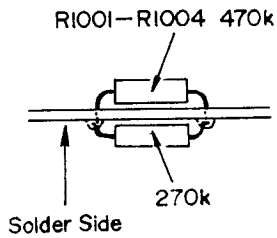


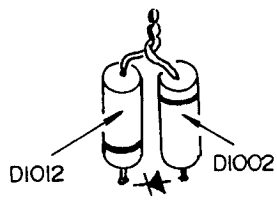
C: AFTER LOT ≥6

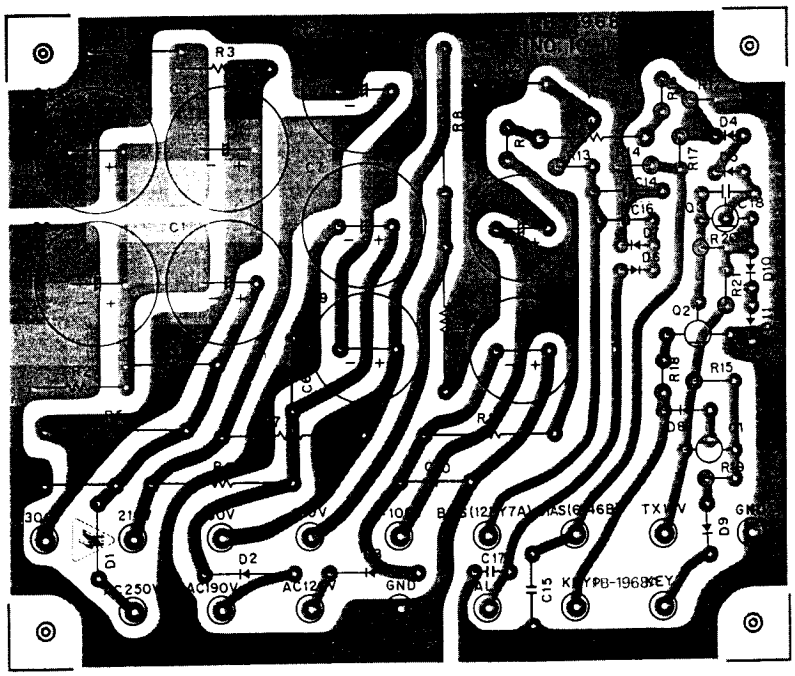
RECT B UNIT PARTS LAYOUT



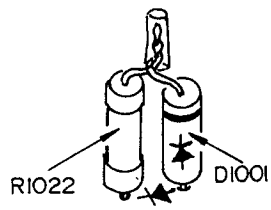
Viewed from component side





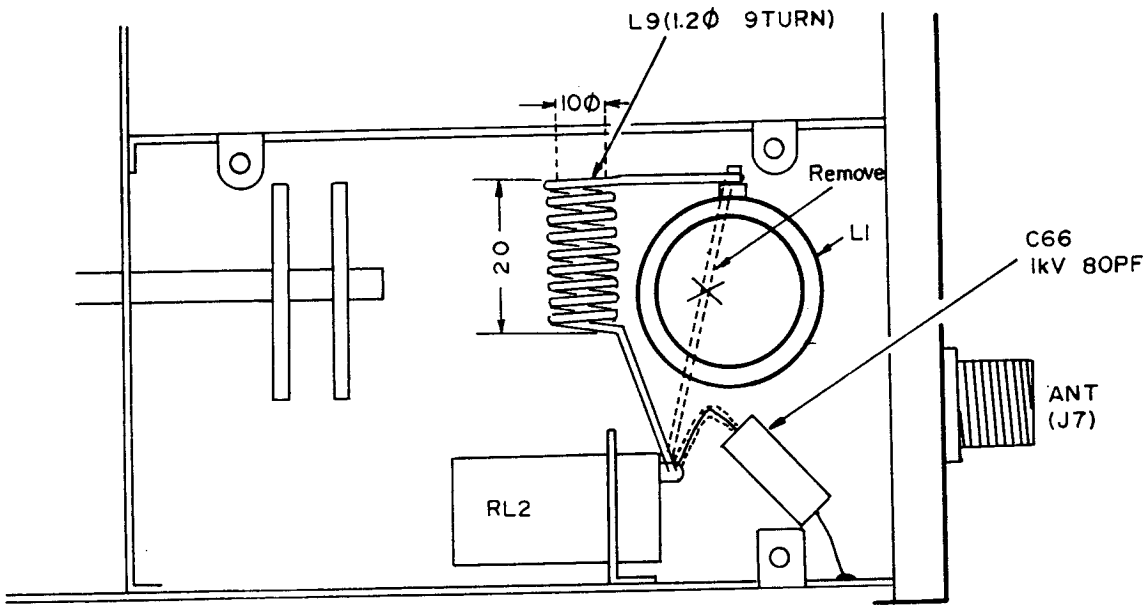


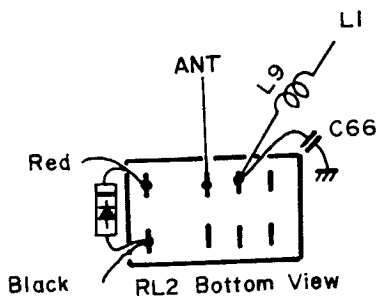
Viewed from solder side



LOW-PASS FILTER ADDITION

The FT-101Z and FT-101ZD transceivers were modified, beginning with the production lot #04, with the inclusion of the low-pass filter circuit shown below. The parts to be added are L_9 (0.4μH) and C_{66} (mica, 80 pF, 1 kV). The drawing below is an underside view, showing the correct installation.





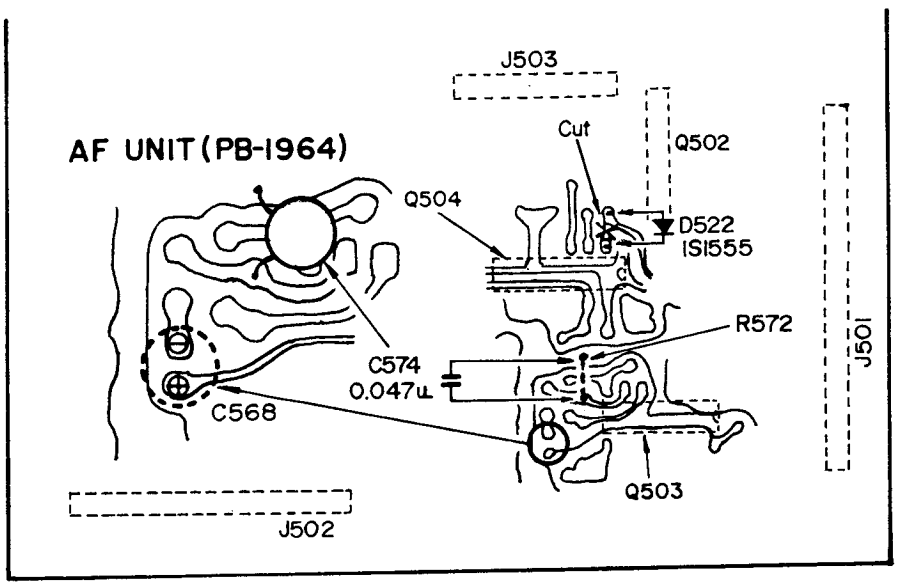
VOX CIRCUIT MODIFICATION

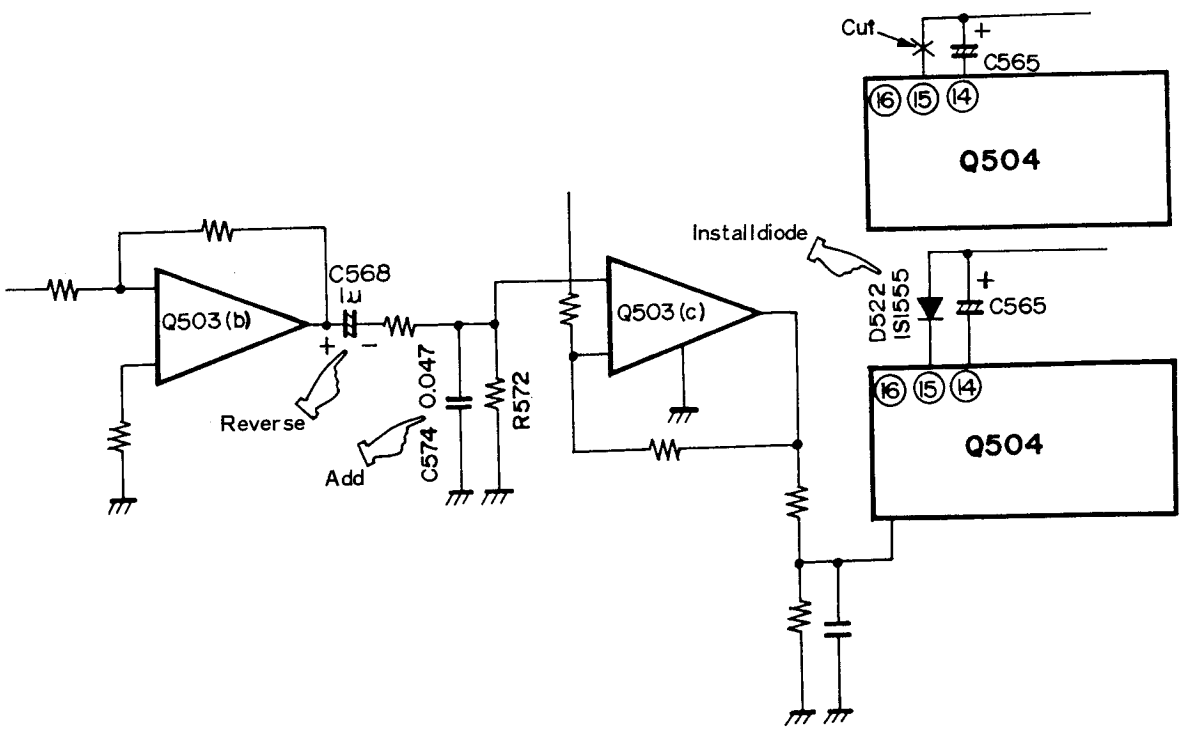
In order to ensure reliable VOX operation, the following modifications were adopted as of production lot number 7, and may be of help if you have a problem with inconsistent VOX timing.

(1) Cut the lead to pin 15 of Q_{504}. Install a silicon switching diode (1S1555) in its place, as shown in the drawing.

(2) Add a new disc ceramic capacitor(C_{574}), 0.047 μF, in parallel with R_{572}.

(3) Reverse the polarity of C_{568}, as it was installed in reverse order for the intended purpose. The correct installation is shown in the drawing, and a new capacitor is probably called for. See also page 3-25.





COUNTER CIRCUIT MODIFICATIONS

In order to eliminate an occasional low-level counter beat, the following modifications may be of help.

(1) In sets from production lots 1 through 4:

(a) Solder a three-pin (one grounded) solder lug to the Counter Support Board, as shown in Figure 19.

(b) Solder new C_{68} (0.047 μF) and C_{69} (0.047 μF) disc ceramic capacitors, as well as the new C_{70} electrolytic (10 μF) to the terminal, per the schematic.

(2) In sets from production lots 1 through 5:

(a) Install the three bypass capacitors C_{2324}, C_{2325}, and C_{2326} from the CW, USB, and LSB terminals of the COUNTER MAIN BOARD, respectively, to ground. Refer also to the schematic for details (these are shown installed in the schematic on page 2-17).

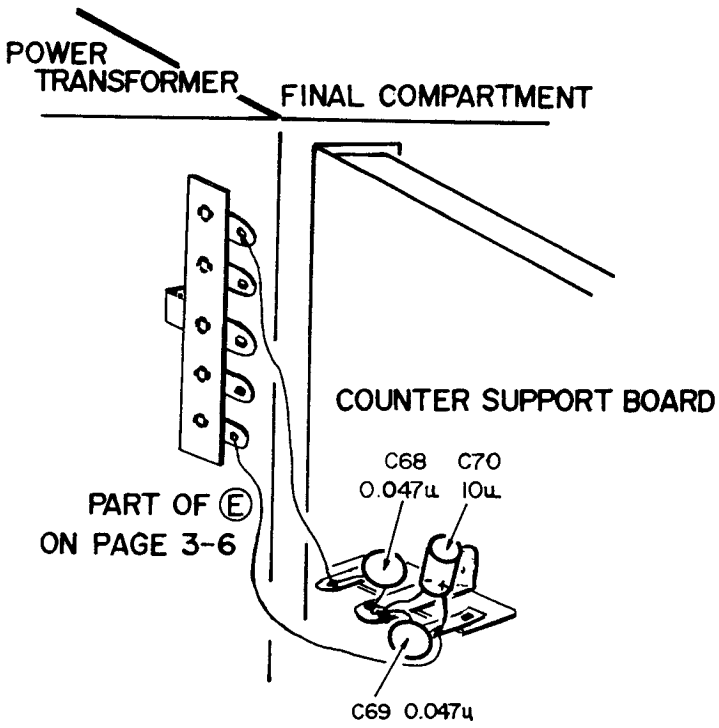
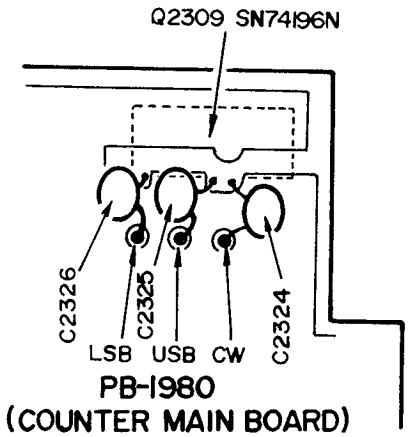


Figure 19.



(C2324/2325/2326 0.047μf)

Figure 20

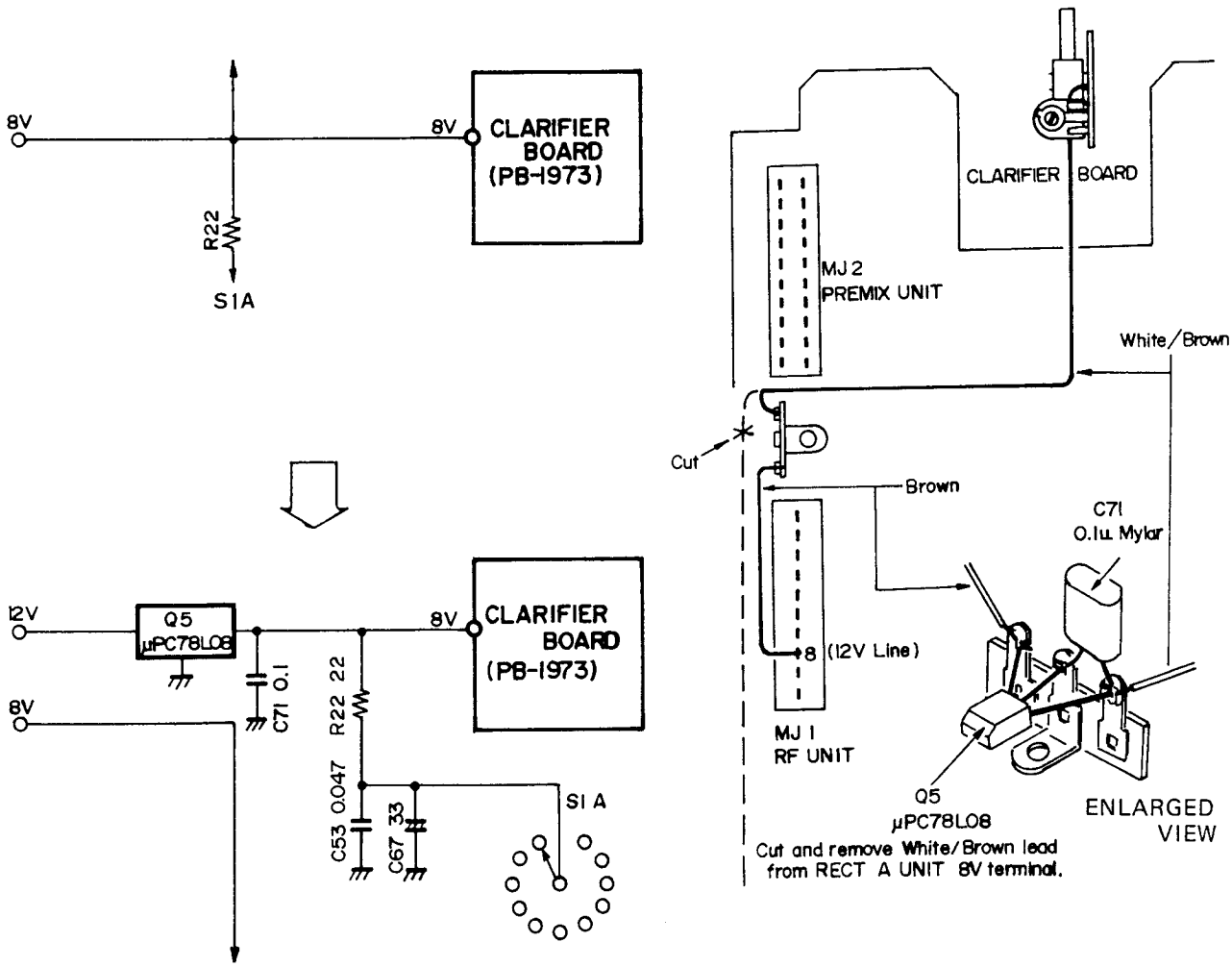
VFO DRIFT IN CONJUNCTION WITH DIMMER CONTROL

Some FT-101ZD transceivers from the first 6 production lots displayed a slight drift of the VFO when the dimmer control was rotated. In order to clear up this problem, the 8 volt line for the clarifier board was separated from the other 8 volt lines, and the following section will describe the correct procedure.

(1) Locate the white/brown lead between the CLARIFIER board and the 8 V terminal on the RECT A Unit. Cut this lead at the RECT A Unit.

(2) Install a three-pin (one grounded) terminal strip adjacent to MJ_1, one the bottom side of the chassis, as shown in the drawing. Connect the white/brown wire to one side, and install the μPC78L08 regulator so that the output side is connected to the white/brown wire. Then install the 0.1 μF mylar capacitor as shown, and connect the input side of the μPC78L08 to the (brown) wire shown. The other end of the brown wire connects to pin 8 of MJ_1, the 12 volt line terminal.

(3) A comparison of the old and new circuits is shown below.

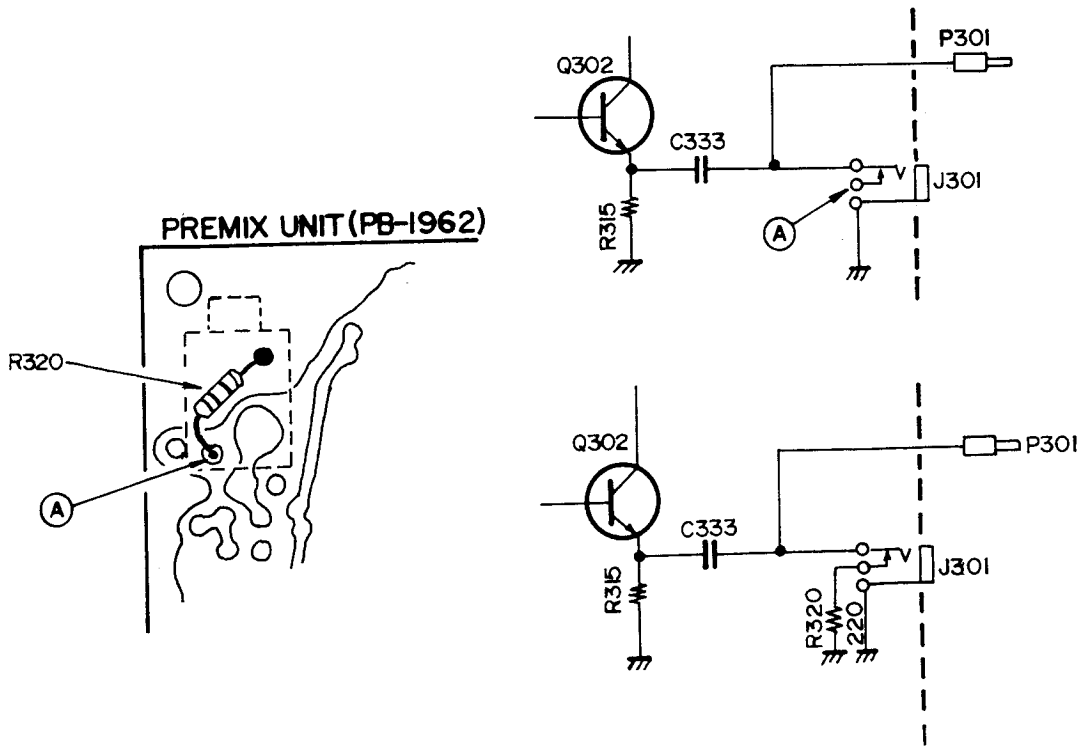


21.2 MHz SPURIOUS SUPPRESSION ON FT-101Z(ANALOG DIAL)

On the analog FT-101Z, a lingering spurious signal could sometimes be heard at 21.2 MHz. With the counter unit installed, the beat is inaudible, and the following modification will eliminate this weak spur in analog versions.

Refer to the drawing below, and install a new 220 ohm ¼ watt resistor (R_{320}) on the PREMIX Unit as shown.

No further modification is required.



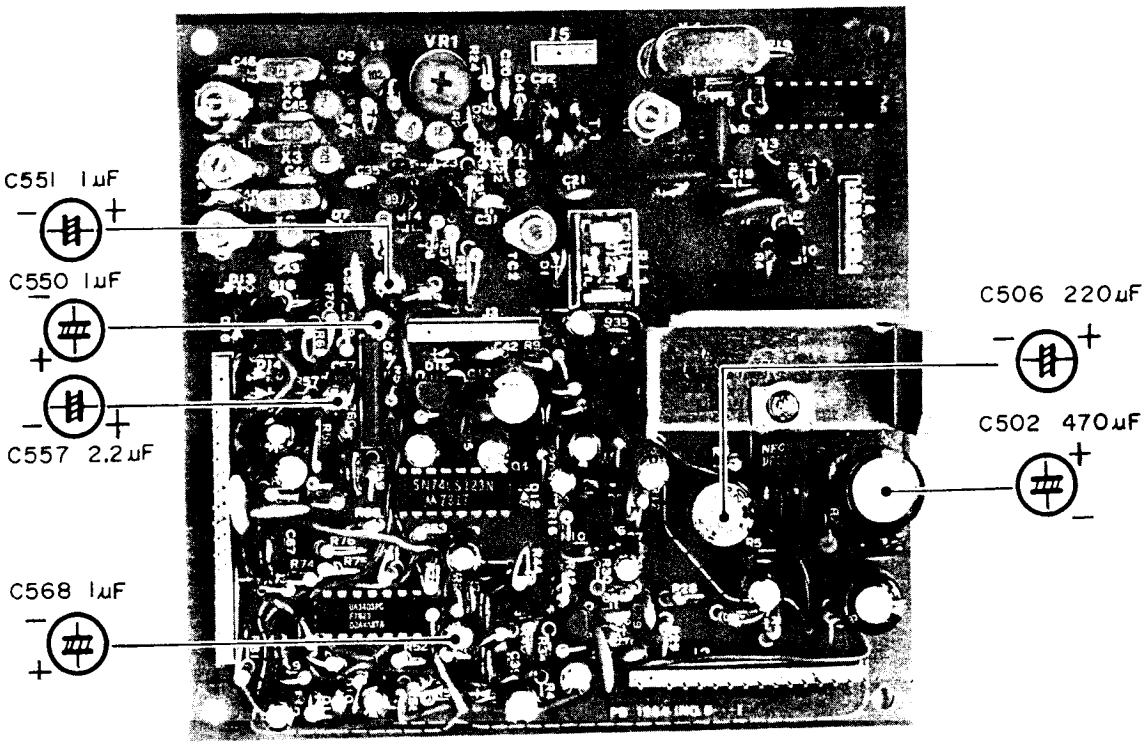
AF UNIT CAPACITOR POLARITY CHECK

In FT-101Z/ZD transceivers bearing serial numbers from the first six production lots, a mistake in the printing on the AF Unit caused several capacitors to be installed in reverse order for their intended purpose, although they were correct according to the printing. In many sets no serious deterioration in performance is noted at all; however, if you get a set for servicing which displays AF oscillation, distortion, or low output, this may be a good place to check. The reversed capacitors should be replaced with new ones installed in the proper position.

The capacitors affected are:

- C_{502} (470 μF)
- C_{506} (220 μF)
- C_{550} (1 μF)
- C_{551} (1 μF)
- C_{557} (2.2 μF)
- C_{568} (1 μF)

In sets from production lots 7 through 10, the printing is not correct, but the capacitors have been correctly installed. The prints on pages 3-60 and 3-61 are correct, as is the schematic diagram.



MAINTENANCE AND ALIGNMENT

WARNING

DANGEROUS VOLTAGES ARE PRESENT WITHIN THIS TRANSCEIVER. USE EXTREME CAUTION WHEN WORKING ON THE TRANSCEIVER WITH THE COVERS REMOVED. DISCHARGE ALL CAPACITORS BY SHORTING THEM TO GROUND WITH AN INSULATED SCREWDRIVER AFTER POWER HAS BEEN REMOVED. OBSERVE NORMAL SAFETY PRECAUTIONS AT ALL TIMES.

CAUTION

Never operate this transceiver in the transmit mode without a matched antenna or dummy load connected to the antenna receptacle on the rear panel. It is possible to damage the final amplifier tubes and the pi network components if the transmitter is operated without the proper load termination.

GENERAL

This transceiver has been carefully aligned and tested at the factory. With normal use, it should not require other than the usual attention given to electronic equipment. Service or realignment of a major component may require substantial adjustment; under no circumstances, though, should realignment be attempted unless the operation of the transceiver is fully understood, the malfunction has been carefully analyzed, and the fault has definitely been traced to misalignment. Sudden difficulties are almost always caused by component failure rather than misalignment.

Service work should only be performed by experienced personnel, using the proper test equipment.

EQUIPMENT REQUIRED

(1) RF Signal Generator: Hewlett-Packard Model 606A or equivalent, with one volt output at 50 ohms, and frequency coverage to 30 MHz.

(2) Vacuum Tube Voltmeter (VTVM): Hewlett-Packard Model 410B or equivalent, with an RF probe good to 40 MHz.

(3) Dummy Load: Yaesu Model YP-150 or equivalent, with 50 ohm non-reactive load impedance, rated to 150 watts average power.

(4) AF Signal Generator: Hewlett-Packard Model 200AB or equivalent.

(5) A general coverage receiver covering 3 to 30 MHz, with a 100 kHz crystal calibrator.

(6) A frequency counter, Yaesu Model YC-500 or equivalent, with resolution to 0.01 kHz and frequency coverage to 30 MHz.

(7) An oscilloscope, Hewlett-Packard Model 1740A or equivalent.

AF UNIT ALIGNMENT

VOX Circuit

A. Antitrip level setting

1. Tune in a signal on the FT-101ZD receiver, and adjust the AF GAIN control for a normal listening level. Position the microphone near the speaker, with the MODE switch in the SSB mode. Increase the VOX GAIN control on the front panel until the speaker output causes the VOX relay to switch the transceiver to transmit. Set the ANTITRIP control VR_9, located on the rear apron, to the point that will just prevent the speaker output from tripping the VOX relay.
2. Now place the microphone in the normal operating position, and speak into the microphone to see if your voice will activate the VOX relay. If not, VR_9 may be advanced too far.

B. VOX relay delay setting

1. Adjust the DELAY control VR_{2b}, located on the front panel, for the desired delay time. This may require a different setting for phone and CW operation, owing to differing operating techniques. For CW or phone operation using a footswitch, the VOX GAIN control may be rotated fully counter-clockwise to the PTT position.

CW Sidetone

1. The CW sidetone level may be adjusted by means of VR_{10}, located on the rear apron.

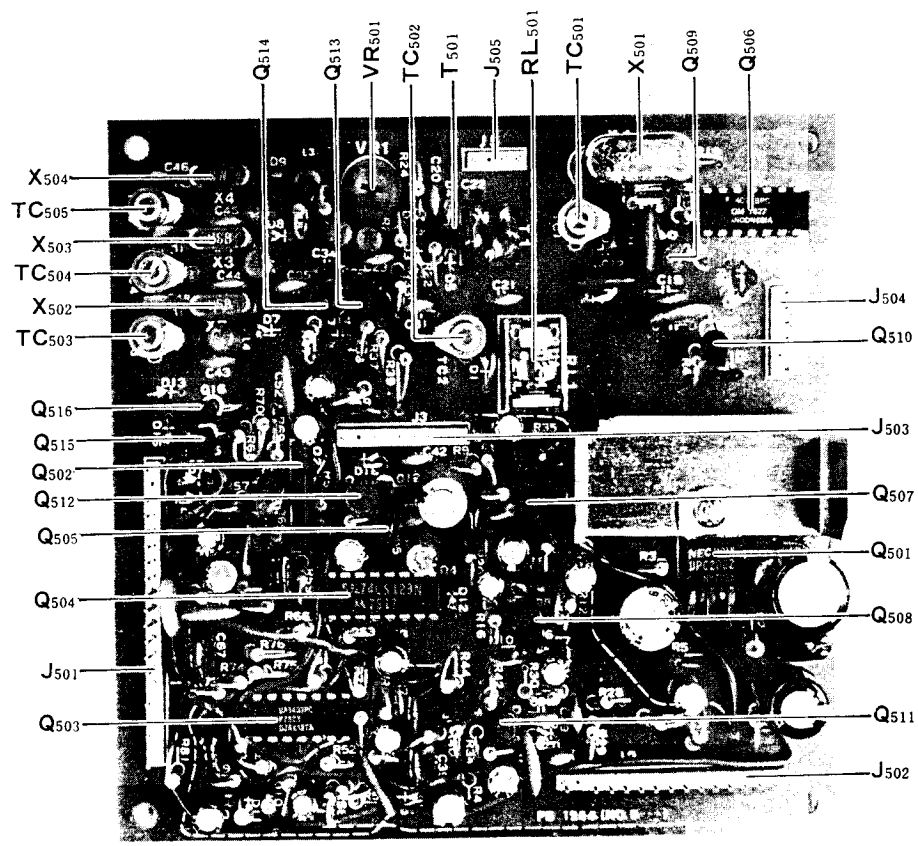
Marker Frequency setting

1. Preset the controls as follows:
   BAND ..... JJY/WWV
   DIAL ..... 5000.0 kHz
   PRESELECT . Peaked for maximum response
   MODE ..... TUNE
2. Place the NB/MARK switch in the MARK position. Tune in the WWV or JJY signal, and adjust TC_{501} for an exact zero beat with the carrier of the incoming signal.

Carrier Frequency Adjustment

A. SSB Carrier Point

1. Tune up the transmitter on 20 meters, LSB mode, into a dummy load. Apply a 1 kHz audio signal to the microphone input, and adjust the audio generator output until the transmitter power output is 60 watts, as indicated on the dummy load wattmeter.
2. Shift the audio generator output frequency to 300 Hz, without changing the output level. Adjust TC_{503} for a power output reading of 15 watts on the wattmeter.
3. Shift the MODE switch to USB. Adjust TC_{504} for an identical 15 watt reading on the wattmeter.



AF UNIT(PB-1964)

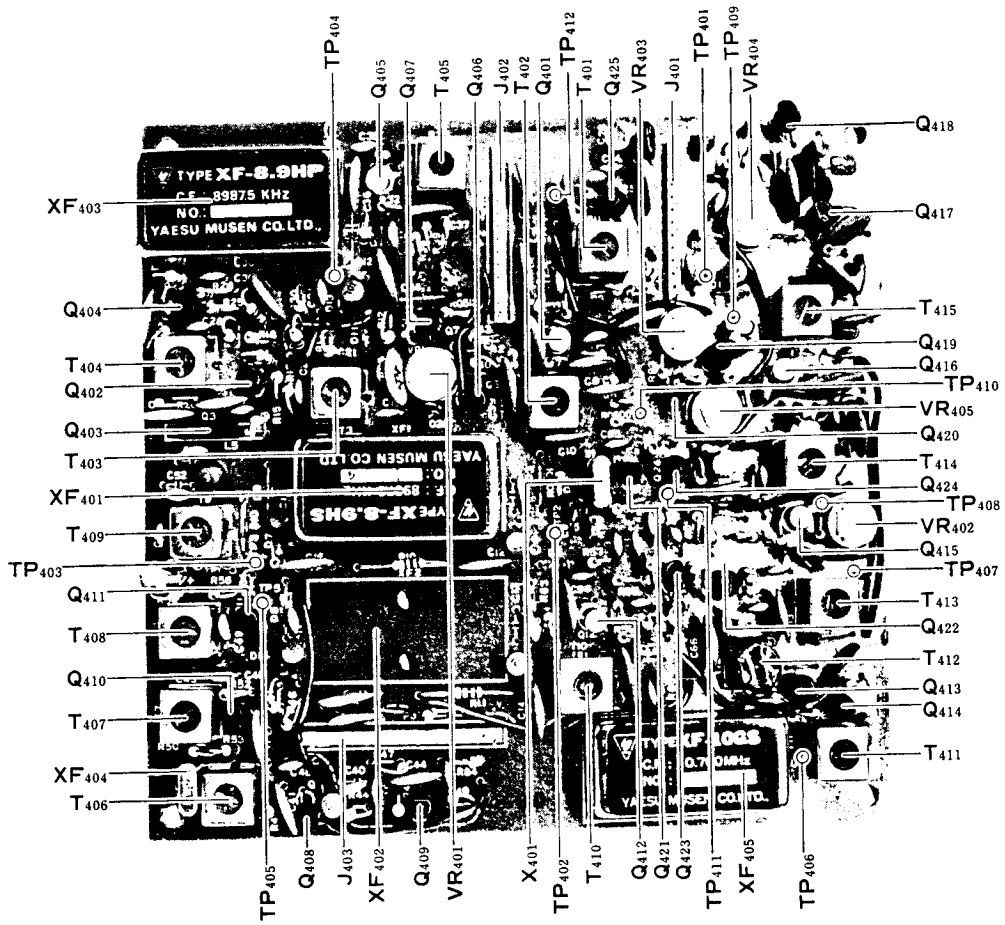
4. Recheck the LSB adjustment, as well as the carrier balance adjustment, after performing the carrier point alignment. The background noise, when switching between USB and LSB, should not change.

B. Carrier Balance

1. Tune up the transceiver on 20 meters, USB mode, into a dummy load. Set the main tuning dial to 14.250 MHz. Connect the RF probe of the VTVM to the antenna jack. Disconnect all microphones, etc., from the microphone jack.
2. Activate the transmitter by placing the VOX GAIN control into the MOX position. Adjust VR_{501} and TC_{502} for a minimum VTVM reading.
3. If a VTVM is unavailable, use an external monitor receiver, tuned to the transmitter frequency, and adjust VR_{501} and TC_{502} for a minimum S-meter reading on the external receiver.
4. This adjustment should be repeated several times on LSB and USB, in order to ensure complete carrier nulling.

C. CW Carrier Point

1. Connect a frequency counter to TP_{402}, located on the IF UNIT. Place the MODE switch in the TUNE position.
2. Adjust TC_{505} for a frequency counter reading of exactly 8988.3 kHz.
3. When using the optional CW filter, a substantial loss on transmit, when in the CW-N position, may indicate the need for adjustment as indicated in steps 1 and 2.



IF UNIT(PB-1963)

IF UNIT ALIGNMENT

S-Meter Sensitivity Adjustment

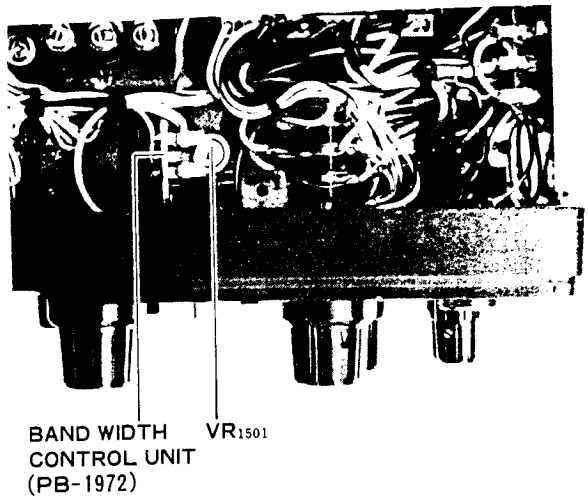
1. Set the BAND switch to 20 meters, the main dial to 14.250 MHz, and set the RF GAIN fully clockwise.
2. Set the signal generator to 14.250 MHz, and set its output to 6 dB. Tune the signal generator signal on the receiver, and peak the preselector for maximum signal strength. The S-meter should just begin to move with the 6 dB input.
3. Adjust VR_{403} for a reading of 0 on the S-meter.
4. Set the generator output to 100 dB, and adjust VR_{405} for a reading of S9 + 60 dB on the S-meter. Confirm that the preselector is peaked.
5. Return the signal generator output to 6 dB, and recheck the adjustment of VR_{403} .

Variable IF Bandwidth Alignment

1. Set the controls as follows:
   BAND . . . . . 20 m
   DIAL . . . . . 14.200 MHz
   RF GAIN . . . . . Fully clockwise
   WIDTH switch . . OFF
   MODE . . . . . USB
   Peak the preselector for maximum response against the marker signal or background noise.
2. Connect the frequency counter to TP_{411}. Adjust VR_{1501} for a reading of exactly 19.7475 MHz.
3. Place the WIDTH switch ON. Make sure that the WIDTH control is exactly in the 12 o'clock position. Adjust VR_{404} for a reading of exactly 19.7475 MHz on the frequency counter.
4. Switch between USB and LSB, and observe the background noise. If there is any difference, adjust VR_{1501} until the background noise is the same.

ALC Meter Alignment

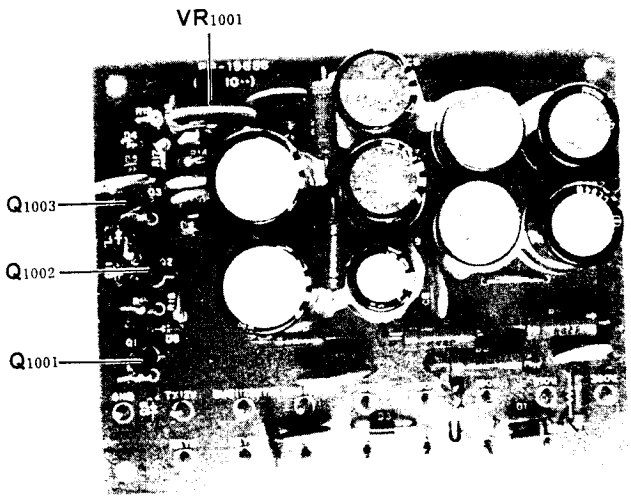
1. On any band, set the MODE switch to USB. Set the meter switch to ALC.
2. With no speech input, activate the transmitter. Adjust VR_{401} for a 0 reading on the ALC meter scale.



RECTIFIER B UNIT

Bias Adjustment

1. Set the MODE switch to USB or LSB, and set the MIC GAIN control fully counterclockwise.
2. Place the METER switch in the IC position, and set the VOX GAIN control to VOX. Adjust the PB-1968 BIAS control, VR_{1001}, for a reading of 50 mA. For 10 watt models, the correct meter reading is 25 mA.



RECT.B UNIT(PB-1968)

VFO UNIT

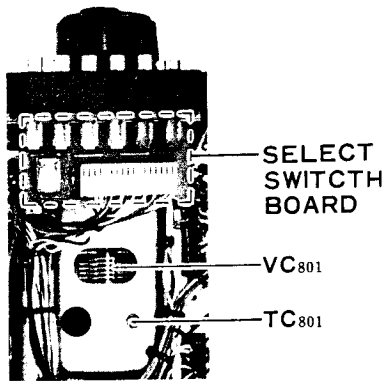
The VFO UNIT is very critical in its adjustment. As well, this is not an area which should ever require alignment. Questions regarding drift, etc., usually can be traced to other areas of the transceiver (instability in the supply voltage, etc.). For this reason, all cases regarding VFO repair should be referred to an experienced service technician.

The following components are of interest from a service standpoint:

TC_{801} is the band set trimmer.

TC_{802} is the VFO level set trimmer.

To confirm proper VFO injection, connect the VTVM to the VFO output. Adjust TC_{802} for a reading of 100 mV.



BAND	CRYSTAL	FREQUENCY	TRANSFORMER
160m	X_{601}	15.9875MHz	T601
80m	X_{602}	17.9875	T602
40m	X_{603}	21.4875	T603
20m	X_{604}	28.4875	T604
15m	X_{605}	35.4875	T605
10mA	X_{606}	42.4875	T606
10mB	X_{607}	42.9875	T607
10mC	X_{608}	43.4875	T608
10mD	X_{609}	43.9875	T609
JJY/WWY	X_{610}	19.4875	T610

Table 7

NB-FIX UNIT

Fixed Channel Frequency Alignment

When the optional fixed channel crystals are being used, they may be placed exactly on the correct frequency by adjusting TC_{201} (for channel 1) and TC_{202} (for channel 2). Confirmation of the correct frequency may be made with an external receiver or by loosely coupling a probe from the frequency counter to the transmitter output. A 1-turn loop is usually sufficient to provide indication on the counter.

PREMIX LOCAL UNIT

Premix Local Alignment .

1. Connect the RF probe of the VTVM to pin 1 of MJ_3 .
2. Refer to Table 7 , and adjust the appropriate transformer for a level of 300 mV for each band and crystal, as shown in the table.

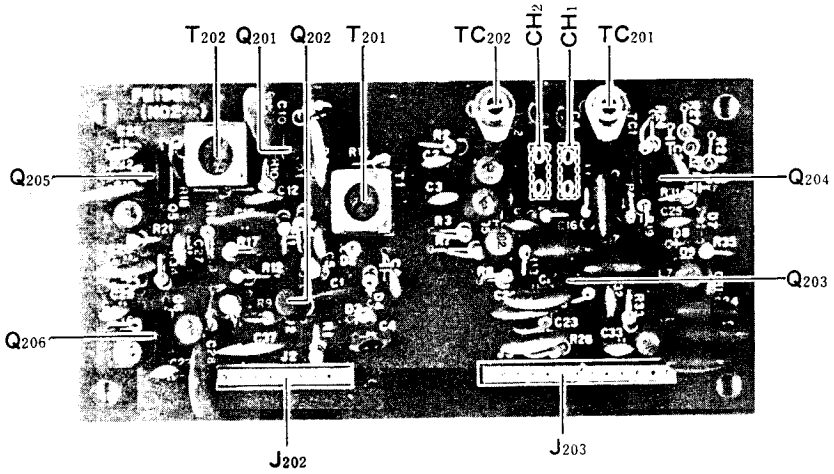
PREMIX UNIT

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

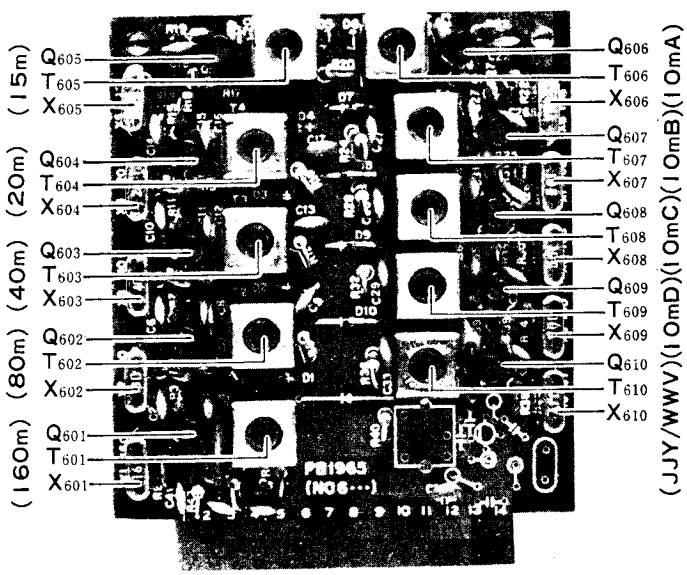
1. Press the EXT select switch. Apply 5.0 - 5.5 MHz sweep output to the VFO output terminal at the rear apron external VFO jack. Connect a high-impedance probe of an oscilloscope to J_{301} .
2. Adjust the transformers shown in Table 8 for a flat response across the entire passband. If you have never 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
20m	T_{307}, T_{308}	22.9—23.5
15m	T_{309}, T_{310}	29.9—30.5
10mA	T_{311}, T_{332}	36.9—39.0
JJY/WWV	T_{313}, T_{314}	13.9—14.5

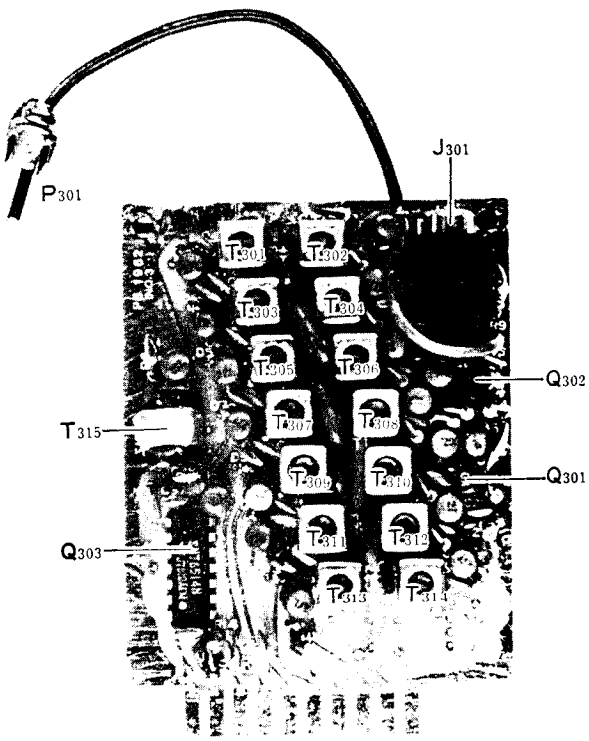
Table 8



NB·FIX UNIT(PB-1961)



PREMIX LOCAL(XTAL)UNIT(PB-1965)



PREMIX UNIT(PB-1962)

AM UNIT (After production lot #8)

1. Set the BAND switch to 40, the MODE switch to AM, and the DRIVE control to the 3 o'clock position. Tune up the transmitter in the usual fashion. Now adjust the core of T_{2401} for maximum power output into the dummy load/wattmeter.
2. Connect a frequency counter to TP_{2402}. Adjust TC_{2401} for a counter reading of exactly 8988.3 kHz while transmitting.
3. Connect the RF probe of the VTVM to TP_{2401}, and adjust TC_{2402} for a reading of 50 mV while transmitting.

TRANSMIT RF/IF TRANSFORMER ALIGNMENT

(1) Connect a dummy load to the antenna jack, and connect an audio signal generator to the microphone input. Tune up the transmitter at 14.2 MHz, and adjust the audio generator output for approximately 50 watts output into the dummy load, single-tone, SSB mode.

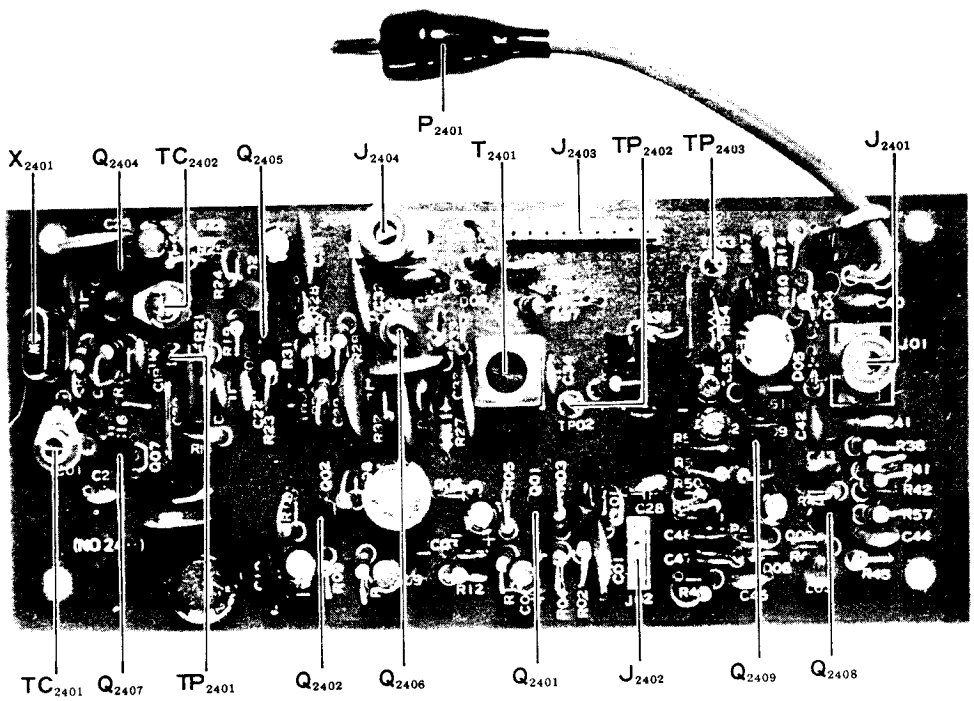
(2) Peak T_{104} (RF UNIT) for maximum power output.

(3) Peak T_{401} - T_{403} and T_{405} (IF UNIT) for maximum power output. Switch the RF processor on, and adjust the COMP LEVEL control for approximately 50 watts output. Peak T_{404} for maximum power output.

RECEIVER RF/IF/NB TRANSFORMER ALIGNMENT

(1) Tune in the marker generator signal at 14.2 MHz, with a dummy load connected to the antenna jack. Peak the preselector for maximum S-meter indication.

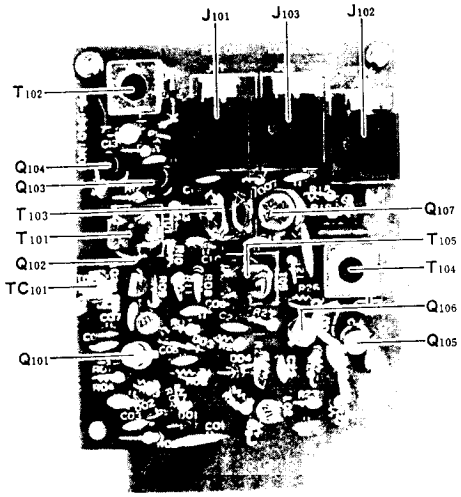
(2) Peak T_{102} (RF UNIT) for maximum S-meter indication.



AM UNIT (PB-2040)

(3) Peak T_{406} - T_{411} and T_{413} - T_{415} for maximum S-meter indication.

(4) Connect the RF probe of a VTVM to the collector of Q_{202} (NB-FIX UNIT). Reduce the RF GAIN control somewhat, and tune T_{201} and T_{202} for a dip in the VTVM indication. If no dip is observed, reduce the RF GAIN control further.



RF UNIT(PB-1960)

ALIGNMENT OF TRANSMITTER MIXER/ DRIVER AND RECEIVER FRONT END STAGES

CAUTION

Be certain not to exceed the recommended 10 seconds of key down time while performing the alignment of the transmitter mixer and driver stages, as described below. Always dip the PLATE control to establish resonance before proceeding with any adjustments. Off-resonance operation will shorten tube life dramatically.

(1) Connect a dummy load/wattmeter to the rear panel ANT jack.

(2) Set the MODE switch to TUNE, the BAND switch to 40, the VFO dial to 000, the PRESELECTOR control to 6 (on the scale of 1-10), and the DRIVE control fully clockwise. Connect a dummy load/wattmeter to the antenna jack, and set the neutralization trimmer TC_1 to the ½ position shown in Figure 2.

(3) Close the PTT switch, and dip the PLATE control for a minimum IC reading on the transceiver meter (the LOAD control should be set to the nominal setting shown in the "operation" section of this manual). Now adjust TC_{1403} for maximum power output into the wattmeter.

(4) Set the BAND switch to 10D, the PRESELECTOR control to 10 (on the scale of 1-10), and reduce the setting of the DRIVE CONTROL. Preset TC_{1206} to the ½ position, and TC_{1306} to the 1/3 position, as shown in Figure 21. Set the LOAD control to the correct position, and close the PTT switch. Dip the PLATE control for minimum IC reading on the transceiver meter. Now advance the DRIVE control to the point where maximum power output is obtained (do not go beyond the maximum PO point). Adjust the cores of T_2 and T_3 for maximum power output. Do not exceed the 10 second key down limitation during this adjustment.

(5) On receive, set the RF GAIN control fully clockwise, and turn the marker on. Tune in the marker signal at 30.000 MHz, and adjust T_2 and T_3 **slightly** for maximum deflection on the S-meter. Now recheck the peaking on transmit; several repetitions may be necessary to secure the proper ratio.

(6) Locate T_1, and set its core to the same physical level as the cores of T_2 and T_3 were set in step (5).

(7) Set the BAND switch to 10A, the VFO dial to 000, and tune up the transmitter. Peak the PRESELECTOR control for maximum power output. Now adjust TC_{1306} for maximum power output into the wattmeter. On receive, tune to the marker signal at 28.000 MHz, and adjust TC_{1206} (and TC_{101} on the RF UNIT) for maximum deflection of the S-meter.

(8) As there may be some interaction of adjustments, please repeat steps (3) through (7), so as to be sure of proper tracking.

(9) Adjust the final amplifier neutralization, as described on page 3-35

(10) Again recheck steps (3) through (7).

(11) Now you are ready to align the other bands. Set the BAND switch to 15, the VFO dial to 000, and the PRESELECTOR control to 8.5 (on the scale of 1-10). Set the LOAD control to the proper position. Close the PTT switch, and dip the PLATE control for minimum IC indication on the transceiver meter. Now adjust TC_{1405} and TC_{1305} for maximum power output into the wattmeter. On receive, tune to the marker signal at 21.000 MHz, and peak TC_{1205} for maximum S-meter deflection on the marker signal.

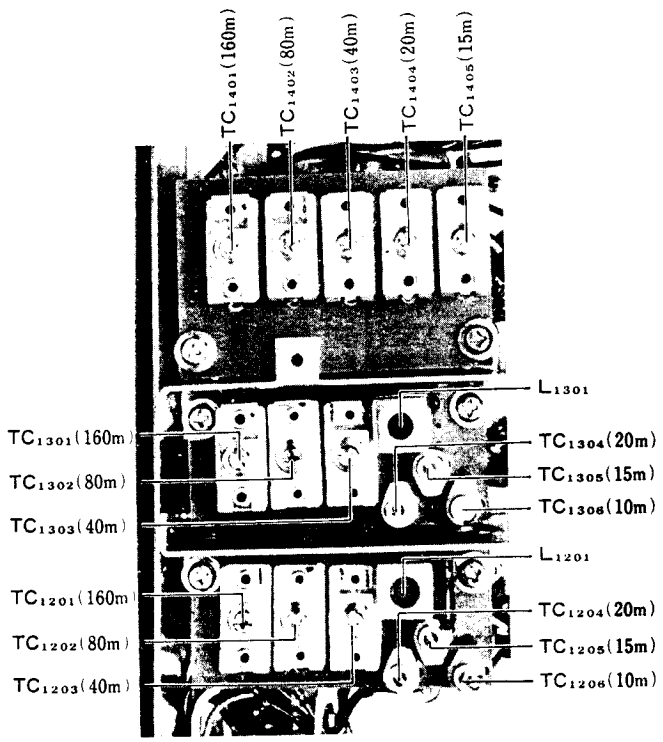
(12) Set the BAND switch to 20, the VFO dial to 000, and the PRESELECTOR control to 8 (on the scale of 1-10). Set the LOAD control to the proper position. Close the PTT switch, and dip the PLATE control for minimum IC indication on the transceiver meter. Now adjust TC_{1404} and TC_{1304} for maximum power output into the wattmeter. On receive, tune to the marker signal at 14.000 MHz, and adjust TC_{1204} for maximum S-meter deflection on the marker signal.

(13) Set the BAND switch to 40, the VFO dial to 000, and the PRESELECTOR control to 6 (on the scale of 1-10). Set the LOAD control to the correct position. Close the PTT switch, and dip the PLATE control for minimum IC reading on the transceiver meter. Now adjust TC_{1403} and TC_{1303} for maximum power output into the wattmeter. On receive, tune to the marker signal at 7.000 MHz, and adjust TC_{1203} for maximum S-meter deflection on the marker signal.

(14) To adjust the trap tuning, leave the VFO dial at 000, and the PRESELECTOR at 6. Remove the dummy load/wattmeter from the antenna jack, and connect a signal generator to the antenna jack. Inject a 90 dB signal at 9.9875 MHz. Adjust L_{1201} and L_{1301} for minimum S-meter deflection. Remove the signal generator, and reconnect the dummy load/wattmeter.

(15) Set the BAND switch to 80, the VFO dial to 000, and the PRESELECTOR control to 2.5 (on the scale of 1-10). Set the LOAD control to the correct position. Close the PTT switch, and dip the PLATE control for minimum IC indication on the transceiver meter. Now adjust TC_{1402} and TC_{1302} for maximum power output into the wattmeter. On receive, tune to the marker signal at 3.500 MHz , and adjust TC_{1202} for maximum S-meter deflection on the marker signal.

(16) Set the BAND switch to 160, the VFO dial to 400 (1.900 MHz), and the PRESELECTOR control to 1.2 (on the scale of 1-10). Set the LOAD control to the correct position. Close the PTT switch, and dip the PLATE control for minimum IC indication on the transceiver meter. Now adjust TC_{1401} and TC_{1301} for maximum power output into the dummy load. On receive, tune to the marker signal at 1.900 MHz, and adjust TC_{1201} for maximum S-meter deflection on the marker signal.



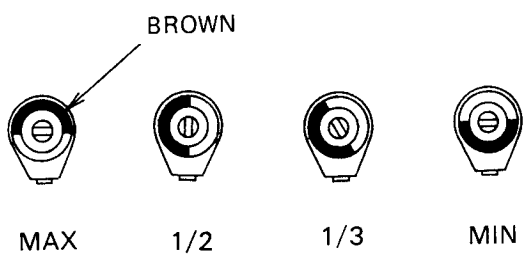


Figure 21

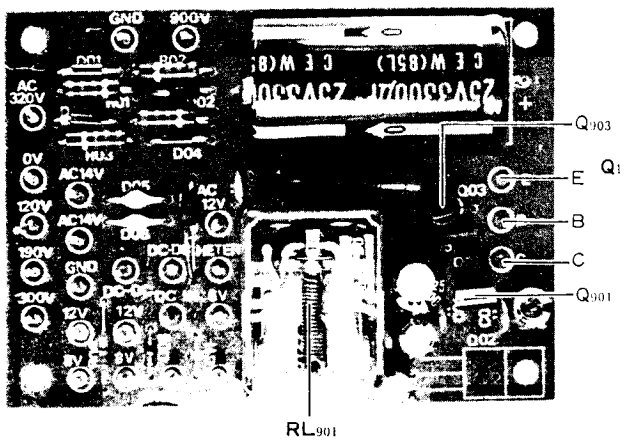
ADVICE ON TROUBLESHOOTING THE DRIVER/FINAL AMPLIFIER STAGES

Three tubes are used in the FT-101ZD: a 12BY7A driver, and two 6146Bs in the final amplifier.

Because not all service personnel are as familiar with tubes as they are with semiconductors, we would begin by cautioning you that tubes are voltage devices. To produce power in useful amounts, they require voltages well in excess of that needed for solid state devices. Take care, lest you develop "serviceman's elbow," a malady well known to old timers. It occurs when your arm jerks back from the +800 volts right into some immovable object. Accompanied by a few colorful phrases, it is not an experience one knowingly encourages, though it is seldom fatal.

The old adage of "keep one hand in your hip pocket" should be heeded whenever working in areas of exposed high voltage. If you **should** come into contact with the high voltage, it is best to call it quits for the service day. Alert your colleagues to what happened, and do not hesitate for even 5 minutes to seek medical attention should **any** signs of shock (trauma) develop. Trauma following contact with high voltage is sometimes more dangerous than the high voltage itself. IT CAN BE FATAL!

Never work on high voltage circuits while alone. You may need someone to turn off the power in an emergency. SAFETY FIRST!



RECT A UNIT(PB-1967)

FINAL AMPLIFIER NEUTRALIZATION

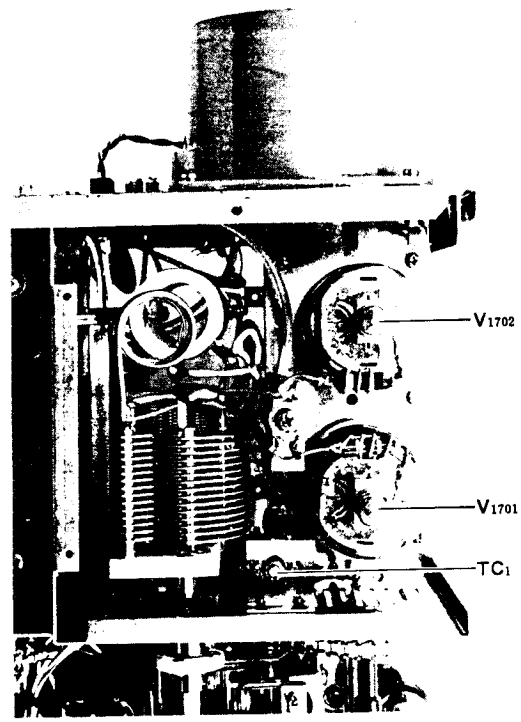
Important Note: For this alignment, use a NON-METALLIC tuning wand.

(1) Set the BAND switch to 10C, set the tuning dial to 29 MHz, and tune into a dummy load for approximately 70% full output power.

(2) Set the METER switch to IC, and observe the dip in the cathode current. The dip should occur at the same point that maximum power output (measured on the dummy load wattmeter) occurs. If this is not the case, adjust TC_1, located inside the final amplifier cage, for the required coincidence of maximum power output and dip on the IC meter.

CAUTION: HIGH VOLTAGES ARE PRESENT ON THE UNDERSIDE OF THE CHASSIS AND INSIDE THE FINAL AMPLIFIER COMPARTMENT. USE GREAT CARE WHILE MAKING ADJUSTMENTS IN AREAS OF EXPOSED WIRING.

Note: The final amplifier enclosure must be in place to provide the required RF shielding during the neutralization procedure.



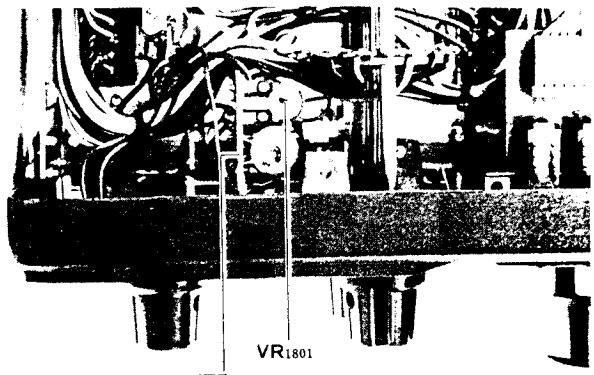
Final Amplifier Compartment

CLARIFIER ALIGNMENT

(1) Tune in the marker generator signal on any band, and peak the preselector on the marker signal.

(2) With the CLARIFIER control OFF, make sure that the CLARIFIER knob is exactly at the 12 o'clock position. Note the tone of the marker signal.

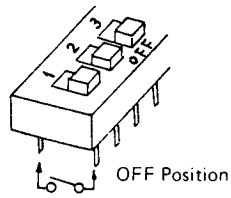
(3) Switch the RX CLARIFIER to ON, and observe the tone of the marker signal. If it is different from when the clarifier was turned off, adjust VR_{1801} for an identical tone with the CLARIFIER knob exactly on the zero mark.



CLARIFIER
CONTROL UNIT
(PB-1973)

COUNTER UNIT (Early model ... Prod. #01 – #15)

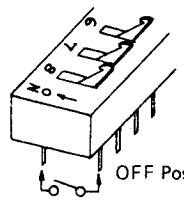
The carrier points for USB, LSB, and CW are preset as follows: USB = 91.011.0; LSB = 91.014.0; CW or AM = 91.011.7. If, for some reason, it is desired to set these frequencies elsewhere, refer to the "Frequency Counter Preset Switch Position" drawing and chart. Adjustment of ±200 Hz is possible as shown. The adjustment is carried out on the miniature switch shown in the drawing.



OFF Position

DSS208

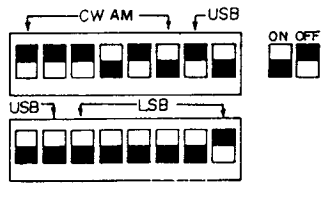
P.N. (N7090016)

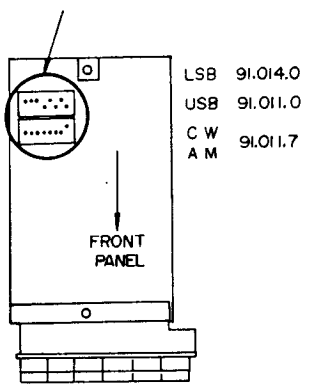


OFF Position

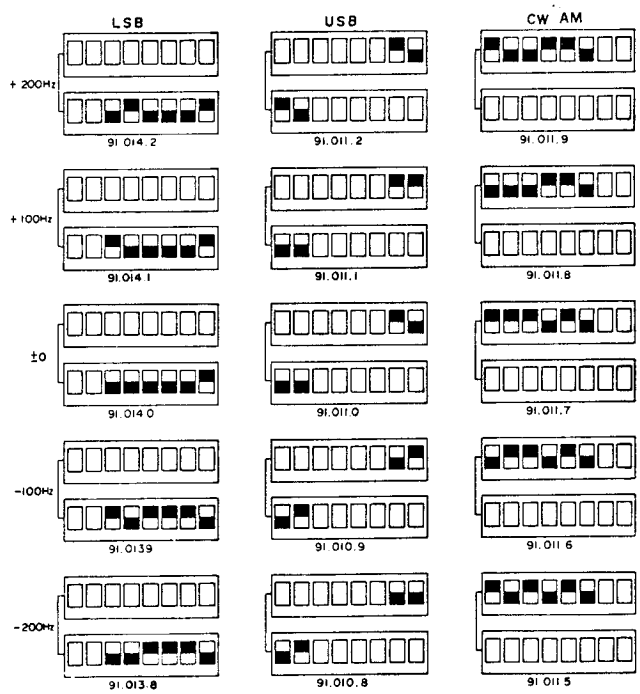
A10040-008

P.N. (66000005)





FREQUENCY COUNTER PRESET SWITCH POSITION



FAULT LOCALIZATION

The process of troubleshooting is highly individualistic. Fundamentally, though, the process is one of logical elimination.

Begin with a visual inspection of the transceiver, looking for broken, discolored, or charred components. Smell the unit, as burnt transformers smell differently than resistors, etc. If you do find a component that is cooked, remember that another fault may well have caused the destruction of the part you have located.

Set up the unit for test using a dummy load and wattmeter. Never shoot trouble using an antenna.

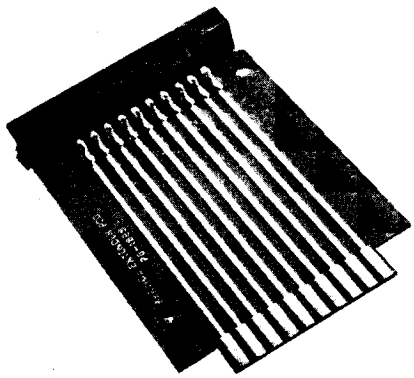
Initially, turn on the receiver, and check out only the RX side. Any malfunctions you detect on the receiver side should be repaired before you check out the transmitter. In doing this, you may well cure the entire problem, as much circuitry is shared on TX and RX.

The logical process of fault identification involves determination of the missing function (no RX on LSB), then the board at fault (AF UNIT), then the band circuit (LSB oscillator), then the malfunctioning part (X_{502}).

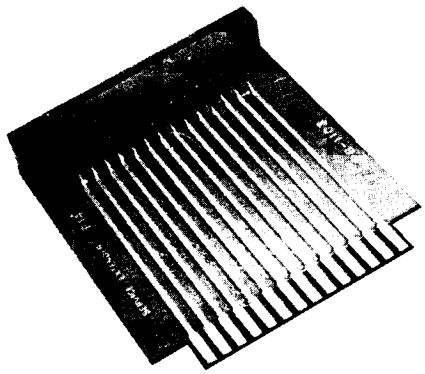
If, after the receiver inspection is completed, all is OK, switch to the transmit side, following the same logical procedure (function-board-circuit-component). Concentrate on those sections unique to the transmit side, as you have already performed a thorough checkout of all receiver and shared circuits (hopefully).

In this section, we will provide troubleshooting advice which leads you directly to suspect components. As the FT-101ZD is a complex electronic instrument, though, it is obviously impossible for us to trace the path of every possible malfunction in the radio. Therefore, if these tips do not lead you to identification of the trouble, the logical elimination process is the way to go.

For troubleshooting, an "extender board" is a valuable tool for quick and easy voltage testing. A double-sided 10-pin extended board will allow tests on the RF and PREMIX boards, and a 14 pin single-face extender will do for the PREMIX LOCAL board. The other boards in the FT-101ZD are not of the plug-in variety, but test points are provided for easy servicing.



10 PIN EXTENDER BOARD



14 PIN EXTENDER BOARD

TROUBLESHOOTING

A FUNDAMENTAL ANALYSIS OF THE TROUBLE

The failure may be caused by one of the following:

1) Mechanical defect
2) Electrical defect
3) Others (Murphy's Law, etc.)

1. MECHANICAL DEFECTS

Typical mechanical defects encountered by the technician are:

a) Damage from shock during transportation (remember the unit was probably subjected both to sea and truck shipment).
b) Damage caused by vibration in service.
c) Damage caused by forcing stubborn knobs or switches. This difficulty is usually proceded by one of the above two defects.

2. ELECTRICAL DEFECTS

Typical electrical defects encountered are:

a) Part(s) failure(s) caused by aging.
b) Failures caused by improper application of supply voltage, or by voltage spikes. An improper fuse in use could cause extensive damage to be sustained.
c) Improper operation (e.g. transistors without load – this usually points to failure elsewhere, in addition to the damaged transistor of IC).
d) Loose connections at the power connector or elsewhere caused by cold solder joints, etc.

3. OTHERS

Among the miscellaneous types of failures or difficulties encountered are:

a) Antenna troubles – poor connectors, use of cheap coax not made to withstand weather, and sabotage by neighbors (nail driven through coax, etc.).
b) "Cockpit error:" including mislabeled coax lines to coax switch, or attempt to use transceiver on frequencies other than those it was designed for.
c) Murphy's Law: use of a non-Yaesu microphone with different connections, for example (See page1-11)

TYPICAL PART FAILURES, CAUSES, AND SYMPTOMS

PARTS	CAUSE OF TROUBLE	SYMPTOMS
Semiconductors (IC, FET, TR)	High supply voltage Open circuit Excessive drive High temperature	Short or open circuit Output decreases to 1/2 at 80°C Internal noise Instability
MOS FET MOS IC	Static electricity	Total failure
Crystal Crystal filter	Shock High temperature	Crystal destroyed Frequency drift Filter bandpass change
Resistor	Excessive power Aging High temperature	Component burned Value changed Open circuit
Potentiometer	Excessive power Shock	Component burned Open circuit Noise Unsmooth rotation
Capacitor	Excess voltage High temperature Excess power	Shorted Leakage Open/decreased capacitance
Variable capacitor Trimmer capacitor	Ratings exceeded Dust between plates Shock, forced rotation	Shorted Leakage Unsmooth rotation
Coils	Ratings exceeded Variation	Open or short circuit Leakage or shorted turns Detuned
Switch	Ratings exceeded Aging	Poor contact Unsmooth operation Open circuit
Relay	Ratings exceeded Humidity	Poor contact Noise Coil open

RECEIVE MODE

TROUBLESHOOTING CHART

Problem	Condition	Probable Cause(s)
(1) No AC Power applied	(a) Fuse OK	* Defective power switch * Defective AC line cord * Cold solder joint to AC cord * Loose contact at power jack
	(b) Fuse blows	* Defective DC-DC Converter (check w/o DC-DC Converter) * Defective D_{901} – D_{904} * High voltage line shorted * Short in 6146B electrodes * Defective D_{905}, D_{906} in 13.6 VDC line * Defective D_{1001}–D_{1003} in DC 300 and 210 V line * Short in pilot lamp supply * Improper transformer connections
	(c) Fuse blows after tubes warm up	* Defective 6146B * Defective R_{1013}, R_{1703}, L_{1701} * Cold solder joint to pin 5 of 6146B socket * Defective bypass capacitor in control grid circuit * Check for −130 volts bias on 6146B * Leakage or short at C_{1701} * Leakage or short at C_1
	(d) Tube heaters do not light up.	* Defective heater switch * Cold soldering in heater supply line * Defective tube * ACC plug not installed * Loose connection at tube socket or ACC jack
	(e) No DC operation, OK on AC	* Defective DC cord
	(f) OK on AC, fuse blows on DC with heater switch on	* Defective T20A6 transistor in DC-DC Converter * Defective D_{1001}–D_{1003}, D_{905}, D_{906}
	(g) OK on AC, fuse OK, but no DC operation	* Defective T20A6 transistor * Cold solder joint in DC-DC converter
(2) No reception	(a) S-meter OK, but no audio output from speaker	* Defective speaker * Defective μPC2002H or 2SC1000GR on PB-1964 * Defective audio circuit around above transistor/IC * Defective EXT SP jack

	(b) No audio output on some mode:	
	LSB	* Defective X_{502}, D_{2404}
	USB/CW	* Defective X_{503}, D_{2404}
	AM	* Defective Q_{2408}, Q_{2409}, D_{2405}, D_{2406}
	Some mode	* Defective mode switch or cold solder joint on switch
	(c) No audio output, S-meter off scale	* Defective RF GAIN control * Defective Q_{419}, Q_{420} (PB-1963)
	(d) Speaker appears OK, no S-meter deflection	* Defective RL_1, Q_{419}, Q_{420}, VR_{405} * Defective 19.7475 MHz xtal * Defective Q_{421}, Q_{422}, Q_{423} * Defective Q_{411} * Defective Q_{101}–Q_{104} (PB-1960) * Defective Q_{408} * Defective Q_{412}–Q_{418}
	(e) MARKER ON, only slight S-meter deflection on the marker signal	* Low PREMIX output (see section on COMMON CIRCUITS) * Defective T_1, L_{1201}, or C_{1207} * Check tuning or T_{102}, T_{406}–T_{415} * Tracking error in RF coils * Defective XF_{401}–XF_{402} or XF_{405}
	(f) Normal S-meter deflection against marker signal (S9 +10 dB nominal)	* Defective FH_2 (lamp fuse) * Defective RL_2 (Antenna Relay) * Defective S_{2004} (ATT)
(3) Partial reception	(a) Poor reception on one or more bands (some bands OK)	* Low PREMIX output (see section on COMMON CIRCUITS) * Defective band switch * Defective TC_{1201} (160 m)–TC_{1206} (10 m), C_{1201} (160 m)–C_{1206} (10 m)
(4) Self-oscillation	(a) Oscillation with HEATER switch on	* Defective 6146B, R_{1013}, R_{1703}, L_{1701} * Defective L_{1701}, C_1 * Defective R_{1014}, R_{1017}, R_{1601}, R_{1602}, C_{1015} * Defective Q_{1002}, Q_{1003} (PB-1968)
	(b) Oscillation with HEATER switch either on or off	* TX 12 V line shorted to RX 12 V line. Check at each board, TX/RX switching diodes and switches.

(5) Marker inoperative	(a) RX OK, no marker signal heard	* Defective NB/MARK switch Check voltage at pin 4 of J_{504} in PB-1964. Should be 8 volts nominally * Defective X_{501} * Defective Q_{606}, Q_{609} and Q_{610}

TRANSMITTER

Problem	Condition	Probable Cause(s)
(1) No power output	(a) IC OK, but no power output	* Defective L_1, L_2, L_9 * Shorted VC_1, VC_2 Defective C_{66} * Low bands only: Defective C_5–C_8 * Defective RL_2
	(b) IC OK, but no output on a particular band	* Cold solder joint between band switch and tank coil * Defective band switch
	(c) No IC indication	* Defective 6146B * ACC plug not correctly wired or improperly seated * No screen voltage at 6146B because of defective L_{1804}, band switch
	(d) Idling IC OK, but no drive	* Defective 12BY7A * No screen voltage because of defective R_{1603}, C_{1009}, R_{1007}–R_{1009} * Defective Q_{105}, Q_{106} or Q_{405}
(2) Poor TX	(a) No power output on LSB only	* Defective X_{502}
	(b) No power output on USB only	* Defective X_{503}
	(c) No power output on both USB/LSB	* Defective RL_{501}, Q_{502}, D_{2402} * No vox operation: defective or grounded MIC or PATCH jack * Defective Q_{503}, Q_{504} or Q_{512}
	(d) No power output on CW/TUNE	* Defective X_{504}, Q_{401}, D_{2402}
	(e) No CW keying	* Defective mode switch, Q_{1001}, and associated circuit * Defective D_{506} if carrier hangs up
	(f) No modulation on AM	* Defective Q_{2401}–Q_{2407}, D_{2401}, X_{2401}
(3) Abnormal meter	(a) Cannot set ALC meter	* Defective C_{1016} * Defective Q_{405}, VR_{401} * Defective meter switch or RL_1

	(b) ALC meter does not function	* Defective 12BY7A * ALC line shorted to ground * Defective D_{1006}, D_{1007} * Driver, IF stages require realignment.
	(c) Power output OK, no IC meter indication	* Defective R_{1706} or meter switch * Defective RL_1
	(d) Power output OK, PO meter does not function	* Improper setting of VR_8 * Defective C_{10}–C_{12}, C_{50}, L_7, D_1, VR_8, or mode switch
(4) No changeover from RX to TX	(a) TX OK in MOX position	* Failure in MIC or PTT line * Loose MIC jack or plug connection
	(b) No TX in MOX position	* Defective VR_1 * Defective RL_1, D_7
	(c) VOX inoperative	* If no CW semi-break-in, check Q_{503}, Q_{504}, Q_{512}.
(5) No return to RX from TX		* PTT line grounded * Defective Q_{512} * Defective Q_{503}, Q_{504}
(6) Fuse blows on transmit	(a) OK on RX	* Insufficient bias voltage on 6146B
(7) TX self-oscillation	(a) OK on receive	* Neutralization of final tubes required * Defective C_{16}, C_{18}, C_{15}, C_{1605} * RX 12 V line shorted to TX 12 V or TX 8 V line only on TX
(8) RF processor trouble	(a) Low or no output with processor on	* Processor switch defective * Defective XF_{403} * Defective Q_{402}–Q_{404}

COMMON CIRCUITS

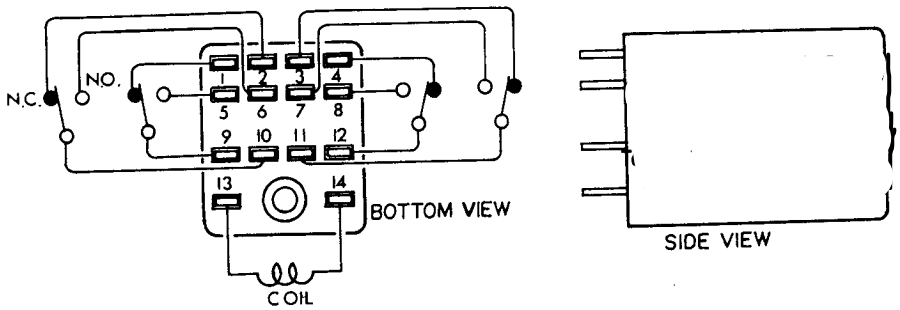
Problem	Condition	Probable Cause(s)
(1) Counter circuit	(a) Digital display does not work	* Defective Q_{2310} * 5 V line in Counter Unit grounded * Defective display LED * Defective Q_{2208}–Q_{2213} * Defective R_{2204}–R_{2245}
	(b) Six digits to the right read below: LSB "91.014.0" USB "91.011.0" CW "91.011.7"	* VFO input not connected or is grounded * Defective Q_{2301}–Q_{2304}, Q_{2309} * Defective 655.36 kHz crystal * Defective Q_{2305}
	(c) Display unstable, all digits working OK	* Defective 655.36 MHz crystal * Low PREMIX input (80–120 mV RMS OK)
(2) PREMIX LOCAL UNIT	(a) No oscillation on all bands	* Defective BAND switch S1A * Open R_{22} * Shorted C_{53} * Defective Q_3
	(b) No oscillation on particular band	* Switching diode for that band defective (check D_{601}–D_{610}) * Defective output coil for that band (check T_{601}–T_{610}) * Defective oscillator transistor for that band (check Q_{601}–Q_{610}) * Defective crystal for that band (check X_{601}–X_{610}) * Defective resistor or capacitor in oscillator circuit for that band
(3) PREMIX UNIT	(a) Output not correct on all bands (nom. output of 100 mV is OK.)	* Defective Q_{301}–Q_{303} * Check for 12 V at pin 9 of PREMIX UNIT * Check for local input at pin 7 * Defective R_{308}, R_{309}, L_{314}, L_{315} * Defective Q_3 * Defective R_{22}, C_{53}
	(b) Output not correct on a particular band	* Defective BAND switch S1A * Defective diodes D_2–D_5 * Defective bandpass filter output diode for that band (check D_{301}–D_{314}) * Defective bandpass filter coil for that band (check T_{301}–T_{314}) * Defective RF choke for that band (check L_{301}–L_{314})

(4) Indicators	(a) WIDTH LED does not work	* Defective LED D_{1501} or R_{1501}, S_{1501}
	(b) CLARIFIER LED does not work	* Defective LED D_{1802} or S_{1801}, S_{1802}, R_{1804}
	(c) PROCESSOR LED does not work	* Defective LED D_9 or R_{17}, S_{2005}
	(d) CH_1, CH_2 does not work	* Defective LED D_{1905}, D_{1906} or S_{701} (e, f), R_{1902}
	(e) TX EXT LED does not work	* Defective LED D_{1902} or RL_{701}, S_{701} (a–f), R_{1902}
	(f) RX EXT LED does not work	* Defective LED D_{1903} or RL_{701}, S_{701} (a–f), R_{1902}
	(g) VFO LED does not work	* Defective LED D_{1904} or S_{701} (a–f), R_{1901}
	(h) EXT LED does not work	* Defective LED D_{1901} or S_{701} (a–f), R_{1901}
(5) Clarifier	(a) Frequency jumps with clarifier on	* Defective VR_6, R_{1801}, R_{1802}, S_{1801}, S_{1802}, RL_{1801}
	(b) OFF and "0" condition do not coincide in frequency	* Defective VR_{1801}, R_{1803}, R_{1805}, RL_{1801}
	(c) Frequency jumps with clarifier off, OK with clarifier on	* Defective VR_{1801}, R_{1803}, R_{1805}, S_{1801}
	(d) Frequency jumps regardless of clarifier position	* Unstable 8 V REG supply, check Q_3. * Check VFO unit

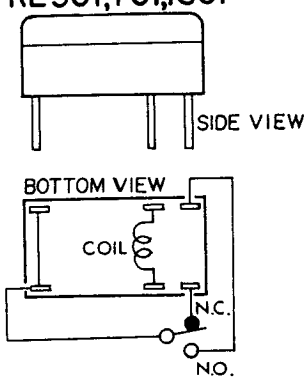
RELAY CONNECTION INFORMATION

Should the need for replacement of relays become necessary, or if you are trying to verify proper relay operation, the diagrams below should help you.

RL-1,901

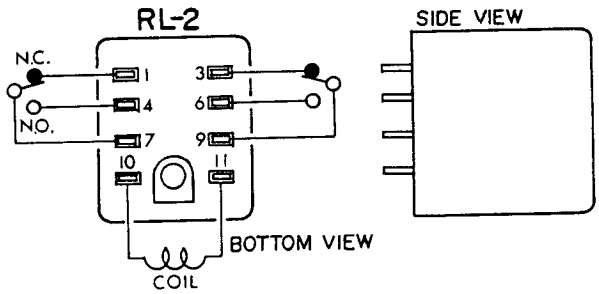


RL-501,701,1801



FBR-211AD012M

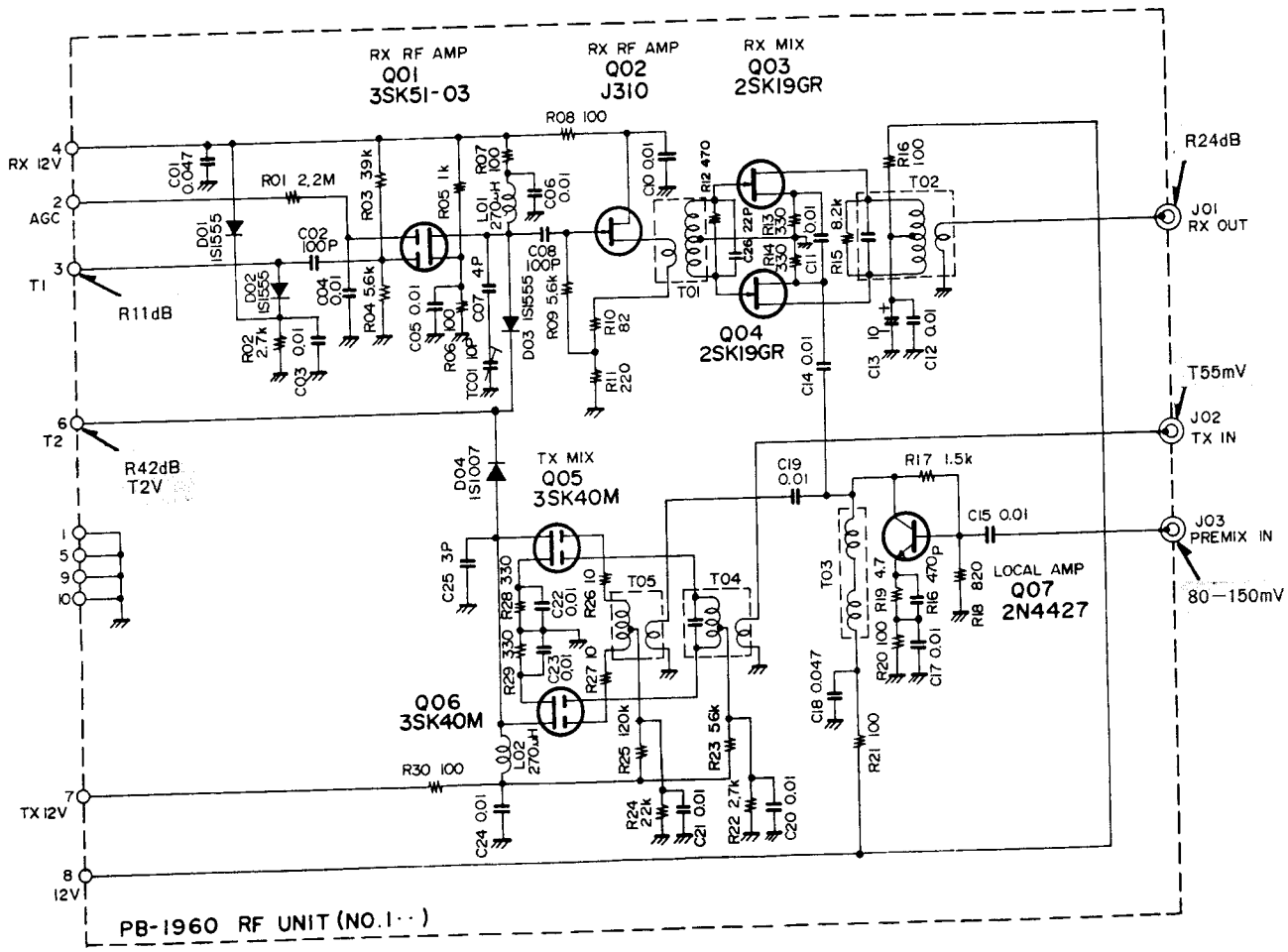
RL-2



MX-2P

RF UNIT (PB-1960A)

(Early model) Before Prod. #16

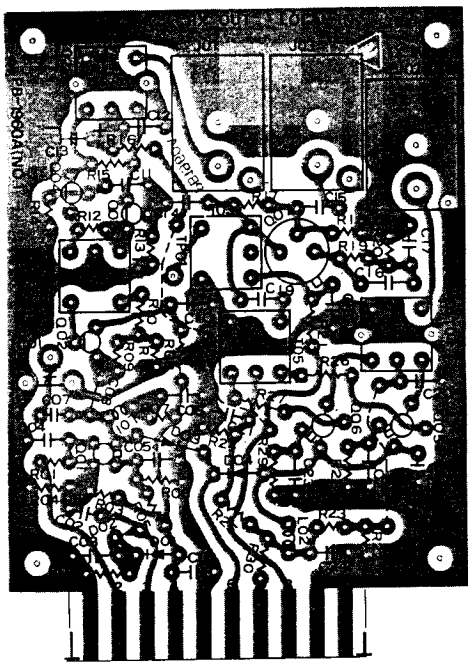


DC VOLTAGES

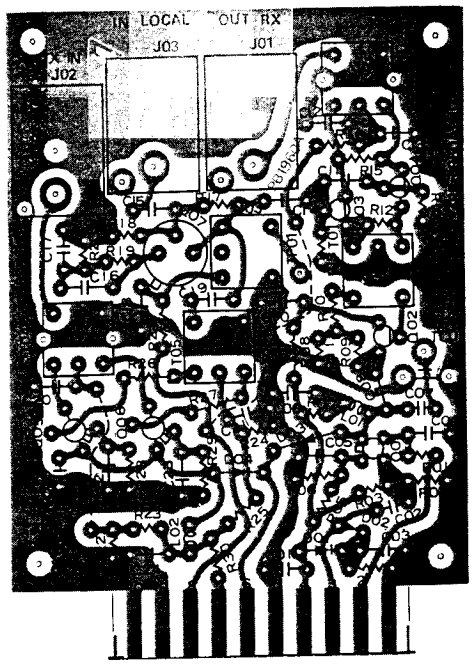
(V)

	E(S)		C(D)		B(G_1)		(G_2)	
	R	T	R	T	R	T	R	T
Q_{101}	1.6	0	10.6	0	1.5	0	0.5	0.5
Q_{102}	3.9	0	10.9	0	2.8	0	—	—
Q_{103}	1.0	0	11.6	0	0	0	—	—
Q_{104}	1.0	0	11.6	0	0	0	—	—
Q_{105}	0	0.7	0	10.6	0	0.5	0	1.6
Q_{106}	0	0.7	0	10.6	0	0.5	0	1.6
Q_{107}	2.4	2.4	9.5	9.5	3.1	3.1	—	—

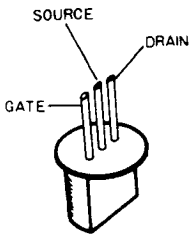
RF UNIT PARTS LAYOUT



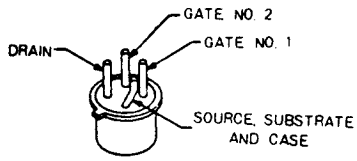
Viewed from component side



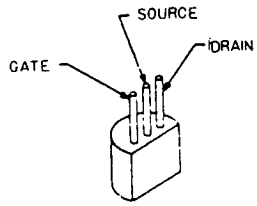
Viewed from solder side



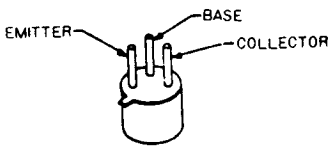
2SK19GR



3SK40M
3SK51-03

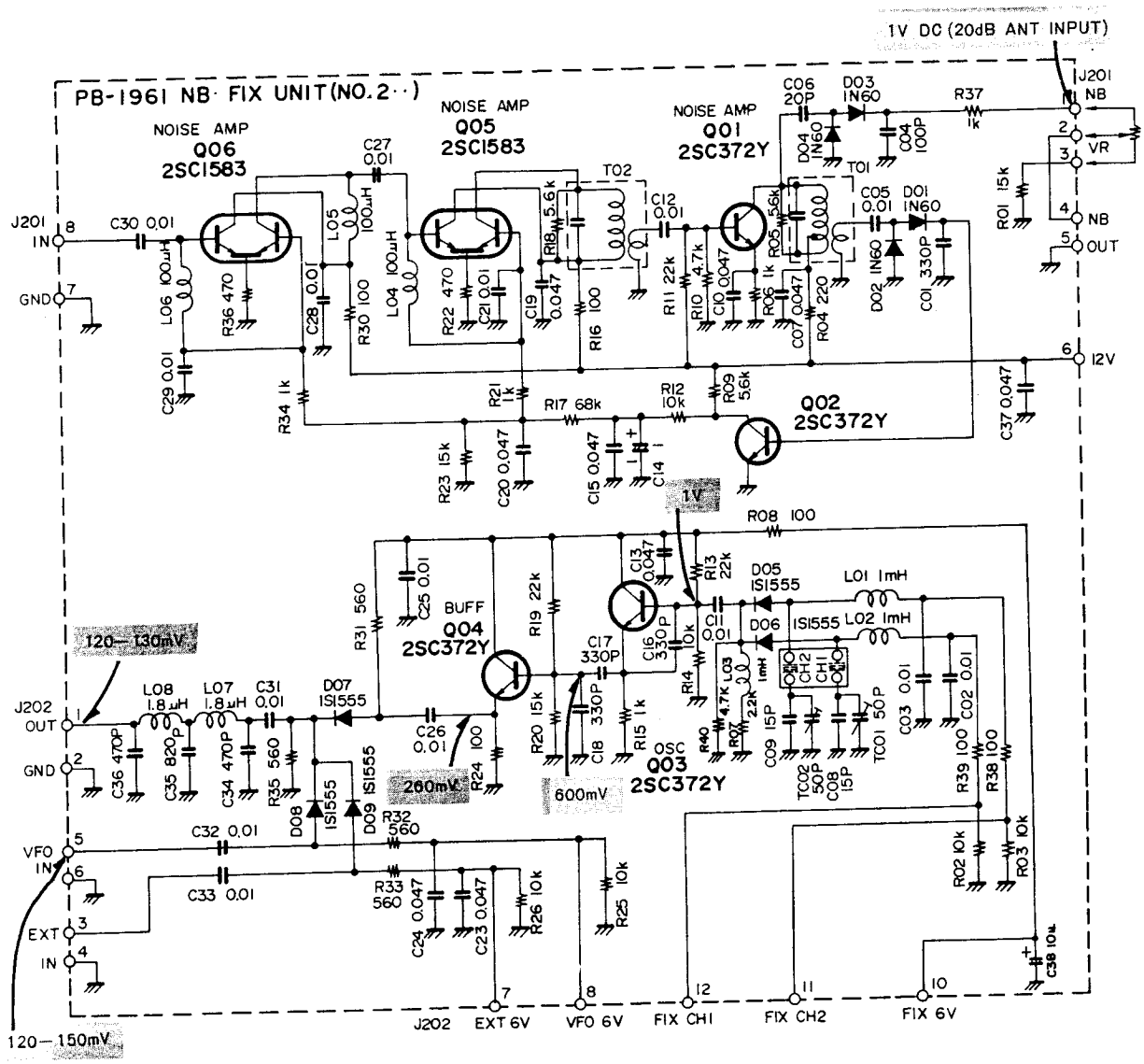


J310



2N4427

NB/FIX UNIT (PB1961B)



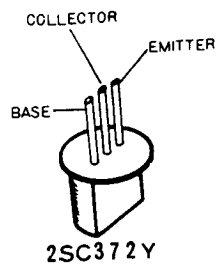
DC VOLTAGES

(V)

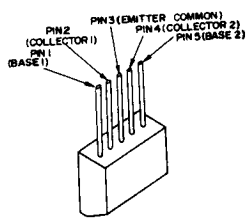
	E	C	B	
Q_{201}	1.5	11.9	2.1	NB ON (NB OFF 0V)
Q_{202}	0	11.4	0.2	
Q_{203}	0.8	4.7	1.4	FIX ON (FIX OFF 0V)
Q_{204}	1.0	4.7	1.5	

(V)

	1(B_1)	2(C_1)	3(E)	4(C_2)	5(B_2)	
Q_{205}	1.7	12.0	1.1	12.0	1.7	NB ON (NB OFF 0V)
Q_{206}	1.7	12.0	1.1	12.0	1.7	

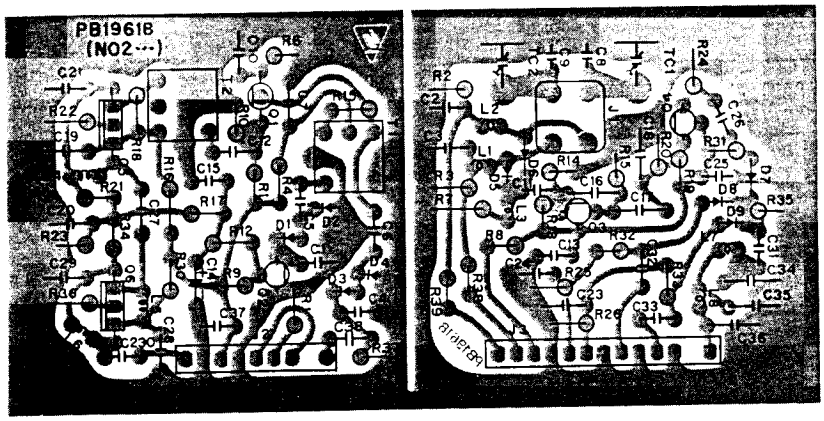


2SC372Y

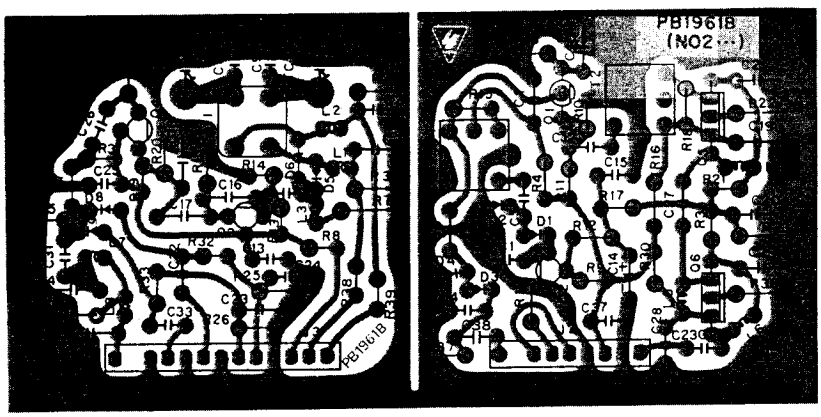


2SC1583

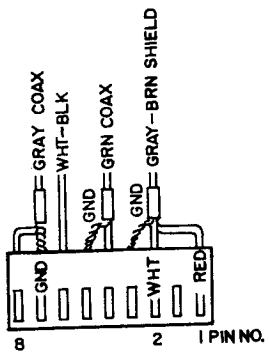
NB / FIX UNIT PARTS LAYOUT



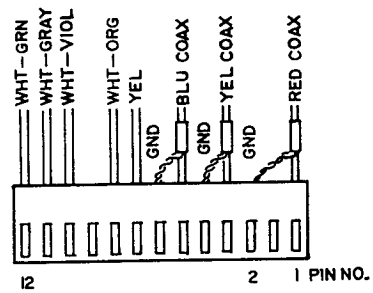
Viewed from component side



Viewed from solder side



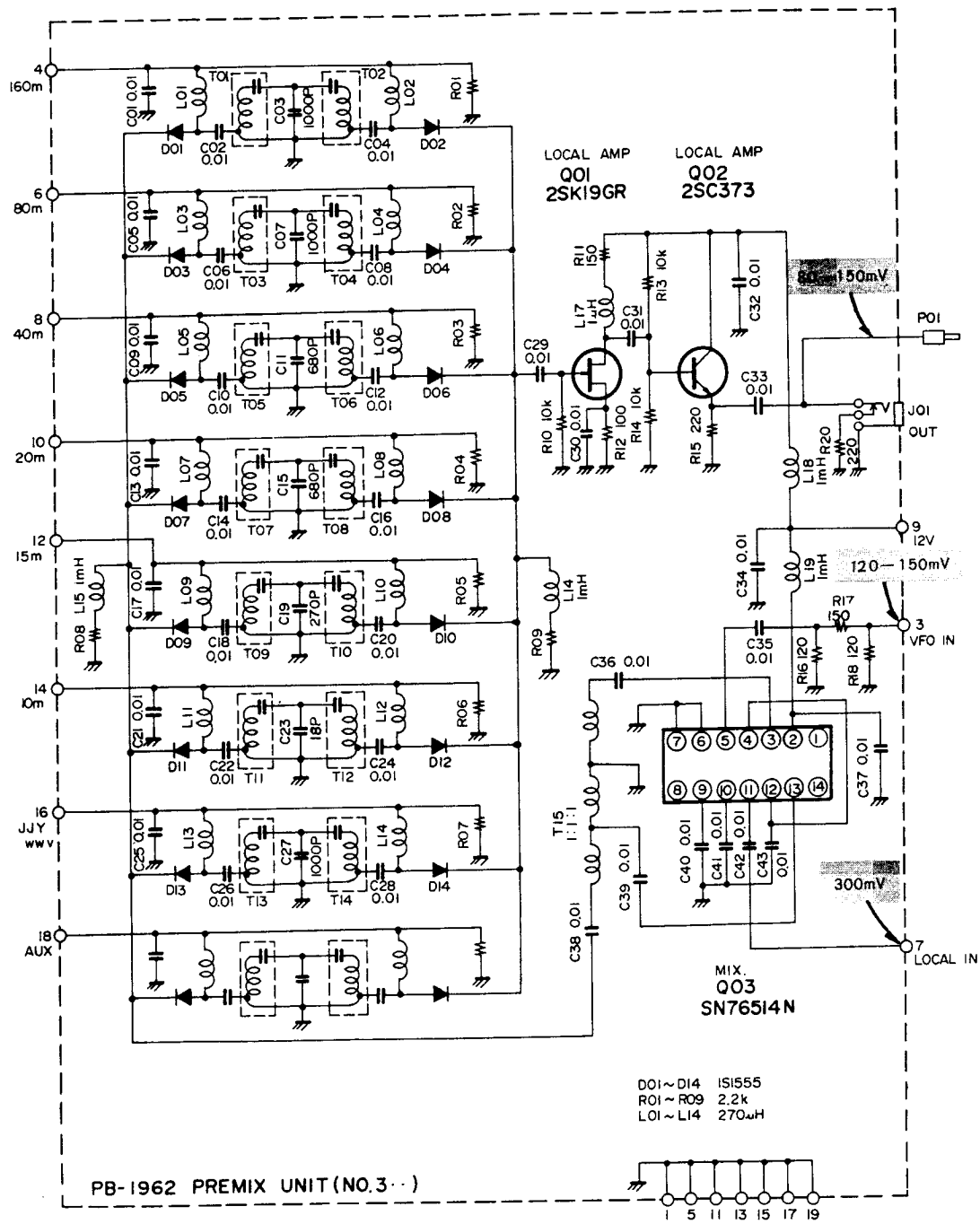
P8 (J201)



P9 (J202)

PREMIX UNIT (PB1962A)

(Early model) Before Prod. #16



DC VOLTAGES

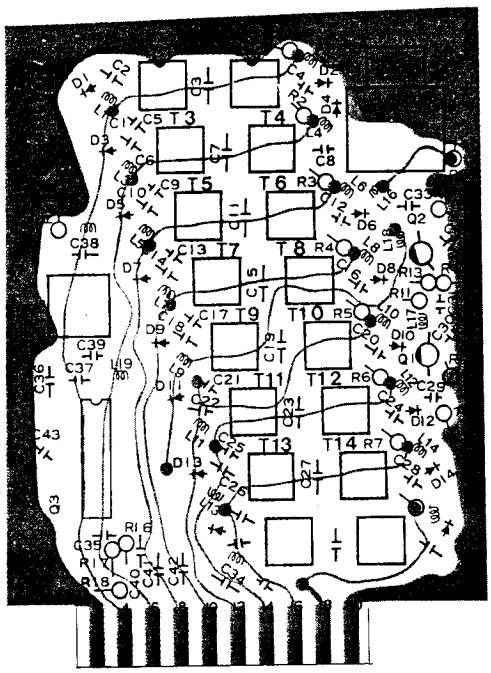
(V)

	E	C	B
Q_{301}	0.4	11.0	0
Q_{302}	4.4	12.0	4.8

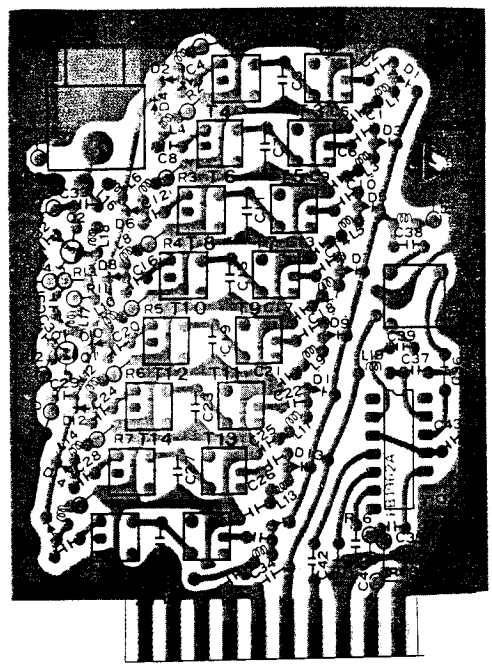
(V)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Q_{303}	0	12.1	10.2	6.1	3.9	0	0	0	3.9	6.0	6.0	6.0	10.2	0

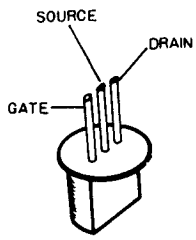
PREMIX UNIT PARTS LAYOUT



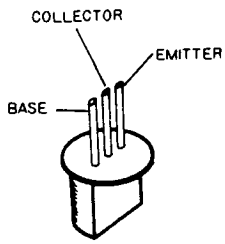
Viewed from component side



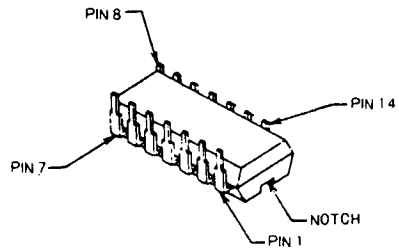
Viewed from solder side



2SK 19GR

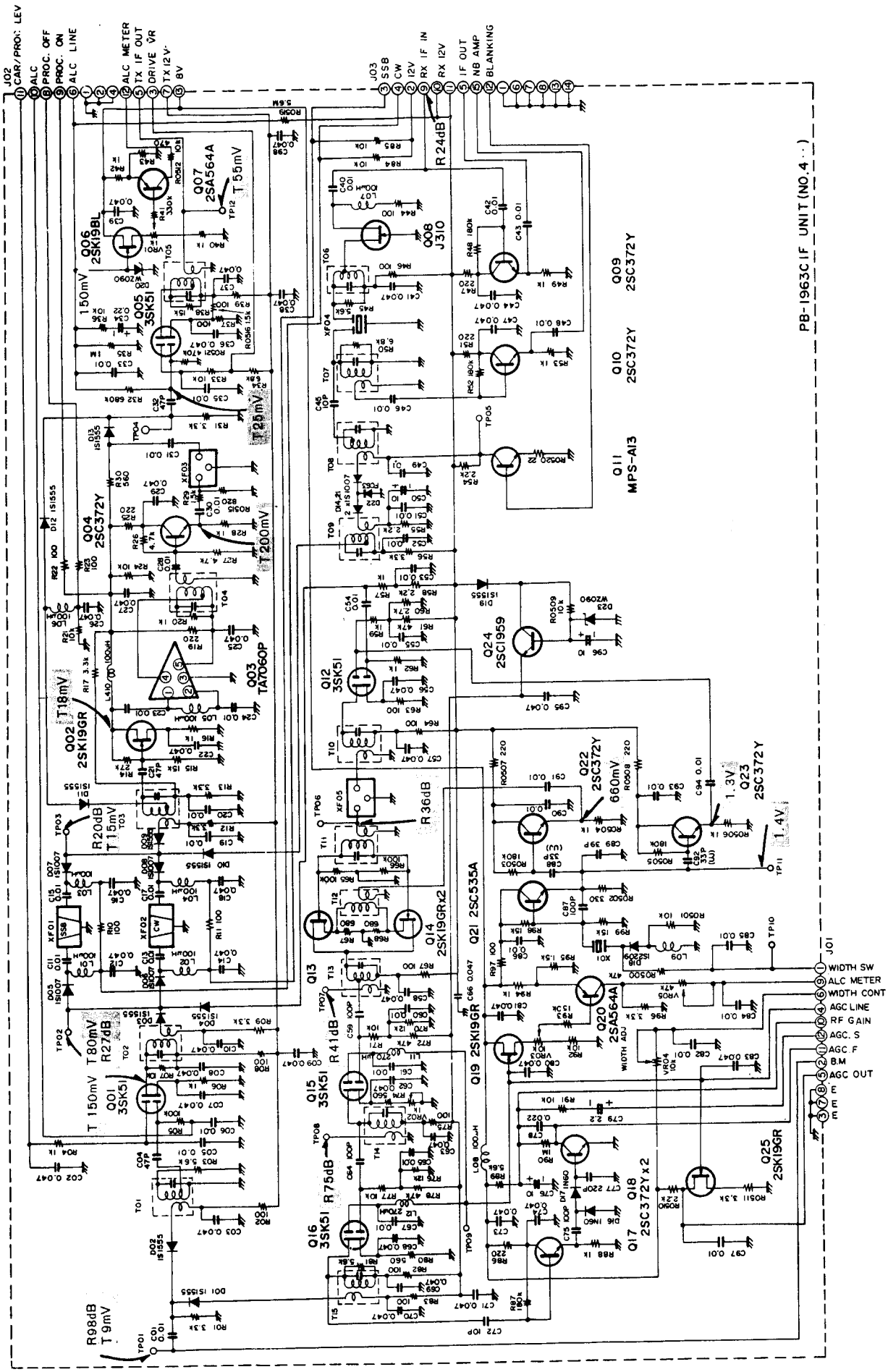


2SC373Y



SN76514N

IF UNIT (PB-1963C)



IF UNIT VOLTAGE CHARTS

DC VOLTAGES

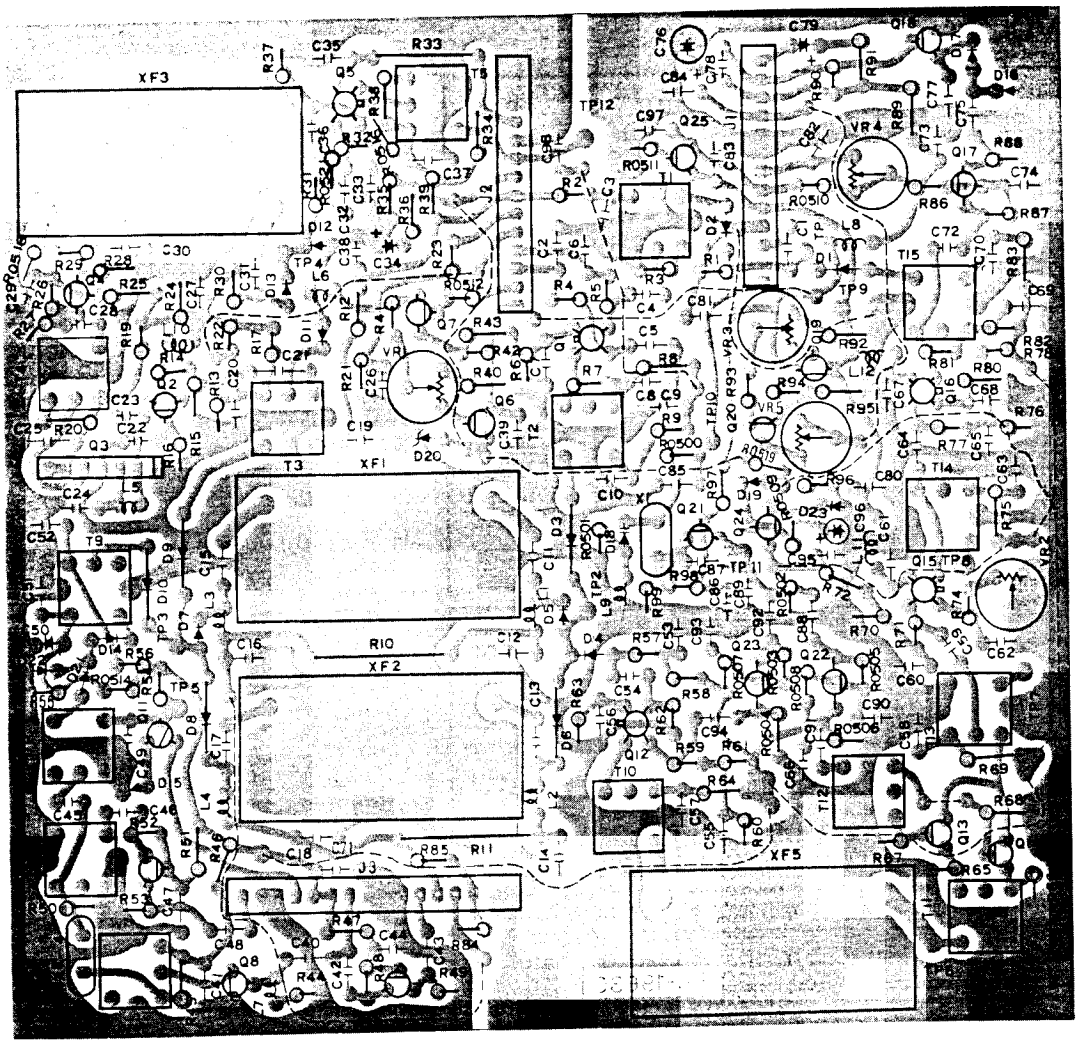
(V)

	E(S)		C(D)		B(G_1)		(G_2)		
	R	T	R	T	R	T	R	T	
Q_{401}	0	0.8	0	12.0	0	0	0	4.5	
Q_{402}	4.6	4.7	10.1	10.1	3.5	3.5	—	—	PROC ON
	1.5	1.3	1.7	1.7	0.6	0.6	—	—	PROC OFF
Q_{404}	3.8	4.6	9.1	8.6	4.5	4.2	—	—	PROC ON
	0.2	0.3	1.6	1.8	0.8	0.9	—	—	PROC OFF
Q_{405}	0	0.9	0	11.2	0	0	0	4.5	DRIVE MAX
Q_{406}	3.0	3.0	8.1	8.1	0	0	—	—	
Q_{407}	2.6	2.6	* 1.3	* 1.3	2.0	2.0	—	—	METER ALC (*IC, PO 2.1V)
Q_{408}	1.3	0	10.9	0	0	0	—	—	
Q_{409}	5.5	0	11.0	0	5.3	0	—	—	
Q_{410}	5.6	0	11.0	0	5.4	0	—	—	
Q_{411}	0	0	6.4	0	** 0.5	** 0.4	—	—	NB ON (**NB OFF 0V)
Q_{412}	0.2	0	12.0	0	0	0	0.6	0.6	
Q_{413}	1.7	0	11.7	0	0	0	—	—	
Q_{414}	1.7	0	11.7	0	0	0	—	—	
Q_{415}	2.4	0	10.2	0	1.7	0	*** 1.2	*** 1.2	RF GAIN MAX (***AGC OFF 3.6V)
Q_{416}	2.3	0	10.0	0	1.7	0	*** 1.2	*** 1.2	〃 (〃)
Q_{417}	3.0	3.0	7.5	7.5	3.3	3.3	—	—	
Q_{418}	0	0	1.2	1.2	0	0	—	—	RF GAIN MAX
Q_{419}	6.2	6.2	8.1	8.1	1.2	1.2	—	—	〃
Q_{420}	4.9	4.9	0	0	3.8	3.8	—	—	〃
Q_{421}	2.2	2.2	7.4	7.4	2.5	2.5	—	—	
Q_{422}	4.0	0	11.3	0	4.9	0	—	—	
Q_{423}	4.2	0	11.2	0	4.7	0	—	—	
Q_{424}	10.4	0	11.5	0	10.5	0	—	—	
Q_{425}	4.7	4.7	4.9	4.9	1.2	1.2	—	—	RF GAIN MAX

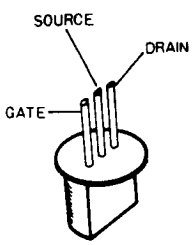
(V)

		1	2	3	4	5	
Q_{403}	R	1.5	1.5	0	9.5	9.5	PROC ON
	T	1.5	1.5	0	9.3	9.3	
	R	1.3	1.3	0	1.7	1.7	PROC OFF
	T	1.3	1.3	0	1.8	1.8	

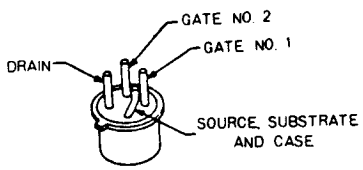
IF UNIT PARTS LAYOUT (1)



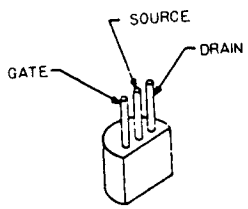
Viewed from component side



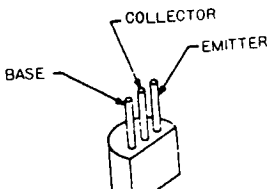
2SK19BL
2SK19GR



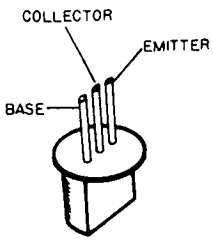
3SK51-03



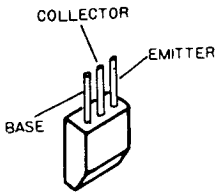
J310



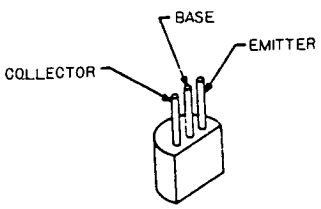
2SA564A



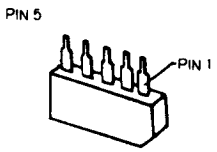
2SC372Y



2SC535A

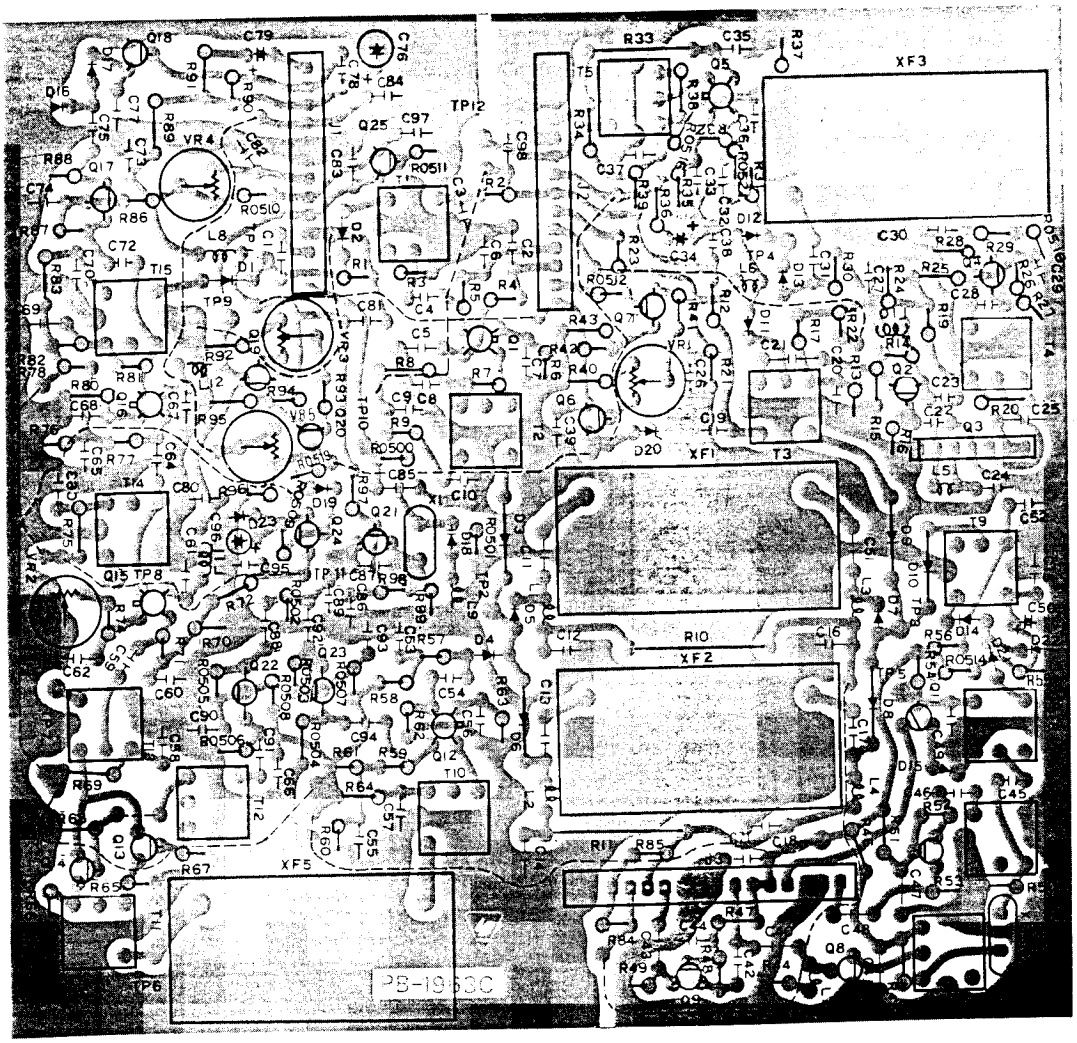


MPSA13

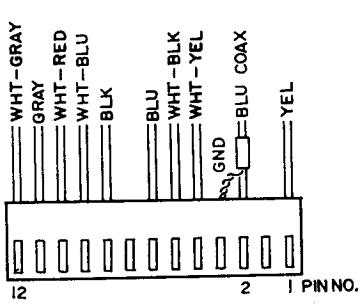


TA7060P

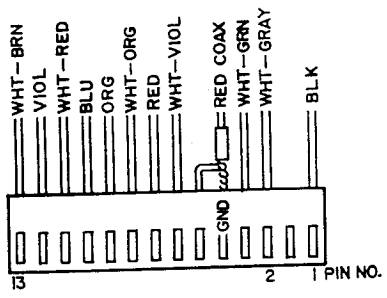
IF UNIT PARTS LAYOUT (2)



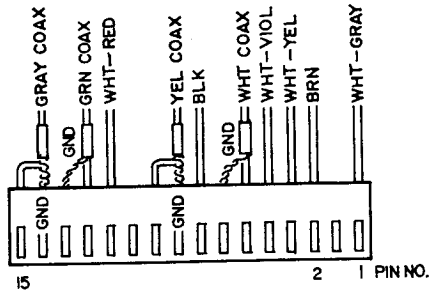
Viewed from solder side



P1(J401)

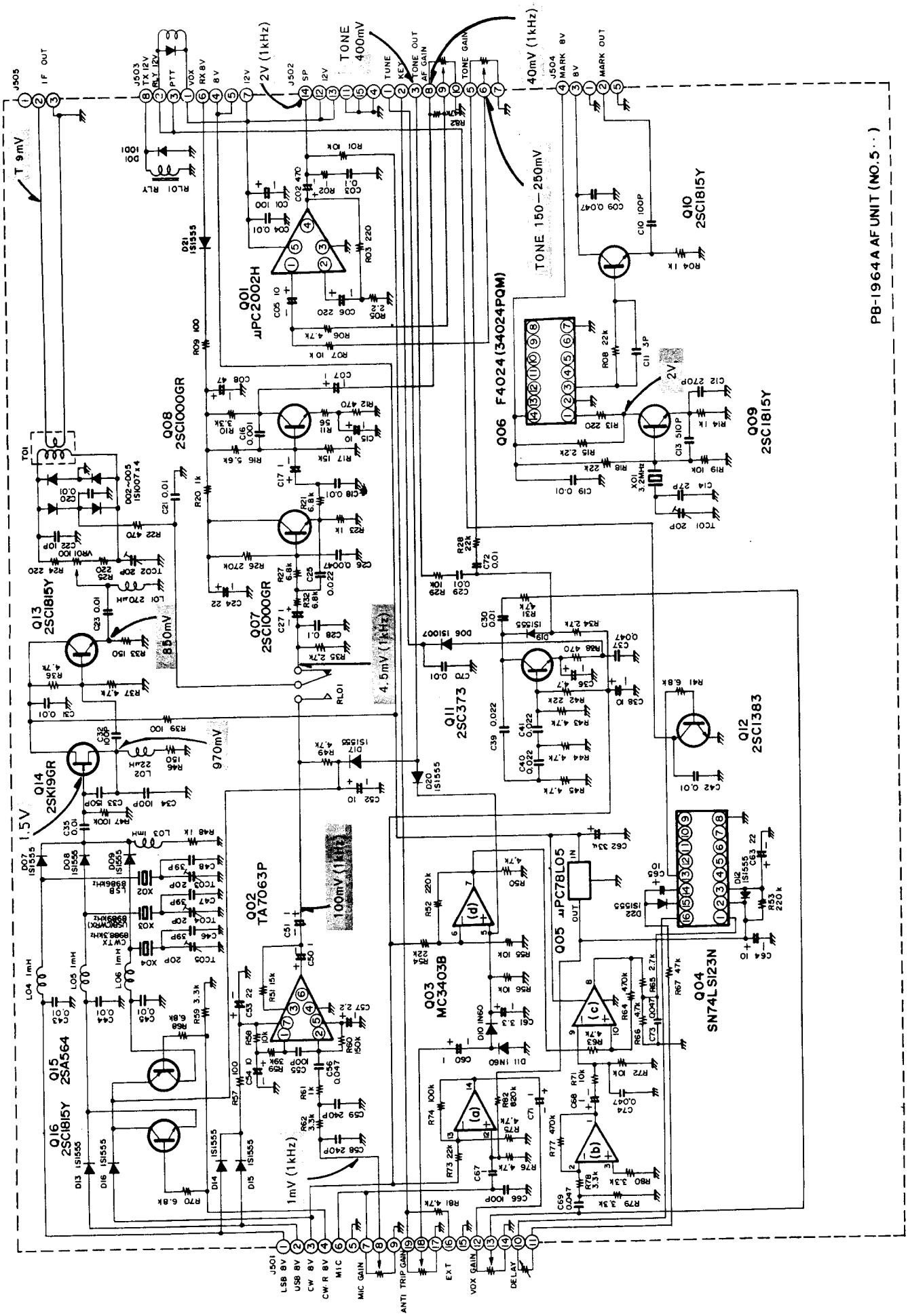


P2(J402)



P3(J403)

AF UNIT (PB-1964)



AF UNIT VOLTAGE CHARTS

DC VOLTAGES

(V)

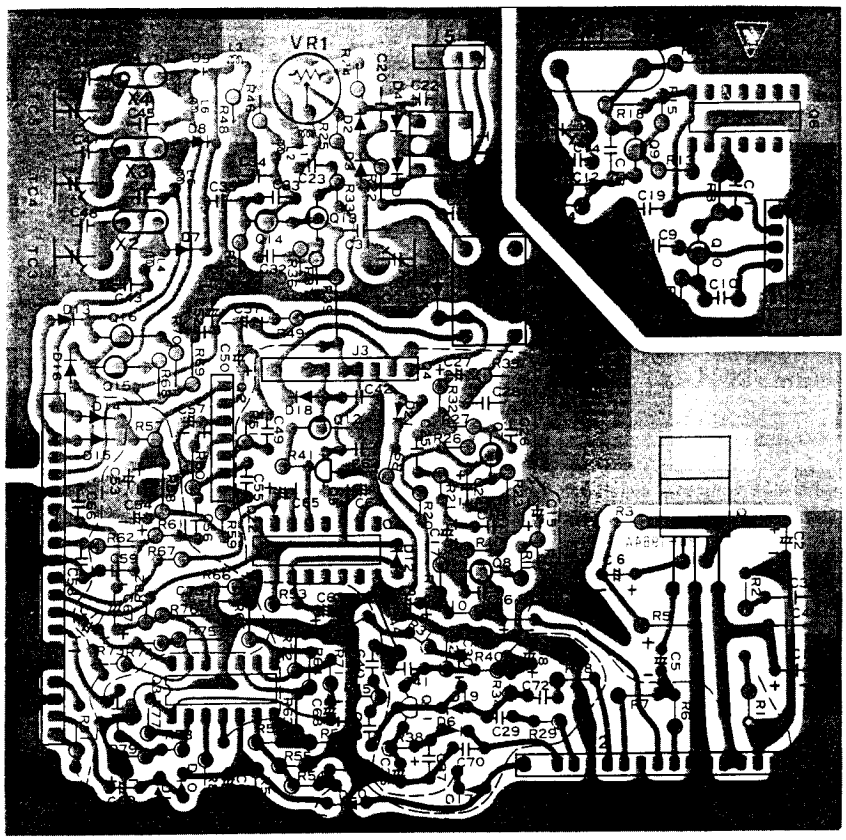
	E(S)		C(D)		B(G)		
	R	T	R	T	R	T	
Q_{507}	2.2	0	4.8	0	2.4	0	
Q_{508}	1.4	0	1.6	0	0.8	0	
★★ Q_{509}	1.8	1.8	3.5	3.5	2.4	2.4	MARKER ON
Q_{510}	★★ 5.5	★★ 5.5	8.2	8.2	★★ 3.6	★★ 3.6	〃 〃
Q_{511}	0.9	0.7	7.7	6.1	1.4	1.4	CW KEY DOWN (MARK)
	0.9	0.7	7.7	7.7	1.4	1.4	〃 UP (SPACE)
Q_{512}	0	0	12.2	0	0.12	0.7	PTT SW TRANSMIT
	0	0	12.2	0.2	0.12	0.7	VOX TRANSMIT
Q_{513}	2.4	2.4	6.0	6.0	2.8	2.8	
Q_{514}	0.9	0.9	6.0	6.0	0	0	
Q_{515}	7.4	7.4	7.4	7.4	6.7	6.7	TUNE
	7.4	7.4	0	7.4	8.0	6.7	CW
Q_{516}	1.7	1.7	7.4	7.4	2.1	2.1	TUNE
	7.2	7.2	7.4	7.4	7.8	1.7	CW

(V)

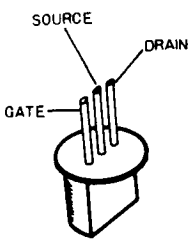
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Q_{501}	0.5	0.7	0	5.6	12.2	—	—	—	—	—	—	—	—	—	—	—
★ Q_{502}	1.3	0.6	0.02	0	0.7	4.8	7.3	—	—	—	—	—	—	—	—	—
Q_{503}	0	0	0	8.1	7.5	0.1	6.7	6.7	0	6.6	0	0	0	1.0	—	—
Q_{504}	4.2	5.0	3.5	4.3	0.1	0	0.4	0	1.2	0	5.0	4.3	0.1	0	1.2	5.0
Q_{505}	8.1	0	5.0	—	—	—	—	—	—	—	—	—	—	—	—	—
★★ Q_{506}	3.7	0	3.2	3.0	3.0	2.9	0	0	2.9	0	3.0	3.0	0	8.1	—	—

★SSB(CW 0V) ★★MARKER ON(OFF 0V)

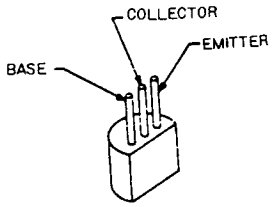
AF UNIT PARTS LAYOUT (1)



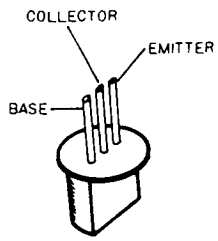
Viewed from component side



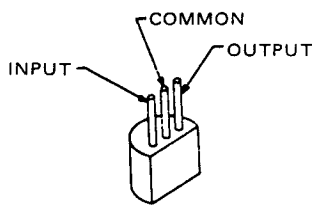
2SK19GR



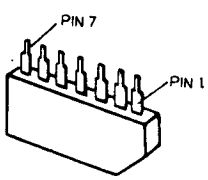
2SA564A
2SC1383
2SC1815Y



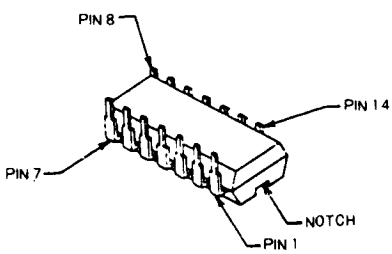
2SC373
2SC1000GR



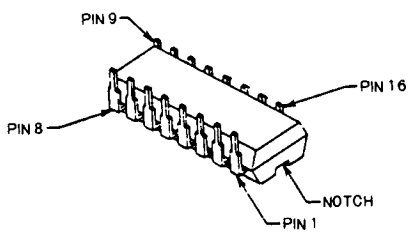
μPC78L05



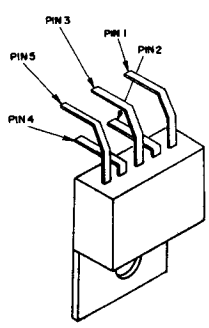
TA7063P



34024PCQM

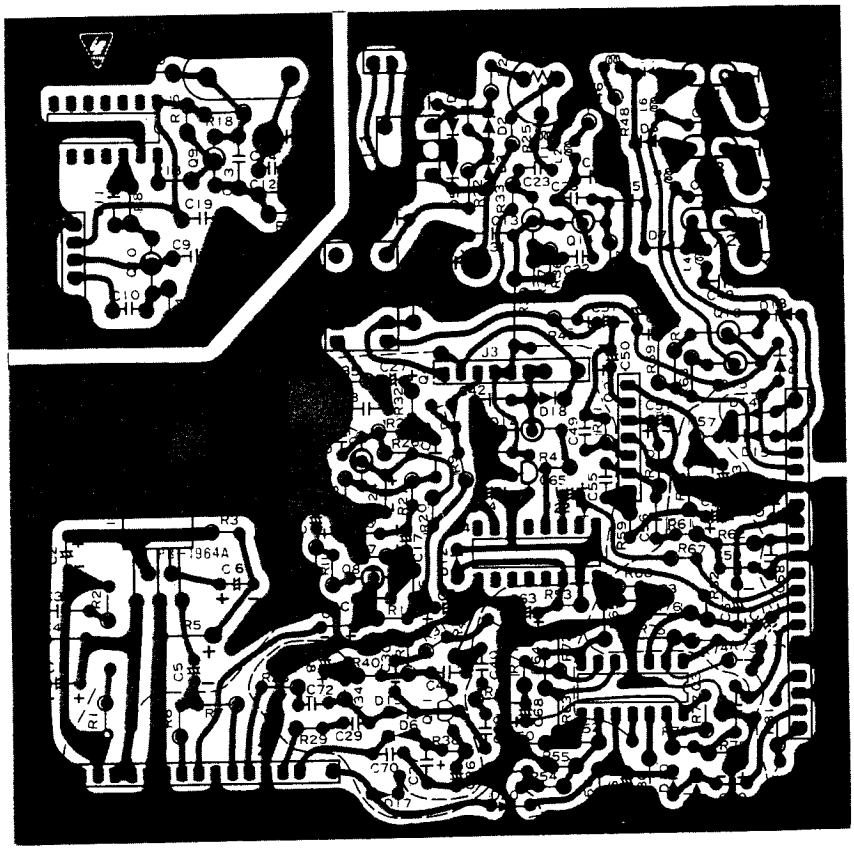


SN74LS123N

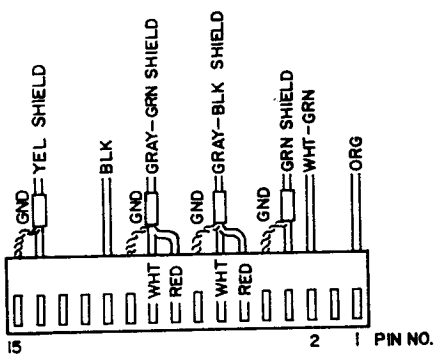


μPC2002H

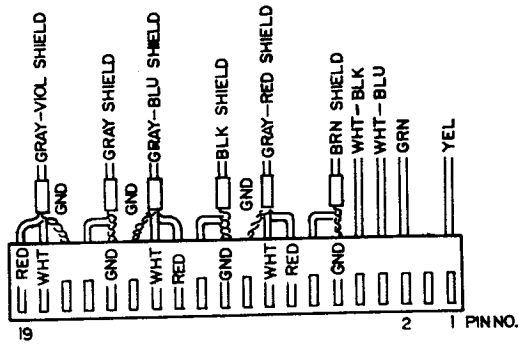
AF UNIT PARTS LAYOUT (2)



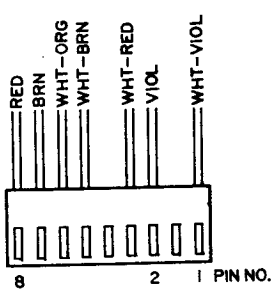
Viewed from solder side



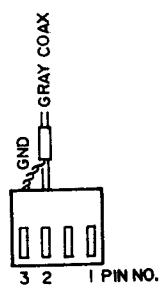
P5(J502)



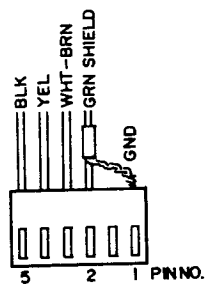
P4(J501)



P6(J503)



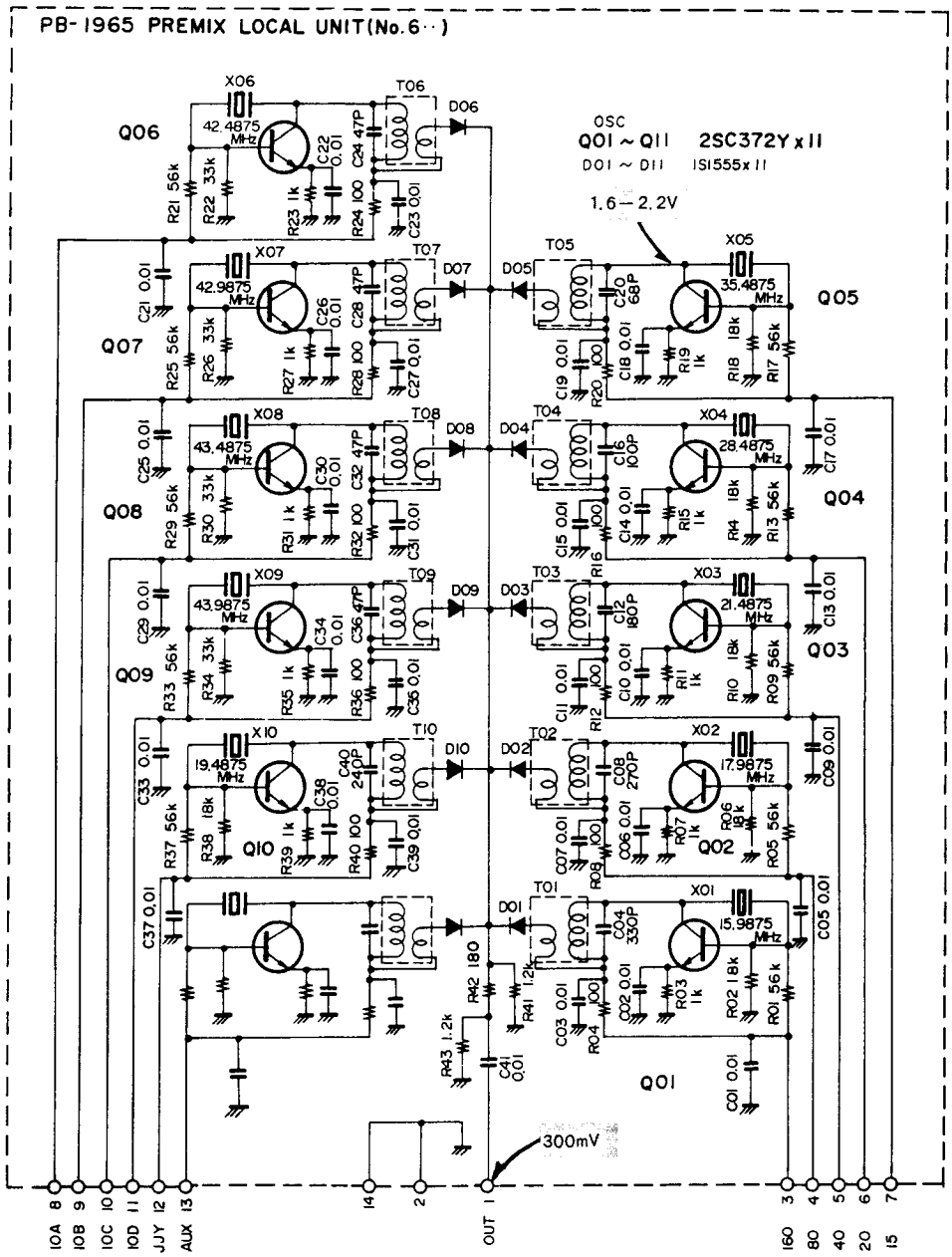
P18(J505)



P7(J504)

PREMIX LOCAL UNIT (PB1965)

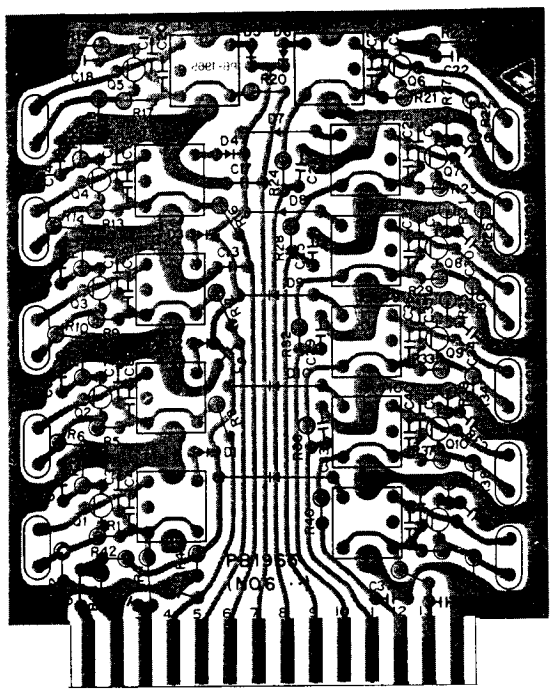
(Prod. #01 ~ #16)



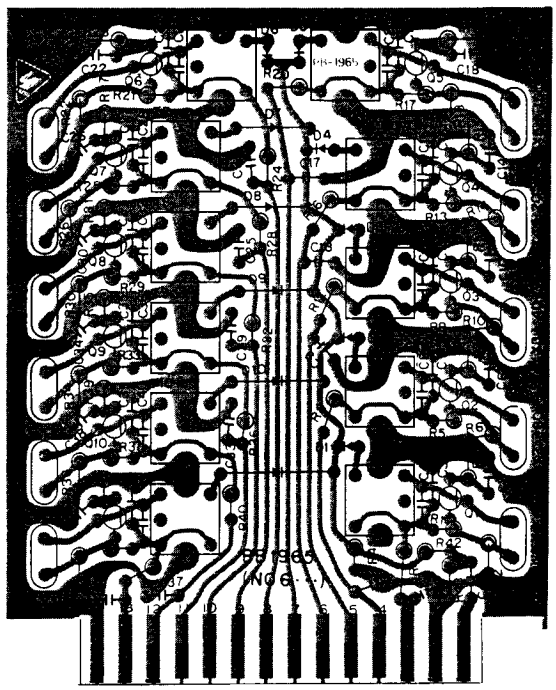
DC VOLTAGES (V)

	E	C	B
Q_{601}	3.1	6.7	1.5
Q_{602}	3.1	6.7	1.5
Q_{603}	3.0	6.7	1.5
Q_{604}	2.6	6.7	1.5
Q_{605}	2.5	6.7	1.0
Q_{606}	1.9	6.7	1.3
Q_{607}	2.8	6.6	1.9
Q_{608}	2.7	6.6	2.1
Q_{609}	2.5	6.6	1.7
Q_{610}	3.2	6.7	1.5
Q_{611}	2.6	6.7	1.5

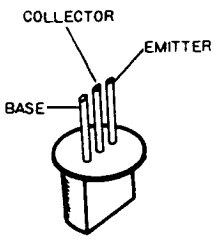
PREMIX LOCAL UNIT PARTS LAYOUT



Viewed from component side



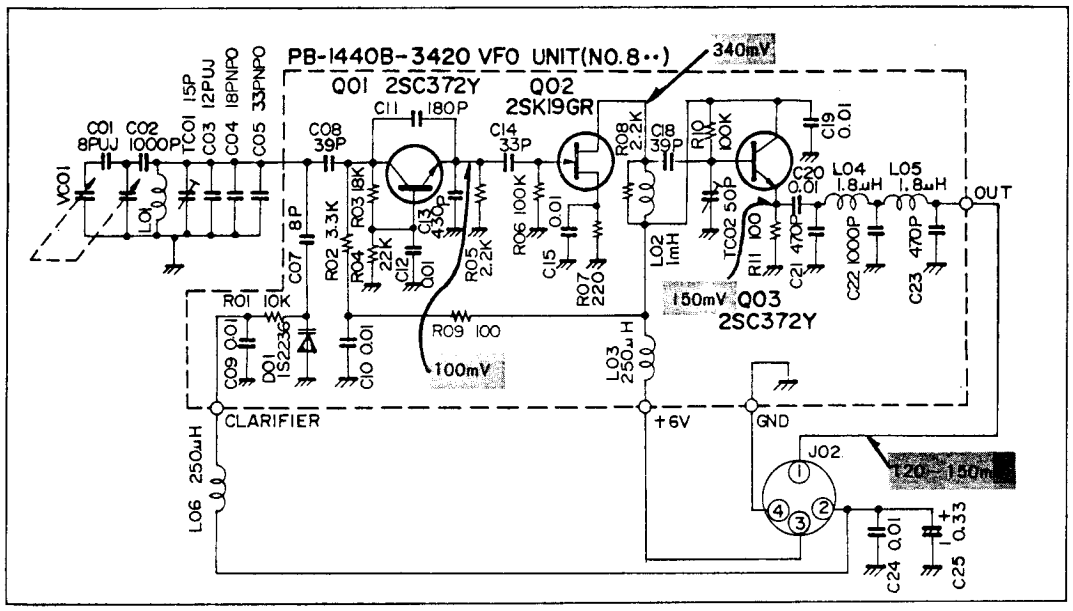
Viewed from solder side

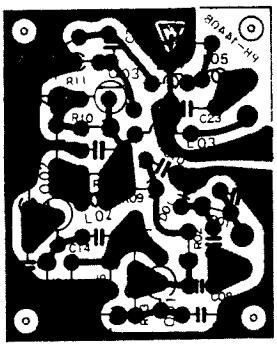


2SC372Y

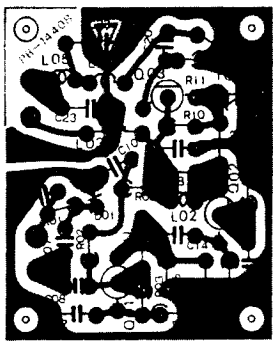
VFO ASSEMBLY

VFO BOARD (PB-1440B-3420)





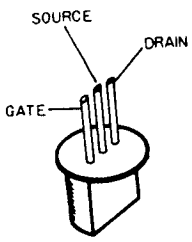
Viewed from component side



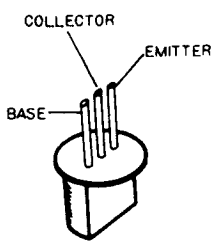
Viewed from solder side

DC VOLTAGES (V)

	E(S)	C(D)	B(G)
Q_{801}	1.4	3.7	1.9
Q_{802}	0.9	6.0	0
Q_{803}	0.9	6.0	1.6

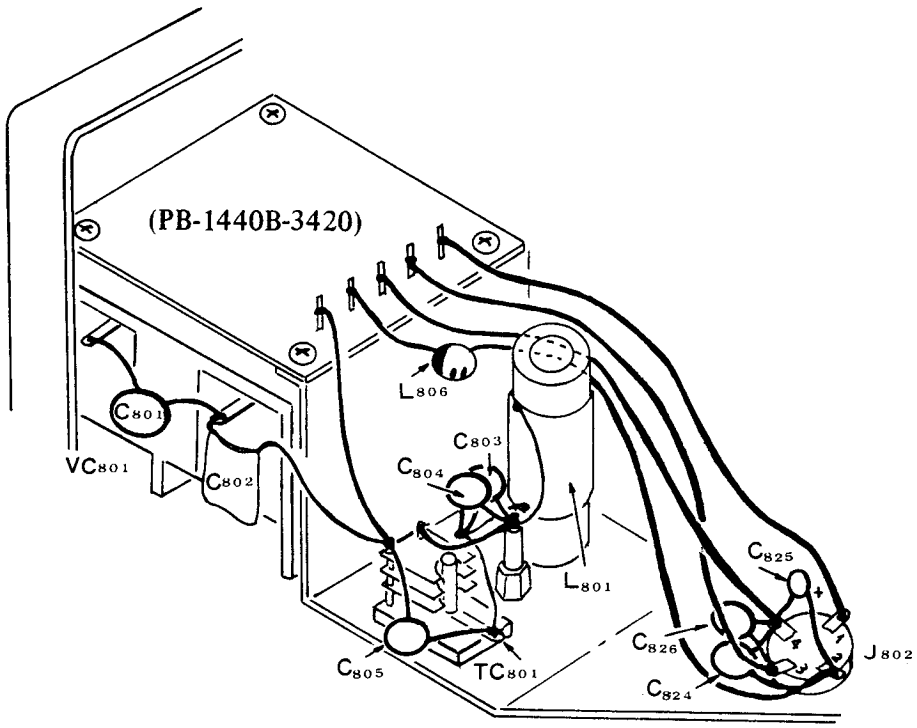


2SK19GR

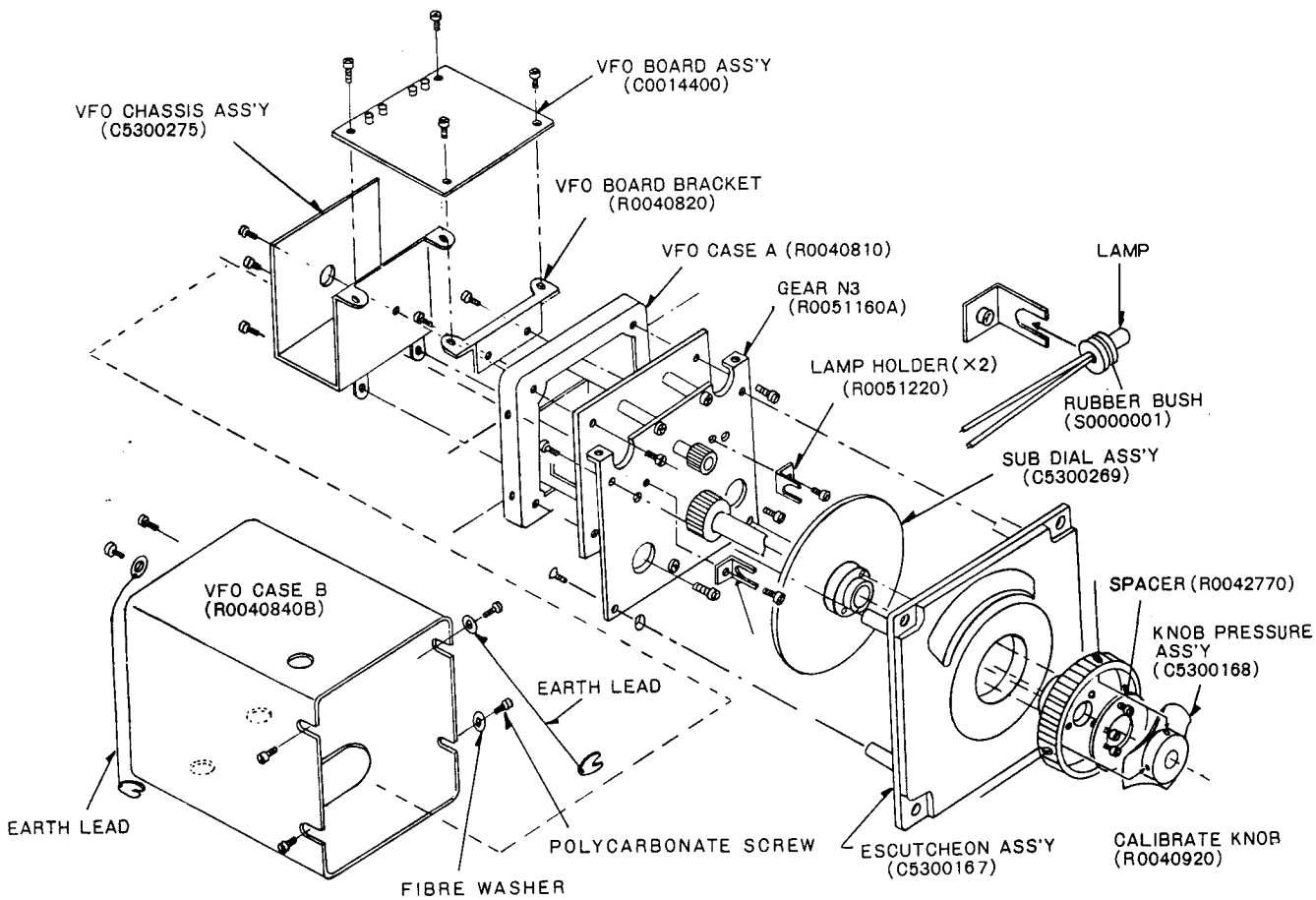


2SC372Y

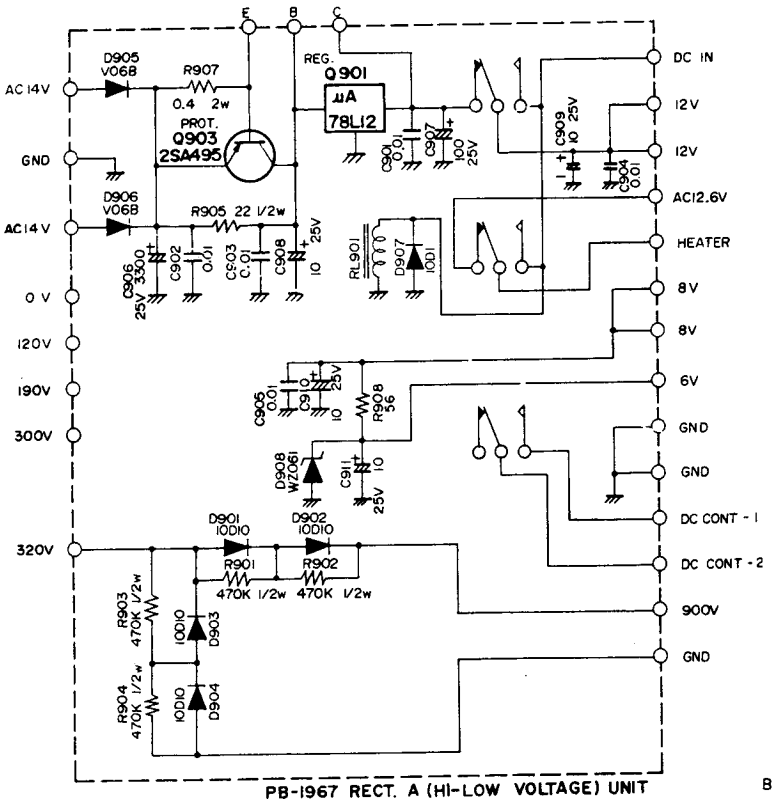
VFO ASSEMBLY PARTS LAYOUT



VFO UNIT EXPLODED VIEW



RECT A UNIT (HIGH/LOW VOLTAGES) UNIT (PB-1967)



PB-1967 RECT. A (HI-LOW VOLTAGE) UNIT

DC VOLTAGES

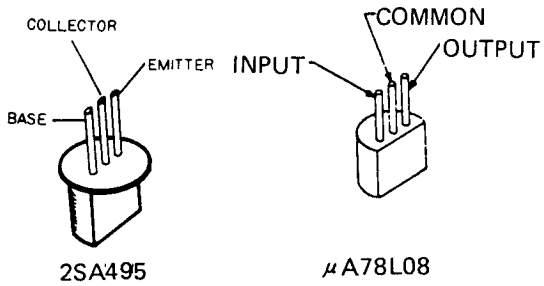
(V)

	IN	OUT
Q_{901}	★ 18.1	12.0

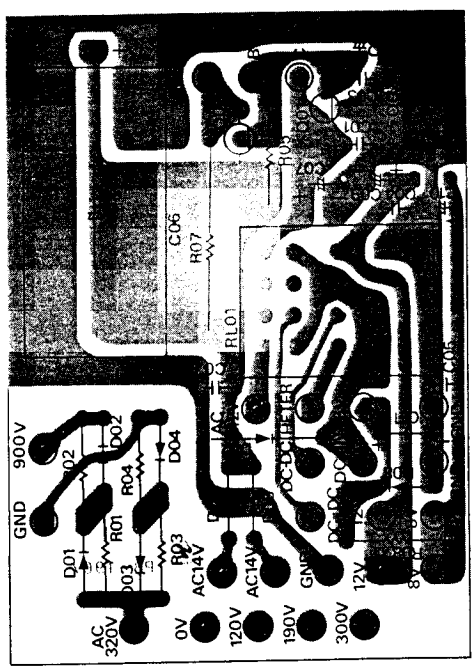
RECEIVE(★ TRANSMIT 17.4V)

(V)

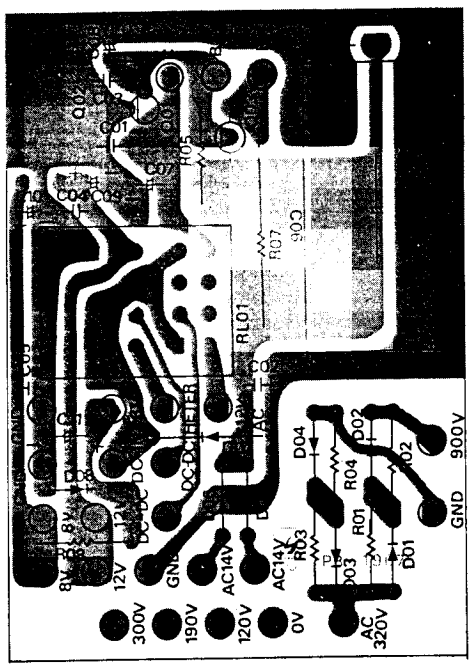
		E	C	B
Q_{903}	R	19.0	18.1	18.7
	T	18.5	17.4	18.2



2SA495 μA78L08

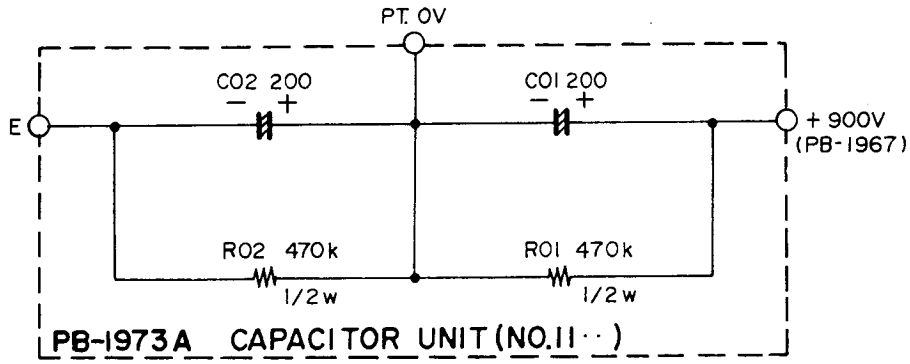


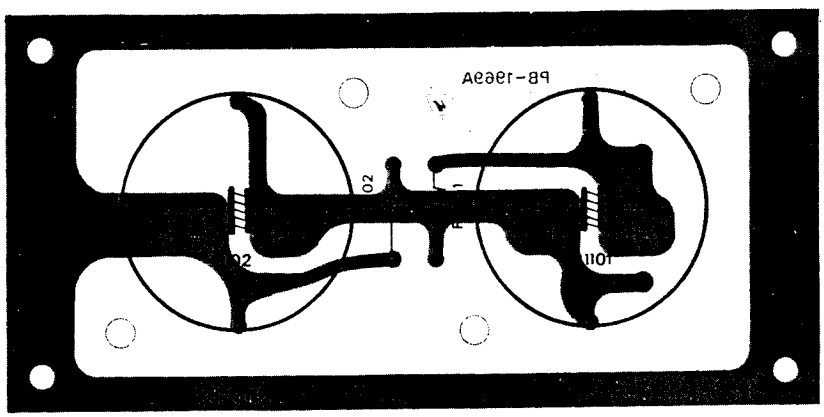
Viewed from component side



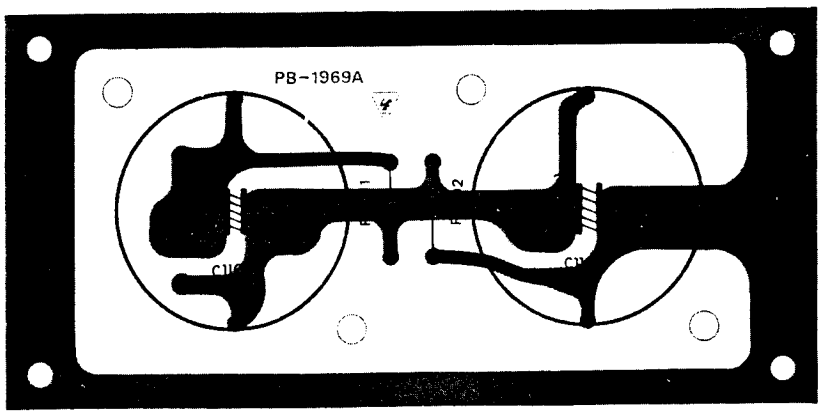
Viewed from solder side

CAPACITOR UNIT (PB-1969A)



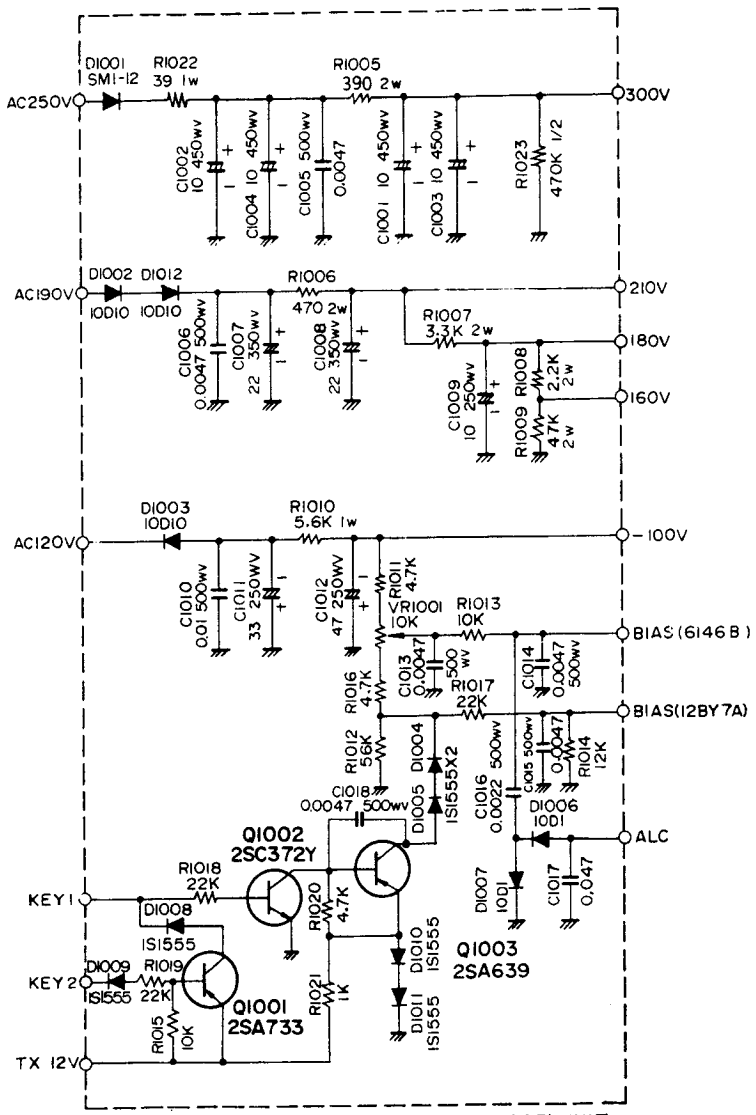


Viewed from component side



Viewed from solder side

RECT B (MEDIUM/BIAS VOLTAGES) UNIT (PB-1968B)

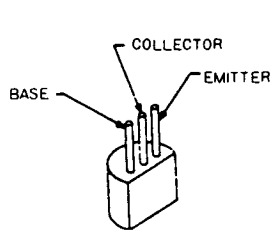


PB-1968 RECT. B(M.BIAS VOLTAGE) UNIT

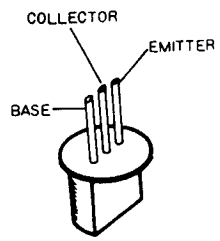
DC VOLTAGES

(V)

	E		C		B		
	R	T	R	T	R	T	
Q_{1001}	0	12.2	0	12.1	0	11.5	KEY UP
	0	12.2	0	0	0	11.9	KEY DOWN
Q_{1002}	0	0	0	1.5	0	0	KEY UP
	0	0	0	0	0	0.7	KEY DOWN
Q_{1003}	0	1.5	−84	−84	0	1.5	KEY UP
	0	0.8	−84	-0.8	0	0	KEY DOWN

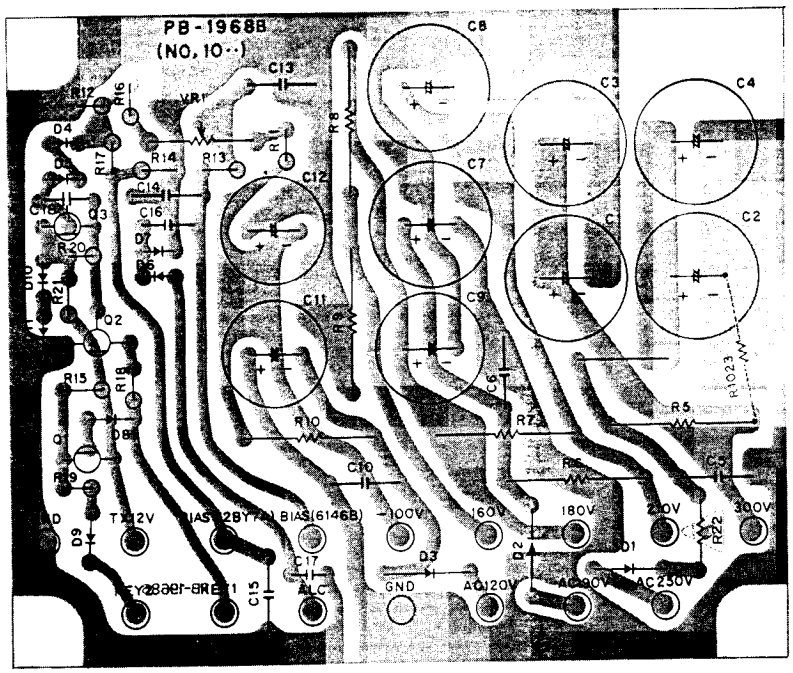


2SA639
2SA733

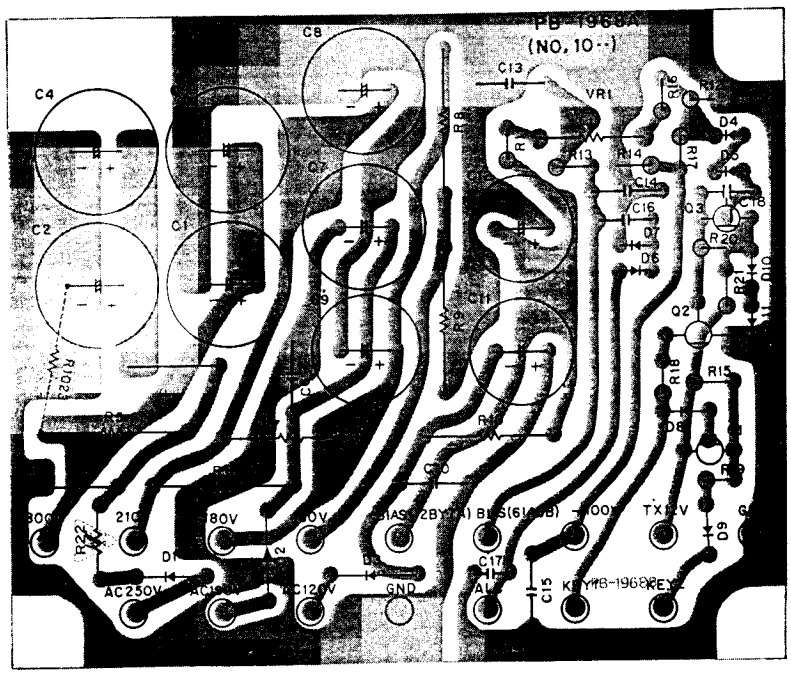


2SC372Y

RECT B UNIT PARTS LAYOUT



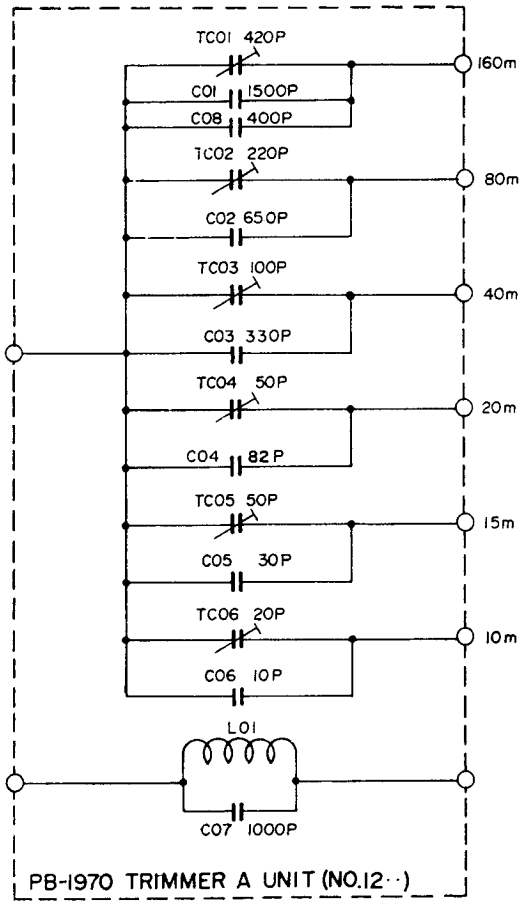
Viewed from component side

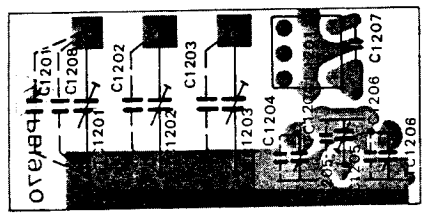


Viewed from solder side

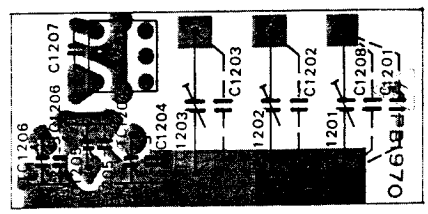
TRIMMER A BOARD (PB-1970Ⓐ)

(Early model) Before Prod. #16





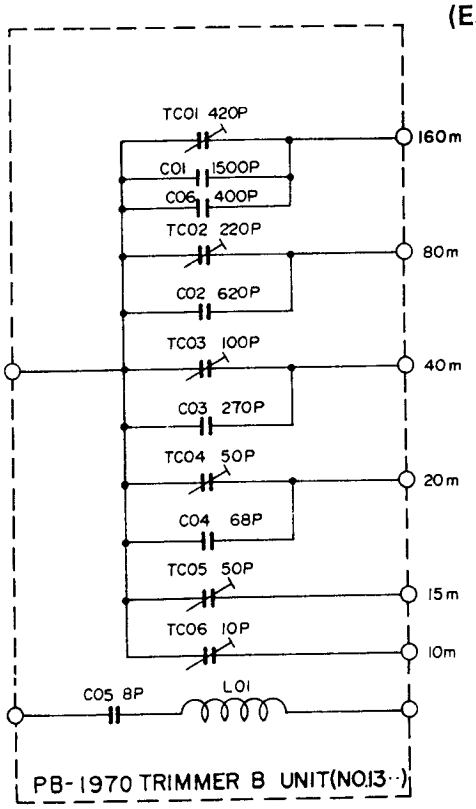
Viewed from component side

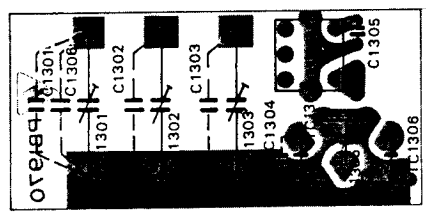


Viewed from solder side

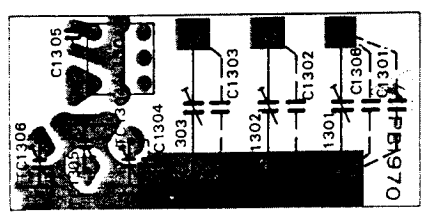
TRIMMER B BOARD (PB-1970Ⓑ)

(Early model) Before Prod. #16



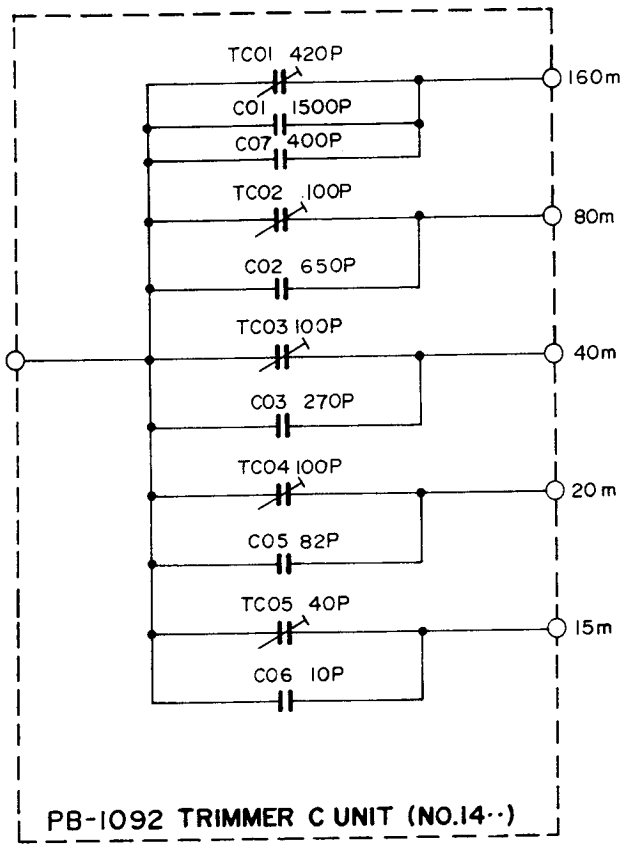


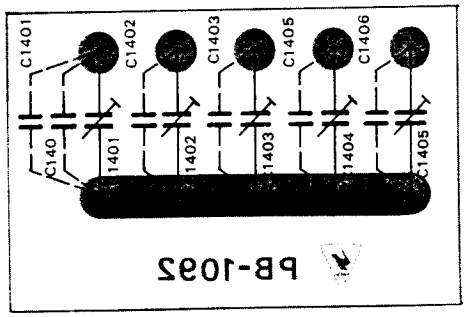
Viewed from component side



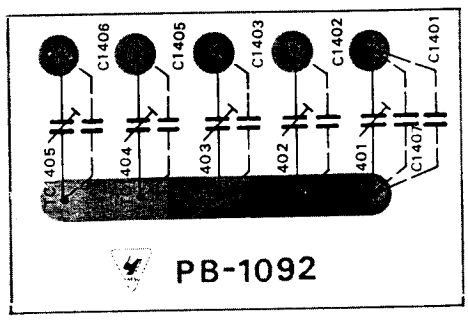
Viewed from solder side

TRIMMER C BOARD (PB-1092)



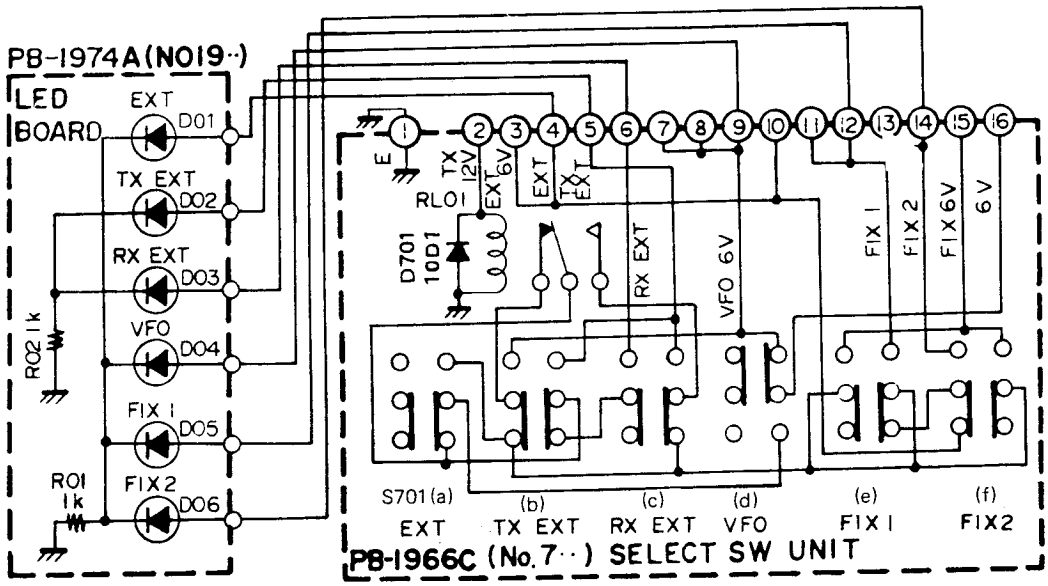


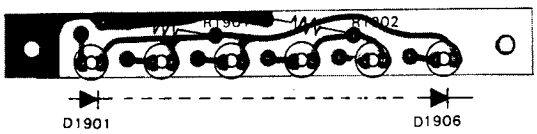
Viewed from component side

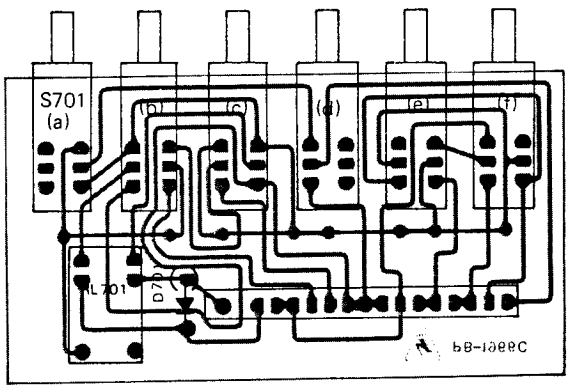


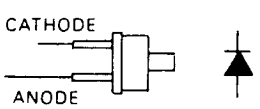
Viewed from solder side

LED UNIT(PB-1974A) SELECT SWITCH UNIT(PB-1966C)



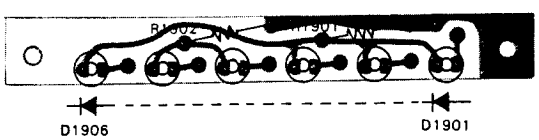


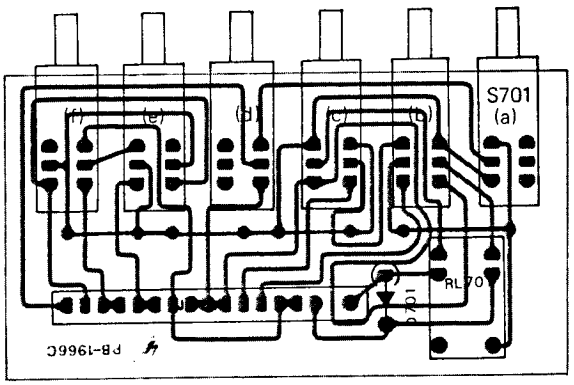




LED Connection

Viewed from component side

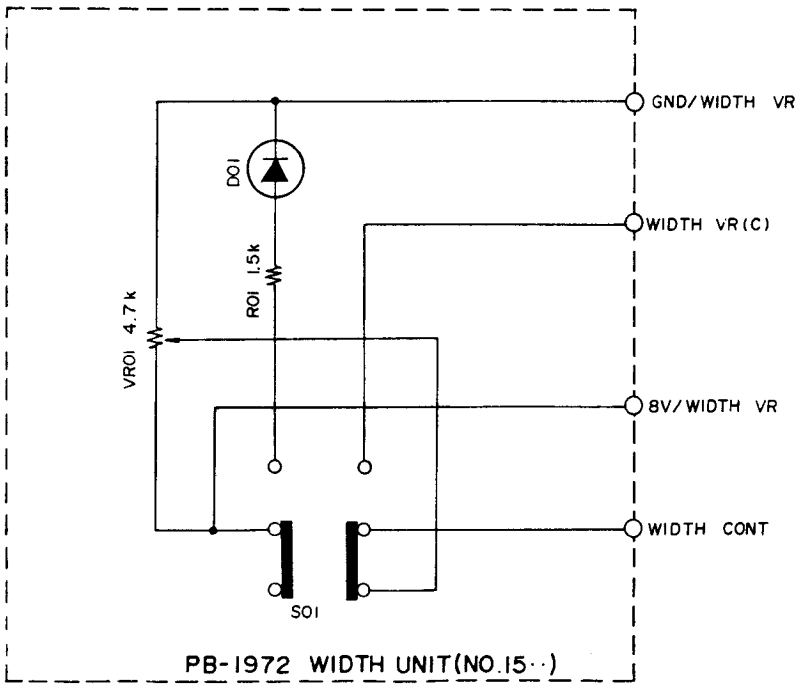


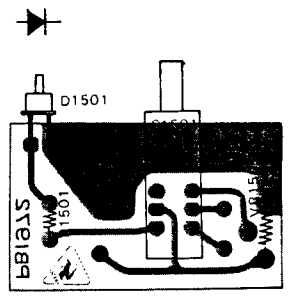


Viewed from solder side

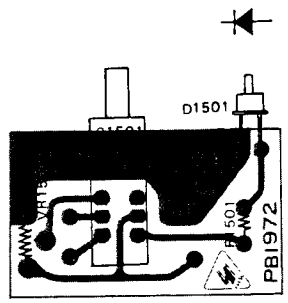
BAND WIDTH CONTROL UNIT (PB-1972)

(Early model) Before Prod. #23

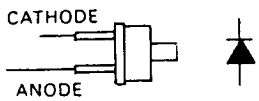




Viewed from component side

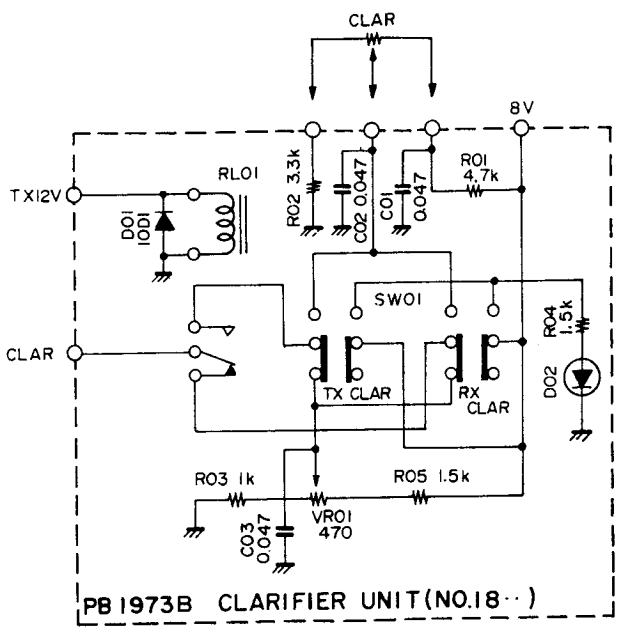


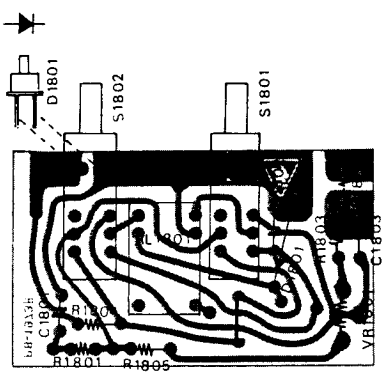
Viewed from solder side



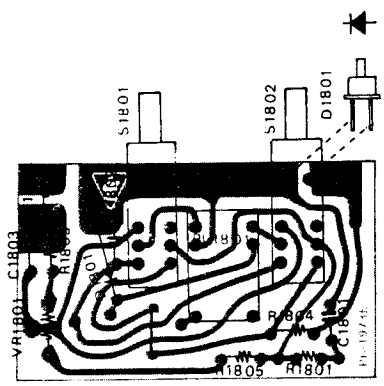
LED Connection

CLARIFIER UNIT (PB-1973)



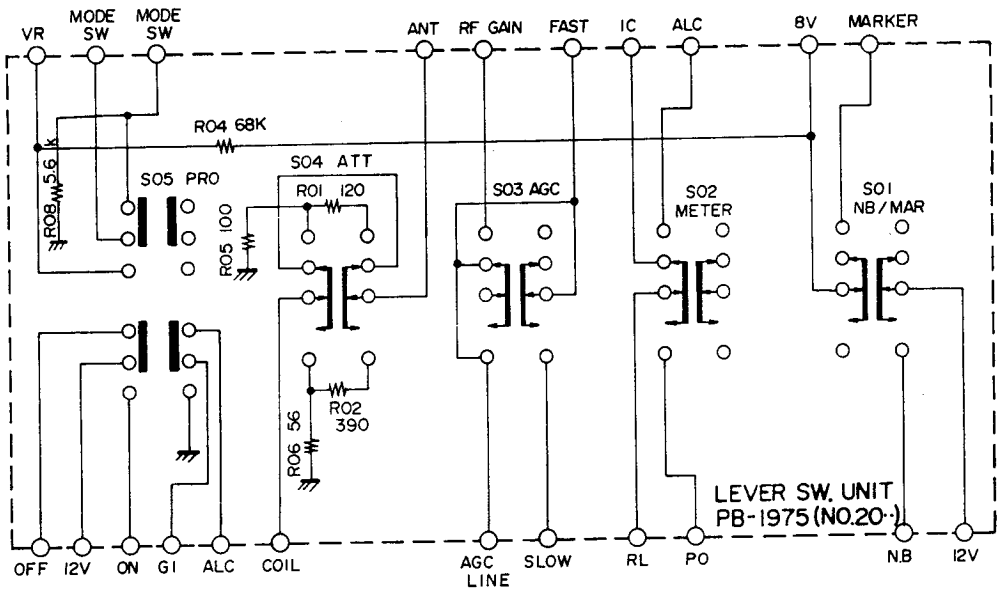


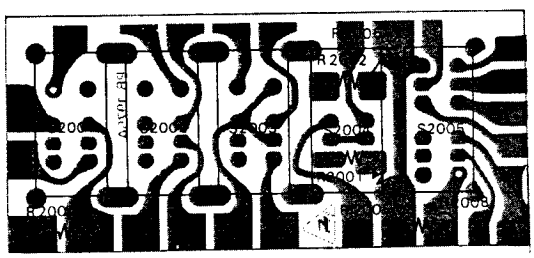
Viewed from component side



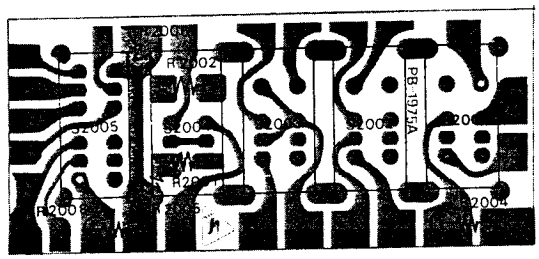
Viewed from solder side

LEVER SWITCH UNIT (PB-1975A)

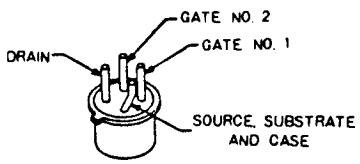




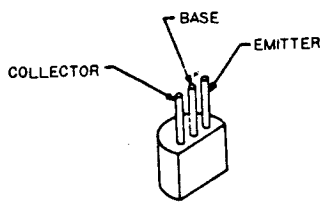
Viewed from component side



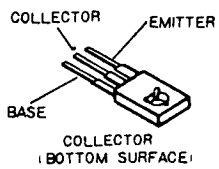
Viewed from solder side



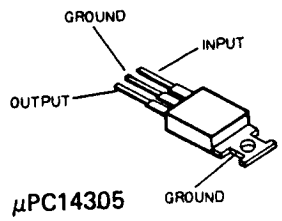
3SK40M
3SK51-03



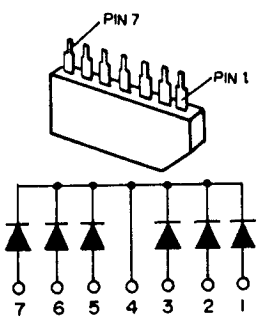
MPS3640



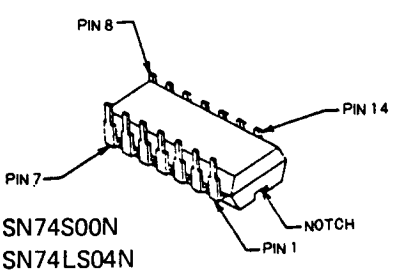
2SA496O



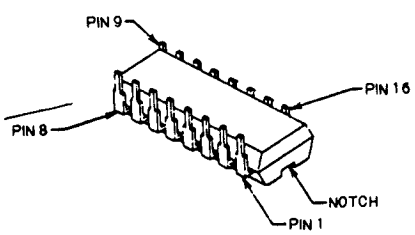
μPC14305



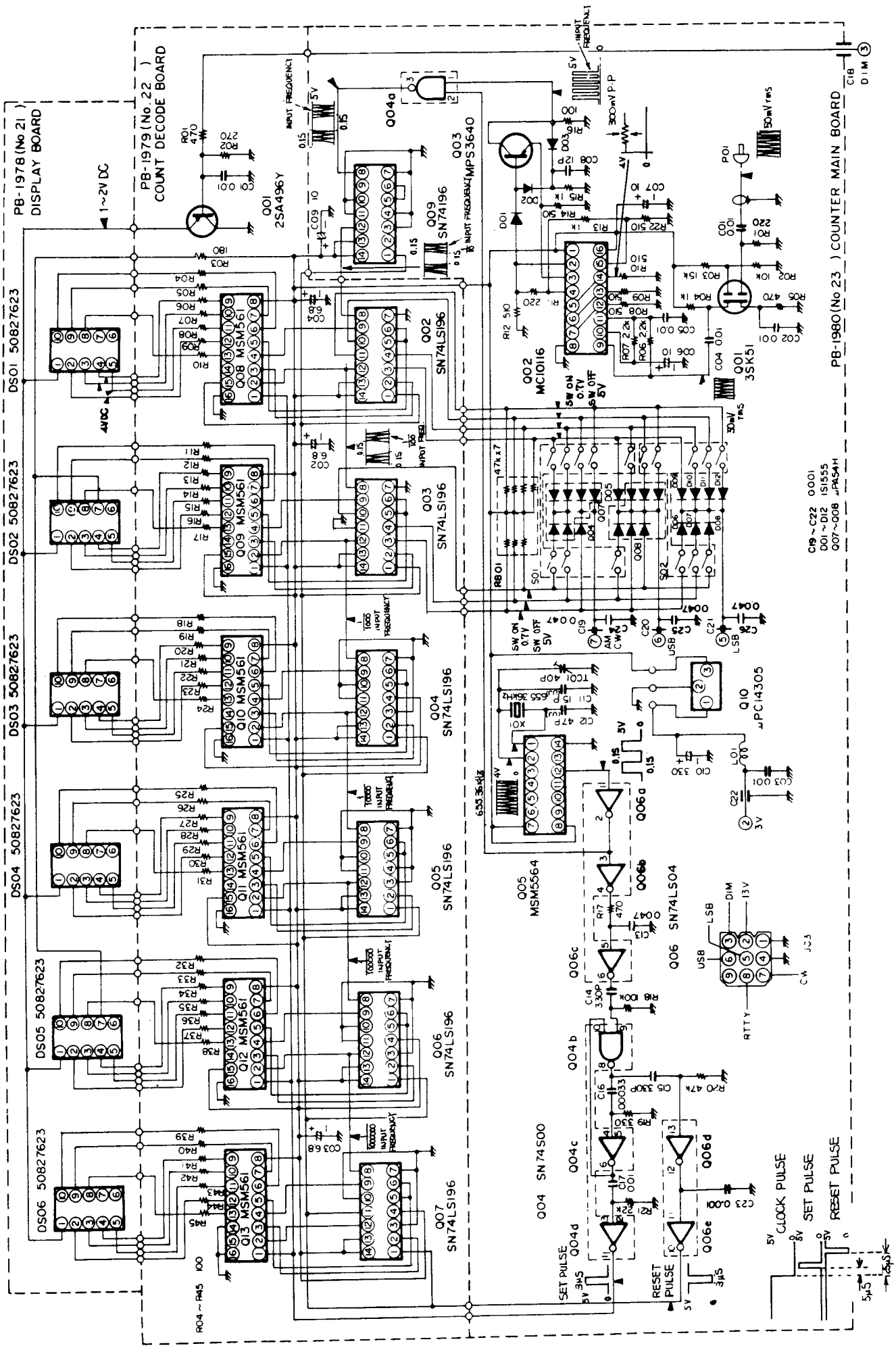
μPA54H



SN74S00N
SN74LS04N
SN74196N
SN74LS196N MSM5564

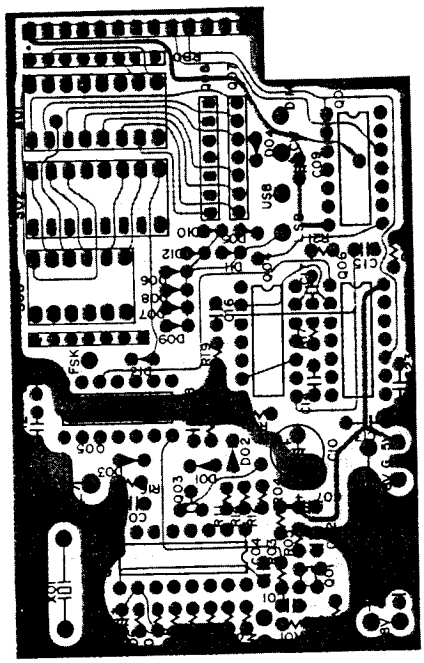


MSM561 MC10116


PB-1978 (No 21)
DISPLAY BOARD
PB-1979 (No. 22)
COUNT DECODE BOARD
PB-1980 (No 23) COUNTER MAIN BOARD
1~2V DC
4VDC
DS01 50827623
DS02 50827623
DS03 50827623
DS04 50827623
DS05 50827623
DS06 50827623
Q01 2SA496Y
Q02 MC10116
Q03 MPS3640
Q01 3SK51
Q02 SN74LS196
Q03 SN74LS196
Q04 SN74LS196
Q05 SN74LS196
Q06 SN74LS196
Q07 SN74LS196
Q08 MSM5611
Q09 MSM5611
Q10 MSM5611
Q11 MSM5611
Q12 MSM5611
Q13 MSM5611
Q09 SN74196
Q10 μPC14305
Q05 MSM5564
Q04 SN74S00
Q06 SN74LS04
INPUT FREQUENCY
SW ON 0.7V
SW OFF 5V
SET PULSE
RESET PULSE
CLOCK PULSE
RTTY
USB
LSB
DIM
13V

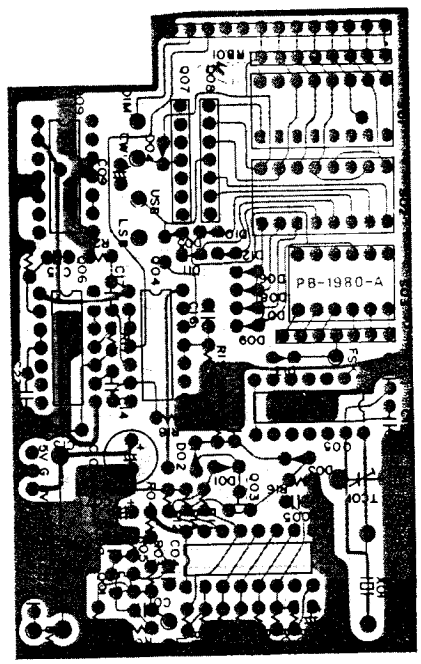
COUNTER UNIT PARTS LAYOUT

(Early model) Before Prod. #15

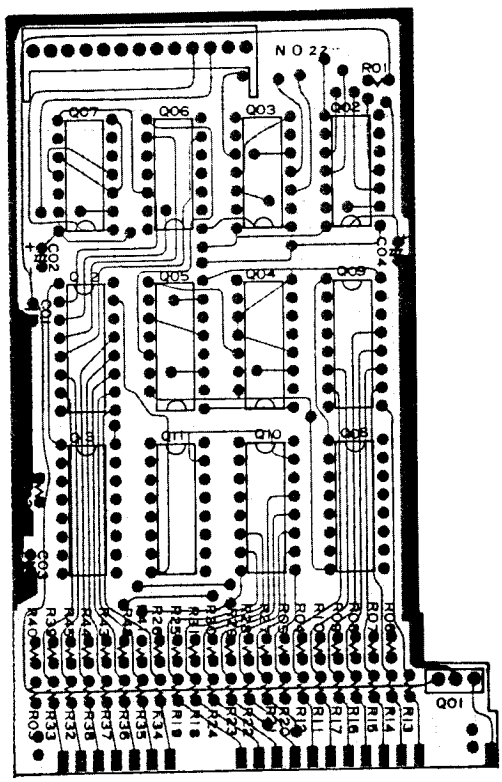


Viewed from component side

(PB-1980)

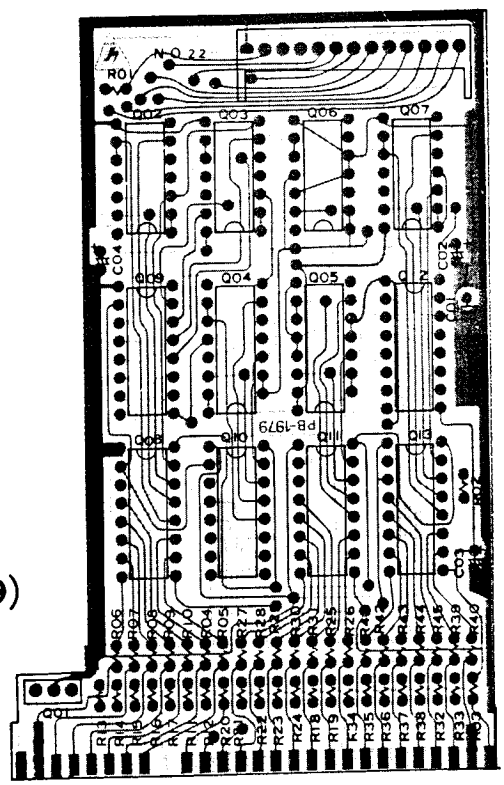


Viewed from solder side

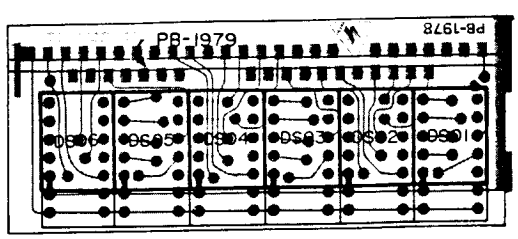


Viewed from component side

(PB-1979)

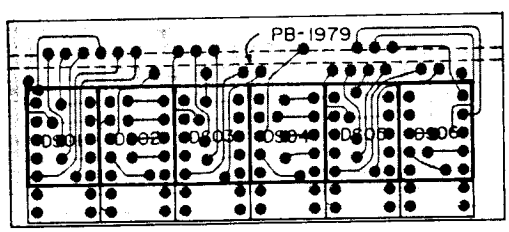


Viewed from solder side



Viewed from solder side

(PB-1978)



Viewed from component side

REMOVAL OF COUNTER AND DISPLAY UNITS

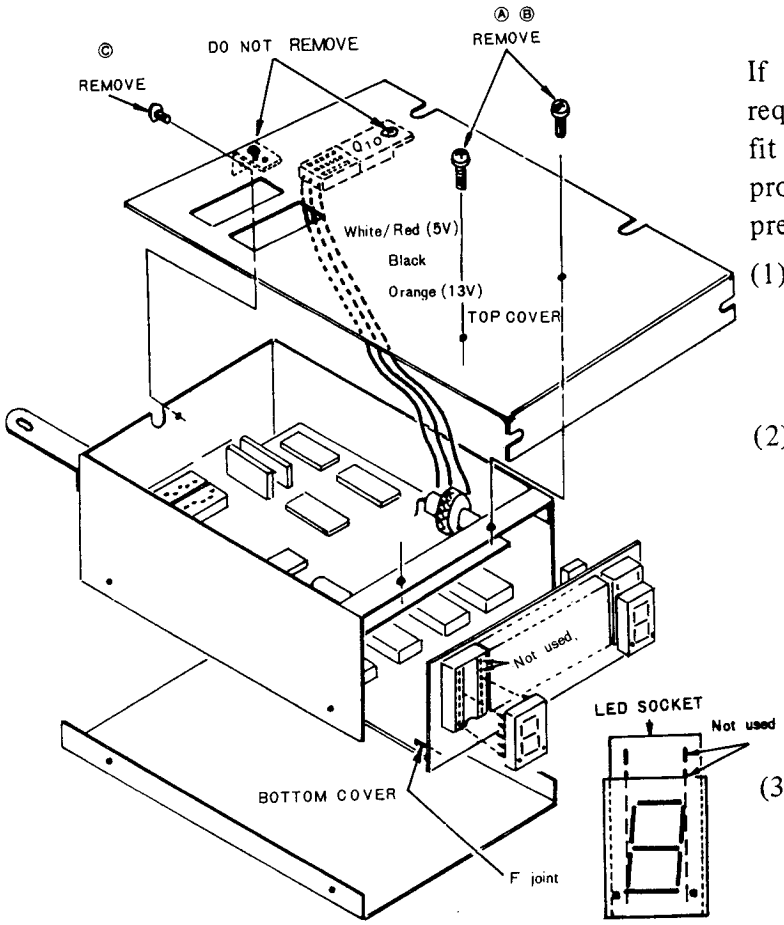


Figure 22.

If servicing of the counter or display unit is required, some caution is required, as the physical fit of the two units is quite precise. However, the process is not difficult, if you follow the directions presented herein.

(1) Remove screws A, B, and C, as shown in Figure 22. Be careful not to remove the two screws on the top rear of the cover. Now remove the top cover.

(2) PB-1980 and PB-1979 are stacked within the enclosure. The display module is held in place with two "F" joints, while the two circuit boards are held together by plug D and socket E. When replacing LED digits, note that the top two pins on each row of the socket are not used; be careful to align the LED correctly. The bottom cover is held in simply by a snap fit.

(3) To remove PB-1980, refer to Figure 23. and insert a small screwdriver in the oblong hole in the rear of the enclosure. Carefully pry plug D away from socket E, and then PB-1980 will be free for servicing.

(4) The color codes for the external access wiring are shown in Figure 24.

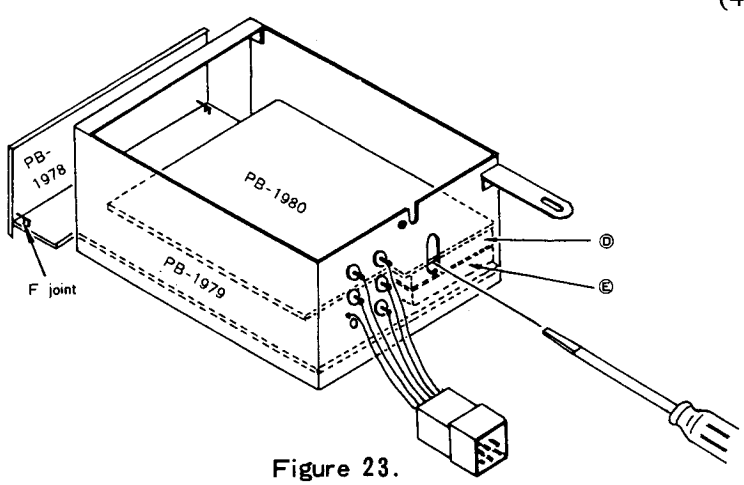
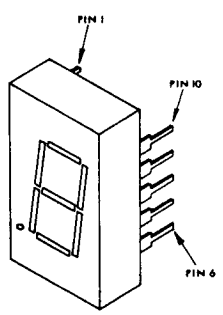


Figure 23.



HP5082-7623

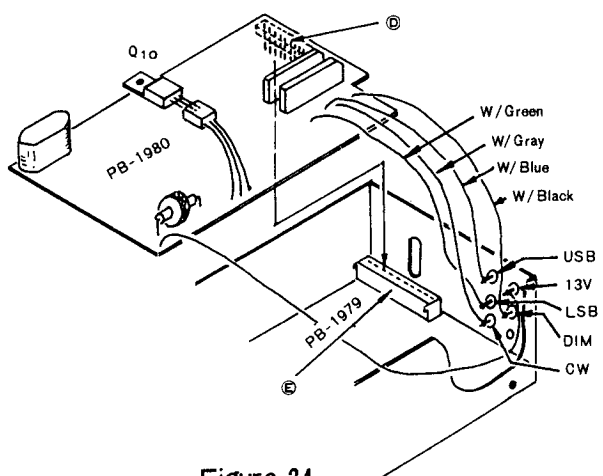
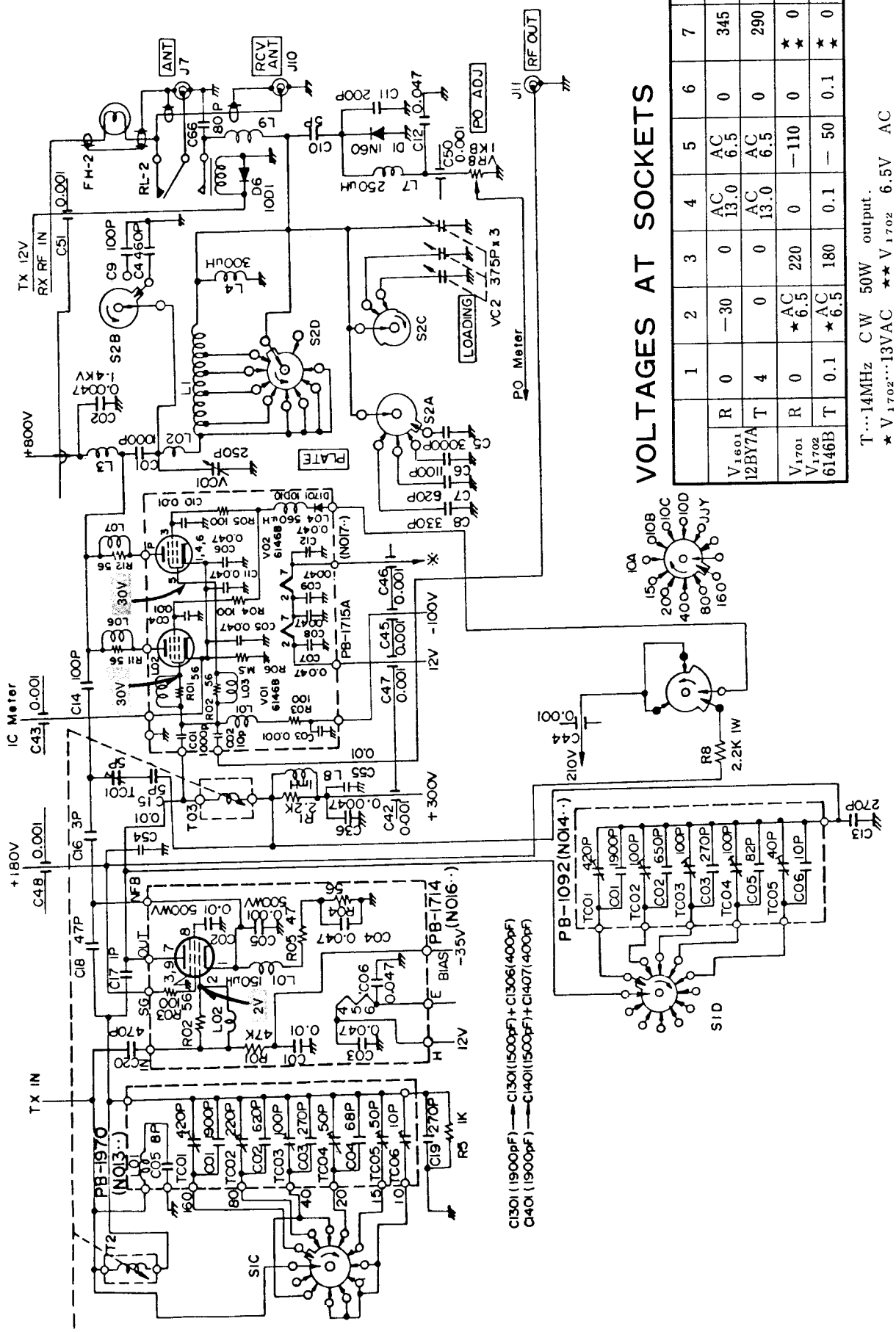
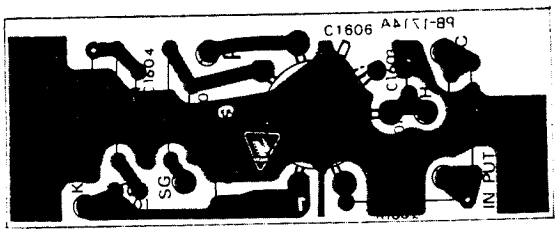


Figure 24

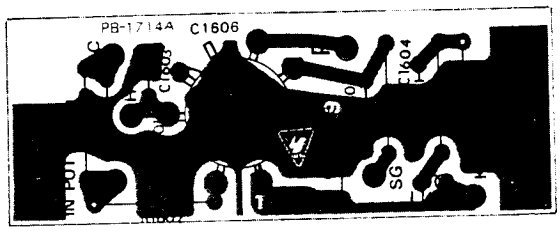


		1	2	3	4	5	6	7	8	9
V1601 12BY7A	R	0	−30	0	AC 13.0	AC 6.5	0	345	235	0
	T	4	0	0	AC 13.0	AC 6.5	0	290	190	0
V1701 V1702 6146B	R	0	★AC 6.5	220	0	−110	0	★★ 0	900	—
	T	0.1	★AC 6.5	180	0.1	− 50	0.1	★★ 0	790	—

DRIVER BOARD (PB-1714A)

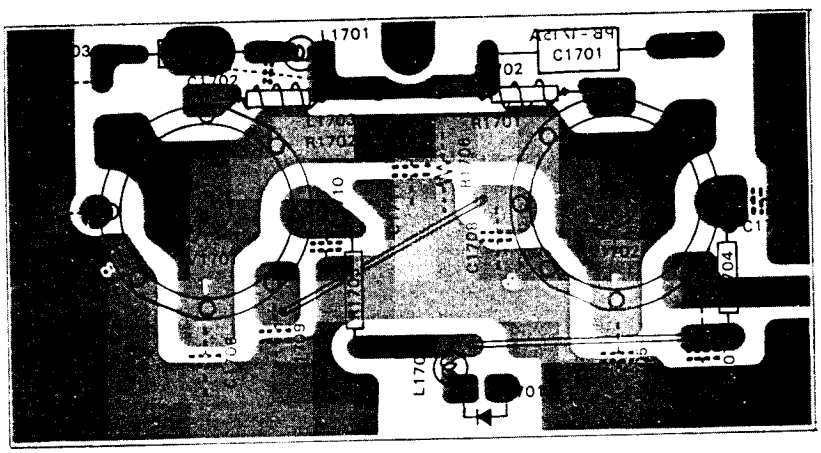


Viewed from component side

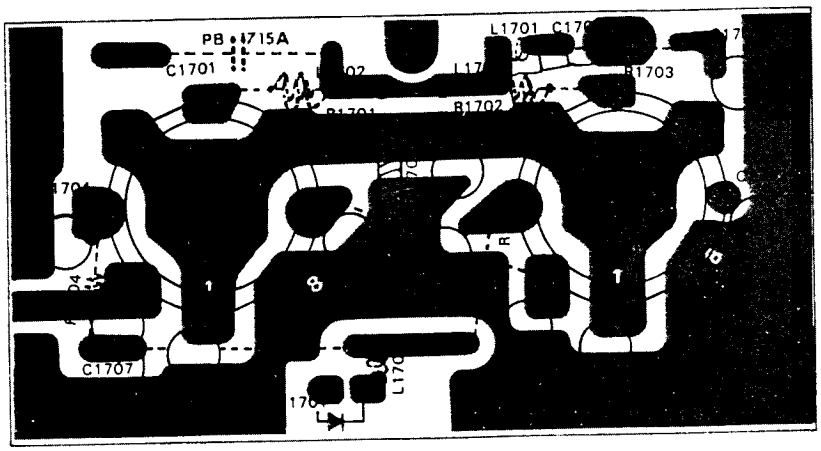


Viewed from solder side

FINAL BOARD (PB-1715A)



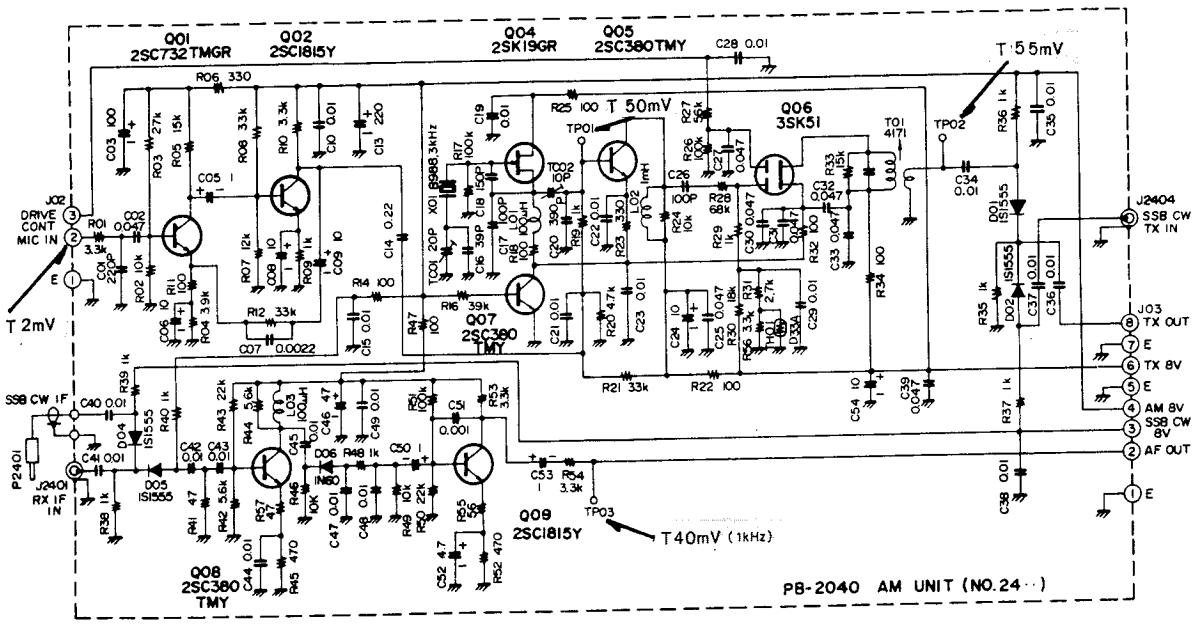
Viewed from component side

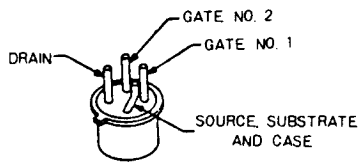


Viewed from solder side

AM UNIT (PB-2040)

(After Prod. #8)



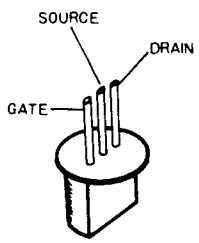


3SK40M
3SK51-03

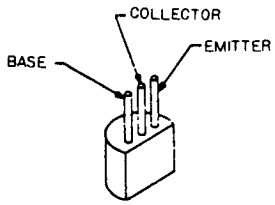
DC VOLAGES (V)

	E(S)		C(D)		B(G_1)		(G_2)		
	R	T	R	T	R	T	R	T	
Q_{2401}	1.4	1.4	2	2	2	2	—	—	
Q_{2402}	1.3	1.3	3.5	3.5	2	2	—	—	
Q_{2404}	0	0.6	0	7.5	0	−2.5	—	—	
Q_{2405}	0	0.3	0	8	0	1	—	—	
Q_{2406}	0	1.3	0	6.5	0	3	0	1.5	DRIVE MAX
Q_{2407}	0	0	0	0.15	0.6	0.8	—	—	
Q_{2408}	0.8	0.8	7.5	7.5	0.5	0.5	—	—	
Q_{2409}	0.6	0.6	3.9	3.9	1.2	1.2	—	—	

MODE AM

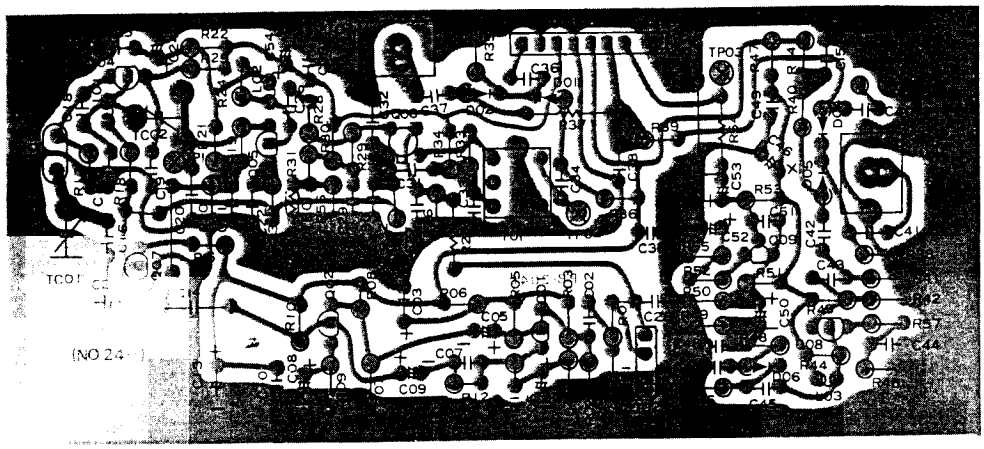


2SK19GR

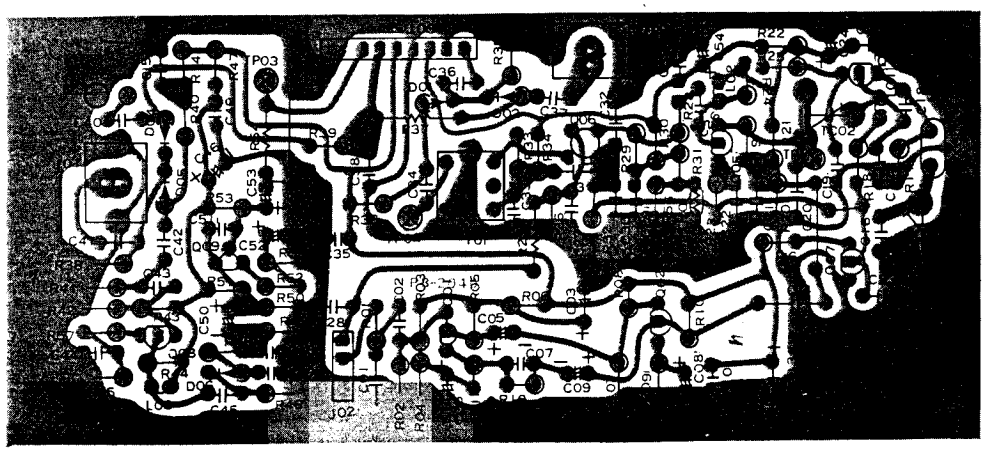


2SC380TM-Y
2SC732TM-GR
2SC1815Y

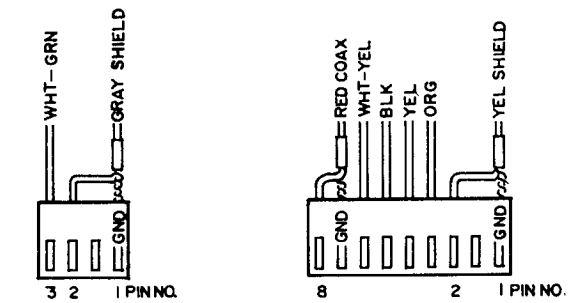
AM UNIT PARTS LAYOUT



Viewed from component side



Viewed from solder side



P19(J2402) P20(J2403)

SECTION 4 – REPAIR PARTS

PARTS LIST AND ORDERING FORMS

If you live in the United States, you may order parts from Yaesu Electronics Corporation. In other countries, you should order parts from the Yaesu agent for your country. In countries where Yaesu is not currently represented, you may order spare parts directly from Yaesu Musen Company, Ltd. in Tokyo.

When ordering, please specify the exact model number of the transceiver that the part is for. Many parts are standard, such as resistors and disc ceramic capacitors, but you should use particular care when ordering such items as electrolytics, tantalum capacitors, and the like.

The parts list to follow identifies the board that the parts belong to, as well as the circuit designation and part description. A "Part Number" is also specified, and this number will allow immediate identification by our parts department of the item you require. (**See note below.)

Shipment of parts from Yaesu USA is usually made by UPS, COD. Allow at least a week for the parts department to process your order. You will receive prompt notification that your order has been received, and if parts are back ordered, or if additional information is required, you will be so informed.

PARTS ORDER EXAMPLE

QUANTITY	TRANSCEIVER IDENTIFICATION	LOCATION	**PART NUMBER	CIRCUIT DESIGNATION
1	FT-101ZD	PB-1960A	G4800510C	Q_{101} 3SK51-03

**Note: In earlier transceivers, no part numbering system was used in the manual. For this reason, the nomenclature "3SK51" will suffice for the part number. All FT-101ZD transceivers have a part number for each component.

(cut here)

YAESU MUSEN COMPANY, LTD. – C.P.O. BOX 1500, TOKYO, JAPAN
YAESU ELECTRONICS CORPORATION – 6851 Walthall Way, Paramount, CA90732
YAESU ELECTRONICS CORPORATION – 9812 Princeton-Glendale Rd., Cincinnati, OH 45246

ORDER BLANK

QUANTITY	TRANSCEIVER IDENTIFICATION	LOCATION	PART NUMBER	CIRCUIT DESIGNATION

I authorize shipment via: ☐ Best Way ☐ Parcel Post ☐ UPS ☐ Other

Ship To: (Print or Type)
Name: _____
Address: _____
City: _____ State: _____ Zip: _____
Country: _____

YAESU MUSEN COMPANY, LTD. – C.P.O. BOX 1500, TOKYO, JAPAN
YAESU ELECTRONICS CORPORATION – P.O. Box 498, Paramount, CA 90723
YAESU ELECTRONICS CORPORATION – 9812 Princeton-Glendale Rd., Cincinnati, OH 45246

ORDER BLANK

QUANTITY	TRANSCEIVER IDENTIFICATION	LOCATION	PART NUMBER	CIRCUIT DESIGNATION

I authorize shipment via: ☐ Best Way ☐ Parcel Post
☐ UPS ☐ Other

Ship To: Name: _____
(Print or Type) Address: _____
City: _____ State: _____ Zip: _____
Country: _____

(cut here)

YAESU MUSEN COMPANY, LTD. – C.P.O. BOX 1500, TOKYO, JAPAN
YAESU ELECTRONICS CORPORATION – P.O. Box 498, Paramount, CA 90723
YAESU ELECTRONICS CORPORATION – 9812 Princeton-Glendale Rd., Cincinnati, OH 45246

ORDER BLANK

QUANTITY	TRANSCEIVER IDENTIFICATION	LOCATION	PART NUMBER	CIRCUIT DESIGNATION

I authorize shipment via: ☐ Best Way ☐ Parcel Post
☐ UPS ☐ Other

Ship To: Name: _____
(Print or Type) Address: _____
City: _____ State: _____ Zip: _____
Country: _____

PARTS LIST

MAIN CHASSIS

Symbol No.	Parts No.	Description
		IC, TRANSISTOR
Q2	G3104960O	TR 2SA496(O)
Q1	G3206160	" 2SB616
Q4	G3402350O	" 2SD235(O)
Q3	G1090070	IC μPC14308
Q5	G1090080	" μPC78L08
		DIODE
D1	G2090029	Ge 1N60
D2–5	G2015550	Si 1S1555
D6	G2090001	" 10D1
		RESISTOR
R22, 24	J01245220	Carbon film 1/4W TJ 22 Ω
R23	J00245330	" " " VJ 33 Ω
R14	J01245560	" " " TJ 56 Ω
R7, 11	J01245101	" " " " 100 Ω
R18	J01245821	" " " " 820 Ω
R4, 5	J01245102	" " " " 1 kΩ
R6	J01245152	" " " " 1.5 kΩ
R19	J01245182	" " " " 1.8 kΩ
R17	J01245222	" " " " 2.2 kΩ
R20	J01245474	" " " " 470 kΩ
R2	J10276100	Carbon composition 1/2W GK 10 Ω
R9, 10 (with L5, L6)	–	" " " " 56 Ω
R3	J10276101	" " " " 100 Ω
R1	J10276222	" " " " 2.2 kΩ
		POTENTIOMETER
VR1	J60800035	VM11AB06A5M1112 10 kΩB
VR2	J62800032	DM10A039A 500 kΩB/20 kΩB
VR3	J62800033	DM10A039A 5 kΩA/5 kΩB
VR4	J60800043	VM10A592A 5 kΩA
VR5, 6	J60800036	VM10A592A 5 kΩB
VR7	J62800034	DM10A39A 5 kΩB/5 kΩA
VR8	J60800037	VM10A654A 1 kΩB
VR9, 10	J60800038	VM10A654A 5 kΩB
VR11	J60800039	VM10AB08A 5 kΩB
		CAPACITOR
		Dipped mica 500 WV 5 pF
C13, 19, 21	K30276271	" " " 270 pF (LCQ1727271K5)
C8	K30276331	" " 500 WV 330 pF (DM-15-331K5)
C7	K30276621	" " 500 WV 620 pF (DM19D621K5)
C6	K30279052	" " 500 WV 1100 pF (DM19-112K5)
C5	K30279062	Dipped mica 500 WV 3000 pF (DM19-302K5)
C66	K31306800	Moulded mica 1 KWV 80 pF
C17	K02279001	Ceramic 500 WV 1 pF
C10	K02279002	" " 5 pF
C18	K02279003	" " 47 pF
C11	K00279001	" " 200 pF
C20	K00279002	" " 470 pF
C16	K00309001	" 1 KV 3 pF
C15	K02309002	" " 5 pF
C14	K02309003	" " 100 pF
C3	K00329002	" 1.5 KWV 460 pF
C9	K00359001	" 3 KV 100 pF
C1	K12359001	" " 1000 pF
C29, 34, 35, 41, 64	K13170103	" 50 WV 0.01 μF
C12, 22–24, 39, 40, 56, 58, 60, 68, 69	K13170473	" " 0.047 μF
C27, 28, 36	K12279004	" 500 WV 0.0047 μF
C30,32,33,54, 55, 61	K12279002	" " 0.01 μF
C2, 25, 26	K12329002	" 1.4 KV 0.0047 μF
C31, 37	K12329001	" " 0.01 μF
C42–51	K21270002	Feed thru 500 WV 0.001 μF (ECK-L2H102PE)
C63	K40120476	Electrolytic 16 WV 47 μF
C65	K40120337	" " 330 μF
C70	K40120106	" " 10 μF
C67	K40100336	" 10 WV 33 μF
C71	K50177104	Mylar 50 WV 0.1 μF
		VARIABLE CAPACITOR
VC1	K90000026	YB-250 250 pF
VC2	K90000016	C134E125
		TRIMMER CAPACITOR
TC1	K91000007	TSN120C 10P x 2
		INDUCTOR
L1	L0020534B	#220534B
L2	L0020611	#220611
L3	L1020065	#220065
L4	L1020064	#220064
L5, L6 (R9, R10)	L1020308	#220308
L7	L1190001	EL0710-251K 250 μH
L8	L1190017	FL-5H-102J 1 mH
L9	L0020705	#220674

		TRANSFORMER
T1	L0020544	#220544
T2	L0020011	#220011
T3	L0020074	#220074
		METER
M1	M0090002	Y-45-02 #250042
		SPEAKER
SP1	M4090005	SA-92Y 4 Ω 3 W
		POWER TRANSFORMER
PT1	L3030028	52-74 (#230028)
		RELAY
RL1	M1190004	FRL-263 D012/04CS01
RL2	M1090002	MX2P
		RELAY SOCKET
RLS1	M1490010	263H204
RLS2	M1490001	PX08
		SWITCH
S1	N0050041	#250041 (SRS)
S2	N0050007	#250044 (RS2-4-11)
S3 *(Lot 1–7)	N0190025	ESR-E485R20
S3 *(Lot 8→)	N0190037	ESR-E486R20
S4, 5	N7090005	WD9223
		COOLING FAN
FAN1	M2090001	2SB10A
		RECEPTACLE
J1, 3	P1090004	SG7814
J2	P0090011	FM144S
J4	P1090033	D6-701B00
J5 (with wire)	P1090062	1625-09R-1 (#240128A)
J6	P1090014	SI7501-1
J7	P1090028	M-BR-06B
J8	P1090040	SA607B00
J9–14, 18	P1090025	STR-01
J15	P1090005	SG-8050
J16	P1090045	AC9-PF
J17	P0090047	QS-DB6-ML
J19	P1090111	J-7015

		MULTI JACK
MJ1	P4090001	121S-10B-105A
MJ2	P4090007	220D-20B-205A
MJ3	P4090002	121S-14B-105A
		PLUG
P1 (with wire)	P1090079	5047-12A (#240129B)
P2 (")	P1090080	5047-13A (#240130B)
P3 (")	P1090082	5047-15A (#240131B)
P4 (")	P1090086	5047-19A (#240132)
P5 (")	P1090082	5047-15A (#240133)
P6 (")	P1090075	5047-08A (#240134)
P7 (")	P1090072	5047-05A (#240135)
P8 (")	P1090082	5047-08A
P9 (")	P1090079	5047-12A (#240137)
P10 (")	P1090083	5047-16A
P18 (")	P1090070	5047-03A (#240129)
P11, 14, 22	P0090045	SQ4052
P15	P0090002	SI5908
P16	P0090005	SI-7502
P19	P1090070	5047-03A
P20	P1090075	5047-08A
P21	P0090075	P-7015
		FUSE
F1	Q0000005	5 A (100V–117V)
	Q0000004	3 A (200V–234V)
		FUSE HOLDER
FH1	P2000001	SN1001 #2
FH2	P2000003	F3265
		PILOT LAMP
PL1	Q1000026	BF311-04071A
PL2–5	Q1000033	K0252-6-8
	Q5000010	Thru terminal FT-SM1
	Q4000002	" A339 (HV)
	Q6000042	Terminal block ML-3182 20P
	Q6000004	Terminal board 1L2PS (2-0)
	Q6000007	" 1L3PS (2-0-1)
	Q6000011	" 1L4PS (2-0-2)
	Q6000003	" 1L2PS (1-0-1)
	Q6000008	" 1L3PS (3-0)

★★★★★ LED B BOARD ★★★★★		
PB-1390	F0001390	P.C. Board
D9	G2090060	GD4-203-SRD

RF UNIT

Symbol No.	Parts No.	Description
	C0019600	RF unit with components
PB-1960A	F0001960A	P.C. Board
		FET & TRANSISTOR
Q103, 104	G3800190G	FET 2SK19GR
Q105, 106	G4800400M	" 3SK40M
Q101	G4800510C	" 3SK51-03
Q102	G3090019	" J310
Q107	G3090010	TR 2N4427
		DIODE
D104	G2010070	Ge (GB) 1S1007
D101–103	G2015550	Si 1S1555
		RESISTOR
R119	J00245479	Carbon film 1/4W VJ 4.7 Ω
R126, 127	J00245100	" " " " 10 Ω
R110	J00245820	" " " " 82 Ω
R106–108, 116, 120, 121 130	J00245101	" " " " 100 Ω
	J00245221	" " " " 220 Ω
R111,113,114, 128,129	J00245331	" " " " 330 Ω
R112	J00245471	" " " " 470 Ω
R118	J00245821	" " " " 820 Ω
R105	J00245102	" " " " 1 kΩ
R117	J00245152	" " " " 1.5 kΩ
R102, 122	J00245272	" " " " 2.7 kΩ
R104, 109	J00245562	" " " " 5.6 kΩ
R115	J00245822	" " " " 8.2 kΩ
R124	J00245223	" " " " 22 kΩ
R103	J00245393	" " " " 39 kΩ
R123	J00245563	" " " " 56 kΩ
R125	J00245124	" " " " 120 kΩ
R101	J10246225	Carbon composition 1/2W GK 2.2 MΩ
		CAPACITOR
C125	K30173030	Dipped mica 50 WV 3 pF
C107	K30173040	" " " 4 pF
C116	K30176471	" " " 470 pF
C126	K02179009	Ceramic " CH 22 pF
C102, 108	K00175101	Ceramic 50WV SL 100 pF
C103–106, 110–112, 114,115,117, 119–124	K13170103	" " 0.01 μF
C101, 118	K13170473	" " 0.047 μF
C113	K40120106	Electrolytic 16WV TT 10 μF
		TRIMMER CAPACITOR
TC101	K91000019	ECV-1ZW 10 x 40 10 pF
		INDUCTOR
L101, 102	L1190038	FL-5H271K 270 μH
		TRANSFORMER
T101,103,105	L0020209	#220209
T102, 104	L0020221	#220221
		JACK
J101–103	P1090018	SQ3081

NB-FIX UNIT

Symbol No.	Parts No.	Description
	C0019610	NB-FIX unit with components
PB-1961B	F0001961B	P.C. Board
		TRANSISTOR
Q201–204	G3303720Y	2SC372Y
Q205, 206	G3315830	2SC1583
		DIODE
D201–204	G2090029	Ge 1N60
D205–209	G2015550	Si 1S1555
		RESISTOR
R208,216,224, 230,238,239,	J00245101	Carbon film 1/4W VJ 100 Ω
R204	J00245221	" " " " 220 Ω
R222, 236	J00245471	" " " " 470 Ω
R231–233,235	J00245561	" " " " 560 Ω
R206,215,221, 234,237	J00245102	" " " " 1 kΩ
R207	J00245222	" " " " 2.2 kΩ

★★★★★ LED B BOARD ★★★★★		
PB-1390	F0001390	P.C. Board
D9	G2090060	GD4-203-SRD

RF UNIT

Symbol No.	Parts No.	Description
	C0019600	RF unit with components
PB-1960A	F0001960A	P.C. Board
		FET & TRANSISTOR
Q103, 104	G3800190G	FET 2SK19GR
Q105, 106	G4800400M	" 3SK40M
Q101	G4800510C	" 3SK51-03
Q102	G3090019	" J310
Q107	G3090010	TR 2N4427
		DIODE
D104	G2010070	Ge (GB) 1S1007
D101–103	G2015550	Si 1S1555
		RESISTOR
R119	J00245479	Carbon film 1/4W VJ 4.7 Ω
R126, 127	J00245100	" " " " 10 Ω
R110	J00245820	" " " " 82 Ω
R106–108, 116, 120, 121 130	J00245101	" " " " 100 Ω
	J00245221	" " " " 220 Ω
R111,113,114, 128,129	J00245331	" " " " 330 Ω
R112	J00245471	" " " " 470 Ω
R118	J00245821	" " " " 820 Ω
R105	J00245102	" " " " 1 kΩ
R117	J00245152	" " " " 1.5 kΩ
R102, 122	J00245272	" " " " 2.7 kΩ
R104, 109	J00245562	" " " " 5.6 kΩ
R115	J00245822	" " " " 8.2 kΩ
R124	J00245223	" " " " 22 kΩ
R103	J00245393	" " " " 39 kΩ
R123	J00245563	" " " " 56 kΩ
R125	J00245124	" " " " 120 kΩ
R101	J10246225	Carbon composition 1/2W GK 2.2 MΩ
		CAPACITOR
C125	K30173030	Dipped mica 50 WV 3 pF
C107	K30173040	" " " 4 pF
C116	K30176471	" " " 470 pF
C126	K02179009	Ceramic " CH 22 pF
C102, 108	K00175101	Ceramic 50WV SL 100 pF
C103–106, 110–112, 114,115,117, 119–124	K13170103	" " 0.01 μF
C101, 118	K13170473	" " 0.047 μF
C113	K40120106	Electrolytic 16WV TT 10 μF
		TRIMMER CAPACITOR
TC101	K91000019	ECV-1ZW 10 x 40 10 pF
		INDUCTOR
L101, 102	L1190038	FL-5H271K 270 μH
		TRANSFORMER
T101,103,105	L0020209	#220209
T102, 104	L0020221	#220221
		JACK
J101–103	P1090018	SQ3081

NB-FIX UNIT

Symbol No.	Parts No.	Description
	C0019610	NB-FIX unit with components
PB-1961B	F0001961B	P.C. Board
		TRANSISTOR
Q201–204	G3303720Y	2SC372Y
Q205, 206	G3315830	2SC1583
		DIODE
D201–204	G2090029	Ge 1N60
D205–209	G2015550	Si 1S1555
		RESISTOR
R208,216,224, 230,238,239,	J00245101	Carbon film 1/4W VJ 100 Ω
R204	J00245221	" " " " 220 Ω
R222, 236	J00245471	" " " " 470 Ω
R231–233,235	J00245561	" " " " 560 Ω
R206,215,221, 234,237	J00245102	" " " " 1 kΩ
R207	J00245222	" " " " 2.2 kΩ

T309, 310	L0020505	#220505
T311, 312	L0020633	#220633
T313, 314	L0020507	#220507
T315	L0020210	#220210
		JACK
J301	P1090018	SQ3081
P301	P0090045	SQ4052

IF UNIT

Symbol No.	Parts No.	Description
	C0019630	IF unit with components
PB-1963C	F0001963C	P.C. Board
		IC, FET, TRANSISTOR
Q403	G1090063	IC TA7060P
Q406	G3800190B	FET 2SK19BL
Q402,413,414, 419, 425	G3800190G	" 2SK19GR
Q401,405,412, 415, 416	G4800510C	" 3SK51-03
Q408	G3090019	" J310
Q407, 420	G3105641	TR 2SA564A
Q404,409,410, 417, 418, 422–424	G3303720Y	" 2SC372Y
Q421	G3305350A	" 2SC535A
Q411	G3090005	" MPSA13
		DIODE
D416, 417	G2090029	Ge 1N60
D405–408, 414, 421	G2010070	" (GB) 1S1007
D401–404, 409–413, 419	G2015550	Si 1S1555
D418	G2022090	Varactor 1S2209
D422	G2090040	" FC63
D420, 423	G2090010	Zener WZ090
		CRYSTAL
X401	H0100431	HC-18/U 19.7475 MHz
		CRYSTAL FILTER
XF401	H1100860	XF8.9HS
XF402(Option)	H1100880	XF8.9HC
XF403	H1100890	XF8.9HP
XF404	H1100470	8.9M20A
XF405	H1100900	XF10GS
		RESISTOR
R0517, 0518, 0520	J00245220	Carbon film 1/4W VJ 22 Ω
R410, 411	J01245101	" " " TJ 100 Ω
R402,408,422, 423,437,439, 444,446,463, 464,469,475, 482,483,497	J00245101	" " " VJ 100 Ω
R419,425,447, 451,486, 0507,0508	J00245221	" " " " 220 Ω
R0502	J00245331	" " " " 330 Ω
	J00245391	390 Ω
R443	J00245471	" " " " 470 Ω
R430,474,480	J00245561	" " " " 560 Ω
R467, 468	J00245681	" " " " 680 Ω
R0515	J00245821	" " " " 820 Ω
R406,416,428, 437,440,442, 449,453,457, 459,462,488, 494,0504, 0506	J00245102	" " " " 1 kΩ
R429, 495	J00245152	" " " " 1.5 kΩ
R0516	J01245152	" " " TJ 1.5 kΩ
R454,455,458, 0510	J00245222	" " " VJ 2.2 kΩ
R460	J00245272	" " " " 2.7 kΩ
R401,409,412, 413,417,431, 456,496,0511	J00245332	" " " " 3.3 kΩ
R426, 427	J00245472	" " " " 4.7 kΩ
R403,445,481, 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
R470, 476	J00245123	" " " VJ 12 kΩ
R415,438,498, 499	J00245153	" " " " 15 kΩ
R414	J00245273	" " " " 27 kΩ
R461,472,478, 0500	J00245473	" " " " 47 kΩ
R405,465,466	J00245104	" " " " 100 kΩ
R493	J00245154	" " " " 150 kΩ
R448,452,487, 0503, 0505	J00245184	" " " " 180 kΩ
R441	J00245334	" " " " 330 kΩ

R0521	J01245474	Carbon film 1/4W TJ 470 kΩ
R432	J00245684	" " " VJ 680 kΩ
R490	J00245105	" " " " 1 MΩ
	J00245225	" " " " 2.2 MΩ
R0519	J10246565	" composition " GK 5.6 MΩ
		POTENTIOMETER
VR401, 402	J51723102	SR-19R 1 kΩB
VR403, 404	J51723103	10 kΩB
VR405	J51723473	47 kΩB
		CAPACITOR
C477	K30176221	Dipped mica 50WV 220 pF
C445, 472	K02173100	Ceramic " CH 10 pF
C488, 492	K06175330	" " UJ 33 pF
C489	K06175390	" " UJ 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
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
C449	K14179003	" " 0.1 μF
C461, 467	K50177103	Mylar 50WV 0.01 μF
C478	K50177223	" " 0.022 μF
C409,439,456, 466,480,481, 483	K50177473	" " 0.047 μF
C434	K70167224	Tantalum 35WV 0.22 μF
C479	K70127225	" " 2.2 μF
C450,476,496	K40120106	Electrolytic 16WV 10 μF
		INDUCTOR
L401–408,410	L1190016	FL-5H 101K 100 μH
L411, 412	L1190038	FL-5H 271K 270 μH
L409	L0020145	5.2 μH #220145
		TRANSFORMER
T410	L0020150	R12-4074
T402,403,404, 407,409,413, 414	L0020140	R12-4170
T401,406,408, 415	L0020141	R12-4171
T405	L0020221	#220221
T411	L0020460	#220460
T412	L0020209	#220209
		MINI CONNECTOR
J401	P0090038	5048-12A
J402	P0090039	5048-13A
J403	P0090040	5048-15A
TP401–412	Q5000011	Wrapping terminal C

AF UNIT

Symbol No.	Parts No.	Description
	C0019640	AF unit with components
PB-1964A	F0001964A	P.C. Board
		IC, FET, TRANSISTOR
Q503	G1090077	IC MC3403P
Q506	G1090064	" 34024P CQM
Q504	G1090100	" SN74LS123N
Q502	G1090086	" TA7063P
Q501	G1090164	" μPC2002H
Q505	G1090120	" NJM78L05
Q514	G3800190G	FET 2SK19GR
Q515	G3105641	TR 2SA564A
Q511	G3303730	" 2SC373
Q507, 508	G3310000G	" 2SC1000GR
Q512	G3313830	" 2SC1383
Q509,510,513, 516	G3318150Y	" 2SC1815Y
		DIODE
D510, 511	G2090029	Ge 1N60
D502–506	G2010070	Ge (GB) 1S1007
D507–509, 512–517, 519–522	G2015550	Si 1S1555

D501, 518	G2090001	Si 10D1
		CRYSTAL
X501	H0100260	HC-6/W 3200 kHz #210026
X502	H0100421	HC-18/U 8986 kHz #210042-1
X503	H0100422	" 8989 kHz #210042-2
X504	H0100423	" 8988.3 kHz #210042-3
		RESISTOR
R511	J00245560	Carbon film 1/4W VJ 56 Ω
R509,539,557	J00245101	" " " " 100 Ω
R533, 546	J00245151	" " " " 150 Ω
R503,513,524, 525	J00245221	" " " " 220 Ω
R512,522,538	J00245471	" " " " 470 Ω
R504,514,520, 523,548,561	J00245102	" " " " 1 kΩ
R515	J00245222	" " " " 2.2 kΩ
R534,535,565	J00245272	" " " " 2.7 kΩ
R510,562,569, 571,578–580	J00245332	" " " " 3.3 kΩ
R583	J01245472	" " " TJ 4.7 kΩ
R501,506,531, 536,537,542, 544,545,549, 550,563,566, 575,576,581	J00245472	" " " VJ 4.7 kΩ
R521,527,532, 541,568,570	J00245682	" " " " 6.8 kΩ
R507,519,529, 555,556,558, 572	J00245103	" " " " 10 kΩ
R517, 551	J00245153	" " " " 15 kΩ
R508,518,528, 540,554,573	J00245223	" " " " 22 kΩ
R559	J00245393	" " " " 39 kΩ
R567	J00245473	" " " " 47 kΩ
R516	J00245563	" " " " 56 kΩ
R547, 574	J00245104	" " " " 100 kΩ
R560	J00245154	" " " " 150 kΩ
R552, 553	J00245224	" " " " 220 kΩ
R526	J00245274	" " " " 270 kΩ
R564, 577	J00245474	" " " " 470 kΩ
R582	J00245824	" " " " 820 kΩ
R505	J10276229	" composition 1/2W GK 2.2Ω
R502	J32276010	Wire wound 1W 1 Ω
		POTENTIOMETER
VR501	J51727101	CR-19R 100 ΩB
		CAPACITOR
C512	K30176271	Dipped mica 50WV 270 pF
C513	K30176511	Dipped mica 50WV 510 pF
C511	K02172030	Ceramic 50 WV CH 3 pF
C522	K02173100	" " " 10 pF
C514	K02179011	" " " 27 pF
C546–548	K02175390	" " " 39 pF
C510,532,534, 555,566	K02175101	" " " 100 pF
C533	K02175151	" " " 150 pF
C558, 559	K00179020	" " SL 240 pF
C504,519–521, 523,531,535, 542–545, 570	K13170103	" " 0.01 μF
C509,537	K13170473	" " 0.047 μF
C516	K50177102	Mylar 50 WV 0.001 μF
C526	K50177472	" " 0.0047 μF
C518,529,530, 572	K50177103	" " 0.01 μF
C525,539–541	K50177223	" " 0.022 μF
C556,567,569, 573, 574	K50177473	" " 0.047 μF
C503,528	K50177104	" " 0.1 μF
C507,517,527, 550,551,560, 568,571	K40170105	Electrolytic " 1 μF
C557	K40170225	" " 2.2 μF
C561	K40170335	" " 3.3 μF
C536	K40140475	" 25 WV 4.7 μF
C505,515,538, 552,554,564, 565	K40126106	" 16 WV 10 μF
C524,553,563	K40126226	" " 22 μF
C508	K40126476	" " 47 μF
C501	K40126107	" " 100 μF
C506	K40126227	" " 220 μF
C502	K40126477	" " 470 μF
C562	K40126336	" " 33 μF
		TRIMMER CAPACITOR
TC501–505	K91000013	ECV-1ZW 20 x 32 20 pF
		INDUCTOR
L502	L1190023	FL-5H 220 22 μH
L501	L1190038	FL-5H 271 270 μH
L503–506	L1190017	FL-5H 102 1 mH
		TRANSFORMER
T501	L0020209	#220209
		RELAY
RL501	M1190002	FBR211A D012M

		MINI CONNECTOR
J501	P0090043	5048-19A
J502	P0090040	5048-15A
J503	P0090037	5048-08A
J504	P0090042	5048-05A
J505	P0090041	5048-03A
	R0042800	**HEAT SINK**

PREMIX LOCAL UNIT

Symbol No.	Parts No.	Description
	C0019650	PREMIX LOCAL unit with components
PB-1965	F0001965	P.C. Board
		TRANSISTOR
Q601–610	G3303720Y	2SC372Y
		DIODE
D601–610	G2015550	Si 1S1555
		RESISTOR
R604,608,612, 616,620,624, 628,632,636, 640	J00245101	Carbon film 1/2W VJ 100 Ω
R642	J00245181	" " " " 180 Ω
R603,607,611, 615,619,623, 627,631,635, 639	J00245102	" " " " 1 kΩ
R641, 643	J00245122	" " " " 1.2 kΩ
R602,606,610, 614,618,638	J00245183	" " " " 18 kΩ
R622,626,630, 634	J00245333	" " " " 33 kΩ
R601,605,609, 613,617,621, 625,629,633, 637	J00245563	" " " " 56 kΩ
		CAPACITOR
C604	K30176331	Dipped mica 50WV 330 pF
C624,628,632, 636	K02175470	Ceramic " CH 47 pF
C620	K02175680	" " " 68 pF
C616	K02175101	" " " 100 pF
C612	K02179023	Ceramic 50WV CH 180 pF
C640	K02179026	" " " 240 pF
C608	K02179027	" " " 270 pF
C601–603, 605–607, 609–611, 613–615, 617–619, 621–623, 625–627, 629–631, 633–635, 637–639, 641	K13170103	" " 0.01 μF
		CRYSTAL
X601	H0100411	HC-18/U 15.9875 MHz #210147
X602	H0101480	" 17.9875 MHz #210148
X603	H0101490	" 21.4875 MHz #210149
X604	H0101500	" 28.4875 MHz #210150
X605	H0101510	" 35.4875 MHz #210151
X606	H0101520	" 42.4875 MHz #210152
X607	H0101530	" 42.9875 MHz #210153
X608	H0101540	" 43.4875 MHz #210154
X609	H0101550	" 43.9875 MHz #210155
X610	H0101560	" 19.4875 MHz #210156
		TRANSFORMER
T601–610	L0020017	#220017

SELECT SWITCH UNIT

Symbol No.	Parts No.	Description
	C0019660	SELECT SW unit with components
PB-1966C	F0001966C	P.C. Board
		DIODE
D701	G2090001	Si 10D1
		RELAY
RL701	M1190002	FBR211A D012M
		SWITCH
S701	M4090006	6B0003CC2060

		MINI CONNECTOR	
J701	P0090049	5048-16A	

VFO UNIT

Symbol No.	Parts No.	Description
	C0014400	VFO assembly 3420
		PCB with components
PB-1440B	F0001440B	P.C. Board
		FET & TRANSISTOR
Q802	G3800190G	FET 2SK19GR
Q801, 803	G3303720Y	Transistor 2SC372Y
		DIODE
D801	G2022360	Varactor 1S2236
		RESISTOR
R809, 811	J00245101	Carbon film 1/4W VJ 100 Ω
R807	J00245221	" " " " 220 Ω
R805, 808	J00245222	" " " " 2.2 kΩ
R802	J00245332	" " " " 3.3 kΩ
R801	J00245103	" " " " 10 kΩ
R803	J00245183	" " " " 18 kΩ
R804	J00245223	" " " " 22 kΩ
R806, 810	J00245104	" " " " 100 kΩ
		CAPACITOR
C807	K02173080	Ceramic disc 50WV CH 8 pF
C801	K06173080	" " " UJ 8 pF
C803	K06175120	" " " " 12 pF
C804	K02175180	" " " CH 18 pF
C805, 814	K02179013	" " " " 33 pF
C808, 818	K02175390	" " " " 39 pF
C811	K02179023	" " " " 180 pF
C809,810,812, 815,819,820, 824,826	K13170103	" " " " 0.01 μF
C813	K30176431	Dipped mica " 430 pF
C821, 823	K30176471	" " " 470 pF
C802, 822	K30209001	" " " 1000 pF
C825	K70167334	Tantalum 10WV 0.33 μF
		VARIABLE CAPACITOR
VC801	K90000024	C521 R112

		TRIMMER CAPACITOR	
TC801	K90000001	TSN-100D15	15 pF
TC802	K91000016	ECV-1ZW 50 x 32	50 pF
		INDUCTOR	
L801	L0020268	#220268	
L804, 805	L1190007	Micro inductor FL-4H	1.8 μH
L803, 806	L1190001	" "	250 μH
L802	L1190040	" " S4 102K	1 mH
		RECEPTACLE	
J801	P1090012	SI-6303-1	
		TERMINAL	
	Q5000005	Lighthouse type	
	Q5000011	Wrapping terminal C	

RECT. B UNIT

Symbol No.	Parts No.	Description
	C0019670	RECT. A unit with components
PB-1967	F0001967	P.C. Board
		IC, TRANSISTOR
Q901	G1090162	IC μPC78L12
Q903	G3104950O	TR 2SA495(O)
		DIODE
D907	G2090001	Si 10D1
D901–904	G2090002	" 10D10
D905, 906	G2090003	" V06B
D908	G2090007	Zener WZ061
		RESISTOR
R908	J01245560	Carbon film 1/4W TJ 56 Ω
R905	J10276220	" composition 1/2W GK 22 Ω
R901–904	J10276474	" " " 470 kΩ
R907	J20339001	Metallic film 2W 0.4 Ω
		CAPACITOR
C901–905	K13170103	Ceramic 50WV 0.01 μF
C908–911	K40140106	Electrolytic 25WV 10 μF
C907	K40140107	" " 100 μF

C906	K41140338	Electrolytic 25WV 3300 μF
		RELAY
RL901	M1190003	FRL-264 D012/04CS-01
	Q5000011	Wrapping terminal C
	Q5000004	Test point D

RECT. B UNIT

Symbol No.	Parts No.	Description
	C0019680	RECT. B unit with components
PB-1968B	F0001968B	P.C. Board
		TRANSISTOR
Q1003	G3106390	2SA639
Q1001	G3107330	2SA733
Q1002	G3303720Y	2SC372Y
		DIODE
D1004, 1005, 1008–1011	G2015550	Si 1S1555
D1002, 1003, 1012	G2090002	" 10D10
D1006, 1007	G2090001	" 10D1
D1001	G2090081	" SM1-12
		RESISTOR
R1021	J00245102	Carbon film 1/4W VJ 1 kΩ
R1011, 1016, 1020	J00245472	" " " " 4.7 kΩ
R1013, 1015	J00245103	" " " " 10 kΩ
R1014	J00245123	" " " " 12 kΩ
R1017–1019	J00245223	" " " " 22 kΩ
R1012	J00245563	" " " " 56 kΩ
R1010	J20306562	Metallic film 1W 5.6 kΩ
R1022	J20306390	" " " 39 Ω
R1005	J20336391	" " 2W 390 Ω
R1006	J20336471	" " " 470 Ω
R1008	J20336222	" " " 2.2 kΩ
R1007	J20336332	" " " 3.3 kΩ
R1009	J20336473	" " " 47 kΩ
R1023	J10276474	Carbon composition ½W GK 470 kΩ
		POTENTIOMETER
VR1001	J50708103	V18K3-2 10 kΩB

		CAPACITOR
C1017	K13170473	Ceramic 50WV 0.047 μF
C1016	K12279003	" 500WV 0.0022 μF
C1005, 1006, 1013–1015, 1018	K12279004	" " 0.0047 μF
C1010	K12279002	" " 0.01 μF
C1009	K40240106	Electrolytic 250WV 10 μF
C1011	K40240336	" " 33 μF
C1012	K40240476	" " 47 μF
C1001–1004	K40270106	" 450WV 10 μF
C1007, 1008	K40260226	" 350WV 22 μF
	Q5000011	Wrapping terminal C

CAPACITOR UNIT

Symbol No.	Parts No.	Description
	C0019690	CAPACITOR unit with components
PB-1969A	F0001969A	P.C. Board
		RESISTOR
R1101, 1102	J10276474	Carbon composition 1/2W GK 470 kΩ
		CAPACITOR
C1101, 1102	K43270003	Electrolytic 500WV 200 μF (CE-62LW)

TRIMMER A UNIT

Symbol No.	Parts No.	Description
	C0019700	TRIMMER A unit with components
PB-1970	F0001970	P.C. Board
		CAPACITOR
C1203	K30176331	Dipped mica 50WV 330 pF
C1208	K30176391	" " " 390 pF
C1202	K30176651	" " " 650 pF
C1207	K30209001	" " " 1000 pF
C1201	K30209003	" " " 1500 pF
C1206	K02173100	Ceramic 50WV CH 10 pF
C1205	K02179012	" " " 30 pF
C1204	K02175820	" " " 82 pF

		TRIMMER CAPACITOR	
TC1203	K91000032	B2PY	100 pF
TC1202	K91000052	B4PY	220 pF
TC1201	K91000033	B7PY	470 pF
TC1206	K91000013	ECV-1ZW 20 x 32	20 pF
TC1204, 1205	K91000016	" 50 x 32	50 pF
		INDUCTOR	
L1201	L0020545	Trap coil =220545	

TRIMMER B BOARD

Symbol No.	Parts No.	Description
	C0019701	TRIMMER B unit with components
PB-1970	F0001970	P.C. Board
		CAPACITOR
C1303	K30176271	Dipped mica 50WV 270 pF
C1306	K30176391	" " " 390 pF
C1302	K30176621	" " " 620 pF
C1301	K30209003	" " " 1500 pF
C1305	K02173080	Ceramic 50WV CH 8 pF
C1304	K02175680	" " " 68 pF
		TRIMMER CAPACITOR
TC1303	K91000032	B2PY 100 pF
TC1302	K91000052	B4PY 220 pF
TC1301	K91000033	B7PY 420 pF
TC1306	K91000012	ECV-1ZW 10 x 32 10 pF
TC1304, 1305	K91000016	" 50 x 32 50 pF
		INDUCTOR
L1301	L0020261	Trap coil #220261

TRIMMER C BOARD

Symbol No.	Parts No.	Description
	C0010920	TRIMMER C unit with components
PB-1092	F1001092	P.C. Board
		CAPACITOR
C1406	K30276100	Dipped mica 500WV 10 pF
C1405	K30276820	" " " 82 pF
C1403	K30276271	" " " 270 pF
C1407	K30276391	Dipped mica 500WV 390 pF
C1402	K30276651	" " " 650 pF
C1401	K30279055	" " " 1500 pF
		TRIMMER CAPACITOR
TC1404, 1405	K91000031	B1PY 40 pF
TC1402, 1403	K91000032	B2PY 100 pF
TC1401	K91000033	B7PY 420 pF

BAND WIDTH CONTROL UNIT

Symbol No.	Parts No.	Description
	C0019720	B.W. CONT. unit with components
PB-1972	F0001972	P.C. Board
		LED
D1501	G2090060	GD4-203 SRD
		RESISTOR
R1501	J00245152	Carbon film 1/4W VJ 1.5 kΩ
		POTENTIOMETER
VR1501	J50710502	V10K8-1-2 5 k ΩB
		SWITCH
S1501	N4090008	1B0001AC2060

DRIVER BOARD

Symbol No.	Parts No.	Description
	C0017140	Driver board with components (without vacuum tube)
PB-1714A	F0001714A	P.C. Board
		VACUUM TUBE
V1601	G6090002	12BY7A
		VACUUM TUBE SOCKET
VS1601	P3090022	SB-9403

		RESISTOR
R1605	J10276470	Carbon composition 1/2W GK 47 Ω
R1602, 1604	J10276560	" " " " 56 Ω
R1603	J10276101	" " " " 100 Ω
R1601	J10276473	" " " " 47 kΩ
		CAPACITOR
C1601, 1602	K12279002	Ceramic disc 500WV 0.01 μF
C1603, 1604, 1606	K13170473	" " 50WV 0.047 μF
C1605	K30279051	Dipped mica 500WV 1000 pF
		INDUCTOR
L1601	L1190020	Micro inductor FL5H 150 μH
L1602(R1602)	L1020029	#220029
	Q5000011	Wrapping terminal C

FINAL BOARD

Symbol No.	Parts No.	Description
	C0017151	Final board with components (without vacuum tube)
PB-1715B	F0001715B	P.C. Board
		VACUUM TUBE
V1701, 1702	G6090001	6146B
		VACUUM TUBE SOCKET
VS1701, 1702	P3090024	SB-3606
		DIODE
D1701	G2090002	Si 10D10
		RESISTOR
R1701, 1702 (L1702, 1703)	J10276560	Carbon composition 1/2W GK 56 Ω
R1703, 1704, 1705	J10276101	" " " " 100 Ω
R1706	J31333010	Meter shunt 2W 1 Ω

		CAPACITOR
C1703	K12279001	Ceramic disc 500WV 0.001 μF
C1704, 1710	K12279002	" " " 0.01 μF
C1705–1709, 1711, 1712	K13170473	" " 50WV 0.047 μF
C1701	K31306102	Moulded mica 1kWV 1000 pF
C1702	K30273050	Dipped mica 500WV 5 pF
		INDUCTOR
L1701	L1190020	Micro inductor 150 μH
L1704	L1190039	" " 560 μH
L1702, 1703 (R1701,1702)	L1020307	RF choke #220307
	Q5000011	Wrapping terminal C

CLARIFIER CONTROL UNIT

Symbol No.	Parts No.	Description
	C0019730	CLAR.CONT. unit with components
PB-1973B	F0001973B	P.C. Board
		DIODE
D1801	G2090001	Si 10D1
D1802	G2090060	LED GD4-203SRD
		RESISTOR
R1803	J00245102	Carbon film 1/4W VJ 1 kΩ
R1804, 1805	J00245152	" " " " 1.5 kΩ
R1802	J00245332	" " " " 3.3 kΩ
R1801	J00245472	" " " " 4.7 kΩ
		POTENTIOMETER
VR1801	J50710501	V10K8-1-2 500 ΩB
		CAPACITOR
C1801–1803	K13170473	Ceramic 50WV 0.047 μF
		RELAY
RL1801	M1190002	FBR211A D012M

		SWITCH	
SW1801	N4090011	2B0005FC206	

LED BOARD

Symbol No.	Parts No.	Description	
	C0019740	LED board with components	
PB-1974A	F0001974A	P.C. Board	
		LED	
D1901–1906	G2090060	GD4-203SRD	
		RESISTOR	
R1901, 1902	J01245102	Carbon film 1/4W TJ	1 kΩ

LEVER SWITCH BOARD

Symbol No.	Parts No.	Description	
	C0019750	LEVER SW board with components	
PB-1975A	F0001975A	P.C. Board	
		RESISTOR	
R2006	J01245560	Carbon film 1/4W TJ	56 Ω
R2005	J01245101	" " " "	100 Ω
R2001	J01245121	" " " "	120 Ω
R2002	J01245391	" " " "	390 Ω
R2008	J01245562	" " " "	5.6 kΩ
R2004	J00245683	" " " VJ	68 kΩ
		SWITCH	
S2001–2004	N3090002	SLE62301	
S2005	N3090008	SLE64251	

COUNTER UNIT

Symbol No.	Parts No.	Description
	C0019800	COUNTER unit assembly
PB-1978		(Display board)
PB-1979		(Count, decode board)
PB-1980A▲		(Main board) ▲655.36 kHz CRYSTAL TYPE
PB-1980B★		(Main board) ★6553.6 kHz CRYSTAL TYPE

★★★★★ DISPLAY board ★★★★★

PB-1978	F0001978	P.C. Board
		DISPLAY LED
DS2101-2106	G2090069	HP5082-7623
		SOCKET
QS2101–2106	P3090038	314AG-37D

★★★★★ COUNT. DECODE board ★★★★★

PB-1979	F0001979	P.C. Board
		IC, TRANSISTOR
Q2208–2213	G1090046	IC MSM561RS
Q2202–2207	G1090033	" SN74LS196N
Q2201	G3104960Y	TR 2SA496Y
		RESISTOR
R2204–2245	J00245101	Carbon film 1/4W VJ 100 Ω
R2203	J00245181	" " " " 180 Ω
R2202	J00245271	" " " " 270 Ω
R2201	J00245471	" " " " 470 Ω
		CAPACITOR
C2201	K13179001	Ceramic 50WV 0.01 μF
C2202–2204	K71137685	Tantalum 6.3WV 6.8 μF
		CONNECTOR
J2201	P1090043	3024-13C
	Q5000007	Board Joint 163740

★★★★★ COUNTER MAIN board ★★★★★

PB-1980A▲	F0001980A	P.C. Board
PB-1980B★	F0001980B	P.C. Board
		IC, FET, TRANSISTOR
Q2302	G1090032	IC MC10116
Q2305	G1090023	" MSM5564
Q2309	G1090033	" SN74LS196N
Q2304	G1090169	" SN74S00N
Q2306	G1090093	" SN74LS04N
Q2307, 2308	G1090079	" μPA54H
Q2310	G1090065	" μPC14305

Q2301	G4800510C	FET 3SK51-03
Q2303	G3090008	TR MPS3640
Q2312*	G1090034	IC SN74LS90N
Q2313*	G3303800Y	TR 2SC380TM-Y
		DIODE
D2301–2312	G2015550	Si 1S1555
		CRYSTAL
X2301▲	H0100250	HC-14/W 655.36 kHz
X2301*	H0102272	HC-18/U 6553.6 kHz
		RESISTOR
R2316, 2326*	J00245101	Carbon film 1/4 WS VJ 100 Ω
R2301, 2311	J00245221	" " " " " 220 Ω
R2319	J00245331	" " " " " 330 Ω
R2305, 2317	J00245471	" " " " " 470 Ω
R2308–2310, 2312, 2314, 2322	J00245511	" " " " " 510 Ω
R2304, 2313, 2315, 2325*	J00245102	" " " " " 1 kΩ
R2306, 2307	J00345222	" " " " " 2.2 kΩ
R2327*	J00245392	" " " " " 3.9 kΩ
R2302	J00245103	" " " " " 10 kΩ
R2303, 2323*, 2324*	J00245153	" " " " " 15 kΩ
R2321	J00245223	" " " " " 22 kΩ
R2320	J00245473	" " " " " 47 kΩ
R2318	J00245104	" " " " " 100 kΩ
		BLOCK RESISTOR
RB2301	J40900001	RK1/16B8R 4.7 kΩ
		CAPACITOR
C2308	K02175120	Ceramic 50WV CH 12 pF
C2311▲	K06175150	" " UJ 15 pF
C2324*	K06175270	" " " 27 pF
C2312▲	K06175470	" " CH 47 pF
C2325*	K02175151	" " " 150 pF
C2326*	K06179018	" " UJ 330 pF
C2301–2305	K13179001	" " 0.01 μF
C2324–2326▲	K13170473	" " 0.047 μF
C2314, 2315	K51176331	Styrol " 330 pF
C2323	K50177102	Mylar " 0.001 μF
C2316	K50177332	" " 0.0033 μF
C2317	K50177103	" " 0.01 μF
C2327–2330*	K13179001	" " 0.01 μF
C2313, 2331*–2333	K50177473	" " 0.047 μF
C2306, 2307, 2309	K70127106	Tantalum 16WV 10 μF
C2310	K40129001	Electrolytic " 330 μF
C2318–2322	K21170002	Feed thru 50WV 0.001 μF

		TRIMMER CAPACITOR
TC2301▲	K9100030	ECV-1ZW 40 x 53 40 pF
TC2302*	K91000029	ECV-1ZW 20 x 53 20 pF
		INDUCTOR
L2301	L1020012	35 μH #220012
L2302	L1190020	150 μH
		SWITCH
S2301, 2302	N7090016	DSS208
		PLUG
P2301	P0090045	SQ4052
P2302 (with wire)	T9201360	1625-09P-1 #240136
J2301	P0090044	3022-13A
J2302	P9201380A	3021-03 #240138A

DC-DC CONVERTER (OPTION)

Symbol No.	Parts No.	Description
		TRANSISTOR
Q3201, 3202	G3090002	T20A6 with insulator
		RESISTOR
R3202	J31306339	Wire wound 1W 3.3 Ω
R3201	J20376221	Metallic film 5W 220 Ω
		CAPACITOR
C3202	K52247474	Metallized paper 250WV 0.047 μF
C3201	K41140227	Electrolytic 25WV 220 μF
		CONNECTOR
P3201	P0090066	AC9M
	T9012720	DC POWER CORD
	Q0000009	FUSE 20 A

ACCESSORIES

Symbol No.	Parts No.	Description
		AC POWER CORD
	T9012380A	2 wire, 2 prong plug
	T9012481A	3 wire without plug
	T9012582A	3 wire, 3 prong plug (UL)
	T9012484	3 wire, 3 prong Australian plug
	T9012683A	3 wire, 2 prong EU plug
	P0090065	CONNECTOR PLUG QS-P6FL
	P0090018	**PIN PLUG** STP58
	P0090035	**ACC PLUG** PA602B04
	Q0000005	**FUSE** (100V–117V) 5A
	Q0000004	" (200V–234V) 3A

SECTION 5 – LATE MODEL UPDATE

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.

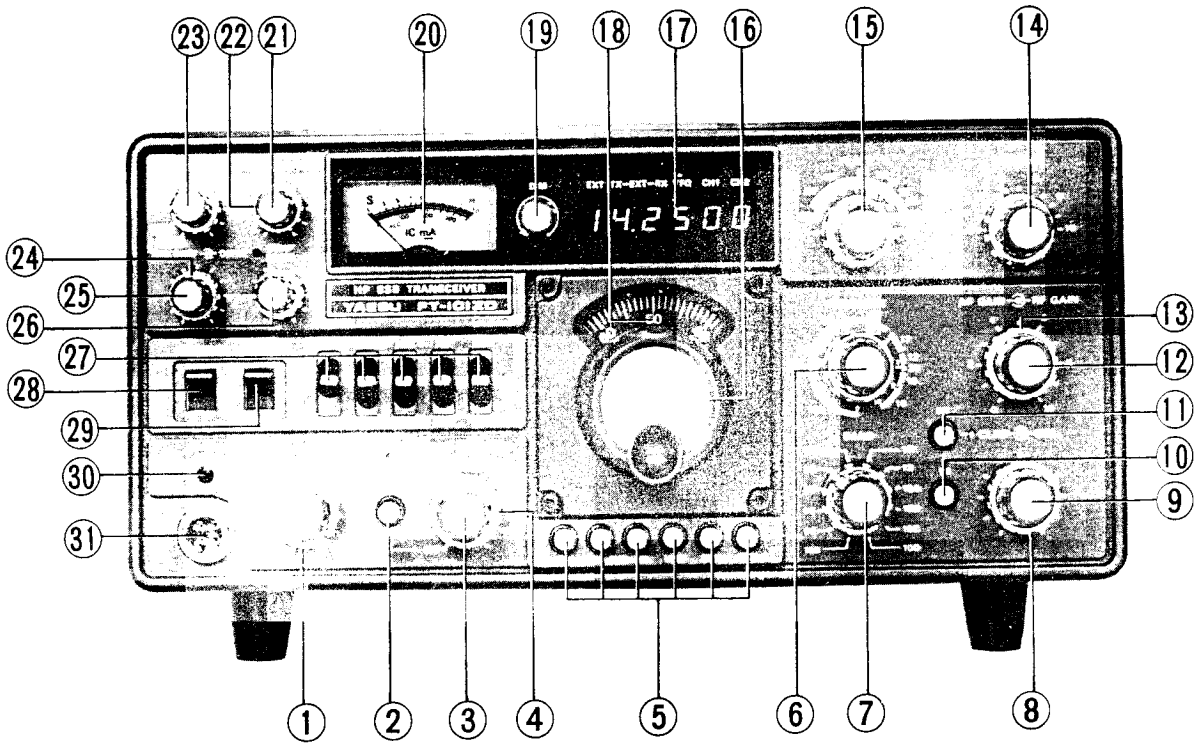
* option

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 transceive frequency to the external VFO.

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.

* with optional unit

(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

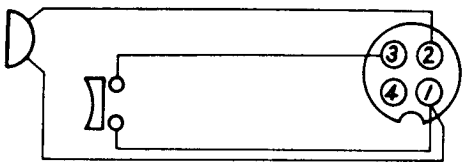
PROC ..... This switch activates the RF speech processor.
ATT ..... This switch allows the insertion of 10 or 20 dB attenuators in the incoming signal path.
AGC S/F/OFF .. This switch allows selection of the desired AGC decay time. In the OFF position, the AGC is switched off, and the S-meter will not function.

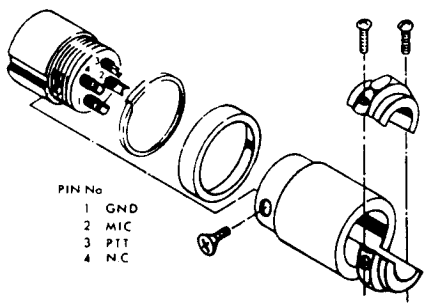
PO/IC/ALC .... In the PO position, relative power output is displayed on the meter. In the IC position, final amplifier cathode current is displayed. In the ALC position, ALC voltage is displayed. Regardless of the setting of the meter switch, the meter functions as an S-meter on receive.

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

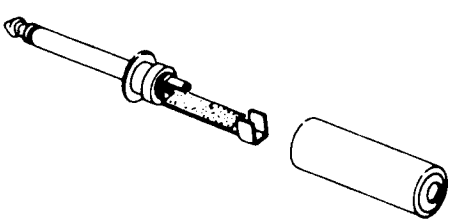
(28) POWER

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





Mic plug



Headphone and external speaker plug

(29) HEATER

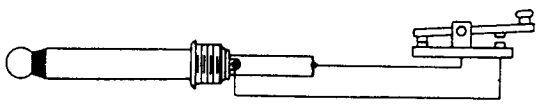
With the HEATER switch on, heater voltage is applied to the driver and final amplifier tubes. This switch may be turned off during periods of RX, when energy conservation is critical.

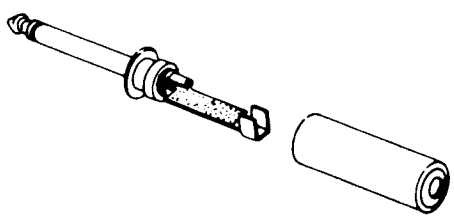
(30) PHONES

This is a standard ¼" phone jack for use with headphones.

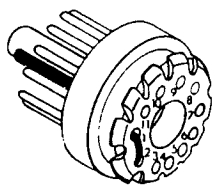
(31) MIC

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



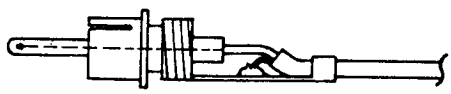


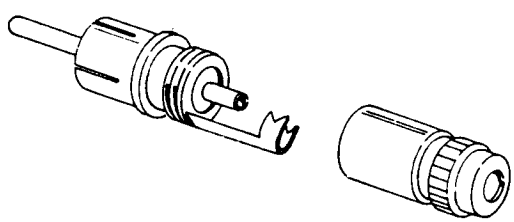
Key plug



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

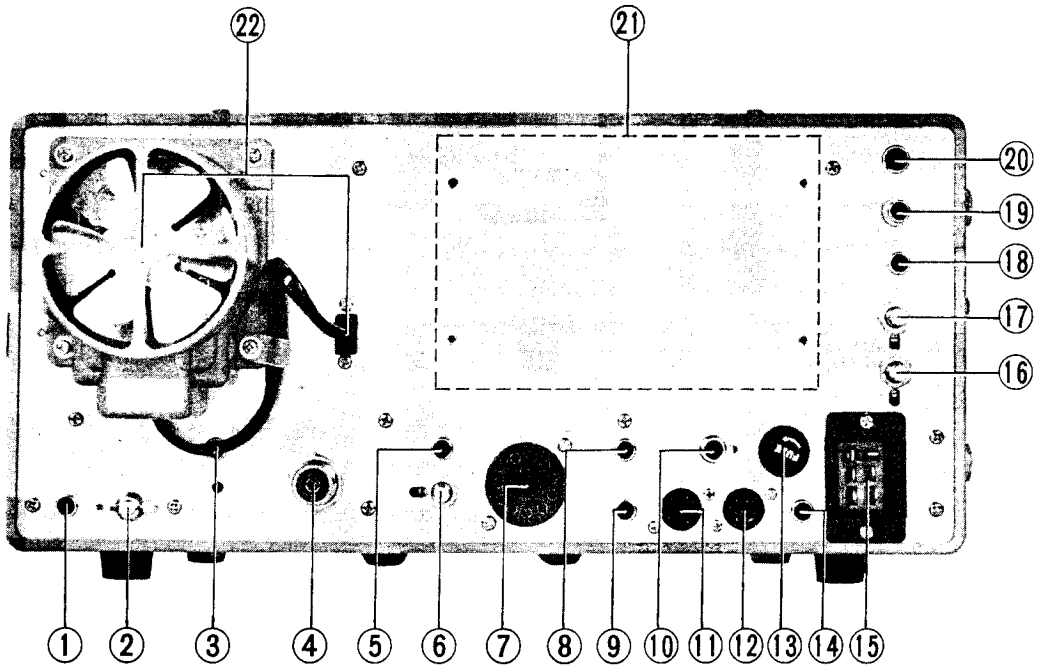
ACC plug





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.

(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

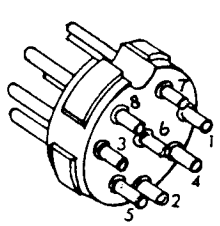
This is a miniature phone jack for speaker output. When a plug is inserted into this jack, the transceiver internal speaker will be cut off. Impedance is 4 - 16 ohms.

(21) DC-DC CONVERTER (OPTION)

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

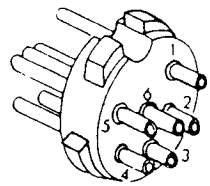
(22) COOLING FAN (OPTION)

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.



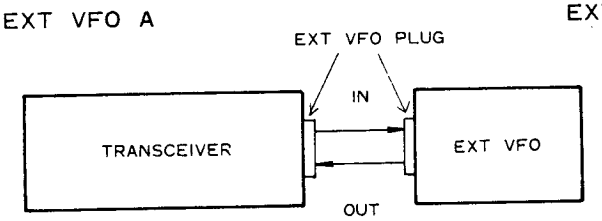
PIN No
1 12V
2 USB 8V
3 VFO 6V
4 +500kHz SHIFT
5 LSB 8V
6 TX EXT
7 D VFO OUT
8 XCVR VFO IN

EXT VFO A



PIN No
1 VFO OUT (FV-101Z, FV-901DM)
NC (FV-101DM)
2 GND
3 EXT 6V IN
4 AGC IN (FV-901DM)
5 TX 12V IN
6 GND (FV-101Z, FV-901DM)
RX EXT (FV-101DM)

EXT VFO B



EXTERNAL VFO PLUG CONNECTIONS

ACCESSORIES

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.

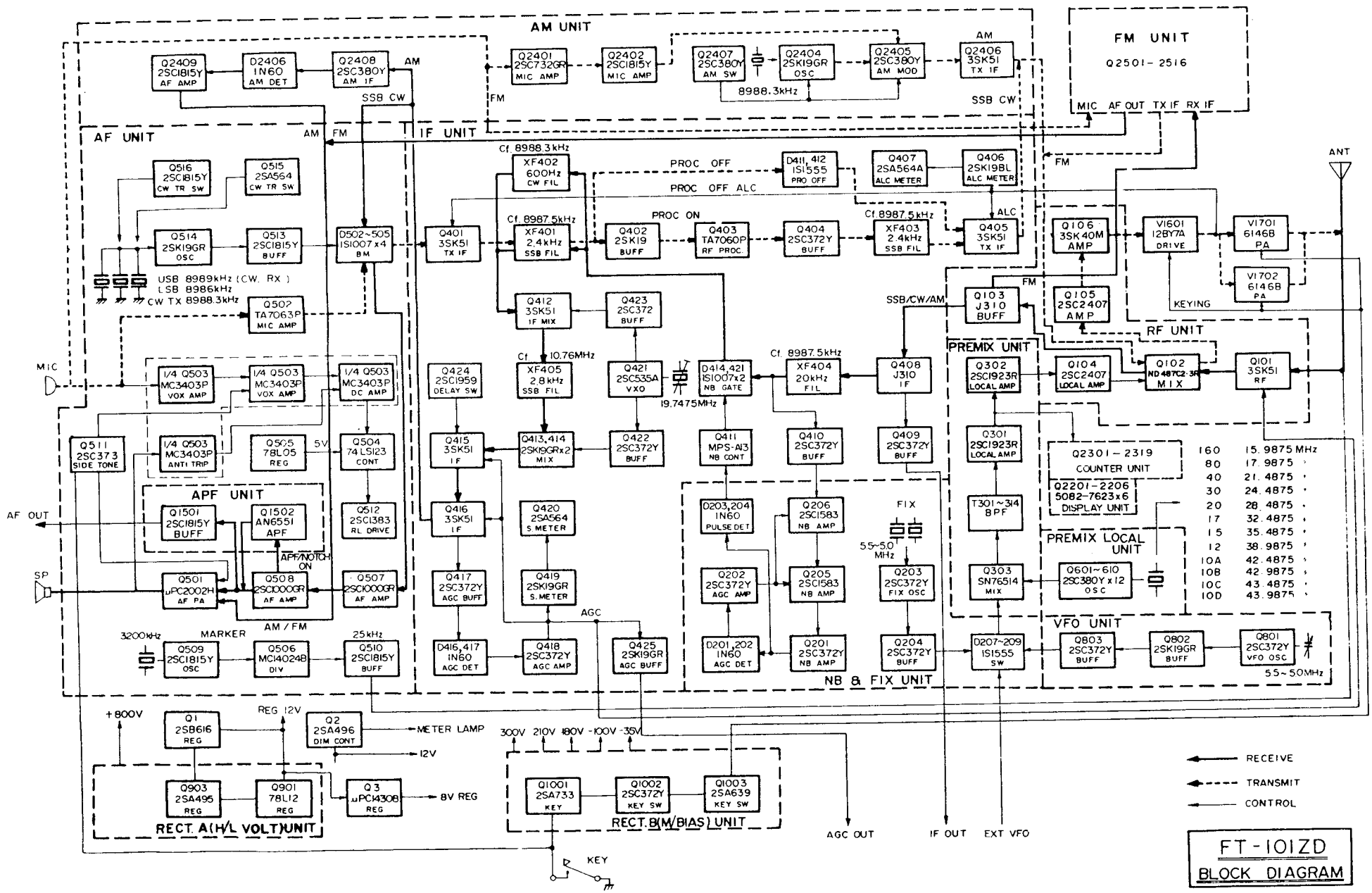
The accessory plug allows access to relay contacts and ALC voltage. The ACC plug must be inserted in the accessory socket for proper operation of the transceiver, whether or not external connections are being made.

(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

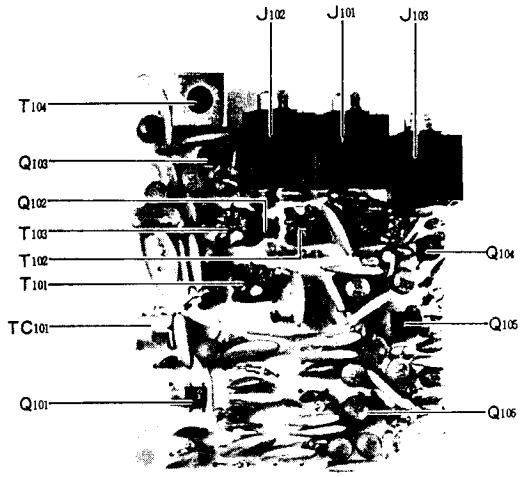
When replacing fuses, be absolutely certain to use a fuse of the proper rating. OUR WARRANTY DOES NOT COVER DAMAGE CAUSED BY IMPROPER FUSE REPLACEMENT. For 100 - 117 volt AC operation, use a 5 amp fuse. For 200 - 234 volt operation, use a 3 amp fuse.


AM UNIT
FM UNIT
Q2501 - 2516
MIC AF OUT TX IF RX IF
AF UNIT
IF UNIT
RF UNIT
PREMIX UNIT
PREMIX LOCAL UNIT
VFO UNIT
NB & FIX UNIT
APF UNIT
RECT. A(H/L VOLT)UNIT
RECT. B(M/BIAS) UNIT
8988.3kHz
Cf. 8988.3kHz
Cf. 8987.5kHz
Cf. 10.76MHz
19.7475MHz
PROC OFF
PROC OFF ALC
PROC ON
ALC
KEYING
SSB/CW/AM
FM
AM
SSB CW
MIC
SP
AF OUT
ANT
USB 8989kHz (CW. RX)
LSB 8986kHz
CW TX 8988.3kHz
APF/NOTCH ON
AM / FM
MARKER
3200kHz
25kHz
AGC
FIX
5.5~5.0 MHz
+800V
REG 12V
12V
8V REG
METER LAMP
300V 210V 180V -100V -35V
KEY
AGC OUT
IF OUT
EXT VFO
RECEIVE
TRANSMIT
CONTROL
160 15.9875 MHz
80 17.9875 "
40 21.4875 "
30 24.4875 "
20 28.4875 "
17 32.4875 "
15 35.4875 "
12 38.9875 "
10A 42.4875 "
10B 42.9875 "
10C 43.4875 "
10D 43.9875 "
FT-101ZD
BLOCK DIAGRAM

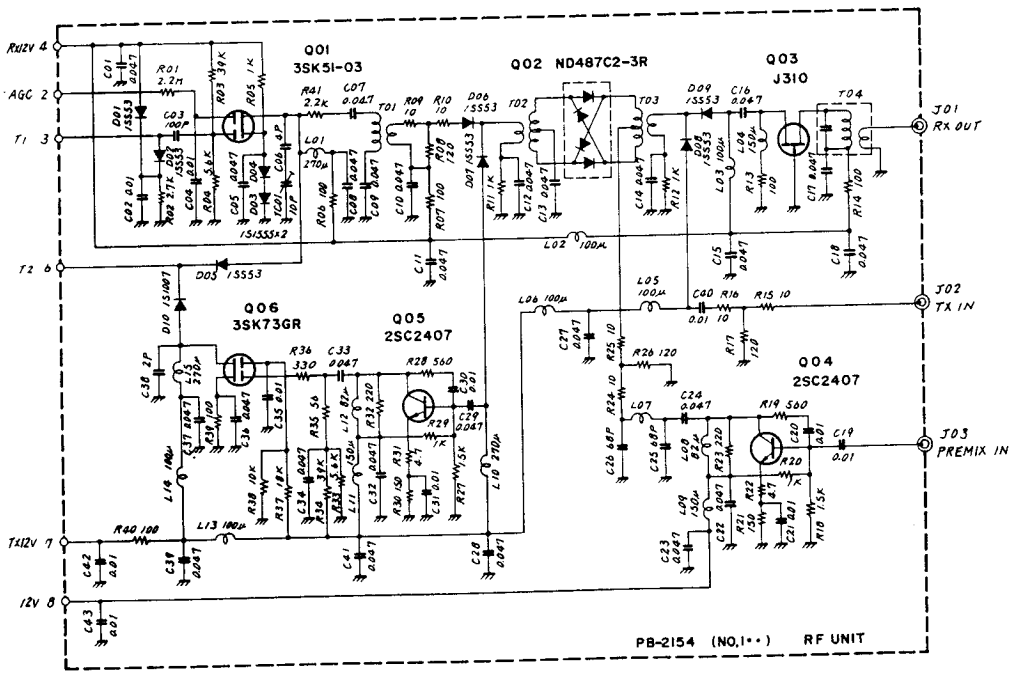
RECEIVER

RF UNIT (PB-2154)

The incoming signal is amplified by the RF amplifier, Q_{101} (3SK51-03), a dual-gate MOS FET with excellent rejection of cross modulation and intermodulation. The amplified signal is fed to the Schottky barrier diode module, Q_{102} (ND487C2-3R), where the RF signal is mixed with a local signal delivered from Q_{104} (2SC2407), resulting in a first IF of 8.9875 MHz. The IF signal is then amplified by Q_{103} (J310) and fed to J_{101}.



RF UNIT (PB-2154)



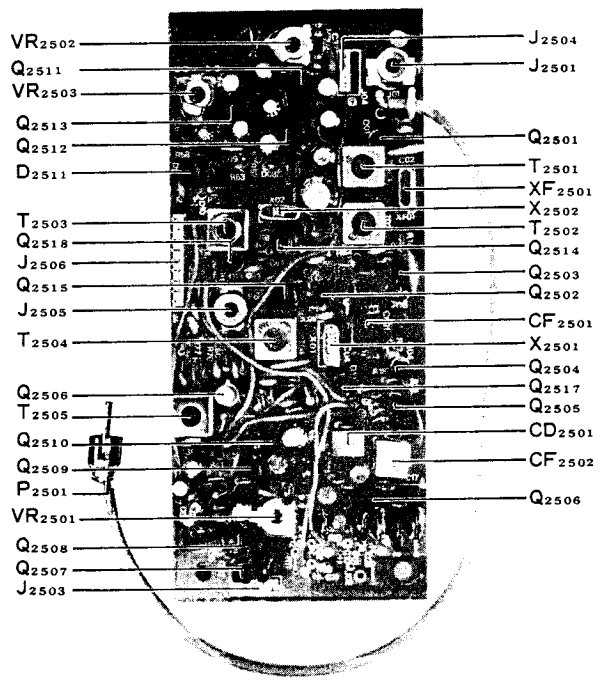
FM UNIT (PB-2219) OPTION

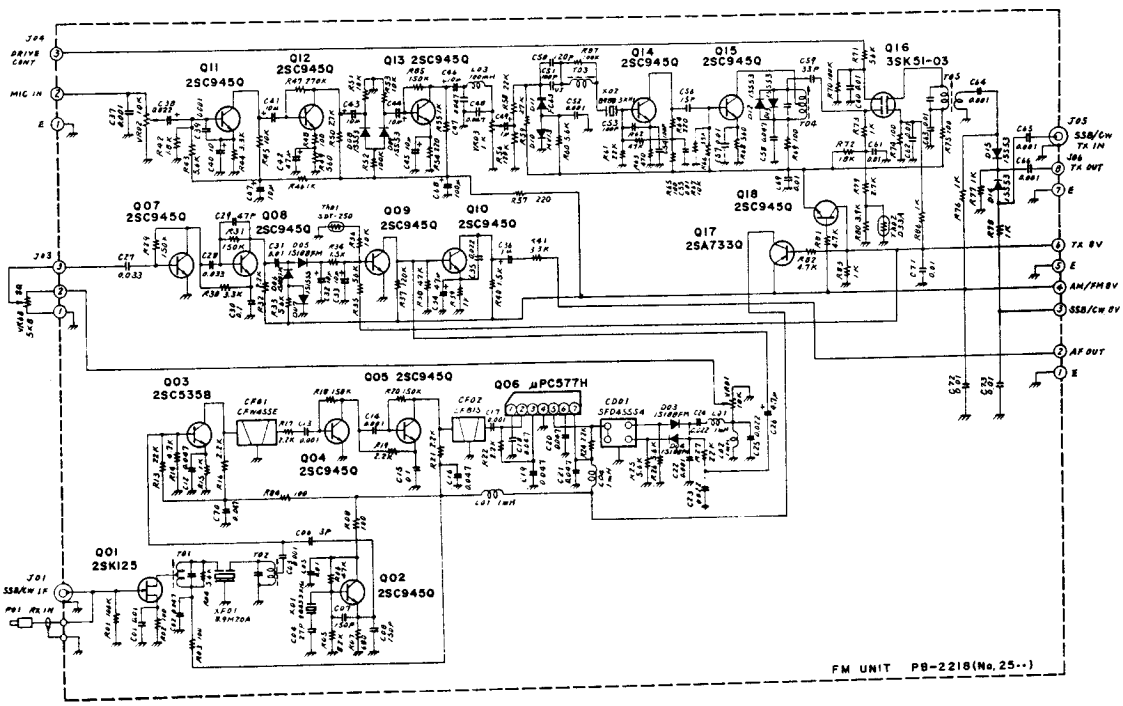
In the FM mode, the IF signal from the RF unit is fed to Q_{2501} (2SK125), where it is buffered and delivered through a 20 kHz band width monolytic filter, XF_{2501} (8.9M20A) to a mixer, Q_{2503} (2SC-535B). The IF signal applied to Q_{2503} is heterodyned with the 8532.5 kHz signal delivered from the local signal oscillator, Q_{2502} (2SC945Q), thus producing a 455 kHz IF signal. Next the 455 kHz IF signal passes through a ceramic filter, CF_{2501} (CFW455E) and is amplified by a two-stage amplifier, Q_{2504}, Q_{2505} (2SC945Q), and then is fed through another ceramic filter, CF_{2502} (LFB15) to an amplifier limiter, Q_{2506} (μPC577H), where any amplified variations in the signal are removed.

A frequency discriminator consisting of CD_{2501} (SFD455S4) and D_{2503}, D_{2504} (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 R_{2527}, R_{2528} and C_{2523}, and then sent to Q_{2510} (2SC945Q).

When no carrier is present in the 455 kHz IF, the noise at the discriminator output is amplified by Q_{2507} and Q_{2508}, and detected by D_{2505}, D_{2506} and D_{2507} (1S188FM) to produce a DC voltage. This voltage is applied to turn "on" Q_{2509} (2SC-945Q). The thermistor, TH_{2501} (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.



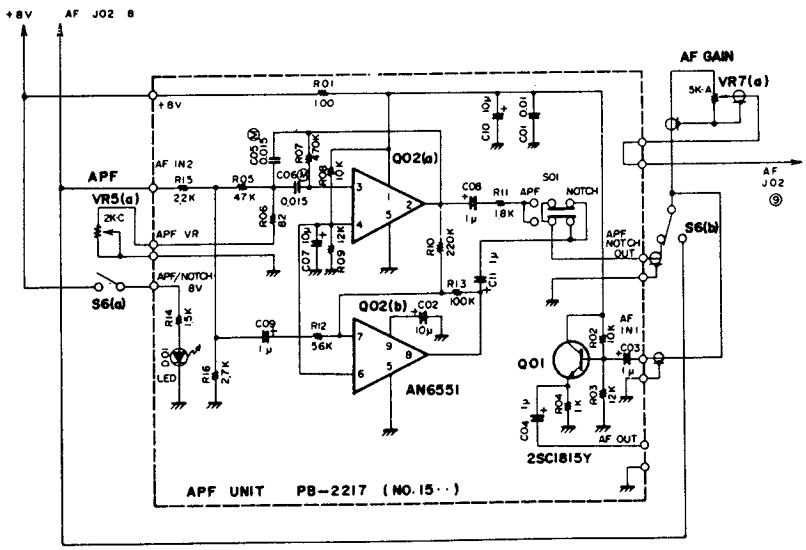


APF UNIT (PB-2217)

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 Q_{1501} (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 J_{102} is delivered to the Schottky barrier diode module Q_{102} (**ND487C2-3R**), where the IF signal is mixed with a local signal delivered from Q_{104} (**2SC2407**), producing the RF output signal. The RF signal is then amplified by Q_{105} (2SC2407) and Q_{106} (**3SK40M**), and fed through diode switch D_{110} (**1S1007**) to the DRIVE UNIT.

FM MODE

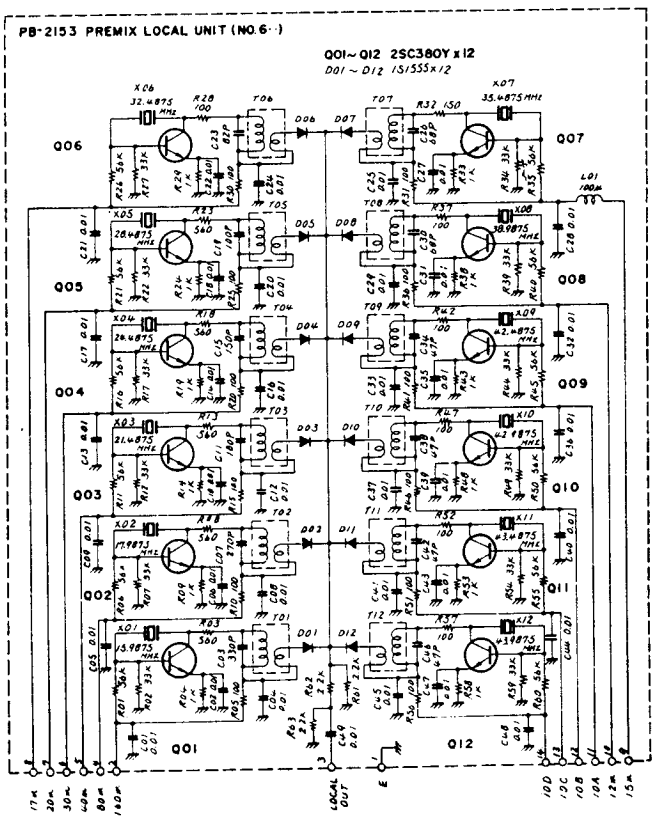
The speech signal from the AF unit is fed through two stages of amplifier, consisting of Q_{2511} and Q_{2512} (**2SC945Q**), and this amplified signal is passed to the instantaneous deviation control (IDC) circuit, where both positive and negative peaks are clipped by D_{2508} and D_{2509} (**1SS53**). The output from the IDC is fed through Q_{2513} (**2SC945Q**), where the signal is amplified and then fed to the de-emphasis circuit, consisting of C_{2547}, C_{2548} and L_{2503}. This signal passes through VR_{2503}, where determines the maximum deviation, to the modulator D_{2511} (**FC63**) while Q_{2514} (**2SC945Q**) oscillates at a crystal frequency of 8988.3 kHz, and its frequency is modulated by variable capacitance diode D_{2511}. The output from Q_{2514} is amplified by Q_{2515} (**2SC945**) and Q_{2516} (**2SK51-03**) and then fed through a diode switch D_{2515} (**1SS53**) to pin 6 of J_{2506}. The output from the terminal is delivered to the IF unit.

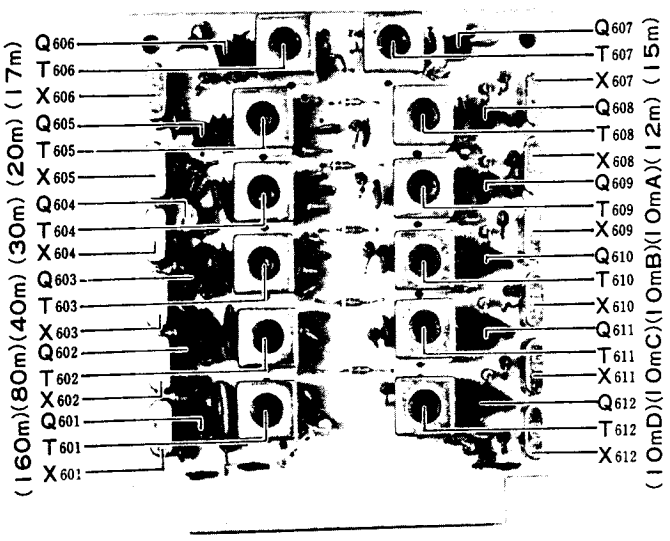
PREMIX LOCAL UNIT (PB-2153)

Crystal oscillators Q_{601}–Q_{612} (2SC380Y) generate the premix local signal at the frequencies shown in Table 3. Diode switches D_{601}–D_{612} (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

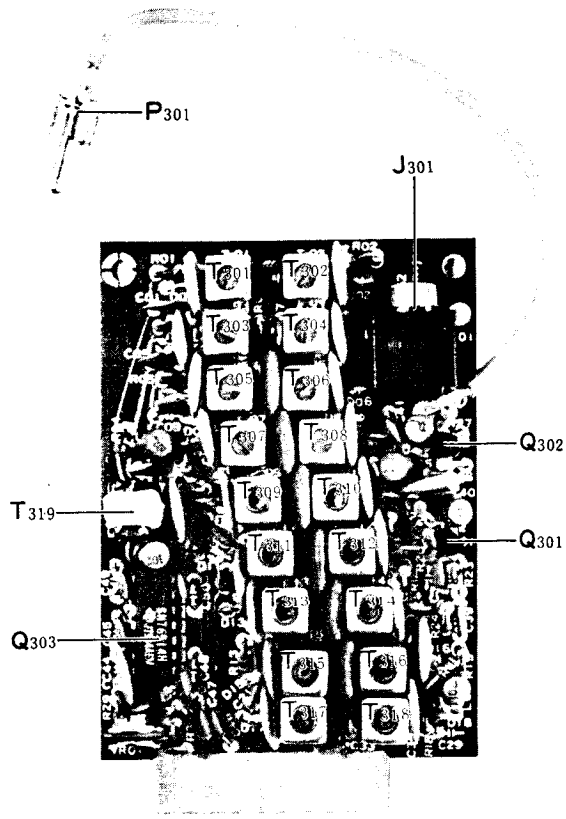




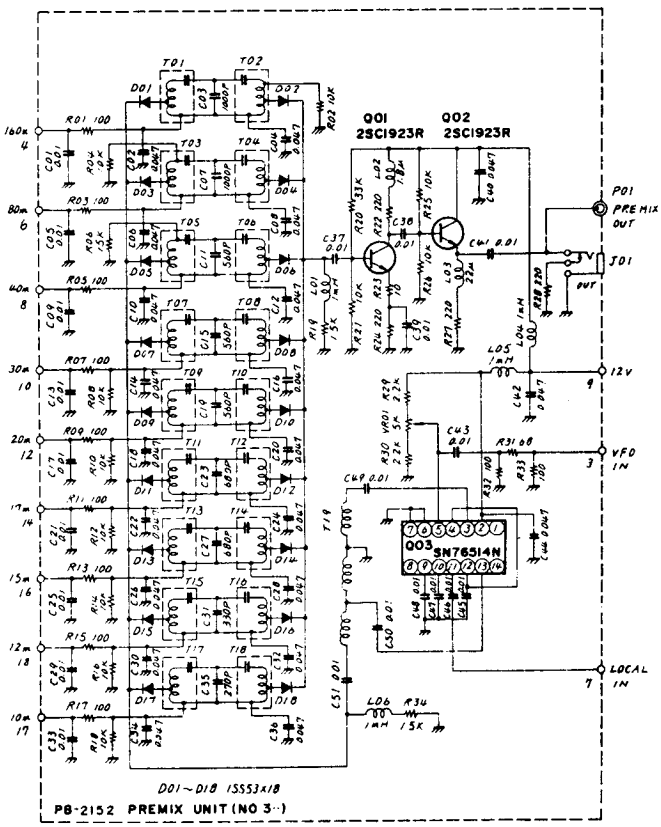
PREMIX LOCAL (XTAL) UNIT (PB-2153)

PREMIX UNIT (PB-2152)

The premix signal is produced at Q_{303} (SN76514N), a double-balanced mixer, where the premix local signal from Q_{601}–Q_{612} 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 T_{301}–T_{318}, and amplified by Q_{301}, Q_{302} (2SC1923R). The amplified signal is then fed to the RF UNIT, where the signal is further amplified by Q_{102} for delivery to the transmitter and receiver mixers.



PREMIX UNIT (PB-2152)



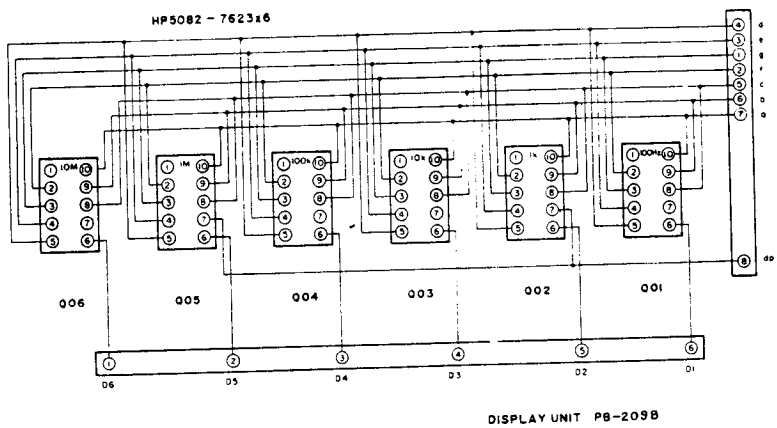
	Nominal Premix Local Frequency	L S B	U S B	CW, AM/FM
160m	10.4875–10.9875(MHz)	10.486–10.986(MHz)	10.489–10.989(MHz)	10.4883–12.9883(MHz)
80m	12.4875–12.9875	12.486–12.986	12.489–12.989	12.4883–12.9883
40m	15.9875–16.4875	15.986–16.486	15.989–16.489	15.9883–16.4883
30m	18.9875–19.4875	18.986–19.486	18.989–19.489	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

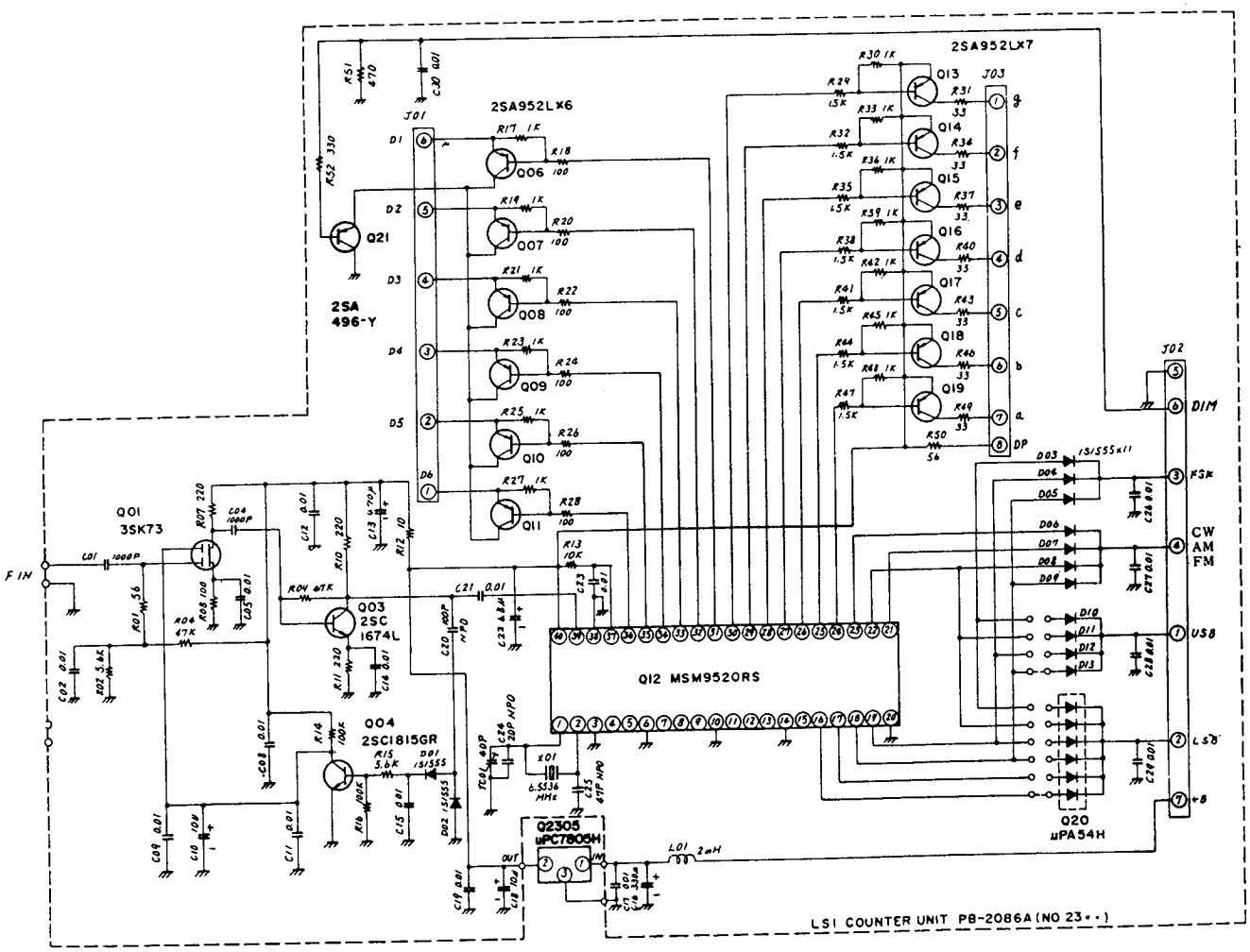
COUNTER UNIT (PB-2086A-3420/PB-2098)

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

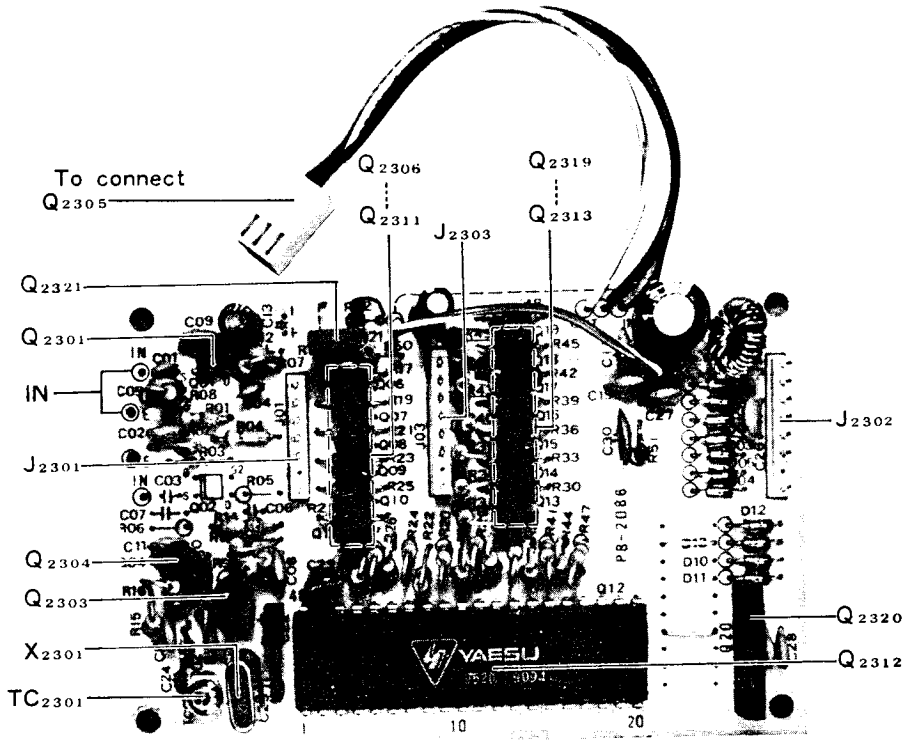
The premix signal as shown in Table 4 from the LOCAL unit, is amplified by Q_{2301} (3SK73). The amplified signal is further amplified by Q_{2303} (2SC1674) and delivered to the LSI counter chip, Q_{2312} (MSM9520RS). A portion of the output from Q_{2303} is amplified by Q_{2304} (2SC1815Y) and fed to gate 2 of Q_{2301} 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 Q_{2313}–Q_{2319} (2SA952L) and digit drivers Q_{2306}–Q_{2311} (2SA952L) through a dynamic drive configuration. Display is performed by D_{2201}–D_{2206} (HP5082-7623), seven-segment light-emitting diodes.

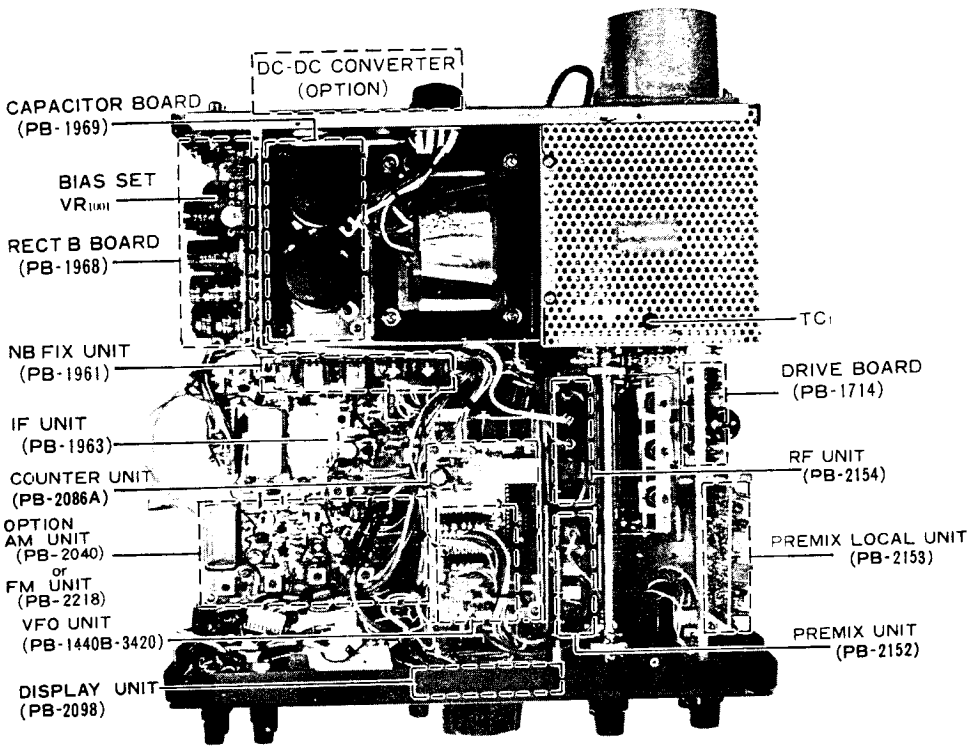




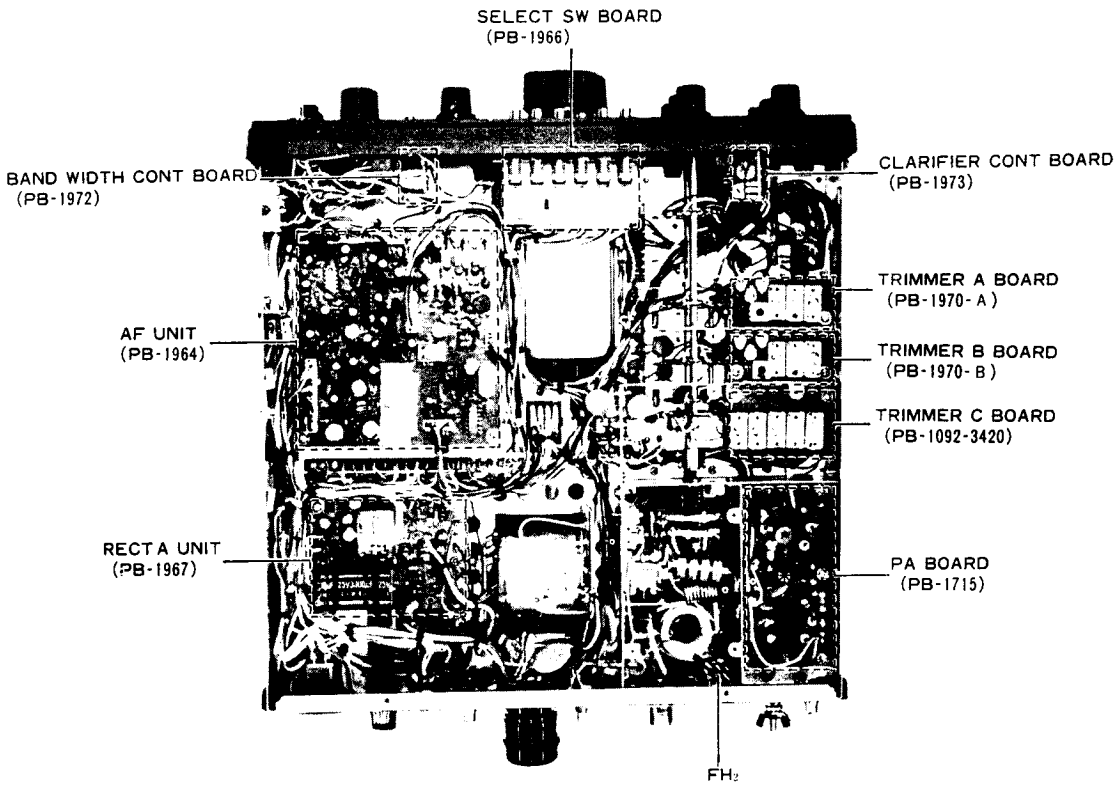
DISPLAY/COUNTER UNIT



COUNTER UNIT (PB-2086A)



TOP VIEW



BOTTOM VIEW

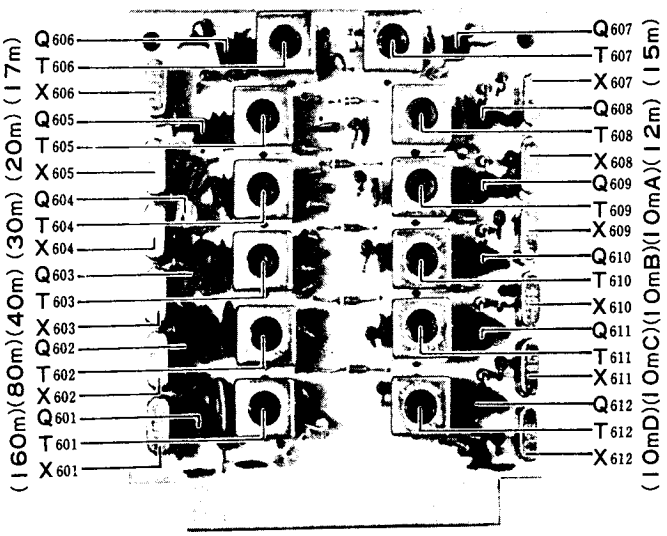
PREMIX LOCAL UNIT

Premix Local Alignment

1. Connect the RF probe of the VTVM to pin 3 of MJ_3.
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)

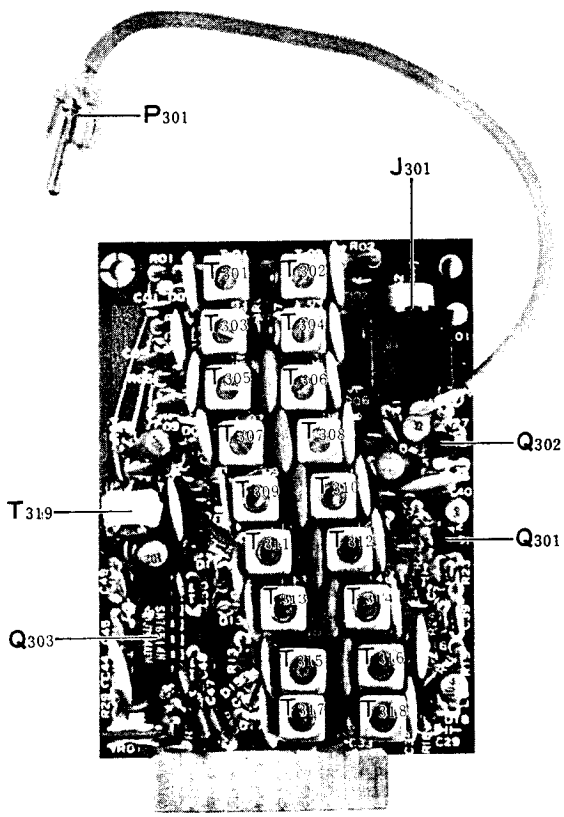
PREMIX UNIT

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 J_{301}.
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

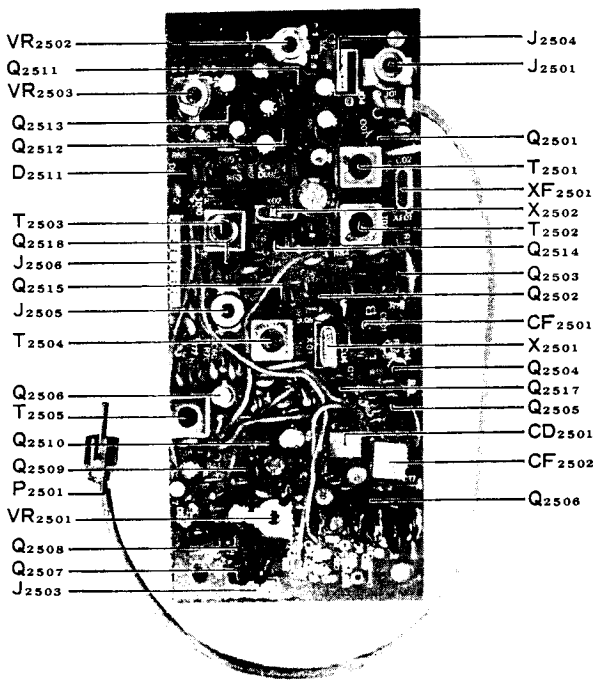
Connect a frequency counter to pin 8 of J_{2501}, and set the MIC GAIN control fully counterclockwise.

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.

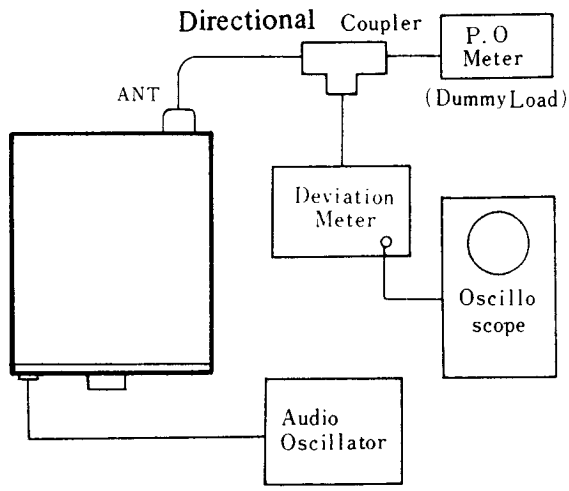
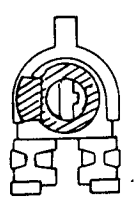


Figure 17



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.

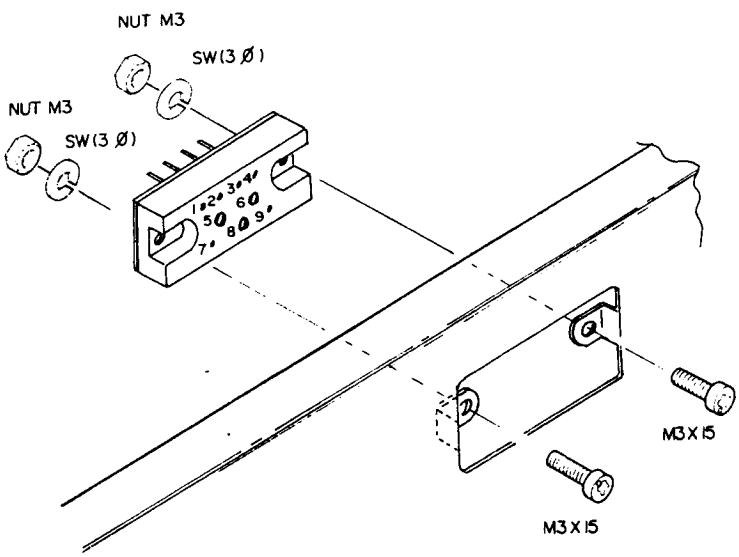


Figure 5

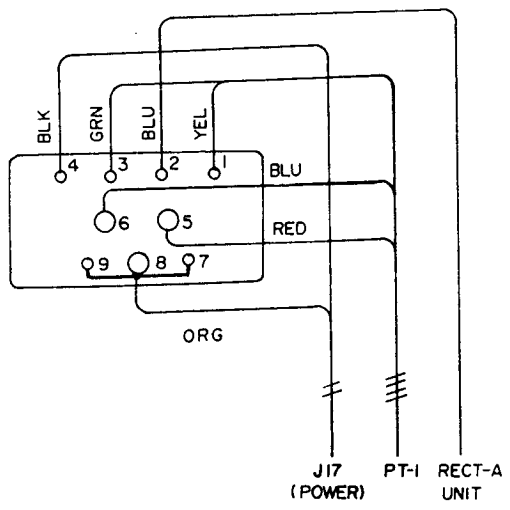


Figure 6

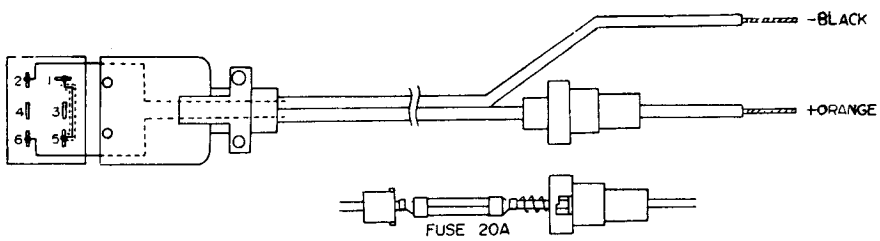


Figure 7

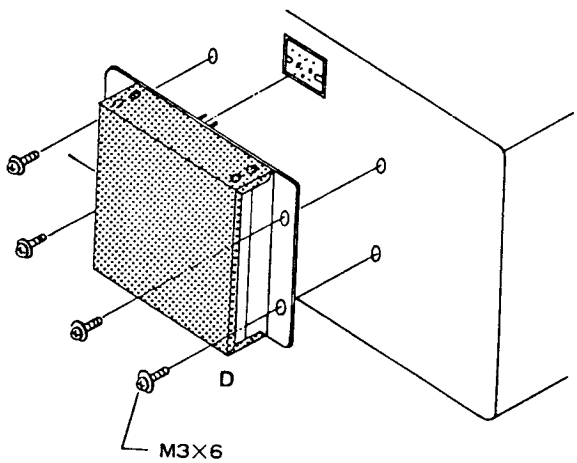


Figure 8

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 Figure10 These screws support the LED board.

(3) Remove the screws marked "B" in Figure10 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 J_{2302} on the Counter unit (if your transceiver bears a serial number smaller than XX159999, use the supplied connector assembly for this connection). The coaxial 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.

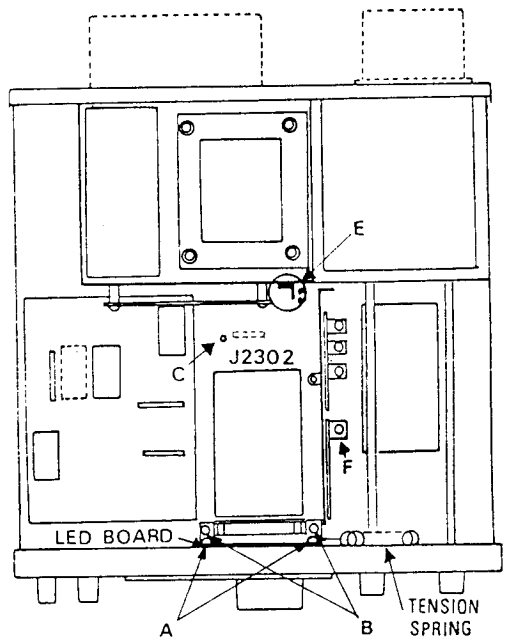
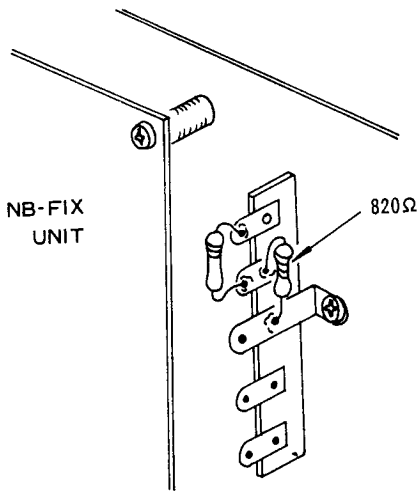


Figure 10



(Enlarged) Part E

Figure 11

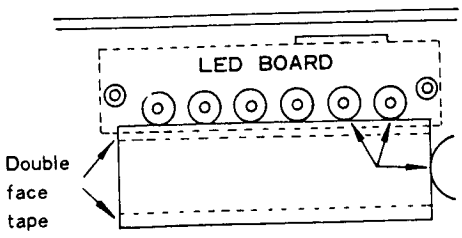


Figure 12

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 P_{19} (3 pin) to J_{2504}; P_{32} (3 pin) to J_{2503}; and P_{20} (8 pin) to J_{2506}. During this procedure, be sure not to press to heavily on the connector, so as not to damage the unit.
5. Unplug P_{14} (yellow shielded cable) from J_{101} on the RF unit, and connect it to J_{101} on the FM unit. Then connect P_{2501} (yellow shielded cable) to J_{101}, by referring to Figure 15.
6. On the RF unit, unplug P_{11} (red shielded cable) from J_{102}, and connect it to J_{2505} on the FM unit. Connect P_{22} (red shielded cable) from P_{20} (connected to J_{2506}) on the FM unit, to J_{102} on the RF unit, as shown in Figure 15.

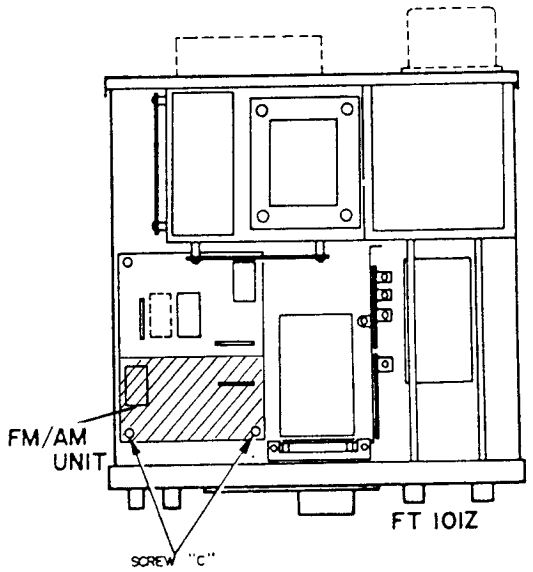


Figure 13

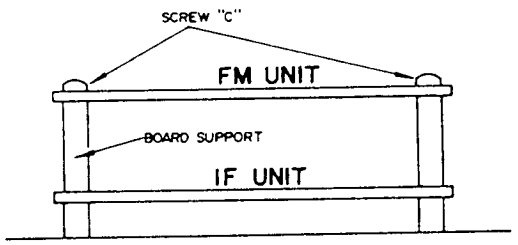


Figure 14

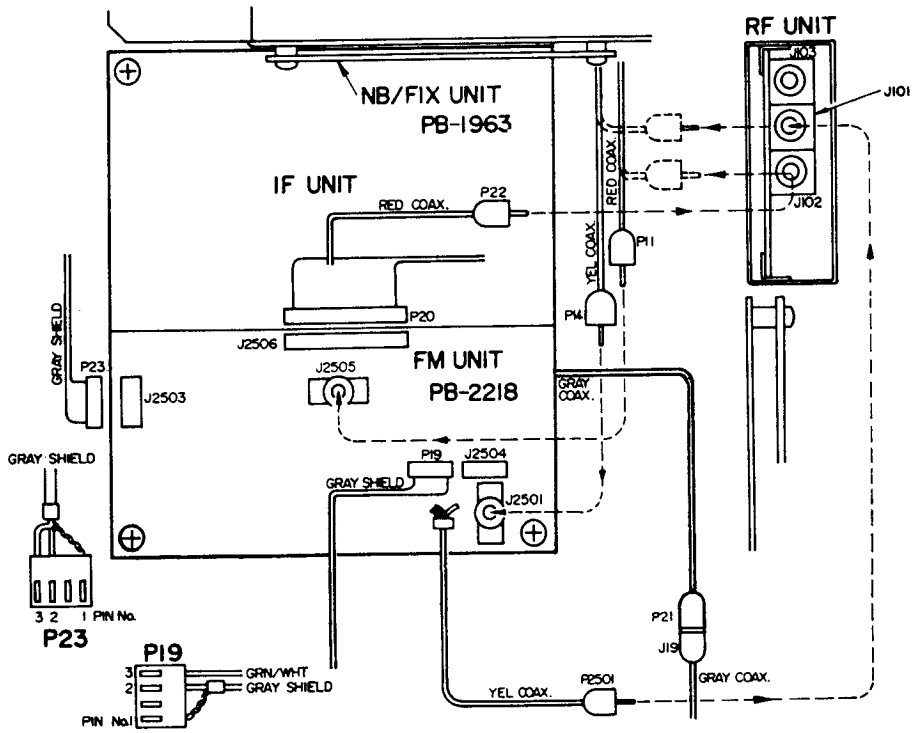


Figure 15

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 P_{21} from J_{19}, as shown in Figure 16, and reconnect P_{21} to J_{2401}. Connect P_{2401} from the AM unit to J_{19}.

(5) Locate the 3-pin and 8-pin Molex connectors ir 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 P_{20} connects to J_{2403}; the 3-pin P_{19} connects to J_{2402}; RCA plug P_{22} (from P_{20}) connects to J_{102} on the RF unit (remove P_{11} from J_{102}, and very carefully insert it into J_{2404} on the AM unit).

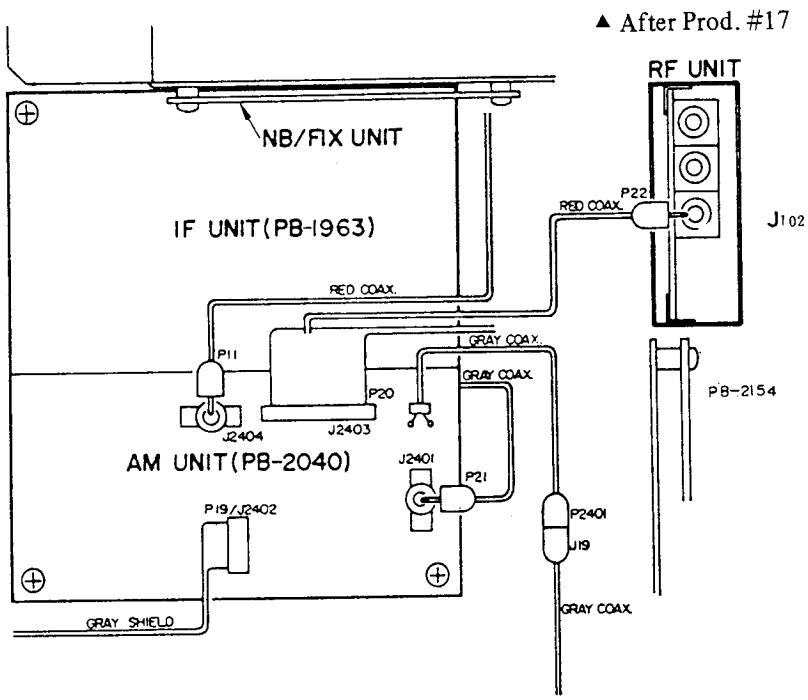
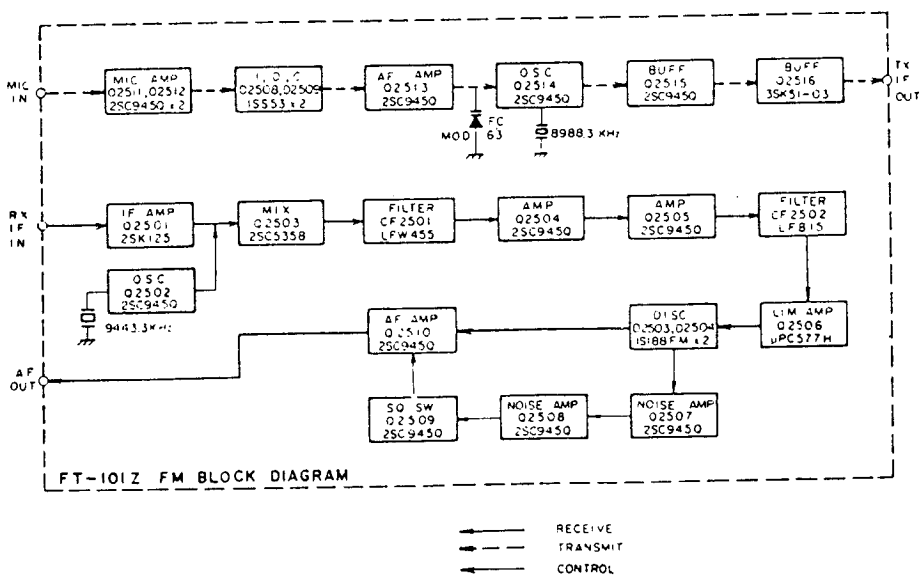


Figure 16



MAIN CHASSIS

Symbol No.	Part No.	Description
		IC, TRANSISTOR
Q2	G3104960Y	TR 2SA496(Y)
Q1	G3206160R	" 2SB616R(S)
Q4	G340880O	" 2SD880(O)
Q3	G1090070	IC μPC14308
	G1090080	" μPC78L08
		DIODE
D1	G2090029	Ge 1N60
D2–5,10–14	G2015550	Si 1S1555
D6	G2090001	" 10D1
		RESISTOR
R22, 24	J01245220	Carbon film 1/4W TJ 22 Ω
R23	J01245330	" " " " 33 Ω
R14	J01245560	" " " " 56 Ω
R7, 11	J01245101	" " " " 100 Ω
R18, 26	J01245821	" " " " 820 Ω
R4, 5	J01245102	" " " " 1 kΩ
R6, 19	J01245152	" " " " 1.5 kΩ
	J01245182	" " " " 1.8 kΩ
R17	J01245222	" " " " 2.2 kΩ
R20	J01245474	" " " " 470 kΩ
R2	J10276100	Carbon composition 1/2W GK 10 Ω
R9, 10 (with L5, L6)	–	" " 1W " 56 Ω
R3	J10276101	" " " " 100 Ω
R1, 8	J10276222	" " " " 2.2 kΩ
R25	J30356150	Cement 3W 15 Ω
		POTENTIOMETER
VR1	J60800078	VM11AX46E 5M1112 10 kΩB
VR2	J62800053	K16BA004C 500 kΩB/20 kΩB
VR3	J62800052	K16BA004C 5 kΩA/5 k B
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
VR8	J60800037	VM10A654A 1 kΩB
VR9, 10	J60800038	VM10A654A 5 kΩB
VR11	J60800077	K1611000AZE 5 kΩB
		CAPACITOR
		Dipped mica 500 WV 5 pF
C13, 19, 21	K30276271	" " " 270 pF (LCQ17271K5)
C8	K30276331	" " 500 WV 330 pF (LCQ17331K5)
C7	K30276621	" " 500 WV 620 pF (LCQ18621K5)

C6	K30279052	Dipped mica 500 WV 1100 pF (DM19D-112K5)
C5	K30279062	" " 500 WV 3000 pF (DM19D-302K5)
C59, 66	K31306800	Moulded mica 1 KWV 80 pF
C17	K02279001	Ceramic 500 WV 1 pF
C10	K02279002	" " 5 pF
C18	K02279003	" " 47 pF
C11	K00279001	" " 200 pF
C20	K00279002	" " 470 pF
C16	K00359003	" 1 KV 3 pF
C15	K02309002	" " 5 pF
C14	K02309003	" " 100 pF
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
C29,34,35,41, 73,76–81	K13170103	" " 0.01 μF
C12, 22–24, 39,40,56,58, 60,68,69,82, 84	K13170473	" " 0.047 μF
C27, 28, 36	K12279004	" 500 WV 0.0047 μF
C54, 55, 61	K12279002	" " 0.01 μF
C2, 25, 26	K12329002	" 1.4 KV 0.0047 μF
C37, 64	K12329001	" " 0.01 μF
C42–51	K21270002	Feed thru 500 WV 0.001 μF (ECK-L2H102PE)
C63	K40120476	Electrolytic 16 WV 47 μF
C72	K40120107	" 50 WV 100 μF
C65	K40120337	" " 330 μF
C70	K40120106	" " 10 μF
C67	K40109011	" 10 WV 33 μF
	K50177104	Mylar 50 WV 0.1 μF
		VARIABLE CAPACITOR
VC1	K90000026	YB-250 250 pF
VC2	K90000016	C134E125
		TRIMMER CAPACITOR
TC1	K91000007	TSN120C 10P x 2
		INDUCTOR
L1	L0020534C	
L2	L0020611B	
L3	L1020690	
L4	L1020064	
L5, L6	L1020308B	
(R9, R10)		
L7	L1190001	EL0710-251K 250 μH
L8	L1190017	FL-5H-102K 1 mH
L9	L0020705	

		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)

	Q600005	Terminal block 1L2P (0-2)
	Q6000014	" 1L5P (3-0-2)
★★★★★ LED B BOARD ★★★★★		
PB-1390	F0001390	P.C. Board
D9	G2090060	GD4-203-SRD

RF UNIT

Symbol No.	Part No.	Description
PB-2154A	F0002154A	Printed Circuit Board
	C0021540	P.C.B. with components
		IC, FET & TRANSISTOR
Q102	G2090135	IC (Ring Module) ND487C2-3R
Q106	G4800400M	FET 3SK40M
Q101	G4800510C	" 3SK51-03
Q103	G3090019	" J310
Q104, 105	G3324070	TR 2SC2407
		DIODE
D110	G2010070	Ge 1S1007
D103, 104	G2015550	Si 1S1555
D101, 102, 105–109	G2090027	" 1SS53
		RESISTOR
R122, 131	J00245479	Carbon film ¼W VJ 4.7 Ω
R109,110,115, 116,124,125, 140	J00245100	" " " " 10 Ω
R135	J00245560	" " " " 56 Ω
R106,107,113, 114,139	J00245101	" " " " 100 Ω
R108,117,126	J00245121	" " " " 120 Ω
R121, 130	J00245151	" " " " 150 Ω
R123,132	J00245221	" " " " 220 Ω
R136	J00245331	" " " " 330 Ω
R119, 128	J00245561	" " " " 560 Ω
R105,111,112, 120,129	J00245102	" " " " 1 kΩ
R118, 127	J00245152	" " " " 1.5 kΩ
R141	J00245222	" " " " 2.2 kΩ
R102	J00245272	" " " " 2.7 kΩ
R104, 133	J00245562	" " " " 5.6 kΩ
R138	J00245103	" " " " 10 kΩ
R137	J00245183	" " " " 18 kΩ
R103, 134	J00245393	" " " " 39 kΩ
R101	J00245225	" " " " 2.2 MΩ

		CAPACITOR
C138	K02179003	Ceramic 50WV CH 2 pF
C106	K02172040	" " " 4 pF
C125, 126	K00175680	" " SL 68 pF
C103	K00175101	" " " 100 pF
C124	K30176391	" " " 390 pF
C102,104,116, 119–121, 130,131,135, 140,144,145	K13170103	" " 0.01 μF
C101, 105, 107–115, 117, 118, 122, 123, 127–129, 132–134, 136,137,139, 142, 143	K13170473	" " 0.047 μF
C141	K40120336	Electrolytic 16WV 33 μF
		TRIMMER CAPACITOR
TC101	K91000019	ECV-1ZW 10 x 40 10 pF
		INDUCTOR
L107	L0020491	0.32 μH
L108	L1190005	FL4H-1R0M 1 μH
L112	L1190033	FL5H-820K 82 μH
L102,103,105, 106,113,114	L1190016	FL5H-101K 100 μH
L104,109,111	L1190020	FL5H-151K 150 μH
L101,110,115	L1190038	FL5H-271K 270 μH
		TRANSFORMER
T101–103	L0020788A	
T104	L0020221A	
		JACK
J101–103	P1090018	SQ-3081

NB-FIX UNIT

Symbol No.	Part No.	Description
	C0019610	NB-FIX unit with components
PB-1961B	F0001961B	P.C. Board
		TRANSISTOR
Q201–204	G3303720Y	2SC372Y
Q205, 206	G3315830	2SC1583

		DIODE	
D201–204	G2090029	Ge 1N60	
D205–209	G2015550	Si 1S1555	
		RESISTOR	
R208,216,224, 230,238,239	J00245101	Carbon film 1/4W VJ	100 Ω
R204	J00245221	" " " "	220 Ω
R222, 236	J00245471	" " " "	470 Ω
R231–233,235	J00245561	" " " "	560 Ω
R206,215,221, 234,237	J00245102	" " " "	1 kΩ
R207	J00245222	" " " "	2.2 kΩ
R240	J10245472	" " " TJ	4.7 kΩ
R210	J00245472	" " " VJ	4.7 kΩ
R205,209,218	J00245562	" " " "	5.6 kΩ
R202,203,212, 214,225,226	J00245103	" " " "	10 kΩ
R201,220,223	J00245153	" " " "	15 kΩ
R211,213,219	J00245223	" " " "	22 kΩ
R217	J00245683	" " " "	68 kΩ
		CAPACITOR	
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
C206	K00179005	" " SL	20 pF
C204	K00175101	" " "	100 pF
C201	K00175331	Ceramic disc " "	330 pF
C202,203,205, 211,212,221, 225–227, 229–233	K13170103	Ceramic "	0.01 μF
C207,210,213, 215,219,220, 223,224,228, 237	K13170473	" "	0.047 μF
C214	K40170105	Electrolytic "	1 μF
C238	K40140475	10WV	4.7 μF
		TRIMMER CAPACITOR	
TC201, 202	K91000016	ECV-1ZW 50 x 32	50 pF
		INDUCTOR	
L207, 208	L1190007	FL-4H 1R8K	1.8 μH
L204–206	L1190016	FL-5H 101K	100 μH
L201–203	L1190017	FL-5H 102K	1 mH
		TRANSFORMER	
T201, 202	L0020140	R12-4170	

		CRYSTAL SOCKET	
XS201	P3090025	S-14 2P	
		MINI CONNECTOR	
J201	P0090037	5048-08A	
J202	P0090038	5048-12A	

PREMIX UNIT

Symbol No.	Part No.	Description	
	C0021520	PREMIX unit with components	
PB-2152C	F0002152C	P.C. Board	
		IC, FET, TRANSISTOR	
Q303	G1090062	IC SN76514N	
Q301, 302	G3319230R	TR 2SC1923R	
		DIODE	
D301–318	G2090027	Si 1SS53	
		RESISTOR	
R323	J00245100	Carbon film 1/4W VJ	10 Ω
R331	J00245680	" " " "	68 Ω
R301,303,305, 307,309,311, 313,315,332, 333	J00245101	" " " "	100 Ω
R317	J02245101	" " " SJ	100 Ω
R322,324,327, 328,336	J00245221	" " " VJ	220 Ω
R337	J02245102	" " " SJ	1 kΩ
R319, 334	J00245152	" " " VJ	1.5 kΩ
R335	J00245182	" " " "	1.8 kΩ
R329, 330	J00245222	" " " "	2.2 kΩ
R302,304,308, 310,312,314, 316,318,321, 325,326	J00245103	" " " "	10 kΩ
R320	J00245333	" " " "	33 kΩ
		POTENTIOMETER	
VR301	J50710502	V10K-8-1-2	5 kΩB
		CAPACITOR	
C335	K30176271	Dipped mica 50WV	270 pF
C331	K30176331	" " "	330 pF

C341	K30176391	Dipped mica 50WV	390 pF
C311,315,319	K30176561	" " "	560 pF
C323, 327	K30176681	" " "	680 pF
C307	K30176751	" " "	750 pF
C301,305,309, 313,317,321, 325,329,333, 337–339,343, 345–351	K13170103	Ceramic "	0.01 μF
C302,304,306, 308,310,312, 314,316,318, 320,322,324, 326,328,330, 332,334,336, 340,342,344	K13170473	" "	0.047 μF
C303	K50177102	Mylar "	0.001 μF
		INDUCTOR	
L302	L1190007	FL4H-1R8M	1.8 μH
L303	L1190005	FL4H-1R0M	1 μH
L301,304–306	L1190017	FL5H-102K	1 mH
		TRANSFORMER	
T301, 302	L0020500		
T303, 304	L0020501		
T305, 306	L0020502		
T307, 308	L0020835		
T309, 310	L0020504		
T311, 312	L0020836		
T313, 314	L0020837		
T315, 316	L0020838		
T317, 318	L0020839		
T319	L0020210		
		JACK	
J301	P1090018	SQ3081	
P301	P0090045	SQ4052	

IF UNIT

Symbol No.	Part No.	Description
	C0019630	IF unit with components
PB-1963C	F0001963C	P.C. Board
		IC, FET, TRANSISTOR
Q403	G1090063	IC TA7060P
Q406	G3090036	FET 2SK19TM-BL
Q413, 414	G3090034	" 2SK19TM-Y

Q402,419,425	G3090035	FET	2SK19TM-GR
Q401,405,412, 415, 416	G4800510C	"	3SK51-03
Q408	G3090019		J310
Q407, 420	G3105641	TR	2SA564A
Q404,409,410, 417, 418, 422–424	G3303720Y	"	2SC372Y
Q421	G3305350A	"	2SC535A
Q411	G3090005	"	MPSA13
		DIODE	
D416, 417	G2090029	Ge	1N60
D414, 421	G2010070	" (GB)	1S1007
D405–408, 425–428	G2090118	"	1SS97
D401–404, 409–413, 419, 424	G2015550	Si	1S1555
D418	G2022090	Varactor	1S2209
D422	G2090040	"	FC63
D420, 423	G2090010	Zener	WZ090
		CRYSTAL	
X401	H0100433	HC-18/U	19.7475 MHz
		CRYSTAL FILTER	
XF401	H1100860		XF8.9HS
XF402(Option)	H1100880		XF8.9HC
XF403	H1100890		XF8.9HP
XF404	H1100470		8.9M20A
XF405	H1100900		XF10GS (XF-10HW)
		THERMISTOR	
TH401	G9090003		D-33A
		RESISTOR	
R0520	J00245220	Carbon film 1/4W VJ	22 Ω
R410, 411	J01245101	" " " TJ	100 Ω
R402,408,419, 422,423,437, 439,444,446, 463,464,469, 475,482,483, 497	J00245101	" " " VJ	100 Ω
R425,447,451, 486, 0507, 0508	J00245221	" " " "	220 Ω
R502	J00245331	" " " "	330 Ω
	J00245391	" " " "	390 Ω

R443	J00245471	Carbon film 1/4W VJ	470 Ω
R474, 480, 0522	J00245561	" " " "	560 Ω
R467, 468	J00245681	" " " "	680 Ω
	J00245821	" " " "	820 Ω
R406,416,428, 440,442,449, 453,457,459, 462,488,494, 0504, 0506, 0515	J00245102	" " " "	1 kΩ
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
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
R470	J00245123	" " " VJ	12 kΩ
R415,438,498, 499	J00245153	" " " "	15 kΩ
R414	J00245273	" " " "	27 kΩ
R461,472,478, 0500	J00245473	" " " "	47 kΩ
R405,465,466	J00245104	" " " "	100 kΩ
R493	J00245154	" " " "	150 kΩ
R448,452,487, 0503, 0505	J00245184	" " " "	180 kΩ
	J00245334	" " " "	330 kΩ
R0521	J01245274	" " " TJ	270 kΩ
R432	J00245684	" " " VJ	680 kΩ
R490	J00245105	" " " "	1 MΩ
	J00245225	" " " "	2.2 MΩ
R0519	J10246565	" composition " GK	5.6 MΩ
		POTENTIOMETER	
VR401, 402	J51723102	SR-19R	1 kΩB
VR403, 404	J51723103	"	10 kΩB
VR405	J51723473	"	47 kΩB
VR407	J50705502	EVN-A1A-A00B53	5 kΩB
VR406	J50705504	EVN-A1A-A00B55	500 kΩB

		CAPACITOR	
C477	K30176221	Dipped mica 50WV	220 pF
C445, 472	K02173100	Ceramic " CH	10 pF
C488, 492	K06175330	" " UJ	33 pF
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
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
C449	K14179003	" "	0.1 μF
C461, 467	K50177103	Mylar "	0.01 μF
C478	K50177223	" "	0.022 μF
C409,439,456, 466,480,481, 483	K50177473	" "	0.047 μF
C434	K70167224	Tantalum 35WV	0.22 μF
C479	K70127225	" "	2.2 μF
C450,476,496	K40120106	Electrolytic 16WV	10 μF
		INDUCTOR	
L401–408, 410, 413	L1190016	FL-5H 101K	100 μH
L411, 412	L1190038	FL-5H 271K	270 μH
L409	L0020145	5.2 μH 220145	
		TRANSFORMER	
T410	L0020150	R12-4074	
T402,403,404, 407,409,413, 414	L0020140	R12-4170	

T401,406,408, 415	L0020141	R12-4171
T405	L0020221	
T411	L0020460	
T412	L0020209	
		MINI CONNECTOR
J401	P0090038	5048-12A
J402	P0090039	5048-13A
J403	P0090040	5048-15A
TP401–412	Q5000011	Wrapping terminal C

AF UNIT

Symbol No.	Part No.	Description
	C0019640	AF unit with components
PB-1964A	F0001964A	P.C. Board
		IC, FET, TRANSISTOR
Q503	G1090077	IC MC3403P (μPC324C)
Q506	G1090064	" MC14024B
Q504	G1090100	" SN74LS123N
Q502	G1090086	" TA7063P
Q501	G1090164	" μPC2002H
Q505	G1090120	" NJM78L05
Q514	G3090035	FET 2SK19TM-GR
Q515	G3105641	TR 2SA564A
	G3303730	" 2SC373
Q507, 508	G3307320G	" 2SC732TM-GR
	G3310000G	" 2SC1000GR
Q512	G3313830	" 2SC1383
Q509,510,513, 516	G3318150Y	" 2SC1815Y
Q511	G3318150G	" 2SC1815GR
		DIODE
D510, 511	G2090029	Ge 1N60
D502–505	G2090118	" 1SS97
D507–509, 512–517, 519–522	G2015550	Si 1S1555
D501, 518	G2090001	" 10D1
D506	G2090027	" 1SS53
		CRYSTAL
X501	H0100260	HC-6/W 3200 kHz
X502	H0100421	HC-18/U 8986 kHz
X503	H0100422	HC-18/U 8988.3 kHz
X504	H0100423	" 8989 kHz
		RESISTOR
	J00245560	Carbon film 1/4W VJ 56 Ω
R509,539,557	J00245101	" " " " 100 Ω
R511	J00245121	" " " " 120 Ω
R533, 546	J00245151	" " " " 150 Ω
R503,513,524, 525	J00245221	" " " " 220 Ω
R512,522,538	J00245471	" " " " 470 Ω
R504,514,520, 523,548,561	J00245102	" " " " 1 kΩ
R515	J00245222	" " " " 2.2 kΩ
R534,535,565	J00245272	" " " " 2.7 kΩ
R510,562,569, 578–580	J00245332	" " " " 3.3 kΩ
	J01245472	" " " TJ 4.7 kΩ
R510,506,531, 536,537,544, 545,549,550, 563,566,575, 576,581	J00245472	" " " VJ 4.7 kΩ
R521,527,532	J00245562	" " " " 5.6 kΩ
R541,542,568, 570	J00245682	" " " " 6.8 kΩ
R501,507,519, 529,555,556, 558,571,572	J00245103	" " " " 10 kΩ
R517, 551	J00245153	" " " " 15 kΩ
R508,518,528, 540,554,573	J00245223	" " " " 22 kΩ
R584	J01245223	" " " TJ 22 kΩ
R559	J00245393	" " " VJ 39 kΩ
R567	J00245473	" " " " 47 kΩ
R516	J00245563	" " " " 56 kΩ
R547, 574	J00245104	" " " " 100 kΩ
R560	J00245154	" " " " 150 kΩ
R553	J00245224	" " " " 220 kΩ
R526	J00245274	" " " " 270 kΩ
R552,564,577	J00245474	" " " " 470 kΩ
R582	J00245824	" " " " 820 kΩ
R505	J10276229	composition 1/2W GK 2.2 Ω
R502	J32276010	Wire wound 1W 1 Ω
		POTENTIOMETER
VR501	J51727101	CR-19R 100 ΩB
		CAPACITOR
C513	K30176511	Dipped mica 50WV 510 pF
C511	K02172050	Ceramic " CH 5 pF
C522	K02173100	" " " 10 pF
C514	K06175270	" " VJ 27 pF
C546–548	K02175390	" " CH 39 pF

C510,532,534, 555, 566	K02175101	Ceramic 50WV CH	100 pF
C533	K02175151	" " "	150 pF
C558, 559	K00179020	" " SL	240 pF
C512	K06175271	" " UJ	270 pF
C504,519–521, 523,531,535, 542–545,570	K13170103	" "	0.01 μF
C509,537,574	K13170473	" "	0.047 μF
C516	K50177102	Mylar 50WV	0.001 μF
C526	K50177472	" "	0.0047 μF
C518,529,530, 572	K50177103	" "	0.01 μF
C525,539–541	K50177223	" "	0.022 μF
C528,556,569, 573	K50177473	" "	0.047 μF
C503	K50177104	" "	0.1 μF
C507,517,527, 550,551,560, 567,568,571	K40170105	Electrolytic "	1 μF
C557	K40170225	" "	2.2 μF
C561	K40170335	" "	3.3 μF
C536	K40140475	" 25WV	4.7 μF
C505,515,538, 552,554,564, 565	K40120106	" 16WV	10 μF
C524,553,563	K40120226	" "	22 μF
C508	K40120476	" "	47 μF
C501	K40120107	" "	100 μF
C506	K40120227	" "	220 μF
C502	K40120477	" "	470 μF
C562	K40120336	" "	33 μF
		TRIMMER CAPACITOR	
TC501–505	K91000013	ECV-1ZW 20 x 32	20 pF
		INDUCTOR	
L502	L1190023	FL-5H 220K	22 μH
L501	L1190038	FL-5H 271K	270 μH
L503–506	L1190017	FL-5H 102K	1 mH
		TRANSFORMER	
T501	L0020209		
		RELAY	
RL501	M1190002	FBR211A D012M	
		MINI CONNECTOR	
J501	P0090043	5048-19A	
J502	P0090040	5048-15A	
J503	P0090037	5048-08A	
J504	P0090042	5048-05A	
J505	P0090041	5048-03A	
	R0042800A	**HEAT SINK**	

PREMIX LOCAL UNIT

Symbol No.	Part No.	Description
	C0021530	PREMIX LOCAL unit with
		components
PB-2153A	F0002153A	P.C. Board
		TRANSISTOR
Q601–612	G3303800Y	2SC380TMY
		DIODE
D601–612	G2015550	Si 1S1555
		RESISTOR
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 " " " "
R632	J00245151	" " " " 150 Ω
R618	J00245221	" " " " 220 Ω
R623	J00245271	" " " " 270 Ω
R603,608,613	J00245561	" " " " 560 Ω
R604,609,614, 619,624,629, 633,638,643, 648,653,658	J00245102	" " " " 1 kΩ
R662	J00245182	" " " " 1.8 kΩ
R661, 663	J00245222	" " " " 2.2 kΩ
R602,607,612, 617,622,627, 634,639,644, 649,654,659	J00245333	" " " " 33 kΩ
R601,606,611, 616,621,626, 635,640,645, 650,655,660	J00245563	" " " " 56 kΩ
		CAPACITOR
C607	K30176271	Dipped mica 50WV 270 pF
C603	K30176331	" " " 330 pF

C643, 638, 642, 646	K02175470	Ceramic 50WV CH	47 pF
C630	K02175560	" " "	56 pF
C626	K02175680	" " "	68 pF
C623	K02175820	" " "	82 pF
C619	K02175101	" " "	100 pF
C615	K02175151	" " "	150 pF
C611	K02179023	" " "	180 pF
C601, 602, 604–606, 608–610, 612–614, 616–618, 620–622, 624, 625, 627–629, 631–633, 635–647, 639–641, 643–645, 647–649	K13170103	" "	0.01 μF
		CRYSTAL	
X601	H0101470	HC-18/U 15.9875 MHz	
X602	H0101480	" 17.9875 MHz	
X603	H0101490	" 21.4875 MHz	
X604	H0102294A	" 24.4875 MHz	
X605	H0101500	" 28.4875 MHz	
X606	H0102295A	" 32.4875 MHz	
X607	H0101510	" 35.4875 MHz	
X608	H0102296A	" 38.9875 MHz	
X609	H0101520	" 42.4875 MHz	
X610	H0101530	" 42.9875 MHz	
X611	H0101540	" 43.4875 MHz	
X612	H0101550	" 43.9875 MHz	
		TRANSFORMER	
T601–612	L0020017		
		INDUCTOR	
L601	L1190016	FL5H-101K	100 μH

SELECT SWITCH UNIT

Symbol No.	Part No.	Description
	C0019660	SELECT SW unit with components
PB-1966C	F0001966C	P.C. Board
		DIODE
D701	G2090001	Si 10D1

		RELAY
RL701	M1190002	FBR211A D012M
		SWITCH
S701	N4090006	6B0003CC2060
		MINI CONNECTOR
J701	P0090049	5049-16A

VFO UNIT

Symbol No.	Part No.	Description
	C0014400	VFO assembly 3420
		PCB with components
PB-1440B	F0001440B	P.C. Board
		FET & TRANSISTOR
Q802	G3090035	FET 2SK19TM-GR
Q801, 803	G3303800Y	Transistor 2SC380TM-Y
		DIODE
D801	G2022360	Varactor 1S2236
		RESISTOR
R809, 811	J00245101	Carbon film 1/4W VJ 100 Ω
R807	J00245221	" " " " 220 Ω
R805, 808	J00245222	" " " " 2.2 kΩ
R802	J00245332	" " " " 3.3 kΩ
R801	J00245103	" " " " 10 kΩ
R803	J00245183	" " " " 18 kΩ
R804	J00245223	" " " " 22 kΩ
R806, 810	J00245104	" " " " 100 kΩ
		CAPACITOR
C827	K02179001	Ceramic disc 50WV CH 1 pF
C829	K02179003	" " " " 2 pF
C828	K06172040	" " " UJ 4 pF
C807	K02173080	" " " CH 8 pF
C801	K06173080	" " " UJ 8 pF
C803	K06173100	" " " " 10 pF
C804	K02175180	" " " CH 18 pF
C805	K02179012	" " " " 30 pF
C814	K02179013	" " " " 33 pF
C808, 818	K02175390	" " " " 39 pF

C811	K02179023	Ceramic disc 50WV CH	180 pF
C821, 823	K00175471	" " " "	470 pF
C809,810,812, 815,819,820, 824,826	K13170103	" " "	0.01 μF
C813	K30176431	Dipped mica "	430 pF
C802, 822	K30209001	" " "	1000 pF
C825	K70167334	Tantalum 10WV	0.33 μF
		VARIABLE CAPACITOR	
VC801	K90000024	C521 R112	
		TRIMMER CAPACITOR	
TC801	K90000001	TSN-100D15	15 pF
TC802	K91000016	ECV-1ZW 50 x 32	50 pF
		INDUCTOR	
L801	L0020268A		
L804, 805	L1190007	Micro inductor FL-4H	1.8 μH
L803, 806	L1190001	" " EL0710	250 μH
L802	L1190040	" " S4 102K	1 mH
		RECEPTACLE	
J801	P1090012	SI-6303-1	
		TERMINAL	
	Q5000005	Lighthouse type	
	Q5000011	Wrapping terminal C	

RECT. A UNIT

Symbol No.	Part No.	Description
	C0019670	RECT. A unit with components
PB-1967	F0001967	P.C. Board
		IC, TRANSISTOR
Q901	G1090162	IC μPC78L12
Q903	G3110150Y	TR 2SA1015Y
		DIODE
D907	G2090001	Si 10D1
D901–904	G2090002	" 10D10
D905, 906	G2090003	" V06B
D908	G2090007	Zener WZ061

		RESISTOR
R908	J01245560	Carbon film 1/4W TJ 56 Ω
R905	J10276220	" composition 1/2W GK 22 Ω
R901–904	J10276474	" " " " 470 kΩ
R907	J20339001	Metallic film 2W 0.4 Ω
		CAPACITOR
C901–905	K13170103	Ceramic 50WV 0.01 μF
C908–911	K40140106	Electrolytic 25WV 10 μF
C907	K40140107	" " 100 μF
C906	K41140338	" " 3300 μF
		RELAY
RL901	M1190003	FRL-264 D012/04CS-01
	Q5000011	Wrapping terminal C
	Q5000004	Test point D

RECT. B UNIT

Symbol No.	Part No.	Description
	C0019680	RECT. B unit with components
PB-1968C	F0001968C	P.C. Board
		TRANSISTOR
Q1003	G3106390	2SA639
Q1001	G3107330	2SA733
Q1002	G3303720Y	2SC372Y
		DIODE
D1004, 1005, 1008–1011	G2015550	Si 1S1555
D1002, 1003, 1012	G2090002	" 10D10
D1006, 1007	G2090001	" 10D1
D1001	G2090081	" SM1-12
		RESISTOR
R1021	J00245681	Carbon film 1/4W VJ 680 Ω
R1011, 1016, 1020	J00245472	" " " " 4.7 kΩ
R1013, 1015	J00245103	" " " " 10 kΩ
R1014	J00245123	" " " " 12 kΩ
R1017–1019	J00245223	" " " " 22 kΩ
R1012	J00245563	" " " " 56 kΩ
R1010	J20306562	Metallic film 1W 5.6 kΩ

		RESISTOR			
R2006	J01245560	Carbon film	1/4W	TJ	56 Ω
R2005	J01245101	"	"	"	100 Ω
R2001	J01245121	"	"	"	120 Ω
R2002	J01245391	"	"	"	390 Ω
R2008	J00245562	"	"	VJ	5.6 kΩ
R2004	J01245683	"	"	TJ	68 kΩ
		SWITCH			
S2001–2004	N3090002	SLE62301			
S2005	N3090008	SLE64251			

DISPLAY UNIT (3420)

Symbol No.	Part No.	Description
	C0020982	P.C.B. with components
PB-2098A	F0002098A	Printed Circuit Board
		DISPLAY LED
D2201–2206	G2090069	HP5082-7623
		PLUG
P2201	P1090073	5047-06 (with wire T9202430)
P2202	P1090075	5047-08 (" " T9202440A)

COUNTER UNIT (3420)

Symbol No.	Part No.	Description
	C0020862	P.C.B. with components
PB-2086B	F0002086B	Printed Circuit Board
		IC, FET & TRANSISTOR
Q2312	G1090249	IC MSM9520RS
Q2320	G1090079	" μPA54H
Q2305	G1090299	" μPC7805H
Q2301	G4800730G	FET 3SK73GR
Q2321	G3104960Y	TR 2SA496Y
Q2306–2311, 2313–2319	G3109520L	" 2SA952L
Q2303	G3316740L	" 2SC1674L
Q2304	G3318150G	" 2SC1815GR
		DIODE
D2301–2313	G2015550	Si 1S1555

		CRYSTAL			
X2301	H0102272	HC-18/U	6.5536 MHz		
		RESISTOR			
R2312	J00245100	Carbon film	1/4W	VJ	10 Ω
R2331, 2334, 2337, 2340, 2343, 2346, 2349	J01245330	"	"	TJ	33 Ω
R2350	J00245560	"	"	VJ	56 Ω
R2308, 2318, 2320, 2322, 2324, 2326, 2328	J00245101	"	"	"	100 Ω
R2301	J01245221	"	"	TJ	220 Ω
R2307, 2310, 2311	J00245221	"	"	VJ	220 Ω
R2352	J00245331	"	"	"	330 Ω
R2351	J00245471	"	"	"	470 Ω
R2317, 2319, 2321, 2323, 2325, 2327	J01245102	"	"	TJ	1 kΩ
R2330, 2333, 2336, 2339, 2342, 2345, 2348	J00245102	"	"	VJ	1 kΩ
R2329, 2332, 2335, 2338, 2341, 2344, 2347	J00245152	"	"	"	1.5 kΩ
R2302, 2315	J00245562	"	"	"	5.6 kΩ
R2313	J00245103	"	"	"	10 kΩ
R2309	J00245473	"	"	"	47 kΩ
R2304	J01245473	"	"	TJ	47 kΩ
R2314	J01245104	"	"	"	100 kΩ
R2316	J00245104	"	"	VJ	100 kΩ
		CAPACITOR			
C2324	K02179008	Ceramic	50WV	CH	20 pF
C2325	K02175820	"	"	"	82 pF
C2320	K02175101	Electrolytic	16WV	"	100 pF
C2301, 2304	K13170102	Ceramic	50WV	CH	0.001 μF
C2302, 2305, 2308, 2309, 2311, 2312, 2314, 2315, 2317, 2319, 2321, 2326–2330	K13170103	"	"	"	0.01 μF
C2323	K50177103	Mylar	"		0.01 μF
C2322	K71137685	Tantalum	20WV		6.8 μF
C2310, 2318	K40120106	Electrolytic	16WV		10 μF
C2313	K40109011	"	10WV		33 μF
C2316	K40129001	"	16WV		330 μF

TRIMMER C BOARD

Symbol No.	Part No.	Description
	C0010920	TRIMMER C unit with components
PB-1092	F1001092	P.C. Board
		CAPACITOR
C1406	K30275180	Dipped mica 500WV 18 pF
C1405	K30276820	" " " 82 pF
C1403	K30276221	" " " 220 pF
	K30276391	" " " 390 pF
C1402	K30279123	" " " 710 pF
C1401	K30279058	" " " 2000 pF
		TRIMMER CAPACITOR
TC1404, 1405	K91000031	B1PY 40 pF
TC1402, 1403	K91000032	B2PY 100 pF
TC1401	K91000078	BW6P-1 420 pF

APF UNIT

Symbol No.	Part No.	Description
	C0022170	PCB with components
PB-2217	F0002217	Printed Circuit Board
		IC & TRANSISTOR
Q1502	G1090248	IC AN6551
Q1501	G3318150Y	TR 2SC1815Y
		DIODE
D1501	G2090060	LED GD4-203SRD
		RESISTOR
R1506	J00245820	Carbon film 1/4W VJ 82 Ω
R1501	J00245101	" " " " 100 Ω
R1504	J00245102	" " " " 1 kΩ
R1514	J00245152	" " " " 1.5 kΩ
R1511, 1515, 1517	J00245222	" " " " 2.2 kΩ
R1516	J00245272	" " " " 2.7 kΩ
	J00245472	" " " " 4.7 kΩ
R1502, 1508	J00245103	" " " " 10 kΩ
R1503, 1509	J00245123	" " " " 12 kΩ
R1505	J00245473	" " " " 47 kΩ
R1512	J00245563	" " " " 56 kΩ
R1513	J00245104	" " " " 100 kΩ
R1510	J00245224	" " " " 220 kΩ
R1507	J00245474	" " " " 470 kΩ

		CAPACITOR
C1501	K13170103	Ceramic 50WV 0.01 μF (DB201YF103Z5L5)
C1505, 1506	K50177153	Mylar 50WV 0.015 μF (50F2U153M)
C1503, 1504, 1508, 1509, 1511	K40179001	Electrolytic 50WV 1 μF (50RC2-1)
C1502, 1507, 1510	K40129004	Electrolytic 16WV 10 μF (16RE10)
		SWITCH
S1501	N4090008	1B0001AC2060

DRIVER BOARD

Symbol No.	Part No.	Description
	C0017140	Driver board with components (without vacuum tube)
PB-1714B	F0001714	P.C. Board
		VACUUM TUBE
V1601	G6090002	12BY7A
		VACUUM TUBE SOCKET
VS1601	P3090022	SB-9403
		RESISTOR
R1605	J10276470	Carbon composition 1/2W GK 47 Ω
R1602, 1604	J10276560	" " " " 56 Ω
R1603	J10276101	" " " " 100 Ω
R1601	J10276473	" " " " 47 kΩ
		CAPACITOR
C1601, 1602	K12279002	Ceramic disc 500WV 0.01 μF
C1603, 1604, 1606	K13170473	" " 50WV 0.047 μF
C1605	K30279051	Dipped mica 500WV 1000 pF
		INDUCTOR
L1601	L1190020	Micro inductor FL5H 150 μH
L1602(R1602)	L1020307	
	Q5000011	Wrapping terminal C

FINAL BOARD

Symbol No.	Part No.	Description
	C0017151	Final board with components (without vacuum tube)
PB-1715B	F0001715B	P.C. Board
		VACUUM TUBE
V1701, 1702	G6090001	6146B
		VACUUM TUBE SOCKET
VS1701, 1702	P3090024	SB-3606
		DIODE
D1701	G2090002	Si 10D10
		RESISTOR
R1701. 1702 (L1702, 1703)	J10276560	Carbon composition 1/2W GK 56 Ω
R1703, 1704, 1705	J10276101	" " " "100 Ω
R1706	J31333010	Meter shunt 2W 1 Ω
		CAPACITOR
	K12279001	Ceramic disc 500WV 0.001 μF
C1703 1704, 1710	K12279002	" " " 0.01 μF
C1705–1709, 1711, 1712	K13170473	" " 50WV 0.047 μF
C1701	K31306102	Moulded mica 1kWV 1000 pF
C1702	K30273050	Dipped mica 500WV 5 pF
		INDUCTOR
L1701	L1190020	Micro inductor 150 μH
L1704	L1190039	" " 560 μH
L1702, 1703	L1020307	RF choke
(R1701,1702)		
	Q5000011	Wrapping terminal C

CLARIFIER CONTROL UNIT

Symbol No.	Part No.	Description
	C0019730	CLAR.CONT.unit with components
PB-1973B	F0001973B	P.C. Board

		DIODE
D1801	G2090001	Si 10D1
D1802	G2090060	LED GD4-203SRD
		RESISTOR
R1803	J00245102	Carbon film 1/4W VJ 1 kΩ
R1804, 1805	J00245152	" " " " 1.5 kΩ
R1802	J00245332	" " " " 3.3 kΩ
R1801	J00245472	" " " " 4.7 kΩ
		POTENTIOMETER
VR1801	J50710501	V10K8-1-2 500 ΩB
		CAPACITOR
C1801–1803	K13170473	Ceramic 50WV 0.047 μF
		RELAY
RL1801	M1190002	FBR211A D012M
		SWITCH
SW1801	N4090011	2B0005FC2060

LED BOARD

Symbol No.	Part No.	Description
	C0019740	LED board with components
PB-1974A	F0001974A	P.C. Board
		LED
D1901–1906	G2090060	GD4-203SRD
		RESISTOR
R1901, 1902	J01245102	Carbon film 1/4W TJ 1 kΩ

LEVER SWITCH BOARD

Symbol No.	Part No.	Description
	C0019750	LEVER SW board with components
PB-1975A	F0001975A	P.C. Board

R1022	J20306390	Metallic film 1W	39 Ω
R1005	J20336391	" " 2W	390 Ω
R1006	J20336471	" " "	470 Ω
R1008	J20336222	" " "	2.2 kΩ
R1007	J20336332	" " "	3.3 kΩ
R1009	J20336473	" " "	47 kΩ
R1023	J10276474	Carbon composition ½W GK	470 kΩ
		POTENTIOMETER	
VR1001	J50708103	V18K3-2	10 kΩB
		CAPACITOR	
C1017	K13170473	Ceramic 50WV	0.047 μF
C1016	K12279003	" 500WV	0.0022 μF
C1005, 1006, 1013, 1018	K12279004	" "	0.0047 μF
C1010, 1014, 1015	K12279002	" "	0.01 μF
C1009	K40240106	Electrolytic 250WV	10 μF
C1011	K40240336	" "	33 μF
C1012	K40240476	" "	47 μF
C1001–1004	K40270106	" 450WV	10 μF
C1007, 1008	K40260226	" 350WV	22 μF
C1019	K50177103	Mylar 50WV	0.01 μF
	Q5000011	Wrapping terminal C	

CAPACITOR UNIT

Symbol No.	Part No.	Description	
		CAPACITOR	
C1101, 1102	K43279001	Electrolytic 500WV (CE-62LW)	200 μF

TRIMMER A BOARD

Symbol No.	Part No.	Description	
	C0021930	TRIMMER A unit with components	
PB-2193B	F0002193B	P.C. Board	
		CAPACITOR	
C1203	K30176271	Dipped mica 50WV	270 pF
	K30176391	" " "	390 pF
C1202	K30176651	" " "	650 pF
C1207	K30209001	" " "	1000 pF
C1201	K30209004	DM19D202K1 50WV	2000 pF

C1206	K02173100	Ceramic 50WV CH	10 pF
C1205, 1210	K02179012	" " "	30 pF
C1204, 1209	K02175820	" " "	82 pF
		TRIMMER CAPACITOR	
TC1203	K91000032	B2PY	100 pF
TC1202	K91000079	BW3P-2	210 pF
	K91000033	B7PY	470 pF
TC1206	K91000013	ECV-1ZW 20 x 32	20 pF
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
		INDUCTOR	
L1201	L0020545	Trap coil	

TRIMMER B BOARD

Symbol No.	Part No.	Description	
	C0021920	TRIMMER B unit with components	
PB-2192B	F0002192B	P.C. Board	
		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 kΩ

		TRIMMER CAPACITOR	
TC2301	K91000030	ECV-1ZW 40 x 53	40 pF
		INDUCTOR	
L2301	L2030068		
		CONNECTOR	
J2301	P0090051	5048-06A	
J2302	P0090054	5048-07A	
J2303	P0090037	5048-08A	
P2301	P0090045	SQ4052	
P2303	P1090186	3021-03 (with wire T9201380A)	

DC-DC CONVERTER (OPTION)

Symbol No.	Part No.	Description	
		TRANSISTOR	
Q3201, 3202	G3090002	T20A6 with insulator	
		RESISTOR	
R3202	J31306339	Wire wound 1W	3.3 Ω
R3201	J20376221	Metallic film 5W	220 Ω
		CAPACITOR	
C3202	K52247474	Metallized paper 250WV	0.047 μF
C3201	K41140227	Electrolytic 25WV	220 μF
		CONNECTOR	
P3201	P0090066	AC9M	
	T9012720	DC POWER CORD	
	Q0000009	FUSE 20 A	

ACCESSORIES

Symbol No.	Part No.	Description
		AC POWER CORD
	T9012380A	2 wire, 2 prong plug
	T9012481A	3 wire without plug
	T9012582A	3 wire, 3 prong plug (UL)
	T9012484	3 wire, 3 prong Australian plug
	T9012683A	3 wire, 2 prong EU plug

	P0090065	CONNECTOR PLUG	QS-P6FL
	P0090018	**PIN PLUG**	STP58
	P0090035	**ACC PLUG**	PA602B04
	Q0000005	**FUSE** (100V–117V)	5 A
	Q0000004	" (200V–234V)	3 A

AM UNIT

Symbol No.	Part No.	Description	
	C0020400	AM unit with components	
PB-2040	F0002040	P.C. Board	
		FET & TRANSISTOR	
Q2404	G3090035	FET	2SK19TM-GR
Q2406	G4800510C	"	3SK51-03
Q2405, 2407, 2408	G3303800Y	TR	2SC280TM-Y
Q2401	G3307320G	"	2SC732TM-GR
Q2402, 2409	G3318150Y	"	2SC1815Y
		DIODE	
D2406	G2090029	Ge.	1N60
D2401, 2402, 2404, 2405	G2015550	Si.	1S1555
		CRYSTAL	
X2401	H0100422	HC-18/U	8988.3 kHz
		RESISTOR	
R2441, 2457	J00245470	Carbon film 1/4W VJ	47 Ω
R2455	J00245560	" " " "	56 Ω
R2411, 2414, 2418, 2422, 2425, 2432, 2434, 2447	J00245101	" " " "	100 Ω
R2406, 2423	J00245331	" " " "	330 Ω
R2445, 2452	J00245471	" " " "	470 Ω
R2409, 2419, 2435, 2436, 2438, 2440, 2448	J00245102	" " " "	1 kΩ
R2437	J01245102	" " " TJ	1 kΩ
R2431	J00245272	" " " VJ	2.7 kΩ
R2401, 2410, 2453, 2456	J00245332	" " " "	3.3 kΩ
R2454	J01245332	" " " TJ	3.3 kΩ
R2404	J00245392	" " " VJ	3.9 kΩ
R2420, 2429	J00245472	" " " "	4.7 kΩ
R2442, 2444	J00245562	" " " "	5.6 kΩ

R2402, 2424, 2446, 2449,	J00245103	Carbon film 1/4W VJ	10 kΩ		
R2458	J01245103	" " " TJ	10 kΩ		
R2407	J00245123	" " " VJ	12 kΩ		
R2405, 2433	J00245153	" " " "	15 kΩ		
R2430	J00245183	" " " "	18 kΩ		
R2443, 2450	J00245223	" " " "	22 kΩ		
R2403	J00245273	" " " "	27 kΩ		
R2408, 2412, 2421	J00245333	" " " "	33 kΩ		
R2416	J00245393	" " " "	39 kΩ		
R2427	J00245563	" " " "	56 kΩ		
R2428	J00245683	" " " "	68 kΩ		
R2417, 2426, 2451	J00245104	" " " "	100 kΩ		
		THERMISTOR			
TH2401	G9090003	D33A			
		CAPACITOR			
C2420	K30176391	Dipped mica 50WV	390 pF		
C2416	K02175390	Ceramic " CH	39 pF		
C2417, 2426, 2456	K02175101	" " "	100 pF		
C2418	K02175151	" " "	150 pF		
C2401	K02179025	" " "	220 pF		
C2419, 2421–2423, 2428, 2429, 2434, 2436, 2437, 2440–2445, 2449, 2455	K13170103	" " "	0.01 μF		
C2425, 2427 2430–2433, 2439	K13170473	" "	0.047 μF		
C2451	K50177102	Mylar "	0.001 μF		
C2407	K50177222	" "	0.0022 μF		
C2410, 2415, 2435, 2438, 2447, 2448, 2449	K50177103	" "	0.01 μF		
C2402	K50177473	" "	0.047 μF		
C2414	K50177224	" "	0.22 μF		
C2405, 2450, 2453	K40170105	Electrolytic "	1 μF		
C2452	K40140475	" 25WV	4.7 μF		
C2406, 2408 2409, 2424, 2454	K40120106	" 16WV	10 μF		
C2446	K40120476	" "	47 μF		
C2403	K40120107	" "	100 μF		
C2413	K40120227	" "	220 μF		

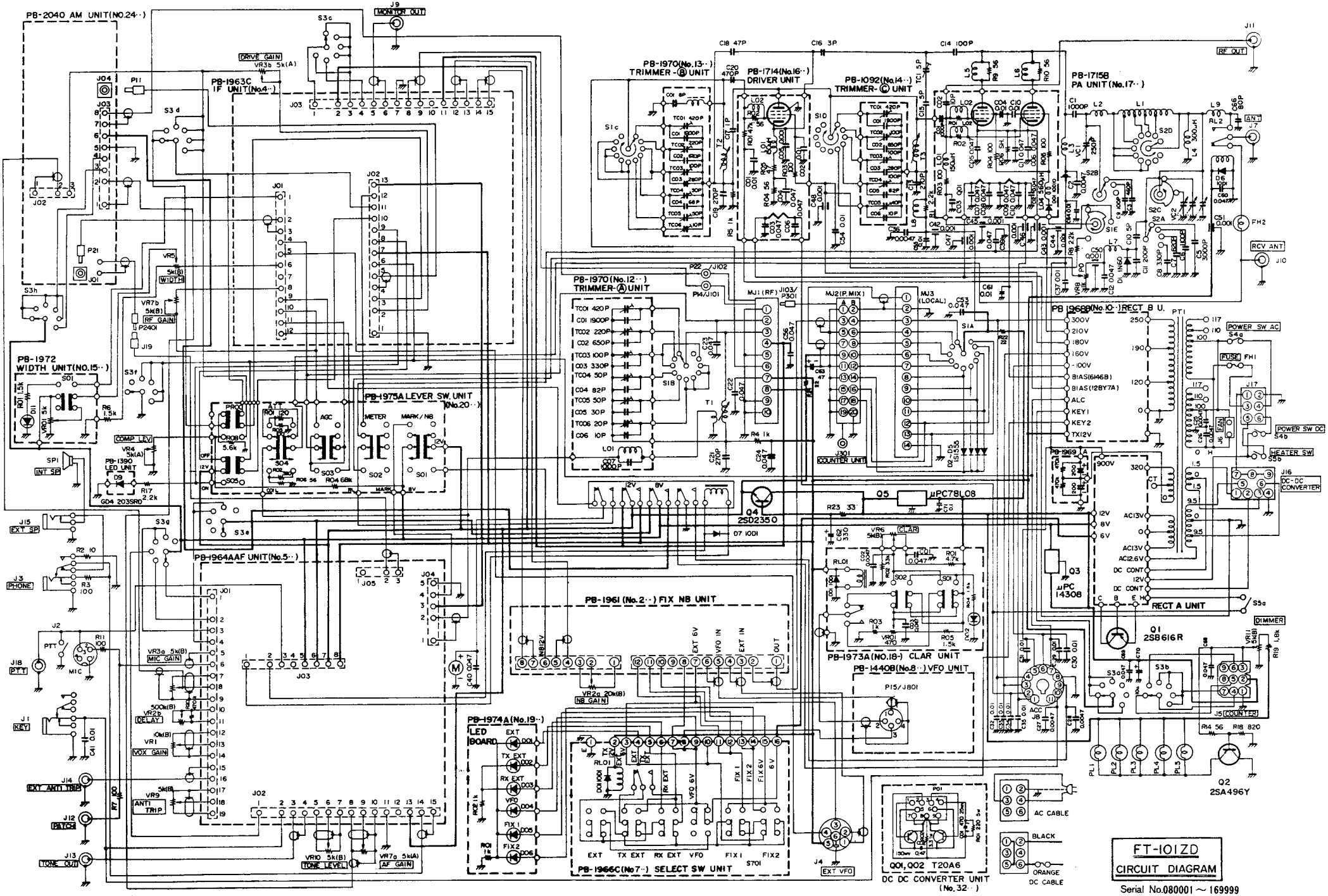
		TRIMMER CAPACITOR
TC2402	K91000012	ECV1ZW 10 x 32 10 pF
TC2401	K91000013	" 20 x 32 20 pF
		INDUCTOR
L2401, 2403	L1190016	FL5H-101K 100 μH
L2402	L1190017	FL5H-102K 1 mH
L2404	L1190038	FL5H-271K 270 μH
		TRANSFORMER
T2401	L0020141	R12-4171
		CONNECTOR
J2401, 2404	P1090016	SQ3056
J2402	P0090041	5048-03A
J2403	P0090037	5048-08A
P2401	P0090075	P-7015
	Q5000011	Wrapping terminal C
	B4025945B	P.C.B. support D

FM UNIT (OPTION)

Symbol No.	Part No.	Description
	C0022180	P.C.B. with components
PB-2218	F0002218	Printed Circuit Board
		IC, FET & TRANSISTOR
Q2506	G1090072	IC μPC577H
Q2501	G3801250	FET 2SK125
Q2516	G4800510C	" 3SK51-03
Q2517	G3107330Q	TR 2SA733Q
Q2503	G3305350B	" 2SC535B
Q2502, 2504, 2505, 2507–2515, 2518	G3309450Q	" 2SC945Q
		DIODE
D2503–2506	G2001880F	Ge 1S188FM
D2507	G2015550	Si 1S1555
D2508, 2509, 2512–2515	G2090027	" 1SS53
D2511	G2090210	Varactor FC63-4
D2510	G9090005	Varistor MV13
D2516	G2090035	Zener RD6.8EB3

		CRYSTAL
X2501	H0100431A	HC-18/U 8532.5 kHz
X2502	H0100440A	" 8988.3 kHz
		CRYSTAL FILTER
XF2501	H1100470	8.9M20A
		CERAMIC FILTER
CF2501	H3900200	CFW455E
CF2502	H3900030	LF-B15
		CERAMIC DISCRIMINATOR
CD2501	H7900040	SFD455-S4
		THERMISTOR
TH2501	G9090001	SDT-250
TH2502	G9090003	D-33A
		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
R2554, 2564	J00245221	" " " " 220 Ω
R2557	J01245221	" " " TJ 220 Ω
R2563	J00245471	" " " VJ 470 Ω
R2549, 2568	J00245561	" " " " 560 Ω
R2507	J00245681	" " " " 680 Ω
R2515, 2546, 2555, 2573, 2577, 2581, 2583, 2586	J00245102	" " " " 1 kΩ
R2539, 2576, 2578	J01245102	" " " TJ 1 kΩ
R2534, 2540	J00245152	" " " VJ 1.5 kΩ
R2542	J00245182	" " " " 1.8 kΩ
R2516, 2517, 2519, 2521, 2522, 2524, 2532	J00245222	" " " " 2.2 kΩ
R2550, 2579	J00245272	" " " " 2.7 kΩ
R2530, 2541, 2544	J00245332	" " " " 3.3 kΩ
R2580	J00245392	" " " " 3.9 kΩ
R2514, 1582	J00245472	" " " " 4.7 kΩ
R2504, 2525, 2526, 2533, 2543, 2560	J00245562	Carbon film 1/4W VJ 5.6 kΩ
R2505	J00245822	" " " " 8.2 kΩ
R2536, 2545, 2551, 2553, 2567	J00245103	" " " " 10 kΩ
R2572	J00245183	" " " " 18 kΩ
R2513, 2527, 2558, 2561	J00245223	" " " " 22 kΩ
R2559	J00245273	" " " " 27 kΩ
R2566	J00245333	" " " " 33 kΩ
R2506, 2538, 2562	J00245473	" " " " 47 kΩ
R2535, 2571	J00245563	" " " " 56 kΩ
R2501, 2552, 2570, 2587	J00245104	" " " " 100 kΩ
R2537, 2556	J00245124	" " " " 120 kΩ
R2518, 2520, 2529, 2531, 2585	J00245154	" " " " 150 kΩ
R2547	J00245274	" " " " 270 kΩ
		POTENTIOMETER
VR2503	J51721102	EVL-S3A A00B13 1 kΩB
VR2501,2502	J51721103	EVL-S3A A00B14 10 kΩB
	J51721503	EVL-S3A A00B54 50 kΩB
		CAPACITOR
C2506	K02179004	Ceramic 50WV CH 3 pF (DD104CH030J50V02)
C2556	K00175150	Ceramic 50WV SL 15 pF (DD104SL150J50V02)
C2504	K02179011	Ceramic 50WV CH 27 pF (DD104CH270JJ50V02)
C2559	K00175330	Ceramic 50WV SL 33 pF (DD104SL330J50V02)
C2529	K00175470	Ceramic 50WV SL 47 pF (DD104SL470J50V02)
C2551, 2553, 2554	K06175101	Ceramic 50WV UJ 100 pF (DD106UJ101J50V02)
C2550	K06175121	Ceramic 50WV UJ 120 pF (ECC-D1H121UJ2)
C2507, 2508	K02175151	Ceramic 50WV UJ 150 pF (DD109CH151J50V02)
C2503, 2537, 2552, 2564–2566	K13170102	Ceramic 50WV 0.001 μF (DB201YF102Z5L2)
C2501, 2505, 2555, 2557, 2560–2563, 2569, 2571, 2572, 2573	K13170103	Ceramic 50WV 0.01 μF (DB201ZF103Z5L5)
C2502, 2512, 2558, 2574	K13170473	Ceramic 50WV 0.047 μF (DB207YF473Z5L5)

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 μF (50F2U102M)
	K50177152	Mylar 50 WV 0.0015 μF (50F2U102M)
C2531	K50177103	Mylar 50WV 0.01 μF (50F2U103M)
C2523–2525, 2535, 2538	K50177223	Mylar 50WV 0.022 μF (50F2U223M)
C2527, 2528	K50177333	Mylar 50WV 0.033 μF (50F2U333M)
C2516, 2518–2521, 2547, 2570	K50177473	Mylar 50WV 0.047 μF
C2536, 2549	K40170105	Electrolytic 50WV 1 μF (50RL105)
C2526	K40140475	Electrolytic 25WV 4.7 μF (25RL475)
C2532, 2533, 2540, 2541, 2543, 2544, 2546, 2567	K40120106	Electrolytic 16WV 10 μF (16RL106)
C2534, 2542	K40129002	Electrolytic 16WV 47 μF (16RE476)
C2568	K40120107	Electrolytic 16WV 100 μF (16RL107)
C2545	K40109001	Electrolytic 16WV 100 μF (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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PB-1714(No.16··) DRIVER UNIT
PB-1092(No.14··) TRIMMER-Ⓒ UNIT
PB-17158 PA UNIT(No.17··)
PB-1970(No.12··) TRIMMER-Ⓐ UNIT
PB-1972 WIDTH UNIT(NO.15··)
PB-1975A LEVER SW. UNIT (No.20··)
PB-1968(No.10··) RECT. B U.
PB-1964AAF UNIT(No.5··)
PB-1961 (No.2··) FIX NB UNIT
PB-1973A(NO.18··) CLAR UNIT
PB-14408(No.8··) VFO UNIT
PB-1974A(No.19··) LED BOARD
PB-1966C(No7··) SELECT SW UNIT
PB-1969 RECT A UNIT
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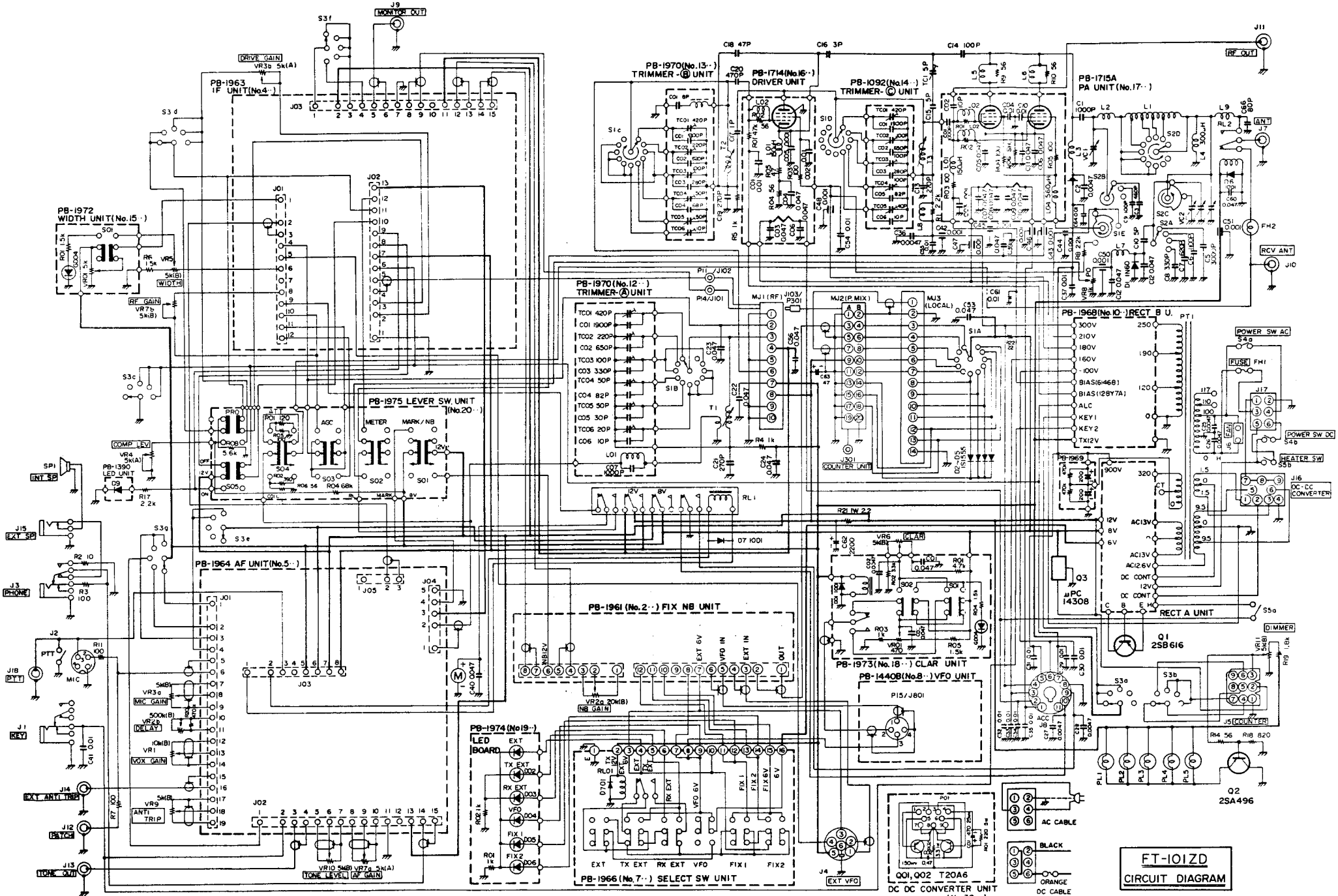
FT-101ZD
CIRCUIT DIAGRAM
Serial No.080001 ~ 169999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PB-1092(No.14··) TRIMMER-Ⓒ UNIT
PB-1715A PA UNIT(No.17··)
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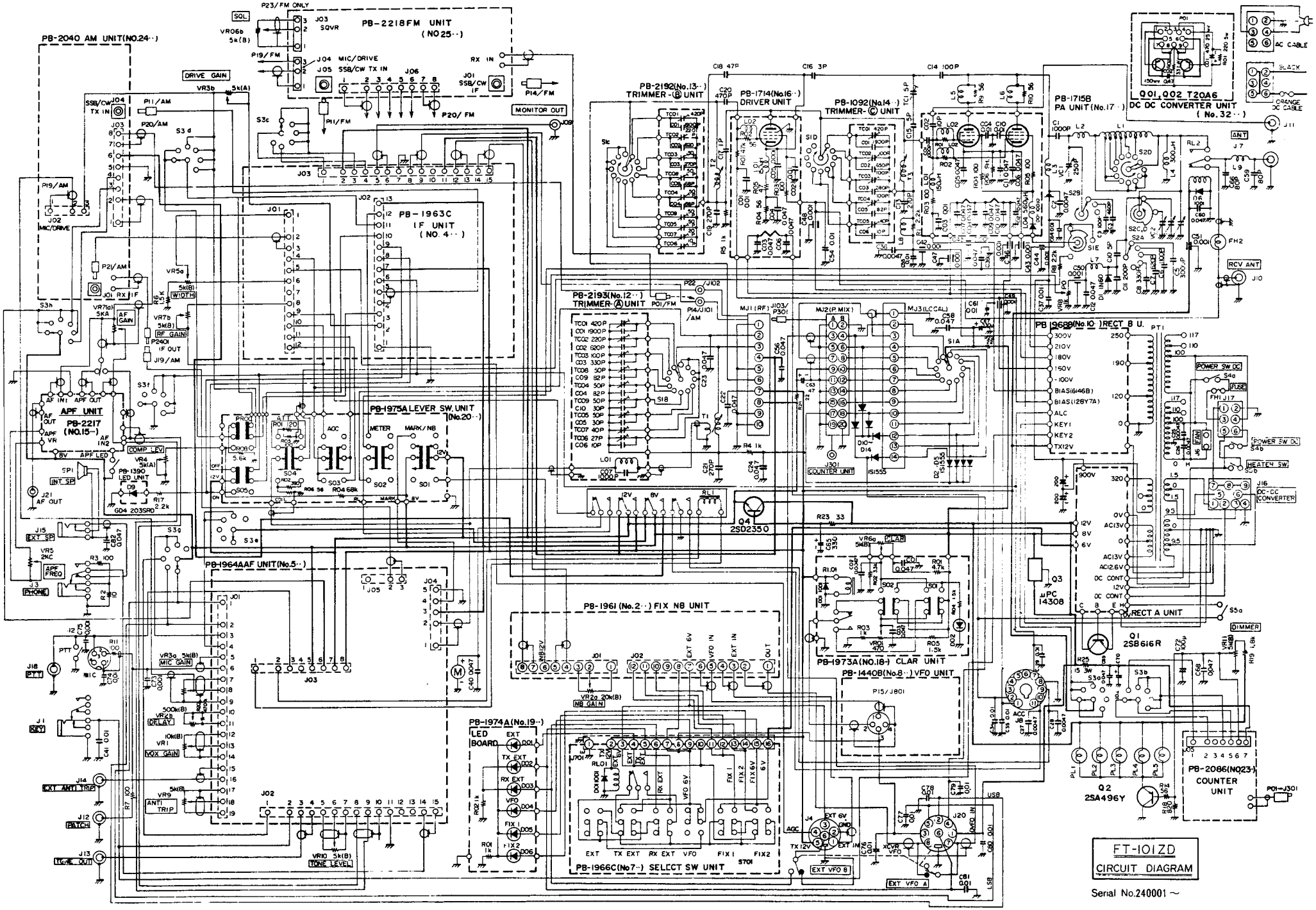
PB-1964 AF UNIT(No.5··)
PB-1961 (No.2··) FIX NB UNIT
PB-1973(No.18··) CLAR UNIT
PB-1440B(No.8··) VFO UNIT
PB-1974(No19··) LED BOARD
PB-1966 (No.7··) SELECT SW UNIT
PB-1969
RECT A UNIT
DC DC CONVERTER UNIT (No.32··)
Q01,Q02 T20A6
Q1 2SB616
Q2 2SA496
Q3 μPC 14308
FT-101ZD
CIRCUIT DIAGRAM
Serial No. 010001~079999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PB-1092(No.14··) TRIMMER-(C) UNIT
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APF UNIT PB-2217 (NO.15··)
PB-1964AAF UNIT(No.5··)
PB-1961 (No.2··) FIX NB UNIT
PB-1973A(NO.18··) CLAR UNIT
PB-1440B(No.8··) VFO UNIT
PB-1974A(No.19··) LED BOARD
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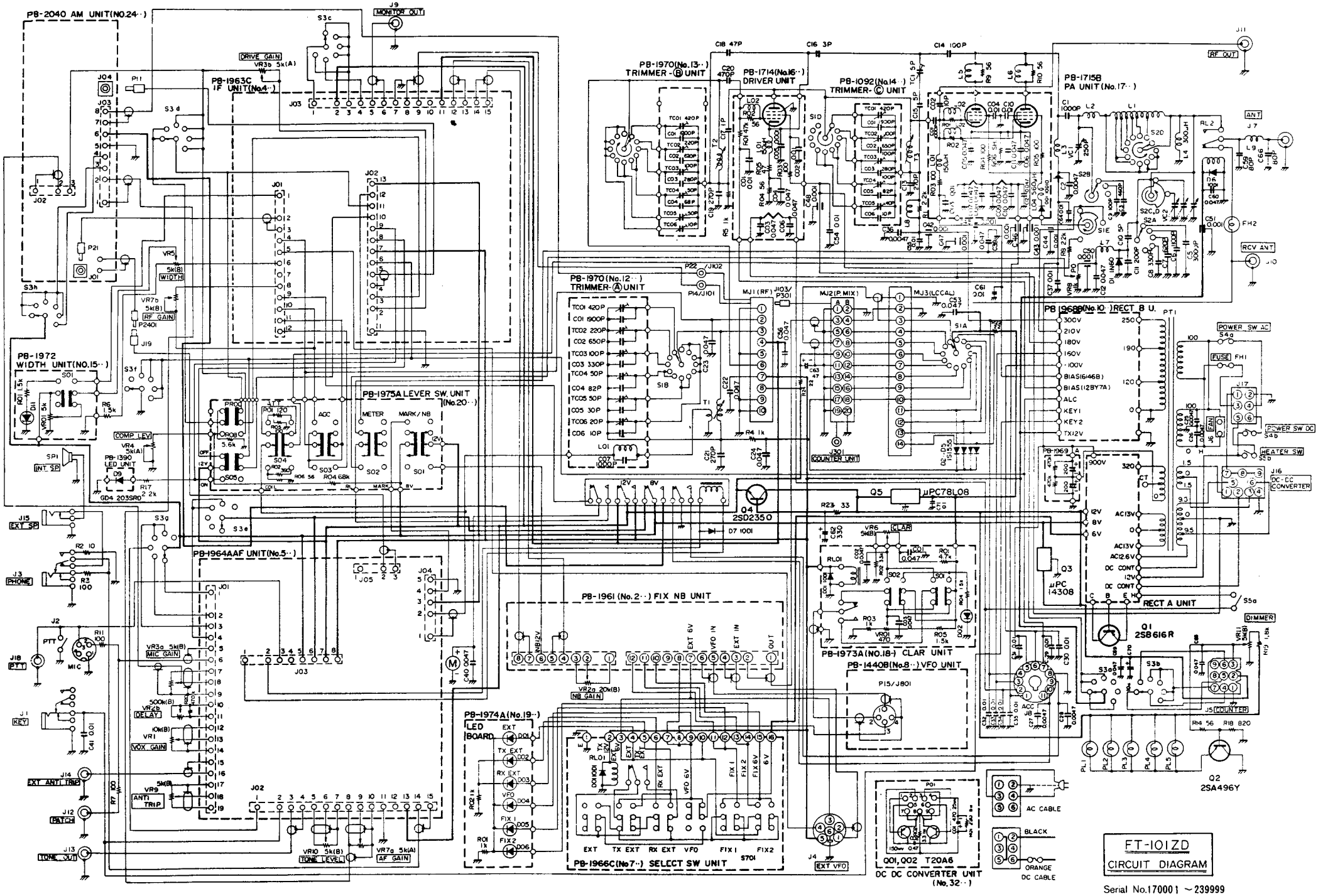
Serial No.240001 ~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PB-1390 LED UNIT
PB-1970(No.13··) TRIMMER-Ⓑ UNIT
PB-1714(No.16··) DRIVER UNIT
PB-1092(No.14··) TRIMMER-Ⓒ UNIT
PB-1715B PA UNIT(No.17··)
PB-1970(No.12··) TRIMMER-Ⓐ UNIT
PB-1968(No.10··)RECT B U.
RECT A UNIT
PB-1961 (No.2··) FIX NB UNIT
PB-1973A(NO.18··) CLAR UNIT
PB-1440B(No.8··) VFO UNIT
PB-1974A(No.19··) LED BOARD
PB-1966C(No7··) SELECT SW UNIT
Q01,Q02 T20A6 DC DC CONVERTER UNIT (No.32··)
COUNTER UNIT
DRIVE GAIN
MONITOR OUT
RF GAIN
WIDTH
COMP LEV
INT SP
EXT SP
PHONE
PTT
MIC
MIC GAIN
DELAY
VOX GAIN
KEY
EXT ANTI TRIP
PATCH
TONE OUT
ANTI TRIP
TONE LEVEL
AF GAIN
NB GAIN
CLAR
DIMMER
RF OUT
ANT
RCV ANT
POWER SW AC
POWER SW DC
HEATER SW
FUSE
DC-DC CONVERTER
AC CABLE
DC CABLE
BLACK
ORANGE
EXT VFO
Q1 2SB616R
Q2 2SA496Y
Q3 μPC 14308
Q4 2SD2350
Q5 μPC78L08
D7 1001
GD4 203SR0
FT-101ZD
CIRCUIT DIAGRAM
Serial No.170001 ~239999