ATLAS WARRANTY

THE ATLAS 350-XL IS GUARANTEED UNDER THE FOLLOWING SCHEDULE:

(1) All components are guaranteed for one (1) year from date of original purchase.

(2) Workmanship is guaranteed unconditionally for one (1) year from date of original purchase.

(3) If factory service is required within 30 days Atlas will pay surface freight both ways. After 30 days customer pays shipping cost to the factory, and Atlas pays return freight. After 1 year, customer pays both ways, plus a nominal service charge.

(4) This warranty will be transferred to owners other than original purchaser, provided the new owner advises Atlas Radio in writing of his name, address, and date of purchase.

UNDER THE REGULATIONS OF THE MAGNUSON-MOSS WARRANTY ACT, THE ATLAS WARRANTY POLICY IS CLASSIFIED AS A LIMITED WARRANTY.

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ATLAS 350-XL

OPERATION AND MAINTENANCE MANUAL

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I. ATLAS 350-XL
GENERAL INFORMATION

A. INTRODUCTION

Atlas Transceivers are designed for single sideband and CW communications in the 10, 15, 20, 40, 80 and 160 meter amateur radio bands. The conservative power rating will provide world wide communications from fixed, portable, or mobile installations.

Our first product, the Model 180, was introduced in January 1974. This all solid state SSB transceiver covered the 20, 40, 80, and 160 meter bands, ran 180 watts input, was only 3½″ high by 9½″ wide, and 9½″ deep, and weighed only 7 pounds. Its state-of-the-art design was taken directly from the AN/URC-87 Military manpack, designed by the solid state genius, Les Earnshaw.

The Model 180 evolved into the 210 which covered 10 through 80 meters, and the 215 which covered 15 through 160 meters. These subsequently evolved into the current Model 210x and 215x.

From the basic design of the 210x/215x has evolved the new Atlas 350-XL. It has deluxe features and superior performance found in no other HF transceiver on the market. The no compromise design of the 350-XL along with continued value engineering will make the 350-XL the trend setter in amateur radio for years to come. The high performance and reliability of Atlas transceivers is enhanced by the finest craftmanship, and a most thorough quality control program.

Last, but not least, is our customer service department. When needed, it is dedicated to making every Atlas owner a satisfied customer.

ATLAS
RADIO INC.

B. SPECIFICATIONS

GENERAL

Standard Frequency Coverage: (Crystals supplied as standard)	Amateur Band Coverage:
1500 - 2000 KHz	1800 - 2000
3500 - 4000 KHz	3500 - 4000
7000 - 7500 KHz	7000 - 7300
14000 - 14500 KHz	14000 - 14350
21000 - 21500 KHz	21000 - 21450
28000 - 28500 KHz	28000 - 28500
28500 - 29000 KHz	28500 - 29000
29000 - 29500 KHz	29000 - 29500
29500 - 30000 KHz	29500 - 29700

Optional Frequency Coverage: Up to 10 auxiliary crystals may be installed for operation in any other 500 KHz segment between 2.0 and 23 MHz (Operation between 5 and 6 MHz not recommended due to I.F. at 5595 KHz).

Primary Tuneable Frequency Control: Highly stable primary oscillator operation in a fixed 500 KHz range with less than 500 Hz drift during first 30 minutes and less than 100 Hz per hour thereafter. Less than 50 Hz shift with supply line variations from 11 to 16 volts.

Auxiliary Frequency Control: On the upper right-hand corner of the 350-XL is provision for a plug-in auxiliary oscillator. This may be a tuneable VFO (Model 305) or a crystal controlled, fixed channel oscillator (Model 311). With the 305 VFO you have a second tuneable VFO for tuning to a separate transmit or receive frequency, covering the same 500 KHz range as the primary tuning.

The Model 311 crystal oscillator permits transmit, receive or transceive on crystal controlled channels. There are 12 crystal sockets available. This accessory is ideal for MARS or network operation.

The selector switch located at the upper left next to the auxiliary oscillator determines the frequency control mode.

Primary Tuning, Frequency Readout: Zero to 500 KHz on a rotary, illuminated dial scale with 5 KHz increments. Dual ratio tuning provides 180 KHz per revolution fast tune, and 18 KHz per revolution slow tune.

Optional Digital Frequency Display: Dot Matrix L.E.D.'s provide direct 6 digit reading to within 50 Hz. Digital readout also functions as frequency counter with switch and input connector on back of transceiver. Digital display may be switched off when desired.

Modes of Operation: Single sideband voice transmission and reception with choice of upper or lower sideband. Push-to-talk or VOX operation. Also CW operation with full break-in operation. (Semi-break-in when using a linear amplifier.) RTTY (AFSK) and SSTV at reduced power.

Circuit Design: All solid state, 9 IC's, 47 transistors, and 54 diodes. Single conversion, 5595 KHz I.F.

Modular Construction: Plug-in PC boards for R.F., I.F., and Audio circuits.

Plug-In Design: For mobile operation a bracket assembly, Model DMK-XL, is available which permits instant plug-in or removal of the transceiver from the vehicle.

Power Requirements: 12-14 volts D.C. negative ground only. Terminal P1 is high current circuit for power amplifier, requiring 32 amps peak in transmit mode. Terminal P2 is low current circuit for receiver and low level stages, draws 0.3 to 0.6 amps in receive and transmit modes. (Digital Dial will draw an additional 0.7-0.8 amps for a total of 1 to 1.4 amps.)

Finish: Black vinyl covered aluminum cabinet, anodized aluminum panel.

Dimensions: 12½ inches (32 cm) wide, 5¼ inches (14 cm) high, (plus 1½ inches for rubber feet), 16 inches (41 cm) deep (including knobs and rear extensions).

Weight: Net weight, 18 lbs (8.2 kg); Shipping weight, 22 lbs, (10 kg).

RECEIVER

Circuit Design: Single Conversion to 5595 KHz I.F. using double balance diode ring mixer. Blocking requires a signal at least −20 dBm, or 115 db above noise floor. Third order intercept better than Ø dBm.

Sensitivity: Noise floor less than −135 dBm, which provides 10 db signal-plus-noise to noise ratio with less than 0.4 microvolts input.

Image Rejection: Down more than 60 db. Local oscillator is 5595 KHz above the signal frequency on all bands.

Internal Spurious: Less than equivalent 2 microvolt signal in amateur bands.

Automatic Gain Control: Audio output is constant within 6 db with signal input from 5 microvolts to more than 3 volts.

Overall Gain: 1 microvolt signal input provides more than ½ watt audio output (CW carrier with 100 Hz heterodyne).

Audio Output: 6 watts at 10% distortion, 300 to 3000 Hz, plus or minus 3 db.

Internal Speaker: 3 inch diameter, 4 ohm 0.68 oz. magnet, rear jack permits plug-in of larger speaker in AC power supply cabinet.

Meter: Reads "S" units from 1 to 9 and plus 10 to 50 db.

TRANSMITTER

Circuit Design: Broadband design eliminates transmitter tuning. Only the PRESELECT control requires peaking. Single conversion produces minimum spurious products. Two section low pass output filters provide high harmonic and TVI suppression. Includes ALC and infinite SWR protection.

Power Rating: 1.8 to 23 MHz; 350 watts P.E.P. input and CW input, 28 to 30 MHz; 250 watts P.E.P. input and CW input. (50 ohm nonreactive load, 14 volt, D.C. supply).

Power Output: 1.8 to 23 MHz; 160 watts minimum, 28 to 30 MHz; 100 watts minimum. RTTY-SSTV power rating: Approximately 180 watts input, depending on heat sink ventilation.

Spurious Suppression: Unwanted sideband better than 60 db at 1000 Hz audio input. Carrier down more than 50 db. Third order distortion approximately 30 db down. Harmonic output and other spurious output signals are more than 50 db below peak input.

CW Transmit: Full-break-in operation (Semi-break-in operation when transceiver is used with linear amplifiers not capable of Full-break-in operation). Automatic frequency offset moves transmit frequency 800 Hz lower in frequency. Sidetone included, with adjustment for pitch and volume as required.

Transmit Control: Manual transmit with panel switch. PTT (Press-to-talk) with MIC button or VOX (Voice operated transmit).

Microphone: Dynamic or crystal, high impedance. Requires ¼ inch diameter 3 circuit plug. Plug is supplied with transceiver, but microphone is not.

Audio Fidelity: 300 to 3000 Hz, plus or minus 3 db.

Meter: Reads P.A. collector current, 0 to 32 amps, or reflected voltage from built-in SWR bridge.

MODEL 350-PS POWER SUPPLY

Input Voltage: 100 to 130 or 200 to 260 volts AC, 50-60 Hz. (Changing fuses selects voltage range.)

Input Power: 10 watts average receive (20 watts with Digital Dial). 400 watts transmit peak at 32 amps.

Output Voltage and Current: 14 volts regulated at 32 amps.

Speaker: 3 × 5 inches oval, 1.1 oz magnet, 3.2 ohm voice coil.

Accessories: Space provided for installation of accessories such as Digital clock/Phone patch, CW keyer and Speech processor.

Finish: Black vinyl covered aluminum cabinet, anodized aluminum panel.

Dimensions: 12½ inches (32 cm) wide, 5¼ inches (14 cm) high, (plus 1½ inches for rubber feet), 16 inches (41 cm) deep (including knobs and rear extensions).

Weight: Net weight, 25 lbs (11.4 kg); Shipping weight 28 lbs (12.8 kg).

II. INSTALLATION

A. FIXED

1. MODEL 350-PS AC POWER SUPPLY.

The 350-XL is designed to operate on a power source of 14 volts D.C. D.C. power can be delivered to the transceiver via the matching AC supply Model 350-PS which provides the 14 volts filtered and regulated for both low current and high current circuits of the 350-XL. A built-in voltage sensing circuit allows for a constant 14 volt power source to the 350-XL. The power supply is fused for 100 to 130 volt operation from the factory, but by removing the bottom cover and changing fuse locations, input will be 200 to 260 volts. Supply line frequency may be 50 or 60 cycles. The D.C. power cable plugs directly into the rear panel of the 350-XL.

By plugging the phone plug into the SPKR jack on the rear of the 350-XL, the front facing 3″ × 5″ speaker of the 350-PS automatically switches in place of the smaller speaker built into the 350-XL.

A tip jack on the rear of the 350-PS allows for other accessory use of +14VDC. Current drain of accessories using this feature should be limited to 3-5 amperes. A phone jack on the front panel allows for high impedance headphone use. 2000 ohm phone are recommended. If lower resistance phones are used, a 1 watt resistor should be connected in series at the headphone plug to make the total resistance approx. 2000 ohms.

B. MOBILE

For mobile or portable operation D.C. power can be delivered to the transceiver via the Plug-In Mounting Kit (DMK-XL). This kit includes all brackets, D.C. cable, and circuit breaker. If the plug-in kit is not used, the Model DCC-XL cable kit is recommended.

1. DELUXE MOUNTING KIT (DMK-XL).

The Deluxe Mobile Mounting Kit is a plug-in unit designed for easy plug-in/removal of the 350-XL transceiver. All DC power connections are made to the DMK-XL and all necessary hook-up cables, including the DC battery cable with circuit breaker and hardware are part of the kit. (See Section 6 for installation instructions.)

2. D.C. CABLE (DCC-XL).

The D.C. Cable is designed for use with portable battery operation or for mobile operation when the DMK-XL is not used. Included with the cable is a circuit breaker and all necessary hardware. A polarity protection diode and fuse is included in the 350-XL transceiver.

a. DC Cable Installation

For mobile installation the power cable should be run from the transceiver through the bulkhead into the engine compartment. It should then be connected to positive and negative terminals as close to the battery as possible. The best way to connect directly to the battery terminal posts is by drilling and tapping for a 10-32 or 10-24 machine screw. The red lead goes to the positive terminal, and brown to negative. (If the DC cable has white and black colored wire, the white is positive and black is negative.)

The advantage of connecting directly to the battery posts is that loose battery clamps will then not affect the transceiver connections, and the danger of intermittant voltage spikes is reduced.

If drilling and tapping the battery posts is not practical, then connect the leads to the engine end of the heavy battery cables. The negative cable will usually be found going to a grounding bolt on the engine block, and the positive cable usually goes to a bolt on the starter solenoid. Use proper terminal lugs at these points for connecting the leads.

The 40 ampere circuit breaker supplied with the kit (or an equivalent fuse) must be installed in series with the positive lead. It is best to mount it close to the battery end of the cable, at some convenient place on the side of a metal panel or bracket. Sheet metal screws are supplied for this purpose. It is not important that the metal case of the circuit breaker be grounded, since there are no connections made to the case. Cut the positive red power lead, install No. 10 terminal lugs, and secure firmly to the circuit breaker with washers and nuts. Solder the terminal lugs.

b. Other DC Installations

In the event that you have not purchased the DMK or DCC kits, your transceiver comes with two banana jacks for the positive battery lead, and are to be connected in parallel as shown in Figure 2.1. The banana plug connects to the negative battery lead. The battery leads should be of No. 8 or No. 10 gauge stranded wire of the automotive type. A 40 amp. fuse or circuit breaker should be installed in the positive lead. Figure 2.1 also illustrates the proper connections required between the battery and the Atlas transceiver. Caution. Be absolutely certain to observe correct polarity. Wrong polarity will destroy transistors and void the warranty.

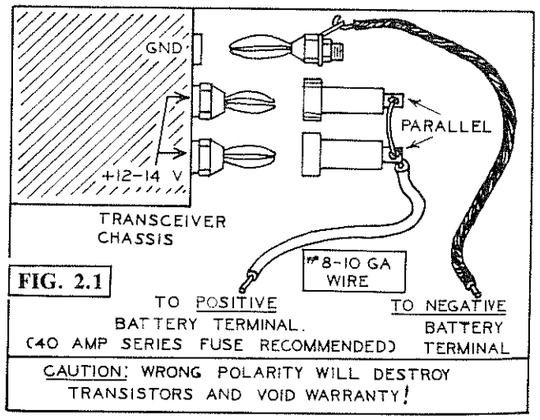


FIG. 2.1

3. AUTOMOTIVE D.C. ELECTRICAL SYSTEMS

The D.C. electrical systems in automobiles may at times generate high voltage transients (spikes of voltage super-imposed on the 12-14 volt D.C. system). These transients may be caused by faulty brushes in the starter motor, alternator or generator, or loose wiring, and can represent a possible hazard to the semiconductors in the transceiver. For this reason, we strongly urge that you read the following notes and follow them carefully.

(a) Clean the battery terminals and clamps, and tighten the clamps securely.

(b) Tighten battery cable terminals where they attach to the engine.

(c) Inspect battery cables and terminals for corrosion or wear. Replace them if they look questionable.

(d) Check battery condition frequently, especially when it approaches its warranty age limit. Use a protective silicone grease on the terminals to inhibit corrosion.

(e) Check the alternator and regulator connections for tightness. Check primary ignition wiring, horn wiring, lights, etc.

(f) Measure the charging voltage from the alternator with the engine running at about twice idling speed. Voltage at the battery terminals should measure 13 volts minimum, 14.5 volts maximum. Consult your auto-electric service shop if correction is required.

4. AUTOMOTIVE NOISE SUPPRESSION

The subject of noise suppressing automotive ignition and alternator noise is beyond the scope of this manual, so it will only be mentioned briefly. Many cars will create very little interference in the HF bands covered by the Atlas transceiver. Almost all cars now use resistance type ignition wire, and will probably create very little ignition noise. More likely the high pitched whine from the alternator will cause more trouble. Refer to the various amateur radio handbooks available from your dealer for information on noise suppression. It will usually be found in the mobile chapters.

Estes Engineering Co., 930 Marine Drive, Port Angeles, WA 98362, manufactures an excellent line of suppression kits which can help cure the more stubborn cases. It is quite likely that your dealer also sells the Estes Engineering line.

C. ANTENNAS

1. FIXED

On 10, 15, and 20 meters a doublet and many beam antennas will match quite well across the entire band. On 40 meters a doublet tuned for phone band center will match quite well across the band. On 75 meters, the typical doublet will have a bandswitch of about 100 KHz for SWR of 1.5 or less. On 160 meters an antenna tuner or at least some kind of matching system will be essential, since even at resonance it is unlikely that the feedpoint will be near 52 ohms. Random length antennas will also require some kind of matching system.

2. MOBILE

The mobile antenna generally requires more critical adjustment than the home station antenna. This is because it operates over a more narrow bandwidth, and must therefore be adjusted very accurately for resonance. Also, the base impedance is seldom very close to 52 ohms. With the tube type transmitters the Pi matching network will adjust to fairly low impedances, but with a broadband solid state transmitter, such as is used in the Atlas transceivers, a close impedance match is necessary in order to operate at full power. Various claims about impedance are made by manufacturers of mobile antennas, but unfortunately our tests on all the most popular brands indicate that your chances of coming up with a close match are less than 1 in 10. Average base impedance is 18 to 23 ohms. Therefore, some method of transforming the antenna base impedance to 52 ohms is required. (See Section 6 for Model MT-1 Broadband Transformer.)

3. TRANSMISSION LINE MATCH

Proper impedance match between the coaxial feedline and the antenna system is much more important with the broadband solid state amplifier than with tube type transmitters. The SWR should be as low as possible in order to permit full power operation. As SWR increases, power output from the Atlas transceiver decreases approximately as indicated by the following table.

SWR	APPROXIMATE OUTPUT
1.0	200 Watts
1.1	196 Watts
1.2	190 Watts
1.3	180 Watts
1.5	160 Watts
2.0	100 Watts
3.0	40 Watts

High SWR will not damage the Atlas transceiver. You may feel free to operate regardless of the SWR. Only power input and output will suffer. Reflected voltage will not cause damage as the Atlas transceiver has a built-in reflectometer which automatically reduces transmitter drive as SWR increases. This makes the power transistors nearly immune to damage from mismatched loads.

4. ANTENNA TUNER

An antenna tuner can be a very useful device to compensate for antenna mismatch. Older tube type transmitters usually have some type of a Pi-network tuning system that will appear to compensate for mismatched antennas. Today's solid state broadbanded transmitters require a 50 ohm impedance match with the antennas, and if it is not feasible to "TUNE" the antenna to this impedance, an antenna tuner is recommended. Refer to antenna handbooks for information, or ask your dealer about antenna tuners now on the market.

III. OPERATION

A. FRONT PANEL CONTROLS

(refer to FIG. 3.1)

1. **Power On:** When using the 350-PS for power, both 350-XL and 350-PS power switches must be on. When using the DC Cable or DMK-XL for power, the 350-XL panel switch must be on. Both low and high current circuits of the DC supply are connected to the switch. On later model 350-XL's the Power On switch is part of the "TX DRIVE" control. Only the low current circuits are now connected to the switch. High current circuits are run directly to the Power Amplifier.

2. **A.F. Gain:** Controls audio volume in receive.

3. **R.F. Gain:** Concentric with A.F. Gain control. Controls sensitivity of the between speech noise level. Full R.F. Gain provides maximum noise level. The AGC system in the Atlas transceiver has a tremendous dynamic signal range. With full R.F. Gain, sensitivity will automatically return to maximum in the absence of a signal, accompanied by a natural increase in backward noise.
You may find it annoying to hear the noise level increase every time the person being received pauses between words or sentences. There are really only two conditions when the R.F. Gain control needs to be on full. One is when you are scanning the band and want to hear weak as well as strong signals. But, a lot of the time you can turn the R.F. Gain down a bit, increase the A.F. Gain correspondingly, and realize more pleasing reception.

4. **Band Selector:** Numbers read in Megahertz for the respective bands: 1.5 for 160 meters, 3.5 for 80 meters, 7 for 40 meters, 14 for 20 meters, 21 for 15 meters, and 28 for the first 500 KHz of 10 meters. Balance of the 10 meter band is covered in three steps with the "Auxiliary Range" control. When using any of these additional 10 meter ranges, bandswitch must be in 28 MHz position. CAUTION: Don't forget to switch AUX. RANGE control back to "N" position when changing to lower frequency bands.

5. **Main Tuning Knob:** Dual ratio tuning provides 180 KHz per revolution fast tune, and 18 KHz per revolution slow tune for precise tuning of SSB and CWsignals.

6. **Tuning Dial:** Illuminated analog 0 to 500 KHz rotary dial with 5 KHz increments. Dial reads directly in KHz on the 7, 14, 21, and 28 MHz bands. Dial reading is additive on the 1.5, 3.5, 28.5-29.0, and 29.5-30.0 MHz bands.

7. **Digital Dial:** Model DD6-XL (Optional): Dot Matrix L.E.D.'s provide direct 6 digit reading in KHz. Last digit is in tenths of KHz, providing accurate frequency readout to within 50 Hz. (See Section 6.)

8. **Preselect:** Control permits peaking of both receiver and transmitter tuned circuits simultaneously. Control is made necessary by the 350-XL's extended frequency coverage capability. Panel markings indicate approximate settings for each amateur band. (See AUX. RANGE operation section for approximate PRESELECT settings when extended frequency coverage is used.)

9. **Dial Set:** Concentric with R.I.T. control. When used in conjunction with the 25KHz calibrator, provides for setting dial scale to exact calibration. The black set screw indicates its position.

10, 11. **R.I.T.:** Receiver Incremental Tuning control tunes the receiver independently of the transmitter up to 5 KHz above or below the transmitting frequency without disturbing the transmit frequency. Panel switch engages circuit and Red L.E.D. (White Lens) will light. Tuning control is the black knob that is concentric with the aluminum Dial Set knob.
R.I.T. is quite useful when working DX where the DX station is working stations slightly off his frequency or when operating nets and all stations arenot on the same exact frequency. Remember to turn R.I.T. off if you want to transmit on the same frequency to which you are listening.

12. **Filters:** Three filters are provided. Upper Side Band, Lower Side Band, and CW. For normal SSB operation on 1.5, 3.5, and 7 MHz, the lower sideband position will be used. For opposite sideband operation on these bands, it will be necessary to switch to the Upper sideband position. For normal SSB operation on 14, 21, and 28 MHz, the upper sideband position will be used. For opposite sideband operation on these bands, it will be necessary to switch to the lower sideband position. For narrow band CW reception, the CW position should be used. This 500 Hz filter is on the lower sideband. When transmitting in CW mode, the carrier frequency automatically shifts 800 Hz lower into the CW filter passband.

13. **ANL:** Automatic Noise Limiter. Reduces hash type and "steady-going" noise.

14. **NB:** Noise Blanker. Designed primarily to blank out pulse type noise. Pulse type noises, such as ignition noise will be effectively silenced. More continuous type noise signals will not be silenced or reduced as much.

15. **MIC Gain:** Modulation level is adjusted with the MIC Gain control. When the transceiver is coupled into a proper 52 ohm load, voice peaks will be reaching about 24-32 amps , although the ammeter cannot respond quickly enough to show these peaks. Adjust MIC Gain for average readings of 12-14 amps. If power output readings are somewhat less than 24-28 amps, adjust MIC Gain control for average ammeter readings of approximately 50% of power output reading. For example, if maximum power on 28 MHz reads 20 amps on ammeter, adjust MIC Gain for an average reading of 10 amps. Do not run the gain above this level, or you will flat-top and distort the transmitted audio, as well

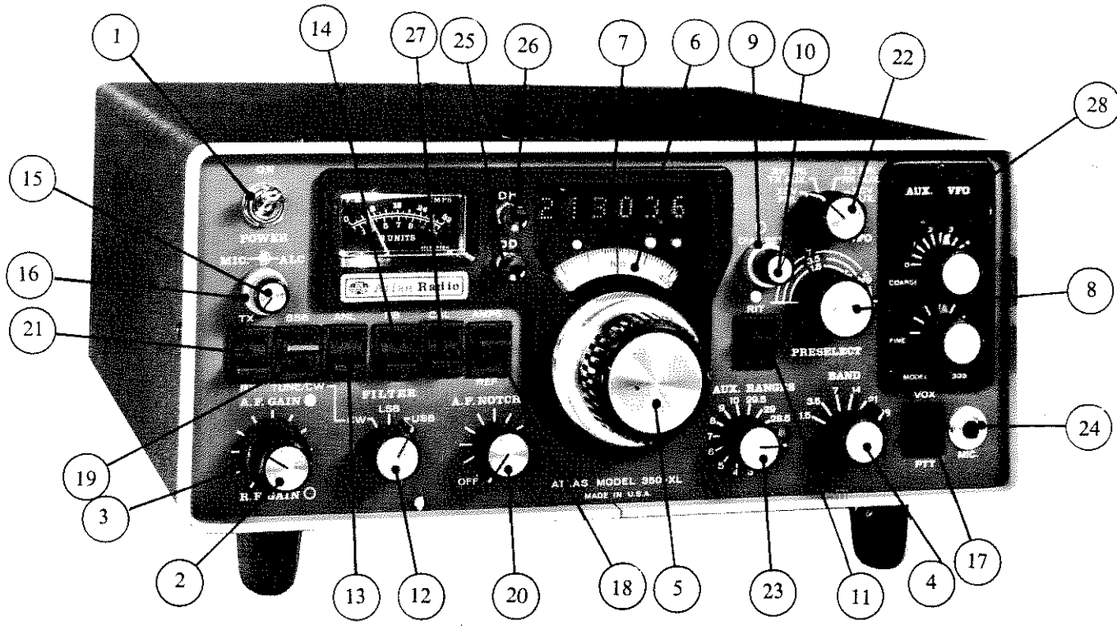


FIG. 3.1

as cause splatter up and down the band. ALC will help reduce this danger, but it is still possible to overmodulate, so MIC Gain must be carefully adjusted.

16. **ALC:** Automatic Level Control. Concentric with MIC Gain control. The black set screw indicates its position. Helps prevent over-modulation which causes flat-topping of the power output stages, distortion and splattering outside the channel. Full counterclockwise setting of this control provides no ALC, while full clockwise setting is maximum ALC. Normally, a setting around 12 to 2 o'clock will be satisfactory. Some variations between bands may be noted. By having the ALC control on the front panel, you can utilize its advantage most effectively. Too little control will make it easier to over-modulate, while too much control will limit output power. Try various settings and ask for signal reports until you become familiar with its effect. If you have a panoramic scanner, this is, of course, the best way to monitor your output signal.

17. **VOX/PTT:** Selects either manual push-to-talk operation or voice operated transmission. Controls for VOX Gain, Anti-VOX, and Delay are three aluminum thumbwheels which protrude through the bottom cover. They are easily accessible by reaching under the front of the transceiver. VOX position also allows for semi-break-in CW operation when transceiver is used in conjunction with a linear amplifier.

18. **AMPS/REF.:** In the AMPS position meter will read P.A. AMPS when in transmit mode. The ammeter provides an excellent indicator of impedance match. By switching the transceiver to the TUNE/CW and LSB positions, the MIC Gain control becomes the carrier insertion control. (On later models the TX DRIVE control is carrier insertion.) Insert carrier and peak the pre-selector for maximum reading. With full carrier insertion and a close impedance match, the ammeter should read about 24 amps or more on 1.5-23 MHz and about 20 amps on 28-30 MHz, (with supply voltage of 14 VDC at transceiver input terminals). In the REF (reflected voltage) position the meter will respond to reflected voltage that results from an antenna mismatch when in the transmit mode, with full carrier insertion. Although the meter is not calibrated for SWR, a small amount of meter movement (3-4 amperes) will indicate a fairly good antenna match. Any readings higher than 4 amperes will indicate that antenna adjustment may be required.

19. **SSB/TUNE-CW:** With switch in SSB position operation may be in either LSB or USB position. When using the TUNE-CW position, the "FILTER" switch must be in LSB or CW position.

20. **A.F. Notch:** Control is used to alternate unwanted adjacent channel heterodyne signals. Rotation of knob provides better than 30 db rejection of an audio frequency from 300 to 3000 Hz.

21. **TX/RX:** TX (Transmit) position allows for locking in the transmit mode or for use with a microphone that does not have a PTT switch. RX (Receive) position is used when PTT or VOX is controlled by the microphone in normal transceiver operation.

22. **VFO Selector:** This control is used only when the 350-XL is equipped with the Model 305 AUX VFO or Model 311 Crystal Controlled Oscillator. This control will select which oscillator is being used, either the transceiver (primary) or the auxiliary (Model 305 or 311), for receiving and transmitting. The L.E.D.'s indicate which oscillator is being used. The green L.E.D. indicates which VFO is being used for receiving. The yellow L.E.D. indicates which VFO is being used for transmitting. The red L.E.D. will light when transceiver is switched to the transmit mode.

23. **AUX Ranges:** Up to 10 auxiliary crystals may be installed under the chassis, permitting operation in any 500 KHz segment between 2 and 23 MHz (except for I.F. guard band between 5 and 6 MHz). The auxiliary range window, just to the right of the auxiliary range control exposes a white disc that provides a convenient place to write in the frequency covered in each auxiliary range. In the normal or "N" setting of this switch, the proper crystal for operation of the six amateur bands is selected by the bandswitch. The 28.5, 29, and 29.5 MHz positions are used when additional 10 meter coverage is needed. (These crystals are installed as a standard feature.) When any of these additional 10 meter positions are used, the bandswitch must be in the 28 MHz position. The numbered positions (1-10) of the switch correspond to the auxiliary range crystal sockets mounted under the chasis. When the switch is set to a numbered position, the crystal in the socket having the same number will be connected to the circuit for auxiliary range operation. Refer to chart for proper bandswitch position to correspond with auxiliary range frequency.

AUXILIARY RANGE MHz	BANDSWITCH POSITION
2-3 MHz	1.5 MHz
3-3.5, 4-5 MHz	3.5 MHz
6-7, 7.5-10 MHz	7 MHz
10-14, 14.5-16 MHz	14 MHz
16-21, 21.5-23 MHz	21 MHz

NOTICE: On band 6 the 350-XL is designed to operate only from 28 to 30 MHz, and will not receive or transmit between 23 and 28 MHz, even if crystals are installed.

The plug-in Model 311 Auxiliary Crystal Oscillator should not be confused with the 10 position AUX Ranges control. Where the AUX Ranges allows for up to 10 additional 500 KHz tuneable ranges between 2 and 23 MHz, the 311 allows up to 12 single frequency crystal controlled positions between 1.5 and 23 MHz. Refer to Accessory Section for detailed information on the Model 311.

ATLAS 350-XL, AUXILIARY RANGES, CRYSTAL FREQUENCY CHART, (MEGAHERTZ)

FIG. 3.2

BAND-SWITCH POS.	AUX. TUNING RANGE	CRYSTAL FREQ.	
1.5	1.5-2.0 2.0-2.5 2.5-3.0	12.6* 13.1** 13.6**	Fundamental Crystals
3.5	3.0-3.5 3.5-4.0 4.0-4.5 4.5-5.0	14.1 14.6* 15.1** 15.6	Fundamental Crystals
7	6.0-6.5 6.2-6.7 6.5-7.0 7.0-7.5 7.5-8.0 8.0-8.5 8.5-9.0 9.0-9.5 9.5-10.0	17.1 17.3** 17.6 18.1* 18.6 19.1** 19.6** 20.1 20.6	Third Overtone Crystals
14	10.0-10.5 10.5-11.0 11.0-11.5 11.5-12.0 12.0-12.5 12.3-12.8 12.5-13.0 12.8-13.3 13.0-13.5 13.5-14.0 14.0-14.5 14.5-15.0 15.0-15.5 15.5-16.0	21.1 21.6 33.1 33.6 23.1 23.4** 23.6 23.9** 24.1 24.6 25.1* 25.6 26.1 26.6	Third Overtone Crystals
21	16.0-16.5 16.4-16.9 16.5-17.0 16.9-17.4 17.0-17.5 17.5-18.0 18.0-18.5 18.5-19.0 19.0-19.5 19.5-20.0 20.0-20.5 20.5-21.0 21.0-21.5 21.5-22.0 22.0-22.5 22.51-23.0	27.1 27.5** 27.6 28.0** 28.1 28.6 29.1 29.6 30.1 30.6 31.1 31.6 32.1* 32.6 33.1* 33.6*	Third Overtone Crystals
NO OPERATION, 23 to 28 MHz			
28	28.0-28.5 28.5-29.0 29.0-29.5 29.5-30.0	39.1-29.1* 39.6* 40.1* 40.6*	Third Overtone Crystals

*Supplied with 350-XL for standard amateur bands.

**Recommended for Marine Band reception. Not FCC type approved for transmission.

Crystal sockets in the 350-XL are designed for type HC25/u crystals. Crystals must be ordered for series resonant, 27 ohms max. Frequency tolerance of ±.002 at 25 degrees centigrade is adequate.

To determine crystal frequencies simply add 11.1 MHz to the desired operating frequency. The FILTER switch on the front panel will determine which sideband, either upper or lower is to be used.

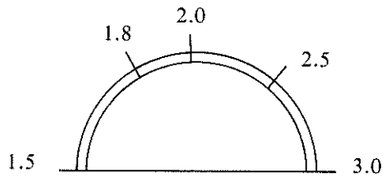
24. **MIC:** The microphone may be either a dynamic or crystal type. A low impedance MIC will work, but will require higher setting of the MIC Gain control, and may require closer speaking. If a dynamic MIC is used, it should preferably be the high impedance type. The choice of microphones is important for good speech quality, and deserves careful consideration. Select a high quality MIC with smooth response from 300 to 3000 Hz or more. The Shure 404C hand MIC and the Shure 444 desk MIC are excellent choices. The plug required for the MIC connector is a standard ¼ inch diameter, 3 conductor type and is supplied with the transceiver. The tip connection is the keying circuit for push-to-talk, the ring connection is for the shielded MIC lead, and the sleeve or barrel is the common ground terminal. If VOX operation is desired with the 404C hand MIC, the microphone shorting contacts inside the MIC must be disabled. Carefully open up the MIC case and locate the shorting contact which are actuated by the push-to-talk button. Either disconnect the contacts, or bend them so they won't close anymore, whichever seems most practical.

25. **DD** (Digital Display OFF-ON): Push button switch turns off digital dial (Optional DD6-XL) readout. Advisable when using battery power because readout draws approximately 800 milliamperes.

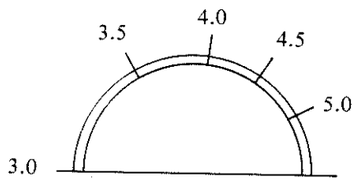
26. **DH** (Digital Dial Hold): Push button switch allows for retention of digital frequency readout when tuning elsewhere.

27. **Calibrator:** Provides markers at 25 KHz increments on tuning dial and digital readout.

28. **AUX OSC Model 305 or Model 311:** Provision for a plug-in auxiliary oscillator. This may be either the Model 305 VFO or the Model 311 Crystal Controlled Oscillator. (See Accessory Section for more details.)

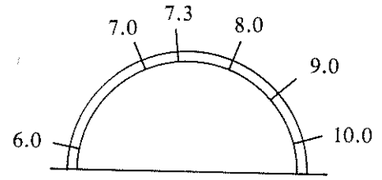


1.5 MHz BAND

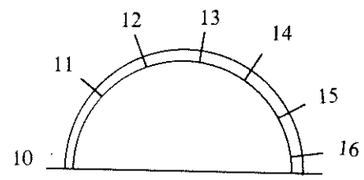


3.5 MHz BAND

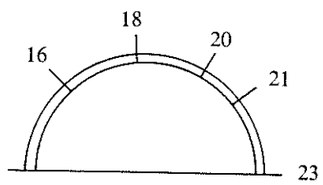
APPROXIMATE PRESELECT SETTINGS, IN MEGAHERTZ, FOR AUX. RANGE OPERATION



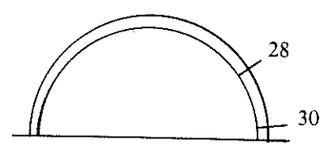
7 MHz BAND



14 MHz BAND



21 MHz BAND



28 MHz BAND

FIG. 3.3

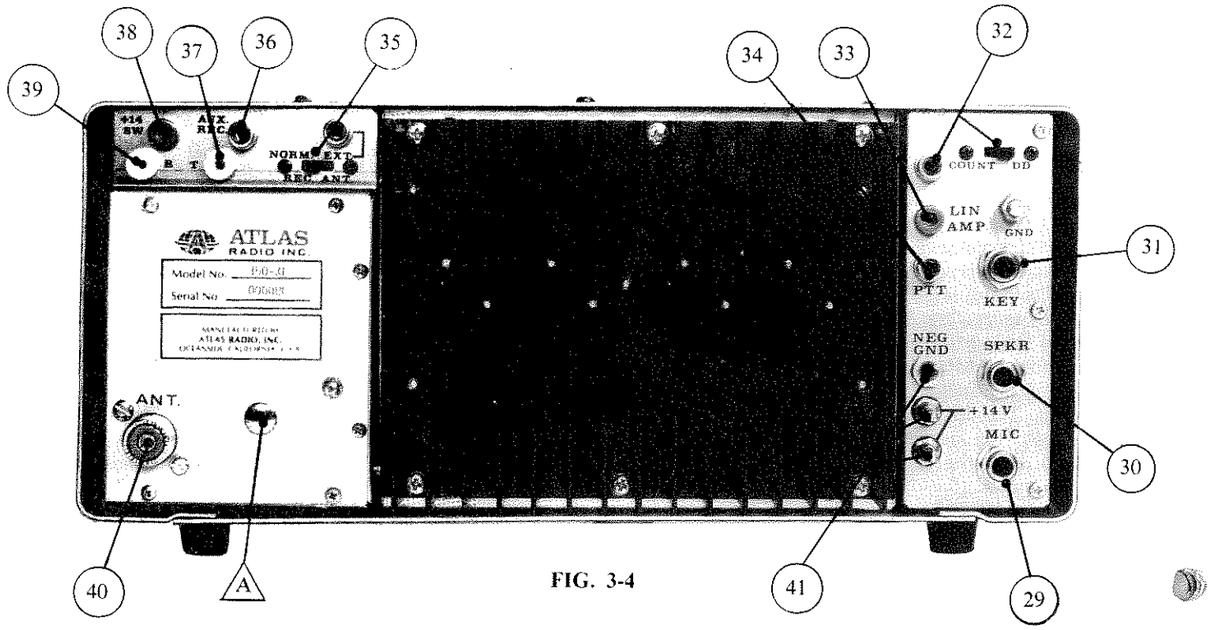


FIG. 3-4

B. REAR PANEL CONTROLS

(Refer to FIG. 3.4).

29. **MIC:** Refer to front panel control section for details concerning microphones.

30. **SPKR:** Speaker jack permits plug in of external speaker or headphones. Headphones of approximately 2000 ohms are recommended. If lower resistance headphones are used, a 1 watt resistor should be installed in series to reach a total of about 2000 ohms. When the 350-PS power supply phone plug is plugged into the transceiver, the internal speaker of the transceiver is disconnected and the front facing speaker in the power supply becomes operative.

31. **KEY:** A jack is provided for insertion of a standard ¼ inch diameter, 2 conductor phone plug. This plug is furnished with the transceiver. Connect the CW key to this plug with a 2 conductor cable. The sleeve connection goes to chassis ground. Keying potential is less than 10 volts, positive, and draws less than 5 milliamperes. Any of the electronic keyers presently on the market will operate satisfactorily.

32. **DD-COUNT:** DD (Digital Dial) position allows for digital readout of receive and transmit frequencies of transceiver. COUNT position permits use of Digital Dial as a frequency counter from 100 Hz to 40 MHz, for general use around the ham shack or lab. Phono jack allows for input, not to exceed 5 volts.

33. **LIN. AMP:** Tip jack allows for Linear Amplifier TX/RX relay control. Later models have a phono-jack instead of a tip jack. Figure 3.5 shows typical connections between transceiver and amplifier. The 350-XL is designed for full-break-in CW and works quite well when the transceiver is used for "barefoot" operation. However, most linear amplifiers on the market today will operate only semi-break-in. It will be necessary to switch the VOX/PTT control to VOX and adjust the DELAY control for desired settings. (See CW Operation.)

34. **PTT:** Phono jack permits external transmit control such as foot controlled switch.

35. **Receiver Antenna:** Slide switch allows for choice of either NORM antenna operation (receive and transmit on the same antenna using 50-239 coaxial ANT connector located in lower left corner of rear panel) or a separate antenna for receiving only. The phone jack marked EXT is for the separate receiver antenna input. When using a separate antenna for receiving, transmitting is done through the normal coax ANT connector.

Also, the EXT receiving antenna input may be required when using some linear amplifiers that do not provide relay switching through the linear for receiving, but have only a relay in the output circuit.

36. **AUX REC:** The Auxiliary Receiver phono jack permits the use of another receiver connected to the same antenna as the 350-XL receiver. Figure 3.5 shows connections for use of Auxiliary Rec.

37, 39. **R,T.:** These tip jacks allow for operation of accessories that require either receive or transmit operation for their functions. External Receive and Transmit circuits should not exceed more than 50ma drain, such as a small relay.

38. **+14SW:** Allows for external use of +14VDC when transceiver is turned on. Current drain should not be greater than 2 amperes.

40. **ANT:** An S0-239 connector connects the transceiver to the antenna system.

41. **14VDC Connectors:** The two banana jacks are for the positive voltage connections and are connected in parallel. The banana plug is for the ground connection. Upper jack is high current circuit.

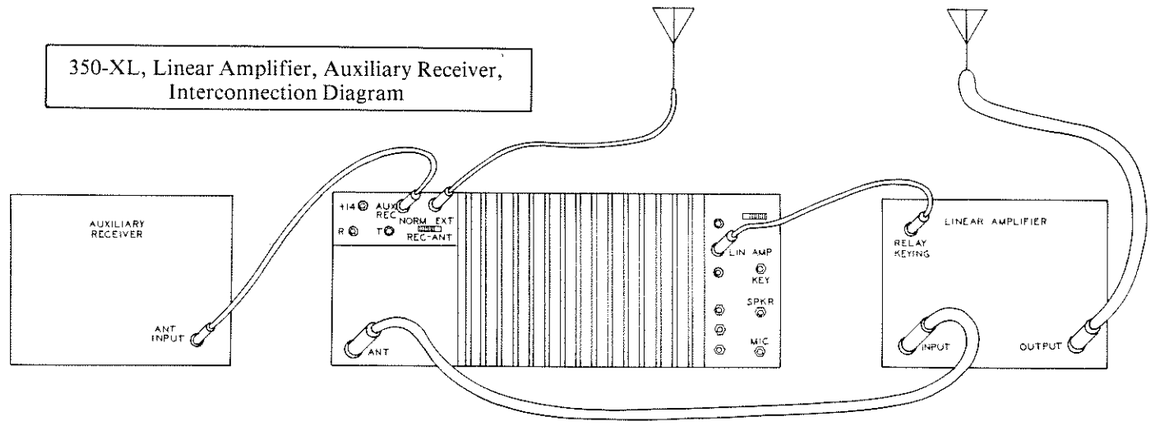


FIG. 3-5

C. BOTTOM COVER CONTROLS

(Refer to Figure 5.2).

58. **ANTI-VOX:** Anti-VOX control allows adjustment to prevent received signals and background noise from tripping the VOX relay.

59. **DELAY:** Delay control allows for setting the time interval between transmit and receive.

60. **VOX GAIN:** The VOX Gain Control adjusts the gain of the VOX amplifier. While speaking into the microphone in a normal manner, slowly rotate the VOX Gain control until the VOX keys the transmitter.

61, 62. **SIDETONE:** The sidetone volume and pitch controls are trimpots located behind the VOX controls. They are easily accessible with a small screwdriver through the slots in the bottom cover of the transceiver. Later Model 350-XL's have a thumbwheel adjustment for sidetone volume.

D. PRE-OPERATION ADJUSTMENT

1. **AUX Range Switch:** Must be in "N" position, unless you intend to operate on an auxiliary frequency range, or one of the three upper segments of 10 meters.

2. **SSB/TUNE-CW:** Must be in SSB position for voice transmission, TUNE-CW position only RX-TX switch or CW key will acutate transmitter.

3. **VOX-PTT:** Must be in PTT position for the MIC button to function.

4. **Filter Switch:** For CW operation switch must be in LSB or CW position to obtain power from transmitter. For SSB operation switch can be in either USB or LSB position.

5. **DD-Count Switch:** Located on rear panel, switch must be in DD position for correct digital dial readout of receive and transmit frequencies.

6. **REC ANTENNA:** Located on rear panel, switch must be in NORM positon to receive signals with same antenna that is used for transmit.

E. RECEIVER OPERATION

1. TX-RX switch must be in RX position.

2. VFO selector switch should be set to XCV PRI position.

3. Turn power switch ON.

4. The Green L.E.D. (right center) and yellow L.E.D. (left center) above the Tuning Dial should be ON. If the Red L.E.D. is on, the transceiver is in transmit mode, and should be turned off until the reason is determined and corrected. (Microphone press-to-talk button may be stuck or shorted. Switch from PTT to VOX position to check this out.)

5. With full R.F. Gain and A.F. Gain at 12 o'clock, or more, there should be background noise.

6. Tune preselector control to proper band area. Some increase in background noise should be noticed.

7. AUX RANGES switch must be in "N" position for normal amateur band coverage, except for upper three segments of the 28 MHz band.

8. REC. ANT. switch on rear panel must be in NORM position, unless a separate receiving antenna connection is being used.

9. A.F. Notch control should be in counter clockwise "OFF" position, unless you wish to notch out a heterodyne or unwanted audio frequency.

10. CAL. switch turns on the crystal calibrator which will produce signals every 25 KHz across the dial. The DIAL SET control may be used to set the dial scale to an exact 25 KHz increment. It is concentric with the RIT control.

11. The RIT switch activates the RIT control and turns on the right hand L.E.D. above the tuning dial. The RIT control will shift the receiving frequency up or down without changing the transmit frequency.

12. If pulse type noise interference is a problem the Noise Blanker may be activated by placing the switch in the NB position.

13. For SSB reception, set FILTER switch to either USB or LSB, depending on band and sideband mode desired. For CW reception set FILTER switch to LSB if 2.7 KHz bandwidth is desired. If 500 Hz bandwidth is desired, switch FILTER control to the CW position.

14. **Additional Frequency Reception:** Additional frequency coverage, including WWV, is available without adding any AUX RANGE crystals. The following table will show front panel control settings required for each additional frequency range. Note that on bands 3.5, 7, and 14, each frequency range will tune backwards and the 0-500 KHz tuning dial calibration will not be accurate.

BAND	PRE-SELECT POSITION	AUX. RANGE POSITION	FREQ. COVERAGE KHz	WWV, KHz
1.5	28	28.5 29.0 29.5	2090-2590 2250-2750 2420-2920	2500
3.5	28	Any position that does not have a crystal.	5400-4400	5000
7	28	Any position that does not have a crystal.	*10,900-9400	*10,000
14	28	Any position that does not have a crystal.	16,400-14,400	15,000

**First digit of Digital Display will not be lit.*

F. DIGITAL DIAL OPERATION

1. Push button switch marked DD is a push-on, push-off type for the Digital Dial (If installed).

2. Push button switch marked DH is a Digital Hold switch. If turning the tuning dial does not change the digital readout, the switch is in "HOLD" position. Push it once to unlock.

3. On the rear panel is a slide switch marked COUNT and DD. It must be in the DD position to operate with the transceiver dial. In the COUNT position, it may be used as a frequency counter by connecting an external signal into the phono jack located beside the slide switch.

G. TRANSMITTER OPERATION

NOTE: 350-XL's with serial numbers beginning at 1950CA have a TX DRIVE control in place of the ON-OFF toggle switch on the front panel. This gain control, which is called "TX DRIVE", operates in both SSB and CW mode. In CW mode, the MIC GAIN control is no longer the carrier insertion control. Instead, the TX DRIVE is the carrier insertion control. In SSB mode, the new control also functions as a transmitter drive or "gain" control, permitting adjustment of the transmitter pre-amplifier to just enough gain to achieve full power, but no more than necessary. This helps reduce possible stability problems if a mismatched antenna system is used, or if the transceiver is in the immediate radiation field of the antenna.

SSB TRANSMISSION

For push-to-talk operation set VOX/PTT switch to PTT. If microphone has push-to-talk switch, it may be used to activate transmitter. Transmitter may also be activated manually with the TX-RX switch or with the PTT phone jack located on the rear panel of the transceiver.

For VOX (Voice Operated Transmit) set VOX/PTT switch to VOX. Note that microphone must not have a shorting contact on the push-to-talk switch if VOX is to be used. If such contacts are connected, as they often are on hand microphones, the microphone case must be opened, and the shorting contacts disconnected or disabled. See Section 3.A.2f for more information regarding microphones. VOX controls are thumbwheels located under the transceiver and accessible from the front with your finger tips. For VOX adjustment advance the VOX Gain control until speaking into the MIC causes the transceiver to go into transmit mode. Set the ANTI-TRIP control to the position where received signals do not trip the transmitter. These adjustments will require some back and forth trials to find the best settings. Set the DELAY control for the desired time for return to receive.

1. SSB-TUNE/CW switch must be in SSB position for voice transmission. In TUNE/CW position the PTT and VOX circuits will not function.

2. Set meter switch to AMPS position. Switch TX-RX switch to TX position, or press MIC button. Ammeter should indicate a slight amount of "idling" current, about ½ division, which is equal to 1 amp. Idling current is not ciritical, but should read at least a little above zero. During a transmission it may creep up to as much as 4 amps, due to heating of the P.A. transistors,

and will drop back when the P.A. cools down. This is normal.

3. With a proper load, close to 52 ohms non-reactive perform the following steps:

a. Switch to TUNE position with the SSB-TUNE/CW switch.

b. Set the FILTER switch to LSB or CW position. The transmitter does not function on CW or TUNE in the USB filter position.

c. PRESELECTOR control in the proper band area.

d. MIC GAIN, ALC, and TX DRIVE (If applicable) at full counter clockwise.

e. With early models, switch to TX. Ammeter should read a few amps. (Probably more than in SSB Position.) Adjust PRESELECT control for maximum.

For later models, switch to TX and advance TX DRIVE until ammeter reads a few amps. Adjust PRESELECT control for maximum.

f. With early models, advance MIC GAIN to point of maximum amps, but do not exceed 30 amps. A well matched 52 ohm load will draw 24 to 30 amps on the first 5 bands and 20 to 24 amps on the 28-20 MHz band. For later models, advance TX DRIVE to point of maximum amps.

NOTE: A dummy load is recommended for regular ham shack use. It verifies what the transmitter will do, and proves whether the antenna is really well matched or not.

CAUTION: DO NOT HOLD IN THE TUNE POSITION WITH HIGH CURRENT FOR MORE THAN 30 SECONDS AT A TIME. THE GREATEST DANGER TO THE POWER OUTPUT TRANSISTORS IS OVERHEATING. THE BLACK ANODIZED HEAT SINK IS DESIGNED TO COOL THE TRANSISTORS ADEQUATELY UNDER NORMAL OPERATING CONDITIONS, BUT AS WITH ANY ELECTRONIC OR MECHANICAL DEVICE, IT IS UP TO THE OPERATOR TO MAINTAIN NORMAL CONDITIONS, AND NOT ABUSE THE EQUIPMENT.

4. Return to RX position. Switch to SSB position. Switch to PTT or VOX and modulate. Modulation level is adjusted with the MIC Gain control. When the transceiver is coupled into a proper 52 ohm load, voice peaks will be reaching about 32 amps, although the ammeter cannot respond quickly enough to show these peaks. Adjust MIC Gain for average readings of 12-14 amps. (See Section 3-15.) Do not run the gain above this level, or you will flat-top and distort the transmitted audio, as well as cause splatter up and down the band. ALC will help reduce this danger, but it is still possible to overmodulate, so MIC Gain must be carefully adjusted.

5. The ALC control is located on the front panel of the transceiver, and is concentric with the MIC Gain control. It is the inner ring with a black set screw indicating its position. ALC is the abbreviation for "Automatic Level Control, " and refers to transmitter modulation level. It aids in preventing over-modulation which causes flat-topping of the power output stages, distortion and splattering outside the channel. Full counterclockwise setting is maximum ALC. Normally a setting around 12 to 2 o'clock will be satisfactory. Some variations between bands may be noted. By having the ALC control on the front panel, you can utilize its advantage most effectively. Too little control will make it easier to over-modulate, while too much control will limit output power. Try various settings and ask for signal reports until you become familiar with its effects. If you have a panoramic scanner, this is, of course, the best way to monitor your output signal.

CW TRANSMISSION

1. Follow tune-up instructions in preceding steps for SSB Transmission.

2. Insert key in jack on rear panel.

3. Set FILTER switch to CW or LSB position. *The transmitter will not function on CW or TUNE in the Upper Sideband position.*

4. Set SSB-TUNE/CW switch to TUNE/CW position. Press the key and advance TX DRIVE (MIC Gain on early models) for maximum output, but not more than 24 amps.

5. Transceiver is now set for FULL BREAK-IN CW operation. For power less than full rating it is only necessary to reduce TX DRIVE for desired output. When transceiver is being used as an exciter for a linear amplifier, set TX DRIVE (MIC Gain on early models) for just the required amount of output to reach the maximum rating of the amplifer.

6. For SEMI-BREAK-IN CW operation, it will only be necessary to switch the VOX/PTT control to VOX and adjust the VOX GAIN and DELAY controls for desired settings. (If you have an earlier model that does not provide semi-break-in operation in VOX position, please contact the factory.)

7. The transmit frequency is automatically shifted downward 800 Hz into the filter passband. Thus, if you are using the Digital Dial, you are reading your receive frequency, but will be transmitting 800 Hertz below the indicated frequency. *For this reason, use caution when operating near the low end of the band.*

8. The 800 Hertz automatic offset on your transmit frequency makes it possible to work a station who is transmitting on your transmit frequency, since when you go into receive mode, his signal will produce an audible beat note of 800 Hertz. This meets the most common operating requirement. For any other situation, the RIT will provide separate control of receive frequency.

9. Sidetone volume and pitch are pre-set, but if further adjustment is required, the controls are located through the ventilating slots in the bottom cover of the transceiver. The two PC boards mounted trim pots can be adjusted with a small screwdriver for desired volume and pitch with the transceiver in TUNE-CW and TX (Transmit) position (Later model 350-XL's have a thumbwheel through the bottom cover for the sidetone volume adjust).

IV. CIRCUIT THEORY

A. RECEIVER CIRCUIT

Referring to the block diagram illustrated in Figure 4.2, the signal is coupled through the input preselector tuning circuit and R.F. Amplifier into the double balanced diode ring mixer where it is heterodyned with the local injection signal to produce a 5595 KHz I.F.

Sensitivity is rated at 0.3 microvolts for a signal-plus-noise to noise ratio of 10 db. Typical measurements will read 0.1 to 0.2 microvolts. This is due largely to the very low noise figure of the R.F. Amplifier and the double balanced diode ring mixer, followed by the low noise I.F. Amplifiers.

Following the low noise I.F. Amplifier stages, the signal passes through the crystal ladder filter, a highly sophisticated band pass filter designed especially for the Atlas transceiver by Network Sciences, Inc., of Phoenix, Arizona. Here is where superior selectivity has been tailored to take full advantage of the extremely wide range of signal levels that the front end design is capable of handling. A 6 db bandwidth of 2700 Hertz was carefully selected to provide audio response from 300 to 3000 Hertz in both receive and transmit modes. While occupying slightly more bandwidth than a 2100 or 2400 Hertz filter, it has been proven that transmission and reception of the audio frequencies between 2400 and 3000 Hertz provides a substantial improvement in weak signal readability. At the same time, the improved fidelity of voice communications is readily noticeable, and helps account for the report of "broadcast quality" from the Atlas. The 6 db bandwidth of 2700 Hertz is backed up by a 6 to 60 db bandwidth ratio of 1.6 (Shape factor), and ultimate rejection greater than 130 db. It is this extremely steep skirt selectivity illustrated in Figure 4.1, which will reject strong adjacent channel signals.

One crystal filter is used for lower sideband, and another for upper sideband. A third filter is available for CW reception. It has a bandwidth of 500 Hertz, centered at 800 Hz from the carrier or "beat frequency oscillator." Thus it will pass audio signals from 550 to 1050 Hertz in the CW mode.

Following the crystal filters is a high gain I.F. stage using a Motorola MC 1349 P integrated circuit. This drives the second diode ring mixer which functions as a product detector. Recovered audio is then amplified by a Fairchild TBA 810 integrated circuit, providing up to 6 watts of audio power.

Automatic gain control is derived by rectifying a portion of the audio signal, and using this voltage to control the integrated I.F. circuit.

STANDARD FREQUENCY RANGES AND LOCAL OSCILLATOR — MIXER — I.F. FREQUENCIES

BAND MHz	CRYSTAL OSC. FREQ. MHz	MINUS	VFO FREQ. MHz	EQUALS	INJECTION FREQ. MHz	MINUS	INTER MEDIATE FREQ. MHz	EQUALS	OPERATING RANGE MHz
1.5	12.6		5.505-5.005		7.095-7.595		5.595		1.5-2.0
3.5	14.6		5.505-5.005		9.095-9.595		5.595		3.5-4.0
7	18.1		5.505-5.005		12.595-13.095		5.595		7.0-7.5
14	25.1		5.505-5.005		19.595-20.095		5.595		14.0-14.5
21	32.1		5.505-5.005		26.595-27.095		5.595		21.0-21.5
28	39.1		5.505-5.005		33.595-34.095		5.595		28.0-28.5
28.5	39.6		5.505-5.005		34.095-34.595		5.595		28.5-29.0
29	40.1		5.505-5.005		34.595-35.095		5.595		29.0-29.5
29.5	40.6		5.505-5.005		35.095-35.595		5.595		29.5-30.0

AUXILIARY FREQUENCY RANGES AND LOCAL OSCILLATOR — MIXER — I.F. FREQUENCIES

BAND MHz	CRYSTAL OSC. FREQ. MHz	MINUS	VFO FREQ. MHz	EQUALS	MIXER FREQ. MHz	MINUS	INTER MEDIATE FREQ. MHz	EQUALS	OPERATING RANGE MHz
1.5	13.1-13.6		5.505-5.005		7.095-8.595		5.595		2.5-3.0
3.5	14.1		5.505-5.005		8.595-10.595		5.595		3.0-3.5
3.5	15.1-15.6		5.505-5.005		9.595-10.595		5.595		4.0-5.0
7	17.1-17.6		5.505-5.005		11.595-12.595		5.595		6.0-7.0
7	18.6-20.6		5.505-5.005		13.095-15.595		5.595		7.5-10.0
14	21.1-24.6		5.505-5.005		15.595-19.595		5.595		10.0-14.0
14	25.6-26.6		5.505-5.005		20.095-21.595		5.595		14.5-16.0
21	27.1-31.6		5.505-5.005		21.595-26.595		5.595		16.0-21.0
21	32.6-33.1		5.505-5.005		27.095-28.595		5.595		21.5-23.0

No operation between 23 and 28 MHz.

FIG. 4.3

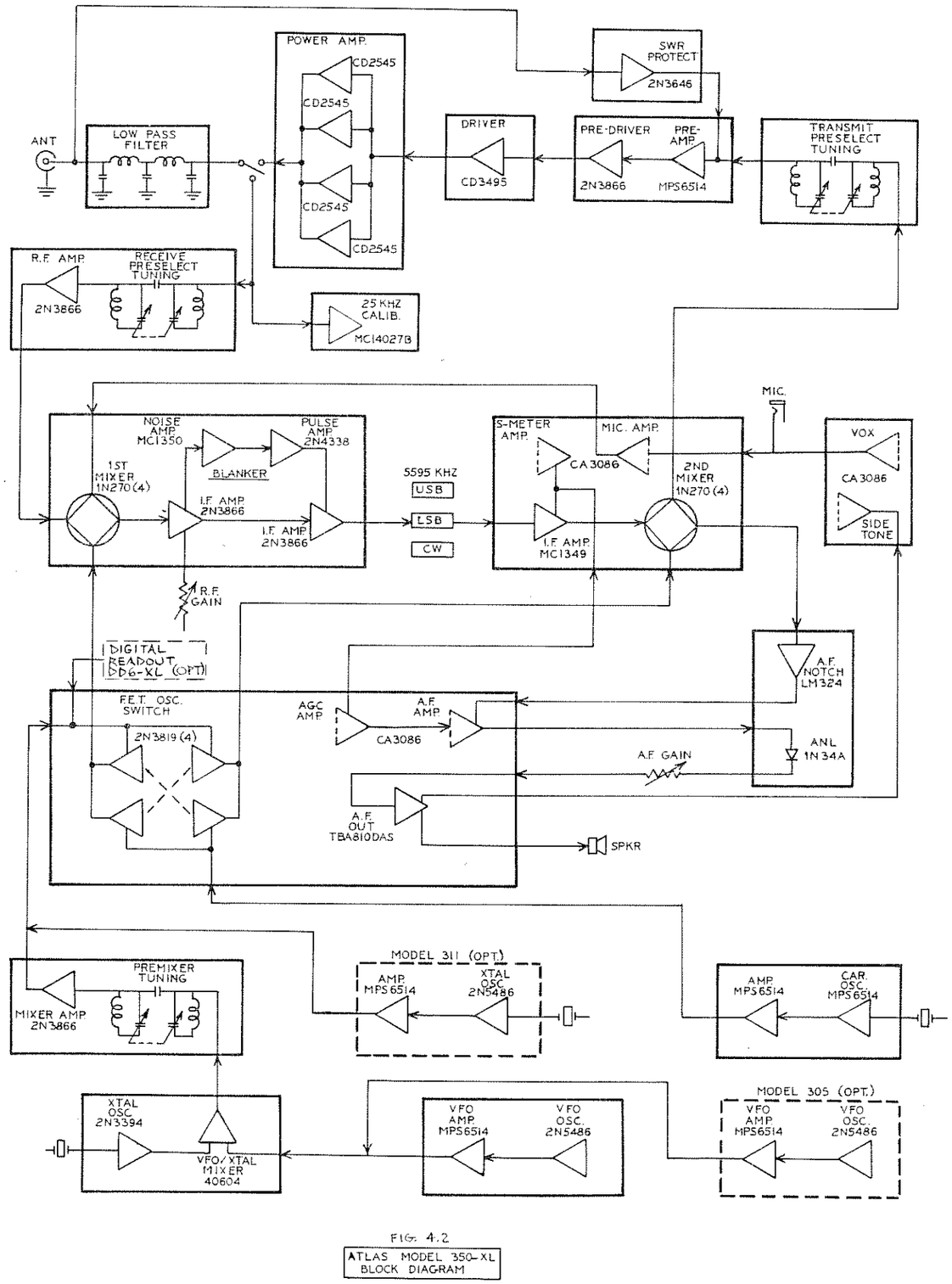


FIG. 4.2
ATLAS MODEL 350-XL BLOCK DIAGRAM

B. TRANSMITTER CIRCUIT

The first mixer functions as a balanced modulator with carrier oscillator injections and Mic. Amp. input with output at the 5595 KHz I.F. The second mixer heterodynes the I.F. signal with pre-mixer injection. Its output is at the transmit frequency, and is coupled through the preselector tuned circuits to preamplifiers, driver, and power amplifier. Harmonic output from the power amplifier is suppressed by a band switched two section low pass filter. The low pass filters and power amplifier are both designed for a 50 ohm load. It is important that the load be quite close to 50 ohms, non-reactive, in order to operate at full rated power.

The amplifier stages of the transmitter provide full power output over the 1.8 to 22 MHz range, about 60% at 29.7 MHz and require only preselect tuning.

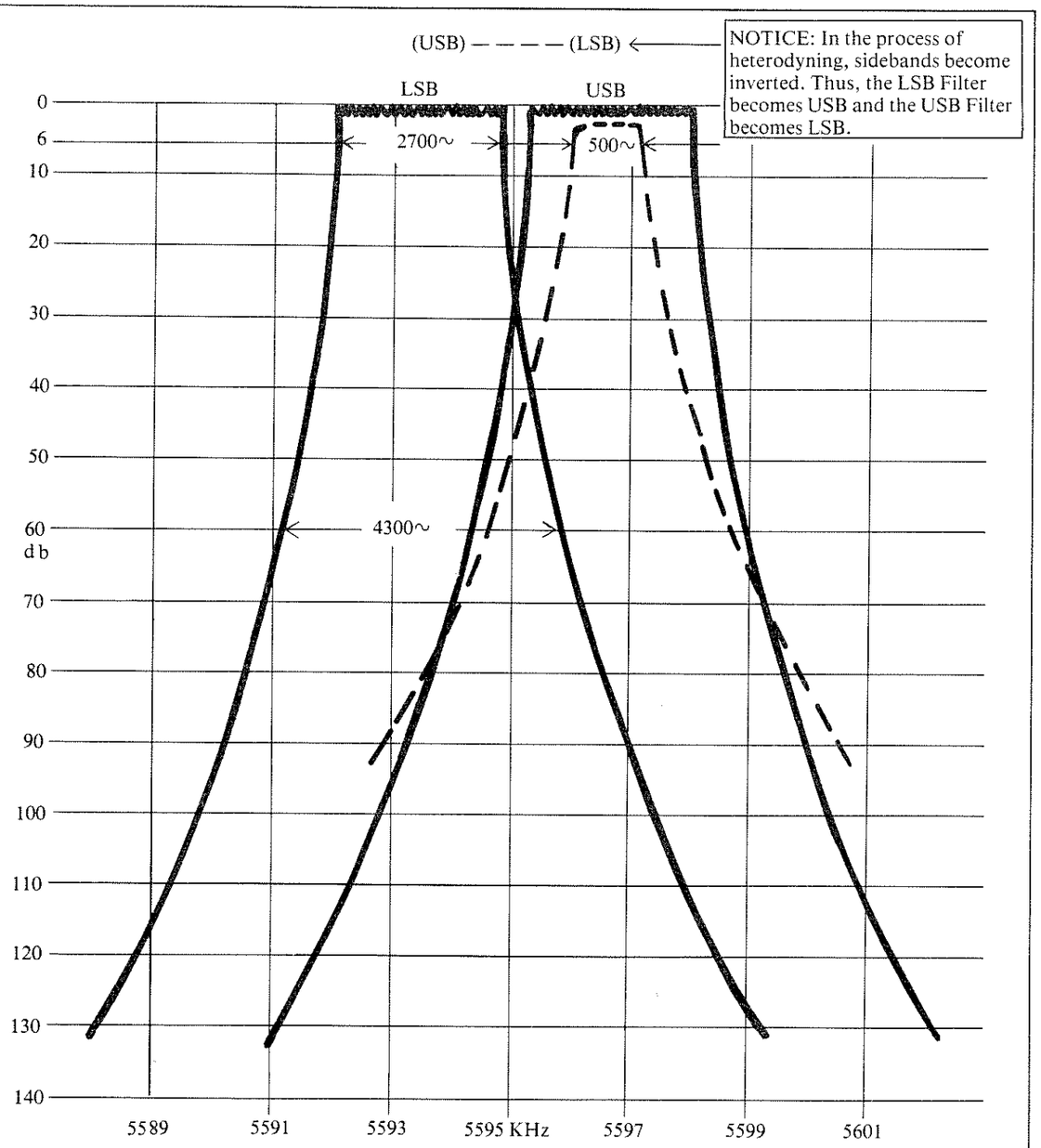


FIG. 4.1 CRYSTAL FILTER SELECTIVITY CHARACTERISTICS

C. P. C. BOARD FUNCTIONS

1. PC-150 FIRST MIXER/FIRST AND SECOND I.F. AMPS/NOISE BLANKER

In the receive mode, the received signal from the R.F. Amplifier is coupled from terminal 1 of PC-150 to the primary of the trifilar toroid transformer T101, through capacitors C128 and C130, to the double balanced diode ring mixer, D111 through D114. The local injection signal is coupled through R123 and C129 to the center tap of the secondary windings of T101, then through C128 and C130 to the first mixer. The two signals are heterodyned and the product is the 5595 KHz I.F. signal. The output of the first mixer is coupled through the trifilar toroid transformer T102, through a tuned circuit consisting of C112 through C114 and T103, to the base of the first I.F. Amplifier, Q105. The tuned circuit is tuned to the I.F. frequency of 5595 KHz. The signal is amplified by Q105 and then connected through a second tuned circuit consisting of C116 through C118 and L102 and L103, to the base of the second I.F. Amplifier, Q106. The tuned circuit is tuned to the I.F. frequency of 5595 KHz. The signal is amplified by Q106 and then connected through terminal 13 of PC-150 to the crystal ladder filters. Diodes D107 through D110 permit R.F. gain control of Q105 during receive mode.

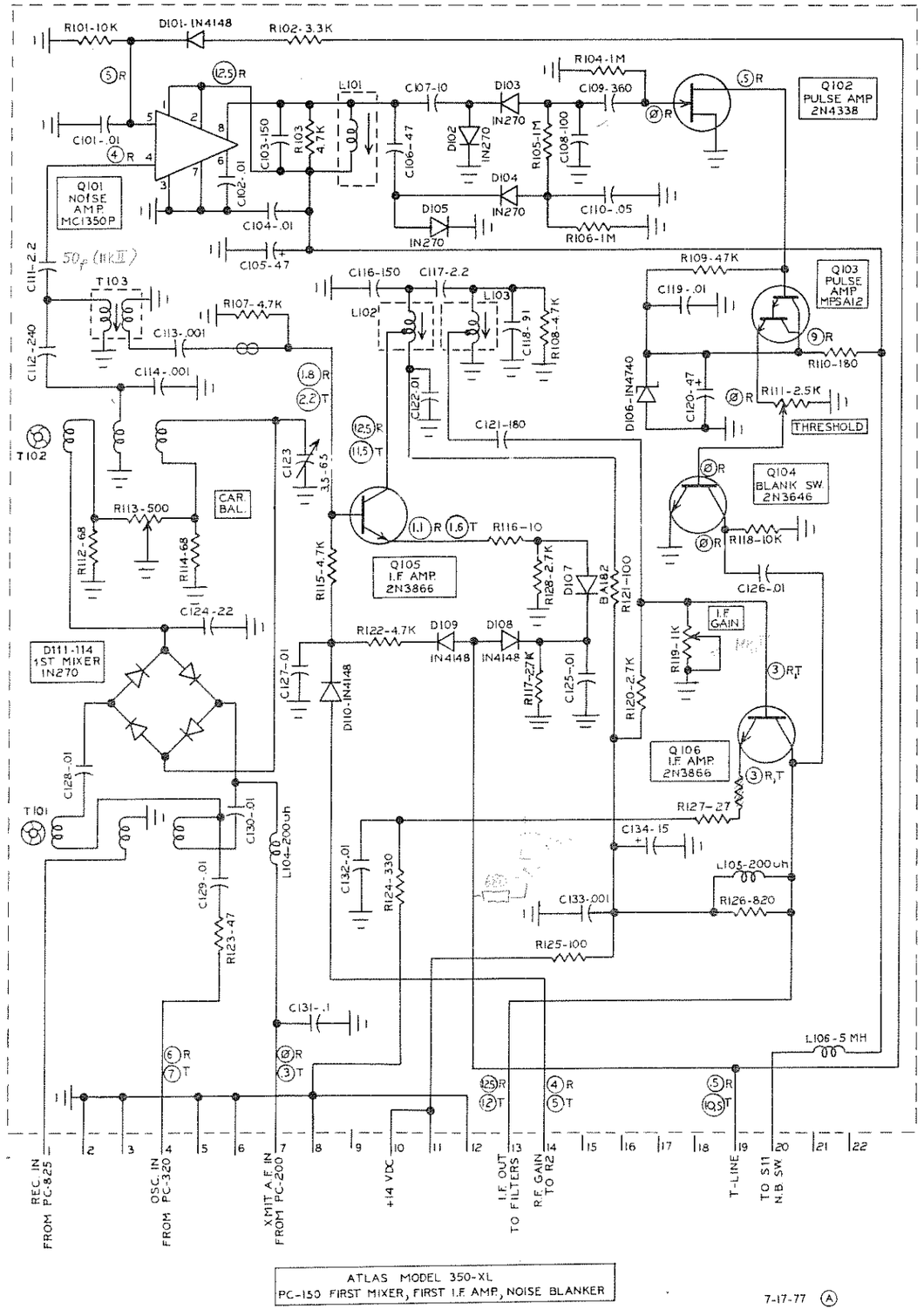
In transmit mode, the transmit audio input is coupled from terminal 7 of PC-150 through L104 to the first mixer, which now operates as a balanced modulator. The carrier oscillator injection is coupled into terminal 4 of PC-150 and is fed to the balanced modulator through R123, C128, C129, and C130. The output of the balanced modulator D111 through D114 is a double sideband, suppressed carrier signal. R113 is used to balance out the carrier, and C123 is used for phase balance. The double sideband signal has a suppressed carrier frequency of 5595 KHz, and is tuned by the tuned circuit consisting of C112 through C114 and T103, to the I.F. Amplifiers, Q105 and Q106. I.F. output is coupled to the crystal ladder filters in the same manner as in receive mode. R119 permits transmit gain control of Q106 during transmit mode.

One of the primary advantages of the double balanced diode ring mixer is that both signal and oscillator injection frequencies are essentially balanced out and do not appear in the output circuit. Only their product frequencies are present at the output. Also, the oscillator is balanced out from the antenna input terminal, eliminating the risk of oscillator radiation.

The noise blanker portion of PC-150 is designed specifically to blank out pulse type noise. Pulse type noises, such as ignition noise will be effectively silenced, while other more continuous type noise signals will not be silenced or reduced as much. The noise blanker works on the same principal as the Lamb noise silencer. Noise pulses are amplified separately by Q101, rectified into DC pulses which are amplified by Q102 and Q103, then applied to Q104, the blanking switch. Q104 shunts Q106, the I.F. Amplifier, whenever a sharp noise pulse comes through from the antenna circuit. A threshold control, R111 is adjusted so that noise pulses will switch Q104 completely, but not excessively.

PC-150 CIRCUIT COMPENENTS
1st MIXER, 1st I.F., NOISE BLANKER

C101, 102, 104, 119, 122, 125, 126, 127, 128, 129, 130, 132	.01 mf 100V Disc
C103, 116	150 pf 10% Disc
C105, 120	47 mf 16V Electrolytic
C106	47 pf 100V 5% Disc
C107	10 pf NPO 5% Disc
C108	100 pf FS 10% Disc
C109	360 pf FS 10% Disc
C110	.05 mf 25V 20% Disc
C111, 117	2.2 pf N330 10% Disc
C112	240 pf FS10% Disc
C113	.001 mf FS 10% Disc
C114, 133	.001 mf 100V 20% Disc
C118	91 pf FS 10% Disc
C121	180 pf 5% disc
C123	3.5-65 pf Trimmer
C124	22 pf NPO 5% Disc
C131	.1 mf 50V 20% Disc
C134	15 mf 16V Tantalum
R101, 118	10K 5% ¼ watt
R102	3.3K 5% ¼ watt
R103, 107, 108, 115, 122	4.7K 5% ¼ watt
R104, 105, 106	1 Meg 5% ¼ watt
R109	47K 5% ¼ watt
R110	180 5% ¼ watt
R111	2.5K Threshold Adj Pot
R112, 114	68 5% ¼ watt
R113	500 Carrier Bal. Pot
R116	10 5% ¼ watt
R117	1K 5% ¼ watt
R119	1K I.F. Gain Pot
R120, 128	2.7K 5% ¼ watt
R121, 125	100 5% ¼ watt
R123	47 5% ¼ watt
R124	330 5% ¼ watt
R126	820 5% ¼ watt
R127	27 5% ¼ watt
D101, 108, 109, 110	1N4148 Silicon Diode
D102, 103, 104, 105, 111, 112, 113, 114,	1N270 Silicon Diode
D106	1N4740 10V Zener Diode
D107	BA-182 Silicon Diode
Q101	MC1350P Noise Amp
Q102	2N4338 Pulse Amp
Q103	MPSA12 Pulse Amp
Q104	2N3646 Blank Switch
Q105, 106	2N3866 I.F. Amp
L101, 102, 103	Shielded I.F. Coil
L104, 105	200 μH R.F. Choke
L106	5 mH R.F. Choke
T101, 102	Trifilar Toriod XFMR
T103	Shielded I.F. XFMR



2. PC-250 SECOND I.F. AMPLIFIER, SECOND MIXER, MIC. AMP., S-METER AMP.

In receive mode, the I.F. signal from the 8 pole Crystal Ladder Filter is coupled through terminal 3 of PC-250 to the Integrated Circuit Q201, which is the Final I.F. Amplifier. The signal is amplified and coupled through the tuned circuit that consists of R201, C201, and T201, which is tuned to the I.F. frequency of 5595 KHz; through R223 to the Trifilar Toroid Transformer T202, to the input of the double balanced diode ring Second Mixer Stage consisting of D201 through D204. In the receive mode, this mixer acts as a product detector by heterodyning the carrier oscillator and I.F. signal to produce audio output. The audio is coupled through C211 and the Trifilar Toroid Transformer T203, through the RF choke L204 to terminal 5 of PC-250. From terminal 5, the audio signal is coupled through the PC-350 A.F. Notcher to terminal 20 of PC-320.

In transmit mode, the double sideband signal from PC—150 is passed through the Crystal Ladder Filter which attenuates the unwanted sideband. The resultant single sideband signal is coupled through terminal 3 of PC-250 to the I.F. Amplifier, and then to the Second Mixer in the same manner as in the receive mode. The local injection signal is coupled through terminal 7 of PC-250 through C212 to the center tap of the Trifilar Toroid Transformer T203. The heterodyning action of the Second Mixer produces the RF transmit frequency which is coupled through the secondary winding of T203 to terminal 9 of PC-250.

Q202 which is an integrated circuit, serves as a 3 stage Mic. Amplifier and also the S-Meter Amplifier.

PC-250 CIRCUIT COMPONENTS
2nd MIXER, 2nd IF, S-METER AMP, MIC. AMP

C210	130 pf FS 10% Disc	R209	2.2K 5% ¼ watt
C202	100 mf 16V Electrolytic	R210	68K 5% ¼ watt
C203, 204, 206, 207, 210, 211, 212	.01 mf 100V Disc	R212	3.3K 5% ¼ watt
C208	.47 mf 35V Tantalum	R213	150K 5% ¼ watt
C209, 216, 223	.1 mf 50V 20% Disc	R214, 220	10K 5% ¼ watt
C214, 221	2.2 mf 16V Tantalum	R215	100K 5% ¼ watt
C215	6.8 mf 10V Tantalum	R216	270 5% ¼ watt
C217, 218	.001 mf 20% Disc	R217, 222	1K 5% ¼ watt
C219, 220	22 mf 16V Tantalum	R218	1K S Meter Ø Trimpot
C222	.05 mf 25V 20% Disc	R221	39K 5% ¼ watt
C224	15 mf 16V Tantalum	D201, 202, 203, 204, 208	1N270 Germanium Diode
R201	3.9K 5% ¼ watt	D205	1N4740 10V Zener Diode
R202, 203	180 5% ¼ watt	D207	1N4148 Silicon Diode
R204, 223	47 5% ¼ watt	Q201	MC1349P IF Amp
R205, 211	5.6K 5% ¼ watt	Q202	CA3086 I.C.
R206, 219	470 5% ¼ watt	T202, 203	Trifilar Toroid Xfmr
R207	22K 5% ¼ watt	T201	Shielded IF Xfmr
R208	68 5% ¼ watt	L201	200 μH RF Choke

3. PC-320 RECEIVER AUDIO, OSCILLATOR SWITCH, AGC AMPLIFIER.

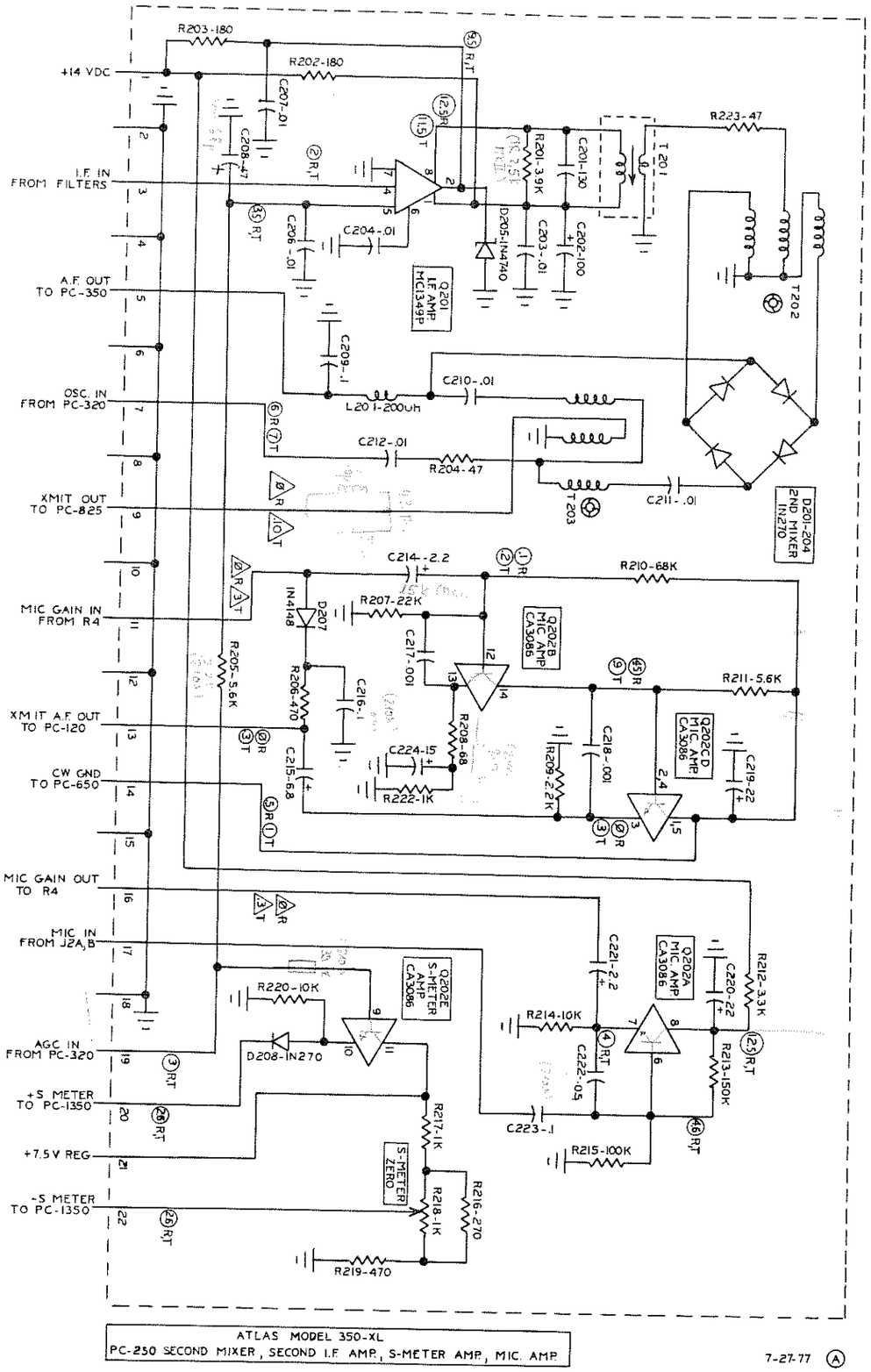
The audio output from PC-250 which has been coupled through PC-350, the A.F. Notcher, is then coupled through terminal 20 of PC-320, through C304 to pin the base of the first A.F. Amplifier, Q301A. The output of Q301A is coupled through C302 to terminal 22 of PC-320, to the ANL circuit of PC-350 and then to the A.F. Gain control on the front panel. The signal then goes back through terminal 12 of PC-320 to the input of the A.F. Power Amplifier, integrated circuit, Q304. The audio output from Q304 is coupled through C322 to terminal 15 of PC-320 to the speaker and sidetone control on PC-1250. Q304 delivers up to 6 watts of audio to the 3.2 ohm speaker.

The output of Q301A is also coupled through C309 to D301 and D302, the AGC rectifiers. AGC is then coupled through L301 to the input of Q301B, the AGC Amplifier. The AGC output is fed from pin 10 of Q301B through terminal 17 of PC-320 to terminal 19 of PC-250 where it is coupled to the Integrated Circuit I.F. Amplifier. AGC attack and decay time are controlled by C312, R315, and R316.

ALC voltage from the SWR bridge is coupled through D303 to Q301B, controlling I.F. gain in a similar manner to AGC in receive mode. (SWR goes to trans. pre-amp. now.)

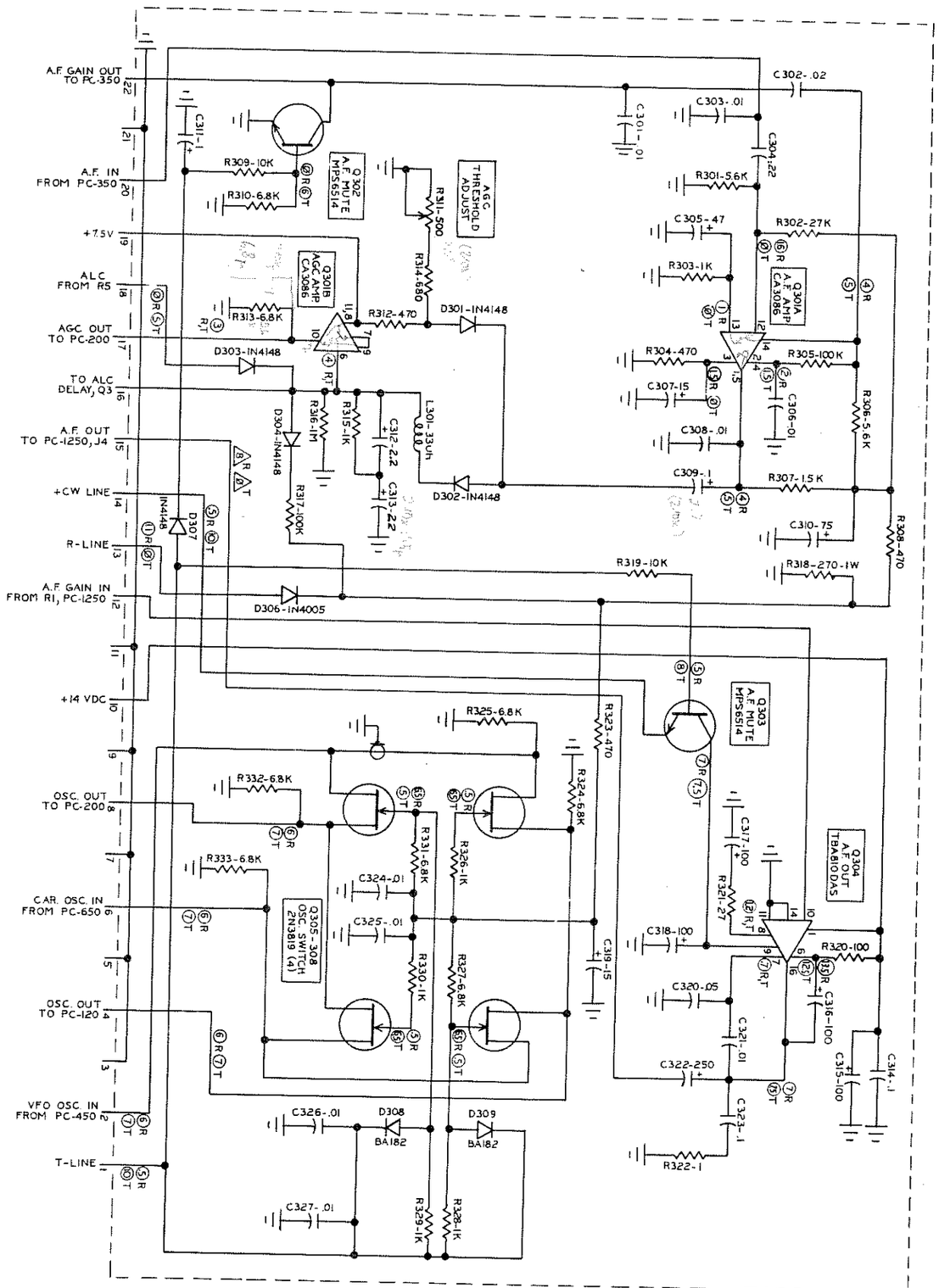
Q305 through Q308 are the F.E.T. oscillator switches, which connect the VFO and Carrier Oscillator to the two mixer stages in proper relationship for receive and transmit functions. The switching is controlled by the "T" line on terminal 1, which is grounded in receive mode and goes +13V in transmit mode.

Q302, A.F. Mute, is used to turn off the A.F. Amplifier Q301A when transmitting in CW mode. Q303 is used to turn off Q304, A.F. power amplifier, when transmitting in SSB mode.



ATLAS MODEL 350-XL
PC-230 SECOND MIXER, SECOND I.F. AMP, S-METER AMP, MIC. AMP

7-27-77 (A)



ATLAS MODEL 350-XL
PC-320 RECEIVER AUDIO, AGC, OSC. SWITCH

7-16-77 (A)

PC-320 CIRCUIT COMPONENTS
RCVR AUDIO, AGC, OSC. SWITCH

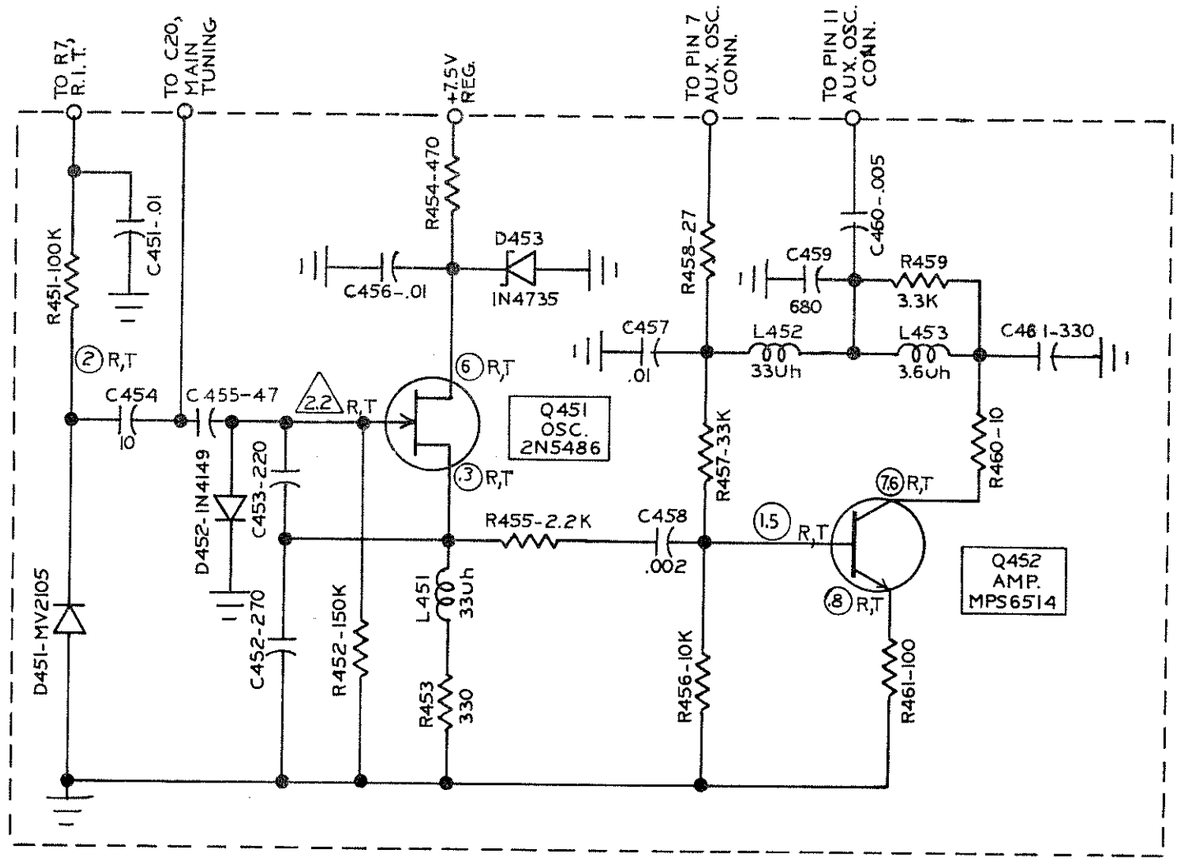
C301, 321	.01 mf 100V 20% Disc
C302	.02 mf 100V 20% Disc
C303, 306, 308, 324, 325, 326, 327	.01 mf 100V Disc
C304	.22 mf 50V Mylar
C305	47 mf 6V Tantalum
C307, 319	15 mf 16V Tantalum
C309, 314, 323	.1 mf 50V 20% Disc
C310	75 mf 15V Electrolytic
C311	1 mf 25V Tantalum
C312	2.2 mf 16V Tantalum
C313	22 mf 16V Tantalum
C315, 316, 317, 318	100 mf 16V Electrol.
C320	.05 mf 25V 20% Disc
C322	250 mf 20V Electrolytic
R301, 306	5.6K 5% ¼ watt
R302	27K 5% ¼ watt
R303, 315, 326, 328, 329, 330	1K 5% ¼ watt
R304, 308, 312, 323	470 5% ¼ watt
R305, 317	100K 5% ¼ watt
R307	1.5K 5% ¼ watt
R309, 319	10K 5% ¼ watt
R310, 313, 324, 325, 327, 331, 332, 333	6.8K 5% ¼ watt
R311	500 S Meter Adj. Pot.
R314	680 5% ¼ watt
R316	1 Meg 5% ¼ watt
R318	270 5% ¼ watt
R320	100 5% ¼ watt
R321	27 5% ¼ watt
R322	1.0 5% ¼ watt
L301	33 µH RF Choke
D301, 302, 303, 304, 307	1N4148 Silicon Diode
D306	1N4005 Silicon Diode
D308, 309	BA-182 Silicon Diode
Q301A, B	CA3086 I.C.
Q302, 303	MPS6514 AF Mute
Q304	TBA810DAS AF Out
Q305, 306, 307, 308	2N3819 Osc. Switch

4. PC-450 VFO OSCILLATOR/PC-760 CRYSTAL OSC.—MIXER

PC-450 contains the VFO Oscillator Q451 and Amplifier Q452. The output of the VFO Oscillator is coupled through C460 to term. 11 of the Auxiliary Oscillator connector, J16, through a jumper and then to PC-760, the VFO/Crystal Oscillator Mixer, Q761. The output from the FET mixer, Q761, is then coupled to the pre-mixer tuning circuits which are tuned to the frequency difference between the VFO and the crystal oscillator, Q762. This difference frequency thus becomes the "local injection signal," and is coupled to the FET switches on PC-320.

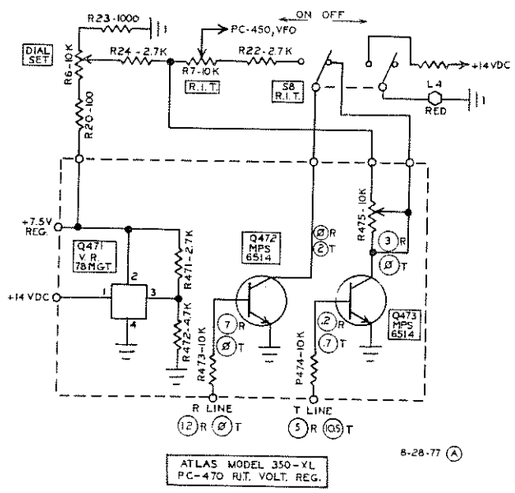
PC-450 CIRCUIT COMPONENTS
PRIMARY VFO

C451, 456, 457	.01 mf 100V Disc
C452	270 pf 5% SM
C453	220 pf 5% SM
C454	10 pf NPO 10% Disc
C455	47 pf N150 5% Disc
C458	.002 mf 20% Disc
C459	680 pf 5% SM
C460	.005 mf 20% Disc
C461	330 pf 20% Disc
R451	100K 5% ¼ watt
R452	150K 5% ¼ watt
R453	330 5% ¼ watt
R454	470 5% ¼ watt
R455	2.2K 5% ¼ watt
R456	10K 5% ¼ watt
R457	33K5% ¼ watt
R458	27 5% ¼ watt
R459	3.3K 5% ¼ watt
R460	10 5% ¼ watt
R461	100 5% ¼ watt
Q451	2N5486 Oscillator
Q452	MPS6514 Osc. Amp.
D451	MV2105 Varicap
D452	1N4149 Silicon Diode
D453	1N4735 6.2V Zener Diode
L451, 452	33 µH RF Choke
L453	3.6 µH RF Choke



ATLAS MODEL 350-XL
PC-450 VFO

8-26-77 (A)



8-28-77 (A)

ATLAS MODEL 350-XL
PC-470 FUT. VOLT. REG.

VOLTAGE SYMBOLS

D.C. VOLTAGE
Voltages are positive unless otherwise noted

A.C.VOLTAGE
Voltages are RMS value

R - RECEIVE

T - TRANSMIT

2N5486 N-FET VHF/UHF I_{DSS} = 8-20mA

≙ BFS 80

2N4416 N-FET VHF I_{DSS} = 5-15mA

5. PC-470 RECEIVER INCREMENTAL TUNING/VOLTAGE REGULATOR

Q472 and Q473 are transistors which control the R.I.T. circuit. Q472 is conducting in Receive mode, while Q473 conducts in Transmit mode. In the OFF position, R7 the R.I.T. control is not conducting current, and thus its setting has no effect on voltage going to the varicap, D451, on the VFO, PC-450. In the ON position, the R.I.T. control will conduct through Q472 in Receive mode, and thus its setting will vary the voltage going to PC-450, and vary the frequency plus or minus approximately 5 KHz. In Transmit mode Q472 will cease conducting, so the voltage going to PC-450 will return to the "normal center" level.

The normal center adjustment is made with the trim-pot, R475, located on PC-470. It should be adjusted so that with R.I.T. turned ON, receive and transmit frequencies coincide when R.I.T. control is at 12 o'clock.

The DIAL SET control, R6, performs its function by controlling the voltage applied to the PC-450 varicap, D451. Q471 is the 7.5 volt I.C. regulator for the VFO and other circuits requiring regulation.

PC-470 CIRCUIT COMPONENTS
R.I.T. & VOLTAGE REGULATOR

R6	10K Dial Set control	R472	4.7K 5% ¼ watt
R7	10K R.I.T. Control	R473, 474	10K 5% ¼ watt
R20	100 5% ¼ watt	R475	10K Trimpot
R21	270 5% 1 watt	Q471	78MGT2C 5-30V.R.I.C.
R22, 24, 471	2.7K 5% ¼ watt	Q472, 473	MPS6514
R23	1K 5% ¼ watt		

revised 8 Mar. 1978

6. PC-540 PRE-DRIVER, SWR PROTECT

The R.F. transmit output from PC-250 is coupled through the preselector tuning circuits, PC-820, to the input terminal on PC-540. The signal is then coupled through C503 to the base of the Pre-Amplifier, Q502, where it is amplified and coupled through C508 to the base of Q503 for further amplification. From Q503 the signal is then coupled to the Driver board, PC-530. The trimpot R507 permits control of transmit drive from the PC-250.

Reflected voltage which is generated by a mismatch in the antenna system is rectified on PC-1150 and then connected to Q501 on the PC-540. There it is used to reduce the gain of Q502 the first pre-amplifier, thus reducing drive to the power output amplifier. The trimpot R502 is adjusted so that standing wave ratios greater than 3 to 4 will substantially reduce R.F. drive.

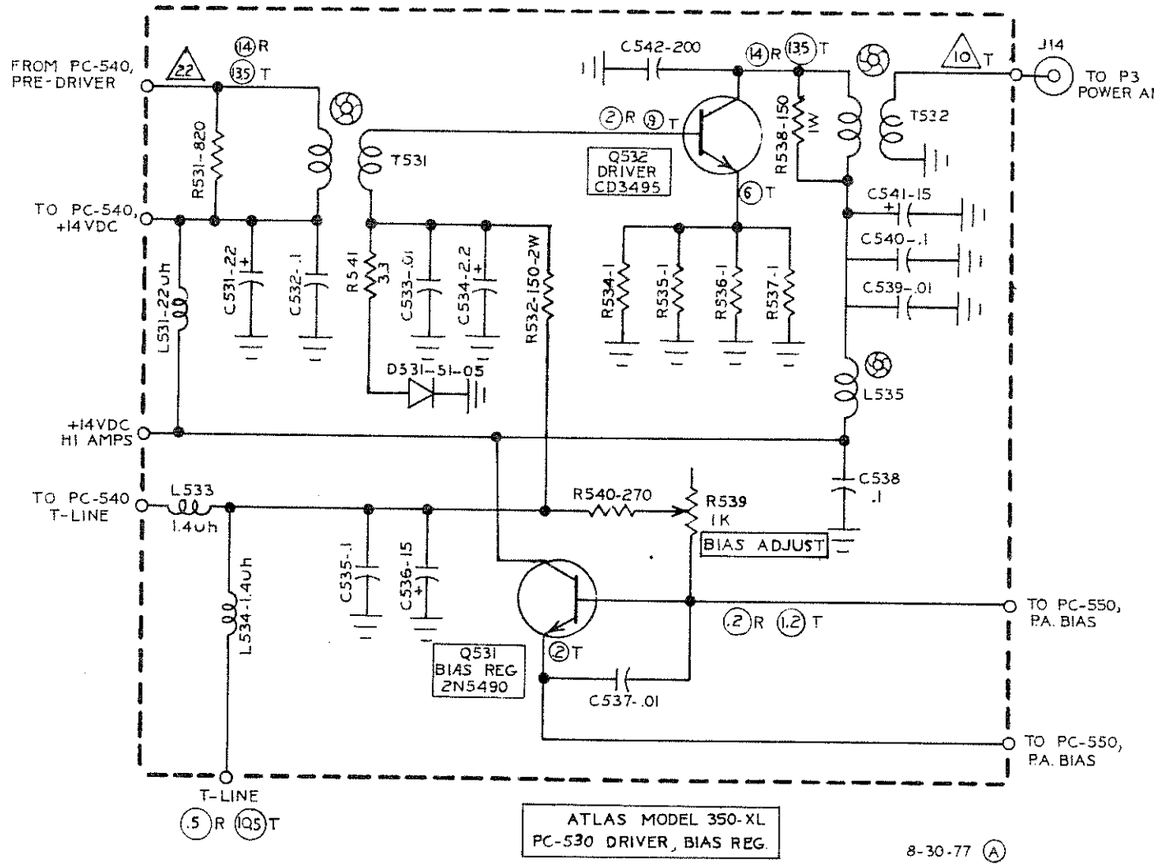
PC-540 CIRCUIT COMPONENTS
PRE-DRIVER

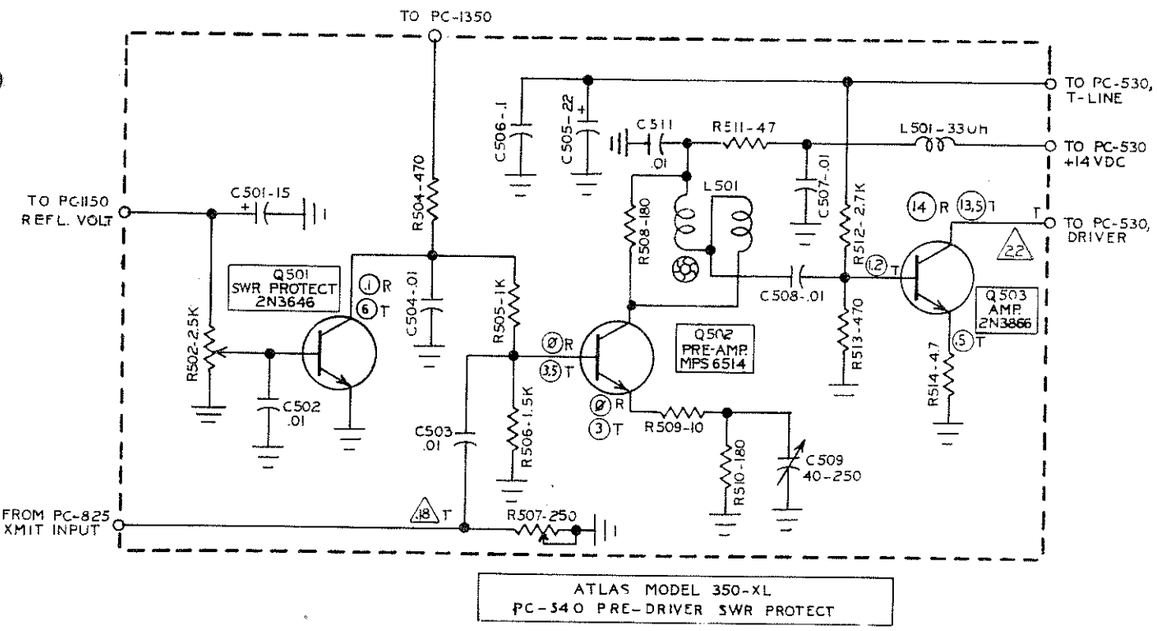
C501	15 mf 16V Tantalum	R508, 510	180 5% ¼ watt
C502, 503, 504, 507, 508, 511	.01 mf 100V Disc	R509	10 5% ¼ watt
C505	22 mf 16V Tantalum	R511	47 5% ¼ watt
C506	.1 mf 50V 20% Disc	R512	2.7K 5% ¼ watt
C509	40-250 pf Trimmer	R514	4.7K 5% ¼ watt
R502	2.5K Trim Pot	L501	33 μH RF Choke
R504, 513	470 5% ¼ watt	Q501	2N3646 SWR Protect
R505	1K 5% ¼ watt	Q502	MPS6514 Pre-amp
R506	1.5K 5% ¼ watt	Q503	2N3866 Amp
R507	250 Trim Pot	T501	Bifilar Toroid XFMR

7. PC-530 DRIVER, BIAS REGULATOR

Output from PC-540 is coupled through the toroid transformer T531 to the base of the Driver Q532 on PC-530. The output of the Driver is coupled through the transformer T532 to the input of PC-550.

Q531 is a bias regulator for the P.A. amplifier. Trimpot R539 is used to adjust resting collector current to approximately 1 amp. Control diodes for the regulator are located on the P.A. Amp, PC-550, and are thermally connected to the heat sink in order to sense temperature increase. Thus, bias voltage automatically decreases with temperature, preventing thermal runaway of the output transistors.

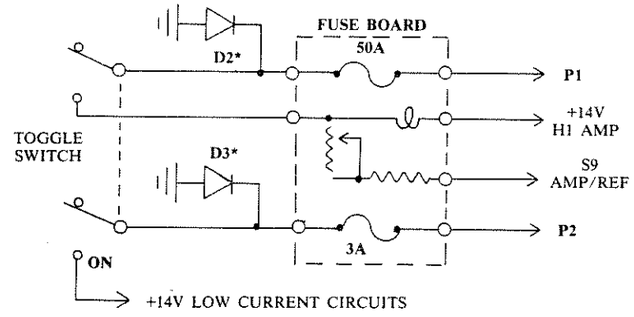




PC-530 CIRCUIT COMPONENTS
POWER AMP DRIVER

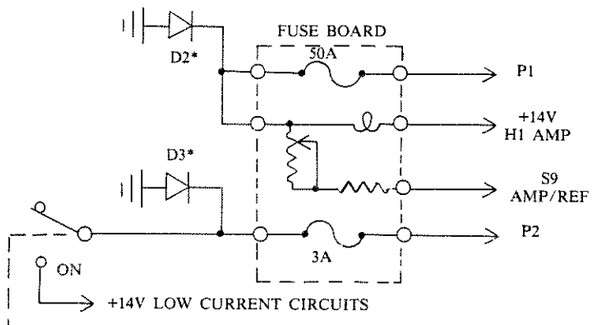
C531	22 mf 25V Electrolytic	R538	150 5% 1 watt
C532, 535, 538, 540	.1 mf 50V 20% Disc	R539	1K Trim Pot
C533, 537, 539	.01 mf 100V Disc	R540	270 5% ¼ watt
C534	2.2 mf 16V Tantalum	R541	3.3 5% ¼ watt
C536, 541	15 mf 20V Tantalum	Q531	2N5490 Bias Reg
C542	200 pf FS 10% Disc	Q532	CD3495 Driver
C543	1000 mf 25V Electrolytic	L531	22 μH RF Choke
R531	27 5% ¼ watt	L533, 534	1.4 μH RF Choke
R532	150 5% 2 watt	L535	8.6 μH Toroid RF Choke
R534, 535, 536, 537	1.0 5% ¼ watt	T531, 532	Toroid Xfmr

revised 8 Mar. 1978



EARLY MODEL ON-OFF SWITCHING

*REVERSE POLARITY PROTECT DIODES



LATER MODEL ON-OFF SWITCHING COMBINED WITH TX DRIVE CONTROL

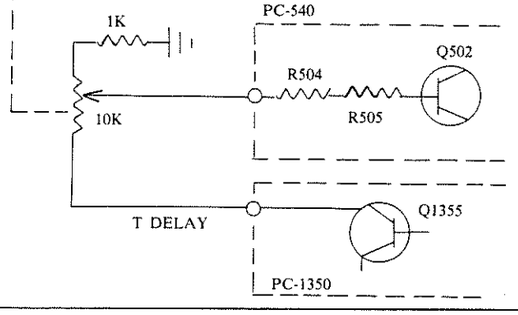
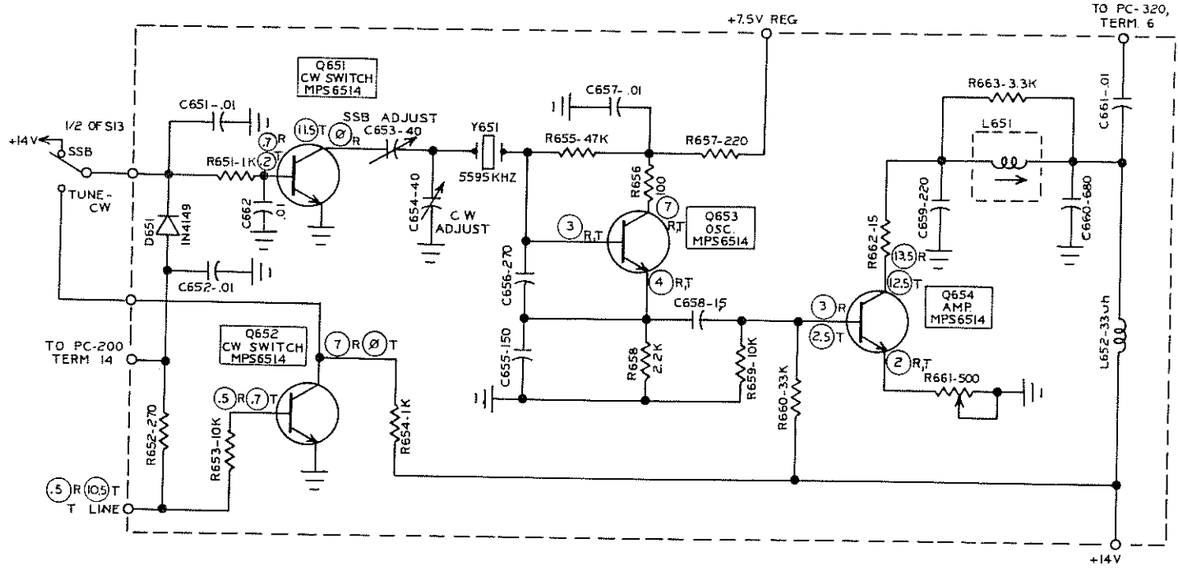
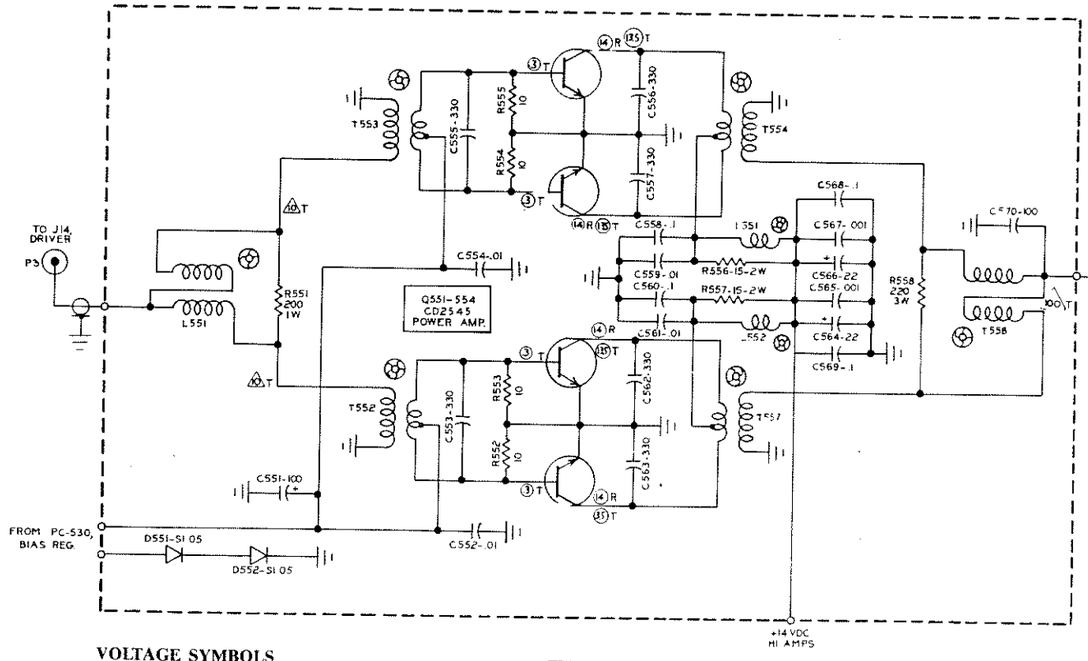


FIG. 4.4





VOLTAGE SYMBOLS

D.C. VOLTAGE
Voltages are positive unless otherwise noted

A.C.VOLTAGE
Voltages are RMS value

R - RECEIVE

T - TRANSMIT

8. PC-550 POWER AMPLIFIER

Output from PC-530 is coupled through the power divider T551 on the PC-550 to the Driver input transformers T552 and T553 to the base inputs of Q551 through Q554, which are the tandem Power Amplifiers.

The outputs of the power amplifiers are coupled through the output transformers T554 and T557 to the power combiner, T558 and then to the output connector. From this connection the signal passes through the Low Pass Filters, PC-1050 and PC-1055 and through the SWR Bridge to the 50 ohm antenna connector.

PC-550 CIRCUIT COMPONENTS
POWER AMPLIFIER

R551	200 5% 1 watt	C565, 567	.001 mf 100V Disc
R552, 553, 554, 555	10 5% ¼ watt	C570	100 pf 5% DM-19 SM
R556, 557	15 5% 2 watt	D551, 552	SI-05 Bias Reg
R558	220 5% 3 watt	Q551, 552, 553, 554	CD2545 Power Amp
C551	100 mf 16V Electrolytic	T551	Input Pwr Divider
C552, 554, 559, 561	.01 mf 100V Disc	L551, 552	Toroid RF Choke
C553, 555, 556, 557, 562, 563	330 pf 5% DM-19 SM	T552, 553	Input Xfmr
C558, 560, 568, 569	.1 mf 100V Mylar	T554, 557	Output Xfmr
C564, 566	22 mf 25V Electrolytic	T558	Output Pwr Combiner

9. PC-650 CARRIER OSCILLATOR

Q653 is the crystal controlled carrier oscillator, or "BFO". Q654 is a buffer stage, and has a tuned low pass filter in its output circuit which effectively suppresses harmonics, assuring a clean sine wave output.

Q651 and Q652 are part of the CW switching circuit which provides automatic frequency shift when transmitting in CW mode. There are two capacity trimmers, C653 and C654. The later, C654 is for CW adjustment.

In TUNE-CW mode, switch S13 is down, and the base of Q651 is biased on by voltage delivered through R654. When the CW key is closed, the T-line goes positive, approximately 10 volts. This causes Q652 to conduct, shorting the collector to ground, removing the plus voltage from the base of Q651, causing it to cease conducting. Thus, the trimmer, C653, is removed from the circuit, causing the oscillating frequency to move upward. This occurs whenever the CW key is pressed. When the key is up the carrier frequency returns to normal. NOTICE: When going into CW transmit mode, the carrier frequency moves upward, approximately 800 Hertz, into the CW filter passband. However, in the process of heterodyning the carrier oscillator with the I.F. in the transmit mixer, the signal is inverted, and the CW transmit frequency actually moves downward. In other words, you will be transmitting 800 Hertz *below* your receive frequency. Always observe caution when operating near the low end of a band. The digital dial will read *only* your receiving frequency.

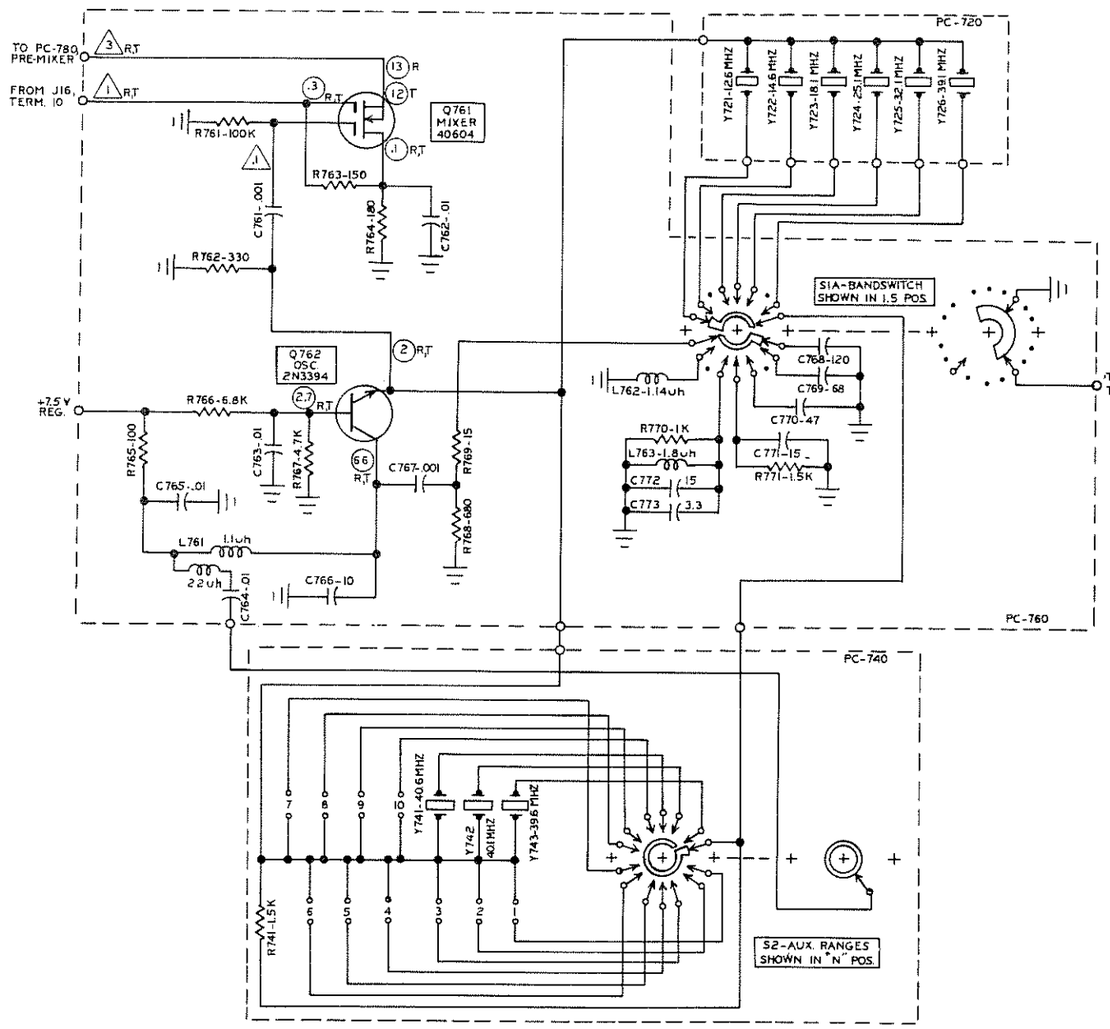
PC-650 CIRCUIT COMPONENTS
CARRIER OSCILLATOR

C651, 652, 657, 661, 662	.01 mf 100V Disc	R656	100 5% ¼ watt
C653, 654	3-40 pf Trimmer	R657	220 5% ¼ watt
C655	150 pf FS 10% Disc	R658	2.2K 5% ¼ watt
C656	270 pf FS 10% Disc	R660	33K 5% ¼ watt
C658	15 pf NPO 5% Disc	R661	500 Trimpot
C659	220 pf FS 10% Disc	R662	15 5% ¼ watt
C660	680 pf FS 10% Disc	R663	3.3K 5% ¼ watt
R651, 654	1K 5% ¼ watt	L651	I.F. Xfmr
R652	270 5% ¼ watt	L652	33 μH RF Choke
R653, 659	10K 5% ¼ watt	D651	1N4149 Silicon Diode
R655	47K 5% ¼ watt	Q651, 652, 653, 654	MPS6514 Silicon Diode
		Y651	5595.0 KHz Crystal

10. PC-720 PRIMARY CRYSTALS; PC-740 AUXILIARY CRYSTALS; PC-760 VFO/CRYSTAL MIXER

The Bandswitch selects crystal frequencies from PC-720 and PC-740 which are coupled into the crystal oscillator, Q762, on PC-760. The signal is then coupled through C761 to the FET mixer, Q761, where it mixes with the 5.005 to 5.505 MHz VFO signal. The output signals are then coupled to the PRE-MIXER tuning, PC-780, where the difference frequency is selected. This becomes the "local injection signal."

On bands 1.5 and 3.5 the crystals oscillate at their fundamental frequency. On the four higher bands the crystals oscillate on their third overtone, and the oscillator circuit is tuned accordingly.



ATLAS MODEL 350-XL
PC-720 PRIMARY CRYSTALS, PC-740 AUX. RANGE CRYSTALS, PC-760 VFO/CRYSTAL MIXER

10-31-77 (A)

VOLTAGE SYMBOLS

D.C. VOLTAGE
Voltages are positive unless otherwise noted

A.C.VOLTAGE
Voltages are RMS value

R - RECEIVE

T - TRANSMIT

PC-720, PC-740 & PC-760 CIRCUIT COMPONENTS PRIMARY BAND XTALS, AUX. RANGE XTALS & VFO/XTAL MIXER

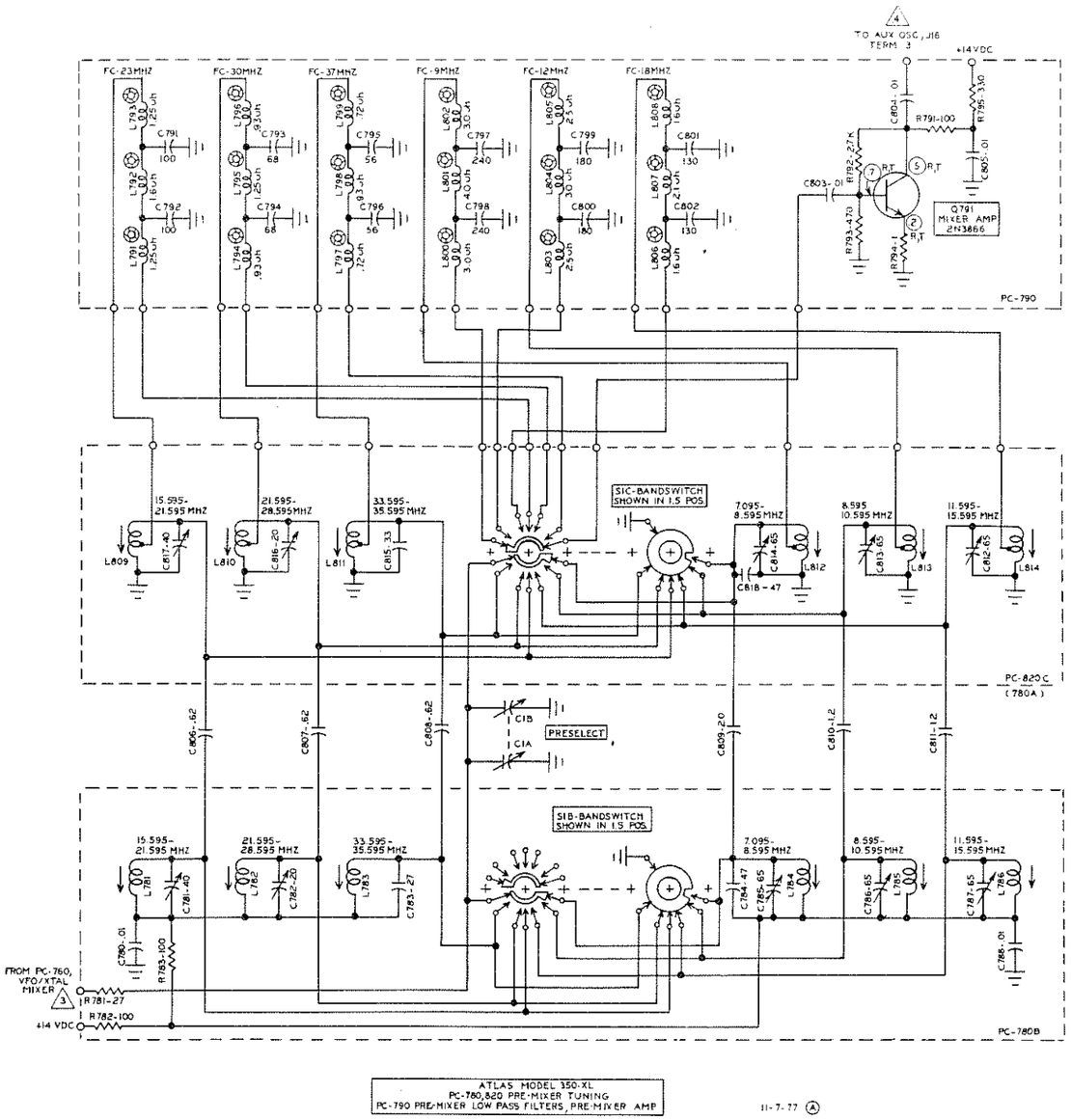
C761, 767	.001 mf 100V Disc	R769	15 5% ¼ watt
C762, 763, 764, 765	.01 mf 100V Disc	R770	1K 5% ¼ watt
C766	10 pf NPO 5% Disc	Q761	40604 Mixer
C768	120 pf FS 10% Disc	Q762	2N3394 Oscillator
C769	68 pf NPO 5% Disc	L761	.22 μH & 1.1 μH Dual RFC
C770	47 pf NPO 5% Disc	L762	1.14 μH RF Choke
C771, 772	15 pf NPO 5% Disc	L763	1.8 μH RF Choke
C773	3.3 pf NPO 5% Disc	Y721	12.6 MHz Xtal
R741, 771	1.5K 5% ¼ watt	Y722	14.6 MHz Xtal
R761	100K 5% ¼ watt	Y723	18.1 MHz Xtal
R762	330 5% ¼ watt	Y724	25.1 MHz Xtal
R763	150 5% ¼ watt	Y725	32.1 MHz Xtal
R764	180 5% ¼ watt	Y726	39.1 MHz Xtal
R765	100 5% ¼ watt	Y741	40.6 MHz Xtal
R766	6.8K 5% ¼ watt	Y742	40.1 MHz Xtal
R767	4.7K 5% ¼ watt	Y743	39.6 MHz Xtal
R768	680 5% ¼ watt		

11. PC-780, PC-820 PRE-MIXER TUNING; PC-790 PRE-MIXER LOW PASS FILTERS, MIXER AMP.

Output from PC-760 FET mixer is coupled through R781 to the two section Pre-Mixer tuned circuits, PC-780 and PC-820. These tuned circuits are band-switched and provide full coverage of each tuning range. C1, the PRESELECT panel tuning control allows for fine tuning of each frequency range. The signal is then coupled through low pass filters on PC-790 to the base of the Pre-Mixer amplifier, Q791. The output is coupled through C804 to terminal 3 of J16, the Auxiliary Oscillator connector, through a jumper, and then to the F.E.T. oscillator switches on PC-320. These F.E.T. switches determine which mixer the local injection signal will couple to, #1 mixer in receive mode, #2 mixer in transmit mode.

PC-780B, PC-790 & PC-820C CIRCUIT COMPONENTS PRE-MIXER TUNING, LOW-PASS FILTERS & AMP

C780, 788, 803, 804, 805	.01 mf 100V Disc	R793	470 5% ¼ watt
C781, 817	40 pf Trimmer	R794	1.0 5% ¼ watt
C782, 816	20 pf Trimmer	R795	330 5% ¼ watt
C783	27 pf N330 5% Disc	L781, 809	1.15 μH Coil, 20-M (Blu)
C784, 818	47 pf NPO 5% Disc	L782, 810	.72 μH Coil, 15-M (Red)
C785, 786, 787, 812, 813, 814	65 pf Trimmer	L783, 811	.6 μH Coil, 10-M (Grn)
C791, 792	100 pf FS 10% Disc	L784, 785, 812, 813	3.2 μH Coil, 160 & 80-M (Gry)
C793, 794	68 pf N1500 5% Disc	L786, 814	2.0 μH Coil, 40-M (Vlt)
C795, 796	56 pf N750 5% Disc	L791, 793	1.25 μH Toroid
C797, 798	240 pf FS 10% Disc	L792, 806, 808	1.6 μH Toroid
C799, 800	180 pf FS 10% Disc	L794, 796, 798	.93 μH Toroid
C801, 802	130 pf FS 10% Disc	L795	1.17 μH Toroid
C806, 807, 808	0.62 pf 10% Tubular	L797, 799	.72 μH Toroid
C809	2 pf 10% Tubular	L800, 802, 804	3.0 μH Toroid
C810, 811	1.2 pf 10% Tubular	L801	4.0 μH Toroid
C815	33 pf N150 5% Disc	L803, 805	2.5 μH Toroid
R781	27 5% ¼ watt	L807	2.1 μH Toroid
R782, 783, 791	100 5% ¼ watt	Q791	2N3866 Mixer Amp
R792	2.7K 5% ¼ watt		



ATLAS MODEL 350-XL
PC-780,820 PRE-MIXER TUNING
PC-790 PRE-MIXER LOW PASS FILTERS, PRE-MIXER AMP

11-7-77 (A)

VOLTAGE SYMBOLS

D.C. VOLTAGE
Voltages are positive unless otherwise noted

A.C.VOLTAGE
Voltages are RMS value

R - RECEIVE

T - TRANSMIT

12. PC-820A, B PRESELECTOR TUNING PC-825 REC/TRANS RELAY, R.F. AMPLIFIER

In receive mode, the signal from the antenna passes through the low pass filters, PC-1050 and PC-1055, then to Ant. Relay RL1051, and then to relay RL825 on the PC-825. The signal then passes through the two section Preselector tuned circuits, PC-820A, B. These tuned circuits are bandswitched and provide full coverage of each tuning range. C1, the PRESELECT panel tuning control allows for fine tuning of each frequency range. The signal then passes through relay RL826 to the base of the R.F. Amplifier, Q825. The signal is then coupled through C824 to terminal 1 of PC-120.

In transmit mode the signal from PC-250 is coupled through relay RL826 and through the Preselector tuned circuits in the same manner as in receive mode. The output signal is then coupled through RL825 to the transmit pre-amplifier on PC-540.

PC-820A, PC-820B & PC-825
CIRCUIT COMPONENTS
PRESELECTOR TUNING, R/T RELAY, RF AMP

C815, 833	82 pf NPO 5% Disc	R825	100K 5% ¼ watt
C816, 834	110 pf N150 5% Disc	R826, 828	100 5% ¼ watt
C817, 835	100 pf NPO 5% Disc	R827	220 5% ¼ watt
C818, 836	33 pf N150 5% Disc	R829	150 5% ¼ watt
C819, 820, 837, 838	47 pf NPO 5% Disc	Q825	2N3866 RF Amp
C821	.001 mf FS 10% Disc	L815, 825	1.15 lμH Coil (Blu)
C822	470 pf FS 10% Disc	L816, 826	.6 μH Coil (Grn)
C823, 824, 825	.01 mf 100V Disc	L817, 827	.28 μH Coil (Ylw)
C826, 830	56 pf N750 5% Disc	L818, 828	52 μH Coil (Brn)
C827, 831	100 pf FS 10% Disc	L819, 829	12 μH Coil (Blk)
C828	75 pf FS 10% Disc	L820, 830	3.2 μH Coil (Gry)
C829	43 pf N750 5% Disc	L821, 822	1.25 μH Coil (Vlt)
C832	10 pf N470 5% Disc	L823, 824	.72 μH Coil (Blk)
		RL825, 826	SPDT 12 VDC DIP Relay

13. PC-850 CRYSTAL CALIBRATOR

On early model 350-XL's, the 100 KHz crystal, Y851, was divided by four down to 25 KHz beats by Q851 - 854. These dividers could also divide by 3 or 5, producing beats at 33⅓ or 20 KHz. Trimpot R860 provided for adjustment to the desired 25 KHz beat. Trimmer C852 is used to adjust the 100 KC crystal to zero beat against a known standard such as WWV. Output from PC-850 is coupled through C832 to RL825 on PC-820.

Later model 350-XL's use an MC14027B I.C. which divides only by four, and this eliminates need for the R860 adjustment.

PC-850 CIRCUIT COMPONENTS
25 KHz CALIBRATOR

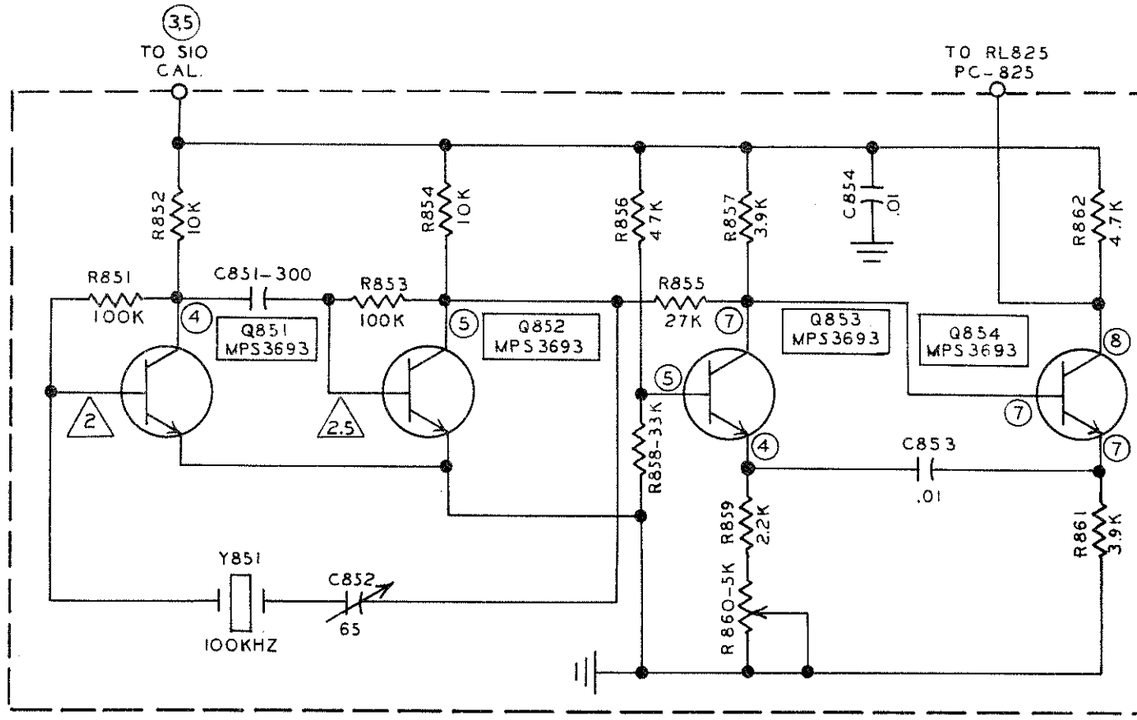
C851	300 pf FS 10% Disc	R856	47K 5% ¼ watt
C852	65 pf Trimmer	R857, 861	3.9K 5% ¼ watt
C853	.01 mf Non-inductive Mylar	R858	33K 5% ¼ watt
C854	.01 mf 100V Disc	R859	2.2K 5% ¼ watt
R851	100 5% ¼ watt	R860	5K Trimpot
R852, 854	10K 5% ¼ watt	R862	4.7K 5% ¼ watt
R853	100K 5% ¼ watt	Q851, 852, 853, 854	MPS3693
R855	27K 5% ¼ watt	Y851	100 KHz Xtal

14. PC-1050, PC-1055 LOW PASS FILTER

Output from the Power Amplifier, PC-550, is coupled to the bandswitched two section low pass filter. The filter is designed to suppress harmonics 50 db or more. The filters are also designed for a 50 ohm load and it is important that the load be quite close to 50 ohms, non-reactive, the low pass filter is also used during receiving operations to suppress interference from strong local VHF signals.

15. PC-1150 SWR BRIDGE

The reflector, or SWR PROTECT circuit, provides a forward going voltage for ALC which increases directly as transmitter output increases. This positive voltage connects to the ALC potentiometer on the front panel and then to terminal 18 of PC-320 where the ALC voltage is amplified and then used to control I.F. gain on PC-250. The capacity trimmer, C1090, is the bridge null adjustment.



NOTE: VOLTAGE MEASUREMENTS TAKEN IN RECEIVE MODE WITH CAL SWITCH "ON".

Sketch 1 IC 1pv 4transistor

ATLAS MODEL 350-XL
PC-850 25KHZ CRYSTAL CALIBRATOR

2-22-78

VOLTAGE SYMBOLS

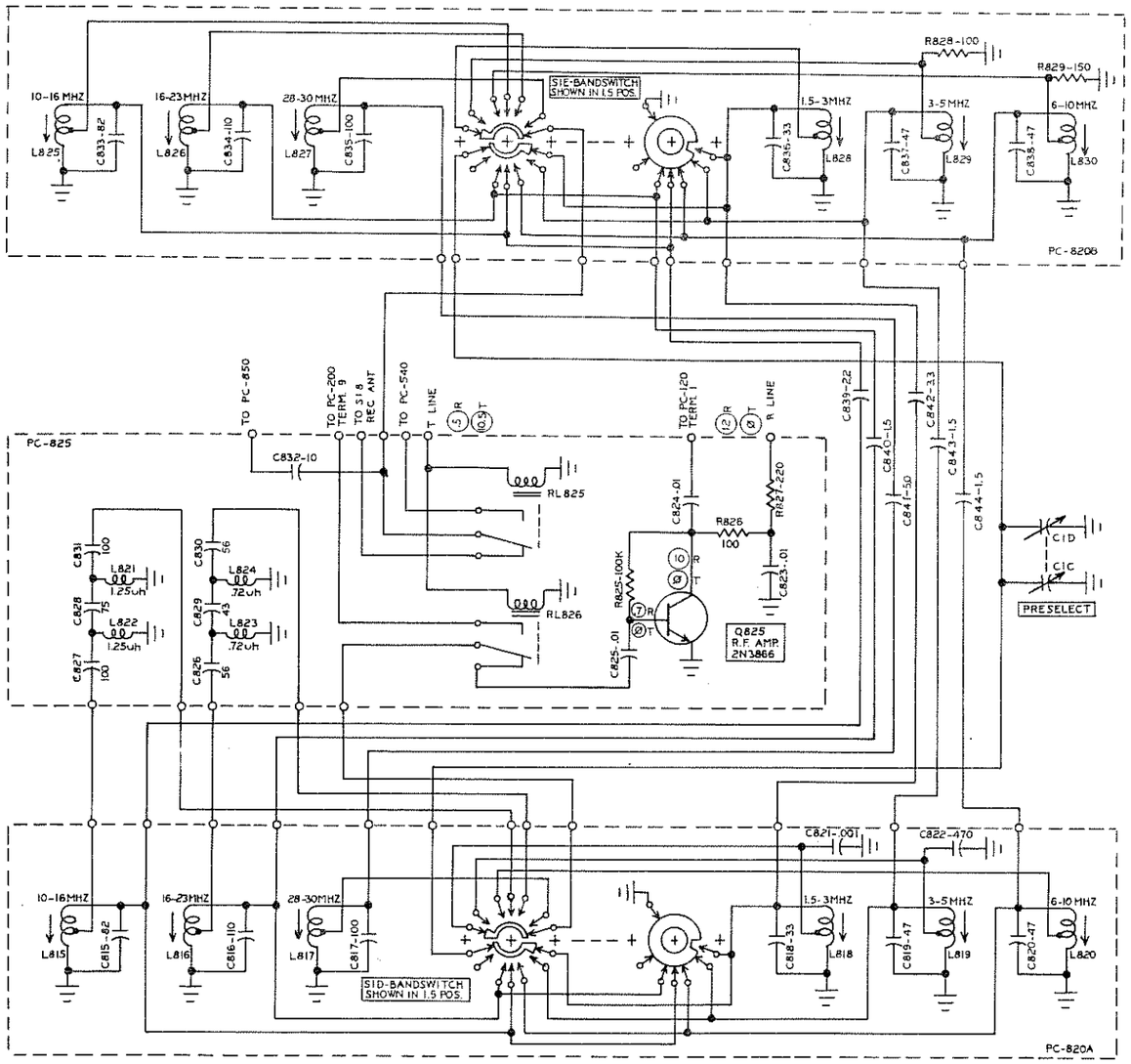
D.C. VOLTAGE
Voltages are positive unless otherwise noted

A.C.VOLTAGE
Voltages are RMS value

R - RECEIVE

T - TRANSMIT

MPS 3693 = 2N3693



ATLAS MODEL 350-XL
PC-820A,B RECEIVE/TRANSMIT TUNING
PC-825 RECEIVE/TRANSMIT RELAY, R.F. AMPLIFIER

11-16-77 (A)

VOLTAGE SYMBOLS

D.C. VOLTAGE
Voltages are positive unless otherwise noted

A.C.VOLTAGE
Voltages are RMS value

R - RECEIVE

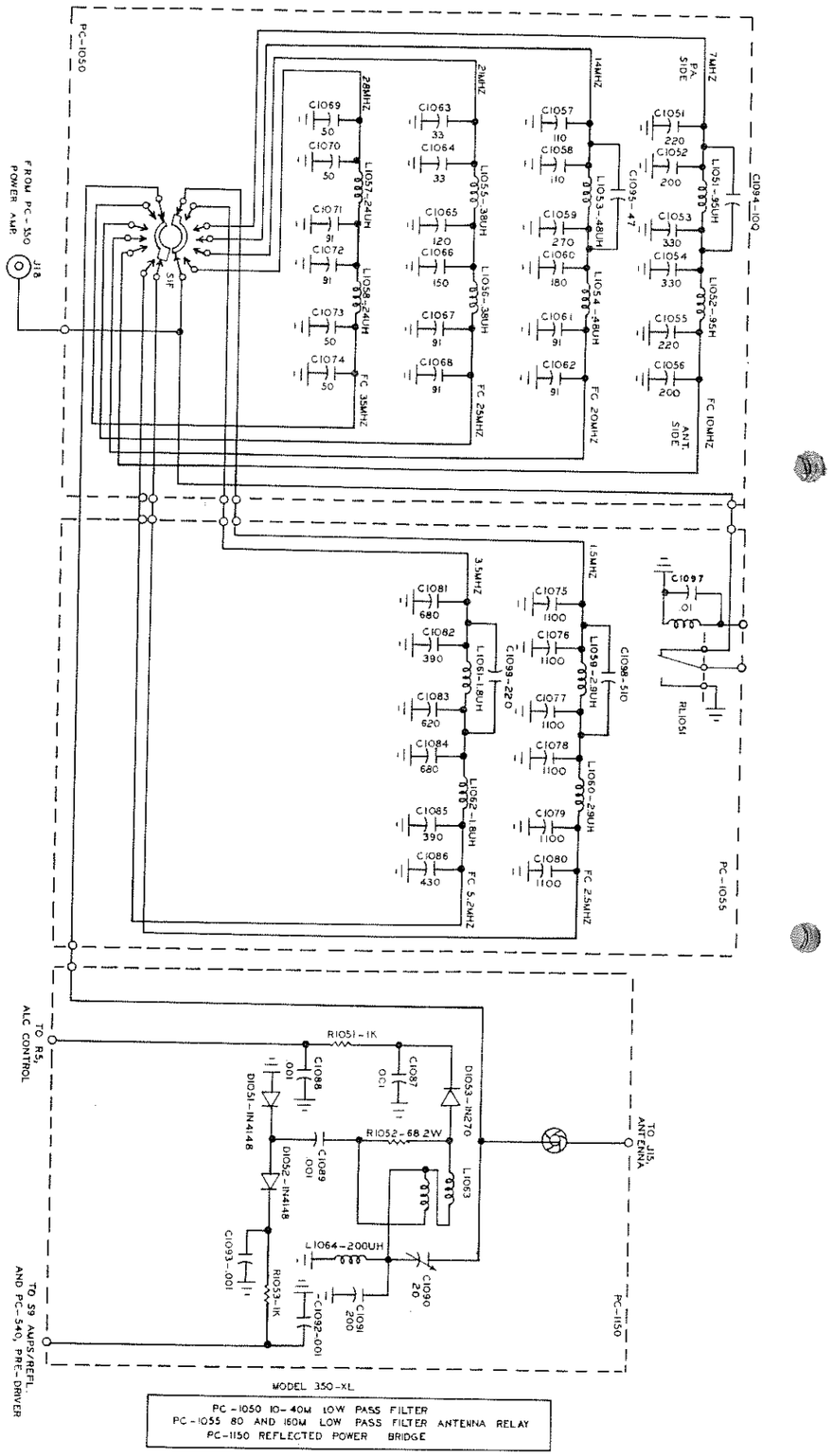
T - TRANSMIT

PC-1050/1055 CIRCUIT COMPONENTS
LOW PASS FILTERS

BAND	COMPONENT		FREQ. CUTOFF
1.5 MHz	C1075, 1076, 1077, 1078, 1079, 1080	1100 pf 5% DM-19 SM	2,500ø KHz
	C1098	510 pf 5% DM-19 SM	
	L1059, 1060	2.9 μH Toroid	
3.5 MHz	C1081, 1084	680 pf 5% DM-19 SM	5,200ø KHz
	C1082, 1085	390 pf 5% DM-19 SM	
	C1083	620 pf 5% DM-19 SM	
	C1086	430 pf 5% DM-19 SM	
	C1099	220 pf 5% DM-19 SM	
	L1061, 1062	1.8 μH Toroid	
7 MHz	C1051, 1055	220 pf 5% DM-19 SM	10,000 KHz
	C1052, 1056	200 pf 5% DM-19 SM	
	C1053, 1054	330 pf 5% DM-19 SM	
	C1094	100 pf 5% DM-19 SM	
	L1051, 1052	.95 μH Toroid	
14 MHz	C1057, 1058	110 pf 5% DM-19 SM	20,000 KHz
	C1059	270 pf 5% DM-19 SM	
	C1060	180 pf 5% DM-19 SM	
	C1061, 1062	91 pf FS 10% Disc	
	C1095	47 pf N150 5% Disc	
	L1053, 1054	.48 μH Toroid	
21 MHz	C1063, 1064	33 pf NPO, 5% Disc	25,000 KHz
	C1065	120 pf 5% DM-19 SM	
	C1066	150 pf 5% DM-19 SM	
	C1067, 1068	91 pf FS 10% Disc	
	L1055, 1056	.38 μH Toroid	
28 MHz	C1069, 1070, 1073, 1074	50 pf NPO 5% Disc	35,000 KHz
	C1071, 1072	91 pf FS 10% Disc	
	L1057, 1058	.24 μH Toroid	
	C1097	.01 mf 100V Disc	
	RL-1051	SPDT 12V Reed Relay	

PC-1150 CIRCUIT COMPONENTS
ANTENNA RELAY & SWR BRIDGE

C1087, 1088, 1089, 1092, 1093	.001 mf 100V 20 %Disc
C1090	20 pf Trimmer
C1091	200 pf FS 10% Disc
R1051, 1053	1K 5% ¼ watt
R1052	68 5% 2 watt
D1051, 1052	1N4148 Silicon Diode
D1053	1N270 Germanium Diode
L1063	Bifilar Toroid
L1064	200 μH RF Choke



VOLTAGE SYMBOLS

D.C. VOLTAGE
Voltages are positive unless otherwise noted

A.C.VOLTAGE
Voltages are RMS value

R - RECEIVE

T - TRANSMIT

16. PC-1250 VOX/SIDETONE

Q1251 is a Darlington Mic Amp. whose output couples through the VOX GAIN control to one of the 5 transistors in Q1252. The amplified Mic signal is rectified by D1251. The DC voltage is amplified by 2 stages using other transistors in Q1252. The amplified DC causes Q1253 to conduct, thus switching the transceiver into transmit mode. The DELAY control adjusts the time constant of C1263, which determines how quickly the circuit will return to receive mode when the operator stops talking. Received signals are coupled from the loud speaker circuit to the ANTI-VOX control, and then rectified by D1253 and D1254. This DC voltage is coupled to the Mic. Amp. circuitry in opposite phase to received signals which are picked up from the loud speaker to the microphone, thus cancelling out and preventing received signals from tripping the VOX. Careful adjustment of VOX GAIN and ANTI-TRIP will provide smooth VOX operation.

One of the transistors in Q1252 is used as a sidetone generator for CW monitoring. Terminals 6, 7, and 8 of Q1252 connect to this transistor. A screwdriver adjusted trim-pot adjusts the frequency of the sidetone, and is called the "pitch" control. Another control adjusts sidetone volume. On earlier models this was also a trim-pot. On later models it is a thumb wheel control which is accessible under the transceiver. A.F. output from the sidetone generator is coupled to Terminal 12 of PC-320, which connects to the input of the audio output I.C. This I.C. is turned off in SSB transmit mode; but is left on in CW transmit in order to monitor the sidetone.

PC-1250 CIRCUIT COMPONENTS
VOX/SIDETONE

C1251	47 mf 16V Electrolytic	R1258	3.3K 5% ¼ watt
C1252, 1263	100 mf 16V Electrolytic	R1259, 1271	22K 5% ¼ watt
C1263, 1256	.001 mf 100V 20% Disc	R1260, 1274, 1275	10K Potentiometer
C1254, 1261, 1262, 1265	.1 mf 25V 20% Disc	R1261	500 Potentiometer
C1255	15 mf 16V Tantalum	R1262, 1263	4.7K 5% ¼ watt
C1257, 1258, 1259	.01 mf 100V 20% Disc	R1264, 1265, 1266, 1268, 1272	10K 5% ¼ watt
C1260	2.2 mf 16V Tantalum	R1267	2.2K 5% ¼ watt
C1264	6.8 mf 16V Tantalum	R1269	270K 5% ¼ watt
R1251	100 5% ¼ watt	R1273	680 5% ¼ watt
R1252	270 5% ¼ watt	R1276	3.3K Potentiometer
R1253	680K 5% ¼ watt	D1251	1N4148 Silicon Diode
R1254	33K 5% ¼ watt	D1252	1N4735 6.2V Zener Diode
R1255	47K 5% ¼ watt	D1253, 1254	1N270 Germanium Diode
R1256	100K 5% ¼ watt	D1255	1N4740 10V Zener Diode
R1257, 1270	180 5% ¼ watt	Q1251, 1253	MPS6514
		Q1252	CA3086 I.C.

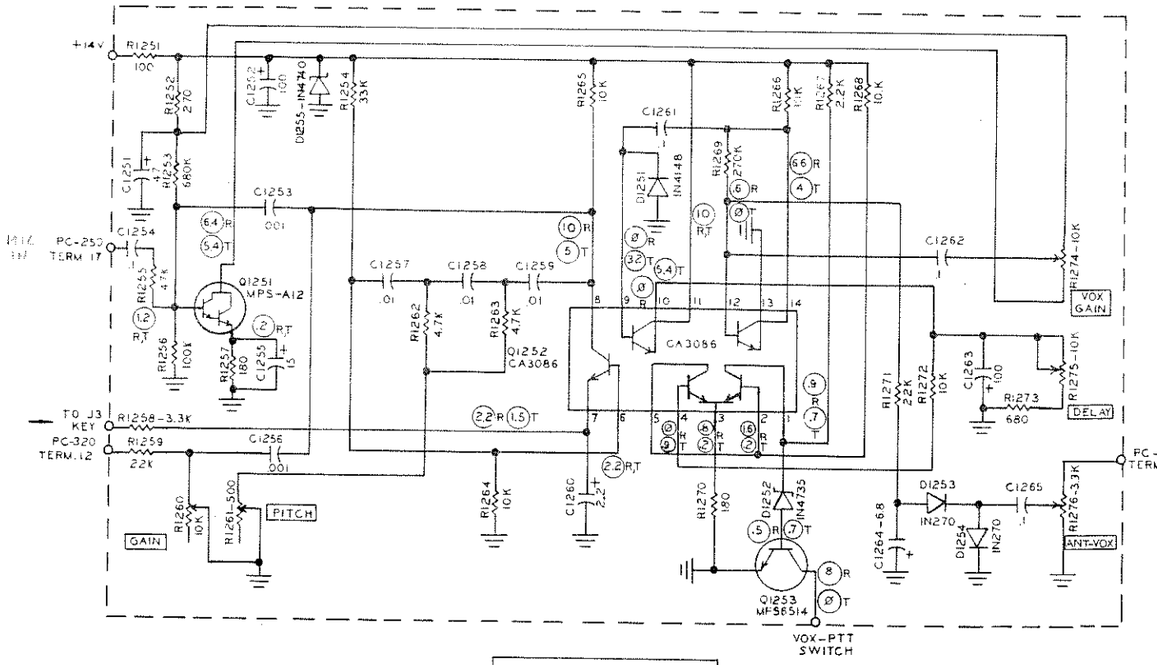
17. PC-350 A.F. NOTCHER, ANL

Audio signal from terminal 5 of PC-250 is coupled through C360 on PC-350 into the quad operational amplifier, Q351. U1, U2, and U3 op amps are used for highpass, bandpass and lowpass outputs. U4 is used to sum the highpass/lowpass outputs which, being 180 degrees out of phase, result in a tuneable notch between 300 and 3000 Hz. The notch output has unity gain with respect to the input signal, and any variations can be adjusted for by trimpot, R351. The audio signal is then coupled into the audio amplifier stage on PC-320.

The Automatic Noise Limiter is the conventional clipping type that reduces hash and steady-going noise such as power line and atmospheric type noise. The low pass filter in the ANL circuit is designed to reduce any audio distortion that may be present when ANL is in operation.

PC-350 CIRCUIT COMPONENTS
AF NOTCHER

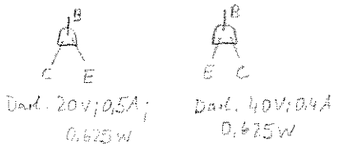
C351, 357, 358	.1 mf 50V Disc	R351	1 Megohm Trimpot
C352, 359	.001 mf 2.5% Polystyrene	R352, 354, 356, 358, 359, 360, 361, 362	100K 5% ¼ watt
C353	15 mf 16V Tantalum	R353, 357	33K 5% ¼ watt
C354	.005 mf 20% Disc	R355	22K 5% ¼ watt
C355	.01 mf 20% Disc	L351	400 mH Audio Choke
C356	.05 mf 20% Disc	Q351	LM324 I.C.
C360	.02 mf 25V Disc	D351, 352	1N270 Germanium Diode



ATLAS MODEL 350-XL
PC-1250 VOX / SIDETONE

3-1-78 (A)

MPS A12 ≙ BC 517



VOLTAGE SYMBOLS

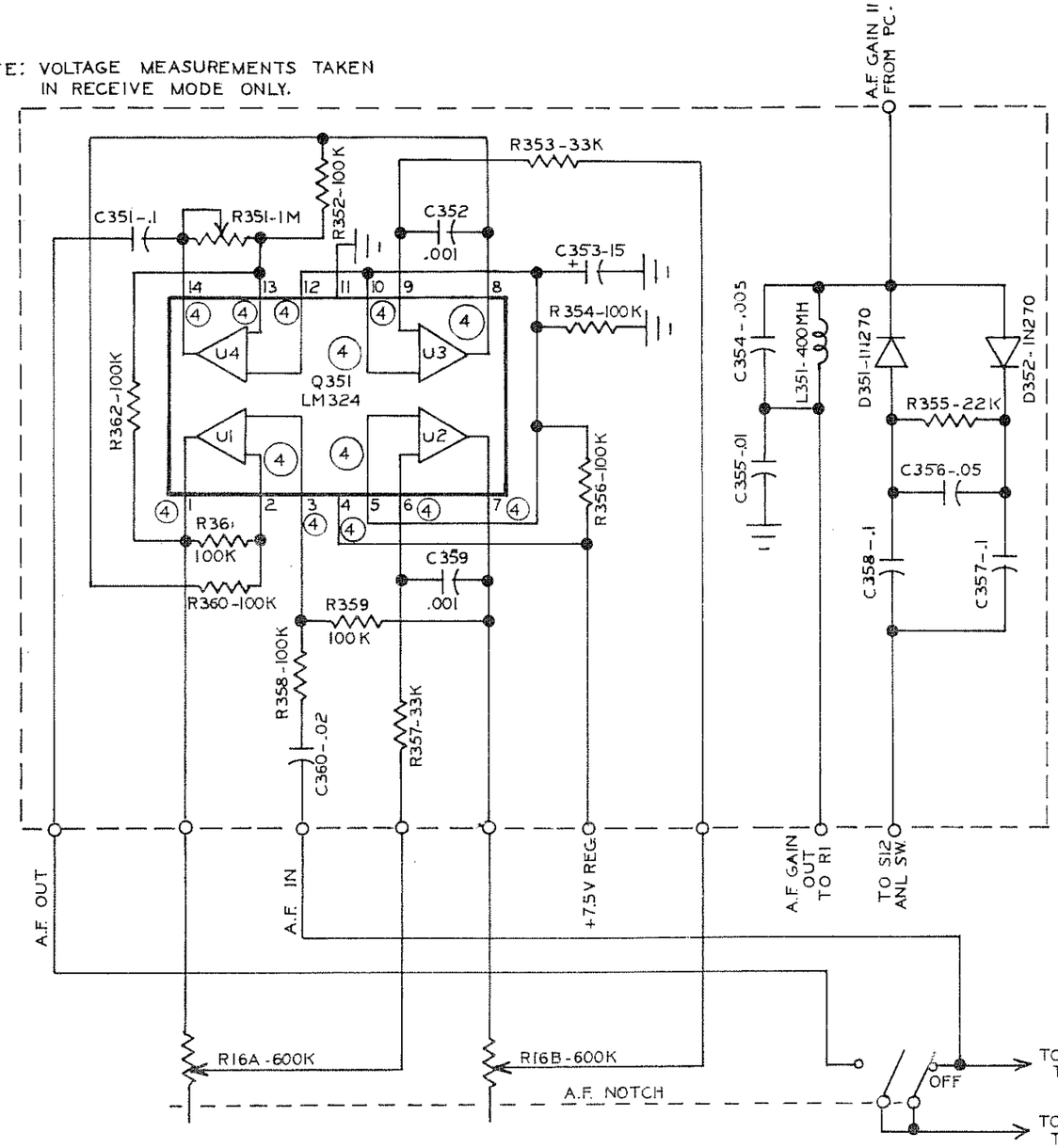
D.C. VOLTAGE
Voltages are positive unless otherwise noted

A.C.VOLTAGE
Voltages are RMS value

R - RECEIVE

T - TRANSMIT

NOTE: VOLTAGE MEASUREMENTS TAKEN IN RECEIVE MODE ONLY.



VOLTAGE SYMBOLS

D.C. VOLTAGE
Voltages are positive unless otherwise noted

A.C.VOLTAGE
Voltages are RMS value

R - RECEIVE

T - TRANSMIT

ATLAS MODEL 350-XL
PC-350 A.F. NOTCH, ANL

7-28-77 (A)

18. PC-1350 TRANSMIT-RECEIVE SWITCHING

Q1351 is the first stage of the T-R switching system. It controls Q1352 and Q1353 in the T-Line circuit. In receive mode the TX-RX switch circuit is open, the base of Q1351 is positive, so Q1351 is conducting. Thus, the bases of Q1352 and Q1353 are grounded. Q1352 is an NPN device, so with no voltage on its base it is not conducting. Thus, there is no voltage conducting to the T-Line. Q1353 is a PNP device, so with no voltage on its base it is conducting, effectively shorting the T-Line nearly to ground.

Q1354 controls the R-Line circuit. With the T-Line grounded (almost) there is not enough voltage on its base to cause it to conduct. Therefore, the bases of Q1356 and Q1357 are positive, (through R1362). Q1356 is an NPN device, and is conducting so the R-Line is positive by approximately 12 volts. Q1357 is a PNP and since its base is positive it is not conducting.

In transmit mode, the above conditions are reversed. The TX-RX switching circuit is grounded, either with the Mic. button, VOX circuit, CW key, or panel switch. This removes base voltage from Q1351 so it stops conducting. This causes voltage through R1354 to run the bases on Q1352 and Q1353 positive. Q1352 now conducts, turning the T-Line on to a potential of approximately 10 volts. Q1353 ceases to conduct.

When the T-Line goes positive, the base of Q1354 goes positive, causing it to conduct. This shorts the bases of Q1356 and Q1357 to ground. Q1356 ceases to conduct, removing positive voltage from the R-Line. Q1357 is now conducting, running the R-Line to near ground.

Q1355 provides a source of delayed T-Line voltage which supplies the transmit pre-amplifier stage. Thus, the transmitter power output is delayed by a fre milliseconds when switching into transmit mode, protecting the antenna relay from arcing.

Q1352 and Q1356 are 2 amp devices so they can carry the necessary current for the T and R circuits.

PC-1350 CIRCUIT COMPONENTS
T/R SWITCHING

C1351	2.2 mf 16V Tantalum	R1358	22K 5% ¼ watt
C1352	47 mf 16V Electrolytic	R1359, 1360	4.7K 5% ¼ watt
C1353	100 mf 16V Electrolytic	R1364, 1366	270 5% 1 watt
C1354	.1 mf 100V Mylar	R1365	150 5% ¼ watt
R1351	27 5% ¼ watt	Q1351,1354, 1355	MPS6514
R1352	6.8K5% ¼ watt	Q1352, 1356	MPSU01A
R1353	47K 5% ¼ watt	Q1353, 1357	2N5087
R1354, 1361, 1362	1K 5% ¼ watt	D1351, 1353	1N4148 Silicon Diode
R1355, 1356	10 5% ¼ watt	D1352	1N4005 Silicon Diode
R1357, 1363	1.0 5% ¼ watt	RL-1351	3-pole 12 VDC Relay

19. PC-380 DD6-XL AMP., PC-1380 LINEAR AMP. SWITCH

The VFO Oscillator signal is coupled through the Pre-Mixer tuning circuit to the F.E.T. oscillator switch, terminal 2 of PC-320. From there the signal is coupled through C382 of PC-380 to the base of Q381, the digital dial amplifier. Output is then coupled through C383 to S17, the DD-COUNT switch on the rear panel of the 350-XL and then to the digital dial connector, J17. On early 350-XL's these components were chassis mounted on terminal strips located near the PC-320 edge connector.

PC-1380 was incorporated on 350-XL's to allow for solid state semi-break-in keying of linear amplifiers. Early model 350-XL's used relay switching for linear amplifier keying and allowed for full break-in only with a maximum amplifier relay switching current of 250 ma. This system proved unsatisfactory for most amplifiers and a kit was made available from the factory to convert early 350's to the solid state switching circuit.

Both the PC-380 and PC-1380 will be incorporated to a single PC-1400 beginning in February, 1978.

PC-380 CIRCUIT COMPONENTS
DD6-XL AMP.

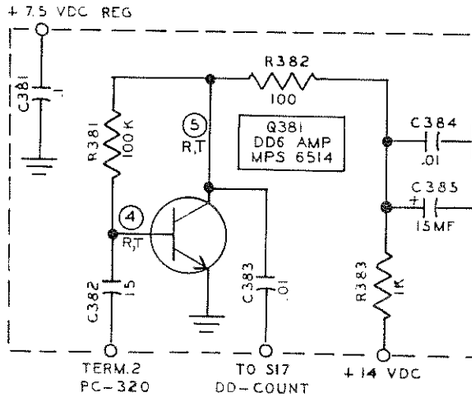
C381	.1 mf 100V 20% Disc	R381	100K 5% ¼ watt
C382	15 pf N150 5% Disc	R382	100 5% ¼ watt
C383, 384	.01 mf 100V Disc	R383	1K 5% ¼ watt
C385	15 mf 16V Tantalum	Q381	MPS6514

PC-1380 CIRCUIT COMPONENTS
LINEAR AMPLIFIER SWITCHING

C1381	.1 mf 50V Disc	R1383	68K 5% ¼ watt
R1381	47K 5% ¼ watt	Q1381	MPS6514
R1382	1K 5% ¼ watt	Q1382	MPSU07

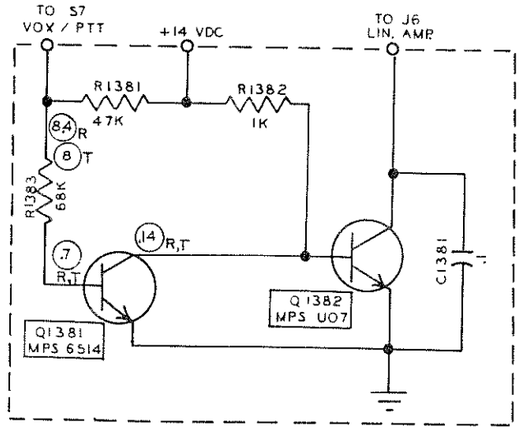
CIRCUIT COMPONENTS
350-XL CHASSIS

C1a, C1b	Premixer Tuning	R8, 15, 41	47K 5% ¼ watt
C1c, C1d	Preselector Tuning	R9, 32, 38, 44	22K 5% ¼ watt
C2, 3, 4, 5, 8, 9, 10, 11, 12, 13, 14, 15, 18, 19, 20, 26, 27, 28, 34, 37, 38.	.001 mf Feed-thru	R10, 11, 12, 23, 31, 36, 37, 42, 43, 48	1K 5% ¼ watt
C6, 7	.47 mf 80V Mylar	R13	6.2 ohm Wire Wound 10 watt
C16, 17	.1 mf 80V Mylar	R14	15K 5% ¼ watt
C21, 22, 36	.1 mf 50V 20 % Disc	R16, 17, 18, 21	270 5% 1 watt
C23	.22 mf 50V Mylar	R19	10 5% 1 watt
C24	470 mf FS 10% Disc	R20	100 5% ¼ watt
C25, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51	.01 mf 100V Disc	R22, 24, 28	2.7K 5% ¼ watt
C29, 30	53 & 12 pf VFO Tuning	R25	470 5% ¼ watt
C31	27 pf N330 5% Disc	R26, 27, 33, 35, 39, 45, 47	4.7K 5% ¼ watt
C32	15 pf N220 5% Disc	R29	4.7 5% ¼ watt
C33	15 pf N330 5% Disc	R30	50 ohm Trimpot
C35	22 mf 16V Tantalum	R34, 40, 46	2.2K 5% ¼ watt
C39	220 mf 25V Electrolytic	D1	BA-182 Silicon Diode
R1	10K AF Control Pot.	D2	1N3491 Silicon Diode
R2	10K RF Control Pot.	D3	1N4005 Silicon Diode
R3a & b	600K Dual AF Notch Pot.	D4, 5, 6, 7, 8, 9,	1N4149 Silicon Diode
R4	10K Mic. Gain Pot.	Q1	7805UC DD6 Reg.
R5	10K ALC Control Pot.	F1	50A 9AG Med. Acting
R6	10K Dial Set Pot.	F2	3A 3AG Slo-Blo
R7	10K RIT Control Pot.	B1, 2, 3	14V Min. Lamp



ATLAS MODEL 350-XL
PC 380 DD6-XL AMP

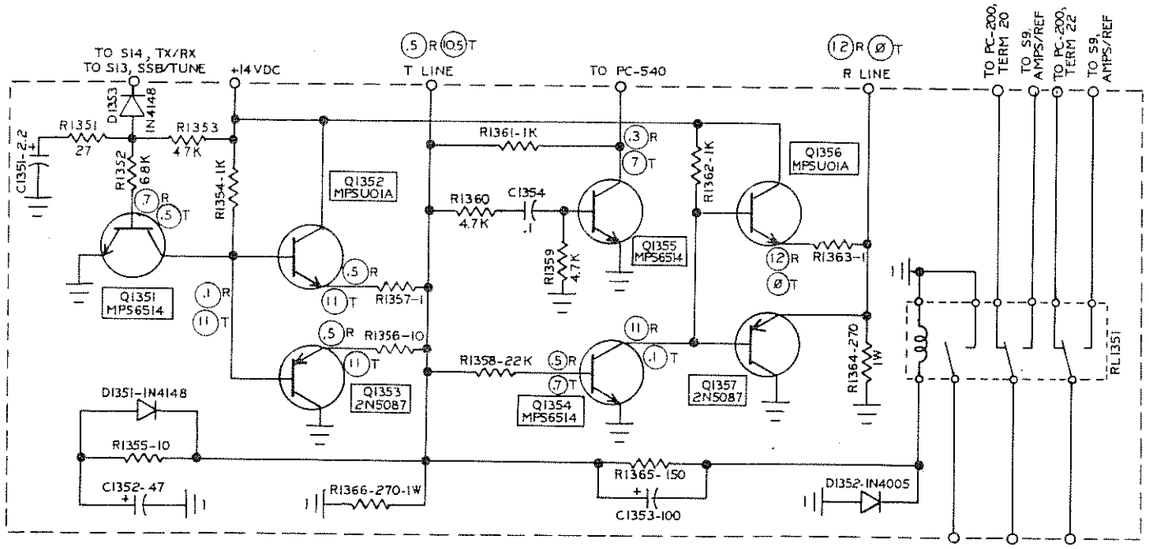
2-20-78 (A)



MPSU 07 ≙ BD523
100V; 2A; 10W 100V; 2A; 10W

ATLAS MODEL 350-XL
PC-1380 LIN. AMP SWITCH

2-20-78 (A)



MPSU 01A ≙ BD517
50V; 2A; 10W 60V; 2A; 10W

ATLAS MODEL 350-XL
PC-1350 TRANSMIT-RECEIVE SWITCH

10-30-77 (A)

MPS 6514 ≙ BC 184 B
40V; 0.1A; 0.3W β = 150-300
50V; 0.1A; 0.3W β = 125-500

VOLTAGE SYMBOLS

D.C. VOLTAGE
Voltages are positive unless otherwise noted

A.C.VOLTAGE
Voltages are RMS value

R - RECEIVE

T - TRANSMIT

V. ALIGNMENT & TROUBLESHOOTING

NOTE: Refer to Figures 3.1, 3.4, 5.1, and 5.2 when performing alignment procedures.

A. INTRODUCTION

A. The following procedures are shown in the approximate order performed during the factory alignment of the transceiver. Read all steps carefully before starting alignment. See Figures 1, 2, 3, 4, for component placement. The following equipment is recommended for complete alignment.

1. VTVM (Vacuum Tube VoltMeter) Hewlett Packard Model 410B or equivalent.
2. R.F. SIGNAL GENERATOR, Hewlett Packard Model 606A or equivalent.
3. 250 WATT DUMMY LOAD. Bird Model 43 Wattmeter.
4. AUDIO GENERATOR, RCA Model WA-504B/44D or equivalent.

REMOVING CABINET:

1. If your transceiver has the one piece cabinet and bottom cover, this is done by removing the feet and screws of the bottom cover and the side and top screws of the cabinet. Then carefully pull the cabinet towards the rear of the chassis until the cabinet is free from the chassis.

2. If your transceiver has the two piece cabinet, remove the screws on both sides and top of the transceiver to remove the top half and remove the screws on both sides and bottom of the transceiver to remove the bottom half.

CAUTION: After removing the bottom half of cabinet, take care in setting transceiver on work bench. The aluminum thumbwheels of the VOX controls and Sidetone volume protrude below the chassis and damage to the pots can occur if care is not taken.

NOTE: Before performing the following procedures, remove the 50 amp fuse (Item (S) , Figure 5.2).

B. SWITCH FUNCTIONS

1. RX (Receive)-TX (Transmit) Switch (Item (21), Figure 3.1). Connect voltmeter to R line, White wire, PC-1350 (Item 57, Figure 5.2). In RX, voltage should be 12 volts DC. In TX, it should drop to about 0.4 volts DC. Connect voltmeter to T line, Yellow wire, PC-1350. In RX, voltage would read about 0.4 volts DC. In TX, voltage should read 10 to 11 volts.

NOTE: Yellow L.E.D. should be in TX position. Red L.E.D. to the left is on in TX position. (VFO Selector Switch in XCV PRI. Position). The above steps verify function of the TRANSMIT-RECEIVE SWITCHING CIRCUIT, as well as the L.E.D.'s. Green L.E.D. should be on in both TX and RX modes.

2. SSB-TUNE/CW SWITCH (Item (19) , Figure 3.1). With RX-TX switch in TX position, connect voltmeter to left hand lug on Mic. Gain Pot. (Junction with 10K resistor). With switch in SSB Position, voltage should measure 0. With switch in TUNE/CW position, voltage should read about 4 volts DC. (This test does not apply to later models that have separate TX DRIVE control:)

With RX-TX Switch in TX position, connect voltmeter to gray wire eyelet on PC-650, (Item (45) , Figure 5.1), with switch in SSB position, voltage should measure 14 volts DC in TUNE/CW position, it should read about 0.1 DC.

With RX-TX Switch in TX position, connect voltmeter to blue wire eyelet on PC-650. With switch in SSB, position, voltage should measure about 4 volts, DC. In TUNE/CW position, it should read about 0.7 volts.

With RX-TX Switch in RX position, insert CW key in rear key jack. Connect voltmeter to T Line, yellow wire, PC-1350. Switch to TUNE/CW position. T Line should measure 10 to 11 volts DC when key is closed, 0.4 to 0.5 volts DC when key is open.

3. PTT-VOX AND L.E.D. SWITCHING:

RX-TX switch in RX position, SSB-TUNE/CW switch in SSB, VOX-PPT switch in PTT position.

Plug Mic into front jack. Press Mic. button. Yellow L.E.D. should go out and red L.E.D. should come on. Green L.E.D. should stay on. Switch to VOX. Advance VOX GAIN. Speak into MIC. Red L.E.D. should come on. Green L.E.D. should stay on. Plug Mic. Jack into rear Mic. Jack and repeat both PTT and VOX tests.

4. CALIBRATOR SWITCH (Item (27) , Figure 3.1).

Measure voltage on PC-850 (Item 44) at gray wire eyelet. With CAL switch on, it should measure 14 volts DC.

5. R.I.T. (RECEIVER INCREMENTAL TUNING).

Position dial set (Item (9) , Figure 3.1) and RIT control (Item (10) , Figure 1) at 12 o'clock. RIT switch (Item (11) , Figure 3.1) in ON (UP) position. Right hand L.E.D. (White Lens, Red L.E.D.) should light. Measure voltage at center lug of RIT control, (Rear control of dual potentiometer). It will be about 2 to 2.3 volts DC. Switch RIT to OFF (DOWN) position. Adjust trimpot (Item (C) , Figure 5.1) on PC-470 (Item (43) , Figure 5.1) for exactly same reading as with RIT on. Switch back and forth to make sure voltage doesn't change when you switch.

NOTE: Early model 350-XL's have the PC-470 board mounted directly behind the DIAL SET/RIT Potentiometer. Later models have the PC-470 mounted as shown in Figure 5.1.

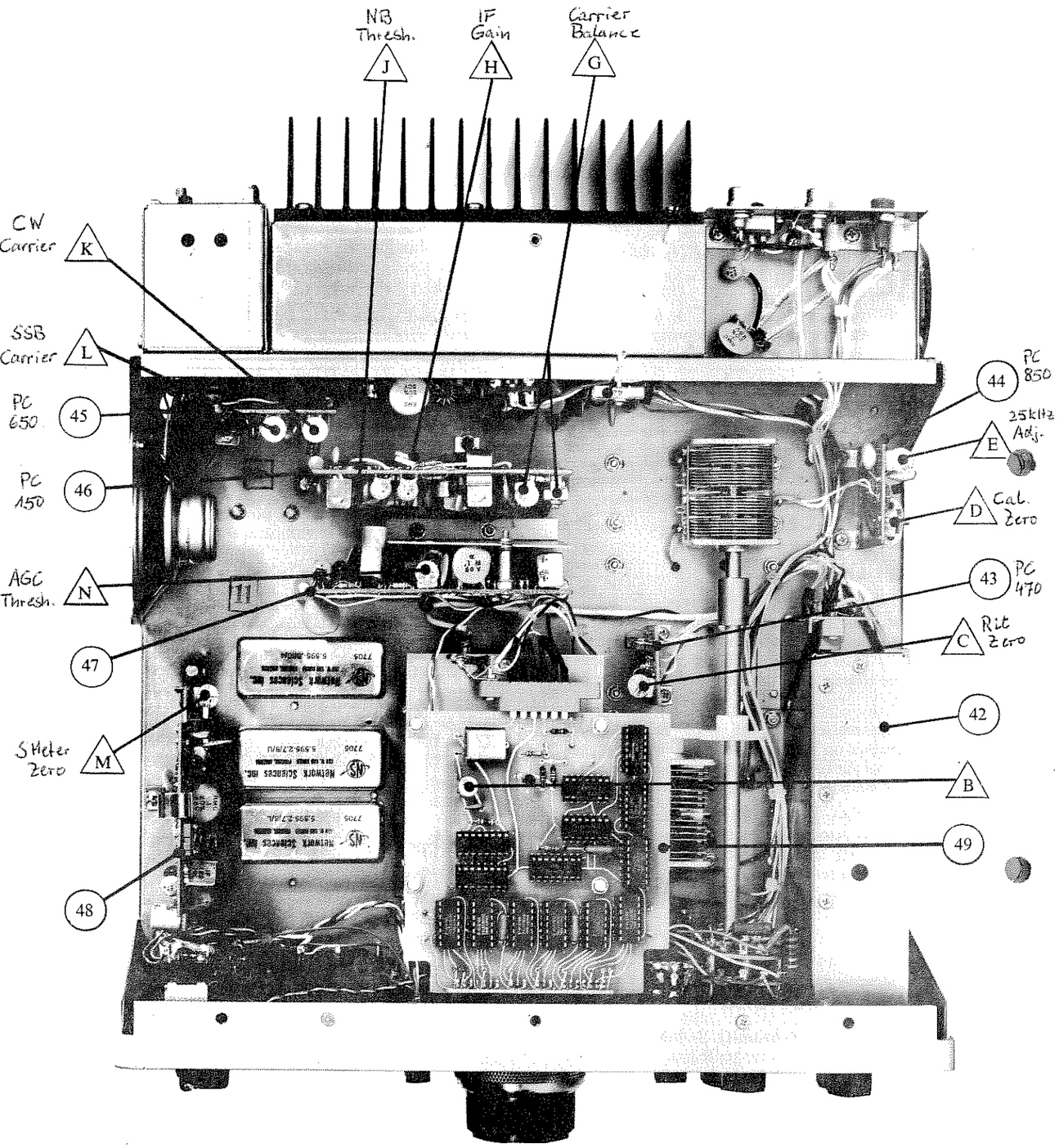


FIGURE 5.1 TOP VIEW, ATLAS MODEL 350-XL

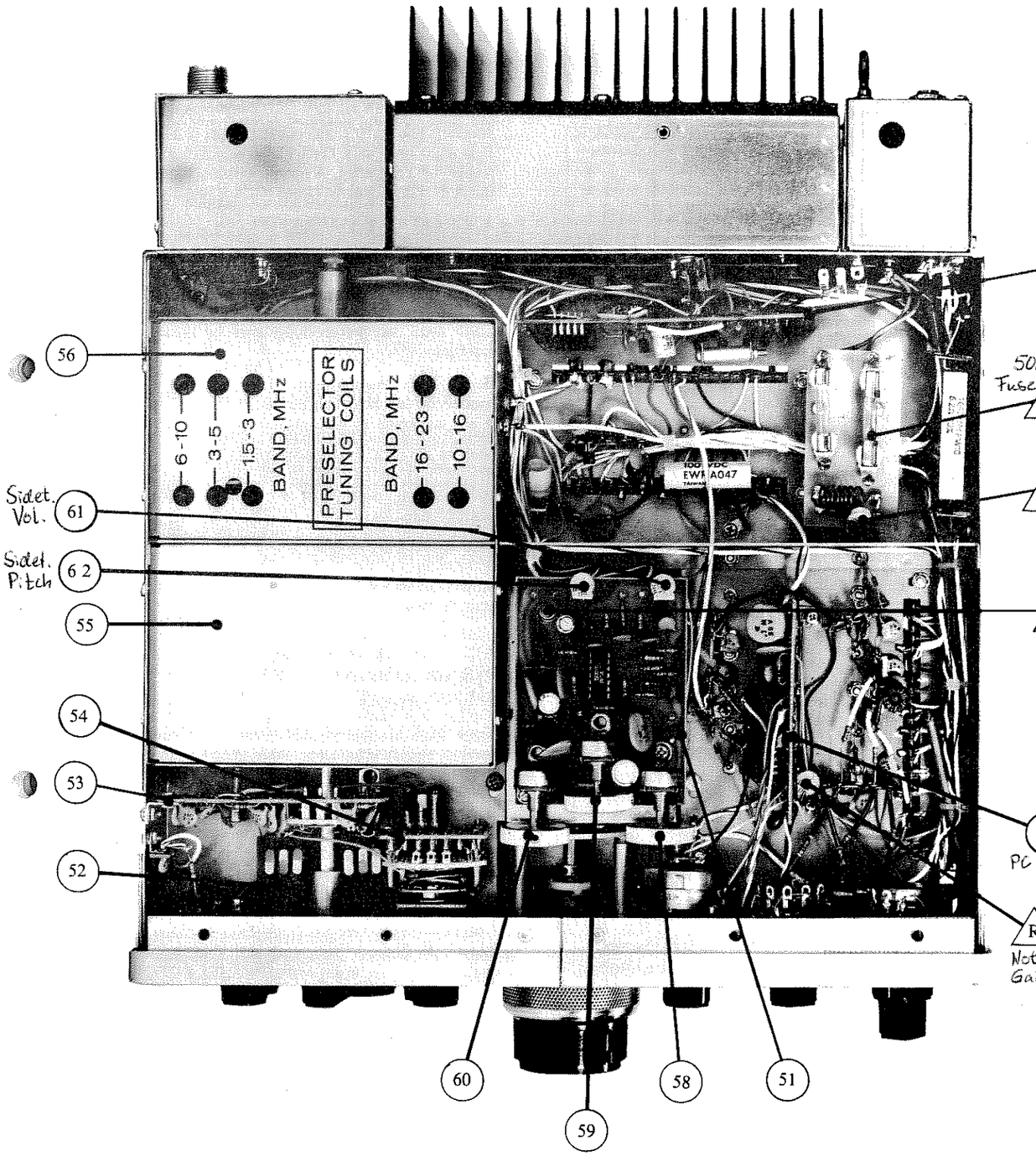


FIGURE 5.2 BOTTOM VIEW, ATLAS MODEL 350-XL

6. VFO SELECTOR SWITCH (Item 22 , Figure 3.1).

Follow the chart below for VFO and L.E.D. switching sequence.

RX-TX SWITCH IN RX POSITION

SWITCH POSITION	PRIMARY VFO (350-XL) 0600 GREEN	PRIMARY VFO (350-XL) 0600 YELLOW	AUXILIARY OSCILLATOR 305, 311 0808 GREEN	AUXILIARY OSCILLATOR 305, 311 0808 YELLOW
XCV PRI	ON	ON	OFF	OFF
TX PRI/RX AUX	ON	OFF	OFF	ON
TX PRI/RX AUX	OFF	ON	ON	OFF
XCV AUX	OFF	OFF	ON	ON

RX-TX IN TX POSITION

SWITCH POSITION	PRIMARY VFO (350-XL) GREEN	YELLOW	RED	AUXILIARY OSCILLATOR 305, 311 GREEN	YELLOW	RED
XCV PRI	ON	OFF	ON	OFF	OFF	OFF
RX PRI/TX AUX	ON	OFF	OFF	OFF	OFF	ON
TX PRI/RX AUX	OFF	OFF	ON	ON	OFF	OFF
XCV AUX	OFF	OFF	OFF	ON	OFF	ON

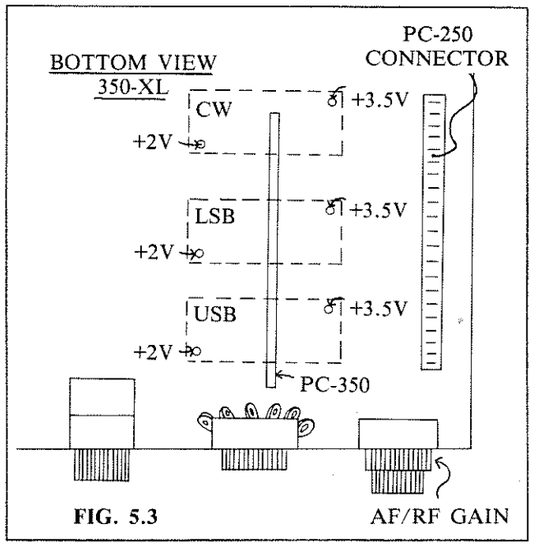


FIG. 5.3

7. Filter Switch (Item (12) , Figure 3.1).

Refer to Figure 5.3 for filter switching voltages.

IMPORTANT: Because the circuitry of the 350-XL inverts the sidebands, filters marked with an "L" are for USB operation, and filters marked with a "U" are for LSB operation.

C. RECEIVER ALIGNMENT

1. Preselector Coils. (Item (56) , Figure 5.2) Couple R.F. Signal generator into EXT. ANTENNA (Item (35) , Figure 3.4) Phono jack. Set slide switch to EXT. position. Set PRESELECTOR control on front panel to proper band marking on each band. Set generator output to 50 μv. Tune to each band center, peaking input coils for maximum S-Meter reading (coils also peak transmitter at same point). By switching generator down, a 0.4 μv signal or less should be heard on each band. Return REC ANT switch to NORM. position.

2. R.F. Gain (Item (3) , Figure 3.1). Locate PC-150 (Item (46) , Figure 5.1), terminal 14. R.F. Gain should run from 2.5 to 9 volts, approximately.

NOTE: The R.F. Gain control does not *turn-off* gain. It is used only as a control for adjusting the "comfort level" of reception. Volume control is adjusted with the A.F. Gain control (Item (2) , Figure 3.1).

3. CRYSTAL CALIBRATOR

A. Zero Adjustment: Using the Digital Dial reading, tune to an exact 100 KHz increment, such as 14,200.0. Adjust capacity trimmer (Item (D) , figure 5.1), on PC-850, for exact zero beat. Switch between LSB and USB until no heterodyne can be heard on either sideband.

B. 25 KHz Adjustment: (Early models only. Later models do not have this adjustment.)

Switch on and tune in signals. Stop at a 25 KHz spot, such as 225 or 275, and adjust TRIM-POT (Item (E) , Figure 5.1) on PC-850 (Item (44) , Figure 5.1) for stable signal. Start with trimpot full CWW, and turn until 25 KHz signal pops in. There are other spots where the multivibrator will lock in at 25 KHz, as well as 20 or 33⅓, but the first one from full CCW is the most stable.

4. R.I.T. TEST:

Tune in CAL Signal. Switch RIT on. Tune control to verify approximate plus and minus 10 KHz swing. With RIT off, switch to TX to verify that frequency does not shift when going from RX to TX.

5. A.F. NOTCH:

Tune in CAL. signal and note the S-Meter reading. Switch the notcher on, and observe any change in S-Meter reading. If it drops more than one S-Unit, adjust trimmer (Item (R) , Figure 5.2), on PC-350 (Item (50) , Figure 5.2), to increase gain. Then turn the control to verify that it will provide a deep notch of the signal. It should dip to little or no S-Meter reading at both low and high pitch signals.

6. ANL TEST

Couple a steady type noise source into the ANT. JACK. Turn R.F. Gain on full, and A.F. Gain enough to hear the noise. Peak noise with PRESELECTOR control: Switch ANL on and off to verify its function. It should reduce the harshness of a steady type noise, such as power leaks and flourescent lights.

7. S-METER ADJUST

a. Tune transceiver to 14.300 MHz and couple R.F. Signal Generator into EXT. ANTENNA phono jack (Item (35) , Figure 3.4) and set slide switch to EXT. position.

b. Set AGC Threshold trimpot (Item (N) , Figure 5.1) to midrange.

c. Set S-Meter zero trimpot (Item (M) , Figure 5.1) for 0 reading on meter.

d. Set generator output to 50 μv and check S-Meter reading.

   1. If meter reads below S-9 + 40 db, turn AGC Threshold trimpot CCW until a very slight meter drop is noticed. (This requires a very slight adjustment of trimpot.)

   2. If meter reads above S-9 + 40 db, turn AGC Threshold trimpot clockwise until a very slight meter rise is noticed. (If meter reading is off scale, you will not notice any meter rise. However, after a couple of back and forth adjustments, it should return to scale.)

e. Tune off signal and re-adjust S-Meter zero trimpot for Ø meter reading. Re-check S-Meter reading.

f. If reading is still not S-9 + 40 db, repeat steps (d) and (e) until S-9 + 40 db is achieved. This may take several back and forth adjustments.

g. While listening to the S-9 + 40 db signal, adjust the S-Meter zero trimpot to S-9.

8. NOISE BLANKER THRESHOLD ADJUST

A source of pulse-type noise will be required for this adjustmentment. Either a homebrew "noise machine" or an automobile creating ignition noise on the 350-XL receiver. Note S-Meter reading. Tune transceiver to 7200 KHz. Locate Threshold trimpot (Item (J)) on PC-150 (Item (46)) and turn to full CCW position. On later model 350-XL's this trimpot is located on the cirucit side of the PC-150 and it will be necessary to turn trimpot full CW. Switch Noise Blanker on and turn trimpot CW (CCW later models) until noise begins to appear.

At this point turn Noise Blanker off and tune in a loud SSB signal on the band. (S-9 or louder.) Tune slightly off his frequency about 1 or 2 KHz, and turn Noise Blanker on. There should be no increase in background noise or any cross mod (Splatter) from station. If there seems to be too much noise or hash, it will be necessary to adjust the threshold control further clockwise. Turning control further than the "Threshold" point may result in reduced blanking action.

D. TRANSMITTER ALIGNMENT:

CAUTION: When performing transmitter tests, DO NOT hold in transmit position for very long. Watch the heat sink temperature. The greatest danger to the power output transistors is OVERHEATING. The black anodized heatsink is designed to cool the transistors adequately under normal operating conditions, but as with any electronic or mechanical device, it is up to the operator to maintain normal conditions, and not abuse the equipment.

The maximum safe temperature of the heatsink near the output transistors is about 150°F. This is a temperature that will be too hot for your fingers to hold, so a good test is to put your fingers on the fins closest to the transistors. If you can hold on without a lot of discomfort, you're OK.

Overheating may be caused by: (A) Modulating too heavily, (B) Making lengthy transmissions with short receiving periods, or (C) Restriction of air circulation around the heatsink. If the air temperature is high, such as on a hot day, or in a hot parked car, cooling capacity will be reduced. A good rule is to check the heatsink from time to time, and make certain you're not running too hot. Back off on modulation level, or shorten transmission time. Under abnormal conditions, a small fan may be directed at the heatsink. This is an excellent idea if SSTV or PTTY transmission is contemplated.

NOTE: To avoid transmitting on an outside antenna during the transmitter test, connect a dummy load to the transceiver. Also, if the 50 amp fuse had been removed while performing any of the preceding adjustments, it will be necessary to replace the fuse for transmitter alignment.

NOTE: 350-XL's with serial numbers beginning at 1950CA have a TX DRIVE control in place of the ON-OFF toggle switch on the front panel. This gain control, which is called "TX DRIVE", operates in both SSB and CW mode. In CW mode, the MIC GAIN control is no longer the carrier insertion control. Instead, the TX DRIVE is the carrier insertion control. In SSB mode, the new control also functions as a transmitter drive or "gain" control, permitting adjustment of the transmitter pre-amplifier to just enough gain to achieve full power, but no more than necessary. This helps avoid possible stability problems if a mismatched antenna system is used, or if the transceiver is in the immediate radiation field of the antenna.

1. BIAS ADJUST

Tune transceiver 14.3 MHz. With SSB/TUNE-CW switch in SSB position, AMPS/REF switch in AMPS position, and MIC/ALC and TX DRIVE controls full CCW, put RX/TX switch in TX position. Observe meter reading. "Idling Current" should be about 1 amp, which is just ¼ of first increment on ammeter. If adjustment is needed, locate the large blue trimpot (Item (T) , Figure 5.4) on the PC-530 (Item (64) Figure 5.4) Driver board, and adjust for correct bias setting.

2. PRESELECTOR COILS (Item (56) , Figure 4)

Connect Dummy Load and Wattmeter in ANT connector (Item (40) , Figure 3.4), (if wattmeter is unavailable, ammeter on 350-XL can be used). FILTER switch in LSB position, SSB/TUNE-CW switch in TUNE-CW position, MIC/ALC and TX DRIVE full CCW, PRESELECT control set to proper band marking on front panel. Switch TX/RX control to TX position and advance MIC Gain or TX DRIVE in later models to approximately to watts or 8 amps. Peak PRESELECT coils for maximum output reading. By advancing MIC Gain or TX DRIVE in later models to full clockwise position, full transmitter output power will be achieved. A well matched 52 ohm load will draw 24 to 30 amps on the first 5 bands and 2 to 24 amps on the 28-3 MHz band. Power output should be a minimum 160 watts on

the first 5 bands and 100 watts on the 28-3 MHz band. NOTE: If ammeter tends to creep upward when in transmit, this is usually because of the normal rise in collector current as the P.A. transistors heat up. They won't run away, but if the transceiver is left in transmit too long serious damage could result.

3. SWR BRIDGE ADJUST

Bandswitch at 14, PRESELECT control at 14, SSB-TUNE/CW in TUNE/CW position, ALC full CCW, FILTER switch in LSB. Switch TX/RX to TX position and advance MIC Gain or TX DRIVE for about 50 watts.Connect voltmeter to blue wire eyelet (Test Point U , Figure 5.4) on PC-540 (Item 63 , Figure 5.4). Adjust SWR Bridge trimmer (Item A , Figure 3.4), for null. Should dip to about 0.3 volts DC or less. Move voltmeter to top of ALC potentiometer. (Brown wire). Should read about 4 volts DC.

Set SWR protect trimpot (Item V , Figure 5.4) on PC-540 to full CCW. Move BAND to 21. Switch TX/RX to TX and rotate trimpot CW until a slight decrease in power is noted (2 to 3 watts). Switch back to RX mode and disconnect antenna from transceiver. Switch back to TX and note ammeter reading. Should read approximately 6-8 amps.

FIG. 5.4

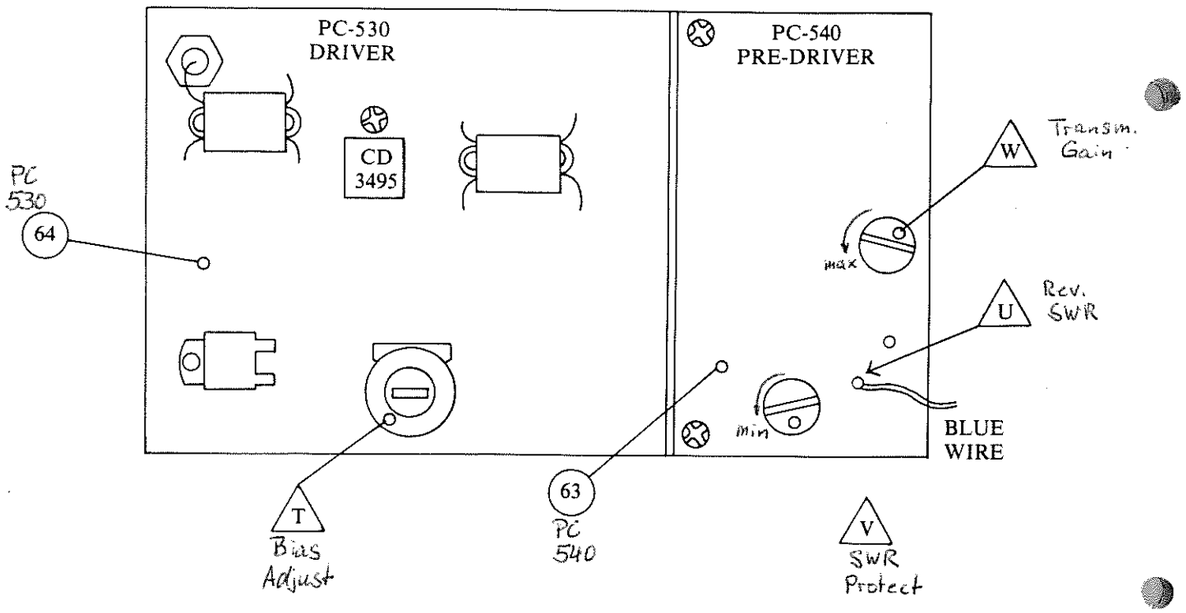
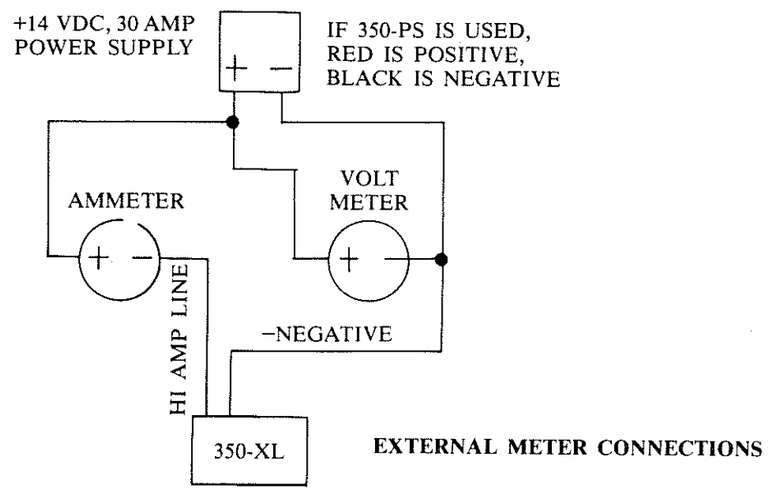


FIG. 5.5



EXTERNAL METER CONNECTIONS

4. ALC

Bandswitch at 14, MIC/ALC controls full CCW, TX DRIVE full clockwise, set PRESELECT control to 14, FILTER in LSB, SSB/TUNE/CW in TUNE/CW position, connect two tone audio from panoramic scanner into MIC Jack switch TX/RX to TX and advance MIC Gain for power output of about 25 watts. Peak PRESELECTOR for maximum. Advance MIC Gain until two tone pattern begins to flat top. Wattmeter reading should be at least 80 watts on the first 5 bands and at least 50 watts on the 28-30 MHz band.

Advance MIC Gain further to where two tone pattern is flat topping quite noticeably. Then advance the ALC control to verify that it is functioning. It should reduce or nearly eliminate the flat topping.

5. AMMETER CALIBRATION

Refer to Figure 5.5 for hook-up of an external *Calibrated* ammeter required when calibrating transceiver ammeter.

With SSB-TUNE/CW switch in TUNE/CW position, FILTER switch in LSB and 350-XL tuned to 14.2 MHz, switch TX/RX to TX position, increase MIC Gain or TX DRIVE until transceiver ammeter reads 20 amps. Compare reading with external ammeter and if adjustment is required, locate trimpot (Item P , Figure 5.2) and adjust transceiver ammeter to correspond with external ammeter.

6. FILTER ADJUSTMENT

A. CW Transmit:

Tune 350-XL to 14.2 MHz. Set filter switch in LSB position. MIC/ALC and TX DRIVE at minimum. SSB-TUNE/CW switch in TUNE/CW position. Insert CW key and press key to transmit. Advance MIC Gain (Now carrier insertion) or TX DRIVE on later models to increase power output. Set to about 100 watts. Then, switch filter control to CW position. Adjust right hand trimmer (Item K , Figure 5.1) on PC-650 (Item 45 , Figure 5.1) for maximum output. Power should now be the same, or within 20 watts or so, as in LSB position. This last adjustment has set carrier frequency for CW transmit. THIS TRIMMER SHOULD NOT REQUIRE FURTHER ADJUSTMENT.

B. SSB CARRIER ADJUST

NOTE: Preceeding step A, CW Transmit, must be done before step B.

Tune 350-XL to 14.2 MHz. Connect A.F. Generator into MIC Jack and Dummy Load/Wattmeter into ANT connector. Switch SSB-TUNE/CW to SSB position and FILTER to LSB. Set A.F. Generator to 1000 cycles. Switch TX/RX to TX position and increase MIC Gain for power of about 80 watts. This is called the 6 db roll-off point. Call this frequency A.F. #1

Switch FILTER to USB and move the A.F. Generator until power is again at 20 watts. Call this A.F. #2. Adjust the left hand trimmer (Item L , Figure 5.1) on PC-650 to bring A.F. #1 and #2 together.

EXAMPLE: If A.F. #1 is 300 cycles, and A.F. #2 is 200 cycles, adjust the trimmer so A.F. #1 moves down to 250 cycles. A.F. #2 will then move up to 250 cycles.

Background noise level and pitch will vary only slightly when switching from LSB to USB, if at all, when the carrier frequency is adjusted to the midpoint between the LSB and USB filters.

Alternate method: Trimmer (Item L , Figure 5.1) may be adjusted fairly close by simply listening to the pitch of background noise on both LSB and USB and setting the trimmer to the place where background noise sounds the same. This is not as accurate as using the audio generator, but will be quite close.

7. CARRIER BALANCE ADJUST

Tune 350-XL to 14.2 MHz. Connect Monitor Scope and/or Dummy Load/Wattmeter, Note: Wattmeter can be used in place of Monitor Scope. FILTER in LSB position, and MIC Gain full clockwise. Switch TX/RX switch to TX and adjust carrier balance trimpot (Item G ,Figure 5.1) for minimum scope deflection, or wattmeter reading. Adjust Phase Balance trimmer (Item G , Figure 5.1) for minimum scope deflection or wattmeter reading. Re-adjust carrier balance trimpot for minimum reading. Note wattmeter reading. If reading is somewhat higher than 1 or 2 watts, rotate, the MIC Gain control (Carrier Insertion) until a null in the wattmeter reading is found. This reading should not be more than 1 or 2 watts. On some 350-XL's, without TX DRIVE, minimum carrier is not achieved at the full CCW setting of the MIC Gain, but at a point somewhere between 9 and 12 o'clock on the MIC Gain control. This is normal and should not be of any concern.

8. I.F. GAIN ADJUST

Tune transceiver to 1.8 MHz. With Dummy Load and Wattmeter connected, set I.F. Gain trimpot (Item H , Figure 5.1) to full CCW position. Switch transceiver to CW transmit mode and rotate gain control trimpot in a clockwise direction until a slight decrease in power is noted, (2-3 watts).

9. TRANSMIT GAIN CONTROL

This control (Item W , Figure 5.4) was incorporated on later model 350-XL's and is located on the PC-540 (Item 63 , Figure 5.4). It is normally set full CCW for maximum drive. However, if any instability, like distortion, is noted on the output signal, it may be necessary to reduce the gain by turning trimpot clockwise. This may result in some loss of power, but normally only a few watts.

10. SIDETONE TEST

Switch transceiver to CW transmit mode. Adjust trimpot (Item 62 , Figure 5.2) for desired pitch and trimpot (Item 61 , Figure 5.2) for desired volume. Later model 350-XL's have a thumbwheel protruding through the bottom cover for the sidetone volume control.

VI. ACCESSORIES

A. MODEL 350-PS POWER SUPPLY

The 350-XL is designed to operate on a power source of 14 volts DC. DC power can be delivered to the transceiver via a matching AC supply that provides the 14 volts filtered and regulated for both low current and high current circuits of the 350-XL. A built-in voltage sensing circuit allows for a constant 14 volt power source to the 350-XL. The power supply is fused for 100 to 130 volt operation from the factory, but by removing the bottom cover and changing fuse locations, input will be 200 to 260 volts. Supply line frequency may be 50 or 60 cycles. The DC power cable plugs directly into the rear panel of the 350-XL.

By plugging the phone plug into the SPKR jack on the rear of the 350-XL, the front facing 3″ × 5″ speaker of the 350-PS automatically switches in place of the smaller speaker built into the 350-XL. A tip jack on the rear of the 350-PS allows for external use of +14 VDC. Current drain of accessories using this feature should be limited to 3-5 amperes. Phone jack on front panel allows for high impedance headphone use. (2000 ohms is recommended.)

SPECIFICATIONS

INPUT VOLTAGE:
100 to 130 or 200 to 260 volts AC, 50-60 Hz.

INPUT POWER:
10 watts average receive (20 watts with Digital Dial).
400 watts transmit peak at 32 amps.

OUTPUT:
High current line; 14 volts regulated at 32 amps.
Low current line; 14 volts regulated, ½ amp (1 amp with Digital Dial).

SPEAKER:
3 × 5 inches oval, 1.1 oz magnet, 3.2 ohm voice coil.

FINISH:
Black vinyl covered aluminum cabinet, anodized aluminum panel.

DIMENSIONS:
12½ inches (32 cm) wide; 5¼ inches (14 cm) high (plus 1½ inches for rubber feet); 16 inches (41 cm) deep (including knobs and rear extensions).

WEIGHT:
Net weight, 25 lbs (11.4 kg); Shipping weight, 28 lbs (12.8 kg).

CIRCUIT COMPONENTS
350-PS POWER SUPPLY

C3501, 3502 ..... .0047 mf 150 VAC Disc	R3509, 3510, 3511,
C3503 ..... 40,000 mf 25V Electrolytic	3512 ..... 0.15 5% 25 w. Wirewound
C3504 ..... 2.2 mf 50V Electrolytic	R3513 ..... 270 5% 1 watt
C3505, 3506..... .001 mf 100V 20% Disc	L3501 ..... 22 μH RF Choke
C3507 ..... 1,000 mf 25V Electrolytic	T3501 ..... Dual Primary Power Xfmr
R3501 ..... 10 5% ½ watt	Q3501..... 30 amp Bridge Rectifier
R3502, 3506 ..... 5K Trimpot	Q3502..... CA3085A Int. Ckt.
R3503..... 47K 5% ½ watt	Q3503..... RCA31A Xsistor
R3504 ..... 1.0 5% ¼ watt	Q3504, 3505, 3506
R3505..... 82K 5% ½ watt	3507 ..... 2N6258 Power Xsistor
R3507..... 10K 5% ½ watt	R3508 ..... 2N2102 Xsistor
R3508 ..... 150 5% 2 watt	SP3501..... 3 × 5 Speaker 4 ohm VC

B. MODEL 305 AUXILIARY VFO

INSTALLATION AND OPERATION INSTRUCTIONS

The Auxiliary VFO, Model 305, is designed for plug-in installation on the upper right-hand corner of the 350-XL transceiver. The 305 Auxiliary VFO allows you to have a second tuneable VFO for tuning to a separate transmit or receive frequency, covering the same 500 KHz range as the primary VFO in the 350-XL. Calibration of tuning controls on the Auxiliary VFO is approximate, so the optional Digital Dial is recommended.

1. INSTALLATION

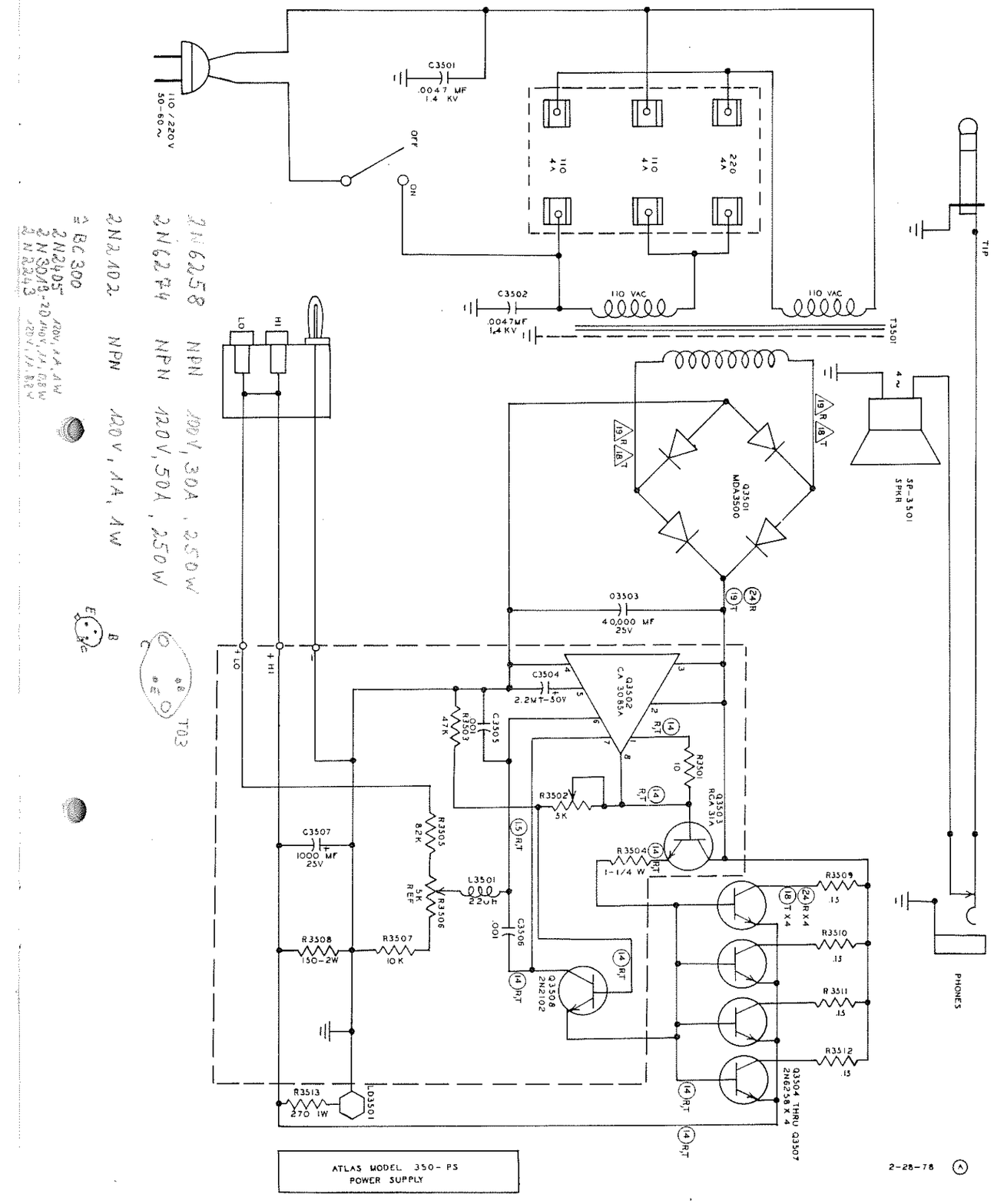
A. Locate the blank black bezel on the upper right hand corner of the 350-XL front panel and remove the two black phillips head screws.

B. The Auxiliary VFO plug-in edge connector is located approximately 6″ behind the opening in the front panel of the 350-XL and there is a jumper board installed in the connector that must be removed. If a tool, such as long needle nose pliers, is not available to pull the jumper board out, it will be necessary to remove the cabinet.

a. If your transceiver has the one piece cabinet and bottom cover, this is done by removing the feet and screws of the bottom cover and the side and top screws of the cabinet. Then carefully pull the cabinet towards the rear of the chassis until the jumper board is exposed enough to remove. Replace cabinet and bottom cover.

b. If your transceiver has the two piece cabinet, it is only necessary to remove the screws on both sides of the transceiver and remove the top half of the cabinet, and unplug the jumper board.

C. Slide the plug-in Auxiliary VFO through the front panel opening and secure with phillips head screws.



2. OPERATION

A. **Coarse Tune:** Provides for fast tuning of 0-500 KHz running range. Covers approximately 100 KHz per revolution with 10:1 planetary drive.

B. **Fine Tune:** Provides for slow tuning of 70 KHz tuning range. Covers 10 KHz per revolution with 10:1 planetary drive.

C. **VFO Selector:** (This control is located on the 350-XL front panel next to the Auxiliary VFO.) This control will select which oscillator is being used, either the transceiver (primary) or the auxiliary (Model 305), for receiving and transmitting. (a) XCV PRI, Transceive Primary, (b) RX PRI - TX AUX, Receive Primary - Transmit Auxiliary, (c) TX PRI - RX AUX, Transmit Primary - Receive Auxiliary, (d) XCV AUX, Transceive Auxiliary. The L.E.D.'s indicate which oscillator is being used. The Green L.E.D. indicates which VFO is being used for receiving. The Yellow L.E.D. indicates which VFO is being used for transmitting. The Red L.E.D. will light when transceiver is switched to the transmit mode.

D. **Digital Dial:** The Digital Dial (if installed in the 350-XL) reading will correspond to the position of the VFO selector switch. Example: VFO selector switch in RX PRI - TX AUX position. In receive mode the digital dial will read the primary oscillator frequency and when the transceiver is switched to the transmit mode, the digital dial will read the auxiliary oscillator frequency.

NOTE: With split frequency operation a power loss may be noticed when operating frequencies are more than 50 KHz apart on 160 and 80 meters and more than 200 KHz apart on 40, 20, 15 and 10 meters. If the power loss seems too great, the preselector tuning can be peaked approximately halfway between the two operating frequencies. Example: Receiving at 3575 KHz and transmitting at 3875 KHz, set preselector tuning at approximately 3725 KHz for a better power balance. Little or no loss in receiver performance will be noticed.

PC-460 CIRCUIT COMPONENTS
MODEL 305 AUX. OSCILLATOR

C401	7 pf Variable Fine Tune
C402	36 pf Variable Coarse Tune
C403	11 pf Trimmer
C404	15 pf NPO 5% Disc
C405	15 pf N080 5% Disc
C406	220 pf 5% SM
C407	270 pf 5% SM
C408	47 pf N150 5% Disc
C409, 411	.01 mf 100V Disc
C410	.002 mf 20% Disc
C412	680 pf 5% SM
C413	330 pf FS 10% Disc
C414	.005 mf 25V 20% Disc
R401	150K 5% ¼ watt
R402	330 5% ¼ watt
R403	2.2K 5% ¼ watt
R404	470 5% ¼ watt
R405	33K 5% ¼ watt
R406	10K 5% ¼ watt
R407, 412	270 5% 1 watt
R408	27 5% ¼ watt
R409	3.3K 5% ¼ watt
R410	10 5% ¼ watt
R411	100 5% ¼ watt
Q401	2N5486 F.E.T.
Q402	MPS6514 Xsistor
D401	1N4149 Silicon Diode
D402	1N4735 6.2V Zener Diode
L401	Slug Tuned 6 μH Osc. Coil
L402, 403	33 μH RF Choke
L404	3.6 μH RF Choke
LD401	LED yellow Diffused
LD402	LED red Diffused
LD403	LED green Diffused
RL401	DPDT 12V Reed Relay

C. MODEL 311 AUXILIARY CRYSTAL OSCILLATOR

INSTALLATION AND OPERATING INSTRUCTIONS

The Auxiliary Oscillator, Model 311, is designed for plug-in installation on the upper right-hand corner of the 350-XL transceiver. The Model 311 oscillator permits transmit, receive or transceive on any of 12 crystal controlled frequencies. Model 311 can be quite useful for MARS or network operation.

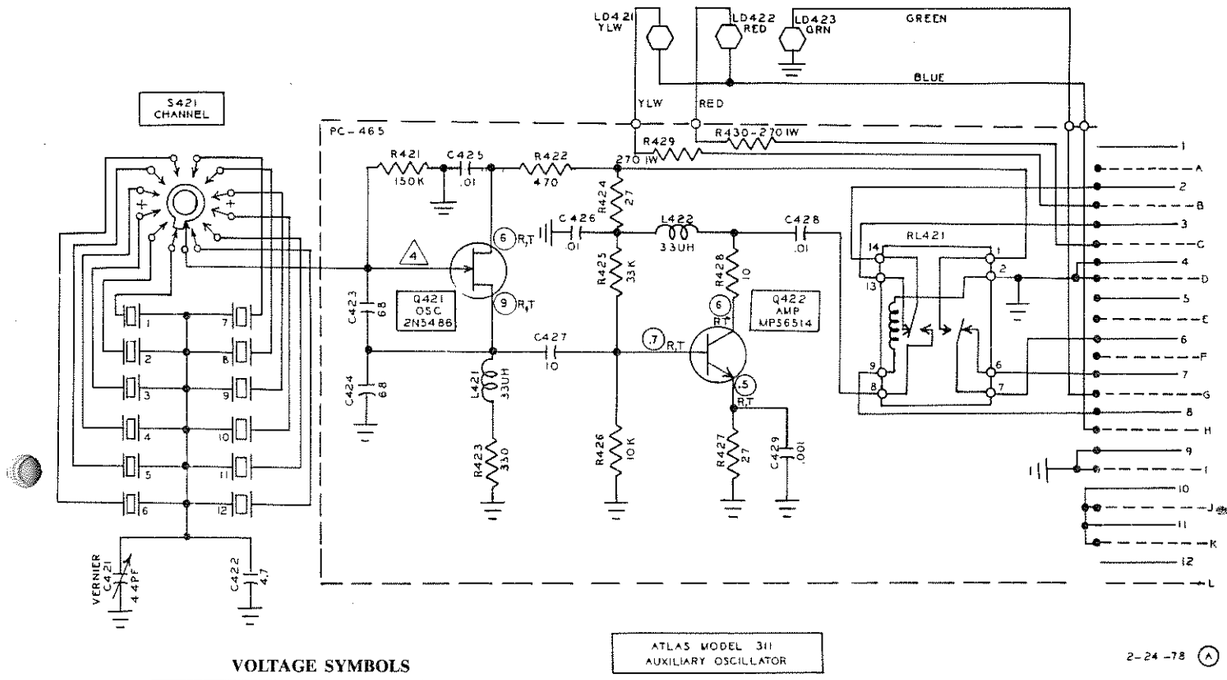
FREQUENCY RANGE

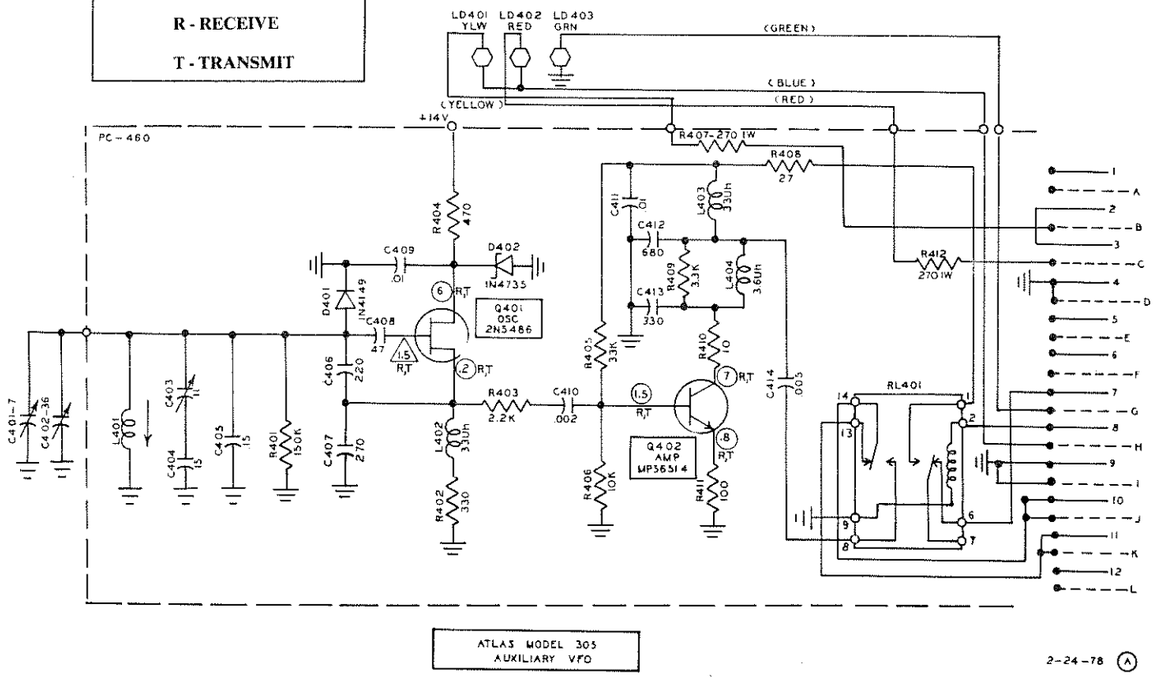
BAND	RANGE
1.5	1.5 - 3.0 MHz
3.5	3.0 - 5.0 MHz
7	6.0 - 10.0 MHz
14	10.0 - 16.0 MHz
21	16.0 - 23.0 MHz

NOTE: The 311 Oscillator will not operate between 28.0 - 30.0 MHz.

1. CRYSTAL REQUIREMENTS

The crystal sockets in the 311 are designed for type HC25/μ crystals with standard .040 inch diameter pins. Crystals must be ordered for parallel resonance with 20 pf shunt capacity. A frequency tolerance of .0025 per cent at 25 degrees centigrade is adequate.





2. CRYSTAL FREQUENCIES

To determine crystal frequencies for operation between 1.5 and 16 MHz, simply add the Intermediate Frequency of the transceiver, 5595 KHz, to the desired Operating Frequency.

EXAMPLE:

OPERATING FREQUENCY	+	INTERMEDIATE FREQUENCY	=	CRYSTAL FREQUENCY
4020 KHz	+	5595 KHz	=	9615 KHz

The Filter switch on the 350-XL front panel will determine which sideband, either upper or lower, is to be used.

For operation between 16.0 - 23.0 MHz, it will be necessary to subtract the Intermediate Frequency of the transceiver, 5595 KHz, from the Operating Frequency to determine the Crystal Freuency.

EXAMPLE:

OPERATING FREQUENCY	–	INTERMEDIATE FREQUENCY	=	CRYSTAL FREQUENCY
21,300 KHz	–	5595 KHz	=	15,705 KHz

However, because the Intermediate Frequency is subtracted from the Operating Frequency, the sidebands have been inverted. For USB operation it will be necessary to switch the Filter control to LSB. For LSB operation, switch the Filter control to USB. When inverting the Intermediate Frequency in this manner, the Digital Dial (if installed) will not read the correct Operating Frequency. Instead it will read a frequency that is 11,190 KHz (2 × Intermediate Frequency) lower than the Operating Frequency.

EXAMPLE:

OPERATING FREQUENCY	–	2 X INTERMEDIATE FREQUENCY	=	DIGITAL DIAL READING
21,300 KHz	–	11,190 KHz	=	10,110 KHz

3. CRYSTAL INSTALLATION

A. Remove cover from the 311 and locate the crystal socket PC Board.

B. Install crystals. Numbers on PC Board correspond to Channel Selector numbers on 311 front panel. Replace cover.

4. MODEL 311 INSTALLATION

A. Locate the blank black bezel on the upper right-hand corner of the 350-XL front panel and remove the two black phillips head screws.

B. The Auxiliary Oscillator plug-in edge connector is located approximately 6″ behind the opening in the front panel of the 350-XL and there is a jumper board installed in the connector that must be removed. If a tool, such as long needle nose pliers, is not available to pull the jumper board out, it will be necessary to remove the cabinet.

a. If your transceiver has the one piece cabinet and bottom cover, this is done by removing the feet and screws of the bottom cover and the side and top screws of the cabinet. Then carefully pull the cabinet towards the rear of the chassis until the jumper board is exposed enough to remove. Replace cabinet and bottom cover.

b. If your transceiver has the two piece cabinet, it is only necessary to remove the screws on both sides and top of the transceiver and remove the top half of the cabinet, and unplug the jumper board.

c. Slide the plug-in Auxiliary Oscillator through the front panel opening and secure with phillips head screws.

5. OPERATION

A. **Channel:** Selector switch allows for selection of up to 12 crystal frequencies.

B. **Vernier:** Allows for frequency adjustment of approximately 3 KHz.

C. **VFO Selector:** (This control is located on the 350-XL front panel next to Auxiliary Oscillator.) This control will select which oscillator is being used, either the transceiver (primary) or the auxiliary (Model 311), for receiving and transmitting.

Switch positions:

XCV PRI	— Transceive Primary
RX PRI - TX AUX	— Receive Primary - Transmit Auxiliary
TX PRI - RX AUX	— Transmit Primary - Receive Auxiliary
XCV AUX	— Transceive Auxiliary

The L.E.D.'s indicate which oscillator is being used. The Green L.E.D. indicates which oscillator is being used for receiving. The Yellow L.E.D. indicates which oscillator is being used for transmitting. The Red L.E.D. will light when transceiver is switched to the transmit mode.

D. **Digital Dial:** The Digital Dial (if installed in the 350-XL) reading will correspond to the position of the VFO selector switch. (Except when operating between 16.0 - 23.0 MHz. See section 2 of instructions.)

Example: VFO selector switch in RX PRI - TX AUX position. In receive mode the digital dial will read the primary oscillator frequency and when the transceiver is switched to the transmit mode, the digital dial will read the auxiliary oscillator frequency.

NOTE: With split frequency operation a power loss may be noticed when operating frequencies are more than 50 KHz apart on 160 and 80 meters and more than 200 KHz apart on 40, 20, and 15 meters. If the power loss seems too great, the preselector tuning can be peaked approximately halfway between the two operating frequencies.

Example: Receiving at 3575 KHz and transmitting at 3875 KHz, set preselector tuning at approximately 3725 KHz for a better power balance. Little or no loss in receiver performance will be noticed.

PC-465 CIRCUIT COMPONENTS
MODEL 311 AUX. CRYSTAL OSCILLATOR

C421	44 pf Variable
C422	4.7 pf N150 5% Disc
C423, 424	68 pf 5% SM
C425, 426, 428	.01 mf 100V Disc
C427	10 pf N470 5% Disc
C429	.001 mf 100V 20% Disc
R421	150K 5% ¼ watt
R422	470 5% ¼ watt
R423	330 5% ¼ watt
R424, 427	27 5% ¼ watt
R425	33K 5% ¼ watt
R426	10K 5% ¼ watt
R428	10 5% ¼ watt
R429, 430	270 5% 1 watt
Q421	2N5486 F.E.T.
Q422	MPS6514 Xsistor
L421, 422	33 μH RF Choke
LD421	LED yellow Diffused
LD422	LED red Diffused
LD423	LED green Diffused
RL421	DPDT 12V Reed Relay

D. MODEL DD6-XL DIGITAL READOUT

INSTALLATION AND OPERATION INSTRUCTIONS

The Model DD6-XL is a frequency counter with a range from 100 Hz to over 32 MHz and when installed in the 350-XL, the digital dial will provide direct frequency readout to within 50 Hz of operating frequency. When frequency is within ±5 Hz of the indicated 0.1 KHz increment, a red dot will light on the lower right corner of the 0.1 KHz L.E.D. The following features are also to be found on the DD6-XL:

- Six 4 × 7 Dot-matrixed L.E.D. readouts for totally unambiguous readings every time.
- Memory storage of the operating frequency and a jitter free output to the last digit.
- Adjustable crystal with self calibrating capability for always accurate readings of frequency.
- All I.C.'s, including L.E.D. readout devices, are socket mounted for ease of maintenance.

INSTALLATION

1. Remove 350-XL cabinet.
2. Locate the four ⅞″ long hex spacers on top of the VFO compartment and remove the dummy PC Board that is connected to the two rear spacers.
3. Install DD6-XL with the four screws and lock-washers supplied with board. If the 350-XL dial window has black paper taped on it, be sure to remove before installing digital dial.
4. Connect edge connector to board making sure the side marked "CAUTION THIS SIDE UP" is facing up. Replace cabinet.

OPERATION

NOTE: The PRESELECT control must be set to the proper panel marking for each band for stable digital dial reading.

1. **DD-COUNT:** Slide switch located on rear panel of 350-XL permits use of digital dial as a frequency counter from 100 Hz to 32 MHz. Phono jack allows for input, not to exceed 5 volts, of equipment to be read by digital dial. Slide switch to COUNT position. When using the DD6-XL as a direct frequency readout for 350-XL, make sure the slide switch is in the DD position.
2. **DD:** Push button switch on 350-XL front panel turns off digital readout. Advisable when using battery power because readout draws approximately 800 milliamperes.
3. **DH:** Push button switch on 350-XL front panel allows for retention of digital frequency readout when tuning elsewhere.

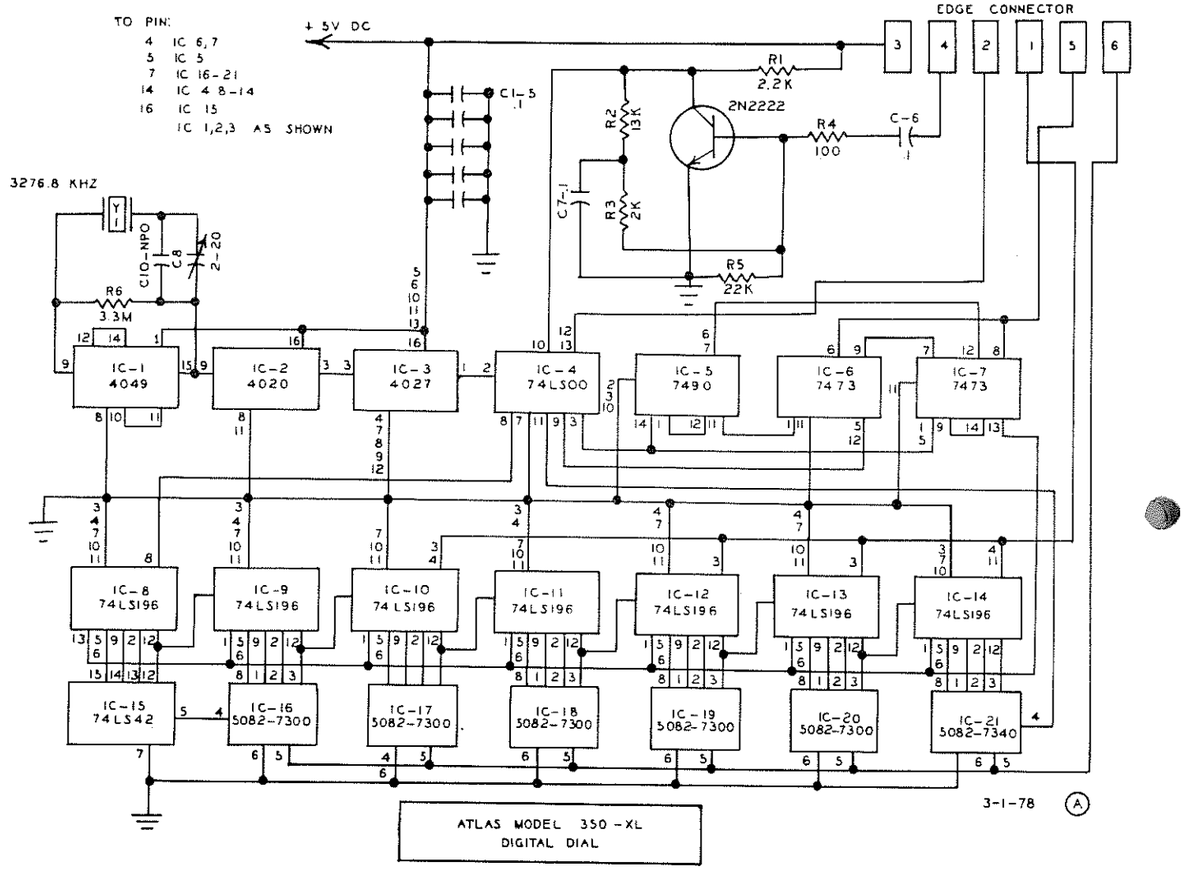
ALIGNMENT

Because of the 350-XL's extended frequency coverage without additional crystals, WWV can be used for the DD6-XL frequency alignment. Set BAND switch at the 7 position, PRESELECT tuning at the 28 panel marking, and the AUX RANGE at any position that *does not* have a crystal installed. The 28.5, 29.0, 29.5, and the "N" positions have crystals installed. Tune for 10 MHz WWV reception, (First digit of digital dial will not light) and adjust the capacity trimmer located at rear of digital dial board next to the crystal for exact 10,000.0 digital reading.

NOTE: Tuning will be backwards and the 0-500 KHz tuning dial calibration will not be accurate.

E. MODEL MT-1 ANTENNA MATCHING TRANSFORMER

The MT-1 transformer is designed to provide a proper impedance match between the HF (High Frequency) mobile antenna and the 50 to 53.5 ohm coaxial feedline. It is particularly useful when the HF Transceiver is one of the new solid state, broadbanded designs which requires a close match to a 50-53.5 ohm non-reactive load. Practically none of the mobile antennas currently on the market will match the coaxial feedline closely enough to provide a proper load for the broadbanded amplifier. With the Atlas MT-1 transformer a tap selection will be found which will provide SWR readings of 1.4 or less when using the common type mobile antennas, such as those manufactured by Nutronics, Swan, and HyGain.



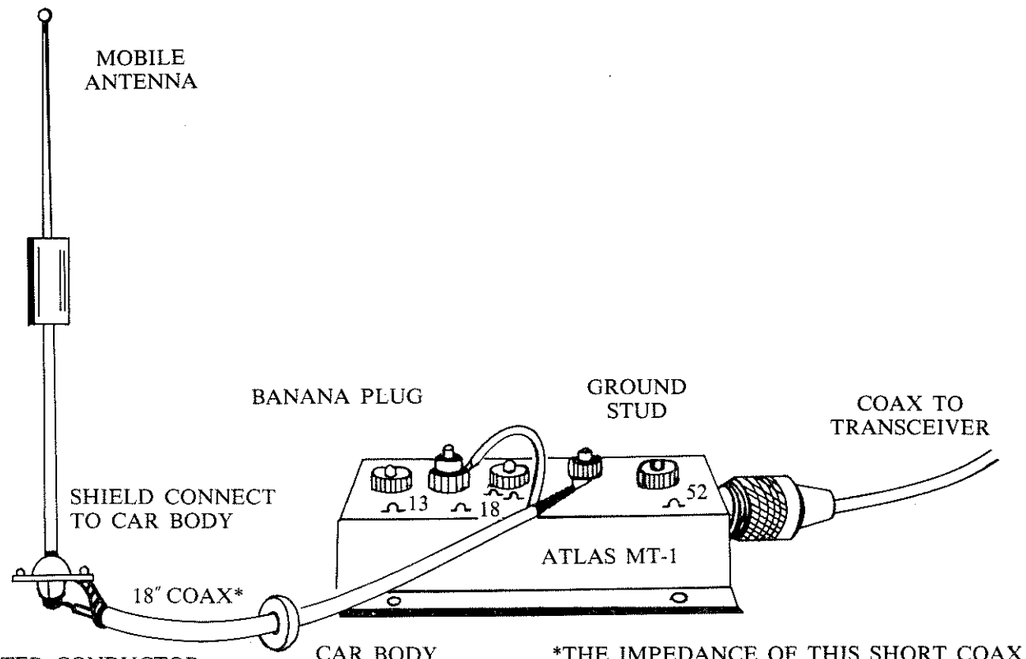
VOLTAGE SYMBOLS

D.C. VOLTAGE
Voltages are positive unless otherwise noted

A.C.VOLTAGE
Voltages are RMS value

R - RECEIVE

T - TRANSMIT



INSTALLATION: The MT-1 transformer is weather sealed and has a black anodized aluminum case, but even so it is recommended that it be installed inside the car body. In cases where the antenna is mounted on a rear bumper mount, install the transformer in the trunk compartment and drill a ⅜ inch hole for a rubber grommet to pass the short length of coax. from the antenna base to the transformer. This is the piece of coax. provided with the transformer, and has a banana plug on one end.

If the antenna is mounted on the rear deck, or front cowl, install the transformer unde the car body, close enough so the 18 inch length of coax. will reach the base connection on the antenna mount. It is essential that the metal case of the transformer be grounded by one or more of the mounting screws. A shakeproof type washer under the screw head will break through the black anodizing to make the ground connection.

F. MODEL DMK-XL

MODEL DKK-XL DELUXE MOUNTING KIT

The Deluxe Mobile Mounting Kit is a plug-in unit designed for easy removal of the 350-XL transceiver. All DC power connections are made to the DMK-XL and all necessary hook-up cables, including the DC battery cable with circuit breaker and hardware are part of the kit.

A. **DMK-XL Kit Installation:**

Note: The Atlas transceivers operate only with negative ground systems. A protective diode is built into the transceiver, and will trip the circuit breaker if wrong polarity is ever applied. This kit includes: (a) Black anodized housing. (b) Two 9 inch and two 12 inch cadmium plated steel mounting bars. (c) 3 inch wide rear bracket. (d) 8 feet of 10 guage 2 conductor power cable. (e) 40 amp circuit breaker.(f) Package of screws and terminal lugs. Refer to the illustrations for typical transmission hump and under dash mounting arrangements.

STEP 1 The rear bracket(s) should be angled as straight back as possible in order to give good support for pushing and pulling the transceiver in and out of mount.

STEP 2 The mounting brackets must be cut and bent to suit the installation, each case being unique. Try different positions and select the one for best ease of operation, and least interference with automotive controls. Then carefully measure and cut each bracket. Bend as required.. After bending the brackets, they may be painted with flat black to match the anodized aluminum parts if desired.

STEP 3 Remove the acorn nut and hex nut. Slip bracket over screw and replace only the acorn nut.

STEP 4 Secure brackets to car with No. 14 sheet metal screws. ***Use shakeproof washers under screw heading. Tighten all screws and nuts securely.*** No. 10 screws are also furnished in case the No. 14 are too large.

NOTE: Black anodizing provides a very durable finish, much better than paint. However, the anodized surface is an electrical insulation. In order to ensure electrical bonding between the transceiver and the car chassis, shakeproof washers must be used under all screw heads. They will cut through the anodizing. Scrapping the anodizing off around the junction points on the rear bracket is also recommended. Poor grounding may lead to transmitter instability, which will cause a regenerative or self-oscillating condition. If there is any question of adequate grounding connect a copper braid or strap from the antenna bracket on the mobile mount to the nearest chassis ground, either the bulkhead or transmission hump.

STEP 5 Connect the 52 ohm antenna coax, as illustrated.

STEP 6 A separate speaker may be connected as follows: Locate the speaker plug on the back of the mobile mount, just above the MIC plug. Clip out the wire jumper going from the tip lug to the ring lug. This will disconnect the internal speaker. Connect the external speaker from the tip lug to the ground lub. Impedance should be 4 ohms.

NOTE: When inserting the transceiver into the mobile mount, push it firmly all the way in to make certain that the connectors seat properly. Secure the front of the transceiver to the DMK-XL housing with the slotted U-shaped bracket. This bracket will prevent the transceiver from bouncing up and down in the housing and coming loose from the rear connectors.

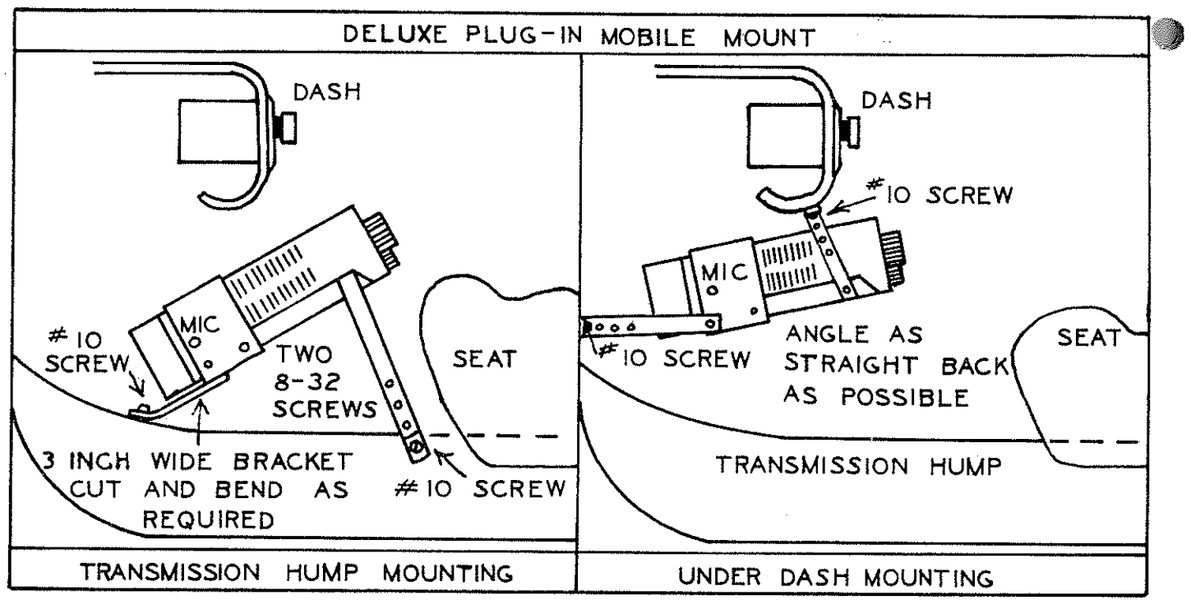
B. Power Cable Installation

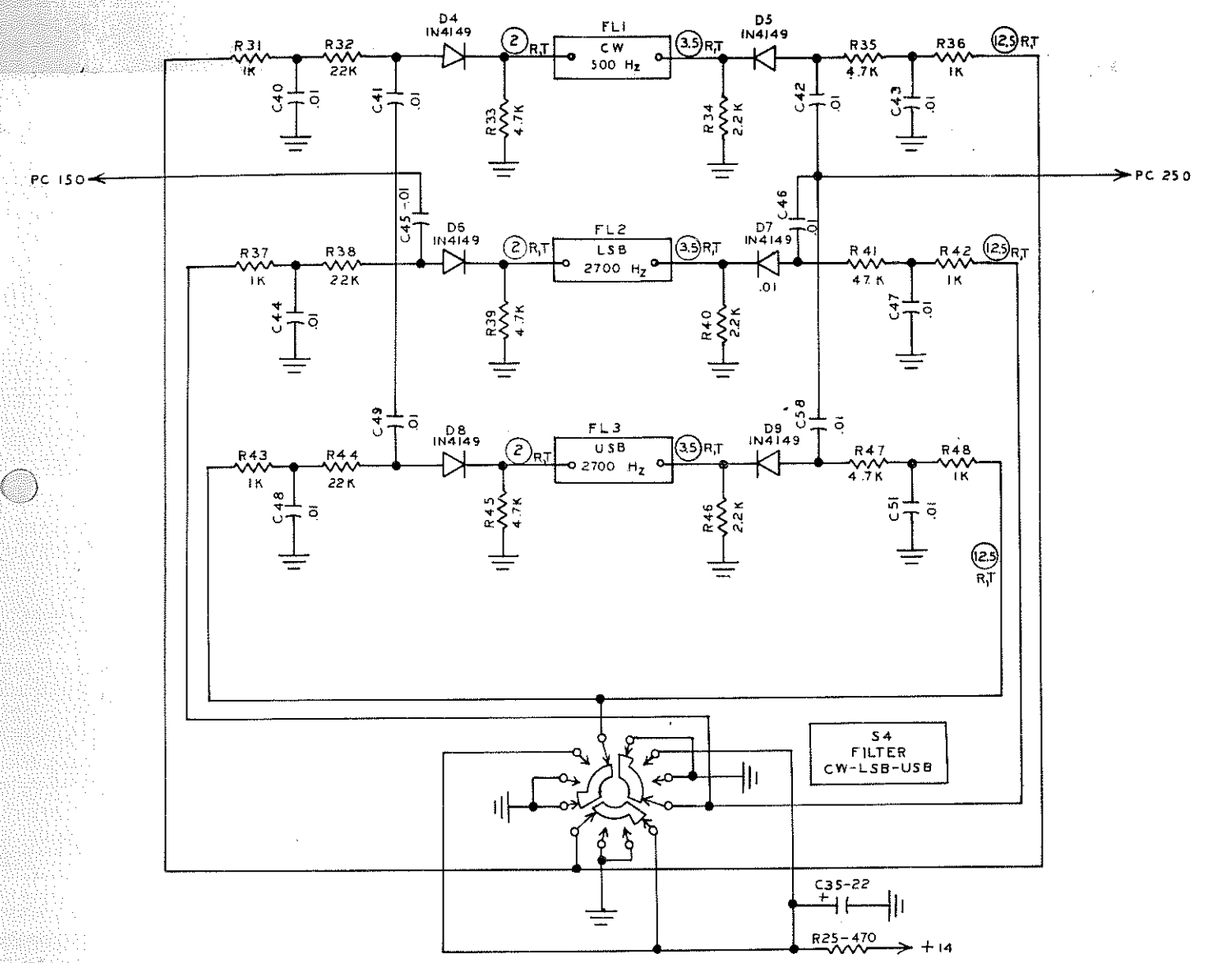
For mobile installation the power cable should be run from the mobile mount through the bulkhead into the engine compartment. It should then be connected to positive and negative terminals as close to the battery as possible. The best way to connect directly to the battery terminal posts is by drilling and tapping for a 10-32 or 10-24 machine screw. The red lead goes to the positive terminal, and brown to negative. (Or white is positive and black is negtive.)

The advantage of connecting directly to the battery posts is that loose battery clamps will then not affect the transceiver connections, and the danger of intermittant voltage spikes is reduced.

If drilling and tapping the battery posts is not practical, then connect the leads to the engine end of the heavy battery cables. The negative cable will usually be found going to a grounding bolt on the engine block, and the positive cable usually goes to a bolt on the starter solenoid. Use proper terminal lugs at these points for connecting the leads.

The 40 ampere circuit breaker supplied with the kit should be installed in series with the positive lead. It is best to mount it close to the battery end of the cable, at some convenient place on the side of a metal panel or bracket. Sheet metal screws are supplied for this purpose. It is not important that the metal case of the circuit breaker be grounded, since there are no connections made to the case. Cut the positive red power lead, install No. 10 terminal lugs, and secure firmly to the circuit breaker with washers and nuts. Solder the terminal lugs.





ATLAS MODEL 350-XL
FILTER SWITCHING

3-1-78 (A)

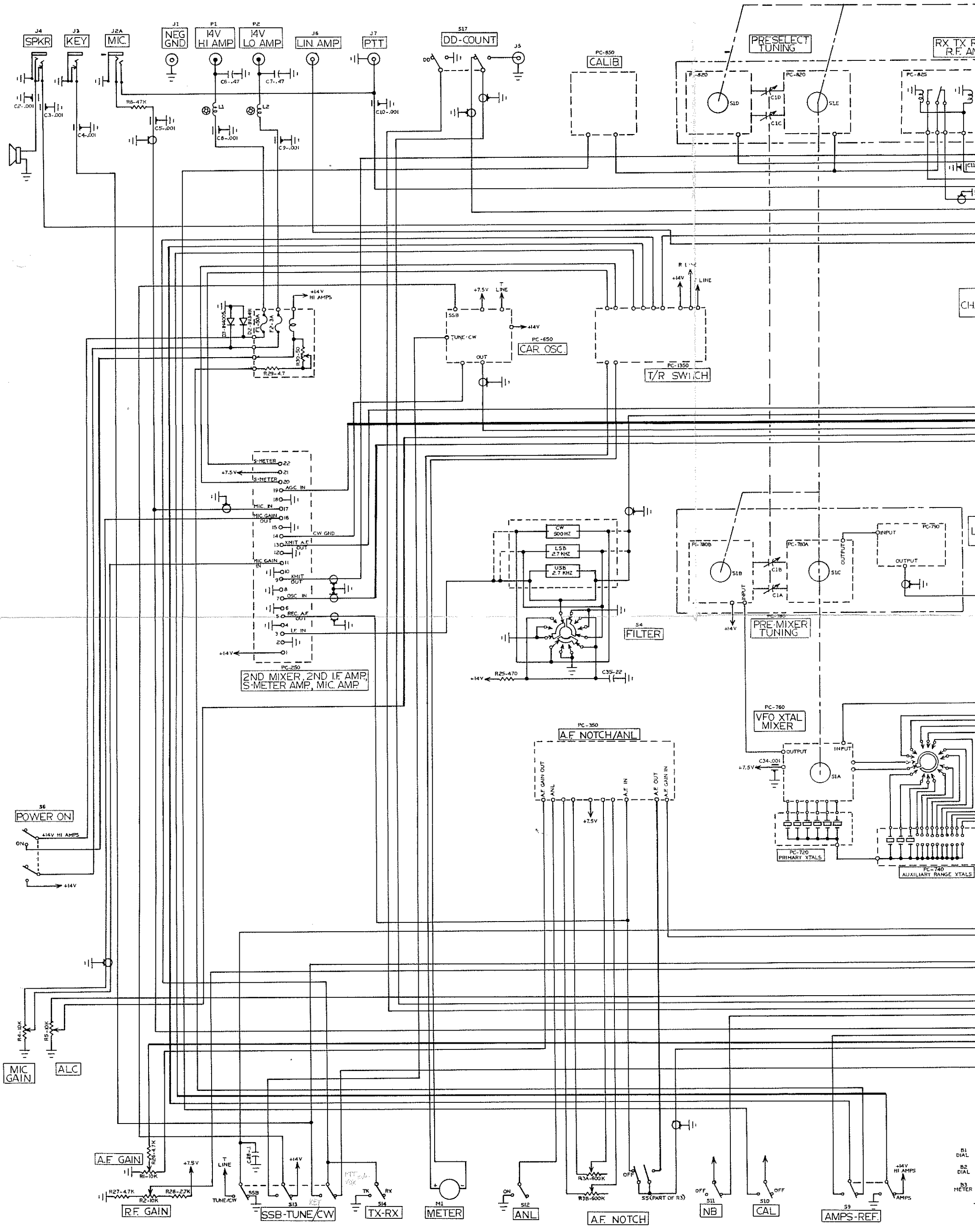
VOLTAGE SYMBOLS

D.C. VOLTAGE
Voltages are positive unless otherwise noted

A.C.VOLTAGE
Voltages are RMS value

R - RECEIVE

T - TRANSMIT


J4 SPKR
J3 KEY
J2A MIC.
J1 NEG GND
P1 14V HI AMP
P2 14V LO AMP
J6 LIN. AMP
J7 PTT
S17 DD-COUNT
J5
PC-850 CALIB
PRESELECT TUNING
RX TX R.F. AM
PC-820
PC-825
S1D
S1E
C1D
C1C
C2-.001
C3-.001
C4-.001
R8-47K
C5-.001
C6-.47
C7-.47
C8-.001
C9-.001
C10-.001
L1
L2
+14V HI AMPS
D3-IN4005
D2-IN3491
FL-.50A
F2-3A
R30-50
R29-4.7
+7.5V
T LINE
+14V
SSB
TUNE-CW
PC-650 CAR OSC.
OUT
PC-1350 T/R SWITCH
S-METER 22
+7.5V 21
S-METER 20
AGC IN 19
18
MIC. IN 17
MIC GAIN OUT 16
15
CW GND 14
XMIT A.F. OUT 13
12
MIC GAIN IN 11
10
XMIT OUT 9
8
OSC IN 7
6
REC. A.F. OUT 5
4
I.F. IN 3
2
+14V 1
PC-250
2ND MIXER, 2ND I.F. AMP, S-METER AMP, MIC AMP
CW 500 HZ
LSB 2.7 KHZ
USB 2.7 KHZ
S4 FILTER
R25-470
C35-.22
+14V
PC-780B
PC-780A
PC-790
INPUT
OUTPUT
S1B
S1C
C1B
C1A
PC-780 PRE-MIXER TUNING
PC-760 VFO XTAL MIXER
C34-.001
S1A
PC-720 PRIMARY XTALS
PC-740 AUXILIARY RANGE XTALS
PC-350 A.F. NOTCH/ANL
A.F. GAIN OUT
ANL
+7.5V
A.F. IN
A.F. OUT
A.F. GAIN IN
S6 POWER ON
+14V HI AMPS
ON
+14V
R4-10K
R5-10K
MIC GAIN
ALC
A.F. GAIN
R26-4.7K
R1-10K
R27-4.7K
R28-27K
R2-10K
R.F. GAIN
T LINE
TUNE/CW
C28-.1
SSB
S13
SSB-TUNE/CW
TK
RX
S14
TX-RX
M1
METER
ON
S12
ANL
R3A-600K
R3B-600K
OFF
S5 (PART OF R3)
A.F. NOTCH
OFF
S11
NB
OFF
S10
CAL
+14V HI AMPS
S9
AMPS-REF.
B1 DIAL
B2 DIAL
B3 METER

MODEL 350-XL CHASSIS WIRING 4-15-78 (A)

PRESELECT TUNING

RX TX RELAY R.F. AMP

PC-820

PC-825

PC-540 PRE-DRIVER

PC-530 DRIVER

PC-550 POWER AMP.

J14

P3

P5

S1-BANDSWITCH

S1D

S1E

C1D

C1C

C11-.001

C12-.001

T LINE

R LINE

INPUT

OUTPUT

+14V HI AMPS

C13-.001

C14-.001

C15-.001

C16-.1

C17-.1

L3

C18-

+14V

PC-380 LIN. AMP. SW.

PC-790 PRE-MIXER LOW PASS FILTERS MIXER AMP.

PC-780B

PC-780A

S1B

S1C

C1B

C1A

PRE-MIXER TUNING

PC-785

PC-760 VFO XTAL MIXER

S1A

C34-.001

+7.5V

PC-720 PRIMARY XTALS

PC-740 AUXILIARY RANGE XTALS

S2 AUX RANGES

PC-150 1ST MIXER, 1ST I.F. AMP, NOISE BLANKER

N.B.

R.F. GAIN

I.F. OUT

XMIT A.F. IN

REC. IN

OSC. INJ.

R14-15K

PC-320 REC. AUDIO, AGC, OSC SWITCH

A.F. GAIN OUT

REC. A.F. IN

A.L.C.

AGC OUT

A.F. OUT

+C.W.

A.F. GAIN IN

CAR. OSC. IN

OSC. OUT

VFO IN

+7.5V

R LINE

T LINE

PC-450 VFO COMPARTMENT

C20 .001

P4 TO AUX. OSC

J13 OUTPUT

R.I.T.

C18-.001

C32-.15

C33-.15

C31-2.7

L7

C30-.12

C29-5.3

C19-.001

PC-470 R.I.T./VOLT. REG.

R LINE

+7.5V

T LINE

+14V

KEY

A.F. OUT

S11 NB

S10 CAL

S9 AMPS-REF.

OFF

AMPS

+14V HI AMPS

B1 DIAL

B2 DIAL

B3 METER

S16 DD ON

S15 DH

HOLD

J17 DD6-XL CONN.

1 2 3 4 5 6

LED 4 R.I.T. (WH)

LED 3 REC. (GRN)

LED 2 STBY (YEL)

LED 1 TRANS (RED)

S8 R.I.T. ON

ON

R21-270-1W

R.I.T.

R22-2.7K

R7-10K

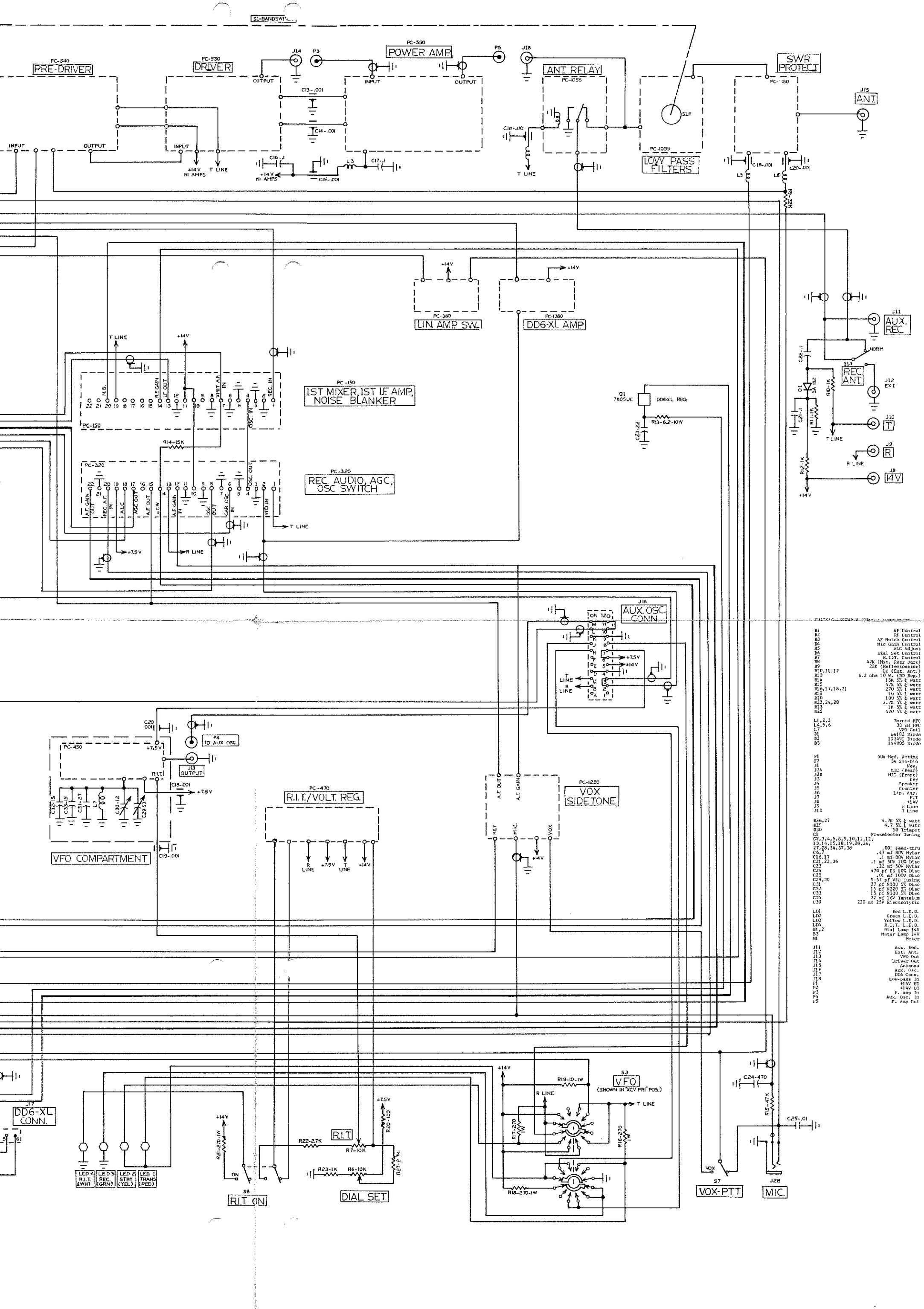
R20-100

R23-1K

R6-10K

R21-2.7K

DIAL SET



CHASSIS ASSEMBLY CIRCUIT COMPONENTS

R1	AF Control
R2	RF Control
R3	AF Notch Control
R4	Mic Gain Control
R5	ALC Adjust
R6	Dial Set Control
R7	R.I.T. Control
R8	47K (Mic. Rear Jack)
R9	22K (Reflectometer)
R10,11,12	1K (Ext. Ant.)
R13	6.2 ohm 10 W. (DD Reg.)
R14	15K 5% ½ watt
R15	47K 5% ½ watt
R16,17,18,21	270 5% 1 watt
R19	10 5% 1 watt
R20	100 5% ½ watt
R22,24,28	2.7K 5% ½ watt
R23	1K 5% ½ watt
R25	470 5% ½ watt
L1,2,3	Toroid RFC
L4,5,6	33 uH RFC
L7	VFO Coil
D1	BA182 Diode
D2	IN3491 Diode
D3	IN4005 Diode
F1	5OA Med. Acting
F2	3A Slo-blo
J1	Neg.
J2A	MIC (Rear)
J2B	MIC (Front)
J3	Key
J4	Speaker
J5	Counter
J6	Lin. Amp.
J7	PTT
J8	+14V
J9	R Line
J10	T Line
RZ6,27	4.7K 5% ½ watt
RZ9	4.7 5% ½ watt
R30	50 Trimpot
C1	Preselector Tuning
C2,3,4,5,8,9,10,11,12, 13,14,15,18,19,20,26, 27,28,34,37,38	.001 Feed-thru
C6,7	.47 mf 80V Mylar
C16,17	.1 mf 80V Mylar
C21,22,36	.1 mf 50V 20% Disc
C23	.22 mf 50V Mylar
C24	470 pf 5% 10% Disc
C25	.01 mf 100V Disc
C29,30	9-57 pf VFO Tuning
C31	27 pf N330 5% Disc
C32	15 pf N220 5% Disc
C33	15 pf N330 5% Disc
C35	22 mf 16V Tantalum
C39	220 mf 25V Electrolytic
LD1	Red L.E.D.
LD2	Green L.E.D.
LD3	Yellow L.E.D.
LD4	R.I.T. L.E.D.
B1,2	Dial Lamp 14V
B3	Meter Lamp 14V
M1	Meter
J11	Aux. Rec.
J12	Ext. Ant.
J13	VFO Out
J14	Driver Out
J15	Antenna
J16	Aux. Osc.
J17	DD6 Conn.
J18	Low-pass In
P1	+14V HI
P2	+14V LO
P3	P. Amp In
P4	Aux. Osc. In
P5	P. Amp Out