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OWNER'S INSTRUCTION MANUAL SSB/AM CB BASE STATION

TRAM D201A

TABLE OF CONTENTS

General Information and Operation

	PAGE
About This Manual	2
Warranty	3
For Your Protection	3
Introduction	4
License and Regulation Information	5
Installation Instructions	6
Basic Operating Procedures	7
External Features and Controls	10
Use of Controls	12
Specifications	16

Basic Technical Service

Introduction	18
Figures 1 - 12	19-29
Zeroing the S-Meter	30
Tube Trouble Locator	31
Receiver Failure Chart	32
Transmitter Failure Chart	33
Fuses	34
Lamps	34

Troubleshooting and Alignment

General Information	35
Test Equipment	35
Power Supplies	35
Synthesizer Board	36
RECEIVER - General Information	39
S-Meter Calibrate	40
AGC	40
Squelch	40
Manual Tuning Calibrate	41
27MHz RF Amplifier	42
455KHz IF	43
6MHZ IF	43
Noise Blanker	44
Noise Limiter	45
Receiver Audio	45
TRANSMITTER - General Information	45
Power Metering	46
Antenna Loading	46
RF Drive, Final and Neutralization	47
Balanced Modulator Board	47
AM Transmit Audio	49
Compression Adjustment	49
Sideband Transmit Audio	49
ALC Adjustment	50
Returning the Set for Service	50
Parts List	52
Technician's Information Form	69

ABOUT THIS MANUAL

We at Tram realize that technical manuals can be dull. Most folks dislike reading manuals and we can't blame them. We hope this manual will be different.

We have tried to present all the dope on your new D201A in a clear and easy-to-understand fashion. Everything from installing your antenna to aligning your IF is covered. And even if you don't know a mho from an ohm this manual will be of great value to you in learning your way around your new D201A.

The first section is for everyone: we suggest some precautions, we fill you in on how we test the radio before you ever see it and we tell you how to install it at your home. All those controls? Not only do we explain what they do, but we explain how to best use them.

The second section covers easy maintenance that any owner can take a crack at, maybe saving a few dollars in the process. Tired tubes, problems in Receive and problems in Transmit, all are investigated and quick fixes are suggested.

The third section is for the electronics whiz only. Fancy test equipment and Government licenses are required to do most everything in here. Anyone curious about the inner workings of his set though, will find circuit descriptions and explanations in this section.

The parts list is last. All those resistors and capacitors, diodes and transistors have a number and value and should you need a replacement part, we try to help you get it down the street instead of sending clear across the country to us.

A full schematic is tucked in the back. While it may look like a road map of Los Angeles to most folks, the service technician will find everything he needs to know about gain measurements, signal injection values, point voltages and signal flow right there on the schematic.

That's about it. Find a comfortable chair, sit awhile and get familiar with this manual and with your great new radio.

LIMITED WARRANTY

TRAM/DIAMOND CORPORATION, hereinafter referred to as TRAM, warrants that, for a period of six (6) months (90 days for vacuum tubes) from the date of first sale to original retail purchaser, this TRAM product will be free of defect in materials and workmanship. TRAM's obligation is limited to repairing or replacing, parts or equipment which are returned, transportation and insurance pre-paid, without alteration or further damage, and which in TRAM's judgment, were originally defective or became defective in normal use.

For specifics concerning Warranty procedures and shipping instructions see page 50.

CAUTION

Before applying power to your new D201A remove the top cover and check that the following components have not shaken loose in shipping: See Figure 3 for component locations.

1. Check all tubes and make sure they are firmly seated in their sockets.
2. Check the Balanced Modulator Board to make sure it is fully seated.
3. Check the Synthesizer Board to make sure both cables are properly connected and main terminal plug fully inserted.
4. Check the Auxiliary Audio Board to insure it is seated firmly on its connector.
5. Check the Receiver Auxiliary Board to insure it is seated firmly in its connector.

FOR YOUR PROTECTION

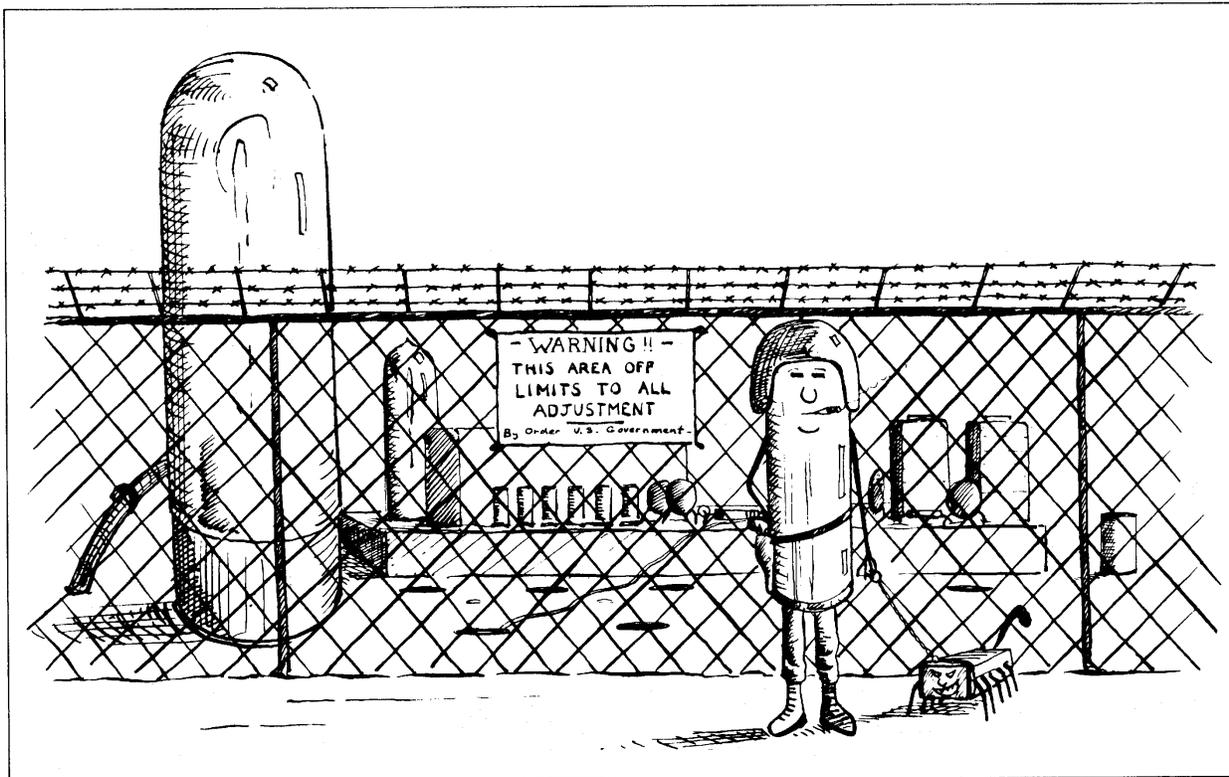
1. Fill out your **Warranty Card** and **mail it**.
2. Record the **Serial Number** of your **new D201A** and **keep this information** in a safe place. (This number is stamped in the lower left corner of the chassis next to the speaker.)
3. If your radio is stolen, notify the Police and the Factory **immediately**.
NOTE: Serial Numbers of all radios returned to the factory for service are recorded. Radios whose serial numbers have been altered or eradicated will not be serviced.
4. Do not discard original shipping carton and packing materials.

INTRODUCTION

Your new D201A is a highly sophisticated, carefully tested electronic instrument. Aside from the usual alignment and bench testing, each D201A is subjected to a physical shock test while being monitored under receive and full load transmit conditions. In addition, each D201A must successfully pass a minimum 40 hour dynamic cycle test sequence consisting of one hour "ON" (while alternately switching between Receive and full power Transmit) and 1/2 hour "OFF". The electronic monitoring systems used during these tests are capable of detecting even momentary malfunctions.

Before attempting to use the radio you should become familiar with the **Installation** and **Operation** sections of this manual. You will find instructions to the effect that an owner should make only recommended adjustments. This is most important. Certain adjustments can **only** be made by a qualified electronic technician using well-calibrated test equipment.

Transmitter circuit adjustments can only be performed by technicians having FCC First or Second Class Commercial Operator licenses. An owner will degrade the performance of his set and may even render it inoperative if he disturbs factory settings. Sets returned to the factory that show evidence of unauthorized adjustment or circuit revision cannot be serviced under the Warranty if such servicing would tend to jeopardize our FCC type acceptances.



LICENSE AND REGULATION INFORMATION

excerpted from sub-Part #95 of FCC Rules and Regulations

The Federal Communications Commission has made it possible for anyone over the age of 18 years to obtain a license to operate two-way radios in the Citizen's Band. It is a violation of federal law to operate this equipment without a license.

To obtain your license; first, become familiar with the rules and regulations governing the use of Class D Citizen's Band Radio by reading sub-Part #95 of FCC Rules and Regulations.

Second, fill out FCC application form #505, enclosed in this manual. Sign the form and mail it with the prescribed Application Fee to FCC, Gettysburg, PA 17325. The FCC will issue you your license and assign station identification numbers to your equipment.

Provisions have been made by the FCC for temporary, sixty day, operation of Class D Citizen's Band equipment. Temporary permit, FCC form #555-B, is designed to serve as an interim license provided a permanent license has been applied for by the filing and **mailing** of FCC form #505. Temporary form #555-B must be filled out in full and kept in a safe place. It is valid for 60 days only and may not be renewed.

Keep your license close to your equipment at all times. Do not transmit unless you have your license. Make transmissions short and to the point and listen to the channel before transmitting to be sure it is not in use.

Operating and equipment requirements are covered in Part #95 of the Federal Communications Commission's Rules and Regulations. Note the proper use of **Channel 9** (27.065 MHz). This channel has been reserved for communications concerned with the **immediate safety of life** of individuals, the **immediate protection of property or assistance to a motorist**. For this reason, **Channel 9** is uniquely marked on both the D201A dials. All use of this equipment must conform to FCC requirements. TYPE ACCEPTANCE DATA IS ON FILE WITH THE FCC, LISTED AS FCC DATA 7154.

INSTALLATION INSTRUCTIONS

ANTENNAS & LEAD-IN CABLE

A quarter-wave vertical ground plane type antenna is suitable for base station use. Improved results will be obtained with commercially available 5/8 wave vertical antennas that have matching sections to match 50 ohm coaxial cable. For directional coverage to greater distances, a vertical beam antenna is recommended. In areas where there is a lot of activity, a beam antenna, because of its directional characteristics, will reduce interference from other stations not directly in the path of the beam's directivity.

CAUTION: Antennas and feedlines should **never** be installed near power lines as it is **extremely dangerous**.

In all cases, install the antenna in the open, away from surrounding objects. Care should be taken in using an ungrounded type of antenna since static charges collected along the antenna elements can damage the metering systems and first RF Amplifier, as well as generate annoying noise in the receiver. A lightning arrestor installed in the transmission line affords protection from static discharge damage.

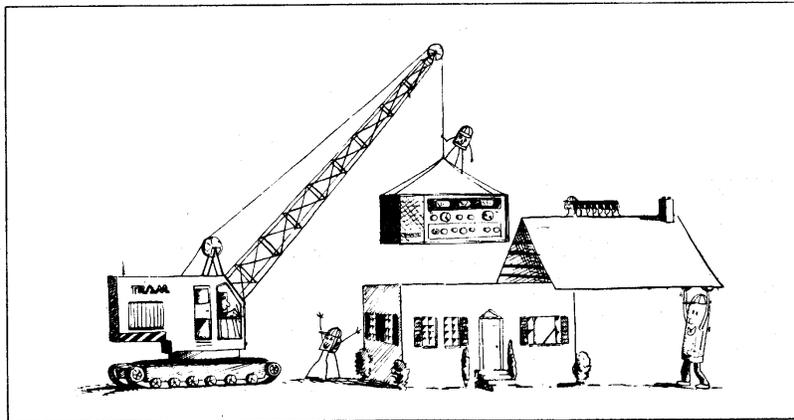
Most commercially available antennas are designed for use with 50 ohm coaxial cable. Be sure to use the correct impedance as specified by the antenna manufacturer. The D201A Pi-network output will match a 50 ohm system, but will not correct for a mismatch between the antenna and cable feeding it. The D201A power meter can be used to read SWR on your antenna system and is useful in correcting mismatch. (Refer to BASIC OPERATING PROCEDURES)

For feedline lengths under 50 feet, RG-58A/U for 50 ohm systems will be satisfactory. For less loss or longer runs, RG-8A/U is recommended.

Exercise **extreme** care when attaching coaxial fittings to the cable. Be sure that the center conductor is soldered. Remember that a cold soldered joint will result in a loss of power. Solder the braid carefully. Screw the fitting firmly on the antenna. Where the fitting is exposed to the weather, wrap it with vinyl tape. **The use of a lightning arrestor is recommended.** Most antenna difficulties result from lack of care in above assembly procedures.

GROUNDING

The three wire power cord includes a ground wire that connects the chassis of the D201A to the ground of your electrical service. In the event that your power system does not accept the three terminal plug, obtain an adaptor that has a ground wire so that you may connect this ground wire to a suitable ground such as a COLD water pipe or a copper ground stake driven 4 or 5 feet into the ground. If an adaptor with a ground wire is not available, ground your D201A by connecting a wire (#14 or larger) from one of the rear panel screws to the cold water pipe or ground stake.



CAUTION The D201A is a complex piece of electronic equipment; proper ventilation is essential. The louvers and venting are functional. Do not obstruct the free flow of air through the cabinet. Do not install the set in a closed space.

Remove the microphone from its box and connect it to the MIC JACK on the left side of the front panel. (See Figure 1) The D201A is equipped with a detachable line cord. Plug this cord into the recessed receptacle at the left rear of the chassis. (See Figure 2) Note that the D201A is completely inoperative whenever the top cover is removed. Connect antenna feedline to antenna connector on D201A rear panel.

BASIC OPERATING PROCEDURES

For basic AM operation set the D201A controls as follows:

CONTROL	SETTING
1. MODE	AM
2. RF GAIN	Maximum CW (clockwise)
3. SQUELCH	Maximum CCW (counter clockwise)
4. CLARIFIER	12 o'clock (top center)
5. CRYSTAL-MANUAL	CRYSTAL
6. CRYSTAL SELECTOR	To desired channel
7. LIMITER	Click Off at maximum CCW
8. MIC GAIN	12 o'clock
9. TTC	3 o'clock
10. CAL	Push in for OFF
11. BLANKER	Push in for OFF
12. METER SWITCH	To S/PWR
13. VOL/PWR OFF	Turn ON and adjust for desired listening level.

The dials and S-meter will light up when the power is on. Wait a few moments for the set to warm up and you will hear background noise or signals if the channel is active. Locate an inactive channel and press the push-to-talk bar on the microphone. The MOD LIGHT will come on and the S-Meter will indicate carrier plus modulation as you speak. Release the bar to turn off the transmitter.

SWR CHECK:

When first connecting your new D201A it is recommended that the SWR of the antenna system in use be checked. SWR (standing wave ratio) is a measurement indicative of the overall match of the antenna system. Each of the elements in this system (the transmitter, the coax cable and the antenna) must be matched to one another for optimum performance. If a mis-match exists, standing waves develop along the transmission line indicating less than optimum operating conditions. An SWR of 2 to 1 is acceptable with optimum results gained as 1 to 1 is approached. The D201A transmitter should not be operated with an SWR of 4 to 1 or greater. To check the SWR proceed as follows:

1. Set MIC GAIN fully CCW and MODE to AM.
2. Set METER SWITCH to SWR CAL. Key the transmitter and adjust the SWR CAL CONTROL for full scale deflection ('CAL' at end of SWR scale).
3. Set METER SWITCH to SWR position and read SWR directly from SWR scale.
4. Return METER SWITCH and MIC GAIN control to customary positions.

If SWR is high the transmission line and antenna should be checked.

For Sideband operation, set the D201A controls as follows:

CONTROL	SETTING
1. MODE	LSB or USB as desired
2. RF GAIN	Maximum CW
3. SQUELCH	Maximum CCW
4. CLARIFIER	12 o'clock (top center)
5. CRYSTAL MANUAL	Crystal
6. CRYSTAL SELECTOR	As desired (Ch. 16 frequently used for SB operation.)
7. LIMITER	Click off at Maximum CCW
8. MIC GAIN	12 o'clock
9. TTC	12 o'clock
10. CAL	Push in OFF
11. BLANKER	Push in OFF
12. METER SWITCH	To S/PWR
13. VOL/PWR OFF	Turn on and adjust volume for desired level.

Increasingly crowded conditions on the 27 MHz Citizen's Band, especially in urban areas, have resulted in greater use of the Sideband mode of transmission. A single sideband signal occupies one half the space of a conventional AM signal. Because of this each channel can handle twice the traffic in the sideband mode that would normally be possible in AM.

Single Sideband signals are distinguished from AM signals by the absence of carrier. When in an SSB mode, a received AM signal will usually be accompanied by a heterodyne (squeal). Since all AM transmissions contain both the upper and the lower sidebands, it is not unusual to hear AM stations perfectly when in either SSB mode. In the AM reception mode, a sideband signal will be unintelligible or highly distorted.

The easiest method of tuning single sideband signals is as follows:

1. Set mode switch to USB or LSB.
2. Set Channel select desired channel, CRYSTAL/MANUAL switch to CRYSTAL.
3. Slowly turn CLARIFIER to the left and right of center until a received signal becomes clear and easy to understand.
4. Slight adjustment of the clarifier may be necessary when listening to several sideband stations.

The manual tuning of single sideband signals is considerably more critical than tuning AM signals. The D201A is designed to tune as easily as possible; however, some care is required.

A recommended procedure for tuning sideband signals is as follows:

Having engaged the direct drive portion of the tuning mechanism, tune approximately one-half channel past the signal to be tuned. Turning the manual tune knob back toward the signal provides a 36:1 vernier tuning ratio. The signal can now be approached and carefully tuned using the vernier drive in about the middle of its range. The clarifier is not functional in the Manual Tune mode.

EXTERNAL FEATURES AND CONTROLS

FRONT PANEL

POWER OFF/VOL	Turns power on and off. Controls the receive volume.
RTC	Receive Tone Control. Varies pitch of receiver audio from bass to treble.
RF GAIN CONTROL	Reduces receiver front-end gain in order to increase strong-signal handling capability.
AM-LSB-USB SWITCH	Selects desired mode of operation for transmit and receive: AM, Lower Sideband, Upper Sideband.
SQUELCH	Provides a means of quieting the receiver from background noise or unwanted signals.
CRYSTAL/MANUAL SWITCH	Selects method of receive – Crystal controlled or Manually tuned.
MANUAL TUNING	Used to tune the receiver when the Crystal/Manual Switch is in the Manual position. Transmit frequency is controlled by the Crystal Selector regardless of Manual Tuning Dial position.
CAL	Calibrate. Functional in Manual Receiver only. Activated when pulled out. Provides a means of checking Manual Dial Accuracy.
CRYSTAL SELECTOR	Selects Transmit Channel at all times and the receive channel in the Crystal Receive mode. Selected channel is displayed in the window above the selector knob.
CLARIFIER	Shifts the Crystal Receive frequencies above and below center channel frequency for SSB operation. NOT functional in the Manual Receiver Mode.
LIMITER, OFF	Activates the AM Noise Limiter and adjusts limiting action for varying levels of noise.
BLANKER	Activates Noise Blanker.
MIC GAIN	Controls the sensitivity of the Microphone Amplifier. Normally set at 12 o'clock.
TTC	Transmitter Tone Control. Controls the transmitter audio frequency response in a range from bass to treble. Normally set at 3 o'clock.
MIC	Microphone Jack. Mating plug is attached to the microphone cord supplied.
MOD LIGHT	AM: When transmitting, light glows dimly with carrier and flashes in proportion to modulation. In Receive, light flashes in proportion to speaker audio output. SSB: Light glows dimly during transmit. Flashes with speaker audio output in receive.
SSB LIGHT	Indicates SSB operation while in LSB or USB modes.
METER SWITCH	Selects meter function desired. S/Power Position: Meter will indicate incoming signal strength

	in Receive and RF Power output in transmit. Switching is automatic.
	SWR CAL Position: See SWR CAL Control.
	SWR Position: Meter indicates SWR on the antenna cable after being calibrated.
SWR CAL CONTROL	Used in conjunction with the Meter and the SWR switch to calibrate the SWR scale on the meter to the right-hand index.
PANEL METER	S METER: Set meter switch to S/PWR position and read S units scale. POWER METER: Meter switch as above, read watts scale when transmitting. SWR: Read standing wave ratio on transmission line directly from SWR scale after Meter has been calibrated. (see page 7 for this procedure)
 REAR PANEL	
FUSE POST	Contains Primary fuse. (use 3A slo-blo only)
AC CONNECTOR	AC power cord connector.
T/R SWITCH (JACK)	Jack for external or remote foot operated transmit/receive switch. (not supplied but available as an optional accessory)
ANT CONNECTOR	SO-239. Mates with PL259 antenna connector and antenna lead-in wire.
EXT. SPEAKER (JACK)	This jack was designed for an external or remote 4 ohm speaker. It is not suitable for the use of headphones with normal sensitivity because of hum pickup and sensitivity to switching transients. If headphone use is desired, it can be achieved by inserting a series resistor in the 1/4" phone plug supplied with the headphones or in a special adaptor that can be constructed from a 1/4" phone plug and a 1/4" jack. The proper resistor value will vary with headphone impedance and should be selected to provide a comfortable listening level with the VOL control at 12 o'clock. A resistor value of 3.3k ohms may be a suitable value.
 TOP COVER	 Removeable for easy access to replaceable internal components. Actuates AC interlock switch to power when cover is replaced.

band is open with skip signals that are weaker than the stations in your local area. The squelch can then be set to open only on the strong local signals.

CRYSTAL-MANUAL SWITCH

This switch allows the operator a choice of receive frequency control. In the CRYSTAL position, the D201A is a fully crystal controlled transceiver. The transmit and receive channels are selected by the 40-position CRYSTAL SELECTOR switch.

In the MANUAL position, there is independent selection of transmit and receive frequencies. The transmit frequency will always be crystal controlled on the channel indicated by the CRYSTAL SELECTOR dial. The receive frequency is governed by the MANUAL TUNING control and indicated on the MANUAL TUNING dial.

CAUTION If you have tuned a station in the Manual mode and you wish to transmit to it, you must set the CRYSTAL SELECTOR to the channel indicated on the Manual Tuning dial.

MANUAL TUNING

The D201A provides a two speed MANUAL TUNING control. Once the skill for operating this control has been achieved, it becomes extremely useful. The device is referred to as a dual ratio, reverse vernier ball drive and operates as follows:

Continuous rotation of the MANUAL TUNING knob in one direction engages the fast tune mechanism. A reversal in direction immediately picks up the vernier action and sustains it for almost a full turn of the knob before again engaging the fast tune in the new direction.

A recommended procedure for tuning is as follows:

Having engaged the direct drive portion of the tuning mechanism, tune approximately one-half channel past the signal to be tuned. Turning the MANUAL TUNE knob back toward the signal provides a 36:1 vernier tuning ratio. The signal can now be slowly approached and carefully tuned using the vernier drive in the middle of its range.

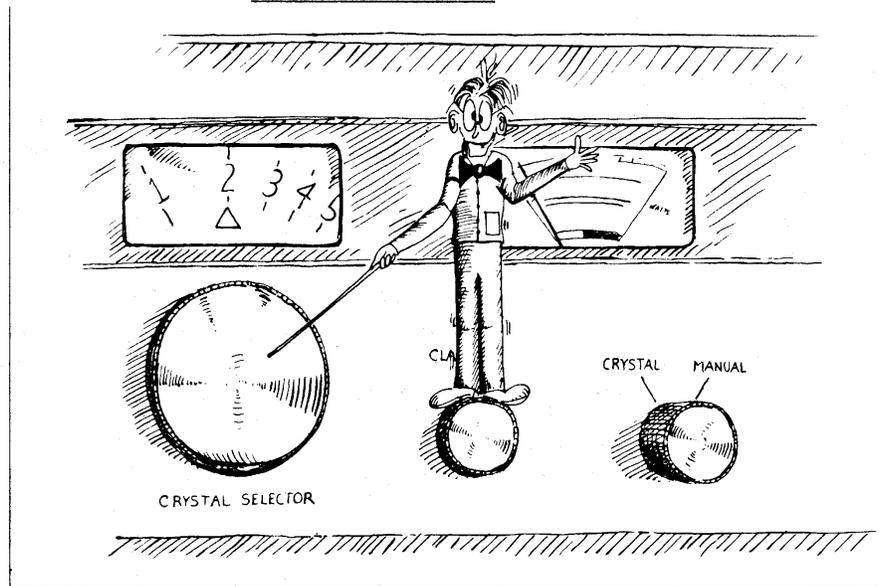
CAL SWITCH

This switch is provided to allow periodic checks of the accuracy of the receive MANUAL TUNING dial. It is useful in the MANUAL receive mode only and must be OFF (pushed in) at all times except when checking dial calibration. The proper calibration procedure is as follows. (Allow thirty minutes for the set to warm up before proceeding.)

1. Set CRYSTAL/MANUAL switch to MANUAL. Mode to AM.
2. Set the MANUAL TUNING dial to Channel 12.
3. Set the CRYSTAL SELECTOR to Channel 12.
4. Pull the CAL button out.
5. Rotate the MANUAL TUNING knob until zero beat is heard. Zero beat is obtained by turning the knob above Channel 12, then slowly turning back towards center. A loud beat note should be heard, decreasing in pitch as Channel 12 is approached. Continue rotating the knob in the same direction and a beat note increasing in pitch can be heard. Zero beat refers to the point of inaudibility between the two beat notes.
6. The dial is properly calibrated when zero beat occurs close to Channel 12.
7. Channels 9, 10 or 11 may be substituted for Channel 12 in Steps 2 through 6.
8. Return CAL button to the "IN" position.
9. If dial calibration is off, see manual tuning alignment instructions. (page 41)

CRYSTAL SELECTOR

The D201 is equipped for 40 channel operation. The desired channel is selected by



USE OF CONTROLS

RTC (Receiver Tone Control)

The receiver tone control allows the operator to adjust the receiver audio tone to suit his preference. This control allows adjustment over a range from bass to treble. Rotating the control CCW (counter clockwise) increases the bass tones. Turning the control CW (clockwise) decreases the bass tones, and, to some extent, the apparent audio level.

PWR OFF-VOL

The volume control is combined with the AC power switch. At the extreme CCW position of the knob, the AC power to the unit is switched off. Advancing the control CW turns on the power and increases the receiver audio volume.

RF GAIN

The RF gain control varies the gain of the RF amplifier. Maximum receiver sensitivity will be obtained with the control at extreme CW position; the **normal** position.

When copying strong signals under noisy or crowded conditions, it may be desirable to reduce the RF gain setting. To do this, set the volume control for nearly maximum and control the audio level with the RF GAIN.

NOTE: The S meter is calibrated with the RF GAIN fully CW; reducing the RF GAIN will result in a corresponding decrease in S meter readings.

AM-LSB-USB SWITCH

This switch selects the mode of operation for both Transmit and Receive portions of the radio. If, in the AM mode, the received signal sounds garbled and the S meter is fluctuating, it is probably an SSB signal. Try LSB or USB. In an SSB mode, it is possible to receive either AM or SSB signals; but mistuning of an AM signal, while in an SSB mode, will result in an annoying beat note.

SQUELCH

This control, when turned CW, quiets the receiver. If set just beyond the point where the receiver background noise disappears, any signal greater in strength than the noise level will restore the receiver to operation. The control may also be advanced to higher settings so that only relatively strong signals will open the squelch. This can be particularly useful if the

rotating the channel selector knob so that the number of the channel appears in the window. There is no stop on the switch so the knob can be continuously rotated in either direction allowing quick channel change.

With the CRYSTAL-MANUAL switch in the CRYSTAL position, the CRYSTAL SELECTOR determines both the transmit and receive channels. With the switch in the MANUAL position the channel selector determines just the transmit channel; the receive channel is determined by the MANUAL TUNE control.

CLARIFIER

This control allows the operator to make slight adjustments to the crystal receiver frequencies. It is useful as a "Fine Tune" control to adjust your frequency to that of other stations.

The CLARIFIER control is used mainly to tune in SSB signals while in the CRYSTAL receive mode. The control does not operate while in MANUAL receive. The fine tune function, when in MANUAL receive, is provided by the dual ratio, reverse vernier built into the receiver tuning mechanism.

If at any time you have difficulty properly tuning an SSB signal with the CLARIFIER control, try switching to MANUAL receive tuning. The other station may be off frequency and outside the range of the CLARIFIER control.

MIC GAIN

This control varies the gain of the microphone preamplifier. It does not significantly affect the modulation level under normal conditions of operation because the Compression-ALC will automatically compensate for widely varying sound levels.

In quiet locations the MIC GAIN can be turned up (CW). If the environment is very noisy, the MIC GAIN should be turned down (CCW). The operator should then hold the microphone about eight inches away and speak directly into it. This results in a clearer signal on the air without transmitting annoying background noises.

NOTE: If you have no transmitter output in SSB and no modulation in AM, check the MIC GAIN control to insure that it has not been turned all the way down.

TTC (Transmitter Tone Control)

The TRANSMITTER TONE CONTROL varies the frequency response of the microphone amplifier. As the control is rotated CW, the bass response is reduced and the treble is favored. This provides a means of tailoring the transmit audio to suit individual voice characteristics.

Short tests with the D201A and another station will enable the other operator to tell you which position of the TTC control best suits your voice.

LIMITER, OFF (Adjustable Noise Limiter)

The "LIMITER, OFF" control actuates the adjustable, series gate, noise limiting circuit. Rotating the control CW from the "OFF" position switches the Noise Limiter ON, and increases the limiting action. For low level or weak noise sources effective limiting will be achieved with small amounts of rotation from full CCW. As the strength of the noise source increases additional rotation CW will eliminate the noise signal. For extremely noisy conditions the LIMITER and BLANKER may be used simultaneously. Additional noise blanking results, but very strong adjacent channel signals may cause intermodulation in the receiver when both systems are employed.

The operator should experiment with these systems to determine the best method of noise elimination for particular conditions.

In the extreme CW position some distortion of the received AM signal will be heard. This is normal.

BLANKER

This switch actuates the RF impulse type noise blanker circuit. Pulling the switch out while listening to a signal will reduce the level of noise on the incoming signal. Noise blanking is accomplished by punching extremely short duration holes in the received signal coinciding with the accompanying noise impulse.

NOTE: These systems are designed to reduce impulse type noise such as auto ignitions and other sporadic, high level pulses. Noise limiting effectiveness decreases for very high repetition rates, or continuous noises, since they cannot be distinguished from a desired signal.

S/PWR, SWR METER

The D201A S-meter is designed to indicate receive signal strength in S units and to automatically switch over to a calibrated RF Power meter when transmitting. In AM transmit, the RF Power Meter will read carrier power accurately in the absence of modulation. The meter reading will normally increase with modulation.

In SSB transmit modes, the RF Power meter will deflect from zero in proportion to modulation level. Because of human voice characteristics, the averaging power meter will tend to read below midscale as you are talking. A short, sharp whistle, which should be done for test purposes only, will cause the meter to read upscale and give a good indication of PEP output.

The meter also functions as an SWR meter when used in conjunction with the meter switch and SWR CAL Control. The switch should be in the S/PWR position except when checking the SWR. The SWR should be checked for each new antenna installation and periodically thereafter. SWR will change with weather conditions, so some variation from day to day is to be expected.

However, an abrupt change after a severe storm should be investigated. A gradually increasing SWR probably indicates deteriorating connections between antenna sections or at cable connections.

The D201A will operate satisfactorily with an SWR of 2 to 1 or less. If SWR readings greater than this are encountered, the antenna systems should be checked.

CAUTION: If the SWR is 4 to 1 or greater, do not continue transmitting. An SWR in excess of 4 to 1 may cause operation not in compliance with FCC regulations.

D201A SPECIFICATIONS

RECEIVER

SENSITIVITY: Channel 1 through 40	SSB-better than 0.1uv for 10db (S+N)/N, carrier ON/OFF. AM-Better than 0.35uv for 10db (S+N)/N.
GAIN: Channel 1 through 40	RF input signals at rated sensitivity provide greater than 1 watt of audio output.
Above Channel 40	AM-less than 1.5uv for 1 watt of audio output. SSB-less than 0.5uv for 1 watt of audio output.
SELECTIVITY:	SSB-6db at 2.1 KHz. AM-6db at 6.0 KHz.
AGC:	Less than 16db audio output change from 1uv to 100,000uv, fast attack, slow release for SSB.
AUDIO FREQUENCY RESPONSE:	Adjustable receive tone control (RTC) greater than 20db change below 400 Hz.
SQUELCH:	Adjustable, threshold from below rated sensitivity to over 5000uv.
AUDIO DISTORTION:	Less than 2% with 1 KHz sine wave into 4 ohms at a 1 watt level.
AUDIO MAX. OUTPUT:	4 watts at 10% T.H.D. into 4 ohms.
IMAGE REJECTION:	Better than 80db above rated sensitivity.
IF REJECTION:	Better than 80db above rated sensitivity.
IF FREQUENCY:	SSB-6.255 MHz. AM-6.2565 MHz, 455 KHz.
ADJACENT CHANNEL REJECTION:	Greater than 80db.
DESENSITIZATION:	Better than 80db for -3db desensitization of desired signal.
RF INTERMODULATION DISTORTION:	Better than 75db.
CRYSTAL CLARIFIER RANGE:	± 800 Hz (1600 Hz total) typical.
MANUAL TUNING:	2-speed reverse-vernier ball drive. Fast, 120 KHz per knob rotation; vernier, 20 KHz per knob rotation.
FREQUENCY STABILITY:	After 30 minutes warm-up; crystal, less than 5 Hz per 15 minutes. Manual, less than 100 Hz per 15 minutes.
NOISE REDUCTION:	RF Noise Blanker and Adjustable Level Series Gate Limiter. Each is switchable.

TRANSMITTER

SSB POWER:	12 watts PEP output (FCC limit).
AM POWER:	4 watts output. (FCC limit).
MODULATION LEVEL:	Adjustable, 0 to 100% modulation.
MODULATION FREQUENCY RESPONSE:	TTC adjustable, bass to treble.
SSB ALC:	70db range.
AM COMPRESSION:	70db range.
HARMONIC SUPPRESSION AND SPURIOUS EMISSIONS:	Better than FCC requirement.
ANTENNA MATCHING:	Adjustable, will match antenna loads of 25 to 100 ohms.
SSB CARRIER SUPPRESSION:	Better than -40db.
SSB OPPOSITE SIDEBAND SUPPRESSION:	Better than -60db at 1 KHz.
CARRIER FREQUENCY TOLERANCE:	± 100 Hz nominal.
GENERAL	
SUPPLY VOLTAGE:	117 VAC nominal @ 50/60 Hz.
POWER CONSUMPTION:	Less than 200 watts.
OVERALL SIZE:	21 1/2" W, 7 1/4" H, 13" D.
SHIPPING WEIGHT:	36 pounds.
MICROPHONE:	Supplied, Astatic GD104, HI-Z crystal.

TECHNICAL SERVICE

Introduction

We hope you never need to use the following portion of this manual. But in case you do, we have tried to lay out the technical service section and schematic as clearly and logically as possible. We want to be sure using the manual isn't more complicated than fixing the set.

The first section of Technical Service deals with problems involving tubes, pilot lamps, S-Meter adjustment and fuses. In addition, SYMPTOM/CAUSE charts are provided to help identify specific problems and suggest solutions.

The second section covers advanced troubleshooting and alignment procedures. A First or Second Class F.C.C. License, sophisticated test equipment and considerable technical experience are required to perform the procedures outlined. If you're not lucky enough to possess all of these stay clear of this section. Usually, more problems are created by well-meaning troubleshooters than are remedied. Problems whose scope goes beyond the material included here should receive factory attention. Failures related to the Balanced modulator Board and Synthesizer Board in particular should be serviced by the factory. The removable nature of these boards is designed to facilitate this.

Remember, modifications void the Warranty. Good luck and good hunting.

