

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 cal. procedure follows. Allow thirty (30) minutes for the set to warm up before proceeding.

1. Set receive CRYSTAL/MANUAL switch to MANUAL.
2. Set the MANUAL TUNING dial to Channel 12 such that the reverse vernier range is from approximately $\frac{1}{2}$ channel below Channel 12 to $\frac{1}{2}$ channel above.
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 approached, finally becoming inaudible. 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. Also, regardless of which channel is selected in Step 3, a beat note will be detectable at either Channel 9, 10, 11 or 12 on the MANUAL TUNING dial in accordance with the crystal chart shown on the schematic.
8. Should the MANUAL oscillator drift out of calibration, it can easily be corrected by presetting the MANUAL dial to Channel 12 in Step 5 and adjusting C319 until zero beat is obtained. C319 is mounted on top of the main tuning condenser bracket (see FIG. 4 on fold out). It will be necessary to lift the top cover and to momentarily defeat the AC Interlock while tuning C319.

CAUTION: Hazardous voltage and high temperatures may be encountered within the D201 cabinet. Keep hands away from hot tubes to prevent burns. Remove microphone cord and turn VOX SENS to OFF before defeating the AC interlock; this will prevent high voltages from appearing on the RF coils located on the SWR BRIDGE should the transmitter be accidentally keyed. Keep fingers clear of the Interlock switch when closing the top cover, to avoid pinching.

9. Return CAL button to the "IN" position.

S/PWR, SWR METER

The D201 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 only 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; but, 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, perhaps monthly, 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 D201 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 investigated.

CAUTION If the SWR is 4 to 1 or greater, do not continue transmitting.

TRAM/DIAMOND CORPORATION cannot certify compliance with FCC Regulations for an SWR of 4 to 1 or greater.

METER OPERATION

- 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**
- Turn MIC GAIN fully CCW and key the transmitter in AM.
 - Set meter switch to SWR CAL position and adjust SWR CAL control for full scale deflection (**CAL** at end of SWR scale).
 - Set meter switch to SWR position and read SWR directly from SWR scale.
 - Return meter switch and Mic Gain control to customary position for normal operation.

S METER ZERO Some drift in S METER ZERO will normally be experienced before the vacuum tubes and related components stabilize with use. To check and adjust Meter Zero, proceed as follows:

- Place CRYSTAL-MANUAL switch in the CRYSTAL position.
- Turn the RF GAIN Control fully CCW.
- Rotate the CRYSTAL SELECTOR to the blank channel between 22 and 23.
- Place the METER switch in the S/PWR position and note the meter reading.
- If adjustment is required, lift the top cover and locate the meter zero control in front of the 455 kHz filter as shown in FIG. 4 fold out.
- Momentarily defeat the AC Interlock switch at the left rear corner, insert small screw driver into meter zero control and adjust for a zero meter reading. See **CAUTION** Page 11.
- Close the top cover and restore CRYSTAL SELECTOR, RF GAIN and other controls to normal operating positions.

CAUTION Keep fingers clear of the AC Interlock switch to avoid pinching when closing the top cover.

TUNE, LOAD The D201 is factory adjusted to match a perfect 50 ohm antenna system. Since few antenna systems are perfect, it is suggested that the D201 be adjusted as follows to obtain optimum performance when used with the owner's antenna. See Page 8 for the location of the TUNE and LOAD Controls. Keep the test procedure as short as possible to prevent undue interference.

- Select a quiet midband channel.

2. Key the transmitter in AM (antenna connected).
3. Alternately adjust the TUNE and LOAD controls for maximum POWER METER reading with the meter switch in the S/PWR position.
4. Unkey the transmitter.

CRYSTAL-MANUAL SWITCH This switch allows the operator a choice of receive modes. In the CRYSTAL position, the D201 is a fully crystal controlled transceiver. The transmit-receive channel is selected by the 23-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 in this mode is governed by the MANUAL TUNING control as indicated on the MANUAL TUNING dial.

CAUTION If you have tuned a signal in the Manual mode and you wish to transmit, you must set the CRYSTAL SELECTOR to the proper channel.

VOX

The D201 incorporates two methods of keying the transmitter on/off:

- | | |
|--------|----------------------------|
| 1. PTT | Push-to-talk |
| 2. VOX | Voice-operated-transmitter |

PTT operation allows the operator to manually key the transmitter by depressing (transmit) and releasing (receive) the bar on the microphone.

PTT operation is selected by rotating the VOX SENS control fully counter clockwise (CCW) to **OFF** position.

VOX operation allows the operator to key the transmitter by merely speaking into the microphone; automatically the transmitter will key on/off in response to the operator's speaking, which allows complete hands-off operation. VOX is particularly suited for SSB operation.

Unlike many other CB transceivers, the D201 features front panel **VOX sensitivity** and **VOX delay** controls for easy accessibility.

Vox operation is selected by rotating the VOX SENS control from CCW position and locking the microphone switch bar in a depressed position.

The VOX SENS control permits the operator to speak lower in volume or move back, away from the microphone, and still be able to key the transmitter.

The VOX DELAY control adjusts the length of time the transmitter stays in transmit when the operator pauses or has finished talking. The time will increase as the VOX DELAY is rotated CW. If the VOX DELAY is set for too short a time interval, the operator will find the transmitter unkeying during slight pauses in speech. Rotating the VOX DELAY CW will keep the transmitter keyed throughout normal speech patterns.

VOX operation is accomplished as follows:

1. Rotate VOX SENS CW from the OFF position.
2. Depress and lock the microphone bar.

3. Speak into the microphone and rotate the VOX SENS control CW until the transmitter keys on with speech.
4. Adjust the VOX DELAY control for desired transmit-on time.

CAUTION If the VOX SENS is advanced too far CW in an attempt to key the transmitter by an operator far away from the microphone, erratic operation may occur because of other noises in the background.

The VOX SENS should be turned CW only as far as necessary to insure proper transmitter keying by the operator.

The microphone should not be placed directly in front of the D201 speaker, nor should the receive volume be set higher than necessary, as sounds from the speaker may turn the transmitter on falsely.

The following control settings are recommended the first time VOX operation is attempted. Later the operator can readjust these controls to suit individual requirements.

MIC GAIN	12 o'clock
VOX SENS	12 o'clock
VOX DELAY	12 o'clock

IMPORTANT

The operator should form the good habit of always unlocking the microphone bar when not in the immediate vicinity of the D201 and of always turning the VOX SENS to OFF when the microphone is unplugged to prevent any possibility of the transmitter being keyed while left unattended.

CLARIFIER This control allows the operator to make slight adjustments to the crystal receive and transmitter output 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 to SSB signals while in the CRYSTAL receive mode. The control does not operate while in the MANUAL receive mode. The fine tune function, when in the MANUAL receive mode, 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.

The MIC GAIN control allows each user optimum operating conditions for his style of operation and station environment. In quiet locations, the MIC GAIN can be turned up (CW) and the operator can enjoy the ultimate in ease of communications. If, on the other hand, 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.

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

MANUAL TUNING The D201 provides a two speed MANUAL TUNING control that may require some experience on the part of the operator to properly appreciate its usefulness. 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, but 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.

This control allows fast scanning of the entire Citizens Band and many of the Business Band frequencies as opposed to using the CRYSTAL SELECTOR and CLARIFIER where 23 different switch positions have to be selected and evaluated.

TUNING SSB SIGNALS Single sideband stations, such as the D201, transmit on **either** the upper sideband (USB) **or** the lower sideband (LSB). Double sideband, suppressed carrier stations transmit on the upper **and** the lower sidebands **simultaneously**. When tuning DSB stations, therefore, you may select either the LSB or the USB receiver mode position. Tuning SSB stations requires selecting the same sideband as the signal being transmitted.

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 or squeal. Note that 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, most of the time, a sideband signal will be unintelligible or highly distorted.

The manual tuning of single sideband signals is considerably more critical than tuning AM signals. The D201 is very carefully designed to tune as easily as possible; however, some care and experience is required.

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 approached and carefully clarified using the vernier drive in about the middle of the range. A signal will tune in at the same spot on the dial whether it is LSB, AM or USB.

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 increases the bass tones. Turning the control CW decreases the bass tones and, therefore, 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 from this position turns on the power. To increase the receiver audio volume, turn the control in a CW direction.

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 found 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 control.

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

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 D201 and another station will enable the other operator to tell you which position of the TTC control best suits your voice.

CRYSTAL SELECTOR

The D201 is supplied equipped for 23 channel operation. The desired channel is selected by 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 channel selector determines both the transmit and receive channel. With the switch in the MANUAL position, the channel selector determines just the transmit channel; the receiver channel is determined by using the manual tuning dial.

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.

REPLACEABLE PARTS

The operator may replace certain parts in this D201 if it ever becomes necessary:

- 1) Crystals
- 2) Vacuum tubes
- 3) Fuses
- 4) Lamps

CAUTION The operator should be aware that dangerous voltages do exist within the D201 cabinet. Therefore, **NO PART SHOULD EVER BE REMOVED OR REPLACED WITH THE AC POWER ON.** AC power should be removed by **disconnecting the AC power cord.**

1) **Crystal Replacement**

TRAM/DIAMOND CORPORATION can only certify continued operation to FCC requirements if replacement crystals are obtained from the factory. If evidence of general off

frequency operation is detected or if replacement crystals do not restore proper operation, service or recalibration to restore proper operation may only be done by a technician with a first or second class commercial radio operator's license as required by Part 95 of the FCC Rules and Regulations.

The crystal location diagrams and synthesizer crystal-channel charts shown on the schematic will aid in locating defective crystals (FIG. 5 and 6, fold out).

If there is no USB operation, the 6.2535 MHz Carrier oscillator crystal may be suspected.

If there is no LSB or AM Transmit operation, the 6.2565 MHz Carrier oscillator crystal may be suspected.

If there is no manual LSB or AM reception and no Channels 9, 10, 11, and 12 Crystal USB reception or transmission, the 16.4085 MHz crystal may be suspected.

If there is no manual USB reception and no Channels 9, 10, 11, and 12 crystal reception or transmission, the 16.4115 MHz crystal may be suspected.

Consult the synthesizer crystal-channel charts on the schematic to pinpoint other crystal defects.

EXAMPLES:

- A. If no operation is possible on Channels 17, 18, 19 and 20, LSB or AM, and all other channels are operational, the 16.5085 crystal is suspected.
- B. If no operation is possible on Channels 4, 8, 12, 16, 20 and 23, LSB-AM-USB, and all other channels are operational, the 4.440 crystal is suspected.

2) Vacuum Tube Replacement

Vacuum tubes may be removed for testing and replaced where necessary. Tube locations are found in FIG. 4 (D201 top chassis view). If a tube should require replacement, it should be replaced only with an identical type of the same high quality as originally supplied in the D201. The operator is assured that replacement of any D201 tube will not result in out-of-specification operation.

The D201 tube trouble locator in FIG. 3 is provided to aid the operator in locating troubles due to defective vacuum tubes. Decide which of the listed conditions at the left of the chart **best apply** to the complaint, then replace the indicated tube.

3) Fuses

Circuit protection is provided by three fuses:

- a. F1 is the AC main fuse (3MDL).
- b. F2 is the low voltage fuse (AGC1).
- c. F3 is the 6.3V filament fuse, which is a short piece of #28 buss wire (approximately 1 inch). See FIG. 7, fold-out.

4) Lamps

Replacing #47 dial lamps requires the removal of the light reflective shroud. It is important that this shroud is properly positioned when reinstalled. Be sure it is positioned between the selector switch and the switch **mounting bracket**, not behind the switch detent plate. Also position **behind** the two-speed vernier dial drive mechanism.

TUBE TROUBLE LOCATOR

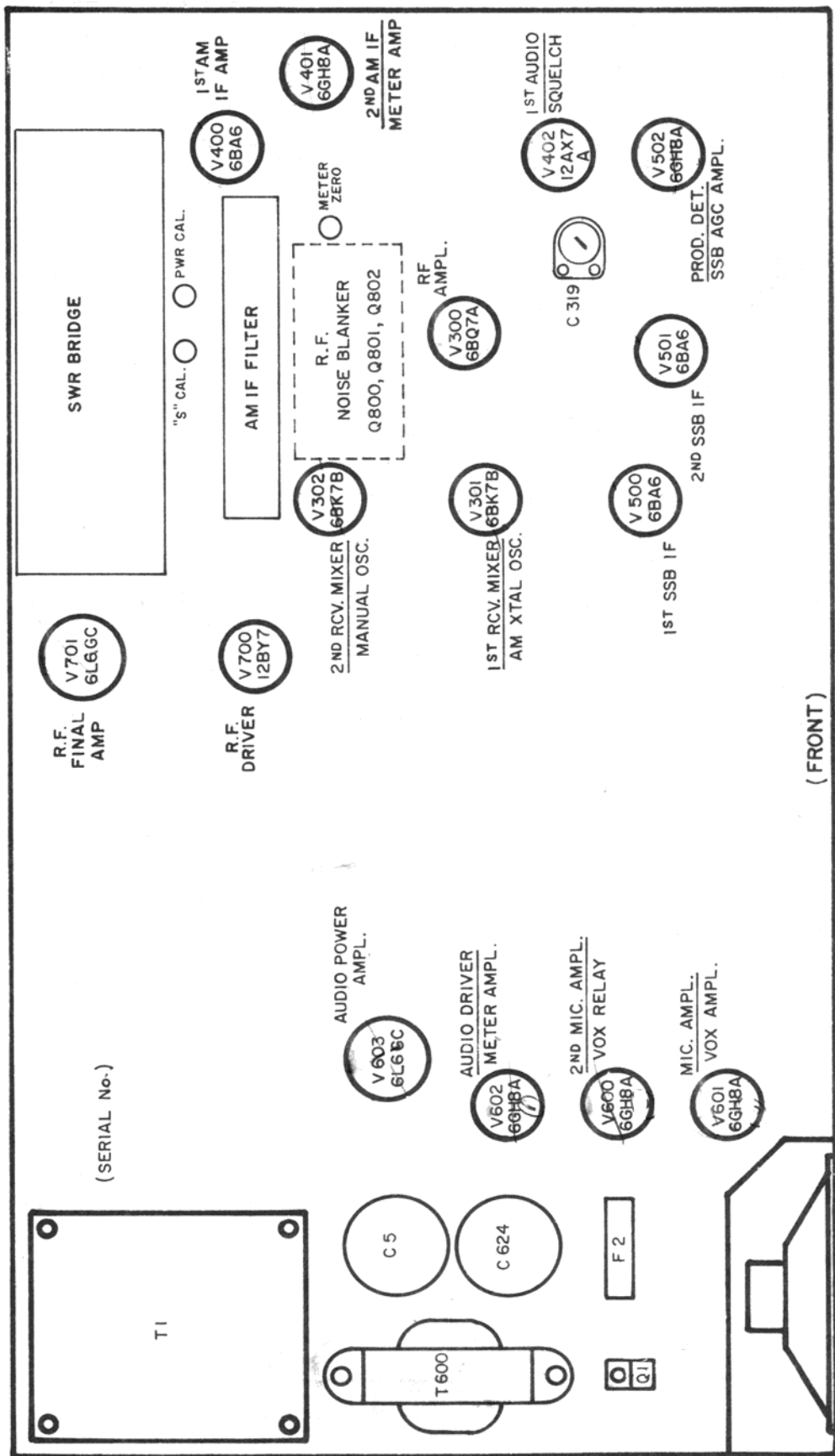
MOST PROBABLE CAUSE

SYMPTOM
WEAK OR NO OPERATION



	6BQ7A V 300	6BK7B V 301	6BK7B V 302	6BA6 V 400	6GH8A V 401	12AX7 V 402	6BA6 V 500	6BA6 V 501	6GH8A V 502	6GH8A V 600	6GH8A V 601	6GH8A V 602	6L6 GC V 603	12BY7A V 700	6L6GC V 701
AM AND SSB RECEIVE	○	○				○						○	○		
AM RECEIVE		○	○	○											
SSB RECEIVE							○	○	○						
MANUAL RECEIVE			○												
AM AND SSB TRANSMIT										○	○		○	○	○
AM MODULATION												○	○		
SSB TRANSMIT/MODULATION															
VOX										○	○				
IMPROPER S-METER					○				○			○			
SQUELCH						○									

FIG. 3



D201 TOP CHASSIS VIEW

FIG. 4

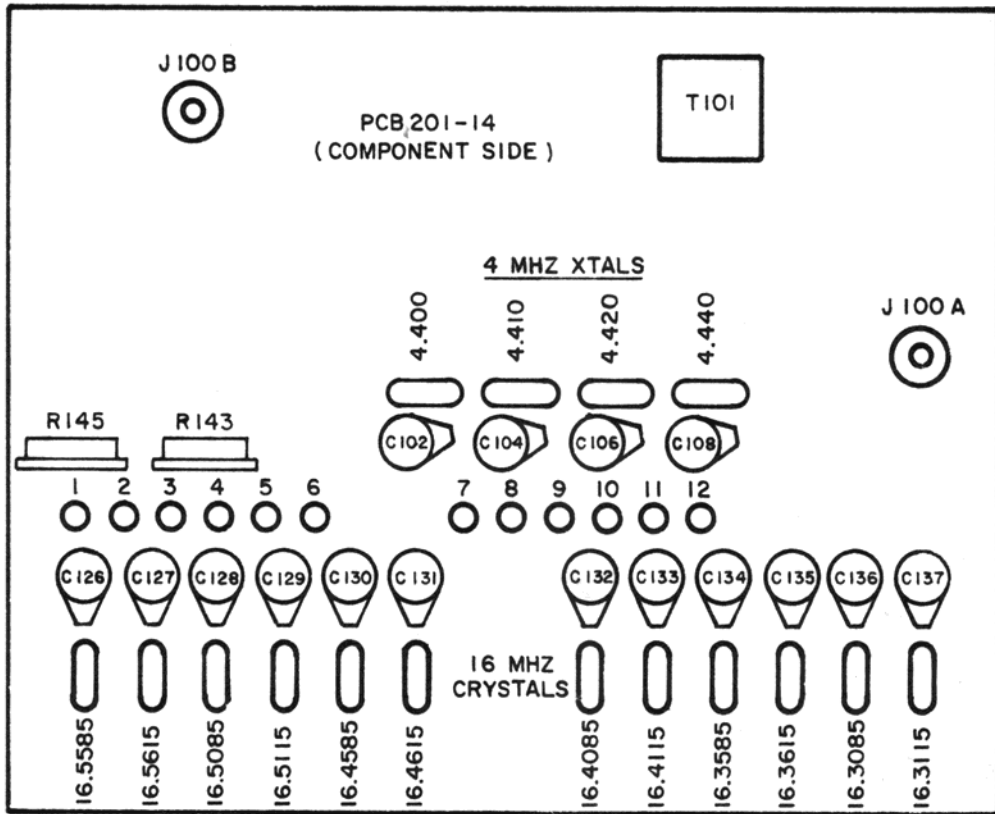


FIG. 5 SYNTHESIZER

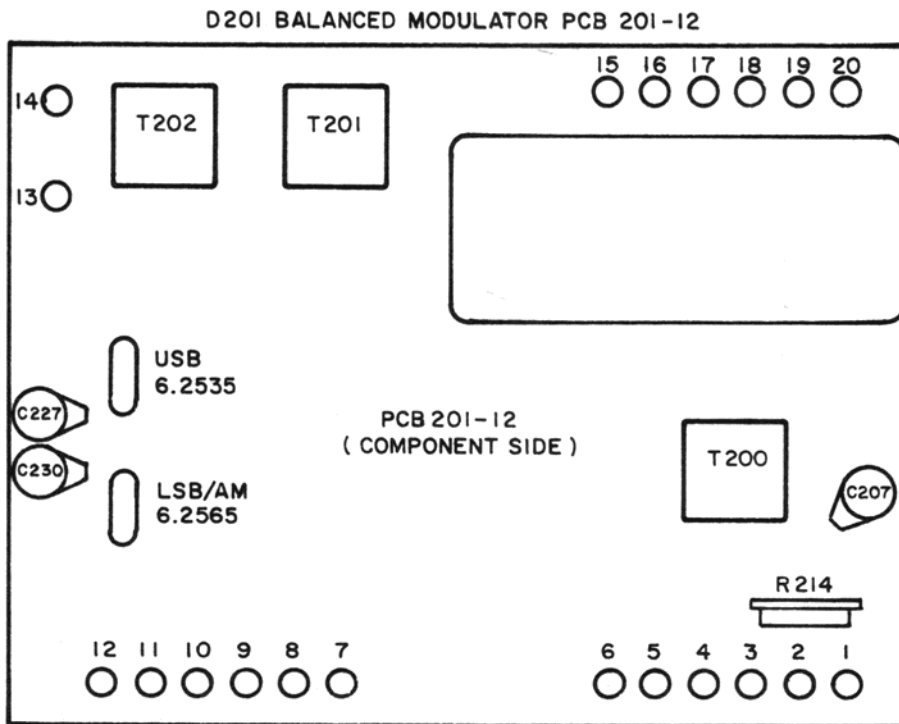


FIG. 6 BALANCED MODULATOR

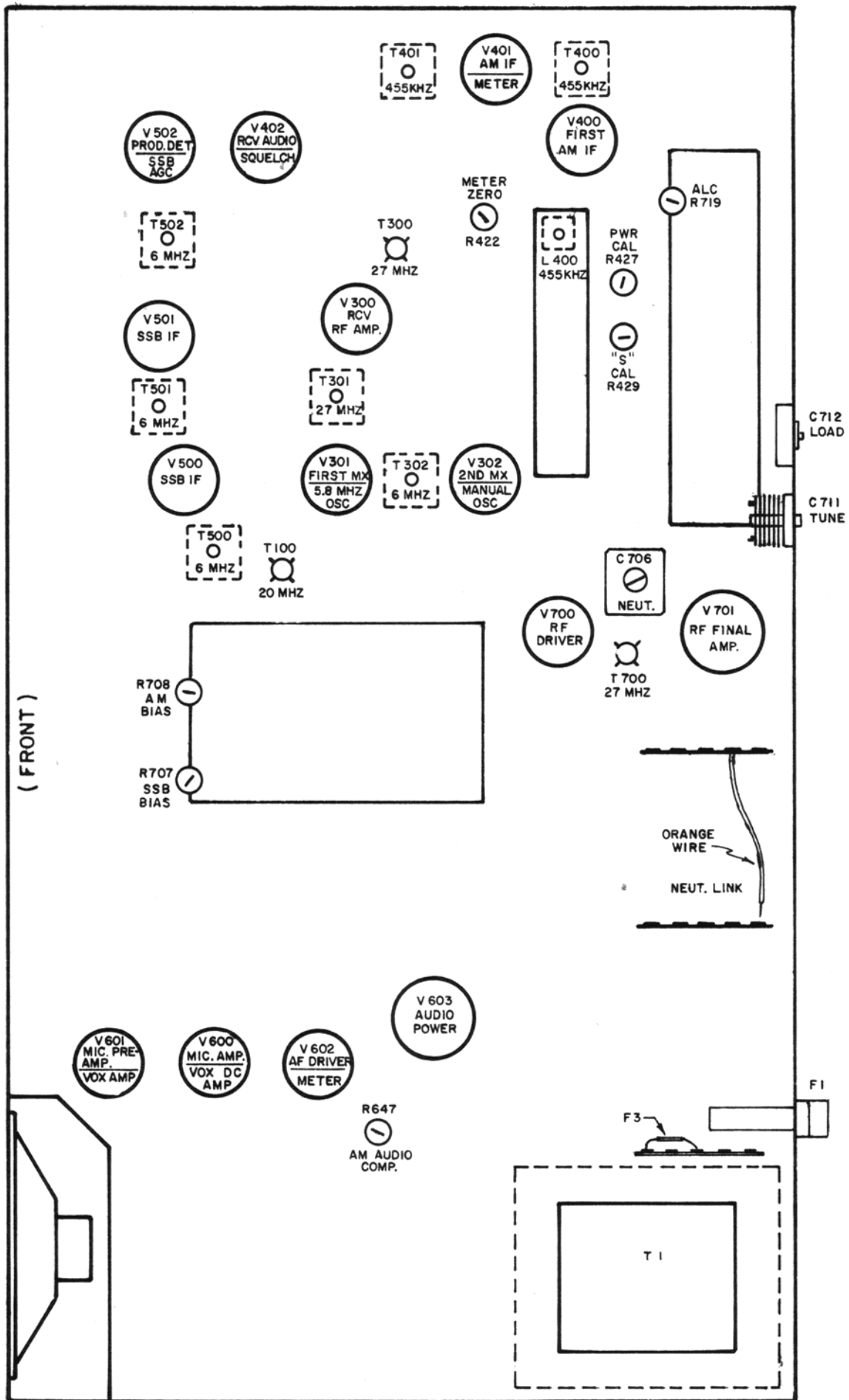


FIG. 7 UNDER-CHASSIS

RETURNING YOUR D201 FOR FACTORY SERVICE

A D201 owner may return his set to the factory for service at any time.

Ordinary check-ups or routine service is not covered by the warranty. The warranty specifically assures the owner of no unnecessary expense as a result of a unit failure due to component breakdown or poor workmanship within a reasonable time after purchase.

The original shipping carton and its packing materials, if still in good condition, are highly recommended for returning the set for service. If the original carton is not available, the set must be packed carefully, to prevent damage, as follows: Seal the unit in a close-fitting carton after first wrapping the set in a plastic film to prevent rubbing on the inside of the carton. Pack the carton containing the set in a second carton, allowing space on all six sides for two inches of resilient packing material between the two cartons. The outside carton should be tightly sealed with a suitable sealing tape. The package should also be tied securely with a stout twine to prevent the carton from bursting in handling. In packing, care must be taken to prevent the unit from sliding back and forth inside the cartons.

The package should be marked "FRAGILE — ELECTRONIC EQUIPMENT" and "DO NOT DROP". A shipping label should be attached to the outside on which is clearly printed your return address and indicating TRAM/DIAMOND CORPORATION, Lower Bay Road, Winnisquam, NH 03289 as the destination.

Depending on the service in your area, U.P.S. (United Parcel Service), REA (Railway Express Agency), or motor freight are recommended carriers. We do **NOT** recommend U.S. parcel post service for electronic equipment.

An owner, in returning a radio for factory service, is responsible for all transportation and insurance charges.

We firmly recommend that you include a letter with the set, detailing the exact complaint and providing all pertinent information available. Complete information will help the technician working on your set to do the best possible job at the least cost.

D201 SPECIFICATIONS

RECEIVER

SENSITIVITY: Channel 1 through 23	SSB - better than .1uv for 10db (S+N) /N, carrier ON/OFF. AM - better than .35uv for 10db (S+N) /N, signal modulated 30% by 1 kHz sine wave, modulation ON/OFF.
Above Channel 23	SSB - better than .25uv for 10db (S+N) /N, carrier ON/OFF. AM - better than .75uv for 10db (S+N) /N, signal modulated 30% by 1 kHz sine wave, modulation ON/OFF
GAIN: Channel 1 through 23	RF input signals at rated sensitivity provide greater than 1 watt of audio output.
Above Channel 23	AM - less than 1.5uv for 1 watt of audio output. SSB - less than .5uv for 1 watt of audio output.
SELECTIVITY:	SSB -6db at 2.1 kHz, -60db at 4.65 kHz. AM -6db at 6.0 kHz, -70db at 20 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% 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 - 6.255 MHz, 455 kHz.
ADJACENT CHANNEL REJECTION:	Greater than 75db at .35uv.
DESENSITIZATION:	Better than 80db for -3db desensitization of desired signal.
CROSS MODULATION:	Better than 75db.
CRYSTAL CLARIFIER RANGE:	±800 Hz (1600 Hz total).
MANUAL TUNING:	2-speed reverse-vernier ball drive. Fast, 120kHz per knob rotation; vernier, 20kHz per knob rotation.
FREQUENCY STABILITY:	After 30 min. warm-up; crystal, less than 5 Hz per 15 min. Manual, less than 100 Hz per 15 min.

NOISE REDUCTION:

RF Noise Blanker and optimum level series gate limiter. Both are switchable.

TRANSMITTER

SSB POWER:

25 watts PEP input.
12 watts PEP output (FCC limit).

AM POWER:

4 watts output.

MODULATION LEVEL:

Adjustable, 0 to 100% modulation.

MODULATION FREQUENCY RESPONSE:

TTC adjustable, bass to treble.

SSB ALC:

70db range.

AM COMPRESSION:

70 db 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 -45db.

SSB OPPOSITE SIDEBAND SUPPRESSION:

Better than -60db at 1kHz.

CARRIER FREQUENCY TOLERANCE:

± 100 Hz nominal.

CLARIFIER RANGE:

± 800 Hz (1600 Hz total).

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.