

D201 SPECIAL PARTS LIST

NOTE: All Electronic components not contained in this parts list are stock catalog items as described on the D201 schematic.

Schematic Reference	DESCRIPTION	Stock Number
C1	2 x .0047uf, 1.5 KV ceramic disc capacitor	15098
C5	3 x 40uf @ 450V DC, Electrolytic Can Type	15269
C102	2-20pf variable, ceramic capacitor	16033
C104	2-20pf variable, ceramic capacitor	16033
C106	2-20pf variable, ceramic capacitor	16033
C108	2-20pf variable, ceramic capacitor	16033
C126	2-20pf variable, ceramic capacitor	16033
through		
C137	2-20pf variable, ceramic capacitor	16033
C207	8-50pf variable, ceramic capacitor	16034
C227	2-20pf variable, ceramic capacitor	16033
C230	2-20pf variable, ceramic capacitor	16033
C317	Manual tuning variable, air dielectric capacitor	16001
C319	3-12pf variable, ceramic capacitor	16022
C320	10pf N750 500V ceramic disc capacitor	15097
C624	4 x 10uf @ 450V DC, Electrolytic Can Type	15268
C705	100pf, 1kV ceramic disc capacitor	15099
C706	35-150pf variable, compression type mica	16011
C711	3-25pf variable, air dielectric capacitor	16006
C712	100-500pf variable, compression type mica	16013
C720	100pf, 1 KV ceramic disc capacitor	15099
D1	200V, 1 amp full wave bridge rectifier assembly	48106
through		
D4		
D127	Motorola voltage variable capacitor (MV-2115)	48159
DS300	Neon indicator lamp, amber (complete)	24073
DS700	Neon indicator lamp, red (complete)	24074
FL200	Crystal filter, 6.255 MHz SSB Filter	27001
FL400	455 kHz AM IF filter (complete)	17013-X
	Ceramic resonator, 455kHz	27003
J600	Microphone input jack	21001
K600	Relay	45002
	Socket - w/retaining spring	21031
COILS		
L301	Manual osc. coil w/tuning slug	18117
L400	455 kHz filter output coil (shielded)	56152
L700	Final plate coil	18206-Y
L701	T. V. I. filter coil	18200
L703	Parasitic suppressor	46039-1-X
M400	Meter	24104
	Meter support bracket	14016
	Meter Retaining springs (2)	28016
	Meter Window	24010
	Microphone, complete w/plug	55050-X
	Microphone plug	21002

Schematic Reference	DESCRIPTION	Stock Number
Q100	N Channel J-Fet 2N5485	48009
Q103	N Channel J-Fet 2N5485	48009
Q204	N Channel J-Fet 2N5485	48009
R418	47K, 3 watt metal oxide film resistor	46212
R419	47K, 3 watt metal oxide film resistor	46212
VARIABLE RESISTOR, TRIMMER TYPE		
R143	100K ohm variable resistor, trimmer type	47004
R145	2.5K ohm variable resistor, trimmer type	47003
R214	1K ohm variable resistor, trimmer type	47002
R422	250 ohm variable resistor, trimmer type	47001
R427	2.5 Meg. variable resistor, trimmer type	47005
R429	2.5 Meg. variable resistor, trimmer type	47005
R647	100K ohm variable resistor, trimmer type	47004
R707	100K ohm variable resistor, trimmer type	47004
R708	100K ohm variable resistor, trimmer type	47004
R719	100K ohm variable resistor, trimmer type	47004
PANEL CONTROLS AND SWITCHES		
R146	Clarifier	47063
R326	R. F. Gain	47050
R425	SWR Cal.	47066
R435	Squelch	47051
R440	Vol/RTC w/ON-OFF Switch	47062
R601	Vox Sens/Delay w/Switch	47049
R622	Mic Gain/TTC	47067
S1	Cover operated interlock switch	51012
S2	Power On-Off (Part of R440)	47062
S3	Mode Switch	51003
S4	Crystal/Manual	51009
S5	Meter Switch	51010
S6	Cal	51103
S7	Limiter	51103
S100	Crystal Selector	51007-Y
TRANSFORMERS		
T1	Power Transformer	56155
T100	RF Transformer, 5/16" dia.	18101
T101	27 MHz Double Tuned Can, 1/2"	56107
T200	Balanced Modulator Output, 1/2"	56108
T201	27 MHz Double Tuned Can, 1/2"	56107
T202	27 MHz Single Tuned Can, 1/2"	56104
T300	RF Transformer, 5/16" dia.	18101
T301	27 MHz Double Tuned Can, 3/4"	56150
T302	6.255 MHz Double Tuned Can, 3/4"	56154
T400	455 kHz Double Tuned Can, 3/4"	56151
T401	455 kHz Double Tuned Can, 3/4"	56151
T500	6.255 MHz Single Tuned Can, 3/4"	56153
T501	6.255 MHz Single Tuned Can, 3/4"	56153
T502	6.255 MHz Single Tuned Can, 3/4"	56153
T600	Modulation Transformer	56156
T700	RF Transformer, 5/16" dia.	18101

Schematic Reference	DESCRIPTION	Stock Number
CRYSTALS		
X100	4.400 MHz	23044
X101	4.410 MHz	23045
X102	4.420 MHz	23046
X103	4.440 MHz	23047
X104	16.3115 MHz	23033
X105	16.3085 MHz	23032
X106	16.3615 MHz	23035
X107	16.3585 MHz	23034
X108	16.4115 MHz	23037
X109	16.4085 MHz	23036
X110	16.4615 MHz	23039
X111	16.4585 MHz	23038
X112	16.5115 MHz	23041
X113	16.5085 MHz	23040
X114	16.5615 MHz	23043
X115	16.5585 MHz	23042
X200	6.2535 MHz	23035
X201	6.2565 MHz	23027
X300	5.8015 MHz	23048
PCB ASSEMBLIES		
	Synthesizer complete with switch wafer, aligned and tested	17011-X
	Printed Board only	17011
	5-40 x 7/16" hex mounting nuts (2)	28029-Y
	Balanced Modulator complete, aligned and tested	17010-X
	Printed Board only	17010
	SWR Bridge (complete)	17009-X
	Printed Board only	17009
DIAL ASSEMBLIES		
	Crystal Selector dial w/hub	24012-X
	Manual Receive dial drilled for hub	24011-Y
	Dial window	24009
	Dial drive, two-speed vernier	28010
	Dial lamp socket	21017
	Shaft Bushing, nylon	28012
	Light reflective shroud	14031
CABINET PARTS		
	Stablizing rails (2)	14036
	Top cover assembly w/trim rail	14030-X
	Bottom cover	14019
	Lower trim rail	14032-BY
	Wooden cabinet end pieces (2)	14039
	Rubber foot 9/16"	28008
KNOBS		
	1-3/4" Knob	24035
	1-1/8" with mark	24041
	7/8" with mark	24036
	7/8" larger of concentric pair	24036-X
	1/2" smaller of concentric pair	24039
SCHEMATIC	Drawing Number	D-201-51

FIELD SERVICE ALIGNMENT INSTRUCTIONS

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A. GENERAL INSTRUCTIONS

WARNING The following alignment instructions are for qualified technicians only. Improper adjustments will result in degraded performance and possible permanent damage to certain components. Obvious tampering will void our warranty.

Alignment should not be attempted until all other possible causes of faulty operation have been identified and corrected.

Alignment should not be attempted until operation of the D201 is fully understood.

Refer to FIGS. 4, 5, and 6 on fold-out for component locations.

WARNING Transmitter adjustments may be made only by, or under the immediate supervision of, a person holding a commercial first or second class radio operator license (This applies specifically to **C. Synthesizer Alignment PCB 201-14** and to **E. Transmitter.**)

B. TEST EQUIPMENT

Alignment should only be attempted when reliable, accurate equipment, as listed below, is available.

DC VTVM — RCA Voltohmyst WV-77E or equivalent

OSCILLOSCOPE — Hewlett-Packard HP-180A or equivalent

AUDIO SIGNAL GENERATOR — Hewlett-Packard HP-209A or equivalent

RF SIGNAL GENERATOR — Hewlett-Packard HP-606 or equivalent

ELECTRONIC FREQUENCY COUNTER — Hewlett-Packard Model 5248L or equivalent

50 OHM DUMMY LOAD — Bird Model 52839 or equivalent

RF WATTMETER — Bird Model 43 or equivalent

C. SYNTHESIZER (PCB201-14)

All references to mechanical position made with respect to component side of board. (See FIG. 5 for crystal locations.) Synthesizer alignment is accomplished in receive.

1) 4 MHz Crystal Calibration

- a. Connect a frequency counter to Q103 (FET mixer) gate.
- b. Remove the 16.3115 and 16.3085 MHz crystals.
- c. Set CRYSTAL-MANUAL switch to CRYSTAL, CRYSTAL SELECTOR to 1 through 4, and adjust appropriate 4 MHz crystal calibration capacitor as follows:

Channel	Selected 4 MHz crystal	Calibration Capacitor	Frequency (MHz)
1	4.400	C102	4.40000
2	4.410	C104	4.41000
3	4.420	C106	4.42000
4	4.440	C108	4.44000

- d. Replace 16 MHz crystals.

2) 16 MHz Crystal Calibration

- a. Connect a frequency counter to Q103 (FET mixer) gate.
- b. Remove 4.400 MHz crystal.
- c. Set CRYSTAL-MANUAL switch to CRYSTAL, CRYSTAL SELECTOR to Channel 1, mode switch to USB, and CLARIFIER control to 12 o'clock.
- d. Adjust R145 for +1.5VDC on Pin 1 of synthesizer.

- e. Select each channel and mode as indicated in the following table, and adjust each calibration capacitor to obtain the appropriate frequency.

Channel	Mode	Calibration Capacitor	Frequency (MHZ)
1	USB	C137	16.311500
1	LSB	C136	16.308500
5	USB	C135	16.361500
5	LSB	C134	16.358500
9	USB	C133	16.411500
9	LSB	C132	16.408500
13	USB	C131	16.461500
13	LSB	C130	16.458500
17	USB	C129	16.511500
17	LSB	C128	16.508500
21	USB	C127	16.561500
21	LSB	C126	16.558500

- f. Replace 4.400 MHz crystal.

3) **20 MHz Mixer**

- Select Channel 17.
- Connect a DC VTVM to Pin 8 V301.
- Tune T100 and top and bottom slugs of T101 for maximum DC. (If T101 is badly detuned, it may be necessary to connect an oscilloscope to J100B and tune T101 for a 20 MHz signal. The oscilloscope should then be removed and T101 slugs peaked for maximum DC voltage.)

4) **Manual Receive Synthesizer Calibration**

- Remove the 4 MHz manual oscillator cable from J100A.
- Connect the frequency counter to Q103 Gate.
- Place the D201 transceiver in the manual receive LSB mode.
- Adjust R143 for 16.408500 MHz.

5) **Synthesizer Module Replacement**

TRAM/DIAMOND CORPORATION has designed the synthesizer module with the technician in mind; should the D201 ever become inoperative due to a synthesizer defect (other than a crystal), the technician may simply remove the module and forward it to the factory for replacement or repair.

Note that both the balanced modulator and synthesizer modules contain adjustable components. Every care must be taken in the removal, packaging for shipment, or the installation of these modules to see that adjustments are not disturbed.

The synthesizer module may be removed as follows:

- Remove Balanced Modulator module. (See Page 29)

- b. Remove harness cable connector.
- c. Support synthesizer board by hand and remove both phono plugs.
- d. Preset the CRYSTAL SELECTOR to the blank channel between Channel 22 and Channel 23.
- e. Remove the two threaded hex spacers holding the synthesizer module to the CRYSTAL SELECTOR switch. (Note for reassembly that the spacers are threaded on one end only.)
- f. Very carefully jiggle the synthesizer module to the rear to clear the switch studs and shaft.
- g. Reassembly is the reverse of steps (a) through (f); however, before initiating reassembly, check the rotor position of the switch wired to the synthesizer module. The slot in the rotor ring must be centered under the green switch contact for proper alignment.

CAUTION The synthesizer module has many delicate components that could be damaged by mishandling. If the module is to be shipped, make sure it is packaged properly and insured.

Synthesizer defects may be best characterized by complete loss of receive and transmit; however, suspect the synthesizer module only after first determining that a tube is not at fault.

D. RECEIVER

1) Manual Receive Dial Calibration

- a. Check the mechanical dial-to-variable capacitor setting. The capacitor C317 should not reach either of its own stops, but its rotation should be limited by the stop screw located in the dial hub.
- b. Connect a frequency counter through a 5pf capacitor to J100A.
- c. Set CRYSTAL-MANUAL Switch to MANUAL.
- d. Set CRYSTAL SELECTOR and MANUAL TUNING each to Channel 9.
- e. Pull CAL button out (ON).
- f. Tune L301 for audio zero beat (Freq. 4.400 MHz).
- g. Set manual dial for 27.450, adjust C319 for 4.785 MHz.
- h. Repeat f. and g. until each is correct.

Tune	Manual Dial	Frequency (MHz)
Coil (L301)	9	4.400
Cap. (C319)	27.450	4.785

2) S Meter Zero

- a. Place D201 in AM position, RF GAIN CCW, and meter switch in S/PWR position.
- b. Adjust R422 for meter zero.

3) **AM 455 kHz IF**

- a. Connect an RF signal generator (455 ± 1 kHz) through a .01 mfd capacitor to V302, Pin 2.
- b. Set RF GAIN control fully CW.
 - c. Set R429 (S-meter sensitivity) to approximately center.
- d. Adjust signal generator level for a usable S-meter indication.
- e. Tune L400, T400 and T401 for greatest S-meter indication. It may be necessary to reduce the generator level as each coil is tuned to maintain an S-meter reading of S9 or less; this will permit more accurate alignment. Note that both top and bottom slugs are to be tuned in T400 and T401.

4) **Front End and Receive Mixers**

- a. Connect an RF signal generator to the antenna jack.
- b. Place the D201 in Crystal AM receive.
- c. Rotate the CRYSTAL SELECTOR dial to Channel 13.
- d. Set the RF GAIN control fully CW.
- e. Set CLARIFIER control at 12 o'clock.
- f. Tune the signal generator for an S-meter indication. Signal generator frequency should be 27.115 MHz.
- g. Peak T300, T301 (top and bottom slugs) and T302 (top and bottom slugs) for maximum indication, reducing the generator level as required for S9 or less S-meter reading.

5) **SSB 6 MHz IF**

- a. Connect an RF signal generator to the antenna jack.
- b. Place D201 in LSB receive, Channel 13.
- c. Set RF GAIN fully CW and CLARIFIER at 12 o'clock.
- d. Adjust signal generator for an S-meter indication and an audio tone from the speaker. Signal generator frequency should be close to 27.1135 MHz.
- e. Tune T500, T501 and T502 for maximum indication, reducing the generator level as required for S9 or less S-meter reading.

6) **S-Meter Calibration**

- a. Connect a calibrated RF signal generator to the D201 antenna jack.
- b. Place the D201 in Channel 13 AM receive with RF GAIN set to maximum CW.
- c. Set the generator for 50 microvolts of output.
- d. Adjust R429 (S-meter sensitivity) for S9 meter reading.

E. TRANSMITTER

1) **Carrier Oscillator Calibration** (Balanced Modulator Board PCB201-12)

- a. Connect a frequency counter to Pin 7 of PCB 201-12, balanced modulator board (see FIG. 6, fold-out).

- b. Place D201 in USB mode and adjust C227 for a frequency of 6.2535 MHz.
- c. Place D201 in LSB mode and adjust C230 for a frequency of 6.2565 MHz.

2) **Balanced Modulator, Transmit Mixer, 27 MHz Amplifier** (Balanced Modulator Board PCB201-12)

- a. Remove B+ from V701 (RF Final Amplifier) by disconnecting the orange wire from the junction of L704-C720.
- b. Connect an oscilloscope to V701 Pin 5 (grid of RF Final).
- c. Place the D201 in Channel 13, AM transmit.
- d. Tune T201 (top and bottom slugs), T202, and T700 for maximum indication. Make note of this indication as reference.
- e. Place the D201 in LSB transmit.
- f. Connect an audio signal generator to the MIC jack (1500 HZ).
- g. Adjust audio generator level and MIC GAIN control for about 1/3 of previous AM transmit indication. Note in the following step it may be necessary to reduce the generator level or MIC GAIN to keep the oscilloscope indication less than the previously noted reference.
- h. Tune T200 and T500, and retune T201 (both slugs), T202 and T200 for maximum indication.
- i. Remove the audio generator and turn MIC GAIN CCW (minimum).
- j. Increase the oscilloscope sensitivity as required and adjust alternately R214 and C207 to suppress the carrier to minimum.

3) **Balanced Modulator Module Replacement**

TRAM/DIAMOND CORPORATION has designed the Balanced Modulator module to be easily replaced. Should the Balanced Modulator module need extensive repair, the technician can simply remove the module and forward it to the factory for replacement or repair.

CAUTION The Balanced Modulator module contains many delicate electronic components that could be damaged by mishandling. If the module is to be shipped, make sure it is packaged and insured.

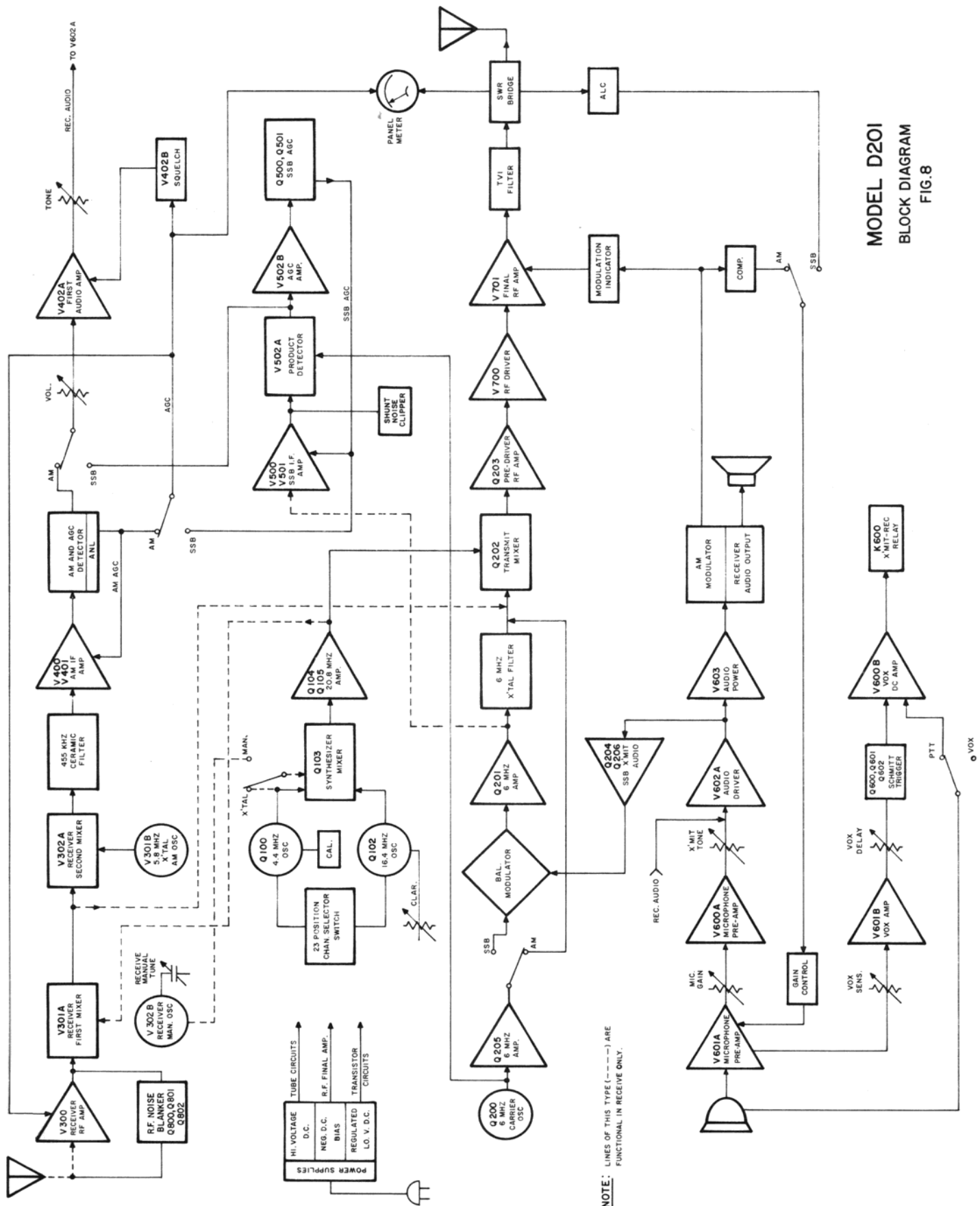
4) **RF Diver, RF Final Amplifier and Neutralization**

- a. Remove B+ from V701 (RF Final) by disconnecting the orange wire from the junction of L704-C720.
- b. Connect a 50 ohm dummy load and RF wattmeter to the D201 antenna jack.
- c. Connect a DC VTVM to the junction of L702, C719 and R709 and R710.
- d. Place D201 in AM receive and adjust R708 (AM bias) for -25 VDC.
- e. Place D201 in LSB receive and adjust R707 (SSB bias) for -32 VDC.
- f. Place D201 in Channel 13 AM transmit.
- g. Retune T700 for maximum DC indication.
- h. Place D201 meter switch in SWR CAL position, SWR CAL control fully CW, C712 (RF Final Load Capacitor) one turn from maximum capacitance (1 turn from full CCW from backside of D201 chassis).

- i. Tune C711 (RF FINAL TUNE capacitor) for maximum SWR CAL meter indication (meter reading may be small but visible).
- j. Tune C706 for a null on the D201 meter.
- k. Place D201 in receive and reconnect the V701 B+ (orange wire).
- l. Place the meter switch in S/PWR position and D201 in AM transmit.
- m. Retune C711 and C712 for maximum power output (3.8-4.2) watts.
- n. Adjust R427 (Power Cal) for the D201 power meter reading to agree with external wattmeter.

5) **AM Compression and SSB ALC**

- a. Connect an audio generator (1500 Hz) to the MIC jack and 50 ohm load, RF wattmeter and oscilloscope to the antenna jack.
- b. Turn R647 and R719 fully CCW.
- c. Place the D201 in AM transmit.
- d. Increase the generator level and MIC GAIN for 100% modulation, then increase generator level by 10db.
- e. Adjust R647 (AM compression) for 95% modulation.
- f. Place the D201 in receive.
- g. Place the D201 in LSB transmit.
- h. Increase the generator level and MIC GAIN until the power output is 12 watts.
- i. Increase the generator level by 10 db.
- j. Adjust R719 (ALC control) for 12 watts.



MODEL D201
BLOCK DIAGRAM
FIG. 8

NOTE: LINES OF THIS TYPE (---) ARE FUNCTIONAL IN RECEIVE ONLY.