TECHNICAL MANUAL

for

MULTIPLE NOTCH FILTER

MODEL MNF-1

THE TECHNICAL MATERIEL CORPORATION

MAMARONECK, N.Y. OTTAWA, ONTARIO

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THE TECHNICAL MATERIEL CORPORATION
COMMUNICATIONS ENGINEERS
700 FENIMORE ROAD MAMARONECK, N. Y.

Warranty

The Technical Materiel Corporation, hereinafter referred to as TMC, warrants the equipment (except electron tubes,* fuses, lamps, batteries and articles made of glass or other fragile or other expendable materials) purchased hereunder to be free from defect in materials and workmanship under normal use and service, when used for the purposes for which the same is designed, for a period of one year from the date of delivery F.O.B. factory. TMC further warrants that the equipment will perform in a manner equal to or better than published technical specifications as amended by any additions or corrections thereto accompanying the formal equipment offer.

TMC will replace or repair any such defective items, F.O.B. factory, which may fail within the stated warranty period, PROVIDED:

1. That any claim of defect under this warranty is made within sixty (60) days after discovery thereof and that inspection by TMC, if required, indicates the validity of such claim to TMC's satisfaction.

2. That the defect is not the result of damage incurred in shipment from or to the factory.

3. That the equipment has not been altered in any way either as to design or use whether by replacement parts not supplied or approved by TMC, or otherwise.

4. That any equipment or accessories furnished but not manufactured by TMC, or not of TMC design shall be subject only to such adjustments as TMC may obtain from the supplier thereof.

Electron tubes* furnished by TMC, but manufactured by others, bear only the warranty given by such other manufacturers. Electron tube warranty claims should be made directly to the manufacturer of such tubes.

TMC's obligation under this warranty is limited to the repair or replacement of defective parts with the exceptions noted above.

At TMC's option any defective part or equipment which fails within the warranty period shall be returned to TMC's factory for inspection, properly packed with shipping charges prepaid. No parts or equipment shall be returned to TMC, unless a return authorization is issued by TMC.

No warranties, express or implied, other than those specifically set forth herein shall be applicable to any equipment manufactured or furnished by TMC and the foregoing warranty shall constitute the Buyers sole right and remedy. In no event does TMC assume any liability for consequential damages, or for loss, damage or expense directly or indirectly arising from the use of TMC Products, or any inability to use them either separately or in combination with other equipment or materials or from any other cause.

*Electron tubes also include semi-conductor devices.

PROCEDURE FOR RETURN OF MATERIAL OR EQUIPMENT

Should it be necessary to return equipment or material for repair or replacement, whether within warranty or otherwise, a return authorization must be obtained from TMC prior to shipment. The request for return authorization should include the following information:

1. Model Number of Equipment.
2. Serial Number of Equipment.
3. TMC Part Number.
4. Nature of defect or cause of failure.
5. The contract or purchase order under which equipment was delivered.

PROCEDURE FOR ORDERING REPLACEMENT PARTS

When ordering replacement parts, the following information must be included in the order as applicable:

1. Quantity Required.
2. TMC Part Number.
3. Equipment in which used by TMC or Military Model Number.
4. Brief Description of the Item.
5. The *Crystal Frequency* if the order includes crystals.

PROCEDURE IN THE EVENT OF DAMAGE INCURRED IN SHIPMENT

TMC's Warranty specifically excludes damage incurred in shipment to or from the factory. In the event equipment is received in damaged condition, the carrier should be notified immediately. Claims for such damage should be filed with the carrier involved and not with TMC.

All correspondence pertaining to Warranty Claims, return, repair, or replacement and all material or equipment returned for repair or replacement, within Warranty or otherwise, should be addressed as follows:

THE TECHNICAL MATERIEL CORPORATION
Engineering Services Department
700 Fenimore Road
Mamaroneck, New York

RECORD OF CORRECTIONS MADE

Change No.	Date of Change	Date Entered	Entered By

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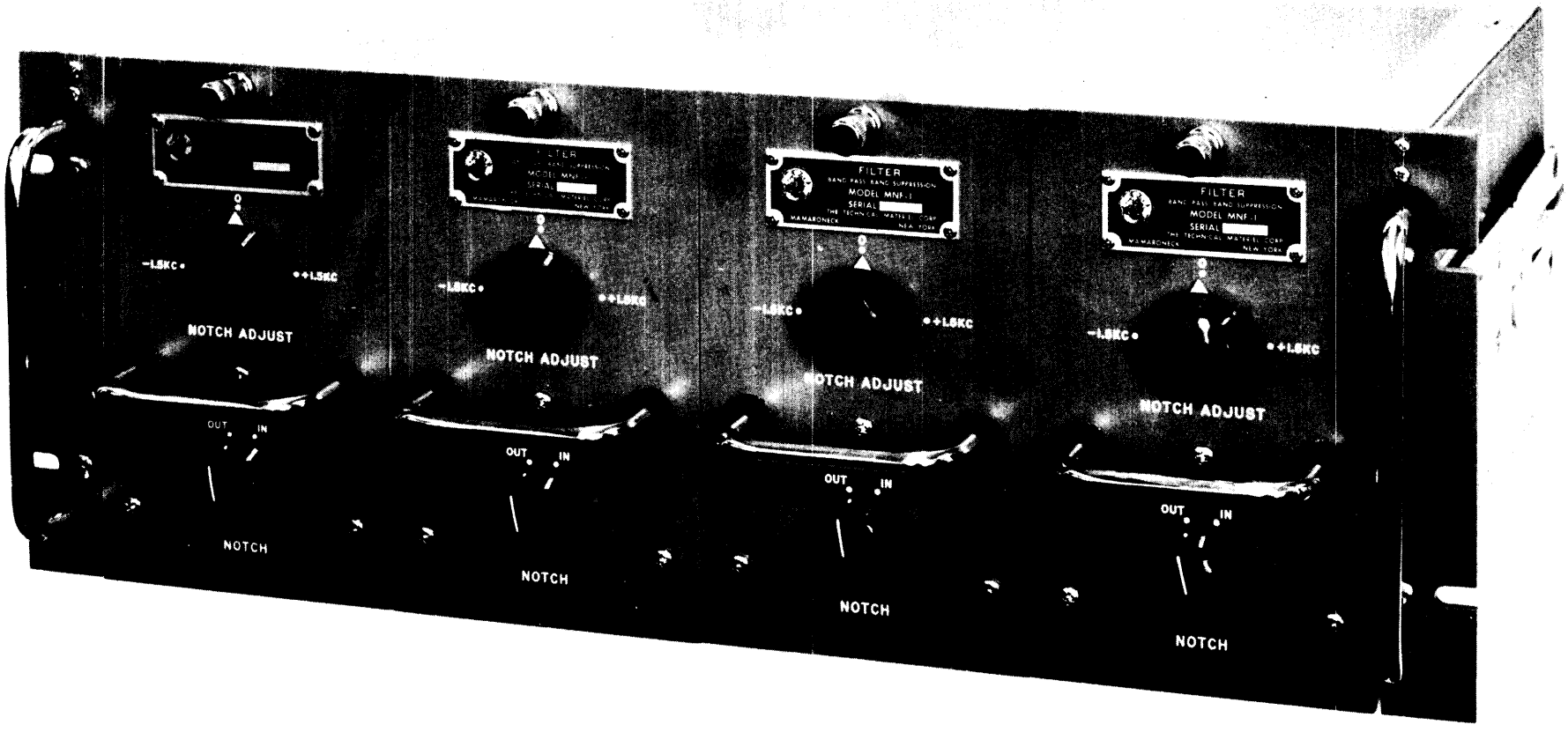

FIGURE 1-1. MULTIPLE NOTCH FILTER MODEL MNF-1

SECTION 1

GENERAL INFORMATION

1-1. PURPOSE OF EQUIPMENT

Multiple Notch Filter, Model MNF-1, a filter drawer consisting of four individual notch filters, is designed to be intergrated into Technical Materiel Corporation's Model MSG(A)-1 Independent AGC Receiving system. The MNF-1 permits notching out of interfering signals in the i-f passband. Operating voltages for the Model MNF-1 is supplied by the Model MFP-1 Power Supply.

1-2. DESCRIPTION OF EQUIPMENT (Figure 1-1)

Multiple Notch Filter, Model MNF-1, is a fixed crystal band suppressor unit providing up to four plug-in notch filters, each filter being tunable across one individual 3-kc channel. Each notch filter provides at least 60 db attenuation at ± 10 cycles to an interfering signal appearing within the passband of its i-f channel. The unit is mounted on a standard 19-inch rack with all individual channels easily removed by twisting the individual cam locks mounted on the front panels. All controls are located on the front panels and all signal and power connections made to the rear. Individual channels are switched off letting the i-f signal pass through unfiltered when notch filtering isn't desired.

1-3. TECHNICAL CHARACTERISTICS

Channels	4
Input and Output Impedances	50 ohms per channel
Band Rejection	± 82 cps at 1 db down ± 10 cps at 60 db down
Power Requirements (supplied by MFP-1)	200 vdc, 6.3 vac
Size	9" x 19" x 15"
Weight	30 lbs.

1-4. ELECTRON TUBE COMPLEMENT

Table 1-1 lists the types and functions of tubes found in the MNF-1.

TABLE 1-1. ELECTRON TUBE COMPLEMENT

REFERENCE SYMBOL	TYPE	FUNCTION
V6901	6S4	Mixer
V6902	6BA6	Amplifier
V6903	6S4	Mixer
V6904	6CE5	Amplifier
V6905	6U8	Amplifier
V6906	6AB4	Oscillator

SECTION 2

INSTALLATION

2-1. INITIAL INSPECTION

Each MNF-1 has been calibrated and tested at the factory before shipment. Upon arrival at the operating site, inspect the packing cases and contents for possible damage. Unpack the equipment carefully. Inspect all packing material for parts which may have been shipped as "loose items". With respect to damage to the equipment for which the carrier is liable, the Technical Materiel Corporation will assist in describing methods of repair and the furnishing of replacement parts.

The equipment is shipped with all tubes installed. Check that all such components are properly seated in their sockets.

2-2. INSTALLATION OF UNIT

The MNF-1 is designed for 19-inch rack mounting with a tilting mechanism. Figure 2-1 shows a tilting slide mechanism. The main frame of the MNF-1 is composed of four individual pull-out notch filter modules which are placed or removed from the main frame by twisting the front panel-mounted cam lock. Figure 2-2 shows the main frame without the plug-in modules. Note the connectors which connect at rear of each plug-in module.

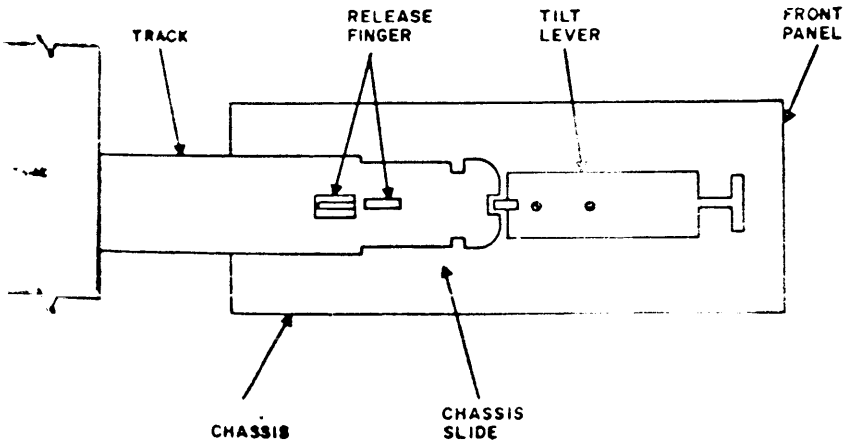

FIGURE 2-1. TILTING SLIDE MECHANISM

2-3. ELECTRICAL CONNECTIONS

Electrical connections to the individual modules are automatically made once the module is inserted into position. The only electrical connections are the signal inputs and power connection made to the rear of the main frame. Each module has individual input and output connections. Table 2-1 lists connections made to the Unit A MNF-1. Unit A is that which is located nearer the top of rack; Unit B is located beneath this unit in the rack. Use table 2-1 for connecting up the Unit B MNF-1 as all connections are the same except that they are made to the Unit B MSA-1 unit instead of Unit A.

TABLE 2-1. ELECTRICAL CONNECTIONS

At MNF-1 Connect From:	Connect To:
A2 Output Jack J6906	Jack J6504 at Unit A MSA-1
A2 Input Jack J6902	Jack J6503 at Unit A MSA-1
A1 Output Jack J6908	Jack J6505 at Unit A MSA-1
A1 Input Jack J6909	Jack J6505 at Unit A MSA-1
B1 Output Jack J6910	Jack J6508 at Unit A MSA-1
B1 Input Jack J6911	Jack J6507 at Unit A MSA-1
B2 Output Jack J6912	Jack J6510 at Unit A MSA-1
B2 Input Jack J6913	Jack J6509 at Unit A MSA-1
Power Connector J6914	Jack J7002 at MFP-1 (Jack J7003 at MFP-1 for Unit B)

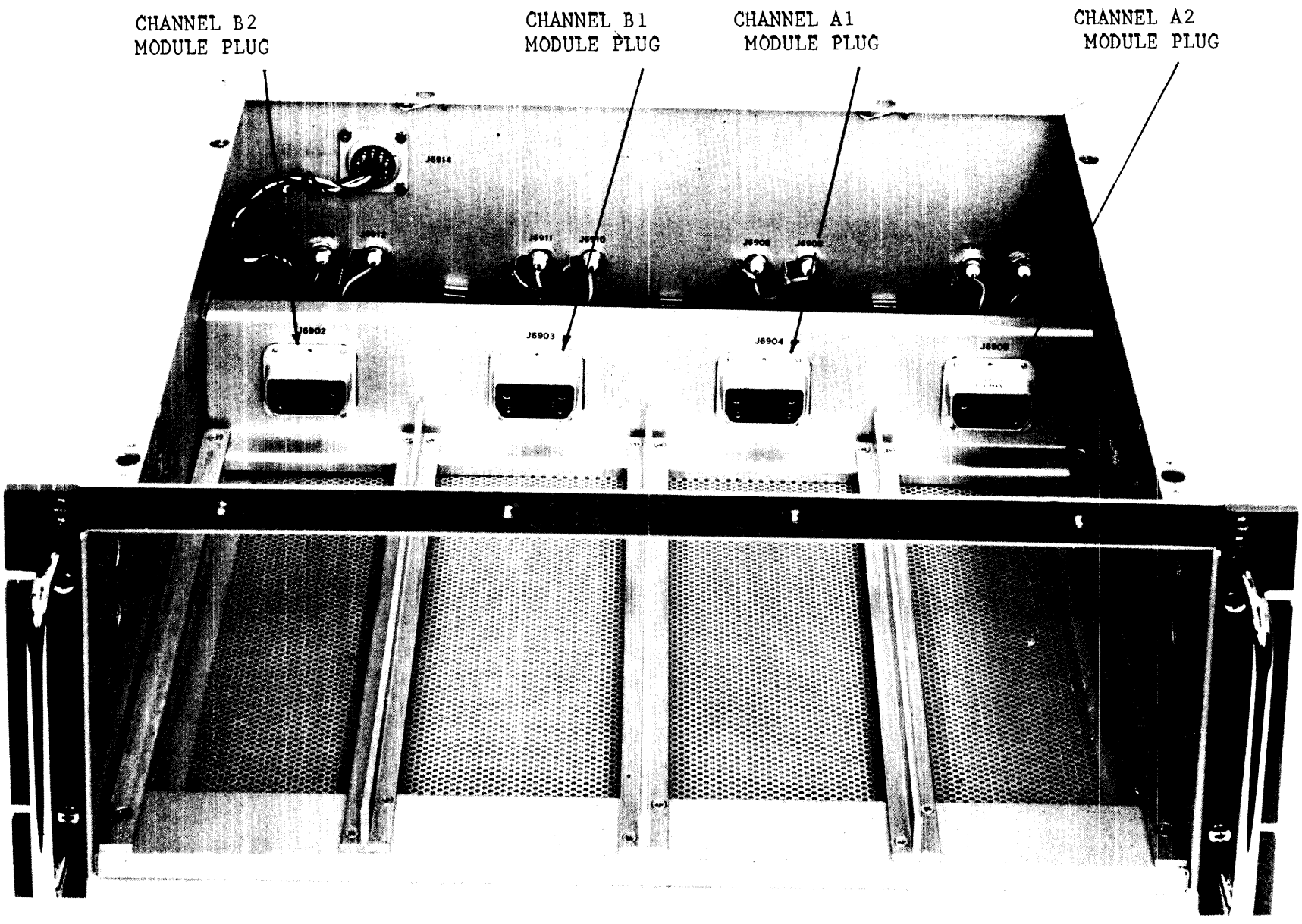

FIGURE 2-2. MAIN FRAME OF MNF-1 UNIT

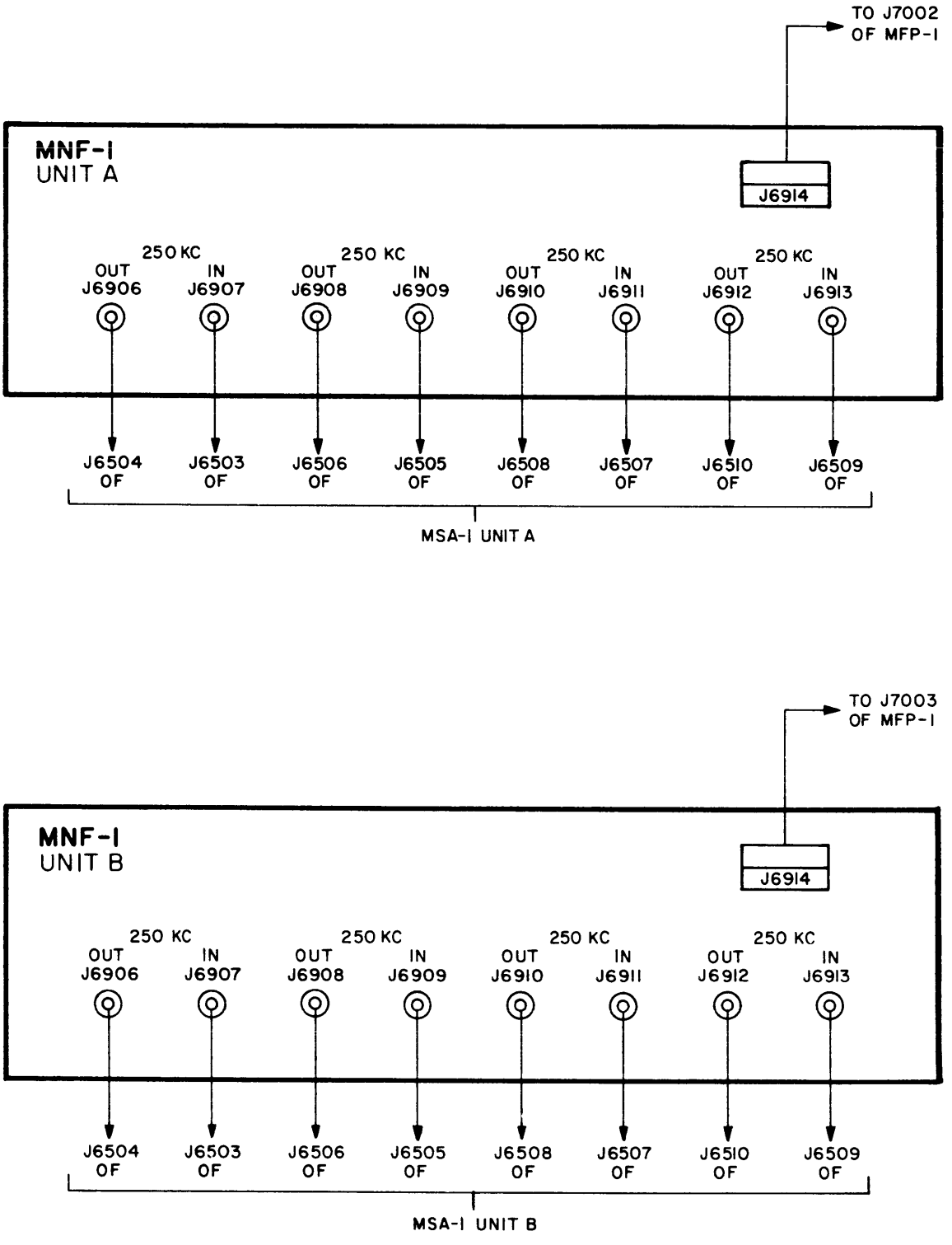

Figure 2-3. MNF-1 INTERCONNECTING DIAGRAM

SECTION 3

OPERATOR'S SECTION

3-1. OPERATING CONTROLS

Since all four modules are identical, all discussions regarding operation will be confined to a single module. The NOTCH OUT-IN switch determines the operation of the unit. In the OUT position the 250-kc i-f signal is fed through the MNF-1 without any notching. In the ON position, normal filtering action takes place. And, the frequency at which notch filtering takes place is controlled by the NOTCH ADJUST control. Note that the NOTCH ADJUST can be moved $\pm$ 1.5-kc about the center frequency. See figure 3-1.

3-2. HOW TO "NOTCH OUT" AN INTERFERING TONE

In reality, the operator will notch out unwanted signal at a particular module, by tuning the NOTCH ADJUST control clockwise and counterclockwise until the interfering tone is eliminated. Theoretically, what happens is this: suppose that an interfering tone exists at 251 kc. Since the 250-kc signal is converted to 455 kc in the notch filter, providing the NOTCH ADJUST is at 0, the NOTCH ADJUST is tuned to 1kc, which means that its internal conversion oscillator is generating a 204-kc signal. Add this to the 251-kc signal and you have 455 kc.

3-3. OPERATOR'S MAINTENANCE

Should a malfunction occur immediately turn off or disconnect all power from the MNF-1. Check the MFP-1 Power Supply for blown fuses, etc. Also check MNF-1 unit for defective tubes and components. When replacing a blown fuse, replace it with one of equal value.

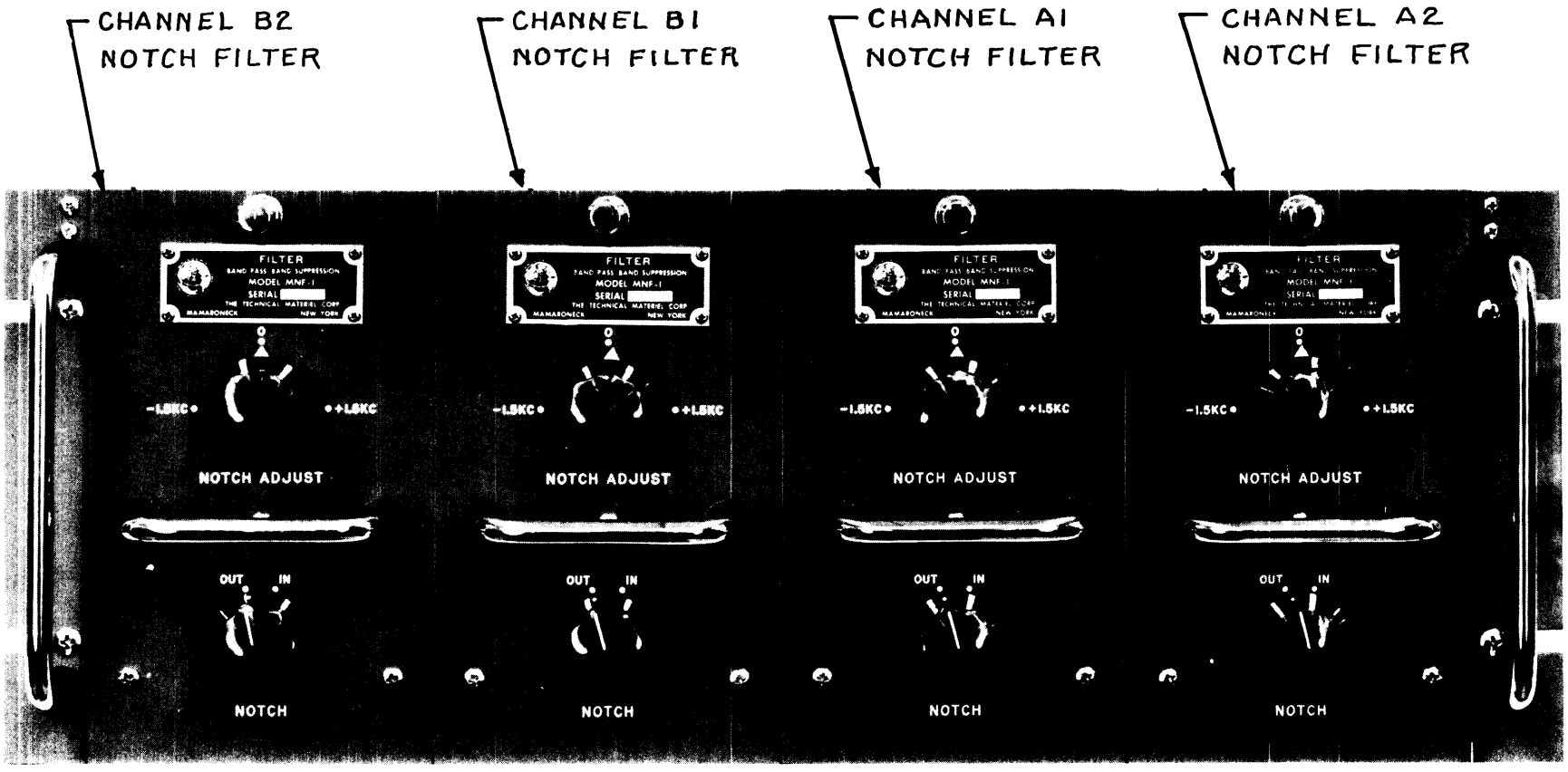

FIGURE 3-1. FRONT PANEL OF MNF-1 UNIT

SECTION 4

TROUBLESHOOTING

4-1. INTRODUCTION

This section contains both troubleshooting procedures and a complete functional description of the equipment and a detailed description of the functional operation of each functional section and circuit. The purpose of this particular arrangement of data is to provide the maintenance technician with sufficient troubleshooting information to allow him to effectively locate equipment troubles. With this method of troubleshooting the technician used his own ability in making the majority of decisions as to what checks should be made and where to make them.

4-2. OVERALL FUNCTIONAL DESCRIPTION

The MNF-1 consists basically of four individual plug-in variable notch filters designed to attenuate an interfering signal within $\pm$ 1.5 kc of an i-f signal. For purposes of discussion, and since the modules are identical, a single notch filter module will be discussed. See figure 4-1.

With the NOTCH switch in the OUT position, the input i-f signal coupled through jack J6901, bypasses the filter, and is coupled directly to jack J6902. With the NOTCH switch in the IN position, the i-f signal is coupled to mixer V6901 where it is heterodyned with a 203.5-kc to 206.5-kc signal (frequency depends on position of NOTCH ADJUST control). This 203.5 to 206.5-kc signal, generated in oscillator V6906, is coupled through amplifier V6905.

The output from V6901, a 453.5 kc to 456.5 kc signal, is then coupled through filter Z6901 which attenuates, by approximately 60 db, any signal at 455 kc $\pm$ 10 cps. The resulting filtered

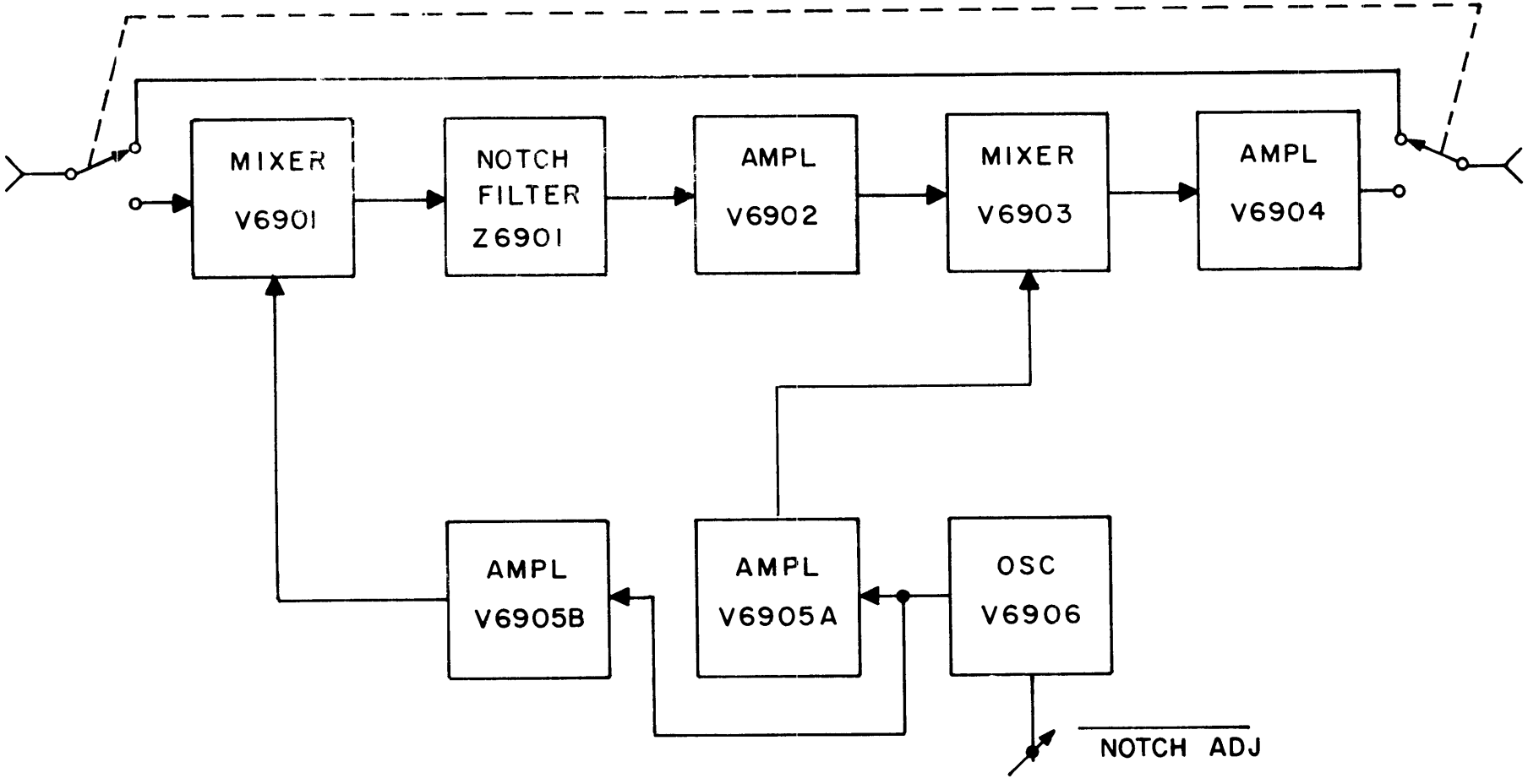

Figure 4-1. BLOCK DIAGRAM of MNF-1 UNIT

signal is coupled through amplifier V6902. This signal is then coupled to mixer V6903 along with the 203.5-kc to 206.5-kc oscillator signal where they are heterodyned to generate a 250-kc signal. The signal is amplified in amplifier V6904 and coupled to output jack J6902.

To illustrate the operation of this unit, consider the following: Assume that an input i-f signal of 250 kc with two 1-kc tones and an interfering signal at 250.5 kc is applied to the unit (See figure 4-2a). When the NOTCH ADJUST control is moved to the proper position, the 251-kc signal will be converted to the notch frequency of 455 kc. This puts oscillator V6906 at a frequency of 455 kc - 250.5 kc, or 204.5 kc. The input to filter Z6901 will look as shown in figure 4-2b.

The notch filter will remove the signal at 455 kc only; thus allowing all other frequencies to pass. The signal at the output Z6901, as shown in figure 4-2c, is applied to mixer V6902 along with a 204.5-kc oscillator frequency. Here the signals are heterodyned and the output signal represents the original input signal without the 250.5-kc interference. (See figure 4-2d).

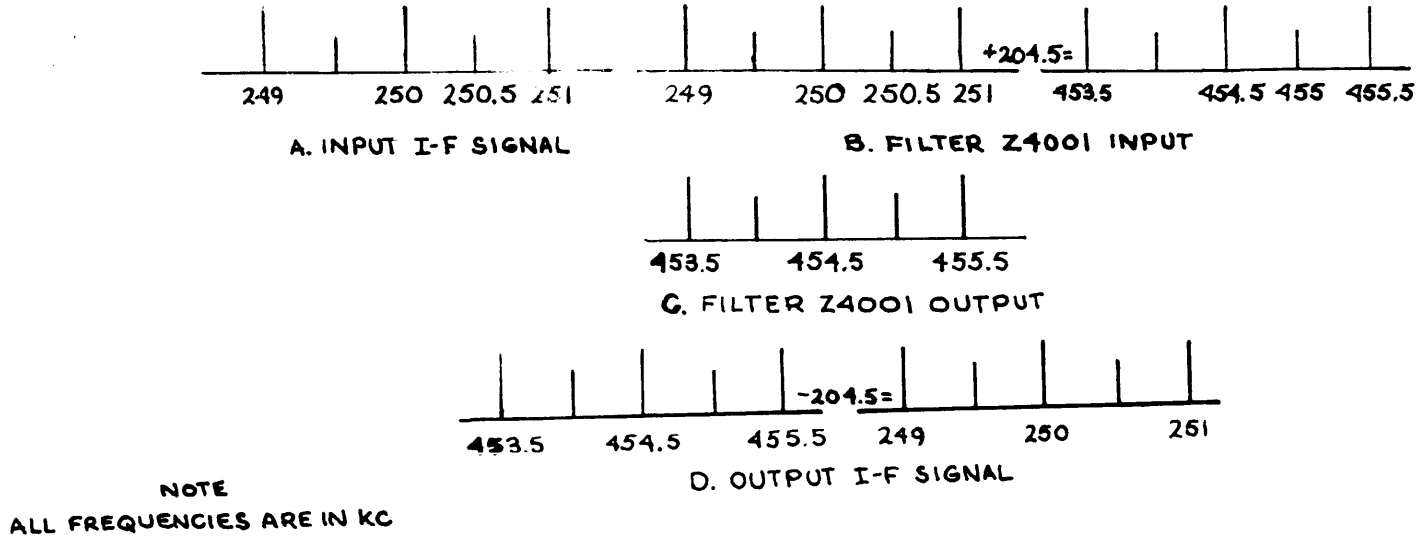

Figure 4-2. I-F Signal Analysis

4-3. OVERALL TROUBLESHOOTING

a. PRELIMINARY CHECK - In the first indication of trouble turn the unit off and examine it for obvious defects. Use table 4-1 below as an inspection guide.

TABLE 4-1. PRELIMINARY INSPECTION PROCEDURES

What to Inspect	Defects to look for	Remedies
Wiring	Loose or frayed wires	Resolder or rewire
Solder joints	Loose, corroded, or cold solder joints	Clean or re-solder
Resistors and Capacitors	Cracks, chipping, leaks, bulges, discoloration	Replace defective part
Tubes	Poor seating open or burned out	Press tubes firmly in socket. Replace if necessary
Switches and Cables	Broken parts, frayed cables, broken connections, dirt, oil, corrosion	Replace defective parts. Repair connections. Clean if necessary
Knobs, screws, connectors	Looseness	Tighten

b. TEST EQUIPMENT - The following test equipment or their equivalents should be used to troubleshoot the units:

(1) A 200 vdc at 250 ma and 6.3 vac at 10 amp power supply.

(2) Measurements Corp. Model 82 Signal Generator.

(3) Ballantine Model 861 RF voltmeter.

(4) Hewlett Packard Model 524C Frequency counter.

(5) 50-ohm, 1/2 watt resistor.

c. TEST PROCEDURES - Many times a malfunction in the unit can be traced to a defective power supply. If suspicions point to a defective power supply, check operating voltages before continuing. If the majority of modules work, yet one or two prove defective, check the cabling and connections.

A signal generator set to around 455 kc can be connected across the input of the desired module. A 50-ohm load is connected across the output jack with a VTVM connected across the load. The output signal level should be approximately equal to the input signal (about 1 volt rms). As the input signal is varied about 455 kc, there should be a noticeable notch around 455 kc. The attenuation is approximately 60 db and up to ± 82 cycles of the 455 kc signal. A loss of null at the output can be caused by a defective variable oscillator (see paragraph 4-5) or mixer (see paragraphs 4-6 and 4-7). A loss of signal amplitude can be caused by defective amplifier stages (see paragraphs 4-6 and 4-7).

4-4. OPERATING VOLTAGES

The MNF-1 has no contained power supply and all operating voltages must be obtained from the MFP-1 Unit. See figure 4-3. A B+ voltage of 200 volts at 240 ma is fed to the modules through jack J6914 mounted at the rear of the unit. From here the B+ is disbursed to the four filter modules (fed through pin g of jack J6902 through J6905). A 6.3 vac at 7.2 amp filament voltage is coupled through pin E of rear panel mounted jack J6914. From here the 6.3 vac is distributed to the modules through pin A at each module connector. Pins L and F-P of jack J6914 are used for B+ and filament ground connectors respectively. Should a loss of filament or B+ voltage occur at all modules, suspect the external power supply or broken wires or connections at jack J6914. Broken wiring or module connectors can cause a loss of filament or B+

voltage.

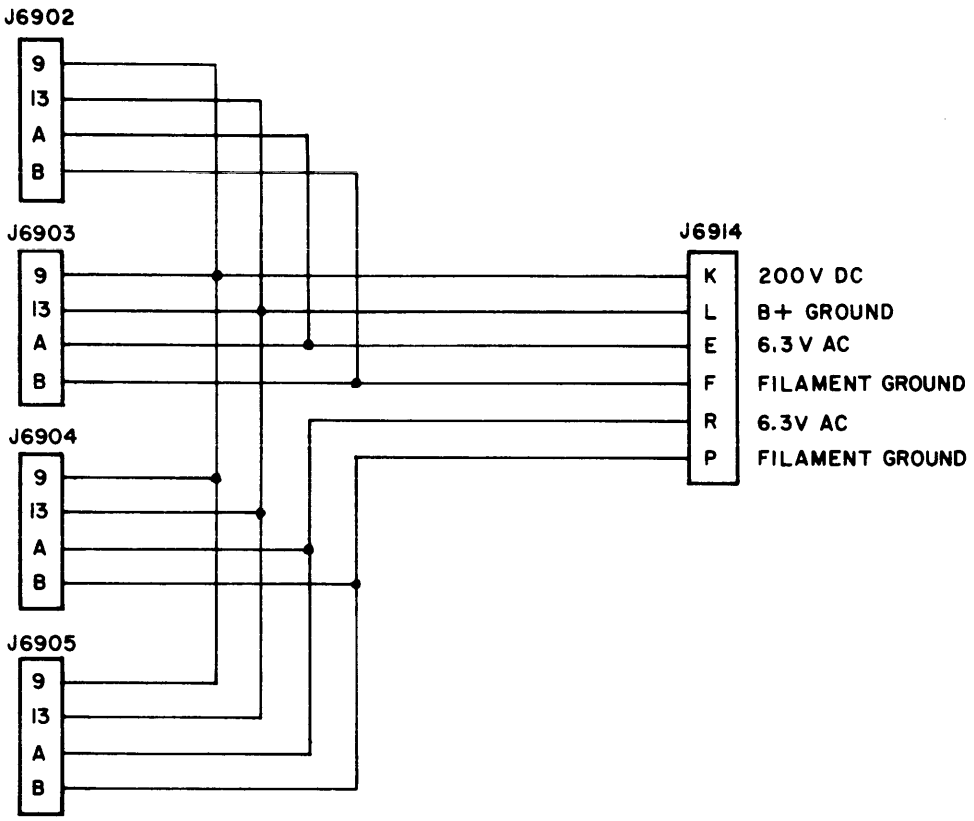

FIGURE 4-3. POWER SUPPLY CONNECTIONS

4-5. OSCILLATOR V6906 AND AMPL V6905

a. CIRCUIT ANALYSIS - Oscillator V6906 is a variable frequency Vackar-type (modified Colpitts) oscillator which generates a 202 to 208-kc output. The output frequency is controlled by NOTCH ADJUST capacitor C6915. Inductor L6901 and capacitors C6914 C6915 comprise the oscillator tuned circuit. With C6915 at mid-capacity, corresponding to the center position of the NOTCH ADJUST control, coil L6901 is adjusted for a frequency of 205 kcs. The output from V6906 is coupled from the grid (pin 6) by coupling capacitor (C6916) to the grids (pins 9 and 2) of amplifiers V6905A and V6905B.

See figure 4-4.

V6905B, a pentode working into a transformer plate load (T6902) amplifiers the 203.5 to 206.5-kc signal. This amplified signal is injected through capacitor C6901 into the cathode circuit of mixer V6901. Oscillator V6900 output which is coupled to triode amplifier

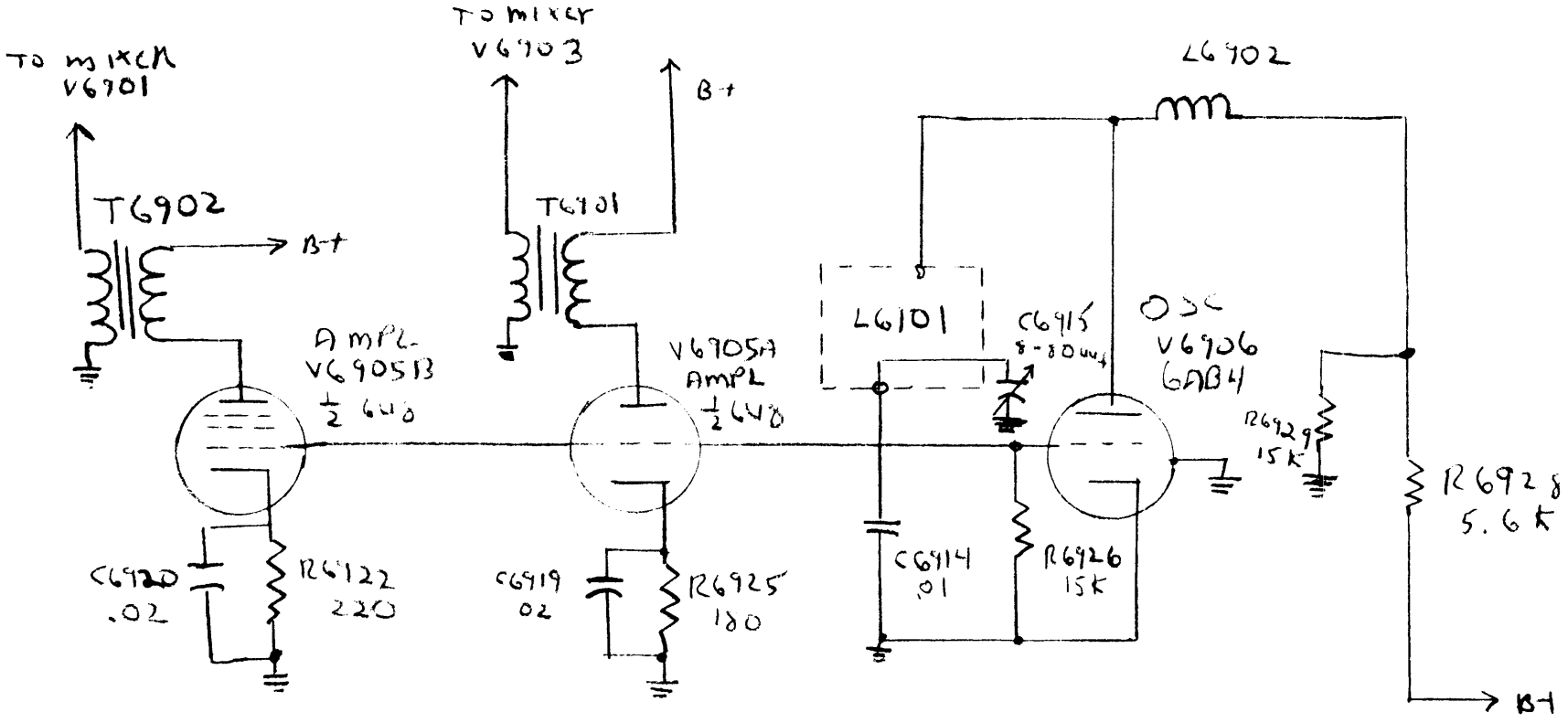

FIGURE 4-4. SIMPLIFIED SCHEMATIC OF OSCILLATOR V6906 AND AMPLIFIER V6905

V6905A is amplified through transformer T6901 and injected through capacitor C6905 into the cathode circuit of mixer V6903.

b. TEST DATA - A quick check of the oscillator output and amplifier stages can be made by connecting a VTVM across pin B2 of transformer T6902 and B1 of transformer T6901 and measure the oscillator injection signal. It should be about 1 volt (rms). Distortion and loss of gain may result from oscillator drift.

4-6. MIXER V6901, FILTER Z6901, AND AMPLIFIER V6902

a. CIRCUIT ANALYSIS - With NOTCH switch S6901 in the IN position, the 250-kc i-f signal is coupled to the grid (pin 6) of mixer V6901 along with an oscillator frequency between 203.5 and 206.5 kc, which is coupled to the cathode (pin 2). These two signals are heterodyned in V6901, producing both additive and subtractive resultant frequencies. Transformer T4003 is tuned to a frequency band between 453.5-kc and 456.5-kc, the frequency sum of the two signals. See figure 4-5.

The converted signals from T6903 are coupled to fixed notch filter Z6901 which attenuates, by approximately 60 db, any signal at 455 kc $\pm$ 10 cps. Signals at 455 kc $\pm$ 82 cps are attenuated by 10 db. The frequency range of 453.5 kc to 456.5 kc represents a spread of 3 kc. Thus, it is possible to notch out an interfering signal within $\pm$ 1.5 kc of the center i-f frequency. This notched signal is then coupled to amplifier V6902 where the signal is amplified through L6901 and coupled to the grid (pin 6) of mixer V6903).

b. TEST DATA - Tube V6901 receives the 250-kc i-f signal and 203.5 to 206.5 kc beat oscillator signal. If suspicions point to a defective mixer stage, filter, or amplifier, connect a VTVM to the grid input circuit (pins) of mixer V6903. A weak or non-existant signal can be caused by the defective circuit component in the

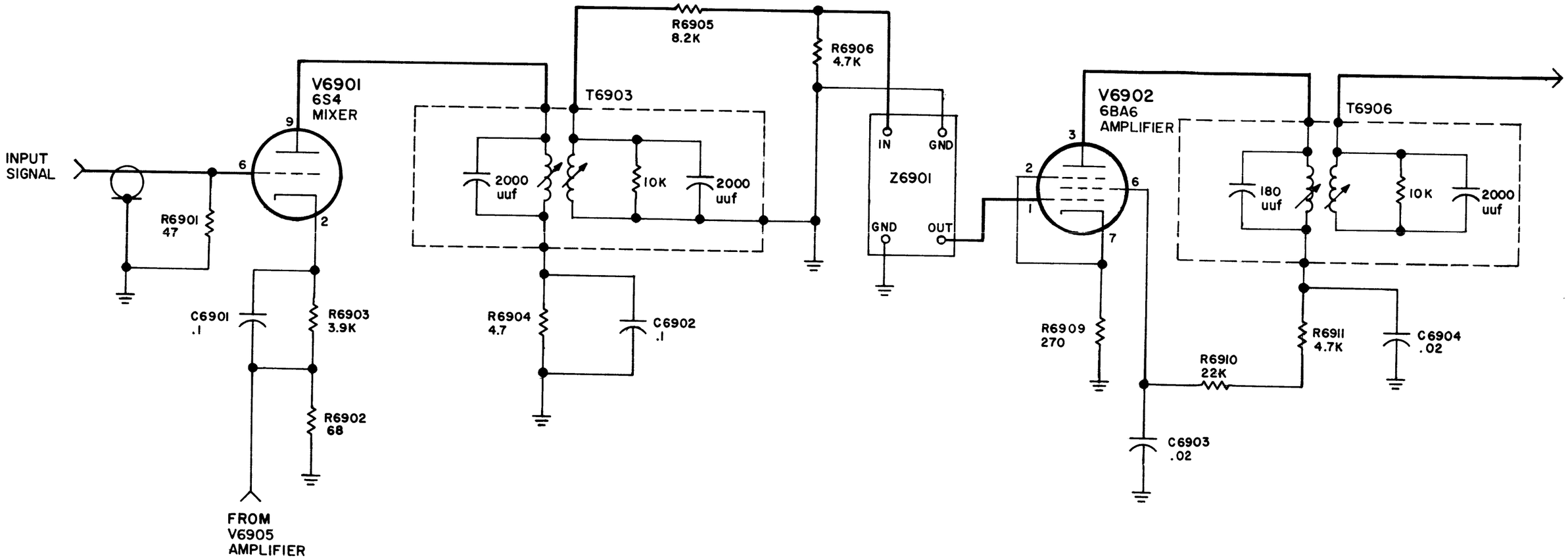

FIGURE 4-5. SIMPLIFIED SCHEMATIC OF MIXER V6901 AND AMPL V6902

first mixer-filter stages. The signal at pin 6 should be about 1 volt rms.

If a malfunction exists check back intothe circuit. A VTVM connected at the output of filter Z6901 should indicate a notch only at 455 kc. To check this vary a signal generator around 455 kc. If indications are normal here, the trouble lies in V6902- a 6BA6 pentode. Check the tube along with its associated circuit components. If filter output is abnormal, the trouble lies in the mixer or filter stages. Check V6901 and Z6901.

4-7. MIXER V6903 AND AMPLIFIER V6904

a. CIRCUIT ANALYSIS - The second input to this mixer is injected in the cathode circuit. These two signals are heterodyned in V6903, producing both additive and subtractive resultant frequencies. The output circuit of V6903, consisting of transformer T6904, is designed to pass the 250-kc difference frequency between the two signals. This 250-kc signal is coupled through R6917 to the grid of V6904. The output, taken from T6905, is coupled through S6901A to J6902. See figure 4-6.

b. TEST DATA - Since V6903 converts the 455 kc-range signal back to 250 kc, lack of conversion would point to a defective mixer. By connecting a 50-ohm load across jack J6902, and a VTVM across the load, the output voltage level can be checked. Since the gain of the filter is unity; that is, the only amplification is the necessity to overcome mixer losses, the output and input voltages should be the same.

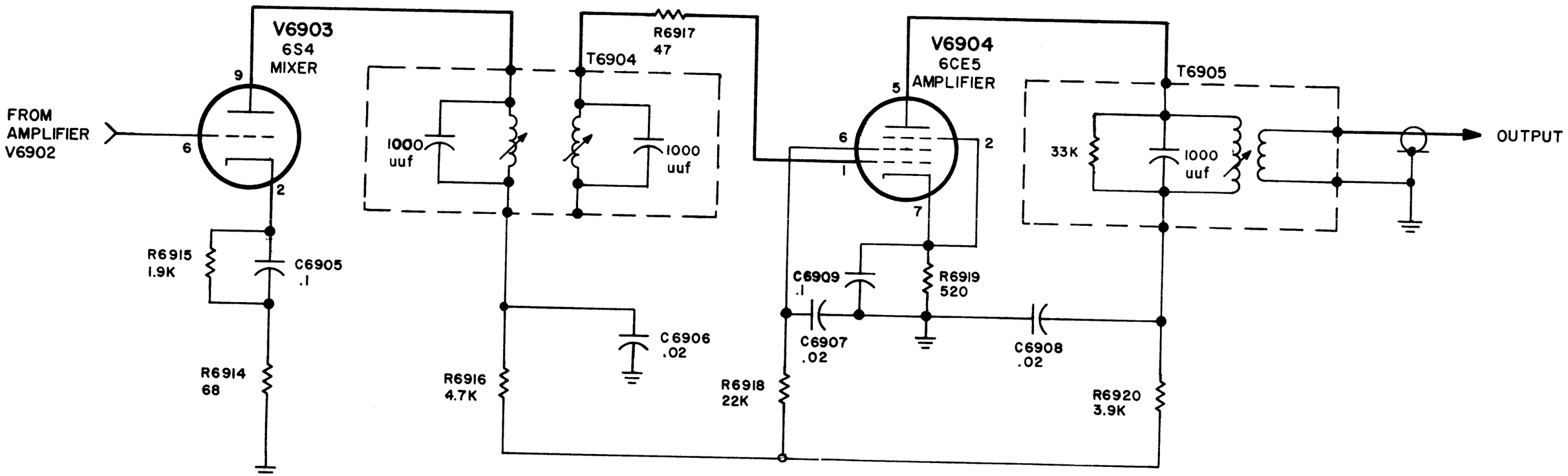

FIGURE 4-6. SIMPLIFIED SCHEMATIC OF MIXER V6903 AND AMPL V6904

4-8 VOLTAGE AND RESISTANCE MEASUREMENTS

Table 4-2 lists the voltage and resistance of the tubes found in this unit. Use this table as an aid to troubleshooting.

TABLE 4-2. VOLTAGE AND RESISTANCE MEASUREMENTS

TUBE AND TYPE	TYPE OF MEASUREMENT	PIN NUMBER 1	2	3	4	5	6	7	8	9
V6901 (6S4)	DC	NC	10	NC	6.3AC	0	0	NC	NC	178
	ohms	INF	4K	0	FIL	GND	2.50	NC	NC	6K
V6902 (6BA6)	DC	0	2.5	6.3K	0	1.50	128	2.5	NC	NC
	ohms	15	270	FIL	GND	6K	25K	2.70	NC	NC
V6903	DC	NC	10	NC	6.3AC	0	0	NC	NC	170
	ohms	INF	4K	47	0	0	47	INF	INF	6K
V6904	DC	0	2.75	6.3AC	0	170	170	2.75	NC	NC
	ohms	50	560	FIL	GND	6K	18K	560	NC	NC
V6905 (6U8)	DC	145	0	150	6.3AC	0	152	2.2	1.7	0
	ohms	6K	10K	15K	GND	FIL	6K	220		10K
V6906	DC	125	NC	6.3AC	0	0	-1.5	0	NC	NC
	ohms	5K	NC	0	FIL	1meg	470K	0	NC	NC

NOTES:

1. All resistive measurements made with respect to chassis ground using a Simpson Model 260 VOM. The NOTCH ADJUST was set to IN and NOTCH ADJUST set at 0.

2. All voltage measurements are d-c and made with respect to chassis ground unless specified otherwise. A Hewlett Packard Model 410B VTVM was used. NOTCH control set at IN with all channel inputs disconnected at rear. Main power switch at HFP-1 set at standby.

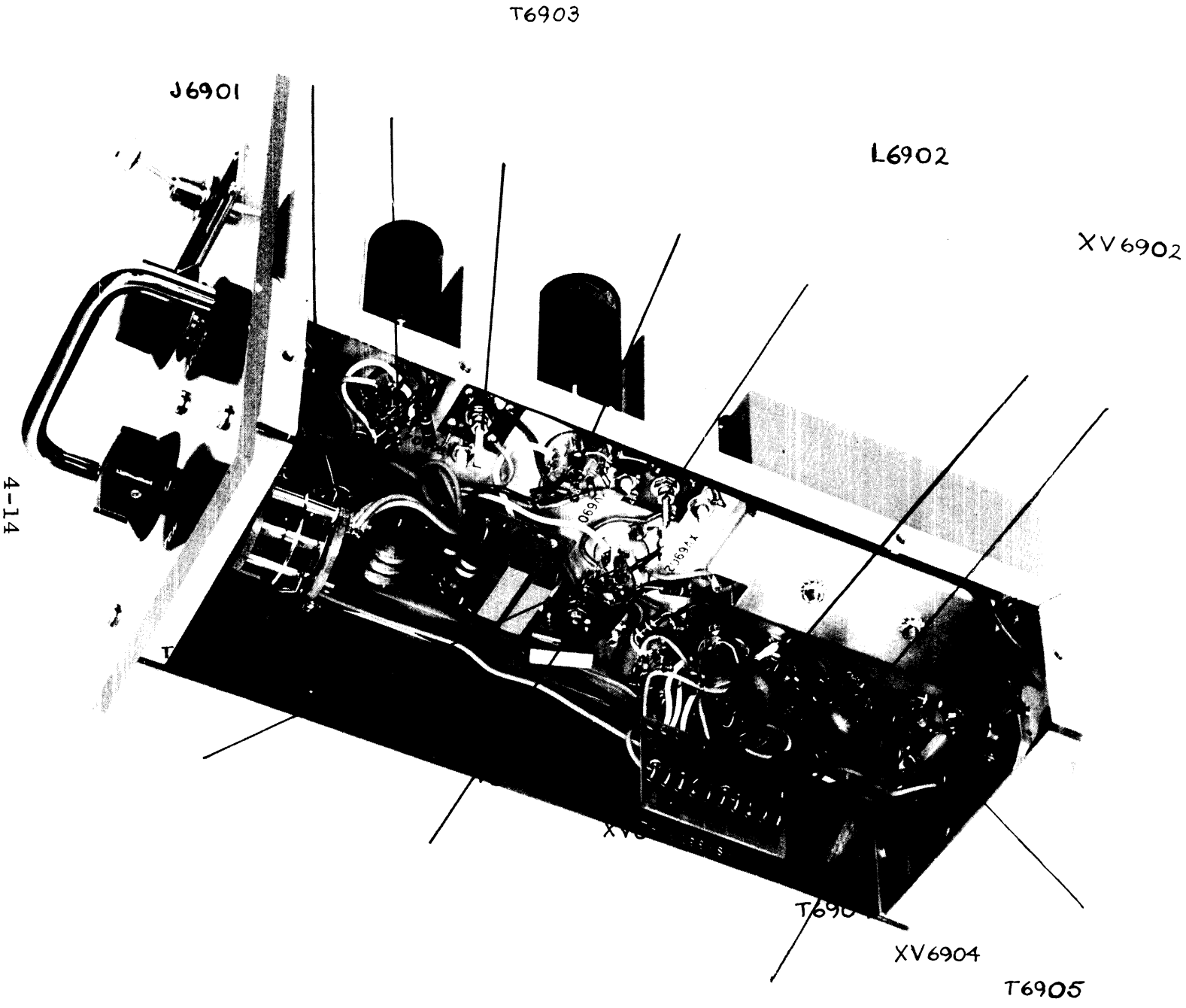

FIGURE 4-7. BOTTOM VIEW OF NOTCH FILTER

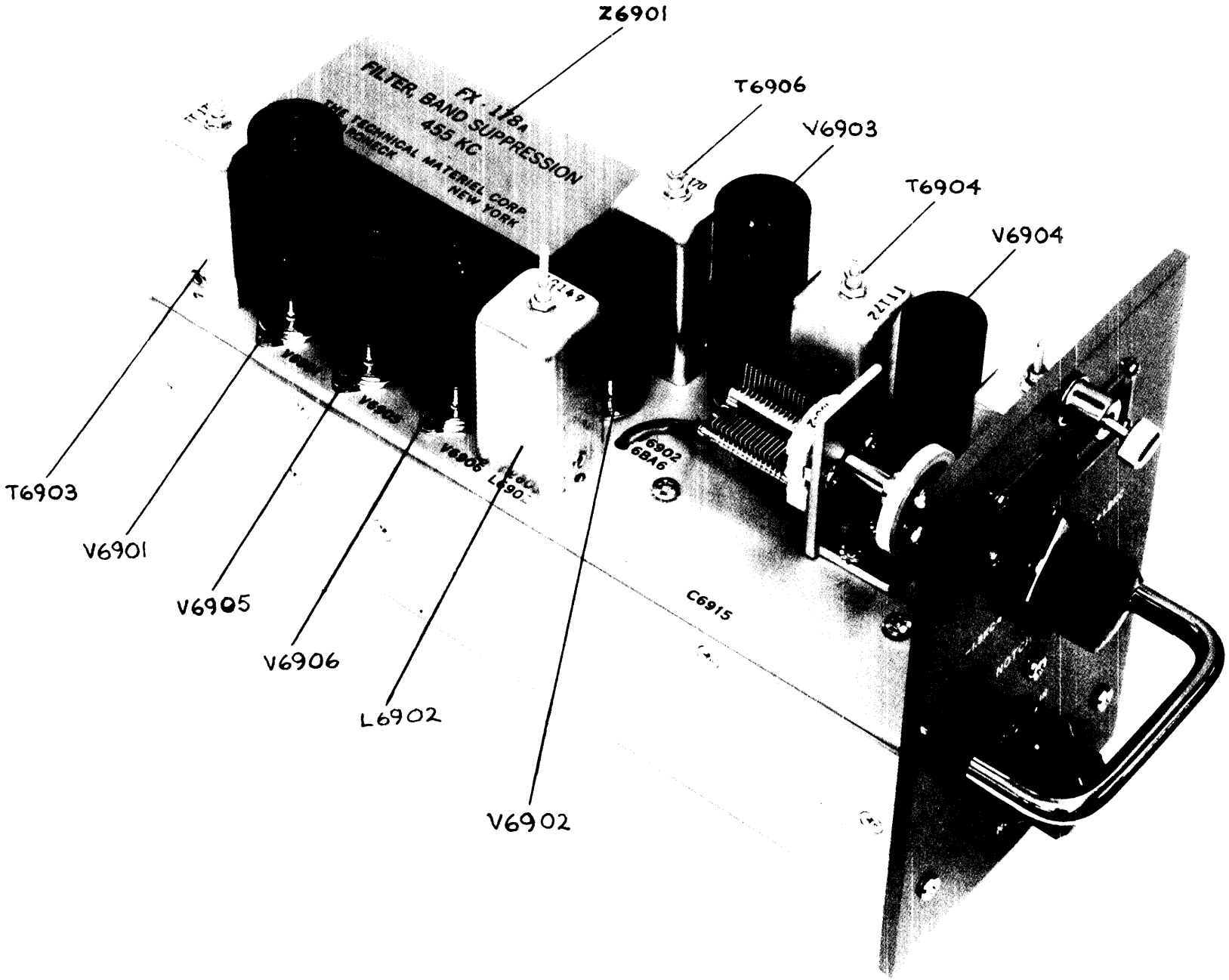

FIGURE 4-8 TOP VIEW OF NOTCH FILTER

SECTION 5

MAINTENANCE

5-1. INTRODUCTION

Maintenance may be divided into three catagories: operator's maintenance, preventive maintenance, and corrective maintenance. The operator's maintenance, normally the maintenance carried out by the operator as he works with the equipment, is in section 3 of this manual. Preventive and corrective maintenance procedures are given in this section.

The MNF-1 has been designed to provide long-term, trouble-free operation under continuous duty conditions. It is recommended that any necessary maintenance be done by a competent maintenance technician familiar with troubleshooting techniques. If the trouble cannot be corrected by following the procedures in this section and Section 4, it is recommended that the unit be returned to the Technical Materiel Corporation for servicing.

5-2. PREVENTIVE MAINTENANCE

In order to prevent failure of the equipment due to corrosion, tube failure, dust, or other destructive elements, it is suggested that a schedule of preventive maintenance be set up and adhered to.

At periodic intervals (at least every six months) the equipment should be removed from the rack for cleaning and inspection. All accessible covers should be removed and the wiring and all components inspected for dirt, corrosion, charring, discoloring, or grease. Dust may be removed with a soft brush. Remove dirt or

grease from electrical parts with trichlorethylene. Remove dirt or grease from other parts with any good dry cleaning fluid.

WARNING

When using trichlorethylene, make certain that adequate ventilation exists. Avoid prolonged contact with skin.

The preliminary inspection procedures, as outlined in table 4-2 can be used as a guide to preventive maintenance.

5-3. ALIGNMENT PROCEDURES

a. TEST EQUIPMENT - The test equipment or their equivalents needed to align the unit are listed below:

(1) Ballantine Model 861 RF Voltmeter

(2) Hewlett Packard Measurements Model 82 Signal Generator.

(3) Model 524C Regulated Power Supply

(4) Hewlett Packard Frequency Counter.

(5) 50-ohm, 1/2 watt, dummy load.

b. OSCILLATOR V6906 AND AMPLIFIER V6905 - The oscillator and amplifier stages can be aligned as follows:

(1) Connect frequency counter to pin B2 of transformer T6902. Turn NOTCH ADJ control C6915 to midrange (0).

(2) Tune core of transformer L6901 to a frequency of 205 kc as indicated on counter. Then tighten lock-nut.

(3) Turn NOTCH ADJ to (maximum capacitance). The frequency counter should indicate 203.5 kc - .25 kc + 0 kc.

(4) Turn NOTCH ADJ to (minimum capacitance). The frequency counter should indicate 206.5 kc - 0, + .25 kc.

(5) A quick check with a VTVM connected to pin B2 of transformer T6902 and pin B1 of transformer T6901 should show approximately 1 volt (rms) at each point.

c. MIXER V6901 AND FILTER Z6901 - The following procedures are used to align the mixer and filter stages. When performing alignment of these stages, always reduce the signal generator output so as to produce 1 volt (rms) or less at the point being measured. The alignment procedures are as follows:

(1) Remove oscillator tube V6906. Tune signal generator to 455 kc and connect it to jack J6901. Connect r-f voltmeter to pin 9 of tube V6901. Temperorily place a jumper between the green lug or transformer T6903 and ground.

(2) Adjust top core of transformer T6903 for maximum VTVM indication. Then tighten lock-nut.

(3) Remove jumper. Then adjust bottom core of transformer for a minimum indication on VTVM. Then tighten lock-nut.

(4) Connect VTVM to pin 1 of tube V6902 and ground. Vary signal generator very slowly around 455 kc. There should be a noticeable notch at 455 kc.

(5) Then connect signal generator tuned to 455 kc to pin 1 of tube V6902 and VTVM to pin 5 of the same tube. Temporarily place a short jumper between the green lug of transformer T6906 and ground.

(6) Adjust top core of transformer T6906 for maximum indication on meter. Tighten lock-nut. Remove jumper and tune for maximum indication on VTVM. Remove generator and connect to the green lug of transformer T6903; set it to a 2-volt output.

(7) Adjust meter scale as needed while slowly tuning signal generator to 455 kc. The notch depth should exceed 50 db. (Actual notch depth may not be possible to measure because of generator sidebands (hum).)

d. MIXER V6903 AND AMPL V6904 - The 250-kc mixer and audio output stages are aligned as follows:

(1) Tune signal generator to 250 kc and connect to pin 6 of tube V6903. Connect the VTVM to pin 9 of the same tube. Then temporarily connect a short jumper between pin 1 of tube V6904 and ground.

(2) Adjust top core of transformer T6904 for maximum indication on VTVM. Then tighten lock-nut.

(3) Remove jumper and adjust bottom core of transformer T6904 for minimum indication on meter. Tighten lock-nut.

(4) Connect VTVM and dummy load at r-f output jack. Adjust transformer T6905 for maximum indication on VTVM, adjusting generator output so as not to exceed 0.5 volts at the VTVM. Then tighten lock-nut.

(5) Connect signal generator to r-f input jack. Reinsert tube V6906 in socket. Rotate ON-OFF switch to ON and OFF positions. Meter readings should not vary more than 2 db.

SECTION 6

PARTS LIST

6-1. INTRODUCTION.

The parts list will be included when available.

SECTION 7

SCHEMATIC DIAGRAMS

REVISIONS							
ZONE	SYM	DESCRIPTION	DATE	E.M.N. NO.	DRAFT	CHKD	APPD

V6901 6S4 · V6902 6BA6 · V6903 6S4 · V6904 6CE5 · V6905A 1/2 6U8 · V6905B 1/2 6U8 · V6906 6AB4

RG6901 47 · RG6902 68 · RG6903 3.9K · RG6904 4.7K · RG6905 8.2K · RG6906 4.7K · RG6907 47 · RG6909 270 · RG6910 22K · RG6911 4.7K · RG6912 47 · RG6914 68 · RG6915 3.9K · RG6916 4.7K · RG6917 47 · RG6918 22K · RG6919 560 · RG6920 3.9K · RG6921 10K · RG6922 220 · RG6923 15K · RG6924 4.7K · RG6925 180 · RG6926 470K · RG6927 4.7K · RG6928 5.6K 2W · RG6929 15K 2W

C6901 .1 · C6902 .1 · C6903 .02 · C6904 .02 · C6905 .1 · C6906 .02 · C6907 .02 · C6908 .02 · C6909 .1 · C6910 750 µµf · C6911 1 · C6912 .1 · C6913 .01 · C6914 .01 · C6915 75-100 µµf · C6916 100 µµf 5% · C6917 .02 · C6918 .02 · C6919 .02 · C6920 .02 · C6921 .02 · C6922 .02 · C6923 .02 · C6924 .1 · C6925 .1 · C6926 .1 · C6927 .02 · C6928 .02 · C6929 .02 · C6930 360 µµf

T6901 · T6902 · T6903 · T6904 · T6905 · T6906 · Z6901 · L6901 · L6902 · L6903 · L6905 · L6906 · J6901

S6901B FRONT · S6901B, REAR · S6901A REAR

+200 · 250 KC IN · 250 KC OUT

FIRST SYMBOL	LAST SYMBOL	MISSING SYMBOLS
RG6901	RG6929	RG6901, 8, 13
C6901	C6930	
L6901	L6906	L6904
T6901	T6906	
V6901	V6906	
J6901	J6901	
C6901	C6901	
Z6901	Z6901	

—UNLESS OTHERWISE SPECIFIED—
1- ALL RESISTORS ARE IN OHMS, 1/2 WATT.
2- ALL CAPACITORS ARE MICROFARADS.

NOTE:
S6901 SHOWN IN OFF POSITION.

NOTES

1	MNF-1	
ASSY UNIT	MODEL NUMBER	ASSY NO
SCALE	CODE	
	A	

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TMC FORM 110

CK-696

Figure 7-1. Schematic Diagram, MNF-1 Module

REVISIONS

ZONE	SYM	DESCRIPTION	DATE	E.M.N. NO.	DRAFT	CHKD	APPD

J6902
a
b
B+ 200 — 9
B+ GRD. — 13
6,3 ACV FILAMENT — A
FILAMENT GRD. — B

J6903
a
b
B+200 — 9
B+ GRD. — 13
6.3 ACV FILAMENT — A
FILAMENT GRD. — B

OUTPUT

J6904
a
b
B+ 200 — 9
B+ GRD. — 13
6.3 ACV FILAMENT — A
FILAMENT GRD. — B

J6905
a
b
B+ 200 — 9
B+ GRD. — 13
6.3 ACV FILAMENT — A
FILAMENT GRD. — B

J6912
J6911
J6910
J6909
J6908
J6907
J6906

J6914
K — B+ 200
L — B+ GRD.
E — 6.3 VAC FILAMENT
F — FILAMENT GRD
R — 6.3 VAC FILAMENT
P — FILAMENT GRD
INPUT

CK-698

NOTES

MNF-1

Q'TY/UNIT | MODEL USED ON | ASS'Y. NO.
SCALE | CODE

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REQ'D.
MATERIAL
FINISH
DECIMALS .X ± .05 .XX ± .01 .XXX ± .005

TMC FORM 110

Figure 7-2. Schematic Diagram, Main Chassis

SECTION 8

MATERIAL LISTS

MATERIAL LIST / NUMERICAL PARTS LIST | REV. | USED ON MODEL: MM 1 | SHEET 1 OF 1

ASSY PART NO.: CA 851 | ASSY TITLE: WIRING HARNESS | NEXT ASSY: A 2334 | QTY PER NEXT ASSY: 1 | ASSY LEVEL: 2

LIST SECTION	PART NO.	DESCRIPTION	ITEM LOCATION: USED ON ASSEMBLY	ITEM LOCATION: USED TO MOUNT	ITEM LOCATION: QTY PER USED TO MOUNT	QTY PER ASSY	REFERENCE SYMBOLS	REMARKS
3	RG 174/U	CABLE, COAX	CA 851			60		
3	MWC 22(7) U12	WIRE, ELEC	↑			47		
3	MWC 22(7) U10	↕	↕			63		
3	MWC 22(7) U91	↕	↕			37		
3	MWC 22(7) U90	WIRE, ELEC				36		
3	CD 101-1 MW	CORD, LACING				X		
3	JJ 172	CONN, RECPT, BNC				1	J 6924	
						1	J 6907	
						1	J 6908	
						1	J 6909	
						1	J 6910	
						1	J 6911	
						1	J 6912	
						1	J 6913	
3	JJ 260-2	CONN, RECPT				1	J 6914	
	PM 118-2	PIN, CONTACT				14		
	PM 115-4	PIN, CONTACT				14		
	PM 115-6	PIN, CONTACT, COAX	↓			8		

MATERIAL LIST / NUMERICAL PARTS LIST

REV.

USED ON MODEL: MNF-1

SHEET

ASSY PART NO.: A3385 | ASSY TITLE: SUPPORT ASSY REAR | NEXT ASSY: A3384 | QTY PER NEXT ASSY: 1 | ASSY LEVEL: 2

LIST SECTION	PART NO.	DESCRIPTION	ITEM LOCATION: USED ON ASSEMBLY	ITEM LOCATION: USED TO MOUNT	ITEM LOCATION: QTY PER USED TO MOUNT	QTY PER ASSY	REFERENCE SYMBOLS	REMARKS
3	LD1404/MS3572	SUPPORT, REAR	A3385			1		
3	MS3572	SUPPORT, REAR	LD1404			1		MACH
3	JJ302	BOKN, RECEPT	A3385			4	J6902, 6903 J6904, J6905	

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TMC FORM PML-3

MATERIAL LIST / NUMERICAL PARTS LIST

REV.

USED ON MODEL: AX467

SHEET 1 OF 1

ASSY PART NO.: A3319-3 | ASSY TITLE: PC BD [illegible] | NEXT ASSY: A3319-4 | QTY PER NEXT ASSY: 1 | ASSY LEVEL: 4

LIST SECTION	PART NO.	DESCRIPTION	ITEM LOCATION: USED ON ASSEMBLY	ITEM LOCATION: USED TO MOUNT	ITEM LOCATION: QTY PER USED TO MOUNT	QTY PER ASSY	REFERENCE SYMBOLS	REMARKS
3	A3319-2	BD, PC, LOADED	A3319-3			1		
3	A3319-1	BD, PC, UNLOADED	A3319-2			1		
3	TE108-2	STANDOFF, RIVET TYPE	A3319-3			2		
3	WL100-7	WIRE, BUSS	A3319-3			AR		
3	PX104-2-034	SLVG, INS	A3319-3			6		
3	PX104-6-034	↑ ↑	↑			3		
3	PX104-5-034					3		
3	PX104-3-034					16		
3	PX104-1-034	↓ ↓				3		
3	PX104-1-034	SLVG, INS	↓			6		
3	BX100	SOLDER, TIN ALLOY	A3319-3			X		

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LIST SECTION	MATERIAL LIST / NUMERICAL PARTS LIST	REV.	USED ON MODEL: AX467	SHEET 1 OF 1
	ASSY PART NO.: A3317-4	ASSY TITLE: PRINTED CIRCUIT BD	NEXT ASSY: A3288	QTY PER NEXT ASSY: 1	ASSY LEVEL: 3

LIST SECTION	PART NO.	DESCRIPTION	ITEM LOCATION: USED ON ASSEMBLY	ITEM LOCATION: USED TO MOUNT	ITEM LOCATION: QTY PER USED TO MOUNT	QTY PER ASSY	REFERENCE SYMBOLS	REMARKS
4	A3317-3	BOARD, PRINTED CIRCUIT	A3317-4			1		
3	CM15B6100D1K	CAP, FXD, MICA				1	C6913	
						1	C6914	
3	CL-226-5	COIL, RF, FXD				1	L6913	
3	CL-275-473	COIL, RF, FXD				1	L6910	
3	RC20GF223K	RES, FXD, COMP				1	R6901	
3	RC20GF223K	RES, FXD, COMP				1	R6902	
3	RC20GF392K	RES, FXD, COMP				1	R6915	
3	RC20GF392K	RES, FXD, COMP				1	R6910	
3	RC20GF472K	RES, FXD, COMP				1	R6911	
3	RC20GF472K	RES, FXD, COMP				1	R6916	
3	RC20GF561K	RES, FXD, COMP				1	R6919	
3	RC42GF153K	RES, FXD, COMP				1	R6929	
3	RC42GF562K	RES, FXD, COMP				1	R6923	
3	RC20GF680K	RES, FXD, COMP				1	R6914	
3	CC103-37	CAP, FXD, CER				1		
3	CC100-35	CAP, FXD, CER				1		
						1		

LIST SECTION

MATERIAL LIST / NUMERICAL PARTS LIST | REV. | USED ON MODEL: AX4107 | SHEET 1 OF

ASSY PART NO.: A3328-3 | ASSY TITLE: | NEXT ASSY: | QTY PER NEXT ASSY: 1 | ASSY LEVEL: 4

PART NO.	DESCRIPTION	ITEM LOCATION: USED ON ASSEMBLY	ITEM LOCATION: USED TO MOUNT	ITEM LOCATION: QTY PER USED TO MOUNT	QTY PER ASSY	REFERENCE SYMBOLS	REMARKS
4 A3328-2	BOARD, P.C., MARKER	A3328-3			1		
4 A3320-1	BOARD, P.C., MARKER	A3320-1			1		
3 TE108-2	STANDOFF, RIVET TYPE	A3328-3			2		

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LIST SECTION

MATERIAL LIST / NUMERICAL PARTS LIST

REV. | USED ON MODEL: | SHEET 1 OF

ASSY PART NO.: | ASSY TITLE: | NEXT ASSY: | QTY PER NEXT ASSY: | ASSY LEVEL:

PART NO.	DESCRIPTION	ITEM LOCATION: USED ON ASSEMBLY	ITEM LOCATION: USED TO MOUNT	ITEM LOCATION: QTY PER USED TO MOUNT	QTY PER ASSY	REFERENCE SYMBOLS	REMARKS
4	[illegible]-3	[illegible]			1		
3	RC2[illegible] 15K	RES, COMP			1	R623	
3	R[illegible]				1	R625	
3	R[illegible] 22K				1	R622	
3	RC20GF 332K				1	R623	
2	RC[illegible] 472K				1	R620	
					1	R624	
					1	R622	
3	CC[illegible]-33	CAP, FXD, CER			1	C[illegible]	
3	[illegible]-35	CAP, FXD, CER			1	C621	
3	[illegible]	SOLDER, TIN ALLOY			X		

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TMC FORM PML-3

MATERIAL LIST / NUMERICAL PARTS LIST | REV. | USED ON MODEL: AX [illegible] | SHEET 1 OF 3

ASSY PART NO.: A3288 | ASSY TITLE: CHASSIS ASSY | NEXT ASSY: A35[illegible] | QTY PER NEXT ASSY: 1 | ASSY LEVEL: 2

LIST SECTION	PART NO.	DESCRIPTION	ITEM LOCATION: USED ON ASSEMBLY	ITEM LOCATION: USED TO MOUNT	ITEM LOCATION: QTY PER USED TO MOUNT	QTY PER ASSY	REFERENCE SYMBOLS	REMARKS
3	TS102P01	SOCKET, ELECT TUBE	A3388			1	XV6,11	
						1	XV6,12	
						1	XV6,13	
3	TS103P01	SOCKET, ELECT TUBE	A3388			1	XV6,7,8,9,10	
						1	XV6,14	
						1	XV6,15,16	
3	TS129-6	SHIELD, TUBE	A3388			2		
3	TS128-5	SHIELD, TUBE	A3388			1		
3	TS128-2	SHIELD, TUBE	A3388			2		
3	TT170	XFMR, TUNED, IF	A3388			1	T6[illegible]	*A2347
						1	T6[illegible]	
3	TT171	XFMR, TUNED, IF	A3388			1	T6905	*A2348
3	TT172	XFMR, TUNED, IF	A3388			1	T6904	*A2349
3	AC149	COIL, IF, ASSY	A3388			1	L6902	*A2350
3	FX178	FILTER, BANDPASS	A3388			1	Z6901	
3		CAPACITOR, VAR, AIR	A3388			1	C6915	
3	MS3575	SHIELD, FILTER	A3388			1		
4	A3319-4	BOARD, P.C.	A3388			1		
4	A3320-4	BOARD, P.C.	A3388			1		

MATERIAL LIST / NUMERICAL PARTS LIST | REV. | USED ON MODEL: | SHEET

ASSY PART NO.: | ASSY TITLE: | NEXT ASSY: | QTY PER NEXT ASSY: | ASSY LEVEL:

LIST SECTION	PART NO.	DESCRIPTION	ITEM LOCATION: USED ON ASSEMBLY	ITEM LOCATION: USED TO MOUNT	QTY PER USED TO MOUNT	QTY PER ASSY	REFERENCE SYMBOLS	REMARKS
3	SW303	WAFER, SW	7328X			1	SW301	
3	TZ107	XFMR, RF				1		
3	6SY	TUBE,				1		
3	6BA6	TUBE,				1		
3	6AU4	TUBE,						
3	6V6	TUBE,						
3	CC100-35	CAP, FXD, CER				1	C301	
						1		
						1		
						1		
						1		
						1		
						1		
						1		
						1		
						1		
						1		
						1		
						1		
3	CC100-28	CAP, FXD, CER				1	C324	
3	CC100-37	CAP, FXD, CER				1		
						1		
3	CM15B181K	CAP, FXD, MICA				1		
	CM15B151K	CAP, FXD, MICA				1		

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TMC FORM PM-3

MATERIAL LIST / NUMERICAL PARTS LIST

REV. | USED ON MODEL: NX-467 | SHEET 3 OF 3

ASSY PART NO.: A 3388 | ASSY TITLE: CHASSIS ASSY | NEXT ASSY: A-3562 | QTY PER NEXT ASSY: 1 | ASSY LEVEL: 2

LIST SECTION	PART NO.	DESCRIPTION	ITEM LOCATION: USED ON ASSEMBLY	ITEM LOCATION: USED TO MOUNT	ITEM LOCATION: QTY PER USED TO MOUNT	QTY PER ASSY	REFERENCE SYMBOLS	REMARKS
3	RC20BF[illegible]K	RES, FXD, COMP	A3388			1	R6926	
3	RC20BF[illegible]K		A3388			1	R6921	
3	RC20BF472K		A3388			1	R6906	
3	RC20BF[illegible]2K		A3388			1	R6905	
3	LD1403 & 53570	CHASSIS	A3388			1		
3	MS35700	CHASSIS	LD1403			1		MACH
3	MS3576	PLATE, LEFT SIDE	A3388			1		
3	MS 3577	PLATE, RIGHT SIDE	A3388			1		
3	MS 3579	SHIELD	A3388			1		
3	JJ 3002	CONN, RECEP, FEMALE				1	J6901	
3		COUPLING, SHAFT				1		
3	6CE5	TUBE, ELECT				1	V6904	
3	RC20BF470K	RES, FXD, COMP				1	R6901	
						1	R6912	
						1	R6917	
3	RC20BF[illegible]K	RES, FXD, COMP				1	R6907	
3	MP630	PLATE, IDENT				1		
2	SFB02[illegible]	SCREW, [illegible]	A3388	MP630		4		

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[illegible]-3

MATERIAL LIST / NUMERICAL PARTS LIST

REV.

USED ON MODEL: AX467

SHEET 1 OF

ASSY PART NO.: A3389 ASSY TITLE: PANEL ASSY, FRONT NEXT ASSY: A3502 QTY PER NEXT ASSY 1 ASSY LEVEL: 2

LIST SECTION	PART NO.	DESCRIPTION	ITEM LOCATION: USED ON ASSEMBLY	ITEM LOCATION: USED TO MOUNT	ITEM LOCATION: QTY PER USED TO MOUNT	QTY PER ASSY	REFERENCE SYMBOLS	REMARKS
3	LDH02-3RB	PANEL, FRONT	A3389			1		
3	DI 101	DRIVE, VERNIER				1		
3	SCFP0832PH2	SCREW, MACHINE		DI 101		2		
3	MP139-3AB	KNOB, INSERT				1		
3	HA102-11BM	HARDWARE				1		
3	CW139-2B	FERRULE		HA102	2	2		
3	ES 123-1	SCREW, CAPTIVE				1		
3	NP 613	PLATE, IDENT	A3389			1		
3	SFP0256SN3	SCREW, THD CUTTING	A3389	NP		4		
3	MS 3662	POINTER, DIAL	A3389			1		
3	SCFP1032PH2	SCREW, MACHINE	A3389	HA102		2		
3	LWE04MRN	WASHER, LK., EXT	A3389	DI101		2		
3	NT 145-1	NUT, PLAIN, SPLINE	MS3581			2		

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NPL

MATERIAL LIST / NUMERICAL PARTS LIST | REV. | USED ON MODEL: MVF-1 | SHEET 1 OF

ASSY PART NO.: A 3562 | ASSY TITLE: FINAL ASSEMBLY | NEXT ASSY: AX467 | QTY PER NEXT ASSY: 4 | ASSY LEVEL: 1

LIST SECTION	PART NO.	DESCRIPTION	ITEM LOCATION: USED ON ASSEMBLY	ITEM LOCATION: USED TO MOUNT	ITEM LOCATION: QTY PER USED TO MOUNT	QTY PER ASSY	REFERENCE SYMBOLS	REMARKS
4	A 3388	CHASSIS ASSY	A3562			1		
4	A 3389	FRONT PANEL ASSY	A3562			1		
5	CH 332	CHART, UNIT BKDN	AX467			1		
5	CK 696	DIAGRAM, SCHEM	AX467			1		

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LIST SECTION

MATERIAL LIST / NUMERICAL PARTS LIST | REV. | USED ON MODEL: MS5D-1 | SHEET of

ASSY PART NO.: MNF-1 | ASSY TITLE: MULTIPLE NOTCH FILTER | NEXT ASSY: MS5A-1 | QTY PER NEXT ASSY: | ASSY LEVEL: 0

PART NO.	DESCRIPTION	ITEM LOCATION			QTY PER ASSY	REFERENCE SYMBOLS	REMARKS
		USED ON ASSEMBLY	USED TO MOUNT	QTY PER USED TO MOUNT			
A3384	FINAL ASSEMBLY	MNF-1			1		
CH333	CHART, UNIT WIRING	MNF-1			1		
S813	TEST PROCEDURE	MNF-1			1		
CK698	DIAGRAM, SCHEMATIC	MNF-1			1		

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TMC FORM PL-3

MATERIAL LIST / NUMERICAL PARTS LIST | REV. | USED ON MODEL: MNF-1 | SHEET 1 OF

ASSY PART NO.: A 3384 | ASSY TITLE: FINAL ASSEMBLY | NEXT ASSY: MNF-1 | QTY PER NEXT ASSY: 1 | ASSY LEVEL: 1

LIST SECTION	PART NO.	DESCRIPTION	ITEM LOCATION: USED ON ASSEMBLY	ITEM LOCATION: USED TO MOUNT	ITEM LOCATION: QTY PER USED TO MOUNT	QTY PER ASSY	REFERENCE SYMBOLS	REMARKS
4	CA 851	CABLE HARNESS	A3384			1		
4	A3385	SUPPORT ASSY, RIGHT	A3384			1		
4	A 3386	CHASSIS ASSY, MAIN	A3384			1		
2	AX467	MODULE, FILTER	A3384			4		NPL
4	MS3579	COVER	A3384			2		
3	NP630	PLATE, IDENT	A3384			1		
3	SFB #2-56 SN3	SCREW, THD CUTTING	A3384	NP630		4		
3	PM1032	HANDLE, GUARD	A3384			1		

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TMC FORM PML-3

LIST SECTION	MATERIAL LIST / NUMERICAL PARTS LIST	REV.	USED ON MODEL: MUF-1	SHEET 1 2
	ASSY PART NO.: A3386	ASSY TITLE: CHASSIS ASSY, MAIN	NEXT ASSY: A3384	QTY PER NEXT ASSY: 1	ASSY LEVEL: 2

LIST SECTION	PART NO.	DESCRIPTION	ITEM LOCATION: USED ON ASSEMBLY	ITEM LOCATION: USED TO MOUNT	ITEM LOCATION: QTY PER USED TO MOUNT	QTY PER ASSY	REFERENCE SYMBOLS	REMARKS
3	LD1405/MS3573	CHASSIS	A3386			1		
3	MS3573	CHASSIS	LD1405			1		MACH
3	JJ 200-2	CONN, RECEPT	A3386			1	J6914	
3	UG625*/U	CONN, RECPT	A3386			8	J6906, 6907, 6912 J6908, 6909, 6913 J6910, 6911	
3	PM1017	GUIDE, T Type	A3386			3		
3	PM1016	GUIDE, L Type	A3386			2		
3	MS3571	SUPPORT, MOD SUIDE	A3386			1		
3	NT109-440-4	NUT, RND, SWAGED	MS3571			4		
3	MS3577	PLATE, RT SIDE	A3386			1		
3	MS3574	PANEL, END, RT	A3386			1		
3	MS3576	PLATE, LFT SIDE	A3386			1		
3	MS3661	PANEL, END, LFT	A3386			1		
3	NT14E-1	NUT, SWAGED	A3386			4		
3	PM1032	GUARD, HANDLE	A3386			2		
3	NT109-8-4	NUT, RND, SWAGED	MS3573			1		
3	MS3590	SUPPORT, MODULE	A3386			1		

LIST SECTION

MATERIAL LIST / NUMERICAL PARTS LIST

REV.

USED ON MODEL: MIII 1

SHEET 2 2

ASSY PART NO.: A3386 | ASSY TITLE: CHASSIS ASSY | NEXT ASSY: A3384 | QTY PER NEXT ASSY: 1 | ASSY LEVEL: 2

PART NO.	DESCRIPTION	ITEM LOCATION: USED ON ASSEMBLY	ITEM LOCATION: USED TO MOUNT	ITEM LOCATION: QTY PER USED TO MOUNT	QTY PER ASSY	REFERENCE SYMBOLS	REMARKS
3 NT129-440-4	NUT, ANC, SWAGED	A3386			4		
3 MIL-[illegible]-832-4	NUT, ANC, SWAGED	A3386			4		
3 MS3582	PLATE, SLIDE SPACER	A3386			2		

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TMC FORM PML-3