GALAXY V

MARK 3

NEW—

FEATURES!

- 500 WATTS SSB POWER
- IMPROVED ALC --

--with linear input provisions

(052968)

Manual #183-71
Price $2.50

The new Galaxy V Mark 3 offers you higher power, improved ALC with linear amplifier input provisions. The Mark 3 still maintains the same high standards of performance and rugged reliability at the same low price that has become a trademark at Galaxy. Backed by a full year warranty and the best service policy ever, we feel sure that the Galaxy V Mark 3 will establish a new standard of value for the HAM industry.

LIST OF ILLUSTRATIONS

INDEX

SECTION 1

UNPACKING

1.1 REMOVING FROM CARTON:

Carefully remove the Galaxy V Mark 3 from the packing carton. Examine it closely for signs of shipping damage. Remove the top (4 screws) and the bottom (6 screws) of the cabinet. Remove all hold-down tape and check to insure all tubes, crystals and transistors are properly seated in their respective sockets. Inspect closely for any signs of internal damage.

Should any shipping damage be apparent -- *NOTIFY THE DELIVERING CARRIER IMMEDIATELY.* State to that carrier the full extent of damage and file a claim *IMMEDIATELY!*

1.2 WARRANTY REGISTRATION:

Fill out the enclosed WARRANTY REGISTRATION CARD and mail it TODAY so that your warranty will be on file.

1.3 SHIPPING CARTON:

Save the packing material and the shipping carton. You may need it at a later date for shipment or storage of the transceiver.

1.4 RE-ASSEMBLY:

After you have satisfied yourself that no damage has resulted from shipment and that all tape has been removed, all tubes, transistors and crystals are properly seated in their sockets; replace the top and the bottom of the cabinet.

SECTION 2

INSTALLATION

2.1 GENERAL:

Do not attempt to operate your Galaxy V Mark 3 or to make any connections until you have read this entire section carefully and understand its content.

2.2 ANTENNA:

The Galaxy V Mark 3 will work with any of the common antenna systems designed for use or the high frequency amateur bands, provided the impedance is not beyond the capability of the pi-network. An antenna that has a resistive impedance between 40 to 100 ohms will take power from the Mark 3 with little difficulty. SWR should be kept at a minimum, preferably less than 2:1. The antenna connection provided on the rear panel of the transceiver is an SO-239. To connect your antenna you will need to provide a PL-259 connector.

Remember that the most powerful transmitter is useless without a good antenna and feedline. These two items are often overlooked by the amateur who is in a hurry to get on the air. A few moments here to make sure you have a good grade of RG-8/U coax cable and a good antenna installation will make a great deal of difference in the performance of your new transceiver.

2.3 SPEAKER:

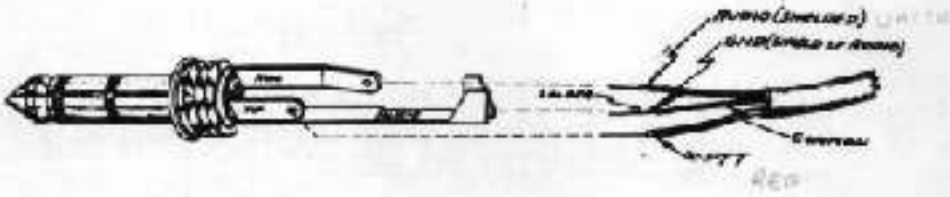
The audio output from the transceiver requires an 8 ohm speaker. The speaker connection is an RCA type phono jack on the rear panel. Galaxy's SC-1 speaker is highly recommended, providing a good quality speaker in a matching cabinet that will also house the AC-400 power supply. For mobile installation a small separate speaker is recommended.

2.4 MICROPHONE:

The best performance from your Galaxy V Mark 3 will result when using a wideband, flat frequency response mike.

The microphone input is a HIGH IMPEDANCE input. The best VOX (voice control) operation is experienced when the mike has a cardiod pattern to reduce background pickup. This type of mike allows you to operate your audio gain at a higher level, giving optimum VOX operation, reducing reverberation, echoes and noise pickup in both fixed and mobile installations. Microphones with limited low or high frequency response with peaks in the voice range commonly used for SSB will work satisfactorily, but at somewhat less than maximum performance. Audio shaping should take palce in the transceiver, not in the microphone.

A three conductor (3-circuit) microphone plug is required for the jack provided on the front panel of the transceiver. A plug such as Switchcrafts' S-260 or equivalent should be used. The plug and microphone are connected as shown in the illustration below --



SWITCHCRAFT S-260 or EQUAL

MICROPHONE CONNECTION

Figure 1

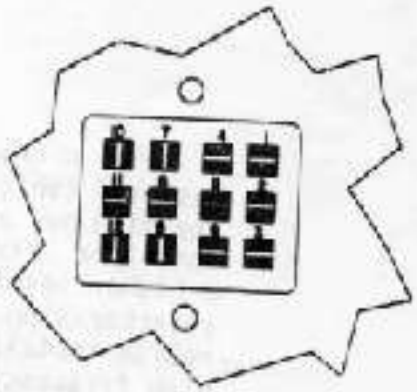
NOTE

Some mikes have a PTT switch wired so the mike element is shorted out when the PTT switch is in the OFF condition. When using this type of mike for VOX operation the SHORT must be eliminated or the VOX will not operate.

2.5 POWER:

The main power jack on the rear of the transceiver requires a Cinch-Jones type 5-312CCT connector. This is part of the Galaxy AC-400 and G-500DC power supplies. The power connector pins are connected as shown in Figure 2 on the following page.

Pin 1 --- 650 vdc Red
Pin 3 --- 350 vdc Blue
Pin 5 --- 12 vdc Purple
Pin 6 --- 12.6 vac Yellow
Pin 7 --- Ground Green
Pin 9 --- -100 vdc (bias) Orange
Pin 11 -- AC Control
Pin 12 -- AC Control



POWER PLUG CONNECTION

Figure 2

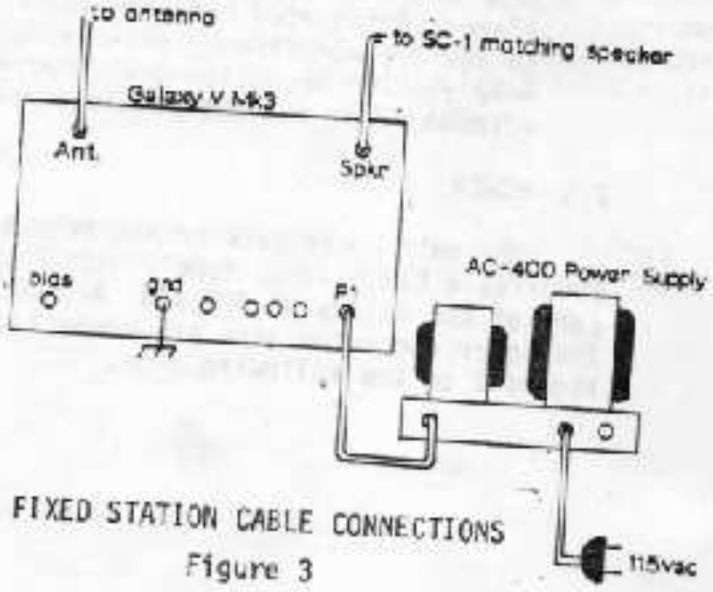
2.5 LOCATION:

The location of the Galaxy V Mark 3, fixed or mobile is not critical. Care should be taken to insure that space is allowed for adequate air circulation. Locations near radiators or heating units should be avoided.

CAUTION!

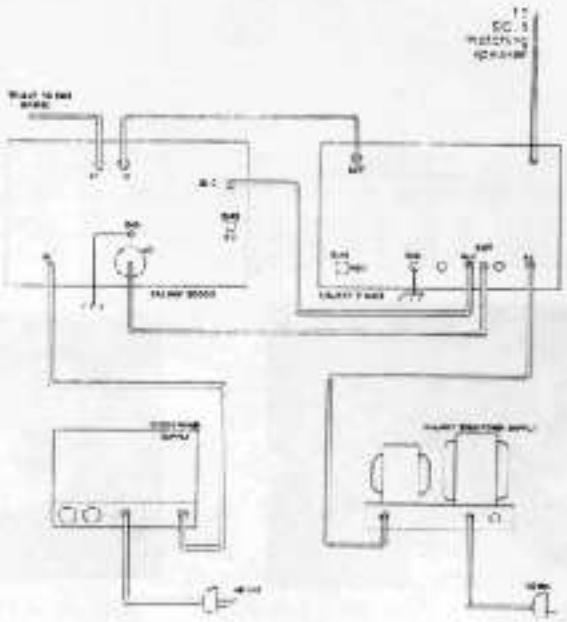
DO NOT COVER THE TOP OF THE TRANSCEIVER WITH BOOKS, PAPERS OR OTHER PIECES OF EQUIPMENT AS OVERHEATING MAY RESULT!

2.6.1 Fixed Installation -- Galaxy's Model AC-400 AC power supply is required for fixed-station installations. The use of the SC-1 matching speaker is highly desireable and you will note from paragraph 2.3 that the power supply will fit inside. This then forms one compact unit. Figure 3 shows the proper connections between the Galaxy V Mark 3 and the AC-400. If a linear is used in your fixed station such as the Galaxy 2000B, it should be connected as shown in Figure 4.



FIXED STATION CABLE CONNECTIONS

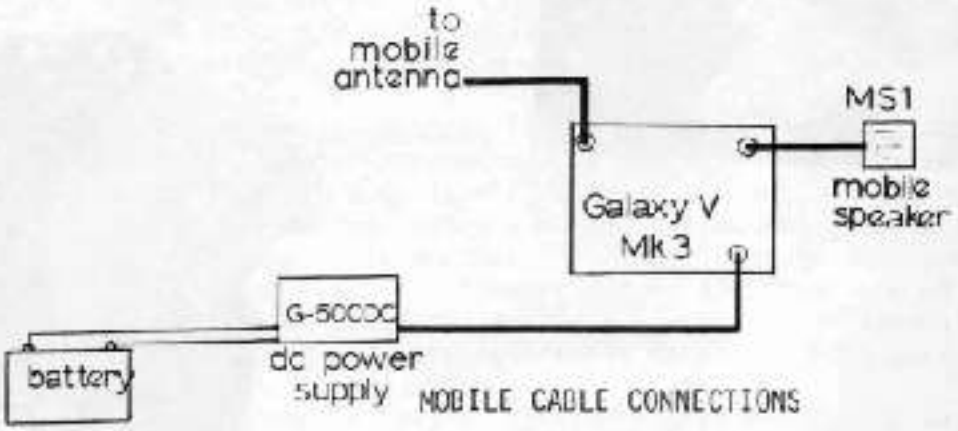
Figure 3



LINEAR CABLE CONNECTIONS

Figure 4

2.6.2 Mobile Installation -- The G-50DDC power supply will be required when using the Galaxy V Mark 3 mobile. The transceiver can be installed in any vehicle having a 12 VDC electrical system. The G-50DDC is factory wired for negative ground and comes with the necessary power plug for the Galaxy V Mark 3. See Figure 5 for proper cable connections.



MOBILE CABLE CONNECTIONS

Figure 5

Mount the transceiver in a location under the dash using the MMB mobile mounting bracket. Figure 6 shows some typical installations. Additional details are provided with the mount.

2.6.3 Mobile DC Supply Considerations -- The Galaxy G-500DC power supply should be mounted as near to the battery as possible. DO NOT mount the supply in a location that would require extension of the primary cables attached to the supply.

The G-500DC should be mounted high on the inside of the fender, near the battery. This will position it out of direct water splash in most cases, and also in the best position for ventilation. DO NOT mount the supply near the firewall -- this is a "HEAT TRAP" in the motor compartment.

The worst condition for a DC supply is to operate the set while driving at high speed, building up considerable heat in the motor compartment, then stop for gas, etc., and turn off the motor. The heat build-up in the motor compartment is terriffic without the motor fan in operation in this case. If you find it necessary to stop and turn off the motor, the DC sup-ly should be SHUT DOWN as well until the heat level has been reduced by opening the hood, or starting the motor for added ventilation from the motor fan.

NEVER start the motor with the DC supply in operation! Turn off the DC supply until the motor is running.

The cable carrying power from the DC supply to the transceiver should not be over 10 feet in length with the cable supplied. If slightly more length is necessary then an added #18 wire should be paralleled with the wire that carries the filament power (Pin 6 on the power plug).

2.6.4 Mobile Antenna Installation -- Install a mobile antenna in the manner recommended by the antenna manufacturer and connect the coax lead from it to the antenna connector on the transceiver using a PL-259 connector. Mobile antenna installation is another item that is often overlooked and done too hastily. Take your time and read some of the many good books available on the subject -- your time will be well spent and very noticeable in your mobile performance.

2.6.5 Mobile Speaker Considerations -- If your car has an all transistor radio as most do nowadays, install a separate speaker for your mobile transceiver which can be mounted for operator convenience.

2.6.5 Ignition Noise -- In most mobile installations ignition noise becomes a problem. It is recommended that you install resistor type spark plugs and insert a 10,000 ohm suppresser resistor in the center tower of the distributor cap. A 5000 ohm suppressor resistor is suggested in each spark plug tower on the distributor cap. A coaxial capacitor at the ignition coil primary, mounted as close to the coil terminal as possible is another MUST. If noise is still present again we suggest you consult the many articles and books written on this subject. There are also commercially avialable noise suppressor kits.

FRONT-VIEW OF THE GALAXY V MARK 3

Figure 7

2.7 CONTROL FUNCTIONS:

ON-OFF SWITCh.....On the AF Gain Control. When in the maximum counter-clockwise position, turns power off.

AF.....AUDIO GAIN CONTROL, controls audio output (volume).

RF.....RF GAIN CONTROL, the lever under the AF knob. Normally it is left in the maximum clockwise position. For strong signals it may be set in a counter-clockwise direction to increase the AVC threshold level. As retarded, the "S" meter level will increase and only signals of this strength or greater will move the meter.

EXCITER.....This control tunes both the Final Driver and the Receiver Antenna Input circuits to resonance.

BAND SWITCH.....Selects desired frequency range in 500 KHz steps. Color of the numbers corresponds to the color on the VFO Dial to be used.

NOTE

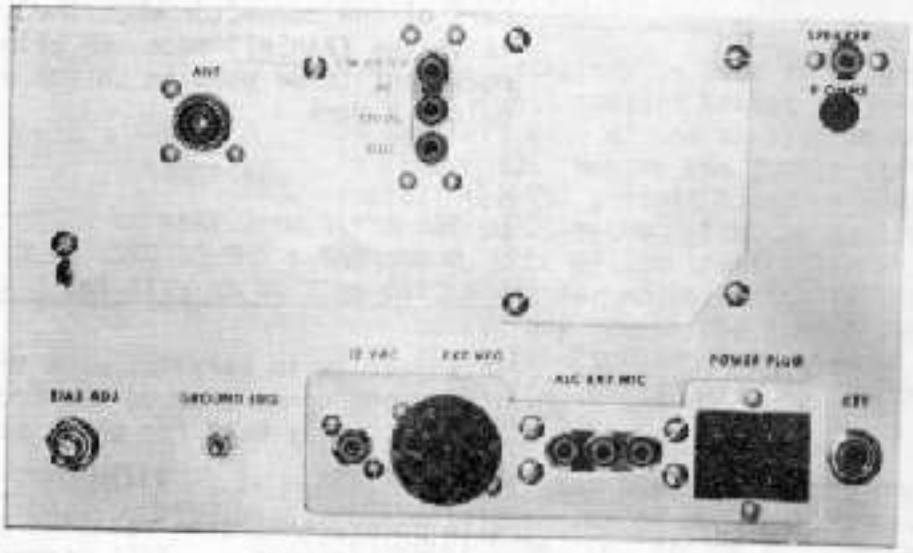
BLUE IS USED ON THE 14.0-14.5 MHz range ONLY!

PLATE.....This control tunes the Final Amplifier to resonance.

LOAD.....This control matches the Final Plate circuit to the Antenna Load within the range of the pi-network. It can match resistive antenna loads from 40 to 100 ohms.

VFO -Main Tuning Dial.....This dial is calibrated in primary marks every 5 KHz and can be interpolated with the vernier logging scale on the inner tuning knob (See Figure 10). The dial reading is added to the lower MHz number on the band you are on. For example -- if the bandswitch is on the 40 meter band (7.0-7.5 MHz) and the red dial reading was 200, add the 200 to the lower number, 7.0 which would mean your operating frequency is 7.200 MHz.

MIC Input Jack.....The microphone jack in the lower left-hand corner requires a small 3-circuit plug such as a Switchcraft S-260. The tip is PTT, the ring is AUDIO and the sleeve or barrel is GROUND.



REAR PANEL VIEW OF THE GALAXY V MARK 3

Figure 8

2.8 REAR PANEL CONTROLS & JACKS:

BIAS ADJ. .....This control is the bias adjust potentiometer R33 used to set the bias on the final tubes.

GROUND LUG.....Grounding connection for external ground. Should be connected to a cold-water pipe or good outside ground for fixed-station use, or to the body chassis for mobile installations.

12 VAC.....Provides 12 volts AC up to 1/2 amp for many purposes. Used for meter illumination voltage when the DAC35 Deluxe Console is connected to the transceiver.

EXT VFO.....Provides power and control circuitry for Galaxy's RV-1 and RX-2 remote VFOs and the NOX-1, Novice Adapter when used. Has a jumper plug installed which is removed to connect accessories.

ALC.....This jack provides an input to the transceivers AVC circuitry to control gain when used with Galaxy's 2000B Linear Amplifier. It assures maximum output without "FLAT-TOPPING".

EXT.....This jack provides a ground on the center part of the connector when the transceiver is in the TRANSMIT mode, to allow other equipment to be used in unison with the Galaxy V Mark 3.

CAUTION!

DO NOT APPLY MORE THAN 20 VOLTS AC OR DC OR MORE THAN 1 AMP TO THIS JACK. NEVER USE THIS JACK TO KEY 115 VAC LINES.

MIC.....This jack is in parallel with the microphone connection on the front panel. It is normally used for phone patch connections.

POWER.....Main power connection requires a Cinch-Jones S-312CCT connector. This connector is supplied with all Galaxy power supplies.

KEY.....A standard 1/4" closed circuit jack used for the insertion of a CW key.

ANT.....Antenna Input, 50 ohms is an SO-239 connector. Requires a PL-259 plug on your antenna lead-in for connection.

CW FILTER.....Filter IN, 12 VDC, Filter OUT -- these three jacks are for connection of the Galaxy F3 selective CW Filter. Internal jumper from IN to OUT must be cut to use the F3. 3 matched cables from the F3 plug into these jacks when the Filter is used.

SPEAKER.....RCA phono type jack for an 8 ohm speaker. If a 3 or 4 ohm speaker is used place a 4 to 5 ohm resistor in series with the speaker before you use the transceiver at maximum volume level.

(HOLE).....Located under the SPEAKER JACK is a hole which is used to pass the RF cable from an accessory REMOTE VFO to the internal VFO Input Jack, when used.

2.9 LOCATION OF INTERNAL ADJUSTMENTS:

VOX.....When this accessory is used it is plugged into the multi-contact socket (J9) located on the left edge of the chassis as shown in Figure 12. Remove the jumper strip and install the VOX circuit board by plugging it into the J9 socket with the controls to the OUTSIDE of the transceiver -- refer to VOX manual for adjustment. If VOX is removed for any reason the jumper strip MUST BE re-inserted in J9 in lieu of the VOX or the transceiver will not go into the transmit mode.

"S" METER ADJUSTMENT.....R2, a screwdriver adjusted potentiometer, located on the top of the chassis near the VFO pilot bulb, see Figure 12. For proper adjustment see paragraph 3.4.

CALIBRATOR.....This octal socket, J2 is located on top of the chassis as shown in Figure 12. No jumper plug is required when removed. Frequency adjustment for the calibrator is on the calibrator chassis, refer to calibrator manual for proper adjustment.

NOTE

OTHER INTERNAL CONTROLS AND ADJUSTMENTS SHOULD NOT BE MADE UNLESS THERE IS A MALFUNCTION, AND THEN ONLY WHEN SUCH ADJUSTMENTS ARE OBVIOUSLY NEEDED. THE OPERATOR SHOULD BE THOROUGHLY FAMILIAR WITH ADJUSTMENT PROCEDURES, REFER TO SECTION #5 ON TEST & ALIGNMENT.

SECTION 3

OPERATION

3.1 GENERAL:

It is assumed that the Galaxy V Mark 3 transceiver has been properly installed as per Section 2, whether it be fixed-station or mobile. Before operation is attempted, check to make certain that the antenna and speaker are properly connected. Check the power connection closely to make sure it is seated properly in the power jack.

The following paragraphs are intended to provide the operator with a basic knowledge making him able to get the most out of the Galaxy V Mark 3. It is strongly recommended that the entire section be read completely before actually operating the transceiver so that the maximum benefit is derived from your new transceiver.

3.2 GROUND CONNECTION:

The very first connection, and the most important consideration is a good ground connection. A grounding bolt is provided on the rear panel of the transceiver as shown in Figure 8. The AC line in the Galaxy V Mark 3 is by-passed and the lack of a ground will result in a slight "shock" between the equipment and anything grounded, unless you do have a good ground. Also, lack of a good ground will often result in improper operation in several respects, including TVI problems.

The ground should be connected to a cold-water pipe or outside ground, if the transceiver is in a fixed-station installation. If in a mobile installation the ground should be connected securely to the vehicle chassis.

3.3 BIAS SETTING:

Place the FUNCTION SWITCH in the PTT position. Turn the transceiver ON with the AF Gain Control and allow for a 5 minute warm-up period.

After 5 minutes set the MIC gain control to a maximum counter-clockwise position. Set the SIDEBAND selector switch to SB1. Set the BIAS potentiometer, R33 on the rear panel maximum counter-clockwise, see Figure 8 for location. Close the PTT circuit and adjust the BIAS control, R33 until the panel meter indicates S3. Open the PTT switch. If the line voltage changes, or when you change the transceiver from fixed-station to mobile operation be sure to re-set the BIAS adjustment. If in doubt, check it!

3.4 "S" METER ZERO SET:

Remove the top portion of the cabinet by removing the four screws on the sides.

CAUTION!

REMEMBER, HIGH VOLTAGE IS PRESENT AND EXPOSED AT MANY POINTS WHEN THE TRANSCEIVER IS OUT OF THE CABINET. THESE VOLTAGES ARE DANGEROUS TO LIFE!

Locate R2 the "S" Meter Zero Adjustment Potentiomenter, shown in Figure 12. After the unit has been on for several minutes, disconnect the antenna, peak the exciter control for maximum noise and then adjust R2 so the "S" Meter rests at the extreme left marking on the meter. This will allow the "S" meter to be properly aligned for a true reading. Also by adjusting the "S" Meter in this manner, you will be able to read atmospheric noise levels. Reconnect the antenna to the Antenna Input. Replace the cabinet's top cover -- if accessories are to be installed leave the cover off and continue with installation instructions found below.

3.5 ACCESSORY INSTALLATION:

If a calibrator is to be installed it should be plugged into the octal socket J2, see Figure 12 for location.

If a VOX is to be installed, FIRST TURN OFF THE AC POWER to the transceiver. Remove the jumper strip from socket J9, see Figure 12 for location. With the VOX positioned so the control side of the board is to the outside of the case, insert it into the socket J9 until it is firmly seated for good contact along its full length. Primary power may now be restored to the transceiver.

If an RV-1, RX-2 or NOX-1 remote VFO is to be installed remove the jumper plug in the back of the transceiver, EXT VFO see Figure 8 for location. Plug the REMOTE VFO control cable into the EXT VFO on the back of the transceiver. Put the small cable thru the hole beneath the speaker jack and plug it into the VFO INPUT jack, see Figure 12 for location.

If the F3 CW FILTER is to be installed, locate the jumper on the inside of the rear panel that runs from the Filter IN to the Filter OUT and CLIP it removing the short, see Figure 12 for location. Plug the three leads into FILTER IN, 12 VDC and FILTER OUT as shown in Figure 8.

Upon completion of any of the above installations replace the top cover and tighten all cabinet screws securely.

3.6 RECEIVER OPERATION:

Turn the transceiver ON by rotating the AF (Audio Gain Control) clock-wise. Allow 30 seconds for the tubes to warm up and during this period you should perform the following:

1 - Place the BAND switch to the desired band
2 - Place the PLATE & LOAD controls to Mid-Position
3 - Place the RF gain control to maximum clock-wise
4 - Adjust the Exciter Control to maximum signal (background noise) as indicated by the reading on the "S" Meter.

NOTE

ADJUSTMENT OF THE CONTROLS MENTIONED ABOVE WILL RESULT IN APPROXIMATE RESONANT CONDITIONS IN THE TRANSMITTER STAGES, THEREFORE ONE SHOULD ALWAYS PERFORM THESE OPERATION FIRST.

3.6.1 Receiver Tuning -- Precise tuning of a single-sideband signal is very important. Do not be satisfied to merely tune until the voice can be understood, take the time to set the fine tuning to the exact spot where the voice becomes natural.

The Galaxy V Mark 3 transmits on exactly the same frequency as the one you have tuned the receiver to, *automatically*. No adjustment is necessary since the same oscillator is used for both send and receive. If separate receive and transmit frequency control is desired, such as DX HUNTING, use the RV-1 Remote VFO.

3.7 TRANSMITTER OPERATION:

Tuning the Galaxy V Mark 3 transmitter is not difficult. If you follow the few simple steps outlined in the following paragraphs the transceiver will perform as it was designed to perform.

After the operator has become familiar with the adjustment procedure he will be able to do the adjustments quickly and from memory. However, until this familiarity is obtained, the operator should read all the steps below and do them as quickly as possible. If a step is forgotten, place the transmitter in a "STANDBY" condition (THIS IS DONE BY PLACING THE FUNCTION SWITCH TO THE PTT POSITION)and re-read the tune-up procedure. DO NOT KEEP THE TRANSCEIVER *ON* IN AN *UNTUNED* CONDITION!

3.7.1 Transmitter tuning --

1 - Place the SIDEBAND selector switch in the SB2 position.
2 - Set the MIC gain fully clockwise.
3 - Set the LOAD control fully counter-clockwise.

WARNING NOTE!

FCC has a ruling about unauthorized tuning ON THE AIR -- it is suggested the following tuning be done with the transceiver connected to a DUMMY LOAD (Waters Model 334A or equal) rather than an antenna to minimize QRM on the air!

4 - Place the FUNCTION switch to the TUNE position.
5 - Tune EXCITER control for maximum meter reading.
6 - Tune the PLATE control for a "DIP" on the meter. (minimum reading)

NOTE

If a CW key is attached to the transceiver be sure it is CLOSED when accomplishing steps 4,5 & 6.

NOTE!

If the meter reading is ABOVE the "TUNE" mark on the meter STOP, turn the FUNCTION switch to PTT position and check your antenna. A "DIP" which results in a meter reading ABOVE the "TUNE" mark at this point indicates antenna problems. This indication points out that the antenna impedance is below that which the pi-network can match (BELOW 40 ohms). Corrective action must be taken such as -- retuning the antenna or using a matching device.

If the meter reading is BELOW the "TUNE" mark on the meter proceed with steps 7 & 8.

7 - Adjust the MIC Gain Control counter clock-wise until the meter drops about 25%, retune the EXCITER control for a precise peak on the meter, then return the MIC gain control to a maximum clockwise setting.

8 - Now adjust the LOAD control clockwise until the meter rises to the "TUNE" mark on the meter, quickly adjust the PLATE control for a "DIP" on the meter once again. It should be a higher minimum than before.

Repeat steps 5,6,7 & 8 until the minimum meter reading, after retuning the PLATE control, is at the "TUNE" mark on the meter. The object being to get the last "DIP" of minimum current at the "TUNE" mark on the meter.

When step 8 allows the "DIP" to appear at the "TUNE" mark on the meter, then tuning is complete. Return the FUNCTION switch to the PTT position.

NOTE!

If the LOAD control reaches a fully clockwise position and you are unable to "DIP" the meter to the "TUNE" mark, STOP and place the FUNCTION switch in the PTT position. This condition indicates your antenna has an impedance ABOVE that which the pi-network can match (ABOVE 100 Ohms). Corrective action must be taken such as retuning the antenna or use of a matching device.

9 - Assuming there was no trouble loading the antenna, the equipment is now ready to be operated on SSB or CW.

3.7.2 CW Operation -- CW operation is available in the following modes:

Low Power Manual Operation
High Power Manual Operation
VOX, "break-in" Operation

3.7.2.1 Low Power - Manual CW Operation -- After completion of steps 8 & 9, simply operate the key to send CW. When you are done transmitting, return the function switch to PTT position. The input with FUNCTION switch in the TUNE position for CW is approximately 150 watts. It is recommended that the microphone be un-plugged from the panel if this method is used. If you wish to reduce power for this type of operation simply set the MIC gain control in a counter-clockwise direction which will reduce the power input. This may be done to obtain any power input level desired down to a fraction of a watt.

3.7.2.2 475 WATT - Manual CW Operation (HIGH POWER) -- This method is normally used when the VOX is not used. The microphone should be plugged in as a convenient means of placing the transmitter in the transmit condition with the PTT switching. The setting of the MIC gain control DOES NOT control power in the CW mode. It should be set fully counter-clockwise in the CW mode.

After completion of steps 8 & 9 open the key and place the FUNCTION switch in the CW position. The unit will now be in a receiving condition. To transmit, close the PTT with the microphone and operate the key for CW. Open the PTT to return to the receiving condition. (A foot switch can be conrected to the MIC jack to operate the PTT if so desired).

3.7.2.3 VOX "break-in" Operation 300 WATT -- This method of operation requires that a VOX accessory be installed and correctly adjusted. Refer to the VOX manual for correct adjustment.

When steps 8 & 9 are completed open the key and place the FUNCTION switch to the CW mode. When the key is closed the unit will automatically go into a transmit condition. It will remain in transmit a second or two, adjustable by the "hold-time" setting on the VOX unit. After this "hold-time" the unit will automatically return to the receive state. Adjust the VOX "hold-time" as desired, however, there is a slight "click" generated in the speaker each time the set goes from transmit to receive, and to minimize this we suggest a "hold-time" of about one second.

3.7.3 SSB Operation -- After tuning steps 8 & 9, return the FUNCTION switch to PTT or VOX as desired. *Remember, VOX will only work if the VOX accessory is installed.* Set the MIC gain to a maximum counter-clockwise position. Select the desired sideband as indicated by the lights on the lower right-hand side of the front panel.

Place the unit in the transmit position with the PTT on the microphone or speak into the microphone and adjust the MIC gain to operate the VOX when in the VOX position. The VOX will actuate the unit at any setting if properly adjusted. Adjust the VOX unit as necessary for VOX gain, Anti-VOX and HOLD-TIME.

While speaking into the microphone, advance the MIC gain control in a clockwise direction until the voice peaks swing the meter up to the "TUNE" mark on the meter. This represents full SSB power.

The exact setting of the MIC gain control is of no importance, it depends on the output level of the microphone in use and the volume level of the operators voice. A high output microphone may need only slight advancement of the MIC gain control (a mike rated at -45db is a very high output mike) while a microphone with a low output may require the MIC gain control to be fully clockwise. (A low output mike is -60db or more) Most high output microphones are prone to "peak" in the higher voice frequencies, one with an output of about -55db is a good all-round choice for SSB use. However any microphone that will allow the unit to be driven to full input power may be used.

NOTE!

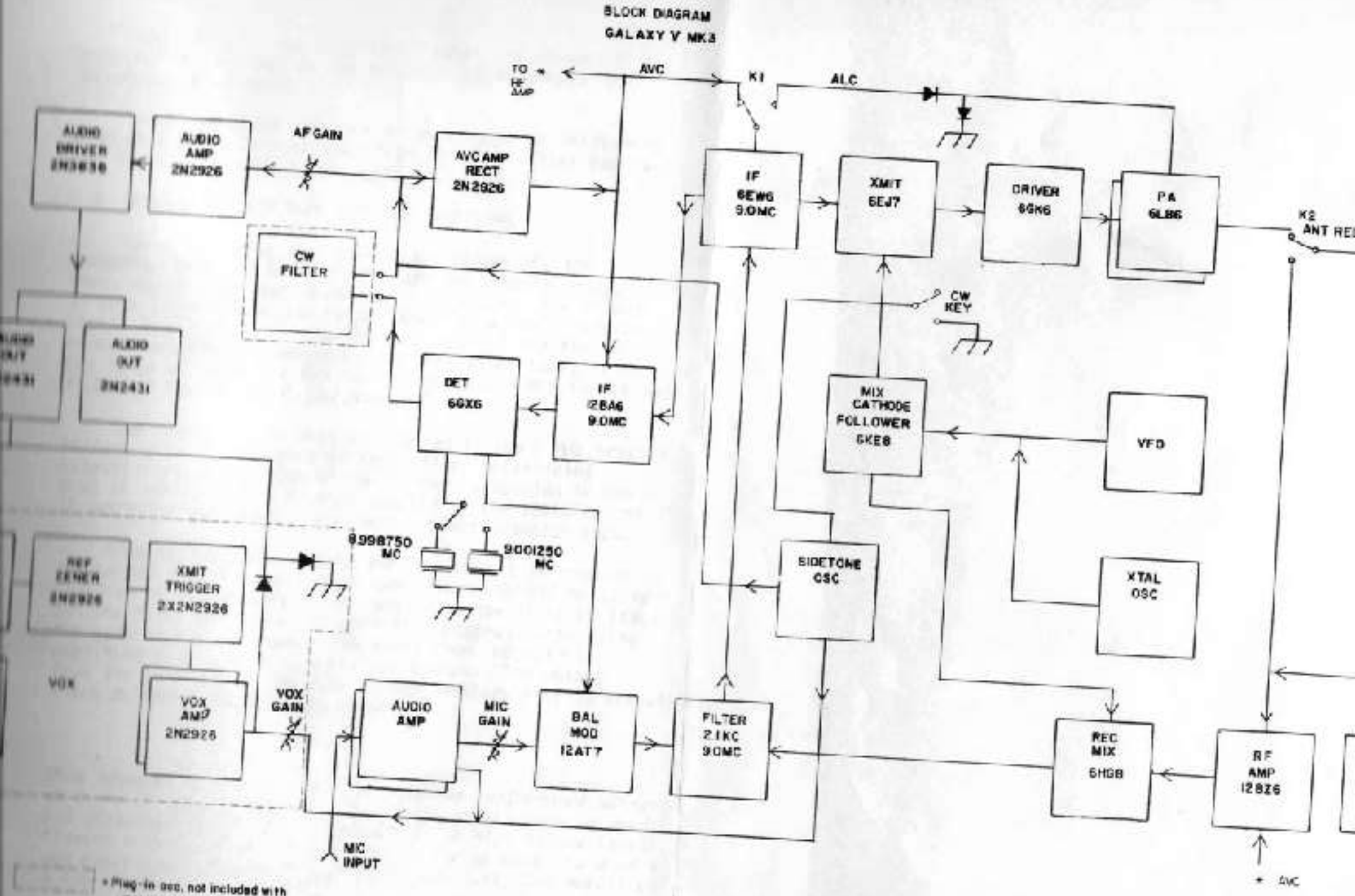
You will hear a tone in the speaker or headphones whenever you have the transceiver in the TUNE or CW settings of the FUNCTION switch and the key closed. The volume of this "side-tone" can be regulated with the AF receive volume control.

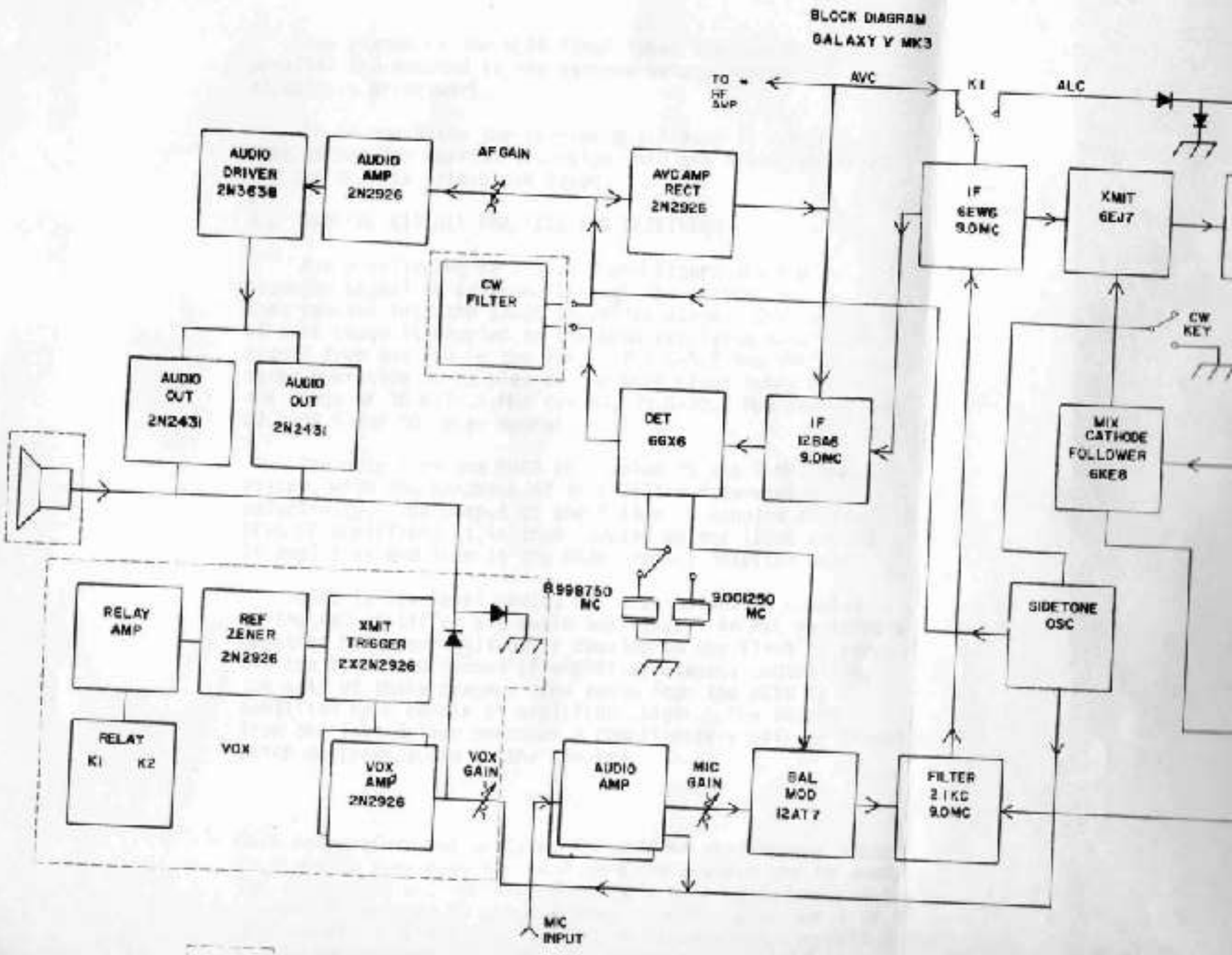
WARNING!!

NEVER TUNE THE SET WITH THE FUNCTION SWITCH IN THE CW POSITION. ALL TUNING IS TO BE DONE IN THE TUNE POSITION ONLY, AS INDICATED IN PARAGRAPH 3.7.1.

3.8 Mobile Tune-Up -- Tuning is the same in all respects for mobile operation as in fixed-station operation and done in accordance with paragraph 3.7.1. However, there are a couple of points of interest that should be mentioned. When changing the set from fixed-station operation to mobile use, be sure the BIAS setting on the final tubes is checked as described in paragraph 3.3. Reset if necessary.

Most mobile antennas are rated for SSB power only, which averages out to a relatively low power. They may fail if you operate the set in TUNE or CW over a period of several minutes and most will certainly DE-TUNE if carrier is left on for several minutes. The trick is to do your TUNING quickly!


BLOCK DIAGRAM
GALAXY V MK3
TO HF AMP
AVC
K1
ALC
AUDIO DRIVER 2N3638
AUDIO AMP 2N2926
AF GAIN
AVC AMP RECT 2N2926
IF 6EW6 9.0MC
XMIT 6EJ7
DRIVER 6GK6
PA 6LB6
K2
ANT REL
CW FILTER
CW KEY
AUDIO OUT 2N2431
DET 6GX6
IF 12BA6 9.0MC
MIX CATHODE FOLLOWER 6KE8
VFO
8.998750 MC
9.001250 MC
REF ZENER 2N2926
XMIT TRIGGER 2X2N2926
SIDETONE OSC
XTAL OSC
VOX
VOX AMP 2N2926
VOX GAIN
AUDIO AMP
MIC GAIN
BAL MOD 12AT7
FILTER 2.1KC 9.0MC
REC MIX 6HG8
RF AMP 12BZ6
MIC INPUT
+ AVC
* Plug-in acc. not included with GALAXY V MK 3


BLOCK DIAGRAM
GALAXY V MK3
TO RF SUP
AVC
K1
ALC
AUDIO DRIVER 2N3638
AUDIO AMP 2N2926
AF GAIN
AVC AMP RECT 2N2926
IF 6EW6 9.0MC
XMIT 6EJ7
CW FILTER
CW KEY
AUDIO OUT 2N2431
AUDIO OUT 2N2431
DET 6GX6
IF 12BA6 9.0MC
MIX CATHODE FOLLOWER 6KE8
RELAY AMP
REF ZENER 2N2926
XMIT TRIGGER 2X2N2926
8.998750 MC
9.001250 MC
SIDETONE OSC
RELAY K1 K2
VOX
VOX AMP 2N2926
VOX GAIN
AUDIO AMP
MIC GAIN
BAL MOD 12AT7
FILTER 2.1 KC 9.0MC
MIC INPUT
= Plug-in acc. not included with GALAXY V MK3

The plates of the 6LB6 final tubes are connected in parallel and matched to the antenna output through an adjustable pi-network.

In CW operation the carrier oscillator is shifted to 8999.45 KHz for carrier insertion into the filter bandpass and the 6EJ7 is grid-block keyed.

4.2 GENERAL CIRCUIT ANALYSIS FOR RECEIVING:

Again referring to Figure 9 and Figure 16, the incoming signal is switched through the antenna relay, then coupled into the 12DZ6 amplifier stage. The output of this stage is coupled to the 6HG8 receiving mixer tube. Signal from the VFO in the range of 5.0-5.5 MHz for 80-20 meter operation is coupled to the 6HG8 mixer tube; or in the range of 16.0-16.5 MHz for 40, 30.0-30.5 MHz for 15 and 37.0-38.0 for 10 meter operation.

The output of the 6HG8 is coupled to the 9 MHz crystal filter, with the bandpass of this filter determining selectivity. The output of the filter is coupled to the 6EW6 IF amplifier; it is then coupled to the 12BA6 second IF amplifier and then to the 6GX6 product detector tube.

6GX6 is low-level audio, and this output is coupled to the AVC rectifier and audio amplifier. An AVC rectifiers negative DC output voltage is coupled to the first RF stage and the first and second IF amplifier stages, controlling the gain of these stages. The audio from the 6GX8 is amplified by a couple of amplifier stages. The output from the last driver operates a complimentary pair of transistors which delivers audio to the speaker.

NOTE:

This transceiver was designed for optimum performance using an 8 ohm PM type speaker. A 3 or 4 ohm speaker can be used, but distortion will be very noticeable at high volume levels. Placing a resistor of about 4 ohms in series with the 3 or 4 ohm speaker will minimize distortion but will also result in a loss in volume.

4.3 VOX CIRCUIT ANALYSIS:

VOX (voice operated control) is an optional plug-in unit as shown by the dotted lines on the block diagram in Figure 9.

A portion of the audio is taken from the second microphone amplifier and coupled to the first VOX amplifier stage which drives the second VOX amplifier. When the input reaches the zener diode reference level, this pre-set level through a pair of transistors "triggers" the relay amplifier. This "trigger" circuit is much more positive in action than the usual VOX circuitry and will minimize "chattering".

When operating CW, the keying circuit operates the sidetone oscillator and it injects a strong audio signal to operate the VOX for "break-in" action. When using the VOX for CW you will find operation better if the VOX gain is set HIGHER and the ANTI-VOX gain set LOWER than when using voice operation.

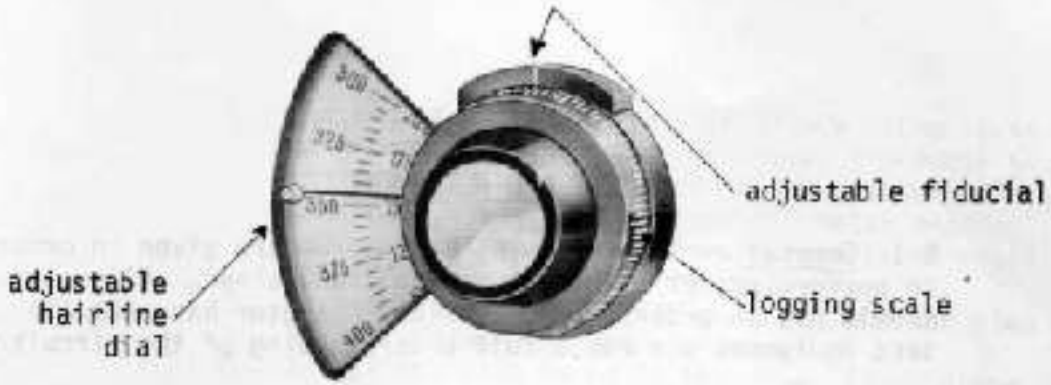
The ANTI-VOX circuitry can reject unwanted signals only to a degree, and excess audio from the speaker may cause the vox unit to cycle on and off. The three proper steps to stop this are --

1 - Reduce speaker volume
2 - Increase ANTI-VOX
3 - Decrease VOX gain

Remember keeping the microphone further from the speaker has the same result as the lowering of the audio level.

4.4 VFO TUNING DIAL

The VFO dial is a two color illuminated dial with adjustable hairline fiducial. It has a two speed vernier reduction system of 12 to 1 which allows for fast tuning and 72 to 1 which allows slow precise tuning. The dial has logging calibration on the tuning knob with adjustable fiducial for high resettability. Primary calibration of 5 KHz markers with 100 logging scale divisions each revolution of the knob. Figure 10 shows an illustration of the VFO dial.



VFO TUNING DIAL

Figure 10

SECTION 5

TEST AND ALIGNMENT

5.1 General -- The following procedures are given in order to perform proper alignment of the transceiver. Alignment should not be undertaken unless the operator has adequate test equipment and has a full understanding of the circuitry.

CAUTION!

HIGH VOLTAGES EXIST AT EXPOSED COMPONENTS WHEN THE TRANSCEIVER IS OUT OF THE CABINET. USE EXTREME CAUTION AS VOLTAGES ARE DANGEROUS TO LIFE!

5.2 Test Equipment Required -- The following test equipment is recommended for use during the alignment procedures spelled out in this section.

1 - Calibrated RF Signal Generator
2 - Crystal Calibrator (100 KHz)
3 - 1000 Watt Dummy Load with output meter
4 - Output Indicator, such as an oscilloscope
5 - Calibrated Audio Generator
6 - Calibrated VTVM with RF probe
7 - Set of alignment tools

5.3 ALIGNMENT:

5.3.1 IF Amplifier Alignment -- Proceed with the following steps:

1 - Remove the VOX or jumper board from J9, this will prevent the unit from being placed in the transmit condition accidentally.
2 - Set the controls as follows:
   - RF GAIN fully clockwise
   - FUNCTION switch in the PTT position
   - LOAD control at a 10 o/clock position
   - PLATE control at a 12 o'clock position
   - BANDSWITCH to the 40 meter band 7.0-7.5 MHz)
3 - Connect the RF Signal Generator to the antenna jack.
4 - Set the Galaxy VOLUME control 1/2 open and allow 5 minutes for the receiver to warm-up fully.
5 - Adjust the R2 potentiometer (Figure 12) for a ZERO "S" Meter reading.

6 - Set the Signal Generator for 10,000 micro-volts output at 9.0 MHz then vary the generator frequency slightly until a beat note is heard in the speaker. Adjust the PLATE tuning for maximum "S" Meter reading. Adjust the signal generators output level until the "S" Meter reads approximately S6.
7 - Adjust the slug in L13 (Figure 12) and the slug in T1 for maximum "S" Meter reading.
8 - Adjust the slug in L1 (9 MHz trap) for minimum "S" Meter reading.
9 - This completes the IF Amplifier Alignment.

5.3.2 VFO ALIGNMENT -- Proceed with the following steps:

1 - Set the controls as follows:
- RF Gain control fully clockwise.
- FUNCTION switch to the CAL (If you do not have a calibrator, use an external source, but the accuracy of alignment depends on the accuracy of the reference)
- Set the BANDSWITCH to 80 meter band (3.5-4.0 MHz)
- Set EXCITER Tuning control to the 10 o'clock position
- Set SIDEBAND selector to SB1 position
- Set hairline (Plastic face over VFO dial) to center

2 - Adjust main tuning dial slightly to find 4.0 MHz signal
3 - Adjust L19 and main tuning dial until ZERO beat note and a calibrator signal occur at 4.0 MHz on the dial.
4 - Set the main tuning to 3.5 MHz (Ø on red scale)
5 - Adjust C5 and main tuning until zero beat note and calibrator signal occur at 3.5 MHz.
6 - Repeat steps 2 thru 5 until tuning dial is at exactly Ø and 4.0 MHz, respectively.

5.3.3 CONVERTER Alignment -- For aligning the converter first make up the special test fixture as shown in figure 11 below. You will need a .001 mfd ceramic capacitor connected in series with a 330 ohm 1/2 watt resistor with miniature clips on each end.

CONVERTER ALIGNMENT TEST FIXTURE

Figure 11

Proceed with the alignment as follows, using the illustration in Figure 13 as a guide to location of the alignment points. Make sure the transceiver is turned OFF while connecting or disconnecting the test fixture. Do the alignment in three distinct adjustments -- for example do the alignment steps 1 thru 10 using the information in column #1, then steps 1 thru 10 using the information in column #2 and finally the steps 1 thru 11 using the information in column #3.

	Column #1	Column #2	Column #3
1 - Set BANDSWITCH to.....	7.0-7.5 MHz	21.0-21.5 MHz	28.0-28.5 MHz
2 - Set VFO dial to.....	7.25 MHz	21.250 MHz	28.5 MHz
3 - Set Signal Generator to..	7.25 MHz	21.250 MHz	28.5 MHz

4 - Adjust the following for maximum "S" Meter readings: coils L14 (top slug), L15 (middle slug), L16 (bottom slug)

5 - Connect the test fixture (Figure 11) from chassis ground to the lug mentioned in each step.

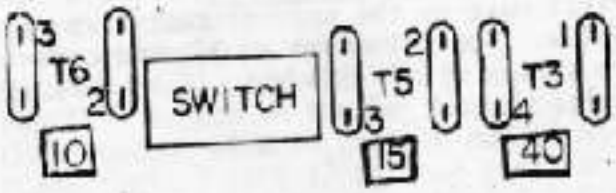
6 - Remember to turn off the set (transceiver) each time you change the test fixture.

7 - Adjust the bottom slug of T3-test fixture on lug 4
T5-test fixture on lug 3
T6-test fixture on lug 3

8 - Repeat steps 5 & 6 for the following adjustments:

9 - Adjust the top slug of T3-test fixture on lug 1
T5-test fixture on lug 2
T6-test fixture on lug 2

10 - Repeat steps 5 thru 10 again for a more exact alignment.



CONVERTER ALIGNMENT IDENTIFICATION

Figure 13

5.3.4 EXCITER ALIGNMENT -- Attach a suitable DUMMY LOAD to the antenna jack and also a suitable RF output indicator device across the load. Replace the VOX or VOX jumper board removed for the converter alignment.

80 METERS -- Set controls as follows:
- BANDSWITCH to 3.5-4.0 MHz
- SIDEBAND switch to SB2
- PLATE tuning to 2 o'clock position
- LOAD control to 10 o'clock position
- MIC Gain maximum counter-clockwise
- VFO dial to 4.0 MHz (500 on RED SCALe)
- EXCITER control to 9 o'clock position
- FUNCTION switch to TUNE

Advance the MIC Gain Control until the meter rises to "S-5".
Adjust L2 and L7 (bottom slugs) for maximum meter reading. Use the MIC Gain Control to keep the "S" meter reading under S-5. Return FUNCTION SWITCH TO PTT.

40 METERS -- Set controls as follows:
- BANDSWITCH to 7.0-7.5 MHz
- PLATE tuning to 12 o'clock
- LOAD control to 10 o'clock
- MIC Gain Control maximum counter-clockwise
- VFO dial to 7.5 MHz. (500 on RED SCALE)
- EXCITER tuning to 9 o'clock
- FUNCTION switch to TUNE
- Advance the MIC Gain Control until the "S" Meter rises to S-5.
- Adjust L3 and L8 (top slugs) for maximum meter reading. Use the MIC Gain Control to keep the meter reading below S-5.
- Return the FUNCTION switch to PTT.

10 METERS -- Set controls as follows:
- BANDSWITCH to 28.0-28.5 MHz
- PLATE control to 10 o'clock
- LOAD control to 11 o'clock
- MIC Gain Control maximum counter-clockwise
- VFO dial to 28.0 MHz
- EXCITER tuning to 3 o'clock
- FUNCTION switch to TUNE.
- Advance MIC Gain Control until meter reads S-5
- Adjust L6 and L1 (bottom slugs) for maximum meter reading, keeping meter below S-5 using the MIC Gain Control
- Return the FUNCTION switch to PTT.

15 METERS -- Set controls as follows:
- BANDSWITCH to 21.0-21.5 MHz
- PLATE tuning to 10 o'clock
- LOAD control to 11 o'clock
- MIC Gain Control maximum counter-clockwise
- VFO dial to 21.0 MHz (0 on RED SCALE)
- EXCITER tuning to 3 o'clock
- FUNCTION switch to TUNE
-Advance MIC Gain Control until S Meter reads S-5
- Adjust L5 and L10 (middle slugs) for maximum meter reading using the MIC Gain Control to keep meter reading under S-5.
- Return FUNCTION switch to PTT

20 METERS -- Set controls as follows:
- BANDSWITCH to 14.0-14.5 MHz
- PLATE tuning to 11 o'clock
- LOAD control to 11 o'clock
- MIC Gain Control maximum counter-clockwise
- VFO dial to 14.0 MHz (0 on BLUE SCALE)
- EXCITER tuning to 3 o'clock
- FUNCTION switch to TUNE
- Advance MIC Gain Control until meter rises to S-5
- Adjust L4 and L9 (top slugs) for maximum meter reading, keeping meter below S-5 with MIC Gain Control.
- Return FUNCTION switch to PTT.

5.3.5 CARRIER SUPPRESSION ADJUSTMENT:

1 - Attach an RF output indicator and DUMMY LOAD
2 - Set BANDSWITCH to 7.0-7.5 MHz. Set VFO anywhere.
3 - Tune-up transmitter normally (See paragraph 3.7.1) then place FUNCTION switch to PTT and MIC Gain Control to Maximum counter-clockwise
4 - Close microphone PTT switch.
5 - Adjust output indicator for good indication.
6 - Observe power output level on indicator used.
7 - Adjust C7 and R1 for minimum power output. These two adjustments interact and should be repeated several times.
8 - Set SIDEBAND selector switch to opposite side and observe carrier remaining, if any. If any remains, C7 and R1 may have to be re-set for a compromise to obtain best suppression on both sidebands.

5.3.6 CARRIER CRYSTAL ALIGNMENT:

1 - Set-up the same paragraph 5.3.5, steps 1 thru 3, then select SB1.
2.- Connect an accurately calibrated audio signal generator to the microphone jack. Also, connect a SPST toggle switch to the PTT circuit front or rear jacks.
3 - Set the audio generator to 1000 Hz with .02 volts output
4 - Close the PTT circuit with the toggle switch and adjust the MIC Gain for a meter reading of S-9.
5 - Observe the exact reading of the output indicators used
6 - Change the audio generator to exactly 350 Hz and, if necessary, adjust C9 until the output indicator shows exactly 1/2 the reading it did before. Open the PTT switch.
7 - Switch to SB2, then repeat steps 3,4 and 5.
8 - Change the generator to exactly 350 Hz and, if necessary, adjust C8 until the output indicator shows exactly 1/2 the output it did before.
9 - Open the PTT. Disconnect the generator and PTT toggle and connect the microphone as usually done.
10 - Repeat the Carrier Adjustment, paragraph 5.3.5 completely.

5.3.7 FINAL AMPLIFIER NEUTRALIZATION:

1 - Set the BANDSWITCH to the 28.0-28.5 MHz range.
2 - Set the VFO dial to 28.5 MHz (500 on RED SCALE)
3 - Do a normal tune-up as given in paragraph3.7.1, then set the FUNCTION switch to CW and close the PTT Switch.
4 - Rock the PLATE tuning slightly to either side and observe if the maximum power output on the indicator occurs exactly at the "DIP", or minimum plate current on the meter. If this does not occur, adjust C13 slightly until the "DIP" and maximum power output occur together.
5 - Open the PTT circuit and set the FUNCTION switch to PTT position.

5.3.8 VFO SIDEBAND SHIFT ADJUSTMENT:

1 - BANDSWITCH to 3.5-4.0 MHz
2 - VFO to 3.8 MHz
3 - RF Gain Control maximum clockwise
4 - Audio level and other functions for receiving on SB1.
5 - Turn on the CAL position, or inject an external source of strong, unmodulated, stable signal for EXACT zero beat.
6 - Switch to SB2 and adjust C4 for exact zero beat again.

5.4 TROUBLE SHOOTING CHART

SYMPTOM	PROBABLE CAUSE
GALAXY V Mk III will not energize (no dial lights or filaments)	1-Power supply NOT PLUGGED INTO 117 VAC 2-POWER CABLE between power supply and the transceiver not securely in place. 3-Fuse in power supply blown.
NO BACKGROUND NOISE (receive audio)	1-Speaker not plugged in 2-CW Filter Jumper cut and jacks not jumpered 3-Unit in the transmit mode 4-Audio Gain fully counter-clockwise
BACKGROUND NOISE but No signals being heard	1-Antenna not attached to the transceiver. Check to make sure it is securely connected. 2-Antenna is presenting a mismatch 3-Q1 open and no 12 VDC to the oscillator circuits, check V1, V4, V2, V5 and V6 4-Remote VFO jumper plug not plugged into J1.
Transceiver performs normally on 80 and 20 meters but dead on 40/15/10 meters	1-Check V6 and Q3
Unit performs normally on all bands but.....	40, Check X1 15, Check X2 28.0-28.5, check X3 28.5-29.0, check X4
Receive is normal but will not TRANSMIT	1 - keying line open at J3, check all cathodes in the transmit string to be sure they are being grounded. Check tubes, V3, V5, V6, V7, V8, V9, V10 and V11.

No Modulation but transceiver TUNES normally.	1-CW key plugged into rear of unit (J3) and is not being shorted for SSB operation. 2-Q9, Q10, or C120, C123, C126, C127
Carrier on SSB Signal	1-V7 is bad replace and USE AMPEREX ONLY. 2-R1 and C7 needs adjustment see para 5.3.5
No Sidetone	1-Check Q11, D9 and D10
Receive Sensitivity is LOW	1-Check V1 and V4
Transmit Drive is LOW	1-Check V3, V6, V8 and V9
Drive is ample, but unable to load to the TUNE mark	1 - V10, V11 soft and require replacement (USE GE SELECTED TUBES ONLY) These tubes are available from Galaxy only! 2 - Possible antenna impedance problems see paragraph 2.2.
FM-ing while MOBILE and drifts when engine speeded up	1-Voltage regulator in car not set high enough -- set to 13.5 VDC.

SECTION 6

SPECIFICATIONS

SPECIFICATIONS

FREQUENCY COVERAGE: 3.5-4.0, 7.0-7.5, 14.0-14.5, 21.0-21.5, 28.0-29.0* mHz (*optional crystals for other 1 mHz ranges), plus MARS-SPECIAL coverage of 3.3-3.5, 4.0-4.85 mHz using optional RA2 Remote VFO and Retuning.

SOLID STATE VFO: Tunes 5.0-5.5 mHz at all times, without any switching for best stability, and doubly temperature compensated and voltage regulated.

GENERATION SCHEME: 5.0-5.5 mHz VFO mixed with 9 mHz filter oscillator for 80 and 20 metre operation using sum-difference selection. 40-15-10 meter operation by pre-mixing VFO with correct crystal controlled oscillator, then into 9 mHz I.F. system.

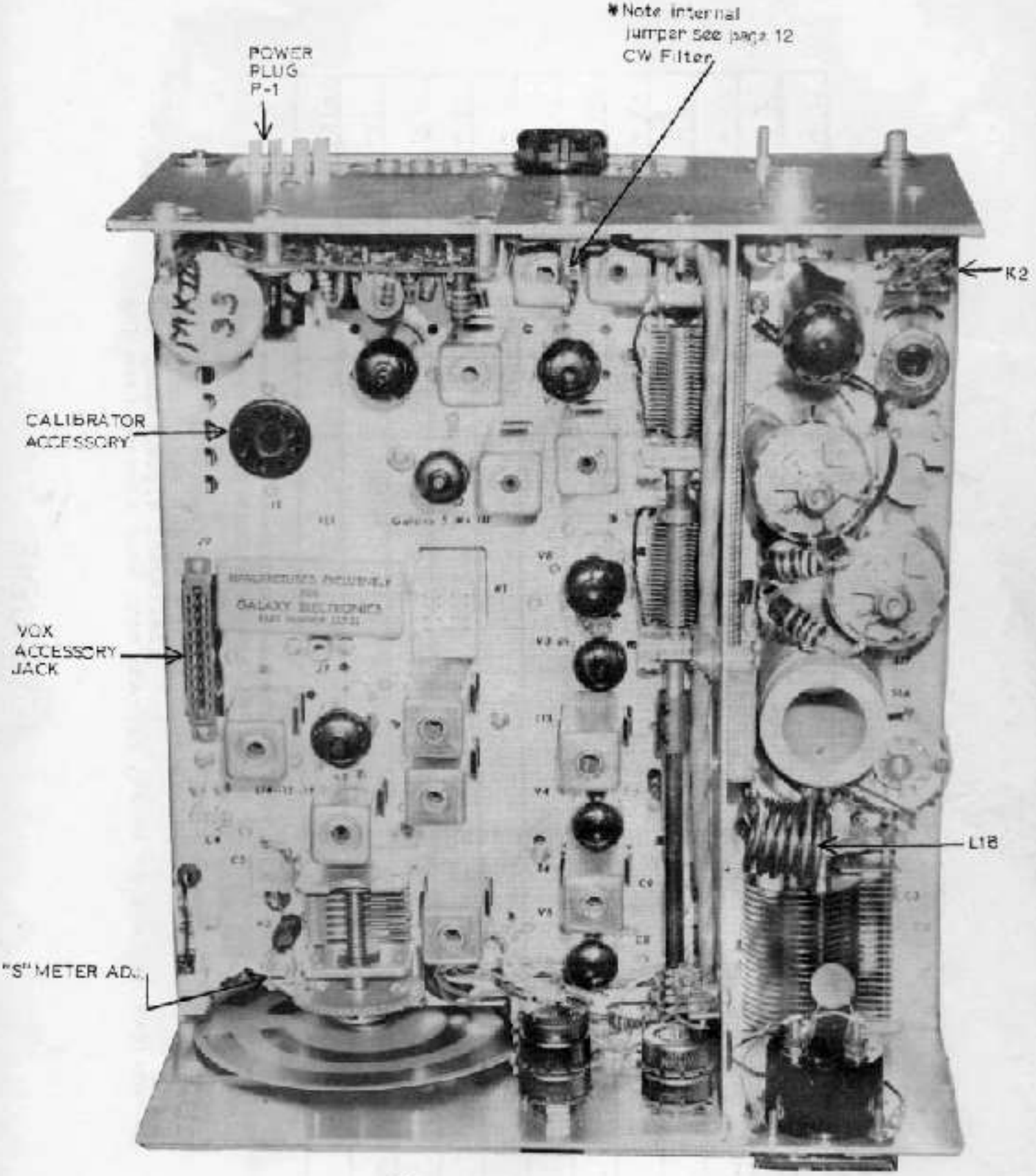
TUNING: Illuminated, two color dial scale system with adjustable hairline fiducial. Two speed vernier reduction system of 12:1 allows fast tuning and 72:1 slow-precise tuning. Also includes new, precise dial logging calibration on tuning knob with adjustable hairline fiducial for high resettability resolution. Primary calibration 5 kHz markers with 100 logging scale divisions each revolution of knob. Over 8 linear inches of dial calibration.

STABILITY: New solid-state VFO circuit has double temperature compensation and double voltage regulation for utmost stability. Drift is less than 100 Hz in any 15 minute period after nominal warm-up; less than 100 Hz change for 10% change of primary voltage on our power supplies.

CONTROLS: (1) Main VFO dial—illuminated (2) A.F. gain (3) R.F. gain (4) Mic. gain (5) Exciter tuning (6) P.A. plate tuning (7) Bandswitch (8) Load control (9) Sideband selector (10) Function selector—PTT, VOX, CAL, TUNE, CW. Rear: Final bias set. Inside: "S" meter zero, VOX (if accessory installed) Gain, Anti-VOX, Delay.

TRANSMITTER: SSB 500 watts; CW 475 watts; Manual keying for SSB or CW, and also automatic "break-in" keying with VOX accessory on phone or CW. Generating audio sidetone into speaker at all times in TUNE or CW functions; Selectible sideband operation with illuminated USB-LSB indicators showing SB in use; Shifted carrier CW operation to minimize "leap-frogging"; Shaped grid-block keying on CW to suppress clix and chirps; Carrier suppression of 45 DB or more without frequent re-adjustment; Unwanted sideband suppression of 55 DB without frequent re-adjustment; Bandpass of 2.1 kHz nominal with 1.8:1 shape factor, and nominal response of -6 DB at 300 and 2400 Hz; A.L.C. control for maximum "talk-power" without "flat-topping". TUNE position for reduced power adjustment and longest tube life; High impedance microphone circuit (microphones should have -50 to -60 DB output for best results) with P.T.T. control. Adjustable Pi-network output matching nominal 50 Ohms and 40-100 Ohm resistive range; Compact size 6" high, 10¼" wide, 11½" deep and 13 lbs. net weight.

RECEIVER: Coverage same as transmitting; preselection coupled with exciter tuning control and does not require separate adjustment; Sensitivity better than ½ uv for 10 DB S+N/N; Selectivity nominal 2.1 kHz with internal 6 crystal lattice filter (or may be reduced to nominal 300 Hz with optional filter—peaked at nominal 800 Hz). Full AGC on received signals with fast attack, slow release, and less than 6 DB output change for 50 DB input variation, using audio derived system; Nominal antenna input impedance of 50 Ohms; Audio response -6 DB at 300 and 2400 Hz points; Audio output impedance 8 Ohms; Audio power output 1 watt nominal.



Chassis Top View

FIGURE 12

Pins	1	2	3	4	5	6	7	8	9	10	11	12
V1 - 12BZ6	3.3m	47	0	.6	60k	45k	0	-	-	-	-	-
V2 - 6HG8	150	100k	150	.6	.4	100k	110k	60k	110k	-	-	-
V3 - 6EW6	3.3m	47	.6	.4	55k	100k	0	-	-	-	-	-
V4 - 12BA6	3.3m	0	.4	0	60k	45k	100	-	-	-	-	-
V5 - 6GX6	2.2m	1k	.4	0	280k	110k	22k	-	-	-	-	-
V6 - 6KB8	65k	10k	150k	.4	0	65k	100	470	100	-	-	-
V7 - 12AT7	30k	130k	inf.	.4	0	30k	0	inf.	4	-	-	-
V8 - 6EJ7	inf.	330k	inf.	0	.4	0	60k	100k	0	-	-	-
V9 - 6CK6	inf.	22k	0	.4	.6	inf.	60k	100k	0	-	-	-
V10- 6LB6	0	.5	23k	0	7.8k	0	0	0	7.8k	0	23k	0
V11- 6LB6	0	.5	23k	0	7.8k	0	0	0	7.8k	0	23k	0
V12- OA2	30k	0	inf.	0	30k	inf.	0	-	-	-	-	-

All resistance readings taken with power dis-connected.
Readings taken with VTVM with at least 11 megaohms input resistance.
Galaxy V Mark 3's controls as follows: RF Gain maximum clockwise
AF Gain mid-range, 40 meters, 7.2 MHz and function switch in PTT position. VOX and CALIBRATOR accessories are removed and the VOX jumper strip installed.
All measurements made from chassis ground to the pin designated.

FIGURE 14

Pins	1	2	3	4	5	6	7	8	9	10	11	12
V1 - 12BZ6	-0.5	0.5	-	-	300	100	0	-	-	-	-	-
	0	83	-	-	275	210	-	-	-	-	-	-
V2 - 6HG8	0.9	-0.1	1	-	-	-0.8	45	300	45	-	-	-
	83	-95	83	-	-	0	0	0	0	-	-	-
V3 - 6EW6	-0.4	0.6	-	-	285	175	0	-	-	-	-	-
	-0.4	0.6	-	-	285	175	0	-	-	-	-	-
V4 - 12BA6	-0.4	0	-	-	300	110	1.2	-	-	-	-	-
	0	0	-	-	300	210	83	-	-	-	-	-
V5 - 6GX6	-0.45	4	#6.3	-	100	150	0	-	-	-	-	-
	-0.45	3.5	-	-	115	150	0	-	-	-	-	-
V6 - 6KE8	200	-0.8	115	-	-	150	0.9	5	-	-	-	-
	180	-0.9	105	-	-	145	0.8	5	-	-	-	-
V7 - 12AT7	-0.1	0	75	-	-	-0.1	0	75	0	-	-	-
	180	0	3.5	-	-	180	0	3.5	0	-	-	-
V8 - 6EJ7	70	0	70	-	-	0	300	300	0	-	-	-
	3	0	3	-	-	0	280	170	0	-	-	-
V9 - 6GK6	75	0	0	-	-	0	365	365	-	-	-	-
	5	0	0	-	-	0	355	235	-	-	-	-
V10- 6LB6	-	0	0	0	-62*	0	0	0	-62*	0	0	-
	-	.015	180	0	-62*	0	0	0	-62*	0	180	-
V11- 6LB6	-	0	0	0	-62*	0	0	0	-62*	0	0	-
	-	.015	180	0	-62*	0	0	0	-62*	0	180	-
V12- 3A2	0	-	-	-	0	-	0	-	-	-	-	-
	180	-	-	-	180	-	32	-	-	-	-	-

\# Indicates reading taken on AC volt scale
* Indicates reading varies with the bias setting potentiometer and must be properly set by the operator to be correct.
All readings taken with a VTVM, the Galaxy V Mark 3 is set in the following manner -- 40 meters, 7.2 MHz, PTT function, RF Gain control maximum clockwise, the AF gain control mid-range.

Top line readings are taken in the RECEIVE mode.
Bottom line readings are taken in the TRANSMIT mode (PTT circuit closed)

FIGURE 15

TRANSISTOR	EMITTER	BASE	COLLECTOR
Q1	15	15	11
Q2	4.4	5.0	15
Q3	.55	.6	11
Q4	3.3	3.6	15
Q5	11	15	16
Q6	16	11	10.8
Q7	10.8	10.6	0
Q8	-13.5	-13.4	-0.3
Q9	1.7	2.4	8.8
Q10	11.7	12.2	25
Q11**	-10.2	-3.7	-17
Q12	1.4	2	6
Q13	.13	0.6	3
Q14	3.5	3	0
Q15	1.3	2	11
Q16	26.5	26.5	28

** Reading taken in the TRANSMIT mode same as Voltage readings. All other readings taken in RECEIVE mode on 40 meters, 7.2 MHz with RF Gain maximum clockwise, AF Gain Mid-Range and MIC Gain full counter-clockwise. Use a good VTVM with at least 11 megaohms input resistance.

FIGURE 16

SECTION 7

PARTS LIST

All parts shown are subject to change of specifications or price without advance notice. Prices shown are for a single part, and shipping costs are additional.

7.1.. RESISTORS:

All resistors are 1/2 watt, 10%, unless noted.

SYMBOL	DESCRIPTION	GALAXY #	PRICE EA.
R1	2.5k pot	13-07	$1.43
R2	50k pot	13-08	1.70
R3	2.5k 10 w	16-11	
R4	4.7k 1 W	10-35A	.25
R5	2.2k	10-31	.20
R6	27K 1 W	10-49A	.25
R7	33k 2W 5%	10-71B	.55
R8	100 1 W	10-65A	.25
R9	1 ohm 1 W	11-32	
R10	1 ohm 1W	11-32	
R13	100 1 W	10-65A	.25
R14	270 ohm 1/2 W 5%	10-30	
R15	68k 1 W	10-68A	.25
R16	47k 2 W	10-52B	.30
R17	100 1 W	10-65A	.25
R18	22k	10-06	.20
R19	10k	10-56	.20
R20	10k	10-56	.20
R21	10k	10-56	.20
R22	100k	10-32	.20
R23	6.8k	10-15	.20
R24	270	10-68	.20
R25	39k 2W	10-68B	.30
R26	270k	10-12	.20
R27	1.5k 1 W	10-21A	.25
R28	6.8k	10-15	.20
R29	1k	10-42	.20
R30	1k	10-42	.20
R31	6.8k	10-15	.20

SYMBOL	DESCRIPTION	GALAXY #	PRICE EA.
R32	100, 5%	10-19	$ .30
R33	7.5k pot	13-12	1.05
R34	1.5k, 5%	10-20	.30
R35	6.8k	10-21	.30
R36	470	10-53	.20
R37	100 k	10-32	.20
R38	1.8k	10-17	.20
R39	6.8k	10-15	.20
R40	33k	10-65	.20
R41	330	10-28	.20
R42	330	10-28	.20
R43	5.6k	10-83	.20
R44	1k	10-42	.20
R45	2.2k	10-31	.20
R46	33k	10-65	.20
R47	12k	10-84	.20
R48	10k 3 W	11-1B	1.85
R49	470	10-53	.20
R50	100	10-07	.20
R51	22k 2W	10-41B	.30
R52	10k	10-56	.20
R53	100	10-7	.20
R54	100k	10-32	.20
R55	4.7k	10-36	.20
R56	470	10-53	.20
R57	47	10-29	.20
R58	330	10-28	.20
R59	1.5k	10-03	.20
R60	2.2k	10-31	.20
R61	1.2k	10-73	.20
R62	10k pot(incl. R110)	13-31	2.10
R63	330k	10-69	.20
R64	330k	10-69	.20
R65	10k	10-56	.20
R66	800 10W	11-3D	.45
R67	10k P. C. B. pot	13-23	.77
R68	47k	10-13	.20
R69	68k	10-33	.20
R70	100k	10-32	.20
R71	68k 2 W	10-63B	.30

SYMBOL	DESCRIPTION	GALAXY #	PRICE EA.
R72	1k	10-42	.20
R73	2.2m	10-02	.20
R74	220k	10-04	.20
R75	47k 1 W	10-46A	.20
R76	47k	10-13	.20
R77	1 m	10-10	.20
R78	1 k	10-42	.20
R79	100	10-07	.20
R80	100k	10-32	.20
R81	1k	10-42	.20
R82	47k	10-13	.20
R83	47	10-29	.20
R84	220	10-58	.20
R85	100k	10-32	.20
R86	47 k 2 W	10-52B	.30
R87	27k 2 W	10-60B	.30
R88	150	10-43	.20
R89	100k	10-32	.20
R90	220 1 W	10-67A	.25
R91	6.8k	10-15	.20
R92	100k	10-32	.20
R93	10k	10-56	.20
R94	10k	10-56	.20
R95	47	10-29	.20
R96	47k	10-13	.20
R97	3.3m	10-57	.20
R98	220k	10-04	.20
R99	15k 1 W	10-20A	.25
R100	1.5k	10-03	.20
R101	47	10-29	.20
R102	10k	1056	.20
R103	10k	10-56	.20
R104	220k	10-04	.20
R105	1.5k	10-03	.20
R106	270k	10-12	.20
R107	1.5m	10-89	.20
R108	1.5m	10-89	.20
R109	10k	10-56	.20
R110	100k(part of R62)	see R62	
R111	10k	10-56	.20
R112	270k	10-12	.20

SYMBOL	DESCRIPTION	GALAXY #	PRICE EA
R113	3.3k	10-59	.20
R114	560	10-67	.20
R115	10k	10-56	.20
R116	100k	10-32	.20
R117	1.5k	10-03	.20
R118	1.5k	10-03	.20
R119	1k	10-42	.20
R120	15k	10-81	.20
R121	10k	10-56	.20
R122	10k pot(incl. R127/S4)	13-18	2.83
R123	1k	10-42	.20
R124	47k	10-13	.20
R125	33k	10-65	.20
R126	4.7m	10-70	.20
R127	50k pot(incl. R122/S4)	See R122	
R128	560k	10-91	.20
R129	1.5k	10-03	.20
R130	10k	10-56	.20
R131	15k	10-81	.20
R132	39k	10-92	.20
R133	1.5k	10-03	.20
R134	1k	10-42	.20
R135	2.7k	10-66	.20
R136	82	10-87	.20
R137	1 1W	10-91A	.25
R138	1 1W	10-91A	.25
R139	1k	10-42	.20
R140	100	10-07	.20
R141	15k	10-81	.20
R142	100k	10-32	.20
R143	470k	10-11	.20
R144	not used		
R145	47	10-29	.20
R146	10 1W 5%	10-71A	.30
R147	47	10-29	.20
R148	Thermistor, spec.	210-3	.90

7.2 CAPACITORS:

All capacitors are ceramic at 600VDC rating, unless otherwise noted. Those marked DSM are dipped silver mica at 500VDC rating. Those marked NPO, N750, TC are temperature compensating types at 500 VDC. The variable types are normally special and field replacement is not normally practical and replacements should be obtained from us. All types that are over 1 mfd are electrolytic capacitors. All decimal listings are in mfd. Others are mmfd, unless noted otherwise.

SYMBOL	DESCRIPTION	GALAXY #	PRICE EA.
C1	.001	20-24	$ .15
C2	.01	20-05	.15
C3	plate tuning	25-15	2.58
C4	5/25 trimmer	26-06	1.35
C5	13 vfo tracking	25-24	2.65
C6	33 DSM	22-07	.30
C7	5/25 trimmer	26-06	1.35
C8	5/25 trimmer	26-06	1.35
C9	5/25 trimmer	26-06	1.35
C10	10 1kv	20-27	1.78
C11	variable	25-21A	4.76
C12	variable	25-21B	4.50
C13	variable	25-11A	2.80
C14A/B.C	LOAD variable	25-10	4.37
C15	.005	20-03	.15
C16	.01 1.6kv	20-29	.35
C17	.01	20-05	.15
C18	.1 200VDC paper	23-07	.46
C19	.005	20-03	.15
C20	.001	20-24	.15
C21	.003mfd	20-2	
C22	.003 mfd	20-2	
C23	.001	20-24	.15
C28	.001	20-24	.15
C29	.001	20-24	.15
C32	.005	20-03	.15
C33	100 DSM	22-21	.30
C34	33 DSM	22-07	.30
C35	18 DSM	22-24	.30
C36	.001 5 Kv mica	22-18	4.25

SYMBOL	DESCRIPTION	GALAXY #	PRICE EA.
C37	.005	20-03	.15
C38	10 1 Kv	20-27	.30
C39	.005	20-03	.15
C40	.005	20-03	.15
C41	18 DSM	22-24	.30
C42	33 DSM	22-07	.30
C43	100 DSM	22-21	.35
C44	.001	20-24	.15
C45	47 DSM	22-30	.35
C46	.002 DSM	22-27	.90
C47	.01	20-05	.15
C48	25	20-08	.15
C49	.005	20-03	.15
C50	.005	20-03	.15
C51	.01	20-05	.15
C52	100 DSM	22-21	.35
C53	560 DSM	22-36	.40
C54	150 DSM	22-26	.35
C55	.01	20-05	.15
C56	.01	20-05	.15
C57	.001 1Kv	20-24	.15
C58	.01	20-05	.15
C59	.01	20-05	.15
C60	.001 1 Kv	20-24	.15
C61	.001 DSM	22-19	.67
C62	.001 DSM	22-19	.67
C63	.01	20-05	.15
C64	.001 DSM	22-19	.67
C65	.1 50 v	20-38	.75
C66	6.8 (approx) TC	selected	.75
C67	68 NPO	20-67	.30
C68	15 N750	20-65	.45
C69	variable	25-17A	3.30
C70	330 N750	20-66	.91
C71	6.8 NPO	20-64	.75
C72	100	20-23	.20
C73	.001	20-24	.15
C74	.001	20-24	.15
C75	.001	20-24	.15
C76	82 DSM	22.48	.30
C77	20 DSM	22-22	.30
C78	150 DSM	22-26	.30
C79	.01	20-05	.15

C80	.01	20-05	.15
C81	.01	20-05	.15
C82	100 mfd	29-09	1.44
C83	100 DSM	22-21	.30
C84	.001	20-24	.15
C85	.01	20-05	.15
C86	.001	20-24	.15
C87	10 DSM	22-37	.30
C88	50 DSM	22-11	.30
C89	470	20-39	.30
C90	.001	20-24	.15
C91	50 DSM	22-11	.30
C92	50 DSM	22-11	.30
C93	.01	20-05	.15
C94	.01	20-05	.15
C95	.005	20-03	.15
C96	.001	20-24	.15
C97	470	20-39	.20
C98	.001	20-24	.15
C99	.01	20-05	.15
C100A/B	2X 40 @ 450VDC	24-21	2.69
C101	.005	20-03	.15
C102	4.7 1 kv	20-53	.25
C103	39 DSM	22-08	.30
C104	.01	20-05	.15
C105	100	20-23	.20
C106	.01	20-05	.15
C107	220 DSM 5%	22-23	.38
C108	50 DSM	22-11	.30
C109	.001	20-24	.15
C110	.005	20-03	.15
C111	.001	20-24	.15
C112	.001	20-24	.15
C113	.01	20-05	.15
C114	.001 mica feedthrough	22-28	4.88
C115	.01	20-05	.15
C116	.001	20-24	.15
C117	.47 100v	23-18	.85
C118	.1 50v	20-38	.75
C119	.01	20-05	.15
C120	.01	20-05	.15
C121	.1 50 v	20-38	.75

SYMBOL	DESCRIPTION	GALAXY #	PRICE EA.
C122	470	20-39	.20
C123	.01	20-05	.15
C124	2 mfd 50 v	29-12	.89
C125	.05 50v	20-57	.35
C126	.01	20-05	.15
C127	.01	20-05	.15
C128	.1 50 v	20-38	.75
C129	.01	20-05	.15
C130	.001	20-24	.15
C131	.001	20-24	.15
C132	500 1 Kv 10%	20-37	.30
C133	43 DSM	22-29	.30
C134	500 1 Kv 10%	20-37	.30
C135	62 DSM	22-09	.30
C136	.005	20-03	.15
C137	.1 50 v	20-38	.75
C138	.02 50 v	20-39	.30
C139	.22 100 v	23-17	.60
C140	.01	20-05	.15
C141	.01	20-05	.15
C142	10 mfd 15 v	29-14	.75
C143	100 mfd 15v	29-13	1.60
C144	.01	20-05	.15
C145	.22 100v	23-15	1.00
C146	.01	20-05	.15
C147	.01	20-05	.15
C148	.01	20-05	.15
C149	.01	20-05	.15
C150	.01	20-05	.15
C151	.01	20-05	.15
C 52	.01	20-05	.15
C153	.01	20-05	.15
C154	.01	20-05	.15
C155	.01	20-05	.15
C156	.01	20-05	15
C157	.01	20-05	.15
C158	.005	20-03	.15
C159	100 mfd 15v	29-09	1.45
C160	.01	20-05	.15
C161	180 DSM	22-52	.30

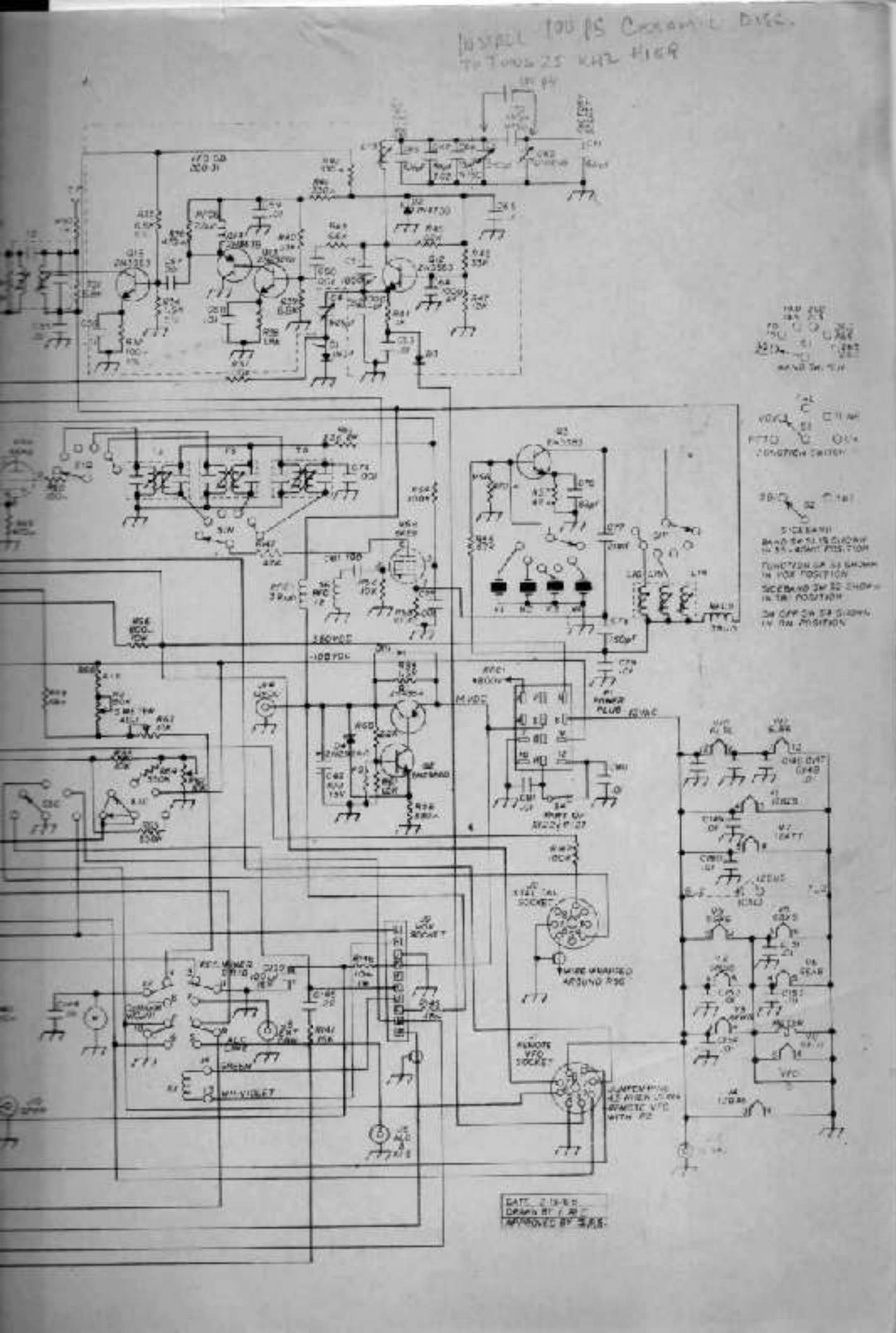
7.3 TUBES:

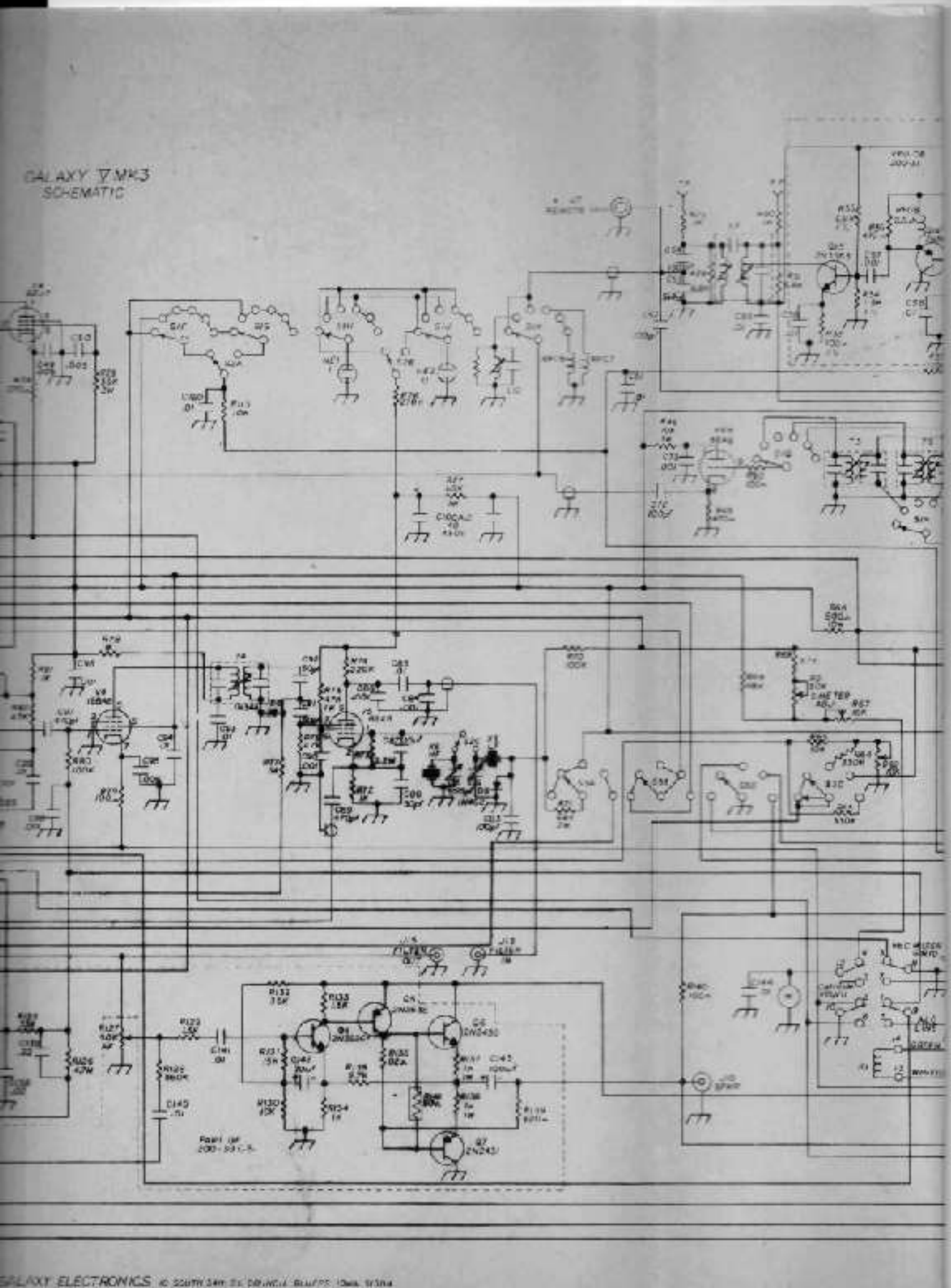
We recommend that the 6HF5 tubes used in this equipment be ordered from Galaxy in -- pairs only. Use only GE brand 6HF5 Tubes.

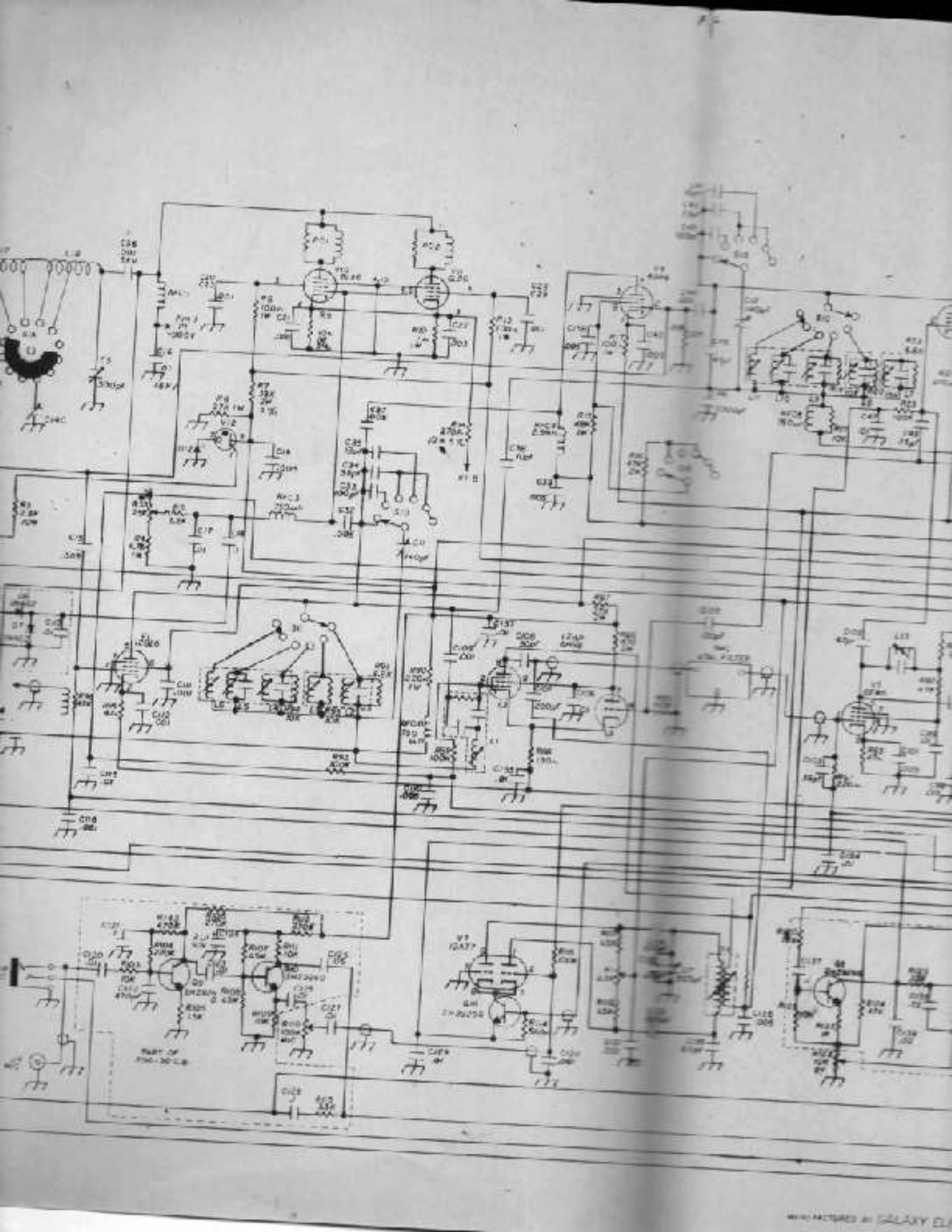
V1	12BZ6	110-12BZ6	2.10
V2	6HG8	110-6HG8	4.10
V3	6EW6	110-6EW6	2.35
V4	12BA6	110-12BA6	1.60
V5	6GX6	110-6GX6	2.60
V6	6KE8	110-6KE8	5.35
V7	12AT7	110-12AT7	2.85
V8	6EJ7	110-6EJ7	3.55
V9	6GK6	110-6GK6	3.00
	6LB6	110-6LB6	
	6LB6	110-6LB6	
V12	OA2	110-0A2	1.85
NE1	LSB light	113B9NE2EAL	.95
NE2	USB light	113-B9NE2UAL	.95
D1	1N34A	112-1N34A	.90
D2	1N4738 (8.2v zener)	112-1N4738	4.75
D3	501 (750 ma. 400 piv)	112-501	.75
D4	2N2926(o)	111-6(o)	.80
D5	501(750 ma 400 piv)	112-501	.75
D6	1N34A	112-1N34A	.90
D7	1N462	112-1N462	.85
D8	1N462	112-1N462	.85
D9	2N2926(a)	111-6(a)	.80
S1a	P.A. bandswitch	53-19	3.00
S1b	Converter bandswitch	53-29	2.85
S1c	Main bandswitch	53-18	2.24
S2	SB selector	53-13	1.78
S3	Function	53-28	4.85
S4	part of assembly		See R122
J1	Octal socket	61-07	.60
J2	Octal socket	61-07	.60
J3	Key jack	102-01	.85
J4/5/6	Triple phono jack	100-05	.35
J7	Phono jack	100-04	.10

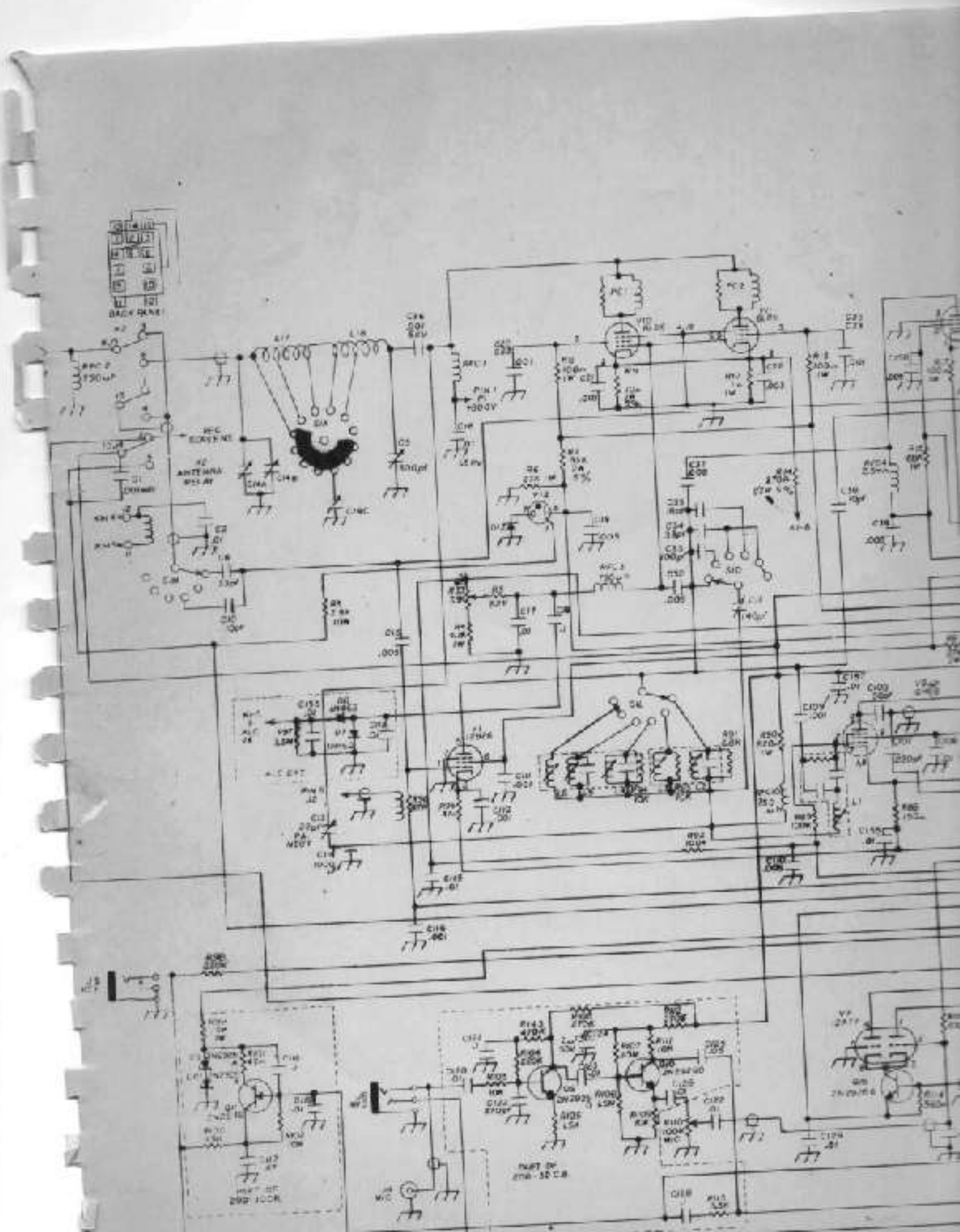
SYMBOL	DESCRIPTION	GALAXY #	PRICE EA
J8	Microphone jack	103-03	1.30
J9	VOX socket	61-17	3.80
J10	Phono jack	100-04	.10
J11	SO-239 coax jack	101-01	1.15
J12	Phono jack	100-04	.10
J13/14/15	Triple phono jack	100-05	.35
X1	21.5 mHz crystal	117-06	5.80
X2	35.5 mHz crystal	117-07	5.88
X3	42.5 mHz crystal	117-08	6.00
X4	43.0 mHz crystal	117-09	6.00
X5	LF carrier xtal	117-21A	5.44
X6	HF carrier xtal	117-21B	5.44
F	2.1 kHz filter	117-21	46.50
K1	Relay, 4PDT, 12VDC	116-15	8.88
K2	Relay, 3PDT, 12VDC	116-14	7.20
T1	9 mHz bal. mod.	73-08	1.73
T2	VFO output	76-10	3.02
T3	16-16.5 mHz	76-05	1.82
T4	9 mHz	73-06	1.46
T5	30-30.5 mHz	76.03	1.68
T6	37-38.5 mHz	76-04	1.68
L1	9 mHz trap	42-36	2.37
L2	80-40 coil	42-34	2.14
L3	80-40 coil	42-34	2.14
L4	20-10 coil	42-33	2.52
L5	20-10 coil	42-33	2.52
L6	20-10 coil	42-33	2.52
L7	80-40 coil	42-31	2.22
L8	80-40 coil	42-31	2.22
L9	20-10 coil	42-32	2.52
L10	20-10 coil	42-32	2.52
L11	20-10 coil	42-32	2.52
L12	40 trap coil	42-37	1.52
L13	9 mHz coil	42-27	1.52
L14	40-15-10 coil	42-35	2.13
L15	40-15-10 coil	42-35	2.13
L16	40-15-10 coil	42-35	2.13
L17	80-15 coil	42-25B	5.75

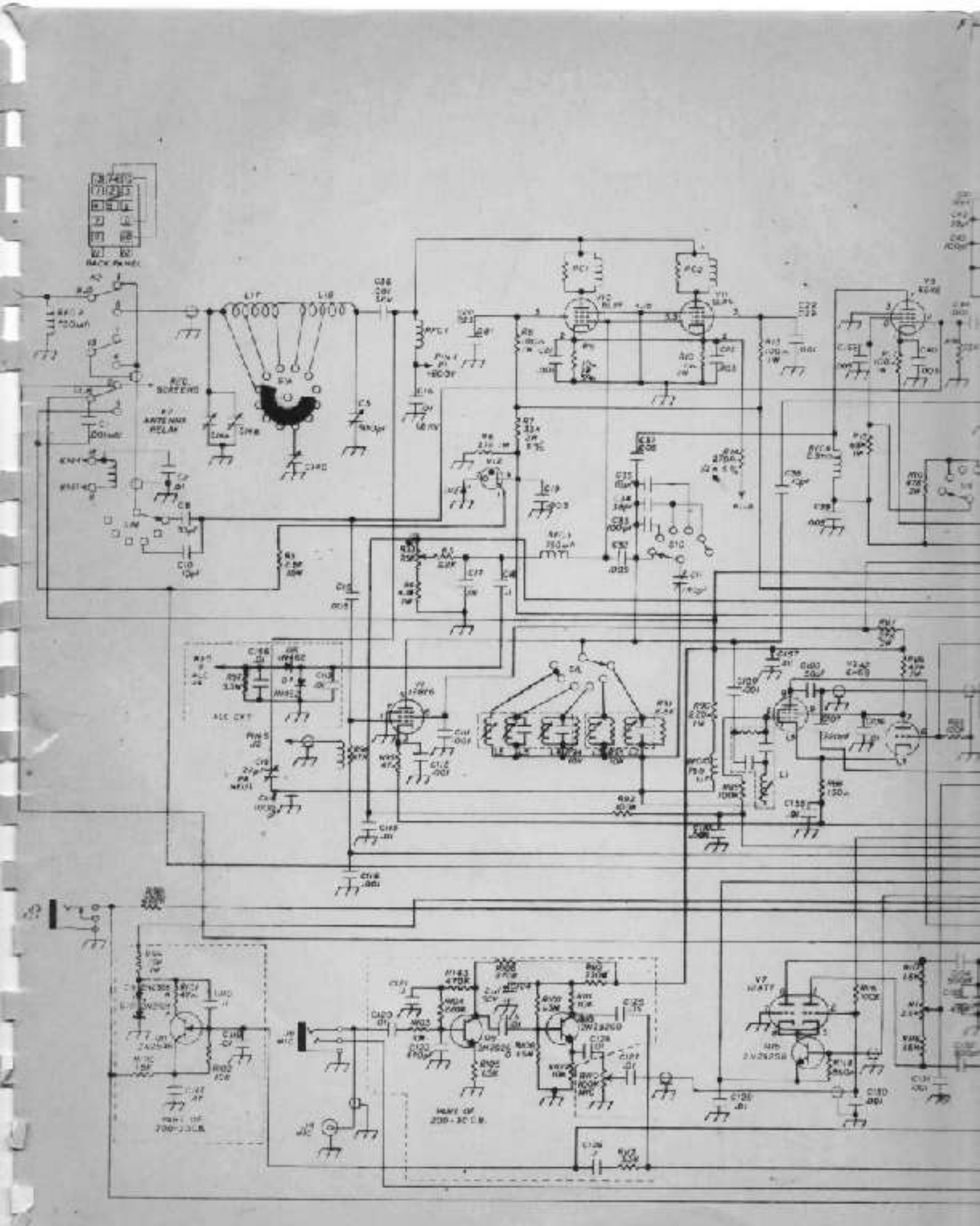
SYMBOL	DESCRIPTION	GALAXY #	PRICE EA
L18	10 coil	40-13	1.85
RFC1	plate choke	30-13	1.60
RFC2	750 uh	30-03	.70
RFC3	750 uh	30-03	.70
RFC4	2.5 mh	30-09	.70
RFC5	750 uh	30-03	.70
RFC6	.33 uh	30-24	.80
RFC7	.56 uh	30-23	.80
RFC8	2.2 mh(4425-10k)	30-22	.55
RFC9	39 uh	30-21	.95
RFC10	750 uh	30-03	.70
RFC11	39 uh	30-21	.95
RFC12	.56 uh	30-23	.80
Q1	2N4354	111-16	2.85
Q2	2N2926(o)	111-6o	.80
Q3	2N3563	111-15	1.75
Q4	2N2926(y)	111-6y	.80
Q5	2N3638	111-10	1.40
Q6 Q7	2N4107 Matched Pair	111-18	4.75
Q8	2N2926(g)	111-6g	.80
Q9	2N2926(o)	111-6o	.80
Q10	2N2926(o)	111-6o	.80
Q11	2N2646	111-07	3.00
Q12	2N3563	111-15	1.75
Q13	2N2926(y)	111-6y	.80
Q14	2N3638	111-10	1.40
Q15	2N3563	111-15	1.75
Q16	2N2926(g)	111-6g	.80
-	VOX jumper strip	200-4	1.00
P2	Octal jumper plug	109-1	.58
P1	Power plug	104-5	1.25
M1	Panel meter	115-6	15.54
-	Knob, large fixed	130-14-1A	1.00
-	Slider for above	130-14-8	.60
-	Knob, calibrated	130-14-2A	1.00
-	Knob, slow tune	130-14-3	.85
-	Knob, RF gain	130-14-4	.37
-	Knob, Audio gain	130-14-5	.77
-	Knob, bandswitch	130-14-7	.77
-	Knob, all other	130-14-6	.77
-	Esc. for VFO dial	134-4	.35
-	Cabinet	140-22	15.80
-	Front panel	141-24	6.04
-	Rear panel	142-28	5.24

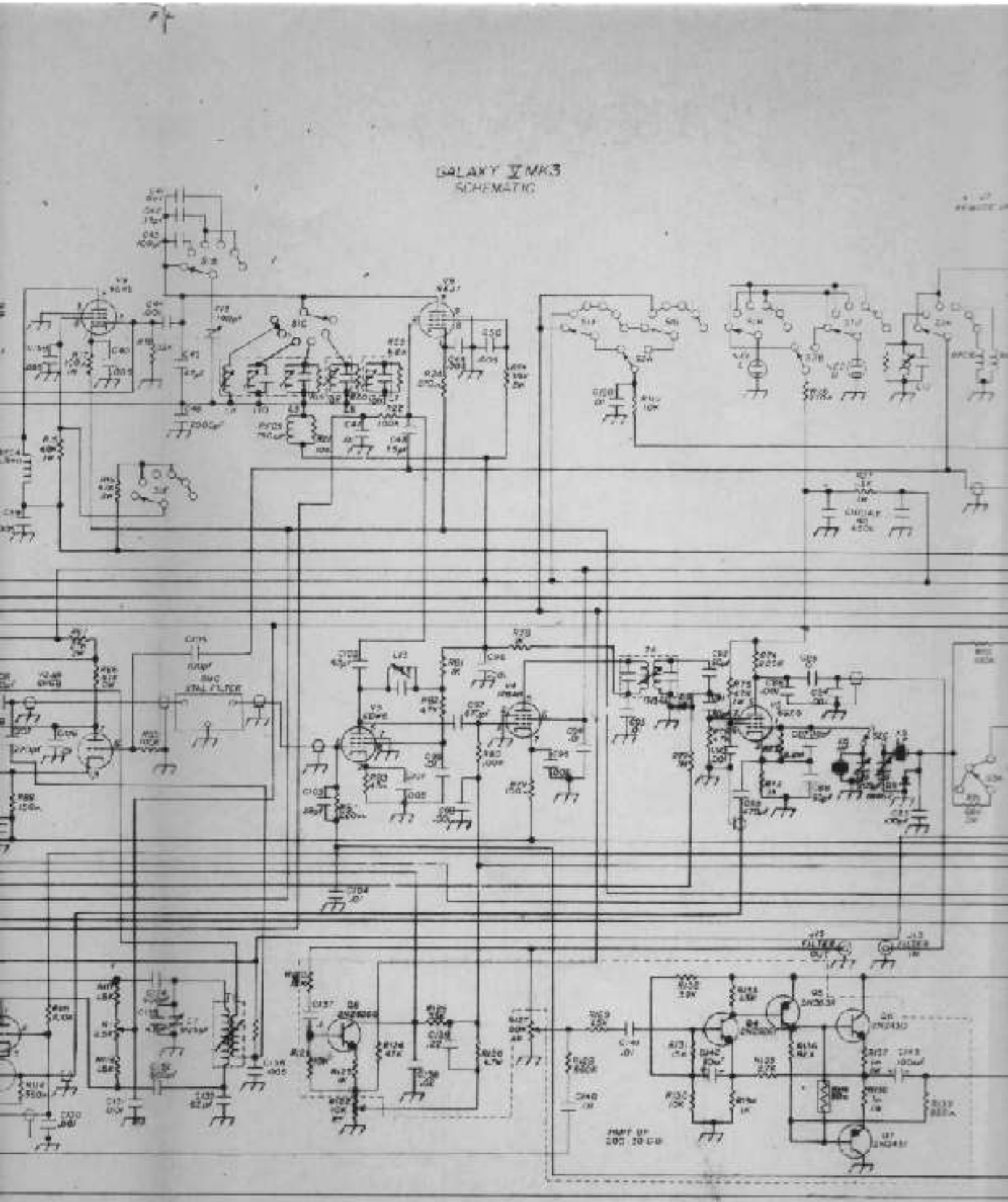

INSTALL 100 pF CERAMIC DISC.
TO TUNE 25 KHZ HIGH


GALAXY V MK3
SCHEMATIC








GALAXY V MK3
SCHEMATIC