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Ten-Tec's service department can repair and service virtually everything we have built going back to our first transceivers in the late 1960's. It is our ability to continue offering service on these rigs that has led to their re-sale value remaining high and has made a major contribution to our legendary service reputation.

Printed and bound copies of all manuals are available for purchase through our service department if you would prefer not to use this copy as your transceiver manual.

We can repair or service your Ten-Tec equipment at our facility in Sevierville, TN. We also offer support via telephone for all products via during usual business hours of 8 a.m. to 5 p.m. USA Eastern time, Monday through Friday. We have a large supply of parts for obsolete products. Repairing a transceiver or amplifier yourself? Contact us for parts pricing information.

**Service department direct line: (865) 428-0364
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Address: 1185 Dolly Parton Parkway, Sevierville, TN 37862 USA**

We have found it is most effective for us to help you troubleshoot or repair equipment with a consultation via telephone rather than by email.

Suggested contact methods are:

**Troubleshooting or repairing equipment – call (865) 428-0364
Other inquiries – call (865) 428-0364 or email service@tentec.com**

THANK YOU AND 73 FROM ALL OF US AT TEN-TEC

TEN-TEC

**OWNER'S
MANUAL**

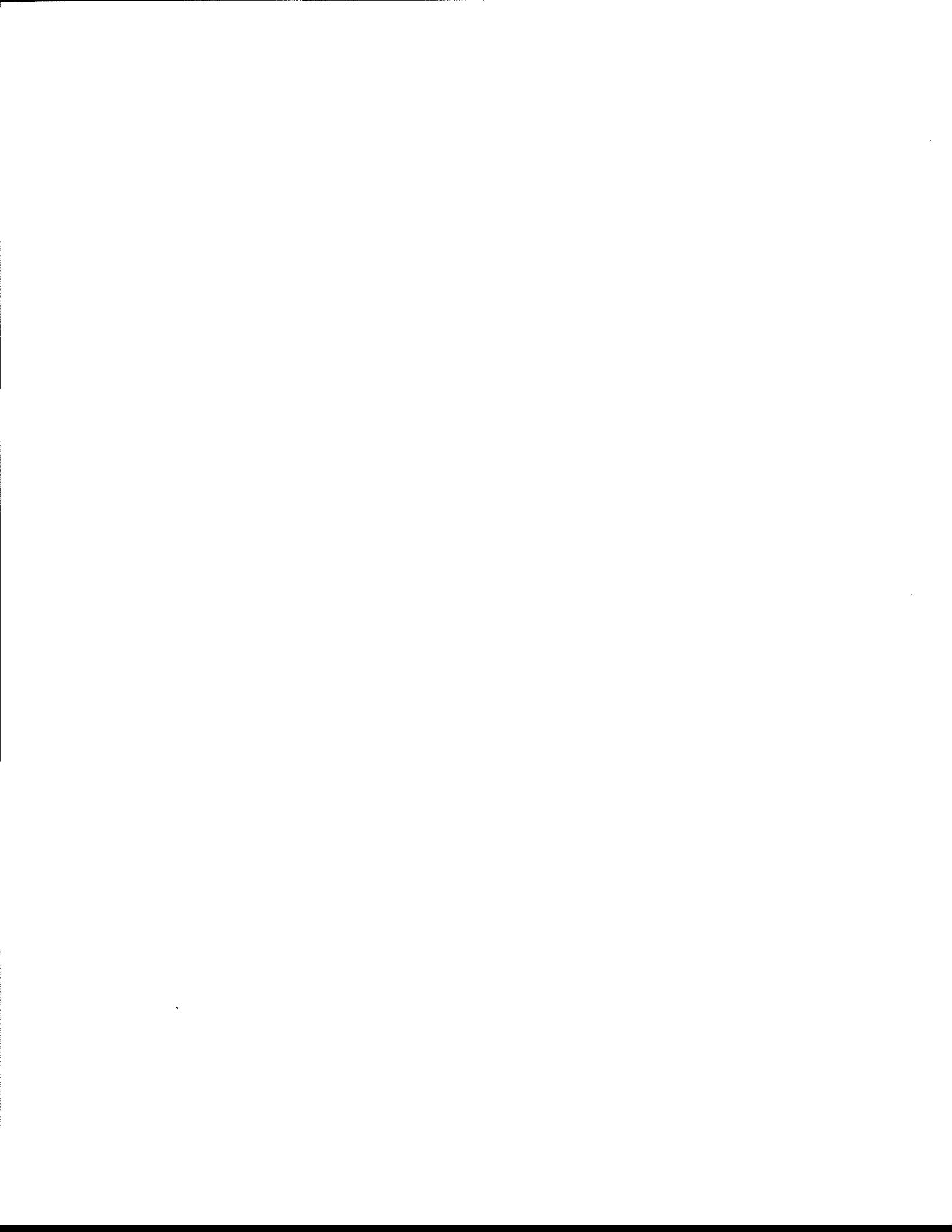
**ARGOSY II
525 D**



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UNPACKING

Carefully remove your ARGOSY from the packing carton and examine it for signs of shipping damage. Should any damage be apparent, notify the delivering carrier or dealer immediately, stating the full extent of the damage.

[REDACTED]

It is recommended that you keep the shipping carton and fillers. In the event that storage, moving or reshipment becomes necessary, they come in handy. Accessory hardware, etc. are packed with the ARGOSY. Make sure that you have not overlooked anything.

INTRODUCTION

The ARGOSY 525-D is a medium power transceiver employing the latest techniques in solid-state technology. Unique balun type transformers couple the rf power stages insuring efficient energy transfer without the need to resonate or tune. As shipped from the factory, the ARGOSY contains all necessary circuits and crystals for transceiver operation in the 80, 40, 30, 20, 15 and 10 meter amateur bands. A HI-LO power switch selects either a 50 or 5 watt output level. A whole new world of excitement and fun in Amateur Radio opens to you when working QRPP. We think you will find it a welcomed change.

Because of its size and basic 12 volts dc transistor circuits, the ARGOSY is equally at home when used as a fixed, mobile or portable station. It operates directly from 12-14 volts dc or from 115/230 volts ac with the optional Model 225 Power Supply.

As you become more familiar with the operation of your ARGOSY you will value the built-in features and conveniences more and more. Instant band changing completely eliminates transmitter tune-up. The panel meter automatically switches from an 'S' meter to an SWR meter when transmitting. QSK, instant break-in cw, turns this mode from a series of monologs into a conversation. These are just a few of the many features that you will enjoy. And a full array of accessories will further enhance the overall enjoyment and flexibility. All in all, the ARGOSY 525-D is designed for active, serious amateurs.

CONSTRUCTION: Rigid steel chassis. Dark painted, molded front panel. Dark painted aluminum back, top and bottom. Stainless steel tilt-up bail.

SENSITIVITY: 0.3 μ v for 10 dB S+N/N, typical.

SELECTIVITY: 4 pole crystal filter. 2.5 kHz bandwidth, 2.7:1 shape factor @ 6/50 dB.

AUDIO OUTPUT: 1 watt at 8 ohms with less than 2% distortion. Built-in speaker.

I-F FREQUENCY: 9 MHz.

NOTCH FILTER: Greater than 50 dB rejection notch, tunable from 200 Hz to 3.5 kHz.

S-METER: Automatically switched on when receiving.

SPURIOUS RESPONSES: More than 50 dB down except 28.980 MHz (which can be eliminated by using low end of 29.0-29.5 MHz band segment).

I-F - REJECTION: 60 dB.

OFFSET TUNING: Receiver, \pm 3.0 kHz, typical, detent center off.

CRYSTAL CW FILTERS: Optional plug-in accessories. Model 217 has 500 Hz band-

METER: Indicates forward or reverse peak power on transmit, front panel switch.

ALC CONTROL: LED indicator.

FRONT PANEL CONTROLS

AF gain/POWER (Pull-off); DRIVE; NOTCH; OFFSET (detent center); BAND Switch; Main tuning knob; MODE switch; NB ON/OFF; Meter FWD/REF; DISPLAY ON/off; XTAL filter IN/OUT; AF filter IN/OUT; AF filter 1/2; MICROPHONE jack; PHONES jack.

REAR PANEL CONTROLS AND CONNECTORS

CONTROLS: RF OUT HI/LO.

CONNECTORS: ANTENNA; KEY; POWER input; GND post; SPARE (3); 12 VDC jacks (2 auxiliary).

3 5-5 4/62 1st printing

SECTION II

INSTALLATIONGENERAL

Choose an operating location that is dry and cool. Allow adequate ventilation around the heat sinks on the rear panels of both transceiver and power supply. For normal intermittent transmissions, such as ssb and cw, natural convection cooling is all that is required. When transmitting for long periods of time and with a high duty cycle, such as RTTY and SSTV modes, it is recommended that a small fan be directed at the heat sinks to improve heat flow away from them. During mobile operation, free access to cool air should be available to the heat sink also. Do not direct the outlet vent of the automobile's heater directly at the ARGOSY.

To reduce the possibility of stray rf pickup on interconnecting cables, which may cause parasitic oscillations, and provide a measure of safety to the operator from possible shock in ac powered systems, all station equipment should be well grounded to earth. It is also important to strap the equipment chassis

all metal components that are accessible to touching to the same potential, removing the possibility of shock when touching more than one piece of equipment. Also, the extra strap between transceiver and power supply chassis serves to reduce voltage drop on the negative 12 volt supply lead caused by resistances in the lead and connector contacts. In mobile installation, connect a ground strap between the rear panel GND post and the automobile chassis (dash board if

When using a dc source other than a Model 225, it will be necessary to construct a power cable using the accessory AMP connector supplied with the ARGOSY.

Complete the power connections by plugging line cord of power supply into wall socket and interconnect ARGOSY and power supply chassis with short leads.

4.1

Any matched antenna presenting 50 to 75 ohms impedance, one side ground, will load satisfactorily. Random length wire antennas and open wire feed systems will require a matching system such as the Model 227 Antenna Tuner. Use coaxial cable between the ARGOSY and 50 ohm antenna or output side of the tuner. If an antenna tuner is used, locate it as far as is practical from the immediate transceiver location. Do not place tuner on top of transceiver or close to microphone key or other cables going to the transceiver or associated equipment.

Since the crystal 4 pole filter system is common to both receiver and transmitter circuits, audio signals picked up by the microphone while receiving may be applied to the audio receiver system, causing possible acoustic howl or reverberation.

Although the noise blanker accessory for the ARGOSY is effective in reducing ignition noise, it is best that the installation be such that ignition noise is reduced as much as possible. Use of resistor spark plugs and noise suppressors in the distributor circuits are very effective in reducing interference. Also, strap the hood to a good chassis point with flexible metal or braid if it is not already well grounded. Locate the antenna as far as is practical from the engine—either on the rear trunk deck or bumper. And since the muffler and exhaust system of most cars are supported and effectively insulated from the chassis with rubber-shocked brackets, they may carry ignition noise currents to the antenna location at the rear of the automobile. Strapping the tail pipe or muffler to the chassis at this location with flexible braid may substantially reduce ignition pickup.

The remaining interconnections for microphone, key, etc. in mobile installations are the same as for fixed stations and need not be repeated here.

OPERATION

CONTROLS AND THEIR FUNCTIONS

All operating controls are readily accessible on the front panel.

Receiver Controls

AF-POWER Control - Adjusts level of received audio from speaker or headphones. Does not affect level of sidetone when operating cw. The POWER switch is a push-pull type and shorts Pins 2 and 3 together in the AMP chassis case.

NOTCH Control - This control determines the frequency within the audio spectrum between 200 Hz and 3.5 kHz at which a sharp null in response is inserted. The frequency at which the null occurs increases as the control is rotated clockwise, and in the full clockwise position (OUT) it is beyond the receiver's highest audio limit and is effectively removed from the circuit. The notch is very useful in removing in-channel QRM carriers or interfering cw stations, or in reducing in-channel ssb interference to some degree. Since the null is very sharp and deep, careful adjustment of this control is required for maximum rejection.

OFFSET Control - This control permits moving the receiver frequency approximately 3 kHz above and below the transmitting frequency. Clockwise rotation from the detented center position increases frequency and counterclockwise rotation reduces frequency. When positioned at the detent the receiver and transmitter values are the same. The control is useful in situations where several stations are being worked in a roundtable and all are not exactly on the same frequency. The received station can then be 'zeroed in' with

PHONES Jack - This jack is the external headphones or speaker connection. When employed, the internal speaker is automatically disconnected from the audio amplifier. Although the amplifier is designed for an 8 ohm load, external speakers between 4 and 16 ohms will work satisfactorily.

Headphones of any impedance will also work directly from this jack. However, since the amount of power required to drive headphones to a satisfac-

- 4.) Increasing the DRIVE control beyond that required to just light LED will not result in any appreciable increase in power out. However, overdrive may increase ssb distortion and destroy cw keying characteristics.
- 5.) Due to the possibility of high voltage transients being generated in the output rf amplifier during bandswitching, changing bands should not be done while transmitting power to the load. Either place the ARGOSY in the receive mode or be certain of a key-up condition in cw. YOU RISK THE POSSIBILITY OF DESTROYING THE OUTPUT TRANSISTORS IF THIS PRECAUTION IS NOT OBSERVED.
- 6.) Although improper antennas will not damage the final, we suggest an SWR below 3 to 1 be achieved for maximum performance. In cases where the antenna cannot be matched to a better SWR, and the power supply repeatedly shuts down due to over-current conditions, the ARGOSY may be operated at reduced output power by rotating the DRIVE control CCW to a position where the rig will operate without tripping the breaker.
- 7.) When operating mobile, always turn ARGOSY 'off' when starting the engine. High voltage transients from the generator may appear on the supply line before the regulator contacts close.
- 8.) To transmit your cw signal on the same frequency as the incoming signal, set OFFSET control to center position and peak the incoming signal on the S-Meter. The peak will be more discernable if the optional cw audio filter is installed and set to the '2' switch position. Since the filter is centered at 750 Hz and the transmitter frequency in cw is offset 750 Hz from the received frequency, peaking the incoming signal correctly sets up the transmitter.
- 9.) WWV can be received on the 10 MHz band. When its carrier is set to 'zero beat' the timebase crystal in the counter can be adjusted to read (10.) 000.0.

AN IMPORTANT MESSAGE

In order to obtain top performance from your ARGOSY, we feel that you should be briefed on new technology such as solid state no-tune rf amplifiers. Misconceptions sometimes arise from incomplete knowledge which result in erroneous conclusions being drawn that the equipment is faulty, erratic or not performing to specifications. It is the purpose of this message to inform you in these areas so that you can knowledge

- 9.) If the breaker repeatedly trips, it is an indication that the load is enough removed from the optimum so as to cause high transistor dissipation.
- 10.) It is possible for the power supply regulator to drop out of regulation just prior to its tripping the breaker with low ac line voltages (brown-outs or long ac power runs). Under these conditions, hum modulation will appear on the transmitted signal. With proper load and line voltage, the current drain will be considerably below the tripping point so no hum should appear on the carrier.

TECHNICAL FACTS OF LIFE

Although vacuum tubes and transistors can amplify rf power, there are some fundamental differences in how this is accomplished. We are all familiar with vacuum tube principles, but not with those of transistors. A better understanding of what we can expect under various operating conditions will aid in recognizing correct or incorrect performance.

- 1.) Broadband vs Resonant Tanks - Almost all tube circuits use resonant tanks in the plate circuit. The ARGOSY uses a broadband system. In class AB operation, these two approaches act similarly without drive being applied. The idle current is relatively low and within the device dissipation rating, even though load impedances may range from open to short circuit.

However, with drive applied, the two act very differently. In the case of tubes the dissipation within the tube depends on both the tuning of the tank and the load applied. If the tank is resonated and the load is very light, the internal power dissipated is quite small as indicated by the deep null in plate current which reduces its value to a level approaching that with no drive. Out of resonance, the plate current, and hence dissipation, increases rapidly and may damage the tube from overheating. In resonance, as the load is increased, the null becomes more shallow at a higher plate current. This increase is a result of more power being delivered to the load. As the tank is tuned to resonance, the load impedance which is usually on the order of 50 ohms is transformed to a relatively high impedance of several thousand ohms to match the plate circuit impedance. Small load reactive components - either capacitive or inductive - can usually be balanced out in the tank resonating function.

With transistors drive applied and with no load, there is no resonant tank

2. SWR-Two Kinds - The standing wave ratio is a direct measure of the ratio between two impedances, i.e. an SWR of 3 to 1 tells us that one impedance is three times the other. Therefore, the unknown impedance can be either three times larger or three times smaller than the known one. If the desired impedance that the transceiver wants to see is 50 ohms, an SWR of 3 to 1 on the line may mean a load impedance of either 150 ohms or one of 17 ohms. If it is 150 ohms, the transmitter will act differently than if it is 17 ohms. In the first case, the power demanded from the supply will be much lower, and will not be large enough to trip the breaker. In the second case, even though the SWR reads the same, the supply may repeatedly trip out. The SWR reading gives no indication of reactive components, nor can it separate the resistive from the reactive components. It is calibrated with a pure resistive load and therefore has its greatest accuracy with a pure resistive load. The SWR bridge should only be used as an indicator when attempting to adjust the antenna system to a pure 50 ohms resistive impedance at the transmitter output point.
3. Efficiency - Since transistor amplifiers have a very low value of output impedance, they act more or less as a constant voltage source. That is, the rf output voltage tends to remain at a fixed level regardless of the load impedance. Hence, the output power will vary depending on the value of the load, and increase as the load impedance decreases. It can be seen that a 3 to 1 SWR on the low side of 50 ohms will ask the amplifier to deliver much more power than a 3 to 1 SWR on the high side. Since the amplifier does have a finite value of output impedance, the amount of power delivered efficiently to the load will change with load impedance.

IF YOU HAVE TROUBLE

SYMPTOM	POSSIBLE CURE
ARGOSY dead. No meter lamp illumination. Receiver and transmitter inoperative.	Make sure power switch is on. Check power cable from supply or battery. Check supply or battery for proper voltage. Check 10 A fuse inside ARGOSY. (Remove bottom cover. Fuse is on Control Board).
10 Ampere fuse blown.	Check for reverse polarity of
ARGOSY dead. Meter lamp OK. Set seems alive but received signals are weak.	1 2-14 volt line. Correct cable wires or connector termination. Check antenna system. Check antenna system and cables. Try dummy load to see if problem is in antenna system. Check settings of antenna tuner if used.
No sidetone. Transmits OK.	Check to see if sidetone level control is advanced far enough.
Transmitter does not come on in ssb. Normal on cw.	Check PTT switch in microphone. Check microphone cable and plug.
Receiver dead. Transmits OK.	Check to see if headphones are

If bottom was removed, make sure speaker cable is intact.

More than just a radio.



Ten-Tec is more than just a manufacturer of Amateur Radio equipment. Our legendary service department repairs almost everything we've ever built. Customer support representatives are active hams that can provide the advice you need to obtain the right equipment and set up your station the way it should be. No one in the industry matches our risk-free trial period for new equipment. When you buy Ten-Tec, you get our entire company in the box with your new radio. Ask a friend who owns "us". Proudly MADE IN USA!

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service@tentec.com, (865) 428-0364. Shipping is additional. TN residents add 9.5% sales tax

www.tentec.com

SECTION III
ALIGNMENT AND SERVICE

GENERAL

This section is divided into a description of the main chassis and each subassembly. Interconnection and transistor voltages are given for each unit. Readings

2.) REMOVAL OF BOTTOM

Remove the lower two screws on each side. Set the ARGOSY on its top. Remove two screws in bottom cover. Lift the rear edge and pull back slowly. The speaker leads are attached to the PHONES jack and must be unsoldered, or the cover carefully laid aside without straining the speaker leads.

3.) REMOVAL OF FRONT PANEL

Remove all knobs using 4-40 and 6-32 Allen wrenches provided. The dial skirt is a friction fit to the VFO shaft and can be pulled off. Remove Phillips screws at each corner. Unplug the ALC light from its socket. Pull the panel forward and remove.

4.) DIAL SKIRT REPLACEMENT

To replace the dial skirt, either a specially constructed tool (below), or a screwdriver with a blade width of approximately 9/32" can be used. With the tool, spread the "D" spring on the skirt hub so that the straight portion does not show through in the hub bore. If the tool tip shows in the bore, this is OK for now. Start the skirt on the shaft, with the tool handle pointing downward in relation to the front panel. This puts the handle of the tool out in the open. Push the

OPTIONAL MODEL 223A
INSTALLED

OPTIONAL MODEL 220
SPACE

RF MIXER 80784-D

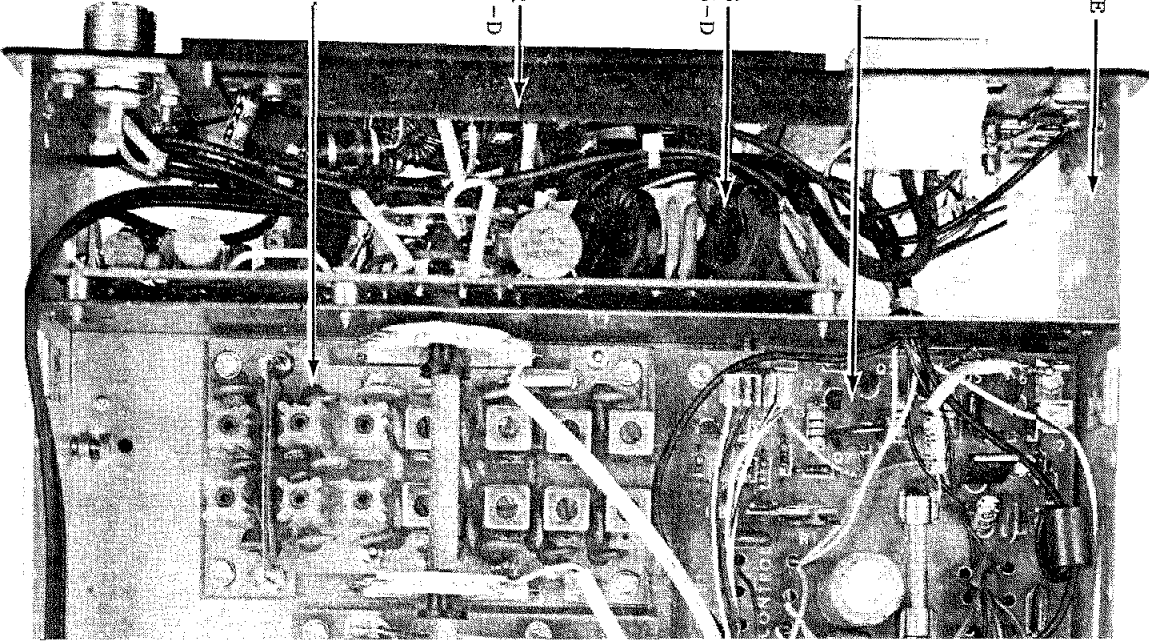
MODEL 1126 SPACE

CONTROL
80781

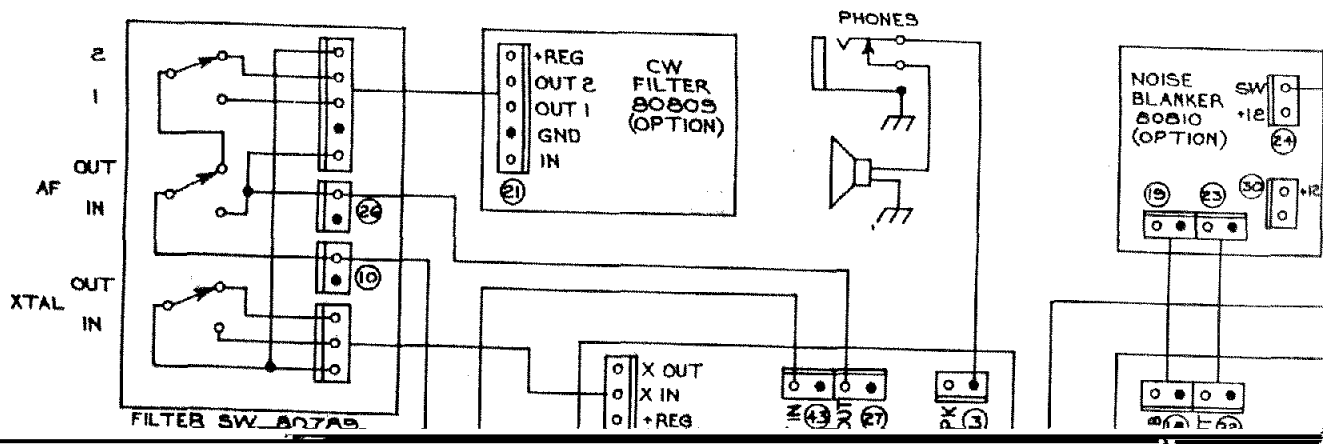
SWR/LOW PASS
FILTER 80805-D

FINAL AMPLIFIER
80804-D

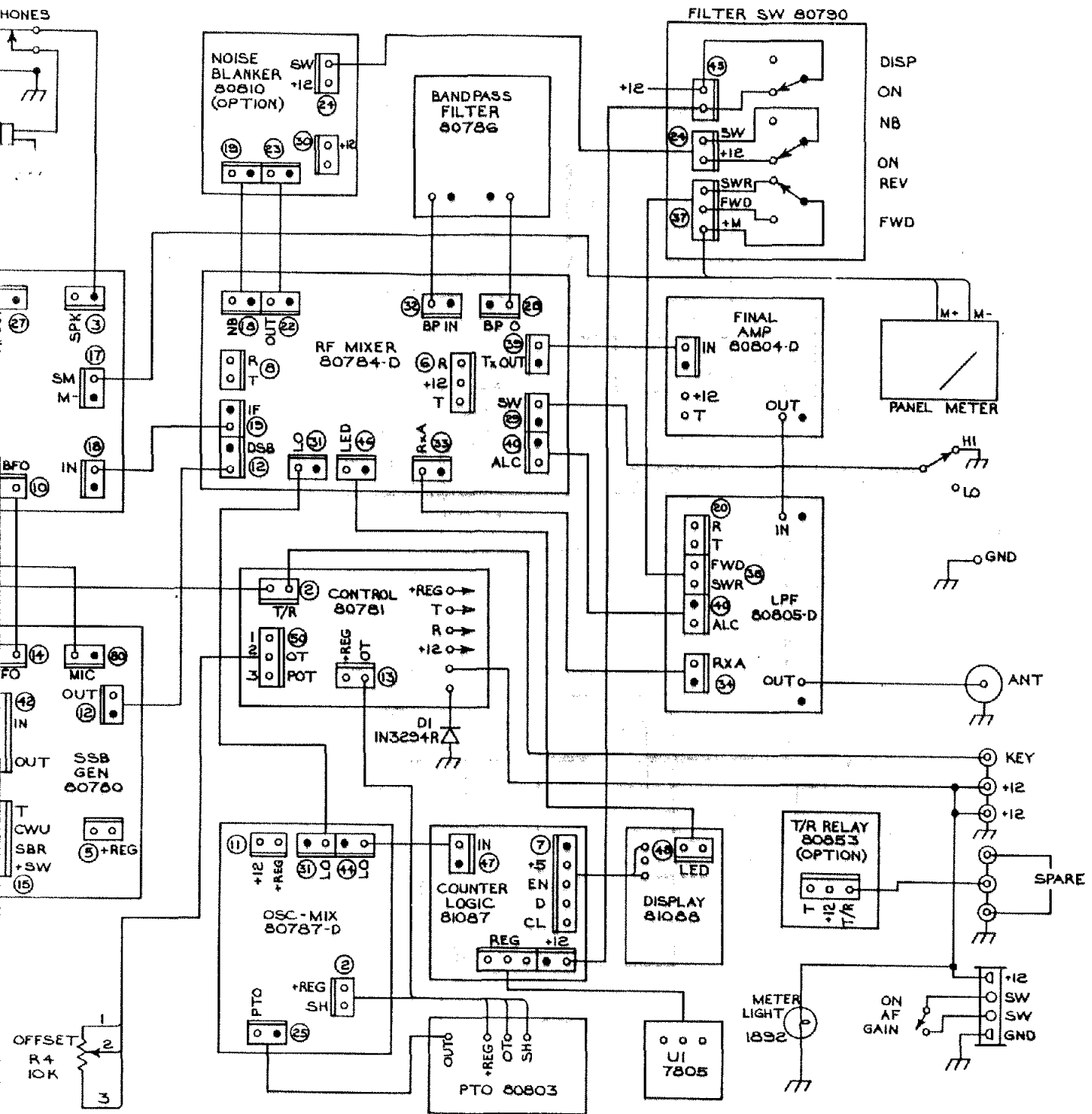
BANDPASS
FILTER 80786



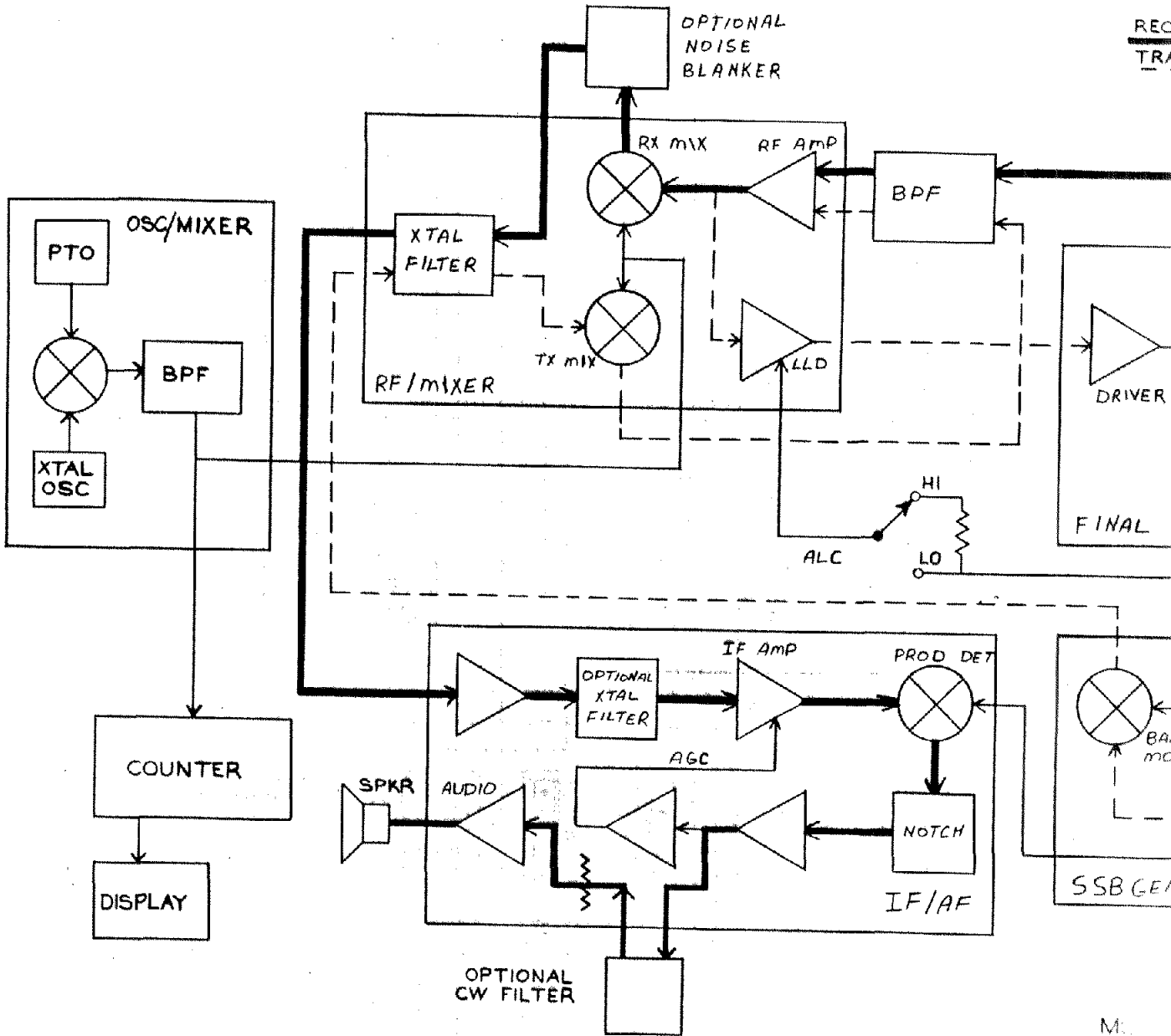
MODEL











REC
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DRIVER
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SSB GEN

M.



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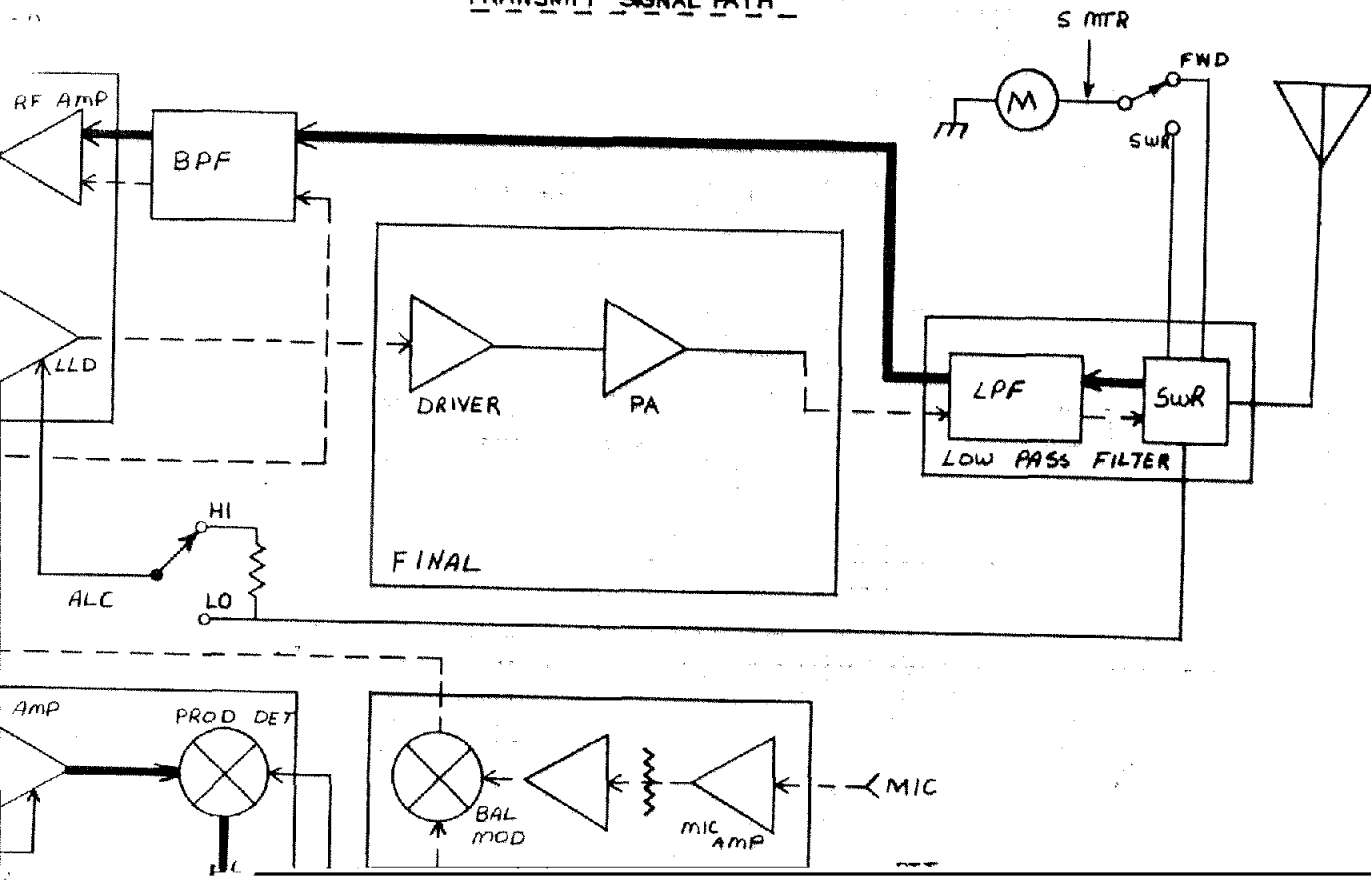
Proudly made in Sevierville, Tennessee USA

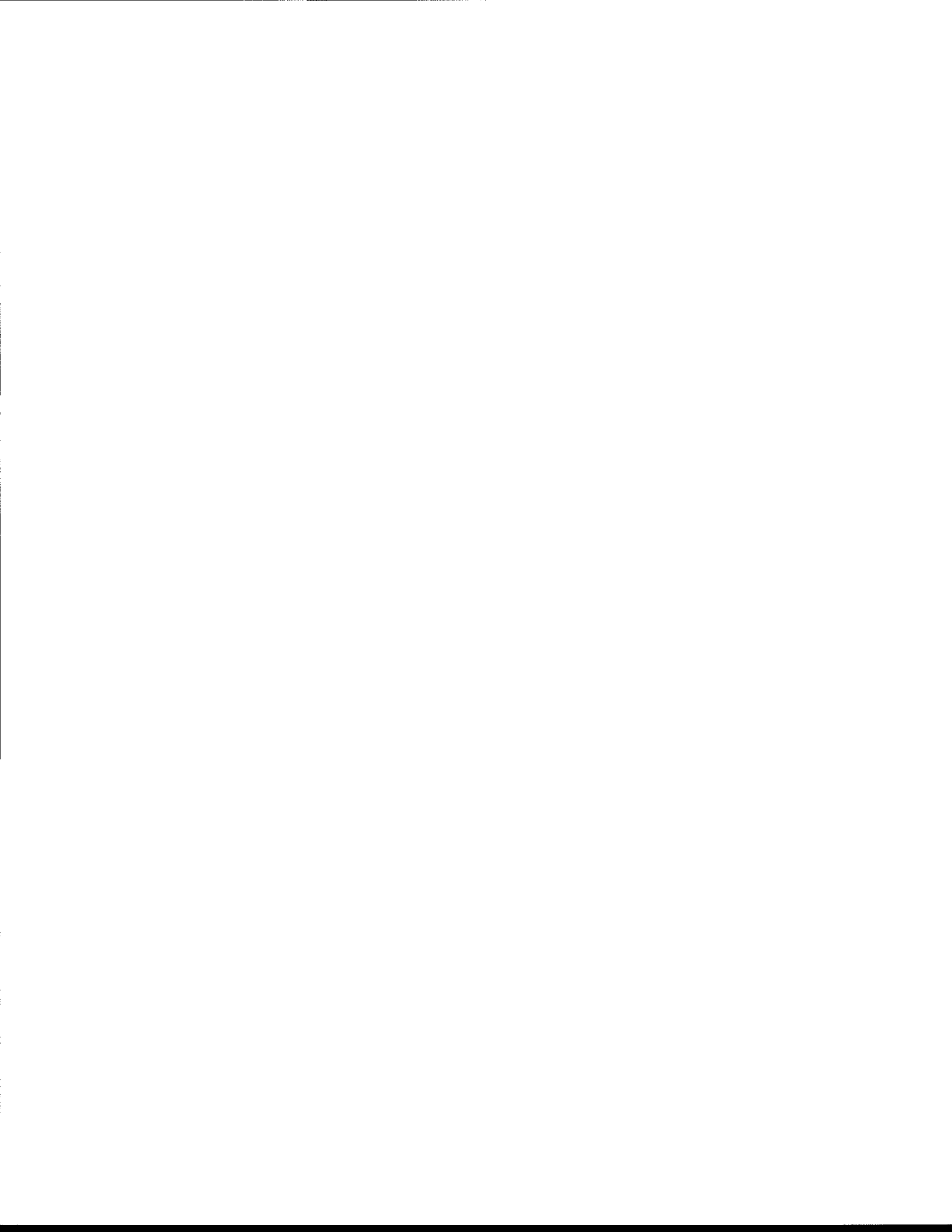
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NAL

RECEIVE SIGNAL PATH
TRANSMIT SIGNAL PATH





DIAL CALIBRATION

The PTO oscillator dial skirt is attached to the control shaft by means of a friction clutch. By holding the knob firmly, the skirt can be rotated to match the display.

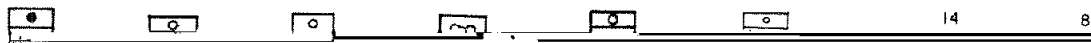
SEMICONDUCTOR PIN IDENTIFICATION.

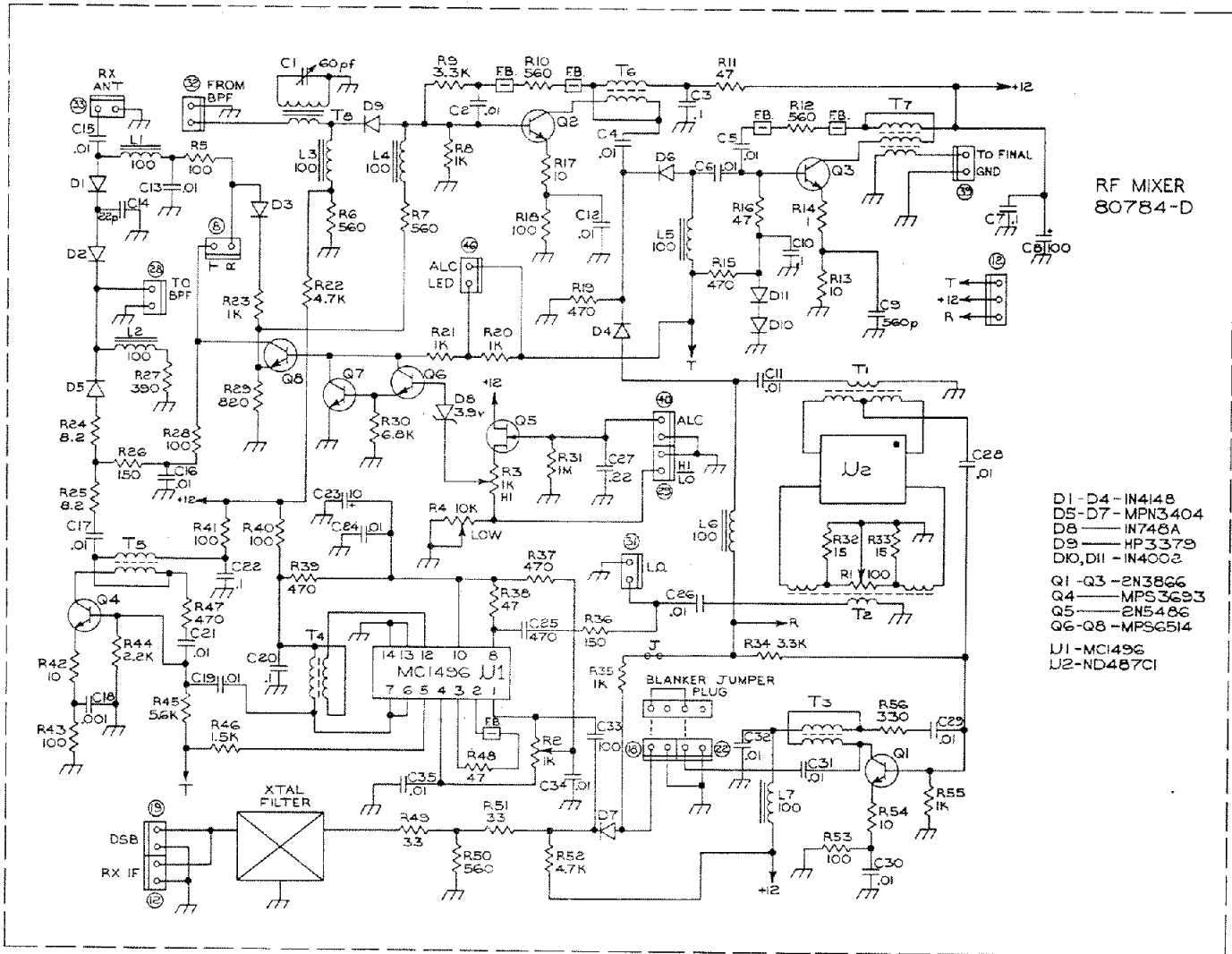
Pins viewed from top
of PC board.



2N3866 2N5109 2N5486 FET CA3053 MPN3404

8





PARTS LIST

L1-8	21060	CHOKE-RF, 100 UH, 100 MA
C3,7,10	23006	CAP-FXD, 0.1 MF, 250 V FILM, 20%
C30	23014	CAP-FXD, 22 PF, 50 V, 5%
C1	23061	CAP-VAR, 5/60 PF, TRIMMER
C18	23133	CAP-FXD, .001 MF, 500 V, CER, 10%
C33	23139	CAP-FXD, 100 PF, 100 V, 5%
C25	23162	CAP-FXD, 470 PF, 100 V, CER, 5%
C27	23197	CAP-FXD, .22 MF, 20%, 50 V, EL
C23	23222	CAP-FXD, 10 MF, 16 V, EL, VERT
Q1-3	25027	TRANSISTOR-RF POWER, 2N3866
Q4	25032	TRANSISTOR-MPS3693
U1	25047	IC-MC1496P
Q6-8	25054	TRANSISTOR - MPS6514
Q5	25060	TRANSISTOR - 2N5486
D10,11	28000	DIODE - POWER, 1N4002, SIL
D1-4	28001	DIODE - 1N4148/1N914, SIL
D5-7	28017	DIODE - PIN, MPN3404
D9	28020	DIODE - PIN, HP3379
D8	28021	DIODE - ZENER, 3.9 V, 1N748
R4	30038	RES-VAR, 10 K, LIN, PC MOUNT
R2,3	30070	RES-VAR, 1K, LIN, PC VERT MTG, 30%
R1	30071	RES-VAR, 100-LIN, PC VERT MTG, 30%
T8	85008	TOROID - RF
T3,4,5,6	85120	TRANSFORMER - RF, BIFILAR
T1,2,7	85134	RF TRANSFORMER - TRIFILAR

U1

PIN	Voltage		PIN	Voltage	
	Receive	Transmit		Receive	Transmit
1	6.2	5.7	8	9.2	8.4
2	5.7	5	9	0	0
3	5.7	5	10	9.2	8.4
4	6.2	5.7	11	0	0
5	0	3	12	12	12
6	12	12	13	0	0
7	12	12	14	0	0

Transistor	Collector		Base		Emitter	
	Receive	Transmit	Receive	Transmit	Receive	Transmit
Q1	12	12	2.5	0	1.6	0
Q2	12	12	2.25	0	1.6	1.5
Q3	12	12	0	1.35	0	.7
Q4	12	11	0	2.8	0	2
Q6	0	10	0	0	0	0
Q7	0	10	0	0	0	0
Q8	0	12	0	12	4	9.6

Drain

Gate

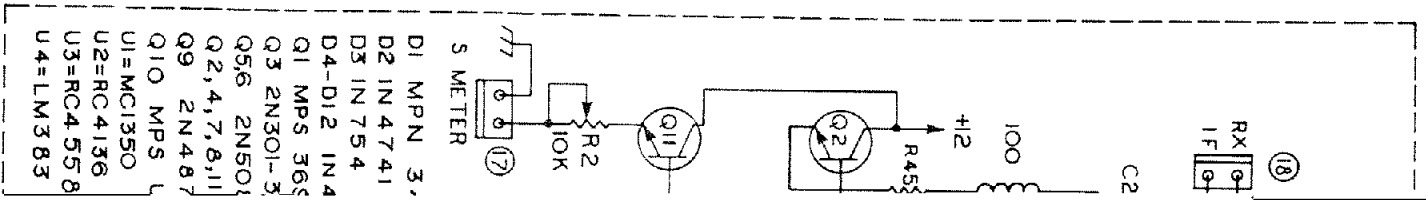
Emitter

BANDPASS FILTER 80786

This assembly contains individual bandpass filters for each band. They consist of critically or overcoupled tuned circuits, two poles for each band. For maximum selectivity and rejection of images and other spurious responses two separate bandpass filters are used to cover the 10 meter band. Because the tuning of these circuits is critical and they are used both when receiving and transmitting these resonant circuits are best designed for

IF/AF 80785-D

This assembly contains only receive functions. Transistor Q1 is the input preamp which drives the optional crystal filter or an attenuator with equal insertion loss. The filter is switched by diodes D4 through D9. Integrated circuit U1 is the i-f amplifier and AGC control element. The product detector is a dual gate MOSFET, Q3. The notch filter function is performed by U2. Preamp U3 and power amplifier U4 complete the audio system. AGC is audio derived and uses U3B, transistors Q2, Q4 through Q7 and diodes D1 and D3. D1 acts as a shunt attenuator. Two adjustments are required. First L1 is peaked for maximum received signal on the S-meter. R2 is then adjusted for a S9 reading with



- D1 MPN 3,
- D2 IN 47 41
- D3 IN 75 4
- D4-D12 IN 4
- Q1 MPS 365
- Q3 2N301-3
- Q5,6 2N501
- Q2,4,7,8,11
- Q9 2N487
- Q10 MPS
- U1=MC1350
- U2=RC 4136
- U3=RC 455 8
- U4=LM383

IF/AF Board 80785-D

U1

PIN	VOLTAGE	
	Receive	Transmit
1	9.60	9.60
2	9.60	9.60
3	0	0
4	3.20	3.20
5	4.40	4.40
6	3.20	3.20
7	0	0
8	9.60	9.60

U2

PIN	VOLTAGE	
	Receive	Transmit
1	3.60	3.60
2	3.60	3.60
3	3.60	3.60
4	3.60	3.60
5	3.60	3.60
6	3.60	3.60
7	0	0
8	3.60	3.60
9	3.60	3.60
10	3.60	3.60
11	7.20	7.20
12	3.60	3.60
13	3.40	3.40
14	3.60	3.60

U3

PIN	VOLTAGE	
	Receive	Transmit
1	6.80	6.80
2	6.60	6.60
3	6.60	6.60
4	0	0
5	3.50	3.50
6	9.30	9.30
7	6.60	6.60
8	13.00	13.00

U4

PIN	VOLTAGE
1	.65
2	2.20
3	0
4	6.60
5	13.00

TRANSISTOR	SOURCE	DRAIN	GATE 1	GATE 2
Q3	.50	6.40	.60	0

Transistor	Collector		Base		Emitter	
	Receive	Transmit	Receive	Transmit	Receive	Transmit
Q1	6	6	.85	.85	.2	.2
Q2	13	13	0	0	0	0
Q4	.6	11	0	0	0	0
Q5	0	0	10	10	11	11
Q6	2	11	11	10	11	11
Q7	8.5	0	0	.7	0	0
Q8	1.4	0	0	.75	0	0
Q10	0	0	0	.65	0	0
Q11	13	13	0	0	0	0

Transistor	Emitter		Base 1		Base 2	
	Receive	Transmit	Receive	Transmit	Receive	Transmit
Q9	4.2	4.2	0	0	6.9	7

NOTE: MODE Set to CW
 XTAL filter OUT
 DRIVE control full CCW
 NOTCH [redacted] to CW

NO RECEIVED SIGNALS

15D 83 pr. ng

PTO 80278

The permeability tuned oscillator (PTO) provides the variable part of the VFO signal in both receive and transmit modes. The PTO operates between 5.0 and 5.5 MHz. The output is mixed with signals from the crystal oscillator for translation to the proper local oscillator frequency. On the 14 MHz band the 5.0 to 5.5 MHz signal is used directly.

The PTO is housed in the main tuning coil assembly on a separate printed circuit board. The main coil, L3, is shunted by L2 and has L1 in series. Ad-

- 1.) Set the OFFSET control to the center detent position. Connect a frequency counter with at least 100 mV sensitivity to the rear pin of the VFO housing.

PTO 80278



To eliminate band edge birdies on the 10, 21 and 28 MHz bands, the crystal oscillator frequencies are chosen 10 kHz lower than what normally would be needed, compared to the other bands. The same

OMNI-VII

"I was struck by how clean, natural and quiet the receiver sounded in comparison to some DSP based radios. I found the Omni-VII a real pleasure to listen to - in any mode." - W1ZR, in the ARRL Product Review, QST July 2007

"What a neat little package! I'm having more fun with this thing!" - K1SA

"In 40+ years and many receivers, the Omni-VII is the most sensitive, most QRM proof and most pleasant to operate I have enjoyed. The noise blanker and noise reduction systems really help me in dealing my sometimes noisy location." - K6LE

"High quality manufacturing...overall a very impressive transceiver" - W9AC

"As an avid CW operator, it is like listening to your favorite music while operating." - N1SW

"Close-in dynamic range unsurpassed by any other general coverage radio." - Radio Society of Great Britain RadCom review, September 2007

"Once again, Ten-Tec has produced a superb transceiver, with great SSB audio and their famous QSK." - K4SQR

"I can say that in my 30+ years of operating I've never enjoyed a rig more than the Omni-VII. The audio is superb as is the QSK, ergonomics, receiver characteristics and on and on." - W7TEA

"My Dad, KB2LAU, in Florida has become active again using my Omni-VII in Vermont. He is enjoying daily contacts [via Internet remote control]. Being a ham with limited to no antenna options, this has been a great opportunity." - W1ZN

Are you next?

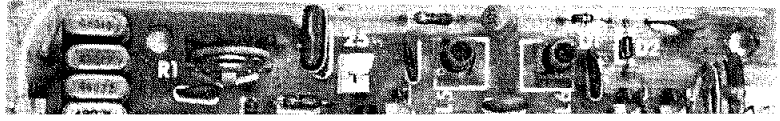
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SSB GENERATOR 80780

This assembly contains the carrier (BFO) crystal oscillator, a balanced modulator for ssb generation, and a two stage microphone audio amplifier. Q1 is the carrier oscillator operating at approximately 9 MHz. Its exact frequency is determined by which of the three trimmer capacitors, C1, C2 or C3, are placed in the crystal circuit. C2 is in the circuit under all MODE switch conditions and sets the carrier to the desired frequency on the high side of the ladder filter skirt. (This position is used in the SB-R mode.) In this mode, both C1 and C3 are removed from the crystal circuit by transistor switches Q2 and Q3 respectively. Their bases are grounded through the MODE switch.

In SB-N, both of these capacitors are inserted in the circuit by removing the base grounds, and the three capacitors in parallel set the oscillator frequency down on the opposite (low frequency) skirt. In the cw mode, C3 is removed by switch Q3 so that the carrier frequency increases 750 Hz into the filter pass band. C1 and C2 determine this setting.

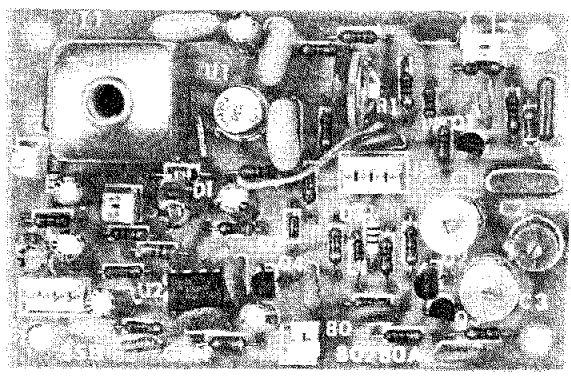
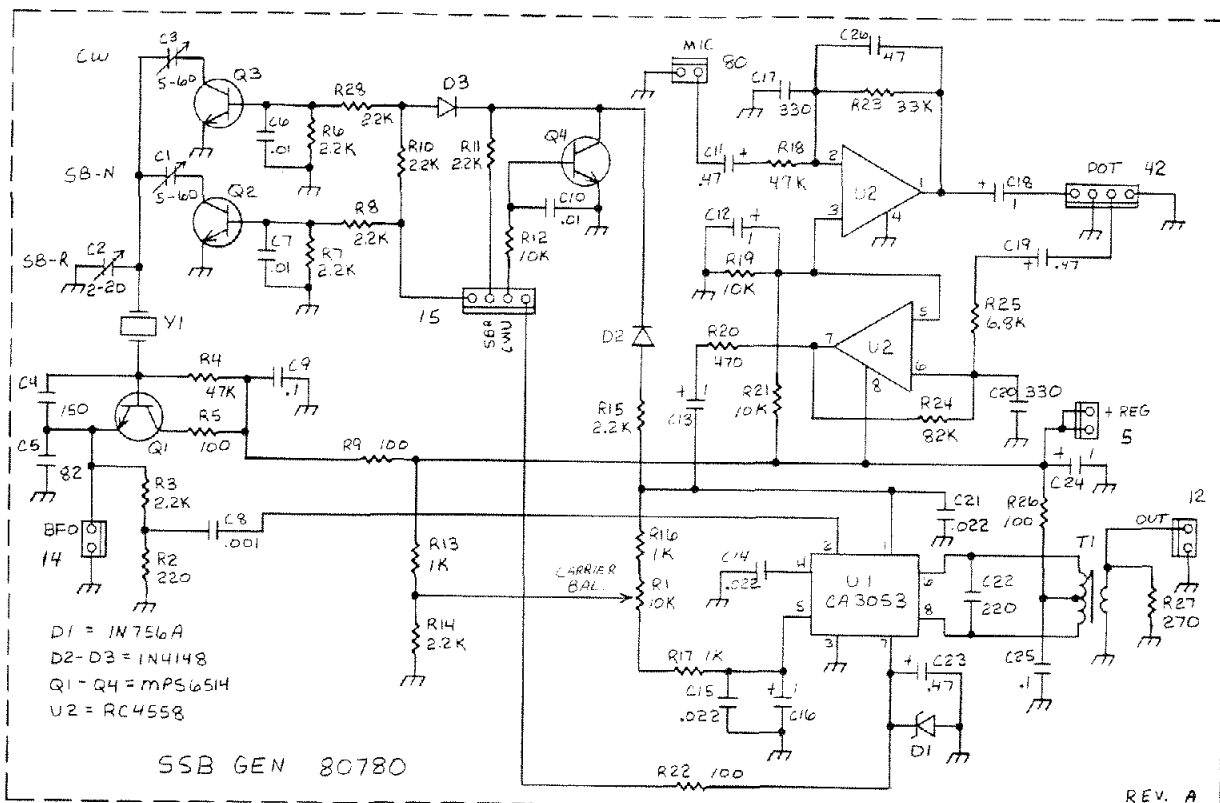
Output from the carrier oscillator is fed to the BFO socket and to the balanced modulator U1 where it is mixed with the audio signal from the microphone amplifier U2. Output in the ssb modes is a double sideband, suppressed carrier signal, whose unwanted sideband is removed by the ladder filter mounted on the RF/MIXER assembly.

For cw operation, the balance of U1 is upset when terminal CWU is grounded through the MODE switch. This also is the case in the LOCK mode. Audio from the microphone channel is eliminated by the same shorting procedure. The amount of 'T' voltage which is controlled by the setting of the DRIVE control in the cw mode, and applied to pin 7 of the balanced modulator, determines the level of the carrier signal applied to the transmit mixer.

CARRIER OSCILLATOR ALIGNMENT - Proper alignment of C1, C2 and C3 requires the use of a frequency counter. These capacitors should not be readjusted on general principles but only after it is definitely found that the carrier is not where it should be in the passband curve, or that the cw frequency is not 750 Hz up from the SB-N carrier frequency. To make the adjustments, proceed as follows:

- 1.) Connect the counter to the junction of R2 and R3 in the emitter of Q1.
- 2.) Set the MODE switch to SB-R, DRIVE fully CCW. Adjust C2 for a frequency of 9.00300 MHz.
- 3.) Set the MODE switch to LOCK position and adjust C1 for a frequency of 9.000750 MHz.
- 4.) Set the MODE switch to SB-N and adjust C2 for a frequency of 9.00000 MHz.
- 5.) Return to Step 2 and check again because the adjustments interact somewhat.

CARRIER NULL ADJUSTMENT - With the MODE switch in SB-N, drive control fully CCW, adjust T1 for maximum output and R1 for minimum transmitted carrier with the PTT line shorted to ground.



33-506D 4-003 15-1-1971

80780 SSB GENERATOR

		PARTS LIST	
C14,15,21	23002	CAP-FXD, .022 MF, 250 V, FILM, 20%	
C9,25	23006	CAP-FXD, 0.1 MF, 250 V, FILM, 20%	
C1,3	23061	CAP-VAR, 5/60 PF, TRIMMER	
C6,7,10	23132	CAP-FXD, .01 MF, 100 V, CER	
C8	23133	CAP-FXD, .001 MF, 500 V, CER, 10%	
C17,20	23136	CAP-FXD, 330 PF, 100 V, 5%	
C5	23140	CAP-FXD, 82 PF, 100 V, 5%	
C26	23143	CAP-FXD, 47PF, 100V, CER, 5%	
C4	23146	CAP-FXD, 150 PF, 100 V, 10%	
C2	23168	CAP-VAR, 3/22 PF, TRIMMER, VERT	
C12,13,16 18,24	23181	CAP-FXD, 1 MF, 50 V, EL, VERT	
C11,19,23	23193	CAP-FXD, .47 MF, 20%, 50 V, EL	
U1	25024	IC-CA3053	
Q1-4	25054	TRANSISTOR - MPS6514	
U2	25078	IC-RC4558P	
D2,3	28001	DIODE - 1N4148/1N914, SIL	
D1	28019	DIODE - ZENER, 8.2 V, 1N756A	
R1	30038	RES-VAR, 10 K, LIN, PC MOUNT	
Y1	48020	CRYSTAL - QUARTZ, 9 MHZ, CARRIER	
T1	85180	COIL-RF, 10 T, #28, 220 PF	

80780 SSB GENERATOR

U1

PIN	VOLTAGE	
	Receive	Transmit
1	5.18	4.93
2	0	2.79
3	0	0
4	0	2.04
5	5.18	4.93
6	7.54	7.14
7	0	8.29
8	7.54	7.14

U2

PIN	VOLTAGE	
	Receive	Transmit
1	3.74	3.74
2	3.74	3.74
3	3.74	3.74
4	0	0
5	3.74	3.74
6	3.74	3.74
7	3.74	3.74
8	7.53	7.53

TRANSISTOR	COLLECTOR		BASE		EMITTER	
	Receive	Transmit	Receive	Transmit	Receive	Transmit
Q1	7.18	7.18	5.48	5.48	4.91	4.91
Q2	0	0	.74	.74	0	0
Q3	0	0	.70	.70	0	0
Q4	4.93	4.70	.05	.05	0	0

NOTE: MODE set to SBN
 XTAL filter OUT
 DRIVE control full CCW
 NOTCH set to OUT
 NO RECEIVED SIGNALS
 NO MIC INPUT

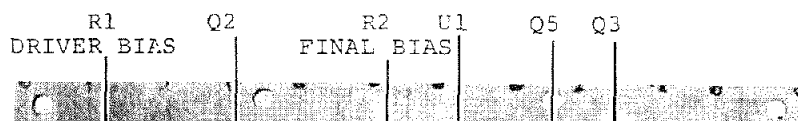
FINAL AMPLIFIER 80804-D

Transistors Q1 and Qw constitute a class AB linear push-pull driver stage of wideband design. Bias to this stage is applied whenever 'T' voltage is applied to the terminal marked 'T'. Qiescent current in the collector circuit is adjusted to a value of 30 mA with potentiometer R1. To adjust the driver bias, unsolder the small gray wire from the terminal pin and insert to 50 or 100 mA dc meter in series with it. Set the DRIVE control fully counterclockwise and the MODE switch to LOCK. If the driver collector current is not within four mA of 30 mA, reset current (clockwise to increase current) by rotating the plastic trim potentiometer R1.

Power amplifier transistors Q3 and Q4 are also in a class AB push-pull arrange-

regulator Q5. To adjust the bias on the final amplifier stage, insert a milliammeter in series with the large red wire feeding the positive supply to this assembly. The desired value quiescent current for this stage is 125 mA. Potentiometer R2 is adjusted to achieve this value. Too low a bias setting will cause distorted audio due to the amplifier operating in class C. Too high a quiescent current will increase the power dissipation in the output transistors, causing overheating.

Bias for both stages is temperature compensated to maintain a relatively constant operating point by mounting the bias diode in direct contact with the heat-sink. D2 controls the driver stage and D3 controls the output stage.



SWR/LOW PASS FILTER 80805

This assembly performs three functions, low pass output filter, T/R switching and SWR metering. The output signal from the final amplifier stage is

components above desirable levels. To attenuate these harmonics to a suitable level, the signal is passed through a set of 5 pole low pass filters before being radiated. The proper filter is selected by the band switch. The switching of the antenna from transmit to receive is performed by diodes D1 through D4 and transistor Q1. This allows extremely fast switching of the antenna and permits full break-in operation on cw. PIN diodes D3 and D4 connect the antenna to the receiver input when receiving, and are back biased by a voltage rectified at D1 and D2 when transmitting. The transmitted signal on its way to the antenna first passes through the primary of transformer T1 in the SWR bridge. This bridge is balanced on 28 MHz by setting the trimmer capacitor so that there is a null on the meter when a 50 ohm resistive dummy load is connected to the antenna jack and the FWD/REV switch is in the REV position. Reflected power is sensed through D9, filtered to a dc component and applied to the meter by way of the REV terminal. R1, in series with this meter, is adjusted for a three to one SWR meter indication when the load is changed to 150 ohms. This adjustment should be made with the DRIVE control set so that the ALC LED lights. Forward power for driving the front panel meter is rectified and converted to a dc control voltage through D7 and D8. This voltage is also fed to the NC pin of the SWR meter.

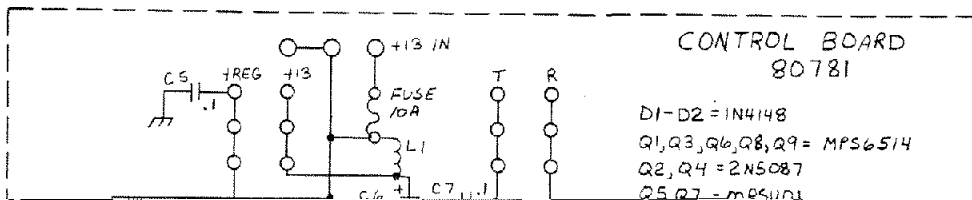
80805 D SWR/LOW PASS FILTER



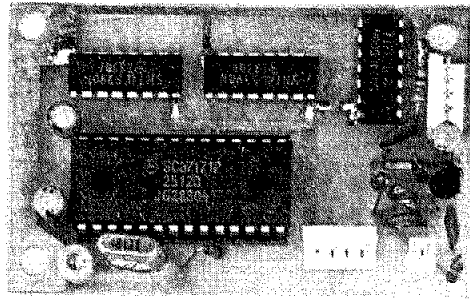
C11 SWR NULL

CONTROL BOARD 80781

This assembly contains a set of synchronous transistor switches for controlling the 'T' and 'R' voltages that switch the unit from transmit to receive. It also contains an integrated circuit voltage regulator which powers the frequency and voltage sensitive circuits in the VFO, ssb generator, product detector and offset control functions.



81087 COUNTER LOGIC



PARTS LIST

C1,3,4	23132	CAP-FXD, .01 MF, 100 V, CER
C2	23188	CAP-FXD, 4.7 MF, 25 V EL VERT
C6	23196	CAP-FXD, 2.2 MF, 20%, 50 V, EL
C7	23222	CAP-FXD, 10 MF, 16 V, EL, VERT
C5	23236	CAP-VAR, CER, 5-30 PF
Q1,2	25054	TRANSISTOR - MPS6514
U1	25120	IC-MC6805P2P/SC87171P
U2,3	25125	IC-SN74LS390N
U4	25131	IC-SN74LS00N
Y1	48111	CRYSTAL, 4.0500000 MHZ, .002 % HC-18

U1

PIN	VOLTAGE
1	0
2	5V
3	5V
6	0

U2 & U3

PIN	VOLTAGE
8	0
16	5

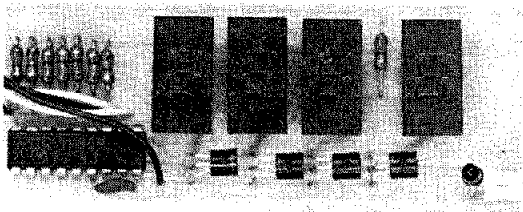
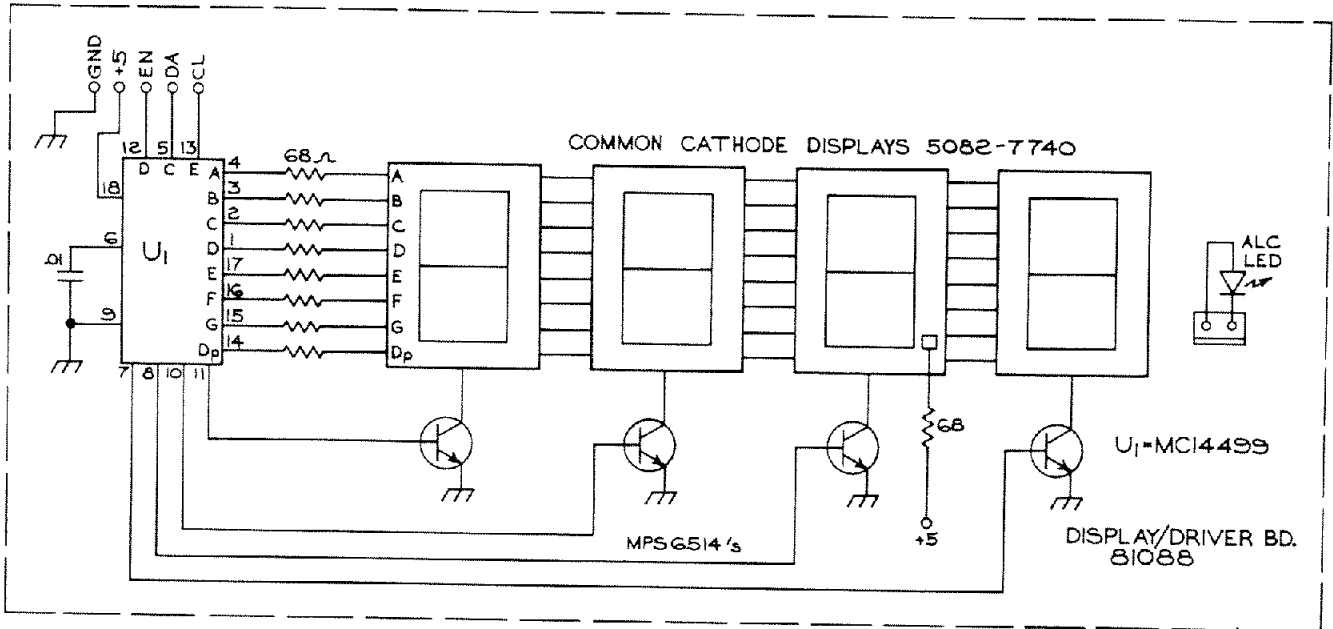
U4

PIN	VOLTAGE
7	0
13	5V
14	5V

Transistor	Collector	Base	Emitter
Q1	7.3	6	5.4
Q2	1.3	7.2	7.4

DISPLAY DRIVER BOARD 81088

U1 is a serial to parallel data decoder which receives 16 bits of serial data, 4 X BCD, latches, converts to 7 segment data and drives the display. No adjustments are required.



81088 DISPLAY/DRIVER

PARTS LIST

C1	23132	CAP-FXD, .01 MF, 100 V, CER
ALL	25054	TRANSISTOR-MPS6514
U1	25126	IC-MCI4499P
ALL	28024	LED-MINI, 1/8 DIA, RED
ALL	28028	DISPLAY-LED, RED

DISPLAY/DRIVER BOARD 81088

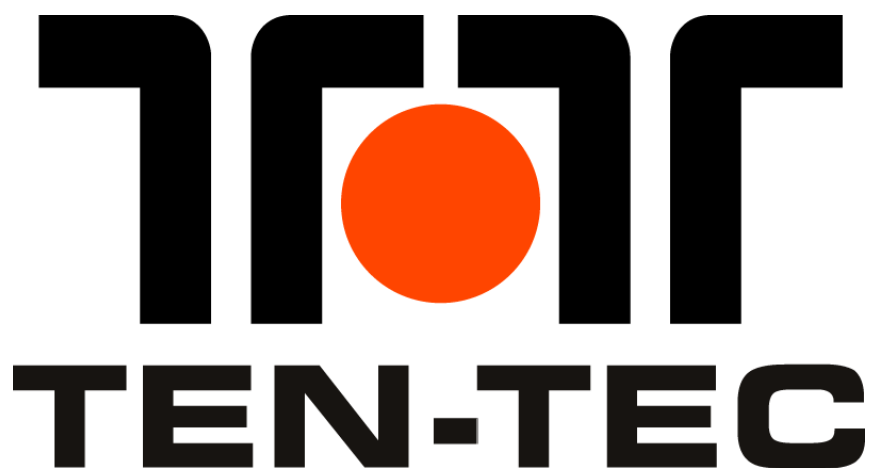
U1

PIN	VOLTAGE
9	0
18	5V

Transistor	Collector	Base	Emitter
Q1	.7	.25	0
Q2	.7	.25	0
Q3	2.8	.25	0
Q4	.7	.25	0







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