

DE LUXE PHASEMASTER JR.

The De Luxe PM-Jr exciter transmitter is a complete self contained transmitter, supplied with 30M coils, one heterodyning crystal, and tubes.

Please read this instruction book carefully before operating your Le Luxe PM-Jr.

UNPACKING AND PREPARATION FOR OPERATING

1. Remove unit from its shipping carton.
2. View back of exciter with help of Figure 1.
3. Connect either antenna or final amplifier to connector "A". Output impedance of exciter is 52 ohms.
4. If VFO is used connect VFO output to connector B. 6 to 10 volt RF required. Do not exceed these values.
5. Set VFO XTAL switch for proper position (this is located through top cabinet door on exciter chassis. See Figure 2).
6. If the ATVC anti-trip voice control is used follow supplied directions for connections.
7. If cutoff bias for a final amplifier silencing is desired connect to terminal 2 of C strip. A negative 100 volts are available from this terminal and grounded on transmit.
8. Install proper coils for desired operation.
9. Turn on AC switch, allow one minute for filaments to heat.
10. Switch function switch to manual.
11. Set ATVC switch for proper position.
12. Turn on plate switch. (Always allow sufficient time before turning on plate switch).
13. Advance carrier level control to about 8 leaving carrier balance controls at 0.
14. Tune mixer and final tuning control for maximum narrowing of eye shadow on RF indicator.
15. Never insert full carrier unless exciter is loaded.
16. Return carrier level control to 0.
17. Balance out carrier with carrier balance controls for maximum shadow on RF indicator.

NOTE: If you are tuned to either 9mc or VFO frequency you cannot balance out carrier - then repeat step 14.

18. Advance audio gain to about 4 and select proper side band on emission switch. (See Figure 3).
19. You are now ready to operate SSB.

OPERATING INSTRUCTIONS FOR THE DE LUXE PHASEMASTER EXCITER

SSB Operation

Insert proper final RF and mixer coils for desired band. Set VFO - crystal switch to proper position. Turn the carrier level control to approximately 8 and tune mixer and final controls for maximum narrowing of RF indicator shadow. Return carrier level control to 0. Balance out carrier by adjusting carrier balance controls for maximum shadow width. Proper loading of output will determine linearity of output. Set modulation switch for desired position, either SSB-1 or SSB-2. Setting of audio gain control determines exciter output power.

AM Operation

Turn the emission switch to AM position leaving carrier balance controls at 0 (in carrier balanced out position). Adjust the carrier level control until maximum level is obtained. Now reduce carrier level to about 1/2 maximum value as indicated on a scope or on RF indicator eye. Adjust audio gain until modulation peak just reach maximum output level obtain. With audio gain properly set, with speech the RF indicator will show a slight flicking of shadow. This is indication of proper operating conditions.

PM Operation (Narrow Band Phase Modulation)

Turn the emission switch to PM position. With the AM carrier control in balanced position and the carrier level control at 0, insert carrier with the PM control to nearly full output. Adjust the audio gain control so that modulation peaks do not overexceed the carrier level. This can be determined by adjusting so that modulation just causes shadow movement of RF indicator eye. The adjustments of the AM and PM conditions can best be first adjusted with a scope and the recorded for ready resetting these conditions. If no scope is available, monitoring signal with the receiver will make it possible to properly set the operating adjustments.

CW Operation

CW operation is available from the keying jack located on the rear of exciter RF chassis. Break-in CW is available using the ATVC anti-trip voice control unit, by placing the function switch to manual position and the ATVC switch to in. CW operation without the ATVC unit CW is possible by placing the ATVC switch to out. A jumper clip must be

inserted in pins 1-2 of the ATVC socket on the exciter chassis. Turn off the audio gain control and adjust carrier level control to approximately 10. Key as above.

Novice CW Operation

Novice direct crystal controlled CW operation is available simply by removing the 9mc crystal from its socket. Then insert the desired fundamental frequency crystal into the heterodyning crystal socket located next to XTAL-VFO switch on exciter chassis. With the proper mixer and final coils inserted tune to the desired frequency output by adjusting the mixer and final tunings for maximum narrowing of shadow of RF indicator eye.

160, 80, and 40 meter band operation is possible with direct frequency crystals.

Frequency multiplication may be used only if the exciter is used with an antenna tuner or additional final amplifier, due to possible radiation of sub-multiple frequencies.

ATVC Operation (Anti-trip Voice Control)

An anti-trip voice control unit is available for your De Luxe Phasemaster Jr. Exciter as an accessory unit. It simply plugs into the provided 15 connector Jones plug mounted on the rear center of the exciter chassis. The ATVC unit provides voice control break-in facilities and also enables the operator to silence the receiver automatically.

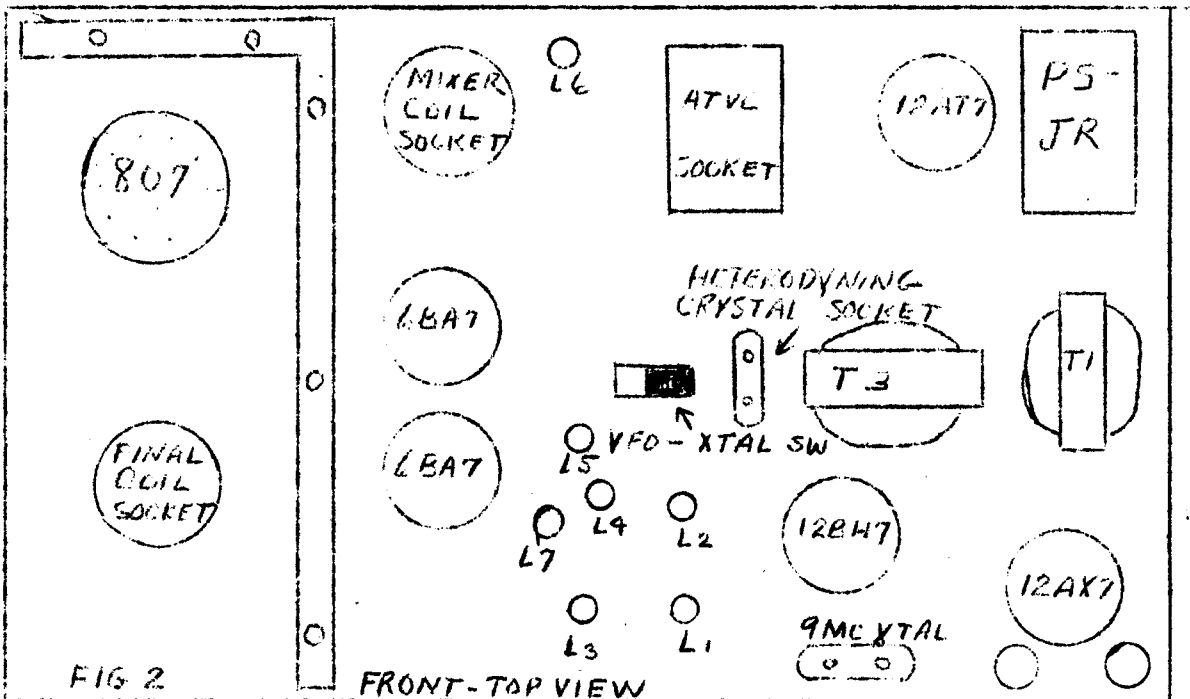
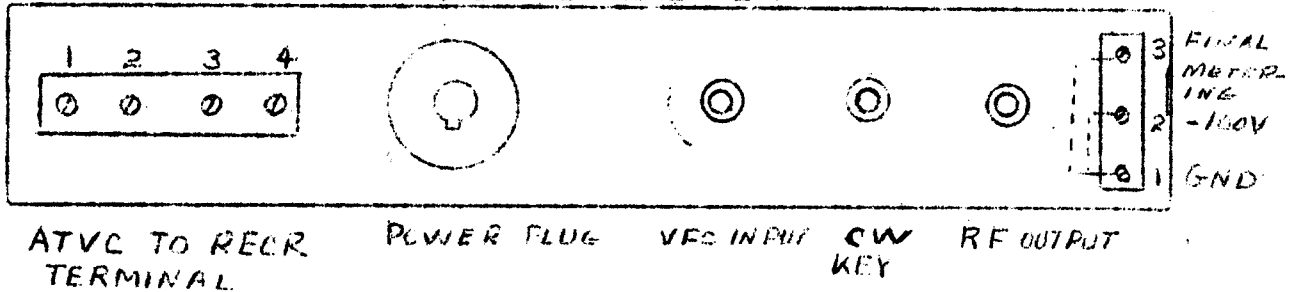
Receiver connections for silencing with the ATVC are as follows: Connect the audio output of the receiver (speaker voice coil impedance) to terminals 1 and 2 of the rear 4 terminal strip. Connect the voice coil lead of your receiver speaker on to terminals 3 and 4 of the same terminal strip. It is now possible to operate voice control with the exciter. Cut off bias is also available from terminal 2 of the 3 terminal strip on the rear of the chassis for cutting off any linear final if used with the De Luxe Phasemaster Jr. Exciter.

IMPORTANT

The De Luxe Phasemaster-Jr Exciter may be operated with or without the ATVC plug-in anti-trip voice control by simply setting the ATVC slide switch located on exciter front panel to the proper position.

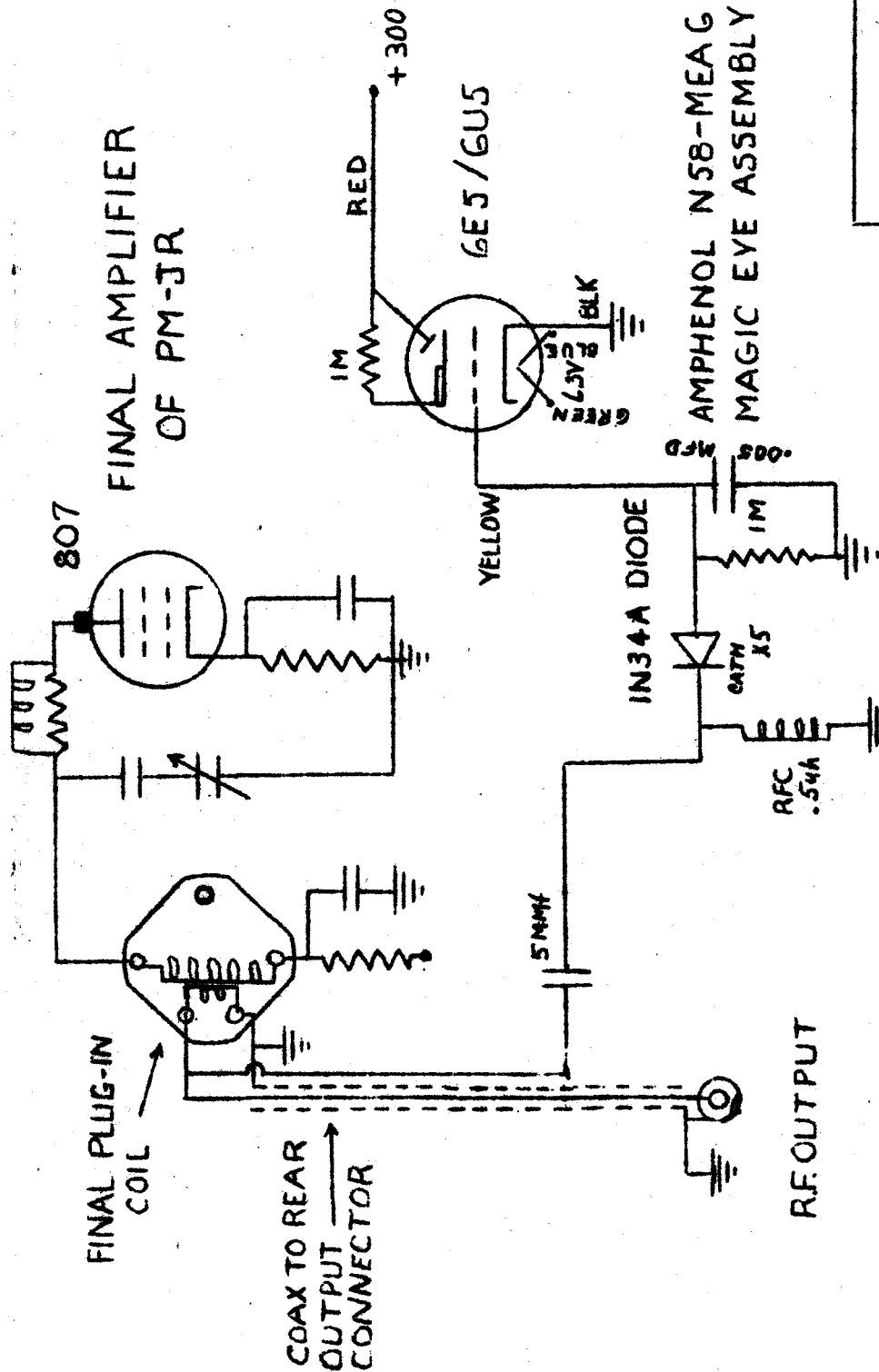
If the ATVC plug-in unit is not used normal manual operation is still available. Manual position on the function switch will be transmit. Standby position will be receive. Control of receiver silencing is not available without the ATVC Unit. It is also necessary for manual phone operation to insert an unused phone plug into the CW jack on the rear of the exciter chassis to open the keying circuit.

FIG 1
REAR VIEW OF EXCITER



SIDEBANDS TRANSMITTED VS VFO INJECTION FREQS
FIG 3

BAND	SSB-1	SSB-2	MASTER XTAL	VFO OR XTAL INJECT FREQ	OUTPUT FREQ
160M	UPPER	LOWER	9 MC	7 MC TO 7.2 MC	2 MC TO 1.8 MC
160M	LOWER	UPPER	9 MC	10.8 MC TO 11. MC	1.8 MC TO 2.0 MC
80M	UPPER	LOWER	9 MC	5.0 MC TO 5.5 MC	4.0 MC TO 3.5 MC
80M	LOWER	UPPER	9 MC	12.5 MC TO 13. MC	3.5 MC TO 4.0 MC
40M	LOWER	UPPER	9 MC	16.0 MC TO 16.3 MC	7.0 MC TO 7.3 MC
20M	LOWER	UPPER	9 MC	5.0 MC TO 5.3 MC	14.0 MC TO 14.3 MC
20M	LOWER	UPPER	9 MC	23.0 MC TO 23.3 MC	14.0 MC TO 14.3 MC
15M	LOWER	UPPER	9 MC	12.0 MC TO 12.45 MC	21.0 MC TO 21.45 MC
15M	LOWER	UPPER	9 MC	30.0 MC TO 30.45 MC	21.0 MC TO 21.45 MC
11M	LOWER	UPPER	9 MC	35.96 MC TO 36.23 MC	26.96 MC TO 27.23 MC
10M	LOWER	UPPER	9 MC	37.0 MC TO 38.7 MC	28. MC TO 29.7 MC



FINAL AMPLIFIER
OF PM-JR

AMPHENOL N58-MEAG
MAGIC EYE ASSEMBLY

MODULATION-TUNING -
CARRIER BALANCING IND
CIRCUIT

FOR USE WITH ALL PM-JR EXCITERS
AND USE IN DELUXE PM-JR
LAKESHORE IND

7-15-54

PIN → TUBE ↓	1	2	3	4	5	6	7	8	9
12AX7 PRE-AMP	140	0	1	3.1	3.1	140	0	1	3.1 AC
12BH7 AF DRIVER AND 9MC OSC	280 50 RF * NOTE 1	-35 35 RF	11	3.1 AC	3.1 AC	270	0	10	3.1 AC
12AT7 A.F. MOD	290	0	4	3.1 AC	3.1 AC	290	0	4	3.1 AC
PARREL 6BA7's MIXER	80	-9 8 RF	0	3.1 AC	3.1 AC	0	3 RF	0	290 24 RF
807 POWER AMP	3.1 AC	300	23 RF	25	3.1 AC				

VOLTAGE CHART FOR DELUXE PM-JR

TEST CONDITIONS

Low voltage 300V

High voltage 750V

Function switch in manual with ATVC unit installed

AM carrier control-OFF

PM carrier control-OFF

Carrier level control 10

Audio gain control-OFF

RF Output - 4 MC

All DC AC and RF voltages taken with VTVM. RF voltages are peak *Means if 9 MC xtal stops oscillating voltage can not be taken at this point.

GENERAL ALIGNMENT PROCEDURE

Set the front panel controls as follows: Speech level completely off, modulation switch SSB-1. AM carrier balance control 0. PM carrier balance control 4. Mixer tuning control. Maximum for 80 M. Amp. tuning control maximum for 30 meters. VFO and crystal switch in crystal.

Plug in the 80 meter mixer and final coils and connect a 15 to 50 watt resistor of approximately 50 ohms to the antenna terminal of the exciter. If a 50 ohm resistor is not available, a 40 watt 115 volt light bulb may be substituted.

PRELIMINARY ALIGNMENT OF SLUG TUNED 9 MC RF COILS

A RF vacuum tube voltmeter can be used to advantage in the following alignment if available. Otherwise the station communications receiver and a pocket voltmeter can be substituted. Either tune the receiver to 9000 KC or connect a DC voltmeter from pin 8 of the 12BH7 oscillator tube for alignment indication. Adjust slug tuned coil L1 until a signal is heard at 9 M, or the voltmeter reads approximately 20 volts DC. This reading will increase sharply when crystal oscillator starts oscillating. It may be necessary to couple the receiver antenna near the location of L1 coil to hear the 9 MC signal. Next loosely couple the receiver near pin 7 of the 6BA7 mixer tube or connect the RF vacuum voltmeter to pin 7 of the 6BA7 tube and adjust L2 through L5 for maximum RF or S meter reading. Now adjust both carrier balance controls for minimum RF carrier output. Again unbalance the PM control slightly to give about 1/3 maximum output and again peak L2 through L5. If by tuning the PM balance control completely clockwise the 9 MC crystal drops out of oscillation, it may be necessary to slightly re-adjust coil L1 until stable operation is assured.

ADJUSTMENT OF SLUG TUNE COILS L6 AND L7 TRACKS

These slug tune coils need to be adjusted only if 20 meter operation is contemplated. With a crystal of approximately 5150 KC installed in the heterodyning crystal socket and 20 meter mixer and output coils installed, tune your receiver to approximately 15 MC and adjust the mixer and output tuning controls for maximum S meter reading. Adjust L6 and L7 for minimum 15 MC output. When a VFO is used, only L6 will provide a 15 MC RF null. Proper adjustment of L6 and L7 will provide a 15 MC suppression when operating on 20 meters in excess of 50 DB.

SIDE BAND ALIGNMENT SUPPRESSION

The following alignment procedure determines the ultimate side band suppression of your Phasemaster Jr. Exciter and it is recommended that the operator use extreme care in making the following adjustments to obtain the ultimate performance from the exciter. It is necessary to use a low distortion audio oscillator connected to the mike, input of the exciter having an output level of less than .05 volts and less than 1%

SIDE BAND ALIGNMENT SUPPRESSION (Cont)

distortion, set at 1225 cycles. Now connect the direct vertical plates of an oscilloscope to the RF output connector and ground of the exciter. Set the internal horizontal sweep oscillator of the oscilloscope to synchronize at about 1/10 the audio frequency, to enable viewing the ripple pattern. At this point you should observe a good amount of ripple on the output wave.

1. Adjust the audio balance control K for minimum observed ripple on scope. Now switch from sideband 1 to sideband 2 and observe the ripple. If the amount of ripple is not equal, slightly adjust L2 until the displays are identical in both sideband 1 and sideband 2 positions. Each time L2 is adjusted it will be necessary to check both carrier balance controls for minimum RF by turning off first the speech level control. It is also necessary to readjust the audio balance control each time coil L2 is adjusted and these adjustments should be gone over several times until ultimate conditions are met.

If an oscilloscope is not available it is possible to make side band suppression alignment using your communications receiver in place of the oscilloscope. Set your receiver for the following conditions: VFO off, AVC on, and reduce RF gain to prevent any receiver overloading. Now tune in the 9 MC signal. Minimum modulation heard in the loudspeaker corresponds to minimum modulation of the RF adjustments. Adjust as described in the above paragraph. Then using the crystal filter and the S meter of your receiver it will be possible to tune through the signal and locate the suppressed side band.

In adjusting L2 it is possible to provide an almost ripple free pattern in one side band position at the expense of degrading the opposite side band. The object is to have both side bands equal, which will give approximately 40 DB suppression of the unwanted side band. The following examples of scope patterns should be studied in order to familiarize the operator with the proper alignment conditions necessary for maximum suppression.

After alignment is completed, cement thread alignment bolt of all slug coils.

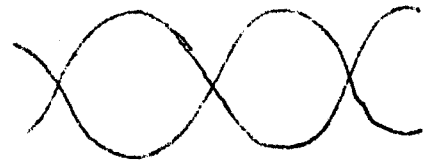
Oscilloscope Patterns



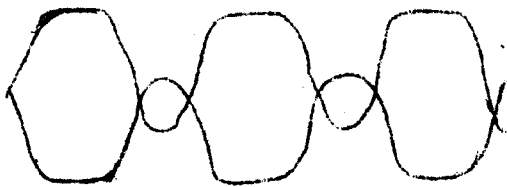
Good SSB signal
with tone modulation.



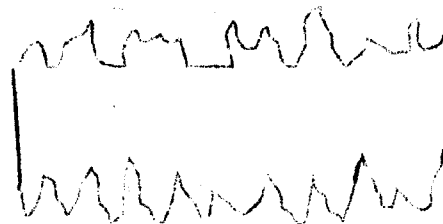
Defective SSB Signal
A- L3 detuned
B- Incorrect AF balance
C- Incorrect RF phasing
Adjust L3
D- Incorrect carrier
balance



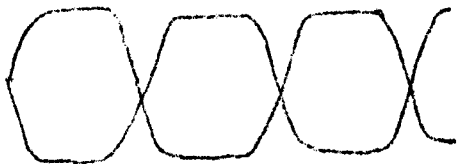
SSB with carrier
100% modulation



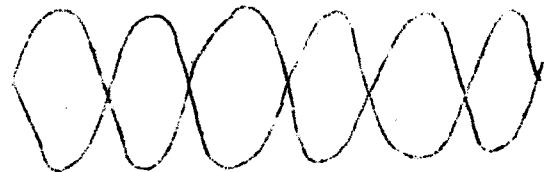
DSWC with over-modulation
and wave flattopping



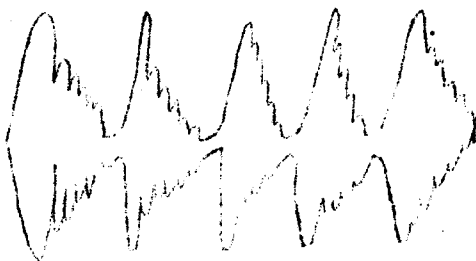
SSB with L3 detuned



SSB with carrier improper
output loading excessive
audio gain

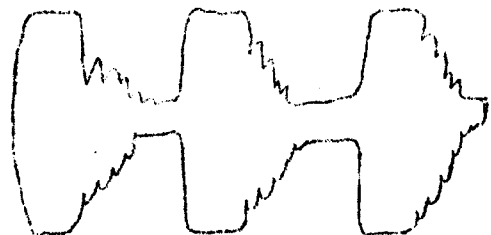


Two tone linearity
test - proper operation



Proper SSB voice modulated

PM-Jr



SSB excessive audio gain
squaring audio wave form

LAKE SHORE INDUSTRIES

DELUXE PM-JR OPERATING NOTES

When changing coils for band shifting always turn off the exciter power switches. High voltage is contained on these coils which may make body contact.

If crystal control is used power should be removed or care taken when changing crystals as to body contact with the function switch contacts.

Surplus Command Transmitters such as the BC-457, 458, and 459 units make excellent low cost Vfor use with your DeLuxe PM-JR exciter. Information for converting these units may be had for 25¢ to cover cost of mailing by writing Lakeshore Industries Box 163 Manitowoc, Wisconsin.

Your DeLuxe PM-JR exciter makes a excellent driver exciter for any type of final power linear amplifier. The P-500 Linear Power Amplifier is now available and will give 500 watts of average input sideband power on all bands with no coil changing of band switching. Simple all band SSB operation is now a reality.

Coils for 160, 80, 40, 20, 15, and 10 meter bands for your DeLuxe PM-JR are available at \$3.95 per band set.

Additional suggestions or ideas for operating improvements or refinements with your DeLuxe PM-JR exciter will be warmly recieved. This is how we of Lakeshore Industries can and do produce a better amateur product for you the Amateur.

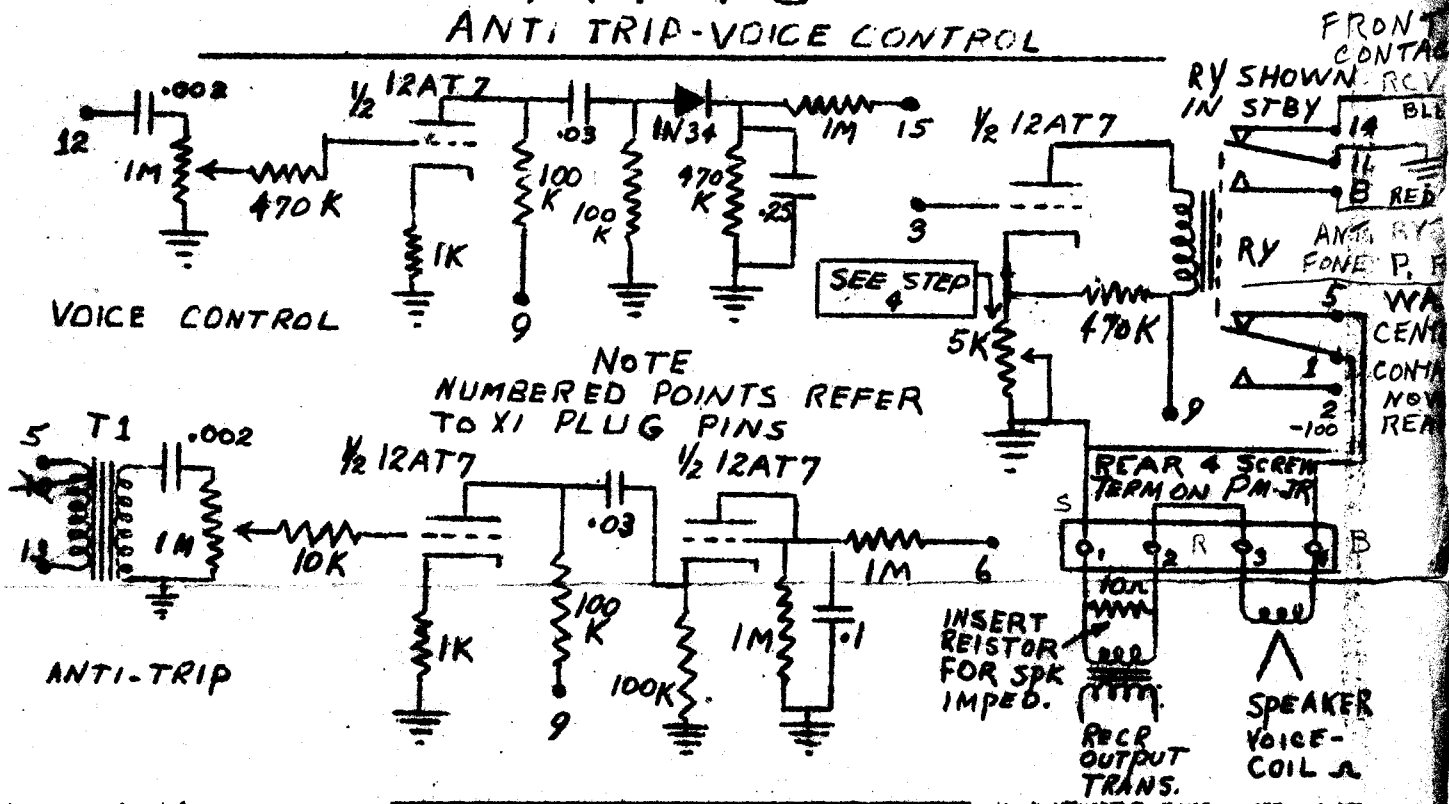
You are now ready to embark into the biggest adventure in the history of amateur radio, Single Sideband Suppressed Carrier. Many pleasant hours are ahead.

Best wishes with SSB

LAKESHORE INDUSTRIES

ATVC

ANTI TRIP-VOICE CONTROL



ATVC UNIT

The ATVC Unit is a plug in anti-trip voice control unit for use with the Phasemaster Jr. Exciters. It makes possible voice control operation having anti-trip feature for speaker operation.

ATVC Installation and Operating Instructions

1. Plug in the ATVC unit on the exciter chassis plug.
2. A -100 volts bias is necessary to operate voice control from your power supply. (This is already contained in all DELUXE exciters)
3. Adjust VC level control for normal exciter operation when talking 2-3 inches away from mike. (This is best distance for VC operation)
4. If difficulty is experienced with the relay not releasing or pulling in adjust **relay set on the top ATVC unit** for proper operation with VC level set at approx 1/2 oper.
5. Connect voice coil output from receiver to term. 1 & 2 of rear chassis 4 term. strip. (It may be necessary to reverse these connections for some receivers have grounded outputs) (SEE CIRCUIT)
6. Connect a speaker voice coil leads to term. 3 & 4 of above strip.
7. Locate a weak signal on the receiver. Adjust receiver level for normal listening. NOW tune in a strong signal preferably a heterodyned station that triggers the voice control with the AT level in off position.
8. Adjust AT level control to just stop triggering action of relay from receiver signal.
9. If too much AT level is used it will make it impossible for you to operate the voice control when speaking into the mike.
10. It may be necessary in extreme heterodyne conditions to reduce your audio gain on the receiver to operate the voice control.