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**Demco Super Satelite Owner's Manual**  
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# DEMCO

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DEMCO SUPER

*Satelite*

C B BASE STATION



## INSTRUCTION BOOK

*Command Electronics, Inc.*

11830 SHAVER ROAD

SCHOOLCRAFT, MICHIGAN 49087

## DESCRIPTION

### SECTION (1)

You are to be congratulated for choosing a Demco Satellite Base Station. You have purchased a very expensive piece of radio equipment, and it should give you many years of enjoyment. However, even though you undoubtedly are anxious to get on the air with your new Satellite, please do not touch anything on this radio until you have read this book from cover to cover at least once.

The Satellite is a completely self-contained two way AM citizens band radio designed for both personal and professional radio communications. Tunable to all 23 channels, its high sensitivity and sharp selectivity affords the operator clear undistorted reception at maximum range.

The Satellite transmits and receives with crystal-controlled reliability on any one of 23 channels. The 23 active channels are selected by merely turning the transmitter dial to any one of 23 channels desired. A unique frequency synthesizer is employed in the radio which determines both transmitting and receiving frequencies well within tolerances specified by the F.C.C. Some of the extra features found on the Satellite include: Variable receive tuning; Beam & ground plane switch on front panel; Pi tuning from front panel; Multi-purpose meter for reading watts, modulation and field strength; S-meter; Receive audio-compressor; Receive and transmit tone control; ANL switch; Instant on operation; Hi or Lo impedance microphone input; 117 VAC or 12 VDC power operation; Earphone and two speaker plugs.

## SPECIFICATIONS

### SECTION (2)

#### RECEIVER

##### SENSITIVITY

.3 microvolts for 10 db  $\frac{S+N}{N}$  @ 30% mod.

.4 " " " 16.5 db " " " "

1.0 " " " 23 db " " " "

##### SELECTIVITY

+ 2.5 KC @ - 6 db down

+ 6.5 KC @ - 60 db "

##### NOISE LIMITER

Series gated type (switched)

##### ADJACENT CHANNEL

Better than -93 db

##### AUDIO OUTPUT

2.5 Watts @ 10% distortion

##### AUDIO COMPRESSOR

Prevents overload from loud audio signals

##### C.A.P. CONVERTER

Plug in C.A.P. Converter (optional)

##### SQUELCH

Adjustable to open @ .4 to 250 microvolts

##### S-METER

S-9 with 50 microvolts at Ant. input

##### TUNING

23 channels with xtal or variable tuning

##### FINE TUNING

+ 1.2 KC tuning for peaking off channel signals

##### AUDIO OUTPUT

##### SELECTOR SWITCH

For selecting earphone or speaker operation

### SECTION (3)

#### TRANSMITTER

##### R. F. OUTPUT

3.5 watts with 5 watts input

##### MODULATION

8A3 100% AM Plate Modulation

##### R. F. OUTPUT

##### IMPEDANCE

30-75 ohms Pi-tuning

##### MIC. INPUT

Slide switch for selecting Hi-Z for ceramic or crystal microphone or Lo-Z carbon microphone

##### PI-TUNING

Controls on front panel

##### METERING

R.F. watts into 50-ohms internal load; field strength meter and modulation percentage

##### TRANSMITTING CHANNELS

23 channels xtal controlled synthesizer

TONE CONTROL	Tone control for setting modulation tone from treble to bass when transmitting
ANT. SWITCH	Switch on front panel for selecting beam or ground plane operation
MODE SWITCH	For selecting xtal, variable or C.A.P. operation
POWER SUPPLY, A.C.	120 V.A.C. .8 Amp. 100 watts
POWER SUPPLY, D.C.	12.6 V.D.C. 8.5 Amp. Rec., 9 Amp. Xmit.

## PRELIMINARY INSTRUCTIONS

### SECTION (4)

These instructions cover setting up and operation of the Satelite Base Station. To obtain the best possible performance from your Satelite Base Station, read the instructions thoroughly before you begin installation.

This Satelite Base Station was carefully tested and inspected before leaving the factory. As you unpack the equipment examine it for any apparent damage that might have occurred in shipment. If any damage is found, file a claim with your carrier or dealer immediately. Supply full information promptly in order to expedite your claim.

The following items are standard equipment with the Satelite Base Station:

1 - - Transmitter	1 - - Mic. plug
1 - - Receiver	1 - - 117 V.A.C. Cord
1 - - Speaker	1 - - Remote Cable
1 - - Instruction Book	1 - - Receiver Ant. Cable
1 - - Warranty Card	

The following items are optional equipment with the Satelite Base Station:

Power Modulator Speaker Console  
 C.A.P. Converter 26.620 MC  
 Transistorized DC Power Supply Oscillator  
 Microphone Foot Switch  
 Auxiliary Speaker Console  
 Shure Model 444 Microphone

## STATION SET UP INSTRUCTIONS

### SECTION (5)

#### 1. CABLE CONNECTIONS

Plug female end of the remote cable into back of receiver; male end into transmitter plug marked (Remote Plug). Next take the black 2½ ft. RG-174 cable, with phono plugs at each end, and plug one end into receiver female plug marked, (ANT.) on receiver rear apron. Take the other end and plug it into the transmitter rear apron marked (Rec. Ant.). Now take the 11 pin female plug on the power cord and plug into male plug on transmitter marked (Power Cord).

#### 2. MICROPHONE

A. The Satelite Base Station does not include a microphone as standard equipment, but a microphone plug is supplied. The reason for this is that each owner has his own

preference as to which microphone is best suited for his operation.

You may order these microphones from your Demco dealer.

B. For hooking up the microphone refer to schematic diagrams. After you have wired the microphone, plug it into back of transmitter marked (Mic. input). If ceramic or any Hi-Z microphone is used, the microphone switch should be in the Hi-Z position. If a carbon or Lo-Z dynamic microphone is used, the switch should be in the Lo-Z position. Important! When using the built-in Power Modulator - Speaker Console, a Hi-Z mike must be used.

### 3. ANTENNAS

The Satellite Base Station has both ground plane and beam connections on the rear apron of the transmitter. The proper antennas should be hooked up as marked on rear apron of transmitter. If only one antenna is used, hook antenna into its proper SO-239 socket.

### 4. PRIMARY POWER

After steps 1 thru 3 have been checked and are correct, plug power cord into a 117 VAC wall outlet. Important! Make sure the A. C. power switch on the transmitter is in the off position.

## SATELITE TRANSMITTER

### SECTION (6)

#### 1. PRELIMINARY INSTRUCTIONS

Before turning on your Satellite Base Station, make sure you have read and are familiar with all of the following sections and their paragraphs. Read each paragraph carefully, for one mistake in setting up or in the operation of your Satellite could cause poor performance. Refer to pictorial diagrams in center section of this booklet for identifiable controls and their uses.

#### 2. SELECTOR

The selector switch on the transmitter control panel should normally be in the xtal or variable position. The variable position on this control is the center position of this switch which is unmarked. Important! Do not use the C.A.P. position of this switch unless a C.A.P. 13.310 half frequency crystal is installed in the transmitter. When the selector switch is in the xtal position, the transmitter channel selector switch becomes a one dial synthesized operation, for crystal controlled transmitting and receiving on the same channel. When the selector switch is turned to the center or variable position which is unmarked, the transmitter channel selector switch is used only for transmitting; and the receiver variable dial is used for receiving. Also, when the selector switch is switched from xtal to variable position, the mode lights will indicate the same on the receiver front panel. The red light shows that the receiver is in the variable mode or when the white light is on, the unit is in the xtal position with lock in transmitting and receiving. If the C.A.P. frequency is used, the selector switch should be switched to the C.A.P. position, and the variable and the xtal mode lights will go off, and the C.A.P. red light will come on. Also the CB mode light will be off.

#### 3. ANT. (SWITCH)

The antenna switch is a new convenience to the CB operator. The transmitter has both beam and ground plane input SO-239 plugs on the rear apron of the transmitter. The antenna switch on the front panel permits you to switch to beam or ground plane as desired. The front panel of the transmitter also has beam and ground plane mode lights for indicating which antenna is being used. This switch also has a center position which is unmarked. When in this position, the internal load is switched to the output of the transmitter for measuring power output. When the antenna switch is in the center position, both beam and ground plane mode lights will be off.

4. MOD.-WATTS (METER SWITCH)

The Satellite transmitter has a red colored rocker switch on the front panel for switching the meter to read R.F. watts or modulation percentage. When the red rocker switch is in the watt position, and the antenna switch is in its center position, the true R.F. watts output will be indicated on the meter. When the antenna switch is switched to either of the antennas, the meter reads relative power out for peaking the Pi tuning for maximum R.F. output into the antenna. Important: In this position the meter reads only as a field strength meter. This can be used to peak the transmitter for maximum output into the antenna. If the rocker switch is switched to the modulation position, the meter will read modulation of the carrier.

5. A. C. POWER

The Satellite incorporates a new three position switch for turning on the primary power to the complete unit. The off position is furthest to the left. This completely shuts off the primary power to the set. The center position of this switch is for maintaining an "instant on" tube standby condition. The on position, or furthest to the right, turns on full power to the receiver and transmitter. When the instant on is used, the filaments are held at 5 V.A.C. but the B+ is completely shut off. The panel illuminating lights are off in this mode. The set may be left in this mode over night for instant on operation. The next time the unit is turned on, the set will be ready for operation in five seconds. If the set is to be off for a longer period of time than over night, the switch should be turned to the off position. For day to day operation, the center instant on position should be used for prolonging tube life, which will average three times longer than normal. Important! When the set is used on D. C. operation, with the optional D. C. power oscillator, the instant on should not be used. The set should be completely shut off or completely turned on. Do not use the center position as this puts 5 volts D. C. on the filaments. If left in this position over night, it will completely exhaust a 12 V.D.C. battery.

## SATELITE RECEIVER

### SECTION (7)

1. VOLUME

The volume control on your Satellite Receiver controls the amount of audio output to the speaker or earphone, whichever is used.

2. PHONE-SPKR.

The audio selector switch may be switched by the operator for earphone or speaker operation as desired. This is done by use of the red rocker switch on the front of the receiver.

3. TONE-A.N.L.

An advanced design series gated noise limiter is employed. This limiter is extremely effective for minimizing impulse type noises. The noise limiter may be shut off by pulling out on the tone control knob and put back in operation by pushing in the tone control knob. The operator may vary the tone of the received signal from bass to treble by turning the knob C.C.W. for added bass or C.W. for added treble.

4. SQUELCH

This circuit will restore the audio from the weakest readable signal, or it can be set to restore only one particularly strong local signal.

5. AUDIO COMP.

When turned C.C.W. to the position marked Comp. it will automatically decrease the volume of strong audio signals going to the speaker from nearby stations. The local position of this switch enables the operator to lower the R.F. gain of the receiver and also improve the selectivity of the receiver. The center position which is the distant position should be used at all times unless a very strong R.F. signal tends to overload the receiver. In this case, the local position should be used. When the switch is in

the Comp. position, the R.F. gain is held at full gain.

6. VARIABLE TUNING

The receiver may be variable tuned over the 23 CB channels when the selector switch on the transmitter control panel is in the variable position. This will also be indicated by the red variable light on the front panel of the receiver. The variable tuning is inoperative when the unit is used on xtal receive.

7. FINE TUNE

This three position control will allow the operator to adjust an off frequency received signal in the I.F. bandpass, approximately  $\pm 1$  kc. Small variations in the received frequency will not be noticeable and signals close to the assigned frequency will fall near the center position of the control. The control has no effect on the transmitter frequency.

8. SPECIAL EXPLANATION

The Satellite has many new and exclusive features. One of them is its ability to be completely crystal controlled on both transmit and receive. Or, by the flick of a switch, you can change to crystal transmit and variable receive (see Section (6) paragraph 2. SELECTOR). When you are crystal controlled on transmit and receive, some incoming signals may be off frequency in varying degrees. With the Fine Tuning control described above, you can center any incoming signal 1,000 cycles plus or minus. (Keep in mind, the F.C.C. requires that a transmitted signal be within 1,350 cycles, plus or minus). If the incoming signal is off more than 1,000 cycles, you can then switch to variable tuning to center the incoming signal. This means that regardless of the frequency that is being transmitted, you will be able to receive any signal at maximum strength with the help of your Fine Tuner or variable receive.

## OPERATION OF THE SATELITE BASE STATION

### SECTION (8)

1. PRELIMINARY INSTRUCTIONS

After reading Section (5) par. 1,2,3 and 4 again and rechecking Sections (6) and (7), turn power switch to the on position on the transmitter control panel. The illuminating lamps will come on and the A. C. power mode lights on both units should light. The white mode light marked Rec. should also be on. NOTE: To have audio from the speaker, it is necessary to plug a correctly wired microphone into the microphone input socket.

2. SELECTOR SWITCH

Now turn the selector switch on the transmitter to either xtal, which is the right position, or to variable which is the center position. When the selector switch is in the xtal position, the white light marked Xtal on the receiver will light up. When the selector switch is in the variable position, the red light marked Variable on the receiver will light up.

3. VOLUME CONTROL AND SQUELCH CONTROLS

Now turn the volume control C.W. to about 1/3 volume so that background noise is heard from the speaker. Make sure the squelch control is in the furthest C.C.W. position. Make sure that the red speaker-earphone switch on the receiver is in the speaker mode. Rotation of the squelch C.W. will cut out all background noise and silence the receiver speaker.

4. AUDIO COMPRESSOR SWITCH

Make sure the audio compressor switch is in its center position which is the distant position for normal receive operation.

5. FINE TUNING CONTROL

Set this control in the middle position.

6. **TONE CONTROL**  
This control may be set in any position depending on the amount of treble or bass desired.
7. **A.N.L. SWITCH**  
The automatic noise limiter may be disabled by pulling out on the tone control knob. Pushing in on the control turns on the noise limiter for cutting out impulse noises. Use the out position only if there is no noise interference or when there is an extremely weak signal.
8. **VARIABLE TUNING**  
If you want to operate on variable receive, turn the selector switch on the transmitter to the variable position, which is the unmarked center position of this switch. The red light on the receiver marked variable should light. Be sure that the antenna switch on the transmitter and the antenna mode lights correspond to the antenna in use. Now dial the variable tuning and you should hear any area stations that are on the air. If the receiver does not tune or receive any station, recheck step 1 thru 6. If you want to operate on xtal receive, turn the Selector Switch to the Xtal position. When in this position, the white light on the receiver marked Xtal will light. Also when in this mode of operation, the fine tuning on the receiver should be used for centering off channel stations. Important! Make sure that if only one antenna is used that it is in its proper socket on the rear apron of the transmitter. If the receiver is operating, continue with the following operation instructions.
9. **S METER ZEROING**  
The S meter zeroing control is on the rear apron of the receiver. With the receiver on a vacant channel, this control should be turned until you get a zero setting on the S meter.
10. **CHECKING TRANSMITTER INTO 50 OHM LOAD**  
After the receiver is working, the transmitter can be tuned to the 50 ohm internal load, so that no R.F. will be radiated into the antenna. With the selector switch in the xtal or variable position, and the microphone plugged in, the Hi-Z or Lo-Z mic. switch on the rear apron of the transmitter should be in its proper mode for the microphone used. If a ceramic or a crystal microphone is used, make sure the switch is in the Hi-Z position. If a carbon microphone is used, be sure the switch is in the Lo-Z position. Set the red rocker meter switch to the watts position on the front control panel. With the switch in this mode, the meter will read true watts into the internal 50 ohm load. It will read in watts on the upper scale of the meter. Set both antenna and plate tuning controls on the front control panel to the mid range. The transmitter channel selector should be set on channel 11 or 12. Now depress mike button and there should be a reading on the watt meter. If there is a reading on the meter, rock both controls for a maximum reading on the meter. If meter indicates  $2\frac{1}{2}$  to 4 watt output at maximum peaking, everything should be operating properly.
11. **FINAL TRANSMITTER ANTENNA PEAKING**  
With the antenna switch left in the center position, switch the red rocker meter switch from watts to modulation, and whistle or talk into the mike. This should deflect the meter needle on voice modulation to about 3/4 scale on the meter. If meter does not show modulation, check microphone impedance switch for proper Lo-Z or Hi-Z impedance mode. If the meter still does not show modulation, check your microphone wiring as per drawing on schematics. If everything up to this point is operating properly, the antenna switch can now be switched so that one of the antennas is switched to the output of the transmitter. Important! The following adjustments should be made as quickly as possible so that you will not interfere with other stations on the air. At this point, the mike should be keyed on a vacant channel. Now as the mike switch is keyed, peak Antenna and Plate Tuning controls for maximum peak R.F. reading on the transmitter meter. Upon completion of the final transmitter peaking, you are ready to transmit and receive. Important! When tuning the transmitter for maximum reading on the watt meter for R.F. power into the antenna, the meter will not read true watts. The meter indicates peak antenna loading and reads only as a field strength meter. The meter will only read true watts when antenna switch is in the 50 ohm load, or center position.

Important! Before operating your Base Station, make sure you are familiar with part 95 F.C.C. rules and regulations. HAPPY CB'ING!

### IN CASE OF DIFFICULTY

#### SECTION (9)

1. RECEIVER DEAD

Check microphone for proper wiring. If microphone is wired wrong, the speaker will be dead. Also make sure the red rocker switch on receiver control panel is in SPKR mode. If this switch is in the earphone mode, the speaker will not be getting audio and receiver will appear dead. Also check remote cable.

2. NOT RECEIVING STATIONS

Make sure when you have been checking power output into 50 ohm load that the antenna switch is returned back to one of the antennas. Also, if the selector switch is turned to the C.A.P. position, the receiver will be dead.

3. NO MODULATION

Check microphone impedance switch for proper impedance setting for microphone being used. If a ceramic microphone is used and the mic. switch is in the Lo-Z position, no modulation will show on the modulation meter.

## WARRANTY

THIS UNIT IS GUARANTEED TO BE FREE FROM MANUFACTURING DEFECTS IN PARTS AND WORKMANSHIP FOR A PERIOD OF 90 DAYS AFTER PURCHASE BY THE ORIGINAL CUSTOMER. SHOULD THIS SET REQUIRE REPAIR DURING THIS PERIOD OF TIME, IT MAY BE RETURNED POSTAGE PREPAID TO COMMAND ELECTRONICS, INC., FOR SUCH REPAIR AT NO COST TO THE PURCHASER.

PLEASE NOTE: THIS GUARANTEE DOES NOT APPLY TO UNITS THAT HAVE BEEN MISUSED, ABUSED, OR ALTERED. THE OBLIGATION OF COMMAND ELECTRONICS, INC., UNDER THIS GUARANTEE IS LIMITED TO THE ORIGINAL PURCHASER.

**DEMCO SUPER SATELITE** receiver NOTES see Sams CB19 page 34/5.

Sensitivity .3uV for 10DB S+N/N at 30% modulation

.4uV for 16.5DB S+N/N at 30% mod.

1.0uB for 23DB S+N/N at 30% mod.

Selectivity  $\pm$  2.5Khz at -6DB down

$\pm$  6.5Khz at -60DB down

Adjacent channel Better than -93DB down

Noise Limiter Series Gated type with switch

Audio Output 2.5Watts @ 10% distortion

Audio Compressor to prevent volume overload from strong signals

CAP converter (optional) plugs in to receive 26.62Mhz

Squelch adjustment range to open at .4 to 250UV

S-meter S-9 with 50uV at antenna input jack

tuning range 23 CB channels with xtal or variable tuning

Fine Tuning  $\pm$ 1.2Khz to peak off channel signals

Switch to select earphone or speaker operation

**FILAMENT VOLTAGE** varies with brand of tube used. Use analog VTVM or VOM (20Kohm/volt) to test heater voltage at pin 3 of V4=6C4 (tunable oscillator). Voltage must be between 6.0 and 6.5VAC. Later production units have a 22ohm 1W or 2W resistor between pin 3 of V4 and ground. Cut this out if voltage is too low. If voltage is still too low: add a 2W resistor between 27 & 51 ohms (larger resistance= little increase, smaller=more increase) between pin 4 and pin 5 of V10=6BQ5.

**DETECTOR/ANL** some late production models may have 1N34 diodes instead of V8a and V8b. Whether or not this tube is present also affects the V4 heater voltage correction above.

**AUDIO AMPLIFIER** (V9) may be omitted in some versions with audio coupled directly from the volume control to the grid of V10.

Audio Output tube V10B=6GW8 was used with R69 of 470 ohms 2W in later units. The 220 ohm resistor shown in SAMS gave louder volume at the expense of shorter tube life. To test C3 in circuit try bridging another capacitor across it when listening at moderate to high volume levels.

Audio Oscillation on strong signals at high volume levels can be caused by bad filter cap 10-22ufd 450V on end of 350 to 1K 10W resistor near middle of receiver. The 10W resistor & filter capacitor are not shown in SAMS; older units used 350 or 500 ohms & the latest units used 1K. This resistor was to drop the B+ feeding the IF tubes to keep them from premature failure. The voltage drop across the 1K resistor is about 50VDC.

Receiver Fading after warmup of 10 to 30 minutes can be caused by the AGC voltage going positive. AGC line feeding the IF tubes should be -1.5VDC with 1uV signal into antenna jack. Check to see what resistance is used for the 10W resistor mentioned in the above paragraph; replace with 1K if it is 350 or 500 ohms. Replace IF tubes as needed if AGC goes positive after warmup. (Late production units used ICC tubes in IF; older units had RCA tubes--ICC tubes were used because later productions of RCA tubes gave positive AGC voltage problems!)

**FINE TUNE** late version units have switch 50-9 (3P3T rotary) with choke & capacitor to vary crystal frequency instead of the potentiometer shown in the SAMS schematic.

**RF AMPLIFIER** V1/V2 is 6DJ8 in later production units: this stage matches the DEMCO STAR schematic rather than the SAMS schematic. R16 (SAMS) or R6 (STAR) may be as high as 180K in some units and may need changing to 47K-68K to get the second triode plate voltage around 100-150VDC to improve sensitivity.

**CAP OSCILLATOR** is not included in the receiver of stock late production units--was available as an option only.

**TUNABLE OSCILLATOR** receive sensitivity should be 1-3 S-units better on tunable than on xtal. If tunable is less sensitive than xtal C30 can be increased to 27pf, 33pf, 47pf, or 100pf as needed (smallest value that gives better sensitivity should be used). R20=33K was 1W on some units & needs to be 2W. R18 (cathode bias of V3a) can be increased to as much as 470 ohms to increase tunable sensitivity if necessary--the larger resistance tends to make the mixer stage go into oscillation.

**TUNABLE BANDSPREAD** L5 is tunable oscillator injection level and has one very broad peak--adjust for best sensitivity on channel 12 with crystal controlled signal generator.

**DIAL TRACKING** requires setting L3 on channel 1 for dial position with signal generator, and A17 dial tracking capacitor on channel 23. L3 (A15) and A17 (C22) interact so this takes several times back and forth with checks for position on channel 12 in the middle. Note there are 2 peaks where you can get the signal on L3--about 6 turns apart--it needs to be the peak with the most air noise.

**RECEIVER ALIGNMENT** needs to be done with a crystal controlled signal generator on channel 11 or 12 in the xtal position. L1 (A14) has its best peak with the slug near the bottom. The slug of (A13) also has its best peak near the bottom. L6 (A10 & A9) has two slugs as do L8, L9, L10, & L11. Best sensitivity and adjacent channel rejection are obtained with the slugs at the outside peaks--top slug near the top, bottom slug near the bottom--not with either or both slugs near the middle. (When the slugs are near the middle the IF can is overcoupled & Q is lowered & performance degraded.)

**POWER MODULATOR/SPEAKER UNIT** later units have 110VAC power transformer and rectifiers/filter caps etc built into the modulator cabinet insted of tapping power from transmitter. The microphone connector is Amphenol 91MPM4L/S not the same outside as later Super Transmitters use on the front which is the 91MC4M type with a locking ring. The output cable of the power modulator gets plugged into back of transmitter with the insert retaining screw up. Pin numbers for mic wiring should match up for all production versions.

**MICROPHONE** both transmitter & power modulator are designed for high impedance microphones. Compatible hand mics include ASTATIC 525C, 531, 539, TURNER 355C, 360, Robyn (T240) etc. Desk mics such as the ASTATIC TUG8D104 and TURNER 254 and 454 are recommended. Power desk mics that work include ASTATIC TUG8D104, TUG9D104, TUP9D104, SHURE 444T, and TURNER Plus Two and Plus Three. Other microphones are unlikely to perform satisfactorily. Power mics can be plugged into the front of the transmitter with a 91MC4M Amphenol plug; non-amplified mics plug into the power modulator/speaker unit using a 91MPM4L/S type Amphenol plug.