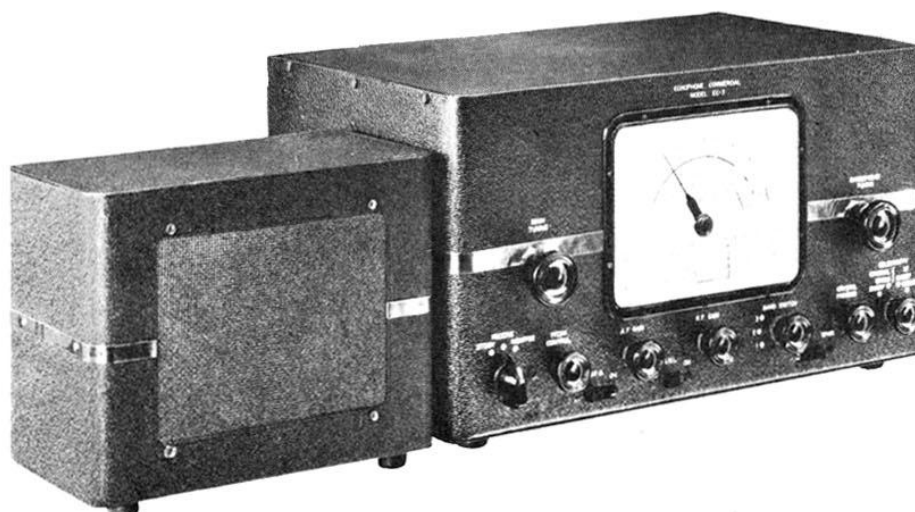


ECHOPHONE RADIO CORPORATION
201 East Twenty-Sixth Street
Chicago, Illinois

INSTRUCTIONS FOR INSTALLATION, OPERATION AND SERVICE

MODEL EC 3
Echophone Commercial

9 TUBE AC-DC THREE BAND 550KC-30 MC RADIO RECEIVER



Specifications

TUBES -

- 1 - 6SG7 R.F. Amplifier
- 1 - 6K8 Mixer - H.F. Oscillator
- 1 - 6SK7 Xtal 1st I.F. Amplifier
- 1 - 6SK7 2nd I.F. Amplifier
- 1 - 6H6 2nd Detector-AVC-ANL
- 1 - 6SC7 BFO - Monitor - 1st Audio
- 1 - 25L6GT Audio Output
- 1 - 25Z6 Rectifier

1 - BK29D Ballast Tube

Power Consumption - 46 watts
Power Source - 115 volts AC or DC
Power Output - One watt undistorted
Selectivity - Single signal crystal to
broad I.F. in four steps
Intermediate Frequency - 455 KC
Frequency Range - 550 KC to 30 mc.

Installation & Operation

Upon receipt of the EC-3 the owner should inspect the carton, the receiver, and the speaker for any sign of damage that might have occurred in transit. If damage is found, immediately file claim with the carrier stating the extent of the damage.

Plug the speaker into the socket provided on the rear of the receiver.

IMPORTANT:- This receiver, unless otherwise marked, must be operated from 115-125 volts - Alternating OR Direct Current power. If the set does not op-

erate in one minute when connected to Direct Current, reverse the power plug in the receptacle.

ANTENNA:- A wire approximately 50 to 75 feet long, including the lead-in, will provide very satisfactory reception throughout the tuning range of the receiver. It should be connected to the A_1 terminal of the antenna terminal strip located on the rear apron of the chassis; the jumper between A_2 and G should remain in place. A good antenna of this type should be erected as high as possible; insulated from ground, and at right angles to interference producing power lines. A ground connected to the G terminal may be used if it is found to materially improve the operation of the receiver. DO NOT GROUND CHASSIS DIRECT.

A doublet antenna should be connected to terminals A_1 and A_2 . The jumper may remain connected between A_2 and G or removed depending upon its favorable effect on reception.

NOTE:- If a ground is used it should always be connected to the G terminal, NEVER to the chassis itself.

TUBES:- The model EC-3 is shipped from the factory with all the tubes in their proper sockets. The types of tubes required and their position is clearly shown in the top chassis photograph. Each tube and its socket has the type number stamped on it. Should it be necessary to replace any tubes insert the center guide pin on the tube base into the center hole in the socket. Rotate the tube until the key on the guide pin drops into the notched portion of the socket hole. Push down on the tube until its base is flush with the socket.

CONTROLS & THEIR FUNCTIONS:

A.F. GAIN:- The ON-OFF switch is part of the A.F. Gain Control. Turning this knob to the right turns the receiver ON and increases the volume. Turning it all the way to the left decreases the volume until the switch clicks and the receiver goes off. The pilot lights

indirectly illuminate the dial scale when the power is on.

MAIN TUNING:- The main tuning control, when rotated, will tune the receiver to any frequency throughout its range.

R.F. GAIN:- This control adjusts the sensitivity of the receiver by varying the cathode bias on the R.F. and I.F. amplifier. Maximum sensitivity will be obtained when this control is rotated as far as it will go to the right.

BAND SWITCH:- Turning this knob connects the proper coils in the circuit to tune the desired frequency range.

Band 1 - 550 to 2100 K.C.
Band 2 - 2.1 to 8.1 M.C.
Band 3 - 8 to 30 M.C.

BAND SPREAD TUNING:- The band spread control acts as an electrical vernier on the main tuning condenser. The 80, 40, 20 and 10 meter amateur bands are calibrated on the band spread scale together with a logging scale. To use these amateur band calibrations it is necessary that careful adjustment of the main tuning pointer be made; the most convenient way being to set the BAND SPREAD TUNING pointer to your transmitter frequency or some known receiver frequency, then adjust the MAIN TUNING pointer until the signal is heard. If this is not possible it will be necessary to locate the bands by setting the main tuning pointer at the high frequency end of the desired amateur band; then adjust the band spread pointer until amateur signals are heard. The band may then be scanned by the BAND SPREAD TUNING to check the calibration. Slight readjustment of the main tuning may be necessary for best accuracy of the BAND SPREAD scale.

"STDBY-RECEIVE-MONITOR"- This switch must be in the RECEIVE position for normal operation of the receiver. The STANDBY position renders the EC-3 inoperative for standby purposes. The MONITOR position places the CW MONITOR in operation to allow the C.W. operator to listen to his keying.

BFO-ON-OFF:- This switch removes the AVC and places the BEAT FREQUENCY OSCILLATOR in operation for the reception of CW signals, and for locating weak DX signals. Code signal intensity should be adjusted by the R. F. GAIN CONTROL.

PITCH CONTROL:- Allows adjustment of the beat note obtained from the BEAT OSCILLATOR to a pitch most pleasing to the listener.

ANL-ON-OFF:- The AUTOMATIC NOISE LIMITER switch will effectively minimize ignition and similar types of interference which would be objectionable to short wave reception. Best results are obtained with the R. F. Gain full on and the A. F. Gain set near minimum.

SELECTIVITY:- This switch allows four step selectivity to meet all receiving requirements.

CRYSTAL PHASING:- This control is in the circuit only when the SELECTIVITY switch is in the "CRYSTAL SHARP" or "CRYSTAL BROAD" positions. The function of the PHASING control is to eliminate the unwanted interfering sideband signal.

PHONES - SPKR:- On the rear apron of the chassis will be found two phone tip jacks. Headphones may remain permanently connected to the receiver. The PHONES-SPKR switch makes it possible to select either.

Further Operating Instructions

Amateurs who operate on C.W. will find the MONITOR circuit in the Ec-3 an aid to easier and more efficient operating

A short wire must be connected to the single MONITOR PICKUP TERMINAL at the rear of the receiver to allow a small amount of R. F. energy to be picked up from the transmitter by the monitor circuit. The length of this wire and its proximity to the transmitter can only be determined experimently, because it depends entirely on the power of your transmitter. Too much coupling is indicated by a raspy note when the monitor circuit is in operation.

The value of the "CRYSTAL SHARP" SELECTIVITY position will be apparent when it is desired to receive CW signals on any of the amateur bands. The tremendous sideband interference encountered will be reduced to a minimum when the SELECTIVITY knob is in the "CRYSTAL SHARP" position and the CRYSTAL PHASING control is adjusted for maximum reduction of unwanted signals. Since tuning becomes easier with decreasing selectivity the receiver should not be set at a SELECTIVITY greater than is necessary. Thus, for best fidelity on the Broadcast band the SELECTIVITY should be "IF BROAD". For amateur phone work the SELECTIVITY may be "IF SHARP" or

"CRYSTAL BROAD" as the interference dictates.

IMPORTANT:

Should at any time your receiver become inoperative check -

FIRST:- See that the tubes are in their sockets correctly. Make sure the tubes are lighted by noting filament glow in the glass tubes. If the metal tubes are warm it may be assumed they are operating.

SECOND:- Be sure there is power at the socket. This may be checked by inserting any handy lamp appliance.

THIRD:- If the receiver is being used on direct current reverse the plug.

FOURTH:- Make sure the antenna is not grounded at some point, and is securely connected to the antenna terminal.

FIFTH:- The speaker wires may not be plugged into the speaker terminal strip. Be sure the PHONES-SPKR switch is in the SPKR position and the STANDBY switch is in the RECEIVE position.

SIXTH:- Have the tubes tested.

SEVENTH:- If the receiver still does not operate explain your difficulties

to the distributor from whom you purchased the receiver.

Alignment Procedure

EQUIPMENT NEEDED FOR ALIGNING AND PRELIMINARY ADJUSTMENTS:

An all wave signal generator which will provide an accurately calibrated signal at the test frequencies listed.

Output indicating meter

Non-metallic screw driver

Dummy antenna 400 ohm, 200 mmf. and 0.1 mfd.

Connect signal generator ground to ground terminal (G) of receiver.

Set bandspread at 100.

Connect output meter across primary of output transformer.

Gain controls - Maximum all adjustments.

I. F. ALIGNMENT

Connect 0.1 mfd. dummy antenna between high side of generator and 6K8 grid.

Set signal generator to 455 kc.

Set receiver selectivity in "I. F. SHARP" position.

Adjust all trimmers on T_1 , T_2 and T_3 for maximum output.

Remove knob from PITCH CONTROL (L_1) and loosen the set screw holding the shaft extension. This is located on the underside of the chassis.

Adjust the BFO control to give a beat note with the 455 kc. I. F. signal.

If necessary, change the setting by adjusting the screw located under the PITCH CONTROL knob.

Tighten the set screw holding the extension shaft and replace the knob.

Place the SELECTIVITY switch in the CRYSTAL BROAD POSITION.

Detune the signal generator so that a high pitched note is heard (BFO "ON").

Adjust the crystal phasing control for maximum rejection or until minimum volume is obtained.

Adjust #2 trimmer on T_1 noting that the output reaches a maximum, goes through a dip and then back to maximum. Wobulate the signal generator tuning adjustment and align to the dip between the two peaks. A distinct change in the crystal note to a swishy sound will be noted when the correct adjustment has been reached.

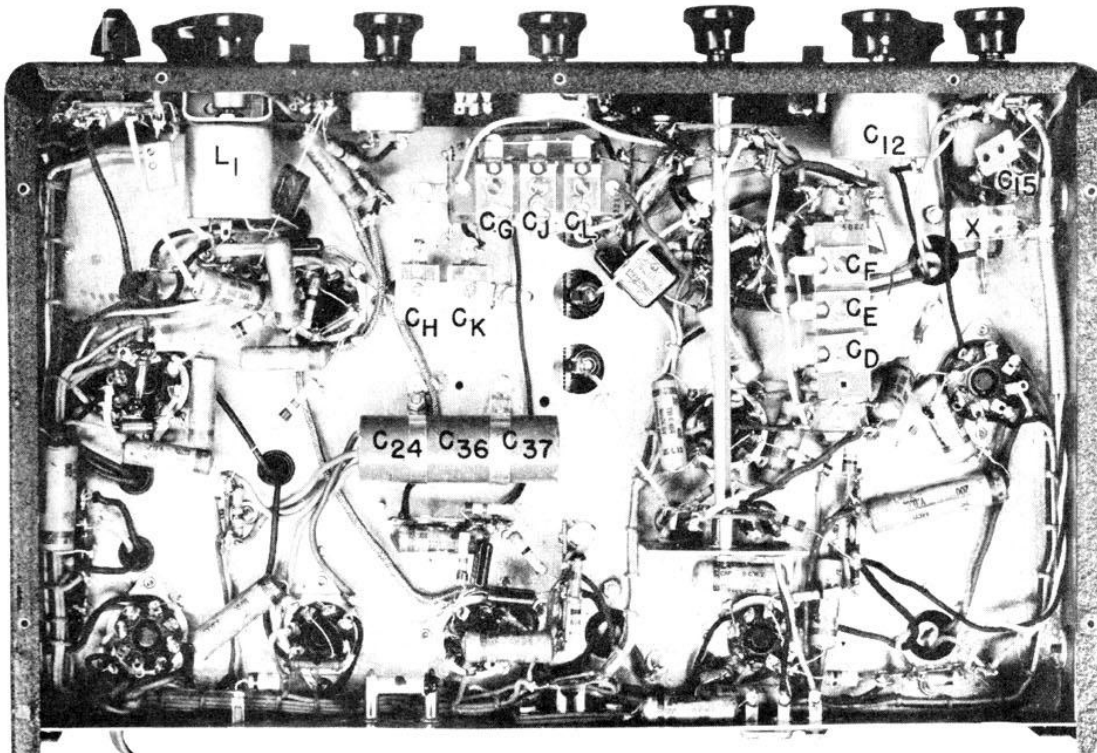
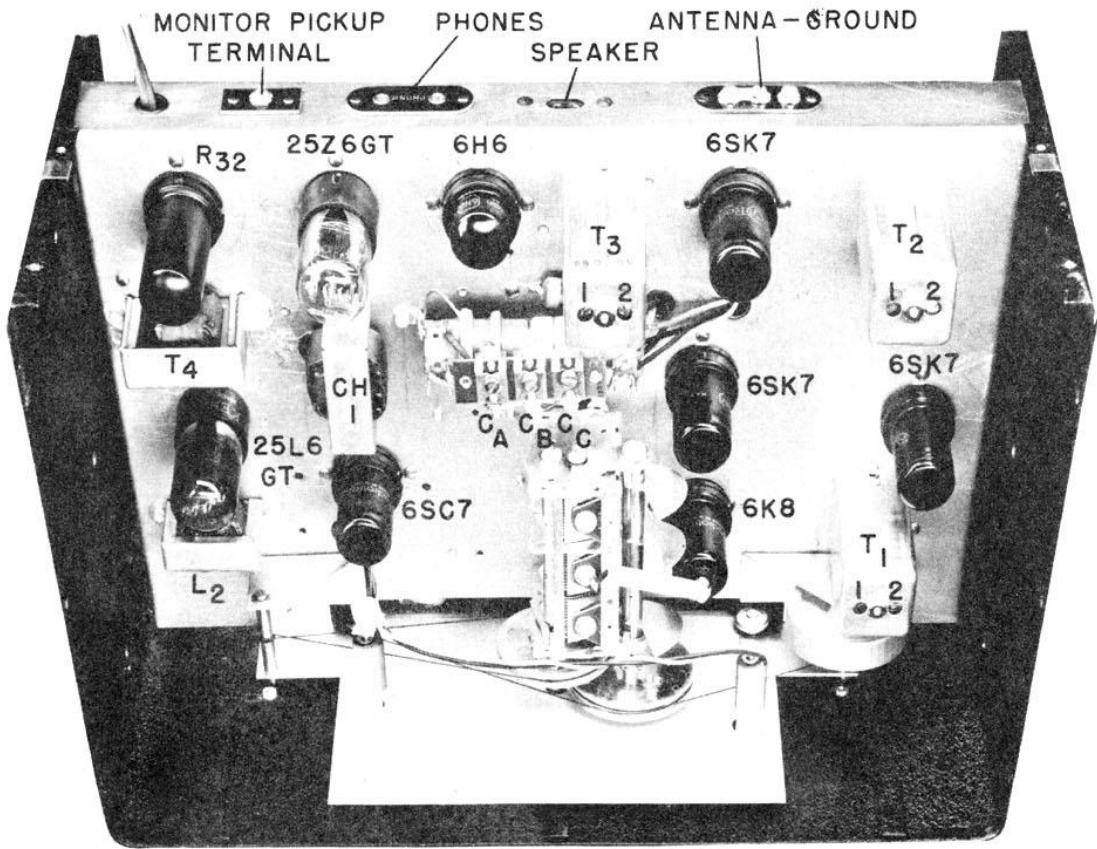
Now readjust the other trimmers for maximum gain without changing any other adjustments.

Set the selectivity switch to the I. F. Sharp position and adjust the trimmer (C_{15}) under T_1 for maximum output.

R. F. ALIGNMENT

The following table indicates R. F. Alignment procedure.

Band	Signal Generator		Pad	Trimmers	Adjustment
	Frequency Setting	Dummy Antenna			
1	600 kc	200 mmf	C_H	none	maximum output
	1800 kc	200 mmf	none	C_A C_E C_G	maximum output
2	2.5 mc	400 ohm	C_K	none	maximum output
	7.0 mc	400 ohm	none	C_B C_D C_J	
3	no padding condenser on this band				
	28 mc	400 ohm		C_C C_F C_L	maximum output



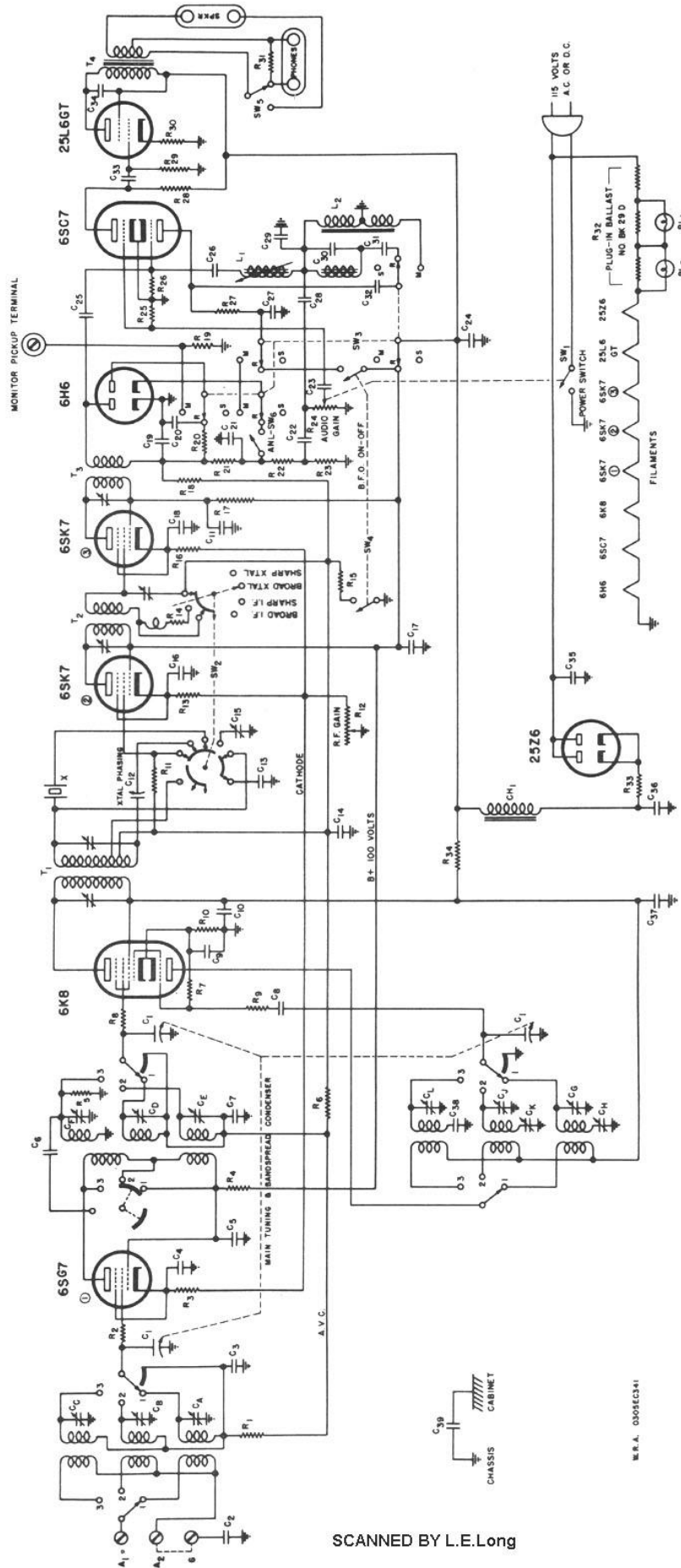
ECHOPHONE
MODEL EC-3
PARTS LIST

CONDENSERS

SYMBOL	CAPACITY	VOLTAGE	TYPE	SYMBOL	CAPACITY	VOLTAGE	TYPE
C1	Main Tuning & Bandsread			C21	50 mmf		Mica
2	.01 mfd	400	Paper	22	.01 mfd	400	Paper
3	.05 mfd	200	Paper	23	.005 mfd	400	Paper
4	.05 mfd	200	Paper	24	40 mfd	150	Electrolytic
5	.02 mfd	200	Paper	25	Twisted Leads		
6	5-6½ mmf		Ceramicon	26	.02 mfd	200	Paper
7	.05 mfd	200	Paper	27	.02 mfd	200	Paper
8	25 mmf		Mica	28	.0001 mfd		Mica
9	.05 mfd	200	Paper	29	.0054 mfd		Mica
10	.05 mfd	200	Paper	30	.0005 mfd		Mica
11	.02 mfd	200	Paper	31	25 mmf		Mica
12	25 mmf	Variable		32	.05 mfd	200	Paper
13	4-5 mmf		Mica	33	.02 mfd	400	Paper
14	.02 mfd	200	Paper	34	.02 mfd	600	Paper
15	1-9 mmf	Variable		35	.05 mfd	400	Paper
16	.05 mfd	200	Paper	36	30 mfd	150	Electrolytic
17	.25 mfd	200	Paper	37	30 mfd	150	Electrolytic
18	.05 mfd	200	Paper	38	.0054 mfd		Mica
19	50 mmf		Mica	39	.25 mfd	200	Paper
20	.05 mfd	200	Paper				

RESISTORS						MISCELLANEOUS	
SYMBOL	OHMS	WATTAGE	SYMBOL	OHMS	WATTAGE	SYMBOL	DESCRIPTION
R1	50,000	1/3	R18	2 meg	1/3	T1	1st I.F. Transformer
2	30	1/3	19	4,000	1/3	T2	2nd I.F. Transformer
3	200	1/3	20	1 meg	1/3	T3	3rd I.F. Transformer
4	1,000	1/3	21	100,000	1/3	T4	Audio output transformer
5	10,000	1/3	22	250,000	1/3	CH ₁	Filter Choke
6	50,000	1/3	23	250,000	1/3	L ₁	B.F.O. Coil
7	50,000	1/3	24	500,000	1/3	L ₂	Monitor Oscillator coil
8	30	1/3			Audio Gain	SW ₁	Power switch on audio gain control
9	100	1/3	25	5 meg	1/3	SW ₂	Selectivity switch
10	300	1/3	26	50,000	1/3	SW ₃	Send-Receive-Monitor switch
11	1 meg	1/3	27	10,000	1/3	SW ₄	BFO-AVC switch
12	10,000	R.F. Gain #25-066	28	250,000	1/3	SW ₅	Speaker-Phones switch
13	400	1/3	29	500,000	1/3	SW ₆	ANL switch
14	200	1/3	30	150	1/3		
15	100	1/3	31	300	1/2		
16	300	1/3	32	Ballast Resistor	BK 29D		
17	1,000	1/3	33	15	1/2		
			34	1,000	1/3		

ECHOPHONE RADIO COMPANY
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