precise

INSTRUCTIONS:

MODEL 630

RF AF & TV MARKER GENERATOR

PRECISE DEVELOPMENT CORPORATION
OCEANSIDE, NEW YORK

PRECISE DEVELOPMENT CORP.

Oceanside, New York
ROckville Centre 6-0171-2

Dear Customer:

Now that you have purchased a PRECISE INSTRUMENT, we would like you to feel that the PRECISE DEVELOPMENT CORP. is available to you at all times. We consider your purchase to be the beginning of our responsibility toward you, our customer. If a question should arise, please feel free to contact us at our factory, or through your distributor.

Very truly yours,

PRECISE DEVELOPMENT CORP.

Melville Byron

Melville Byron
Chief Engineer

MB/bsm

construction book

MODEL 630

PRECISE

PRECISE DEVELOPMENT CORP.
Oceanside, L. I., N. Y.

INTRODUCTION:

The construction of an instrument from its kit form, is as important as any of the major components used within the instrument. Realizing this, the PRECISE DEVELOPMENT CORP. used extreme care in the preparation of this construction book, with such inovations as two-color pictorials and photographs, plus schematic diagrams. Above all, this basic construction was made as a simple series of steps which may readily be followed by even the most inexperienced person. If a moderate amount of care is used, and the instructions are carried out step-by-step, there is little possibility of ending with anything other than a truly professional piece of equipment. PRECISE certainly appreciates the anxiety felt by the constructor and has therefore taken every intelligent short-cut to reduce the construction time, but do not try to go too quickly. Care is your assurance of an instrument with many years of fine service ahead.

WIRING TECHNIQUE:

The charts and pictorials on the following pages have been prepared to show both the points to which a wire should be connected and the way to route the wire. The routing at first may not seem important, but at high frequencies it is of major concern. It also reduces the undesireable effects of distributed capacity and inductance. For these reasons do not cable leads.

SOLDERING:

Excessive heat will adversely effect parts by causing them to either change value, lose their protective coating or actually break down. To avoid this hold the tip of a pair of longnose pliers on the lead between the part and the junction that is being soldered. The pliers will conduct a sufficient amount of heat away to prevent damage.
Too little heat applied to connections may cause what is technically called a 'rosin joint'. These may simply be avoided by making certain that the solder flows and that all the flux has been 'burned-off'. The resulting contact should be smooth and shiny. A 'rosin joint' will often appear pitted, grey, and show the dark brown rosin in the connection proper. Although rosin is very important in the basic soldering process, and NO OTHER type of flux should be used, it can cause trouble by leakage between contacts. This may give rise to inaccurate readings, especially in the case of switches where rosin flowing between contacts develops leakage. Rosin may be removed by briskly going over the area with a stiff brush that has been saturated with carbon-tetrachloride. Be very careful not to spring the contacts when cleaning switches.

PARTS LIST:

The following pictorials, and parts list should be checked to both familiarize the constructor with each of the parts used, and to make certain of actual count. The incorporation of a check balance system at PRECISE makes it unlikely that any of the parts should be missing. If a discrepancy does occur, however, please write and action will be taken immediately. Since resistors and condensers are often color coded, rather than marked directly, the standard RMA Color Code is reprinted in this manual. It should be retained for future use.
In order to maintain a continuous supply of parts, orders are placed with several reputable manufacturers at the same time. You may find, therefore, that the parts list calls for a particular value although another is supplied. The substituted part will work equally well inasmuch as the circuit has a normal 20% tolerance. i.e. a 39K resistor may be substituted for a 47K resistor without altering the circuit operation. This, of course, does not apply to precision parts.

ADDENDA:

Please see addenda, in rear of this book, before proceeding with the actual construction.

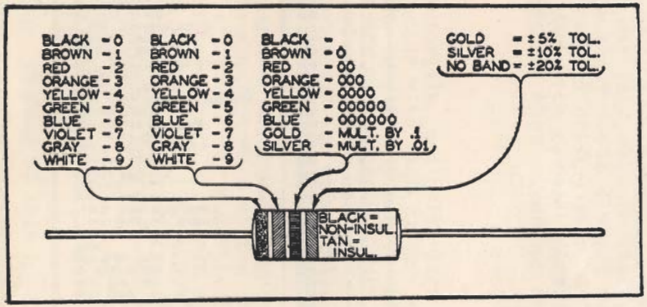
CHECK	DESCRIPTION	PART#	AM'T	REMARKS
	Octal Socket (wafer)	H1	1	
	6-32x¼" Machine Screw	H2	19	
	6-32 Palnut	H3	28	
	6-32 x ¼ Phillips Head M.S.	H4	2	
	#6 Solder Lug	H5	7	
	Three Lug Terminal Strip	H6A-B-C	3	
	Octal Socket(molded,low loss)	H7	1	
	7 Pin " " "	H8	1	
	#2 Machine Screw	H9	4	
	" Nut	H10	4	
	" Lockwasher	H11	4	
	Pilot Light Socket(large)	H12	1	
	Condenser Bracket	H13	1	May be mounted on condenser
	3/8" I.D. Lockwasher	H14	12	
	" " Nut	H15	14	
	Pilot Light Socket(small)	H16	9	
	Four Lug Terminal Strip	H17	2	
	6-32x3/8" Machine Screw	H18	5	
	Large Metal Shield Bracket	H19	1	
	Rubber Grommet (large)	H20	1	
	Long Solder Lug	H21	2	
	Chassis Connector	H22	2	
	Spade Lug - #8 Hole	H23	4	
	8-32x1/16" Machine Screw	H24	4	
	Plastic Plate with drilling	H25	2	
	2" O.D. Pulley	H26	2	
	4-40x¼" machine screw	H27	5	
	Brass Eyelet Spacer	H28	4	
	4-40 Nut	H29	8	
	Spade Lug - #6 Hole	H30	2	
	1" O.D. Pulley	H31	4	
	#8 Flat Metal Washer	H32	8	
	Threaded Spacer ½" Long	H33	2	
	1 3/8" O.D. Pulley	H34	2	
	Dial Cord	H35	2	
	Dial Spring	H36	2	
	AF Dial Scale	H37	1	
	3½" O.D. Drum	H38	2	
	Tape	H39	2	
	Plastic Window	H40	2	
	Fibre Shoulder Washer	H41	6	
	Fibre Extension Shaft	H42	1	
	Handle	H43	1	
	Cabinet	H44	1	
	Handle Bracket	H45	2	
	Pointer Knob	H46	4	
	Round Knob (large)	H47	2	
	Alligator Clip	H48	2	
	Microphone Connector	H49	1	
	Etched Panel	H50	1	
	3/8" O.D. Threaded Bearing	H51	3	
	Chassis (large)	H52	1	
	Spaghetti	H53	1	
	Gal" Self Tapping Screw	H54	4	
	#6 Acorn Nuts	H55	2	
	Crystal Jack	H56	1	
	1 Lug Terminal Strip	H57	1	
	RF Dial Scale	H58	1	
	RF Chassis	H59	1	
	6½" x 2" metal Plate	H60	1	
	7 Pin Socket(molded low loss)	H61	1	
	¼ Pal Nut	H62	5	
	Brass Extension Shaft-12"	H63	1	
	Rubber Grommet (small)	H64	4	
	8-32x3/8" Machine Screw	H65	4	
	6-32x1/4 Machine Nut	H66	2	
	Round Knob (small)	H67	2	
	#8 Flat Metal Washer	H68	2	

CHECK	DESCRIPTION	PART#	AM'T	REMARKS
	Pilot Light (small)	B1	1	
	" "	B2	1	
	Variable Condenser	C1-4	1	
	300 uufd "	C5	1	
	10 " "	C6	1	
	.0015 ufd "	C7	1	
	500 uufd "	C8	1	
	.1 ufd "	C9	1	
	360 uufd "	C10	1	
	" "	C11	1	
	Variable "	C12-15	1	
	20 or 24 ufd "	C16	1	
	.1 ufd Condenser	C17	1	
	.25 " "	C18	1	
	10 uufd"	C19	1	
	.0015 ufd "	C20	1	
	" "	C21	1	
	20X20 " "	C22-23	1	
	White Dot Coil	L1	1	
	Yellow " "	L2	1	
	Red " "	L3	1	
	Black " "	L4	1	
	HF Coil	L5	1	
	Buss Bar	L7	1	
	2,000 ohm Potentiometer	P1	1	If 3/8" Long Bushing used, add 1-H15
	" " "	P2	1	" " " " " " " "
	10K Potentiometer	P3	1	" " " " " " " "
	RF Choke	RFC	1	
	220K Resistor	R1	1	
	47K "	R2	1	
	33K "	R3	1	
	10K "	R4	1	
	820 "	R5	1	
	22K "	R6	1	
	1K "	R7	1	
	3.3K " ½ Watt	R8	1	
	360K Resistor	R9	1	
	470K "	R10	1	
	100K "	R11	1	
	10K "	R12	1	
	1 "	R13	1	
	10 "	R14	1	
	68 "	R15	1	
	" "	R16	1	
	100 "	R17	1	
	1.8M 5% Res.	R18	1	
	180K " "	R19	1	
	10M " "	R20	1	
	1.8M " "	R21	1	
	180K " "	R22	1	
	10M " "	R23	1	
	56K Resistor	R24	1	
	100K "	R25	1	
	" "	R26	1	
	1.2M "	R27	1	
	1K "	R28	1	
	3.3K "	R29	1	
	2.2K " ½ Watt	R30	1	
	5 Position Switch(long)	S1	1	If 3/8" Long Bushing used, add 1-H15
	" " "	S2	1	" " " " " " " "
	" " "	S3	1	" " " " " " " "
	" " "	S4	1	" " " " " " " "
	6CH Tube	V1	1	
	6SN7 "	V2-3	1	
	6AU6 "	V4	1	
	Pilot Light (large)	V5	1	
	6X5	V6	1	
	Line Cord	W1	1	
	Hook-up Wire	W2	1	
	Coaxial Wire	W3	1	

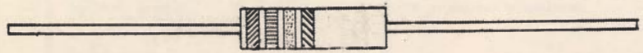
Note: Certain components may have hardware already attached; these should be included in count. O.D. means OUTSIDE DIAMETER while I.D. means INSIDE DIAMETER. A 6-32 screw is thicker than a 4-40 screw and is thinner than a 8-32 screw. The first number determines the thickness of the part, while the next indicates the turns per inch. If the PRE-ASSEMBLED RF HEAD (MODEL 630KA) was purchased, the parts contained are in the above list and should be included in the count.

RMA Color Code STANDARD

RESISTORS



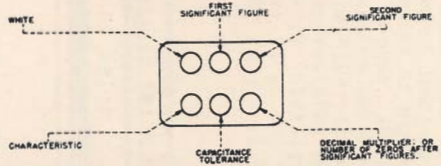
½ WATT



1 WATT

MICA CAPACITORS

RMA REC 115 COLOR CODE



Color	Figure or Multiplier	Characteristic Letter	Tolerance	Color	Figure or Multiplier	Characteristic Letter	Tolerance
Black	0	A	20% (M)	Blue	6	....	....
Brown	1	B	....	Violet	7	....	....
Red	2	C	2% (G)	Gray	8	I	....
Orange	3	D	3% (H)	White	9	J	....
Yellow	4	E	....	Gold	.1	....	....
Green	5	....	5% (J)	Silver	.01	....	10% (K)

RMA REC 115 CHARACTERISTIC LETTERS

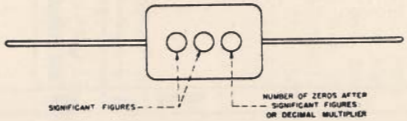
Class	Temperature Coefficient Parts/Million/ Deg. C	Capacitance Drift Not More Than
A	+ —1000	+ —(5% +1 mmf)
B	+ —500	+ —(3% +1 mmf)
C	+ —200	+ —(0.5% +0.5 mmf)
I	+150 — 50	+ —(0.3% +0.2 mmf)
D	+ —100	+ —(0.3% +0.1 mmf)
J	+100 — 50	+ —(0.2% +0.2 mmf)
E	+100 — 20	+ —(0.1% +0.1 mmf)

RMA COLOR CODE

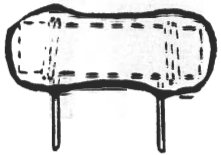
SHEET 419 JUNE 1, 1938

THREE DOT

USED FOR 500 VDCW CAPACITORS WHOSE TOLERANCE IS GREATER THAN 10%



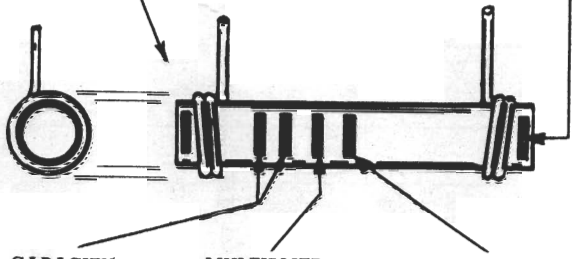
CERAMIC, CAPACITORS



Silver end dot denotes bypass and coupling capacitor.

VOLTAGE

Brown - - 150
Orange - - 350
Omitted . 500



CAPACITY

Black - - - 0
Brown - - - 1
Red - - - - 2
Orange - - 3
Yellow - - 4
Green - - - 5
Blue - - - - 6
Violet - - - 7
Gray - - - - 8
White - - - 9

MULTIPLIER

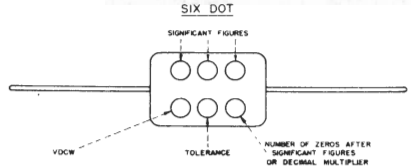
Black - - - 1
Brown - - - 10
Red - - - - 100
Orange - - 1000

TOLERANCE

Black - - - ±20%
White - - ±10%
Omitted — Guar. Min. Value

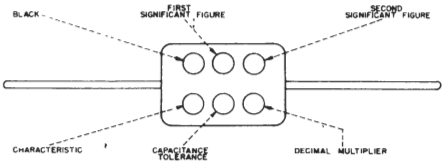
The position of the capaciter illustrates the relation of the leads to the color code. The left end is the termination of the inner electrode.

PRECISE



Color	Significant Figure, or No. of Zeros, or Decimal Multiplier	VDCW	Tolerance	Color	Significant Figure, or No. of Zeros, or Decimal Multiplier	VDCW	Tolerance
Black	0	....	....	Violet	7	700	7%
Brown	1	100	1%	Gray	8	800	8%
Red	2	200	2%	White	9	900	9%
Orange	3	300	3%	Gold	.1	1000	....
Yellow	4	400	4%	Silver	.01	2000	10%
Green	5	500	5%	None	..	500	20%
Blue	6	600	6%				

JAN-C-5 COLOR CODE



Color	Figure or Multiplier	Character-istic Letter	Tolerance	Color	Figure or Multiplier	Character-istic Letter	Tolerance
Black	0	A	20% (M)	Blue	6	G	....
Brown	1	B	....	Violet	7		....
Red	2	C	2% (G)	Gray	8		....
Orange	3	D	....	White	9		....
Yellow	4	E	....	Gold	.1		5% (J)
Green	5	F	....	Silver	.01	..	10% (K)

JAN-C-5 CHARACTERISTIC LETTERS

Character-istic	Temperature Coefficient Parts/Million/Deg. C	Maximum Capacitance Drift	Verification of Characteristics By Production Test
A	Not Specified	Not Specified	Not Required
B	Not Specified	Not Specified	Not Required
C	−200 to +200	± 0.5%	Not Required
D	−100 to +100	± 0.3%	Not Required
E	−20 to +100	± (0.1% + 0.1 mmf)	Not Required
F	0 to +70	± (0.05% + 0.1 mmf)	Required
G	0 to −30	± (0.05% + 0.1 mmf)	Required

RMA COLOR CODE

CHASSIS MOUNTING INSTRUCTIONS

PALNUTS-

The Palnuts have been incorporated into this unit in order to simplify, speed-up and improve the mechanical assembly. Since this nut is a self locking device, it eliminates the necessity of lockwashers. It is most important that these nuts be placed on properly. The solid (concave) side is the side applied to the screw.

Place chassis so that it is as shown in Diagrams 1 & 2. Mount parts in the order described below. Make certain the direction of each part is as shown in Diagram #2. For parts requiring a TOP MOUNT, a TOP CHASSIS view is shown further on in this book.

EXPLANATION ON USING THE FOLLOWING TABLE: The first line states: "A 7 pin molded, low-loss socket (H8) is to be mounted in holes #20, 21 & 22 of the chassis (as shown in Diagram #1). It is to be secured with 2 part H9, 2 part H10 and 2 part H11. The PARTS LIST indicates that H9 is a #2 Machine Screw, H10 is a #2 Machine Nut and H11 is a #2 Lockwasher. Diagram #2 shows the mounted assembly

CHECK	PART DECRIPTION	PART#	MOUNT IN HOLE #	W I AM'T	T H PART #	REMARKS
✓	7 Pin Socket, Molded low Loss	H8	20.21.22	2 2 2	H9 H10 H11	
✓	Octal Socket, Wafer	H1	26,27,28	2 2	H2 H3	
✓	" " , Molded Low Loss	H7	14,15,16	2 2	H2 H3	H6A over hole #16
				1	H6A	
✓	Pilot Light Socket, Large	H12	35	1 1	H2 H3	
				1	H5	
✓	Pilot Light Socket, Small	H16	13	1 1	H2 H3	H16 & H5 mount on top of chassis
				1	H5	
✓	Rubber Grommet	H20	38			
✓	Power Transformer	PT1	40,41	1 1 2	H2 H18 H3	Nut over hole #41 inside of chassis; nut over hole #40 outside of chassis H68 over hole #41. H17 over hole #40. Black wires of PT1 face out-
				1 1	H68 H17	side of chassis. H18 in hole#40 H2 in hole #41
✓	6-32x3/8 Machine Screw	H18	39	1	H3	H3 on outside.
✓	Condenser Bracket	H13	23.24.25	2 1 3	H2 H18 H3	1-H18, 1-H3 are used to secure C22-23 through Bracket. Assembly mounts on top of chassis. Do not make H18 too tight. H57
				1 1	C22-23 H57	over hole #23 inside of chassis. See TOP VIEW further on.
✓	Large Metal Shield Bracket	H19	19.29	2 2	H2 H3	Shield is mounted on top.
✓	5 Position Switch	S2	9	1 1	H14 H15	See Insert, secure to panel and chassis. Do not tighten
✓	" " "	S4	10	1 1	H14 H15	See Insert.
✓	Chassis Connector	H22	7	1 1 1	H14 H15 H21	
✓	10K Pot.	P3	6	1 1	H14 H15	
✓	Crystal Jack	H56	3,4,5	1 1	H27 H62	Closed end of H62 toward panel. If too loose, squeeze nut while on screw & retighten. Use pliers.
✓	2K Pot.	P2	32	1 1	H14 H15	

DIAGRAM 1 CHASSIS MOUNTING BOTTOM VIEW

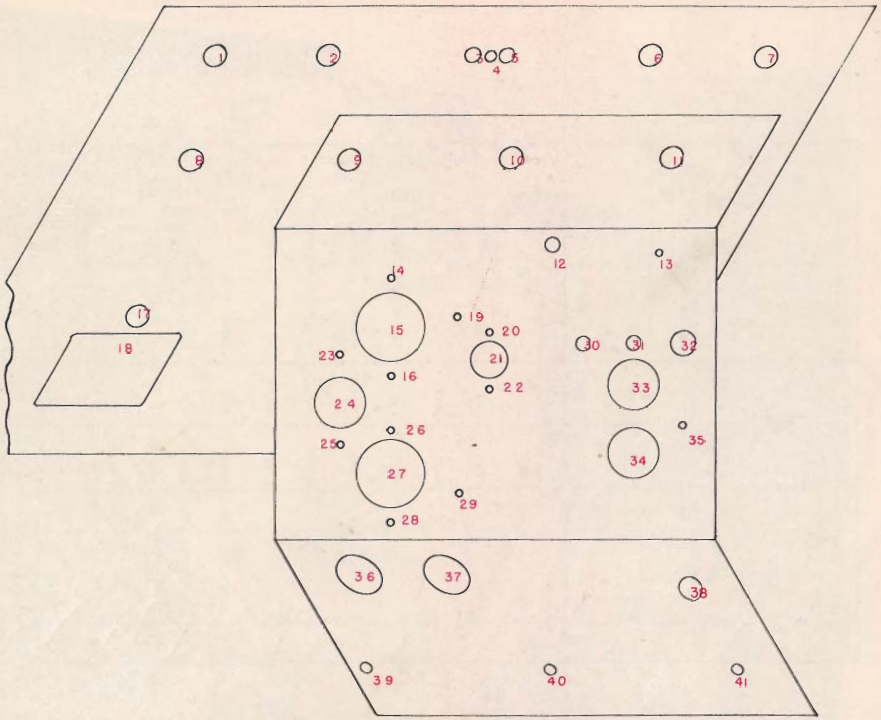
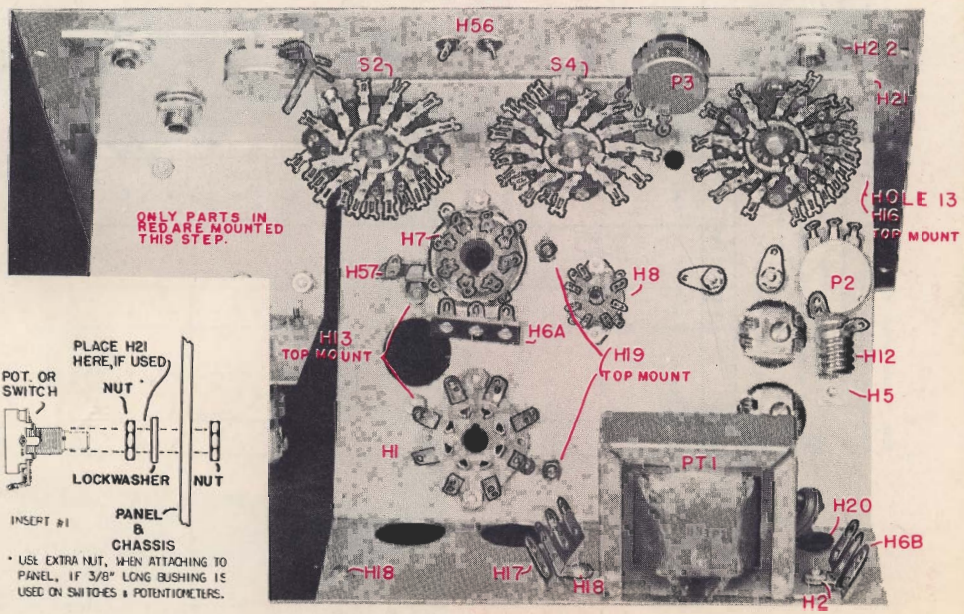


DIAGRAM 2 ASSEMBLED CHASSIS BOTTOM VIEW

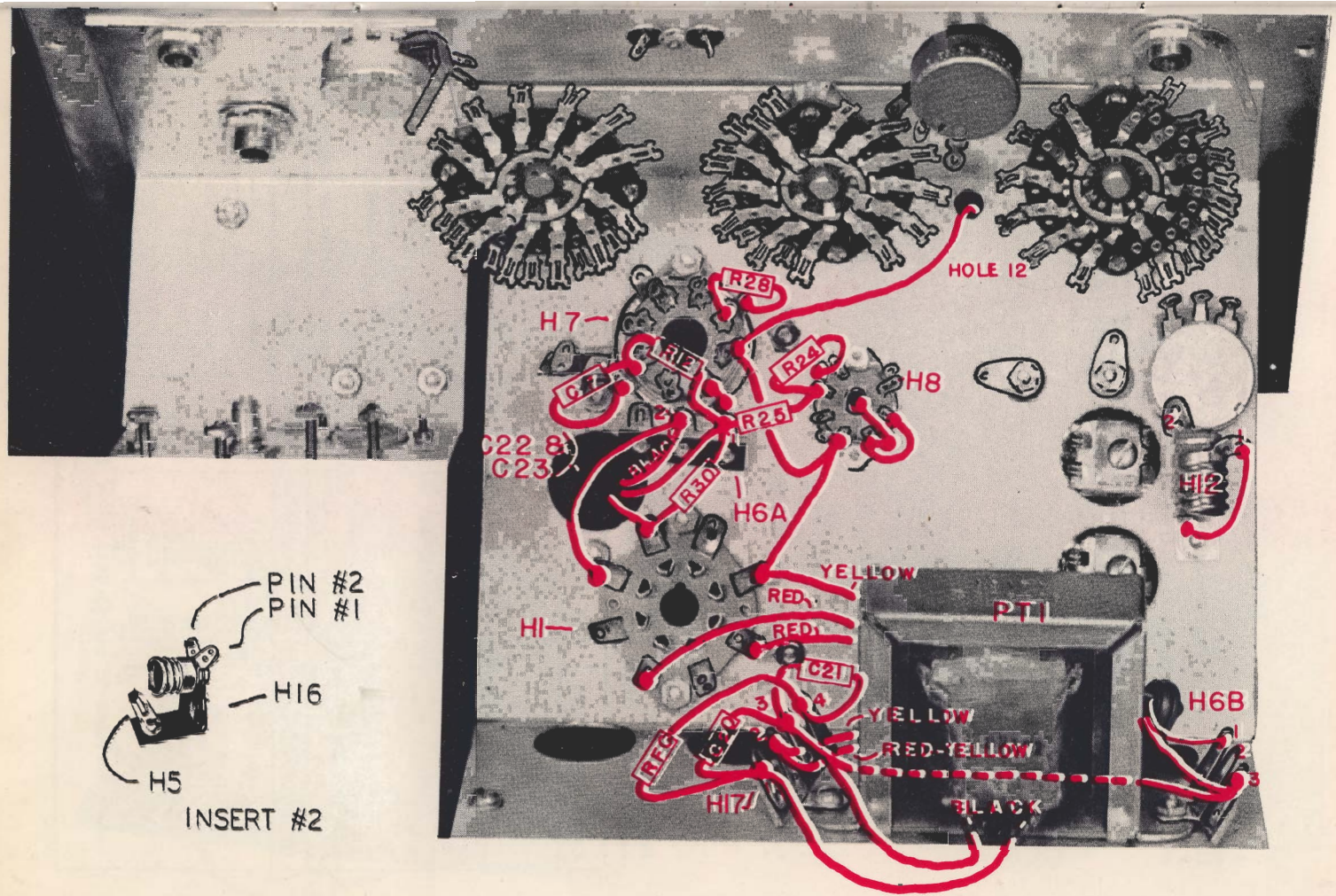


Note: * means solder. If no asterisk appears, simply connect the wire to that contact and leave it there. It will be soldered while doing another step. EXAMPLE - Consider the sixth step: A .0015 ufd condenser (C20) is SOLDERED to H17#3 and the other end is connected to H17#1. The condenser leads are to be covered with spaghetti. The asterisk (*) indicated that H17#3 was to be soldered, while the omission of the asterisk indicated that H17#1 was not to be soldered as yet.

CHECK	PART	PART#	WIRE FROM	WIRE TO	REMARKS
	Line Cord	W1		H6B#1	Through Grommet & knot wire. Terminal Strips are numbered clockwise when viewed from the side showing the entire grounding lug.
	" "	"		H6B#3	" " other wire.
	Wire	W2	H6B#3*	H17#3	
	Power Trans.	PT1		H17#3	One of the Black Wires.
	.0015 ufd Con.	C21	H17#3	H17#4	Spaghetti
	.0015 ufd Con.	C20	H17#3*	H17#1	"
	RF Choke	RFC	H17#1	H17#4	"
	Power Trans.	PT1		H17#1*	Other Black Wire
	" "	"		H17#2	One of the Yellow Wires.
	" "	"		H17#2*	Red-Yellow Wire
	" "	"		H1#3*	Red Wire
	" "	"		H1#5*	Other Red Wire
	" "	"		H1#2	Other Yellow Wire

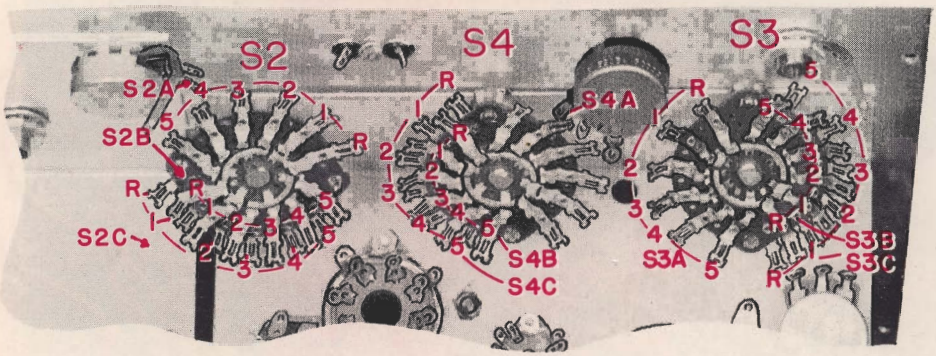
CHECK	PART	PART#	WIRE FROM	WIRE TO	REMARKS
	Wire	W2	H1#2*	H8#4	
	"	"	H8#4*	H7#7	
	"	"	H7#7	H16#1*	Through hole #12, see insert
	20x20 ufd Con.	C22-23		H6A#2	Black Wire. (Note: Wire may be from top of condenser).
	"	"		H1#8	One of the Red Wires
	"	"		H6A#1	Other Red wire
	2.2K Res. 1W	R30	H6A#1	H1#8*	Spaghetti
	Wire	W2	H1#7*	H6A#2	
	"	"	H7#8*	Lug*	Lug on socket below pin 8
	"	"	H8#2*	H8#3	
	"	"	H8#3*	Lug	Lug on socket below pins 2 & 3
	"	"	Lug*	Shield*	Shield in center of socket
	"	"	H12#1*	Lug	Lug beneath H12 socket
	"	"	H16#2*	Lug*	" " H16 "
	10K Res.	R12	H6A#1	H7#2	Spaghetti
	.0015 ufd Con.	C7	H7#2*	Lug*	Lug below H7#2*. Spaghetti
	1K Res.	R28	H7#6*	"	" " H7#6*. "
	100K Res.	R25	H6A#1	H8#6	Spaghetti
	56K Res.	R24	H8#6*	Lug*	Lug between pins 6 & 7

PURPOSE OF THE CIRCUIT: The Purpose Of The Circuit is to explain the function of the major components and their location. To those who are not too familiar with this type of instrument, it is suggested that the explanatory section of this instruction book be read before trying to digest this part. The first series of steps represents the Line Cord and R.F. Input Filter wiring. The remaining section is the Power Supply and Filament wiring.


HOLE 12
R28
H7
R1
C1
R24
H8
R25
C22
C23
BLACK
R30
H6A
H12
YELLOW
RED
H1
RED
PT1
C21
H6B
YELLOW
RED-YELLOW
C20
REG
H17
BLACK
PIN #2
PIN #1
H16
H5
INSERT #2

SWITCH NUMBERING: Switches are numbered COUNTER-CLOCKWISE starting from their ROTOR (R) and then through their five positions. Switch S2 is actually 3 switches on one wafer - S2A, S2B & S2C. The same applies to the various other switches, except that their position has been rotated in different directions.

DIAGRAM 4 SWITCH NUMBERING



PREWIRING SWITCH S2: Remove switch S2 from the chassis temporarily. This will simplify the ultimate construction. The instructions below refer to Diagram #5.

CHECK	DESCRIPTION	PART #	WIRE FROM	WIRE TO	REMARKS
	Wire	W2	S2C#5*	S2C#2*	Thread through S2C#5*, S2C#4*, S2C#3* to S2C#2*. Leave a 7" piece of wire soldered to S2C#2* The other end will be connected later on.
	"	"	S2B#4*	S2B#2*	Thread through S2B#4* through S2B#3*, to S2B#2*. Leave a 2½" piece of wire soldered to S2B#2*.

PREWIRING SWITCH S3: The instructions below refer to Diagram #6.

CHECK	DESCRIPTION	PART #	WIRE FROM	WIRE TO	REMARKS
	360 uufd	C11	S3C#1	S3C#5	Spaghetti
	"	C10	S3C#1*	S3A#1*	"
	1.8M Res.	R21	S3C#3	S3C#5	"
	10M Res.	R23	S3C#3*	S3C#R	"
	180K Res.	R22	S3C#4*	S3C#5*	"
	10M Res.	R20	S3A#3	S3A#R	"
	1.8M Res.	R18	S3A#3*	S3A#5	"
	180K Res.	R19	S3A#4*	S3A#5	"
	Wire	W2	S3C#R*		Leave 1" wire.

Insert switches S2 and S3 into their proper holes on the chassis and panel

DIAGRAM 5 **SWITCH S2 WIRING**

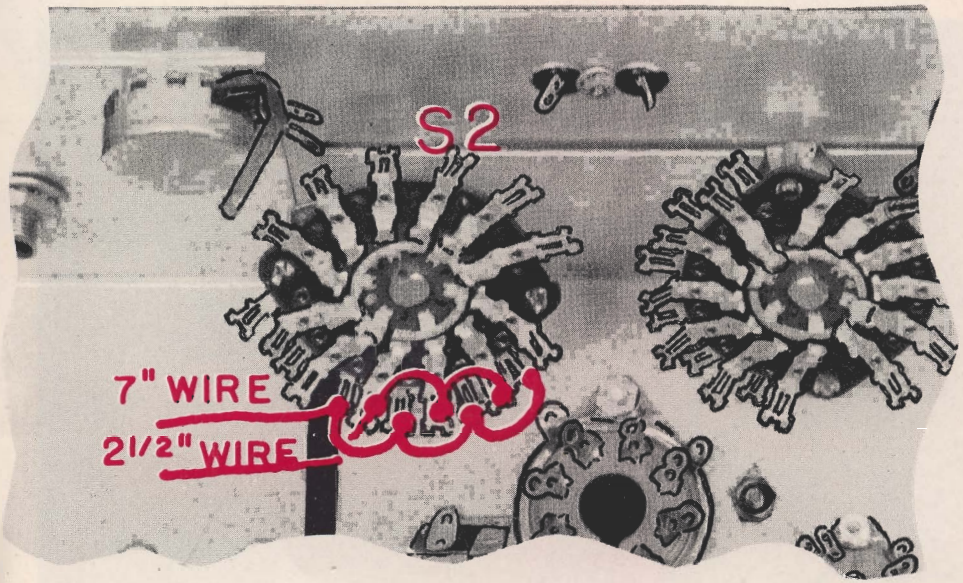
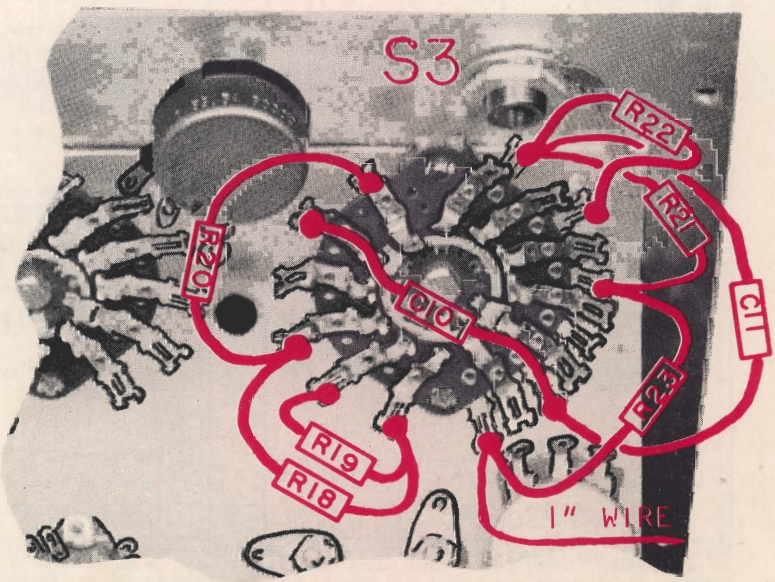
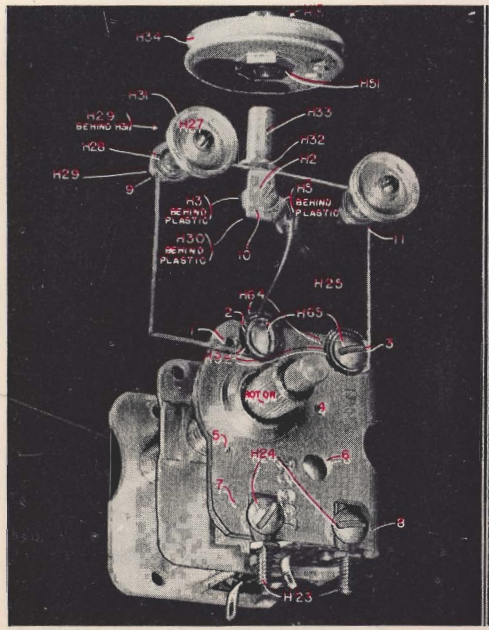
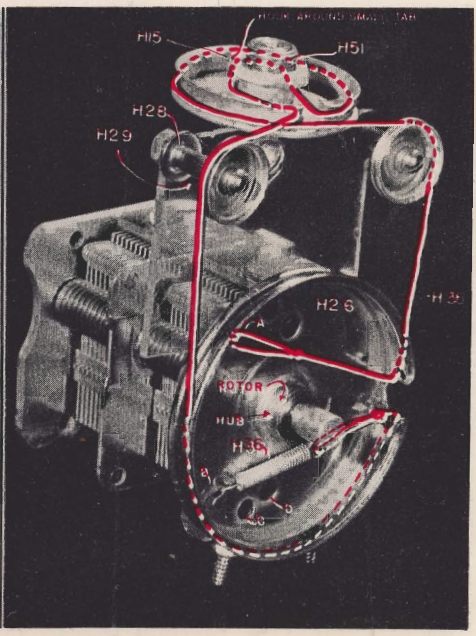


DIAGRAM 6 **SWITCH S3 WIRING**



CONDENSER ASSEMBLY





Assemble both variable condensers as indicated below. If a Pre-Assembled RF Head were purchased (Model 630KA), use the following instructions for mounting the AF condenser.

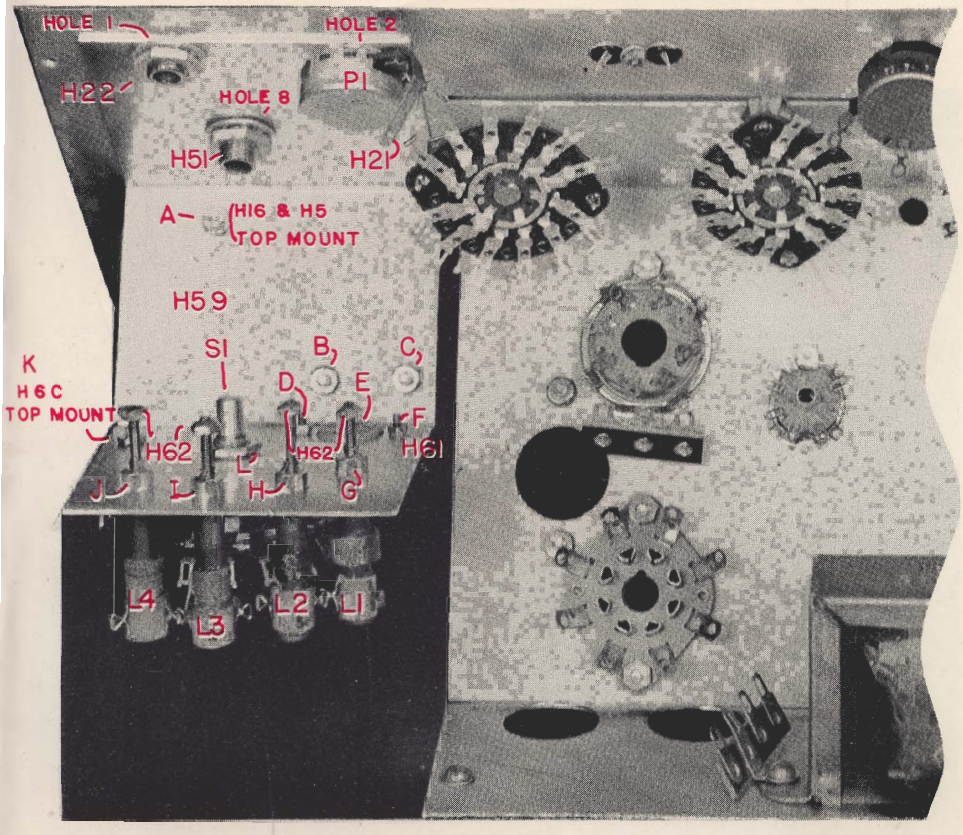
CHECK	DESCRIPTION	PART #	MOUNT IN HOLE #	WASHER AM'T	THRU PART #	REMARKS
	Spade Lug	H23	7	1	H24	Lug with the larger, #8, hole.
	"	"	8	"	"	"
	Plastic Plate	H25	2,3	2 2 2	H65 H32 H64	Do not make too tight or use lockwashers since the plastic is somewhat brittle. H32 & H64 fit between head of screw & Plastic Plate - NOT between plate & condenser frame.

Lay the condenser (variable) on a table with the ROTOR facing you. Rotate the ROTOR counter-clockwise until the plates are completely closed. Place the largest pulley (H26) with the cord opening to the right (in the direction of 3 o'clock) see Diagram. Press pulley onto condenser rotor, being very careful not to disturb the condenser plates. Gently move the pulley from side-to-side while pressing down. Press down until the edge of the condenser rotor is flush with the Hub of the pulley. Do not go down too far, beyond the point where both are flush, since it may cause the pulley to bind. (If the Hub of the pulley becomes enlarged due to excess manipulation, close the Hub slightly with a pair of pliers and re-insert). A pressure fit of this type, although a bit difficult to attach, is commercially accepted and ultimately gives the best service.

	Spade Lug	H30	10	1 1 1	H2 H3 H5	H3,H5 & H30 mount behind plastic. Do not make too tight.
	#4x$\frac{3}{8}$" Machine Screw	H27	9	1 2 1	H28 H29 H31	Adjust nut until H31 just turns freely.
	"	"	11	"	"	"
	#8 Flat Washer	H32				Place over H30 on hole #10.
	Threaded Spacer	H33				Screw over H30 & H 32.
	Medium Pulley	H34		1 1	H51 H15	Place H51 thru H34 & secure with H15.

Place a small loop at each end of Dial Cord (H35) so that the cord is 18" long. Attach one loop to "A" on pulley (H26). Thread around as indicated, terminating through the Spring (H36) at point "B". Try the assembly, if the vernier shaft slips - or does not make the complete rotation - the cord may be too tight. This may be rectified by moving H36 to points "C" or "D". The opposite is true if the assembly is too loose.

DIAGRAM 7 | RF CHASSIS MOUNTING | BOTTOM VIEW



Secure the RF Chassis (H59) with 1-H51, 1-H14 & 1-H15 into hole #8 of the panel. Place H22 into hole #1 and secure with 1-H15 & 1-H14. Place P1 into hole #2 of the panel and secure with 1-H14, 1-H15 & 1-H21 (H21 over lug #1 of P1). If the Model 630KA (Pre-Assembled RF Head) is being constructed, proceed directly to the next section, otherwise follow the instructions below.

CHECK	DESCRIPTION	PART#	MOUNT IN HOLE #	WITH AM'T	PART#	REMARKS
	Low Loss 7 Pin Socket (molded)	H61	D,E,F	2	H9	See next Diagram for key.
				2	H10	
				2	H11	
	5 Position Switch	S1	L	1	H14	Diagram shows short shaft for simplicity. Rotate so SIC#R just touches pin 1 of tube socket (when pin 1 is bent out).
				1	H15	
	White Dot Coil	L1	G			Push Tinnerman Fastener through hole, snap edges will hold it in place. If coil does not slip on easily, bend tabs on fasteners slightly.
	Yellow " "	L2	H			
	Red " "	L3	I			
	Black " "	L4	J			
	3 Lug Terminal Strip	H6C	K	1	H2	
				1	H3	
	Pilot Light Socket (small)	H16	A	1	H2	Mount H16 on top of chassis with 1-H5
				1	H3	
	#4 Palnuts	H62				Place one on each of the adjustments screws for the 4 coils, open end toward coil. Thread down only about 1 turn and then solder to brass adjustment screw.

CHECK	DESCRIPTION	PART#	WIRE FROM	WIRE TO	REMARKS
	220K Res.	R1	S1A#1*	S1A#3	Spaghetti
	47K "	R2	S1A#3	S1A#2*	"
	33K "	R3	S1A#3*	S1A#4	"
	10K "	R4	S1A#4*	S1A#5	"
	3.3K " 1W	R8	S1A#5*	H6C#1	"
	20K Res.	R6	S1A#R	S1B#R	"
	1K "	R7	S1A#R	H6C#3	"
	820 "	R5	S1A#R*	S1B#5* & S1C#5*	One end of R5 through S1B#5* & then through S1C#5*.

Examination will show that the coils have three terminals, although only two are actually used. Rotate each coil so that they are as shown in the diagram. When rotating the coil, use a pair of pliers and turn the metal Tinnerman Fastener. Do not try turning from the open end as this could break the seal. Note that the unused connection faces away from the switch. Coils are numbered clockwise starting from the unused connection, when viewed from the open end of the coil. Make certain that adjacent lugs are not touching each other.

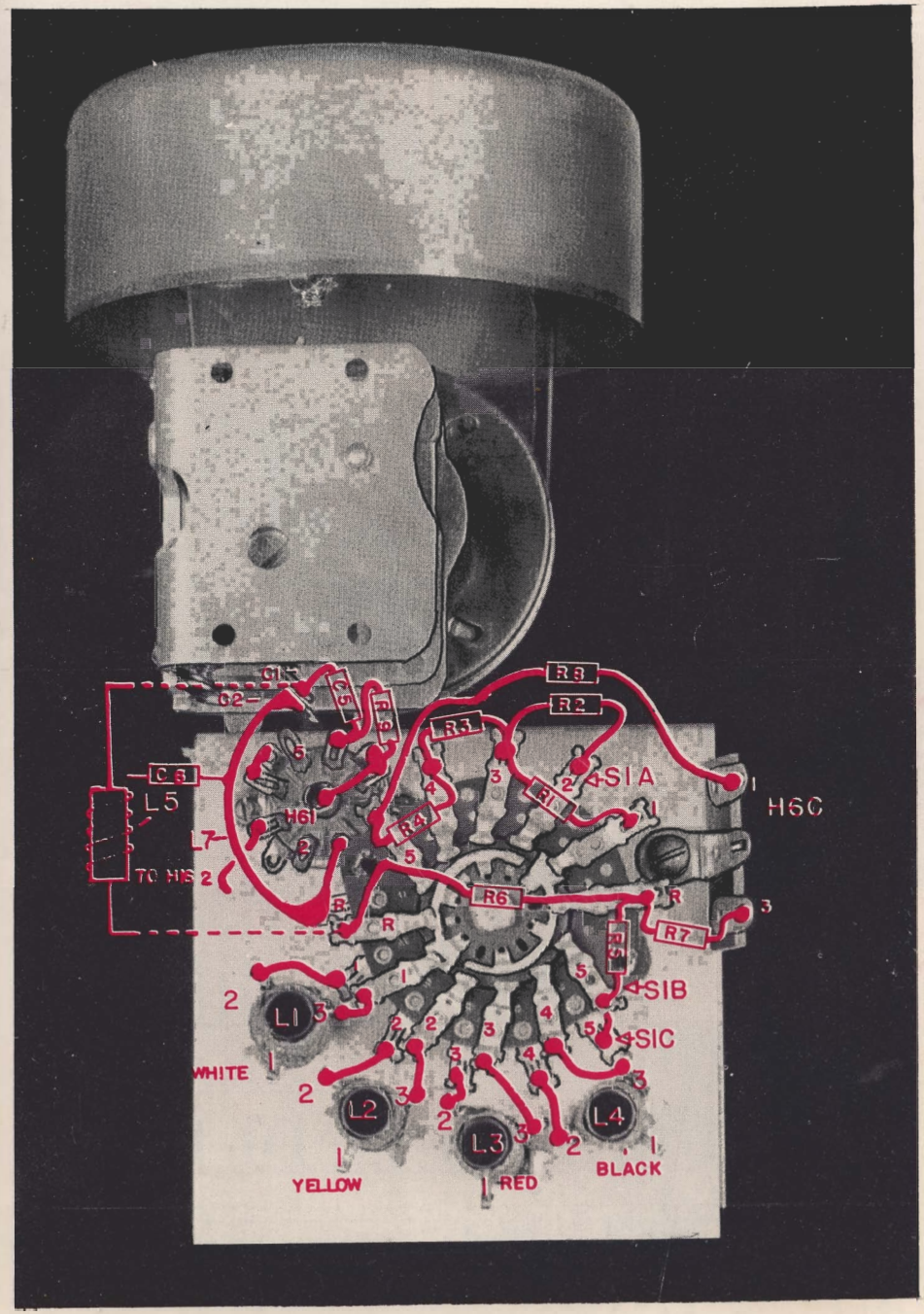
	Wire	W2	L4#3*	S1B#4*	Keep leads very short.
	"	"	L4#2*	S1C#4*	"
	"	"	L3#3*	S1B#3*	"
	"	"	L3#2*	S1C#3*	"
	"	"	L2#3*	S1B#2*	"
	"	"	L2#2*	S1C#2*	"
	"	"	L1#3*	S1B#1*	"
	"	"	L1#2*	S1C#1*	"

Attach Metal Extension Shaft (H63) to one of the variable condensers and insert condenser spade bolts into holes B & C securing with 2-H3 and 2-H66. under RF Chassis. H66 is screwed onto spade lug before inserting into RF chassis. Bend or clip off terminals 2 & 5 of the 7 pin miniature socket (H61). Bend terminal #4 of socket H61 down and solder to lug beneath it. Bend terminal #7 of socket H61 down until it touches lug beneath it. Attach a wire to the center shield of the socket and bring it to the same lug. Solder on the Shield side. Connect a 360K Resistor R9 to pin #6 and solder the other end to the same ground lug of the previous step. Bend pin #1 over until it touches S1C#R*. Solder half round coil (L7) from S1C#R* to the Lug* on C2. Tin coil L7 before soldering. If pin #3 is in the way, bend it down slightly so that coil has ample clearance. Solder 1 end of 100ufd Condenser (C6) to L7. Leave other end free.

	300 uufd Con.	C5	H61#6*	Lug	Lug on condenser C1
	Coil, H.F.	L5	S1B#R*	Lug*	" " " ". It should not be necessary to bend the terminals on the coil. Place so that coil is above its leads. This will allow ample clearance between coil & shield.
	Wire	W2	H61#3*	H16#2	
	"	"	H16#1*	Lug*	Ground Lug below socket.

PURPOSE OF THE CIRCUIT: The first section is the DC supply to the Colpitts Oscillator tube. The resistor network is to keep the oscillator output approximately the same from Band to Band and also to aid stabilization. R7 is a decoupling resistor in the AF section. The 2nd section is the coil and socket wiring. L6-A and L6-B are formed by the switch inductance.

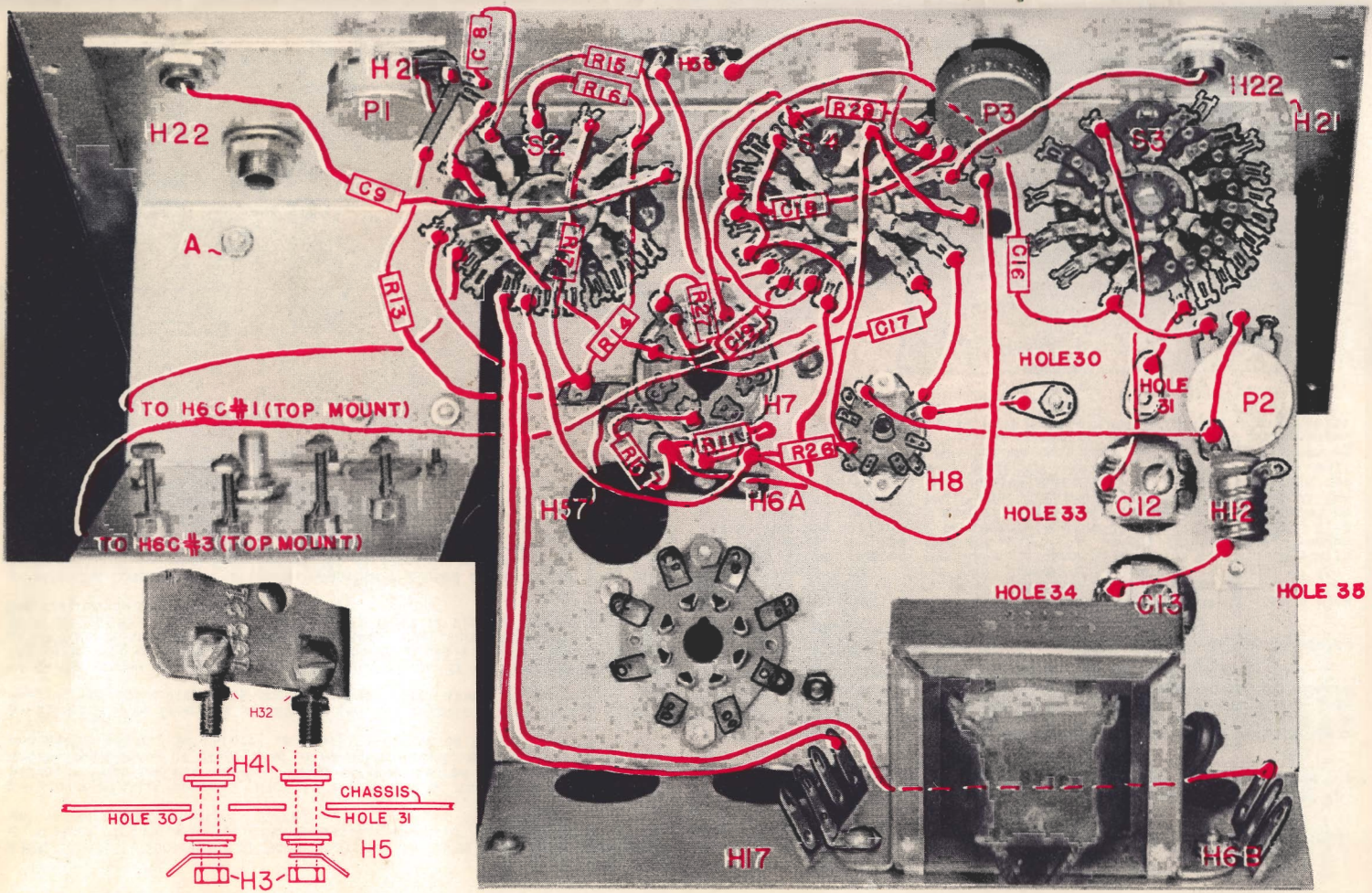
DIAGRAM 8 | RF CHASSIS | REAR VIEW



CHECK	DESCRIPTION	PART#	WIRE FROM	WIRE TO	REMARKS
	Wire	W2	S2C#2	H17#4*	7" inch wire from S2C#2
	"	"	S2B#2	H6A#1	2½" inch lead
	"	"	S2C#R*	H68#1*	
	.1 ufd Con.	C9	S2A#R*	H22*	Spaghetti
	68 Res.	R16	S2A#1	S2A#3*	"
	"	R15	S2A#1	S2A#4	
	500 uufd Con.	C8	S2A#4*	P1#2*	
	10 Res.	R14	S2A#1*	H57#1	
	1 Res.	R13	H57#1	H21*	Solder H21 to P1#1"; solder R13 to extended part of H21
	100 Res.	R17	H57#1*	S2A#2*	
	Wire	W2	S2A#5	P1#3*	
	"	"	S4A#1*	Lug*	Lug under pin #1 of H8
	"	"	S4A#2*	S4A#5	
	"	"	S4A#5*	H8#5	Straight short lead
	100K Res.	R26	H8#5*	H6A#1	
	Wire	W2	P3#1*	H6A#1*	5" long-keep flat against chassis
	24 ufd Con.	C16	S4C#2	S3A#5	Place C16 between switches S3 & S4 with + side up. If necessary remove P3 & replace after C16 is in place. + to S4C#2
	Wire	W2	S4C#2*	S4C#5*	
	"	"	S4A#3*	H22*	Ext. Mod. Connector
	.25 ufd Con.	C18	S4B#R*	P3#2*	Place Con. flat against chassis between S4 & Crystal Jack
	Wire	W2	S4A#1*	H56*	Right hand lug on H56
	"	"	S4C#R	H7#5*	
	3.3K Res.	R29	S4C#R*	P3#3*	
	Wire	W2	S4C#4*	H56*	Left Lug
	"	"	H8#7*	H12#2	Keep lead short
	"	"	H12#2*	P2#2*	
	"	"	P2#1*	S3A#5*	Keep lead short

CHECK	DESCRIPTION	PART#	WIRE FROM	WIRE TO	REMARKS
	10 uufd Con.	C19	S4B#4*	H7#3	
	Wire	W2	H7#3*	S2A#5*	
	1.2M Res.	R27	H7#4	Lug*	Lug under pin #4 of H7
	.1 ufd Con.	C17	H7#4*	S4A#R*	
	470K Res.	R10	H7#1	H6A#3	
	100K "	R11	H6A#2*	H6A#3	
	Wire	W2	H6A#3*	S4B#5*	
	Mount the condenser assembly into holes #30 & 31 of the chassis using 4-H41, 2-H32, 2-H3 & 2-H5. See insert.				
	"	"	H8#1*	Lug*	Lug over hole #30
	"	"	S3C#R	"	This lead is the one previously soldered when switch assembly was made. Solder to lug over hole #31.
	Wire	W2	S3A#R*	C12*	Lug on C12 thru hole #33. Straight short lead.
	"	"	C13*	Lug*	Lug on C13 thru hole #34 to lug over hole #35. Straight short lead.
	"	"	S4B#2*	S4B#3	
	"	"	S4B#3*	H6C#3*	
	"	"	S2B#R*	H6C#1*	
	10 uufd Con.	C6	H7#1*	L7	Lead to L7 already connected
	Solder H21 (under H22) to S3C#5*				Clip off excess
	Wire	W2	H16#2*	H7#7*	H16 mounts in hole 'A'.

PURPOSE OF THE CIRCUIT: The wires from S2C are the on-off AC portion of the circuit. Those to S2B form the DC supply to the RF output. C9 is the output blocking condenser. S2A is the AF bridge circuit. S4A is the selector switch for the multi-purpose amplifier tube V3. R26 is the plate load of V4. C16 is the feedback path for the bridge. C18 is the de-coupling condenser for V3. R29 is the de-coupling resistor for V3. C19 is the crystal coupling condenser. R27 & C17 are part of the AF RC coupling. R10 & R11 is the grid input circuit of V2.


H2
P1
H22
C8
R15
R16
H56
S2
R20
S4
P3
H22
H21
S3
C9
A
C18
C16
R13
R14
R21
C19
C17
HOLE 30
HOLE 31
P2
TO H6C #1 (TOP MOUNT)
H7
R11
R26
R5
H8
H57
H6A
HOLE 33
C12
H12
TO H6C #3 (TOP MOUNT)
HOLE 34
C13
HOLE 35
H32
H41
CHASSIS
HOLE 30
HOLE 31
H5
H3
H17
H6B

FINAL STEPS: 1- Secure the AF Scale (H37) to the large Scale Drum (H38) with a 1" piece of tape on each side. Repeat the above for the RF Assembly if it was not purchased pre-wired (630KA).

2- Secure plastic windows (H40) to the inside of the panel with two 1½" pieces of tape for each window. Make certain the red line is centered. If desired some Duco, or other type of adhesive cement, may be used at the top and bottom edges. Be careful in applying cement so that it does not run.

3- Solder a wire from the solder lug (on the plastic plate) to C13 (top-lug) of the audio frequency condenser (variable) assembly.

4- Solder a wire from the center partition of the RF variable condenser to the solder lug on the plastic plate of the RF assembly. Note: this step may be omitted if the 630KA has been purchased. Make sure the wire is bent so that the condenser may readily be opened without it binding against the wire See diagram which follows.

5- With the condensers (variable) completely closed place the AF Drum and scale onto the top medium pulley of the AF assembly and secure with 1-H15 & 1-H14. (Note: H14 is placed between the pulley and the drum, rather than between the drum and H-15). Tighten H-15 slightly and rotate the condenser thru a complete rotation: the scale should be so aligned that the vertical lines at each end approximately appear under the red line of the plastic window. Repeat for the RF Assembly if MODEL 630KA was not purchased.

6- Place, for each of the condenser assemblies, a 6-32 x ¼" machine screw H2 into the threaded spacer (H33) with a shoulder washer (H41) between. If too tight, rotate or remove H41.

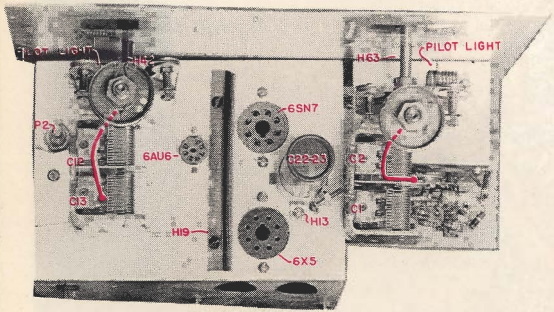
7- Secure the handle (H43) to the cabinet with 4 6-32 machine screws (H2), 4 6-32 nuts (H3), & 2 handle brackets (H45).

8- Make certain the Fibre Extension shaft is connected to the shaft of the audio condenser assembly. Do not tighten too much as this could cause the shaft to split. The brass shaft should be on the RF Assembly.

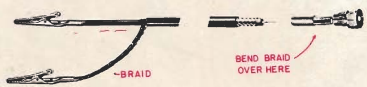
9- Making sure that all switches and potentiometers are in their maximum counterclockwise position, place the four pointer knobs (H46) onto the switch shafts; the two large round knobs are placed onto the shafts from the variable condensers; the remaining two small round knobs are placed on the two potentiometer shafts along the bottom of the panel.

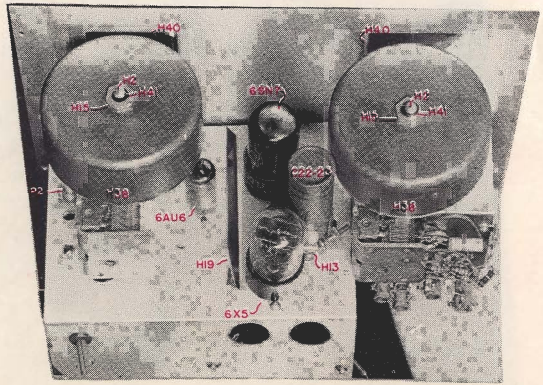
10- Insert all tubes into their proper sockets as shown on the following diagram. 6C4 mounts in RF Head.

11- LEAD PREPARATION: Strip the outer insulation about three inches back on one side of coaxial wire (W3). Separate the braid from inner lead, but do not cut off braid. Strip inner conductor ¼" and connect to one of the alligator clips. Connect the other alligator clip to the wire braid. Strip top insulation from the other end about 1". Do not remove braid. Loosen screw from the microphone connector (H49) and remove the spring. Slip spring over the cable, with smaller diameter end toward the stripped portion of the cable. Bend the braid over the smaller diameter portion of the spring as far as it will go. Remove about 5/8" of inside insulation and slip exposed wire thru hole in center of microphone connector. Press small spring and braid into the microphone connector and secure by tightening set screw. Solder wire in front of connector and cut off all excess wire. Carefully clean off the rosin with carbon tetrachloride, if available.



LEAD PREPARATION





You have now completed the construction and wiring of your MODEL 630-A few more points of CAUTION here may save the waiting time for replacement parts.
1- Check over the entire assembly. Make certain that all connections are properly soldered; that rosin has not caused leakage between pin or switch contacts; that there are no rosin joints. Do this in an organized way, starting from one end of chassis and gradually progressing to the other side while examining all connections.

2- Check the resistance from pin 8 of the 6X5 (V6) to ground. This should be at least 30,000 ohms and the ohmmeter needle should show the gradual charging of the electrolytic condensers. If a lower resistance is observed, DO NOT TURN SET ON, but recheck the power supply wiring.

Check the resistance from the frame of the audio variable condenser (C12-C13) to ground. This should be at least 10 megohms when the AF BAND switch is in the 40-200 position. If a lower resistance, or direct short appears, check the fibre washers on the spade lug mounting of the variable condenser.

3- Plug the line cord into any 110 volt 50-60 cycle line. Turn power on by rotating the OUTPUT switch to the RF STAND. AF position. The small pilot lights should light immediately. If they do not, turn power off AT ONCE and recheck filament wiring. Large pilot light should not light.

AF CALIBRATION: The calibration of this section is extremely simple and actually only consists of three adjustment controls: a) the potentiometer (P2) which adjusts the output waveform; b) the trimmers C14 & 15 which adjust the frequency.
The surest method of calibration employs an oscilloscope, although an AC Voltmeter may be used as an approximate method. Both systems are explained herein.
A warm-up period, of about two hours, should be allowed before calibration, although you may start at once and "touch-up" the adjustments later on.

CALIBRATION WITH AN AC VOLTMETER: Note - If an oscilloscope is available, disregard this procedure and go directly to the section marked CALIBRATION WITH AN OSCILLOSCOPE.
1- Set all controls as follows:

CONTROL	SET TO
AF CRYSTAL	MAXIMUM CLOCKWISE
OUTPUT	RF STAND. AF
SELECTOR	AF
AF BAND	40-200
AF TUNING	MAXIMUM COUNTERCLOCKWISE

2- Connect one lead of an AC VOLTMETER (preferably 1,000 ohms/volt or more) to pin 6 of V3 (Pin 6 of the 6SN7 low loss molded socket . H7). The other lead goes to chassis ground. Use large condenser in series with one of AC leads to block DC.
3- Adjust potentiometer (P2) for approximately 4.5 volts rms. The usual AC meter is calibrated in rms voltages.

4- Loosen the trimmer adjustment screw for C13 until it is almost all the way out. (C13 is located from the bottom of the chassis through hole #34 as shown in the diagram).

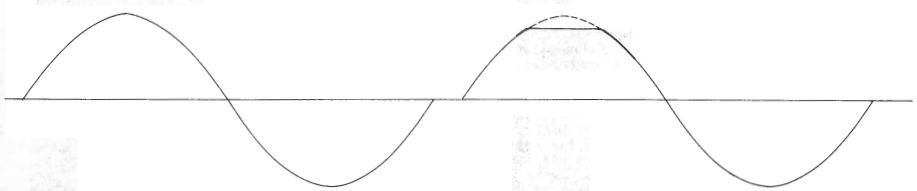
5-Rotate the AF Tuning control to its maximum clockwise position (high frequency end of the band) and adjust the trimmer for C12 until the voltage is approximately between 3½ & 4½ v. (C12 is located from the bottom of chassis through hole #33 as shown in the Diagram). An insulated alignment tool should be used for these adjustments.

6- This approximately aligns the instrument. For a more exact alignment the oscilloscope method should be used. The instrument, however, should be accurate enough for general purpose uses. The greatest accuracy will normally be found on the lowest frequency portions of each band. The highs require the oscilloscope method.

CALIBRATION WITH AN OSCILLOSCOPE: 1- Set all controls as shown in step 1 of CALIBRATION WITH AN AC VOLTMETER.

2- Connect the output leads of the MODEL 630 to the vertical amplifier input terminals of the oscilloscope.

3- Adjust P2 (located on the chassis) until an undistorted pattern appears on the screen of the oscilloscope. Best results may be obtained by adjusting the scope's internal sweep until two patterns appear simultaneously. Distortion is recognized by a flattening off on the top and/or bottom of the SINE wave. Adjust P2 until the distortion just disappears; be careful not to adjust down too far as this could cause instability. Note: If a slight wavering of the signal is noticed, it is probably caused by stray pickup and will be eliminated when placed into the cabinet.



SINE WAVE WITHOUT DISTORTION

SINE WAVE WITH DISTORTION ON TOP

Dotted line indicates direction of a pure sine wave

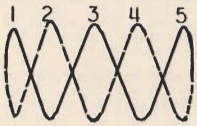
4- Loosen the trimmer adjustment screw for C13 until it is almost all the way out. (C13 is located from the bottom of the chassis through #34 in the diagram).

5-Rotate the AF Tuning control to its maximum clockwise position (highest frequency) and adjust the trimmer for C12 until the height is approximately the same as was seen in step 3. The trimmer for C12 is located from the bottom of the chassis through hole #33 as shown in the Diagram). This approximately aligns the generator.

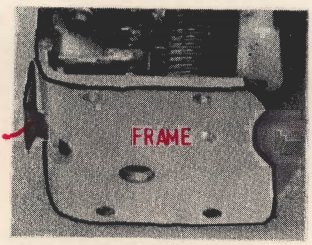
6-For exact alignment, rotate the AF TUNING control to the position marked 'CALIBRATION POINT' on the 40-200 scale

7- Feed a 60 cycle signal to the HORIZONTAL AMPLIFIER terminals of the oscilloscope and change the sweep setting to the HORIZONTAL AMPLIFIER position. If the oscilloscope has a 60 cycle position on the sweep switch, use that.

8- Adjust trimmer for C12 until a Lissajous figure* shown below appears. Note that it has 5 peaks on top; this means that the unknown is 5 times the frequency of the known or 300 cycles. The CALIBRATION POINT, therefore, is to be adjusted for 300 cycles. Note: If the picture rotates slightly, it should not be of too much concern. If the signal amplitude drops down considerably on the CALIBRATION POINT, remove the trimmer screw from C13 and bend the trimmer plate completely open (270 degrees) so that it is flat up against the variable condenser frame To do this, it may be necessary to loosen the nuts holding the variable condenser to the chassis.



LISSAJOUS FIGURE
SHOWING 5 TO 1 RATIO



9- Without changing the setting on the oscilloscope, turn the AF TUNING control on the MODEL 630 until the Dial reads 60 cycles. A circle should appear. This again is a Lissajous figure and since it has only one peak, the unknown and known are at the same frequency. i.e. 60x1 = 60.

LISSAJOUS FIGURE SHOWING A ONE TO ONE RATIO

If both frequencies are not exactly the same, the figure will rotate through the various patterns shown above.

If the 60 cycle point does not come in properly, loosen the 3/8" I.D. nut holding the Dial Drum to the small PULLEY and rotate the Drum, without changing the position of the variable condenser, until the 60 cycle point is set. Tighten the 3/8" nut and repeat steps 6,7 & 8 above.

10- The other ranges should be properly calibrated since only precision components are used in the frequency determining bridge circuit. If distortion is noticed on any other range, a slight adjustment of P2 should rectify the trouble. It is suggested that the instrument be used for about a month and then a final calibration should be made. This gives all the major components a chance to properly stabilize after aging.

SPECIAL SCALE: It is often said that an instrument is as accurate as its scales. The aforementioned has been proved true many times with some of the most expensive instruments coming out with hand drawn scales. This follows since it is veritably impossible to make a multi-range instrument calibrate easily on just one scale. The above problem was the one given to the PRECISE ENGINEERING DEPT. with special emphasis placed on finding a method of approaching the accuracy of "hand drawing" without the obvious tremendous disadvantage in cost. Basically it was treated as an engineering problem with the following facts noted:

1- An instrument which was "off-calibration" most often retained the proper distribution curve. i.e. although the reading was wrong, the scale was off in the same direction on each portion of the band.
2- If the range could be moved, most of the scale could be brought within a prescribed tolerance.

The result of these observations is in the enclosed scales. You will note that each scale range on each scale is slitted with the exception of one. If desired any one of the ranges may be removed by completing the cut with a razor along its left and right edges. The scale may then be reinserted and moved slightly in the proper direction to compensate for an error noted. Since this will cause slight over-lapping at one edge, it must then be trimmed. Note: we do not recommend the cutting of scales until several months of use have allowed components to age properly. Once final calibration has been made, after several months of aging, a cement such as Duco may be used to make the scale permanently adhere to the drum. The tape which previously held the scale may then be removed.

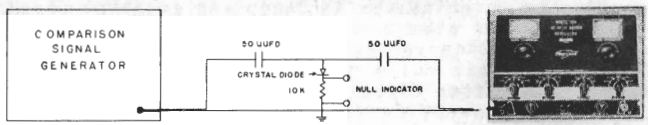
* LISSAJOUS FIGURES: By feeding a known frequency signal (in this case 60 cycles) to one set of deflection plates of an oscilloscope and an unknown frequency to the other set of plates, the unknown frequency may be determined by examination of the resultant picture.

30-100M new mod 8va 95 a 90

RF CALIBRATION: The following calibration procedure refers only to the Model 630K and may be omitted by those who have the Model 630KA (Pre-calibrated RF Head).
There are two generally accepted procedures in the calibration of signal generators: 1- Calibration against another signal generator; 2- Calibration against radio stations by using a communications receiver, radio or FM receiver as a detector. Both methods are explained herein. The 2nd method is considered to be a more exact check since the frequencies are extremely accurate.

STABILIZATION: Allow the instrument at least an hour's "warm-up" before calibration. This allows the components to stabilize.

CALIBRATION AGAINST ANOTHER SIGNAL GENERATOR (SIGNAL COMPARISON):
The signal comparison method of calibration consists of feeding two signals (one unknown and one known) into a detector (a device for beating or heterodyning two or more signals) and adjusting for a Zero-beat.
1- Wire the circuit shown in the Figure below. The Null Indicator could be a pair of earphones, a VTVM, an Oscilloscope, an Audio Amplifier or a multimeter. On the VTVM or multimeter, a zero-beat can be observed if the AC range is used. If desired a crystal probe, similar to the PRECISE Model 912AM, could be used as the entire circuit with both signal generators feeding into the tip. The probe could then be terminated in any of the aforementioned Null Indicators.



2- Use the following Calibration Chart for aligning the various bands. Explanation on using the following chart: The first line states: "The frequency to which the first band is tuned is 300KC (300,000 cycles). The Comparison Signal Generator is to be tuned to 300KC. The Model 630 is to be tuned to 300KC and its Dial should be set for that frequency on the .3M-1MC range of the RF BAND Switch. The Slug on the White Dot Coil (L1) is to be adjusted for "Zero-beat" on the Null Indicator."

CALIBRATION CHART: Set all controls as follows and then proceed through steps 1 thru 6 for Final Calibration: Set RF Band to setting as listed in Chart; OUTOUT to RFX100; SELECTOR switch to CW; AF BAND to AF STAND.; RF to maximum clockwise; RADIO FREQUENCIES to Frequency on chart; other controls are not used. Set comparison Generator to Frequencies below using CW position.

STEP	CALIBRATING FREQUENCY	SET COMPARISON GENERATOR TO	SET 630 TO	ON BAND	ADJUST	ADJUST FOR	REMARKS
1	300KC	300KC	300KC	.3-1MC	Slug on L1 (White Dot)	Zero Beat	
2	1MC	1MC	1MC	"	Trimmers on C1 & C2	"	Adjust both trimmers approximately same
3	"	"	"	1-3MC	Slug on L2 (Yellow)	"	
4	3MC	3MC	3MC	3-10MC	" " L3 (Red)	"	1.320 mV
5	30MC	30MC	30MC	30-100MC	Coil L5	"	See note below 4.20 mV
6	10MC	10MC	10MC	10-30MC	Slug on L4 (Black)	"	1.720 mV

Note referring to Step 5:
If the frequency is lower than 30MC, place an insulated alignment tool between the turns of L5 and gently twist the alignment tool (thereby spreading the turns) until Zero-beat is heard. If when the alignment tool is withdrawn the Zero-beat is lost, move the turns a trifle apart to compensate for the spring tension of the coil. Removal of the alignment tool should then bring the frequency to its proper setting. The reverse is true if the frequency were too high. Note: It is imperative that an insulated tool be used here since "BF" is present on the coil and also since a metal tool would change the electrical characteristics. We do not recommend the use of a slug for this coil since losses may occur especially on the high frequency end of the band.

CALIBRATION WITH A COMMUNICATIONS RECIEVER
This procedure consists of beating the Model 630 with known frequency station and then by harmonics, calibrating the remainder of the ranges.

CALIBRATION CHART: Set all controls as follows and then proceed thru Steps 1 thru 7 for final calibration. RF BAND to setting as listed in chart; OUTPUT to RFX100; SELECTOR SWITCH to CW; AF BAND to AF STAND.; RF to maximum clockwise; RADIO FREQUENCIES to frequency on chart. Other controls are not used. Connect the output on the Model 630 thru a small condenser (about 100uufd) to the antenna terminal of the receiver. Explanation on using the following table: The first line states; "the receiver is to be tuned to a station around 600KC or slightly above." The Model 630 is to be set to a frequency which is exactly ½ that frequency on the .3-1MC range. The slug on L1 (white dot coil) is then adjusted until a zero-beat is heard.

STEP	TUNE RECEIVER TO	SET MODEL 630 TO	ON BAND	ADJUST	ADJUST FOR	REMARKS
1	Station around 600KC or over	Exactly ½ frequency of station	.3-1MC	Slug on L1(white)	Zero-beat	
2	" " 1MC or slightly lower	Same frequency as station	"	Trimmers on C1 & 2	"	Adjust both trimmers approximately same. If necessary, all the way out.
3	Station around 1.2MC or slightly higher	"	1-3MC	Slug on L2(yellow)	"	
4	Although certain stations of known frequency do exist above the broadcast range in certain localities, they are extremely difficult to receive. We therefore show the harmonic method which follows. (Note: If your area can receive stations of known frequency above the broadcast range, you may follow the above procedure of Step 3 for the remaining low frequency adjustment of the three remaining bands. The Red Dot Coil is adjusted for 3MC or slightly higher; the Black Dot Coil is adjusted for 10MC or slightly higher and the HF Coil (L5) is adjusted for 30MC.)					
5	3 times frequency of Step 3 until change in noise is apparent. If Receiver is slightly off, its Dial may not coincide exactly.	3 times frequency of Step 3 above	3-10MC	Slug on L3(Red)	Change in background level.	The receiver and generator are both tuned to the same frequency of about 3.6MC, when this step is completed. It is important that the proper order be followed with the receiver being tuned first as read from left to right.
6	3 times frequency of Step 5 until change in background noise is apparent.	Exactly 3 times frequency of Step 5 above	10-30MC	Slug on L4 (Black)	"	This is about 10.8MC.
7	3 times frequency of Step 6 above.	Exactly 3 times frequency of above.	30-100MC	L5	"	See note below.

Note referring to Step 7:
This range is adjusted by spreading or compressing the turns of L5 slightly. Do not adjust too far in any direction. For spreading the coil, place an insulated alignment tool between the turns of L5 and twist the alignment tool until the proper adjustment is made. If when the alignment tool is withdrawn the zero-beat is lost, move the turns a trifle apart to compensate for the spring tension of the coil. Removal of the tool should then bring the frequency into its proper setting. The reverse is true if the coil is to be compressed. Note: It is imperative that an insulated tool be used here since BF is present on the coil and also since a metal tool would change the electrical characteristics. We do not recommend the use of a slug for this coil since losses may occur especially on the high frequency end of the band.

Once the alignment above has been completed, it is suggested that the various ranges be re-checked against stations, if possible if any particular range is completely out, scale is adjustable as was mentioned in AF Assembly section. An extremely accurate source of calibration is the Government station WWV which broadcasts on frequencies of 2.5MC, 5MC, 10MC, 15MC, 20MC and 25MC.

GENERAL: 1- Insert into cabinet threading the line cord thru the large hole in the rear and secure with 2 Acorn Nuts in back and four self-tapping screws in front.

SERVICING: In event of difficulty, recheck the wiring carefully. Most troubles may be immediately traced to wiring mistakes or 'Rosin Joints' or Rosin between contacts or 'Shorts'.

FACTORY REPAIR & CALIBRATION: If a question arises, write to our engineering dept. listing all possible readings, etc. which may aid in analyzing the problem. Your letter will be answered promptly. The instrument may, if you so desire, be returned to the factory for final repair and calibration at a service charge of $5.50. This does not include cost of parts that may have been damaged due to misuse. Pack carefully and use the original carton if possible. SHIP EXPRESS prepaid. Make certain that all parts are secured tightly in place so that vibration during transit will not cause damage.

Your MODEL 630 RF, AF & TV MARKER GENERATOR is another example of an "engineered product" by PRECISE.

This instrument was designed to meet a definite need in the industry today. A highly stable RF Generator was required with: an equally stable source of internal modulation - operation on fundamentals at least through the lower TV Channels and also covering the FM Band - An accuracy check, such as a Crystal Oscillator, for accurate alignment of TV & FM Traps and IFs - Internal Modulation that is variable in amplitude as well as frequency - Individually controllable coils on both ends of their range - constant impedance output - a Buffer circuit which decouples the oscillator from the output, thereby preventing frequency changes with load variation.

The above specifications, admittedly never before found in one instrument, was a tremendous challenge if the instrument was to be produced at a reasonable price.

The most stable form of oscillator for the RF was certainly the Colpitts. To this was added various forms of external stabilization. The frequency was brought up to 110 MC on fundamentals.

The only audio oscillator that could meet the stability and waveform required was a bridge type. Thus the Wien Bridge was selected. Instead of one single frequency of Internal Modulation, the entire audio range was made available in four bands from 20 to 20,000 cycles.

A universal type of crystal oscillator was incorporated to provide the necessary check points.

A % Modulation control was added variable from 0 to 30%.

A Buffer and Cathode-follower was added to maintain the frequency independant of output setting as well as maintaining a constant Z OUT.

To all the above was included low-loss mica-filled sockets where needed; coaxial type output connectors; coaxial output leads; a completely separate High Frequency Chassis that shock absorbs and isolates the RF section; a Line Filter; an Internal Amplifier for External Modulation; Drum dials; an etched panel design for simplicity of operation; and above all, NEW PARTS directly from the manufacturer according to PRECISE specifications.

ELECTRICAL SPECIFICATIONS:

POWER	25 WATTS
VOLTAGE	105-125 VOLTS
LINE FREQUENCY	60 CYCLES

RANGES:

AF			RF			
20	-	40	300KC	-	1 MC	FUNDAMENTALS
40	-	200	1MC	-	3MC	"
200	-	2,000	3MC	-	10MC	"
2,000	-	20,000	10MC	-	30MC	"
			30MC	-	110MC	"
			90MC	-	330MC	3rd Harmonic

TUBES: 1 - 6C4
1 - 6AU6
1 - 6SN7
1 - 6X5
1 - 6S6

MECHANICAL SPECIFICATIONS:

HEIGHT	8"
WIDTH	11"
DEPTH	5"
WEIGHT	10 LBS
PANEL	SLATE GREY, DEEPLY ETCHED ALUMINUM WITH RAISED NUMERALS.
CABINET	BAKED, WRINKLE GREY STEEL
HANDLE	GENUINE LEATHER
FITTINGS	COAXIAL TYPE

OPERATION:

POWER ON: Insert the line cord and rotate the OUTPUT switch to any position other than POWER OFF. This automatically turns on the instrument. Always allow a "warm-up" period before using thereby permitting the instrument to stabilize.

CONTROLS:

RF BAND - This control selects the particular RF frequency range. As an example 2.5MC would be found on the 1-3MC range.

OUTPUT - The primary function of this control is to vary the maximum RF output voltage. i.e. the RFX100 range will deliver 10 times the voltage of the RFX10 range which in turn delivers 10 times the voltage of the RFX1 range. This is performed by an internal Stepping Attenuator. The same control also turns the power ON & OFF.

In its extreme clockwise position, the RF section is placed in "STANDBY" with only the filaments operating in the RF Head. The same position allows the internal AF Oscillator frequencies to be fed out of the AF and RF connector.

SELECTOR:- This switch selects the function to be performed. In the first position only a CW (continuous RF wave) is fed out with no modulation. The 2nd position allows an AM (amplitude modulated) wave to be fed out. The third position is for EXTernal MODulation where an audio signal may be fed into the EXTernal MODulation jack. The fourth position is for XTAL (crystal). When a crystal is plugged into the crystal jack the signal from the generator is internally mixed with the crystal frequency and harmonics of same. In the last position, the audio amplifier and oscillator is turned on.

AF BAND - This control selects the particular AF frequency range. As an example 1,000 cycles would be found on the .2-2K range.

RF - This is the Radio Frequency output attenuator and varies the amount of the radio frequency voltage fed out. It is used in conjunction with the OUTPUT stepping attenuator which in turn selects the maximum voltage which can be fed out. The Radio Frequency potentiometer then adjusts the proper amount of that voltage as a form of vernier control. The OUTPUT attenuator would then be the "coarse" adjustment while the RF attenuator would be the "fine" adjust.

AF CRYSTAL - This is a three purpose potentiometer which varies: the Percent Modulation (the amount of audio amplitude modulation) - the amount of crystal signal mixed with the Radio Frequency signal output -the AF OUTPUT when in the audio position.

RADIO FREQUENCIES - This control selects the particular frequency off the band selected by the RF BAND control.

AUDIO FREQUENCIES - This control selects the particular frequency off the band selected by the AF band control.

JACKS:

AF & RF - All output signals (both RF & AF) are available at this jack.

EXT. MOD. - This jack is used only for EXTernal MODulation.

CRYSTAL - This is the crystal receptacle.

DESIRED OUTPUT	RF BAND	OUTPUT	SELECTOR	AF BAND	RADIO FREQUENCIES	AUDIO FREQUENCIES	RF	AF CRYSTAL	NOTE
Pure RF - CW	Desired Frequency Range	RFX1, RFX10 or RFX100. Highest output on RFX100	CW	AF STAND.	Desired Frequency	Not used	Maximum voltage in extreme Clockwise position	Not used	1
Amplitude Modulation AM	"	"	AM	Desired Range	"	Desired Frequency	"	Maximum modulation in clockwise position	2
External Modulation	"	"	Ext. Mod.	Not used	"	Not used	"	"	3
Crystal - XTAL	"	"	XTAL	AF STAND.	"	"	"	"	4
Audio Frequencies	Not used	RF STAND. AF	AF	Desired Range	Not used	Desired Frequency	Not used	"	5

All output voltages are available from the RF & AF jack. The EXT. MOD. jack is only used for inserting the External modulation.

1- In this position a continuous RF wave with no modulation is produced. It is particularly useful in the CW method of TV or FM alignment. It is also the position used when the instrument is used as a Marker.
2- This position is one most commonly used in Radio testing where an audio modulation is desireable. It is particularly important since the entire AF range may be covered without disturbing the set internally.

3- If a signal is fed into the EXT MOD jack, the modulation amplifier allows the RF section to be modulated while still offering sufficient decoupling to prevent frequency shift. A 1 volt signal is ample. A phone or microphone converts the instrument to a small voice transmitter.

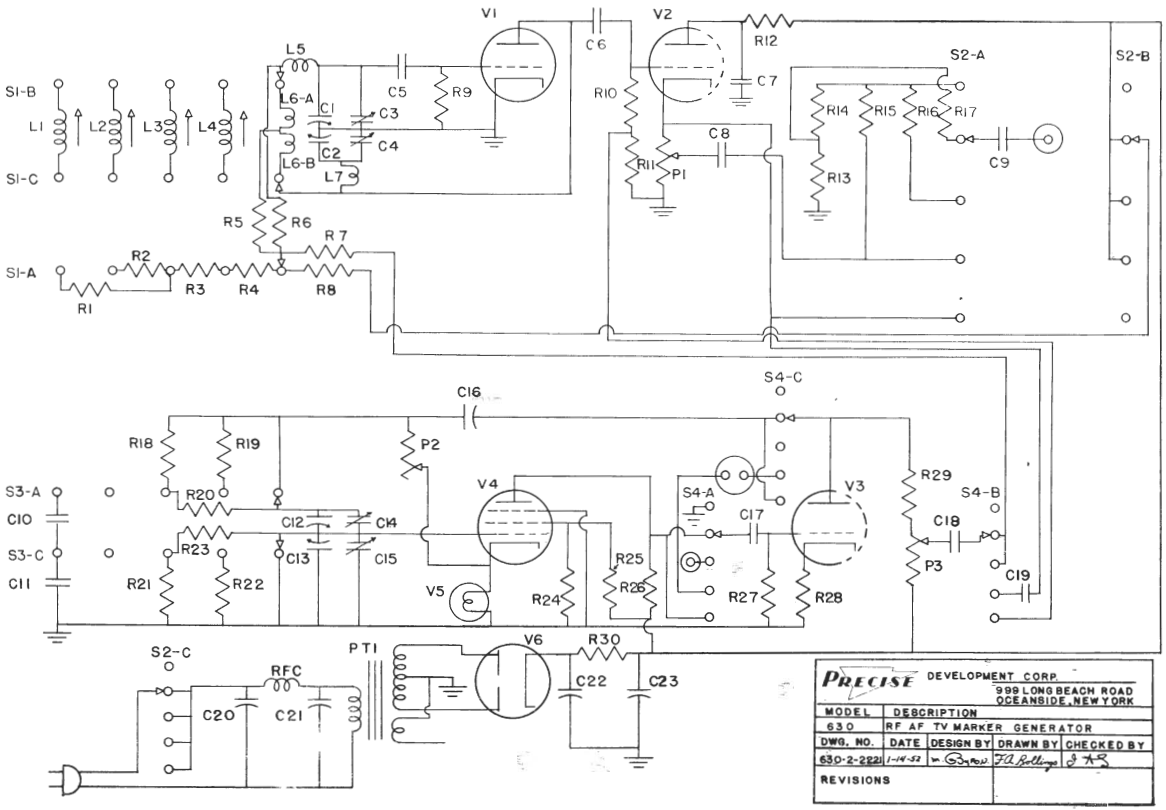
4- Plugging a crystal into the CRYSTAL JACK allows both the RF and the crystal to be seen simultaneously on a pattern. The same position may be used for checking the alignment accuracy of the 630.
5- In this position the 630 becomes an audio oscillator covering the AF spectrum in four bands.

WARRANTY: All merchandise is warranted to be free from defects in material and workmanship per the standard RMA GUARANTEE.

ADDENDA: In order to maintain your instrument in its most modern form, certain improvements are made from time to time. If changes are contemplated they will be listed in the space below.

C19 may be connected to S2A#R for greater crystal output.

SCHEMATIC



PRECISE DEVELOPMENT CORP.
999 LONG BEACH ROAD
OCEANSIDE, NEW YORK

MODEL	DESCRIPTION
630	RF AF TV MARKER GENERATOR

DWG. NO.	DATE	DESIGN BY	DRAWN BY	CHECKED BY
630-2-2221	1-14-52	[illegible]	[illegible]	[illegible]

REVISIONS

DESCRIPTION	PART#
Variable Condenser	C1-4
300 uufd "	C5
10 " "	C6
.0015 ufd "	C7
500 uufd "	C8
.1 ufd "	C9
360 uufd "	C10
" "	C11
Variable "	C12-15
20 or 24 ufd "	C16
.1 ufd Condenser	C17
.25 " "	C18
10 uufd"	C19
.0015 ufd "	C20
" "	C21
20x20 " "	C22-23
White Dot Coil	L1
Yellow " "	L2
Red " "	L3
Black " "	L4
MF Coil	L5
Buss Bar	L7
2,000 ohm Potentiometer	P1
" " "	P2
10K Potentiometer	P3
RF Choke	RFC
220K Resistor	R1
47K "	R2
33K "	R3
10K "	R4
820 "	R5
20K "	R6
1K "	R7
3.3K " 1 Watt	R8
360K Resistor	R9
470K "	R10
100K "	R11
10K "	R12
1 "	R13
10 "	R14
68 "	R15
" "	R16
100 "	R17
1.8M 5% Res.	R18
180K " "	R19
10M " "	R20
1.8M " "	R21
180K " "	R22
10M " "	R23
56K " Resistor	R24
100K " "	R25
" "	R26
1.2M "	R27
1K "	R28
3.3K "	R29
2.2K " 1 Watt	R30
5 Position Switch(long)	S1
" " "	S2
" " "	S3
" " "	S4
6C4 Tube	V1
6SN7 "	V2-3
6AU6 "	V4
Pilot Light (large)	V5
6X5	V6

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precise

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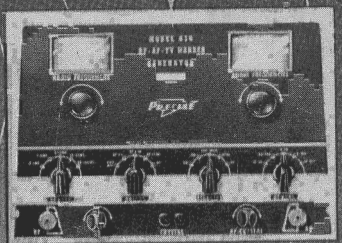
still setting standards for competitive efforts • an engineered product

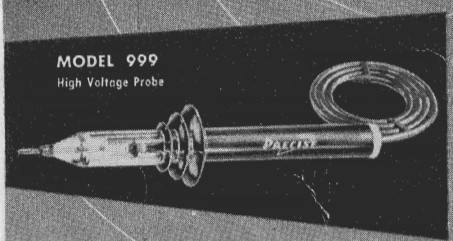
KITS • WIRED

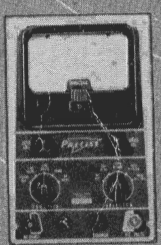
MODEL 630 RF-AF-TV and Marker Generator.



MODEL 635 Universal AF Sine, Square & Pulse Generator.

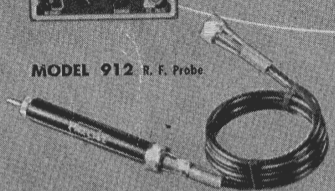
MODEL 999
High Voltage Probe

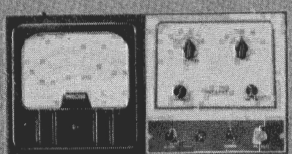




MODEL 909
Vacuum Tube Voltmeter

MODEL 912 R. F. Probe





MODEL 907 DELUXE Vacuum Tube Voltmeter

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Save MORE THAN 50% . . . and own the finest!

Model 630 RF-AF-TV and Marker Generator. For the first time in the history of the industry . . . SO MUCH FOR SO LITTLE. The very first kit to reach 110 mc on fundamentals, 330 mc on harmonics. The first kit to offer a complete factory pre-assembled and calibrated RF head.

RF FREQUENCIES: Band 1—300KC to 1MC Fundamentals • Band 2—1MC to 3MC Fundamentals • Band 3—3MC to 10MC Fundamentals • Band 4—10MC to 30MC Fundamentals • Band 5—30MC to 110MC Fundamentals • Band 5A—60MC to 220MC 2nd Harmonic • Band 5B—90MC to 330MC 3rd Harmonic

AF FREQUENCIES: Band 1—20 to 60 Cycles • Band 2—60 to 200 Cycles • Band 3—200 to 2K Cycles • Band 4—2K to 20K.

Pre-tuned RF Head; Audio 20-20,000 cycles; variable percent modulation; Cathode-follower output; stepping attenuator, external modulation; speech amplifier; crystal marker; crystal amplitude control; RF & AF stand-by; Wien Bridge AF Oscillator; Colpitts RF Oscillator; Drum Dials; Coaxial fittings; individually tuned coils; constant output impedance; filtered line; Vernier tuning on RF & AF; Separate RF section; complete shielding; 8 x 11 x 6½; wrinkle steel cabinet; etched panel; amphenol type connectors; 18 lbs.

Model 630K . . . Model 630KB
Model 630W

Model 635 Universal AF Sine, Square & Pulse Generator.

Efficiently and effectively ascertains audio and video troubles. Sine waves; square waves, pulses; Wien Bridge Oscillator; variable impedance output; voltage regulation insures a veritably constant output; cathode follower output; square waves and pulses with minimum overshoot and roundoff through 30,000 cycles; sine waves through 200,000 cycles.

RANGES: 20-60 cycles • 40-200 cycles • 200-2000 cycles • 2000-20,000 cycles • 20,000-200,000 cycles.

Model 999 High Voltage Probe. 100,000,000,000,000,000,000,000,000,000,000, to 1 are the odds against a voltage breakdown occuring in this probe!

PRECISE Model 999 High Voltage Probe was designed for high voltage measurements with special emphasis on SAFETY, OPERATIONAL SIMPLICITY AND RUGGED CONSTRUCTION. FIRST in the industry to include any one or more of the following exclusive features: MULTIPLE INSULATION, MECHANICALLY SHOCKPROOF CONSTRUCTION; INTERCHANGEABLE TIPS; SWIVEL HEAD CONNECTION; INTERCHANGEABLE RESISTORS.....Wired Only

Model 909 Vacuum Tube Voltmeter. Make a comparison . . . then, buy PRECISE. Ceramic precision resistors 1% or better; etched panel; steel cabinet; amphenol type DC connector; separate 6V. AC scale; special true zero alignment scale; burn out proof circuit; RUGGED oversize 4½" meter

Model 912 R. F. Probe. LOWEST PRICED, finest factory wired and calibrated R.F. Probe in the industry. Individually calibrated at 75 megacycles for accuracy, impedance and shunt capacity.....Wired Only

Model 907 DELUXE Vacuum Tube Voltmeter.

Another PRECISE first! Vertical or Horizontal construction. GIGANTIC 7½" meter movement; all the unusual values and features of Model 909 in a really DELUXE version

Prices slightly higher in the West.
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