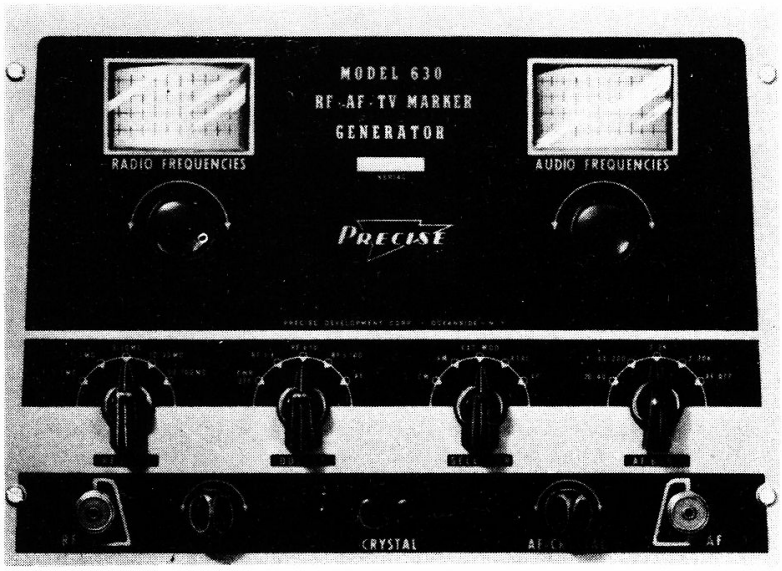
MODEL 630



PRECISE

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

Your MODEL 630 RF, AF & TV MARKER GENERATOR is another exampie 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 of the band selected by the RF BAND control.

AUDIO FREQUENCIES - This control selects the particular frequency of 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 Freguency	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.

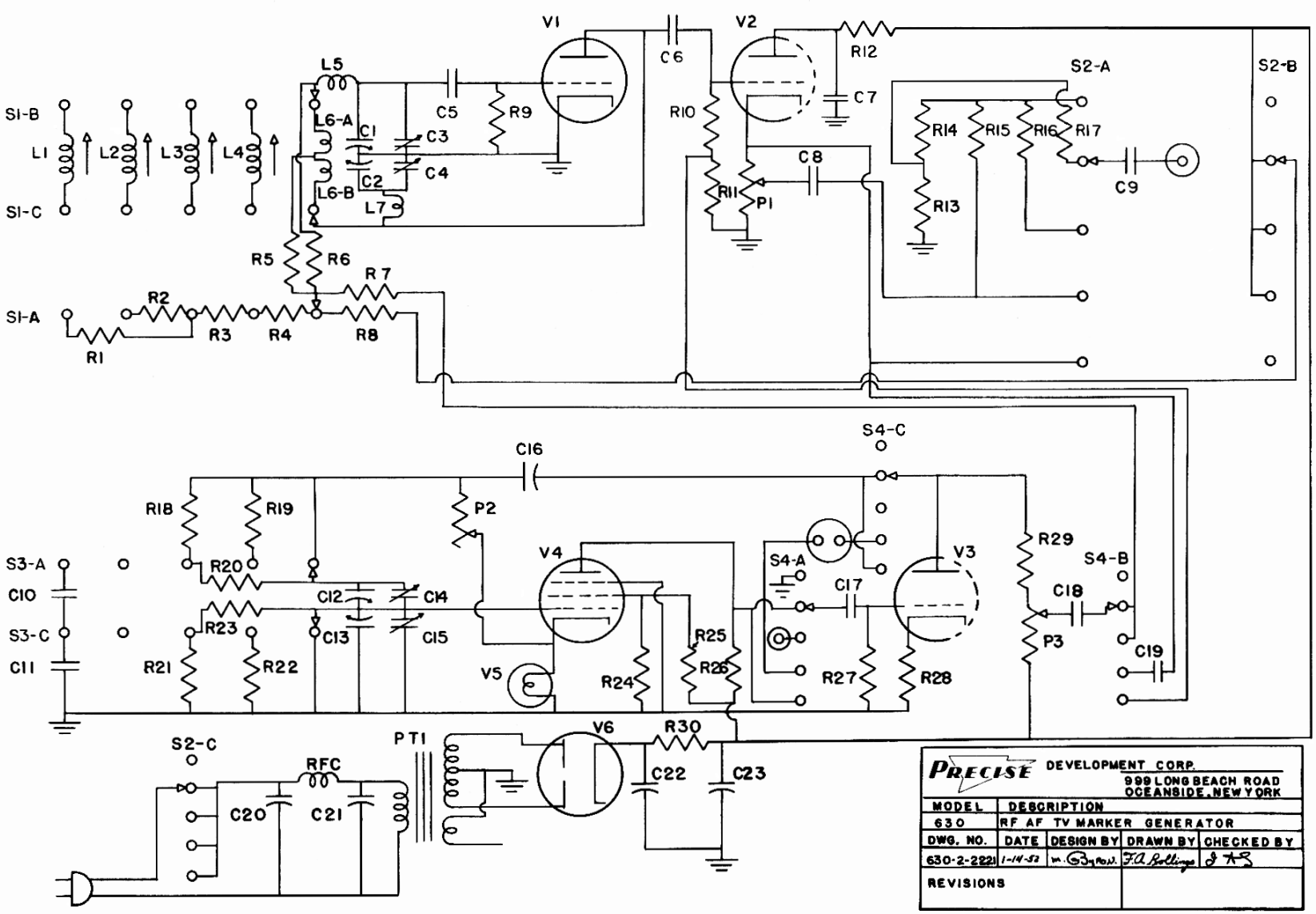
4- Plugging a crystal into the CRYSTAL JACK allows both the RF and the crystal to be seen simultaneously on a pattern. The same position may be used for checking the alignment accuracy of the 630.
5- In this position the 630 becomes an audio oscillator covering the AF spectrum in four bands.

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
630-2-222I	1-14-52	W. Byron	F.A. Rollings	J.A.S.
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
HF 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

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).

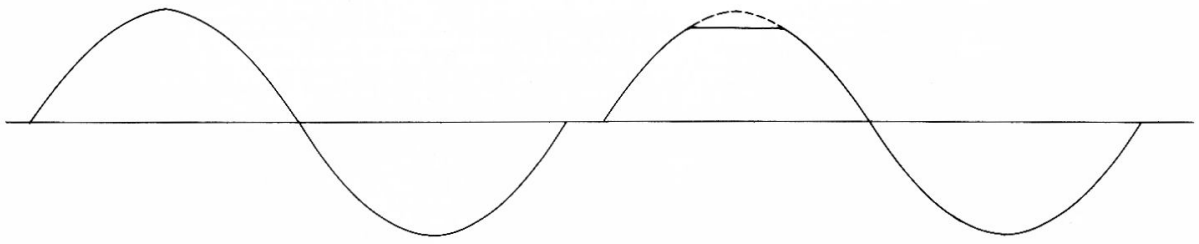
5-Rotate the AF Tuning control to its maximum clockwise position (high frequency end of the band) and adjust the trimmer for C12 until the voltage is approximately between 3½ & 4½ v. (C12 is located from the bottom of chassis through hole #33 as shown in the Diagram). An insulated alignment tool should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

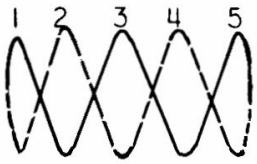
4- Loosen the trimmer adjustment screw for C13 until it is almost all the way out. (C13 is located from the bottom of the chassis through #34 in the diagram).

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.

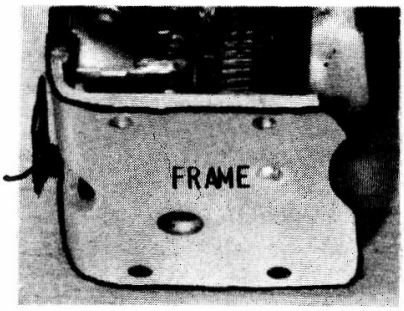
6-For exact alignment, rotate the AF TUNING control to the position marked 'CALIBRATION POINT' on the 40-200 scale

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.

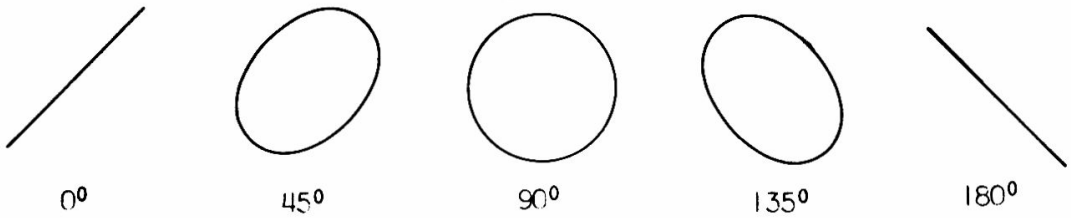
8- Adjust trimmer for C12 until a Lissajous figure* shown below appears. Note that it has 5 peaks on top; this means that the unknown is 5 times the frequency of the known or 300 cycles. The CALIBRATION POINT, therefore, is to be adjusted for 300 cycles. Note: If the picture rotates slightly, it should 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.

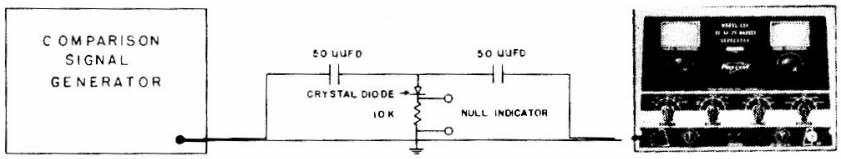
The result of these observations is in the enclosed scales. You will note that each scale range on each scale is slitted with the exception of one. If desired any one of the ranges may be removed by completing the cut with a razor along its left and right edges. The scale may then be reinserted and moved 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.

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 912MM, 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 .3-1MC 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	S E T 6 3 0 TO	ON BAND	ADJUST	ADJUST FOR	REMARKS
1	300KC	300KC	300KC	.3-1MC	Slug on L1 (White Dot)	Zero Beat	
2	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)	"	
5	30MC	30MC	30MC	30-100MC	Coil L5	"	See note below
6	10MC	10MC	10MC	10-30MC	Slug on L4 (Black)	"	

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 "B+" 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	T U N E R E C E I V E R T O	S E T MODEL 6 3 0 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.

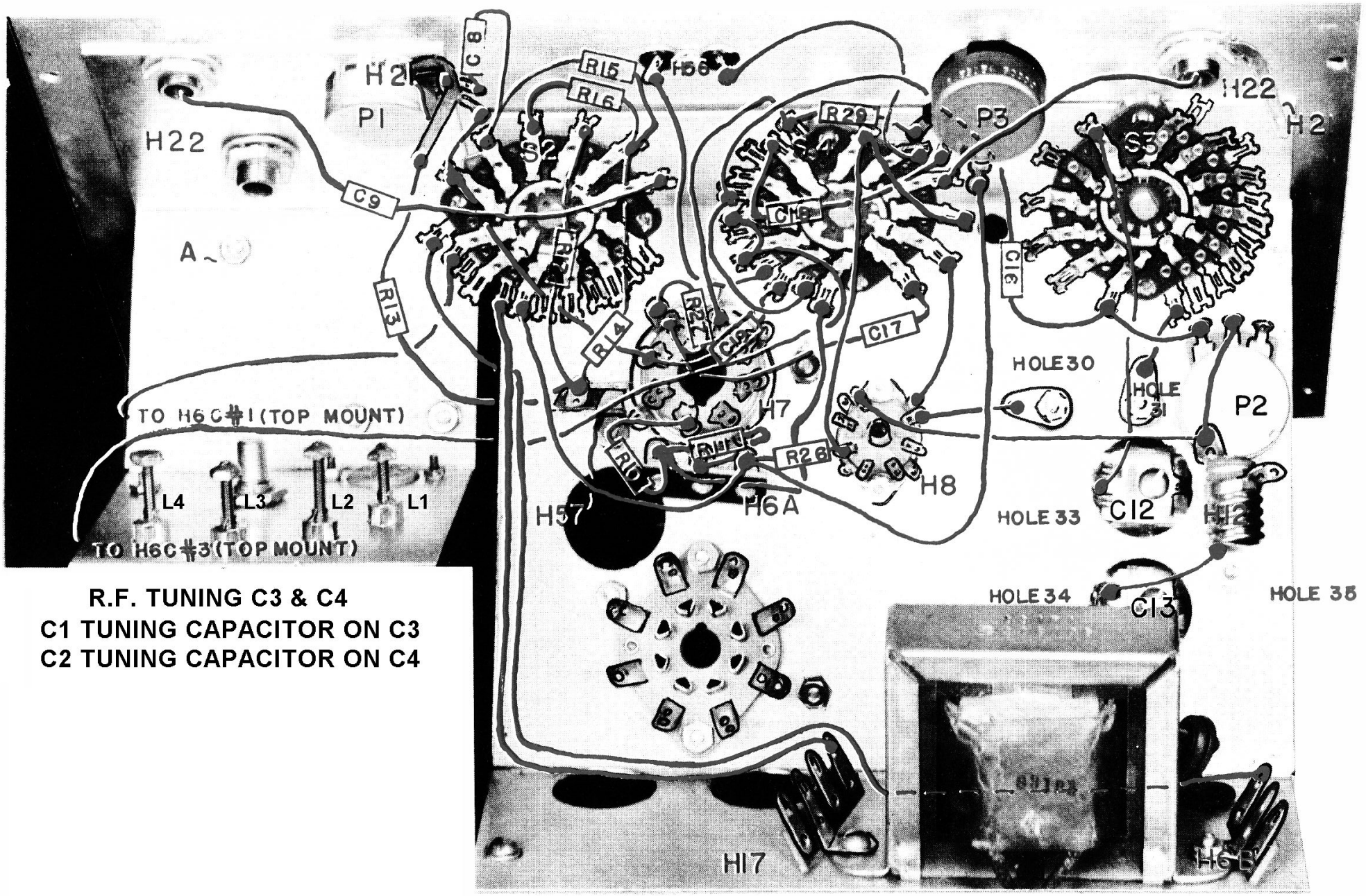
Note referring to Step 7:
This range is adjusted by spreading or compressing the turns of L5 slightly. Do not adjust too far in any direction. For spreading the coil, place an insulated alignment tool between the turns of L5 and twist the alignment tool until the proper adjustment is made. If when the 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 B+ 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.



R.F. TUNING C3 & C4
C1 TUNING CAPACITOR ON C3
C2 TUNING CAPACITOR ON C4