

STEWART-WARNER

RADIO SERVICE INSTRUCTIONS

September 11, 1931

Radio Index #37

5827-SS-3129

RADIO SERVICE NOTES (R-101 & 102)

#4 - PHASING THE MODEL R-102 RECEIVER

PHASING EQUIPMENT

The equipment necessary to phase the Model 102 Stewart-Warner radio receiver consists of a completely shielded modulated oscillator, an output meter, and a special phasing tool, our number T-70583.

IT IS ABSOLUTELY ESSENTIAL THAT ALL STEWART-WARNER RADIO DISTRIBUTORS BE PROVIDED WITH ALL THIS EQUIPMENT.

OSCILLATOR

The oscillator required must be thoroly shielded since no modern sensitive receiver can be accurately phased if the oscillator has an appreciable external field. It must have at least two frequency ranges, including the broadcast band from 550 to 1500 K.C., and the I.F., band from 170 to 180 K.C., and must have accurate and effective means for controlling the signal output.

OUTPUT METER

The output meter should preferably be of the oxide rectifier type with a full scale reading of from 1.5 to 15 volts. A 1 or 2 Mfd. 400 volt condenser should be connected in series with this meter to prevent direct current from damaging it when used as directed below.

A special service letter on oscillators and output meters will be issued shortly.

PHASING TOOL

The phasing tool, our tool number T-70583, will be supplied on request for 25¢ net. An order has already been entered for one of these phasing tools for each Stewart-Warner distributor.

PREPARING THE SET FOR PHASING

Before aligning the various tuned circuits, the chassis should be taken out of the cabinet. This is done by pulling off the control knobs and removing the four hex head screws holding the chassis in place. The speaker can be left in the cabinet since the speaker cable is long enough to allow the set to be slipped completely out of the cabinet and placed on a work bench or nearby stool.

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LAYOUT OF PARTS OF RADIO RECEIVER

Phasing can be carried out intelligently only if the service man knows the general layout of the set, and how each circuit is affected during the process of phasing. The attached sketch gives the layout of the receiver and indicates the name and location of the various aligning adjustments. The following brief discussion of what actually happens during phasing should be carefully read, using the sketch as a basis before commencing the actual work.

LOCATION AND FUNCTION OF PHASING ADJUSTMENTS

The incoming signal is tuned first by the pre-selector "A" stage and then fed into the first detector "B" circuit, where it is tuned again to improve selectivity. These circuits are brought into exact phase by the two trimmer condensers "A" and "B", pointed out in the attached sketch. The tuned oscillator circuit "O" is so designed that it tunes to a frequency exactly 177.5 K.C. higher than the incoming signal. This circuit is kept in exact step by means of two adjustments, the oscillator condenser trimmer "O", and the padding condenser, which can be reached thru a small hole in the chassis base just in front of the "B" condenser.

THE "O" TRIMMER IS MAINLY EFFECTIVE AT THE HIGH FREQUENCY END OF THE DIAL, AND THE PADDING CONDENSER AT THE LOW END, and the phasing routine which will be outlined takes this into consideration.

The two intermediate frequency (I.F.) transformers are of the tuned input, - tuned output type and each winding is tuned by a separate trimmer condenser, making a total of four additional adjustments. The first I.F. transformer is in the steel shield at the right side of the set, while the second I.F. transformer is at the rear of the chassis. The I.F. trimmer adjusting screws can easily be reached thru two small holes at the base of each shield, the primary in each case being at the left and the secondary at the right.

PHASING

With this preliminary discussion clearly in mind, the actual phasing can be carried out. The following step-by-step routine should be followed for satisfactory results.

1. Connect up the radio receiver, taking care that the volume control is full on and the tone control in the high position (to the left.)
2. Insert the output meter, WITH ITS SERIES CONDENSER, in the television terminals of the set.
3. Remove the grid clip leading from the "B" condenser to the cap of the first detector tube.

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4. Set up the oscillator, tune it to 177.5 K.C. and connect its output to the grid cap of the first detector tube.
5. Adjust the oscillator output to give about one-half full scale deflection of the output meter.

ADJUSTING THE I.F. CIRCUITS

1. By means of the socket end of the phasing tool, adjust all four I.F. trimmer condensers, in each case tuning carefully to make sure that maximum deflection is obtained on the output meter. Since these I.F. trimmer condensers have a tendency to work stiffly, much smoother action and consequently easier adjustment will be obtained if the screw is turned down hard all the way, then backed up and carefully tuned to the correct point.

IT IS VERY IMPORTANT THAT ABSOLUTELY NO INWARD PRESSURE BE APPLIED TO THE PHASING TOOL, OR THE CONDENSER MAY SPRING BACK TO A DIFFERENT SETTING AS SOON AS THE TOOL IS REMOVED.

2. Go back and repeat all four adjustments since the adjustment of each I.F. trimmer affects the others to a certain extent, thus necessitating readjustment.

ADJUSTING R.F. AND OSCILLATOR CIRCUITS

1. Replace the grid cap on the first detector tube.

2. Braid the aerial and ground wires of the set together to reduce noise pick-up. Connect the aerial wire to the output of the oscillator and ground both set and oscillator. Adjust the oscillator frequency to 1400 K.C. and carefully tune the receiver to give maximum output. Adjust the oscillator output to produce about one half full scale deflection of the output meter.

3. With the screw-driver end of the phasing tool carefully tune the "A" trimmer till the output meter reading reaches a maximum.

If, as a result of these adjustments, the output meter needle goes off scale, the oscillator output should be reduced accordingly. If the oscillator output is still too great with its output control at the minimum position, use a high resistance in series with the aerial lead to cut it down. NEVER TURN BACK THE VOLUME CONTROL OF THE SET TO REDUCE THE OUTPUT METER READING.

4. Adjust the "B" and "O" trimmers for maximum output, using the same method. Be very careful in setting the "O" trimmer as this adjustment is extremely critical.

5. Set the oscillator at 600 K.C. and tune the set carefully to this frequency.

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6. Adjust the oscillator padding condenser for maximum output RETUNING THE SET AFTER EACH CHANGE IN ADJUSTMENT.

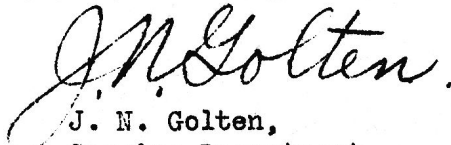
7. Turn back the oscillator to 1400 K.C., tune the set to the same frequency, and very carefully readjust the "A", "B" and "O" trimmer condensers to produce maximum output.

The receiver should now be perfectly phased.

Occasionally when only a simple broadcast frequency oscillator is available the I.F. transformers may be adjusted by introducing a broadcast signal at the aerial and ground terminals.

Sincerely yours,

STEWART-WARNER CORPORATION


J. N. Golten,
Service Department.

JNG/VO.

