CLAIRTONE

service data for C305

ALIGNMENT INSTRUCTIONS

GENERAL

The alignment of the tuned circuits of the chassis is an exacting procedure and should be undertaken only when absolutely necessary and when adequate test equipment is available. The step by step instructions given below should be strictly adhered to. Two methods for the F.M. I.F. circuit alignment are described; one using an unmodulated signal generator and VTVM, and a second using a sweep generator and oscilloscope. The latter is preferred and should be used whenever psosible.

During the alignment operations the audio output stages of the receiver should be loaded, by connecting an 8 ohm loudspeaker, or a 5 to 10 ohm dummy load, across the secondaries of the output transformers.

TEST EQUIPMENT

The test equipment required to align the chassis is listed below:

Amplitude Modulation I.F. and R.F. Circuits

1. Amplitude modulated signal generator with range 455 Kc/s-1625 Kc/s
2. Vacuum tube voltmeter (VTVM)

Frequency Modulation I.F. Circuits

1. F.M. sweep generator with range covering 10.7 Mc/s
2. 10.7 Mc/s crystal calibrator or other accurate marker generator
3. Oscilloscope

Frequency Modulation I.F. Circuits (Without Oscilloscope)

1. Un-modulated signal generator with range covering 10.7 Mc/s
2. Vacuum tube voltmeter (VTVM)

Multiplex Circuits

1. Audio signal generator with range 600c/s to 70 Kc/s
2. Multiplex test set
3. Oscilloscope
4. Vacuum tube voltmeter (VTVM)

AMPLITUDE MODULATION I.F. and R.F. CIRCUIT ALIGNMENT

Step	Radio Setting		Signal Generator		VTVM Connection	Adjustment
	Dial	S1	Connection	Frequency		
1	Tuning gang fully closed	A.M.	High side to TP1 thru .001 MFD capacitor. Low side to ground	455Kc/s	Between T.P.4 and ground	Adjust top and bottom cores of IFT2 and IFT3 for max. output as shown on VTVM Ensure that VTVM reading does not exceed 3V by reducing input as required.
2	Tuning gang fully closed	A.M.	Couple generator inductively to L6	535Kc/s	Between T.P.4 and ground	Adjust the core of L9 for maximum VTVM reading.
3	Tuning gang fully open	A.M.	Couple generator inductively to L6	1625Kc/s	Between T.P.4 and ground	Adjust oscillator trimmer, C23, for maximum VTVM reading.
4	Repeat step 2 and 3 until no further increase in VTVM reading is possible.					
5	1400Kc/s	A.M.	Couple generator inductively to L6	1400Kc/s	Between T.P.4 and ground	Adjust R.F. trimmer, C19, for maximum VTVM reading.

FREQUENCY MODULATION I.F. CIRCUIT ALIGNMENT (Without Oscilloscope)

Step	Radio Setting		Signal Generator		VTVM Connection	Adjustment
	Dial	S1	Connection	Frequency		
1	Point of no Interference	F.M.	High side to tube shield fitted over V1. Low side to ground.	10.7Mc/s (Unmod.)	Between T.P.6 and ground.	Adjust both cores of IFT1 and IFT4, and the bottom core of IFT5 for max. output as shown on VTVM.
2	Point of no Interference	F.M.	As in step 1	10.7Mc/s (Unmod.)	Between T.P.5 and ground	Adjust top core of IFT5 for a zero reading. This is found between positive and negative readings.

FREQUENCY MODULATION I.F. CIRCUIT ALIGNMENT

During this alignment procedure the F.M. sweep generator should be set to give a frequency deviation of 450 Kc/s and should have the deviation rate synchronised to the oscilloscope sweep rate, at approximately 60 cps.

Step	Radio Setting		Signal Generator		VTVM	Adjustment
	Dial	S1	Connection	Frequency	Connection	
1	Point of no interference	F.M.	High side to T.P.3 Low side to ground	10.7 Mc/s	Vert amp input to T.P.6 Common to ground.	Disconnect C34 and adjust bottom core of IFT5 for max. amplitude and symmetry.
2	Point of no interference	F.M.	High side to T.P.3 Low side to ground	10.7 Mc/s	Vert amp input to T.P.5 Common to ground.	Re-connect C34 and adjust top core of IFT5 so that 10.7 Mc/s point appears as in fig. 2. Carefully adjust bottom core of IFT5 for max. amplitude and symmetry.
3	Repeat step 1					
4	Point of no interference	F.M.	High side to T.P.2 Low side to ground	10.7 Mc/s	Vert amp input to T.P.6 Common to ground.	With C34 disconnected, adjust top and bottom cores of IFT4 for response shown in fig. 3.
5	Point of no interference	F.M.	High side to tube shield fitted over V1. Low side to ground.	10.7 Mc/s	Vert amp input to T.P.6 Common to ground.	With C34 disconnected, adjust top and bottom cores of IFT4 for optimum amplitude and symmetry of response.
6	Point of no interference	F.M.	As in step 5	10.7 Mc/s	Vert amp input to T.P.5 Common to ground.	Re-connect C34 and adjust top core of IFT5 for max. symmetry of response (fig. 2) maintaining 10.7 Mc/s at cross-over point.

MULTIPLEX CIRCUIT ALIGNMENT The various coils in this circuit rarely need adjustment.
BUT, WHEN adjustment is necessary it should not be attempted unless a multiplex generator is available.

Step 1: Connect the audio generator to T.P.7, the VTVM to T.P.8 and ground pin 7 of V6.
Step 2: Set the audio generator frequency to 670 cps and the output level to give a VTVM reading of Odb on the 1V scale.
Step 3: Reset the audio generator to 67.5 Kc/s and adjust L11 and L12 for minimum VTVM reading. Check the minimum is at least -40db when referred to Odb on the 1V scale. Remove the ground connection to pin 7 of V6.
Step 4: Connect T.P.9 to the vertical input terminals of the oscilloscope. Connect the 19 Kc/s output from the multiplex test set to the oscilloscope as an external X-sweep. Adjust L10 until a figure 8 lissajous display is obtained.
Step 5: Set the oscilloscope for internal repetitive time base operation and adjust T4 for maximum output.
Step 6: Set the Fisher test set to give left channel output and loosely couple the R.F. to the receiver under test. Connect the oscilloscope to T.P.5 and tune receiver for maximum output.
Step 7: Connect the oscilloscope to T.P.10 and adjust T4 for minimum output.
Step 8: Check the channel separation by connecting the oscilloscope to T.P.10 and T.P.11 in turn: the separation should be at least 18db.

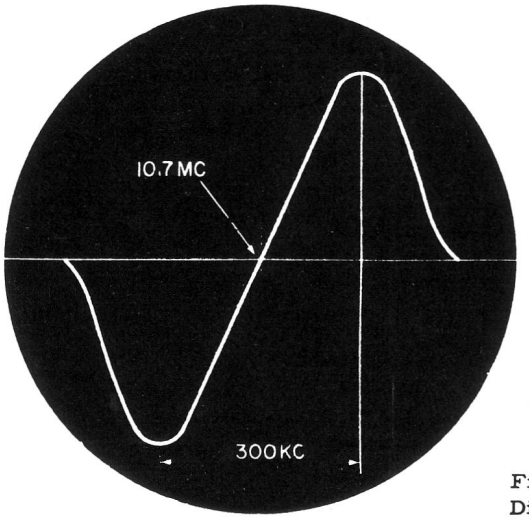
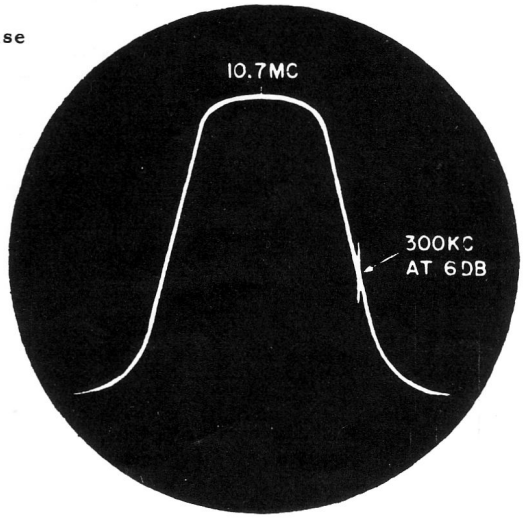


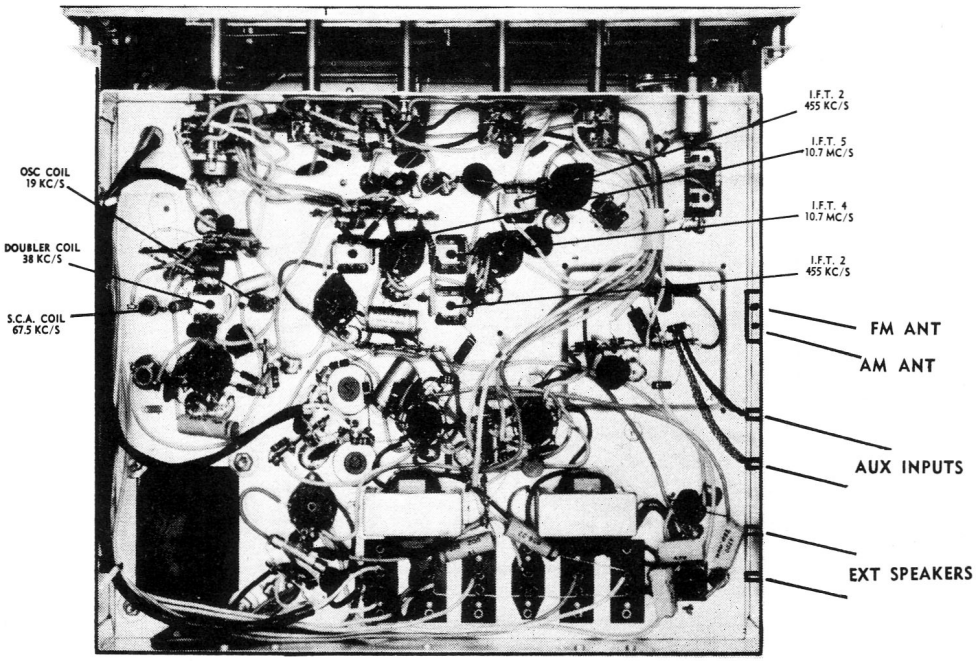
Figure 2
Discriminator Response

Figure 3
I.F. Response

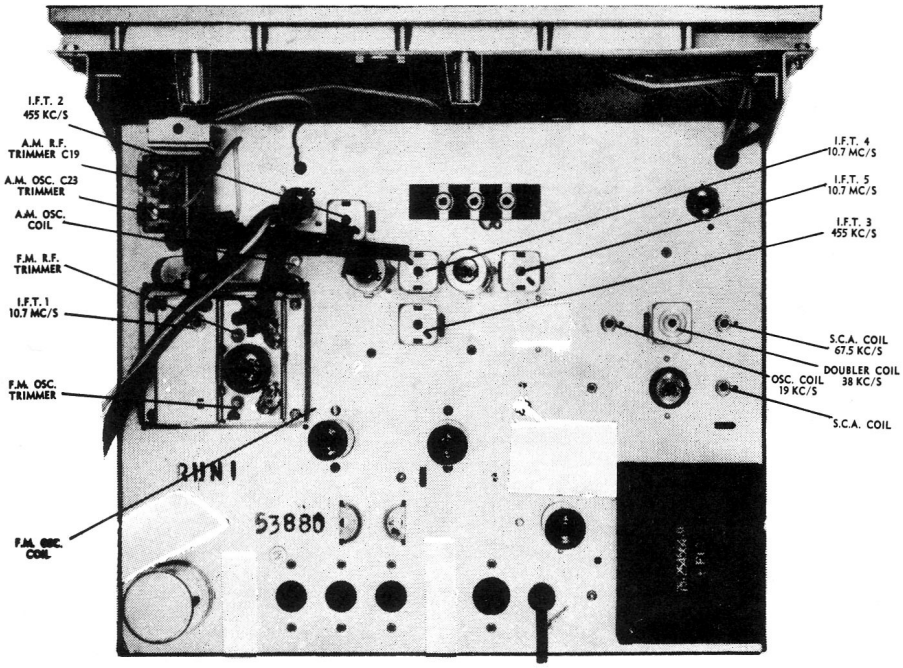


COMPONENT LOCATION

chassis underside

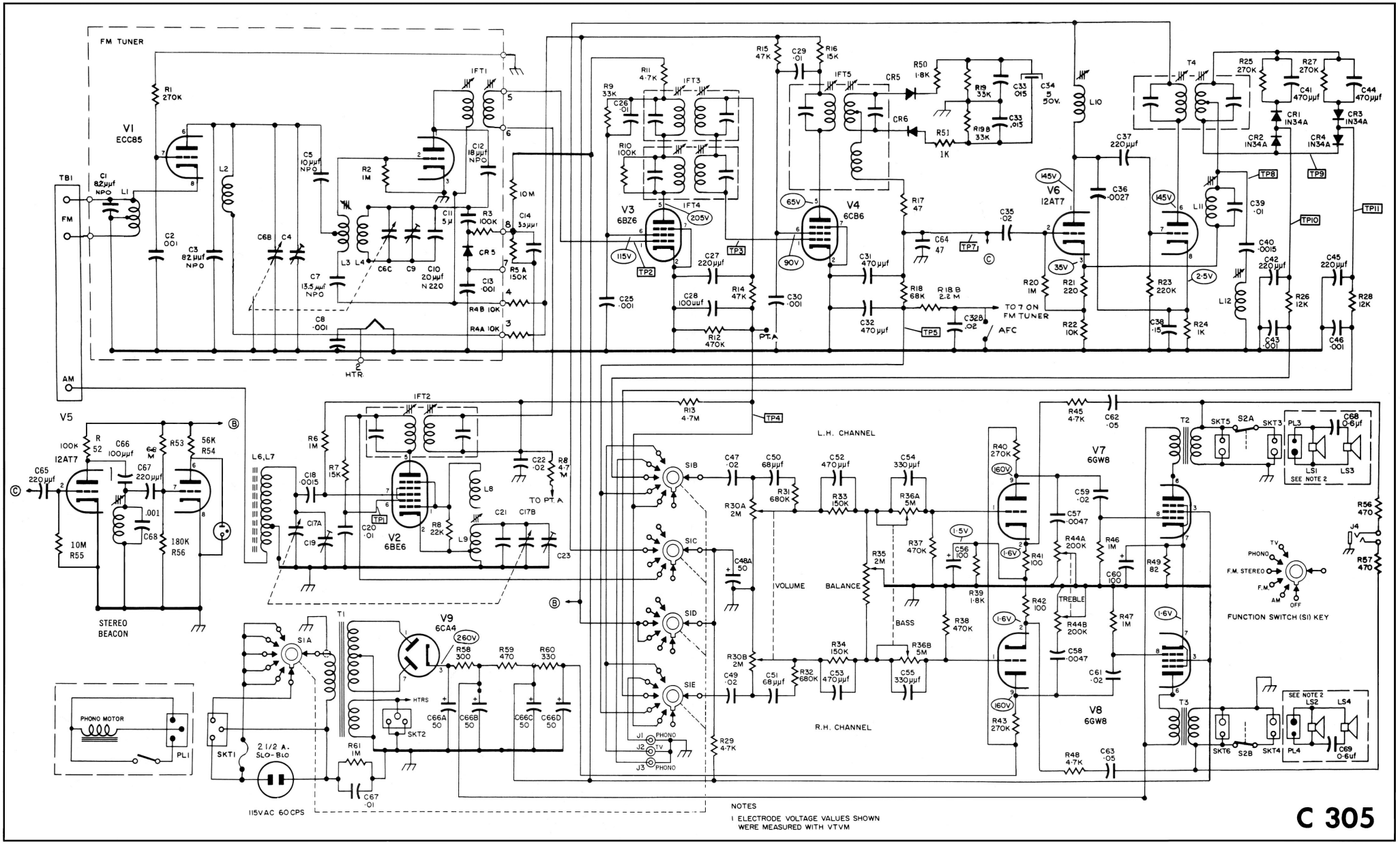


chassis top-view



PARTS LIST

COMP. REF.	DESCRIPTION	CLAIRTONE PART NO.
CAPACITORS		
C17A, B	A.M. Gang and Drum Ass'y.	38-270716-2
C34	5 mfd 50V	32-254587-2
C48A, B	2 x 50 mfd 300V	32-254599-11
C56	100 mfd 10V	32-254587-12
C66 A, B, C, D	4 x 50 mfd 300V	32-254599-4
CONNECTORS		
J1 thru J3	3 section phono/T.V. jack	79A-254785-3
J4	Phone jack	79-270456-1
PL1	3-Pin phono motor power plug	33-80-00
PL2	3-Pin pilot lamp power plug	33-80-01
PL3	2-Pin speaker plug with lead	30-62-00
PL4	2-Pin speaker plug with lead	30-62-00
SKT1	3-Pin phono motor power socket	79-254578-3
SKT2	3-Pin cabinet pilot light socket	79-254578-4
SKT3	2-Pin internal speaker socket	79-254578-1
SKT4	2-Pin internal speaker socket	79-254578-1
SKT5	2-Pin external speaker socket	79-254578-1
SKT6	2-Pin external speaker socket	79-254578-1
TB1	Antenna terminal board	15-254577-5
DIAL AND DRIVE ASSEMBLY		
	Clips, dial retaining	24-270458-1
	Cord, dial - main	21-12538-3
	Dial, glass	49-270223-8
	Mask, dial	12-270431-1
	Pointer, dial	122-270249-4
	Spring, A.M. dial cord	39-254573-3
	Shaft coupling spring	12-270744-1
INDUCTORS		
L1 thru L4	Part of F.M. tuner assembly	
L6, L7	A.M. ferrite rod antenna	83A270881-1
L8, L9	A.M. oscillator coil	83A254592-7
L10	Oscillator coil - 19 Kc/s	83A270484-1
L11	S.C.A. filter - parallel tuned	83A270536-1
L12	S.C.A. filter - series tuned	83A270537-1
CONTROLS		
R30A, B	2M Volume control (dual)	33-254595-24
R35	2M Balance control with A.F.C. switch	33-270736-2
R36A, B	5M Bass control (dual)	33-254595-22
R44A, B	200K Treble control (dual)	33-254595-23
R52, 53	1M Linear pre-set	33-270321-2
S1A,B,C,D	Function switch	58-270225-8
TRANSFORMERS		
IFT1	Part of F.M. tuner assembly	
IFT2, 3	455 Kc/s I.F. transformer	1655-6
IFT4	10.7 Mc/s I.F. transformer	K1009
IFT5	10.7 ratio detector transformer	K1008
T1	Power transformer	75-254564-9
T2, 3	Output transformer	75-254634-7
T4	38 Kc/s transformer "K" tran type	83A270494-1
TUBES AND DIODES		
V1	ECC85	
V2	6BE6	
V3	6BZ6	
V4	6CB6	
V5	12AT7	
V6	12AT7	
V7	6GW8	
V8	6GW8	
V9	6CA4	
CR1	1N34A	
CR2	1N34A	
CR3	1N34A	
CR4	1N34A	
CR5	1N542	
CR6	1N542	
MISCELLANEOUS		
	Knob, control	22-20-09
	Knob, with dot	22-20-11
	Knob, without dot	22-20-03
	Face Plate	20-82-18
	Lamp, pilot - no. 47	34-90-47
	Nut, phone jack	39-270463-1
	Record Changer, type "A" T6	12-30-00
	Record Changer Cartridge, Acos	13-50-00
	Signal Lead, phono - 18 ins.	30-64-00
	Switch, function	58-270225-7
	Switch, slide - D.P.S.T.	58-254780-7
	Tuner Assembly, F.M.	116-270738-1
	Dial Glass	21-91-01



Subject to change without prior notice.