

GENERAL SPECIFICATION

Frequency Coverage

F.M. - 88-108 Mc/s
A.M. - 550-1600 Kc/s

R. F. Sensitivity

(for 100mv at detector)
F.M. - 18mv
A.M. - 3.3mv (1400Kc/s)
- 7.4mv (600Kc/s)

Intermediate Frequencies

F.M. - 10.7 Mc/s
A.M. - 455 Kc/s

Audio Response

50-20,000 cps ± 3 db

Audio Output

2.5 Watts (rms) per channel

Power Supplies

115 vac, 60 cps.

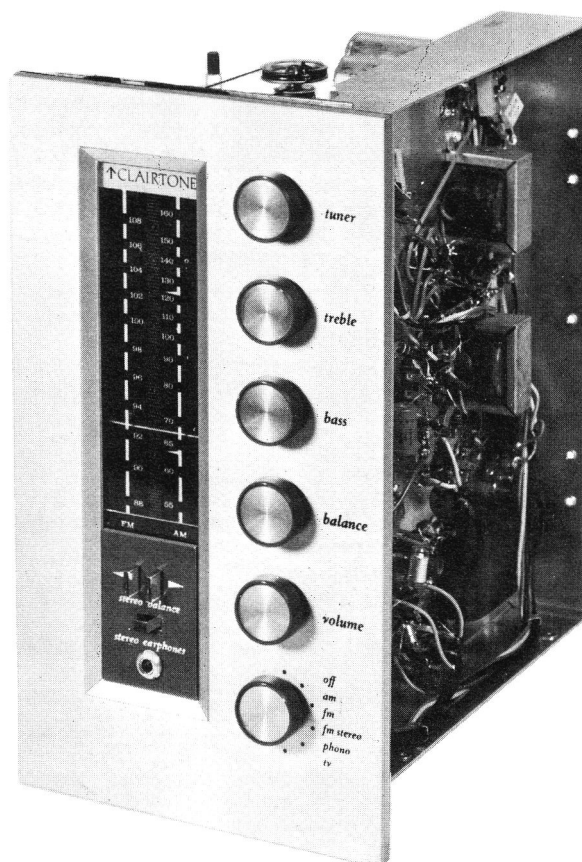


Figure 1 Chassis Type C303

CIRCUIT DESCRIPTION

The R.F. and mixer circuits employ a double triode tube, V1 (ECC85). One triode functions as a conventional grounded cathode R.F. amplifier and the second triode as an additive mixer. These circuits are contained in the F.M. Tuner Unit, which is manufactured as a separate assembly and mounted on top of the main chassis. The A.M. mixer uses a heptode tube V2 (6BE6) in an autodyne circuit. A built-in ferrite rod antenna is used in the input circuit to provide high sensitivity and selectivity. A.M. and F.M. intermediate frequency signals are applied to a common two-stage amplifier wired around V3 (6BZ6) and V4 (6CB6). The first stage functions as a conventional amplifier; the second stage as a limiter to F.M. signals and a demodulator to A.M. signals. A.G.C. voltage, developed across the A.M. load resistor R12 is applied to V2 and V3. The F.M. signals are passed from the limiter stage to the ratio de-

tector discriminator V5 (6AL5). This is a conventional unbalanced circuit. The frequency and amplitude of the demodulated audio signal, appearing at the tertiary winding of IFT5, are functions of the carrier deviation rate and amplitude, respectively. Two audio outputs are taken from the ratio detector. One is fed, via the function switch to the audio amplifier during monaural operation, the other is fed to the multiplex circuits for stereo. The multiplex circuit, V6 (12AT7) differentiates between left and right hand channel information and passes this to the two channels of the audio amplifier, V7 and V8 (6GW8) via the function switch. The two channels of the audio amplifier are identical; each consisting of a conventional two-stage resistance/capacity coupled circuit, providing an audio output of 2.5 watts (rms). The power supplies circuit comprises power transformer (T1) and full-wave rectifier (V9).

ALIGNMENT INSTRUCTIONS

GENERAL

The alignment of the tuned circuits of the C303 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 possible.

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 C303 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. Fisher 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	Sl	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	Sl	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 T.P.12	Adjust top core of IFT5 for a zero reading. This is found between positive and negative readings.

ALIGNMENT INSTRUCTIONS

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	SI	Connection	Frequency		
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

- 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 0db 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 0db 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 Fisher 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 3
I. F. Response

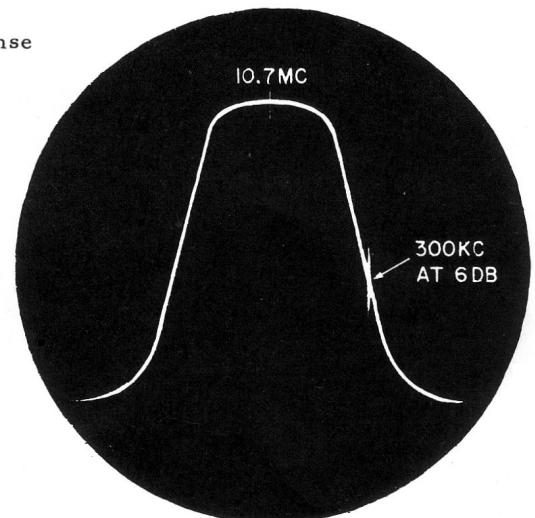
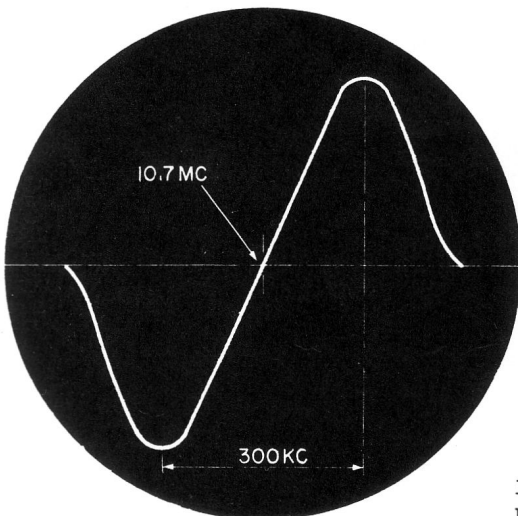


Figure 2
Discriminator Response



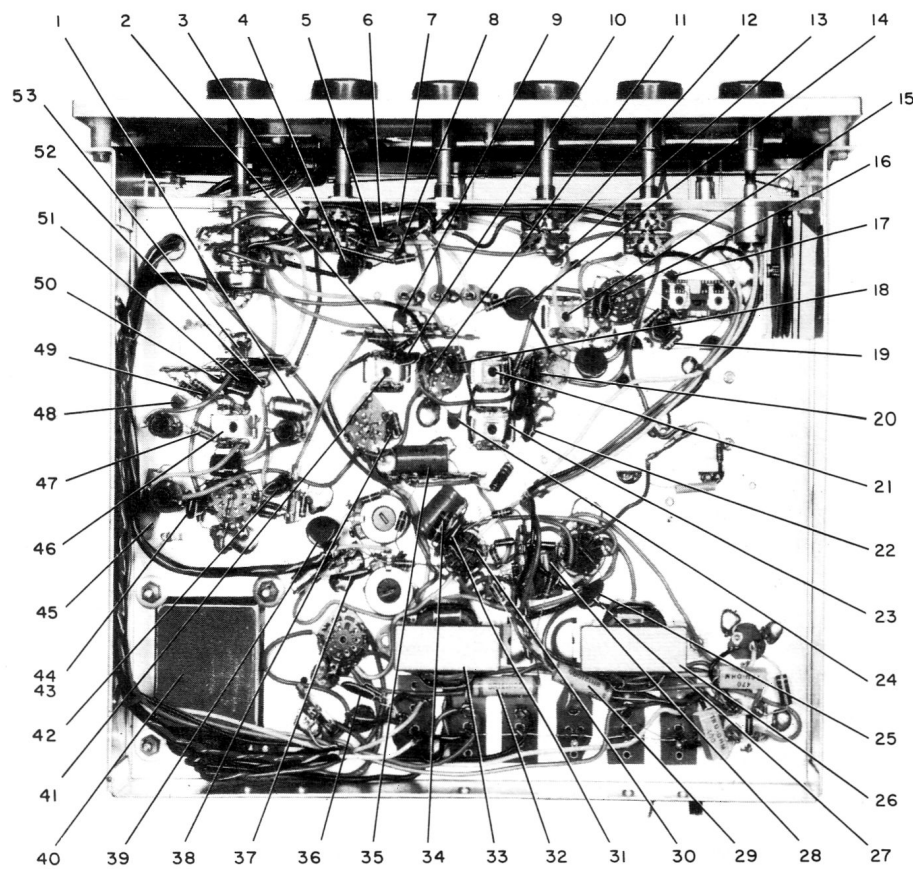


Figure 4

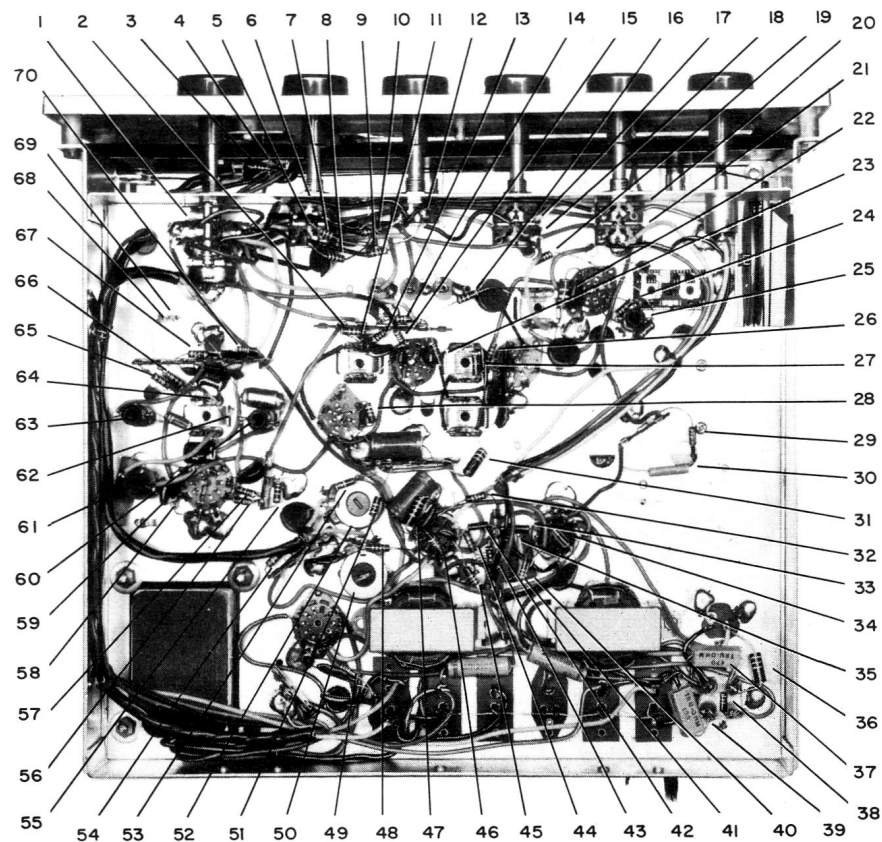


Figure 5

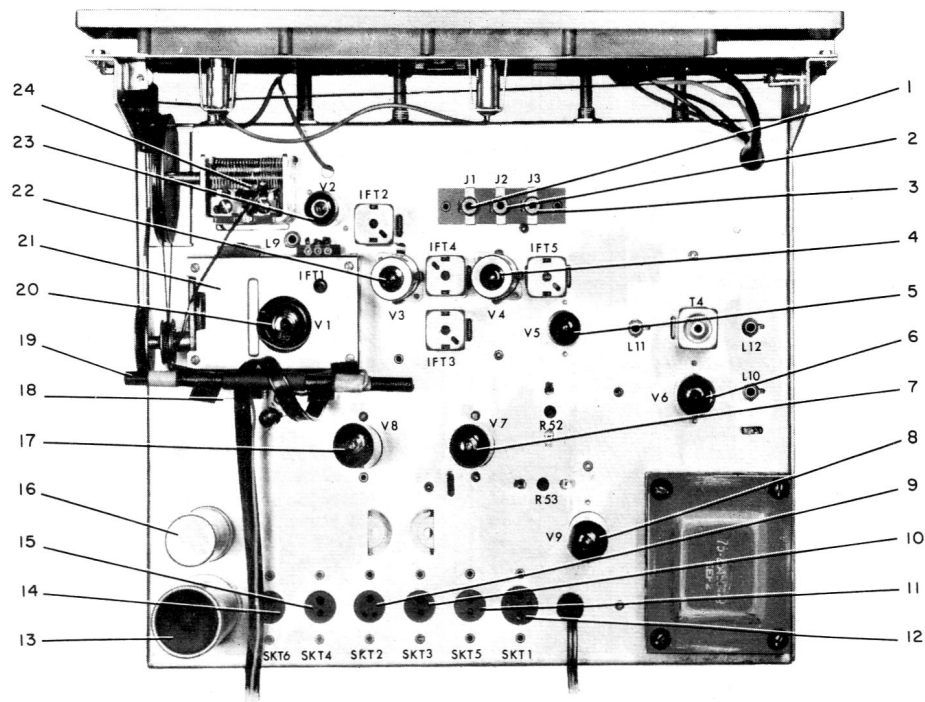


Figure 6

DIAL STRINGING

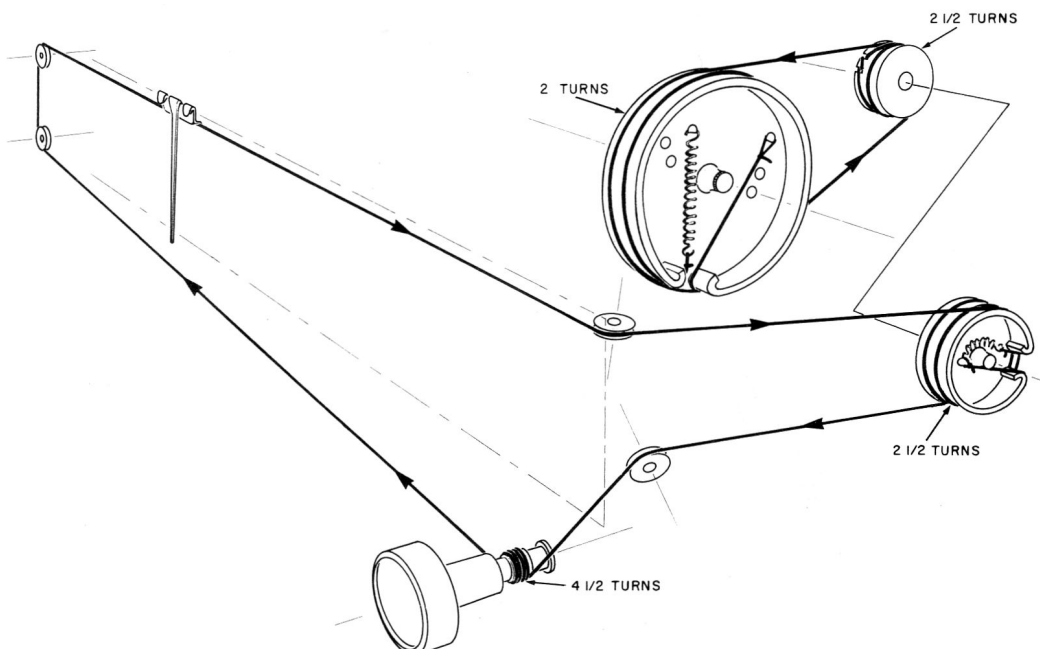


Figure 7

PARTS LIST

chassis parts

COMP. REF.	DESCRIPTION	CLAIRTONE PART NO.	COMPONENT LOCATION		COMP. REF.	DESCRIPTION	CLAIRTONE PART NO.	COMPONENT LOCATION	
			FIG.	ITEM				FIG.	ITEM
CAPACITORS					INDUCTORS				
C1 thru C15	Part of F.M. tuner assembly		6	21	L1 thru L5	Part of F.M. tuner assembly		6	21
C16	0.0047 UF±20%, 500V, ceramic	32-250950-42	6	18	L6, L7A.M.	ferrite rod antenna	83A270261-5	6	19
C17A, B	Tuning capacitor	38-270452-1	6	24	L8, L9A.M.	oscillator coil	83A254592-6	5	25
C18	0.0015UF±20%, 500V, ceramic	32-0575-18	4	17	L10	Oscillator coil - 19 Kc/s	83A270484-1	5	61
C19	Trimmer capacitor - part of C17		6	24	L11	S.C.A.filter - parallel tuned	83A270536-1	5	60
C20	0.01 UF±20%, 500V, ceramic	32-200044-68	4	16	L12	S.C.A.filter - series tuned	83A270537-1	5	63
C21	Part of tuning capacitor assembly		4	19					
C22	0.02 UF±20%, 500V, ceramic	32-200044-43	4	14	RESISTORS				
C23	Trimmer capacitor - part of C17		6	24	R1 thru R4	Part of F.M. tuner assembly		6	21
C24	0.0047 UF±20%, 500V, ceramic	32-250950-42	6	18	R5	1K ±20%, 1/2 watt	33-21035	5	29
C25	0.001 UF±7.5%, ceramic	32-250950-82	4	20	R6	1 M±20%, 1/2 watt	33-51035	5	19
C26	0.01 UF±20%, 500V, ceramic	32-200044-68	4	22	R7	15K±20%, 1 watt	33-31575	5	22
C27	220 UUF±20%, ceramic	32-250950-41	4	24	R8	22K±20%, 1/2 watt	33-32235	5	24
C28	100 UUF±20%, ceramic	32-250950-44	4	18	R9	33K±20%, 1/2 watt	33-33335	5	26
C29	0.01 UF±20%, 500V, ceramic	32-200044-68	4	10	R10	100K±20%, 1/2 watt	33-41035	5	27
C30	0.001 UF±7.5%, ceramic	32-250950-82	4	11	R11	4.7K±20%, 1 watt	33-24775	5	31
C31	470 UUF±20%, ceramic	32-250950-10	4	2	R12	470K±20%, 1/2 watt	33-44735	5	14
C32	470 UUF±20%, ceramic	32-250950-10	4	9	R13	4.7M±20%, 1/2 watt	33-54735	5	16
C33	0.0015 UF±20%, 500V, ceramic	32-0575-18	4	38	R14	47K±20%, 1/2 watt	33-34735	5	23
C34	5 UF 50V, electrolytic	32-254587-2	4	35	R15	47K±20%, 1/2 watt	33-34735	5	15
C35	0.02 UF±20%, 400V, ceramic	32-200044-43	4	42	R16	15K±20%, 1/2 watt	33-31535	5	13
C36	0.0027 UF±10%, durez dipped	32-270324-4	4	43	R17	47±20%, 1/2 watt	33-04735	5	11
C37	220 UUF±10%, NPO, ceramic	33-200044-9	4	44	R18	68K±20%, 1/2 watt	33-36835	5	2
C38	0.15 UF±20%, 25V, tubular	32-253659-21	4	45	R19	68K±20%, 1/2 watt	33-36835	5	28
C39	0.01 UF±20%, 100V, polystyrene	32-270538-1	4	1	R20	1M±20%, 1/2 watt	33-51035	5	57
C40	0.0015UF±20%, 100V, polystyrene	32-270538-2	4	47	R21	220 ±10%, 1/2 watt	33-12233	5	56
C41	470 UUF±10%, ceramic	32-250950-83	4	41	R22	10K ±10%, 1/2 watt	33-31033	5	55
C42	220 UUF±10%, ceramic	33-200044-9	4	51	R23	220K ±20%, 1/2 watt	33-42235	5	58
C43	0.001 UF±10%, ceramic	32-250550-59	4	53	R24	1K ±10%, 1/2 watt	33-21033	5	59
C44	470 UUF±10%, ceramic	32-250950-83	4	49	R25	270K ±10%, 1/2 watt	33-42733	5	65
C45	220 UUF±10%, ceramic	33-200044-9	4	50	R26	12K ±10%, 1/2 watt	33-31233	5	70
C46	0.001 UF±10%, ceramic	32-250550-59	4	52	R27	270K ±10%, 1/2 watt	33-42733	5	66
C47	0.02 UF±20%, 500V, ceramic	32-200044-43	4	4	R28	12K ±10%, 1/2 watt	33-31233	5	67
C48A, B	2 x 50 UF, 300V, electrolytic	32-254599-11	6	16	R29	4.7K ±20%, 1/2 watt	33-24735	5	36
C49	0.02 UF±20%, 500V, ceramic	32-200044-43	4	3	R30A, B	2M volume control (dual)	33-254595-15	5	5,6
C50	68 UUF±20%, 500V, ceramic	32-250950-45	4	5	R31	680K ±20%, 1/2 watt	33-46835	5	8
C51	68 UUF±20%, 500V, ceramic	32-250950-45	4	6	R32	680K ±20%, 1/2 watt	33-46835	5	7
C52	470 UUF±20%, ceramic	32-250950-10	4	8	R33	150K ±20%, 1/2 watt	33-41535	5	99
C53	470 UUF±20%, ceramic	32-250950-10	4	7	R34	150K ±20%, 1/2 watt	33-41535	5	10
C54	330 UUF±20%, ceramic	32-250950-50	4	12	R35	2M balance control	33-254597-3	5	12
C55	330 UUF±20%, ceramic	32-250950-50	4	13	R36A, B	5M bass control (dual)	33-254595-16	5	17, 18
C56	100 UF, 10 V, electrolytic	32-254587-12	4	28	R37	470K ±20%, 1/2 watt	33-44735	5	44
C57	0.0047 UF±20%, 500V, ceramic	32-250950-42	4	30	R38	470K ±20%, 1/2 watt	33-44735	5	41
C58	0.0047 UF±20%, 500V, ceramic	32-250950-42	4	27	R39	1.8K ±20%, 1/2 watt	33-21835	5	43
C59	0.02 UF±20%, 500V, ceramic	32-200044-43	4	31	R40	270K ±20%, 1/2 watt	33-42735	5	32
C60	100 UF, 10 V, electrolytic	32-254587-12	4	34	R41	100±20%, 1/2 watt	33-11035	5	42
C61	0.02 UF±20%, 500V, ceramic	32-200044-43	4	25	R42	100±20%, 1/2 watt	33-11035	5	33
C62	0.05 UF±20%, 800V, tubular	32-253659-23	4	32	R43	270K ±20%, 1/2 watt	33-42735	5	35
C63	0.05 UF±20%, 800V, tubular	32-253659-23	4	29	R44A, B	200K treble control	33-254595-17	5	21, 20
C64	0.02 UF±20%, 500V, ceramic	32-200044-43	4	39	R45	4.7K ±20%, 1/2 watt	33-24735	5	45
C65	0.02 UF±20%, 500V, ceramic	32-200044-43	4	37	R46	1M ±20%, 1/2 watt	33-51035	5	46
C66A, B, C, D	4 x 50 UF, 300V	32-254599-4	6	13	R47	1M ±20%, 1/2 watt	33-51035	5	34
C67	0.01 UF±20%, 1400V	32-250950-43	4	36	R48	4.7K ±20%, 1/2 watt	33-24735	5	40
CONNECTORS					R49	82 ±10%, 1 watt	33-08273	5	47
J1 thru J3	3 section phono/T. V. jack	79A-254785-3	6	1, 2, 3	R50	82K ±10%, 1/2 watt	33-38233	5	48
J4	Phone jack	79-270456-1			R51	82K ±10%, 1/2 watt	33-38233	5	54
PL1	3-Pin phono motor power plug	33-80-00			R52	1 M linear pre-set control	33-270321-2	5	52
PL2	3-Pin pilot lamp power plug	33-80-01			R53	1 M linear pre-set control	33-270321-2	5	50
PL3	2-Pin speaker plug with lead	30-62-00			R54	100K±20%, 1/2 watt	33-41035	5	53
PL4	2-Pin speaker plug with lead	30-62-00			R55	100K±20%, 1/2 watt	33-41035	5	51
SKT1	3-Pin phono motor power socket	79-254578-3	6	12	R56	470 ±10%, 1/2 watt	33-14733	5	3
SKT2	3-Pin cabinet pilot light socket	79-254578-4	6	9	R57	470 ±10%, 1/2 watt	33-14733	5	44
SKT3	2-Pin internal speaker socket	79-254578-1	6	10	R58	100 ±20%, 5 watt	33-254644-13	5	39
SKT4	2-Pin internal speaker socket	79-254578-1	6	15	R59	470 ±20%, 3 watt	33-254644-14	5	37
SKT5	2-Pin external speaker socket	79-254578-1	6	11	R60	330 ±20%, 1/2 watt	33-13335	5	38
SKT6	2-Pin external speaker socket	79-254578-1	6	14	R61	1M ±20%, 1/2 watt	33-51035	5	49
TB1	Antenna terminal board	15-254577-5			TRANSFORMERS				
DIAL AND DRIVE ASSEMBLY					IFT1	Part of F.M. tuner assembly		6	21
	Clips, dial retaining	24-270458-1			IFT2	455 Kc/s I.F. transformer	1655-6	4	15
	Cord, dial - A.M./F.M. linking	21-254789-1			IFT3	455 Kc/s I.F. transformer	1655-6	4	23
	Cord, dial - main	21-254789-1			IFT4	10.7 Mc/s I.F. transformer	K1009	4	21
	Dial, glass	49-270223-5			IFT5	10.7 ratio detector transformer	K1008	4	41
	Mask, dial	12-270431-1			T1	Power transformer	75-254564-9	4	40
	Pointer, dial	122-270249-4			T2	Output transformer	75-254634-7	4	33
	Spring, A.M. dial cord	39-254573-3			T3	Output transformer	75-254634-7	4	26
	Spring, A.M./F.M. dial cord	39-254573-1			T4	38 Kc/s transformer"K" tran type	83A270494-1	4	46

PARTS LIST

chassis parts cont'd

COMP. REF.	DESCRIPTION	CLAIRTONE PART NO.	COMPONENT LOCATION		COMP. REF.	DESCRIPTION	CLAIRTONE PART NO.	COMPONENT LOCATION	
			FIG.	ITEM				FIG.	ITEM
TUBES AND DIODES					MISCELLANEOUS				
V1	ECC85		6	20		Escutcheon, front - die cast	41-270425-1		
V2	6BE6		6	23		Escutcheon Inset, type C303	20-82-00		
V3	6BZ6		6	22		Indicator Assembly, stereo balance	35A270433-1		
V4	6CB6		6	4		Knob, control - with dot	22-20-01		
V5	6AL5		6	5		Knob, control - less dot	22-20-00		
V6	12AT7		6	6		Lamp, pilot - no. 47	34-90-47		
V7	6GW8		6	7		Nut, phone jack	39-270463-1		
V8	6GW8		6	17		Record Changer, type "A"	12-30-01		
V9	6CA4		6	8		Record Changer Cartridge, Acos	13-50-00		
CR1	1N34A		5	69		Signal Lead, phono - 18 ins.	30-64-00		
CR2	1N34A		5	62		Switch, function	58-270225-7		
CR3	1N34A		5	68		Switch, slide - D.P.S.T.	58-254780-7		
CR4	1N34A		5	64		Tuner Assembly, F.M.	116-254724-3		

cabinet parts

DESCRIPTION	CLAIRTONE PART NO.	DESCRIPTION	CLAIRTONE PART NO.
MODEL S253		MODEL S373 (cont'd)	
Antenna, F.M. dipole	30-60-00	Panel, lattice work - colonial (L.H.)	10-114-90
Bracket, pilot lamp	30-61-00	Panel, lattice work - colonial (R.H.)	10-114-91
Cover, back	17-71-01	Panel, lattice work - colonial (center)	10-114-92
Lamp, pilot - no. 47	34-90-47	Plate, strike	4454
Lead, speaker - with 2-pin plug	30-62-00	Speaker, tweeter - TW34 97492J	14-41-01
Lens, pilot lamp	35-20-00	Speaker, woofer - CE200-106 93870AP	14-40-00
Lid Support	1748-8-11-B-A	Stop, catch - nylon	1298
Panel, basket weave (R.H.) - mahogany	10-112-93	Tube, light shield	47-00-02
Panel, basket weave (L.H.) - mahogany	10-112-92	MODEL S383	
Panel, basket weave (R.H.) - walnut	10-122-91	Antenna, F.M. dipole	30-60-00
Panel, basket weave (L.H.) - walnut	10-122-90	Bracket, pilot lamp	30-61-00
Plate, strike	4454	Cover, back	17-71-02
Speaker, tweeter - TW34 97492J	14-41-01	Lamp, pilot - no. 47	34-90-47
Speaker, woofer - CE200-106 93870AP	14-40-00	Lead, speaker - with 2-pin plug	30-62-00
Stop, catch - nylon	1298	Lens, pilot lamp	35-20-00
Tube, light shield	47-00-02	Lid Support	1748-8-11-B-A
MODEL S303		Panel, - basket weave (L.H.) - walnut	10-115-90
Antenna, F.M. dipole	30-60-00	Panel, - basket weave (R.H.) - walnut	10-115-91
Bracket, pilot lamp	30-61-00	Panel, - basket weave (center) - walnut	10-115-92
Cover, back	17-71-07	Panel, - basket weave (L.H.) - antique ivory	10-115-93
Door, sliding (R.H.) - walnut	10-113-91	Panel, - basket weave (R.H.) - antique ivory	10-115-94
Door, sliding (L.H.) - walnut	10-113-90	Panel, - basket weave (center) - antique ivory	10-115-95
Door, sliding (R.H.) - teak	10-113-93	Plate, strike	4454
Door, sliding (L.H.) - teak	10-113-92	Speaker, tweeter - TW34 97492J	14-41-01
Lamp, pilot - no. 47	34-90-47	Speaker, woofer - CE200-106 93870AP	14-40-00
Lead, speaker - with 2-pin plug	30-62-00	Stop, catch - nylon	1298
Lens, pilot lamp	35-20-00	Tube, light shield	47-00-02
Lid Support	1748-6-12-C	MODEL S393	
Plate, strike	4454	Antenna, F.M. dipole	30-60-00
Speaker, tweeter - TW34 97492J	14-41-01	Bracket, pilot lamp	30-61-00
Speaker, woofer - CE200-106 93870AP	14-40-00	Cover, back	17-71-02
Stop, catch - nylon	1298	Lamp, pilot - no. 47	34-90-47
Stop, door	238	Lead, speaker - 2-pin plug	30-62-00
Tube, light shield	47-00-02	Lens, pilot lamp	35-20-00
MODEL S373		Lid Support	1748-8-11-B-A
Antenna, F.M. dipole	30-60-00	Panel, basket weave (R.H.) - fruitwood	10-116-90
Bracket, pilot lamp	30-61-00	Panel, basket weave (L.H.) - fruitwood	10-116-91
Cover, back	17-71-02	Panel, basket weave (center) - fruitwood	10-116-92
Lamp, pilot - no. 47	34-90-47	Plate, strike	4454
Lead, speaker - with 2-pin plug	30-62-00	Speaker, tweeter - TW34 97492J	14-41-01
Lens, pilot lamp	35-20-00	Speaker, woofer - CE200-106 93870AP	14-40-00
Lid Support	1748-8-11-B-A	Stop, catch - nylon	1298
		Tube, light shield	47-00-02

CLAIRTONE SOUND CORPORATION LIMITED

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