SERVICE MANUAL

AND

PARTS LIST

FOR

CLAIRTONE

STEREOPHONIC RADIO-PHONOGRAPH

Model S 1003

Printed in Canada

ALIGNMENT PROCEDURE

Preliminary:

Alignment is an exacting procedure and should be undertaken only when necessary. The following equipment is required:

1. Signal generator with a frequency range of at least from 455 kc to 1640 kc.
2. Signal generator with a frequency range covering 10.7 mc. for FM-IF. alignment.
3. Vacuum tube voltmeter,

OR

2. F.M. (sweep) signal generator usable at 10.7 mc
3. 10.7 Crystal or other accurate marker generator
4. Oscilloscope

Notes: Allow at least five minutes for the set to warm up before attempting alignment. An (8 ohm) speaker or dummy load (5-10 ohms) must be connected across the audio output transformer secondaries at all times.

F.M. DETECTOR CURVE

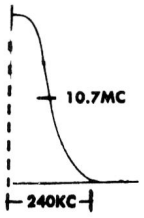


FIG. 1

F.M. I.F. PASSBAND

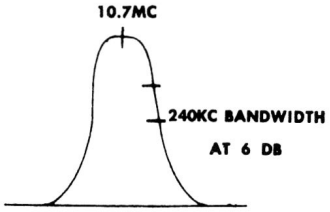


FIG. 2

AM IF & RF ALIGNMENT

Step	Signal Generator Coupling	Signal Generator Frequency	Band Switch Position	Radio Dial Setting	Connect VTVM	Adjust	Remarks
1.	High Side to Pin 7 of V7 (6BE6) Low side to Chassis	455 KC	A.M.	Tuning Gang Fully Open	High Side to Point 3 Low Side to Chassis	T5-T6 Top and Bottom	Adjust for maximum deflection.
2.	Loop (Radiated)	535 KC	A.M.	535 (A.M. Gang Fully Closed)	Same as in Step 1	RFT 4	Adjust for maximum deflection.
3.	Same as in Step 2	1625 KC	A.M.	1625 (A.M. Gang Fully Open)	Same as in Step 1	A.M. Osc. Trimmer C 38 CT	Adjust for maximum deflection.
4.							Repeat Steps 2 & 3 until no further increase is noted.
5.	Same as in Step 2	600 KC	A.M.	600 KC	Same as in Step 1	RFT 3	Adjust for maximum deflection.
6.	Same as in Step 2	600 KC	A.M.	600 KC	Same as in Step 1	RFT 2	Adjust for maximum deflection.
7.	Same as in Step 2	1400 KC	A.M.	1400 KC	Same as in Step 1	C 38 AT	Adjust for maximum deflection.
8.	Repeat Step 5, 6, and 7 until no further increase is noted						

F.M. - I.F. ALIGNMENT USING UNMODULATED SIGNAL GENERATOR AND VTVM

1.	High and Low Side to FM Antenna	10.7 Mc (Unmodulated)	F.M.	Point of Non-Interference	D.C. Probe to Point 4. Common Lead to Chassis.	I.F.T. 4 Prim. only (Bottom) I.F.T. 3 & 1 Pri. & Sec.	Adjust for maximum deflection.
2.	Same as in Step 1	10.7 Mc (Unmodulated)	F.M.	Same as in Step 1	D.C. Probe to Point 2. Common Lead to Point 1	I.F.T. 4 Sec. (Top)	Adjust for zero reading. A positive and negative reading will be obtained on either side of correct setting.

F.M. - I.F. ALIGNMENT USING F.M. SIGNAL GENERATOR AND OSCILLOSCOPE

FREQUENCY MODULATE THE I.F. SIGNAL WITH 60 CYCLE SINE WAVE TO A TOTAL DEVIATION OF 450 KC. ADJUST THE SCOPE INTERNAL HORIZONTAL DEFLECTION VOLTAGE TO 120 CYCLES, AND SYNCHRONIZE IT WITH THE 60 CYCLE SINE WAVE.

1.	High Side to Pin 1 of V2 (Second 6BA6 F.M.-I.F. Ampl.)	10.7 Mc 450 KC Total Sweep Deviation	F.M.	Point of Non-Interference	Vertical Amp. Input to Point 4. Common to Point 1	I.F.T. 4 Prim. (Bottom) only and I.F.T. 3 & 2 Prim. & Sec.	Adjust curve for maximum amplitude & symmetry (see Fig. 2)
2.	Same as in Step 1	Same	F.M.	Same as in Step 1	Vertical Amp. Input to Point 2. Common to Point 1	I.F.T. 4 Secondary (Top) only	Adjust so that 10.7 MC occurs at centre of S curve (see Fig. 1)
3.	High and Low Side to FM Antenna	Same	F.M.	Same as in Step 1	Same as in Step 1	I.F.T. 1 Prim. & Sec. (Top & Bottom)	Adjust curve for maximum amplitude & symmetry (see Fig. 2)
4.	Same as in Step 3	Same	F.M.	Same as in Step 1	Same as in Step 2	I.F.T. 4 Sec. (Top) only	Adjust so that 10.7 MC occurs at centre of S curve (see Fig. 1)

PARTS LIST

NOTE: As the F.M. tuner assembly is equipped with many now standard parts which may vary from tuner to tuner, it is necessary to quote tuner type number (on rear of tuner) and date on chassis assembly when ordering spare parts. Please quote circuit location and listed value from schematic diagram.

75B Tuner parts are not listed below.

RESISTORS

(All resistors in ohms and rated at ½W unless noted)

Circuit Location	Part Number	Description
R8, 9, 12, 71, 72, 75, 76	33-41035	100K
R10, 13, 15	33-33365	33K,2W
R11, 14, 24	33-14735	470
R17	33-13375	330, 1W
R16, 29, 63, 64	33-32235	22K
R18	33-22735	2.7K
R21	33-26835	6.8K
R22, 32	33-21035	1K
R23, 25, 28, 39, 83, 84, 106	33-51035	1M
R26, 33	33-11535	150
R27	33-26075	6K, 1W
R30	33-31565	15K, 2W
R31, 45, 46, 51, 52	33-36875	68K, 1W
R34, 38	33-53335	3.3M
R35, 37, 40, 104, 105	33-44735	470K
R36, 97, 41, 42	33-34735	47K
R55, 56	33-254596-1	1M+1M Dual clutched treble contr. Linear taper
R61, 62	33-254596-2	1M+1M Dual clutched base contr. Audio taper
R65, 66	33-254595-3	2M+2M Dual balance contr. Linear taper
R67, 68	33-254595-4	2M+2M Dual volume contr. Audio taper
R69, 70	33-21835	1800
R73, 74	33-45635	560K
R77, 78	33-21235	1200
R79, 80, 81, 82, 85, 36	33-41535	150K
R87, 88	33-61035	10M
R89, 90, 91, 92	33-43335	330K
R93, 98	33-22235	2.2K
R94	33-254644-10	1250, 7W
R95	33-254644-11	1250, 15W
R96	33-31575	15K, 1W
R99	33-254644-6	8, 5W
R100, 101, 102, 103	33-54735	4.7M
R43, 44, 49, 50	33-254807-4	3.3M Low noise
R47, 48	33-28235	8.2K
R25	33-31065	IM
R53, 54		2.7M

CAPACITORS

(All capacitors in pF (μμF) and rated at 400VDC unless noted)

C-17, 18, 19, 20, 21, 24, 27, 30, 39	32-250950-42	4700
C22, 26, 29, 31, 41, 43, 44	32-200044-68	.01 μF
C23, 25, 28, 32	32-9575-18	1500
C33, 46	32-250950-41	220
C34, 40, 45, 48, 49, 70, 71, 74, 75, 76, 77, 78, 79, 80, 81, 85, 86, 87, 88, 92, 93, 94, 95, 96, 97, 98, 99, 101	32-200044-43	.02 μF
C37	32-254587-2	5 μF, 50VW electrolytic
C50, 51, 102	32-253659-6	.1 μF, 200VW paper tubular
C38A, 38B, 38C	38-270132-1	AM tuning capacitor ganged & geared + drive drum
C38AT, 38BT, 38CT	11-270137-1	2-12 trimmer capacitor
C47, 66, 67, 72, 73, 1	32-250950-44	100
C52, 53, 54, 55, 56, 57	32-254588-1	.047 μF, paper tubular
C68, 69	32-200044-34	33
C82A, 82B, 82C, 82D	32-254599-7	50+50+50+50μF electrolytic
C84A, 84B, 83	32-254599-9	1000+1000+200 μF electrolytic
C89, 90	32-254587-9	120 μF, 200 VW
C91	32-250950-43	.01 μF, 1.4KVW
C42		5 μF, N1500

COILS, TRANSFORMERS & DIODES

IFT2, IFT3	1607-5	10.7 Mc IF transformer
IFT4	2607-5	10.7 Mc ratio dot transformer
RFT2	83A254591-8	AM antenna transformer
RFT3	83A270079-1	AM interstage transformer
IFT5, IFT6	1655-6	455 Kc IF transformer
RF3, 4, 5, 6	39-12595-1	Heater choke
RFT4	83A254592-2	Oscillator transformer
T1	75-254564-3	Power transformer
TR2, 3	75-254565-3	Audio output transformer

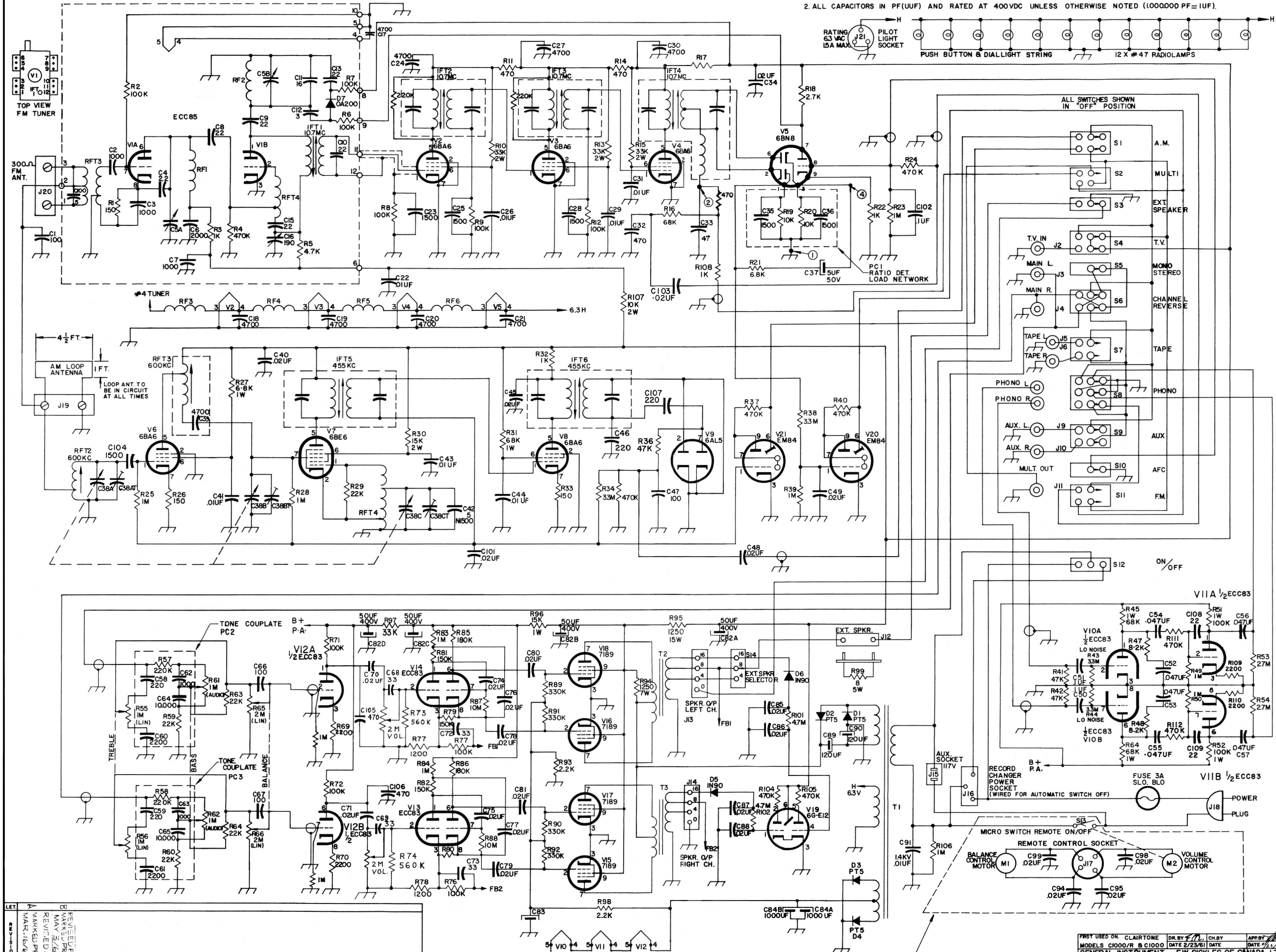
MISCELLANEOUS

J20	15-254577-1	FM antenna term. board
J19	15-254577-2	AM antenna term. board
	116-254724-1	FM tuner ass'y.
PC1	32A270034-1	Ratio detector load network
PC2, 3	32A254557-1	Tone couplate
S1, 4, 6, 9	58-254780-4	Switch DPDT
S2, 5, 10	58-254780-1	Switch SPST
S3	58-254780-3	Switch SPDT
S7, 11	58-254780-5	Switch DPST
S8	58-254781-1	Switch TPDT
S12	58-254781-2	Switch SPDT 3A 117V
S13	58-270115-1	Micro switch ass'y.
S14	15A270058-1	Impedance selector panel
J16	79-254578-3	Record changer power socket
J15	79-254579-1	Ann. socket 117V
J17	79-254578-5	Motor power socket
J18	79A254581-1	
J21	79-254578-4	Pilot light socket
J1, 2, 3, 4, 5, 6	79A254785-6	Phono socket ass'y. (6)
J7, 8, 9, 10, 11	79A254785-5	Phono socket ass'y. (5)
M2		Control motor (part of volume control)
M1		Control motor (part of balance control)
	122-254783-2	Dial pointer ass'y.
	102A2005-TB-1	Pushbutton (crystal)
	24-254812-1	Deterrent spring pushbutton
	117-270121-1	Fuse 3A slow blow
	12A270122-1	Cam ass'y. (microswitch)

CABINET PARTS

12ALM7D-10	Garrary type A changer c/w M7D with cartridge & auto. switch off
14-138-10	E.M.I. dutton 13x8 woofer
14-60-10	Pioneer PT-01 tweeter
20-1610-10	Escutchion plate 103c—FP-1
21-143-10	Dial glass
22-16-1	Knob, loudness, bass and treble
22-16-2	Knob, AM, FM tuning and balance
25-2-10	Cross over network TDN-1
26-10-10	Grille cloth No. 1400, 20x11
33-4-432	Pilot light plug, 3 pin, No. 2799
33-5-10	Power plug 3 pin with cover
35-3-10	Plastic back grill, 15⅜x7½
37-2-10	Pushbutton light switch
35-2-10	Vinyl light cover

NOTES: 1. ALL RESISTORS IN OHMS AND RATED AT ½ W. UNLESS OTHERWISE NOTED (K=1000X, M=1000,000X).
2. ALL CAPACITORS IN PF(UUF) AND RATED AT 400VDC UNLESS OTHERWISE NOTED (1,000,000 PF=1UF).



LET.	REVISIONS
A	MARKED PRINT MAR. 16/61
B	REVISED PER MARKED PRINT MAY 3/61

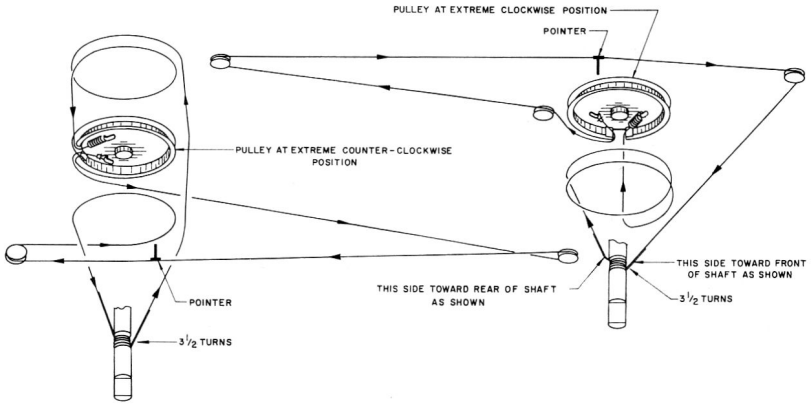
SUBJECT TO CHANGE WITHOUT NOTICE:

HIGHEST CAPACITOR NO. NO-C109
HIGHEST RESISTOR NO- NO- R112

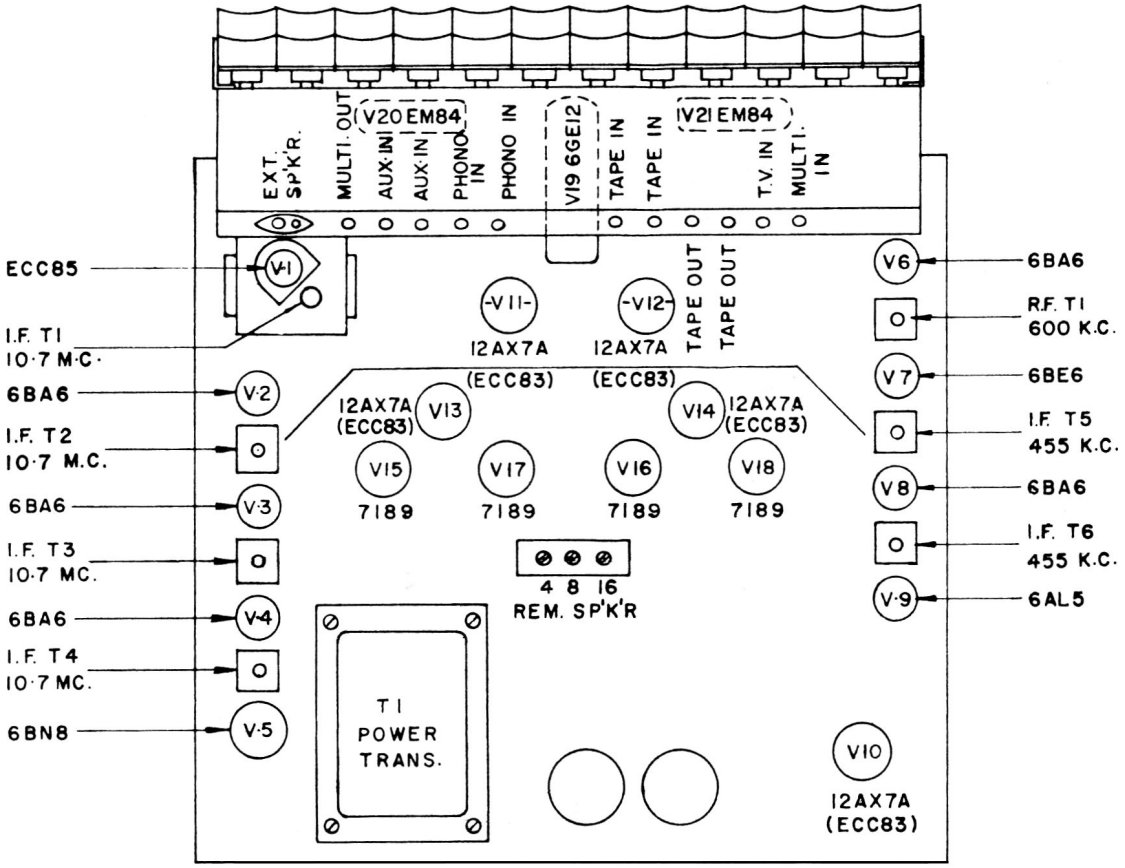
IN C-1000R MODELS ONLY

FIRST USED ON CLAIRTONE MODELS C1000/R & C1000	DR. BY F.M. DATE 2/23/61	CH. BY DATE	APP. BY DATE
GENERAL INSTRUMENT — F.W. SICKLES OF CANADA LTD. WATERLOO ONTARIO			
DESCRIPTION CIRCUIT DIAGRAM		PART NO. 53-270107-1	

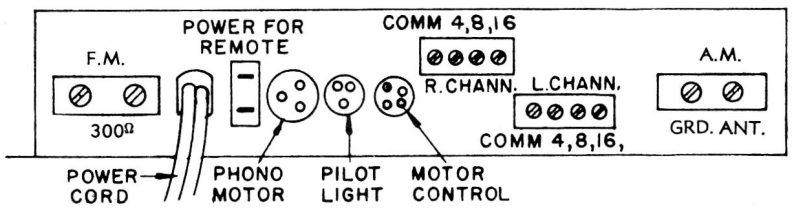
A. M.— F. M. DIAL STRINGING

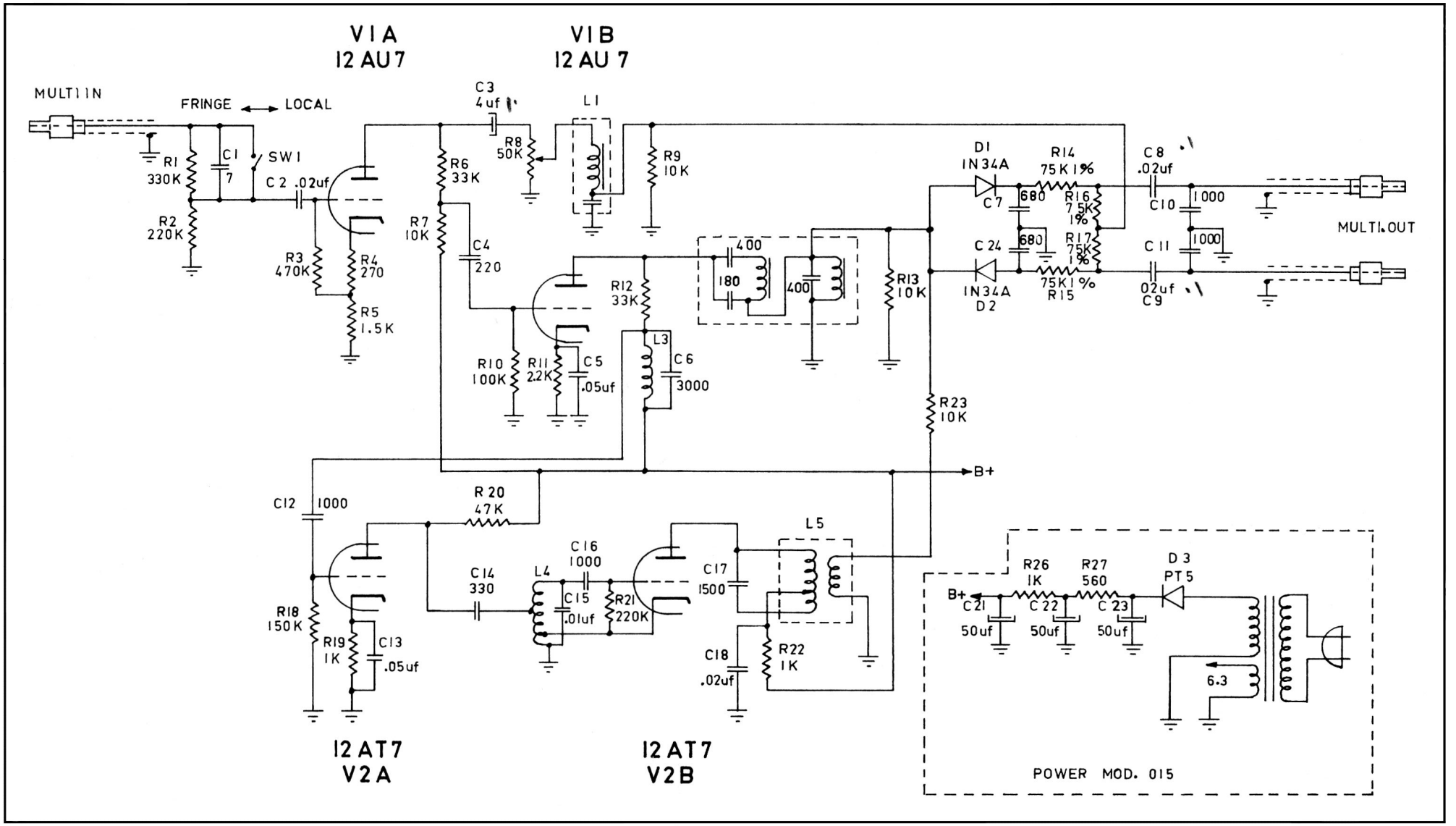


TOP VIEW OF CHASSIS



BACK VIEW OF CHASSIS




V1A
12AU7
V1B
12AU7
MULTI IN
FRINGE
LOCAL
SW1
C1
7
C2 .02uf
R1
330K
R2
220K
R3
470K
R4
270
R5
1.5K
C3
4uf
R8
50K
L1
R9
10K
R6
33K
R7
10K
C4
220
R10
100K
R11
2.2K
C5
.05uf
R12
33K
L3
C6
3000
400
180
400
R13
10K
D1
IN34A
C7
680
R14
75K 1%
R16
75K
1%
C24
680
R17
75K
1%
IN34A
D2
75K 1%
R15
C8
.02uf
C10
1000
C11
1000
02uf
C9
MULTI. OUT
R23
10K
B+
C12
1000
R20
47K
C14
330
L4
C16
1000
C15
.01uf
R21
220K
C17
1500
L5
R18
150K
R19
1K
C13
.05uf
C18
.02uf
R22
1K
12AT7
V2A
12AT7
V2B
B+
C21
50uf
R26
1K
C22
50uf
R27
560
C23
50uf
D3
PT5
6.3
POWER MOD. 015

PARTS LIST

Multiplex Adapter — Model C-1003

Circuit Loc.	Part No.	Description
D1, D2	78-270325-1	Diode IN34A
D3	78-254566-1	PT5 Silicon Rectifier
	75-270327-1	Power Transformer
R8	33-270321-1	Potentiometer, 50K, Linear 10%
L1	M.S. 34179-2	Filter—E1191139 AX
L6	M.I. 34253-2	Band Filter—E1191152 AX
L5	M.S. 34183-2	Doubler Coil—E1191143 AX
L4	83A270330-1	19 kc/s Oscillator Coil
L3	83A270331-1	19 kc/s Pilot Take Off
SW1	58-254780-1	Slide Switch SPST
C15	32-270324-1	Condensers, Durez Dipped ± 10% .01 mfd
C16	32-270324-2	Condensers, Durez Dipped ± 10% 1000 mmfd
C17	32-270324-3	Condensers, Durez Dipped ± 10% 1500 mmfd
C6	32-270324-4	Condensers, Durez Dipped ± 10% 2700 mmfd
C10, 11, 12	32-250950-59	Disc Capacitors 1000 mmfd ± 10% 500v
C4	32-200044-9	Disc Capacitors 220 mmfd ± 10% 500v
C1	32-250950-76	Disc Capacitors 7 mmfd ± 10% 500v*
C7, 24	32-250-950-57	Disc Capacitors 680 mmfd ± 10% 500v
C14	32-250950-50	Disc Capacitor 330 mmfd ± 20% 500v
C5, C13	32-250950-75	Disc Capacitor .05 mfd ± 20% 500v
C8, C9	32-253659-6	Capacitor Tubular .1 mfd 200v±20%†
C3	32-254587-11	Electrolytic 1.0 mfd 150v‡
C21, 22, 23	32-254599-13	Electrolytic 50 + 50 + 50 300v
R14, 15, 16, 17	33-254807-5	Resistor 75K ± 1%
R27	33-15633	Resistor 560 ohm ½w ± 10%
R2, R21	33-42233	Resistor 220K ½w ± 10%
R1	33-48333	Resistor 330K ½w ± 10%
R5	33-21533	Resistor 1.5K ½w ± 10%
R4	33-12733	Resistor 270 ohm ½w ± 10%
R26	33-21035	Resistor 1K ½w ± 20%
R7, 9, 13, 23	33-31033	Resistor 10K ½w ± 20%
R10	33-41033	Resistor 100K ½w ± 20%
R18	33-41533	Resistor 150K ½w ± 20%
R11	33-22233	Resistor 2.2K ½w ± 20%
R19, 22	33-21033	Resistor 1K ½w ± 20%
R6, 12	33-33333	Resistor 33K ½w ± 10%
R20	33-34733	Resistor 47K ½w ± 10%
R3	33-44733	Resistor 470K ½w ± 10%

* Schematic shows 75 mmfd

† Schematic shows 02 μf

‡ Schematic shows 4 μfd

TEST SPECIFICATION AND ALIGNMENT PROCEDURES FOR MULTIPLEX ADAPTER MA-010 & MA-015

Equipment required:

Multiplex Stereo Generator (Scott Type 830 or equivalent.)
Oscilloscope with low capacity (20pf max.) probe and frequency response to 100 kc/s.
Audio generator with balanced output (Hewlet-Packart or equivalent.)

1. Plug adapter into power supply (respectively AC line) and allow a min. of 5 minutes warm-up.
2. Connect oscilloscope probe (low "C") to junction of the two diodes IN34A. Oscilloscope on external sweep from Scott generator (19Kc).
   No input to adapter. Adapter switch in fringe position.
   Adjust oscillator until Lissajou comes to standstill.
3. Scope to internal sweep. 19Kc signal from Scott generator to input of adapter. Probe on same point as in 2.
   Adjust 38Kc/s doubler coil for maximum
4. Scope to external (19Kc) sweep as in 2.
   No signal to input of adapter.
   Check that oscillator frequency is unchanged, and correct if required.
5. Probe on pin #2 of 12AT7. Short pin #7 of 12AT7 to ground. 19Kc/s signal from Scott generator to input of adapter.
   Adjust 19Kc/s take-off coil for maximum.
6. Pin #7 of 12AT7 still grounded. Probe (low "C") at junction of diodes IN34A's.
   Input to adapter 67.5 Kc/s.
   Adjust Bandpass filter (Bottom coil) for minimum.
   Input to adapter 38 Kc/s.
   Adjust Bandpass filter (top coil) for maximum.
7. Input to adapter: "Left" channel composite signal ("+ L", "Right" = O.)
   Modulation frequency 1000 C/s. Probe on output "R" of adapter.
   Local — fringe switch in "fringe" position.
   Adjust output for minimum by adjusting potentiometer. If proper minimum cannot be obtained by adjusting potentiometer, a slight adjustment of the 19 Kc/s take-off coil will be required.
8. Check that minimum output is maintained by switching input to "+R" "L-O" and probe to output "L" on adapter.
9. Check that no phase shift occurs by switching, "local-fringe" switch to local position. Amplitude of output should decrease. If the amplitude of the output increases, the following should be checked:
   (a) oscillator frequency as in 2.
   (b) minimum adjust as in 7.
10. Calibrate oscilloscope using input signal to adapter as reference. Check output of adapter (maximum channel). Gain must be +3 db.
11. Check stereophonic separation by taking ratio of "R" and "L" outputs. Ratio must be 10 times minimum. (Modulation 1000 c/s.)