

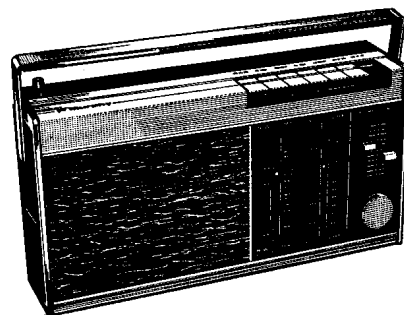
BUSH | MURPHY

SERVICE INFORMATION

MODELS

VTR188 BUSH

BA890 MURPHY



BA890

SPECIFICATION

GENERAL

These models are mains/battery operated AM/FM radio receivers designed to cover the Medium, Long, VHF and two S.W. bands.

MAINS SUPPLY

240 volts 50 Hz.

BATTERY SUPPLY

Six 1.5 volt cells SP2 or equivalent.

Average battery consumption 24mA quiescent (29mA normal listening level).

DIMENSIONS (with handle down)

Height : 180 mm (7.1 ins.)

Width : 320 mm (12.6 ins.)

Depth : 104 mm (4.14 ins.)

Weight: 3 kg (6.6 lb.) excluding battery.

LOUDSPEAKER

Frame size : 101 mm (4 in.) circular impedance 8 ohms.

WAVEBANDS

LW 150 kHz to 285 kHz (2000 to 1050 metres).

MW 1620 kHz to 515 kHz (185 to 582 metres).

SW1 5.8 MHz to 10.2 MHz (31, 41 & 49 metres band).

SW2 10.2 MHz to 20 MHz (16, 19 & 25 metres band).

VHF 87.5 MHz to 104 MHz.

INTERMEDIATE FREQUENCIES

AM bands = 470 kHz oscillator high with respect to the signal frequency.

FM band = 10.7 MHz oscillator low with respect to the signal frequency.

SOUND OUTPUT

550mW at 1000 Hz for 10% Total Harmonic Distortion.

AERIALS

An internal ferrite rod aerial for LW, MW and SW bands and telescopic rod aerial for the VHF band. This rod aerial is also operative on the two S.W. bands.

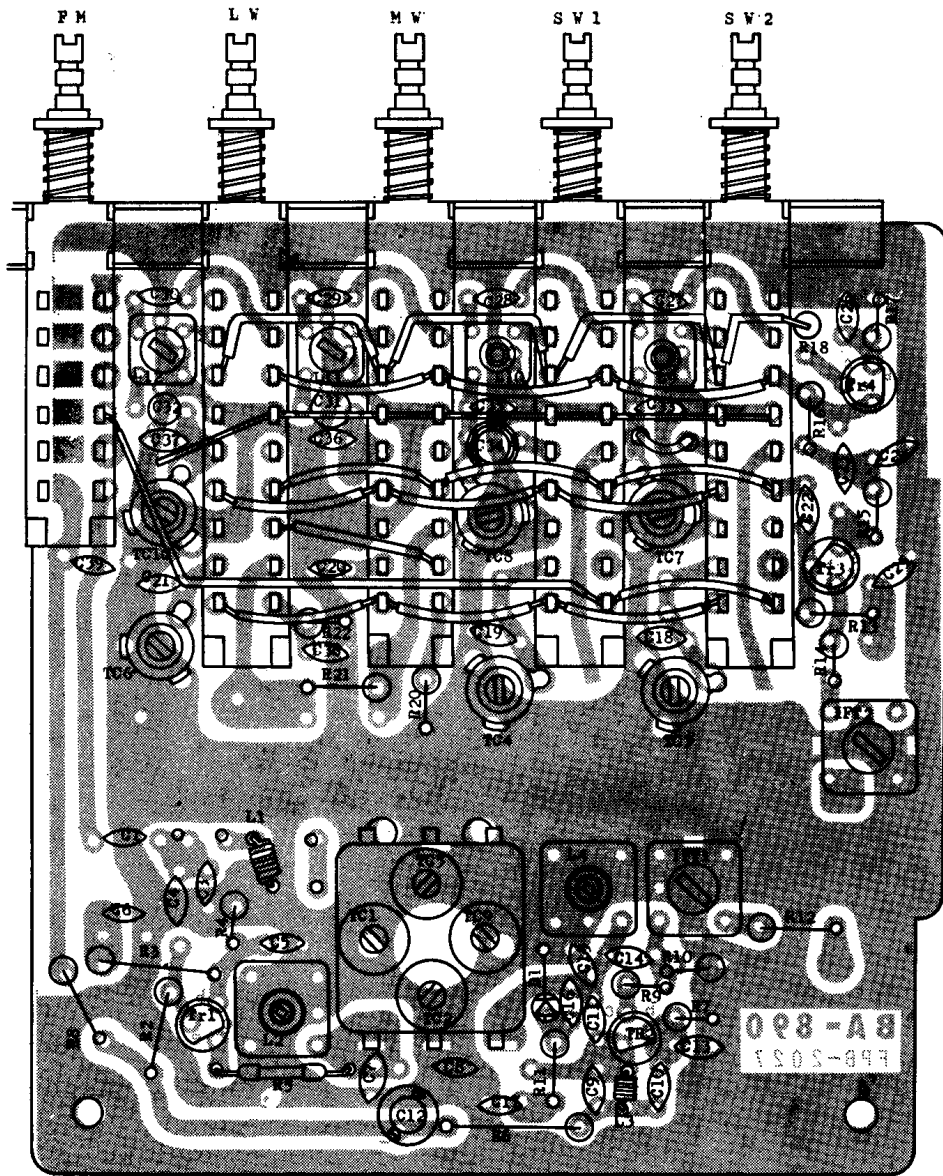


Fig. 1. R.F. panel layout.

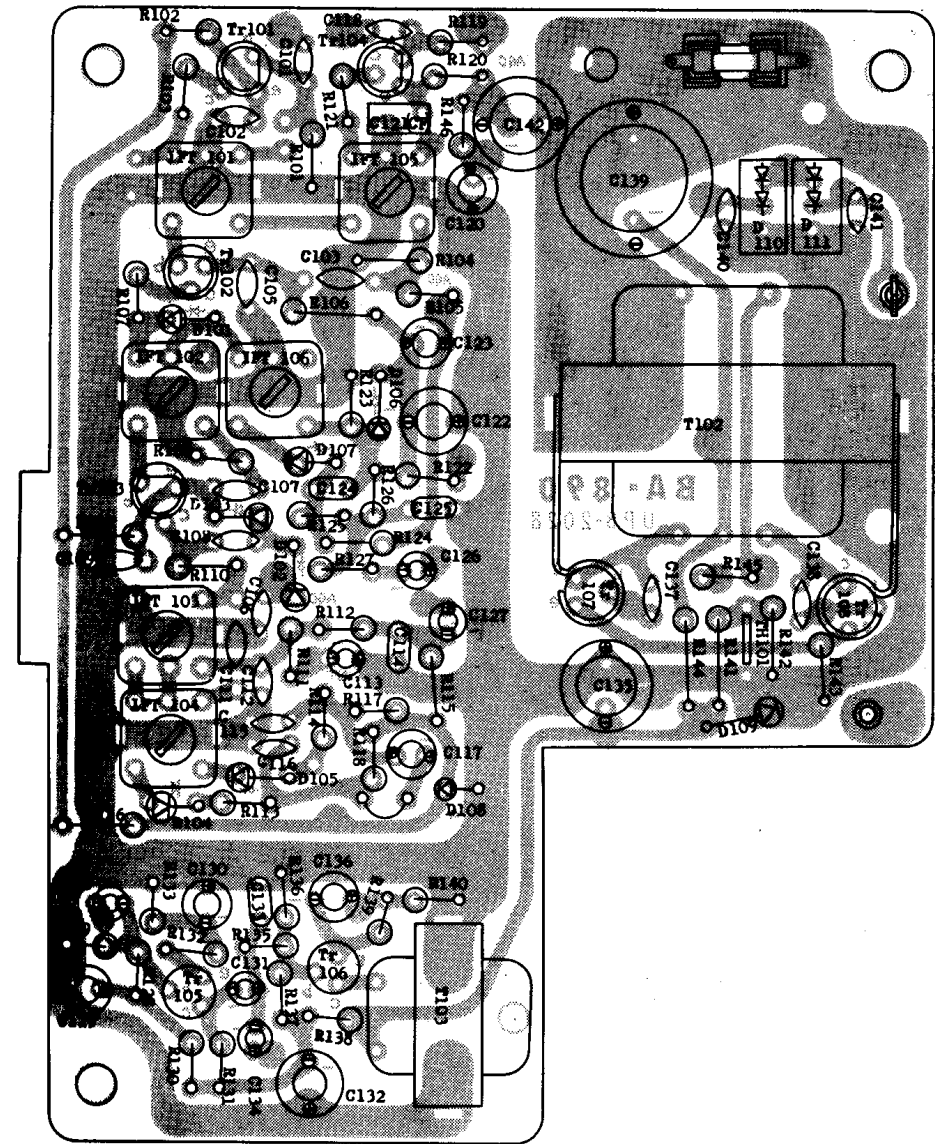


Fig. 2. Amplifier panel layout.

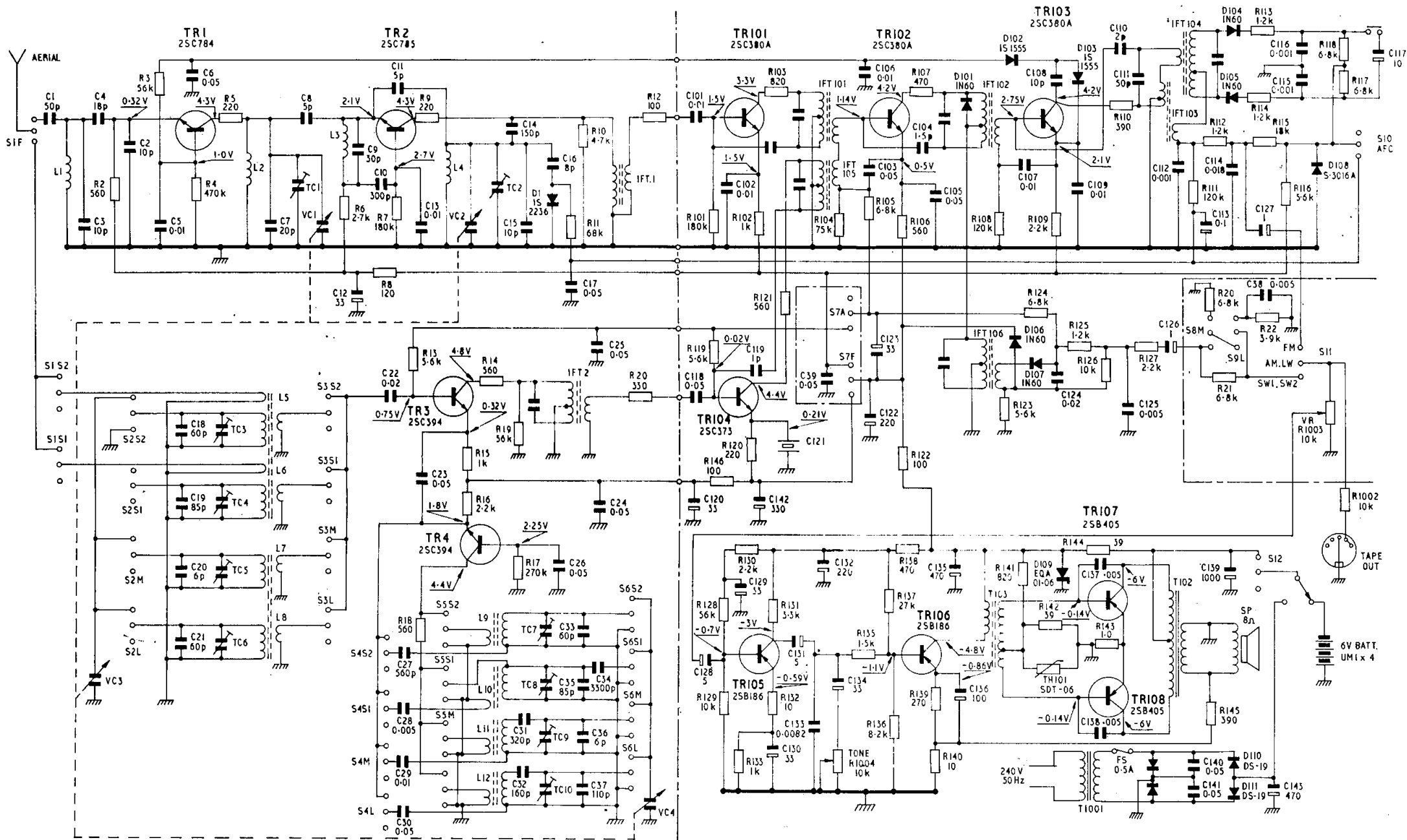


Fig. 3. Circuit diagram VTR188/BA890.

CIRCUIT ALIGNMENT

Preliminary Notes.

- (i) Equipment required.
 - (a) Sweep generator with markers at 470 kHz and 10.7 MHz.
 - (b) Oscilloscope.
 - (c) FM Signal generator to cover 87 MHz to 106 MHz.
 - (d) AM Signal generator to cover 150 kHz to 25 MHz.
 - (e) Power output meter 500mW, 8 ohms impedance.
 - (f) A coupling loop consisting of a 10 inch diameter loop of wire in series with a resistor of a value to match the output impedance of the generator.
- (ii) Set the Volume control to maximum and the Tone control to minimum unless otherwise stated. Switch off the AFC (button fully raised).
- (iii) Disconnect the loudspeaker and connect the output meter in its place.

R.F. ALIGNMENT (Volume control at maximum)

Operation	Wave-Band	Sig. Gen. Freq. (mod. 30% 400 Hz)	Tuning	Adjust for Max. Output
1	LW	145 kHz	LF end of scale	L12
2	LW	300 kHz	HF end of scale	TC10
3	LW	175 kHz	175 kHz	L8*
4	LW	250 kHz	250 kHz	TC6
5	MW	510 kHz	LF end of scale	L11
6	MW	1650 kHz	HF end of scale	TC9
7	MW	600 kHz	600 kHz	L7*
8	MW	1400 kHz	1400 kHz	TC5
9	SW1	5.6 MHz	LF end of scale	L10
10	SW1	10.5 MHz	HF end of scale	TC8
11	SW1	5.9 MHz	5.9 MHz	L6*
12	SW1	10 MHz	10 MHz	TC4
13	SW2	10 MHz	LF end of scale	L9
14	SW2	21 MHz	HF end of scale	TC7
15	SW2	11 MHz	11 MHz	L5*
16	SW2	19 MHz	19 MHz	TC3

*on ferrite rod

AM CIRCUITS

I.F. ALIGNMENT

- (a) Connect the oscilloscope across the Volume control.
- (b) Connect the Signal Generator via the coupling loop placed about 2 feet from the receiver with its plane at right angles to the ferrite rod aerial.
- (c) Switch the receiver to MW, set the pointer to approximately 300 metres and the V/C to minimum position.
- (d) Inject a modulated signal of 470 kHz and adjust IFT2, IFT105 and IFT106 for maximum output.

F.M. CIRCUITS

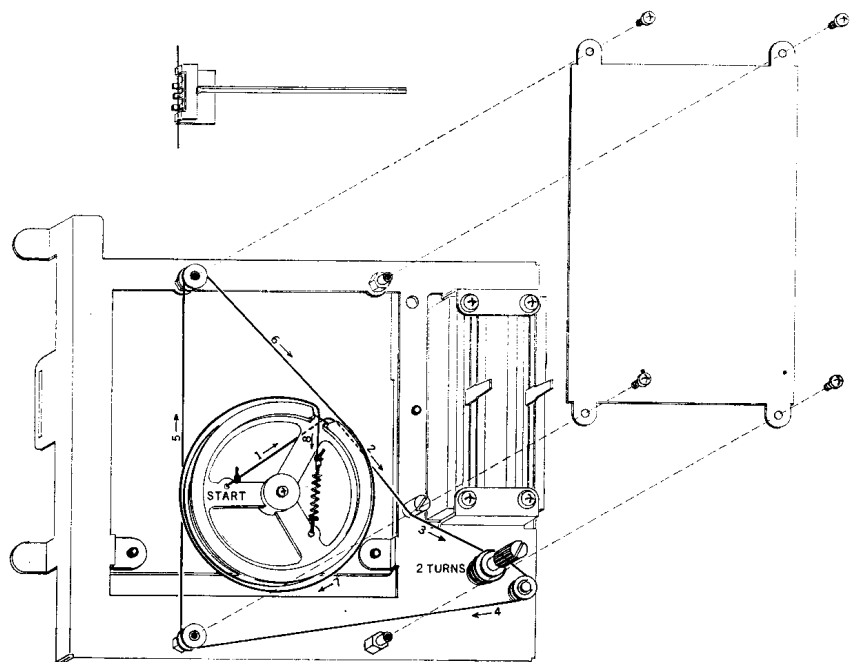
I.F. ALIGNMENT

- (a) Connect the FM Signal Generator to the aerial socket and the oscilloscope across discriminator output.
- (b) Switch to VHF, set the tuning pointer to HF end of scale and the V/C to minimum position.
- (c) Inject a modulated signal of 10.7 MHz and adjust IFT1, IFT101, IFT102 and IFT103 for a maximum symmetrical response centred at 10.7 MHz.
- (d) With the same signal applied, adjust IFT104 for optimum symmetry of "S" shaped curve centred at 10.7 MHz.
- (e) Repeat adjustments for optimum results.

R.F. ALIGNMENT (Volume control at maximum)

Operation	Wave-band	Sig. Gen. Freq. (modulated)	Tuning	Adjust for Max. Output
1	FM	87 MHz	LF end of scale	L4
2	FM	104.5 MHz	HF end of scale	TC2
3	FM	88 MHz	88 MHz	L2
4	FM	104 MHz	104 MHz	TC1
5	FM	95 MHz	95 MHz	L1

Fig. 4. Cord drive details.



PARTS LIST

ABBREVIATIONS:

CD—CERAMIC DISC. E—ELECTROLYTIC S—STYROL

SE—SOLID ELECTROLYTIC M—MYLAR

CAPACITORS

Ref.	Value (μ F) (pF)	Type	Tol. (\pm %)	Volts	Part Number
C1	50	CD	10	50	AP93402
C2	10	CD	± 25 pF	50	AP93397
C3	10	CD	± 25 pF	50	AP93397
C4	18	CD	5	50	AP93399
C5	$\cdot 01$	CD	+100/-10	50	AP93411
C6	$\cdot 05$	CD	+100/-10	50	AP93413
C7	20	CD	10	50	AP93400
C8	5	CD	± 25 pF	50	AP93394
C9	30	CD	10	50	AP93401
C10	300	CD	10	50	AP93407
C11	5	CD	± 25 pF	50	AP93394
C12	33	E		6.3	AP93426
C13	$\cdot 01$	CD	+100/-10	50	AP93411
C14	150	CD	10	50	AP93406
C15	10	CD	± 25 pF	50	AP93397
C16	8	CD	± 25 pF	50	AP93396
C17	$\cdot 05$	CD	+100/-10	50	AP93413
C18	60	CD	10	50	AP93403
C19	85	CD	10	50	AP93404
C20	6	CD	± 25 pF	50	AP93395
C21	60	CD	10	50	AP93403
C22	$\cdot 02$	CD	+100/-10	50	AP93412
C23	$\cdot 05$	CD	+100/-10	50	AP93413
C24	$\cdot 05$	CD	+100/-10	50	AP93413
C25	$\cdot 05$	CD	+100/-10	50	AP93413
C26	$\cdot 05$	CD	+100/-10	50	AP93413
C27	560	CD	10	50	
C28	$\cdot 005$	CD	20	50	AP93410
C29	$\cdot 02$	CD	+100/-10	50	AP93412
C30	$\cdot 05$	CD	+100/-10	50	AP93413
C31	320	S	5	125	AP93422
C32	160	S	5	125	AP93421
C33	60	CD	10	50	AP93403
C34	3300	S	5	125	AP93423
C35	85	CD	10	50	AP93404
C36	6	CD	± 25 pF	50	AP93395
C37	110	CD	10	50	AP93405
C38	$\cdot 005$	CD	20	50	AP93410
C39	$\cdot 05$	CD	+100/-10	50	AP93415
C101	$\cdot 01$	CD	+100/-10	50	AP93411
C102	$\cdot 01$	CD	+100/-10	50	AP93411
C103	$\cdot 05$	CD	+100/-10	50	AP93413
C104	1.5	CD	± 25 pF	50	AP93392
C105	$\cdot 05$	CD	+100/-10	50	AP93413
C106	$\cdot 01$	CD	+100/-10	50	AP93411
C107	$\cdot 01$	CD	+100/-10	50	AP93411
C108	10	CD	± 25 pF	50	AP93397
C109	$\cdot 01$	CD	± 100 /-10	50	AP93411
C110	2	CD	± 25 pF	50	AP93393
C111	50	CD	10	50	AP93402
C112	$\cdot 001$	CD	20	50	AP93408
C113	$\cdot 1$	SE		6.3	AP93418
C114	$\cdot 018$	M	10	50	AP93416
C115	$\cdot 001$	CD	20	50	AP93408
C116	$\cdot 001$	CD	20	50	AP93408
C117	10	E		6.3	AP93425
C118	$\cdot 05$	CD	+100/-10	50	AP93413
C119	2	CD	± 25 pF	50	AP93393
C120	33	E		6.3	AP93426
C121	Ceramic Filter				AP93336—470 kHz.
C122	220	E		6.3	AP93428

CAPACITORS—continued

Ref.	Value (μ F) (pF)	Type	Tol. (\pm %)	Volts	Part Number
C123	33	E		6.3	AP93426
C124	$\cdot 02$	M	10	50	AP93417
C125	$\cdot 005$	M	10	50	AP93414
C126	1	SE		6.3	AP93420
C127	1	SE		6.3	AP93420
C128	5	E		6.3	AP93424
C129	33	E		6.3	AP93426
C130	33	E		6.3	AP93426
C131	5	E		6.3	AP93424
C132	220	E		6.3	AP93428
C133	$\cdot 0082$	M	10	6.3	AP93415
C134	$\cdot 33$	SE		6.3	AP93419
C135	470	E		10	AP93430
C136	100	E		6.3	AP93427
C137	$\cdot 005$	CD	20	50	AP93410
C138	$\cdot 005$	CD	20	50	AP93410
C139	1000	E			AP93431
C140	$\cdot 05$	CD	+100/-10	50	AP93413
C141	$\cdot 05$	CD	+100/-10	50	AP93413
C142	330	E		6.3	AP93429
C143	470	E		10	AP93430
VC1-4					Tuning capacitor
TC3, 4, 7, 8					Trimmers
TC6, 10					Trimmers
					AP93340
					AP93341

RESISTORS

Ref.	Value (ohms)	Type	Tol. (\pm %)	Rating (watts)	Part Number
R1	1	Carbon Film	10	$\frac{1}{4}$	AP93359
R2	560	"	10	$\frac{1}{4}$	AP93368
R3	56k	"	10	$\frac{1}{4}$	AP93384
R4	470k	"	10	$\frac{1}{4}$	AP93391
R5	220	"	10	$\frac{1}{4}$	AP93364
R6	2.7k	"	10	$\frac{1}{4}$	AP93374
R7	180k	"	10	$\frac{1}{4}$	AP93389
R8	120	"	10	$\frac{1}{4}$	AP93363
R9	220	"	10	$\frac{1}{4}$	AP93364
R10	4.7k	"	10	$\frac{1}{4}$	AP93377
R11	68k	"	10	$\frac{1}{4}$	AP93385
R12	100	"	10	$\frac{1}{4}$	AP93362
R13	5.6k	"	10	$\frac{1}{4}$	AP93378
R14	560	"	10	$\frac{1}{4}$	AP93368
R15	1k	"	10	$\frac{1}{4}$	AP93370
R16	2.2k	"	10	$\frac{1}{4}$	AP93373
R17	270k	"	10	$\frac{1}{4}$	AP93390
R18	560	"	10	$\frac{1}{4}$	AP93368
R19	56k	"	10	$\frac{1}{4}$	AP93384
R20	6.8k	"	10	$\frac{1}{4}$	AP93379
R21	6.8k	"	10	$\frac{1}{4}$	AP93379
R22	3.9k	"	10	$\frac{1}{4}$	AP93376
R101	180k	"	10	$\frac{1}{4}$	AP93389
R102	1k	"	10	$\frac{1}{4}$	AP93370
R103	820	"	10	$\frac{1}{4}$	AP93369
R104	75k	"	10	$\frac{1}{4}$	AP93386
R105	6.8k	"	10	$\frac{1}{4}$	AP93379
R106	560	"	10	$\frac{1}{4}$	AP93368
R107	470	"	10	$\frac{1}{4}$	AP93367

RESISTORS—continued

Ref.	Value (ohms)	Type	Tol. (±%)	Rating (watts)	Part Number
R108	120k	Carbon Film	10	1/4	AP93387
R109	2.2k	"	10	1/4	AP93373
R110	390	"	10	1/4	AP93366
R111	120k	"	10	1/4	AP93387
R112	1.2k	"	10	1/4	AP93371
R113	1.2k	"	10	1/4	AP93371
R114	1.2k	"	10	1/4	AP93371
R115	18k	"	10	1/4	AP93382
R116	5.6k	"	10	1/4	AP93378
R117	6.8k	"	10	1/4	AP93379
R118	6.8k	"	10	1/4	AP93379
R119	5.6k	"	10	1/4	AP93378
R120	220	"	10	1/4	AP93364
R121	560	"	10	1/4	AP93368
R122	100	"	10	1/4	AP93362
R123	5.6k	"	10	1/4	AP93378
R124	6.8k	"	10	1/4	AP93379
R125	1.2k	"	10	1/4	AP93371
R126	10k	"	10	1/4	AP93381
R127	2.2k	"	10	1/4	AP93373
R128	56k	"	10	1/4	AP93384
R129	10k	"	10	1/4	AP93381
R130	2.2k	"	10	1/4	AP93373
R131	3.3k	"	10	1/4	AP93375
R132	10	"	10	1/4	AP93360
R133	1k	"	10	1/4	AP93370
R134	—	—	—	—	—
R135	1.5k	"	10	1/4	AP93372
R136	8.2k	"	10	1/4	AP93380
R137	27k	"	10	1/4	AP93383
R138	470	"	10	1/4	AP93367
R139	270	"	10	1/4	AP93365
R140	10	"	10	1/4	AP93360
R141	820	"	10	1/4	AP93369
R142	39	"	10	1/4	AP93361
R143	1	"	10	1/4	AP93359
R144	39	"	10	1/4	AP93361
R145	390	"	10	1/4	AP93366
R146	100k	"	10	1/4	AP93362
R1001	150k	"	10	1/4	AP93388
R1002	10k	"	10	1/4	AP93381
R1003	10k	Volume			AP93316
R1004	10k	Tone			AP93316

THERMISTOR

Ref.	Type	Part Number
TH101	SDT-06	AP93346

TRANSFORMERS AND INDUCTORS

Ref.	Function	Part Number
L1	F.M. Aerial Coil	AP93322
L2	F.M. R.F. Coil	AP93323
L3	F.M. FBC. Coil	AP93324
L4	F.M. Oscillator Coil	AP93325
L5/L6	SW1/SW2 Ferrite Aerial Assy.	AP93327
L7/L8	MW/LW Ferrite Aerial Assy.	AP93326
L9	SW2 Oscillator Coil	AP93331
L10	SW1 Oscillator Coil	AP93330
L11	MW Oscillator Coil. Brown	AP93329
L12	LW Oscillator Coil. Black	AP93328
IFT1	F.M. IFT A. Mauve	AP93332
IFT2	A.M. IFT A. Orange	AP93337
IFT101	F.M. IFT B. Orange	AP93333
IFT102	F.M. IFT C. Orange	AP93333
IFT103	F.M. IFT D. Pink	AP93334
IFT104	F.M. IFT E. Black	AP93335
IFT105	A.M. IFT B. Yellow	AP93338
IFT106	A.M. IFT D. Black	AP93339
T102	Output Transformer	AP93320
T103	Driver Transformer	AP93321
T1001	Mains Transformer	AP93319

TRANSISTORS

Ref.	Type	Part Number
TR1	2SC784-0	AP91036
TR2	2SC785-0	AP93342
TR3	2SC394-Y	AP92245
TR4	2SC394-Y	AP92245
TR101	2SC380A-0	AP91038
TR102	2SC380A-0	AP91038
TR103	2SC380A-R	AP91040
TR104	2SC373	AP93343
TR105	2SB186A	AP93344
TR106	2SB186A	AP93344
TR107	2SB405	AP93345
TR108	2SB405	AP93345

DIODES

Ref.	Type	Part Number
D1	IS2236	AP93347
D101	IN60	AP92249
D102	IS1555V	AP93348
D103	IS1555V	AP93348
D104	IN60-FM	AP93349
D105	IN60-FM	AP93349
D106	S3016-R	AP93350
D107	IN60	AP92249
D108	S3016-R	AP93350
D109	EQA01-06R	AP93351
D110	DS(L)-19	AP93318
D111	DS(L)-19	AP93318

CABINET

Title	Description	Part Number	Title	Description	Part Number
Aerial	telescopic	AP93311	Knob	tuning	VTR188 AP93528
Cabinet front assembly		BA890 AP93461	Knob	Volume and Tone controls	BA890 AP93451
Cabinet front assembly		VTR188 AP93536	Knob	Volume and Tone controls	VTR188 AP93529
Cabinet back assembly		BA890 AP93533	Knob	Push Button—Grey (6)	BA890 AP93449
Cabinet back assembly		VTR188 AP93537	Knob	Push Button—ON/OFF	VTR188 AP93521
Dial Scale		AP93442	Knob	Push Button—Red. ON/OFF	BA890 AP93448
Drive Drum	tuning	AP93492	Knob	Push Button—(6)	VTR188 AP93522
Drive Drum	spring	AP93494	Loudspeaker		AP93317
Fuse	0.5 amp.	AP93354	Pointer		VTR188 AP93520
Fuseholder		AP93353	Pointer		BA890 AP93447
Knob	tuning	BA890 AP93450	Push Button	Switch Assy.	AP93310