

**B385 & B485**

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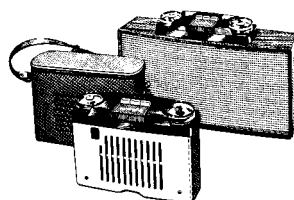
# **MURPHY SERVICE MANUAL**

*Issued by*

**MURPHY RADIO LTD  
WELWYN GARDEN CITY · HERTS**

**Telephone: WELWYN GARDEN 23434**

## THE B385 & B485 RECEIVERS



B385 & B1



B485

### SPECIFICATION

BATTERY SUPPLY:		12 volts (two 6 volt batteries)
CONSUMPTION:		22mA at moderate volume
WAVE-RANGES:	M:	187-560 metres
	L:	1100-1900 metres
INTERMEDIATE FREQUENCY:		470 kc/s
TRANSISTORS:		Two PXA102, two PXA101, PXB103, PXC131
CRYSTAL DIODE:		CG64H or XD202
LOUDSPEAKER:		5 in. dia., permanent magnet, 25 ohms impedance
OVERALL DIMENSIONS:	In carrying case:	7¼ in. high, 10 1/8 in. wide, 3½ in. deep
	In B1 baffle cabinet:	10 5/8 in. high, 17 5/8 in. wide, 4¼ in. deep
WEIGHT:	In carrying case:	5½ lb., including batteries
	In B1 baffle cabinet:	12 lb., including all batteries
RELEASED:	B385:	September, 1959
	B1:	September, 1959
	B485:	February, 1961
PRICE:	B385:	£16. 12s. 10d. plus P.T.
	B1:	£3. 19s. 3d. plus P.T.
	B485:	£16. 12s. 10d. plus P.T.

## INTRODUCTION

The B485 receiver is a slightly modified version of the B385. The differences lie in the aerial and battery supply circuits, and in the design of the front and rear portions of the cabinet. In addition the B385 has conventional aerial and earth sockets, while the B485

has a socket to take a standard car aerial plug.

The B1 Baffle Cabinet is for use with the B385 only. It contains extra long-life batteries which are automatically connected to the receiver when it is lowered into the cabinet.

## SERVICING PRECAUTIONS

Replacement transistors must be of the correct type as shown on the circuit diagram. TR6 and TR7 (PXC131) are a matched pair and must not be separated; in the event of one of them becoming defective, both must be replaced by a new pair.

Transistor leads should not be bent at the point where they emerge from the seal and, while they are being soldered, the joint should be made as quickly as possible. Where a satisfactory joint cannot be made quickly, or the lead is shorter than about  $\frac{1}{4}$  in., a heat shunt (such as a clean pair of pliers) should grip the bare wire between the point of soldering and the transistor. It is also important to see that either the soldering iron is correctly earthed or that the chassis is not earthed, otherwise leakage currents may damage the transistors.

When measuring the d.c. resistance of components and transformer windings, always disconnect one end to avoid damaging the transistors in the circuit. The

electrolytic capacitors in this receiver are of the low voltage working type (e.g. C17, 3V d.c.) and care must be taken to see that the voltage of the batteries in the meter does not exceed that of the capacitors. Remember, also, that the negative terminal of most multi-range meters must be connected to the positive side of the electrolytic capacitors, to avoid a reversed voltage.

**SIGNAL GENERATOR CONNECTIONS.** Before connecting a signal generator to the receiver, make sure that either its case and output leads are properly earthed or that the receiver chassis is not earthed; otherwise random leakage currents may damage the transistors. In addition, when connecting a signal generator to intermediate points in the circuit, a 0.25uF (approximately) blocking capacitor should be connected in series with the live lead from the signal generator; otherwise the transistor bias circuits would be upset by the low resistance path through the signal generator.

## GENERAL NOTES

**ACCESSIBILITY.** To gain access to the inside of the receiver proceed as follows: Remove the large fixing screw (B385) or release the clip (B485) from the bottom of the cabinet, and ease off the back by an outwards and downwards movement. The front cover can then be removed by taking out the two small screws at the front.

To remove the top moulding, pull off the two large knobs and the tuning pointer, and remove the screw under each end of the moulding. When refitting the tuning pointer, position it just clear of the scale, and so that when the ganged capacitor is at maximum capacitance the pointer is parallel with the line across the centre of the scale.

**THE B1 BAFFLE CABINET.** This is a cabinet into which the B385 can be fitted for home use. It contains batteries of extra large capacity which are automatically connected to the receiver via contacts 1A, 2A, and 3A when the receiver is lowered into the

cabinet. Contacts 1A and 2A also operate switches which disconnect the internal batteries of the receiver.

When no internal batteries are fitted in the receiver, and it is used in the B1 baffle cabinet, the internal battery connectors must be tucked inside the battery containers against the side walls, and must not be clipped together.

To remove the back of the B1, take out the two back fixing screws, lift the back slightly, and withdraw the bottom edge first.

**OUTPUT STAGE CURRENT.** To balance the quiescent currents in the output transistors, the bias on the bases of TR6 and TR7 is made adjustable. If TR6 and TR7 or any of the associated components are changed, the quiescent current must be checked and if necessary adjusted as follows:

Switch Off the receiver and turn the Volume control to minimum. Connect a milliammeter (10mA f.s.d.) in series with TR6 collector (+ve lead to collector), switch On the receiver, and adjust R42 slider to give

a reading of 1.5mA. Switch Off the receiver, remove the meter, and reconnect TR6 collector. Repeat this procedure for TR7 and adjust R46 also for 1.5mA.

The setting of 1.5mA is correct when the room temperature is 68°F. If the temperature is much different, then the appropriate setting should be selected from the following figures: 1.3mA at 59°F, 1.75mA at 77°F, 2.0mA at 86°F. If the current is observed to increase slowly after the initial setting, instead of remaining steady, then TR6 and TR7 should be replaced (assuming that they are not being heated by any other source).

**TRANSISTOR REPLACEMENTS.** Transistors which qualify for free replacement within the terms of the manufacturer's

guarantee, must be returned to the manufacturer and not to Murphy Radio.

**BATTERY REPLACEMENTS.** Two 6 volt dry batteries are required for the receiver and the B1 baffle cabinet.

Suitable types are as follows:

	RECEIVER	B1 CABINET
Ever Ready:	PP1	PP8
Siemax:	TR1	TR8
Drydex:	DT1	DT8
G. E. C:	BB21	BB28
Vidor:	V6001	V6008

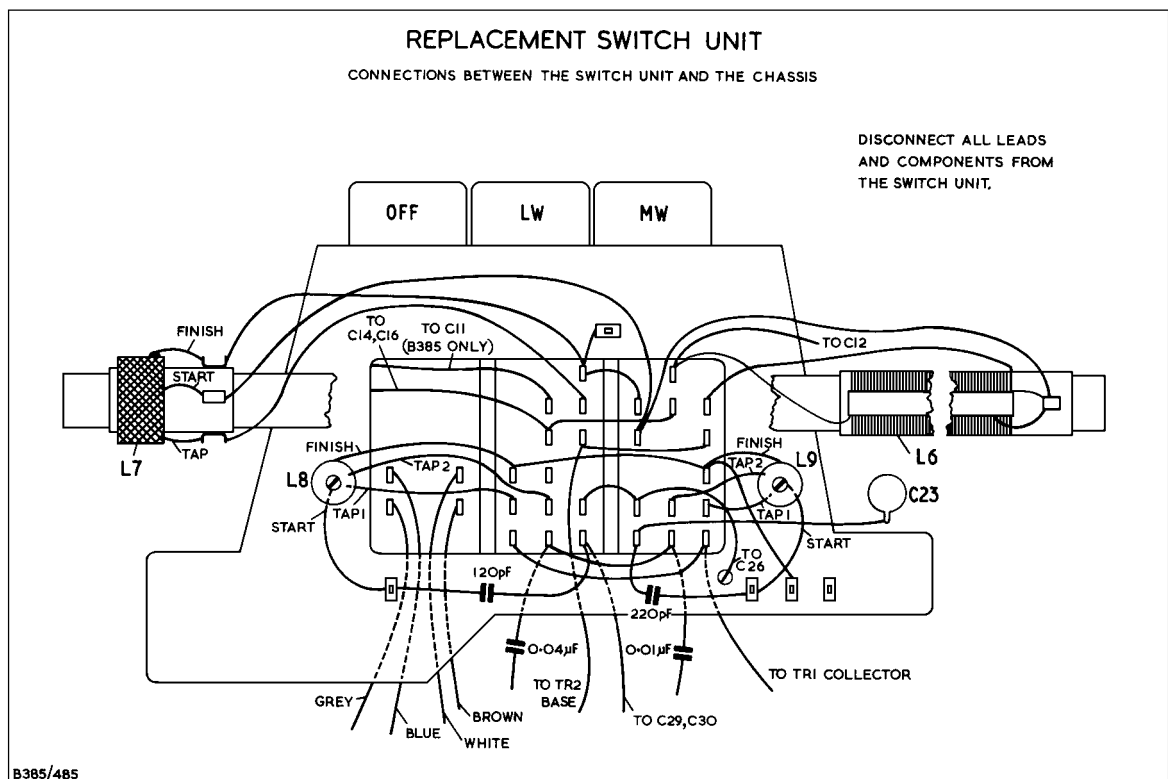


Fig. 1.

## MODIFICATIONS

**DETECTOR DIODE (B385).** Early sets were fitted with a type CG12E diode. Later sets have a type CG64H or XD202; both are direct replacements for the early type.

**I.F. DECOUPLING (B385).** Capacitor C51, 0.04μF, was not fitted to early receivers.

# CIRCUIT ALIGNMENT

Before attempting alignment, read carefully the Servicing Precautions notes, in particular the section headed "Signal Generator Connections".

**TRIMMING TOOL.** A special narrow bladed tool (Part No. 76539, price 1/- net) is required for adjusting the coil cores; it is obtainable from Murphy Radio Ltd, Service Department.

**RECEIVER OUTPUT.** With the Volume control at maximum, the output must be kept at or below 25mW (0.8V across the loudspeaker speech coil) by suitable adjustment of the signal generator attenuator.

**CORE POSITIONS.** When aligning the i.f. ts., the correct peak is the one obtained with the core nearest to the chassis. With the oscillator coils the correct peak is the one obtained with the core nearest to the open end of the coil former.

**POINTER SETTING.** With the ganged capacitor at maximum capacitance, the pointer must be parallel with the line across the centre of the dial. During alignment the pointer must register with the small dots that correspond with the alignment frequencies.

**RECEIVER OSCILLATOR FREQUENCY.** This is above the signal frequency on both wave-ranges.

**AERIAL COUPLING COIL.** This can consist of about 20 turns of wire wound on a 6 in. dia. former, placed about 1 ft. away from the receiver, and with its axis in line with the aerial rod.

**AERIAL COILS.** Only replacement aerial coils need to be adjusted. Start by setting the ends of the coil formers approximately  $\frac{1}{8}$  in. from the adjacent face of the moulded support, then adjust the position of the M coil (L5, L6) for maximum output at 600 kc/s (500m), and adjust the L coil (L7) for maximum output at 176.5 kc/s (1700m.). Check the settings of the aerial trimmers (C13 and C14) at 1,364 kc/s (220m.) and 230.8 kc/s (1300m.) respectively. Repeat all these adjustments until there is no further improvement.

When connected in the correct phase, the approximate distance between the end of the coil former and the adjacent face of the moulded support, should be  $\frac{1}{2}$  in. for L6, and 1 in. for L7. Finally, secure the coils to the aerial rod with cellulose cement.

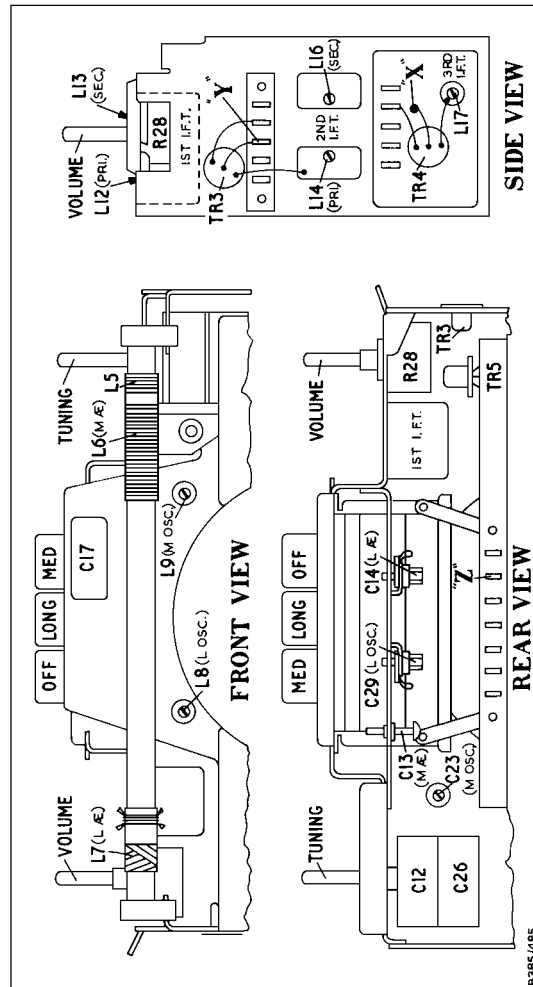


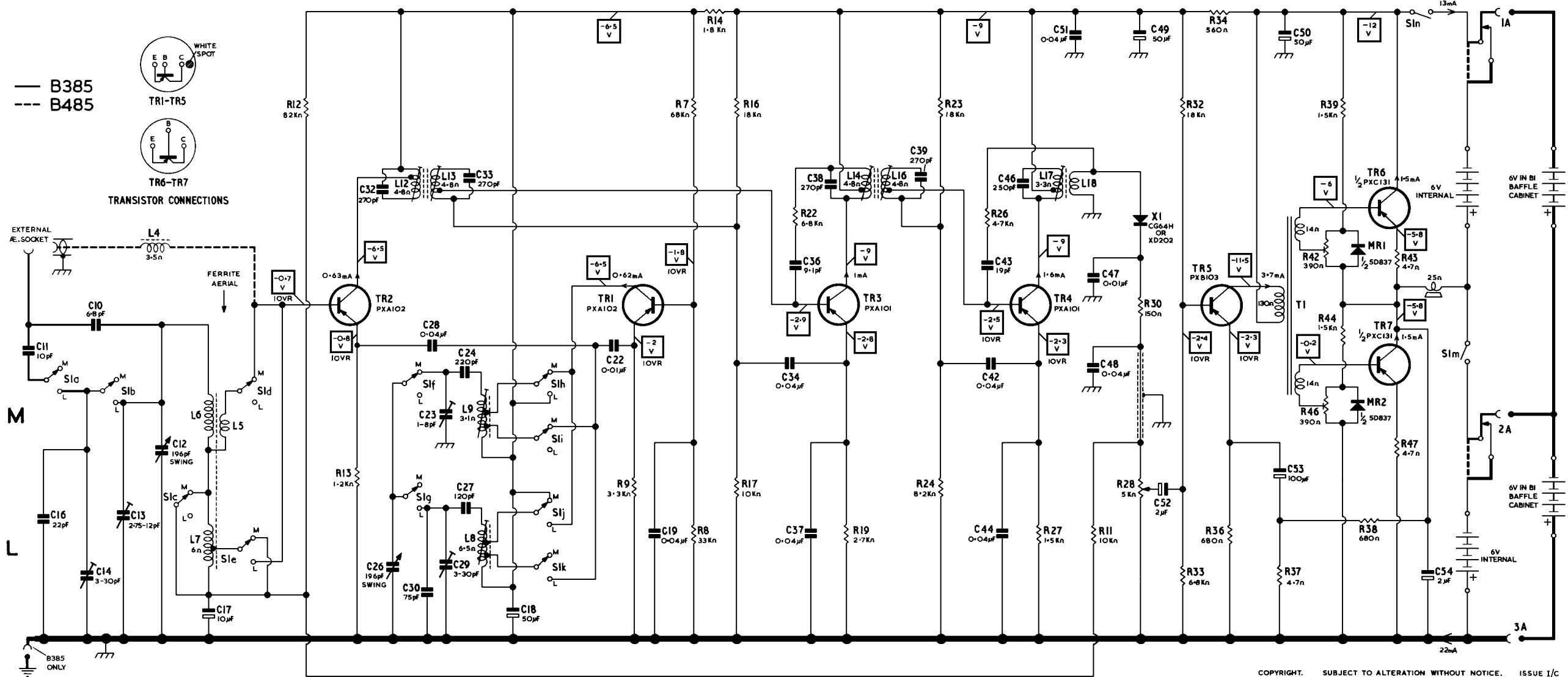
Fig. 2. Trimmer positions and connecting points

## CIRCUIT ALIGNMENT TABLE

CIRCUIT	NOTES	SIG. GEN. SETTING	SIG. GEN. TERMINATION	SIG. GEN. CONNECTION	RECEIVER SETTING	ADJUSTMENTS
3rd i. f. t.	Switch to M band	470 kc/s	Via 0.25µF capacitor	TR4 base (point "X")	Ganged capacitor at minimum	L17 (pri.) chassis side
2nd i. f. t.	As above	As above	As above	TR3 base (point "Y")	As above	L16 (sec.) chassis side L14 (pri.) chassis side
1st i. f. t.	As above and remove top moulding	As above	As above	TR2 base (point "Z")	As above	L13 (sec.) chassis top L12 (pri.) chassis top
M	Replace top moulding and repeat these adjustments until there is no further improvement	600 kc/s	Direct	Via coupling coil	500m. dot	L9 (osc.) chassis front
		1364 kc/s	As above	As above	220m. dot	C23 (osc.) chassis rear C13 (ae.) chassis rear
L	As above	176.5 kc/s	As above	As above	1700m. dot	L8 (osc.) chassis front
		230.8 kc/s	As above	As above	1300m. dot	C29 (osc.) chassis rear C14 (ae.) chassis rear

C	11 16	10 14	13	12	17	32 26	30	23 28	24 29	33 27	18	22	19	34	36 37	38	39	44	42	43 46	51	47 48	49	52	53	50	54	C		
L	4				6 7	5	12	13	8 9				14	16	17				18											L
R					12				13					7	14	16	22	23	26	30				32	34	42 46	39 44	38	43 47	R
MISC.	Sl <sub>a</sub>	Sl <sub>b</sub>	Sl <sub>c</sub>	Sl <sub>d</sub>	TR2				Sl <sub>f</sub> Sl <sub>g</sub>	Sl <sub>h</sub> Sl <sub>j</sub>	Sl <sub>i</sub> Sl <sub>k</sub>	TR1	TR3				TR4				X1	TR5		TR1	MR1 MR2	TR6 TR7	Sl <sub>n</sub> Sl <sub>m</sub>	2A 1A 3A	MISC.	

B385 & B485



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The wave-range switch is shown in the M position, and the d.c. resistance of the coils is omitted where the value is less than one ohm. Voltage and current readings were taken under no-signal conditions with the receiver switched to the M range and the

Volume control at minimum, using a 20K $\Omega$ /V meter. Where the meter range seriously affects the voltage readings, the range (e.g. 10VR) is indicated beside the squares concerned. The room temperature was about 68 $^{\circ}$ F.

Fig. 3.

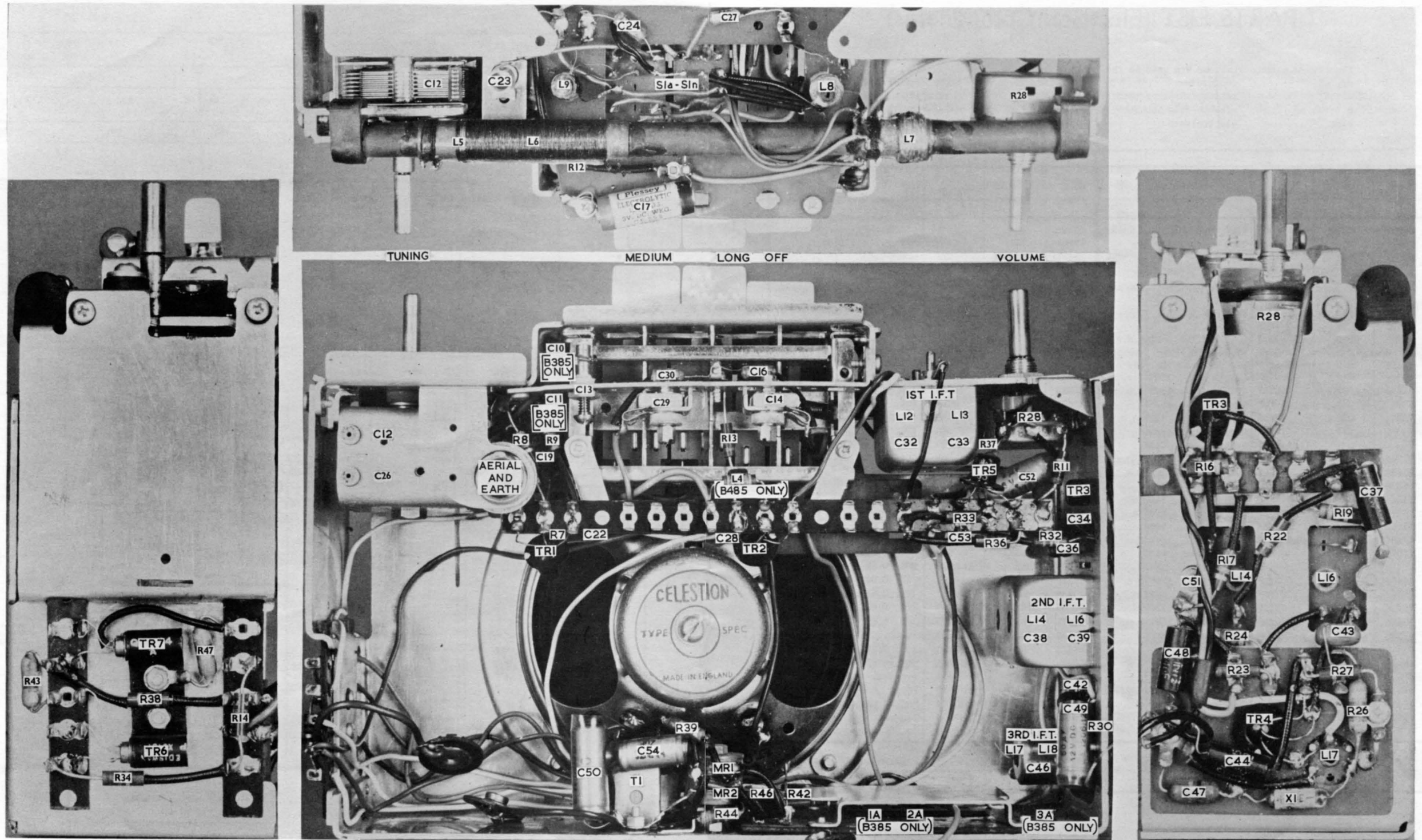


Fig. 4. The receiver chassis.



# PARTS LIST (Electrical Components)

The following abbreviations are used in the table:

cer.	-	ceramic	V d.c.	-	d.c. voltage rating
m. tub.	-	metallized paper tubular	W	-	wattage rating
p.f. tub.	-	plastic film tubular	log.	-	logarithmic law
elec.	-	electrolytic			

PART NO.	CIRCUIT NO.	VALUE	TOLERANCE AND REMARKS	PART NO.	CIRCUIT NO.	VALUE	TOLERANCE AND REMARKS
66155	C10	6.8pF	±2pF, cer., N750, 750V d.c., B385 only	75428	C50	50µF	+100% -20%, elec., 12V d.c.
66157	C11	10pF	±2pF, cer., N750, 750V d.c., B385 only	49454	C51	0.04µF	20%, m. tub., 150V d.c.
82935	C12	196pF	Ganged capacitor, ae. section, with C26	75427	C52	2µF	+100% -20%, elec., 6V d.c.
63323	C13	2.75-12pF	Trimmer, M. ae.	75427	C54	2µF	+100% -20%, elec., 6V d.c.
56328	C14	3-30pF	Trimmer, L. ae.				
84258	C16	22pF	10%, p.f. tub., 125V d.c.	25643	R7	68KΩ	10%, 0.6W
75429	C17	10µF	+100% -20%, elec., 3V d.c.	25515	R8	33KΩ	10%, 0.6W
75428	C18	50µF	+100% -20%, elec., 12V d.c.	25131	R9	3.3KΩ	10%, 0.6W
49454	C19	0.04µF	20%, m. tub., 150V d.c.	25323	R11	10KΩ	10%, 0.6W
57815	C22	0.01µF	20%, m. tub., 150V d.c.	25675	R12	82KΩ	10%, 0.6W
63322	C23	1-8pF	Trimmer, M. osc.	24971	R13	1.2KΩ	10%, 0.6W
75244	C24	220pF	1%, p.f. tub., 125V d.c.	25035	R14	1.8KΩ	10%, 0.6W
82935	C26	196pF	Ganged capacitor, osc. section, with C12	25419	R16	18KΩ	10%, 0.6W
75245	C27	120pF	1.5%, p.f. tub., 125V d.c.	25323	R17	10KΩ	10%, 0.6W
49454	C28	0.04µF	20%, m. tub., 150V d.c.	25099	R19	2.7KΩ	10%, 0.6W
56328	C29	3-30pF	Trimmer, L. osc.	25259	R22	6.8KΩ	10%, 0.6W
84222	C30	75pF	5%, p.f. tub., 125V d.c.	25419	R23	18KΩ	10%, 0.6W
75248	C32	270pF	2%, p.f. tub., 125V d.c.	25291	R24	8.2KΩ	10%, 0.6W
75248	C33	270pF	2%, p.f. tub., 125V d.c.	25195	R26	4.7KΩ	10%, 0.6W
49454	C34	0.04µF	20%, m. tub., 150V d.c.	25003	R27	1.5KΩ	10%, 0.6W
47079	C36	9.1pF	±0.1pF, cer., P100, 500V d.c.	68581	R28	5KΩ	Volume control, log.
49454	C37	0.04µF	20%, m. tub., 150V d.c.	26731	R30	150Ω	20%, 0.6W
75248	C38	270pF	2%, p.f. tub., 125V d.c.	25419	R32	18KΩ	10%, 0.6W
75248	C39	270pF	2%, p.f. tub., 125V d.c.	25259	R33	6.8KΩ	10%, 0.6W
49454	C42	0.04µF	20%, m. tub., 150V d.c.	24843	R34	560Ω	10%, 0.6W
47080	C43	19pF	2.5%, cer., N750, 500V d.c.	24875	R36	680Ω	10%, 0.6W
49454	C44	0.04µF	20%, m. tub., 150V d.c.	28600	R37	4.7Ω	±0.5Ω 0.6W
-	C46	250pF	with L17/L18	24875	R38	680Ω	10%, 0.6W
57815	C47	0.01µF	20%, m. tub., 150V d.c.	24998	R39	1.5KΩ	10%, 0.6W
49454	C48	0.04µF	20%, m. tub., 150V d.c.	77942	R42	390Ω	Pre-set, TR6 bias
75428	C49	50µF	+100% -20%, elec., 12V d.c.	28600	R43	4.7Ω	±0.5Ω 0.6W
				24998	R44	1.5KΩ	10%, 0.6W
				77942	R46	390Ω	Pre-set, TR7 bias
				28600	R47	4.7Ω	±0.5Ω 0.6W
PART NO.	CIRCUIT NO.	DESCRIPTION AND REMARKS		PART NO.	CIRCUIT NO.	DESCRIPTION AND REMARKS	
87647	L4	Aerial choke, B485 only		82890	{ L14 L16 }	2nd i.f.t., complete	
84403	L6	M ae., coil only		83051	{ L17 L18 }	3rd i.f.t., complete	
84405	L7	L ae., coil only		82931	T1	Drive transformer	
82887	L8	L osc.					
82888	L9	M osc.					
82889	{ L12 L13 }	1st i.f.t., complete					

# PARTS LIST (Mechanical Components)

This list contains only those parts which are not included in the Electrical Parts List; items such as self-tapping screws, bolts and nuts, etc., may be obtained from Murphy Radio Ltd, Service Department. When more than one item is used per receiver, the quantity is given in brackets after the title.

PART NO.	TITLE	DESCRIPTION AND REMARKS	PART NO.	TITLE	DESCRIPTION AND REMARKS
<b>CABINET</b>			<b>CHASSIS (Cont.)</b>		
83939	Back	for B1 cabinet	84452	Insulator	right-hand battery box
83234	Cabinet, B1	less back	78525	Loudspeaker	5 in. dia., permanent magnet, 25Ω impedance
89034	Clip, captive	cover retainer, B485 only	84439	Plug (2)	press-stud battery connector
85927	Cover, front } 85928 Cover, rear }	B385 only	87427	Push-on-Fix	for car ae. socket, B485 only
92835	Cover, front }	B485 only	58543	Rectifier MR1 and MR2	Westinghouse type 5D837
92836	Cover, rear }		87583	Socket	for car ae., B485 only
83116	Disc	"Volume"	84438	Socket clip (2)	press-stud battery connector
82944	Disc	tuning scale	82572	Spacer (3)	for ganged capacitor mounting
85581	Panel and leads	in B1, for battery contacts	82934	Switch	push-button, unwired
86071	Panel, control	top moulding with all fittings	<b>KNOBS AND POINTER</b>		
82939	Plate, decorative	"Murphy" for control panel	74328	Circlip (4)	for Volume and Tuning control knobs
82941	Plate, printed	"B485" for front cover	82950	Clip, retaining	for pointer
83251	Screw	cover retainer, B385 only	85788	Knob (2)	for Volume and Tuning controls
<b>CHASSIS</b>			91691	Knob (3)	for push-button switch
85094	Bracket	with ae. panel and sockets, B385 only	82946	Pointer	less clip 82950
85101	Contact panel	assembly, B385 only	<b>MISCELLANEOUS</b>		
71053	Core (6)	for L8, L9, L12, L13, L14, L16	73480	Bag, polythene (2)	for battery
85930	Core	for L17	82967	Case, carrying	B385 only
63556	Ferrite rod	for internal ae., less coils	88812	Case, carrying	B485 only
42879	Grommet (3)	for ganged capacitor mounting	58786	Plug	car ae., B485 only
82875	Grommet (2)	support for ferrite rod			
84451	Insulator	left-hand battery box			

# THE B385 & B485 RECEIVERS

After publication of the Service Manual covering the B385 and B485 receivers, the following changes were made to the B485 receiver only.

**ALTERNATIVE COLOUR SCHEMES.** The front and rear of the cabinet, the top moulding, the tuning pointer, and various metal trims (including the tuning scale and Volume discs), are now available in alternative colour groupings as indicated below:

1. Beige (Khaki) front and rear, Green top, Red pointer, and Gold trims.

2. Grey front and rear, Green top, Red pointer, and Gold trims.

3. Primrose front and rear, Black top, Black pointer, and Silver trims.

The parts list in the Service Manual covers the first grouping but, for completeness, the alternative items from all three groupings are included in the following list.

PART NO.	TITLE	DESCRIPTION AND REMARKS	PART NO.	TITLE	DESCRIPTION AND REMARKS
<b>CABINET</b>			<b>CABINET (contd.)</b>		
92835	Cover, front	Beige (Khaki)	92093	Plate, decorative	Silver, "Murphy" for top moulding
94136	Cover, front	Grey	82941	Plate, printed	Gold, "B485" for front cover
94132	Cover, front	Primrose	92095	Plate, printed	Silver, "B485" for front cover
92836	Cover, rear	Beige (Khaki)	<b>KNOBS AND POINTER</b>		
94137	Cover, rear	Grey	85788	Knob (2)	with Gold trim, for Volume and Tuning controls
94133	Cover, rear	Primrose	91707	Knob (2)	with Silver trim, for Volume and Tuning controls
82944	Disc	Gold, tuning scale	82947	Pointer	Black, less clip (82950)
92097	Disc	Silver, tuning scale	82946	Pointer	Red, less clip (82950)
83116	Disc	Gold, Volume			
92096	Disc	Silver, Volume			
94134	Panel, control	Black with Silver trim, top moulding with all fittings			
86071	Panel, control	Green with Gold trim, top moulding with all fittings			
82939	Plate, decorative	Gold, "Murphy" for top moulding			

**TRANSISTOR TYPES.** At an intermediate stage during the manufacturing run of the B485, the frequency changer (TR2) was changed to a Mullard type AF117. This was to improve slightly the performance of the receiver, and no circuit changes were required other than the addition of an earthing lead for the case of the transistor.

At a later stage, when manufacture of the remaining Ediswan transistors ceased, Mullard types were substituted throughout. No circuit changes were required in the a.f. sections but, to obtain optimum performance in the i.f. amplifier, the i.f. transformers and neutralizing circuits were changed. Receivers fitted with Mullard transistors throughout, can be identified by the label underneath the chassis which shows the model number as "B485T", and by the clip holding the output transistors (TR6 and TR7) which is now nickel plated instead of Black.

The transistors, i.f. transformers, and neutralizing components are now as follows:

TR1	: OC44	TR5	: OC81D
TR2	: AF117	TR6	: OC81
TR3	: OC45	TR7	: OC81
TR4	: OC45	X1	: OA90

Clip for TR6 and TR7 : Part No. 96133

1st i.f.t. (L12 and L13) : Part No. 96492

2nd i.f.t. (L14 and L16) : Part No. 96490

3rd i.f.t. (L17 and L18) : Part No. 96491

C36 : 4.7pF,  $\pm 0.1\text{pF}$ , cer., 750V d.c., Part No. 66683

C43 : 18pF,  $\pm 2.5\text{pF}$ , cer., 500V d.c., Part No. 47078

R22 : 22K $\Omega$ , 10%, 0.6W : Part No. 25446

R26 : 15K $\Omega$ , 10%, 0.6W : Part No. 25382

It should be noted that while the Ediswan output transistors (TR6 and TR7) were available only as a matched pair already fitted in their mounting clip, the Mullard output transistors are not supplied in their mounting clip. If a Mullard output transistor becomes defective, it is generally satisfactory to replace that one only with a normal replacement type (not one removed from another receiver) and to balance the quiescent currents as indicated on page 2 of the Service Manual. However, if distortion is experienced after the balancing adjustment, then the other transistor should also be replaced. See that a new transistor makes good thermal contact with the nickel-plated mounting clip, which also acts as a heat sink.

**METAL RECTIFIER TYPE.** In later receivers, the double rectifier unit (MR1 and MR2) was changed to a Westinghouse type 5D825, Part No. 58545. This was to suit the material supply position and no circuit changes were involved. Both types are available for replacement purposes but, as the mounting arrangements are slightly different, the correct rectifier should be ordered. The original rectifier had a 4BA mounting stud, requiring a 4BA nut and shakeproof washer, while the later one requires a 6BA  $\frac{1}{4}$  in. mounting screw with a nut, plain washer, and shakeproof washer with external teeth.