"TRADER" SERVICE SHEET

608

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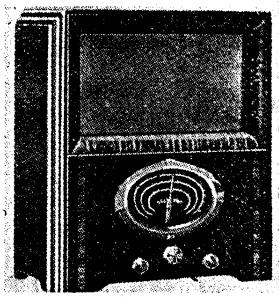
BELMONT 600

AC/DC SUPERHET



THE Belmont 600 is a 4-valve (plus rectifier) AC/DC 3-band superhet. There is no voltage adjustment, but the receiver is designed to operate from mains of 200-260 V, 40-100 C/S in the case of AC. The SW range is 18-55 m.

Release date and original price: September, 1937; £10 10s.

CIRCUIT DESCRIPTION

Aerial input via series condenser **C1** and coupling coils **L2** (SW), **L3** (MW), and **L4** (LW) to single-tuned circuits **L5, C28** (SW), **L6, C28** (MW), and **L7, C28** (LW). IF filter **L1, C24** across aerial input circuit.

First valve (**V1, Belmont 6A8G**) is a heptode operating as frequency changer with electron coupling. Oscillator grid coils **L8** (SW), **L9** (MW) and **L10** (LW) are tuned by **C29**; parallel trimming by **C32** (SW), **C33** (MW) and **C7, C34** (LW); series tracking by **C30** (MW), and **C31** (LW). Reaction from anode by coils **L11** (SW), **L12** (MW) and **L13** (LW).

Second valve, a variable-mu RF pentode (**V2, Belmont 6K7G**), operates as intermediate frequency amplifier with tuned-primary tuned-secondary transformer couplings **C35, L14, L15, C36** and **C37, L16, L17, C38.**

Intermediate frequency 465 KC/S.

Diode second detector is part of double-diode triode valve (**V3, Belmont 6Q7G**), the two diodes being strapped together. Audio frequency component in rectified output is developed across load resistance **R10** and passed via coupling condenser **C15** and manual volume control **R9** to CG of triode section, which operates as AF amplifier. IF filtering by **C14** and **C17.**

DC potential developed across **R10** is fed back through decoupling circuits as GB to FC (except on SW) and IF valves, giving automatic volume control.

Resistance-capacity coupling by **R12, C18, R13** between **V3** triode and pentode output valve (**V4, Belmont 25A6G**). Fixed tone correction in anode circuit by condenser **C20.**

When the receiver is used with AC mains, HT current is supplied by IHC rectifying valve (**V5, Belmont 25Z6G**) with both anodes and both cathodes strapped to operate as half-wave rectifier, which, with DC supplies, behaves as a low resistance. Smoothing is effected by speaker field **L20** and dry electrolytic condensers **C21, C22.**

Valve heaters, together with ballast resistances **R16, R17** and **R18** and scale lamps, are connected in series across mains input. **R16, R17** form the element of an American **ballast tube K52H,** the **R16** section shunting the scale lamps. **R18** is a line cord resistance, wound in the mains lead. Filter circuit comprising air-cored chokes **L21, L22** and condenser **C23** (returned to **E** lead direct) suppresses mains borne interference.

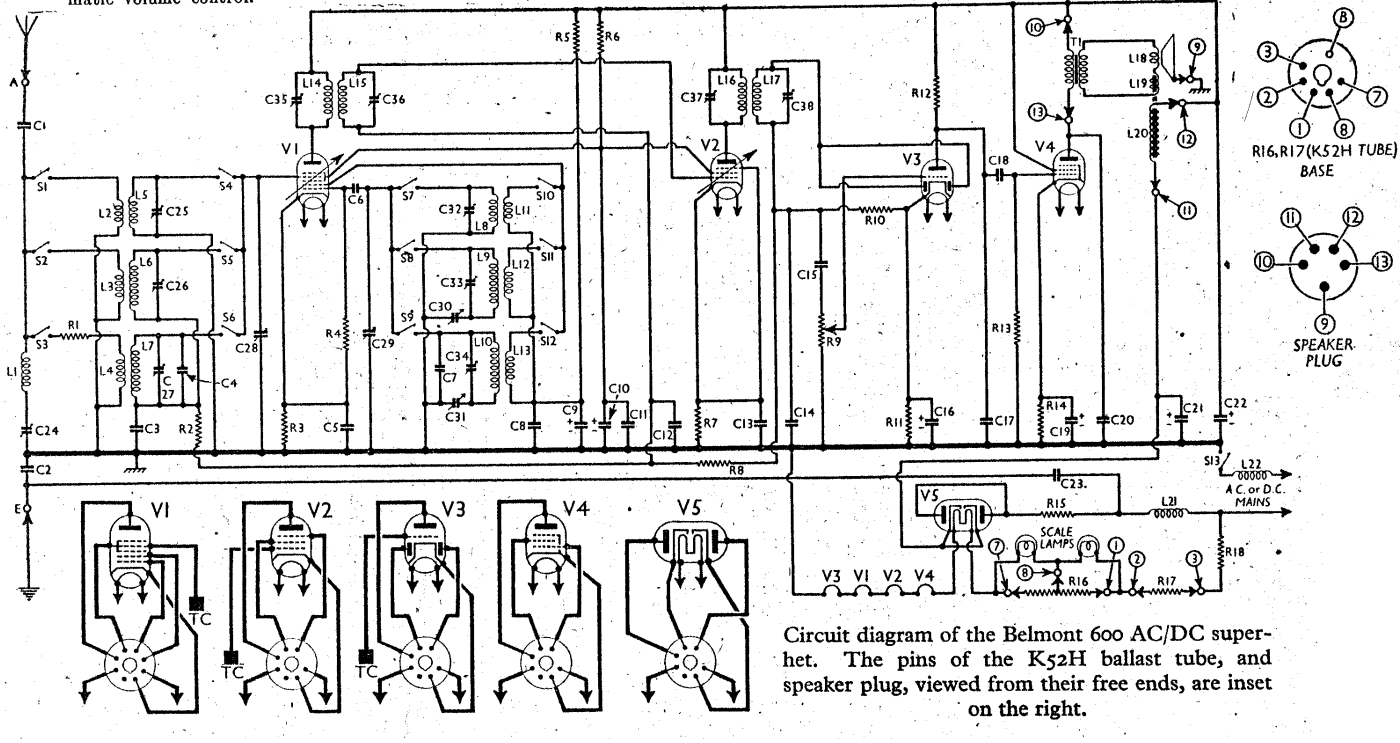
COMPONENTS AND VALUES

	RESISTANCES	Values (ohms)
R1	Aerial circuit LW damping	1,000
R2	V1 pent. CG decoupling...	250,000
R3	V1 fixed GB resistance ...	250
R4	V1 osc. CG resistance ...	50,000
R5	V1 osc. anode HT feed ...	10,000
R6	V1, V2 SG's HT feed ...	25,000
R7	V2 fixed GB resistance ...	250
R8	AVC line decoupling ...	250,000
R9	Manual volume control ...	1,000,000
R10	V3 diodes load resistance	500,000
R11	V3 triode GB resistance...	5,000
R12	V3 triode anode load ...	250,000
R13	V4 CG resistance ...	500,000
R14	V4 GB resistance ...	500
R15	V5 anodes surge limiter	50
R16	Part heater circuit ballast and scale lamps shunt	*56
R17	Part heater circuit ballast	*134
R18	Line cord resistance ...	†350

* K52H tube; R16 centre tapped.
† In mains lead.

	CONDENSERS	Values (μF)
C1	Aerial isolating condenser	0·0005
C2	Earth isolating condenser	0·01
C3	V1 pent. CG decoupling •	0·05
C4	Aerial LW fixed trimmer	0·000025
C5	V1 cathode by-pass ...	0·1
C6	V1 osc. CG condenser ...	0·00005
C7	Osc. LW fixed trimmer...	0·00007
C8	V1 osc. anode decoupling condensers	0·1
C9*		8·0
C10*	V1, V2 SG's decoupling...	8·0
C11		0·1
C12	V2 CG decoupling ...	0·05
C13	V2 cathode by-pass ...	0·1
C14	IF by-pass	0·0002
C15	AF coupling to V3 triode	0·01~
C16*	V3 cathode by-pass ...	50·0
C17	V3 anode IF by-pass ...	0·0002
C18	V3 triode to V4 coupling	0·01
C19*	V4 cathode by-pass ...	10·0
C20	Fixed tone corrector ...	0·01
C21*	HT smoothing condensers	32·0
C22*		10·0
C23	Mains RF by-pass ...	0·01
C24‡	Aerial IF filter tuning ...	—
C25‡	Aerial SW trimmer ...	—
C26‡	Aerial MW trimmer ...	—
C27‡	Aerial LW trimmer ...	—
C28‡	Aerial circuit tuning ...	—
C29†	Oscillator circuit tuning	—
C30‡	Osc. circ. MW tracker ...	—
C31‡	Osc. circ. LW tracker ...	—
C32‡	Osc. circ. SW trimmer...	—
C33‡	Osc. circ. MW trimmer...	—
C34‡	Osc. circ. LW trimmer...	—
C35‡	1st IF trans. pri. tuning	—
C36‡	1st IF trans. sec. tuning	—
C37‡	2nd IF trans. pri. tuning	—
C38‡	2nd IF trans. sec. tuning	—

* Electrolytic. † Variable. ‡ Pre-set.



Circuit diagram of the Belmont 600 AC/DC superhet. The pins of the K52H ballast tube, and speaker plug, viewed from their free ends, are inset on the right.

	OTHER COMPONENTS	Approx. Values (ohms)
L1	Aerial IF filter coil ...	9·0
L2	Aerial SW coupling ...	0·3
L3	Aerial MW coupling ...	2·8
L4	Aerial LW coupling ...	42·0
L5	Aerial SW tuning coil ...	0·05
L6	Aerial MW tuning coil ...	3·0
L7	Aerial LW tuning coil ...	18·0
L8	Osc. circ. SW tuning coil	0·05
L9	Osc. circ. MW tuning coil	4·25
L10	Osc. circ. LW tuning coil	6·5
L11	Oscillator SW reaction	25·0
L12	Oscillator MW reaction	70·0
L13	Oscillator LW reaction...	8·0
L14	1st IF trans. Pri. ...	9·0
L15	1st IF trans. Sec. ...	10·0
L16	2nd IF trans. Pri. ...	9·0
L17	2nd IF trans. Sec. ...	10·0
L18	Speaker speech coil ...	1·75
L19	Hum neutralising coil ...	0·1
L20	Speaker field coil ...	2,000·0
L21	Mains filter chokes ...	3·5
L22	Mains filter chokes ...	3·5
T1	Speaker input trans. Pri.	250·0
	Speaker input trans. Sec.	0·2
S1-S12	Waveband switches ...	—
S13	Mains switch, ganged R9	—

VALVE ANALYSIS

Valve voltages and currents given in the table below are those measured in our receiver when it was operating on AC mains of 233 V. The receiver was tuned to the lowest wavelength on the medium band, and the volume control was at maximum, but there was no signal input, as the aerial and earth leads were shorted together.

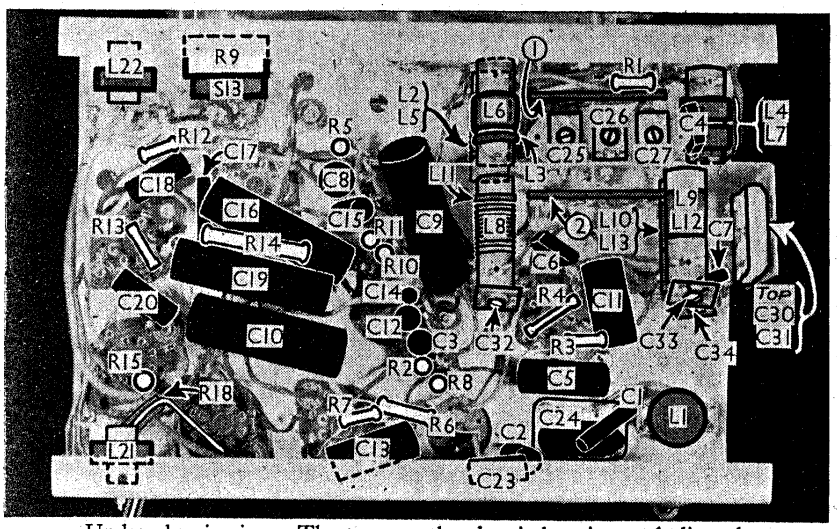
Voltages were measured on the 400 V scale of a model 7 Universal Avometer, chassis being negative.

Valve	Anode Voltage (V)	Anode Current (mA)	Screen Voltage (V)	Screen Current (mA)
V1 6A8G	175	1·9	70	2·5
	Oscillator			
	133	3·1		
V2 6K7G	175	5·8	70	1·3
V3 6Q7G	58	0·2	—	—
V4 25A6G	163	38·0	175	7·0
V5 25Z6G	289†	—	—	—

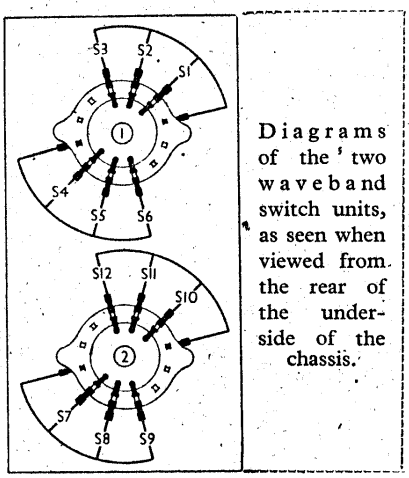
† Cathodes to chassis, DC.

DISMANTLING THE SET

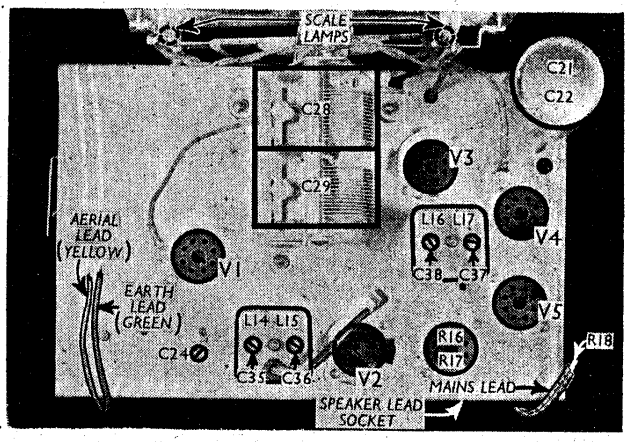
Removing Chassis.—Remove the three control knobs (recessed grub screws and felt washers);
free the speaker leads from the cleat on the side of the cabinet, and withdraw speaker plug from its socket on chassis;
remove the four bolts (with metal washers and rubber washers) holding the chassis to the bottom of the cabinet.



Under-chassis view. The two waveband switch units are indicated.



Diagrams of the two waveband switch units, as seen when viewed from the rear of the underside of the chassis.



Plan view of the chassis. **R18** is the line cord resistance. The aerial and earth leads emerge from a hole in the rear of the chassis. The K52H tube socket is marked **R16, R17.**

Removing Speaker.—Withdraw the plug from the chassis, and remove the four nuts (with lock-washers) holding the speaker to the sub-baffle.

When replacing, the transformer should be on the right.

If the leads have been unsoldered, connect them as follows, numbering the tags from top to bottom: 1, yellow/blue; 2, brown/red; 3, green/red; 4, black/green. The white earthing lead goes to one of the lugs holding the connecting panel to the transformer.

GENERAL NOTES

Switches.—S1-S12 are the waveband switches, in two rotary units beneath the chassis. These are indicated in our under-chassis view, and are shown in detail in the diagrams on this page.

S1, S4, S7, S10 close on SW; **S2, S5, S8, S11** close on MW; **S3, S6, S9, S12** close on LW. Otherwise the switches are open.

S13 is the QMB mains switch, ganged with the volume control, **R9.**

Coils.—L1 is attached to the underside of the chassis. The remaining coils up to **L13** are in pairs on tubular formers beneath the chassis, attached to the screen between the two switch units. They are indicated in our under-chassis view.

Scale Lamps.—These are two MES types, with tubular bulbs, rated at 6.0 V, 0.15 A. Those fitted were marked Tre Vita.

External Speaker.—No provision is made for this, but a low impedance type could be connected across the secondary of the internal speaker transformer. As the set is for AC/DC operation, no external speaker should be connected to the primary of **T1.**

Condensers C21, C22.—These are two dry electrolytics in a single tubular metal case on the chassis deck. The case forms the common negative connection. The yellow lead is the positive of **C22** (10 μF). Red is positive of **C21** (32 μF).

Resistances R16, R17.—These are ballast resistors, contained in a metal-cased unit fitted with an octal base, and plugging into a holder on the chassis deck. In the circuit diagram the ends of the two resistances, and the centre tap of **R16** are indicated by numbers in circles, which correspond with the pin numbers of the base, a diagram of which is beside the circuit diagram. The unit is an American K52H.

Resistance R18.—This is a flexible line cord resistor included in the mains lead.

Speaker Connections.—These are taken to a special 5-pin plug, fitting into a socket at the rear of the chassis. The connections are numbered from 9 to 13 in the circuit diagram, and beside it is a diagram of the plug, viewed from the free ends of the pins.

CIRCUIT ALIGNMENT

IF Stages.—Feed a 465 KC/S (645.16 m) signal to control grid (top cap) of **V1** and earth connection (not chassis), and adjust **C38, C37, C36** and **C35** for maximum output.

RF and Oscillator Stages.—With gang at maximum, pointer should cover the 550 m mark on the MW scale.

SW.—Connect signal generator to **A** and **E** leads, feed in a 17.6 MC/S (17 m) signal, switch set to SW and tune to 17 m on scale. Adjust **C32** and **C25** for maximum output.

MW.—Switch set to MW, feed in a 1,500 KC/S (200 m) signal, tune to 200 m on scale, and adjust **C33** and **C26** for maximum output. Feed in a 600 KC/S (500 m) signal, tune it in, and adjust **C30** for maximum output, rocking the gang slightly for optimum results.

LW.—Switch set to LW, feed in a 300 KC/S (1,000 m) signal, tune to 1,000 m on scale, and adjust **C34** and **C27** for maximum output. Feed in a 150 KC/S (2,000 m) signal, tune it in, and adjust **C31** for maximum output, rocking the gang slightly for optimum results.

IF Filter.—Feed in a strong 465 KC/S signal into **A** and **E** connections, switch set to LW, tune to 1,000 m on scale (a harmonic of 465 KC/S) and adjust **C24** for *minimum* output.

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