

BURNDEPT 281 CONSOLE EIGHT

CIRCUIT.—The aerial input is fed to the grid of V1, a pentode operating as an H.F. amplifier, by transformer coils on all wavebands, but by an additional series condenser on Band 2.

V1 is transformer coupled to V2, a triode hexode frequency changer. Grid stabiliser resistances are fitted in the top grid connecting caps to V1 and V2, and heater R.F. by-pass condensers are connected between the heaters of V2 and chassis line.

The signal, converted to the I.F., passes by a transformer tuned to 473 kc. to V3, another H.F. pentode. Coupling to V4, a double-diode valve, is effected by a coupling condenser C21. V4 is the A.V.C. valve controlling V1, V2 and V3 by means of bias potentials fed to each of the valves through decoupling circuits.

V5, another double-diode valve, and the demodulator, is fed from a tapping on the second I.F. transformer. The coupling arrangements to the following valve include a gram-radio switch and a volume control.

V5 is an H.F. pentode operating as an L.F. amplifier. A noise-suppression circuit controlled by a switch enables inter-tuning quiet tuning to be obtained.

V6 is resistance capacity coupled to V7, a 6B5 double-triode valve. The cathode of the input triode is internally connected to the grid of the output triode, and the anode of the input triode is connected to the H.T. line. The anode of the output triode has the speaker transformer connected in circuit. A tone control circuit consisting of a variable resistance and condenser is connected in series between the anode of the output triode and chassis.

Mains equipment consists of a transformer, a full-wave rectifying valve V8, electro-smoothing condensers and a smoothing choke (the speaker field coil).

Chassis Removal.—Remove the back of

the cabinet, the five control knobs from the front and the tone control knob from the side. The tone control will also have to be removed.

Take out the six chassis securing bolts and washers. Remove the two grub screws securing the pointer from the tuning drum, and the two bolts from the spacing pillars, and detach the drum together with cables still attached.

Next detach all dial illuminating and waveband indicating lights from their mountings, remove the two clips securing the dial light cable and also the connections to the two-pin mains plug, afterwards pulling mains lead through the hole and reassembling the plug.

After the leads to the speaker have been unsoldered, the chassis may be completely withdrawn from the cabinet. The colours of the four leads to the speaker panel are (from top to bottom) red (No. 5), blue, green, and the black lead to the last two tags.

When replacing chassis, the various pilot bulbs are placed on the mountings



The 281 by Burndept, Ltd., has this distinctive console cabinet and employs an eight-valve four-band chassis.

VALVE READINGS

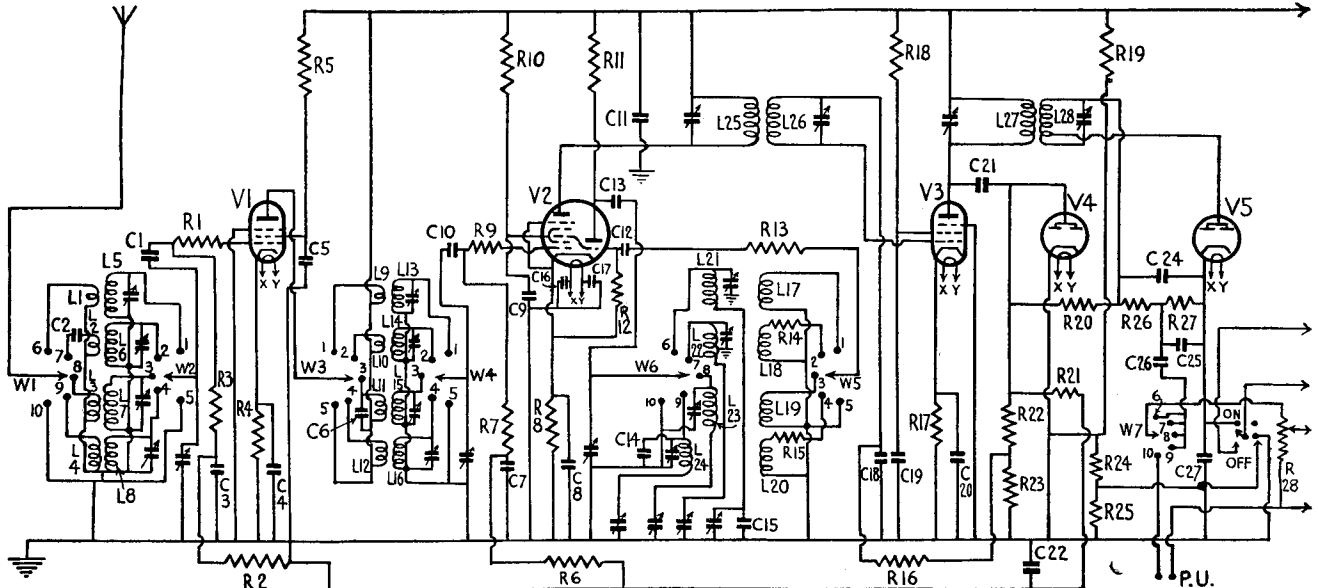
No signal. Volume maximum. I.W. min. cap. 200 volt. A.C. mains.

| V. | Type. | Electrode. | Volts. | Ma. |
|----|---------------|---------------|--------|-----|
| 1 | AC/VP2 (7) .. | Anode .. | 230 | 7.5 |
| | | Screen .. | 170 | 2 |
| 2 | AC/TH1 (7) .. | Anode .. | 230 | 1.8 |
| | | Screen .. | 70 | 5.8 |
| | | Osc.anode | 100 | 3.8 |
| | | Anode .. | 230 | 8.5 |
| 3 | AC/VP2 (7) .. | Anode .. | 230 | 8.5 |
| | | Screen .. | 170 | 2 |
| 4 | V914 (5) .. | Diodes | — | — |
| | | only. | — | — |
| 5 | V914 (5) .. | Diodes | — | — |
| | | only. | — | — |
| 6 | AC/SP1 (7) .. | Anode .. | 120 | 3 |
| | | Screen .. | 155 | 3 |
| | | Output anode. | 258 | 34 |
| 8 | R3 (4).. | Heater .. | 372 | — |

according to the length of the leads, and no trouble should be experienced. The pointer should be adjusted by tuning the receiver to a known station or signal from a service oscillator, turning the pointer to correspond with the wavelength or name calibration, and locking the pointer clamping grub screws.

If retrimming of the signal circuits is contemplated, the four wood screws securing the wavelength dial assembly must be removed. Then the receiver can be aligned, using the dial with Bowden control wires still connected.

Special Notes.—To obtain access to the tuning coils, switch contacts and trimmers underneath the chassis, the 22 screws



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securing the metal screening box must be removed. The tone control R37 is mounted on the side of the cabinet.

Sockets are provided at the rear of the chassis for connecting a pick-up.

A pair of terminals on the speaker panel enable a low-impedance permanent-magnet speaker to be operated.

There are five waveband indicating lights in the coloured panels. They are mounted in screw-in holders clamped to supports at various positions behind the dial. They are rated at 6 volts .2 amp., and have M.E.S. bases.

Two wavelength dial illuminating lights
(Continued in next column.)

| CONDENSERS | | |
|------------|---------------------------------|--------|
| C. | Purpose. | Mfds. |
| 1 | V1 grid isolating .. | .0001 |
| 2 | B2 aerial coupling .. | .0001 |
| 3 | V1 A.V.C. decoupling .. | .1 |
| 4 | V1 cathode bias shunt .. | .1 |
| 5 | V1 screen decoupling .. | .1 |
| 6 | M.W. H.F. fixed trimmer .. | .0001 |
| 7 | V2 A.V.C. decoupling .. | .1 |
| 8 | V2 cathode bias shunt .. | .1 |
| 9 | V2 screen decoupling .. | .1 |
| 10 | V2 grid isolating .. | .00004 |
| 11 | H.T. line decoupling .. | .5 |
| 12 | Osc. grid .. | .0002 |
| 13 | Osc. anode decoupling .. | .0001 |
| 14 | L.W. osc. fixed trimmer .. | .00004 |
| 15 | B1 oscillator fixed padder .. | .006 |
| 16 | V2 heater by-pass .. | .01 |
| 17 | V2 heater by-pass .. | .01 |
| 18 | V3 A.V.C. decoupling .. | .1 |
| 19 | V3 screen decoupling .. | .1 |
| 20 | V3 cathode bias shunt .. | .1 |
| 21 | V4 A.V.C. diode coupling .. | .0001 |
| 22 | A.V.C. line decoupling .. | .01 |
| 23 | V4 cathode bias shunt .. | .1 |
| 24 | H.F. by-pass .. | .0001 |
| 25 | H.F. by-pass .. | .0001 |
| 26 | L.F. coupling .. | .05 |
| 27 | Suppression bias shunt .. | .01 |
| 28 | V6 cathode bias shunt (part) .. | 50 |
| 29 | V6 cathode bias shunt (part) .. | 25 |
| 30 | V6 anode shunt .. | .0005 |
| 31 | Suppressor grid decoupling .. | .03 |
| 32 | V6 anode decoupling .. | 2 |
| 33 | L.F. coupling .. | .05 |
| 34 | Tone compensator .. | .001 |
| 35 | H.T. smoothing .. | .16 |
| 36 | H.T. smoothing .. | 8 |
| 37 | Tone control .. | .05 |
| 38 | V6 screen decoupling .. | 2 |

| RESISTANCES | | |
|-------------|-------------------------------|---------|
| R. | Purpose. | Ohms. |
| 1 | V1 grid stabiliser .. | 50 |
| 2 | V1 A.V.C. decoupling .. | 500,000 |
| 3 | V1 A.V.C. feed .. | 250,000 |
| 4 | V1 cathode bias .. | 200 |
| 5 | V1 screen decoupling .. | 20,000 |
| 6 | V2 A.V.C. decoupling .. | 500,000 |
| 7 | V2 A.V.C. feed .. | 250,000 |
| 8 | V2 cathode bias .. | 200 |
| 9 | V2 grid stabiliser .. | 50 |
| 10 | V2 screen decoupling .. | 30,000 |
| 11 | Osc. anode load .. | 30,000 |
| 12 | Osc. grid leak .. | 50,000 |
| 13 | Regeneration modifier .. | 100 |
| 14 | B2 regeneration modifier .. | 500 |
| 15 | L.W. regeneration modifier .. | 500 |
| 16 | V3 A.V.C. decoupling .. | 500,000 |
| 17 | V3 cathode bias .. | 200 |
| 18 | V3 screen decoupling .. | 20,000 |
| 19 | Suppression pot. (part) .. | 50,000 |
| 20 | V4, V5 diodes link .. | 1 meg. |
| 21 | A.V.C. line decoupling .. | 250,000 |
| 22 | V4 diode load (part) .. | 750,000 |
| 23 | V4 diode load (part) .. | 250,000 |
| 24 | Suppression pot. (part) .. | 1,500 |
| 25 | Suppression pot. (part) .. | 2,500 |
| 26 | V5 diode load (part) .. | 500,000 |
| 27 | V5 diode load (part) .. | 100,000 |
| 28 | Volume control .. | 500,000 |
| 29 | V6 cathode bias (part) .. | 2,500 |
| 30 | V6 cathode bias (part) .. | 400 |
| 31 | Suppressor grid resistance .. | 500,000 |
| 32 | V6 anode load .. | 20,000 |
| 33 | V6 anode decoupling .. | 10,000 |
| 34 | V6 screen decoupling .. | 20,000 |
| 35 | H.T. line decoupling .. | 1,000 |
| 36 | V7 grid leak .. | 250,000 |
| 37 | Tone control .. | 50,000 |

Burndept 281 on Test

MODEL CN281.—Console for A.C. mains, 200-260 volts, 40-100 cycles. Price, 23 gns.

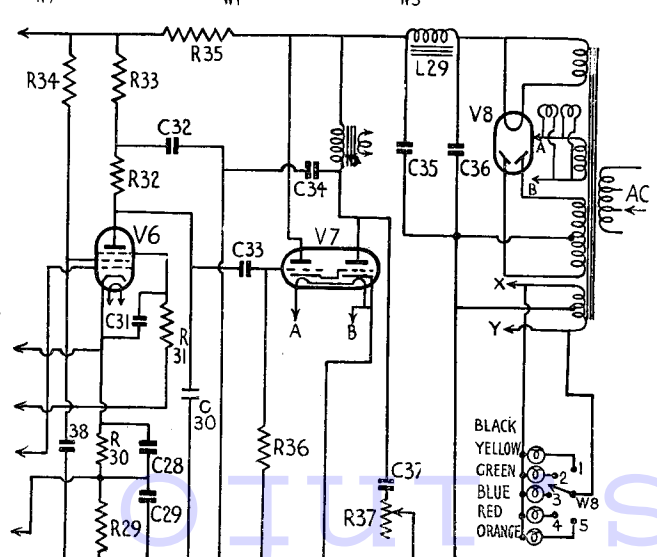
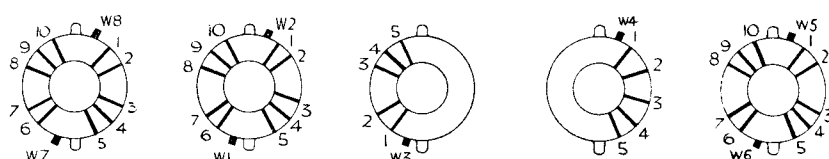
DESCRIPTION.—Seven-valve, plus rectifier, four-band superhet console.

FEATURES.—Console cabinet, with large wavelength scale on top of cabinet. Calibration in metres and station names. Two-speed tuning. Wave selection switch operates illuminated indicating panels on scale. Combined volume control and master switch. Switch for inter-station noise suppression. Sockets for pick-up and low-impedance speaker. Self-contained aerial.

LOADING.—95 watts.

Sensitivity and Selectivity
SHORT WAVES (13.5-51 and 50-172 metres).—Excellent gain and selectivity. Very easy handling. Gain well maintained.
MEDIUM WAVES (170-570 metres).—Excellent all-round performance, with local stations spread on adjacent channels only. Well-maintained gain with a good background.
LONG WAVES (750-2,100 metres).—Very good gain and selectivity. Very slight overlap on Deutschlandsender. All main stations easily received with clean background.

Acoustic Output
 Ample volume for a large room, with excellent tone and very good low-note radiation. The attack is crisp and clean and speech is remarkably free from colouration. All orchestral and instrumental music is very nicely balanced.



Above are diagrams of the switch banks of the Burndept 281 with contacts numbered to correspond with the circuit diagram. The chassis layout drawings are on the next page.

have bayonet bases and are rated at 6 to 8 volts 6 watts.

The muting switch operates by impressing a negative potential on the suppressor grid of V6, an H.F. pentode operating as an L.F. amplifier.

Circuit Alignment Notes

I.F. Circuits.—Connect an output meter across the primary of the speaker transformer. Turn noise suppression switch to "off" position, volume control to maximum, wave selection switch to M.W., and gang condenser to maximum capacity.

Connect a service oscillator between top grid cap of V2 and chassis and shunt with a 250,000-ohms resistance between grid and chassis. Short circuit the oscillator section of the gang.

Tune service oscillator to 473 kc. and adjust the trimmers of 1FT2 and then 1FT1 for maximum response, reducing the input from the service oscillator as the circuits come into line to render the A.V.C. inoperative.

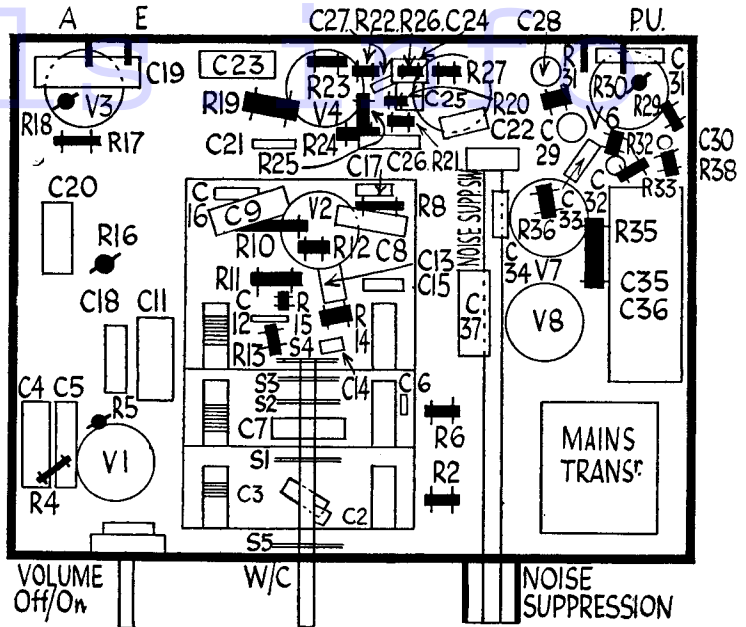
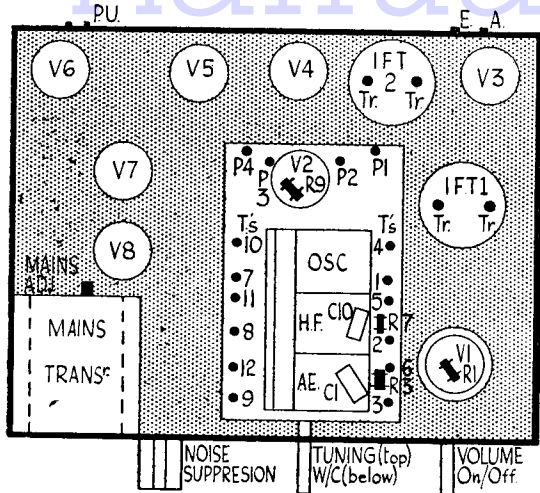
Signal Circuits.—Connect the service oscillator to the A. and E. sockets via a dummy aerial. With gang at maximum capacity the tuning pointer should be parallel with the maximum end of the wavelength scale.

Only feed sufficient input from the service oscillator to obtain definite peaks in
(Continued on next page.)

Most interesting circuit feature is the unusual American output valve used in the 281. Another unorthodox point is the use of two separate double diode valves, each with the anodes strapped.

Burndept Model 281

(Continued from previous page.)



The use of a tuning sub-assembly is a feature of the Burndept chassis. As the top deck view (left) shows, the grouped trimmers are conveniently accessible from above.

the output meter so as to prevent operation of the A.V.C. network.

Long Waves.—Tune set and oscillator to 750 metres (400 kc.) and adjust T1, T2 and T3 for maximum response.

Tune set and oscillator to 2,000 metres (150 kc.) and adjust P1 for maximum response, simultaneously rocking the gang. Repeat both operations until no further improvement results.

Medium Waves.—Tune set and oscillator to 170 metres (1,765 kc.) and adjust T4, T5 and then T6 for maximum.

Tune set and oscillator to 550 metres (545 kc.) and adjust P2 for maximum response, simultaneously rocking the gang. Repeat both operations until no further improvement results.

Short Waves.—Band 2 (50 to 172 metres).—Tune set and oscillator to 50 metres (6 mc.) and adjust T7, T8 and then T9 for maximum response.

Tune set and oscillator to 170 metres (1,765 kc.) and adjust P3 for maximum, simultaneously rocking the gang.

Repeat both operations until no further improvement results.

Band 1 (13.5 to 51 metres).—Connect the service oscillator to the A. and E. terminals *via* a .00003 fixed condenser instead of *via* the dummy aerial.

Tune set and oscillator to 13.5 metres (22.2 mc.), fully unscrew T10 as far as possible (without removing screw, of course), then slowly screw up until the first peak is heard. Then adjust T11 and T12 for maximum response.

Tune set and oscillator to 50 metres (6 mc.) and adjust P4 for maximum, simultaneously rocking the gang.

Repeat both operations until no further improvement results.

WINDINGS (D.C. Resistances)

| Inductance. | Ohms. | Wave-band. | Measured between. |
|---------------------|----------|------------|------------------------------|
| L1 | 1 | B1 | V1 and chassis. |
| L2 | 1 | B2 | Coil end of C2 and chassis. |
| L3 | 1 | MW | W1 and chassis. |
| L4 | 101 | LW | W1 and chassis. |
| L5 | Below .1 | B1 | Top aerial gang and chassis. |
| L6 | Below .1 | B2 | Top aerial gang and chassis. |
| L7 | 2 | MW | Top aerial gang and chassis. |
| L8 | 8 | LW | Top aerial gang and chassis. |
| L9 | Below .1 | B1 | W3 and HT line. |
| L10 | 1 | B2 | W3 and HT line. |
| L11 | 78 | MW | W3 and HT line. |
| L12 | 1 | LW | W3 and HT line. |
| L13 | .6 | B1 | Top HF gang and chassis. |
| L14 | 1 | B2 | Top HF gang and chassis. |
| L15 | 2 | MW | Top HF gang and chassis. |
| L16 | 9 | LW | Top HF gang and chassis. |
| L17 | Below .1 | B1 | W5 and chassis. |
| L18 + R14 | 533 | B2 | W5 and chassis. |
| L19 | 69 | MW | W5 and chassis. |
| L20 + R15 | 530 | LW | W5 and chassis. |
| L21 | Below .1 | B1 | W6 and various padders. |
| L22 | Below .1 | B2 | W6 and various padders. |
| L23 | 3 | MW | W6 and various padders. |
| L24 | 5 | LW | W6 and various padders. |
| L25 | 6 | — | IF pins. |
| L26 | 6 | — | V2 top cap and IF pin. |
| L27 | 6 | — | IF pins. |
| L28 | 4 | — | IF pins. |
| L29 | 1,000 | — | Speaker panel. |
| Output trans. prim. | 510 | — | Speaker panel. |
| Mains trans. prim. | 12 | — | Mains plug pins. |
| Total H.T. sec. | 237 | — | V8 anode pins. |

Replacement Condensers

Exact replacement condensers for the 281 are available from A. H. Hunt, Ltd. For the block containing C35 and C36 there is unit 3831 at 8s. 6d.; for either C32 or C38, unit 4039, 2s. 3d.; C28, 2792, 2s. 3d.; and C29, 2918, 1s. 9d.

Kolster-Brandes 660

(Continued on page 45.)

extreme right is a double socket panel, for connecting a pick-up. Near this panel is a similar pair of sockets with a flying lead terminated in a wander plug. When working on gramophone the wander plug should be inserted in the top socket. It should be replaced in the bottom socket when radio is required.

In our particular chassis R3 was found to be 150 ohms and R12 to be 12,000. R26 is located on the T.I. valve holder.

Negative feed back is introduced from the secondary of the speaker transformer in conjunction with a resistor in the cathode circuit of the output valve.

Inter-station muting is provided by the alteration of the bias on the demodulating diode load via a resistance network.

Alignment Notes

I.F. Circuits.—Connect an output meter across the primary of the speaker transformer. Switch receiver to M.W. band, gang condenser to maximum, volume control to maximum, and tone to "high" position. Short circuit the oscillator section of the gang.

Connect a service oscillator between the top grid cap of V1 and chassis, tune oscillator to 464 kc., and adjust the trimmers of IFT3, IFT2 and then IFT1 for maximum response. Repeat the input from the oscillator as the circuits come into line so as to render the A.V.C. inoperative.

Signal Circuits.—Remove the short circuit from the oscillator section of the gang. Connect the oscillator via a dummy aerial to the A. and E. terminals of the receiver. Only feed sufficient input to obtain reliable peaks in the output meter.

Medium Waves.—Tune set and oscillator to 214 metres (1,400 kc.) and adjust T1, T2 and then T3 for maximum response.

Tune set and oscillator to 500 metres (600 kc.) and adjust P1 (the nut of the double padding condenser) for maximum, simultaneously rocking the gang.

Repeat both operations until no further improvement results.

Long Waves.—Tune set and oscillator to 1,200 metres (250 kc.) and adjust T4, T5 and then T6 for maximum.

Tune set and oscillator to 1,714 metres (175 kc.) and adjust P2 (the screw of the double padding condenser) for maximum, simultaneously rocking the gang.

Repeat both operations until no further improvement results.

Short Waves (Band S.W.1).—Tune set and oscillator to 33 metres (9 mc. approx.) and adjust T7 and T8 for maximum response.

(Band S.W.2).—Tune set and oscillator to 13.6 metres (22 mc. approx.) and adjust T9 for maximum response.

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