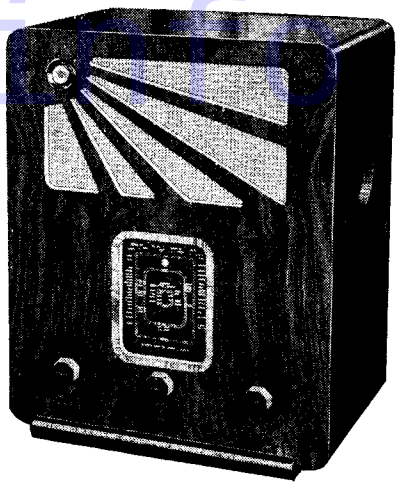
McMICHAEL 373 TRANSPORTABLE FIVE



The 373 five-valve battery transportable.

CIRCUIT.—The frame aerial windings constitute the grid coils of V1, an H.F. pentode operating as an amplifier. On the short waves a separate short-wave coil is used. Connections are also provided for an external aerial and earth system for the short-wave band, coupling being effected *via* C1. Separate A.V.C. decoupling is provided for short waves.

V1 is tuned secondary H.F. transformer coupled to V2, a triode hexode frequency changer that is A.V.C. controlled on medium and long waves. With regard to the oscillator section of V2, it will be noticed that the oscillator anode works with two load resistances, and these are put in parallel on the short-wave band. Separate regeneration modifying resistances are also inserted in the grid circuits.

Coupling between V2 and V3, an H.F. pentode operating as the I.F. amplifier, is effected by the usual transformer. Another I.F. transformer couples V3 to the demodulating diode of V4, a double diode triode. The connection to the demodulating diode load includes an H.F. filter circuit.

A manual volume control, connections for a pick-up and a grid stopper resistance are included in the coupling arrangement to the grid of the triode section of V4. The other diode of V4, fed by a coupling condenser C15, provides a D.C. potential that is utilised for A.V.C.

A noise suppression switch is included, providing considerable reduction of interstation noise and interference. The suppression circuit operates by returning the A.V.C. diode load to a more negative point.

V4 is resistance-capacity transformer coupled to the output valve V5, a twin

VALVE READINGS

No signal. Volume maximum. MW min. cap. New batteries.

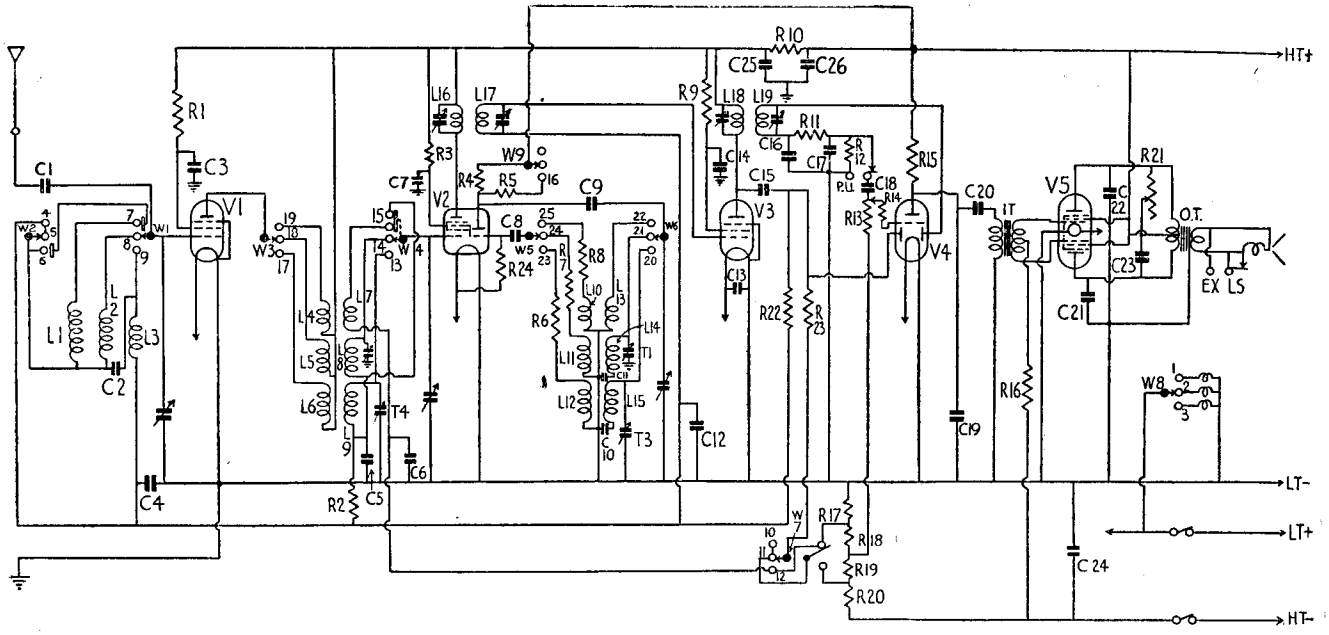
V.	Type.	Electrode.	Volts.	Ma.
	All Mazda.			
1	VP 210 (7)	Anode	82	1.1
		Screen	28	.3
2	TP 23 (7)	Anode	82	.7
		Screen	36	.8
		Osc. anode	48	2.1
3	VP 210 (7)	Anode	82	1.1
		Screen	30	.3
4	HL21/DD (5)	Anode	57	.6
5	QP230 (7)	Anode	107	1.4
		Anode	107	1.4
		Screens	108	.8

CONDENSERS

C.	Purpose.	Mfds.
1	Series aerial	.00001
2	SW frame aerial coupling	.00001
3	V1 screen decoupling	.1
4	V1 AVC decoupling SW	.01
5	V2 MW & LW AVC decoupling.	.1
6	SW V2 grid decoupling	.01
7	V2 screen decoupling	.1
8	Osc. grid	.0002
9	Osc. anode coupling	.0001
10	LW osc. fixed padder	.000719
11	MW osc. fixed padder	.000223
12	V3 AVC decoupling	.1
13	V3 filaments HF bypass	.01
14	V3 screen decoupling	.1
15	AVC diode coupling	.0001
16	HF bypass	.0001
17	HF bypass	.0001
18	LF coupling	.005
19	V4 anode shunt	.0003
20	LF coupling	.1
21	Pentode compensator	.001
22	Pentode compensator	.001
23	Tone control	.01
24	Bias potr. shunt	50
25	HT to V1, V2, V3 decoupling	8
26	HT reservoir	8

RESISTANCES

R.	Purpose.	Ohms.
1	V1 screen decoupling	100,000
2	V2 MW & LW AVC decoupling.	500,000
3	V2 screen decoupling	60,000
4	MW & LW osc. anode load	25,000
5	SW osc. anode load	50,000
6	LW regeneration modifier	1,000
7	MW regeneration modifier	1,000
8	SW regeneration modifier	20
9	V3 screen decoupling	100,000
10	V1, V2, V3 decoupling	5,000
11	HF stopper	100,000
12	Demodulating diode load	500,000
13	Volume control	100,000
14	V4 grid stopper	100,000
15	V4 anode load	50,000
16	V5 grid return	100,000
17	Bias potr. (part)	100,000
18	Bias potr.	20
19	Bias potr.	450
20	Bias potr.	400
21	Tone control	100,000
22	AVC diode load	1 meg.
23	SW V2 AVC decoupling	1 meg.
24	Osc. grid leak.	50,000



Separate A.V.C. decoupling for the short waves and a noise-suppression switch are two features of the 373. Arrangements are provided for the use of an external aerial if desired.

pentode operating in a Q.P.P. circuit. Bias for V5 (and also V4) is obtained by means of a potentiometer network of resistances connected between L.T. negative and H.T. negative and shunted by a large capacity fixed condenser.

Pentode compensator condensers are included, and R21 and C23 enable tone to be modified at will.

Battery power consists of a 120-volt H.T. battery No. 601/09 and 2-volt 25-a.h. accumulator. The receiver type number should be quoted when requesting replacement from the makers.

Chassis Removal.—Remove back of cabinet, take out batteries and uncleat battery leads from shelf, pulling leads through hole provided. The shelf may then be withdrawn and access to the top of the chassis obtained.

Remove the three spring-fixed control knobs and the four chassis securing bolts from the base. The four nuts must then be removed from the wood cross-bar near the speaker. The tone control knob (spring fixing), the tone control resistance and wire to earthing tag on fixing plate should then be removed from the side of the cabinet.

The chassis and speaker, together with frame aerial structure, may then be completely withdrawn from the cabinet in one unit.

To remove the frame aerial structure from the chassis the leads to the panel beneath the wave-change switch must be unsoldered. When replacing the leads connect as follows: Black from the wave-change switch to the first tag from the left and the third tag from the left; green to second; and yellow to the fourth (end) tag. The small condenser C2 is also connected to the first tag.

If two bolts and six bolts and nuts are removed, the frame aerial structure may be removed sufficiently for service work to be carried out. To completely remove the structure, the leads to the speaker panel and dial light must be unsoldered and the table uncleated from the side. When replacing leads, counting from top to bottom, the colours of the leads are: yellow, white, blue, green, red and yellow. Also to the top tag is connected the tone condenser C23, and to the bottom tag the yellow lead to the tone resistance R21.

The black lead is connected to an earthing tag on the speaker frame, and the red-tipped white lead is connected to the remaining tag of the dial light holder.

Special Notes.—A pair of sockets at the

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WINDINGS (D.C. Resistances)

Winding.	Ohms.	Range.	Measured between.
L1	25	LW	Tags on aerial panel.
L2	2.2	MW	Tags on aerial panel.
L3	.2	SW	Coil tags.
L4	.2	SW	W3 and C25.
L5	4.5	MW	W3 and C25.
L6	5.2	LW	W3 and C25.
L7	.2	SW	W4 and coil side C6.
L8	2	MW	W4 and coil end R2.
L9	20	LW	W4 and coil end R2.
L10	7	SW	Coil end R8 and chassis.
L11	3	MW	Coil end R7 and chassis.
L12	5.7	LW	Coil end R6 and chassis.
L13	.3	SW	W6 and chassis.
L14	3.1	MW	W6 and coil end C11.
L15	13	LW	W6 and coil end C10.
L16	40.2	—	Tags.
L17	40.2	—	Tags.
L18	42.6	—	Top connector V3 and C25.
L19	—	—	Inaccessible.
I.T. prim.	685	—	Tags.
Sec.	2440 + 3140	—	Tags.
O.T. prim.	630	—	Top and bottom tags speaker panel.

McMichael 373 on Test

MODEL 373.—Standard model for battery operation needing a 120-volt H.T. battery, No. 601/09, and a 2-volt 25-a.h. accumulator. Price, 14 gns.

DESCRIPTION.—Five-valve, three-band transportable battery superhet with frame aerial.

FEATURES.—Full-vision scale calibrated in metres and station names traversed by individual illuminated pointers on each waveband. Flywheel tuning. Other controls for wave selection, tone and combined volume, and master switch. Pilot light on speaker grille. Noise suppression switch at rear of chassis. Sockets for pick-up, extension L.S. and external A. and E. system.

LOADING.—H.T., 10.6 ma., L.T., 1.8 amp.

Sensitivity and Selectivity.

SHORT WAVES (16.5-50 metres).—Strong signals received on self-contained frame, but very good performance with small external aerial.

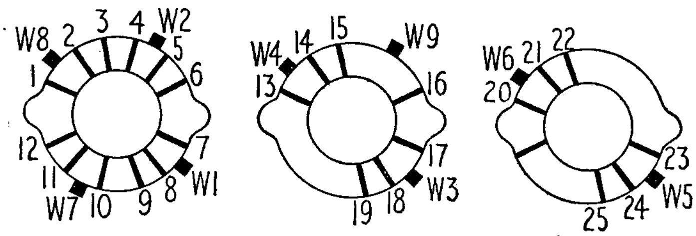
MEDIUM WAVES (200-550 metres).—Adequate gain and selectivity with frame aerial. The gain is well maintained. There are some whistles, which is general with an open frame. Ample sensitivity over the entire band.

LONG WAVES (850-2,000 metres).—Excellent gain and selectivity for a battery portable. Very good gain and selectivity. Deutschlandsender received with substantially no side splash with the aid of the directional properties of the aerial.

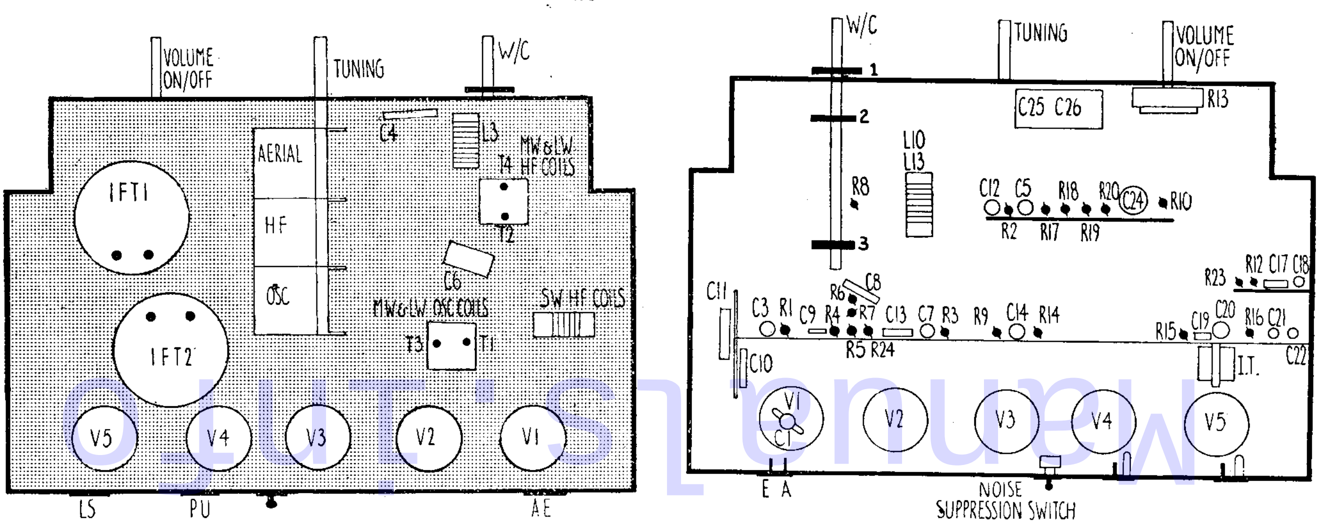
Acoustic Output

There is ample volume for an ordinary room, with well-balanced output. Good low-note radiation and crisp, clean attack.

EXACT replacements, available from A. H. Hunt, Ltd., are: For the block containing C25 and C26, unit 3489, 3s. 6d.; for C24, unit 2915, 1s. 6d.



Left to right, the switch banks, one to three (see chassis layout below).



All the components on the 373 chassis can be identified with the aid of these diagrams of the top (left) and underside (right.)

McMichael 373 Transportable

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rear of the chassis enable an extension loudspeaker to be operated. The external speaker should be of the low impedance type (2 ohms). A special two-pin plug enables both speakers to be controlled.

Sockets adjacent to the above sockets are for a pick-up. When the special plug is pushed home the radio section of the receiver is rendered inoperative.

A QMB switch at the rear of the chassis effects noise suppression if desired, and operates when the switch is "up."

The single pilot light is located in a screw-in holder secured to the front of the cabinet and visible through an aperture. The bulb is rated at 2 volts .1 amp., and is an MES base type.

The waveband indication and pointer illumination lights, of which there are three, are also rated at 2 volts .1 amp.

R11, R22, C15 and C16 are inside the can housing IFT2. The tone control resistance, R21, is mounted on the side of the cabinet with associated condenser C23. C2 is on the wavechange switch on the front of the chassis.

In our particular chassis, a .00001 mfd. fixed condenser was connected across the long wave section (L1) of the frame aerial.

Alignment Notes

I.F. Circuits.—Connect an output meter across the primary of the speaker transformer. Switch set to MW band, turn gang to maximum and tone to "high" position. Connect a service oscillator between the top grid cap of V2 and chassis.

Tune service oscillator to 128.5 kc., and adjust the trimmers of IFT2 and then IFT1 for maximum response, reducing the input from the service oscillator as the circuits come into line.

Signal Circuits.—With gang at maximum, check that the leading edge of the medium wave tuning light is in line with the last calibration mark found 3-16 in. from the top (high wavelength) end of the medium wave scale. Adjust it if necessary by means of the set screws on the condenser coupling.

Connect the leads of a service oscillator to a few turns of wire and inductively inject a signal into the frame aerial, keeping the input as low as possible consistent with reliable peaks in the output meter.

Medium Waves.—Tune set and oscillator to 214 metres (1,400 kc.). On the set scale this is the short line opposite Radio Lyons. Adjust T1 and then T2 for maximum response.

The medium wave padding is fixed, but if calibration is very much out at 500 metres (600 kc.), compensate with T1 and then retrim T2 on a 214 metres signal for maximum sensitivity.

Long Waves.—Tune set and oscillator to 1,000 metres (300 kc.) and adjust T3 and then T4 for maximum response.

The long wave padding is fixed.

Short Waves.—There are no trimming adjustments.

VIDOR 277 A.C. FIVE

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Repeat both operations until no further improvement results.

Medium Waves, B3.—Tune set and oscillator to 200 metres (1,500 kc.), and adjust T3 and T4 for maximum.

Tune set and oscillator to 550 metres (545 kc.), and adjust P2 for maximum, simultaneously rocking the gang.

Repeat both operations until no further improvement results.

Short Waves, B2 (50 to 170 metres).—Tune set and oscillator to 50 metres (6 mc.) and adjust T5 and then T6 for maximum.

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.

Short Waves, B1 (13.5 to 51 metres).—Replace dummy aerial with a 30 to 40 mmfd. fixed condenser.

Tune set and oscillator to 13.5 metres (22.2 mc.), and adjust T7 and then T8 for maximum response.

The short-wave padding is fixed, but check calibration throughout the range covered.

Replacement Condensers

Two exact service replacement condensers for the 277 are available from A. H. Hunt, Ltd. For the block containing C19 and C20 there is unit list number 1931A, at 8s 6d., and for C15, unit 2918, price 1s. 9d.

Ultra "Robot" 400

(*Continued from page 29.*)

Tune service oscillator to 456 kc. and adjust the iron cores of I.F.T.2 and then I.F.T.1 for maximum response, reducing the input from the service oscillator as the circuits come into line to render the A.V.C. inoperative. A non-metallic trimming tool should be used.

Signal Circuits.—Adjust the tuning pointer so that it coincides with the black dial line when the gang is fully closed.

Connect the service oscillator to the A and E sockets *via* a dummy aerial, only feeding sufficient input from the service oscillator to obtain reliable peaks in the output meter.

Medium Waves.—Tune set and oscillator to 200 metres (1,500 kc.) and adjust T1, T2, and then T3 for maximum.

Tune set and oscillator to 500 metres (600 kc.) and adjust P1 for maximum simultaneously rocking the gang.

Repeat both operations.

Long Waves.—Tune set and oscillator to 1,000 metres (300 kc.) and adjust T4, T5 and T6 respectively for maximum response.

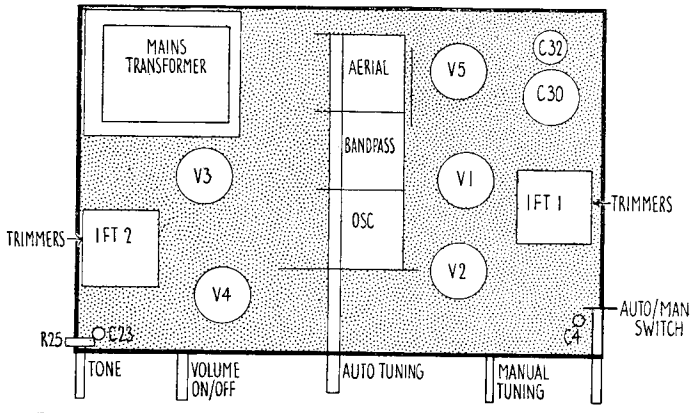
Tune set and oscillator to 1,700 metres (176.5 kc.) and adjust P2 for maximum simultaneously rocking the gang.

Repeat both operations.

Short Waves.—Tune set and oscillator to 17 metres (17,647 kc.) and adjust T7 and the T8 for maximum

The short wave padding is fixed, but check calibration throughout the range covered.

Right, is the layout diagram for the top of the chassis.



Button Adjustment

The buttons are calibrated on the actual stations themselves and not by means of generator signals.

Unscrew the centre boss, with the spanner provided, and take off the bakelite press-button cover, thereby obtaining access to the buttons. The buttons are numbered and each covers a section of the wavelength scale as follows :—

Press buttons 1 and 5, 450 to 550 or 1,700 to 2,000 metres.

Press buttons 2 and 6, 330 to 490 or 1,300 to 1,800 metres.

Press buttons 3 and 7, 230 to 390 or 950 to 1,400 metres.

Press buttons 4 and 8, 200 to 260 or 850 to 1,050 metres.

To set a button for the desired station, find the correct button to use from the table (according to wavelength) and insert the station name from the printed sheet into the name cover.

Push the button down with the spanner provided and rotate the entire plate until the button latches. Then, still keeping the button pressed down in the slot, unscrew the collar nut half a turn and rotate the entire plate until the desired station is tuned in spot on. Then screw up again making sure that the station is still accurately tuned in.

Repeat operations on different stations until all the buttons are used.

Replacement Condensers

Exact replacement condensers by A. H. Hunt, Ltd., are : for C30, 3,060, 6s. 9d.; C32, 3,068, 5s.; C7, 4,107, 3s.; C31, 2,546, 2s. 3d., and for C27, 2,899, 3s. 6d.