

NO COIL CHANGING

NO SOLDERING

ONE TUNING CONTROL

RANGE

VOLUME

QUALITY

SELECTIVITY

Supplement to
RADIO FOR THE MILLION

The Mullard Master 3



Seven times a star—

“It is amazing what The New Master Three* can do with three valves . . . ”

An aerial stretched across the ceiling brings to you the world of radio

NINE months after the publication of The Master Three its universal popularity continues undiminished. Wherever one overhears talk of radio, there echos the name of this receiver which, since December of last year, has been predominantly eminent. Throughout this country every city, town, village and hamlet can claim to have within its boundaries a number of Mullard Master Three Receivers in daily operation. An accurate computation of the number of these receivers which have rendered so great a service to the leisure hours of this island's families would be hard to make, if not impossible.

In every radio shop one reads the world-famous name. Truth to tell, its fame has extended beyond the seas to the most distant and remote parts of the earth. Nor is this widespread employment and world-wide adoption of this receiver to be marvelled at. In the opinion of the thousands upon thousands whose appreciation of and contentment with the vast panorama of radionic pleasures has been gained through the instrumentality of one of these receivers, it is a set of mark, a set of rank, rightly occupying the position and enjoying the favour of being the most popular set of the time.

Experience at the hands of the expert and practical familiarity in the homes of the non-technical has ascribed a reputa-

tion to The Mullard Master Three which time only enhances. The long experienced radio enthusiast chooses a Mullard Master Three. More valves is the only way he knows to gain a better performance. Yet he finds this three-valve receiver fascinating and only dimly realises why. It was, probably, his first choice. But capriciousness carried him into experiment with four and five valve receivers. As satisfying to the experimental turn of mind as these large receivers are, there is the inevitable return to three valves. One remarks spontaneously, “It is amazing what can be done with the simplest of three valve receivers.”

This is true in fact and substance. A very small aerial stretched across an attic ceiling brings in the whole world of radio from north to south and east to west . . . from Scandinavia to Australia and from America to the most easterly point of Asia. Indeed, there is reason for this attraction made by three valves. It is not to be disregarded that, correctly designed, sensitivity is not the only attraction with which three valves are invested. In point of fact the really desirable qualities of radio are more easily attained by three valves than with a receiver boasting more. This is an interesting sidelight on the expert's preference for a simple set.

Primarily, ease of manipulation is a corollary of the fewness of controls. In the set with which we are dealing there is only one tuning control . . . only one major operation to bear in mind while tuning. It is something in which expert and lay people alike find pleasure, the first because it provides the opportunity for the demonstration of his training and the second for the reason that excellent results are to be obtained without training. It is, that in three valves, we have universality in its widest application to the vast multitude of radio owners—

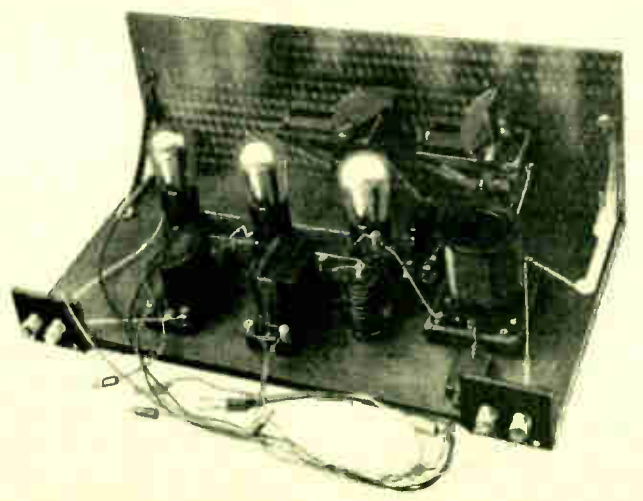
High measure of efficiency—an adjunct of the extreme simplicity of the design

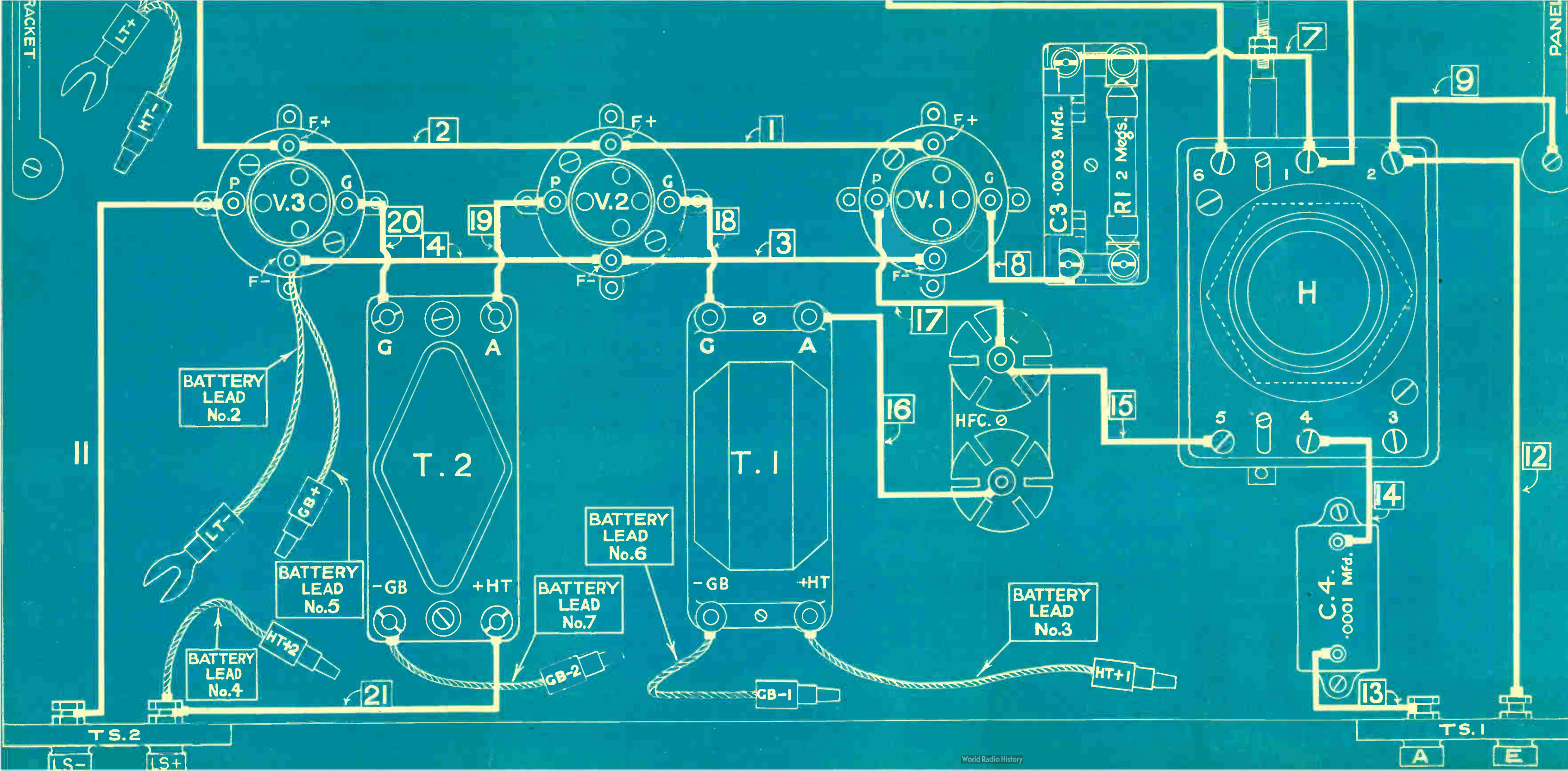
from the smallest child just tall enough and with strength enough to pull out a simple switch to the most dexterous schoolboy who, sitting up far into the dark and chilly nights, tunes in regularly transmissions emanating from the other side of the globe.

Then quality of reproduction is readily obtained without complicated devices and systems. Here again expert and lay people find themselves on common ground. Unless reaction is pressed to the point of oscillation, the quality characteristic of the three-valve receiver is irreproachable. Nor is this high degree of quality confined to the local station, as present owners of The Master Three have discovered to their joy.

Every feature which has contributed to the immense popularity of The

Mullard Master Three published during last winter is retained in the new design with which this supplement to RADIO FOR THE MILLION deals. Low initial outlay, economical running upkeep, absolute simplicity of assembly, really takes less time to assemble than any other type of set with a similar number of valves, all parts provided with terminals to make soldering entirely a thing of the past, very responsive to weak signals, gives speaker reception on most popular British and Continental stations, is easily handled by every member of the household, provides reproduced music from the radio stations of the Western world with faultless quality, a degree of selectivity higher than which it is not wise to achieve as quality would be impaired, . . . all these salient points are also characteristic of the new design. But in addition there is the utility of a combined waveband, this is the main departure from last year's model, which has enjoyed and will continue to enjoy the golden opinions of those who are possessed of it. The essential points in the circuit have been retained with a consequent retention of the performance which captivated everyone who installed a model at home.





- 19 Connect left hand terminal (F) of valve holder V.2 to terminal A of transformer T.2.
- 20 Connect terminal G of transformer T.2 to right hand terminal (G) of valve holder V.3.
- 21 Connect terminal +HT of transformer T.2 to terminal L.S. + on terminal strip T.S.2.

Battery Leads.

No. 1.—Take a piece of black flex wire about a yard in length; bare each end attaching to one a black wander plug. About twelve inches from this same end remove the braid and rubber insulation at which point attach a red spade. Fix the other end of this wire under the left terminal of the on-off switch S. The red spade on this lead is placed under the + terminal of the L.T. (Wet) Accumulator. The black wander plug on this lead is inserted into the socket marked negative of the dry high-tension battery. This wire is labelled Battery Lead No. 1.

No. 2.—A second piece of black flex cut to a length of about 2 feet, is bared at each end; to one extremity attach a black spade which is placed under the negative terminal of the low-tension (wet) accumulator. The other end is attached to the terminal F- of the third valve holder into which the L.F. valve called V.3 is placed.

No. 3.—A piece of red flex about 2 feet in length is bared at either end; one extremity is placed under the terminal marked + HT on Transformer T.1. To the other end attach a red wander plug and insert this into the socket marked 60v in the dry high-tension battery.

No. 4.—Another 2 feet length of red flex is similarly treated at each end; one end is taken to the terminal marked L.S. + on the terminal strip T.S.2. To the other end attach a red wander plug which should be inserted into the socket marked 108v in the dry high-tension battery.

No. 5.—A 9-inch length of red flex is bared at each end; take one end under the terminal F- of the valve holder marked V.3 and attach a red wander plug to the other extremity. This plug is inserted into the positive socket of the grid bias battery.

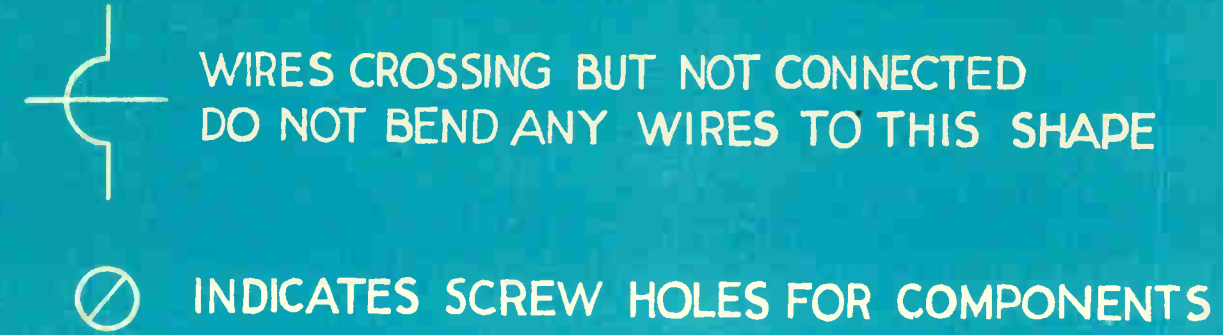
No. 6.—A 9-inch length of black flex wire is then bared at each end, one end being taken to the terminal marked - GB of transformer T.1. and a black wander plug being attached to the other is inserted into the first or second negative socket (1½—3 volts) of the grid-bias battery.

No. 7.—Another 9-inch length of flex is treated in the same way. One end is taken to the terminal marked - GB on Transformer T.2. and the other end to which is attached a black wander plug is inserted into the fifth negative socket (7½—9 volts) of the grid bias battery. When a Mullard Super Power Valve is employed this lead will be taken to the last negative socket in the second G.B. Battery.

SIMPLIFIED PLAN OF ASSEMBLY N° 304 For THE MULLARD MASTER THREE STAR

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issue of Radio for the Million

by the MULLARD WIRELESS SERVICE CO. LTD LONDON W.C.2



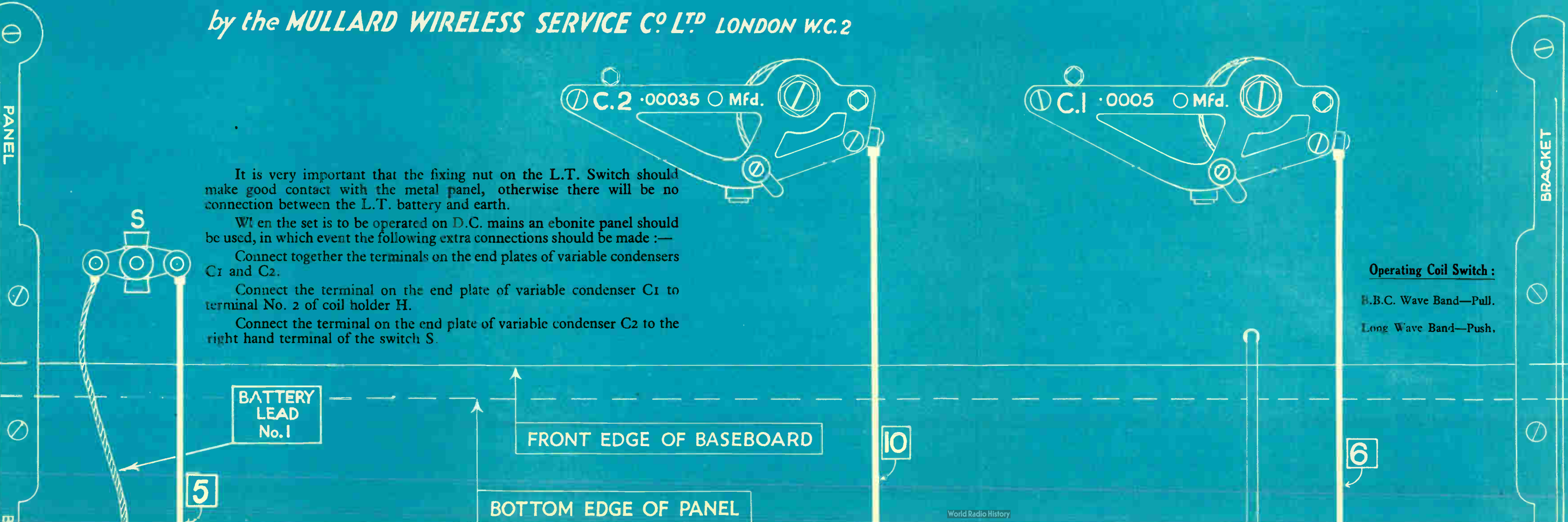
It is very important that the fixing nut on the L.T. Switch should make good contact with the metal panel, otherwise there will be no connection between the L.T. battery and earth.

When the set is to be operated on D.C. mains an ebonite panel should be used, in which event the following extra connections should be made:—

Connect together the terminals on the end plates of variable condensers C1 and C2.

Connect the terminal on the end plate of variable condenser C1 to terminal No. 2 of coil holder H.

Connect the terminal on the end plate of variable condenser C2 to the right hand terminal of the switch S.



Operating Coil Switch:
B.B.C. Wave Band—Pull.
Long Wave Band—Push.

Point-by-Point Table

- | Wire No. | Description |
|---|--|
| 1 | Connect together furthest terminals (F+) of valve holders V1 and V2. |
| 2 | Connect together furthest terminals (F+) of valve holders V2 and V3. |
| 3 | Connect together nearest terminals (F-) of valve holders V1 and V2. |
| 4 | Connect together nearest terminals (F-) of valve holders V2 and V3. |
| 5 | Connect furthest terminal (F+) of valve holder V3 to right hand terminal of switch S. |
| 6 | Connect terminal No. 1 of coil H to terminal on right side (fixed vanes) of variable condenser C1. |
| 7 | Connect terminal No. 1 of coil H to furthest terminal of combined grid leak and condenser holder R1 and C3. |
| 8 | Connect nearest terminal of combined grid leak and condenser holder R1 and C3 to right hand terminal (G) of valve holder V1. |
| <i>Note.</i> —See that the two terminals at the nearest end of the combined grid leak and condenser holder are linked together. | |
| 9 | Connect terminal No. 2 of coil H to nearest screw securing right hand panel bracket to baseboard. |
| 10 | Connect terminal No. 6 of coil H to terminal on right hand side (fixed vanes) of variable condenser C2. |
| 11 | Connect left hand terminal (P) of valve holder V3 to terminal LS—on terminal strip T.S.2. |
| 12 | Connect terminal No. 2 of coil H to terminal E on terminal strip T.S.1. |
| 13 | Connect terminal A on terminal strip T.S.1 to nearest terminal of fixed condenser C4. |
| 14 | Connect furthest terminal of condenser C4 to terminal No. 4 on coil H. |
| 15 | Connect terminal No. 5 of coil H to furthest terminal of H.F. Choke (H.F.C.). |
| 16 | Connect nearest terminal of H.F. Choke (H.F.C.) to terminal A of transformer T.1. |
| 17 | Connect left hand terminal (P) of valve holder V1 to furthest terminal of H.F. Choke (HFC). |
| 18 | Connect terminal G of transformer T.1 to right hand terminal (G) of valve holder V2. |

The long experienced radio enthusiast chooses a Mullard Master Three*

A sturdy instrument for family entertainment throughout the winter evenings

The new design adopts two stages of transformer coupled L.F., resulting in a gain in volume. It is a modification which will enable this receiver to be used under the most unfavourable conditions and yet, to produce results surpassing those even of the former model.

Where the erection of an outside aerial is possible and when one's pocket cannot extend to a more ambitious receiver, the meritorious claims of the modern adaptation of the Mullard Master Three cannot be overlooked. They are insistent and have technical, economical and practical considerations to support them.

Where domestic arrangements permit the allocation of a radio corner to the radio enthusiast, there is everything to be said in favour of installing there a modern conception of a three-valve receiver bearing the insignia of an international test. It is a receiver, to improve which, neither technical skill nor practical design could venture. Therein lies its fascination for all. Its cost is as but a few shillings viewed from the vast treasures it gives in exchange. It is a sturdy instrument for family entertainment every evening throughout the dark winter. When the children have gone to bed, comes the chance to wander into other lands . . . to hear from Europe's great cities, voices speaking to fill leisure hours with the refreshing pleasure of story, play and song; and music, ringing to stir the soul of man with its infinite variety of colour, tune and form. This is radio . . . romance if you will, but radio for all that.

The assembly of this receiver is greatly simplified by the fact that the joining up of the respective components is assisted by the system of standard connecting links procurable from your dealer at the time of purchasing the kit of parts. It is merely a matter of selecting the correct link for a given connection . . . a process by no means difficult.

Further assistance, however, might appear puzzling to devise, although every builder of this receiver knows that another step towards

the utter simplification of home assembly is announced in respect of this set. Instead of having to work with the plan at one's elbow, in which direction it is necessary to cast a careful glance every so often, the complete baseboard plan is printed upon the wooden baseboard itself. Thus it is only a matter of registering the physical outline of the baseboard components with the plan view impressed on the baseboard and immediately screwing them into position. The taking of dimensions between adjacent parts and the measuring of separations from edges becomes no longer imperative. At once are you positively sure that an exact duplicate of the original receiver is being assembled. This is a forward stride of distinct interest to those unfamiliar with plans as free of difficulty as those issued by RADIO FOR THE MILLION are in actuality. It is interesting to note that the baseboard plan is photographically exact.

With the engraved baseboard before you, place into position the coil, grid-condenser and grid-leak base, three valve holders and two transformers. Attach the two terminal strips at the back edge of the baseboard according to direction.

As panels for this receiver are obtainable ready drilled, the two variable condensers may be mounted as also the battery switch and panel brackets. Four wood screws through the other arms of these two brackets position up the panel at right angles to the baseboard. Bear in mind that the shaft of the switch must make electrical contact with the metal panel. The same applies also to the shafts of the two variable condensers.

Select connecting links in the order named by the Point by Point Table and join up each component as directed. Pass now to the eight battery leads instructions for the attachment of which are given in the second section of the Point by Point Table. Arrival at this stage completes the assembly of the Master Three for the winter of 1928 and 1929.

Prepare a table in the corner and stand on it the cabinet, into which the set may now be placed. Now everything is ready for the first trial. It is an exciting moment, however old at the game one happens to be. The interest aroused by this product of one's own hands, skill, labour and intelligence really infuses into the quiet hours of the evening quite a large measure of activity. "What will it do?" is the half-expressed thought.

With the modern Master Three you know . . . many points ahead of the last year's model. Naturally, before removing the set from the work-bench (or dining room table

Creates record signal energy for three valves—tone, volume, distance

Seven times a star . . . cost, assembly, operation, combined waves, selective, quality

probably) make a very thorough check-over. Assure yourself at the outset that all is according to plan and instruction. It is easier to rectify an error at this juncture than later on, when you find upon switching-on, that nothing happens. With just ordinary care mistakes cannot accrue as the directions are worded clearly and accurately.

All is so extremely simple, but not at the expense of efficiency. It is rather to the contrary, for the high measure of efficiency comes as an adjunct of the simplicity. In the modern Master Three you have The Master Three—seven times a star . . . a star on the counts of low initial cost and low upkeep, simplicity of assembly, through the absence of soldering, the ability to use an engraved baseboard and connecting links; responsive to weak signals; easily operated; no coil changing; selective and capable of reproducing broadcast music with the breath of reality . . . seven times a star. Indeed, a set you will be most proud to own.

Component schedule.

The following list is intended to save you the time and trouble of preparing a list of components from the plan of assembly. Every builder of the new Master Three is advised to take this broadsheet with him to his dealer and thus have handy this very important reference at the time of purchase. While there is not much possibility of the dealer being unfamiliar with the specified parts, it will enable a check-over to be made before the kit is laid out on the table at home, when one has everything else ready to start assembling.

Naturally, any wise radio enthusiast would take care to conform to the author's specification regardless of anything. A departure from the actual make and type specified does not remain at assembly troubles but may be the cause of more serious difficulty in the future, when the set would otherwise have operated perfectly. Conformity to the published design makes the construction of the

receiver a very straightforward affair. The assistance of the printed baseboard, the helpfulness of the connecting links and the simplicity of the plan of assembly are points to be considered. These are not to be lightly treated, when it is possible that the successful performance of the set may be jeopardised by failure to make full use of the assistance which these things can render.

Moreover, it should be remembered that apart from maintaining accuracy of assembly, the specified components are important in duplicating the published performance of the receiver. Experience of set construction only emphasises the wisdom of following the author's recommendations without modification in any respect. Components may have similar physical appearances, but this is no indication of operative similarity. To avoid doubt, take the path of the author. Test has shown the success of the original set.

- 1 Cabinet to dimensions (Lock).
- 1 Baseboard.
- 1 Aluminium panel, 18" x 7" (Colvern).
- 3 Receiving valves (to specification) (Mullard).
- 3 Valve-holders, new type (Lotus).
- 1 Combined Wave coil (Colvern).
- 1 Permacore transformer (Mullard).
- 1 Low-frequency transformer (type LFA) (Climax).
- 1 High-frequency choke (Climax).
- 1 Battery switch (Benjamin).
- 2 Log variable tuning condensers (.0005 mfd., .00035 mfd.) (J. B.).
- 1 Combined condenser and leak holder (complete with condenser, .0003 mfd. and leak, 2 megohms) (Mullard).
- 1 Fixed condenser (.0001 mfd.) (Mullard).
- 8 Battery plugs, 4 red, 4 black (Lisenin).
- 1 Pair of panel brackets (Burne-Jones).
- 2 Terminal strips (2½" x 2" x ¼").
- 2 Spade connectors, 1 red, 1 black (Lisenin).
- 4 Terminals (A., E., L.S.—, L.S.—) (Belling & Lee).
- Low tension battery (voltage determined by the classification of the valves used) (Exide).
- 1 High-tension battery 108 volts (super-capacity type, with super-power valve for V.3) (Siemens).
- 1 9 volt Grid-bias battery, (two with super-power valve for V.3) (Siemens).
- 1 Packet of connecting links (Junit).
- Quantity of twin flex.
- 100 feet aerial wire.
- 4 Aerial insulators.
- 1 Earth tube (Climax).

All parts provided with terminals for rapid and simple assembly

Assembly of receiver greatly simplified by connecting links and printed baseboard

Table of specified Mullard P.M. valves.

A few words of recommendation on the really vital selection to be made by the prospective set builder—valves.

Whatever has been said concerning other parts for the new Master Three, may also be applied to the valves only to a much greater degree. One cannot play fast and loose with the most essential factor in the design of a receiver. It is true to say the whole performance of the set is bound up with the valves from every angle, whether the owner intends the set to be one for providing good musical entertainment from one station or twenty.

It is quite certain that every owner of a new Master Three would not be satisfied with a travesty of the results which are to be obtained when the correct valves are employed. Nor would he be any more satisfied with a performance below that which Mullard P.M. Valves render universally possible associated with the simplest receiver design that has ever been published for the million or so people who actively interest themselves in the home assembly of radio sets. Bear in mind that the valve is to the performance of a radio receiver what boundless energy is to the athlete. The valve is more than energy . . . it is the source of power. It is the driving force from first to last. Within the attractive silvered bulb is hidden the motive power which brings you every joy to be gained by the possession of a radio set . . . entertainment from the world of sound—a world which comprises the eternal beauty of music in all its forms and the immortal personality of speech.

With so much at stake, with so much dependent upon the choice of the valves for the new Master Three, with all that radio means lying ahead as soon as the construction of the set is completed, this choice is one which, without expert direction, might well have dire consequences.

All valves are similar in physical appearance . . . a silvered glass bulb, a cap and four pins taking a special and uniform formation. But one cannot judge a valve by sight. In modern times, at the present stage of development, behind which there is a vast history of experience, one thing counts and one thing only: it is performance at the hands of the non-technical, performance in the experience of the ordinary radio set owner, who with a keen ear for efficiency, makes his choice in his millions for Mullard P.M. Valves.

In his footsteps you are recommended to follow. He understands efficiency by its interpretation of faithful quality, by its idea of ample volume, and by its conception of distance. Reliable radio has come to him through Mullard as reliable radio is the birth-right of Mullard P.M. Valves. Here are the correct valves for the new Master Three:

With a two-volt low-tension battery:

- V1. (Detector) Mullard P.M.1HF (High Frequency Valve).
- V2. (First L.F.) Mullard P.M.1LF (L.F. Valve).
- V3. (Second L.F.) Mullard P.M.2 (Power Valve).

With a four-volt low-tension battery:

- V1. (Detector) Mullard P.M.3 (General Purpose Valve).
- V2. (First L.F.) Mullard P.M.3 (G.P. Valve).
- V3. (Second L.F.) Mullard P.M.4 (Power Valve).

With a six-volt low-tension battery:

- V1. (Detector) Mullard P.M.5X (General Purpose Valve).
- V2. (First L.F.) Mullard P.M.5X (General Purpose Valve).
- V3. (Second L.F.) Mullard P.M.6 (Power Valve).

For the second low-frequency valve (V3) greatly increased quality is obtained when, in place of the above listed power valves—P.M.2, P.M.4, or P.M.6—the more suitable super-power Mullard P.M. Valve is used. It is only necessary in this case to run the set from a super-capacity high tension battery, or what is better still, a mains high-tension supply unit. We are able to say that the high degree of efficiency reached by the first two valves makes it almost imperative for a super power of the P.M.252, P.M.254, or P.M.256 class to be used in the output stage. Where it is possible to run to the slight extra cost of a super-capacity battery, make your choice from the Mullard P.M. super-power class.

Combined long and short wave coil further simplifies operation

Every feature of new design many points ahead of last year's model

In similar circumstances and where extreme quality is the main feature desired, rather than great volume, the use of a special detector valve is very helpful. Thus, where the recommended valve for V1 is a P.M.1 HF, P.M.3, or P.M.5X, employ a P.M.2DX, P.M.4DX, or P.M.6D.

Amazing results on small aerial eight miles from London.

One Sunday evening the original model of the new Master Three was tested about eight miles from London's aerial. It was connected to a good aerial and earth system during the early part of the tests. The aerial was about forty feet high, stretched across the roof of the house ten feet lower. From end to end, including the lead-in, the length of the aerial was not more than sixty feet. During daylight, Radio Paris was far too strong for the comfort of the speaker and it was not possible for people present to converse without detuning. Hilversum, though not quite as strong, was heard at full speaker volume. Daventry, of course, excelled either. After dark the signal strength was tremendous from quite a dozen stations, and it was necessary to change over to a smaller aerial round the rafters in the loft. For the remainder of the evening the tests were confined to this second aerial. It was an excellent test for the reason that this small inefficient aerial was representative and placed us at no advantage over the average conditions under which the set would normally be expected to operate. Its performance could only be adjudged as amazing. Stations at full speaker strength were tuned-in from one end of the scale to the other. To on-lookers it appeared almost magical and as it was put by one "stations came in almost tumbling over the heels of one another." This was the experience whether set for long or short waves.

Here are the dial readings of most of them:

SHORT WAVES (with the switch pulled out).

Metres.		
200	..	34
225	..	55
242	Nurnberg	67
250	Muenster	72
252.1	Bradford (2LS)	73
254.6	Kiel	74.5
245.7	Toulouse	70
260.1	Malmö	77.5
273	Sheffield (6FL)	85
276	Nottingham (5NG)	87
277.8	Leeds (2LS)	88
288.2	Edinburgh (2EH)	94
294.1	Hull (6KH)	97
297	Liverpool (6LV)	98
303.6	Königsberg	101
306.1	Belfast (2BE)	103
312.5	Newcastle (5NO)	106
319.1	Dublin (2RN)	109
323.2	Breslau	111
326.1	Bournemouth (6BM)	112
340	Paris (P.P.)	118
345.2	Barcelona	120
349.2	Prague	122
353	Cardiff (5WA)	123.5
361.4	London (2LO)	127
366.8	Leipzig	128.5
370	Paris (Radio LL)	130
374.5	Madrid	132
379.7	Stuttgart	134
384.6	Manchester (2ZY)	136
389.6	Toulouse	137.5
396.3	Hamburg	140
400	Plymouth (5PY) & Cork (6CK)	142
405.4	Glasgow (5SC)	143.5
409.8	Berne	145
429	Frankfurt-on-Main	151.5
441.1	Brünn	155
448.4	Rome	157.5
461.5	Oslo	161.5
471.6	Langenberg	164
483	Berlin	168
491.8	Daventry (5GB)	170
500	Aberdeen (2BD)	173
508.5	Brussels	175.5
517.2	Vienna	178
522	..	180

LONG WAVES (with the switch pushed in).

1071	Hilversum	55
1153.8	Kalundborg	70
1250	Königswusterhausen	85
1604.8	Daventry (5XX)	135
1765	Radio Paris	152
1875	Huizen	165