About the T.1154

GENERAL ARRANGEMENT, MODIFICATION AND OPERATION

IF there is one item of "surplus" equipment, more than any other, that never seems to die, it is the ex-R.A.F. T.1154, still available at a ridiculously cheap price.

The T.1154 was the first modernised airborne transmitter to be supplied to the R.A.F. during the early part of the war, and it was designed to work in combination with a companion receiver, the R.1155—also well known and still in good supply.

It cannot be said, however, that either the T.1154 or the R.1155 are really suitable for serious work on the amateur bands. Nevertheless, at its price and because it can be modified, the T.1154—which is basically a very sound design—has become popular. In any event, it can be kept as a useful stand-by while, to some people, it is an interesting intellectual exercise to work out the modifications needed to make it into a good transmitter. And in

Table of Values

Essential Circuit of the T.1154 Transmitter

*C1, C2	= 150 $\mu\mu$F	R1	= 51 ohms
C3, C5	= .005 μF	R2	= 15,000 ohms
C4, C10	= 200 $\mu\mu$F	R3	= 50,000 ohms
C6	= .004 μF	R4, R5	= 75,000 ohms
*C7	= 205 $\mu\mu$F	R6	= 350 ohms
C8	= 0.25 μF	R7	= 5,000 ohms
C9	= .01 μF	R8	= 12,000 ohms
C11	= 50 $\mu\mu$F	R9, R10	= 20,000 ohms
C12	= .001 μF	R11	= 2,000 ohms
CM	= Carbon microphone	R12	= 6 ohms
		R13	= 10 ohms
EM	= Electro-magnetic microphone	R14	= 650 ohms
		R15	= 7,500 ohms
V1, V4	= ML6	R16	= 800 ohms
V2, V3	= PT15		

(*C1, C7 are larger values in the MF tuning section, 200-500 kc).

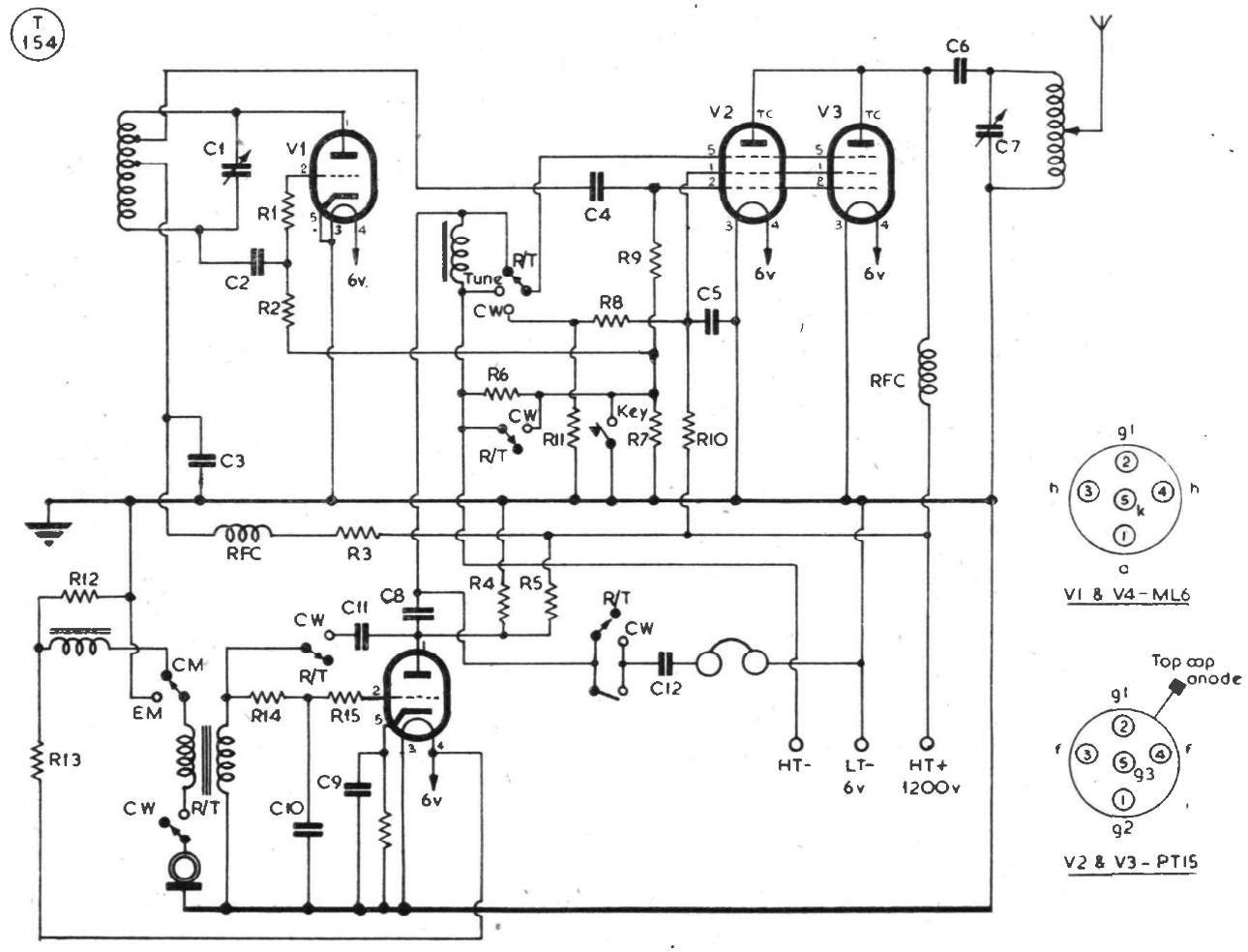

Fig. 1. Essential circuit of the T.1154 transmitter. The arrangement is MO-PA (V1-V2, V3) with an ML6 driving a pair of PT15's in parallel. In the original V4, also an ML6, was used for suppressor-grid modulation and MCW transmission. This part of the circuit can be modified as indicated in the text. For simplicity, the separate tuned circuits for each of the three ranges covered have been omitted in this diagram. For effective amateur band operation, various modifications are necessary. *(Note: The resistor across C9 is R16).*

the end, when finally "reduced to produce," the T.1154 will yield a very useful assortment of parts !

The fact remains that a great many T.1154's are in regular use, and in most cases their owners have contrived to make them put out a reasonably good signal. Indeed, several practical articles on the T.1154 have appeared in *Short Wave Magazine*, the most recent being that by G3EGC in the June, 1955, issue. The notes below, which, as well as being based upon articles published previously, also contain some new material, should be read in conjunction with the suggestions by G3EGC in the June issue.

General Description

The T.1154 is a 100-watt CW/Phone transmitter, using an MO-PA arrangement — an ML6 driving a pair of PT15's in parallel. The frequency coverage is in three ranges : 5·5-10 mc, 3·0-5·5 mc and 200-500 kc. Thus, the amateur bands covered are 3·5 and 7 mc.

At the 'phone position, provision is made for operation with either a carbon or an electromagnetic microphone. Suppressor-grid modulation is used, with a second ML6 as modulator, and there is a side-tone circuit for CW monitoring.

Each tuning range has its own coil-condenser assembly on both MO and PA sides and on all three ranges, which are selected by means of switching. Any desired frequency in the range selected, up to a total of eight, can be pre-set by an ingenious click-stop mechanism which locks the dial at a particular setting.

Aerial Coupling

The aerial coupling as fitted is direct and was designed to be used either with the aircraft fixed aerial or the usual trailing aerial, which on the HF bands could be run out to a length to match the frequency.

At a ground (amateur) station, the aerial output could be taken to any type of transmitting aerial *via* a suitable matching network.

Apart from the wave-range selection and tuning, the T.1154 is entirely relay controlled, with automatic change-over in combination with the R.1155 receiver. Two panel meters are fitted, reading 0-300 mA for plate and 0-3·5 amps RF for aerial current.

The equipment is extremely ruggedly built and is shock-mounted to withstand the inevitable rough usage involved in aircraft working. Unit construction has been adopted and the various elements of the transmitter are on separate chassis.

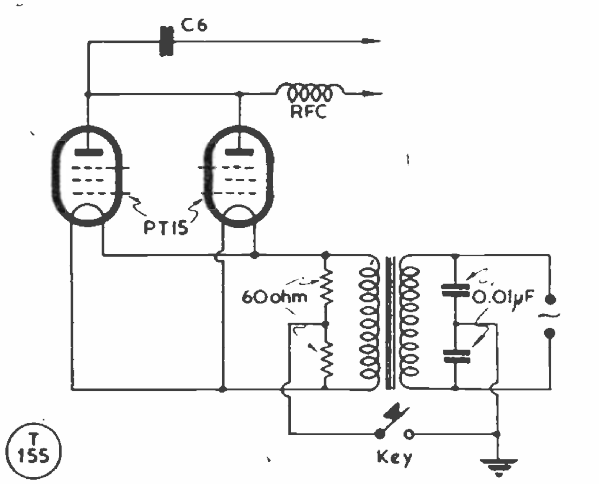

Fig. 2. LT supply and keying circuit for the T.1154 PA. Originally proposed by G2ASY in our December 1953 issue, this gives clean, sharp keying, with a good note, and is a great improvement over the original.

In the air, power at 1250 volts HT and 6 volts LT was obtained from motor-generators operated off the aircraft 24-volt DC line. One of these two generators was double-wound to give LT for the transmitter and R.1155 receiver, as well as HT for the latter.

The inter-connection between the units—transmitter, receiver, power generators and control system—involved a good deal of complicated wiring and the use of a starter control for ensuring that LT was fully applied to the transmitter before HT could be switched on.

Instruction Manual

There is not the space here to discuss all these points in detail ; the Service manual describing the installation contains on the T.1154 alone some 24 quarto pages of instructions and warnings, with numerous illustrations and tables and two double-page detail wiring and circuit diagrams. Indeed, this manual is a model of its kind, containing all the information which could possibly be required on the construction, operation and maintenance of the whole installation. Wherever possible, anyone contemplating the modification of a T.1154 should endeavour to obtain the manual, one copy of which was originally supplied with each equipment issued to the Service.

T.1154 Circuitry

The essential circuit, for one band only, is shown in Fig. 1. As three separate wave-ranges are selected and tuned, there are actually three switched sets of coil-condenser assemblies at the anodes of V1 and V2, V3. The modulator section can be modified to give much improved results (*see* p.177, June, 1955, issue),

and so can the PA tank—*see* same article, which also discusses some other desirable PA modifications. At Fig. 2 is an improved LT supply and keying circuit, fully described below.

The first thing is to remove completely the long-wave (200-500 kc) tuning sections, being careful to leave the common HT positive lead intact. This is the rear-most of the vertical bare wire leads on the left of the chassis. It feeds the yellow, red and blue sections through an RF choke just at the rear of the yellow oscillator sections. The next step is to get the red and blue oscillators operating with a T9 note when feeding the oscillator valve V1 with AC. A ·01 μF condenser is connected across the filament of the ML6 oscillator and the note should be found to be T9.

A separate filament transformer is necessary to supply the PT15's, the long yellow positive LT lead to the PA valves being eliminated by taking connections direct to them from the transformer. A 6v. 3 amp LT transformer can be installed in the space formerly occupied by the long wave PA tuner (bottom right of chassis). Then, two 60-ohm resistors are connected across the secondary of the filament transformer in series and the point between them earthed, with two ·01 μF condensers across the primary of the same transformer and to earth in the same manner.

When this is done the PA note will be T9, with no trace of AC ripple. When the yellow lead to the PT15's is removed the connections from the other sides of the filaments to the chassis are also taken out, as the PA can

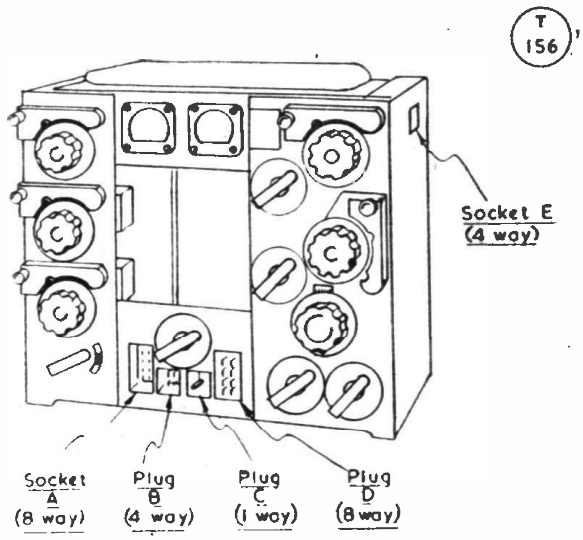

Fig. 3. Outline appearance of the well-known T.1154, to locate the connector points, the key to which is given in Fig. 4.

then be keyed by breaking the lead from the centre of the two 60-ohm resistors and inserting the key there. The keying is clean and smooth.

The send-receive relay at the right-rear of the chassis is fixed in the "send" position and the aerial lead plugged in to the "HF aerial" socket.

Figs. 3 and 4 will enable the power connection points on the T.1154 to be identified, without the necessity for laborious tracing through the whole transmitter. By connecting power as shown in Fig. 4 (the "emphasised" leads) the transmitter can be got going—though at first this should be into a dummy load consisting

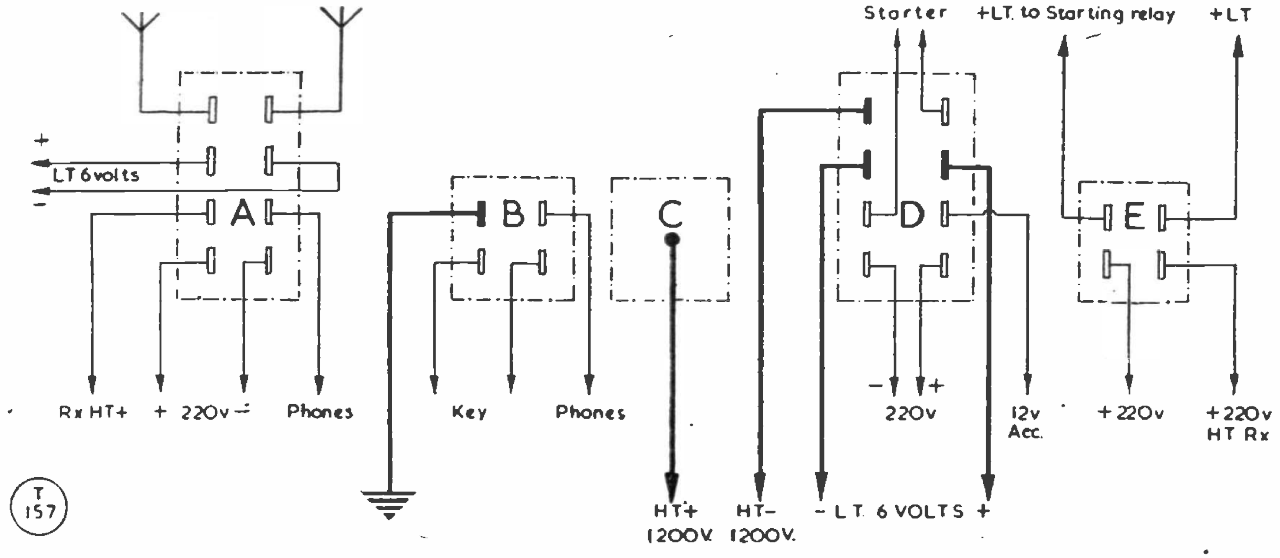

Fig. 4. Detail of the connector system on the T.1154 transmitter—see Fig. 3 for location diagram. By making the connections as emphasised in this sketch, power can be applied direct to the transmitter without involving the receiver inter-connection or control circuitry, which can be ignored.

of a 60-watt lamp coupled to the PA coil by a few turns of flex. Furthermore, if AC is used, the LT supply connections will have to be modified as shown in Fig. 2.

In any event, before putting the transmitter on the air, an aerial tuning unit should be provided, which can be of the type suggested by G3EGC on p.177 of the June, 1955, issue of *Short Wave Magazine.*

Power Supply

It is not necessary to provide the full 1200 volts called for by the original design. The transmitter will work quite well at lower inputs with 500-600 volts HT. In the latter case, it would be necessary to locate R3 (*see* Fig. 1) in the assembly—it will be one of the high-wattage types on the rear panel—and substitute a 20,000-ohm 10w. resistor. This is to ensure the ML6, V1, getting enough HT to give sufficient RF drive at the reduced voltage.

The Valve Types

The PT15 is a very good valve of its kind, and certainly should not be sneered at merely because it is an obsolescent type. Its characteristics are similar to the American RK20, which is still in the lists. For less than 2 watts of grid drive, the PT15 will give up to 60 watts RF *output,* and a single valve can be run at 100 watts DC input with 1200v. HT. A pair in push-pull are easy at 150 watts input at least up to the 14 mc band, and probably on 21 mc as well (the writer has not himself used a PT15 above 14 mc). As they are usually "given away" with the T.1154, their potentialities should be kept in mind for other amateur band transmitting apparatus — incidentally, the PT15 is on a British 5-pin *ceramic* base, and is a directly-heated filament valve, taking 6·0 volts at 1·3 amps. (The S.T.C. 4052A is a similar valve, but is on an American 5-pin base, pluggable with the RK20.)

The ML6, two of which go with each T.1154, is also a very useful RF valve, as G5JU has shown in his article in the November, 1955, issue of *Short Wave Magazine.*

Going After DX

NOTES FOR NOVICES

PART I

THE OLD TIMER

The intention of this short series—promised in our November Editorial—is to give the beginner on the DX bands some advice and guidance on raising it. Though the art of working DX cannot be taught and can come only by practice and experience, there are a number of fundamental "rules of procedure," evolved over the years, which the novice needs to know, and which will help him considerably in his quest for DX. It is our contributor's hope that he will be able to pass on the benefit of his own experience of many years on the DX bands.
—Editor.

EVERY weekend finds a handful of brand-new stations taking the air for the very first time, and every weekend finds the bands more crowded. Conditions are vastly better than they were a year ago, and they are likely to improve for some time to come, which means that more and more stations will come back on the DX bands after "resting" during the years of poor conditions.

It is our guess that at least two-thirds of the novices taking the air have, as their chief ambition, the idea of working DX. Not rare stations like ZD9's and VR6's—just "DX," meaning W's, VK's, ZS's and whatever they are lucky enough to reach with their new gear.

In this and subsequent short articles we hope to show them how to do it with the least trouble to themselves, and with the least interference to all the other users of the bands.

Avoid CQ Calls

Our first and strongest piece of advice is "Don't call CQ." CQ calls are all very well on an apparently empty or dead band—a hopeful throwing out of bait. But on a heavily populated band they are a waste of time, because there will be so many of them already going on! So look for a DX station calling CQ, set your VFO very near his frequency (say 2 kc on one side or the other) and call him when he signs.

Get in *quickly* — don't waste time over "dah-de-dah-de-dah," which is the trade mark of a man who simply hasn't a clue about DX work. Send his call perhaps four times—no need for more—and sign your own three or four times. Simply "W1ZZZ W1ZZZ W1ZZZ W1ZZZ de G3XXX G3XXX G3XXX K." No need for any other trimmings, and the quicker you start it the better. If he doesn't hear you during a call of that length, you can take it that he wouldn't have heard you any-