TRANS TRONIC

PATENTS PENDING

Super 60

INSTRUCTION BOOK

A BRAYHEAD PRODUCT

TRANSTRONIC - SUPER 60

Patents Pending

LIST OF PARTS

Part No.	Quantity	DESCRIPTION	Electrical Symbol	Check
1	1	Coil, medium waves–long waves.		
2	1	Ferrite plunger coil.		
3	1	Low-frequency transistor (Blue coding).		
4	1	High-frequency transistor (Red coding).		
5	1	Diode.		
6	2	270 pF capacitors.		
7	1	Battery holder.		
8	1	Key.		
9	1	Earphone-microphone.		
18	1	0.1 mF capacitor.		
19	1	4.7 K ohms resistor.		
20	1	220 K ohms resistor.		
10	1	Stranded aerial.		
11	1	Earth with clip.		
12	1	Packet of connectors.		
15	1	Standard drilled chassis.		
	7	Circuit diagrams.		
	1	Instruction booklet.		

Check that your set is complete by ticking the check column.

CONTENTS

General information on the TransTronic

Radio, or more accurately, Electronics, the science of the future, is conquering new fields every day. Radio, television, High-Fidelity amplifiers, guidage systems, navigation, radar, electronic brains, artificial satellites, etc., and soon, space travel, all rely to a large extent on electronics.

But electronics is a very complicated science which would appear to be beyond you. It is indeed complicated but not beyond you provided you begin at the beginning. Your **TransTronic** has been designed and created for that very purpose. In fact, with your **TransTronic** workshop you will be able to build easily and on your own, without any possible mistakes and without any danger, various kinds of radio sets.

For all the radio circuits, **TransTronic** uses the **transistor,** that marvel of modern engineering which acts in the same way as the valves in an ordinary radio, but is very much smaller and consumes very much less current. Thanks to the transistor, all your **TransTronic** assemblies run for hundreds of hours on a simple 3-volt torch battery, thus eliminating any risk of electrocution. **All contacts may be touched without any danger, even by very young children.**

With the **TransTronic** system, connections between components are made by prepared wires of different lengths and special TransTronic clips. These clips make a reliable contact **without using a soldering iron** and allow the circuits to be constructed and dismantled very quickly.

The scope of your TransTronic " Super 60 " set

With the components in your Super 60 set you can build :

Circuit No. 1. : Single diode medium and long wave receiver, without battery, the simplest of circuits enabling nearby powerful stations to be received.

Circuit No. 2. : Single transistor medium and long wave receiver working off a 3-volt battery, more sensitive than Circuit 1.

Circuit No. 3. : Diode and Transistor medium and long wave receiver working off a 3-volt battery.

Circuit No. 4. : Short-range morse transmitter incorporating a transistor transmitting morse with a key to a neighbouring receiver without **connecting wires, i.e. wireless.**

Circuit No. 5. : Short-range speech transmitter incorporating a transistor, transmitting speech by speaking into the combined earphone and microphone.

Circuit No. 6. : Medium and long wave receiver incorporating a diode and 2 transistors. The best receiver with your " Super 60 " set.

Circuit No. 7. : Transmitter-receiver for wireless communication with two similar circuits built with two TransTronic sets.

But this is not the limit, when you get to know your " laboratory " better, you will do your own tests and experiments in the tracks of the radio engineers. Many other circuits are possible.

This is the way to build each circuit :

Circuit No. 1 : Diode Receiver

3-1.—Construction.

Take the drilled chassis from the box and place it flat on a table.

Take circuit No. 1 and place it on your chassis so that the holes correspond.

Take from your set the components shown on the circuit diagram and fit them by gently pressing the bosses into the holes in the chassis. Keep to the positions shown in the diagram, (fig.1).

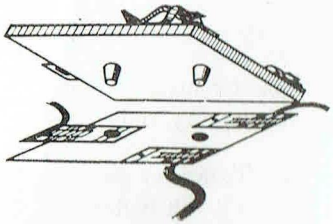

Fig. 1

Wire up your circuit. To do this take connections which are the same length as those shown on the diagram and pinch the bared ends in the **TransTronic** clips fitted to each component, as shown in fig. 2.

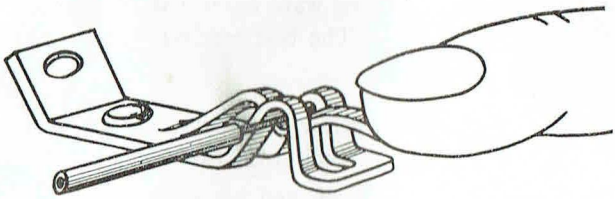

Fig. 2

The TransTronic clip can take up to three connections satisfactorily.

Connect the ends of the Earphone-Microphone lead to the point shown in the same way.

Connect also in the same way, the earth wire (the one fitted with a clip) and the aerial to the points shown, **by their bared parts.**

3-2.—OPERATION.

Connect the earth : Place the universal clip on your earth wire on the **bare** part of a water pipe (tap) or gas pipe (not your gas fire if it is connected by means of a rubber tube) or to the central heating system (scratch away the paint if necessary).

Warning : A very good earth contact is nesessary for correct operation of all receivers.

Connecting the aerial : Unwind the aerial wire coil **completely** and **stretch it to its full extent** either over your floor or, better still, suspend it indoors or outdoors between two points away from the earth (tree, balcony, etc. fig.3).

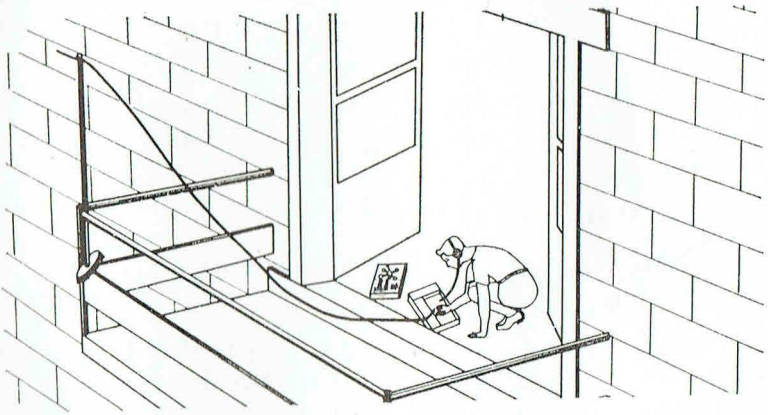

Fig. 3

Put on the headphone-microphone so that the ear-piece is centrally adjusted over your ear.

Search for stations by sliding the tuning tube **very slowly** holding it by the red knob.

To change the waveband, place the coil-capacitor connection on the dotted line marked PO for medium waves, on the full line for long waves.

The receiver you have just built (Circuit No. 1) is the simplest of all receivers ; it uses neither battery nor transistor, and therefore is not very

sensitive and receives only powerful nearby stations. Do not be disappointed if reception is weak ; this is quite normal, the following explanations will explain why. Now that you have already gained a little experience, try Circuit No. 2, then No.3 and finally No. 6 which will give you better results.

3-3.—EXPLANATION :

Radio waves which are sent out from the transmitter are captured by your aerial in the form of a very weak high-frequency current which is set up between the aerial and the earth.

Your " tuning coil " with its " plunger core " and your capacitor select a certain frequency corresponding to the station you want.

The selected current then flows through your Diode which acts as a detector, which means that it transforms the **high-frequency current** into a **low-frequency** current which you are able to hear in your earphone.

You will see immediately that this receiver gives only a weak signal because it does not add any energy to the signal received by the aerial.

3-4—DISMANTLING :

Remove all connections and straighten them out before putting them back in their bag.

Dismantle the components, taking care to pull them by their plastic bases and **never by the electronic portion, its connections or its clips.**

Replace each component in its correct place.

Circuit No. 2 : Single transistor Receiver

4-1.—CONSTRUCTION :

Construct your No. 2 Circuit by following the same procedure as for Circuit No. 1. (See 3-1).

Use the Red coded HF transistor.

Warning : See that the battery holder is fitted in the position shown in the diagram.

4-2.—OPERATION :

Connect the aerial and the earth.

Put a 3-volt small torch battery into the battery holder in accordance with the diagram engraved on the base. If you put your battery in the wrong way round, **it will not make contact.**

Put on the combined headphone and microphone and search for stations

4-3.—EXPLANATION :

In this circuit, the current selected by your coil passes through the transistor where it controls by bias, the current from the battery flowing from the emitter to the collector of the transistor, then into your headphone (fig. 4).

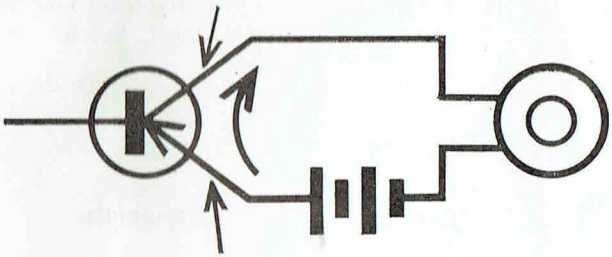

Fig. 4

In this particular case, your **transistor** acts both as **detector** and **amplifier.**

The receiver receives energy from the battery, which explains why you can hear the signal more strongly.

Circuit No. 3 : Diode and Transistor Receiver

5-1.—CONSTRUCTION :

Proceed as for the previous circuits.
Make sure that the battery is in the right way round.
Use the Blue coded LF Transistor.

5-2.—OPERATION :

Fit the battery.

Connect aerial and earth.

Put on the combined headphone-microphone and search for stations.

Try also connecting and disconnecting the 220 K. ohms resistor on the right of your circuit.

If the signals appear to be weak, try reversing the diode which may give better reception the other way round.

5-3.—EXPLANATION :

In this circuit, you are using your Diode for detecting the **High Frequency** current from the aerial ; then your transistor **amplifies** the **Low Frequency** current which you heard directly with Circuit No. 1.

This circuit shows you how much **gain** you get with the **Transistor.**

Circuit No. 4 : " Morse " Transmitter

6-1.—CONSTRUCTION :

Fit all components and wire up as usual.

Use the Red coded HF Transistor.

6-2.—OPERATION :

Fit the battery.

Connect aerial and earth.

Put on the combined headphone and microphone.

Press down the **key** (the red knob at the bottom and to the right of your circuit) with the index finger of your right hand. Slide the core gently keeping the key depressed until you hear a note.

By pressing for different lengths of time on the key, notes of different duration are produced. These enable you to transmit messages in Morse code :

a short one : dot.

a long one : dash.

Learn the Morse alphabet by heart (see at the back of this book).

You will note that by moving the core slightly you can alter the tone of the note.

Every time you press the key, your TransTronic transmits your message by radio waves like a real transmitter.

You can therefore receive your own transmission on the radio in your house or on another **TransTronic** receiver (Circuit No. 6) if you are playing with a friend who has one also.

To receive on the radio in your house, place the aerial of your **TransTronic** indoors near the radio, **not outside.**

Keep the key pressed and turn the tuning knob on the radio (on the medium waveband) until you hear the note from your transmitter over the radio (turn volume up full).

Having done this, you can transmit your messages from one room to another by **real wireless communication.**

If the signal is received over another station, change the frequency of your own transmission by moving the plunger core **gently** and follow this on the radio with the tuning knob.

6-3.—EXPLANATION :

You have just built a real transmitter using the same basic principles as the big radio transmitters.

Actually, the radio waves are produced from your aerial by the high frequency current which flows through it.

This current is produced by an **oscillator** formed by your Transistor and the two medium and long wave coils which react with each other.

The tone of your transmission is due to the **locking of the oscillations** at an audio-frequency for a certain coupling of the two coils (tuning).

Circuit No. 5 : " Speech " Transmitter

7-1.—CONSTRUCTION.

Fit all the components shown and wire up your transmitter.
Use the Red coded HF Transistor.

7-2.—OPERATION :

— Fit the battery.

— Connect the aerial and the earth, the aerial should be located indoors near your Radio set.

— Put the combined headphone and microphone close to your ear.

— Move the plunger core until a **very high pitched whistle** is heard.

— Turn on the radio set to the medium waves and tune in the whistle at its loudest.

— Continue to move the plunger core in the direction in which the note becomes higher still.

— Follow the loudest point on the radio.

— Stop moving the plunger core as soon as the whistle becomes inaudible after being extremely high pitched.

— Turn the volume of the receiver up full.

— Speak loudly into the combined microphone and earphone, placing it against your mouth.

— You should hear your voice on the radio set.

— Tune in the radio to the loudest point while you continue to speak into the microphone.

EXPERIMENTS :

Speak while you hold the microphone at the side of your throat : the combined microphone-headphone acts as a throat microphone.

Place the headphone and microphone against the loudspeaker of the radio. If it is correctly adjusted, you will hear a very strong, low noise which only stops when you take the microphone away from the loud speaker. This noise is due to re-amplification of the sound received by the microphone from the loudspeaker, then again by the microphone, and so on. This is called the " Larsen effect."

Move your plunger coil gently each side of the tuned point and you will be able to hear on the radio a station which is not usually found at that point.

It is your " TransTronic " Transmitter which is receiving a nearby powerful station and re-transmitting it to your receiver.

7-3.—EXPLANATION :

The principle of this transmitter is the same as the previous one (note that the whistle is not very different). But your **Transistor oscillates at High Frequency** only, there is no locking. The high-frequency oscillation is **modulated** by the current from your microphone.

Circuit No. 6 : Two-Transistor Receiver

8-1.—CONSTRUCTION :

— Fit components as for the other circuits.

— Pay attention to the resistors :

— Resistor 4.7 K ohms marked by yellow, violet and red bands should be placed between the first transistor and battery.

— Resistor 220 K ohms (red, red, yellow) should be placed between the second transistor and the battery.

8-2.—OPERATION :

Connect the battery, aerial and earth, search for stations as with circuit No. 3.

If the reception is distorted, try turning the diode round the other way and disconnect the 220 K ohm resistor as in the case of Circuit No. 3.

8-3.—EXPLANATION :

With Circuit No. 6 you have built a second amplifier stage and in this way you obtain much stronger reception than with Circuit No. 3.

If you are in a good reception area, you may be able to receive without earth and even perhaps without an aerial.

Circuit No. 7 : Transmitter-Receiver

9-1.—CONSTRUCTION :

— Fit and wire up your circuit as usual.
— Use the Red coded HF Transistor.

9-2.—OPERATION :

— This transmitter-receiver is a station which enables wireless communication to be established between two points with the aid of two similar circuits. It is therefore interesting to communicate with somebody else who has the same **TransTronic Super 60** set and has built the same circuit.
— Connect battery, aerial and earth.
— Place the two aerials near one another.
— Place the combined microphone-headphone to the ear.
— The circuit operates as a transmitter when the key is pressed and as a receiver when the key is in the raised position.

9-3.—EXPLANATION :

You will recognise your No. 3 receiver and your No. 4 transmitter in this circuit.

10. —OTHER POSSIBILITIES :

Your " **TransTronic Super 60** " enables you to make contact with the marvels of the Science of Electronics.

The knowledge you have acquired will now enable you to build sets directly from circuit diagrams which are shown above and to the right of each diagram. Try it !

ALPHABET MORSE

A . —	N — .	1 . — — — —
B — . . .	O — — —	2 . . — — —
C — . — .	P . — — .	3 . . . — —
D — . .	Q — — . —	4 . . . . —
E .	R . — .	5 . . . . .
F . . — .	S . . .	6 — . . . .
G — — .	T —	7 — — . . .
H	U . . —	8 — — — . .
I . .	V . . . —	9 — — — — .
J . — — —	W . — —	0 — — — — —
K — . —	X — . . —	
L . — . .	Y — . — —	
M — —	Z — — . .	

ATTENTION

1. The range of the **TransTronic** transmitters can, under certain circumstances, be sufficient for your transmissions to reach your immediate neighbours' receiver. Make sure you are not interfering with reception in your neighbourhood, particularly during meal times and in the evening, and you will avoid being the subject of complaints to the Post Office Authorities.

2. Note also that if you are thinking of building a permanent **TransTronic** receiver, it must be declared unless your parents already have a receiving licence. You will have to apply to the Post Office for a licence if or before you make a permanent **TransTronic** Transmitter or Transceiver.

3. Spare Parts are obtainable from either your Supplier or direct from the manufacturers :—

Brayhead Products Limited,
The Power House,
Headstone Lane,
Harrow, Middx.
Telephone : Hatch End 1021

Hendon Printing Works Ltd., 66, East Road, Burnt Oak, Edgware, Middx. Tel.: EDGware 6181