

Variations on a theme: The Bush MB60 family by Robert Darwent

Like many, I found myself immediately drawn to the stylish appearance of these Bush portables that have become so evocative of the late 50's and early 60's period when they were released. Whether you share my enthusiasm for these sets or not, you will have not failed to notice just how popular they have become among vintage radio enthusiasts and the general public alike. The story of how the moulded plastic case for the first incarnation in the family, the MB60, was designed by David Ogle is well known, but how many are as familiar with all of the other related models that share this classic case design?



The MB60 (Early) model using the A99 chassis



The EBM60 export model using the A100 chassis



The MB60 (Later) model using the modified A99 chassis



Ogle's 'iconic' design proved so successful that Bush went on to release at least fifteen model variants that used it, several of which are scarce and a few quite rare by comparison to the better known sets. That success was not just down to the eye-catching good looks however but in equal part due to the simple well thought out ergonomics. The sets have a large tiltable carry handle and an attractive circular tuning dial which is both easy to read and a pleasure to use. Likewise the oversized thumbwheel controls and waveband push buttons make operation very simple. Definite plus points amongst prospective purchasers especially if you have poor eyesight and/or large fingers, factors which no doubt contributed greatly towards the design's overall popularity and longevity. So lets get acquainted in greater detail with the models in the family and begin with the set that started it all;

The MB60

Released in 1957 the MB60 is a two band portable designed for AC mains or battery operation, hence the model being designated 'MB' for Mains/Battery. The set is switched over from one power source to the other by the mains lead operating a

simple switch arrangement when the plug is inserted or withdrawn from its socket. The set uses five Mullard Dx96 series battery valves, which was one more than typical four valve designs of the time, due to the circuit having an extra IF amplifier. This made the set a good deal more sensitive, a definite advantage over its rivals. It covers the reception of the long and medium wavebands using an internal ferrite rod with provision to plug in an external aerial via a socket at the rear. The moulded plastic case is light grey in colour with a red rexine band around the middle, brass being used for the 'B U S H' lettering and the trim. Initially the MB60 was designed to operate using an Ever Ready B147 battery or equivalent, which was a combined HT and LT unit, however the decision was made to modify the original chassis to allow the use of separate HT (Ever Ready B131) and LT (2 x U2 cells) batteries instead. Consequently all MB60's with serial numbers 12001 onwards have the modified chassis arrangement. The chassis remains electrically identical just some of the components, most noticeably the DL96 output valve and some large electrolytic capacitors, have been repositioned to accommodate the different battery types.

The TR82

Following on the success of the initial design Bush released in 1959 the TR82, a transistorised version of the MB60. Instead of battery valves this set uses seven Mullard OC-series transistors. Unlike the MB60 the set is battery powered only, using a 9 volt Ever Ready PP9 or equivalent. The initial models released were the TR82B and the TR82C, the difference only being in the colour scheme offered. The TR82B model has a cream case with a dark brown rexine band around the middle and as with the MB60 the metal trim on the set is brass. Whilst the colour of the TR82B case is best described as "coffee" or "mushroom" in shade, Bush described the colour themselves as "Regency Cream". The TR82C model has a light blue/green case with a dark blue rexine band around the middle, metal trim on these sets being chrome.

The VTR103

A further development of the MB60 theme came in 1961 with the release of a new set that had VHF coverage from 88 to 100 MC/s in addition to the existing long and medium wave ranges of the earlier models. Given the model designation of VTR103, it had a chassis design that



The TR82B & TR82C models using the A177 chassis



The ETR82 export model using the A190 chassis



The ETR92 export model using the A253 chassis



made use of the recently available Mullard AF11x series of alloy-diffusion transistors which offered improved HF performance over the earlier OC-series. The colour scheme for the set was new too, the case being light cream or ivory in colour with a tan rexine band around the middle. The metal trim is chrome and a telescopic aerial was provided for VHF reception, capped by a translucent red plastic 'pip'.

The TR82 modified

Shortly after the VTR103 release, Bush modified the existing chassis used in the TR82 slightly to include an headphone socket. Only the TR82C and apparently not the TR82B received this modification, examples of which all seem to have high serial numbers beginning 15xxxx. In addition this same modified chassis was used for the release of a TR82 set having the same colour scheme as the VTR103, that is light cream case, tan rexine and chrome trim, designated the TR82D.

The TR82 Mk.II

In 1963 Bush released Mk.II versions of the TR82C and TR82D with a new chassis which also made use of the improved Mullard AF11x series transistors, the existing colour schemes of both models being retained. Presumably the earlier headphone modification for the TR82C and TR82D was either a way of using up existing stocks of the earlier chassis or used simply as a stop-gap measure until Bush was ready to release the Mk.II models. In any event, it made the sets with the modified chassis relatively short lived and they are fairly scarce in number. Again noticeably a Mk.II version of the TR82B set seems not to have been produced.

The VTR103C

Almost as an after thought, in 1964 the VTR103 design was released in the alternate colour scheme of light blue/green case, blue rexine and chrome trim as per the existing TR82C model and bearing the model designation VTR103C.

The TR82L

Released in 1964, the 'L' suffix denotes that the set had the addition of a preset '208' tuning button for Radio Luxembourg. As with the standard TR82 models the colour schemes offered were the same. So you could have the TR82CL with a blue/green case and blue rexine or the TR82DL with a light cream case and tan rexine, both models having chrome trim. But why bother to produce sets with a '208' button in the first place? Well Radio Luxembourg was immensely popular at the time and was the station of choice during this period for the younger generation, however receiving Radio Luxembourg was not without its problems. It suffered a great deal from fading after dark and could be quite difficult to tune in, so a preset button specifically for the station was very useful. No doubt it was a good selling point for the sets.

The Export sets

Intended for use overseas these models offer three wavebands. Dispensing with the long wave range, they instead offer the medium and two short wave bands. All three models were produced in much smaller numbers than their domestic counterparts and are quite rare by comparison.

The EBM60

The EBM60 was the first export set and as its model number suggests is the export

version of the MB60, both models being released at around the same time in 1957. The EBM60 shares the same colour scheme as the MB60 too, that is light grey case, red rexine band and brass trim but the dial is clearly different having short-wave scales and legends. Interestingly the long strip of brass metal trim at the back of the set doubles as a sort of internal short wave aerial, however a separate plug-in telescopic aerial was also provided with the set which greatly improves reception. Like the MB60 the set uses five Mullard Dx96 series battery valves and is mains or battery powered, using HT (Ever Ready B131) and LT (2 x U2 cells) batteries.

The ETR82

Now for the most unusual and possibly also the rarest set of the family. Released in 1959 the ETR82 was the second of the export sets and is interesting and unique for a couple of reasons. Firstly it is a hybrid (i.e. valve and transistor) and secondly I believe it is the only hybrid set that Bush ever made. The circuitry is basically the front end of the EBM60 spliced to a TR82. This was done because the short wave coverage of the ETR82 extended to 18MC/s (16m-band) and the Mullard OC4x series transistors available at the time could not be guaranteed to operate reliably at that high a frequency. Bush got around the problem by using a solitary DK96 valve to perform the task of frequency changer with transistors used throughout the rest of the circuit. The high voltage supply for the valve was produced from a miniature transistorised inverter (giving around 65 volts) fed from the main 9 volt supply (6 x U2 cells) used for the transistors. The LT for the valve was from another single U2 cell. Unlike the EBM60, the rear trim was not used as a sort of internal short wave aerial and the



VTR103 & VTR103C models using the A287 chassis



TR82C (Later) & TR82D models using modified A177 chassis



TR82C (MkII) & TR82D (MkII) models using A349 chassis



ETR82 has a proper built-in telescopic aerial instead of a detachable one which is easily lost. The colour scheme of the set was light blue/green case, dark blue rexine band and chrome metal trim as per the TR82C model.

The ETR92

The following year in 1960 the final export set was released, the ETR92. By this time transistor technology had improved allowing an all-transistorised set to be produced, the new Mullard OC17x range of transistors taking the place of the frequency changer valve in the ETR82 model. Bush also took the opportunity to extend the upper range of the short wave coverage a little to 22MC/s (13m-band). Externally the ETR82 and ETR92 appear identical, they share the same colour scheme and both have built-in telescopic aerials. They only vary in the ETR92's dial having been modified slightly to include the increased short wave coverage and with the ETR92 having the addition of an headphone socket. Battery supply for the ETR92 was 9 volts made up again from 6 x U2 cells instead of the 9 volt PP9 battery used by the domestic sets. Presumably this was done because U2 cells were more readily available than the PP9 overseas.

Model, type and chassis tables

Fortunately Bush was very helpful in providing a type and serial number plate on the models it produced. On the MB60 family this metal plate is mounted underneath on the middle section of the case. Similarly the chassis number is given on a small plastic disk screwed to the chassis itself. Using this information I have created the following tables listing the 15 known model types and the 10 different chassis employed in them:

Model	Type	Chassis	Wavebands	Case	Rexine	Trim	Released
1. MB60 (Early)	237	A99	LW, MW	Light grey	Red	Brass*	c.1957
2. EBM60	240	A100	MW, S1, S2	Light grey	Red	Brass*	c.1957
3. MB60 (Later)	237	A99 (mod.)	LW, MW	Light grey	Red	Brass*	c.1958
4. TR82B	345	A177	LW, MW	Cream*	Brown	Brass*	c.1959
5. TR82C (Early)	346	A177	LW, MW	Blue/green	Blue	Chrome	c.1959
6. ETR82	355	A190	MW, S1, S2	Blue/green	Blue	Chrome	c.1959
7. ETR92	421	A253	MW, S1, S2	Blue/green	Blue	Chrome	c.1960
8. VTR103	462	A287	LW, MW, VHF	Light cream	Tan	Chrome	c.1961
9. TR82C (Later)	346	A177 (mod.)	LW, MW	Blue/green	Blue	Chrome	c.1962
10. TR82D	508	A177 (mod.)	LW, MW	Light cream	Tan	Chrome	c.1962
11. TR82C Mk.II	528	A349	LW, MW	Blue/green	Blue	Chrome	c.1963
12. TR82D Mk.II	530	A349	LW, MW	Light cream	Tan	Chrome	c.1963
13. VTR103C	622	A287	LW, MW, VHF	Blue/green	Blue	Chrome	c.1964
14. TR82CL	653	A458	LW, MW, 208	Blue/green	Blue	Chrome	c.1964
15. TR82DL	655	A458	LW, MW, 208	Light cream	Tan	Chrome	c.1964

(*Bush in their sales literature described the colour as "Regency cream" and the trim as "Florentine Bronze")

Chassis	Valve and/or semiconductor line-up used									
1. A99	DK96	DF96	DF96	DAF96	DL96					
2. A99 (mod.)	DK96	DF96	DF96	DAF96	DL96					
3. A100	DK96	DF96	DF96	DAF96	DL96					
4. A177	OC44	OC45	OC45	OC72	OC72	OC72	OC72	OA70		
	OC44	OC45	OC45	OC71	OC78D	OC78	OC78	OA70		
	OC44	OC45	OC45	OC72	OC81D	OC81	OC81	OA70		
5. A190	DK96	OC45	OC45	OC71	OC78D	OC78	OC78	OA70	OC72	OA81
6. A253	OC170	OC170	OC45	OC45	OC71	OC81	OC81	OA70		
7. A287	AF114	AF115	AF116	AF116	AF116	OC71	OC81D	OC81	OC81	OA90
8. A177 (mod.)	OC44	OC45	OC45	OC72	OC81D	OC81	OC81	OA70		
9. A349	AF117	AF117	AF117	OC71	OC81D	OC81	OC81	OA90		
10. A458	AF117	AF117	AF117	OC71	OC81D	OC81	OC81	OA90		

Models using AF11x transistors

The models using the later Mullard alloy diffusion transistors of the AF11x series, the Mk.II sets and the VTR103, etc have a common fault of developing internal short-circuits, usually between the emitter and shield connections. It is sometimes possible to cut the shield lead and restore

functionality but this can also lead to an increase in noise or cause instability. Replacement of the defective transistor is therefore the preferred option, and the AF12x series transistors are recommended.

Production differences

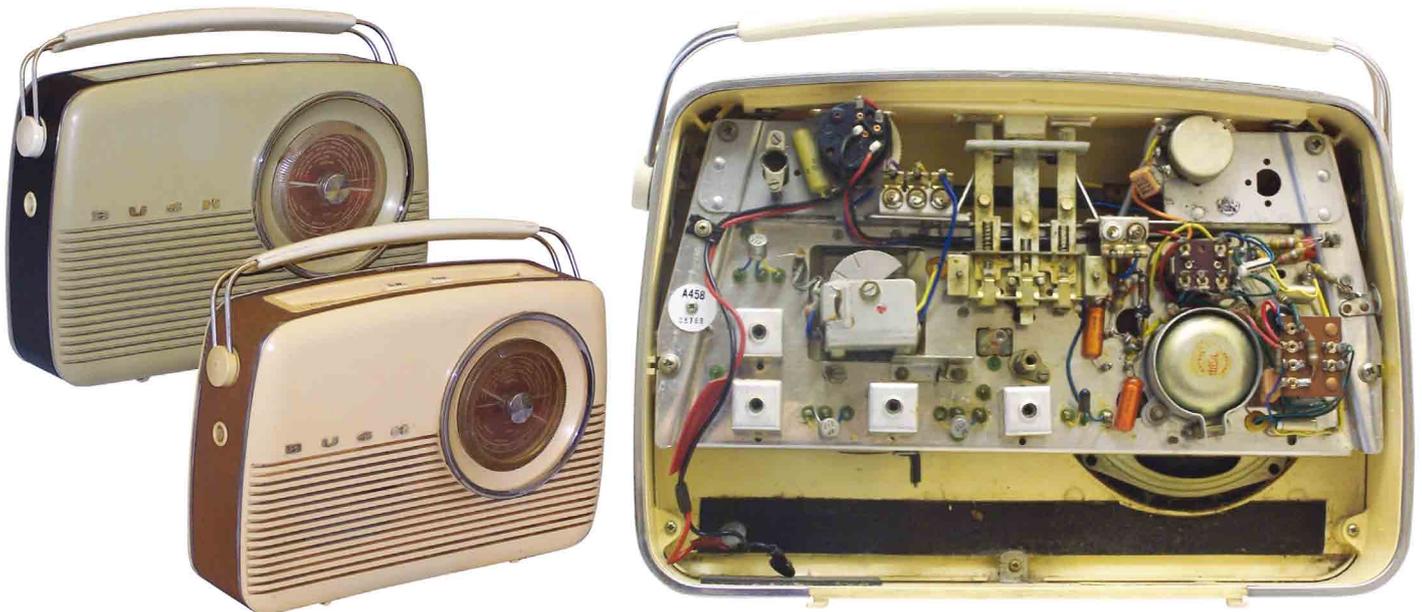
Different on the later models is the

“B U S H” lettering on the front of the sets. On earlier sets the letters are made of solid metal plated with brass or chrome, later models however have plastic lettering upon which a chrome coloured coating has been applied. Unfortunately this coating commonly wears thin revealing the bare plastic beneath.

Further model variants?

The list of 15 model types given here may not be exhaustive and there may be other little-known variants out there. It has been speculated that there may be a TR82B set with an headphone socket using the modified A177 chassis and

even a TR82B Mk.II set with the A349 chassis, though this set seems far less likely to exist than the former. Any further information regarding such sets not already covered here would be most welcomed by the author: robert.g0uhf.2@gmail.com



The TR82CL and TR82DL models using the A458 chassis

About the new BVWS DVD by Terry Martini

I am delighted to be able to tell you a little bit more about this year's DVD content. Before I do however, I should explain that this will probably be the last DVD in the series unless any further material turns up. The last year or two has been a real challenge in terms of producing an interesting mix of material. With that said, I certainly never envisaged being in the very fortunate position of transferring and authoring five of the six member DVDs that the Society has issued which started way back in 2004 with our two valve films.

For our DVD this time around we start off with a rarely seen film from 1934, entitled *Death at Broadcasting House*. The film appeared in a collection of reels that formed some of the footage kindly handed to us by Gordon Bussey last year. The film was in the 9.5mm format and despite best efforts; we could not get it through the telecine as it was so fragile. Luckily, I had a much better video copy of it to hand and it is this version that has made it to DVD.

The film is ostensibly two stories in one. The first is the underlying plot of a murder during a live radio broadcast of a play. There are several plausible suspects who all had the opportunity and motive to commit the crime but the actual culprit seemingly has a cast iron alibi. His unmasking therefore comes as a genuine surprise. The second story is that of the daily routine in Broadcasting House where we meet two of the top stars of the day, Elisabeth Welch and Eve Becke, delightfully singing to the accompaniment of Ord Hamilton at the piano and Percival

Mackey's dance orchestra respectively. Interweaved and connecting both stories is a gormless intruder who goes all over the building in search of the Variety studio, upsetting everyone in the process and also becoming a prime murder suspect. A gripping film, the only disappointment being that the police inspector never reveals his evidence until right at the end, thus depriving the viewer of accurately guessing the whodunit.

Our second film is Norman McLaren's *Around is Around*. This was originally made for showing in 3D at the Festival of Britain. For it, he developed a technique based on filming oscilloscope patterns. The film used McLaren's trademark technique of direct drawing on to 35mm film. It was designed to introduce the viewer to the concept of 3-D and depicted patterns made by an oscilloscope set to especially composed music.

The film was first shown at The Telekinema Cinema, London, which was designed by Wells Coates. Funded by the Festival authorities, this 400-seat, state-of-the-art cinema was specially designed to screen both film (including 3-dimensional films) and large-screen television. Situated between Waterloo Station and the Royal Festival Hall, it proved one of the most popular attractions of the South Bank Exhibition between May and September 1951. "Around is Around" garnered much praise at the time.

Our final two films are as a result of one of our members, Tony Dutton who kindly got in touch with me several months ago and to

whom I would like to extend the societies thanks for submitting two short, but never the less interesting films. The first is a Mullard film on special quality valves. Unfortunately it ends very abruptly suggesting part of it is missing. The second film is a bit of a mystery so if any eagled eyed members can help here please get in touch through the usual channels. All we know about the footage is that the ship is the *Electra 3*, moored on Tyneside. There is no clue as to the company behind it or the equipment.

All film footage has been sourced from the best sources available, however due to the age of the material; the quality may be a little variable.