"The BMC Car Radio"

By Tony Cripps

BMC CAR RADIO's

The motorists travelling companion

"Technological Advances have enabled us to produce the smallest car radio in Australia that gives the ultimate in performance with an unobtrusive built in appearance". - BMC

In the 1960's the provision of a car radio was indeed the height of luxury for any vehicle, especially those from BMC. The official BMC Accessory Catalogue devotes several pages for the discerning and well-heeled owner. The top of the range was of course the 11 transistor Diamond Dot. This incredible radio featured (in order of importance) BMC 12/12 warranty, provision for cassette type tape player, automatic gain control, temperature compensating circuit, straight line tune, filtered dial illumination (i.e. a green light), push on/off switch, advanced printed circuit, 11 transistors, wide range tone control – and on some models, the exclusive "crackle cutter" switch (which appears to be nothing more than a low pass circuit that just filtered out all the treble).

All genuine BMC car radios were made by Astor which supplied the same radios to other car manufacturers with a dial or sticker on the front panel that might have read "BMC" or "Holden" as required. Today, they are hard to find and command a high price, especially in working order. The chances are that a radio, once procured, will no longer work. However, the good news is that for the most part, they are easily repaired.

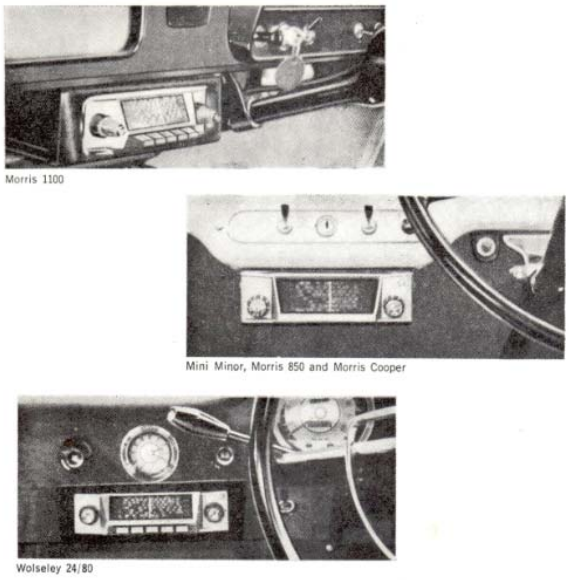

Fig. 1 *Genuine BMC car radio examples.*

One of the weakest link components inside the unit are the capacitors. In keeping with the technology of the day, these were often made with paper as the insulating dielectric and over time, this material deteriorates and cause other parts of the circuit to

malfunction. Often the first step in repair is to identify those capacitors which show visible signs of leakage and replace them with modern equivalents, or if time permits, all the capacitors can be replaced.

The next port of call are the resistors – often made from carbon, which sometimes fall to pieces upon touching them. Resistors can also be easily replaced with modern equivalents for only a couple of dollars.

If these efforts do not restore sound, then the chances are that the semi-conductors may be at fault. This is where problems arise. In the 1960's, transistors were manufactured from the element Germanium. For scientific reasons, it is best to make such devices "positive" polarity and you will find that may of the transistors in these old radios are Germanium PNP type – impossible to purchase these days. Later, transistors were made from Silicon and a late advertisement for a BMC radio features "the latest type silicon type transistors" which would impress the prospective owner. Silicon is more stable than Germanium and this is why these older radios with Germanium transistors often featured a "temperature compensating circuit" to allow for the change in characteristics of these devices as they heated up. The only option for repair is to find another radio for parts if a replacement transistor is required.

There are two particularly important transistors in the radio – the main power transistors, often visible bolted to the outside of the case which is used as a heat sink. Should a previous owner have used the wrong impedance speaker, or connected the speaker wires together, then these transistors will be almost certainly burnt out and some hunting around will be needed to get working ones installed.

Service information for most of these radios can sometimes be found on the internet. These service sheets often provide a full circuit diagram and procedure for adjustment. Adjusting the internals of the radio is possible and is relatively easy but requires a signal generator and oscilloscope. The best adjustment for the average owner is to just trim the aerial using the external trimming knob. This has to be done with the radio installed in the vehicle with the aerial extended and the radio tuned to a weak station with the volume up high. The reason for the weak station and high volume is that should you tune in a strong station, you will find that the trimmer doesn't do very much. This is due to the action of the "automatic gain control (AGC)" mentioned above. Because car radio reception can be variable, the designers concocted a clever scheme to automatically increase the gain (i.e. the volume) of the unit if the signal being received got weaker. This evened out the volume so that music would not fade in and out as you motored along past buildings and behind hills etc. Now, if you try to adjust the trimmer for maximum volume on a strong station at low volume, the AGC will take over and you won't notice any change in volume as you adjust the trimmer. You have to use a weak station with the volume high so that the AGC is already maxed out in order to get the best trimmer position.

The other very important issue for today's prospective owner of such a radio is the speaker. These radios were designed to drive a 15 ohm speaker. These can no longer be purchased. Plessey Rola, who made the speakers originally, have stopped production of this type of speaker and have no stock. Modern speakers are usually 4 or 8 ohms. It is important to never connect a speaker of lower resistance to the output of a radio designed for 15 ohms. Doing so will cause the power transistors to overheat and burn out. If no 15 ohm speaker can be found, it is possible to use an 8 ohm speaker, or even a 4 ohm speaker if a resistor is

put in series with the speaker wire so that the total will be 15 ohms. A fairly large wattage resistor (about 2 W at least) will be required. The down side to this procedure is that most of the output signal will be converted to heat within the resistor instead of delivering actual sound, but at least something can be heard instead of nothing if one wishes to just make sure the unit is working.

One more very important issue is that many of these radios are dual polarity. Many cars of the 1960's were positive to earth while those later (usually those fitted with an alternator) are negative to earth. The Astor radios have a variety of methods of converting operation to suit the earth polarity of the vehicle. Often it is a sliding switch while on others, links have to be inserted the right way around on the circuit board. It is very important that the polarity setting of the radio be checked and set to match that of the vehicle. This is especially important if you are transferring the radio from one car (which might be positive earth) to another (which might be negative earth). Neglecting this single issue could mean ruin for the whole project.

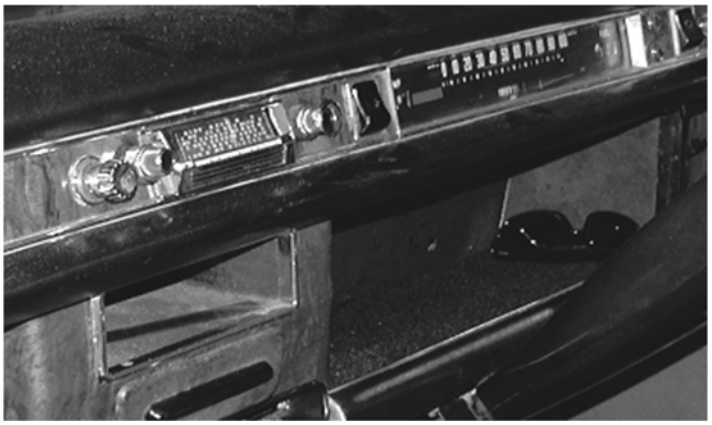

Fig. 2. 8 transistor model fitted to the author's Austin 1800.

The present writer had the pleasure of installing the BMC 8 transistor radio in his Austin 1800. This model was selected because it's height would fit nicely in the correct radio position for this strip type dashboard in these vehicles whereas the larger 11 transistor diamond dot is too large and has to be mounted in the oddment tray position. Note how most of them have to go under the dash). As well, the 8 transistor has an in-built speaker whereas the diamond dot has to have an external speaker fitted.

The 8 transistor certainly looked an integral part of the car. Despite the decline of AM, there are still many of the old stations still on the air. Being somewhat of mature age, I decided that 2CH would be suitable for listening to, and so with pleasant music playing, I invited my then 13 year old son to sample the incredible luxury that now adorned the family saloon. His first question was to ask about the FM band. When it was explained that this was an AM radio, he expressed some disappointment, but out of a sense of pity perhaps, removed his iPod earphones and sat in the passenger seat listening intently for a few minutes. "Well", he said, "that's great Dad. But just one thing: This music that's coming out is from when it was last turned off, right? from the 1960's?". Oh well, at least I can savour the unobtrusive appearance of the unit with the lettered dial face and chrome push button knobs even if the music is 40 years old.

Tony Cripps