

Radio Head Unit designed and manufactured for Bentley Motors



Bentley Motors was refreshing the design of their flagship Arnage/Azure/Brooklands models in the last 2-3 years of life before the Mulsanne was launched. The existing radio head unit was an old design which had only a single CD player and an FM radio, unlike their Continental range which had a full-featured audio system. The design requirement was to produce a replacement head unit that would fit in the same location, but support a 6-CD changer, internal MP3 player with SD card slot, iPod interface, DAB and satellite radio, and also to interface to and control a separate power amplifier produced by Naim Audio for the premium cars. It also had to have the same look as the original unit with a monochrome orange-on-black display and the same rotary knobs and buttons, which precluded existing after-market radios. Since the total requirement was for less than 1000 vehicles, none of the major radio manufacturers was able to offer such a custom design.

The first challenge was to produce a working prototype within 3 months which had the look and feel of the finished product. This was achieved by taking an existing radio fascia and enclosure, machining out the display aperture and fitting our own electronics. Getting the display to look right was equally challenging and we used a commercial computer module running Linux to control it and drive the graphic display. The prototype was demonstrated in the car, on time, and was duly approved to proceed to the full design stage.

We used Linux for the prototype simply to get a fast solution. Although not an obvious choice for the production radio, we opted to keep it because it gave us several useful features: Built in SD card and USB memory stick support with the ability to read a FAT file system; Built-in MP3 playback; Network support and remote login to simplify development; Multi-tasking allowing us to divide the core functions into separate processes which could be developed independently. In order to save costs and reduce boot time we produced our own computer module based on an ARM9 processor running a customised version of Linux.

Although some of the cars would be fitted with the Naim amplifier, the base model needed an internal 6-channel power amplifier, requiring a compact electronics design and careful heatsinking to fit within the original enclosure envelope.

The Sirius satellite radio module is used only in the US and Canada. Indeed the only way to test it in the UK is to use pre-recorded programme material and an RF generator designed to work with the Sirius system. We believe we are the first UK manufacturer to integrate this into a commercial product for world-wide use.

The unit was controlled via the infotainment CAN, but diagnostics had to be implemented using the older K-Line interface for backward compatibility with previous vehicles. Unfortunately there was almost no design documentation available for the existing radio, so much of this work involved decoding activity on the diagnostics interface to find out what was supported.

Following extensive testing and automotive approvals, the new head unit entered production in 2008 ready for the new car launch, and LS Design continued to manufacture all units until end-of-life.



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