Bluetooth Links From JK Audio

Simon Jones MIBS has been reading the runes on Danish-inspired technology from Illinois.

King Harald Blåtand would probably not be amused. The grandson of King Ethelred of England and grandfather of King Canute forcefully united Denmark and Norway. His initials are now a trademark, and a millennium after his death his name has been appropriated by telephony and computer manufacturers to unify a variety of short-range communications systems. Perhaps it was inevitable that this technology would eventually find its way into professional broadcast products? Though Harald probably had no concept of the United States that the products I'm reviewing here come from…

At the end of my review of JK Audio's range of analogue mobile phones and landline interfaces, in the last edition of *Line Up,* I said that I'd take a look at some new products with Bluetooth connectivity in this issue. But is BlueTooth really very useful in a professional broadcast environment? After all, its predominant use is as a low-fi, low power, low range, cable replacement for mobile phone earpieces.

Bluetooth Technology

Bluetooth works in the licence-free 2.45GHz frequency band, and the protocol divides that spectrum into 79 channels with devices changing channels up to 1600 times per second. Inevitably, there are a number of versions and profiles for Bluetooth. Three classes of device have maximum permitted output powers of 100mW, 2.5mW and 1mW, with corresponding ranges of approximately 100, 10 and 1 meter. Pairing devices of different classes usually produces a compromise range. Maximum data rates are 1Mbit/s for Bluetooth Version 1.2, and 3Mbit/s for Version 2.0+EDR – so they are actually quite respectable for use in comms environments or programme chains that are used to 128kbit/s ISDN. For comparison, the highest voice data rate over GSM mobile phones is 12.2kbit/s, while enhanced GPRS (3G) can theoretically carry 236.8kbits/s.

Bluetooth has significantly higher capacity than that, but may be overtaken by the so-called 3.5G networks now evolving with over 5Mbit/s uplinks and even faster downlinks.

Practical implementations use 'Profiles,' such as for two-way 'Hands Free' or Headset applications using the G772 codec, and bandwidth is limited to 300-3400Hz. An alternative profile called A2DP (Advanced Audio Distribution Profile) allows uni-directional stereo audio and can use the full data rate to give high quality stereo, via common audio codecs including MPEG, AAC and ATRAC.

Daptor Three

Following on from Daptor Two (see *Line Up* Sept/Oct 2008), the Daptor Three unit is housed in the same black metal box, and serves a very similar function: to connect a local system to another at the far end of a telephone. While the Daptor Two unit plugged directly into an analogue phone or imitated a mobile phone headset, the Daptor Three uses Bluetooth connectivity. Two XLRs on one side provide line in and line out, while the opposite panel houses a battery compartment (for one 9V PP3-type battery), an indicator LED and a semi-recessed button. Establishing a connection with my mobile phone was simple: after getting the phone ready to seek a new 'paired device,' holding the button for five seconds broadcasts the unit's readiness. The Daptor Three emits a beep through the line out and the phone will request a code (based on serial number) to complete the pairing operation.

The use of Bluetooth and digital phone networks brings one significant advantage over analogue products – a lack of crosstalk. I measured a dynamic range of about 65dB without a hint of crosstalk, although this may depend on the model of phone used. The bandwidth in each direction is limited to 300Hz-3.4kHz by the nature of telephone networks.

Phones are not the only devices using Bluetooth though, and there are other modes of transferring audio over Bluetooth and A2DP mode will support a much higher bandwidth of 30Hz to 17kHz, and in stereo. To facilitate this mode of operation, a raised metal bump on the end of the box protects two unbalanced stereo minijacks, enabling stereo line level signals to be fed in or out. I struggled to work out if that would be useful when Bluetooth isn't intended for distances greater than 25 feet or so, but one situation would be as an emergency IFB – a presenter with an earpiece for his phone *could* gain freedom from cables and still listen to cue.

For a box with just one control, the Daptor Three provides a lot of information about what it is doing – both flashing the LED with codes, but more usefully with tones through the line output: A high beep indicates power-on, while a low beep signifies a lack of connection, and a pair of pips announces successful pairing. A rising scale (roughly E major!) indicates an incoming call, another high beep indicates the call ending or that the device has been disconnected for a couple of minutes and is turning itself off.

The battery could last for eighteen hours if the other Bluetooth device stays within a few feet, but increasing distance demands high power transmission and hence lower battery life.

BluePack

For those used to outside broadcasts, the simplest description of the BluePack is a four-wire beltpack using Bluetooth instead of a cable. For radio journalists it is essentially a COOBE via a mobile phone using Bluetooth.

The Bluepack is roughly four inches square. The rear panel contains all the connectors (microphone input, quarter-inch headphone socket, and stereo 3.5mm sockets for line in and out), while the right hand side has a drawer for a 9V PP3 battery. The large flat sides are very slightly curved: the outer is convex, the inner is concave and a belt-clip hints at the fact it is intended to be worn!

The front panel has two large recessed push buttons: one for power and the other to initiate Bluetooth connectivity. Three shielded wheels provide level control for a dynamic mic, stereo aux input and headphones. The headphone amp has

plenty of power available – and the usual warnings and disclaimers are made regarding high listening volumes in the compact manual. There are also four LEDs: one each for peak levels on the mic and line inputs, one for Bluetooth indications and one to show when the unit is powered.

With a mobile phone in a reporter's pocket (or within a few paces of a laptop with Bluetooth and a 3G card or fast broadband/LAN) this gives a remarkable freedom to the out-and-about radio reporter. The mini-jack output can be used

for pre-recording interviews (locally or with the interviewee at the end of the phone), the input for playing back to the studio and the headphones. For outside broadcast use, it can work as a cabled mic-amp or four-wire via the minijack output or over a mobile phone. In all, a very compact and flexible box.

RemoteAmp Blue

This is a simplified version of the Bluepack without the mic amp – instead the XLR input accepts a single line input. Customers

have bought this in quantity simply as a cost-effective headphone-amp, the Bluetooth feed being a bonus!

RemoteMix 4

This product must be one of the most flexible devices available to the post-ISDN radio production market. It incorporates all the analogue phone connectivity of the Compack (see *Line Up* Sept/Oct 2008) with the Bluetooth functionality found in DaptorThree and BluePack. (It should be noted that the keypad dialer only operates on the analogue line – when connected via Bluetooth or handset (RJ22), the phone keypad must be used.) In addition, it contains four channels of analogue input and four headphone outputs. The inputs are on four XLRs, each with independently switchable phantom power. If all four have phantom power switched off, the unit intelligently shuts down the phantom generator, thus saving power when using batteries. Inputs three and four are switchable between Mic and Line level – and selecting Line automatically overrides the Phantom power setting for that channel. The fourth channel also has a

stereo minijack (summed to mono) in parallel with the XLR. With suitable cables, the RemoteMix 4 becomes a six-input outside broadcast mixer with three mic inputs and three high-level sources.

As with BluePack, there is a stereo minijack output carrying the mixer's Master output on the left channel and the return (from analogue phone line, analogue interface cable from a mobile or via BlueTooth) on the right. On the rear of the unit four headphone outputs are provided on quarter-inch jacks, each with a separate volume control and a switch selecting either the local mix or the Return with some local mix bled in as well.

The unit can do all this while running off a 9V battery (although there are slots for two PP3s, they are wired in parallel). The power LED forms a crude battery life meter – the brighter it shines, the better the battery – and it extinguishes completely when it judges the batteries to have half an hour of life remaining. Thankfully, the output level and BlueTooth indicator LEDs will keep going to the bitter end. JK Audio's own Lab tests suggest the unit will power four sets of headphones at average listening levels for ten hours with dynamic mics, about an hour less with a phantom-powered mic, and maybe seven hours

while paired to a nearby BlueTooth device.

The RemoteMix4 is supplied with a mains power unit which overrides the batteries, although in the event of a mains failure the batteries take over with only the quietest of clicks during the automatic switchover. With two battery drawers, batteries could be hot-swapped if needed during a marathon broadcast from a remote hilltop, so there is absolutely no need for bulky external batteries.

Summary

This range of products fills very precise niches exquisitely, and the models seem to be under continual development. For example, the review model of the RemoteMix 4 had a new switch on the rear to change the wireless phone connector into a cue input. An imminent upgrade will apparently also allow JK Audio devices to pair with each other, enabling, for example, the RemoteAmp Blue together with a Daptor Three to be even more versatile where cable-free cue or IEM is needed in a small space, without the set-up and licencing issues of UHF links. The name Vortex seems apt for the UK distributors: alluding to busy despatching of products.

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