

The Whistler TRX-1 and TRX-2 scanners

Historically, we've not seen reviews of scanners in the pages of RadCom, so why would you find one useful or interesting to have in the shack or at hand?

Scanning receivers are a fairly modern development, the first models becoming available in the 1970s. I suppose I was first aware of them in my 'youth', looking covetously through the Tandy catalogue. Although my father was very interested in short wave receivers, there was a note of disapproval about scanners! At the time, scanners had a limited number of channels and could only demodulate AM/FM signals.

Of course, in the intervening years many things have changed. Scanners still cover AM and FM, but many of them cover digital voice modes such as DMR, NXDN, P25. The introduction of digital modes has complicated things and if you're not careful, it's easy to spend your hard-earned cash on a digital scanner that won't be any good in the UK, because the digital systems it decodes are not used in this country! I would suggest that if you are interested in scanning generally and are a radio amateur then you should aim to have a scanner that will demodulate Digital Mobile Radio (DMR) at the very least. There are a fair few DMR repeaters, particularly in the 70cm band, that you may well be interested in trying to receive. Of course, a scanner capable of receiving DMR will also demodulate AM, FM as well and very probably modes in commercial use such as Motorola's Capacity Plus (which is not in use on the amateur bands).

Why a scanner in the shack?

Why might a scanning receiver be interesting to have in your shack or in your pocket? Of course, it allows you to monitor a lot of channels for activity. Scanning speed on 'proper' scanners is very fast indeed – much faster than on the majority of amateur radio transceivers, which although they do offer a scanning facility, sometimes on frequencies outside the amateur bands, is slow by comparison. You may want to scan various amateur VHF/UHF/SF frequencies for activity without tying up the main radios in the shack.



The TRX-1E is the handheld version.

This will also give you a good idea about propagation, if you monitor distant channels where you don't normally hear anything – the exceptions are always interesting! Of course, there are non-amateur frequencies that you can listen to although the legal position, in the UK, is that you should not. Airband and marine frequencies may carry traffic depending on where you are located. Perhaps you might like to try receiving and decoding signals from weather satellites or voice traffic from the International Space Station when astronauts are on a space walk? If you're a VHF/UHF enthusiast you may monitor certain commercial channels which, if you hear them, may give you an indication that conditions are becoming enhanced.

Of course, the nice thing about scanners is that you can use them to monitor amateur bands that you may not have transmitting

equipment for – so you could, for example program some 29MHz repeater frequencies, FM channels on 50MHz, FM and AM channels on 70MHz and any local repeaters you may have on 1297MHz. The 2m band and 70cm are already programmed. Monitoring these channels might persuade you to try transmitting on another band, or you could try some crossband full duplex contacts using the scanner as a receiver whilst you transmit on a band that you already have (Top Band AM to 23cm FM or 70cm DMR anyone?)

Whistler TRX-1E and TRX-2E

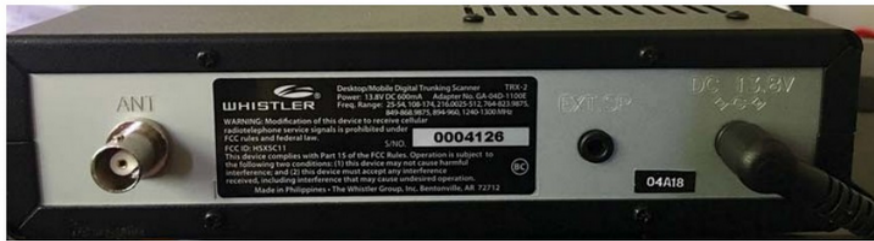
Specifically, this article is about the Whistler TRX-1E and TRX-2E scanners. The operation of the two models is very similar, however the TRX-1E is handheld and the TRX-2E is a desktop unit. How you will use the receiver probably indicate which model will be of most interest to you.

I will be looking at the two scanners running the TRX-1E and TRX-2E firmware, which has been customised for the UK market and takes into account the UK band plans and spectrum usage. If you decide to purchase one of these scanners, you can ask the retailer what version of the firmware the unit is being supplied.

The TRX-1E is the handheld version of the scanner. It covers 25-54, 108-136.99, 137-174, 216-379.97, 380-512, 764-781, 791-796, 806-960 (excluding cellular) and 1240-1300MHz. It will cover AM/FM/DMR/NXDN/P25 modes as well as Hytera XPT, MotoTRBO Capacity Plus, MotoTRBO Connect Plus and MotoTRBO Linked Cap Plus systems.

The TRX-1E comes with a rugged plastic case. It needs 4 AA batteries (not supplied). There's a USB Mini-B connector for interfacing with a computer for configuration purposes. A small 'stubby' rubber-duck style antenna with a BNC connection is supplied. Whilst the stubby antenna is probably ok to get you started, you'll almost certainly want to have additional antennas. I found an airband whip supplied by Moonraker worked well on airband, the 2m band and marine, as you might expect.

The TRX-2 desktop variant is surprisingly small! The front panel is dominated by the display and the controls are reasonably easy to master without recourse to the instruction manual (which is well written, as it happens). There's a mini-USB socket to allow connection to a computer as well as a headphone socket. On the rear of the scanner



The rear panel of the surprisingly small TRX-2E base station scanner.

there's a BNC socket for the antenna (a telescopic is supplied to get you started) an extension speaker socket and a socket for external 13.8V DC (a power supply is provided). You can also detach the control head of the TRX-2E from the body of the unit – useful perhaps if you are going to mount the scanner in a vehicle.

When you switch on the receiver the first thing you have to do is wait. And wait and actually wait a little bit longer. In total, the whole process takes about 3 minutes! Why so long? It's because of the number of channels (around 1650) that the scanner is loading into memory. There are several banks of frequencies AIRBAND, MARINE, DMR REPEATER, DMR SIMPLEX, FM REPEATER, FM SIMPLEX, NXDN REPEATER, P25 REPEATER, PMR 446 and DMR 446. The majority of channels (1271) are contained within the AIRBAND bank, so if you deselect that bank, in order to listen to other traffic, the scanner will start up very much faster.

Once the scanner has gone through its extended startup routine, it will start to scan through all the memory banks that you have selected (the default is all of them). Hopefully you will start to hear signals. In rural Oxfordshire, using the default mode where it scanned all the pre-programmed memories, the predominant traffic was from the airband.

I was curious though because I was not hearing as much as I would have expected. Rather like the startup issue, the reason was because of the number of channels that the TRX-1E was scanning through. With the scanner having to go through so many channels, it is easy, despite the rapid scanning speed (80 channels per second) for a brief transmission to be missed. With 1271 channels in the airband bank, the scanner will spend 15 seconds of its roughly 20 second cycle in the airband bank and of course, the sheer number of channels means that each channel will only be sampled every 20 seconds, making it easy for a brief transmission to be missed if you are scanning everything. The same will happen if you have other large banks of frequencies.

Many scanner users complain that they do not know where to listen and that they never hear anything on their scanner. It's therefore a great idea to have the unit pre-programmed with all the channels to give people their best chance of hearing something interesting.

My first attempt to remedy the situation was to split the enormous airband memory bank into

two. I was able to do this using the programming software on the PC, creating a new memory bank and moving all the appropriate frequencies into that new bank. To my delight the move worked fine. With both the airband banks de-selected, I found that amateur transmissions could be identified very quickly – even very brief transmissions. I was pleased to find that both scanners picked up and decoded DMR transmissions on the 2m and 70cm amateur bands from GB7TC (Swindon, 70cm) and GB7CT (Tring, 2m) DMR repeaters when they were connected to the external antenna. Talkgroup and radio ID information is displayed on the scanner – the talkgroup data being particularly useful for determining what talkgroups your local repeater is carrying. The scanners also decode NXDN and P25 transmissions, which I wasn't able to test 'off air' here, although MMDVM digital hotspots can transmit both modes, but there is almost no activity on those modes in the UK. If you're reading this in Australia, then there's a reasonable amount of P25 activity on the amateur bands.

With the TRX-1E and the rubber duck antenna, I found the receiver was quite susceptible to local noise from electronics and the like and quickly worked out that I needed to skip over various noisy frequencies. Fortunately, this is easy to do from the keypad of the scanner. The squelch is readily adjustable with a knob on the top of the TRX-1E. With the TRX-2E connected to a 'white stick' vertical on the roof (they work very well as scanner antennas), this was much less of a problem as the antenna was out of the 'EMC fog' of the house. Which scanner you choose will probably depend on how you intend to use it. My preference would be for the desktop configuration connected to a decent external antenna, which should allow for reception of interesting signals over a fair distance, depending on your location of course.

The handheld TRX-1E would come into its' own if you are interested in taking the scanner out portable, which of course can be very interesting, especially if you live in a poor VHF/UHF location. The configuration of the TRX-1E and TRX-2E codeplug does not include any frequencies in the 450-460MHz region often occupied by commercial users.

What about usability?

The TRX-1E and TRX-2E are smaller than expected – particularly the TRX-2E. However, the most frequently used controls such as

volume, squelch, skip and hold are fairly easily accessible. With the TRX-2E I enjoyed the ability to control the scanner from a USB connected computer – more of which later.

How sensitive are these scanners?

As radio amateurs, we get used to a certain level of sensitivity from our rigs and, occasionally in the past, I have been disappointed to find that a scanner that I had bought to scan a wide range of frequencies (including amateur ones) was well down on the sensitivity I had come to expect from our dedicated equipment. The good news with the Whistler equipment, both TRX-1E and TRX-2E, is that they are quite adequate for use on amateur frequencies and you should not notice too much difference between what you'd hear on 70cm, say, using a amateur band rig and one of the Whistler scanners, if you are using the scanners on a good antenna. However, in a handheld configuration, even with the improved whip, I found the TRX-1E slightly poorer than some other scanners with a similar aerial on the airband, 2m amateur and marine bands.

And what about selectivity?

Historically, scanners have a reputation for being prone to all sorts of images when faced with strong signals, because of their wideband design. Things have moved on and whilst there is still some element of this, I found that I could transmit on 2m whilst receiving on the civil airband without any problem – which I felt was positive (having said that, one of my first encounters with amateurs on 2m FM was through an image appearing on my airband portable receiver!).

Digital scanning

With the Whistler scanners (and indeed most others) capable of scanning DMR, the nice thing is that you don't need to know the talkgroup, timeslot and so on of the signal that you are listening to. The scanner will work it out and display the information on the screen for you, as you are listening to the signal. If you are used to having to know this information for programming the codeplug on a DMR receiver, this may come as a relief. If you have a digital hotspot or digital amateur repeater close to you then you can use the Whistler scanners to listen to them. Please note, however, that these scanners do not decode D-Star signals.

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The front panel of the TRX-2E desktop scanner.

Programming software

Installing the Whistler EZ-Scan software on the PC included drivers for the TRX-1E and TRX-2E scanners. If you want to modify the configuration, you have a choice between using the USB connection (a USB lead is supplied with the scanners) or by popping the micro-SD card out of the scanner and into a reader on the PC. The second method is very much faster than the first. You'll need to use the direct USB connection though if you upgrade the firmware on the scanners.

Both TRX-1E and TRX-2E can be controlled by software. Whistler provide a 'Remote Control' program that is really a demonstration program showing developers what's possible. However, I found there was a great deal of benefit in using this software. How often are you scanning, you hear an interesting channel come up and before

you get to the dial, the scanner has hopped on again! With the remote control software you can see a log on screen of the channels where activity has been found (albeit the version I used didn't always log brief transmissions – though I've a feeling that might have been due to the slow speed of the computer that I used).

Recording functionality

The scanners both allow recording of audio received, along with the date/time and frequency data onto the SD card. This can be good if you want to find out what traffic occurs on a channel while you are out at work.

The recordings are made as separate files – that may, or may not, be ideal depending on what you want to do with them.

Conclusion

If you're interested in VHF/UHF then you'll almost certainly want a way of listening around. Is a scanner right for you? If you plan to listen to AM/FM and perhaps DMR then a scanner could be a good solution. If you're more interested in narrow band modes such as SSB (which aren't much used outside the amateur bands at VHF/UHF/SHF) then you may be better looking at a Software Defined Receiver (SDR).

Assuming you decide to go the scanner route, then I can recommend the Whistler scanners. Whether you go for the portable or desktop version will depend on how you plan to use it. If you plan to use it in the shack and will have access to an external antenna, then I'd recommend the TRX-2E – the TRX-1E being more suitable for portable operating.

The TRX-1E and TRX-2E firmware variants are a real plus because they practically guarantee that you will switch the scanner on and start to hear signals because they are so comprehensive. The downside too is that they are so comprehensive! The TRX-1E and TRX-2E cost £419.95 and £479.95 respectively and are available from Moonraker at www.moonraker.eu/whistler.

My thanks to Chris Taylor of Moonraker Ltd for the loan of the TRX-1E and TRX-2E and for being ready to answer my questions.

WHISTLER



You've read the review, now buy the Radio!

Moonraker have worked with Whistler to customise a UK band plan for the scanners! This ensures the radios cover UK bands in the correct steps and the correct mode. When a user does a service scan it will search in the correct steps for the selected band ensuring maximum received stations.

The radios will receive both amateur and commercial DMR transmissions as apart from the frequency they are fundamentally the same mode. The radio is supplied with software and users can select mode when writing memories or select auto and it will work out the mode itself!

This multi-system adaptive digital trunking scanner supports Motorola P25 Phase I, X2-TDMA, Phase II and DMR making it capable of monitoring the following unencrypted channels/systems:

- Conventional DMR (Entered as a DMR trunked system)
- MotoTRBO™ Capacity Plus • MotoTRBO™ Connect Plus
- MotoTRBO™ Linked Cap Plus systems
- Hytera XPT • NXDN & DMR out of the box

TRX-1E Key Specifications:

- Frequency: 25-54MHz, 108-136.99MHz, 137-174MHz, 216-379.97MHz, 380-512MHz, 764-781MHz, 791-796MHz, 806-960MHz (excluding cellular), 1240-1300MHz
- Easy updating via Internet
- APCO P25 Digital Phase I & II
- CTCSS and DCS subaudible decoder
- IF Discriminator Out
- User upgradable CPU firmware
- Spectrum Sweeper

£419.95

TRX-2E Key Specifications:

- Frequency: 25-54MHz, 108-136.99MHz, 137-174MHz, 216-379.97MHz, 380-512MHz, 764-781MHz, 791-796MHz, 806-960MHz (excluding cellular), 1240-1300MHz
- APCO P25 Digital Phase I & II
- Removable, removable magnetic head
- Scanning at up to 70 channels/second
- CTCSS and DCS subaudible decoder
- IF Discriminator Out
- Easy Internet updating, user upgradable CPU
- Spectrum Sweeper
- Clock / Calendar
- Store Favorites Scan List

£479.95

Available direct from Moonraker's website www.moonraker.eu and all specialist dealers