

# Kenwood TH-D74E

## dual band digital handheld

**K**enwood's new flagship handheld is the first radio equipped with both D-Star and APRS – and makes Kenwood only the second major manufacturer to embrace D-Star.

Ever since the 2<sup>nd</sup> generation of D-Star radios came with GPS as standard, people have wondered why they couldn't also include APRS. This would make the radio useful not only for use on the D-Star network, but also allowing extra functionality on the analogue side. Kenwood has now bridged that gap with the release of the TH-D74E handheld.

I first clapped eyes on the TH-D74E at Friedrichshafen in 2016, before it had even been given a model number. It was behind a Perspex case to stop anyone fiddling with it – but it was drawing a crowd, not least because of its large and colourful LCD display. Now the TH-D74E has been released and its specs are known.

### Outline specification

The TH-D74E is a handheld radio able to receive all modes (FM, AM, CW, SSB etc) between 100kHz and 524MHz (there are some small gaps in modes and coverage, for example no FM below 28MHz, but it does receive SSB/CW on 2m and 70cm). Transmit is FM and D-Star in the 2m and 70cm amateur bands. There are four power levels: 5, 2, 0.5W and 50mW. Battery life is up to 15 hours when used sporadically and/or with 50mW output power, and about 6 hours with 'normal use' at high power. Enabling the GPS reduces battery life. In one of my tests I drove from Glasgow to Cambridge with APRS SmartBeaconing in use at high power and the battery was still half-full after seven hours.

All the usual FM handheld features such as variable channel steps (including 8.33kHz on Air Band), CTCSS, tone burst, DCS, DTMF, Echolink memory dialler channels and so on. There are Tx and Rx audio equalisers, a VOX, simultaneous two-band receive with separate squelch, voice guidance and even KISS packet operation. There is a MicroSD slot that lets you store audio, memories and settings and the radio is rated as being water and dust resistant to IP54/IP55.

### In the box

The TH-D74E comes with all the accessories you would normally expect. There is the radio itself, the 7.4V 1800mAh lithium-ion battery, a short rubber duck-style flexible antenna with normal polarity SMA fitting, a belt clip and a charger with UK and EU cables. The late pre-production version I received did not have instructions, a USB cable or memory card.

### First impressions

Although I've used Kenwood radios before I've never owned one, so I thought that reviewing this new HT wouldn't be swayed by past experiences. In a way, my comments will be comparing the TH-D74E in the light of other manufacturers' handhelds. (I did give the TH-D74E to a few friends who own Kenwood THD72E's and they found the feel and interface familiar.)

The first thing I found was the colour screen made navigating the menus very easy. The navigation method is simple, using the up, down, left, right and enter keys on the front. It uses a method familiar from old Nokia phones where each menu option is assigned a number, meaning if you wanted to get to the menu to set the date or time, menu number 950, you can either follow the onscreen prompts or just press 9, 5 then 0 on the keypad for fast access. This is very useful when using the manual as it navigates you to menus using such codes.

The TH-D74E has a MicroSD card slot that allows you to back up settings and load memory files, both of which can be read or modified on a computer. The settings allow configuring two additional buttons on the keypad, PF1 & PF2, plus 3 buttons on a suitable Kenwood mic (one that contains physical buttons for PF3-PF5). One configuration option for the PF3-PF5 buttons is a Screenshot option, which I used to capture some of the images for this article. You can also record audio and GPS track logs on the card.

During the review period the transmit audio was commented on many times for its roundness, even when using D-Star. The speaker on the front can be very loud if the volume is turned up fully.



PHOTO 1: The Kenwood TH-D74.

### Software update

When I received the TH-D74E for review it had firmware 1.01 installed. Looking at the Kenwood webpage, version 1.05 was available so I decided to update the radio to latest version. First I checked the changes between each version: Kenwood, unlike many others, produce detailed change notes so you have a good understanding of what has been altered between each version. The changes between v1.01 and v1.05 were numerous so it was only fair I used the latest v1.05 for this review.

The update process is very easy. You download an EXE file to a PC, run it and follow the instructions. A USB cable is used to connect the radio to the PC. At one stage you need to power the TH-D74E up and hold a set of buttons, but afterwards it proceeded automatically and the upgrade process worked fine for me. Kenwood also supply a driver should you need it, but as the COM hardware used for the USB serial connection is quite common, I already had the driver installed.

A full CPU reset is required afterward the update, however it's possible to save the memories, and, crucially, settings to the MicroSD card so they can be restored after the reset.

### D-Star digital voice

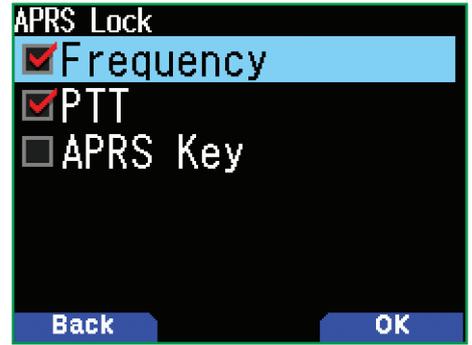
It's the inclusion of D-Star that makes the TH-D74E particularly special, and Kenwood has made D-Star very usable. Kenwood has implemented all aspects of D-Star on the TH-D74E, including voice mode, position beaconing and data mode. Kenwood has also implemented two ways to use D-Star on the TH-D74E: Simplex (DV mode) and Repeater (DR mode). Both are the same in respect to D-Star, it just makes it easier to use the radio. In each mode the TH-D74E shows details of the station currently transmitting, as shown in **Figure 3** and **Figure 4**.

In DV mode the callsigns setting used in D-Star are simplified. MY is still your callsign, programmed in the TH-D74E, UR is set to CQCQCQ but RPT1 and RPT2 are removed as they are not needed for simplex communication with another D-Star user. This makes it easier to configure the radio for simplex QSOs – and for the newcomer.

I imagine most people will work through D-Star repeaters or simplex nodes, using the mode Kenwood calls DR. In DR you can configure all the callsigns, MY, UR, RPT1 and RPT2. Again, MY is the callsign you programmed but the other three can be programmed in a multitude of ways depending upon the repeater or node you are working through. The simplest way is to use the GPS to get a list of nearby D-Star repeaters.



**FIGURE 1:** APRS active on 2m and 70cm repeater GB3PY on Band B.



**FIGURE 2:** Lock options when APRS is the main band selected.



**FIGURE 3:** D-Star Screen in DV (direct) mode.



**FIGURE 4:** D-Star Screen in DR (repeater) mode.

By default the TH-D74E comes with all D-Star repeaters and simplex nodes worldwide programmed into memory. At the time of writing (late January 2017) there were 1438 entries. The list is arranged by world region, country, then county. This list is separate from the 1000 user memories and is updated by Kenwood on a regular basis, although the user can also update it. I needed to do so for GB7PI-B, which had the old frequency of 439.9125MHz instead of the new frequency, 439.7625MHz. Using the MCP-D74 software (described later) the update took seconds.

### APRS

The APRS features in the TH-D74 are extensive and have been a pleasure to use. Some earlier amateur handholds struggle to get a GPS lock unless you are stationary outdoors with a clear sky, but the TH-D74E outclasses the competition and is able to get a GPS lock even indoors or in a moving car, usually in less than a minute. One thing I found strange and that initially caught me off guard is that the GPS icon is solid when there is no GPS lock and flashes when there is a lock; I'd prefer it to be the other way round.

The APRS modem can be set to band A, band B or the active band. **Figure 1** shows APRS being active on Band A (the top line). It's possible to set the beacon mode to one of four modes: off, PTT, auto

or SmartBeaconing. The latter adjusts the beacon rate based on speed or change of direction, making your beacons much more correlated to your actual path on a map: the faster you travel the more frequent the beacons. It also sends a beacon if you change direction more than that set in the SmartBeacon settings, which is useful if you change direction by say 90 degrees (eg at a junction): the extra transmission(s) make it clear you stayed on the road and didn't take the 'agricultural route'.

In receive you can set how the decoded beacon is shown. It can be either a small notification at the top of the display or a full screen showing much more detail. Each decoded APRS beacon has four pages of information that you can navigate using the left and right keys. These pages cover the originating callsign of the beacon, their speed, direction and altitude, a compass showing direction and distance in real-time to the beacon location and finally the beacon location in latitude and longitude (along with Maidenhead locator and path). Each page shows a small compass with the heading to the beacon's location. Pressing the up and down keys scrolls through the

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last 70 stations received on APRS. This list is also accessible by pressing the 5 (APRS) key on the keypad.

There are so many features relating to APRS I can't list them all here in this review. The TH-D74 is the most comprehensive APRS handheld I've ever used. It supports APRS Messaging and can create APRS Objects (fixed beacons different from your location, handy if used in say a RAYNET event and you want to highlight a location someone needs to check). Other very useful features include things like the option to re-tune to a frequency listed in a beacon Comment field, handy if a local repeater has an APRS beacon associated with it. It is possible to lock selectable features when the APRS modem is enabled, eg frequency or PTT, see **Figure 2**. Usefully, the TH-D74 can be connected to a PC over the USB cable and used as a packet/APRS modem from computer software.

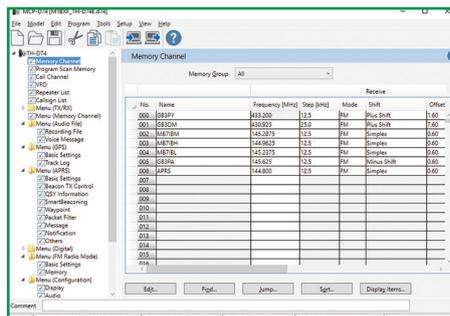
## Bluetooth

The addition of Bluetooth in the radio is welcome. Firstly you can use Bluetooth as a way to receive and transmit audio, using Headset Profile (HSP), with a normal Bluetooth headset. Alternatively, using Serial Port Profile (SPP) you can interface with memory software MCP-D74 to read and write memory files with a Bluetooth-equipped PC. Taking it to the next level, remote control software ARFC-D74 can also control the TH-D74E over Bluetooth. Unfortunately only one Bluetooth device can be connected at once, meaning if you wanted to control the TH-D74E from another room you'll need to find another way to transfer the audio.

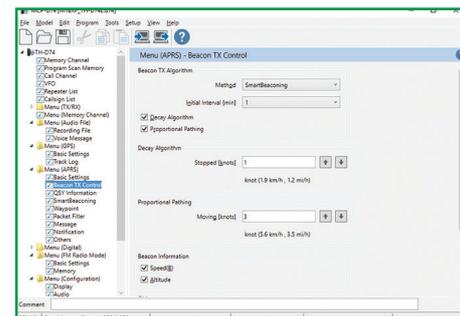
## MCP-D74 memory manager

As radios get ever more complex with ever more settings and an increasing number of memory channels, they become more complicated and time-consuming to program correctly. PC software can make this much more manageable and Kenwood supply, as a free download, the MCP-D74 Memory Control Program [1].

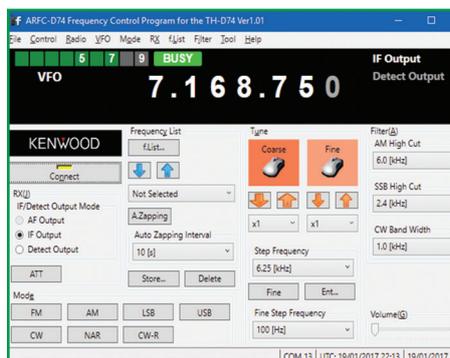
Using this program you can change every radio setting and all memory channels in a spreadsheet-like environment, as seen in **Figure 5** and **Figure 6**. You can save any frequency and mode to the memory channels. It took me a little while to realise that many memory settings (columns) were hidden by default and can be enabled using 'Display Items...' at the bottom of the memory table. Saving and loading settings is very easy, as is downloading and uploading to the radio, which can be done via USB, Bluetooth or directly to the MicroSD card.



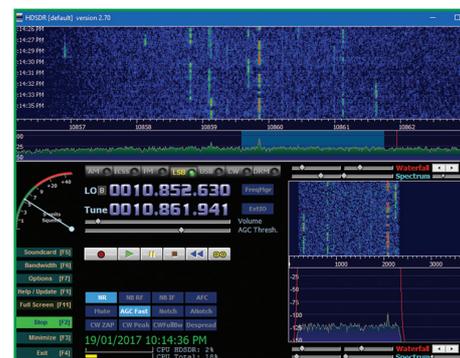
**FIGURE 5:** Editing memory channels in the MCP-D74 memory manager software.



**FIGURE 6:** Setting APRS beacon preferences using MCP-D74.



**FIGURE 7:** Controlling the TH-D74E using the ARFC-D74 frequency control program.



**FIGURE 8:** HSDR decoding the TH-D74E IF output.

The Bluetooth connection is particularly convenient because it means you don't have to dig out a cable or card reader.

## ARFC-D74 frequency control program

Kenwood has also released a very handy PC application [2] that allows you to control the TH-D74E from a PC, making it much easier to use the TH-D74E as a shortwave receiver. **Figure 7** shows it in use. ARFC-D74 controls the radio over USB or Bluetooth and, on a PC, there is a soundcard driver installed to allow audio to be sent from the TH-D74E to the PC. Note that transmit control is not supported by the ARFC-D74 software.

There are two operating modes in ARFC-D74: Detect Output and IF Output. IF Output is only 12kHz wide. In Detect Output the speaker on the radio is the output for the audio. Based on the mode and filter settings in the ARFC-D74, the same audio is sent to the PC soundcard input, which allows you to record the audio you hear. If you enable 'Listen to this device' in the Windows soundcard settings the audio will also come out your PC speakers.

In IF mode the TH-D74E outputs 12kHz of IF audio to the soundcard. The IF audio can then be opened in the SDR software of your choosing. **Figure 8** shows this mode being used to receive CW on 40m

using HSDR SDR program (ignore the frequencies shown on HSDR).

## Conclusion

The TH-D74E is a radio I'm likely to purchase sometime in the near future due to the features it supports. I really got on with the APRS side of the radio, especially the APRS messaging, but also found the wide range receiver capabilities and modes extremely useful at contests and within the shack as an on-air reference. D-Star works very well also and after working out the differences of DV and DR modes it becomes extremely intuitive to use and easy to have QSOs. With all the D-Star repeater and simplex nodes worldwide loaded as default, using the TH-D74E when travelling will be a breeze.

Thanks to Kenwood for making this radio available for review. As it was a pre-production sample I haven't tried to measure its performance, and it's possible there might be some small changes with the production version. However, as the radio's firmware is (easily) updateable, Kenwood may choose to add all sorts of new features in the future.

## Websearch

- [1] [www.kenwood.com/i/products/info/amateur/mcpd74\\_e.html](http://www.kenwood.com/i/products/info/amateur/mcpd74_e.html)
- [2] [www.kenwood.com/i/products/info/amateur/arfc74\\_e.html](http://www.kenwood.com/i/products/info/amateur/arfc74_e.html)