

The Telecom 64-HK

50–70MHz Dual-Band Linear Amplifier



Sitting on top of its padded interior smart aluminium carry case, that's used to transport the Telecom 64-HK 50–70MHz dual-band linear amplifier.

Company: Waters & Stanton PLC (UK importers)

Pros: The amplifier effortlessly provides 500W output on both the 50–52.0MHz and 70–70.5MHz bands with minimal drive requirements. The built-in safety features will protect the amplifier from serious damage.

Cons: The slow switching time when going from receive to transmit causes significant problems for digital mode (JT6M, FSK441) and c.w. operators.

Supplier:

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I was very interested when **Rob G3XFD** the Editor offered me the opportunity to review a new dual-band solid-state linear amplifier. The Telecom 64-HK amplifier runs 500W output on 50 and 70MHz and as I'm very active on both those bands I was very keen to put it through its paces.

The amplifier arrived in an aluminium flight case with internal protective foam. This is a thoughtful method of protection and is a great way to protect the amplifier when being used for portable activity.

Broadband Amplifier

The 64-HK is a broadband solid-state amplifier covering the two bands and doesn't require any adjustment to be made by the user. It's a high gain unit and may be driven to the full 500W output with only 4W drive.

The amplifier is a desktop package, measuring 270mm (W), 420mm (D), 105mm (H) and is completely self-contained. It has a built-in switch mode power supply unit (p.s.u.) that operates from 100-240V AC. This is great when operating portable with an unstable generator or even from a fixed station that has a 'sagging' mains supply.

At switch-on, an internal microprocessor carries out a number of self-checks of the control and protection circuitry. The protection includes p.s.u. over-voltage, high drive level, high output v.s.w.r. and high temperature all of which will automatically inhibit amplification.

Two large fans keep the amplifier module within the correct operating temperature and two smaller fans provide cooling for the switched mode power supply unit. This p.s.u. operates at 48V and produces 16A when the amplifier is running at 500W output. This indicates that the linear amplifier is operating with 65% efficiency.

The front panel meter can be switched between functions and monitors either the output power or output v.s.w.r. Panel mounted l.e.d.s warn against over drive, over temperature, high v.s.w.r. and also indicate when the amplifier is 'on air'.

Amplifier Connections

The amplifier requires a push-to-talk (p.t.t.) input, which is essentially an earth-on-transmit from your transceiver or switching system. It uses a rear panel-mounted

Our v.h.f. specialist author David Butler G4ASR tries out a new dual-band 50–70MHz linear amplifier.

RCA (phono) socket so the user will require a p.t.t. lead terminated in a standard phono plug.

Also mounted on the rear panel are two female N-type connectors. One is used for the drive input from the station transceiver and the other is the output connector to the antenna. You will therefore require that the patch lead from your transceiver and the antenna coaxial cable are both terminated in Male N-type plugs. No mains lead is provided* and you'll need a cable terminated with an IEC plug.

* *Waters & Stanton confirm that the mains lead is normally supplied and apologise for the omission. Editor.*

Test Results

To test the amplifier I connected two calibrated Bird 43 power meters, one to measure the input drive level (with a 10W element) and the other to measure the output power (with a 1kW element). Having made the necessary connections it was then time to fire up the amplifier and see how it performed on both the 50 and 70MHz bands.

My results are shown in the table, **Fig. 1** and show some disparity between the output power levels indicated on the Bird-43 power meter and the 64-HK front panel meter. I was using a new calibrated 1kW element that covered the frequency range 50-125MHz and was pretty confident from experience that my power measurements were correct.

Operating on the 50MHz band I required a drive level of 2W to achieve an output of 400W, although the Telecom 64-HK indicated only 340W output. Up on the 70MHz band I required a drive level of 3W to achieve 400W output, although the 64-HK meter indicated 250W output.

In the UK the maximum power output allowed on the

Figure 1. Output Power Measurements

50MHz		
Power Meter	Bird-43	Built-in
1W drive =	200W output	140W
2W drive =	400W output	340W
3W drive =	500W output	460W

70MHz		
Power Meter	Bird-43	Built-in
1W drive =	300W output	170W
3W drive =	400W output	250W
4W drive =	500W output	350W

Note: The manufacturers recommend that high quality plugs, cable and connections are used with this high power amplifier.

70MHz band is 160W and I needed around 650mW drive to achieve this. As an approximation I could achieve 500W output on either band with a nominal 3.5W drive.

I did have an issue regarding the required drive level. The amplifier I tested only required 2W drive to produce 400W output on the 50MHz band. Many transceivers currently available run considerably more power than this and often cannot be reduced below the 5W level.

Stations using a transverter, typically on the 70MHz band, will encounter a similar problem especially as less than 1W drive is required to provide the UK 160W output level. In my opinion it might have been better to reduce the gain of the amplifier by padding the input so that 10W was the nominal drive level.

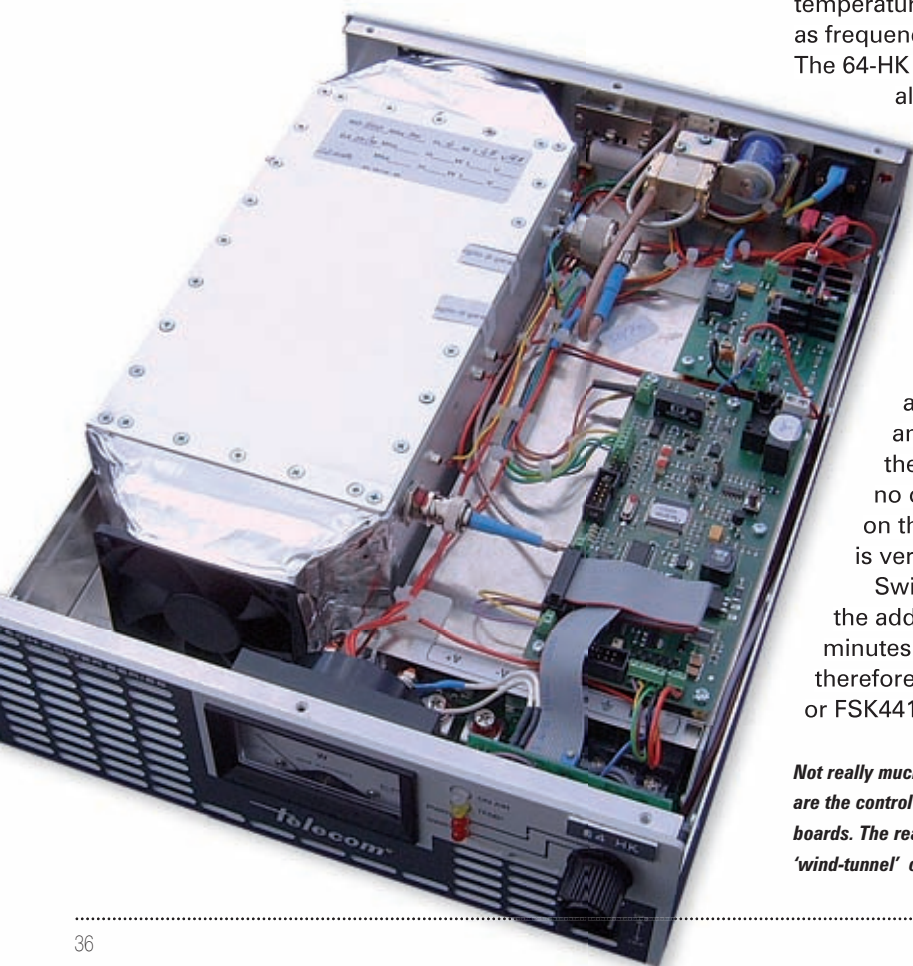
I then wanted to see if there was any significant temperature rise when using 100% duty cycle modes such as frequency modulation (f.m.) or JT6M digital modulation. The 64-HK amplifier has a large muffin fan that's rotating

all the time and increases in speed as the output power increases. The noise level when in receive mode is fairly unobtrusive, which is good for a desk top unit. Additional fans (there's a total of four) turn on under microprocessor control if the amplifier or power supply temperature rises above a predetermined level.

I set the amplifier for 400W continuous carrier into a dummy load. After 4.5 minutes the additional cooling fans came on, increasing the ambient noise level – but not significantly. I kept the amplifier at the 400W level for 10 minutes with no obvious signs of temperature rise. The air outlet on the front panel didn't appear to get hot at all. This is very good result.

Switching back to receive I was pleased to note that the additional p.a. cooling fans remained on for two minutes before switching off. This solid-state amplifier is therefore ideal for 100% duty cycle modes such as JT6M or FSK441.

Not really much to see inside, the two printed circuit boards that can be seen are the control circuitry. The PSU is contained in its screened box under these boards. The real 'heart' of the amplifier, its p.a. stages are contained in the 'wind-tunnel' on the far side of the chassis.



Specifications

Model:	64-HK
Frequency Range:	50-52MHz and 70 -70.5MHz
Nominal Input Power:	2.5W
Maximum Output Power:	500W
Gain:	23dB
Maximum Output v.s.w.r.:	1.7:1
Power Supply:	Built In 100-240V AC
Input & Output Connectors:	N-type Female
PTT Connector:	RCA - Phono Socket
PTT Switching:	Earth on Transmit
Protection:	PSU Over Voltage, Over Drive, Over Temperature, Output VSWR
Meter:	Selectable Output Power / V.S.W.R.
Operating Temperature:	-10°C to +50°C
Size (W/H/D):	270mm, 105mm, 420mm
Weight:	7kg
Carry Case:	Aluminium Case with Protective Foam

Next, I made an observation regarding the panel meter. This meter can be switched to indicate either output power or v.s.w.r. The meter however is only calibrated in Watts from 0 - 500W and when switching to v.s.w.r. it doesn't indicate any meaningful reflection coefficient.

Operational Issues

There was one significant issue with the amplifier I was reviewing and this involved the time taken to changeover from receive to transmit. When earthing the p.t.t. line there's a noticeable 'kerchunk' as both the open-frame input and output relays operate. It's only a second or so but it's more than enough to clip the first few letters when using c.w. and the first syllable when operating on voice. There was absolutely no way that the amplifier could be used with a transceiver operational in voice control (VOX) mode.

The problem also means that the amplifier cannot be used easily for any of the digital modes such as JT6M or FSK441 where your computer automatically controls the transmitter on-off switching periods. The amplifier needed manual switching from the transceiver to allow sufficient time for the relays to settle down before consciously speaking into the microphone or operating the morse paddle.

If you do try operating in VOX mode (as most Morse or digital-mode operators do) then you will discover that your transmitter operates into an infinite v.s.w.r. before the switching cycle is completed. I think that the 64-HK 500W amplifier would definitely benefit from high-speed sealed switching relays.

In my opinion – and this isn't a criticism of the amplifier per se – is the use of dual-band amplifiers in a station that can operate on both the 50 and 70MHz bands. There's no such thing as a dual-band 50/70MHz transceiver and although there are some dual-band beam antennas available, the majority of DXers will possess separate antenna systems.

Therefore you can only effectively use this dual-band amplifier on one band at a time. And then when wanting to move to the other band, you'll have to unplug both the drive connection and antenna connection and re-plug them up to another transceiver and antenna. It would be nice for dual-band amplifiers to have dual inputs and dual outputs!



As you can see from this shot, the PSU has its own dual fans to ventilate hot air when running. The larger fan to the right is for the p.a. stage ventilation. Signals in and out of the amplifier, go via good quality N-type sockets.

You can, of course, achieve the necessary band switching with two external, manually-switched 4-port coaxial switches – but it would be nice to have it all included within the amplifier in the first place.

User Manual

The user manual is reasonably well written, although it contains a small number of typographical errors. It has all the installation and operational information we require but it doesn't contain any trouble-shooting details. Mistakenly, it also mentions on a number of occasions that the band 70.100–70.200MHz is allocated in the USA. Unfortunately, this is completely incorrect.

Italian Made

The amplifier is designed and manufactured in Italy by **Falcon Radio** (actually based in Spain) and distributed in the UK by **Waters and Stanton PLC**. My thanks go to Jeff Stanton G6XYU, who arranged for the loan of the Telecom 64-HK amplifier, which costs £1995 inclusive of VAT.

There are similar models, the 2M-HK and 70-HK that provide 500W output on the 144MHz and 430MHz bands and the 23CM-150 that provides 150W output on the 1.3GHz band.