Heath HO-5404 Station Monitor

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Price class: $250

How many times have you heard a signal on 20 meters that's so broad and splatters so much that you just had to see it for yourself and, maybe, tell the other operator about it? With the congestion on HF today, the chances are pretty good that you've run into this situation at least once an operating session.

The next question that will probably arise, if you're serious about it, is: "How do I go about it?" If you can afford it, you might consider tying up a lab-grade oscilloscope at a slow sweep speed and a lower frequency response level. But there are few operators who can afford this luxury, especially if the scope is used for other things. The solution, then, is a station monitor, which also can double as a minimal level oscilloscope.

Usually inexpensive enough to be dedicated to monitoring station activity alone—$250—most station monitors add to their utility by offering pan-adapter modules so they will also function somewhat as spectrum analyzers.

Further, station monitor scopes are made to handle station monitoring chores, unlike oscilloscopes whose primary missions are for far more sophisticated chores. For example, the average station monitor scope comes equipped with audio level inputs, while you must use clip leads and, possibly, attenuator pads—if the audio drive is too high—so an oscilloscope can handle station monitoring.

And this brings us to the topic at hand, the Heathkit HO-5404 Station Monitor. It's a unit which is made to be part of an HW-5400 HF station, so it follows Heathkit's relatively recent change to a brown color scheme. Its price puts it in line with other station monitors on the market.

A competent unit, the HO-5404 arrives in two boxes. The first contains the chassis, motherboard, demodulator board, and their associated parts; the second contains the cathode ray tube.

As you first look at it, two things strike you: (1) You wonder why Heath used such a big box for so few components—the chassis is 11-1/4" x 12-1/8" x 1-3/8" and it weighs 10.6 pounds—and (2) you notice that it's an organized kit.

Rather than engaging in its former practice of providing bags and boxes of parts which were arranged in a seemingly helter-skelter manner, Heath has organized everything neatly and logically. Major subassemblies and their parts are grouped together so that everything is easy to find and check.

Once this is finished, the first major assembly is the demodulator board, after which you move on to the motherboard. The demodulator board takes about an hour or so to put together and the motherboard takes another four or five.

If you look carefully as you assemble the kit, you can see there is a subtle pattern in the way the components are mounted. As each wave of mounting washes across the board, you notice the close-mounted items, such as resistors and diodes, are mounted first. Then come the medium-height mounts, such as capacitors. Finally, the transistors are mounted. It does make things more convenient as you stuff the board.

With these items out of the way, you begin to assemble the chassis, with the rear connectors first. These connectors include antenna inputs as well as vertical and horizontal inputs. The attenuator switch and power line also are installed in this area.

After these connectors are installed, you turn your attention to the front of the chassis, which is probably the toughest part of the assembly.

At the front, the first step is installing a huge plastic decal. It not only contains the labeling for various potentiometers and switches, but it also serves as the graticule for the scope. It requires a great deal of care to do this correctly and I'd suggest lining up the work several times before you peel the covering off the back. The glue on the back holds like iron, and once you've put it on there's no turning back. So, if it's crooked, you're in for an interesting time trying to get it off and reposition it. Fortunately, rather than rush ahead, I took my own advice and lined everything up—and placed it on the first try.

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The decal and the installation of the potentiometers and switches are the easiest steps of the process. Because once you've installed the switches—the motherboard is also installed about now—you must begin to wire them up in place. Not only does this call for care, it also calls for a steady hand with the soldering iron because it gets pretty crowded with wires and other pot-mounted components—capacitors, for example—very quickly. It's also a very tedious job that quickly becomes tiring and, as we all know, tiredness leads to inattention.

Once this is done, you must then wire up the switches, an even more tiring job because it seems like there are twice the number of connections to be made.

Quite frankly, this seems to be a time-wasting, backwards method of mounting and wiring switches and pots. I would urge the procedures to be turned around so that everything is wired up outside the chassis and then installed. This would make it easier for the kit builder, who would be worried only about the length of the leads instead of burning through wires in a jungle of tangled connections with already-installed components. It would also lessen the potential for mistakes because it is possible to attach a wire to the wrong point as the jungle of wires grows. The same is true of the switches.

Heath's HO-5404 Station Monitor.

With all of this done, the final step is installing and wiring up the CRT and connector. This, again, is straightforward, although it does pay to take care not to handle the CRT too roughly to limit chances of breaking it.

At this point, you're ready for the tuneup which also is straightforward and simply involves balancing the vertical and horizontal amplifier sections. This involves setting a couple of pots on the motherboard so that the circuits are balanced at 80 volts. It was at this point that I began to go somewhat gray as I kept on trying to get the vertical circuitry balanced and it wouldn't. Each time, one side would be at 80 and the other would be at 137, and when I adjusted the other side, the first would be out of adjustment.

Checking things out, it looked as if one of the driver transistors in the amplifier section was bad—Q104 and Q106—and I called customer assistance.

As I explained what was going on to the customer assistance rep, he quickly diagnosed the problem—Q104—and transferred me to the parts department where he had already ordered the new part to replace the offender on the motherboard. All I had to do was give my name and address. Less than a week later, the part arrived; I installed it, and everything was aligned quickly.

The acid test came when I put it on a rig and fired it into the dummy load. After adjusting everything according to instructions, I keyed the microphone and everything appeared as the documentation said it would.

I then went on to monitor my radioteletype signals, packet signals (just to see what they looked like), CW signals, and phone signals. As I watched the phone signals, one thing became clear to me: Too many operators have their speech compressors cranked up way too high and their signals are splattering all over the place. Nearly every signal I looked at on 75 was flat-topped and splattered everywhere.

The strength of the Heathkit HO-5404 Monitor Scope isn't so much that it will serve as a good station monitor for VHF (1.8 to 54 MHz) or even as a reasonable 5-MHz scope (10–40-kHz vertical response and 10–300-Hz horizontal response) for bench purposes. It's a strong performer in both roles and is easy to use since there are only seven switches and eight pots in front, some of which you set once and forget.

The real strength of the HO-5404 is that you built it and know it thoroughly. You can go in and troubleshoot a problem and replace a bad part. This is possible because the scope uses discrete components rather than Very Large Scale Integration techniques. It is probably one of the few kits on the market that isn't stuffed full of ICs that you can't work on.

Another real strength is its documentation. Not only does it lead you step-by-step through the scope's construction and alignment, but it also guides you through troubleshooting procedures and gives suggestions should a problem arise. It also has a theory-of-operation section that explains precisely how the scope works, which is a refreshing change in this day of appliance manuals.

Further, the manual gives you valuable examples of the types of scope patterns you will see given a certain set of conditions (chirping, splattering, flat-topping, for example).

Despite these strengths, there is a sobering thought that occurs to me and that is cost. Operators used to build kits because they were less-expensive alternatives to over-the-counter gear. But with Heathkits costing nearly the same as fully assembled gear, it makes you wonder why an operator would build instead of buy.

In my case, I feel a sense of satisfaction, but I can't say that I've learned anything from it, other than how to stuff a board. I also am familiar with the innards of the gear and it is fairly easy to work on. But I can't say that this is the situation with the rest of the amateur world. Surely, there are many who agree with me, but there are many more who would prefer to plunk down their plastic and buy ready-made gear.

And who's to say who's right? The only piece of advice I have for Heath is to consider realigning the pricing structure of their gear. If they can afford to cut margins and make their equipment the low-cost alternative again, they'll stand a chance of revitalizing a whole marketplace. Heath's equipment is good and something you can get your hands on. Now, isn't that something in this day of tiny rigs and tinier parts? You bet it is! Reader Service number 151.■