



ICOM IC-PCR1500 & R1500

By John F. Catalano

Anyone who has read my *Computers & Radio* column over the past years knows I rate the ICOM IC-PCR1000 right up there at the top of wide spectrum, computer controlled receivers. It was one of the first with full capabilities and is easy to use. I still think it's great. So, when the rumor mill began churning concerning a replacement for the venerable 1000, I was all ears. But oddly, at the time of this writing, the 1500 is still not even mentioned on the ICOM America website.

The 1500 family is based around a computer-controlled receiver "black brick" similar to the PCR1000, but larger. Other than a power switch, all other functions on the IC-PCR1500 are controlled via a PC. It comes with its own suite of ICOM software, which we will put through its paces. Its list price is \$695, but is discounted by many dealers.

On the back of this "brick" is a jack labeled "Controller." ICOM has developed a separate "Controller" which plugs into this jack, thereby removing the need for a computer. The Controller, which is visible in the foreground of Figure 1, is roughly the same size as the removable front panel on the ICOM IC-208H 2 m/440 MHz mobile. If the unit is purchased with the Controller, its designation changes to IC-R1500 to reflect the fact that it is a standalone receiver. List price is \$845 with discounts common.

Well, thanks to the people at Grove, which has 1500s in stock, we have had a 1500 for our use for the past few weeks. So here goes with our first impressions.

❖ Operational Specs

The receiver circuit is a triple-conversion superheterodyne with intermediate frequencies (IF) at 266.7, 10.7 and 0.45 MHz. The most dramatic specification is its frequency range. The 1500 almost covers the fabled "DC to Light," going from 0.01 to a 3299.999999 MHz (0.495 to 3000 MHz guaranteed). The US consumer version omits the cellular phone frequencies in the 800 MHz range.



Figure 1 - The ICOM IC-PCR1500 and the controller that turns it into the IC-R1500

It tunes this wide range in steps from 1 Hz to 10 MHz selectable by the user. In addition, the user can define a customized tuning step. Modes of operation include FM, AM, WFM, USB, LSB and CW.

Sensitivities are quite respectable in the 1.8 to 1300 MHz fre-

quency range, equal to or better than SSB/CW at 0.5 uV and AM at 2.5 uV. FM sensitivity is spec from 28 to 13000 MHz at equal to or better than 0.63 uV and FMW at 1.8uV. In typical ICOM fashion, to "tame" the strong AM (MW) commercial radio station signals, sensitivities are purposely reduced below 1.8 MHz by a factor of 10.

❖ Physical Specs

Although compact at 5-3/4 (W) X 1-5/8 (H) X 8-1/8 (D), the 1500 is thicker and larger than the PCR1000. However, the 1500's internal speaker has been increased to 2.5 inches, which provides "listenable" quality sound. A rather large 12-volt DC, wall-mounted power pack supplies juice to the 1500.

The back panel of the 1500 has six connectors and a grounding screw. DC power and external speaker connections account for two. The antenna is connected via a BNC. The aforementioned Controller connects via a telephone style RJ jack. A "Packet" jack can be used, with a TNC (terminal node controller), to decode 9600bps packet ham signals. This is not very different from the back panel of a PCR1000.

A major difference is the computer interface. Gone is the 9 pin serial port jack, replaced by a USB jack. In theory, this is a higher speed connection than the serial port. In addition, the 1500 can use the USB port to send demodulated audio to the computer for storage or playing through the soundcard/speakers. However, as ICOM warns in the manual, this slows down the CPU and should only be used with fast PCs.

❖ PC Requirements

Clearly, a PC with a USB port is required. The minimum PC configuration suggested by ICOM is a Pentium III, 450 MHz, 128 MB RAM, 50MB hard disk space, 1024 x 768 high color screen capability and CD ROM drive. A Pentium 4 with 256 MB of RAM is recommended.

The receiver control and memory (logging) program come on a CD and work with Windows XP/2000/ME/98SE operating systems.

Against ICOM advice, I first tried to use a Pentium I 233 PC running Win98SE. This is the PC I first ran the PCR1000 on many, many years ago. The installation proved to be surprisingly tedious, requiring three different drivers to be loaded from the ICOM CD. Not following ICOM's installation instruction *exactly* caused me unnecessary grief.



Figure 2 - 1500 shown in the component format in the center. The "Tool" Bar is at right and the memory channel editor (log) at left

However, after I corrected my mistakes, the 1500 did run on the Pentium I, although the screen update was slow, very sloooow.

Going to a faster Pentium III, 1 GHz running Windows XP, installation is still not plug and play. The XP system still required the same three driver installations, with just as much care required. My suggestion? Be real careful and follow the ICOM driver installation instructions exactly. Once properly installed, a shortcut is placed on the Desktop.

❖ Tooling Around

Starting the program via the Desktop icon brings up the Tool Bar.

Here, in Figure 2, we are displaying the critically important Tool Bar, shown as a long vertical box at the upper right side of Figure 2 along side the Component receiver screen.

The Tool Bar is one method of controlling all major functions, including starting the program, selecting the receiver type screen, saving files, memory management, USB management, digital audio recorder, cloning memory files, DTMF unit, setting options, exiting the program and much more.

In what we have now come to know as ICOM-style, the software allows you to control the receiver with three different receiver display types: Simple, Multi-Function and Components. This is very similar to the PCR1000 ICOM Software Rev 2.2.

The Simple radio screen looks like a desktop scanner, with its few, but capable, controls. The Multi-Function Receiver screen is reminiscent of a high-end communications receiver with the front panel crammed with buttons and knobs. See Figure 3. The Component screen displays different functions on different panels, four main panels, in all. We'll concentrate on this screen, seen in Figure 2, which contains all the functions available to the 1500 user.



Figure 3 – The other faces of the 1500 - multi function communications receiver (left) and simple radio (right)

The Component screen, also shown in Figure 2, looks like a bench or a rack full of separate units. At the top is the Tuning Panel, which offers a number of tuning methods, which utilize PC keyboard/mouse-screen interactions. Let's look at a few.

The "ten key" pad on the right side of the Tuning Panel can be used to input frequency directly, followed by the "Ent" button. Another method employs the dial, shown on the left side. Placing the cursor on the dial, the frequency can be tuned up (right mouse button) and down (left). This approach is used by all "knob" controls. The little arrowhead above a digit indicates which digit the dial will control. The TS switches below the dial determine the arrowhead's position.

All graphical mouse click commands can also be performed via keystrokes. One very nice feature that ICOM has included in the software is user customization of keyboard commands. This is simply and easily performed via a dropdown table accessed from the Tool Bar's "Setting" icon. This is a great control method which should be incorporated into all radio control software. You now have a general feeling for the control methods of the 1500 software.

❖ Kicking the Tires

Let's point out some of the unique/interesting features and functions of the 1500. The "Signaling" section of this panel allows the user to choose different squelch methods including tone and voice. For example, right clicking on TSQ button brings up a menu of tone frequencies that the user can select. The 1500 can decode and utilize pocket beep, DTCS and tones to open its squelch. Additionally, it can determine and display an unknown access tone frequency or DTCS code that it receives.

The IF shift control, seen on the "Mode/Vol" Panel, has a re-centering feature that is very handy. No matter where you have set the IF bandpass, one click and it's back in the middle of one of the six user-set filters. Not a new feature, but very useful.

Meter/Scan Panel

The next panel down controls some important scanning features of the program. The buttons in the Scan Control area enable tone scanning (which stops a scan when a selected tone is present), priority channel scanning, and weather tone alert monitoring. Each one worked perfectly.

Band Scope

The last panel is deceptively simple in its appearance, but it is one of my favorite features. This panel is incredibly versatile and performs many different functions. In one mode, signals on either side of the tuned frequency are displayed. Clicking on a "peak" will retune the 1500 to that frequency. This is an indispensable tool when searching for

new frequencies. The spectrum can be saved as a file for later viewing and analysis. In another mode, the band scope displays the signal strength of the tuned signal, over a given time period. This is very useful for propagation and signal analysis.

However, as in the PCR1000, while the Band scope is operating in the SSB or CW mode, the audio is shut off with no possibility of listening to the signal.

The 1500 Band scope software includes a "Wide Band Scope" feature that allows 1, 2 and 5 MHz wide scans. It means you can determine the signal activity in an entire ham or shortwave band with one scan, just like a spectrum analyzer.

Other Band Scope capabilities include band scanning in the WFM mode and 1/2 sweep, doubling the sweep resolution—features found only on \$10,000 communications equipment not too long ago!

Multichannel Scanning

The Multi Channel Monitor (MCM) provides a quick graphical method of "watching" up to 25 active channels. See Figure 4. Each box represents a frequency entered via a table accessed from the Tool Bar.

Once MCM scanning begins, the channel number, a user-defined name, frequency, and S-meter reading are displayed almost simultaneously for all channels. The color of a square also indicates activity and signal strength. Black shows no activity and red indicates a signal level greater than S9. In order to hear a channel, scanning must be stopped by clicking on the channel-box to be monitored. In Figure 4 we can see from their S-meters that channels 2, 9 and 11 are active.



Figure 4 – Monitoring 25 channels – the multi-channel monitor screen

More on Memory

The 1500 can utilize its memory in many useful ways. Basically, each PCR1500 file can have 2600 user defined memory channels. These are arranged as 100 channels in 26 Banks. Look back at the left side of Figure 2. Here you can see the Memory Channel Editor table display filled with entries. We are looking at Bank 01, labeled "HF Radio." Due to display limitations, only the first six of thirteen columns are visible. All thirteen parameters are user-selectable.

I consider this a station log of sorts, since clicking on a line causes the 1500 to automatically tune to that channel's thirteen parameters (yet another tuning method). In Figure 2 we have tuned the 1500 to Radio Japan on 6.145 MHz by clicking on Channel 15 in Bank 01.

The Tuning Panel allows control of the memory banks via the buttons located below the frequency display. Alternatively, the Tool Bar Memory Edit icon can be used to display and modify the memory channels in table form. Another method of modifying the memory is via the "Auto-Write" feature. When the 1500 is scanning and stops on a frequency, it can automatically be written to a memory bank and channel.

More on Scanning

There are so many potential combinations of scan modes that we cannot cover them all here in detail. Briefly, they include programmed, select memory, mode select memory, mode scan, memory skip and auto memory write. I tried them all and they work as advertised.

The different squelch types really are helpful for optimizing different scanning environments. We found that the 1500 squelch operated very reliably and was sensitive enough to allow for even very weak signals to break it.

How fast does the 1500 really scan? The spec says it should run at 60 channels per second. On the Pentium III 1GHz PC we measured 27 channels per second when scanning memory frequencies. In the Multi Channel Monitor mode it was 14 channels per second. Perhaps the discrepancies are due to the older PIII computer.

❖ Personal Impressions

We have just touched on the capabilities of the 1500. In fact, we have missed important features such as the UT-106 DSP unit, an added accessory which adds noise reduction and an auto notch filter. But we're almost out of space.

The Controller works very well, is easy to use, and unchains the 1500 from a PC. Although fun to use, I'm not convinced that the Controller is worth the extra cost. Remember that a very inexpensive Palm Pilot can control the PCR1000! In any case, connecting the 1500 to a PC allows it to perform to its full potential.

According to the sensitivity specs, in the 1300 to 2300 MHz range sensitivity falls off by a factor of 8 to 10. Then from 2300 to 3000 sensitivity falls by another factor of 3, bringing the total reduction in sensitivity close to a factor of thirty (30) times. (This dramatic drop-off in sensitivity could be the result of shortcuts in construction techniques, but one would have to look inside to know.) However, the more pertinent question may be: unless you're on the space shuttle, what is there to hear above 2300 MHz?!

I was really excited about the Multi Channel Monitor feature. But after using it for a while, I decided it really wasn't useful. Since a "hit" counter is not included as a box-displayed parameter, it's difficult to keep track of the active channels without constantly looking at the display. And if you don't manually click on a single channel "box," you don't hear *anything*. Not very multi channel!

Overall, the PCR1500 is a very capable receiver—wide ranging, sensitive, with lots of functions and easy to operate. Once *all* the drivers were properly installed, the software worked smoothly and without any problems, no matter how I abused it.

I really like the IC-PCR1500. In fact, it reminds me a lot of my old favorite the IC-PCR1000! So, next time we'll do an A-B comparison of the PCR1500 and the PCR1000 on the same antenna and computer. Stay tuned!

The Icom 1500 series is available from Grove Enterprises (1-800-438-8155; order@grove-ent.com) – \$579.95 for the PCR-1500 and \$699.95 for the R-1500 (base/mobile receiver can be used without computer).