MT REVIEW

A Tough Act to Follow
Comparing the ICOM PCR1000 to the PCR1500 & PCR2500

By John F. Catalano

Last month we took a first look at ICOM's new IC-PCR1500 computer controller receiver and its standalone front-paneled sibling the IC-R1500. This time we'll draw some interesting comparisons between the 1500 and its "ancestor," the PCR1000.

In the interim, ICOM has launched yet another computer controlled receiver, the IC-PCR2500. Like the 1500, it also comes in a standalone, "no computer needed" version. We actually used a PCR1500, but did not have our hands on a 2500.

Although at the time of this writing, June 2006, the ICOM America website, **www.icomamerica.com**, still had no mention of either the 1500 or the 2500, the 1500 is readily available from US ICOM dealers along with details on the 2500. Icom told *MT* it should be on the web site by July, but if not, you can go to ICOM's Japan worldwide site at **www.icom.co.jp/world/products/receivers/index.htm** for official details on the new receivers.

❖ The Comparison

These ICOM receivers are highly capable, many-functioned pieces of sophisticated equipment. So we'll hit just some of their features, which differentiate one from the other … or which make them very similar. I know I was surprised with some of the side-by-side comparisons. These were done on a Pentium III 1GHz, 256MB RAM, running Windows XP.

It was fortuitous that last month we looked at the PCR-1500, since it has become the new "basic" PC receiver at ICOM. The PCR2500 appears to be based on the 1500 with some added hardware and features. (More on the 2500 later.) Let's first concentrate on looking at the PCR-1500 versus the PCR-1000. To simplify our task, we'll break the comparisons into hardware and software.

❖ Hardware Comparisons

Lots of similarities here. Both the 1500 and the older 1000 use a triple conversion super-heterodyne circuit approach. They share common intermediate frequencies of 266.7 MHz, 10.7 MHz, and 450 kHz. Their modes of operation include AM, USB, LSB, CW, FM-N and FM-W. Both can utilize the optional UT-106 digital signal-processing module to implement Automatic Notch Filter (ANF) and Noise Reduction (NR) functions. A 20dB RF attenuator, noise blanker, Automatic Frequency Control (in FM mode) and Automatic Gain Control are hardware-based features common to all the PCR receivers.

One major difference is the receiver's computer interface. The PCR1000 uses the relatively slow (and sometimes difficult to configure) serial port. In contrast, the PCR1500 uses a much faster, auto-detecting USB connection. Audio, as well as data, can be sent via the USB port connection

Another big difference is their frequency ranges. The PCR1000 goes from 0.01 to 1300 MHz, a range that amazed me when it was introduced. The PCR1500 more than doubles the PCR1000 range to 3299.999MHz – but at a price?

What Price Frequency?

ICOM has chosen to use a downconverter to get the extended frequency range. This methodology uses an "add-in" module at the antenna that reduces, or converts, the higher incoming signal to a lower frequency. This can then be received and demodulated by the base receiver block. This approach allows expanded frequency coverage with a minimal of hardware redesign, since the base receiver can remain the same.

Its downside is that the added circuitry and associated signal path usually leads to a loss of sensitivity. From the increased size and weight of the 1500 as compared to the 1000 (see Table 1), some hardware has been added.

Again looking at Table 1, under the Sensitivity heading we can see that indeed the sensitivity of the 1500 is
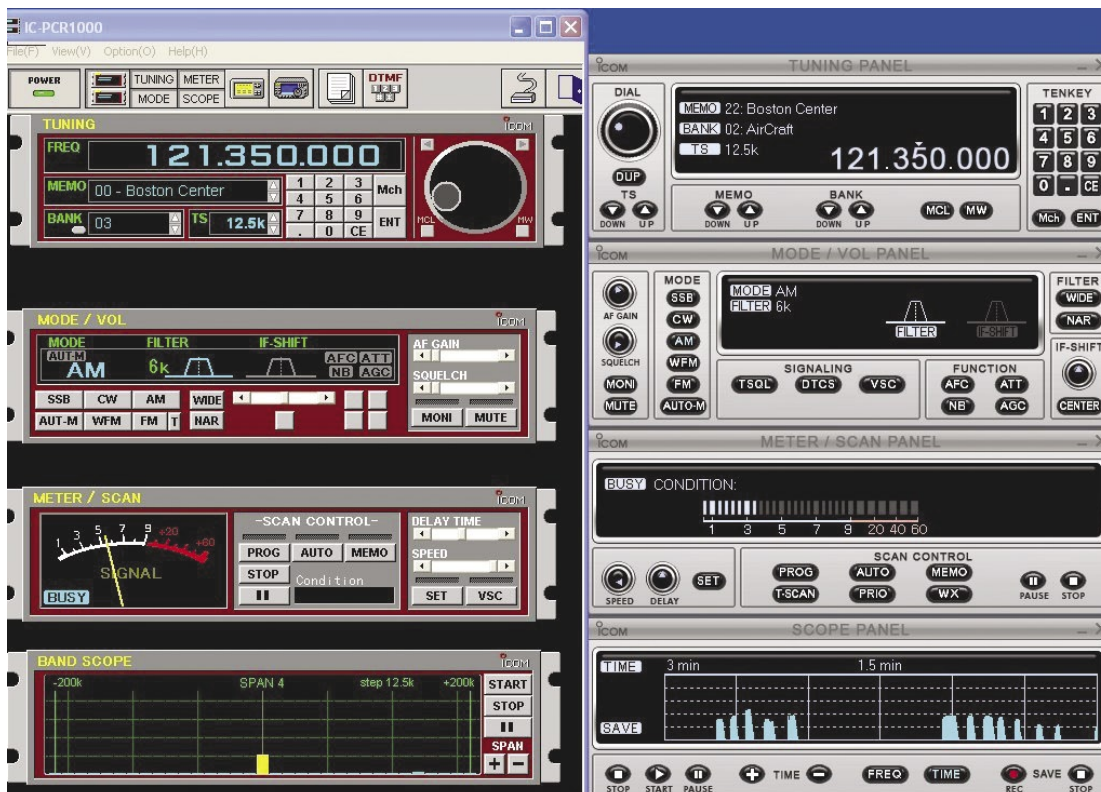

Figure 1 – Side-By-Side: Left PCR1000-Right PCR1500. Notice PCR1500 Time-line Scope function in operation at bottom right.

lower than the 1000 by an almost consistent 0.2 microvolts. In most frequency ranges this is almost a 50% reduction in sensitivity. Of course, sensitivity alone is not the whole story of how a receiver will perform. However, rarely is a lower sensitivity a good thing, especially at these usable levels.

If you check the ICOM America website, which defines the sensitivity of the PCR1000 across its frequency range, you may see a problem in the specs. The frequency ranges listed are 0.5 to 1.799999 MHz, 1.8 to 29.99999, 30 to 49.99999, 50 to *59.99999* and 700 to 1300.

Perhaps the 59.99999 should be *699.99999* so that the spectrum is continuous. In Table 1 we have surmised that this is the problem and have modified what ICOM America is reporting. If this assumption is incorrect, then ICOM has an even bigger issue, since it left out sensitivity data for a major portion of the PCR1000 range. In either case, it's another sign of inattention to Icom's online product listings.

❖ Comparing Software Packages

Software is provided by ICOM for all the PCR receivers. But the PCR1000 comes with added software, the very capable Bonito software package. However, to compare apples to apples, we used the ICOM PCR1000 V2.2 software as our baseline. Again we'll compare the 1000 to its heir apparent, the 1500.

PC Requirements

All ICOM PCR programs run under Windows 98SE through Windows XP. I've had earlier versions of the1000 software running under Windows 3.1 and 95. Table 2 compares the software capabilities of each receiver. The first thing to notice is the *huge* difference in computer requirements. The PCR1000 *minimum* PC is a 486DX4 with only 16 MB of RAM and a serial port. That's not much more than an abacus. The recommended system is a Pentium I 100 MHz.

In contrast, the 1500's (and 2500's) minimum PC requirement is a Pentium3 450 MHz with 128 MB of RAM, a far more powerful PC. The recommended system is a Pentium 4 and 256MB of RAM. This is a major increase in computing power.

Software Similarities

If you're comfortable with the PCR1000's ICOM version 2.2 software, you'll feel right at home with the PCR1500 and probably the 2500. If we look at Figure 1, showing the two operating side-by-side in the Component rack, the subtle differences in the software presen-tation are apparent. However, overall they are very, very similar. All the PCR software packages have the familiar ICOM three interfaces – Component rack, Communications Receiver and Simple Scanner – for receiver control.

The 1000 and the 1500 both have a real-time Bandscope (Bandscan) function that shows the band activity centered around the current operating frequency. The 1500 Bandscan operates much smoother with more than double the frequency span range. Unfortunately, the annoying muting of the audio during Bandscan operation in the SSB or CW modes is still a "feature" of the PCR 1500 and 2500 software.

Other common and welcome software features include IF shift, VSC (voice scan control), S-meter squelch, and tone squelch, to name a few. On the PCR1500 and 2500 data sheets, decoding of DTMF tones is a highlighted feature. However, although not mentioned specifically on the PCR1000 data sheet, its software is also capable of DTMF decoding.

Viva La Difference

Two software features of the 1500 that showcase the greater PC power, are the Multi Channel Monitor and the Time-Line Scope. The Multi Channel function allows monitoring up to 25 channels, tracking S-meter levels of each channel. See last month's article on the PCR1500 for figures and details of this function.

Although all PCRs can perform the Bandscope function in some fashion, only the 1500 and 2500 have the Timeline Scope function. The Timeline Scope graphically displays and stores the band "happenings" within a 3 to 100 minute time period.

See the bottom right side of Figure 1. Here we can see the activity on this frequency for Boston Center over a period of a few minutes. Also look at the peak at the center of the PCR1000 Bandscope, on the lower left side of Figure 1, which was simultaneously monitoring the same frequency. Two radios working together: What a *great* idea.

More Soft Power

Although audio recording was possible with the PCR1000, it required a separate cable between the 1000's audio output and the PC's soundcard. Both new receivers utilize the USB port for audio input and therefore only require a single cable. However, if you perform a USB audio transfer and don't have at least the recommended PC hardware, be prepared for a chopped-up, useless record-ing.

Other 1500 functions include: CTCSS/DTCS tones and duplex mode operation for monitoring a repeater, pocket beep function, weather alert function and tuned bandpass filters for VHF/UHF bands. The PCR1000's limit of 1000 channels per file has been increased to 2500 channels on the 1500.

❖ Enter the PCR-2500

The PCR-2500 has the same physical

TABLE 1: HARDWARE COMPARISON

Specs	PCR1000	PCR1500	PCR2500
Circuit SuperHet Triple Conversion	Yes	Yes	Yes
IF Freqs: 266.7MHz/10.7MHz/450kHz	Yes	Yes	Yes
Frequency 0.010–1300MHz	Yes	Yes	Yes
Frequency 1300–3299.999MHz	No	Yes	Yes
Noise Reduction & Auto Notch	UT106 Req	UT106 Req	UT106 Req
Size (Inches) approx.	5x1.2x7.9	5.75x1.5x8.1	5.75x1.5x8.1
Weight (lbs)	2.2	2.6	3

Modes of Operation			
AM. SSB, CW, FM-N, FM-W	Yes	Yes	Yes
D-STAR DV	No	No	UT118 Req
APCO P25	No	No	UT122 Req
Dualwatch Capability	No	No	Yes
Diversity Receive	No	No	Yes

Sensitivity (10 dB S/N) uV			
1.8 - 29.99999 MHz - SSB/CW	0.28	0.5	0.5
30 - 49.99999 MHz - SSB/CW	0.35	0.5	0.5
50 - 699.99999 MHz - SSB/CW **	0.2	0.4	0.4
700 - 1300 MHz - SSB/CW	0.25	0.5	0.5
1300 - 2299.999 - FM	N/A	5.6	5.6
2300 - 3000.000 - FM	N/A	18	18

** See Text

TABLE 2: SOFTWARE COMPARISON

PC Requirements	PCR1000	PCR1500	PCR2500
CPU Requirements	486DX4	P3 450MHz	P3 450MHz
Minimum RAM	16 MB	128 MB	128 MB
USB Port	No	Yes	Yes
Serial Port	Yes	No	No
Monitor Resolution Min	640x480	1024 × 768	1024 × 768

Software Features/Functions			
Three Receiver Screen Modes	Yes	Yes	Yes
Bandscope	Yes	Yes	Yes
Time-Line Scope	No	Yes	Yes
Multi Channel Monitor	No	Yes	Yes
Recording	Yes	Yes	Yes
DTMF tone decoder	Yes	Yes	Yes
Weather alert function	No	Yes	Yes

size as the PCR1500, but is almost half a pound heavier. From the data found on the ICOM Japan website, this receiver appears to be composed of a PCR-1500 and a second receiver, or "sub-receiver." The main 2500 receiver does everything that the 1500 does and more. The 2500's "sub-receiver" only covers 50–1300 MHz in AM, FM and WFM modes. See Figure 2.

The 2500's sub-receiver, with a second antenna, can be put to good use as a diversity receiver. In the diversity mode, the PCR2500 continuously compares the signal strength from both receivers and selects the one that maintains the highest sound and signal quality.

If you are not using the sub-receiver in the diversity mode, it can be used to simultaneously monitor frequencies or frequency ranges. Of course a second antenna is required, and the sub-receiver's mode and frequency range is limited as stated above. This "Dualwatch Capability" makes the PCR2500 much more powerful than any a single receiver and you can imagine the software possibilities.

Clearly, with the additional hardware and high-power PC capabilities, comes the potential of new features and functions. I think the PCR2500 has the potential to perform some amazing monitoring feats.

❖ More Modes, More Money

With the addition of the optional UT-122 P25 digital unit, the 2500 becomes capable of decoding the APCO P25 digital mode which has become common on VHF/UHF for government, military and law enforcement transmissions. However, the radio does not have the ability to follow trunked systems.

The ICOM Japan site has details on the IC-PCR2500 and its optional D-STARS mode – a new ham radio system that offers digital voice and data communication that ICOM is pushing. However, the 2500 requires yet another optional unit for it: UT-118.

Like the PCR1500, the PCR2500 comes in a standalone form – the IC-R2500 – that has a faceplate full of mechanical controls and does not require a computer for its operation. This feature costs an additional $140 to the price of the PC controlled radio.

❖ Keep the 1000 or Go for the 1500?

After using both the PCR1000 right next to the PCR1500 for a few weeks, I've come to some personal conclusions. On the plus side for the 1500, I really like the USB port convenience of the 1500, data and audio with one simple click.

However, as reported last time, the measured scanning rate for the PCR1500 on a Pentium 3, 1 GHz PC was only slightly faster than the PCR1000, not enough to make a great difference. On-air listening tests, as arbitrary as they are, confirmed ICOM's sensitivity specs. The 1000 and 1500 were very close in sensitivity, with the 1000 having a tiny edge.

The Multi Channel feature is very nice, but in order to hear a channel, scanning must be manually stopped by clicking on the channel-box to be monitored.

True, the PCR1500 and PCR2500 cover 2000 more megahertz than the PCR1000. If you have a specific need to monitor above 1300 MHz, then they may be just right. But, in the words of a famous monitoring personality, quoted on the Internet, "…*in our entire history, I don't remember a single logging being reported above 960 MHz. At those frequencies range is very limited, almost all communications are by data and voices have been digitized.*"

I have to agree. To be fair, that statement was made a while ago. However, after three weeks of scanning 1300 to 3300 MHz and finding only three frequencies carrying clear audio, I must agree with the essence of the quote.

Next, I reflected on the amount of great 2nd party software available for the PCR1000, such as PCR Talker. Then consider the very inexpensive standalone possibilities available by using a Palm Pilot and PCRPilot software with the PCR1000. (Both these programs are free, but are no longer sup-

ported and may be hard to find. Try the Yahoo groups PCR1000 and TalkPCR for manuals, programs and lots more.)

I've never been the sort of reviewer who sees every new product as "the best thing since sliced bread." All things considered, with the base price of the PCR1500 being $695 list ($580 street price), as compared to a like-new used PCR1000 averaging $320 on Ebay, I'll be happily keeping my PCR1000 and enjoying every minute of listening.

In my opinion, a used PCR1000 is still the best value for the money for a PC controlled wideband receiver. When the price of the PCR2500 comes closer to $500 from its current $850 street price, I'll reconsider … just maybe.

Figure 2 – Seeing Double. The PCR2500 in DualWatch Mode. Notice the two frequencies 145 and 430 MHz being monitored simultaneously.