Product Review & Short Takes Columns from *QST* Magazine

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Product Reviews

Ranger Communications RCI-5054DX 6-Meter Transceiver
Maha MH-C777 and MH-C777PLUS Battery Chargers

Short Takes

KAM XL Multimode Communications Processor

Ranger Communications RCI-5054DX 6-Meter Transceiver

Reviewed by Joe Bottiglieri, AA1GW
Assistant Technical Editor

It's already clear that Cycle 23 will be going down in ham history as the best yet for 50-MHz fans. For years, we younger folks could only stand by and listen quietly as Old Timers reminisced about the incredible worldwide 6-meter openings they witnessed during the peaks of the legendary cycles of the hollow-state age. Now, however, a few of us—bona fide members of "generation solid-state"—have impressive 6-meter cycle-peak DX tales of our own to tell.

Impeccable Timing

Ranger Communications recently added several new transceivers to its Amateur Radio lineup. These include three tabletop/rack-mount transceivers—two for 10 and 12 meters and a single-bander for 10—and a mobile rig for the 6-meter band. The RCI-5054DX 6-meter all-mode, the focus of this review, first hit dealers' shelves last July. Considering the tremendous 6-meter propagation that we've been experiencing over the last several months, it's hard to imagine Ranger's release of this radio could have been timed any better.

The Big Picture

The RCI-5054DX covers 50 to 54 MHz in the SSB, CW, FM and AM modes. Maximum power output is 25 W for SSB, and 10 W for the other modes. Features include 10 memory channels, a relative SWR indicator, an all-mode squelch, a noise blanker/antenna noise limiter, memory and VFO scanning, programmable scan and band limits and transmit/receive frequency offset capabilities (for repeater and split operation).

The '5054 shares faceplate, enclosure and chassis components with Ranger's classic—and somewhat hefty—'2900-series mobile transceivers. A peek under the covers of this new rig, however, reveals a big double-sided glass/epoxy printed circuit board that's rather sparsely populated with surface mount components.

Frankly, there's an awful lot of underutilized space inside this cabinet. It's likely that the conversion to surface mount technology in its most recent products (the changeover occurred within the last couple of years) provided Ranger with a tempting opportunity to decrease overall radio dimensions—and this should certainly be a consideration for companies marketing contemporary mobile equipment. By retaining all of the existing—albeit oversized—exterior components used in the manufacture of some of its earlier radios, though, the company could avoid considerable re-engineering and retooling costs. While most of the other ham radio manufacturers are focusing on ever smaller and sexier packaging, Ranger chose an alternative route. They evidently believe they can lure traditionally frugal ham customers with *functional* styling, but attractive *pricing*. Hmmm…maybe bigger *is* better?

The transceiver's large LCD display is easy to read from most angles. The exception: viewing angles below perpendicular to the screen. From these vantage points the segments essentially vanish. A mounting location on a high shelf or in an overhead console probably won't cut it. Glare and washout can also be a problem—especially in a mobile installation. Keep these factors in mind when choosing a permanent mounting position.

Big frequency digits, a signal strength/RF power/SWR bargraph-style meter and an extensive collection of feature icons appear as black segments on a teal background. The display and key illumination can be set to one of three different levels or shut off entirely.

Front panel controls include the main tuning knob, a small army of pushbuttons and seven rotary controls. The tuning knob—located in the upper left-hand corner—has a detented action (40 clicks per revolution—4 kHz per revolution at the 100 Hz tuning step size). There are also CHANNEL up and down buttons on the top of the included hand mike, and Δ and ∇ buttons on the front panel. Any of these can be used to tune around in the VFO mode.

The available tuning step sizes are 1 MHz; 100, 10 and 1 kHz; and 100 Hz. The step increment is selected via a "shift" key. Each press of the SHF button repositions an arrow cursor under one of the digits in the display. The mike buttons, the tuning knob or the Δ/∇ buttons are then used to increase or decrease the selected digit's value. This arrangement works very well for rapidly hopping around on the band.

The minimum step size for transmit tuning is 100 Hz. A CLR (clarifier) control knob…*all right*, RIT for you purists… allows the receive frequency to be varied anywhere within ±2.5 kHz of the transmit frequency. For the receive and transmit frequencies to match, the indicator on the knob must be set to the 12 o'clock position. It would be handy if the control had a detent at this "zero-offset" setting.

I found the main tuning knob a bit too

Bottom Line

The Ranger RCI-5054DX all-mode transceiver has made gearing up for 6 meters considerably more affordable.

Joe Bottiglieri, AA1GW ◻ Assistant Technical Editor

Table 1
Ranger RCI-5054DX, serial number TIY00796

Manufacturer's Claimed Specifications	*Measured in the ARRL Lab*
Frequency coverage: receive and transmit, 50-54 MHz.	Receive and transmit, as specified.
Power requirements: 13.8 V dc; current consumption not specified.	Receive, 0.30 A; transmit, 4.6 A, tested at 13.8 V.
Modes of operation: CW, USB, LSB, FM, AM.	As specified.
Receiver	***Receiver Dynamic Testing***
CW/AM Sensitivity, 10 dB (S+N)/N: 0.5 μV.	Noise floor (MDS)[1]: 50 MHz –135 dBm AM, 10 dB (S+N)/N, 1-kHz tone, 30% modulation: 53 MHz 0.44 μV
FM Sensitivity, 12 dB (S+N)/N: 0.25 μV.	For 12-dB SINAD: 52 MHz 0.16 μV
Blocking dynamic range: Not specified.	Blocking dynamic range, 20-kHz spacing: 50 MHz 80 dB
Two-tone, third-order IMD dynamic range: Not specified.	Two-tone, third-order IMD dynamic range: 50 MHz 65 dB
Third-order intercept: Not specified.	Intercept: 50 MHz, –37 dBm.
FM adjacent channel rejection: Not specified.	20-kHz offset from 52 MHz, 60 dB.
FM two-tone, third-order IMD dynamic range: Not specified.	20-kHz channel spacing, 52 MHz: 59 dB.
S-meter sensitivity: Not specified.	Maximum indication: 52 μV.
Spurious response: IF rejection, 65 dB; image rejection: Not specified.	IF rejection: 112 dB; image rejection, 93 dB.
Squelch sensitivity: Not specified.	0.34 μV at threshold.
Audio power output: 2.5 W, THD and load unspecified.	2.3 W at 10% THD into 8 Ω.
IF/audio response: Not specified.	Range at –6 dB points, (bandwidth): CW: 340-2426 Hz (2086 Hz); USB: 346-2472 Hz (2126 Hz); LSB: 340-2425 Hz (2085 Hz); AM: 389-2252 Hz (1863 Hz).
Transmitter	***Transmitter Dynamic Testing***
Power output: CW, FM, AM, 10 W; SSB, 25 W.	AM, FM, CW, typically 10 W; SSB, typically 26 W.
Spurious signal and harmonic suppression: 60 dB.	Meets FCC requirements for spectral purity.
SSB carrier suppression: 50 dB.	50 dB.
Undesired sideband suppression: Not specified.	37 dB.
Third-order intermodulation distortion (IMD) products:	See Figure 1.
CW keying characteristics: Not specified.	See Figure 2.
Transmit-receive turn-around time (PTT release to 50% of full audio output): Not specified.	Squelch on, S9 signal, 200 ms. Unit is not suitable for use on AMTOR.
Receive-transmit turn-around time ("tx delay"): Not specified.	SSB, 40 ms; FM, 30 ms.
Composite transmitted noise: Not specified	See Figure 3.
Size (HWD): 2.4×7.8×10.8 inches; weight, 3.2 lb.	

All dynamic range measurements are taken at the ARRL Lab standard spacing of 20 kHz.

[1]500-Hz bandwidth filter not available. Bandwidth on CW is approximately 2100 Hz.
[2]Intercept points calculated using noise floor method.

small for my tastes. For weak signal work, I like to manually tune for activity at the smallest available step size. I'd consider a larger tuning knob a welcome enhancement.

The RF power output level and microphone gain; RIT and RF gain; and volume and squelch are set up as concentric pairs of rotary controls. A six-position mode selector switch stands alone. The inner and outer knobs of the concentric sets and the mode selector knob are nice and big—and that does make them easy to grip, but there's insufficient space between them. It's difficult to make adjustments without accidentally changing the settings of nearby controls. In this instance, I'd gladly trade off some overall knob size for the increase in room between that would result. Perhaps Ranger could look into marketing an optional set of replacement knobs? I'll bet it would be an extremely popular accessory package—and not just with owners of this rig, but for those who have one of the dead-ringer '2900-series radios as well.

Fourteen pushbuttons are arranged in

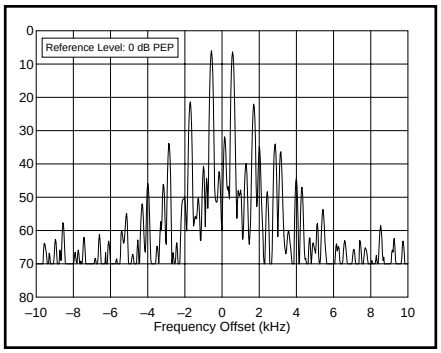


Figure 1—Spectral display of the RCI-5054DX transmitter during two-tone intermodulation distortion (IMD) testing. The third-order product is approximately 22 dB below PEP output, and the fifth-order is approximately 35 dB down. The transmitter was being operated at 25 W output at 50.2 MHz.

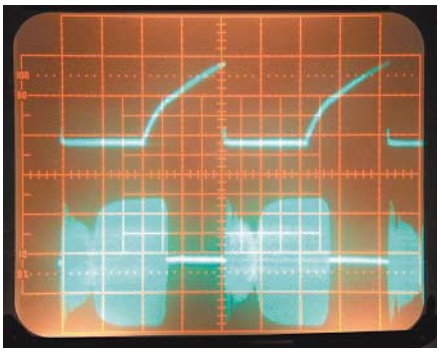


Figure 2—CW keying waveform for the RCI-5054DX showing the first two dits. The equivalent keying speed is 60 WPM. The upper trace is the actual key closure; the lower trace is the RF envelope. Horizontal divisions are 10 ms. The transceiver was being operated at 10 W output at 50.02 MHz. See text.

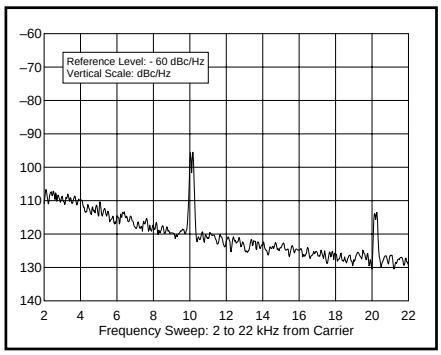


Figure 3—Spectral display of the RCI-5054DX transmitter output during composite-noise testing at 50.02 MHz. Power output is 10 W. The carrier, off the left edge of the plot, is not shown. This plot shows composite transmitted noise 2 to 22 kHz from the carrier.

two rows just below the display window. These white buttons are backlit and translucent, and function legends are printed in black on the surface of each—a particularly nice design feature for nighttime mobile operation. The majority of these keys control just a single operation—another mobiling plus.

Rear-panel jacks include an SO-239 antenna connector, three $^1/_8$-inch mono phone jacks and a flat three-pin dc power socket. The mating dc power cord is about 5½ feet long and fused, in the positive lead only, at 7 A. The phone jacks serve as connection points for a CW key, external speaker and public address speaker. A dedicated headphone jack is not provided. A multi-finned heat sink is attached to the rear apron. An internal speaker is mounted in the bottom cover.

A mike hanger, an adjustable mobile mounting bracket with four large knob-style screws and a handful of associated fastening hardware are supplied.

The 20-page *Owner's Manual*, though brief, is more than adequate. The radio is simple and intuitive to operate, and the programming and operating instructions in the manual text are clearly worded and easy to follow. A pin-out diagram for the 6-pin microphone connector is included, but—unfortunately—a schematic diagram of the radio is not.

Basic Feature Basics

Memories

The '5054 comes up in the VFO mode when the power is switched on. Pressing the MEM key activates memory mode operation. Memory channel one is always initially selected when entering the memory mode. Each subsequent stroke of the key then selects the next higher channel. A press of the MAN (manual) key will return the radio to the VFO mode. The tuning knob, microphone control buttons and the front panel Δ and ∇ buttons cannot be used to step through the memory channels, and the memories are not tunable.

Splits

Split transmit/receive frequency capabilities—for repeater, phone or CW operation—are supported. Split offsets of up to 4 MHz are possible. The memories do not retain the mode, offset value or direction of the split, though. If you decide to use memory channels to store repeater information, you'll have to select the FM mode and activate split operation separately. While the radio is in the split mode, the transmit frequency appears in the display when the transmitter is keyed.

Scanning

The transceiver includes a scan feature that will troll for activity on the programmed memory channels or within a range of frequencies. The scan direction can be set to ascending or descending. The scan will stop on any signal that breaks the squelch, and will remain there until activity ceases for more than two seconds. Facilities for locking specific memory channels out of a memory scan operation are not provided.

The upper and lower scan limits are programmable. These two frequencies also serve as the upper and lower limits of the manually tunable range of the VFO. Once you've changed these setting from their default values, to restore the full 4-MHz VFO tuning range, the upper and lower 6-meter band edges (50 and 54 MHz) must be manually reentered. This is a simple operation, though. This feature is handy when you wish to concentrate your attention on a particular band sub-segment—the bottom 80 kHz or so to listen for CW beacons, from about 50.103-50.250 for SSB activity or within one of any of several different ranges for searching for FM simplex operations, for example. (See *The ARRL Repeater Directory* or visit *ARRLWeb* for the suggested ARRL 6-meter Band Plan).

Noise Blanker/Antenna Noise Limiter

The '5054DX features both a noise blanker and a combination noise blanker/antenna noise limiter. The noise blanker is designed to work on repetitive impulse noise (classic ignition interference). It wasn't effective on the computer hash that's generated by my late-model vehicle. The noise blanker/antenna noise limiter setting worked reasonably well on my particular flavor of automotive electrical interference, but—unfortunately—only in the AM mode.

Public Address

The RCI-5054DX's mode switch includes a PA position. Connect an external speaker to the rear-panel PA jack, and you can use the rig to make door prize announcements at your club's next hamfest, or to get the whole gang's attention at the Field Day site ("Hey, everybody! I worked Western Samoa!"). An undocumented alternative application is to use it for evaluating the change in sound quality when testing substitute microphones—a feature that's typically referred to as a "monitor" function.

SSB Operation

The transceiver can operate in either the upper *or lower* SSB modes (6-meter RTTY, anyone?). Separate RF power output and mike gain controls are provided. The bargraph meter doesn't include a marker for the ALC set point. I received good audio reports with the mike gain control adjusted so that voice peaks hovered at about two-thirds scale when the RF power output setting was set to maxi-

mum. The mike gain control also varies the transmit audio level when operating in the AM or FM modes. The same mike gain setting that I settled on for the SSB mode worked just fine for the other phone modes as well.

The comparatively large (100-Hz) transmit tuning steps are pretty coarse for weak signal work, at least by today's standards. Most contemporary transceivers tune in 10-Hz (or smaller) increments. Although this is usually not a problem when chasing DX and general one-on-one ragchewing, net operation is occasionally an *I'm-as-close-as-I-can-get* proposition. The manual mentions—but doesn't detail—a modification that involves rewiring the clarifier (RIT) control so that it varies both the transmit and receive frequencies simultaneously. This change would come at the expense of independent receive incremental tuning, however. Contact Ranger for additional information.

FM and Repeater Operation

The radio works fine in the FM mode; reports on the quality of the transmit audio were invariably favorable. The '5054DX has one particularly disappointing shortcoming for those who are hoping to use it for communicating through repeaters. Nearly every 6-meter repeater system uses CTCSS tone access to reduce the interference that can result from distant repeaters that share the same frequency pair. (When this band opens up, the whole concept of what constitutes a "distant repeater" goes right out the window!)

The RCI-5054DX does not come equipped with a CTCSS tone encoder. Text in the *Owner's Manual* and Ranger's advertisements for this rig state that an "optional" tone unit can be installed, but it turns out that this is a little more involved than simply popping off a cover and plugging in an accessory board.

Ranger's Web site has a section that provides complete instructions for hardwiring in one of three models of CTCSS units sold by Communications Specialists.[1] One of these is an encode board that generates a single tone. (The specific tone frequency is set prior to installation by bridging a combination of solder-pad jumpers.) The second is an encode/decode board that employs six DIP switches for programming the desired tone. The third—and most flexible alternative—is a tone encoder unit that comes in its own separate enclosure, the TE-32. This model has front-panel toggle and rotary switches that allow quick and easy selection of one of 32 commonly used tones. It sells for around $50. (You should first verify that your favorite 6-meter repeaters are using CTCSS tones that the TE-32 is capable of generating.)

Installation of either of the two encode-only models is fairly easy. DC power, ground and a connection (through a 100 kΩ resistor) to the main circuit board at the base of a surface mount transistor are all that's required. Wiring in the encode/decode board is a bit more complicated. This procedure involves cutting a circuit board trace and making a couple of additional connections. Hooking up any of these boards should be well within the capabilities of hams with moderate soldering skills. It would have been great if Ranger had included CTCSS circuitry in this radio's design, or at least provided a dedicated multi-pin socket on the board or a rear-panel accessory jack for this purpose. Local 6-meter FM repeater operation can be lots of fun, and can sure help you wile away the time between those long-haul band openings.

CW Operation

The mode selector switch on the RCI-5054DX includes a CW position, but—as has been the case with the last couple of Ranger products we've looked at—CW seems as if it's more of an afterthought than a feature. A single CW signal can be heard on both sides of zero beat. As we pointed out in our evaluation of the RCI-2970DX (see "Product Review," Oct 2001), you can verify that you are properly tuned to a CW signal by taking a quick listen for it in the LSB mode. The CW sidetone volume and frequency are fixed.

As can be seen in Figure 2, the CW keying waveform shows considerable distortion during the "make" of each element. While, quite surprisingly, this didn't result in any on-air reports of unusual-sounding keying (it also sounded acceptable to me on a second receiver) it certainly warrants some further investigation on Ranger's part. A second unit we looked at exhibited identical waveform distortion.

Take a Number

Looking over Table 1, you'll notice that sensitivity in the FM mode, which came in at a hot 0.16 μV, is right in line with the best we've measured on recently reviewed transceivers that include 6-meter FM capabilities. The FM adjacent channel rejection (20-kHz offset) fell slightly below par, as did the FM two-tone, third-order IMD dynamic range.

SSB/CW sensitivity—at –135 dBm—came in somewhat short of the running average for this parameter as well, but still manages to equal the 6-meter number posted by a very popular multi-band/multi-mode mobile that we evaluated a couple of years ago. The SSB/CW blocking and IMD dynamic numbers that we measured on this rig were pretty mediocre. All in all, though, I guess this is about what should be expected from an economy-class transceiver.

On the Road with the RCI-5054DX

It was time to give the RCI-5054DX a try on the open road. I temporarily lashed it to the center console of my truck. (Finding a permanent mounting spot for a rig this size in most modern vehicles will likely present some challenges.)

The comparatively low maximum current requirement—under 5 A—makes it tempting to try to power it from a fuse block, vehicle cigarette lighter or dc accessory jack. If you choose to go with any of these connection schemes and end up running into problems with interference to or from your vehicle's electronics, begin your troubleshooting process with a direct power connection to the vehicle's battery terminals.

One of the great things about 6—particularly when you compare it to setting up for mobile operation on the HF bands—is the relative ease of installation and potential efficiency of 6-meter mobile antennas. A full-size $^1/_4$-λ vertical (a very adequate mobile antenna on this, and most other bands) is only around 4$^1/_2$ feet tall. I mounted a whip on an adapter that threads onto my existing through-the-roof NMO connector. A 2-meter $^5/_8$-λ mobile antenna—even mag-mount versions—will also work very well on 6.

Just five minutes after hooking the rig up in the car, I already had three west-coast SSB contacts in the log. Readability and signal reports were good—59 in all three cases—and specific requests for honest critiques on my audio quality were met with universally good comments.

Summing It Up

Admittedly, the RCI-5054DX is unlikely to become the radio of choice among serious VHF contesters—particularly those who have any interest in CW. This radio will get you on the band for casual DXing, net operations, ragchewing and even informal contesting pretty inexpensively, though. With just a few more dollars and a little workbench time, it can even be further accessorized for FM repeater use.

Manufacturer: Ranger Communications Inc, 401 W 35th St—Suite B, National City, CA 91950; 877-536-0772, fax 702-262-0780; **rci@rangerusa.com**; **www.rangerusa.com**. Manufacturer's suggested list price: $329. Typical current street price: $300.

[1]Communications Specialists Inc, 426 W Taft Ave, Orange, CA 92865; 800-854-0547, fax 800-850-0547; **www.comm-spec.com**.

Maha MH-C777 and MH-C777*PLUS* Battery Chargers

Reviewed by Kenneth Stuart, W3VVN
ARRL Technical Advisor

It's probably safe to say that most of us own a transceiver—or at the very least a portable consumer electronics device—that relies on a rechargable battery pack for its power source. Perhaps that's why rechargable battery choices and their proper care and feeding always seems to be a popular topic.[1]

Maha Energy Corp provides a wide selection of battery-related products to both the communications and consumer electronics markets. Among these are replacement and higher-performance battery packs—of a variety of compositions—and charging devices that can be used to replenish them. Let's take a look at a couple of the charging systems that Maha is currently marketing to both consumers, and amateur and land-mobile transceiver users.

Maha's product offerings include a few different tabletop charging devices, but the two that would seem to be of most interest to radio operators are the MH-C777 universal charger/conditioner and the more recently developed—and somewhat more expensive—MH-C777*PLUS* universal charger/conditioner/analyzer. Both are designed to rapidly recharge and condition nickel-cadmium (NiCd) and nickel-metal-hydride (NiMH) batteries. The MH-C777*PLUS* can also handle lithium-ion (Li-ion) recharging duties.

The units employ microprocessor control. The devices begin the charging process with a determination of the voltage of the connected battery pack. The charging stage is then initiated. The systems use any one of four parameters to sense when to terminate the charging process:

1) The battery voltage begins to drop
2) The voltage of the pack rises above its rated value
3) The pack reaches a certain temperature
4) The maximum time for the charging cycle elapses

Once the main charging cycle is completed, the units automatically switch to a lower charging current stage in order to balance the charge in the individual cells, thereby "topping off" any that might not have reached a fully-charged state during the main cycle.

[1]For additional information regarding rechargable battery types and their associated characteristics, please refer to my Dec 2001 *QST* article, "Honey, They've Shrunk the Batteries!"

[2]A cup that can be adapted for this application is available from W&W Maufacturing Co. (See "Index of Advertisers," p 174.)

Consider the Choices

The MH-C777 is the more basic of the two and will charge packs that are 4.8 to 12 V. The MH-C777*PLUS* offers some advanced features and is intended for packs of 1.2 to 14.4 V (3.6 to 14.4 V for Li-ion packs). The most obvious difference between the two chargers is the display arrangement. The basic unit employs LED indicators to show the charge state, while the deluxe unit contains a much more sophisticated LCD readout. The display on the MH-C777*PLUS* provides a wide range of information, and this allows the user to more fully monitor the charging or reconditioning process. The mAh rate of charge, or discharge, is continuously shown. Elapsed time—in minutes—is also displayed, as is the battery pack terminal voltage.

The *PLUS* has a two-position switch that must be set to correspond with the type of battery pack. One of the positions is for nickel cadmium and nickel metal hydride, and the other is for lithium-ion packs. When charging Li-ion packs, the charger employs a "taper charging" procedure. As the battery approaches the fully charged state, the charging current is greatly reduced. Li-ion packs can take as long as 12 hours to charge.

Those who frequently travel abroad will be happy to hear that the inline transformer-type power supply that's provided with the *PLUS* will operate on any voltage between 80 and 240 V ac. The included ac line cord fits standard US convenience outlets, but the transformer end of the cord is terminated in the conventional three-pin plug that's commonly used on computer equipment. Locating a suitable substitute cord to use in other countries should be easy. The MH-C777 comes with a wall transformer supply designed for 120 V ac use only.

Pack and Power Particulars

The physical design of the two units is significantly different. The end of the case of the 'C777 can be swung open and the battery contact pin blocks reversed, allowing it to work on physically larger packs—such as those that fit the RadioShack HTX-202/404 and some of the older ICOM handheld units. (These radios use the hefty BP-7 and BP-8 type packs). The *PLUS* doesn't offer this feature. These larger battery packs cannot be directly accommodated without the use of some type of external drop-in charger cup, and this accessory is not available from Maha.[2] A set of alligator clip terminated jumpers is supplied with the *PLUS*, but in order to use them on the BP-series batteries you'll have to slightly back out the contact screws on the bottom of the packs. Though you won't need it for these packs, the jumper set is also available as an optional accessory for the 'C777.

The two units employ entirely different ac power supplies. The charging current that's supplied by the one that comes with the *PLUS* is somewhat greater—on the order of 800 mA—so battery packs that contain cells rated at less than 400 mAh can quickly overheat during the charging process. Maha recommends that you don't

Bottom Line

The Maha 'C777-series microprocessor-controlled chargers can help you get maximum performance out of a wide variety of rechargeable battery pack types.

recharge these packs with the *PLUS*.

Although the MH-C777*PLUS* can be directly powered from 12 V dc (a cigarette lighter cord is provided with both models), the packs that can be charged are then limited to those that contain at most four NiCd or NiMH cells, or two Li-ion cells. One workaround for this would be to set up a system that powers the unit's included ac supply through a 12 V dc to 115 V ac inverter.

Operating the MH-C777

When a battery pack is initially connected to this model, the charger's microprocessor quickly measures the pack voltage and flashes a red front panel LED. The number of flashes corresponds to the number of cells that it has detected inside the pack. Note that if one or more of the cells are fully discharged, the microprocessor may be fooled into thinking that the number of cells in the pack is fewer than the actual number. If this occurs the pack will not be properly recharged.

The more deluxe model avoids this by immediately starting the charging process, and then stopping and determining the cell count a few minutes later. You can manually duplicate this action on the more basic model by briefly disconnecting the pack from the charger after the first minute or so and then reconnecting it. This will to force the microprocessor in the MH-C777 to make a second assessment of the number of cells in the pack.

On this basic model, the charge state of the attached pack is indicated by a set of three LEDs. These light up to show when the pack is in the low, medium or full charge states. When a full charge is attained, the charger automatically switches to a low current trickle charge mode.

Conditioning of a battery pack can be done at any time by simply pressing the DISCHARGE button. The MH-C777 will then slowly discharge the battery to what it considers a low state-of-charge and then automatically perform the charging procedure.

Operating the MH-C777*PLUS*

When a battery pack is initially connected to this model, the charger applies a "surface charge" to the battery for a period of three minutes. This allows any depleted or reverse-charged cells to come up within their normal voltage range. At the end of this stage, the microprocessor determines the voltage of the pack. Charging then begins at a constant current of 800 mA (400 mA for lithium batteries).

During the charging process, the display shows the mAh of charge accepted, the battery voltage, the elapsed charging time and the operating status ("Quick Charge" or "Full").

Quick charging will cease when the microprocessor detects either a slight reduction in the battery voltage, that a specific period of time has elapsed without an increase in battery voltage or that the pack has reached a temperature of 123° F. When the Quick charge cycle is completed, the unit automatically enters a low-rate trickle charge mode.

Lithium-ion batteries are charged under a different routine. The initial charge current is tapered rapidly with increasing battery voltage. Maha states that it can take as long as 10 hours for a Li-ion battery to reach full charge. They illustrate this by saying that when charging a fully depleted 1200 mAh Li-ion battery pack, the accumulated charging capacity will likely be 300 mAh at the end of the first hour, 550 mAh at the end of the second hour and 1150 mAh at the end of the fourth hour. However, the remaining 50 mAh of charge can take up as much as 3 to 5 additional hours. This is because the Li-ion cell is highly intolerant of overcharging. Of course, the final 50 mAh adds little to the overall capacity of the battery, and for all practical purposes charging can be manually terminated after the first four or five hours, even though the charger will not be indicating that the battery has reached full charge.

The user must be reminded, however, that the charger cannot automatically identify which type of battery has been connected to its terminals. The NiCd NiMH/Li-ion selector switch must be set in the correct position before the battery is connected. Failure to do this will likely result in damage to lithium batteries.

Conditioning of a battery pack is performed by depressing the DISCHARGE button within 30 seconds of attaching the battery to the charger. The MH-C777*PLUS* will first surface charge the battery to determine its nominal voltage and then discharge the pack at a rate of about 300 mAh to what it considers a low state-of-charge. A series of beeps will then be emitted. At this point the charger will pause for about 15 minutes before it begins the main charging cycle.

Summary

Either the MH-C777*PLUS* or the MH-C777 chargers are capable of doing a fine job of keeping your collection of rechargeable battery packs in tiptop condition. Charging them with either of these units is fast and safe, and the connection alternatives offered on the units are flexible enough to work with almost any battery pack. With the MH-C777*PLUS*, though, you'll enjoy the added benefits of having a continuous readout of voltage, battery capacity and elapsed charging time, as well as an excellent indication of remaining battery life.

Manufacturer: Maha Energy Corp, 545-C W Lambert Rd, Brea, CA 92821; 714-990-4557, fax 714-990-1325; **sales@mahaenergy.com**; **www.mahaenergy.com**. Manufacturer's suggested list price, MH-C777*PLUS*, $89.95; MH-C777, $49.95; MHS-CW4 clip-lead accessory for the MH-C777, $4. QST

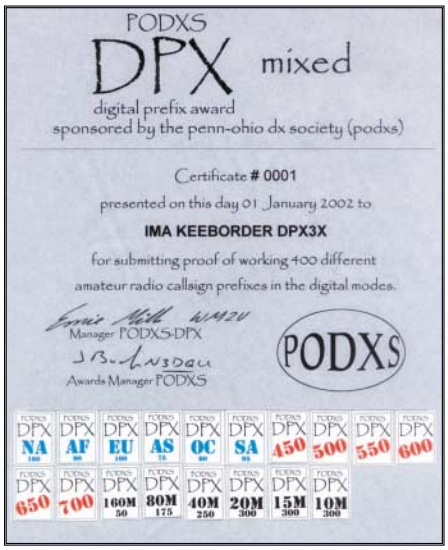
STRAYS

THE PENN-OHIO DX SOCIETY DIGITAL PREFIX AWARDS PROGRAM

The Penn-Ohio DX Society (PODXS) recognizes the achievements of Amateur Radio operators worldwide by offering its new Digital Prefix Awards Program.

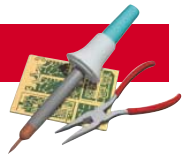
To qualify for the *mixed basic award* the applicant must have a minimum of 400 different prefixes confirmed by either hard copy QSL or eQSL. There are many more specific digital awards being offered—PSK DPX, RTTY DPX—with a minimum confirmed requirement of 300 each. Endorsements to the basic awards are in increments of 50. Continent and Band endorsements are also available.

All applicants must use the PODXS DPX application—PODXS form 3-36, and the endorsement list, PODXS form 3-37—or a computer printout. If you use the latter option for the endorsement list, please maintain a similarity to the PODXS form 3-37.



Go to **www.qsl.net/wm2u/podxs_dpx.html** or **hometown.aol.com/n3dqu/podxs_dpx.htm** for detailed information and instructions. You can download the required forms in either PDF or zipped Microsoft *Word* format.—*Ernie Mills, WM2U*, **wm2u@arrl.net**. QST

SHORT TAKES



KAM XL Multimode Communications Processor

With so many digital modes available as computer sound card applications these days, is there still a place in the Amateur Radio world for a multimode communications processor like the new Kantronics KAM XL?

The answer is a qualified "yes," depending on the need…

• A stand-alone processor allows hams with older computer technology to enjoy digital operating. With just a simple terminal program, even a vintage Commodore computer can "talk" to a stand-alone processor.

• A stand-alone processor offers flexibility to amateurs who own fast sound-card-equipped computers. An external processor allows them to operate digital modes while using their computer sound cards simultaneously in other applications.

• Despite the sound-card "revolution," there are still several operating modes that are not commonly available as full-transceive software applications. These include PACTOR and PACTOR II, G-TOR, Clover and NAVTEX. With few exceptions, if you want to use these modes you still need a stand-alone controller.

So What About the KAM XL?

The KAM XL is the latest product to build on the respected KAM processor series. Its operating modes include packet (up to 9600 baud), PACTOR I, RTTY (AFSK and FSK), NAVTEX, CW, ASCII and WEFAX. The XL also includes goodies such as GPS compatibility (connect a GPS receiver to the KAM and you're ready for mobile APRS enjoyment), remote control with telemetry functions and a hefty mailbox that you can access on packet or the TOR modes.

The KAM will also do PSK31, after a fashion. The methodology is cumbersome, especially compared to the ease of panoramic sound card software such as *DigiPan* and others. Even so, it does work.

And, of course, the KAM XL continues the tradition of offering dual ports. With dual radio ports, the KAM XL can "gateway" between ports 1 and 2, allowing local packet to be received, then transmitted over HF. All port connectors are DB9s, except for the telemetry port that uses a DB15.

Hits and Misses

I put the KAM XL to work during the OK DX RTTY contest last December and it performed reasonably well. The traditional KAM "bouncing LED" tuning meter was a pleasure to use. When it came to weak or fluttery signals, however, my *RITTY* and *MMTTY* sound card software consistently copied text when the KAM could not.

On PACTOR the KAM was a winner. I could tune and copy PACTOR signals within seconds. I also tried the KAM XL with *AirMail* software, which is popular among WinLink 2000 users. *AirMail* recognized the KAM XL and worked perfectly.

The KAM XL copied CW remarkably well—even when the sending was a little sloppy. I don't know if Kantronics actually changed the CW decoding algorithm in the KAM XL, or if I was just lucky, but the processor seemed to read CW better than almost any other I have tried in recent memory.

The KAM XL still carries the G-TOR mode, but I couldn't find anyone on the air to test it with, even after persistent searches and CQs. There are a lot of G-TOR-capable KAMs out there, but few hams are using the mode.

The KAM XL's NAVTEX mode was terrific for monitoring maritime stations. I tuned to 518 kHz and quickly picked up the following:

> UNEXPLODED ORDNANCE HAS BEEN REPORTED IN THE VICINITY OF CASHES LEDGE IN THE FOLLOWING POSITIONS: 42-40N 069-00W AND 42-29N 069-00W. MARINERS ARE URGED TO USE CAUTION WHEN FISHING OR CONDUCTING UNDERWATER OPERATIONS IN THIS AREA.

The nits to pick with the KAM XL include the absence of a printed manual. The XL manual exists on a CD-ROM as an Adobe *Acrobat* file, so you have to read it on your computer screen, or print it yourself. The CD also includes *PacTerm '98* for *Windows* by Creative Services Software (**www.cssincorp.com/**), which runs beautifully with the KAM XL and makes operating a breeze. (It beats the heck out of using *HyperTerminal* in *Windows*!) The *PacTerm '98* provided on the KAM XL CD is only a demo copy. The full version is available for $79.95 from Creative Services Software. *Pacterm for Windows* owners can upgrade for $29.95. Finally, the ports on the back panel of the XL are unlabeled, which is annoying when you're trying to set up the unit.

Is the KAM XL worth the cost? If you want multimode capability in a stand-alone processor, the KAM XL is an excellent choice—as long as you don't need Clover or PACTOR II, which are proprietary modes unavailable on the XL. On the other hand, if you're content using sound card software for all of your digital operating, *any* outboard processor would be a difficult purchase to justify.

Kantronics, 1202 East 23rd St, Lawrence, KS 66046; tel 785-842-7745; **www.kantronics.com**. *$399.95*

Steve Ford, WB8IMY *QST* Editor