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ICOM IC-271A 2-Meter Multimode Transceiver

Ten-Tec Century/22 HF CW Transceiver

Conducted By Paul K. Pagel, N1FB
Senior Assistant Technical Editor

ICOM IC-271A 2-Meter Multimode Transceiver

The VHF/UHF crowd is indeed fortunate that ICOM has more than a passing interest in multimode operation for the bands above 50 MHz. ICOM's current offering of VHF boxes includes not one, but two 2-meter base-station multimode rigs. The IC-271 is offered in two different versions in the U.S. marketplace. The IC-271A features SSB, CW and FM operation from 143.8 to 148.2 MHz, 25-W output, 32 memories, a scanning system, and built-in subaudible tones. It may be powered from one of two optional power supplies: the IC-PS15 external power supply (common to all other ICOM transceivers) or the IC-PS25 internal supply. The IC-271H offers the same features as the IC-271A, except power output is 100 W.

ICOM IC-271A 2-Meter Multimode Transceiver, Serial No. 02468

Manufacturer's Claimed Specifications	*Measured in ARRL Lab*
Frequency coverage: 143.800 to 148.200 MHz.	As specified.
Mode of operation: FM, USB, LSB, CW.	As specified.
kHz per turn of knob: Not specified.	FM — 50 or 250; SSB/CW — 2 or 50.
Frequency display: 7-digit luminescent.	White fluorescent, 5/16-inch-high digits.
Frequency resolution: 100 Hz.	As specified.
S-meter sensitivity (μV for S9 reading): Not specified.	21.
Transmitter output power: 1 W to 25 W, adjustable.	2 W to 30 W.
Harmonic suppression: Greater than 60 dB.	70 dB (see Fig. 1).
Spurious suppression: Greater than 60 dB.	70 dB (see Fig. 1).
Third-order IMD: Not specified.	−28 dB worst case (see Fig. 2).
Receiver sensitivity: SSB/CW — less than 0.5 μV for 10-dB S + N/N; FM — less than 0.3 μV for 12-dB SINAD; less than 0.6 μV for 20-dB quieting.	Noise floor (MDS) dBm: −138. Blocking DR (dB): 108. Two-tone, 3rd-order IMD DR (dB): 84. Third-order intercept (dBm): −12. Receiver quieting (μV for 12-dB SINAD): 0.16.
Squelch sensitivity: SSB/CW — less than 0.6 μV; FM — less than 0.4 μV.	Min. 0.15 μV; max. 0.36 μV.
Receiver audio output at 10% THD: More than 2 W.	2.65 W.
Color: Two-tone green.	
Weight: 11.4 lb without internal power supply.	
Size (HWD): 4-3/8 × 11-1/4 × 10-3/4 in.	

Frequency Control

The IC-271A shares many of the elaborate frequency-control features found on other ICOM HF and VHF transceivers. There are two built-in VFOs, a scanning feature that allows scanning of selected portions of the band or preset memory channels, RIT, and complete flexibility in selecting standard repeater offsets or programming oddball ones.

The MHz UP and DOWN switches in the lower-right-hand corner of the front panel move the transceiver frequency up and down in 1-MHz steps. Once you're in the right MHz range (for example, 144 MHz for SSB and CW operation or 146 MHz for repeater operation), you can use the main tuning knob to tune around at several different rates. On SSB or CW, normal tuning is in 10-Hz steps at 2 kHz per knob revolution. If you spin the knob quickly, the rate steps up to about 5 kHz per revolution in 100-Hz steps. Normal tuning in the FM mode is 5-kHz steps at 250 kHz per revolution. When the TS switch is pressed in any mode, the tuning switches to 1-kHz steps. For SSB or CW, the TS feature is handy for large frequency excursions, while for FM it is useful for tuning odd splits or working in the lower simplex area.

Like most HF rigs these days, the IC-271 has two built-in VFOs. These VFOs may be used to operate SPLIT—one for transmit, and the other for receive—or they may be used independently; the effect is the same as having two radios in one box. The VFOs need not be set to the same part of the band or to the same mode.

The dial-lock switch disables the tuning knob to prevent accidental frequency changes. This feature is especially handy during mobile operation.

Another feature of the '271 not always found on VHF radios is RIT. Its range is ±9.9 kHz, and the control knob has a prominent place next to the main VFO knob.

Repeater offsets are handled by the +DUPLEX, −DUPLEX and OW (offset write) buttons. Pushing the +DUPLEX button automatically shifts the transmit frequency up 600 kHz from the displayed receive frequency. The −DUPLEX button moves the transmit frequency 600 kHz down. With the IC-271 in the FM mode, you can press the OW button and change the offset from 600 kHz to anything you like.

Memory and Scanning

When the M/VFO switch is pressed the main tuning knob also controls the elaborate memory system incorporated in the IC-271. There are 32 memory channels available. Each memory stores not only the frequency, but also the mode of operation and any information on repeater splits. For example, memory 1 might store 144.200 USB, while memory 2 could store 146.520 FM (simplex) and memory 3 could store 146.940 FM (duplex, −600 kHz transmitter offset). The possibilities are endless. Memory information may be written right from the VFO dial with the WRITE switch. Similarly, you may turn frequency control over to the VFO at the memory channel selected by pressing the M>VFO switch.

The scanning functions are everything a VHF operator could want. There are three scanning modes. The first, activated by the SCAN button, checks all programmed memory channels for activity. If activity on the channel opens the squelch, scanning will stop and you can press the SCAN switch again to remain on that channel. If you do not press the switch, scanning resumes after

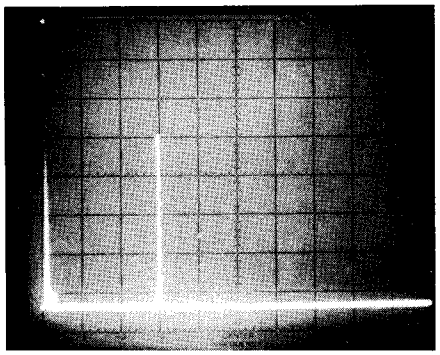


Fig. 1—Spectral display of the IC-271A. Horizontal divisions are each 50 MHz; vertical divisions are each 10 dB. Output power is approximately 30 W on 144 MHz. The fundamental has been reduced in amplitude approximately 30 dB by means of notch cavities to prevent analyzer overload. All harmonics and spurious emissions are at least 70 dB below peak fundamental output. The IC-271A complies with current FCC spectral-purity specifications.

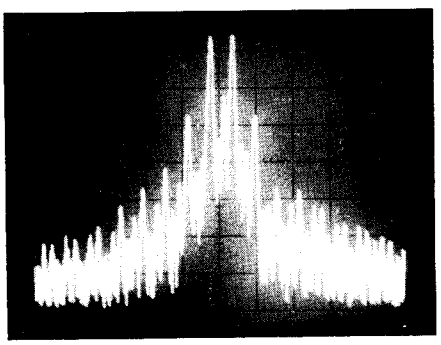


Fig. 2—Spectral display of the IC-271A during two-tone IMD testing. Third-order products are approximately 28 dB below PEP, and fifth-order products are approximately 42 dB down. Vertical divisions are each 10 dB; horizontal divisions are each 2 kHz. The transceiver was being operated at 28-W PEP output on 144 MHz.

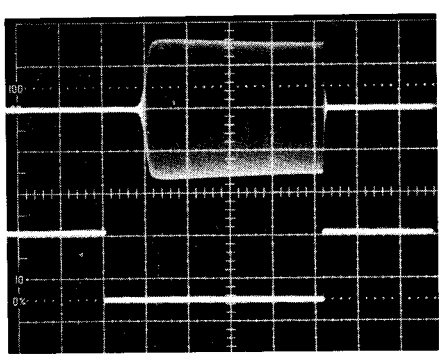


Fig. 3—CW keying waveform of the IC-271A. Upper trace is the RF envelope; lower trace is the actual key closure. Each horizontal division is 5 ms.

about 10 seconds. The second scanning mode, activated by the MODE-S switch, scans only those memory channels with the specified mode (for example, only those channels with FM). The third scanning function scans those VFO frequencies between specified start and stop points. For example, you might want to let the transceiver scan 144.080 to 144.250 MHz if you anticipate a band opening, but don't want to sit next to the rig and turn the knob all evening.

Receiver

The IC-271 has several useful receiver features. The SQUELCH control works in all modes. Besides the obvious uses on FM, it allows you to leave the receiver tuned to the SSB calling frequency, 144.200 MHz, with the squelch on and the volume control turned up. You can go about your business, and if you hear the squelch break, you can then go into the shack and find out who's on frequency. The PREAMP switch turns on an optional preamplifier (the review unit was not equipped with this feature).

The noise blanker is sometimes effective against pulse-type interference such as automobile ignition noise. Unfortunately, with the noise blanker in operation the dynamic range is reduced and strong local signals create noise and spurious signals that mask weaker signals.

Two choices are afforded by the AGC switch—FAST and SLOW. The slow position offers a hang-type AGC that is appropriate for strong-signal SSB. On weak signals and on CW, the faster AGC setting is preferable.

Transmitter

While most multimode VHF radios offer 10-W output, the IC-271A offers at least 25-W output on all modes. The extra 4 dB or so is useful if the transceiver is used barefoot, and 25-W is just about right for a solid-state power amplifier requiring high drive power or a triode tube amplifier using an 8874 or a 3CX800A7. You must be very careful, however, when using this transceiver with a run-of-the-mill solid-state power amp that requires 10-W drive or with a tube amplifier using a tetrode such as a 4CX250 or 4CX1000A. Excessive drive will cause unwanted splatter and could damage the amplifier.

A panel on the top cover provides access to the VOX controls. There are separate delay controls for CW and SSB. The sidetone monitor level control is also located under this cover.

ICOM has included a subaudible tone encoder on the '271. Any tone between 1 and 55 Hz can be chosen by pressing the tone SELect button and turning the main tuning knob until the correct tone number appears on the display.

Operation

I enjoyed using the IC-271 for almost a year. During this time, I operated it on FM, both on simplex and through local repeaters. It took a little getting used to, but I quickly learned how to set up the transceiver for almost any type of duplex FM operation. The memory features enhance the radio's desirability—after the initial setup, there is very little to do but recall your most-used channels.

The IC-271 "holds its own" at the weak-signal end of the band. The receiver was sensitive enough to hear plenty of signals around New England, in Canada and down into the Washington DC area. There are no provisions for a narrow-bandwidth CW filter, and this hurt during weak-signal work. Most of the time I used the rig barefoot or with a Mirage B215 power amplifier, and had many enjoyable contacts. Under strong-signal conditions, the receiver held up as well as can be expected for a synthesized multimode rig. Two strong local stations caused synthesizer noise problems—problems not normally encountered when I use my clean, non-synthesized IF transceiver and transverter.

I found two inconveniences on the IC-271 that were present on earlier ICOM rigs, but which have been cleaned up on the latest ICOM HF transceivers. First, there is no way to key an external power amplifier directly from the rear panel of the '271. There is a multipin accessory socket that makes available +8 V at 5 mA on transmit — enough to turn on a suitable switching transistor. It is inconvenient, however, to have to build an amplifier interface for a "full-featured" transceiver.

The other inconvenience I found was that not all electronic keyers will key the '271. The ICOM will only key if the KEY terminals are brought within 0.4 V of ground. Keyers with reed relays in the output will do this fine. Some keyers that use transistor switching will work; others will not. Also, the key jack accepts a 1/8-inch mini phone plug instead of the almost universally accepted ¼-inch plug.

Digital Display Problems

We examined two IC-271A transceivers during the review—serial nos. 01276 and 02468. During the initial lab testing, we noticed that the frequency display on no. 01276 was intermittent. This problem cleared itself up for a while, but after a few months the display quit altogether. Lab examination revealed that ICOM had placed a foil shield around the rear of the display, perhaps to keep noise from the display from getting into the receiver. This foil shield did not have an insulated backing, and it touched the exposed leads of several components on the display board. R26, a 2.2-ohm, ¼-W resistor, burned and scorched the foil. We replaced R26, but the multivibrator circuit (consisting of T1, Q12 and Q13) still did not function. We returned that transceiver to ICOM for repair. It is interesting to note that this foil shield is not present in no. 02468.

The IC-271A is an impressive radio. While it has some faults, it is worth considering if you're in the market for a multimode radio for 2 meters. Price class: IC-271A, $700; IC-PS15 external power supply, $150; IC-PS25 internal power supply, $100. Manufacturer: ICOM America, Inc., P.O. Box C90029, Bellevue, WA 98009, tel. 206-454-8155.—*Mark J. Wilson, AA2Z*

TEN-TEC CENTURY/22 HF CW TRANSCEIVER

☐ I've always tried to dismiss the overworked expression, "good things come in small packages," but the Century/22 fits that description nicely. This is particularly true if we consider some specific areas of need in amateur communications—the beginner's first station, the RV enthusiast's portable rig, or the QRPer's home rig or camping station. This compact equipment should appeal also to those who are just plain "wrung out" from paying high prices for QRO transmitters and the high-power accessories that go with them.

I found it refreshing to fire up with only

20 W of RF output power on the CW bands. Signal-strength comparisons between the 20 W and 100 W from my main station transceiver were not in the least significant. Most stations contacted reported that they could detect no audible change in signal strength, owing to the AGC action of their receivers. S-meter comparisons, however, did show a few-dB-less signal from the Century/22. However, this small reduction in signal power did not impair my ability to effectively work DX when using a triband Yagi on 20 and 15 meters. My 80-meter full-wave Delta loop provided excellent coverage on 80 and 40 meters with the little 20-watter.

The Century/22 is an updated version of the popular Century/21. The '22 is more compact (volume about the same as a shoe box, without the power supply) than is the Century/21. To me, the new unit looks much better: The front and rear panels are beige, and the cabinet is charcoal gray; black knobs with chrome inserts are used on the controls.

The transceiver covers six bands: 3.5-4.0, 7.0-7.5, 10.0-10.5, 14.0-14.5, 21.0-21.5 and 28.0-28.5 MHz. Although it is designed for CW operation only, other modes can be monitored with the receiver.

Other features include RIT (±2 kHz), a pulsed crystal calibrator (pulsing helps to identify the calibrator signal) and a four-pole, variable band-pass audio filter. I found that the filter works very well in reducing QRM and elevating weak signals above the noise. Filter "ringing" is minimal, even in the most selective mode.

Ten-Tec Century/22, Serial No. 579-0004

Manufacturer's Claimed Specifications	*Measured in ARRL Lab*
Frequency coverage: 3.5-4.0, 7.0-7.5, 10.0-10.5, 14.0-14.5, 21.0-21.5 and 28.0-28.5 MHz, plus 40-kHz overrun on each end of tuning range.	As specified.
Mode of operation: CW on transmit; CW and SSB on receive.	As specified.
kHz/turn of knob: 17.	As specified.
Tuning steps: Not specified.	1-kHz increments, analog.
Backlash: Not specified.	Nil.
S meter sensitivity (μV for S9 reading): not listed.	Filter out (filter in): 80 m, 17 (48); 40 m, 13 (34); 30 m, 14 (40); 20 m, 22 (54); 15 m, 15 (50); 10 m, 16 (42).
Transmitter output power: 20 W all bands.	As specified.
Receiver AGC: Not listed.	Audio derived.
Receiver type: Direct conversion with RC active audio filter.	As specified.
Receiver sensitivity (3.5 to 28.5 MHz): 0.5 μV for 10-dB S + N/N.	

	80 m	*20 m*
Noise Floor (MDS) dBm:	−131	−128
Blocking DR (dB):	112	109
Third-order intercept (dBm):	82	81

Receiver selectivity: 750-Hz center frequency, 200-Hz bandwidth, variable skirt selectivity.	As specified.
Audio output 1 W @ < 2% THD.	1.4 W @ 10% THD.
Color: Two-tone — beige panels, charcoal gray cabinet.	
Size (HWD): 4 × 10 × 10.5 in.	
Weight: 6 lb.	

Performance Notes

A direct-conversion (synchrodyne) receiver is used in the Century/22. This means that single-signal reception is not possible, as with a superheterodyne receiver, and that a CW signal can be tuned in above and below the signal frequency. In the case of a superheterodyne receiver with an IF filter, a CW signal can be tuned in on only the upper or lower sideband without resetting the sideband-selection switch. Had I not known that the Century/22 had a direct-conversion receiver, I would have been certain I was operating a conventional "superhet"—that is, until I discovered a beat note on both sides of the incoming signal zero beat. Normally, this is not an inconvenience, but when the QRM gets heavy (and close by), you may experience more QRM than with a conventional receiver.

I was favorably impressed with the smoothness of the audio-derived AGC. Gone were the loud clicks and thumps that are characteristic of some of the earlier Ten-Tec gear that used audio-derived AGC. I have built many a direct-conversion receiver with audio AGC, but I have not achieved the smooth operation I find in the Century/22.

As on earlier Ten-Tec transceivers, the PTO shaft floats above ground. If you touch the metal insert in the main tuning knob, you'll notice a slight frequency shift. Simply keep your fingers off the insert to prevent this from occurring.

Receiver sensitivity appears to be more than ample for the HF bands. I was able to copy any signal that could be dug out of the noise with my $1200 transceiver. Local-oscillator stability is good, with about 100-Hz maximum drift during the first 15 minutes of operation. After that, the drift is minimal, as the VFO moves up and down no more than 20 Hz (typical of most LC local oscillators).

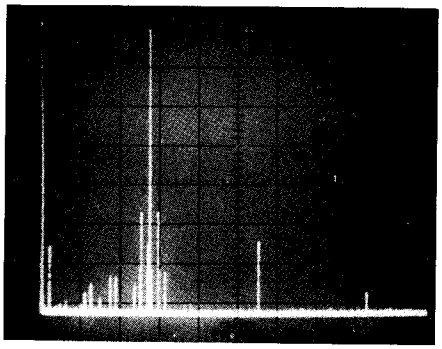
I received good reports concerning the quality (shaping) of the CW note from the transmitter. No buzz or clicks were reported. Similarly, no one could detect chirp on the signal. The QSK (full break-in) feature was a bit hard for me to get used to, since I am not a QSK enthusiast. Hearing noise and signals between words when transmitting was distracting at first. But after two days of QSK operation, I learned to like it better than the break-in delay feature of my other transceivers. If you like to handle CW traffic, you will definitely enjoy QSK operation! It is great also for contesting and nonmonologue ragchewing.

There is an S meter for observing the relative strength of received signals. The meter does double duty by providing relative RF output and SWR readings.

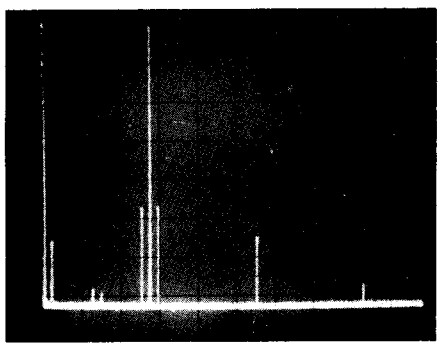
True QRP (less than 10-W dc input to the PA stage) can be realized with this transceiver by simply reducing the amount of RF drive by means of the front panel DRIVE control. I had an enjoyable time (and many QSOs) while operating at 1 W output.

General Impressions

A Model 679 keyer was added to one of the two Century/22 transceivers on hand for review. This optional accessory consists of a PC board, a speed control and 3-circuit jack that you wire into the '22. The keyer speed control and the paddle-input jack mount on the rear apron of the rig. Labeled mounting

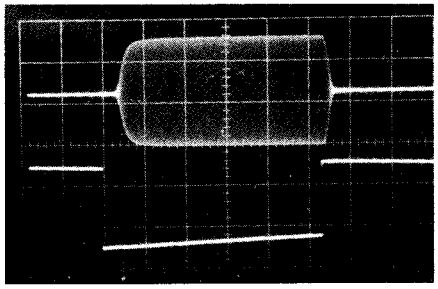


(A)

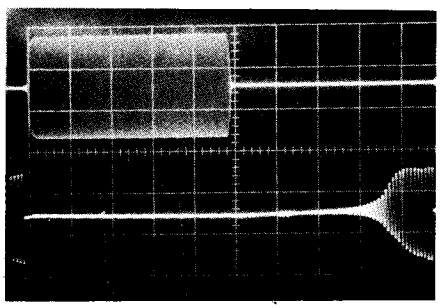


(B)

Fig. 4—At A, worst-case spectral display of the Century/22. The crystal calibrator was on during this measurement. Vertical divisions are 10 dB each; horizontal divisions are 5 MHz each. Output power is approximately 23 W at a frequency of 14 MHz. All spurious emissions are at least 46 dB below peak fundamental power. The Century/22 complies with current FCC specifications for spectral purity. At B, all conditions are equal, but the calibrator has been turned off.



(A)



(B)

Fig. 5 — CW-keying waveforms of the Century/22. At A, the photograph shows the characteristics of the leading and trailing edges of the RF waveform; the lower trace is key closure, and the upper trace is the RF envelope. Horizontal divisions are each 5 ms. At B, RF output (upper trace) versus receiver recovery time (lower trace) in QSK operation. Each horizontal division is 20 ms.

holes are provided for these two items; simply push out the plastic plugs sealing the holes and insert the potentiometer and jack. There's even a label on the inside chassis telling you where to mount the keyer board! The keyer works well and has the feel of a Curtis Keyer, but is composed of a 7476NA IC and five transistors.

The various modules that make up the Century/22 appear to be built on high-quality glass-epoxy circuit board rather than on phenolic material. The transmitter RF power board is made of double-sided PC material, providing a ground plane for improved stability.

With a minimum number of "bells and whistles," the rig should be excellent for beginners and persons with disabilities. There is no tuning required when changing bands. All you need do is change the band-switch setting and adjust the DRIVE control until the ALC LED illuminates, at which point the DRIVE control should not be advanced further.

If I were to be picky about the overall package, I might say that the instruction manual is a tad short of necessary data. For example, the review unit arrived with a 2.5-kHz offset between transmit and receive. I wondered why no one was answering me! Nothing was found in the book to indicate the cure. Luckily, I spotted an arrow on the photographic view of the bottom side of the Century/22. It pointed to a TX OFFSET PC-board control on one of the circuit boards. I adjusted it while listening to my main station receiver, then checked the signal from my station transmitter. I adjusted the control for a 700-Hz offset between receive and transmit with the Century/22. The transmit signal was then 700 Hz lower than the beat note during receive. I think some troubleshooting data should be included in the manual, along with a more definitive explanation of the various functions of the unit. Also, there was no schematic diagram sent with the equipment. A letter to Ten-Tec requesting one brought a quick response.

All in all, I would definitely recommend this transceiver to anyone who likes to operate CW. It is small enough to tuck under your arm and take along on trips or to a friend's house. It could be a fine rig for Field Day as well. It operates from a 13-V dc supply. The Ten-Tec 979 ac-operated 13.5-V dc supply (5A) is available for fixed-station use. It also is a compact unit. The Century/22 is available from Ten-Tec Corporation, Hwy. 411 East, Sevierville, TN 37862, tel. 615-453-7172. Price classes: Century/22, $390; Model 979 power supply, $90; Model 679 internal keyer, $27.—*Doug DeMaw, W1FB/8*

SOLICITATION FOR PRODUCT REVIEW EQUIPMENT BIDS

[In order to present the most objective reviews, ARRL purchases equipment "off-the-shelf" from Amateur Radio dealers. ARRL receives no remuneration for items presented in the Product Review or New Products columns.—Ed.]

The following ARRL-purchased Product Review equipment is for sale to the highest bidder. Prices quoted are minimums and reflect a discount from our purchase price.

Sealed bids must be submitted by mail and be postmarked on or before May 27. Bids postmarked after the closing date will not be considered. Bids will be opened seven days after the closing postmark date. In the case of a tie, the highest bid bearing the earliest postmark will be declared the winner.

Please clearly identify the item you are bidding on, using the manufacturer's name, item model number and other identification number if so specified. Each item requires a separate bid and envelope. Shipping charges will be paid by the winning bidder, FOB Newington. Please send your bids to Kathy McGrath, Product Bids, ARRL, 225 Main St., Newington, CT 06111.

Yaesu FT-757GX HF transceiver, s/n 3N040531; Yaesu FP-757FX power supply, s/n 3M020142 (as a package only—see Dec. 1984 *QST*). Min. bid $680.

Yaesu FT-980 HF transceiver, s/n 3G020161, with XF8.9-kHz filter; MD-1B microphone; Apple computer interface FIF-65, s/n 0535 (as a package only—see Nov. 1984 *QST*). Min. bid $992.

ICOM 751 HF transceiver, s/n 1982; FL-52A filter; SM-6 microphone, s/n 20504795; PS-15, s/n 11319534 (as a package only—see Jan. 1985 *QST*). Min. bid $1009.

Kantronics Interface II w/Kantronics Apple software, s/n 34869 (as a package only—see Sept. 1984 *QST*). Min. bid $160.

Info-Tech M107 RTTY modem. Min. bid $130.

HAL CRI-100 RTTY modem. Min. bid $150.

MFJ 1224 RTTY modem. Min. bid $67.

MAXCOM 200 Antenna Matcher, center section only (no dipole antenna—see Nov. 1984 *QST*). No min. bid.

Amateur Radio Software

Kantronics AMTOR 64, s/n 36192. Min. bid $47.

Kantronics Hamtext C64, s/n 33842. Min. bid $51.

New Products

CYLINDRICAL LITHIUM-BATTERY HOLDERS

☐ An assortment of battery holders for use with cylindrical, 3-V lithium cells is available from Keystone Electronics Corp. These holders are designed for battery-backup-power applications, and can mount directly on PC boards.

Holders are available in aluminum or steel, with or without lugs that can be soldered to a PC board. The aluminum holders have brass, nickel-plated contacts, while the steel units have stainless-steel contacts. These holders accept 1/3N, 1/2A, 2/3A, 1/2AA and CR-2N batteries.

For more information, contact Keystone Electronics Corp., 49 Bleecker St., New York, NY 10012, tel. 212-475-4600.—*Paul K. Pagel, N1FB*