Product Review & Short Takes Columns from *QST* Magazine

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Product Reviews

Short Takes

The Kenwood UT-20 1.2 GHz Module for the TS-2000

Reviewed by Tom Williams, WA1MBA
ARRL Contributing Editor

The ARRL Lab reviewed the Kenwood TS-2000 several months ago (*QST*, July 2001). I read this review with great expectation, being an owner of Kenwood's TS-950SDX, a radio that is central to my VHF, UHF and microwave home station. The TS-2000 is affordable (for a high-end rig) and has several VHF and UHF bands included. The trend to include higher bands (such as in the ICOM 706 MkIIG and the Yaesu FT-817 and FT-100D) has been extended with the promised addition of the 23 cm band in the TS-2000.

When the Lab had the UT-20 module (covering 1240 to 1300 MHz) installed in this radio, they decided to have it tested on the air, and asked for my help. Unfortunately, it had a significant problem when I put it on the air; the 1296 signal was very constrained and somewhat distorted on SSB. The signal was fine on all other modes and on all modes on all other bands. It was sent back to Kenwood, and they discovered the problem, reporting that a change in the procedure for installation of the UT-20 module will eliminate the problem in the future.

Upon its return, I found that the problem was indeed fixed. So, in addition to having locals give me reports, I asked the Lab to let me use it during the ARRL June VHF QSO Party. This gave me plenty of experience quickly changing bands, listening and hunting for weak signals, dealing with interference and running many hours straight-out.

Getting Physical

This report does not cover all the basics of the TS-2000. Please read the review in July 2001 *QST* for details of all the functions that are common to all bands.

There are separate antenna connectors for HF+6M, 144, 432 and 1296 bands. N connectors are used on 432 and 1296. The 1296 connector is on a 4-inch coax pigtail. A standard circular 8-pin DIN socket EXT CONT that has a separate connection for each band and ALC inputs as well provides the T/R control. It is primarily intended for connection of an external power amplifier, but can be used to control LNAs (low noise amplifiers, or preamps) and sequencers.

There are menu controls to turn each band's T/R control off, fast or slow. In fast it switches 10 ms prior to RF output, whereas in slow it switches 25 ms prior to RF output. In a serious VHF/UHF station, even 25 ms might not be enough to ensure that all switching has completed. Many stations have 100 ms or more allotted to T/R switching so that LNAs and amplifiers can be switched in an orderly manner with the required heavy-duty mechanical relays. In such installations, one should consider use of appropriate safety controls to prevent equipment damage. As an extra precaution, I installed an isolator on the receive port of the T/R relay that I connected to the TS-2000 1296 pigtail. This prevented any RF that might have come from the TS-2000 prior to the switching of that relay from damaging my LNA.

Performance and the Numbers

Selectivity seems as good as the '950, which is quite good. The use of IF DSP is a step up from audio DSP as was offered in the TS950SDX and other radios of the mid to late '90s. The filters in the '2000 are applied in the last IF rather than after detection so that signals are rejected one step earlier in the chain. Furthermore, digital detectors can offer improved audio fidelity and better unwanted-sideband rejection.

The two-tone third-order IMD receive dynamic range of 65 dB at 5 kHz is quite respectable for a 1296 MHz radio. I found no problems whatsoever working weak ones at the same time as a crusher contest station line-of-sight 25 miles from me was calling CQ only 10 kHz away.

Image rejection is excellent at 83 dB and IF rejection is 101 dB.

The speaker audio level little weak for contesting work, especially with other radios running and fans in shack. The lab measured just over 2 W of audio power at 10% THD. Personally, I could have used 10. I suspect that the addition of more preamp gain would raise signals to the point where the audio level is not an issue. Several speaker choices are available, with two speaker outputs and ways of directing main and sub-receiver audio into either or both speakers. One of the speaker jacks mutes the internal speaker when used.

While I would say that this radio is not very sensitive on UHF (less sensitive than a typical modern UHF transverter connected to an HF radio), it was quite immune to overloading. The MDS (minimum discernable signal) measurement of –139 dBm suggests that there is room for about 6 dB of noise figure improvement on the 23 cm band. Therefore, all that is needed is an external low noise preamp. In general, this is a good situation, primarily because most amateur stations have significant feed-line loss on these frequencies requiring the use of a preamp anyway. By installing a low noise amplifier at the antenna, with slightly more gain than is needed to overcome the feed-line loss, the complete system noise figure approaches that of the LNA, and the radio remains immune to overload.

Bottom Line

The UT-20 expansion module adds transverter-free microwave capability to a solid performer.

Table 1
Kenwood TS-2000/UT-20

Manufacturer's Claimed Specifications	Measured in the ARRL Lab
Frequency coverage: Receive and transmit, 1240-1300 MHz.	Receive and transmit, as specified.
Receiver	***Receiver Dynamic Testing*** [1]
SSB/CW sensitivity, 10 dB S/N: 0.11 µV.	Noise floor (mds), 500 Hz filter: *Preamp on* [2] 1240 MHz –139 dBm
AM sensitivity, 10 dB S/N: 1.0 µV.	10 dB (S+N)/N, 1-kHz tone, 30% modulation[1]: *Preamp on* 1240 MHz 0.62 µV.
FM sensitivity, 12 dB SINAD: 0.18 µV.	For 12 dB SINAD[1]: *Preamp on* 1240 MHz 0.24 µV
Blocking dynamic range: Not specified.	Blocking dynamic range, 500 Hz filter[1]: *Preamp on* 1240 MHz 20 kHz, 98 dB*; 5 kHz, 80 dB*.
Two-tone, third-order IMD dynamic range: Not specified.	Two-tone, third-order IMD dynamic range, 500 Hz filter[1]: *Preamp on* 1240 MHz 20 kHz, 86 dB*; 5 kHz, 65 dB*.
Third-order intercept: Not specified.	*Preamp on* 1240 MHz 20 kHz, –15 dBm; 5 kHz, –38 dBm
FM adjacent channel rejection: Not specified.	20 kHz channel spacing, preamp on: 1240 MHz, 58 dB.
FM two-tone, third-order IMD dynamic range: Not specified.	20 kHz channel spacing, preamp on: 1240 MHz, 58 dB*.
S-meter sensitivity: Not specified.	S9 signal at 1240 MHz, preamp on, 40 µV.
Spurious and image rejection: 70 dB.	First IF rejection, 1240 MHz, 101 dB; image rejection, 1240 MHz, 83 dB.
Transmitter	***Transmitter Dynamic Testing***
Power output: CW, SSB, FM, 10 W high, 1 W low; AM, 2.5 W high, 1 W low.	CW, SSB, FM, typically 12 W high, < 1 W low; AM, 2.7 W high, < 1 W low.
Spurious-signal and harmonic suppression: 50 dB.	70 dB.
SSB carrier suppression: 50 dB.	47 dB.
Undesired sideband suppression: 50 dB.	57 dB.
Third-order intermodulation distortion (IMD) products: Not specified.	See Figure 1.

Note: Unless otherwise noted, all dynamic range measurements are taken at the ARRL Lab standard spacing of 20 kHz.
Third-order intercept points were determined using S5 reference.
*Measurement was noise limited at the value indicated.
[1]Tested with TS-2000.
[2]The preamp is always on for this band.

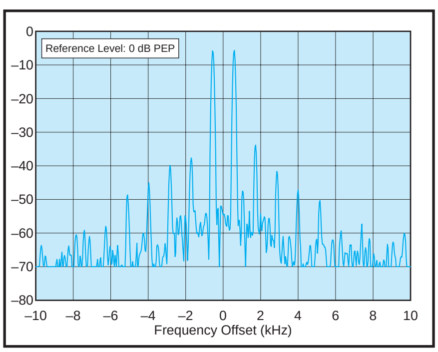


Figure 1—Worst-case spectral display of the UT-20 expansion module of the TS-2000 transmitter during two-tone intermodulation distortion (IMD) testing. The worst-case third-order product is approximately 34 dB below PEP output, and the worst-case fifth-order product is approximately 40 dB down. The transmitter was being operated at 10 W output at 1296.000 MHz.

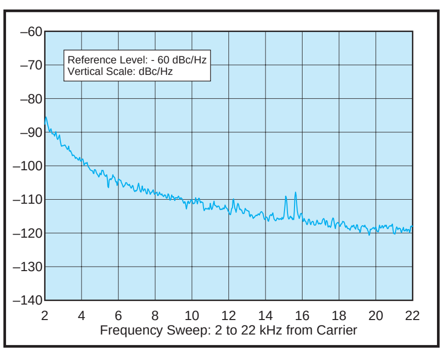


Figure 2—Worst-case spectral display of the UT-20 expansion module of the TS-2000 transmitter during composite noise testing 1296.020 MHz. Power output is 10 W. The carrier, off the left side of the plot, is not shown. The plot shows composite transmitted noise 2 to 22 kHz from the carrier.

The preamp gain in my home system is not high enough for this transceiver—I could have used another 5 dB or so. Nonetheless, I was able to work all stations during the contest that had transmit power similar to mine, and some with considerably less.

Transmitter

The output power matched the indicator very closely. I only needed 5 W to drive my power amplifier to full power. Some amplifiers will take all of the 10 W that are available. Reports of audio quality were identical at all power level settings.

The transmit IMD third-order products are down about 30 dB from peak envelope power and the fifth-order products are about 40 dB down (see Figure 1). These are respectable numbers for a 1296 signal at full power (10 W). There is no noticeable distortion or splatter in the signal as reported by nearby amateurs receiving the signal at very high levels.

Transmitted composite noise (see Figure 2) is roughly 10 dB higher than on 432 MHz. This is expected as phase noise normally rises with frequency by just about this rate.

On the Air

Changing bands in a radio that has VHF and UHF built in is a breeze. Push one band change button a few times and you're there. Modes can be changed quickly—again, just one button.

The main dial knob is about the right size for easy tuning, and covers 10 kHz in one revolution on SSB/CW. This is a very comfortable tuning rate, especially when coupled with the (default but adjustable) 10 kHz clicks of the MULTI/CH secondary tuning knob that can assist quick QSYs during a contest ("let's go to dot two five oh"). I did not find a way to increase the mechanical drag on the primary tuning knob. Personally I would have preferred a little less freewheeling, but this is surely a matter of preference.

Although probably less of a useful feature on HF, folks that do non-FM work on VHF, UHF and microwaves will often need to switch between CW and SSB. Unfortunately, with many radios, this means moving frequency by 800 Hz to keep the signal tuned properly. I have a reminder next to my radio showing which way to move the knob when changing modes. The TS-2000 offers a menu (#37) choice to operate in the normal mode (retuning required) or in a mode that will change the radio's frequency by the necessary amount when you change modulation modes. I immediately set this mode on, and enjoyed quick mode changes that were just the way I liked them.

Two types of DSP noise reduction are provided with some control. My impression is that these can reduce fatigue, especially when listening to weak signals during rag-chew sessions, but is not very effective during contesting or DX chasing. I might form a different opinion if I lived with the radio for a while longer.

The transmit audio menu (#21) has several options for tailoring the response. I found that "conventional" worked best for me.

I tried the FM and AM modes to make sure that they worked well. The audio reports were very good and the tuning rate for FM felt right.

One thing that the higher frequency crowd will appreciate is the ability to control power independently on each band. Amplifiers all have different gain, and therefore different drive requirements. You can set the drive levels appropriately and have it all work right when you switch bands without tweaking the power or living with sub-optimal settings.

Wishes and Weaknesses

Of course, it is impossible to please everyone (especially me), and with such a compact package any radio will have some compromises. Here are some of the things that I personally would have liked to see different.

The 1296 band T/R connection has a brief "T" state (transmit relay engaged), a little over 10 milliseconds long during the power-up sequence. This is present whether or not the menu selection that chooses the T/R function for 1296 is on or off. In most installations, this will only be a small annoyance, especially considering that it only happens when the unit is turned on. This glitch does not appear on any other band.

As is the trend with HF radios, there are no transverter connections on this radio. The '950 and some of the other high-end radios had these connections in the past, but I do not know of any that have them presently. I have to assume that the designers figure that the radio has so many bands in it already that this feature would not be in high demand. Interestingly enough, there is a transverter frequency function in a menu that lets you set a readout offset (one only) if you were using the radio with a transverter! As a microwave operator who thinks of HF radios as IF radios, I find that the lack of transverter connections is a drawback. Most users, however, would not.

No doubt, because the rest of the world does not all have the 222 or the 902 MHz bands, these are not built into any of the HF+ multi-band radios. The TS-2000 follows suit, even though it does provide 222 MHz receive coverage. I'd still like to see these underutilized bands included. How else are we going to get more hams to use them?

The UT-20 vs External Transverters

External transverters have been the only way to achieve high performance on the VHF, UHF and microwave bands in the past. Recently, however, I have heard several reports of hams using this radio and others on the VHF and UHF bands for very serious and demanding applications including DX and EME. This is from amateurs who have actually given up their transverters in favor of an integrated radio! Clearly, having the other bands and a direct frequency readout built into a compact package is attractive—but EME? Well, yes.

This radio has plenty of stability, great keying and modulation, and tremendous selectivity now that IF DSP is ready for prime time. A mast-mounted preamp is a must for any serious UHF or microwave work anyway, so making sure that the gain level is right to overcome your radio's noise figure is just good practice. Is this a serious VHF and UHF radio? Sure, but add a good preamp.

A Nice Addition

If I were in the market for a new radio, I would certainly put this one on my list for comparison shopping. It has a lot going for it, and does a great job on the upper bands. As was stated in the original review of this radio, "You can't argue with success…" and I have to agree. This is one amazing package, and a great way to get started on the upper frequencies.

Manufacturer: Kenwood Communications Corp, PO Box 22745, Long Beach, CA 90801-5745; 310-639-9000; **www.kenwoodusa.com**. The UT-20 1.2 GHz module is only available installed prior to purchase, or installed after purchase of the TS-2000 by Kenwood Service. Cost: $550.

M² 23CM22EZA 1.2 GHz Antenna

Reveiewd by Dick Janssen, WD4FAB
ARRL Technical Advisor

Bottom Line

The M² 23CM22EZA offers a lot of gain in a small package and opens the door to AO-40 operation.

If you are looking for a new "magic band" these days, try the microwave bands of OSCAR 40 (AO-40). Many operators are discovering the joys of reliable armchair copy of S band (2401 MHz) downlink signals from all over the world using only a small dish antenna. They are using small uplink antennas on U band (435 MHz) and on L band (1269 MHz). The L band uplinks to AO-40 can use really small antennas—ones that nearly disappear when next to the large antennas

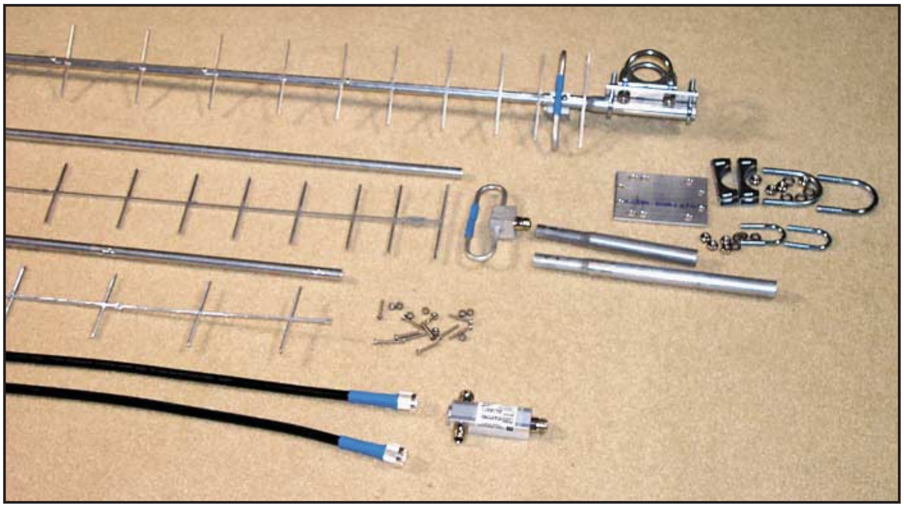


Figure 3—Before and after: a completed 23CM22EZA (top), and the parts of which it is made (bottom).

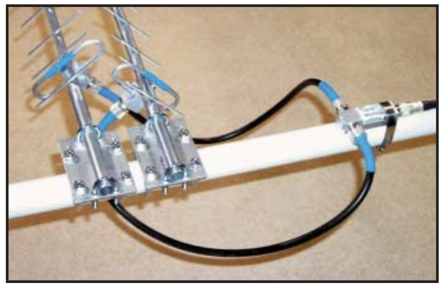


Figure 4—Mounting of two 23CM22EXA antennas for circular polarization.

that we used to use for AO-13. For my AO-40 station, I needed to find some kind of L band antenna for my uplink that would give me great performance with only the 40 W of 1269 MHz RF power that I had available at the top of my tower. My effort started a search for this high-gain antenna performance without the need for another, larger dish. I also wanted this antenna to be a right-hand circular polarized (RHCP) antenna so as to enhance my uplink signals to AO-40.

The answer for my L band needs was found in M^2's highest frequency Yagi, their 23CM22EZA. It is small, with only a 63 inch by 0.50 inch diameter boom. Two of these antennas, mounted side-by-side for circular polarization (CP) or in a stacked operation, will have practically no effect on the wind loading of your rotators.

Antenna Assembly

These antennas came in two rather small, 3.5-pound boxes less than 3 feet long. In addition to the antennas, the boxes contained a 23CM 2 Port PD (the 23 cm 2-port power divider) and a pair of phasing cables (constructed of rugged LMR400 coaxial cable with weather-sealing, silver plated type N coaxial connectors). Also included was an additional, extra-long rear mounting post needed for setting up the CP operation. All of these parts are partially shown, along with one of the assembled antennas in Figure 3.

The included screws and self-locking nuts for the antenna assembly were high-quality stainless steel. Unfortunately, this fine collection of antenna parts did not also include stainless steel U bolts and mast-mounting clamp hardware. What were included were high-quality, but conventionally plated bolts and clamps; these parts quickly corrode and do not maintain their usability. I hot-formed my own U bolts out of stainless steel threaded rod to solve the problem. Other than that, the parts for these antennas were very well made and finished.

The elements are not made of typical aluminum rods, but sheets of elements sets sheared out of 0.125 inch thick aluminum plate. There are only two of these element set "sheets" for each antenna. This construction method "allows the optimized design to be stamped out under numerical computer control, holding spacing and element lengths to 0.003 inch tolerance." The aluminum tubular boom is in two sections joined with a coupling sleeve. A folded dipole driven element is provided, attached to its sealed mounting block with an integral N connector. This antenna goes together with only ten screws, and nine self-locking stainless steel nuts. On examination, I felt a little uneasy with the firmness of the boom-coupling sleeve and so I cross drilled and installed two additional screws perpendicular to the original ones, adding to the comfort level of that joining sleeve.

As noted, there was an added "rear mounting post," which is a piece of 0.75-inch diameter aluminum tube that is swaged down on one end to slide over the boom. The large end of this post is U-bolt clamped to the boom-to-mast mounting plate, giving a rear mounting for the antenna, placing all of the active antenna completely in

Table 2
M^2 23CM22EZA 23-cm Yagi

Manufacturer's Claimed Specifications	*Measured in the ARRL Lab*
Frequency of operation: 1250-1300 MHz	Tested only at 1269 MHz
Number of elements: 22	As specified.
Boom length / diameter: 63 in / 0.50 in	As specified.
Weight: 2 lb	As specified.
Wind area: 0.3 sq.ft.	
Wind survival: 100 MPH	Not measured.
Power rating: 600 W	Tested only at 40 W
VSWR, typical 1.1:1	1.19:1 at 1269, see text.
Input impedance / 50 Ω connector / N female	As specified.

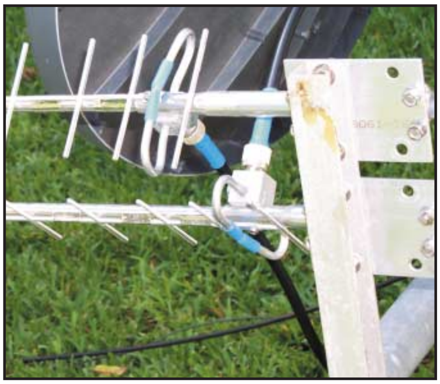


Figure 5—Channel mounting of two 23CM22EXAs for right-hand circular polarization.

front of the support structure. The extra-long rear mounting post was included to allow the mounting of one of the Yagi antennas a quarter wavelength in front of the other for the proper CP phasing. At 1269 MHz, a wavelength is 236 mm and a quarter wavelength is just 59 mm. With a tubing cutter I carefully trimmed this extra-long mounting post to 234 mm, which is exactly 59 mm (2.32 in) longer than the 175 mm long standard post, mounted on the first antenna.

M^2 provided special instructions for the use of these antennas in RHCP. They also give very specific orientation assembly information for placing the driven element on each antenna assembly and aligning the element planes with respect to each other. The driven element can be installed front-forward or front-backward, so to speak, and you must follow these instructions precisely, or be sorry about the results later.

Installation

If you are going to use these antennas in a CP array, you can follow the mounting idea shown in Figure 4, which illustrates a simple mounting of the two antennas onto an elevation boom just 0.38 wavelength (3.50 inches) apart. My final installation actually used a 25-inch-long piece of aluminum channel that I clamped perpendicular to the elevation boom. This allowed me the option of mounting the antennas in an H-plane stacked array or in a RHCP array, by providing all of the needed mounting holes when I had the channel in the shop. Figure 5 shows this channel mounting with the two antennas mounted for RHCP operation. An in-the-air view (Figure 6) shows the two 23CM22EZA antennas in operation in the stacked configuration, along with my M^2 436-CP30 U band antenna and my S band dish antenna.

M^2 also provides instructions for adjusting the antenna SWR. When I installed the antennas on my tilted-over tower, I applied power to them using a Heathkit SM-4190 Bi-Directional RF Wattmeter. For the tests, the initial con-ditions we read were Pf = 40 W and Pr = 1.5 W, for SWR = 1.48. Bending the driven element in a "bat wing" configuration quickly showed that we could get the reflected power levels down to Pr = 0.3 W, or SWR = 1.19:1. At this point I decided that the reflected power was already quite well down on the meter scale. I would have had to measure a reflected power less than Pr = 0.1 W to get the desired VSWR = 1.1:1, and that did not seem worth the effort. The really crazy looking driven elements of Figure 3 are from this tuning effort—but that is what M^2 advises!

On the Air

The 23CM22EZA antennas were first operated as a stacked H plane configuration spaced 22 inches apart. By manually adjusting my antennas I found that I had greatly improved results when I pointed the array 4° up from the computed position—and the light dawned. In the stacked configuration, these antennas have a very narrow H-plane (elevation) half-power-beam-width (HPBW) of only 11.5° in H plane, while it is still a reasonable 27.8° in E plane (azimuth). A 4° elevation pointing error will really be noticed, as I did. This was corrected on the ground in the antenna rotator control boxes.

Operation of the stacked array now provides very good performance. I hear the satellite transponder noise floor and this sets my receiving limits. Typically, the AO-40 transponder noise floor will read S3 on my IC-746's S meter. AO-40's LEILA will impose a limit on U band uplink signals, allowing them a maximum S8 (as seen on my receiver). The AO-40 beacon will normally read a S9. These conditions amount to downlink signals that are peaking 15 dB above the noise floor while the beacon is 25 dB above the noise floor, all as S+N/N values from my S meter. All this said, the stacked 23CM22EZA antennas consistently provided me S7 to S8 downlink signals, meaning that they gave me signals that were running 12-15 dB above the noise floor. Not bad.

The antennas were remounted for RHCP in the holes already provided in the channel on my elevation boom. AO-40 was in view and at its 59,000 km apogee with a low squint angle just after this work. My first signals were really a "Wow!" RHCP does make a difference and we saw it immediately, bringing back signals that were clearly S8, or 15 dB, over the S3 noise floor, all on my meager 40 W PEP of 1269 MHz RF power. Operations over the days since this work have confirmed these results.

Figure 6—On the air at WD4FAB: two completed 23CM22EXAs in action at the author's station.

In Summary

As my equipment is limited, I cannot provide a solid, side-by-side set of numbers directly comparing these antenna arrangements, the H plane stacked vs RHCP arrays. I can, however, clearly declare that there is no loss of performance on AO-40 by having the antennas in the RHCP configuration, even though they are about 3 dB lower gain than when in the stacked array. In fact, I feel that these antennas in RHCP may actually provide AO-40 downlink signals that are 1-2 dB greater than when they are in the H plane stacked array. On AO-40 these differences are noticeable.

In talking with AO-40 operators in other areas, it developed that this antenna is also popular with operators communicating over some pretty long tropospheric scatter paths on 1296 MHz. M^2 has taken pains to design this antenna for operations over a pretty wide part of the spectrum. I have not been able to test them at 1296 MHz, as my equipment for that part of the 23 cm is not working.

There is no question that the 23CM22EZA antenna is a keeper. Its design packs a lot of gain in a small package. While this antenna is very easy to put together, and its performance is just super, I felt that the element mechanical design is just a little tender. I found that the elements could be easily bent out of order if I was not especially careful.

Manufacturer: M^2 Enterprises, 7560 N Del Mar Ave, Fresno, CA 93711, tel 559-432-8873; fax 559-432-3509; **www.m2inc.com**. Manufacturer's suggested retail prices: 23CM22EZA, $138 each; 23CM 2Port PD, $65; UHF 50 Phasing Kit, $79.

ICOM PS-125 Power Supply

Reviewed by Steve Ford, WB8IMY
QST *Editor*

Thoughts of 25-A dc power supplies conjure images of transformers so large and dense that they substantially warp the space-time continuum in their immediate vicinities. Prior to about 1980, they were your only choice when you needed to generate lots of dc current from an ac source.

Technology marches on, though. Thanks to switching power supply design, we can now convert 60-Hz ac up to a much higher frequency. This enables small, lightweight transformers to perform the step-down magic from 110 V to 12 V, or whatever our radios require. The higher-frequency ac is also easier to filter and regulate.

The results are power supplies that can deliver high current in small physical spaces without inducing hernias whenever you attempt to move them. The trade-off—there is *always* a trade-off—is that the frequency-conversion aspect of the switching power supply tends to generate a fair amount of RF noise. So the challenge for switching power supply designers is to provide stable current and voltage without creating an unacceptable level of interference in your transceiver.

The PS-125

The ICOM PS-125 25-A power supply is about as simple and unadorned as you can get. It is a 4 × 4 × 11-inch black box that weighs less than 7 pounds. There is an ON/OFF rocker switch and an LED indicator on the tiny front panel—nothing more. The ac power cord is removable, but the dc cable is fixed. The dc cable is about a foot long and terminates in a square 6-pin Molex connector. This connector is compatible with a number of ICOM rigs, including the IC-706 series. If you are interested in using this supply with other non-ICOM radios or devices, you could attach a mating connector and run your wiring from there. Or, simply whack off the Molex connector and attach your wiring directly.

The PS-125 worked just fine with my IC-706 transceiver. The PS-125 was physically quiet and cool. It didn't break a sweat while delivering 20 A to run 100 W on RTTY.

But how "RF quiet" is the PS-125? According to ARRL Laboratory tests, at least as quiet on the HF bands as other comparable switching power supplies on the market. See Figure 7 and compare the other models including the ICOM PS-85, featured in the January 2000 *QST* Product Review column, pp 70-73.

Manufacturer: ICOM America, 2380-116th Ave NE, Bellevue, WA 98004; tel 425-454-8155; **www.icomamerica.com**. Street price: $299.99.

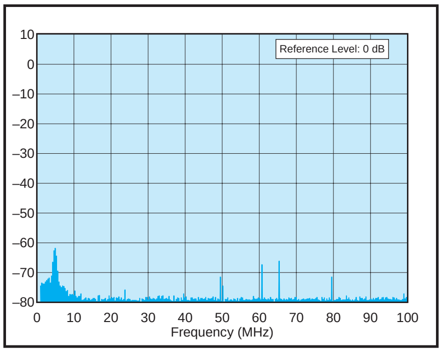


Figure 7—A spectral plot of the output of the ICOM PS-125 under load. This supply exhibited low levels of broadband noise. The most prominent peak appears between 4 and 7 MHz.

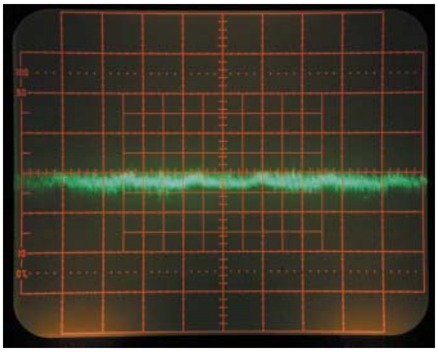


Figure 8—An oscilloscope trace of the dc output of the ICOM PS-125 while operating under a 20 A load. The vertical scale is 50 mV/div and the horizontal scale is 5 mS/div.

Table 3
ICOM PS-125 serial number 01819

Manufacturer's Specifications

Power requirement: 85-135 V ac.
Output voltage: 13.11-14.49 V dc (13.8 ±5%).
Output current (continuous): 25 A.
Size (HWD): 3.7×4.4×11.3 inches; weight, 6.6 pounds.

Lab Measurements

Output voltage, no load: 14.28 V dc.
Output voltage, 21 A load: 13.85 V dc.
Low line drop out voltage: 65 V ac.
DC variation during dynamic testing: ≈ 300 mV.

Figure 9—A view of the interior of the ICOM PS-125.

SHORT TAKES

GOwin

In the DX game there are four pathways to that precious QSL:

- via the bureau
- electronically (via e-mail or an online service)
- directly
- through a QSL manager

DX stations will usually pass along their QSL information on the air, but in the frenzy of a pileup those details are often neglected. As you bask in the glow of your pleasure at working yet another DXCC entity, you suddenly realize that you don't know where to send your QSL. Now what?

You can search a call sign database for a clue, or hope that some kind soul will post the information on the DX cluster. Or you can double click on the *GOwin* icon on your PC desktop and have the information in a matter of seconds.

GOwin

The GOList, currently owned by John Shelton, K1XN, has been the bible of QSL information. With *GOwin* you can enjoy the power of the GOList at your own computer. It's as easy as typing in the call sign that you wish to look up (Figure 1). *GOwin* instantly zips through its DX QSL database. With my 1.8-GHz PC, *GOwin* produced results so quickly that the information was on the screen before my fingers lifted from the keyboard.

Written by Tom Dandrea, N3EQF, *GOwin* is compatible with *Windows 95* and up and loads in a heartbeat. It also interfaces with QRZ, RAC and Buckmaster call sign directories for address lookup. *GOwin* is powered by the Golist database files. The files are updated and available to subscribers *weekly* from the Golist Web site. These same database files are used by these other DXing programs: *WIN-EQF, DX4WIN, SWISSLOG, DXBASE, WINLOG32, LOG WINDOWS, LOG-PLUS, LOGGER32, DX TELNET* and *TRX-MANAGER*.

GOwin can interface with the "Buckmaster HamCall," "Radio Amateur Callbook" or "QRZ! Ham Radio" call sign databases to provide you with mailing address information. To prepare *GOwin* to do this, you simply specify which call sign database you want to use, and the disk drive (or CD-ROM drive) where it is located.

"Output" to a Text File

GOwin provides a way to send all the information displayed to a text file, where you can edit, print and save as needed. The OUTPUT button on *GOwin* will become available as soon as there is any information displayed in the QSL Manager window. When you click on OUTPUT, *GOwin* will create a text file called LABEL.TXT, and display it in your favorite editor. From there, you can "Save As" to keep it in a different text file, or PRINT to send it to your printer. Each time you click on OUTPUT, *GOwin* will place the new information at the bottom of the existing LABEL.TXT file. If the LABEL.TXT file still exists when you exit *GOwin*, the program will ask if you want to delete the file. If you answer "No," then *GOwin* will continue adding to the file the next time you run *GOwin*.

Web Linking

If the QSL destination doesn't appear in the *GOwin* window, you can click the GOSEARCH button and get the latest information from the **www.golist.net** Web service (Figure 2).

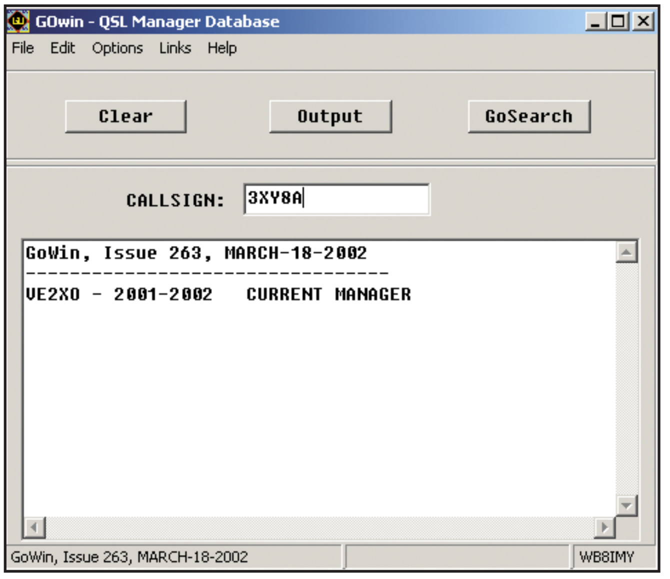


Figure 1—In this example, I entered 3XY8A. In a fraction of a second *GOwin* informed me that I needed to send my card to VE2XO (the operator's home call).

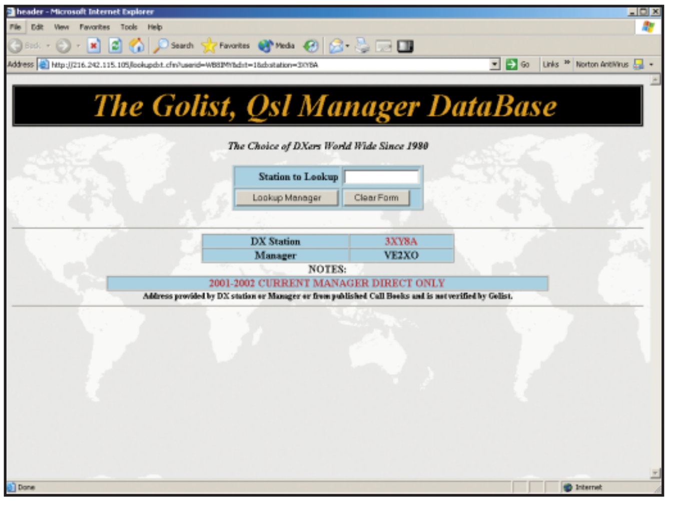


Figure 2—If *GOwin* doesn't have the answer, just click on the GOSEARCH button. *GOwin* will automatically connect you to the GoList Web site and do a rapid search.

GoSearch may contain information on DX stations that do not appear in the weekly GoList database updates.

Conclusion

You can order your own copy of *GOwin* online at **golist.net/** for $49.95. The cost includes a year of weekly updates and a subscription to *DX Alert*, a weekly listing of published DX operations. Once you make the purchase, *GOwin* can be sent to you electronically as an e-mail attachment, or by mail on a CD-ROM (add $5 for CD shipping; add $5 for international shipping).

Manufacturer: The GoList, PO Box 3071, Paris, TN 38242; tel 731-641-4354; **golist@golist.net**.

Steve Ford, WB8IMY ◻ *QST* Editor

NuMorse Professional version 1.30

Aids to mastering Morse code certainly have come a long way since the days of code tapes—or, if you're a real old timer, phonograph disks or, older yet, the punched-tape Instructograph. *NuMorse Pro* software by Tony Lacy, G4AUD, not only contains all the tools needed to learn Morse from scratch, it also has the means to generate an actual Element 1 examination or serve as a keyboard CW program.

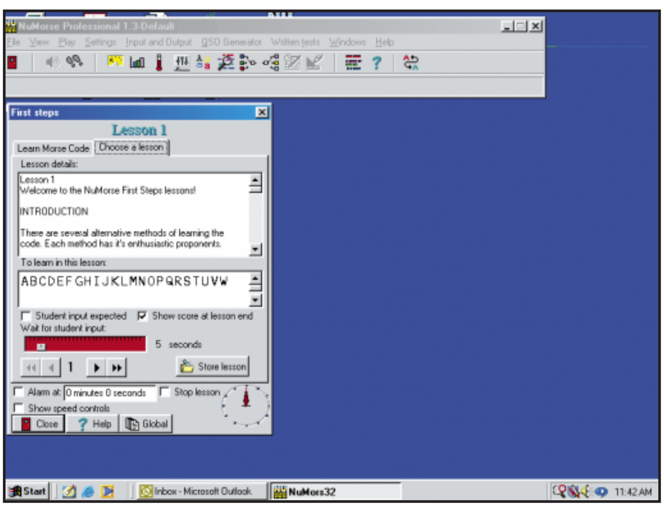
NuMorse Pro includes a 29-lesson Morse code tutorial. For newcomers, the program assigns mnemonics for each letter—like "kangaroo" for the letter K, and "a jar" for the letter A. Some of these were a bit obtuse, such as "binocular" for B. "Pea in a pod" for P, while cute, *sounds* more to me like it should be the mnemonic for the letter X.

True to its name, *NuMorse Pro* is not just for beginners. If you aspire to the ranks of the QRQ (high-speed) ops, *NuMorse Pro* might help boost you to the 50 WPM level too. Beyond that, you're on your own—that's as high as it goes. It's also a great source of practice for those priming for a contest like ARRL November Sweepstakes or CQ World Wide CW and who lack complete confidence in their ability to copy code at, say, the 30 WPM level.

At startup *NuMorse Pro* offers a choice of Koch or "default" method. In Koch, you start right out at your "target" speed (say, 25 WPM) with just two characters. Get those down pat and the program adds more characters, until, eventually, you've mastered them all. For multiple users, the program permits storing several user profiles—a handy feature for classroom-type applications.

The program has two basic user modes—"drill" and "play." The "input devices" for *NuMorse Pro* include text files (you can, of course, generate your own with your word processor and save them as .txt files). Also, the program will do random character generation, play CW from the keyboard (and you can map special characters, such as prosigns), and intercept keystrokes.

The "intercept keystrokes" selection is supposed to play the code characters you type into other *Windows* programs, such as a word processor. This could be a handy way to learn (or at least become more familiar with) the code while doing other work, but I had limited success with it. The program only "intercepted" occasional characters, not all of them. I tried different settings but couldn't seem to get this feature to work as advertised—at least not with *MS-Word* and my e-mail program on the aging 233-MHz Pentium-class machine I have in the ham shack. The program did create a file of what I'd typed, however.



Of course there's a QSO generator, so you can practice "taking the test." There's even an option to ensure the program follows FCC Element 1 testing guidelines for this. The call sign generator is a terrific contest primer, especially if your last contest Log Checking Report indicated a surfeit of busted call signs!

You can set a virtual keyboard to show the keypresses as the letters are sent, display the text sent and accept—and evaluate—input from the user, although this sometimes seemed more like a test of my keyboarding skills than my ability to copy Morse code—especially at higher speeds (I never did learn how to copy fast CW on a typewriter—only in my head).

Drill settings let you, among other things, decide how many times to repeat code just sent if it detects an error (ie, the student presses the wrong key), or how long to wait before restarting drilling after an error.

If you like, this program can be set up to send Morse from the PC keyboard or from a text file to your transceiver for on-the-air use, so it's plenty versatile.

"Real Morse" options was my absolute favorite feature. This lets you apply real-world conditions to the Morse you're listening to. Here you can add background noise and fading (both adjustable) to the signal, as well as impulse noise and ignition noise. The end result very much resembles on-the-air CW—uncannily so, in fact. The only problem I noticed was that—at least on my PC—there were actual dropouts in the background noise (sort of like a squelch or noise gate) that sometimes affected your ability to read the characters. This was disconcerting.

The "Sound board options" window even lets you apply a time constant to the CW waveform you're hearing (or none at all); *NuMorse Pro* recommends 1 ms. There are three choices of CW pitch—400, 600 and 800 Hz, which ought to satisfy most users.

The "Speed (WPM)" window permits adjustment of several variables to obtain an overall code speed. You can set the "code speed of characters" and then adjust the spacing (*a la* Farnsworth) and insert extra spacing (on a scale of 0-10, the longest being about 1 second) between individual words. The resulting overall code speed is displayed. Other buttons let you store and later recall up to three particular settings. An "automatic speed control" setting can adjust speed according to your ability to copy it on the keyboard. It also can vary sent code speed (eg, increase speed at a preset increment and interval) during a code session.

Other odds and ends include a small library of sound files (the sound of a spark gap is among them) and the text of the *Titanic* distress call sent by Radioman Phillips from MGY that fateful night.

NuMorse Pro is a useful tool for either learning Morse code from scratch or for ratcheting up your CW skills. The help files are, well, helpful, and organized and clearly written, with lots of hyperlinks to specific topics. Most users will be able to install the program and have it up and running in short order.

Manufacturer: NuWare, Llanoris, Llanerfyl, Welshpool, Powys, SY21 0EP United Kingdom; **www.nu-ware.com**. NuMorse Pro *can be downloaded free of charge at* **www.nu-ware.com/NuMorseP/nmpdload.htm**. *Registration is $34. You can also receive* NuMorse Pro *on CD-ROM by postal mail for $59.95. Minimum system requirements: 130-MHz Pentium PC running* Windows 95/98/NT/ME/2000/XP *with a Soundblaster-compatible sound card and a printer driver installed (even if a hardware printer is not actually connected).*

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