

Product Review

Yaesu FT-901DM Transceiver

A new model of an existing product does not denote improved performance. Rather, it usually means that a frill has been added here and there to entice new customers or stimulate the buying urges of old customers. That's why we feel it is important to point out early in this review that the FT-901DM is not a reworked version of the long-popular FT-101 Yaesu series. This is a new box with a completely different circuit design. There are numerous operational features which do not appear in the '101 transceiver series. There is little similarity in the design when comparing the FT-901 to the FT-301, the latter of which followed the '101 to the U.S. marketplace.

These are the highlights: frequency coverage from 1.8 to 29.9 MHz in nine band positions, plus WWV in the 10th position; operational modes are lsb, usb, cw, fsk, a-m and fm. Dc input power to the PA stage is 180 watts during cw and ssb. For the rest of the modes it is 80 watts.

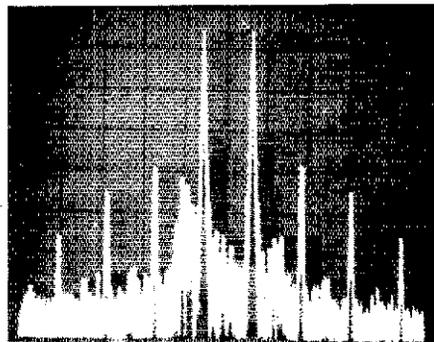
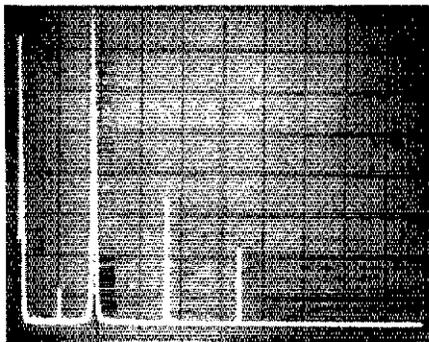
Significant among the circuit features are digital plus analog frequency readout, PLL local oscillator, built-in Curtis keyer, memory frequency control, dual-filter variable i-f bandwidth tuning, and for cw, built-in RC active audio filter.

Some of the more common highlights are semi-break-in delay (not full QSK), sidetone, VOX, 25-kHz calibrator, noise blanker, rf speech processor, and time-delay tune-up position (prevents damage to the PA stage by limiting carrier-on time to short periods). There is also a 20-dB rf attenuator in the receiver front end (selectable) and two agc choices (fast or slow).

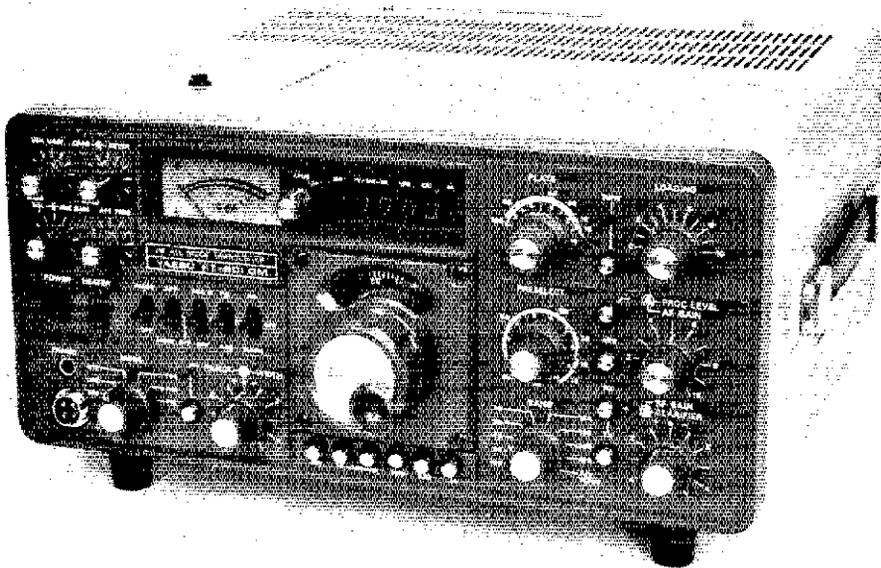
Solid-state circuitry is used throughout the transceiver except for the driver and PA sections. Sweep tubes are not used in the final amplifier. Instead, a pair of 6146Bs is used to enhance tube longevity and improve transmitter IMD. Mobile operation is made possible by using the dc-to-dc converter which is built into the '901. Changing from ac to dc operation is achieved by simply attaching the appropriate external power cable. The only optional accessories for the FT-901DM are the a-m and cw i-f filters. Various other models of the '901 are available (901D, 901SD and 901DE) which have many of the features contained in the 901DM available as accessories. The FT-901SD is a QRP (10-watt) version of the other models.

Audio output is greater than 3 watts at 10 percent total harmonic distortion. Although a built-in speaker is included, external speakers can be used. The output impedance is 4 to 16 ohms. The audio filter is variable for peaking between 400 and 900 Hz. Passband tuning is continuous from 2.4 kHz to 300 Hz. Ssb selectivity is 2.4 kHz, a-m is 6 kHz, fm is 12 kHz and cw is 600 Hz. All are specified at the -6-dB points on the filter response curve.

The memory feature should appeal to those who operate in split-band fashion. This circuit eliminates the need for an external VFO. When the M button (memory) is pushed a frequency can be stored. This will be the frequency which



At left, the transmitter output of the FT-901 on 160 meters, as displayed on a spectrum analyzer. Vertical scale is 10 dB per division and horizontal divisions are each 1 MHz. The tall pip at the extreme left of the photo is generated in the analyzer and represents 0 MHz. This photo was taken while the FT-901 was operating at rated input power on cw. The most significant spurious emission is the second harmonic at 3.6 MHz, which is down 46 dB with respect to the fundamental, shown here at full scale. Other spurs are at least 57 dB down. The FT-901 meets or exceeds the FCC requirements for spectral purity. The right-hand photo shows the output of the FT-901 during a full-power, 7-MHz, two-tone test. Each vertical division is 10 dB and each horizontal division equals 1 kHz. Third-order products are approximately 38 dB down from the PEP level. Measurements were taken in the ARRL lab.



The FT-901 is top of the hf line at Yaesu, with several models available. Shown here is the '901DM which contains almost all possible features as standard. The only options on the "DM" are the a-m and cw i-f filters which go for \$45 each.

is displayed before the M button is activated. Once the frequency is stored, it can be recalled for use on transmit by pushing the TX button, or for receiving by punching the RX button. In effect, these are memory-recall buttons. However, when the MR button is activated, the stored frequency is used for the transceive mode. An EXT (external) button is available for transferring the frequency control to an outboard VFO, such as the FV-901, if that type of operation is desired. On our review unit

there was evidence of a T8 cw note when the operating frequency was controlled by the built-in memory. This condition was not noted while using the straight VFO function. On-the-air checks with other FT-901DM owners showed their signals to be clean, suggesting that our unit may have had a local ground-loop problem or small internal anomaly.

The receiver dynamic range turned out to be substantially better than that of earlier Yaesu equipment. The MDS (noise floor) on 20 and

80 meters is -137 dBm. Blocking above the noise floor is 118 dB (20 meters), 114 dB (80 meters) and IMD checks out at 90 and 85 dB respectively. These tests were done in accordance with the technique outlined by Hayward in July 1975 *QST*. Transmitter IMD characteristics are shown in the spectral display which accompanies this review.

Subjective Analysis

This reviewer has used all models of the Yaesu transceiver equipment which were available during the past 10 years, and it is felt that the FT-901DM is the finest of the lot for performance and features. The rig is easy to operate, just plain "sounds nice" with respect to the receiver, and apparently sounds good to those who have checked the quality of the ssb signal during on-the-air discussions of the unit.

Although the '901 is somewhat larger and heavier than the older 101s, it's the type of transceiver that a reviewer hates to send back to the U.S. distributor after running it through its paces at the home station. Going back to the older station transceiver may require biting the well-known bullet for awhile, at least! — *Doug DeMaw, W1FB*

Yaesu-Musen FT-901DM Transceiver

Frequency range: 1.8 to 29.9 MHz, plus WWV.

Modes: Cw, ssb, a-m, fm and fsk.

Power input: 180 watts cw and ssb, 80 watts for other modes.

Selectivity: See text.

Power requirements: 117 V ac — 70 W on receive, 320 W on transmit; 13.5 V dc — 5 A on receive, 21 A during full-power transmit.

Color: two-tone gray.

Dimensions (HWD): 6-1/8 × 13-1/2 × 12-3/4 inches (154 × 342 × 324 mm).

Weight: 39.6 lb (18 kg).

Price class: \$1460.

U.S. Distributor: Yaesu Electronics Corp., 15954 Downey Ave., Paramount, CA 90723.

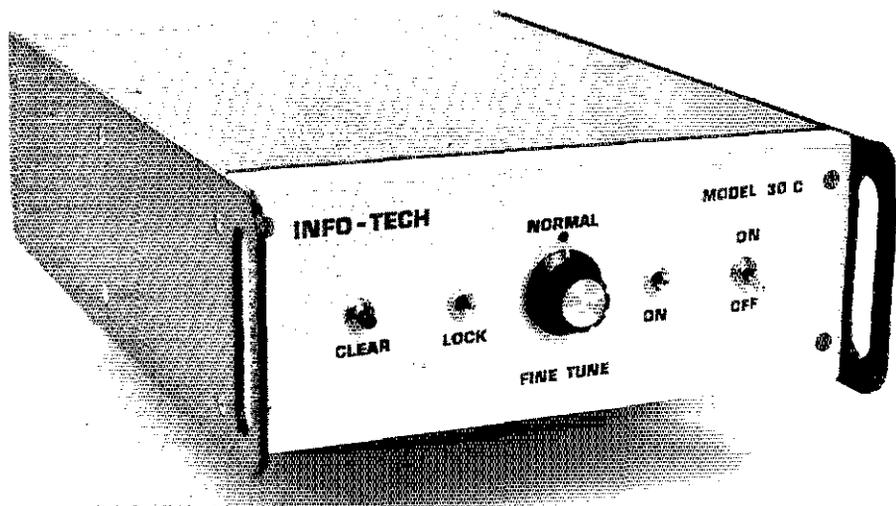
INFO-TECH MODEL 30C CW TO VIDEO CONVERTER

If you're in the market for an automatic cw-receiving device, you might want to consider the Info-Tech model 30. This device converts audio cw to video characters which can be displayed on a video monitor or modified TV.

Audio from your receiver is fed to the input jack on the rear apion of the cabinet. Inside the unit, the cw signal is detected, and the corresponding video characters are generated and sent to the video output jack. This composite video signal can then be applied to the input of a video monitor.

The source of audio must be capable of delivering at least 0.1 V peak to peak into a 500-ohm load. To operate the cw-receiving device, you tune in a cw station and adjust the receiver tuning so that the audio note is approximately 1000 Hz. The "Morse Fine Tune" control on the front of the model 30 should be left in the center of its tuning range. As the signal is detected, the red LED "lock" light flashes in time with the received dots and dashes. The fine-tuning control can be used to adjust the input passband of the model 30 between 800 and 1200 Hz. This can be used to tune in a signal from a receiver that doesn't have a variable BFO.

The model 30 copies Morse code quite well,



The model 30 Info-Tech Morse code receiving unit, shown here in its handsome metal cabinet. All controls are located on the front panel; clear button, lock light, fine tuning knob, power-on indicator, and power switch. Four rubber feet are attached to the cabinet bottom.

and even copies most punctuation marks as well as the standard alphabet and numerals. Some of the procedural signals are also known to the model 30, as it prints out a "<" for \overline{AS} , "=" for \overline{BT} , and "-" for \overline{SK} .

The video display generated by the model 30 is a standard 32-character by 16-line format. (A 72-character by 16-line format is available also.) Each of the characters is displayed on the video screen as a 5 × 7 dot matrix. When the unit is turned on and code is received, the first video line is generated so as to appear at the bottom of the screen. As new lines are started, the first line scrolls up and eventually goes off the top of the screen. The "clear" button on the front panel of the model 30 wipes the video display clean when pressed.

The model 30 was able to copy most cw signals on the bands, having trouble only with poorly sent Morse. There was no difficulty copying weak signals, and in fact the unit sometimes could copy signals that were practically inaudible. The passband of the audio input circuitry isn't as narrow as a few we've seen, but it caused no problems. There was never any need to retune the signal because of slight drifts, as copy was solid regardless. Of course, there will always be many signals too garbled, weak or otherwise deformed to be copied by anything other than the human ear. When the model 30 receives characters it can not recognize, it prints nothing on the video display.

Interconnections

Directions concerning the hook-up to a video monitor or converted television set are included with the model 30. An important warning states the dangers involved in using monitors that are not transformer-isolated from the power line. Although this is true with all types of equipment that are attached to video monitors or TV sets, it was reassuring to see Info-Tech make the dangers clear in its product literature.

Besides the video output and audio input jacks on the model 30 rear panel, another RCA-type jack labeled AUX is included. This connection can be used to feed a local cw signal to the model 30, such as the output from your

keyer. To use the AUX jack, you use a relay so that the model 30 sees a series of opens and shorts at the input of the AUX line. This type of operation allows you to see both sides of the conversation displayed on the video monitor screen.

Appearance

The Info-Tech model 30 is packaged in an all-metal enclosure, as shown in the photo. All controls are located on the front panel, which is partially protected from damage by the two small decorative-type handles on each side. The handles are actually functional, being handy for carrying the model 30 when necessary. The rear panel contains the three RCA-type jacks previously mentioned, a three-wire line cord, and the fuse holder. The cabinet appears to be well shielded, and the instrument operated flawlessly inside W1AW while the station was transmitting with full power on eight bands. If the unit were subject to RFI, it certainly would have been apparent under such operating conditions.

Inside

When the cover is removed, you can see the two glass-epoxy pc boards mounted one on top of the other in piggy-back fashion. A 12-pin connector ties the two boards together, and by removing four nuts you can remove the top board by lifting it upward. The connector separates, leaving only two wires attached to the upper board. The upper board is the video board, which generates the video characters for ASCII input. The lower board is a Morse-to-ASCII converter. All components are mounted on these two double-sided, plated-through boards except for the power supply transformer, two disk-ceramic capacitors and an LM309 5-volt regulator. These components are mounted on the rear panel of the model 30. This layout seems to be one that would be easy to work on, and it would seem also that an ASCII output could be easily added if desired for driving printers, computers, etc. Full schematic diagrams were supplied with the model 30. For more information contact Info-Tech, Inc., 2349 Weldon Parkway, St. Louis, MO 63141. — *Jim Bartlett, K1TX*