



FT-990

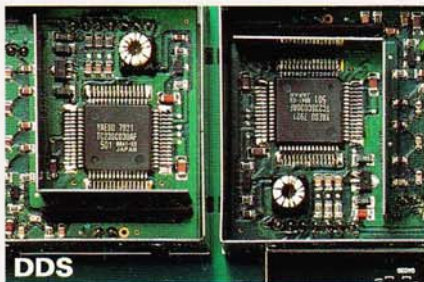
ALL MODE HF TRANSCEIVER



Based on the acclaimed performance and easy operation of the FT-1000, the new FT-990 combines the basic technical features of that top-of-the-line model with several new advances in both transmitter and receiver circuitry, resulting in a spectacular performer at a very reasonable price.

Multiple Direct Digital Synthesizers

Like the FT-1000 (but without dual receive) the FT-990 utilizes multiple direct digital synthesizers (DDS) to provide pure local signals for high receiver performance: the low carrier-to-noise ratio of the local signal lets you hear the weakest signals clearly, even on crowded bands. The DDS also provides lightning-fast t/r changeover important in QSK CW and digital modes.



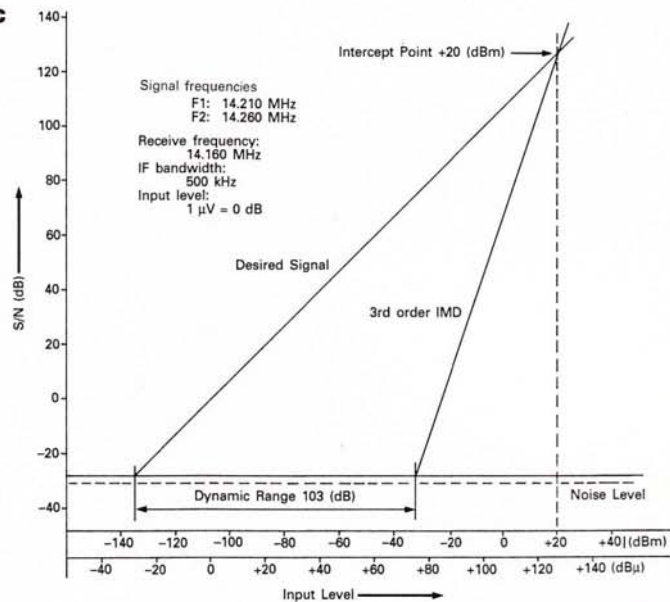
Wide Dynamic Range

To get the full benefit of the DDS, you need a really tough frontend that will

not cave in to intermodulation from strong signals on nearby frequencies. The FT-990 uses a PIN-diode-controlled high IDSS push-pull grounded-gate FET RF amplifier followed by a quad-FET ring

mixer, resulting in very wide dynamic range on all frequencies. Jacks are provided for either a separate receive antenna (selectable from the front panel) or an external receiver.

Dynamic Range



Quiet, Stable & Efficient

Of course even the best DDS and front end performance can be spoiled by internal receiver noise or instability. The FT-990 incorporates a magnetic rotary encoder for silent, silky-smooth tuning—so smooth it feels like an analog vfo. For stability (and simplicity), all local signals are derived from a single master oscillator. Like the FT-1000, an optional temperature-compensated oscillator is available to provide exceptional ± 0.5 -ppm stability from -10 to $+50^{\circ}\text{C}$. An all-new switching regulator AC power supply is built in and optimized to be as electrically quiet as a series regulator (and physically much quieter), while keeping efficiency high and weight low. The FT-990 runs cool all the time, and weighs only 13 kg (29 lbs).



Switching Power Supply

Modular Construction

Modular design with individually

shielded plug-in circuit boards keeps signals where they belong, minimizing internal birdies while maximizing selectivity and making servicing easy.

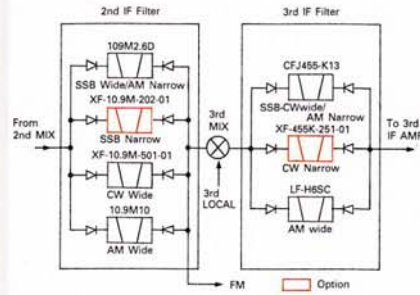


Units

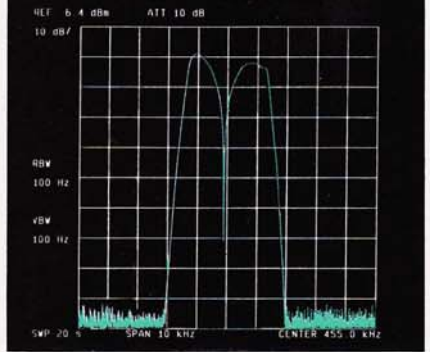
Effective Interference Rejection, with Digital Filtering

Interference rejection is facilitated by both IF shift and an IF notch filter, with pushbutton selection of IF bandwidths. Optional narrow IF filters are available for 2.0-kHz SSB and 250-Hz CW.

IF Filtering

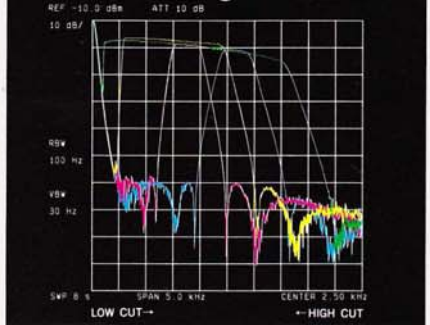


Notch Filter Attenuation



But the FT-990 steps ahead of its older brother with an astounding dual digital SCF audio filter with independently adjust-able selectivity skirts (unique to the FT-990). All automatically mode-dependent AGC selection is provided along with manual AGC decay select/disable.

Digital Filtering



FT-990

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A/B VFOs & Ninety Memories

The front panel keypad provides one-touch band selection, with two independent (A/B) VFOs for each band holding their own frequencies, modes and IF bandwidth settings, and even clarifier offsets and repeater shifts, if used. All settings last used on a band are instantly recalled when switching bands.

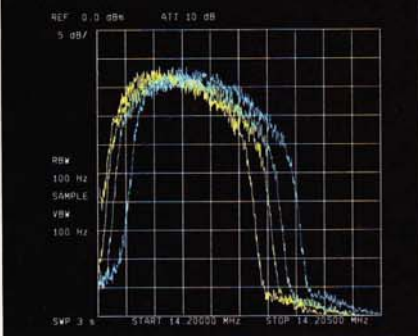
Ninety freely tunable and scannable memories are selectable with a single (MEM) knob, each storing all of the operating data held in both VFOs.

Other important features include general coverage reception from 100 kHz to 30 MHz, an effective noise blanker, all-mode squelch, independent receive and transmit clarifiers and a 6-function multimeter.

Customizable Transmit Carrier Offset

The RF speech processor for SSB incorporates Yaesu's "FSP": IF passband offset for transmit audio, which lets you fine tune processor output to provide maximum punch with your voice.

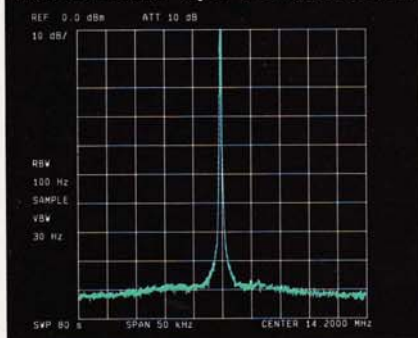
FSP Tailored SSB Tx RF



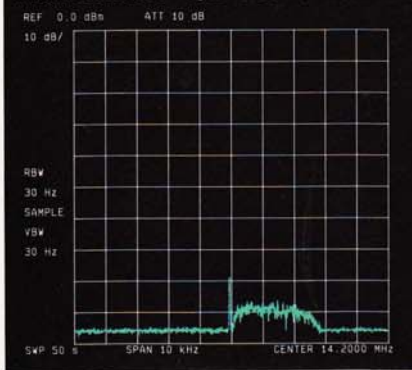
Clean Transmitter Output

Of course the digitally synthesized local signal benefits not only receiver performance, but transmitter signal purity as well. The FT-990 designers have taken extra steps to maintain that purity all the way to the antenna. Transmitter circuit noise is nearly 90 dB down from the carrier.

Transmitter C/N Performance

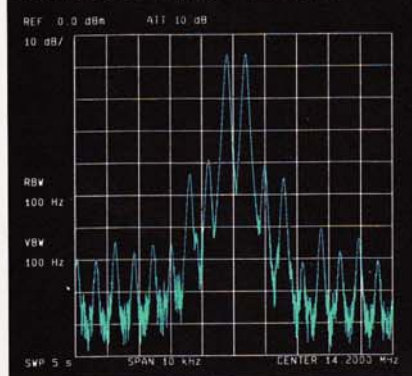


Transmitter S/N Performance



The power efficiency of the switching AC supply allows the final transistor heatsink to be completely internal, cooled by a whisper-quiet, temperature-switched squirrel cage blower. Clean transmitter power output up to 100 watts (25 watts AM) is provided, directly adjustable for all modes from the front panel. Rear panel connectors are much easier to reach since there is no need to have the heatsink protruding from the cabinet.

3rd-Order IMD Product



CPU-Controlled Automatic Antenna Tuner

The FT-990 incorporates the same high-speed antenna tuner as the FT-1000, with its own microprocessor and 39 memories which automatically store most recent antenna matching settings for nearly instant recall while changing operating frequency.



Special Provisions for CW, RTTY & Packet

Adjustments for SSB carrier point, as well as carrier offsets for CW, RTTY and packet modes are easily accessible from the top subpanel.





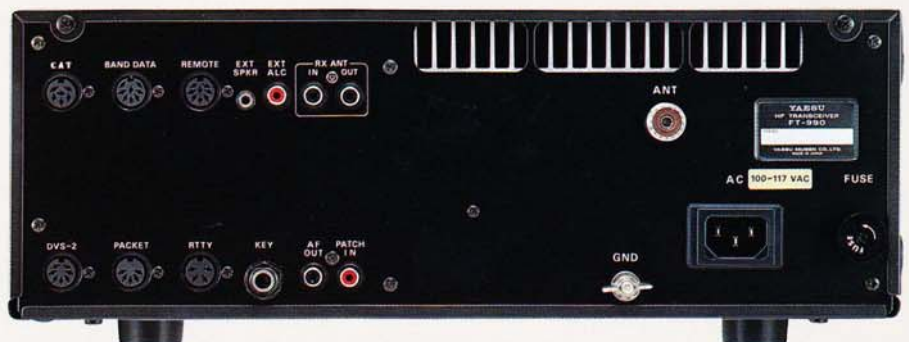
Other special features for CW operation include a built-in iambic memory keyer with dot-dash memory, spotting button for precise tuning by zero-beat, and key jacks on both front and rear panels. In addition to the remarkable facility of the SCF audio filter for CW reception, a 250-Hz IF filter is available as an option to complement the supplied 500-Hz bandwidth IF filter.

Special digital mode provisions include separate interface jacks for an RTTY terminal unit and packet tnc, and RTTY and PKT mode selection buttons which disable the microphone jack automatically while providing either sideband for RTTY or LSB/FM modes for packet; switch between voice and digital modes with only the push of a button.

Digital Voice Contesting

For serious voice contesting, the same DVS-2 digital voice recorder option introduced with the FT-1000 can also be used with the FT-990, providing continuous-loop receiver recording and pushbutton transmission of multiple

voice messages to help keep you at your peak QSO-rate throughout the contest. If you're looking for top performance in an hf transceiver, try out the FT-990 alongside any other, *You just might fall in love!*



OPTIONS

TCXO-2 High Stability Master Reference Oscillator

For special applications and environments where extra frequency stability is essential, such as for long-term HF packet monitoring under wide temperature variations, the TCXO-2 provides 0.5-ppm stability from -10 to +50°C for the master reference oscillator.

MD-1cs Desk-Top Microphone

Designed especially to match the electrical and cosmetic features of the FT-990, the MD-1cs has 600-Ω impedance, and includes up/down scanning buttons and a large PTT switch with latch.

SP-6 Loudspeaker with Audio Filters and LL-5 Phone Patch Option

Selectable audio high- and lowpass filters together with a large loudspeaker complement the superb audio characteristics of the FT-990 with your choice of 12 different audio filtering combinations. Two input terminals are provided for multiple transceivers, with a front panel switch to select between them. A (monaural) phone jack is provided on the front panel to take advantage of the audio filters with headphones.

With the optional LL-5 Phone Patch Unit installed in the SP-6, the FT-990 can be patched to the public telephone network. The LL-5 includes a hybrid transformer circuit to assure proper impedance matches, and front panel gain controls and level meter to set proper audio levels on the telephone line.

YH-77ST Lightweight Headphones

Dual samarium-cobalt transducers with sensitivity of 103 dB/mW (2 dB, @ 1 kHz,

35Ω) provide the perfect match for the FT-990, taking full advantage of the spectacular audio performance.

DVS-2 Digital Voice System

Serving as either a continuous receiver recorder for instant pushbutton playback, or microphone audio recorder for multiple on air playback, the DVS-2 applies the advantages of random-access solid-state digital memory to serious communications. All data is stored electronically, with no moving parts except your finger and the pushbutton.

FIF-232C CAT System Interface

To control the FT-990 from an RS-232C serial port of an external personal computer, use the FIF-232C to convert

the TTL levels required by the transceiver to the RS-232C levels required by the serial port. A cable is included for connection between the transceiver and the FIF-232C (the cable to the computer must be provided separately). The FIF-232C includes its own AC power supply.

IF Crystal Filter Options

For extra receiver selectivity in CW mode, the XF-455K-251-01 8-pole 250-Hz crystal filter may be installed in the 455-kHz 3rd IF of the FT-990, to cascade with the 500-Hz 2nd IF filter installed at the factory.

Also, for SSB reception under difficult conditions, the XF-10.9-202-01 8-pole 2-kHz crystal filter may be installed in the 10.9-kHz 2nd IF, and switched in from the front panel when more selectivity is needed.



MD-1cs



DVS-2



SP-6



LL-5



TCXO-2



YH-77ST



XF-10.9-202-01
XF-455K-251-01

SPECIFICATIONS

GENERAL

Receiving frequency range:

100 kHz ~ 30 MHz

Transmitting frequency range:

160-m band, 1.8 ~ 2.0 MHz

80-m band, 3.5 ~ 4.0 MHz

40-m band, 7.0 ~ 7.5 MHz

30-m band, 10.0 ~ 10.5 MHz

20-m band, 14.0 ~ 14.5 MHz

17-m band, 18.0 ~ 18.5 MHz

15-m band, 21.0 ~ 21.5 MHz

12-m band, 24.5 ~ 25.0 MHz

10-m band, 28.0 ~ 29.7 MHz

Frequency stability:

< ±10 ppm from -10°C to +50°C
(except FM, < ±200 Hz)

< ±0.5 ppm from -10°C to +50°C
w/TCXO-2 option
(except FM, < ±150 Hz)

Emission mode:

LSB/USB (J3E), CW (A1A),
FSK (J1D, J2D), AM (A3E), FM (F3E)

Basic frequency steps:

10 Hz for J3E, A1A and J1D

100 Hz for A3E, F3E and J2D

Antenna impedance:

50 ohms, unbalanced

Supply voltage:

100, 110, 117, 200, 220 or 234 VAC

Power consumption (approx.):

60 VA receive, 470 VA for 100 watts
transm

Dimensions:

368 (W) x 129 (H) x 335 (D) mm

Weight (approx.):

13 kg

TRANSMITTER

Power output:

Adjustable up to 100 watts
(25 watts AM carrier)

Modulation types:

SSB Balanced, filtered carrier

AM Low-level (early stage)

CW Variable reactance

FSK Audio frequency shift keying

Maximum FM deviation:

±2.5 kHz

FSK shift frequencies:

170, 425 and 850 Hz

Harmonic radiation:

at least 50 dB below peak output

SSB carrier suppression:

at least 40 dB below peak output

Undesired sideband suppression:

at least 50 dB below peak output

Audio response (SSB):

not more than -6 dB from 400 to
2600 Hz

3rd-order IMD:

-36 dB for 14 MHz

Microphone impedance:

500 to 600 Ω

RECEIVER

Circuit type:

Triple conversion superheterodyne

Intermediate frequencies:

1st 47.21 MHz, 2nd 10.94076 MHz
and 3rd 455 kHz

Sensitivity:

With preamp on, for 10 dB S/N,
(0 dBμ = 1 μV)

Frequency Mode (BW)	100 ~250 kHz	250 ~500 kHz	0.5 ~1.6 MHz	1.8 ~30 MHz
SSB, CW (2.4 kHz)	< 4 μV	< 1 μV	< 2 μV	< 0.25 μV
AM (6 kHz)	< 10 μV	< 2 μV	< 4 μV	< 1 μV
28 MHz FM (for 12 dB SINAD)	—	—	—	< 0.5 μV

Selectivity (-6 /-60 dB):

Button	Modes	Minimum -6 dB BW	Maximum -60 dB BW
2.4 kHz	all exc. FM	2.2 kHz	4.0 kHz
2.0 kHz	all exc. AM,FM	1.8 kHz	3.6 kHz
500 Hz	CW, RTTY, Packet	500 Hz	1.8 kHz
250 Hz	CW, RTTY	240 Hz	700 Hz
—	AM (wide)	6 Hz	15 kHz

Squelch sensitivity:

1.8 ~ 30 MHz (CW, SSB, AM):

< 2.0 μV

28 ~ 30 MHz (FM):

< 0.32 μV

IF rejection (1.8 ~ 30 MHz):

80 dB or better

Image rejection (1.8 ~ 30 MHz):

80 dB or better

IF shift range:

±1.2 kHz

Maximum audio power output:

2 watts into 4 Ω with < 10% THD

Specifications subject to change without notice.



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