



**YAESU**

# FT-650

24.5, 28 & 50MHz  
ALL MODE TRANSCEIVER





# FT-650

## 24.5, 28 & 50MHz ALL MODE TRANSCEIVER



The FT-650 is a high performance all mode transceiver providing transmission on the 24.5, 28 and 50-MHz amateur bands, and continuous general coverage reception (where legal) from 24.5 to 56-MHz. Transmitter power output is adjustable from 10 to 100 watts in CW, SSB and FM modes, and up to 25 watts carrier in AM mode. Operating from 13.8 V DC, the FT-650 is available with or without the FP-22 switching mode AC power supply, which mounts in the rear of the transceiver using a single screw.

FT-650 design incorporates a compartmentalized steel chassis with extensive use of surface mount components on individually shielded plug-in composite epoxy boards. The diecast final amplifier module and the slide-in 100% duty cycle FP-22 power supply option each have their own independent forced-air cooling systems, for greater cooling efficiency than single flow designs.

For exceptionally clean receiver and

transmitter performance, the FT-650 incorporates three Direct Digital Synthesizers (DDSs) for its local oscillators (all driven by a single  $\pm 2$ -ppm TCXO master oscillator), and a 2-stage low noise (1.2-dB NF) front end RF amplifier with the first stage switchable from the front panel. Two microprocessors in the FT-650 allow a simple user interface with a minimum of knobs and buttons capable of controlling a vast array of important features. For example, 10-Hz, 100-Hz and 10-kHz tuning steps are available for the main tuning knob, while the MEM/CH knob is easily settable for 2.5-, 5-, 10-, 12.5-, 15-, 20- and 25-kHz steps (with 500-kHz giant steps always available). In addition to standard IF bandwidths, fine tailoring of the IF passband is made possible by two of the DDSs, providing selectable IF bandwidths of 1.8, 2, 2.2 and 2.4 kHz in SSB modes, 300, 600, 1200 and 2400 Hz in CW mode, 2.4 and 6 kHz in AM and 8 and 15 kHz in FM modes (the two narrow-

est CW modes require an optional filter). IF passband shift is continuously adjustable for  $\pm 1.2$  kHz, and in addition to a manual IF notch filter, an automatic IF notch filter finds and notches out interfering heterodynes without operator intervention (when enabled).

Also provided are 105 scanable memories, each of which stores its own mode and IF filter selection, in addition to one frequency on each band, scan status and CTCSS tone frequency (if the optional FTS-8 Tone Squelch Unit is installed). The FT-650 holds up to 427 independent frequency, mode, clarifier and repeater settings. Two priority channel memories are included.

External options include the DVS-2 Digital Voice Synthesizer for continuous recording and instant playback of received signals, and pushbutton pre-recorded transmissions, and the MD-1c3 Desktop Scanning Microphone and MH-1b3 Hand Scanning Microphone.





REAR PANEL

## OPTIONS

### MD-1cs Desk-Top Microphone

Designed especially to match the electrical and cosmetic features of the FT-650, the MD-1cs HAS 600Ω impedance, and includes up/down scanning buttons and a large PTT switch with latch.

### SP-5 Loudspeaker with Audio Filters

Selectable audio high- and lowpass filters together with a large loudspeaker complement the superb audio characteristics of the FT-650 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.

### 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-650 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.

### Narrow CW IF Crystal Filter Option

The XF-455M601-01 600-Hz BW crystal filter enables both 300- and 600-Hz narrow CW bandwidths to be selected.



MD-1cs



FIF-232C



SP-5



DVS-2



XF-455M601-01



# SPECIFICATIONS

## GENERAL

Receiving frequency range .....	24.5 — 56 MHz
Transmitting frequency ranges .....	12-m band, 24.5 to 25.0 MHz 10-m band, 28.0 to 29.7 MHz 6-m band, 50.0 to 54.0 MHz
Frequency stability (0 to +50°C) .....	< ± 2 ppm SSB/CW < ±10 ppm AM/FM
Emission modes .....	LSB/USB (J3E), CW (A1A), AM (A3E), FM (F3E)
Frequency steps .....	10 kHz & 500 kHz for all modes; 10 Hz for J3E, A1A and A3E; 100 Hz for F3E; 2.5, 5, 10, 15, 20, 25 kHz selectable, all modes
Antenna impedance .....	50Ω nominal
Supply voltage .....	13.8 V DC; 110–125 or 220–234 VAC (selectable), 50/60 Hz with optional FP-22 AC PSU
Power consumption (approx.) .....	2.0/18 A DC receive/100W transmit; or 55/500 VA AC receive/100W transmit (with FP-22)
Dimensions (WHD) .....	285 × 110 × 262 mm without feet, knobs or FP-22
Weight (approx.) .....	7 kg for transceiver, plus 1 kg for FP-22 PSU

## TRANSMITTER

Power output .....	10–100 watts adjustable (max. 25 watts AM carrier)
Duty cycle .....	100% @ 100 watts, 25°C
Modulation types .....	SSB: Balanced, filtered carrier AM: Low-level (early stage) FM: Variable reactance
Maximum FM deviation .....	±5 kHz at normal IF bandwidth, ±2.5 kHz at narrow IF bandwidth
Spurious radiation .....	at least 50/40 dB below peak output below 30 MHz, (harmonic/non-harmonic) 70/60 dB above 50 MHz
SSB carrier suppression .....	at least 40 dB below peak output
Undesired sideband suppression .....	at least 40 dB below peak output
Audio response (SSB) .....	better than –6 dB from 400 to 2600 Hz
3rd-order IMD .....	–31 dB @ 80 watts PEP, 50.1 MHz
Microphone impedance .....	200–10kΩ (600Ω nominal)

## RECEIVER

Circuit type .....	triple-conversion superheterodyne (dual-conversion for FM)
Intermediate frequencies .....	13.69 and 455 kHz, 8.215 MHz (exc. FM)
Sensitivity (RF amplifier on) .....	SSB/CW 0.125 μV for 10 dB S/N AM 0.5 μV for 10 dB S/N FM 0.16 μV for 12 dB SINAD
Squelch Sensitivity (RF amplifier on) .....	0.2 μV SSB/CW/AM 0.125 μV FM
Selectivity .....	SSB/CW/AM-narrow 2.4/4.5 kHz (–6/–60 dB) CW narrow 1200 Hz (–6/–60 dB), plus 300/600 Hz w/optional filter AM normal 6/18 kHz (–6/–50 dB) FM normal 15/30 kHz (–6/–40 dB) FM narrow 8/30 kHz (–6/–40 dB)
IF rejection .....	70 dB or better (within amateur bands)
Image rejection .....	60 dB or better (within amateur bands)
IF shift range .....	±1.12 kHz
IF notch depth .....	40 dB or better
Maximum audio power output .....	1.5 watts into 8Ω for < 5% THD
Audio output impedance .....	4 to 16Ω (8Ω nominal)

*Specifications are subject to change, in the interest of technical improvement, without notice or obligation.*



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