Specifications

	FT1DR	FT1DE	FTM-400DR	FTM-400DE	DR-1
Receiver Frequency Range	0.5 - 999.99 MHz	0.5 - 999.99 MHz	108 - 999.99 MHz	108 - 999.99 MHz	144 - 148 MHz (American & Asian versions) 144 - 146 MHz (European version) 430 - 450 MHz (American & Asian versions) 430 - 440 MHz (European version)
Transmit Frequency Range	144 - 148 MHz 430 - 450 MHz	144 - 146 MHz 430 - 440 MHz	144 - 148 MHz 430 - 450 MHz	144 - 146 MHz 430 - 440 MHz	144 - 148 MHz (American & Asian versions) 144 - 146 MHz (European version) 430 - 450 MHz (American & Asian versions) 430 - 440 MHz (European version)
Modes	C4FM, FM, AM (RX)	C4FM, FM, AM (RX)	C4FM, FM, AM (RX)	C4FM, FM, AM (RX)	C4FM, FM
Tx Power Output	5 W/2.5 W/1 W/0.1 W	5 W/2.5 W/1 W/0.1 W	50 W/20 W/5 W	50 W/20 W/5 W	50 W/25 W/10 W
Sensitivity (Amateur Bands)	0.19 µV (Digital 2 m/70 cm) BER 1% 0.16 µV (FM 2 m/70 cm) 12dB SINAD	0.19 µV (Digital 2 m/70 cm) BER 1% 0.16 µV (FM 2 m/70 cm) 12dB SINAD	0.19 µV (Digital 2 m/70 cm) BER 1% 0.2 µV (FM 2 m/70 cm) 12dB SINAD	0.19 µV (Digital 2 m/70 cm) BER 1% 0.2 µV (FM 2 m/70 cm) 12dB SINAD	0.45 µV (Digital 2 m/70 cm) BER 1% 0.30 µV (FM 2 m/70 cm) 12dB SINAD Adjacent Channel Selectivity : Better than 65 dB (20 kHz offset) Intermodulation : Better than 65 dB (20 / 40 kHz offset)
Audio Output	200 mW @8 Ω10% THD (@7.4 V) 400 mW @8 Ω10% THD (@13.8 V)	200 mW @8 Ω10% THD (@7.4 V) 400 mW @8 Ω10% THD (@13.8 V)	3 W @8 Ω10% THD (@13.8 V) INT SP 8 W @4 Ω10% THD (@13.8 V) EXT SP	3 W @8 Ω10% THD (@13.8 V) INT SP 8 W @4 Ω10% THD (@13.8 V) EXT SP	3 W @8 Ω10% THD (@13.8 V) INT SP
Dimensions W x H x D	2.4" x 3.7" x 1.1" (60 x 95 x 28 mm)	2.4" x 3.7" x 1.1" (60 x 95 x 28 mm)	Radio unit: 5.5" x 1.6" x 4.9" w/o Fan (140 x 40 x 125 mm) Controller: 5.5" x 2.8" x 0.8" w/o Knob (140 x 72 x 20 mm)	Radio unit: 5.5" x 1.6" x 4.9" w/o Fan (140 x 40 x 125 mm) Controller: 5.5" x 2.8" x 0.8" w/o Knob (140 x 72 x 20 mm)	19" x 3.5" x 15" (482 x 88 x 380 mm)
Weight	9.35 oz (265 g) with FNB-101LI & Antenna	9.35 oz (265 g) with FNB-101LI & Antenna	2.64 lbs (1.2 kg)	2.64 lbs (1.2 kg)	22.05 lbs (10 kg)

*Bluetooth® is a registered trademark of Bluetooth Special Group (SIG), inc. YAESU MUSEN Co., Ltd. is an Adopter Member of Bluetooth® SIG.
*APRS® is registered trademark of Bob Bruninga WB4APR.
*Smart Beaconing TM from Ham HUD Nichetronix

About this brochure: We have made this brochure as comprehensive and factual as possible. We reserve the right, however, to make changes at any time in equipment, optional accessories, specifications, model numbers, and availability. Precise frequency range may be different in some countries. Some accessories shown herein may not be available in some countries. Some information may have been updated since the time of printing; please check with your Authorized Yaesu Dealer for complete details.

YAESU
The radio

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Kwun Tong, Kowloon, Hong Kong

VEGETABLE OIL INK
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YAESU
The radio

Invitation to the Future

12.5 kHz C4FM Digital
25 kHz FM

System Fusion

DR-1
C4FM/FM Digital Repeater

FT1DR/FT1DE
C4FM/FM Handheld Transceiver

FTM-400DR/FTM-400DE
C4FM/FM Mobile Transceiver

HRI-200
WIRES-X Internet Network System

The Best Solution for the Future

The new YAESU System Fusion leads the way for future Ham Radio digital systems; it provides total integration and compatibility of both digital and conventional FM communications.

Conventional FM has a number of excellent features that continue to provide substantial advantages over digital modulations, such as low battery consumption and greater distance capability. Conventional FM communications on the VHF and UHF bands will continue to be the mainstream communication method for Ham Radio in the future.

Digital modulation provides a wide range of advantages by enabling the exchange of more complex information, resistance to radio interference and better audio quality. You can discover a completely new side to amateur radio that was never before possible with conventional FM systems.

Fusion of Conventional FM and Digital

System Fusion joins digital and conventional FM communication into a single multiple function system.

By using the revolutionary System Fusion, the user no longer needs to choose between digital or conventional FM; instead, we can use whichever system is best suited for the situation. Users can also communicate freely between digital and conventional FM stations.

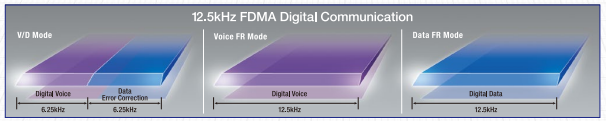
System Fusion

The Choice of C4FM Digital

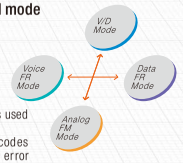
Compared to other digital modulations within FDMA, C4FM has excellent communication quality (BER: Bit Error Rate characteristics). Presently, C4FM is the standard method for professional communication devices in FDMA, and is therefore expected to continue to be the main stream digital communication in the future.

In System Fusion, you can choose between three C4FM digital modes and a conventional FM mode to suit your needs.*

* System Fusion is not compatible with D-STAR GMSK format



The Automatic Mode Select (AMS) function detects the receive signal mode



V/D mode (Voice/Data simultaneous communication mode)
The digital voice signal is transmitted in one half of the bandwidth. Simultaneously the other half of the 12.5 kHz bandwidth channel is used for error correction of the voice signal and other data.
By incorporating powerful error correction technology developed for professional communication devices, effective error correction codes provide the advantage of fewer interruptions to conversations. The standard C4FM FDMA Digital mode provides the ideal balance of error correction and sound quality with the Digital Clear Voice technology developed for C4FM digital.

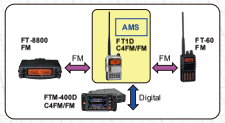
Voice FR mode (Voice Full Rate Mode)
This mode uses the full 12.5 kHz bandwidth to transmit digital voice data. The increased amount of voice data permits high quality voice communication, providing superb sound quality for a "rag chew" with friends.

Data FR mode (High Speed Data Communication Mode)
This high-speed data communication mode uses the full 12.5 kHz bandwidth for data communication. The transceiver automatically switches to Data FR mode when transmitting Snapshot pictures, and can be used to transmit large quantities of data at high speed.

FM mode
Analog FM is effective when weak signal strength causes audio drop out in the digital mode, and enables communication up to the borderline of the noise level.
Also the use of established Yaesu low power circuit designs provides far less battery consumption than the digital mode.

AMS (Automatic Mode Select)

This function instantly recognizes whether the received signal is C4FM digital or conventional FM. The communication mode automatically switches to match the received mode. Even if a digital signal is being used, you can switch to FM communication if radio signals are received from a FM station. This function enables stress-free operation by removing the need to manually switch the communication method each time.

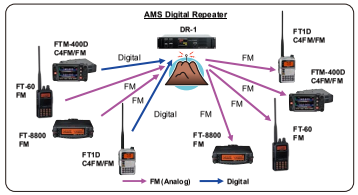


FM Friendly Digital

Until now, FM repeaters were only used for conventional FM communication, and digital repeaters were only used for digital communication. There has been no option for cross-communication in a single repeater. However, System Fusion can be used in multiple ways, for digital communication, for conventional FM communication and even internet communication. Most importantly, System Fusion enables intercommunication between all users. This is enabled by the AMS (Automatic Mode Select) function used in System Fusion. With AMS, the modulation of your station is automatically selected according to the received signal. If a member transmits in conventional FM, the other radios in the System Fusion automatically select their modulation to conventional FM to communicate between all members.

Easy Migration

By simply replacing the current conventional FM repeater station with the DR-1 System Fusion AMS digital repeater, you can continue to use the conventional FM communication, as well as using the repeater for digital communications. Because the DR-1 is capable of converting and transmitting digital communication to conventional FM communication, you can intercommunicate with members using either conventional FM communication, or those using C4FM digital communication. Previously, when a repeater group planned to use a digital system, all other members of the club using conventional FM communication needed to purchase equipment capable of digital communication. With the groundbreaking YAESU DR-1 repeater, digital communication and conventional FM communication can join together in a single multiple function system.



New Functions Enabled by C4FM Digital Communication

Digital GM Function (Digital Group Monitor Function)
The digital GM function automatically checks whether members registered to a group are within communication range, and displays information such as the distance and orientation for each call sign on the screen. This useful function not only enables you to see which friends are within communication range, it also enables you to see at a glance where all group members are located. Additionally, this function can be used to send data such as messages and images between group members.
* Only when using C4FM digital direct communication (not through a repeater)

Snapshot Function (Image Data Transmission)
Simply connect an MH-85A11U (option) microphone with camera and press the microphone shutter button to take snapshots easily and send them to other C4FM FDMA digital transceivers.

Smart Navigation Function
- **Real-time navigation function enables location checking at any time**
  In digital V/D mode, information such as position data is transmitted together with voice signals so the distance and direction to the other stations can be displayed in real-time while communicating with them.
- **Backtrack function that starts navigation facing a registered point**
  The backtrack function enables navigation to a registered location at the touch of a button.
  When hiking or camping, simply register your starting point or campsite before departure, and the distance and orientation from the current location is displayed on the screen.

144/430 MHz Dual Band C4FM/FM Digital Repeater DR-1

YAESU DR-1 is a digital/conventional FM dual mode repeater that covers the VHF and UHF amateur radio bands. It was developed for use with System Fusion. Replacing your conventional analog FM repeater with the DR-1 will provide continued use of conventional FM communication while integrating the use of digital communication functions through its unique AMS capability.

144/430 MHz DUAL BAND C4FM/FM DIGITAL REPEATER

DR-1

AC Power Cable included

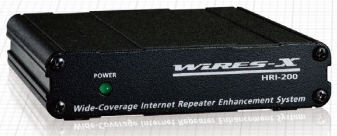
C4FM Digital Clear Voice
Clear and Crisp Voice Technology

Features:

- Modulation Mode: 25 kHz FM, 12.5 kHz C4FM Digital (V/D Mode, VFR Mode, DFR Mode) *
  * System Fusion is not compatible with the D-STAR GMSK digital format.
- Output Power: 50 W/25 W/10 W
  Equipped with large-size heat-sink and cooling fan to ensure a stable transmission output.
- Emergency Operation: Supports operation on an emergency battery.
- AMS (Automatic Mode Select) function automatically recognizes whether the signal is a C4FM digital or conventional FM signal, and transmits using the set communication method.
- Built-in large-size monitor speaker with volume control for checking the reception state during setup. The speaker can also be used to constantly monitor the reception state.
- A microphone terminal is provided on the front panel for use in repeater transmitter tests and to enable use as a base station.

WIRES-X

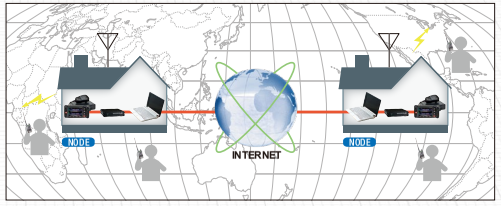
In addition to the convenient and easy-to-use digital function, advanced VoIP wireless WIRES-X is also available.



AMATEUR RADIO INTERNET LINKING KIT

HRI-200

USB Cable and Data Cable (MDIN10 pin to MDIN10 pin) included

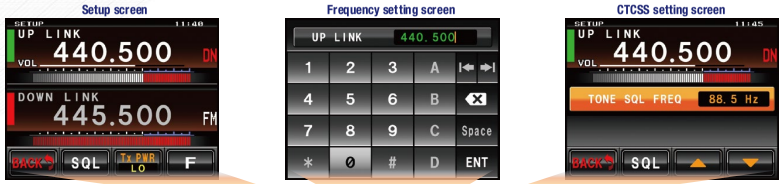


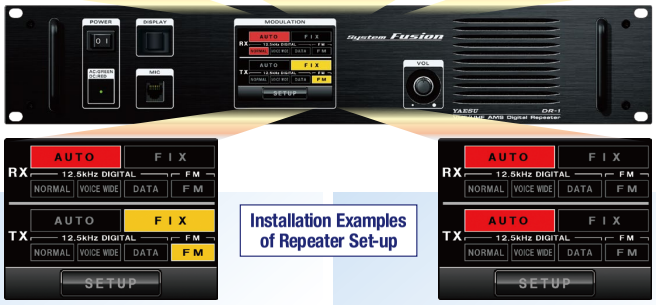
User Friendly Set-up

The large color touch-panel screen installed in the front panel is used to configure various settings such as transmit and receive frequencies, transmit power output and AMS function. The display can be switched off after configuring the settings to prevent accidental operation. Simply turn the display switch ON and use the touch panel screen to confirm or change settings.
The transmit and receive frequencies, CTCSS frequency and other functions are configured by the touch panel screen.
CTCSS can be set for Tx/Rx (Same frequency) or Rx only.

Easy Migration

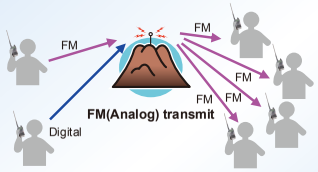
The repeater controller, receiver and transmitter are all packaged into a 19" standard mount cabinet for simple replacement of the existing repeater. Other peripheral devices such as the duplexer and amplifier, etc., can continue to be used as-is.



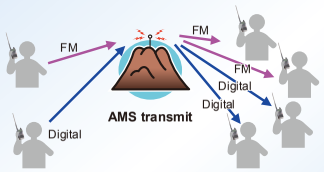


Installation Examples of Repeater Set-up

AMS receive → FM transmit



AMS receive → AMS transmit



Installation Example 1: Replacing Existing Analog FM Repeater
When replacing an existing conventional FM repeater, AMS on the receiver side is set to AUTO mode and AMS on the transmitter side is set to FM FIX mode. If the DR-1 repeater receives C4FM Digital signals, it converts them, and retransmits them in conventional FM automatically. When receiving conventional FM signals it retransmits them unchanged as the FM repeater.

*C4FM digital signals are converted to FM signals in the repeater. Therefore, digital information such as GPS data included in the C4FM digital signals is not transmitted.

Installation Example 2: New Repeater set-up for C4FM Digital and conventional FM
AMS is set to AUTO mode on both the receiver and transmitter sides. DR-1 transmits received conventional FM signals unchanged as conventional FM signals, and transmits received C4FM digital signals unchanged as C4FM digital signals.*

*When this setting is used, members using transceivers that are not equipped with the C4FM and AMS function cannot receive digital transmitted signals.

144/430 MHz Dual Band Digital/FM Handheld Transceiver

Exciting New Amateur Digital Transceiver

C4FM DIGITAL CLEAR VOICE
Clear and Crisp Voice Technology

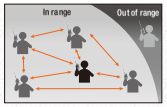
C4FM FDMA 144/430 MHz DUAL BAND
5W DIGITAL/FM TRANSCEIVER

FT1DR American and Asian versions
FT1DE European version

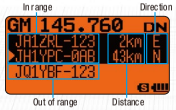
7.4V 1100 mAh Lithium Ion Battery FNB-101LI, Battery charger PA-48 / SAD-11B (USA version), and PC connection Cable SCU-18 included

Digital Group Monitor (GM) Function

This function automatically checks whether members registered to a group are within communication range, and displays information such as the distance and orientation on the screen. This useful function not only informs you which friends are within communication range, it also enables you to see at a glance where all group members are located.



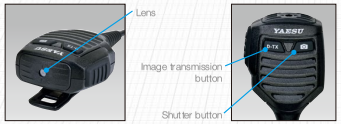
Group Monitor Function



Group Monitor screen

Snapshot Function (Image Data Transmission)

Simply connect an MH-85A11U (option) speaker microphone with camera. Press the microphone shutter button to take snapshots, and then easily send them to other C4FM FDMA digital transceivers.

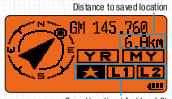


Smart Navigation Screen

Check location relationships at any time
Real Time Navigation Function

Backtrack function for returning to your departure point

With the simple touch of a button you can start navigating to your departure point or any location previously saved in the memory.



Tough waterproof design equivalent to IPX5 (water-jet-resistant)

You will be safe using this transceiver in the field when sudden changes in weather may cause it to become wet with rain or splashed with water.

Built-in GPS with antenna in the top section of the unit

Equipped with micro SD card slot

(micro SD card not included)

Battery Operating Time (Approximately)

Band • Mode		FNB-101LI	FNB-102LI	Battery Case FBA-39(0.8W)
144MHz	Analog Mode	5 hours	8 hours	15.5 hours
	Digital Mode	4 hours	6.5 hours	11 hours
430MHz	Analog Mode	4.5 hours	7.5 hours	15 hours
	Digital Mode	3.6 hours	6.0 hours	10.5 hours

* Duty Cycle based on Tx 6 sec., Rx 6 sec., Standby 48 sec.
(Tx Power 5 Watts, Rx audio output 10%THD, Battery save 1:5, Monoband receive, and GPS function off.)
* Operating times may very depending on operating conditions.

OPTIONS

Speaker Microphone with Snapshot camera **MH-85A11U**	Speaker / Microphone **MH-34B4B**	Earpiece Microphone **MH-37A4B**	VOX Headset **VC-25**	Microphone Adapter **CT-44**	Lithium Ion Battery Pack (7.4V 1100 mAh) **FNB-101LI**[*1]	Lithium Ion Battery Pack (7.4V 1800 mAh) **FNB-102LI**	Battery Charger[*1] **SAD-11B, PA-48B/C/U**[*2]	Rapid Charger **CD-41**
3x"AA" Cell Battery Case **FBA-39**	PC Connection Cable **SCU-18**[*1]	Data Cable **CT-170**	Data Cable (2.5φ) **CT-176**	Clone Cable **CT-168**	DC Cable **E-DC-6**	DC Cable w / Noise Filter **E-DC-5B**	BNC-to-SMA Adapter **CN-3**	Soft Case **CSC-97**

*1 The same as the supplied accessory *2 SAD-11B for USA version / PA-48B for 120VAC / PA-48C for 220 – 240 VAC / PA-48U for 230VAC w/ UK Plug

144/430 MHz Dual Band Digital/FM Mobile Transceiver

Equipped with advanced touch panel operation and full-color TFT large-scale display

C4FM DIGITAL CLEAR VOICE
Clear and Crisp Voice Technology

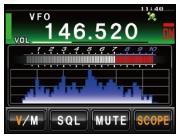
C4FM FDMA 144/430 MHz DUAL BAND
50W DIGITAL/FM TRANSCEIVER

FTM-400DR American and Asian versions
FTM-400DE European version

DTMF Microphone MH-48A6JA, Mounting Bracket, Bracket for Controller, Control Cable 10 ft (3m), PC connection Cable SCU-20, and DC Power Cable included

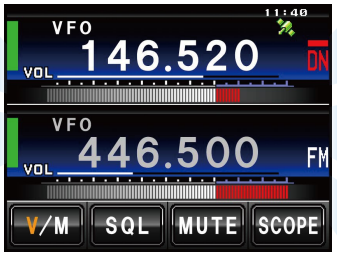
3.5-inch full color touch panel operation

The icon symbols, multi-function key display and pop-up messages are all displayed in high-resolution color thanks to the full-color, high luminance TFT liquid crystal screen. The settings and status of the wireless devices are displayed in an easy-to-understand format. You can perform various function operations simply and easily by gently touching the screen.



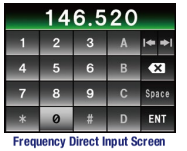
Band Scope Screen

Digital Group Monitor Screen

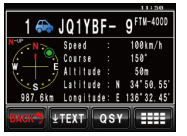


Screen (actual size)

Smart Navigation Screen



Frequency Direct Input Screen



APRS® Screen

- **Equipped with micro SD Card Slot/ Data communication Terminal** (micro SD card not included)
- **Built-in GPS with Antenna**

Front side of the Radio Unit

Rear side of the Controller

OPTIONS

Microphone with Snapshot camera **MH-85A11U**	DTMF Microphone **MH-48A6JA**[*1]	Normal Microphone **MH-42C6J**	Bluetooth® Adapter Unit **BU-2**	Bluetooth® Headset **BH-2A**	Charger Cradle (3 hours) for BH-2A Bluetooth® Headset **CD-40**	AC Adapter for CD-40 **PA-46B/C/U**[*2]
High-Power External Speaker **MLS-200-M10**	Voice Guide Unit **FVS-2**	Vacuum Cup Mount Bracket for Controller **MMB-98**	PC Connection Cable **SCU-20**[*1]	Separation Cable 20 ft (6m) **CT-162**	Cloning Cable **CT-166**	Data Cable **CT-163** MDIN10 pin to MDIN6 pin + Dsub9 **CT-164** MDIN10 pin to MDIN6 pin **CT-165** MDIN10 pin to Dsub9 **CT-167** MDIN10 pin to Open

*1 The same as the supplied accessory *2 "B" : for USA version / "C": for 220 – 240 VAC / "U" for 230VAC w/ UK Plug