FUJITSU

shaping tomorrow with you

FRX-3 Series
Long-Haul Microwave Radio Systems

Transport Ethernet and SDH services for long-haul, high-capacity wireless backhaul applications. Standard and compact versions available.

FRX-3 Series
Long-Haul Microwave Radio Systems

Flexible, Robust and Scalable Wireless Backhaul

Fujitsu FRX-3 Series next-generation, long-haul microwave radio systems provide long reach and high-throughput.

Designed to meet the challenges faced by rapidly evolving mobile networks, particularly when the advent of LTE requires a migration to IP-based transport, these systems feature an innovative architecture that makes for simple operation. With FRX-3 systems, you can deploy microwave transmission networks quickly, successfully managing both capex and opex.

These products are scalable and cost-effective in both low- and high-capacity applications. That's because an in-service growth path to higher density means there's no need to purchase all your capacity up front.

FRX-3E: Ultra-High Capacity and Industry-Leading Density

With up to 4 Gbps performance for Ethernet/IP and SDH traffic, the FRX-3E packs up to 16 channels in a single subrack.

FRX-3C: Up to 4 Channels in a Compact System

With up to 1 Gbps throughput and up to 4 channels, the Fujitsu FRX-3C is a compact, cost-effective design. This system has a rugged outdoor cabinet that stands up to the elements and mounts on a pedestal, pole or pad.

Modular, Flexible and Upgradable

Numerous configurations and the modular design of FRX-3 systems meet virtually every requirement, and system upgrades are easy.

Reliable and Robust

You can depend on FRX-3 products to be reliable and robust in the field because they're made by Fujitsu, one of the great global names in microwave radios. For more than 50 years, Fujitsu has stood for excellence in microwave technology.

Why the FRX-3 Series?

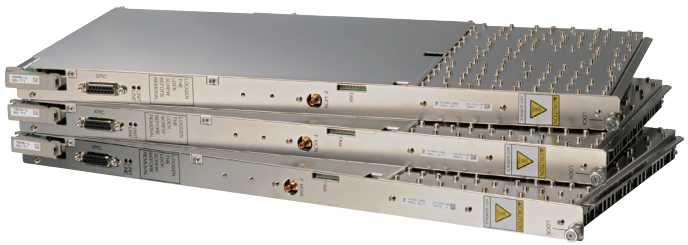
Ecology
Makes your network greener with the very latest environmental solutions

Ethernet
Supports your network migration toward 4G

Economy
Helps you efficiently manage your capital and operating expenditures

FRX-3E

FRX-3C



Transmitter/Receiver/Modulator/Demodulator (TRMD) units

Key Features of the FRX-3 Series

- Native Ethernet transport
- High scalability accommodates up to 16 radio frequency carriers in a single rack
  - FRX-3E supports up to 16 RF channels
  - FRX-3C supports up to 4 RF channels
- Flexible system configurations suit numerous network applications
- Powerful Cross Polarization (XPIC) performance
- Optimized Ethernet data speed through Radio Link Aggregation
- Carrier-class Ethernet features
  (Link Aggregation, QoS, Ring Protection, Sync, OAM and more)
- High system gain (high-power transmitter option available)
- Broad range of modulation schemes with LDPC Forward Error Correction
- 20 dB ATPC dynamic range with adjustable maximum Tx power setting
- Low power consumption
  - FRX-3E: 200 W in 1+0 system configuration
  - FRX-3C: 158 W in outdoor 1+0 cabinet configuration
- Simple design architecture for easy set-up and maintenance
- User-friendly Web interface and SNMP for management connectivity
- NETSMART® 1500 management for alarms
- SDH features
  - 64/128QAM modulation scheme
  - N+1 configuration
    - 16 STM1 units maximum per FRX-3E rack
    - 4 STM1 units maximum per FRX-3C
  - Hitless N+1 Radio Protection Switching (RPS) for carrier-grade SDH transmission
  - Hybrid mixture of STM1 and GbE interface units in the same FRX-3E or FRX-3C system
  - Section adaptation
  - Scrambler/descrambler
  - Addition/drop of section overhead bits

FRX-3E

FRX-3C

Technical Specifications

Input Voltage	–40.5 V to –57.0 V
Power Consumption	FRX-3E: 1650 W maximum configuration FRX-3C: 500 W maximum configuration
Temperature	FRX-3E: 23 °F to 113 °F (–5 °C to +45 °C) FRX-3C: –27.4 °F to +131 °F (–33 °C to +55 °C)
Humidity	5 to 95% at 86 °F (30 °C)
EMC	FCC Parts 101 and 15, ICES-003
Environmental Conditions	GR-63-Core equivalent EN 300 019 (Operation Class 3.2, Storage Class 1.3, Transportation Class 2.3)
Safety	UL/CE 60950-1/CISPR 22, UL 60825
Radio Frequency	Refer to radio frequency specification table
Electrical	–48 VDC
EU Directives	RoHS, REACH, WEEE
Dimensions	FRX-3E: 84 x 25 x 10″ (2133 x 635 x 254 mm) (7-ft. network rack) FRX-3C: 33.46 x 17.32 x 20.87″ (850 x 440 x 530 mm)
Weight	FRX-3E: 176 lbs. (80 kg) in 1+0 configuration FRX-3C: 99 lbs. (45 kg) in 1+0 configuration
EMS Interface	2 x 10/100Base-T Ethernet, SNMP/HTTP/FTP/TELNET protocols

Frequency Range [GHz]	4, 5, L6, U6, 7, 8, 11, 13 GHz Compliant with ITU-R recommendations
Capacity Range	FRX-3E: Maximum 16 RF carriers in a single rack FRX-3C: Maximum 4 RF carriers in a single cabinet
Radio Frequency Arrangements	ACCP/ACAP/CCDP
Radio Protection Switching Configurations	FRX-3E: 16+0 for Ethernet Radio Protection FRX-3C: 4+0 for Ethernet Radio Protection
Modulation	QPSK/8, 16, 32, 64, 128, 256, 512 QAM with LDPC (Low-Density Parity Check) FEC
Power Control	20 dB by 1 dB step in manual or automatic TPC (Transmit Power Control) mode
Dispersive Fade Margin	50 dB or better (BER = 10^{-6})
XPIC	20 dB typical; 18 dB guaranteed
Diversity	Frequency diversity/RF band diversity/space diversity
Auxiliary Signals	Wayside channels 2.048 Mbps x 2 user channels 64 Kbps x 3 voice-order wire
Housekeeping	FRX-3E: 16 inputs and 8 outputs FRX-3C: 4 inputs and 4 outputs
Synchronization	Ethernet: Sync E/IEEE 1588v2
Line Interface	Gigabit Ethernet and SDH

Technical Specifications

System	4 GHz	U4 GHz	5 GHz	L6 GHz	U6 GHz	7 GHz	8 GHz	11 GHz	13 GHz
Frequency Range (MHz)	3,600 ~ 4,200	3,803.5 ~ 4,203.5	4,400 ~ 5,000	5,925 ~ 6,425	6,425 ~ 7,125	7,125 ~ 7,725	7,725 ~ 8,275	10,700 ~ 11,700	12,750 ~ 13,250
ITU-R Rec.	F.635-6	F.382-8	F.1099-4	F.383-8	F.384-10	F.385-9	F.386-8	F.387-10	F.497-7
T-R Spacing (MHz)	320	213	300	252.04	340	161 154	311.32	530 490	266
Channel Bandwidth (MHz)	40	29	40	29.65	40	28	29.65	40	28
Ethernet RPS Configurations [Alternated (ACCP/ACAP)]	Up to 7+0	Up to 6+0	Up to 7+0	Up to 8+0	Up to 8+0	Up to 5+0	Up to 8+0	Up to 12+0	Up to 8+0
Ethernet RPS Configurations [Co-Channel (CCDP)]	Up to 2 x 7+0	Up to 2 x 6+0	Up to 2 x 7+0	Up to 2 x 8+0	Up to 2 x 8+0	Up to 2 x 5+0	Up to 2 x 8+0	Up to 2 x 8+0	Up to 2 x 8+0
Flange Type	UDR 40	UDR 40	UDR 48	UDR 70	UDR 70	UDR 70	UDR 84	UDR 100	UDR 120

Transmit Output Power (dBm) at TRMD RF Output Port

QAM	4 GHz to 8 GHz				11 GHz	13 GHz	Tolerance
	30 MHz		40 MHz		40 MHz	30MHz	
	STD	HP	STD	HP			
QPSK	+29	+32	+30	+33	+30	+27	+/–1 dB
8QAM	+29	+32	+30	+33	+30	+27	
16QAM	+29	+32	+30	+33	+30	+27	
32QAM	+29	+32	+30	+33	+30	+27	
64QAM	+29	+32	+30	+33	+30	+27	
128QAM	+29	+32	+29	+32	+29	+27	
256QAM	+28	+31	+28	+31	+28	+26	
512QAM	+27	+30	+27	+30	+27	+25	

Fujitsu Network Communications, Inc.
2801 Telecom Parkway, Richardson, TX 75082
Tel: 888.362.7763
us.fujitsu.com/telecom