



# FTP4/8/16

## 4/8/16xE1 TDM over IP Multiplexer

- Simultaneously performs TDM circuit emulation over enterprise or carrier packet-switched Ethernet L2/L3 networks for 4, 8 or 16 E1
- At the Ethernet line side supports both electrical Fast and optical 100 FX Ethernet interface
- Multiprotocol encapsulation supporting IPv4, IPv6, UDP, RTP, L2TPv3, MPLS and Metro Ethernet.
- Compliant with IETF, ITU-T, MFA Forum and Metro Ethernet Forum Technical Specifications
- Recovered clock jitter and wander compliant to ITU-T G.823, G.824. Supports adaptive clock recovery, differential clock (common clock) (using RTP), external clock
- Lost/misordered packet compensation
- FTP4/816 provide traditional leased-line and TDM switched services transparently over IP with higher voice quality with much lower latency than VoIP and can support all applications that run over E1 circuits, not just voice

**Description**

FTP4/8/16 is TDM circuit emulation over Ethernet packet switched network transmission unit. It combines 4, 8 or 16 TDM E1 signals over IP based network. FTP4/8/16 enables transparent services for E1 signals from central unit transmission over enterprise or carrier Ethernet network.

Besides TDM traffic transmission over IP based networks FTP4/8/16 provides many value-added functions in order to meet different customers needs including different network management capabilities, traffic protection, synchronization etc.

**Applications**

- In carrier network FTP4/8/16 typically finds applications for:
  - TDM services over Ethernet MAN, broadband wireless, CATV
  - 2G / 2.5G cellular backhaul over IP/MPLS
  - HDLC-based traffic (ex. Frame Relay) trunking over IP/MPLS
  - PSTN-IP network bridging
  - SS7 transport over IP
- In enterprise applications FTP4/8/16 is suitable to be used for:
  - Private line/toll bypass via Ethernet MAN
  - TDM PBX migration to Ethernet MAN
- In access networks FTP4/8/16 typically finds application as Multi Tenant Multi Dwelling Unit MTU/MDU

**Basic features**

- 4, 8 or 16 E1, framed or unframed, PDH tributary interfaces
- One 10/100 electrical and one 100 optical Ethernet interface
- Multiprotocol encapsulation supporting IPv4, IPv6, UDP, RTP, L2TPv3, MPLS and Metro Ethernet
- Recovered clock jitter and wander compliant to ITU-T G.823, G.824 synchronization interface
- Lost/misordered packet compensation
- Compliant with:
  - IETF PWE3 Internet drafts for SAToP, TDMoIP, CESoP-SN, HDLC
  - ITU-T Recommendations Y.1413 and Y.1414 (clause 10) Y.1453, Y.1452.
  - MFA Forum Implementation Agreements 4.1, 5.1 and 8.0.0
  - Metro Ethernet Forum Technical Specification MEF8
- Supports adaptive clock recovery, differential clock (common clock) (using RTP), external clock and loopback timing modes
- Integrated network management system, SNMP and SUNCE support

**TECHNICAL DATA**

**Ethernet interfaces**

Standards IEEE 802.3, IEEE 802.3u  
IEEE 802.1p, IEEE 802.1Q  
Maximum Frame size 1536 bytes

**10/100 BaseTx**

Number of interfaces 1  
Data rate 10 or 100 Mbits  
Full/Half duplex  
Connector RJ45

**100 BaseFx**

Number of interfaces 1  
Data rate 100 Mbits Full duplex  
Connector SFP plug in module

**option -S1A**

light source optical connector LC  
FPLD, 1310 nm  
output power -5 dBm  
typical section length 49 km

**option -S1B**

light source optical connector LC  
DFBLD, 1550 nm  
output power -5 dBm  
typical section length 100 km

sensitivity for 10<sup>-10</sup> BER -34 dBm

maximum input level -10 dBm

**Interface G.703 2 Mbit/s**

Number of interfaces 4, 8, 16  
Type of signal 2048 kbit/s ±50 ppm HDB3  
Nominal impedance 75 Ω asymmetric  
120 Ω symmetric

**Input**

Max. cable attenuation 0 - 6 dB at 1024 kHz  
Input jitter tolerance ITU-T G.823  
Input return loss  
12 dB in range 50 kHz to 100 kHz  
18 dB in range 100 kHz to 2 MHz  
14 dB above 2 MHz

**Output**

Nominal impulse amplitude 2.37 V ± 0.237 V, 75 .  
Impulse shape according to ITU-T 15/G.703  
Output jitter up to 100 kHz 0.25 UI p-p  
in range 18 kHz to 100 kHz 0.05 UI p-p

**Power supply**

DC input voltage -36 to -72 V  
Power consumption <5 W

**Environmental conditions**

Climatic conditions class 3.2 ETSI  
Temperature -5°C to +45°C