escapecommunications

EXM-2L™

Microwave Radio Indoor Unit

Value Proposition

- Cost-optimized IDU for price sensitive applications

- Fully scalable and customer configurable architecture

- Customizable to OEM or reseller brand

- Compatible with all major third-party ODUs

Applications

- Point-to-point connections

- Cellular / mobile backhaul

- WiMAX backhaul

- Private networks and campus connectivity

- Video surveillance and monitoring transmission

- Triple-play (voice, data and video) transmission

- Government and campus building interconnection

- Critical infrastructure protection

- Public safety applications

Cost-Optimized IDU For Price Sensitive Applications

Escape Communications' EXM-2L™ is a flexible, scalable, cost-optimized Indoor Unit (IDU) for point-to-point microwave radio backhaul applications.

The EXM-2L is designed for easy adoption by system OEMs to fit seamlessly into their product line. The ODU interface is compatible with all major ODU providers and can be customized to OEM requirements.

Escape's flexible signal processing architecture allows flexibility and scalability in combining up to 16 x E1/T1 TDM circuit-switched data and 4 x 100-baseT Ethernet packet data at full duplex data rates to 170 Mbps. Native TDM and IP framing is used to deliver carrier-grade signal and frame timing accuracy. Escape's Flexband™ bandwidth selection permits programming of any arbitrary channel size. Extensive link management is supported via a web GUI and SMNP with custom enterprise MIB.

The EXM-2L is available in two versions. The EXM-2L16 provides full TDM+IP support, and is available in both unprotected and 1+1 hot standby protected configurations. The lower cost EXM-2Le supports Ethernet-only data traffic. Each design is programmable to serve both the CEPT and ANSI markets.

Features

High data throughput
- Up to 170 Mbps full duplex

Customer configurable PDH and Ethernet traffic
- PDH to 16 x E1/T1
- Ethernet to 4 x 100-BaseT

Native E1/T1 and Ethernet transmission

Flexible, scalable design
- QPSK to 256QAM modulation
- Flexband™ arbitrary bandwidth selection to 30 MHz
- Programmable FEC
- Field-upgradable firmware

Built-in 4-port Ethernet switch
- Port-based VLAN security
- Port-based rate limiting
- QoS priority queuing
- Ethernet flow control

Extensive link management capabilities
- Web-based GUI
- SNMP monitoring and control
- RS-232 craft interface

Wide operational voltage
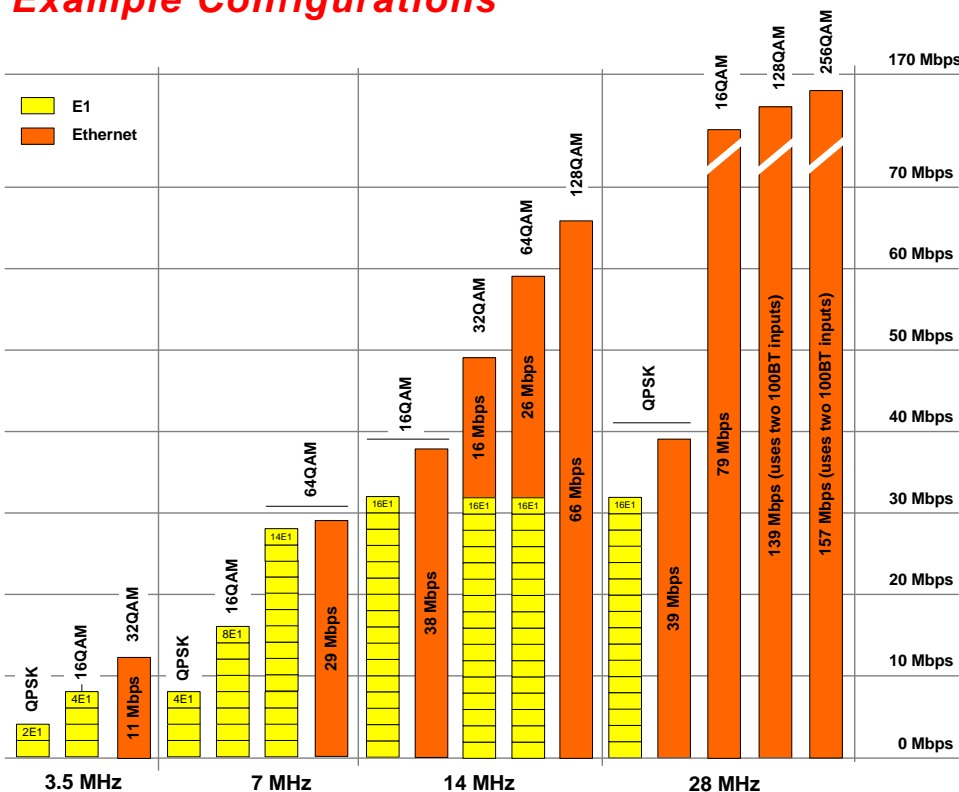- -20 to -72 VDC supply

Optional hot stand-by operation
- Protect 2 ODUs from single IDU

Specifications

GENERAL	
Configuration	1U high, 19" rack mounted IDU
Temperature	-5 to +45 °C
MTBF	> 500,000 hours
Compliance	Designed to meet licensed PTP specs: • ETSI: EN 312 207-2-2 • FCC: 47 CFR part 101
Power	• -20 to -72 V DC, < 15 W • Fused with reverse polarity protection

MODEM	
Configuration	Programmable FPGA-based modem
Modulations	QPSK, 8PSK, 16QAM, 32QAM, 64QAM, 128QAM, 256QAM*
Bandwidths	Customizable to any channel size up to 30 MHz. Standards include: • CEPT/ETSI: 3.5, 7, 14 and 28 MHz • ANSI/FCC: 5, 10, 20 and 30 MHz
Data rates	Up to 170 Mbps*, full duplex
FEC	• Customizable Reed-Solomon coding • Customizable interleaving depth
End-to-end latency	≤ 1 ms, depending on modulation, frame size, FEC and interleaver configuration

Sensitivity threshold (typical values for 10^{-6} BER with FEC)

Modulation	Eb/No (dB)	SNR (dB)
QPSK	10	12.6
16QAM	12	17.6
32 QAM	14	20.6
64 QAM	16	23.3
128 QAM	20	28.0

DATA INTERFACES AND FORMATS	
Configuration	Customer selectable • Ethernet only • TDM only (1 to 16xE1/T1) • Mix of TDM + Ethernet
Ethernet functionality	• Native IP transport • 4 x 100baseT ports for data or management • 1536 bytes maximum frame size • Configurable VLAN-based security, port-based QoS priority and port-based rate limiting
TDM functionality	• IDU supports both E1 and T1 rates • Customer selectable: 0 to 16 E1 or T1 • RJ-48, 100 ohm T1 / 120 ohm E1 balanced
IF / ODU Interface	Single N-type connector (two connectors for 1+1 protection) supporting 350 / 140 MHz IF ODUs
Additional interfaces	• Programmable wayside / service channel • Multiple programmable alarms (2 Form-C relays, 4 TTL inputs, 2 TTL outputs)

NETWORK MANAGEMENT

• HTTP server via web GUI
• SNMPv1 with custom enterprise MIB and traps
• RS-232 craft / serial port supporting command line interface
• Telnet

PROTECTION CONFIGURATIONS

• 1+0 supporting single ODU
• 1+1 switch protection supporting 2 ODUs in hot standby, space and frequency diversity configurations (single Rx demodulator with non-hitless switchover)

Example Configurations

Build Options

	EXM-2L16	EXM-2Le
Ethernet (to 170 Mbps*)	✓	✓
TDM (to 16xE1/T1)	✓	
1+1 switch protection	✓	

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