



EX-i Series GigE



All-Indoor, Carrier-Class, Upgradeable Licensed-Band Trunk Radio Systems for Medium and High Capacity TDM and Ethernet Backhaul Applications

The EX-i Series GigE long-haul microwave radios are carrier-class, fully software configurable systems featuring 3xGbE, 16xT1/E1 and 1xDS3 interfaces in a single unit. The system is designed to natively support combinations of TDM and Ethernet traffic, making it ideal for reliable, efficient transport of both legacy voice and IP-based multimedia traffic for any application, including Long Term Evolution (LTE) of mobile networks.

Unique “1.5+0” semi-protected Configuration. The EX-i Series GigE systems are available with Exalt Transmit and Receive Availability (E~~X~~tra™), enabling semi-protected operation that maximizes reliability without the expense of traditional 1+1. With integrated dual receivers and transmit fail-safe switching, E~~X~~tra provides for receiver and power amplifier protection of key circuits in a single system.

The Native Difference. Like all Exalt radio systems, the EX-i Series GigE radios deliver true carrier-class capability with native TDM and native Ethernet. That means rock-solid TDM performance regardless of IP traffic behavior and a future-proof migration path from TDM-based networks to LTE, WiMAX or other all-IP network alternatives.

Adaptive Coded Modulation. Exalt’s adaptive coded modulation technology allows links to simultaneously support different availability levels for TDM (99.999%, for example) and Ethernet (99.9%, for example). This optimizes range and performance for the most sensitive TDM traffic while ensuring high performance for inherently resilient Ethernet traffic. Links can be engineered for longer distances and Ethernet transport will respond elastically to changing link conditions without affecting TDM availability.

Interference Cancellation. Exalt E~~X~~tra brings single and cross-polarization interference cancellation to licensed microwave for the first time. A known coordinated or non-coordinated interfering signal source in either polarization can be effectively cancelled using the system’s built-in second receiver to reduce the overall system noise and maximize reliability.

Advanced Data Networking. The EX-i Series GigE radios offer a rich set of advanced data networking features, including a built-in Gigabit Ethernet layer 2 switch with 802.1q VLAN (single and double tag) up to 4094 VLAN IDs, plus multilevel QoS featuring 8 priority levels and 8 individual queues. Traffic can be prioritized based on 802.1p tags, VLAN ID, MAC source address, or MAC destination address as required.

Capacity Aggregation. The EX-i Series GigE radios can aggregate capacity across multiple licensed and license-exempt microwave links and/or across polarizations to deliver a single, high speed connection of up to 2 Gbps (1 Gbps full-duplex) across a single Gigabit Ethernet interface.

Advanced Spectrum Diagnostics. Exalt is the first to offer built-in spectrum analysis in a licensed radio. The spectrum analyzer simplifies site survey analysis and aids in antenna alignment, installation and RSL optimization. Once the link is commissioned, the spectrum analyzer is a useful troubleshooting tool to ensure no interference issues exist and to verify that the link is performing at optimum.

Single Radio Sparring and Operational Simplicity. Featuring field-installable diplexer modules, the same EX-i Series GigE terminal can be used at either end of the link or for any 6 GHz link in the network. Software-controlled channel selection from 5 to 30 MHz means the same unit can be moved easily from site to site as needed.



Specifications		6 GHz Lower	6 GHz Upper
Maximum Capacity	TDM	1xDS3, 16xT1/E1	
	Ethernet (full-duplex)	187 Mbps	62 Mbps
Frequency (GHz)		5.925-6.425	6.525-6.875

Specifications EX-i Series GigE

System		Physical	
Indoor Unit (IDU) Options	+33dBm, 6 GHz Lower or Upper Non-protected 1+0 terminal Semi-protected 1.5+0 terminal +30dBm, 6 GHz Lower or Upper Non-protected 1+0 terminal upgradeable to 33dBm Semi-protected 1.5+0 terminal upgradeable to 33dBm +27dBm, 6 GHz Lower or Upper Non-protected 1+0 terminal	IDU Dimensions	2RU (H x W x D) 3.5 x 17 x 16.5 in / 9 x 43.2 x 42 cm including external diplexer
Power Control Step Size	0.5 dB	IDU Weight	17 lbs/8 kg
Maximum RSL		Full Specification Temperature	0 to +50 C° / 32 to +122 F°
64 QAM	-30dBm error-free	Operating Temperature	-25 to +50 C° / -13 to +122 F°
128 QAM	-32dBm error-free	Altitude	15,000 ft/4.6 km
256 QAM	-32dBm error-free	Humidity	95% non-condensing
Error Floor	10 ⁻¹²	Interfaces	
Power Control Range	20 dB	Antenna	SMA Female, impedance 50 ohm
ATPC¹	Yes	RF Diplexers	Field-installable. Single reversible diplexer for high or low band operation. 6 GHz Lower Terminals Band 1 6177- 6284 MHz/ 5925-6032 MHz Band 2 6249-6356 MHz/ 5997-6104 MHz Band 3 6321-6428 MHz/ 6069-6176 MHz Non-standard T/R spacings available 6 GHz Upper Terminals Band 1 6700-6770 MHz/ 6535-6605 MHz Band 2 6750-6820 MHz/ 6590-6660 MHz Band 3 6805-6875 MHz/ 6645-6715 MHz Non-standard T/R spacings available
Adaptive Modulation¹	QPSK - 256 QAM; Selectable, fully configurable with prioritization	TDM	Native, 1xDS3, 16xT1/E1 software configurable
Latency	<100µs at full throughput (GigE)	DS3	2x BNC Female (x1); Native 75 ohms, unbalanced
Data Security	NIST FIPS-197 compliant 128-bit AES and 256-bit AES ² or 96 bit proprietary encryption	Impedance	75 ohms, unbalanced
Transmit Protection	Transmit fail-safe switching to +26dBm; 1.5+0 terminal	Line Code	B3ZS
Equipment Configurations	Non-protected 1+0 Semi-protected 1.5+0 Protected 1+1 Protected 1.5+1 SD Protected 1.5+1.5	Clocking Speed	44.736 Mbps
Path Protection	Space diversity with errorless switching ¹ Space diversity with linear combining (3dB system gain improvement) ¹	Compliance	ANSI T1.102-1993; GR-499-CORE
Capacity aggregation¹	Polarization aggregation with XPIC 6 GHz n+0 link aggregation 6 GHz + 5 GHz license-exempt link aggregation	T1/E1	T1 : RJ48C/RJ45 Female (x16) E1 : RJ48C/RJ45 : Female (x16) Impedance : 100 ohms, balanced : 120 ohms, balanced Line Code : AMI, B8ZS, per channel : HDB3 Data Rate : 1.544 Mbps : 2.048 Mbps Compliance : ANSI T1.102-1987; ITU-T; : CEPT-1; G.703; : ITU-T-G.703 G.823; GR-499-CORE
Interference Cancellation	Spatial or polarization (XPIC) interference cancellation	Loopback Modes	Remote Internal; Remote External; Local Line
T1/E1 Cross-Connect¹	Built-in, software controlled T1/E1 port cross-connection between endpoints	Ethernet (native)	RJ45 Female (x2), auto-MDIX : SFP (x1)
T1/E1 Prioritization	Software controlled T1/E1 prioritization	Interface Speed	10/100/1000BaseT : 1000BaseT/X
Spectrum management¹	Built-in spectrum analyzer	Duplex	Half, Full, Auto
Installation & Management Manual	Embedded in radio, accessible via HTTP GUI	Compliance	802.3 : 802.3
Management	In-band and out-of-band management	Maximum Packet Size	9728 bytes
Security	SSL/SSH ¹ and secure, encrypted SNMP v3	VLAN¹	802.1q, transparent, trunk, and management only; over 4,000 VLAN IDs
HTTP	Embedded web server GUI (Internet Explorer, Firefox)	QoS¹	8 priority levels, 8 queues 802.1p, 802.1q (VLAN ID), Source/Destination MAC Address
CLI/Telnet	10/100/1000BaseT or serial craft port	Ethernet Rate Limiting	Configurable per port via software, 1 Kbps resolution
SNMP	v1, v2c, and secure v3	1+1 Protection Port	1x RJ48C/RJ45, proprietary control
MIB support	MIB I, MIB II, Exalt MIB	Console (Serial)	9-pin Sub-D (F)
XML	XML configuration file	Speed	9600 bps
Compliance		Compliance	EIA-574 (RS-232)
RF	FCC Part 101; IC SRSP-305.9, SRSP-306.4	Alarm	9-pin Sub-D (F) Inputs (2) TTL/Closure Outputs (2) Relay (Form C)
EMI	FCC Part 15; IC RSS-210; CISPR 22	DC Power	Dual 3-pin barrier strip for power source redundancy
Safety	IEC 60950-1, EN 60950-1, UL 60950-1	Input Voltage	±20-60 VDC
		Consumption	<160 W (48 V, <4 A, 24 V, <8 A) 30/33dBm operation <100 W (48V, <2A, 24V,<4A) 27dBm operation

¹ Software upgrade required.

² Software license key option.

Specifications EX-i Series GigE

		6L	6U
Frequency Bands³			
Frequency Range (GHz)		5.925–6.425	6.525–6.875
TR Spacing (MHz)		252.04	170, 160, 180 ⁶
Channel Bandwidth (MHz)		5, 10, 30	5, 10
System Capacity (Ethernet Mbps)⁴			
64 QAM / TCM ¹ _{code1} / TCM ¹ _{code2}	5 MHz	23	23
	10 MHz	46	46
	20 MHz ⁸	92	92
	30 MHz	140 / 130 / 118	-
128 QAM / TCM ¹ _{code1} / TCM ¹ _{code2}	5 MHz	27	27
	10 MHz	54	54
	20 MHz ⁸	108	108
	30 MHz	164 / 153 / 141	-
256 QAM / TCM ¹ _{code1} / TCM ¹ _{code2}	5 MHz	31	31
	10 MHz	62	62
	20 MHz ⁸	124	124
	30 MHz	187 / 176 / 165	-
Maximum System Capacity (TDM:xDS3+xT1 or xE1)⁴			
64 QAM / TCM ¹ _{code1}	5 MHz	0xDS3 + 15xT1 or 11xE1	0xDS3 + 15xT1 or 11xE1
	10 MHz	1xDS3 + 1xT1 or 1xE1	1xDS3 + 1xT1 or 1xE1
	20 MHz ⁸	1xDS3 + 16xT1 or 16xE1	1xDS3 + 16xT1 or 16xE1
	30 MHz ⁹	1xDS3 + 16xT1 or 16xE1	-
128 QAM / TCM ¹ _{code1}	5 MHz	0xDS3 + 16xT1 or 13xE1	0xDS3 + 16xT1 or 13xE1
	10 MHz	1xDS3 + 6xT1 or 4xE1	1xDS3 + 6xT1 or 4xE1
	20 MHz ⁸	1xDS3 + 16xT1 or 16xE1	1xDS3 + 16xT1 or 16xE1
	30 MHz ⁹	1xDS3 + 16xT1 or 16xE1	-
256 QAM / TCM ¹ _{code1}	5 MHz	0xDS3 + 16xT1 or 15xE1	0xDS3 + 16xT1 or 15xE1
	10 MHz	1xDS3 + 11xT1 or 8xE1	1xDS3 + 11xT1 or 8xE1
	20 MHz ⁸	1xDS3 + 16xT1 or 16xE1	1xDS3 + 16xT1 or 16xE1
	30 MHz ⁹	1xDS3 + 16xT1 or 16xE1	-
Receiver Threshold with 3dB Linear Combining, 1.5+0 Configuration (dBm)⁷ (guaranteed over temperature BER 10⁻⁶)			
64 QAM / TCM ¹ _{code1} / TCM ¹ _{code2}	5 MHz	-82	-82
	10 MHz	-79	-79
	20 MHz ⁸	-76	-76
	30 MHz	-74 / -77 / -79	-
128 QAM / TCM ¹ _{code1} / TCM ¹ _{code2}	5 MHz	-79	-79
	10 MHz	-76	-76
	20 MHz ⁸	-73	-73
	30 MHz	-71 / -74 / -76	-
256 QAM / TCM ¹ _{code1} / TCM ¹ _{code2}	5 MHz	-76	-76
	10 MHz	-73	-73
	20 MHz ⁸	-70	-70
	30 MHz	-68 / -71 / -73	-
Output Power (dBm)			
1.5+0 semi-protected	64 QAM	30 / 33 ⁵	30 / 33 ⁵
	128 QAM	30 / 33 ⁵	30 / 33 ⁵
	256 QAM ¹	30 / 31.5 ⁵	30 / 31.5 ⁵
1+0 Non-protected	64 QAM	27, 30 / 33 ⁵	27, 30 / 33 ⁵
	128 QAM	27, 30 / 33 ⁵	27, 30 / 33 ⁵
	256 QAM ¹	27, 30 / 31.5 ⁵	27, 30 / 31.5 ⁵
Emission Designators	5 MHz	5M00W7D	5M00W7D
	10 MHz	10M0W7D	10M0W7D
	30 MHz	30M0W7D	-

¹ Software upgrade required.

² Software license key option.

³ 5 MHz channels are not available on 6L band 1 or band 2.

⁴ Consult your Exalt sales representative for base model and capacity upgrade options. If 1xDS3 is shown for maximum TDM capacity, all 16 T1s or E1s can be supported if DS3 interface is not enabled.

⁵ 33dBm is a software license key option.

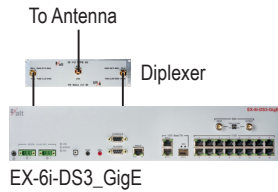
⁶ Non-standard TR spacings also available.

⁷ Adjust by 3dB for 1+0 configurations.

⁸ Bonded 2x10MHz adjacent channels per FCC part 101 rules.

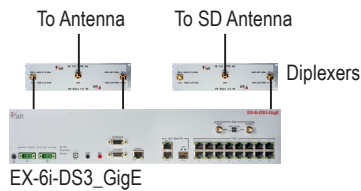
⁹ With or without TCM

EX-6i-DS3-GigE Terminal Configurations



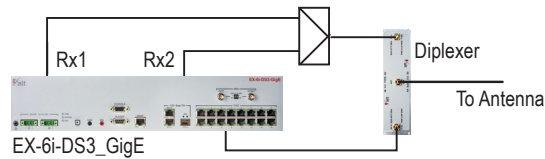
EX-6i-DS3-GigE Terminal Configurations

Non-protected 1+0
Unique sparing with field installable diplexers
2RU design



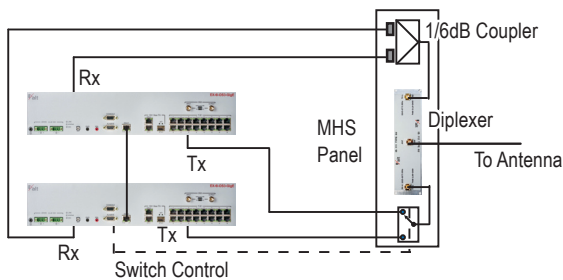
Semi-protected 1.5+0 with space diversity

Built-in transmit protection
Built-in dual receiver for SD
Unique sparing with field installable diplexers
2RU design



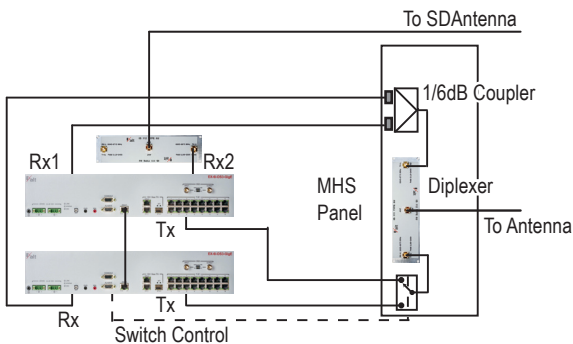
Semi-protected 1.5+0 with receiver protection

Built-in transmit protection
Built-in dual receiver
Single diplexer configuration
Unique sparing with field installable diplexers
2RU design



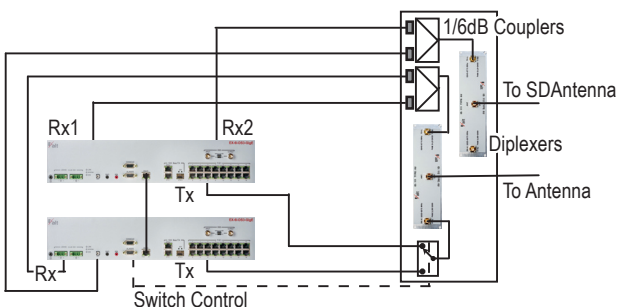
Protected 1+1

Low loss design 1RU protection panel
Full equipment protection
Single diplexer configuration
1xDS3, 16xT1/E1, and GigE protection
5RU design



Protected 1.5+1 SD

Built-in transmit protection on primary terminal
Built-in dual receiver on primary terminal for SD
Low loss design 1RU protection panel
1xDS3, 16xT1/E1, and GigE protection
5RU design



Protected 1.5+1.5

Built-in transmit protection per terminal
Built-in dual receiver per terminal
Low loss design 1RU protection panel
Non-protected or protected space diversity
1xDS3, 16xT1/E1, and GigE protection
5RU design



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