TRANGO SYSTEMS

Innovating Microwave Backhaul™

POINT-TO-POINT

TrangoLINK® Apex 11 GHz

All-Outdoor Full Duplex Licensed Microwave Native Ethernet Wireless Backhaul System

HIGH-CAPACITY POINT-TO-POINT WIRELESS NETWORK LINK

TrangoLINK® Apex is an all-outdoor high-capacity full duplex wireless point-to-point radio link that is ideal for carrier Ethernet, WiMAX/ISP broadband backhaul, private Enterprise networks, municipal/government networks, and broadcast applications using the licensed 11 GHz spectrum.

TrangoLINK® Apex offers simplified installation and easier operation in a compact all-outdoor single integrated unit. Designed for network operators who require high-capacity bandwidth and carrier-grade availability, this native Ethernet microwave backhaul is a highly-flexible easy-to-use solution with superior performance and fast ROI.

Benefits

- Low cost of ownership fast ROI relative to fiber and other options
- No right-of-way issues, unlike fiber deployment
- All-Outdoor integrated design carries benefits of higher throughput speeds, greater system efficiency, simpler installation and operation, and significant cost savings
- Excellent system gain for longer range and higher availability
- Replace leased lines, eliminate recurring costs
- Rapid scalability, easily add bandwidth and extend reach

Easy Setup and Deployment

- Simplified installation and operation
- Easy alignment via real-time digital RSSI LED indicators
- Minimal maintenance, "set and forget"
- Easily upgrade throughput *as you need it,* with no hardware replacements and no forklift upgrades
- Pay-as-you-grow 2-tier throughput upgrade path: Basic Package, and License Key 1

Highlights

- Up to 730 Mbps (365 Mbps full duplex)
- Hitless Adaptive Modulation
- Ultra low latency, <100 µS, for *triple play* applications
- All-outdoor integrated radio and modem
- Supports FCC, IC, and ETSI channel sizes of 10, 20, 28, 30, 40, and 56 MHz‡
- Standard 2-year manufacturer warranty

Flexibility & Performance

- High spectral efficiency of up to 7.5 bits/Hz
- LDPC (Low Density Parity Check) for improved receive sensitivity
- Port Priority assignment (VLAN) and QoS features
- Power-over-Ethernet (PoE) or direct power, -48 Volt
- GigE copper interface data port, PoE capable
- Fast Ethernet copper management port, PoE capable
- GigE optical/fiber interface data port
- Fast modulation shifting
- Supports jumbo packets in GigE mode
- Flexible modulations, bandwidth and throughput controls

Fail Safe Features for High Reliability

- Supports Hot Standby for protection against equipment failure
- Supports full link redundancy, 1+1 protection
- Supports ring/mesh/star topologies with *Rapid Port Shutdown*

Management

- In-band management and out-of-band management
- Network management through SSH, SNMP, and HTTP browser
- Built in loop back and far end monitoring

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All-Outdoor Point-to-Point Microwave Backhaul

Specifications

RADIO PARAMETERS		Band 1	Band 2
Frequency of Operation (ODU) ‡	**FCC/IC** (490 MHz duplex spacing)	***Band 1A:*** 10.715 to 10.945 GHz ***Band 1B:*** 11.215 to 11.435 GHz	***Band 2A:*** 10.955 to 11.185 GHz ***Band 2B:*** 11.445 to 11.685 GHz
	ETSI (490 MHz duplex spacing)	***Band 1A:*** 10.715 to 10.945 GHz ***Band 1B:*** 11.215 to 11.435 GHz	***Band 2A:*** 10.955 to 11.185 GHz ***Band 2B:*** 11.445 to 11.685 GHz
Channel Size ‡	10 MHz / 20 MHz / 28 MHz / 30 MHz / 40 MHz / 56 MHz		

RF Power Output (max per modulation)	**QPSK**	**16QAM**	**32QAM**	**64QAM**	**128QAM**	**256QAM**
	+22 dBm	+22 dBm	+22 dBm	+21 dBm	+20 dBm	+19 dBm

Modulation Format	Selectable from QPSK, 16QAM, 32QAM, 64QAM, 128QAM, 256QAM
Receiver Sensitivity	-67 dBm (256 QAM maximum speed); -91 dBm (QPSK minimum speed)
Features	ATPC (Automatic Transmit Power Control), Modulation Shifting, LDPC (Low Density Parity Check) Forward Error Correction
Regulatory Compliance ‡	**FCC/ANSI:** Part 101, Part 15 Class B Unintentional Radiator **Industry Canada (IC):** SRSP-310.7 Issue 2 **ETSI:** EN 302 217-2-1 (System Dependent) Class 5B-1, EN 302 217-2-2 (Essential Requirements) Class 5B-1

DATA

Data Throughput/ RSSI (1E10^{-6} BER) ‡

Speeds are uni-directional. For aggregate full duplex speeds, multiply numbers below by 2.

Legend

Basic Package = 110 Mbps maximum

License Key 1 = 365 Mbps maximum *

Channel Size	QPSK / RSSI	16QAM / RSSI	32QAM / RSSI	64QAM / RSSI	128QAM / RSSI	256QAM / RSSI
10 MHz	15 Mbps / -91 dBm	30 Mbps / -84 dBm	38 Mbps / -81 dBm	47 Mbps / -78 dBm	N/A	N/A
20 MHz	32 Mbps / -88 dBm	63 Mbps / -81 dBm	79 Mbps / -78 dBm	98 Mbps / -75 dBm	115 Mbps / -72 dBm	N/A
28 / 30 MHz	44 Mbps / -86 dBm	89 Mbps / -80 dBm	110 Mbps / -76 dBm	138 Mbps / -74 dBm	162 Mbps / -71 dBm	188 Mbps / -68 dBm
40 MHz	64 Mbps / -85 dBm	128 Mbps / -79 dBm	153 Mbps / -75 dBm	198 Mbps / -72 dBm	234 Mbps / -69 dBm	263 Mbps / -67 dBm
56 MHz	89 Mbps / -83 dBm	178 Mbps / -77 dBm	223 Mbps / -73 dBm	277 Mbps / -71 dBm	327 Mbps / -68 dBm	365 Mbps / -65 dBm

Packet Size	64-9600 bytes
Flow Control	Yes, via Ethernet pause frames (GigE mode only)
Security	Authentication uses 2 level password
Configuration & Management	SSH, HTTPS, Ethernet, SNMPV2

ANTENNA	Model/Description	Gain	3 dB Beamwidth
Antenna options	AD11G-2 / 2-foot antenna with slip-fit mount	33.4 dBi mid-band	3.4°
	AD11G-3 / 3-foot antenna with slip-fit mount	37.1 dBi mid-band	2.6°
	AD11G-4 / 4-foot antenna with slip-fit mount	40.4 dBi mid-band	1.7°
	AD11G-6 / 6-foot antenna with slip-fit mount	43.8 dBi mid-band	1.1°

POWER	
Input	-40.5 to –57 VDC
Power Consumption	48 Watts
MECHANICAL & ENVIRONMENTAL	
Enclosure	Cast Aluminum with RSSI window
Indicators	2-digit LED "in dBm" RSSI indicator for alignment
Dimensions	12 × 12 × 6.8 inches (height × width × length)
Weight	18 lbs
Temperature Range	-40° to 140° F (-40° to +60° C)
Humidity	100% condensing
Interfaces	1 GigaEthernet port, RJ45 (10/100/1000 BaseT), PoE capable 1 Fiber Optic port (SFP Module required) 1 Ethernet management port, RJ45 (10/100 BaseT), PoE capable
Power connector	Power-over-Ethernet / 2 pin Molex connector
Redundancy (1+1)	6 pin circular
Antenna Connector	Slip-fit mount / Optional waveguide adapter: WR90 / UBR100

* Based on purchasable Option Key. Contact sales for more information. 56 MHz channels available subject to regional regulations.

‡ Legal regulations for specific frequencies vary from region to region—users are responsible for complying with their local regulations.

CE RoHS Compliant

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