TRANGO®
S Y S T E M S

Innovating Microwave Backhaul™

TrangoLINK® Apex 15 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 15 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 3-tier throughput upgrade path

Highlights

• Up to 730 Mbps (365 Mbps full duplex)

• Hitless Adaptive Modulation

• Ultra low latency, <150 μS, for *triple play* applications

• All-outdoor integrated radio and modem

• Supports ETSI channel sizes of 14, 28 & 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

TrangoLINK® Apex 15 GHz

All-Outdoor Point-to-Point Microwave Backhaul

ETSI Specifications

RADIO PARAMETERS				Band 1 (728 MHz duplex)		Band 2 (644 MHz duplex)	
Frequency of Operation (ODU) ‡	ITU-R F.387 for duplex spacing of 644 MHz and 728 MHz			**Band 1A ODU:** 14.515 to 14.613 GHz **Band 1B ODU:** 15.243 to 15.341 GHz		**Band 2A ODU:** 14.515 to 14.683 GHz **Band 2B ODU:** 15.159 to 15.327 GHz	
Channel Size ‡	14 MHz / 28 MHz / 56 MHz						
RF Power Output (max per modulation)	**QPSK**	**16QAM**	**32QAM**	**64QAM**	**128QAM**	**256QAM**	
	+23 dbm	+23 dbm	+22 dbm	+22 dbm	+21 dbm	+20 dbm	
Modulation Format	Selectable from QPSK, 16QAM, 32QAM, 64QAM, 128QAM, 256QAM						
Receiver Sensitvity	-65 dBm (256 QAM maximum speed); -90 dBm (QPSK minimum speed)						
Features	ATPC (Automatic Transmit Power Control), Modulation Shifting, Forward Error Correction						
Regulatory Compliance ‡	**ETSI**: EN 302 217-2-1 V1.2.1, EN 302 217-2-2 V1.2.2, EN 301 489, ITU-R F.387-10, NZPIB22						

DATA							
Data Throughput/ RSSI (1E10^{-6} BER) ‡	Speeds are uni-directional. For aggregate full duplex speeds, multiply throughput numbers below by 2.						
Legend Basic Package = 110 Mbps maximum License Key 1 = 188 Mbps maximum * License Key 2 = 365 Mbps maximum *	**Channel Size**	**QPSK / RSSI**	**16QAM / RSSI**	**32QAM / RSSI**	**64QAM / RSSI**	**128QAM / RSSI**	**256QAM / RSSI**
	14 MHz	22 Mbps / -90 dBm	42 Mbps / -84 dBm	52 Mbps / -80 dBm	64 Mbps / -77 dBm	75 Mbps / -74 dBm	86 Mbps / -71 dBm
	28 MHz	46 Mbps / -87 dBm	94 Mbps / -80 dBm	110 Mbps / -77 dBm	142 Mbps / -74 dBm	165 Mbps / -71 dBm	188 Mbps / -68 dBm
	56 MHz	90 Mbps / -84 dBm	181 Mbps / -78 dBm	225 Mbps / -74 dBm	275 Mbps / -71 dBm	320 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, Console (RS232), Ethernet, SNMPV2						
Remote firmware update	TFTP client in radio unit						

ANTENNA	Model/Description	Gain	3 dB Beamwidth
Antenna options	AD15G-1 / 1.4-foot antenna with slip-fit mount	34.2 dBi	3.0°
	AD15G-2 / 2.4-foot antenna with slip-fit mount	38.6 dBi	2.0°
	AD15G-3 / 3.5-foot antenna with slip-fit mount	42.0 dBi	1.3°
	AD15G-4 / 4.75-foot antenna with slip-fit mount	44.5 dBi	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	10.5 × 10.5 × 5.5 inches (height × width × length)
Weight	18 lbs
Temperature Range	-40° to 131° F (-40° to +55° C)
Humidity	100% condensing
Interfaces	1 GigaEthernet port, RJ45 (10/100/1000 BaseT) 1 Fiber Optic port (SFP Module required) 1 Ethernet management port, RJ45 (10/100 BaseT)
Power connector	Power-over-Ethernet / 2 pin Molex connector
Redundancy (1+1)	6 pin circular
Antenna Connector	Slip-fit mount / Optional waveguide adapter: WR62 / UBR 140

* Based on purchasable Option Key. Contact sales for more information.
‡ Legal regulations for specific frequencies vary from region to region—users are responsible for complying with their local regulations.

CE

RoHS Compliant

TRANGO SYSTEMS®