



Motorola Point-to-Point 400 Series

Wireless Ethernet Bridges



MOTO⁴**WI**

Highly-Reliable Connectivity Virtually Anywhere

Which word best defines success in wireless connectivity? Is it availability, reliability or speed?

Consider this: 85% of properties 1500 feet (457 meters) apart have no optical line-of-sight path between their roofs. For them, a conventional wireless solution won't work 75% of the time. Motorola's PTP 400 family of point-to-point wireless solutions succeeds over 99% of the time.

Operating in the unlicensed 5.8 and 5.4 GHz frequencies as well as the 4.9 GHz licensed band, the wi4 Fixed Point-to-Point (PTP) 400 Series Wireless Ethernet Bridges succeed where more conventional solutions disappoint. The systems achieve highly reliable connections, much more often and at faster data rates than comparable wireless solutions because the radios can maintain as high as 99.999% availability in challenging environments. Even in supposedly connection-friendly applications, PTP 400 solutions protect against the transient attenuation, fading and dispersion that degrade all wireless signals. (It is recommended that regulatory conditions for radio-frequency bands be confirmed prior to system purchase.)

Choice and Flexibility

Incorporated into Motorola's MOTOwi4 portfolio, the PTP 400 family of bridges offers several models to meet a variety of customer requirements:

- **Integrated:** Integrated versions of the PTP 400 bridges include built-in antennas. The 5.8 and 5.4 GHz Integrated systems operate at up to 43 Mbps Ethernet data rates, while the 4.9 GHz solution for public safety offers up to 35 Mbps Ethernet data rates. These systems are ideal for near- and non-line-of-sight environments.
- **Integrated Lite:** The Lite versions of the PTP 400 Integrated bridges include the same robust technology of the full-speed versions, but at less cost. Operating in the 5.8, 5.4 and 4.9 GHz frequencies, Lite solutions deliver Ethernet data rates up to 21 Mbps (5.8 and 5.4 GHz systems)

or 17 Mbps (4.9 GHz systems). The Lite versions are software upgradeable to 43 Mbps (5.8 and 5.4 GHz models) or 35 Mbps (4.9 GHz models) as throughput requirements increase. These systems are excellent entry-level solutions for growing WISPs and ISPs and for any budget-constrained organization that needs a robust solution to overcome interference and navigate obstructions.

- **Connectorized:** PTP 400 Series Connectorized bridges combine all the innovative technology found in the Integrated models with the high-gain advantage of external antennas. In extremely adverse environments, including deep non-line-of-sight, these solutions let you connect over greater distances, at a higher level of reliability and speed than comparable bridges. The 5.8 and 5.4 GHz Connectorized systems operate at up to 43 Mbps Ethernet data rates, while the 4.9 GHz systems deliver up to 35 Mbps throughput.
- **Connectorized Lite:** The Lite versions of the PTP 400 Series Connectorized bridges offer all the performance and reliability of the full-speed versions, but at less cost. The 5.8 and 5.4 GHz Lite solutions deliver up to 21 Mbps Ethernet data rates, whereas the 4.9 GHz Lite systems operate at data rates up to 17 Mbps. These solutions are excellent choices for growing and budget-constrained organizations that need to communicate in extremely challenging conditions. Then as bandwidth requirements increase, the 5.8 and 5.4 GHz systems are software upgradeable to 43 Mbps, while the 4.9 GHz systems can be upgraded to 35 Mbps.

MOTOwi4™

The wi4 Fixed PTP 400 Series bridges can operate as stand-alone systems or integrate easily with other systems in the MOTOwi4 portfolio of innovative wireless broadband solutions that create, complement and complete IP networks. Delivering IP coverage to virtually all spaces, the MOTOwi4 portfolio includes wi4 Fixed, wi4 Mesh, wi4 Indoor and wi4 WiMAX solutions for high-speed connectivity over private and public networks.



High-Availability Wireless Ethernet Bridges for Obstructed and High-Interference Environments As Well As Long-Range Line-of-Sight Links, Including Those Over Water

How Far Will Connectorized Systems Take You?

PTP 400 Series Connectorized bridges connect to external antennas to increase signal gain, and, therefore, the range and robustness of the link. As the diagrams show, throughput rates remain consistently high from a distance of a few miles to 124 miles (200 km). At the maximum range, 29.8 Mbps and 14.9 Mbps Ethernet data rates – full-speed and Lite models respectively – can be sustained over a line-of-sight path, using a six-foot antenna. In non-line-of-sight environments, Connectorized systems can increase link availability up to 99.999%. Prior to purchase, you can use Motorola's PTP Link Estimator to predict link reliability and throughput for your specific wireless application. (A list of approved antennas that meet FCC requirements is available on our web site.)

A Unique Technology Combination

The success of the PTP 400 Series bridges results from a unique combination of technologies – the overall effect of which is much more powerful than using any of them individually. You can acquire this combination in a surprisingly small form factor that is easy to install and maintain, even in aesthetically or physically restrictive environments. These technologies include:

- **Multiple-Input Multiple-Output (MIMO):** The radios radiate multiple beams from the antenna – the effect of which is to significantly protect against fading and radically increase the probability that the receiver will decode a useable signal.
- **Intelligent Orthogonal Frequency Division Multiplexing (i-OFDM):** OFDM is now the industry-recognized method of reducing interference caused by signals that take multiple paths arriving out of phase at the receiver. Motorola takes this technology further by using more sub-carriers and pilot tones than competitors to provide class-leading capability for handling multipath dispersion and instant fade recovery.

- **Advanced Spectrum Management with i-DFS:** Our *intelligent* Dynamic Frequency Selection (i-DFS) is at the heart of our exceptional spectrum management capabilities. At power-up and during operation, the bridges scan the band – 500 times a second – and automatically switch to the clearest channel. Our 30-day, time-stamped database alerts you to any interference that does exist and provides statistics that help you pinpoint the channels that provide the clearest data paths, providing virtually interference-free performance even in highly-congested environments.

- **Adaptive Modulation:** Transmitter and receiver negotiate the highest mutually sustainable data rate – then dynamically “upshift” and “downshift” the rate as conditions change to provide the maximum performance possible within the current power limits.

- **Spatial Diversity:** Having the capabilities of Spatial Diversity, PTP 400 Series bridges can enable two distinct paths that are not simultaneously affected by fading or multipath, giving you a very reliable link in adverse conditions.

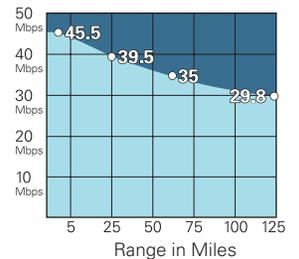
- **Best-In-Class Radio:** A powerful transmitter combined with a super-sensitive receiver delivers a class-leading 167 dB system gain. This is significantly better than the performance of comparable point-to-point wireless solutions.

Reassuring, Robust Security

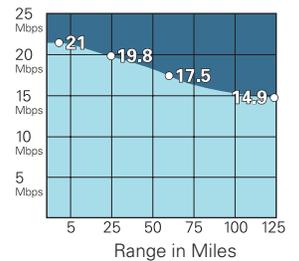
With Motorola's unique software, each wireless bridge will communicate only with its matched counterpart at the other end of the link – and with no other. In addition communications are encoded using a unique scrambling mechanism to secure over-the-air transmissions. Another layer of security can be applied with FIPS-197 compliant 128-bit AES encryption (optional).

Motorola PTP 400 Series Point-to-Point Bridges

Performance with 5.8 and 5.4 GHz Connectorized Models



Performance with 5.8 and 5.4 GHz Connectorized Lite Models



The success of Motorola's PTP 400 Series Point-to-Point Bridges results from a unique combination of technologies.



Cost of ownership is low, and ROI is typically less than one year.

Power Up and Point

PTP 400 systems are easy to install and automatically select the clearest channel, modulation scheme and transmit power for the link. Large antenna beam width simplifies the initial connection, and an audio tone helps the installer optimize link alignment.

Productivity Payoff

The high performance afforded by Motorola's PTP 400 family of point-to-point solutions means more productive users, fewer connection points and, ultimately, much lower cost of ownership. You avoid the expense of leased lines, the disruptions of unreliable service and the hassles of trying to find line-of-sight locations. PTP 400 solutions are usually the lower-cost option when you consider:

- The business impact from low-availability and unreliable or slow wireless solutions
- Easy remote management and maintenance with our onboard software
- The effects of relocations, foliage growth or building construction

Put PTP 400 Bridges to Work for You

Service Providers: Where geography is a challenge and infrastructure a priority, mobile operators and Internet providers can offer super-reliable, robust coverage. Simply use PTP 400 point-to-point solutions to backhaul traffic from multiple wireless LAN access points to a point of presence.

Enterprises: A PTP 400 system can provide a high-capacity secure link, quickly creating a seamless local area network between company headquarters and a warehouse, branch office, service center or other facility.

Vertical Markets: When creating a seamless network over a wide geographic area covering multiple buildings and open spaces, PTP 400 solutions are extraordinarily cost-effective, high-powered alternatives for a wide variety of organizations including government agencies, universities, schools and hospitals.

Public Safety: Designed for public safety applications, our 4.9 GHz solutions provide firefighters, police officers, medical personnel and government officials with high-bandwidth, ultra-reliable connectivity and rapid deployment. The systems can deliver the voice, video and data traffic necessary for applications, such as: T1 replacements, on-scene streaming video, Internet and database access, large-file transfers for maps, blueprints, medical records and missing-person images, backhaul for wireless networks, and temporary fixed point-to-point links.

Locate a Partner

Motorola PTP 400 solutions are available through value-added distributors around the world. Our authorized Point-to-Point Distributors can be found on our web site, listed under the "Buy PTP" link on the Home Page.

Additional Information

For more information on Motorola's PTP 400 bridges, refer to the PTP 400 Series Technical Specifications and Fact Sheet.



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