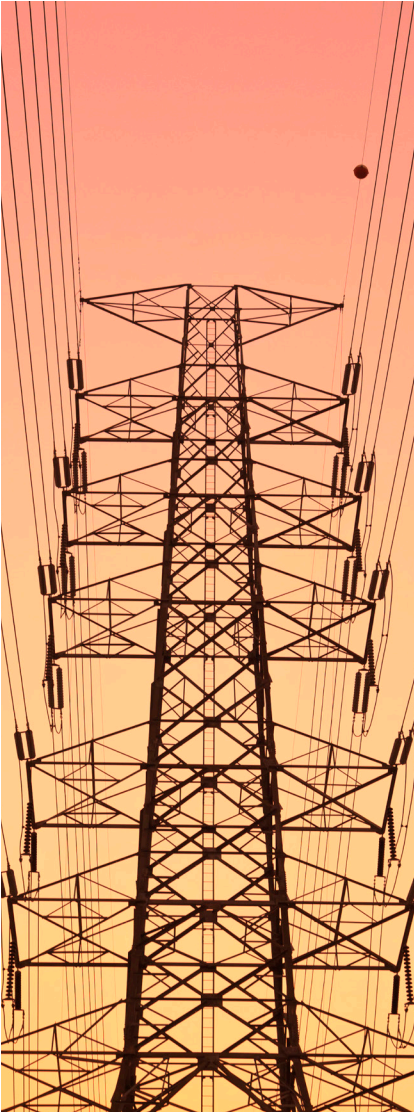




TELEPROTECTION

mimomax

GUIDELINES FOR A ROBUST TELEPROTECTION SYSTEM



A central factor in minimizing the risk of severe blackouts is the use of a robust Teleprotection system. The communication requirements for such a system are extremely stringent due to the potential impact to the grid if such a system were to fail.

The key elements you must consider are:

Latency & Priority

- Latency is the most critical parameter for teleprotection as a matter of milliseconds can determine the difference between an isolated outage and a blackout across an entire city.
- To achieve an adequate level of protection, latency should be around or below 5 milliseconds
- In addition to speed, teleprotection traffic **MUST** have priority over IP traffic.

Resilience

- In order to ensure a network is protected 24/7, the use of dedicated licensed spectrum for communications is required.
- Relying on an unlicensed public channel (i.e. cellular) for delivery of critical data is obviously unwise. The options are therefore limited to licensed narrowband spectrum, fiber and microwave.

Coverage

- Again, to ensure resilience of your network, it is imperative that network availability is maintained consistently. Detailed path planning, coverage design and propagation modelling prior to deployment to minimize issues with potential path interference is crucial for mission critical deployments such as teleprotection.
- Microwave and higher bands (>1GHz) struggle to maintain coverage in non-line of sight scenarios. Antenna offset (due to weather events) is also an issue for solutions with narrower antenna beamwidth, such as microwave.

Advanced Radio Technology



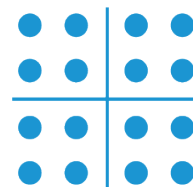
MIMO

Two transceivers in each radio to double the data throughput



FULL DUPLEX

Simultaneously transmit & receive – required for IP-based networks



256 QAM

More bits per symbol = more data per transmission

THE MIMOMAX TELEPROTECTION SOLUTION

Licensed – operates on licensed channels to ensure interference-free operation;

Ultra-low latency & jitter – typically offers latency of 5ms but can achieve rates as low as 3ms depending on channel size and modulation rate. This allows multiple MiMO links with a total latency inside of one power cycle. In a Mimomax Tornado radio, jitter is minimized to less than 55ns – well below the 1ms recommendation;

Teleprotection priority – guaranteed priority is given to teleprotection traffic by inserting the serial at the lowest level in the protocol stack and with the highest priority;

Residual bandwidth – high data capacity (due to MIMO, full duplex and high order modulation) means the solution also provides the ability to use residual capacity to carry IP/SCADA traffic;

Excellent coverage – high performance for both line of sight and non-line of sight due to use of sub 1GHz spectrum;

Common platform – ability to combine teleprotection with other applications such as AMI backhaul over one radio network but with no impact on the dedicated protection circuit;

Detailed path planning – our in-house design team can carry out detailed propagation modelling to ensure links are robust and any issues with interference and path obstructions have been mitigated.

Synchronous Serial Interfaces

Mimomax power line protection uses a synchronous serial interface including:

- C37.94
- X21
- G703
- RS530 (also referred to as RS422)

Mimomax supports all these interfaces at 64kbps and also supports X21 and RS530 (RS422) at 128kbps, 192kbps and 256kbps.

SEL Mirrored Bits

Support for SEL mirrored bits is provided via using RS232 with low latency and jitter.

Traffic Prioritization

In the Tornado radio Optimized Protection Variant (OPV-T), serial port 1 has the highest priority in the system with serial port 2 data given second priority. All IP traffic, however, is configured to be lower priority than the serial port traffic to ensure any IP data does not negatively impact latency or bandwidth.

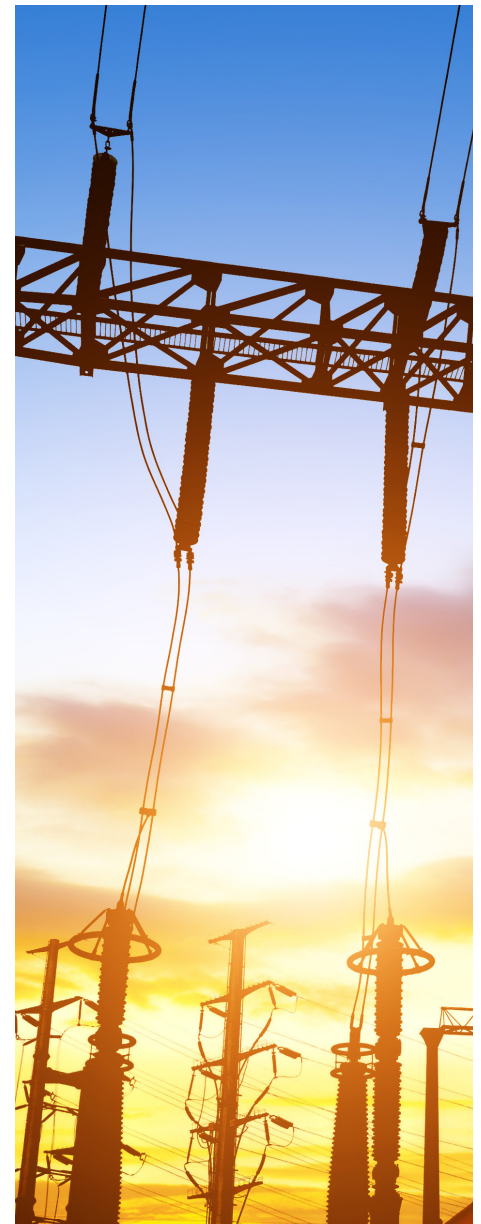
Furthermore, in the OPV-T, a reliable and constant latency is ensured by not dynamically adjusting any of the link parameters which affect latency.

Mimomax Data Rates

Channel Size	Gross Data Rate Aggregate
50 kHz at 256 QAM	1.28 Mb/s
25 kHz at 256 QAM	640 kb/s
12.5 kHz at 256 QAM	320 kb/s

Mimomax Latency Rates

3-5 milliseconds (one way)*



*See the Mimomax Tornado Optimized Protection Variant datasheet for a Synchronous Serial Latency and Bandwidth Tables.



Case Study: Orion New Zealand choose Mimomax for substation protection network

Owning and operating an electricity distribution network of 8000 square kilometres (3000 square miles) of diverse geography, Orion NZ Ltd required a teleprotection solution to maintain an uninterrupted, reliable power supply.

Orion's substation protection ring crosses farmland, hill and coastal terrain (including areas where stringent environmental standards need to be met) and has the following requirements:

- Ultra-low latency and phase jitter;
- The ability to be installed across difficult terrain;
- An approach which would not depend upon the installation of fibre or microwave links.

In response to these requirements, Mimomax developed an "Optimised Protection Variant" (OPV) for Orion – a variant of its MiMO product family. This product offered Orion the ability to support a dedicated serial protection circuit with up to 256kb/s (full duplex) in a 25kHz bandwidth channel. Using this solution, the utility would also have residual capacity available to carry IP/SCADA traffic with no impact on the dedicated protection circuit.

RESULTS

After deploying their initial Differential Protection radio links across their network, Orion has continued to expand their protection circuits into new areas, include remote areas of the Banks Peninsula. Key results from these deployments include:

- Complete substation protection in addition to SCADA and voice traffic over one radio link;
- Interference-free operation on licensed channel with up to 256 kb/s capacity (25KHz channel);
- Wide antenna beamwidth offering greater immunity to weather and path obstructions;
- Easy & low-cost integration with existing GE L90 relays.



MIMOMAX TORNADO OPV-T SYNCHRONOUS SERIAL LATENCY TABLE

Bandwidth	Modulation	X21 64kbps	X21 128kbps	X21 192kbps	X21 256kbps	RS422 64kbps	RS422 128kbps	RS422 192kbps	RS422 256kbps	C37.94	G703
50kHz	QPSK	4.6	4.5	-	-	4.4	4.5	-	-	5.3	5.2
	16QAM	2.9	2.8	2.8	2.7	3.0	2.8	2.6	2.7	3.7	3.5
	64QAM	2.4	2.2	2.2	2.2	2.3	2.2	2.2	2.2	3.1	2.9
	256QAM	2.1	1.9	1.9	1.9	2.2	1.9	1.9	1.8	2.7	2.6
25kHz	QPSK	9.0	-	-	-	9.0	-	-	-	9.5	9.5
	16QAM	5.5	5.0	-	-	5.5	5.0	-	-	5.9	5.9
	64QAM	4.5	4.4	4.2	-	4.5	4.4	4.2	-	4.8	4.8
	256QAM	4.0	3.8	3.6	3.6	4.0	3.8	3.6	3.6	4.3	4.3
12.5kHz	QPSK	-	-	-	-	-	-	-	-	-	-
	16QAM	10.7	-	-	-	10.7	-	-	-	11.0	11.0
	64QAM	8.0	-	-	-	8.0	-	-	-	9.0	9.0
	256QAM	7.5	7.2	-	-	7.5	7.2	-	-	8.0	8.0

Note 1: Latencies figures are in milliseconds

Note 2: Latencies figures are for a single radio hop and are one way (not round trip)

The background of the entire page is a photograph of a multi-lane highway curving into the distance. On the left side of the road, there are several tall, lattice-structured power line towers with multiple cross-arms and insulators. The sky is a mix of orange, pink, and blue, suggesting a sunset or sunrise. The right side of the image is partially covered by a semi-transparent blue rectangular overlay.

MIMOMAX TELEPROTECTION LINKING KIT

**Speed and resilience to maintain
critical teleprotection links**

*Terms of supply apply. Please contact your regional sales manager or sales@mimomax.com for more details.

MIMOMAX TELEPROTECTION LINKING KIT

Speed and resilience to maintain critical teleprotection links



Operating in the licensed frequency bands between 400-470MHz, 757-788MHz & 806-960MHz, Mimomax radios can be configured to 12.5 kHz, 25 kHz and 50 kHz bands.

Mimomax Teleprotection Linking Kit includes:

- ▶ **2 x Mimomax Tornado Radios (Select)**
 - 400MHz, 700MHz, 900MHz
 - 12.5kHz, 25kHz, 50kHz
 - QPSK, QAM16, QAM64, QAM256
- ▶ **2 x MiMO antennas (Select)**
 - Panel
 - Yagi
- ▶ **2 x Tornado DC Connectors and Leads**
- ▶ **2 x RJ45-RJ45 Cables**
- ▶ **2 x Media Converter Trays**
- ▶ **2 x Mimomax Converters (Select)**
 - X-21
 - RS530/RS422
 - G703 (64kbps co-dir)
 - C37.94 (single mode fibre)
 - C37.94 (multi mode fibre)
- ▶ **2 x Mounting kits**
 - 1U Rack Mount
- ▶ **Service (Select)**
 - Basic
 - Premium



MIMOMAX FULLY REDUNDANT TELEPROTECTION LINKING KIT

Hot-swappable, ultra-reliable,
low latency links for teleprotection

*Terms of supply apply. Please contact your regional sales manager or sales@mimomax.com for more details.

MIMOMAX FULL REDUNDANCY KIT

Hot-swappable, ultra-reliable, low latency links for teleprotection



Offering full redundancy within the link itself, this system supports both a hot and warm standby to ensure your communications never go down. Mimomax can also provide a fully redundant antenna solution if required. Operating in the licensed frequency bands between 400-470MHz, 806-960MHz, and 700MHz Upper A-Block, with a wide temperature operating range, Mimomax radios can be configured to 12.5 kHz, 25 kHz and 50 kHz bands.

Mimomax Full Redundancy Kit includes:

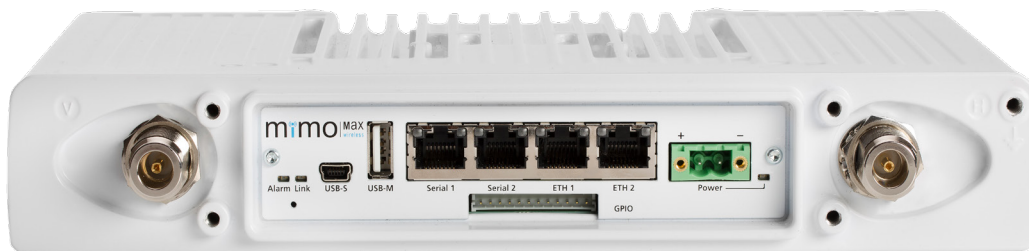
- ▶ **2 x Mimomax 1+1 Tornado Radios Set (Select)**
 - 400MHz, 700MHz, 900MHz
 - 12.5kHz, 25kHz, 50kHz
 - QPSK, QAM16, QAM64, QAM256
- ▶ **2 x MiMO antennas (Select)**
 - Panel
 - Yagi
- ▶ **4 x Tornado DC Connectors and Leads**
- ▶ **4 x RJ45-RJ45 Cables**
- ▶ **2 x Media Converter Trays**
- ▶ **4 x Mimomax Converters (Select)**
 - X-21
 - RS530/RS422
 - G703 (64kbps co-dir)
 - C37.94 (single mode fibre)
 - C37.94 (multi mode fibre)
- ▶ **2 x Mounting kits**
 - 1U Rack Mount
- ▶ **Service (Select)**
 - Basic
 - Premium

TORNADO RADIO



MiMO + Full Duplex + QAM 256 = 1.28Mb/s

Our award-winning Mimomax Tornado radio is pushing the boundaries of what can be achieved in narrowband channels.



Utilizing MIMO technology, full-duplex communications and high order modulation (QAM256), the Tornado radio can achieve higher rates of data throughput than standard narrowband radios. The result is a better **return on investment** in the spectrum and the ability to run more voice channels over the same link.

Operating in the licensed frequency bands between 400-470MHz, 757-788MHz & 806-960MHz, the Tornado has a wide temperature operating range. The Tornado enables unrivalled performance while maintaining Mimomax's renowned reputation for reliability and operational efficiency.

Key Benefits

- » Aggregate data rates of up to 1280kbps in a 50kHz channel
- » Latency as low as 3ms in 50 kHz channels (using the Optimized Protection Variant for Teleprotection) and sub 10ms in a standard point-to-point configuration
- » Resilient communications over links as long as 60 miles
- » Built-in duplexers and band-pass filters to minimize interference
- » Support a combination of ethernet and RS232 interfaces for ease of integration with legacy systems
- » Isolated Power Supply with low power consumption
- » Remote over-the-air radio configuration
- » Optional SNMP and DNP3 support and a very efficient random access protocol

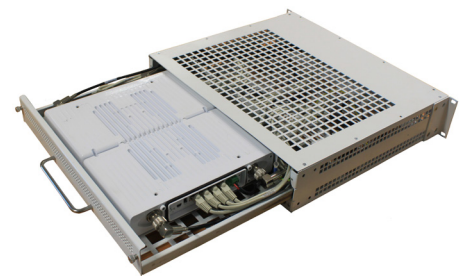
Available for 400MHz, 700MHz, 800MHz, & 900MHz Frequency Bands (others available on request)

We offer a package of software that comes with the kit, including MSYNCH, SNMP, MDAP & CCMS

For more features, visit our website at mimomax.com/products_category/software or contact your regional sales manager.

TORNADO RADIO SPECIFICATIONS				
		400MHz	700MHz	900MHz
Gross Data Rates	50kHz 25kHz 12.5kHz	160/320/480/640kb/s <i>Uplink and/or downlink</i> 320/640/960/1280kb/s <i>Full-duplex</i> 80/160/240/320kb/s <i>Uplink and/or downlink</i> 160/320/480/640kb/s <i>Full-duplex</i> 40/80/120/160kb/s <i>Uplink and/or downlink</i> 80/160/240/320kb/s <i>Full-duplex</i>		
Configuration		2 x 2 Full Duplex MIMO		
Supply Voltage		+/- 10.5v DC to +/- 60V DC		
Maximum Power Consumption		26W (at 13.8V) 20W typical		
Standby Power Consumption		<6W typical		
Ambient Temperature Range		-30°C (-40°C) to +60°C (+70°C)		
Mounting		1U High Rack Mount Pole Mount Wall Mount DIN Rail Mount		
Dimensions (L x W x H)		180 x 270 x 44mm		
Weight		2 kg <i>radio unit only, excl. mounts</i>		
RECEIVER				
Modulation		QPSK/16/64/256QAM		
Number of MIMO receivers		2		
Symbol Rate	50kHz 25kHz 12.5kHz	2x40k symbols/sec 2x20k symbols/sec 2x10k symbols/sec	2x40k symbols/sec 2x20k symbols/sec 2x10k symbols/sec	2x40k symbols/sec 2x20k symbols/sec 2x10k symbols/sec
Modulation Sensitivity for 10 ⁻⁴ BER	50kHz 25kHz 12.5kHz	<-111/-104/-98/-91dBm <-114/-107/-101/-94dBm <-117/-110/-104/-97dBm	<-111/-104/-98/-92dBm <-114/-107/-101/-94dBm <-117/-110/-104/-97dBm	<-111/-103/-97/-91dBm <-113/-106/-100/-94dBm <-116/-109/-102/-96dBm
Modulation Sensitivity for 10 ⁻⁷ BER	50kHz 25kHz 12.5kHz	<-109/-102/-96/-89dBm <-112/-105/-99/-92dBm <-116/-108/-102/-96dBm	<-109/-102/-96/-89dBm <-112/-105/-99/-92dBm <-116/-108/-102/-96dBm	<-109/-102/-96/-89dBm <-112/-105/-99/-92dBm <-116/-108/-102/-96dBm
Frequency Range		400 to 470 MHz	757-758 & 787-788 MHz	806 to 960 MHz
Frequency Step Size		5 kHz & 6.25 kHz selectable		
Frequency Accuracy and Stability		better than +/- 1ppm		
Nominal Channel Bandwidth		12.5 kHz, 25 kHz, 50kHz	12.5 kHz, 25 kHz, 50kHz	12.5 kHz, 25 kHz, 50kHz
TRANSMITTER				
RF Power Output		Avg. before duplexer 2 x 27dBm Avg. after duplexer 2 x 24dBm Peak before duplexer 2 x 35dBm	Avg. before duplexer 2x26dBm Avg. after duplexer 2x24dBm Peak before duplexer 2x34dBm Peak after duplexer 2x32dBm	Avg. before duplexer 2 x 26dBm Avg. after duplexer 2 x 24dBm Peak before duplexer 2 x 34dBm Peak after duplexer 2 x 32dBm
RF Power Control Range		>20 dB		
Other Details		<i>Modulation, Number of MIMO receivers, Symbol Rates, Frequency Range, Frequency Step Size, Frequency Accuracy and Stability are similar with Receiver</i>		
DUPLEXER (INTERNAL)				
Type	Bandpass			
Tx / Rx Split	5 MHz minimum		30 MHz	9 MHz minimum
Frequency Range	400 to 470 MHz		757-758 & 787-788 MHz	806 to 960 MHz
Duplexer Sub Bands	400-430 MHz 440-450 MHz 450-470 MHz		757-758 to 787-788 MHz	806-869 MHz 852-933 MHz 896-960 MHz
Stop Band Attenuation	>60 dB @ >5 MHz from centre		>75 dB	>60 dB @ >9 MHz from centre
Pass Band Bandwidth	2 MHz (-0.5dB)		3 MHz (-0.5dB)	4 MHz (-0.5dB)
DUPLEXER (EXTERNAL)				
Type	Bandpass	<i>Available on request</i>		Bandpass
Tx / Rx Split	4.5 MHz			6 MHz minimum
Frequency Range	400 to 470 MHz			806 to 960 MHz
Insertion Loss	<1.75 dB			<1.5 dB
Stop Band Attenuation	>70 dB			>70 dB
Pass Band Bandwidth	1 MHz min			tunable, 1 MHz min
Mounting	2U High Rack Mount			1U High Rack Mount
INTERFACE (DIGITAL & ANALOG)				
ETHERNET	Dual 10BaseT/100BaseT Connector: 2 x RJ45			
ASYNCHRONOUS SERIAL	Format: Dual RS232 Connector: 2 x RJ45 Baud Rate: 300 - 115,200 baud			
USB	High speed USB 2.0 Connector: Type A and mini B			
ALARM	1 set of volt-free change over contacts			
GPIO <i>Analog/Digital</i>	4 x s/w configurable I/O ports			
FREQUENCY REFERENCE <i>Input/Output</i>	isolated differential pair			

TORNADO 1+1 SYSTEM



Using multiple Mimomax Tornado radio units, this system provides automated support for both a warm and hot standby system where if one radio fails a second standby radio is automatically switched in to take over. The faulty radio can be replaced without impacting the operating radio, enabling the system to operate without loss of data.

The Tornado 1+1 system offers multiple configurations with the ability to switch over Serial, GPIO, alarm and antenna ports. The design also provides the flexibility of an optional two-antenna solution, where each radio has its own antenna to provide a redundant antenna solution.

Applications:

Our Advanced Redundancy point-to-point links are ideal for:

- » **Zero Interruption, Mission Critical, primary communications**
- » **Back up redundant links for use when primary communications are down**




Mimomax also offers a Redundancy Upgrade Kit for customers who already have a Mimomax link in place. This kit contains an additional radio and the housing kit to build a fully redundant 1+1 system.

ELECTRICAL SPECIFICATION			
POWER SUPPLY			
Rated Input Voltage	Normal Operation		+/-13 to +/-50 Vdc
Extreme Input Voltage	Normal Operation		+/-10.5 to +/-60 Vdc
Total Power Consumption	Idle, Tx Off	Warm Swap	12.3-17.7 W
		Hot Swap	12.5-17.7 W
	Tx Active	Warm Swap	27-36.1 W
		Hot Swap	41.5-54.5 W
Power Consumption Per Power Connector	Idle, Tx Off		6.25-10.1 W
	Tx Active		21-28.5 W
ETHERNET			
Tx Peak Differential Voltage	100Base-Tx, 100 Ohm termination		1.00-1.05 V
Tx Voltage Imbalance	100Base-Tx, 100 Ohm termination		2%
Tx Rise/Fall Time	100Base-Tx		3-5 ns
Tx Rise/Fall Imbalance	100Base-Tx		0-0.5 ns
Tx Duty Cycle Distortion	100Base-Tx		+/- 0.5 ns
Tx Overshoot	100Base-Tx		5%
Tx Output Jitter	100Base-Tx, Peak to Peak		0.7-1.4 ns
Tx Peak Differential Voltage	10Base-T, 100 Ohm termination		2.4 V
Tx Output Jitter	10Base-T, Peak to Peak		1.4-11 ns
Rx Squelch Threshold	10Base-T, 5MHz square wave		400 mV
SERIAL			
Output Voltage Swing	Loaded with 3kOhms to ground		+/- 5 to +/-5.4 V
Output Short Circuit Current			-60 to +60 mA
Input Voltage			-25 to +25 V
Input Low Threshold	Temperature ambient = +25		0.8-1.5 V
Input High Threshold	Temperature ambient = +25		1.8-2.4 V
5VDC Output Current			200 mA
GPIO			
Input Voltage	Input		-0.3-60 V
Current Sinking Capability	Output driving low		100mA
Input Impedance			109 kOhms
Alarm	Input Current (max)		300 mA
	Switching Voltage (max)		33 VDC
Reference Input	Level		-5 to +20 dBm
	Frequency		10 MHz
Reference Output	Level		0 dBm
	Frequency		10 MHz
1+1 SPECIFIC			
Radio Switch Over Time			0.2s
IP Configuration Switch Over Time			7s
Synchronous Serial Switch Over Time			< 2s
PHYSICAL SPECIFICATION			
Dimensions (L x W x H)			17.32 x 15.75 x 3.46 in (440 x 400 x 88 mm) 2U standard size 19 inch rack
Minimum Operating Temperature			-22°F (-30°C)
Maximum Operating Temperature			+140°F (+60°C)
Maximum Operating Humidity			95%RH Non-Condensing
Minimum Storage Temperature			-40°F (-40°C)
Maximum Storage Temperature			+176°F (+80°C)


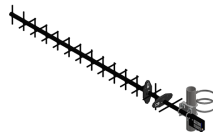
ANTENNA OPTIONS

Mimomax offers a range of industry-standard antennas built to withstand harsh conditions and maintain communications over long paths and difficult terrain. Our Panel and Yagi antennas operate in 400MHz, 700MHz, and 900 MHz.




PANEL ANTENNA COLLECTION

Product	Code	Frequency range	Gain	VSWR	Max. Power	Impedance	Connector	Mounting
Low Profile Panel Antenna								
	ANT-400-420-009-PD00	400-420MHz	9dBi Typical	≤1.5:1 Typical	200W	50Ω	2 x N-Female	Normal
	ANT-415-435-009-PD00	415-435MHz						
	ANT-440-470-009-PD00	440-470MHZ						
	ANT-757-788-012-PD00	757-788MHZ	12dBi Typical					
	ANT-800-880-012-PD00	800-880MHZ						
	ANT-880-960-012-PD0H	880-960MHZ						
Dual Horizontal Stacked Low Profile Panel Antennas								
	ANT-400-420-012-PD02	400-420MHz	12dBi	≤ 1.5:1 Typical	200W	50Ω	2 x N-Female	Normal
	ANT-415-435-012-PD02	415-435MHz						
	ANT-440-470-012-PD02	440-470MHZ						
Compact Panel Antenna								
	ANT-806-869-016-PD00	806-869 MHz	16dBi	≤ 1.5:1	100W	50Ω	2 x N-Female	Normal
	ANT-896-960-016-PD00	896-960MHz						

YAGI ANTENNA COLLECTION

Product	Code	Frequency range	Element (per polarization)	Gain	VSWR	Max. Power	Impedance	Connector
MIMO Yagi 1 - UHF Collection								
	MMX-Y406-DP	380-700MHz	6 element	11dBi	< 1.5:1 across specified band-width	150W	50Ω	2 x N-Female
	MMX-Y409-DP		9 element	13.5dBi				
	MMX-Y415-DP		15 element	16dBi				
MIMO Yagi Antenna 2								
	ANT-757-788-012-YD00	757-788 MHz	7 element	12dBi	≤ 1.43:1	200 W	50Ω	2 x N-Female
MIMO Yagi Antenna 3								
	ANT-757-788-015-YD00	757-788 MHz	14 element	15dBi	≤ 1.43:1	200 W	50Ω	2 x N-Female

CONVERTER OPTIONS

Product	Code	Interfaces Supported	Connector Type	User Bit Rate	Isolation
X-21/RS422 Converter					
	INT-TMC-X21-000	X-21, RS422, RS530 and HSSI2	RJ45	64kbps, 128kbps, 192kbps, 256kbps	1500VDC between radio port and X-21/RS422 port
G703 Converter					
	INT-TMC-703-000	G703	RJ45	64kbps	1500VDC between radio port and G703 port
C37.94 Fibre Converter					
	INT-TMC-C37-000	C37.94 (multi mode)	ST (IEC 61754-2)	64kbps	850 nm (multi mode)
	INT-TMC-C37-001	C37.94 (single mode)	ST (IEC 61754-2)	64kbps	1300 nm (single mode)

Common Converter Specifications

MECHANICAL SPECIFICATIONS

X-21/RS422 and G703 Converters Mechanical Dimensions (L x W x H)	3.31 x 2.32 x 1.30 inches (84 x 59 x 33 mm) (excluding mounting tabs)
C37.94 Fibre Mechanical Dimensions (L x W x H)	3.07 x 2.20 x 0.90 inches (78 x 56 x 23 mm)

ENVIRONMENTAL SPECIFICATIONS

Operating Temperature	-22°F to 140°F (-30°C to 60°C)
Operating Humidity	4% to 100%
Operating Altitude	0 to 1.86 miles (0 to 3000 m)
Environmental Protection	IP20 (Indoor use only)

POWER SPECIFICATIONS

Nominal Voltage	5V (Supplied by Mimomax Tornado)
Power Dissipation	< 75mW
Connection	Included in radio interface port

RADIO INTERFACE SPECIFICATIONS

Electrical Standard	EIA 232
Connector	1 or 2 RJ45s*

SERVICES

From training to build in-house capability in installing and configuring our products through to advanced Radio Network Design and propagation modelling, Mimomax offers a range of services to optimize the performance of our communication solutions for your customers.

Services	BASIC	PREMIUM
Online Induction Training	V	V
Certificate of Training Completion	V	V
Products & Services Update	V	V
Manuals, Brochures, Specsheets	V	V
Modulation Upgrade (QAM64 to QAM256)	V *	V
Initial Radio Path Viability Check	V *	V
Antenna Gain Recommendation	V	V
Teleprotection Interface Recommendation**	V *	V
Online Comprehensive Training	-	V
Comprehensive Path Check	-	V
Configuration	-	V
(Annual) Remote Support Service	-	V
(Annual) Software Maintenance	-	V

*Limited time offer

**Provided teleprotection equipment is known

For more services, please visit mimomax.com/services, contact your Mimomax sales manager or email our team at sales@mimomax.com.

“Testing was completed to a very high standard and the test report we received contained an excellent amount of information. Timescales were carefully managed throughout the project and the regular communication updates ensured project progress was clearly understood resulting in the project being delivered early.”

SANDRA CALLOWHILL - AIRWAVE COMMUNICATIONS

“Throughout this project, every member of the Mimomax team has been vastly knowledgeable about the products and always eager to answer any questions or help solve individual issues. The result is that they have ensured that Navopache Electric is getting exactly what we need out of our radios. “

JEREMY HELLMAN, COMMUNICATIONS ELECTRONIC TECHNICIAN, NAVOPACHE ELECTRIC



mimomax

About

Founded: 2007

Headquarters: Christchurch, New Zealand

Regional offices: Phoenix, Arizona and Portland, Oregon

Key target markets: Utilities

Solutions: Teleprotection, Field Area Networks, SCADA, Distributed Energy Resources, Advanced Metering Infrastructure, Distributed Automation, LMR Voice Backhaul, Redundancy

Combining a deep understanding of RF engineering with a continuous drive towards greater innovation, Mimomax Wireless provides cost-effective advanced communications solutions in licensed narrowband channels.

Our communications solutions are engineered to provide high capacity, low latency links which support near real-time communications for SCADA control and asset integration & monitoring for the utility market.

As a result of our North American success, we have established offices in Phoenix, Arizona and Portland, Oregon - resourced to manage warehouse and logistics, project management and technical support. In addition, we are supported by our head office in Christchurch, New Zealand where development, manufacturing, administration, support, sales, and marketing are carried out.

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