SONABEAM™

SONA
OPTICAL WIRELESS

SONABEAM FROM FSONA

At fSONA, we deliver optical wireless connectivity solutions that bridge network gaps with unmatched simplicity and performance. From point-to-point connectivity to meshed networking architectures, the SONAbeam's protocol transparent technology gives military, government, service providers and enterprise customers alike the unique ability to integrate free space optics (FSO) quickly and easily into any existing network.

By transmitting through the atmosphere, the SONAbeam eliminates the substantial costs of digging up streets and sidewalks required to install fiber, and unlike other wireless solutions, the SONAbeam is immune to electro-magnetic (EM) and radio-frequency (RF) interference, as well as offering the benefit of eliminating the requirement for costly spectrum licenses. Plus; the SONAbeam's narrow, highly directional transmission all but eliminates eavesdropping or interception. Utilizing advanced FSO technology at the eye-safe 1550 nm wavelength, fSONA has created the most potent FSO systems ever brought to market.

FORWARD THINKING IN FREE SPACE OPTICS (OPTICAL WIRELESS)

Key to SONAbeam's breakthrough laser technology is its operational wavelength of 1550 nm, which provides a broad spectrum of safety and performance advantages. Wavelengths longer than 1400 nm are safe to the human eye. Thus the SONAbeam is a true eyesafe platform that meets ANSI Class 1 and IEC Class 1M safety standards. Already operating with the highest output power levels in the industry, the SONAbeam still has room to grow; thanks to the benefits of the 1550 nm wavelength.

SECURE WIRELESS

In today's environment, network security is critical to an organization's survival. The vulnerabilities of RF systems have led people to wrongly conclude that all wireless transmissions are highly vulnerable to interception. The SONAbeam's FSO technology is among the most secure of any wide-area connectivity solution; this is due to its inherent low probability of interception, its anti-jam characteristics and the stealth nature of the transmission.

RUGGED AND ROBUST

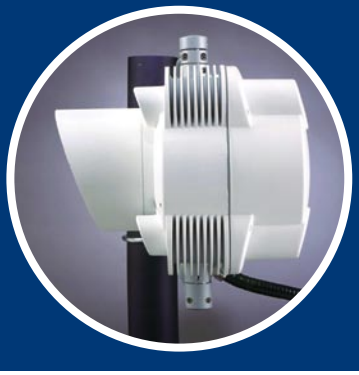
At fSONA, we explored every possible design consideration to ensure the SONAbeam transceivers are able to survive in even the most extreme weather conditions - from the intense cold of the north, to the blazing desert sun. The SONAbeam's superior environmentally sealed, cast-aluminum housing, is unique in the market and is impervious to water, sun and other environmental hazards. Its support infrastructure is rigid enough to maintain stability in winds up to 120 km/h and survive driving gales of up to 160 km/h, allowing for problem-free rooftop and tower installations. The SONAbeam has also been designed to operate through windows, again furthering the available deployment options.

THE MOST RELIABLE PART OF YOUR NETWORK

Thorough product testing is one of the cornerstones of our business, and we consider our testing procedures to be the most rigorous in the industry. To ensure complete reliability throughout the SONAbeam's internal systems, we select and design the electronics to not only utilize the best components available, but to ensure these components operate at the lowest possible stress levels. We then subject every component and every subsystem to a battery of laboratory and real-world tests to confirm the integrity of our design.

CARRIER-CLASS AVAILABILITY

The SONAbeam's high-powered laser transmitters are able to penetrate heavy rain, snow and fog far more effectively and consistently than any other available FSO technology. The ability to deliver the industry's highest link margins makes the SONAbeam ideal for use in hybrid networks; using complementary technologies to create fully protected, fully redundant, multi-media solutions - a requirement in today's networks. With up to four redundant transmitters, the SONAbeam produces up to 640mW of output power; 30-50 times more transmission power than most competing FSO products. With greater power comes enhanced weather penetration capabilities and more effective transmission over longer ranges.



	sonaBeam 1250-M	sonaBeam 155-M
Transmission rates	100 - 1448 Mbps (datarate transparent and reclocked)	31 - 180 Mbps (datarate transparent and reclocked)
Transmission standards	OC-3/STM-1, OC-12/STM-4, 270 Mbps, 1064 Mbps, Fast/Gig Ethernet	OC-3/STM-1, Fast Ethernet
Range: 3 dB/km (clear air)	400 m to 5300 m (1310 ft to 3.3 mi)	300 m to 6400 m (980 ft to 4.0 mi)
10 dB/km (extreme rain)	400 m to 2325 m (1310 ft to 1.4 mi)	300 m to 2675 m (980 ft to 1.7 mi)
Laser output power	640 mW peak (4 x 160 mW)	640 mW peak (4 x 160 mW)
Fiber xmtr output power	-11 dBm(min), -3 dBm (max)	-15 dBm (min), -8 dBm (max)
Fiber rcvr input power	-20 dBm (min), -3 dBm (max)	-31 dBm (min), -8 dBm (max)
Receive aperture	20 cm (8 in) diameter, effective clear	20 cm (8 in) diameter, effective clear

	sonaBeam 52-M
Transmission rates	10 - 68 Mbps (datarate transparent and reclocked)
Transmission standards	E3, DS3, OC-1/STM-0
Range: 3 dB/km (clear air)	300 m to 7700 m (980 ft to 4.8 mi)
10 dB/km (extreme rain)	300 m to 3125 m (980 ft to 1.9 mi)
Laser output power	640 mW peak (4 x 160 mW)
Fiber xmtr output power	-15 dBm (min) to -8 dBm (max)
Fiber rcvr input power	-31 dBm (min) to -8 dBm (max)
Receive aperture	20 cm (8 in) diameter, effective clear

FIBER-OPTIC INTERFACE	
Interface type	SM or MM fiber, SC terminated
Fiber xmtr wavelength	1310 nm nominal (1280 nm to 1335 nm)
Fiber rcvr wavelength	1310 nm nominal (1280 nm to 1335 nm)

MECHANICAL / ELECTRICAL / ENVIRONMENTAL	
Operating temperature	-40ºC to 60ºC (-40ºF to 140º F)
Solar filters	2 spatial, 2 spectral
Pointing stability	120 km/h (75 mph) operating, > 160 km/h (100 mph) survivability
Environmental seal	Water-tight, IP66 + NEMA-4 rated
Dimensions (W*H*D)	Centimeters: 41 x 41 x 46; Inches: 16 x 16 x 18
Weight - kg (lbs)	Head: 20 kg (44 lbs); PCA: 8 kg (17 lbs); Yoke: 8 kg (17 lbs)
Input voltage	-48v DC nominal, Operational range (-40v to -57v)
Optional AC	External AC supply available: 85-260 VAC (50/60 Hz)
Power consumption	Transceiver: 55 watts, max; Heaters: 200 watts, max

CARRIER-CLASS RELIABILITY AND DURABILITY	
Heating	Internal, to 30ºC (86ºF), prevents optics fogging, snow/sleet accumulation
Laser cooling	Active solid state cooling to 35ºC (95ºF), even in desert conditions
Redundant transmitters	4 independent lasers, drivers, coolers & cooler controllers
Power supply	Carrier-grade, 2 million hour MTBF for DC
Structure	Cast aluminum housing, yoke & mount
Adaptive power control	Adjusts laser power to changing weather conditions

COMING SOON

	sonabeam 1250-Z	
Transmission rates	100 - 1602 Mbps (datarate transparent or reclocked)	
Transmission standards	Fast Ethernet , OC-3/STM-1, OC-12/STM-4, Gigabit Ethernet (1.25 Gbps)	
Range: 3 dB/km (clear air)	50 m to 1200 m (160 ft to 0.75 mi)	
10 dB/km (extreme rain)	50 m to 750 m (160 ft to 0.5 mi)	
Laser output power	160 mW peak, directly modulated laser diode	
Receive aperture	40 mm (1.6 in) diameter	
Free space wavelength	1550 nm	
INTERFACE	**1000-base-SX (850nm)**	**1000-base-LX (1310nm)**
Data physical interface	MM fiber, LC	SM + MM fiber, LC
Data transmission	100 to 1602 Mbps	100 to 1602 Mbps
Fiber xmtr/rcvr wavelength	850 nm nominal	1310 nominal
Fiber xmtr output power	802.3z compliant	-11 dBm(min), -03 dBm(max)
Fiber rcvr input power	802.3z compliant	-20 dBm(min), -03 dBm(max)
3R clock & data recovery (CDR)	Configurable (rate specific or bypass)	Configurable (rate specific or bypass)
MECHANICAL / ELECTRICAL / ENVIRONMENTAL		
Operating temperature	-40ºC to 50ºC (-40ºF to -122ºF)	
Pointing stability	120 km/h (75 mph) operating, > 160 km/h (100 mph) survivability	
Environmental seal	Water-tight, IP66 + NEMA-4 Certified	
Dimensions (W*H*D)	Centimeters: 25 x 33 x 46; Inches: 10 x 13 x 18	
Weight - kg (lbs)	Head: 10 kg (22 lbs)	
Input voltage	22-57 VDC or 100-240 VAC	
Power consumption	Transceiver & heater: 40 watts max	
CARRIER-CLASS RELIABILITY AND DURABILITY		
Heating	Window heating prevents optics fogging, snow/sleet accumulation	
Laser cooling	Cast aluminum heat sink	
Power supply	Telco grade - >550,000 hr demonstrated at 25ºC (77ºF)	
Structure	Cast aluminum and steel housing & mount	

	sonaBeam 155-E	sonaBeam 52-E
Transmission rates	31 - 180 Mbps (datarate transparent or reclocked)	10 - 68 Mbps (datarate transparent or reclocked)
Transmission standards	E3, DS3, OC-1/STM-0, OC-3/STM-1, Fast Ethernet	E3, DS3, OC-1/STM-0, Ethernet 10baseT
Range: 3 dB/km (clear air)	50 m to 3300 m (160 ft to 2.1 mi)	50 m to 3850 m (160 ft to 2.3 mi)
10 dB/km (extreme rain)	50 m to 1620 m (160 ft to 1.0 mi)	50 m to 1820 m (160 ft to 1.1 mi)
Laser output power	100 mW peak (2 x 50 mW)	100 mW peak (2 x 50 mW)
Receive aperture	10 cm (4 in) diameter	10 cm (4 in) diameter
MULTI-MODE FIBER-OPTIC INTERFACE CARD		
Data physical interface	Multi-mode fiber, SC terminated	Multi-mode fiber, SC terminated
Fiber xmtr output power	-20 dBm (min), -14 dBm (max)	-20 dBm (min), -14 dBm (max)
Fiber rcvr input power	-30 dBm (min), -14 dBm (max)	-30 dBm (min), -14 dBm (max)
3R clock & data recovery (CDR)	User selectable, bypass for rate-transparency or mux	User selectable, bypass for rate-transparency or mux
SINGLE-MODE FIBER-OPTIC INTERFACE CARD		
Data physical interface	Single-mode fiber, SC terminated	Single-mode fiber, SC terminated
Fiber xmtr output power	-15 dBm (min), -8 dBm (max)	-15 dBm (min), -8 dBm (max)
Fiber rcvr input power	-31 dBm (min), -8 dBm (max)	-31 dBm (min), -8 dBm (max)
3R clock & data recovery (CDR)	User selectable, bypass for rate-transparency or mux	User selectable, bypass for rate-transparency or mux

	sonaBeam 1250-E
Transmission rates	100 - 1602 Mbps (datarate transparent or reclocked)
Transmission standards	Fast Ethernet , OC-3/STM-1, OC-12/STM-4, Gigabit Ethernet (1.25 Gbps)
Range: 3 dB/km (clear air)	50 m to 2600 m (160 ft to 1.6mi)
10 dB/km (extreme rain)	50 m to 1350 m (160 ft to 0.8 mi)
Laser output power	320 mW peak (2 x 160 mW) Directly modulated laser diode
Receive aperture	10 cm (4 in) diameter, effective clear
Free space wavelength	1550 nm

INTERFACE CARDS	1000-base-SX (850nm)	1000-base-TX	1000-base-LX (1310nm)
Data physical interface	MM fiber, LC	RJ45 copper interface	SM + MM fiber, LC
Data transmission	100 to 1602 Mbps	100 and 1000 Mbps	100 to 1602 Mbps
Fiber xmtr/rcvr wavelength	850 nm nominal	Not applicable	1310 nominal
Fiber xmtr output power	802.3z compliant	Not applicable	-11 dBm(min), -03 dBm(max)
Fiber rcvr input power	802.3z compliant	Not applicable	-20 dBm(min), -03 dBm(max)
3R clock & data recovery (CDR)	Configurable (rate specific or bypass	100-base-t Ethernet 1000-base-t Ethernet	Configurable (rate specific or bypass



FIBER-OPTIC INTERFACE	
Interface type	SM or MM fiber, SC terminated
Fiber xmtr wavelength	1310 nm nominal (1280 nm to 1335 nm)
Fiber rcvr wavelength	1310 nm nominal (1280 nm to 1335 nm)

MECHANICAL / ELECTRICAL / ENVIRONMENTAL	
Operating temperature	-40ºC to 50ºC (-40ºF to -122ºF)
Solar filters	2 spatial, 2 spectral
Pointing stability	120 km/h (75 mph) operating, > 160 km/h (100 mph) survivability
Environmental seal	Water-tight, IP66 + NEMA-4 Certified
Dimensions (W*H*D)	Centimeters: 25 x 33 x 46; Inches: 10 x 13 x 18
Weight - kg (lbs)	Head: 10 kg (22 lbs)
Input voltage	22-57 VDC or 100-240 VAC
Power consumption	Transceiver & heater: 155-E/52-E: 30 watts, max; 1250-E: 50 watts max

CARRIER-CLASS RELIABILITY AND DURABILITY	
Heating	Window heating prevents optics fogging, snow/sleet accumulation
Laser cooling	Cast aluminum heat sink
Redundant transmitters	2 independent lasers and drivers
Power supply	Telco grade - >550,000 hr demonstrated at 25ºC (77ºF)
Structure	Cast aluminum and steel housing & mount

ELEMENT MANAGEMENT AND CONTROL	
Management interface	Serial (DB9 or RJ-45) and 10-base-t
SNMP	Embedded v.1 agent
GUI control program	SONAbeam™ Terminal Controller
Command line interface	Via RS232 or IP address
Key parameters monitored	Receive signal strength Power supply currents and voltages Laser currents Laser powers (APC levels) Laser temperatures Internal temperature and humidity Clock recovery / sync status Network interface signal status
Historical logging	Internal data and event logging

CERTIFICATIONS AND CLASSIFICATIONS	*US/Canada*	*International*
Laser safety	CDRH 21 CFR including Laser Notice 50, Class 1M; ANSI Z136.1 & Z136.6, Class 1	IEC 60825-1, Class 1M EN 55022 - emissions
EMC	FCC - Pat 15 / ICES - 003	EN 55024 - immunity
Electrical	UL 60950 / CSA 60950	EN 60950 (CB scheme)

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