



FibeAir™ Family

Broadband Wireless Network Solutions



6-38 GHz 155-622 Mbps SONET/SDH IP ATM Fast Ethernet Built-in ADM

AN INNOVATIVE SOLUTIONS PROVIDER IN HIGH-CAPACITY FIXED WIRELESS COMMUN

Features

- ▣ Operates in millimetric wave frequencies 6 - 38 GHz
- ▣ Multiple modulation scheme, 16 and 128 QAM
- ▣ Complies with FCC, ETSI, ITU-R, ITU-T and IEEE standards and frequency plans, for operation worldwide
- ▣ Provides STM-1/OC-3, 3xE3/DS3, 100BaseTx and E1/T1 interfaces
- ▣ Automatic Tx Power Control (ATPC)
- ▣ Compact, easy-to-install and fully software configurable for simplified provisioning
- ▣ Supports SONET/SDH, ATM and IP over SONET
- ▣ Additional 2 Mbps wayside channel and 64 Kbps user channel
- ▣ Advanced FEC with special ATM optimization provides fiber-like performance ($BER < 10^{-13}$)
- ▣ Built-in Add and Drop Multiplexer (ADM) providing up to 32 T1/E1 tributary interfaces per site
- ▣ Configurations: (1+0), protected (1+1), space and frequency diversity
- ▣ Encrypted 155 Mbps radio with high level DES based core (FITS PUB 46-3)
- ▣ CeraView®, Java-based SNMP element manager, and PolyView™ open interface network management applications



IN THE COMMUNICATIONS MARKET



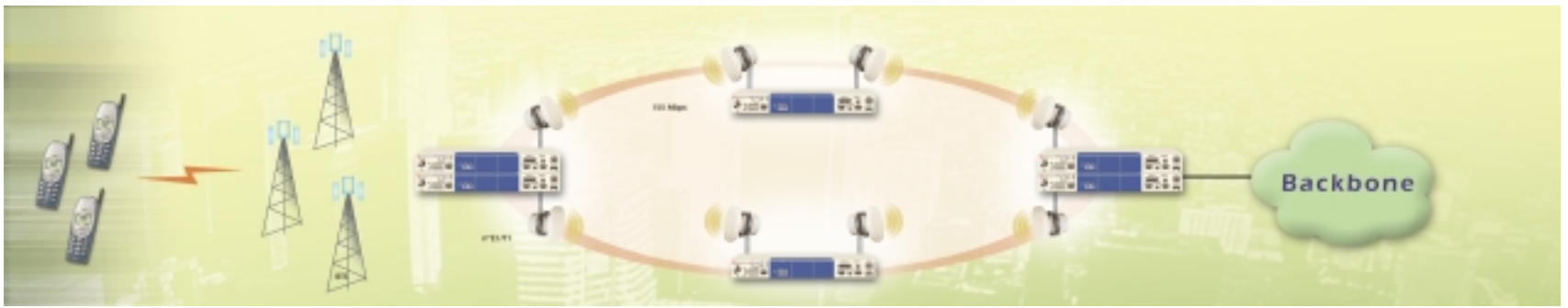
Applications

Ceragon's FibeAir™ product family of broadband wireless systems enables rapid and cost-effective high capacity connectivity for carriers, both in the cellular and fixed operator markets and for private networks. The FibeAir family offers a wide variety of solutions for growing capacity demands, frequency needs and bandwidth requirements.

Mobile Cellular Infrastructure – Ceragon's FibeAir product family is an optimal solution for mobile cellular networks, which require higher capacity due to an increase in subscribers, cell sites and data rich applications. Ceragon's built-in ADM reduces the cost and complexity of deploying ring topologies to manage growing network capacity. As an intelligent network element, FibeAir offers a smooth migration path from existing PDH to SONET/SDH network functionality and to next generation ATM and IP.

Fixed Networks – To bridge the broadband access gap between end-user demands and the core network infrastructure, Ceragon's FibeAir product family offers carriers high-capacity wireless metropolitan ring and PTP solutions in the core network. Ceragon's FibeAir delivers Internet access and integrated high-speed data, video and voice traffic in a cost-effective manner.

Private Networks – The modular FibeAir is ideal for private networks, such as educational and financial institutions, utility companies and corporate campuses, providing carrier-class voice ATM and IP private networks and IP + TDM direct connections.



Management Systems

Ceragon provides state-of-the-art management based on SNMP. Our management applications are written in Java code, and provide management functions at both the element and network levels. The applications run on Windows 95/98/2000/NT, UNIX, and Sun Solaris.

CeraView® is Ceragon's SNMP-based EMS (Element Management System) that enables the operator to perform element configuration, performance monitoring in RF and SDH levels, remote diagnostics, alarm reports and more. CeraView integrates with different NMS (Network Management System) platforms, such as HP OpenView® and SNMPc, to provide more comprehensive system management.

PolyView™ is Ceragon's family of network management applications that can be used to monitor network element status, provide statistical and inventory reports, download software and configuration to elements in the network, and other network-level operations. PolyView integrates with other NMS platforms, such as HP OpenView, to provide more comprehensive network management.

Technical Specifications

GENERAL	6 GHz	7/8 GHz	11 GHz	13 GHz	15 GHz	18 GHz	23 GHz	26 GHz	28 GHz	32 GHz	38 GHz
Standards	FCC/ETSI	ETSI/Canada	FCC/ETSI	ETSI	ETSI/Canada	FCC/ETSI	FCC/ETSI	ETSI	FCC/ETSI/Canada	ETSI	ETSI/FCC
Operating Frequency Range (GHz)	5.925-6.425, 6.425-7.1	7.1-8.5	10.7-11.7	12.75-13.25	14.5-15.35	17.7-19.7	21.2-23.6	24.5-26.5	LMDS, A1, A2, B, LMCS, ETSI	31.8-33.4	37-38.4, 38.6-40/37-39.5
Tx/Rx Spacing (MHz)*	240, 252.04, 260, 266, 340	119, 154, 161, 245, 311.32, 168, 182, 196	500/530, 520, 490	266	315/420/475/728	1560/1010	1200/1232/1008	1008	350-500/1008	812	700/1260
Channel Spacing 16 QAM (MHz)											
128 QAM (MHz)	28/40	28/29.65	28/30/40	28	28	50/55/80 40/27.5	50/56 30/28	56 28	50/56 28	28	50/56 28
Capacity	OC-3/STM-1 or equivalent										
Modulation Type	16 QAM/128 QAM										
Frequency Stability	+/- 0.001% (128 QAM) +/- 0.0005% (16 QAM)										
Frequency Source	Synthesizer										
RF Channel Selection	Via NMS										
System Configurations	Non-protected (1+0), protected (1+1), space diversity, frequency diversity										

*For additional Tx/Rx spacing schemes, please contact your Ceragon representative

RADIO	6 GHz	7/8 GHz	11 GHz	13 GHz	15 GHz	18 GHz	23 GHz	26 GHz	28 GHz	32 GHz	38 GHz
Tx Power 16/128 QAM (dBm)	NA/26	NA/24	NA /20	NA /18	NA /18	20/17	20/17	20/17	20/17*	17/15	15 /15
Tx Range 16/128 QAM	30/25 dB										
Auto Tx Control (ATPC) 16/128 QAM	30/25 dB										
Rx Sensitivity (BER=10 ⁻⁶) 16/128 QAM (dBm)	NA/-68	NA /-68	NA /-68	NA /-68	NA /-68	-73/-68	-72/-67	-72/-67	-72/-67*	-70 /-67	-70/-66
Rx Overload	Better than -20 dBm (128 QAM) / Better than -15 dBm (16 QAM)										
Unfaded BER	Better than 10 ⁻¹³										

ANTENNA	6 GHz	7/8 GHz	11 GHz	13 GHz	15 GHz	18 GHz	23 GHz	26 GHz	28 GHz	32 GHz	38 GHz
1 Ft Gain (dBi)	—	—	—	29.2	31.9	33.5	35	36	36.6	37	39
2 Ft Gain (dBi)	—	30.1	—	35.5	36.6	38.5	40	41	41.5	42	44
3 Ft Gain (dBi)	—	—	—	37.8	38.9	42	43.5	44.5	—	—	—
4/6 Ft Gain (dBi)	39.3	36.4/40.2	40.5/43.6	41.5/45	42.6/46	44.5/48	46/49.5	47/-	—	—	—
8 Ft Gain (dBi)	41.9	42.9									
10 Ft Gain (dBi)	43.3	44.8									
12 Ft Gain (dBi)	45.2	46.3									
15 Ft Gain (dBi)	46.9	48.2									
Polarization	Vertical or Horizontal										
Std Mounting OD Pole	48 mm - 114 mm/1.9" - 4.5" (subject to vendor and antenna size)										

*For LMDS B channel, Tx power is 14 dBm and receiver sensitivity level -62 dBm

PAYLOAD

Capacity: 155.52 Mbps

Payload Types:

SONET: OC-3/STS-3, OC-3C/STS-3C
SDH: STM-1
ATM: ATM over SONET/SDH
IP: IP over SONET/SDH
TDM: E3/DS3/E1/T1

Main interface modules:

STM-1/OC-3: Electrical-CMI/BNC
Optical-SM/MM
Fast Ethernet: 100BaseTx/Fx
TDM: E3/2xE3/DS3/2xDS3/8E1/8T1

Common interfaces combinations:

Fast Ethernet + E3/DS3, 2xFast Ethernet
Fast Ethernet + 8E1/T1

Compatible standards:

ITU-T G.703, G.707, G.783, G.823, G.957, G.958,
ITU-T I.432, ATM Forum, ETSI ETS 300 147, ETS
300 417, ANSI T1.105, ANSI T1.102-1993, Bellcore
GR-253-core, TR-NWT-000499

1544/2048 Kb/s Wayside Channel

Available Interfaces: T1, E1, Ethernet bridge 10Base-T, V.35, X.21, RS-530 or V.36

ADM Interfaces:

OC-3/STM-1 Aggregate Interfaces,
Optical: Single/multi-mode: SC Type, RF: N-Type
E1/T1 Tributary Interfaces: 120/100 ohm balanced
75 ohm unbalanced using adaptor panel to
BT-43/BNC

ADM Configurations:

Single: Optical and Radio Aggregates, 1-16 E1/T1
Single with Regenerator: 2 Optical or 2 Radio
Aggregates, 1-16 E1/T1
Double: 2 Optical or 2 Radio Aggregates,
1-32 E1/T1

ADM Protection:

Topologies: Protected Ring, Cascaded (Chain)
Protection Method: Path Protection, UPSR
Synchronization: External inputs/outputs:
1.5/2 Mbps, 2 MHz

64 Kb/s User Channel, RS-232

Engineering order wire: Audio channel

Protection:

1+1 HSB, space and frequency diversity, hitless
and errorless switching

NETWORK MANAGEMENT, DIAGNOSTICS, STATUS AND ALARMS

Type

SNMP, in compliance with RFC 1213, RFC 1595
(SONET MIB)

Local or Remote NMS Station

PolyView™, CeraView® for Windows
95/98/2000/NT or UNIX, integrated with HPoV

NMS Interface

Ethernet bridge 10Base-T, RS-232 (PPP, SLIP)

Local Configuration & Monitoring

Standard ASCII terminal, serial RS-232

In-band Management

In-band management uses Standard Embedded
Communications Channel

Remote Software Download

External Alarms

8 inputs, TTL-level or contact closure to ground
5 outputs, Form C contacts, software configurable

RSL Indication

Accurate power reading (dBm) available at IDU,
ODU and NMS

ENVIRONMENTAL

Operating Temperature (Guaranteed Performance)

ODU: -35°C to +55°C
IDU: -5°C to +45°C

Relative Humidity

ODU: up to 100% (all weather operation)
IDU: up to 95% (non-condensing)

Altitude

Up to 4,500 m (15,000 ft)

POWER

DC -48V

Optional Inputs

AC 110-220V

MECHANICAL DIMENSIONS

ODU

25 cm dia. X 23 cm depth
(10" dia. X 9" depth)
8 kg weight

IDU

4.3 cm H X 43.2 cm W X 24 cm D
(1.7" H X 17" W X 9.4" D)
3 kg weight

IDU - ODU Coaxial Cable

RG-223 (100 m/300 ft), Belden 9914/RG-8
(300 m/1000 ft) or equivalent, N-type connectors
(male)

Ceragon Networks - The Microwave Fiber™ Company

Ceragon Networks Ltd. (NASDAQ: CRNT), a pacesetter in broadband wireless networking systems, enables rapid and cost-effective high-capacity network connectivity for mobile cellular infrastructure, fixed networks and private networks. As a leader in the global high-capacity wireless infrastructure market, Ceragon's FibeAir™ product family was uniquely designed for carriers, both in the cellular and the fixed operator markets and for private networks, to progressively build networks that meet the growing demand for value-added broadband services. Ceragon's intelligent solutions offer carriers the capacity and reliability of fiber without the high cost and time required to lay lines. Operating across multiple frequencies from 6 to 38 GHz, the modular FibeAir product family supports integrated services from 155 to 622 Mbps over SONET/SDH, ATM and IP networks, and offers innovative built-in add/drop multiplexing and encryption functionality. Ceragon initiated commercial FibeAir deployments in 1998 and today has commercial installations with over 100 customers in more than 40 countries. Founded in 1996, Ceragon is headquartered in Tel Aviv, Israel with offices in the US, UK, France, Mexico, Brazil, India and Hong Kong.



**Corporate Headquarters
Ceragon Networks Ltd.**
24 Raoul Wallenberg St. Tel Aviv 69719, Israel
Tel: 972-3-645-5733 Fax: 972-3-645-5499
info@ceragon.com

Ceragon Networks Inc.
777 Corporate Drive, Mahwah, NJ 07430, U.S.A.
Tel: 1-201-529-4444 Fax: 1-201-529-4559
Toll free: 1-877-FIBEAIR
infous@ceragon.com

Ceragon Networks (UK) Limited.
4 Oak Tree Park, Burnt Meadow Rd.
North Moons Moat, Redditch, Worcestershire B98 9NZ, UK
Tel: 44-(0)-1527-591900 Fax: 44-(0)-1527-591903
infoeuro@ceragon.com

www.ceragon.com