



# **FibeAir™ 1500 Family**

**FibeAir™ 1500**

**FibeAir™ 1528**

**FibeAir™ 1500A**

**FibeAir™ 1528A**

**With CeraView® Java**

**High-Capacity Wireless  
Network Systems**

**Installation and  
Operation Manual**

**BM-0074-2 Rev. 2.0**

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89/336/EEC Council Directive of 3 May 1989 on the approximation of the laws of Member States relating to electromagnetic compatibility.

73/23/EEC Low Voltage Directive

ETS 300 385 dated February 1996 with Amendment 1 March 1997 to Grade B standard. Electromagnetic Compatibility (EMC) standard for fixed radio links and ancillary equipment.

EN60950 (Amendment 4) "Safety of Information Technology Equipment"

EN 300 430 Digital Radio Relay System operating in the 18 GHz.

EN 300 198 Parameters for DRRS for the transmission of digital signals and analogue video signals operating at 23 GHz.

EN 300 431 Digital fixed point-to-point radio link equipment operating in the frequency range 24.25 to 29.5 GHz.

EN 300 197 Parameters for the transmission of digital signals and analogue video signals operating at 38 GHz.

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**Equipment Category:** Digital Microwave Fixed Link

**Notify Body no.:** 889

As the manufacturer we declare under our sole responsibility that the above-mentioned products comply with the above named directives and standards.



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73/23/EEC Low Voltage Directive

EN 301 489-4 V1.2.1(2000-08) Electromagnetic compatibility and radio spectrum matters (ERM); Electromagnetic compatibility (EMC) standard for radio equipment and services.

EN60950 (Amendment 4) "Safety of Information Technology Equipment"

EN 300 197 Parameters for DRRS for the transmission of digital signals and analogue video signals operating at 38 GHz

EN 300 431 Parameters for DRRS for the transmission of digital signals and analogue video signals operating at 24.50 GHz to 29.5 GHz

EN 300 198 Parameters for DRRS for the transmission of digital signals and analogue video signals operating at 23 GHz

EN 300 430 Parameters for radio systems for the transmission of STM-1 digital signals operating in the 18 GHz frequency band with channel spacing of 55 MHz and 27.5 MHz

EN 300 234 High Capacity digital radio systems carrying 1 x STM-1 signals and operating in frequency bands with about 30 MHz channel spacing and alternated arrangements

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# Safety Precautions

*The following safety precautions should be observed when working with fiber optic lines.*



**Before turning on the equipment, make sure that the fiber optic cable is intact and is connected to the transmitter.**



**Do not attempt to adjust the laser drive current.**



**Do not use broken or unterminated fiber optic cables/connectors or look straight at the laser beam.**

**ATTENTION: The laser beam is invisible!**



**The use of optical devices with the equipment will increase eye hazard.**



**Use of controls, adjustments, or performing procedures other than those specified herein, may result in hazardous radiation exposure.**

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# Chapter 1

## Introduction

### FibeAir 1500/1528

FibeAir™ 1500/1528 is a member of the Ceragon Networks™ new-generation of Digital Radio Relay Systems (DRRS). FibeAir is a compact, flexible, easy-to-deploy and cost-effective product designed to support high capacity voice, data, and video applications in Wide Area Networks (WANs), and Metropolitan Area Networks (MANs).



***FibeAir System***

FibeAir systems operate in the 6 to 38 GHz frequency bands and carry medium and high capacity payloads in accordance with ETSI and ITU-T standards, for worldwide operation.

FibeAir provides operators with a wireless-based network solution offering fiber-like quality of service. The system's all digital design provides superior radio performance resulting in an extremely low residual BER, and, consequently, an extremely low cost alternative to metropolitan fiber lines.

FibeAir is designed especially for SDH/SONET and IP based networks, as well as microwave ATM, ensuring safe routing of ATM cells.

As a software-oriented system, FibeAir deploys state-of-the-art digital technology. Together with its integrated SNMP agent, FibeAir can be controlled either by the company's management software or interfaced to the Telecommunication Management Network (TMN) of the service provider.

CeraView™, Ceragon's SNMP-based GUI element manager, and PolyView™, Ceragon's open interface network management software, run on Windows 95/98/2000/NT and over HP OpenView (Windows or UNIX).

## Features

- Compact and easy to install.
- All system setups and configurations are software-determined, including operating frequency channel.
- Internal multiplexer supports most relevant physical interfaces and data rates.
- Forward Error Correction (FEC) coding for improved performance.
- Special optimization for safe ATM transports
- Advanced digital signal processing implementing all-digital adaptive equalization, tracing loops, IF modulation/demodulation.
- High spectral efficiency due to advanced modulation (16/128 QAM).
- 13 external input and output alarms.
- Local display of far-end terminal status.
- Remote software downloads for easy upgrades.
- Loopback control for easy fault isolation.
- In-band management implementation.
- Unique SNMP-based management, with user friendly GUI, operating on Windows or UNIX platforms.
- Protected and non-protected configurations.
- Hitless, errorless diversity protection switching.

## Applications

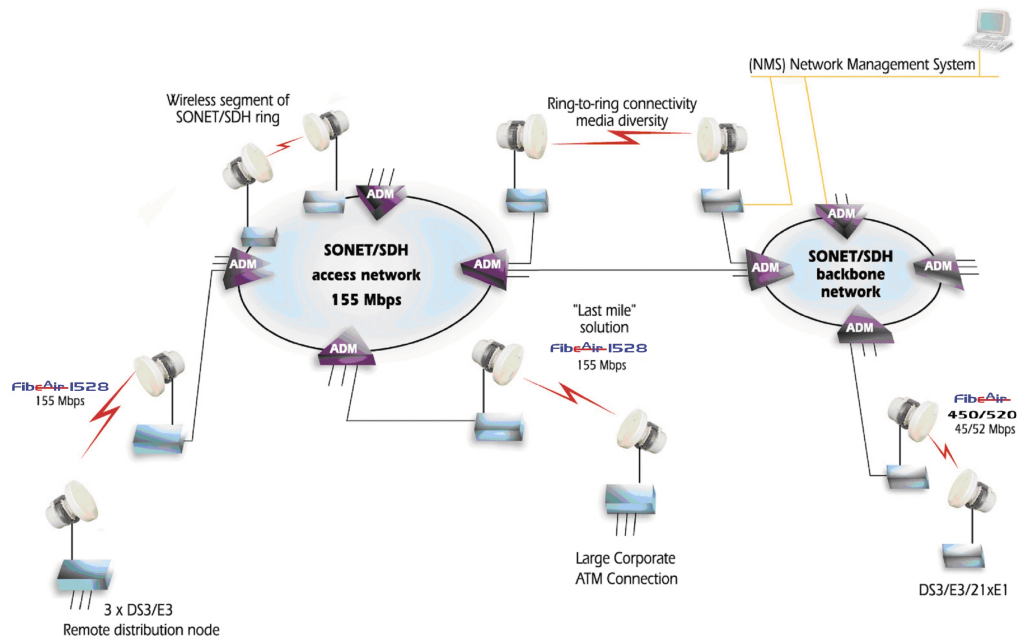
FibeAir 1500/1528 is a natural choice for metropolitan SONET, SDH, ATM, and IP networks. The system is used for ring closures, ring/LAN interconnections and access to remote distribution nodes. The system may be used either as a transparent alternative to fiber lines, or as a redundant link, providing media diversity protection.

FibeAir's low frequency links (6-15 GHz) enable longer operating distances, essential for cellular backbones, ILEC/CLEC backbones, and large enterprises. Together, Ceragon's high and low frequency links provide a comprehensive one-vendor wireless communication solution.

The following are typical FibeAir 1500/1528 applications:

- SONET/SDH Networks
- Cellular Networks - MSC to BSC UPSR Ring
- ATM Networks
- Corporate/Campus Networks
- LMDS Backhaul

## SONET/SDH Networks

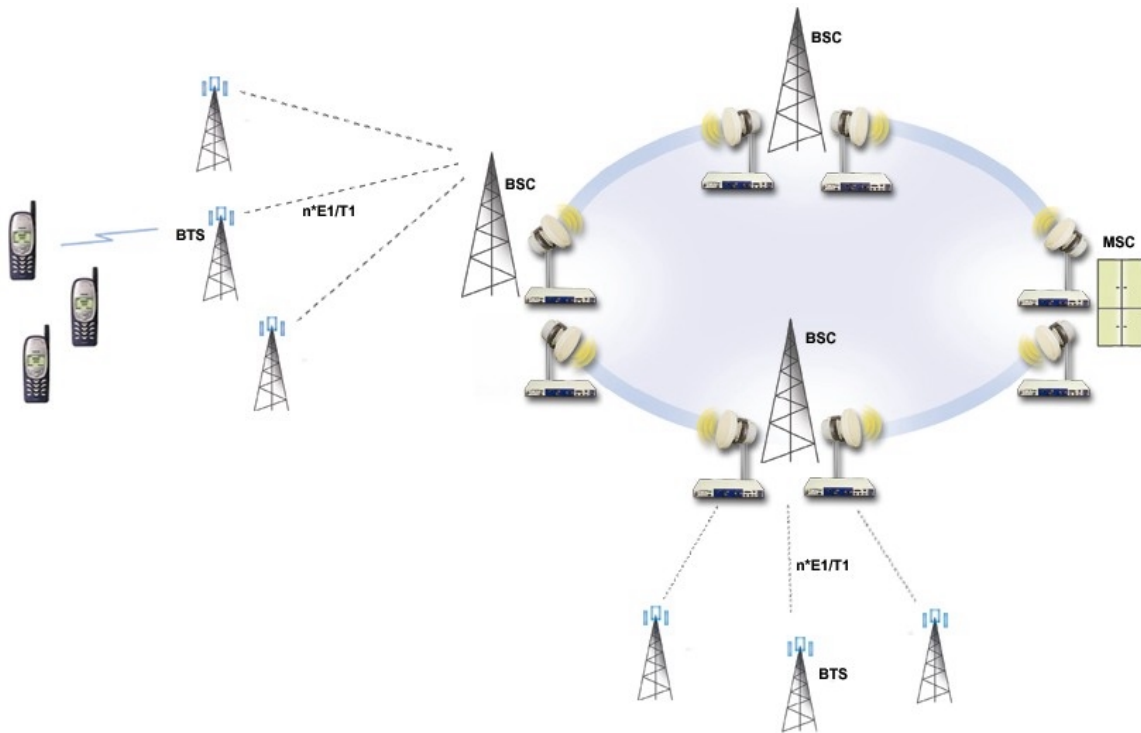


### SONET/SDH Network Enhancement

FibeAir 1500/1528 is a revolutionary compact wireless solution for metropolitan high capacity SONET/SDH networks. In access applications, the system provides a "last mile" high bit rate connection to large corporate networks or to remote distribution node carrying data, video and voice to multiple subscribers.

FibeAir includes an internal multiplexer that can provide a combination of OC-3/STM-1, DS3/E3, Ethernet/Fast Ethernet, T1/E1 interfaces. As a SONET/SDH network element, FibeAir can perform ring closures, ring interconnections and carry IP or ATM traffic over SONET/SDH.

### Cellular Networks - MSC to BSC UPSR Ring



Cellular Networks - MSC to BSC UPSR Ring

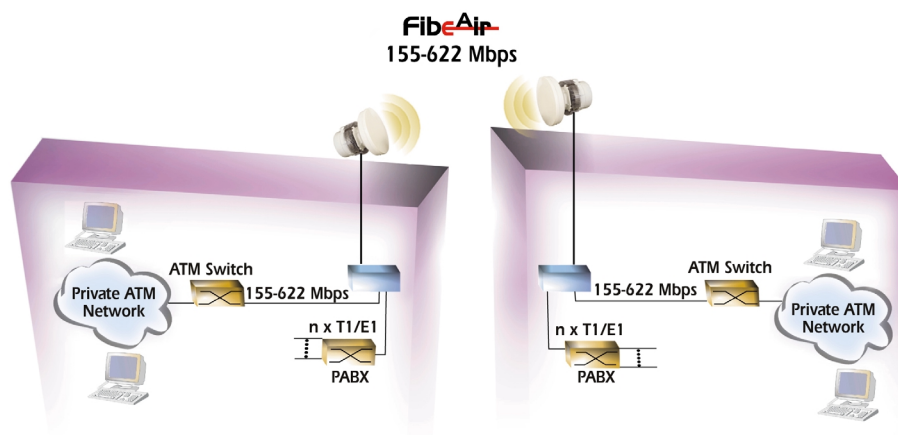
High speed links allow for expansion of capacity in Cellular systems. Especially well-suited for creation of dense micro-cells.

### Microwave ATM Networks

ATM was originally designed for transmission over error-free channels (e.g. fibers). Radio transmission is challenged by ATM, and ATM's basic and simple error correction mechanism needs to be strengthened for transmission over actual radio links.

Ceragon has chosen an ATM design solution, one that significantly improves the important cell transfer parameters. Furthermore, Ceragon's approach is optimized for ATM transport, but is also suitable for high-performance transmission of other payloads (e.g. SONET/SDH, Packet over SONET). No special configuration via management is required for any payload type.

The FibeAir system is optimally designed for microwave ATM transmission. Advanced algorithms minimize cell loss (CLR) and cell miss-insertion (CMR), and together with error correction mechanisms, ensure fiber-like quality transmission. The system can be integrated with ATM NTUs (Network Termination Units) and ATM access concentrators offering a wide variety of access solutions in capacities ranging from DS3/E3 to 155 Mbps.



### *Microwave ATM Networks*

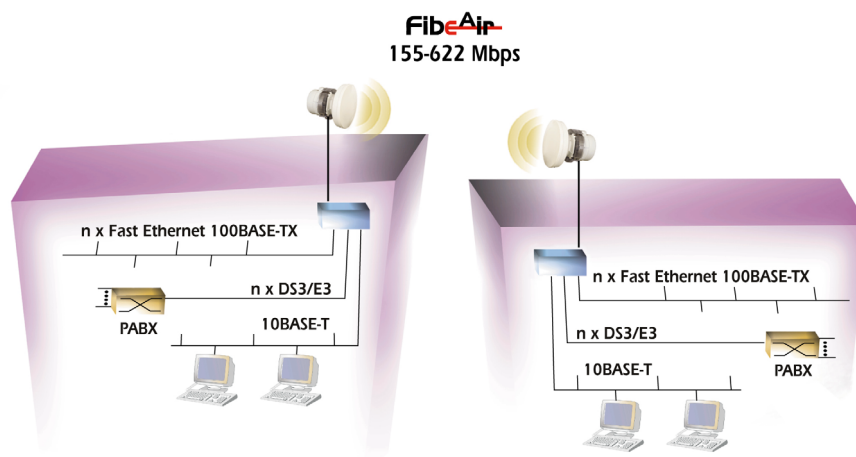
FibeAir 1500/1528 supports various services (CBR, VBR, and ATM UNI) at the customer premises. Designed for the most demanding data applications, FibeAir 1500/1528 meets the most stringent QoS requirements.

## **Corporate/Campus Networks**

The FibeAir 1500/1528 system is a flexible, cost-effective solution for corporate networks and campus environment presenting a point-to-point, end-to-end broadband wireless alternative to expensive leased fiber lines. The FibeAir system provides a “one box” solution by integrating services such as Fast Ethernet, data, video and voice.

For pure Ethernet applications, FibeAir 1528 can be used to create virtual networks for LAN users (VLANs). FibeAir 1500/1528 provides two Fast Ethernet (100Base-TX) connections over 155 Mbps.

In addition, the FibeAir 1000 Digital Radio system offers LAN-to-LAN and PBX connectivity for campus networks, large enterprises, and metro last mile access. The system provides full throughput (up to 116 Mbps) Fast Ethernet connectivity together with up to 8 E1/T1 ports for TDM based information.



### *Corporate/Campus Networks*

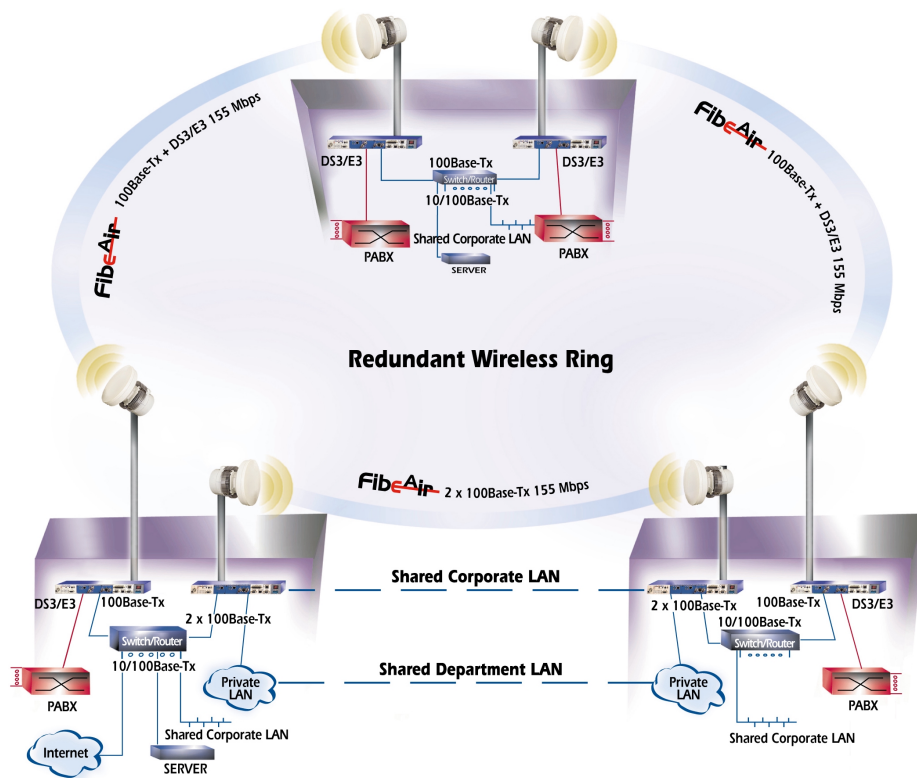
### Integral Multiplexer

In the Telecom and Datacom environment, different interfaces are used. The FibeAir integral multiplexer supports both Telecom and Datacom interfaces by mapping the different data streams into the SONET/SDH payload.

The following applications using the FibeAir 1500/1528 system are available:

- **Fast Ethernet and DS3/E3** - combines wireless Fast Ethernet and DS3/E3 interfaces for various applications such as the corporate and campus environment.
- **Fast Ethernet and 8xE1/T1** - combines wireless Fast Ethernet and 8xE1/T1 interfaces for various applications that require E1/T1 tributary lines.
- **3XE3, 3XDS3** - broadband wireless solutions for Wide Area Networks (WANs), Metropolitan Area Networks (MANs) and Corporate/Campus applications.
- **2XFast Ethernet** - wireless Fast Ethernet applications for the Corporate and Campus environment and Internet Service Providers (ISPs).

The following figure illustrates a Telecom and Datacom Convergence wireless network.



Telecom/Datacom Convergence