

TurboLink®

TurboLink® Features

- TurboLink® bridges the gap between traditional high-data-rate network technology and non-network based radio technology.
- Provides reliable transmission of data with link Bit Error Rates (BER) as low as 10^{-3} through the use of forward error correction.
- Provides priority queuing to designated traffic streams.
- Standard synchronous serial RS-530 (DTE) interface to the radio.
- Standard OC-3 interface to the ATM network. The OC-3 transceiver is a standard multimode 155MB unit with a duplex SC receptacle. The transceiver operates at a wavelength of 1300 nm and is effective at distances up to 2 km.
- Support for data rates from 2.4 kbps to 8.448 Mbps on the serial interface.
- Configuration and monitoring via RS-232 console port. The console port is a 9 pin d-subminiature connector suitable for interfacing with a dumb terminal or PC. The console port allows an operator to configure operating parameters as data rate, size of data frames transmitted over the serial interface, and level of forward error correction applied to data.



emerged to satisfy the appetite for new products and services. The industry is challenged with improving the speed, reliability and economics of voice, data and video transmissions for the business user. New ways are being sought to provide a superior connection across the “last mile”. Due to the transmission expense, right-of-way issues and delays in the deployment of wireline and cable options, many businesses and system operators wish to augment their traditional wireline networks with line of sight wireless and satellite links. These wireline/wireless hybrid networks can enable high-speed multimedia services to be deployed more rapidly and cost-effectively. To date however, wireless links do not provide a secure, trouble-free, and seamless end-to-end communications path. Data network protocols were not designed to perform well over wireless links resulting in transmission errors and degradation of service. Bandwidth is wasted due to the retransmission of data. Further, inherent inefficiencies exist in wireless networks since they were designed to handle “worst case” link conditions. While convergence of wireline and wireless is underway, a technology chasm still exists that is inhibiting the growth of this market.

Introduction

With deregulation, competition, technological advances and big leaps in market demand, the telecommunications industry is experiencing a whirlwind of change. Many new service providers, and equipment suppliers have

TurboLink® overview

TurboLink® bridges the gap between traditional high-data-rate network technology and non-network based radio technology. It enables the extension of ATM networks over modem and radio links in point-to-point topologies. While some ATM switch manufacturers provide specialized (and expensive) interface modules that can be used over wireless media, TurboLink® provides this capability at a small fraction of the cost. The principal function of the TurboLink® is to provide an interface conversion between ATM OC-3c and serial RS-530. The OC-3 port interfaces directly to any ATM switch or edge device. The RS-530 serial port interfaces to synchronous serial equipment not typically used in ATM networks such as modems or radios used in terrestrial and satellite communication. TurboLink® also provides improved performance for ATM traffic over a wireless communication channel through the incorporation of Forward Error Correction (FEC). TurboLink® is also capable of providing priority queuing to traffic designated by the operator. When priority queuing is enabled, the designated traffic is processed and transmitted first (Priority Service). The remainder of the traffic is treated as Best Effort traffic and is processed and transmitted after the Priority Service traffic.

Configuration and initial setup of TurboLink® is minimal. Once initialized, TurboLink® runs automatically and requires no operator intervention or monitoring. If desired, the operator can monitor performance characteristics via a console interface. Example statistics that can be monitored are current channel Bit Error Rate and the number of ATM cells transmitted/received/dropped.

Typical TurboLink® Application

Figure 1 shows a typical system diagram using TurboLink® in an ATM over wireless network. TurboLink® systems are always fielded in pairs, having one system at each end of the wireless link.

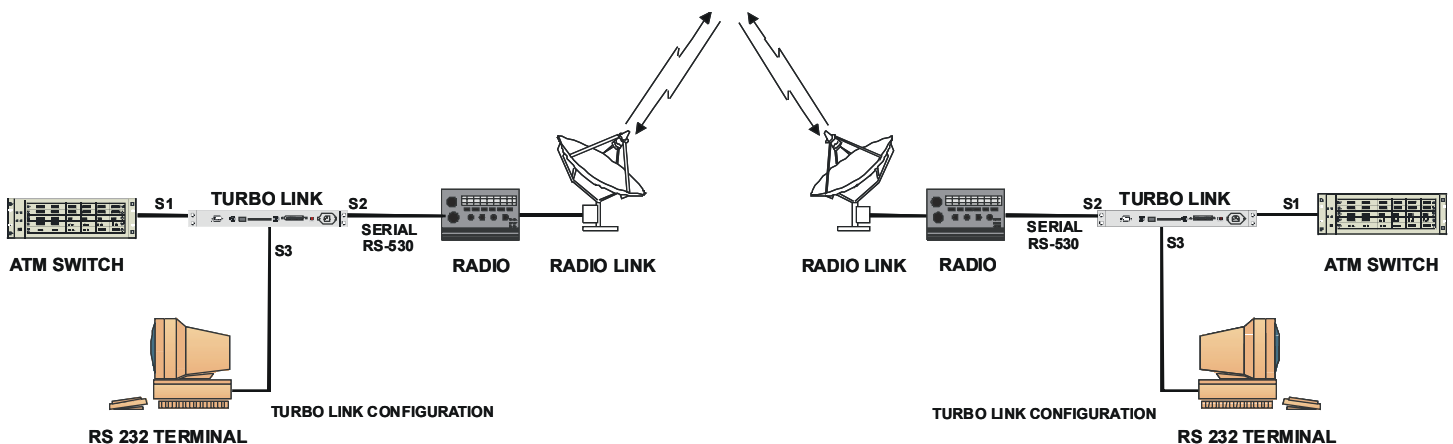


Figure 1 Wireless ATM network diagram with Turbolink®.

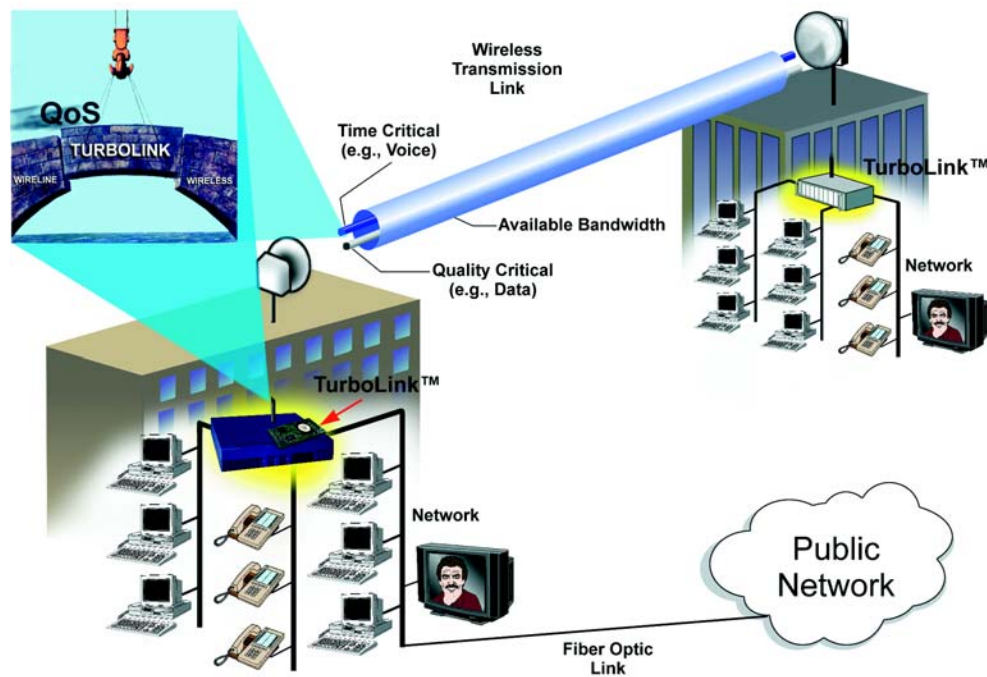


Figure 2 – TurboLink® Unifying the Network and the Wireless Medium

Interface Conversion

TurboLink® bridges the gap between traditional high-data-rate network technology and non-network based radio technology. An OC-3 interface is provided to interface directly to any ATM switch or edge device via the standard OC-3 ATM serial interface. An RS-530/RS-422 synchronous serial interface port is provided to interface to common radio equipment, which typically do not have a network interface.

Forward Error Correction

Reliable data transmission across error prone wireless links is accomplished by using forward error correction (FEC). TurboLink® uses the Reed-Solomon FEC algorithm. The operator can select the amount of error correction that is applied to the data or has the ability to turn off the FEC. The Reed-Solomon FEC algorithm is capable of correcting up to 10 byte errors per block.

Priority Queuing

Priority queuing allows the operator to select two VPIs, which will be guaranteed a user specified amount of bandwidth up to the bandwidth of the link. The remainder of the traffic will be treated as best effort traffic, which will be sent as bandwidth is available. The operator also has the capability to invert the sense of the priority queuing such that the specified VPIs are treated as best effort traffic and the remainder of the traffic is considered Priority Service traffic.

Configuration

Configuration and initial setup of TurboLink® is minimal. Once initialized, TurboLink® runs automatically and requires no operator intervention or monitoring. If desired, the operator can monitor performance characteristics via the console interface. Example statistics that can be monitored are number of ATM cells transmitted/received/dropped, Reed-Solomon codec correction utilization, guaranteed service dropped cells, and interface status.

Planned TurboLink® Features

The features listed below are candidates for incorporation into future version of TurboLink®. Those features incorporated will be determined, in large part, by customer requirements.

- DS-1, DS-3, and/or Ethernet interfaces to the modem/radio
- User configuration via Ethernet.
- Serial side data rate up to 45Mbps

Turbolink® Specifications

- 1U, 19" Rack-mountable chassis
- 110-250 VAC
- RS-530 synchronous serial interface to radio
- SC Duplex OC-3 Multimode ATM interface
- Console serial interface
- 2.4 kbps to 8.448 Mbps data rate

* Units Shipping Fourth Quarter 2001