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Xedge TID-4

Synchronized Xedge Transport of Independently Timed Data Systems

INTRODUCTION

GDC's Xedge Time Independent Data IV (TID-4) is a bit-transparent, serial-data-over-packet solution that combines clock recovery and wide area transport over private or public networks. Xedge TID-4 is ideally suited for non-standard baud rate communication of DoD, MoD, Aerospace, Transportation, or specialized commercial networks.

TID-4 maintains the clock/data relationship in critical commercial or government applications, such as Telemetry and unidirectional data transport, as well as satellite circuits that are asymmetric due to up/downlink bandwidth differences.

SYSTEM OVERVIEW

The TID-4 employs a multi-port line interface module and a companion circuit emulation slot controller. In applications where the position of the data bit on the clock is critical, each TID-4 port maintains a totally independent synchronized clock from end to end of the application circuit (DTE or DCE). The slot controller recovers timing for transport across the Xedge network.

Figure 1 shows a TID-4 application conveying multiple symmetric or asymmetric data rates from 75bps to 50Mbps.

FEATURE HIGHLIGHTS

- Provides interworking between systems that are timed independent of the transport network.
- Employs an Xedge circuit emulation slot controller and an Adaptive Serial I/O LIM in an Xedge 6000 chassis.
- Choice of Xedge modules support a variety of
- transport interfaces and protocols.
- Adaptive Serial I/O LIMs support up to 4 serial interface ports (RS449, RS530, V.35 or X21), as well as high speed ports (HSSI, ECL, TTL).
- Per port rate interface type configuration (DCE/DTE).
- Per port configuration to standard and non-standard rate from 75 bps to 50 Mbps.
- Performs adaptive data rate tracking according to changes in input data rates.
- Timing derived from serial ports can be used to supply system timing for any Xedge 6000 chassis.
- Configurable clock tracking mechanisms.
- Supports Ethernet, MPLS-Pseudowire or ATM transmission over a satellite facility.
- Supports simplex, duplex and asymmetric operations.
- TDM to Ethernet IP encapsulation or TDM to ATM cell encapsulation.
- Managed via SNMP or ProSphere NMS.

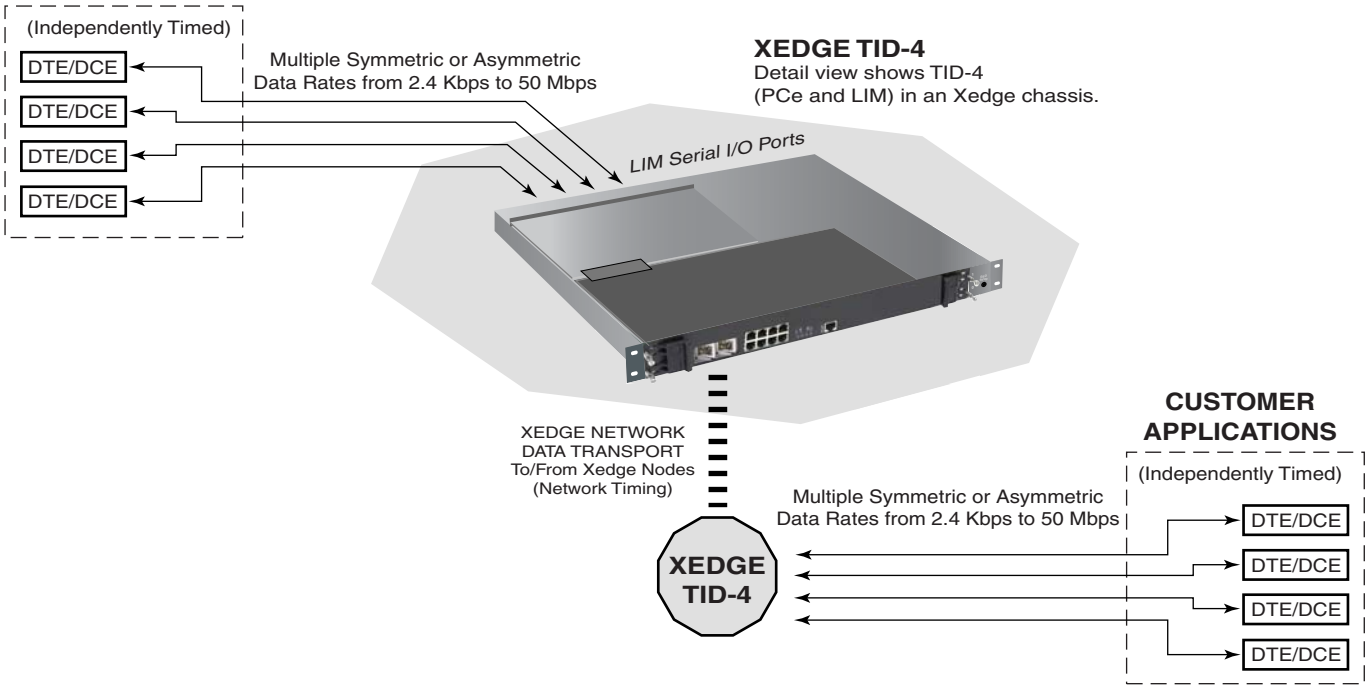

Figure 1: Typical Xedge TID-4 Deployment

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Telemetry Data Transport Challenge

The communication of telemetry data is typically associated with high speed airborne vehicles (satellites, jet aircraft, rockets, missiles, spaceshuttle, etc.) that communicate with ground stations. Other critical applications can be found in certain data connections for DoD/MoD networks that require transmission equipment flexible enough to adapt to real-time phenomena.

Air to ground communications for telemetry that use facilities of ground tracking stations remote from a data analysis center can be a challenge for range operators. For example, a network may need to transmit telemetry information over a wide area connecting system that is timed independent of the transport network.

The aggregation of telemetry data for a mission requires a wide range of transmission bit rates. When combined with the speed of the vehicle, and the relative distance of tracking stations to it, communication devices in the network may require tolerance for frequency variation and delay. The signal, in bit serial form, is transmitted via radio transmitter; at the ground station a receiver and data synchronizer recovers both clock and data. These bit streams and any device connected to them can cover an extremely wide range of bit rates up to 50 Mbps.

TID-4 Tracking & Clock Recovery

GDC's Time Independent Data solutions provide adaptive non-standard baud rate communication that satisfies the requirements for networks that must acquire, transport and distribute real-time telemetry, SCADA, radar or other data. These solutions provide for encapsulation of bit transparent serial data in Ethernet/IP packets or ATM cells. The Packet Circuit Emulation (PCE) or Circuit Emulation (CE) controller provides the encapsulation and adaptive timing function, with the adaptive timing based on traffic arrival time.

Tracking allows TID-4 to maintain clock synchronization from end to end of the circuit as the transmission experiences positive and negative frequency variations and transmission delays in the incoming serial bitstream. These conditions can be due to distance variations between satellite and Earth Stations, caused by Doppler Effect or other application phenomena *(Figure 2)*.

TID-4 tracking and clock recovery capabilities adapt to such changes in order to prevent the loss of critical data. Data rates can be configured from 2.4 Kbps to 50 Mbps. The standard tracking range is optimized for fast acquisition. Wide range tracking allows for adaptive, any frequency variation. *Figure 2* shows TID-4 accommodating these challenges in Terrestrial Link-Satellite Extension networks.

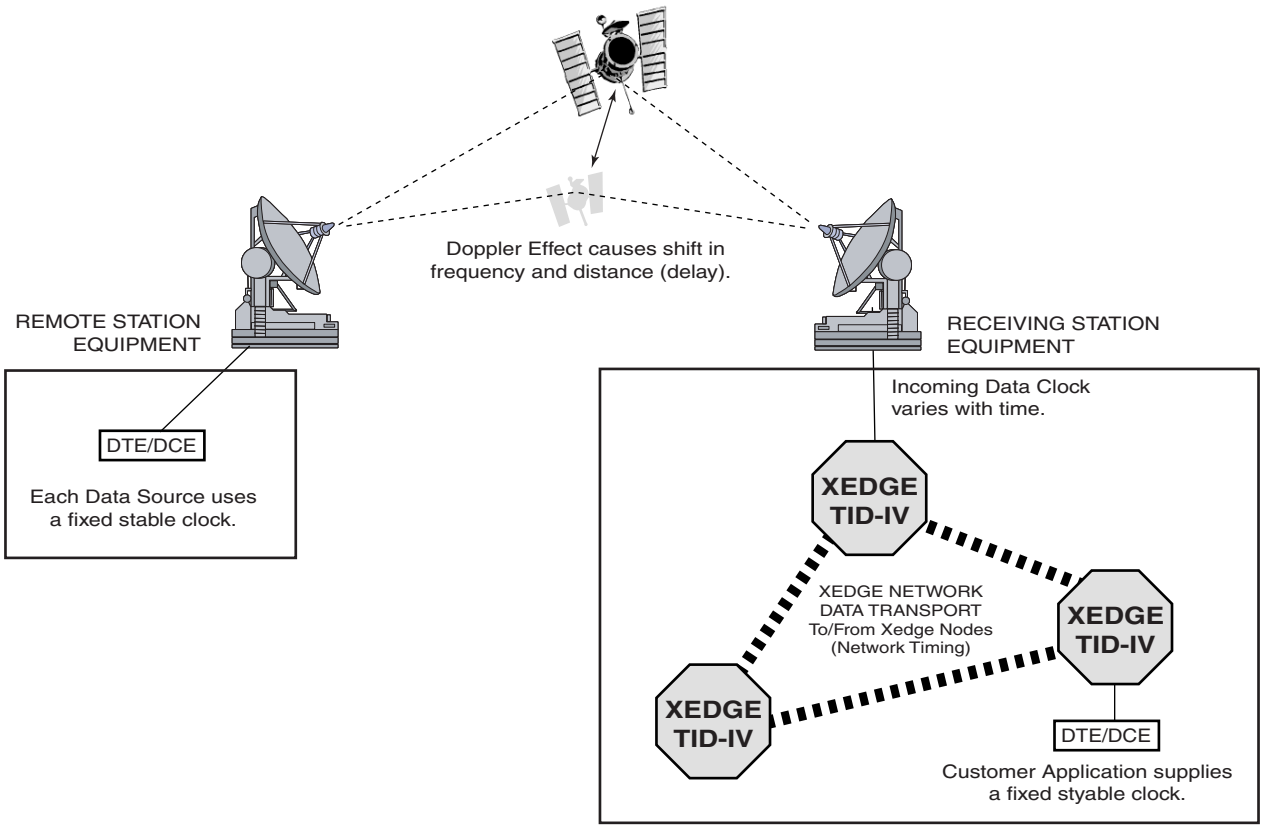

Figure 2: TID-4 in a Terrestrial Link-Satellite Extension Network

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Flexible Networking & Bandwidth

The Xedge TID-4 is designed to communicate with multiple serial devices and allows the operator to adjust bandwidth to a configured serial input rate using Pseudowires over MPLS, Ethernet or ATM virtual circuits, depending on the type of circuit emulation module deployed. Flexible and standards-based Xedge technology facilitates TID-4 connectivity to any Ethernet, MPLS or ATM transit network via standard interfaces and protocols.

Secure, Integrated Management

The SNMP interface provides password-protected access to the Xedge switch via a craft or Telnet connection. Menu-based SNMP utilizes both standard MIBS and GDC's proprietary MIBs that define the management data available from the TID-4 and other Xedge6000-series network elements installed in the switch.

ProSphere Network Management System (NMS) is GDC's Java-based management software that allows multiple clients to access a ProSphere Server located on a remote PC or SUN workstation. ProSphere facilitates the configuration and monitoring of users, communications and Xedge devices via an intuitive graphical user interface.

Compatible Xedge slot controllers and LIMs support standard network diagnostics. The system administrator can collect TID-IV configuration, status and operation information for informed maintenance and troubleshooting..

Reliable & Scalable Deployment

Xedge TID-4 comprises a slot controller and LIM card that plug into an AC- or DC-powered Xedge chassis. The slot controller plugs into the chassis midplane at the front panel of the chassis; the LIM plugs into the slot controller at the chassis rear panel. *Figure 3* shows TID-4 fuctionality with components installed in the Xedge 6002 chassis.

Xedge network elements and system software are designed to perform consistently across the Xedge platform. This seamless integration enables simplified, scalable and cost-effective network maintenance, sparing and operation. The Xedge family of products support high-speed Ethernet, IP and legacy TDM/ATM, enabling operators to migrate legacy services over a secure, resilient Ethernet, MPLS or ATM backbone.

- Use Packet Circuit Emulation module (PCe) in any Xedge chassis for TDM to Ethernet/IP encapsulation for circuit emulation.
- Use Packet Cell Switch module (PCx) in any Xedge chassis for high-speed MPLS, Ethernet or cell transmission
- Use either the 2-port or 4-port Adaptive Serial I/O LIM (ASIO) for the particular circuit emulation module in your TID-4.
- For ATM applications, use the Circuit Emulation module (CE) in any chassis except the Xedge 6002 chassis.

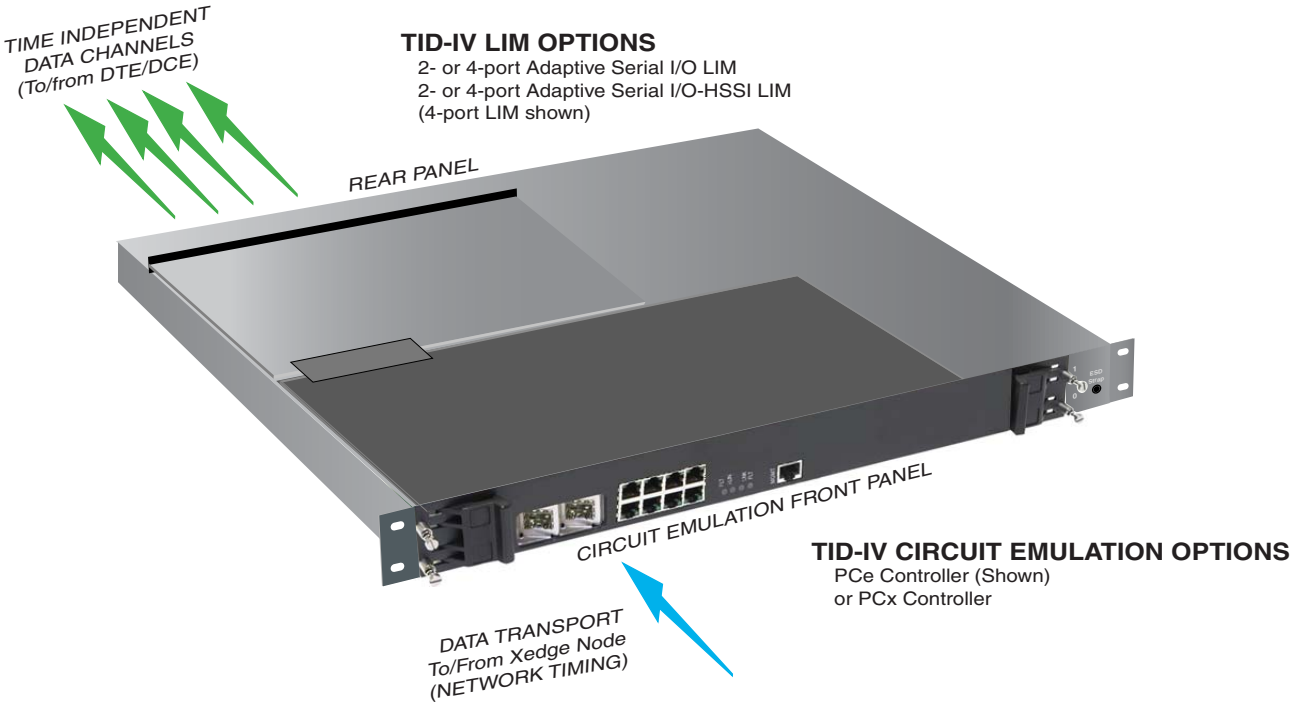

Figure 3: TID-4 in the Xedge 6002 Chassis

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Physical Specifications

Single Slot Controller (CE Module)

(Horizontally installed)
Single-slot Height: 19.81 mm (0.78 in.)
Width: 395.73 mm (15.58 in.)
Depth: 240.53 mm (9.47 in.)
Weight: TBD

*Dual Slot Controller (PCX or PCE_*

Dual-slot Height: 40.13 mm (1.58 in.)
Width: 395.73 mm (15.58 in.)
Height: 261.62 mm (10.3 in.)
Depth: 240.53 mm (9.47 in.)
Weight: TBD

Adaptive Serial I/O LIM

Single-slot Height: 19.81 mm (0.78 in.)
Width: 261.62 mm (10.3 in.)
Depth: 198.12 mm (7.80 in.)
Weight: TBD

Adaptive Serial I/O High Speed LIM

Single-slot Height: 19.81 mm (0.78 in.)
Width: 261.62 mm (10.3 in.)
Depth: 198.12 mm (7.80 in.)
Weight: TBD

Ordering Information

Xedge Circuit Emulation Slot Controller (CE)

Xedge Packet Cell Switch Slot Controller (PCx)

Xedge Packet Circuit Emulation Slot Controller (PCe)

Xedge Adaptive Serial I/O LIM

Xedge Adaptive Serial I/O High Speed LIMs

Environmental Specifications

Non-Operating

Temperature: -40 to 70 degrees C (-40 to 158 degrees F)
Relative Humidity: Up to 95%
Altitude: up to 12,191 m (40,000 ft)

Operating

Temperature: 0 to 50 degrees C (32 to 122 degrees F)
Relative Humidity: Up to 95% non-condensing
Altitude: -60 to 4,0000 m (-197 to 13,123 ft)

Electrical Specifications

Dependent on Xedge Chassis used:
Xedge 6645 Switch Chassis (16 I/O slots, DC Power)
Xedge 6640 Switch Chassis (16 I/O slots, AC Power)
Xedge 6280 Switch Chassis (7 I/O slots, AC or DC Power)
Xedge 6160 Switch Chassis (4 I/O slots, AC or DC Power)
Xedge 6002 Switch Chassis (2 I/O slots, AC or DC Power)

Functional Specifications

Physical Interfaces

ASIO LIM: RS449, RS530, V.35, X.21 (Either DCE or DTE)

ASIO High Speed LIMs: HSSI, ECL or TTL

Port Capacity: 2 or 4 serial ports

Typical Data Rates (in Kbps)

2.4	19.2	57.6	144.0	307.2	1536.0
4.8	28.8	64.0	15360	320.0	1920.0
7.2	32.0	76.8	192.0	384.0	2048.0
9.6	38.4	96.0	224.0	448.0	4096.0
14.4	48.0	112.0	230.0	512.0	6144.0
16.0	50.0	115.0	256.0	768.0	8192.0
16.6	56.0	128.0	288.0	1024.0	10000.0

Note: The TID-4 automatically adjusts to the arrival time of the incoming stream.

Operational Specifications

Control Leads: RTS, CTS, DTR, DSR, DCD

Circuit Startup Time: Less than 50 ms (default)

Tracking range: +/- 10 percent

Configurable CDV Tolerance

Configurable Clock Recovery Bandwidth

Transparent to any data pattern

CBR guaranteed rates

Management Interfaces

SNMP and ProSphere Network Management System

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