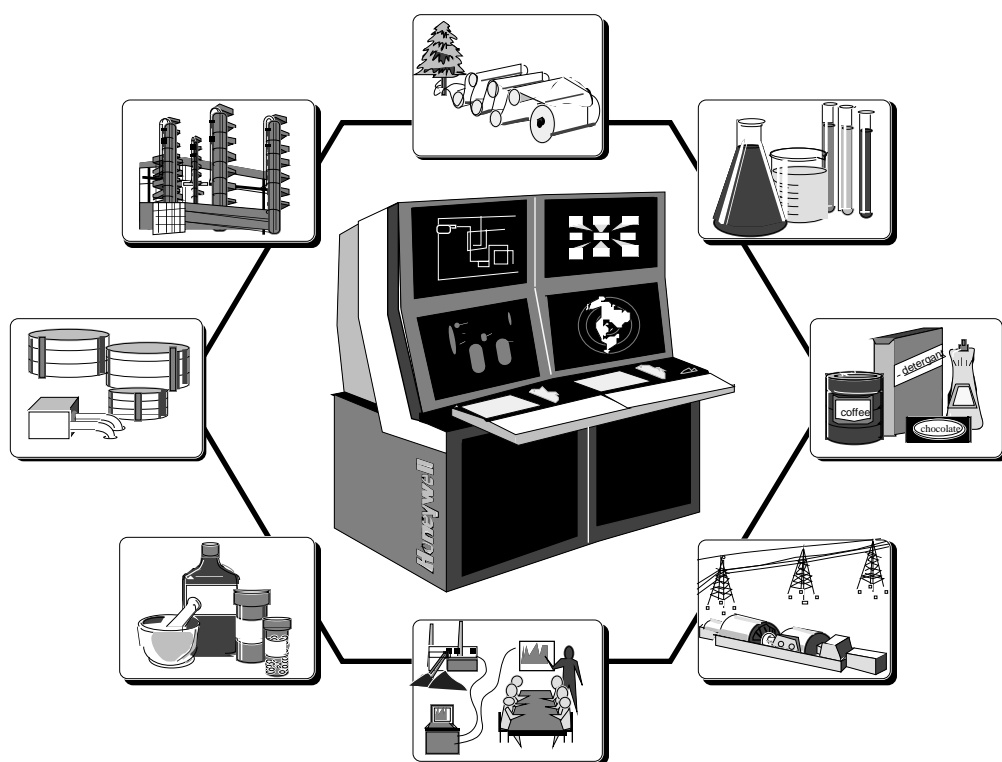


Hiway Gateway Specification and Technical Data

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TDC 3000 Hiway Gateway

Specification and Technical Data

Introduction

This publication defines the significant functions of the TDC 3000 Hiway Gateway (HG). The Hiway Gateway provides the link between the Local Control Network (LCN) and a Data Hiway.

The Hiway Gateway is one of the modules on the Local Control Network. As Figure 1 indicates, it communicates with other modules on the Local Control Network and with process-connected devices on the Data Hiway. In this position in the TDC 3000 System architecture, the Hiway Gateway makes the transition from the transmission

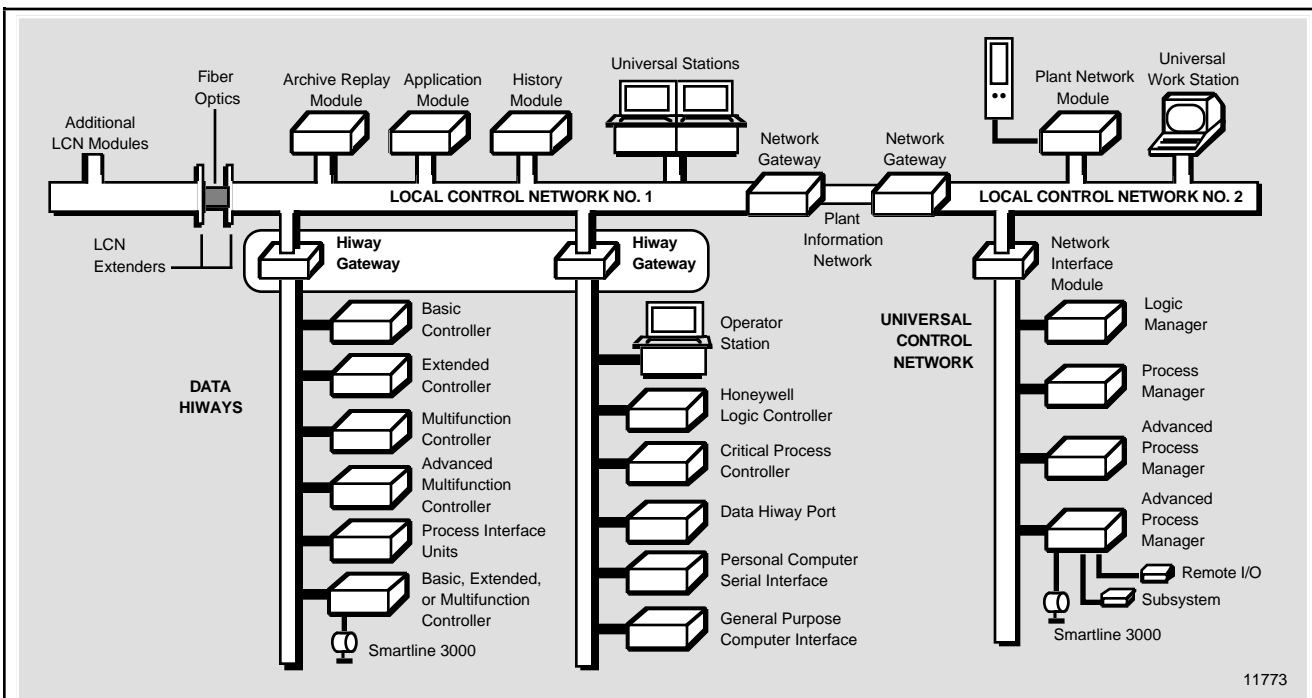
technique and protocol of the Local Control Network to the transmission technique and protocol of the Data Hiway. See *System Technical Data* for information on the Hiway Gateway's relationship with other TDC 3000 modules and devices.

One Hiway Gateway is required for each Data Hiway that is connected to a Local Control Network. Up to 20 Data Hiways can be connected to a Local Control Network. The Hiway Gateway provides access to up to 3000 process points on the Data Hiway.

Functional Description

The relationships of the Hiway Gateway functions are shown in Figure 2.

The Hiway Gateway provides the data conversion, buffering, and sequencing necessary to provide an efficient interchange of information between the Local Control Network and the Data Hiway. Although the Local Control Network and the Data Hiway use similar dual coaxial cables and bit-serial communications, they have different communication protocols because of the type of information they carry. This



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Figure 1 — TDC 3000 Architecture with Hiway Gateways

conversion of protocols and communication speeds is necessary to link the short-distance, high-speed communications typical of LCN-based modules with the widely dispersed, short-message, and less-rapid communications that are characteristic of Data Hiway-based devices.

- Functions**
- Provides secure communication link between the TDC 3000 Local Control Network and the Data Hiway.
 - Converts data and protocol between the Local Control Network and the Data Hiway.
 - Provides hiway polling if the Data Hiway has a single branch and there are no other preferred-access devices on the hiway.
 - Scans the hiway for alarm conditions.
 - Synchronizes time-keeping for hiway-based process-connected devices.

The TDC 3000 full-redundancy option is usually recommended for the Hiway Gateway, as the backup HG ensures security of critical information and control in the event of a primary failure.

Local Control Network/ Hiway Communication Link

The following Data Hiway-based devices can be connected through the hiway to a Hiway Gateway for access by the modules on the Local Control Network:

- Basic, Extended, and Multifunction Controllers, and their respective Reserve Controller Directors
- Low-Level, Low-Energy, and High-Level Process Interface Units

- BASIC and Enhanced Operator Stations
- 620 Logic Controller System
- Critical Process Controller
- Data Hiway Port to a variety of devices from other vendors, including programmable controllers
- Personal Computer Serial Interface to PCs with RS-232 C serial port
- General Purpose Computer Interface to selected minicomputers
- Hiway Traffic Director

Information about the process and about the status and configuration of the process-connected devices is transferred through the Hiway Gateway from the Data Hiway to the Local Control Network. Commands, configuration information, and control outputs are transferred through the Hiway Gateway from the Local Control Network to the Data Hiway.

Data Conversion and Linearization

Not all process data on the Data Hiway is in the same form, but the Hiway Gateway recognizes each type of process-connected device that sends data. The Hiway Gateway converts that data to a consistent form for

transmission over the Local Control Network. For example, a digital count that represents a percentage of the range of an analog instrument is converted to engineering units. Most analog process data is presented to the Local Control Network in engineering units.

Conversely, the Hiway Gateway converts data received in consistent form from the Local Control Network to the differing forms expected by the process-connected devices. For example, a value in engineering units might be converted to a digital count that represents a percentage of the range of a control device.

The Data Hiway is a proprietary network that uses a command/response message-exchange technique. Commands and data words are transmitted at 250,000 bits per second. The Local Control Network is a proprietary, token-passing, local area network that operates at 5 million bits per second. The Hiway Gateway translates the information received on each of these networks to the form used by the other and provides temporary storage of information in transit from one network to the other.

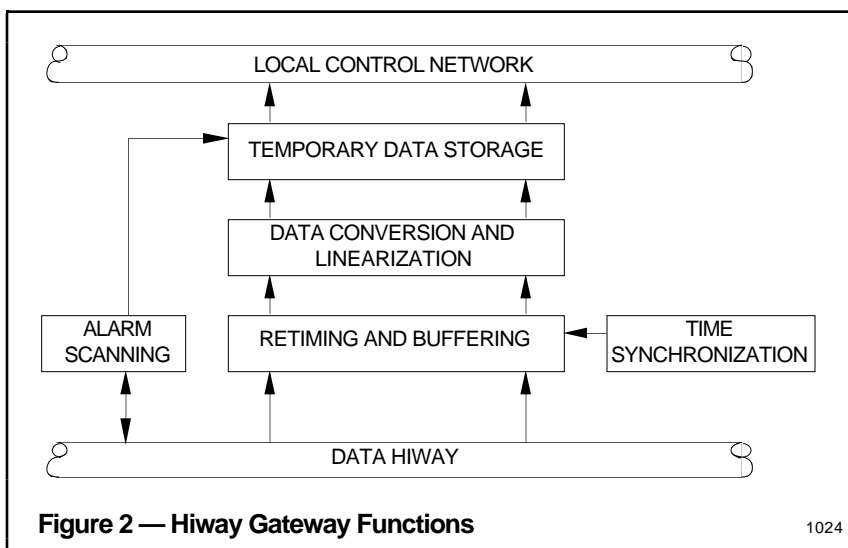


Figure 2 — Hiway Gateway Functions

Hiway Traffic Director Functions

In some configurations, the Hiway Gateway serves as the hiway master device, handling both the polling of devices that use exception reporting and the cable-switching function; however, when a Hiway Traffic Director (HTD) is present, the Hiway Gateway relinquishes its role as master device and functions as a preferred-access device, obtaining hiway-access grants from the HTD. The HTD is required in hiway configurations that include other preferred-access devices (for example, 45000 Computer or BASIC Operator Station), or if the Data Hiway has more than one branch.

Alarm Scanning

The Hiway Gateway accesses all hiway-connected devices for device and hiway alarms. In addition, up to 50 critical process alarms may be specified by the process engineer to be scanned each 1/2 second by the Hiway Gateway. The remaining alarms receive normal handling, including the processing of exception reports when polling by the Hiway Gateway or the

Hiway Traffic Director indicates that they are available.

Time Synchronization

The Hiway Gateway synchronizes timekeeping in Process Interface Units that report sequences of events, so that the time tags appended to the sequence-of-event information presented on the Local Control Network are synchronized, no matter which PIU the information originated in.

Options

The Hiway Gateway is available in a 5-card electronics module and a dual node electronics package. For additional information about the two types of enclosures, see the latest *System Technical Data*. Each Hiway Gateway can be backed up by a redundant Hiway Gateway to assure maximum dependability. The backup Hiway Gateway is kept up-to-date with relevant information from the primary Hiway Gateway so that the backup can take over at any time with virtually no disruption in system operation. If more than one Data Hiway is to be connected to a Local Control Network, it is usually

recommended that each such Hiway Gateway have a backup. Additional Hiway Gateways can also be used to increase point-access capacity or further increase information throughput. Each Hiway Gateway provides access to up to 3000 process points on a Data Hiway.

Physical Description

When packaged as a 5-card module, the Hiway Gateway contains a Local Control Network Interface board, microprocessor/memory board(s), a Data Hiway Interface board, a power supply, and a fan assembly. The dual node version of the Hiway Gateway consists of a high-density K2LCN board, a Data Hiway Interface board, power supply, and fan assembly. Each of these items is an Optimum Replaceable Unit for maintenance. Both types of electronics modules can be mounted in an Operator Console or in a system cabinet. The Data Hiway and the Local Control Network are connected to the Hiway Gateway through coaxial connectors.

Hiway Gateway Specifications

Physical Characteristics

Height	18.8 cm (7")	5-Card File	21 kg (46 lb)
Width	48.3 cm (19")	Dual-Node File with	
Depth	53.3 cm (21")	Single Node	14.6 kg (32 lb)
		Two Nodes	18 kg (40 lb)

Power Options

Strap-Selected Ac-Voltage Options

120, 220, 240 Vac +10%, -15%

Frequency Options

50 Hz or 60 Hz, +3%, -6%

All gateways operate without disruption through an interruption in the input ac voltage of up to 40 ms duration.

Operating Characteristics

Hiway Gateway

Data Hiway/Point Handling Capacity

One Data Hiway; up to 3000 process points per HG, or
redundant HG pair. Maximums per type are:

Digital inputs/latched outputs	3000
Analog points	3000
Momentary digitals	500
Critical alarms	50
Point calibration capability	250
Event-initiated processing triggers	600
Point contact cutout capability	500
Control counters	100
RV alarms	500

Configuration Capability

Maximum Number of HGs per LCN	20 single HGs or 20 redundant pairs
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