

# 916X T1/FT1 NETWORK ACCESS UNIT

## BENEFITS

- NETWORK SAVINGS — THE ABILITY TO COMBINE BOTH MULTIPLE VOICE AND DATA APPLICATIONS ON A SINGLE DIGITAL ACCESS LINE RESULTS IN LOWER RECURRING NETWORK COSTS
- INVESTMENT PROTECTION — COMMON HARDWARE (NAM AND APMs) IS UTILIZED ALLOWING FOR EQUIPMENT UPGRADES AND FOR GROWTH TO MEET EVOLVING CUSTOMER NETWORK NEEDS
- ENHANCED FUNCTIONALITY — SOFTWARE DOWNLOADABLE ARCHITECTURE PROVIDES FAST AND EASY PRODUCT ENHANCEMENTS ON DEMAND WITHOUT REQUIRING EXPENSIVE ON-SITE UPGRADES
- COMMON NETWORK MANAGEMENT PLATFORM — SNMP SUPPORT ALLOWS THE CUSTOMER TO UTILIZE THE NETWORK MANAGEMENT SYSTEM OF THEIR CHOICE AND AVOID THE EXPENSE OF MULTIPLE MANAGEMENT SYSTEMS
- FLEXIBLE AND SIMPLIFIED MANAGEMENT — ROBUST, EASY-TO-USE SNMP AND TELNET MANAGEMENT CAPABILITIES RESULT IN SIMPLE NETWORK MANAGEMENT AND CONTROL
- FASTER PROBLEM DETERMINATION AND RESOLUTION IS PROVIDED THROUGH MULTIPLE BERT AND LOOP-BACK DIAGNOSTIC TOOLS RESULTING IN HIGHER NETWORK AVAILABILITY



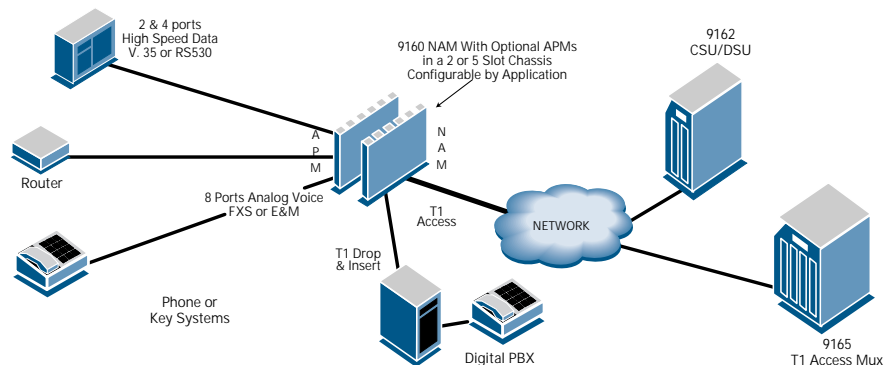
The Paradyne™ 916X is a flexible, customer-configurable T1 and Fractional T1 (FT1) Network Access Unit that provides an interface between customer premises equipment and the T1 leased-line network. The 916X can function in its most basic role as a T1/FT1 CSU/DSU Access Unit and can grow in functionality into a full-featured T1 Access Multiplexer.

The 916X product line consists of a two-slot T1/FT1 CSU/DSU Access Unit and a five-slot T1 Access Multiplexer. The two-slot unit has base functionality that provides two high-speed synchronous data ports and a DSX-1 drop and insert port (allowing for digital PBX and other DS1 DTE connectivity over the same T1 network facility). In addition, the user can choose one of three modules that will provide either eight E&M trunk connections, eight FXS interfaces, or four additional high-speed synchronous data ports. The five-slot T1 Access Multiplexer provides two high-speed synchronous data ports and a DSX-1 drop and insert port and allows for up to four additional application modules. Each of these modules can provide eight E&M connections, eight FXS interfaces, or four additional high-speed (V.35) synchronous data ports. These application modules can be configured in any user-defined combination.

The 916X cards that populate both the two- and five-slot versions are:

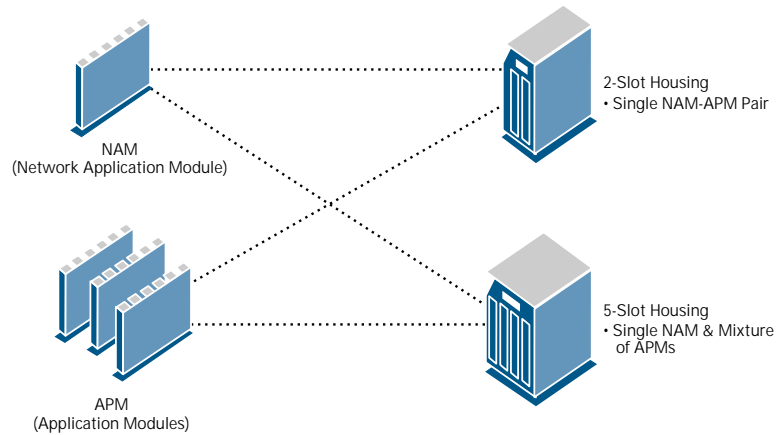
- Network Access Module (NAM) – This card is equipped with the T1 network interface, a DSX-1 drop and insert port, and two DTE interfaces to support the integrated DSU/CSU applications
- Application Modules (APMs) – There are three types: an eight-port analog voice FXS, an eight-port analog voice E&M, and a four-port synchronous data card

The 916X is an expandable T1 CSU-DSU/Access Multiplexer:



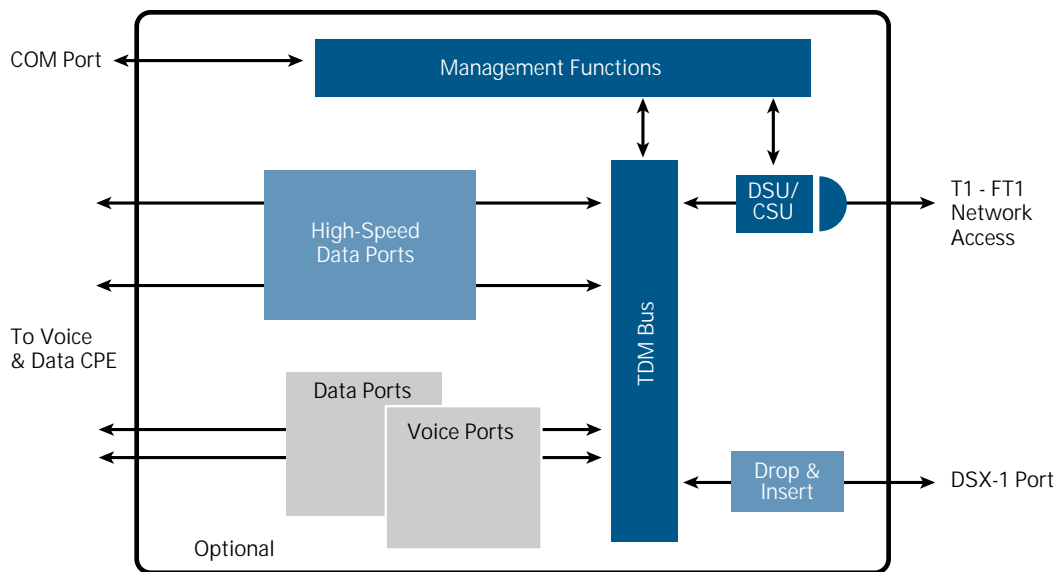
## Architecture

The 916X was developed to operate in a dynamic, ever-changing communications environment. Scalability was designed in to accommodate network evolution. The key to 916X scalability is commonality of hardware components. This allows customers to affordably upgrade a unit to support additional applications. The 916X's modular and scalable architecture provides a cost-effective entry-level access device that can grow with the customer. The common hardware components can be interchanged among multiple housings. A customer can deploy a basic 916X solution and expand it to a high-end application without having to replace hardware as needs change.



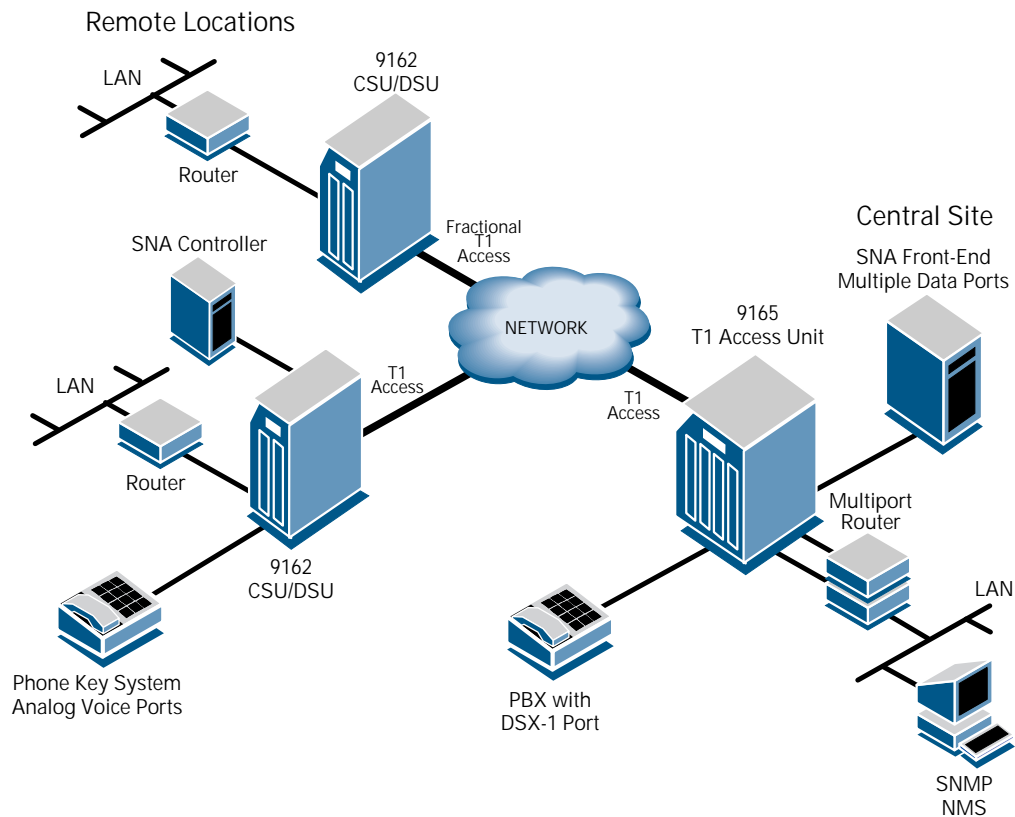
This architecture provides a graceful and seamless migration path. All the common circuit cards, Network Access Module (NAM) and Application Modules (APMs), are supported by two housings—a two-slot and a five-slot. The two-slot housing, populated with a NAM and one APM, can be configured to operate in a CSU/DSU/MUX application. If the need arises for a mini channel bank, the customer can simply order the five-slot housing, move the common hardware (NAM and APM) from the two-slot housing to the five-slot housing, and order any additional circuit cards needed to support the application(s).

## 916X Functional Block Diagram



## Applications

- In its most basic configuration, the core 916X application is an SNMP-managed T1 CSU/DSU providing connectivity between the T1 network and high-speed DTE on its two synchronous data ports.
- Another basic 916X application is consolidated access for two synchronous data devices *plus* a DTE using the DS1 signaling format (e.g., a digital PBX) on the drop and insert port.
- The 916X can also support more robust consolidated access applications by adding either FXS or E&M analog voice support to high-speed synchronous data and DS1 DTE support.
- In a channel bank application, the 916X can simultaneously support both FXS and E&M voice.
- Utilized to its fullest, as a T1 Access Mux, in a consolidated voice and data application, the 916X provides simultaneous access for synchronous data devices, analog FXS voice, analog E&M voice, and digital voice.



## Network Management

Supports synchronous or asynchronous Point-to-Point Protocol (PPP) or asynchronous Serial Line Internet Protocol (SLIP) for connection to an SNMP network management system. In addition to supporting SNMP, an extensive native user interface provides complete configuration and control accessible through a VT100-compatible local terminal or from a remote terminal via a modem or a TELNET connection.

ORDERING INFORMATION			
Model Number	BCS COM Code	NSG COM Code	Description
9162-A1-201	407666494	407672104	Two-slot housing, 120 VAC power supply, Network Access Module (NAM)
9165-A1-201	407666502	407672112	Five-slot housing, 120 VAC power supply, Network Access Module (NAM)
9165-A1-209	407666700	407672120	Five-slot housing, 120 VAC power supply, Network Access Module (NAM), mounting brackets
9109-F1-604	407666460	407672062	Application Module (APM): High-speed synchronous data card, 4 ports
9109-F1-648	407666486	407672096	Application Module (APM): FXS analog voice card, 2-wire $\mu$ -law, 8 ports
9109-F1-668	407666478	407672088	Application Module (APM): E&M analog voice card, 4-wire $\mu$ -law, 8 ports

# FEATURES

- INDEPENDENTLY CONFIGURABLE NX56/64 Kbps DATA PORTS
- DSX-1 DROP AND INSERT PORT
- SOFTWARE CONTROL OF EIA-530A, V.35, RS449 OR V.11/X.21 ON A PORT BY PORT BASIS
- TWO POWER SOURCES INCLUDING 120 VAC AND -48 VDC FOR FIVE-SLOT HOUSING (AVAILABLE 2Q97)
- LOAD SHARING REDUNDANT POWER SUPPLY CAPABILITIES FOR THE 9165
- INTEGRAL BERT TEST PATTERNS: QRSS, 1 IN 8 (T1 & DSX), 3 IN 24 (T1 & DSX), ALL 1s, ALL 0s, 63, 511, 2047, 2<sup>15</sup>-1, 2<sup>20</sup>-1, AND 2 BYTE USER-DEFINED
- HOST OF LOOPBACKS
- 1004 Hz TEST TONE GENERATION ON VOICE CARDS
- SNMP MANAGED
- STANDARD MIB SUPPORT: RS232-LIKE (RFC 1659), MIB II (RFC 1213), INTERFACES GROUP (RFC 1573), DS1 MIB (RFC 1406)
- ENTERPRISE MIB FOR TEST, STATISTICS, AND SOME CONFIGURATION FUNCTIONS
- MULTIPLE HOUSINGS
- μ-LAW PCM CODING OF ANALOG VOICE LINE
- SUPPORTS E&M TYPE I, II, IV, OR V CIRCUITS
- SUPPORTS FXS CIRCUITS
- EMBEDDED DATA LINK (EDL) MANAGEMENT PATH SUPPORT
- FACILITY DATA LINK (FDL) MANAGEMENT PATH SUPPORT
- DIRECT DATA LINK (DDL) MANAGEMENT PATH SUPPORT
- TELNET SESSION SUPPORT
- FTP SUPPORT
- "CRY FOR HELP" DIAL OUT ASCII ALARMS OR SNMP TRAPS

## SPECIFICATIONS

Wide Area Network Interfaces  
Physical Interface (USA): RJ48C  
Physical Interface (Canada): CA81A using adapter cable  
Framing Format: D4, ESF  
Coding Format: AMI, B8ZS  
Line Build-Out (LBO):  
0.0 db, -7.5 db, -15 db, -22.5 db  
ANSI PRM: Selectable  
Bit Stuffing: FCC Part 68, AT&T TR 62411  
Yellow Alarm Generation: Selectable

### Data

Data Channel Interfaces:  
EIA 530A, V.35, RS-449, V.11, X.21  
Network Access Module:  
2 high-speed channels of Nx56 Kbps to  
1.344 Mbps or Nx64 Kbps to 1.536 Mbps  
Sync Data Application Module:  
4 high-speed channels of Nx56 Kbps to 1.344 Mbps  
or Nx64 Kbps to 1.536 Mbps

### Voice

Voice Channel Interfaces: 4-wire E&M, FXS circuits  
Voice Channel Speeds: 64 Kbps PCM  
E&M Signaling Types:  
Type I, Type II, Type IV, Type V  
FXS Signaling Types:  
Loop Start, Loop Start/Forward Disconnect, Ground  
Start, Ground Start Immediate, Ground Start  
Automatic, PLAR D3, PLAR D4  
Voice Coding:  
μ-law PCM coding of analog voice line  
Ports per Module: 8

### DSX-1 Interface

Framing Format: D4, ESF  
Coding Format: AMI, B8ZS  
DTE Line Equalization:  
5 selectable ranges from 0 to 655 feet  
(0 to 196.5 meters)  
Send AIS: Selectable

### Approvals

FCC Part 15: Class A Digital Device  
FCC Part 68: AW2USA-24209-DE-N  
Industry Canada: 467 7784 A  
UL: Listed UL 1950  
CSA Safety: Certified CSA 22.2, No. 950-93

### Clock Sources

NET  
DSX  
Sync Port  
External  
Internal (Stratum 4)

### Loopbacks

Standard:  
AT&T TR 54016  
AT&T TR 62411  
ANSI T1.403  
V.54 Loop 2 and Loop 3



9165 T1/FT1  
Back Panel

### Additional:

Network Repeater Loopback  
DSX-1 Line Loopback  
DSX-1 Payload Loopback  
DSX-1 Repeater Loopback  
DTE Loopback

### SNMP MIB Support

RFC 1213 MIB II  
RFC 1573 Interfaces Group  
RFC 1406 DS1  
RFC 1659 RS232-like  
Paradyne Enterprise MIB

### Physical Description

9162 T1 CSU/DSU Access Unit  
Height: 11.0 in. (27.95 cm)  
Width: 4.25 in. (10.80 cm)  
Depth: 14.75 in. (37.48 cm)  
Weight: 11 lbs. 2 oz. (5.01 kg)

### 9165 T1 Access Unit

#### Desktop

Height: 11.9 in. (30.23 cm)  
Width: 8.8 in. (22.35 cm)  
Depth: 15.6 in. (39.63 cm)  
Weight: 21 lbs. (9.45 kg)

#### Rack-mount

Height: 10.5 in. (26.67 cm)  
Width: 8.2 in. (20.83 cm)  
Depth: 14.3 in. (36.32 cm)  
Weight: 21 lbs. (9.45 kg)

### Power

AC: 90 to 132 VAC, 50 Hz, (+/- 3 Hz), 1.5 amps

### Operating Environment

Operating Temperature:  
35° F to 122° F (1.7° C to 50° C)

Storage Temperature:  
-4° F to 158° F (-20° C to 70° C)

Relative Humidity:  
5% to 85% (noncondensing)

### Shock and Vibration:

Withstands normal shipping and handling

### Redundancy

Load sharing redundant power supply for the 9165 T1  
Access Multiplexer

### Module Capacity

#### 9162 T1 CSU/DSU Access Unit

NAM Slots: 1

APM Slots: 1

#### 9165 T1 Access Multiplexer

NAM Slots: 1

APM Slots: 4

All 9000 products are backed by a two-year, return-to-factory warranty and full on-line phone support. Extended warranties are available upon request.

It is the policy of Paradyne to improve products as new technology, software, components, and firmware become available. Paradyne, therefore, reserves the right to change specifications without prior notice. All features, functions, and operations described herein may not be marketed by Paradyne in all parts of the world.

For additional information on this or any Paradyne product or service, contact the office nearest you. Or, dial toll-free (USA and Canada) 800 482-3333 or call 813 530-8623. Fax (USA) 813 530-2103.

Toronto 905 709-5000 fax: 905 709-3469  
Europe 44-1-753-515000 fax: 44-1-753-550011  
Hong Kong 852 2543-0083 fax: 852 2541-3767  
Singapore 65 355-5230 fax: 65 355-5244

Montreal 514 288-0001 fax: 514 288-1246  
Japan 81 3-5541-6630 fax: 81 3-5541-6631  
Latin America 813 530-8358 fax: 813 532-5240  
Internet address <http://www.paradyne.com>

Specifications subject to change without notice. Printed in U.S.A. ©Paradyne Corporation 1997.

PARADYNE is a trademark of Paradyne Corporation. All products or services mentioned are the trademarks, service marks, registered trademarks, or registered service marks of their respective owners.



MUX-916X-1-0197

PARADYNE™