![General DataComm logo] **General DataComm**

# PRODUCT BRIEF

## Universal Access System 7000 Series

### Overview

The copper loop has long been the dominant media used to distribute telephone, telex and data services. Today, fiber optic cable is rapidly growing as an alternative media for local distribution; fiber is being installed directly into the customer's site or to the curb with copper loops providing the final segment. However, fiber installations require a substantial investment and a large concentration of traffic. Because of this, twisted pair cables will continue to play a significant role for provisioning subscriber services.

GDC's Universal Access System (UAS) provides fast and cost-effective provisioning of advanced digital services and maximizes use of the existing 2-wire copper loop infrastructure. The UAS supports subrate speeds to 2 Mbps provisioning on a single platform and fractional T1/E1 and multi-loop grooming services. An integrated SNMP-based network management architecture supports high quality of service.

The UAS 7000 enhances GDC's UAS system by adding access multiplexing to the platform. Located at the central site, the UAS 7000 works across the copper loop with GDC's existing data set components.

### The System

#### UAS 7616 DIU

Designed for more efficient local loop distribution using DSL (Digital Subscriber Line) technology, the UAS 7616 DIU (Drop-side Interface Unit) interoperates with any co-located GDC 7001/7002 NIU (Network Interface Unit) via the SpectraComm/ Universal Access shelf, eliminating the need for external multiplexing equipment. The UAS 7616 supports one, two or three independent DSL interfaces, each capable of single or dual channel operation. Each UAS 7616 supports up to 6 x 64 Kbps timeslots. Only five DIU cards are required to serve as many as 15 channelized E1 subscribers and only four are required to serve up to 12 channelized T1 subscribers. As with all DIUs, the 7616 uses the SpectraComm/Universal Access shelf timing.

#### UAS 7001/7002 NIUs

The UAS 7001 (T1) and UAS 7002 (E1) NIUs provide an interface to T1/E1 and fractional T1/E1 services. The NIUs offer interfaces for both short distance and long distance operation. Operating with 7616 DIUs, the NIUs add the advantage of T1/E1 multiplexing. They provide the ability to groom multiple customer locations into a single T1/E1 aggregate at the central site.
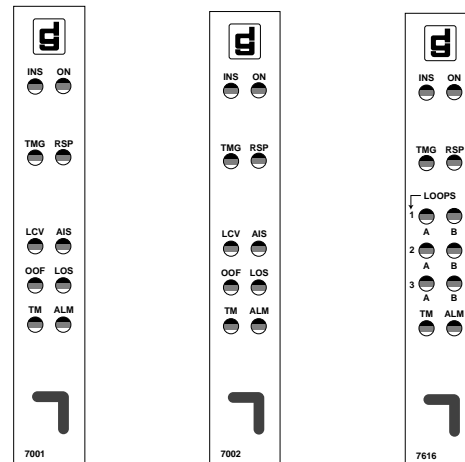


*Figure 1 — UAS 7000 Modules*

This provides an elegant and economical method of providing high speed access to backbone TDM, Frame Relay, DACS-based and ATM networks.

#### SpectraComm/Universal Access Shelf

Entirely modular and SNMP-managed, UAS products are housed in GDC's SpectraComm/Universal Access Shelf at the central office. They connect across the subscriber loop to standalone network terminating units (NTUs) at the remote customer sites. The shelf's 16 slot design enables high density processing within a very small package (19" W x 7" H x 12" D). The shelf is available in both AC and DC versions, with optionally redundant power supplies. The SpectraComm UAS shelf also incorporates a versatile backplane architecture to help minimize cabling and deliver application-specific solutions. Additionally, the SpectraComm/Universal Access shelf accommodates a SpectraComm alarm card that supports external contacts to activate local and remote customer alarm systems.

#### Network Management

UAS 7000 Series products are managed through an associated SNMP manager or through GDC's unique TEAM series of management applications. TEAM applications offer a graphical view of the equipment and work in cooperation with HP OpenView. TEAM applications use SNMP to perform configuration, mainte-

nance, status and other system functions via the SpectraComm Manager (SCM) to shelf cards and associated remote units. The IP addressable SCM is an SNMP agent that proxies requests to the other cards in the SpectraComm/Universal Access shelf.

## Performance and Alarm Monitoring

Because the UAS system is used to provision services, it must be capable of reliable operation, rapid fault isolation and fast service restoral. Built-in features enhance its reliability by helping to isolate sectional faults. While UAS system elements are designed to be compatible with relevant standard network diagnostics, full management may be obtained by means of SNMP, the UAS core network management protocol.

## Multi-level Redundancy

One UAS 7001/7002 NIU can back-up another NIU as a spare UAS system element, furnishing redundancy for mission-critical service applications. The primary NIU passes the T1/E1 data stream to the appropriate data highway. When redundancy is required, the backup NIU takes complete control from the primary NIU. This type of fail-safe element redundancy provides insurance against either a card failure or a network failure when an alternate wideband network interface port is available.

## DSL Technology

DSL transmission technology has become the de facto worldwide standard for enhancing the capacity of today's local loops to meet increasing end-user narrowband service requirements for high speeds. Together, the UAS 7001/7002 NIUs and the UAS 7616 provide the most efficient method of integrating DSL loop
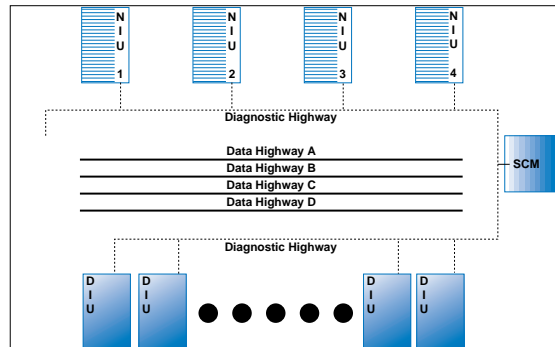
Figure 2 — UAS 7000 Architecture

traffic into the higher-order network. Up to four NIUs can be co-located in a shelf.

The UAS 7616 sends signals from subscriber 64 Kbps timeslots across the UAS data highways to the NIU. The NIU then combines these signals from other UAS 7616s and sends the composite signal to the network interface.

Each of the backplane's data highways can handle payloads from 64 Kbps to 1.920 Mbps, with bandwidth allocated to the DIUs as required by the applications. Up to 24 T1 or 30 E1 ports can be associated with each NIU for maximum T1/E1 and fractional T1/E1 services and cost-effective provisioning using existing resources. Compatibility with a full range of today's higher-order network offerings is ensured through support for B8ZS, HDB3 and optional AMI line coding.
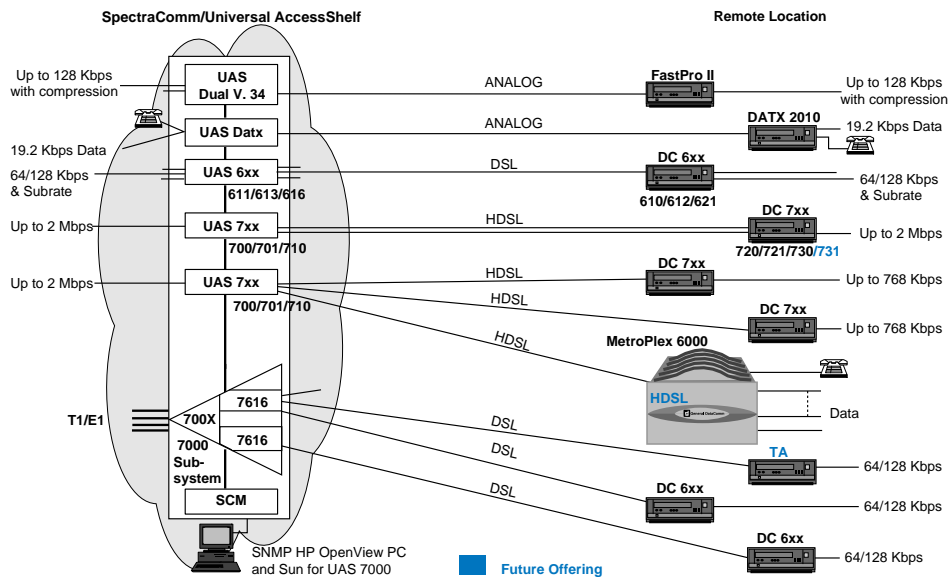
Figure 3 — Service Provisioning with UAS

## Applications

### Service Provisioning

As shown in Figure 3, the UAS is designed to be flexible and adapt to a customer's application needs. The UAS supports both analog and digital communications, including DSL, HDSL, DATX and V.34 transmission technologies. The following examples are a few of the possible provisioning scenarios available through the UAS.

### Frame Relay Network Provisioning

Frame Relay is now a popular alternative to private line services, delivering the flexibility of packet switching transparently to the user. When used with UAS 600 units, the UAS 7000 provides a cost-effective means of provisioning dedicated Frame Relay services for the many businesses needing high speed transport for their information networks (Figure 4). Most Frame Relay switches support channelized T1/E1 interfaces and the UAS 7000 brings user traffic in very efficiently.
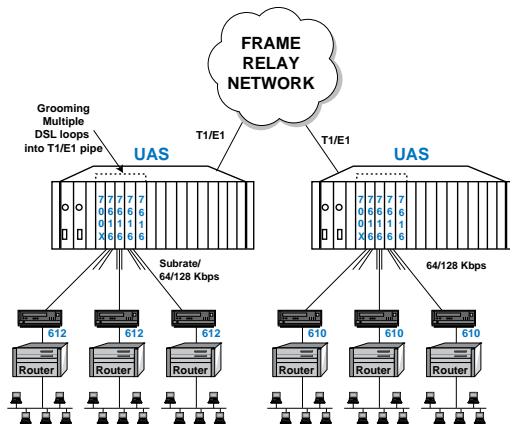


*Figure 4 — Frame Relay Network Provisioning with UAS*

Complete SNMP management gives the carrier complete control of the network to the customer premises. In addition, since UAS 7000 NIUs and DIUs communicate over the backplane, eliminating the need for external multiplexers, service providers will also save on equipment expenditures.

Because UAS 7000 products use existing copper facilities, the carrier can offer new services now. There is no need to wait until fiber to the desktop has been installed. Finally, since new DSL technology is used, provisioning can be at local loop rates up to 128 Kbps.

### Internet Access Provisioning

Another new service possibility emerging for service providers is Internet access. UAS 7000 Series products are ideal for estab-

lishing a dedicated Internet service at the higher access speeds increasingly being demanded by users. Using UAS 7000 Series products, PT&Ts, carriers or CAPS (Competitive Access Providers) can take advantage of the large installed base of copper loops and still be able to deliver high data throughput, again without investing in expensive fiber installation.
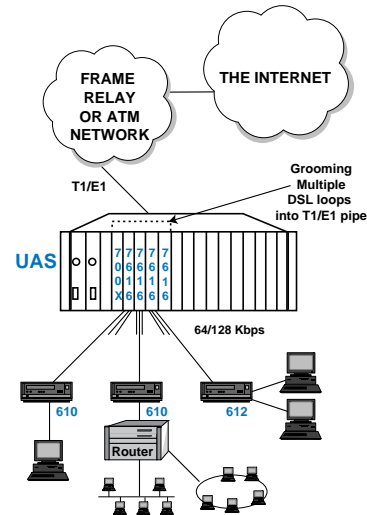


*Figure 5 — Internet Access Provisioning with UAS*

### Private Enterprise Networking

UAS 7000 products work with UAS 600 and GDC's OCM 1000 and Metroplex products to build cost-effective private networks over 64/128 Kbps links, allowing businesses to save substantially on access charges. Networks like the one in Figure 5 are attractive to businesses with many branch offices: shared communications are important to them, but operating costs must be kept at a minimum.
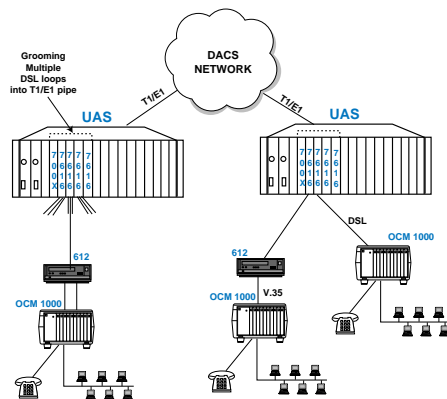


*Figure 6 — Private Enterprise Networks*

## Advantages to the UAS System

### Built-in Access Multiplexing
The UAS's grooming and multiplexing functions make it very easy and elegant to feed multiple customers into a higher order network.

### Reduced Engineering Costs
The complex design required to engineer copper loops to support digital leased line services can be reduced to a simple two-step process with the UAS. Step One establishes a database of the copper loop plant based on the resistance of the cables. The technology is limited only by the gauge and distance of the cable used. Step Two involves deciding which product meets the customer's bandwidth and distance requirements and installing it onto the designated loop. Carriers can now centralize a more cost-effective engineering staff.

### Reduced Installation Costs
Costs can be reduced dramatically by shortening the time required to complete an installation. Using pre-engineered loops, modular plug-in hardware and remote centralized testing reduces the installation time to that of traditional voice services. Further savings can be realized by pre-provisioning the plug-in modules, which reduces the installation to assigning cable pairs and connecting the customer-located equipment.

### Reduced Maintenance Costs
The UAS centralized network management provides performance monitoring, testing and service verification for all equipment, both within the exchange office and at the customer location. Performance degradation and fault alarms are constantly monitored, allowing network managers to proactively anticipate trouble before it strikes.

By detecting faults before customers report them and correcting degraded lines before they become total outages, overall service availability and customer satisfaction are greatly improved.

## The Future
As part of our commitment to customers, GDC intends to add new services to the UAS. Current plans include supporting the Metroplex 6000 via its HDSL capabilities, which are currently in development. Support for a variety of off-the-shelf terminal adapters, allowing a dedicated interface to the UAS 7616, is also planned.

## Other GDC Integrated Access Solutions
✔ MetroPlex
   Super-intelligent Access Multiplexer
✔ SpectraComm 5000 System
   Integrated T1 Access for Data Applications
✔ SpectraComm RLN
   Remote LAN Access
✔ OCM 1000 Office Communications Manager
   Hybrid Access Networking Device for point-to-point, point-to-multipoint, and point-to-network applications—voice, fax, data, video, LAN—with a growth path to the TMS 3000 System.

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