ipRocketLink G.SHDSL Integrated Access Device

A technical overview of a new ipDSL product that offers 2-wire, standards-based transmission with Sync-Serial, WAN, and Ethernet/IP for fast, dedicated, always-on access.

Based on the ETSI and ITU G.SHDSL G.991.2 standard, the Patton Model 3086 ipRocketLink IAD enables nx64 2.3/4.6 Mbps speeds over a single pair of wires while combining standards-based transmission with synchronous-serial, Ethernet, and high speed IP routing…all in one compact package.

Patton Electronics Company
Gaithersburg, Maryland, USA
Tel: +1 301 975-1000
Fax: +1 301 869-9293
E-mail: **marketing@patton.com**

Western Europe Office
France
Tel: +33 1 44 63 08 31
Fax: +1 301 542-0038
E-mail: **europe@patton.com**

Middle East/North Africa Office
Lebanon
Tel: +961 4 712 691
Fax: +1 413 832-9194
E-mail: **mena@patton.com**

Latin America/Caribbean Office
Gaithersburg, Maryland, USA
Tel: +1 301 975-1000
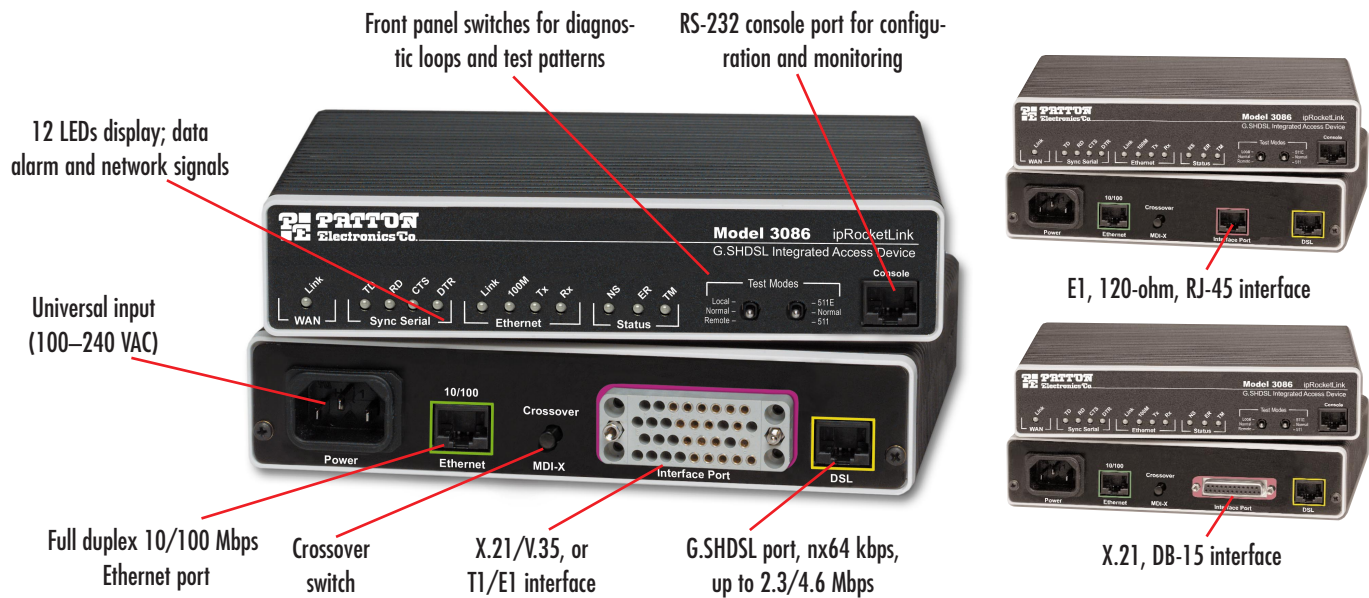Fax: +1 301 869-9293
E-mail: **americas@patton.com**

Asia Pacific Office
China
Tel: **86-10-6474-4148**
E-mail: **simon@patton.com**

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Introduction

The 3086 ipRocketLink IAD redefines access and sets the new standard for customer premise equipment. Based on ETSI and International Telecommunications Union (ITU) G.SHDSL G.991.2 standards, the Patton 3086 ipRocketLink enables nx64 (*n*=1..36) over a single pair of wires while combining standards-based transmission with Synchronous Serial, Ethernet, and high-speed IP routing…all in one compact package. With Patton's FlexIP™ architecture, The Model 3086 offers V.35/X21 Sync Serial or T1/E1 interfaces interfaces and 10/100 Ethernet ports. The sync serial port is user configurable for either V.35 or X.21. Integrated software selectable DCE/DTE support eliminates messy crossover cables. The Ethernet port gives access to any IP network via ATM, PPP, or Frame Relay. Both interfaces can be simultaneously selected with user-defined bandwidth for each port. The 3086 boasts easy installation with DIP switch, Telnet, and WEB/SNMP management. It provides bridging and routing functionality along with advanced IP features like NAT and Firewall and optional IPSec-based VPN. As part of Patton's family of ipDSL products, the Model 3086 offers a complete, managed, end-to-end system when used with Patton's central site access concentrators.

Front panel switches for diagnostic loops and test patterns

RS-232 console port for configuration and monitoring

12 LEDs display; data alarm and network signals

Universal input (100–240 VAC)

Full duplex 10/100 Mbps Ethernet port

Crossover switch

X.21/V.35, or T1/E1 interface

G.SHDSL port, nx64 kbps, up to 2.3/4.6 Mbps

E1, 120-ohm, RJ-45 interface

X.21, DB-15 interface

3086 Key Product Features

The Patton Model 3086 ipRocketLink Series set of hardware and software features enables user quick up time. The 3086 offers hassle free power, terminal, and network installation, while an intuitive built-in web server allows complete command and control of your unit.

Key Features	Product Highlights	Feature Benefits
Dual Ethernet/IP Router and Sync serial Interfaces	With Patton's FlexIP architecture, split the bandwidth and use both interfaces at the same time	Double the functionality. The 3086 complete suite of multiplexing/routing protocols, allows for simultaneous transport of packetized data to the Ethernet port, and serial synchronous data on its X.21/V.35/E1 port over a single DSL link
Connect to ATM, PPP, and Frame Relay	Versatile interface options allow for simple deployment into any network environment	Multiprotocol capable unit enables secure and reliable WAN data link connections. Using widely used standards based services, the 3086 presents to the user the choice of connecting to ATM, PPP, or Frame relay

Key Features	Product Highlights	Feature Benefits
Advanced WEB/SNMP/TELNET Management Features	Built-in VT-100 console port makes setup a snap, and you can use the embedded HTTP/SNMP agent or built-in TELNET server to manage the Model 3086 from anywhere in the world	The most friendly configuration system- have your customer's connection up and running today. Intuitive menus, via VT-100 terminal port and HTTP/SNMP browser via built-in web server, allows fast and simple configuration of DSL, routing, DLC protocol, and diagnostics options
nx64 Speeds to 2.3/4.6 Mbps	User selectable data rates for either Sync Serial or Ethernet/IP ports. Use as a standalone or with the ForeFront Access System	Bandwidth selection allows complete provisioning flexibility. Start at any nx64kbps, and as your customer's bandwidth demand increases, simply switch on more 64kbps channels (locally or remotely) without service interruptions or additional equipment
User Selectable DCE/DTE V.35/X.21	Get both interfaces at same time. Software selectable with DCE/DTE support without messy crossover cables (model specific—call for details)	Avoid the hassle and headache of finding the right cable or adapter during installation. The 3086 user configurable X.21/V.35, and easy installation, testing, and reconfiguration
T1/E1 drop and insert port	T1/E1 port allows convenient connection to PBX at the customer locations	Complete Data and Voice solution for small to medium size bussineses all in one box
Interoperable with third-party DSLAMS	Take advantage of Patton reliability whether you connect back-to-back or to a third-party DSLAMs	Patton 3086 standards based IAD, does not lock the user into a single proprietary solution. Compliant with ETSI/ITU G.991.2 standard, the Model 3086 connects to another Patton 3086, 3096RC, or a third party compliant device
LEDs and Full V.52/V.54 Diagnostics	Test the link with built-in test modes with easy-to-access toggle switches. LEDs provide clear status at-a-glance	Minimize or avoid downtime with the most complete, user-friendly diagnostics suit. The Model 3086 comes equipped with a full set of diagnostics including V.54 local/remote loops, and V.52 compliant 511/511E BERT patterns. All diagnostics are accessible via front panel switches, VT-100 menus or SNMP/HTTP browser. LEDs present at-a-glance alarms and other data signals
Universal Input Power	Full range Internal Universal Input (100-240 VAC, 50-60Hz) power supply	Power this unit at any standard voltage level and frequency range, anywhere in the world. Sturdy IEC-320 compliant AC, fully grounded, power entry connector securely connects and filters power to an internal power supply module

3086 IAD Product Highlights

- IP access via ATM, PPP, or Frame relay.

- Complete routing and bridging core including Firewall and optional IPSec-based VPNs.

- Dual Serial (X.21/V.35) or T1/E1 and 10/100 Ethernet interfaces can be used simultaneously over a single, high speed DSL link.

- User configurable X.21 or V.35 interface, and DTE/DCE selection.

- Configure with VT-100 console, HTTP/SNMP Web browser, Telnet, or dip-switches.

- Built-in Ethernet crossover

- Built-in Local/Remote loops and 511/511 BERT initiated via switches or software menus.

- Complete alarm facilities monitor Serial, Ethernet, and DSL link.

3086 IAD Product Highlights

- 12 easy to read front panel LEDs display status information at-a-glance.

- Internal Universal (100-240VAC, 50-60Hz) Power Supply. (External power supply is also available.)

- Compact case (7.3 x 6.6 x 1.62 in.) can be easily installed in any equipment closet.

3086 Competitive Summary

The Patton Model 3086 ipRocketLink IAD delivers all the advanced features for secure, reliable, and high-speed data connections. By combining sync serial access with Ethernet/IP, the 3086 IAD makes next generation connectivity simple, easy, and cost effective. Available with a single V.35 or X.21 sync serial interface or with user selectable V.35/X.21 or T1/E1 interfaces, the 3086 is a potent NTU for any network connection. With it's 10/100 Ethernet/IP interface, the 3086's routing capabilities are ready for the task: included are NAT, DHCP, Firewall, and Filtering. Future integration allows both sync serial and Ethernet ports to be used at the same time. The 3086 IAD can be used back-to-back applications or with the Patton ForeFront Access Infrastructure System. Additionally, the 3086 IAD can be used with any other G.SHDSL TDM or Packet system. Patton's 3086 is easily configured and managed via VT-100 console SNMP or its built web or TELNET servers–different user-friendly ways to get the system on-line quickly. Complete configuration and management capabilities are available through the integrated Click-and-Go GUI or customized by directly downloading the SNMP MIB from the 3096. The Web management screens can be managed from any location in the world via the internet. All software upgrades are free and easily downloaded via FTP for immediate upgrades. The model 3086 can connect at DSL speeds of nx64 kbps up to 2.3/4.6 Mbps, and can reach distances up to 32,000 feet. In most applications, users take advantage of the dual port capabilities of the model 3086 to assign part of the DSL bandwidth to the Ethernet port for IP centric services, and part of the bandwidth to the sync serial port for connection to routers or multiplexer in campus environments.

3086 Competitive Positioning

		Patton 3086	Cisco 828	ZyXel 782
Connectivity	Line Type	**G.SHDSL**	G.SHDSL	G.SHDSL
	ATM Encapsulation	**YES**	Yes	YES
	Native PPP/Frame Relay	**YES**	NO	NO
	Bridging/PPPoE/IPoATM	**YES**	Yes	Yes
	NAT/MultiNAT/DHCP	**YES**	Yes	Yes
	Statefull Firewall/ACL	**YES**	Yes	Yes
	V.35/X.21	**YES**	NO	NO
	T1/E1	**YES**	NO	NO
Ease of Use	Status LEDS	**12**	10	6
	ENET Cross-Over Switch	**YES**	Yes	NO
	10/100 Ethernet	**YES**	NO	Yes
	Built-In Web Mgmt	**YES**	NO	NO
	Tech Support	**FREE**	$$$	included
	Software Upgrades	**FREE**	$$$	included
	Compact Unit	**Compact**	Large	Large
	Best Value	**YES**	$$$	$$$

3086 Applications

The increasing convergence and expansion of local loop data and voice services, along with shrinking budgets, demands the efficient use of new and current equipment and infrastructure. The model 3086 IAD responds to the needs of medium and small enterprise by offering an economical way to connect in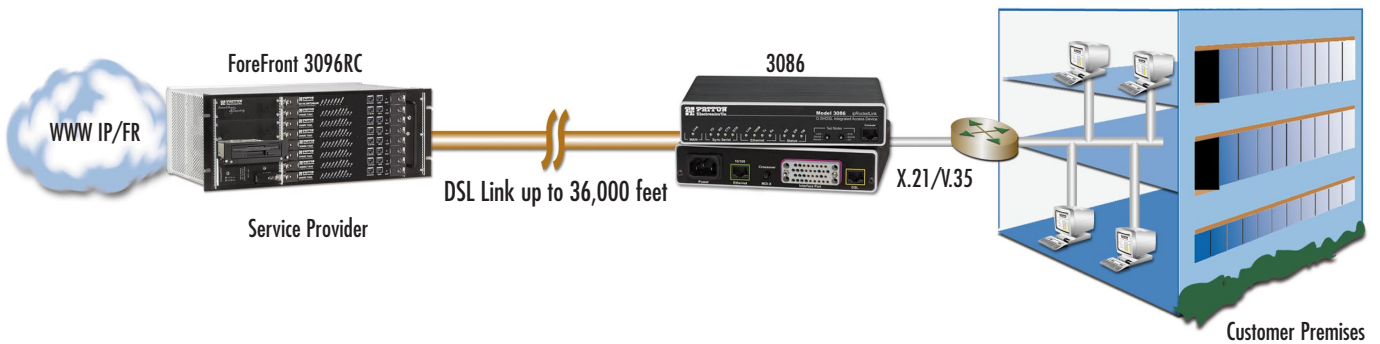tranets, and PBX voice connections to the Internet via a single-pair, high speed DSL link. The 3086 IAD connects to FR/ATM/PPP links and provide routing features for small to medium enterprise costumer, including NAT, DHCP, and Firewall. The 3086 IAD also connects to sync serial or E1/T1 drop and insert interfaces to provide complete, one-box solutions in IP, TDM, or voice connectivity.

Application 1—TDM Data Internet Access

For customers who already have a router but need access to the data network, the Model 3086 is the ideal solution to provide a fast, scalable, and long-reach solution.

In TDM data application, the Model 3086 primary function is for network access over DSL, and to provide interface conversion to X.21, or V.35 for connection to the local router. On the terminal side the model 3086 easily connects to any outer via a DB-9, DB-25, or M34 connector. In addition, the serial port can be configured as a DTE or DCE operation. In TDM applications, the 3086 provides physical access to a router running IP over any WAN protocol such as ATM/FR/PPP, the 3086 is protocol transparent. On the DSL network side, the 3086 runs at user selectable increments of nx64 kbps, from 192kbps to 2.3 Mbps, and can connect at distances up 32,000 feet (9,753 meters). At the data network's edge, the 3086 connects to a Patton ForeFront 3096RC system, another 3086, or to a third party G.SHDSL compliant device.

ForeFront 3096RC

WWW IP/FR

Service Provider

DSL Link up to 36,000 feet

3086

X.21/V.35

Customer Premises

3086 Applications (Continued)

Application 2—IF/FR Access

With a powerful business class router core, and scalable Nx64k DSL standards based links, the Model 3086 securely connects small/branch offices directly to IP/FR services. The 3086 is equipped with ip routing protocols and FR/ATM/PPP links for high speed customer connections in Internet access or point-to-point deployments.

In Internet access applications, the ISP installs a 3086 at the customer premises, and connects directly to the customer LAN switch via a 10/100 10Base-T Ethernet interface. The 3096

provide all routing and security facilities for full duplex low latency packet traffic from and to the customer LAN. At the ISP end, the remote 3086 connects to a local 3086, 3096RC ForeFront concentrator, or a compliant third party device. ISP personnel can conveniently configure and monitor the local and remote Model 3086 from any PC in their main office.
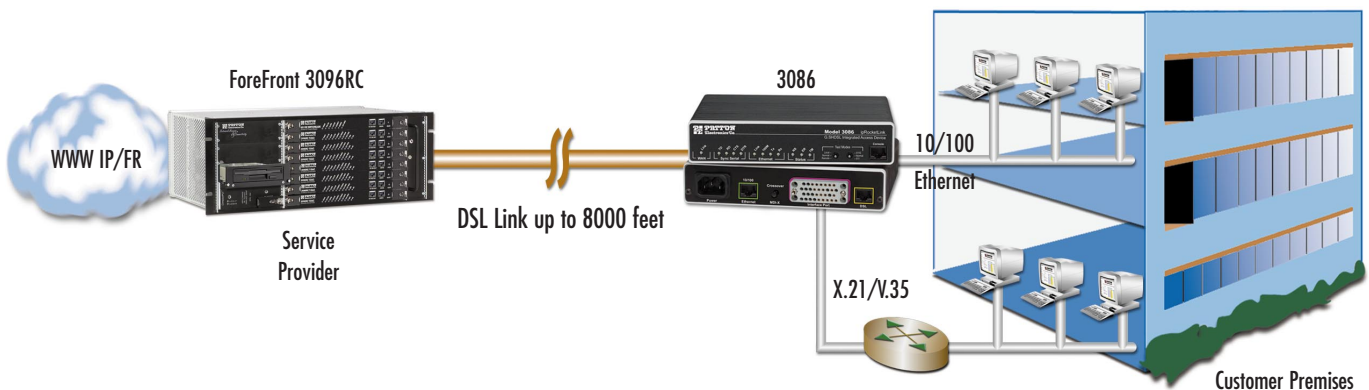
In a IP/FR application, Network access translation features in the 3086 takes a single dynamic IP address for use by all devices in the customer LAN.

ForeFront 3096RC   3086

WWW IP/FR   10/100 Ethernet

ISP   DSL Link up to 8000 feet

Customer Premises
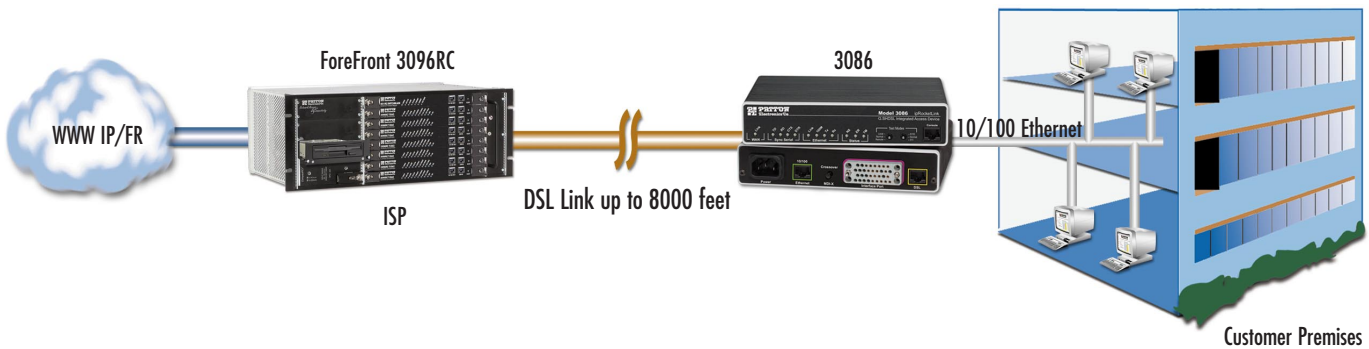
Application 3—IF/FR and TDM Data Access

The 3086 IAD dual sync serial and IP connectivity offers the most cost effective aggregation solution for small to medium size business users. With a powerful business class router core combined with an IP based 10/100 Base-T and versatile sync serial X.21/V.35 interface, the model 3086 provides the ideal solution for IP based and serial data in extranets and Internet applications.

The Model 3096 Ethernet interface connects directly to a 10/100 LAN switch or Hub, while the X.21/V.35 interface connects typically to a router or multiplexer at scalable Nx64kps speeds. The router core comes equipped with all standards routing, WAN, Management, security features, and more!
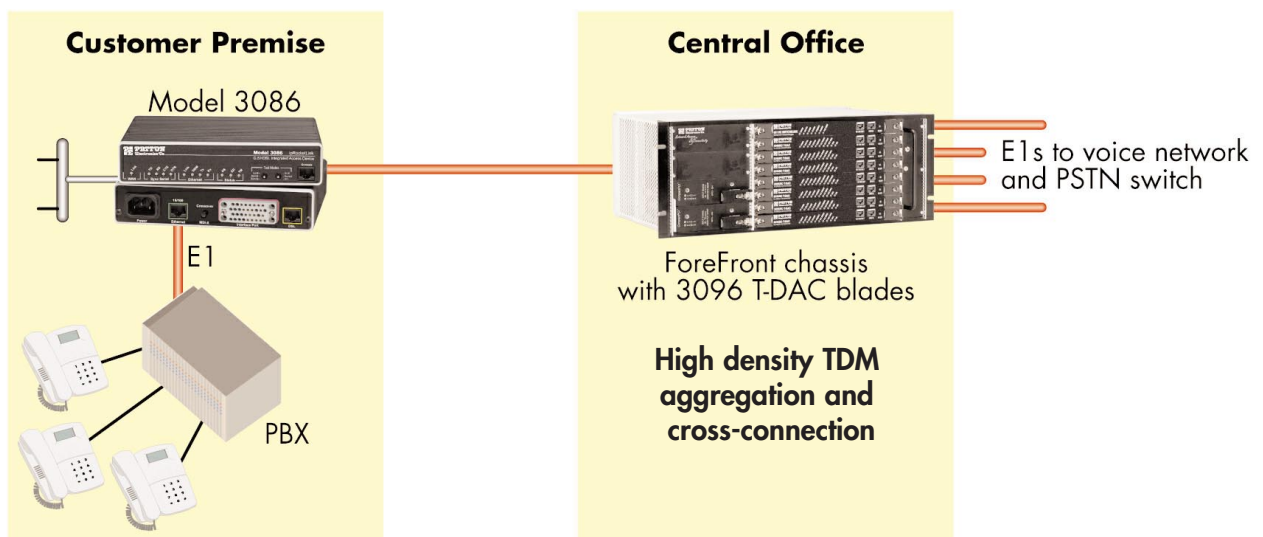

ForeFront 3096RC   3086

WWW IP/FR   10/100 Ethernet

Service Provider   DSL Link up to 8000 feet

X.21/V.35

Customer Premises

3086 Applications (Continued)

Application 4—**IF/FR and Voice-Over-DSL**

The 3086/RIK, dual Ethernet and E1/T1 IAD offers business customers complete one-box data and voice solution over DSL when used in conjunction with the Patton 3096 Forefront system.Using a Patton Model 3086/RIK, telephony services can be transported to a local PBX over standard T1/E1 WAN connections. As the E1/T1 is transparently interconnected to the PBX through the 3086, any signaling protocol can be used, including CAS R2, and CCS PRI. Through the TDM network, T1/E1's are cross connected from the PSTN voice network to appropriate E1/STM-1 streams and interconnected to a Patton 3096RC

ForeFront Chassis. The E1 is then routed to the appropriate DSL port on the 3096. At the customer premise, the E1 is connected to the PBX. All call control, signaling, and voice traffic is between the PBX and the voice switch. Additionally, E1 ports on the 3096 can also be used to deliver PBX extension through the TDM network. As the Ethernet port is active and can allow always-on IP access at the same time the E1 is being used. This allows easy and low-cost integration into the existing voice network while offering advance IP connectivity…all over DSL.
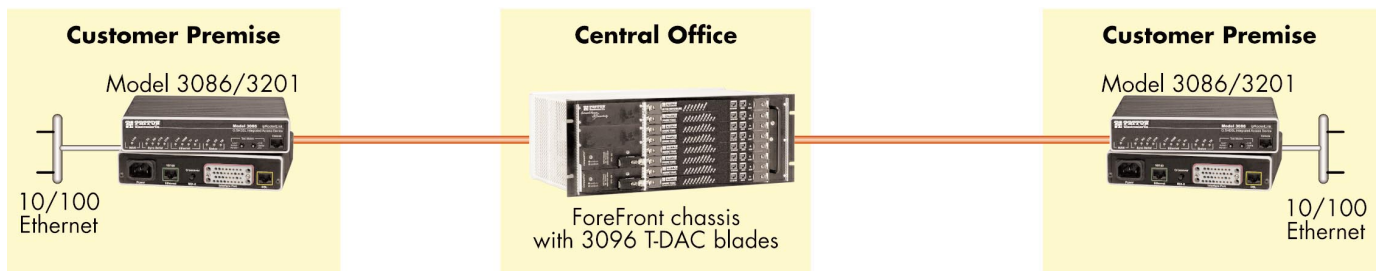
Customer Premise

Model 3086

E1

PBX

Central Office

ForeFront chassis
with 3096 T-DAC blades

**High density TDM
aggregation and
cross-connection**

E1s to voice network
and PSTN switch

3086 Applications (Continued)

Application 5—Metro Intranet Access

As a result of the symmetrical nature of the G.SHDSL modulation scheme, 3086 units can be deployed in simple back-to-back configurations. This benefit allows the easy and lowest cost creation of VPN's and intranets. Additionally, Model 3086 AID units can be connected through the network, either locally such as a metro office extension application through the same center, or via the TDM network to other centers. This allows secure networking and independent traffic engineering. Logically a PPP or Frame Relay link is established between each 3086 router. Either bridging or IP routing is activated. The use of IP routing permits NAT as well as other IP services such as firewall and DHCP. Each router will then forward traffic as appropriate to each end node of the network. IP, PPP, and Frame Relay connections are between each standalone, whether through T-DAC, TDM Network, or in back-to-back configurations.

Customer Premise
Model 3086/3201
10/100 Ethernet

Central Office
ForeFront chassis
with 3096 T-DAC blades

Customer Premise
Model 3086/3201
10/100 Ethernet

3086 Software Overview

The Model 3086's rich software feature set enables users to configure routing, WAN, Management, and diagnostic for operation in a wide array of WAN and LAN environments. The operator can use the traditional EIA-232 craft port or the embedded graphical user interface (GUI). The RS-232 serial port with VT-100 emulation allows for connection of a terminal. Based on SNMP, the 3086 also contains built-in web and Telnet servers.

- HTTP
- SNMPv2 with MIB II
- TELNET
- RS-232 Console port
- Full system management including status queries and diagnostics

Routing Protocol Support

- Complete internetworking with IP (RFC 741), TCP (RFC 793), UDP (RFC 768), ICMP (RFC 950), ARP (RFC 826).
- IP Router with RIP (RFC 1058), RIPv2 (RFC 2453)]
- Support for OSPF (RFC 2328)*+ dynamic routing.
- Up to 64 static routes with user selectable priority over RIP/OSPF routes.
- Built-in Ping and Traceroute facilities.
- Integrated DHCP Server (RFC 2131). Selectable general IP leases and user specific MAC/IP parings. Selectable lease period.
- DHCP relay agent (RFC 2132/RFC 1542) with 8 individual address pools.
- DNS Relay with primary and secondary Name Server Selection.
- NAT (RFC 3022) with Network Address Port Translation (NAPT) for cost-effective sharing of a single DSL connection. Integrated Application Level Gateway with support for over 80 applications.
- NAT MultiNat with 1:1 mapping.

- NAT Many:1
- NAT Many:Many mapping
- NAT Port/IP redirection and mapping.
- VPN services supporting PPTP PAC+ (RFC 2637) with MS-CHAP*+ and MPPE*+ L2TP LAC+ (RFC 2661).
- uPNP controlled device for seamless networked device interconnectivity and Windows XP integration.
- IP-in-IP (RFC 2003) Encapsulation Patton VL2 Technology (Virtual-Layer-2)*+
- IP-in-IP selectable Direct-IP for NBT traffic with default routing for all others. Supports NBT broadcasts for tunneling across WAN.*
- IGMPv2 Proxy support (RFC 2236)+
- Frame Relay with Annex A/D/LMI, RFC 1490 MpoFR and FRF.12 Fragmentation

Compression Support

- STAC (LZS) Compression.*
- V.44* Compression.*
- PPP Header Compression.*
- VJ TCP Header Compression.*
- PPP Compression Control Protocol (RFC 1974).*

PPP Support

- Point-to-Point Protocol over HDLC
- PPPoA (RFC 2364) Point-to-Point Protocol over ATM.
- PPPoE (RFC 2516) Client for autonomous network connection. Eliminates the requirement of installing client software on a local PC and allows sharing of the connection across a LAN.
- User configurable PPP PAP (RFC 1661) or CHAP (RFC 1994) authentication.
- PPP BCP (RFC 1638) support for bridged networking support.

3086 Software Overview (Continued)

ATM Protocols

- Multiprotocol over ATM AAL5 and Multiprotocol Bridged encapsulation RFC 2684 (Formerly RFC 1483) and RFC 1577 Classical IP over ATM. Default RFC 1483 route mode. Logical Link Control (LLC)/ Subnetwork Access Protocol (SNAP) encapsulation. Default VC mux mode.

- ATM UNI 3.0, 3.1, and 4.0 signaling ATM QoS with UBR, CBR, nrt-VBR, and rt-VBR and per-VC queuing and shaping. IISP V.1.0 Q.2931 UNI L3 and Q.2971 UNI L3 support.

- LAN Emulation Client (LEC) V.1 with LEC via PVC or ILMI connection

- Peak cell rate shaping on a per-VCC basis up to 32 active VCCs across VPI 0-255, VCI 0-65525. Single default PVC: 8/35 with PCR=5,500 cells.

- I.610 OAM network management including AIS/RDI, loop-back and performance monitoring.

- Enhanced ILMI 4.0 for auto-configuration of ATM PVCs.

- FRF.12 Frame Relay Fragmentation support, LMI For Frame Relay PVC Link Management, FRF.5 Frame Relay to ATM Network internetworking, and FRF.8 Frame Relay to ATM Service Internetworking.

- IP QoS with class of service definition and traffic shaping+

- Early Packet Discard/Partial Packet Discard DiffServ (RFC 2475)+

Management

- User selectable ATM, PPP, or Frame Relay WAN datalink connection.

- Web-Based configuration via embedded web server

- CLI menu for configuration, management, and diagnostics.

- Local/Remote CLI (VT-100 or Telnet).

- SNMPv1 (RFC 1157) MIB II (RFC 1213)

- PC Windows based configuration program to aid in setup.*

- Quick Start Setup runs through common options to simplify circuit turn-up.

- Real-time SNTP with primary and secondary NTP hosts.*

- Logging via SYSLOG, and VT-100 console. Console portset at 9600 bps 8/N/1 settings no flow control.

- EOC access for End-To-End management, configuration, and control.

Security

- Packet filtering firewall for controlled access to and from LAN/WAN. Support for 255 rules in 32 filter sets. 16 individual connection profiles.

- Statefull inspection firewall.*++

- IPSEC*++with DES and 3DES, Transport or Tunnel mode, ESP or AH Authentication, MD5 or SHA-1 data integrity & IKE key exchange.

- DoS Detection/protection. Intrusion detection, Logging of session, blocking and intrusion events and Real-Time alerts. Logging or SMTP on event.

- Password protected system management with a username/password for console and virtual terminal. Separate user selectable passwords for SNMP RO/RW strings.

- Access list determining up to 5 hosts/networks which are allowed to access management system SNMP/HTTP/ TELNET.

- Logging or SMTP on events: POST, POST errors, line/DSL, PPP/DHCP, IP.

* Future development.

3086 Hardware Overview

The Model 3086 hardware is optimized for quick connection, resilience, and reliability to deliver your IP and/or serial data at high speeds in any environment. The model 3086 is equipped with a universal input power supply (100-240VAC), either user selectable DTE/DCE interface programmable for X.21/V.35, or T1/E1 port. In addition a 10/100 Base-T port includes a built-in crossover switch, a console port allows quick turn-up to get your customer's connections up and running immediately. Front panel LEDs display alarms and data status signals at-a-glance.

WAN Interface

The 3086 comes with a standard G.HSDSL interface presented in a female RJ-45 connector – The model 3086 connects directly to the local loop via 2-wire twisted pair media.

The WAN interface supports the following features:

- Sturdy RJ-45 connector for connection to the DSL link.

- 2-wire twisted pair, full duplex operation.

- Nx64kbps speeds up to 2.3Mbps

- Reach of up to 32,000 feet.

- Connects to IP/FR/ATM/PPP WAN protocols.

- Connects to another Patton 3086, 3096RC ForeFront System, or third party compliant devices.

LAN

The 10/100-Mbps Ethernet LAN port is presented on an RJ-45 connector with an auto sensing/full duplex 10Base-T or 100Base-T interface. Also included are:

- 100 Base-T half/full duplex operation

- 10 Base-T half/full duplex operation

- Auto detection and fallback

- 10/100Mbps link and status indicator

Sync Serial Interface

The 3086 comes with a Synchronous Serial Interface for connection to a router or multiplexer. Options for this port include:

- ITU-T X.21(DB-15) or V.35 (M34) fixed interfaces, or X.21/V.35 (DB-25) user selectable

- User selectable DTE/DCE configuration

- NX64kbps speeds up to 2.3/4.6 Mbps (split with the LAN interface)

T1/E1

- Line Rate 1.544Mbps (T1), and 2.048Mbps (E1)

- RJ-48C connector (120-ohm and 75-ohm (E1 only)

- Reach and range 1 mile (1.6 km), 24AWG wire

- Nx56/64kbps with full DS0 mapping

- AMI/B8ZS (T1), AMI/HDB3 (E1)

- D4/ESF coding and framing (T1)

RS-232 Console Port

The RS-232 console port (located on the front panel) provides for initial configuration of the model 3086. The RS-232 port supports.

- An RJ-45 connector with EIA-561 pinout

- Asynchronous data rates up to 115 kbps

- A management interface that supports VT-100 terminals

- Hardware flow control

- Hardware CD and DTR for external modem support

Power System

The Model 3086 offers flexible power supply options.

- Internal AC power supply.

- Sturdy connection via rugged IEC-320, filtered power connector.

- Accepts universal-input voltage range, 100 –240VAC, 50–60Hz.

3086 Hardware Overview (Continued)

Central Processing Core

The 3086 employs a Dual ARM RISC Virata processor. The general purpose RISC processor runs higher level protocols, while a higher performance microcoded RISC Protocol Processor is used for cell and frame handling, switching traffic at up to 120MHz. The Processor controls the direct connection to Etherenet and in conjunction with the Conexant DSL control the WAN interface. In addition the Viarta dual processor core supports the following features:

Protocol Processor

- Ethernet PHY Management
- Initialization code
- Soft-start real tasks

Network Processor

- Data transfer Framing, interleaving,CRC generation, Switching.
- Hard real-time tasks

Memory

- 16 Mbyte DRAM
- 4 Mbyte Flash

Configuration/Diagnostic Switches.

The model 3086 provides limited configuration capabilities via DIP-switches (located on the underside of the unit), and complete diagnostic capabilities via front panel switches.

- DIP switches: Allow configuration for speed, and clock mode for DSL and Sync Serial ports.
- Two front panel toggle switches: Allow user to initiate V.54 local or remote loops, and 511/511 BER test patterns.

System Timing

The Model 3086 may be derived from an internal source, Network (DSL), or External source from a V, 35 port. The system timing can be configured trough DIPswitches, VT-100 or NMS control.

- Internal clock, derived from an internal (oscillator source)
- Network clock, derived from the DSL link.
- External clock, derived from the V.35 serial port. Not available for units with X.21 serial port.

LED display

12 front panels LEDs display status of the WAN port, Ethernet, Sync serial, and diagnostic signals as follows:

WAN

- Link. Display connection status of the DSL link – solid yellow when connected, OFF when no connection is detected.

Ethernet

- Link. Solid yellow indicates connection to Ethernet LAN.OFF, no connection.
- 100M. Solid yellow, indicates connection to a 100Mbps LAN. OFF, connection to a 10Mbps LAN.
- TX. Glows yellow to indicate data transmission to the LAN.
- RX. Glows yellow to indicate Data received from the LAN.

Sync Serial

- TD. Indicates data received from the terminal.
- RD. Indicates data received from the DSL link.
- CTS. Indicates that the 3086 has activated the Clear –to Send signal to the terminal.
- DTR. Indicates that the terminal device has activated the Data Terminal Ready signal.

T1/E1 Signals

- Link. Indicates connection to T1/E1 line
- Loss. Indicates no valid connection detected

3086 Hardware Overview (Continued)

Status/Diagnostic signals

- NS. Indicates that the 3086 has not detected a connection with the DSL Link.

- ER. Blinks to indicates received error when BERT patterns are activated

- TM. Indicates that the 3086 has entered diagnostic mode.

Physical & Environmental

The Model 3086 is enclosed in a strong, fire retardant case. It's small footprint is a plus when installing the units in tight spaces. The model 3086 physical and environmental includes the following.

- Dimensions: 7.3 x 6.6 x 1.62 in. (185 x 168 x 41mm)

- Operating Temperature: 0–50°C (32–122°F)

- Humidity: 5 to 95% RH, non-condensing.

- Power consumption: less that 5 watts.

Approvals/Compliance

The model 3086 has the following approvals:

- FCC part 15, class A

- Complies with UL1950 (MET)

- Complies with Canadian cMET

- EMC directive 89/336/EEC

- Low voltage directive 73/23/EEC (EN60950)

- ETSI/ITU-T G.SHDSL G.991.2

- CTR 12, CTR 13, and FCC part 68 (T1/E1 interface models)

3086 Specifications	
DSL	G.991.2 ITU G.SHDSL Annex A and Annex B, G.994.1 G.hs. nx64 data rates over 2-wire full-duplex to 2.3 Mbps, symmetrical, TC-PAM encoding. Distance of 32,000 ft (9.8 km) at 192 kbps to 18,000 ft (5.6 km) at 2.312 Mbps.
DSL Connection	Shielded RJ-11F isolation per IEC 950
Ethernet Connection	10/100Base-T, Auto-Sensing, Full/Half-Duplex operation
Serial Interface	User configurable ITU-T X.21/V.35 interface (DCE/DTE) presented on M34F or DB-25F connectors
Management	EIA-561 RJ-45 RS-232, VT-100 CLI, TELNET, Embedded WEB/HTTP, SNMP, Logging or SMTP on events: POST, POST errors, line/DSL, PPP/DHCP, IP MPOA AAL5 and Bridged encapsulation RFC 2684 and RFC 1577 IPoATM. LLC/VC Mux support.
ATM Support	UNI 3.0, 3.1, and 4.0 ATM QoS with UBR/CBR/nrt-VBR/rt-VBR and per-VC queuing and shaping.
	Peak cell rate shaping on a per-VCC basis up to 32 active VCCs
	I.610 OAM network management including AIS/RDI, loop-back and performance monitoring.
Protocol	Enhanced ILMI 4.0 for auto-configuration of ATM PVCs, IP (RFC 741), TCP (RFC 793), UDP (RFC 768), ICMP (RFC 950), ARP (RFC 826). IP Router with RIP (RFC 1058), RIPv2 (RFC 2453), OSPF (RFC 2328) Integrated DHCP Server (RFC 2131). Selectable IP
Protocol (continued)	leases and MAC/IP pairings. DHCP relay agent (RFC 2132/RFC 1542) with 8 address pools. DNS Relay. IGMP v1 and v2. IP-in-IP (RFC-2003) encapsulation, Ethernet Bridging.
	NAT/NAPT with integrated application support, MultiNat with 1:1 mapping, Many:1, Many:Many mapping, NAT Port/IP redirection and mapping.
Security	DoS Detection/protection. Intrusion detection, Logging of session, blocking and intrusion events and Real-Time alerts, Password protected system management with a username/password for console and virtual terminal, Packet filtering firewall for controlled access to and from LAN/WAN. Support for 255 rules in 32 filter sets. 16 individual connection profiles. Access list determining up to 5 hosts/networks which are allowed to access management system SNMP/HTTP/TELNET
Indicators	12 LEDs: DSL Link; Sync Serial: TD, RD, CTS, DTR; LAN: TX, RX, 100M Link; Status: NS, ER, TM.
Power Supply	Internal universal 90-260 VAC input
Compliance	FCC Part 15A, CE Mark, EMC Directive 89/336/EEC, Low-Voltage Directive 73/23/EEC, EN60950, EN55022 (CISPR 22)
Environment	Temperature: 32–122°F (0–50°C); Humidity: 5–90%, non-condensing
Dimensions	7.3" x 6.6" x 1.62" (185mm x 168mm x 41mm).