APS-8, APS-16, APS-24

Multiprotocol FRADs/PADs and Packet Switches

FEATURES

- 8/16/24-port asynchronous channel Frame Relay/Packet Assemblers/Disassemblers (FRADs/PADs) and multiprotocol packet switches
- Asynchronous data rate of up to 115.2 kbps
- SLIP/PPP supported on all asynchronous ports
- Protocols supported: Frame Relay, X.25, IP, HDLC, SLIP, PPP, ML-PPP and asynchronous
- IP networking using:
  - RIP1, RIP2 and static routing
  - Standard IP encapsulation over Frame Relay (RFC 1490), or X.25 (RFC 1356) networks
- Standard bridging
- Built-in Telnet client/server to support terminal/server applications
- Managed via an ASCII terminal or RADview-PC/HPOV, RAD's SNMP-based network management system
- Optional built-in Ethernet for easy integration of LAN segments
- Optional ISDN interface for Frame Relay, X.25, PPP and ML-PPP protocol traffic
- Flash memory for software upgrades

DESCRIPTION

- APS-8, APS-16 and APS-24 are high performance FRAD / X.25 PADs for access to Frame Relay / X.25 networks. The number of async channels is expandable up to 72, via external statistical multiplexers. All models have three synchronous links, which also function as a multiprotocol packet switch.
- Typical applications include:
  - Transferring async data over Frame Relay network, using either of the two options:
    1. Direct asynchronous to Frame Relay encapsulation
    2. Reliable asynchronous using X.25 over Frame Relay.
  - Transferring async data over an X.25 network
  - Migration of terminal / server applications to an IP environment, while improving its durability (see *Figure 1*)

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- Consolidating IP (Ethernet) using RFC 1490 / RFC 1356 and Async traffic over Frame Relay / X.25 networks (see *Figure 2*).

FRAME RELAY

- APS-8, APS-16 and APS-24 provide access to public or private Frame Relay networks. Async data is sent directly over the Frame Relay or encapsulated over X.25 / Frame Relay (Annex G), to achieve maximum reliability.
- A unique funneling mechanism adjusts feeder throughput to CIR levels.
- LMI and ANSI PVC management protocols are supported in compliance with ANSI T1.606, T1.618, T1.617 Annex D, and ITU Rec. Q.922, Annex A.

X.25

- APS-8, APS-16 and APS-24 allow both mandatory and additional ITU X.25 facilities to be used for X.25 applications.
- X.25-configured links support permanent virtual circuits (PVCs) and switched virtual circuits (SVCs). The link packet size is up to 4096 bytes.
- Dial-up X.25 links are established via a dial-up modem, controlled by a DTR signal or V.25 bis commands.
- X.25 multicasting is fully supported.

X.32

- The X.32 protocol can be used for establishing an X.25 dial-up link. This enables users to access an X.25 network remotely via a dial-up modem using X.32, or use the dial-up backup link over an X.25 or Frame Relay network.

HDLC TRANSPARENT ACCESS

- Each port can be programmed to operate in transparent HDLC mode for connecting bridges, routers and other HDLC communication devices over X.25 or Frame Relay networks. The HDLC protocol is encapsulated over X.25 or Frame Relay, providing end-to-end transparent operation.

ASYNCHRONOUS ACCESS

- All asynchronous channels can act according to X.3, X.28 and X.29 profiles at traffic speeds of up to 115.2 kbps. Asynchronous traffic can be packetized directly over the Frame Relay network, or the X.25 network. All channels are configured and monitored by the management agent of the units.
- Each one of the APS-8, APS-16 and APS-24 ports can be configured to SLIP or PPP modes, operating at data rates of up to 115.2 kbps.

IP ROUTING

- IP datagrams can be routed over Ethernet, PPP or SLIP links and over Frame Relay networks (according to RFC 1490) or over an X.25 network (according to RFC 1356).
- The units support RIP1, RIP2 and triggered acknowledgment RIP messages (according to RFC 1058, 1723 and 1724). The RIP support enables easy IP connection while minimizing IP user configuration. The triggered RIP reduces the overhead associated with the RIP mechanism, by minimizing the number of periodic messages sent.

APPLICATIONS

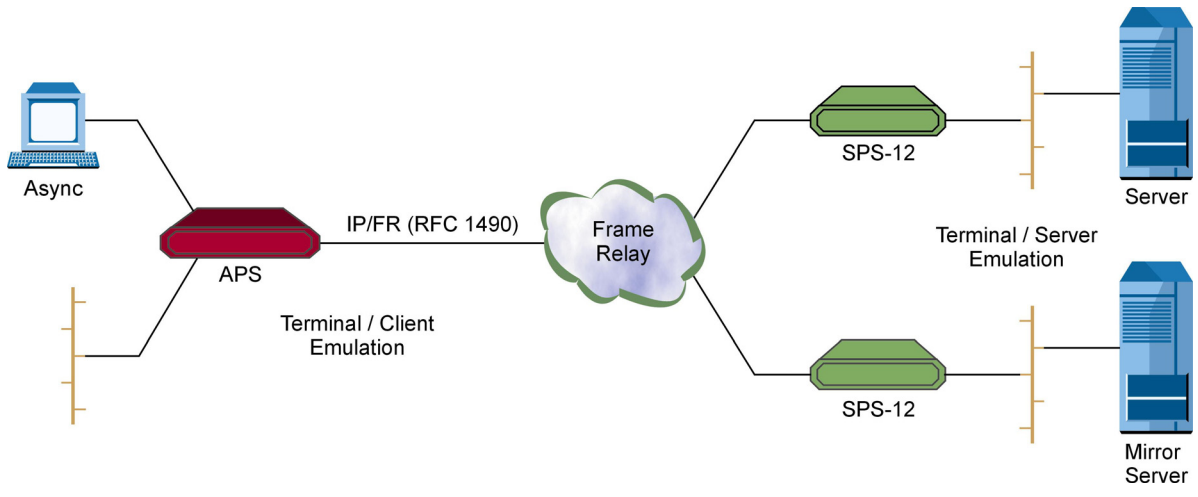

Figure 1. Remote Branch Connection with ISDN/GPRS Backup Channel

- Static IP routing is supported. IP packets are routed to destination via SLIP, PPP, LAN (Ethernet), X.25 or Frame Relay link, according to the IP address.

ETHERNET

- The Ethernet interface enables bridging and/or routing of LAN packets over a Frame Relay network (according to RFC 1490) and over an X.25 network (according to RFC 1356).

ISDN

- PPP/FR/X.25 data can be transmitted over the ISDN media.
- The ISDN data rate is up to 128 kbps.

MANAGEMENT CAPABILITIES

- APS-8, APS-16 and APS-24 contain an SNMP agent, which enables remote configuration, collection of statistics/status reports, and diagnostics. The management agent can be programmed to periodically send statistics and status reports to a maximum of five management stations.
- A management station can be connected directly to the units using LAN, PPP or SLIP.
- Configuration, monitoring and controlling of all network resources can be performed via an ASCII terminal or by using RADview-PC/UNIX, RAD's SNMP-based management system.
- The SNMP agents support private and standard MIBs, including MIB II with RFC 1213, RFC 1381 and RFC 1382 for X.25, and RFC 1315 for Frame Relay.

BACKUP

- Enhanced backup facilities include PSTN/ISDN support.
- Frame Relay, X.25 and PPP traffic can be transmitted over ISDN.
- The main facility links are automatically restored after a network recovery.

SPECIFICATIONS

SYNCHRONOUS PORTS

- **Number of Ports**
  3
- **Data Rate**
  2 Mbps aggregation on every three associated ports (115.2 kbps for asynchronous)
- **Throughput**
  Up to 450 packets per second for X.25 or Frame Relay
- **Interfaces**
  V.24, V.35, X.21, RS-530, IBE, UTP and DDS on port 1
- **Connectors**
  - V.24: 25-pin D-type, female
  - V.35: 34-pin D-type, female
  - X.21: 15-pin D-type, female
  - RS-530: 25-pin D-type, female
  - DDS: RJ-48, socket (DTE)
  - IBE: 'S' interface, RJ-45
  - UTP: 10BaseT, RJ-45 (DTE)

  ***Note**: An adapter cable is provided for all V.35 and X.21 interfaces.*
- **Protocols**
  - Compatibility: X.25, Frame Relay, HDLC, STM, asynchronous, IP, PPP, ML-PPP
  - X.25: complies with 1988 ITU X.25 LAP-B
  - Frame Relay: supports CLLM, LMI, and ANSI PVC management protocols; complies with ANSI T1.606, T1.617 Annex D, T1.618, ITU Rec. Q.922 Annex A, and Q.933 Annex A

  ***Note**: Each port is user-selectable.*

ASYNCHRONOUS PORTS

- **Number of Ports**
  - APS-8: 8 ports
  - APS-16: 16 ports
  - APS-24: 24 ports
- **Data Rate**
  75 bps to 115.2 kbps

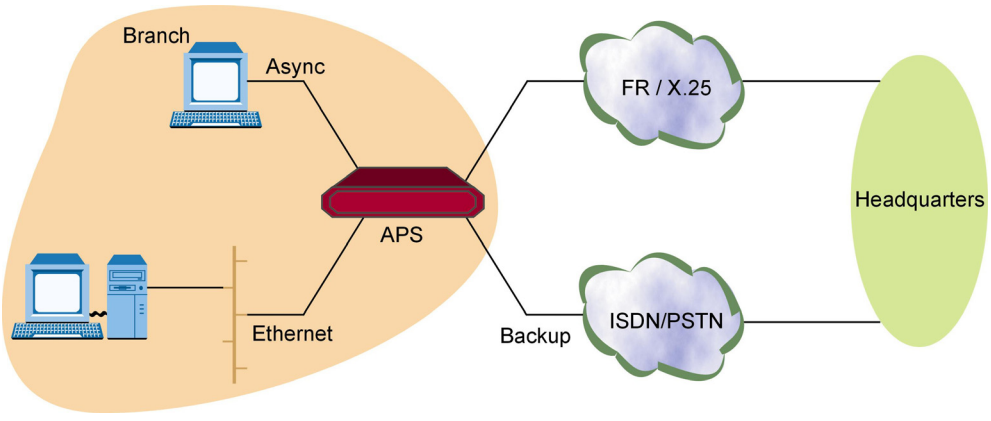

Figure 2. X.25 Traffic over an IP Network

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Multiprotocol FRADs/PADs and Packet Switches

- **Flow Control**
  XON/XOFF, CTS/RTS
- **Command Modes**
  X.28, X.29

DDS LINK

- **Interface**
  Compatible with AT&T PUB 62310
- **Connector**
  RJ-48 (8 pins)
- **Connector**
  RJ-48 (8 pins)
- **Data Rates**
  4.8, 9.6, 19.2, and 56 kbps
- **Data Rates**
  4.8, 9.6, 19.2, and 56 kbps
- **Timing**
  Receive: Recovered from line signal
  Transmit: Locked to receive signal
  Internal oscillator
- **Attenuation**
  Up to 43 dB
- **Range (AWG 24, 0.6 mm)**
  9.6 kbps: 10.5 km (6.5 miles)
  19.2 kbps: 8.0 km (5 miles)
  56 kbps: 6.5 km (4 miles)
- **Transmitted BPV Sequence**
  Zero suppression
- **Received BPV Sequence**
  Out of service (OOS)
  Out of frame (OOF)
  DSU loopback

GENERAL

- **Indicators**

PWR	ON when unit is powered (green)
ERR	ON when failure in operation is detected (red)
OVF	ON when overflow is detected (red)
SYNC	ON when synchronization in the protocol layer is achieved (green)
ACTIV	ON when data is transmitted on the line (yellow)

- **Controls and Switches**
  Front panel: Reset button
  Rear panel: Power button
- **Power**
  AC: 100–230 VAC (±10 %)
  50–60 Hz
  DC: 24 or 48 VDC
- **Power Consumption**
  15W max
- **Physical**
  Height: 44.0 mm (1.7 in)
  Width: 432.0 mm (17.0 in)
  Depth: 298.0 mm (11.7 in)
  Weight:
  - APS-8: 1.9 kg (4.2 lb)
  - APS-16: 2.0 kg (4.4 lb)
  - APS-24: 2.2 kg (4.8 lb)
- **Environment**
  Temperature: 0°–50°C (32°–122°F)
  Humidity: Up to 90%, non-condensing

ORDERING

APS-8/#/*
Multiprotocol packet switch with 8 asynchromous ports

APS-16/#/*
Multiprotocol packet switch with 16 asynchromous ports

APS-24/#/*
Multiprotocol packet switch with 24 asynchromous ports

Specify optional DC power supply (default is with AC power supply):
24 for 24 VDC
48 for 48 VDC

* Specify optional special interface:
DDS for integral CSU/DSU
IBE for ISDN BRI 'S' interface
IBU for ISDN BRI 'U' interface
UTP for integral 10BaseT interface
BNC for integral 10Base2 interface

Note: *By default, special interfaces are not included.*

APS-M/&
APS interface module

& Specify interface type:
V24T for V.24/RS-232 (DTE)
V24C for V.24/RS-232 (DCE)
V35T for V.35 (DTE)
V35C for V.35 (DCE)
V36T for V.36/RS-449 (DTE)
X21T for X.21/V.11 (DTE)
530T for RS-530/RS-422 (DTE)

Note*: All X.21, V.35 and V.36 interfaces include an adapter cable (see Supplied Accessories).*

SUPPLIED ACCESSORIES

Power cable

CBL-RJ45/D9/F/STR
Adapter cable for converting RJ-45 control to DB-9 control

CBL-8H/F
Adapter cable for V.35 (if V.35 interface is ordered)

CBL-530/499/F
Adapter cable for V.36 (if V.36 interface is ordered)

CBL-530T/21C/F
Adapter cable for X.21 (if X.21 interface is ordered)

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