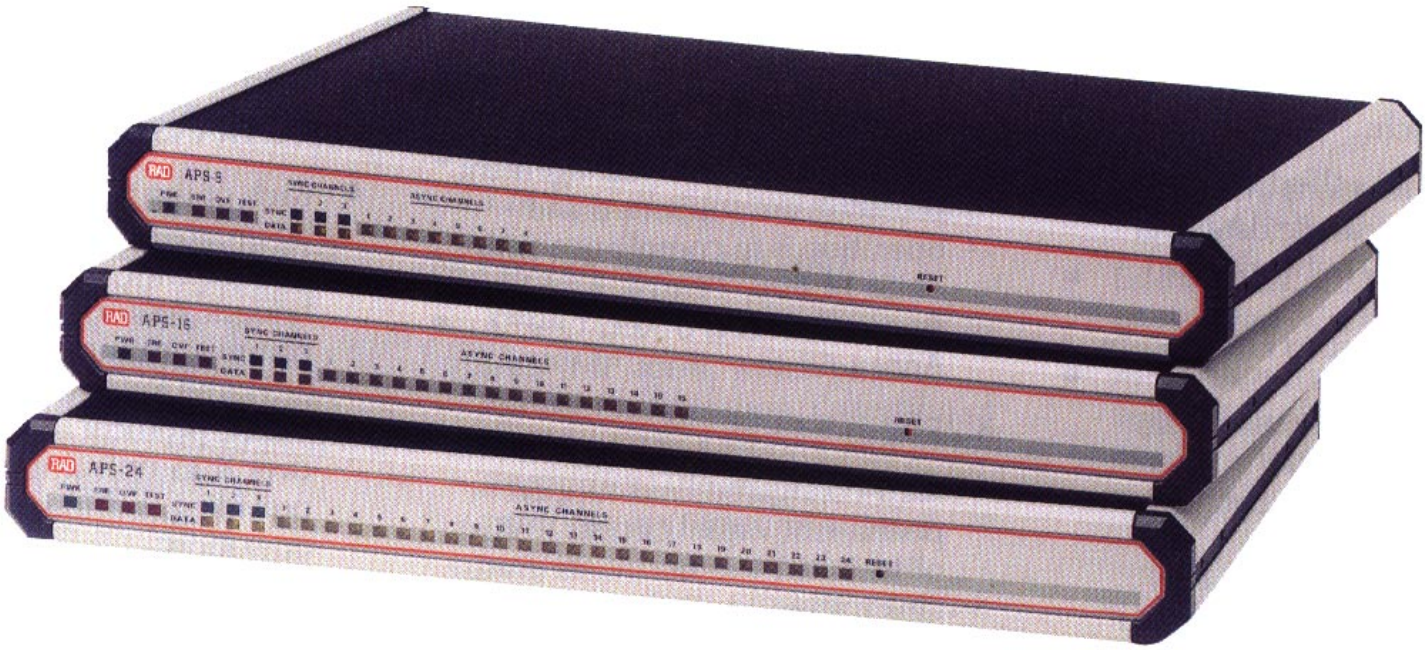
APS-8, APS-16, APS-24

Multiprotocol Packet Switches for Frame Relay / X.25 / IP / Async / HDLC



FEATURES

- 8, 16 or 24 Async channel FRAD / X.25 PAD with three multiprotocol ports
- Async data rate up to 115.2 kbps
- SLIP/PPP supported on all Async ports
- Protocols supported: Frame Relay, X.25, IP, HDLC, SLIP, PPP, ML-PPP and Async
- IP support:
  - RIP1, RIP2 and static routing
  - Standard IP encapsulation over Frame Relay (RFC 1490), or X.25 (RFC 1356) networks
- Standard bridging
- Telnet client / server to support terminal / server applications
- SNMP management using RADview PC / UNIX platforms
- Optional built-in Ethernet interface, allowing easy integration of LAN segments
- Optional support for ISDN: Frame Relay / X.25 / PPP / ML-PPP can be transmitted over the ISDN media
- FLASH memory for software upgrade

APS-8, APS-16, APS-24

Multiprotocol Packet Switches for Frame Relay / X.25 / IP / Async / HDLC

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. Two options exist:
    1. Direct async to Frame Relay encapsulation
    2. Reliable async using X.25 over Frame Relay
  - Transferring async data over X.25 network
  - IP PAD facilities allow easy migration of terminal / server applications to an IP environment, at the same time improving its durability (see *Figure 1*)
  - 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 and operation is in compliance with ANSI T1.606, T1.618, T1.617, Annex D, and ITU Rec. Q.922 Annex A.

X.25

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

X.32

- APS-8, APS-16 and APS-24 support X.32 protocol for a dial-up X.25 link. This enables users to access an X.25 network remotely, via a dial-up modem with X.32, or to use the backup dial-up link for an X.25 or Frame Relay network.

HDLC TRANSPARENT ACCESS

- Each of the three switch ports can be programmed to operate with transparent HDLC 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.

ASYNC ACCESS

- All async channels can act according to X.3, X.28 and X.29 profiles at traffic speeds of up to 115.2 kbps. Async traffic can be packetized directly over a Frame Relay network, or packetized over the X.25 network. All channels are configured and monitored by the management agent of APS-8, APS-16 and APS-24.

APPLICATIONS

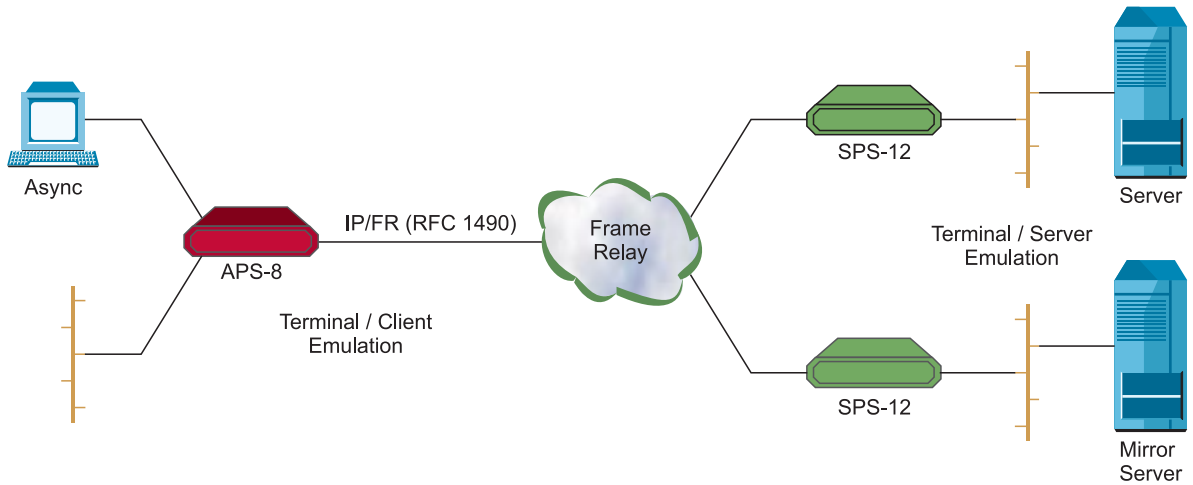


Figure 1. Terminal / Server Emulation Application

APS-8, APS-16, APS-24

Multiprotocol Packet Switches for Frame Relay / X.25 / IP / Async / HDLC

- 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).
- APS-8, APS-16 and APS-24 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 enables reduction of the overhead associated with the RIP mechanism, by minimizing the number of periodic messages sent.
- 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/Frame Relay/X.25 can be transmitted over the ISDN media.
- ISDN support includes up to 128 kbps (Bundle two B channels).

NETWORK MANAGEMENT

- 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.
- Configuration, monitoring and controlling of all network resources can be performed from a RADview-PC or RADview-HPOV/UNIX SNMP management station.
- A management station can be connected directly to APS-8, APS-16 and APS-24 through LAN, PPP or SLIP.
- APS-8, APS-16 and APS-24 SNMP agent 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 can be transmitted over the ISDN media.
- APS-8, APS-16 and APS-24 features an automatic return to main link facility after a network recovery.

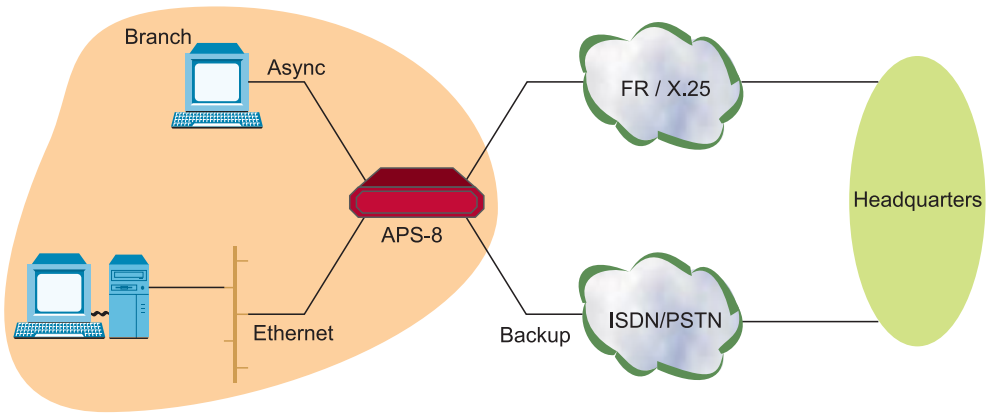


Figure 2. Consolidating IP (Ethernet) and Async Traffic over FR/X.25 Networks

APS-8, APS-16, APS-24

Multiprotocol Packet Switches for Frame Relay / X.25 / IP / Async / HDLC

SPECIFICATIONS

COMMUNICATIONS

- **Number of Ports**
  Three
- **Data Rate**
  2 Mbps aggregate on all ports (115.2 kbps for async)
- **Throughput**
  Up to 450 packets per second for X.25 / Frame Relay
- **Interfaces**
  V.24, V.35, X.21, RS-530 (see *Ordering*)
  IBE, UTP and DDS on port 1 only
- **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: Adapter cable is supplied 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 soft-selectable

ASYNC PORTS

- **Number of Async Ports**
  Eight for the APS-8
  Sixteen for the APS-16
  Twenty-four for the APS-24
- **Data Rate**
  75 bps to 115.2 kbps
- **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)
- **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)

- **Physical**

Height:	4.4	cm / 1.7	in
Width:	43.2	cm / 17	in
Depth:	29.8	cm / 11.7	in
Weight:	1.9	kg / 4.2	lb

- **Environment**

Temperature:	0-50°C / 32-113°F
Humidity:	Up to 90%, non-condensing

- **Power**
  100 to 230 VAC (±10%)
  50 to 60 Hz, 15W

ORDERING

APS-8/#/*
Multiprotocol PAD/Switch with 8 async ports and 3 sync ports

APS-16/#/*
Multiprotocol PAD/Switch with 16 async ports and 3 sync ports

APS-24/#/*
Multiprotocol PAD/Switch with 24 async ports and 3 sync ports

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

* 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
(default is without special interface)

Interface Modules APS-M/&

& Specify link interface:
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)

RAD
data communications

http://www.rad.com

Corporate Headquarters
12 Hanechoshet Street
Tel Aviv 69710, Israel
Tel: (972) 3-6458181
Fax: (972) 3-6498250, 6474436
Email: rad@rad.co.il

U.S. Main Office
900 Corporate Drive
Mahwah, NJ 07430
Tel: (201) 529-1100
Fax: (201) 529-5777
Email: market@radusa.com

212-100-06/99