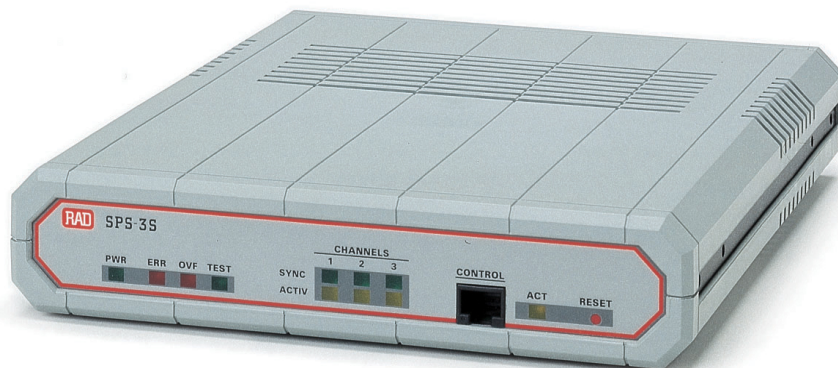




## Multiprotocol FRAD/PAD Packet Switch



### FEATURES

- Frame Relay/Packet Assembler/Disassembler (FRAD/PAD) and multiprotocol packet switch
- Allows legacy protocols, such as X.25 and Frame Relay to run over IP networks
- Backup channel over cellular GPRS networks
- 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
- Transmit Frame Relay, X.25, PPP and ML-PPP over ISDN
- Flash memory for software upgrade

### DESCRIPTION

- SPS-3S is a FRAD/PAD packet switch with three ports. The unit enables multiprotocol connection between the enterprise headquarters and remote branches.
- While retaining the functionality of the SPS family of products, other features include:
  - Support for the Legacy over IP architecture
  - Asynchronous backup channel for GPRS packet streams.
- SPS-3S provides access and switching to public or private Frame Relay networks, and consolidate asynchronous, HDLC, IP and X.25 protocols together over the Frame Relay network.

### FRAME RELAY

- As a Frame Relay switch, the unit can integrate DLCIs from several sources into a single port. SPS-3S supports BECN/FECN signaling for congestion avoidance.
- A unique funneling mechanism adjusts feeder throughput to CIR levels.
- For each DLCI, an optional backup Frame Relay link is available.
- The Frame Relay multicasting feature (complies with FRF-7), enables multicasting frames from one DLCI onto several DLCIs. The feature supports one-way, two-way and broadcast communication options.

# SPS-3S

## Multiprotocol FRAD/PAD Packet Switch

- 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.
- SPS-3S supports CLLM management protocol and comply with ITU REC Q.933, Annex A.

### X.25

- SPS-3S allows 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.

### ISDN

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

### 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 SPS-6 and SPS-12.

- Each one of the SPS-3S ports can be configured to SLIP or PPP modes, operating at data rates of up to 115.2 kbps.
- IP PAD facilities allow easy migration of terminal/server applications to an IP environment.

### 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).
- SPS-3S supports 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.
- In static IP routing, IP packets are routed to destination via SLIP, PPP, LAN (Ethernet), X.25 or Frame Relay link, according to the IP address.

## APPLICATIONS

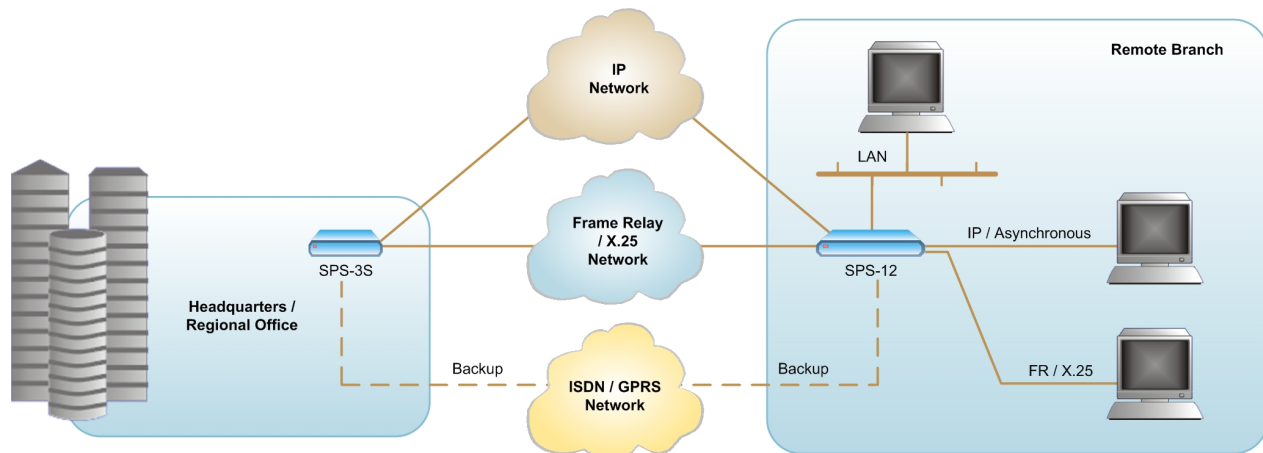


Figure 1. Remote Branch Connection with ISDN/GPRS Backup Channel

## Multiprotocol FRAD/PAD Packet Switch

## 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).

## MANAGEMENT CAPABILITIES

- SPS-3S contains 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 SPS-3S 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 SPS-3S 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 CHANNEL

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

## SPECIFICATIONS

## COMMUNICATIONS

- **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, port 7 (SPS-12 only)
- **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)

## Ports 2 and 3 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

*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.*

## CONTROL PORT

- **Data Rate**  
75 bps to 38.4 kbps
- **Interface**  
V.24 (RS-232)
- **Connector**  
RJ-45
- **Flow Control**  
XON/XOFF, CTS/RTS
- **Command Modes**  
X.28, X.29

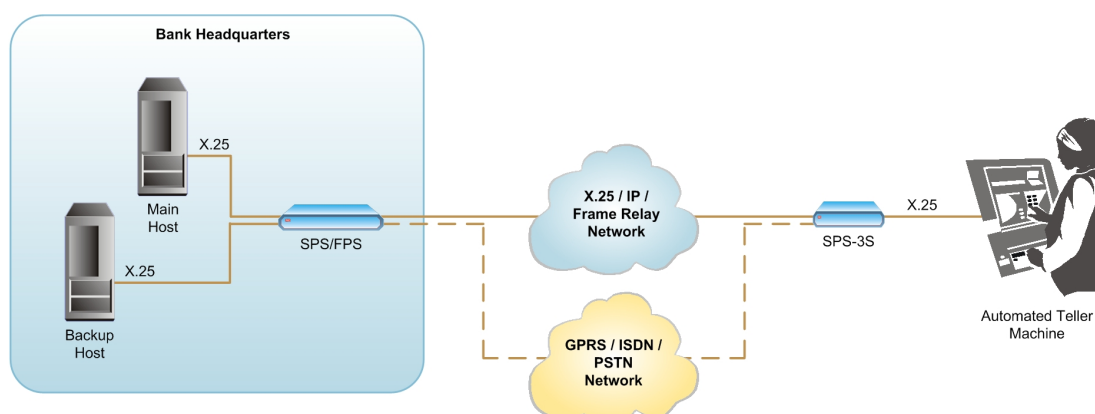


Figure 2. X.25 Traffic over an IP Network

## SPS-3S

## Multiprotocol FRAD/PAD Packet Switch

## 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 on 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 (green)  
On: the unit is powered  
ERR (red)  
On: failure in operation is detected  
OVF (red)  
On: overflow is detected  
SYNC (green)  
On: synchronization in the protocol layer has been achieved  
ACTIV (yellow)  
On: data is transmitted on the line
- **Power**
  - AC: 100–230 VAC ( $\pm 10\%$ )  
50–60 Hz
  - DC: 24 or 48 VDC
- **Power Consumption**  
20W max

- **Physical**  
Height: 44.0 mm (1.7 in)  
Width: 215.0 mm (8.5 in)  
Depth: 240.0 mm (9.4 in)  
Weight: 1.2 kg (2.6 lb)
- **Environment**  
Temperature: 0–50°C (32–122°F)  
Humidity: Up to 90%,  
non-condensing

 **ORDERING**
**SPS-3S\*/#/\$**

Multiprotocol FRAD/PAD Packet Switch

- \* Specify optional DC power supply (if required):  
**24** for 24 VDC  
**48** for 48 VDC
- # Specify link 1 interface type:  
**V24** for V.24/RS-232 interface  
**V35** for V.35 interface  
**V36** for V.36/RS-449 interface  
**X21** for X.21 interface  
**530** for RS-530 interface  
**DDS** for integral DDS interface  
**IBE** for ISDN BRI 'S' interface  
**IBU** for ISDN BRI 'U' interface  
**UTP** for 10BaseT Ethernet interface  
**BNC** for 10Base2 interface

- \$ Specify link 2 and link 3 interface type:  
**V24** for V.24/RS-232 interface  
**V35** for V.35 interface  
**V36** for V.36/RS-449 interface  
**X21** for X.21 interface  
**530** for RS-530 interface

*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)



data communications

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