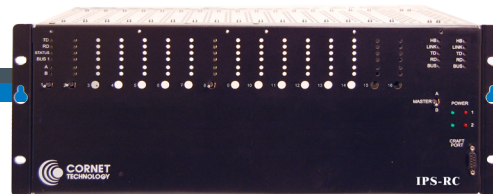# CORNET
SWITCHING SYSTEMS

Intelligent Protection Switches

Redundant Controller

IPS-RC

Intelligent Protection Switches

The Cornet Switching Systems Intelligent Protection Switches (IPS) are high bit-rate, high-bandwidth, electromechanical, 16 or 32 channel digital, analog and optical fiber A/B and A/B/C switches. These versatile switches are designed to switch an extensive range of electrical and optical interfaces
for datacom, telecom, and LAN topologies. Applications for the IPS switches include: Out-of-Service Testing and Monitoring, SCADA Backup, Ethernet Switch/Hub Redundancy, Fallback Switching, FEP/Router Sparing and Anti-Hacking Switching.

Design Overview

The IPS Switch's rear-mount design is ideal for multi-interface environments. Multiple interface cards are offered (datacom, T1/E1, Analog/VF, balanced electrical, and optical cards). Two-channel interface cards are also available for LAN and fiber. Each interface card is designed with interface appropriate connectors enabling multiple interface cards to reside in a single chassis. In the IPS LEDs located on the front panel correspond to each interface card for key datacom interface Leads. These LEDs indicate: A-position, B-position, Bus in Use, Transmit Data (TD), Receive Data (RD), and Status.

The chassis for the IPS switch measures 7" high (4 RU) and 8" deep. It fits into a standard 19" cabinet. Spring-loaded toggle switches to control the "Master A/B" switch function as well as individual card A/B switching are located on the front panel. Each chassis handles 16 cards.

Control

The IPS-16/32RC supports dual controller cards. These cards share a backplane bus connection, which provides an internal path to insure each controller has the latest switch status and configuration information. The primary advantage

of having dual controllers is it provides completely separate paths from the umbrella manager to the chassis. Either controller card can assume control. This feature plus the redundant power supplies provide maximum uptime for the system and the shortest repair time possible.

Both manual and automatic control of the IPS switch are available. To automate switching, the IPS can be programmed to switch when predefined conditions are met.

Communication to the switch is through TCP/IP or SNMP (via a private MIB). This MIB allows users to develop customized software for integration into their network management system. A TCP/IP server and an SNMP agent are built into the controller card allowing control from either source. This design allows all switch functions to be controlled remotely.

Control of the IPS switches is also provided through Cornet Switching Systems's CorScan® control software. Functions offered with CorScan include: setting trap conditions, switching, status polling, and LED monitoring. CorScan automatically records switching and alarm events. The software also allows both group and scripted switching. For security, CorScan allows port control to be assigned to specific operators while others can control the entire system. For more details
refer to the CorScan data sheet.

In addition to automated remote control, both the IPS-16 and IPS-32 can be controlled via a serial RS-232 interface from a local VT-100 terminal and via Telnet. A Control Interface Protocol is available. This protocol allows users to write their own system control and management software for incorporation into their Network Management Systems.

Key Features

- Dual Redundant Controller Cards
    - IP or serial control per card
    - Automatic status updates between controllers

- Multiple Control Mechanisms
    - VT-100 terminal
    - CorScan control
    - TCP/IP Ethernet
    - Telnet

- Front panel toggle switches

- Rear mounting of up to 16 interface cards
    - Multiple interface cards available
    - Datacom, telecom, optical fiber, LAN

- Signal Types
    - RS.232/V.24
    - EIA-530
    - V.35
    - RS-449
    - X.21
    - DS1/E1 PRI or BRI
    - 2-, 4-, 6-wire analog

- Switching via latching relays

- MTBF greater than 10 million switching actions

- 7" high (4 RU) 19" rackmount chassis

- Dual power supplies
    - 90-230 VAC bricks (external)
    - -48VDC or +12VDC modules

IPS controller cards support a user-defined IP address that enables multiple IPS chassis to be chained together. In this configuration one IPS switch acts as a primary with an IP address while the other co-located chassis are access and controlled via an Async RS-422 chain-in link. Up to 99 IPS chassis can be managed in this manner.

Specifications

Chassis:	16 card slots per chassis
	One switch per card

Interfaces/Port
DB-25 Connector Versions

Quad Card:	EIA-232, EIA-530, EIA-449, V.35, X.21
Connectors:	DB-25(f) (A, B, Common)
Pins Switched:	2-25; pin 1 hard-wired (referenced to DB-25F connectors)
Bus:	Full (break DTE, break DCE, and monitor), or no bus
Lead Alarming:	RTS, CTS, DSR, DTR, no data, no clock (appropriate to specific interface, consult factory for details)
Lead Monitoring:	none
Switching Time:	< 10 msec.

Copper Path Card:

Connector:	DB-25F
Leads Switched:	Pins 2 through 25; pin 1 hard-wired (referenced to DB-25F connector)
Bus:	none
Lead Alarming:	none
Lead Monitoring:	none
Switching Time:	< 10 msec.
Adaptors:	V.35(f), X.21 (f), DB-15 (f)

Optical Fiber:

	Fiber Channel, OC-3/12/48
Fiber Type:	Single-mode (SM) 9/125
	Multimode (MM) 62.5/125 or 50/125
Wave Length:	SM 1290/1610 nm; MM 750/1450 nm
Switching:	A/B, A/B/C
Signal Flow:	Bidirectional
Insertion Loss:	SM: 1.0 dB per switching element
	MM: 1.3 dB per switching element
Switching Time:	< 10 msec.
Connector:	SC, FC, ST
Signal Type:	OC1, 3, 12, 48; STM-1, 4, 16
	Gigabit Ethernet
	Fiber Channel 1.25 and 2.5 Gbps

RJ-45 Connector Versions   T1/E1, VF, 10/100BaseT Ethernet

Connectors:	RJ-45 socket (A, B, and Common), two per card
Pins Switched:	All eight
Bus:	Two full (break both ways and monitor), or no bus
Alarms:	None
Alarm Monitoring:	None
CorScan:	400/500
Switching Time:	< 10 msec.

Switching Methods

Relay: Master A/B under control of external relay closure

Manual: Single channel switch (1 channel at a time)
Master channel switch (all channels simultaneously in one chassis)

CorScan: Single Channel
or TCP/IP: Master Channel
SNMP: Group Switch (defines a group of individual channels)
Scripted Switching

Automatic
Interface Type: Switching Conditions
Datacom Interface: Monitors change of status of RTS, CTS, DSR, CD and DTR (RS.232, V.35), loss of Rx Data and/or Rx Clock (RS-530; RS-449) X.21 C&I Lead Status Change; Loss of T, R. and ST

Control
CorScan: CTI control software interfaces with controlled devices via TCP/IP server and SNMP agent on each controller card through a private MIB
Allows for sharing a single IP address across multiple chassis

LEDS: Heartbeat; TD; RD; CFM
RS-232: Local CorScan terminal or from front-mounted A/B switch

Power Requirements

Power supplies: -48 VDC ~1.5A input or 12 VDC module 90-230 VAC bricks (external)

Environmental

Operating: 0° to 50°C (32° to 122°F); 10 - 80% Relative Humidity (RH) non-condensing
Non-Operating: -20° to 70°C (-5°to 160°F); 98% RH @ 65°C (150°F)

Mechanical

Dimensions: 7" H x 19" W x 8" D also available in 23" wide chassis
(17.7 cm H x 48.2 cm W x 20.3 cm H)
Weight: Approx. 20 lbs (9Kg)
Note: All interface plug-in cards offered individually. Any one-channel card can reside in the same chassis.

Chassis also available with -48 VDC and +12 VDC power supplies.