Service Interface Protection Panel
Model SIPP-600

Figure 1. SIPP-600 with modules installed

- Supports multiple wall mount configurations
- Plug-in flexibility and convenience
- Choice of front-only or front and rear access
- Keystone module for fiber or unexposed cable
- Heavy duty, stainless steel construction
- Tested to Telcordia GR-974, GR-3108, and NEBS requirements
- Operating temperature range of -40°C to +70°C

1. OVERVIEW

The Service Interface Protection Panel (SIPP), Model SIPP-600, is a modular and easy to configure interface that protects network transmission equipment exposed to outside plant facilities. Advanced technology in the SIPP provides greater protection to network equipment than conventional methods. Applications include central offices, CEVs, and outside plant cabinets - wherever protection from lightning surges and AC power faults is needed.

The base SIPP-600 model is a 6-slot chassis that accepts plug-in modules to terminate and protect dry-loop Ethernet, T1/E1, or DS3 services. A fiber interface module (without protection) is also available, allowing all high-speed services to be groomed through a single access panel. A choice of connector configurations provides added flexibility and utility. The SIPP can be installed in cabinet or wall mounted.

Document Status

This version of the document (Rev. 000) supersedes all preliminary (Rev. Pxx) versions.

Product Features

- Carrier-class interface for high-speed services:
  - Ethernet 10/100 or GigE (RJ45)
  - T1/E1 (RJ48)
  - DS3 (Coax)
- Enhanced protection against lightning and AC power faults
- Up to 6 circuits in a compact 1RU chassis

2. APPLICATION

Multiplexers, switches and other network elements that are connected to outside plant facilities require protection from excess voltage or current that could cause damage to equipment or injure personnel.

A common method is to install voltage-limiting primary protectors on network ports and a separate service panel for connection to outdoor facilities. The shortcomings of this approach are: 1) voltage limiting alone may not adequately protect some types of network equipment, 2) wiring to separate protector blocks and service panels is space consuming and cumbersome, and 3) many applications require fuse links to prevent risk of fire, shock, or potential damage to the service panel.

The SIPP resolves these issues by combining service panel convenience with advanced protection of personnel and equipment (see Figure 2). The integrated solution meets rigorous telecom network standards, simplifies wiring, and saves valuable space.
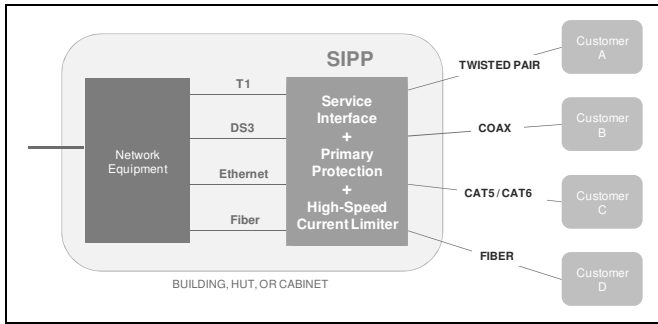
Figure 2. SIPP application

The versatility of the SIPP makes it suitable for any combination of Ethernet, T1/E1, DS3, or fiber services in central offices, CEVs, or outside plant cabinets. Orderable options allow for front-only or front and rear access to connectors.

NOTE: For dry-loop service only (no DC voltage).

3.   DESCRIPTION

The base SIPP-600 model is a 6-slot chassis, 1RU high, with adjustable brackets for a variety of wall mount configurations. The chassis is constructed of heavy-gauge stainless steel and accommodates up to six plug-in modules, as described below. Model SIPP-600C includes a removable cable cover to prevent tampering with front-side network equipment connections.

Plug-in Modules

Service Protection Modules (SPM) connect to copper facilities to protect Ethernet, DS3, or T1/E1 network equipment against lightning surges and AC power faults. Modules are available with front-only or front and rear connectors, and optional monitor jacks. Each SPM occupies one or two slots in a SIPP chassis, depending on the chosen jack configuration.
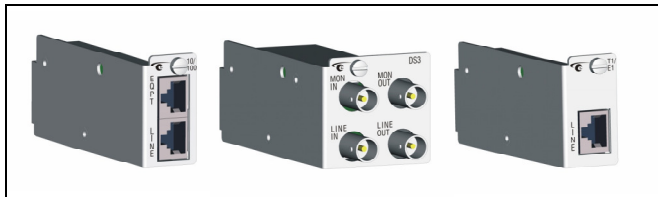

Figure 3. Example Service Protection Modules

Fiber services or copper services that do not require protection can be connected through a Modular Interface Panel (MIP), shown in Figure 4. The MIP module occupies four slots in a SIPP chassis and provides four Keystone slots for snap-in couplers that connect network equipment to facilities.

Please refer to the Ordering Guide at the end of this document for a list of plug-in modules and their descriptions.
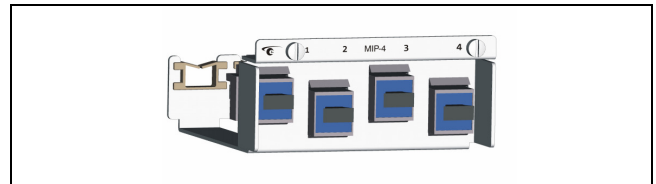

Figure 4. MIP with SC fiber couplers installed

Coordinated Protection

The Service Protection Modules combine current limiting, voltage limiting (gas discharge tube), and fusing to prevent lightning and AC surges from damaging network equipment. Figure 5 shows the placement of these protection elements within the SPM.
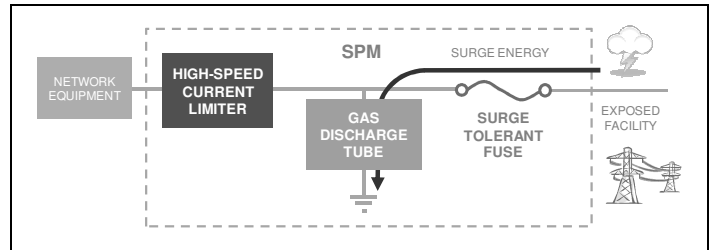

Figure 5. SPM block diagram

The fast-reacting current limiter blocks transients by switching to a high resistance state, at which point the gas tube diverts surge energy to ground. The combination of current and voltage limiting blocks more energy than can be achieved by voltage clamping alone. Within one microsecond, the current let through toward network equipment is reduced to less than 1 mA (0.1V into a 100Ω load). After the surge clears, the current limiter returns to a low series resistance and the gas tube returns to high bridging resistance.

Fail Safe Operation

Fusing within the SPM provides an alternative to installation of external fuse links. In the event of an extreme lightning surge or high AC exposure, SPM fuses opens to prevent hazardous damage to connectors or cabling. The fuses are surge tolerant and remain transparent to moderate strikes.

In addition, all SPM gas tubes include a fail-short mechanism that prevents thermal overload under AC conditions. The feature creates a mechanical short to ground and only operates if prolonged AC energy exists that could otherwise create a fire hazard.

Activation of a fuse or fail-short mechanism requires the SPM to be replaced.

4. INSTALLATION

WARNING

To avoid possible electric shock or personal injury, follow these guidelines:

1) Do not install, troubleshoot, or conduct maintenance on the SIPP-600 or associated SPM modules during lightning or thunderstorm activity.

2) This equipment provides primary protection and requires use of appropriate installation practices.

   - Only qualified and trained personnel should install or maintain these products.

   - Complete the installation of the protection equipment BEFORE connecting outside cable facilities.

   - A separate primary protector should not be installed in conjunction with this equipment.

   - Suitable cabling must be used for all connections.

3) Protection requires the use of appropriate grounding practices in order to function properly. The SIPP chassis and associated equipment should be connected to a single common ground point. Wiring must conform to applicable electrical codes and standards.

Chassis Installation

The SIPP-600 chassis is 1RU in height (1.75 inches) with adjustable mounting brackets that support a variety of wall mounted configurations (Figure 6).
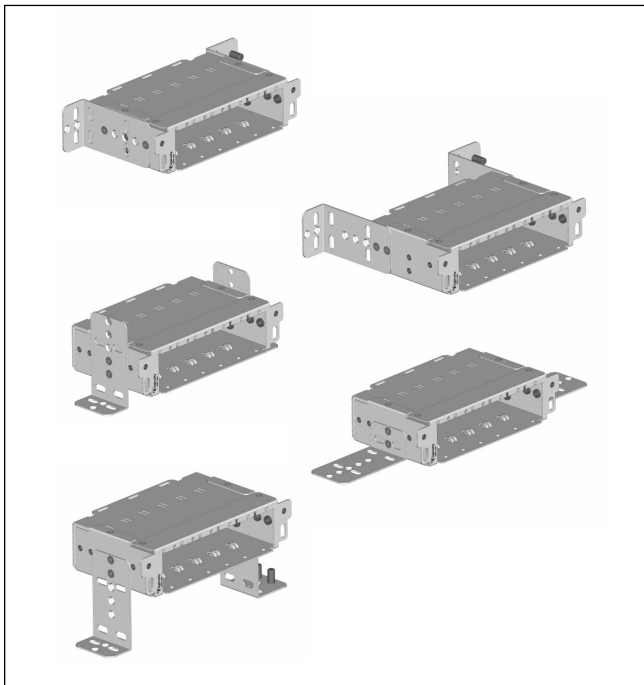

Figure 6. Mounting configurations

To install the SIPP-600 on a wall or other surface:

1) Align the holes of a mounting bracket with holes on the side of the chassis in the desired position. The brackets can be positioned with the flanges toward the rear, top, or bottom of the chassis.

2) Insert two (2) of the included 8-32 x 3/8" machine screws through the round holes of the bracket and tighten them firmly.

3) Repeat steps 1 and 2 with the second bracket on the opposite side of the chassis. Ensure that the positions of the brackets are symmetrical.

4) Attach the panel assembly to a suitable surface with four (4) fasteners (not included), two for each bracket. Be sure to use the appropriate fastener type, and anchors if necessary, to securely support the panel.

For outside plant applications, the SIPP assembly must be installed in a cabinet that complies with Telcordia GR-487 requirements.

Chassis Grounding

CAUTION: Protection requires the use of appropriate grounding practices in order to function properly. The SIPP chassis and associated equipment should be connected to a single common ground point. Wiring must conform to applicable electrical codes and standards.

To ground the SIPP-600 chassis:

1) Choose an appropriately sized ground lug to fit the dual ground posts on the mounting bracket of the chassis, shown in Figure 7. The studs are 1/4" diameter with 5/8" center-to-center spacing.

2) Fasten the ground lug securely to the studs with the included lock washers and 1/4"–20 hex nuts.

3) Attach one end of a #6 AWG ground wire to the ground lug.

4) Attach the other end of the #6 AWG ground wire to the nearest qualified ground (impedance of 1 ohm or less) via the shortest and most direct path, avoiding sharp turns.
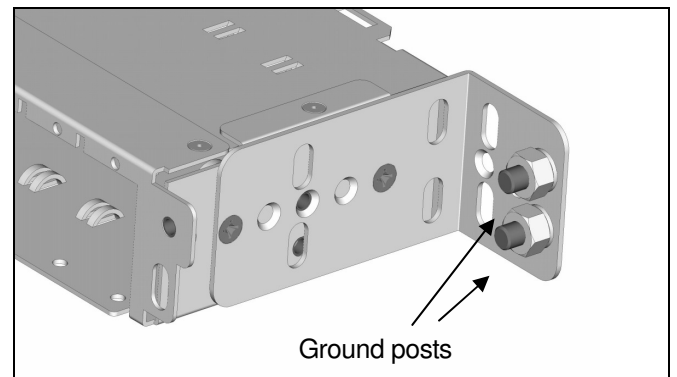

Ground posts

Figure 7. Chassis ground connector

SIPP-600C Cable Cover

Model SIPP-600C includes a cable cover (Figure 8) that needs to be removed in order to install or remove modules. The cable cover prevents tampering with front-side connections to network equipment after the modules and cables are installed. The cover is fastened to the chassis with two (2) spring-loaded Phillips screws.
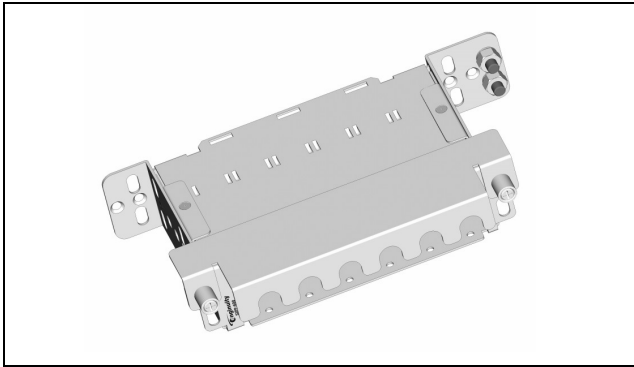

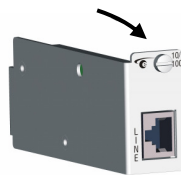
Figure 8. SIPP-600C with cable cover

SPM Installation

NOTE: *Primary protectors shall be installed in accordance with the applicable requirements of National Electric Code ANSI/NFPA-70, Article 800 Section 800.50.*

Service Protection Modules can be placed in any order or combination in available positions of the SIPP-600 chassis. Each SPM occupies one or two positions, depending on its function.

To install a module, insert it into the front of the chassis and slide it back slowly through the card guides. After fully seating the module, tighten the screw on the front of the unit to ensure proper grounding of its front panel to the chassis frame.

IMPORTANT: The module's front panel screw must be tightened securely to ensure proper grounding. Recommended screw torque is four (4) inch-pounds.

SPM Network Connections

For SPM-XX-R modules, connect network equipment to the jack(s) on the rear of the module.

NOTE: *Installations with limited rear access may require cables to be fed through the chassis, from back to front, and attached to the module before inserting it into the mounting.* ***Be sure to provide adequate cable slack.***

For SPM-XX-F modules, connect network equipment to the EQPT jack(s) on the front of the module.

SPM Line Connections

Connect the exposed facility to the LINE jack(s) on the front of the module.

MODULE CONNECTOR	CONNECT TO
Front (EQPT) or rear	Network equipment (protected)
Front (LINE)	Exposed facility (unprotected)

SPM Removal

> ### WARNING
>
> **When removing a module or its LINE connection:**
> - Visually inspect the cable and equipment for damage or exposed conductors BEFORE making contact.
> - Use appropriate detection equipment to ensure that no hazardous voltages or currents are present.
> - Follow local guidelines for safety.

To remove a protection module, first disconnect cables from the unit. If access is limited, rear cables can be disconnected after the module is removed from the mounting. Loosen the screw on the module's front panel and slowly slide the unit forward out of the chassis, being careful to guide any cables connected to the rear.

MIP-4 Couplers

The MIP-4 module accepts snap-in Keystone style couplers for fiber, coaxial, or twisted pair terminations that do not require protection.

NOTE: *Couplers are installed or removed from the rear of the MIP-4 with the module removed from the chassis.*

Each coupler is held in place by angled tabs along the top and bottom of the coupler body. To install a coupler, tilt it back slightly while inserting it though the rectangular opening, until the lower tab clears the front of the panel. Then apply pressure to the upper tab and tilt the coupler body forward until it snaps in place.

To remove a coupler from the MIP-4, apply pressure to the upper tab while tilting the coupler body backward. After the upper tab is freed, the coupler can be lifted and removed from the opening.

MIP-4 Installation/Connection

The MIP-4 module occupies four slots in the SIPP-600 chassis.

Before installing the MIP-4 module, feed network cables through the chassis, from back to front, and connect them to the rear of the couplers. Then insert the MIP-4 through the front the chassis and slide it back slowly through the card guides. After fully seating the module, tighten the

screw on the front of the unit to ensure proper grounding of its front panel to the chassis frame.

Connections can now be made to the front of the installed couplers.

MIP-4 Removal

To remove the MIP-4 module, first disconnect cables from the front of each coupler. Then loosen the screw on the module's front panel and slowly slide the unit forward out of the chassis, being careful to guide any cables connected to the rear. Cables can then be disconnected from the rear of each coupler.

5. TESTING AND TROUBLESHOOTING

> ### IMPORTANT
>
> Follow all instructions and safety warnings in the installation section of this publication (Section 4) when testing or troubleshooting this equipment.

To test through a module toward the protected equipment, connect test equipment to the LINE jack(s) on the front of the unit. To test toward the exposed facility, connect to the equipment side jack(s) on the front or rear of the unit (jack location depends on the specific model being used).

Loss of signal, or more than 1.0 dB insertion loss through an SPM, indicates that a fail-safe condition has occurred and that the module needs to be replaced.

6. CUSTOMER SERVICE

If technical or customer assistance is required, please contact Enginuity at the following address or phone number:

> Enginuity Communications
> 3545 Stern Avenue
> St. Charles, Illinois 60174
> Toll Free: 1-800-980-3266
> Voice: (630) 444-0778
> www.enginuitycom.com

7. WARRANTY & REPAIRS

Warranty

Enginuity warrants this product for ten (10) years from date of purchase.

The Service Protection Modules contain fuses and fail-to-ground mechanisms to safely protect personnel and equipment. Operation of these fail-safe mechanisms due to high voltage or current constitutes normal operation and replacement under these conditions is not covered by this warranty.

The warranty does not cover any losses or damages resulting from shipment, improper installation, abuse, modification, or repair by other than Enginuity personnel.

Repair and Return

Enginuity equipment will be repaired or replaced without cost during the warranty period if the product is defective for any reason other than abuse, improper use, or improper installation. Before returning defective equipment, first request a Return Material Authorization (RMA) number from Enginuity. Once an RMA number is obtained, return the unit, freight prepaid, along with a brief description of the problem, to:

> Enginuity Communications
> 3545 Stern Avenue
> St. Charles, Illinois 60174
> ATTN: Repair & Return Dept.

Replacements will be shipped in the fastest manner consistent with the urgency of the situation. Repair or replacement of faulty equipment beyond the warranty period is available for a nominal charge. Contact Enginuity for details.

8. SPECIFICATIONS

Chassis (SIPP-600)	
Dimensions	Height: 1.75" / Width: 6.1" (excluding mounting brackets) / Depth: 4.3"
Weight	1.6 pounds

Service Protection Modules

Ethernet 10/100 (SPM-100-XX)	
Signal	10Base-T: Manchester Encoding, 10MHz or 100Base-T: MLT-3, 125MHz
Connector	Cat5e RJ45; gel coated contacts
Protected Leads	Pins 1, 2, 3, 6 (Pins 4, 5, 7, 8 grounded)
Ethernet GigE (SPM-1G-XX)	
Signal	PAM-5 TC, 125 MHz, 1Gbit/s
Connector	Cat6 RJ45 (shielded); gel coated contacts
Protected Leads	Pins 1 through 8
T1/E1 (SPM-T1-XX)	
Signal	T1: AMI B8ZS Encoding, 1.544 MHz, E1: HDB3 Encoding, 2.048 MHz
Connector	RJ48; gel coated contacts
Protected Leads	Pins 1, 2, 4, 5 (Pins 3, 6, 7, 8 grounded)
DS3 (SPM-DS3-XX)	
Signal	AMI B3ZS Encoding, 44.736 MHz
Connector	75Ω BNC
Protected Leads	Center (signal)

Common Specifications (applicable to each of the above modules)		
Standards	Tested to Telcordia GR-974, GR-1089, GR-3108, and GR-63 requirements	
Application	Dry loop (No DC)	
Impulse Life Characteristics	±10 A, 10/1000 µs:	> 1500 operations
	±100 A, 10/1000 µs:	> 100 operations
AC Life Characteristics	1 A rms, 1 sec:	> 60 operations
	10 A rms, 1 sec:	Fuse opens for protection
End of Life Characteristics	±10 A, 10/1000 µs:	> 3000 operations
	±100 A, 10/1000 µs:	> 300 operations
Current Limiting (toward equipment)	Protection turn-on threshold:	180 mA min., 360 mA max.
	Time to trigger / Time to fully block	~ 10 nanoseconds / ~ 1 microsecond
	Maximum let-through (blocked state):	1 mA (0.1V @ 100 Ω)
Insulation Resistance	> 100 MΩ @ ±50 VDC	
Insertion Loss	< 1.0 dB	
Series Resistance	< 14 Ω	
Capacitance	< 20 pF	
Operating Temperature	-40°C to +70°C	

9. ORDERING GUIDE

Chassis

DESCRIPTION	PART NUMBER
SIPP chassis, 6-slot, wall mountable	SIPP-600
SIPP chassis, 6-slot, wall mountable, with removable cable cover	SIPP-600C

Service Protection Modules

SERVICE	CONNECTOR TYPE	EQUIPMENT CONNECTION	LINE CONNECTION	MONITOR CONNECTION	CHASSIS SLOTS	PART NUMBER
10/100 Base-T	RJ45 (Cat5e)	REAR	FRONT	N/A	1	SPM-100-R
		FRONT	FRONT	N/A	1	SPM-100-F
1G (GigE)	RJ45 (Cat6/shielded)	REAR	FRONT	N/A	1	SPM-1G-R
T1/E1	RJ48C	REAR	FRONT	N/A	1	SPM-T1-R
		REAR	FRONT	FRONT	1	SPM-T1-RM
		FRONT	FRONT	N/A	1	SPM-T1-F
		FRONT	FRONT	FRONT	2	SPM-T1-FM
DS3	BNC Coax	REAR	FRONT	N/A	2	SPM-DS3-R
		REAR	FRONT	FRONT	2	SPM-DS3-RM
		FRONT	FRONT	N/A	2	SPM-DS3-F

Accessory Panels

DESCRIPTION	CHASSIS SLOTS	PART NUMBER
Keystone coupler panel with (4) blank inserts installed	4	MIP-4
Keystone coupler panel with (4) SC fiber couplers installed	4	MIP-4SC
Blank cover for empty module slot	1	BP1-1

Cable Management Accessories

DESCRIPTION	PART NUMBER
Universal D-Ring, right or left rail mounted, 1RU	DRNG-U-1