# Enginuity Interface Panels for Service Demarcation

# CenturyLink Installation Guide

| REVISION | DATE | SUMMARY |
|---|---|---|
| A | June 1, 2013 | New document |
| B | September 26, 2016 | Update Enginuity contact information |
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## Purpose

This document provides technical staff with installation guidelines for Service Interface Panels (SIP) and Service Interface Protection Panels (SIPP) from Enginuity Communications.

## Equipment Overview

The Service Interface Panels (SIP) and Service Protection Interface Panels (SIPP) are modular products, primarily for demarcation of broadband services delivered at remote sites – cabinets, huts, and buildings. The panels provide a defined point of demarcation, isolation of network connections, and optional circuit protection (SIPP series). Each panel can terminate a combination of copper and fiber services by selecting the appropriate connector modules. SIP and SIPP products can be installed in a standard equipment rack or mounted to a wall.

The SIP product line is used for terminations that do not require electrical surge protection. The SIPP product line includes primary protection for copper services and also supports fiber terminations without protection. While both product families – SIP and SIPP – provide modular demarcation, the two are not interchangeable and are described separately in this document.

## Service Interface Panel (SIP) - Description

The SIP Series consists of five chassis models that support snap-in Keystone-type couplers for service connections. Couplers are available for 10/100Base-T, Gig-E, DS3, video coax, and fiber services. Descriptions and photos of the chassis and couplers are contained in Tables 1 and 2, below.
NOTE: **SIP Series products do not provide electrical surge protection.**

Model SIP-600 is a wall mounted unit. All other SIP models can be installed in a 19" or 23" equipment rack, or mounted to a wall. The snap-in couplers allow panels to be configured to match the types of services being delivered. Network connections are made to the rear of the panel and customer (CPE) connections are made at the front.

A tray at the rear of the panel allows network equipment cables to be fastened with tie wraps (included). The 1RU-high panels (SIP-600/1200/1400) provide single trays. The 2RU-high panels (SIP-2400/3600) provide lower and upper trays. Examples are shown in Figures 1 and 2. An optional front tray, Model SIPT-1 (Figure 3), is available for the SIP-1200 and SIP-2400.

Two types of D-Ring accessories are available for cable management. Model DRNG-1 is used with a SIP-1200 or SIP-2400 panel and mounts directly to the chassis.  Model DRNG-U-1 is a general purpose design that attaches to a wall or rack rail.

The SIP-600/1200/1400/2400 includes a magnetic strip on the front of the panel for circuit identification. The SIP-3600 includes a hanging tag with a protective sleeve for the same purpose.

| Chassis Model | Coupler Capacity | Mounting Configuration | Front View |
|---|---|---|---|
| SIP-600 | 6 | Wall mount | |
| SIP-1200 | 12 | 19" or 23" rack (1RU) or wall mount | |
| SIP-1400 | 14 | 19" or 23" rack (1RU) or wall mount | |
| SIP-2400 | 24 | 19" or 23" rack (2RU) or wall mount | |
| SIP-3600 | 36 | 19" or 23" rack (2RU) or wall mount | |

Table 1 - SIP chassis

| Coupler Model | Connector Type | | Service | Front View |
|---|---|---|---|---|
| CPL-5E-1 | Front: | Cat5e RJ45/48 (shielded) | Ethernet (10/100BT), T1, E1 | |
| | Rear: | Cat5e RJ45/48 (shielded) | | |
| JCK-5E-KRO-1 | Front: | Cat5e RJ45/48 (shielded) | Ethernet (10/100BT), T1, E1 | |
| | Rear: | Krone®/110 (shielded) | | |
| CPL-6S- 1 | Front: | Cat6e RJ45/48 (shielded) | Ethernet (Gig-E) | |
| | Rear: | Cat6e RJ45/48 (shielded) | | |
| CPL-BNC- 1 | Front: | BNC coaxial | DS3 | |
| | Rear: | BNC coaxial | | |
| CPL-F81- 1 | Front: | F81 coaxial | Video | |
| | Rear: | F81 coaxial | | |
| CPL-SC- 1 | Front: | SC fiber | Single or Multi-mode optical | |
| | Rear: | SC fiber | | |
| CPL-SC- APC-1 | Front: | SC-APC fiber | Single or Multi-mode optical | |
| | Rear: | SC-APC fiber | | |
| CPL-LC- 1 | Front: | LC fiber | Single or Multi-mode optical | |
| | Rear: | LC fiber | | |
| CPL-ST- 1 | Front: | ST fiber | Single or Multi-mode optical | |
| | Rear: | ST fiber | | |

Table 2 – SIP couplers

Figure 1 – Rear view of SIP-1200
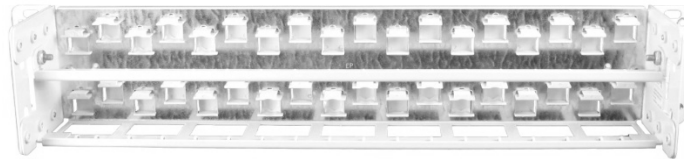


Figure 2 – Rear view of SIP-3600



Figure 3 – Optional front cable tray for SIP-1200 or SIP-2400

## Service Interface Panel (SIP) - Applications

The SIP is suitable for managing circuit demarcation or interconnection at the following locations:

- Commercial buildings
- Remote cabinets (GR-487 compliant)
- Cell sites
- Data centers
- Multi-Dwelling Units (MDUs)

RECOMMENDATION:  When a service demarcation is located near network terminating equipment (multiplexer, NIU, etc.), install a collocated SIP to prevent customer tampering with equipment connections, cables, or controls.

RECOMMENDATION:  When extending a service demarcation beyond network terminating equipment (multiplexer, NIU, etc.), install a SIP to establish a clear point of demarcation and prevent tampering with network cabling.

RECOMMENDATION:  Plan for service growth when choosing a panel size. Snap-in couplers can be added as needed.

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## Service Interface Panel (SIP) - Installation and Use

Following are guidelines to be used in conjunction with technical product documentation published by Enginuity.

**CHASSIS**

SIP chassis are equipped with adjustable side brackets (Figure 4) for rack-mounting and wall-mounting in several orientations.

For rack-mounted applications, ensure that sufficient space is available behind the chassis for insertion and removal of couplers and for installation and grooming of network cabling.

For wall-mounted applications, the chassis can be installed perpendicular to the wall (Figure 5) to minimize wall space, help isolate network connections, and provide easy access to customer connections. The chassis can also be installed flat to a wall (Figure 6), which requires less clearance away from the mounting surface and provides easier access to network connections.
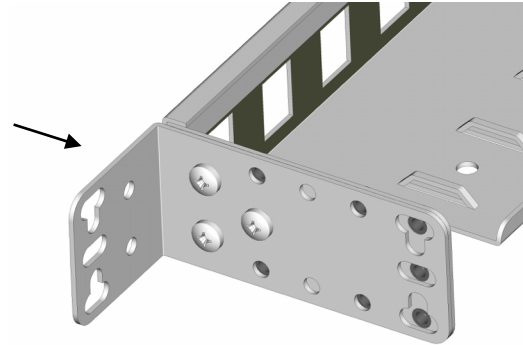


**Figure 4 - Adjustable mounting bracket on SIP chassis**
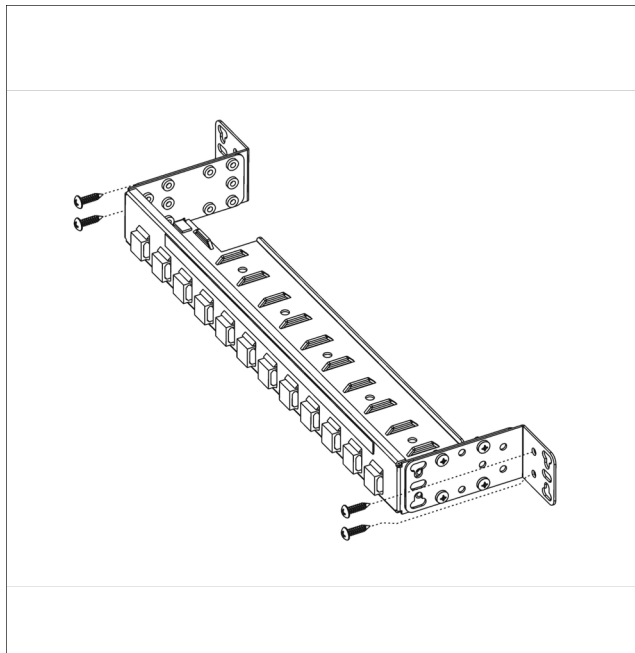


**Figure 5 – SIP extended from wall**
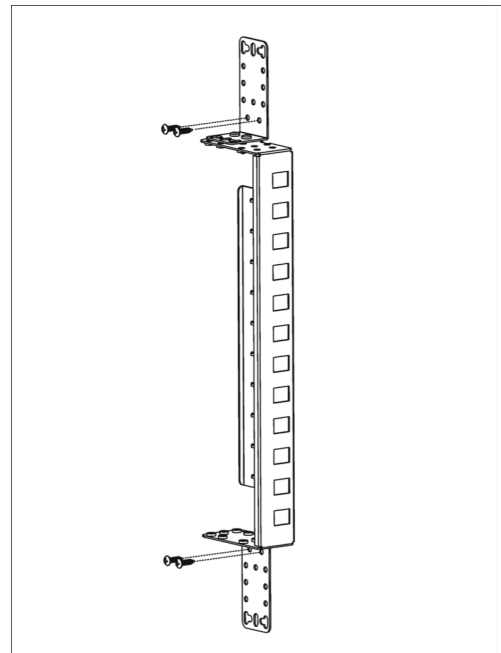


**Figure 6 - SIP flat to wall**

**COUPLERS**

Snap-in couplers can be installed in any of the SIP chassis slots and are independent from one another. Couplers must be installed from the rear of the panel, as described in the product documentation. RJ45/48 connectors are also available with an optional gel coating.

**GROUNDING**

Use the ground stud(s) of the SIP chassis to establish grounding per local procedures for network equipment.  In some instances, it may be more convenient to fasten the ground lug and wire to the SIP chassis before it is mounted.

**CABLING**

For service demarcation, network cables are connected to the rear of the panel and customer cables are connected to the front of the panel. Network cable slack should be looped and secured to the rear tray with cable ties. Observe standards for minimum bend radius. An optional front cable tray is available for the SIP-1200 and SIP-2400 for tying down customer cables.

## Service Interface Protection Panel (SIPP) - Description

SIPP Series products provide **demarcation and circuit protection for network equipment connected to customer facilities**. Three chassis types support plug-in Service Protection Modules (SPM) for protection of Ethernet, DS3, and T1 services. Modules are also available for demarcation of fiber facilities (no protection). Descriptions and photos of the chassis and modules are contained in Tables 3 and 4, below.

Model SIP-600 is a wall mounted unit. Models SIPP-1800 and SIPP-3600 can be installed in a 19" or 23" equipment rack, or mounted to a wall. Plug-in modules allow panels to be configured to match the types of services being delivered. Service Protection Modules are available with network connections at the rear or front of the unit. Customer (CPE) connections are made at the front. Optional signal monitoring jacks are available on T1 and DS3 modules.

Optional SIPP accessories are shown in Figure 7. For cable management, a D-Ring (DRNG-U-1) attaches to a wall or rack rail. A cable management bar (CMB-1), is available for grooming of cables in front of the SIPP-1800 or SIPP-3600 panel. Blank inserts (BP1-1) can be used to fill empty chassis slots.

Each SIPP chassis includes a hanging tag with a protective sleeve for circuit identification.

| Chassis Model # | Module Slots | Mounting Configuration | Front View |
|---|---|---|---|
| SIPP-600 & SIPP-600C | 6 | Wall mount |  SIPP-600C adds front cable cover (not shown) |
| SIPP-1800 | 18 | 19" or 23" rack (1RU) or wall mount |  |
| SIPP-3600 | 36 | 19" or 23" rack (2RU) or wall mount |  |

**Table 3 - SIPP chassis**

| Model # | Service | Connector Type / Location | Slots | Front View |
|---|---|---|---|---|
| SPM-T1-R | T1 | Line: RJ48C / Front<br>Equip: RJ48C / Rear | 1 |  |
| SPM-T1-RM | T1 | Line: RJ48C / Front<br>Mon: RJ48C / Front<br>Equip: RJ48C / Rear | 1 |  |
| SPM-T1-F | T1 | Line: RJ48C / Front<br>Equip: RJ48C / Front | 1 |  |
| SPM-T1-FM | T1 | Line: RJ48C / Front<br>Mon: RJ48C / Front<br>Equip: RJ48C / Front | 2 |  |
| SPM-DS3-R | DS3 | Line: BNC coaxial / Front<br>Equip: BNC coaxial / Rear | 2 |  |
| SPM-DS3-RM | DS3 | Line: BNC coaxial / Front<br>Mon: BNC coaxial / Front<br>Equip: BNC coaxial / Rear | 2 |  |
| SPM-DS3-F | DS3 | Line: BNC coaxial / Front<br>Equip: BNC coaxial / Front | 2 |  |
| SPM-100-R | Ethernet<br>(10/100 Base-T) | Line: Cat5e RJ45 / Front<br>Equip: Cat5e RJ45 / Rear | 1 |  |
| SPM-100-F | Ethernet<br>(10/100 Base-T) | Line: Cat5e RJ45 / Front<br>Equip: Cat5e RJ45 / Front | 1 |  |
| SIM-T1-RM | T1<br>(no protection) | Line: RJ48C / Front<br>Mon: RJ48C / Front<br>Equip: RJ48C / Rear | 1 |  |
| SIM-DS3-RM | DS3<br>(no protection) | Line: BNC coaxial / Front<br>Mon: BNC coaxial / Front<br>Equip: BNC coaxial / Rear | 2 |  |
| MIP-4SC | Optical<br>(no protection) | Line: SC Fiber/ Front<br>Equip: SC Fiber/ Rear | 4 |  |
| MIP-4 | Generic<br>(no protection) | Line: Field installed / Front<br>Equip: Field installed / Rear | 4 |  |

Table 4 - SIPP modules

| DRNG-U-1 / D-Ring | CMB-1 / Cable bar | BP1-1 / Blank |
| --- | --- | --- |

**Figure 7 - SIPP accessories**

## Service Interface Protection Panel (SIPP) - Applications

The SIPP is a demarcation and **primary** protection panel for the **drop side** (customer side interface) of network equipment (e.g., fiber multiplexer or network interface unit). Services must be dry loop (no DC voltage). The SIPP helps protect network eq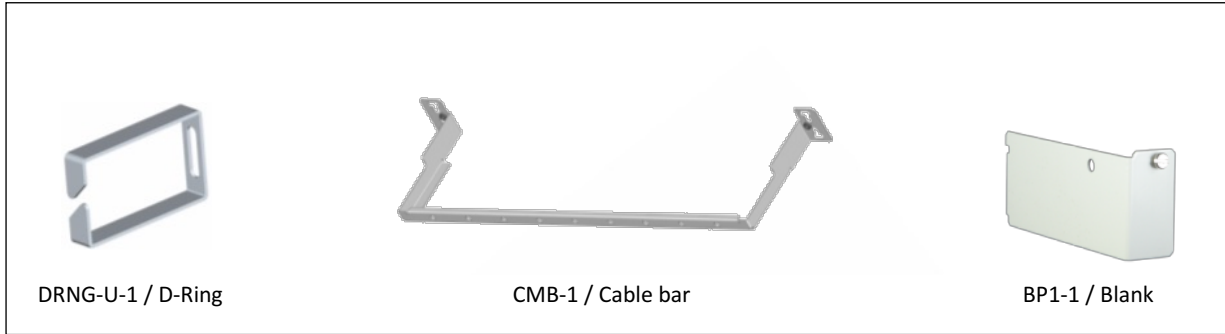uipment from damage caused by voltage and current surges on copper cables.  The surges may be induced or created by a ground potential rise (GPR) as a result of a lightning strike or customer equipment malfunction.

SIPP Service Protection Modules provide high-speed current limiting and fusing in addition to primary voltage protection (gas tubes). The additional protection reduces voltages at the network interface to lower levels than gas tubes alone.

The main application for the SIPP is at cell sites in areas that are exposed to lightning storms. The SIPP is installed in a cabinet or hut as a service hand-off to wireless carriers. Multiple customers can be served from a single panel by installing the appropriate Service Protection Modules for each line.

The SIPP can also be used in business or campus applications where drop side facilities may be extended from a cabinet or building.

**RECOMMENDATION:**  Always install a SIPP on the drop side of network equipment if customer service cable is exposed outdoors (exceptions are areas of the West coast where lightning storms are rare).

**RECOMMENDATION:**  For sites that have a history of recurring damage from surges, replace 5-pin protectors with a SIPP, when practicable.

**RECOMMENDATION:**  Plan for service growth when choosing a panel size. Plug-in modules can be added as needed.

# Service Interface Protection Panel (SIPP) - Installation and Use

Following are guidelines to be used in conjunction with technical product documentation published by Enginuity.

**CHASSIS**

SIPP chassis are equipped with adjustable side brackets (Figure 8) for rack-mounting and wall-mounting in several orientations.

For rack-mounted applications, ensure that sufficient space is available behind the chassis for insertion and removal of modules and for installation and grooming of network cabling.

For wall-mounted applications, the chassis can be installed perpendicular to the wall (Figure 9) to minimize wall space, help isolate network connections, and provide easy access to customer connections. The chassis can also be installed flat to a wall (Figure 10), which requires less clearance away from the surface and provides easier access to network connections.
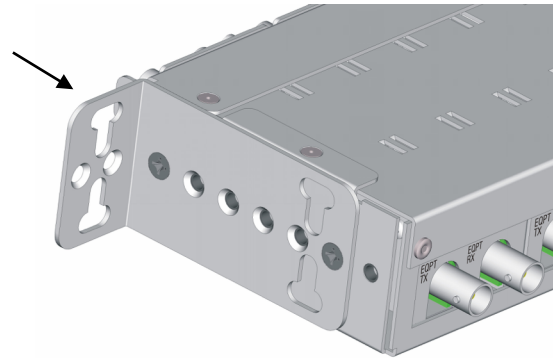
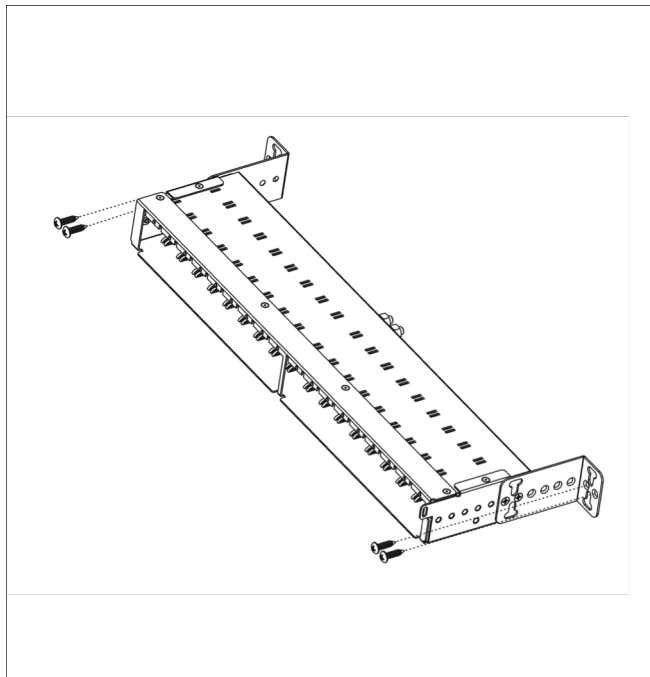**Figure 8 - Adjustable mounting bracket on SIPP chassis**

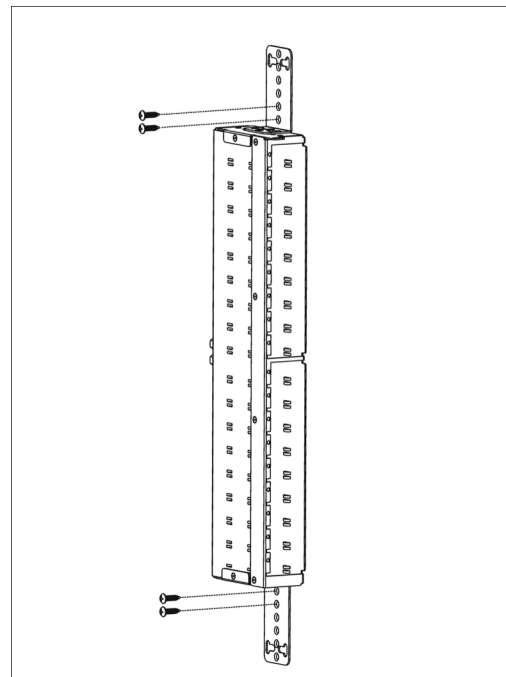**Figure 9 - SIPP extended from wall**

**Figure 10 - SIPP flat to wall**

Using modules with front-facing network equipment connections allows the back of the chassis to be placed directly against a wall. For this application, Model SIPP-600C includes a removable cable guard to prevent tampering with network connections at the front of the chassis. Install the cable guard over network equipment cables after they are connected to the front of the modules.

**MODULES**

Modules can be installed in any order in SIPP chassis slots and are independent from one another. Modules must be installed from the front of the panel, as described in the product documentation. RJ45/48 connectors are gel-filled. Blank inserts (BP1-1) can be used to fill empty chassis slots but are not required.

The gas tubes and current limiters in the SPMs are self-resetting, returning to normal operation after a surge clears. The fuses in the SPMs are not self-resetting but are designed to survive common lightning surges. Transmission loss through the module indicates that the unit must be replaced.

T1 and DS3 modules with optional monitor jacks provide isolated bridging on the protected (EQUIP) side of the unit. The monitor jacks are helpful as a troubleshooting tool in applications where the serving multiplexer is not equipped with test access. Monitoring modules are also available without protection for T1 and DS3 services that are not exposed to surges.

The unprotected MIP-4 module uses the same couplers and associated methods and procedures described in the SIP section of this document.

**GROUNDING**

***Proper ground is critical for protection equipment.***

- Use the dual ground studs of the SIPP chassis to establish grounding as describe in the product documentation. In some instances, it may be more convenient to fasten the ground lug and wire to the SIPP chassis before it is mounted.
- Front panel screws on installed Service Protection Modules must be securely fastened.
- The SIPP chassis must be bonded with other network equipment to an intersystem bonding termination.

**CABLING**

Depending on the SPM models chosen, network cables are connected to the front or rear jacks of the modules. Customer cables are connected to the front of the modules. The unprotected MIP-4 module supports rear network connections and front customer connections only.

If rear-connected modules are used in installations with limited rear access, provide sufficient slack for modules to be removed from the front of the chassis with rear cables connected. Observe standards for minimum bend radius. An optional front cable bar is available for the SIPP-1800 and SIPP-3600 for tying down customer cables.

## Ordering Information

| ENGINUITY MODEL | MATERIAL CODE | DESCRIPTION |
|---|---|---|
| SIP-600 | 1224897 | 6 Position Interface Panel w/(6) Blanks |
| SIP-1200 | 1126714 | 12 Position Interface Panel w/(12) Blanks |
| SIP-1200SOL-PKG | | 12 Position Interface Panel w/(8) CAT5e Couplers and (4) SC Couplers Installed |
| SIP-1206 | | 12 Position Interface Panel w/(6) CAT5e Couplers |
| SIP-1206BNC-PKG | | 12 Position Interface Panel w/(6) BNC Couplers, (6) Blanks and (1) D-Ring |
| SIP-1206SC-PKG | | 12 Position Interface Panel w/(6) SC Couplers, (6) Blanks, (1) D-Ring and (1) CPE Cable Tray |
| SIP-1212 | | 12 Position Interface Panel w/(12) CAT5e Couplers |
| SIP-1212BNC-PKG | | 12 Position Interface Panel w/(12) BNC Couplers and (1) D-Ring |
| SIP-1212SC | 1126734 | 12-Position Service Interface Panel w/ SC Couplers |
| SIP-1212SC-PKG | | 12 Position Interface Panel w/(12) SC Couplers, (1) D-Ring and (1) CPE Cable Tray |
| SIP-1400 | | 14 Position Interface Panel w/(14) Blanks |
| SIP-2400 | | 24 Position Interface Panel w/(24) Blanks |
| SIP-2412 | | 24 Position Interface Panel w/(12) CAT5e Couplers |
| SIP-2412BNC-PKG | | 24 Position Interface Panel w/(12) BNC Couplers, (12) Blanks, (2) D-Rings and (1) CPE Cable Tray |
| SIP-2412SC-PKG | | 24 Position Interface Panel w/(12) SC Couplers, (12) Blanks, (2) D-Rings and (1) CPE Cable Tray |
| SIP-2424 | | 24 Position Interface Panel w/(24) CAT5e Couplers |
| SIP-2424BNC-PKG | | 24 Position Interface Panel w/(24) BNC Couplers, (2) D-Rings and (1) CPE Cable Tray |
| SIP-2424SC-PKG | | 24 Position Interface Panel w/(24) SC Couplers, (2) D-Rings and (1) CPE Cable Tray |
| SIP-3600 | 1223101 | 36 Position Interface Panel w/(36) Blanks |
| SIP-3600XL-PKG | | 36 Position Interface Panel w/(8) CPL-5E-1, (6) CPL-BNC-1 & (4) CPL-SC-1 Couplers Installed |
| DRNG-1 | 1223023 | D-Ring w/Screws for SIP-1200/2400 |
| SIPT-1 | 1223027 | Cable Tray w/ Screws for SIP-1200/2400 |
| CPL-5E-1 | 1126715 | Keystone Coupler: Cat5e RJ45/RJ45 |
| CPL-Q5E-1 | 1223026 | Keystone Coupler: Cat5e RJ45/RJ45, gel coated |
| JCK-5E-KRO-1 | 1223102 | Keystone Coupler: Cat5e RJ45/KRONE |
| JCK-Q5E-KRO-1 | 1223103 | Keystone Coupler: Cat5e RJ45/KRONE, gel coat |
| CPL-6S-1 | 1126735 | Keystone Coupler: Cat6e RJ45/RJ45 |
| CPL-Q6S-1 | | Keystone Coupler: Cat6e RJ45/RJ45, shielded, gel coat |
| CPL-BNC-1 | 1126736 | Keystone Coupler: Coax BNC/BNC |
| CPL-LC-1 | 1126738 | Keystone Coupler: Fiber LC/LC |
| CPL-SC-1 | 1126737 | Keystone Coupler: Fiber SC/SC |
| CPL-SC-APC-1 | 1126739 | Keystone Coupler: Fiber SC/SC APC |
| CPL-ST-1 | | Keystone Coupler: Fiber ST/ST |
| CPL-F81-1 | | Keystone Coupler: Coax F-81/F-81 |
| SIP-CVR-1 | 1223104 | Blank Position Cover |

**Table 5 – SIP ordering information**

| ENGINUITY MODEL | MATERIAL CODE | DESCRIPTION |
|---|---|---|
| SIPP-600 | 1223105 | 6- slot SIPP chassis for Service Protection Modules (SPM) and Service Interface Modules (SIM) |
| SIPP-600C | 1223106 | Six (6) slot SIPP chassis for Service Protection Modules (SPM) and Service Interface Modules (SIM), w/ removable cable cover for front connections |
| SIPP-1800 | 1228219 | Eighteen (18) slot SIPP chassis for Service Protection Modules (SPM) and Service Interface Modules (SIM) |
| SIPP-3600 | 1223107 | Thirty-six (36) slot SIPP chassis for Service Protection Modules (SPM) and Service Interface Modules (SIM) |
| SPM-100-R | | Service Protection Module for Ethernet 10/100 Base-T (dry loop) with Cat5E/RJ45 connectors. Equipment connector on rear, Line connector on front. |
| SPM-100-F | | Service Protection Module for 10/100 Base-T Ethernet (dry loop) with Cat5E/RJ45 connectors. Equipment connector and Line connector on front. |
| SPM-T1-R | 1223108 | Service Protection Module for T1/E1 (dry loop) with RJ48C connectors. Equipment connector on rear, Line connector on front. |
| SPM-T1-RM | 1228222 | Service Protection Module for T1/E1 (dry loop) with RJ48C connectors. Equipment connector on rear, Line and Monitor connectors on front. |
| SIM-T1-RM | 1228223 | Service Interface Module (NO PROTECTION) for T1/E1 with RJ48C connectors. Equipment connector on rear, Line and Monitor connectors on front. |
| SPM-T1-F | 1223109 | Service Protection Module for T1/E1 (dry loop) with RJ48C connectors. Equipment and Line connectors on front. |
| SPM-T1-FM | | Service Protection Module for T1/E1 (dry loop) with RJ48C connectors. Equipment, Line, and Monitor connectors on front. |
| SPM-DS3-R | 1223110 | Service Protection Module for DS3 (dry loop) with BNC coax connectors. Equipment connectors on rear, Line connectors on front. |
| SPM-DS3-RM | 1228220 | Service Protection Module for DS3 (dry loop) with BNC coax connectors. Equipment connectors on rear, Line and Monitor connectors on front. |
| SIM-DS3-RM | 1228221 | Service Interface Module (NO PROTECTION) for DS3 with BNC coax connectors. Equipment connectors on rear, Line and Monitor connectors on front. |
| SPM-DS3-F | 1223111 | Service Protection Module for DS3 (dry loop) with BNC coax connectors. Equipment and Line connectors on front. |
| MIP-4 | 1224895 | Keystone coupler module with four (4) blank inserts installed |
| MIP-4SC | 1224896 | Keystone coupler module with four (4) SC fiber couplers installed |
| MIP-4SC-FOC | | Keystone coupler module with four (4) SC-FOC fiber couplers installed |
| BP1-1 | | Blank cover for empty module slot in SIPP chassis |
| DRNG-U-1 | 1223024 | Universal D-Ring |
| CMB-1 | 1145839 | Cable management bar |

**Table 6 - SIPP ordering information**

## Supplier Contact

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