

**NOTE**

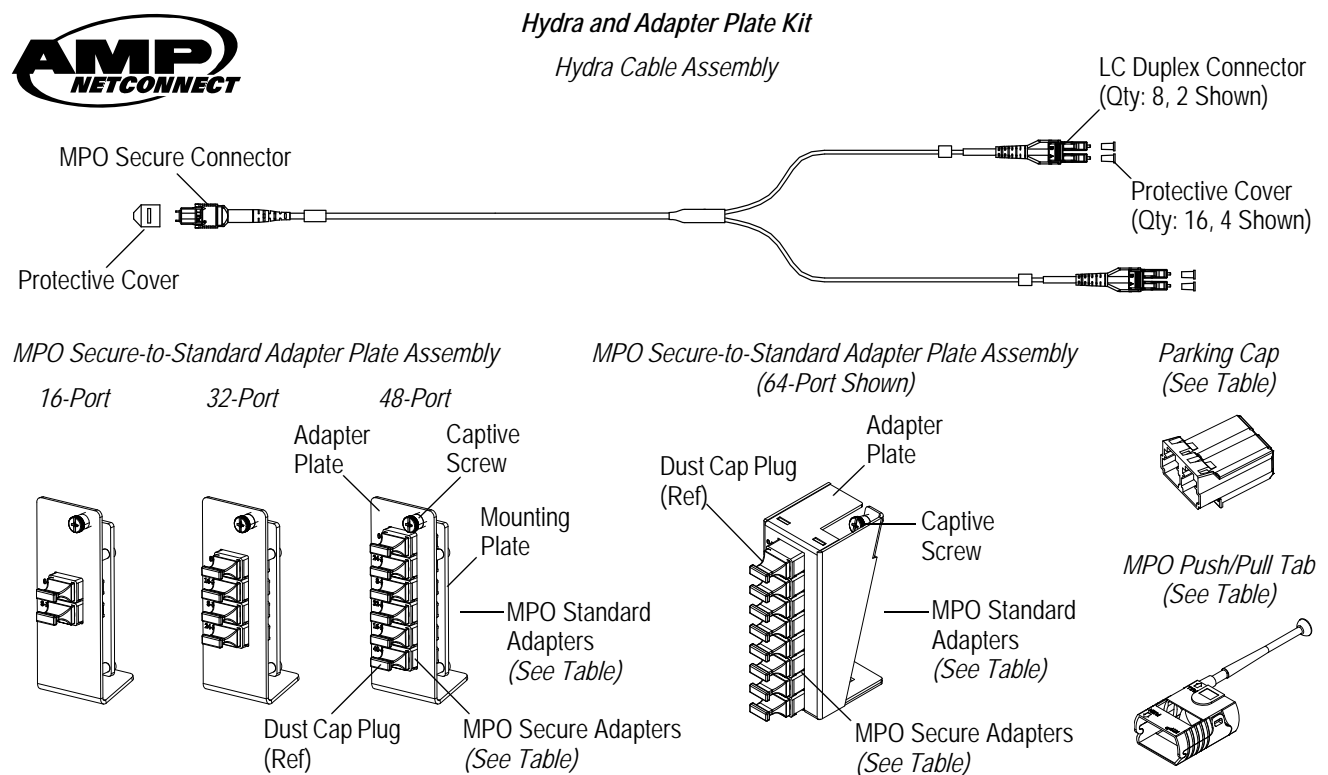


All numerical values are in metric units [with U.S. customary units in brackets]. Dimensions are in millimeters [and inches]. Unless otherwise specified, dimensions have a tolerance of  $\pm 0.13$  [ $\pm .005$ ] and angles have a tolerance of  $\pm 2^\circ$ . Figures and illustrations are for identification only and are not drawn to scale.

## 1. INTRODUCTION

This specification covers the requirements for application of the AMP NETCONNECT Gen II vertical Storage Area Management (SAM) system used to store and manage cable assemblies from the storage area network (SAN) electronics to patching points distributed within a data center or large network. The SAM system consists of 3 types of cable assemblies available in singlemode (SM) and multimode (MM): multi-fiber push-on (MPO) Secure-to-8 LC duplex fiber optic connectors or mini small form factor plugs (mSFP) (Hydra) (included in a kit), MPO-to-MPO (trunk), and LC duplex-to-LC duplex (patch cord/jumper), MPO Adapter Plate Assembly (included in a kit); Q3000 SAM Blade Assembly, and 2 types of enclosure assemblies: 2U MPO Secure (under chassis) and Quareo Q3000 (far end). The enclosure assemblies fit into a standard 483 [19.0] Electronic Industries Alliance (EIA) rack or cabinet.

When corresponding with personnel, use the terminology provided in this specification to facilitate your inquiries for information. Basic terms and features of this product are provided in Figure 1.

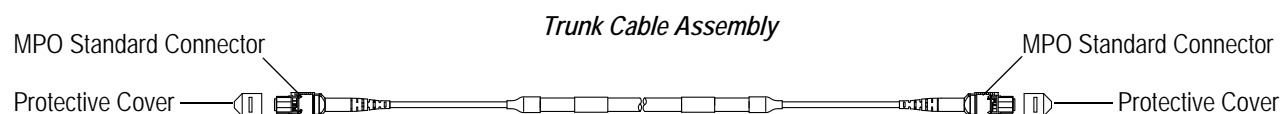
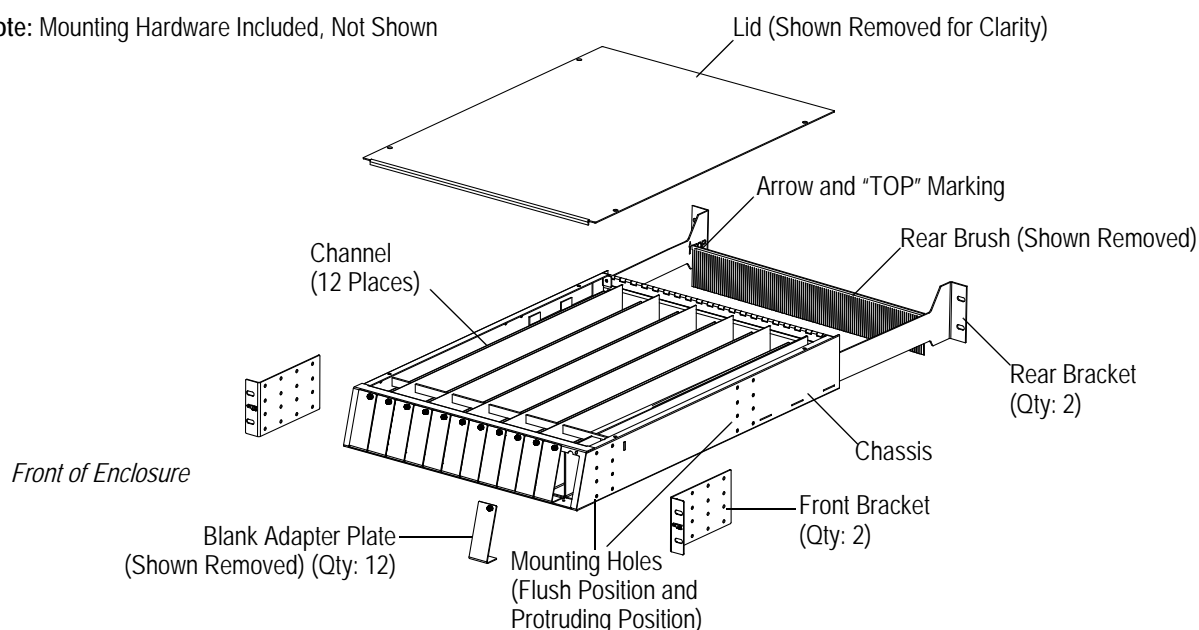


KIT TYPE (2 Fibers Per Port)	KIT CONTENTS				
	HYDRA CABLE ASSEMBLY	MPO ADAPTER	PARKING CAP	MPO PUSH/PULL TAB	MPO ADAPTER PLATE
16-Port	2	2	8	—	1
32-Port	4	4	16		
48-Port	6	6	24		
64-Port	8	8	—	2	

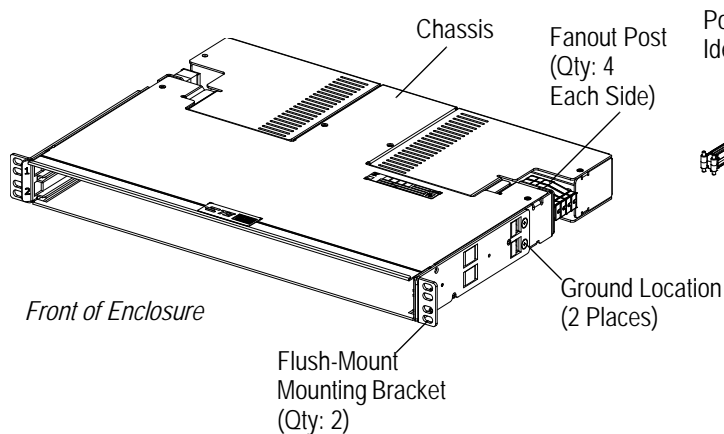
Figure 1 (Cont'd)

## 2U MPO Secure (Under Chassis) Enclosure

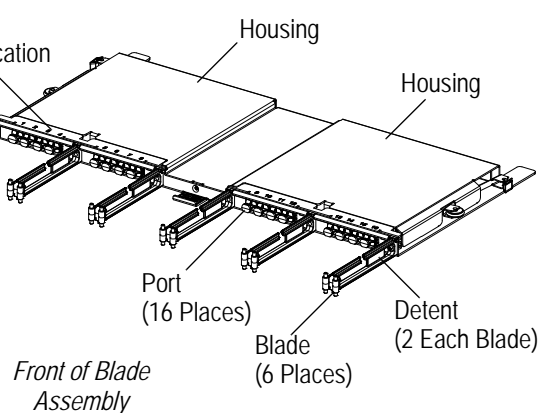
Note: Mounting Hardware Included, Not Shown



## Q3000 SAM Blade (Far End) Enclosure (1U Chassis Shown)



## Q3000 SAM Blade Assembly



RACK SPACE	ENCLOSURE HOLDS	
	PORTS (2 Fibers Per Port)	Q3000 SAM BLADE
1U	16	1
	32	2
2U	48	3
	64	4

Figure 1 (Cont'd)

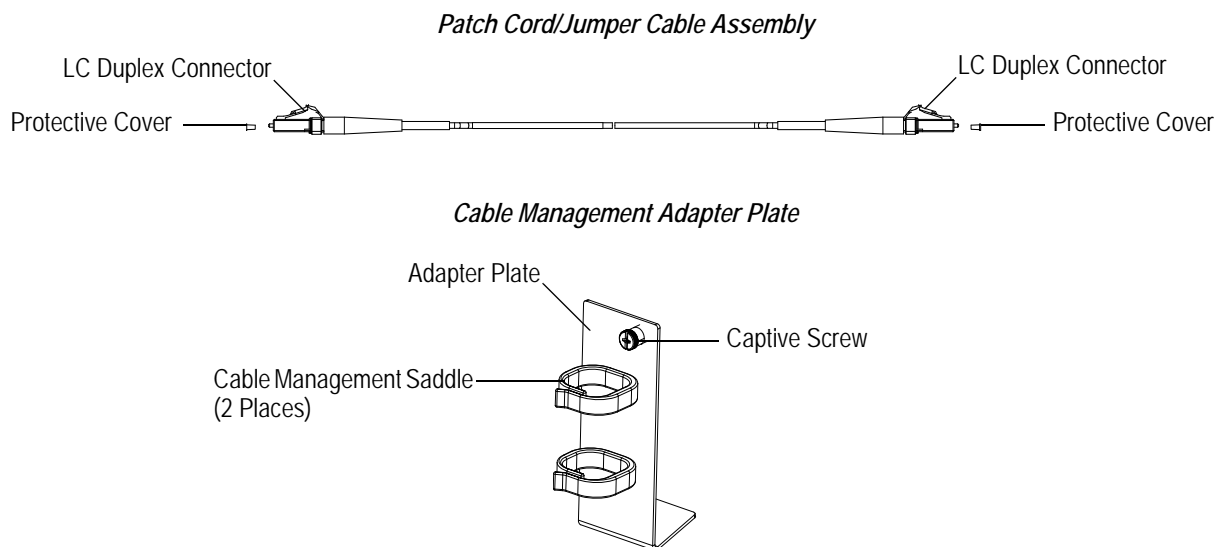


Figure 1 (End)

The hydra and adapter plate kit consists of 2, 4, 6, or 8 Hydra cable assemblies each with an MPO Secure connector on one end and 8 LC duplex or mSFP connectors on the other end, an MPO Secure adapter plate assembly, and 4 parking caps for each hydra cable assembly. Each connector is covered by a protective cover. The parking cap is used to install onto any unloaded transceiver cage ports of the blade assembly and is used to support the LC connector leg. The MPO push/pull tab is used to aid in removing an MPO connector from the port. The MPO Secure adapter plate assembly, parking cap, and MPO push/pull tab are also available separately.

The MPO Secure adapter plate assembly consists of an adapter plate with a captive screw for securing the assembly to the Under Chassis enclosure. The adapter plate assembly is available with 16, 32, 48, or 64 ports (2 fibers per port). Each port is covered with a dust cap plug. The front of the plate is marked with port designations. The adapter plate is used for connecting the MPO connectors of the trunk assembly to the MPO Secure connectors of the hydra cable assembly.

The Under Chassis enclosure consists of a chassis with a non-removable lid, 12 blank adapter plates (with attaching hardware), 2 front mounting brackets, 2 (right and left) rear mounting brackets, and mounting hardware. The mounting holes in the chassis provide a choice of two positions when mounting the enclosure onto the rack or cabinet. The chassis features 12 channels for routing cable and a rear brush. The rear brush is used to conceal the inside of the chassis. Each channel is marked on the front and back of the chassis to identify the adapter plate it supports.

The trunk cable assembly consists of a singlemode (SM) or multimode (MM) 24-fiber cable (using only 16 fibers) with an MPO connector on both ends. Each connector is covered by a protective cover. The trunk cable assembly is available in lengths of 3.05-m [10-ft] increments. This cable assembly is rated optical fiber nonconductive riser (OFNR)/optical fiber nonconductive plenum (OFNP).

The Far End enclosure is available with a 1U or 2U chassis. The enclosure features 16 to 32 ports (1U chassis) or 16 to 64 ports (2U chassis) and 2 flush-mount mounting brackets. The enclosure holds up to 2 Q3000 SAM blade assemblies (1U chassis) or 4 (2U chassis) Q3000 SAM blade assemblies. The blade assemblies are available separately. Each blade assembly is pre-loaded with 16 LC duplex connectors, 2 MPO adapters, and 2 singlemode or multimode fan-out cable assemblies. The front and back of the blade assembly is marked for port identification. The enclosure also features a trace label and a warranty label; and includes four 12-24 UNC-2A mounting screws and 16 cable ties.

The patch cord/jumper consists of a multimode (MM) or singlemode (SM) cable with an LC duplex connector on both ends. Each connector is covered by a protective cover. This cable assembly is available in lengths of 1-m [3.28-ft] increments.

A cable management adapter plate is available to manage the cable assemblies at the front of the Under Chassis enclosure. This adapter plate consists of adapter plate, 2 cable management saddles, and 2 captive screws for securing the assembly to the enclosure.

A hook-and-loop cable tie and AMP-TY\* cable tie (self-locking head with serrated tail) are available to provide strain relief for trunk cable assemblies at the back of the rack or cabinet.

## 2. REFERENCE MATERIAL

### 2.1. Revision Summary

Initial release of application specification

### 2.2. Customer Assistance

Reference Product Base Part Number 1553761 and Product Code A101 are representative of the Gen II vertical SAM system. Use of these numbers will identify the product line and expedite your inquiries through a service network established to help you obtain product and tooling information. Such information can be obtained through a local Representative, by visiting AMP NETCONNECT website at [www.amphnetconnect.com](http://www.amphnetconnect.com) or, after purchase, by calling PRODUCT INFORMATION at the number at the bottom of page 1.

### 2.3. Drawings

Customer Drawings for product part numbers are available from the service network. If there is a conflict between the information contained in the Customer Drawings and this specification or with any other technical documentation supplied, call PRODUCT INFORMATION at the number at the bottom of page 1.

### 2.4. Standards and Publications

Standards and publications developed by the Insulated Cable Engineers Association (ICEA), Institute of Electrical and Electronics Engineers (IEEE), International Organization for Standardization and International Electrotechnical Commission (ISO/IEC), Telcordia Technologies (TELCORDIA), Telecommunications Industry Association (TIA), and provide industry test and performance requirements.

Documents available that pertain to this product are:

ICEA S-83-596, "Indoor Optical Fiber Cables"

ICEA S-87-640, "Optical Fiber Outside Plant Communications Cables"

ICEA S-104-696, "Indoor-Outdoor Optical Fiber Cable"

IEEE 802.3, "Information Technology—Telecommunications and Information Exchange Between Systems Local and Metropolitan Area Networks—Specific Requirements Part 3: Carrier Sense Multiple Access with Collision Detection (CSMA/CD) Access Method and Physical Layer"

ISO/IEC 24764, "Information Technology—Generic Cabling Systems for Data Centers"

TIA-942, "Telecommunications Infrastructure Standard for Data Centers"

TELCORDIA GR-20-CORE, "Generic Requirements for Optical Fiber and Cable"

TELCORDIA GR-409-CORE, "Generic Requirements for Premises Fiber Optic Cable"

### 2.5. Instructional Material

Instruction Sheets (408-series) provide product assembly instructions or tool setup and operation procedures. Documents available which pertain to this system are:

408-32067 AMP NETCONNECT 2U Multi-Fiber Push-On (MPO) Secure Rack-Mounted Enclosure Assembly 1553761-1

ADCP-92-319 Quareo Q3000 Network Chassis Installation Instructions

## 3. REQUIREMENTS

### 3.1. Safety Precautions and Inspection

— Product shipping containers must not be stacked so high that the containers buckle or deform.



*To avoid personal injury, eye protection must ALWAYS be worn when working with optical fibers. The end of terminated or unterminated optical fiber must NEVER be looked into; laser radiation is invisible, but can still damage eye tissue.*

Telcordia is a trademark.



*To avoid personal injury, defective or damaged product must NEVER be used. Stray laser radiation may degrade system performance. Defective or damaged product must ALWAYS be replaced immediately.*

— To reduce risk of damaged fiber end faces, the protective cover or dust cap plug **MUST NOT** be removed from a port when the port is not in use.

— **INSPECT BEFORE YOU CONNECT!**

Before inspecting a fiber endface, the optical fiber from the power signal source must be **DISCONNECTED**. A fiber endface must always be clean and inspected before installing and connecting the cable assembly.

— The fiber endface must **NEVER** be inspected when power is applied to the optical fiber.

### 3.2. Storage

#### A. Shelf Life

Products should be used on a first in, first out basis to avoid storage contamination that could adversely affect performance.

#### B. Chemical Exposure

Do not store products near any chemical listed below as they may cause stress corrosion cracking in the product material.

Alkalies	Ammonia	Citrates	Phosphates	Citrates	Sulfur Compounds
Amines	Carbonates	Nitrites	Sulfur Nitrites		Tartrates

### 3.3. Limitations

The Gen II vertical SAM system is designed to operate in a temperature range of -40 to 65°C [-40 to 149°F). Installation temperature range, tensile load, and maximum bend radii for the cable assemblies are given in Figure 2.

Fiber endfaces **MUST NOT** be cleaned using products containing any solvent, such as alcohol.

CABLE ASSEMBLY TYPE	VALUE			
	INSTALLATION		OPERATING	
	TEMPERATURE RANGE	TENSILE LOAD N [lb-force]	TEMPERATURE RANGE	TENSILE LOAD N [lb-force]
Trunk	-10-60°C [14-140°F]	660 [150]	-20-70°C [-4-158°F]	198 [45]
Hydra	-20-50°C [-4-122°F]	440 [100]	-20-50°C [-4-122°F]	132 [30]
Patch Cord/Jumper	-20-50°C [-4-122°F]	40 [9]	-20-50°C [-4-122°F]	12 [3]

Figure 2

### 3.4. Location

The location of the switch, enclosures, and fiber pathways and layout must be determined by considering the following:

1. The type (underfloor or overhead) and the layout of the fiber pathways will determine the length of the trunk cable assembly run.
2. The Under Chassis enclosure must be mounted in the rack or cabinet directly below the switch (no gap). The length of the hydra cable assemblies are optimized to provide minimum slack in this arrangement.
3. The Under Chassis enclosure can be mounted flush to or protrude from the front of the rack or cabinet. The front of the enclosure must be flush with the front of the switch.
4. Locating the Far End enclosure at the top of the rack or cabinet enables better access to the trunk cable assemblies, which typically enters from the top of the rack or cabinet.
5. Locating the Far Enclosure in each row of the racks or cabinets will enable moving, adding, and changing equipment in that row.

6. If possible, space in the rack or cabinet should be reserved for possible future expansion.

### 3.5. Installation

The SAM system must be installed in the following order:

1. Under Chassis enclosure and Far End enclosure must be mounted onto rack or cabinet.
2. Trunk cable assemblies must be routed through Under Chassis enclosure.
3. The trunk cable assemblies must be connected to back of adapter plates, the adapter plates must be installed onto Under Chassis enclosure, and the hydra cable assemblies must be connected to front of adapter plates.
4. LC duplex patch cords must be connected to front of Far End enclosure, and trunk cable assemblies must be connected to back of Far End enclosure.

#### A. Mounting Enclosures (See Figure 3)

##### 1) Far End Enclosure

The chassis must be secured to the rack or cabinet using the mounting brackets.

##### 2) Under Chassis Enclosure

If desired, the rear brush can be removed from the chassis. It must be removed before the enclosure is mounted onto the rack or cabinet. It cannot be removed after the enclosure is mounted.

The chassis must be secured to the rack or cabinet using the front brackets and rear brackets.

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#### *Mounting Enclosures*

Front Brackets of Enclosure Secured to Rack (Ref)



Back Brackets of Enclosure Secured to Rack (Ref)



*Figure 3*

#### B. Cable Assemblies

1. The end of each cable assembly must be labeled.
2. Cable assemblies should be installed according to the following.

##### a. Each trunk cable assembly

One MPO connector must be inserted into the back of the Under Chassis enclosure so that it enters the applicable channel and reaches the front of the enclosure. There must be a small amount of slack in the cable at the back of the enclosure. The MPO connector must be connected to the adapter at the back of the MPO adapter plate (then, the adapter plate can be installed onto the enclosure).

The other MPO connector must be connected to the MPO connector adapter at the back of the Far End enclosure.

The label of each connector should match the port markings on the front of the adapter plate.

A cable tie must be wrapped loosely around each end of the trunk cable assembly at the back of the enclosure.



b. Each hydra cable assembly

Each MPO Secure connector must be connected to an adapter at the front of the MPO Secure adapter plate of the Under Chassis enclosure. The MPO Secure adapters of the adapter plate are keyed to match the MPO Secure connector. The label of each MPO Secure connector should match the port designations and color codes marked on the front of the adapter plate.

Each LC duplex connector must be connected to the front of the applicable port of the blade assembly. A parking cap can be installed onto any unloaded transceiver cage ports of the blade assembly for support.

The label of each LC duplex connector matches the port markings of the blade assembly.

c. Each LC duplex patch cord

One connector must be connected to an LC adapter port at the front of the Far End enclosure. The other connector must be connected to a port of the equipment, such as a router, switch, and other SAN.

The label of each connector should match the port markings on the front of the Far End enclosure.

### C. Adapter Plates (See Figure 4)

An MPO Secure adapter plate (included in the hydra and adapter plate kit) must be installed onto each opening of the Under Chassis enclosure. A blank adapter plate (included with the enclosure) must be installed onto any opening not used. As an option, cable management adapter plates can also be installed onto the Under Chassis enclosure. Each adapter plate must be secure to the enclosure using the attached captive screw.

#### Installing Adapter Plate Assemblies

Captive Screw Securing MPO Secure-to-Standard Adapter Plate



MPO Secure Adapter Plates (Ref) Installed in Enclosure



Figure 4

### 3.6. Cable Routing

Recommended cable routing and minimum bend radius is given in Figure 5.

CABLE ASSEMBLY	ROUTING		MINIMUM BEND RADIUS	
	From	To	Installation	Operating
Trunk	Under Chassis Enclosure	Far End Enclosure	144 [5.7]	72 [2.8]
Hydra	Under Chassis Enclosure	Switch Blade	76 [3.0]	38 [1.5]
Patch Cord/Jumper	Far End Enclosure	Equipment, Such As Router, Switch and Other SAN	50 [1.97]	25 [.98]

Figure 5

### 3.7. Repair

Defective or damaged product must not be used. Defective or damaged product must be replaced immediately.

#### 4. QUALIFICATION

The Gen II vertical SAM system does not require agency approval.

#### 5. TOOLING

Available tooling needed to install this system is shown in Figure 6.

##### 5.1. Installation

A cross-recessed screwdriver should be used to mount the enclosures to the rack or cabinet.

##### 5.2. Cleaning and Inspection

The following tool should be used to clean and inspect the connectors of the cable assemblies:

- MTP/MPO Secure In Bulkhead Adapter Cleaner 1918809-1
- LC/SC In Bulkhead Adapter Cleaner 2064500-1
- One Slot Reel Cleaner 1918803-1
- (for MPO Secure connectors and LC connectors)
- 200× Microscope Kit 1754767-1 fitted with:
  - Universal Microscope Adapter 1754765-1
  - (for LC connectors)
  - MPO Secure Microscope Adapter 1828836-1
  - (for MPO Secure multimode connectors)
  - MPOA Microscope Adapter 1828837-1
  - (for MPO Secure singlemode connectors)

#### NOTE

*Professional Fiber Optic Connector Inspection Kit 2064651-1 contains all of the above tools.*



Figure 6



## 6. VISUAL AID

The illustration below shows a typical application of the Gen II vertical SAM system. This illustration should be used by production personnel to ensure a correctly applied product. Applications which DO NOT appear correct should be inspected using the information in the preceding pages of this specification and in the instructional material shipped with the product or tooling.

PROTECTIVE COVER AND DUST CAP PLUGS MUST NOT BE REMOVED FROM PORTS NOT IN USE

ALL FIBER ENDFACES MUST ALWAYS BE CLEANED AND INSPECTED BEFORE BEING CONNECTED

LABELS OF ALL CABLE ASSEMBLIES MUST MATCH PORT MARKINGS AND COLOR CODE MARKINGS OF ADAPTER PLATES

NOT SHOWN:

FAR END ENCLOSURE MUST BE SECURED TO RACK OR CABINET USING BRACKETS AND MOUNTING HARDWARE

FAR END ENCLOSURE MOUNTED AT TOP OF ANOTHER RACK OR CABINET IS RECOMMENDED

PATCH CORD /JUMPER CABLE ASSEMBLIES MUST BE CONNECTED TO FRONT OF FAR END ENCLOSURE AND PORT OF EQUIPMENT

UNDER CHASSIS ENCLOSURE MUST BE MOUNTED IN RACK OR CABINET DIRECTLY BELOW SWITCH (NO GAP)

UNDER CHASSIS ENCLOSURE MUST BE SECURED TO RACK OR CABINET USING BRACKETS AND MOUNTING HARDWARE

ALL OPENINGS OF UNDER CHASSIS ENCLOSURE MUST BE COVERED WITH ADAPTER PLATE

ADAPTER PLATES MUST BE SECURE TO UNDER CHASSIS ENCLOSURE USING ATTACHED CAPTIVE SCREWS

HYDRA CABLE ASSEMBLIES MUST BE CONNECTED TO FRONT OF ADAPTER PLATE OF UNDER CHASSIS ENCLOSURE AND FRONT OF SWITCH BLADE

(NOT SHOWN) TRUNK CABLE ASSEMBLIES MUST BE CONNECTED TO BACK OF ADAPTER PLATE OF UNDER CHASSIS ENCLOSURE AND BACK OF FAR END ENCLOSURE



**FIGURE 7. VISUAL AID**