paloalto TECHDOCS

PA-7000 Series Firewall Hardware Reference

docs.paloaltonetworks.com

Contact Information

Corporate Headquarters:
Palo Alto Networks
3000 Tannery Way
Santa Clara, CA 95054
www.paloaltonetworks.com/company/contact-support

About the Documentation

- For the most recent version of this guide or for access to related documentation, visit the Technical Documentation portal docs.paloaltonetworks.com.
- To search for a specific topic, go to our search page docs.paloaltonetworks.com/search.html.
- Have feedback or questions for us? Leave a comment on any page in the portal, or write to us at documentation@paloaltonetworks.com.

Copyright

Last Revised

March 15, 2024

Table of Contents

Before You Begin

Read the following topics before you install or service a Palo Alto Networks® next-generation firewall or appliance.**The following topics apply to all Palo Alto Networks firewalls and appliances except where noted.**

- Upgrade/Downgrade Considerations for Firewalls and Appliances
- Tamper Proof Statement
- Third-Party Component Support
- Product Safety Warnings

Upgrade/Downgrade Considerations for Firewalls and Appliances

The following table lists all hardware features that have upgrade or downgrade impact. Make sure you understand all upgrade/downgrade considerations before you upgrade or downgrade from the specified version of PAN-OS.

Feature	Release	Upgrade Considerations	Downgrade Considerations
PA-7000 Log Forwarding Card (LFC)	10.0	If you are using an LFC with a PA-7000 Series Firewall, when you upgrade to PAN-OS 10.0, you must configure the management plane or dataplane interface for the service route because the LFC ports do not support the requirements for the service route. We recommend using the dataplane interface for the Data Services service route.	n/a
Upgrading a PA-7000 Series Firewall with a first generation switch management card (PA-7050-SMC or PA-7080-SMC)	PAN-OS 8.0 and later	Before upgrading the firewall, run the following CLI command to check the flash drive's status: **`debug system disk-smart-info disk-1`**. If the value for attribute ID #232, **Available_Reservd_Space 0x0000**, is greater than 20, then proceed with the upgrade. If the value is less than 20, then contact support for assistance.	Before downgrading the firewall, run the following CLI command to check the flash drive's status: **`debug system disk-smart-info disk-1`**. If the value for attribute ID #232, **Available_Reservd_Space 0x0000**, is greater than 20, then proceed with the downgrade. If the value is less than 20, then contact support for assistance.

Tamper Proof Statement

To ensure that products purchased from Palo Alto Networks were not tampered with during shipping, verify the following upon receipt of each product:

- The tracking number provided to you electronically when ordering the product matches the tracking number that is physically labeled on the box or crate.
- The integrity of the tamper-proof tape used to seal the box or crate is not compromised.
- The integrity of the warranty label on the firewall or appliance is not compromised.

(PA-7000 Series firewalls only) PA-7000 Series firewalls are modular systems and therefore do not include a warranty label on the firewall.

Third-Party Component Support

Before you consider installing third-party hardware, read the Palo Alto Networks Third-Party Component Support statement.

Product Safety Warnings

To avoid personal injury or death for yourself and others and to avoid damage to your Palo Alto Networks hardware, be sure you understand and prepare for the following warnings before you install or service the hardware. You will also see warning messages throughout the hardware reference where potential hazards exist.

All Palo Alto Networks products with laser-based optical interfaces comply with 21 CFR 1040.10 and 1040.11.

The following safety warnings apply to all Palo Alto Networks firewalls and appliances, unless a specific hardware model is specified.

- When installing or servicing a Palo Alto Networks firewall or appliance hardware component that has exposed circuits, ensure that you wear an electrostatic discharge (ESD) strap. Before handling the component, make sure the metal contact on the wrist strap is touching your skin and that the other end of the strap is connected to earth ground.

  French Translation: Lorsque vous installez ou que vous intervenez sur un composant matériel de pare-feu ou de dispositif Palo Alto Networks qui présente des circuits exposés, veillez à porter un bracelet antistatique. Avant de manipuler le composant, vérifiez que le contact métallique du bracelet antistatique est en contact avec votre peau et que l'autre extrémité du bracelet est raccordée à la terre.
- Use grounded and shielded Ethernet cables (when applicable) to ensure agency compliance with electromagnetic compliance (EMC) regulations.

  French Translation: Des câbles Ethernet blindés reliés à la terre doivent être utilisés pour garantir la conformité de l'organisme aux émissions électromagnétiques (CEM).
- (PA-3200, PA-5200, PA-5400, PA-7000, and PA-7500 firewalls only) At least two people are recommended for unpacking, handling, and relocating the heavier firewalls.
- Do not connect a supply voltage that exceeds the input range of the firewall or appliance. For details on the electrical range, refer to electrical specifications in the hardware reference for your firewall or appliance.

  French Translation: Veillez à ce que la tension d'alimentation ne dépasse pas la plage d'entrée du pare-feu ou du dispositif. Pour plus d'informations sur la mesure électrique, consulter la rubrique des caractéristiques électriques dans la documentation de votre matériel de pare-feu ou votre dispositif.
- (Devices with serviceable batteries only) Do not replace a battery with an incorrect battery type; doing so can cause the replacement battery to explode. Dispose of used batteries according to local regulations.

  French Translation: Ne remplacez pas la batterie par une batterie de type non adapté, cette dernière risquerait d'exploser. Mettez au rebut les batteries usagées conformément aux instructions.
- I/O ports are intended for intra-building connections only and not intended for OSP (Outside Plant) connections or any network connections subject to external voltage surge events.

• 	(All Palo Alto Networks appliances with two or more power supplies) Caution: Shock hazard Disconnect all power cords (AC or DC) from the power inputs to fully de-energize the hardware. **French Translation:** (Tous les appareils Palo Alto Networks avec au moins deux sources d'alimentation) Débranchez tous les cordons d'alimentation (c.a. ou c.c.) des entrées d'alimentation et mettez le matériel hors tension.
• 	(PA-7000 Series firewalls only) Caution: High touch current Connect to earth before connecting to the power supply. Ensure that the protective earthing conductor is connected to the provided ground lug on the rear side of the firewall.
• 	(PA-7000 Series firewalls only) When removing a fan tray from a PA-7000 Series firewall, first pull the fan tray out about 1 inch (2.5cm) and then wait a minimum of 10 seconds before extracting the entire fan tray. This allows the fans to stop spinning and helps you avoid serious injury when removing the fan tray. You can replace a fan tray while the firewall is powered on but you must replace it within 45 seconds and you can only replace one fan tray at a time to prevent the thermal protection circuit from shutting down the firewall. **French Translation:** (Pare-feu PA-7000 uniquement) Lors du retrait d'un tiroir de ventilation d'un pare-feu PA-7000, retirez tout d'abord le tiroir sur 2,5 cm, puis patientez au moins 10 secondes avant de retirer complètement le tiroir de ventilation. Cela permet aux ventilateurs d'arrêter de tourner et permet d'éviter des blessures graves lors du retrait du tiroir. Vous pouvez remplacer un tiroir de ventilation lors de la mise sous tension du pare-feu. Toutefois, vous devez le faire dans les 45 secondes et vous ne pouvez remplacer qu'un tiroir à la fois, sinon le circuit de protection thermique arrêtera le pare-feu.

The following applies only to Palo Alto Networks firewalls that support a direct current (DC) power source:

French Translation: Les instructions suivantes s'appliquent uniquement aux pare-feux de Palo Alto Networks prenant en charge une source d'alimentation en courant continu (c.c.):

- Do not connect or disconnect energized DC wires to the power supply.

  French Translation: Ne raccordez ni débranchez de câbles c.c. sous tension à la source d'alimentation.
- The DC system must be earthed at a single (central) location.

  French Translation: Le système c.c. doit être mis à la terre à un seul emplacement (central).
- The DC supply source must be located within the same premises as the firewall.

  French Translation: La source d'alimentation c.c. doit se trouver dans les mêmes locaux que ce pare-feu.
- The DC battery return wiring on the firewall must be connected as an isolated DC (DC-I) return.

  French Translation: Le câblage de retour de batterie c.c. sur le pare-feu doit être raccordé en tant que retour c.c. isolé (CC-I).
- The firewall must be connected either directly to the DC supply system earthing electrode conductor or to a bonding jumper from an earthing terminal bar or bus to which the DC supply system earthing electrode conductor is connected.

  French Translation: Ce pare-feu doit être branché directement sur le conducteur à électrode de mise à la terre du système d'alimentation c.c. ou sur le connecteur d'une barrette/d'un bus à bornes de mise à la terre auquel le conducteur à électrode de mise à la terre du système d'alimentation c.c. est raccordé.
- The firewall must be in the same immediate area (such as adjacent cabinets) as any other equipment that has a connection between the earthing conductor of the DC supply circuit and the earthing of the DC system.

  French Translation: Le pare-feu doit se trouver dans la même zone immédiate (des armoires adjacentes par exemple) que tout autre équipement doté d'un raccordement entre le conducteur de mise à la terre du même circuit d'alimentation c.c. et la mise à la terre du système c.c.
- Do not disconnect the firewall in the earthed circuit conductor between the DC source and the point of connection of the earthing electrode conductor.

  French Translation: Ne débranchez pas le pare-feu du conducteur du circuit de mise à la terre entre la source d'alimentation c.c. et le point de raccordement du conducteur à électrode de mise à la terre.
- Install all firewalls that use DC power in restricted access areas only. A restricted access area is where access is granted only to craft (service) personnel using a special tool, lock and key, or other means of security, and that is controlled by the authority responsible for the location.

  French Translation: Tous les pare-feux utilisant une alimentation c.c. sont conçus pour être installés dans des zones à accès limité uniquement. Une zone à accès limité correspond à une zone dans laquelle l'accès n'est autorisé au personnel (de service) qu'à l'aide d'un outil spécial,

cadenas ou clé, ou autre dispositif de sécurité, et qui est contrôlée par l'autorité responsable du site.

- Install the firewall DC ground cable only as described in the power connection procedure for the firewall that you are installing. You must use the American wire gauge (AWG) cable specified and torque all nuts to the torque value specified in the installation procedure for your firewall.

  French Translation: Installez le câble de mise à la terre c.c. du pare-feu comme indiqué dans la procédure de raccordement à l'alimentation pour le pare-feu que vous installez. Utilisez le câble American wire gauge (AWG) indiqué et serrez les écrous au couple indiqué dans la procédure d'installation de votre pare-feu pare-feu.

- The firewall permits the connection of the earthed conductor of the DC supply circuit to the earthing conductor at the equipment as described in the installation procedure for your firewall.

  French Translation: Ce pare-feu permet de raccorder le conducteur de mise à la terre du circuit d'alimentation c.c. au conducteur de mise à la terre de l'équipement comme indiqué dans la procédure d'installation du pare-feu.

- A suitably-rated DC mains disconnect device must be provided as part of the building installation.

  French Translation: Un interrupteur d'isolement suffisant doit être fourni pendant l'installation du bâtiment.

PA-7000 Series Firewall Overview

The PA-7000 Series firewalls (PA-7050 and PA-7080) are high performance modular firewalls designed for large enterprise and carrier class environments. These multi-blade chassis can leverage either AC or DC power and have hot-swappable Network Processing Cards (NPCs) to allow for expansion as needs grow. You can install up to six NPCs in the PA-7050 firewall and up to ten NPCs in the PA-7080 firewall. These firewalls also include a dedicated high availability (HA) control port (HA1), as well as two dedicated 80Gb QSFP HA ports for HA2 (data link) and HA3 (packet forwarding) functions. These dedicated HA ports enable PA-7000 Series firewalls to function with full hardware redundancy in either an active/passive or active/active configuration. Additionally, to improve logging performance, the firewalls use a dedicated log card to handle all log processing tasks. In PAN-OS versions 10.0 and later, you can install Data Processing Cards (DPCs) in the same slots as the NPCs to improve the processing power of the chassis.

First Supported PAN-OS® Software Release:

- **PAN-OS 6.0**—PA-7050 firewall
- **PAN-OS 7.0**—PA-7080 firewall

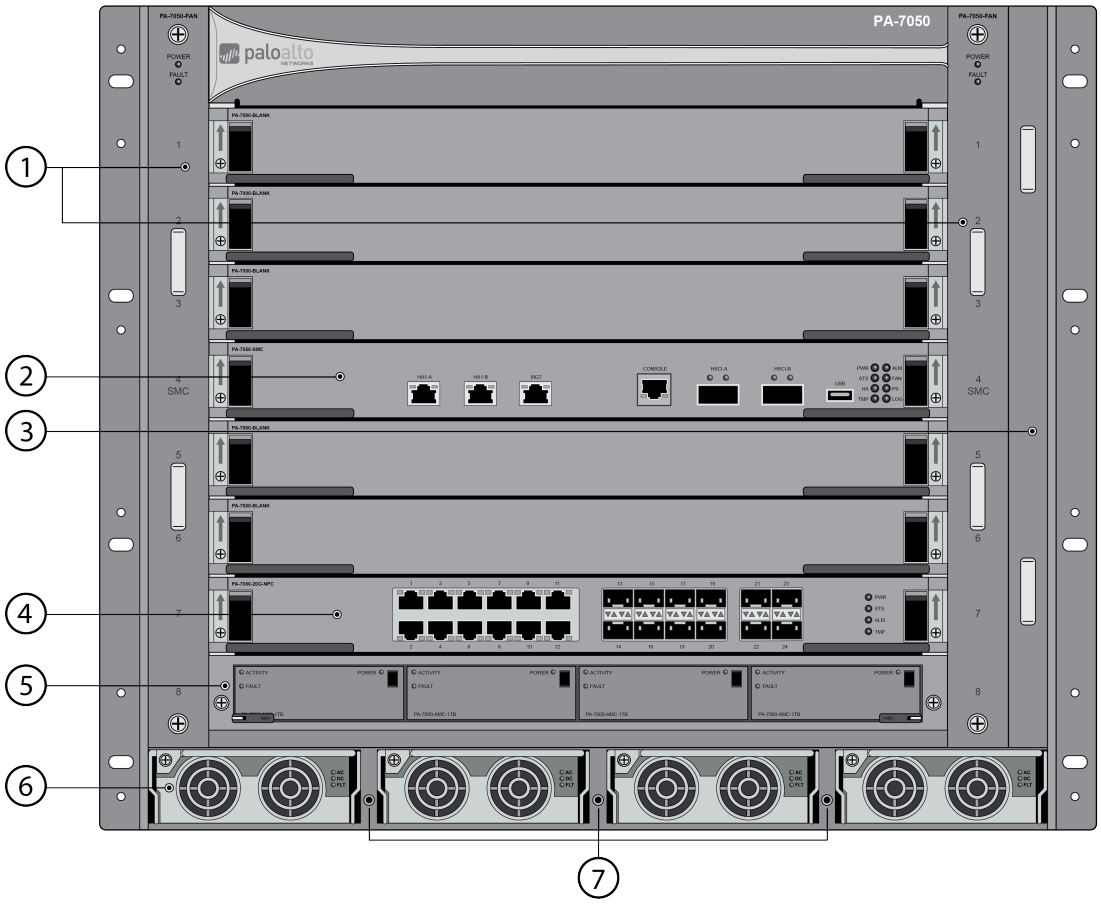
The minimum supported PAN-OS software also varies based on the installed components. For example, if you install a PA-7000 20GQXM NPC, the firewall must have PAN-OS 7.1 or later installed. In the PAN-OS 9.0 release, there are also requirements to install newer components based on the installed hardware. For example, if you install the PA-7000-100G-NPC in a PA-7050 firewall, you must also install the PA-7050 second-generation fan trays (PA-7050-FANTRAY-L-A (left) and PA-7050-FANTRAY-R-A (right)). For more information on these requirements, see PA-7000 Series Firewall Module and Interface Card Information.

- PA-7050 Front and Back Panel Descriptions
- PA-7080 Front and Back Panel Descriptions

PA-7050 Front and Back Panel Descriptions

PA-7050 Front Panel (AC)

The following image shows the front panel of the PA-7050 firewall (with AC power supplies installed) and the table describes each front panel component.



Item	Component	Description
1	Exhaust and intake fan trays (first-generation fan tray shown)	Provides ventilation and cooling for the chassis. While facing the front of the firewall, air enters from the left and exits to the right. There are two PA-7050 fan tray models:

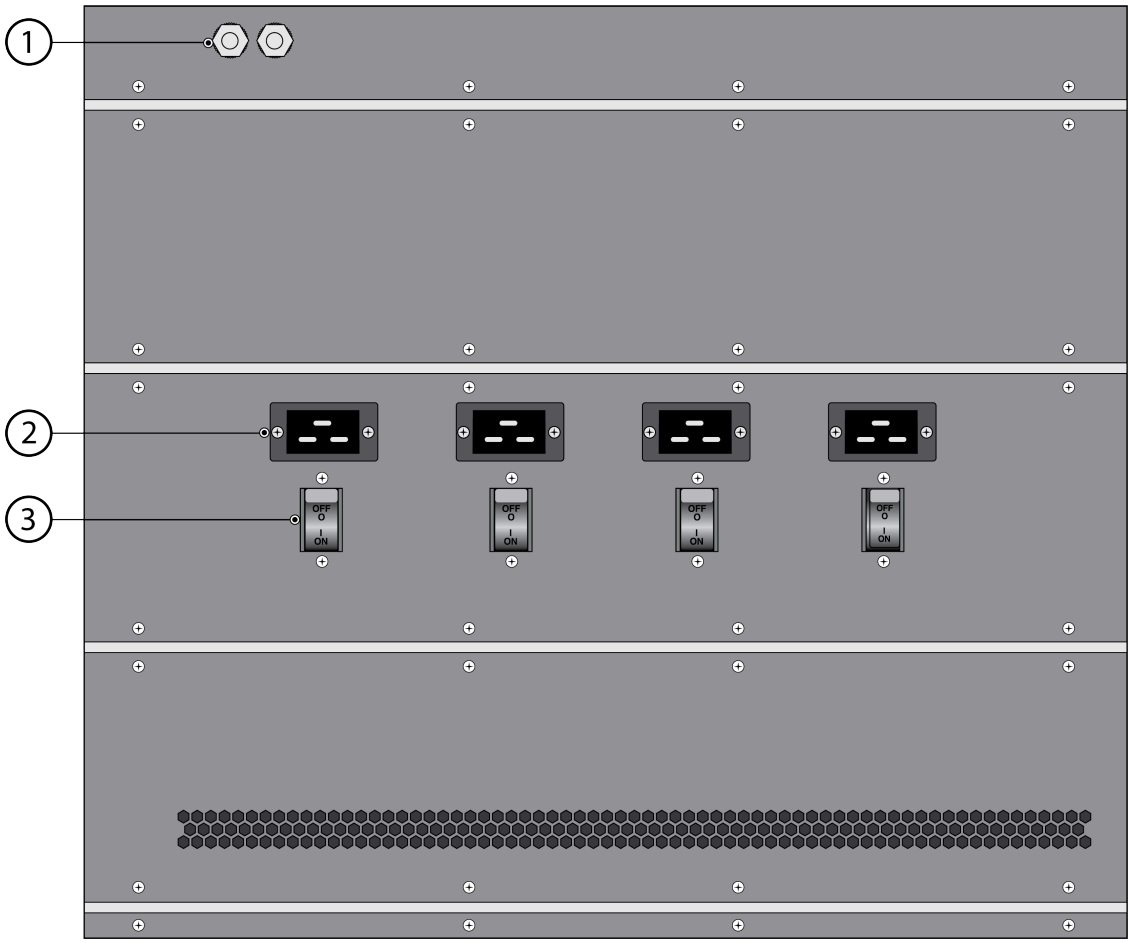
Item	Component	Description
		• **PA-7050-FAN**—First-generation fan tray. These fan trays are interchangeable, so you can install them in either fan tray slot. • **PA-7050-FANTRAY-L-A (left) and PA-7050-FANTRAY-R-A (right)**—Second-generation fan tray that provides more cooling capacity than the first-generation fan tray. While facing the front of the firewall, install PA-7050-FANTRAY-L-A on the left and the PA-7050-FANTRAY-R-A on the right. The right fan tray also includes the air intake filter that slides into the fan tray. This fan tray is required when installing certain hardware components. For example, you must install this fan tray if you install a PA-7000 100G NPC. For more details, see the system and hardware requirements in PA-7000 Series Firewall Module and Interface Card Information. During normal operation, the Power LED on the fan tray is green and the Fault LED is off. If an individual fan fails on the fan tray, the Power LED turns off and the Fault LED turns red. For information on replacing a fan tray, see Replace a PA-7050 Fan Tray.
2	Switch Management Card (SMC) (first-generation SMC shown)	Provides management access to the chassis using a serial console cable connected to the Console port or an RJ-45 cable connected to the management (MGT) port. The SMC also has high availability (HA) ports and LED indicators that provide information on various chassis components. The SMC also stores PAN-OS, the configuration, and management logs (**Alarm**, **Configuration**, and **System**). *One SMC is required to operate the chassis and on a PA-7050 firewall, it must be installed in slot 4. You cannot install an SMC into any other slot.* *The SMC-B is shipped with four copper 1G transceivers for use in the MGT-A, MGT-B, HA1-A, and HA1-B ports. You can use these or replace them with a transceiver of your choice.* There are two PA-7050 SMC models as described in PA-7000 Series Firewall Switch Management Cards (SMCs).

Item	Component	Description
		The PAN-OS® software is preinstalled on the embedded solid-state drive (SSD) on the SMC.
3	Air filter	Filters air entering the chassis. Periodically inspect the filter to ensure it is clean. The filter is not designed to be cleaned and it is recommended that you replace it every six months (depending on the environment). If the firewall has the second-generation fan trays installed (PA-7050-FANTRAY-L-A on the left and the PA-7050-FANTRAY-R-A), the air filter is inserted into the right fan tray (PA-7050-FANTRAY-R-A).
4	Network Processing Card (NPC) or Data Processing Card (DPC)	**Network Processing Card (NPC)** Provides network connectivity. On a PA-7050 firewall, you can install up to six NPCs (in slots 1, 2, 3, 5, 6, and/or 7). You must have at least one NPC installed before the firewall can process network traffic. For more information, see PA-7000 Series Firewall Network Processing Cards (NPCs). **Data Processing Card** (PAN-OS versions 10.0 and later) Improves the processing capacity of the chassis and other installed cards. On a PA-7050 firewall, you can install up to five DPCs (in slots 1, 2, 3, 5, 6, or 7). Since the DPC does not have any interfaces, at least one NPC is still required for the chassis to process network activity. For more information, see PA-7000 Series Firewall Data Processing Card (DPC).
5	Log card (LPC shown)	There are two log card models that you can install: • **LFC** (PAN-OS 9.0 or later)—High-speed log forwarding card that forwards all dataplane logs to an external log collection system, such as Panorama or a syslog server. The only logs that are stored locally are the **Alarm** ,**Configuration**, and **System** logs; these logs are stored on the SMC. • **LPC**—Manages and stores all dataplane logs generated by the firewall. The LPC contains four disk drives that are configured in two separate RAID1 pairs to provide redundancy. Each drive is installed in an Advanced Mezzanine Card (AMC), which physically connects the drive to the LPC. When replacing a drive, the AMC and drives are ordered and installed as one unit.

Item	Component	Description
		You must have one LFC or LPC installed in slot 8 for chassis operation. You cannot install an LFC or LPC into any other slot. For more information, see PA-7000 Series Firewall Log Cards.
6	AC power supplies	Provides power to the chassis using an AC power source. For information on connecting power, see Connect Power to a PA-7000 Series Firewall.
7	Electrostatic Discharge (ESD) ports	Provides a grounding point that you use when removing or installing chassis components. Secure the provided wrist strap end of the ESD strap around your wrist and plug the other end into one of the ESD ports.

PA-7050 Back Panel (AC)

The following image shows the back panel of the PA-7050 firewall (with AC power supplies installed) and the table describes each back panel component.



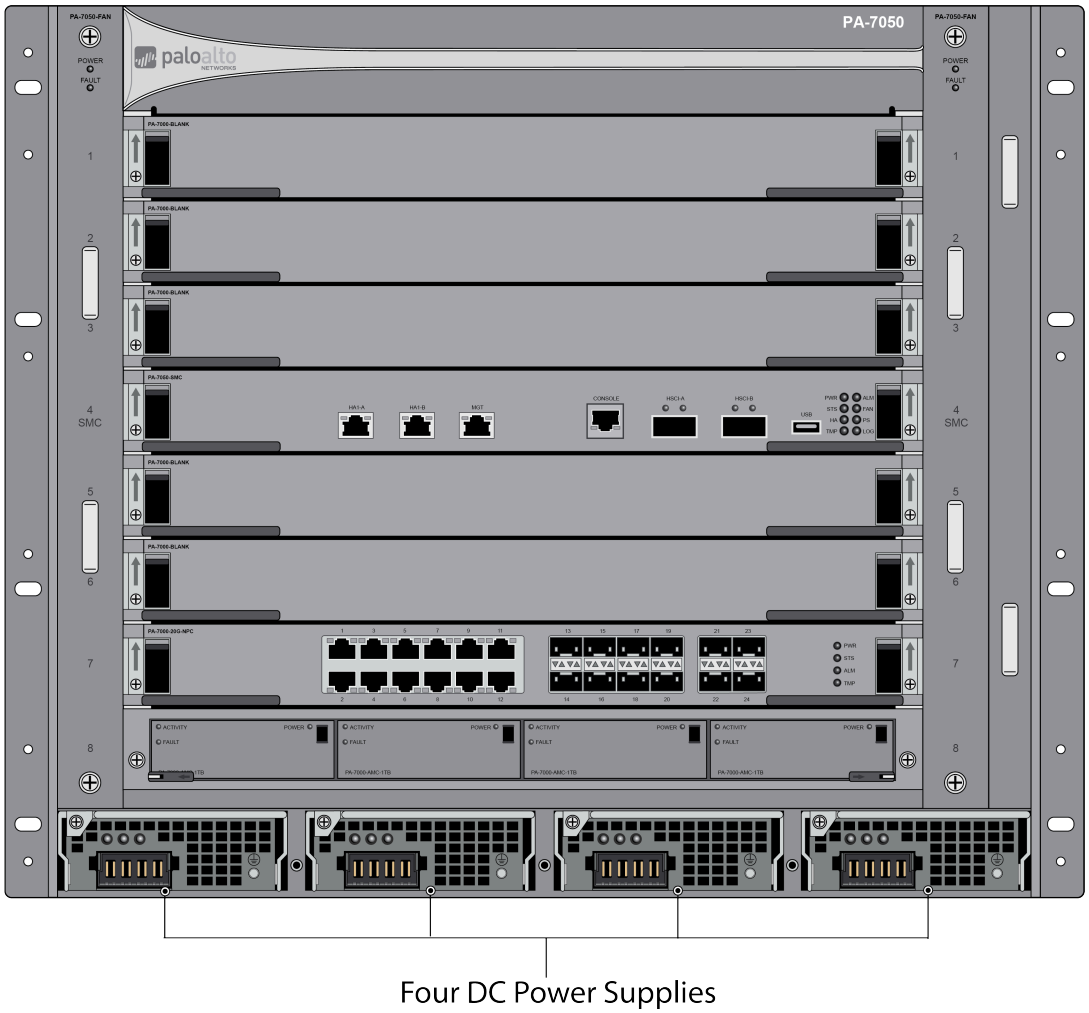
Item	Component	Description
1	Ground stud	Two-post stud used to ground the chassis to earth ground. Use the provided 6 AWG two#post ground lug to connect a grounded cable (not included) to the two#post stud.
2	Power Entry Module (PEM) AC power inlets	Connects the power source to the power supplies located on the front of the chassis. The front power supplies distribute power to all chassis components. The AC PEM contains four 20-amp AC power inlets—each accompanied by a switch—one pair, inlet with switch, for each power supply. If you are facing the back of the chassis, the inlet and switch on the far left side provides power to the power supply on the far right side when facing the front of the chassis. For information on connecting power, see Connect Power to a PA-7000 Series Firewall.

Item	Component	Description
		The AC PEMs are not field-serviceable.
3	Power Entry Module (PEM) AC power switches	Provides switches to power on or off the AC power supplies. Each switch has a circuit breaker that will trip if the load reaches 25-amps.

PA-7050 Front Panel (DC)

The following image shows the front panel of the PA-7050 firewall (with DC power supplies installed).

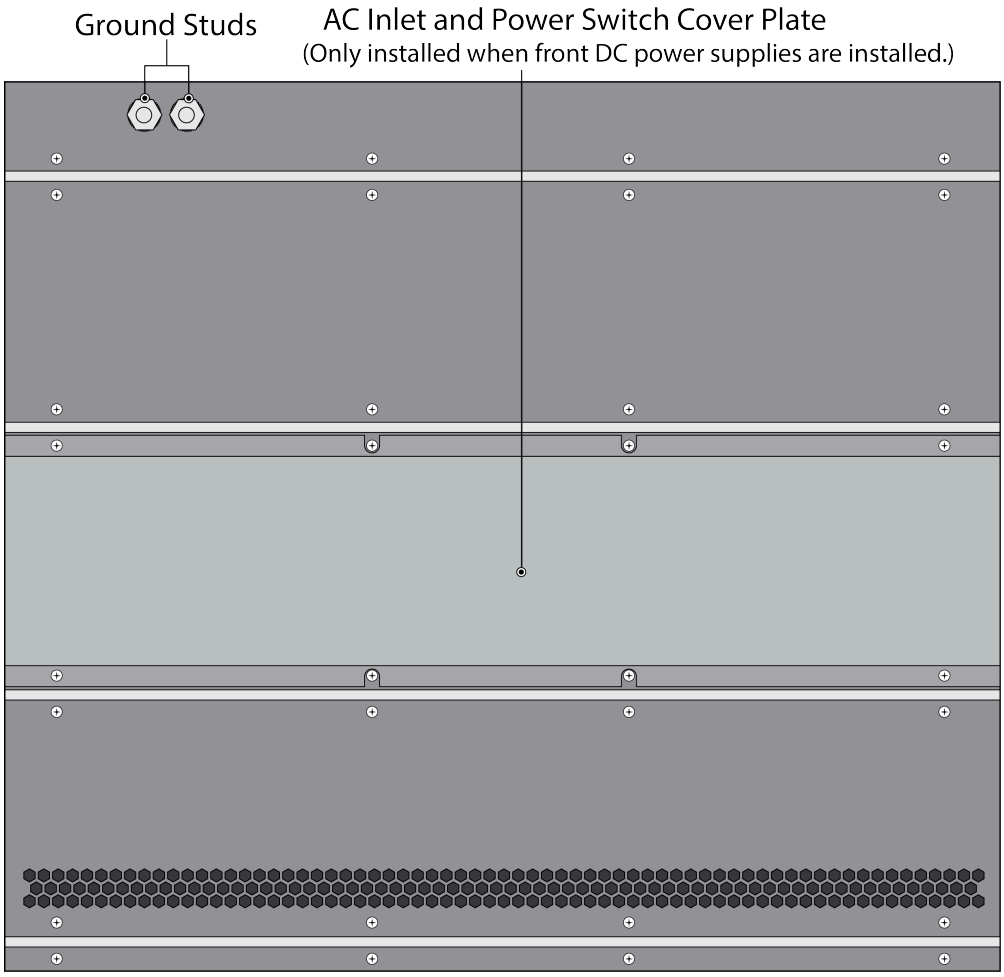
The only difference between the front panel of the AC model and the front panel of the DC model is that the DC model has four front DC power supplies instead of four AC power supplies. For descriptions of the front panel components, see PA-7050 Front Panel (AC) *and for information on connecting DC power, see* Connect Power to a PA-7000 Series Firewall.



PA-7050 Back Panel (DC)

The following image shows the back panel of the PA-7050 firewall (with DC power supplies installed). The AC inlets and switches are not functional and must remain covered using the provided cover plate.

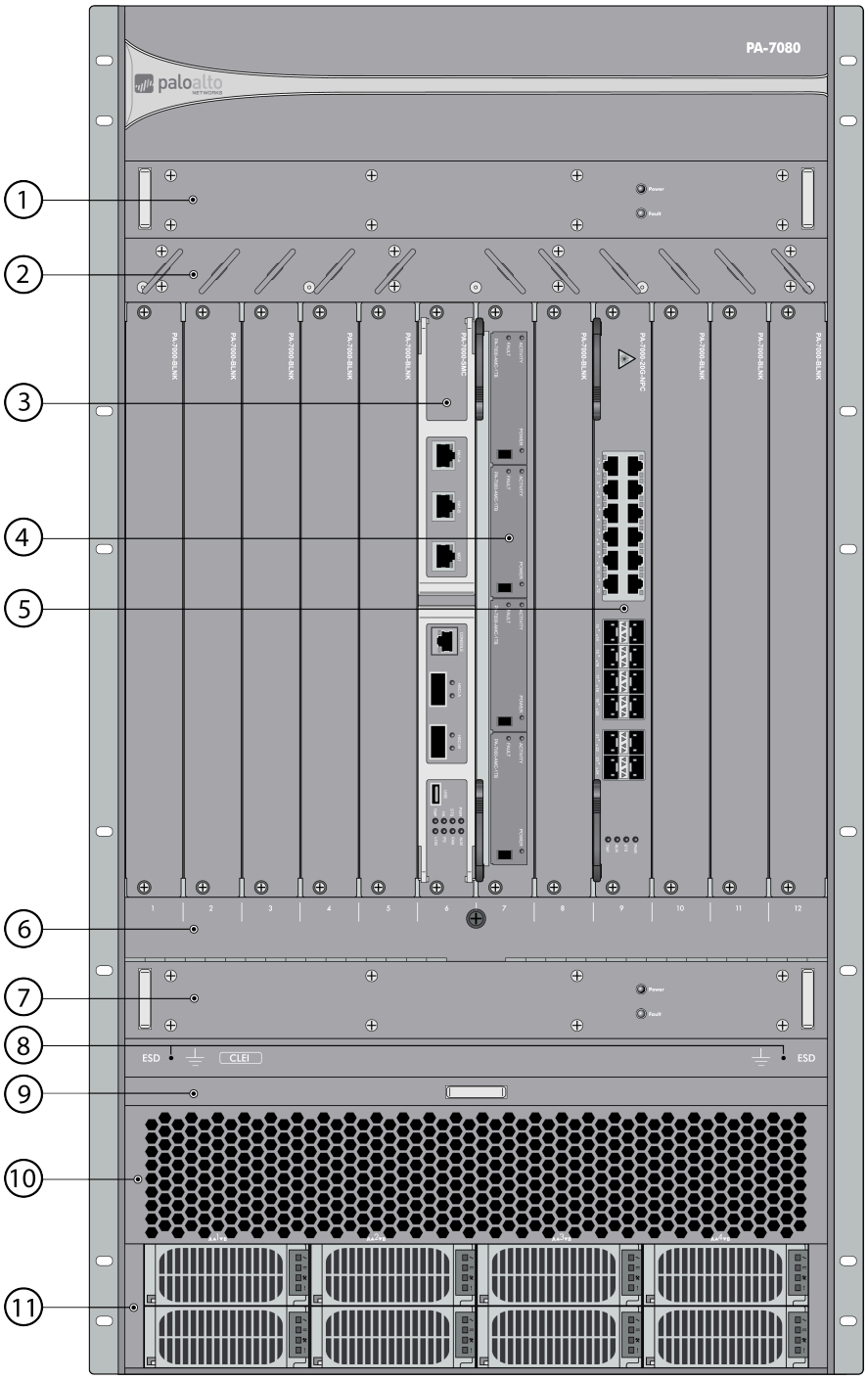
The only differences between the back panel of the AC model and the back panel of the DC model is that the DC model does not have a Power Entry Modules (PEM); the DC power source connects directly to the front of the power supplies. For descriptions of the back panel components, see PA-7050 Back Panel (AC).



PA-7080 Front and Back Panel Descriptions

PA-7080 Front Panel (AC)

The following image shows the front panel of the PA-7080 firewall (with AC power supplies installed) and the table describes each front panel component.



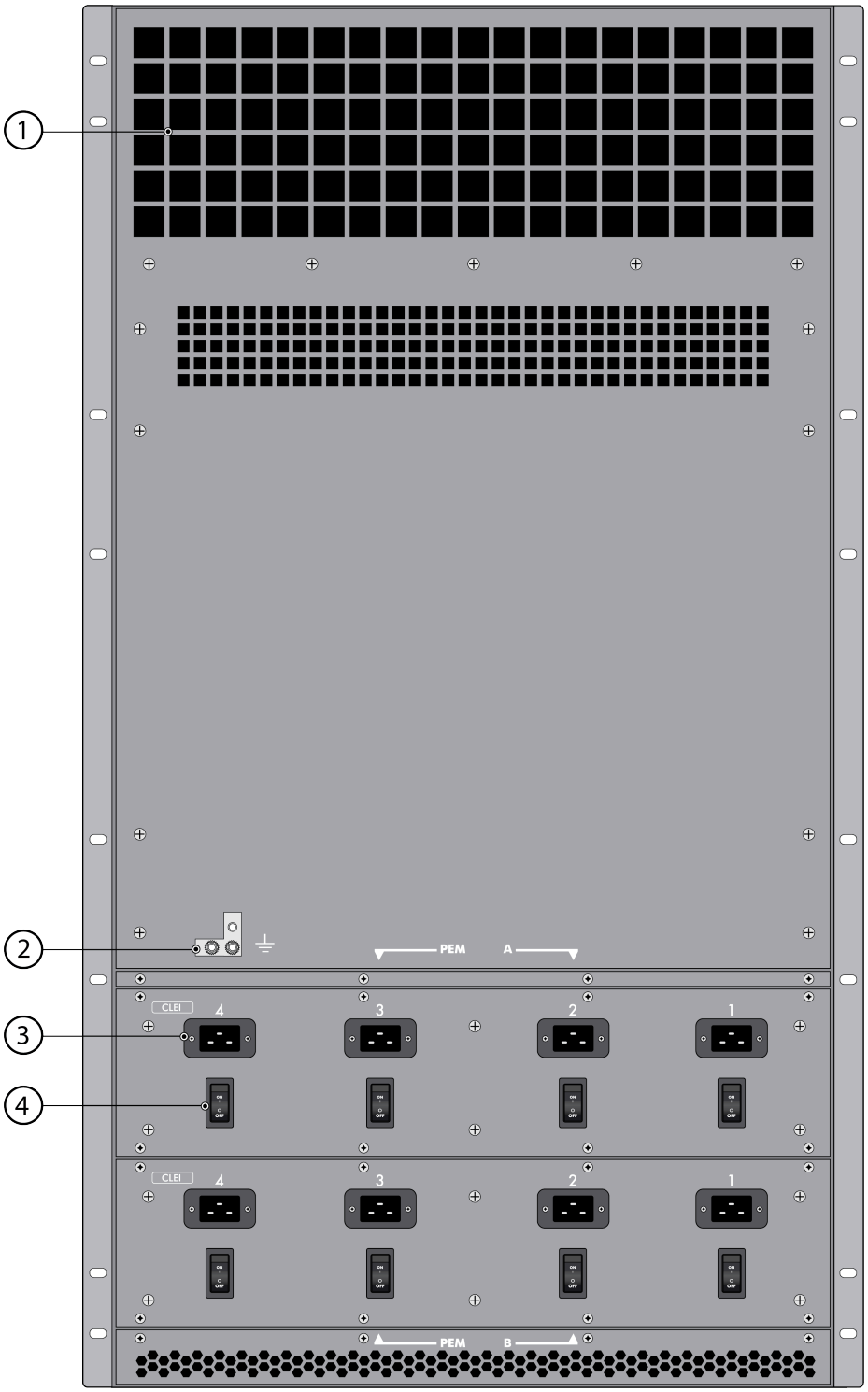
Item	Component	Description
1	Exhaust fan tray	Provides ventilation and cooling for the chassis. The fan trays are interchangeable, so you can install them in either fan tray slot. During normal operation, the Power LED is green and the Fault LED is off. If an individual fan fails on the fan tray, the Power LED turns off and the red Fault LED illuminates. For information on replacing a fan tray, see Replace a PA-7080 Fan Tray.
2	Upper cable guide	(Optional) Provides cable management to route Ethernet cables and the console cable. This item ships with the chassis but is not preinstalled.
3	Switch Management Card (SMC)	Provides management access to the chassis using a serial console cable connected to the Console port or an RJ-45 cable connected to the management (MGT) port. The SMC also has high availability (HA) ports and LED indicators that provide information on various chassis components. The SMC also stores PAN-OS, the configuration, and management logs (**Alarm**, **Configuration**, and **System**). *One SMC is required to operate the chassis and on a PA-7080 firewall, it must be installed in slot 6. You cannot install an SMC into any other slot.* *The SMC-B is shipped with four copper 1G transceivers for use in the MGT-A, MGT-B, HA1-A, and HA1-B ports. You can use these or replace them with a transceiver of your choice.* There are two PA-7050 SMC models as described in PA-7000 Series Firewall Switch Management Cards (SMCs). *The PAN-OS® software is preinstalled on the embedded solid-state drive (SSD) on the SMC.*
4	Log Processing Card (LPC) (shown) or Log Forwarding Card (LFC)	There are two log card models: • **LFC** (PAN-OS 9.0 or later)—High-speed log forwarding card that forwards all dataplane logs to an external log collection system, such as Panorama or a syslog

Item	Component	Description
		server. The only logs that are stored locally are the **Alarm**,**Configuration**, and **System** logs; these logs are stored on the SMC. • **LPC**—Manages and stores all dataplane logs generated by the firewall. The LPC contains four disk drives that are configured in two separate RAID 1 pairs to provide redundancy. Each drive is installed in an Advanced Mezzanine Card (AMC), which physically connects the drive to the LPC. When replacing a drive, the AMC and drives are ordered and installed as one unit. *You must have one LFC or LPC installed in slot 7 for chassis operation. You cannot install an LFC or LPC into any other slot.* For more information, see PA-7000 Series Firewall Log Cards.
5	Network Processing Card (NPC) or Data Processing Card (DPC)	**Network Processing Card (NPC)** Provides network connectivity. On a PA-7080 firewall, you can install up to ten NPCs (in slots 1, 2, 3, 4, 5, 8, 9, 10, 11, and/or slot 12). You must have at least one NPC installed before the firewall can process network traffic. For more information, see PA-7000 Series Firewall Network Processing Cards (NPCs). **Data Processing Card** (PAN-OS versions 10.0 and later) Improves the processing capacity of the chassis and other installed cards. On a PA-7080 firewall, you can install up to nine DPCs (in slots 1, 2, 3, 4, 5, 8, 9, 10, 11, or slot 12). Since the DPC does not have any interfaces, at least one NPC is still required for the chassis to process network activity. For more information, see PA-7000 Series Firewall Data Processing Card (DPC).
6	Lower cable guide	(Optional) Provides cable management to route fiber optic cables. This item ships with the chassis but is not preinstalled.
7	Air intake fan tray	Provides ventilation and cooling for the chassis. The fan tray is interchangeable, so you can install it in either fan tray slot. During normal operation, the Power LED is green and the Fault LED is off. If an individual fan fail on the fan

Item	Component	Description
		tray, the Power LED turns off and the red Fault LED illuminates. For information on replacing a fan tray, see Replace a PA-7080 Fan Tray.
8	Electrostatic Discharge (ESD) ports	Provides a grounding point that you use when removing or installing chassis components. Secure the provided wrist strap end of the ESD strap around your wrist and plug the other end into one of the ESD ports.
9	Air filter	Filters air entering the chassis. Periodically inspect the filter to ensure it is clean. The filter is not designed to be cleaned and it is recommended that you replace it every six months (depending on the environment).
10	Air intake vent	Provides air circulation for chassis cooling. Do not obstruct this vent.
11	AC power supplies	Provides power to the chassis using an AC power source. For information on connecting power, see Connect Power to a PA-7000 Series Firewall.

PA-7080 Back Panel (AC)

The following image shows the back panel of the PA-7080 firewall (with AC power supplies installed) and the table describes each back panel component.



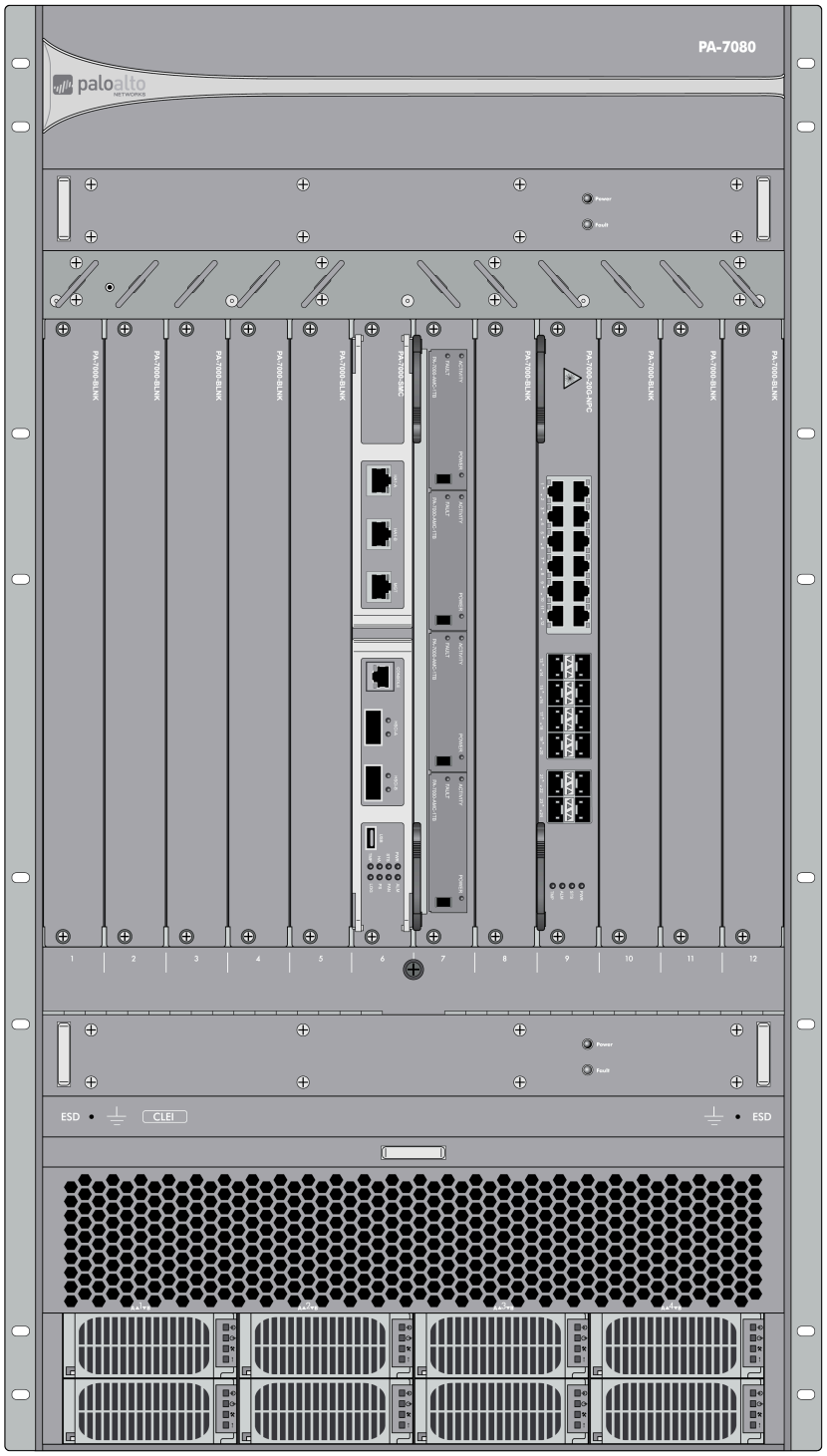
Item	Component	Description
1	Exhaust vent	Provides air circulation for chassis cooling. Do not obstruct this vent.

Item	Component	Description
2	Ground stud	Two-post stud used to ground the chassis to earth ground. Use the provided 6 AWG two#post ground lug to connect a grounded cable (not included) to the two#post stud.
3	Power Entry Module (PEM) AC power inlets	Connects the power source to the power supplies located on the front of the chassis. The front power supplies distribute power to all chassis components. The AC PEM contains four 20-amp AC power inlets—each accompanied by a switch—one pair, inlet with switch, for each power supply. If you are facing the back of the chassis, the inlet and switch on the far left side provides power to the power supply on the far right side when facing the front of the chassis. *The AC PEMs are not field-serviceable.*
4	Power Entry Module (PEM) AC power switches	Provides switches to power on or off the AC power supplies. Each switch has a circuit breaker that will trip if the load reaches 25-amps.

PA-7080 Front Panel (DC)

The following image shows the front panel of the PA-7080 firewall (with DC power supplies installed).

The only difference between the front panel of the AC model and the front panel of the DC model is that the DC model can hold up to eight DC power supplies instead of AC power supplies. For descriptions of the front panel components, see PA-7080 Front Panel (AC) and for information on connecting power, see Connect Power to a PA-7000 Series Firewall.

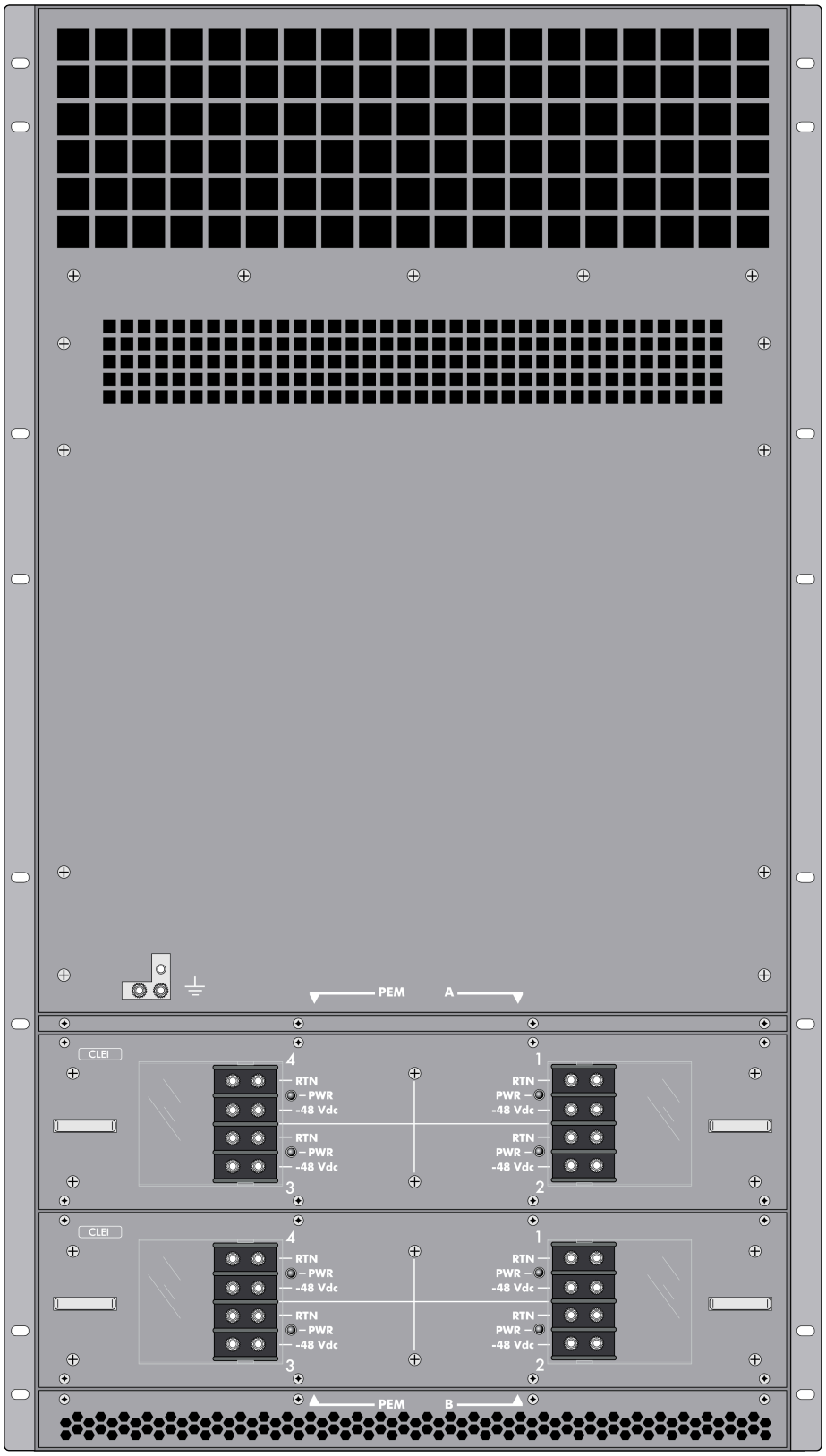


PA-7080 Back Panel (DC)

The following image shows the back panel of the PA-7080 firewall (with DC power supplies installed).

The only differences between the back panel AC model and the back panel DC model is that the DC model has two DC Power Entry Modules (PEMs) instead of two AC PEMs. Each DC PEM

contains two terminal strips, which connect eight wires (4 red positive and 4 black negative). The DC PEMs are field replaceable. For information on replacing a DC PEM, see Replace a PA-7080 DC PEM and for descriptions of the back panel components, see PA-7080 Back Panel (AC).



PA-7000 Series Firewall Module and Interface Card Information

The PA-7000 Series firewalls are modular systems and requires a minimum set of front slot cards. The required cards include the Switch Management Card (SMC), Log Processing Card (LPC) or Log Forwarding Card (LFC), and at least one Network Processing Card (NPC). To expand port density and throughput, you can install a total of six NPCs in the PA-7050 firewall and ten NPCs in the PA-7080 firewall. You can also optionally install Data Processing Cards (DPCs) to improve the processing power of the chassis. The PA-7050 supports up to five DPCs and the PA-7080 supports up to nine DPCs. For details on installing front slot cards, see Install the Mandatory PA-7000 Series Firewall Front Slot Cards.

Although all front slot cards have protection to prevent damage if they are installed or removed when the chassis is powered on, only the NPCs and DPCs are intended to be hot-swapped.

- PA-7000 Series Firewall Switch Management Cards (SMCs)
- PA-7000 Series Firewall Log Cards
- PA-7000 Series Firewall Network Processing Cards (NPCs)
- PA-7000 Series Firewall Data Processing Card (DPC)

PA-7000 Series Firewall Switch Management Cards (SMCs)

The PA-7000 Series Switch Management Card (SMC) provides: switch fabric management for the chassis, system management access, stores PAN-OS, the firewall configuration, and management logs. It also includes ports for high availability (HA) connectivity and LED indicators that provides status of the chassis components.

There are two SMC models: the first-generation SMC (PA-7050-SMC and PA-7080-SMC) and the second-generation SMC (PA-7050-SMC-B and PA-7080-SMC-B). The SMC is supported on PAN-OS versions up to PAN-OS 10.1. The SMC-B is supported on PAN-OS 9.0 and later versions. The second-generation SMC-B provides higher performance, a micro USB management port, redundant management ports, and redundant system drives.

The PA-7050 SMCs and PA-7080 SMCs are not interchangeable. Although the cards are similar, their back plane connectors and software are different. The hardware is also keyed in such a way that you cannot install a PA-7050 SMC in a PA-7080 firewall and vice versa.

A first-generation SMC (PA-7050-SMC or PA-7080-SMC) must be paired with a first-generation logging card (PA-7000-LPC). Similarly, a second-generation SMC (PA-7050-SMC-B or PA-7080-SMC-B) must be paired with a second-generation logging card (PA-7000-LFC-A).

When using PA-7000 Series firewalls in a High Availability (HA) pair, both firewalls must have SMCs of the same generation installed.

Use the following topics to learn about requirements, descriptions of the SMC components, and how to interpret the LEDs.

- PA-7000 Series Firewall SMC Component Descriptions
- PA-7000 Series Firewall SMC-B Component Descriptions
- PA-7000 Series Firewall Switch Management Card (SMC-B) Requirements
- Interpret the PA-7000 Series Firewall SMC LEDs

PA-7000 Series Firewall SMC Component Descriptions

The following images show the first-generation PA-7050 SMCs and the PA-7080 SMC and the tables describe each SMC component.

There are two versions of the first-generation PA-7050 Switch Management Card (SMC): version 1 and version 2.

Version 2 of the SMC is not the same as the second-generation SMC-B. See PA-7000 Series Firewall SMC-B Component Descriptions for details about the second-generation SMC-B.

The PA-7050 firewall must be running PAN-OS 6.1 or a later release to recognize a version 2 SMC. Physically, there are two differences between the versions: the version 2 SMC uses the same install and release levers as the LPC—version 1 does not; and the USB port is in a different location. There are no functional differences between the two versions.

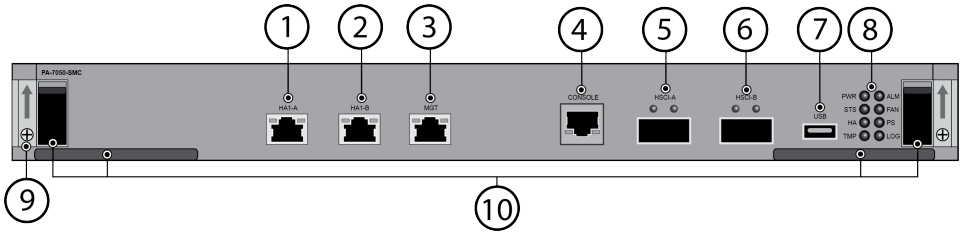


Figure 1: PA-7050 Version 1 SMC, First Generation

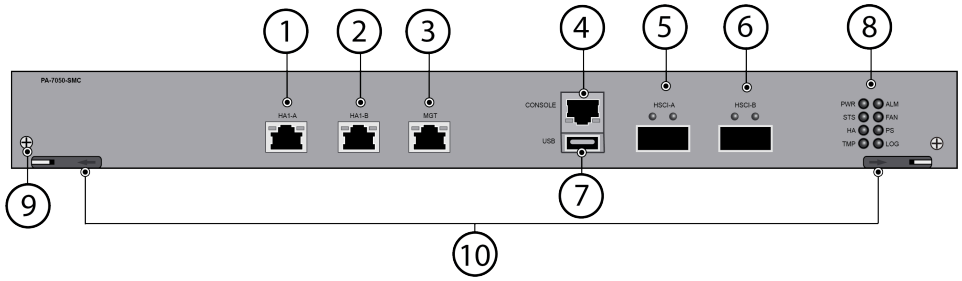


Figure 2: PA-7050 Version 2 SMC, First Generation

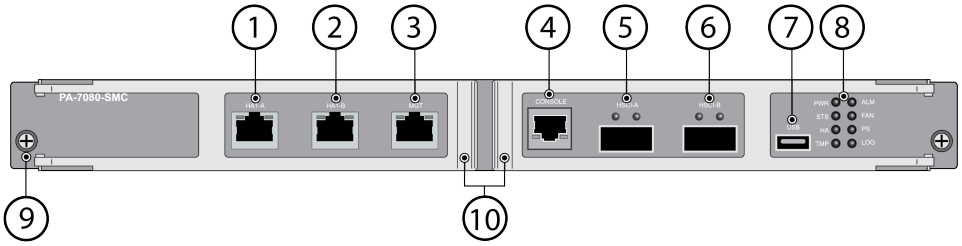


Figure 3: PA-7080 SMC, First Generation

Item	Component	Description
1	HA1-A	Ethernet 10/100/1000Mbps port for high availability (HA) control and synchronization. Connect this port directly from HA1-A port on the first firewall in an HA pair to the HA1-A port on the second firewall in the pair, or connect these two ports to each other through a switch or router. You cannot configure HA1 (control) on NPC data ports or the MGT port.
2	HA1-B	Ethernet 10/100/1000Mbps port for high availability (HA) control and synchronization. Use this port as a backup to HA1-A. Connect this port directly from HA1-B port on the first firewall in an HA pair to the HA1-B port

Item	Component	Description
		on the second firewall in the pair, or connect these two ports to each other through a switch or router. You cannot configure HA1 (control) on NPC data ports or the MGT port.
3	MGT	Ethernet 10/100/1000Mbps port used to access the management interface. To manage the firewall, change your management computer IP address to 192.168.1.2, connect an RJ-45 cable from your computer to the MGT port and browse to https:// 192.168.1.1. The default login name is admin and the default password is admin. *The Management port cannot be used to configure HA1 or HA1 backup. You must use the dedicated HA1-A and HA1-B ports.*
4	Console	Use this port to connect a management computer to the firewall using a 9-pin serial-to-RJ-45 cable and terminal emulation software. The console connection provides access to firewall boot messages, the Maintenance Recovery Tool (MRT), and the command line interface (CLI). *If your management computer does not have a serial port, use a USB-to-serial converter.* Use the following settings to configure your terminal emulation software to connect to the console port:Data rate: 9600Data bits: 8Parity: NoneStop bits: 1Flow control: None
5	HSCI-A (High Speed Chassis Interconnect)	Quad-SFP+ (QSFP+) interface used to connect two PA-7000 Series firewalls for a high availability (HA) configuration. Each port is comprised of four 10Gbps links internally for a combined speed of 40Gbps and is used for HA2 data link in an active/passive configuration. When in active/active mode, the port is also used for HA3 packet forwarding for asymmetrically routed sessions that require Layer 7 inspection for App-ID™ and Content#ID™. In a typical installation, HSCI-A on the first chassis connects directly to HSCI-A on the second chassis and HSCI-B on the first chassis connects to HSCI-B on the second chassis. This provides full 80Gbps transfer rates. In software, both ports (HSCI-A and HSCI-B) are treated as one HA interface.

Item	Component	Description
		The HSCI ports are not routable and must be connected directly to each other, not through a switch. You can configure HA2 (data link) on the HSCI ports or on NPC data ports. When configuring on dataplane ports, you must ensure that both the HA2 and HA2-Backup links are configured on dataplane interfaces. A mix of a dataplane port and an HSCI port for either HA2 or HA2-Backup will result in a commit failure.
6	HSCI-B (High Speed Chassis Interconnect)	See the HSCI-A description above for details. The purpose of HSCI-B is to increase the bandwidth for HA2/HA3 processing.
7	USB port	One USB port that accepts a USB flash drive that contains a bootstrap bundle (PAN-OS configuration) that enables you to bootstrap the firewall. Bootstrapping enables you to provision the firewall with a specific configuration, license it, and make it operational on the network. The firewall must have PAN-OS 7.1 or later installed to use this feature. Prior to PAN-OS 7.1, this port is disabled. For information on bootstrapping, refer to Bootstrap the Firewall in the PAN-OS® Administrator's Guide Version 7.1.
8	LED Indicators	Eight LEDs that indicate the status of various hardware components. For details on the LEDs, see Interpret the PA-7000 Series Firewall SMC LEDs.
9	Mounting Screws	One screw on each side of the SMC to secure the SMC to the chassis.
10	SMC installation and removal hardware	• PA-7050 SMC—Levers and lever release latches used to install and remove the SMC card. The lever release latch on each side slides upward to release the ejection lever. The version 2 SMC does not use lever release latches; instead, it uses the same double-lever style used on the Log Processing Card (LPC). After loosening the thumb screws, pull the inner lever toward you to unlock the outer lever from the chassis and then pull the outer lever toward you to release the card from the chassis. The left and right inner levers have micro-switches that power off the card when they are pulled. • PA-7080 SMC— Two levers used to install and remove the SMC.

PA-7000 Series Firewall SMC-B Component Descriptions

The following image shows the second-generation SMC (PA-7050 SMC-B and PA-7080 SMC-B), and the tables describe each SMC component.

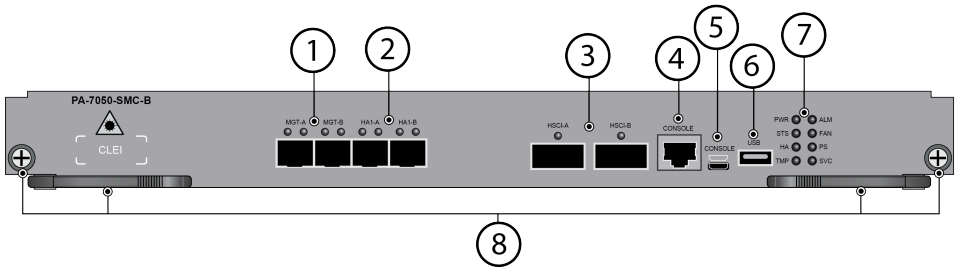


Figure 4: PA-7050-SMC-B

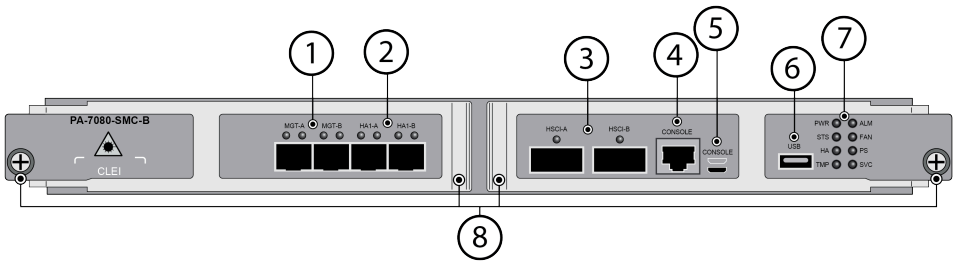


Figure 5: PA-7080-SMC-B

Item	Component	Description
1	MGT-A and MGT-B	Two redundant SFP/SFP+ Ethernet ports used to access the management interface. If both ports are connected, one port is primary and the other port is secondary. If a link failure occurs on the primary port, the firewall automatically fails over to the secondary port. Configure the ports in **Device** > **Setup** > **Interfaces**. To manage the firewall during the initial configuration, change your management computer IP address to 192.168.1.2, connect an RJ-45 cable from your computer to the MGT port and browse to https:// 192.168.1.1. The default login name is admin and the default password is admin.
2	HA1-A and HA1-B	Two enhanced SFP (SFP+) ports for high availability (HA) control and synchronization. Connect this port directly from HA1-A port on the first firewall in an HA pair to the HA1-A port on the second firewall in the pair, or connect these two ports to each other through a switch or router. You cannot configure HA1 (control) on NPC data ports or the MGT port.

Item	Component	Description
3	HSCI-A and HSCI-B (High Speed Chassis Interconnect)	Two 40Gbps QSFP+/100Gbps QSFP28 ports as defined by the IEEE 802.3ba standard. The link speed is based on the installed transceiver. Use this port to connect two PA-7000 Series firewalls in a high availability (HA) configuration as follows: • In an active/passive configuration, this port is for HA2 (data link). • In an active/active configuration, you can configure this port for HA2 and/or HA3. HA3 is used for packet forwarding for asymmetrically routed sessions that require Layer 7 inspection for App-ID™ and Content-ID™. *When configuring an HSCI port as HA2 and connecting both HSCI-A and HSCI-B ports between the firewalls in an HA configuration, the HA2 link will increase link speed and secure redundancy. In this case, you cannot configure an HSCI port as HA2-Backup as it will cause a commit failure.* *HA2 and HA2-Backup links can be configured to use a dataplane interface instead of the HSCI ports. However, if configured this way, both the HA2 and HA2-Backup links need to use dataplane interfaces. A mix of a dataplane port and an HSCI port for either HA2 or HA2-Backup will result in a commit failure.* *The HSCI ports must be connected directly between the two firewalls in the HA configuration (not between a network switch or router). When directly connecting two PA-7050 or PA-7080 firewalls, use either a 40Gbps QSFP+ Active Optical Cable (AOC) or a 100Gbps QSFP28 Active Optical Cable (AOC). For installations where the two firewalls are not near each other and you cannot use an AOC cable, use a standard 40Gbps or 100Gbps transceivers and the appropriate cable length.*
4	Console	Use this port to connect a management computer to the firewall using a 9-pin serial-to-RJ-45 cable and terminal emulation software.

Item	Component	Description
		The console connection provides access to firewall boot messages, the Maintenance Recovery Tool (MRT), and the command line interface (CLI). *If your management computer does not have a serial port, use a USB-to-serial converter.* Use the following settings to configure your terminal emulation software to connect to the console port:Data rate: 9600Data bits: 8Parity: NoneStop bits: 1Flow control: None
5	CONSOLE port (Micro USB)	Use this port to connect a management computer to the firewall using a standard Type-A USB-to-micro USB cable. The console connection provides access to firewall boot messages, the Maintenance Recovery Tool (MRT), and the command line interface (CLI). Refer to Micro USB Console Port for more information and to download the Windows driver or to learn how to connect from a Mac or Linux computer. *Ensure that you insert your micro-USB cable in the correct orientation to avoid damaging the connector. The image above the port shows the correct orientation.*
6	USB port	One USB port that accepts a USB flash drive that contains a bootstrap bundle (PAN-OS configuration) that enables you to bootstrap the firewall. Bootstrapping enables you to provision the firewall with a specific configuration, license it, and make it operational on the network. For information on bootstrapping, refer to Bootstrap the Firewall in the PAN-OS® Administrator's Guide.
7	LED Indicators	Eight LEDs that indicate the status of various hardware components. For details on the LEDs, see Interpret the PA-7000 Series Firewall SMC LEDs.
8	Mounting Screws	• PA-7050 SMC—Levers and lever release latches used to install and remove the SMC card. The lever release latch on each side slides upward to release the ejection lever. The version 2 SMC does not use lever release latches; instead, it uses the same double-lever style used on the Log Processing Card (LPC). After loosening the thumb

Item	Component	Description
		screws, pull the inner lever toward you to unlock the outer lever from the chassis and then pull the outer lever toward you to release the card from the chassis. The left and right inner levers have micro-switches that power off the card when they are pulled. • PA-7080 SMC— Two levers used to install and remove the SMC.

PA-7000 Series Firewall SMC-B Requirements

The following information describes the system and hardware requirements for the second-generation Switch Management Card (SMC-B).

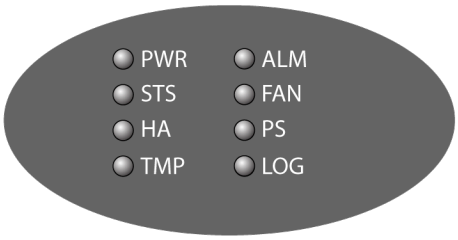
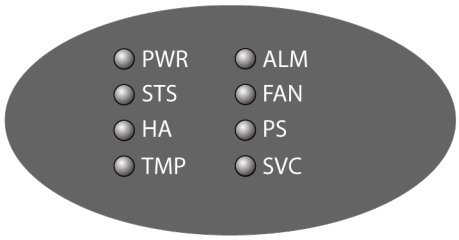
If you install the Switch Management Card (SMC-B), Log Forwarding Card (LFC), or PA-7000 100G NPC in a PA-7050 firewall, you must install the second-generation fan trays (PA-7050-FANTRAY-L-A and PA-7050-FANTRAY-R-A). If you install these cards in a PA-7080 firewall, you must also install the electromagnetic interference (EMI) filter. You do not have to install these components if the last five digits of the firewall serial number is 10,000 or greater because the PA-7050 will have the second-generation fan trays installed and the PA-7080 will have a built-in EMI filter.

The SMC-B is not compatible with the PA-7000 Log Processing Card (LPC) or any of the PA-7000 20G Network Processing Cards (NPCs). You must use a 100G NPC with the SMC-B.

- PAN-OS 9.0 or later.
- Install the PA-7000 Series Firewall Log Forwarding Card (LFC)
- (PA-7050 only) Install the second-generation fan tray to increase cooling capacity. The Replace a PA-7050 Fan Tray topic shows how to install a fan tray.
- (PA-7080 only) Install the PA-7080 Firewall EMI Filter to reduce electromagnetic interference.

Interpret the PA-7000 Series Firewall SMC LEDs

Use the following information to learn how to interpret the LED dashboard located on the first-generation and second-generation PA-7000 Series Firewall Switch Management Cards (SMCs). The only difference between the first-generation SMC and the second-generation SMC-B LEDs is that the LOG LED on the SMC-B is replaced with a service (SVC) LED.

First-Generation SMC (PA-7050-SMC and PA-7080-SMC)	Second-Generation SMC (PA-7050-SMC-B and PA-7080-SMC-B)
	

LED	State	Description
PWR (POWER)	Green	The chassis is powered.
	Off	The chassis power is off.
STS (STATUS)	Green	The chassis is operating normally.
	Yellow	The chassis is booting up.
HA	Green	The chassis is the current active firewall.
	Yellow	The chassis is the current passive firewall.
	Off	High availability (HA) is not enabled on this firewall.
		The above LED status descriptions are for an active/passive configuration. In an active/active configuration, the HA LED only indicates HA status for the local firewall and does not indicate HA connectivity of the peer. If HA is active on the given firewall the LED is green; if HA is not active the LED is off. See the ALM (Alarm) LED information in this table for information on how that LED changes if an HA issue occurs.
TMP (Temperature)	Green	The chassis temperature is normal.
	Yellow	The chassis temperature for one or more of the installed cards is outside the temperature tolerance.

LED	State	Description
ALM (Alarm)	Red	There is a hardware failure, which may include the following: • Voltage issue. • Power supply detected but not operational. • Fan failure. • Hard drive failure. • Temperature above high temperature threshold. You may also see varying behavior for the ALM LED in an HA configuration as follows: • If HA transitions into tentative or a non-functional state, the ALM LED turns red. • When the state returns to a functional state (any active or passive state) the LED turns off. • If you intentionally suspend HA, the LED will not turn red. • If the firewall is suspended due to a failure loop, the firewall will go into a suspended state to end the loop. In this case, the LED turns red.
	Off	The firewall is operating normally.
FAN	Green	The fan trays and all fans are operating normally.
	Red	One or more fans have failed on one or both of the fan trays. To determine which fan tray has a fan failure, check the fan tray LEDs.
PS (Power Supply)	Green	All power supplies (AC or DC) are operating normally.
	Red	One or more power supplies (AC or DC) has failed.
LOG (First-generation PA-7050-SMC and PA-7080-SMC only.)	Red	There is a drive failure on the LPC, temperature issue, or other issue with the Log Processing Card (LPC). To determine which drive has failed, check the LEDs on each disk drive AMC.
	Off	There are no alarms present on the Log Processing Card (LPC) and the card and drives are operating normally.
SVC (Second-generation PA-7050-SMC-B and	The service LED option allows a remote administrator to illuminate the SVC LED on a specific front-slot card so an on-site technician can locate the card.	

<table>
<tr><th>LED</th><th>State</th><th>Description</th></tr>
<tr><td>PA-7080-SMC-B.)</td><td colspan="2">Enter the following command to view the status of the SVC LED on all cards that have this LED:

<pre>admin@PA-7080> show system service-led status
Service LED
Slot   Description   Status
s1   empty   Off
s2   empty   Off
s3   PA-7000-100G-NPC Off
s4   empty   Off
s5   empty   Off
s6   PA-7080-SMC-B   On
s7   PA-7000-LFC   On
s8   empty   Off
s9   empty   Off
s10   empty   Off
s11   empty   Off
s12   empty   Off</pre></td></tr>
<tr><td rowspan="3">SVC (Continued)</td><td colspan="2">Enter the following command to view the status for a card in a specific slot:

<pre>admin@PA-7080> show system service-led status slot s3</pre>Enter the following command to enable all SVC LEDs:

<pre>admin@PA-7080>set system setting service-led enable yes</pre>Enter the following command to disable the SVC LED:

<pre>admin@PA-7080> set system setting service-led enable no</pre>Enter the following command to enable the SVC LED on the card in a specific slot:

<pre>admin@PA-7080> set system setting service-led enable slot s3 yes</pre></td></tr>
<tr><td>Off</td><td>LED is off.</td></tr>
<tr><td>On</td><td>LED is solid blue.</td></tr>
</table>

The following table describes the functions and states of the SMC MGT port LEDs.

LED	Description
Left	The LED is solid green if there is a network link.
Right	The LED blinks green if there is network activity.

The following table describes the functions and states of the SMC HA1-A and HA1-B port LEDs.

LED	Description
Left	The LED is solid green if there is a network link.
Right	The LED blinks green if there is network activity.

The following table describes the functions and states of the SMC HSCI-A and HSCI-B port LEDs.

LED	Description
Left	The LED is solid green if there is a network link. Because this interface is comprised of four 10Gbps links, the LED uses an AND operation for all four link states.
Right	The LED blinks green if there is network activity. Because this interface is comprised of four 10Gbps links, the LED uses an OR operation of all four activity states.

PA-7000 Series Firewall Log Cards

The PA-7000 Series firewalls support two log card models: the Log Processing Card (LPC) and the Log Forwarding Card (LFC). The difference between the LPC and the LFC is that the LPC stores logs locally and forward logs; the LFC is a high-speed forwarding card that forwards all dataplane logs to one or more external systems, such as Panorama or a syslog server.

A first-generation logging card (PA-7000-LPC) must be paired with a first-generation switch management card (PA-7050-SMC or PA-7080-SMC). Similarly, a second-generation logging card (PA-7000-LFC-A) must be paired with a second-generation switch management card (PA-7050-SMC-B or PA-7080-SMC-B).

- PA-7000 Series Firewall Log Processing Card (LPC)
- PA-7000 Series Firewall Log Forwarding Card (LFC)

PA-7000 Series Firewall Log Processing Card (LPC)

The Log Processing Card (LPC) is a dedicated log card (similar to the LFC) that performs all logging functions and local log storage for the dataplane logs. You can also configure the firewall to forward logs from the LPC to an external log collection system that you define. The LPC contains four disk drives used to store dataplane logs. The disk drives are contained in Advanced Mezzanine Cards (AMCs) that enables you to hot-swap a drive if it fails. The management logs (**Configuration**, **System**, and **Alarms**) are stored on an internal SSD located on the SMC.

There is one LPC model used for both the PA-7050 and PA-7080 firewalls and there is no special configuration required for the firewall to use the LPC for logging.

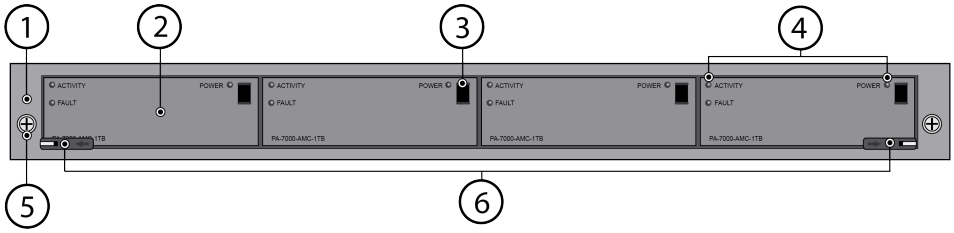
On the PA-7050 firewall, you must install the LPC in slot 8 and on the PA-7080 firewall you must install the LPC in slot 7. The LPC with at least one formatted drive must be installed for chassis operation. During normal operation, all four drives should be installed in two RAID 1 pairs for redundancy.

The LPC is only compatible with a first-generation SMC (Switch Management Card).

- PA-7000 Series Firewall LPC and AMC Component Descriptions
- Interpret the PA-7000 Series Firewall AMC LEDs

PA-7000 Series Firewall LPC and AMC Component Descriptions

The following image shows the Log Processing Card (LPC) and Advanced Mezzanine Cards (AMCs) and the table describes each component.



Item	Component	Description
1	LPC	Log Processing Card (LPC) that processes all logs and then stores the logs on the four Advanced Mezzanine Cards (AMCs) that contain one disk drive each.
2	AMC	Four Advanced Mezzanine Cards (AMCs) and drives used for log storage. The AMC is a Printed Circuit Board (PCB) card that houses a disk drive and connects the drive to the LPC. Each AMC contains one 1TB or 2TB 2.5" SATA disk drive. The first two drives on the left (A1 and A2) are in a RAID 1 pair and the next two drives on the right (B1 and B2) are also configured in a RAID 1 pair. If the AMCs contain 1TB drives the total log storage capacity is 2TBs; if the AMCs contain 2TB drives the total capacity is 4TBs. You can upgrade the 1TB drives to 2TB drives as described in Increase Log Storage Capacity on a PA-7000 Series Firewall. To learn how to replace a failed drive, see Replace a PA-7000 Series Firewall LPC Drive.
3	Advanced Mezzanine Card (AMC) release handle.	Handle used to remove the AMC and disk drive from the LPC card. Pull the handle toward you to unlock and remove the AMC. After installing an AMC into the LPC, push the handle in to lock the AMC to the LPC.
4	AMC (disk drive) LED panel	Three LEDs that indicate drive activity, drive failure, and drive power. Top left is activity, bottom left is fault, and top right is power.
5	Mounting Screws	One screw on each side of the LPC that you use to secure the LPC to the chassis.
6	LPC installation and removal hardware	Release levers and screws that you use to install and remove the LPC card. The LPC uses a double-lever on each side of the card. After loosening the thumb screws, you must pull the inner lever toward you to unlock the outer lever from the chassis and then pull the outer lever toward you to release the card from the chassis. When installing the card, push the outer lever in to lock the inner lever. *The left and right inner levers have micro-switches that power off the card when the levers are pulled to release the outer levers.*

Interpret the PA-7000 Series Firewall AMC LEDs

Use the following information to learn how to interpret the LED dashboard located on the front of the AMC. The Log Processing Card (LPC) does not have LEDs. If there is a hardware issue with the LPC, the LOG LED on the Switch Management Card (SMC) changes to red and the firewall generates a system log.

LED	State	Description
Activity	Green	The LED blinks green when there is drive activity.
	Off	The LED is off if there is no activity.
Fault	Red	The LED is red if a drive is missing or faulty.
	Off	The LED is off during normal operation.
POWER	Green	The LED is green if the drive is powered.
	Off	The LED is off if the drive is not receiving power.

PA-7000 Series Firewall Log Forwarding Card (LFC)

The Log Forwarding Card (LFC) is a high-performance log card that forwards all dataplane logs (traffic and threat for example) from the firewall to one or more external logging systems, such as Panorama or a syslog server. Because the dataplane logs are no longer available on the local firewall, the **ACC** tab is removed from the management web interface and **Monitor > Logs** contain only management logs (**Configuration**, **System**, and **Alarms**).

There is one LFC model used for both the PA-7050 and PA-7080 firewalls. On the PA-7050 firewall, you must install the LFC in slot 8 and on the PA-7080 firewall you must install the LFC in slot 7.

The LFC is only compatible with the SMC-B. When installing an LFC, you must replace the SMC with a SMC-B.

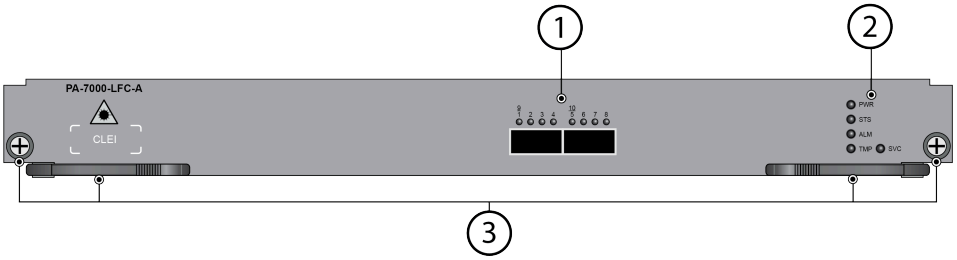
The LFC does not support log forwarding on subinterfaces.

Use the following topics to learn about system and hardware requirements, descriptions of the LFC components, and how to interpret the LEDs.

- PA-7000 Series Firewall LFC Component Descriptions
- Interpret the PA-7000 Series LFC LEDs
- PA-7000 Series Firewall LFC Requirements

PA-7000 Series Firewall LFC Component Descriptions

The following image shows the Log Forwarding Card (LFC) and the table describes each LFC component.

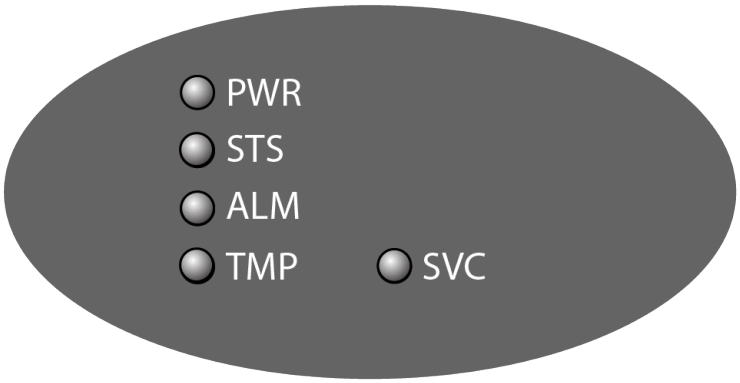


Item	Component	Description
1	QSFP+ ports	Two quad small form-factor pluggable (QSFP+) 10Gbps/40Gbps Ethernet interfaces as defined by the IEEE 802.3ba standard. The two physical QSFP+ interfaces operate at 40Gbps each. The firewall uses the ports to forward all dataplane logs to an external system, such as Panorama, Firewall Data Lake, or a syslog server. Configure the ports in **Device** > **Log Forwarding Card**. **PAN-OS 10.0 and later:** To breakout the two interfaces into individual 10G ports, you must configure the LFC as lfc1/1 and use the PAN-QSFP-40GBASE-SR4. Lfc1/1 auto-configures ports 1-4 in the first interface and auto-configures ports 5-8 in the second interface for up to eight usable 10G ports. You can use any number of the eight ports for your configuration. If four ports (one ethernet interface) is used, the LFC provides a maximum transfer rate of 40Gbps. If all eight ports (both ethernet interfaces) are used, then the LFC provides a maximum transfer rate of 80Gbps. *To properly breakout the QSFP+ ports, you must use the PAN-QSFP-40GBASE-SR4 transceiver and an appropriate passive breakout cable.* When not using a breakout deployment, you must configure the LFC as lfc1/9. Lfc1/9 auto-configures port 9 in the first interface and auto-configures port 10 in the second interface for up to two usable 40G ports. You can use one or both interfaces to provide up to 40G or 80G connectivity in this way.

Item	Component	Description
		In both of the above deployments, the linked device must be set to use LAG for all ports attached to the LFC. The LFC does not currently support LACP. Ports 1 and 9 share the same LED and ports 5 and 10 share the same LED. Port transfer rate is differentiated by color. Green indicates 10Gbps and yellow indicates 40Gbps. **PAN-OS 9.1 and earlier:** You can only use ports 1 or 9 in PAN-OS versions 9.1 and prior. Ports 2-8 and 10 are not available. Configuring the LFC as lfc1/1 operates the first interface as port 1 at 10G (Green LED). Configuring the LFC as lfc1/9 operates the first interface as port 9 at 40G (Yellow LED). The second interface is not used in either configuration. The LFC does not support LAG and LACP.
2	LED dashboard	Five LEDs that provide LFC status. For details on the LEDs, see Interpret the PA-7000 Series Firewall Log Forwarding Card (LFC) LEDs.
3	LFC installation and removal hardware	Screws and levers used to install and remove the LFC. There are thumb screws and double lever release latches on each side of the card. Each inner ever contains a micro-switch and when you simultaneously pull both inner levers outward to release the outer ejector

Interpret the PA-7000 Series LFC LEDs

Use the following information to learn how to interpret the LED dashboard and port LEDs located on the Log Forwarding Card (LFC).



LED	State	Description
PWR (POWER)	Green	The LFC is powered.
	Off	The LFC power is off.
STS (STATUS)	Green	The LFC is operating normally.
	Yellow	The LFC is booting up.
ALM (Alarm)	Red	There is a hardware failure, which may include the following: • Voltage issue. • Power supply detected but not operational. • Fan failure. • Hard drive failure. • Temperature above high temperature threshold. You may also see varying behavior for the ALM LED in an HA configuration as follows: • If HA transitions into tentative or a non-functional state, the ALM LED turns red. • When the state returns to a functional state (any active or passive state) the LED turns off. • If you intentionally suspend HA, the LED will not turn red. • If the firewall is suspended due to a failure loop, the firewall will go into a suspended state to end the loop. In this case, the LED turns red.
	Green	The chassis temperature is normal.
TMP (Temperature)	Yellow	The LFC temperature is outside the temperature tolerance.
	Off	The LFC is operating normally.

SVC (Service)	Allows a remote administrator to illuminate the SVC LED on a specific front-slot card so an on-site technician can locate the card.
	Enter the following command to view the status of the SVC LED on all cards that have this LED:
	`admin@PA-7080> show system service-led status`
	`Service LED`
	`Slot  Description  Status`	

LED	State	Description
	s1 empty Off s2 empty Off s3 PA-7000-100G-NPC Off s4 empty Off s5 empty Off s6 PA-7080-SMC-B On s7 PA-7000-LFC On s8 empty Off s9 empty Off s10 empty Off s11 empty Off s12 empty Off	

SVC (Continued)	Enter the following command to view the status for a card in a specific slot:
	`admin@PA-7080> show system service-led status slot s3`
	Enter the following command to enable all SVC LEDs:
	`admin@PA-7080>set system setting service-led enable yes`
	Enter the following command to disable the SVC LED:
	`admin@PA-7080> set system setting service-led enable no`
	Enter the following command to enable the SVC LED on the card in a specific slot:
	`admin@PA-7080> set system setting service-led enable slot s3 yes`	

	Off	LED is off.
	On	LED is solid blue.

The following table describes functions and states of the QSFP port LEDs.

As of PAN-OS 9.0, a single port is supported on the LFC QSFP ports. You can configure port 1 at 10Gbps or port 9 at 40Gbps. Ports 2-8 are not supported.

LED	Description
QSFP LEDs	These LEDs indicate link and activity. The color of the LED indicates the port speed. • **Green**—The port is operating at 10Gbps • **Yellow**—The port is operating at 40Gbps

To learn about the orientation of the LED indicators, see Identify PA-7000 Series NPC Port Activity and Link LEDs.

PA-7000 Series Firewall LFC Requirements

The following information describes the system and hardware requirements for upgrading to the Log Forwarding Card (LFC).

If you install the Switch Management Card (SMC-B), Log Forwarding Card (LFC), or PA-7000 100G NPC in a PA-7050 firewall, you must install the second-generation fan trays (PA-7050-FANTRAY-L-A and PA-7050-FANTRAY-R-A). If you install these cards in a PA-7080 firewall, you must also install the electromagnetic interference (EMI) filter. You do not have to install these components if the last five digits of the firewall serial number is 10,000 or greater because the PA-7050 will have the second-generation fan trays installed and the PA-7080 will have a built-in EMI filter.

- PAN-OS 9.0 or later.
- Remove the Log Processing Card (LPC) before you install the Log Forwarding Card (LFC).
- (PA-7050 only) Install the second-generation fan tray to increase cooling capacity. The Replace a PA-7050 Fan Tray topic shows how to install a fan tray.
- Replace the first-generation SMC (PA-7050-SMC or PA-7080-SMC) with the second-generation SMC (PA-7050-SMC-B or PA-7080-SMC-B).

  The LFC is only compatible with the SMC-B.

- (PA-7080 only) Install the PA-7080 Firewall EMI Filter to reduce electromagnetic interference.

PA-7000 Series Firewall Network Processing Cards (NPCs)

Network Processing Cards (NPCs) provide network connectivity for a PA-7000 Series firewall. To scale performance and capacity, you can install up to six NPCs in a PA-7050 firewall and up to ten NPCs in a PA-7080 firewall. If you plan on fully populating a PA-7000 Series firewall with NPCs, see Determine PA-7000 Series Firewall Power Configuration Requirements to ensure that you provide enough power to the firewall.

When viewing the NPCs from the web interface, the NPCs are organized by slot and you click the icon to the left of the slot number to show the NPC ports. The port numbering designation is Ethernet, followed by slot/port such as ethernet<slot>/<port>, where slot is the physical slot the card is installed in and the port is the interface port number. For example, the first Ethernet port on an NPC installed in slot 1 shows ethernet1/1 and port 2 shows ethernet1/2. The first port on an NPC installed in slot 2 shows ethernet2/1 and port 2 shows ethernet2/2. For information on installing the NPCs, see Replace a PA-7000 Series Network Processing Card (NPC).

On the PA-7050 firewall, you install NPCs in slots 1, 2, 3, 5, 6, and 7 and on the PA-7080 firewall, you install NPCs in slots 1, 2, 3, 4, 5, 8, 9, 10, 11, and 12.

You must install at least one NPC to enable the firewall to process network traffic.

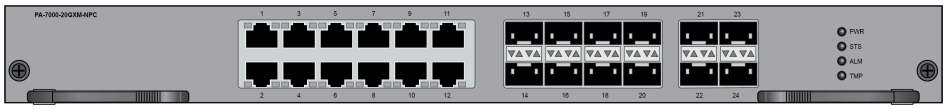
The following NPCs can be installed in a PA-7000 Series firewall:

- PA-7000 20GXM NPC
- PA-7000 20GQXM NPC
- PA-7000 100G NPC
- Identify PA-7000 Series NPC Port Activity and Link LEDs

PA-7000 20GXM NPC

The PA-7000 20GXM NPC supports up to 8 million sessions.

The PA-7000 Series firewall must have PAN-OS 7.1 or later installed to use the PA-7000-20GXM-NPC.



PA-7000 20GQXM NPC

The PA-7000 20GQXM NPC supports up to 8 million sessions.

The PA-7000 Series firewall must have PAN-OS 7.1 or later installed to use the PA-7000-20GQXM-NPC.

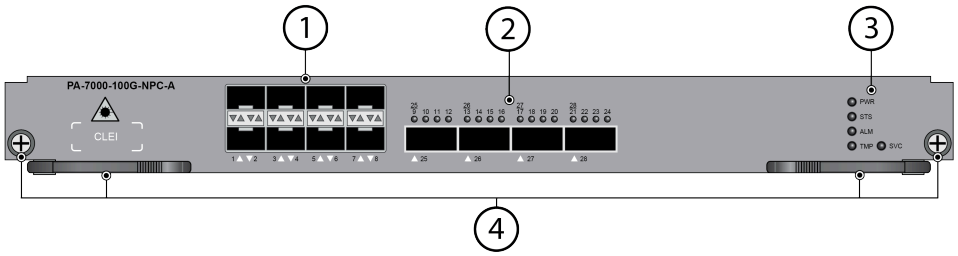
PA-7000 100G NPC

The PA-7000 100G NPC provides 100Gbps Ethernet connectivity. Use the following topics to learn about requirements, descriptions of the NPC components, and how to interpret the LEDs.

- PA-7000 100G NPC Component Descriptions
- Interpret the PA-7000 100G NPC LEDs
- PA-7000 100G NPC Requirements

PA-7000 100G NPC Component Descriptions

The following images show the PA-7000 100G NPCs and the table describes the NPC components.



Item	Component	Description
1	SFP ports	Eight small form-factor pluggable (SFP/SFP+) 1Gbps/10Gbps Ethernet ports.
2	QSFP ports	Four quad small form-factor pluggable (QSFP+/QSFP28) 40Gbps/100Gbps Ethernet ports as defined by the IEEE 802.3ba standard. You can configure ports 25, 26, 27, and 28 as 40Gbps or 100Gbps. As of PAN-OS 10.0, you can breakout four ports from ports 9-24 at 10Gbps or 25Gbps each. *To properly breakout the QSFP ports, your transceiver must be either the PAN-QSFP-40GBASE-SR4 or PAN-QSFP28-100GBASE-SR4, and you must use an appropriate passive breakout cable.*
2	LED dashboard	Five LEDs that provide NPC status. For details on the LEDs, see Interpret the PA-7000 100G NPC LEDs.

Item	Component	Description
4	NPC installation and removal hardware	Screws and levers used to install and remove the NPC. There are thumb screws and double levers release latches on each side of the card. Each inner lever contains a micro-switch and when you simultaneously pull both inner levers outward to release the outer ejector

Interpret the PA-7000 100G NPC LEDs

Use the following information to learn how to interpret the LED dashboard and port LEDs on the PA-7000 100G Network Processing Card (NPC).

The following table describes the functions and states of the NPC LED dashboard.

LED	State	Description
PWR	Green	The card is powered on.
	Off	The card is powered off.
STS (STATUS)	Green	The card is operating normally.
	Yellow	The card is booting up.
ALM (Alarm)	Red	The card hardware failed.
	Off	The card is operating normally.
TMP (Temperature)	Green	The card temperature is normal.
	Yellow	The card temperature is outside the temperature tolerance.
SVC (Service)	Allows a remote administrator to illuminate the SVC LED on a specific front-slot card so an on-site technician can locate the card. Enter the following command to view the status of the SVC LED on all cards that have this LED:	

<table>
<tr><th>LED</th><th>State</th><th>Description</th></tr>
<tr><td></td><td colspan="2">

```
admin@PA-7080> show system service-led status
Service LED
Slot    Description       Status
s1      empty             Off
s2      empty             Off
s3      PA-7000-100G-NPC  Off
s4      empty             Off
s5      empty             Off
s6      PA-7080-SMC-B     On
s7      PA-7000-LFC       On
s8      empty             Off
s9      empty             Off
s10     empty             Off
s11     empty             Off
s12     empty             Off
```

</td></tr>
<tr><td>SVC (Continued)</td><td colspan="2">
Enter the following command to view the status for a card in a specific slot:

```
admin@PA-7080> show system service-led status slot s3
```

Enter the following command to enable all SVC LEDs:

```
admin@PA-7080>set system setting service-led enable yes
```

Enter the following command to disable the SVC LED:

```
admin@PA-7080> set system setting service-led enable no
```

Enter the following command to enable the SVC LED on the card in a specific slot:

```
admin@PA-7080> set system setting service-led enable slo
t s3 yes
```

<table>
<tr><td>Off</td><td>LED is off.</td></tr>
<tr><td>On</td><td>LED is solid blue.</td></tr>
</table>
</td></tr>
</table>

The following table describes functions and states of the SFP+ port LEDs.

LED	Description
Left	The LED shows green if there is a network link.

LED	Description
Right	Blinks green or stays green if there is network activity.

The following table describes functions and states of the QSFP28 port LEDs. The LEDs are tri-color and the color indicates link and the current port speed. The LED blinks continuously as long as there is network activity.

As of PAN-OS 9.0, only the first LED on a port illuminates. For example, if port 25 is connected at 100Gbps, LED 9 illuminates blue.

Interface Speed	Green LED	Blue LED	Yellow LED
10Gbps	On	Off	Off
25Gbps	On	On	Off
40Gbps	Off	Off	On
100Gbps	Off	On	Off

PA-7000 100G NPC Requirements

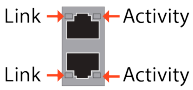
The following information describes the system and hardware requirements for the PA-7000 100G Network Processing Card (NPC).

If you install the Switch Management Card (SMC-B), Log Forwarding Card (LFC), or PA-7000 100G NPC in a PA-7050 firewall, you must install the second-generation fan trays (PA-7050-FANTRAY-L-A and PA-7050-FANTRAY-R-A). If you install these cards in a PA-7080 firewall, you must install the electromagnetic interference (EMI) filter. You do not have to install these components if the last five digits of the firewall serial number is 10,000 or greater because the PA-7050 will have the second-generation fan trays installed and the PA-7080 will have a built-in EMI filter.

- PAN-OS 9.0 or later.
- (PA-7050 only) Install the second-generation fan tray (PA-7050-FANTRAY-L-A and PA-7050-FANTRAY-R-A) to increase cooling capacity. The Replace a PA-7050 Fan Tray topic shows how to remove and install a fan tray.
- (PA-7080 only) Install the PA-7080 Firewall EMI Filter to reduce electromagnetic interference.

Identify PA-7000 Series NPC Port Activity and Link LEDs

The following image shows how to identify the activity and link LEDs for the port types available on PA-7000 Series firewall NPCs. The image shows the port orientation if the NPC is in a horizontal position. For details on the functions and states of the LEDS, see PA-7000 Series Firewall Network Processing Cards (NPCs) for the NPC that you are using.



(RJ-45)

(QSFP+)

(SFP/SFP+)

PA-7000 Series Firewall Data Processing Card (DPC)

The PA-7000 Series Data Processing Card (PA-7000-DPC-A) is an optional interface card that can be installed to improve the processing capacity of the chassis. Similar in physical design to the PA-7000 100G NPC, the DPC offers scalability in the form of four additional data plane instances. As opposed to the PA-7000 100G NPC, the DPC does not have a network processor or a physical I/O; therefore, your firewall must have at least one or more PA-7000 Series Firewall Network Processing Cards (NPCs).

To install and enable a DPC in your chassis, your firewall must be on PAN-OS 10.0 or later. On the PA-7050 firewall, you can install DPCs in slots 1, 2, 3, 5, 6, or 7 and on the PA-7080 firewall, you can install DPCs in slots 1, 2, 3, 4, 5, 8, 9, 10, 11, or 12. Furthermore, because the DPC has no front panel ports, you must change the firewall's session distribution policy from the default (ingress-slot).

*It is recommended that you change the session distribution policy to **session-load** when installing the DPC.*

The DPC is compatible with all PA-7050 and PA-7080 hardware, with the exception of the old PA-7050 fan tray. You must use the updated fan tray models (PA-7050-FANTRAY-L-A and PA-7050-FANTRAY-R-A, as well as the air filter, PA-7050-FLTR-A) to use the DPC.

To discern which generation fan trays your PA-7050 has, check the firewall serial number. If the last five digits of the serial number are numerically greater than 10,000, the PA-7050 was manufactured with the new fan trays and is compatible with the DPC. If the last five digits of the firewall serial number are numerically less than 10,000, then the PA-7050 was manufactured with the old fan trays. Pull the fan trays out to verify. If your PA-7050 has the old fan trays, you must Replace a PA-7050 Fan Tray in order to ensure full compatibility between the chassis and the DPC.

See the following topic to learn how to interpret the DPC LEDs.

- Interpret the PA-7000 Series DPC LEDS

Interpret the PA-7000 Series DPC LEDS

Use the following information to learn how to interpret the LED dashboard and port LEDs on the PA-7000 Data Processing Card (DPC).

The following table describes the functions and states of the DPC LED dashboard.

LED	State	Description
PWR	Green	The card is powered on.
	Off	The card is powered off.
STS (STATUS)	Green	The card is operating normally.

<table>
<tr><th>LED</th><th>State</th><th>Description</th></tr>
<tr><td></td><td>Yellow</td><td>The card is booting up.</td></tr>
<tr><td rowspan="2">ALM
(Alarm)</td><td>Red</td><td>The card hardware failed.</td></tr>
<tr><td>Off</td><td>The card is operating normally.</td></tr>
<tr><td rowspan="2">TMP
(Temperature)</td><td>Green</td><td>The card temperature is normal.</td></tr>
<tr><td>Yellow</td><td>The card temperature is outside the temperature tolerance.</td></tr>
<tr><td>SVC
(Service)</td><td colspan="2">Allows a remote administrator to illuminate the SVC LED on a specific front-slot card so an on-site technician can locate the card.

Enter the following command to view the status of the SVC LED on all cards that have this LED:

<pre>admin@PA-7080> show system service-led status
Service LED
Slot   Description   Status
s1   empty   Off
s2   empty   Off
s3   PA-7000-100G-NPC Off
s4   empty   Off
s5   empty   Off
s6   PA-7080-SMC-B   On
s7   PA-7000-LFC   On
s8   empty   Off
s9   empty   Off
s10   empty   Off
s11   empty   Off
s12   empty   Off</pre></td></tr>
<tr><td>SVC
(Continued)</td><td colspan="2">Enter the following command to view the status for a card in a specific slot:

<pre>admin@PA-7080> show system service-led status slot s3</pre>
Enter the following command to enable all SVC LEDs:

<pre>admin@PA-7080>set system setting service-led enable yes</pre>
Enter the following command to disable the SVC LED:

<pre>admin@PA-7080> set system setting service-led enable no</pre>
Enter the following command to enable the SVC LED on the card in a specific slot:</td></tr>
</table>

LED	State	Description
	`admin@PA-7080> set system setting service-led enable slot s3 yes`	
	Off	LED is off.
	On	LED is solid blue.

PA-7000 Series Firewall Installation

The PA-7000 Series firewalls are modular systems that require you to install several components, such as network cards, during the installation process. Due to the weight of the firewalls, we recommend that you first install the firewall chassis into the rack and then install the front slot cards. After the firewall is installed in the rack (with all components installed), connect power, verify that the front slot cards are functioning, and then connect network and management cables.

Read Before You Begin before starting the installation.

- PA-7000 Series Firewall Equipment Rack Installation
- Install the Mandatory PA-7000 Series Firewall Front Slot Cards
- Connect Power to a PA-7000 Series Firewall
- Verify the PA-7000 Series Firewall LPC and NPC Configuration
- Connect Cables to a PA-7000 Series Firewall
- Install the PA-7080 Firewall EMI Filter

PA-7000 Series Firewall Equipment Rack Installation

PA-7000 Series firewalls are designed for installation in a standard 19-inch equipment rack in a mid-mount or front-mount position. Before you install the hardware, read PA-7000 Series Firewall Rack Install Safety Information.

- Install the PA-7050 Firewall in the Mid-Mount Position
- Install the PA-7050 Firewall in the Front-Mount Position
- Install the PA-7080 Firewall in the Mid-Mount Position
- Install the PA-7080 Firewall in the Front-Mount Position

PA-7000 Series Firewall Rack Install Safety Information

Read the following information before you proceed with a PA-7000 Series Firewall Equipment Rack Installation.

- Elevated ambient operating temperature—If the PA-7000 Series firewall is installed in a closed or multi-unit rack assembly, the ambient operating temperature of the rack environment may be greater than the ambient room temperature. Verify that the ambient temperature of the rack assembly does not exceed the maximum rated ambient temperature requirements listed in PA-7000 Series Firewall Environmental Specifications.
- Reduced airflow—Ensure that the airflow required for safe operation is not compromised by the rack installation.
- Mechanical loading—Ensure that the rack-mounted firewall does not cause hazardous conditions due to uneven mechanical loading.
- Circuit overloading—Ensure that the circuit that supplies power to the firewall is sufficiently rated to avoid circuit overloading or excess load on supply wiring. See PA-7000 Series Firewall Electrical Specifications.
- Reliable earthing—Maintain reliable earthing of rack-mounted equipment. Pay special attention to power connections other than direct connections to the branch circuit (such as use of power strips or extension cords) to ensure that the firewall does not exceed power ratings for connected hardware.

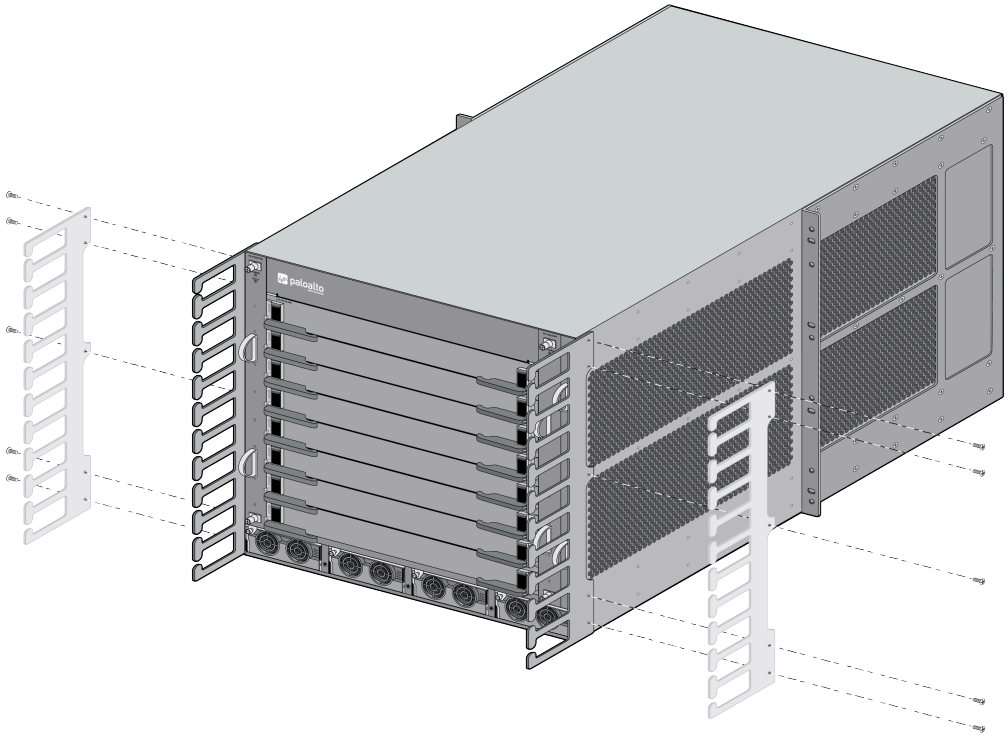
Install the PA-7050 Firewall in the Mid-Mount Position

The following procedure describes how to install the PA-7050 firewall in a mid-mount position.

The PA-7050 chassis and the front slot cards (SMC, LPC or LFC, NPC) ship in separate boxes and it is recommended that you install the cards after you rack-mount the chassis. This will prevent any damage to the cards that could occur during rack mounting and will reduce the chassis weight. To further reduce the chassis weight, remove the fan trays and front power supplies.

STEP 1 | Read PA-7000 Series Firewall Rack Install Safety Information.

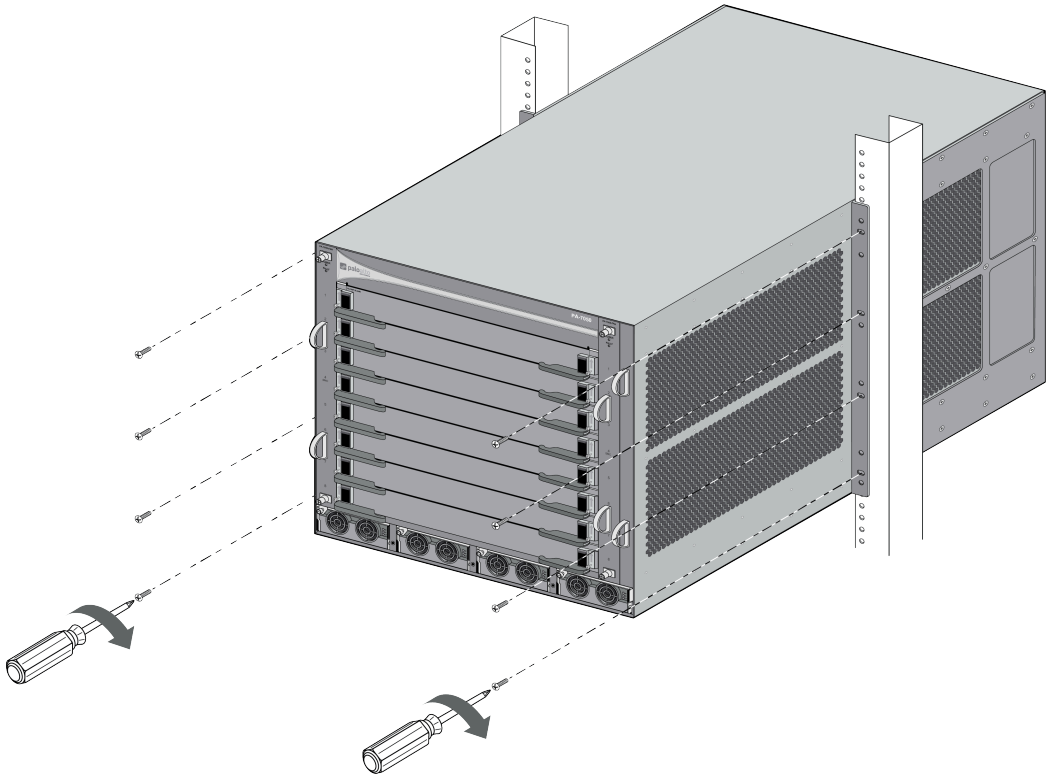
STEP 2 | (Optional) Install the mid-mount cable management brackets using the fives screws included with the bracket.



STEP 3 | Position the chassis into the rack using two or more people and if available, use a mechanical equipment lift.

STEP 4 | Align the rack-mount bracket mounting holes on each side of the chassis with the holes on the rack rail, ensuring that the chassis is level.

STEP 5 | Attach the rack-mount brackets to the rack using rack-mount screws (not provided) and tighten with a screwdriver. Install four screws on each side of the chassis.



Install the PA-7050 Firewall in the Front-Mount Position

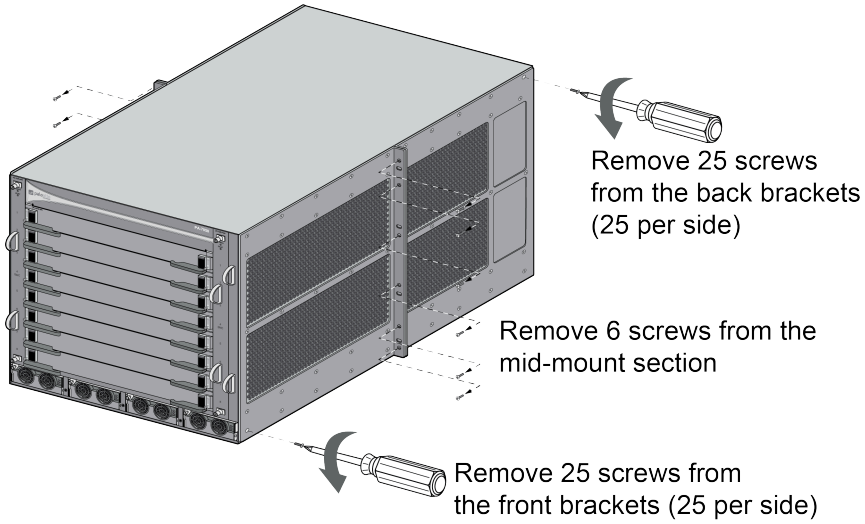
The following procedures describe how to install the PA-7050 firewall in a front-mount position. The chassis ships with the rack-mount brackets in the mid-mount position, so you will need to move the brackets to the front-mount position as described.

The PA-7050 chassis and the front slot cards (SMC, LPC or LFC, NPC) ship in separate boxes and it is recommended that you install the cards after you rack-mount the chassis. This will prevent any damage to the cards that could occur during rack mounting and will reduce the chassis weight. To further reduce the chassis weight, remove the fan trays and front power supplies.

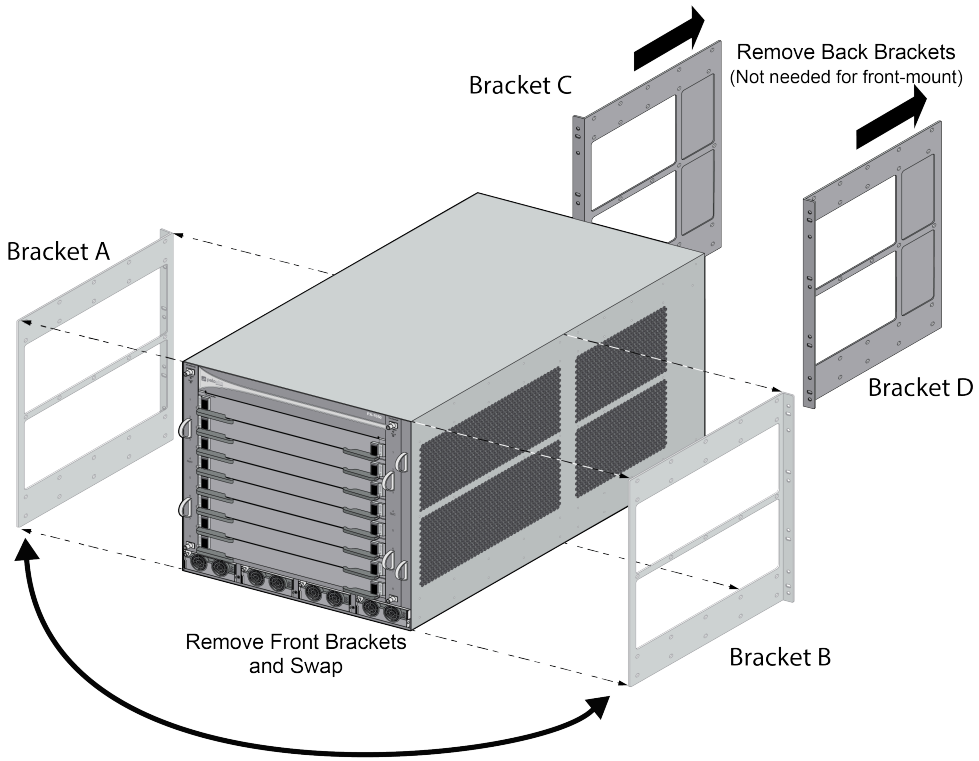
STEP 1 | Read PA-7000 Series Firewall Rack Install Safety Information.

STEP 2 | Move the brackets from the mid-mount position to the front-mount position. The brackets are in two sections on each side of the chassis (the front section and the back section).

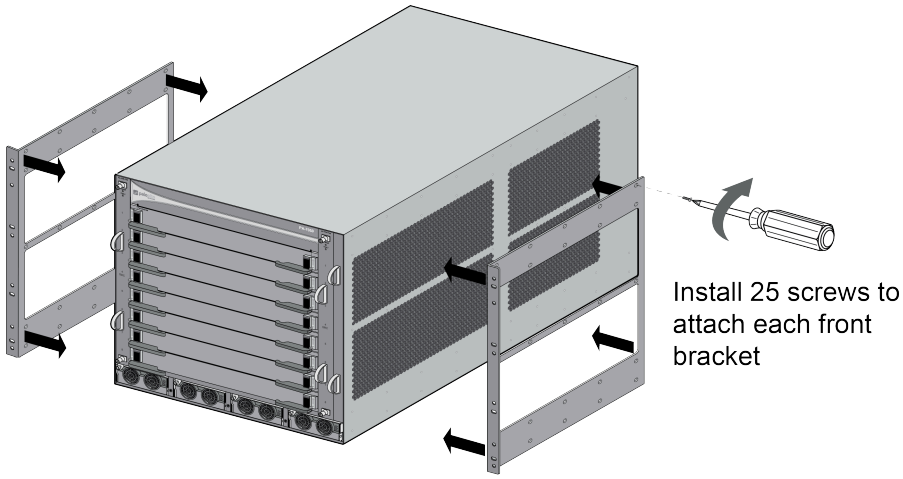
Remove the six screws on each side of the chassis where the two brackets come together in the mid-mount position and then remove 25 screws to remove each of the four brackets (two brackets on each side). There is a total of 112 bracket screws (56 on each side).



Remove the front brackets (A and B) and back brackets (C and D) from the chassis. The back brackets (C and D) are not needed in this configuration.

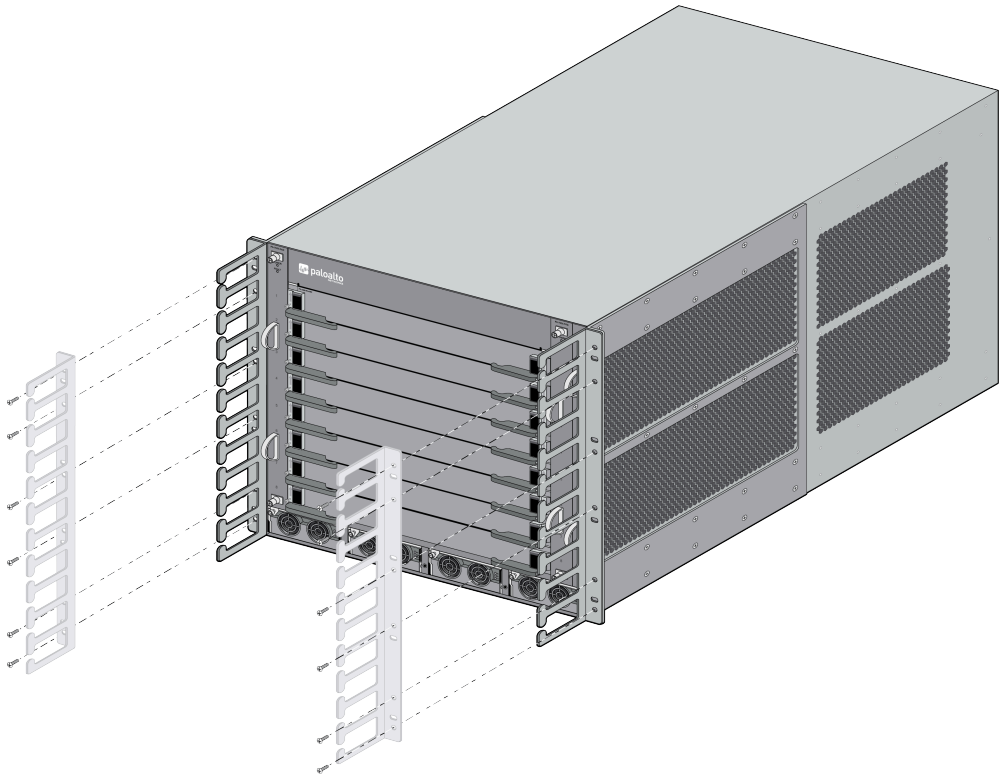


Swap the front brackets, so the rack mount screw holes are now on the front of the chassis. Use 25 screws to attach each bracket to the chassis in the front position. When swapping the brackets, rotate them 180 degrees so the screw holes line up and the rack mount holes are on the front of the chassis.



Front-Mount Bracket Configuration

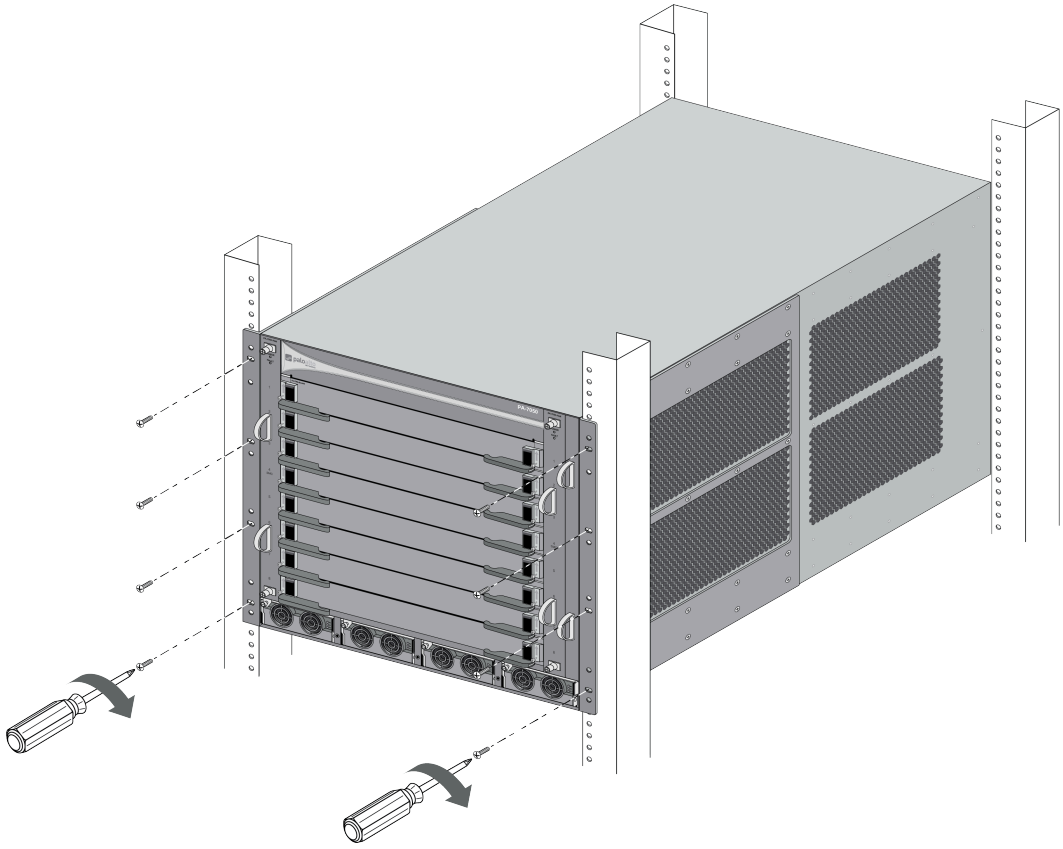
STEP 3 | (Optional) Install the front-mount cable management brackets using the six screws included with the bracket. In the front-mount installation, the cable management brackets install over the chassis rack mount bracket used to mount the chassis to the rack, so it is recommended that you install the cable management bracket before installing the chassis into the rack.



STEP 4 | Position the chassis into the rack using two or more people and if available, use a mechanical equipment lift.

STEP 5 | Align the mounting holes on the side of the chassis with holes in the rack rail, ensuring that the chassis is level.

STEP 6 | Attach the chassis brackets to the rack using the provided rack mount screws and tighten with a Phillips-head screwdriver. Install all four screws on each side of the chassis.



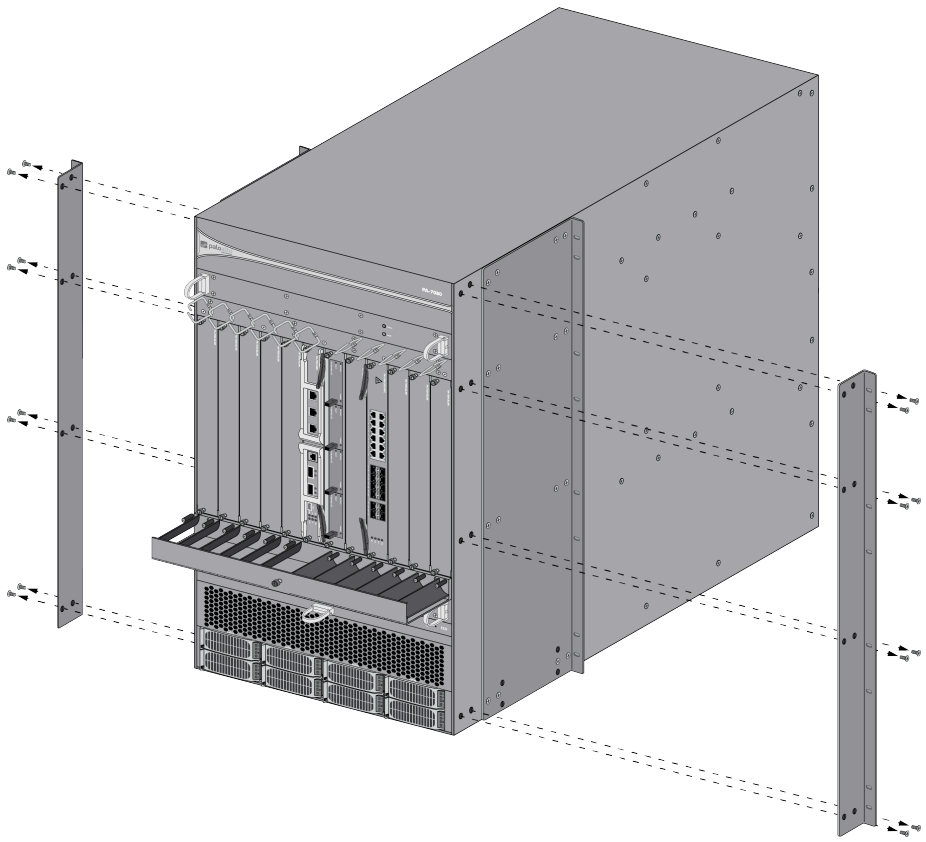
Install the PA-7080 Firewall in the Mid-Mount Position

The following procedures describe how to install the PA-7080 firewall in a mid-mount position. Both rack#mount bracket types (mid-mount and front-mount) are preinstalled. For a mid-mount install, you must remove the front-mount brackets.

The PA-7080 chassis and the front slot cards (SMC, LPC or LFC, NPC) ship in separate boxes and it is recommended that you install the cards after the chassis is rack mounted. This will prevent any damage to the cards that could occur during rack mounting and will reduce the weight of the chassis.

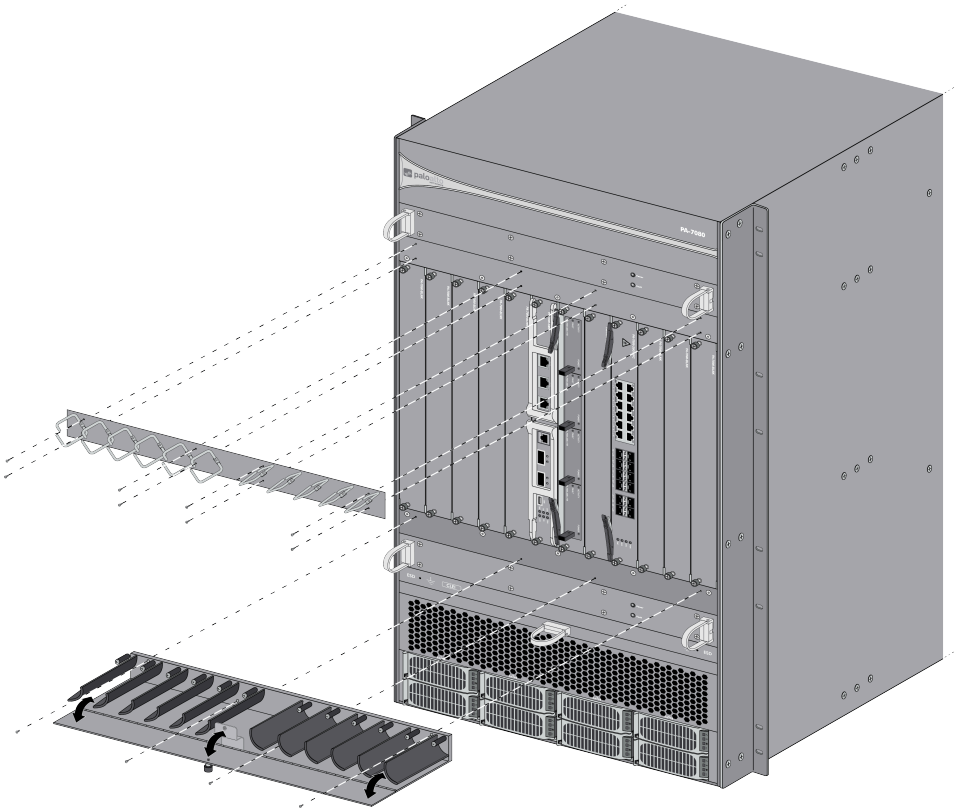
STEP 1 | Read PA-7000 Series Firewall Rack Install Safety Information.

STEP 2 | Remove eight screws from each front-mount bracket (one left and one right) and then remove the brackets.



STEP 3 | (Optional) Install the upper and lower cable management brackets using the provided screws (8 upper bracket screws and 4 lower bracket screws). The upper bracket is designed for Ethernet cables and the console cable and the lower bracket is designed for fiber optic

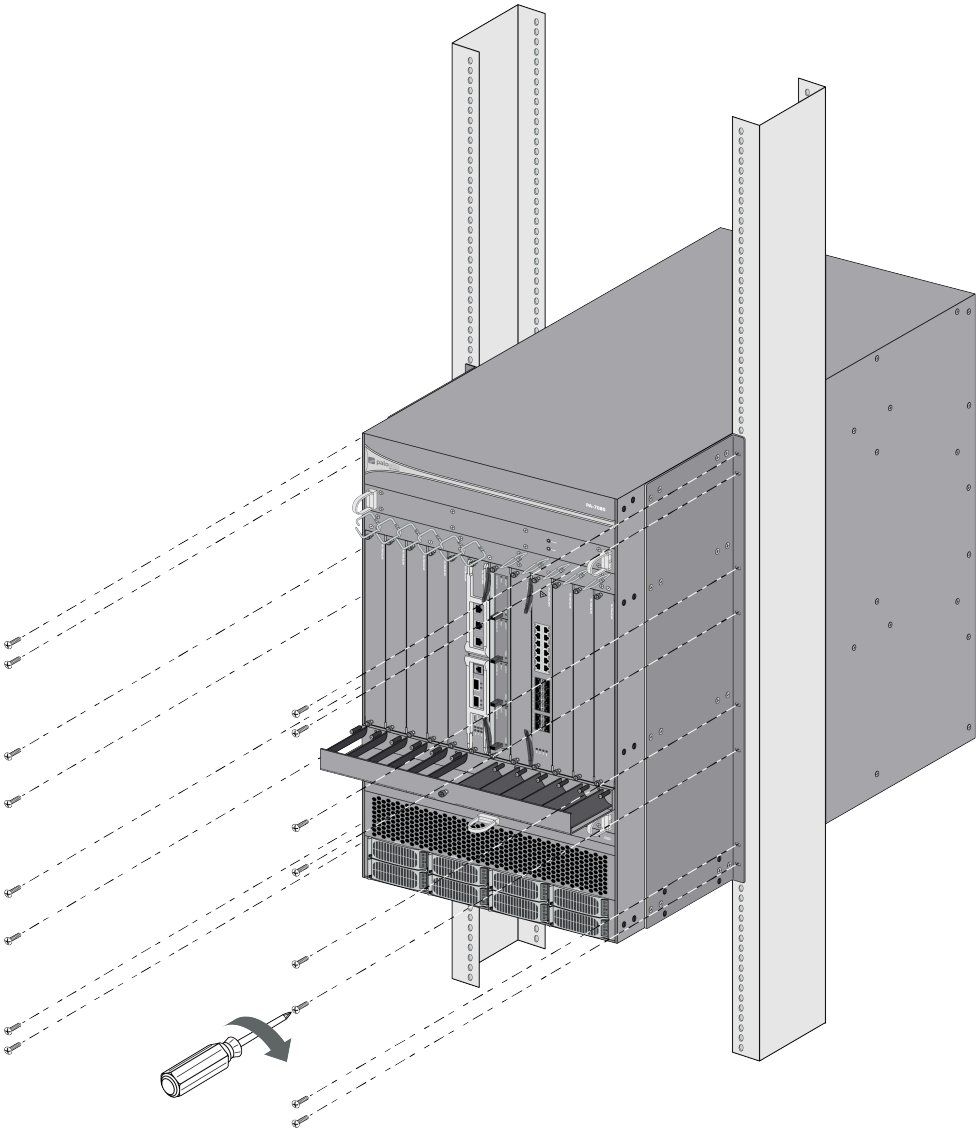
cables. To access the screw holes on the lower bracket, open the door located at the front of the bracket as shown in the following image.



STEP 4 | Position the chassis into the rack using two or more people and if available, use a mechanical equipment lift.

STEP 5 | Align the rack-mount bracket mounting holes on each side of the chassis with the holes on the rack rail, ensuring that the chassis is level. Secure the chassis to the rack using eight

rack#mount screws (not included) on each side of the chassis and tighten with a Phillips-head screwdriver.



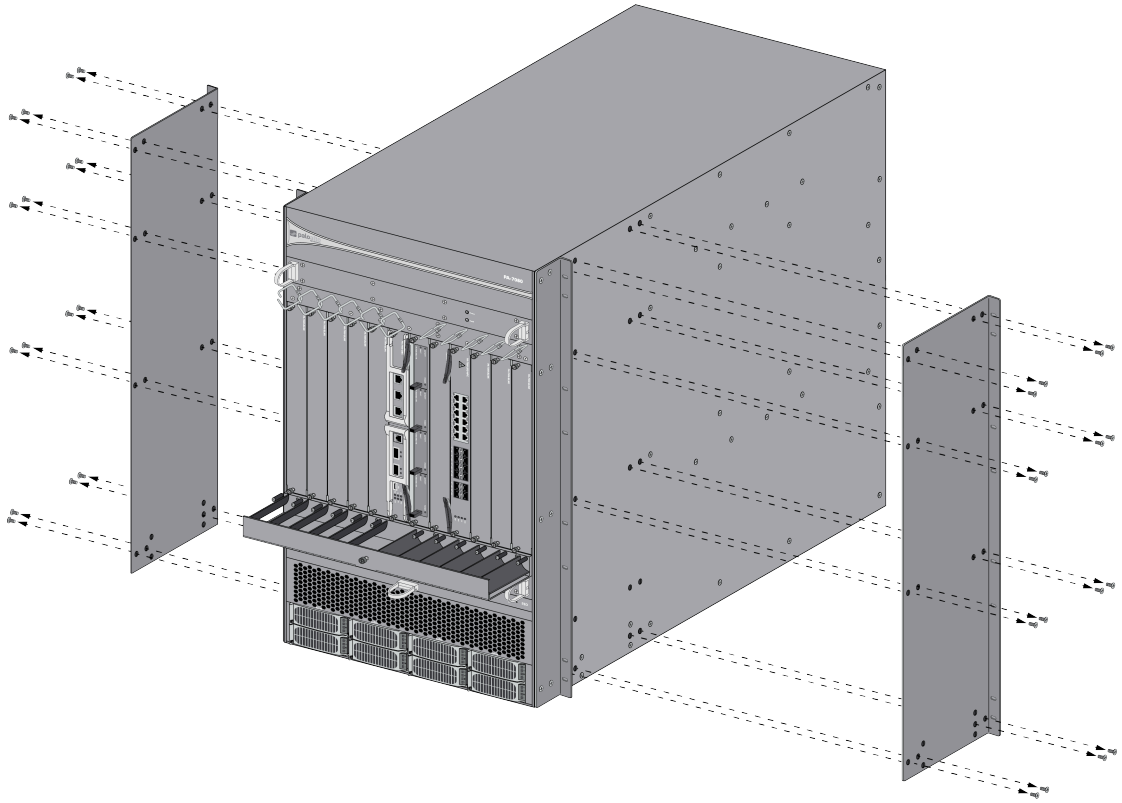
Install the PA-7080 Firewall in the Front-Mount Position

The following procedure describes how to install the PA-7080 firewall in a mid-mount position. Both rack#mount bracket types (mid-mount and front-mount) are preinstalled. For a front-mount install, you must remove the mid-mount brackets.

The PA-7080 chassis and the front slot cards (SMC, LPC or LFC, NPC) ship in separate boxes and it is recommended that you install the cards after the chassis is rack mounted. This will prevent any damage to the cards that could occur during rack mounting and will reduce the weight of the chassis.

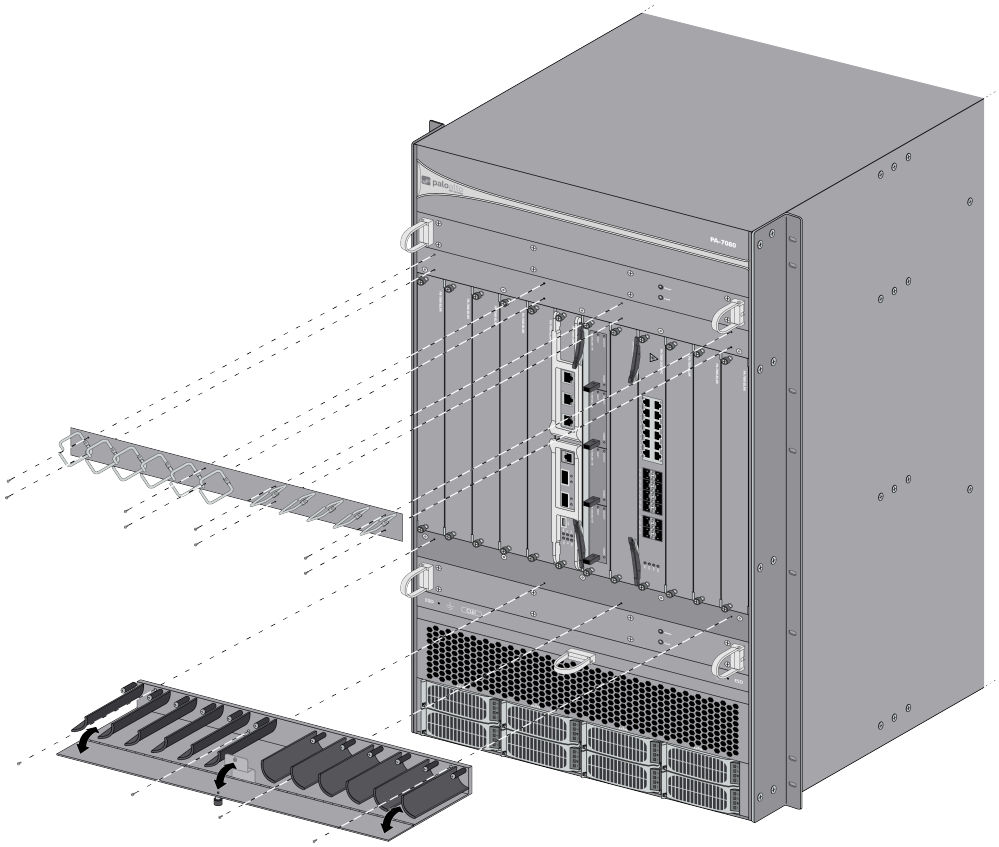
STEP 1 | Read PA-7000 Series Firewall Rack Install Safety Information.

STEP 2 | Remove 16 screws from each mid-mount bracket (one left and one right) and then remove the brackets.



STEP 3 | (Optional) Install the upper and lower cable management brackets using the provided screws (8 upper bracket screws and 4 lower bracket screws). The upper bracket is designed for Ethernet cables and the console cable and the lower bracket is designed for fiber optic

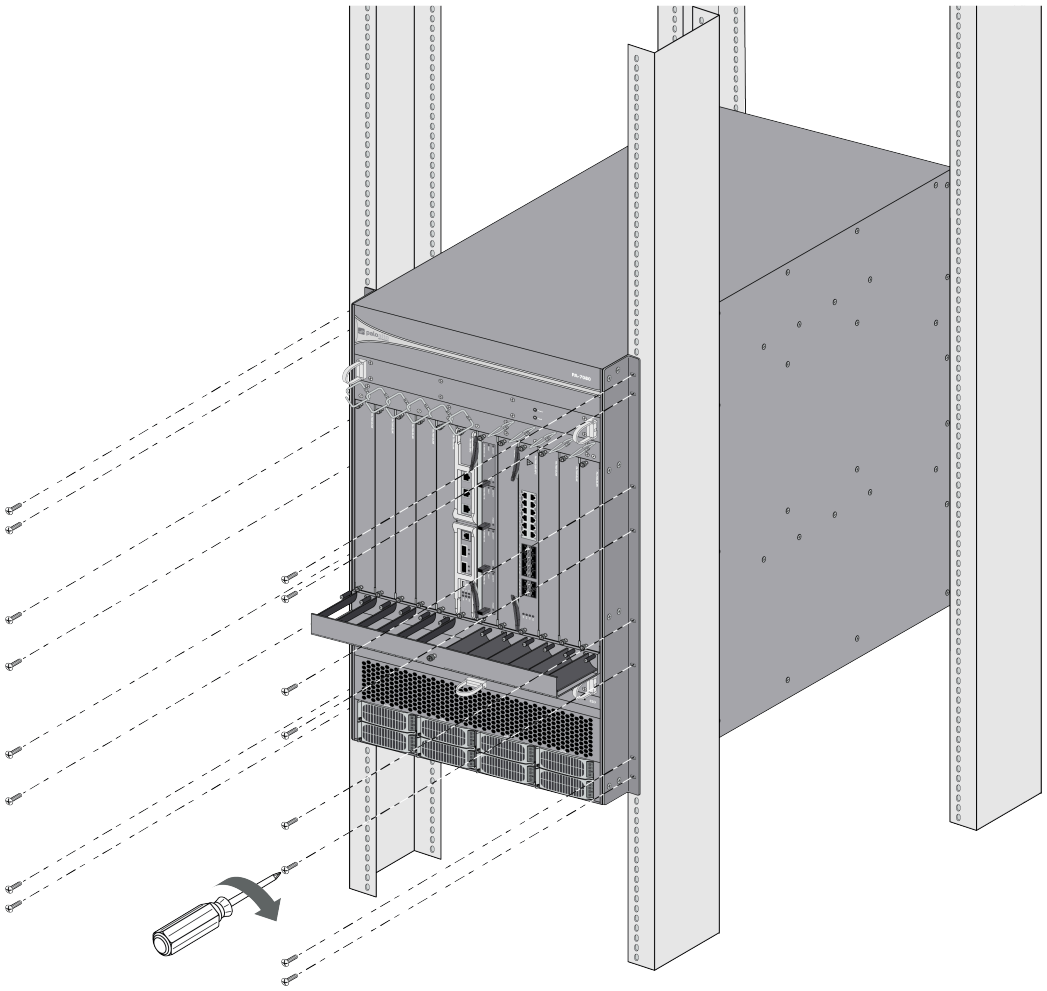
cables. To access the lower bracket screw holes, open the door located at the front of the bracket as shown in the image.



STEP 4 | Position the chassis into the rack using two or more people and if available, use a mechanical equipment lift.

STEP 5 | Align the rack-mount bracket mounting holes on each side of the chassis with the holes on the rack rail, ensuring that the chassis is level. Secure the chassis to the rack using eight

rack#mount screws (not included) on each side of the chassis and tighten with a Phillips-head screwdriver.



Install the Mandatory PA-7000 Series Firewall Front Slot Cards

The PA-7000 Series firewalls require a minimum of three cards that you install in the front slots of the chassis. These cards are shipped separately from the chassis and include the following: The Switch Management Card (SMC) provides management connectivity to the chassis and HA connectivity; the Log Processing Card (LPC) or the Log Forwarding Card (LFC) handles all log processing; and at least one Network Processing Card (NPC) must be installed to enable the firewall to process network traffic. Data Processing Cards (DPCs) can be installed for improved data processing performance.

Although all front slot cards have protection to prevent damage if they are installed or removed when the chassis is powered, only the NPCs and DPCs are intended to be hot-swapped during normal operation.

Install a PA-7000 Series Switch Management Card

The PA-7000 Series firewall must have a switch management card installed to operate. You can install the first-generation SMC or second-generation SMC-B. To learn about the available SMC models to help you determine which model to install, see PA-7000 Series Firewall Switch Management Cards (SMCs)

- Install the PA-7000 Series Firewall Switch Management Card (SMC)
- Install the PA-7000 Series Firewall Switch Management Card (SMC-B)

Install the PA-7000 Series Firewall Switch Management Card (SMC)

A Switch Management Card (SMC) is required for chassis operation. On a PA-7050 firewall, you must install the SMC in slot 4 and on the PA-7080 firewall, you must install the SMC in slot 6. You cannot install an SMC into any other slot.

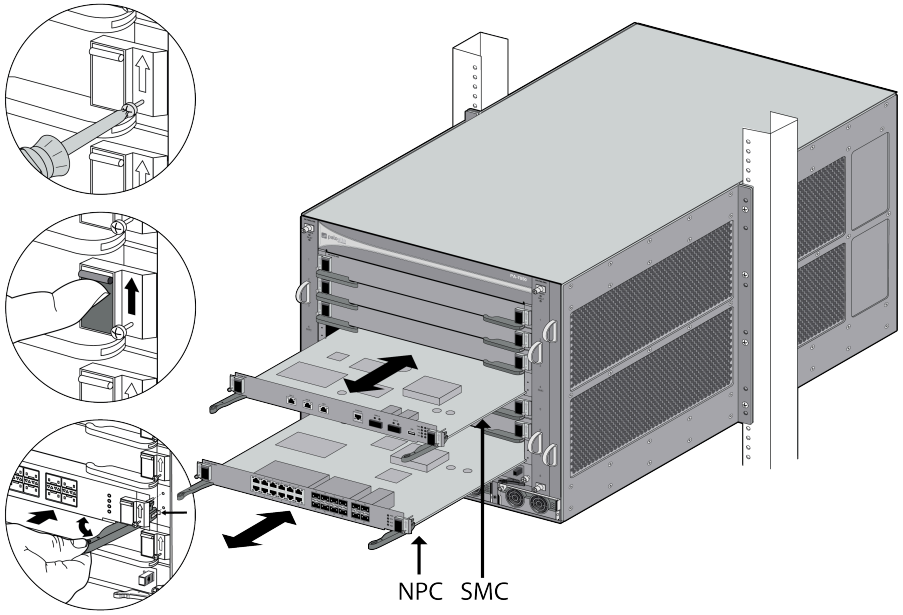
There are two versions of the PA-7050 SMC: version 1 and version 2. The PA-7050 firewall must be running PAN-OS 6.1 or a later release to recognize a version 2 SMC. The version 2 SMC uses the same install and release levers as the LPC; the version 1 SMC does not. For more details, see PA-7000 Series Firewall SMC Component Descriptions.

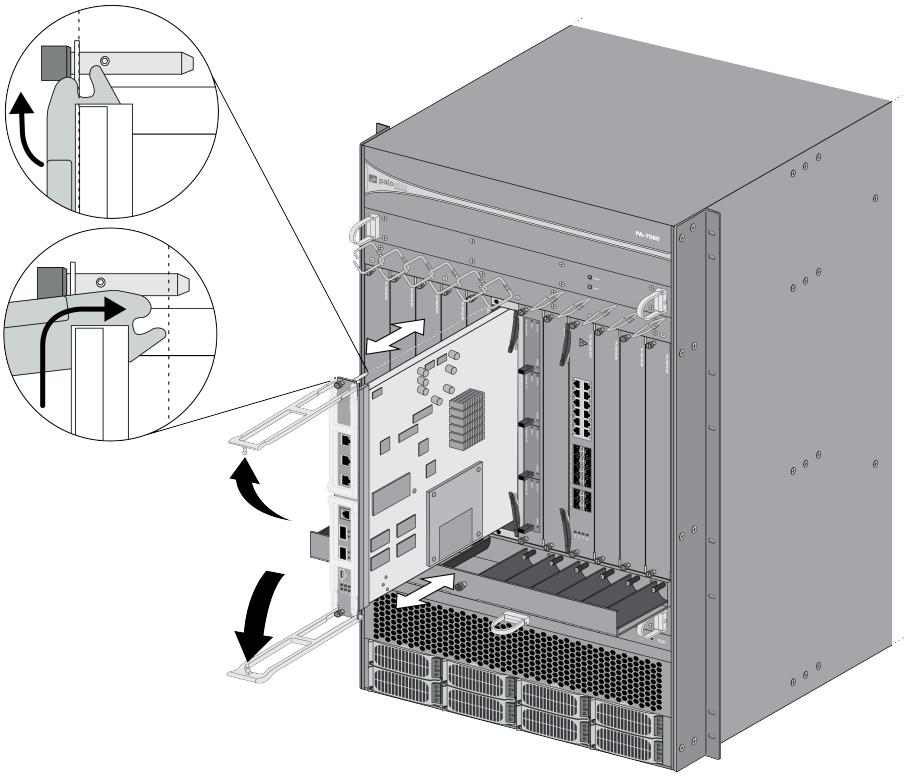
The PA-7050 SMC and PA-7080 SMC are not interchangeable. Although both cards have the same ports and LEDs, the back connectors and the software is different. The hardware is also keyed in such a way that you cannot install a PA-7050 SMC in a PA-7080 firewall and vice versa.

STEP 1 | Put the provided ESD wrist strap on your wrist ensuring that the metal contact is touching your skin. Then attach (snap) one end of the ground cable to the wrist strap and remove the alligator clip from the banana clip on the other end of the ESD grounding cable. Plug the banana clip end into one of the ESD ports located on the front of the chassis before handling ESD sensitive hardware. For details on the ESD port location, see PA-7050 Front Panel (AC) or PA-7080 Front Panel (AC).

STEP 2 | Ensure that the chassis is powered off and disconnect the power cords.

STEP 3 | Remove the SMC from the antistatic bag and slide it into the front slot (slot 4 on a PA-7050 firewall or slot 6 on a PA-7080 firewall) until it is about 1/4-inch from being fully inserted. Ensure that the handles are in the open position.





STEP 4 | Close the handles and ensure that the SMC fully seats into the SMC slot.

STEP 5 | Tighten the thumb screws on each side of the SMC to secure it to the chassis. Use a Phillips-head screwdriver if necessary.

STEP 6 | Proceed to Install the PA-7000 Series Firewall Log Processing Card (LPC).

Install the PA-7000 Series Firewall Switch Management Card (SMC-B)

A Switch Management Card (SMC) is required for chassis operation. On a PA-7050 firewall, you must install the SMC in slot 4 and on the PA-7080 firewall, you must install the SMC in slot 6. You cannot install an SMC into any other slot.

There are two versions of the PA-7050 SMC: version 1 and version 2. The PA-7050 firewall must be running PAN-OS 6.1 or a later release to recognize a version 2 SMC. The version 2 SMC uses the same install and release levers as the LPC; the version 1 SMC does not. For more details, see PA-7000 Series Firewall SMC Component Descriptions.

The PA-7050 SMC and PA-7080 SMC are not interchangeable. Although both cards have the same ports and LEDs, the back connectors and the software is different. The hardware is also keyed in such a way that you cannot install a PA-7050 SMC in a PA-7080 firewall and vice versa.

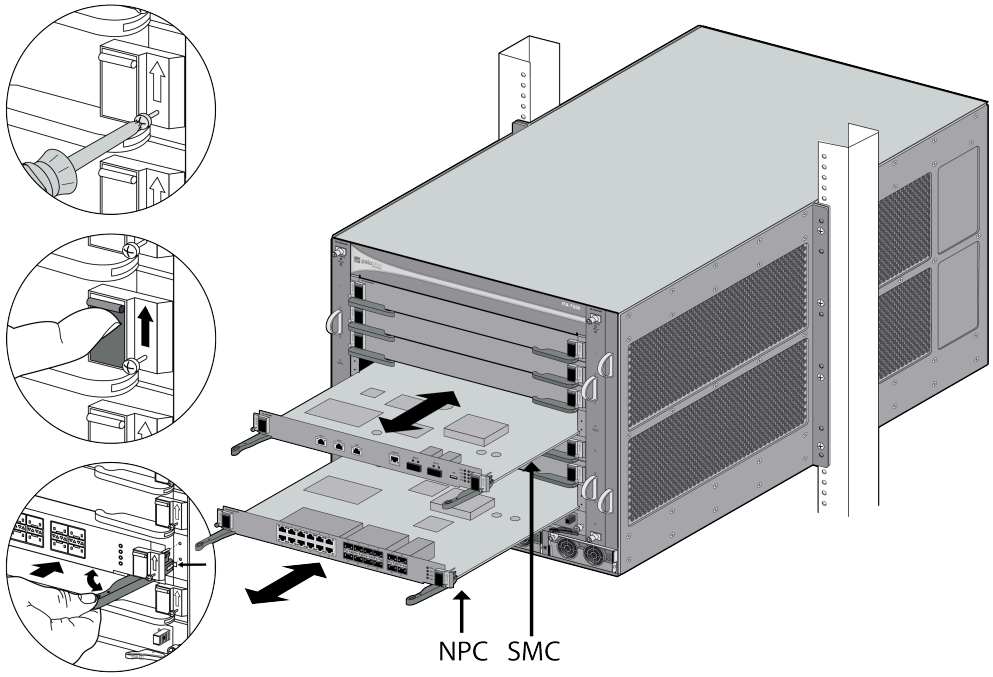
STEP 1 | Put the provided ESD wrist strap on your wrist ensuring that the metal contact is touching your skin. Then attach (snap) one end of the ground cable to the wrist strap and remove the

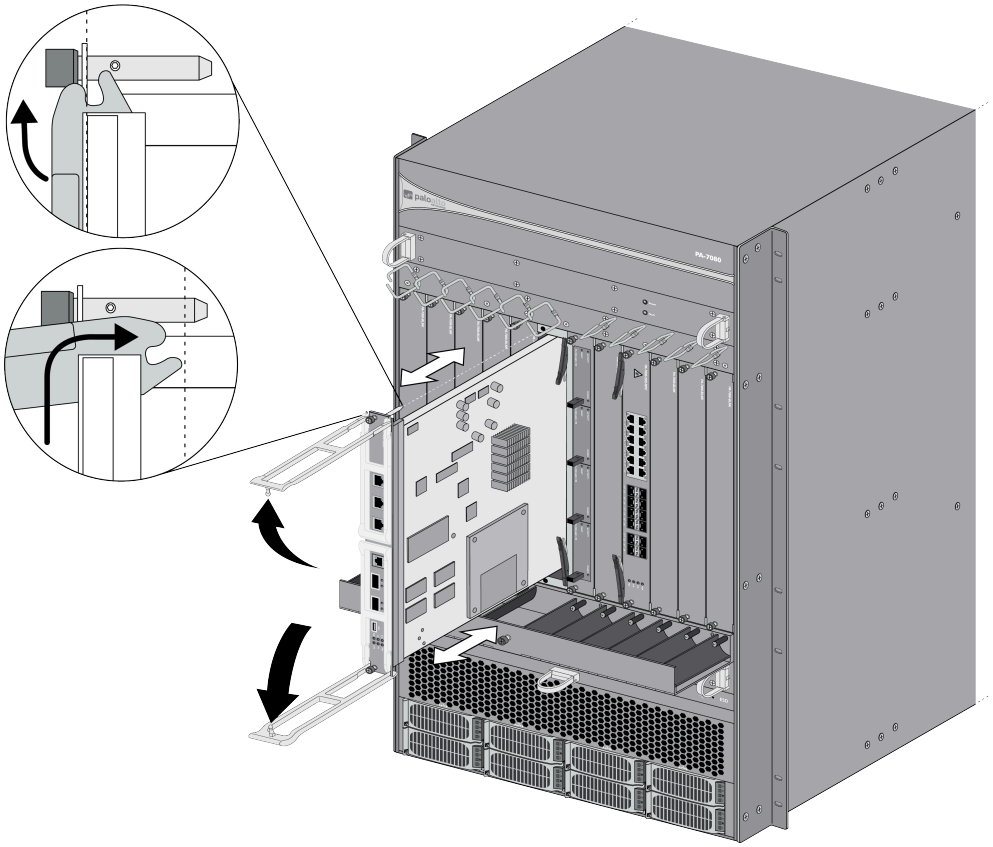
alligator clip from the banana clip on the other end of the ESD grounding cable. Plug the banana clip end into one of the ESD ports located on the front of the chassis before handling ESD sensitive hardware. For details on the ESD port location, see PA-7050 Front Panel (AC) or PA-7080 Front Panel (AC).

STEP 2 | Ensure that the chassis is powered off and disconnect the power cords.

STEP 3 | Remove the SMC-B from the antistatic bag and slide it into the front slot (slot 4 on a PA-7050 firewall or slot 6 on a PA-7080 firewall) until it is about 1/4-inch from being fully inserted. Ensure that the handles are in the open position.

The following images show the first-generation SMC; the install procedure for the second-generation SMC-B is the same.





STEP 4 | Close the handles and ensure that the SMC-B fully seats into the SMC slot.

STEP 5 | Tighten the thumb screws on each side of the SMC-B to secure it to the chassis. Use a Phillips-head screwdriver if necessary.

Install a PA-7000 Series Firewall Log Card

The PA-7000 Series firewall must have a log card installed to operate. You can install a Log Processing Card (LPC) or a Log Forwarding Card (LFC). To learn about the available log cards to help you determine which card to install, see PA-7000 Series Firewall Log Cards.

The firewall must be running PAN-OS 9.0 or later to use the LFC and you must install only one log card type (LPC or LFC).

- Install the PA-7000 Series Firewall Log Processing Card (LPC)
- Install the PA-7000 Series Firewall Log Forwarding Card (LFC)

Install the PA-7000 Series Firewall Log Processing Card (LPC)

The Log Processing Card (LPC) is required for chassis operation and the same LPC model is used in both the PA-7050 and PA-7080 firewalls. On a PA-7050 firewall, you must install the LPC in slot 8 and on the PA-7080 firewall, you must install the LPC in slot 7. You cannot install an LPC into any other slot. The LPC must also contain at least one AMC. During normal operation, all four AMCs should be installed in two RAID 1 pairs, which are automatically configured when all four AMCs are present and the chassis is brought up for the first time.

The LPC does not ship with the AMCs installed, so install the LPC into the chassis first and then install each of the four AMCs into the LPC slots. After you power on the chassis for the first time, you must allow enough time for the firewall to format the drives in the AMCs and to add the drives into the RAID configuration before the drives can accept logs. The chassis will operate with one AMC, but there will be no drive redundancy.

The disk drives are connected to the LPC using an Advanced Mezzanine Card (AMC) and each AMC contains one 2.5" SATA disk drive. The AMC contains the status LEDs and a handle used to install and lock the AMC and drive into the LPC.

Initial boot software and system logs are stored on the embedded SSD on the Switch Management Card (SMC) and all other logs (dataplane logs, threat logs, and User-ID™ logs for example) are stored on the LPC. Also, the auto commit function requires the LPC, so do not perform an upgrade of PAN-OS until the LPC is ready. For information about verifying the drive status, see Verify the PA-7000 Series Firewall LPC Configuration.

You can install the AMCs in any order in the LPC slots during the initial set up of the firewall. After the firewall is powered on for the first time, it will format the drives and configure them into two RAID 1 pairs.

To install the LPC and AMCs:

STEP 1 | Put the provided ESD wrist strap on your wrist ensuring that the metal contact is touching your skin. Then attach (snap) one end of the ground cable to the wrist strap and remove the alligator clip from the banana clip on the other end of the ESD grounding cable. Plug the banana clip end into one of the ESD ports located on the front of the chassis before handling ESD sensitive hardware. For details on the ESD port location, see PA-7050 Front Panel (AC) or PA-7080 Front Panel (AC).

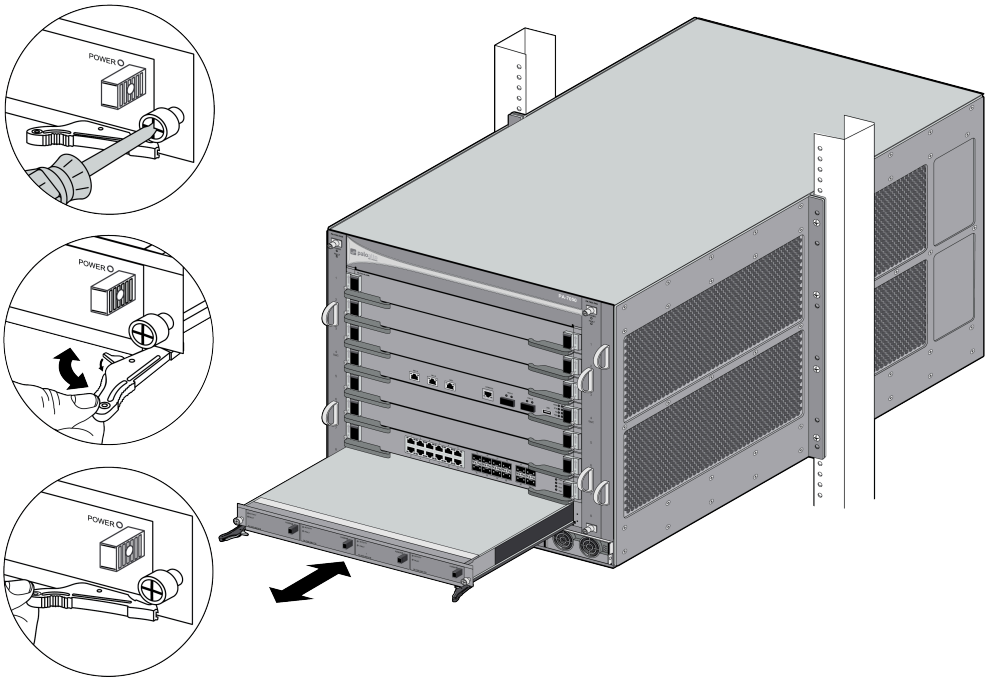
STEP 2 | Power off the chassis and disconnect the power cords.

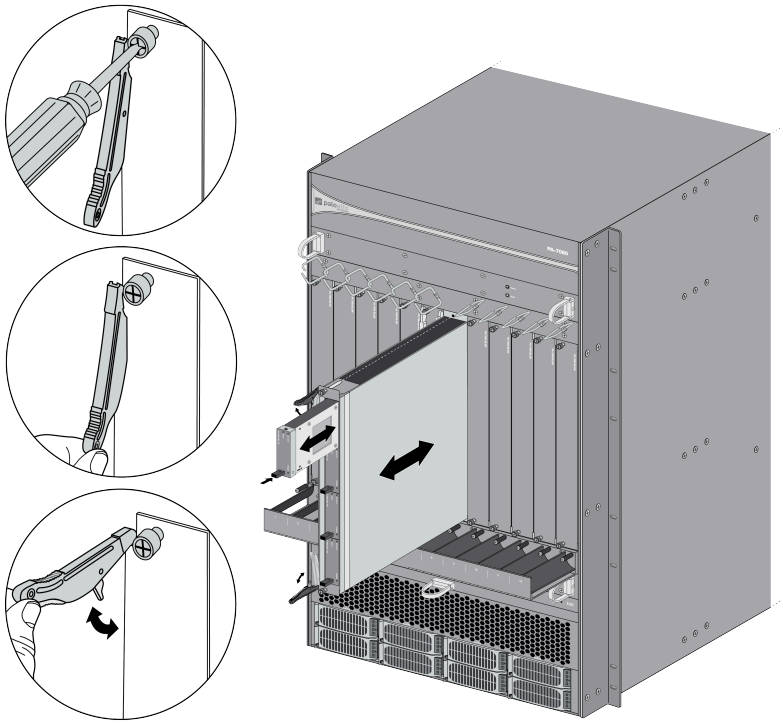
STEP 3 | Remove the LPC from the antistatic bag and slide it into the log card slot (slot 8 on a PA-7050 firewall or slot 7 on a PA-7080 firewall) ensuring that the handles are in the open

position. When the card is about 1/4-inch from being fully inserted, adjust the levers to align with the chassis and then close the levers to seat the card in place.

The LPC has a double lever on each side of the card. After loosening the thumb screws, you must pull the inner lever toward you to unlock the outer lever from the chassis and then pull the outer lever to release the card from the chassis. When installing the card, when you push the outer lever in, it will lock the inner lever.

The left and right inner levers have a micro-switch that will power off the card as soon as they are pulled to unlock the outer lever.

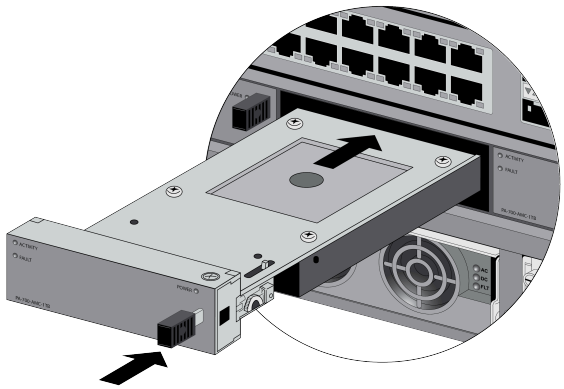




STEP 4 | Tighten the thumb screws on each side of the LPC to secure it to the chassis. Use a Phillips-head screwdriver if necessary.

STEP 5 | Ensure that the handle on the front of each AMC is pulled out to the unlocked position and then install each of the four AMCs into the four slots on the LPC.

STEP 6 | After you install each AMC, push the handle in to lock the AMC in place. For more information on how to install or remove AMCs, see Replace a PA-7000 Series Firewall LPC Drive.



To install the AMC, pull this handle outward until it stops. After fully inserting the AMC into the LPC slot, push the handle in until it stops to lock the drive to the LPC.

After you power on the chassis for the first time, the firewall will format the drives and configure them in two RAID 1 configurations. The first two drives on the left (A1 and A2) are configured in a RAID 1 pair and the second two drives (B1 and B2) on the right are configured in a second RAID 1 pair. If the AMCs contain 1TB drives the total log storage capacity is 2TBs; if the AMCs contain 2TB drives the total capacity is 4TBs.The initial formating and RAID configuration will take approximately 3 minutes. To check drive status, see Verify the PA-7000 Series Firewall LPC Configuration.

STEP 7 | Proceed to Install a PA-7000 Series Firewall Network Processing Card (NPC).

Install the PA-7000 Series Firewall Log Forwarding Card (LFC)

The Log Forwarding Card (LFC) is required for chassis operation and the same LFC model is used in both the PA-7050 and PA-7080 firewalls. On a PA-7050 firewall, you must install the LFC in slot 8 and on the PA-7080 firewall, you must install the LPC in slot 7. You cannot install an LFC into any other slot.

STEP 1 | Read PA-7000 Series Firewall Log Forwarding Card (LFC) Requirements.

STEP 2 | Put the provided ESD wrist strap on your wrist ensuring that the metal contact is touching your skin. Then attach (snap) one end of the ground cable to the wrist strap and remove the alligator clip from the banana clip on the other end of the ESD grounding cable. Plug the banana clip end into one of the ESD ports located on the front of the chassis before handling ESD sensitive hardware. For details on the ESD port location, see PA-7050 Front Panel (AC) or PA-7080 Front Panel (AC).

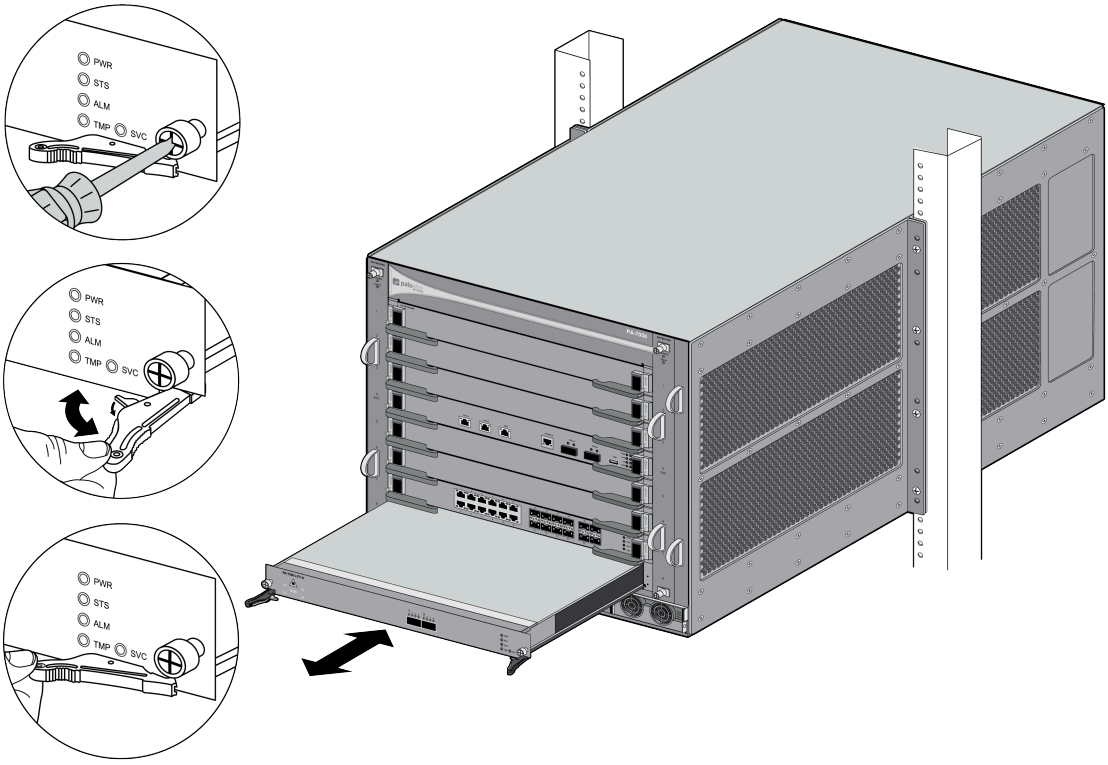
STEP 3 | Power off the chassis and disconnect the power cords.

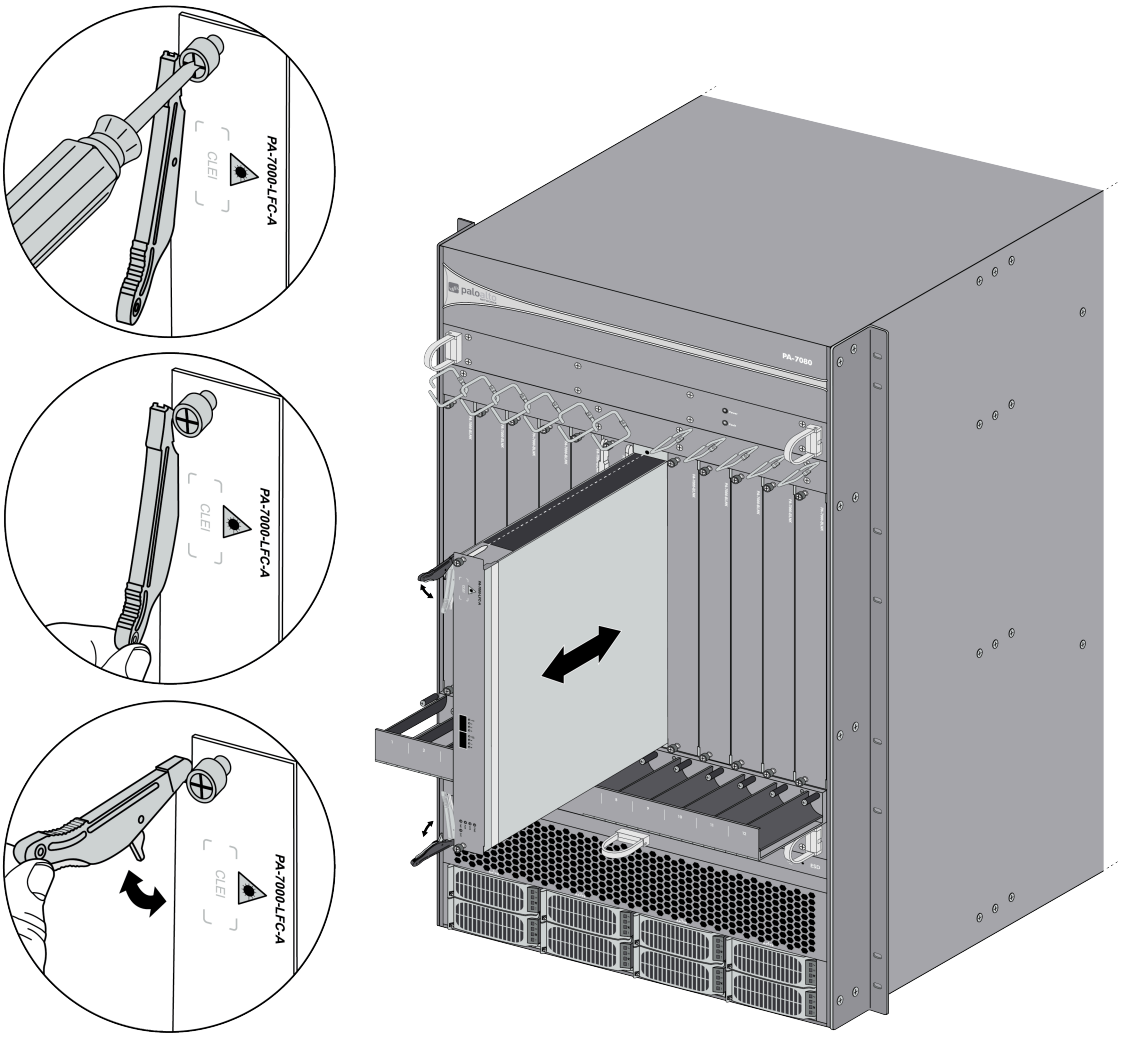
STEP 4 | Remove the LFC from the antistatic bag and slide it into the log card slot (slot 8 on a PA-7050 firewall or slot 7 on a PA-7080 firewall) ensuring that the handles are in the open

position. When the card is about 1/4-inch from being fully inserted, adjust the levers to align with the chassis and then close the levers to seat the card in place.

The LFC has a double lever on each side of the card. After loosening the thumb screws, you must pull the inner lever toward you to unlock the outer lever from the chassis and then pull the outer lever to release the card from the chassis. When installing the card, when you push the outer lever in, it will lock the inner lever.

The left and right inner levers have a micro-switch that will power off the card as soon as they are pulled to unlock the outer lever.





STEP 5 | Tighten the thumb screws on each side of the LFC to secure it to the chassis. Use a Phillips-head screwdriver if necessary.

STEP 6 | Proceed to Install a PA-7000 Series Firewall Network Processing Card (NPC).

Install a PA-7000 Series Firewall Network Processing Card (NPC)

You can install up to 6 NPCs in a PA-7050 firewall and up to 10 NPCs in a PA-7080 firewall to expand port density and throughput. On a PA-7050 firewall, you install NPCs in slots 1, 2, 3, 5, 6, and/or 7 and on a PA-7080 firewall, you install NPCs in slots 1, 2, 3, 4, 5, 8, 9, 10, 11, and/or 12. If you install two or more NPCs, review Configure Session Distribution on a PA-7000 Series Firewall to understand how the firewall distributes sessions and to determine the best policy to use based on your environment.

If you install an NPC in slot 1, the system configures ethernet1/1 and ethernet1/2 as a virtual wire. If you install an NPC in any other slot, the system does not apply a default configuration.

If you plan to populate all NPC slots on the firewall, ensure that you install the appropriate number of power supplies (see Determine PA-7000 Series Firewall Power Configuration Requirements).

The procedures to install NPCs in a single chassis and the procedure to install NPCs in a pair of chassis in high availability (HA) are different.

If you enable log forwarding (for syslog or WildFire for example), you must configure one port on an NPC with the type Log Port as described in Configure a Log Card Port on a PA-7000 Series Firewall.

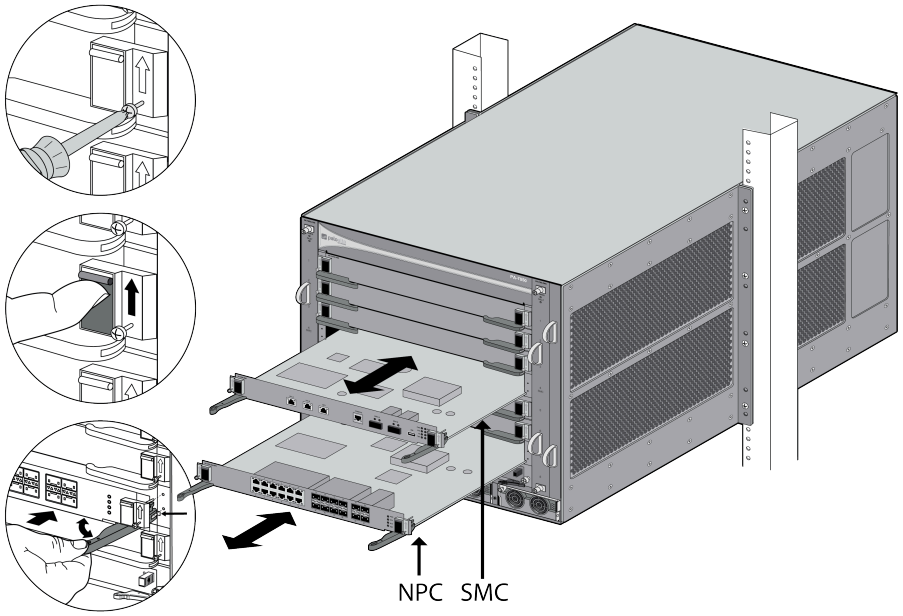
- Install a PA-7000 Series Firewall NPC in a Single Chassis
- Install a PA-7000 Series Firewall NPC in a High Availability (HA) Configuration
- Configure a Log Card Port on a PA-7000 Series Firewall
- Configure Session Distribution on a PA-7000 Series Firewall

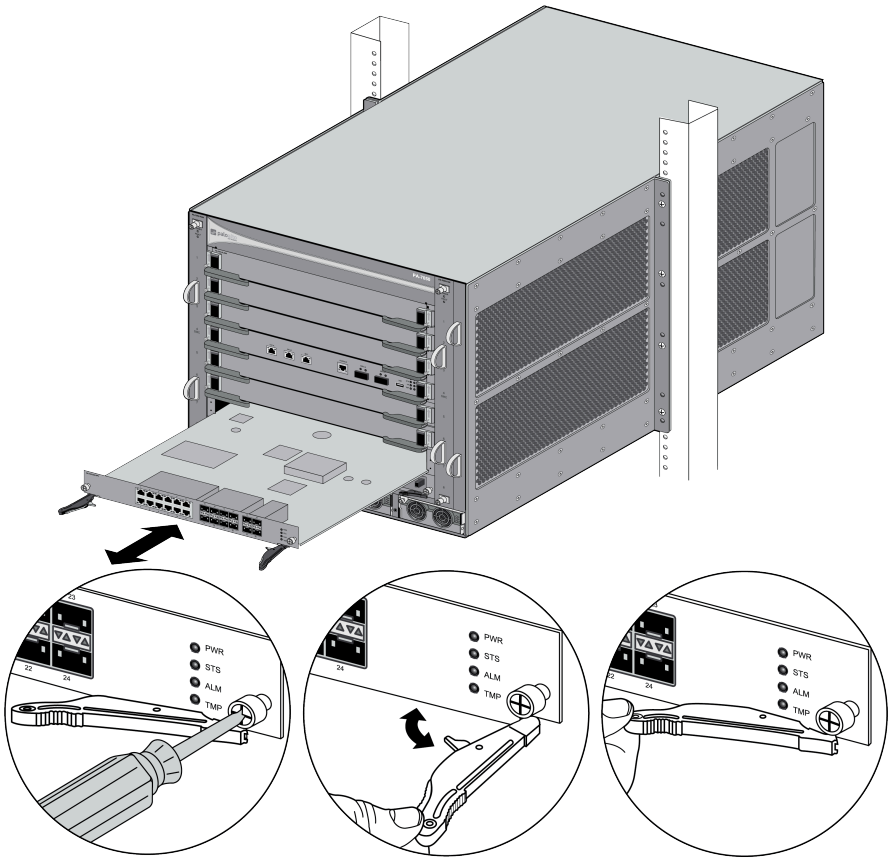
Install a PA-7000 Series Firewall NPC in a Single Chassis

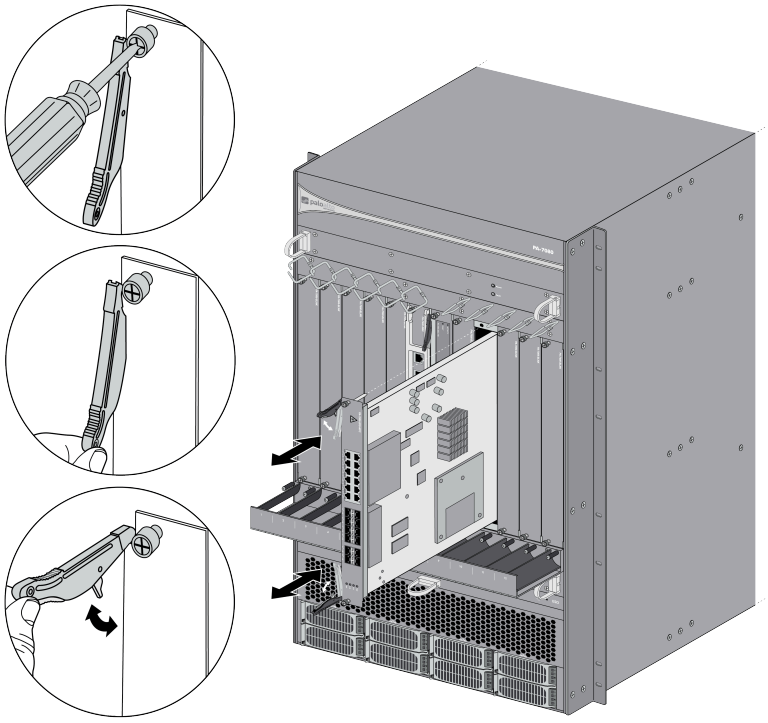
STEP 1 | Put the provided ESD wrist strap on your wrist ensuring that the metal contact is touching your skin. Then attach (snap) one end of the ground cable to the wrist strap and remove the alligator clip from the banana clip on the other end of the ESD grounding cable. Plug the banana clip end into one of the ESD ports located on the front of the chassis before handling ESD sensitive hardware. For details on the ESD port location, see PA-7050 Front Panel (AC) or PA-7080 Front Panel (AC).

STEP 2 | Remove the NPC from the antistatic bag and partially slide it into any of the available NPC slots, ensuring that the handles are in the open position. When the card is about 1/4-inch

from being fully inserted, adjust the levers to align with the chassis and then close the levers to seat the card in place. The following images show how to install NPCs.







STEP 3 | Tighten the screws on each side of the card to secure the card to the chassis. The version 1 NPC has a standard Phillips-head screw and the version 2 NPC has a thumb screw that you can also tighten with a Phillips-head screwdriver.

STEP 4 | Cover any empty slots with the provided blank slot covers. Each empty slot must be covered with the provided blank slot covers to ensure proper airflow and to prevent debris from entering the chassis. The number of blank slot covers that you will receive for a new order is based on the number of NPCs ordered. For example, if you order one NPC, you will receive enough blank covers to cover all empty slots.

STEP 5 | Connect the network cables and the NPCs are ready to process data traffic.

STEP 6 | Proceed to Connect Power to a PA-7000 Series Firewall. After the chassis is powered on, view the status of the NPCs by going to Verify the PA-7000 Series Firewall NPC Configuration.

Install a PA-7000 Series Firewall NPC in a High Availability (HA) Configuration

With all Palo Alto Networks firewalls, the hardware must match when configuring two firewalls in an HA pair. When configuring PA-7000 Series firewalls, the installed Network Processing Cards (NPC) must also match and must be installed in the same slots on each firewall.

Important: When installing new NPCs in a PA-7000 Series firewall with high availability (HA) configured, PAN-OS puts the cards in a disabled state. This allows you to bring up both cards (one in each firewall) at the same time, so HA can start monitoring the cards.

Installing a new NPC also causes any virtual routers to restart.

STEP 1 | Put the provided ESD wrist strap on your wrist ensuring that the metal contact is touching your skin. Then attach (snap) one end of the ground cable to the wrist strap and remove the alligator clip from the banana clip on the other end of the ESD grounding cable. Plug the banana clip end into one of the ESD ports located on the front of the chassis before handling ESD sensitive hardware. For details on the ESD port location, see PA-7050 Front Panel (AC) or PA-7080 Front Panel (AC).

STEP 2 | Using a Phillips-head screwdriver, remove the blank slot covers for each slot in which you will install an NPC.

STEP 3 | Remove the first NPC from the antistatic bag and partially slide it into any of the available NPC slots, ensuring that the handles are in the open position. When the card is about 1/4-inch from being fully inserted, adjust the levers to align with the chassis and then close the levers to seat the card in place.

STEP 4 | Install the second NPC (of the same model) in the other chassis in the HA pair in the same slot you installed the NPC in the first chassis. For example, if you installed the first NPC in slot 3 of the first chassis, install the second NPC in slot 3 of the second chassis.

After you install the firewall in the rack and power it on as described in Connect Power to a PA-7000 Series Firewall, continue the following steps to bring up the NPCs in the HA pair. Refer to Verify the PA-7000 Series Firewall NPC Configuration for information on how to check the status of the NPCs.

Run the following command to power-on both NPCs in the HA pair:

```
admin@PA-7050> request
chassis power-on slot <slot-number> target ha-pair
```

For example, if you installed the NPCs in slot 3 of each chassis, run the following command:

```
admin@PA-7050> request
chassis power-on slot s3 target ha-pair
```

This will simultaneously power-on both cards in each chassis.

Enable the NPCs by running the following command:

```
admin@PA-7050> request
chassis enable slot s3 target ha-pair
```

Check the status of the card in slot 3 on either chassis by running:

```
admin@PA-7050> show
```



```
chassis status slot s3
```

If the cards are functioning properly, the status will show an output similar to the following:

```
Slot...Component........Card Status.....Config Status
3 .....PA-7000-100G-NPC .Up..............Success
```

STEP 5 | Connect the network cables and the NPCs are ready to process network traffic.

Configure a Log Card Port on a PA-7000 Series Firewall

A log card port is required if you configure the firewall to forward logs to an external system or if you configure a WildFire™ forwarding profile. You configure the log card port on one available port on a Network Processing Card (NPC) using the type Log Card. This is required because the traffic processing and logging capabilities of a PA-7000 Series firewall exceeds the capabilities of the management port, which is the port used for these services on other firewall models.

A log card port is not required if the firewall has a Log Forwarding Card (LFC) installed. See PA-7000 Series Firewall Log Forwarding Card (LFC).

When configuring an LFC interface for HA, ensure that you configure different IP addresses on the peers.

This special port is used by the firewall for the following log forwarding functions: syslog, emails generated by the firewall, SNMP, WildFire file forwarding, and Panorama log forwarding. Log forwarding to Panorama requires PAN-OS 8.0 or later. In PAN-OS 7.1 and earlier releases, Panorama queries logs stored on the PA-7000 Series firewall.

You can set only one NPC port on the firewall to the type Log Card. If you enable log forwarding and this port is not configured, a commit error occurs. Also ensure that this port can reach the servers that will receive content from the firewall. For example, if you configure a log forwarding profile for a syslog server, this port must be able to reach the syslog server. As another example, if you enable WildFire file forwarding, the interface must be able to reach the WildFire cloud server or if applicable, a private WF-500 appliance.

When selecting the NPC port to use as the log card port, you must use a 1 Gbps port connection or higher to ensure that the firewall can maintain log forwarding rates.

STEP 1 | Select **Network** > **Interfaces** and click the **Ethernet** tab.

STEP 2 | Select the **Slot** and **Interface Name**. For example, to configure ethernet2/1, expand Slot 2 and click on ethernet2/1.

STEP 3 | Select the **Interface Type** drop-down and select **Log Card**.

STEP 4 | If multiple virtual systems are enabled, select the desired virtual system in the **Config** tab. For details on the LPC and virtual systems, refer to Configure a PA-7000 Series Firewall for Logging Per Virtual System.

STEP 5 | Click the **Log Card Forwarding** tab.

STEP 6 | Enter the IPv4 and/or IPv6 IP Address, Netmask, and Default Gateway.

STEP 7 | Click **OK** and then click **Commit**. After the commit completes, connect the port to your network equipment.

STEP 8 | Verify that the log port is sending and receiving traffic by viewing logical interface counters. To view counters, run the following command:

```
admin@PA-7050> debug
log-card-interface info slot s8
```

If counters are incrementing, but traffic is not reaching to the remote server, you can ping the server from the log port by running the following command:

```
admin@PA-7050> debug
log-card-interface ping slot s8 host <host-ip-address>
```

The firewall will now use this port to forward dataplane logs, email, and WildFire file forwarding.

For complete details on configuring log forwarding, refer to the PAN-OS Administrator's Guide.

Install a PA-7000 Series Firewall Data Processing Card (DPC)

You can install up to 5 DPCs in a PA-7050 firewall and up to 9 DPCs in a PA-7080 firewall to expand data processing performance. On a PA-7050 firewall, you can install DPCs in slots 1, 2, 3, 5, 6, and 7 and on a PA-7080 firewall, you can install DPCs in slots 1, 2, 3, 4, 5, 8, 9, 10, 11, and 12.

The procedures to install DPCs in a single chassis and the procedure to install DPCs in a pair of chassis in high availability (HA) are slightly different.

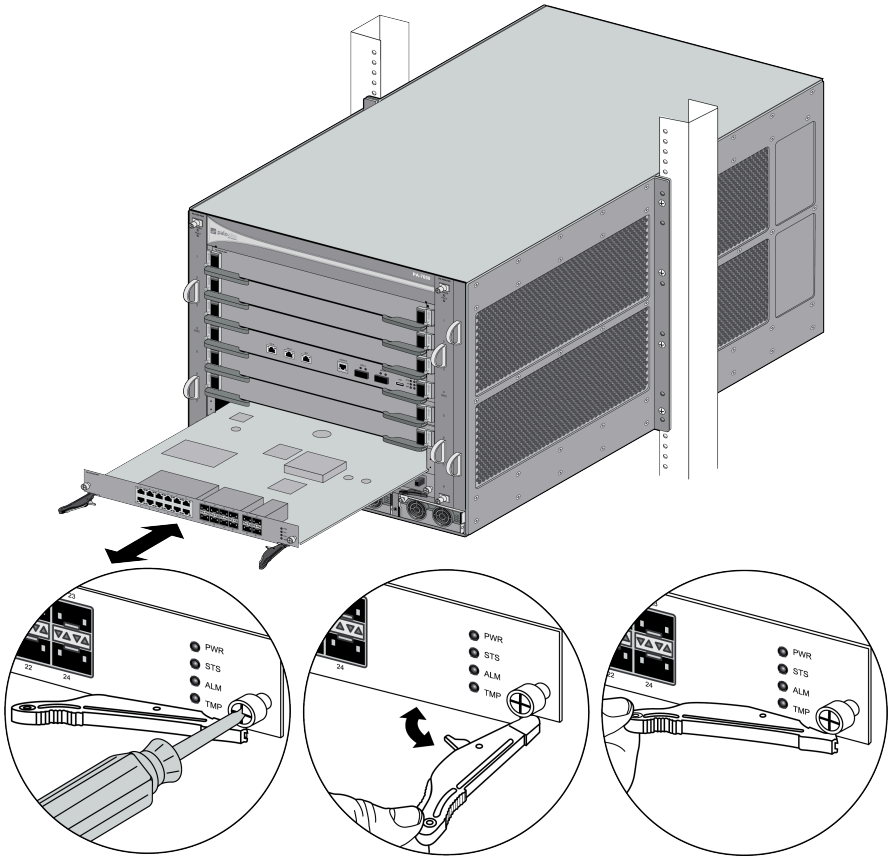
- Install a PA-7000 Series Firewall DPC in a Single Chassis
- Install a PA-7000 Series Firewall DPC in a High Availability (HA) Configuration

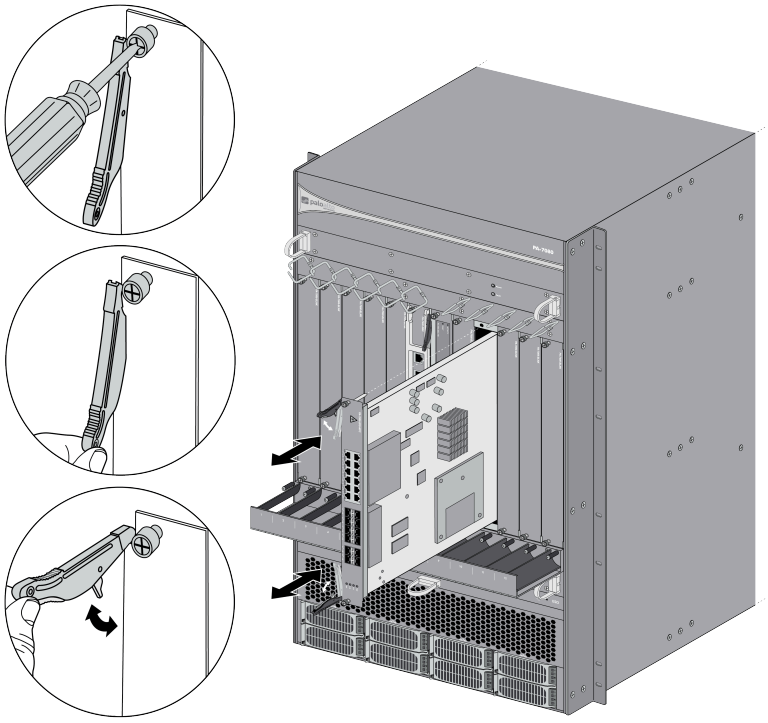
Install a PA-7000 Series Firewall DPC in a Single Chassis

STEP 1 | Put the provided ESD wrist strap on your wrist ensuring that the metal contact is touching your skin. Then attach (snap) one end of the ground cable to the wrist strap and remove the alligator clip from the banana clip on the other end of the ESD grounding cable. Plug the banana clip end into one of the ESD ports located on the front of the chassis before handling ESD sensitive hardware. For details on the ESD port location, see PA-7050 Front Panel (AC) or PA-7080 Front Panel (AC).

STEP 2 | Remove the DPC from the antistatic bag and partially slide it into any of the available DPC slots, ensuring that the handles are in the open position. When the card is about 1/4-inch

from being fully inserted, adjust the levers to align with the chassis and then close the levers to seat the card in place. The following images show how to install DPCs.





STEP 3 | Tighten the thumb screws on each side of the card to secure the card to the chassis by hand or using a Phillips-head screwdriver.

STEP 4 | Cover any empty slots with the provided blank slot covers. Each empty slot must be covered with the provided blank slot covers to ensure proper airflow and to prevent debris from entering the chassis.

STEP 5 | Enable the DPC by running the following command using slot 3 as an example:

```
admin@PA-7050> request chassis enable slot s3
```

It is recommended that you observe the enabled card for about two minutes to check for internal path monitoring failures. If there is no failure, proceed to the next step.

Check the status of the card in slot 3 on the chassis by running:

```
admin@PA-7050> show chassis status slot s3
```

If the card is functioning properly, the status will show an output similar to the following:

```
Slot...Component........Card Status.....Config Status
3.......PA-7000-DPC ...Up..................Success
```


STEP 6 | Ensure that the DPC's session distribution policy is set to **session-load**.

1. Run the following command to check the DPC's current distribution policy:

```
admin@PA-7050> show session distribution policy
```

2. If the **Ownership Distribution Policy** reads as any value other than **session-load**, run the following command:

```
admin@PA-7050> set session distribution-policy session-load
```

3. Running the **show session distribution policy** command should now read **Ownership Distribution Policy: session-load**.

Install a PA-7000 Series Firewall DPC in a High Availability (HA) Configuration

With all Palo Alto Networks firewalls, the hardware must match when configuring two firewalls in an HA pair. When configuring PA-7000 Series firewalls, the installed Data Processing Cards (DPCs) must also match and must be installed in the same slots on each firewall.

Installing and enabling a new DPC also causes any virtual routers to restart. In an HA clustering configuration, it is recommended that you activate the DPCs in both chassis simultaneously in order to limit downtime.

STEP 1 | Put the provided ESD wrist strap on your wrist ensuring that the metal contact is touching your skin. Then attach (snap) one end of the ground cable to the wrist strap and remove the alligator clip from the banana clip on the other end of the ESD grounding cable. Plug the banana clip end into one of the ESD ports located on the front of the chassis before handling ESD sensitive hardware. For details on the ESD port location, see PA-7050 Front Panel (AC) or PA-7080 Front Panel (AC).

STEP 2 | Using a Phillips-head screwdriver, remove the blank slot covers for each slot in which you will install a DPC.

STEP 3 | Remove the first DPC from the antistatic bag and partially slide it into any of the available DPC slots, ensuring that the handles are in the open position. When the card is about 1/4-inch from being fully inserted, adjust the levers to align with the chassis and then close the levers to seat the card in place.

STEP 4 | Install the second DPC in the other chassis in the HA pair in the same slot you installed the DPC in the first chassis. For example, if you installed the first DPC in slot 3 of the first chassis, install the second DPC in slot 3 of the second chassis.

After you install the firewall in the rack and power it on as described in Connect Power to a PA-7000 Series Firewall, use the CLI to bring up the DPCs in the HA pair.

Run the following command to power-on both DPCs in the HA pair:

```
admin@PA-7050> request chassis power-on slot <slot-number> target
 ha-pair
```

For example, if you installed the DPCs in slot 3 of each chassis, run the following command:

```
admin@PA-7050> request chassis power-on slot s3 target ha-pair
```

This will simultaneously power-on both cards in each chassis.

Enable the DPCs by running the following command:

```
admin@PA-7050> request chassis enable slot s3 target ha-pair
```

It is recommended that you observe the enabled cards for about two minutes to check for internal path monitoring failures. If there is no failure, proceed to the next step.

Check the status of the card in slot 3 on either chassis by running:

```
admin@PA-7050> show chassis status slot s3
```

If the cards are functioning properly, the status will show an output similar to the following:

```
Slot...Component........Card Status.....Config Status
3.......PA-7000-DPC ...Up.................Success
```

STEP 5 | Ensure that the DPC's session distribution policy is set to **session-load**.

1. Run the following command to check the DPC's current distribution policy:

   ```
   admin@PA-7050> show session distribution policy
   ```

2. If the **Ownership Distribution Policy** reads as any value other than **session-load**, run the following command:

   ```
   admin@PA-7050> set session distribution-policy session-load
   ```

3. Running the **show session distribution policy** command should now read **Ownership Distribution Policy: session-load**.

Configure Session Distribution on a PA-7000 Series Firewall

After the firewall is installed and powered on, you can review the available session distribution policies to determine if it make sense for you to change the default policy to better fit your environment. For details, refer to Session Distribution Policies in the PAN-OS Administrator's Guide.

Connect Power to a PA-7000 Series Firewall

The following topics describe how to connect power to a PA-7050 or PA-7080 firewall. Before proceeding, read PA-7000 Series Power Configuration Options and Determine PA-7000 Series Firewall Power Configuration Requirements to ensure that you understand the available power options and that you provide enough power to the firewalls based on your configuration. After you power on the firewall, you can View PA-7000 Series Firewall Power Statistics.

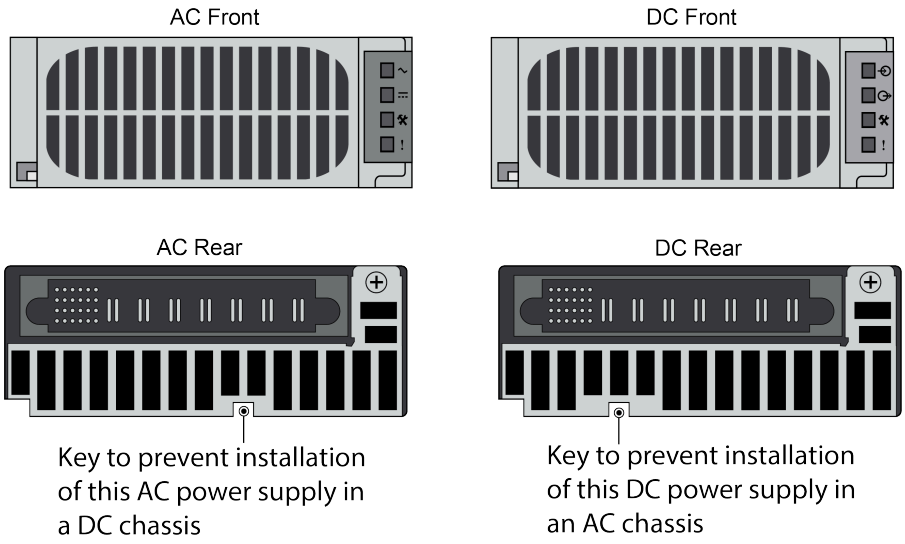
- Connect AC Power to a PA-7050 Firewall
- Connect DC Power to a PA-7050 Firewall
- Connect AC Power to a PA-7080 Firewall
- Connect DC Power to a PA-7080 Firewall

PA-7000 Series Power Configuration Options

This topic describes power configuration options for PA-7000 Series firewalls.

- **PA-7050 firewall—**Ships with either four AC or four DC power supplies preinstalled in the front power supply slots; you can change the power type (AC or DC) in the field.
  - **AC—**The AC power inlets and switches are located on the back of the chassis. The Power Entry Module (PEM) on the back of the chassis is not field serviceable.
  - **DC—**The DC power connections are located at the front of the DC power supplies (DC power cables are provided). The back AC power inlets and switches are disabled. You must cover the back inlets and switches using the cover plate (provided) as shown in PA-7050 Back Panel (DC).
- **PA-7080 firewall—**Ships with either four AC or four DC power supplies preinstalled in the front power supply slots; you cannot change the power type (AC or DC) in the field. However, you can install up to four additional power supplies.
  - **AC—**The AC power inlets and switches are located on the back of the chassis. The Power Entry Modules (PEMs) on the back of the chassis are not field serviceable.
  - **DC—**The DC power connections are located at the back of the chassis and cable lugs, star washers, and lug nuts are provided but the DC power cables are not. The Power Entry Modules (PEMs) on the back of the chassis are field serviceable (see Replace a PA-7080 DC PEM).

The following image shows the front and back of the PA-7080 AC and DC power supplies and also shows how the power supplies are keyed to prevent you from installing them in the wrong chassis. Although the PA-7050 and PA-7080 power supplies look similar, they are not interchangeable.



Determine PA-7000 Series Firewall Power Configuration Requirements

The number of active power supplies required to operate a PA-7000 Series firewall depends on the power input that you connect to the power supplies (120VAC, 240VAC, or -48VDC), the number of Network Processing Cards (NPCs), and your power redundancy requirement.

To determine the number of active power supplies required to operate the chassis, refer to PA-7000 Series Power Supply Chart and locate your model and power input type and then locate the column that coincides with the number of installed NPCs. To provide full redundancy, install double the minimum number of power supplies specified in the table. A fully redundant power configuration means that half of the installed power supplies can fail and the chassis and installed NPCs will still function.

If you connect 120VAC power and you install five or six NPCs in a PA-7050 firewall or ten NPCs in a PA-7080 firewall, you can configure only partial redundancy. Full redundancy is not possible because the chassis do not hold twice the minimum number of active 120VAC power supplies required to power the chassis and the NPCs.

Table 1: PA-7000 Series Power Supply Chart

Model and Power Input	NPCs Installed and Active Power Supplies Required									
	1 NPC	2 NPCs	3 NPCs	4 NPCs	5 NPCs	6 NPCs	7 NPCs	8 NPCs	9 NPCs	10 NPCs
PA-7050 Firewall 120VAC	2	2	2	2	3	3	-	-	-	-
PA-7050 Firewall240VAC or -48VDC	1	1	1	1	2	2	-	-	-	-

Model and Power Input	NPCs Installed and Active Power Supplies Required									
	1 NPC	2 NPCs	3 NPCs	4 NPCs	5 NPCs	6 NPCs	7 NPCs	8 NPCs	9 NPCs	10 NPCs
PA-7080 Firewall120VAC	2	2	3	3	3	4	4	4	4	5
PA-7080 Firewall 240VAC or -48VDC	1	1	2	2	2	2	2	2	2	3

For example, if you have a PA-7080 firewall with ten NPCs and configure it to use 240VAC or #48VDC, you must power on a minimum of three power supplies to power the chassis and all NPCs. For full redundancy, you must install and power on two power supplies in addition to the four that come with your chassis for a total of six active power supplies.

If one or more power supplies fail and there is not enough power to operate all installed NPCs, the firewall powers down NPCs starting from the highest NPC slot number to the lowest NPC slot number until the hardware power requirements no longer exceed the power that is still available to the chassis.

The power calculations used to provide the values in Example Chassis Power Output from a PA-7080 Firewall are based on the total output of each active power supply (1,200 watts with 120VAC input or 2,500 watts with either 240VAC or -48VDC input) minus the rated power consumption of all hardware components. You can find power information for hardware components in PA-7000 Series Firewall Component Electrical Specifications. To view power statistics on an active firewall, see View PA-7000 Series Firewall Power Statistics.

After you determine the power requirements for your firewall, see Connect Power to a PA-7000 Series Firewall and select the topic for your model and power type.

Connect AC Power to a PA-7050 Firewall

The following procedure describes how to connect power to a PA-7050 firewall with AC power supplies installed. The power supplies require 120VAC 15-amp or 240VAC 20-amp power input. For details on power requirements, see Determine PA-7000 Series Firewall Power Configuration Requirements.

STEP 1 | Read Product Safety Warnings.

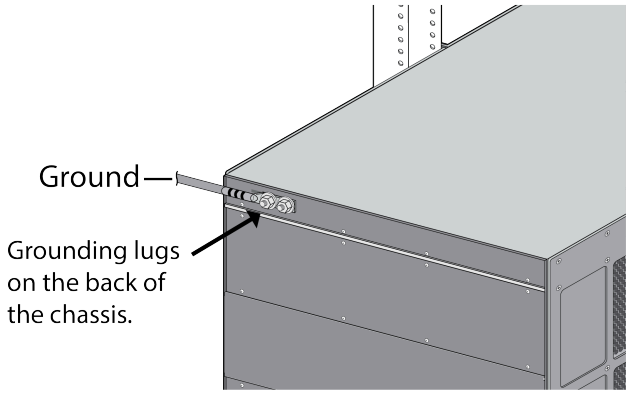
STEP 2 | Put the provided ESD wrist strap on your wrist ensuring that the metal contact is touching your skin. Then attach (snap) one end of the ground cable to the wrist strap and remove the alligator clip from the banana clip on the other end of the ESD grounding cable. Plug the banana clip end into one of the ESD ports located on the front of the chassis before handling ESD sensitive hardware. For details on the ESD port location, see PA-7050 Front Panel (AC) or PA-7080 Front Panel (AC).

STEP 3 | Ensure that all AC power switches are in the off position.

STEP 4 | Remove the two nuts and star washers from the ground studs located on the back of the chassis on the upper left side.

STEP 5 | Crimp a 6-AWG wire to the provided grounding lug and connect the other end to your earth ground point.

STEP 6 | Connect the two-post lug connector to the two-post ground studs on the chassis using the provided star washers and nuts and then torque the nuts to 50 in-lbs. Be careful not to strip the nuts and studs.

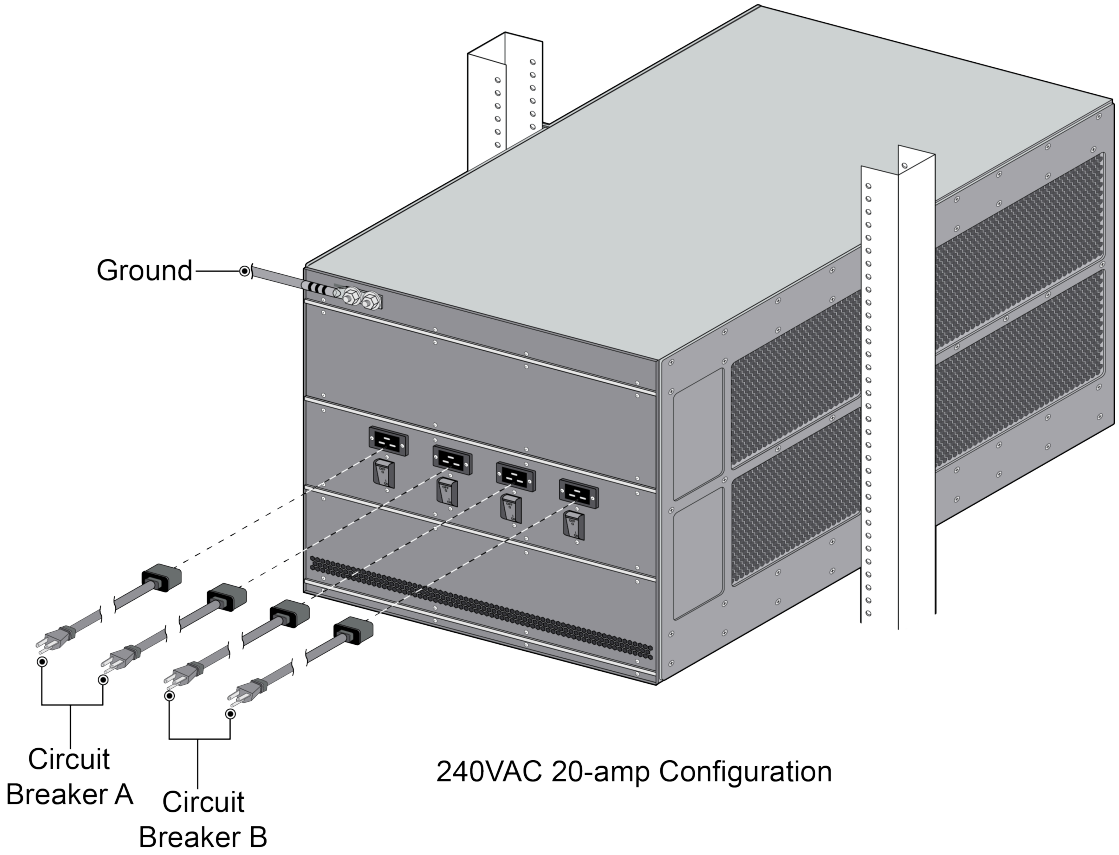


STEP 7 | Connect the first two power supplies to a 120VAC 15-amp circuit breaker or 240VAC 20-amp circuit breaker using the provided power cords and then connect the second two power supplies to a second, independent 120VAC 15-amp circuit breaker or 240VAC 20-amp circuit breaker.

If you connect 120VAC power and you install five or six NPCs in a PA-7050 firewall or ten NPCs in a PA-7080 firewall, you can configure only partial redundancy. Full redundancy is not possible because the chassis do not hold twice the minimum number of active 120VAC power supplies required to power the chassis and the NPCs.

STEP 8 | Secure the power cords to the power inlets using the power cord retainer clips.

STEP 9 | Confirm that all front slot cards are properly inserted and then turn on each of the four AC power switches located on the back of the chassis. The chassis will power on.



Connect DC Power to a PA-7050 Firewall

The following procedure describes how to connect power to DC power supplies in a PA-7050 firewall. The DC power supplies require -40VDC to -60VDC power input. For details on power requirements, see Determine PA-7000 Series Firewall Power Configuration Requirements.

For the DC input circuit, make sure there is a 60-amp protected circuit breaker, minimum -40VDC to -60VDC, and a double pole on the input to the DC power. The power cables used to connect DC power are provided with the PA-7050 firewall, but not the PA-7080 firewall.

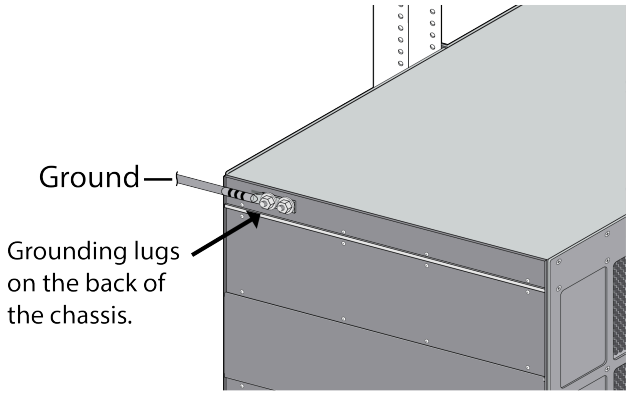
STEP 1 | Read Product Safety Warnings.

STEP 2 | Put the provided ESD wrist strap on your wrist ensuring that the metal contact is touching your skin. Then attach (snap) one end of the ground cable to the wrist strap and remove the alligator clip from the banana clip on the other end of the ESD grounding cable. Plug the banana clip end into one of the ESD ports located on the front of the chassis before handling ESD sensitive hardware. For details on the ESD port location, see PA-7050 Front Panel (AC).

STEP 3 | Remove the two nuts and star washers from the ground studs located on the back of the chassis on the upper left side.

STEP 4 | Crimp a 6-AWG wire to the provided grounding lug and connect the other end to your earth ground point.

STEP 5 | Connect the two-post lug connector to the two-post studs on the chassis using the provided star washers and nuts and then torque the nuts to 50 in-lbs. Be careful not to strip the nuts and lug studs.



STEP 6 | Power off your DC power feed.

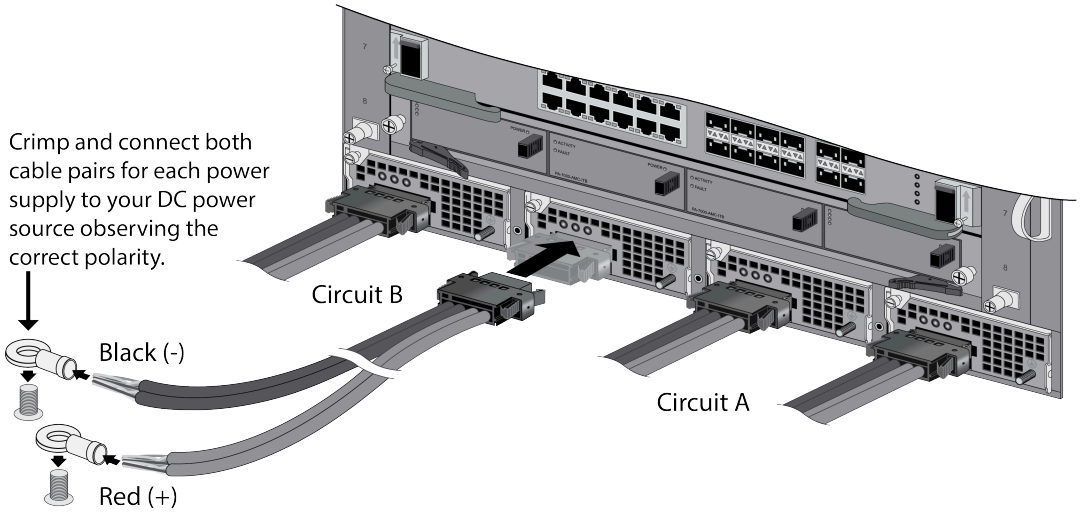
STEP 7 | Connect each of the four DC power supplies to a -48VDC power source using the provided DC power cables.

1. Crimp the bare wire ends of the cables using lugs (not included) designed for your DC power source. Each cable has two red (positive) and two black (negative) wires. Crimp the two black wires together and connect to your DC negative terminal and then crimp the two red wires together and connect to the positive terminal. Do this for each of the four power supplies, ensuring that the first two power supplies on the left are connected to one power circuit breaker and the second pair on the right is connected to a different circuit breaker. This ensures power redundancy and allows for planned electrical circuit maintenance.
2. Connect the other ends of the DC cables to the front of the DC power supplies by pushing the plastic connector into the DC power supply until it clicks into place. Ensure that you connect each pair of power supplies to a different circuit breaker.

When cabling the DC power supply to your power source, ensure that you route the cable in such a way that it does not put pressure on the plastic clips located at the front of the DC power supplies. It is best to route the cables first and then plug the cables into the power supplies.

STEP 8 | Confirm that all front slot cards are properly inserted.

STEP 9 | After each DC cable is securely connected, power on the DC power source and the chassis will power on.



Connect AC Power to a PA-7080 Firewall

The following procedure describes how to connect power to a PA-7080 firewall with AC power supplies installed. The power supplies require 120VAC 15-amp or 240VAC 20-amp power input. For details on power requirements, see Determine PA-7000 Series Firewall Power Configuration Requirements.

STEP 1 | Read Product Safety Warnings.

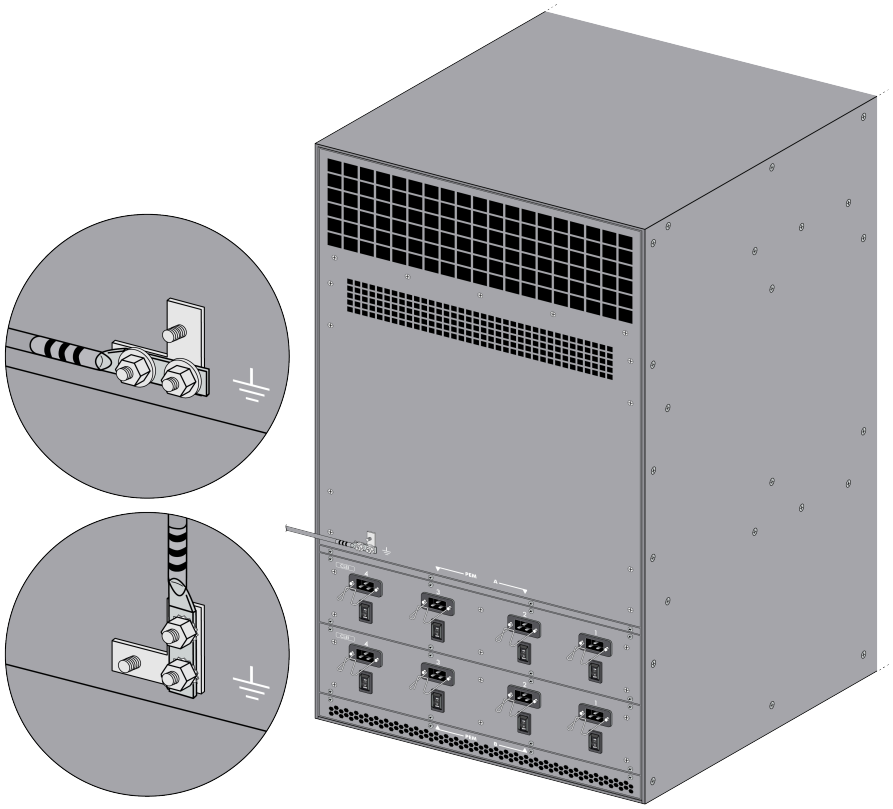
STEP 2 | Put the provided ESD wrist strap on your wrist ensuring that the metal contact is touching your skin. Then attach (snap) one end of the ground cable to the wrist strap and remove the alligator clip from the banana clip on the other end of the ESD grounding cable. Plug the banana clip end into one of the ESD ports located on the front of the chassis before handling ESD sensitive hardware. For details on the ESD port location, see PA-7080 Front Panel (AC).

STEP 3 | Ensure that all AC power switches are in the off position.

STEP 4 | Remove the two nuts and star washers from the ground studs located on the back of the chassis on the upper left side.

STEP 5 | Crimp a 6-AWG wire to the provided cable lug and connect the other end of the wire to your ground point using a lug designed for your ground point.

STEP 6 | Connect the two-post lug connector to the two-post lugs on the chassis using the provided star washers and nuts and then torque the nuts to 50 in-lbs. You can install the lug in a vertical or horizontal position. Be careful not to strip the threads on the nuts and lug studs.

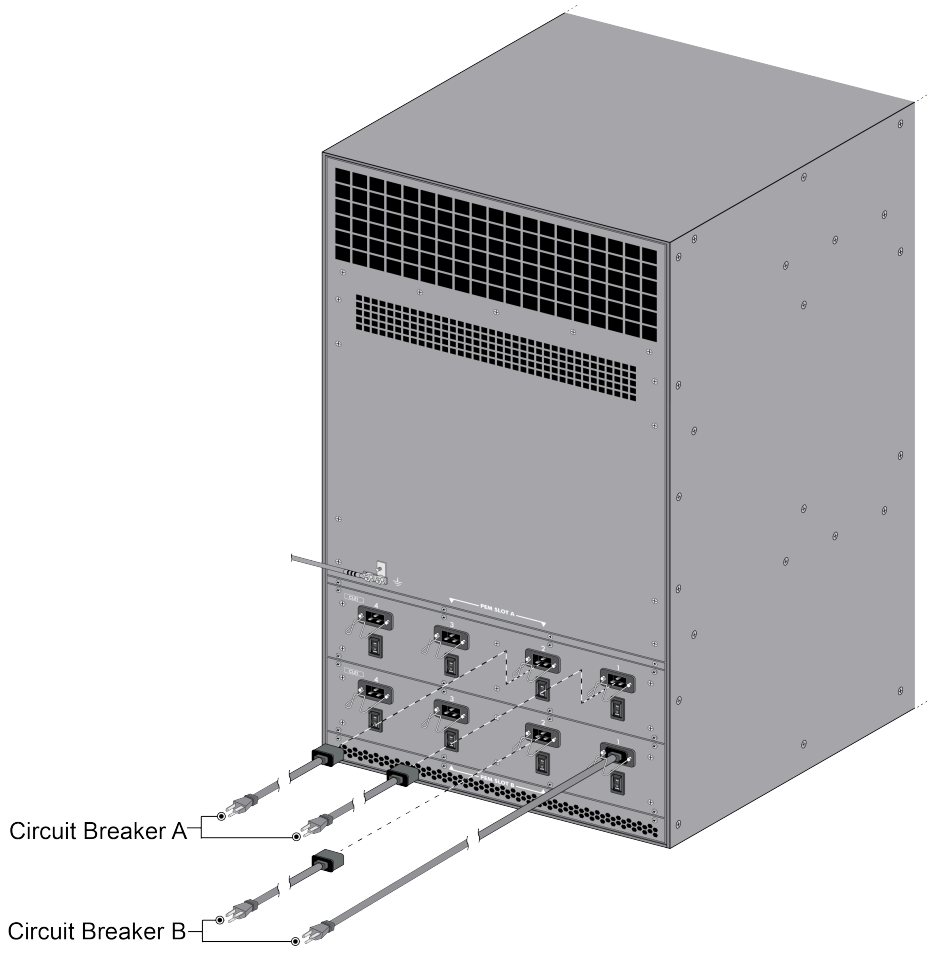


STEP 7 | Connect the first two power supplies (PEM A power inlets 1 and 2) to the appropriate (120VAC 15#amp circuit breaker or 240VAC 20-amp) circuit breaker using the provided power cords and then connect the second two power supplies (PEM B power inlets 1 and 2) to a second appropriate and independent (120VAC 15#amp circuit breaker or 240VAC 20-amp) circuit breaker.

If you connect 120VAC power and you install five or six NPCs in a PA-7050 firewall or ten NPCs in a PA-7080 firewall, you can configure only partial redundancy. Full redundancy is not possible because the chassis do not hold twice the minimum number of active 120VAC power supplies required to power the chassis and the NPCs.

STEP 8 | Secure the power cords to the power inlets using the power cord retainer clips.

STEP 9 | Confirm that all front slot cards are properly inserted and then turn on each of the four AC power switches located on the back of the chassis. The chassis will power on.



—

Connect DC Power to a PA-7080 Firewall

The following procedure describes how to connect power to DC power supplies in a PA-7080 firewall. The power supplies require -40VDC to -60VDC power input. For details on power requirements, see Determine PA-7000 Series Firewall Power Configuration Requirements.

You must connect each of the eight DC power connections (four on each PEM) to separate 60-amp protected circuit breakers, minimum -48VDC, and a double pole on the input to the DC power.

Due to the various DC cable lengths required in your environment, DC power cables are not provided with the PA-7080 DC model.

STEP 1 | Read Product Safety Warnings.

STEP 2 | Put the provided ESD wrist strap on your wrist ensuring that the metal contact is touching your skin. Then attach (snap) one end of the ground cable to the wrist strap and remove the alligator clip from the banana clip on the other end of the ESD grounding cable. Plug the banana clip end into one of the ESD ports located on the front of the chassis before handling ESD sensitive hardware. For details on the ESD port location, see PA-7080 Front Panel (AC).

STEP 3 | Remove the two nuts and star washers from the ground studs located on the back of the chassis on the upper left side.

STEP 4 | Crimp a 6-AWG wire to the grounding lug and connect the other end to your earth ground point.

STEP 5 | Connect the two-post lug connector to the two-post studs on the chassis using the provided star washers and nuts and then torque the nuts to 50 in-lbs. You can install the lug in a vertical or horizontal position. Be careful not to strip the threads on the nuts and lug studs.

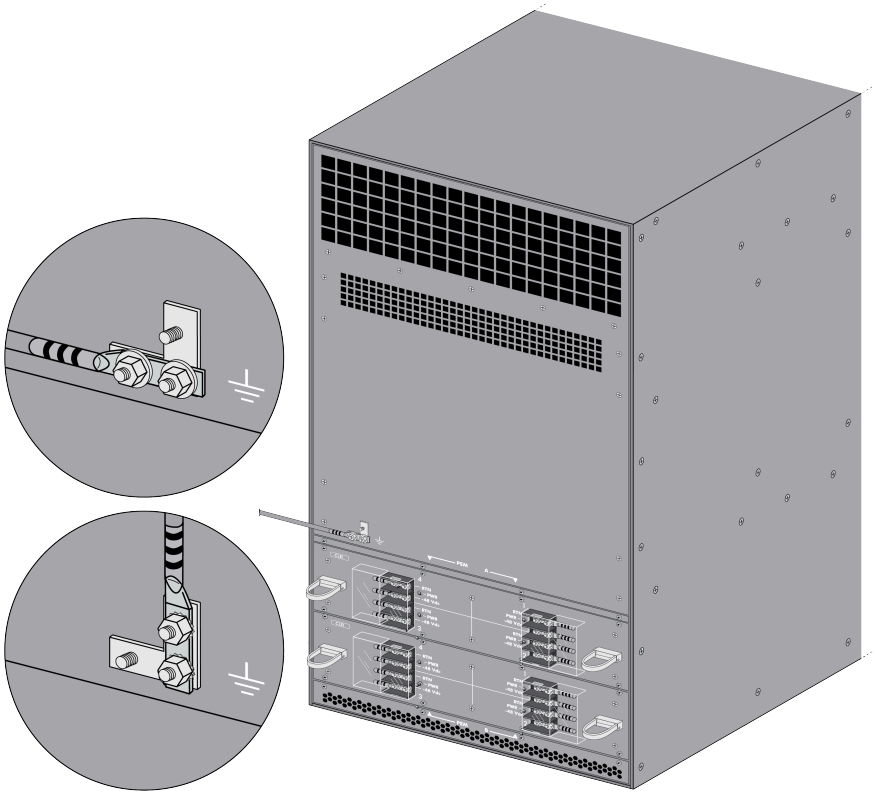


Figure 6: PA-7080 Ground Cable Connection

STEP 6 | While facing the back of the chassis, remove the plastic covers that protect the DC power connections for PEM A (1 and 2) and PEM B (1 and 2).

If you are installing additional DC power supplies on the front of the chassis, remove the plastic covers for the corresponding PEM numbers. For example, to install two additional power supplies, remove the covers over PEM A (3) and PEM B (3).

STEP 7 | Remove the two nuts and star washers from the DC power studs on the PEMs and then remove the power lugs. In this case, you are connecting four power supplies, so remove a total of eight lugs from PEM A (1 and 2) and PEM B (1 and 2).

STEP 8 | Crimp each two#hole power lug (eight total) to enough 6-AWG wire to reach from the DC lug on the PEM to your DC power source. Connect lugs (not included) designed for your DC power source to the other end of each cable. Use red wire for the positive cables and black wire for negative cables.

Do not connect the cables to the live power source at this point.

STEP 9 | Power off your DC power feed.

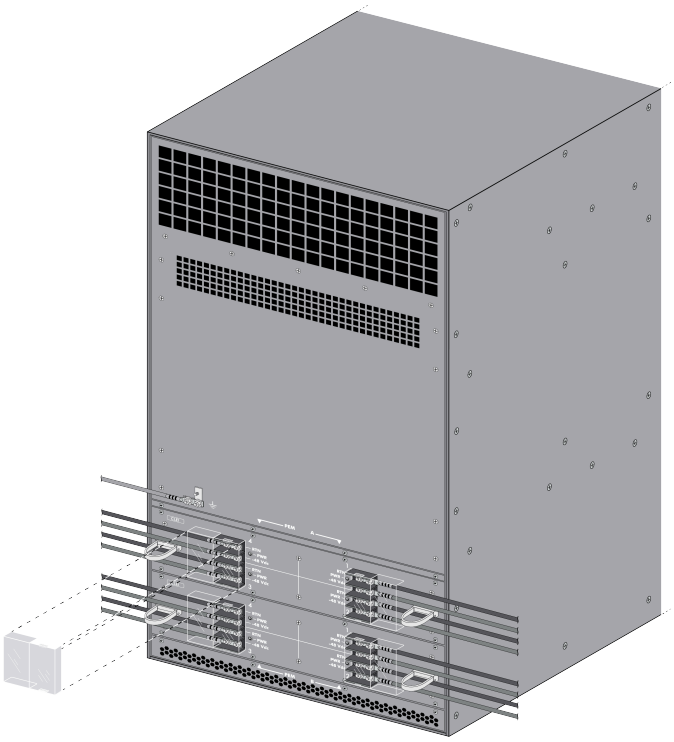
STEP 10 | Connect a positive cable (red) from your power source to the two-post RTN studs for PEM A 1 and then connect a negative cable (black) from your power source to the two-post studs for PEM A 1 #48VDC studs. Do the same for PEM A 2, ensuring that you connect each connection using the correct polarity and that each connection goes to a 60-amp protected circuit breaker.

STEP 11 | Using DC power connected to a different 60-amp protected circuit breaker, connect a positive cable (red) from your power source to the two-post RTN studs for PEM B and then connect a negative cable (black) from your power source to the two-post studs PEM B 1 -48VDC. Do the same for PEM B, ensuring that you connect each connection using the correct polarity. This will connect the four power supplies located at the front of the chassis numbered 1 A and 1 B and 2 A and 2 B.

STEP 12 | Re-attach the plastic covers over the exposed DC power studs and cables.

STEP 13 | Confirm that all front slot cards are properly inserted.

STEP 14 | After each DC cable is securely connected, power on the DC power source and the chassis will power on.



View PA-7000 Series Firewall Power Statistics

Use the following information to learn how to view active power statistics on a PA-7000 Series firewall to help you ensure power redundancy and to plan for growth. You can view the amount of power that each power supply is producing as well as the power rating for each hardware component.

This information will also help you Determine PA-7000 Series Firewall Power Configuration Requirements.

*The power numbers provided by the **`show chassis power`** command represent power calculated by the chassis power management software and does not represent the exact measured power. The difference allows margin for thermal conditions and component aging factors. For example, although an NPC shows that it is using 350 watts, under normal conditions it may use only 290 watts. This CLI output helps you know how much power is required to prevent the chassis from overloading under extreme conditions.*

STEP 1 | Using a terminal emulator, such as PuTTY, launch an SSH session to the firewall.

Run the following command:

```
admin@PA-7080> show
chassis power
```


STEP 2 | View the output for information on the status of each component and the current power rating.

For example, the following table shows the CLI output (in table format) from a PA-7080 with four power supplies and six NPCs installed. The output shows each front slot (1 to 12), the installed power supplies and fan trays, the status of each component, the rated power consumption for each component, and the amount of power produced by each power supply. The power supplies are labeled PSA1 to PSA4 and PSB1 to PSB4.

Example Chassis Power Output from a PA-7080 Firewall

Slot	Component	Card Status	Power (w)
1	PA-7000-20GXM-NPC	Up	350
2	PA-7000-20GXM-NPC	Up	350
3	PA-7000-20GQXM-NPC	Up	350
4	PA-7000-20GQXM-NPC	Up	350
5	PA-7000-20GQXM-NPC	Up	350
6	PA-7080-SMC	Up	300
7	PA-7000-LPC	Up	300
8	empty		
9	PA-7000-20GXM-NPC	Up	350
10	empty		
11	empty		
12	empty		

Slot	Component	Card Status	Power (w)
FANTRAY 1	PA-7080-FANTRAY	Present	520
FANTRAY 2	PA-7080-FANTRAY	Present	520
PSA1	CP2500AC54TE	OK	2500 (+)
PSA2	CP2500AC54TE	OK	2500 (+)
PSA3	empty		
PSA4	empty		
PSB1	CP2500AC54TE	OK	2500 (+)
PSB2	CP2500AC54TE	OK	2500 (+)
PSB3	empty		
PSB4	empty		
	Provided: Used: Remaining		10000 3740 6260

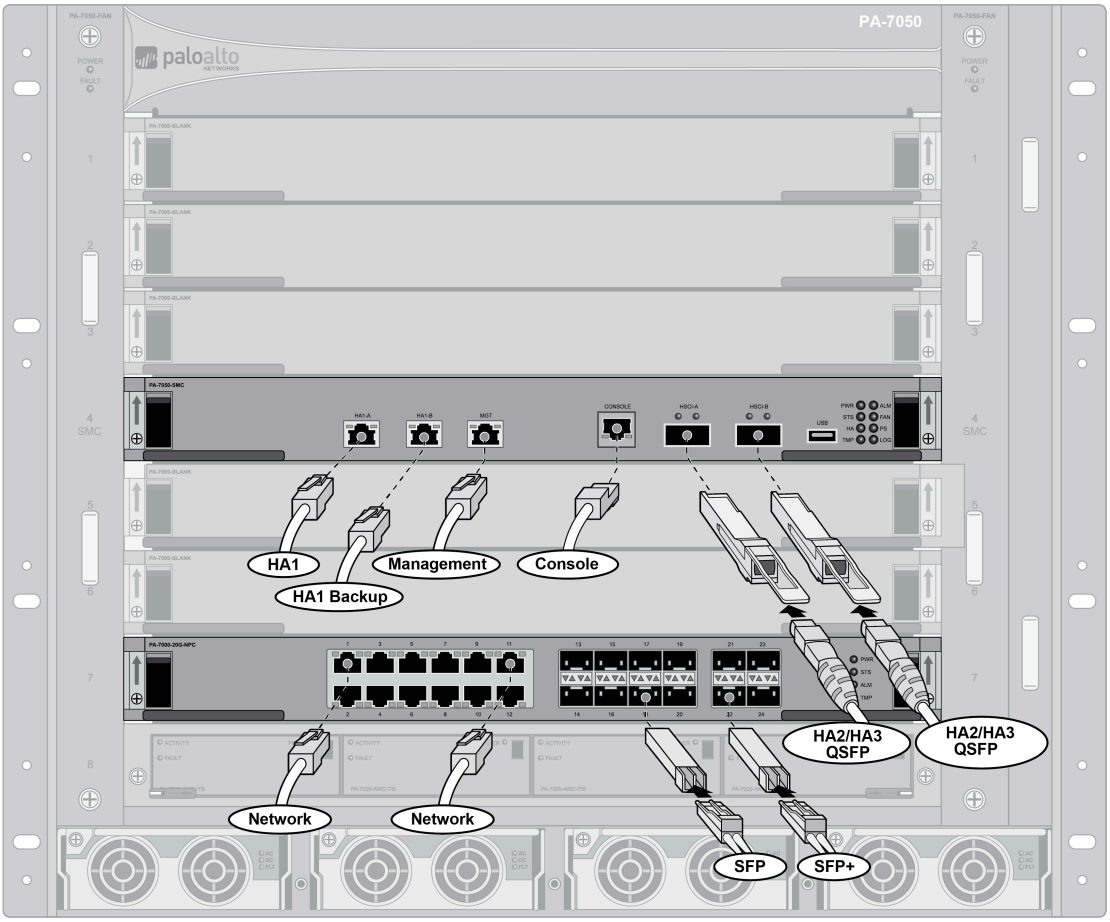
As indicated in the last row of the table, the four 2500 watt power supplies provide 10000 watts and the installed hardware components (SMC, LPC or LFC, and NPCs) use 3740 watts. If you subtract 3740 from 10000, there is 6260 watts of power remaining.

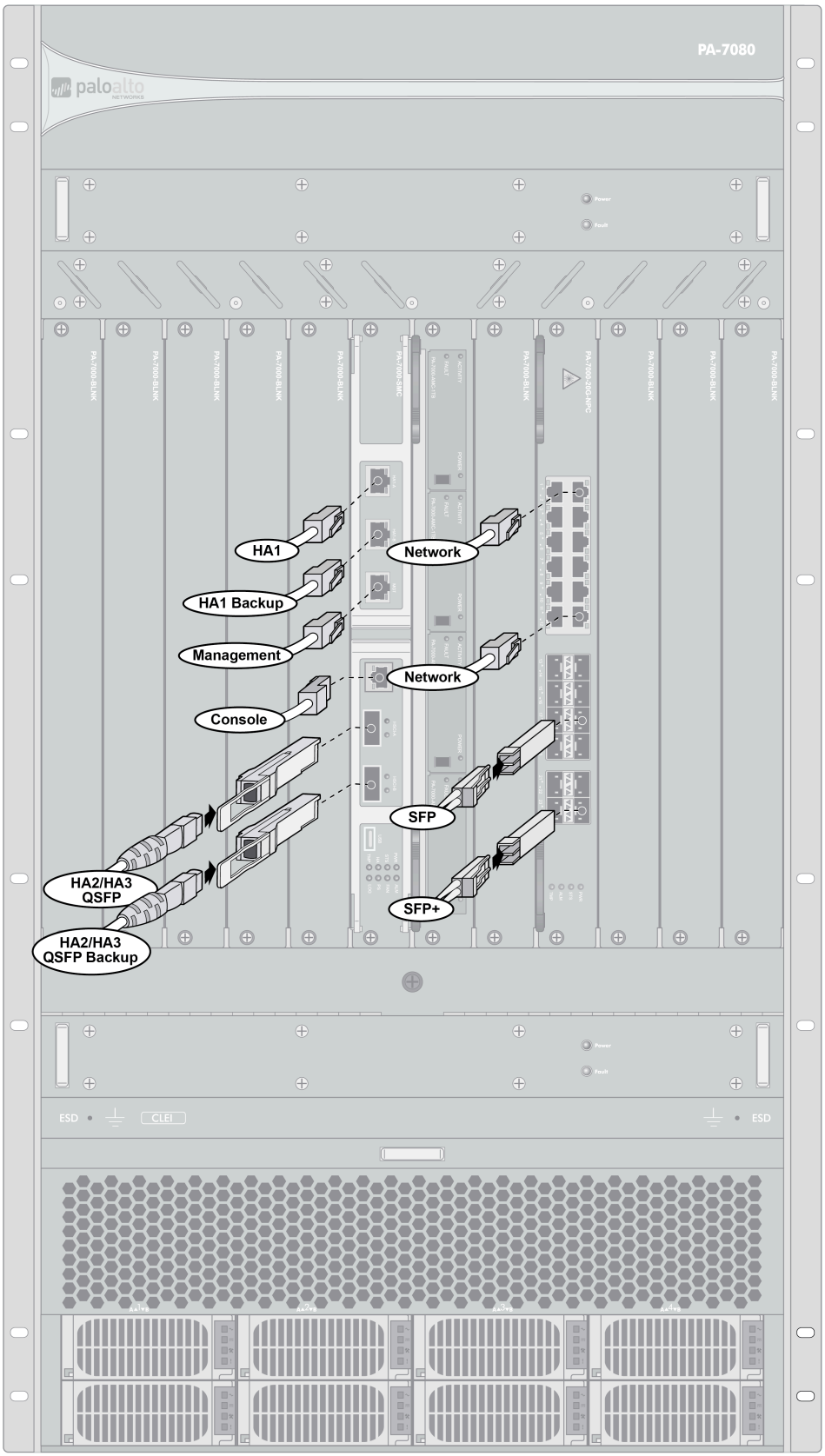
Connect Cables to a PA-7000 Series Firewall

After you Connect Power to a PA-7000 Series Firewall, connect your management computer to the management port (MGT) on the firewall so you can begin the initial configuration. You can optionally connect your management computer to the console port, which provides a serial connection to the firewall and enables you to view the bootup messages and manage the firewall using the command line interface (CLI). Both the MGT and console ports are located on the Switch Management Card (SMC). You then configure the Network Processing Card (NPC) ports and then connect these ports to your switch or router.

If you install two matching firewalls in a high availability configuration, you will also connect HA cables between the two chassis (see HA Links and Backup Links).

The following images show the PA-7050 firewall and PA-7080 firewall cable connections. To install cable guides, see PA-7000 Series Firewall Equipment Rack Installation.





Verify the PA-7000 Series Firewall LPC and NPC Configuration

After you install the front-slot cards and power on the PA-7000 Series firewall (described in Connect Power to a PA-7000 Series Firewall), you can use the following information to verify the status of the Log Processing Card (LPC) and the Network Processing Cards (NPCs).

- Verify the PA-7000 Series Firewall LPC Configuration
- Verify the PA-7000 Series Firewall NPC Configuration

Verify the PA-7000 Series Firewall LPC Configuration

After you install the Log Processing Card (LPC) and Advanced Mezzanine Cards (AMCs) in the chassis, the firewall configures the first two drives on the left (A1 and A2) in a RAID 1 pair and the second two drives (B1 and B2 on the right) in a second RAID 1 pair. If the AMCs contain 1TB drives the total log storage capacity is 2TBs; if the AMCs contain 2TB drives the total capacity is 4TBs. The initial formating and RAID 1 configuration will take approximately 3 minutes.

The chassis will not operate without a functioning LPC with at least one drive configured. During normal operation, all four drives should be installed and configured in two RAID 1 pairs.

To view the status of the RAID configuration, run the following command:

```
admin@PA-7050> show system
raid detail
```

Confirm that at least one RAID 1 pair shows `Available`, which indicates that a drive pair is ready and the LPC can receive logs. In the following output, `Disk Pair S8A` shows `Available` and the status of the first RAID 1 is `clean`. The second RAID 1 pair (`Disk Pair S8B`) is also ready.

```
Disk Pair S8A                           Available
   Status                                   clean
   Disk id A1                             Present
       model        : ST91000640NS
       size         : 953869 MB
       status       : active sync
       card serial  : 002901000061
   Disk id A2                             Present
       model        : ST91000640NS
       size         : 953869 MB
       status       : active sync
       card serial  : 002901000067
Disk Pair S8B                           Available
   Status                                   clean
   Disk id B1                             Present
       model        : ST91000640NS
       size         : 953869 MB
       status       : active sync
```



```
        card serial  : 002901000089
    Disk id B2                          Present
        model        : ST91000640NS
        size         : 953869 MB
        status       : active sync
        card serial  : 002901000076
```

The output also shows the model, size, status, and the AMC serial number. For information on replacing a failed drive and commands to add and remove drives, see Replace a PA-7000 Series Firewall LPC Drive.

The following table describes the possible status levels for a drive:

Table 2: AMC Status Indicators

Status	Description
not in use	The drive is not part of a RAID pair.
spare rebuilding	After replacing a failed drive in a RAID 1 pair, this status message indicates that the firewall is synchronizing data from the existing drive to the new drive.
active sync	The drive is ready and is currently part of a RAID 1.
failed	The drive has failed and must be replaced.

Verify the PA-7000 Series Firewall NPC Configuration

When you first set up a PA-7000 Series firewall, all NPC slots are ready to use. If you are working with a firewall that is already deployed, you should check slot status before adding a new NPC to ensure that the NPC slot is ready. If the firewall is in a high availability (HA) configuration, a newly installed NPC stays in a disabled state until a matching NPC is installed. After you install a matching NPC in the same slot number in the HA peer firewall, you must enable the NPCs.

The following commands describe how to view NPC status and how to change the state of an NPC.

To view NPC status, run the following command:

```
admin@PA-7050> show chassis
status slot <slot-number>
```

For example, to view the status of slot 3 run the following command:

```
admin@PA-7050> show chassis
status slot s3
```

If an NPC slot is ready to use, the status shows `empty`. When you insert an NPC, the system updates the status of the slot.

After you successfully install an NPC, the status shows `Card Status Up` and `Config Status Success`.

You can power down a slot and the slot will stay in the down state until you power it on. Use the following commands to change the slot status:

To power on an NPC slot:

```
admin@PA-7050> request
chassis admin-power-on slot <slot-number>
```

To power off an NPC slot:

```
admin@PA-7050> request
chassis admin-power-off slot <slot-number>
```

To temporarily power down a slot:

```
admin@PA-7050> request
chassis power-off slot <slot-number>
```

In an HA configuration, you must install the same number and model of NPCs in each chassis and the slot numbers must match. After you install the NPCs in each chassis, the firewall keeps them in a disabled state until you enable them. This allows the firewall to start HA monitoring on both NPCs.

Use the following command to bring up a pair of NPCs in an HA configuration:

```
admin@PA-7050> request
chassis power-on slot <slot-number> target ha-pair
```

For example, to enable NPCs installed in slot 3 of both chassis, run the following command:

```
admin@PA-7050> request
chassis power-on slot s3 target ha-pair
```

For information on installing NPCs, see Replace a PA-7000 Series Network Processing Card (NPC) and for information on slot status indicators, see PA-7000 Series Front Slot States.

Install the PA-7080 Firewall EMI Filter

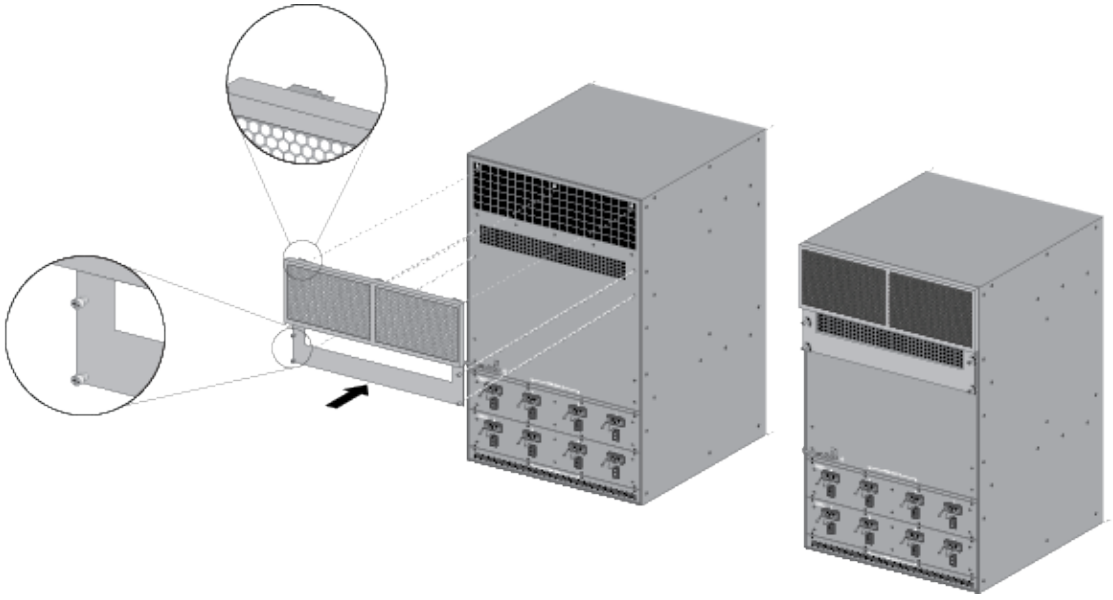
The PA-7080 Electromagnetic Interference (EMI) filter (PAN-PA-7080-EMI-FLTR) reduces EMI emissions and is required when you install the following hardware components:

- PA-7000 100G NPC
- PA-7080-SMC-B
- PA-7000-LFC-A

If the last five digits of your PA-7080 firewall serial number are greater than 10,000, or the PA-7080 was manufactured after March 2019, the built-in internal EMI filter is already installed and this external EMI filter is not required. Inspect the back vents to determine if the internal filter is installed.

STEP 1 | Slide the top tabs of the EMI filter into the top row of air vents on the back of the firewall and then lower the filter until it is flush with the chassis.

STEP 2 | Secure the filter to the chassis using the four captive screws (two screws on each side).



Service the PA-7000 Series Firewall Hardware

The following topics describes how to replace field-serviceable components on a PA-7000 Series firewall. For an overview of the hardware components, see PA-7000 Series Firewall Overview.

- Replace a PA-7000 Series Firewall AC or DC Power Supply
- Replace a PA-7000 Series SMC Boot Drive
- Replace a PA-7000 Series Firewall LPC Drive
- Increase the PA-7000 Series Firewall LPC Log Storage Capacity
- Replace a PA-7000 Series Firewall Fan Tray
- Replace a PA-7000 Series Firewall Air Filter
- Replace a PA-7000 Series Firewall Front Slot Card

Replace a PA-7000 Series Firewall AC or DC Power Supply

The following topics describe how to interpret the power supply LEDs and how to replace a PA-7000 Series firewall power supply.

- Interpret the PA-7000 Series Firewall Power Supply LEDs
- Replace a PA-7000 Series AC Power Supply
- Replace a PA-7000 Series DC Power Supply

Interpret the PA-7000 Series Firewall Power Supply LEDs

- PA-7050 Power Supply LEDs
- PA-7080 Power Supply LEDs

PA-7050 Power Supply LEDs

Use the following information to learn how to interpret the LEDs on the PA-7050 AC power supply.

LEDs	Description
	• **AC (Input)**—Green indicates that the power supply input is within normal limits, blinking indicates power input is out of normal limits, and off indicates no power input. • **DC (Output)**—Green indicates that the power supply DC output to the chassis components are within normal limits, blinking indicates power overload, and off indicates no DC output power. • **FLT (Fault)**—Red indicates a power supply failure, blinking indicates that the management plane cannot communicate with the power supply, and off indicates no issues.

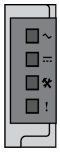
The following table describes the PA-7050 DC power supply LEDs.

LEDs	Description
	The LEDs on the power supply are not labeled. The following descriptions list the LEDs from left to right. • **Input**—Green indicates that the power supply input is within normal limits, blinking indicates power input is out of normal power limits, and off indicates no power input. • **Output**—Green indicates that the power supply DC output to the chassis components are within normal limits, blinking indicates power overload, and off indicates no DC output power.

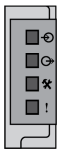
LEDs	Description
	• **Fault**—Red indicates a power supply failure, blinking indicates that the management plane cannot communicate with the power supply and off indicates no issues.

PA-7080 Power Supply LEDs

Use the following information to learn how to interpret the LEDs on the PA-7080 AC power supply.

LEDs	Description
	• **Input**—Green indicates that the power supply input is within normal limits, blinking indicates power input is out of normal limits, and off indicates no power input. • **Output**—Green indicates that the power supply DC output to the chassis components are within normal limits, blinking indicates power overload, and off indicates no DC output power. • **Warning**—Yellow indicates that the power supply temperature is exceeded, blinking indicates that the power supply needs service and should be replaced, and off indicates no warning. • **Fault**—Red indicates a power supply failure, blinking indicates that the management plane cannot communicate with the power supply, and off indicates no issues.

The following table describes the PA-7080 DC power supply LEDs.

LEDs	Description
	• **Input**—Green indicates that the power supply input is within normal limits and off indicates no power input. • **Output**—Green indicates that the power supply DC output to the chassis components are within normal limits and blinking indicates overload. • **Warning**—Yellow indicates that the power supply temperature is exceeded and off indicates no warning. • **Fault**—Red indicates a power supply failure and off indicates no issues.

Replace a PA-7000 Series AC Power Supply

- Replace a PA-7050 AC Power Supply
- Replace a PA-7080 AC Power Supply

Replace a PA-7050 AC Power Supply

STEP 1 | Put the provided ESD wrist strap on your wrist ensuring that the metal contact is touching your skin. Then attach (snap) one end of the ground cable to the wrist strap and remove the alligator clip from the banana clip on the other end of the ESD grounding cable. Plug the banana clip end into one of the ESD ports located on the front of the chassis before handling ESD sensitive hardware. For details on the ESD port location, see PA-7050 Front Panel (AC).

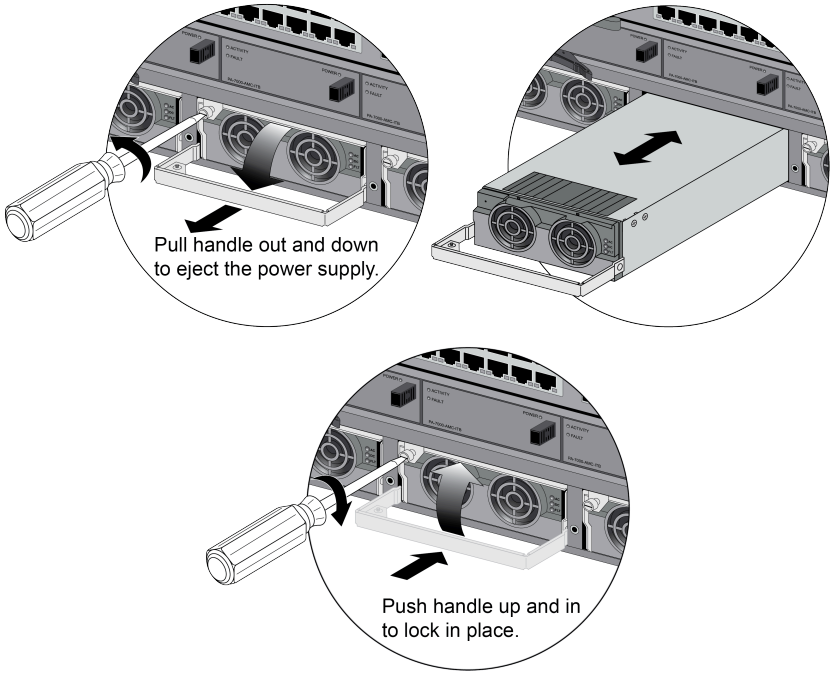
STEP 2 | Locate the failed power supply by viewing the system logs or by viewing the LED on the front of the power supply. A red LED indicates a failed power supply. For details on the power supply LEDs, see Interpret the PA-7000 Series Firewall Power Supply LEDs.

STEP 3 | Power off the failed power supply; the switch is on the back of the chassis. Then unplug and remove the power cord (leaving the cord in place can cause arcing inside the chassis).

The front power supplies correspond directly to the power connection on the back of the chassis. For example, if you are facing the front of a PA-7050 chassis, the power supply on the far left corresponds to the switch and cord located on the far right when facing the back of the chassis.

STEP 4 | Loosen the power supply thumb screw located at the top left of the power supply.

STEP 5 | Pull the power supply ejector handle out and down from the top center of the power supply to disengage it from the chassis and then slide the power supply out of the chassis using the handle.



STEP 6 | Remove the replacement power supply from the packaging and open the front ejector handle until it is fully open.

STEP 7 | Slide the new power supply into the empty power supply slot until it is almost fully seated. Ensure that the notch near the hinged part of the ejector handle lines up with the chassis, so that you can close the handle and properly seat the power supply.

STEP 8 | Tighten the upper left thumb screw on the power supply to secure the power supply.

STEP 9 | Plug the power cable into the corresponding AC power module on the back of the chassis and turn on the power switch. The new power supply turns on and the LED will turn green.

Replace a PA-7080 AC Power Supply

STEP 1 | Put the provided ESD wrist strap on your wrist ensuring that the metal contact is touching your skin. Then attach (snap) one end of the ground cable to the wrist strap and remove the alligator clip from the banana clip on the other end of the ESD grounding cable. Plug the banana clip end into one of the ESD ports located on the front of the chassis before handling ESD sensitive hardware. For details on the ESD port location, see PA-7080 Front Panel (AC).

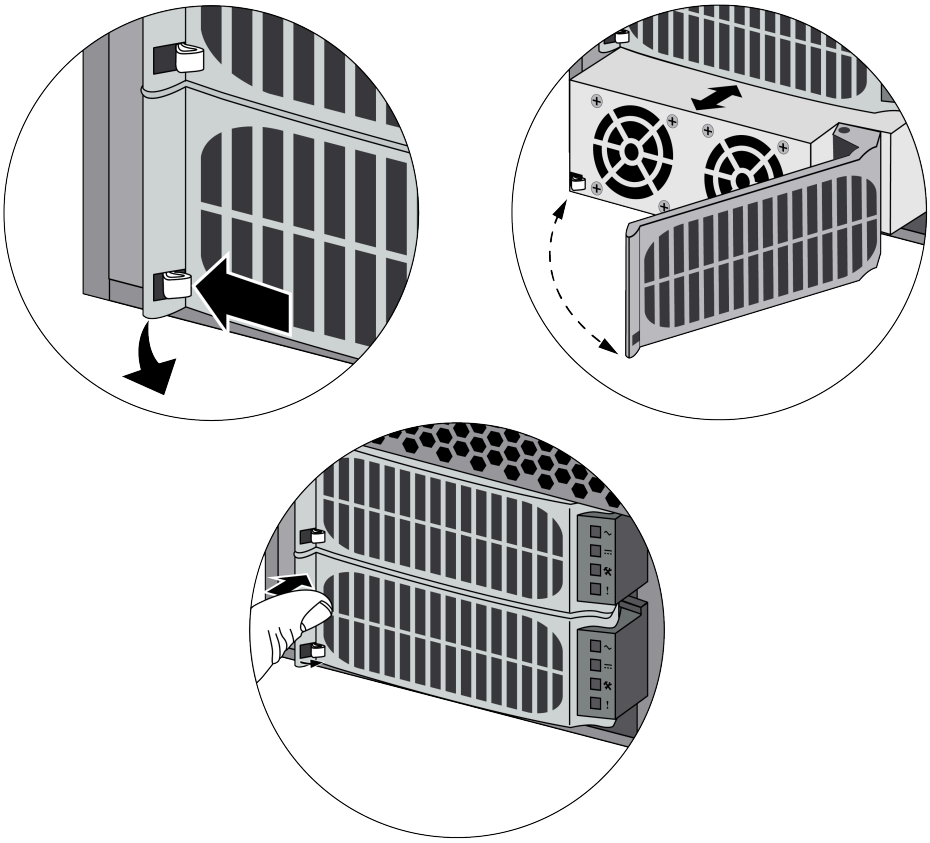
STEP 2 | Locate the failed power supply by viewing the system logs or by viewing the LED on the front of the power supply. A red LED indicates a failed power supply. For details on the power supply LEDs, see Interpret the PA-7000 Series Firewall Power Supply LEDs.

STEP 3 | Power off the failed power supply; the switch is on the back of the chassis. Then unplug and remove the power cord (leaving the cord in place can cause arcing inside the chassis).

The front power supplies correspond directly to the power connections on the back of the chassis from front to back. There are two rows of power supplies on the front of the chassis and two rows of PEMs on the back. For example, while facing the front of a PA-7080 firewall, the two far left power supplies are 1A and 1B, which connect to the power connections on the far right when facing the back of the chassis and numbered PEM A 1 and PEM B 1.

STEP 4 | Remove the failed power supply by pushing the small metal clip located on the bottom left of the power supply ejector door (as shown in the following image) and then pulling the power

supply door toward you from the left side to eject the power supply from the chassis. Then pull the power supply toward you and remove it.



STEP 5 | Remove the replacement power supply from the packaging and open the front ejector door until it is fully open. Remember to push the metal clip located on the bottom left to release the ejector door.

STEP 6 | Slide the new power supply into the empty power supply slot until it is almost fully seated. Ensure that the notch near the hinged part of the ejector door inserts into the chassis so that when you close the door, it properly seats the power supply.

STEP 7 | Plug the power cable into the corresponding AC power module on the back of the chassis and turn on the power switch. The new power supply will turn on and the LED will turn green.

Replace a PA-7000 Series DC Power Supply

- Replace a PA-7050 DC Power Supply
- Replace a PA-7080 DC Power Supply
- Replace a PA-7080 DC PEM

Replace a PA-7050 DC Power Supply

STEP 1 | Put the provided ESD wrist strap on your wrist ensuring that the metal contact is touching your skin. Then attach (snap) one end of the ground cable to the wrist strap and remove the alligator clip from the banana clip on the other end of the ESD grounding cable. Plug the banana clip end into one of the ESD ports located on the front of the chassis before handling ESD sensitive hardware. For details on the ESD port location, see PA-7050 Front Panel (AC).

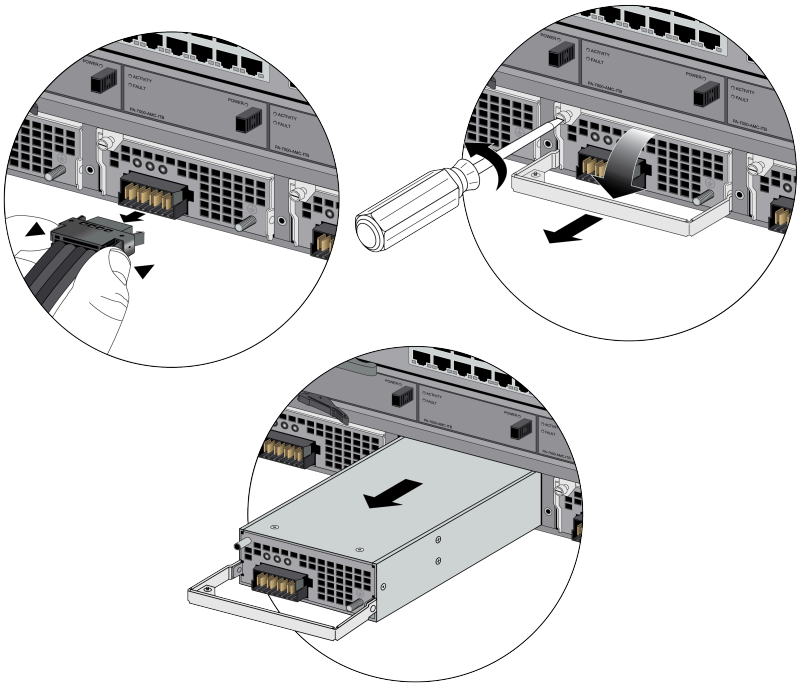
STEP 2 | Locate the failed power supply by viewing the system logs or by viewing the LED on the front of the power supply. A red LED indicates a failed power supply. For details on the power supply LEDs, see Interpret the PA-7000 Series Firewall Power Supply LEDs.

STEP 3 | Power off the DC power source that is connected to the failed DC power supply.

STEP 4 | Remove the DC power cable from the failed DC power supply by squeezing the two clips on each side of the plastic connector and then pull the connector away from the power supply.

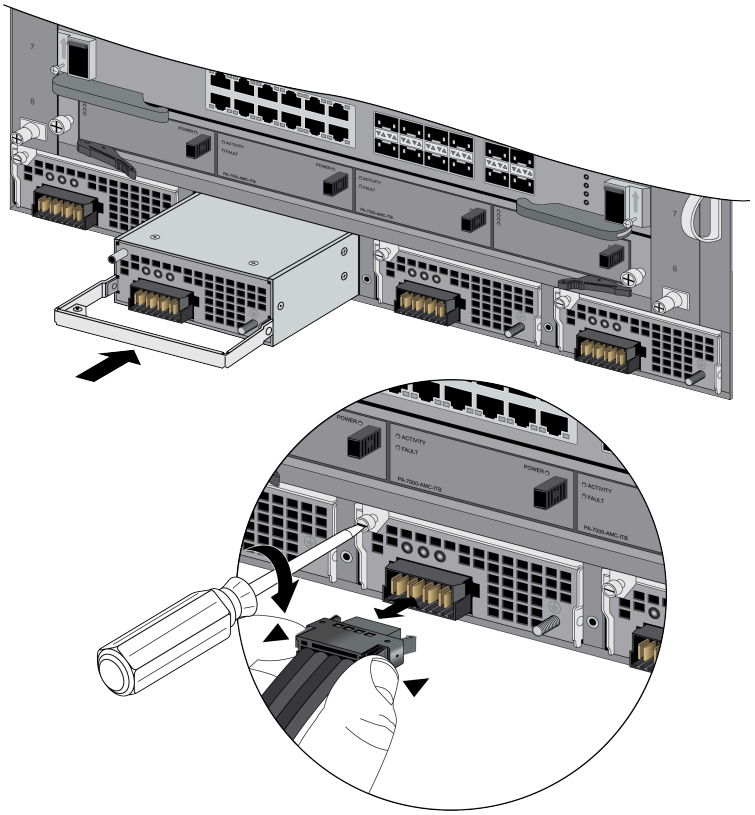
STEP 5 | Loosen the power supply thumb screw located at the top left of the power supply.

STEP 6 | Pull the power supply ejector handle out and down from the top center of the power supply to disengage it from the chassis and then slide the power supply out of the chassis using the power supply handle.



STEP 7 | Remove the replacement power supply from the packaging and open the front ejector handle until it is fully open.

STEP 8 | Slide the new power supply into the empty power supply slot until it almost fully seated. Ensure that the notch near the hinged part of the ejector handle inserts into the chassis so that when you close the handle, it properly seats the power supply.



STEP 9 | Tighten the upper left screw on the power supply to secure the power supply.

STEP 10 | Insert the DC power cable back into the power supply ensuring that the notches line up correctly. The plastic clips on each side of the connector will clip into place as you seat the cable.

> *When cabling the DC power supply to your power source, ensure that you route the cable in such a way that it does not put pressure on the plastic clips located at the front of the power supply. It is best to route and secure the cable first and then plug the cable into the power supply.*

STEP 11 | Turn on the DC power feed.

Replace a PA-7080 DC Power Supply

The following procedures describe how to replace a PA-7080 DC power supply located on the front of the chassis. For information on replacing the Power Entry Module (PEM) located on the back of the chassis, see Replace a PA-7080 DC PEM.

STEP 1 | Put the provided ESD wrist strap on your wrist ensuring that the metal contact is touching your skin. Then attach (snap) one end of the ground cable to the wrist strap and remove the alligator clip from the banana clip on the other end of the ESD grounding cable. Plug the banana clip end into one of the ESD ports located on the front of the chassis before handling ESD sensitive hardware. For details on the ESD port location, see PA-7080 Front Panel (AC).

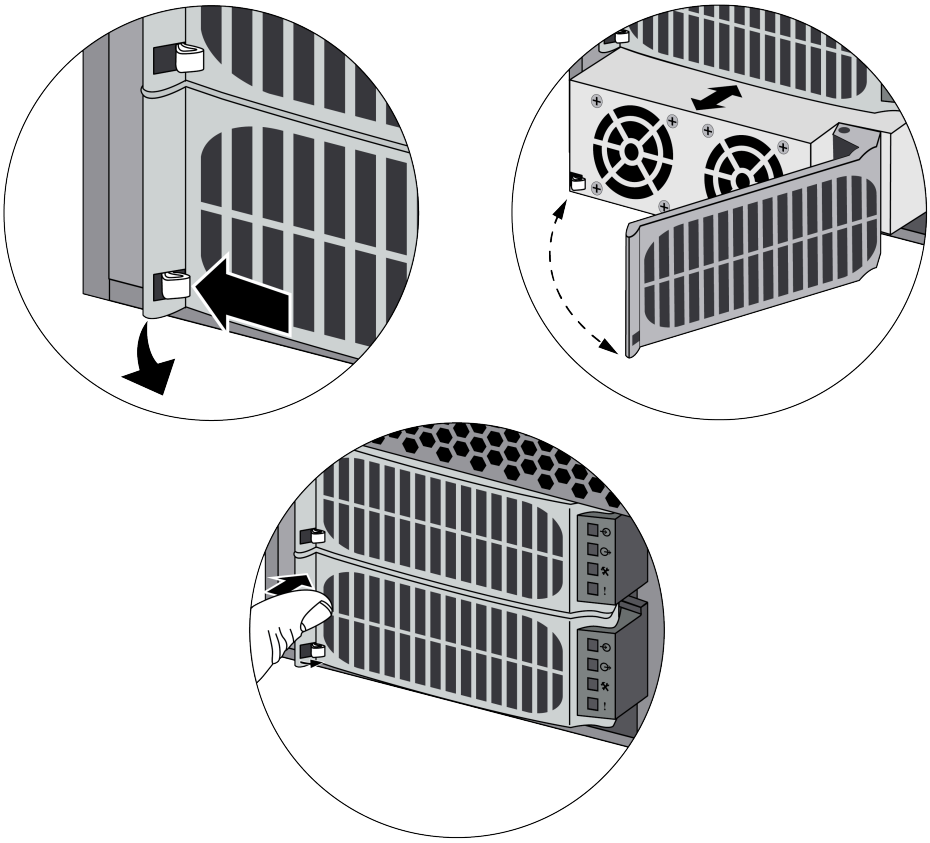
STEP 2 | Locate the failed power supply by viewing the system logs or by viewing the LED on the front of the power supply. A red LED indicates a failed power supply. For details on the power supply LEDs, see Interpret the PA-7000 Series Firewall Power Supply LEDs.

STEP 3 | Turn off the DC power feed connected to the Power Entry Module (PEM) on the back of the chassis that corresponds to the failed power supply on the front of the chassis. Check that the power LED on the PEM turns off, to ensure that you powered off the correct circuit breaker.

There are two rows of power supplies on the front of the chassis and two rows of Power Entry Modules (PEMs) on the back, which are numbered. For example, while facing the front of the chassis, the two far left power supplies are 1A and 1B, which connect to the power connections on the far right while facing the back of the chassis, numbered PEM A1 and PEM B1.

STEP 4 | Remove the failed power supply by pushing the small metal clip located on the bottom left of the power supply ejector door. Pull the door toward you from the left side to open, which

will eject the power supply from the chassis. Pull the power supply toward you and remove it.



STEP 5 | Remove the replacement power supply from the packaging and open the front ejector door until it is fully open. Remember to push the metal clip located on the bottom left to release the door.

STEP 6 | Slide the new power supply into the empty power supply slot until it almost fully seated. Ensure that the notch near the hinged part of the ejector door inserts into the chassis, so when you close the door, it pulls the power supply inward and seats it into place.

STEP 7 | Plug the power cable into the corresponding AC power module on the back of the chassis and turn on the power switch.

Replace a PA-7080 DC PEM

The DC Power Entry Module (PEM) is located on the back of the chassis and connects the power source to the power supplies located on the front of the chassis, which then distributes power to all chassis components.

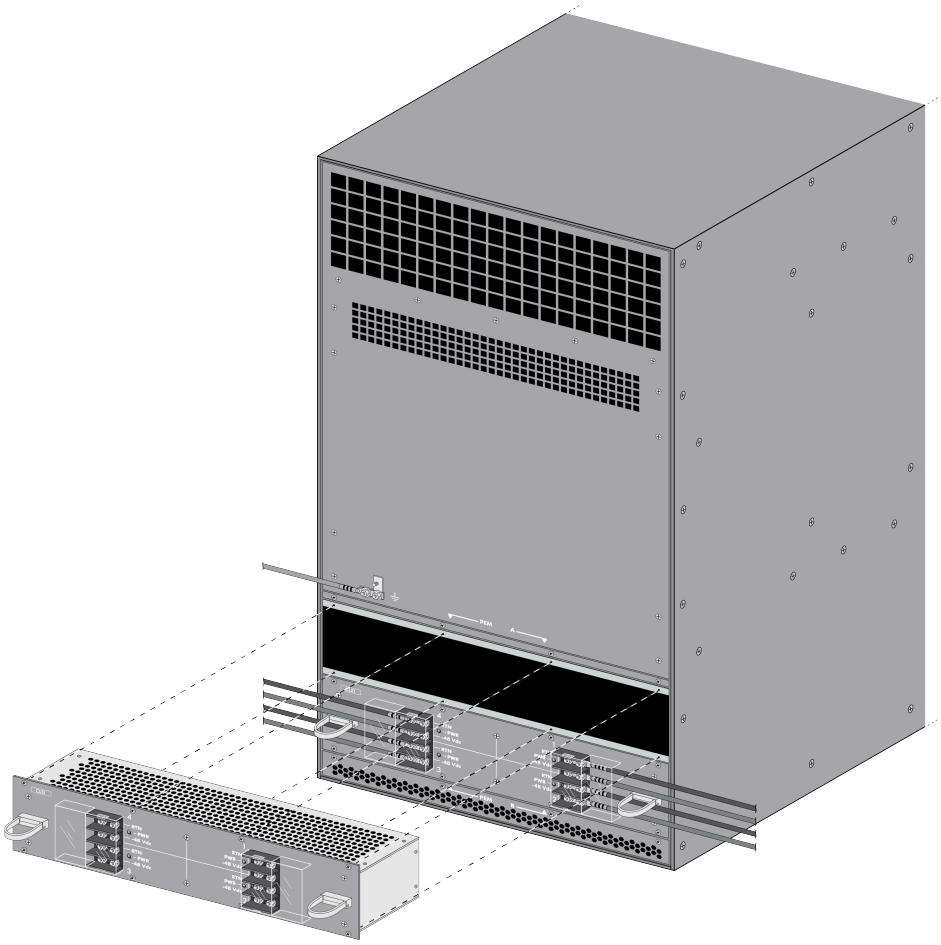
The PEMs are not hot swappable. You must power off the chassis, turn off the DC power feed, and remove the DC power cables from the failed PEM before proceeding. The PEMs on the AC model are not field serviceable.

STEP 1 | Put the provided ESD wrist strap on your wrist ensuring that the metal contact is touching your skin. Then attach (snap) one end of the ground cable to the wrist strap and remove the alligator clip from the banana clip on the other end of the ESD grounding cable. Plug the banana clip end into one of the ESD ports located on the front of the chassis before handling ESD sensitive hardware. For details on the ESD port location, see PA-7080 Front Panel (AC).

STEP 2 | Power off the chassis and disconnect the power source to the chassis.

STEP 3 | Remove the stud nuts and star washers from the DC studs that secure the DC cables to the PEM and then remove the cables.

STEP 4 | Remove the eight screws that secure the PEM to the chassis.



STEP 5 | Remove the failed PEM from the chassis using the handles on each side of the PEM.

STEP 6 | Carefully slide the replacement PEM into the PEM slot and secure it with the eight screws.

STEP 7 | Reconnect the DC power cables, ensuring that you install them in the correct polarity. Secure each DC lug to the DC studs with the star washers and nuts and torque to 50 in-lbs. Be careful not to strip the nuts and lug studs.

STEP 8 | Turn on the DC power feed.

Replace a PA-7000 Series Firewall Fan Tray

The following topics describe how to replace a PA-7050 or PA-7080 fan tray.

- Replace a PA-7050 Fan Tray
- Replace a PA-7080 Fan Tray

Replace a PA-7050 Fan Tray

The following procedure describes how to replace a PA-7050 fan tray. There are two PA-7050 fan tray models: the first-generation PA-7050-FAN, which is one fan tray model that you can install in the left or right fan tray slot, and the second-generation fan trays, which has a left and right model. The left fan tray is labeled PA-7050-FANTRAY-L-A and the right fan tray is labeled PA-7050-FANTRAY-R-A. The PA-7050-FANTRAY-R-A also contains the air filter. The procedure to replace both models is similar.

On a PA-7050 firewall that has the PA-7050-PAN-AIRDUCT kit installed, the left fan tray is located at the top of the firewall and the right fan tray (and air filter) are located at the bottom.

If one fan on a fan tray fails, the fault LED on the fan tray will turn red. If this occurs, replace the fan tray immediately to avoid service interruption. If two or more fans fail on one or both fan trays, the firewall shuts down. You can replace a fan tray while the firewall is powered on; however, you must replace it within 45 seconds and you can only replace one fan tray at a time (two total) or the thermal protection circuit will automatically shut down the firewall.

The second-generation fan trays provide more cooling capacity than the first-generation fan trays and are required if you install certain hardware components. For details, see the system and hardware requirements in PA-7000 Series Firewall Module and Interface Card Information.

STEP 1 | Put the provided ESD wrist strap on your wrist ensuring that the metal contact is touching your skin. Then attach (snap) one end of the ground cable to the wrist strap and remove the alligator clip from the banana clip on the other end of the ESD grounding cable. Plug the banana clip end into one of the ESD ports located on the front of the chassis before handling ESD sensitive hardware. For details on the ESD port location, see PA-7050 Front Panel (AC).

When removing a fan tray, first pull the fan tray out about 1 inch (2.5cm) and wait 10 seconds. This allows enough time for the working fans to stop spinning.

STEP 2 | Remove the replacement fan tray from the packaging and have it ready.

STEP 3 | Identify the failed fan tray by viewing the LEDs. The red fan LED on the SMC card and the red fault LED on the failed fan tray will both turn red in the event of a failure.

STEP 4 | Turn the top and bottom fan tray thumb screws counter-clockwise until the screws stop. This will move the latches to the open position in preparation for the fan tray removal.

If you replace the PA-7050-FANTRAY-R-A fan tray, remove the air filter that is part of the fan tray. You will install the air filter after you install the replacement fan tray.

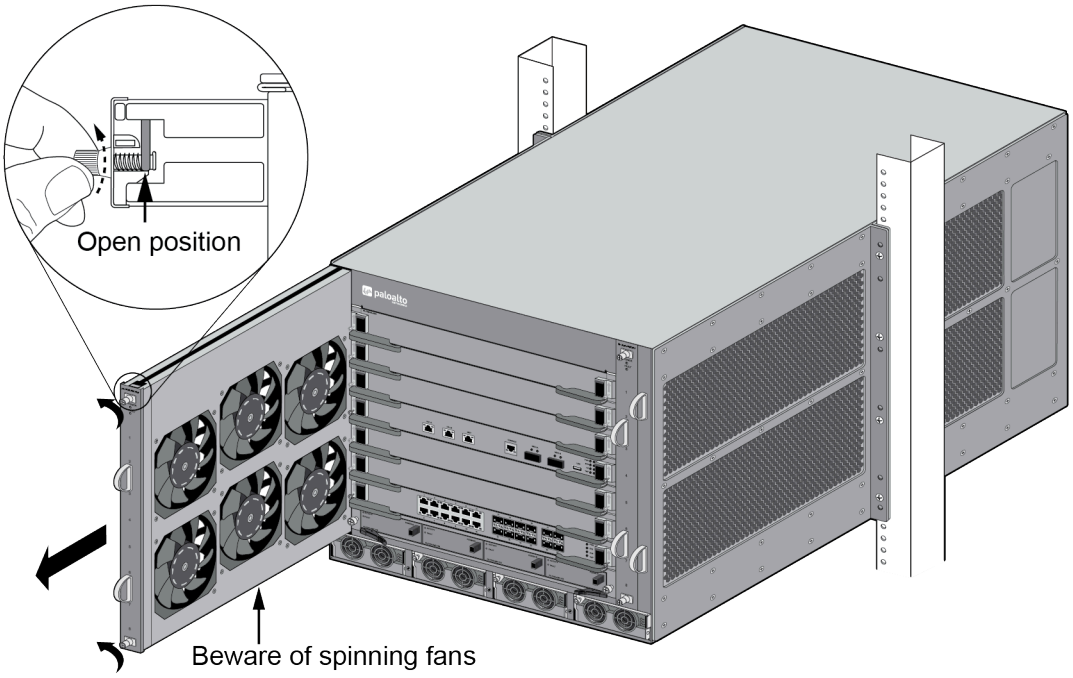


Figure 7: PA-7050-FAN

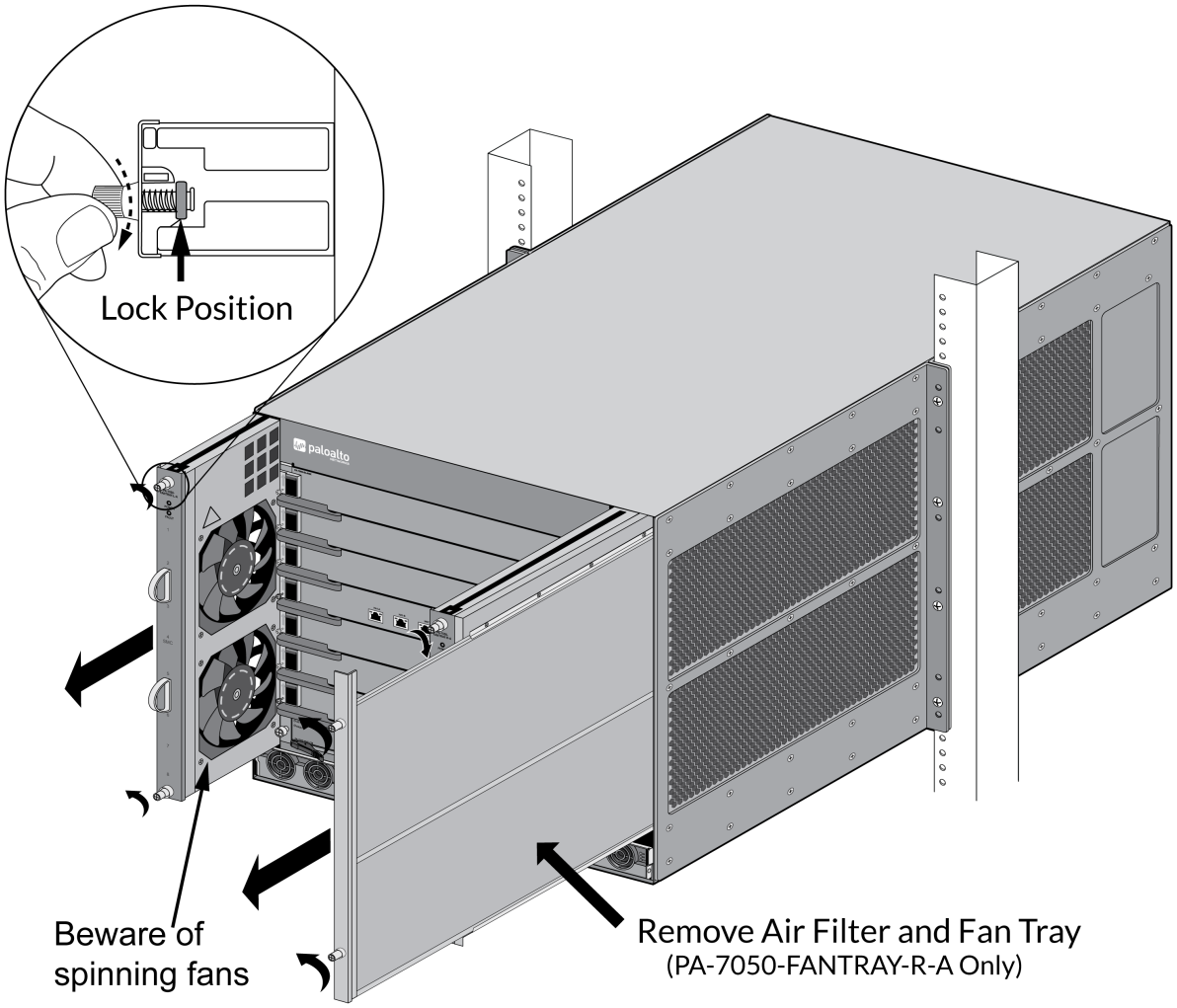


Figure 8: PA-7050-FANTRAY-L-A and PA-7050-FANTRAY-R-A

STEP 5 | Grasp the fan tray handles and pull the tray out about two inches. After all working fans have stopped spinning, remove the fan tray from the chassis. The fan tray is heavy, so be prepared to support the weight of the tray when removing it.

STEP 6 | Install the new fan tray by sliding the tray into the chassis and ensure it seats properly.

If you replaced the PA-7050-FANTRAY-R-A fan tray, install the air filter that you removed from the failed fan tray.

STEP 7 | Turn the thumb screws to the right until they stop. This will lock the top and bottom latches to secure the tray to the chassis. Use a Phillips-head screwdriver to tighten the thumb screws.

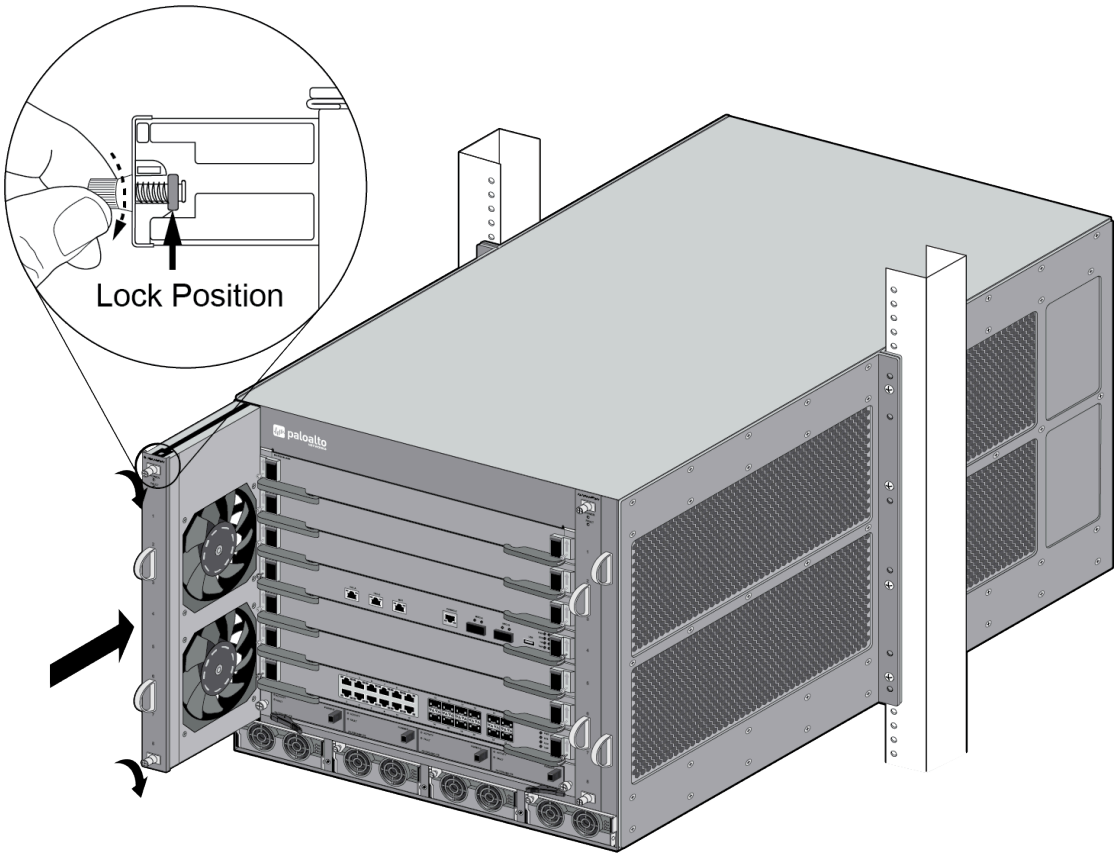


Figure 9: PA-7050-FAN

If the thermal protection circuit powers off the chassis due to over heating or failed fans, you will need to turn the power off to the chassis and then restore power before the chassis will power on again. On an AC model, you can turn off the power switches located on the back of the chassis and then turn them back on or you can disconnect the power cords and plug them back in. On a DC model, shut down the DC circuit to the chassis and then restore power.

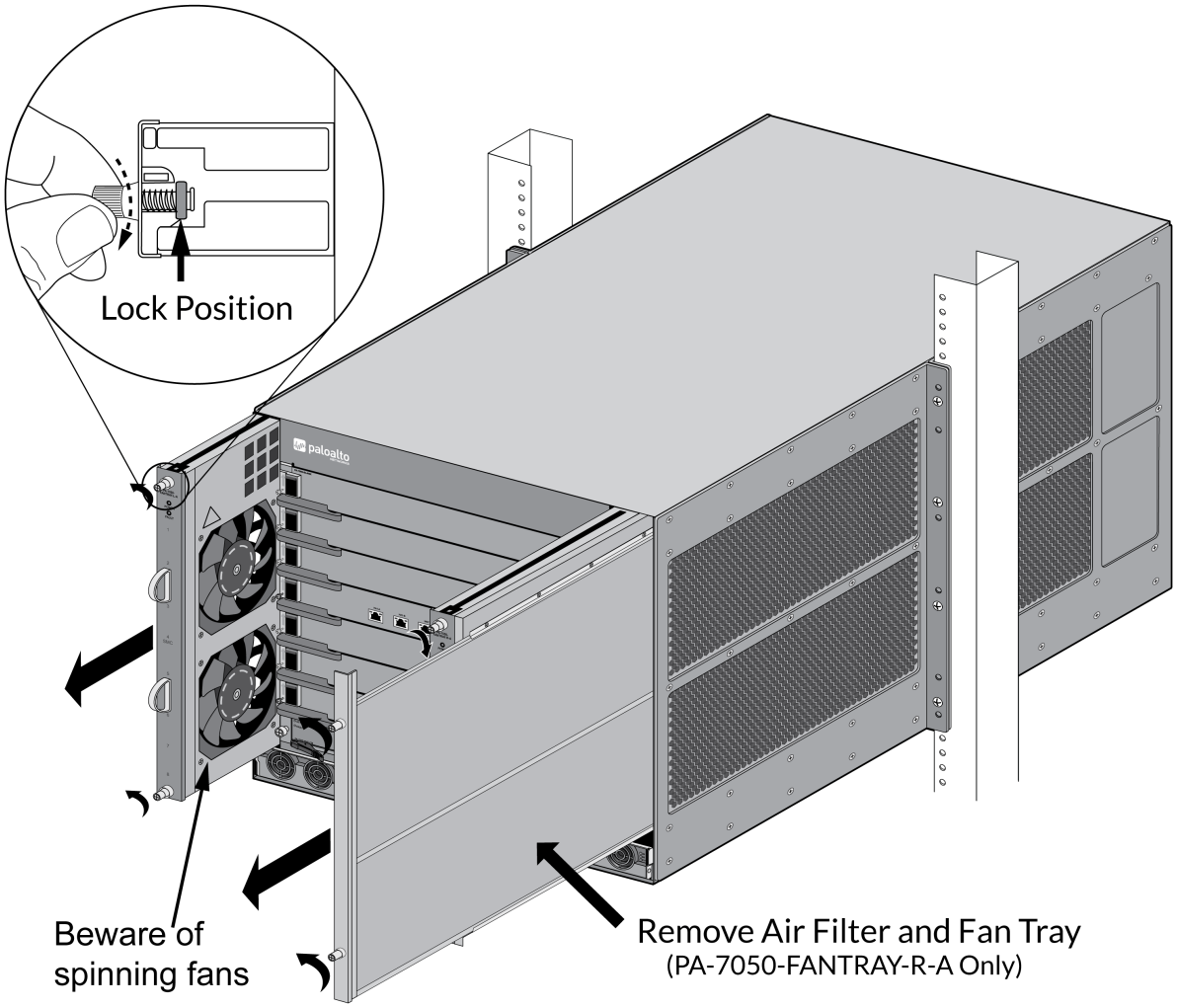


Figure 10: PA-7050-FANTRAY-L-A and PA-7050-FANTRAY-R-A

STEP 8 | Verify that the fan tray is operational by noting the status of the fan tray LEDs and the fan LED on the SMC (slot 4). The Fault LED on the fan tray turns off, the Power LED on the fan tray illuminates green, and the fan LED on the SMC changes from red to green. You can view the status of the fan trays by entering the following command:

```
admin@PA-7050> show
system environmentals fan-tray
```

To view the status of each fan on a fan tray, run the following command:

```
admin@PA-7050> show
system environmentals fans
```

The fan tray status is managed by the SMC in slot 4, so the above output will show that both fan trays are in slot S4.

Replace a PA-7080 Fan Tray

The following procedure describes how to replace a PA-7080 fan tray.

If one fan on a fan tray fails, the fault LED on the fan tray will turn red. If this occurs, replace the fan tray immediately to avoid service interruption. If two or more fans fail on one or both fan trays, the firewall shuts down. You can replace a fan tray while the firewall is powered on; however, you must replace it within 45 seconds and you can only replace one fan tray at a time (two total) or the thermal protection circuit will automatically shut down the firewall.

STEP 1 | Put the provided ESD wrist strap on your wrist ensuring that the metal contact is touching your skin. Then attach (snap) one end of the ground cable to the wrist strap and remove the alligator clip from the banana clip on the other end of the ESD grounding cable. Plug the banana clip end into one of the ESD ports located on the front of the chassis before handling ESD sensitive hardware. For details on the ESD port location, see PA-7080 Front Panel (AC).

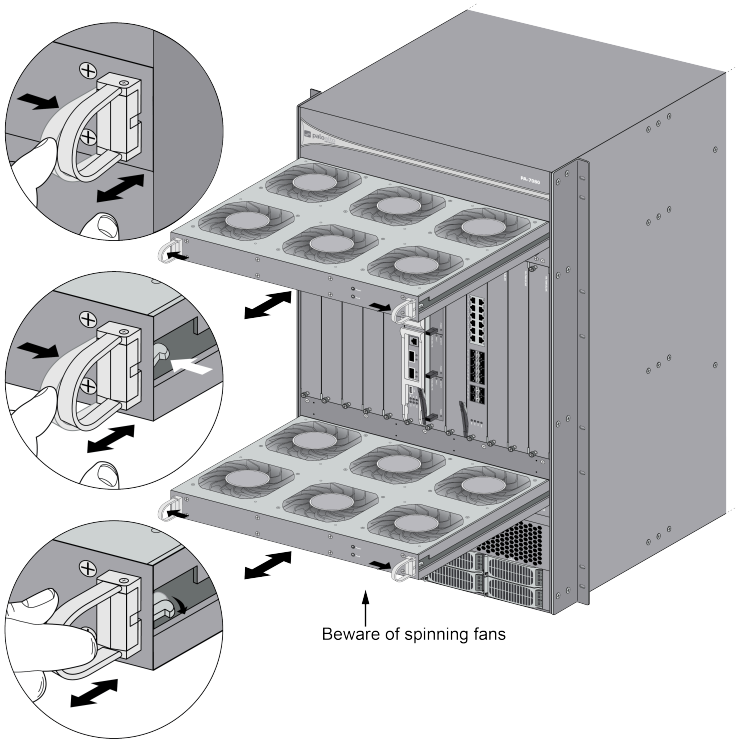
When removing a fan tray, first pull the fan tray out about 1 inch (2.5cm) and wait 10 seconds. This allows enough time for the working fans to stop spinning.

STEP 2 | Remove the replacement fan tray from the packaging and have it ready.

STEP 3 | Identify the failed fan tray by viewing the LEDs. The FAN LED on the SMC card and the FAULT LED on the failed fan tray will both change to red in the event of a failure.

STEP 4 | Grasp both handles on the failed fan tray and gently push them outward as you slide the fan tray toward you about 1 inch. Wait 10 seconds to allow enough time for the working fans to stop spinning.

Pushing the handles outward does not eject the fan tray; it unlocks the tray from the chassis. Only a small amount of pressure is required to operate the release handles.



STEP 5 | Verify that the front set of fans have stopped spinning and then continue to pull the fan tray outward while supporting the back of the tray. Note that the fan tray weighs over 15 lbs., so be prepared to support the weight of the tray.

STEP 6 | Align the new fan tray with the empty fan tray slot rails and gently slide it in to the chassis until it stops. You can do this by pushing on the handles or by pushing on the front panel of the fan tray. As you fully seat the tray into place, the handles will click, indicating that the tray is locked in place. The fan will then power on.

If the thermal protection circuit powers off the chassis due to over heating or failed fans, you will need to turn the power off to the chassis and then restore power before the chassis will power on again. On an AC model, you can turn off the power switches located on the back of the chassis and then turn them back on or you can disconnect the power cords and plug them back in. On a DC model, shut down the DC circuit to the chassis and then restore power.

STEP 7 | Verify that the fan tray is operational by noting the status of the fan tray LEDs and the FAN LED on the SMC (slot 6). The Fault LED on the fan tray turns off, the Power LED on the fan

tray illuminates green, and the FAN LED on the SMC changes from red to green. You can view the status of the fan trays by running the CLI command:

```
admin@PA-7080> show
system environmentals fan-tray
```

To view the status of each fan on a fan tray, run the following command:

```
admin@PA-7080> show
system environmentals fans
```

The fan tray status is managed by the SMC in slot 6, so the output from the above command will show that both fan trays are in slot S6.

Replace a PA-7000 Series Firewall Air Filter

The air filter is a critical part of the chassis cooling system that ensures that air entering the chassis does not contain debris. We recommend that you replace the first-generation filter every six months or less, depending on the environment where the firewall is located, to prevent a scenario where there is not enough air passing through the filters to keep the firewall from overheating. Second-generation air filters might require more frequent replacement.

The firewall does not generate a system log indicating that an air filter has been removed or that it needs to be replaced. Therefore, in addition to replacing the filter every six months (or as needed), you need to schedule regular inspections and ensure that the filters do not clog sooner than when they are due to be replaced. Do not attempt to clean and reuse a filter.

You can purchase replacement air filters from Palo Alto Networks or an authorized reseller. The following lists the air filter order numbers:

- **PA-7050 air filter**—PAN-PA-7050-FLTR (two pull handles)
- **PA-7050-FANTRAY-R-A air filter**—PAN-PA-7050-FLTR-A (two screws)
- **PA-7080 air filter**—PAN-PA-7080-FLTR (one pull handle)

STEP 1 | Remove the air filter.

The PA-7080 firewall has one type of air filter and the PA-7050 firewall has two types of air filters as follows:

- **PA-7050 chassis air filter**—Installed in the chassis on the right (while facing the front of the firewall) of the PA-7050-FAN. To remove, grasp the air filter handle(s) and gently pull the air filter out to unsnap it from the mount point (ball joint) located at the back of the filter and then pull the air filter out of the chassis.
- **PA-7050-FANTRAY-R-A air filter**—Installed in the right fan tray (while facing the front of the firewall). To remove, turn the two air filter screws counter-clockwise until loose and then pull the air filter out of the fan tray. You do not have to remove the fan tray to replace the air filter.

STEP 2 | Slide the new filter into the chassis (see images below), ensuring that the filter is aligned with the slide rails and that it is facing the correct position (the grid side of the filter faces the center of the chassis).

STEP 3 | Push the filter in until the rear ball joint(s) snap into place. If you are installing a PA-7050-FANTRAY-R-A air filter, turn the air filter screws clockwise until tight.

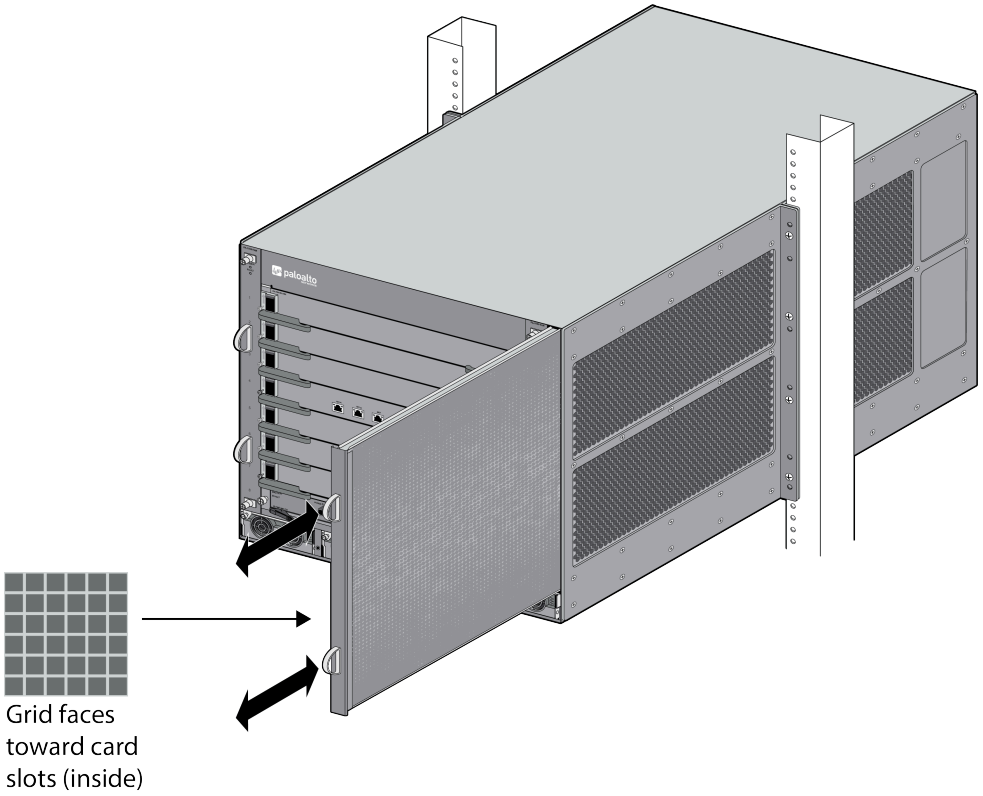


Figure 11: PA-7050 Chassis Air Filter

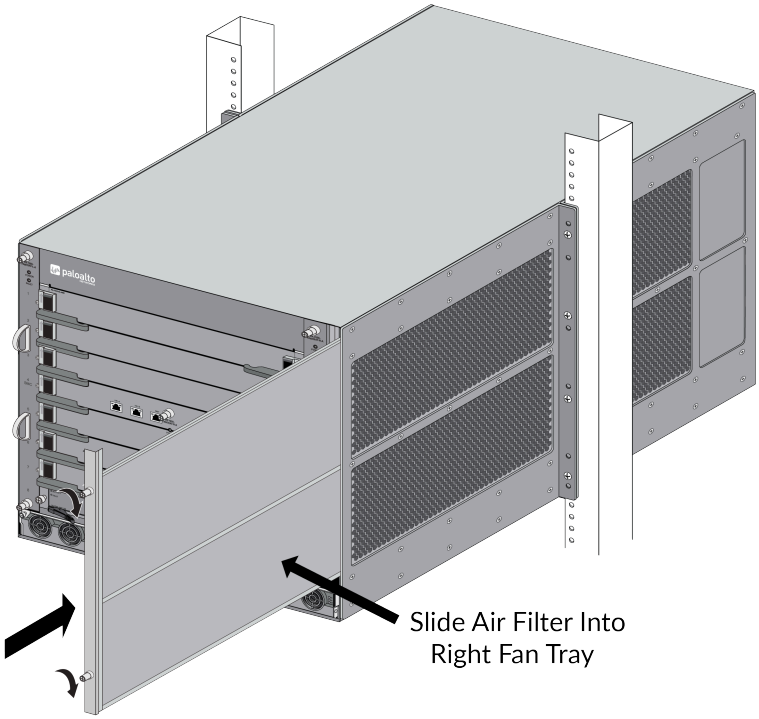


Figure 12: PA-7050 FANTRAY-R-A Air Filter

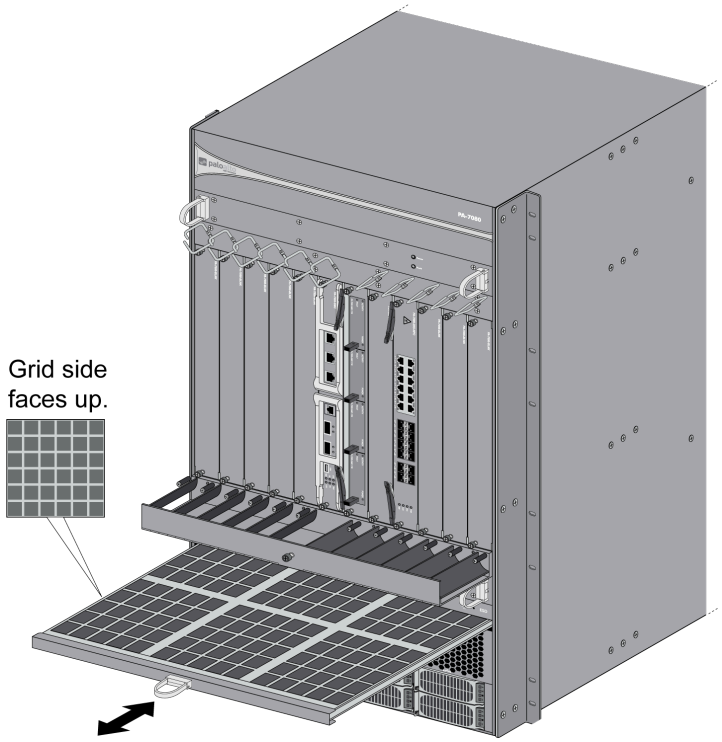


Figure 13: PA-7080 Air Filter

Replace a PA-7000 Series Firewall Front Slot Card

The PA-7000 Series firewalls require one Switch Management Card (SMC), one Log Processing Card (LPC), and at least one Network Processing Card (NPC). The procedures to replace a front slot card on a PA-7050 and PA-7080 firewall are almost identical. The only differences are the slot numbers and the handles used to remove and install the SMC.

- Replace a PA-7000 Series Switch Management Card (SMC)
- Replace a PA-7000 Series Log Processing Card (LPC)
- Replace a PA-7000 Series Network Processing Card (NPC)
- Replace a PA-7000 Series Data Processing Card (DPC)

Replace a PA-7000 Series Switch Management Card (SMC)

If the SMC fails, the log card (LPC or LFC) and NPC cards power down, the chassis reboots and attempts to recover the SMC. If the chassis reboots more than 3 times in 30 minutes, it enters maintenance mode at which time you must power off the chassis until you replace the SMC.

If the device is in FIPS-CC mode, you must power off the firewall before adding or replacing an SMC, otherwise the device will boot into maintenance mode.

The replacement SMCs ship with a factory default configuration and version of PAN-OS. You may need to upgrade or downgrade the PAN-OS version to your preferred version and you will need to restore the firewall configuration from a backup. Alternatively, you may swap out the boot drive from the original SMC if the drive is not the cause of the card failure. See Replace a PA-7000 Series SMC Boot Drive to learn how to replace the SSD in a first generation PA-7050-SMC and PA-7080-SMC. For details on replacing an SMC-B drive, see Replace a PA-7050-SMC-B or PA-7080-SMC-B Drive.

There are four SMC versions: the PA-7050-SMC version 1 and version 2, the PA-7050-SMC-B, and the PA-7080-SMC-B. The PA-7050 firewall must be running PAN-OS 6.1 or a later release to recognize a PA-7050-SMC version 2 SMC and the firewall must be running PAN-OS 9.0 and later to recognize the PA-7050-SMC-B or PA-7080-SMC-B. The procedure to replace all of these SMCs is similar. For more details, see PA-7000 Series Firewall SMC Component Descriptions.

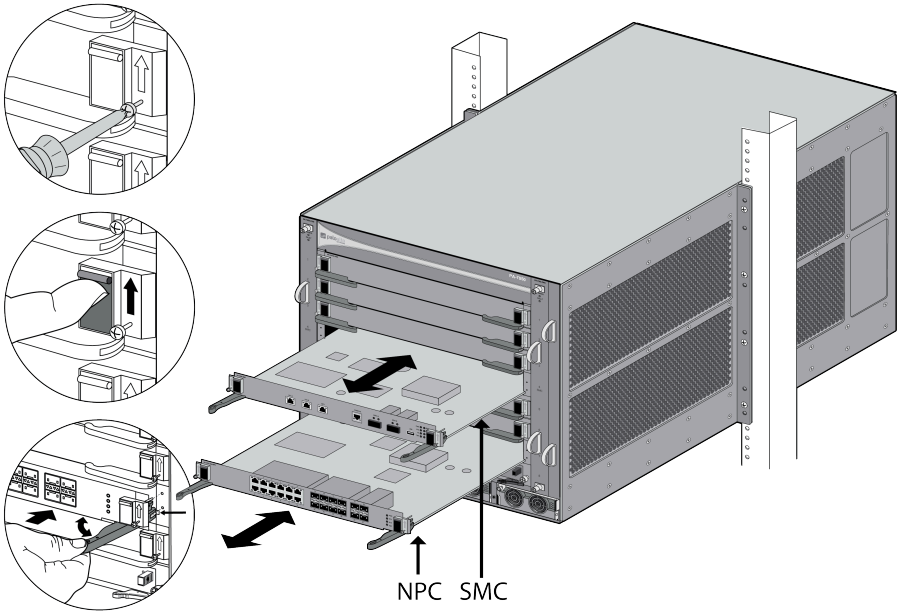
STEP 1 | Put the provided ESD wrist strap on your wrist ensuring that the metal contact is touching your skin. Then attach (snap) one end of the ground cable to the wrist strap and remove the alligator clip from the banana clip on the other end of the ESD grounding cable. Plug the banana clip end into one of the ESD ports located on the front of the chassis before handling ESD sensitive hardware. For details on the ESD port location, see PA-7050 Front Panel (AC) or PA-7080 Front Panel (AC).

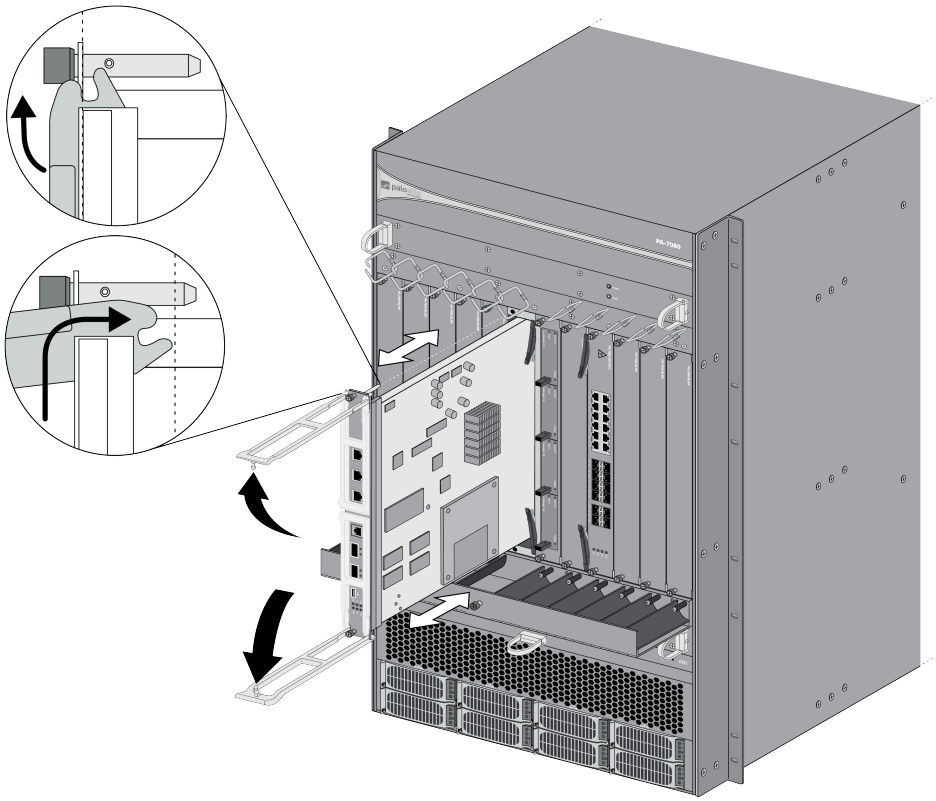
STEP 2 | Power off the chassis and disconnect the power source to the chassis.

STEP 3 | Make note of the cable connections and then loosen the screws on each side of the SMC. On the PA-7050 firewall, the SMC is located in slot 4; on the PA-7080 firewall, the SMC is located in slot 6.

STEP 4 | Remove the failed SMC from the chassis. If you are replacing a failed PA-7050-SMC-B or PA-7080-SMB, also remove the SSD drives and label the drives (Sys 1 and Sys2) to ensure

that you install them in the same SSD slots on the replacement SMC-B (See Replace a PA-7050-SMC-B or PA-7080-SMC-B Drive).





STEP 5 | Remove the replacement SMC from the antistatic bag. If you are replacing a failed PA-7050-SMC-B or PA-7080-SMC-B, install the SSDs that you removed in the previous step.

STEP 6 | Slide it into the SMC slot, ensuring that the handles are in the open position. When the card is about 1/4-inch from being fully inserted, adjust the levers to align with the chassis and then close the levers to seat the card in place.

The small notches located near the hinge of the card levers are used to fully seat the card into the back connector of the slot. To prevent damage, ensure that the notches line up with the chassis so that when you close the levers, the levers fully seat the card into the backplane connectors.

STEP 7 | Tighten the screws on each side of the SMC with a Phillips-head screwdriver to secure it to the chassis.

STEP 8 | Reconnect power and power on the chassis.

The session distribution policy configuration is stored on the SMC so if you replace a failed SMC, the default option is set in the configuration. If you configured an option other than the default, you will need to reconfigure the distribution policy after installing the new SMC (see Session Distribution Policies).

Replace a PA-7000 Series Log Card

Use the following topics to learn how to replace a PA-7000 Series Log Processing Card (LPC) or a PA-7000 Series Log Forwarding Card (LFC). The LPC has disk drives that must be removed and re-installed, while the LFC does not contain disk drives.

If the device is in FIPS-CC mode, you must power off the firewall before adding or replacing a log card, otherwise the device will boot into maintenance mode.

- Replace a PA-7000 Series Log Processing Card (LPC)
- Replace a PA-7000 Series Log Forwarding Card (LFC)

Replace a PA-7000 Series Log Processing Card (LPC)

If the LPC fails, the chassis reboots and will attempt to recover the LPC. If the LPC continues to fail and the chassis reboots more than 3 times in 30 minutes, it enters maintenance mode at which time you must power off the chassis until you replace the LPC.

The LPC contains the drives that the firewall uses to store logs. If the LPC fails, you will need to remove the drives and then reinstall them in the new LPC. It is important that you install each AMC in the same slot in the new LPC to maintain the RAID configuration. For example, the AMC in the far-right slot of the old LPC must be installed in the far-right slot in the new LPC and the same for each of the other three AMCs. After you replace an LPC, you will need to re-index the drives as described in Re-Index the LPC Drives.

There is one LPC model used for both the PA-7050 and PA-7080 firewall and the procedure is the same except that, on the PA-7050 firewall, you must install the LPC in slot 8 while on the PA-7080 firewall, you must install the LPC in slot 7.

STEP 1 | Power off the chassis and disconnect the power source to the chassis.

STEP 2 | Put the provided ESD wrist strap on your wrist ensuring that the metal contact is touching your skin. Then attach (snap) one end of the ground cable to the wrist strap and remove the alligator clip from the banana clip on the other end of the ESD grounding cable. Plug the banana clip end into one of the ESD ports located on the front of the chassis before handling ESD sensitive hardware. For details on the ESD port location, see PA-7050 Front Panel (AC) or PA-7080 Front Panel (AC).

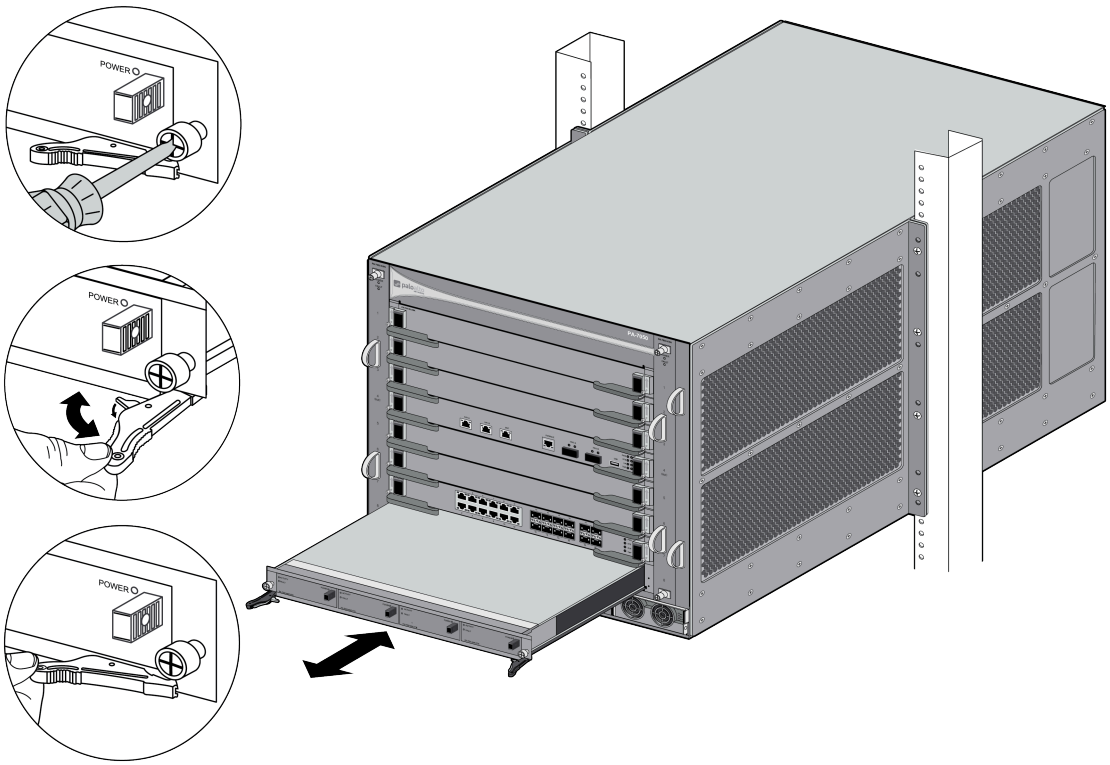
STEP 3 | Remove the four drives from the front of the LPC and note the location of each drive. For details on removing the drives, see Replace a PA-7000 Series Firewall LPC Drive.

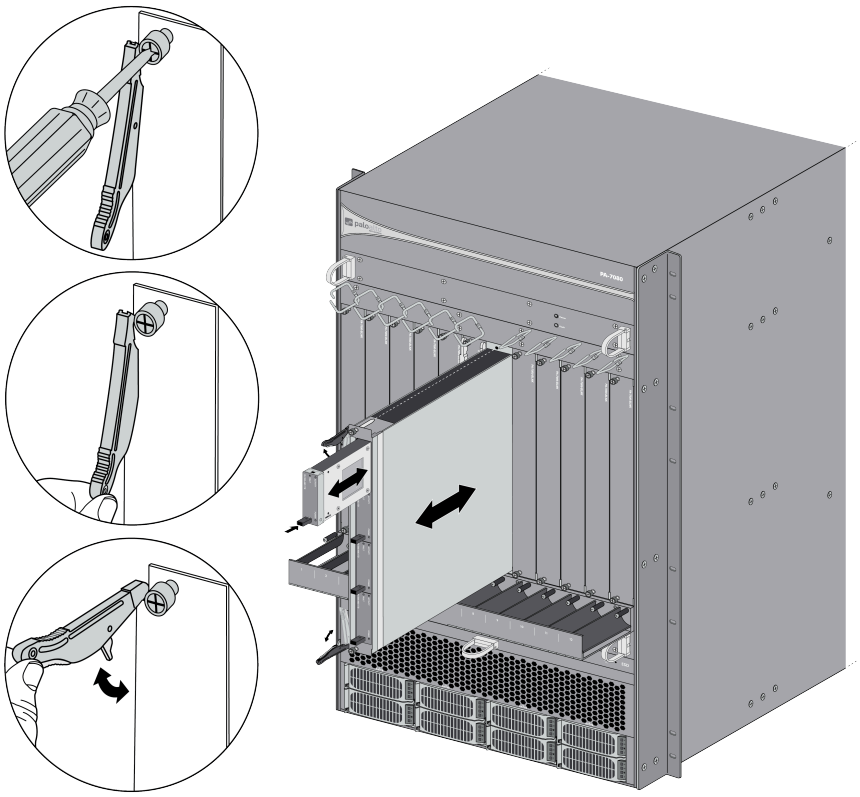
It is important that you reinstall the drives in the same position from which you removed them to maintain the RAID configuration. It is best to label the drives and take a picture before removing them.

STEP 4 | Loosen the thumb screws on each side of the LPC.

STEP 5 | Remove the LPC by pulling the inner release lever to unlock the outer release lever and then use the outer release lever to pull the LPC out of the chassis.

The LPC has a double-lever on each side of the card. After loosening the thumb screws, you must pull the inner lever toward you to unlock the outer lever from the chassis and then pull the outer lever to release the card. When installing the card, push the outer lever in to lock the inner lever.





STEP 6 | Remove the new LPC from the antistatic bag. Slide the LPC into the LPC slot, ensuring that the handles are in the open position. When the card is about 1/4-inch from being fully inserted, adjust the levers to align with the chassis and then close the levers to seat the card in place.

The small notches located near the hinge of the card levers are used to fully seat the card into the back connector of the slot. To prevent damage, ensure that the notches line up with the chassis so that when you close the levers, the levers fully seat the card into the backplane connectors.

STEP 7 | Tighten the thumb screws on each side of the LPC to secure it to the chassis.

STEP 8 | Install the drives that you removed earlier in the same slots from which you removed them. For details on replacing drives, Replace a PA-7000 Series Firewall LPC Drive.

STEP 9 | If you are using the drives from the failed LPC, read the steps in Re-Index the LPC Drives before powering on the chassis.

Replace a PA-7000 Series Log Forwarding Card (LFC)

If the LFC fails, the chassis reboots and will attempt to recover the LFC. If the LFC continues to fail and the chassis reboots more than 3 times in 30 minutes, it enters maintenance mode at which time you must power off the chassis until you replace the LFC.

There is one LFC model used for both the PA-7050 and PA-7080 firewalls and the procedure is the same except that, on the PA-7050 firewall, you must install the LFC in slot 8 while on the PA-7080 firewall, you must install the LFC in slot 7.

STEP 1 | Power off the chassis and disconnect the power source to the chassis.

STEP 2 | Put the provided ESD wrist strap on your wrist ensuring that the metal contact is touching your skin. Then attach (snap) one end of the ground cable to the wrist strap and remove the alligator clip from the banana clip on the other end of the ESD grounding cable. Plug the banana clip end into one of the ESD ports located on the front of the chassis before handling ESD sensitive hardware. For details on the ESD port location, see PA-7050 Front Panel (AC) or PA-7080 Front Panel (AC).

STEP 3 | Loosen the thumb screws on each side of the LFC.

STEP 4 | Remove the LFC by pulling the inner release lever to unlock the outer release lever and then use the outer release lever to pull the LFC out of the chassis.

The LFC has a double-lever on each side of the card. After loosening the thumb screws, you must pull the inner lever toward you to unlock the outer lever from the chassis and then pull the outer lever to release the card. When installing the card, push the outer lever in to lock the inner lever.

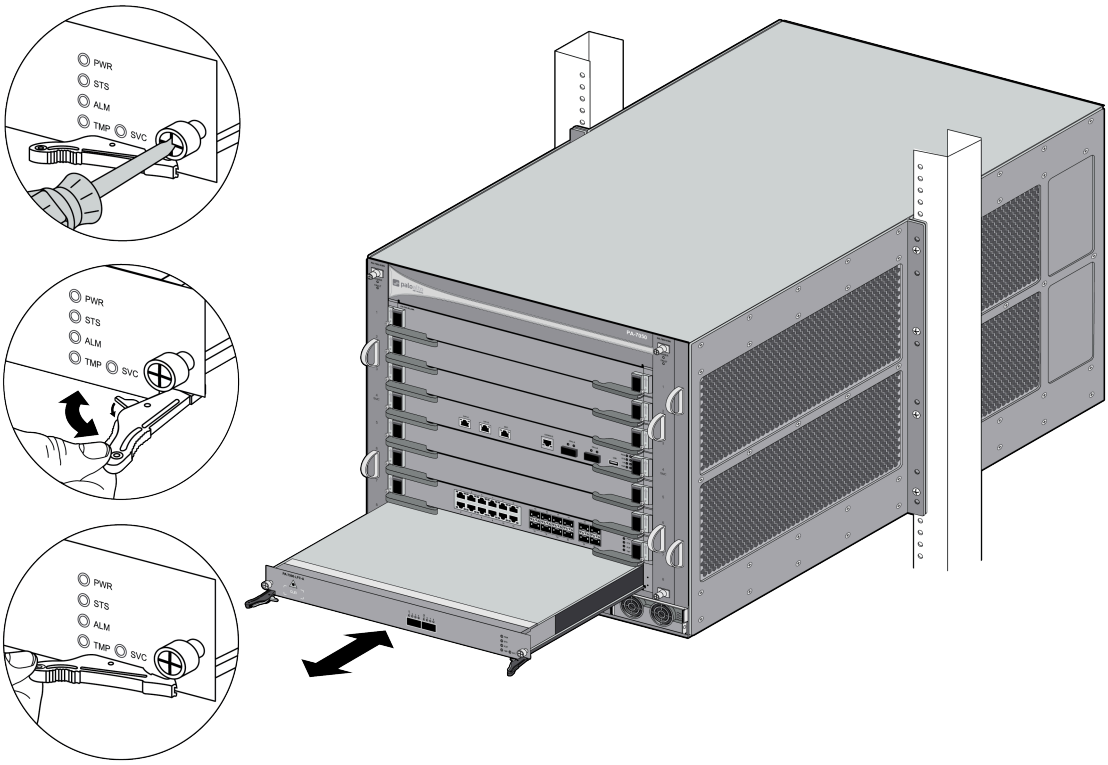


Figure 14: PA-7050 LFC

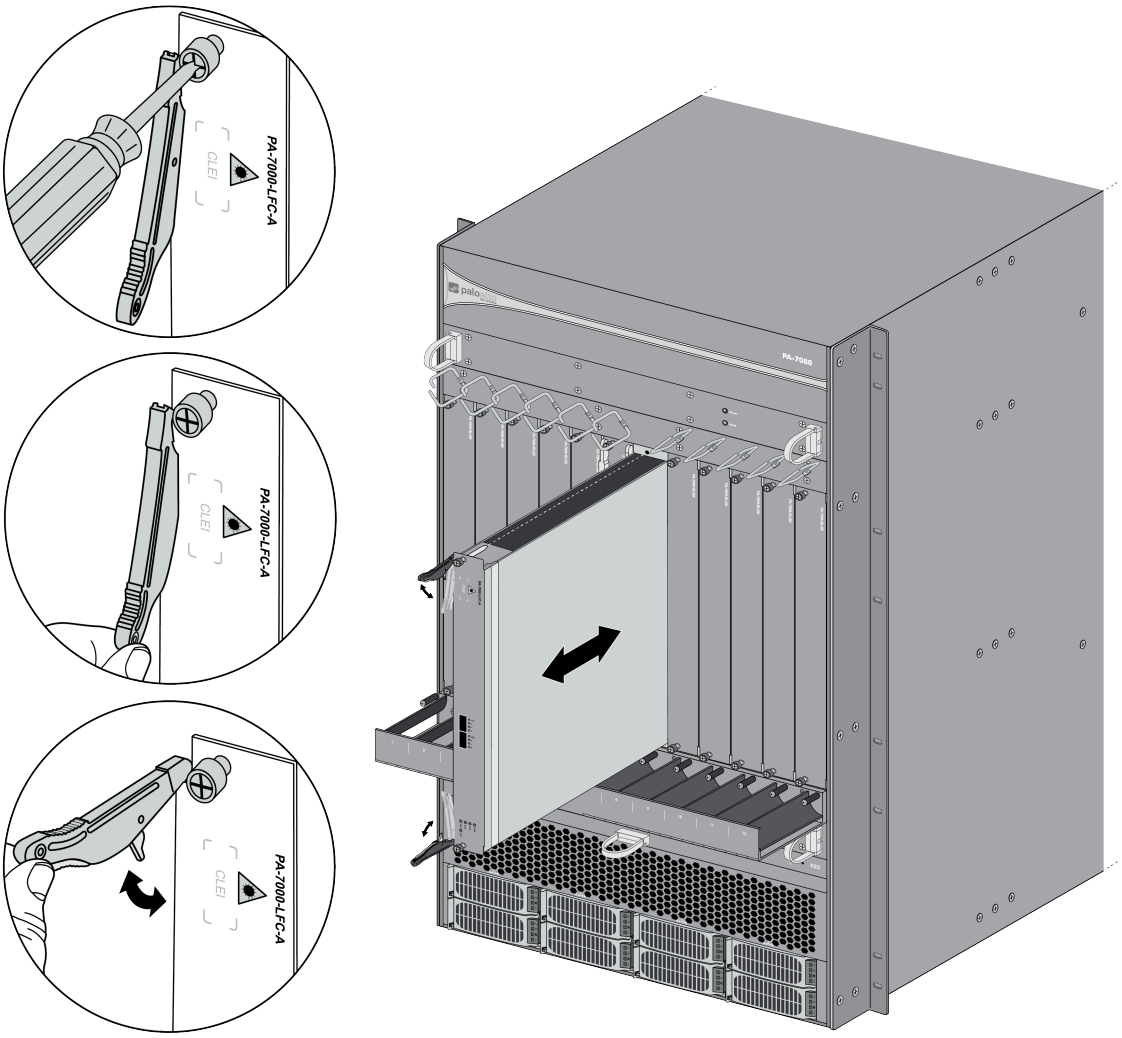


Figure 15: PA-7080 LFC

STEP 5 | Remove the new LFC from the antistatic bag. Slide the LFC into the LFC slot, ensuring that the handles are in the open position. When the card is about 1/4-inch from being fully inserted, adjust the levers to align with the chassis and then close the levers to seat the card in place.

The small notches located near the hinge of the card levers are used to fully seat the card into the back connector of the slot. To prevent damage, ensure that the notches line up with the chassis so that when you close the levers, the levers fully seat the card into the backplane connectors.

STEP 6 | Tighten the thumb screws on each side of the LFC to secure it to the chassis.

Replace a PA-7000 Series Network Processing Card (NPC)

If a Network Processing Card (NPC) fails, the card will reboot and attempt to recover. If the card does not recover, it will change to a down state. If there is only one functioning NPC in the chassis

and the NPC fails after three recovery attempts, the chassis will reboot to attempt to recover the card.

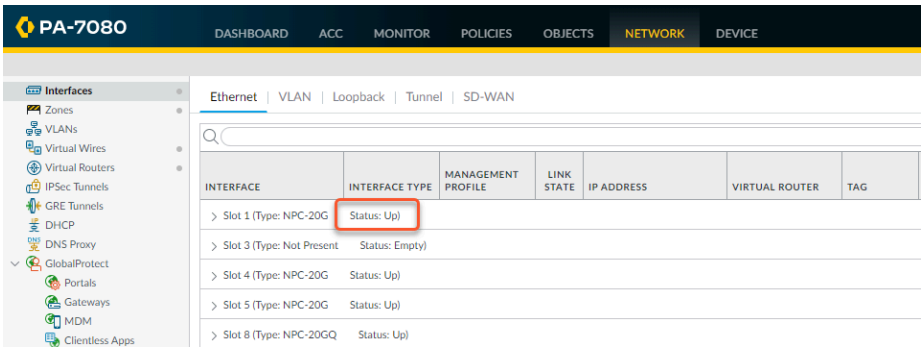
You do not have to power off the firewall to install or remove NPCs unless the device is in FIPS-CC mode. If the device is in FIPS-CC mode, you must power off the firewall before adding or replacing an NPC, otherwise the device will boot into maintenance mode. The procedure to replace an NPC is the same for both the PA-7050 and PA-7080 firewalls except for NPC slot numbering.

The following topics describe how to replace an NPC in a single chassis and in a high availability (HA) configuration and provides details on checking the card slot status as well as how to troubleshoot an NPC.

- Replace PA-7000 Series Firewall NPC in a Single Chassis
- Replace PA-7000 Series Firewall NPC in a High Availability (HA) Configuration
- PA-7000 Series Front Slot and Card States
- PA-7000 Series Firewall Network Processing Card (NPC) Troubleshooting Commands

Replace PA-7000 Series Firewall NPC in a Single Chassis

STEP 1 | Check the status of the NPC that is having a problem. You can do this from the web interface or from the CLI. In the web interface, navigate to **Network** > **Interfaces** to view status of each NPC slot.



If the NPC failed due to a hardware problem, the status shows `Failure`. The NPC may also have a configuration problem, in which case you can run the commit force command to try and force a commit.

STEP 2 | Make note of the cable connections and then loosen the screws on each side of the NPC.

Releasing the eject levers on the NPC will trigger a micro switch that powers down the card to prepare it for removal. Only release the levers if you intend to remove the card.

STEP 3 | Put the provided ESD wrist strap on your wrist ensuring that the metal contact is touching your skin. Then attach (snap) one end of the ground cable to the wrist strap and remove the alligator clip from the banana clip on the other end of the ESD grounding cable. Plug the banana clip end into one of the ESD ports located on the front of the chassis before handling ESD sensitive hardware. For details on the ESD port location, see PA-7050 Front Panel (AC) or PA-7080 Front Panel (AC).

STEP 4 | Remove the NPC using the appropriate procedure below depending on the version of the installed NPC. There are two versions of the NPC. Version 1 has a black slide switch on each side of the card that is used to release the ejector lever. Version 2 does not use the slide switch; instead it uses a double-lever design where you use an inner lever to release the outer ejector lever before you can use the outer ejector lever to remove the NPC.

Removing a version 1 NPC—Turn the card screws on each side of the card counterclockwise until loose and then slide the black lever release switch upward on both sides to unlock the release levers and then wait for the green power LED to turn off. After the power LED is off, pull the outer ejector release levers toward you to pull the card out of the chassis.

Removing a version 2 NPC—Turn the card screws on each side of the card counterclockwise until loose and then gently pull the inner release lever to release the outer ejector levers. Wait

for the green power LED to go off and then pull the release lever toward you to pull the card out of the chassis.

The following images show the two versions of the PA-7000 NPCs.

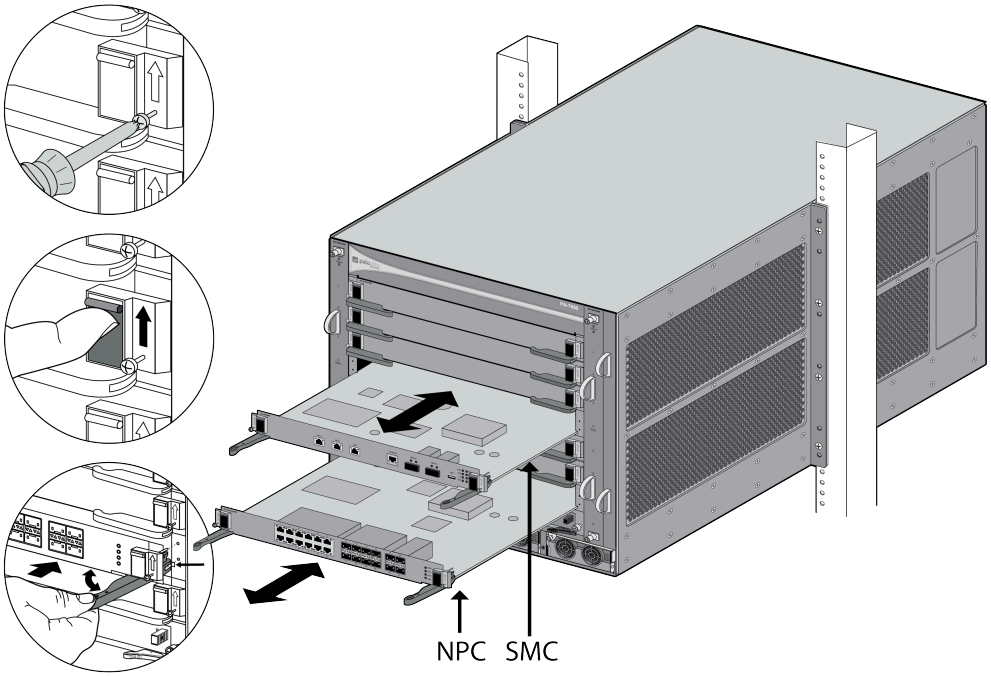


Figure 16: Install or Remove a PA-7000 Version 1 NPC

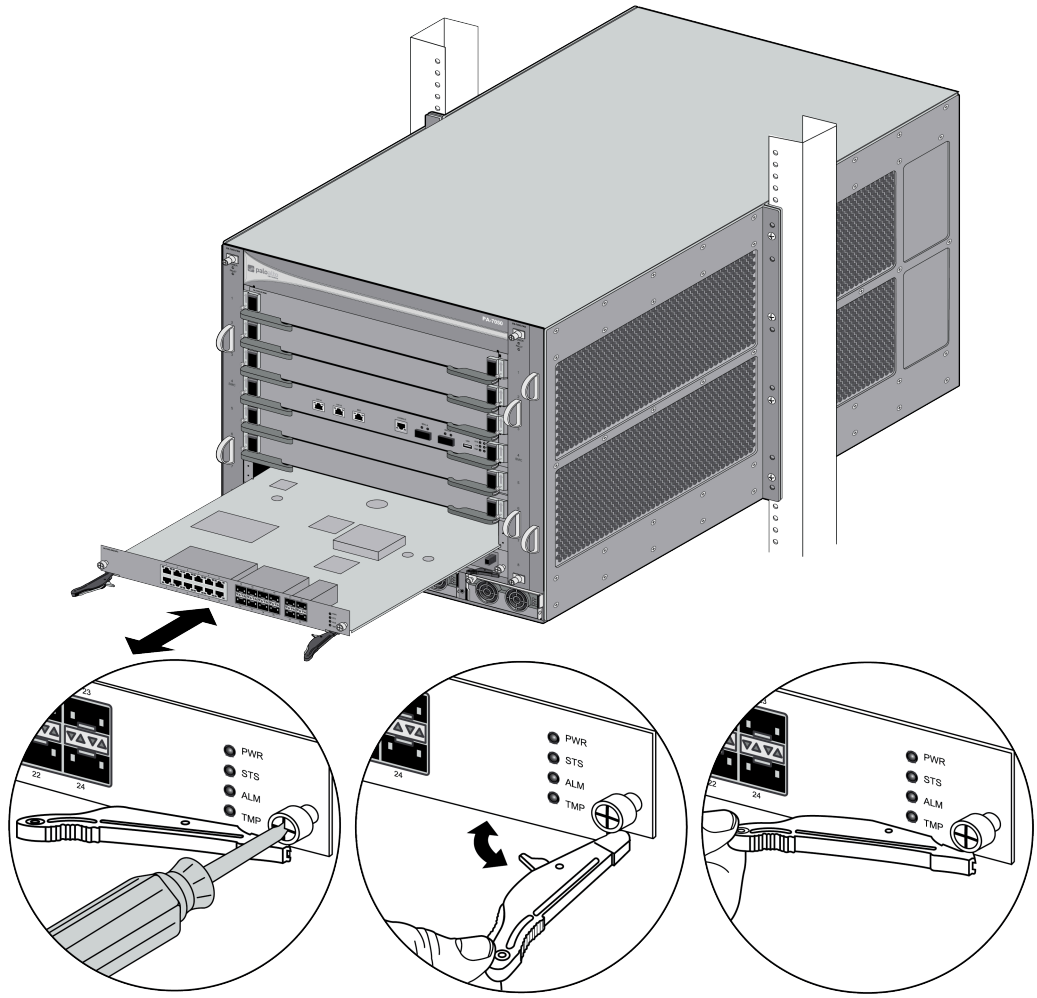


Figure 17: Install or Remove a PA-7000 Version 2 NPC

STEP 5 | Remove the replacement NPC from the antistatic bag and slide it into the empty slot, ensuring that the handles are in the open position. When the card is about 1/4-inch from being fully inserted, adjust the levers to align with the chassis and then close the levers to seat the card in place.

The small notches located near the hinge of the card levers are used to fully seat the card into the back connector of the slot. To prevent damage, ensure that the notches line up with the chassis so that when you close the levers, the levers fully seat the card into the backplane connectors.

STEP 6 | Tighten the screws on each side of the NPC with a Phillips-head screwdriver to secure it to the chassis.

STEP 7 | Insert the network cables that you removed earlier.

For slot status information and troubleshooting, see the following sections: PA-7000 Series Front Slot States and PA-7000 Series Firewall Network Processing Card (NPC) Troubleshooting Commands.

Replace PA-7000 Series Firewall NPC in a High Availability (HA) Configuration

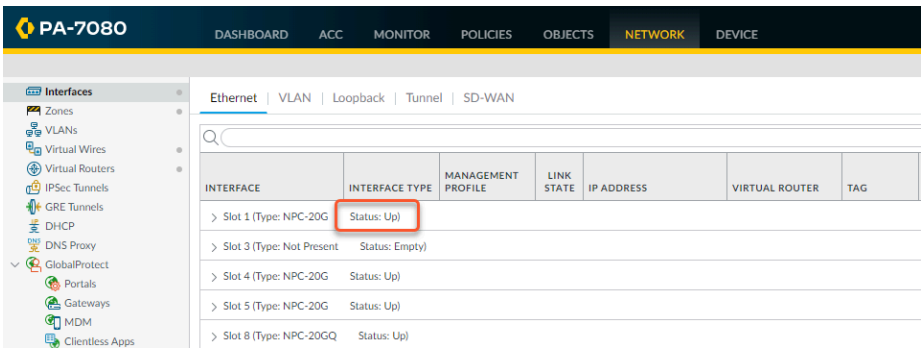
When HA is configured on the firewall, the firewall is designed to allow the insertion of new Network Processing Cards (NPCs) without causing a failover. This is accomplished by the system not allowing a new card to come up in one chassis until an NPC is installed in the same slot on the second chassis. The cards stay in a disabled state until you enable both cards simultaneously.

If an NPC fails on one of the chassis, that chassis changes to a non-functional state when in active/passive mode or to a tentative state when in active/active mode. The chassis stays in the failover state until a new NPC is installed and configured or until you remove or disable the matching NPC in the functioning firewall. After the failed card is replaced and enabled, the chassis comes up as passive (in active/passive configuration) or as active-secondary (in an active/active configuration).

To identify the failed NPC, check the LEDs on the NPC or check the system logs. For example, if slot 3 has a failed NPC in one of the chassis, the following error is displayed in the log: `Slot3 failure; moving to failure state`.

In the following procedure, the first seven steps are the same steps you follow for replacing an NPC in a single chassis. The HA specific steps start at 7. For images on replacing an NPC, see Replace PA-7000 Series Firewall NPC in a Single Chassis.

STEP 1 | Verify the status of the NPC that is having a problem. You can do this from the web interface or from the CLI. In the web interface, navigate to **Network** > **Interfaces** to view status for each NPC slot. The system log also shows `slot <slot-number>failure; moving to failure state`.



If the NPC failed due to a hardware problem, the status shows `Failure`. The NPC may also have a configuration problem, in which case you should run the **`commit force`** command to force a commit.

If the firewall with the failed NPC is the active firewall, ensure that you trigger a failover before removing the NPC. For more information, see Failover.

STEP 2 | Make note of the cable connections and then loosen the screws on each side of the card that secure the NPC to the chassis.

Releasing the eject levers on the NPC triggers a micro switch that powers down the card to prepare it for removal. Only release the levers if you intend to remove the card.

STEP 3 | Put the provided ESD wrist strap on your wrist ensuring that the metal contact is touching your skin. Then attach (snap) one end of the ground cable to the wrist strap and remove the alligator clip from the banana clip on the other end of the ESD grounding cable. Plug the banana clip end into one of the ESD ports located on the front of the chassis before handling ESD sensitive hardware. For details on the ESD port location, see PA-7050 Front Panel (AC) or PA-7080 Front Panel (AC).

STEP 4 | Remove the failed NPC from the chassis.

STEP 5 | Remove the replacement NPC from the antistatic bag and slide it into the empty slot, ensuring that the handles are in the open position. When the card is about 1/4-inch from being fully inserted, adjust the levers to align with the chassis and then close the levers to seat the card.

The small notches located near the hinge of the card levers are used to fully seat the card into the back connector of the slot. To prevent damage, ensure that the notches line up with the chassis so that when you close the levers, the levers fully seat the card into the backplane connectors.

STEP 6 | Tighten the screws on each side of the NPC with a Phillips-head screwdriver to secure it to the chassis.

STEP 7 | Enable the slots that contain the functioning NPC (in the second chassis) and the NPC that you just replaced.

```
admin@PA-7050> request chassis enable slot <slot-number>
```

For example, run the following command to enable slot 3 on the firewall:

```
admin@PA-7050> request chassis enable slot s3
```

STEP 8 | Power on the slots that contain the functioning NPC (in the second chassis) and the NPC that you just replaced.

```
admin@PA-7050> request chassis power-on slot <slot-number>
```

For example, run the following command to enable slot 3 on the firewall:

```
admin@PA-7050> request chassis power-on slot s3
```


STEP 9 | Insert the network cables that you removed earlier.

For slot status information and troubleshooting, see the following sections: PA-7000 Series Front Slot States and PA-7000 Series Firewall Network Processing Card (NPC) Troubleshooting Commands.

PA-7000 Series Front Slot and Card States

You can view the slot and card status information on a PA-7000 firewall using the web interface or the command line interface (CLI). From the web interface, select **Network** > **Interfaces** to view the status of each slot. From the CLI operational mode, run the following command:

```
admin@PA-7050> show chassis
status slot <slot-number>
```

For example, to show the status of slot 1, run the following command:

```
admin@PA-7050> show chassis
status slot s1
```

For information on troubleshooting card slots and changing slot states, see PA-7000 Series Firewall Network Processing Card (NPC) Troubleshooting Commands.

State	Description
Empty	The slot is empty and is ready to use.
Up	The card is powered on and has a valid software configuration.
Disabled	(HA only) The slot is not enabled. In a high availability (HA) configuration, the NPC slots stay in a disabled state until you enable the slot. This is by design, so you can install new NPCs without causing a failover. After you insert matching NPCs in both chassis, you then bring up both cards simultaneously. For details, see Install a PA-7000 Series Firewall NPC in a High Availability (HA) Configuration.
HA-Disabled	(HA only) After you enable a slot, this status appears until both slots are ready. This also occurs if the peer does not have a matching card in the same slot number or the card in the peer is not ready.
Stopping	The card is preparing for removal.
Starting	The card is in the process of powering on and the software is initiating.
PowerOff	The card is powered down and ready for removal.

State	Description
AdminPowerOff	An administrator powered down the slot and it will not be available until you power it back on. If there is a slot that you want ignored in an HA configuration HA, put it in this state.
Failure	The card has failed and needs to be replaced.
Unsupported	The card is not a supported type for this slot.

PA-7000 Series Firewall Network Processing Card (NPC) Troubleshooting Commands

The following table describes common commands that you can use to troubleshoot NPC issues on a PA-7000 Series firewall.

Purpose	Command

Show NPC slot status.	Run the following to view all of the slots:
	`admin@PA-7080> show chassis status`
	To view the status of one slot run:
	`admin@PA-7080> show chassis status slot <slot-number>`
	For example, to check the status of slot 3, run:
	`admin@PA-7080> show chassis status slot s3`

Temporarily power on and off an NPC slot.
This command gracefully powers off a slot and ends current sessions. You can use this command to remove an NPC.
	To power off a slot:
	`admin@PA-7080> request chassis power-off slot <slot-number>`
	To power on a slot:
	`admin@PA-7080> request chassis power-on slot <slot-number>`

Power off an NPC slot. When running this command, the NPC slot	`admin@PA-7080> request chassis admin-power-off slot <slot-number>`

Purpose	Command
stays powered off, even after a chassis reboot.	
Enable a slot so the NPC can pass traffic.	`admin@PA-7080> request chassis enable slot <slot-number>`

Enable new NPCs on both chassis in an HA configuration.	In an HA configuration, you must install the same number and model of NPCs in each chassis and the slot numbers must match. For example, after installing two NPCs (one in each firewall), the firewall keeps them in a disabled state until you enable them. This allows the firewall to start HA monitoring on each NPCs at the same time.
	To enable NPCs after inserting them into the same slot numbers on each chassis in an HA configuration, run the following command:
	`admin@PA-7080> request chassis power-on slot <slot-number> target ha-pair`
	For example, to enable NPCs installed in slot 3 of both chassis, run the following command:
	`admin@PA-7080> request chassis power-on slot 3 target ha-pair`
	You can use the `ha-pair` option in an HA configuration for many of the slot control commands.

Replace a PA-7000 Series Data Processing Card (DPC)

You do not have to power off the firewall to install or remove DPCs The procedure to replace an NPC is the same for both the PA-7050 and PA-7080 firewalls.

The following topics describe how to replace a DPC in a single chassis and in a high availability (HA) configuration and provides details on checking the card slot status.

- Replace a PA-7000 Series Firewall DPC in a Single Chassis
- Replace a PA-7000 Series Firewall DPC in a High Availability (HA) Configuration

Replace a PA-7000 Series Firewall DPC in a Single Chassis

STEP 1 | Check the status of the DPC that is having a problem. You can do this from the web interface or from the CLI. In the web interface, navigate to **Device** > **Setup** > **Interfaces** to view status of each DPC slot.

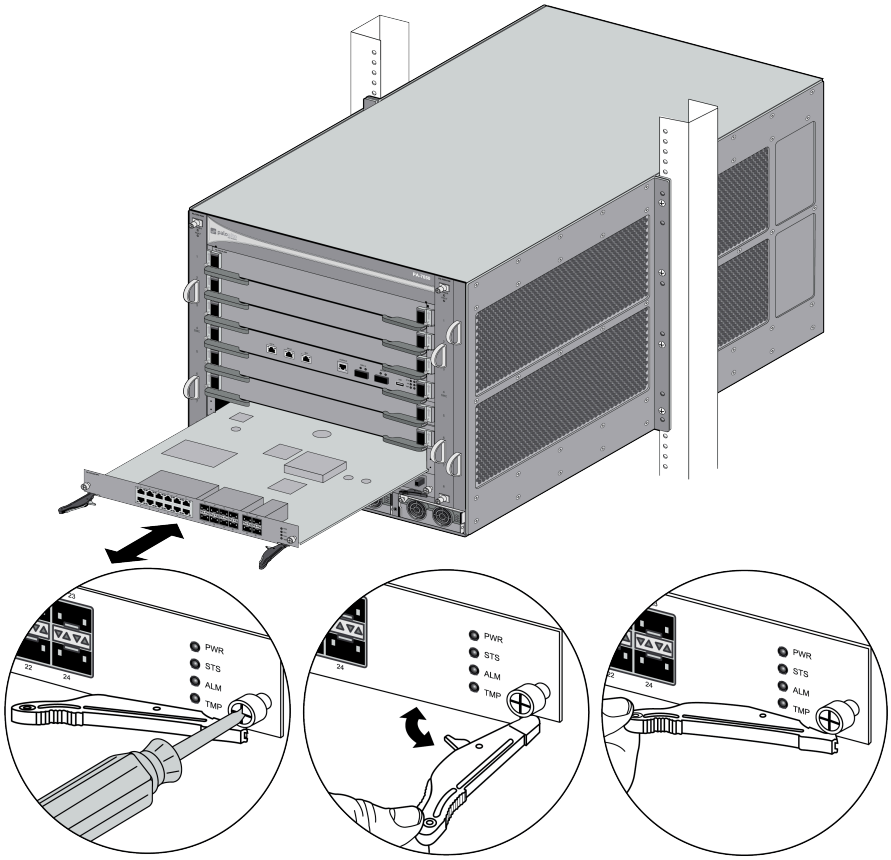
If the DPC failed due to a hardware problem, the status shows `Failure`.

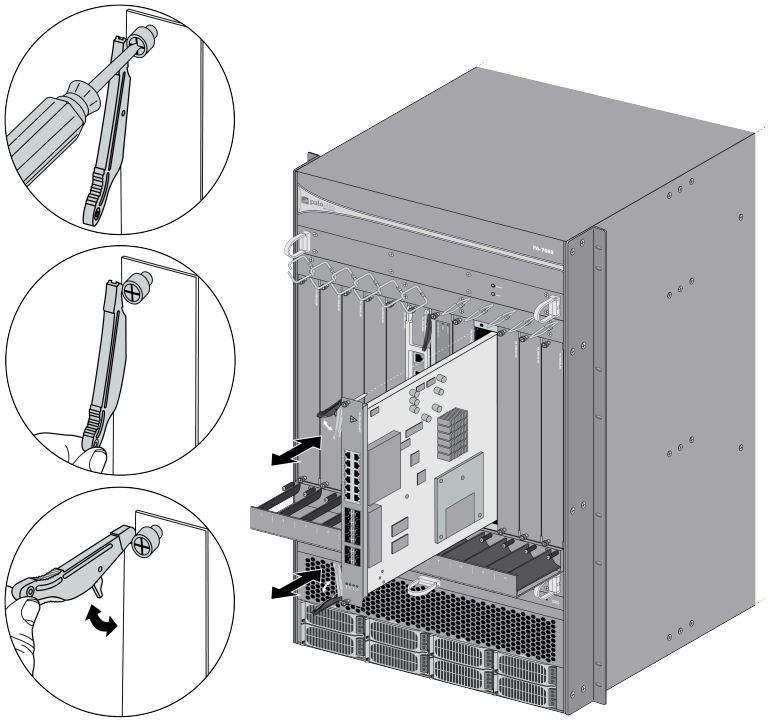
STEP 2 | Put the provided ESD wrist strap on your wrist ensuring that the metal contact is touching your skin. Then attach (snap) one end of the ground cable to the wrist strap and remove the alligator clip from the banana clip on the other end of the ESD grounding cable. Plug the banana clip end into one of the ESD ports located on the front of the chassis before handling ESD sensitive hardware. For details on the ESD port location, see PA-7050 Front Panel (AC) or PA-7080 Front Panel (AC).

STEP 3 | Turn the card screws on each side of the card counterclockwise until loose and then gently pull the inner release lever to release the outer ejector levers. Wait for the green power LED to go off and then pull the release lever toward you to pull the card out of the chassis.

STEP 4 | Remove the DPC from the antistatic bag and partially slide it into any of the available DPC slots, ensuring that the handles are in the open position. When the card is about 1/4-inch

from being fully inserted, adjust the levers to align with the chassis and then close the levers to seat the card in place.





STEP 5 | Tighten the thumb screws on each side of the card to secure the card to the chassis by hand or using a Phillips-head screwdriver.

STEP 6 | Enable the new DPC by running the following command using slot 3 as an example:

```
admin@PA-7050> request chassis enable slot s3
```

It is recommended that you observe the enabled card for about two minutes to check for internal path monitoring failures. If there is no failure, proceed to the next step.

Check the status of the card in slot 3 on the chassis by running:

```
admin@PA-7050> show chassis status slot s3
```

If the card is functioning properly, the status will show an output similar to the following:

```
Slot...Component........Card Status.....Config Status
3.......PA-7000-DPC ...Up..................Success
```


STEP 7 | Ensure that the DPC's session distribution policy is set to **session-load**.

1. Run the following command to check the DPC's current distribution policy:

```
admin@PA-7050> show session distribution policy
```

2. If the **Ownership Distribution Policy** reads as any value other than **session-load**, run the following command:

```
admin@PA-7050> set session distribution-policy session-load
```

3. Running the **show session distribution policy** command should now read **Ownership Distribution Policy: session-load**.

Replace a PA-7000 Series Firewall DPC in a High Availability (HA) Configuration

When HA is configured on the firewall, the firewall is designed to allow the insertion of new Data Processing Cards (DPCs) without causing a failover. This is accomplished by the system not allowing a new card to come up in one chassis until an DPC is installed in the same slot on the second chassis. The cards stay in a disabled state until you enable both cards simultaneously.

To identify the failed DPC, check the LEDs on the DPC or check the system logs. For example, if slot 3 has a failed DPC in one of the chassis, the following error is displayed in the log: `Slot3 failure; moving to failure state`.

STEP 1 | Check the status of the DPC that is having a problem. You can do this from the web interface or from the CLI. In the web interface, navigate to **Device** > **Setup** > **Interfaces** to view status of each DPC slot.

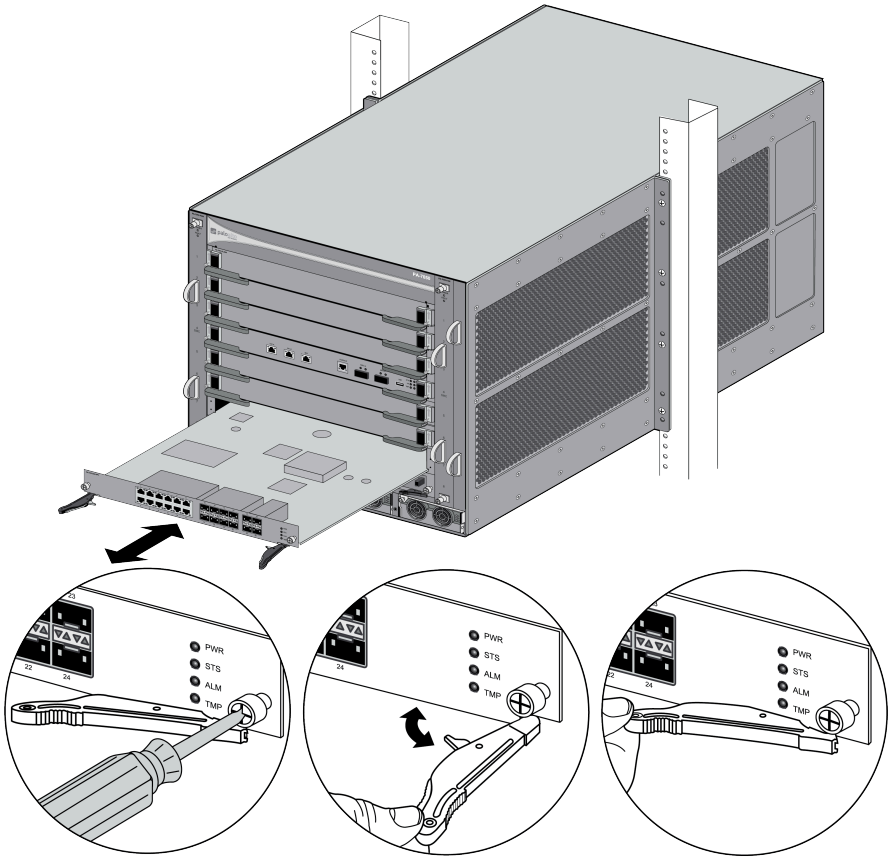
If the DPC failed due to a hardware problem, the status shows `Failure`.

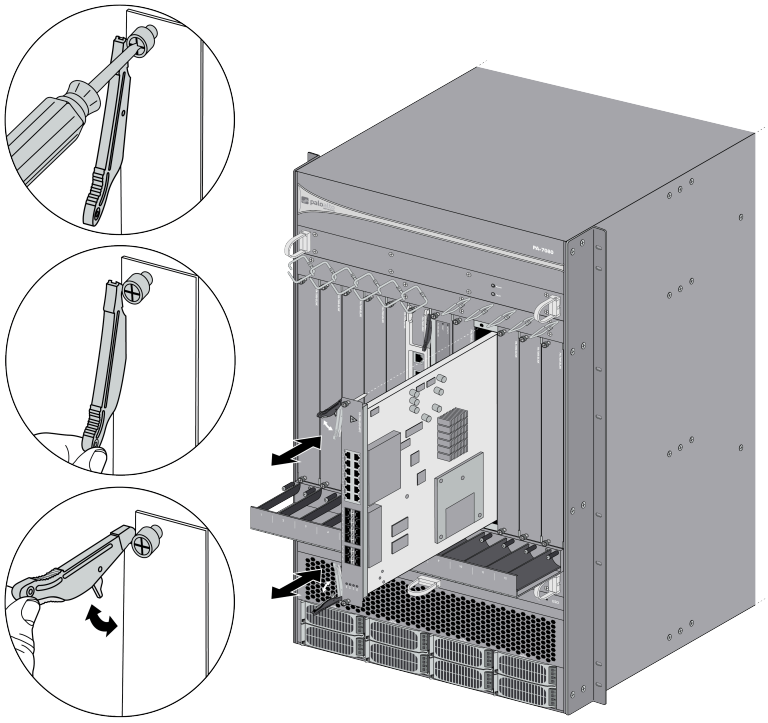
STEP 2 | Put the provided ESD wrist strap on your wrist ensuring that the metal contact is touching your skin. Then attach (snap) one end of the ground cable to the wrist strap and remove the alligator clip from the banana clip on the other end of the ESD grounding cable. Plug the banana clip end into one of the ESD ports located on the front of the chassis before handling ESD sensitive hardware. For details on the ESD port location, see PA-7050 Front Panel (AC) or PA-7080 Front Panel (AC).

STEP 3 | Turn the card screws on each side of the card counterclockwise until loose and then gently pull the inner release lever to release the outer ejector levers. Wait for the green power LED to go off and then pull the release lever toward you to pull the card out of the chassis.

STEP 4 | Remove the DPC from the antistatic bag and partially slide it into any of the available DPC slots, ensuring that the handles are in the open position. When the card is about 1/4-inch

from being fully inserted, adjust the levers to align with the chassis and then close the levers to seat the card in place.





STEP 5 | Tighten the thumb screws on each side of the card to secure the card to the chassis by hand or using a Phillips-head screwdriver.

STEP 6 | Enable the slots that contain the functioning DPC (in the second chassis) and the DPC that you just replaced.

```
admin@PA-7050> request chassis enable slot <slot-number>
```

For example, run the following command to enable slot 3 on the firewall:

```
admin@PA-7050> request chassis enable slot s3
```

It is recommended that you observe the enabled card for about two minutes to check for internal path monitoring failures. If there is no failure, proceed to the next step.

STEP 7 | Power on the slots that contain the functioning DPC (in the second chassis) and the DPC that you just replaced.

```
admin@PA-7050> request chassis power-on slot <slot-number>
```

For example, run the following command to enable slot 3 on the firewall:

```
admin@PA-7050> request chassis power-on slot s3
```

It is recommended that you observe the enabled card for about two minutes to check for internal path monitoring failures. If there is no failure, proceed to the next step.

STEP 8 | Check the status of the card in slot 3 on either chassis by running:

```
admin@PA-7050> show chassis status slot s3
```

If the cards are functioning properly, the status will show an output similar to the following:

```
Slot...Component........Card Status.....Config Status
3.......PA-7000-DPC ...Up.................Success
```

STEP 9 | Ensure that the DPCs' session distribution policy is set to **session-load**.

1. Run the following command to check the DPCs' current distribution policy:

   ```
   admin@PA-7050> show session distribution policy
   ```

2. If the **Ownership Distribution Policy** reads as any value other than **session-load**, run the following command:

   ```
   admin@PA-7050> set session distribution-policy session-load
   ```

3. Running the **show session distribution policy** command should now read **Ownership Distribution Policy: session-load**.

Replace a PA-7000 Series SMC Boot Drive

The first generation switch management cards (PA-7050-SMC and PA-7080-SMC) come with an mSATA solid-state drive (SSD) that contains the PAN-OS boot images and configuration files. If your PAN-OS configuration file is too large to fit on the pre-installed SSD, you can replace the stock SSD with the PAN-PA-7000-MSATA-IMG. The PAN-PA-7000-MSATA-IMG has more storage space and is pre-loaded with a PAN-OS image. Follow the procedure below to replace the mSATA in your SMC.

STEP 1 | Put the provided ESD wrist strap on your wrist, ensuring that the metal contact is touching your skin. Attach (snap) one end of the ground cable to the wrist strap and remove the alligator clip from the banana clip on the other end of the ESD grounding cable. Plug the banana clip end into one of the ESD ports located on the front of the chassis before handling ESD sensitive hardware. For details on the ESD port location, see PA-7050 Front Panel (AC) or PA-7080 Front Panel (AC).

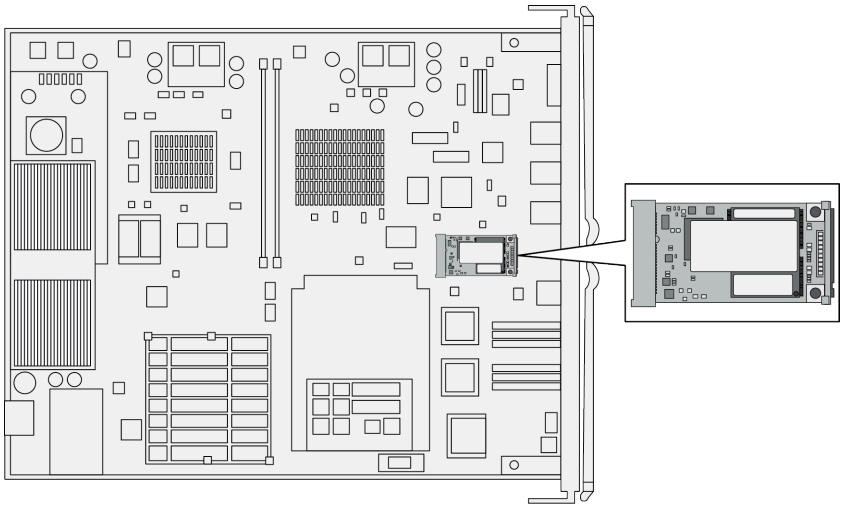
Before you power off the chassis in the following step, ensure that you have created a backup of your PAN-OS configuration. See Save and Export Firewall Configurations.

STEP 2 | Power off the chassis. Disconnect the cables connected to the SMC and all power cords plugged into the chassis.

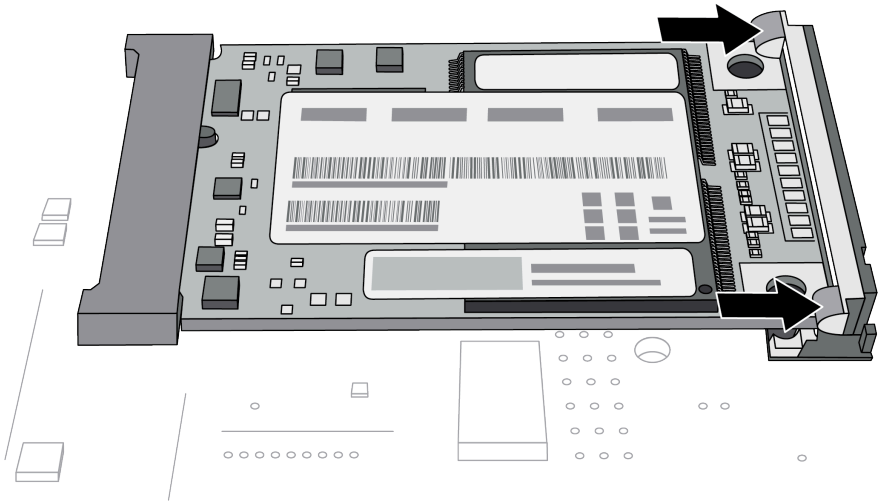
STEP 3 | Use a #1 or #2 Phillips screwdriver to unscrew the SMC screws at the front of the chassis. On the PA-7050 firewall, the SMC is located in slot 4; on the PA-7080 firewall, the SMC is located in slot 6.

STEP 4 | Use the card ejector levers adjacent to the SMC screws to release the card. Remove the card and place it on an ESD work surface. Detach your wrist strap's ground cable from the ESD port on the chassis and securely attach the alligator clip to the new ESD surface.

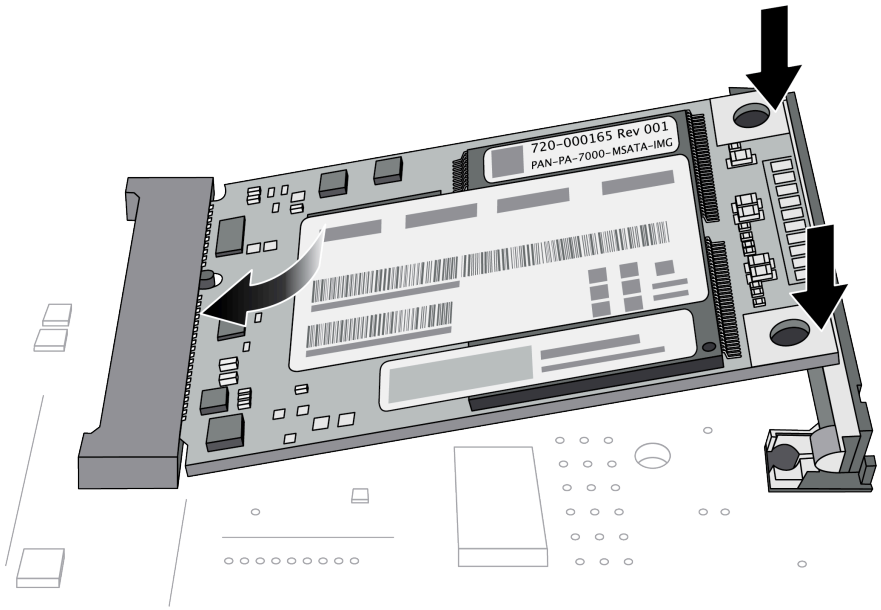
STEP 5 | Locate the mSATA.



STEP 6 | Gently press the two clips to release the mSATA. Once the mSATA pops up, carefully remove it from the socket.



STEP 7 | Carefully place the new mSATA into the socket. Ensure that the label displaying the Palo Alto Networks SKU and bar codes is facing up. Press the mSATA down until it clicks into place and is secured by both clips.



STEP 8 | Detach your wrist strap's ground cable from the ESD surface and plug the banana clip back into one of the ESD ports on the front of the chassis. While the card ejector levers are ajar, gently slide the SMC back into the appropriate slot in the chassis. Ensure that the SMC faceplate aligns with the faceplates of the other cards.

STEP 9 | Lock the card ejector levers and screw the SMC screws back into the front of the chassis.

STEP 10 | Reconnect the power cords and SMC cables.

STEP 11 | Boot the chassis with the new mSATA installed. When prompted, log in and reset the firewall to factory default settings. After the reset operation is complete, load your preferred version and configuration of PAN-OS.

Replace a PA-7000 Series Firewall LPC Drive

The Log Processing Card (LPC) contains four Advanced Mezzanine Cards (AMCs) used to house one 2.5” SATA drive each. The first two drives (A1 and A2) are configured in a RAID 1 array and the second two drives (B1 and B2) are configured in a second RAID 1 array. This configuration provides redundancy so if a drive in a RAID 1 array fails there is no service interruption or loss of log data.

When ordering replacement drives from Palo Alto Networks or your reseller, you will receive the AMC and the drive as a single unit. Do not attempt to replace the drive in the AMC with a third-party drive. Also, do not mix drive models within a RAID 1 array (for example, the drive model must be the same for both drives in the A1/A2 RAID 1 array). You can, however, mix drive models in different RAID 1 arrays on the same LPC. For example, the drives in the A1/A2 array can both be model ST91000640NS and the drives in the B1/B2 array can both be model ST1000NX0423.

STEP 1 | Identify the failed drive and note the drive model by running the following operational command and viewing the `status` and `model` fields:

```
admin@PA-7080> show
system raid detail
```

For example, the following output shows that drive A2 failed and the drive model is `ST91000640NS`.

```
Disk Pair S7A                              Available
   Status                                    clean, degraded
   Disk id A1                                Present
       model        : ST91000640NS
       size         : 953869 MB
       status       : active sync
       card serial  : 002901000061
   Disk id A2                                Present
       model        : ST91000640NS
       size         : 953869 MB
       status       : failed
       card serial  : 002901000067
```

STEP 2 | Put the provided ESD wrist strap on your wrist ensuring that the metal contact is touching your skin. Then attach (snap) one end of the ground cable to the wrist strap and remove the alligator clip from the banana clip on the other end of the ESD grounding cable. Plug the banana clip end into one of the ESD ports located on the front of the chassis before handling ESD sensitive hardware. For details on the ESD port location, see PA-7050 Front Panel (AC) or PA-7080 Front Panel (AC).

STEP 3 | Remove the failed drive from the RAID 1 array. In this example, run the following command to remove drive A2 from the array:

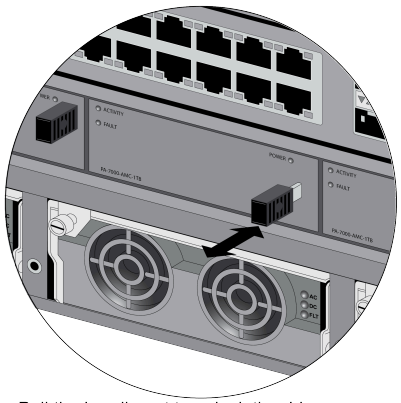
```
admin@PA-7080> request
```



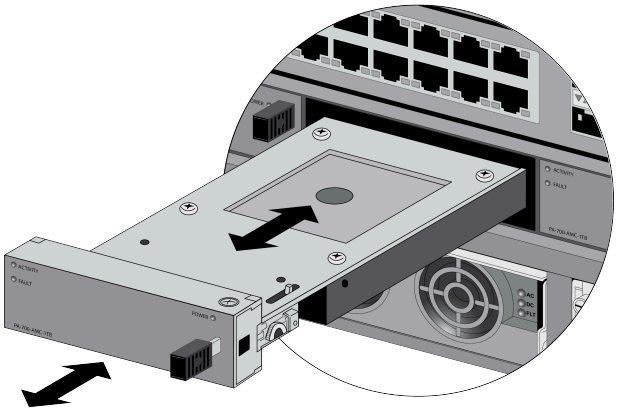
```
system raid slot s7 remove A2
```

This procedure is based on a PA-7080 firewall where the LPC is installed in slot s7. If you are working on a PA-7050 firewall, the LPC is installed in slot s8. For a PA-7050 firewall, replace `slots7` with `slot s8` in those commands that specify the LPC slot number.

STEP 4 | Gently pull the AMC release handle of the failed drive toward you until it stops to unlock the AMC from the chassis and then completely remove the AMC. The FAULT LED on the AMC that contains the failed drive will show red.



Pull the handle out to unlock the drive.
Push the handle in to lock the drive to the AMC.



STEP 5 | Remove the replacement drive from the packaging and compare the drive model on the label with the drive model of the failed drive. Proceed as follows based on your findings:

- If the replacement drive is the same model number of the failed drive that you removed, then continue to 6.
- If the replacement drive is a different model number than the drive that you removed, then continue to 7.

STEP 6 | (Same model replacement drive only) Install a replacement drive that is the same model as the other drive in the RAID 1 array:

1. Pull the AMC handle on the replacement drive outward until it stops to prepare it for installation into the LPC.
2. Install the replacement drive by gently sliding it into the empty AMC slot (slot A2 in this example) and then push the release handle inward until it stops to lock the AMC to the LPC.
3. Add the replacement drive to the RAID 1 array. In this example, run the following command to add drive A2 to the array:

```
admin@PA-7080> request
system raid slot s7 add A2
```

   The system will automatically configure the new drive to mirror the other drive in the RAID 1 array.
4. View the RAID status until you see that the disk pair (S7A in this example) shows `Available` and both disks show the status `active sync`. To view RAID status, run the following command:

```
admin@PA-7080> show
system raid detail
```

5. The following output shows that the RAID 1 array is functioning properly:

```
Disk Pair S7A                          Available
Status                                   clean
   Disk id A1                            Present
       model        : ST91000640NS
       size         : 953869 MB
       status       : active sync
       card serial  : 002901000061
   Disk id A2                            Present
       model        : ST91000640NS
       size         : 953869 MB
       status       : active sync
       card serial  : 002901000072
```


STEP 7 | (Different model replacement drive only) Install a replacement drive that is a different model than the other drive in the RAID 1 array:

When you initiate the copy command as described in the following steps, logging and log query will not be available on the drive array until the copy is complete and the disk pair shows `Available`. If the other drive array (B1/B2 in this example) is low on drive space during the copy process, older logs are deleted to make room for new logs.

1. Pull the AMC handle on the replacement drive outward until it stops to prepare it for installation into the LPC.
2. Install the replacement drive by gently sliding it into the empty AMC slot (slot A2 in this example) and then push the release handle inward until it stops to lock the AMC to the LPC.

   If you want to copy data from the existing drive to the replacement drive, proceed to the next substep.

   If you do not want to copy data to the replacement drive, proceed to installing the second replacement drive.
3. Copy the data from the existing drive in the RAID 1 array to the replacement drive. In this example, run the following command to copy the data from the A1 drive to the A2 drive:

   ```
   admin@PA-7080> request
   system raid slot s7 copy from A1 to A2
   ```
4. Run the following CLI command to view the status of the copy:

   ```
   admin@PA-7080> show
   system raid detail
   ```
5. Continue running this command to view the RAID detail output until the copy is complete and the disk pair shows `Available`. The following example output shows that `Disk Pair S7A` is `Available`.

   At this point, drive A1 will show `notin use` because there is a drive model mismatch.

   ```
   Disk Pair S7A                              Available
   Status                                       clean, degraded
      Disk id A1                                Present
          model          : ST91000640NS
          size           : 953869 MB
          status         : not in use
          card serial    : 002901000061
      Disk id A2                                Present
          model          : ST1000NX0423
          size           : 953869 MB
          status         : active sync
          card serial    : 002901000098
   ```


6. Install the second replacement drive. In this example, physically remove the drive from slot A1 and then install the second replacement drive—one that is the same model as you installed in slot A2—into slot A1.
7. Add the second replacement drive to the RAID 1 array. In this example, run the following command to add drive A1 to the array:

```
admin@PA-7080> request
system raid slot s7 add A1
```

   The system will automatically configure the new drive to mirror the other drive in the RAID 1 array.
8. Continue to view the RAID status until you see that the drive array (S7A in this example) shows `Available` and both drives show the status `active sync`.

```
admin@PA-7080> show
system raid detail
```

   The following output shows that the RAID 1 array is functioning properly:

```
Disk Pair S7A                          Available
Status                                   clean
   Disk id A1                            Present
       model        : ST1000NX0423
       size         : 953869 MB
       status       : active sync
       card serial  : 002901000089
   Disk id A2                            Present
       model        : ST1000NX0423
       size         : 953869 MB
       status       : active sync
       card serial  : 002901000067
```


Re-Index the LPC Drives

If you reuse the drives from a failed Log Processing Card (LPC) when installing a new LPC, you must install the drives in the same order in which they were removed from the old LPC and then re-index the log metadata. This ensures that the firewall properly displays the logs that are on the drives. The following example is for a PA-7050 firewall. Use the same procedure for a PA-7080 firewall, but use S7 instead of S8 as the LPC slot number in the log view step.

If you are using a data port on an NPC for management access, you must reconnect to the firewall using the console port because you will shut down all NPCs to avoid generating new traffic logs during indexing.

STEP 1 | After replacing an LPC as described in Replace a PA-7000 Series Log Processing Card (LPC), power on the chassis.

STEP 2 | If the firewall is in a high availability (HA) configuration, run the following commands to ensure that the firewall with the replacement LPC is in the suspend state:

```
admin@PA-7050> show
high-availability state
```

If the firewall is active, suspend it by running the following CLI command:

```
admin@PA-7050> request
high-availability state suspend
```

STEP 3 | If the firewall is not in an HA configuration, you must disable all NPCs, so traffic does not traverses the firewall during indexing.

To check for active sessions, run the following command:

```
admin@PA-7050> show
session all
```

To clear all sessions, run the following command:

```
admin@PA-7050> clear
session all
```

To view the status of each NPC:

```
admin@PA-7050> show
chassis status
```

For each NPC that is in the Up state, run the following command to power off the NPC(s):

```
admin@PA-7050> request
```



```
chassis admin-power-off slot <slot-number>
```

For example, if there is an NPC in slot 1, run the following command:

```
admin@PA-7050> request
chassis admin-power-off slot s1
```

Do the same for each installed NPC until all NPCs show `AdminPowerOff`. This ensures that network traffic will not traverse the firewall during indexing.

STEP 4 | Run the following commands to start indexing on the two logical drives (two RAID pairs):

```
admin@PA-7050> request
metadata-regenerate slot 1
:admin@PA-7050> request metadata-regenerate slot 2
```

You can start a second SSH session to the firewall and run the second command to simultaneously re-index both logical drives. If your session stops responding during the indexing process, re-establish a new connection.

STEP 5 | Monitor the indexing progress. This process may take several hours, depending on the amount of data on the drives.

Run the following commands to view the progress log for the first logical RAID pair:

*On a PA-7080 firewall, in the following commands, replace **`S8lp-log`** with **`S7lp-log`**. This is required because the LPC on a PA-7080 firewall is installed in slot 7.*

```
admin@PA-7050> less
s8lp-log vld-0-0.log
```

Periodically view the log until you see the following:

```
Done generating metadata for LD:0
```

Do the same to check the status of the second logical RAID pair as indicated in log vld-1-0.log:

```
admin@PA-7050> less
s8lp-log vld-1-0.log
```

When the indexing is complete on the second logical drive, you will see the following in the vld-1-0.log output:

```
Done generating metadata for LD:1
```

STEP 6 | After both logical drives complete the indexing process, check the status of the drives as described in Verify the PA-7000 Series Firewall LPC Configuration.

STEP 7 | If your NPCs are powered off or disabled, bring them back up by running the following commands.

To view the status of each NPC:

```
admin@PA-7050> show
chassis status
```

For each NPC that is in the `AdminPowerOff` state, run the following command:

```
admin@PA-7050> request
chassis admin-power-on slot <slot-number>
```

For example, if there is an NPC in slot 1, run the following command:

```
admin@PA-7050> request
chassis admin-power-on slot s1
```

For each NPC that is in the `disabled` state, run the following command to enable the slot it is in:

```
admin@PA-7050> request chassis enable slot <slot-number>
```

For example, if there is an NPC in slot 3, run the following command:

```
admin@PA-7050> request chassis enable slot s3
```

Do the same for each installed NPC until all NPCs are in the `Up` state.

STEP 8 | If the firewall is in an HA configuration and you suspended it, set the state to functional by running the following command:

```
admin@PA-7050> request
high-availability state functional
```

STEP 9 | Use the CLI or web interface to check that the logs now appear. For example, run the following CLI command and press the q key to exit the log output:

```
admin@PA-7050> show
log traffic
```

For example:

```
A maximum of 500 of last 7 day's logs will be displayed.
Please use 'scp export log ...' if more logs are needed
Time                 App             From
 Src Port          Source
```



```
Rule                 Action          To
 Dst Port           Destination
                     Src User        Dst User
 End Reason
=============================================================
2015/01/18 07:14:12 incomplete      EDM-Vwire-Vsys5
 36502              10.43.5.17
EDM-Vsys5-Sec-Pol-2 allow           EDM-Vwire-Vsys5
 135                10.5.40.161

 aged-out
2015/01/18 08:06:39 incomplete      EDM-Vwire-Vsys5
 40706              10.43.5.17
EDM-Vsys5-Sec-Pol-2 allow           EDM-Vwire-Vsys5
 135                10.5.40.161

 aged-out
```

You can also use the web interface to view logs. For example, to view the traffic logs, select **Monitor** > **Logs** > **Traffic**.

Replace a PA-7050-SMC-B or PA-7080-SMC-B Drive

The PA-7050-SMC-B and PA-7080-SMC-B have two SSD drives in a RAID 1 configuration. This configuration provides redundancy so if a drive in a RAID 1 array fails there is no unplanned service interruption or loss of data.

When ordering replacement drives from Palo Alto Networks or your reseller, you will receive two drives that are the same model. Do not attempt to replace the drive with a third-party drive. Also, do not mix drive models within the RAID 1 array.

You must power off the firewall and remove the power cords from the chassis before you remove and service a Switch Management Card (SMC).

STEP 1 | Identify the failed drive and note the drive model by running the following operational command and viewing the `status` and `model` fields:

```
admin@PA-7080> show
system raid detail
```

For example, the following output shows that the Sys 2 partitions are degraded, which indicates that the Sys 2 drive failed, and the drive model is `MICRON_M510DC_MT`.

```
Overall RAID status                          degraded
-------------------------------------------------------------------------
Drive status
   Disk id Sys1                              Present
 (MICRON_M510DC_MT)
   Disk id Sys2                              Present
 (MICRON_M510DC_MT)
-------------------------------------------------------------------------
Partition status

panlogs                                        clean
   Drive id Sys1                           active sync
   Drive id Sys2                           degraded

maint                                          clean
   Drive id Sys1                           active sync
   Drive id Sys2                           degraded

sysroot0                                       clean
   Drive id Sys1                           active sync
   Drive id Sys2                           degraded

sysroot1                                       clean
   Drive id Sys1                           active sync
   Drive id Sys2                           degraded

pancfg                                         clean
   Drive id Sys1                           active sync
```



```
   Drive id Sys2                          degraded

panrepo                                      clean
   Drive id Sys1                          active sync
   Drive id Sys2                          degraded

swap                                         clean
   Drive id Sys1                          active sync
   Drive id Sys2                          degraded
```

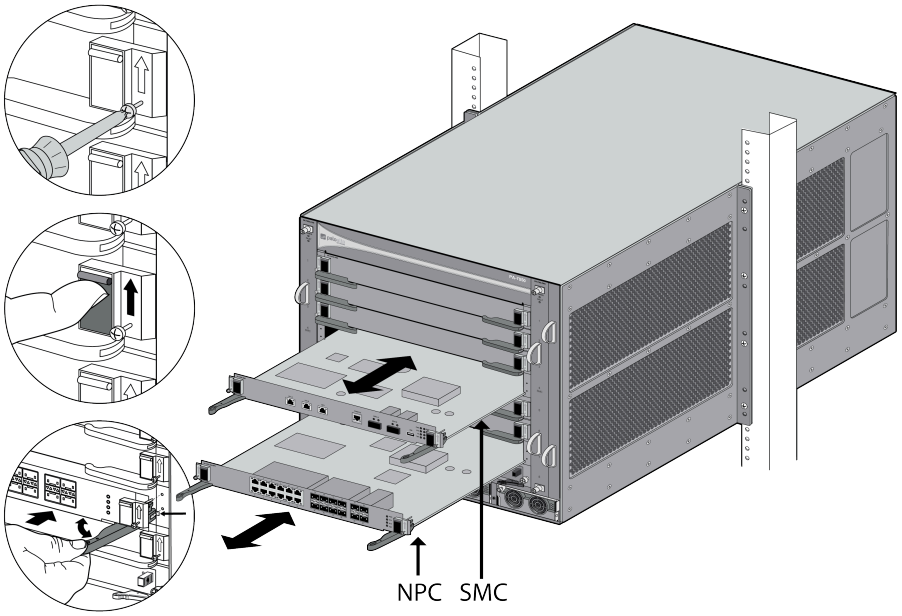
STEP 2 | Run the following command to shut down the firewall:

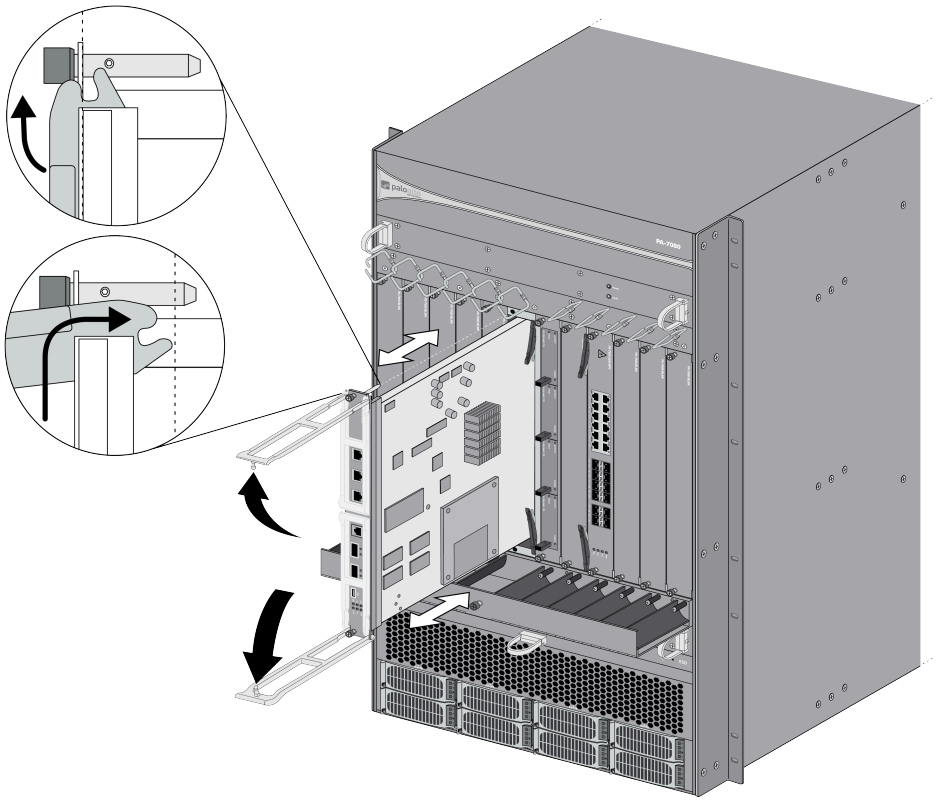
```
admin@PA-7080> request shutdown system
```

STEP 3 | After the firewall is down, remove the power cords and make note of the cable connections. Loosen the screws on each side of the SMC-B. On the PA-7050 firewall, the SMC-B is located in slot 4; on the PA-7080 firewall, the SMC-B is located in slot 6.

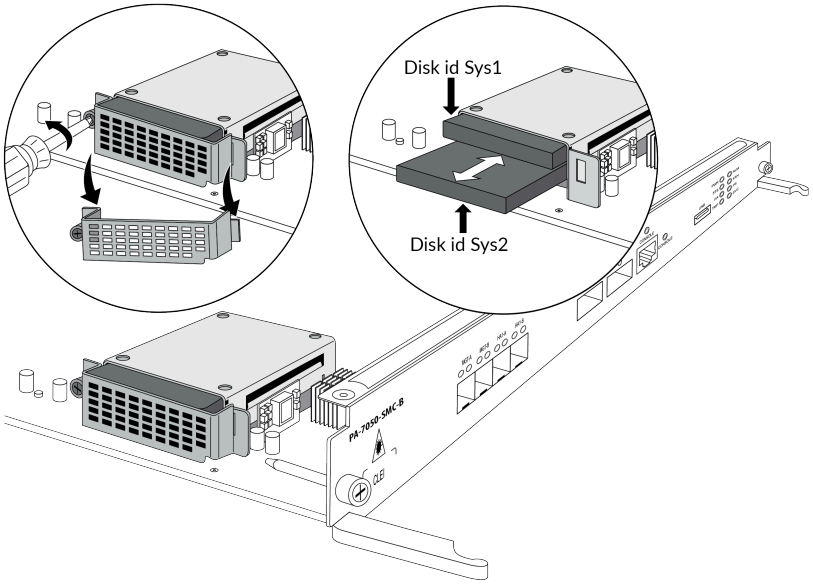
STEP 4 | Put the provided ESD wrist strap on your wrist ensuring that the metal contact is touching your skin. Then attach (snap) one end of the ground cable to the wrist strap and remove the alligator clip from the banana clip on the other end of the ESD grounding cable. Plug the banana clip end into one of the ESD ports located on the front of the chassis before handling ESD sensitive hardware. For details on the ESD port location, see PA-7050 Front Panel (AC) or PA-7080 Front Panel (AC).

STEP 5 | Remove the failed SMC-B from the chassis. The following images show the first-generation SMCs; the procedure is the same for the second-generation SMCs (SMC-B).





STEP 6 | Remove the failed drive (Sys 2 in this example). Turn the screw on the SSD drive slot door counter-clockwise and then remove the door. Pull the failed drive out of the SSD drive slot. Note the model number and compare it to the replacement drive. If the model number is different, you will replace both drives. The following image show the PA-7050-SMC-B; the procedure to replace a PA-7080-SMC-B SSD is the same.



STEP 7 | Insert the replacement drive (into the Sys 2 slot in this example), reinstall the drive slot door and turn the door screw clockwise until tight.

STEP 8 | Reinstall the SMC-B into the chassis.

STEP 9 | Insert the power cords to power on the firewall.

STEP 10 | The firewall detects the new drive and prompt you with one of the following options:

During the drive sync process, you can run the following CLI command to check status: ***`show system raid status`***.

- **Adding blank but identical drive**—The drive model numbers of the existing and new drives match and the new drive is blank. The firewall powers up normally, the new drive is added to the RAID partition without any user interaction, and background RAID sync starts. The alarm LED remains RED until the RAID sync is complete, indicating that there is a single point of failure in the firewall. When the RAID sync completes, the alarm LED turns GREEN. This process could take up to an hour or more. Store the second replacement drive as a spare.
- **Adding blank but different drive**—The drive model numbers of the existing and new drives are different. The firewall boots, determines that the drives are different, and then boots into maintenance mode with the reason `Drive model mismatch`. At the prompt, select one of the following options (we recommend the second option so both drive models match):
  - **Add the new drive to the array, ignoring the model mismatch**—In this case, the drives are compatible, but are different models. The drive is added to the array and you are prompted to reboot. Upon reboot, the system behavior is the same as if an identical drive was replaced.
  - **Migrate from one drive to the other**—In this case, the firewall formats the new drive to maximum capacity, copies all contents from the old drive to the new drive, and adds the new drive to the array. After the migration process completes, you are prompted to power down the firewall, remove the old drive, insert the new drive, and then power on the firewall. If you are migrating from a larger drive to a smaller drive, you are warned that all saved logs are removed because there is no guarantee that the logs will be fully migrated.
- **Adding old drive back into system**—If two synced and running drives become out-of-sync (for example, because one drive was removed for a period of time), the firewall determines that two valid drives paired to the serial number of the firewall are present, so the firewall will reboot into maintenance mode. You are then prompted to select which drive is primary. Select the primary drive and then reboot at the next prompt. Upon rebooting, the firewall adds the secondary drive to the primary drive's RAID array and then the firewall behavior is the same as if an identical drive was installed. This procedure may require one extra automatic reboot to correctly set up the firewall (due to how automatic RAID selection functions).

Increase the PA-7000 Series Firewall LPC Log Storage Capacity

The PA-7000 Series firewall ships with four 1TB drives installed in the Log Processing Card (LPC) and each drive pair (A1/A2 and B1/B2) is in a separate RAID 1 array to provide 2TBs of log storage. You can replace the 1TB drives with 2TB drives to double the log storage capacity to 4TBs.

- *The logs on the 1TB drives will not be available after upgrading drives on a PA-7000 Series firewall that is running a PAN-OS 7.0.7 or earlier release. Even if this is acceptable, we recommend that you perform this upgrade during a maintenance window.If it is important to you to retain logs, you must upgrade to Panorama 7.0.8 or a later release. The following procedure describes both scenarios.*

- *When ordering new drives from Palo Alto Networks or your reseller, you will receive each AMC and drive as a single unit. Do not attempt to replace the drive in the AMC with a third-party drive. Also, do not mix drive models within a RAID 1 array (for example, the drive model must be the same for both drives in the A1/A2 RAID 1 array). You can, however, mix drive models in different RAID 1 arrays on the same LPC. For example, the drives in the A1/A2 array can both be model ST91000640NS and the drives in the B1/B2 array can both be model ST1000NX0423.*

STEP 1 | Put the provided ESD wrist strap on your wrist ensuring that the metal contact is touching your skin. Then attach (snap) one end of the ground cable to the wrist strap and remove the alligator clip from the banana clip on the other end of the ESD grounding cable. Plug the banana clip end into one of the ESD ports located on the front of the chassis before handling ESD sensitive hardware. For details on the ESD port location, see PA-7050 Front Panel (AC) or PA-7080 Front Panel (AC).

STEP 2 | Verify that the RAID 1 status for the installed drives shows there are at least two functioning RAID 1 arrays. During the upgrade, you will upgrade one RAID 1 array at a time and there must be at least one other RAID 1 array that is available to the firewall. The firewall will show an abort error if you try to remove the only functioning array from the configuration.

To view the RAID status, run the following command:

```
admin@PA-7080> show
system raid detail
```

For example, the following output from a PA-7080 firewall shows that both drive arrays (S7A and S7B) are `Available`, each disk is `Present`, and the status of each disk shows `active sync`.

```
Disk Pair S7A                              Available
   Status                                      clean
   Disk id A1                                Present
       model          : ST91000640NS
       size           : 953869 MB
```



```
        status       : active sync
        card serial  : 002901000067
   Disk id A2                          Present
        model        : ST91000640NS
        size         : 953869 MB
        status       : active sync
        card serial  : 002901000369
Disk Pair S7B                        Available
   Status                                clean
   Disk id B1                          Present
        model        : ST91000640NS
        size         : 953869 MB
        status       : active sync
        card serial  : 002901000237
   Disk id B2                          Present
        model        : ST91000640NS
        size         : 953869 MB
        status       : active sync
        card serial  : 002901000358
```

IMPORANT: If there is only one functioning RAID 1 array and the other array shows failed drives or has a status other than `Available`, you must replace at least one of the failed drives in the problem array before you proceed. A RAID 1 array can contain only one drive. In this case, you will see that the RAID details show `Available` and `clean/degraded`. For details, see Replace a PA-7000 Series Firewall LPC Drive.

STEP 3 | Upgrade the drives based on the PAN-OS version running on the firewall:

- If the firewall is running a PAN-OS 7.0.8 or later release, continue to 4.
- If the firewall is running a PAN-OS 7.0.7 or earlier release, continue to 5.

STEP 4 | Upgrade the firewall from 1TB to 2TB drives if the firewall is running PAN-OS 7.0.8 or later:

1. To remove drive A1 from the RAID 1 array, run the following command and enter y when prompted to confirm the request:

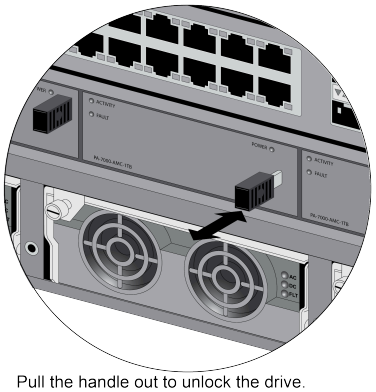
```
admin@PA-7080> request
```



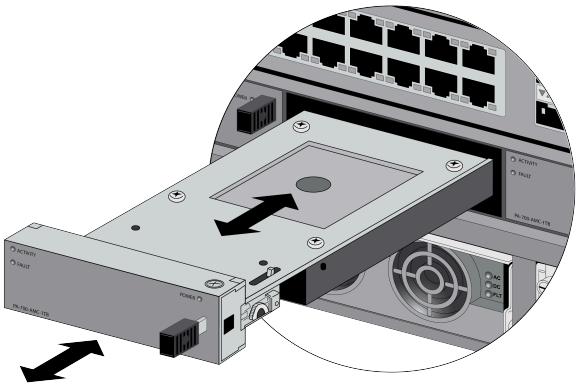
```
system raid slot s7 remove A1
```

This procedure is based on a PA-7080 firewall where the LPC is installed in slot s7. If you are working on a PA-7050 firewall, the LPC is installed in slot s8. For a PA-7050 firewall, replace ***slot s7*** *with* ***slot s8*** *in those commands that specify the LPC slot number.*

2. Gently pull the AMC release handle on drive A1 toward you until it stops to unlock the AMC from the chassis and then completely remove the AMC.



Pull the handle out to unlock the drive.
Push the handle in to lock the drive to the AMC.



3. Remove a new 2TB drives from the packaging and pull the AMC handle out to prepare it for installation into the LPC. Install the drive into the empty drive slot (A1 in this example) and then push in the release handle on the AMC to lock it to the chassis.
4. Copy the data from the 1TB (A2) drive to the newly installed 2TB (A1) drive:

```
admin@PA-7080> request
system raid slot s7 copy from A2 to A1
```

To view the status of the copy process, run the following command:

```
admin@PA-7080> show
```



```
system raid detail
```

Continue running this command to view the RAID detail output until you see that the array (A1/A2 in this example) shows **Available**.

At this point, drive A2 will show not in use because there is a drive size mismatch.

```
Disk Pair S7A                           Available
Status                                    clean, degraded
   Disk id A1                             Present
       model        : ST2000NX0253
       size         : 1907738 MB
       status       : active sync
       card serial  : 002901000063
   Disk id A2                             Present
       model        : ST1000NX0423
       size         : 953869 MB
       status       : not in use
       card serial  : 002901000067
```

5. Remove the 1TB drive from the A2 slot and then install a new 2TB drive in the A2 slot.
6. Add drive A2 to the RAID 1 array:

```
admin@PA-7080> request
system raid slot s7 add A2
```

The system will copy the data from A1 to A2 to mirror the drives.

To view the status of the copy process, run the following command:

```
admin@PA-7080> show
system raid detail
```

Continue to view the RAID detail output until you see that the array (S7A in this example) shows `Available` and both drives show the status `active sync`.

The following output shows that the RAID 1 array is functioning properly:

```
Disk Pair S7A                           Available
Status                                    clean
   Disk id A1                             Present
       model        : ST2000NX0253
       size         : 1907738 MB
       status       : active sync
       card serial  : 002901000063
   Disk id A2                             Present
       model        : ST2000NX0253
       size         : 1907738 MB
       status       : active sync
```



```
        card serial  : 002901000064
```

To upgrade the B1/B2 drive array, repeat these procedures replacing the drive designators. For example, replace A1 with B1 and A2 with B2 to upgrade the drives in the B1/B2 RAID 1 array.

STEP 5 | Upgrade the firewall from 1TB to 2TB drives if the firewall is running PAN-OS 7.0.7 or earlier:

The logs on the 1TB drives will not be available after the upgrade. We recommend that you perform this upgrade during a maintenance window.

To retain logs, you must upgrade to PAN-OS 7.0.8 and follow the procedure described in Upgrade the firewall from 1TB to 2TB drives if the firewall is running PAN-OS 7.0.8 or later:.

1. To remove the first two 1TB drives (A1 and A2 in this example) from the RAID 1 array, run the following commands and enter **y** when prompted to confirm the requests:

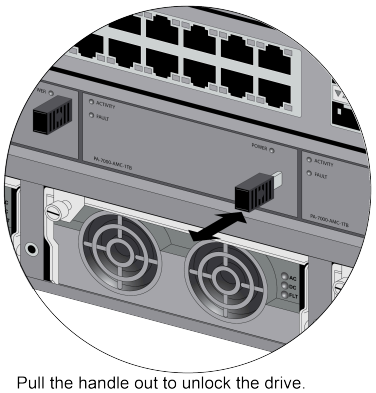
```
admin@PA-7080> request
system raid slot s7 remove A1
```



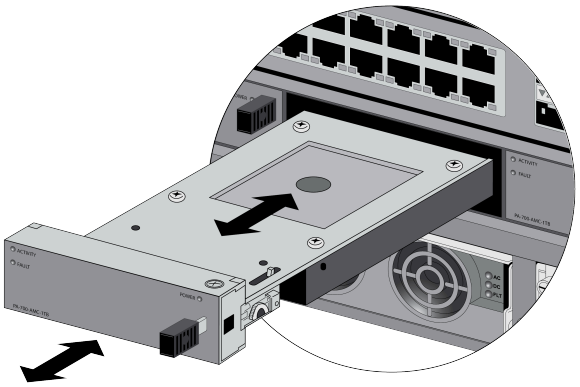
```
:admin@PA-7080> request system raid slot s7 remove A2
```

This procedure is based on a PA-7080 firewall where the LPC is installed in slot s7. If you are working on a PA-7050 firewall, the LPC would be installed in slot s8. For a PA-7050 firewall, replace slot s7 with slot s8 in those commands that specify the LPC slot number.

2. Gently pull the AMC release handle on drive A1 toward you until it stops to unlock the AMC from the chassis and then completely remove the AMC. Do the same for drive A2.



Pull the handle out to unlock the drive.
Push the handle in to lock the drive to the AMC.



3. Remove two 2TB drives from their packaging and pull the AMC handle out on each drive to prepare them for installation into the LPC. Install the drives into the empty slots (A1 and A2) and then push in the release handle on each AMC to lock the AMCs to the chassis.
4. Create a new RAID 1 array for the 2TB drives (using A1 in this example) by running the following command:

```
admin@PA-7080> request
system raid slot s7 add A1
```

5. View the status of the array configuration to confirm that the new array was created.

```
admin@PA-7080> show
```



```
system raid detail
```

The following output shows that the S7A array is Available.

At this point, drive A2 will show `not in use` *because you have not added it to the new RAID 1 array configuration.*

```
Disk Pair S7A                              Available
Status                                       clean/degraded
   Disk id A1                                Present
       model          : ST2000NX0253
       size           : 1907738 MB
       status         : active sync
       card serial    : 002901000063
   Disk id A2                                Present
       model          : ST2000NX0253
       size           : 1907738 MB
       status         : not in use
       card serial    : 002901000064
```

6. Add the second drive to the new array (A2 is this example):

```
admin@PA-7080> request
system raid slot s7 add A2
```

The system will copy the data from A1 to A2 to mirror the drives.

Continue running the **`show system raid detail`** command to view the RAID output until the disk pair status shows `clean` and both disks show `active sync`.

7. To upgrade the B1/B2 drive array, repeat these procedures replacing the drive designators. For example, replace A1 with B1 and A2 with B2 to upgrade the drives in the B1/B2 RAID 1 array.

PA-7000 Series Firewall Specifications

The following topics provide chassis and component specifications for the PA-7000 Series firewalls. The Log Cards (LPC and LFC) and Network Processing Cards (NPCs) are universal, so you can install them in a PA-7050 or PA-7080 firewall. Components that are not universal, such as power supplies, the Switch Management Card (SMC), fan trays, and the air filter are listed separately for each model. View the Datasheet for information on features, performance, and capacity numbers.

- PA-7000 Series Firewall Physical Specifications
- PA-7000 Series Firewall Electrical Specifications
- PA-7000 Series Firewall Environmental Specifications

PA-7000 Series Firewall Physical Specifications

The following table describes PA-7050 and PA-7080 firewall physical specifications.

Specification	Value
Height	• PA-7050 firewall—15.75 inches (40 cm) 9U • PA-7050 firewall with air flow kit installed (PAN-AIRDUCT)—24.5 inches (62.23 cm) 14U • PA-7080 firewall—33.22 inches (84.38 cm) 19U
Depth	• PA-7050 firewall—23.75 inches (60.32 cm). Including the front handles and rear DC power module posts (DC model), the depth is 25.5 inches (64.77 cm). • PA-7080 firewall—24.66 inches (62.64 cm). Including the front handles and rear DC power module posts (DC model), the depth is 26.97 inches (68.50 cm).
Width	• PA-7050 firewall—17.5 inches (44.45 cm). Including the mounting ears on each side, the width is 19 inches (48.26 cm). • PA-7080 firewall—17.5 inches (44.45 cm). Including the mounting ears on each side, the width is 19 inches (48.26 cm).
Chassis weight	**PA-7050 firewall** • Chassis (AC)—111.2 lbs (50 kg) Includes the chassis, two fan trays, air filter, and four power supplies. Does not include the blank slot covers, SMC, NPCs, LFC, or LPC. Total Weight (fully loaded)— 187.4 lbs (85 kg 3.20 g) Includes the chassis weight above, plus the SMC, LPC, and six NPCs. • Chassis (DC)—108.8 lbs (49 kg) Includes the chassis, two fan trays, the air filter, and four power supplies. Does not include the blank slot covers, SMC, NPCs, or LPC. Total Weight (fully loaded)—185 lbs (83 kg 915 g) Includes the chassis weight above, plus the SMC, LPC, and six NPCs. **PA-7080 firewall**

Specification	Value
	• Chassis (AC)—173 lbs (78 kg 471.47 g) Includes the chassis, two fan trays, air filter, and four power supplies. Does not include the blank slot covers, SMC, NPCs, or LPC. Total Weight (fully loaded)— 299.3 lbs (135 kg 760.19 g) Includes the chassis weight above, plus the SMC, LPC, ten NPCs, and eight AC power supplies. • Chassis (DC)—172 lbs (78 kg 17.88 g) Includes the chassis, two fan trays, the air filter, four DC power supplies, and the DC Power Entry Module (PEM). Does not include the blank slot covers, SMC, NPCs, or LPC. Total Weight (fully loaded)— 298.3 lbs (135 kg 306.59 g) Includes the chassis weight above, plus the SMC, LPC, ten NPCs, and a total of eight DC power supplies.

Chassis component weights	**Switch Management Card (SMC)**
	• PA-7050-SMC—11 lbs (4 kg 989.52 g)
	• PA-7080-SMC—12.5 lbs (5 kg 669.90 g)
	• PA-7050-SMC-B—14.5 lbs (6 kg 577.09 g)
	• PA-7080-SMC-B—14.5 lbs (6 kg 577.09 g)
	Network Processing Card (NPC)
	• 9.4 lbs (4 kg 263.77 g)
	• PA-7000-100G-NPC-A—12.5 lbs (5 kg 669.91 g)
	Log Card
	• Log Processing Card (LPC)
	  • LPC only with no drives—6.4 lbs (2 kg 902.99 g)
	  • Advanced Mezzanine Card (AMC) —0.6 lbs (272.16 g)
	  Each AMC includes a 2.5” SATA disk drive.
	  • LPC fully loaded with four AMCs—8.8 lbs (3 kg 991.61 g)
	• Log Forwarding Card (LFC)—9.5 lbs (4 kg 309.13)
	Fan tray
	• PA-7050 First-generation fan tray
	  • PA-7050-FANTRAY—9.8 lbs (4 kg 445.20 g)

Specification	Value

	• PA-7050 Second-generation fan trays
	  • PA-7050-FANTRAY-L-A—12 lbs (5 kg 443.11 g)
	  • PA-7050-FANTRAY-R-A—13.5 lbs (6 kg 123.49 g)
	• PA-7080 firewall—15.5 lbs (6 kg 945.63 g)
	EMI Filter
	• PAN-PA-7080-EMI-FILTR—1.5 lbs (680 g)
	Power supply (AC)
	• PA-7050 firewall—4.8 lbs (2 kg 177.24 g)
	• PA-7080 firewall—4 lbs (1 kg 814.37 g)
	Power Supply (DC)
	• PA-7050 firewall—4.2 lbs (1 kg 905.09 g)
	• PA-7080 firewall—4 lbs (1 kg 814.37 g)

Rack mount size	• **PA-7050 firewall**—9U, 19” standard rack (15.75”H x 19”W x 24”D) • **PA-7080 Firewall**—19U, 19” standard rack (32.22”H x 19”W x 24.66”D)
Power supply configurations	• **PA-7050 firewall**—Four AC or DC power supplies. The AC and DC power supplies are hot#swappable. • **PA-7080 firewall**—Up to eight AC or DC supplies. The AC and DC power supplies are hot#swappable. *The power supplies are not interchangeable between the PA-7050 and PA-7080 firewalls. For power configuration planning, see* Determine PA-7000 Series Firewall Power Configuration Requirements.

PA-7000 Series Firewall Electrical Specifications

Use the following topics to learn about the PA-7000 Series firewall electric specifications and the types of power cords you can use.

- PA-7000 Series Firewall Component Electrical Specifications
- PA-7000 Series Firewall Power Cord Types

PA-7000 Series Firewall Component Electrical Specifications

The following table describes PA-7050 and PA-7080 firewall power supply output and rated power consumption for the hardware components. For power configuration planning, see Determine PA-7000 Series Firewall Power Configuration Requirements.

Component SKU Number	Power Specification (Power Produced (+) or Rated Consumption (-))	Notes
PA-7000-20GXM-NPC	-350 Watts	Includes power allocation for optics
PA-7000-20GQXM-NPC	-350 Watts	Includes power allocation for optics
PA-7000-100G-NPC	-430 Watts	Includes power allocation for optics
PA-7000-LFC-A	-240 Watts	Includes power allocation for LEDs
PA-7000-LPC	-300 Watts	Includes power allocation for four AMC/disk drives
PA-7000-AMC-1TB PA-7000-AMC-2TB	N/A	Included in the PA-7000-LPC line item
PA-7050-SMC	-300 Watts	
PA-7050-SMC-B	-500 Watts	
PA-7000-DPC-A	-500 Watts	
PA-7050-FAN	-175 Watts	Not compatible with PAN-OS 9.0 hardware.
PA-7050-FANTRAY-L-A	-180 Watts	Left side exhaust fan tray for PA-7050 chassis

Component SKU Number	Power Specification (Power Produced (+) or Rated Consumption (-))	Notes
PA-7050-FANTRAY-R-A	-1200 Watts	Right side intake fan tray for PA-7050 chassis. This incorporates the new air filter, PA-7050-FLTR-A. The legacy air filter, PA-7050-FLTR, is not compatible with the new right side intake fan tray.
PA-7050-PWR25-AC	• Input Voltage—90-264VAC (50-60 Hz), Single phase • Output Power—+2500 Watts @ 208/240VAC or +1200 Watts @ 100/120VAC	
PA-7050-PWR25-DC	• Input Voltage— -40 to -60VDC • Output Power— +2500 Watts	
PA-7080-SMC	-300 Watts	
PA-7080-SMC-B	-500 Watts	
PA-7080-FAN	-520 Watts	
PA-7080-PWR25-AC	• Input Voltage—90-264VAC (50-60 Hz), Single phase • Output Power—+2500 Watts @ 208/240VAC or +1200 Watts@ 100/120VAC	
PA-7080-PWR25-DC	• Input Voltage— -40 to -60VDC • Output Power— +2500 Watts	

PA-7000 Series Firewall Power Cord Types

The PA-7000 Series firewalls ship with four AC or four DC power supplies by default. On the PA-7080 firewall, you can order up to four additional power supplies (eight total) and power cords are included with each AC power supply. The PA-7080 DC power cords are not included. The PA-7050 DC configuration supports one type of DC power cord (included) and is listed in the first row of the following table.

SKU Number	Description
PAN-PWR-DC-CBL-A	(PA-7050 firewall only) 15 ft DC power cord. One end of the cable has a connector that you plug into the front of the DC power supply and the other end of the cable has bare wires, which you must terminate to your DC power source. This cord is supported only on the PA-7050 DC power supply SKU number PAN-7050-PWR25-DC.
PAN-PWR-C19-AUS	AC power cord with IEC-60320 C19 and AS/NZS 4417 cord ends, 3 m
PAN-PWR-C19-EU	AC power cord with IEC-60320 C19 and CEE 7/7 SCHUKO cord ends, 3 m
PAN-PWR-C19-JP	AC power cord with IEC-60320 C19 and NEMA L6-20P cord ends, 3 m
PAN-PWR-C19-TW	AC power cord with IEC-60320 C19 and CNS 10917-3 cord ends, 3 m
PAN-PWR-C19-UK	AC power cord with IEC-60320 C19 and BS 1363 UK13 cord ends, 3 m
PAN-PWR-C19-US	AC power cord with IEC-60320 C19 and NEMA 6-20P cord ends, 3 m
PAN-PWR-C19-US-L	AC power cord with IEC-60320 C19 and locking NEMA L6-20P cord ends, 3 m
PAN-PWR-C19-BR	Power Cord, Brazil, 16A, 250V, NBR14136 (IEC 60906-1) to IEC-60320-C19, 10-FT, Brazilian INMETRO certified
PAN-PWR-C19-C20	Power Cord, North America, 20A, 250V, IEC C19 to IEC C20, 10ft
PAN-PWR-C19-C14	Power Cord, North America, 15A, 250V, IEC C19 to IEC C14, 10ft
PAN-PWR-C19-US-120V	Power Cord, North America, 15A, 125V, C19 to NEMA 5-15P, 10ft
PAN-PWR-C19-JP-120V	Power Cord, Japan, 15A, 125V, JISC8303 to C19, 10ft, PSE Certified

PA-7000 Series Firewall Environmental Specifications

The following table describes PA-7050 and PA-7080 firewall environmental specifications.

Specification	Value
Operating temperature range	0° to 50°C (32°F to 122°F)
Storage temperature range	-20° to 70°C (-4°F to 158°F)
Humidity	5% to 90% non-condensing
Chassis airflow	• PA-7050—Side-to-side (While facing the front of the chassis, the air enters from the right and exits on the left) *You can change the chassis airflow from side-to-side to front-to-back by installing the PAN-AIRDUCT kit. Contact your reseller or Palo Alto Networks for ordering information.* • PA-7080—Front-to-back

PA-7000 Series Firewall Hardware Compliance Statements

Palo Alto Networks obtains regulatory compliance certifications to comply with the laws and regulations in each country where there are requirements applicable to our products. Our products meet standards for product safety and electromagnetic compatibility when used for their intended purpose.

To view compliance statements for the PA-7000 Series firewalls, see PA-7000 Series Firewall Compliance Statements.

PA-7000 Series Firewall Compliance Statements

The following are the PA-7000 Series firewall hardware compliance statements:

- **VCCI**

  This section provides the compliance statement for the Voluntary Control Council for Interference by Information Technology Equipment (VCCI), which governs radio frequency emissions in Japan.

  The following information is in accordance to VCCI Class A requirements:

  この装置は、クラスA情報技術装置です。この装置を家庭環境で使用すると電波妨害を引き起こすことがあります。この場合には使用者が適切な対策を講ずるよう要求されることがあります。 VCCI-A

  Translation: This is a Class A product. In a domestic environment this product may cause radio interference, in which case the user may be required to take corrective actions.

- **NEBS Requirements**

  The following lists the Network Equipment Building System (NEBS) requirements for PA-7000 Series firewalls.

  - The firewall is intended to be installed in a Network Telecommunication Facility (Central Office) as part of a Common Bonding Network (CBN) or Isolated Bonding Network (IBN). Bare conductors must be coated with an appropriate antioxidant compound before crimp connections are made. All unplated connectors, braided strap, and bus bars must be brought to a bright finish and then coated with an antioxidant before they are connected.
  - Fastening hardware must be compatible with the materials being joined and must preclude loosening, deterioration, and electrochemical corrosion of the hardware and the joined materials.
  - The firewall is suitable for connection to the Central Office or Customer Premise Equipment (CPE).
  - The DC battery return wiring on the firewall must be connected as an isolated DC return (DC-I).

  The intra-building ports (RJ-45 Ethernet ports, AUX ports, HA ports, and the MGT port) of the equipment or subassembly are suitable for connection to only intra-building or unexposed wiring or cabling. The intra-building port(s) of the equipment or subassembly must not be metallically connected to interfaces that connect to the Outside Plant (OSP) or its wiring. These interfaces are designed for use as intra-building interfaces only (Type 2 or Type 4 ports as described in GR-1089-CORE, Issue 6) and require isolation from the exposed OSP cabling. The addition of primary protectors is not sufficient protection to connect these interfaces metallically to OSP wiring.

  The firewall must be connected to an external Special Protection Device (SPD) when installed and connected to commercial AC power.

- **BSMI EMC Statement**—User warning: This is a Class A product. When used in a residential environment it may cause radio interference. In this case, the user will be required to take adequate measures.
  - **Manufacturer**—Flextronics International.
  - **Country of Origin**—Made in the USA with parts of domestic and foreign origin.
- **CE (European Union (EU) Electromagnetic Compatibility Directive)**—This device is herewith confirmed to comply with the requirements set out in the Council Directive on the Approximation of the Laws of the Member States relating to Electromagnetic Compatibility Directive (2014/30/EU).

  The above product conforms with Low Voltage Directive 2014/35/EU and complies with the requirements relating to electrical equipment designed for use within certain voltage limits.
- **Federal Communications Commission (FCC) statement for a Class A digital device or peripheral**—This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:
  - Reorient or relocate the receiving antenna.
  - Increase the separation between the equipment and receiver.
  - Connect the equipment to an outlet on a circuit that is different from the one to which the receiver is connected.
  - Consult the dealer or an experienced radio/TV technician for help.
- **ICES (Canadian Department Compliance Statement)**—This Class A digital apparatus complies with Canadian ICES-003.

  French translation: Cet appareil numérique de la classe A est conforme à la norme NMB-003 du Canada.
- **Korean Communications Commission (KCC) Class A Statement**—This equipment is an electromagnetic compatible device for business purposes (Class A). The provider or user should be aware that the equipment is intended for use outside the home.
- **Technischer Überwachungsverein (TUV)**

Risk of explosion if battery is replaced by an incorrect type. Dispose of used battery according to local regulations.

