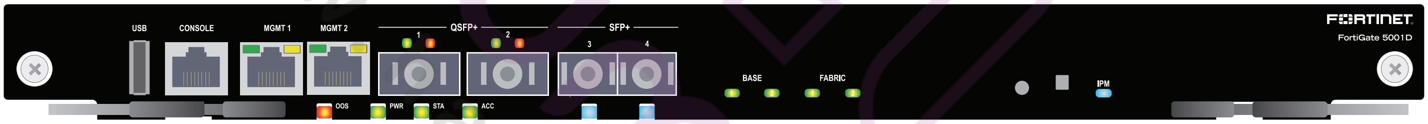
FortiGate-5001D

Security System Guide



This *FortiGate-5001D Security System Guide* describes FortiGate-5001D hardware features, how to install a FortiGate-5001D board in a FortiGate-5000 series chassis, and how to configure the FortiGate-5001D security system for your network.

The most recent versions of this and all FortiGate-5000 series documents are available from the FortiGate-5000 page of the Fortinet Technical Documentation web site (http://docs.fortinet.com).

Visit https://support.fortinet.com to register your FortiGate-5001D security system. By registering you can receive product updates, customer support, and FortiGuard services.

FortiGate-5001D Security System Guide

01-560-0242101-20170728

Cautions and Warnings

Environmental specifications

Operating Temperature – If this device is installed in a closed or multi-unit rack assembly, the rack's ambient temperature may be greater than the room's ambient temperature. Make sure the rack environment is compatible with the manufacturer's maximum rated ambient temperature (Tma).

Température ambiante élevée — Si cet appareil est installé dans un cabinet fermé, la température ambiante du cabinet peut être supérieure à la température ambiante de la pièce. Assurez- vous que l'environnement dans le cabinet est compatible avec la température ambiante maximale du fabricant (Tma).

Air flow – For rack installation, make sure that the amount of air flow required for safe operation of the equipment is not compromised. For free-standing installation, make sure that the appliance has at least 2 inches (5 cm) of clearance on each side to allow for adequate air flow and cooling.

Ventilation — Pour une installation dans un cabinet, assurez-vous que la ventilation nécessaire au fonctionnement de l'équipement n'est pas compromise. Pour une installation autonome, assurez-vous que l'appareil dispose d'au moins 2 pouces (5 cm) de dégagement de chaque côté pour permettre l'écoulement de l'air et un refroidissement adéquat.

Circuit overloading – To avoid overloading, use the ratings on the label. Consider the equipment's connection to the supply circuit and the effect that circuit overloading might have on current protection and supply wiring.

For redundant power sources, connect each to an IEC/UL Listed power source whose output rating is greater than or equal to the equipment.

Surtension – Pour éviter de surcharger le circuit d'alimentation, référez-vous aux notes sur l'étiquette de l'équipement . Envisagez l'effet que la surtension du circuit pourrait avoir sur la protection de surtension et le câblage d'alimentation .

Pour les sources d'alimentation redondantes, connectez chacun à une source d'alimentation Mis CEI / UL dont la cote de rendement est supérieur ou égal à l'équipement.

Reliable earthing – Make sure all rack-mounted equipment is grounded. This includes supply connections (e .g . power strips), not only direct connections to the branch circuit.

Mise à la terre – Assurez-vous que tout l'équipement est mis à la terre . Ceci comprend les connexions d'alimentation (par exemple, les barres d'alimentation) en plus des connexions directes au circuit de dérivation.

Interference – If possible, use Shielded Twisted Pair (STP) Ethernet cables instead of Unshielded Twisted Pair (UTP) .

Interférence – Si possible, utilisez des câbles Ethernet de paire torsadée blindée (STP) plutôt que de paire torsadée non blindée (UTP).

Mechanical loading – To avoid personal injury or damage to the appliance, Fortinet recommends that 2 or more people together install the appliance into the rack. Balance the equipment to avoid uneven mechanical loading and tipping. Do not place heavy objects on the appliance.

Installation – Pour éviter des blessures ou des dommages à l'appareil, Fortinet recommande que deux personnes ou plus installent ensemble cet équipement dans un cabinet. L'installation du matériel à l'intérieur de la baie doit être effectuée de façon à éviter toute situation dangereuse liée à une installation non conforme . Ne placez pas d'objets lourds sur l'appareil, celui-ci n'étant pas conçu pour soutenir un poids additionnel.

Refer to specific Product Model Data Sheet for Environmental Specifications (Operating Temperature, Storage Temperature, Humidity, and Altitude)

Safety

Moving parts — Hazardous moving parts. Keep away from moving fan blades.

Pièces mobiles – Pièces mobiles dangerouses. Se tenir éloigné des pales de ventilateurs mobiles.

Do not install this equipment in a home or public area accessible to the general population. When installed in schools, this equipment must be installed in a location where access is restricted to trained personnel.

Dans les écoles, ce matériel doit être installé en lieu sûr, de façon à le rendre accessible seulement aux personnels qualifies.

Battery – Risk of explosion if the battery is replaced by an incorrect type. Do not dispose of batteries in a fire. They may explode. Dispose of used batteries according to your local regulations. IMPORTANT: Switzerland: Annex 4.10 of SR814.013 applies to batteries.

Batterie – Risque d'explosion si vous remplacez la batterie par un modèle incompatible. Jetez les piles usagées selon les réglementations locales en vigueur. IMPORTANT: Suisse: Annexe 4.10 de SR814.013 s'appliquant aux batteries.

警告

本電池如果更換不正確會有爆炸的危險

請依製造商說明書處理用過之電池

Contents

FortiGate-5001D security system

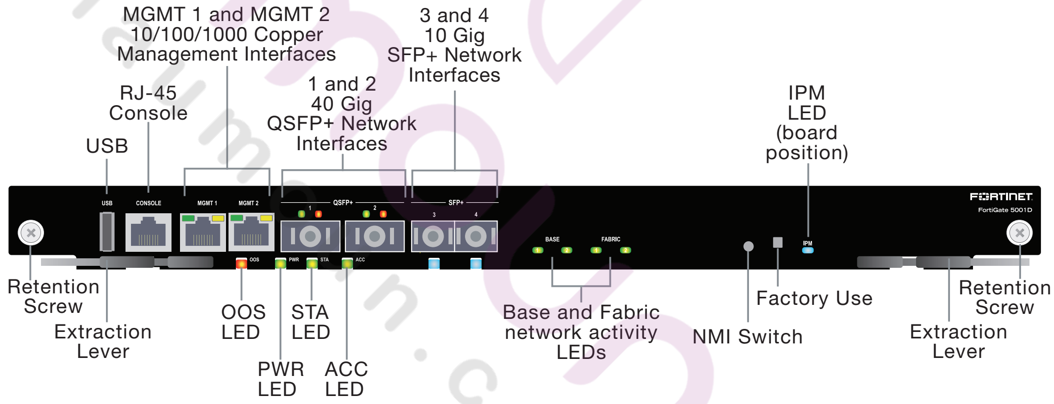
The FortiGate-5001D security system is a high-performance Advanced Telecommunications Computing Architecture (ATCA) compliant FortiGate security system that can be installed in any ATCA chassis that can provide sufficient power and cooling.

Fortinet's FortiGate-5144C chassis is recommended because it has a 40-gigabit fabric backplane and the FortiGate-5001D has 40-gigabit fabric interfaces. You can also install the FortiGate-5001D in a FortiGate-5060 or FortiGate-5140B chassis; both of which have 10-gigabit fabric backplanes.

See the FortiGate-5000 Compatability Guide for up-to-date information about FortiGate-5000 series chassis and other components that are compatible with the FortiGate-5001D.

The FortiGate-5001D security system contains two front panel 40-gigabit QSFP+ interfaces, two front panel 10-gigabit SFP+ interfaces, two base backplane 1-gigabit interfaces, and two fabric backplane 40-gigabit interfaces. The front panel SFP+ interfaces can also operate as 1-gigabit SFP interfaces. Use the front panel interfaces for connections to your networks and the backplane interfaces for communication across the ATCA chassis backplane. The FortiGate-5001D also includes two front panel RJ45 10/100/1000 management Ethernet interfaces, one RJ45 front panel serial console port, and one front panel USB port.

Figure 1: FortiGate-5001D front panel



The FortiGate-5001D front panel QSFP+ 40-gigabit, SFP+ 10-gigabit interfaces and fabric backplane interfaces also provide NP6-accelerated network processing for eligible traffic passing through these interfaces.

You can also configure two or more FortiGate-5001D boards to create a high availability (HA) cluster using the base or fabric backplane interfaces for HA heartbeat communication through the chassis backplane, leaving front panel interfaces available for network connections.

In most cases the base backplane interfaces are used for HA heartbeat communication and the fabric backplane interfaces are used for data communication.

The FortiGate-5001D board also supports high-end FortiGate features including 802.1Q VLANs, multiple virtual domains, 802.3ad aggregate interfaces, and FortiOS Carrier.

The FortiGate-5001D board includes the following features:

- Two front panel QSFP+ 40-gigabit interfaces (port1 and port2) accelerated by FortiASIC NP6 network processors. port1 and port2 can each be split into four 10-gigabit ports using the `config system global set split-port` command.
- Two front panel SFP+ 10-gigabit interfaces (port3 and port4) also accelerated by FortiASIC NP6 network processors. Can also be configured as SFP 1-gigabit interfaces.
- Two front panel 10/100/1000Base-T copper 1-gigabit management ethernet interfaces (mgmt1 and mgmt2).
- Two base backplane 1-gigabit interfaces (base1 and base2) for HA heartbeat communications across the FortiGate-5000 chassis base backplane.
- Two fabric backplane 40-gigabit interfaces (fabric1 and fabric2) for data communications across the FortiGate-5000 chassis fabric backplane.
- Two NP6 network processors that accelerate traffic on the interfaces port1, port2, port3, port4, fabirc1, and fabric2.
- Four CP8 content processors that accelerate IPS, SSL VPN, and IPsec VPN.
- Internal 200 GByte SSD for storing log messages, DLP archives, historic reports, IPS packet archiving, file quarantine, WAN Optimization byte caching and web caching.
- One RJ-45 RS-232 serial console connection.
- 1 USB connector.
- NMI switch for troubleshooting as recommended by Fortinet Support.
- Mounting hardware.
- LED status indicators.

Front panel components

From the FortiGate-5001D front panel you can view the status of the front panel LEDs to verify that the board is functioning normally. You also connect the FortiGate-5001D board to your 40-gigabit network using the front panel QSFP+ connectors and to your 10-gigabit network using the front panel SFP+ or SFP connectors. The front panel also includes two Ethernet management interfaces, an RJ-45 console port for connecting to the FortiOS CLI and a USB port. The USB port can be used with any USB key for backing up and restoring configuration files.

LEDs

Ports 1 and 2 can operate in 40-gigabit mode or 4 x 10-gigabit mode. The LEDs function differently in each mode

Table 1: FortiGate-5001D Port 1 and 2 LEDs (40-gigabit mode)

Green LED (left)	Amber LED (right)	Description
On	Off	The correct cable is connected to the interface and the connected equipment has power.
Off	Off	No link is established.

Table 2: FortiGate-5001D Port 1 and 2 LEDs (4 x 10-gigabit mode)

Green LED (left)	Amber LED (right)	Description
Flashing	On	The correct cable is connected to the interface and the connected equipment has power and all 10-gigabit connections are connected.
Flashing	Flashing	The correct cable is connected to the interface and the connected equipment has power and only some of the 10-gigabit connections are connected.
Off	Off	No link is established.

Table 3: Other FortiGate-5001D LEDs

LED	State	Description
3 and 4	Green	The correct cable is connected to the interface and the connected equipment has power.
	Flashing Green	Network activity at the interface.
	Off	No link is established.
Fabric 1 and 2	Off	Fabric backplane interface 1 or 2 (fabric1 or fabric2) is connected at 10 Gbps.
	Flashing Green	Network activity at fabric backplane interface 1 or 2 (fabric1 or fabric2).
Base 1 and 2	Green	Base backplane interface 1 or 2 (base1 or base2) is connected at 1 Gbps.
	Flashing Green	Network activity at base backplane interface 1 or 2 (base1 or base2).
OOS (Out of Service)	Off	Normal operation.
	Amber	A fault condition exists and the FortiGate-5001D blade is out of service (OOS). This LED may also flash very briefly during normal startup.
PWR (Power)	Green	The FortiGate-5001D board is powered on.
STA (Status)	On	The FortiGate-5001D board is powered on.
	Flashing Green	The FortiGate-5001D is starting up. If this LED is flashing at any time other than system startup, a fault condition may exist.

Table 3: Other FortiGate-5001D LEDs (Continued)

LED		State	Description
ACC (Disk activity)		Off or Flashing green	The ACC LED flashes green when the FortiGate-5001D board accesses the FortiOS flash disk. The FortiOS flash disk stores the current FortiOS firmware build and configuration files. The system accesses the flash disk when starting up, during a firmware upgrade, or when an administrator is using the CLI or GUI to change the FortiOS configuration. Under normal operating conditions this LED flashes occasionally, but is mostly off.
MGMT 1 and MGMT 2	Link/Act (Left LED)	Solid Green	Indicates the management interface (mgmt1 or mgmt2) is connected with the correct cable and the attached network device has power.
		Blinking Green	Indicates network traffic on this interface.
		Off	No Link
	Speed (Right LED)	Green	Connection at 1 Gbps.
		Amber	Connection at 100 Mbps.
		Off	Connection at 10 Mbps.
IPM		Blue	The FortiGate-5001D board is ready to be hot-swapped (removed from the chassis). If the IPM light is blue and no other LEDs are lit the FortiGate-5001D board has lost power
		Flashing Blue	The FortiGate-5001D board is changing from hot swap to running mode or from running mode to hot swap. This happens when the FortiGate-5001D board is starting up or shutting down.
		Off	Normal operation. The FortiGate-5001D board is in contact with the chassis backplane.

Connectors

Table 4: FortiGate-5001D connectors

Connector	Type	Speed	Protocol	Description
CONSOLE	RJ-45	9600 bps 8/N/1	RS-232 serial	Serial connection to the command line interface.
1 and 2	QSFP+ (40 gigabit), SFP+ (10 gigabit)	40-gigabit full 10-gigabit full	Ethernet	40-gigabit QSFP+ connection to 40-gigabit networks or 10-gigabit SFP+ connection to 10-gigabit networks. Quad small form-factor pluggable transceiver.
3 and 4	SFP+ (10 gigabit) or SFP (1 gigabit)	10-gigabit full 1-gigabit auto 1-gigabit full	Ethernet	10-gigabit SFP+ connection to 10-gigabit networks or 1-gigabit SFP connection to 1-gigabit networks. Small form-factor pluggable transceiver.

Table 4: FortiGate-5001D connectors

Connector	Type	Speed	Protocol	Description
MGMT 1 and MGMT 2	RJ-45	10/100/1000 Base-T	Ethernet	Copper 1-gigabit connection to 10/100/1000Base-T copper networks for management or system administration.
USB	USB			USB key for firmware updates and configuration backup.

NMI switch

When working with Fortinet Support to troubleshoot problems with the FortiGate-5001D board you can use the front panel non-maskable interrupt (NMI) switch to assist with troubleshooting. Pressing this switch causes the software to dump registers/backtraces to the console. After the data is dumped the board reboots. While the board is rebooting, traffic is temporarily blocked. The board should restart normally and traffic can resume once its up and running.

Base backplane communication

The FortiGate-5001D base backplane 1-gigabit interfaces (base1 and base2) are typically used for HA heartbeat or other management communication between FortiGate-5001D boards installed in the same or in different FortiGate-5000 series chassis. You can also configure FortiGate-5001D boards to use the base backplane interfaces for data communication between FortiGate boards. To support base backplane communications your FortiGate-series chassis must include one or more FortiSwitch or FortiController-5000 series or other 1-gigabit base backplane switches installed in the chassis in base slots 1 and 2.

For information about FortiSwitch and FortiController-5000 series boards, see the *FortiGate-5000* page of the Fortinet Technical Documentation website.

Fabric backplane communication

The FortiGate-5001D fabric backplane interfaces (fabric1 and fabric2) are typically used for data communication between FortiGate-5001D boards installed in the same or in different FortiGate-5000 series chassis. These interfaces can operate as 40-gigabit or 10-gigabit interfaces

To support 40-gigabit fabric backplane communications your FortiGate-5000 series chassis must include one or more FortiController-5903C boards or other 40-gigabit fabric backplane switching boards installed in the chassis in fabric slots 1 and 2.

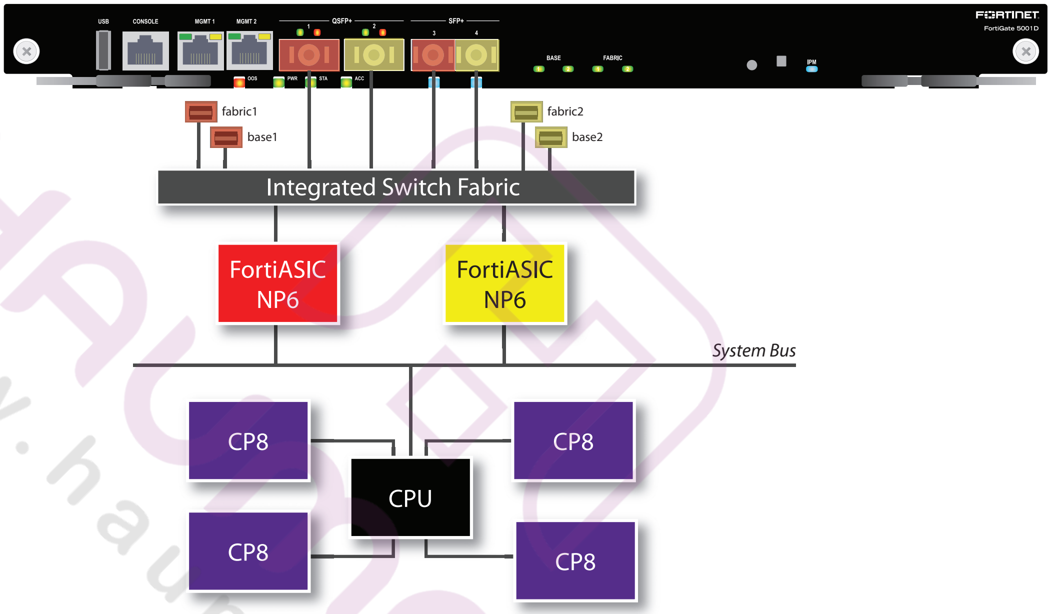
To support 10-gigabit fabric backplane communications your FortiGate-5000 series chassis must include one or more FortiSwitch-5003B or FortiController-5903C boards or other 10-gigabit fabric backplane switching boards installed in the chassis in fabric slots 1 and 2.

For information about FortiSwitch and FortiController-5000 series boards, see the *FortiGate-5000* page of the Fortinet Technical Documentation website.

Accelerated packet forwarding and policy enforcement (NP6 network processors)

The FortiGate-5001D board includes two NP6 processors and an integrated switch fabric that provides fastpath acceleration by offloading communication sessions from the FortiGate CPU. All traffic from the front panel and backplane interfaces can be accelerated. The result is enhanced network performance provided by the NP6 processor plus the network processing load is removed from the CPU. The NP6 processor can also handle some CPU intensive tasks, like IPsec VPN encryption/decryption. Because of the integrated switch fabric, all sessions are fast-pathed and accelerated.

Figure 2: FortiGate-5001D NP6 to interface mapping



The FortiGate-5001D features two NP6 processors.

- port1, port3, fabric1 and base1 share connections to the first NP6 processor.
- port2, port4, fabric2 and base2 share connections to the second NP6 processor.

Accelerated IPS, SSL VPN, and IPsec VPN (CP8 content processors)

The FortiGate-5001D board includes four CP8 processors that provide the following performance enhancements:

- Over 10Gbps throughput IPS content processor for packet content matching with signatures

- High performance VPN bulk data engine
  - IPSEC and SSL/TLS protocol processor
  - DES/3DES/AES in accordance with FIPS46-3/FIPS81/FIPS197
  - ARC4 in compliance with RC4
  - MD5/SHA-1/SHA256 with RFC1321 and FIPS180
  - HMAC in accordance with RFC2104/2403/2404 and FIPS198
- Key Exchange Processor support high performance IKE and RSA computation
  - Public key exponentiation engine with hardware CRT support
  - Primarily checking for RSA key generation
  - Handshake accelerator with automatic key material generation
  - Random Number generator compliance with ANSI X9.31
  - Sub public key engine (PKCE) to support up to 4094 bit operation directly
- Message authentication module offers high performance cryptographic engine for calculating SHA256/SHA1/MD5 of data up to 4G bytes (used by any application like WAN opt.)

Splitting the FortiGate-5001D front panel port1 and port2 interfaces

You can use the following command to split the 40-gigabit front panel port1 interface into a 4 x 10-gigabit interface:

```
config system global
  set split-port port1
end
```

The FortiGate-5001D reboots and when it does you can see four new interfaces named port1/1, port1/2, port1/3, and port1/4.

Hardware installation

Before use, the FortiGate-5001D board must be correctly inserted into an Advanced Telecommunications Computing Architecture (ATCA) chassis that can provide sufficient power and cooling.

This section describes:

- Installing QSFP+ and SFP+ transceivers
- Changing FortiGate-5001D SW6 switch settings
- FortiGate-5001D mounting components
- Inserting a FortiGate-5001D board
- Shutting down and removing a FortiGate-5001D board
- Power cycling a FortiGate-5001D board
- Installing QSFP+ and SFP+ transceivers
- Troubleshooting
- Fabric backplane communication speed compatability

Installing QSFP+ and SFP+ transceivers

You must install QSFP+ transceivers to connect the FortiGate-5001D front panel port1 and port2 interfaces to a 40-gigabit network. The QSFP+ transceivers are inserted into cage sockets numbered 1 and 2 on the FortiGate-5001D front panel. You can install the QSFP+ transceivers before or after inserting the FortiGate-5001D board into a chassis.

You must install SR SFP+ transceivers for normal operation of the FortiGate-5001D front panel port3 and port4 interfaces. The FortiGate-5001D ships with two SR SFP+ transceivers. You can also configure front panel interfaces to operate at 1-gigabit and install SFP transceivers. You can install the transceivers before or after inserting the FortiGate-5001D board into a chassis.

You can install the following types of transceivers for connectors 3 and 4:

- SFP+ SR (10 gigabits)
- SFP+ LR (10 gigabits)
- SFP (1gigabit)

To install QSFP+, SFP+ or SFP transceivers

To complete this procedure, you need:

- A FortiGate-5001D board
- Two or QSFP+, SFP+ or SFP transceivers
- An electrostatic discharge (ESD) preventive wrist or ankle strap with connection cord

⚠ FortiGate-5001D boards must be protected from static discharge and physical shock. Only handle or work with FortiGate-5001D boards at a static-free workstation. Always wear a grounded electrostatic discharge (ESD) preventive wrist strap when handling FortiGate-5001D boards.

1 Attach the ESD wrist strap to your wrist and to an available ESD socket or wrist strap terminal.

2 Remove the caps from the cage sockets on the FortiGate-5001D front panel.

Handling the QSFP+, SFP+ and SFP transceivers by holding the release latch can damage the connector. Do not force transceivers into their cage slots. If the transceiver does not easily slide in and click into place, it may not be aligned correctly. If this happens, remove the transceiver, realign it and slide it in again.

3 Hold the sides of the transceiver and slide it into the cage socket until it clicks into place.

Changing FortiGate-5001D SW6 switch settings

You should only change the SW6 switch setting if are required to install the FortiGate-5001D board in a chassis that does not contain a functioning shelf manager. The factory default SW6 setting is required for most uses of the FortiGate-5001D.

The SW6 switch on the FortiGate-5001D board can be set to operate the FortiGate-5001D in standalone mode (without a shelf manager) or in normal mode in a chassis with a shelf manager. The switch is factory set by Fortinet so that you can install the FortiGate-5001D in normal mode in a chassis that includes an operating shelf manger (such as a FortiGate-5000 series chassis).

The top of the FortiGate-5001D board is covered with a metal panel. The printed circuit board is under the metal panel. SW6 is located on the printed circuit board and is accessible from the left side of the board under the metal panel as shown in Figure 3.

Figure 3: Location of SW6 on the FortiGate-5001D board

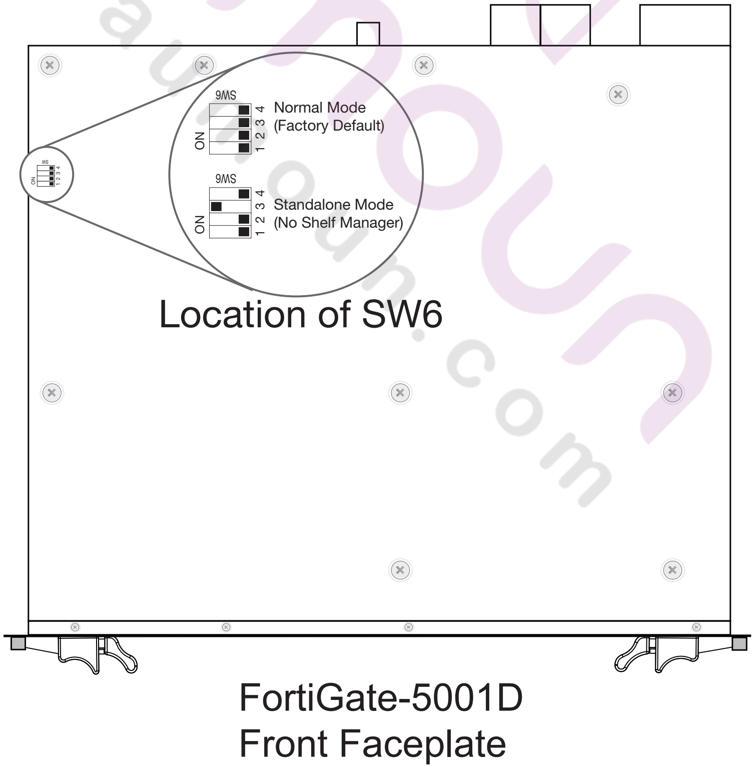
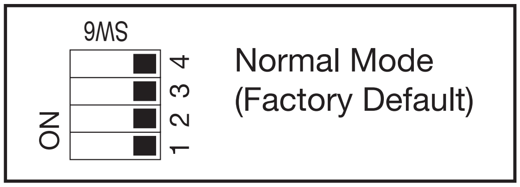
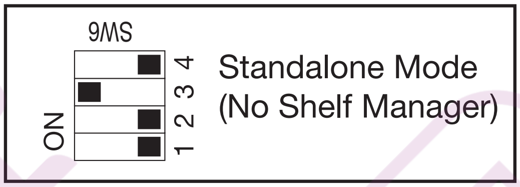


Figure 4: Factory default shelf manager mode setting for SW6



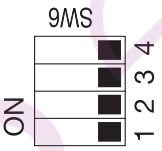
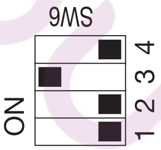
By default a FortiGate-5001D board will not start up if the board is installed in a chassis that does not contain a shelf manager or that contains a shelf manager that is not operating. Before installing a FortiGate-5001D in a chassis that does not contain an operating shelf manager you must change the SW6 switch setting to match Figure 5.

Figure 5: Standalone mode setting for SW6



In all cases you should confirm that you have the correct SW6 setting before installing the board in a chassis.

Table 5: FortiGate-5001D SW6 settings

Chassis	Correct SW6 Setting	Result of wrong jumper setting
FortiGate-5140B or 5060 or a ATCA chassis with a compatible operating shelf manager (factory default shelf manager mode).		Shelf manager cannot find FortiGate-5001D board. No shelf manager information about the FortiGate-5001D board available.
Any ATCA chassis without an operating shelf manager (standalone mode).		FortiGate-5001D board will not start up.

If the shelf manager in a FortiGate-5000 series chassis is missing or not functioning, FortiGate-5001D boards with factory default SW6 settings will not start up.

To change or verify the SW6 switch setting

To complete this procedure, you need:

- A FortiGate-5001D board
- A tool for changing the SW6 switch setting (optional)
- An electrostatic discharge (ESD) preventive wrist strap with connection cord

FortiGate-5001D boards must be protected from static discharge and physical shock. Only handle or work with FortiGate-5001D boards at a static-free workstation. Always wear a grounded electrostatic discharge (ESD) preventive wrist strap when handling FortiGate-5001D boards.

1 Attach the ESD wrist strap to your wrist and to an available ESD socket or wrist strap terminal.

2 If you have installed the FortiGate-5001D board in a chassis, remove it.

For removal instructions, see "Shutting down and removing a FortiGate-5001D board" on page 19.

3 Use Figure 3 on page 14 to locate SW6 on the FortiGate-5001D board.

4 If required, change SW6 to the correct setting.

5 Insert the FortiGate-5001D board into a chassis and verify that the board starts up and operates correctly.

For inserting instructions, see "Inserting a FortiGate-5001D board" on page 17.

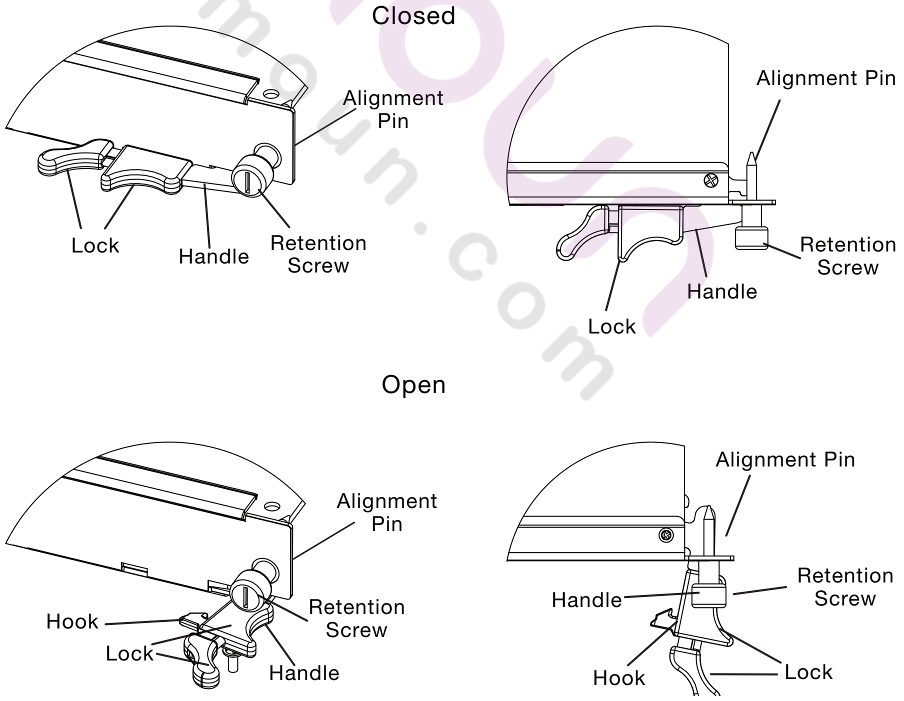
FortiGate-5001D mounting components

To install a FortiGate-5001D board you slide the board into an open slot in the front of an ATCA chassis and then use the mounting components to lock the board into place in the slot. When locked into place and positioned correctly the board front panel is flush with the chassis front panel. The board is also connected to the chassis backplane.

FortiGate-5001D boards are horizontal when inserted into a FortiGate-5060 chassis and vertical when inserted into a FortiGate-5140 chassis. The inserting and removing procedures are the same in either case. For clarity the descriptions in this document refer to the left (top) and right (bottom) mounting components.

To position the board correctly you must use the mounting components shown in Figure 6 for the right (bottom) side of the front panel. The mounting components on the left (top) side of the FortiGate-5001D front panel are the same but reversed. The FortiGate-5001D mounting components align the board in the chassis slot and are used to insert and eject the board from the slot.

Figure 6: FortiGate-5001D right (bottom) mounting components



The FortiGate-5001D handles align the board in the chassis slot and are used to insert and eject the board from the slot. The right (bottom) handle activates a microswitch that turns on or turns off power to the board. When the right (bottom) handle is open the microswitch is off and the board cannot receive power. When the right (bottom) handle is fully closed the microswitch is on and if the board is fully inserted into a chassis slot the board can receive power.

You can use front panel reset switch to cycle the power and reset the board without removing the board from the chassis. See "Power cycling a FortiGate-5001D board" on page 21.

Inserting a FortiGate-5001D board

The FortiGate-5001D board must be fully installed in a chassis slot, with the handles closed and locked and retention screws fully tightened for the FortiGate-5001D board to receive power and operate normally. If the FortiGate-5001D board is not receiving power, the IPM LED glows solid blue and all other LEDs remain off. See "Front panel components" on page 6.

It is important to carefully seat the FortiGate-5001D board all the way into the chassis, to avoid using excessive force on the handles, and to make sure that the handles are properly locked. Only then will the FortiGate-5001D board power-on and start up correctly.

FortiGate-5001D boards are hot swappable. The procedure for inserting a FortiGate-5001D board into a chassis slot is the same whether or not the chassis is powered on.

To insert a FortiGate-5001D board into a chassis slot

Do not carry the FortiGate-5001D board by holding the handles or retention screws. When inserting or removing the FortiGate-5001D board from a chassis slot, handle the board by the front panel. The handles are not designed for carrying the board. If the handles become bent or damaged the FortiGate-5001D board may not align correctly in the chassis slot.

To complete this procedure, you need:

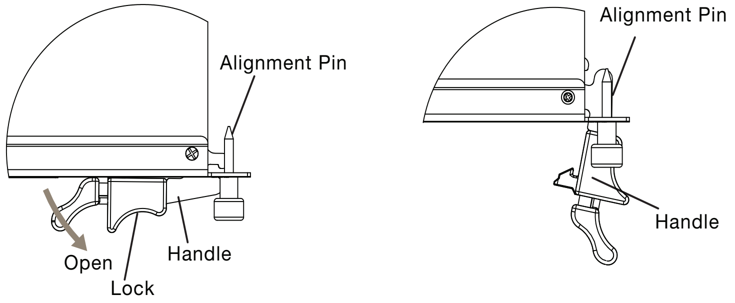
- A FortiGate-5001D board
- An ATCA chassis with an empty slot
- An electrostatic discharge (ESD) preventive wrist strap with connection cord

FortiGate-5001D boards must be protected from static discharge and physical shock. Only handle or work with FortiGate-5001D boards at a static-free workstation. Always wear a grounded electrostatic discharge (ESD) preventive wrist strap when handling FortiGate-5001D boards.

1. Attach the ESD wrist strap to your wrist and to an available ESD socket or wrist strap terminal.
2. If required, remove the protective metal frame that the FortiGate-5001D board has been shipped in.
3. Insert the FortiGate-5001D board into the empty slot in the chassis.
4. Unlock the handles by squeezing the handle locks.

5 Open the handles to their fully open positions.

To avoid damaging the lock, make sure you squeeze the handles fully to unlock them before opening. The handles should pop easily out of the board front panel.



6 Carefully guide the board into the chassis using the rails in the slot.

Insert the board by applying moderate force to the front faceplate (not the handles) to slide the board into the slot. The board should glide smoothly into the chassis slot. If you encounter any resistance while sliding the board in, the board could be aligned incorrectly. Pull the board back out and try inserting it again.

7 Slide the board in until the alignment pins are inserted half way into their sockets in the chassis.

8 Turn both handles to their fully-closed positions.

The handles should hook into the sides of the chassis slot. Closing the handles draws the FortiGate-5001D board into place in the chassis slot and into full contact with the chassis backplane. The FortiGate-5001D front panel should be in contact with the chassis front panel and both handles should lock into place.

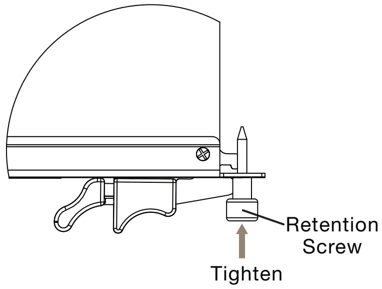
As the handles closed power is supplied to the board. If the chassis is powered on the IPM LED starts flashing blue. If the board is aligned correctly, inserted all the way into the slot, and the handles are properly closed the IPM LED flashes blue for a few seconds. At the same time the STATUS LED flashes green, the interface LEDs flash amber, and the ACC LED starts flashing green. After a few seconds the IPM LED goes out and the FortiGate-5001D firmware starts up. During start up the STATUS LED may continue to flash green. Once the board has started up and is operating correctly, the front panel LEDs are lit as described in Table 6.

Table 6: FortiGate-5001D normal operating LEDs

LED	State
OOS	Off
PWR	Green
STA	Off
ACC	Off (Or flashing green when the system accesses the FortiGate-5001D flash disk.)
IPM	Off

If the board has not been inserted properly the IPM LED changes to solid blue and all other LEDS turn off. If this occurs, open the handles, slide the board part way out, and repeat the insertion process.

9 Once the board is inserted correctly, fully tighten the retention screws to lock the FortiGate-5001D board into position in the chassis slot.



Shutting down and removing a FortiGate-5001D board

The following procedure describes how to correctly use the FortiGate-5001D mounting components described in "FortiGate-5001D mounting components" on page 16 to remove a FortiGate-5001D board from an ATCA chassis slot.

To avoid potential hardware problems, always shut down the FortiGate-5001D operating system (FortiOS) properly before power cycling the FortiGate-5001D board.

FortiGate-5001D boards are hot swappable. The procedure for removing a FortiGate-5001D board from a chassis slot is the same whether or not the chassis is powered on.

To remove a FortiGate-5001D board from a chassis slot

Do not carry the FortiGate-5001D board by holding the handles or retention screws. When inserting or removing the FortiGate-5001D board from a chassis slot, handle the board by the front panel. The handles are not designed for carrying the board. If the handles become bent or damaged the FortiGate-5001D board may not align correctly in the chassis slot.

To complete this procedure, you need:

- An ATCA chassis with a FortiGate-5001D board installed
- An electrostatic discharge (ESD) preventive wrist strap with connection cord

FortiGate-5001D boards must be protected from static discharge and physical shock. Only handle or work with FortiGate-5001D boards at a static-free workstation. Always wear a grounded electrostatic discharge (ESD) preventive wrist strap when handling FortiGate-5001D boards.

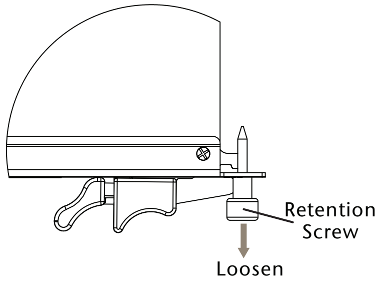
1 Shut down the operating system running on the FortiGate-5001D board. For example:
   - From the web-based manager, go to *System* > *Status* and from the *Unit Operation* widget, select *Shutdown* and then select *OK*.
   - From the CLI enter

```
execute shutdown
```

2 Attach the ESD wrist strap to your wrist and to an available ESD socket or wrist strap terminal.

3 Disconnect all cables from the FortiGate-5001D board, including all network cables, the console cable, and any USB cables or keys.

4 Fully loosen the retention screws on the FortiGate-5001D front panel.



5 Unlock the handles by squeezing the handle locks.

6 Slowly open both handles a small amount (about 8 degrees) until the IPM LED flashes blue.

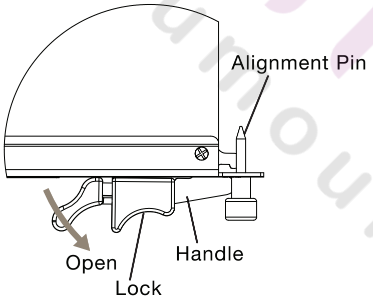
7 Keep the handles in this position until the IPM LED stops flashing and becomes solid blue.

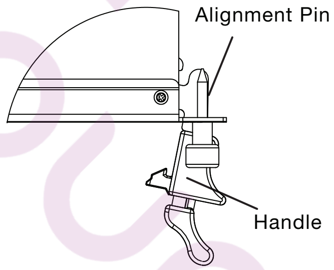
Waiting for the IPM LED to change to solid blue makes sure that the board software shutdowns completely before disconnecting it from backplane power.

8 Open the handles to their fully open positions.

To avoid damaging the lock, make sure you squeeze the handles fully to unlock them before opening. The handles should pop easily out of the board front panel.

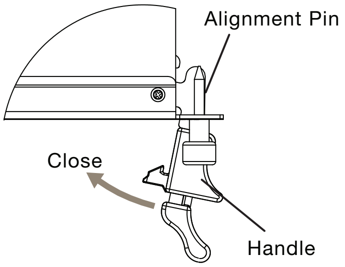
- You need to open the handles with moderate pressure to eject the board from the chassis. Pivoting the handles turns off the microswitch, turns off all LEDs, and ejects the board from the chassis slot.

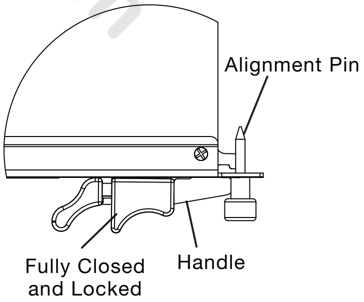




9 Pull the board about half way out.

10 Turn both handles to their fully-closed positions.





11 Carefully slide the board completely out of the slot.

12 Re-attach the protective metal frame before shipping or storing the FortiGate-5001D board.

Power cycling a FortiGate-5001D board

This section describes how to cycle the power on a FortiGate-5001D board by opening the right handle (the lower handle when the board is installed vertically in a FortiGate-5140 chassis) to activate a switch that cycles the power without removing the board from the chassis. The steps recommend loosening the retention screws before opening the handle to allow the handle to toggle the switch. During this process the board may move out a small amount (less than 1 mm).

> To avoid potential hardware problems, always shut down the FortiGate-5001D operating system properly before power cycling the FortiGate-5001D board.

To power cycle a FortiGate-5001D board without fully removing the board from the chassis

To complete this procedure, you need:

- An ATCA chassis with a FortiGate-5001D board installed
- An electrostatic discharge (ESD) preventive wrist strap with connection cord

> FortiGate-5001D boards must be protected from static discharge and physical shock. Only handle or work with FortiGate-5001D boards at a static-free workstation. Always wear a grounded electrostatic discharge (ESD) preventive wrist strap when handling FortiGate-5001D boards.

1 Shut down the operating system running on the FortiGate-5001D board. For example:

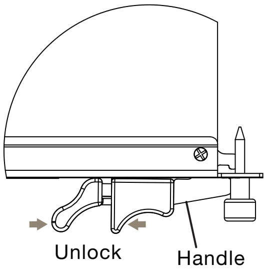
- From the web-based manager, go to the *Unit Operation* dashboard widget, select *Shutdown* and then select *OK*.
- From the CLI enter

```
execute shutdown
```

2 Attach the ESD wrist strap to your wrist and to an available ESD socket or wrist strap terminal.

3 Fully loosen the retention screws on the FortiGate-5001D front panel.

4 Unlock both handles by squeezing the handle locks.



5 Slowly open both handles a small amount (about 8 degrees) until the IPM LED flashes blue.

6 Keep the handles in this position until the IPM LED stops flashing and becomes solid blue.

7. After 10 seconds snap both handles back into place.

   The board powers up, the LEDs light and in a few minutes the FortiGate-5001D board operates normally.

8. Fully tighten the retention screws to lock the FortiGate-5001D board into position in the chassis slot.

Troubleshooting

This section describes some common troubleshooting topics.

FortiGate-5001D board does not start up

Shelf manager or firmware problems may prevent a FortiGate-5001D board from starting up correctly.

Chassis with a shelf manager: no communication with shelf manager

If the FortiGate-5001D board is receiving power and the handles are fully closed and the FortiGate-5001D still does not start up, the problem could be that the FortiGate-5001D cannot communicate with the chassis shelf manager. This problem can only occur in an ATCA chassis that contains a shelf manager.

To correct this problem power down and then restart the chassis. If you are operating a FortiGate-5000 series chassis you can power down and then restart the chassis without removing FortiGate-5000 series components.

All chassis: Firmware problem

If the FortiGate-5001D board is receiving power and the handles are fully closed, and you have restarted the chassis and the FortiGate-5001D still does not start up, the problem could be with FortiOS. Connect to the FortiGate-5001D console and try cycling the power to the board. If the BIOS starts up, interrupt the BIOS startup and install a new firmware image. If this does not solve the problem, contact Fortinet Customer Service and Support.

FortiGate-5001D STA (status) LED is flashing during system operation

Normally, the FortiGate-5001D STA (status) LED is on when the FortiGate-5001D board is operating normally. If this LED starts flashing while the board is operating, a fault condition may exist. At the same time the FortiGate-5001D may stop processing traffic.

To resolve the problem you can try removing and reinserting the FortiGate-5001D board in the chassis slot. Reloading the firmware may also help. If this does not solve the problem there may have been a hardware failure or other problem. Contact Fortinet Technical Support for assistance.

Fabric backplane communication speed compatability

To make sure the FortiGate-5001D can successfully communicate with the fabric backplane you should make sure the fabric backplane interfaces are set to the correct speed for the chassis and the backplane switching device.

Do not set the FortiGate-5001D fabric backplane interfaces to auto negotiate. In most cases this setting will cause interruptions or compatibility issues.

This applies to fabric backplane interfaces fabric1 and fabric2 as well as any VLANs added to these interfaces. For example, SLBC configurations include interfaces such as elbc-ctrl/1 and elbc-ctrl/2 that must be able to connect to the fabric backplane.

For example, if the FortiGate-5001D is installed in a FortiGate-5144C chassis with a 40-Gbyte backplane the FortiGate-5001D fabric backplane interfaces should be set to 40000full:

```
config system interface
   edit fabric1
     set speed 40000full
   next
   edit fabric2
     set speed 40000full
   next
   edit elbc-ctrl/1
     set speed 40000full
   next
   edit elbc-ctrl/2
     set speed 40000full
   end
```

If the FortiGate-5001D is installed in a chassis with a 10-gbyte backplane (such as the FortiGate-5060 or 5140B) the FortiGate-5001D fabric backplane interfaces should be set to 10000full:

```
config system interface
   edit fabric1
     set speed 10000full
   next
   edit fabric2
     set speed 10000full
   next
   edit elbc-ctrl/1
     set speed 10000full
   next
   edit elbc-ctrl/2
     set speed 10000full
   end
```

Quick Configuration Guide

This section is a quick start guide to connecting and configuring a FortiGate-5001D security system for your network.

Before using this chapter, your FortiGate-5000 series or compatible ATCA chassis should be mounted and connected to your power system. In addition, your FortiGate-5001D board should be inserted into the chassis and QSFP+ or SFP+ transceivers should be installed. The FortiGate-5001D board should also be powered up and the front panel LEDs should indicate that the board is functioning normally.

This chapter includes the following topics:

- Registering your Fortinet product
- Planning the configuration
- Choosing the configuration tool
- Factory default settings
- Configuring NAT/Route mode
- Configuring Transparent mode
- Upgrading FortiGate-5001D firmware
- FortiGate-5001D base backplane data communication

Registering your Fortinet product

Register your Fortinet product to receive Fortinet customer services such as product updates and customer support. You must also register your product for FortiGuard services such as FortiGuard Antivirus and Intrusion Prevention updates and for FortiGuard Web Filtering and AntiSpam.

Register your product by visiting https://support.fortinet.com.

To register, enter your contact information and the serial numbers of the Fortinet products that you or your organization have purchased. You can register multiple Fortinet products in a single session without re-entering your contact information.

Planning the configuration

Before beginning to configure your FortiGate-5001D security system, you need to plan how to integrate the system into your network. Your configuration plan depends on the operating mode that you select: NAT/Route mode (the default) or Transparent mode.

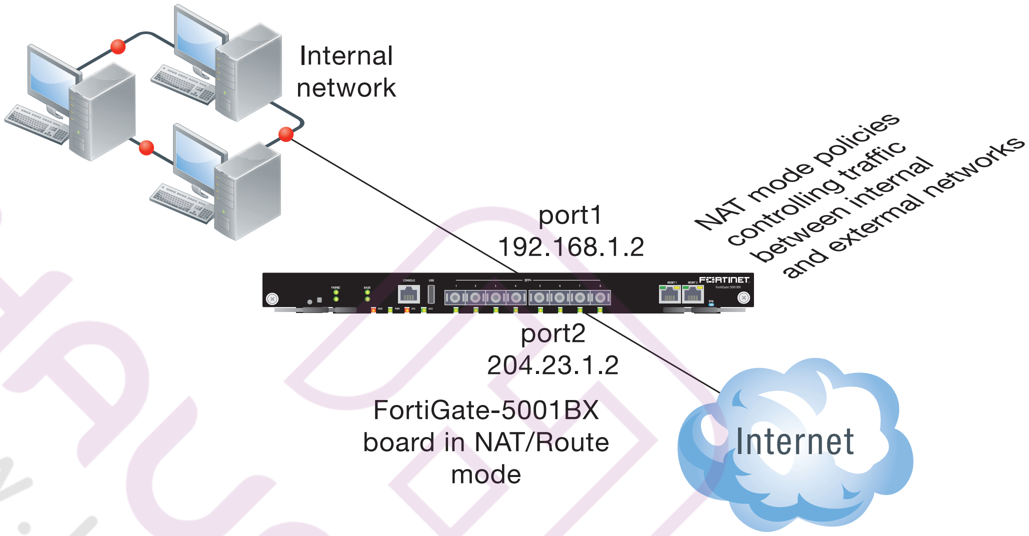
NAT/Route mode

In NAT/Route mode, the FortiGate-5001D security system is visible to the networks that it is connected to. Each interface connected to a network must be configured with an IP address that is valid for that network. In many configurations, in NAT/Route mode all of the FortiGate interfaces are on different networks, and each network is on a separate subnet.

You would typically use NAT/Route mode when the FortiGate-5001D security system is deployed as a gateway between private and public networks. In the default NAT/Route mode configuration, the FortiGate-5001D security system functions as a firewall. Firewall policies control communications through the FortiGate-5001D security system. No traffic can pass through the FortiGate-5001D security system until you add firewall policies.

In NAT/Route mode, firewall policies can operate in NAT mode or in Route mode. In NAT mode, the FortiGate firewall performs network address translation before IP packets are sent to the destination network. In Route mode, no translation takes place.

Figure 7: Example FortiGate-5001D board operating in NAT/Route mode

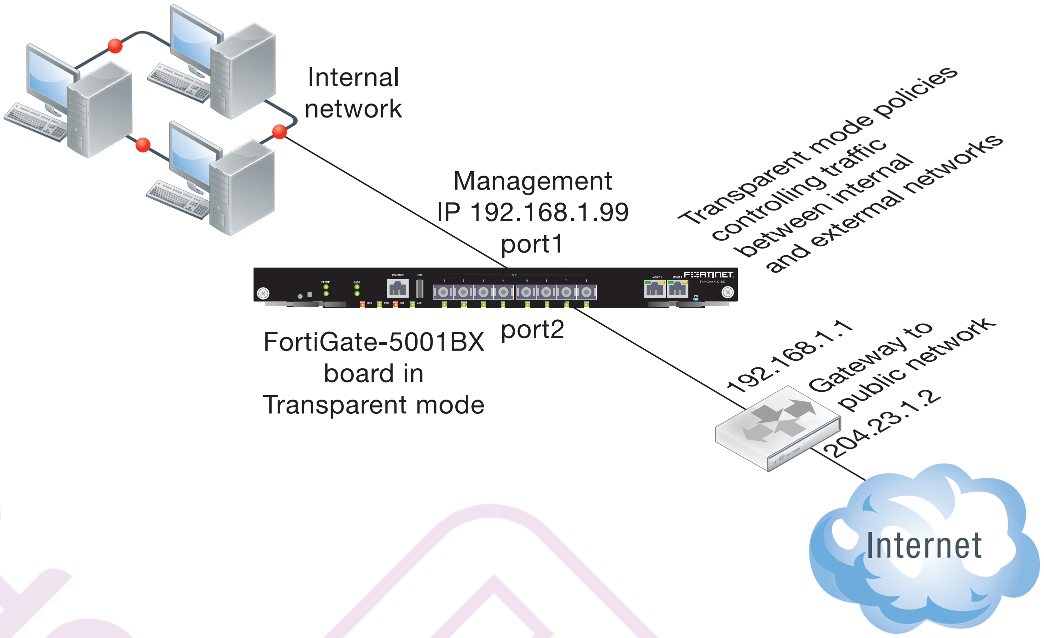

Internal network
NAT mode policies controlling traffic between internal and external networks
port1
192.168.1.2
port2
204.23.1.2
FortiGate-5001BX board in NAT/Route mode
Internet

Transparent mode

In Transparent mode, the FortiGate-5001D security system is invisible to the network. All of the FortiGate-5001D interfaces are connected to different segments of the same network. In Transparent mode you only have to configure a management IP address so that you can connect to the FortiGate-5001D security system to make configuration changes and so the FortiGate-5001D security system can connect to external services such as the FortiGuard Distribution Network (FDN).

You would typically deploy a FortiGate-5001D security system in Transparent mode on a private network behind an existing firewall or behind a router. In the default Transparent mode configuration, the FortiGate-5001D security system functions as a firewall. No traffic can pass through the FortiGate-5001D security system until you add firewall policies.

Figure 8: Example FortiGate-5001D board operating in Transparent mode


Internal network
Management
IP 192.168.1.99
port1
Transparent mode policies controlling traffic between internal and external networks
FortiGate-5001BX board in Transparent mode
port2
192.168.1.1
Gateway to public network
204.23.1.2
Internet

Choosing the configuration tool

You can use either the web-based manager or the Command Line Interface (CLI) to configure the FortiGate board.

Web-based manager

The FortiGate-5001D web-based manager is an easy to use management tool. Use the web-based manager to configure the FortiGate-5001D administrator password, the interface addresses, the default gateway, and the DNS server addresses.

Requirements:

- An Ethernet connection between the FortiGate-5001D board and management computer.
- Internet Explorer 11.0 or higher on the management computer.

Command Line Interface (CLI)

The CLI is a full-featured management tool. Use it to configure the administrator password, the interface addresses, the default gateway, and the DNS server addresses.

Requirements:

- The serial connector that came packaged with your FortiGate-5001D board.
- Terminal emulation application (for example, HyperTerminal for Windows) on the management computer.

Factory default settings

The FortiGate-5001D unit ships with a factory default configuration. The default configuration allows you to connect to and use the FortiGate-5001D web-based manager to configure the FortiGate-5001D board onto the network. To configure the FortiGate-5001D board onto the network you add an administrator password, change the network interface IP addresses, add DNS server IP addresses, and, if required, configure basic routing.

Table 7: FortiGate-5001D factory default settings

Operation Mode	NAT/Route
Administrator Account	User Name: admin Password: (none)
mgmt1 IP/Netmask	192.168.1.99/24
mgmt2 IP/Netmask	192.168.100.99/24
Default route	Gateway: 192.168.100.1 Device: mgmt2
Primary DNS Server:	208.91.112.53
Secondary DNS Server:	208.91.112.52

At any time during the configuration process, if you run into problems, you can reset the FortiGate-5001D board to the factory defaults and start over. From the CLI enter `execute factory reset`.

Configuring NAT/Route mode

Use Table 8 to gather the information you need to customize NAT/Route mode settings for the FortiGate-5001D security system. You can use one table for each board to configure.

Table 8: FortiGate-5001D board NAT/Route mode settings

Admin Administrator Password:		
mgmt1	IP:	_____._____._____._____
	Netmask:	_____._____._____._____
port1	IP:	_____._____._____._____
	Netmask:	_____._____._____._____
port2	IP:	_____._____._____._____
	Netmask:	_____._____._____._____
Default Route	Device (Name of the Interface connected to the external network):	
	Default Gateway IP address:	_____._____._____._____
	The default route consists of the name of the interface connected to an external network (usually the Internet) and the default gateway IP address. The default route directs all non-local traffic to this interface and to the external network.	
DNS Servers	Primary DNS Server:	_____._____._____._____
	Secondary DNS Server:	_____._____._____._____

Using the web-based manager to configure NAT/Route mode

1 Connect port1 of the FortiGate-5001D board to the same hub or switch as the computer you will use to configure the FortiGate-5001D board.

> If you cannot connect to port1, see “Using the CLI to configure NAT/Route mode” on page 30.

2 Configure the management computer to be on the same subnet as the port1 interface of the FortiGate-5001D board. To do this, change the IP address of the management computer to 192.168.1.2 and the netmask to 255.255.255.0.

3 To access the FortiGate-5001D web-based manager, start Internet Explorer and browse to https://192.168.1.99 (remember to include the “s” in https://).

4 Type admin in the Name field and select Login.

To change the admin administrator password

1 Go to *System* > *Admin* > *Administrators*.

2 Select Change Password for the admin administrator and enter a new password.

> See the Fortinet Knowledge Base article Recovering lost administrator account passwords if you forget or lose an administrator account password and cannot log into your FortiGate-5001D unit.

To configure interfaces

1 Go to *System* > *Network* > *Interface* and edit each interface to configure.

2 Set the addressing mode for the interface. (See the online help for information.)

- For manual addressing, enter the IP address and netmask for the interface that you added to Table 8 on page 28.
- For DHCP addressing, select DHCP and any required settings.
- For PPPoE addressing, select PPPoE and enter the username and password and any other required settings.

To configure the Primary and Secondary DNS server IP addresses

1 Go to *System* > *Network* > *DNS*.

2 Enter the Primary and Secondary DNS IP addresses that you added to Table 8 on page 28 as required and select Apply.

To configure the Default Gateway

1 Go to *Router* > *Static* > *Static Route* and Edit the static route.

2 Select the Device that you recorded above.

3 Set Gateway to the Default Gateway IP address that you added to Table 8 on page 28.

4 Select OK.

Using the CLI to configure NAT/Route mode

1. Use the serial cable supplied with your FortiGate-5001D board to connect the FortiGate-5001D Console port to the management computer serial port.
2. Start a terminal emulation program (HyperTerminal) on the management computer. Use these settings:

   Baud Rate (bps) 9600, Data bits 8, Parity None, Stop bits 1, and Flow Control None.
3. At the Login: prompt, type admin and press Enter twice (no password required).
4. Change the administrator password.

```
config system admin
  edit admin
    set password <password>
end
```

See the Fortinet Knowledge Base article Recovering lost administrator account passwords if you forget or lose an administrator account password and cannot log into your FortiGate-5001D unit.

5. Configure the mgmt1, port1, and port1 interfaces to the settings that you added to Table 8 on page 28.

```
config system interface
  edit mgmt1
    set ip <intf_ip>/<netmask_ip>
  next
  edit port1
    set ip <intf_ip>/<netmask_ip>
  next
  edit port2
    set ip <intf_ip>/<netmask_ip>
end
```

6. Configure the primary and secondary DNS server IP addresses to the settings that you added to Table 8 on page 28.

```
config system dns
  set primary <dns-server_ip>
  set secondary <dns-server_ip>
end
```

7. Configure the default gateway to the setting that you added to Table 8 on page 28.

```
config router static
  edit 1
    set device <interface_name>
    set gateway <gateway_ip>
  end
```

Configuring Transparent mode

Use Table 9 to gather the information you need to customize Transparent mode settings.

Table 9: Transparent mode settings

Admin Administrator Password:		
Management IP	IP:	_____._____._____._____
	Netmask:	_____._____._____._____
	The management IP address and netmask must be valid for the network where you will manage the FortiGate-5001D unit.	
Default Route	Default Gateway IP address:	_____._____._____._____
	In Transparent mode the default route requires the default gateway IP address. The default route directs all non-local traffic to the external network.	
DNS Servers	Primary DNS Server:	_____._____._____._____
	Secondary DNS Server:	_____._____._____._____

Using the web-based manager to configure Transparent mode

1 Connect port1 of the FortiGate-5001D board to the same hub or switch as the computer you will use to configure the FortiGate-5001D board.

> If you cannot connect to port1, see "Using the CLI to configure Transparent mode" on page 32.

2 Configure the management computer to be on the same subnet as the port1 interface of the FortiGate-5001D board. To do this, change the IP address of the management computer to 192.168.1.2 and the netmask to 255.255.255.0.

3 To access the FortiGate-5001D web-based manager, start Internet Explorer and browse to https://192.168.1.99 (remember to include the "s" in https://).

4 Type admin in the Name field and select Login.

To switch from NAT/Route mode to transparent mode

1 Go to *System* > *Dashboard* > *Status* and select the Change link beside Operation Mode: NAT.

2 Set Operation Mode to Transparent.

3 Set the Management IP/Netmask to the settings that you added to Table 9 on page 31.

4 Set the default Gateway to the setting that you added to Table 9 on page 31.

To change the admin administrator password

1 Go to *System* > *Admin* > *Administrators*.

2 Select Change Password for the admin administrator and enter the password that you added to Table 9 on page 31.

To change the management IP address

1. Go to *System* > *Dashboard* > *Status* and select the Change link beside Operation Mode: Transparent.
2. Change the Management IP/Netmask to the address and netmask hat you added to Table 9 on page 31 and select Apply.

To configure the Primary and Secondary DNS server IP addresses

1. Go to *System* > *Network* > *DNS*.
2. Enter the Primary and Secondary DNS IP addresses that you added to Table 9 on page 31 as required and select Apply.

Using the CLI to configure Transparent mode

1. Use the serial cable supplied with your FortiGate-5001D board to connect the FortiGate-5001D Console port to the management computer serial port.
2. Start a terminal emulation program (HyperTerminal) on the management computer. Use these settings:

   Baud Rate (bps) 9600, Data bits 8, Parity None, Stop bits 1, and Flow Control None.
3. At the Login: prompt, type admin and press Enter twice (no password required).
4. Change from NAT/Route mode to Transparent mode. Configure the Management IP address and default gateway to the settings that you added to Table 9 on page 31.

```
config system settings
  set opmode transparent
  set manageip <mng_ip>/<netmask>
  set gateway <gateway_ip>
end
```

5. Configure the primary and secondary DNS server IP addresses to the settings that you added to Table 9 on page 31.

```
config system dns
  set primary <dns-server_ip>
  set secondary <dns-server_ip>
end
```

Upgrading FortiGate-5001D firmware

Fortinet periodically updates the FortiGate-5001D FortiOS firmware to include enhancements and address issues. After you have registered your FortiGate-5001D security system you can download FortiGate-5001D firmware from the support web site http://support.fortinet.com.

Only FortiGate-5001D administrators (whose access profiles contain system read and write privileges) and the FortiGate-5001D admin user can change the FortiGate-5001D firmware.

To upgrade the firmware using the web-based manager

1. Copy the firmware image file to your management computer.
2. Log into the web-based manager as the admin administrator.
3. Go to *System* > *Dashboard* > *Status*.
4. Under *System Information* > *Firmware Version*, select Update.

5 Type the path and filename of the firmware image file, or select Browse and locate the file.

6 Select OK.

The FortiGate-5001D board uploads the firmware image file, upgrades to the new firmware version, restarts, and displays the FortiGate-5001D login. This process takes a few minutes.

7 Log into the web-based manager.

8 Go to *System* > *Status* and check the Firmware Version to confirm the firmware upgrade is successfully installed.

9 Update the FortiGate-5001D antivirus and attack definitions. See the FortiGate-5001D online help for details.

To upgrade the firmware using the CLI

To use the following procedure, you must have a TFTP server the FortiGate-5001D board can connect to.

1 Make sure the TFTP server is running.

2 Copy the new firmware image file to the root directory of the TFTP server.

3 Log into the CLI.

4 Make sure the FortiGate-5001D board can connect to the TFTP server.

You can use the following command to ping the computer running the TFTP server. For example, if the IP address of the TFTP server is 192.168.1.168:

```
execute ping 192.168.1.168
```

5 Enter the following command to copy the firmware image from the TFTP server to the FortiGate-5001D board:

```
execute restore image <name_str> <tftp_ipv4>
```

Where `<name_str>` is the name of the firmware image file and `<tftp_ipv4>` is the IP address of the TFTP server. For example, if the firmware image file name is `image.out` and the IP address of the TFTP server is 192.168.1.168, enter:

```
execute restore image image.out 192.168.1.168
```

The FortiGate-5001D board responds with the message:

```
This operation will replace the current firmware version!
Do you want to continue? (y/n)
```

6 Type `y`.

The FortiGate-5001D board uploads the firmware image file, upgrades to the new firmware version, and restarts. This process takes a few minutes.

7 Reconnect to the CLI.

8 To confirm the firmware image is successfully installed, enter:

```
get system status
```

9 Update antivirus and attack definitions. You can use the command

```
execute update-now
```

FortiGate-5001D base backplane data communication

This section describes how to configure FortiGate-5001D boards for base backplane data communication.

By default the base backplane interfaces are not enabled for data communication. Once the base backplane interfaces are configured for data communication you can operate and configure them in the same way as any FortiGate-5001D interfaces.

Although not recommended, you can use base backplane interfaces for data communication and HA heartbeat communication at the same time.

FortiGate-5001D base backplane communication requires one or two FortiSwitch-5000 series boards. A FortiSwitch board installed in chassis base slot 1 provides communication on the base1 interface. A FortiSwitch board installed in chassis base slot 2 provides communication on the base2 interface.

> Mixing different FortiSwitch-5000 series boards in the same chassis is not supported.

For details and configuration examples of FortiGate-5001D base backplane communication, see the FortiGate-5000 Backplane Communications Guide and the FortiSwitch-5000 Series CLI Reference.

To enable base backplane data communication from the FortiGate-5001D web-based manager

From the FortiGate-5001D web-based manager use the following steps to enable base backplane data communication.

1 Go to *System* > *Network* > *Interface*.

2 Select Show backplane interfaces.

The fabric1, fabric2, base1 and base2 and backplane interfaces now appear in all Interface lists. You can now configure the base backplane interfaces and add routes, firewall policies and other configuration settings using these interfaces.

To enable base backplane data communication from the FortiGate-5001D CLI

From the FortiGate-5001D board CLI you can use the following steps to enable base backplane data communication.

1 Enter the following command to show the backplane interfaces:

```
config system global
  set show-backplane-intf enable
end
```

The base1 and base2 backplane interfaces now appear in all Interface lists. You can now configure the base backplane interfaces and add routes, firewall policies and other configuration settings using these interfaces.

FortiGate-5001D fabric backplane data communication

This section describes how to configure FortiGate-5001D boards for fabric backplane data communication using the fabric1 and fabric2 interfaces. 10-gigabit Fabric backplane data communication is supported for FortiGate-5001D boards installed in a FortiGate-5000 chassis with a FortiSwitch board installed in chassis slot1 for the fabric1 interface and a chassis slot2 for the fabric2 interface.

By default the fabric backplane interfaces are not enabled for data communication. Once the fabric backplane interfaces are configured for data communication you can operate and configure them in the same way as any FortiGate-5001D interfaces.

Although not recommended, you can use fabric backplane interfaces for data communication and HA heartbeat communication at the same time.

To enable fabric backplane data communication from the FortiGate-5001D web-based manager

From the FortiGate-5001D web-based manager use the following steps to enable fabric backplane data communication.

1. Go to *System* > *Network* > *Interface*.
2. Select Show backplane interfaces.

   The fabric1, fabric2, base1 and base2 backplane interfaces now appear in all Interface lists. You can now configure the fabric backplane interfaces and add routes, firewall policies and other configuration settings using these interfaces.

To enable fabric backplane data communication from the FortiGate-5001D CLI

From the FortiGate-5001D board CLI you can use the following steps to enable fabric backplane data communication.

1. Enter the following command to show the backplane interfaces:

   ```
   config system global
     set show-backplane-intf enable
   end
   ```

   The fabric1, fabric2, base1 and base2 backplane interfaces now appear in all Interface lists. You can now configure the fabric backplane interfaces and add routes, firewall policies and other configuration settings using these interfaces.

To enable sending heartbeat packets to the FortiSwitch-5003A and 5003B

Use the following command to enable sending heartbeat packets from the FortiGate-5001D fabric interfaces. A FortiSwitch-5003A or 5003B board receives the heartbeat packets to verify that the FortiGate-5001D board is still active.

The FortiGate-5001D board sends 10 packets per second from each fabric interface. The packets are type 255 bridge protocol data unit (BPDU) packets.

1. Enter the following command to enable sending heartbeat packets:

   ```
   config system global
     set fortiswitch-heartbeat enable
   end
   ```

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FortiGate-5001D Security System Guide

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(1) this device may not cause harmful interference, and

(2) this device must accept any interference received; including interference that may cause undesired operation.

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 when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy, and if it is not installed and used in accordance with the instruction manual, it may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference, in which case the user will be required to correct the interference at his own expense.

WARNING: Any changes or modifications to this product not expressly approved by the party responsible for compliance could void the user’s authority to operate the equipment

Industry Canada Equipment Standard for Digital Equipment (ICES) – Canada

CAN ICES-3 (A) / NMB-3 (A)

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Le présent appareil numérique n’emet pas de bruits radioélectriques dép¬assant les limites applicables aux appareils numeriques de la classe A préscrites dans le Règlement sur le brouillage radioélectrique édicte par le ministère des Communications du Canada.

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