6 Boards

About This Chapter

This chapter describes the boards of the device.

6.1 Overview
This chapter describes the appearance and structure of boards and subcards, filler panel, board and subcard specifications, rules for numbering slots and interfaces.

6.2 Integrated NetworK Processing Unit (IPU)

6.3 Interface Card

6.1 Overview

This chapter describes the appearance and structure of boards and subcards, filler panel, board and subcard specifications, rules for numbering slots and interfaces.

Micro Switch

Figure 6-1 shows that the micro switch is located between the ejector lever base of the control board and the panel.

- When the ejector lever is opened, the micro switch is open. A master/slave switchover is triggered when the micro switch changes from the closed status to the open status.

- When the ejector lever is lowered, the micro switch is closed. If the ejector lever is not lowered completely, the micro switch is still open. In this case, an alarm is generated, indicating that the ejector lever is not lowered.

Figure 6-1 Micro switch position

Precautions for Routing Optical Fibers

□ NOTE

When an optical attenuator is used on the board, ensure that enough cabling space is reserved in front of the board panel so that optical fibers do not collide with the cabinet door and optical fiber reliability is not affected.

6.1.1 Rules for Numbering Slots and Interfaces

Numbering Rule of Service Interfaces of the NetEngine 8000M8

A service interface on a PIC is numbered in the format of 0/PIC slot number/ interface number.

- PIC slot number

  Slot ID of a PIC where the service interface resides. For DC chassis, the value is an integer ranging from 1 to 8. For AC chassis, the value is 2, 4 and 5 to 8.

- Interface number

  ID of the service interface on a PIC. The value is an integer ranging from 0 to the maximum number of interfaces on the PIC.

Figure 6-2 shows how a service interface on a PIC is numbered.

Figure 6-2 Numbering rule of service interfaces on the NetEngine 8000M8

Table 6-1 NetEngine 8000M8 slot description

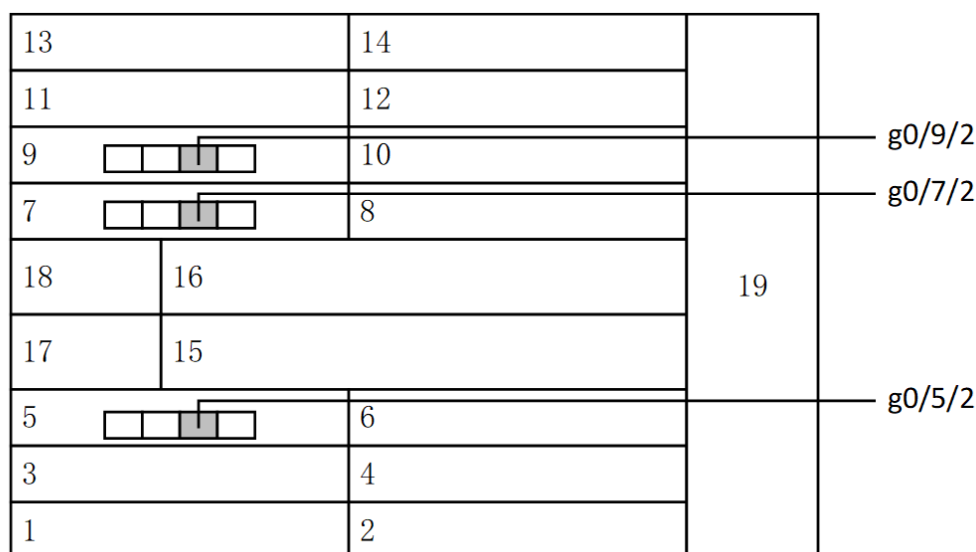| Slot	Quantity	Remarks
DC: 1-8 AC: 2, 4, 5-8	DC: 8 AC: 6	Slots for PICs
9 and 10	2	Slot for the IPUs
DC: 11 and 12 AC: 1 and 3	2	Slots for power modules
13	1	Slot for a fan module

Numbering Rule of Service Interfaces of the NetEngine 8000M14

A service interface on a PIC is numbered in the format of 0/PIC slot number/ interface number.

- PIC slot number

  Slot ID of a PIC where the service interface resides. For DC chassis, the value is an integer ranging from 1 to 14. For AC chassis, the value is an integer ranging from 5 to 14.

- Interface number

  ID of the service interface on a PIC. The value is an integer ranging from 0 to the maximum number of interfaces on the PIC.

Figure 6-3 shows how a service interface on a PIC is numbered.

Figure 6-3 Numbering rule of service interfaces on the NetEngine 8000M14

Table 6-2 NetEngine 8000M14 slot description

Slot	Quantity	Remarks
DC: 1-14 AC: 5-14	DC: 14 AC: 10	-
15, 16	2	Slot for the IPUs
DC: slot17, slot18 AC: slot1-4	DC: 2 AC: 4	DC and AC power modules cannot be used together. When AC power modules are installed, insert filler panels into the DC power module slots.
19	1	Slot for a fan module

6.1.2 Bar Code for Boards

The bar code of a board is provided on the front panel of the board and contains the basic information about the board, including the BOM code and delivery time.

The bar code of a board provides the feature information about the board and varies according to boards. **Figure 6-4** shows a bar code and **Table 6-3** provides the description of the bar code.

Figure 6-4 Bar code of a board
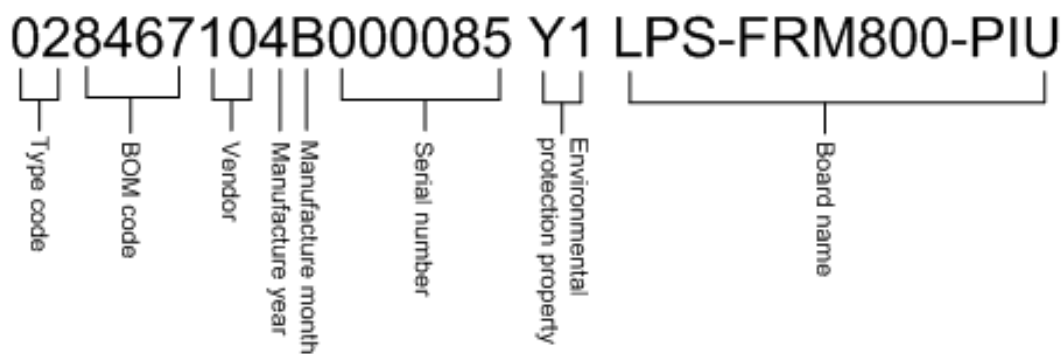
NOTE

The bar code in the figure is only an example and it may differ in practice.

Table 6-3 Description of the bar code of a board

Item	Description
Type Code	Indicates whether a board is a manufactured or finished board. "02" indicates a manufactured board and "03" indicates a finished board.

Item	Description
BOM Code	Indicates the last four digits of the BOM code of a board.
Vendor	Indicates the vendor of a board. "10" indicates Huawei.
Manufacture Year	Indicates the last digit of the year when a board is manufactured. For example, "4" indicates 2004. From 2010 onwards, a letter is used to indicate the manufacture year. For example, the letter "A" indicates 2010, the letter "B" indicates 2011, and so on. **NOTE** The letter "I" is similar to the number "1" and the letter "O" is similar to the number "0". To avoid confusion, "I" and "O" are removed from the 26 letters, and the remaining 24 letters are retained to indicate years in ascending order. For example, "H" indicates 2017, and "J" indicates 2018, skip the letter "I".
Manufacture Month	Indicates the month when a board is manufactured. The value is expressed in hexadecimal format. For example, the letter B indicates November.
Serial Number	Indicates the production serial number of a board. The value ranges from 000001 to 999999.
Environmental Protection Property	Indicates the environmental protection property of a board.
Board Name	Indicates the name and associated information about a board.

6.2 Integrated NetworK Processing Unit (IPU)

6.2.1 Introduction to the IPU

Figure 6-5 shows the device physical structure.
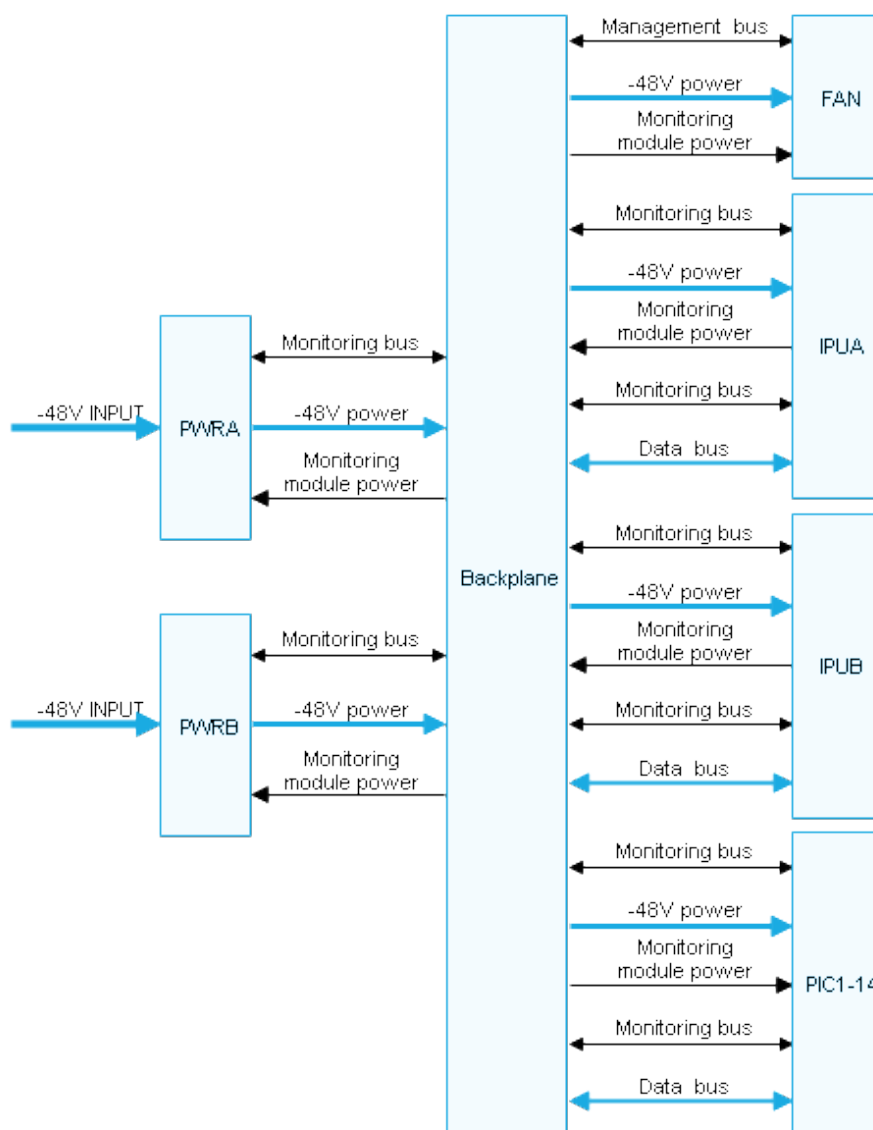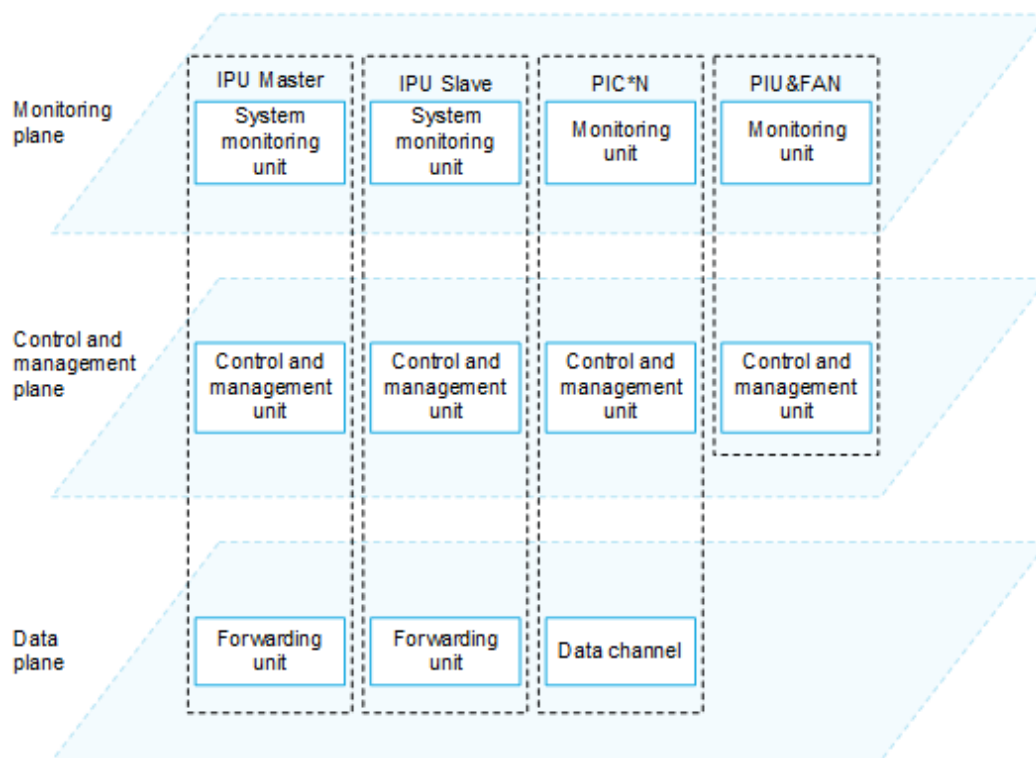
Figure 6-5 Physical Structure

Figure 6-6 shows the device logical structure.

Figure 6-6 Logical Structure

An IPU integrates the functions of the control plane and data plane.

The NetEngine 8000 can be equipped with a single IPU or double IPUs (in backup mode).

Control plane

When two IPUs are configured, the active IPU works, and the other IPU stands by. Only one of the management network interfaces, either on the active or standby IPU, can be connected to the NetEngine 8000 at a time. The standby IPU exchanges messages (including heartbeat messages and backup data) only with the active IPU and not with any of the other boards or devices. The active and standby IPUs synchronize data using high reliability mechanisms such as batch and real-time backup to ensure data consistency. If an active/standby IPU switchover is performed, the standby IPU immediately takes over services of the active IPU. The system allows a user to specify a default active IPU, which is preferred as the active IPU in the startup process.

By integrating the system control and management unit, clock unit, and management and maintenance unit, the IPU provides the functions of the control plane and maintenance plane. The functions of the IPU are detailed as follows:

● System control and management unit

The IPU is mainly responsible for processing routing protocols. In addition, the IPU broadcasts and filters routing packets, and downloads routing policies from the policy server.

The IPU is also responsible for data management. The system configuration data, startup file, upgrade software, and system logs are stored on the IPU.

The IPU allows users to manage and maintain the device. Users can manage and maintain the device through management interfaces on the IPU, such as the console and network management interfaces.

- System clock unit

  The IPU provides PICs with reliable and synchronous SDH clock signals.

- System maintenance unit

  The IPU collects monitoring information to test system units locally or remotely or perform in-service upgrades on system units.

Through the Monitorbus, the IPU periodically collects the operation data of each system unit. The IPU then generates related control information based on the collected information, and tests system units locally or remotely or performs in-service upgrades on system units.

Data plane

The data unit of an IPU processes data exchanged between the IPU and PICs. The procedure for data processing is as follows:

1. IP packets on a PIC are converged to the convergence module.
2. The NP processes the IP packets.
3. The TM module performs traffic management on the IP packets.

The NetEngine 8000 supports two types of active/standby IPU switching: failover and switchover. A failover is triggered either by a reset of the active IPU or by serious faults occurring in the active IPU. A switchover is performed upon the commands delivered through the console or network management interface.

6.2.2 Integrated Network Processing Unit (IPU-2T)

Overview

Table 6-4 Board attributes
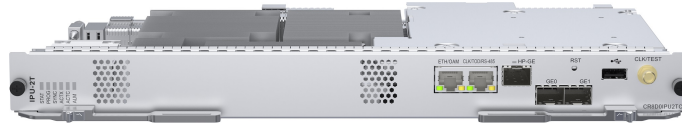
Attribute	Description
Board name silkscreen	IPU-2T
Description	Integrated Network Processing Unit (IPU-2T)
BOM	03033FPV
Model	CR8D0IPU2TC1

Table 6-5 Mapping products and versions

Product	Slot ID	Minimum Version Requirement
NetEngine 8000 M14	slot 15 to 16	V800R012C00

Appearance

Panel

Table 6-6 Buttons

Name	Description
RST	You can press the RST button to reset the NE or restore the factory settings of the NE.
	The procedure is as follows:
	To reset the NE, press the RST button and release it.
	To restore factory settings, press and hold the RST button. This operation will clear the NE database and system parameter configurations and cannot be restored. Exercise caution when you perform the following operations:
	1.Press the RST button to restart the NE.
	2.When the PROG indicator blinks (the blinking frequency is about 1 second and the time window is about 15 seconds), press and hold down the RST button.
	3.Wait for no longer than 2 minutes till both the STAT and PROG indicators blink (the time window is 5 seconds). Then release the RST button immediately.
	NOTE 1. When you press the RST button to clear the configuration file, the original configuration file will be cleared. You are advised to periodically back up the configuration file.
	2. When you press the RST button to clear the configuration file, to prevent the cleared configuration from being synchronized again between the active and standby main control boards, remove one main control board first in a dual-main control board chassis to ensure that the configuration file is cleared in a single-main control board scenario. Perform the same operations on the other main control board.
	3. When pressing the RST button to clear the configuration file, you only need to pay attention to the STAT and PROG indicators. Other indicators may vary depending on the product model.

Table 6-7 Indicators

Name	Description
STAT	Board status indicator On (green): the board is working normally. On (red): the board hardware is faulty. Off: the board is not running or no power is input.
PROG	Program running indicator On (green): The board software is being initialized. The board software is normally initialized, and the board software is running normally. On (red): The memory self-check fails. The board software or the logic file is lost. Loading of the board software fails. On for 100 ms and off for 100 ms alternately (green): loading of the board software is in process. On for 300 ms and off for 300 ms alternately (green): the BIOS is guiding the upper-layer software. On for 100 ms and off for 100 ms alternately (red): the BIOS self-check fails. Off: no power is input.
SYNC	Synchronization status indicator On (green): The clock works in free-run mode and the system clock priority list is not set. By default, the system clock priority list contains only internal sources. The clock works in locked mode and is tracing a clock source other than the internal sources in the priority list. The system clock is working in time synchronization mode, and the PTP time and system clock are in the tracing state. On (red): The system clock priority list is set. All the clock sources, however, are lost except for the internal clock sources. The clock works in holdover mode or free-run mode. The system clock is working in time synchronization mode, but no synchronization source is available. The system clock and PTP time are working in holdover or free-run mode.

Name	Description
ACTX	Switching status indicator
	On (green): the board is in the working switching state.
	Off: the board is in the protection switching state.
ACTC	Control status indicator
	On (green): the board is in the working control state.
	On for 100 ms and off for 100 ms alternately (green): the data of the equipment is backed up in batch.
	Off: the board is in the protection control state.
ALM	alarm indicator:
	On (red): critical alarms are generated.
	On (orange): major, minor alarms are generated.
	Off: no alarms are generated in the equipment.
ETH/OAM	ETH/OAM indicator
	On (green): If the indicator is steady on, the link is normal.
	Blinking (orange): If the indicator blinks, data is being transmitted.
	Off: the board is in the protection control state.

Table 6-8 Management interfaces

Interface Name	Interface Type	Connector Type	Description	Cable
CLK/TOD/RS-485	N/A	RJ45	Clock/Time/RS-485 input/output interface, RS-485 is a reserved interface.	1-into-2 clock cable + clock cable (external clock mode, delivery-ready): applicable to the CLK mode 1-into-2 clock cable + clock cable (external clock/external time mode, prepared onsite): applicable to the CLK or TOD mode 1-into-2 clock cable + Ethernet cable: applicable to the TOD mode
ETH/OAM	FE/RS-232	RJ45	10M/100M interface that can function as an NM interface or console interface	ETH/OAM Management Cables
USB	-	Type A	USB interface(reserved)	NA

Interface Name	Interface Type	Connector Type	Description	Cable
CLK/TEST	-	SMA	Clock test interface	Coaxial Cable
HP-GE	GE	SFP	Ultra-high-precision GE port(Reserved)	LC optical fiber
GE0,GE1	GE	SFP	(Reserved)Cascading interfaces are used for control panel expansion in scenarios like virtual cluster.	LC optical fiber

Functional Specifications

Table 6-9 Functions and features

Functions and Features	Remarks
Line-Rate capability	Data forwarding: The IPU is the core of service processing in the entire system, and is connected to all subcards through data channels. Control and management: Through the management channels between IPUs and the subcards, the IPUs can manage subcards and transmit routing protocol data. The line rate capability is 4T bit/s@256Bytes(Bidirectional).
Reliability and availability	Supports the hot swappable function. Supports the board-level 1:1 backup function.
Restrictions and remarks	This board supports value-added services and is not applicable to outdoor scenarios. In addition, this board cannot be used together with other IPUs.

Technical Specifications

Table 6-10 Board specifications

Item	Specification
Dimensions (H x W x D)	34.78 mm x 354.4 mm x 209 mm (1.37 in. x 13.95 in. x 8.23 in.)

Item	Specification
Typical power consumption	324.4 W
Typical heat dissipation	1052.6 BTU/hour
Weight	4.0 kg (8.82 lb)
Ambient temperature	Long terms: -20 °C to 55 °C (-4°F to 131°F) , -5 °C (23°F) start

6.2.3 Integrated Network Processing Unit (IPU-1T2)

Overview

Table 6-11 Board attributes

Attribute	Description
Board name silkscreen	IPU-1T2
Description	Integrated Network Processing Unit (IPU-1T2)
BOM	03033GRW
Model	CR8DIPU1T2C3

Table 6-12 Mapping products and versions

Product	Slot ID	Minimum Version Requirement
NetEngine 8000 M14	slot 15 to 16	V800R012C00

Appearance
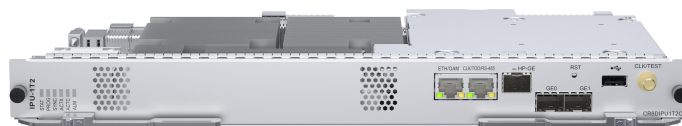
Panel

Table 6-13 Buttons

Name	Description
RST	You can press the RST button to reset the NE or restore the factory settings of the NE.
	The procedure is as follows:
	To reset the NE, press the RST button and release it.
	To restore factory settings, press and hold the RST button. This operation will clear the NE database and system parameter configurations and cannot be restored. Exercise caution when you perform the following operations:
	1.Press the RST button to restart the NE.
	2.When the PROG indicator blinks (the blinking frequency is about 1 second and the time window is about 15 seconds), press and hold down the RST button.
	3.Wait for no longer than 2 minutes till both the STAT and PROG indicators blink (the time window is 5 seconds). Then release the RST button immediately.
	NOTE 1. When you press the RST button to clear the configuration file, the original configuration file will be cleared. You are advised to periodically back up the configuration file. 2. When you press the RST button to clear the configuration file, to prevent the cleared configuration from being synchronized again between the active and standby main control boards, remove one main control board first in a dual-main control board chassis to ensure that the configuration file is cleared in a single-main control board scenario. Perform the same operations on the other main control board. 3. When pressing the RST button to clear the configuration file, you only need to pay attention to the STAT and PROG indicators. Other indicators may vary depending on the product model.

Table 6-14 Indicators

Name	Description
STAT	Board status indicator On (green): the board is working normally. On (red): the board hardware is faulty. Off: the board is not running or no power is input.
PROG	Program running indicator On (green): The board software is being initialized. The board software is normally initialized, and the board software is running normally. On (red): The memory self-check fails. The board software or the logic file is lost. Loading of the board software fails. On for 100 ms and off for 100 ms alternately (green): loading of the board software is in process. On for 300 ms and off for 300 ms alternately (green): the BIOS is guiding the upper-layer software. On for 100 ms and off for 100 ms alternately (red): the BIOS self-check fails. Off: no power is input.
SYNC	Synchronization status indicator On (green): The clock works in free-run mode and the system clock priority list is not set. By default, the system clock priority list contains only internal sources. The clock works in locked mode and is tracing a clock source other than the internal sources in the priority list. The system clock is working in time synchronization mode, and the PTP time and system clock are in the tracing state. On (red): The system clock priority list is set. All the clock sources, however, are lost except for the internal clock sources. The clock works in holdover mode or free-run mode. The system clock is working in time synchronization mode, but no synchronization source is available. The system clock and PTP time are working in holdover or free-run mode.

Name	Description
ACTX	Switching status indicator On (green): the board is in the working switching state. Off: the board is in the protection switching state.
ACTC	Control status indicator On (green): the board is in the working control state. On for 100 ms and off for 100 ms alternately (green): the data of the equipment is backed up in batch. Off: the board is in the protection control state.
ALM	alarm indicator: On (red): critical alarms are generated. On (orange): major or minor alarms are generated. Off: no alarms are generated in the equipment.
ETH/OAM	ETH/OAM indicator On (green): If the indicator is steady on, the link is normal. Blinking (orange): If the indicator blinks, data is being transmitted. Off: the board is in the protection control state.

Table 6-15 Management interfaces

Interface Name	Interface Type	Connector Type	Description	Cable
ETH/OAM	FE/RS-232	RJ45	10M/100M interface that can function as an NM interface or console interface	ETH/OAM Management Cables
USB	-	Type A	USB interface(reserved)	NA
CLK/TEST	-	SMA	Clock test interface	Coaxial Cable
HP-GE	GE	SFP	Ultra-high-precision GE port(Reserved)	LC optical fiber

Interface Name	Interface Type	Connect or Type	Description	Cable
GE0,GE1	GE	SFP	(Reserved)Cascading interfaces are used for control panel expansion in scenarios like virtual cluster.	LC optical fiber
CLK/TOD/RS-485	N/A	RJ45	Clock/Time/RS-485 input/output interface, RS-485 is a reserved interface.	1-into-2 clock cable + clock cable (external clock mode, delivery-ready): applicable to the CLK mode 1-into-2 clock cable + clock cable (external clock/external time mode, prepared onsite): applicable to the CLK or TOD mode 1-into-2 clock cable + Ethernet cable: applicable to the TOD mode

Functional Specifications

Table 6-16 Functions and features

Functions and Features	Remarks
Line-Rate capability	Data forwarding: The IPU is the core of service processing in the entire system, and is connected to all subcards through data channels.
	Control and management: Through the management channels between IPUs and the subcards, the IPUs can manage subcards and transmit routing protocol data.
	The line rate capability is 2.4T bit/s@310Bytes(Bidirectional).
Reliability and availability	Supports the hot swappable function.
	Supports the board-level 1:1 backup function.
Restrictions and remarks	This board supports value-added services and is not applicable to outdoor scenarios. In addition, this board cannot be used together with other IPUs.

Technical Specifications

Table 6-17 Board specifications

Item	Specification
Dimensions (H x W x D)	34.78 mm x 354.4 mm x 209 mm (1.37 in. x 13.95 in. x 8.23 in.)
Typical power consumption	315.5 W
Typical heat dissipation	1023.6 BTU/hour
Weight	4.0 kg (8.82 lb)
Ambient temperature	Long terms: -20 °C to 55 °C (-4°F to 131°F) , -5 °C (23°F) start

6.2.4 Integrated Network Processing Unit (IPU-1T2)

Overview

Table 6-18 Board attributes

Attribute	Description
Board name silkscreen	IPU-1T2
Description	Integrated Network Processing Unit (IPU-1T2)
BOM	03033FXD
Model	CR8DIPU1T2C1

Table 6-19 Mapping products and versions

Product	Slot ID	Minimum Version Requirement
NetEngine 8000 M8	slot 9 to 10	V800R011C10

Appearance
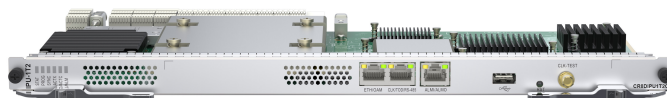
Panel

Table 6-20 Buttons

Name	Description
RST	You can press the RST button to reset the NE or restore the factory settings of the NE.
	The procedure is as follows:
	To reset the NE, press the RST button and release it.
	To restore factory settings, press and hold the RST button. This operation will clear the NE database and system parameter configurations and cannot be restored. Exercise caution when you perform the following operations:
	1.Press the RST button to restart the NE.
	2.When the PROG indicator blinks (the blinking frequency is about 1 second and the time window is about 15 seconds), press and hold down the RST button.
	3.Wait for no longer than 2 minutes till both the STAT and PROG indicators blink (the time window is 5 seconds). Then release the RST button immediately.
	NOTE 1. When you press the RST button to clear the configuration file, the original configuration file will be cleared. You are advised to periodically back up the configuration file.
	2. When you press the RST button to clear the configuration file, to prevent the cleared configuration from being synchronized again between the active and standby main control boards, remove one main control board first in a dual-main control board chassis to ensure that the configuration file is cleared in a single-main control board scenario. Perform the same operations on the other main control board.
	3. When pressing the RST button to clear the configuration file, you only need to pay attention to the STAT and PROG indicators. Other indicators may vary depending on the product model.

Table 6-21 Indicators

Name	Description
STAT	Board status indicator On (green): the board is working normally. On (red): the board hardware is faulty. Off: the board is not running or no power is input.
PROG	Program running indicator On (green): The board software is being initialized. The board software is normally initialized, and the board software is running normally. On (red): The memory self-check fails. The board software or the logic file is lost. Loading of the board software fails. On for 100 ms and off for 100 ms alternately (green): loading of the board software is in process. On for 300 ms and off for 300 ms alternately (green): the BIOS is guiding the upper-layer software. On for 100 ms and off for 100 ms alternately (red): the BIOS self-check fails. Off: no power is input.
SYNC	Synchronization status indicator On (green): The clock works in free-run mode and the system clock priority list is not set. By default, the system clock priority list contains only internal sources. The clock works in locked mode and is tracing a clock source other than the internal sources in the priority list. The system clock is working in time synchronization mode, and the PTP time and system clock are in the tracing state. On (red): The system clock priority list is set. All the clock sources, however, are lost except for the internal clock sources. The clock works in holdover mode or free-run mode. The system clock is working in time synchronization mode, but no synchronization source is available. The system clock and PTP time are working in holdover or free-run mode.

Name	Description
ACTX	Switching status indicator On (green): the board is in the working switching state. Off: the board is in the protection switching state.
ACTC	Control status indicator On (green): the board is in the working control state. On for 100 ms and off for 100 ms alternately (green): the data of the equipment is backed up in batch. Off: the board is in the protection control state.
ALM	alarm indicator: On (red): critical alarms are generated. On (orange): major or minor alarms are generated. Off: no alarms are generated in the equipment.
ETH/OAM	ETH/OAM indicator On (green): If the indicator is steady on, the link is normal. Blinking (orange): If the indicator blinks, data is being transmitted. Off: the board is in the protection control state.

Table 6-22 Management interfaces

Interface Name	Interface Type	Connect or Type	Description	Cable
ETH/OAM	FE/RS-232	RJ45	10M/100M interface that can function as an NM interface or console interface	ETH/OAM Management Cables
ALMI/ ALMO	-	RJ45	Alarm input/output interface	Alarm Input/ Output Cables
USB	-	Type A	USB interface(reserved)	USB Flash Disk
CLK/TEST	-	SMA	Clock test interface	Coaxial Cable

Interface Name	Interface Type	Connector Type	Description	Cable
CLK/TOD/ RS-485	N/A	RJ45	Clock/Time/RS-485 input/ output interface, RS-485 is a reserved interface.	1-into-2 clock cable + clock cable (external clock mode, delivery-ready): applicable to the CLK mode 1-into-2 clock cable + clock cable (external clock/ external time mode, prepared onsite): applicable to the CLK or TOD mode 1-into-2 clock cable + Ethernet cable: applicable to the TOD mode

Functional Specifications

Table 6-23 Functions and features

Functions and Features	Remarks
Line-Rate capability	Data forwarding: The IPU is the core of service processing in the entire system, and is connected to all subcards through data channels.
	Control and management: Through the management channels between IPUs and the subcards, the IPUs can manage subcards and transmit routing protocol data.
	The line rate capability is 2.4T bit/s@310Bytes(Bidirectional).
Reliability and availability	Supports the hot swappable function.
	Supports the board-level 1:1 backup function.
Restrictions and remarks	This board does not support value-added services and is not applicable to outdoor scenarios. In addition, this board cannot be used together with other IPUs.

Technical Specifications

Table 6-24 Board specifications

Item	Specification
Dimensions (H x W x D)	22.36 mm x 388.4 mm x 209.3 mm (0.88 in. x 15.29 in. x 8.24 in.)
Typical power consumption	144.2 W
Typical heat dissipation	467.9 BTU/hour
Weight	2.3 kg (5.07 lb)
Ambient temperature	Long terms: -40 °C to 65 °C (-40°F to 149°F) , -20 °C (-4°F) start

6.2.5 Integrated Network Processing Unit (IPU-480)

Overview

Table 6-25 Board attributes

Attribute	Description
Board name silkscreen	IPU-480
Description	Integrated Network Processing Unit (IPU-480)
BOM	03033GLB
Model	CR8DIPU480C1

Table 6-26 Mapping products and versions

Product	Slot ID	Minimum Version Requirement
NetEngine 8000 M8	slot 9 to 10	V800R012C00

Appearance
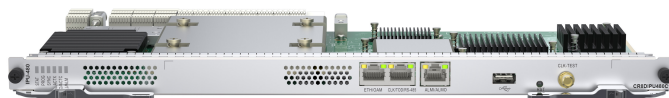
Panel

Table 6-27 Buttons

Name	Description
RST	You can press the RST button to reset the NE or restore the factory settings of the NE.
	The procedure is as follows:
	To reset the NE, press the RST button and release it.
	To restore factory settings, press and hold the RST button. This operation will clear the NE database and system parameter configurations and cannot be restored. Exercise caution when you perform the following operations:
	1.Press the RST button to restart the NE.
	2.When the PROG indicator blinks (the blinking frequency is about 1 second and the time window is about 15 seconds), press and hold down the RST button.
	3.Wait for no longer than 2 minutes till both the STAT and PROG indicators blink (the time window is 5 seconds). Then release the RST button immediately.
	NOTE 1. When you press the RST button to clear the configuration file, the original configuration file will be cleared. You are advised to periodically back up the configuration file.
	2. When you press the RST button to clear the configuration file, to prevent the cleared configuration from being synchronized again between the active and standby main control boards, remove one main control board first in a dual-main control board chassis to ensure that the configuration file is cleared in a single-main control board scenario. Perform the same operations on the other main control board.
	3. When pressing the RST button to clear the configuration file, you only need to pay attention to the STAT and PROG indicators. Other indicators may vary depending on the product model.

Table 6-28 Indicators

Name	Description
STAT	Board status indicator On (green): the board is working normally. On (red): the board hardware is faulty. Off: the board is not running or no power is input.
PROG	Program running indicator On (green): The board software is being initialized. The board software is normally initialized, and the board software is running normally. On (red): The memory self-check fails. The board software or the logic file is lost. Loading of the board software fails. On for 100 ms and off for 100 ms alternately (green): loading of the board software is in process. On for 300 ms and off for 300 ms alternately (green): the BIOS is guiding the upper-layer software. On for 100 ms and off for 100 ms alternately (red): the BIOS self-check fails. Off: no power is input.
SYNC	Synchronization status indicator On (green): The clock works in free-run mode and the system clock priority list is not set. By default, the system clock priority list contains only internal sources. The clock works in locked mode and is tracing a clock source other than the internal sources in the priority list. The system clock is working in time synchronization mode, and the PTP time and system clock are in the tracing state. On (red): The system clock priority list is set. All the clock sources, however, are lost except for the internal clock sources. The clock works in holdover mode or free-run mode. The system clock is working in time synchronization mode, but no synchronization source is available. The system clock and PTP time are working in holdover or free-run mode.

Name	Description
ACTX	Switching status indicator On (green): the board is in the working switching state. Off: the board is in the protection switching state.
ACTC	Control status indicator On (green): the board is in the working control state. On for 100 ms and off for 100 ms alternately (green): the data of the equipment is backed up in batch. Off: the board is in the protection control state.
ALM	alarm indicator: On (red): critical alarms are generated. On (orange): major or minor alarms are generated. Off: no alarms are generated in the equipment.
ETH/OAM	ETH/OAM indicator On (green): If the indicator is steady on, the link is normal. Blinking (orange): If the indicator blinks, data is being transmitted. Off: the board is in the protection control state.

Table 6-29 Management interfaces

Interface Name	Interface Type	Connector Type	Description	Cable
ETH/OAM	FE/RS-232	RJ45	10M/100M interface that can function as an NM interface or console interface	ETH/OAM Management Cables
ALMI/ ALMO	-	RJ45	Alarm input/output interface	Alarm Input/ Output Cables
USB	-	Type A	USB interface(reserved)	NA
CLK/TEST	-	SMA	Clock test interface	Coaxial Cable

Interface Name	Interface Type	Connect or Type	Description	Cable
CLK/TOD/RS-485	N/A	RJ45	Clock/Time/RS-485 input/output interface, RS-485 is a reserved interface.	1-into-2 clock cable + clock cable (external clock mode, delivery-ready): applicable to the CLK mode 1-into-2 clock cable + clock cable (external clock/external time mode, prepared onsite): applicable to the CLK or TOD mode 1-into-2 clock cable + Ethernet cable: applicable to the TOD mode

Functional Specifications

Table 6-30 Functions and features

Functions and Features	Remarks
Line-Rate capability	Data forwarding: The IPU is the core of service processing in the entire system, and is connected to all subcards through data channels.
	Control and management: Through the management channels between IPUs and the subcards, the IPUs can manage subcards and transmit routing protocol data.
	The line rate capability is 960G bit/s@190Bytes(Bidirectional).
Reliability and availability	Supports the hot swappable function.
	Supports the board-level 1:1 backup function.
Restrictions and remarks	This board does not support value-added services and is not applicable to outdoor scenarios. In addition, this board cannot be used together with other IPUs.

Technical Specifications

Table 6-31 Board specifications

Item	Specification
Dimensions (H x W x D)	22.36 mm x 388.4 mm x 209.3 mm (0.88 in. x 15.29 in. x 8.24 in.)
Typical power consumption	113.3 W
Typical heat dissipation	367.7 BTU/hour
Weight	2.3 kg (5.07 lb)
Ambient temperature	Long terms: -40 °C to 65 °C (-40°F to 149°F) , -20 °C (-4°F) start

6.2.6 Integrated Network Processing Unit (IPU-240)

Overview

Table 6-32 Board attributes

Attribute	Description
Board name silkscreen	IPU-240
Description	Integrated Network Processing Unit (IPU-240)
BOM	03033NNR
Model	CR8DIPU240C1

Table 6-33 Mapping products and versions

Product	Slot ID	Minimum Version Requirement
NetEngine 8000 M8	slot 9 to 10	V800R012C00

Appearance

Panel

Table 6-34 Buttons

Name	Description
RST	You can press the RST button to reset the NE or restore the factory settings of the NE. The procedure is as follows: To reset the NE, press the RST button and release it. To restore factory settings, press and hold the RST button. This operation will clear the NE database and system parameter configurations and cannot be restored. Exercise caution when you perform the following operations: 1.Press the RST button to restart the NE. 2.When the PROG indicator blinks (the blinking frequency is about 1 second and the time window is about 15 seconds), press and hold down the RST button. 3.Wait for no longer than 2 minutes till both the STAT and PROG indicators blink (the time window is 5 seconds). Then release the RST button immediately. **NOTE** 1. When you press the RST button to clear the configuration file, the original configuration file will be cleared. You are advised to periodically back up the configuration file. 2. When you press the RST button to clear the configuration file, to prevent the cleared configuration from being synchronized again between the active and standby main control boards, remove one main control board first in a dual-main control board chassis to ensure that the configuration file is cleared in a single-main control board scenario. Perform the same operations on the other main control board. 3. When pressing the RST button to clear the configuration file, you only need to pay attention to the STAT and PROG indicators. Other indicators may vary depending on the product model.

Table 6-35 Indicators

Name	Description
STAT	Board status indicator On (green): the board is working normally. On (red): the board hardware is faulty. Off: the board is not running or no power is input.
PROG	Program running indicator On (green): The board software is being initialized. The board software is normally initialized, and the board software is running normally. On (red): The memory self-check fails. The board software or the logic file is lost. Loading of the board software fails. On for 100 ms and off for 100 ms alternately (green): loading of the board software is in process. On for 300 ms and off for 300 ms alternately (green): the BIOS is guiding the upper-layer software. On for 100 ms and off for 100 ms alternately (red): the BIOS self-check fails. Off: no power is input.
SYNC	Synchronization status indicator On (green): The clock works in free-run mode and the system clock priority list is not set. By default, the system clock priority list contains only internal sources. The clock works in locked mode and is tracing a clock source other than the internal sources in the priority list. The system clock is working in time synchronization mode, and the PTP time and system clock are in the tracing state. On (red): The system clock priority list is set. All the clock sources, however, are lost except for the internal clock sources. The clock works in holdover mode or free-run mode. The system clock is working in time synchronization mode, but no synchronization source is available. The system clock and PTP time are working in holdover or free-run mode.

Name	Description
ACTX	Switching status indicator On (green): the board is in the working switching state. Off: the board is in the protection switching state.
ACTC	Control status indicator On (green): the board is in the working control state. On for 100 ms and off for 100 ms alternately (green): the data of the equipment is backed up in batch. Off: the board is in the protection control state.
ALM	alarm indicator: On (red): critical alarms are generated. On (orange): major or minor alarms are generated. Off: no alarms are generated in the equipment.
ETH/OAM	ETH/OAM indicator On (green): If the indicator is steady on, the link is normal. Blinking (orange): If the indicator blinks, data is being transmitted. Off: the board is in the protection control state.

Table 6-36 Management interfaces

Interface Name	Interface Type	Connector Type	Description	Cable
ETH/OAM	FE/RS-232	RJ45	10M/100M interface that can function as an NM interface or console interface	ETH/OAM Management Cables

Interface Name	Interface Type	Connector Type	Description	Cable
CLK/TOD/ RS-485	N/A	RJ45	Clock/Time/RS-485 input/ output interface, RS-485 is a reserved interface.	1-into-2 clock cable + clock cable (external clock mode, delivery-ready): applicable to the CLK mode 1-into-2 clock cable + clock cable (external clock/ external time mode, prepared onsite): applicable to the CLK or TOD mode 1-into-2 clock cable + Ethernet cable: applicable to the TOD mode
ALMI/ ALMO	-	RJ45	Alarm input/output interface	Alarm Input/ Output Cables
USB	-	Type A	USB interface(reserved)	NA
CLK/TEST	-	SMA	Clock test interface	Coaxial Cable

Functional Specifications

Table 6-37 Functions and features

Functions and Features	Remarks
Line-Rate capability	Data forwarding: The IPU is the core of service processing in the entire system, and is connected to all subcards through data channels.
	Control and management: Through the management channels between IPUs and the subcards, the IPUs can manage subcards and transmit routing protocol data.
	The line rate capability is 480G bit/s@100Bytes(Bidirectional).
Reliability and availability	Supports the hot swappable function.
	Supports the board-level 1:1 backup function.
Restrictions and remarks	This board does not support value-added services and is not applicable to outdoor scenarios. In addition, this board cannot be used together with other IPUs.

Technical Specifications

Table 6-38 Board specifications

Item	Specification
Dimensions (H x W x D)	22.36 mm x 388.4 mm x 209.3 mm (0.88 in. x 15.29 in. x 8.24 in.)
Typical power consumption	113.3 W
Typical heat dissipation	367.7 BTU/hour
Weight	2.3 kg (5.07 lb)
Ambient temperature	Long terms: -40 °C to 65 °C (-40°F to 149°F) , -20 °C (-4°F) start

6.3 Interface Card

6.3.1 8-Port 100/1000Base-RJ45 Physical Interface Card(PIC)

Overview

Table 6-39 Board attributes

Attribute	Description
Board name silkscreen	8xFE/GE-RJ
Description	8-Port 100/1000Base-RJ45 Physical Interface Card(PIC)
BOM	03031DGY
Model	CR5D00E8GE71

Table 6-40 Mapping products and versions

Product	Slot ID	Minimum Version Requirement
NetEngine 8000 M8	IPU-1T2: DC:slot 1 to 2, 7 to 8 AC:slot 2, 7 to 8 IPU-480: DC:slot 1 to 2, 7 to 8 AC:slot 2, 7 to 8 IPU-240: DC:slot 1 to 2, 7 to 8 AC:slot 2, 7 to 8	V800R012C00
NetEngine 8000 M14	IPU-1T2: DC:slot 1 to 2, 13 to 14 AC:slot 13 to 14 IPU-2T: DC:slot 1 to 2, 13 to 14 AC:slot 13 to 14	V800R012C00

☐ **NOTE**

Minimum Version Requirement refers to the minimum version of interface cards on the device but not the minimum version of mapping IPUs. For details about the mapping IPUs, see "Product Compatibility" in Hardware Description.

Appearance

Panel

Table 6-41 Indicators

Name	Description
STAT	Green:
	If the indicator is steady on, the PIC is working properly.
	Red:
	If the indicator is steady on, the hardware on the PIC is faulty.
	Orange:
	If the indicator is steady on, the PIC is installed in a slot for a HIC and an alarm is reported or the PIC is not loaded with the logic.
	If the indicator is off, the PIC is powered off or is not registered.

Table 6-42 Service interfaces

Interface Name	Interface Type	Connect or Type	Description	Cable
FE/GE0 to FE/GE7	GE/FE	RJ45	GE/FE service signal input and output interface	Network cable

Functional Specifications

Table 6-43 Functions and features

Functions and Features	Remarks
Line-Rate capability	Occupies one flexible card slot.
	Supports the line-rate receiving and transmitting on eight GE/FE interfaces and supports 10M/100M/1000M electrical interface features on the interfaces.
Reliability and availability	Supports the hot swappable function.

Technical Specifications

Table 6-44 Interface specifications

Attribute	Description
Working mode	Full-duplex
Compliant standard	IEEE 802.3
Frame format	Ethernet_II, Ethernet_SAP, and Ethernet_SNAP

Table 6-45 Board specifications

Item	Specification
Dimensions (H x W x D)	19.8 mm x 193.8 mm x 209.3 mm (0.78 in. x 7.63 in. x 8.24 in.)
Typical power consumption	11.7 W
Typical heat dissipation	38.0 BTU/hour
Weight	0.5 kg (1.10 lb)
Ambient temperature	Long terms: -40 °C to 65 °C (-40°F to 149°F)

6.3.2 4-Port 10GBase LAN/WAN-SFP+ Physical Interface Card(PIC)

Overview

Table 6-46 Board attributes

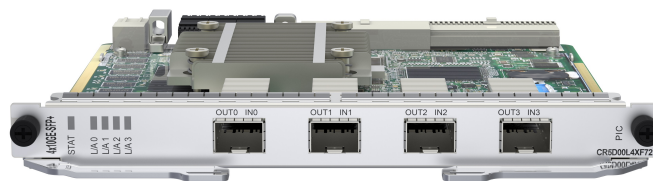| Attribute	Description
Board name silkscreen	4x10GE-SFP+
Description	4-Port 10GBase LAN/WAN-SFP+ Physical Interface Card(PIC)
BOM	03031DJM
Model	CR5D00L4XF72

Table 6-47 Mapping products and versions

Product	Slot ID	Minimum Version Requirement
NetEngine 8000 M8	IPU-1T2: DC:slot 1 to 8 AC:slot 2, 4 to 8	V800R012C00
	IPU-480: DC:slot 1 to 8 AC:slot 2, 4 to 8	
	IPU-240: DC:slot 1 to 8 AC:slot 2, 4 to 8	
NetEngine 8000 M14	IPU-1T2: DC:slot 1 to 14 AC:slot 5 to 14	V800R012C00
	IPU-2T: DC:slot 1 to 14 AC:slot 5 to 14	

📖 **NOTE**

Minimum Version Requirement refers to the minimum version of interface cards on the device but not the minimum version of mapping IPUs. For details about the mapping IPUs, see "Product Compatibility" in Hardware Description.

Appearance

Panel

Table 6-48 Indicators

Name	Description
STAT	Status indicator Green: If the indicator is steady on, the PIC is working properly. Red: If the indicator is steady on, the hardware on the PIC is faulty. Orange: If the indicator is steady on, the PIC is installed in a slot for a HIC and an alarm is reported or the PIC is not loaded with the logic. If the indicator is off, the PIC is powered off or is not registered.
L/A(0-3)	Running status indicator Green: If the indicator is steady on, the link is normal. If the indicator is off, the link is Down. If the indicator blinks, data is being transmitted.

Table 6-49 Service interfaces

Interface Name	Interface Type	Connector Type	Description	Cable
OUT0 IN0 -OUT3 IN3	10GE LAN/ 10GE WAN/GE	SFP+	10 GE service signal input and output interface	LC optical fiber

Functional Specifications

Table 6-50 Functions and features

Functions and Features	Remarks
Line-Rate capability	Occupies one flexible card slot. Supports the line-rate receiving and transmitting on four 10GE/GE interfaces and supports SFP+/SFP optical modules on the interfaces.

Functions and Features	Remarks
Reliability and availability	Supports the hot swappable function.
Restrictions and remarks	The board does not support the OTN mode or FEC function. If a colored optical module is used and does not support optical amplifier insertion, the board supports only point-to-point optical transmission.
Interface Rate Auto-Negotiation Supported	GE/10GE autonegotiation supported

Technical Specifications

Table 6-51 Interface specifications

Attribute	Description
Optical type supported	**10Gbps SFP+ optical module** **10Gbps SFP+ BIDI optical module** **10Gbps SFP+ CWDM optical module** **1.25/9.953/10.3125Gbps SFP+ optical module** **1.25Gbps eSFP BIDI optical module** **1.25Gbps eSFP CWDM optical module** **1.25Gbps eSFP optical module** **125M~2.67Gbps eSFP DWDM optical module** **1Gbps electrical module** **155Mbps eSFP optical module** **155Mbps eSFP BIDI optical module**
Working mode	Full-duplex
Compliant standard	IEEE 802.3
Frame format	Ethernet_II, Ethernet_SAP, and Ethernet_SNAP

Table 6-52 Board specifications

Item	Specification
Dimensions (H x W x D)	19.8 mm x 193.8 mm x 209.3 mm (0.78 in. x 7.63 in. x 8.24 in.)
Typical power consumption	25.0 W
Typical heat dissipation	81.1 BTU/hour

Item	Specification
Weight	0.7 kg (1.54 lb)
Ambient temperature	Long terms: –40 °C to 65 °C (-40°F to 149°F)

6.3.3 10-Port 100/1000Base-X-SFP Physical Interface Card(PIC)

Overview

Table 6-53 Board attributes

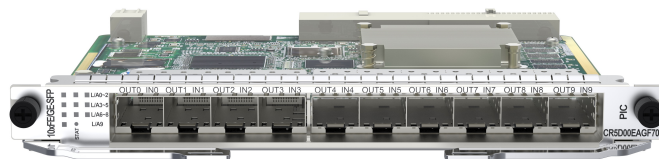| Attribute	Description
Board name silkscreen	10xFE/GE-SFP
Description	10-Port 100/1000Base-X-SFP Physical Interface Card(PIC)
BOM	03031DJR
Model	CR5D00EAGF70

Table 6-54 Mapping products and versions

Product	Slot ID	Minimum Version Requirement
NetEngine 8000 M8	IPU-1T2: DC:slot 1 to 2, 7 to 8 AC:slot 2, 7 to 8 IPU-480: DC:slot 1 to 2, 7 to 8 AC:slot 2, 7 to 8 IPU-240: DC:slot 1 to 2, 7 to 8 AC:slot 2, 7 to 8	V800R012C00
NetEngine 8000 M14	IPU-1T2: DC:slot 1 to 2, 13 to 14 AC:slot 13 to 14 IPU-2T: DC:slot 1 to 2, 13 to 14 AC:slot 13 to 14	V800R012C00

☐ **NOTE**

Minimum Version Requirement refers to the minimum version of interface cards on the device but not the minimum version of mapping IPUs. For details about the mapping IPUs, see "Product Compatibility" in Hardware Description.

Appearance

Panel

Table 6-55 Indicators

Name	Description
STAT	Status indicator Green: If the indicator is steady on, the PIC is working properly. Red: If the indicator is steady on, the hardware on the PIC is faulty. Orange: If the indicator is steady on, the PIC is installed in a slot for a HIC and an alarm is reported or the PIC is not loaded with the logic. If the indicator is off, the PIC is powered off or is not registered.
L/A(0-9)	Running status indicator Green: If the indicator is steady on, the link is normal. If the indicator is off, the link is Down. If the indicator blinks, data is being transmitted.

Table 6-56 Service interfaces

Interface Name	Interface Type	Connect or Type	Description	Cable
OUT0 IN0-OUT9 IN9	GE/FE	SFP	GE/FE service signal input and output interface	LC optical fiber

Functional Specifications

Table 6-57 Functions and features

Functions and Features	Remarks
Line-Rate capability	Occupies one flexible card slot.
	Supports the line-rate receiving and transmitting on ten GE interfaces and supports SFP optical modules on the interfaces.
Reliability and availability	Supports the hot swappable function.

Technical Specifications

Table 6-58 Interface specifications

Attribute	Description
Optical type supported	**1.25Gbps eSFP optical module**
	1.25Gbps eSFP CWDM optical module
	1.25Gbps eSFP BIDI optical module
	125M~2.67Gbps eSFP DWDM optical module
	1Gbps electrical module
	155Mbps SFP electrical module
	155Mbps eSFP optical module
	155Mbps eSFP BIDI optical module
Working mode	Full-duplex
Compliant standard	IEEE 802.3
Frame format	Ethernet_II, Ethernet_SAP, and Ethernet_SNAP

Table 6-59 Board specifications

Item	Specification
Dimensions (H x W x D)	19.8 mm x 193.8 mm x 209.3 mm (0.78 in. x 7.63 in. x 8.24 in.)
Typical power consumption	13.3 W
Typical heat dissipation	43.2 BTU/hour
Weight	0.6 kg (1.32 lb)
Ambient temperature	Long terms: -40 °C to 65 °C (-40°F to 149°F)

6.3.4 10-Port 10GBase LAN/WAN-SFP+ MACsec Physical Interface Card(PIC)

Overview

Table 6-60 Board attributes

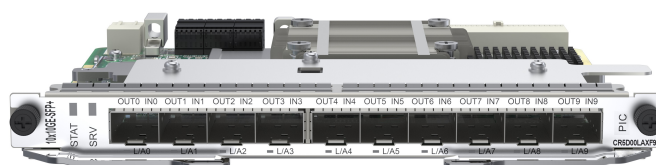| Attribute	Description
Board name silkscreen	10x10GE-SFP+
Description	10-Port 10GBase LAN/WAN-SFP+ MACsec Physical Interface Card(PIC)
BOM	03033BLN
Model	CR5D00LAXF91

Table 6-61 Mapping products and versions

Product	Slot ID	Minimum Version Requirement
NetEngine 8000 M8	IPU-1T2: DC:slot 1 to 8 AC:slot 2, 4 to 8 IPU-480: DC:slot 1 to 8 AC:slot 2, 4 to 8 IPU-240: DC:slot 1 to 8 AC:slot 2, 4 to 8	V800R011C10
NetEngine 8000 M14	IPU-1T2: DC:slot 1 to 14 AC:slot 5 to 14 IPU-2T: DC:slot 1 to 14 AC:slot 5 to 14	V800R012C00

☐ NOTE

Minimum Version Requirement refers to the minimum version of interface cards on the device but not the minimum version of mapping IPUs. For details about the mapping IPUs, see "Product Compatibility" in Hardware Description.

Appearance

Panel

Table 6-62 Indicators

Name	Description
STAT	Green:
	If the indicator is steady on, the PIC is working properly.
	Red:
	If the indicator is steady on, the hardware on the PIC is faulty.
	Orange:
	If the indicator is steady on, the PIC is installed in a slot for a HIC and an alarm is reported or the PIC is not loaded with the logic.
	If the indicator is off, the PIC is powered off or is not registered.
SRV	Service status indicator
	On (green): the board has no CRC alarm.
	On (orange): the board has CRC alarm.
	Off: the board is not running or no power is input.
L/A(0~9)	Running status indicator
	Green:
	If the indicator is steady on, the link is normal.
	If the indicator is off, the link is Down.
	If the indicator blinks, data is being transmitted.

Table 6-63 Service interfaces

Interface Name	Interface Type	Connect or Type	Description	Cable
OUT0 IN0-OUT9 IN9	10GE LAN/10GE WAN/GE	SFP+	10 GE service signal input and output interface	LC optical fiber

Functional Specifications

Table 6-64 Functions and features

Functions and Features	Remarks
Line-Rate capability	Occupies one flexible card slot. Supports the line-rate receiving and transmitting on ten 10GE/GE interfaces and supports SFP+/SFP optical modules on the interfaces.
Reliability and availability	Supports the hot swappable function.
Restrictions and remarks	Port2~5 in a group, port6~9 in a group, LAN/WAN must be switched in a group at the same time.
Interface Rate Auto-Negotiation Supported	GE/10GE autonegotiation supported

Technical Specifications

Table 6-65 Interface specifications

Attribute	Description
Optical type supported	**10Gbps SFP+ optical module** **10Gbps SFP+ BIDI optical module** **10Gbps SFP+ CWDM optical module** **1.25/9.953/10.3125Gbps SFP+ optical module** **1.25Gbps eSFP BIDI optical module** **1.25Gbps eSFP CWDM optical module** **1.25Gbps eSFP optical module** **125M~2.67Gbps eSFP DWDM optical module** **1Gbps electrical module** **155Mbps eSFP optical module** **155Mbps eSFP BIDI optical module**
Working mode	Full-duplex
Compliant standard	IEEE 802.3
Frame format	Ethernet_II, Ethernet_SAP, and Ethernet_SNAP

Table 6-66 Board specifications

Item	Specification
Dimensions (H x W x D)	19.8 mm x 193.8 mm x 209.3 mm (0.78 in. x 7.63 in. x 8.24 in.)
Typical power consumption	32.2 W
Typical heat dissipation	104.6 BTU/hour
Weight	0.8 kg (1.76 lb)
Ambient temperature	Long terms: -40 °C to 65 °C (-40°F to 149°F)

6.3.5 4-Port 25GE(SFP28)/10GE(SFP+) MACsec Physical Interface Card (PIC)

Overview

Table 6-67 Board attributes

Attribute	Description
Board name silkscreen	4x25GE-SFP28
Description	4-Port 25GE(SFP28)/10GE(SFP+) MACsec Physical Interface Card (PIC)
BOM	03033BLK
Model	CR5D00E4XM25

Table 6-68 Mapping products and versions
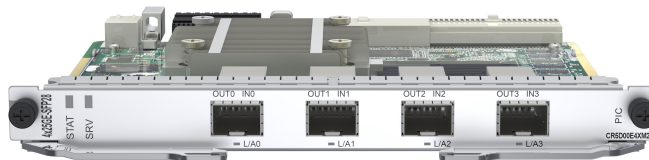
Product	Slot ID	Minimum Version Requirement
NetEngine 8000 M8	IPU-1T2: DC:slot 1 to 8 AC:slot 2, 4 to 8 IPU-480: DC:slot 1 to 8 AC:slot 2, 4 to 8 IPU-240: DC:slot 1 to 8 AC:slot 2, 4 to 8	V800R011C10

Product	Slot ID	Minimum Version Requirement
NetEngine 8000 M14	IPU-1T2: DC:slot 1 to 14 AC:slot 5 to 14	V800R012C00
	IPU-2T: DC:slot 1 to 14 AC:slot 5 to 14	

☐ NOTE

Minimum Version Requirement refers to the minimum version of interface cards on the device but not the minimum version of mapping IPUs. For details about the mapping IPUs, see "Product Compatibility" in Hardware Description.

Appearance

Panel

Table 6-69 Indicators

Name	Description
STAT	Green: If the indicator is steady on, the PIC is working properly. Red: If the indicator is steady on, the hardware on the PIC is faulty. Orange: If the indicator is steady on, the PIC is installed in a slot for a HIC and an alarm is reported or the PIC is not loaded with the logic. If the indicator is off, the PIC is powered off or is not registered.
SRV	Service status indicator On (green): the board has no CRC alarm. On (orange): the board has CRC alarm. Off: the board is not running or no power is input.

Name	Description
L/A(0~3)	Running status indicator Green: If the indicator is steady on, the link is normal. If the indicator is off, the link is Down. If the indicator blinks, data is being transmitted.

Table 6-70 Service interfaces

Interface Name	Interface Type	Connector Type	Description	Cable
OUT0 IN0-OUT3 IN3	25GE/10GE LAN/10GE WAN/GE	SFP28	25 GE/10 GE service signal input and output interface	LC optical fiber

Functional Specifications

Table 6-71 Functions and features

Functions and Features	Remarks
Line-Rate capability	Occupies one flexible card slot. Supports the line-rate receiving and transmitting on four 25GE/10GE interfaces and supports QSFP28/SFP+ optical modules on the interfaces.
Reliability and availability	Supports the hot swappable function.
Restrictions and remarks	Ports 0-3 belong to a port group. By default, 25GE/10GE auto-negotiation is supported. You can run the port-mode group-id command in the slot view to switch the mode of a port group to 10GE/GE auto-negotiation. In LAN/WAN switching, the mode of ports in a port group must be switched at the same time.
Interface Rate Auto-Negotiation Supported	In 25G mode, 10GE/25GE autonegotiation supported; In 10G mode, GE/10GE autonegotiation supported

Technical Specifications

Table 6-72 Interface specifications

Attribute	Description
Optical type supported	**25Gbps SFP28 optical module** **25Gbps SFP28 BIDI optical module** **10Gbps SFP+ optical module** **10Gbps SFP+ BIDI optical module** **10Gbps SFP+ CWDM optical module** **1.25/9.953/10.3125Gbps SFP+ optical module** **1.25Gbps eSFP BIDI optical module** **1.25Gbps eSFP CWDM optical module** **1.25Gbps eSFP optical module** **125M~2.67Gbps eSFP DWDM optical module** **1Gbps electrical module** **155Mbps eSFP optical module** **155Mbps eSFP BIDI optical module**
Working mode	Full-duplex
Compliant standard	IEEE 802.3
Frame format	Ethernet_II, Ethernet_SAP, and Ethernet_SNAP

Table 6-73 Board specifications

Item	Specification
Dimensions (H x W x D)	19.8 mm x 193.8 mm x 209.3 mm (0.78 in. x 7.63 in. x 8.24 in.)
Typical power consumption	25.1 W
Typical heat dissipation	81.3 BTU/hour
Weight	0.7 kg (1.54 lb)
Ambient temperature	Long terms: -40 °C to 65 °C (-40°F to 149°F)

6.3.6 2-Port 50GBase/1-Port 100GBase-QSFP28 FlexE MACsec Physical Interface Card(PIC)

Overview

Table 6-74 Board attributes

Attribute	Description
Board name silkscreen	2x50GE-QSFP28
Description	2-Port 50GBase/1-Port 100GBase-QSFP28 FlexE MACsec Physical Interface Card(PIC)
BOM	03033GDR
Model	CR5D0E5XMF94

Table 6-75 Mapping products and versions

Product	Slot ID	Minimum Version Requirement
NetEngine 8000 M8	IPU-1T2: DC:slot 1 to 8 AC:slot 2, 4 to 8 IPU-480: DC:slot 1 to 8 AC:slot 2, 4 to 8 IPU-240: DC:slot 1 to 8 AC:slot 2, 4 to 8	V800R011C10
NetEngine 8000 M14	IPU-1T2: DC:slot 1 to 14 AC:slot 5 to 14 IPU-2T: DC:slot 1 to 14 AC:slot 5 to 14	V800R012C00

☐ NOTE

Minimum Version Requirement refers to the minimum version of interface cards on the device but not the minimum version of mapping IPUs. For details about the mapping IPUs, see "Product Compatibility" in Hardware Description.

Appearance

Panel

Table 6-76 Indicators

Name	Description
STAT	Green: If the indicator is steady on, the PIC is working properly. Red: If the indicator is steady on, the hardware on the PIC is faulty. Orange: If the indicator is steady on, the PIC is installed in a slot for a HIC and an alarm is reported or the PIC is not loaded with the logic. If the indicator is off, the PIC is powered off or is not registered.
SRV	Service status indicator On (green): the board has no CRC alarm. On (orange): the board has CRC alarm. Off: the board is not running or no power is input.
L/A(0~1)	Running status indicator Green: If the indicator is steady on, the link is normal. If the indicator is off, the link is Down. If the indicator blinks, data is being transmitted.
Breakout(0~3)	MPO module channel indicator. Each indicator for channels 0, 1, 2, and 3 turns on for 5s in sequence to indicate the status of the corresponding channel. This process repeats.

Table 6-77 Service interfaces

Interface Name	Interface Type	Connector Type	Description	Cable
OUT0 IN0-OUT1 IN1	OUT0 IN0:50GE/100GE OUT1 IN1:50GE	QSFP28	100 GE/50 GE service signal input and output interface	LC optical fiber

Functional Specifications

Table 6-78 Functions and features

Functions and Features	Remarks
Line-Rate capability	Occupies one flexible card slot.
	Supports the line-rate receiving and transmitting on two 50GE/one 100GE interfaces and supports QSFP28 optical modules on the interfaces.
Reliability and availability	Supports the hot swappable function.
Restrictions and remarks	Port 0 supports 100GE, 50GE, 40GE, 4x25GE breakout, and 4x10GE breakout. Port 1 is valid only when port 0 is a 50GE port.

Technical Specifications

Table 6-79 Interface specifications

Attribute	Description
Optical type supported	**100Gbps QSFP28 optical module**
	50Gbps QSFP28 BIDIoptical module
	50Gbps QSFP28 optical module
	40Gbps QSFP+ optical module
Working mode	Full-duplex
Compliant standard	IEEE 802.3
Frame format	Ethernet_II, Ethernet_SAP, and Ethernet_SNAP

Table 6-80 Board specifications

Item	Specification
Dimensions (H x W x D)	19.8 mm x 193.8 mm x 209.3 mm (0.78 in. x 7.63 in. x 8.24 in.)
Typical power consumption	28.7 W
Typical heat dissipation	93.0 BTU/hour
Weight	0.8 kg (1.76 lb)
Ambient temperature	Long terms: -5 °C to 55 °C (23°F to 131°F)

6.3.7 10-port 100/1000Base-X-SFP MACsec Physical Interface Card(PIC)

Overview

Table 6-81 Board attributes

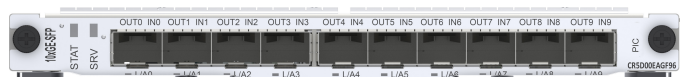| Attribute	Description
Board name silkscreen	10xGE-SFP
Description	10-port 100/1000Base-X-SFP MACsec Physical Interface Card(PIC)
BOM	03033GFJ
Model	CR5D00EAGF96

Table 6-82 Mapping products and versions

Product	Slot ID	Minimum Version Requirement
NetEngine 8000 M8	IPU-1T2: DC:slot 1 to 8 AC:slot 2, 4 to 8 IPU-480: DC:slot 1 to 8 AC:slot 2, 4 to 8 IPU-240: DC:slot 1 to 8 AC:slot 2, 4 to 8	V800R011C10

▢ **NOTE**

Minimum Version Requirement refers to the minimum version of interface cards on the device but not the minimum version of mapping IPUs. For details about the mapping IPUs, see "Product Compatibility" in Hardware Description.

Appearance

Panel

Table 6-83 Indicators

Name	Description
STAT	Green:
	If the indicator is steady on, the PIC is working properly.
	Red:
	If the indicator is steady on, the hardware on the PIC is faulty.
	Orange:
	If the indicator is steady on, the PIC is installed in a slot for a HIC and an alarm is reported or the PIC is not loaded with the logic.
	If the indicator is off, the PIC is powered off or is not registered.
SRV	Service status indicator
	On (green): the board has no CRC alarm.
	On (orange): the board has CRC alarm.
	Off: the board is not running or no power is input.
L/A(0~9)	Running status indicator
	Green:
	If the indicator is steady on, the link is normal.
	If the indicator is off, the link is Down.
	If the indicator blinks, data is being transmitted.

Table 6-84 Service interfaces

Interface Name	Interface Type	Connector Type	Description	Cable
OUT0 IN0-OUT9 IN9	GE/FE	SFP	GE/FE service signal input and output interface	LC optical fiber

Functional Specifications

Table 6-85 Functions and features

Functions and Features	Remarks
Line-Rate capability	Occupies one flexible card slot.
	Supports the line-rate receiving and transmitting on ten GE interfaces and supports SFP optical modules on the interfaces.
Reliability and availability	Supports the hot swappable function.

Technical Specifications

Table 6-86 Interface specifications

Attribute	Description
Optical type supported	**1.25Gbps eSFP optical module**
	1.25Gbps eSFP CWDM optical module
	1.25Gbps eSFP BIDI optical module
	125M~2.67Gbps eSFP DWDM optical module
	1Gbps electrical module
	155Mbps SFP electrical module
	155Mbps eSFP optical module
	155Mbps eSFP BIDI optical module
Working mode	Full-duplex
Compliant standard	IEEE 802.3
Frame format	Ethernet_II, Ethernet_SAP, and Ethernet_SNAP

Table 6-87 Board specifications

Item	Specification
Dimensions (H x W x D)	19.8 mm x 193.8 mm x 209.3 mm (0.78 in. x 7.63 in. x 8.24 in.)
Typical power consumption	30.2 W
Typical heat dissipation	98.1 BTU/hour
Weight	0.8 kg (1.76 lb)
Ambient temperature	Long terms: -40 °C to 65 °C (-40°F to 149°F)

6.3.8 4-Port 10GE(SFP+)/GE(SFP) MACsec Physical Interface Card(PIC)

Overview

Table 6-88 Board attributes

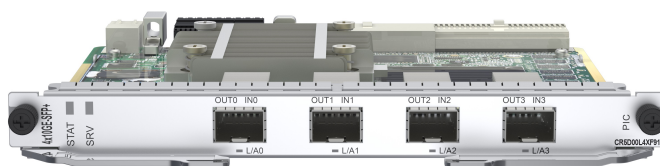| Attribute	Description
Board name silkscreen	4x10GE-SFP+
Description	4-Port 10GE(SFP+)/GE(SFP) MACsec Physical Interface Card(PIC)
BOM	03033FXF
Model	CR5D00L4XF91

Table 6-89 Mapping products and versions

Product	Slot ID	Minimum Version Requirement
NetEngine 8000 M8	IPU-1T2: DC:slot 1 to 8 AC:slot 2, 4 to 8 IPU-480: DC:slot 1 to 8 AC:slot 2, 4 to 8 IPU-240: DC:slot 1 to 8 AC:slot 2, 4 to 8	V800R011C10
NetEngine 8000 M14	IPU-1T2: DC:slot 1 to 14 AC:slot 5 to 14 IPU-2T: DC:slot 1 to 14 AC:slot 5 to 14	V800R012C00

> ☐ **NOTE**
>
> Minimum Version Requirement refers to the minimum version of interface cards on the device but not the minimum version of mapping IPUs. For details about the mapping IPUs, see "Product Compatibility" in Hardware Description.

Appearance

Panel

Table 6-90 Indicators

Name	Description
STAT	Green:
	If the indicator is steady on, the PIC is working properly.
	Red:
	If the indicator is steady on, the hardware on the PIC is faulty.
	Orange:
	If the indicator is steady on, the PIC is installed in a slot for a HIC and an alarm is reported or the PIC is not loaded with the logic.
	If the indicator is off, the PIC is powered off or is not registered.
SRV	Service status indicator
	On (green): the board has no CRC alarm.
	On (orange): the board has CRC alarm.
	Off: the board is not running or no power is input.
L/A(0~3)	Running status indicator
	Green:
	If the indicator is steady on, the link is normal.
	If the indicator is off, the link is Down.
	If the indicator blinks, data is being transmitted.

Table 6-91 Service interfaces

Interface Name	Interface Type	Connect or Type	Description	Cable
OUT0 IN0-OUT3 IN3	10GE LAN/10GE WAN/GE	SFP+	10 GE service signal input and output interface	LC optical fiber

Functional Specifications

Table 6-92 Functions and features

Functions and Features	Remarks
Line-Rate capability	Occupies one flexible card slot. Supports the line-rate receiving and transmitting on four 10GE/GE interfaces and supports SFP+/SFP optical modules on the interfaces.
Reliability and availability	Supports the hot swappable function.
Restrictions and remarks	Ports 0–3 belong to a port group. In LAN/WAN switching, the mode of ports in a port group must be switched at the same time.
Interface Rate Auto-Negotiation Supported	GE/10GE autonegotiation supported

Technical Specifications

Table 6-93 Interface specifications

Attribute	Description
Optical type supported	**10Gbps SFP+ optical module** **10Gbps SFP+ BIDI optical module** **10Gbps SFP+ CWDM optical module** **1.25/9.953/10.3125Gbps SFP+ optical module** **1.25Gbps eSFP BIDI optical module** **1.25Gbps eSFP CWDM optical module** **1.25Gbps eSFP optical module** **125M~2.67Gbps eSFP DWDM optical module** **1Gbps electrical module** **155Mbps eSFP optical module** **155Mbps eSFP BIDI optical module**
Working mode	Full-duplex
Compliant standard	IEEE 802.3
Frame format	Ethernet_II, Ethernet_SAP, and Ethernet_SNAP

Table 6-94 Board specifications

Item	Specification
Dimensions (H x W x D)	19.8 mm x 193.8 mm x 209.3 mm (0.78 in. x 7.63 in. x 8.24 in.)
Typical power consumption	23.9 W
Typical heat dissipation	77.4 BTU/hour
Weight	0.7 kg (1.54 lb)
Ambient temperature	Long terms: -40 °C to 65 °C (-40°F to 149°F)

6.3.9 16-Port E1 Physical Interface Card(PIC,75ohm/120ohm)

Overview

Table 6-95 Board attributes

Attribute	Description
Board name silkscreen	16xE1-75/120
Description	16-Port E1 Physical Interface Card(PIC,75ohm/120ohm)
BOM	03033GGD
Model	CR5D000DE1C1

Table 6-96 Mapping products and versions

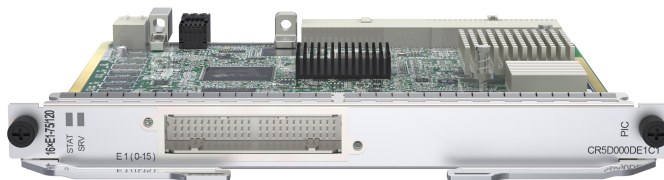| Product	Slot ID	Minimum Version Requirement
NetEngine 8000 M8	IPU-1T2: DC:slot 1 to 2, 7 to 8 AC:slot 2, 7 to 8 IPU-480: DC:slot 1 to 2, 7 to 8 AC:slot 2, 7 to 8 IPU-240: DC:slot 1 to 2, 7 to 8 AC:slot 2, 7 to 8	V800R012C00
NetEngine 8000 M14	IPU-1T2: DC:slot 1 to 2, 13 to 14 AC:slot 13 to 14 IPU-2T: DC:slot 1 to 2, 13 to 14 AC:slot 13 to 14	V800R012C00

> 📖 **NOTE**
>
> Minimum Version Requirement refers to the minimum version of interface cards on the device but not the minimum version of mapping CXPs. For details about the mapping CXPs, see "Product Compatibility" in Hardware Description.

Appearance

Panel

Table 6-97 Indicators

Name	Description
STAT	Board status indicator On (green): the board is working normally. On (red): the board hardware is faulty. On (orange): the board is not loaded with the logic. Off: the board is not running or no power is input.
SRV	Business status indicator On (green): the board has no CRC alarm. On (orange): the board has no CRC alarm. Off: the board is not running or no power is input.

Table 6-98 Service interfaces

Interface Name	Interface Type	Connector Type	Description	Cable
E1(0-15)	E1	Anea 96	16 E1 interfaces	E1 cable

Functional Specifications

Table 6-99 Functions and features

Functions and Features	Remarks
Line-Rate capability	Supports a maximum of 16 E1 interfaces. Services on each interface can be configured.
Reliability and availability	Supports the hot swappable function.
Link protocol	PPP, MP, TDM.

Technical Specifications

Table 6-100 Interface specifications

Attribute	Description
Working mode	Full-duplex
Compliant standard	RFC4385, RFC5086, RFC4553_SATOP, RFC1662
Frame format	Unframed mode, CRC4, and NO-CRC4

Table 6-101 Board specifications

Item	Specification
Dimensions (H x W x D)	19.8 mm x 193.8 mm x 209.3 mm (0.78 in. x 7.63 in. x 8.24 in.)
Typical power consumption	15.1 W
Typical heat dissipation	48.9 BTU/hour
Weight	0.6 kg (1.32 lb)
Ambient temperature	Long terms: -40 °C to 65 °C (-40°F to 149°F)

6.3.10 4-Port OC-3c/STM-1c POS-SFP Flexible Interface Card(PIC)

Overview

Table 6-102 Board attributes

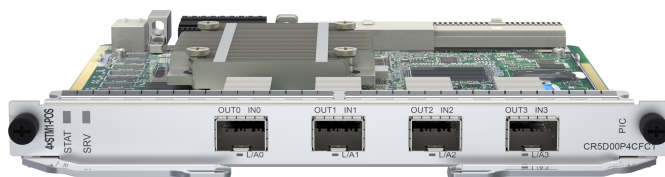| Attribute	Description
Board name silkscreen	4xSTM1-POS
Description	4-Port OC-3c/STM-1c POS-SFP Flexible Interface Card(PIC)
BOM	03033GGE
Model	CR5D00P4CFC1

Table 6-103 Mapping products and versions

Product	Slot ID	Minimum Version Requirement
NetEngine 8000 M8	IPU-1T2: DC:slot 1 to 2, 7 to 8 AC:slot 2, 7 to 8	V800R012C00
	IPU-480: DC:slot 1 to 2, 7 to 8 AC:slot 2, 7 to 8	
	IPU-240: DC:slot 1 to 2, 7 to 8 AC:slot 2, 7 to 8	
NetEngine 8000 M14	IPU-1T2: DC:slot 1 to 2, 13 to 14 AC:slot 13 to 14	V800R012C00
	IPU-2T: DC:slot 1 to 2, 13 to 14 AC:slot 13 to 14	

◻ **NOTE**

Minimum Version Requirement refers to the minimum version of interface cards on the device but not the minimum version of mapping IPUs. For details about the mapping IPUs, see "Product Compatibility" in Hardware Description.

Appearance

Panel

Table 6-104 Indicators

Name	Description
STAT	Status indicator Green: If this indicator is steady green, the board is working properly. Red: If this indicator is steady red, the board hardware is faulty. Orange: If this indicator is steady orange, the logic is not loaded to the board. If this indicator is steady off, the board is not powered on or registered.
SRV	Service status indicator On (green): the board has no CRC alarm. On (orange): the board has CRC alarms. Off: the board is not running or no power is input.
L/A(0~3)	Running status indicator Green: If the indicator is steady on, the link is normal. If the indicator is off, the link is Down. If the indicator blinks, data is being transmitted.

Table 6-105 Service interfaces

Interface Name	Interface Type	Connector Type	Description	Cable
OUT0 IN0-OUT3 IN3	POS	SFP	STM-1 service signal input and output interface	LC optical fiber

Functional Specifications

Table 6-106 Functions and features

Functions and Features	Remarks
Line-Rate capability	Occupies one flexible card slot. Supports the line-rate receiving and transmitting on four 155M POS interfaces and supports SFP optical modules on the interfaces.
Reliability and availability	Supports the hot swappable function.
Link protocol	PPP

Technical Specifications

Table 6-107 Interface specifications

Attribute	Description
Optical type supported	**155Mbps SFP electrical module** **155Mbps eSFP optical module** **155Mbps eSFP BIDI optical module**
Working mode	Full-duplex
Compliant standard	ITU-T G707
Frame format	SDH

Table 6-108 Board specifications

Item	Specification
Dimensions (H x W x D)	19.8 mm x 193.8 mm x 209.3 mm (0.78 in. x 7.63 in. x 8.24 in.)
Typical power consumption	16.8 W
Typical heat dissipation	54.5 BTU/hour
Weight	0.5 kg (1.10 lb)
Ambient temperature	Long terms: -20 °C to 65 °C (-4°F to 149°F)

6.3.11 4-Port Channelized STM-1c POS-SFP Physical Interface Card(PIC)

Overview

Table 6-109 Board attributes

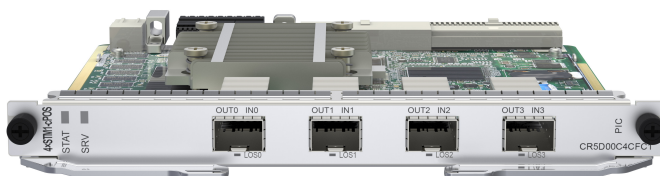| Attribute	Description
Board name silkscreen	4xSTM1-cPOS
Description	4-Port Channelized STM-1c POS-SFP Physical Interface Card(PIC)
BOM	03033GGF
Model	CR5D00C4CFC1

Table 6-110 Mapping products and versions

Product	Slot ID	Minimum Version Requirement
NetEngine 8000 M8	IPU-1T2: DC:slot 1 to 2, 7 to 8 AC:slot 2, 7 to 8 IPU-480: DC:slot 1 to 2, 7 to 8 AC:slot 2, 7 to 8 IPU-240: DC:slot 1 to 2, 7 to 8 AC:slot 2, 7 to 8	V800R012C00
NetEngine 8000 M14	IPU-1T2: DC:slot 1 to 2, 13 to 14 AC:slot 13 to 14 IPU-2T: DC:slot 1 to 2, 13 to 14 AC:slot 13 to 14	V800R012C00

☐ **NOTE**

Minimum Version Requirement refers to the minimum version of interface cards on the device but not the minimum version of mapping CXPs. For details about the mapping CXPs, see "Product Compatibility" in Hardware Description.

Appearance

Panel

Table 6-111 Indicators

Name	Description
STAT	Board status indicator On (green): the board is working normally. On (red): the board hardware is faulty. On (orange): the board is not loaded with the logic. Off: the board is not running or no power is input.
SRV	Business status indicator On (green): the board has no CRC alarm. On (orange): the board has no CRC alarm. Off: the board is not running or no power is input.
LOS0 to LOS3	Connection/data transmission status indicator On (green): the connection on the physical port is normal. Blinking (green): The connection on the physical port is normal, and data is received or transmitted on the port. Off: the physical connection fails.

Table 6-112 Service interfaces

Interface Name	Interface Type	Connector Type	Description	Cable
OUT0 IN0-OUT3 IN3	POS	SFP	STM-1 service signal input and output interface	LC optical fiber/PC cable

Functional Specifications

Table 6-113 Functions and features

Functions and Features	Remarks
Line-Rate capability	Supports 63 E1 links over four 155M SDH links.

Functions and Features	Remarks
Reliability and availability	Supports the hot swappable function.
Link protocol	PPP, MP, TDM.

Technical Specifications

Table 6-114 Interface specifications

Attribute	Description
Optical type supported	**155Mbps SFP electrical module** **155Mbps eSFP optical module** **155Mbps eSFP BIDI optical module**
Working mode	Full-duplex
Compliant standard	RFC4385, RFC5086, RFC4553_SATOP, RFC1662
Frame format	155M interfaces support SDH. Channelized E1 interfaces support the unframed mode, CRC4, and NO-CRC4.

Table 6-115 Board specifications

Item	Specification
Dimensions (H x W x D)	19.8 mm x 193.8 mm x 209.3 mm (0.78 in. x 7.63 in. x 8.24 in.)
Typical power consumption	16.8 W
Typical heat dissipation	54.5 BTU/hour
Weight	0.5 kg (1.10 lb)
Ambient temperature	Long terms: -20 °C to 65 °C (-4°F to 149°F)

6.3.12 2-Port 100GBase/50GBase-QSFP28 FlexE MACsec Interface Card(PIC)

Overview

Table 6-116 Board attributes

Attribute	Description
Board name silkscreen	2x100GE-QSFP28
Description	2-Port 100GBase/50GBase-QSFP28 FlexE MACsec Interface Card(PIC)
BOM	03033GDS
Model	CR5DE2NE4X14

Table 6-117 Mapping products and versions

Product	Slot ID	Minimum Version Requirement
NetEngine 8000 M8	IPU-1T2: DC:slot 3 to 6 AC:slot 4 to 6 IPU-480: DC:slot 3 to 6 AC:slot 4 to 6 IPU-240: DC:slot 3 to 6 AC:slot 4 to 6	V800R012C00
NetEngine 8000 M14	IPU-1T2: slot 7 to 12 IPU-2T: slot 7 to 12	V800R012C00

□ NOTE

Minimum Version Requirement refers to the minimum version of interface cards on the device but not the minimum version of mapping IPUs. For details about the mapping IPUs, see "Product Compatibility" in Hardware Description.

Appearance

Panel

Table 6-118 Indicators

Name	Description
STAT	Green:
	If the indicator is steady on, the PIC is working properly.
	Red:
	If the indicator is steady on, the hardware on the PIC is faulty.
	Orange:
	If the indicator is steady on, the PIC is installed in a slot for a HIC and an alarm is reported or the PIC is not loaded with the logic.
	If the indicator is off, the PIC is powered off or is not registered.
SRV	Service status indicator
	On (green): the board has no CRC alarm.
	On (orange): the board has CRC alarm.
	Off: the board is not running or no power is input.
L/A(0~1)	Running status indicator
	Green:
	If the indicator is steady on, the link is normal.
	If the indicator is off, the link is Down.
	If the indicator blinks, data is being transmitted.
0~3 BreakOut	MPO module channel indicator. Each indicator for channels 0, 1, 2, and 3 turns on for 5s in sequence to indicate the status of the corresponding channel. This process repeats.

Table 6-119 Service interfaces

Interface Name	Interface Type	Connector Type	Description	Cable
OUT0 IN0-OUT1 IN1	OUT0 IN0:50GE/100GE OUT1 IN1:50GE/100GE	QSFP28	100 GE/50 GE service signal input and output interface	LC optical fiber

Functional Specifications

Table 6-120 Functions and features

Functions and Features	Remarks
Line-Rate capability	Occupies one flexible card slot.
	Supports the line-rate receiving and transmitting on two 100GE/50GE interfaces and supports QSFP28 optical modules on the interfaces.
Reliability and availability	Supports the hot swappable function.

Technical Specifications

Table 6-121 Interface specifications

Attribute	Description
Optical type supported	**100Gbps QSFP28 optical module**
	50Gbps QSFP28 BIDIoptical module
	50Gbps QSFP28 optical module
	40Gbps QSFP+ optical module
Working mode	Full-duplex
Compliant standard	IEEE 802.3
Frame format	Ethernet_II, Ethernet_SAP, and Ethernet_SNAP

Table 6-122 Board specifications

Item	Specification
Dimensions (H x W x D)	19.8 mm x 193.8 mm x 209.3 mm (0.78 in. x 7.63 in. x 8.24 in.)
Typical power consumption	32.2 W
Typical heat dissipation	104.4 BTU/hour
Weight	0.8 kg (1.76 lb)
Ambient temperature	Long terms: -5 °C to 55 °C (23°F to 131°F)

6.3.13 20-Port 100/1000Base-X-CSFP/10-Port 100/1000Base-X-SFP Physical Interface Card(PIC)

Overview

Table 6-123 Board attributes

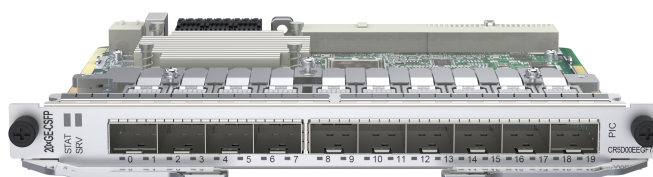| Attribute	Description
Board name silkscreen	20xGE-CSFP
Description	20-Port 100/1000Base-X-CSFP/10-Port 100/1000Base-X-SFP Physical Interface Card(PIC)
BOM	03033GMU
Model	CR5D00EEGF73

Table 6-124 Mapping products and versions

Product	Slot ID	Minimum Version Requirement
NetEngine 8000 M8	IPU-1T2: DC:slot 1 to 8 AC:slot 2, 4 to 8 IPU-480: DC:slot 1 to 8 AC:slot 2, 4 to 8 IPU-240: DC:slot 1 to 8 AC:slot 2, 4 to 8	V800R012C00
NetEngine 8000 M14	IPU-1T2: DC:slot 1 to 14 AC:slot 5 to 14 IPU-2T: DC:slot 1 to 14 AC:slot 5 to 14	V800R012C00

☐ NOTE

　　Minimum Version Requirement refers to the minimum version of interface cards on the device but not the minimum version of mapping IPUs. For details about the mapping IPUs, see "Product Compatibility" in Hardware Description.

Appearance

Panel

Table 6-125 Indicators

Name	Description
STATUS	Status indicator Green: If the indicator is steady on, the PIC is working properly. Red: If the indicator is steady on, the hardware on the PIC is faulty. Orange: If the indicator is steady on, the PIC is installed in a slot for a HIC and an alarm is reported or the PIC is not loaded with the logic. If the indicator is off, the PIC is powered off or is not registered.
SRV	Service status indicator On (green): the board has no CRC alarm. On (orange): the board has CRC alarms. Off: the board is not running or no power is input.
L/A(0~19)	Running status indicator Green: If the indicator is steady on, the link is normal. If the indicator is off, the link is Down. If the indicator blinks, data is being transmitted.

Table 6-126 Service interfaces

Interface Name	Interface Type	Connector Type	Description	Cable
OUT0 IN0-OUT19 IN19	GE/FE	CSFP/SFP	GE/FE service signal input and output interface	LC optical fiber

Functional Specifications

Table 6-127 Functions and features

Functions and Features	Remarks
Line-Rate capability	Occupies one flexible card slot.
	Supports the line-rate receiving and transmitting on twenty GE interfaces and supports CSFP optical modules on the interfaces.
	Supports the line-rate receiving and transmitting on ten GE interfaces and supports GE and FE optical modules and electrical modules on the interfaces.
Reliability and availability	Supports the hot swappable function.

Technical Specifications

Table 6-128 Interface specifications

Attribute	Description
Optical type supported	**1.25Gbps eSFP optical module**
	1.25Gbps eSFP CWDM optical module
	1.25Gbps eSFP BIDI optical module
	1.25Gbps CSFP BIDI optical module
	125M~1.25Gbps CSFP BIDI optical module
	125M~2.67Gbps eSFP DWDM optical module
	155Mbps eSFP optical module
	155Mbps eSFP BIDI optical module
Working mode	Full-duplex
Compliant standard	IEEE 802.3
Frame format	Ethernet_II, Ethernet_SAP, and Ethernet_SNAP

Table 6-129 Board specifications

Item	Specification
Dimensions (H x W x D)	19.8 mm x 193.8 mm x 209.3 mm (0.78 in. x 7.63 in. x 8.24 in.)
Typical power consumption	32.2 W

Item	Specification
Typical heat dissipation	104.3 BTU/hour
Weight	0.8 kg (1.76 lb)
Ambient temperature	Long terms: -40 °C to 65 °C (-40°F to 149°F)

6.3.14 10-port 100/1000Base-X-SFP MACsec Physical Interface Card(PIC)

Overview

Table 6-130 Board attributes

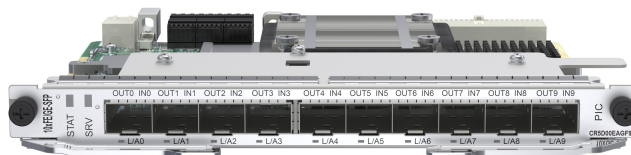| Attribute	Description
Board name silkscreen	10xFE/GE-SFP
Description	10-port 100/1000Base-X-SFP MACsec Physical Interface Card(PIC)
BOM	03033FXE
Model	CR5D00EAGF95

Table 6-131 Mapping products and versions

Product	Slot ID	Minimum Version Requirement
NetEngine 8000 M8	IPU-1T2: DC:slot 1 to 8 AC:slot 2, 4 to 8 IPU-480: DC:slot 1 to 8 AC:slot 2, 4 to 8 IPU-240: DC:slot 1 to 8 AC:slot 2, 4 to 8	V800R012C00
NetEngine 8000 M14	IPU-1T2: DC:slot 1 to 14 AC:slot 5 to 14 IPU-2T: DC:slot 1 to 14 AC:slot 5 to 14	V800R012C00

📖 **NOTE**

Minimum Version Requirement refers to the minimum version of interface cards on the device but not the minimum version of mapping IPUs. For details about the mapping IPUs, see "Product Compatibility" in Hardware Description.

Appearance

Panel

Table 6-132 Indicators

Name	Description
STAT	Status indicator Green: If the indicator is steady on, the PIC is working properly. Red: If the indicator is steady on, the hardware on the PIC is faulty. Orange: If the indicator is steady on, the PIC is installed in a slot for a HIC and an alarm is reported or the PIC is not loaded with the logic. If the indicator is off, the PIC is powered off or is not registered.
SRV	Service status indicator On (green): the board has no CRC alarm. On (orange): the board has CRC alarms. Off: the board is not running or no power is input.
L/A(0~9)	Running status indicator Green: If the indicator is steady on, the link is normal. If the indicator is off, the link is Down. If the indicator blinks, data is being transmitted.

Table 6-133 Service interfaces

Interface Name	Interface Type	Connector Type	Description	Cable
OUT0 IN0-OUT9 IN9	GE/FE	SFP	GE/FE service signal input and output interface	LC optical fiber

Functional Specifications

Table 6-134 Functions and features

Functions and Features	Remarks
Line-Rate capability	Occupies one flexible card slot. Supports the line-rate receiving and transmitting on ten GE interfaces and supports SFP optical modules on the interfaces.
Reliability and availability	Supports the hot swappable function.

Technical Specifications

Table 6-135 Interface specifications

Attribute	Description
Optical type supported	**1.25Gbps eSFP optical module** **1.25Gbps eSFP CWDM optical module** **1.25Gbps eSFP BIDI optical module** **125M~2.67Gbps eSFP DWDM optical module** **1Gbps electrical module** **155Mbps SFP electrical module** **155Mbps eSFP optical module** **155Mbps eSFP BIDI optical module**
Working mode	Full-duplex
Compliant standard	IEEE 802.3
Frame format	Ethernet_II, Ethernet_SAP, and Ethernet_SNAP

Table 6-136 Board specifications

Item	Specification
Dimensions (H x W x D)	19.8 mm x 193.8 mm x 209.3 mm (0.78 in. x 7.63 in. x 8.24 in.)
Typical power consumption	19.3 W
Typical heat dissipation	62.5 BTU/hour
Weight	0.7 kg (1.54 lb)
Ambient temperature	Long terms: -40 °C to 65 °C (-40°F to 149°F)

6.3.15 8-Port 25GE(SFP28)/10GE(SFP+) MACsec Physical Interface Card (PIC)

Overview

Table 6-137 Board attributes

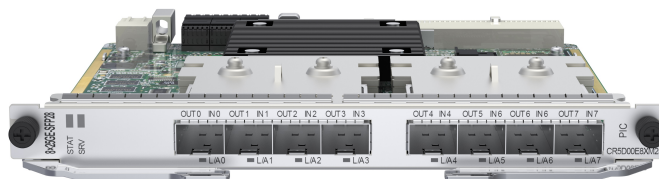| Attribute	Description
Board name silkscreen	8x25GE-SFP28
Description	8-Port 25GE(SFP28)/10GE(SFP+) MACsec Physical Interface Card (PIC)
BOM	03033BLM
Model	CR5D00E8XM25

Table 6-138 Mapping products and versions

Product	Slot ID	Minimum Version Requirement
NetEngine 8000 M14	IPU-1T2: slot 7 to 12 IPU-2T: slot 7 to 12	V800R012C00

📖 **NOTE**

Minimum Version Requirement refers to the minimum version of interface cards on the device but not the minimum version of mapping IPUs. For details about the mapping IPUs, see "Product Compatibility" in Hardware Description.

Appearance

Panel

Table 6-139 Indicators

Name	Description
STAT	Green:
	If the indicator is steady on, the PIC is working properly.
	Red:
	If the indicator is steady on, the hardware on the PIC is faulty.
	Orange:
	If the indicator is steady on, the PIC is installed in a slot for a HIC and an alarm is reported or the PIC is not loaded with the logic.
	If the indicator is off, the PIC is powered off or is not registered.
SRV	Service status indicator
	On (green): the board has no CRC alarm.
	On (orange): the board has CRC alarms.
	Off: the board is not running or no power is input.
L/A(0~7)	Running status indicator
	Green:
	If the indicator is steady on, the link is normal.
	If the indicator is off, the link is Down.
	If the indicator blinks, data is being transmitted.

Table 6-140 Service interfaces

Interface Name	Interface Type	Connector Type	Description	Cable
OUT0 IN0-OUT7 IN7	25GE/10GE LAN/10GE WAN/GE	SFP28	25 GE/10 GE service signal input and output interface	LC optical fiber

Functional Specifications

Table 6-141 Functions and features

Functions and Features	Remarks
Line-Rate capability	Occupies one flexible card slot. Supports the line-rate receiving and transmitting on eight 25GE/10GE interfaces and supports QSFP28/SFP+ optical modules on the interfaces.
Reliability and availability	Supports the hot swappable function.
Restrictions and remarks	Ports 0-3 belong to a port group, and ports 4-7 belong to another one. By default, 25GE/10GE auto-negotiation is supported. You can run the port-mode group-id command in the slot view to switch the mode of a port group to 10GE/GE auto-negotiation. In LAN/WAN switching, the mode of ports in a port group must be switched at the same time.
Interface Rate Auto-Negotiation Supported	In 25G mode, 10GE/25GE autonegotiation supported; In 10G mode, GE/10GE autonegotiation supported

Technical Specifications

Table 6-142 Interface specifications

Attribute	Description
Optical type supported	**25Gbps SFP28 optical module** **25Gbps SFP28 BIDI optical module** **10Gbps SFP+ optical module** **10Gbps SFP+ BIDI optical module** **10Gbps SFP+ CWDM optical module** **1.25/9.953/10.3125Gbps SFP+ optical module** **1.25Gbps eSFP BIDI optical module** **1.25Gbps eSFP CWDM optical module** **1.25Gbps eSFP optical module** **125M~2.67Gbps eSFP DWDM optical module** **1Gbps electrical module** **155Mbps eSFP optical module** **155Mbps eSFP BIDI optical module**
Working mode	Full-duplex
Compliant standard	IEEE 802.3
Frame format	Ethernet_II, Ethernet_SAP, and Ethernet_SNAP

Table 6-143 Board specifications

Item	Specification
Dimensions (H x W x D)	19.8 mm x 193.8 mm x 209.3 mm (0.78 in. x 7.63 in. x 8.24 in.)
Typical power consumption	37.5 W
Typical heat dissipation	121.6 BTU/hour
Weight	0.8 kg (1.76 lb)
Ambient temperature	Long terms: -40 °C to 65 °C (-40°F to 149°F)

6.3.16 8-Port 100/1000Base-RJ45 Physical Interface Card

Overview

Table 6-144 Board attributes

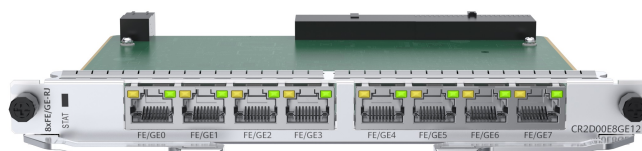| Attribute	Description
Board name silkscreen	8xFE/GE-RJ
Description	8-Port 100/1000Base-RJ45 Physical Interface Card
BOM	03031DHB
Model	CR2D00E8GE12

Table 6-145 Mapping products and versions

Product	Slot ID	Minimum Version Requirement
NetEngine 8000 M8	IPU-1T2: DC:slot 1 to 2, 7 to 8 AC:slot 2, 7 to 8 IPU-480: DC:slot 1 to 2, 7 to 8 AC:slot 2, 7 to 8 IPU-240: DC:slot 1 to 2, 7 to 8 AC:slot 2, 7 to 8	V800R012C00
NetEngine 8000 M14	IPU-1T2: DC:slot 1 to 2, 13 to 14 AC:slot 13 to 14 IPU-2T: DC:slot 1 to 2, 13 to 14 AC:slot 13 to 14	V800R012C00

☐ **NOTE**

Minimum Version Requirement refers to the minimum version of interface cards on the device but not the minimum version of mapping IPUs. For details about the mapping IPUs, see "Product Compatibility" in Hardware Description.

Appearance

Panel

Table 6-146 Indicators

Name	Description
STAT	Status indicator Green: If this indicator is steady green, the board is working properly. Red: If this indicator is steady red, the board hardware is faulty. Orange: If this indicator is steady orange, the logic is not loaded to the board. If this indicator is steady off, the board is not powered on or registered.

Table 6-147 Service interfaces

Interface Name	Interface Type	Connector Type	Description	Cable
FE/GE0-FE/GE7	GE/FE	RJ45	GE/FE service signal input and output interface	Network cable

Functional Specifications

Table 6-148 Functions and features

Functions and Features	Remarks
Line-Rate capability	Occupies one flexible card slot. Supports the line-rate receiving and transmitting on eight GE/FE interfaces and supports 10M/100M/1000M electrical interface features on the interfaces.
Reliability and availability	Supports the hot swappable function.

Technical Specifications

Table 6-149 Interface specifications

Attribute	Description
Working mode	Full-duplex
Compliant standard	IEEE 802.3
Frame format	Ethernet_II, Ethernet_SAP, and Ethernet_SNAP

Table 6-150 Board specifications

Item	Specification
Dimensions (H x W x D)	19.8 mm x 193.8 mm x 209.3 mm (0.78 in. x 7.63 in. x 8.24 in.)
Typical power consumption	11.7 W
Typical heat dissipation	38.0 BTU/hour
Weight	0.5 kg (1.10 lb)
Ambient temperature	Long terms: -40 °C to 65 °C (-40°F to 149°F)

6.3.17 10-Port 100/1000Base-X-SFP Physical Interface Card

Overview

Table 6-151 Board attributes

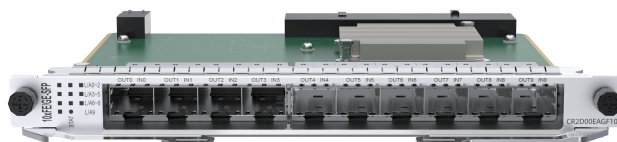| Attribute	Description
Board name silkscreen	10xFE/GE-SFP
Description	10-Port 100/1000Base-X-SFP Physical Interface Card
BOM	03031DJK
Model	CR2D00EAGF10

Table 6-152 Mapping products and versions

Product	Slot ID	Minimum Version Requirement
NetEngine 8000 M8	IPU-1T2: DC:slot 1 to 2, 7 to 8 AC:slot 2, 7 to 8 IPU-480: DC:slot 1 to 2, 7 to 8 AC:slot 2, 7 to 8 IPU-240: DC:slot 1 to 2, 7 to 8 AC:slot 2, 7 to 8	V800R012C00
NetEngine 8000 M14	IPU-1T2: DC:slot 1 to 2, 13 to 14 AC:slot 13 to 14 IPU-2T: DC:slot 1 to 2, 13 to 14 AC:slot 13 to 14	V800R012C00

☐ NOTE

Minimum Version Requirement refers to the minimum version of interface cards on the device but not the minimum version of mapping IPUs. For details about the mapping IPUs, see "Product Compatibility" in Hardware Description.

Appearance

Panel

Table 6-153 Indicators

Name	Description
STAT	Status indicator Green: If this indicator is steady green, the board is working properly. Red: If this indicator is steady red, the board hardware is faulty. Orange: If this indicator is steady orange, the logic is not loaded to the board. If this indicator is steady off, the board is not powered on or registered.
L/A(0-9)	Running status indicator Green: If the indicator is steady on, the link is normal. If the indicator is off, the link is Down. If the indicator blinks, data is being transmitted.

Table 6-154 Service interfaces

Interface Name	Interface Type	Connect or Type	Description	Cable
OUT0 IN0-OUT9 IN9	GE/FE	SFP	GE/FE service signal input and output interface	LC optical fiber

Functional Specifications

Table 6-155 Functions and features

Functions and Features	Remarks
Line-Rate capability	Occupies one flexible card slot. Supports the line-rate receiving and transmitting on ten GE interfaces and supports SFP optical modules on the interfaces.
Reliability and availability	Supports the hot swappable function.

Technical Specifications

Table 6-156 Interface specifications

Attribute	Description
Optical type supported	**1.25Gbps eSFP optical module** **1.25Gbps eSFP CWDM optical module** **1.25Gbps eSFP BIDI optical module** **125M~2.67Gbps eSFP DWDM optical module** **1Gbps electrical module** **155Mbps SFP electrical module** **155Mbps eSFP optical module** **155Mbps eSFP BIDI optical module**
Working mode	Full-duplex
Compliant standard	IEEE 802.3
Frame format	Ethernet_II, Ethernet_SAP, and Ethernet_SNAP

Table 6-157 Board specifications

Item	Specification
Dimensions (H x W x D)	19.8 mm x 193.8 mm x 209.3 mm (0.78 in. x 7.63 in. x 8.24 in.)
Typical power consumption	13.3 W
Typical heat dissipation	43.2 BTU/hour
Weight	0.6 kg (1.32 lb)
Ambient temperature	Long terms: -40 °C to 65 °C (-40°F to 149°F)

6.3.18 4-Port 10GBase LAN/WAN-SFP+ Physical Interface Card

Overview

Table 6-158 Board attributes

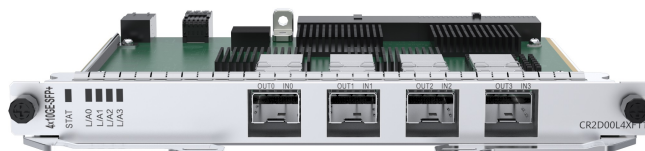| Attribute	Description
Board name silkscreen	4x10GE-SFP+
Description	4-Port 10GBase LAN/WAN-SFP+ Physical Interface Card
BOM	03031DJP
Model	CR2D00L4XF11

Table 6-159 Mapping products and versions

Product	Slot ID	Minimum Version Requirement
NetEngine 8000 M8	IPU-1T2: DC:slot 1 to 8 AC:slot 2, 4 to 8 IPU-480: DC:slot 1 to 8 AC:slot 2, 4 to 8 IPU-240: DC:slot 1 to 8 AC:slot 2, 4 to 8	V800R012C00
NetEngine 8000 M14	IPU-1T2: DC:slot 1 to 14 AC:slot 5 to 14 IPU-2T: DC:slot 1 to 14 AC:slot 5 to 14	V800R012C00

☐ **NOTE**

Minimum Version Requirement refers to the minimum version of interface cards on the device but not the minimum version of mapping IPUs. For details about the mapping IPUs, see "Product Compatibility" in Hardware Description.

Appearance

Panel

Table 6-160 Indicators

Name	Description
STAT	Status indicator
	Green:
	If the indicator is steady on, the PIC is working properly.
	Red:
	If the indicator is steady on, the hardware on the PIC is faulty.
	Orange:
	If the indicator is steady on, the PIC is installed in a slot for a HIC and an alarm is reported or the PIC is not loaded with the logic.
	If the indicator is off, the PIC is powered off or is not registered.
L/A(0-3)	Running status indicator
	Green:
	If the indicator is steady on, the link is normal.
	If the indicator is off, the link is Down.
	If the indicator blinks, data is being transmitted.

Table 6-161 Service interfaces

Interface Name	Interface Type	Connector Type	Description	Cable
OUT0 IN0 -OUT3 IN3	10GE LAN/WAN	SFP+	10 GE service signal input and output interface	LC optical fiber

Functional Specifications

Table 6-162 Functions and features

Functions and Features	Remarks
Line-Rate capability	Occupies one flexible card slot.
	Supports the line-rate receiving and transmitting on four 10GE/GE interfaces and supports SFP+/SFP optical modules on the interfaces.

Functions and Features	Remarks
Reliability and availability	Supports the hot swappable function.
Restrictions and remarks	The board does not support the OTN mode or FEC function. If a colored optical module is used and does not support optical amplifier insertion, the board supports only point-to-point optical transmission.
Interface Rate Auto-Negotiation Supported	GE/10GE autonegotiation supported

Technical Specifications

Table 6-163 Interface specifications

Attribute	Description
Optical type supported	**10Gbps SFP+ optical module** **10Gbps SFP+ BIDI optical module** **10Gbps SFP+ CWDM optical module** **1.25/9.953/10.3125Gbps SFP+ optical module** **1.25Gbps eSFP BIDI optical module** **1.25Gbps eSFP CWDM optical module** **1.25Gbps eSFP optical module** **125M~2.67Gbps eSFP DWDM optical module** **1Gbps electrical module** **155Mbps eSFP optical module** **155Mbps eSFP BIDI optical module**
Working mode	Full-duplex
Compliant standard	IEEE 802.3
Frame format	Ethernet_II, Ethernet_SAP, and Ethernet_SNAP

Table 6-164 Board specifications

Item	Specification
Dimensions (H x W x D)	19.8 mm x 193.8 mm x 209.3 mm (0.78 in. x 7.63 in. x 8.24 in.)
Typical power consumption	25.0 W
Typical heat dissipation	81.1 BTU/hour

Item	Specification
Weight	0.7 kg (1.54 lb)
Ambient temperature	Long terms: -40 °C to 65 °C (-40°F to 149°F)