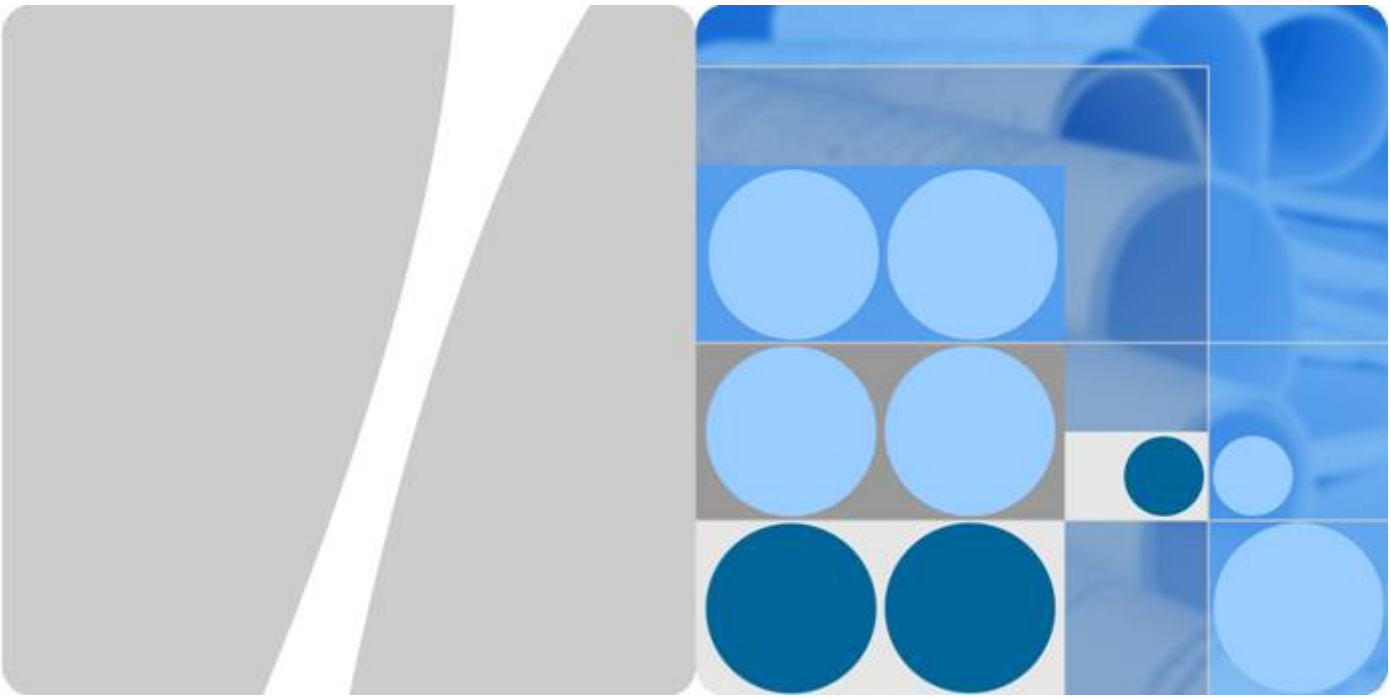


HUAWEI CX600-8/16/X3/X8/X16 Metro Service Platform

V600R007C00

Hardware Description

Issue 03

Date 2013-11-30

HUAWEI TECHNOLOGIES CO., LTD.

Trademarks and Permissions


and other Huawei trademarks are trademarks of Huawei Technologies Co., Ltd.
All other trademarks and trade names mentioned in this document are the property of their respective holders.

Notice

The purchased products, services and features are stipulated by the contract made between Huawei and the customer. All or part of the products, services and features described in this document may not be within the purchase scope or the usage scope. Unless otherwise specified in the contract, all statements, information, and recommendations in this document are provided "AS IS" without warranties, guarantees or representations of any kind, either express or implied.

The information in this document is subject to change without notice. Every effort has been made in the preparation of this document to ensure accuracy of the contents, but all statements, information, and recommendations in this document do not constitute a warranty of any kind, express or implied.

Huawei Technologies Co., Ltd.

Address: Huawei Industrial Base
Bantian, Longgang
Shenzhen 518129
People's Republic of China

Website: http://www.huawei.com

Email: support@huawei.com

About This Document

Purpose

This document describes the contents, related version, intended audience, conventions, and change history of the HUAWEI CX600 Metro Services Platform Hardware Description.

Related Versions

The following table lists the product versions related to this document.

Product Name	Version
HUAWEI CX600 Metro Services Platform	V600R007C00

Intended Audience

The intended audience of this document are:

- Commissioning Engineers
- Data Configuration Engineers
- Network Monitoring Engineers
- System Maintenance Engineers

Symbol Conventions

The symbols that may be found in this document are defined as follows.

Symbol	Description
	Indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.

Symbol	Description
	Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.
	Indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury.
	Indicates a potentially hazardous situation which, if not avoided, could result in equipment damage, data loss, performance deterioration, or unanticipated results. NOTICE is used to address practices not related to personal injury.
	Calls attention to important information, best practices and tips. NOTE is used to address information not related to personal injury, equipment damage, and environment deterioration.

Update History

Updates between document versions are cumulative. Therefore, the latest document version contains all updates made to previous versions.

Changes in Issue 03 (2013-11-30)

The third commercial release.

Changes in Issue 02 (2013-09-30)

The second commercial release.

Changes in Issue 01 (2013-06-15)

Initial commercial release. This document has the following updates compare with V600R006C00SPC300.

Change Types	Board Name	Description
New	CR5DLPUFF070	**Flexible Card Line Processing Unit (LPUF-240)**
New	CR5DLPUFF07B	**Flexible Card Line Processing Unit (LPUF-240-B)**

Change Types	Board Name	Description
New	CR5DLPUFF07B	**Flexible Card Line Processing Unit (LPUF-240-E)**
New	CR5D00E1NC74	**8.8.1 1-Port 100GBase-CFP Flexible Card A(P240-A)**
New	CR5D00LBXF71	**8.8.2 12-Port 10GBase LAN/WAN-SFP+ Flexible Card A(P240-A)**
New	CR5D00E2NC70	**8.9.1 2-Port 100GBase-CFP Integrated Line Processing Unit (LPUI-240)**
New	CR5D00LFXF70	**8.9.2 24-Port 10GBase LAN/WAN-SFP+ Integrated Line Processing**
New	CR5DE2NLBX70	**8.9.3 1-Port 100GBase-CFP + 12-Port 10GBase LAN/ WAN-SFP+ Integrated Line Processing Unit (LPUI-240)**
New	CR5D00E2NC73	**8.9.4 2-Port 100GBase LAN-CFP Integrated Line Processing Unit B (LPUI-240-B)**
New	CR5D00LFXF73	**8.9.5 24-Port 10GBase LAN/WAN-SFP+ Integrated Line Processing Unit B(LPUI-240-B)**
New	CR5DE2NLBX73	**8.9.6 1-Port 100GBase-CFP + 12-Port 10GBase LAN/ WAN-SFP+ Integrated Line Processing Unit B (LPUI-240-B)**
New	CR5DLPUFB070	**Flexible Card Line Processing Unit (LPUF-120)**
New	CR5DLPUFB07B	**Flexible Card Line Processing Unit (LPUF-120-B)**
New	CR5DLPUFB07E	**Flexible Card Line Processing Unit (LPUF-120-E)**

Change Types	Board Name	Description
New	CR5D0L6XFA70	8.10.1 6-Port 10GBase LAN/WAN-SFP+ Flexible Card A(P120-A)
New	CR5D00E1NC75	8.10.2 1-Port 100GBase-CFP Flexible Card A(P120-A)
New	CR5D00LBXF72	8.10.3 12-Port 10GBase LAN/WAN-SFP+ Flexible Card A(P120-A)
New	CR5D0LBXFA70	8.11.1 12-Port 10GBase LAN/WAN-SFP+ Integrated Line Processing Unit(LPUI-120)
New	CR5D0E2MCA70	8.11.2 2-Port 40GBase LAN-CFP Integrated Line Processing Unit(LPUI-120)
New	CR5D00E1NC76	8.11.3 1-Port 100GBase-CFP Integrated Line Processing Unit (LPUI-120)
New	CR5D0LBXFA7B	8.11.4 12-Port 10GBase LAN/WAN-SFP+ Integrated Line Processing Unit B(LPUI-120-B)
New	CR5D0E2MCA7B	8.11.5 2-Port 40GBase LAN-CFP Integrated Line Processing Unit B (LPUI-120-B)
New	CR5D00E1NC7B	8.11.6 1-Port 100GBase-CFP Integrated Line Processing Unit B (LPUI-120-B)
New	CR5DLAXFAJ7E	8.12.1 10-Port 10GBase LAN/WAN-SFP+ Integrated Line Processing Unit E(LPUI-102-E)
New	CR5D0L5XFE71	8.16.5 5-Port 10GBase LAN/WAN-SFP+ Flexible Card E(P101-E)
New	CR5D0EFGFE70	8.19.4 24-Port 1000Base-X-SFP Flexible Card E(P51-E)

Change Types	Board Name	Description
New	CR5D0L5XFE70	**8.19.5 5-Port 10GBase LAN/WAN-SFP+ Flexible Card E(P51-E, Occupy two slots)**
New	CR5D0L2XFE70	**8.19.6 2-Port 10GBase LAN/WAN-SFP+ Flexible Card E(P51-E)**
New	CR5D0EEGEA70	**8.19.7 20-Port 10/100/1000Base-RJ45 Flexible Card(P51-A)**
New	CR5DL3XEFG7C	**8.20.5 3-Port 10GBase LAN/WAN-SFP++24-Port 100/1000Base-X-SFP Integrated Line Processing Unit (LPUI-51)**
New	CR5D0L5XFA7E	**8.20.13 5-Port 10GBase LAN/WAN-SFP+ Integrated Line Processing Unit E(LPUI-51-E,Enhanced HQos)**
New	CR5DL2XEFG7E	**8.20.14 2-Port 10GBase LAN/WAN-SFP++24-Port 1000Base-X-SFP Integrated Line Processing Unit E(LPUI-51-E,Enhanced HQos)**
New	CR5D00A8CF70	**8.22.12 8-Port OC-3c/ STM-1c ATM-SFP Flexible Card(P50)**

Contents

About This Document.....ii

1 Product Overview.....1

1.1 Overview.....2

2 Product Signal Flow Overview.....3

2.1 General Service Process Overview.....4

2.2 Signal Flow on the Control Plane.....5

2.3 Signal Flow on the Data Plane.....8

2.4 Signal Flow on the Monitoring Plane.....10

3 CX600-X16.....12

3.1 Device Overview.....13

3.1.1 System Overview.....13

3.1.2 Main Components and Slot Layout.....16

3.1.3 CX600-X16 Specifications.....18

3.1.4 Board Specifications.....20

3.2 Power Supply System.....36

3.2.1 Architecture of the Power Supply System.....36

3.2.2 Distributed Architecture of the System.....36

3.2.3 DC Power Supply System.....37

3.2.4 AC Power Supply System.....40

3.3 Heat Dissipation System.....43

3.3.1 System Air Channel.....43

3.3.2 Air Intake Vent.....44

3.3.3 Fan Module.....45

3.3.4 Air Filter.....46

3.3.5 Fan Speed Adjustment.....47

3.4 Switching Network.....48

3.4.1 Introduction to the Switching Network.....48

3.4.2 Switch Fabric Unit B.....49

3.4.3 40Gbps Switch Fabric Unit B.....51

3.5 Control Plane.....53

3.5.1 Introduction to the Control Plane.....53

3.5.2 Main Processing Unit B4....54
4 CX600-X8....61
4.1 Device Overview....62
4.1.1 System Overview....62
4.1.2 Components of the CX600-X8....64
4.1.3 CX600-X8 Specification....66
4.1.4 Board Specifications....68
4.2 Power Supply System....81
4.2.1 Architecture of the Power Supply System....82
4.2.2 Distributed Architecture of the System....82
4.2.3 DC Power Supply System....82
4.2.4 AC Power Supply System....84
4.3 Heat Dissipation System....88
4.3.1 System Air Channel....88
4.3.2 Air Intake Vent....89
4.3.3 Fan Module....89
4.3.4 Air Filter....91
4.3.5 Fan Speed Adjustment....91
4.4 Switching Network....91
4.4.1 Introduction to the Switching Network....92
4.4.2 200Gbps Switch Fabric Unit C(SFUI-200-C)....93
4.4.3 100Gbps Switch Fabric Unit D(SFUI-100-D)....95
4.4.4 40Gbps Switch Fabric Unit C....97
4.5 Control Plane....99
4.5.1 Introduction to the Control Plane....99
4.5.2 Switch and Route Processing Unit A7....100
4.5.3 Switch and Route Processing Unit A5....106
4.5.4 Switch and Route Processing Unit A4....112
5 CX600-X3....119
5.1 Device Overview....120
5.1.1 System Overview....120
5.1.2 Main Components and Slot Layout....121
5.1.3 CX600-X3 Specifications....123
5.1.4 Board Specifications....126
5.2 Power Supply System....135
5.2.1 Architecture of the Power Supply System....135
5.2.2 Diagram of the Power Supply System....136
5.2.3 DC Power Supply System....136
5.2.4 AC Power Supply System....137
5.3 Heat Dissipation System....140
5.3.1 System Air Channel....141

5.3.2 Air Intake Vent....142
5.3.3 Fan Module....142
5.3.4 Air Filter....143
5.3.5 Fan Speed Adjustment....144
5.4 Control Plane....144
5.4.1 Introduction to the Control Plane....144
5.4.2 Main Processing Unit D2(CX6D0MPUD170)....145
6 CX600-16 Chassis Overview....150
6.1 Product Overview....151
6.1.1 Device Structure....151
6.1.2 CX600-16 Specifications....154
6.1.3 Board Specifications....156
6.2 Power Supply....162
6.2.1 DC Power Supply Module....162
6.2.2 AC Power Supply Module....167
6.3 Heat Dissipation System....169
6.3.1 Appearance of a Fan Module....170
6.3.2 Front Panel....171
6.3.3 Air Filter....172
6.3.4 Functions of the FCB....173
6.3.5 Technical Parameters....173
6.4 LCD Module....174
6.4.1 Front Panel....174
6.4.2 Display Mode....175
6.4.3 Display Contents....176
6.4.4 Technical Parameters....183
6.5 SFU(CR52-SFUG-40Gbps)....183
6.5.1 Overview....183
6.5.2 Features and Functions....184
6.5.3 Panel....184
6.5.4 Interface Attributes....186
6.5.5 Technical Specifications....186
6.6 MPU....186
6.6.1 Overview....187
6.6.2 Features and Functions....187
6.6.3 Panel....188
6.6.4 Interface Attributes....192
6.6.5 Technical Specifications....193
7 CX600-8....196
7.1 Overview....197
7.1.1 Device Structure....197

7.1.2 CX600-8 Specifications....200
7.1.3 Board Specifications....202
7.2 Power Supply....205
7.2.1 DC Power Supply Module....206
7.2.2 AC Power Supply Module....209
7.3 Heat Dissipation System....211
7.3.1 Appearance of the Fan Module....212
7.3.2 Front Panel....213
7.3.3 Air Filter....214
7.3.4 Functions of the FCB....214
7.3.5 Technical Parameters....215
7.4 SFU(CX61-SFUD)....215
7.4.1 Overview....216
7.4.2 Features and Functions....216
7.4.3 Panel....216
7.4.4 Technical Specifications....217
7.5 SRU....218
7.5.1 Overview....218
7.5.2 Features and Functions....219
7.5.3 Panel....220
7.5.4 Interface Attributes....224
7.5.5 Technical Specifications....225
8 Boards....228
8.1 Overview....231
8.1.1 Board Structure....231
8.1.2 Board and Subcard Specifications....233
8.1.3 Filler Panel....236
8.1.4 Rules for Numbering Slots and Interfaces....237
8.2 CX600-X16 Board Specifications....241
8.3 CX600-X8 Board Specifications....257
8.4 CX600-X3 Board Specifications....270
8.5 CX600-16 Board Specifications....280
8.6 CX600-8 Board Specifications....286
8.7 Service Process Unit....289
8.7.1 Versatile Service Process Unit C (SPUC)....289
8.7.2 Flexible Card Versatile Service Unit 10 (VSUF-10)....293
8.7.3 Integrated Versatile Service Unit(VSUI-20-A)....295
8.7.4 Flexible Card Value-Added Service Processing Unit (VSUF-160)....298
8.7.5 Flexible Card Value-Added Service Processing Unit (VSUF-80)....302
8.7.6 Versatile Service Flexible Card (SP160)....305
8.7.7 Versatile Service Flexible Card (SP80)....307

8.8 Flexible Card Line Processing Unit(LPUF-240/LPUF-240-B/LPUF-240-E)....309
8.8.1 1-Port 100GBase-CFP Flexible Card A(P240-A)....311
8.8.2 12-Port 10GBase LAN/WAN-SFP+ Flexible Card A(P240-A)....314
8.9 Integrated Line Processing Unit(LPUI-240)....317
8.9.1 2-Port 100GBase-CFP Integrated Line Processing Unit (LPUI-240)....317
8.9.2 24-Port 10GBase LAN/WAN-SFP+ Integrated Line Processing....320
8.9.3 1-Port 100GBase-CFP + 12-Port 10GBase LAN/WAN-SFP+ Integrated Line Processing Unit (LPUI-240)....324
8.9.4 2-Port 100GBase LAN-CFP Integrated Line Processing Unit B(LPUI-240-B)....328
8.9.5 24-Port 10GBase LAN/WAN-SFP+ Integrated Line Processing Unit B(LPUI-240-B)....331
8.9.6 1-Port 100GBase-CFP + 12-Port 10GBase LAN/WAN-SFP+ Integrated Line Processing Unit B(LPUI-240-B)
....334
8.10 Flexible Card Line Processing Unit(LPUF-120/LPUF-120-B/LPUF-120-E)....338
8.10.1 6-Port 10GBase LAN/WAN-SFP+ Flexible Card A(P120-A)....341
8.10.2 1-Port 100GBase-CFP Flexible Card A(P120-A)....344
8.10.3 12-Port 10GBase LAN/WAN-SFP+ Flexible Card A(P120-A)....347
8.10.4 24-Port 100/1000Base-X-SFP Flexible Card A(P101-A)....350
8.10.5 5-Port 10GBase LAN/WAN-SFP+ Flexible Card A(P101-A)....353
8.10.6 1-Port 40GBase LAN-CFP Flexible Card A(P101-A)....356
8.10.7 5-Port 10GBase LAN/WAN-SFP+ Flexible Card E(P101-E)....359
8.10.8 24-Port 1000Base-X-SFP Flexible Card E(P51-E)....362
8.11 Integrated Line Processing Unit(LPUI-120)....365
8.11.1 12-Port 10GBase LAN/WAN-SFP+ Integrated Line Processing Unit(LPUI-120)....365
8.11.2 2-Port 40GBase LAN-CFP Integrated Line Processing Unit(LPUI-120)....369
8.11.3 1-Port 100GBase-CFP Integrated Line Processing Unit (LPUI-120)....372
8.11.4 12-Port 10GBase LAN/WAN-SFP+ Integrated Line Processing Unit B(LPUI-120-B)....375
8.11.5 2-Port 40GBase LAN-CFP Integrated Line Processing Unit B(LPUI-120-B)....379
8.11.6 1-Port 100GBase-CFP Integrated Line Processing Unit B (LPUI-120-B)....382
8.12 Integrated Line Processing Unit(LPUI-102)....385
8.12.1 10-Port 10GBase LAN/WAN-SFP+ Integrated Line Processing Unit E(LPUI-102-E)....386
8.13 Flexible Card Line Processing Unit(LPUF-100,four slots)....389
8.13.1 5-Port 10GBase LAN/WAN-XFP Flexible Card A(P100-A,Supporting 1588v2,Occupy two sub-slots)....391
8.13.2 48-Port 100/1000Base-X-CSFP Flexible Card(P100,Occupy two sub-slots)....395
8.13.3 24-Port 100/1000Base-SFP Flexible Card(P100,Occupy two sub-slots)....399
8.13.4 1-Port OC-768c/STM-256c POS-2KM-LC Flexible Card(P100,Occupy two sub-slots)....402
8.13.5 2-Port OC-192c/STM-64c POS-XFP Flexible Card (P101-A,Occupy one sub-slots)....405
8.14 Integrated Line Processing Unit(LPUI-100)....409
8.14.1 10-Port 10GBase LAN/WAN-XFP Integrated Line Processing Unit (LPUI-100,Supporting 1588v2)....409
8.14.2 16-Port 10GBase LAN-SFP+ Integrated Line Processing Unit(LPUI-100)....413
8.14.3 1-Port 100GBase-CFP Integrated Line Process Unit(LPUI-100)....417
8.15 Line Processing Unit S (LPUS-100)....420
8.15.1 10-Port 10GBase LAN/WAN-XFP Line Processing Unit S(LPUS-100)....420
8.15.2 16-Port 10GBase LAN-SFP+ Line Processing Unit S(LPUS-100)....425

8.15.3 1-Port 100GBase-CFP Line Processing Unit S (LPUS-100)....428
8.16 Flexible Card Line Processing Unit (LPUF-101/LPUF-101-B)....432
8.16.1 5-Port 10GBase LAN/WAN-XFP Flexible Card A(P100-A,Supporting 1588v2,Occupy two sub-slots)....434
8.16.2 24-Port 100/1000Base-X-SFP Flexible Card A(P101-A)....438
8.16.3 5-Port 10GBase LAN/WAN-SFP+ Flexible Card A(P101-A)....441
8.16.4 1-Port 40GBase LAN-CFP Flexible Card A(P101-A)....444
8.16.5 5-Port 10GBase LAN/WAN-SFP+ Flexible Card E(P101-E)....447
8.16.6 24-Port 1000Base-X-SFP Flexible Card E(P51-E)....450
8.17 Integrated Line Processing Unit (LPUI-101)....453
8.17.1 2-Port 40GBase LAN-CFP Integrated Line Processing Unit (LPUI-101)....453
8.17.2 1-Port 100GBase-CFP Integrated Line Processing Unit (LPUI-101)....456
8.17.3 10-Port 10GBase LAN/WAN-SFP+ Integrated Line Processing Unit (LPUI-101)....460
8.17.4 2-Port 40GBase LAN-CFP Integrated Line Processing Unit B(LPUI-101-B)....463
8.17.5 10-Port 10GBase LAN/WAN-SFP+ Integrated Line Processing Unit B(LPUI-101-B)....466
8.18 Line Processing Unit S(LPUS-101)....469
8.18.1 2-Port 40GBase LAN-CFP Line Processing Unit S(LPUS-101)....469
8.18.2 1-Port 100GBase-CFP Line Processing Unit S(LPUS-101)....472
8.18.3 10-Port 10GBase LAN/WAN-SFP+ Line Processing Unit S(LPUS-101)....475
8.19 Flexible Card Line Processing Unit(LPUF-51/LPUF-51-B/LPUF-51-E,two sub-slots)....479
8.19.1 24-Port 100/1000Base-X-SFP Flexible Card A(P51-A)....481
8.19.2 5-Port 10GBase LAN/WAN-SFP+Flexible Card A (P51-A, Occupy two sub-slots)....485
8.19.3 2-Port 10GBase LAN/WAN-SFP+ Flexible Card A(P51-A)....488
8.19.4 24-Port 1000Base-X-SFP Flexible Card E(P51-E)....491
8.19.5 5-Port 10GBase LAN/WAN-SFP+ Flexible Card E(P51-E, Occupy two slots)....494
8.19.6 2-Port 10GBase LAN/WAN-SFP+ Flexible Card E(P51-E)....497
8.19.7 20-Port 10/100/1000Base-RJ45 Flexible Card(P51-A)....500
8.20 Integrated Line Processing Unit (LPUI-51)....503
8.20.1 5-Port 10GBase LAN/WAN-SFP+ Integrated Line Processing Unit (LPUI-51)....503
8.20.2 4-Port 10GBase LAN/WAN-SFP+ Integrated Line Processing Unit (LPUI-51)....507
8.20.3 48-Port 100/1000Base-X-SFP Integrated Line Processing Unit (LPUI-51)....510
8.20.4 2-Port 10GBase LAN/WAN-SFP+ + 24-Port 100/1000Base-X-SFP Integrated Line Processing Unit (LPUI-51)....513
8.20.5 3-Port 10GBase LAN/WAN-SFP+ + 24-Port 100/1000Base-X-SFP Integrated Line Processing Unit (LPUI-51)....518
8.20.6 5-Port 10GBase LAN/WAN-SFP+ Integrated Line Processing Unit B(LPUI-51-B)....523
8.20.7 4-Port 10GBase LAN/WAN-SFP+ Integrated Line Processing Unit B(LPUI-51-B)....526
8.20.8 48-Port 100/1000Base-X-SFP Integrated Line Processing Unit B(LPUI-51-B)....529
8.20.9 2-Port 10GBase LAN/WAN-SFP+ + 24-Port 100/1000Base-X-SFP Integrated Line Processing Unit B(LPUI-51-B)....534
8.20.10 5-Port 10GBase LAN/WAN-SFP+ Integrated Line Processing Unit L(LPUI-51-L)....538
8.20.11 48-Port 100/1000Base-X-SFP Integrated Line Processing Unit L(LPUI-51-L)....541

8.20.12 2-Port 10GBase LAN/WAN-SFP+ + 32-Port 100/1000Base-X-SFP Integrated Line Processing Unit L(LPUI-51-L).....545
8.20.13 5-Port 10GBase LAN/WAN-SFP+ Integrated Line Processing Unit E(LPUI-51-E,Enhanced HQos).....550
8.20.14 2-Port 10GBase LAN/WAN-SFP+ + 24-Port 1000Base-X-SFP Integrated Line Processing Unit E(LPUI-51-E,Enhanced HQos).....553
8.21 Line Processing Unit S(LPUS-51).....557
8.21.1 5-Port 10GBase LAN/WAN-SFP+ Line Processing Unit S(LPUS-51).....557
8.21.2 4-Port 10GBase LAN/WAN-SFP+ Line Processing Unit S(LPUS-51).....561
8.21.3 48-Port 100/1000Base-X-SFP Line Processing Unit S(LPUS-51).....564
8.21.4 2-Port 10GBase LAN/WAN-SFP+ + 24-Port 100/1000Base-X-SFP Line Processing Unit S(LPUS-51).....567
8.22 Flexible Card Line Processing Unit(LPUF-50,four sub-slots).....572
8.22.1 24-Port Channelized E1/T1-DB100 Flexible Card.....574
8.22.2 8-Port OC-3c/STM-1c POS-SFP Flexible Card.....577
8.22.3 4-Port OC-48c/STM-16c POS-SFP Flexible Card.....580
8.22.4 2-Port OC-48c/STM-16c POS-SFP Flexible Card.....583
8.22.5 2-Port Channelized OC-3c/STM-1c POS-SFP Flexible Card.....586
8.22.6 8-Port OC-12c/STM-4c POS-SFP Flexible Card.....589
8.22.7 8-Port 100/1000Base-X-SFP Flexible Card A(P10-A,Supporting 1588v2).....593
8.22.8 2-Port 10GBase WAN/LAN-SFP+ Flexible Card A.....597
8.22.9 1-Port OC-192c/STM-64c POS-XFP Flexible Card(Occupy two slots).....600
8.22.10 4-Port Channelized STM-1c POS-SFP Flexible Card.....603
8.22.11 8-Port Channelized STM-1c POS-SFP Flexible Card.....606
8.22.12 8-Port OC-3c/STM-1c ATM-SFP Flexible Card(P50).....609
8.23 Flexible Card Line Processing Unit(LPUF-40-A/LPUF-40-B/LPUF-40-E,2 sub-slots).....612
8.23.1 20-Port 100/1000Base-X-SFP Flexible Card(P40).....615
8.23.2 20-Port 100/1000Base-X-SFP Flexible Card A(P40-A,Supporting 1588v2).....619
8.23.3 20-Port 100/1000Base-X-SFP Flexible Card B(P40-B).....623
8.23.4 2-Port 10GBase LAN/WAN-XFP Flexible Card(P40).....626
8.23.5 2-Port 10GBase LAN/WAN-XFP Flexible Card A(Supporting 1588v2).....629
8.23.6 2-Port 10GBase LAN/WAN-XFP Flexible Card B(P40-B).....633
8.23.7 20-Port 1000Base-X-SFP Flexible Card E(P40-E).....637
8.23.8 2-Port 10GBase LAN/WAN-XFP Flexible Card E(P40-E).....640
8.23.9 2-Port 10GBase LAN/WAN-XFP Flexible Card V(P40-V).....644
8.23.10 20-Port 10/100/1000Base-RJ45 Flexible Card(P40).....647
8.23.11 4-Port 10GBase LAN/WAN-XFP Flexible Card(P40,Occupy one sub-slot).....650
8.24 Integrated Line Processing Unit (LPUI-40).....654
8.24.1 4-Port 10GBase LAN/WAN-XFP Integrated Line Processing Unit(LPUI-40).....654
8.24.2 40-Port 100/1000Base-X-SFP Integrated Line Processing Unit(LPUI-40).....658
8.25 Integrated Line Processing Unit (LPUI-41).....662
8.25.1 8-Port 10GBase LAN/WAN-XFP Integrated Line Processing Unit (LPUI-41).....662
8.25.2 4-Port 10GBase LAN/WAN-XFP Integrated Line Processing Unit (LPUI-41).....666
8.25.3 48-Port 100/1000Base-X-SFP Integrated Line Processing Unit(LPUI-41).....671

8.25.4 2-Port 10GBase LAN/WAN-XFP+24-Port 100/1000Base-X-SFP Integrated Line Processing Unit(LPUI-41) 675
8.25.5 4-Port 10GBase LAN/WAN-XFP Integrated Line Processing Unit (LPUI-41,Supporting 1588v2)....680
8.25.6 40-Port 100/1000Base-X-SFP Integrated Line Processing Unit(LPUI-41,Supporting 1588v2)....685
8.25.7 2-Port 10GBase LAN/WAN-XFP+20-Port 100/1000Base-X-SFP Integrated Line Processing Unit (LPUI-41,Supporting 1588v2)....689
8.26 Line Processing Unit S(LPUS-41)....695
8.26.1 8-Port 10GBase LAN/WAN-XFP Line Processing Unit S (LPUS-41)....695
8.26.2 4-Port 10GBase LAN/WAN-XFP Line Processing Unit S (LPUS-41)....700
8.26.3 48-Port 100/1000Base-X-SFP Line Processing Unit S(LPUS-41)....704
8.26.4 2-Port 10GBase LAN/WAN-XFP+24-Port 100/1000Base-X-SFP Line Processing Unit S(LPUS-41)....708
8.27 Integrated Line Processing Unit L(LPUI-21-L)....714
8.27.1 24-Port 100/1000Base-X-SFP Integrated Line Processing Unit L(LPUI-21-L)....714
8.27.2 1-Port 10GBase LAN/WAN-SFP+ + 16-Port 100/1000Base-X-SFP Integrated Line Processing Unit L(LPUI-21-L)....718
8.28 Line Processing Unit S(LPUS-20)....722
8.28.1 4-Port 10GBase WAN/LAN-XFP Line Processing Unit S(LPUS-20)....723
8.28.2 40-Port 100/1000Base-X-SFP Line Processing Unit S(LPUS-20)....726
8.28.3 40-Port 10/100/1000Base-RJ45 Line Processing Unit S....730
8.29 Flexible Card Line Processing Unit(LPUF-21-A/LPUF-21-B/LPUF-21-E,2 sub-slots)....732
8.29.1 1-Port 10GBase WAN/LAN-XFP Flexible Card....735
8.29.2 1-Port 10GBase WAN/LAN-XFP Flexible Card A(Supporting 1588v2)....738
8.29.3 1-Port 10GBase LAN/WAN-XFP Flexible Card B(P20-B)....742
8.29.4 1-Port 10GBase LAN/WAN-XFP Flexible Card E(P20-E)....745
8.29.5 12-Port 100/1000Base-SFP Flexible Card....749
8.29.6 12-Port 100/1000Base-SFP Flexible Card A(Supporting 1588v2)....753
8.29.7 12-Port 100/1000Base-X-SFP Flexible Card B(P20-B)....757
8.29.8 10-Port 1000Base-X-SFP Flexible Card E(P20-E)....761
8.29.9 12-Port 10/100/1000Base-RJ45 Flexible Card....764
8.29.10 1-Port OC-192c/STM-64c POS-XFP Flexible Card(Occupy two slots)....766
8.29.11 4-Port 10GBase WAN/LAN-XFP Flexible Card(Occupy two sub-slots)....769
8.29.12 40-Port 10/100/1000Base-RJ45 Flexible Card(Occupy two sub-slots)....773
8.29.13 40-Port 100/1000Base-SFP Flexible Card(Occupy two sub-slots)....775
8.29.14 2-Port 10GBase LAN/WAN-XFP+20-Port 100/1000Base-X-SFP Flexible Card(P20,Occupy two sub-slots) 779
8.30 Flexible Card Line Processing Unit (LPUF-10,four slots)....784
8.30.1 1-Port OC-192c/STM-64c POS-XFP Flexible Card(Occupy two slots)....787
8.30.2 1-Port OC-48c/STM-16c POS-SFP Flexible Card....790
8.30.3 2-Port OC-48c/STM-16c POS-SFP Flexible Card....793
8.30.4 4-Port OC-48c/STM-16c POS-SFP Flexible Card....796
8.30.5 4-Port OC-12c/STM-4c POS-SFP Flexible Card....799
8.30.6 8-Port OC-12c/STM-4c POS-SFP Flexible Card....802

8.30.7 4-Port OC-3c/STM-1c POS-SFP Flexible Card....805
8.30.8 8-Port OC-3c/STM-1c POS-SFP Flexible Card....809
8.30.9 2-Port OC-12c/STM-4c ATM-SFP Flexible Card....812
8.30.10 4-Port OC-3c/STM-1c ATM-SFP Flexible Card....814
8.30.11 8-Port 100/1000Base-X-SFP Flexible Card....817
8.30.12 8-Port 100/1000 Base-X-SFP Flexible Card A (Supporting 1588v2)....821
8.30.13 2-Port Channelized OC-3c/STM-1c POS-SFP Flexible Card....825
8.30.14 24-Port Channelized E1/T1-DB100 Flexible Card....828
8.30.15 4-Port Clear Channel E3/Channelized T3-SMB Flexible Card....832

9 Cables....835

9.1 DC-Input Power Cable....836
9.1.1 CX600-X16 DC-Input Power Cable....836
9.1.2 CX600-X8 DC-Input Power Cable....837
9.1.3 CX600-X3 DC-Input Power Cable....839
9.1.4 CX600-8 DC-Input Power Cable....840
9.2 AC-input Power Cable....841
9.2.1 CX600-X16 AC-input Power Cable....841
9.2.2 CX600-X8 AC-input Power Cable....842
9.2.3 CX600-X3 AC-input Power Cable....843
9.2.4 CX600-8 AC-input Power Cable....843
9.3 Chassis and Cabinet Grounding Cable....844
9.3.1 Introduction....844
9.3.2 Structure....844
9.3.3 Technical Specifications....844
9.4 Console Port Cable....844
9.4.1 Introduction....844
9.4.2 Structure....845
9.4.3 Technical Specifications....845
9.5 Auxiliary Port Cable....846
9.5.1 Introduction....846
9.5.2 Structure....846
9.5.3 Technical Specifications....847
9.6 Clock Cable....848
9.6.1 Introduction....848
9.6.2 Structure....849
9.6.3 Technical Specifications....851
9.7 Ethernet Cable....853
9.7.1 Introduction....853
9.7.2 Structure....853
9.7.3 Technical Specifications....855
9.8 Optical Fiber....856

9.8.1 Introduction....856
9.8.2 Optical Connectors....856
9.8.3 Technical Specifications....858
9.9 CE1/CT1/E3/T3 Cable....858
9.9.1 Introduction....858
9.9.2 Structure....858
9.9.3 Technical Specifications....860
9.10 24xE1 Cable....860
9.10.1 Overview....860
9.10.2 Structure....861
9.10.3 Technical Specifications....863
9.11 Serial Port Cable (RS232/RS485)....864
A List of Indicators....866
A.1 Indicators of CX600-X16....867
A.1.1 Fan Module Indicators....867
A.1.2 Power Module Indicators....867
A.1.3 MPU Indicators....867
A.1.4 SFU Indicators....869
A.1.5 LPU Indicators....869
A.2 Indicators of CX600-X8....870
A.2.1 Fan Module Indicators....870
A.2.2 Power Module Indicators....870
A.2.3 SRU Indicators....871
A.2.4 SFU Indicators....872
A.2.5 LPU Indicators....872
A.3 Indicators of CX600-X3....873
A.3.1 Fan Module Indicators....873
A.3.2 Power Module Indicators....874
A.3.3 MPU Indicators....874
A.3.4 LPU Indicators....875
A.4 Indicators of CX600-16....876
A.4.1 Fan Module Indicators....876
A.4.2 Power Module Indicators....877
A.4.3 MPU Indicators....877
A.4.4 SFU Indicators....878
A.4.5 LPU Indicators....878
A.5 Indicators of CX600-8....879
A.5.1 Fan Module Indicators....879
A.5.2 Power Module Indicators....880
A.5.3 SRU Indicators....881
A.5.4 SFU Indicators....881

A.5.5 LPU Indicators....882

B List of Boards....883

B.1 Typical Configuration....884
B.2 Boards....884
B.3 Power Consumption and Weight....896

C List of Interface Attributes....907

C.1 Interface Attributes of 10Base-T/100Base-TX/1000Base-T-RJ45....909
C.2 Interface Attributes of 100Base-FX....909
C.3 Interface Attributes of 1000Base-X-SFP....910
C.4 Interface Attributes of 100/1000Base-CSFP....911
C.5 Interface Attributes of 10GBase LAN/WAN-XFP....912
C.6 Interface Attributes of 10GBase LAN-SFP+....913
C.7 Interface Attributes of 40GBase-CFP....914
C.8 Interface Attributes of 100GBase-CFP....915
C.9 Interface Attributes of OC-3c/STM-1c cPOS-SFP....916
C.10 Interface Attributes of OC-3c/STM-1c POS-SFP....917
C.11 Interface Attributes of OC-12c/STM-4c POS-SFP....918
C.12 Interface Attributes of OC-48c/STM-16c POS-SFP....919
C.13 Interface Attributes of OC-192c/STM-64c POS-XFP....920
C.14 Interface Attributes of OC-768c/STM-256c POS-LC....921
C.15 Interface Attributes of OC-3c/STM-1c ATM-SFP....922
C.16 Interface Attributes of OC-12c/STM-4c ATM-SFP....923
C.17 Interface Attributes of CE1/CT1....924
C.18 Interface Attributes of E3/T3....924

D Optical Module....926

D.1 Instructions on How to Use an Optical Module....928
D.2 155 Mbit/s SFP/eSFP Optical Module....932
D.3 622 Mbit/s eSFP Optical Module....938
D.4 1 Gbit/s Electrical Transceiver....942
D.5 1.25 Gbit/s SFP/eSFP Optical Module....943
D.6 2.5 Gbit/s SFP/eSFP Optical Module....954
D.7 10 Gbit/s XFP Optical Module....960
D.8 10 Gbit/s XFP CWDM Optical Module....965
D.9 10 Gbit/s SFP+ Optical Module....968
D.10 10 Gbit/s SFP+ CWDM Optical Module....975
D.11 10 Gbps XFP DWDM Optical Module....978
D.12 10 Gbps TXFP DWDM Optical Module....980
D.13 BIDI Optical Module....983
D.14 155 Mbit/s CSFP Optical Module....995
D.15 1.25 Gbit/s CSFP Optical Module....997

D.16 40 Gbit/s TRANSPONDER Optical Modules....999
D.17 40 Gbit/s CFP Optical Modules....1001
D.18 100 Gbit/s CFP Optical Modules....1003
E DPD300-4-12 Power Distribution Box, Dual-Two Inputs....1010
E.1 Product Description....1011
E.2 Power Distribution Instance....1014
E.3 Installing the Power Distribution Box into a Cabinet....1018
E.4 Air Breaker Maintenance....1023
F Glossary....1026
G Acronyms and Abbreviations....1028

1 Product Overview

About This Chapter

This chapter provides the positioning of the HUAWEI CX600 Metro Services Platform in the network.

1.1 Overview
This section describes the position and the features of the device.

1.1 Overview

This section describes the position and the features of the device.

The Huawei CX600 Metro Services Platform (MSP) (hereinafter referred to as the CX600) is a high-end network product used to access, converge, and transmit carrier-class Ethernet services on Fixed-Mobile Convergence (FMC) Metropolitan Area Networks (MANs).

The CX600 operates on the Versatile Routing Platform (VRP) operating system developed by Huawei and uses the hardware-based forwarding and non-blocking data switching technology. The CX600 features carrier-class reliability, line-speed forwarding capability, a Quality of Service (QoS) mechanism, service processing capability, and good scalability.

The CX600 provides strong capabilities for network access, Layer 2 switching, and transmission of Ethernet over MultiProtocol Label Switching (EoMPLS) services. The CX600 also supports a wide range of IP services and provides broadband access, triple play, IP leased line, and Virtual Private Network (VPN) services. The CX600 can work in conjunction with the CX200/300, NE80E, NE40E, ME60, and MA5200G developed by Huawei to set up a hierarchical metro Ethernet that provides an extensive menu of services for customers to choose from.

2 Product Signal Flow Overview

About This Chapter

This section describes how component units on a device process and forward signal flows. This section demonstrates how data packets enter a device and how the device forwards the data packets.

2.1 General Service Process Overview

2.2 Signal Flow on the Control Plane

2.3 Signal Flow on the Data Plane

2.4 Signal Flow on the Monitoring Plane

2.1 General Service Process Overview

Concept Analogy

A router is a device that searches for paths to transmit IP packets on the Internet. The router functions as a post office. IP packets are to the router as mails to the post office. The core function of a router is addressing and forwarding.

In a post office, a mail collection center collects all mails, and a mail query and distribution center queries addresses of the mails and distributes these mails to their addresses. A mail collection center, similar to the data plane on a router, collects mails. A mail query and distribution center, similar to the control plane on the router, searches for paths and forwards mails along the paths to various addresses.

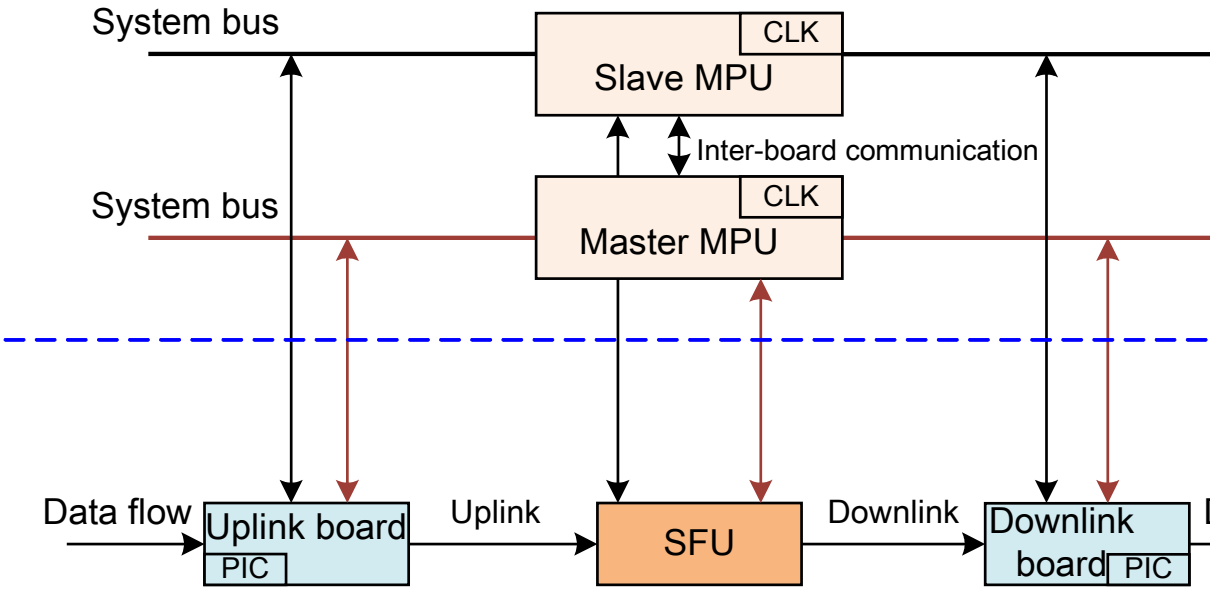
Logical Architecture

A router consists of the data and control planes, which implements addressing and forwarding. In addition, the router has a monitoring plane, which helps ensure stable addressing and forwarding performance. The three planes provide the following functions:

- Data plane: Similar to a mail collection center, the data plane provides interfaces that send and receive packets on a router, while processing the packets at a high speed and switching data packets inside the router. The data plane encapsulates packets, decapsulates packets, processes Ethernet, Multiprotocol Label Switching (MPLS), IPv4, and IPv6 packets, implements quality of service (QoS), schedules packets, and provides various statistics.
- Control plane: Similar to the mail query and distribution center, the control plane is the central nervous system on a router. It uses system buses to control system units and provide various functions. These functions allow the router to calculate routes, generate LSPs, build multicast, unicast, and MPLS forwarding tables, processes protocols and signalings, configure the routes, maintain the route status, monitor the system status, and generate the system status report.
- Monitoring plane: monitors the system environment and helps the data and control plane operate stably and securely. The monitoring plane measures the power voltage, controls the system power-on and power-off, monitors temperatures, and controls fan modules. In addition, the monitoring plane isolates a fault if a unit fails to prevent the fault from affecting other units on the router.

Figure 2-1 illustrates the logical architecture of a router.

Figure 2-1 Logical architecture



Physical Architecture

The physical architectures of the data, control, and monitoring planes on a router are as follows:

- The data plane's forwarding function is implemented by the uplink and downlink line processing units (LPUs) and a switch fabric unit (SFU) on the router.
- Control and monitoring plane functions are implemented by control units on the main processing units (MPUs) and LPUs.

For information about the mapping between the physical and logical architectures, see section "Product Overview" in *HUAWEI CX600 Metro Services Platform Hardware Description - Product Overview*.

2.2 Signal Flow on the Control Plane

The control plane, functioning as the nerve center, integrates control and management functions and uses buses to control system units.

The control plane consists of control units on MPUs and those on other boards. Each MPU is comprised of the following three functional units:

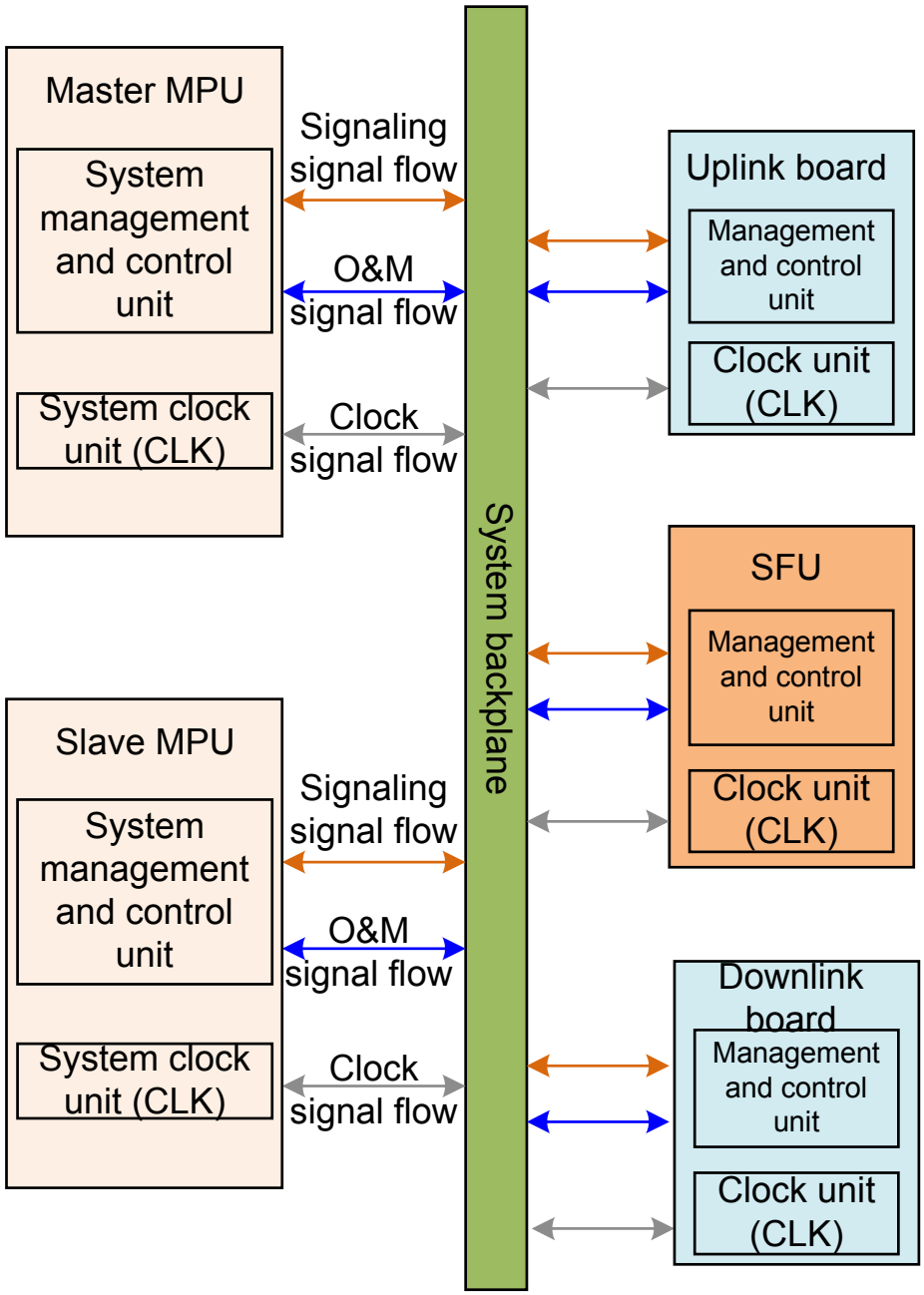
- System management and control unit and system clock unit: work on the control plane.
- System maintenance unit: works on the monitoring plane. For more information, see section "Signal Flow on the Monitoring Plane" in this document.

MPU units and board units communicate through system buses and the SFU.

Signal Flow on the Control Plane

Figure 2-2 illustrates the principles of signal flow transmission on the control plane.

Figure 2-2 Signal flow transmission on the control plane



The control plane processes the following signal flows:

- Singling signal flow and operation and maintenance signal flow: processed by the system management and control unit.
- Clock signal flow: processed by the system clock unit.

The signal flow on the control plane is bidirectional.

- Signal flow contains host packets carrying signals, for example, routing protocols.
  - Board-to-MPU signal flow: calculates data. Therefore, a board sends these packets to the MPU, and the management and control unit on the MPU parses these packets. Then

the MPU delivers signaling to the data plane so that they can be identified by the data plane.

- MPU-to-board signal flow: used to update entries in forwarding tables. After the MPU delivers parsed data to a board, the board uses the data to forward packets on the data plane.

In the following example, routing calculation is used. A packet arrives at an interface of a board. The network processor (NP) on the board identifies the packet that needs to be sent to the MPU. The NP sends the packet to the MPU. The MPU calculates the packet and delivers the destination IP address and the next-hop IP address to the routing table on the NP. The data plane forwards the packet to the next-hop address over a route to the destination IP address.

- Operation and maintenance signal flow: Operation data includes configuration, debugging, and query data. Maintenance data includes system-generating data, such as logs and alarms.
  - Board-to-MPU signal flow: contains maintenance signals. The system management and control unit uses the system buses to collect maintenance information, such as logs and alarms that are generated by modules and saves the information in an information center. The maintenance data helps query and maintain the device.

    For example, when a user wants to query active alarms, the user runs the **display alarm active** command. The control plane parses this command and instructs the information center to display all collected active alarms.
  - MPU-to-board signal flow: contains operation signals. The control plane provides software interfaces to communicate with other devices, communication interfaces to communicate with host software, and LAN switch interfaces to communicate with other boards and modules. These interfaces form a logical network. Operation commands are configured on the control plane. The control plane then sorts information based on types and priorities and sends the information through interfaces along various channels to various modules.

    For example, a user runs the **power off slot 1** command to power off a board in slot 1. The control plane parses the command and delivers the command through an outband interface to the board in slot 1.
- Clock signal flow: contains synchronization Ethernet or 1588v2 (also called IEEE Standard for a Precision Clock Synchronization Protocol for Networked Measurement and Control Systems) signals.
  - Board-to-MPU signal flow: used to obtain clock signals. An uplink board obtains clock frequency signals from packets and sends them to the system clock unit on an MPU. The system clock unit then selects a clock source.
  - MPU-to-board signal flow: used to restore the system clock frequency and time. After the MPU selects a clock source, it restores the synchronous system clock and delivers it to all boards so that a device forwards packets all carrying the synchronous signals to downstream devices through outbound interfaces.

Reliability

Both the MPUs and clocks are working in 1:1 redundancy mode. The master and slave MPUs communicate and monitor each other's status. If the master MPU fails, the slave MPU automatically takes over packets and becomes the new master MPU, which improves device reliability.

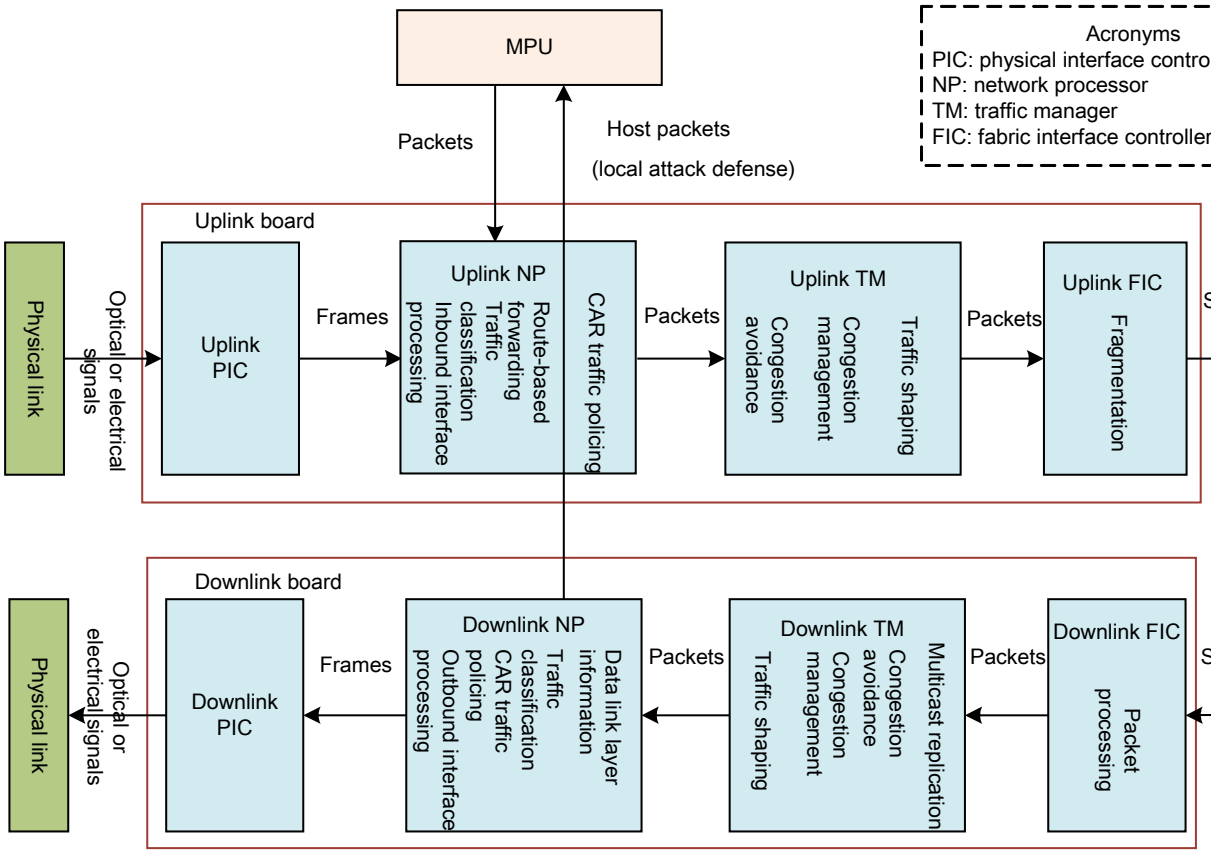
2.3 Signal Flow on the Data Plane

The data plane processes and forwards data packets at a high speed. The signal flow in the data plane is primarily service data signals.

Signals on the data plane flow through a physical link, an uplink board, an SFU, a downlink board, and another physical link.

Figure 2-3 illustrates the processing and forwarding of a signal flow on the data plane.

Figure 2-3 Processing and forwarding of a signal flow on the data plane



The processing of an incoming signal flow is as follows:

1. An uplink physical interface card (PIC) provides an inbound interface for a signal flow. Optical and electrical signals transmitted along a physical link enter the uplink PIC. The PIC obtains the physical layer clock frequency and performs data layer link protocol negotiation. Then the PIC encapsulates packets into Ethernet frames and sends the frames to the uplink NP.

NOTE

A PIC can receive high-speed services, such as packet over synchronous digital hierarchy (SDH)/ synchronous optical network (SONET) (POS) and Ethernet packets and low-sped services, such as asynchronous transfer mode (ATM), time division multiplexing (TDM), and Point-to-Point Protocol (PPP) packets. Services before they are encapsulated are not described here.

2. The uplink NP searches a forwarding table for an outbound interface for the signal flow. The processing is as follows:
   a. Inbound interface processing: Upon receipt of the signal flow, the inbound interface of the NP parses the data link layer protocol carried in the packets and obtains the packet types.
   b. Traffic classification: The uplink NP prioritized packets, performs traffic classification, and re-marks them.
   c. Packet forwarding based on the forwarding table: The uplink NP searches for forwarding entries based on destination MAC addresses, destination IP addresses, and MPLS labels and obtains outbound interface names or next-hop IP addresses contained in matching entries.

      NOTE

      Data packets are classified as Layer 2 MAC address-based packets, Layer 2.5 MPLS label-based packets, and Layer 3 IP address-based packets. The processing module on the inbound interface identifies packet types and searches forwarding tables based on these types so that the outbound interface names or next-hop IP addresses for all types of packets can be found.

   d. Traffic policing: The uplink NP limits the rate at which incoming packets are sent based on the committed access rate (CAR) parameters configured on the inbound interface or those configured in the incoming traffic classification profile. If the forwarding behavior is to discard packets, the uplink NP discards them before performing the CAR function.
3. The uplink traffic management (TM) chip processes the signal flow as follows:
   - Congestion management and avoidance: The uplink TM monitors network resource usage. If traffic congestion worsens, the uplink TM discards packets and adjusts traffic to relieve network overload.
   - Traffic shaping: If traffic congestion occurs, the uplink TM caches packets in queues and uses a specific scheduling algorithm to prioritize packets before forwarding them.

   After the uplink TM processes packets using QoS functions, it sends them to the uplink flexible interface card (FIC).
4. The uplink FIC fragments the signal flows. The SFU switches packets based on a fixed cell length. Before packets are sent to the SFU, the uplink FIC fragments the packets that are longer than the fixed cell length. The upstream FIC encapsulates the fragments into cells before sending them to the SFU.

The SFU switches data between LPUs. Upon receipt of the cells, the SFU caches and schedules them before sending them to the switching unit. The switching unit balances the cells using multiple switching planes, which improves the fault tolerance capability. The switching unit sends data packets through outbound interfaces to a downlink board.

NOTE

Whether or not the SFU processes packets depends on the hardware architecture. The CX600-X8 and CX600-X16 devices have switched networks installed so that packets are processed by the SFU on these devices. The CX600-X1, CX600-X2, and CX600-X3 devices do not have switched network so that the switch module (SM) determines the link on which packets are transmitted.

The processing of an outgoing signal flow is as follows:

1. Switched network cell assembly on the downstream FIC: The downstream FIC assembles switched network cells into packets after switched network cells flow from the SFU to the downlink FIC.
2. Queuing and scheduling on the downlink TM: The downstream TM puts packets of the signal flow in queues and schedules them based on the traffic shaping, policing, congestion avoidance parameters. Then it sends the packets to the downstream NP.

   NOTE

   The downlink TM also replicates multicast packets before sending them through several outbound interfaces.
3. Forwarding table lookup and data layer link information query: The downlink NP obtains data link layer encapsulation information, processes packets using a signal flow processing module and outbound interface-specific processing modules. The processing is as follows:
   a. The downstream NP obtains data link layer encapsulation information and encapsulates packets. The encapsulation process varies according to packet types. For example:
      - For Layer 2 802.1q-in-802.1q (QinQ) packets, the downlink NP adds a virtual local area network (VLAN) tag to each packet.
      - For MPLS packets, the downlink NP adds an MPLS label to each packet.
      - For IP packets, the downlink NP searches for Address Resolution Protocol (ARP) entries and adds MAC addresses mapped to ARP entries to the packets.
   b. The flow processing module performs traffic classification and re-marks packets based on priorities configured on outbound interfaces.
   c. The downstream NP limits the rate limit at which outgoing packets are sent based on CAR parameters configured on the outbound interface or those in the outgoing traffic classification profile.
   d. Host packets destined for the MPU are sent to an MPU, and packets to be forwarded are sent to the outbound interface-specific processing modules.

      NOTE

      Due to limited CPU processing capability on an MPU, the limit on packets destined for the CPU must be configured. This prevents attack or defective packets from being sent to the MPU and causing high CPU usage, which improves device security. The packets are verified, and only valid packets are sent to the CPU at a specified rate, which defends against attacks on the CPU.
   e. The outbound interface-specific processing module adds a Layer 2 header to each packet and forwards the packets to the downlink PIC.
4. The downlink PIC converts data packets into optical and electrical signals and forwards them through outbound interfaces connected to physical links.

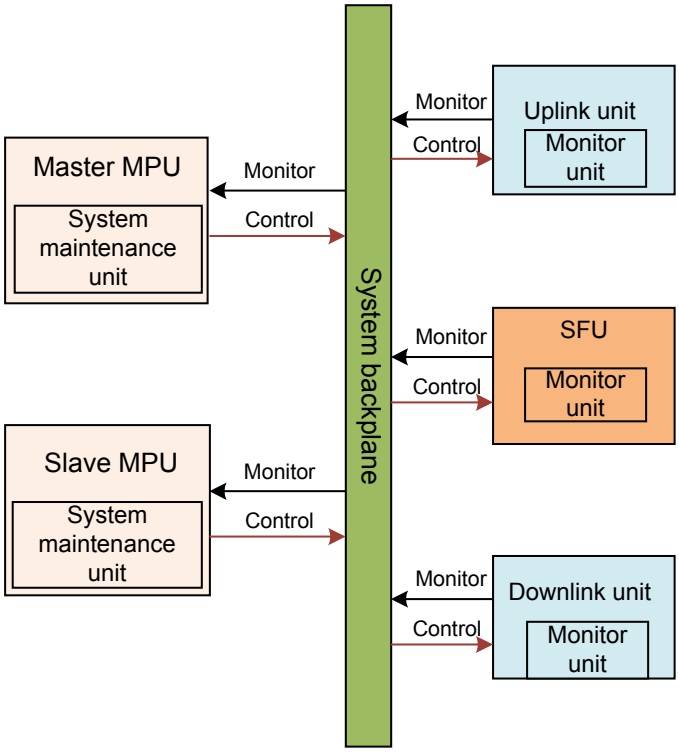
2.4 Signal Flow on the Monitoring Plane

The monitoring plane monitors the system environment. If a fault occurs on a unit, the monitoring plane isolates the fault to prevent it from affecting other units on the device. The control and monitoring planes are working together to support the operation and maintenance of a device and improve performance stability.

Both the control plane and monitoring plane consist of the system operation and maintenance unit and the monitoring units on LPUs and an SFU. Inter-board communication is implemented using the system backplane.

Figure 2-4 illustrates the principles of signal flow transmission on the monitoring plane.

Figure 2-4 Signal flow transmission on the monitoring plane



The monitoring plane, like the control plane, supports bidirectional signal flows.

- Board-to-MPU signal flow: implements monitoring. The system maintenance unit on each MPU uses a MonitorBus to collect operating information on system units and generates control information based on the unit-specific operating status.
- MPU-to-board signal flow: implements control. An MPU delivers control information to modules to monitor board information, such as the installation and operating status and fan speed. The MPU also loads a bus to locally or remotely test or upgrade system units.

3 CX600-X16

About This Chapter

This section describes the overview of the CX600-X16 Chassis.

3.1 Device Overview
This section describes the system overview, main components and slot layout, and specifications and board lists.

3.2 Power Supply System
This chapter describes the power supply system used by the CX600.

3.3 Heat Dissipation System
This section describes the appearance, functions, and specifications of the heat dissipation system.

3.4 Switching Network
This section describes the functions of the switch fabric unit.

3.5 Control Plane
This chapter describes the control plane of the CX600-X16.

3.1 Device Overview

This section describes the system overview, main components and slot layout, and specifications and board lists.

3.1.1 System Overview

This section gives an overview of the system.

System Overview

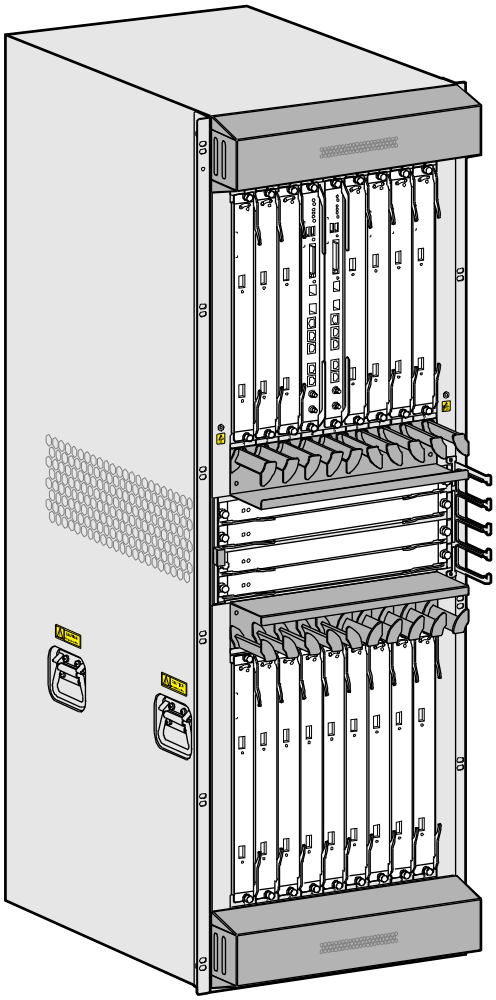
The CX600 series adopt a centralized routing engine and distributed forwarding architecture. This helps to provide rich and flexible service and to perform large-capacity forwarding.

The CX600-X16 has an integrated chassis, with main components which all support hot swapping.

The CX600-X16 supports all the Line Processing Units (LPUs) on the former CX600, but the Main Processing Units (MPUs) and Switch Fabric Units (SFUs) are new.

As shown in **Figure 3-1**, the CX600-X16 has 16 LPU slots. The switching capacity of the entire system is 12.58 Tbit/s.

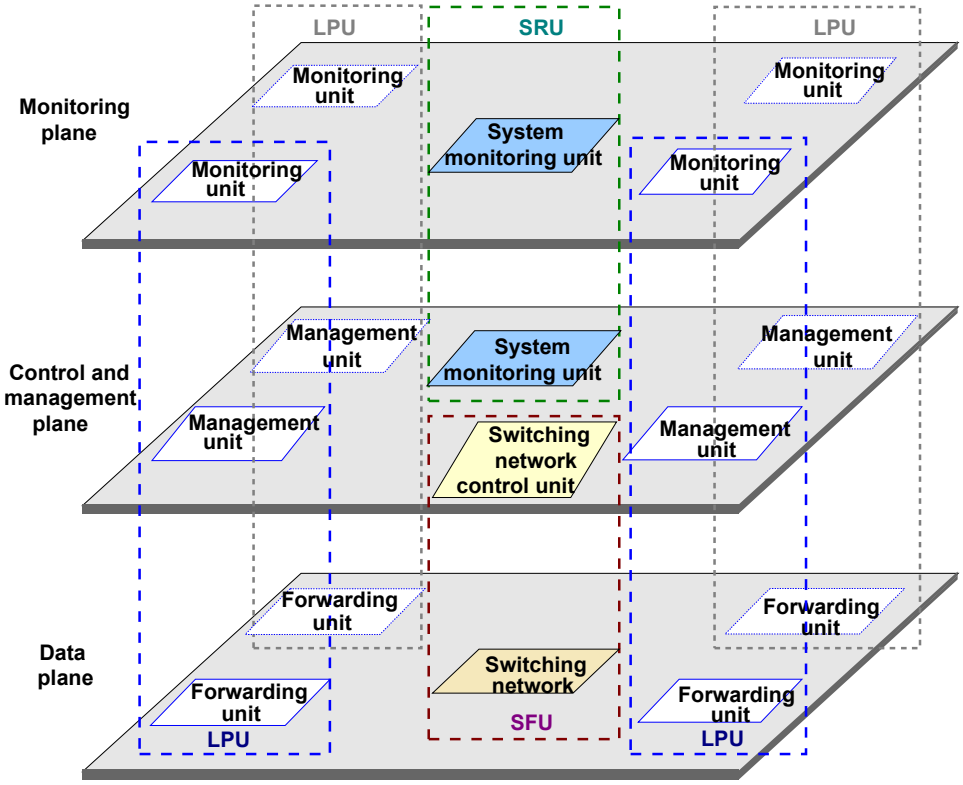
Figure 3-1 Appearance of the CX600-X16



System Architecture

The CX600-X16 adopts a system architecture shown in **Figure 3-2**. In this architecture, the data plane, management and control plane, and monitoring plane are separated. This design helps to improve system reliability and facilitates upgrading of each plane separately.

Figure 3-2 Diagram of the system architecture



System Features

The CX600-X16 provides the following system features:

- Unblocked switching network that can be upgraded, with switching capacity at the Tbit/s level
- Distributed hardware-based forwarding and fast service deployment
- Compact structure to increase interface density
- Normalized design of system components
- Separation of the control channel, service channel, and monitoring channel to ensure non-blacking control channels and monitoring channels
- Carrier-class high reliability and manageability
- Shielding at the modular level to meet ElectroMagnetic Compatibility (EMC) requirements
- Hot-swappable boards, power modules, and fans
- U-shaped air channels to improve system heat dissipation
- Distributed power supply to enhance power supply capability for a single chassis
- Support for 200 mm (7.87 in.) fans
- MPUs in 1:1 backup mode
- SFUs in load balancing mode

- Backup for key components such as power modules, fan modules, clocks, and management buses
- Protection against incorrect of boards
- Queries about alarm prompts, alarm indications, running status, and alarm status of the voltage and ambient temperature

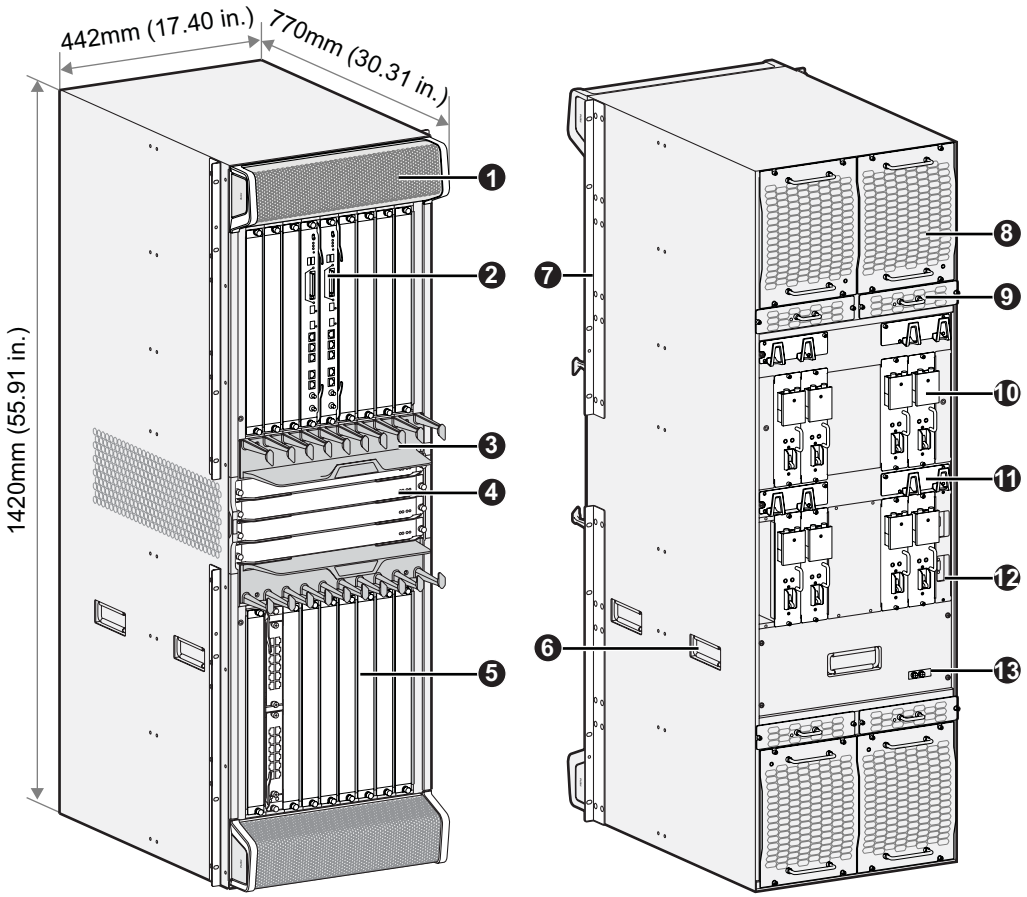
3.1.2 Main Components and Slot Layout

Main Components

The CX600-X16 has an integrated chassis, with main components which all support hot swapping.

Figure 3-3 shows the architecture and main components of the CX600-X16.

Figure 3-3 Appearance and main components of the CX600-X16



1. Air intake frame	2. MPU slot	3. Front cable trough	4. SFU slot	5. LPU slot
6. Handle	7. Mounting ear	8. Fan module	9. Filtering box	10. PEM
11. Rear cable trough	12. Power monitoring module	13. Ground terminal		

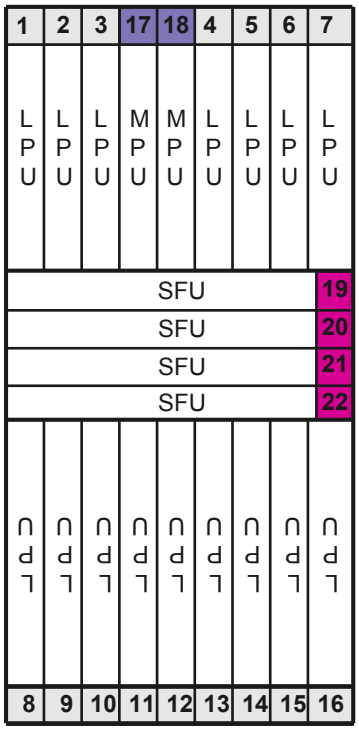
NOTE

Currently, the CX600-X16 has two types of chassis: one with a filtering box and the other without a filtering box. For the latter type, the filtering box module on the rear is replaced by a panel. Changing a filtering box module to a panel is not available on site. The chassis without a filtering box is an optimized alternative, which has no impact on the application and performance of the CX600-X16.

Slot Layout

Figure 3-4 shows the slot layout on the CX600-X16.

Figure 3-4 Slot layout on the CX600-X16



An interface is numbered in the format of Slot number/card number/Port number

NOTE

Slot number: On the CX600-X16, the slots of LPUs are numbered from 1 to 16. The slot number increases from left to right and from top to bottom, facing the front panel of the CX600 (there are corresponding marks on the panel).

Card number:

- Upper chassis
  - The cards of LPUs are numbered from top to bottom and from right to left beginning with 0. If there is no card on a board, the card number is set to 0.
- Lower chassis
  - The cards of LPUs are numbered from bottom to top and from left to right beginning with 0. If there is no card on a board, the card number is set to 0.

Port number:

- Upper chassis
  - The ports of LPUs are numbered from left to right and from top to bottom beginning with 0.
- Lower chassis
  - The ports of LPUs are numbered from right to left and from bottom to top beginning with 0.

Table 3-1 describes the slot layout on the CX600-X16.

Table 3-1 Board distribution in the board cage of the CX600-X16

Slot Number	Quantity	Slot Width	Remarks
1 to 16	16	41 mm (1.6 inches)	These slots are used to hold LPUs.
17 to 18	2	41 mm (1.6 inches)	These slots hold MPUs that work in 1:1 backup mode.
19 to 22	4	41 mm (1.6 inches)	These slots are used to hold SFUs that work in 3+1 load balancing mode.

3.1.3 CX600-X16 Specifications

This section describes the system configuration and physical parameters of the CX600-X16.

Chassis Specifications

Table 3-2 lists the physical parameters of the CX600-X16.

Table 3-2 Physical parameters of the CX600-X16

Item	Description
Dimensions (H x W x D)	1420 mm x 442 mm x 650 mm (55.91 in. x 17.40 in. x 25.59 in.) (chassis main body dimensions) 1420 mm x 442 mm x 770 mm (55.91 in. x 17.40 in. x 30.31 in.) (chassis dimensions including the chassis's front and rear assembly and cable racks)

Item		Description
Installation position		N68E cabinet or a standard 19-inch cabinet
Weight	Empty chassis	69.6 kg (153.47 lb)
	Full configuration (maximal)	279 kg (588.74 lb)
Typical power consumption		5360 W (40G platform) 7970W(200G platform)
Heat dissipation		25833.96 BTU/hour
DC input voltage	Rated voltage	48 V
	Maximum voltage range	-38 V to -72 V
AC input voltage	Input voltage range	90 V to 275 V 175 V to 275 V (recommend)
System reliability	MTBF (year)	36.38
	MTTR (hour)	0.5
Ambient temperature	Long-term	0°C to 45°C (32°F to 113°F)
	Short-term	-5°C to 55°C (23°F to 131°F)
	Remarks	Limit of the temperature change rate: 30°C (86 °F)/hour
Storage temperature		-40°C to 70°C (-40°F to 158°F)
Relative humidity	Long-term	5% RH to 85% RH, no coagulation
	Short-term	5% RH to 95% RH, no coagulation
Storage humidity		5% RH to 100% RH, no coagulation
Long-term altitude		⩽ 4000 m (If the altitude is between 1800 meters and 4000 meters, the operating temperature of the device must decrease by 1°C for every 220 meters increase in altitude.

Product Specifications

Table 3-3 System configuration list of the CX600-X16

Item	Description	Remarks
Processing unit	Main frequency: 1.5 GHz	-
BootROM	8 MB	-

Item	Description	Remarks
SDRAM	4 GB	-
NVRAM	4 MB	-
Flash	32 MB	-
CF card	4 GB	Two 2 GB CF cards.
Switching capacity	12.58 Tbit/s (bidirectional)	-
Interface capacity	7.68 Tbit/s (bidirectional)	-
Number of LPU slots	16	-
Number of MPU slots	2	-
Number of SFU slots	4	-

3.1.4 Board Specifications

This section describes the specifications of boards supported by the CX600-X16.

Table 3-4 lists the specifications of boards supported by the CX600-X16.

Table 3-4 Specifications of boards supported by the CX600-X16

Type	Description	Silkscreen
MPU	**Main Processing Unit B4**	MPU
SFU	**40Gbps Switch Fabric Unit B**	SFUI-40-B
	Switch Fabric Unit B	SFUI-200-B
SPU	**Versatile Service Process Unit C (SPUC)**	SPU
	Flexible Card Versatile Service Unit 10	VSUF-10
	Integrated Versatile Service Unit 20 A	VSUI-20-A
	Flexible Card Versatile Service Unit 160 (VSUF-160)	VSUF-160
	Flexible Card Versatile Service Unit 80 (VSUF-80)	VSUF-80

Type	Description	Silkscreen
	Versatile Service Flexible Card(SP160)	SP160
	Versatile Service Flexible Card(SP80)	SP80
LPUF-10	**8.30 Flexible Card Line Processing Unit (LPUF-10,four slots)**	LPUF-10
	8.30.1 1-Port OC-192c/ STM-64c POS-XFP Flexible Card(Occupy two slots)	FPIC-1xOC192-POS
	8.30.2 1-Port OC-48c/ STM-16c POS-SFP Flexible Card	FPIC-1xOC48-POS
	8.30.3 2-Port OC-48c/ STM-16c POS-SFP Flexible Card	FPIC-2xOC48-POS
	8.30.4 4-Port OC-48c/ STM-16c POS-SFP Flexible Card	FPIC-4xOC48-POS
	8.30.5 4-Port OC-12c/ STM-4c POS-SFP Flexible Card	FPIC-4xOC12-POS
	8.30.6 8-Port OC-12c/ STM-4c POS-SFP Flexible Card	FPIC-8xOC12-POS
	8.30.7 4-Port OC-3c/ STM-1c POS-SFP Flexible Card	FPIC-4xOC3-POS
	8.30.8 8-Port OC-3c/ STM-1c POS-SFP Flexible Card	FPIC-8xOC3-POS
	8.30.9 2-Port OC-12c/ STM-4c ATM-SFP Flexible Card	FPIC-2xOC12-ATM
	8.30.10 4-Port OC-3c/ STM-1c ATM-SFP Flexible Card	FPIC-4xOC3-ATM

Type	Description	Silkscreen
	8.30.11 8-Port 100/1000Base-X-SFP Flexible Card	FPIC-8xGE
	8.30.12 8-Port 100/1000 Base-X-SFP Flexible Card A (Supporting 1588v2)	P10-8xFE/GE-SFP-A
	8.30.13 2-Port Channelized OC-3c/ STM-1c POS-SFP Flexible Card	2xcPOS/STM1-SFP
	8.30.14 24-Port Channelized E1/T1-DB100 Flexible Card	24xcE1/cT1-DB 100
	8.30.15 4-Port Clear Channel E3/ Channelized T3-SMB Flexible Card	4xE3/cT3-SMB
LPUS-20	**8.28.1 4-Port 10GBase WAN/LAN-XFP Line Processing Unit S (LPUS-20)**	LPUS-20 4x10GBase LAN/WAN-XFP
	8.28.2 40-Port 100/1000Base-X-SFP Line Processing Unit S (LPUS-20)	LPUS-20 40xFE/GE-SFP
	8.28.3 40-Port 10/100/1000Base-RJ45 Line Processing Unit S	LPUS-20 40xFE/GE-RJ45
LPUF-21	**8.29 Flexible Card Line Processing Unit (LPUF-21-A/LPUF-21-B/LPUF-21-E,2 sub-slots)**	LPUF-21-A LPUF-21-B LPUF-21-E
	8.29.1 1-Port 10GBase WAN/LAN-XFP Flexible Card	1x10GBase LAN/WAN
	8.29.2 1-Port 10GBase WAN/LAN-XFP Flexible Card A (Supporting 1588v2)	1x10GBase LAN/WAN-A

Type	Description	Silkscreen
	8.29.3 1-Port 10GBase LAN/WAN-XFP Flexible Card B(P20-B)	P20-1x10GBase LAN/WAN-XFP-B
	8.29.4 1-Port 10GBase LAN/WAN-XFP Flexible Card E(P20-E)	P20-1x10GBase LAN/WAN-XFP-E
	8.29.5 12-Port 100/1000Base-SFP Flexible Card	12x100/1000Base-SFP
	8.29.6 12-Port 100/1000Base-SFP Flexible Card A (Supporting 1588v2)	12x100/1000Base-SFP-A
	8.29.7 12-Port 100/1000Base-X-SFP Flexible Card B(P20-B)	P20-12xGE-SFP-B
	8.29.8 10-Port 1000Base-X-SFP Flexible Card E (P20-E)	P20-10xGE-SFP-E
	8.29.9 12-Port 10/100/1000Base-RJ45 Flexible Card	12x10/100/1000Base-TX-RJ45
	8.29.10 1-Port OC-192c/ STM-64c POS-XFP Flexible Card(Occupy two slots)	1-port OC-192c/STM-64c POS-XFP
	8.29.11 4-Port 10GBase WAN/LAN-XFP Flexible Card(Occupy two sub-slots)	4x10GBase LAN/WAN
	8.29.12 40-Port 10/100/1000Base-RJ45 Flexible Card(Occupy two sub-slots)	40x10/100/1000Base-TX-RJ45
	8.29.13 40-Port 100/1000Base-SFP Flexible Card(Occupy two sub-slots)	40x100/1000Base-SFP

Type	Description	Silkscreen
	8.29.14 2-Port 10GBase LAN/WAN-XFP+20-Port 100/1000Base-X-SFP Flexible Card (P20,Occupy two sub-slots)	P20-2x10GBase LAN/WAN-XFP-20xFE/GE-SFP
LPUI-21-L	**8.27.1 24-Port 100/1000Base-X-SFP Integrated Line Processing Unit L (LPUI-21-L)**	LPUI-21-L 24xFE/GE-SFP-A
	8.27.2 1-Port 10GBase LAN/WAN-SFP+ + 16-Port 100/1000Base-X-SFP Integrated Line Processing Unit L (LPUI-21-L)	LPUI-21-L 1x10GBase LAN/WAN-SFP+-16xFE/GE-SFP-A
LPUF-40	**8.23 Flexible Card Line Processing Unit (LPUF-40-A/LPUF-40-B/LPUF-40-E,2 sub-slots)**	LPUF-40-A LPUF-40-B LPUF-40-E
	8.23.1 20-Port 100/1000Base-X-SFP Flexible Card(P40)	P40-20xFE/GE-SFP
	8.23.2 20-Port 100/1000Base-X-SFP Flexible Card A(P40-A,Supporting 1588v2)	P40-20xFE/GE-SFP-A
	8.23.4 2-Port 10GBase LAN/WAN-XFP Flexible Card(P40)	P40-2x10GBase LAN/WAN-XFP
	8.23.5 2-Port 10GBase LAN/WAN-XFP Flexible Card A (Supporting 1588v2)	P40-2x10GBase LAN/WAN-XFP-A
	8.23.3 20-Port 100/1000Base-X-SFP Flexible Card B(P40-B)	P40-20xFE/GE-SFP-B
	8.23.6 2-Port 10GBase LAN/WAN-XFP Flexible Card B(P40-B)	P40-2x10GBase LAN/WAN-XFP-B

Type	Description	Silkscreen
	8.23.7 20-Port 1000Base-X-SFP Flexible Card E (P40-E)	P40-20x FE/GE-SFP-E
	8.23.8 2-Port 10GBase LAN/WAN-XFP Flexible Card E(P40-E)	P40-2x10GBase LAN/WAN-XFP-E
	8.23.10 20-Port 10/100/1000Base-RJ45 Flexible Card(P40)	P40-20 x FE/GE-RJ45
	8.23.11 4-Port 10GBase LAN/WAN-XFP Flexible Card (P40,Occupy one sub-slot)	P40-4x10GBase LAN/WAN-XFP
LPUI-40	**8.24.1 4-Port 10GBase LAN/WAN-XFP Integrated Line Processing Unit (LPUI-40)**	LPUI-40 4x10GBase LAN/WAN-XFP
	8.24.2 40-Port 100/1000Base-X-SFP Integrated Line Processing Unit (LPUI-40)	LPUI-40 40xFE/GE-SFP
LPUI-41	**8.25.1 8-Port 10GBase LAN/WAN-XFP Integrated Line Processing Unit (LPUI-41)**	LPUI-41 8x10GBase LAN/WAN-XFP
	8.25.2 4-Port 10GBase LAN/WAN-XFP Integrated Line Processing Unit (LPUI-41)	LPUI-41 4x10GBase LAN/WAN-XFP
	8.25.3 48-Port 100/1000Base-X-SFP Integrated Line Processing Unit (LPUI-41)	LPUI-41 48xFE/GE-SFP

Type	Description	Silkscreen
	8.25.4 2-Port 10GBase LAN/WAN-XFP+24-Port 100/1000Base-X-SFP Integrated Line Processing Unit (LPUI-41)	LPUI-41 2x10GBase LAN/WAN-XFP-24xFE/GE-SFP
	8.25.5 4-Port 10GBase LAN/WAN-XFP Integrated Line Processing Unit (LPUI-41,Supporting 1588v2)	LPUI-41 4x10GBase LAN/WAN-XFP-1588v2
	8.25.6 40-Port 100/1000Base-X-SFP Integrated Line Processing Unit (LPUI-41,Supporting 1588v2)	LPUI-41 40xFE/GE-SFP-1588v2
	8.25.7 2-Port 10GBase LAN/WAN-XFP+20-Port 100/1000Base-X-SFP Integrated Line Processing Unit (LPUI-41,Supporting 1588v2)	LPUI-41 2x10GBase LAN/WAN-XFP-20xFE/GE-SFP-1588v2
LPUS-41	**8.26.1 8-Port 10GBase LAN/WAN-XFP Line Processing Unit S (LPUS-41)**	LPUS-41 8x10GBase LAN/WAN-XFP
	8.26.2 4-Port 10GBase LAN/WAN-XFP Line Processing Unit S (LPUS-41)	LPUS-41 4x10GBase LAN/WAN-XFP
	8.26.3 48-Port 100/1000Base-X-SFP Line Processing Unit S (LPUS-41)	LPUS-41 48xFE/GE-SFP
	8.26.4 2-Port 10GBase LAN/WAN-XFP+24-Port 100/1000Base-X-SFP Line Processing Unit S(LPUS-41)	LPUI-41 2x10GBase LAN/WAN-XFP-20xFE/GE-SFP

Type	Description	Silkscreen
LPUF-50	**8.22 Flexible Card Line Processing Unit (LPUF-50,four sub-slots)**	LPUF-50
	8.30.14 24-Port Channelized E1/T1-DB100 Flexible Card	24xcE1/cT1-DB 100
	8.30.8 8-Port OC-3c/ STM-1c POS-SFP Flexible Card	FPIC-8xOC3-POS
	8.30.4 4-Port OC-48c/ STM-16c POS-SFP Flexible Card	FPIC-4xOC48-POS
	8.30.3 2-Port OC-48c/ STM-16c POS-SFP Flexible Card	FPIC-2xOC48-POS
	8.30.13 2-Port Channelized OC-3c/ STM-1c POS-SFP Flexible Card	2xcPOS/STM1-SFP
	8.30.6 8-Port OC-12c/ STM-4c POS-SFP Flexible Card	FPIC-8xOC12-POS
	8.30.12 8-Port 100/1000 Base-X-SFP Flexible Card A (Supporting 1588v2)	P10-8xFE/GE-SFP-A
	8.22.8 2-Port 10GBase WAN/LAN-SFP+ Flexible Card A	P50-2x10GBase LAN/WAN-SFP+-A
	8.30.1 1-Port OC-192c/ STM-64c POS-XFP Flexible Card(Occupy two slots)	FPIC-1xOC192-POS
	8.22.10 4-Port Channelized STM-1c POS-SFP Flexible Card	4xcPOS/STM1-SFP
	8.22.11 8-Port Channelized STM-1c POS-SFP Flexible Card	8xcPOS/STM1-SFP

Type	Description	Silkscreen
	8.22.12 8-Port OC-3c/ STM-1c ATM-SFP Flexible Card(P50)	P50-8×OC3c/STM1c ATM-SFP
LPUF-51	**8.19 Flexible Card Line Processing Unit (LPUF-51/LPUF-51-B/ LPUF-51-E,two sub-slots)**	LPUF-51 LPUF-51-B LPUF-51-E
	8.19.1 24-Port 100/1000Base-X-SFP Flexible Card A(P51-A)	P51-24xFE/GE-SFP-A
	8.19.2 5-Port 10GBase LAN/WAN-SFP +Flexible Card A (P51-A, Occupy two sub-slots)	P51-5x10GBase LAN/WAN-SFP+-A
	8.19.3 2-Port 10GBase LAN/WAN-SFP+ Flexible Card A(P51-A)	P51-2x10GBase LAN/WAN-SFP+-A
	8.19.4 24-Port 1000Base-X-SFP Flexible Card E (P51-E)	P51-24xGE-SFP-E
	8.19.5 5-Port 10GBase LAN/WAN-SFP+ Flexible Card E(P51-E, Occupy two slots)	P51-5x10GBase LAN/WAN-SFP+ -E
	8.19.6 2-Port 10GBase LAN/WAN-SFP+ Flexible Card E(P51-E)	P51-2x10GBase LAN/WAN-SFP+ -E
	8.19.7 20-Port 10/100/1000Base-RJ45 Flexible Card(P51-A)	P51-20xFE/GE-RJ45-A
LPUI-51	**8.20.1 5-Port 10GBase LAN/WAN-SFP+ Integrated Line Processing Unit (LPUI-51)**	LPUI-51 5x10GBase LAN/WAN-SFP+-A
	8.20.2 4-Port 10GBase LAN/WAN-SFP+ Integrated Line Processing Unit (LPUI-51)	LPUI-51 4x10GBase LAN/WAN-SFP+-A

Type	Description	Silkscreen
	8.20.3 48-Port 100/1000Base-X-SFP Integrated Line Processing Unit (LPUI-51)	LPUI-51 48xFE/GE-SFP-A
	8.20.4 2-Port 10GBase LAN/WAN-SFP+ + 24-Port 100/1000Base-X-SFP Integrated Line Processing Unit (LPUI-51)	LPUI-51 2x10GBase LAN/WAN-SFP+ -24xFE/GE-SFP-A
	8.20.6 5-Port 10GBase LAN/WAN-SFP+ Integrated Line Processing Unit B (LPUI-51-B)	LPUI-51-B 5x10GBase LAN/WAN-SFP+-A
	8.20.7 4-Port 10GBase LAN/WAN-SFP+ Integrated Line Processing Unit B (LPUI-51-B)	LPUI-51-B 4x10GBase LAN/WAN-SFP+-A
	8.20.8 48-Port 100/1000Base-X-SFP Integrated Line Processing Unit B (LPUI-51-B)	LPUI-51-B 48xFE/GE-SFP-A
	8.20.9 2-Port 10GBase LAN/WAN-SFP+ + 24-Port 100/1000Base-X-SFP Integrated Line Processing Unit B (LPUI-51-B)	LPUI-51-B 2x10GBase LAN/WAN-SFP+ -24xFE/GE-SFP-A
	8.20.10 5-Port 10GBase LAN/WAN-SFP+ Integrated Line Processing Unit L (LPUI-51-L)	LPUI-51-L 5x10GBase LAN/WAN-SFP+-A
	8.20.11 48-Port 100/1000Base-X-SFP Integrated Line Processing Unit L (LPUI-51-L)	LPUI-51-L 48xFE/GE-SFP-A

Type	Description	Silkscreen
	8.20.12 2-Port 10GBase LAN/WAN-SFP+ + 32-Port 100/1000Base-X-SFP Integrated Line Processing Unit L (LPUI-51-L)	LPUI-51-L 2x10GBase LAN/WAN-SFP+-32xFE/GE-SFP-A
	8.20.13 5-Port 10GBase LAN/WAN-SFP+ Integrated Line Processing Unit E (LPUI-51-E,Enhanced HQos)	LPUI-51 5x10GBase LAN/WAN-SFP + -E
	8.20.14 2-Port 10GBase LAN/WAN-SFP+ + 24-Port 1000Base-X-SFP Integrated Line Processing Unit E (LPUI-51-E,Enhanced HQos)	LPUI-51 2x10GBase LAN/WAN-SFP + -24xGE-SFP-E
LPUS-51	**8.21.1 5-Port 10GBase LAN/WAN-SFP+ Line Processing Unit S (LPUS-51)**	LPUS-51 5x10GBase LAN/WAN-SFP+-A
	8.21.2 4-Port 10GBase LAN/WAN-SFP+ Line Processing Unit S (LPUS-51)	LPUS-51 4x10GBase LAN/WAN-SFP+-A
	8.21.3 48-Port 100/1000Base-X-SFP Line Processing Unit S (LPUS-51)	LPUS-51 48xFE/GE-SFP-A
	8.21.4 2-Port 10GBase LAN/WAN-SFP+ + 24-Port 100/1000Base-X-SFP Line Processing Unit S(LPUS-51)	LPUS-51 2x10GBase LAN/WAN-SFP+-24xFE/GE-SFP-A
LPUS-100	**8.15.1 10-Port 10GBase LAN/WAN-XFP Line Processing Unit S (LPUS-100)**	LPUS-100 10x10GBase LAN/WAN-XFP

Type	Description	Silkscreen
	8.15.2 16-Port 10GBase LAN-SFP+ Line Processing Unit S (LPUS-100)	LPUS-100 16x10GBase LAN-SFP+
	8.15.3 1-Port 100GBase-CFP Line Processing Unit S (LPUS-100)	LPUS-100 1x100GE-CFP
LPUF-100	**8.13 Flexible Card Line Processing Unit (LPUF-100,four slots)**	LPUF-100
	8.13.1 5-Port 10GBase LAN/WAN-XFP Flexible Card A(P100-A,Supporting 1588v2,Occupy two sub-slots)	P100-5x10GBase LAN/WAN-XFP-1588v2
	8.13.3 24-Port 100/1000Base-SFP Flexible Card (P100,Occupy two sub-slots)	P100-24xFE/GE-SFP
	8.13.2 48-Port 100/1000Base-X-CSFP Flexible Card (P100,Occupy two sub-slots)	P100-48 x FE/GE-CSFP
	8.13.4 1-Port OC-768c/STM-256c POS-2KM-LC Flexible Card (P100,Occupy two sub-slots)	P100-1xOC768c/STM256c POS-LC
	8.13.5 2-Port OC-192c/STM-64c POS-XFP Flexible Card (P101-A,Occupy one sub-slots)	P100-2xOC-192c/STM-64c POS-XFP
LPUI-100	**8.14.1 10-Port 10GBase LAN/WAN-XFP Integrated Line Processing Unit (LPUI-100,Supporting 1588v2)**	LPUI-100 10x10GBase LAN/WAN-XFP-1588v2

Type	Description	Silkscreen
	8.14.2 16-Port 10GBase LAN-SFP+ Integrated Line Processing Unit (LPUI-100)	LPUI-100 16x10GBase LAN-SFP+
	8.14.3 1-Port 100GBase-CFP Integrated Line Process Unit(LPUI-100)	LPUI-100 1x100GE-CFP
LPUF-101	**8.16 Flexible Card Line Processing Unit (LPUF-101/LPUF-101-B)**	LPUF-101 LPUF-101-B
	8.13.1 5-Port 10GBase LAN/WAN-XFP Flexible Card A(P100-A,Supporting 1588v2,Occupy two sub-slots)	P100-5x10GBase LAN/WAN-XFP-1588v2
	8.16.2 24-Port 100/1000Base-X-SFP Flexible Card A(P101-A)	P101-24xFE/GE-SFP-A
	8.16.3 5-Port 10GBase LAN/WAN-SFP+ Flexible Card A(P101-A)	P101-5x10GBase LAN/WAN-SFP+-A
	8.16.4 1-Port 40GBase LAN-CFP Flexible Card A(P101-A)	P101-1x40GBase LAN-CFP-A
	8.16.5 5-Port 10GBase LAN/WAN-SFP+ Flexible Card E(P101-E)	P101-5x10GBase LAN/WAN-SFP+ -E
	8.19.4 24-Port 1000Base-X-SFP Flexible Card E (P51-E)	P51-24xGE-SFP-E
LPUI-101	**8.17.1 2-Port 40GBase LAN-CFP Integrated Line Processing Unit (LPUI-101)**	LPUI-101 2x40GBase LAN-CFP-A
	8.17.2 1-Port 100GBase-CFP Integrated Line Processing Unit (LPUI-101)	LPUI-101 1x100GBase LAN-CFP

Type	Description	Silkscreen
	8.17.3 10-Port 10GBase LAN/WAN-SFP+ Integrated Line Processing Unit (LPUI-101)	LPUI-101 10x10GBase LAN/WAN-SFP+-A
	8.17.4 2-Port 40GBase LAN-CFP Integrated Line Processing Unit B (LPUI-101-B)	LPUI-101-B 2x40GBase LAN-CFP-A
	8.17.5 10-Port 10GBase LAN/WAN-SFP+ Integrated Line Processing Unit B (LPUI-101-B)	LPUI-101-B 10x10GBase LAN/WAN-SFP+-A
LPUS-101	**8.18.1 2-Port 40GBase LAN-CFP Line Processing Unit S (LPUS-101)**	LPUS-101 2x40GBase LAN-CFP-A
	8.18.2 1-Port 100GBase-CFP Line Processing Unit S(LPUS-101)	LPUS-101 1x100GBase LAN-CFP
	8.18.3 10-Port 10GBase LAN/WAN-SFP+ Line Processing Unit S (LPUS-101)	LPUS-101 10x10GBase LAN/WAN-SFP+-A
LPUI-102	**8.12.1 10-Port 10GBase LAN/WAN-SFP+ Integrated Line Processing Unit E (LPUI-102-E)**	LPUI-102 10x10GBase LAN/WAN-SFP+ -E
LPUF-120	**8.10 Flexible Card Line Processing Unit (LPUF-120/LPUF-120-B/LPUF-120-E)**	LPUF-120 LPUF-120-B LPUF-120-E
	8.10.1 6-Port 10GBase LAN/WAN-SFP+ Flexible Card A(P120-A)	P120-6x10GBase LAN/WAN-SFP+ -A
	8.10.2 1-Port 100GBase-CFP Flexible Card A (P120-A)	P120-1x100GBase LAN-CFP-A

Type	Description	Silkscreen
	8.10.3 12-Port 10GBase LAN/WAN-SFP+ Flexible Card A(P120-A)	P120-12x10GBase LAN/WAN-SFP+ -A
	8.16.2 24-Port 100/1000Base-X-SFP Flexible Card A(P101-A)	P101-24xFE/GE-SFP-A
	8.16.3 5-Port 10GBase LAN/WAN-SFP+ Flexible Card A(P101-A)	P101-5x10GBase LAN/WAN-SFP+-A
	8.16.4 1-Port 40GBase LAN-CFP Flexible Card A(P101-A)	P101-1x40GBase LAN-CFP-A
	8.16.5 5-Port 10GBase LAN/WAN-SFP+ Flexible Card E(P101-E)	P101-5x10GBase LAN/WAN-SFP+ -E
	8.19.4 24-Port 1000Base-X-SFP Flexible Card E (P51-E)	P51-24xGE-SFP-E
LPUI-120	**8.11.1 12-Port 10GBase LAN/WAN-SFP+ Integrated Line Processing Unit (LPUI-120)**	LPUI-120 12x10GBase LAN/WAN-SFP+ -A
	8.11.2 2-Port 40GBase LAN-CFP Integrated Line Processing Unit (LPUI-120)	LPUI-120 2x40GBase LAN-CFP-A
	8.11.3 1-Port 100GBase-CFP Integrated Line Processing Unit (LPUI-120)	LPUI-120 1x100GBase LAN-CFP-A
	8.11.4 12-Port 10GBase LAN/WAN-SFP+ Integrated Line Processing Unit B (LPUI-120-B)	LPUI-120 12x10GBase LAN/WAN-SFP+ -A

Type	Description	Silkscreen
	8.11.5 2-Port 40GBase LAN-CFP Integrated Line Processing Unit B (LPUI-120-B)	LPUI-120 2x40GBase LAN-CFP-A
	8.11.6 1-Port 100GBase-CFP Integrated Line Processing Unit B (LPUI-120-B)	LPUI-120 1x100GBase LAN-CFP-A
LPUF-240	**8.8 Flexible Card Line Processing Unit (LPUF-240/LPUF-240-B/LPUF-240-E)**	LPUF-240 LPUF-240-B LPUF-240-E
	8.8.1 1-Port 100GBase-CFP Flexible Card A (P240-A)	P240-1x100GBase LAN-CFP-A
	8.8.2 12-Port 10GBase LAN/WAN-SFP+ Flexible Card A(P240-A)	P240-12x10GBase LAN/WAN-SFP+ -A
LPUI-240	**8.9.1 2-Port 100GBase-CFP Integrated Line Processing Unit (LPUI-240)**	LPUI-240 2x100GBase LAN-CFP-A
	8.9.2 24-Port 10GBase LAN/WAN-SFP+ Integrated Line Processing	LPUI-240 24x10GBase LAN/WAN-SFP+ -A
	8.9.3 1-Port 100GBase-CFP + 12-Port 10GBase LAN/WAN-SFP+ Integrated Line Processing Unit (LPUI-240)	LPUI-240 1x100GBase LAN-CFP -12x10GBase LAN/WAN-SFP+ -A
	8.9.4 2-Port 100GBase LAN-CFP Integrated Line Processing Unit B (LPUI-240-B)	LPUI-240 2x100GBase LAN-CFP-A
	8.9.5 24-Port 10GBase LAN/WAN-SFP+ Integrated Line Processing Unit B (LPUI-240-B)	LPUI-240 24x10GBase LAN/WAN-SFP+ -A

Type	Description	Silkscreen
	8.9.6 1-Port 100GBase-CFP + 12-Port 10GBase LAN/WAN-SFP+ Integrated Line Processing Unit B (LPUI-240-B)	LPUI-240 1x100GBase LAN-CFP -12x10GBase LAN/WAN-SFP+ -A

3.2 Power Supply System

This chapter describes the power supply system used by the CX600.

3.2.1 Architecture of the Power Supply System

This section describes the features of the power supply system.

The CX600-X16 supports either DC or AC power supply.

In the case of a DC power supply system, eight 70 A Power Entry Modules (PEMs) are inserted at the rear of the chassis, working in 4+4 backup mode.

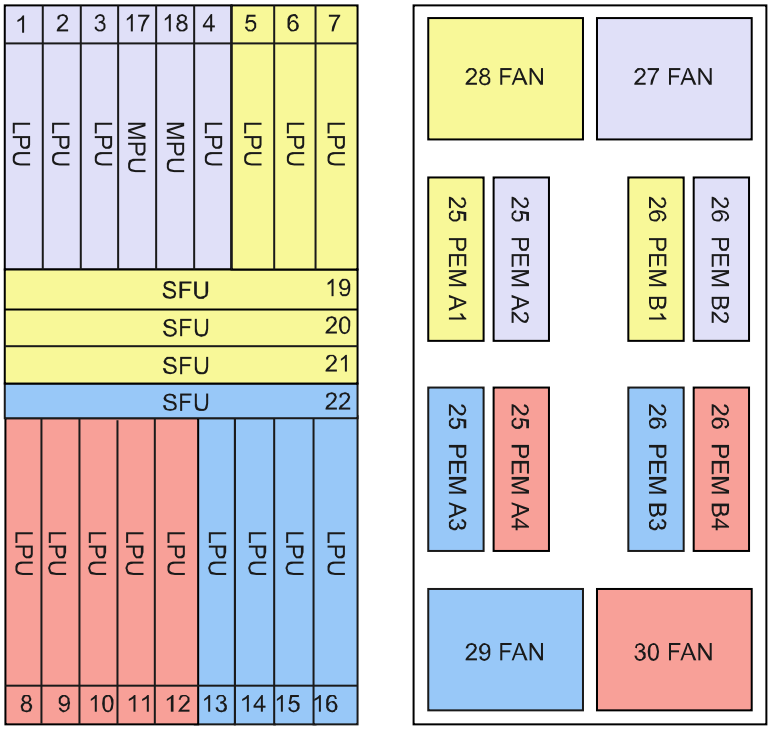
In the case of an AC power supply system, two AC power frames are placed outside the chassis and installed with rectifier modules based on system power. The AC power frames are then connected to the input terminals on the DC-PEMs to supply power for the system. (In short, external AC power frames are added to the DC power supply system to constitute an AC power supply system.)

3.2.2 Distributed Architecture of the System

This section describes partitioned power supply on the CX600-X16.

As shown in **Figure 3-5**, the CX600-X16 backplane is divided into four areas, with each area having two power inputs. These eight power inputs work in backup mode.

Figure 3-5 Schematic diagram of the power supply for the CX600-X16



3.2.3 DC Power Supply System

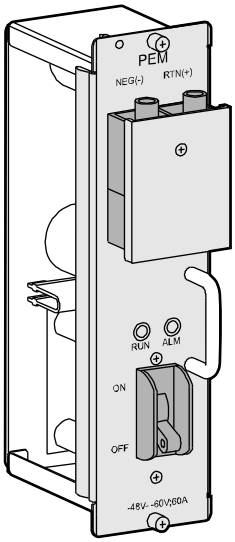
This section describes the appearance, functions, and technical parameters of the DC power supply module.

Figure 3-6 appearance of the PEM on theCX600-X16.

NOTE

If the power devices need a large number of power lines, see **DPD300-4-12 Power Distribution Box, Dual-Two Inputs**.

Figure 3-6 Appearance of the CX600-X16's PEM



The LED indicators on the PEM of the CX600-X16 are described in **Table 3-5**.

Table 3-5 Description of the indicators of the PEM

Indicator	Color	Description
RUN	Green	Indicates normal power output. If the indicator is steady on, it implies the normal output.
ALM	Red	Power failure indicator. If the indicator is steady on, it indicates the following: ● The lightning protection link of the power module failed. ● The power modules do not have input power.

Table 3-6 lists the technical parameters of the DC power supply module.

Table 3-6 Technical parameters of the DC PEM

Item	Technical Parameter
Dimensions (H x W x D)	220 mm x 58 mm x 115 mm (8.66 in. x 2.28 in. x 4.53 in.)
Weight	1.1 kg (2.43 lb)
Input voltage range	-38.4 V DC to -72 V DC
Input rated voltage	-48V/-60V
Maximum input current	70 A

Item	Technical Parameter
Output voltage	-38.4 V DC to -72 V DC
Output current	70 A
Rated current of the air-break	70 A
Maximum output power	2800 W

If the CX600-X16 has a DC power supply system, eight 70 A PEMs work in 4+4 backup mode. **Figure 3-7** shows details of the DC power supply system.

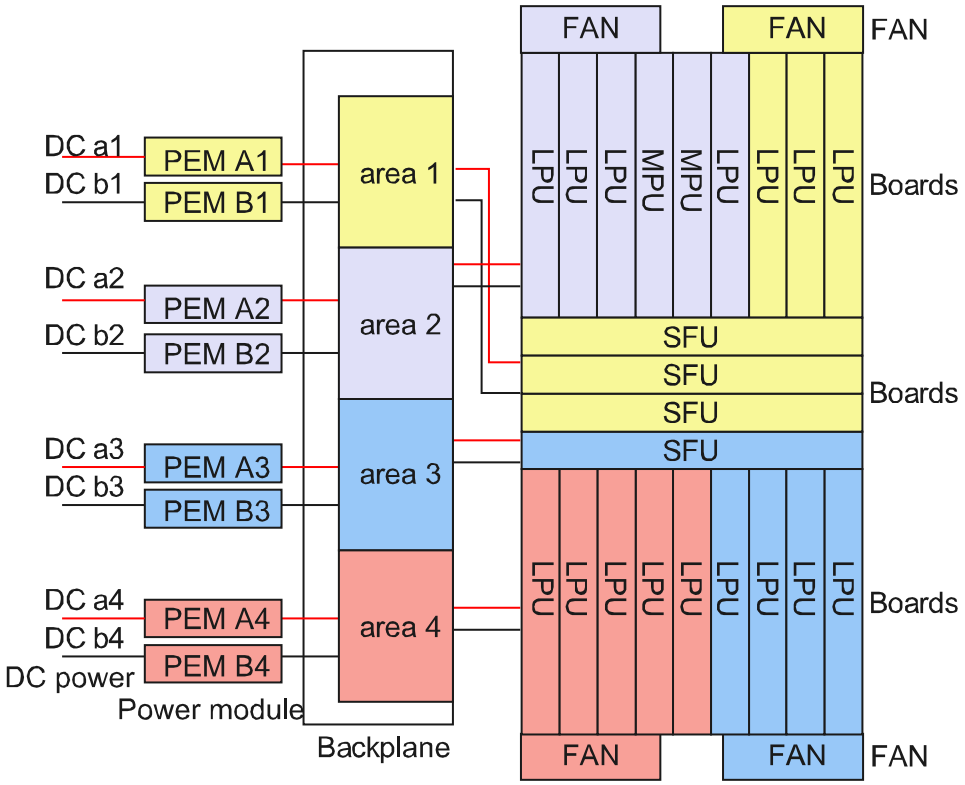
Two -48V power inputs are joined on the board.

After the low-frequency filtering, the two -48 V power inputs for fans are joined inside the fan module.

NOTE

In **Figure 3-7**, each DC power input contains one -48 V power input and one RTN input. Two separated RTN input are joined on the board.

Figure 3-7 Architecture of the CX600-X16 DC power supply system



NOTE

PEM A1 and PEM B1 work in 1+1 backup mode, PEM A2 and PEM B2 work in 1+1 backup mode, PEM A3 and PEM B3 work in 1+1 backup mode, PEM A4 and PEM B4 work in 1+1 backup mode.

3.2.4 AC Power Supply System

This section describes the appearance, functions, and the technical parameters of the AC power supply system.

NOTE

If only AC power is available, the CX600-X16 requires two AC-DC converter EPS200-4850A.

Figure 3-8 and Figure 3-9 show the appearance of the EPS200-4850A.

Figure 3-8 Front view of the EPS200-4850A

Figure 3-9 Rear view of the EPS200-4850A

Table 3-7 lists the technical parameters of the EPS200-4850A.

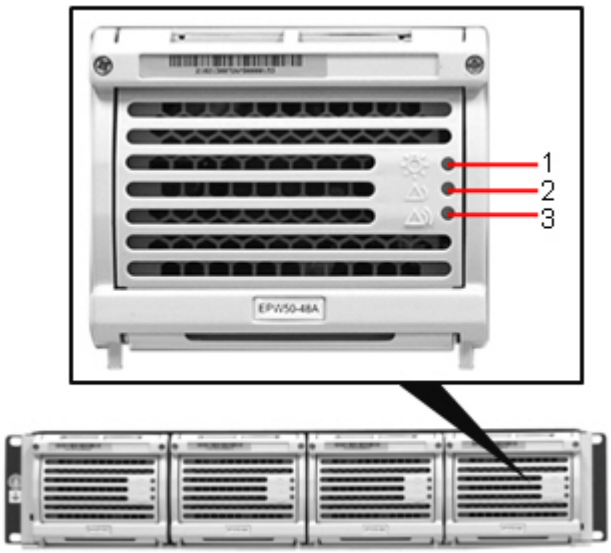
Table 3-7 Technical parameters of the EPS200-4850A

Item	Technical Parameter
Dimensions (H x W x D)	86.1 mm x 442.0 mm x 580.0 mm (3.39 in. x 17.40 in. x 22.83 in.)

Item	Technical Parameter
Input voltage range	90 V AC to 275 V AC 175 V AC to 275 V AC (recommended)
Maximum input current	18.5 A/single module
Maximum output current	50 A/single module
Maximum output power	2900 W/single module

The following figure shows the indicators on the EPS200-4850A.

Figure 3-10 Indicators on the EPS200-4850A



1. Operation indicator 2. Protection indicator 3. Fault indicator

The following table provides the checklist for the EPS200-4850A.

Item	Indicator Color	Status Description	Cause of the Abnormality
Operation indicator	Green	If the indicator is steady green, the EPS200-4850A is running properly. If the indicator is off, an exception occurs.	No main AC power is input, the AC input voltage is higher or lower than the normal range, or the EPS200-4850A has no output.

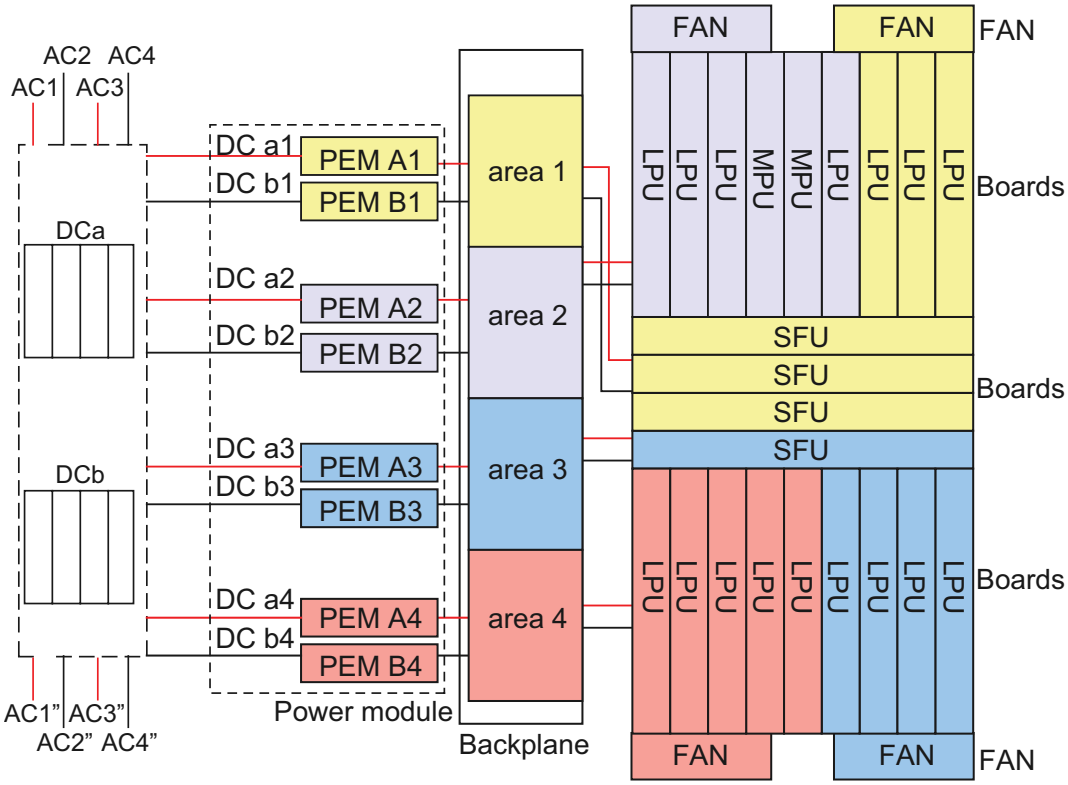
Item	Indicator Color	Status Description	Cause of the Abnormality
Protection indicator	Yellow	If the indicator is off, the EPS200-4850A is running properly. If the indicator is on, an exception occurs.	A temperature alarm is generated (if the temperature exceeds 65°C, the EPS200-4850A will be powered off), or the EPS200-4850A is in the dormant state (the indicator is on and no alarm is generated).
Fault indicator	Red	If the indicator is off, the EPS200-4850A is running properly. If the indicator is on, an exception occurs.	The EPS200-4850A is powered off due to over-voltage or over-temperature, or fans are faulty, or the EPS200-4850A has no output due to its internal faults.
DC output voltage	-	The normal voltage ranges from –43.2 V DC to –57 V DC	-

Figure 3-11 diagrams the AC power supply system of the CX600-X16. The input AC power is converted into regulated DC power by an EPS200-4850A. The resulting DC power output is connected to the PEMs through external cables to supply power for all boards and fan modules.

Two -48V power inputs are joined on the board.

In **Figure 3-11**, each DC power input contains one -48 V power input and one RTN input. Two separated RTN inputs are joined on the board.

Figure 3-11 Architecture of the CX600-X16 AC power supply system



Installing the EPS200-4850A in the same cabinet as the chassis is recommended. If the EPS200-4850A cannot be installed in the same cabinet as the chassis, it should be placed near the cabinet and careful attention needs to be paid to the cabling. Two EPS200-4850A work in 1+1 backup mode. Each power module provides four circuit breakers and eight AC power inputs. Each circuit breaker is 20 A.

NOTE

PEM A1 and PEM B1 work in 1+1 backup mode, PEM A2 and PEM B2 work in 1+1 backup mode, PEM A3 and PEM B3 work in 1+1 backup mode, PEM A4 and PEM B4 work in 1+1 backup mode.

3.3 Heat Dissipation System

This section describes the appearance, functions, and specifications of the heat dissipation system.

3.3.1 System Air Channel

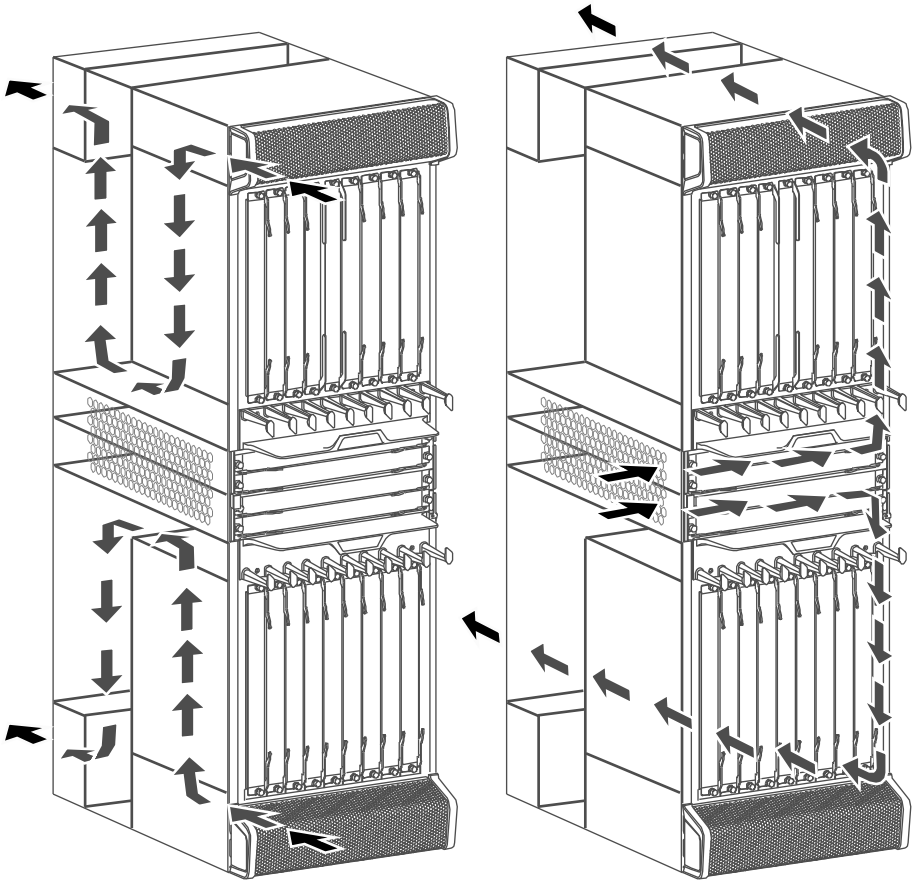
This section describes the CX600-X16's system air channel.

The CX600-X16 is divided into an upper chassis and a lower chassis; it draws in air from the front and exhausts air from the rear. The air intake vent on the upper chassis is located above the board area on the front chassis; the air exhaust vent is located above the board area on the rear chassis. The lower chassis and the upper chassis are opposites. The upper chassis and the lower chassis also have separate heat dissipation systems.

The middle area of the CX600-X16 is for SFU slots. The air intake vent of this area is located on the left of the chassis. Two upper SFU slots in the area draw in air from the left. When flowing to the right, the air joins the air from the upper chassis. Two lower SFU slots in the area also draw in air from the left. When flowing to the right, the air joins the air from the lower chassis.

Figure 3-12 shows the air flow in the CX600-X16.

Figure 3-12 Air flow in the CX600-X16



3.3.2 Air Intake Vent

This section describes the air intake vents.

The CX600-X16 has three air channels.

The upper and lower chassis have separate air channels that draw air from the front and exhausts air from the rear. The air filters are installed over the air intake vents. Each filter has a curved face, large area, and small windage resistance. These features help to improve heat dissipation efficiency. Air filters on the upper and lower chassis are identical.

The air channel in the SFU slot area is located on the left of the chassis. The air filter uses front access. The depth of the air filter is the same as that of an SFU and the height of the air filter is four times the height of the SFU.

3.3.3 Fan Module

This section describes the appearance of the fan module.

Two fan modules, each containing one fan, are located side by side at the air exhaust vent. If a single fan fails, the system can still work normally for a short period of time at ambient temperature of 40ºC (104ºF). **Figure 3-13** shows the appearance of a fan module.

NOTE

Short-term operation means that the continuous working time does not exceed 96 hours and the accumulated time per year does not exceed 15 days.

Figure 3-13 Appearance of a fan module

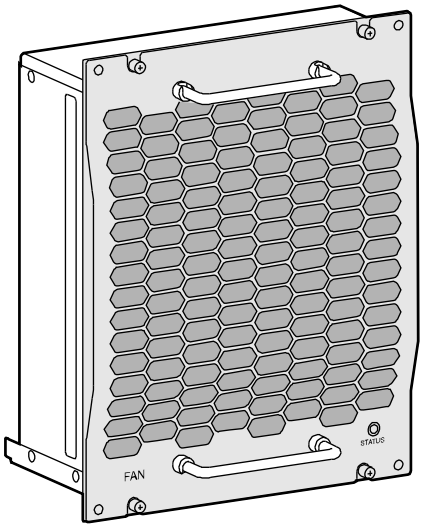


Table 3-8 lists the indicators on the fan module.

Table 3-8 Description of the indicators on the fan module

Indicator	Color	Description
STATUS	Green	If the indicator blinks, the fan module is working normally.
	Red	If the indicator blinks, the fan module, PEM, or filtering box is faulty.

Table 3-9 lists the technical parameters of the fan module.

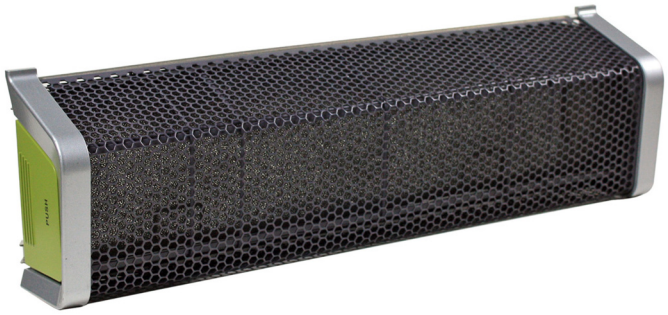
Table 3-9 Technical parameters of the fan module

Item	Technical Parameter
Dimensions (H x W x D)	243.7 mm x 210.4 mm x 100 mm (9.59 in. x 8.28 in. x 3.94 in.)
Number of fans	CX600-X16: 4CX600-X8: 2
Weight of a fan	3.4 kg (7.50 lb)
Power consumption of a fan (typical value)	250 W
Maximum noise of a fan	74 dB

3.3.4 Air Filter

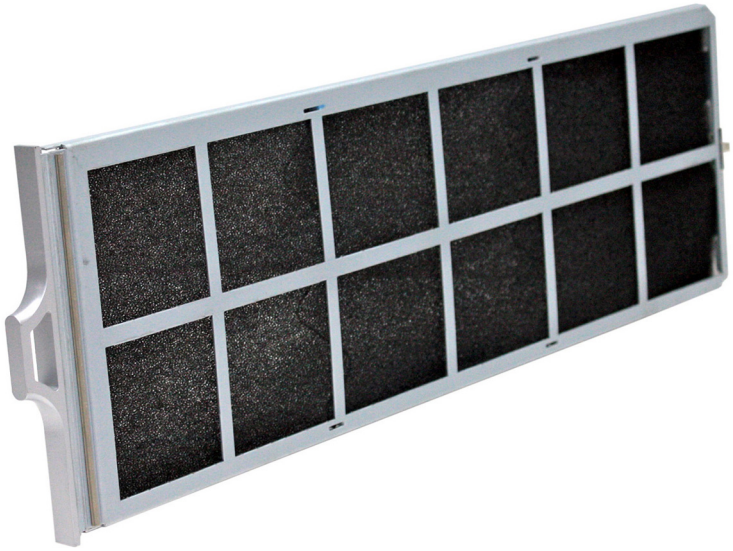
The CX600-X16 draws in air from the front and exhausts air from the rear. The two air filters on the upper and lower chassis are identical. To maximize air intake, the filters are fully perforated. Air filters are fixed to the chassis by fasteners to facilitate filter removal and replacement. **Figure 3-14** shows the appearance of an air filter.

Figure 3-14 An air filter



The air channel in the SFU slot area is located on the left of the chassis. The air filter uses front access. The depth of the air filter is the same as that of an SFU and the height of the air filter is four times the height of an SFU as shown in **Figure 3-15**.

Figure 3-15 An air filter in the SFU slot area



Placing a black sponge air filter at the air intake vent helps to prevent dust from entering the system. It is recommended that air filters be removed and cleaned at least once every three months.

3.3.5 Fan Speed Adjustment

This section describes the fan speed adjustment.

When the system is fully configured, temperatures reported by the temperature sensors on the LPUs, SFUs, and MPUs serve as the basis for fan speed adjustment. **Table 3-10** lists general principles.

Table 3-10 Fan Speed Adjustment Principles

Ambient Temperature	Rotational Speed	Noise and Dissipation Standards
-5°C-+27°C (23°F - 80.6°F)	Low speed (50% rotational speed)	When fans rotate at a constantly low speed, the noises meet the NEBS standard and the fans meet heat dissipation requirements of a fully configured system.
27°C-50°C (80.6°F - 122°F)	Linear variation	The fan speed is adjusted smoothly in linear mode, without a sharp increase in noises.
Over 45°C (113°F)	High speed (100% rotational speed)	Fans rotate at high speed to meet heat dissipation requirements.

3.4 Switching Network

This section describes the functions of the switch fabric unit.

NOTE

The 200G switch fabric unit cannot be used together with 40G switch fabric unit for long-term working, and can be used together only for short-term operation during upgrade.

3.4.1 Introduction to the Switching Network

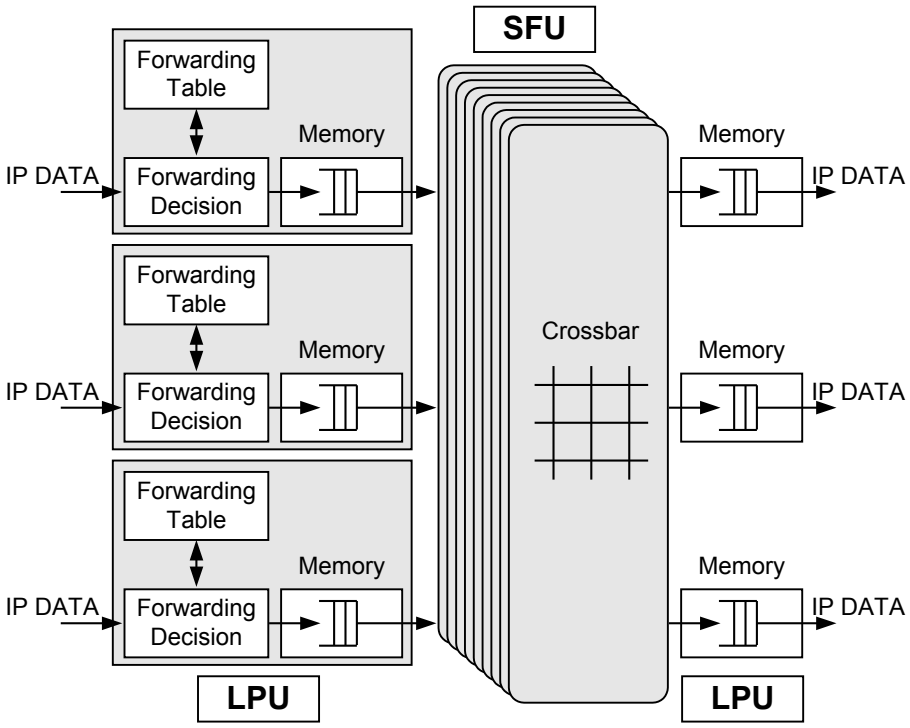
This section describes the principle of the SFU.

The switching network responsible for switching data between LPUs is a key component of the CX600. The CX600 uses switching chips developed by Huawei and Memory-Crossbar-Memory (M-C-M) to provide a three-level switching mode. Level-1 and level-3 switching use a shared-memory model and are performed on LPUs; level-2 switching uses a Crossbar model and is performed on SFUs. **Figure 3-16** shows the switching network of the CX600.

The level-1 switching chip on one LPU is fully connected to the level-2 switching chips on SFUs. The level-2 switching chips on the SFUs are also fully connected to the level-3 switching chip on another LPU. In addition, the level-2 crossbar switching chips work in load balancing mode on multiple switching planes. The entire switching network is unblocked. The following describes how data packets are transmitted across the switching network.

1. Data packets enter an LPU through physical interfaces and are fragmented into cells of a fixed length. These cells are then sent to the level-1 switching chips. After being buffered and scheduled, the cells enter the crossbar switching chips on the SFU. The level-1 switching chip on an LPU is fully connected to all of the level-2 switching chips. As a result, the same number of cells can be distributed to each level-2 switching plane. This implements load balancing on switching planes and facilitates fault tolerance.
2. After the cells reach the crossbar switching chips, the crossbar switching chips schedule the cells to the corresponding outbound interfaces according to the destination interfaces of the data packets. The cells are then sent to the level-3 switching chips on another LPU. At this point, the switching of the cells by the level-2 switching chips is completed.
3. After the cells reach the level-3 switching chips on another LPU, the system searches for the destination interfaces. Once found, the cells are reassembled and sent out through physical interfaces. At this point, switching of the data packets is completed.

Figure 3-16 Switching network of the CX600



Reliability

The CX600-X16 has four SFUs that work in 3+1 load balancing mode. The four SFUs load balance services at the same time. When one SFU is faulty or being replaced, the other three SFUs automatically take over its tasks to ensure normal delivery of services,therefore improving system reliability.

3.4.2 Switch Fabric Unit B

Appearance

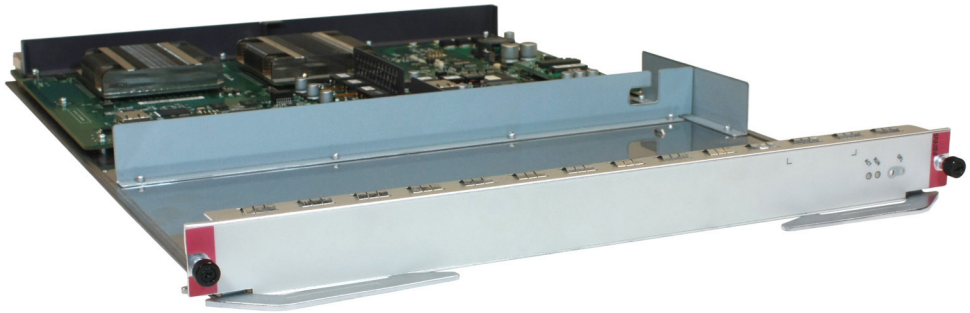
The Switch Fabric Unit B(SFUI-200-B) is the new generation switch board. It supports 200G full duplex capacity per slot. The Switch Fabric Unit B(SFUI-200-B) switches data for the entire system at line speed of 3.15 Tbit/s. This ensures a non-blocked switching network.

The CX600-X16 has four SFUs working in 3+1 load balancing mode. The entire system provides a switching capacity at wire speed of 12.58 Tbit/s.

The four SFUs load balance services at the same time. When one SFU is faulty or being replaced, the other three SFUs automatically take over its tasks to ensure normal delivery of services.

Figure 3-17 shows the appearance of the Switch Fabric Unit B(SFUI-200-B).

Figure 3-17 Appearance of the Switch Fabric Unit B(SFUI-200-B)



Panel

Figure 3-18 shows the appearance of the panel.

Figure 3-18 Appearance of the panel

1. Ejector lever 2. ACT indicator 3. OFL button 4. OFL indicator
5. RUN indicator

Table 3-11 describes the buttons and indicators on the panel.

Table 3-11 Buttons and indicators on the panel

LED	Description
RUN (green)	Before the registration of the SFU: If the indicator blinks twice every second (2 Hz), the system is in the alarm state. After the registration of the SFU: If the indicator blinks once every two seconds (0.5 Hz), the system is running normally.
ACT (green)	If the indicator is on, it indicates that the SFU is working normally; if the green indicator is off, it indicates that the SFU is faulty.
OFL (red)	When the SFU is working normally, the OFL indicator is off. After the OFL button is pressed to power off the SFU, the OFL indicator is on.

NOTE

The Switch Fabric Unit B (SFUI-200-B) can be used only on the CX600-X16.

Technical Specifications

Table 3-12 lists the technical specifications of the Switch Fabric Unit B (SFUI-200-B).

Table 3-12 Technical specifications of the Switch Fabric Unit B (SFUI-200-B)

Item	Specifications
Silkscreen of the board name	SFUI-200-B
Power consumption (typical value)	90 W
Heat dissipation	292 BTU/hour
Board weight	4.26 kg (9.39 lb)
Dimensions (H x W x D)	41 mm x 399 mm x 551 mm (1.61 in. x 15.71 in. x 21.69 in.)
Lowest Software Version	V600R003C00

3.4.3 40Gbps Switch Fabric Unit B

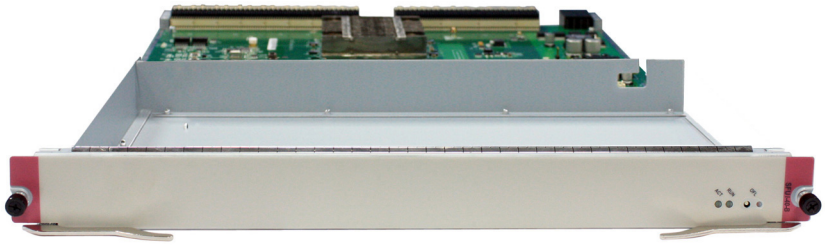
Appearance

As shown in Figure 3-19, the CX6DSFUI401B on the CX600-X16 switches data for the entire system at line speed of 640 Gbit/s (320 Gbit/s for the upstream traffic and 320 Gbit/s for the downstream traffic). This ensures a non-blocked switching network.

The CX600-X16 has four SFUs working in 3+1 load balancing mode. The entire system provides a switching capacity at wire speed of 2.56 Tbit/s.

The four SFUs load balance services at the same time. When one SFU is faulty or being replaced, the other three SFUs automatically take over its tasks to ensure normal delivery of services.

Figure 3-19 Appearance of the CX6DSFUI401B



Panel

Figure 3-20 shows the appearance of the panel.

Figure 3-20 Appearance of the panel

1. Ejector lever 2. ACT indicator 3. OFL button 4. RUN indicator
5. OFL indicator

Table 3-13 describes the buttons and indicators on the panel.

Table 3-13 Buttons and indicators on the panel

LED	Description
RUN (green)	Before the registration of the SFU: If the indicator blinks twice every second (2 Hz), the system is in the alarm state. After the registration of the SFU: If the indicator blinks once every two seconds (0.5 Hz), the system is running normally.
ACT (green)	If the indicator is on, it indicates that the SFU is working normally; if the green indicator is off, it indicates that the SFU is faulty.
OFFLINE (red)	When the SFU is working normally, the OFL indicator is off. After the OFL button is pressed to power off the SFU, the OFL indicator is on.

NOTE

The CX6DSFUI401B can be used only on the CX600-X16.

The 40G switch fabric unit cannot be used together with 200G switch fabric unit for long-term working, and can be used together only for short-term operation during upgrade.

Technical Specifications

Table 3-14 lists the technical specifications of the 40Gbps Switch Fabric Unit B.

Table 3-14 Technical specifications of the 40Gbps Switch Fabric Unit B

Item	Specifications
Silkscreen of the board name	SFUI-40-B
Power consumption (typical value)	50 W
Heat dissipation	162.22 BTU/hour
Board weight	3.5 kg (7.72 lb)
Dimensions (H x W x D)	41 mm x 399 mm x 551 mm (1.61 in. x 15.71 in. x 21.69 in.)
Lowest Software Version	V600R001

3.5 Control Plane

This chapter describes the control plane of the CX600-X16.

3.5.1 Introduction to the Control Plane

This section describes the functions of the control plane.

The control plane of the CX600-X16 is separated from the data plane and the monitoring plane.

The MPU on the CX600-X16 is responsible for system control and management, including route calculation, device management and maintenance, and device monitoring.

System Control and Management Unit

As the system control and management unit, the MPU provides the following functions on the system control panel:

- Route calculation: All routing protocol packets are sent by the forwarding engine to the MPU for processing. In addition, the MPU broadcasts and filters packets, and downloads routing policies from the policy server.
- Outband communication between boards: The LAN switch modules integrated on the MPU provide outband communications between boards. In this manner, messages can be controlled, maintained, and exchanged between SFUs and LPUs.
- Device management and maintenance: Devices can be managed and maintained through the management interfaces (serial interfaces) provided by the MPU.
- Data configuration: The MPU stores configuration data, startup files, charging information, upgrade software, and system logs.
- Data storage: The MPU provides two interfaces for CF cards, which serve as mass storage devices to store data files.

System Clock Unit

As the system clock unit, the MPU provides accurate and reliable SDH clock signals for LPUs. The MPU can provide three-channel 2.048 MHz synchronous clock signals for the downstream devices, or receive 2.048 MHz or 2.048 Mbit/s external reference clock signals.

To support IEEE 1588v2, that is, the Precision Time Protocol (PTP), the SDH clock interface can input time information in multiple formats by selecting specific software.

System Maintenance Unit

As the system maintenance unit, the MPU collects monitored information to test system units locally or remotely, or implement in-service upgrading of system units.

The MPU periodically collects information about the operation of system units through the MonitorBus. The MPU then generates related control information based on the collected information, for example, the detection of board installations and adjustments to fan speed. Through the joint test action group (JTAG) bus, the MPU remotely or locally tests system units, or performs in-service upgrades of system units.

Reliability

The main control modules, clock modules, and LAN switch modules on the MPU work in 1:1 hot backup mode, therefore improving system reliability.

The two MPUs work in 1:1 backup mode. Each MPU monitors the status of the other. If the master MPU is faulty, the slave MPU automatically takes over as the master MPU.

3.5.2 Main Processing Unit B4

Appearance

Figure 3-21 shows the appearance of the CX6D0MPUB410.

Figure 3-21 Appearance of the MPU

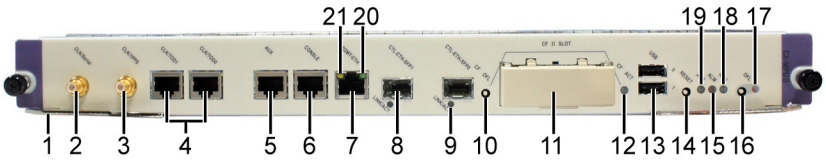
NOTE

In this document, the equipment exterior is for reference only. The actual equipment may differ from what is shown in the figures.

Panel

Figure 3-22 shows the appearance of the panel.

Figure 3-22 Appearance of the panel



1. Ejector lever	2. CLK/Serial	3. CLK/1PPS	4. CLK/TOD
5. AUX	6. Console	7. MGMT-ETH	8. CTL-ETH-SFP
9. LINK/ACT	10. CF OFL button	11. CF card	12. CF indicator
13. USB	14. RESET button	15. ALM indicator	16. OFL button
17. OFL indicator	18. RUN indicator	19. ACT active/standby indicator	20. MGMT-ETH LINK indicator
21. MGMT-ETH ACT indicator			

Table 3-15 lists the buttons and indicators on the panel of the MPU.

Table 3-15 Buttons and indicators on the panel of the MPU

Indicator/Button	Description
OFL button	To remove a board, you must press and hold the button for six seconds until the OFL indicator turns on. This button takes effect only on the slave MPU.

Indicator/Button	Description
OFL indicator (red)	If the indicator is on, you can remove the board.
RUN indicator (green)	If the indicator blinks once every two seconds (0.5 Hz), the system is in the normal state. If the indicator blinks twice each second (2 Hz), the system is in the alarm state.
ALM indicator (red)	If the indicator is steady on, the system is in the alarm state. If the indicator is steady off, the system is in the normal state.
ACT active/standby indicator (green)	If the indicator is steady on, the MPU is in the active state. If the indicator is off, the MPU is in the standby state.
Reset button	The button is used for resetting the MPU. If you press the Reset button, you can reset the MPU.
CF ACT indicator (green)	If the indicator is on, the CF is in position. If the indicator is blinking, data is being read or written. If the indicator is off, the CF is not in position or can be removed.
CF OFL button	If you press the CF OFL button, all operations on the CF card will be ended and the CF card will be powered off.
SFP LINK/ACT indicator (green)	If the indicator is steady on, the link is normal. If the indicator is blinking, data is being transmitted.
MGMT-ETH LINK indicator (green) (on Ethernet network interfaces)	If the indicator is steady on, the link is normal. If the indicator is off, the link is Down.
MGMT-ETH ACT indicator (amber) (on Ethernet interfaces)	If the indicator is blinking, data is being transmitted. If the indicator is off, no data is being transmitted.

Table 3-16 lists the interfaces on the MPU and their uses.

Table 3-16 Interfaces on the MPU and their uses

Interface Name	Connector Type	Description
USB interface	USB	It is not used and reserved.
CF card interface	TYPE II (compatible with TYPE I)	It is used to hold a CF card to store data files as a massive storage device.

Interface Name	Connector Type	Description
CTL-ETH-SFP interface (1000MBase-X)	SFP	It is not used and reserved for the use after capacity expansion.
MGMT-ETH interface (10M/100M/1000M Base-TX auto-sensing)	RJ45	It connects to the NMS workstation and has LINK and ACT indicators.
Console interface	RJ45	It connects to the console for on-site configuration of the system.
AUX interface	RJ45	It connects to the Modem for remote maintenance through dialing.
CLK/TOD0	RJ45	Bits0: It is used to input or output 2 Mbit/s clock signals, 2 MHz clock signals, 1pps +ASCII clock signals, or two channels of DCLS clock signals.
CLK/TOD1	RJ45	Bits1: It is used to input or output 2 Mbit/s clock signals, 2 MHz clock signals, 1pps +ASCII clock signals, or two channels of DCLS clock signals.
CLK/1PPS	SMB	Bits2: It is used to input or output 2 Mbit/s clock signals, 2 MHz clock signals, or 1 PPS signals.
CLK/Serial	SMB	Bits2: It is used to input or output 2 Mbit/s clock signals, 2 MHz clock signals, or RS232 signals.

NOTE

BITS2 provides two SMB ports, and the signal type can be set to 2Mbps/2Mhz/1PPS+RS232. When signal is 2Mbps/2Mhz, CLK/1PPS is fixed as input and CLK/Serial is fixed as output. When signal is 1PPS +RS232, CLK/1PPS and CLK/Serial are bound together, CLK/1PPS signal type is 1PPS whereas CLK/Serial signal type is RS232, and the setting of input/output apply to both SMB ports.

Interface Attributes

Table 3-17 lists the 1000MBase-X-SFP interface attributes.

Table 3-17 1000MBase-X-SFP interface attributes

Attribute	Description
Connector type	SFP
Operation mode	1000M fiber
Standard compliance	IEEE 802.3-2002

Attribute	Description
Cable specification	Single-mode or multi-mode fibers

Table 3-18 lists the attributes of the 10Base-T/100Base-TX/1000Base-T-RJ45 interfaces.

Table 3-18 10Base-T/100Base-TX/1000Base-T-RJ45 interface attributes

Attribute	Description
Connector type	RJ45
Operation mode	10M/100M/1000M auto-sensing interfaces, supporting half-duplex and full-duplex modes
Standard compliance	IEEE 802.3-2002
Cable specification	Category 5 unshielded twisted pair (UTP) cables recommended when the interface rate is 10 Mbit/s or 100 Mbit/s; super category 5 Shielded Twisted Pair (STP) cables recommended when the interface rate is 1000 Mbit/s

Table 3-19 lists the console interface attributes.

Table 3-19 Console interface attributes

Attribute	Description
Connector type	RJ45
Operation mode	Duplex Universal Asynchronous Receiver/Transmitter (UART)
Electrical attribute	RS-232
Baud rate	9600 bit/s (default value), which can be changed as required
Data equipment type	Data Circuit-terminating Equipment (DCE)
Cable specification	8-core shielded cable

Table 3-20 lists the AUX interface attributes.

Table 3-20 AUX interface attributes

Attribute	Description
Connector type	RJ45
Operation mode	Duplex UART
Electrical attribute	RS-232
Baud rate	9600 bit/s (default value), which can be changed as required
Data equipment type	Data Terminal Equipments (DTE)
Cable specification	8-core shielded cable

Table 3-21 lists the external clock interface attributes.

Table 3-21 External clock interface attributes

Attribute	Description
Connector type	RJ45
Cable specification	120-ohm clock cable
Standard compliance	G.703

Table 3-22 lists the external clock interface attributes.

Table 3-22 External clock interface attributes

Attribute	Description
Connector type	SMB
Cable specification	75-ohm clock cable
Standard compliance	G.703

Technical Specifications

Table 3-23 lists the technical specifications of the Main Processing Unit B4.

Table 3-23 Technical specifications of the Main Processing Unit B4

Item	Specifications
Silkscreen of the board name	MPUB
Power consumption (typical value)	85 W
Heat dissipation	275.78 BTU/hour
Board weight	4.2 kg (9.26 lb)
Dimensions (H x W x D)	41 mm x 399 mm x 551 mm (1.61 in. x 15.71 in. x 21.69 in.)
Lowest Software Version	V600R001

4 CX600-X8

About This Chapter

This chapter describes the device structure, power supply and heat dissipation system.

4.1 Device Overview
This section gives an overview of the CX600-X8 hardware.

4.2 Power Supply System
This chapter describes the power supply system of the CX600-X8.

4.3 Heat Dissipation System
This section describes the appearance, functions, and specifications of the heat dissipation system.

4.4 Switching Network
This section describes the functions of the switch fabric unit.

4.5 Control Plane
This chapter describes the control plane of the CX600-X8.

4.1 Device Overview

This section gives an overview of the CX600-X8 hardware.

4.1.1 System Overview

This section gives an overview of the system.

System Overview

The CX600 series adopt a centralized routing engine and a distributed forwarding architecture. This helps to provide rich and flexible services and to perform large-capacity forwarding.

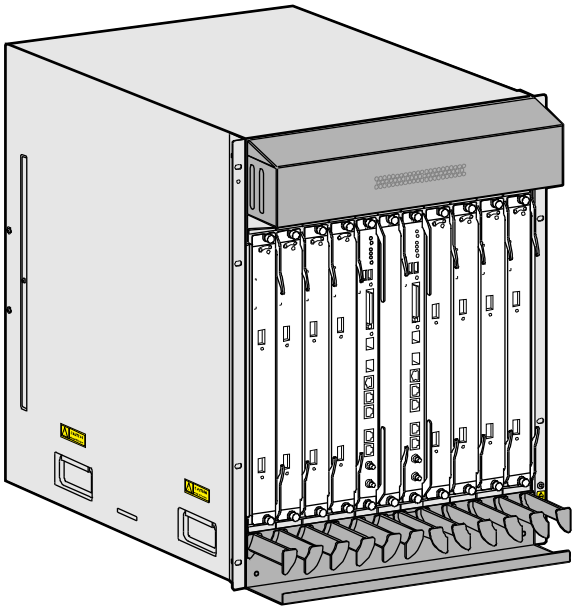
The CX600-X8 has an integrated chassis, with main components which all support hot swapping.

The CX600-X8 supports all the Line Processing Units on the former CX600, but the Switch and Route Processing Units (SRUs) and Switch and Fabric Units (SFUs) are new.

As shown in **Figure 4-1**, the CX600-X8 has eight LPU slots. The switching capacity of the entire system is 7.08 Tbit/s.

Figure 4-1 shows the appearance of the CX600-X8.

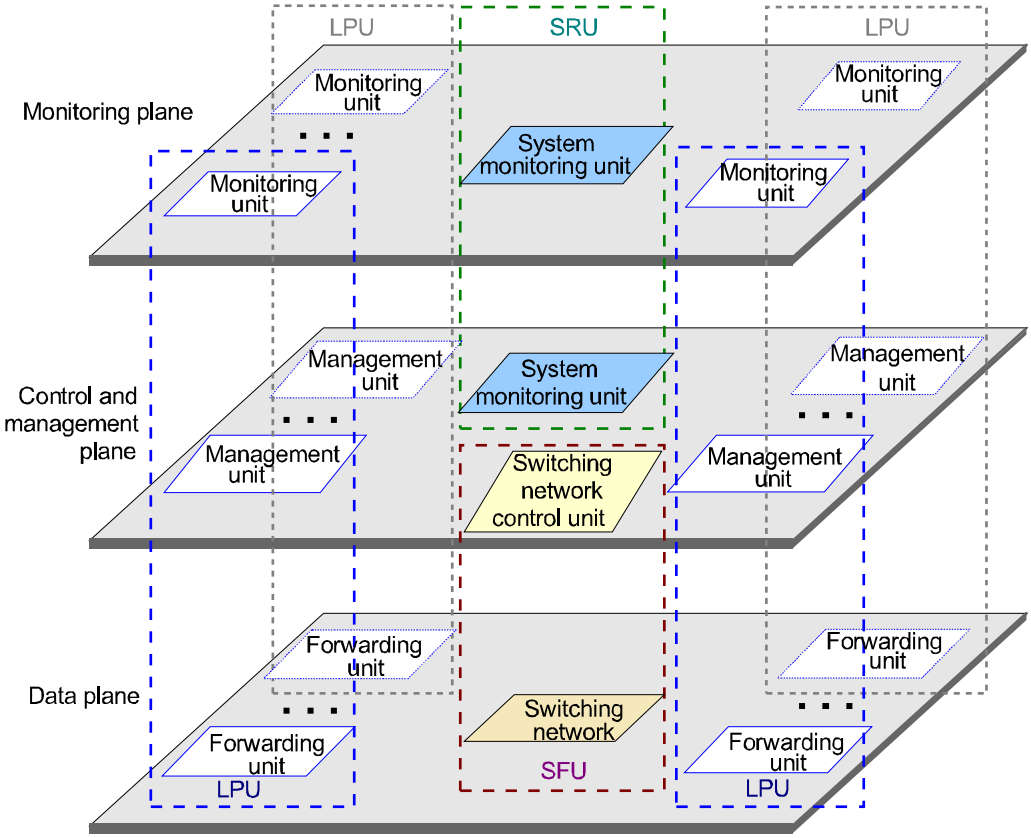
Figure 4-1 Appearance of the CX600-X8



System Architecture

The CX600-X8 adopts a system architecture shown in **Figure 4-2**. In this architecture, the data plane, management and control plane, and monitoring plane are separated. This design helps to improve system reliability and facilitates upgrading of each plane separately.

Figure 4-2 Diagram of the system architecture



System Features

The CX600-X8 provides the following system features:

- Unblocked switching network that can be upgraded, with switching capacity at the Tbit/s level
- Distributed hardware-based forwarding and fast service deployment
- Compact structure to increase interface density
- Normalized design of system components
- Separation of the control channel, service channel, and monitoring channel to ensure non-blacking control channels and monitoring channels
- Carrier-class high reliability and manageability
- Shielding at the modular level to meet ElectroMagnetic Compatibility (EMC) requirements
- Hot-swappable boards, power modules, and fans
- U-shaped air channels to improve system heat dissipation
- Distributed power supply to enhance power supply capabilities for a single chassis
- 200 mm (7.87 in.) fans with a filtering box, and supports for NEBS and ETSI
- SRUs in 1:1 backup mode
- SFUs in load balancing mode

- Backup for key components such as power modules, fan modules, clocks, and management buses
- Protection against incorrect insertion of boards
- Queries about alarm prompts, alarm indications, running status, and alarm status of the voltage and ambient temperature

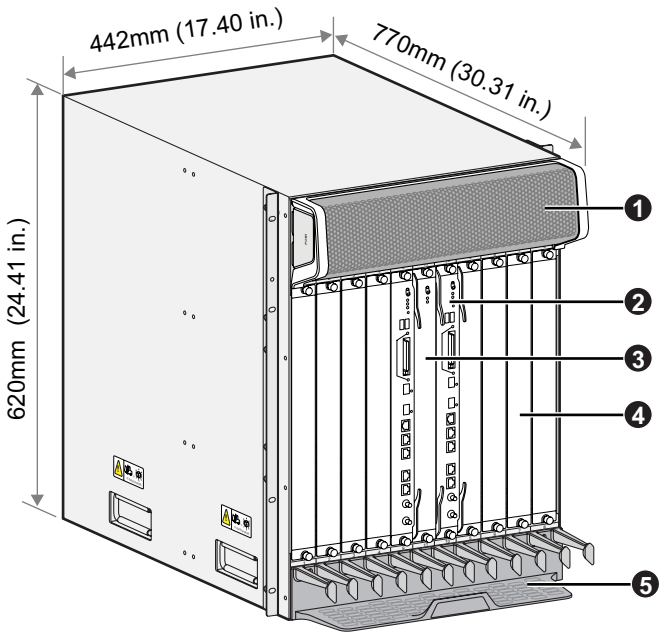
4.1.2 Components of the CX600-X8

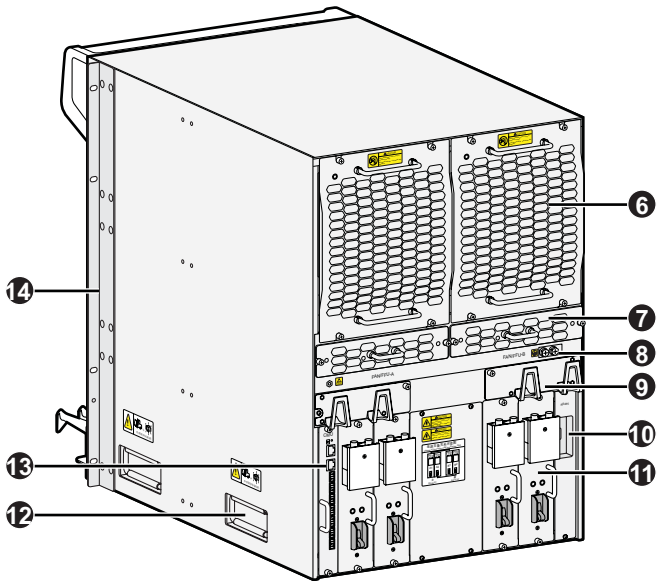
Main Components

The CX600-X8 has an integrated chassis, with main components which all support hot swapping.

Figure 4-3 shows the architecture and main components of the CX600-X8.

Figure 4-3 Appearance and main components of the CX600-X8





1. Air intake vent	2. SRU	3. SFU	4. LPU
5. Cable trough	6. Fan	7. Filtering box	8. Ground terminal
9. Rear cable trough	10. power management interface	11. DC power module	12. Handle
13. CMU	14. Mounting ear		

NOTE

Currently, the CX600-X8 has two types of chassis: one with a filtering box and the other without a filtering box. For the latter type, the filtering box module on the rear is replaced by a panel. Changing a filtering box module to a panel is not available on site. The chassis without a filtering box is an optimized alternative, which has no impact on the application and performance of the CX600-X8.

Slot Layout

Figure 4-4 shows the slot layout on the CX600-X8.

Figure 4-4 Slot layout on the CX600-X8

1	2	3	4	9	11	10	5	6	7	8
LPU	LPU	LPU	LPU	SRU	SFU	SRU	LPU	LPU	LPU	LPU
1	2	3	4	9	11	10	5	6	7	8

An interface is numbered in the format of Slot number/card number/Port number

NOTE

Slot number: On the CX600-X8, the slots of LPUs are numbered from 1 to 8. The slot number increases from left to right facing the front panel of the CX600 (there are corresponding marks on the panel).

Card number: The cards of LPUs are numbered from top to bottom and from right to left beginning with 0. If there is no card on a board, the card number is set to 0.

Port number: The ports of LPUs are numbered from left to right and from top to bottom beginning with 0.

Table 4-1 describes the slot layout on the CX600-X8.

Table 4-1 Board distribution in the board cage of the CX600-X8

Slot Number	Quantity	Slot Width	Remarks
1 to 8	8	41 mm (1.6 inches)	These slots are used to hold LPUs.
9 to 10	2	36 mm (1.4 inches)	These slots hold SRUs in 1:1 backup mode.
11	1	36 mm (1.4 inches)	The slot is used to hold an SFU, which, together with two switch fabric units on the SRUs, works in 2+1 load balancing mode.

4.1.3 CX600-X8 Specification

This section describes the system configuration and physical parameters of the CX600-X8.

Chassis Specification

Table 4-2 lists the physical parameters of the CX600-X8.

Table 4-2 Physical parameters of the CX600-X8

Item		Description
Dimensions (H x W x D)		620 mm x 442 mm x 650 mm (24.41 in. x 17.40 in. x 25.59 in.) (chassis main body dimensions) 620 mm x 442 mm x 770 mm (24.41 in. x 17.40 in. x 30.31 in.) (chassis dimensions including the chassis's front and rear assembly and cable racks)
Installation position		N68E cabinet or a standard 19-inch cabinet
Weight	Empty chassis	43.2kg (95.27 lb)
	Full configuration (maximal)	136kg (299.88 lb)
Typical power consumption		4100W

Item		Description
Heat dissipation		13289.74 BTU/hour
DC input voltage	Rated voltage	-48 V
	Maximum voltage range	-38 V to -72 V
AC input voltage	Maximum voltage range	90 V to 275 V AC 175 V to 275 V AC(recommend)
System reliability	MTBF (year)	36.23
	MTTR (hour)	0.5
Ambient temperature	Long-term	0°C to 45°C (32°F to 113°F)
	Short-term	-5°C to 55°C (23°F to 131°F)
	Remarks	Limit of the temperature change rate: 30°C (86°F)/hour
Storage temperature		-40°C to 70°C (-40°F to 158°F)
Relative humidity	Long-term	5% RH to 85% RH, no coagulation
	Short-term	5% RH to 95% RH, no coagulation
Storage humidity		5% RH to 100% RH, no coagulation
Long-term altitude		≤ 4000 m (If the altitude is between 1800 meters and 4000 meters, the operating temperature of the device must decrease by 1°C for every 220 meters increase in altitude.

NOTE

As shown in the table, "width" does not involve the dimensions of rack-mounting ears.

As shown in the table, "width" does not involve the dimensions of rack-mounting ears. The measurement point of the temperature and humidity is 1.5 m (4.92 ft) over the floor and 0.4 m (1.31 ft) in front of the cabinet without the front and back doors.

Short-term operation means that continuous operating time does not exceed 48 hours and accumulated operating time per year does not exceed 15 days. If an operation exceeds either of these conditions, it is called a long-term operation.

Product Specifications

Table 4-3 System configuration list of the CX600-X8

Item	Typical Configuration	Remarks
Processing unit	Main frequency: 1.5 GHz	-
BootROM	8 MB	-
SDRAM	4 GB	-
NVRAM	4 MB	-
Flash	32 MB	-
CF card	4 GB	Two 2 GB CF cards.
Switching capacity	7.08 Tbit/s	-
Interface capacity	3.84 Tbit/s (bidirectional)	-
Number of LPU slots	8	-
Number of SRU slots	2	-
Number of SFU slots	1	-

4.1.4 Board Specifications

This section describes the specifications of boards supported by the CX600-X8.

Table 4-4 lists the specifications of boards supported by the CX600-X8.

Table 4-4 Specifications of boards supported by the CX600-X8

Type	Description	Silkscreen
SRU	**SRUA5**	SRUA
	SRUA4	SRUA
	SRUA7	SRUA
SFU	**SFU**	SFUI-200-C
	SFU	SFUI-40-C
	SFU	SFUI-100-D
SPU	**SPU**	SPU

Type	Description	Silkscreen
	Flexible Card Versatile Service Unit 10	VSUF-10
	Integrated Versatile Service Unit 20 A	VSUI-20-A
	Flexible Card Versatile Service Unit 160(VSUF-160)	VSUF-160
	Flexible Card Versatile Service Unit 80(VSUF-80)	VSUF-80
	Versatile Service Flexible Card(SP160)	SP160
	Versatile Service Flexible Card(SP80)	SP80
LPUF-10	**8.30 Flexible Card Line Processing Unit (LPUF-10,four slots)**	LPUF-10
	8.30.1 1-Port OC-192c/ STM-64c POS-XFP Flexible Card(Occupy two slots)	FPIC-1xOC192-POS
	8.30.2 1-Port OC-48c/ STM-16c POS-SFP Flexible Card	FPIC-1xOC48-POS
	8.30.3 2-Port OC-48c/ STM-16c POS-SFP Flexible Card	FPIC-2xOC48-POS
	8.30.4 4-Port OC-48c/ STM-16c POS-SFP Flexible Card	FPIC-4xOC48-POS
	8.30.5 4-Port OC-12c/ STM-4c POS-SFP Flexible Card	FPIC-4xOC12-POS
	8.30.6 8-Port OC-12c/ STM-4c POS-SFP Flexible Card	FPIC-8xOC12-POS
	8.30.7 4-Port OC-3c/STM-1c POS-SFP Flexible Card	FPIC-4xOC3-POS
	8.30.8 8-Port OC-3c/STM-1c POS-SFP Flexible Card	FPIC-8xOC3-POS

Type	Description	Silkscreen
	8.30.9 2-Port OC-12c/ STM-4c ATM-SFP Flexible Card	FPIC-2xOC12-ATM
	8.30.10 4-Port OC-3c/ STM-1c ATM-SFP Flexible Card	FPIC-4xOC3-ATM
	8.30.11 8-Port 100/1000Base-X-SFP Flexible Card	FPIC-8xGE
	8.30.12 8-Port 100/1000 Base-X-SFP Flexible Card A (Supporting 1588v2)	P10-8xFE/GE-SFP-A
	8.30.13 2-Port Channelized OC-3c/STM-1c POS-SFP Flexible Card	2xcPOS/STM1-SFP
	8.30.14 24-Port Channelized E1/T1-DB100 Flexible Card	24xcE1/cT1-DB 100
	8.30.15 4-Port Clear Channel E3/Channelized T3-SMB Flexible Card	4xE3/cT3-SMB
LPUS-20	**8.28.1 4-Port 10GBase WAN/ LAN-XFP Line Processing Unit S(LPUS-20)**	LPUS-20 4×10GBase LAN/WAN-XFP
	8.28.2 40-Port 100/1000Base-X-SFP Line Processing Unit S(LPUS-20)	LPUS-20 40×FE/GE-SFP
	8.28.3 40-Port 10/100/1000Base-RJ45 Line Processing Unit S	LPUS-20 40×FE/GE-RJ45
LPUF-21	**8.29 Flexible Card Line Processing Unit(LPUF-21-A/ LPUF-21-B/LPUF-21-E,2 sub-slots)**	LPUF-21-A LPUF-21-B LPUF-21-E
	8.29.1 1-Port 10GBase WAN/ LAN-XFP Flexible Card	1x10GBase LAN/WAN
	8.29.2 1-Port 10GBase WAN/ LAN-XFP Flexible Card A (Supporting 1588v2)	1x10GBase LAN/WAN-A
	8.29.3 1-Port 10GBase LAN/ WAN-XFP Flexible Card B (P20-B)	P20-1x10GBase LAN/WAN-XFP-B

Type	Description	Silkscreen
	8.29.4 1-Port 10GBase LAN/WAN-XFP Flexible Card E (P20-E)	P20-1x10GBase LAN/WAN-XFP-E
	8.29.5 12-Port 100/1000Base-SFP Flexible Card	12x100/1000Base-SFP
	8.29.6 12-Port 100/1000Base-SFP Flexible Card A (Supporting 1588v2)	12x100/1000Base-SFP-A
	8.29.7 12-Port 100/1000Base-X-SFP Flexible Card B(P20-B)	P20-12xGE-SFP-B
	8.29.8 10-Port 1000Base-X-SFP Flexible Card E(P20-E)	P20-10xGE-SFP-E
	8.29.9 12-Port 10/100/1000Base-RJ45 Flexible Card	12x10/100/1000Base-TX-RJ45
	8.29.10 1-Port OC-192c/STM-64c POS-XFP Flexible Card(Occupy two slots)	1-port OC-192c/STM-64c POS-XFP
	8.29.11 4-Port 10GBase WAN/LAN-XFP Flexible Card(Occupy two sub-slots)	4x10GBase LAN/WAN
	8.29.12 40-Port 10/100/1000Base-RJ45 Flexible Card(Occupy two sub-slots)	40x10/100/1000Base-TX-RJ45
	8.29.13 40-Port 100/1000Base-SFP Flexible Card(Occupy two sub-slots)	40x100/1000Base-SFP
	8.29.14 2-Port 10GBase LAN/WAN-XFP+20-Port 100/1000Base-X-SFP Flexible Card(P20,Occupy two sub-slots)	P20-2x10GBase LAN/WAN-XFP-20xFE/GE-SFP
LPUI-21-L	**8.27.1 24-Port 100/1000Base-X-SFP Integrated Line Processing Unit L(LPUI-21-L)**	LPUI-21-L 24xFE/GE-SFP-A

Type	Description	Silkscreen
	8.27.2 1-Port 10GBase LAN/WAN-SFP+ + 16-Port 100/1000Base-X-SFP Integrated Line Processing Unit L(LPUI-21-L)	LPUI-21-L 1x10GBase LAN/WAN-SFP +-16xFE/GE-SFP-A
LPUF-40	**8.23 Flexible Card Line Processing Unit(LPUF-40-A/LPUF-40-B/LPUF-40-E,2 sub-slots)**	LPUF-40-A LPUF-40-B LPUF-40-E
	8.23.1 20-Port 100/1000Base-X-SFP Flexible Card(P40)	P40-20xFE/GE-SFP
	8.23.2 20-Port 100/1000Base-X-SFP Flexible Card A(P40-A,Supporting 1588v2)	P40-20xFE/GE-SFP-A
	8.23.4 2-Port 10GBase LAN/WAN-XFP Flexible Card (P40)	P40-2x10GBase LAN/WAN-XFP
	8.23.5 2-Port 10GBase LAN/WAN-XFP Flexible Card A (Supporting 1588v2)	P40-2x10GBase LAN/WAN-XFP-A
	8.23.3 20-Port 100/1000Base-X-SFP Flexible Card B(P40-B)	P40-20xFE/GE-SFP-B
	8.23.6 2-Port 10GBase LAN/WAN-XFP Flexible Card B (P40-B)	P40-2x10GBase LAN/WAN-XFP-B
	8.23.7 20-Port 1000Base-X-SFP Flexible Card E(P40-E)	P40-20xFE/GE-SFP-E
	8.23.8 2-Port 10GBase LAN/WAN-XFP Flexible Card E (P40-E)	P40-2x10GBase LAN/WAN-XFP-E
	8.23.10 20-Port 10/100/1000Base-RJ45 Flexible Card(P40)	P40-20xFE/GE-RJ45
	8.23.11 4-Port 10GBase LAN/WAN-XFP Flexible Card(P40,Occupy one sub-slot)	P40-4x10GBase LAN/WAN-XFP
LPUI-40	**8.24.1 4-Port 10GBase LAN/WAN-XFP Integrated Line Processing Unit(LPUI-40)**	LPUI-40 4x10GBase LAN/WAN-XFP

Type	Description	Silkscreen
	8.24.2 40-Port 100/1000Base-X-SFP Integrated Line Processing Unit(LPUI-40)	LPUI-40 40xFE/GE-SFP
LPUI-41	**8.25.1 8-Port 10GBase LAN/WAN-XFP Integrated Line Processing Unit (LPUI-41)**	LPUI-41 8x10GBase LAN/WAN-XFP
	8.25.2 4-Port 10GBase LAN/WAN-XFP Integrated Line Processing Unit (LPUI-41)	LPUI-41 4x10GBase LAN/WAN-XFP
	8.25.3 48-Port 100/1000Base-X-SFP Integrated Line Processing Unit(LPUI-41)	LPUI-41 48xFE/GE-SFP
	8.25.4 2-Port 10GBase LAN/WAN-XFP+24-Port 100/1000Base-X-SFP Integrated Line Processing Unit(LPUI-41)	LPUI-41 2x10GBase LAN/WAN-XFP-24xFE/GE-SFP
	8.25.5 4-Port 10GBase LAN/WAN-XFP Integrated Line Processing Unit (LPUI-41,Supporting 1588v2)	LPUI-41 4x10GBase LAN/WAN-XFP-1588v2
	8.25.6 40-Port 100/1000Base-X-SFP Integrated Line Processing Unit (LPUI-41,Supporting 1588v2)	LPUI-41 40xFE/GE-SFP-1588v2
	8.25.7 2-Port 10GBase LAN/WAN-XFP+20-Port 100/1000Base-X-SFP Integrated Line Processing Unit(LPUI-41,Supporting 1588v2)	LPUI-41 2x10GBase LAN/WAN-XFP-20xFE/GE-SFP-1588v2
LPUS-41	**8.26.1 8-Port 10GBase LAN/WAN-XFP Line Processing Unit S (LPUS-41)**	LPUS-41 8x10GBase LAN/WAN-XFP
	8.26.2 4-Port 10GBase LAN/WAN-XFP Line Processing Unit S (LPUS-41)	LPUS-41 4x10GBase LAN/WAN-XFP
	8.26.3 48-Port 100/1000Base-X-SFP Line Processing Unit S(LPUS-41)	LPUS-41 48xFE/GE-SFP

Type	Description	Silkscreen
	8.26.4 2-Port 10GBase LAN/WAN-XFP+24-Port 100/1000Base-X-SFP Line Processing Unit S(LPUS-41)	LPUI-41 2x10GBase LAN/WAN-XFP-24xFE/GE-SFP
LPUF-50	**8.22 Flexible Card Line Processing Unit (LPUF-50,four sub-slots)**	LPUF-50
	8.30.14 24-Port Channelized E1/T1-DB100 Flexible Card	24xcE1/cT1-DB 100
	8.30.8 8-Port OC-3c/STM-1c POS-SFP Flexible Card	FPIC-8xOC3-POS
	8.30.4 4-Port OC-48c/STM-16c POS-SFP Flexible Card	FPIC-4xOC48-POS
	8.30.3 2-Port OC-48c/STM-16c POS-SFP Flexible Card	FPIC-2xOC48-POS
	8.30.13 2-Port Channelized OC-3c/STM-1c POS-SFP Flexible Card	2xcPOS/STM1-SFP
	8.30.6 8-Port OC-12c/STM-4c POS-SFP Flexible Card	FPIC-8xOC12-POS
	8.30.12 8-Port 100/1000 Base-X-SFP Flexible Card A (Supporting 1588v2)	P10-8xFE/GE-SFP-A
	8.22.8 2-Port 10GBase WAN/LAN-SFP+ Flexible Card A	P50-2x10GBase LAN/WAN-SFP+-A
	8.22.12 8-Port OC-3c/STM-1c ATM-SFP Flexible Card(P50)	P50-8xOC3c/STM1c ATM-SFP
	8.30.1 1-Port OC-192c/STM-64c POS-XFP Flexible Card(Occupy two slots)	FPIC-1xOC192-POS
	8.22.10 4-Port Channelized STM-1c POS-SFP Flexible Card	4*cPOS/STM1-SFP
	8.22.11 8-Port Channelized STM-1c POS-SFP Flexible Card	8*cPOS/STM1-SFP

Type	Description	Silkscreen
	8.22.12 8-Port OC-3c/ STM-1c ATM-SFP Flexible Card(P50)	P50-8×OC3c/STM1c ATM-SFP
LPUF-51	**8.19 Flexible Card Line Processing Unit(LPUF-51/ LPUF-51-B/LPUF-51-E,two sub-slots)**	LPUF-51 LPUF-51-B LPUF-51-E
	8.19.1 24-Port 100/1000Base-X-SFP Flexible Card A(P51-A)	P51-24xFE/GE-SFP-A
	8.19.2 5-Port 10GBase LAN/ WAN-SFP+Flexible Card A (P51-A, Occupy two sub-slots)	P51-5x10GBase LAN/WAN-SFP +-A
	8.19.3 2-Port 10GBase LAN/ WAN-SFP+ Flexible Card A (P51-A)	P51-2x10GBase LAN/WAN-SFP +-A
	8.19.4 24-Port 1000Base-X-SFP Flexible Card E(P51-E)	P51-24xGE-SFP-E
	8.19.5 5-Port 10GBase LAN/ WAN-SFP+ Flexible Card E (P51-E, Occupy two slots)	P51-5x10GBase LAN/WAN-SFP + -E
	8.19.6 2-Port 10GBase LAN/ WAN-SFP+ Flexible Card E (P51-E)	P51-2x10GBase LAN/WAN-SFP + -E
	8.19.7 20-Port 10/100/1000Base-RJ45 Flexible Card(P51-A)	P51-20xFE/GE-RJ45-A
LPUI-51	**8.20.1 5-Port 10GBase LAN/ WAN-SFP+ Integrated Line Processing Unit (LPUI-51)**	LPUI-51 5x10GBase LAN/WAN-SFP+-A
	8.20.2 4-Port 10GBase LAN/ WAN-SFP+ Integrated Line Processing Unit (LPUI-51)	LPUI-51 4x10GBase LAN/WAN-SFP+-A
	8.20.3 48-Port 100/1000Base-X-SFP Integrated Line Processing Unit (LPUI-51)	LPUI-51 48xFE/GE-SFP-A

Type	Description	Silkscreen
	8.20.4 2-Port 10GBase LAN/WAN-SFP+ + 24-Port 100/1000Base-X-SFP Integrated Line Processing Unit (LPUI-51)	LPUI-51 2x10GBase LAN/WAN-SFP+ -24xFE/GE-SFP-A
	8.20.6 5-Port 10GBase LAN/WAN-SFP+ Integrated Line Processing Unit B(LPUI-51-B)	LPUI-51-B 5x10GBase LAN/WAN-SFP+-A
	8.20.7 4-Port 10GBase LAN/WAN-SFP+ Integrated Line Processing Unit B(LPUI-51-B)	LPUI-51-B 4x10GBase LAN/WAN-SFP+-A
	8.20.8 48-Port 100/1000Base-X-SFP Integrated Line Processing Unit B(LPUI-51-B)	LPUI-51-B 48xFE/GE-SFP-A
	8.20.9 2-Port 10GBase LAN/WAN-SFP+ + 24-Port 100/1000Base-X-SFP Integrated Line Processing Unit B(LPUI-51-B)	LPUI-51-B 2x10GBase LAN/WAN-SFP+ -24xFE/GE-SFP-A
	8.20.10 5-Port 10GBase LAN/WAN-SFP+ Integrated Line Processing Unit L (LPUI-51-L)	LPUI-51-L 5x10GBase LAN/WAN-SFP+-A
	8.20.11 48-Port 100/1000Base-X-SFP Integrated Line Processing Unit L(LPUI-51-L)	LPUI-51-L 48xFE/GE-SFP-A
	8.20.12 2-Port 10GBase LAN/WAN-SFP+ + 32-Port 100/1000Base-X-SFP Integrated Line Processing Unit L(LPUI-51-L)	LPUI-51-L 2x10GBase LAN/WAN-SFP +-32xFE/GE-SFP-A
	8.20.13 5-Port 10GBase LAN/WAN-SFP+ Integrated Line Processing Unit E (LPUI-51-E,Enhanced HQos)	LPUI-51-E 5x10GBase LAN/WAN-SFP+ -E

Type	Description	Silkscreen
	8.20.14 2-Port 10GBase LAN/WAN-SFP+ + 24-Port 1000Base-X-SFP Integrated Line Processing Unit E (LPUI-51-E,Enhanced HQos)	LPUI-51-E 2x10GBase LAN/WAN-SFP+ -24xGE-SFP-E
LPUS-51	**8.21.1 5-Port 10GBase LAN/WAN-SFP+ Line Processing Unit S(LPUS-51)**	LPUS-51 5x10GBase LAN/WAN-SFP+-A
	8.21.2 4-Port 10GBase LAN/WAN-SFP+ Line Processing Unit S(LPUS-51)	LPUS-51 4x10GBase LAN/WAN-SFP+-A
	8.21.3 48-Port 100/1000Base-X-SFP Line Processing Unit S(LPUS-51)	LPUS-51 48xFE/GE-SFP-A
	8.21.4 2-Port 10GBase LAN/WAN-SFP+ + 24-Port 100/1000Base-X-SFP Line Processing Unit S(LPUS-51)	LPUS-51 2x10GBase LAN/WAN-SFP +-24xFE/GE-SFP-A
LPUS-100	**8.15.1 10-Port 10GBase LAN/WAN-XFP Line Processing Unit S (LPUS-100)**	LPUS-100 10x10GBase LAN/WAN-XFP
	8.15.2 16-Port 10GBase LAN-SFP+ Line Processing Unit S(LPUS-100)	LPUS-100 16x10GBase LAN-SFP+
	8.15.3 1-Port 100GBase-CFP Line Processing Unit S (LPUS-100)	LPUS-100 1x100GE-CFP
LPUF-100	**8.13 Flexible Card Line Processing Unit (LPUF-100,four slots)**	LPUF-100
	8.13.1 5-Port 10GBase LAN/WAN-XFP Flexible Card A (P100-A,Supporting 1588v2,Occupy two sub-slots)	P100-5x10GBase LAN/WAN-XFP-1588v2
	8.13.3 24-Port 100/1000Base-SFP Flexible Card (P100,Occupy two sub-slots)	P100-24xFE/GE-SFP

Type	Description	Silkscreen
	8.13.2 48-Port 100/1000Base-X-CSFP Flexible Card (P100,Occupy two sub-slots)	P100-48 x FE/GE-CSFP
	8.13.4 1-Port OC-768c/ STM-256c POS-2KM-LC Flexible Card(P100,Occupy two sub-slots)	P100-1xOC768c/STM256c POS-LC
	8.13.5 2-Port OC-192c/ STM-64c POS-XFP Flexible Card (P101-A,Occupy one sub-slots)	P100-2xOC-192c/STM-64c POS-XFP
LPUI-100	**8.14.1 10-Port 10GBase LAN/WAN-XFP Integrated Line Processing Unit (LPUI-100,Supporting 1588v2)**	LPUI-100 10x10GBase LAN/WAN-XFP-1588v2
	8.14.2 16-Port 10GBase LAN-SFP+ Integrated Line Processing Unit(LPUI-100)	LPUI-100 16x10GBase LAN-SFP+
	8.14.3 1-Port 100GBase-CFP Integrated Line Process Unit (LPUI-100)	LPUI-100 1x100GE-CFP
LPUF-101	**8.16 Flexible Card Line Processing Unit (LPUF-101/ LPUF-101-B)**	LPUF-101 LPUF-101-B
	8.13.1 5-Port 10GBase LAN/ WAN-XFP Flexible Card A (P100-A,Supporting 1588v2,Occupy two sub-slots)	P100-5x10GBase LAN/WAN-XFP-1588v2
	8.16.2 24-Port 100/1000Base-X-SFP Flexible Card A (P101-A)	P101-24xFE/GE-SFP-A
	8.16.3 5-Port 10GBase LAN/ WAN-SFP+ Flexible Card A (P101-A)	P101-5x10GBase LAN/WAN-SFP+-A
	8.16.4 1-Port 40GBase LAN-CFP Flexible Card A(P101-A)	P101-1x40GBase LAN-CFP-A

Type	Description	Silkscreen
	8.16.5 5-Port 10GBase LAN/WAN-SFP+ Flexible Card E (P101-E)	P101-5x10GBase LAN/WAN-SFP+ -E
	8.19.4 24-Port 1000Base-X-SFP Flexible Card E(P51-E)	P51-24xGE-SFP-E
LPUI-101	**8.17.1 2-Port 40GBase LAN-CFP Integrated Line Processing Unit (LPUI-101)**	LPUI-101 2x40GBase LAN-CFP-A
	8.17.2 1-Port 100GBase-CFP Integrated Line Processing Unit (LPUI-101)	LPUI-101 1x100GBase LAN-CFP
	8.17.3 10-Port 10GBase LAN/WAN-SFP+ Integrated Line Processing Unit (LPUI-101)	LPUI-101 10x10GBase LAN/WAN-SFP+-A
	8.17.4 2-Port 40GBase LAN-CFP Integrated Line Processing Unit B (LPUI-101-B)	LPUI-101-B 2x40GBase LAN-CFP-A
	8.17.5 10-Port 10GBase LAN/WAN-SFP+ Integrated Line Processing Unit B (LPUI-101-B)	LPUI-101-B 10x10GBase LAN/WAN-SFP+-A
LPUS-101	**8.18.1 2-Port 40GBase LAN-CFP Line Processing Unit S (LPUS-101)**	LPUS-101 2x40GBase LAN-CFP-A
	8.18.2 1-Port 100GBase-CFP Line Processing Unit S (LPUS-101)	LPUS-101 1x100GBase LAN-CFP
	8.18.3 10-Port 10GBase LAN/WAN-SFP+ Line Processing Unit S (LPUS-101)	LPUS-101 10x10GBase LAN/WAN-SFP+-A
LPUI-102	**8.12.1 10-Port 10GBase LAN/WAN-SFP+ Integrated Line Processing Unit E (LPUI-102-E)**	LPUI-102 10x10GBase LAN/WAN-SFP+ -E
LPUF-120	**8.10 Flexible Card Line Processing Unit(LPUF-120/LPUF-120-B/LPUF-120-E)**	LPUF-120 LPUF-120-B LPUF-120-E

Type	Description	Silkscreen
	8.10.1 6-Port 10GBase LAN/WAN-SFP+ Flexible Card A (P120-A)	P120-6x10GBase LAN/WAN-SFP+ -A
	8.10.2 1-Port 100GBase-CFP Flexible Card A(P120-A)	P120-1x100GBase LAN-CFP-A
	8.10.3 12-Port 10GBase LAN/WAN-SFP+ Flexible Card A(P120-A)	P120-12x10GBase LAN/WAN-SFP+ -A
	8.16.2 24-Port 100/1000Base-X-SFP Flexible Card A (P101-A)	P101-24×FE/GE-SFP-A
	8.16.3 5-Port 10GBase LAN/WAN-SFP+ Flexible Card A (P101-A)	P101-5×10GBase LAN/WAN-SFP+-A
	8.16.4 1-Port 40GBase LAN-CFP Flexible Card A(P101-A)	P101-1×40GBase LAN-CFP-A
	8.16.5 5-Port 10GBase LAN/WAN-SFP+ Flexible Card E (P101-E)	P101-5x10GBase LAN/WAN-SFP+ -E
	8.19.4 24-Port 1000Base-X-SFP Flexible Card E(P51-E)	P51-24xGE-SFP-E
LPUI-120	**8.11.1 12-Port 10GBase LAN/WAN-SFP+ Integrated Line Processing Unit (LPUI-120)**	LPUI-120 12x10GBase LAN/WAN-SFP+ -A
	8.11.2 2-Port 40GBase LAN-CFP Integrated Line Processing Unit(LPUI-120)	LPUI-120 2x40GBase LAN-CFP-A
	8.11.3 1-Port 100GBase-CFP Integrated Line Processing Unit (LPUI-120)	LPUI-120 2x100GBase LAN-CFP-A
	8.11.4 12-Port 10GBase LAN/WAN-SFP+ Integrated Line Processing Unit B (LPUI-120-B)	LPUI-120 12x10GBase LAN/WAN-SFP+ -A
	8.11.5 2-Port 40GBase LAN-CFP Integrated Line Processing Unit B (LPUI-120-B)	LPUI-120 2x40GBase LAN-CFP-A

Type	Description	Silkscreen
	8.11.6 1-Port 100GBase-CFP Integrated Line Processing Unit B (LPUI-120-B)	LPUI-120 1x100GBase LAN-CFP-A
LPUF-240	**8.8 Flexible Card Line Processing Unit(LPUF-240/ LPUF-240-B/LPUF-240-E)**	LPUF-240 LPUF-240-B LPUF-240-E
	8.8.1 1-Port 100GBase-CFP Flexible Card A(P240-A)	P240-1x100GBase LAN-CFP-A
	8.8.2 12-Port 10GBase LAN/ WAN-SFP+ Flexible Card A (P240-A)	P240-12x10GBase LAN/WAN-SFP+ -A
LPUI-240	**8.9.1 2-Port 100GBase-CFP Integrated Line Processing Unit (LPUI-240)**	LPUI-240 2x100GBase LAN-CFP-A
	8.9.2 24-Port 10GBase LAN/ WAN-SFP+ Integrated Line Processing	LPUI-240 24x10GBase LAN/ WAN-SFP+ -A
	8.9.3 1-Port 100GBase-CFP + 12-Port 10GBase LAN/ WAN-SFP+ Integrated Line Processing Unit (LPUI-240)	LPUI-240 1x100GBase LAN-CFP -12x10GBase LAN/WAN-SFP+ -A
	8.9.4 2-Port 100GBase LAN-CFP Integrated Line Processing Unit B (LPUI-240-B)	LPUI-240 2x100GBase LAN-CFP-B
	8.9.5 24-Port 10GBase LAN/ WAN-SFP+ Integrated Line Processing Unit B (LPUI-240-B)	LPUI-240 24x10GBase LAN/ WAN-SFP+ -B
	8.9.6 1-Port 100GBase-CFP + 12-Port 10GBase LAN/ WAN-SFP+ Integrated Line Processing Unit B (LPUI-240-B)	LPUI-240 1x100GBase LAN-CFP -12x10GBase LAN/WAN-SFP+ -B

4.2 Power Supply System

This chapter describes the power supply system of the CX600-X8.

4.2.1 Architecture of the Power Supply System

This section describes the features of the power supply system.

The CX600-X8 supports either DC or AC power supply.

In the case of a DC power supply system, four 70 A Power Entry Modules (PEMs) are inserted at the rear of the chassis, working in 2+2 backup mode.

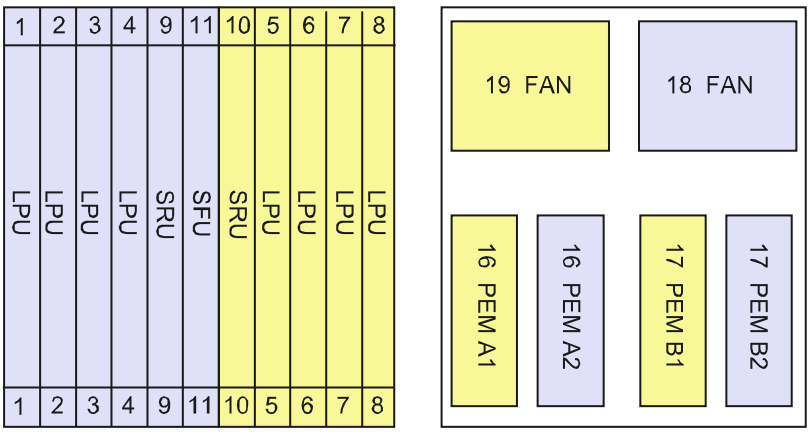
In the case of an AC power supply system, an AC power frame is placed outside the chassis and installed with rectifier modules based on system power. The AC power frame is then connected to the input terminals on the DC-PEMs to supply power for the system. (In short, an external AC power frame is added to the DC power supply system to constitute an AC power supply system.)

4.2.2 Distributed Architecture of the System

This section describes partitioned power supply on the CX600-X8.

As shown in **Figure 4-5**, the CX600-X8 backplane is divided into two areas, with each area having two power inputs. These four power inputs work in backup mode.

Figure 4-5 Schematic diagram of the power supply for the CX600-X8



4.2.3 DC Power Supply System

This section describes the appearance, functions, and technical parameters of the DC power supply module.

Figure 4-6 shows the appearance of the CX600-X8's PEM.

NOTE

If the power devices need a large number of power lines, please according to **DPD300-4-12 Power Distribution Box, Dual-Two Inputs**.

Figure 4-6 Appearance of the CX600-X8's PEM

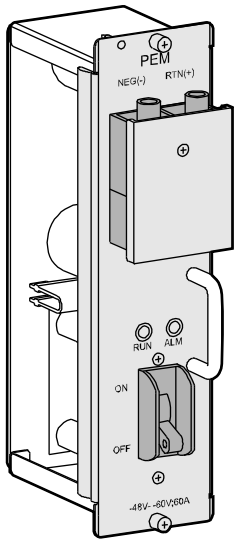


Table 4-5 lists the LED indicators on the PEM of the CX600-X8.

Table 4-5 Description of the indicators of the PEM

Indicator	Color	Description
RUN	Green	Indicates normal power output. If the indicator is steady on, it implies a normal output.
ALM	Red	Power failure indicator. If the indicator is steady on, it indicates the following: ● The lightning protection link of the power module has failed. ● The power modules do not have input power.

Table 4-6 lists the technical parameters of the PEM.

Table 4-6 Technical parameters of the DC PEM

Item	Technical Parameter
Dimensions (H x W x D)	220 mm x 58 mm x 115 mm (8.66 in. x 2.28 in. x 4.53 in.)
Weight	1.1 kg (2.43 lb)
Input voltage range	-38.4 V DC to -72 V DC
Input rated voltage	-48 V/-60 V

Item	Technical Parameter
Maximum input current	70 A
Output voltage	-38.4 V DC to -72 V DC
Output current	70 A
Rated current of the air-break	70 A
Maximum output power	2800 W

If the CX600-X8 has a DC power supply system, four 70 A PEMs work in 2+2 backup mode. **Figure 4-7** shows details of the DC power supply system.

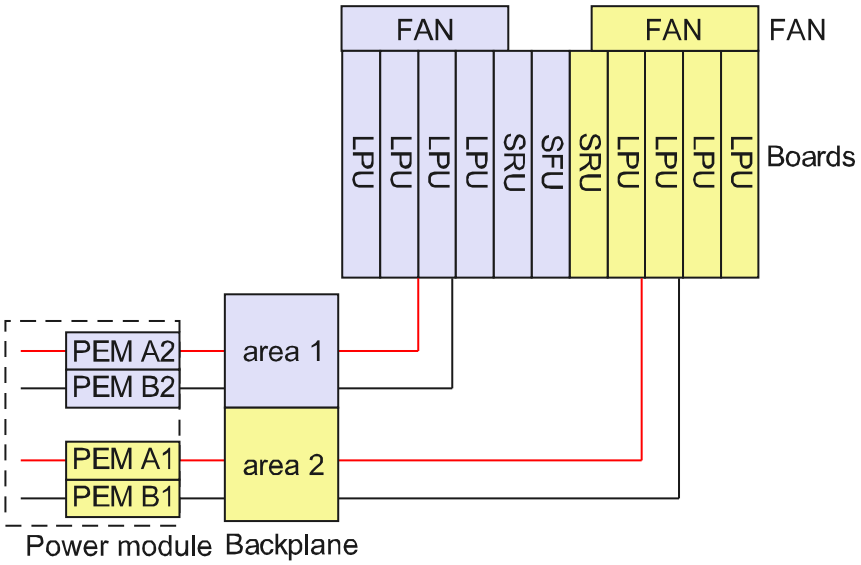
Two -48 V power inputs are joined on the board.

After the low-frequency filtering, the two -48 V power inputs for fans Two separated RTN inputs are joined on the board inside the fan module.

NOTE

In **Figure 4-7**, each DC power input contains one -48 V power input and one RTN input. Two separated RTN inputs are joined on the board.

Figure 4-7 Architecture of the CX600-X8 DC power supply system



NOTE

PEM A1 and PEM B1 work in 1+1 backup mode, PEM A2 and PEM B2 work in 1+1 backup mode.

4.2.4 AC Power Supply System

This section describes the appearance, functions, and the technical parameters of the AC power supply system.

NOTE

NOTE

If only AC power is available, the CX600-X8 requires an AC-DC converter EPS200-4850A.

Figure 4-8 and Figure 4-9 show the appearance of the EPS200-4850A.

Figure 4-8 Front view of the EPS200-4850A

Figure 4-9 Rear view of the EPS200-4850A

Table 4-7 lists the technical parameters of the EPS200-4850A.

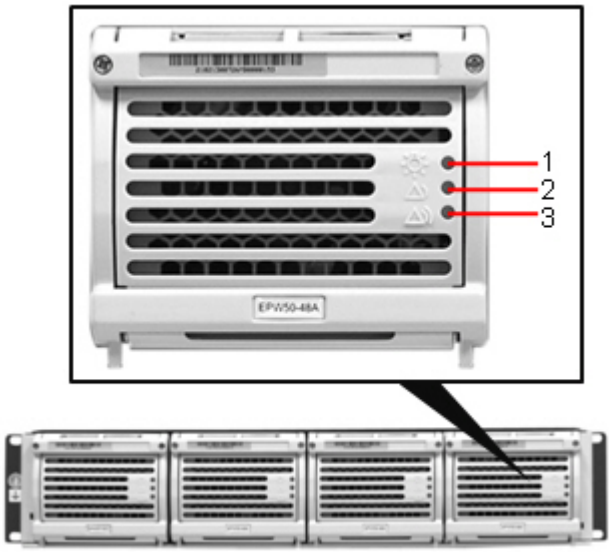
Table 4-7 Technical parameters of the EPS200-4850A

Item	Technical Parameter
Dimensions (H x W x D)	86.1 mm x 442.0 mm x 580.0 mm (3.39 in. x 17.40 in. x 22.83 in.)
Input voltage range	90 V AC to 275 V AC 175 V AC to 275 V AC (recommended)
Maximum input current	18.5 A/single module

Item	Technical Parameter
Maximum output current	50 A/single module
Maximum output power	2900 W/single module

The following figure shows the indicators on the EPS200-4850A.

Figure 4-10 Indicators on the EPS200-4850A



1. Operation indicator 2. Protection indicator 3. Fault indicator

The following table provides the checklist for the EPS200-4850A.

Item	Indicator Color	Status Description	Cause of the Abnormality
Operation indicator	Green	If the indicator is steady green, the EPS200-4850A is running properly. If the indicator is off, an exception occurs.	No main AC power is input, the AC input voltage is higher or lower than the normal range, or the EPS200-4850A has no output.

Item	Indicator Color	Status Description	Cause of the Abnormality
Protection indicator	Yellow	If the indicator is off, the EPS200-4850A is running properly. If the indicator is on, an exception occurs.	A temperature alarm is generated (if the temperature exceeds 65°C, the EPS200-4850A will be powered off), or the EPS200-4850A is in the dormant state (the indicator is on and no alarm is generated).
Fault indicator	Red	If the indicator is off, the EPS200-4850A is running properly. If the indicator is on, an exception occurs.	The EPS200-4850A is powered off due to over-voltage or over-temperature, or fans are faulty, or the EPS200-4850A has no output due to its internal faults.
DC output voltage	-	The normal voltage ranges from –43.2 V DC to –57 V DC	-

Figure 4-8 diagrams the AC power supply system of the CX600-X8. AC power input is converted into regulated DC power by an EPS200-4850A. The resulting DC power output is connected to the PEMs through external cables to supply power for all boards and fan modules.

NOTE

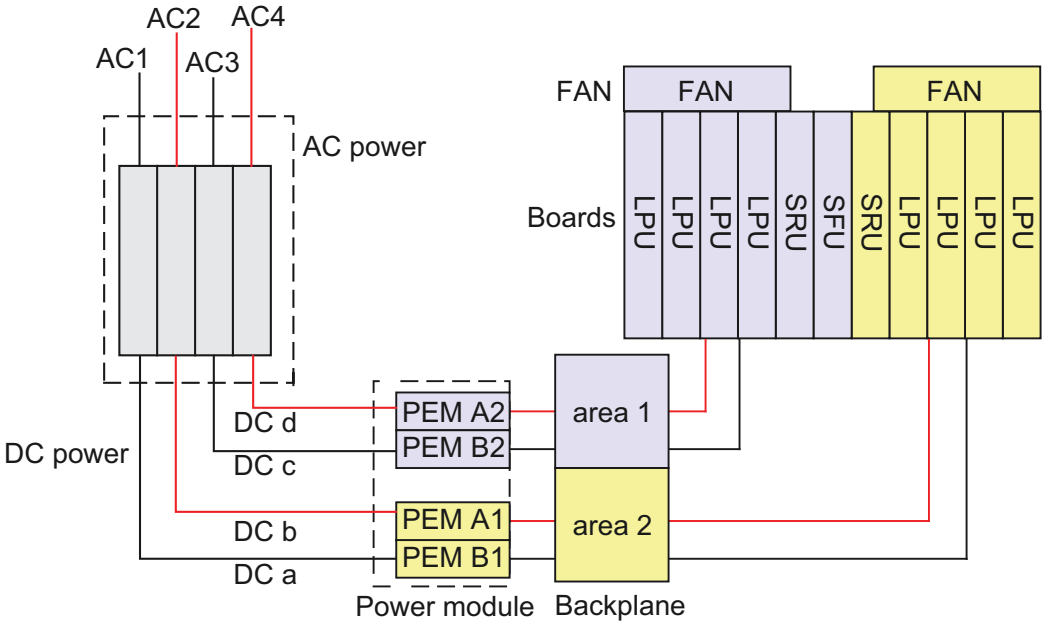
Installing the EPS200-4850A in the same cabinet as the chassis is recommended. If the EPS200-4850A cannot be installed in the same cabinet as the chassis, it should be placed near the cabinet and careful attention needs to be paid to the cabling. Each power module provides four circuit breakers. Each circuit breaker is 20 A.

Two -48 V power inputs are joined on the board.

NOTE

In **Figure 4-11**, each DC power input contains one -48 V power input and one RTN input. Two separated RTN inputs are joined on the board.

Figure 4-11 Architecture of the CX600-X8 AC power supply system



NOTE

PEM A1 and PEM B1 work in 1+1 backup mode, PEM A2 and PEM B2 work in 1+1 backup mode.

4.3 Heat Dissipation System

This section describes the appearance, functions, and specifications of the heat dissipation system.

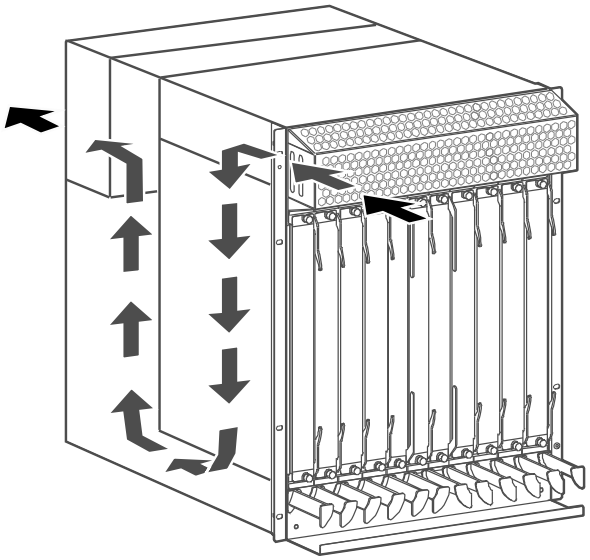
4.3.1 System Air Channel

This section describes the CX600-X8's system air channel.

The CX600-X8 draws in air from the front and exhausts air from the rear. The air intake vent is located above the board area on the front chassis; the air exhaust vent is located above the board area on the rear chassis.

The two fan modules of the CX600-X8 are located side by side at the air exhaust vent, with each module containing one fan. The entire system dissipates heat by drawing in air, as shown in **Figure 4-12**.

Figure 4-12 Air flow in the CX600-X8



4.3.2 Air Intake Vent

An air filter is installed over the air intake vent of the CX600-X8. The air filter has a curved face, large area, and small windage resistance. These features help to improve heat dissipation efficiency.

4.3.3 Fan Module

This section describes the appearance of the fan module.

Two fan modules, each containing one fan, are located side by side at the air exhaust vent. If a single fan fails, the system can still work normally for a short period of time at ambient temperature of 40ºC (104ºF). **Figure 4-13** shows the appearance of a fan module.

NOTE

Short-term operation means that the continuous working time does not exceed 96 hours and the accumulated time per year does not exceed 15 days.

Figure 4-13 Appearance of a fan module

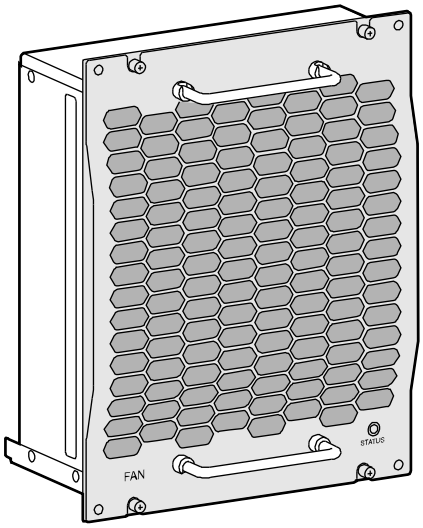


Table 4-8 lists the indicators on the fan module.

Table 4-8 Description of the indicators on the fan module

Indicator	Color	Description
STATUS	Green	If the indicator blinks, the fan module is working normally.
	Red	If the indicator blinks, the fan module, PEM, or filtering box is faulty.

Table 4-9 lists the technical parameters of the fan module.

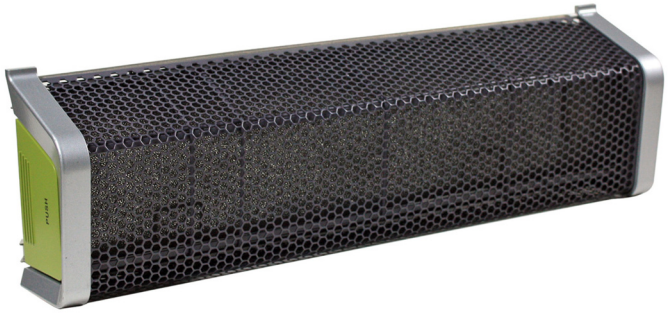
Table 4-9 Technical parameters of the fan module

Item	Technical Parameter
Dimensions (H x W x D)	243.7 mm x 210.4 mm x 100 mm (9.59 in. x 8.28 in. x 3.94 in.)
Number of fans	CX600-X16: 4CX600-X8: 2
Weight of a fan	3.4 kg (7.50 lb)
Power consumption of a fan (typical value)	250 W
Maximum noise of a fan	74 dB

4.3.4 Air Filter

The CX600-X8 draws in air from the front top and exhausts air from the rear top. There is a 3 U space in the upper part of the chassis and an air filter on the front of the chassis. To maximize air intake, the filter is fully perforated. The air filter is fixed to the chassis by a fastener to facilitate filter removal and replacement. **Figure 4-14** shows the appearance of an air filter.

Figure 4-14 An air filter



NOTE

Placing a black sponge air filter at the air intake vent helps to prevent dust from entering the system. It is recommended that the air filter be removed and cleaned once every three months.

4.3.5 Fan Speed Adjustment

When the system is fully configured, temperatures reported by the temperature sensors on the LPUs, SFUs, and MPUs serve as the basis for fan speed adjustment. **Table 4-10** lists general principles.

Table 4-10 Fan Speed Adjustment Principles

Ambient Temperature	Rotational Speed	Noise and Dissipation Standards
-5°C-+27°C (23°F - 80.6°F)	Low speed (50% rotational speed)	When fans rotate at a constantly low speed, the noises meet the NEBS standard and the fans meet heat dissipation requirements of a fully configured system.
27°C-50°C (80.6°F - 122°F)	Linear variation	The fan speed is adjusted smoothly in linear mode, without a sharp increase in noises.
Over 45°C (113°F)	High speed (100% rotational speed)	Fans rotate at high speed to meet heat dissipation requirements.

4.4 Switching Network

This section describes the functions of the switch fabric unit.

NOTE

The 200G switch fabric unit cannot be used together with 40G switch fabric unit for long-term working, and can be used together only for short-term operation during upgrade.

4.4.1 Introduction to the Switching Network

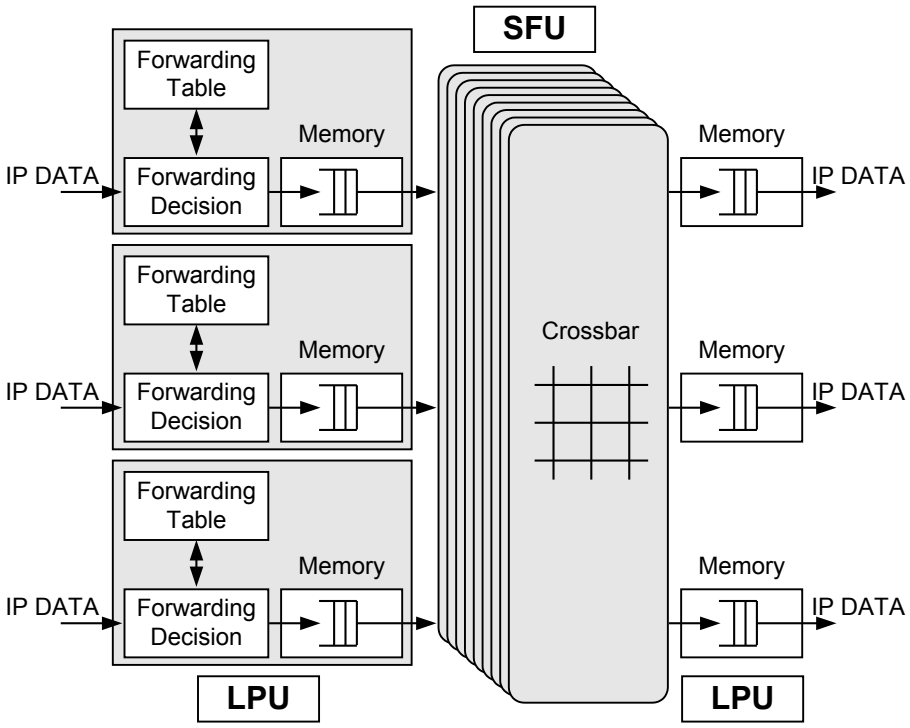
This section describes the principle of the SFU.

The switching network responsible for switching data between LPUs is a key component of the CX600. The CX600 uses the switching chips developed by Huawei and Memory-Crossbar-Memory (M-C-M) to provide a three-level switching mode. Level-1 and level-3 switching adopts the shared-memory model and is performed on LPUs; level-2 switching adopts the Crossbar model and is performed on an SFU. **Figure 4-15** shows the switching network of the CX600.

The level-1 switching chip on one LPU is fully connected to all the level-2 switching chips on the SFUs. The level-2 switching chips on the SFUs are also fully connected to the level-3 switching chip on another LPU. In addition, the level-2 crossbar switching chips work in load balancing mode across multiple switching planes. The entire switching network is unblocked. The following describes how data packets are transmitted across the switching network.

1. Data packets enter the LPU through physical interfaces and are fragmented into cells of a fixed length. These cells are then sent to the level-1 switching chips. After being buffered and scheduled, the cells enter the crossbar switching chips on the SFU. The level-1 switching chip on the LPU is fully connected to all of the level-2 switching chips on SFUs. As a result, the same number of cells can be distributed to each level-2 switching plane. This implements load balancing across switching planes and facilitates fault tolerance.
2. After the cells reach the crossbar switching chips, the crossbar switching chips schedule the cells to the corresponding outbound interfaces according to the destination interfaces of the data packets. The cells are then sent to the level-3 switching chips on another LPU. At this point, the switching of the cells by the level-2 switching chips is completed.
3. After the cells reach the level-3 switching chips on another LPU, the system searches for the destination interfaces. Once found, the cells are reassembled and sent out through physical interfaces. At this point, the switching of the data packets is completed.

Figure 4-15 Switching network of the CX600



Reliability

The CX600-X8 has three SFUs. Two SFUs are integrated on two SRUs. The other SFU is separate. These three SFUs work in 2+1 load balancing mode. The three SFUs load balance services at the same time. When one SFU is faulty or being replaced, the other two SFUs automatically take over its tasks to ensure normal delivery of services, improving system reliability.

4.4.2 200Gbps Switch Fabric Unit C(SFUI-200-C)

Appearance

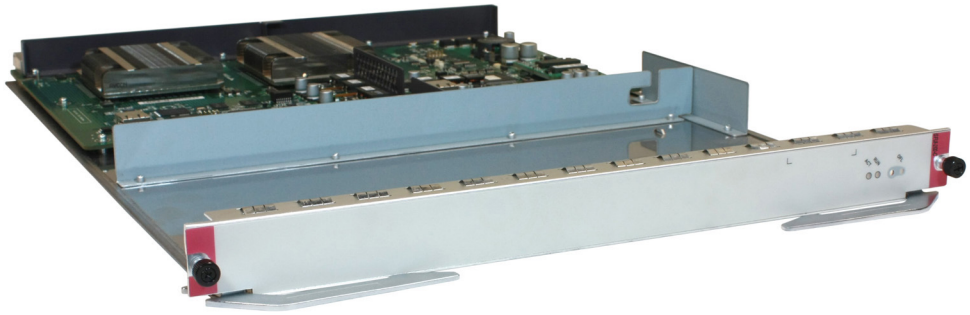
The Switch Fabric Unit C(SFUI-200-C) is the new generation switch board. It supports 200G full duplex capacity per slot. The Switch Fabric Unit C(SFUI-200-C) switches data for the entire system at line speed of 2.36 Tbit/s. This ensures a non-blocked switching network.

The CX600-X8 has three SFUs working in 2+1 load balancing mode. The entire system provides a switching capacity at line speed of 7.08 Tbit/s.

The three SFUs load balance services at the same time. When one SFU is faulty or being replaced, the other two SFUs automatically take over its tasks to ensure normal delivery of services.

Figure 4-16 shows the appearance of the Switch Fabric Unit C(SFUI-200-C).

Figure 4-16 Appearance of the SFUI-200-C



Panel

Figure 4-17 shows the appearance of the panel.

Figure 4-17 Appearance of the panel

1. Ejector lever
2. ACT indicator
3. OFL button
4. OFL indicator
5. RUN indicator

Table 4-11 describes the buttons and indicators on the panel of the SFU.

Table 4-11 Buttons and indicators on the panel of the SFUI-200-C

LED	Description
RUN	Before the registration of the SFU: If the green indicator blinks twice each second (2 Hz), the system is in the alarm state. After the registration of the SFU: If the green indicator blinks once every two seconds (0.5 Hz), the system is running normally.
ACT	If the green indicator is on, it indicates that the SFU is working normally; if the green indicator is off, it indicates that the SFU is faulty.
OFFLINE	When the SFU is working normally, the OFL indicator is off. After the OFL button is pressed to power off the SFU, the OFL indicator is on.

NOTE

The SFUI-200-C can be used only on the CX600-X8.

The SFUI-200-C can be used only together with the 200G Switch and Route Processing Unit A5.

Technical Specifications

Table 4-12 lists the technical specifications of the SFUI-200-C.

Table 4-12 Technical specifications of the SFUI-200-C

Item	Specifications
Silkscreen of the board name	SFUI-200-C
Power consumption (typical value)	77 W
Heat dissipation	249.82 BTU/hour
Board weight	3.82 kg (8.42 lb)
Dimensions (H x W x D)	41 mm x 399 mm x 551 mm (1.61 in. x 15.71 in. x 21.69 in.)
Lowest Software Version	V600R003C00

4.4.3 100Gbps Switch Fabric Unit D(SFUI-100-D)

Appearance

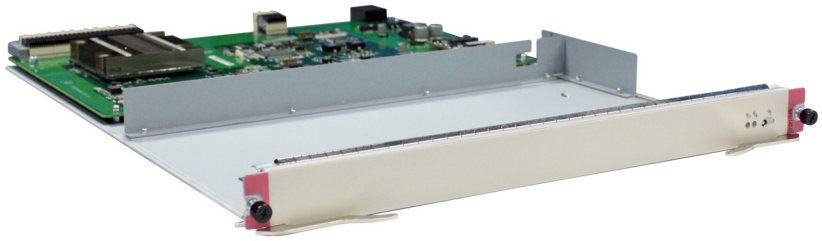
100Gbps Switch Fabric Unit D(SFUI-100-D) is the new generation switch board. It supports 100G full duplex capacity per slot. The Switch Fabric Unit D(SFUI-100-D) switches data for the entire system at line speed of 1.18 Tbit/s. This ensures a non-blocked switching network.

The CX600-X8 has three SFUs working in 2+1 load balancing mode. The entire system provides a switching capacity at line speed of 3.54 Tbit/s.

The three SFUs load balance services at the same time. When one SFU is faulty or being replaced, the other two SFUs automatically take over its tasks to ensure normal delivery of services.

Figure 4-18 shows the appearance of the Switch Fabric Unit D(SFUI-100-D).

Figure 4-18 Appearance of the SFUI-100-D



Panel

Figure 4-19 shows the appearance of the panel.

Figure 4-19 Appearance of the panel

1. Ejector lever 2. ACT indicator 3. OFL button 4. OFL indicator
5. RUN indicator

Table 4-13 describes the buttons and indicators on the panel of the SFU.

Table 4-13 Buttons and indicators on the panel of the SFUI-100-D

LED	Description
RUN	Before the registration of the SFU: If the green indicator blinks twice each second (2 Hz), the system is in the alarm state. After the registration of the SFU: If the green indicator blinks once every two seconds (0.5 Hz), the system is running normally.
ACT	If the green indicator is on, it indicates that the SFU is working normally; if the green indicator is off, it indicates that the SFU is faulty.
OFFLINE	When the SFU is working normally, the OFL indicator is off. After the OFL button is pressed to power off the SFU, the OFL indicator is on.

NOTE

The SFUI-100-D can be used only on the CX600-X8.

The 100G switch fabric unit can be used only together with the 100G Switch and Route Processing Unit A7. The 100G switch fabric unit cannot be used together with 40G switch fabric unit and 200G switch fabric unit for long-term working, and can be used together only for short-term operation during upgrade.

Technical Specifications

Table 4-14 lists the technical specifications of the SFUI-100-D.

Table 4-14 Technical specifications of the SFUI-100-D

Item	Specifications
Silkscreen of the board name	SFUI-100-D
Power consumption (typical value)	46 W
Heat dissipation	149.24 BTU/hour
Board weight	3.82 kg (8.42 lb)
Dimensions (H x W x D)	41 mm x 399 mm x 551 mm (1.61 in. x 15.71 in. x 21.69 in.)
Lowest Software Version	V600R006C00

4.4.4 40Gbps Switch Fabric Unit C

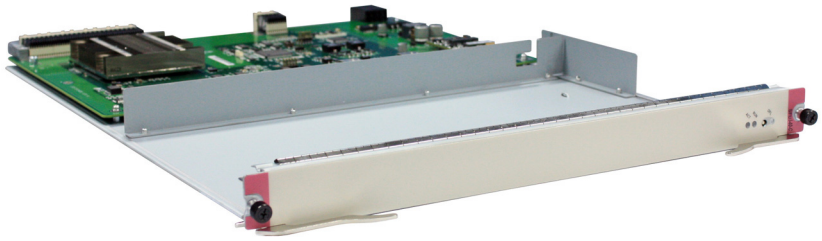
Appearance

As shown in Figure 4-20, the CX6DSFUI401C on the CX600-X8 switches data for the entire system at line speed of 480 Gbit/s (240 Gbit/s for the upstream traffic and 240 Gbit/s for the downstream traffic). This ensures a non-blocked switching network.

The CX600-X8 has three SFUs working in 2+1 load balancing mode. The entire system provides a switching capacity at line speed of 1.44 Tbit/s.

The three SFUs load balance services at the same time. When one SFU is faulty or being replaced, the other two SFUs automatically take over its tasks to maintain the line speed of 0.96 Tbit/s.

Figure 4-20 Appearance of the SFU



Panel

Figure 4-21 shows the appearance of the panel.

Figure 4-21 Appearance of the panel

1. Ejector lever 2. ACT indicator 3. OFL button 4. RUN indicator
5. OFL indicator

Table 4-15 describes the buttons and indicators on the panel of the SFU.

Table 4-15 Buttons and indicators on the panel of the SFU

LED	Description
RUN	Before the registration of the SFU: If the green indicator blinks twice each second (2 Hz), the system is in the alarm state. After the registration of the SFU: If the green indicator blinks once every two seconds (0.5 Hz), the system is running normally.
ACT	If the green indicator is on, it indicates that the SFU is working normally; if the green indicator is off, it indicates that the SFU is faulty.
OFFLINE	When the SFU is working normally, the OFL indicator is off. After the OFL button is pressed to power off the SFU, the OFL indicator is on.

NOTE

The CX6DSFUI401C can be used only on the CX600-X8.

The 40G switch fabric unit cannot be used together with 200G switch fabric unit for long-term working, and can be used together only for short-term operation during upgrade.

The 40G switch fabric unit can be used only together with the 40G Switch and Route Processing Unit A4.

Technical Specifications

Table 4-16 lists the technical specifications of the 40Gbps Switch Fabric Unit C.

Table 4-16 Technical specifications of the 40Gbps Switch Fabric Unit C

Item	Specifications
Silkscreen of the board name	SFUI-40-C
Power consumption (typical value)	40 W
Heat dissipation	129.78 BTU/hour
Board weight	3.2 kg (7.06 lb)
Dimensions (H x W x D)	41 mm x 399 mm x 551 mm (1.61 in. x 15.71 in. x 21.69 in.)
Lowest Software Version	V600R001

4.5 Control Plane

This chapter describes the control plane of the CX600-X8.

NOTE

The 200G switch and route processing unit cannot be used together with 40G switch and route processing unit for long-term working.

4.5.1 Introduction to the Control Plane

This section describes the functions of the control plane.

The control plane of the CX600 is separated from the data plane and the monitoring plane. The SRU is used by the CX600-X8.

The SRU integrates an SFU used for data switching.

System Control and Management Unit

As the system control and management unit, the SRU provides the following functions on the system control panel:

- Route calculation: All routing protocol packets are sent by the forwarding engine to the SRU for processing. In addition, the SRU broadcasts and filters packets, and downloads routing policies from the policy server.
- Outband communication between boards: The LAN switch modules integrated on the SRU provide outband communications between boards. In this manner, messages can be controlled, maintained, and exchanged between the boards.
- Device management and maintenance: Devices can be managed and maintained through the management interfaces (serial interfaces) provided by the SRU.
- Data configuration: The SRU stores configuration data, startup files, charging information, upgrade software, and system logs.
- Data storage: The SRU provides two interfaces for CF cards, which serve as mass storage devices to store data files.

System Clock Unit

As the system clock unit, the SRU provides accurate and reliable SDH clock signals for LPUs. The SRU can provide three-channel 2.048 MHz synchronous clock signals for the downstream devices, or receive 2.048 MHz or 2.048 Mbit/s external reference clock signals.

To support IEEE 1588v2, that is, the Precision Time Protocol (PTP), the SDH clock interface can input time information in multiple formats by selecting specific software.

System Maintenance Unit

As the system maintenance unit, the SRU collects system monitoring information to test system units locally or remotely, or implement in-service upgrading of system units.

The SRU periodically collects information about the operation of system units through the MonitorBus. The SRU then generates related control information based on the collected information, for example, the detection of board installations and adjustments to fan speed. Through the joint test action group (JTAG) bus, the SRU remotely or locally tests system units, or performs in-service upgrading of system units.

Reliability

The main control modules, clock modules, and LAN switch modules on the SRU work in 1:1 hot backup mode, therefore improving system reliability.

The two SRUs work in 1:1 backup mode. Each SRU monitors the status of the other. If the master SRU is faulty, the slave SRU automatically takes over as the master SRU.

4.5.2 Switch and Route Processing Unit A7

NOTE

Switch and Route Processing Unit A7 is the 100G Switch and Route Processing Unit

Appearance

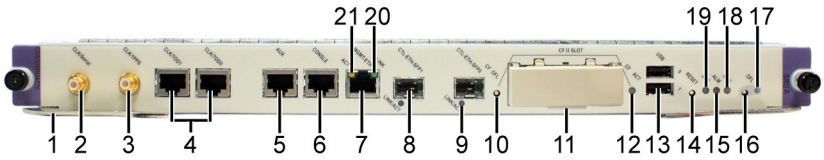
Figure 4-22 shows appearance of the CX6D0SRUA770.

Figure 4-22 Appearance of the SRU

Panel

Figure 4-23 shows the appearance of the panel.

Figure 4-23 Appearance of the panel



1. Ejector lever	2. CLK/Serial	3. CLK/1PPS	4. CLK/TOD
5. AUX	6. Console	7. MGMT-ETH	8. CTL-ETH-SFP
9. LINK/ACT	10. CF OFL button	11. CF card	12. CF indicator
13. USB	14. RESET button	15. ALM indicator	16. OFL button
17. OFL indicator	18. RUN indicator	19. ACT active/standby indicator	20. MGMT-ETH LINK indicator
21. MGMT-ETH ACT indicator			

Table 4-17 describes the buttons and indicators on the SRU panel.

Table 4-17 Buttons and indicators on the panel of the SRU

Indicator/ Button	Description
OFL button	To remove a board, you must press and hold the button for six seconds until the OFL indicator turns on. This button takes effect only on the slave SRU.

Indicator/ Button	Description
OFL indicator (red)	If the indicator is on, you can remove the board.
RUN indicator (green)	If the indicator blinks once every two seconds (0.5 Hz), the system is in the normal state. If the indicator blinks twice each second (2 Hz), the system is in the alarm state.
ALM indicator (red)	If the indicator is steady on, the system is in the alarm state. If the indicator is steady off, the system is in the normal state.
ACT active/ standby indicator (green)	If the indicator is steady on, the SRU is in the active state. If the indicator is off, the SRU is in the standby state.
Reset button	If you press the Reset button, you can reset the main control unit on the SRU.
CF ACT indicator (green)	If the indicator is on, the CF is in position. If the indicator is blinking, data is being read or written. If the indicator is off, the CF is not in position or can be removed.
CF OFL button	If you press the CF OFL button, all operations on the CF card will be ended and the CF card will be powered off.
SFP LINK/ACT indicator (green)	If the indicator is steady on, the link is normal. If the indicator is blinking, data is being transmitted.
MGMT-ETH LINK indicator (green) (on Ethernet interfaces)	If the indicator is steady on, the link is normal. If the indicator is off, the link is Down.
MGMT-ETH ACT indicator (amber) (on Ethernet network interfaces)	If the indicator is blinking, data is being transmitted. If the indicator is off, no data is being transmitted.

Table 4-18 lists the interfaces on the SRU and their uses.

Table 4-18 Interfaces on the SRU and their uses

Interface Name	Connector Type	Description
USB interface	USB	It is not used and reserved.
CF card interface	TYPE II (compatible with TYPE I)	It is used to hold a CF card to store data files as a massive storage device.
CTL-ETH-SFP interface (1000MBase-X)	SFP	It is not used and reserved for future capacity expansion.
MGMT-ETH interface (10M/100M/1000M Base-TX auto-sensing)	RJ45	It connects to the NMS workstation and has LINK and ACT indicators.
Console interface	RJ45	It connects to the console for on-site configuration of the system.
AUX interface	RJ45	It connects to the Modem for remote maintenance through dialing.
CLK/TOD0	RJ45	Bits0: It is used to input or output 2 Mbit/s clock signals, 2 MHz clock signals, 1pps+ASCII clock signals, or 2-channel DCLS clock signals.
CLK/TOD1	RJ45	Bits1: It is used to input or output 2 Mbit/s clock signals, 2 MHz clock signals, 1pps+ASCII clock signals, or 2-channel DCLS clock signals.
CLK/1PPS	SMB	Bits2: It is used to input or output 2 Mbit/s clock signals, 2 MHz clock signals, or 1 PPS signals.
CLK/Serial	SMB	Bits2: It is used to input or output 2 Mbit/s clock signals, 2 MHz clock signals, or RS232 signals.

NOTE

Bits2 includes 2 SMB ports, and the signal type can be set as 2Mbps/2Mhz/1PPS+RS232. When signal is 2Mbps/2Mhz, CLK/1PPS is fixed as input and CLK/Serial is fixed as output. When signal is 1PPS+RS232, CLK/1PPS and CLK/Serial are bound together, CLK/1PPS signal type is 1PPS whereas CLK/Serial signal type is RS232, and the input/output settings apply to both SMB ports.

Interface Attributes

Table 4-19 lists the 1000MBase-X-SFP interface attributes.

Table 4-19 1000MBase-X-SFP interface attributes

Attribute	Description
Connector type	SFP
Operation mode	1000 M fiber
Standard compliance	IEEE 802.3-2002
Cable specification	Single-mode or multi-mode fibers

Table 4-20 lists the 10Base-T/100Base-TX/1000Base-T-RJ45 interface attributes.

Table 4-20 10Base-T/100Base-TX/1000Base-T-RJ45 interface attributes

Attribute	Description
Connector type	RJ45
Operation mode	10M/100M/1000M auto-sensing interfaces, supporting half-duplex and full-duplex modes
Standard compliance	IEEE 802.3-2002
Cable specification	Category 5 unshielded twisted pair (UTP) cables recommended when the interface rate is 10 Mbit/s or 100 Mbit/s; super category 5 Shielded Twisted Pair (STP) cables recommended when the interface rate is 1000 Mbit/s

Table 4-21 lists the console interface attributes.

Table 4-21 Console interface attributes

Attribute	Description
Connector type	RJ45
Operation mode	Duplex Universal Asynchronous Receiver/Transmitter (UART)
Electrical attribute	RS-232
Baud rate	9600 bit/s (default value), which can be changed as required
Data equipment type	DCE (Data Circuit-terminating Equipment)

Attribute	Description
Cable specification	8-core shielded cable

Table 4-22 lists the AUX interface attributes.

Table 4-22 AUX interface attributes

Attribute	Description
Connector type	RJ45
Operation mode	Duplex UART
Electrical attribute	RS-232
Baud rate	9600 bit/s (default value), which can be changed as required
Data equipment type	Data Terminal Equipments (DTE)
Cable specification	8-core shielded cable

Table 4-23 lists the attributes of the external clock interface..

Table 4-23 External clock interface attributes

Attribute	Description
Connector type	RJ45
Cable specification	120-ohm clock cable
Standard compliance	G.703

Table 4-24 lists the external clock interface attributes.

Table 4-24 External clock interface attributes

Attribute	Description
Connector type	SMB

Attribute	Description
Cable specification	75-ohm clock cable
Standard compliance	G.703

NOTE

The Switch and Route Processing Unit A7 can be used only on the CX600-X8.

The 100G Switch and Route Processing Unit A7 can be used only together with the SFUI-100-D.

Technical Specifications

Table 4-25 lists the technical specifications of the Switch and Route Processing Unit A7.

Table 4-25 Technical specifications of the Switch and Route Processing Unit A7

Item	Specifications
Silkscreen of the board name	SRUA
Power consumption (typical value)	125 W
Heat dissipation	405.55 BTU/hour
Board weight	4.8 kg (10.58 lb)
Dimensions (H x W x D)	35 mm x 398.5 mm x 554 mm (1.38 in. x 15.69 in. x 21.81 in.)
Lowest Software Version	V600R006C00

4.5.3 Switch and Route Processing Unit A5

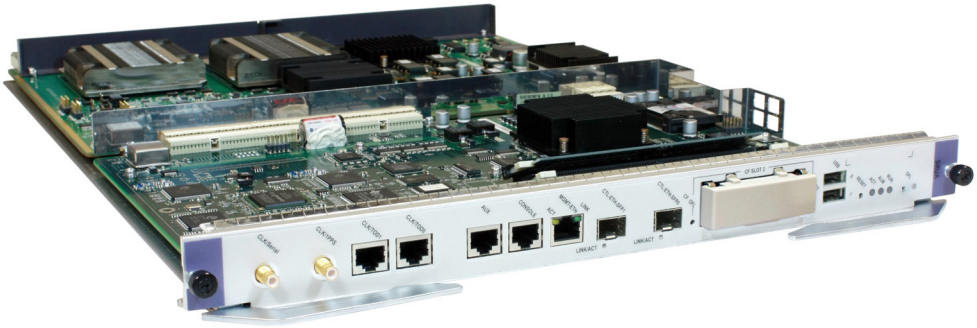
NOTE

Switch and Route Processing Unit A5 is the 200G Switch and Route Processing Unit

Appearance

Figure 4-24 shows appearance of the CX6D0SRUA510.

Figure 4-24 Appearance of the SRU



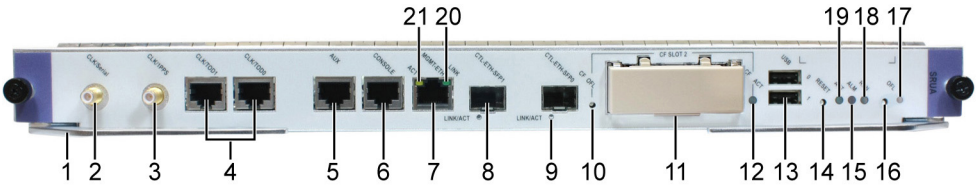
NOTE

In this document, the equipment exterior is for reference only. The actual equipment may differ from what is shown in the figures.

Panel

Figure 4-25 shows the appearance of the panel.

Figure 4-25 Appearance of the panel



1. Ejector lever	2. CLK/Serial	3. CLK/1PPS	4. CLK/TOD
5. AUX	6. Console	7. MGMT-ETH	8. CTL-ETH-SFP
9. LINK/ACT	10. CF OFL button	11. CF card	12. CF indicator
13. USB	14. RESET	15. ALM indicator	16. OFL button
17. OFL indicator	18. RUN indicator	19. ACT active/standby indicator	20. MGMT-ETH LINK indicator
21. MGMT-ETH ACT indicator			

Table 4-26 describes the buttons and indicators on the SRU panel.

Table 4-26 Buttons and indicators on the panel of the SRU

Indicator/ Button	Description
OFL button	To remove a board, you must press and hold the button for six seconds until the OFL indicator turns on. This button takes effect only on the slave SRU.
OFL indicator (red)	If the indicator is on, you can remove the board.
RUN indicator (green)	If the indicator blinks once every two seconds (0.5 Hz), the system is in the normal state. If the indicator blinks twice each second (2 Hz), the system is in the alarm state.
ALM indicator (red)	If the indicator is steady on, the system is in the alarm state. If the indicator is steady off, the system is in the normal state.
ACT active/ standby indicator (green)	If the indicator is steady on, the SRU is in the active state. If the indicator is off, the SRU is in the standby state.
Reset button	If you press the Reset button, you can reset the main control unit on the SRU.
CF ACT indicator (green)	If the indicator is on, the CF is in position. If the indicator is blinking, data is being read or written. If the indicator is off, the CF is not in position or can be removed.
CF OFL button	If you press the CF OFL button, all operations on the CF card will be ended and the CF card will be powered off.
SFP LINK/ACT indicator (green)	If the indicator is steady on, the link is normal. If the indicator is blinking, data is being transmitted.
MGMT-ETH LINK indicator (green) (on Ethernet interfaces)	If the indicator is steady on, the link is normal. If the indicator is off, the link is Down.
MGMT-ETH ACT indicator (amber) (on Ethernet network interfaces)	If the indicator is blinking, data is being transmitted. If the indicator is off, no data is being transmitted.

Table 4-27 lists the interfaces on the SRU and their uses.

Table 4-27 Interfaces on the SRU and their uses

Interface Name	Connector Type	Description
USB interface	USB	It is not used and reserved.
CF card interface	TYPE II (compatible with TYPE I)	It is used to hold a CF card to store data files as a massive storage device.
CTL-ETH-SFP interface (1000MBase-X)	SFP	It is not used and reserved for future capacity expansion.
MGMT-ETH interface (10M/100M/1000M Base-TX auto-sensing)	RJ45	It connects to the NMS workstation and has LINK and ACT indicators.
Console interface	RJ45	It connects to the console for on-site configuration of the system.
AUX interface	RJ45	It connects to the Modem for remote maintenance through dialing.
CLK/TOD0	RJ45	Bits0: It is used to input or output 2 Mbit/s clock signals, 2 MHz clock signals, 1pps+ASCII clock signals, or 2-channel DCLS clock signals.
CLK/TOD1	RJ45	Bits1: It is used to input or output 2 Mbit/s clock signals, 2 MHz clock signals, 1pps+ASCII clock signals, or 2-channel DCLS clock signals.
CLK/1PPS	SMB	Bits2: It is used to input or output 2 Mbit/s clock signals, 2 MHz clock signals, or 1 PPS signals.
CLK/Serial	SMB	Bits2: It is used to input or output 2 Mbit/s clock signals, 2 MHz clock signals, or RS232 signals.

NOTE

Bits2 includes 2 SMB ports, and the signal type can be set as 2Mbps/2Mhz/1PPS+RS232. When signal is 2Mbps/2Mhz, CLK/1PPS is fixed as input and CLK/Serial is fixed as output. When signal is 1PPS+RS232, CLK/1PPS and CLK/Serial are bound together, CLK/1PPS signal type is 1PPS whereas CLK/Serial signal type is RS232, and the input/output settings apply to both SMB ports.

Interface Attributes

Table 4-28 lists the 1000MBase-X-SFP interface attributes.

Table 4-28 1000MBase-X-SFP interface attributes

Attribute	Description
Connector type	SFP
Operation mode	1000 M fiber
Standard compliance	IEEE 802.3-2002
Cable specification	Single-mode or multi-mode fibers

Table 4-29 lists the 10Base-T/100Base-TX/1000Base-T-RJ45 interface attributes.

Table 4-29 10Base-T/100Base-TX/1000Base-T-RJ45 interface attributes

Attribute	Description
Connector type	RJ45
Operation mode	10M/100M/1000M auto-sensing interfaces, supporting half-duplex and full-duplex modes
Standard compliance	IEEE 802.3-2002
Cable specification	Category 5 unshielded twisted pair (UTP) cables recommended when the interface rate is 10 Mbit/s or 100 Mbit/s; super category 5 Shielded Twisted Pair (STP) cables recommended when the interface rate is 1000 Mbit/s

Table 4-30 lists the console interface attributes.

Table 4-30 Console interface attributes

Attribute	Description
Connector type	RJ45
Operation mode	Duplex Universal Asynchronous Receiver/Transmitter (UART)
Electrical attribute	RS-232
Baud rate	9600 bit/s (default value), which can be changed as required
Data equipment type	DCE (Data Circuit-terminating Equipment)

Attribute	Description
Cable specification	8-core shielded cable

Table 4-31 lists the AUX interface attributes.

Table 4-31 AUX interface attributes

Attribute	Description
Connector type	RJ45
Operation mode	Duplex UART
Electrical attribute	RS-232
Baud rate	9600 bit/s (default value), which can be changed as required
Data equipment type	Data Terminal Equipments (DTE)
Cable specification	8-core shielded cable

Table 4-32 lists the attributes of the external clock interface..

Table 4-32 External clock interface attributes

Attribute	Description
Connector type	RJ45
Cable specification	120-ohm clock cable
Standard compliance	G.703

Table 4-33 lists the external clock interface attributes.

Table 4-33 External clock interface attributes

Attribute	Description
Connector type	SMB

Attribute	Description
Cable specification	75-ohm clock cable
Standard compliance	G.703

NOTE

The Switch and Route Processing Unit A5 can be used only on the CX600-X8.

The 200G Switch and Route Processing Unit A5 can be used only together with the SFUI-200-C.

Technical Specifications

Table 4-34 lists the technical specifications of the Switch and Route Processing Unit A5.

Table 4-34 Technical specifications of the Switch and Route Processing Unit A5

Item	Specifications
Silkscreen of the board name	SRUA
Power consumption (typical value)	149 W
Heat dissipation	483.42 BTU/hour
Board weight	4.8 kg (10.58 lb)
Dimensions (H x W x D)	35 mm x 398.5 mm x 554 mm (1.38 in. x 15.69 in. x 21.81 in.)
Lowest Software Version	V600R003C00

4.5.4 Switch and Route Processing Unit A4

NOTE

Switch and Route Processing Unit A4 is the 40G Switch and Route Processing Unit

Appearance

The CX6D0SRUA410 is used by the CX600-X8.

Figure 4-26 shows the appearance of the SRU.

Figure 4-26 Appearance of the SRU

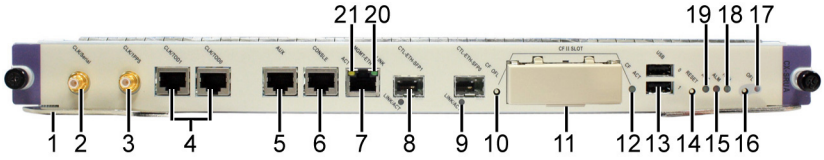
NOTE

In this document, the equipment exterior is for reference only. The actual equipment may differ from what is shown in the figures.

Panel

Figure 4-27 shows the appearance of the panel.

Figure 4-27 Appearance of the panel



1. Ejector lever	2. CLK/Serial	3. CLK/1PPS	4. CLK/TOD
5. AUX	6. Console	7. MGMT-ETH	8. CTL-ETH-SFP
9. LINK/ACT	10. CF OFL button	11. CF card	12. CF indicator
13. USB	14. RESET	15. ALM indicator	16. OFL button
17. OFL indicator	18. RUN indicator	19. ACT active/standby indicator	20. MGMT-ETH LINK indicator
21. MGMT-ETH ACT indicator			

Table 4-35 describes the buttons and indicators on the SRU panel.