Calix

☒ PRODUCT
☐ MARKETING
☐ SERVICE

CUSTOMER ADVISORY BULLETIN

NO: CAB-11-012
DATE: 4/15/2011
ORIG: Marketing
DIST: External

E-Series Cabinets & Retrofit Kits Product Planning Guide

Table of Contents

ABOUT THIS PRODUCT PLANNING GUIDE

This document is intended to guide Calix customers on the choices and options available for the deployment of E-Series products in outside plant cabinets, either E-Series specific Calix ODC (Outdoors Cabinet) configurations, retrofit into legacy Calix ODCs, or retrofit options for third party cabinets.

The ODC-x000 line of cabinets is the second generation of outdoor cabinets designed, manufactured and integrated by Calix. ODC-100 is one of the third generation families. With the ODC-x000 cabinet line Calix moved away from the legacy ODC-10/20/40/80 and ODC-120 cabinets, which were C7 chassis centric, into a more open and flexible philosophy of outdoor enclosure design. Going forward, Calix will support the complete portfolio of Calix C-, E-, B- and F-Series products in our cabinets, with associated model numbers being a more generic naming convention; ODC-100, ODC-1000/2000/3000, etc. On occasion name suffixes are used to denote cabinet configurations specifically targeted to support certain product families (i.e. ODC-2000E7-2), or powering options (i.e. ODC-1000xR or ODC-1000xL for Remote and Local power configurations respectively).

This document also contains information regarding powering options for E-Series equipment in indoor and outdoor applications.

CALIX ODC-100 OUTSIDE PLANT CABINET

ODC-100 FEATURE DESCRIPTION

The Calix ODC-100 is a compact outside plant cabinet designed to support copper and/or fiber based broadband subscribers. The Calix ODC-100 cabinet is designed to house a low count of small form factor rack mount telecom equipment, such an E5-100, E7-2 and/or B6-001.

Calix ODC-100 Outdoor Cabinet (shown are E7-2 and E5-121 with copper and fiber distribution assemblies)

The ODC-100 provides all the features and capabilities of larger cabinets, including generator connectors, battery base and battery warmer, commercial AC power load center with convenience outlets or line/network remote power options, copper protection panels and high count fiber distribution/termination assemblies, for modular subscriber port count growth.

ODC-100 Features and Functionality

- **Dimensions:** 37"H x 18"W x 24"D outside plant enclosure designed to meet GR-487 compliance. The optional battery base adds 11" to cabinet height (48"H). A side door mounted heat exchanger adds 4.75" to the cabinet width (22.75"W)
- **Mounting options:** Wall, pole, pad (pour-in-place template or pre-cast pad available), or vault mount. The ODC-100 can also be mounted on a cabinet host as an adjunct.
- **Powering options:** Local AC and remote power:

  - Local AC power: 120/240 VAC 50-60Hz single phase input into AC load center with two 110 VAC convenience outlets. Ten position fused 120VAC to -48Vdc rectifier.
  - Remote power: Integrated +/-190 Vdc DC-DC Downstream converter. Ten position fused -48Vdc source. Upstream DC-DC converter (-48 Vdc to +/-190 Vdc) needed at headend, supports multiple remote/line powered nodes.
- **Cabinet options:** Battery base, batteries, battery warmer, generator connector, remote power hold-over capacitor.
- **Access infrastructure:** Choice of copper or fiber subscriber distribution and termination, or mix of both.
  - Cabinet integrated GPON splitters (Nx 1:32 splits).
  - Integrated cross-connect; 150 and 300 pair options.
- **Copper transport:** Integrated Ethernet over Copper (EoCu) transport solutions for deployment in fiber – less areas.
- **Transport Fiber distribution**: A 12 position fiber splicing tray is included inside every ODC-100 cabinet. Upgradeable to 36 positions.

ODC-100 PRODUCT DETAILS

The Calix ODC-100 is an ultra-compact outdoor cabinet (ODC) enclosure, specifically designed for small form factor, rack mountable telecom equipment like the Calix E-Series E7-2/E5-100/400 or B-Series B6-001 products.

The basic building blocks of the Calix ODC-100 are shown below. The ODC-100 cabinet meets GR-487 requirements fully, which helps ensure OSP longevity of the enclosure and the equipment it houses. The Calix ODC-100 is equipped with two doors – a plain door on the cabinet's front, and a right side door with a standard 300 watt capacity heat exchanger.

ODC-100 Outdoor Cabinet Anatomy (front and side views)

The ODC-100 is designed for modular expansion, allowing cost effective service deployment and scalability. Starter packages are available that include 48 ports of ADSL2+ (overlay and combo), 24 ports of VDSL2 (overlay and combo), or 24 ports of Active Ethernet FTTP subscriber drops. The corresponding number of copper protection is supported in increments of up to four 48x 5-pin protector panels.

Copper Distribution; Pro-panels, Cross-Connects, etc.

The ODC-100 supports up to four 50-pair protection panels. These protector panels have been designed to be field installable and do not require the use of special tools – which allows for easy installation in the field. The intent of this modularity, which extends to a field installable door-mounted heat exchanger, is to maintain a low initial price point while maintaining price linearity as broadband service requirements expand:

- 100-01521 - ODC-x000E 50pr CAT5 Protector Block, MS2
- 100-01887 - ODC-x000E 50pr CAT5 Protector Block, 710

Calix has qualified 5-pin protector modules for successful deployment of ADSL2+ and VDSL2 deployment.

- 100-00035 - 5 Pin Protection Module (Gas/solid state), Quantity 25

A different 5-pin protector module has been qualified for over voltage protection of the copper loops used for remote power of the RT:

- 100-01074 - Remote Power 5-pin Protector Module (25 Pack)

Integrated cross-connects (150- & 300-pair, MS^2 and 710 OSP cable connector);

- 100-01804 - ODC-100 Integrated Cross Connect, ADC, 150 pair, 2:1 Block, MS2
- 100-01724 - ODC-100 Integrated Cross Connect, ADC; 300 pair, 2:1 Block, MS2
- 100-02075 - ODC-100 Integrated Cross Connect, ADC, 150 pair, 2:1 Block, 710
- 100-02076 - ODC-100 Integrated Cross Connect, ADC; 300 pair, 2:1 Block, 710

Fiber Distribution & Termination, splicing, splitters, etc.

In case of fiber intensive applications, such as deployment of Active Ethernet or GPON FTTP subscriber access, the ODC-100 can be equipped with fiber management accessories, based on SC/ACP termination assemblies, to support equivalent subscriber ports to that of copper subscriber access, in increments of up to four 48x SC termination panels (or up to two 96 x SC termination panels). Cabinet based deployment of integrated 1:32 GPON splitters is also supported in this cabinet. Options for fiber distribution and integrated FTTP include:

Calix Part #	Description
100-01841	1by32 PON Splitter; planar, 33x 51" fiber pigtails, SC-APC
100-01842	96 Position Fiber Distribution assembly (SC connectors) for Pro-panel frame, 100ft OSP fiber cable
100-01843	48 Position Fiber Distribution assembly (SC connectors) for Pro-panel frame, 100ft OSP fiber cable
100-01879	ODC-100 Splitter Integration Kit - Misc. Routing/Mnting Hardware
100-01890	48 Position Fiber Distribution mounting frame bracket for Pro-panel frame
100-01891	ODC-100 Fiber management accessories; spool, fiber routing, etc.
100-01895	Ruggedized fiber patch cord, 1 meter; 2mm bend insensitive, OSP SC/APC to SC/APC, simplex
100-01896	Ruggedized fiber patch cord, 3 meter; 2mm bend insensitive, OSP SC/APC to SC/APC, simplex
100-01899	Ruggedized fiber patch cord, 1 meter; 2mm bend insensitive, OSP SC/UPC to SC/APC, simplex
100-01900	Ruggedized fiber patch cord, 3 meter; 2mm bend insensitive, OSP SC/UPC to SC/APC, simplex
100-01901	Ruggedized fiber patch cord, 1 meter; 2mm bend insensitive, OSP LC/UPC to SC/APC, simplex
100-01902	Ruggedized fiber patch cord, 3 meter; 2mm bend insensitive, OSP LC/UPC to SC/APC, simplex

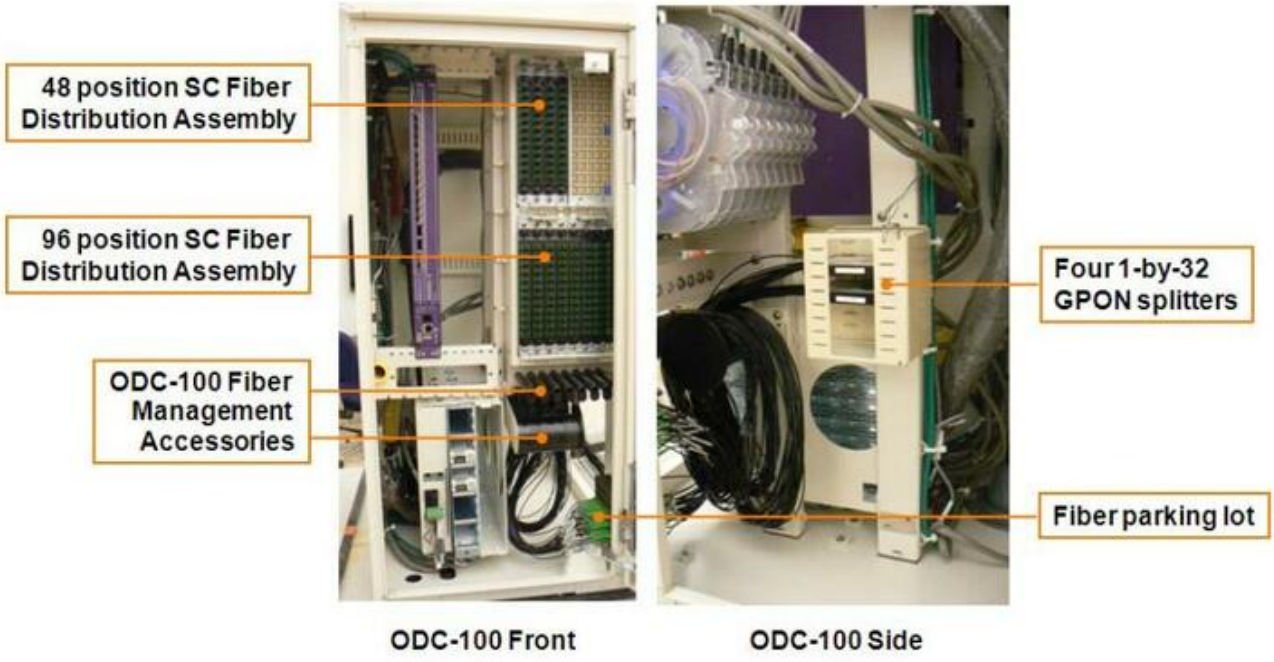
Fiber management and FTTP subscriber fiber termination solutions for the ODC-100 have been arranged in the following ordering convenience packages:

Item Number	Qty	Item Description
000-00379		ODC-100 Fiber Distribution (192 SC ports) and Splitter (4x 1by32 splits) solution for 4x GPON ports
100-01841	4	1 x 32 PON Splitter; planar, 33x 51" fiber pigtails, SC-APC
100-01842	2	96 Position Fiber Distribution assembly (SC connectors) for Pro-panel frame, 100ft OSP fiber cable
100-01879	1	ODC-100 Splitter Integration Kit - Misc. Routing/Mnting Hardware
100-01890	4	48 Position Fiber Distribution mounting frame bracket for Pro-panel frame
100-01891	1	ODC-100 Fiber management accessories; spool, fiber routing, etc.

Item Number	Qty	Item Description
000-00405		ODC-100 48 Fiber Distrib. pkg; 48 SC conn., mounting bracket for Pro-panel, Fiber management
100-01843	1	48 Position Fiber Distribution assembly (SC connectors) for Pro-panel frame, 100ft OSP fiber cable
100-01890	1	48 Position Fiber Distribution mounting frame bracket for Pro-panel frame
100-01891	1	ODC-100 Fiber management accessories; spool, fiber routing, etc.
000-00406		ODC-100 96 Fiber Distrib. pkg; 96 SC conn., mounting bracket for Pro-panel, Fiber management
100-01842	1	96 Position Fiber Distribution assembly (SC connectors) for Pro-panel frame, 100ft OSP fiber cable
100-01890	2	48 Position Fiber Distribution mounting frame bracket for Pro-panel frame
100-01891	1	ODC-100 Fiber management accessories; spool, fiber routing, etc.
000-00407		ODC-100 1by32 splitter package; 1x splitter & Splitter Integration Kit
100-01841	1	1 x 32 PON Splitter; planar, 33x 51" fiber pigtails, SC-APC
100-01879	1	ODC-100 Splitter Integration Kit - Misc. Routing/Mnting Hardware

Some details:

- Each 48 fiber distribution assembly (100-01843) mounts in the same space as a 48-pair copper pro-panel, with the help of one 48 Position Fiber Distribution mounting frame bracket (100-01890).
- Each 96 fiber distribution assembly (100-01842) mounts in the same space as a two contiguous 48-pair copper pro-panels, with the help of two 48 Position Fiber Distribution mounting frame brackets (100-01890).
- Both fiber distribution assemblies terminate in an outside plant cable, 48 or 96 fibers respectively, which is 100ft in length.
- One 48 fiber distribution assembly (100-01843) can be mounted next to a 48-pair copper pro-panel, for mixed copper/fiber deployments.
- Up to 4 splitters can be collocated in the cabinet with the help of Splitter Integration Kit (100-01879).
- An ODC-100 Fiber management accessories kit (100-01891) is recommended for any fiber application for this cabinet.



ODC-100 Fiber Management Details (front and side views)

Please refer to the following Calix documentation for more details; "Installation Guide, Fiber Management Solutions for ODC-100" (document #220-00329).

In addition, the cabinet is always equipped with a 12 position mechanical fiber splicing tray, as a default part of the cabinet's integration in factory, upgradeable to 36 positions;

- 100-01684 - Double Fiber Splice Tray assembly, 24 positions

Other Cabinet Options

All traditional cabinet configuration options are also supported by the cabinet:

- 100-01246 - ODC-100 40AH Battery Systems Battery String (one string per cabinet)
- 100-01247 - ODC-100 Battery Warmer
- 100-01290 - ODC-100 Earthquake Battery Bracket
- 100-01185 - ODC-100 Generator Connector NEMA L14-30R 30amp
- 120-00121 - Replacement Battery Breaker, 50A, ODC-100

ODC-100 MOUNT AND VAULT OPTIONS

The ODC-100 is currently supported on three different mounting options:

- 100-01244 - ODC-100 Pour-in-Place Template
- 100-01172 - ODC-100 Pole Mount Kit (also used for Wall-Mount)
- 100-01768 - ODC-100 Adjunct kit for mounting on host 3rd party enclosures

Please refer to the following Calix documentation for more details; "*Calix ODC-100 Pad Template Installation Guide*" (Document #220-00247).

ODC-100 Pole Mount (front view)

Please refer to the following Calix documentation for more details; *"Calix ODC-100 Installation Guide"* (document #220-00221).

ODC-100 Adjunct Mount (side view)

Please refer to the following Calix documentation for more details; *"Calix ODC-100 Adjunct Mounting Kit for 3M 4220 Enclosures"* (document #220-00311).

Precast pads and vault options have been designed for the ODC-100 cabinet. For details on dimensions and installation guidelines of the concrete precast pads and vaults, please refer to the *"ODC-100 Installation Guide"*, or contact the suppliers directly:

CGM Precast, Inc.
Attn: Chuck Machledt
5402 Massachusetts Ave
Indianapolis, IN 46218
Phone: 317-545-6557 Fax: 317-545-6558
Email: CGMFL@aol.com

Tunnel Mill Polymer, Inc
Attn: Steve Day
Box 23
Alden, IA 50006
Phone: 515-859-7629 Cell: 515-669-8315 Fax: 515-859-7706
Email: steveday@tunnelmill.com

Newbasis
Attn.: Matt Stockbridge
2626 Kansas Avenue
Riverside, California 92507
Phone: (951) 787-0600 Fax: (951) 328-1275
Mobile: (530) 613-6096
E-mail: mstockbridge@newbasis.com
E-mail 2: info@newbasis.com
Web Page: www.newbasis.com

DMAC Industries
Attn.: Dave McMaster
P.O. Box 325
Dawson, IL 62520
Phone: 217-364-4405 Fax: 217 364-4405
E-mail: mcmaster@dmacindustries.com
Web Page: http://www.dmacindustries.com/

ODC-100 on vault (front view)

ODC-100 POWER OPTIONS

The Calix ODC-100 supports *Local* AC or *Remote* DC (aka line or network) power conversion to -48 Vdc. AC power is typically sourced from the Power Utility locally wherever the cabinet is deployed.

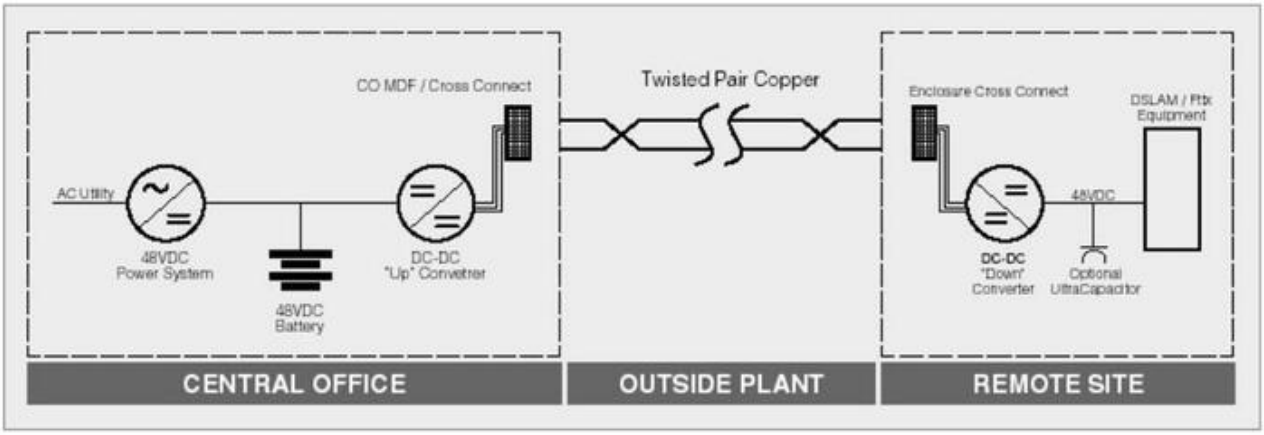
Remote power is often described or called also "span", "loop", "network", "express" or "line" powering, and usually occurs from a centralized power hub in and RT or CO. Remote power provides centralized backup instead of needing to locate battery strings in every cabinet. Remote power is often used to avoid right-of-way issues or in locations where AC power is difficult or too costly to attain.

Remote Power Details

Remote power is based on two DC-DC power conversion devices:

- The Upstream (US) source converts from -48 Vdc to ±190 Vdc

- The Downstream (DS) device re-converts from the ±190 Vdc power on the line/loop back to -48 Vdc



High Voltage DC Network Powering

Remote power uses copper pairs from the outside plant to power remote access equipment. Currently a voltage of +/-190 VDC is used by remote power circuits or channels, older line/express power equipment used +/-130 VDC. With +/-190 VDC, more power and greater reach is attainable over a given copper pair, this is what has been implemented by the Calix for remote powered ODCs and the E3 family of products.

Remote power allows communications service providers to reuse their copper-based outside plant infrastructure to bypass local utilities and centralize battery maintenance. The table below provides a comparison of local and remote power options:

Local Power	Remote Power
Advantages:	**Advantages:**
• Well understood, commercially available AC power source • Commonly used in the current access network	• Allows an operator to get power to a location without a presence from the local utility • Allows a centralized backup system to be used, reducing installation and maintenance costs • Reuses existing copper plant
Disadvantages:	**Disadvantages:**
• Requires the local utility to install power access, which adds to installation costs and takes valuable time away from service deployment • Requires local battery backup to be collocated with the access equipment, increasing footprint, cost, and maintenance activities	• A large amount of the launch power is dissipated over the twisted pairs, causing power utilization inefficiency • Outside plant technicians run the risk of a substantial shock if they grab the wrong copper pairs (need to be clearly identifiable)

Calix uses remote power systems from Lineage Power (formerly Tyco Power Systems Group), these systems are resold, supported and integrated by Calix into remote powered solutions. The Lineage Power remote power

shelf provides a simple, modular design. The Lineage Power CPS3200U upstream converter shelf is 2RU high and is deployed with a 2RU fan tray assembly, which is designed to provide cooling for up to three stacked CPS3200U units – both mount in a 23" equipment rack. The CPS3200U consists of 16 service slots into which power modules are inserted, each power modules supports two +/-190 VDC circuits or channels. The input voltage for the shelf is -48 VDC. Each power circuits or channels can use one or several copper pairs (anywhere between one and four OSP copper pairs per each power circuit or channel is common. Multiple OSP copper pairs are used in order to achieve a desired loop resistance (usually 550 – 800 Ohm round trip resistance). Each power circuit supplies 100 watts of launch power for a total of 3200 watts per upstream converter shelf. Physical connectivity is provided by two RJ21 connectors on the side of the Lineage Power shelf.

Lineage Power CPS3200U Upstream Converter Remote Power Shelf

Remote power is received on the +/-190 VDC pairs (in either and ODC-100, ODC-1000R, E3, etc) by the RT's downstream converter called the Lineage Power CPS2500D, installed within the RT. The CPS2500D terminates the power circuits and converts the remote power to again to -48 VDC. The CPS2500D downstream converter supports ten service slots into which power modules are inserted, each power modules supports two +/-190 VDC circuits or channels. Each power module in the CPS2500D supports two power circuits just like the CPS3200U, providing up to 65 watts of power per pair for a total of 130 watts per module.

Lineage Power CPS2500D Downstream Converter Remote Power Shelf

The modules in both the CPS3200U and CPS2500D may be populated in a modular fashion, providing only as much power capacity as is required for the equipment deployed in the RT. The number of power modules required for an RT is dependent upon the equipment being powered, as well as the type of copper, gauge of copper, age of copper, distance, and condition of the cable being used. New, purpose specific remote power deployments use 19AWG or 20AWG copper, but unused subscriber copper loops (24AWG, 26AWG) can also be used.

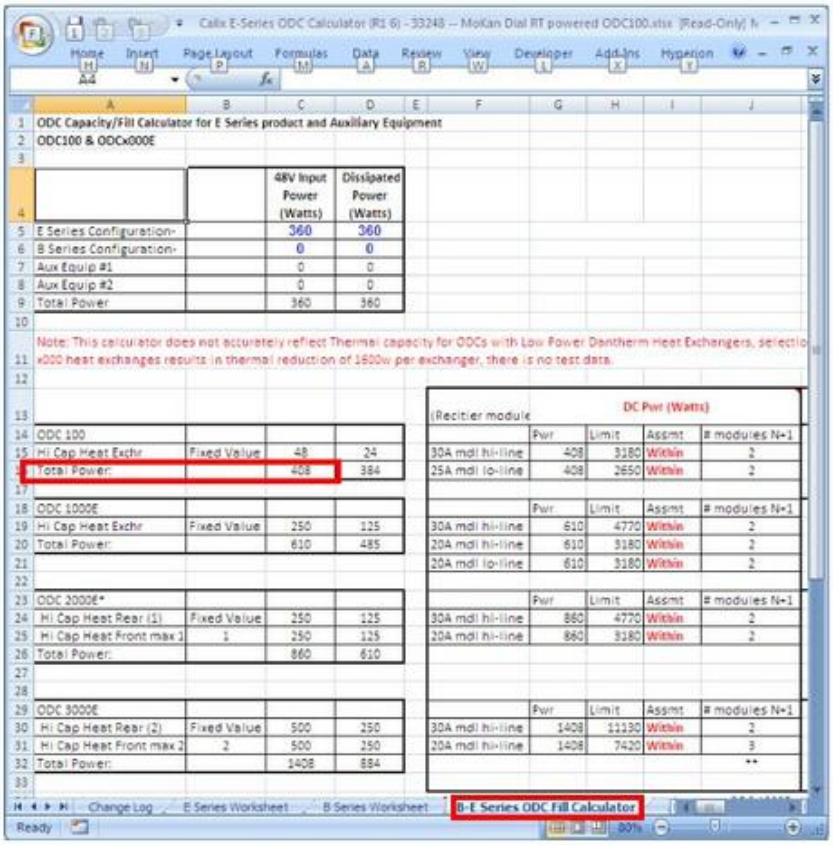
The CPS3200U must be populated with one module for every module deployed in the downstream CPS2500D remote power shelves. Every pair connected on the CPS3200U must also be connected directly to the CPS2500D at the other end. Power module redundancy is supported in a 1:N mode.

The condition of the copper pairs must be determined on a case-by-case basis. Some copper pairs (and particularly splices) may have deteriorated over time and may be unsuitable for remote power or may require OSP cable maintenance before use. Copper pair crosses and deteriorated pairs can cause instability in the upstream converter. A brief reset on an individual, or multiple, converters can cause an interruption of power to the load equipment. Therefore, a converter reset can potentially cause a lengthy outage of the load equipment and requirements for a short duration backup system at the remote site become a very attractive solution. Calix has developed for remote powered ODCs a capacitor based solution to ensure load equipment can ride through brief converter resets. The remote power holdover capacitor draws minimal 48V overhead from the remote system for charging and provides backup power from 3 to 10 second duration to ensure power source reliability. The package mounts on a 19in rack within the cabinets and parallels onto the 48VDC bus, similar to a battery in a standard 48VDC power system. These Remote Power Holdover Capacitors are highly recommended for all remote powered ODCs. Please consult the "Calix B- and E-Series ODC Calculator" to determine how many capacitors are needed in an ODC:

- 100-01992 - ODC-100 Downstream converter (RT), Remote Power Holdover Capacitor option, field or factory instal.
- 100-01993 - ODC-x000E DS converter (RT), RT Pwr Holdover Capacitor option, Integr. Kit, field/factory install
- 100-02279 - ODC-x000E DS converter (RT), RT Pwr Holdover Capacitor Add-on, field/factory install

Due to the number of variables involved in calculating remote power, Calix has made available a spreadsheet within the "Calix B- and E-Series ODC Calculator" to help calculate the number of modules and pairs required to remotely power RTs based on the distance and gauge of the specific copper loops available. This spreadsheet takes into account the total power consumed by the equipment configuration and power draw of the ODCs' heat exchanger and auxiliary or 3rd party equipment:

Using the "Calix B- and E-Series ODC Calculator", use the E-Series and B-Series worksheets to calculate the input power requirements of the Calix equipment in the cabinet, then use the B-E Series ODC Fill Calculator worksheet to add optionally add power requirements for auxiliary equipment and obtain the total power of your configuration:



ODC Capacity/Fill Calculator for E Series product and Auxiliary Equipment
ODC100 & ODCx000E

		48V Input Power (Watts)	Dissipated Power (Watts)
E Series Configuration-		360	360
B Series Configuration-		0	0
Aux Equip #1		0	0
Aux Equip #2		0	0
Total Power		360	360

Note: This calculator does not accurately reflect Thermal capacity for ODCs with Low Power Dantherm Heat Exchangers, selectio
x000 heat exchanges results in thermal reduction of 1600w per exchanger, there is no test data.

ODC 100			
Hi Cap Heat Exchr	Fixed Value	48	24
Total Power:		408	384
ODC 1000E			
Hi Cap Heat Exchr	Fixed Value	250	125
Total Power:		610	485
ODC 2000E*			
Hi Cap Heat Rear (1)	Fixed Value	250	125
Hi Cap Heat Front max 1	1	250	125
Total Power:		860	610
ODC 3000E			
Hi Cap Heat Rear (2)	Fixed Value	500	250
Hi Cap Heat Front max 2	2	500	250
Total Power:		1408	884

DC Pwr (Watts)

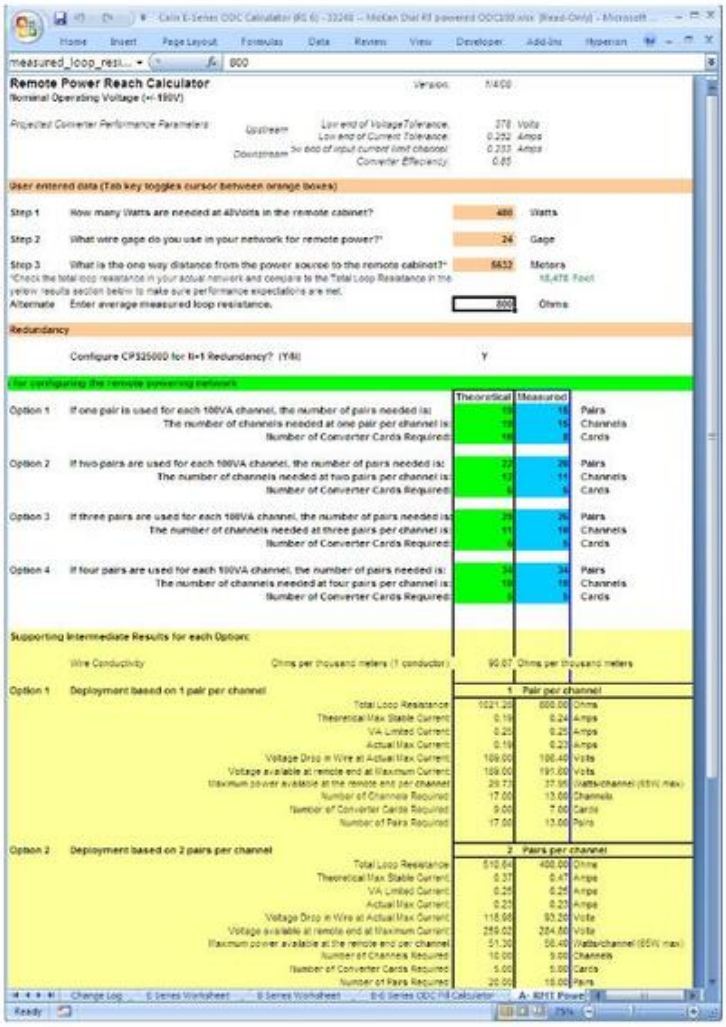
(Recitier module	Pwr	Limit	Assmt	# modules N+1
30A mdl hi-line	408	3180	Within	2
25A mdl lo-line	408	2650	Within	2
	Pwr	Limit	Assmt	# modules N+1
30A mdl hi-line	610	4770	Within	2
20A mdl hi-line	610	3180	Within	2
20A mdl lo-line	610	3180	Within	2
	Pwr	Limit	Assmt	# modules N+1
30A mdl hi-line	860	4770	Within	2
20A mdl hi-line	860	3180	Within	2
	Pwr	Limit	Assmt	# modules N+1
30A mdl hi-line	1408	11130	Within	2
20A mdl hi-line	1408	7420	Within	3
				**

Change Log | E Series Worksheet | B Series Worksheet | B-E Series ODC Fill Calculator

Ready

Calix B- & E-Series ODC Calculator (B- & E-Series ODC Fill Calculator Worksheet)

Use the "A- RMT Power channel calculator", in the "Calix B- and E-Series ODC Calculator", to calculate the number of ±190Vdc power circuits (channels) needed to power the RT remotely, as a function of total power required (Watts), gauge of the copper loops being used for line power, and distance of those loops. Select the number of pairs per channel option that shows total loop resistance closest to the desired 550 – 800 Ohm (see Options 1/2/3/4 in bottom of the worksheet):



Calix B- & E-Series ODC Calculator (Remote Power Channel Calculator)

Technically speaking, the correct number of power circuits and pairs per circuit is calculated by knowing the power requirements of the RT, distance to the remote, and measured round trip loop resistance. This information provides empirical data towards the calculation of circuits and pairs required. *(See green "Measured" column of the results part of the remote power calculator spreadsheet.)*

If the resistance is not known, the number of powering modules required can be obtained by knowing the power requirements of the ODC-100 remote, the distance to the remote, and copper wire gauge. This data provides an approximate number of modules / circuits required as a function of different options for the number of pairs used per power circuit, assuming theoretical numbers for copper pair cable resistance. Choose the option that yields a "Total Loop Resistance" closest to the optimum 550 – 800 Ohm value. *(See blue "Theoretical" column of the results part of the remote power calculator spreadsheet.)*

Distance and loop quality versus round trip loop resistance: As loop quality degrades, the resistance on a copper loop will increase. This increase in loop resistance has the net effect of causing the copper loop to appear longer. In order to ensure the proper number of copper pairs is utilized, Calix recommends that the service provider measure the resistance on a loop and convert that to distance for use in calculating the number of copper pairs required.

Protection is accomplished by adding two additional power circuits (same amount of pairs per circuit as working modules) and one additional module beyond the number required (as defined in the spreadsheet calculation redundancy option). This enables 1-2 pairs to be cut or a power module to be removed and still have enough pairs / modules to power the ODC-100 and E5-100 platforms.

Remote Power Ordering Guide

The base Lineage Power CPS3200U remote power upstream converter system is offered as a package; *Remote Power Starter Kit – Lineage Power: Part # 000-00108*. This package consists of the following components:

- 100-00670 - Upstream converter (CO), Remote Power Shelf (Lineage Power) (x1)
- 100-00903 - Upstream converter (CO), Remote Power Fan Tray (Lineage Power) (x1)

The following upstream shelf converter cards will need to be added to the Lineage Power shelf on an as needed basis. Each module supports two +/-190Vdc power circuits or channels:

- 100-00900 - Upstream converter (CO), Remote Power Module, +/-190Vdc (Lineage Power)

The base system supports alarm access via contact closures, located on the alarm control card. For Ethernet-based management and SNMP traps, one Ethernet controller card can be inserted into the fan tray:

- 100-00902 - Upstream converter (CO), Remote Power Ethernet Controller (Lineage Power)

Connectivity between the Lineage Power shelves and the fan tray Ethernet controller is achieved with a standard RJ45 connector. Lineage Power shelves can be daisy-chained to maximize the use of a single Ethernet controller card.

The CPS2500D remote power downstream converter system is included as part of the integration of all remote powered packages, so it does not need to be ordered separately. For ODC-100 this includes:

- 100-01241 - Downstream converter (RT), Remote Power Shelf, Integration Kit (Lineage Power)
- 100-01243 - Downstream converter (RT), Remote Power Fan Tray, Integration Kit

The following downstream shelf converter cards will need to be added to the Lineage Power shelf on an as needed basis. Each card supports two +/-190Vdc power circuits or channels:

- 100-01242 - Downstream converter (RT), Remote Power Module, +/-190Vdc (Lineage Power)

If a remote powered ODC-1000/2000-ER cabinet requires more than the 20 remote power circuits they support by default, up to three more remote power shelves can be ordered for the cabinet using the following orderable package:

- 000-00345 - ODC-x000-ER, Remote Power Shelf upgrade: Pwr. Shelf, FTA, DC distrib., Pwr. Pro-panel, 2 modules

These Remote Power Holdover Capacitors are highly recommended for all remote powered ODCs. Please consult the "Calix B- and E-Series ODC Calculator" to determine how many capacitors are needed in an ODC:

- 100-01992 - ODC-100 Downstream converter (RT), Remote Power Holdover Capacitor option, field or factory instal.
- 100-01993 - ODC-x000E DS converter (RT), RT Pwr Holdover Capacitor option, Integr. Kit, field/factory install
- 100-02279 - ODC-x000E DS converter (RT), RT Pwr Holdover Capacitor Add-on, field/factory install

Copper pairs used for line/remote power purposes need to be terminated in the RT on a different protector panel from the loops used for subscriber pairs. This is meant as a safety measure for the splicer and OSP field operator. These protector panels are included as part of the integration of all remote powered packages, but if a cabinet is upgraded in order to add further remote power capacity, order more line power pro-panels separately:

- 100-01001 - ODC-100 25 Pair Power Protector Panel

A 5-pin protector module has been qualified for over voltage protection of the copper loops used for remote power of the RT:

- 100-01074 - Remote Power 5-pin Protector Module (25 Pack)

Detailed documentation for these systems can be found on the Calix Customer documentation portal, under:

Equipment Installation

ODC Equipment Installation
Retrofits for Third-Party Cabinets
ODC Equipment Wiring
Retrofit Wiring

ODC Equipment Installation Guides

DC Converter Shelves (Line Power)

LP CPS3200U Upstream Power System Product Manual

LP CPS2500D Downstream Power System Product Manual

LP QS941A Controller User Interface Manual

LP QS941A Controller Web Interface Manual

LP CPS3200U Technical Support Guide

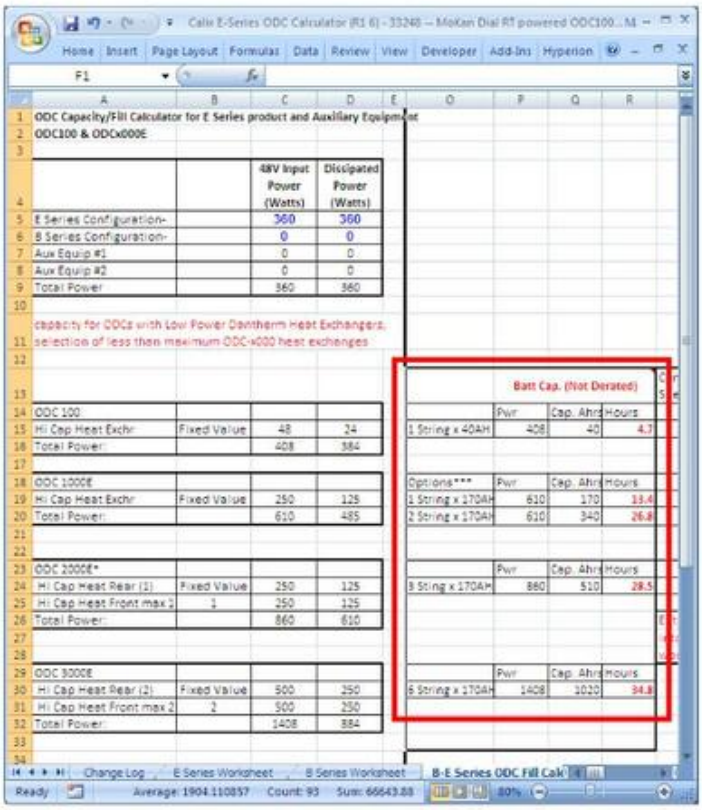
Local Power Details

The Calix ODC-100 may also be ordered in a locally powered configuration. Local power package items for the Calix ODC-100 include a battery base, Valere rectifier shelf, rectifier controller, two rectifier modules and an AC load center that is equipped with two AC convenience outlets. The Valere rectifier shelf supports the ability to power the E-Series products by providing -48VDC on dual power feeds. Local power optional items are battery strings, battery warmers, and a 30A twist lock generator connector:

- 100-01185 - ODC-100 Generator Connector NEMA L14-30R 30amp

- 100-01247 - ODC-100 Battery Warmer
- 100-01246 - ODC-100 40AH Battery String

For customers who choose to provide battery backup for locally powered from a Calix ODC cabinet please consult the "Calix B- and E-Series ODC Calculator" spreadsheet, "B-E-Series ODC Fill Calculator" worksheet, to determine the extend or battery backup time of you RT configuration:



ODC Capacity/Fill Calculator for E Series product and Auxiliary Equipment
ODC100 & ODCx000E

		48V Input Power (Watts)	Dissipated Power (Watts)
E Series Configuration-		360	360
B Series Configuration-		0	0
Aux Equip #1		0	0
Aux Equip #2		0	0
Total Power		360	360

capacity for ODCs with Low Power Dantherm Heat Exchangers.
selection of less than maximum ODC-x000 heat exchanges

ODC 100			
Hi Cap Heat Exchr	Fixed Value	48	24
Total Power:		408	384

ODC 1000E			
Hi Cap Heat Exchr	Fixed Value	250	125
Total Power:		610	485

ODC 2000E*			
Hi Cap Heat Rear (1)	Fixed Value	250	125
Hi Cap Heat Front max 2	1	250	125
Total Power:		860	610

ODC 3000E			
Hi Cap Heat Rear (2)	Fixed Value	500	250
Hi Cap Heat Front max 2	2	500	250
Total Power:		1408	884

Batt Cap. (Not Derated)

	Pwr	Cap. Ahrs	Hours
1 String x 40AH	408	40	4.7

Options***	Pwr	Cap. Ahrs	Hours
1 String x 170AH	610	170	13.4
2 String x 170AH	610	340	26.8

	Pwr	Cap. Ahrs	Hours
3 Sting x 170AH	860	510	28.5

	Pwr	Cap. Ahrs	Hours
6 String x 170AH	1408	1020	94.8

Change Log | E Series Worksheet | B Series Worksheet | B-E Series ODC Fill Calc

Calix B- & E-Series ODC Calculator, Battery Capacity calculations (B- & E-Series ODC Fill Calculator Worksheet)

ODC-100 COPPER TRANSPORT OPTIONS

ODC cabinets can be equipped with Ethernet over copper (EoCu) transport units, i.e. Hatteras HN and Actelis ML platforms.

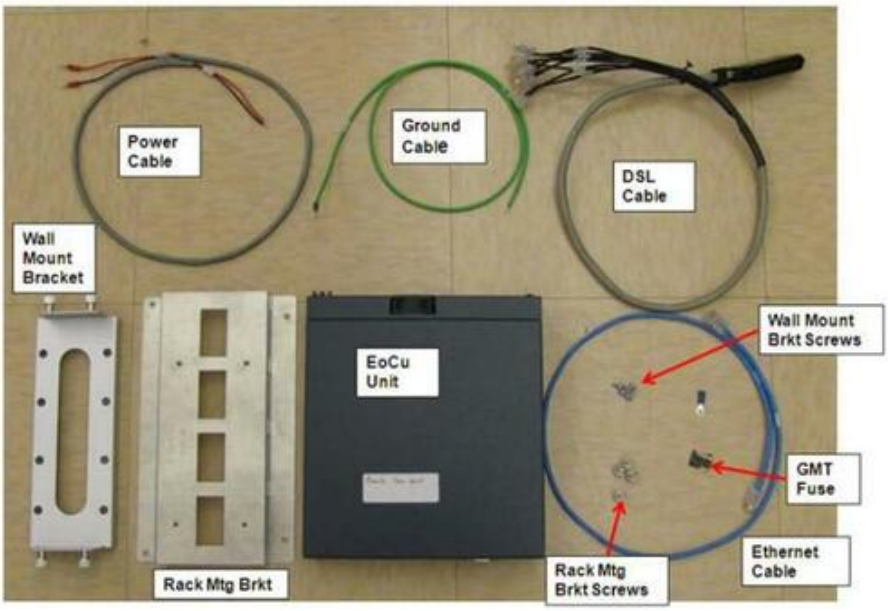
Calix does not at this point re-sell 3rd party EoCu solutions, except in some cases where customers have expressed interest in sourcing the technical and commercial solutions entirely from Calix.

Kits for EoCu solutions inside ODC cabinets include:

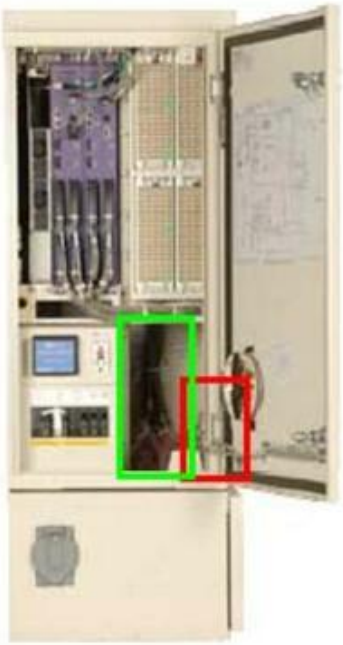
- Power & ground cables for EoCu units
- DSL/signal cable from EoCu units to 24 pair protector panel(*)
- Mounting brackets for EoCu units
- Ethernet cable, EoCu units to E5/E3/E7 Calix equipment
- Fuses and miscellaneous mounting HW (screws, ties, etc).

(*)Customers must order the copper trunking 24-pair pro-panel for the EoCu loops (part # 100-01176) from Calix with the cabinet.

EoCu unit kit for ODC-100:



The ODC-100 24 Port Trunk Protector Panel (100-01176), used to cable and protect EoCu trunks, installs in the bottom right of the front of the ODC-100 cabinet (side wall), see in red below. Next to where the EoCu units are installed, see in green below.



ODC-100 Front
(local power)

The EoCu solution takes the same space within the ODC-100 cabinet as the fiber spool option, used for fiber management. Customer may choose not to install the fiber spool and routing parts and be able to use that space for EoCu.

Actelis ML-600

The following kits are available for integration of Actelis ML600 products into ODC-100 and ODC-x000 Cabinets:

Calix Part #	Name	Description
100-02043	Single Actelis ML600 in ODC-100, Factory Install.	Factory installation kit for Single Actelis ML600 into ODC-100
100-02046	Single Actelis ML600 in ODC-100, Field Install.	Field installation kit for Single Actelis ML600 into ODC-100

These kits include; power & ground cables for Actelis units, DSL/signal cable from Actelis units to pro-panel, mounting brackets for Actelis units, Ethernet cable (Actelis to E5/E3/E7), fuses and miscellaneous mounting HW.

When used in the ODC-100 cabinet, also order the copper trunking pro-panel for the EoCu loops:

Part #	Name	Description
100-01176	ODC-100 24 Prt Trunk Protector	ODC-100 24 Port Trunk Protector Panel

Note: Each of the above items would be ordered with a quantity of 1 per ODC-100 cabinet

Documentation detailing these kits is available on the Calix Customer Support portal. The kits for Calix ODC cabinets can also be purchased directly from Actelis.

Hatteras HN-400

ODC-100 cabinet packages can ship with pre-installed cabling for dual power (-48Vdc A & B) from rectifier's DC distribution shelf for:

- Hatteras HN408-Ui or,
- Hatteras HN408-Ui and LPM-8.

Each of these Hatteras products provide the EoCu (HN408-Ui) and pair repeater functionality (LPM-8), in case ODC-100s are subtended from each other and the distance requires that subtended cabinets need repeating of the signal coming from a distant CO.

Each of the kits below need to be ordered with ODC-100 cabinets, if they are to house Hatteras equipment in them:

- 100-01893 - Factory install power cables and 1A fuse for ODC-100 Ethernet Copper trunking unit
- 100-01894 - Factory install power cables, 1A fuse for ODC-100 Ethernet Copper trunking unit and repeater 4A fuse

  Note: Each of the above items would be ordered with a quantity of 1 per ODC-100 cabinet

These kits only provide the DC power portion (cabling and fuses) of what is needed for the installation and turn up of the Hatteras equipment in the cabinet.

When used in the ODC-100 cabinet, also order the copper trunking pro-panel for the EoCu loops:

Part #	Description
100-01176	ODC-100 24 Port Trunk Protector Panel

Note: Each of the above items would be ordered with a quantity of 1 per ODC-100 cabinet

The installation kits for the Hatteras equipment (mounting brackets and other HW, ground cables, signal cables for copper loops, etc), for the Calix ODC-100 cabinet must be purchased from Hatteras directly.

The E5-100 and E3 systems ship with one pair of power cables, if an additional set of cables is required, they can be obtained using the following part numbers:

- 100-01523 - E5-110/120/121 Power & Ground Cables, fuse & Mnting Hardware
- 100-01988 - E5-111 Power & Ground Cables, fuse & Mnting Hardware

ODC-100 PACKAGES AND ORDERING INFORMATION

In an effort to ensure a simplified ordering process, Calix has created ODC-100 packages for common deployment scenarios with E5-100, E5-400 and E7-2. These packages include a base cabinet configuration for either Local AC or Remote powered cabinet configuration options:

- In the AC powered configurations, the different packages include AC load center, rectifier (shelf with controller, 10-position DC distribution and two redundant modules), and battery base (battery string must be ordered separately). Local power configurations can be ordered with a generator connector and a battery warmer for colder regions.
- In the remote powered configurations, the package includes separate protection panels for 24 remote/line power pairs, DC-DC downstream power converter, 10-position DC distribution, and fan tray assembly for the power converted, and a quantity of two power modules (4 channels or circuits) for the downstream converter. No battery base is required for the remote powered cabinet option. It is highly recommended that an ODC-100 Downstream converter (RT) Remote Power Holdover Capacitor option (part # 100-01992) be ordered for each and all remote powered ODC-100 cabinets.

For copper access applications, ADLS2+ & VDSL2 in Overlay or Combo deployment, protection panels for 48/96 ADSL2+ subscriber ports (overlay or converged broadband) or 24/48 VDSL2 subscriber ports (overlay or converged broadband) are included in the packages, as well as one or two E5-100 platforms. The configuration guidelines for the base system and available line cards are captured on the following pages.

For fiber access applications, Active Ethernet or GPON with E7-2 ODC-100 packages, customers have the option to deploy subscriber fiber management options within the cabinet or outside of it in an additional passive enclosure (i.e. non GR-487 compliant) or splice vault. If the ODC-100 is to house fiber management options, those have to be ordered separately from the ODC-100/ E7-2 package (see section *'Fiber Distribution & Termination, splicing, splitters, etc'* above for details).

The base ODC-100 comes equipped with one 12-position mechanical fiber splice tray for transport fiber uplinks termination. In addition, Calix qualified SFP transceiver modules can be purchased and deployed. Industrial temperature (I-temp) SFPs are commercially available in single fiber variants (BIDI SFPs), in addition to traditional two-fiber solutions.

After choosing the appropriate ODC-100 base package and choosing the SFP optics, the only remaining option is the cabinet mounting style and the inclusion of an optional integrated cross-connect or fiber management solutions.

E-Series Equipment Kits

All E-series equipment includes power cables, ground cable, 19" and 23" install brackets out of the box, so that shelves are easy to install and turn up regardless of where. Below are the detailed lists of complementary components shipped with E-Series equipment:

E7-2 Field Install Kit for CO & RT (19" and 23" mounting brackets, power and ground cables, etc)	
Qty	Item Description
2	Rack Mount Ears, 19 inch (ROHS)
2	Rack Mount Ears, 23 inch (ROHS)
1	Cable Assembly, E7 Ground [ROHS]
1	Cable Assembly, E7 Power
1	Bag, Open top Pink Anti-Static , 6 x 8 x .004 thk
1	Lug 2-hole 8 AWG Red 21 Die
4	Scr PP Thrdroll taptite Sq cone 12-24x.625lg SS Passivated
8	Screw, Machine, Phil, 18-8 SS FLT HD, 4-40, 3/16 Long, ROHS
2	Nut, KEPS, #10-32, SS, 11NK188
2	Washer Ext. tooth #10 SS Passivated
E5-110/E5-120/E5-121 Field Install Kit for CO & RT (19" and 23" mounting brackets, power and ground cables, etc)	
Qty	Item Description
1	Fan Filter, ROHS
2	Bracket, E5-110/E5-111, 19" L-BRACKET, ROHS
2	Bracket, E5-110/E5-111, 23" L-BRACKET, ROHS
1	CABLE, RS-232, DB9(F)->RJ 11(4P4C), 185cm, ROHS
1	Ground Cable, 12 FT FOR E5-100
1	Power Cables,WIRE 14AWG 41/0.254MM, ROHS STRANDED TINNED BLK/RED L=12FEET LABLE 1.0*2.44IN WHITE SHRINK TABING 0.375*0.187IN ID BLACK,LANTERRA

1	INSTALLATION GUIDE MANUAL, E5-110 DC/E5-110 AC/E5-111/E5-120/E5-121
E5-111 Field Install Kit for CO & RT (19" and 23" mounting brackets, power and ground cables, etc)	
Qty	Item Description
1	Fan Filter, ROHS
2	Bracket, E5-110/E5-111, 19" L-BRACKET, ROHS
2	Bracket, E5-110/E5-111, 23" L-BRACKET, ROHS
1	CABLE, RS-232, DB9(F)->RJ 11(4P4C), 185cm, ROHS
1	Ground Cable, 12 FT FOR E5-100
1	Power Cables plus Ferrite Core,WIRE 14AWG 41/0.254MM, ROHS STRANDED TINNED BLK/RED L=12FEET LABLE 1.0*2.44IN WHITE SHRINK TABING 0.375*0.187IN ID BLACK,LANTERRA
1	INSTALLATION GUIDE MANUAL, E5-110 DC/E5-110 AC/E5-111/E5-120/E5-121

ODC-100 CAT-5 and CAT-3 Options

Calix always recommends the use CAT-5 cable assemblies for use in copper access deployments (ADSL2+ and VDSL2), connecting to DSL ports (DSL in from/on equipment side).

As a reference see below some field results from side by side testing of E5-11x ADSL2+ and E5-12x VDSL2 systems using CAT-3 and CAT-5 cables:

Calix E5-110 ADSL2+: Category 3 vs. Category 5 Cable.

Port	Attained Rate DS CAT-5	Attained Rate DS CAT-3	SNR DS CAT-5	SNR DS CAT-3	SNR US CAT- 5	SNR US CAT- 3
Average	26.18Mbps	24.43Mbps	8.22dB	7.73dB	8.27dB	8.33dB
Difference	1.75Mbps		.49dB			1dB
Percentage	6.70%		6%			1%

Calix E5-120 VDSL2: Category 3 vs. Category 5 Cable.

Port	Attained Rate DS CAT-5	Attained Rate DS CAT-3	Attained Rate US CAT-5	Attained Rate US CAT-3	SNR DS CAT-5	SNR DS CAT-3	SNR US CAT- 5	SNR US CAT- 3
Average	85.14Mbps	64.063Mbps	17.48Mbps	11.93Mbps	8.1dB	8.1dB	8.3dB	8.3dB
Difference	21.77Mbps		5.55Mbps		0dB		0dB	
Percentage	25%		32%		0%		0%	

ODC-100 cabinet packages with CAT-5 pro-panel cabling assemblies:

PART #	PART DESCRIPTION
000-00324	ODC-100 - 48 ADSL2+ Overlay Package (Cabinet, E5-110, AC/DC Rectifier, CAT-5, Prot)

PART #	PART DESCRIPTION
000-00325	ODC-100 - 48 ADSL2+ Combo Package (Cabinet, E5-111, AC/DC Rectifier, CAT-5, Prot)
000-00326	ODC-100 - 24 VDSL2 Overlay Package (Cabinet, E5-120, AC/DC Rectifier, CAT-5 Prot)
000-00327	ODC-100 - 24 VDSL2 Combo Package (Cabinet, E5-121, AC/DC Rectifier, CAT-5 Prot)
000-00328	ODC-100 - 48 ADSL2+ Overlay Package (Cabinet, E5-110, Remote Power, CAT-5 Prot)
000-00329	ODC-100 - 48 ADSL2+ Combo Package (Cabinet, E5-111, Remote Power, CAT-5 Prot)
000-00330	ODC-100 - 24 VDSL2 Overlay Package (Cabinet, E5-120, Remote Power, CAT-5 Prot)
000-00331	ODC-100 - 24 VDSL2 Combo Package (Cabinet, E5-121, Remote Power, CAT-5 Prot)
000-00332	ODC-100 - 96 ADSL2+ Overlay Package (Cabinet, (2) E5-110, AC/DC Rectifier, CAT-5 Prot)
000-00333	ODC-100 - 96 ADSL2+ Combo Package (Cabinet, (2) E5-111, AC/DC Rectifier, CAT-5, Prot)
000-00334	ODC-100 - 48 VDSL2 Overlay Package (Cabinet, (2) E5-120, AC/DC Rectifier, CAT-5 Prot)
000-00335	ODC-100 - 48 VDSL2 Combo Package (Cabinet, (2) E5-121, AC/DC Rectifier, CAT-5 Prot)
000-00336	ODC-100 - 96 ADSL2+ Overlay Package (Cabinet, (2) E5-110, Remote Power, CAT-5 Prot)
000-00337	ODC-100 - 96 ADSL2+ Combo Package (Cabinet, (2) E5-111, Remote Power, CAT-5 Prot)
000-00338	ODC-100 - 48 VDSL2 Overlay Package (Cabinet, (2) E5-120, Remote Power, CAT-5 Prot)
000-00339	ODC-100 - 48 VDSL2 Combo Package (Cabinet, (2) E5-121, Remote Power, CAT-5 Prot)
000-00340	ODC-100 Upgrade Kit (E5-110 ADSL2+ Overlay, CAT-5 Protection)
000-00341	ODC-100 Upgrade Kit (E5-111 ADSL2+ Combo, CAT-5 Protection)
000-00324	ODC-100 - 48 ADSL2+ Overlay Package (Cabinet, E5-110, AC/DC Rectifier, CAT-5, Prot)
000-00325	ODC-100 - 48 ADSL2+ Combo Package (Cabinet, E5-111, AC/DC Rectifier, CAT-5, Prot)

Note: The packages all include an upgraded door for the cabinet with a 300 watt heat exchanger to allow for full broadband deployments - up to 96 subscriber ports.

ODC-100 cabinet packages with CAT-5 pro-panel and 710 OSP connector cabling assemblies:

- 000-00431 - ODC-100, 48 ADSL2+ Combo Package (Cabinet, E5-111, AC/DC Rectifier, 710, CAT-5 Prot)
- 000-00432 - ODC-100, 96 ADSL2+ Overlay Package (Cabinet, (2) E5-110, AC/DC Rectifier, 710, CAT-5 Prot)
- 000-00433 - ODC-100, 96 ADSL2+ Combo Package (Cabinet, (2) E5-111, AC/DC Rectifier, 710 CAT-5 Prot)

ODC-100 with E7-2/E5-400

ODC-100 cabinet packages with one E7-2 (including one card slot filler) and one E5-400 each:

- 000-00391 - ODC-100 Local AC Pwr Package: 1x E7-2, 12 fiber splice tray
- 000-00392 - ODC-100 Remote DC Pwr Package: 1x E7-2, 12 fiber splice tray

- 000-00316 - ODC-100 Package w/ 1x E5-400 Local AC Pwr (Cabinet, E5-400, AC/DC Rectifier, 36 fiber splice)
- 000-00317 - ODC-100 Package w/ 1x E5-400 Remote DC Pwr (Cabinet, E5-400, Remote Power, 36 fiber splice)

Other than the equipment supported, these packages vary only from other E5-1xx related packages in that the ODC-100 assembly comes standard with 36 mechanical fiber slice positions for extended fiber support, and not protector panels are included outside of the E5-100 related packages:

PART #	PART NAME	PART DESCRIPTION
100-01684	2x Fiber Splice tray, 24 position	Double Fiber Splice Tray assembly, 24 positions

ODC Cabinet Deployments with GPON ONTs and RF Overlay EDFAs

Calix cabinets support field or factory installation of 76xGX-R rack mount ONTs in ODC cabinets;

Part #	Description
100-01905	76xGX-R Cable for install in ODC; 8 Port T1/RJ45 to RJ-21 (pro-panel)
100-01906	ODC, Field Installation Kit for 76xGX-R; Pwr & Gnd cables, fuses, mounting HW
100-01907	ODC, Factory Installation Kit for 76xGX-R; Pwr & Gnd cables, fuses, mounting HW

If T-1 services are used from the 76xGX-R rack mount ONTs within ODC cabinets, use the specially designed cable, 100-01905 [76xGX-R Cable for install in ODC; 8 Port T1/RJ45 to RJ-21 (pro-panel)], to connect the copper pairs use for the service to a pro-panel of your choice:

Part #	Description
100-01521	ODC-x000E 50pr CAT5 Protector Block, MS2
100-01887	ODC-x000E 50pr CAT5 Protector Block, 710
100-01176	ODC-100 24 Port Trunk Protector Panel

For more information please consult "Calix 76xGX-R MDU ONT Installation Kit for Calix ODC Cabinets" (document #220-00332).

Calix cabinets also support field or factory installation of IPG's 2-Way, 8x and 4x 20.0dBm, 2RU, I-Temp EDFAs in ODC-100 and ODC-x000E E-Series cabinets;

Part #	Description
100-01898	ODC, Field Installation Kit for IPG EDFA; 19" bracket, Pwr & Gnd cables, fuses, mounting HW

For more information please consult "IPG EDFA Installation Kit for Calix ODC Cabinets" (document #220-00331).

The IPG EDFAs are available from Calix's EF&I services group:

- IPG 2-Way EDFA, 4x20.0dBm, 4W CWDM, Cascade WDM, 2RU, I-Temp
- IPG 2-Way EDFA, 8x20.0dBm, 4W CWDM, Cascade WDM, 2RU, I-Temp

Calix ODC-100 with E7-2 GPON and 8-port EDFA

ODC-100 Package Details

Below are detailed Bill Of Materials descriptions of the items included in some of the more illustrative ODC-100 cabinet Packages:

Item Number	Qty	Item Description
000-00332		ODC-100 - 96 ADSL2+ Overlay Package (Cabinet, (2) E5-110, AC/DC Rectifier, CAT-5 Prot)
100-01168	1	ODC-100 Cabinet Shell Only
100-01169	1	ODC-100 Battery Base
100-01239	1	ODC-100 Door w/ 300Watt HX
100-01240	1	ODC-100 AC Load Center w/ Convenience Outlet
100-01288	2	ODC-100 Rectifier Module 30A
100-01174	1	ODC-100 Rectifier Controller
100-01170	1	ODC-100 Rectifier Shelf w/ Dist & LVD
100-01521	4	ODC-x000E 50pr CAT5 Protector Block, MS2

Item Number	Qty	Item Description
100-01467	2	E5-110 ADSL2+ Overlay 48 Port Unit, DC Power (Std. RJ-21 pin-out)
100-01238	1	ODC-100 Standard Door - No HX
100-01412	2	ODC-100, E5-100, Mounting Kit (Bracket and Screws)
100-01414	1	ODC-100, Local Power Shelf, Integration Kit (includes Cables, Fuses, Labels for Valere Rectifier)
000-00333		**ODC-100 - 96 ADSL2+ Combo Package (Cabinet, (2) E5-111, AC/DC Rectifier, CAT-5, Prot)**
100-01168	1	ODC-100 Cabinet Shell Only
100-01169	1	ODC-100 Battery Base
100-01239	1	ODC-100 Door w/ 300Watt HX
100-01240	1	ODC-100 AC Load Center w/ Convenience Outlet
100-01288	2	ODC-100 Rectifier Module 30A
100-01174	1	ODC-100 Rectifier Controller
100-01170	1	ODC-100 Rectifier Shelf w/ Dist & LVD
100-01521	2	ODC-x000E 50pr CAT5 Protector Block, MS2
100-01469	2	E5-111 ADSL2+ Combo 48 Port Unit, DC Power (Std. RJ-21 pin-out)
100-01238	1	ODC-100 Standard Door - No HX
100-01412	2	ODC-100, E5-100, Mounting Kit (Bracket and Screws)
100-01414	1	ODC-100, Local Power Shelf, Integration Kit (includes Cables, Fuses, Labels for Valere Rectifier)
000-00334		**ODC-100 - 48 VDSL2 Overlay Package (Cabinet, (2) E5-120, AC/DC Rectifier, CAT-5 Prot)**
100-01168	1	ODC-100 Cabinet Shell Only
100-01169	1	ODC-100 Battery Base
100-01239	1	ODC-100 Door w/ 300Watt HX
100-01240	1	ODC-100 AC Load Center w/ Convenience Outlet
100-01288	2	ODC-100 Rectifier Module 30A
100-01174	1	ODC-100 Rectifier Controller
100-01170	1	ODC-100 Rectifier Shelf w/ Dist & LVD
100-01521	2	ODC-x000E 50pr CAT5 Protector Block, MS2
100-01228	2	E5-120 VDSL2 Overlay 24 Port Unit, DC Power
100-01238	1	ODC-100 Standard Door - No HX
100-01412	2	ODC-100, E5-100, Mounting Kit (Bracket and Screws)
100-01414	1	ODC-100, Local Power Shelf, Integration Kit (includes Cables, Fuses, Labels for Valere Rectifier)
000-00335		**ODC-100 - 48 VDSL2 Combo Package (Cabinet, (2) E5-121, AC/DC Rectifier, CAT-5 Prot)**
100-01168	1	ODC-100 Cabinet Shell Only
100-01169	1	ODC-100 Battery Base
100-01239	1	ODC-100 Door w/ 300Watt HX
100-01240	1	ODC-100 AC Load Center w/ Convenience Outlet

Item Number	Qty	Item Description
100-01288	2	ODC-100 Rectifier Module 30A
100-01174	1	ODC-100 Rectifier Controller
100-01170	1	ODC-100 Rectifier Shelf w/ Dist & LVD
100-01521	1	ODC-x000E 50pr CAT5 Protector Block, MS2
100-01230	2	E5-121 VDSL2 Combo 24 Port Unit, DC Power
100-01238	1	ODC-100 Standard Door - No HX
100-01412	2	ODC-100, E5-100, Mounting Kit (Bracket and Screws)
100-01414	1	ODC-100, Local Power Shelf, Integration Kit (includes Cables, Fuses, Labels for Valere Rectifier)
000-00336		**ODC-100 - 96 ADSL2+ Overlay Package (Cabinet, (2) E5-110, Remote Power, CAT-5 Prot)**
100-01168	1	ODC-100 Cabinet Shell Only
100-01239	1	ODC-100 Door w/ 300Watt HX
100-01001	1	Remote power cabinet, 25 Pair Power Protector Panel
100-01242	2	Downstream converter (RT), Remote Power Module, +/-190Vdc (Lineage Power)
100-01241	1	Downstream converter (RT), Remote Power Shelf, Integration Kit (Lineage Power)
100-01243	1	Downstream converter (RT), Remote Power Fan Tray, Integration Kit
100-01521	4	ODC-x000E 50pr CAT5 Protector Block, MS2
100-01467	2	E5-110 ADSL2+ Overlay 48 Port Unit, DC Power (Std. RJ-21 pin-out)
100-01238	1	ODC-100 Standard Door - No HX
100-01412	2	ODC-100, E5-100, Mounting Kit (Bracket and Screws)
000-00337		**ODC-100 - 96 ADSL2+ Combo Package (Cabinet, (2) E5-111, Remote Power, CAT-5 Prot)**
100-01168	1	ODC-100 Cabinet Shell Only
100-01239	1	ODC-100 Door w/ 300Watt HX
100-01001	1	Remote power cabinet, 25 Pair Power Protector Panel
100-01242	2	Downstream converter (RT), Remote Power Module, +/-190Vdc (Lineage Power)
100-01241	1	Downstream converter (RT), Remote Power Shelf, Integration Kit (Lineage Power)
100-01243	1	Downstream converter (RT), Remote Power Fan Tray, Integration Kit
100-01521	2	ODC-x000E 50pr CAT5 Protector Block, MS2
100-01469	2	E5-111 ADSL2+ Combo 48 Port Unit, DC Power (Std. RJ-21 pin-out)
100-01238	1	ODC-100 Standard Door - No HX
100-01412	2	ODC-100, E5-100, Mounting Kit (Bracket and Screws)
000-00338		**ODC-100 - 48 VDSL2 Overlay Package (Cabinet, (2) E5-120, Remote Power, CAT-5 Prot)**
100-01168	1	ODC-100 Cabinet Shell Only
100-01239	1	ODC-100 Door w/ 300Watt HX
100-01001	1	Remote power cabinet, 25 Pair Power Protector Panel
100-01242	2	Downstream converter (RT), Remote Power Module, +/-190Vdc (Lineage Power)

Item Number	Qty	Item Description
100-01241	1	Downstream converter (RT), Remote Power Shelf, Integration Kit (Lineage Power)
100-01243	1	Downstream converter (RT), Remote Power Fan Tray, Integration Kit
100-01521	2	ODC-x000E 50pr CAT5 Protector Block, MS2
100-01228	2	E5-120 VDSL2 Overlay 24 Port Unit, DC Power
100-01238	1	ODC-100 Standard Door - No HX
100-01412	2	ODC-100, E5-100, Mounting Kit (Bracket and Screws)
000-00339		**ODC-100 - 48 VDSL2 Combo Package (Cabinet, (2) E5-121, Remote Power, CAT-5 Prot)**
100-01168	1	ODC-100 Cabinet Shell Only
100-01239	1	ODC-100 Door w/ 300Watt HX
100-01001	1	Remote power cabinet, 25 Pair Power Protector Panel
100-01242	2	Downstream converter (RT), Remote Power Module, +/-190Vdc (Lineage Power)
100-01241	1	Downstream converter (RT), Remote Power Shelf, Integration Kit (Lineage Power)
100-01243	1	Downstream converter (RT), Remote Power Fan Tray, Integration Kit
100-01521	1	ODC-x000E 50pr CAT5 Protector Block, MS2
100-01230	2	E5-121 VDSL2 Combo 24 Port Unit, DC Power
100-01238	1	ODC-100 Standard Door - No HX
100-01412	2	ODC-100, E5-100, Mounting Kit (Bracket and Screws)
000-00391		**ODC-100 Local AC Pwr Package: 1x E7-2, 12 fiber splice tray**
100-01168	1	ODC-100 Cabinet Shell Only
100-01169	1	ODC-100 Battery Base
100-01239	1	ODC-100 Door w/ 300Watt HX
100-01449	1	E7-2 Shelf, 1RU, 2 Slots, with 1 Blank Card
100-01451	1	E7-2 Fan Tray Assembly, 1RU, 2 Slot Shelf
100-01240	1	ODC-100 AC Load Center w/ Convenience Outlet
100-01288	2	ODC-100 Rectifier Module 30A
100-01174	1	ODC-100 Rectifier Controller
100-01170	1	ODC-100 Rectifier Shelf w/ Dist & LVD
100-01881	1	E7-2 Factory Install Kit for ODC-100/x000(E) (19 and 23" brackets, power and ground cables, etc)
100-01238	1	ODC-100 Standard Door - No HX
100-01414	1	ODC-100, Local Power Shelf, Integration Kit (includes Cables, Fuses, Labels for Valere Rectifier)
000-00392		**ODC-100 Remote DC Pwr Package: 1x E7-2, 12 fiber splice tray**
100-01168	1	ODC-100 Cabinet Shell Only
100-01239	1	ODC-100 Door w/ 300Watt HX
100-01001	1	Remote power cabinet, 25 Pair Power Protector Panel

Item Number	Qty	Item Description
100-01241	1	Downstream converter (RT), Remote Power Shelf, Integration Kit (Lineage Power)
100-01242	2	Downstream converter (RT), Remote Power Module, +/-190Vdc (Lineage Power)
100-01243	1	Downstream converter (RT), Remote Power Fan Tray, Integration Kit
100-01449	1	E7-2 Shelf, 1RU, 2 Slots, with 1 Blank Card
100-01451	1	E7-2 Fan Tray Assembly, 1RU, 2 Slot Shelf
100-01881	1	E7-2 Factory Install Kit for ODC-100/x000(E) (19 and 23" brackets, power and ground cables, etc)
100-01238	1	ODC-100 Standard Door - No HX

CALIX ODC-1000E/2000E/3000E OUTSIDE PLANT CABINETS

The Calix ODC-x000 cabinets have been designed with the philosophy of modularity and flexibility, while maintaining a maximum cooling capacity for broadband services. Special configurations have been created to allow the ODC-x000E cabinet family to support a maximum number of E-Series products; E5-100, E7-2 and combinations of both.

Calix ODC-1000ER; Remote Powered ODC-1000 Outdoor Cabinet with E5-110s

ODC-X000E FEATURE DESCRIPTION

The Calix ODC-x000E cabinets are designed to accommodate E5-100, E7-2 and/or B6-001 shelves, and provide all the powering, protection, and copper or fiber cable management to maximize subscriber deployment for DSL, GPON or Active Ethernet access.

Calix ODC-2000E Outdoor Cabinet with E7-2s and Fiber Management Accessories

The ODC-x000E series provides all the features and capabilities of any cabinet, including generator connectors, battery base and battery warmer, commercial AC power load center with convenience outlets or line/network remote power options, copper protection panels and high count fiber distribution/termination assemblies, and modular subscriber port count growth.

ODC-x000 Features and Functionality

- Dimensions:

Cabinet	Dimensions (W x D x H, in.)	Space Available Rear	Depth
ODC-1000	38 x 34 x 54	18 RU	12" deep
ODC-2000	48 x 48 x 73	26 RU	12" deep
ODC-3000	98 x 48 x 73	52 RU (26 RU x 2 bays)	12" deep

Calix ODC-3000E Outdoor Cabinet (front view)

- **Mounting options:** Wall (ODC-1000 only), pole, pad (pour in place template or pre-cast pad available).
- **Powering options:** Local AC and remote power:
    - Local AC power: 120/240 VAC 50-60Hz single phase input into AC load center with two 110 VAC convenience outlets. Ten position fused 120VAC to -48Vdc rectifier.
    - Remote power : +/-190 Vdc DC-DC Downstream converter. Ten position fused -48Vdc source. Upstream DC-DC converter (-48 Vdc to +/-190 Vdc) needed at headend, supports multiple remote/line powered nodes.
- **Cabinet options:** Battery base, batteries, battery warmer, generator connector, remote power hold-over capacitor.
- **Access infrastructure:** Choice of copper or fiber subscriber distribution and termination, or mix of both.
    - Cabinet integrated GPON splitters (Nx 1:32 splits).
    - Integrated cross-connect.
- **Copper transport:** Integrated Ethernet over Copper (EoCu) transport solutions for deployment in fiber – less areas.
- **Transport Fiber distribution**: Multiple options available for fiber splicing trays and cassettes, high density fiber management and distribution.

- Main Features:
  - Door mount heat exchange cooling system
  - Additional space for 3rd party equipment
  - Environmentally rated –40C to +46C ambient temperature
  - Standard 5-pin copper protection panels – up to 480 positions for C7
  - 110 – 240 VAC single phase power feed
  - 60 Amp service with UL listed service disconnect
  - Redundant AC feeds to rectifier; redundant DC feeds to equipment shelves
  - Low voltage DC disconnect
  - High power AC surge protection (Joslyn)
  - Extensive alarm functionality
  - Telcordia, GR-63-CORE
  - NEBS requirements, Issue 1, October 1995 - Telcordia
  - GR-487, Generic requirements for electronic equipment cabinets, Issue 2, March 2000

ODC-X000E PRODUCT DETAILS

The Calix ODC-1000 cabinet is fully documented in Calix CAB-07-006 (ODC-1000 Service Provider Planning Guide). This document will identify the specific differences when only E-Series products are installed in the cabinet.

The ODC-1000E cabinet is designed to support up to 16x E5-1xx, or 9x E7-2 shelves. In order to ensure proper airflow additional mounting brackets have been included in the cabinet to ensure air flows from the bottom of the cabinet thru the E5's mounted vertically to the top of the cabinet.

- 100-01522 - ODC-X000 Vertical Mounting Bracket for E-Series

The following table identifies how many of each type of E5-1xx can be installed in the ODC-1000E cabinet, with one high capacity heat exchanger present (on rear door of cabinet):

E5-100 Product	Max Units	Max Port Count	Notes
E5-110 48 Port ADSL2+ Overlay	9	432	• Limited by Protector Space • Requires High power Heat Exchanger above 8 Units
E5-111 48 Port ADSL2+ Combo	10	480	• Limited by Thermal Capacity • Requires High Power Heat Exchanger above 4 Units
E5-120 24 Port VDSL2 Overlay	16	384	• Limited by Mounting Space • Requires High Power Heat Exchanger above 10 Units
E5-121 24 Port VDSL2 Combo	16	384	• Limited by Mounting Space • Requires High Power Heat Exchanger above 6 Units
E7-2 Shelf, 1RU, 2 Slots	9	AE: 432 GPON: 2,048 (1:32 slpit)	• Limited by Thermal Capacity and fiber distribution (if integrated within cabinet) • Requires High Power Heat Exchanger

The Calix ODC-2000 cabinet is fully documented in Calix CAB-07-032 (ODC-2000 Service Provider Planning Guide). This document will identify the specific differences when only E-Series products are installed in the cabinet.

The ODC-2000E cabinet is designed to support up to 16 E5-1xx, or 17x E7-2 shelves. In order to ensure proper airflow additional mounting brackets have been included in the cabinet to ensure air flows from the bottom of the cabinet thru the E5's mounted vertically to the top of the cabinet.

The following table identifies how many of each type of E5-1xx can be installed in the ODC-2000E cabinet, when only one high capacity heat exchanger is present (on rear door of cabinet):

E5-100 Product	Max Units	Max Port Count	Notes
E5-110 48 Port ADSL2+ Overlay	15	720	Limited by Protector Space
E5-111 48 Port ADSL2+ Combo	10	480	Limited by Thermal Capacity
E5-120 24 Port VDSL2 Overlay	16	384	Limited by Mounting Space
E5-121 24 Port VDSL2 Combo	16	384	Limited by Mounting Space
E7-2 Shelf, 1RU, 2 Slots	17	AE: 816 GPON: 4,096 (1:32 slpit)	• Limited by Thermal Capacity and fiber distribution (if integrated within cabinet) • Requires High Power Heat Exchanger

The Calix ODC-3000 cabinet is fully documented in Calix PIB-08-007 (ODC-3000 Product Planning Guide). This document will identify the specific differences when only E-Series products are installed in the cabinet.

The ODC-3000E cabinet is designed to support up to 34x E7-2 shelves. In order to ensure proper airflow additional mounting brackets have been included in the cabinet to ensure air flows from the bottom of the cabinet thru the E7's mounted vertically to the top of the cabinet.

The following table identifies how many of each type of E7-2 can be installed in the ODC-3000E cabinet, when only one high capacity heat exchanger is present (on rear door of cabinet):

E5-100 Product	Max Units	Max Port Count	Notes
E7-2 Shelf, 1RU, 2 Slots	34	AE: 1,632 GPON: 8,192 (1:32 slpit)	• Limited by Thermal Capacity and fiber distribution (if integrated within cabinet) • Requires High Power Heat Exchanger

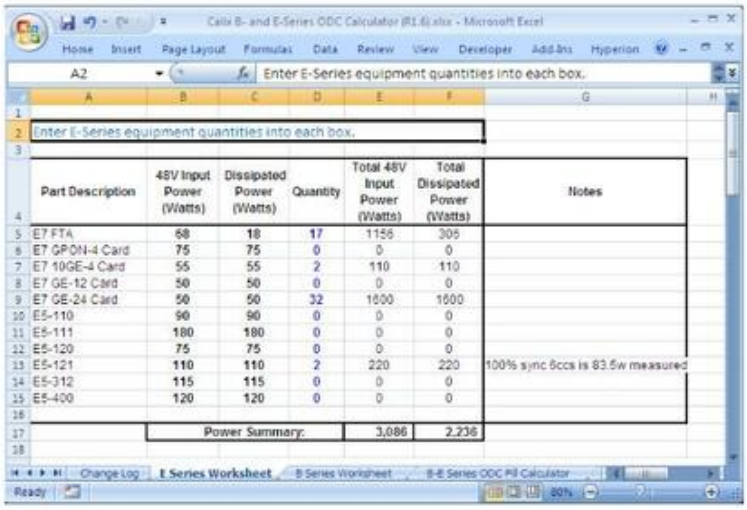
ODC-x000 Support for B- & E-Series Equipment; the Calix ODC Calculator

Due to the number of possible combinations of the kinds and quantities of B- and E-Series equipment that can be supported in ODC-x000 cabinets, Calix has made available an ODC Calculator spreadsheet. This tool helps calculate the number of shelves and line cards that can be supported within a specific cabinet.

The ODC Calculator spreadsheet takes into account the total power consumed by different equipment configurations, and the power dissipated by the equipment, as well as the power draw of the ODCs' heat exchanger(s) and auxiliary or 3rd party equipment. As a result the calculator provides the following guidelines to Calix ODC support of that specific equipment configuration:

- The equipment configuration is within or exceeds the ODC cabinets' capacity for;
    - Local DC power wattage, within the different types of supported rectifier modules (20Amp, 25A, 30A),
    - Thermal dissipation capacity of the heat exchangers supported for each cabinet,
- Battery back-up time supported by each cabinet and its battery options,
- Remote DC power wattage, please refer to instructions in "*ODC-100 POWER OPTIONS, Remote Power Details*" section of this document,
- Remote power capacitor hold-up time supported.
- The Calculator allows the user to configure the number of heat exchangers used in ODC-2000/3000E cabinets
- The Calculator provides a guideline to the number of rectifier modules to be used in each cabinet for the given equipment configuration

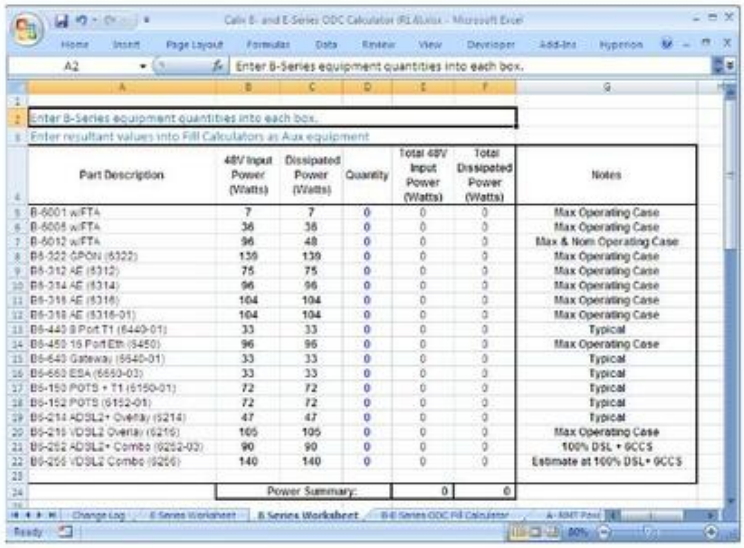
Using the "Calix B- and E-Series ODC Calculator" spreadsheet, enter in the E-Series and B-Series worksheets the number of equipment shelves (expressed in E7-2 or B6 shelf fan tray assemblies or FTAs), and the type and number of line cards desired. This is done in order to calculate the input power and heat dissipation requirements of the Calix equipment in the cabinet:



Enter E-Series equipment quantities into each box.

Part Description	48V Input Power (Watts)	Dissipated Power (Watts)	Quantity	Total 48V Input Power (Watts)	Total Dissipated Power (Watts)	Notes
E7 FTA	68	18	17	1156	306	
E7 GPON-4 Card	75	75	0	0	0	
E7 10GE-4 Card	55	55	2	110	110	
E7 GE-12 Card	50	50	0	0	0	
E7 GE-24 Card	50	50	32	1600	1600	
E5-110	90	90	0	0	0	
E5-111	180	180	0	0	0	
E5-120	75	75	0	0	0	
E5-121	110	110	2	220	220	100% sync 6ccs is 83.5w measured
E5-312	115	115	0	0	0	
E5-400	120	120	0	0	0	
		Power Summary:		3,086	2,236	

Calix B- & E-Series ODC Calculator (E-Series Worksheet)



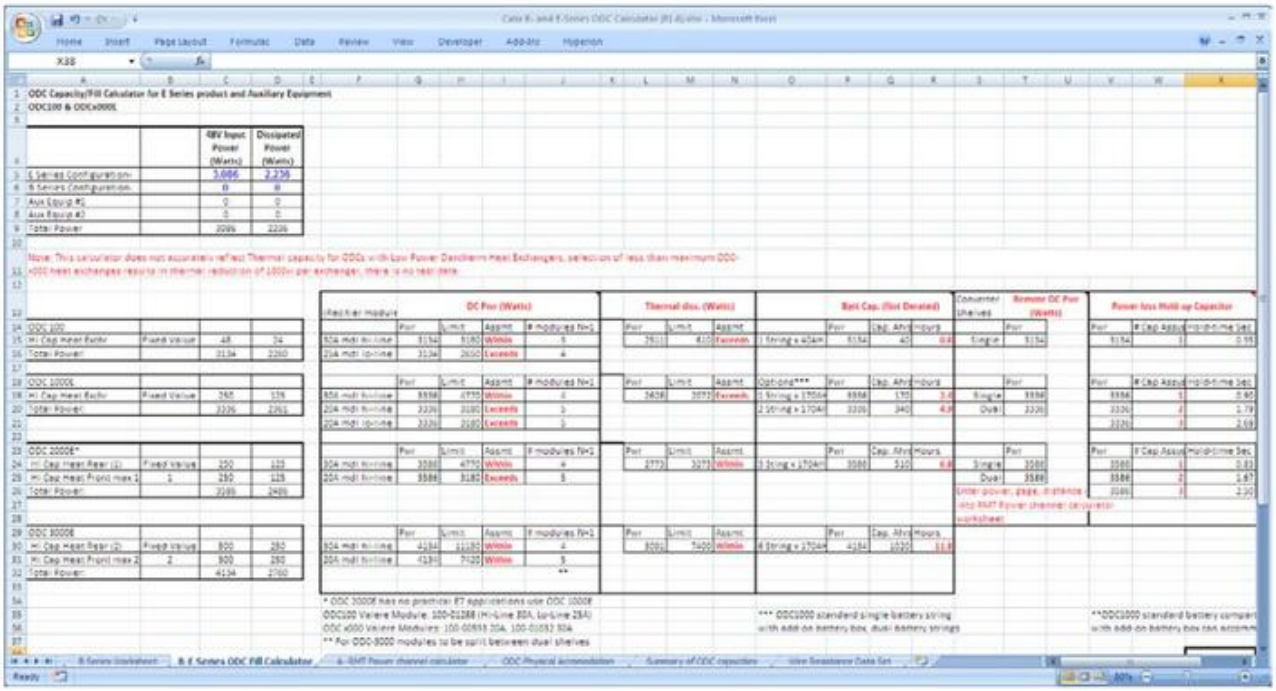
Enter B-Series equipment quantities into each box.

Enter resultant values into Fill Calculators as Aux equipment

Part Description	48V Input Power (Watts)	Dissipated Power (Watts)	Quantity	Total 48V Input Power (Watts)	Total Dissipated Power (Watts)	Notes
B-6001 w/FTA	7	7	0	0	0	Max Operating Case
B-6005 w/FTA	36	36	0	0	0	Max Operating Case
B-6012 w/FTA	96	48	0	0	0	Max & Nom Operating Case
B6-322 GPON (6322)	139	139	0	0	0	Max Operating Case
B6-312 AE (6312)	75	75	0	0	0	Max Operating Case
B6-314 AE (6314)	96	96	0	0	0	Max Operating Case
B6-316 AE (6316)	104	104	0	0	0	Max Operating Case
B6-316 AE (6316-01)	104	104	0	0	0	Max Operating Case
B6-440 8 Port T1 (6440-01)	33	33	0	0	0	Typical
B6-450 16 Port Eth (6450)	96	96	0	0	0	Max Operating Case
B6-640 Gateway (6640-01)	33	33	0	0	0	Typical
B6-660 ESA (6660-03)	33	33	0	0	0	Typical
B6-150 POTS + T1 (6150-01)	72	72	0	0	0	Typical
B6-152 POTS (6152-01)	72	72	0	0	0	Typical
B6-214 ADSL2+ Overlay (6214)	47	47	0	0	0	Typical
B6-216 VDSL2 Overlay (6216)	105	105	0	0	0	Max Operating Case
B6-262 ADSL2+ Combo (6262-03)	90	90	0	0	0	100% DSL + 6CCS
B6-266 VDSL2 Combo (6266)	140	140	0	0	0	Estimate at 100% DSL+ 6CCS
		Power Summary:		0	0	

Calix B- & E-Series ODC Calculator (B-Series Worksheet)

Use the "B-E Series ODC Fill Calculator" worksheet to optionally add power requirements for auxiliary equipment and obtain results for support of the equipment configuration:



Calix B- & E-Series ODC Calculator (B- & E-Series ODC Fill Calculator Worksheet)

Copper Distribution; Pro-panels, Cross-Connects, etc

The protector panels have been designed to be field installable and do not require the use of special tools – which allows for easy installation in the field. The intent of this modularity, which extends to a field installable door-mounted heat exchanger, is to maintain a low initial price point while maintaining price linearity as broadband service requirements expand:

- 100-01521 - ODC-x000E 50pr CAT5 Protector Block, MS2
- 100-01887 - ODC-x000E 50pr CAT5 Protector Block, 710

In ODC-x000E cabinets protection panels are installed on specially designed 23" frames. These frames hold six 50-pair pro-panels per frame and can be installed on the rear of the cabinets' bay or the splice compartment (if it is not already used to house the integrated cross-connect:

- 100-01416 - ODC-x000 Pro-Panel Mounting Frame
- 100-01133 - ODC-3000 Pro Panel Mounting Frame

ODC-x000 Outdoor Cabinet Pro-panel Mounting Frame

Calix has qualified 5-pin protector modules for successful deployment of ADSL2+ and VDSL2 deployment.

- 100-00035 - 5 Pin Protection Module (Gas/solid state), Quantity 25

A different 5-pin protector module has been qualified for over voltage protection of the copper loops used for remote power of the RT:

- 100-01074 - Remote Power 5-pin Protector Module (25 Pack)

Integrated cross-connects (MS^2 and 710 OSP cable connector);

ODC-1000E: Capacity for 750 total pairs, for 240 DSL port configurations

Capacity for 1500 total pairs, for 480 DSL port configurations

- 100-01697 - Integrated Cross Connect, ADC 2:1 Block, MS2, Slot 1-10, ODC-1000
- 100-01759 - Integrated Cross Connect, ADC 2:1 Block, MS2, Slot 11-20, ODC-1000
- 100-02077 - Integrated Cross Connect, ADC 2:1 Block, 710, Slot 1-10, ODC-1000
- 100-02078 - Integrated Cross Connect, ADC 2:1 Block, 710, Slot 11-20, ODC-1000

ODC-2000E/3000E(*): Capacity for 3000 pair total, for 960 DSL port configurations

- 100-01698 - Integrated Cross Connect, ADC 2:1 Block, MS2, Slot 1-20, ODC-2000
- 100-01699 - Integrated Cross Connect, ADC 2:1 Block, MS2, Slot 21-40, ODC-2000
- 100-02079 - Integrated Cross Connect, ADC 2:1 Block, 710, Slot 1-20, ODC-2000

- 100-02080 - Integrated Cross Connect, ADC 2:1 Block, 710, Slot 21-40, ODC-2000

(*) ODC-3000 uses the same copper and fiber management solutions as ODC-2000, but can double up on the number of components on each bay's side splicing compartments.

ODC-2000/3000 Outdoor Cabinet Integrated Cross-Connect (splice chamber view)

Fiber Distribution & Termination, splicing, splitters, etc

In case of fiber intensive applications, such as deployment of Active Ethernet and GPON FTTP subscriber access, the ODC-x000E cabinets can be equipped with integrated fiber management accessories, based on SC/ACP termination assemblies.

Fiber distribution assemblies support equivalent subscriber ports as that of copper subscriber access, in increments of x12, x24, x96, x144 and/or x244 SC termination panels (plastic protection covers are available for the 96, 144 and 288 fiber management assemblies):

Fiber Management Solutions for ODC-x000, ODC-x000E and ODC-x000E7-2

Calix Part #	Calix Description
Category:	Loose Tube, 100ft. OSP Fiber Cable Assemblies:
100-02240	12 Position Fiber Distribution assembly (SC/APC conn.) for 23" frame, 100ft Loose Tube OSP fbr cbl
100-02241	24 Position Fiber Distribution assembly (SC/APC conn.) for 23" frame, 100ft Loose Tube OSP fbr cbl
100-02242	96 Position Fiber Distribution assembly (SC/APC conn.) for 23" frame, 100ft Loose Tube OSP fbr cbl
100-02243	144 Position Fiber Distribution assembly (SC/APC conn.) for 23" frame, 100ft Loose Tube OSP fbr cbl

Calix Part #	Calix Description
100-02244	288 Position Fiber Distribution assembly (SC/APC conn.) for 23" frame, 100ft Loose Tube OSP fbr cbl
Category:	12-fiber Ribbon, 100ft. OSP Fiber Cable Assemblies:
100-02245	12 Position Fiber Distribution assembly (SC/APC conn.) for 23" frame, 100ft Ribbon OSP fbr cable
100-02246	24 Position Fiber Distribution assembly (SC/APC conn.) for 23" frame, 100ft Ribbon OSP fbr cable
100-02247	96 Position Fiber Distribution assembly (SC/APC conn.) for 23" frame, 100ft Ribbon OSP fbr cable
100-02248	144 Position Fiber Distribution assembly (SC/APC conn.) for 23" frame, 100ft Ribbon OSP fbr cable
100-02249	288 Position Fiber Distribution assembly (SC/APC conn.) for 23" frame, 100ft Ribbon OSP fbr cable
Category:	Protection Covers for Fiber Distribution Assemblies:
100-02268	96 Position Fiber Distribution assembly (SC/APC conn.) front protection cover, for 23" frame
100-02269	144 Position Fiber Distribution assembly (SC/APC conn.) front protection cover, for 23" frame
100-02270	288 Position Fiber Distribution assembly (SC/APC conn.) front protection cover, for 23" frame
Fiber Patch Cords:	
Category:	Ruggedized fiber patch cords, LC/UPC to SC/APC:
100-01901	Ruggedized fiber patch cord, 1 meter; 2mm bend insensitive, OSP LC/UPC to SC/APC, simplex
100-01902	Ruggedized fiber patch cord, 3 meter; 2mm bend insensitive, OSP LC/UPC to SC/APC, simplex
100-02251	Ruggedized fiber patch cord, 5 meter; 2mm bend insensitive, OSP LC/UPC to SC/APC, simplex
100-02252	Ruggedized fiber patch cord, 7 meter; 2mm bend insensitive, OSP LC/UPC to SC/APC, simplex
100-02253	Ruggedized fiber patch cord, 10 meter; 2mm bend insensitive, OSP LC/UPC to SC/APC, simplex
Category:	Ruggedized fiber patch cords, SC/APC to SC/APC:
100-01895	Ruggedized fiber patch cord, 1 meter; 2mm bend insensitive, OSP SC/APC to SC/APC, simplex
100-01896	Ruggedized fiber patch cord, 3 meter; 2mm bend insensitive, OSP SC/APC to SC/APC, simplex
Category:	Ruggedized fiber patch cords, SC/UPC to SC/APC:
100-01899	Ruggedized fiber patch cord, 1 meter; 2mm bend insensitive, OSP SC/UPC to SC/APC, simplex
100-01900	Ruggedized fiber patch cord, 3 meter; 2mm bend insensitive, OSP SC/UPC to SC/APC, simplex
Category:	Multi-Mode fiber patch cords, LC/UPC to LC/UPC:
100-02033	Multi-Mode fiber patch cord, LC/UPC to LC/UPC, 2 meter
100-02034	Multi-Mode fiber patch cord, LC/UPC to LC/UPC, 6 meter
Category:	Ruggedized, multiple termination fiber patch cords:
100-02049	Fiber patch; Dual Fiber, 2x LC/UPC to unterminated, 25ft, OSP rated
100-02050	Fiber patch; Dual Fiber, 2x SC/UPC to unterminated, 25ft, OSP rated
100-02051	Fiber patch; Quad Fiber, 4x LC/UPC to unterminated, 25ft, OSP rated

Cabinet based deployment of GPON subscriber access also supports integrated 1:32 splitters within ODC-x000 cabinets:

- 100-01342 - 1X32 PON Splitter Assembly, SC/APC

ODC-2000E with Fiber Management & Splitters

Some details about ODC-x000E7-2 packages (these packages are detailed in the ODC-x000E package details):

- ODC-1000E7-2 Package: 000-00438 - 1x High Capacity Heat eXchanger = E7-2s; 9x AE or 8x GPON shelves, Hi-count fiber routing, 10x A+B DC fuses.

  This cabinet configuration is limited in equipment support by its heat dissipation airflow. All equipment is installed in the cabinet's front vertical rack.

  Fiber termination assembly capacity in the rear of the ODC-1000 cabinet is limited by the need to access equipment for cabling of power, ground alarms, BITS wire-wrap pins, etc, from the rear, and the ability to support bulk fiber jumpering.

ODC-1000E Front

ODC-1000E Rear

ODC-1000E Outdoor Cabinet with Fiber Management (front and rear views)

- ODC-2000E7-2 Package: 000-00439 - 2x Heat eXchanger, Capacity 3700W = E7-2s; 17x AE or 14x GPON shelves, Hi-count fiber routing, 20x A+B DC fuses.

  In Active Ethernet deployments, this cabinet configuration is limited by its ability to house fiber distribution assemblies:

  - Ten x 96x SC Fiber Port Distrib. (4"/2.5RU) = 960 SC fiber terminations
  - Six x 144x SC Fiber Port Distrib. (96"/3.5RU) = 864 SC fiber terminations
  - Three x 288x SC Fiber Port Distrib. (11"/6.5RU) = 864 SC fiber terminations

  In GPON deployments, this cabinet configuration is limited thermally to 14x E7-2 shelves with two GPON-4 line cards each.

ODC-2000E/3000E Fiber Management detail (front view)

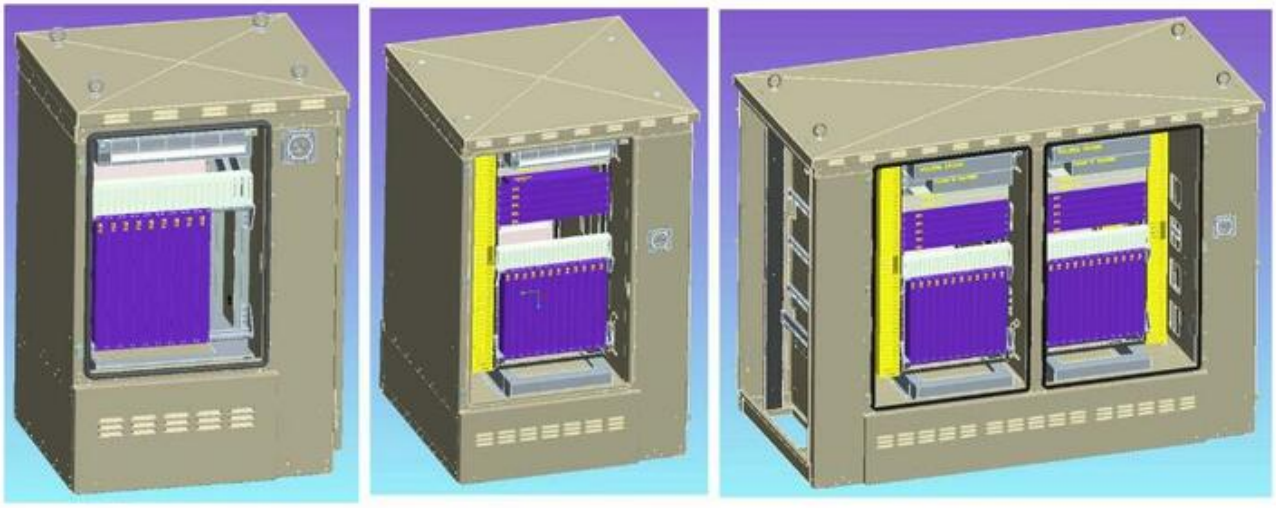
- ODC-3000E7-2 Packages: ODC-3000 cabinet configurations are limited in equipment support by the amount of heat exchanger units installed on the cabinet. Three different configurations are supported;
    - 000-00456 - 2x Heat eXchangers, Capacity 3700W = E7-2s; 17x AE or 14x GPON shelves, Hi-count fiber routing, 40x A+B DC fuse
    - 000-00457 - 3x Heat eXchangers, Capacity 5550W = E7-2s; 28x AE or 25x GPON shelves, Hi-count fiber routing, 40x A+B DC fuse
    - 000-00440 - 4x Heat eXchangers, Capacity 7400W = E7-2s; 34x AE or 32x GPON shelves, Hi-count fiber routing, 40x A+B DC fuse

  As with the ODC-2000 cabinet, in Active Ethernet deployments, the ODC-3000E7-2 cabinet configurations are limited by their ability to house fiber distribution assemblies:
    - Twenty x 96x SC Fiber Port Distrib. (4"/2.5RU) = 1920 SC fiber terminations
    - Twelve x 144x SC Fiber Port Distrib. (96"/3.5RU) = 1728 SC fiber terminations
    - Six x 288x SC Fiber Port Distrib. (11"/6.5RU) = 1728 SC fiber terminations

  In GPON deployments, this cabinet configuration is limited thermally to 30x E7-2 shelves with two GPON-4 line cards each.

The bullet points below clarify aspects of the ODC-x000E7-2 cabinet packages that differentiate them from other C- and E-Series focused ODC packages:

- All ODC-x000E7-2 packages include -48Vdc rectifier shelf/shelves, controller(s), and enough 30Amp rectifier modules sufficient to power the equipment supported by each cabinet package.
- All ODC-x000E7-2 packages include (one) 1x E7-2 shelf and Fan Tray, with mounting and power/ground cabling support for just that one shelf. For each additional E7-2 shelf an additional 000-00389 [E7-2 Factory Pkg. (ODC): Shelf, FTA, Install Kit] is needed.
- ODC-2000E7-2 and ODC-3000E7-2 packages include added DC Distribution and GMT fuse panels sufficient to power the A+B equipment power feeds supported by each cabinet package.
- E-Series Vertical Mounting Bracket; different number of brackets depending on equipment support.
- All ODC-x000E7-2 packages include high capacity fiber routing items. These items are integrated in our factory before cabinets ship:
    - High count fiber routing kit: horizontal fiber comb, plus;
        - Front & rear side fiber guards in ODC-2000/3000.
        - Front-to-rear fiber routing ramp in ODC-1000.
    - ODC-x000E Strain Relief Clamping Bar; allows securing 100ft OSP fiber cables. Clamps ship with each fiber termination frame.
    - ODC-x000 Fiber Slack Management Spool Assembly (2 Spools each); different number of spools depending on fiber distribution support.
    - ODC-x000 Splice Chamber Fiber Feed Through Assembly; enough assemblies are equipped with each cabinet type.



ODC-1000E/2000E/3000E with E7-2s and Fiber Management (front views)

In order to properly size the cabinet for integrated FTTP one only needs to be concerned with how many fiber termination points are required in a cabinet, as all fiber routing options for inside the cabinets are included in the cabinet packages' BOMs and list prices.

Fiber management and bulkhead distribution options are not integrated in our factory, as it would be impractical to ship them installed in the cabinets due to the weight of the 100 foot outside plant fiber cables, and bulk of the fiber termination frames. The frames and/or fibers would incur damage in transportation. Also consider that customers would need to take the fiber termination frames out of the cabinets in order to be able to manage the 100ft cable in the splice chamber entry, out the duct, and into the splice chamber or manhole.

More information can be found in the *"Calix ODC PON Splitter Kit Installation Guide"* (document #220-00244).

Other Cabinet Options

The ODC-1000E and ODC-2000E cabinets provide multiple options:

- Local AC Power Rectifier Options & Configuration Rules
- Cabinet Battery Backup Option
- Valve Regulated Lead Acid Battery Options
- Additional Battery Reserve
- Cabinet Battery Heater Option & Configuration Rules
- Cabinet Battery Seismic Kit Option & Configuration Rules
- Cabinet Mounting Kit Options
- Cabinet Generator Connector Options & Configuration Rules
- Cabinet Fiber Distribution Panel Options & Configuration Rules
- Cabinet Fiber Distribution Cassette Configuration Rules
- Cabinet Fiber Splice Tray/Holder Options & Configuration Rules
- Cross Connect Option & Configuration Rules

For details on ODC-1000E/2000E options, please refer to the Calix *CAB-07-006 ODC-1000 Service Provider Planning Guide* and *CAB-07-032 ODC-2000 Service Provider Planning Guide*.

ODC-x000E Mount Options

The ODC-x000 can be pad, pole, wall, or H-frame mounted. The pad mounting kit consists of a pour-in-place template, hardware, and instructions. This template is an easy to assemble metal guide that contains cutouts for placement of subscriber, ground, and AC conduits. Once assembled, the template attaches to the service provider supplied wooden concrete form used to construct the cabinet pad. In addition to pad mounting, kits are available for mounting the ODC-1000 on a wall or free standing frame:

- 100-01034 - Pad Mount Kit with Pour in Place Template, ODC-1000
- 100-01035 - ODC-1000 Wall/H-Frame/Pole Mount Kit, ODC-1000
- 100-01109 - Pad Mount Kit with Pour in Place Template, ODC-2000
- 100-01166 - Pad Mount Kit with Pour in Place Template, ODC-3000

ODC-1000E/2000E POWER OPTIONS

The Calix ODC-100 supports *Local* AC or *Remote* DC (aka line or network) power conversion to -48 Vdc. AC power is typically sourced from the Power Utility locally wherever the cabinet is deployed.

Remote power is often described or called also "span", "loop", "network", "express" or "line" powering, and usually occurs from a centralized power hub in and RT or CO. Remote power provides centralized backup instead of needing to locate battery strings in every cabinet. Remote power is often used to avoid right-of-way issues or in locations where AC power is difficult or too costly to attain.

The details on remote power, as well the configuration of remote power systems for ODC-x000R deployment, can be found in the "ODC-100 POWER OPTIONS - Remote Power Details " section found earlier in this document.

ODC-1000E/ODC-2000E Remote Power Features

When the ODC-1000E or ODC-2000E are remote powered, they are fed by a 3rd party headend remote power source just like the ODC-100. Calix resells and supports the Lineage Power (formerly Tyco Power) remote power headend. This is the same shelf as already described in Remote Power Details section above. When the ODC-1000E/ODC-2000E is ordered in a remote power configuration it comes equipped with a single CPS2500D remote power shelf. An additional shelf can be added to the cabinet if required for powering additional E5's or 3rd party equipment.

Due to the number of variables involved in calculating remote power, Calix has made available a spreadsheet to help calculate the number of modules required and pairs required for remotely powered locations based on the distance and gauge of the specific copper loops available. This spreadsheet takes into account the configuration and power draw of the ODC-1000E/ODC-2000E, as well as the upstream power node, when determining required modules and pairs. The spreadsheet is available to registered customers on the calix.com website and instructions for its use are found earlier in this document.

Remotely powered ODC-x000E cabinets are limited to a maximum of four (4) CPS2500D remote power shelves. From a thermal perspective the first CPS2500D remote power shelf is accounted for by the design of the cabinet, and as a rule each extra CPS2500D remote power shelf will subtract by one (1) the total number of shelves supported by the cabinet. Cabinets requiring more than one CPS2500D remote power shelf (remember that each CPS2500D support up to 20 power circuits, in 10 remote power modules 100-01242), can be upgraded with:

Calix Part Number	Remote Power Shelf Upgrade Description
100-01733	ODC-x000-ER, Remote Power Shelf upgrade: Pwr. Shelf, FTA, DC distrib., Pwr. Pro-panel, 2 modules

Remote Power Holdover Capacitors are highly recommended for all remote powered ODCs. Please consult the "Calix B- and E-Series ODC Calculator" to determine how many capacitors are needed in an ODC:

- 100-01993 - ODC-x000E DS converter (RT), RT Pwr Holdover Capacitor option, Integr. Kit, field/factory install
- 100-02279 - ODC-x000E DS converter (RT), RT Pwr Holdover Capacitor Add-on, field/factory install

ODC-1000E/ODC-2000E Local Power Details

The Calix ODC-1000E/ODC-2000E may also be ordered in a locally powered configuration. Local power package items for the Calix ODC-1000E/ODC-2000E include a Valere rectifier shelf, and an AC load center. The Valere rectifier shelf supports the ability to power the E-Series products by providing -48VDC on dual power feeds. Local power optional items are battery strings, battery warmers, and a 30A twist lock generator connector.

For customers who choose to provide battery backup for locally powered broadband overlay from a Calix ODC-1000E/ODC-2000E cabinet, the following table indicates the battery string options available for these cabinets:

Calix Part Number	Battery String Description
100-00513	Battery String Kit (Northstar), All ODC, 100 AH - Front Access
100-01065	Battery String Kit (Northstar), ODC-1000/2000/3000/4000, 170 AH - Front Access

Cabinet Power Rectifier Ordering Information

The ODC-x000 cabinets are equipped with up to four 30A power rectifier modules. These modules share the power load of the equipment in the cabinet. The power rectifier modules are integrated in the factory and the shelf ships with the modules populated.

- 100-01032 Valere Rectifier Module- 30 AMP

In the ODC-3000, each cabinet bay (right and left) have their own power plants (including distinct rectifier shelves), but a common rectifier controller and battery feed. Each rectifier shelf is equipped with a controller module that monitors power functions and alarm information and regulates voltage in response to battery temperature. A master controller module (BC-2000) resides in shelf 1 and features a 16-character front panel display for programming menu-driven system controls. An expansion controller module (EC-1000) resides in shelf 2.

Cabinet packages include the BC-2000, and EC-1000 controller in the package configuration:

- 100-01189 - Valere Controller Mdl- BC 2000
- 100-01210 - Valere EC1000 Expansion Controller

Cabinet Battery Backup Options

Battery backup provides emergency power in the event of a power outage. The cabinets are designed to support battery backup to 170Ah. The ODC-1000 will also support the standard 100 Ah battery used in the other ODC lines, preferred batteries for the ODC-1000 are the Northstar NSB170FT.

- 100-00513 - Battery String Kit (Northstar), All ODC,100 AH -FA
- 100-01065 - Battery String Kit (Northstar), ODC-1000/2000/3000/4000, 170 AH - Front Access

The ODC-1000 offers the ability to double the battery reserve capacity via an optional 2nd string battery riser. The battery riser kit can be factory or field installed for new deployments of the ODC-1000. For service providers who choose to increase their battery reserve capacity, please order the following part number:

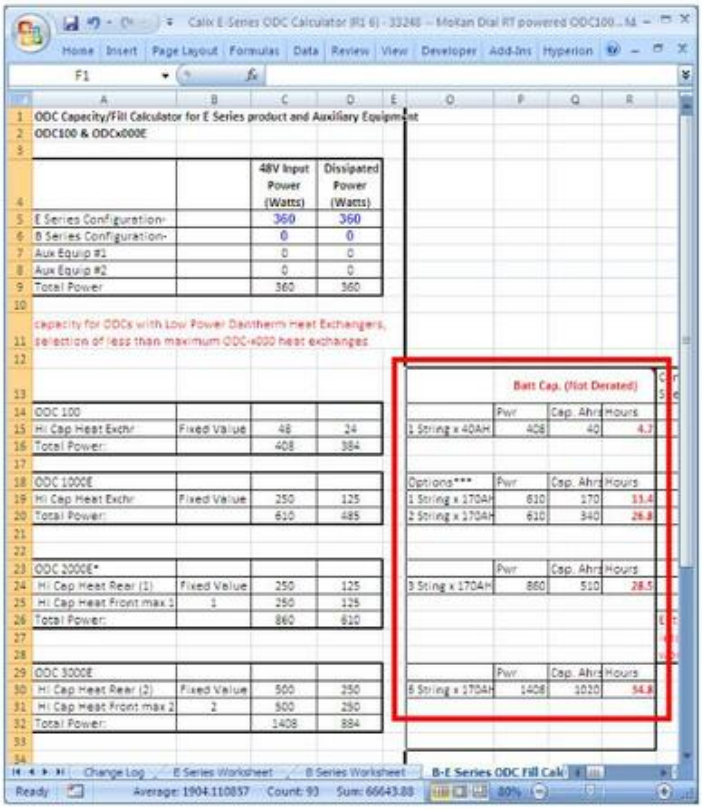
- 100-01037 ODC-1000 2nd String Battery Riser Kit

The ODC-2000 supports three (3) battery strings. The ODC-3000 supports six (6) battery strings.

In addition to these batteries the ODC-x000 cabinet can support the following list of battery manufacturers and models:

Vendor	Model	Ah Reserve
NorthStar	NSB 170FT	170AH
Fiamm	12FAT 155	155AH
GNB Marathon	M12V155FT	155AH
C&D Dynasty	TEL-150F	150AH
NorthStar	NSB 100FT	100AH
Enersys PowerSafe	SBS C11	92AH

For customers who choose to provide battery backup for locally powered from a Calix ODC cabinet please consult the "Calix B- and E-Series ODC Calculator" spreadsheet, "B-E-Series ODC Fill Calculator" worksheet, to determine the extend or battery backup time of you RT configuration:



ODC Capacity/Fill Calculator for E Series product and Auxiliary Equipment
ODC100 & ODCx000E

		48V Input Power (Watts)	Dissipated Power (Watts)
E Series Configuration-		360	360
B Series Configuration-		0	0
Aux Equip #1		0	0
Aux Equip #2		0	0
Total Power		360	360

capacity for ODCs with Low Power Dantherm Heat Exchangers, selection of less than maximum ODC-x000 heat exchanges

ODC 100			
HI Cap Heat Exchr	Fixed Value	48	24
Total Power:		408	384
ODC 1000E			
HI Cap Heat Exchr	Fixed Value	250	125
Total Power:		610	485
ODC 2000E*			
HI Cap Heat Rear (1)	Fixed Value	250	125
HI Cap Heat Front max 2	1	250	125
Total Power:		860	610
ODC 3000E			
HI Cap Heat Rear (2)	Fixed Value	500	250
HI Cap Heat Front max 2	2	500	250
Total Power:		1408	884

Batt Cap. (Not Derated)

	Pwr	Cap. Ahrs	Hours
1 String x 40AH	408	40	4.7

Options***	Pwr	Cap. Ahrs	Hours
1 String x 170AH	610	170	13.4
2 String x 170AH	610	340	26.8

	Pwr	Cap. Ahrs	Hours
3 String x 170AH	860	510	28.5

	Pwr	Cap. Ahrs	Hours
6 String x 170AH	1408	1020	54.8

One battery heater supports a single battery string. If the 2nd string battery riser option is selected for ODC-1000, a second battery warmer is needed. The battery heater can be integrated at the factory or installed in the field.

- 100-01028 - Battery Heater - FAB - ODC1000
- 100-01111 - Battery Heater - Front Access Battery - ODC-2000
- 100-01132 - Battery Heater - Front Access Battery - ODC-3000

The ODC-x000 cabinets support an optional Zone 4 seismic kit to provide additional stability and protection for batteries in the event of an earthquake. One seismic kit supports a single battery string. If the 2nd string battery riser option is selected, the service provider should order a second battery seismic kit as well.

- 100-01036 - Zone 4 Seismic Kit (Northstar), ODC-1000/3000, 170 AH
- 100-01077 - Zone 4 Seismic Kit (Northstar), ODC-1000/3000, 100AH
- 100-01123 - Zone 4 Seismic Kit (Northstar), ODC-2000 100 AH - Front Access
- 100-01122 - Zone 4 Seismic Kit (Northstar), ODC-2000 170 AH - Front Access

Cabinet Generator Connector options

Generator connectors allow an external power generator to be connected to the cabinet in the event of a power outage. The generator connectors can be integrated at the factory or installed in the field. When installation is done in the field, it is recommended that the generator connector be installed prior to subscriber cable routing.

- 100-01027 - 30amp Generator Connector, NEMA L14-30R
- 100-01039 - ODC-1000/2000 60amp Generator Connector, Pin/Sleeve
- 100-02210 - ODC-3000 60amp Generator Connector, Pin/SleeveW/Right Angle Adapter

ODC-X000 COPPER TRANSPORT OPTIONS

ODC cabinets can be equipped with Ethernet over copper (EoCu) transport units, i.e. Actelis ML600 platforms.

Calix does not at this point re-sell 3rd party EoCu solutions, except in some cases where customers have expressed interest in sourcing the technical and commercial solutions entirely from Calix.

Kits for EoCu solutions inside ODC cabinets include;

- Power & ground cables for EoCu units,
- DSL/signal cable from EoCu units to 24 pair protector panel(*),
- Mounting brackets for EoCu units,
- Ethernet cable, EoCu units to E5/E3/E7 Calix equipment,
- Fuses and miscellaneous mounting HW (screws, ties, etc).

Actelis ML-600

The following kits are available for integration of Actelis ML600 products into ODC-100 and ODC-x000 Cabinets:

Calix Part #	Description
100-02044	Factory installation kit for Single Actelis ML600 into ODC-x000E
100-02047	Field installation kit for Single Actelis ML600 into ODC-x000E
100-02045	Factory installation kit for Dual Actelis ML600 into ODC-x000E
100-02048	Field installation kit for Dual Actelis ML600 into ODC-x000E

These kits include; power & ground cables for Actelis units, DSL/signal cable from Actelis units to pro-panel, mounting brackets for Actelis units, Ethernet cable (Actelis to E5/E3/E7), fuses and miscellaneous mounting HW.

When used in the ODC-100 cabinet, also order the copper trunking pro-panel for the EoCu loops:

Part #	Name	Description
100-01176	ODC-100 24 Prt Trunk Protector	ODC-100 24 Port Trunk Protector Panel

Note: Each of the above items would be ordered with a quantity of 1 per ODC-100 cabinet

Documentation detailing these kits is available on the Calix Customer Support portal. The kits for Calix ODC cabinets can also be purchased directly from Actelis.

The E5-100 and E3 systems ship with one pair of power cables, if an additional set of cables is required, they can be obtained using the following part numbers:

- 100-01523 - E5-110/120/121 Power & Ground Cables, fuse & Mnting Hardware
- 100-01988 - E5-111 Power & Ground Cables, fuse & Mnting Hardware

ODC-X000E PACKAGES AND ORDERING INFORMATION

E-Series Equipment Kits

All E-series equipment includes power cables, ground cable, 19" and 23" install brackets out of the box, so that shelves are easy to install and turn up regardless of where. Below are the detailed lists of complementary components shipped with E-Series equipment:

E7-2 Field Install Kit for CO & RT (19" and 23" mounting brackets, power and ground cables, etc)	
Qty	Item Description
2	Rack Mount Ears, 19 inch (ROHS)
2	Rack Mount Ears, 23 inch (ROHS)
1	Cable Assembly, E7 Ground [ROHS]
1	Cable Assembly, E7 Power
1	Bag, Open top Pink Anti-Static , 6 x 8 x .004 thk
1	Lug 2-hole 8 AWG Red 21 Die
4	Scr PP Thrdroll taptite Sq cone 12-24x.625lg SS Passivated
8	Screw, Machine, Phil, 18-8 SS FLT HD, 4-40, 3/16 Long, ROHS
2	Nut, KEPS, #10-32, SS, 11NK188
2	Washer Ext. tooth #10 SS Passivated

E5-110/E5-120/E5-121 Field Install Kit for CO & RT (19" and 23" mounting brackets, power and ground cables, etc)	
Qty	Item Description
1	Fan Filter, ROHS
2	Bracket, E5-110/E5-111, 19" L-BRACKET, ROHS
2	Bracket, E5-110/E5-111, 23" L-BRACKET, ROHS
1	CABLE, RS-232, DB9(F)->RJ 11(4P4C), 185cm, ROHS
1	Ground Cable, 12 FT FOR E5-100
1	Power Cables,WIRE 14AWG 41/0.254MM, ROHS STRANDED TINNED BLK/RED L=12FEET LABLE 1.0*2.44IN WHITE SHRINK TABING 0.375*0.187IN ID BLACK,LANTERRA
1	INSTALLATION GUIDE MANUAL, E5-110 DC/E5-110 AC/E5-111/E5-120/E5-121
E5-111 Field Install Kit for CO & RT (19" and 23" mounting brackets, power and ground cables, etc)	
Qty	Item Description
1	Fan Filter, ROHS
2	Bracket, E5-110/E5-111, 19" L-BRACKET, ROHS
2	Bracket, E5-110/E5-111, 23" L-BRACKET, ROHS
1	CABLE, RS-232, DB9(F)->RJ 11(4P4C), 185cm, ROHS
1	Ground Cable, 12 FT FOR E5-100
1	Power Cables plus Ferrite Core,WIRE 14AWG 41/0.254MM, ROHS STRANDED TINNED BLK/RED L=12FEET LABLE 1.0*2.44IN WHITE SHRINK TABING 0.375*0.187IN ID BLACK,LANTERRA
1	INSTALLATION GUIDE MANUAL, E5-110 DC/E5-110 AC/E5-111/E5-120/E5-121

ODC-x000E Packages and E5-100

In an effort to ensure a simplified ordering process, Calix has created several E5-100 packages for common ODC-1000E deployment scenarios. These packages include a base cabinet configuration for either AC or remote powered cabinet configuration options. In the AC powered configuration, the different packages include protection for 96 ADSL2+ subscriber ports (overlay or converged broadband) or 48 VDSL2 subscriber ports (overlay or converged broadband), AC load center and rectifier (with required 30 Amp modules and controller), as well as two E5-100 platforms. The same subscriber count packages are available for remote powered ODC-1000E which includes protection for 48 or 96 subscriber ports (overlay or converged broadband), DC power converter, protection for the power and service pairs, and a base quantity of power modules.

The following table lists the available packages for the ODC-1000E with E5-1xx products installed. The base packages all come with 2 E5-1xx products and the mounting brackets to mount up to 8 units in the front

compartment of the cabinet. If additional units are required an additional mounting bracket (100-01522) must be installed in the rear compartment of the cabinet.

ODC-1000E packages:

PART #	PART DESCRIPTION
000-00233	ODC-1000EL (Cabinet, AC Pwr, 2 E5-111's, Mounting Bracket for 8 E5-1xx), Max 10 E5-111's
000-00235	ODC-1000E AC Power, 2 E5-120, CAT5 Cable, Mnting for 8 E5-1xx, Low Pwr HX, MAX 16 E5-120's
000-00237	ODC-1000EL (Cabinet, AC powered, 2 E5-121's, Mounting Bracket for 8 E5-1xx), MAX 16 E5-121's
000-00242	ODC-1000ER (Cabinet, RMT powered, 2 E5-111's, Mounting Bracket for 8 E5-1xx), MAX 10 E5-111's
000-00244	ODC-1000ER (Cabinet, RMT powered, 2 E5-120's, Mounting Bracket for 8 E5-1xx), MAX 16 E5-120's
000-00246	ODC-1000ER (Cabinet, RMT powered, 2 E5-121's, Mounting Bracket for 8 E5-1xx), MAX 16 E5-121's

ODC-2000E packages:

PART #	PART DESCRIPTION
000-00277	ODC-2000EL (Cabinet, AC powered, 2 E5-110's, Mounting Bracket for 8 E5-1xx), MAX 15 E5-110's
000-00278	ODC-2000EL (Cabinet, AC powered, 2 E5-111's, Mounting Bracket for 8 E5-1xx), MAX 10 E5-111's
000-00280	ODC-2000EL (Cabinet, AC powered, 2 E5-121's, Mounting Bracket for 8 E5-1xx), MAX 16 E5-121's
000-00281	ODC-2000EL (Cabinet, AC powered, 2 E5-121's, Mounting Bracket for 8 E5-1xx), MAX 16 E5-121's
000-00282	ODC-2000EL (Cabinet, Rmt powered, 2 E5-110's, Mounting Bracket for 8 E5-1xx), MAX 16 E5-110's
000-00283	ODC-2000EL (Cabinet, Rmt powered, 2 E5-111's, Mounting Bracket for 8 E5-1xx), MAX 10 E5-111's
000-00284	ODC-2000EL (Cabinet, Rmt powered, 2 E5-111's, Mounting Bracket for 8 E5-1xx), MAX 16 E5-111's
000-00285	ODC-2000EL (Cabinet, Rmt powered, 2 E5-120's, Mounting Bracket for 8 E5-1xx), MAX 16 E5-120's
000-00286	ODC-2000EL (Cabinet, Rmt powered, 2 E5-121's, Mounting Bracket for 8 E5-1xx), MAX 16 E5-121's

ODC-1000E Package Details

The contents of the above ODC-1000E E-Series cabinet packages are provided in the following tables:

000-00233	**ODC-1000EL (Cabinet, AC powered, 2 E5-111's, Mounting Bracket for 8 E5-1xx), MAX 10 E5-111's**	
100-01189	Valere Controller Module -BC 2000	1
100-01614	ODC-1000-EL Enclosure for E5 Using Local Power	1
100-01024	ODC-1000 High Power Heat Exchanger	1
100-01520	ODC-1000/2000E (Local) Rectifier, 23in 2/20 GMT's Valere	1
100-01032	Valere Rectifier Module - 30amp	2
100-01029	ODC-x000 Pro Panel Mounting Frame	1
100-01521	ODC-x000 50pr CAT5 Protector Block Module, MS2	2

100-01226	E5-111 ADSL2+ Combo 48 Port Unit, DC Power	2
100-01237	E5-100 Cable Adapter (CAT3)	4
100-01522	ODC-1000/2000 Mounting Bracket kit for E5-1xx(1 kit per 8 units)	1
100-01523	ODC-1000/2000 Power/Alarm Cables for E5-1xx (1 per E5)	2

000-00235	**ODC-1000EL (Cabinet, AC powered, 2 E5-120's, Mounting Bracket for 8 E5-1xx), MAX 16 E5-120's**	
100-01189	Valere Controller Module -BC 2000	1
100-01614	ODC-1000-EL Enclosure for E5 Using Local Power	1
100-01024	ODC-1000 High Power Heat Exchanger	1
100-01520	ODC-1000/2000E (Local) Rectifier, 23in 2/20 GMT's Valere	1
100-01032	Valere Rectifier Module - 30amp	2
100-01029	ODC-x000 Pro Panel Mounting Frame	1
100-01521	ODC-x000 50pr CAT5 Protector Block Module, MS2	2
100-01228	E5-120 VDSL2 Overlay 24 Port Unit, DC Power	2
100-01522	ODC-1000/2000 Mounting Bracket kit for E5-1xx(1 kit per 8 units)	1
100-01523	ODC-1000/2000 Power/Alarm Cables for E5-1xx (1 per E5)	2

000-00237	**ODC-1000EL (Cabinet, AC powered, 2 E5-121's, Mounting Bracket for 8 E5-1xx), MAX 16 E5-121's**	
100-01189	Valere Controller Module -BC 2000	1
100-01614	ODC-1000-EL Enclosure for E5 Using Local Power	1
100-01024	ODC-1000 High Power Heat Exchanger	1
100-01520	ODC-1000/2000E (Local) Rectifier, 23in 2/20 GMT's Valere	1
100-01032	Valere Rectifier Module - 30amp	2
100-01029	ODC-x000 Pro Panel Mounting Frame	1
100-01521	ODC-x000 50pr CAT5 Protector Block Module, MS2	1
100-01230	E5-121 VDSL2 Combo 24 Port Unit, DC Power	2
100-01522	ODC-1000/2000 Mounting Bracket kit for E5-1xx(1 kit per 8 units)	1
100-01523	ODC-1000/2000 Power/Alarm Cables for E5-1xx (1 per E5)	2

000-00288	**ODC-1000EL AC Power, 1 E5-400, Mnting for 8 E5-1xx, High Pwr HX**	
100-01189	Valere Controller Module -BC 2000	1
100-01614	ODC-1000-EL Enclosure for E5 Using Local Power	1
100-01024	ODC-1000 High Power Heat Exchanger	1
100-01520	ODC-1000/2000E (Local) Rectifier, 23in 2/20 GMT's Valere	1
100-01032	Valere Rectifier Module - 30amp	2
100-01448	E5-400 Chassis: Aggregation 12x 1GigE / 4x 10GigE xFP sockets (no FTA)	1
100-01450	E5-400 Fan Tray Assembly	1
100-01538	E5-400 Filter	1
100-01522	ODC-1000/2000 Mounting Bracket kit for E5-1xx(1 kit per 8 units)	1
100-01523	ODC-1000/2000 Power/Alarm Cables for E5-1xx (1 per E5)	2

000-00242	**ODC-1000ER (Cabinet, RMT powered, 2 E5-111's, Mounting Bracket for 8 E5-1xx), MAX 10 E5-111's**	
100-01615	ODC-1000-ER Enclolsure for E5 Using Remote Power	1
100-01602	ODC-X000E, Power Protection Panel Mounting	1

100-01603	ODC-x000E, Remote power converter/DC distribution	1
100-01024	ODC-1000 High Power Heat Exchanger	1
100-01242	ODC-100 Remote Power Module	2
100-01243	ODC-100 Remote Power Fan Assembly	1
100-01001	ODC-100 25 Pair Pwr Protection	1
100-01029	ODC-x000 Pro Panel Mounting Frame	1
100-01521	ODC-x000 50pr CAT5 Protector Block Module, MS2	2
100-01226	E5-111 ADSL2+ Combo 48 Port Unit, DC Power	2
100-01237	E5-1xx Adapter Cable	4
100-01522	ODC-1000/2000 Mounting Bracket for E5-1xx (1 Bracket per 8 Units)	1
100-01523	ODC-1000/2000 Power/Alarm Cables for E5-1xx (1 per E5)	2

000-00244	**ODC-1000ER (Cabinet, RMT powered, 2 E5-120's, Mounting Bracket for 8 E5-1xx), MAX 16 E5-120's**	
100-01615	ODC-1000-ER Enclolsure for E5 Using Remote Power	1
100-01602	ODC-X000E, Power Protection Panel Mounting	1
100-01603	ODC-x000E, Remote power converter/DC distribution	1
100-01024	ODC-1000 High Power Heat Exchanger	1
100-01242	ODC-100 Remote Power Module	2
100-01243	ODC-100 Remote Power Fan Assembly	1
100-01001	ODC-100 25 Pair Pwr Protection	1
100-01029	ODC-x000 Pro Panel Mounting Frame	1
100-01521	ODC-x000 50pr CAT5 Protector Block Module, MS2	2
100-01228	E5-120 VDSL2 Overlay 24 Port Unit, DC Power	2
100-01522	ODC-1000/2000 Mounting Bracket for E5-1xx (1 Bracket per 8 Units)	1
100-01523	ODC-1000/2000 Power/Alarm Cables for E5-1xx (1 per E5)	2

000-00246	**ODC-1000ER (Cabinet, RMT powered, 2 E5-121's, Mounting Bracket for 8 E5-1xx), MAX 16 E5-121's**	
100-01615	ODC-1000-ER Enclolsure for E5 Using Remote Power	1
100-01602	ODC-X000E, Power Protection Panel Mounting	1
100-01603	ODC-x000E, Remote power converter/DC distribution	1
100-01024	ODC-1000 High Power Heat Exchanger	1
100-01242	ODC-100 Remote Power Module	2
100-01243	ODC-100 Remote Power Fan Assembly	1
100-01001	ODC-100 25 Pair Pwr Protection	1
100-01416	Pro Panel Mounting Frame	1
100-01521	ODC-x000 50pr CAT5 Protector Block Module, MS2	1
100-01230	E5-121 VDSL2 Combo 24 Port Unit, DC Power	2
100-01522	ODC-1000/2000 Mounting Bracket for E5-1xx (1 Bracket per 8 Units)	1
100-01523	ODC-1000/2000 Power/Alarm Cables for E5-1xx (1 per E5)	2

000-00290	**ODC-1000ER RMT Power, 1 E5-400, Mnting for 8 E5-xxx, High Pwr HX**	
100-01615	ODC-1000-ER Enclolsure for E5 Using Remote Power	1
100-01602	ODC-X000E, Power Protection Panel Mounting	1
100-01603	ODC-x000E, Remote power converter/DC distribution	1
100-01024	ODC-1000 High Power Heat Exchanger	1
100-01242	ODC-100 Remote Power Module	2
100-01243	ODC-100 Remote Power Fan Assembly	1
100-01001	ODC-100 25 Pair Pwr Protection	1
100-01448	E5-400 Chassis: Aggregation 12x 1GigE / 4x 10GigE xFP sockets (no FTA)	1
100-01450	E5-400 Fan Tray Assembly	1

100-01538	E5-400 Filter	1
100-01522	ODC-1000/2000 Mounting Bracket for E5-1xx (1 Bracket per 8 Units)	1
100-01523	ODC-1000/2000 Power/Alarm Cables for E5-1xx (1 per E5)	2

ODC-2000E Package Details

The contents of the above ODC-1000E E-Series cabinet packages are provided in the following tables:

000-00277	**ODC-2000EL (Cabinet, AC powered, 2 E5-110's, Mounting Bracket for 8 E5-1xx), MAX 15 E5-110's**	
100-01616	ODC-2000-EL Enclosure for E5 using Local Power	1
100-01107	ODC-2000 Door Mount Heat Exchanger- Front	1
100-01221	ODC-2000-R/3000-LR Door, Non Heat Exchanger	1
100-01189	Valere Controller Module -BC 2000	1
100-01032	Valere Rectifier Module - 30amp	2
100-01520	ODC-1000 Valere Rectifier Shelf w/DIST/LVD, W/20GMTS	1
100-01029	ODC-x000 Pro Panel Mounting Frame	1
100-01521	ODC-x000 50pr CAT5 Protector Block Module, MS2	4
100-01224	E5-110 ADSL2+ Overlay 48 Port Unit, DC Power	2
100-01237	E5-100 Cable Adapter (CAT3)	8
100-01522	ODC-1000/2000 Mounting Bracket for E5-1xx (1 Bracket per 8 Units)	1
100-01523	ODC-1000/2000 Power/Alarm Cables for E5-1xx (1 per E5)	2

000-00278	**ODC-2000EL (Cabinet, AC powered, 2 E5-111's, Mounting Bracket for 8 E5-1xx), MAX 10 E5-111's**	
100-01616	ODC-2000-EL Enclosure for E5 using Local Power	1
100-01107	ODC-2000 Door Mount Heat Exchanger- Front	1
100-01221	ODC-2000-R/3000-LR Door, Non Heat Exchanger	1
100-01189	Valere Controller Module -BC 2000	1
100-01032	Valere Rectifier Module - 30amp	2
100-01520	ODC-1000 Valere Rectifier Shelf w/DIST/LVD, W/20GMTS	1
100-01029	ODC-x000 Pro Panel Mounting Frame	1
100-01521	ODC-x000 50pr CAT5 Protector Block Module, MS2	2
100-01226	E5-111 ADSL2+ Combo 48 Port Unit, DC Power	2
100-01237	E5-100 Cable Adapter (CAT3)	4
100-01522	ODC-1000/2000 Mounting Bracket for E5-1xx (1 Bracket per 8 Units)	1
100-01523	ODC-1000/2000 Power/Alarm Cables for E5-1xx (1 per E5)	2

000-00279	**ODC-2000EL (Cabinet, AC powered, 2 E5-111's, Mounting Bracket for 8 E5-1xx), MAX 16 E5-111's**	
100-01616	ODC-2000-EL Enclosure for E5 using Local Power	1
100-01107	ODC-2000 Door Mount Heat Exchanger- Front	1
100-01108	ODC-2000 Rear Door Asy (w/ Heat Exchanger)	1
100-01189	Valere Controller Module -BC 2000	1
100-01032	Valere Rectifier Module - 30amp	2
100-01520	ODC-1000 Valere Rectifier Shelf w/DIST/LVD, W/20GMTS	1
100-01029	ODC-x000 Pro Panel Mounting Frame	1
100-01521	ODC-x000 50pr CAT5 Protector Block Module, MS2	2
100-01226	E5-111 ADSL2+ Combo 48 Port Unit, DC Power	2
100-01237	E5-100 Cable Adapter (CAT3)	4
100-01522	ODC-1000/2000 Mounting Bracket for E5-1xx (1 Bracket per 8 Units)	1
100-01523	ODC-1000/2000 Power/Alarm Cables for E5-1xx (1 per E5)	2

000-00280	ODC-2000EL (Cabinet, AC powered, 2 E5-121's, Mounting Bracket for 8 E5-1xx), MAX 16 E5-121's	
100-01616	ODC-2000-EL Enclosure for E5 using Local Power	1
100-01107	ODC-2000 Door Mount Heat Exchanger- Front	1
100-01221	ODC-2000-R/3000-LR Door, Non Heat Exchanger	1
100-01189	Valere Controller Module -BC 2000	1
100-01032	Valere Rectifier Module - 30amp	2
100-01520	ODC-1000 Valere Rectifier Shelf w/DIST/LVD, W/20GMTS	1
100-01029	ODC-x000 Pro Panel Mounting Frame	1
100-01521	ODC-x000 50pr CAT5 Protector Block Module, MS2	2
100-01228	E5-120 VDSL2 24 Port Overlay, DC Power	2
100-01522	ODC-1000/2000 Mounting Bracket for E5-1xx (1 Bracket per 8 Units)	1
100-01523	ODC-1000/2000 Power/Alarm Cables for E5-1xx (1 per E5)	2

000-00281	ODC-2000EL (Cabinet, AC powered, 2 E5-121's, Mounting Bracket for 8 E5-1xx), MAX 16 E5-121's	
100-01616	ODC-2000-EL Enclosure for E5 using Local Power	1
100-01107	ODC-2000 Door Mount Heat Exchanger- Front	1
100-01221	ODC-2000-R/3000-LR Door, Non Heat Exchanger	1
100-01189	Valere Controller Module -BC 2000	1
100-01032	Valere Rectifier Module - 30amp	2
100-01520	ODC-1000 Valere Rectifier Shelf w/DIST/LVD, W/20GMTS	1
100-01029	ODC-x000 Pro Panel Mounting Frame	1
100-01521	ODC-x000 50pr CAT5 Protector Block Module, MS2	1
100-01230	E5-121 VDSL2 Combo 24 Port Unit, DC Power	2
100-01522	ODC-1000/2000 Mounting Bracket for E5-1xx (1 Bracket per 8 Units)	1
100-01523	ODC-1000/2000 Power/Alarm Cables for E5-1xx (1 per E5)	2

000-00282	ODC-2000EL (Cabinet, Rmt powered, 2 E5-110's, Mounting Bracket for 8 E5-1xx), MAX 16 E5-110's	
100-01617	ODC-2000-ER Enclosure for E5 Using Remote Power	1
100-01602	ODC-X000E, Power Protection Panel Mounting	1
100-01603	ODC-x000E, Remote power converter/DC distribution	1
100-01107	ODC-2000 Door Mount Heat Exchanger- Front	1
100-01221	ODC-2000-R/3000-LR Door, Non Heat Exchanger	1
100-01242	ODC-100 Remote Power Module	2
100-01243	ODC-100 Remote Power Fan Assembly	1
100-01001	ODC-100 25 Pair Pwr Protection	1
100-01029	ODC-x000 Pro Panel Mounting Frame	1
100-01521	ODC-x000 50pr CAT5 Protector Block Module, MS2	4
100-01224	E5-110 ADSL2+ Overlay 48 Port Unit, DC Power	2
100-01237	E5-100 Cable Adapter (CAT3)	8
100-01522	ODC-1000/2000 Mounting Bracket for E5-1xx (1 Bracket per 8 Units)	1
100-01523	ODC-1000/2000 Power/Alarm Cables for E5-1xx (1 per E5)	2

000-00283	ODC-2000EL (Cabinet, Rmt powered, 2 E5-111's, Mounting Bracket for 8 E5-1xx), MAX 10 E5-111's	
100-01617	ODC-2000-ER Enclosure for E5 Using Remote Power	1
100-01602	ODC-X000E, Power Protection Panel Mounting	1
100-01603	ODC-x000E, Remote power converter/DC distribution	1

100-01107	ODC-2000 Door Mount Heat Exchanger- Front	1
100-01221	ODC-2000-R/3000-LR Door, Non Heat Exchanger	1
100-01242	ODC-100 Remote Power Module	2
100-01243	ODC-100 Remote Power Fan Assembly	1
100-01001	ODC-100 25 Pair Pwr Protection	1
100-01029	ODC-x000 Pro Panel Mounting Frame	1
100-01521	ODC-x000 50pr CAT5 Protector Block Module, MS2	2
100-01226	E5-111 ADSL2+ Combo 48 Port Unit, DC Power	2
100-01237	E5-100 Cable Adapter (CAT3)	4
100-01522	ODC-1000/2000 Mounting Bracket for E5-1xx (1 Bracket per 8 Units)	1
100-01523	ODC-1000/2000 Power/Alarm Cables for E5-1xx (1 per E5)	2

000-00284	**ODC-2000EL (Cabinet, Rmt powered, 2 E5-111's, Mounting Bracket for 8 E5-1xx), MAX 16 E5-111's**	
100-01617	ODC-2000-ER Enclosure for E5 Using Remote Power	1
100-01602	ODC-X000E, Power Protection Panel Mounting	1
100-01603	ODC-x000E, Remote power converter/DC distribution	1
100-01107	ODC-2000 Door Mount Heat Exchanger- Front	1
100-01108	ODC-2000 Rear Door Asy. (w/ Heat Exchanger)	1
100-01242	ODC-100 Remote Power Module	2
100-01243	ODC-100 Remote Power Fan Assembly	1
100-01001	ODC-100 25 Pair Pwr Protection	1
100-01029	ODC-x000 Pro Panel Mounting Frame	1
100-01521	ODC-x000 50pr CAT5 Protector Block Module, MS2	2
100-01226	E5-111 ADSL2+ Combo 48 Port Unit, DC Power	2
100-01237	E5-100 Cable Adapter (CAT3)	4
100-01522	ODC-1000/2000 Mounting Bracket for E5-1xx (1 Bracket per 8 Units)	1
100-01523	ODC-1000/2000 Power/Alarm Cables for E5-1xx (1 per E5)	2

000-00285	**ODC-2000EL (Cabinet, Rmt powered, 2 E5-120's, Mounting Bracket for 8 E5-1xx), MAX 16 E5-120's**	
100-01617	ODC-2000-ER Enclosure for E5 Using Remote Power	1
100-01602	ODC-X000E, Power Protection Panel Mounting	1
100-01603	ODC-x000E, Remote power converter/DC distribution	1
100-01107	ODC-2000 Door Mount Heat Exchanger- Front	1
100-01221	ODC-2000-R/3000-LR Door, Non Heat Exchanger	1
100-01242	ODC-100 Remote Power Module	2
100-01243	ODC-100 Remote Power Fan Assembly	1
100-01001	ODC-100 25 Pair Pwr Protection	1
100-01029	ODC-x000 Pro Panel Mounting Frame	1
100-01521	ODC-x000 50pr CAT5 Protector Block Module, MS2	2
100-01228	E5-120 VDSL2 24 Port Overlay, DC Power	2
100-01522	ODC-1000/2000 Mounting Bracket for E5-1xx (1 Bracket per 8 Units)	1
100-01523	ODC-1000/2000 Power/Alarm Cables for E5-1xx (1 per E5)	2

000-00286	**ODC-2000EL (Cabinet, Rmt powered, 2 E5-121's, Mounting Bracket for 8 E5-1xx), MAX 16 E5-121's**	
100-01617	ODC-2000-ER Enclosure for E5 Using Remote Power	1
100-01602	ODC-X000E, Power Protection Panel Mounting	1
100-01603	ODC-x000E, Remote power converter/DC distribution	1
100-01107	ODC-2000 Door Mount Heat Exchanger- Front	1
100-01221	ODC-2000-R/3000-LR Door, Non Heat Exchanger	1
100-01242	ODC-100 Remote Power Module	2

100-01243	ODC-100 Remote Power Fan Assembly	1
100-01001	ODC-100 25 Pair Pwr Protection	1
100-01029	ODC-x000 Pro Panel Mounting Frame	1
100-01521	ODC-x000 50pr CAT5 Protector Block Module, MS2	1
100-01230	E5-121 VDSL2 Combo 24 Port Unit, DC Power	2
100-01522	ODC-1000/2000 Mounting Bracket for E5-1xx (1 Bracket per 8 Units)	1
100-01523	ODC-1000/2000 Power/Alarm Cables for E5-1xx (1 per E5)	2

ODC-1000E and ODC-2000E Upgrades and Options

When a service provider wants to add more E-Series products to the above ODC packages, or there is a need to mix E5-1xx/E5-400/E7-2 product types, a base package should be ordered and upgrade kits added to it. E-Series upgrade kits have been created in two separate categories; *Field Installation Kits*, and *Factory Installation Kits*. Selecting and ordering the appropriate kit allows proper fulfillment of the equipment, where *Factory Installation Kits* are integrated into a cabinet before it ships to the customer, and *Field Installation Kits* are shipped loose to be integrated by the customer or installer inside a cabinet in production. These different types of kits are:

- E-Series Factory Installation kits, available for adding additional E-Series products into any of the base cabinet packages:

PART #	PART DESCRIPTION
000-00340	ODC-100 Factory Installation Kit for ODC-100/x000(E) (E5-110 ADSL2+ Overlay, CAT-5 Protection)
000-00341	ODC-100 Factory Installation Kit for ODC-100/x000(E) (E5-111 ADSL2+ Combo, CAT-5 Protection)
000-00273	ODC-1000E/2000E Factory Installation Kit (1x E5-110, Protector panels, Pwr cables)
000-00274	ODC-1000E/2000E Factory Installation Kit (1x E5-111, Protector panels, Pwr cables)
000-00275	ODC-1000E/2000E Factory Installation Kit (1x E5-120, Protector panels, Pwr cables)
000-00276	ODC-1000E/2000E Factory Installation Kit (1x E5-121, Protector panels, Pwr cables)
000-00309	ODC-1000E/2000E Factory Installation Kit (1x E5-400, Pwr cables)
000-00389	E7-2 Factory Install Package (ODC): Shelf, FTA, and Factory installation Kit

- E-Series Field Installation kits, available for adding additional E-Series products into any of the base cabinet packages:

PART #	PART DESCRIPTION
000-00397	ODC-100 Field Installation Kit for E5-110 ADSL2+ Overlay, CAT-5 Protection)
000-00398	ODC-100 Field Installation Kit for E5-111 ADSL2+ Combo, CAT-5 Protection)
000-00399	ODC-1000E/2000E Field Installation Kit (1x E5-110, Protector panels, Pwr cables)
000-00400	ODC-1000E/2000E Field Installation Kit (1x E5-111, Protector panels, Pwr cables)
000-00401	ODC-1000E/2000E Field Installation Kit (1x E5-120, Protector panels, Pwr cables)
000-00402	ODC-1000E/2000E Field Installation Kit (1x E5-121, Protector panels, Pwr cables)
000-00403	ODC-1000E/2000E Field Installation Kit (1x E5-400, Pwr cables)
000-00372	E7-2 Field Install Package (CO & ODC/RT): Shelf, FTA, and Field installation Kit

It is important to remember that if the cabinet will be housing more than 8x E5-1xx products, or more than 12x E7-2, an additional mounting bracket must be ordered. When adding E5-1xx products to the cabinet it is possible that additional Protector Panel Mounting Frames will be required. One of the frames is required for every 6 protector panel modules in the cabinet.

PART #	PART DESCRIPTION
100-01522	ODC-1000/E5-1xx Vertical Mounting Bracket (1 per 8 E5-1xx)
100-01416	ODC-1000/2000 Protector Panel Mounting Swing Frame (1 per 6 Protector Panels)
100-01523	ODC-1000E/2000E Pwr&Grnd and Alarm Cables for E5-xxx (supports both E5-1xx and E5-4xx)
100-01521	CAT5 50Pair Protector Panel Module (MS2)
100-01600	ODC-X000E, 90 Deg. Cat 3, Pro-Block, 50 Pair Module MS2

The following table can be referred to when determining when an addition protection Panel mounting frame is required. The table indicates how many protector panels are required per E5. Once 6 protector panels are installed in the ODC-x000E cabinets an addition protection panel mounting frame is required.

E5	Protection Panel Requirements
E5-110	2 Modules per unit (each unit requires 48 pairs in and 48 pairs out)
E5-111	1 Module per unit (each unit requires 48 pairs)
E5-120	1 Module per unit (each unit requires 24 pairs in and 24 pairs out)
E5-121	½ Module per unit (each unit requires 24 pairs)
E4-400	0 Modules per unit

If an ODC-1000/2000-E cabinet, housing only E5-400 units, needs to be upgraded with copper serving E5-100 units, protection panels will need to be added to the cabinet. These pro-panels require mounting brackets:

PART #	PART DESCRIPTION
100-01416	ODC-1000/2000 Protector Panel Mounting Swing Frame
100-01521	CAT5 50Pair Protector Panel Module (MS2)

As stated earlier in this section, each of the E5-1xx upgrade kits (000-00273-6) include the required power and alarm cabling, as well as the required protector blocks and a single E5 of the designated type.

ODC-x000E Packages and E5-400 and E7-2

Special packages have been put together in support for high density fiber, E-Series applications. This section describes the content of the ODC-x000E7-2 packages themselves, but detailed descriptions of the fiber accessories within the packages can be found in section "*Fiber Distribution & Termination, splicing, splitters, etc*" earlier in this document.

ODC-x000E7-2 Packages; Part # and Descriptions:

- 000-00438 - ODC-1000E7-2 Pckg: 1x Hi-Cap HX = E7-2s; 9x AE/ 8x GPON, Hi-count fiber routing, 10x A+B DC fuses
- 000-00439 - ODC-2000E7-2 Pckg: 2x HX Cap. 3700W = E7-2s; 17x AE/ 14x GPON, Hi-count fiber rout., 20x A+B DC fuse

- 000-00440 - ODC-3000E7-2 Pckg: 4x HX Cap. 7400W = E7-2s; 34x AE/ 32x GPON, Hi-count fiber rout., 40x A+B DC fuse
- 000-00456 - ODC-3000E7-2 Pckg: 2x HX Cap. 3700W = E7-2s; 17x AE/ 14x GPON, Hi-count fiber rout., 40x A+B DC fuse
- 000-00457 - ODC-3000E7-2 Pckg: 3x HX Cap. 5550W = E7-2s; 28x AE/ 25x GPON, Hi-count fiber rout., 40x A+B DC fuse

Below are detailed Bill Of Materials descriptions of the items included in some of the more illustrative ODC-x000E7-2 cabinet Packages:

Item Number	Qty	Item Description
000-00438		ODC-1000E7-2 Pckg: 1x Hi-Cap HX = E7-2s; 9x AE/ 8x GPON, Hi-count fiber routing, 10x A+B DC fuses (Name: ODC-1000E7-2 Pckg: 1x HX E7-2 supp.; 9x AE/8x GPON)
100-01189	1	Valere Controller Module- BC 2000
100-01614	1	ODC-1000-EL enclosure: ODC-1000 for E-Series, Local AC power
100-01024	1	ODC-1000 High Power Heat Exchanger
100-01520	1	ODC-1000(E)/2000(E) Rectifier, 23in W/20 GMT's, Valere
100-01449	1	E7-2 Shelf, 1RU, 2 Slots, with 1 Blank Card
100-01032	2	Valere Rectifier Module- 30 AMP
100-01451	1	E7-2 Fan Tray Assembly, 1RU, 2 Slot Shelf
100-01522	1	ODC-X000 Vertical Mounting Bracket for E-Series
100-01881	1	E7-2 Factory Install Kit for ODC-100/x000(E) (19 and 23" brackets, power and ground cables, etc)
100-02257	1	ODC-1000-E high count fiber routing kit: horizontal fiber comb (front), plus front-rear fiber ramp
100-02250	1	ODC-x000E Active Ethernet Fiber deployment; Strain Relief Clamping Bar for OSP Cable
100-01347	1	ODC x000 PON Fiber Management Spool Assembly, (2 Spools)
100-01348	2	ODC 1000 PON Splice Chamber Fiber Feed Through Assembly
000-00439		ODC-2000E7-2 Pckg: 2x HX Cap. 3700W = E7-2s; 17x AE/ 14x GPON, Hi-count fiber rout., 20x A+B DC fuse (Name: ODC-2000E7-2 Pckg: 2x HX E7-2 supp.; 17xAE/14xGPON)
100-01616	1	ODC-2000-EL enclosure: ODC-2000 for E-Series, Local AC power
100-01107	1	ODC-2000 Front/ODC-3000 Front Left Door Mount HX
100-01108	1	ODC-2000 Rear/ODC-3000 Rear Left Door Mount HX
100-01189	1	Valere Controller Module- BC 2000
100-01520	1	ODC-1000(E)/2000(E) Rectifier, 23in W/20 GMT's, Valere
100-01032	2	Valere Rectifier Module- 30 AMP
100-01449	1	E7-2 Shelf, 1RU, 2 Slots, with 1 Blank Card
100-01451	1	E7-2 Fan Tray Assembly, 1RU, 2 Slot Shelf
100-01522	1	ODC-X000 Vertical Mounting Bracket for E-Series

Item Number	Qty	Item Description
100-01881	1	E7-2 Factory Install Kit for ODC-100/x000(E) (19 and 23" brackets, power and ground cables, etc)
100-02258	1	ODC-2/3000-E high count fiber routing kit: horizontal fiber comb, plus front & rear fiber guards
100-02235	1	ODC-2000E/3000E DC Distribution - 10+10 (A+B) GMT fuses, 1RU, 19/23"
100-02250	1	ODC-x000E Active Ethernet Fiber deployment; Strain Relief Clamping Bar for OSP Cable
100-01347	2	ODC x000 PON Fiber Management Spool Assembly, (2 Spools)
100-01595	3	ODC 2000/3000 PON Splice Chamber Fiber Feed Through Assembly
000-00456		**ODC-3000E7-2 Pckg: 2x HX Cap. 3700W = E7-2s; 17x AE/ 14x GPON, Hi-count fiber rout., 40x A+B DC fuse (Name: ODC-3000E7-2 Pckg: 2x HX E7-2 supp.; 17xAE/14xGPON)**
100-01032	4	Valere Rectifier Mdl-30A
100-01104	2	ODC-2000/3000 Valere Rectifier Shelf & DC Distribution 19", 4 RU
100-01130	1	ODC-3000 Enclosure
100-01134	1	ODC-3000 Front Right Door Mount Heat Exchanger
100-01135	1	ODC-3000 Rear Right Door Mount Heat Exchanger
100-01189	1	Valere Controller Module- BC 2000
100-01210	1	Valere EC1000 Expansion Controller
100-01221	1	ODC-2000-Rear/ODC-3000-Rear Left Door, Non Heat Exchanger
100-01222	1	ODC-3000-Left Front Door, Non Heat Exchanger
100-01522	1	ODC-1000E/2000E Vertical Mounting Bracket for E-Series
100-02258	2	ODC-2/3000-E high count fiber routing kit: horizontal fiber comb, plus front & rear fiber guards
100-02235	4	ODC-2000E/3000E DC Distribution - 10+10 (A+B) GMT fuses, 1RU, 19/23"
100-02250	2	ODC-x000E Active Ethernet Fiber deployment; Strain Relief Clamping Bar for OSP Cable
100-01347	4	ODC x000 PON Fiber Management Spool Assembly, (2 Spools)
100-01595	6	ODC 2000/3000 PON Splice Chamber Fiber Feed Through Assembly
100-01449	1	E7 Shelf, 1RU, 2 Slots, with 1 Blank Card
100-01451	1	E7 Fan Tray Assembly, 1RU, 2 Slot Shelf
100-01881	1	E7 Factory Installation Kit for ODC-100/x000(E) (19 and 23" brackets, power and ground cables, etc)
000-00457		**ODC-3000E7-2 Pckg: 3x HX Cap. 5550W = E7-2s; 28x AE/ 25x GPON, Hi-count fiber rout., 40x A+B DC fuse (Name: ODC-3000E7-2 Pckg: 3x HX E7-2 supp.; 28xAE/25xGPON)**
100-01032	4	Valere Rectifier Mdl-30A
100-01104	2	ODC-2000/3000 Valere Rectifier Shelf & DC Distribution 19", 4 RU
100-01130	1	ODC-3000 Enclosure
100-01134	1	ODC-3000 Front Right Door Mount Heat Exchanger
100-01135	1	ODC-3000 Rear Right Door Mount Heat Exchanger

Item Number	Qty	Item Description
100-01189	1	Valere Controller Module- BC 2000
100-01210	1	Valere EC1000 Expansion Controller
100-01221	1	ODC-2000-Rear/ODC-3000-Rear Left Door, Non Heat Exchanger
100-01107	1	ODC-2000 Front/ODC-3000 Front Left Door Mount HX
100-01522	2	ODC-1000E/2000E Vertical Mounting Bracket for E-Series
100-02258	2	ODC-2/3000-E high count fiber routing kit: horizontal fiber comb, plus front & rear fiber guards
100-02235	4	ODC-2000E/3000E DC Distribution - 10+10 (A+B) GMT fuses, 1RU, 19/23"
100-02250	2	ODC-x000E Active Ethernet Fiber deployment; Strain Relief Clamping Bar for OSP Cable
100-01347	4	ODC x000 PON Fiber Management Spool Assembly, (2 Spools)
100-01595	6	ODC 2000/3000 PON Splice Chamber Fiber Feed Through Assembly
100-01449	1	E7 Shelf, 1RU, 2 Slots, with 1 Blank Card
100-01451	1	E7 Fan Tray Assembly, 1RU, 2 Slot Shelf
100-01881	1	E7 Factory Installation Kit for ODC-100/x000(E) (19 and 23" brackets, power and ground cables, etc)
000-00440		**ODC-3000E7-2 Pckg: 4x HX Cap. 7400W = E7-2s; 34x AE/ 32x GPON, Hi-count fiber rout., 40x A+B DC fuse (Name: ODC-3000E7-2 Pckg: 4x HX E7-2 supp.; 34xAE/32xGPON)**
100-01032	4	Valere Rectifier Mdl-30A
100-01104	2	ODC-2000/3000 Valere Rectifier Shelf & DC Distribution 19", 4 RU
100-01130	1	ODC-3000 Enclosure
100-01134	1	ODC-3000 Front Right Door Mount Heat Exchanger
100-01135	1	ODC-3000 Rear Right Door Mount Heat Exchanger
100-01189	1	Valere Controller Module- BC 2000
100-01210	1	Valere EC1000 Expansion Controller
100-01107	1	ODC-2000 Front/ODC-3000 Front Left Door Mount HX
100-01108	1	ODC-2000 Rear/ODC-3000 Rear Left Door Mount HX
100-01522	2	ODC-1000E/2000E Vertical Mounting Bracket for E-Series
100-02258	2	ODC-2/3000-E high count fiber routing kit: horizontal fiber comb, plus front & rear fiber guards
100-02235	4	ODC-2000E/3000E DC Distribution - 10+10 (A+B) GMT fuses, 1RU, 19/23"
100-02250	2	ODC-x000E Active Ethernet Fiber deployment; Strain Relief Clamping Bar for OSP Cable
100-01347	4	ODC x000 PON Fiber Management Spool Assembly, (2 Spools)
100-01595	6	ODC 2000/3000 PON Splice Chamber Fiber Feed Through Assembly
100-01449	1	E7 Shelf, 1RU, 2 Slots, with 1 Blank Card
100-01451	1	E7 Fan Tray Assembly, 1RU, 2 Slot Shelf
100-01881	1	E7 Factory Installation Kit for ODC-100/x000(E) (19 and 23" brackets, power and ground cables, etc)

ODC Cabinet Deployments with GPON ONTs and RF Overlay EDFAs

Calix cabinets support field or factory installation of 76xGX-R rack mount ONTs in ODC cabinets;

Part #	Description
100-01905	76xGX-R Cable for install in ODC; 8 Port T1/RJ45 to RJ-21 (pro-panel)
100-01906	ODC, Field Installation Kit for 76xGX-R; Pwr & Gnd cables, fuses, mounting HW
100-01907	ODC, Factory Installation Kit for 76xGX-R; Pwr & Gnd cables, fuses, mounting HW

If T-1 services are used from the 76xGX-R rack mount ONTs within ODC cabinets, use the specially designed cable, 100-01905 [76xGX-R Cable for install in ODC; 8 Port T1/RJ45 to RJ-21 (pro-panel)], to connect the copper pairs use for the service to a pro-panel of your choice:

Part #	Description
100-01521	ODC-x000E 50pr CAT5 Protector Block, MS2
100-01887	ODC-x000E 50pr CAT5 Protector Block, 710
100-01176	ODC-100 24 Port Trunk Protector Panel

For more information please consult "Calix 76xGX-R MDU ONT Installation Kit for Calix ODC Cabinets" (document #220-00332).

Calix cabinets also support field or factory installation of IPG's 2-Way, 8x and 4x 20.0dBm, 2RU, I-Temp EDFAs in ODC-100 and ODC-x000E E-Series cabinets;

Part #	Description
100-01898	ODC, Field Installation Kit for IPG EDFA; 19" bracket, Pwr & Gnd cables, fuses, mounting HW

For more information please consult "IPG EDFA Installation Kit for Calix ODC Cabinets" (document #220-00331).

The IPG EDFAs are available from Calix's EF&I services group:

- IPG 2-Way EDFA, 4x20.0dBm, 4W CWDM, Cascade WDM, 2RU, I-Temp
- IPG 2-Way EDFA, 8x20.0dBm, 4W CWDM, Cascade WDM, 2RU, I-Temp

CABINET RETROFIT KITS

Calix provides a select set of 3rd party cabinet retrofit kits designed to allow easy installation of the E5-100 product line within them. These cabinets have been tested to characterize powering, heat dissipation / cooling, mechanical as well as cabling and protector panel requirements in an effort to minimize service provider installation and maintenance activities.

The 3rd party cabinet retrofit efforts have focused on:

- Augmenting the capacity of the cabinet with E5-100 services; in this case it is assumed that some of all of the existing equipment for the cabinet is staying within the cabinet. This provides space, power and heat dissipation capacity to add one or two E5-100 units, to augment the existing broadband service delivery
- Clear-and-Fill applications provide the ability to remove entirely the existing legacy equipment, and add the new generation of converged voice, video and data service delivery E5s.

The following cabinet generic retrofit kits are available from Calix. The intention of these kits is to simplify the configuration and deployment of Calix equipment within existing cabinets. All these kits and discrete retrofit elements are described in this section of the document:

- E-Series protection-panel retrofit kits
- Door Mount Heat Exchanger Generic Retrofit Kit (1600W)
- 48Vdc Power Upgrade Generic Retrofit Kit (1+1 30A)
- Alarm Cable Generic Retrofit Kit; 7 inputs, mediating block, adapter connectors: E5-100, E5-400, E7
- E-Series DSL and POTS signaling cables

At this time, cabinet retrofit kits are available for the following cabinets:

- Calix legacy ODC; augment one E5-100, E5-400 or E7-2 in a Calix ODC cabinet.
- AFC 120 Augment; 1-2x E5-100.
- AFC 240 Augment; 1-2x E5-100.
- AFC 120 Clear & Fill; 1-3x E5-100.
- AFC 240 Clear & Fill; 1-6x E5-100.
- MNLC 320 Local AC Power Augment.
- MNLC 420 Local AC Power Augment.
- MNLC 310 Remote/Line DC Power Augment.
- MNLC 410 Remote/Line DC Power Augment.
- MNLC 810 Local AC Power Augment.

These retrofit kits include the following features and options:

- Mounting of Calix E5-100 equipment
- Protection for overlay and converged broadband ports installed
- Cabling to connect to existing power supplies or options to upgrade cabinet power systems
- Upgraded heat exchanger or roof fan for additional cooling (as needed)
- Upgraded power system or rectifier (as needed)

INDIVIDUAL KIT COMPONENTS

All E-series equipment includes power cables, ground cable, 19" and 23" install brackets out of the box, so that shelves are easy to install and turn up regardless of where. Below are the detailed lists of complementary components shipped with E-Series equipment:

E7-2 Field Install Kit for CO & RT (19" and 23" mounting brackets, power and ground cables, etc)	
Qty	Item Description
2	Rack Mount Ears, 19 inch (ROHS)
2	Rack Mount Ears, 23 inch (ROHS)
1	Cable Assembly, E7 Ground [ROHS]
1	Cable Assembly, E7 Power
1	Bag, Open top Pink Anti-Static , 6 x 8 x .004 thk
1	Lug 2-hole 8 AWG Red 21 Die
4	Scr PP Thrdroll taptite Sq cone 12-24x.625lg SS Passivated
8	Screw, Machine, Phil, 18-8 SS FLT HD, 4-40, 3/16 Long, ROHS
2	Nut, KEPS, #10-32, SS, 11NK188
2	Washer Ext. tooth #10 SS Passivated
E5-110/E5-120/E5-121 Field Install Kit for CO & RT (19" and 23" mounting brackets, power and ground cables, etc)	
Qty	Item Description
1	Fan Filter, ROHS
2	Bracket, E5-110/E5-111, 19" L-BRACKET, ROHS
2	Bracket, E5-110/E5-111, 23" L-BRACKET, ROHS
1	CABLE, RS-232, DB9(F)->RJ 11(4P4C), 185cm, ROHS
1	Ground Cable, 12 FT FOR E5-100

1	Power Cables,WIRE 14AWG 41/0.254MM, ROHS STRANDED TINNED BLK/RED L=12FEET LABLE 1.0*2.44IN WHITE SHRINK TABING 0.375*0.187IN ID BLACK,LANTERRA
1	INSTALLATION GUIDE MANUAL, E5-110 DC/E5-110 AC/E5-111/E5-120/E5-121

E5-111 Field Install Kit for CO & RT (19" and 23" mounting brackets, power and ground cables, etc)

Qty	Item Description
1	Fan Filter, ROHS
2	Bracket, E5-110/E5-111, 19" L-BRACKET, ROHS
2	Bracket, E5-110/E5-111, 23" L-BRACKET, ROHS
1	CABLE, RS-232, DB9(F)->RJ 11(4P4C), 185cm, ROHS
1	Ground Cable, 12 FT FOR E5-100
1	Power Cables plus Ferrite Core,WIRE 14AWG 41/0.254MM, ROHS STRANDED TINNED BLK/RED L=12FEET LABLE 1.0*2.44IN WHITE SHRINK TABING 0.375*0.187IN ID BLACK,LANTERRA
1	INSTALLATION GUIDE MANUAL, E5-110 DC/E5-110 AC/E5-111/E5-120/E5-121

The following tables list the ordering information for individual retrofit kit items.

E-Series DSL and POTS signaling cables

The following cables can be used to install E-Series equipment for copper based deployments (DSL overlay and DSL/POTS Combo) into existing cabinets. This cable connects from the equipment (DSL in and/or POTS out) to the existing or newly installed protector panels (note that Calix supplied protector panels are already equipped with this cable termination to the equipment end):

- 100-01918 - E-Series ext. Cable, CAT-5, 6', RJ-21 Male to RJ-21 Male connector

A different version of the cable listed above has been made with a female RJ-21/Champ connector on the pro-panel side. Some cabinets (AFC 120/240 are some cases known) might have *inverted* gender connectors on their pro-panels. The cable below can be used in those cases:

- 100-01921 - E-Series ext. Cable, CAT-5, 6', RJ-21 Male to RJ-21 Female connector

A different version of the cable listed above has been made with pro-panel side termination on an MS^2 connector. Some 3rd party cabinets (Next Level 310/410 are some cases known) may require this:

- 100-01649 - E5-100 Cabinet Retrofit signaling cable, RJ-21 to MS2, 3 feet, CAT-5

Longer versions of the cables listed above have been created for use inside Central Offices. Note that as with some AFC cabinets' pro-panels, some MDF blocks have been known to have *inverted* gender connectors on them, thus the option to have male or female options on one side of the equipment:

- 100-01919 - E-Series ext. Cable, CAT-5, 15', RJ-21 Male to RJ-21 Male connector
- 100-01920 - E-Series ext. Cable, CAT-5, 25', RJ-21 Male to RJ-21 Male connector
- 100-01922 - E-Series ext. Cable, CAT-5, 15', RJ-21 Male to RJ-21 Female connector
- 100-01923 - E-Series ext. Cable, CAT-5, 25', RJ-21 Male to RJ-21 Female connector

Calix always recommends the use CAT-5 cable assemblies for use in copper access deployments (ADSL2+ and VDSL2), connecting to DSL ports (DSL in from/on equipment side). Nevertheless, in the case of overlay deployment (POTS out from/on equipment side), CAT-3 cables can be purchased to reduce cost:

- 100-01585 - E5-100 Generic Retrofit Extension Cable, CAT-3, 6 feet, Male RJ21 - Male RJ21
- 100-01586 - E5-100 Generic Retrofit Extension Cable, CAT-3, 6 feet, Male RJ21 - Female RJ21

E-Series protection-panel retrofit kits

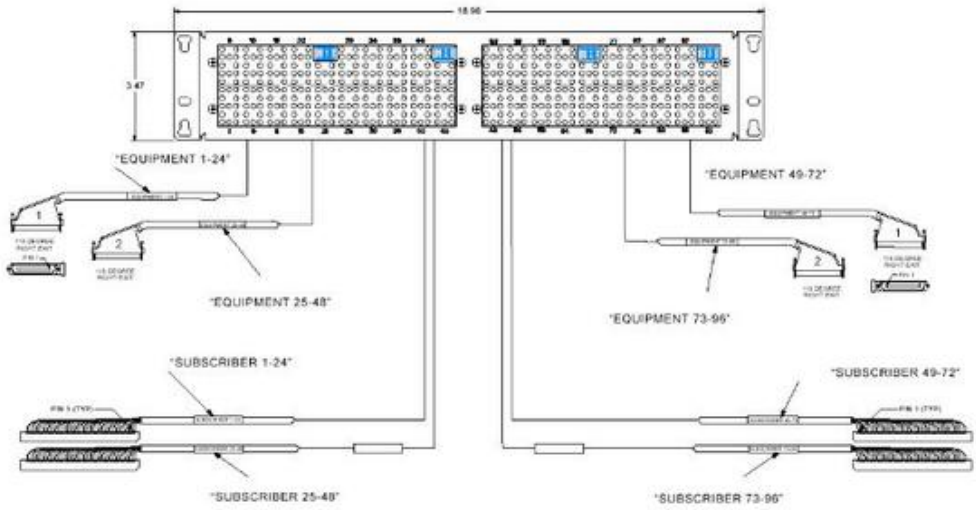
The following kits can be ordered to install E5-100 equipment into legacy Calix ODC-10/20/40/80/120 or 3rd party cabinets. These assemblies are also ideal for upgrading existing legacy cabinets to CAT-5 pro-panel cables:

Calix ODC or Third party cabinet pro-panel assemblies (Augment of E5-100 in cabinets)

PART #	PART DESCRIPTION
100-01755	100 pair pro-panel, 19 & 23" - 2RU frame, CAT-5, RJ-21 to MS2
100-01587	E5-100 Third party Cabinet Retrofit Octopus Cable, 50 Pair Pro Panel, 19 & 23" - 2RU, CAT-5

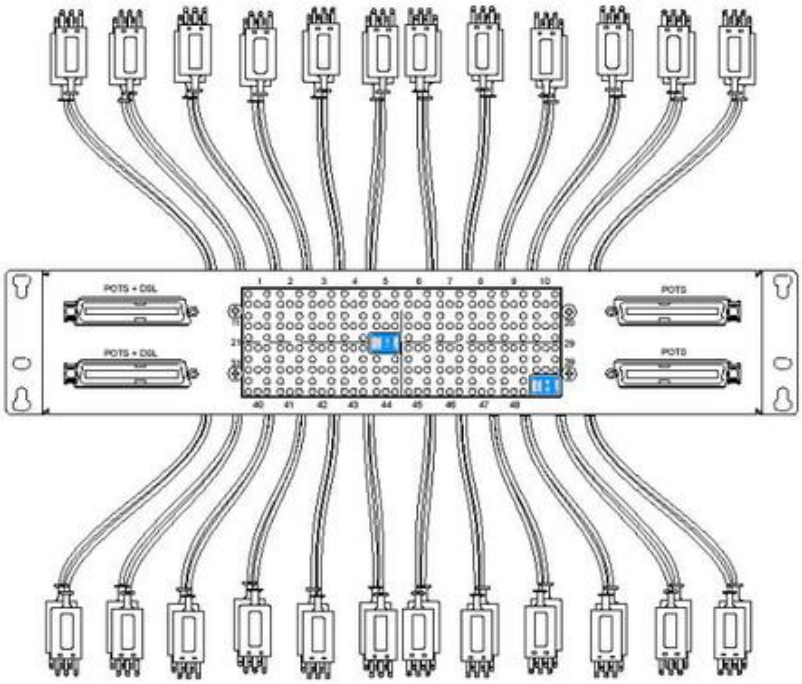
Some talk points on the 100-01755 [100 pair pro-panel, 19 & 23" - 2RU, CAT-5], as compared to its standard CAT-5 50-pair pro-panel counterpart in the ODC cabinets:

- 100-pair pro-panel offers 19" and 23" mounting options.
- Offers longer CAT-5 MS2 cable; 180" vs. 66".
- Offers longer CAT-5 RJ-21 cable; 72" vs. 66".
- Sheet metal has quite more work on the 100-pair pro-panel in order to support proper routing of all cabling assemblies



100-01755 - 100 pair pro-panel, 19 & 23" - 2RU, CAT-5

The Octopus cable's purpose is to terminate the E5-100's subscriber Telco (24 pairs), but be able to turn up one subscriber at a time in the retrofitted cabinet. As with the case of the 100-pair pro-panel assembly, 100-01587 encompasses a 100-pair pro-panel assembly (2x 50 pair Pro-panel) and offers 19" and 23" 2RU rack installation, and 10ft CAT-5 subscriber cabling terminated in *dummy* protector modules. The application of this Octopus cable assembly if primarily to overlay ADSL2+/VDSL2 on a subscriber POTS line, one subscriber at a time. The Octopus cable assembly also allows overlaying ADSL2+/VDSL2 on subscribers without needing to augment all 24 subscribers of a system or line card all at once.



100-01587 - E5-100 Octopus Cbl assembly, 50 Pair pro-panel, 19 & 23" - 2RU, CAT5

Mechanical drawings and Pin Assignment List 100-pair Pro-Panel and Octopus cable concepts are available from the Calix Customers documentation portal.

E-Series Generic Retrofit Kits; cooling, power, and alarm cable upgrade kits

The following generic retrofit kits are available to upgrade existing cabinets' power system, thermal dissipation system, or re-terminate cabinets' environmental alarms (open door, AC Fail, etc) onto a newly installed E-Series product:

- 100-01837 - Retrofit Door Mount Heat Exchanger Kit (1600W)

  The intention of this kit is to make it easy for a service provider to re-use and existing cabinet for all new equipment, and augment the heat dissipation of the cabinet.

  The kit includes a door-mounted, 1,600W capacity heat exchanger unit and the necessary hardware, cables and instructions to mounted into an existing metal door (a drill template is supplied).

  Note: Ensure the cabinet door that will host the door-mounted heat exchanger can accommodate an assembly size of 18.1" wide by 36.1" high, with a maximum protrusion of 8.8" from the surface of the door.

For detailed information please refer to "Calix Door-Mounted Heat Exchanger Installation Guide" (document #220-00357).

- 100-01987 - Retrofit 48Vdc Power Upgrade Kit (1+1 30A)

  The intention of this kit is to make it easy for a service provider to re-use and existing cabinet for all new equipment, as well as upgrade the cabinets power system (rectifier) for a state of the art model.

  The kit provides:

  - An Eltek-Valere J-Series 1RU rectifier shelf (same as that used in the ODC-100 cabinet),
  - 19" and 23" mounting bracket adapters for the rectifier shelf and mounting hardware
  - Power & ground cables for the rectifier shelf
  - Rectifier controller
  - 10-position GMT fused based DC distribution,
  - Two (redundant) 30Amp rectifier modules,
  - One 50Amp breaker and assorted GMT fuses; 1x 1Amp, 3x 3Amp, 1x 5Amp, and 3x 7.5Amp

- 100-02281 - Generic Retrofit Alarm Cable Kit; 7 inputs, mediating block, adapter connectors: E5-100, E5-400, E7

  The intention of this kit is to make it easy for a service provider to re-use and existing cabinet for all new equipment, and aggregate the cabinet's alarm onto the new equipment.

  The kit provides a cable harness that attached to the points of test for alarms in the cabinet (open door sensor, heat sensor, rectifier contact outputs, etc.), two terminal blocks that allow mediation points, and alarm adapter cables to go from the terminal blocks to either of E-Series products.

  Up 8 alarms inputs can be terminated on the blocks, 7 of which are expected; rectifier major, rectifier minor, AC fail, battery fail, heat exchanger fail, auxiliary fans fail, and door alarm.

- DSL and POTS signaling cables:
  - 100-01918 - E-Series ext. Cable, CAT-5, 6', RJ-21 Male to RJ-21 Male connector
  - 100-01921 - E-Series ext. Cable, CAT-5, 6', RJ-21 Male to RJ-21 Female connector
  - 100-01649 - E5-100 Cabinet Retrofit signaling cable, RJ-21 to MS2, 3 feet, CAT-5
  - 100-01585 - E5-100 Generic Retrofit Extension Cable, CAT-3, 6 feet, Male RJ21 - Male RJ21
  - 100-01586 - E5-100 Generic Retrofit Extension Cable, CAT-3, 6 feet, Male RJ21 - Female RJ21

E-Series kits for Calix Legacy ODC cabinets

The following kits can be ordered to install one E5-100 system inside legacy Calix ODC-10/20/40/80/120 cabinets:

- 100-01674 - E5-100 Augment kit for ODC-10 cabinet: cables & mounting HW for Qty. 1 E5-1xx
- 100-01675 - E5-100 Augment kit for ODC cabinets (excluding ODC-10): cables & mounting HW for Qty. 1 E5-1xx

For more information please refer to document *"Calix E5-100 Retrofit Kit Installation Guide"* (document #220-00286).

The following kits can be ordered to install one E7-2/E5-300/E5-400 system inside legacy Calix ODC-10/20/40/80/120 cabinets:

- 100-01700 - E7-2/E5-300/E5-400 Retrofit kit for ODC-20/40/80/120 Cabinets (Pwr cable, fuses)
- 100-01701 - E7-2/E5-300/400 Retrofit kit for ODC-10 (Door Mnt Bkt, Pwr Cable, fuses)

For more information please refer to document *"Calix E7-2 and E5-400 Retrofit Kit Installation Guide"* (document #220-00287).

E-Series kits for AFC cabinets

The following kits can be ordered to install E5-100 equipment into AFC cabinets:

- **Augmenting** the capacity of the cabinet with E5-100 services; in this case it is assumed that some of all of the existing equipment for the cabinet is staying within the cabinet. This provides space, power and heat dissipation capacity to add one or two E5-100 units, to augment the existing broadband service delivery

AFC 120 / 240 Retrofit Kits (1-2x E5-100 Augment)

PART #	PART DESCRIPTION
100-01272	E5-100 AFC 120 Retro Kit (Mounting, Protection, Cabling)
100-01274	E5-100 AFC 240 Retro Kit (Mounting, Protection, Cabling, Fiber Routing)
100-01277	E5-100 AFC 120 / 240 Power Kit (Power, ALM, Ground, Term Block, Fan Control)
100-01280	E5-100 AFC 120 / 240 Roof Fan Kit w/o CC
100-01281	E5-100 AFC 120 / 240 Roof Fan Kit w/ CC

- **Clear-and-Fill** applications provide the ability to remove entirely the existing legacy equipment, and add the new generation of converged voice, video and data service delivery E5s.

AFC 120 (1-3x E5-100 Clear & Fill) **/ 240 Retrofit Kits** (1-6x E5-100 Clear & Fill)

PART #	PART DESCRIPTION
100-01583	E5-100 AFC 240 Clear and Fill Retrofit Kit (DC Distrib., 3x E5-100 cables, misc. cables)
100-01584	E5-100 AFC 120 Clear and Fill Retrofit Kit (DC Distrib., 3x E5-100 cables, misc. cables)

Valere rectifier modules need to be ordered in addition to the Valere rectifier shelves included in E5-100 AFC & MNLC power upgrade retrofit kits (see table below):

RETROFIT KIT	PART #	KIT DESCRIPTION	ADDITIONAL RECTIFIER MODULES REQ.
AFC-120	100-01277	AFC 120/240 Valere Power Kit, Calix E5-100	2x 20 Amp (1:1 protection)
AFC-240	100-01277	AFC 120/240 Valere Power Kit, Calix E5-100	2x 25 Amp (1:1 protection)
RT-320	100-01278	MNLC RT-320 Valere Power Kit, Calix E5-100	3x 20 Amp (2:1 protection)
RT-420	100-01445	MNLC RT-420 Valere Power Kit, Calix E5-100	3x 20 Amp (2:1 protection)
RT-810	100-01473	MNLC RT-810 Valere Power Kit, Calix E5-100	3x 25 Amp (2:1 protection) if wired for 110VAC (*)
RT-810	100-01473	MNLC RT-810 Valere Power Kit, Calix E5-100	3x 40 Amp (2:1 protection) if wired for 220VAC (**)

(*) Note: This limits the cabinet to about 25% ADSL maximum
(**) Note: This supports a 100% ADSL load

Available Valere rectifier modules:

PART #	PART NAME	PART DESCRIPTION
100-00593	Valere Rectifier Mdl-20A	Valere Rectifier Module- 20 AMP
100-01537	Valere Rectifier Mdl-25A	Valere Rectifier Module- 25 AMP
100-01032	Valere Rectifier Mdl-30A	Valere Rectifier Module - 30AMP
100-01536	Valere Rectifier Mdl-40A	Valere Rectifier Module- 40 AMP

AFC 120 / 240 Documentation

The following AFC cabinet retrofit kit documentation is available on the Calix resource center:

AFC 120 / 240 DOCUMENTATION
E5-100 AFC 120-240 cabinet retrofit Extension Cable Schematic.pdf
E5-100 AFC 120-240 cabinet retrofit Extension Cable Pair Assignment List.pdf
E5-100 AFC 120 cabinet retrofit Mounting Kit Spec Sheet.pdf

E5-100 AFC 120 cabinet retrofit Mounitng Kit Schematic.pdf
E5-100 AFC 120 cabinet retrofit Mounting Kit Installation Guide.pdf
E5-100 AFC 240 cabinet retrofit Mounting Kit Spec Sheet.pdf
E5-100 AFC 240 cabinet retrofit Mounitng Kit Schematic.pdf
E5-100 AFC 240 cabinet retrofit Mounting Kit Installation Guide.pdf
E5-100 AFC 120-240 cabinet retrofit Extension Cable Spec Sheet.pdf
E5-100 AFC 120-240 cabinet retrofit Valere Rectifier Kit Spec Sheet.pdf
E5-100 AFC 120-240 cabinet retrofit Valere Rectifier Kit Schematic.pdf
E5-100 AFC 120-240 cabinet retrofit Valere Rectifier Kit Installation Guide.pdf
E5-100 AFC 120-240 cabinet retrofit Roof Fan Kit Spec Sheet.pdf
E5-100 AFC 120-240 cabinet retrofit Roof Fan Kit Schematic.pdf
E5-100 AFC 120-240 cabinet retrofit Roof Fan Kit Installation Guide.pdf
E5-100 AFC 120-240 cabinet retrofit Heat Exchanger Kit Spec Sheet.pdf

E-Series kits for Motorola NLC cabinets

The following table lists the ordering information for individual retrofit kit items and packages available for the Motorola / Next Level Communications (MNLC) cabinets:

- Augmenting the capacity of the cabinet with E5-100 services; in this case it is assumed that some of all of the existing equipment for the cabinet is staying within the cabinet. This provides space, power and heat dissipation capacity to add one or two E5-100 units, to augment the existing broadband service delivery

Local AC powered MNLC 320 / 420 / 810 Retrofit Kits (Each line item represents a complete / separate cabinet retrofit package)

PART #	PART DESCRIPTION
100-01275	E5-100 MNLC 320 Mounting Retro Kit: power, alarm, and ground cables; extension cable; terminal block kit; dc distribution
100-01278	E5-100 MNLC 320 Power Kit (Rectifier, Pwr/Ground Cables)
100-01282 (*)	E5-100 Generic Heat Exch Kit, Cabinet retrofit
100-01444	E5-100 MNLC 420 Mounting Retro Kit: extension cable; environmental alarm cable; terminal block kit; dc distribution
100-01445	E5-100 MNLC 420 Power Kit (Rectifier, Pwr/Ground Cables)
100-01465	E5-100 MNLC RT-420 Cabinet Heat Exch Kit
100-01472	E5-100 MNLC 810 Mounting Retro Kit: power, alarm, and ground cables; extension cable; terminal block kit; dc distribution
100-01473	E5-100 MNLC 810 Power Kit (Rectifier, Pwr/Ground Cables)
100-01466	E5-100 MNLC RT-810 Cabinet Heat Exch Kit

(*) Note : In order to retrofit MNLC 310 cabinets, a generic heat exchanger (part # 100-01282) unit is mounted onto the existing cabinet's door.

Valere rectifier modules need to be ordered in addition to the Valere rectifier shelves included in E5-100 AFC & MNLC power upgrade retrofit kits (see table below):

RETROFIT KIT	PART #	KIT DESCRIPTION	ADDITIONAL RECTIFIER MODULES REQ.
AFC-120	100-01277	AFC 120/240 Valere Power Kit, Calix E5-100	2x 20 Amp (1:1 protection)
AFC-240	100-01277	AFC 120/240 Valere Power Kit, Calix E5-100	2x 25 Amp (1:1 protection)
RT-320	100-01278	MNLC RT-320 Valere Power Kit, Calix E5-100	3x 20 Amp (2:1 protection)
RT-420	100-01445	MNLC RT-420 Valere Power Kit, Calix E5-100	3x 20 Amp (2:1 protection)
RT-810	100-01473	MNLC RT-810 Valere Power Kit, Calix E5-100	3x 25 Amp (2:1 protection) if wired for 110VAC (*)
RT-810	100-01473	MNLC RT-810 Valere Power Kit, Calix E5-100	3x 40 Amp (2:1 protection) if wired for 220VAC (**)

(*) Note: This limits the cabinet to about 25% ADSL maximum
(**) Note: This supports a 100% ADSL load

Available Valere rectifier modules:

PART #	PART NAME	PART DESCRIPTION
100-00593	Valere Rectifier Mdl-20A	Valere Rectifier Module- 20 AMP
100-01537	Valere Rectifier Mdl-25A	Valere Rectifier Module- 25 AMP
100-01032	Valere Rectifier Mdl-30A	Valere Rectifier Module - 30AMP
100-01536	Valere Rectifier Mdl-40A	Valere Rectifier Module- 40 AMP

Remote/Line DC powered MNLC 310 / 410 Retrofit Kits:

PART #	PART DESCRIPTION
100-01649	E5-100 MNLC Cabinet Retrofit Kit, signaling cable (RJ-21 to MS2) CAT-5
100-01648	E5-100 MNLC Cabinet Retrofit Kit, Remote Power Converter & Distribution Shelf 19"

Note about the MNLC 310/410 Remote Powered Cabinets Retrofit Kit:

Remote/Line DC powered MNLC 310 / 410 Retrofit Kits (Each line item represents a complete, separate retrofit package)

PART #	PART DESCRIPTION
120-00157	Cable assembly, Lineage CPS2500D to MNLC Remote Pwr Pairs

These MNLC Network or Remote Powered cabinets are equipped with Argus Technologies remote power cards, which directly feed DC voltage onto the MNLC USAM shelves. They are fed from COs by Argus Upstream remote power systems. These systems are based on older -135Vdc technology.

Comparatively a +/-190Vdc system is superior to a -135Vdc one in that

- It as lower operating currents for safety, though both comply with UL60950-21.
- Provides more stable networks as power and distance increases.
- Will provide up to 7x the distances achieved by -135Vdc network powering, due to losses achieved with +/-190Vdc.
- Ensures future viability due to obsolescence of -135Vdc network powering systems.

Argus has since gone to +/-190Vdc systems, very similar to the Lineage Power system we use for ODC-100 and ODC-1000E cabinet remote power solutions: CPS3200U (Upstream) in CO & CPS2500D (Downstream) in RT.

The retrofit kit for the MNLC cabinets uses the Lineage CPS2500D remote power downstream shelf. The Service Provider may device not to upgrade their COs' remote power upstream systems, and stayed with the Argus -135Vdc solution. It is recommended that customers looking to upgrade remotely powered networks would upgrade their Upstream power source together with the RTs and cabinets, but it is not mandatory requirement. Lineage Power provided us with a remote power calculator to engineer these cases.

Customers need to be aware that mixing a -135Vdc Upstream power source with +/-190Vdc Downstream power shelves may cause deployment limitations depending on the copper loop gauge and distances.

MNLC 320 / 420 & 810 Documentation

The following AFC cabinet retrofit kit documentation is available on the Calix resource center:

AFC 120 / 240 DOCUMENTATION
E5-100 NLC 320 cabinet retrofit Mounting Kit Spec Sheet.pdf
E5-100 NLC 320 cabinet retrofit Mounting Kit Schematic.pdf
E5-100 NLC 320 cabinet retrofit Mounting Kit Installation Guide.pdf
E5-100 NLC 420 cabinet retrofit Mounting Kit Spec Sheet.pdf
E5-100 NLC 420 cabinet retrofit Mounting Kit Schematic.pdf
E5-100 NLC 420 cabinet retrofit Mounting Kit Installation Guide.pdf
E5-100 NLC 320-420-820 cabinet retrofit Extension Cable Spec Sheet.pdf
E5-100 NLC 320-420-820 cabinet retrofit Extension Cable Schematic.pdf
E5-100 NLC 320 cabinet retrofit Valere Rectifier Kit Spec Sheet.pdf
E5-100 NLC 320 cabinet retrofit Valere Rectifier Kit Schematic.pdf
E5-100 NLC 320 cabinet retrofit Valere Rectifier Kit Installation Guide.pdf
E5-100 NLC 420 cabinet retrofit Valere Rectifier Kit Spec Sheet.pdf
E5-100 NLC 420 cabinet retrofit Valere Rectifier Kit Schematic.pdf
E5-100 NLC 420 cabinet retrofit Valere Rectifier Kit Installation Guide.pdf

KEY TO RECOMMENDING RETROFIT KITS

For a full assessment of the requirements for retrofitting E-Series equipment into a third party cabinet, please obtain a copy of the Calix document *"Calix E-Series Generic Cabinet Retrofit Inspection Checklist"* (document # 990-00290). This checklist contains all the information required to assess the feasibility of the retrofit, it also requests all the information of interest needed when inspecting a cabinet for a potential Calix E-Series retrofit project.

Equipment Installation Kits

All E-series equipment includes power cables, ground cable, 19" and 23" install brackets out of the box, so that shelves are easy to install and turn up regardless of where. Below are the detailed lists of complementary components shipped with E-Series equipment:

E7-2 Field Install Kit for CO & RT (19" and 23" mounting brackets, power and ground cables, etc)	
Qty	Item Description
2	Rack Mount Ears, 19 inch (ROHS)
2	Rack Mount Ears, 23 inch (ROHS)
1	Cable Assembly, E7 Ground [ROHS]
1	Cable Assembly, E7 Power
1	Bag, Open top Pink Anti-Static , 6 x 8 x .004 thk
1	Lug 2-hole 8 AWG Red 21 Die
4	Scr PP Thrdroll taptite Sq cone 12-24x.625lg SS Passivated
8	Screw, Machine, Phil, 18-8 SS FLT HD, 4-40, 3/16 Long, ROHS
2	Nut, KEPS, #10-32, SS, 11NK188
2	Washer Ext. tooth #10 SS Passivated
E5-110/E5-120/E5-121 Field Install Kit for CO & RT (19" and 23" mounting brackets, power and ground cables, etc)	
Qty	Item Description
1	Fan Filter, ROHS
2	Bracket, E5-110/E5-111, 19" L-BRACKET, ROHS
2	Bracket, E5-110/E5-111, 23" L-BRACKET, ROHS
1	CABLE, RS-232, DB9(F)->RJ 11(4P4C), 185cm, ROHS
1	Ground Cable, 12 FT FOR E5-100
1	Power Cables,WIRE 14AWG 41/0.254MM, ROHS STRANDED TINNED BLK/RED L=12FEET LABLE 1.0*2.44IN WHITE SHRINK TABING 0.375*0.187IN ID BLACK,LANTERRA
1	INSTALLATION GUIDE MANUAL, E5-110 DC/E5-110 AC/E5-111/E5-120/E5-121

E5-111 Field Install Kit for CO & RT (19" and 23" mounting brackets, power and ground cables, etc)	
Qty	Item Description
1	Fan Filter, ROHS
2	Bracket, E5-110/E5-111, 19" L-BRACKET, ROHS
2	Bracket, E5-110/E5-111, 23" L-BRACKET, ROHS
1	CABLE, RS-232, DB9(F)->RJ 11(4P4C), 185cm, ROHS
1	Ground Cable, 12 FT FOR E5-100
1	Power Cables plus Ferrite Core,WIRE 14AWG 41/0.254MM, ROHS STRANDED TINNED BLK/RED L=12FEET LABLE 1.0*2.44IN WHITE SHRINK TABING 0.375*0.187IN ID BLACK,LANTERRA
1	INSTALLATION GUIDE MANUAL, E5-110 DC/E5-110 AC/E5-111/E5-120/E5-121

When installing E5-100 equipment in 3rd party cabinets, always order the appropriate install kit to go with the cabinet, if available:

- 100-01272 - E5-100 AFC 120 Retro Kit (Mounting, Protection, Cabling)
- 100-01274 - E5-100 AFC 240 Retro Kit (Mounting, Protection, Cabling, Fiber Routing)
- 100-01583 - E5-100 AFC 240 Clear and Fill Retrofit Kit (DC Distrib., 3x E5-100 cables, misc. cables)
- 100-01584 - E5-100 AFC 120 Clear and Fill Retrofit Kit (DC Distrib., 3x E5-100 cables, misc. cables)
- 100-01275 - E5-100 MNLC 320 Mounting Retro Kit: power, alarm, and ground cables; extension cable; terminal block kit; dc distribution
- 100-01444 - E5-100 MNLC 420 Mounting Retro Kit: extension cable; environmental alarm cable; terminal block kit; dc distribution
- 100-01472 - E5-100 MNLC 810 Mounting Retro Kit: power, alarm, and ground cables; extension cable; terminal block kit; dc distribution

Always include signaling cables as part of the retrofit of the legacy cables, in order to add the new DSL equipment.

Cooling Upgrade Kits

Whenever two or more E-Series shelves are being installed in a 3rd party cabinet, either as part of and Augment or Clear-and-Fill retrofit, always consider upgrading the cooling capacity of the cabinet (either via a roof-fan upgrade or heat exchanger kit installation). You may choose for this purpose a generic heat exchanger upgrade kit or a cabinet specific kit, if available:

- 100-01837 - Retrofit Door Mount Heat Exchanger Kit (1600W) (* Generic kit)
- 100-01280 - E5-100 AFC 120 / 240 Roof Fan Kit w/o CC

- 100-01281 - E5-100 AFC 120 / 240 Roof Fan Kit w/ CC
- 100-01282 - E5-100 Generic Heat Exch Kit, Cabinet retrofit
- 100-01465 - E5-100 MNLC RT-420 Cabinet Heat Exch Kit
- 100-01466 - E5-100 MNLC RT-810 Cabinet Heat Exch Kit

Power Upgrade Kits

Upgrading the legacy power system or rectifier existing in the cabinet is always a good idea, but not always a necessity. You may use for a generic heat exchanger upgrade kit or a cabinet specific kit, if available:

- 100-01987 - Retrofit 48Vdc Power Upgrade Kit (1+1 30A)
- 100-01277 - E5-100 AFC 120 / 240 Power Kit (Power, ALM, Ground, Term Block, Fan Control)
- 100-01278 - MNLC RT-320 Valere Power Kit, Calix E5-100
- 100-01445 - MNLC RT-420 Valere Power Kit, Calix E5-100
- 100-01473 - MNLC RT-810 Valere Power Kit, Calix E5-100

Cabling kits

Always procure signaling cables when retrofitting new DSL equipment inside a legacy cabinet:

- 100-01918 - E-Series ext. Cable, CAT-5, 6', RJ-21 Male to RJ-21 Male connector
- 100-01921 - E-Series ext. Cable, CAT-5, 6', RJ-21 Male to RJ-21 Female connector
- 100-01649 - E5-100 Cabinet Retrofit signaling cable, RJ-21 to MS2, 3 feet, CAT-5
- 100-01585 - E5-100 Generic Retrofit Extension Cable, CAT-3, 6 feet, Male RJ21 - Male RJ21
- 100-01586 - E5-100 Generic Retrofit Extension Cable, CAT-3, 6 feet, Male RJ21 - Female RJ21

Pro-panel assemblies are also ideal for upgrading existing legacy cabinets to CAT-5 pro-panel cables:

- 100-01755 - 100 pair pro-panel, 19 & 23" - 2RU frame, CAT-5, RJ-21 to MS2
- 100-01587 - E5-100 Third party Cabinet Retrofit Octopus Cable, 50 Pair Pro Panel, 19 & 23" - 2RU, CAT-5

POWERING OPTIONS FOR E-SERIES PRODUCTS

INDOOR POWER SYSTEMS

In order to simplify the process, Calix has made two separate solutions available:

Part #	Part Name	Part Description	Package / Qty.	Package / Qty.
			Pkg. #: 000-00239 E-Series MDU Power System, 1x E5/E7, No Rectifier Redund	Pkg. #: 000-00240 E-Series MDU Power System, 2x E5/E7, No Rectifier Redund
100-01560	E-Series MDU Power System / E-Series MDU Rectifier & Distribution Enclosure	Power shelf including control unit, DC distribution and rectifier module chassis. Wall or rack mountable enclosure. Allows for one non-redundant rectifier module, or two 1:1 redundant rectifier modules.	1	1
100-01561	E-Series MDU Battery System (7 or 12 Ah) / E-Series MDU 7Ah or 12 Ah Battery Enclosure	Wall or rack mountable battery enclosure for 7Ah or 12 Ah battery strings (includes battery cabling). Up to five 7Ah and/or 12Ah battery strings can be daisy chained for more Ah battery backup, each string housed in its own separate enclosure.	2	0
100-01564	E-Series MDU Rectifier Module 7A	7 Amp rectifier module for up to 2x E5-1x1, 3x E5-121/E5-110 or E5-400, 4x E5-120,	1	1
100-01562	E-Series MDU Battery System (40 Ah) / E-Series MDU 40 Ah Battery Enclosure	Wall or rack mountable battery enclosure for 40 Ah battery strings (includes battery cabling). The 40Ah battery strings cannot be daisy chained for more Ah battery backup.	0	1
100-01568	E-Series MDU Power System AC cable, Non-locking	AC line cord, 10 ft. long, 14 AWG gauge conductor, non-locking retention, std NEMA 515P AC plug type.	1	1
100-01570	E-Series MDU Cabling Kit	E5-100 cables: power, ground and alarm	1	2

Note 1: The 000- packages are for non-redundant rectifier systems. If redundancy is required please add 1x 100-01564 to 000-00239 or 000-00240.

Note 2: Fuses are not included with these systems' packages. E-Series equipment must be fused using GMT fuses for the following values;

- E5-110 – 2.5A maximum (90 Watts maximum)
- E5-111 – 5A maximum (180 Watts maximum)
- E5-120 – 2A maximum (75 Watts maximum)
- E5-121 – 3A maximum (110 Watts maximum)
- E5-400 – 5A maximum (180 Watts maximum)
- E7-2 – 7.5A maximum (220 Watts maximum)

Note 3: Battery strings must be ordered separately:

Part #	Part Name	Part Description	000-00239	000-00240
			24 Ah battery capacity	40 Ah battery capacity
100-01566	E-Series MDU Battery String (12 Ah)	12 Ah Battery String	2	0
100-01246	E-Series MDU Battery String (40 Ah)	40 Ah Battery String	0	1

E-Series MDU Power Systems: 000-00239 Eltek-Valere LPS with 12Ah Battery Compartment (left), and 000-00240 Eltek-Valere LPS with 40Ah Battery Compartment (right)

The E5-100 and E3 systems ship with one pair of power cables, if an additional set of cables is required, they can be obtained using the following part numbers:

- 100-01523 - E5-110/120/121 Power & Ground Cables, fuse & Mnting Hardware
- 100-01988 - E5-111 Power & Ground Cables, fuse & Mnting Hardware

In locations where a larger amount of equipment will be installed, the following DC distribution and GMT fuse panel can be used:

- 100-02235 - ODC-2000E/3000E DC Distribution - 10+10 (A+B) GMT fuses, 1RU, 19/23"

Detailed documentation for these DC power systems and DC distribution and fuse panel can be found on the Calix Customer documentation portal, under:

OEM Product Information

E-Series Accessory Documentation

DC Distribution / Fuse Panels	
DC Distribution & 10+10 GMT fusel panel (Data Sheet)	PDF
UPS power solutions	
Alpha 150W Multipurpose Power Supply (Spec Sheet & Use Practice)	PDF
Pulsecom 300W DC Power Node/30 (Spec Sheet & Use Practice)	PDF
MDU power solutions	
Valere Low Power (LP) DC Power System (Data Sheet)	PDF
Valere Low Power (LP) DC Power System (Spec Sheet)	PDF
Valere Low Power (LP) DC Power System (Installation & Operation Manual)	PDF
Valere LPB040 (40Ah) Battery Box (Installation Manual)	PDF

OUTDOOR POWER SYSTEMS

Find below part number information for -48Vdc Outside Plant UPS systems supporting E3 Series products. These systems are composed of:

- 110VAC to -48Vdc power rectifier.
- Four position, A+B redundant, GMT fuse based DC distribution module.
- Alarm relay outputs and cables.
- Single battery string.
- Outdoor rated, GR-487 enclosure with pole mount support.

E3-12C / -48Vdc, local power option:

- Input: −48 Vdc
- Power dissipation: 66.72 Watts at 1.39 Amps (max./peak of 75W)

The 300W UPS below will support up to 4x (four) E3-12Cs;

40Ah battery string: 40Ah/(300w/48v) = 6.4 hours back-up time at E3-12C max.

Calix Part #	Qty.	Description
000-00443		E-Series Outdoor UPS 300W, rectifier, DC distrib., alarm relay & cables and 40Ah battery string
100-02212	1	E-Series OSP UPS 300W; 120V-48Vdc rectif., 4x Fuse & A+B DC Dist., encl. w/ batt. heater, alarm rel.
100-01246	1	ODC-100 40AH Battery Systems Battery String
100-02238	1	E-Series Outdoor UPS 300W, Pole Mounting Stabilizer
100-02223	1	E-Series to 300W UPS Alarm Cabling Kit; Alarms from Pulsecom UPS to any E-Series product

The 150W UPS below will support up to 2x (two) E3-12Cs;

With one 8Ah battery string: 8Ah/(75w/48v) = 5 hours back-up capacity at E3-12C max.

Calix Part #	Qty.	Description
000-00448		E-Series Outdoor UPS 150W, alarm cable assembly and 28Ah Battery string
100-02226	1	Outdoor UPS 150W, Alarm Relay Extension, 4 Outputs
100-02224	1	Outdoor UPS 150W, -48Vdc rectifier & enclosure
100-01565	1	E-Series MDU Battery String (-48Vdc, 8Ah)
100-02096	1	E-Series to UPS Alarm Cabling Kit (Alarms from UPS to any E-Series product)

An extra battery string may be purchased and installed within the chassis of the UPS, doubling the back-up time.

E-Series Outdoor UPS 150W with cover removed and two 7.2Ah battery strings

The E5-100 and E3 systems ship with one pair of power cables, if an additional set of cables is required, they can be obtained using the following part numbers:

- 100-01523 - E5-110/120/121 Power & Ground Cables, fuse & Mnting Hardware
- 100-01988 - E5-111 Power & Ground Cables, fuse & Mnting Hardware

Detailed documentation for these systems can be found on the Calix Customer documentation portal, under:

OEM Product Information

E-Series Accessory Documentation

UPS power solutions

Alpha 150W Multipurpose Power Supply (Spec Sheet & Use Practice)	PDF
Pulsecom 300W DC Power Node/30 (Spec Sheet & Use Practice)	PDF

MDU power solutions

Valere Low Power (LP) DC Power System (Data Sheet)	PDF
Valere Low Power (LP) DC Power System (Spec Sheet)	PDF
Valere Low Power (LP) DC Power System (Installation & Operation Manual)	PDF
Valere LPB040 (40Ah) Battery Box (Installation Manual)	PDF

Calix

PETALUMA HEADQUARTERS
1035 N. McDowell Blvd.
Petaluma, CA 94954
Phone: 707.766.3000

INFORMATION
Web: www.calix.com
Email: info@calix.com

TECHNICAL SUPPORT
Email: tech.support@calix.com
Phone: 877.766.3500

ORDER MANAGEMENT
Email: order.management@calix.com
Phone: 877.766.3500
FAX: 707.283.3771