CORNING

C-RAN Solutions Guide

Centralized Radio Access Network

APPLICATIONS

Centralized radio access network (C-RAN) architecture is a relatively new network that takes advantage of advances in fiber optic, wireless, and communication IT systems to make it possible for a centralized location to support thousands of network access points in the form of 4G and 5G antennas.

Carriers are building out fiber-dense networks and are leveraging existing assets to create the infrastructure for implementing the C-RAN architecture. C-RAN electronics and fiber optic hardware will occupy a wide variety of spaces, some of which are smaller than a one-car garage. Space constraint is not an issue with the ultra-high-connector density of the Corning Centrix™ system. The marriage between Centrix and the C-RAN architecture will enable carriers to offer a powerful multiservice network with wholesale, residential, business, and wireless service offerings at Gigabit speeds.

CONTENTS:

Choosing Stubbed Hardware vs. Field Splice Options

An initial product decision will involve either stubbed hardware or field splice deployment options. The following pages will highlight recommendations for each type of installation.

432 Stubbed Centrix™ Housing

Centrix Splicing Cassette (36 LC UPC Adapters)

Stubbed Housings

You don't need to commit all of your capital on day one. Factory-stubbed housings provide a scalable option which allows for cables to be easily added even after the initial installation of the unit, making it possible to defer the installation costs of splicing until time to connect these stubbed housings to the outside plant (OSP). The optical splice enclosure (OSE) is a complimentary enclosure used to hold splice trays and store unterminated fibers. Using stubbed housings also takes advantage of factory-terminated and -tested connectors, moving all craft work to the end of a cable stub, away from electronics and cross-connect frames. Splicing off-frame is easier to do in a separate location far from fiber bays and network electronics where installers will have more room.

Splice Cassettes

Direct splicing from the OSP cable is an option that does increase both field labor cost and time but does allow for cable slack flexibility. Centrix splice cassettes are ideal for on-frame splicing without loss of connector count density or special splice housing interconnections. The installer must pull the OSP fiber directly to the frame where it will be terminated 100 percent on day one since there is no furcation-leg-slack-storing provision in 19-, or 23-in racks or in Centrix frames. The OSP cable can be split among several splice housings in order to accommodate fiber counts greater than 432.

Internal Splice Point
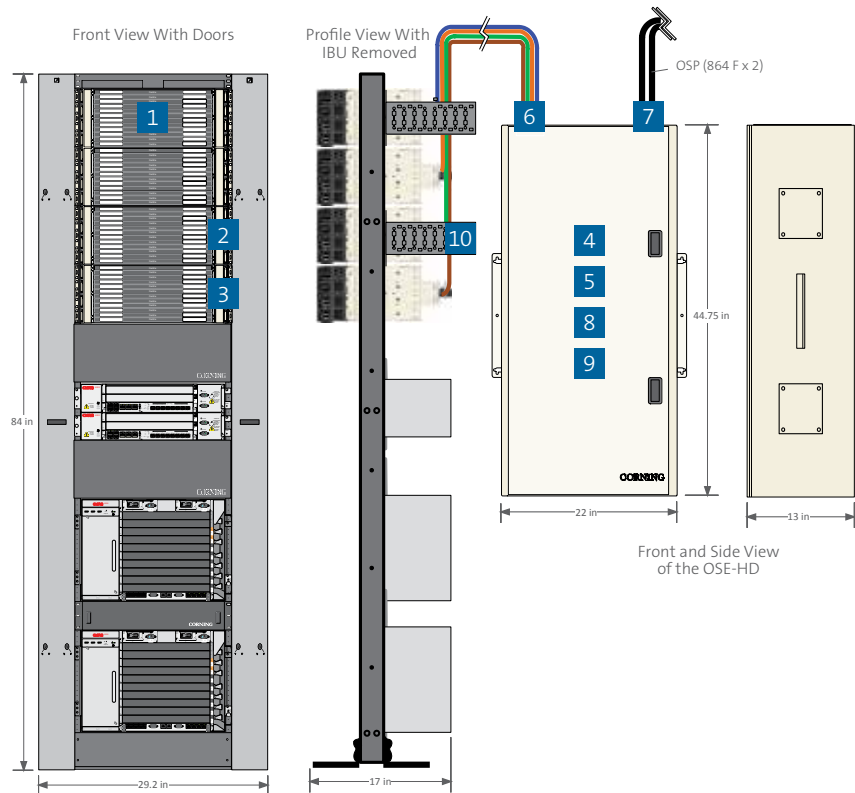
Option 1: Internal Splice Point

Centrix™ splice cassettes are the easiest and most versatile system to install and grow with demand. The OSE (Table 1, item 4) is an industry-leading indoor splice enclosure that simplifies cable termination, splicing, and fiber storage. The OSE accepts both indoor and outdoor cables through the top or bottom plate where cables are strain-relieved using cable entry kits (Table 1, items 6,7). Cables are broken out using furcation kits (Table 1, items 8, 9) and furcation legs are routed into ribbon splice trays (Table 1, item 5) where they will be spliced during the initial installation or stored for future growth. Stubbed Centrix housings (Table 1, items 1-3) come in fiber increments ranging from a one-rack unit 72-fiber housing up to a four-rack unit 432-fiber housing. Adding capacity is as simple as installing the housing, pulling the cable stub to the OSE, furcating the cable, and splicing to the OSP cable. However, this option does require interior wall space that may not be available in all sites.

Advantages

- Easy up-front installation
- Pay-as-you-grow system
- Painless addition of capacity
- Indoor splicing environment

Drawbacks

- Requires indoor wall space

Front View With Doors

Profile View With IBU Removed

OSP (864 F x 2)

Front and Side View of the OSE-HD

Option 1: Internal Splice Point

Please refer to the numbered diagram on previous page.

No.	Description/Location	Part Number	Qty.	Spec Sheet	SRP
1	432 F Stubbed Centrix™ housing, 12 cassettes, each cassette with 36 LC UPC adapters, 50 ft (16 m) stub with ALTOS® ribbon riser indoor cable, gel-free, one cable, right entry when viewed from rear, 0.93-in cable outer diameter	CX4WW1636A9-Q7001B	4	Spec Sheet	SRP
2a	Centrix Mounting Kit for stubbed 4U housing in a 19-in rack	CTX-KIT-4RU-19CLP	4	Spec Sheet	SRP
2b	Centrix Mounting Kit for stubbed 4U housing in a 23-in rack	CTX-KIT-4RU-23CLP	4	Spec Sheet	SRP
3	Centrix Cassette Kit for right-hand jumper routing (12 per pack)	CTX-KIT-RT-DH	4	Spec Sheet	SRP
4	High-Density OSE, space for 30 OSE splice trays. (4) 1-in, (15) 1.375-in, and (4) 1.9375-in entry ports per plate, stacker for OSE splice trays, with worksheet, with T-slot mounting kit, standard cable entry, no lock	OSE-HD0-WT-1	1	Spec Sheet	SRP
5	144 F Mass Fusion Heat-Shrink Splice Tray	OSE-ST-3-TQ	12	Spec Sheet	SRP
6	OSE Cable Entry Kit, 0.875-in to 1-in outer diameter, 1.375-in knockout	OSE-CBL-38	4	Spec Sheet	SRP
7	OSE Cable Entry Kit, 1-in to 1.25-in outer diameter, 1.75-in knockout	OSE-CBL-39	2	Spec Sheet	SRP
8	Furcation for gel-filled/gel-free UltraRibbon™ cables, 288-864 F, one kit per cable end (uses epoxy)	HFC-FURC-KIT-A	2	Spec Sheet	SRP
9	Furcation for ALTOS® construction cables, one kit per buffer tube	HFC-FURC-KIT-C	24	Spec Sheet	SRP
10	EDGE™ Strain-Relief Bracket, accommodating four EDGE solutions clip parking positions	EDGE-CDF-RJ04-BKT	2	Spec Sheet	SRP

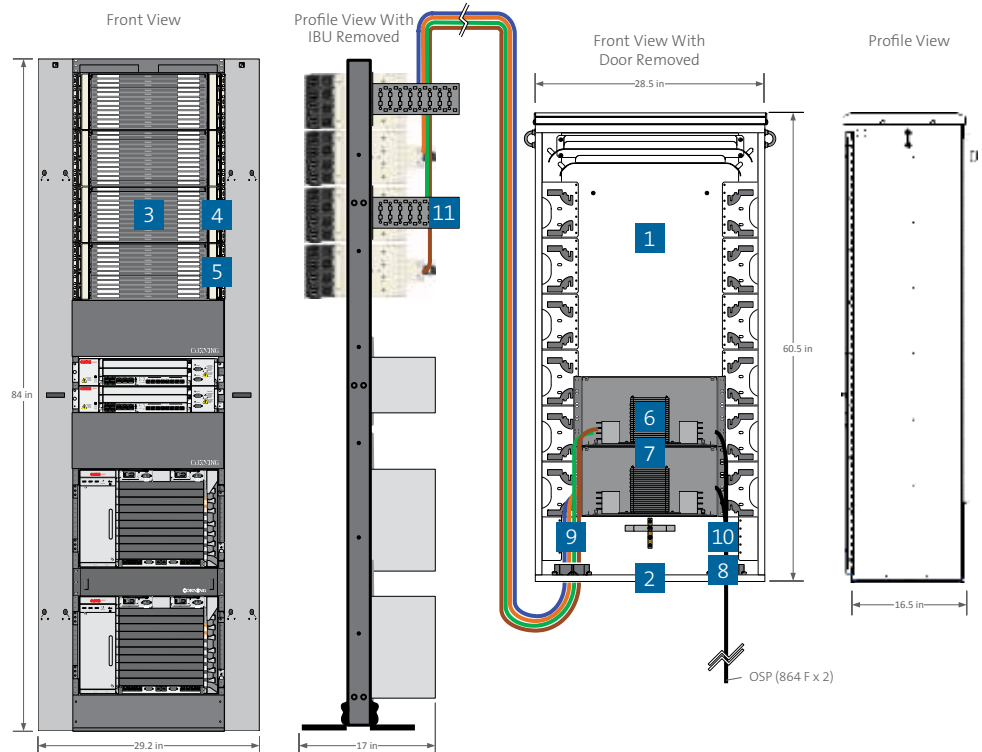External Splice Point

Option 2: External Splice Point

The outdoor splice configuration has all of the advantages of the internal splice configuration in an outdoor splice package. This configuration has a smaller indoor footprint because splicing takes place outdoors. The optical cross-connect (OCC) cabinet (Table 2, items 1, 2) serves as the outdoor NEMA-rated (3, 3R, 3S, and 4) cabinet that accommodates closet splice housings (CSH) (Table 2, item 6). Each splice housing holds a fiber count of 864 ribbon fibers, enabling the cabinet to hold up to 4,320 fibers when fully populated using 864-fiber ribbon cables. The incoming cables are broken out using furcation kits (Table 2, items 9, 10) and routed to splice trays (Table 2, item 7). Any unterminated fibers may be stored in the OCC for future use. Again, stubbed Centrix™ housings (Table 2, items 3-5) come in fiber increments ranging from a 1-rack unit, 72-fiber housing up to a 4-rack unit, 432-fiber housing and can be installed and spliced as needed for future growth. The OCC may be mounted on the exterior wall of the C-RAN facility itself or on an adjacent H-frame.

Advantages

- Easy up-front installation
- Pay-as-you-grow system
- Smaller indoor footprint

Drawbacks

- Outdoor splicing considerations
- Need for outdoor space

Option 2: External Splice Point

Please refer to the numbered diagram on previous page.

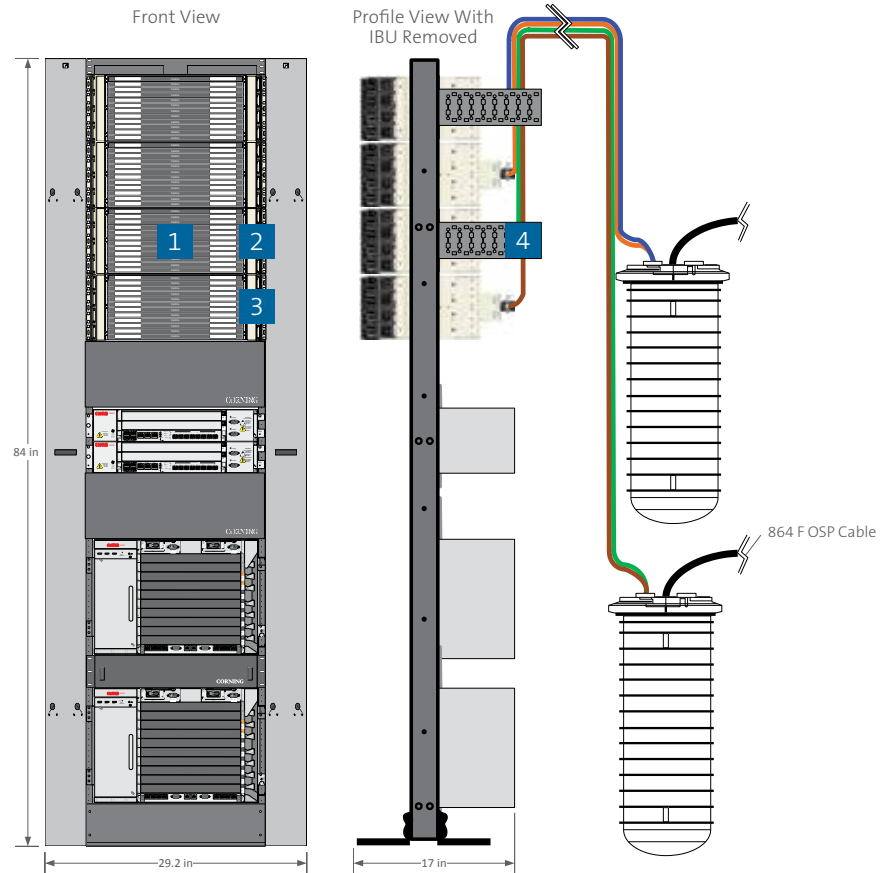| No.	Description/Location	Part Number	Qty.	Spec Sheet	SRP
1	Optical Cross-Connect (OCC) Cabinet, 51-in space, wall- or pole-mountable	OCC-051	1	Spec Sheet	SRP
2	Bottom Entry Panel, equipped with six watertight cable entry kits, 10 ports total	OCC-PORT-KIT	1	Spec Sheet	SRP
3	432 F Centrix™ Stubbed Housing, 12 cassettes, each cassette with 36 LC UPC adapters, 50 ft (16 m) stub with FREEDM® loose tube indoor/outdoor ribbon, one cable, standard rear access frame, 1.09-in cable outer diameter	CX4WW1636A9-QF001B	4	Spec Sheet	SRP
4a	Centrix Mounting Kit for stubbed 4U housing in a 19-in rack	CTX-KIT-4RU-19CLP	4	Spec Sheet	SRP
4b	Centrix Mounting Kit for stubbed 4U housing in a 23-in rack	CTX-KIT-4RU-23CLP	4	Spec Sheet	SRP
5	Centrix Cassette Kit for right-hand jumper routing (12 per pack)	CTX-KIT-RT-DH	4	Spec Sheet	SRP
6	Closet Splice Housing (CSH), 5U, holds (14) 0.4-in splice trays	CSH-05U-F	2	Spec Sheet	SRP
7	Splice Closure Fiber (SCF) Tray, 0.4-in, 48 heat-shrink single-fiber splices or six mass fusion splices	SCF-ST-077	24	Spec Sheet	SRP
8	OSE Cable Entry Kit, 1-in to 1.25-in outer diameter, 1.75-in knockout	OSE-CBL-39	2	Spec Sheet	SRP
9	Furcation for gel-filled/gel-free UltraRibbon™ cables, 288-864 F, one kit per cable end (uses epoxy)	HFC-FURC-KIT-A	2	Spec Sheet	SRP
10	Furcation for ALTOS® construction cables, one kit per buffer tube	HFC-FURC-KIT-C	24	Spec Sheet	SRP
11	EDGE™ Strain-Relief Bracket, accommodating four EDGE solutions clip parking positions	EDGE-CDF-RJ04-BKT	2	Spec Sheet	SRP

Vault Near Site

Option 3: Vault Near Site

The vault splicing scenario will use the same stubbed housings (Table 3, items 1 or 2-4) used in the previous two scenarios; however, splicing will take place in an outdoor splice closure. Using closures to complete the connection between inside plant fiber and outside plant fiber will require planning to make sure there is sufficient room in the conduit so cable can be pulled in as needed to reach the closure. This option offers scalability and the ability to defer capital investment because unused fiber can be coiled up inside the closure for termination later when needed.

Advantages

- Small indoor footprint
- Familiar splice setup

Drawbacks

- Outdoor splicing considerations including conduit space and closure capacity
- Managing the longer cable stub can be challenging in terms of packaging, size, and installation

Front View

Profile View With IBU Removed

84 in

29.2 in

17 in

864 F OSP Cable

Option 3: Vault Near Splice

No.	Description/Location	Part Number	Qty.	Spec Sheet	SRP
1a	432 F Centrix™ Stubbed Housing, 12 cassettes, each cassette with 36 LC UPC adapters, 100 ft (31 m) stub with ALTOS® ribbon dielectric gel-free outdoor, one cable, standard rear access frame, 96-in cable outer diameter	CX4WW3136A9-Q4001B	4	Spec Sheet	SRP
1b	432 F Centrix Stubbed Housing, 12 cassettes, each cassette with 36 LC UPC adapters, 100 ft (31 m) stub with FREEDM® loose tube indoor/outdoor ribbon, one cable, standard rear access frame, 1.09-in cable outer diameter	CX4WW3136A9-QF001B	4	Spec Sheet	SRP
2a	Centrix Mounting Kit for stubbed 4U housing in a 19-in rack	CTX-KIT-4RU-19CLP	4	Spec Sheet	SRP
2b	Centrix Mounting Kit for stubbed 4U housing in a 23-in rack	CTX-KIT-4RU-23CLP	4	Spec Sheet	SRP
3	Centrix Cassette Kit for right-hand jumper routing (12 per pack)	CTX-KIT-RT-DH	4	Spec Sheet	SRP
4	EDGE™ Strain-Relief Bracket, accommodating four EDGE solutions clip parking positions	EDGE-CDF-RJ04-BKT	2	Spec Sheet	SRP

Vault Away From Site on Street

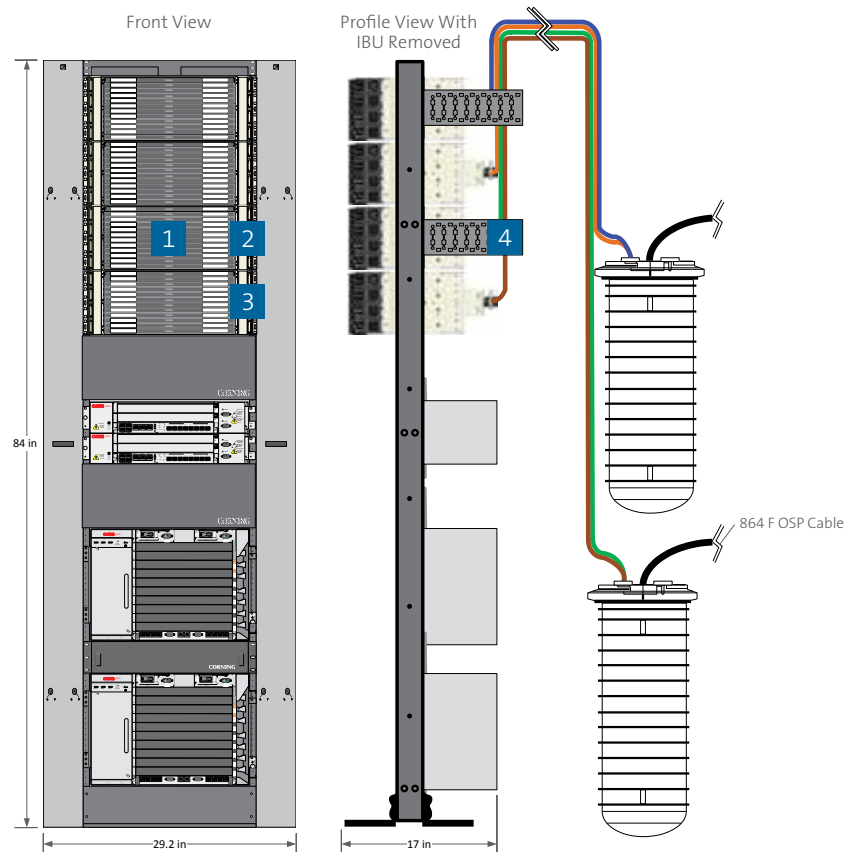# Option 4: Vault Away From Site on Street

The vault splicing scenario will use the same stubbed housings (Table 4, items 1 or 2-4) used in the previous two scenarios; however, splicing will take place in an outdoor splice closure. Using closures to complete the connection between inside plant fiber and outside plant fiber will require a little more planning to make sure you have enough room in your conduit ahead of time so you can pull more cable as needed to reach your closure. You will also need to make sure you have closures that have the capacity to accommodate your cable stubs. This option offers scalability and deferring of capital investment because you can coil up the unused fiber inside the closure for termination later when needed.

Advantages

- Small indoor footprint
- Familiar splice setup

Drawbacks

- Outdoor splicing considerations including conduit space and closure capacity
- Managing the longer cable stub can be more challenging in terms of packaging, size, and installation

Front View

Profile View With IBU Removed

84 in

29.2 in

17 in

864 F OSP Cable

Option 4: Vault Away from Site on Street

No.	Description/Location	Part Number	Qty.	Spec Sheet	SRP
1a	432 F Centrix™ Stubbed Housing, 12 cassettes, each cassette with 36 LC UPC adapters, 300 ft (92 m) stub with ALTOS® ribbon dielectric gel-free outdoor, one cable, standard rear access frame, 0.96-in cable outer diameter	CX4WW9236A9-Q4001B	4	Spec Sheet	SRP
1b	432 F Centrix Stubbed Housing, 12 cassettes, each cassette with 36 LC UPC adapters, 300 ft (92 m) stub with FREEDM® loose tube indoor/outdoor ribbon, one cable, standard rear access frame, 1.09-in cable outer diameter	CX4WW3136A9-QF001B	4	Spec Sheet	SRP
2a	Centrix Mounting Kit for S4U in a 19-in rack	CTX-KIT-4RU-19CLP	4	Spec Sheet	SRP
2b	Centrix Mounting Kit for S4U in a 23-in rack	CTX-KIT-4RU-23CLP	4	Spec Sheet	SRP
3	Centrix Cassette Kit for right-hand jumper routing (12 per pack)	CTX-KIT-RT-DH	4	Spec Sheet	SRP
4	EDGE™ Strain-Relief Bracket, accommodating four EDGE solutions clip parking positions	EDGE-CDF-RJ04-BKT	2	Spec Sheet	SRP

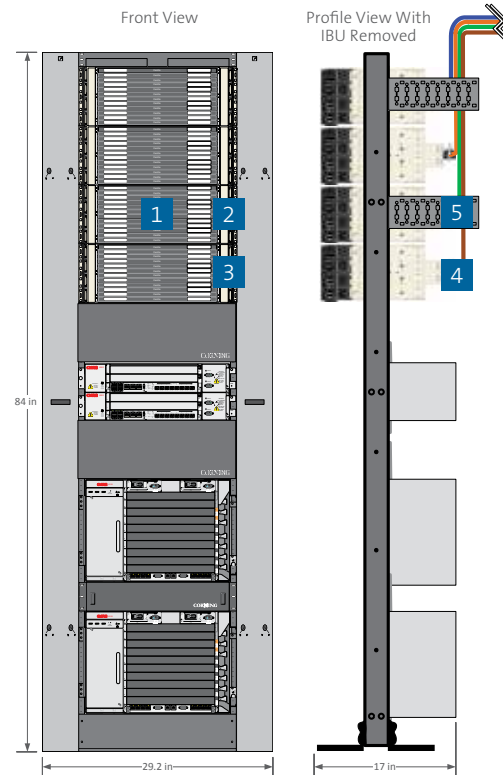Splice Option

Option 5: Splice Option

Outside plant (OSP) cables are broken out using furcation kits (Table 5, item 4) and strain-relieved to Centrix™ housings using universal cable clamps (Table 5, item 6). If cables have a fiber count greater than 432 fibers, the furcation legs will be routed to more than one splice housing (Table 5, items 1-3). Splicing then takes place in the splice cassettes. If OSP cables are not spliced once they are pulled into the building, they will need to be stored in cable racks until they are spliced. It is recommended to furcate and splice the total fiber count of a cable at one time, or to store unterminated furcation legs in a suitable housing until the time comes to splice them in splice cassettes. Splice housings come in fiber increments ranging from a 1-rack unit, 72-fiber housing up to a 4-rack unit, 432-fiber housing, and cassettes can be purchased individually with 24- or 36- fiber counts. These can also be purchased preloaded into a housing which reduces ordering complexity.

Advantages

- Indoor splicing environment

Drawbacks

- Limited OSP cable storage options
- Requires termination of 100 percent of fiber on day one OR you will have to find a location to store additional fibers and tubes if you have a higher fiber cable coming in than the number of cassettes needed on day one.

Front View

Profile View With IBU Removed

84 in

29.2 in

17 in

Option 5: Splice Option

No.	Description/Location	Part Number	Qty.	Spec Sheet	SRP
1	432 F Centrix™ 4U Splice Housing, 12 cassettes, each cassette with 36 LC UPC adapters, single-mode (SM) pigtails, ribbon standard SM pigtails	CX4WWP36-A9-2RJ000	4	Spec Sheet	SRP
2a	Centrix Mounting Kit for stubbed 4U housing in a 19-in rack	CTX-KIT-4RU-19CLP	4	Spec Sheet	SRP
2b	Centrix Mounting Kit for stubbed 4U housing in a 23-in rack	CTX-KIT-4RU-23CLP	4	Spec Sheet	SRP
3	Centrix Cassette Kit for right-hand jumper routing (12 per pack)	CTX-KIT-RT-DH	4	Spec Sheet	SRP
4a	Furcation for gel-filled/gel-free UltraRibbon™ cables, 288-864 F, one kit per cable end (uses epoxy)	HFC-FURC-KIT-A	2	Spec Sheet	SRP
4b	Furcation for ALTOS® construction cables, one kit per buffer tube	HFC-FURC-KIT-C	24	Spec Sheet	SRP
5	EDGE™ Strain-Relief Bracket, accommodating four EDGE solutions clip parking position	EDGE-CDF-RJ04-BKT	2	Spec Sheet	SRP
6	Centrix Housing Cable Strain-Relief Bracket with UCC standard access	CTX-KIT-SR-SA-UCC	4	Spec Sheet	SRP

Stubbed MTP Solution
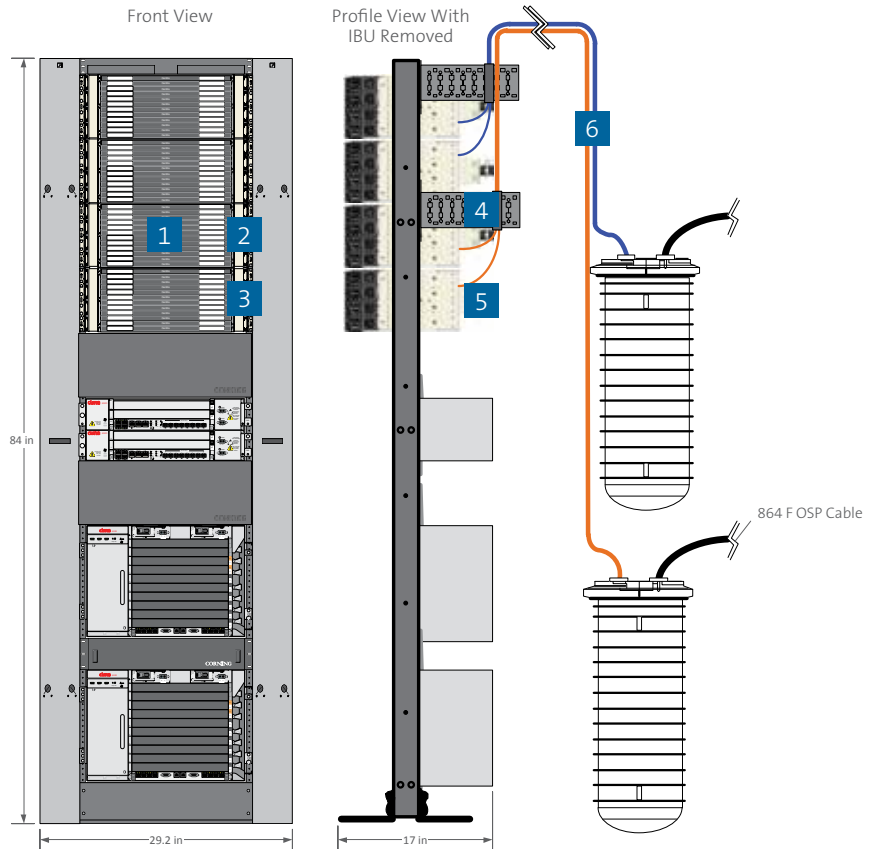
Option 6: Stubbed MTP® Solution

The newest addition to Corning's C-RAN portfolio uses a preconnectorized 864-F MTP®/MPO trunk cable (Table 6, item 6) to connect the inside plant to the outside plant (OSP). Prepopulated Centrix™ MTP housings (Table 6, items 1,3) are mounted to a 19-in by 23-in rack using mounting brackets (Table 6, item 2) with integrated jumper routing clips. The trunk cable is strain-relieved using frame- and housing-mounted brackets (Table 6, items 4,5), creating a secure environment for the cable furcation legs. The furcation legs are plugged in to the rear of each Centrix MTP cassette and the stub end of the cable is spliced to OSP cables in a closure up to 1,500 ft away from the rack.

Advantages

- Quick inside plant connection
- No bulky hardware stored in the cable reel
- 864-fiber count per cable occupies less space in wall penetrations and ducts
- Gel-free cable enables faster and cleaner splicing in closures

Drawbacks

- Additional MTP (0.75 dB per mated pair) connector loss compared to traditional stubbed housings

Front View

Profile View With IBU Removed

864 F OSP Cable

Option 6: Stubbed MTP® Solution

Please refer to the numbered diagram on previous page.

No.	Description/Location	Part Number	Qty.	Spec Sheet	SRP
1	432 F Centrix™ MTP® Housing, 12 cassettes, each cassette with 36 LC UPC adapters, three rear-facing MTP adapters	CX4WWM36-A9-893RBR	4	Spec Sheet	SRP
2a	Centrix Mounting Kit for stubbed 4U housing in a 19-in rack	CTX-KIT-4RU-19CLP	4	Spec Sheet	SRP
2b	Centrix Mounting Kit for stubbed 4U housing in a 23-in rack	CTX-KIT-4RU-23CLP	4	Spec Sheet	SRP
3	Centrix Cassette Kit for right-hand jumper routing (12 per pack)	CTX-KIT-RT-DH	4	Spec Sheet	SRP
4	EDGE™ Strain-Relief Bracket, accommodating four EDGE solutions clip parking positions	EDGE-CDF-RJ04-BKT	2	Spec Sheet	SRP
5	Centrix Housing Cable Strain-Relief Bracket with UCC standard access	CTX-KIT-SR-SA-UCC	8	Spec Sheet	SRP
6a	Plug & Play™ Indoor/Outdoor 864 F Trunk Cable, 36-in MTP furcation legs/stub end, FREEDM® gel-free ribbon cable, 300 ft	A0090CEGUF0BP300F	2	Spec Sheet	SRP
6b	Plug & Play Indoor/Outdoor 864 F Trunk Cable, 36-in MTP furcation legs/stub end, FREEDM gel-free ribbon cable, 500 ft	A0090CEGUF0BP500F	2	Spec Sheet	SRP
6c	Plug & Play Indoor/Outdoor 864 F Trunk Cable, 36-in MTP furcation legs/stub end, FREEDM gel-free ribbon cable, 1,000 ft	A0090CEGUF0BPA00F	2	Spec Sheet	SRP
6d	Plug & Play Indoor/Outdoor 864 F Trunk Cable, 36-in MTP furcation legs/stub end, FREEDM gel-free ribbon cable, 1,500 ft	A0090CEGUF0BPF00F	2	Spec Sheet	SRP