

**QWEST Communications  
International Inc.  
Technical Publication**

**QWEST Dark Fiber**

## NOTICE

This document describes QWEST Dark Fiber offered by QWEST Communications International Inc. It covers distinguishing service features, technical specifications, and defines valid interfaces.

This publication is being reissued at this time to revise the Description information in Chapter 2, paragraph 2.2, and the configuration in Chapter 3, Exhibit 3-1. It also reflects new formatting.

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## **1. Introduction**

### **1.1 General**

This document describes QWEST Dark Fiber offered by QWEST. It covers distinguishing service features, technical specifications, and defines valid interfaces.

This publication is being reissued at this time to revise the Description information in Chapter 2, paragraph 2.2, and the configuration in Chapter 3, Exhibit 1. It also reflects new formatting.

### **1.2 Purpose**

The purpose of this document is to describe QWEST Dark Fiber appropriate for the majority of applications. Sufficient technical detail is furnished to allow a customer, such as an Interexchange Carrier or End-User, to determine if available dark fiber is suitable for use in an end-to-end configuration. It is not the intent of this document to provide specific ordering information, but to describe the technical features of this offering.

### **1.3 Reason For Reissue**

To show QWEST Communications International Inc. as the owner of this publication and the one to contact concerning the content.

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## **2. Description of Offering**

### **2.1 Applicability of Technical Specifications**

The technical specifications presented in this document are applicable to QWEST Dark Fiber only. It does not attempt to describe the various types of transmission equipment, which could be used as a transport facility on this medium.

### **2.2 Description**

Dark Fiber is composed of single mode or multi-mode optical fiber cable between customer designated premises, on which no regenerating or terminating optical or electronic equipment is provided by QWEST. The customer will provide the terminating equipment, which is required to convert the Dark Fiber into a usable path for communications transport.

The minimum number of fibers provided between customer's designated locations is two.

The maximum distance between customer designated locations will be dependent upon the operating line speed of the customer's transmission equipment and the end-to-end link loss budget of the fiber optic facilities. Each Dark Fiber facility will need to be custom designed by the QWEST Transmission Engineering Department.

QWEST will not place automatic or manual protection switching equipment on the Dark Fibers to protect against service interruptions. The customer is responsible for providing this equipment if they desire this protection.

QWEST will not provide any type of alarm surveillance or performance monitoring on Dark Fiber facilities.

### **2.3 Dark Fiber Configurations**

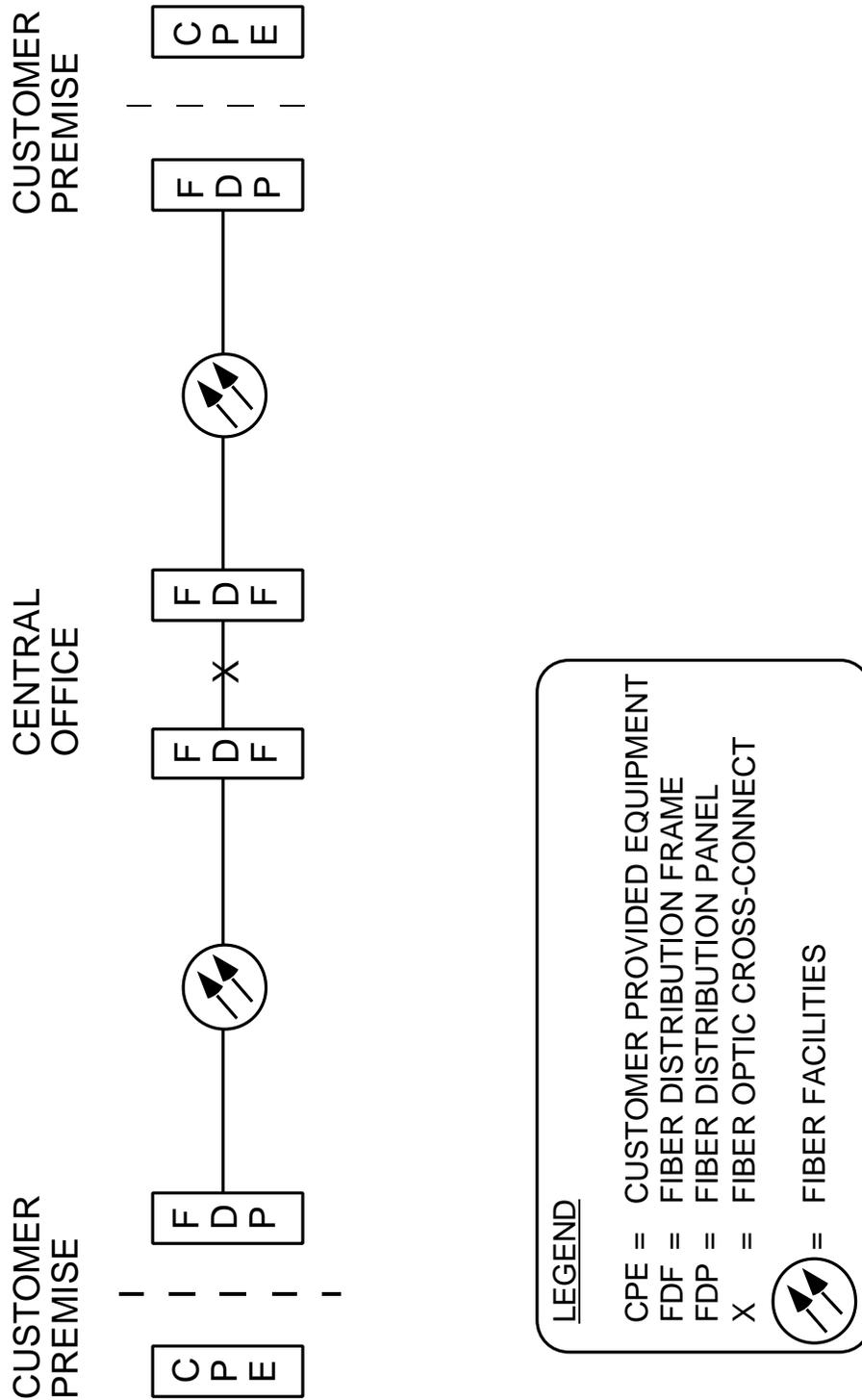
QWEST will utilize spare capacity in existing fiber optic cables whenever possible. New facilities will be built only when spare capacity is unavailable. All Dark Fiber facilities will route through a QWEST Wire Center. This configuration is shown in Exhibit 2-1.

### **2.4 Customer Responsibilities**

The customer will provide the addresses of their designated locations to the QWEST Transmission Engineering Department prior to placing an order for Dark Fiber.

### **2.5 QWEST Responsibilities**

The QWEST Transmission Engineering department will provide the customer calculated attenuation characteristics for the A to Z connection between the customers designated locations, along with a budget requirement for connectors in the network and at the network interface. This information will then be presented to the customer for review. After reviewing, if the customer determines Dark Fiber is viable for their application, an order can be placed.



**Exhibit 2-1:** Dark Fiber Configuration

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### 3. Network Interfaces

#### 3.1 Description of Interface

The Network Interface will be at a QWEST provided Fiber Distribution Panel at the customer's location. The fiber optic cable will be terminated in fiber optic connectors by QWEST.

When new construction is required to terminate Dark Fiber in a customer's location, the type of connectors to be used will be jointly agreed upon by the customer's and QWEST Transmission Engineers.

If there is an existing fiber optic cable terminated in a customer's location that meets the transmission design requirements, the existing fiber optic connectors will be used. QWEST will not reterminate existing fiber optic cable.

The type of fiber optic connectors required in QWEST Central Offices will be determined by QWEST Transmission Engineers.

The customer will provide the fiber optic patch cords to connect their equipment to the Network Interface.

When the customer's designated location is in a multi-tenant building, the Network Interface will be in a Fiber Distribution Panel separate from the Main Point of Presence (MPOP) as shown in Exhibit 1 in order to ensure network security. QWEST will cross-connect the Dark Fibers from the front of the optical connectors in the MPOP to the rear of the optical connectors in the network interface. Both parties will only have access to their half of the Network Interface.

If the customer owns the building and is the sole tenant the Network Interface will be at the MPOP as shown in Exhibit 3-2.

#### 3.2 Network Channel Interface (NCI) Code

The interface with the QWEST Network is described by an interface code for each End-User termination. The interface codes must be specified by the customer when ordering QWEST Dark Fiber.

The Network Channel Interface (NCI) Code identifies interface characteristics at the customer's Point Of Termination (POT). The NCI code provides the means to ensure compatibility between the network channel being used and the customer's POT. The NCI code is a ten-character code that consists of five data elements:

- Total Number of Conductors (character positions 1 and 2) is a two-character numeric code that represents the total number of physical conductors required at the interface.
- Protocol (character positions 3 and 4) is a two-character alpha code that defines requirements for the interface regarding signaling/transmission.
- Impedance (character position 5) is a one-character alpha or numeric code representing the nominal reference impedance that will terminate the channel for the purpose of evaluating transmission performance.

- Protocol Options (character positions 6 - 8) is a one to three-character numeric/alphanumeric code that describes additional restrictions, such as bandwidth or resistance on the protocol to be used.
- Transmission Level Point(s) (character positions 9 and 10) is an assigned one or two-character alpha code corresponding to a value for the transmission level point(s) from either the Local Exchange Carrier or customer end. These are optionally assigned characters and may not be applicable in all cases.

The compatible NCI code for QWEST Dark Fiber is shown in Table 3-1.

**Table 3-1:** Compatible NCI Code Combinations

Compatible NCI Code Combinations	
NCI	SECNCI
01FCF.X	01FCF.X

Definitions of NCI Code Components:

- 01 = 1 Conductor
- FC = Fiber Optic Interface
- F = Fiber
- X = Dark Fiber

### 3.3 Network Channel (NC) Code

The Network Channel (NC) Code is an encoded description of the channel that is provided by QWEST from the POT at the customer's Point of Presence (POP) or from the POP to an End-User location. The NC codes must be specified by the customer when ordering QWEST Dark Fiber.

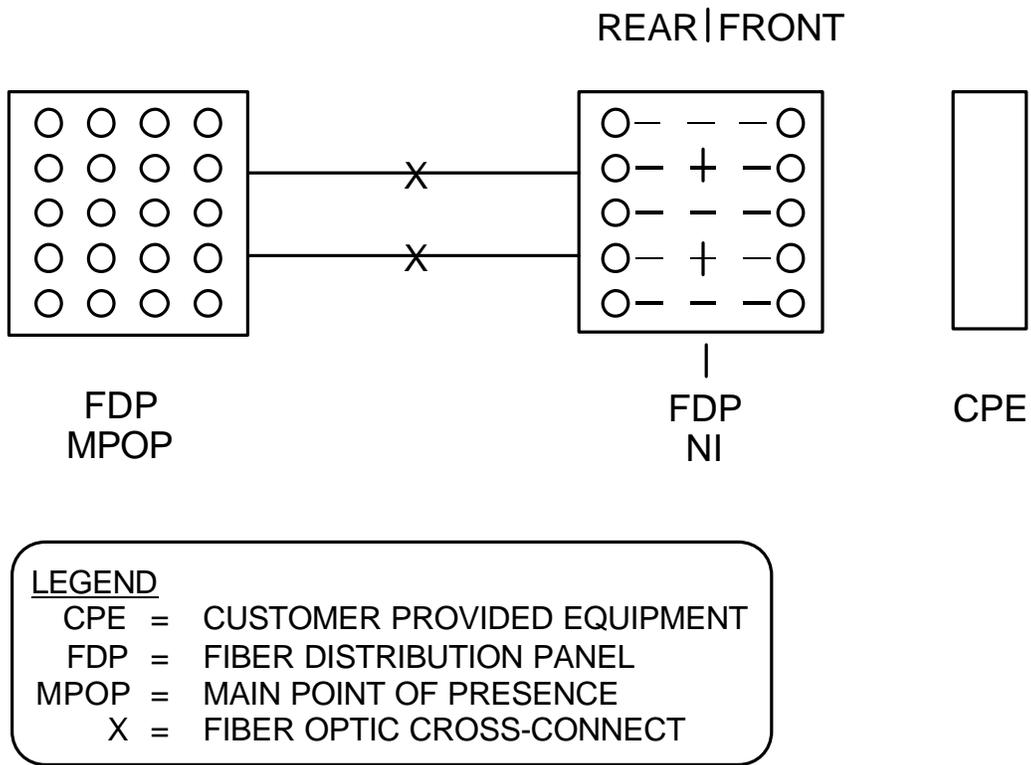
The NC code is a four-character code that consists of two data elements:

- The Channel Service code (character positions 1 and 2) is a two-character alphanumeric code that describes the channel service type.
- The Optional Feature code (character positions 3 and 4) represents the option codes available for each channel service code.

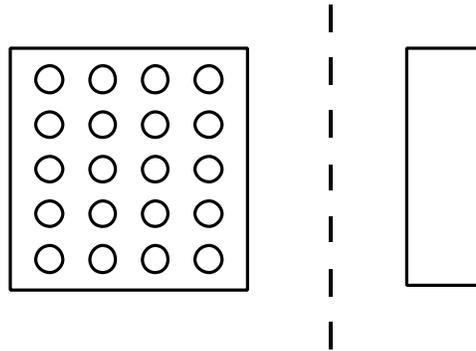
The compatible NC code for QWEST Dark Fiber is shown in Table 3-2.

**Table 3-2:** Compatible NC Code

Compatible NC Code
LX-- Dedicated Facility Without Telephone Company Provided Optical or Electrical Terminating or Regeneration Equipment.



**Exhibit 3-1:** Network Interface - Multi-Tenant Building



LEGEND

CPE = CUSTOMER PROVIDED EQUIPMENT  
FDP = FIBER DISTRIBUTION PANEL  
MPOP = MAIN POINT OF PRESENCE

**Exhibit 3-2:** Network Interface - Single Tenant Building

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## **4. Performance Specifications**

### **4.1 Transmission Design**

QWEST will provide the customer a copy of the Dark Fiber transmission design.

QWEST will provide the customer a copy of the acceptance test results prior to the service date. On Single Mode Dark Fibers, these measurements will include end-to-end attenuation measurements in both directions of transmission at the 1310 nm. and 1550 nm. wavelengths. On Multi-mode Dark Fibers, the measurements will include end-to-end attenuation measurements in both directions of transmission at the 850 nm. and 1300 nm. wavelengths.

If the transmission performance of the Dark Fibers falls below the transmission design parameters, QWEST will restore the fibers to meet the parameters of the transmission design.

In order for QWEST to perform tests or repair functions on the Dark Fibers after they have been turned over to the customer, the customer must transfer any service carried over the fibers to spare facilities and release the fibers to QWEST.

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## **5. Maintenance**

### **5.1 Customer Responsibilities**

The customer is responsible for all equipment and cable on the customer side of the Network Interface at their location.

The customer or their responsible agent must sectionalize the trouble and verify that the trouble is not in the customer owned equipment or cable, before calling the QWEST Customer Service Center.

If the trouble is isolated to the customer owned equipment or cable, the customer is responsible for clearing the trouble and restoring the service to normal.

Joint testing between the customer location and a QWEST Central Office may sometimes be necessary to isolate the trouble.

### **5.2 QWEST Responsibilities**

QWEST is responsible for maintaining the transmission facility between the Network Interface at each customer location.

QWEST will furnish the customer a trouble reporting telephone number.

QWEST will commit to a maximum restoral time of four hours in the event of a service degradation below the level of the transmission design. If the trouble is caused by a cable failure, QWEST will make every attempt to restore the cable within eight hours. The possibility may exist that environmental or safety hazards may extend the restoral time beyond eight hours.

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## **6. Definitions**

### **6.1 Glossary**

#### **Fiber Distribution Panel**

A device employing fiber optic connectors used to terminate fiber optic cable. The connectors are necessary in order to connect the cable to the customer's equipment and to provide test access to the cable. In large installations this is also called a Fiber Distribution Frame.

#### **Link Loss**

The total amount of attenuation measured in decibels found within a regenerator section. Causes of attenuation are Fiber Optic Cable, Splices, Connectors, Splitters, and Wave Division Multiplex devices. The Link Loss Budget must not exceed the gain of a fiber optic transmission system.

#### **Multi-Mode Fiber**

A type of optical fiber that supports more than one mode of light propagation.

#### **Single Mode Fiber**

An optical fiber that supports only one mode of light propagation above the cutoff wavelength.

#### **System Gain**

The numerical difference in the transmit optical power and the receive optical power in a fiber optic transmission system.

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## 7. References

### 7.1 Ordering Information

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