

**QWEST Communications  
International Inc.  
Technical Publication**

**QWEST Fiber Optic  
Commercial Video Service**

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77326  
Issue E  
September 2001

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## **1. Introduction**

### **1.1 Purpose**

This document describes QWEST Fiber Optic Commercial Video Service offered by QWEST to its customers for Access and Non-Access Service. It covers distinguishing service features, technical specifications and defines valid interfaces.

### **1.2 Reason for Reissue**

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

### **1.3 Scope**

This document describes QWEST Fiber Optic Commercial Video Service appropriate for the majority of applications. Sufficient technical detail is furnished to describe the Network Interfaces (NIs) and Network Channel (NC) options used to configure an end-to-end communications channel. It is not the intent of this document to provide specific ordering information, but to describe the technical features of this service offering.

Use of the word "Commercial" in the service title is not intended to refer to the broadcast television industry, but refer instead to a type of video service where the performance level is less than broadcast quality. The applications for this type of video and audio service include distance learning, judicial arraignment and surveillance systems.

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## **2. Description of Service**

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

The technical specifications presented in this document are applicable to QWEST Fiber Optic Commercial Video Service only. It does not attempt to describe the various types of transmission equipment used to provide this service.

### **2.2 Description of Service**

QWEST Communications International Inc. Fiber Optic Commercial Video Service uses a standard 525-line/60-field System M - National Television Systems Committee (NTSC) compatible video signal. This service will transport and deliver NTSC video signal(s) and associated audio signal(s) using fiber optic facilities for the customer local loops and the interoffice section(s). This offering applies to Access and Non-Access Service.

Fiber Optic Commercial Video Service is one or two-way, with the requirement of two circuits for two-way service, and will be provided on a point-to-point or point-to-multipoint basis. The service may be used as video only or may include one, two or four audio channels per video channel. The electrical interfaces are as follows:

- 75 ohm unbalanced termination for the baseband video signal.
- 600 ohm balanced termination for the baseband audio signal.

#### **2.2.1 Transmission Equipment and Facilities Configurations**

QWEST will design a network and technology solution to meet the customer's needs of Fiber Optic Commercial Video Service utilizing fiber optic cable, including video and audio terminal equipment as Network Channel Terminating Equipment (NCTE), as depicted in Figure 3-1 of Chapter 3 of this technical publication.

#### **2.2.2 Fiber Optic Commercial Video Service (TV3)**

This service is designated as TV3 and provides a full motion, high quality NTSC video signal, with the option of one, two or four 15-kHz associated audio signal(s). The performance parameters are less stringent than those required for Broadcast Quality service. The minimum video signal and audio signal performance parameters for QWEST are shown in Chapter 4 of this technical publication.

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### **3. Channel and Interface Specifications**

#### **3.1 General**

This chapter provides information about the channels and the Network Interfaces (NIs) used with Fiber Optic Commercial Video Service. The description makes use of a generic configuration which should help the understanding of what must be ordered to obtain the Fiber Optic Commercial Video Service.

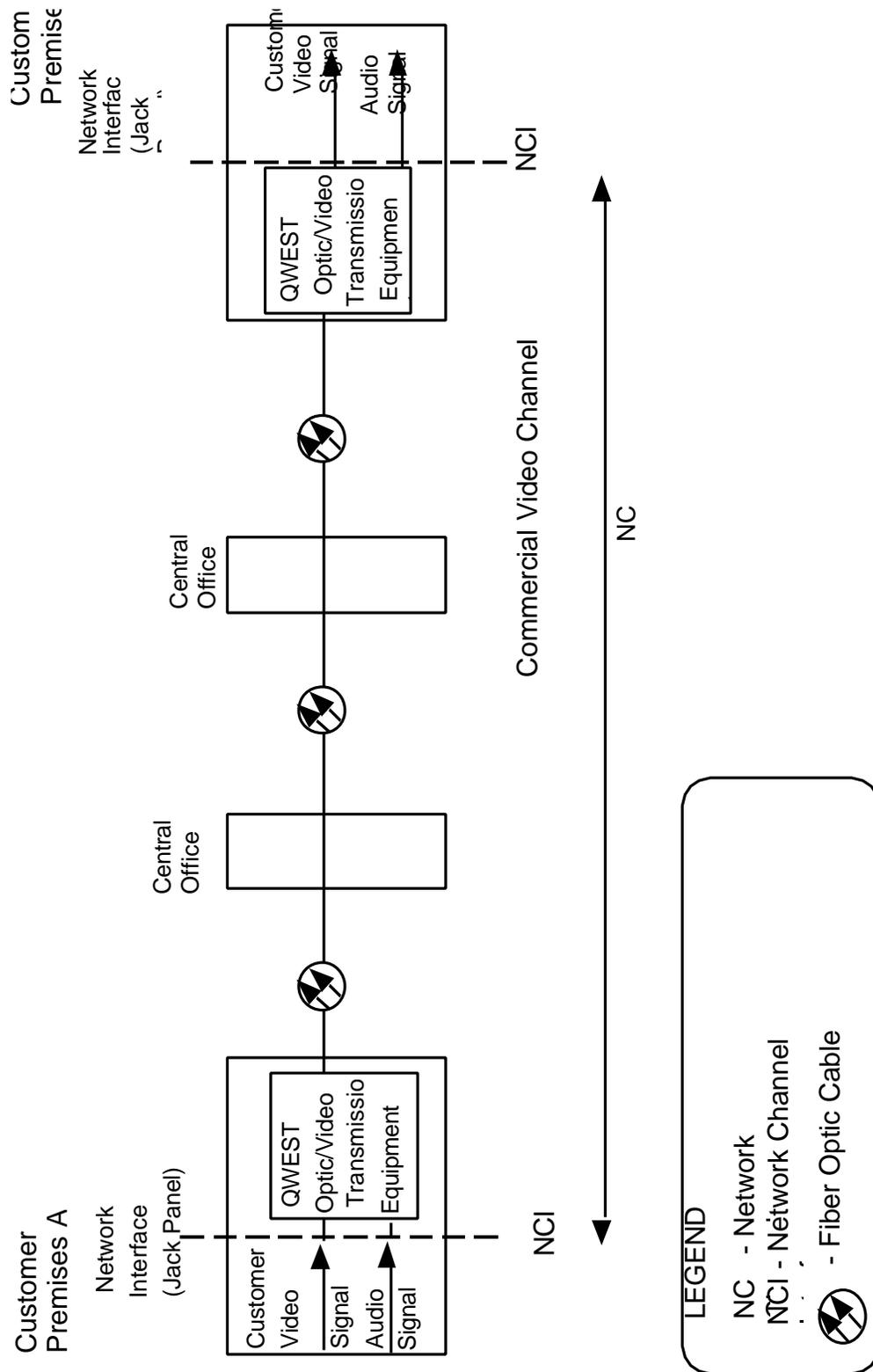
Figure 3-1 illustrates a typical Fiber Optic Commercial Video Service application and may be used as a reference while reviewing this document. This typical application consists of ordering a one-way, point-to-point, single channel video circuit between two customer locations. QWEST will provide fiber optic-based video terminal equipment at each customer location. The customer will input one baseband analog video signal and associated baseband audio signal to the transmitting equipment at the first location. The multiplexed signal will be transmitted over fiber optic facilities to the end customer location where it will be received optically in the QWEST equipment, converted to baseband analog video and audio signals and handed-off to the customer.

The Fiber Optic Commercial Video Service channel is defined by the Network Channel (NC) and Network Channel Interface (NCI) codes. The NC code defines the channel while the NCI code defines the interface at the ends of the channel. A brief explanation of the format of these codes is provided in the following sections. For a more detailed view of coding parameters, refer to the American National Standards Institute (ANSI) document ANSI T1.223-1991, "Telecommunications - Information Interchange - Structure and Representation of Network Channel (NC) and Network Channel Interface (NCI) Codes for the North American Telecommunications System."

The interface description also includes a portrayal of the baseband video signal waveform, an explanation of the electrical and physical specifications, and the related illustrations.

#### **3.2 Network Channel (NC) Codes**

The NC code consists of four character positions as shown in Table 3-1. The first two characters (positions 1 and 2) of the NC code specify the type and quality of the channel. Character positions 3 and 4 represent the option codes available for each NC code. Various combinations of this code will allow the customer to enhance the technical performance of the requested channel, or to further identify the type of service.



**Figure 3-1** Fiber Optic Commercial Video Service, Typical Configuration

**Table 3-1** QWEST Fiber Optic Commercial Video Service Network Channel (NC) Code for Access and Non-Access Service

NC Code			
Position			Description
1 & 2	3	4	
TZ	A		A circuit for video and optional audio, allowing for the use of fiber optic facilities by QWEST.
			Commercial Quality (NOTE: Meets NTSC "End-to-End" Video/Audio Signal Performance per ANSI T1.502-1988.)
		–	Point-to-Point Service
		B	Central Office Bridged (Point-to-Multipoint)

### 3.3 Network Channel Interface (NCI) Code

The electrical interface with the QWEST network is described by an NCI code for each End-User (EU), Interexchange Carrier (IC) or Local Exchange Carrier (LEC). The interface codes for the service must be specified by the customer when ordering Fiber Optic Commercial Video Service.

The NCI code identifies five interface elements located at the NI. The interface elements are: (1) The number of conductors, (2) protocol code, (3) impedance code, (4) protocol option, and (5) Transmission Level Point (TLP) code.

For Fiber Optic Commercial Video Service, an example code is 04TV6.15A.O- which contains the following components:

- Code 04 = 4 conductors; two conductors for the video channel and two conductors for one audio channel. (Table 3-2 defines the allowable entries for this component.)

**Table 3-2** Number of Conductors

Number of Conductors	Code
2 (video only)	02
4 (video and 1 channel audio)	04
6 (video and 2 channels audio)	06
10(video and 4 channels audio)	10

- Protocol Code TV = Television Interface (Table 3-3 below)

**Table 3-3** Glossary of Protocol Codes and Selected Options

Code	Option	Definition
TV		Television Interface
	0	Video signal only
	15A	Video plus one through four (2-conductor) 15-kHz audio signals. For QWEST, there may be one, two or four audio signals.

- Impedance Code 6 = 75 ohms (for coaxial cable) as shown in Table 3-4 below.

**Table 3-4** Impedance

Value (ohms)	Code
75 (coaxial cable)	6

- Protocol Option Code 15A = Video plus one 15-kHz audio channel at the NI as shown in Table 3-3.
- Transmission Level Point(s). For a baseband video signal, there is no signal level specified with the TLP code. There is, however, an assigned one-character alpha code (the letter "O"), corresponding to the direction of service, and a hyphen, indicating the interface is standard as specified by QWEST. This is shown in Table 3-5 below.

**Table 3-5** Transmission Level Point (TLP) Code for Direction of Service

O-	Video signal is transmitted from one EU/IC/LEC location to QWEST
-O	Video signal is received at another EU/IC/LEC location from QWEST

### 3.4 NCI Codes, Access and Non-Access Service

The NCI Codes associated with each NC Code are shown in Table 3-6 for Access and Non-Access Service. The same Television Service Code, TV3, applies to every one of this codes. Table 3-6 portrays NCI coding for each direction of two one-way video channels. The upper set applies to the End-User as the Transmit location and the IC, LEC or another EU as the Receive location. The lower set applies to the IC, LEC or an EU as the Transmit location and an EU as the Receive location.

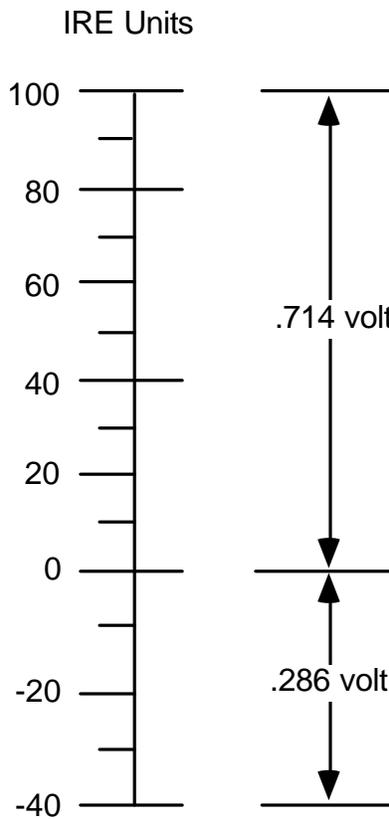
**Table 3-6** NCI Codes for Access and Non-Access Service

<b>Television Special Access and Local Channel Service</b>	<b>NC Code</b>	<b>End-User Transmit NCI Code</b>	<b>Interexchange Carrier, Local Exchange Carrier or End- User Receive NCI Code</b>
TV3	TZA- & TZAB	02TV6.0.O- 04TV6.15A.O- 06TV6.15A.O- 10TV6.15A.O-	02TV6.0.-O 04TV6.15A.-O 06TV6.15A.-O 10TV6.15A.-O
		<b>End-User Receive NCI Code</b>	<b>Interexchange Carrier, Local Exchange Carrier or End- User Transmit NCI Code</b>
		02TV6.0.-O 04TV6.15A.-O 06TV6.15A.-O 10TV6.15A.-O	02TV6.0.O- 04TV6.15A.O- 06TV6.15A.O- 10TV6.15A.O-

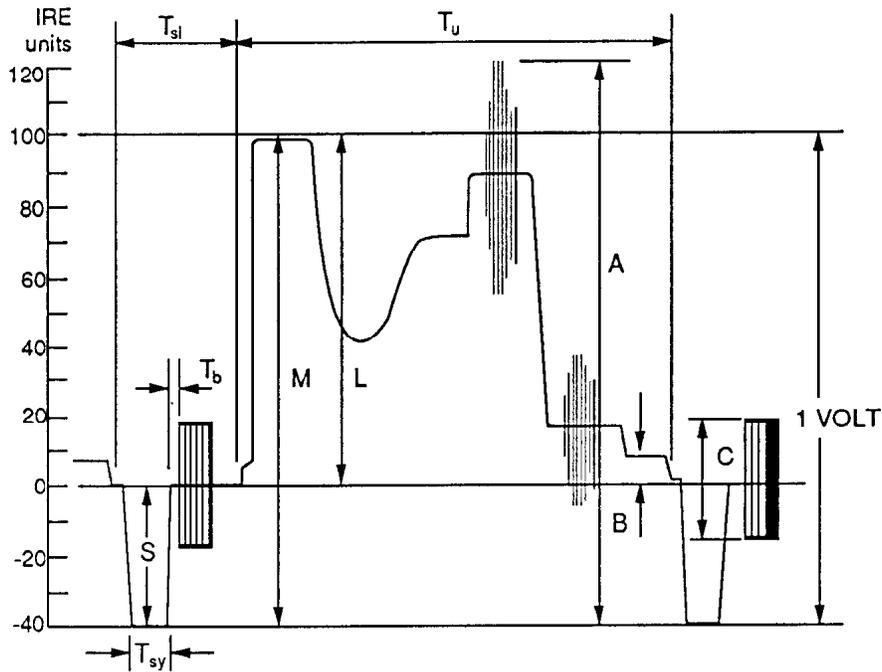
### 3.5 Description of Signal

**Video Signal:** The video signal is usually described in waveform terminology as shown in Figure 3-3 and measured in accordance with Figure 3-2, the IRE Scale Units for a 1 volt peak-to-peak composite signal.

**Audio Signal:** The audio signals are waveforms comprised of periodic and/or nonperiodic components confined to the frequency range from 50 Hz to 15 kHz, usually measured in decibels in which the reference power is one milliwatt (noted as dBm).



**Figure 3-2** The IRE Scale Units (For a 1v P-P Composite Signal)



WAVEFORM TERMINOLOGY

- A: The peak-to-peak amplitude of the composite color video signal
- B: The difference between black level and blanking level (set-up)
- C: The peak-to-peak amplitude of the color burst
- L: Luminance signal - nominal value
- M: Monochrome video signal peak-to-peak amplitude ( $M=L+S$ )
- S: Synchronizing signal - amplitude
- $T_b$ : Duration of breezeway
- $T_{sl}$ : Duration of line blanking period
- $T_{sy}$ : Duration of line synchronizing pulse
- $T_u$ : Duration of active line period

**Figure 3-3** The Standard Composite Color Video Signal

### 3.6 Electrical Interface Specifications

#### 3.6.1 Video

The NI at the customer's premises is a baseband analog video signal compatible with the 525-line/60-field System M-NTSC video standard.

Impedance:

1. Source impedance - The impedance presented to the input terminals of a transmission service channel by the output terminals of the baseband signal source. Proper source impedance is required for transmission service channel evaluation.
2. Input impedance - The impedance presented by the input terminals of a transmission service channel.
3. Output impedance - The impedance presented by the output terminals of a transmission service channel.
4. Load impedance - The impedance presented by the input terminals of a device that will terminate the baseband signal of the transmission service channel. Proper load impedance is required for channel evaluation.

The standard value for these four impedances shall be 75 ohms, unbalanced-to-ground, with a return loss of at least 30 dB over the frequency range of 30 Hz to 4.2 MHz.

#### 3.6.2 Video Signal Level

Input Signal Level of a transmission service channel is the difference in voltage between sync tip (-40 IRE units) and reference white (+100 IRE units) of a composite picture signal presented to the video baseband input terminals and is usually expressed in volts. The values shall be nominally 1 volt peak-to-peak difference between sync tip and reference white (140 IRE units).

Output Signal Level of a transmission service channel is the difference in voltage between sync tip and reference white of a composite picture signal presented by the video baseband output terminal and is usually expressed in volts peak-to-peak. The output signal shall be a faithful reproduction of the input signal, subject to the parametric variations permitted by the performance specifications set forth in this publication.

- Nonuseful DC Component

The nonuseful DC component of the picture signal is any DC component that is unrelated to the signal and only will be present as a result of the transmission equipment. The values shall be less than 0.05 volt across a

75 ohm load and less than 0.05 volt referenced to ground.

### 3.6.3 Audio

Impedance:

- The descriptions of the four audio impedance sections (source, input, output and load) are found in Section 3.6.1.

The standard value for these four audio impedances shall be 600 ohms, balanced to ground with no DC voltage present and with a return loss of at least 30 dB over the frequency range of 50 Hz to 15 kHz.

Audio Signal Level

- The input signal level to a transmission service channel is the signal level across the transmission service channel input impedance. When the signal is sinusoidal, the input signal is expressed in dBm. The peak operating level of the input signal to the transmission service channel across the standard impedance is equal to the peaks of a sine-wave whose average power is +18 dBm.
- The output signal level of a transmission service channel is the signal level across the transmission service channel output impedance and is expressed in dBm. The output signal shall be a faithful reproduction of the input signal subject to the parametric variations permitted by the performance specifications in this publication.

Nonuseful DC Component

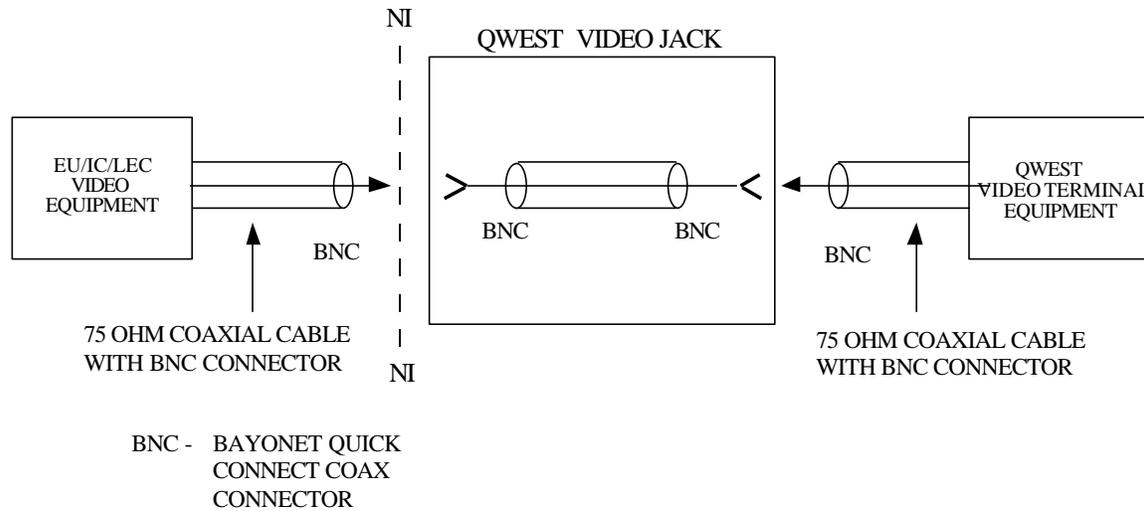
- The nonuseful DC component of the audio channel is any DC component which is unrelated to the signal and is present when the audio signal is removed. When the audio signal is removed, direct current flow shall be equal to or less than 0.2 mA through a zero ohm termination across the audio channel input or output terminal. Direct current flow shall be equal to or less than 0.2 mA when the terminals are shorted together and measured through a zero impedance to ground.

## 3.7 Physical Environment Specifications

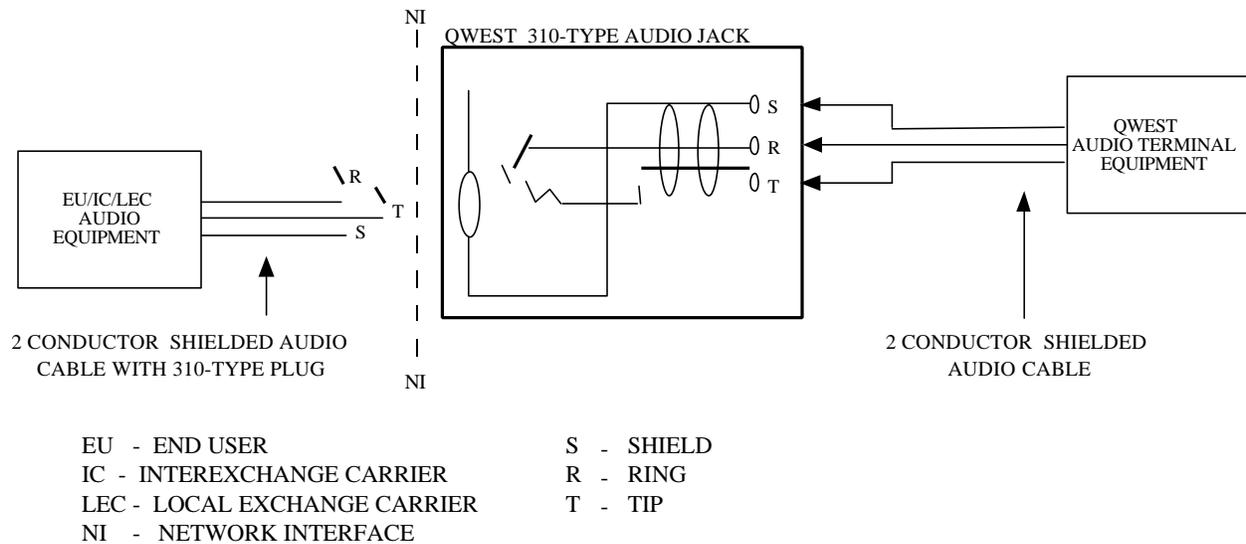
Connectors: The customer's equipment will be connected to the QWEST network via a QWEST jack panel located at the EU/IC/LEC premises.

- Video connection at the NI to an EU/IC/LEC shall be with a coaxial cable and a BNC (Bayonet Quick Connect Coax) connector as shown in Figure 3-4.
- Audio connection at the NI to an EU/IC/LEC shall be with a two conductor shielded audio cable and 310-type plug as shown in Figure 3-5.

QWEST NETWORK INTERFACE JACK PANEL



**Figure 3-4** Video Network Interface Connection



**Figure 3-5** Audio Network Interface Connection

- Environmental (typically at a customer premises location)
  - Ambient temperature, 40 to 100°F
  - Humidity, 20 to 55%
- Power: At the Network Interface, the End-User, Interexchange Carrier or Local Exchange Carrier shall provide local power:
  - 60 Hz 110 VAC (preferred) or
  - - 48/24 VDC

### **3.8 Interface Illustrations**

This section illustrates each interface used to provide Television Special Access and Local Channel Services applicable for QWEST Fiber Optic Commercial Video Service. Included is a summary of the technical information applicable to each interface.

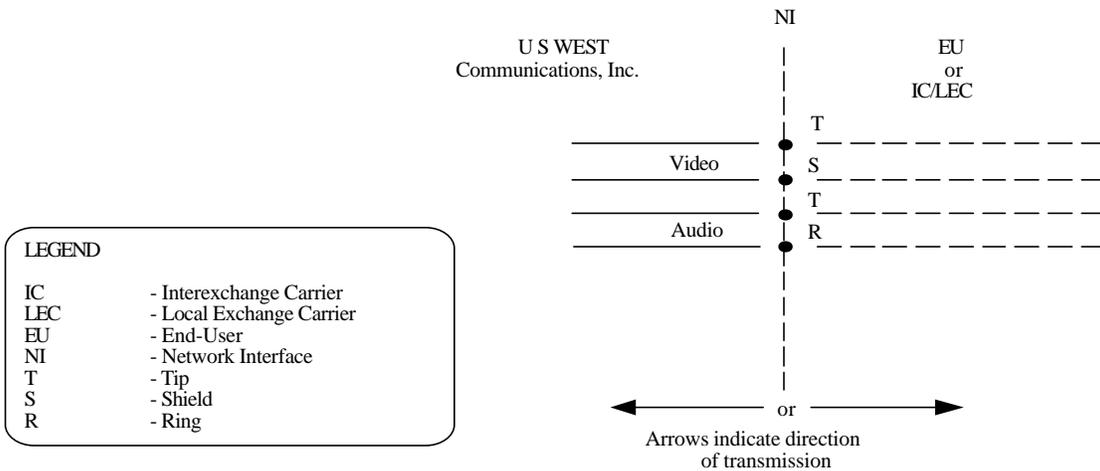


### 3.8.2 Interface Type 04TV6.15A

Application:	Provides one-way transmission of a standard 525-line/60-field monochrome or System M-NTSC color video signal, and one associated 15-kHz audio signal
Operating mode:	Full-time video and associated audio signal
Physical description:	Coaxial cable with BNC connector for video and two-conductor (T, R) with 310-type plug for audio
Service:	TV3

Electrical Features	Video	Audio
Impedance:	75 ohms unbalanced	600 ohms balanced
Overload point:	1.2 V peak-to-peak (Sync tip to reference white)	+18 dBm at 404 Hz at a maximum of 4 sec.
Operating Levels (nominal):	1 V peak-to-peak (Sync tip to reference white)	0 dBm (max) program level
Max. Steady-State Levels: (Averaged over one second)	N/A	+8 dBm, 50 Hz = f = 404 Hz 0 dBm, 404 Hz < f = 15 kHz
Frequency range:	30 Hz to 4.2 MHz	50 Hz to 15 kHz

Illustration:

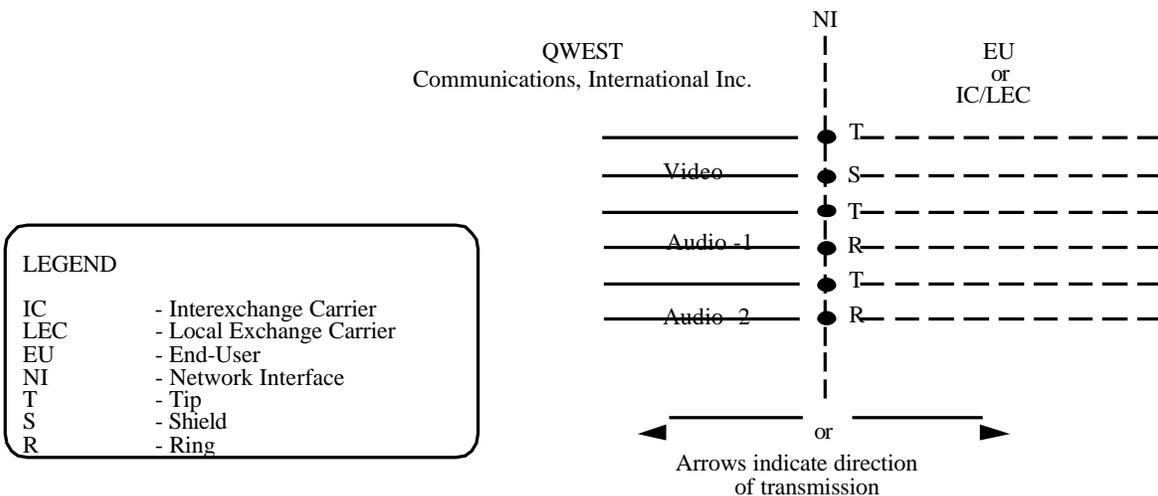


### 3.8.3 Interface Type 06TV6.15A

Application:	Provides one-way transmission of a standard 525-line/60-field monochrome or System M-NTSC color video signal, and two associated 15-kHz audio signals
Operating mode:	Full-time video and associated audio signals
Physical description:	Coaxial cable with BNC connector for video and two-conductor (T, R) with 310-type plug for audio
Service:	TV3

Electrical Features	Video	Audio
Impedance:	75 ohms unbalanced	600 ohms balanced
Overload point:	1.2 V peak-to-peak (Sync tip to reference white)	+18 dBm at 404 Hz at a maximum of 4 sec.
Operating Levels (nominal): 1 V peak-to-peak (Sync tip to reference white)		0 dBm (max) program level
Max. Steady-State Levels: (Averaged over one second)	N/A	+8 dBm, 50 Hz = f = 404 Hz 0 dBm, 404 Hz < f = 15 kHz
Frequency range:	30 Hz to 4.2 MHz	50 Hz to 15 kHz

Illustration:

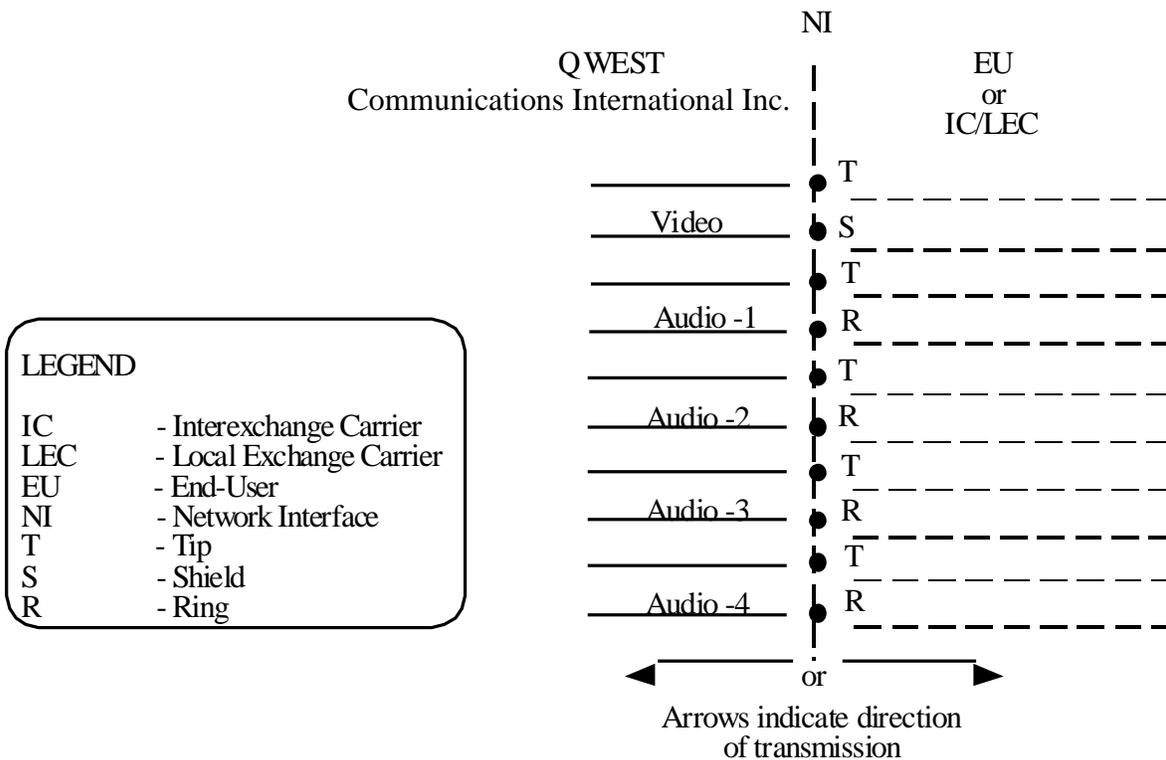


### 3.8.4 Interface Type 10TV6.15A

Application:	Provides one-way transmission of a standard 525-line/60-field monochrome or System M-NTSC color video signal, and four associated 15-kHz audio signals
Operating mode:	Full-time video and associated audio signals
Physical description:	Coaxial cable with BNC connector for video and two-conductor (T, R) with 310-type plug for audio
Service:	TV3

Electrical Features	Video	Audio
Impedance:	75 ohms unbalanced	600 ohms balanced
Overload point:	1.2 V peak-to-peak (Sync tip to reference white)	+18 dBm at 404 Hz at a maximum of 4 sec.
Operating Levels (nominal):	1 V peak-to-peak (Sync tip to reference white)	0 dBm (max) program level
Max. Steady-State Levels: (Averaged over one second)	N/A	+8 dBm, 50 Hz < f = 404 Hz 0 dBm, 404 Hz < f = 15 kHz
Frequency range:	30 Hz to 4.2 MHz	50 Hz to 15 kHz

Illustration:



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## **4. Performance Specifications**

### **4.1 Performance**

QWEST will design a network solution using appropriate technology to meet the customer's performance needs of Fiber Optic Commercial Video Service TV3 for a System M-NTSC video signal and optional 15-kHz audio signal(s) as prescribed in this publication for end-to-end Access and Non-Access Service.

- For video signal performance, refer to Table 4-1, Video Signal Transmission Service Channel End-to-End Performance specifications.
- For audio signal performance, refer to Table 4-2, Audio Signal Transmission Service Channel End-to-End Performance specifications.

### **4.2 Availability**

The availability of a video and audio transmission service channel is the portion of time that the transmission service channel is capable of performing its function. Availability is deemed interrupted for any of the following reasons:

- Continuity of the transmission service channel is interrupted.
- Picture or audio quality is deemed unusable due to transmission service channel impairment.

The availability depends on the reliability of the transport facility and the network equipment. The reliability of a video system may be affected by the equipment used and architecture of the system as well as the maintenance/restoral procedures employed for the system. The objective for QWEST will be based on the design and installation for the particular application.

**Table 4-1** Video Signal Transmission Service Channel End-To-End Performance Specifications

PARAMETER	STANDARD
Amplitude response versus frequency (50-IRE-unit sine wave)	
0.5 MHz	+2.5 to -2.4 IRE units
1.0 MHz	+3.5 to -3.2 IRE units
2.0 MHz	+4.7 to -4.3 IRE units
3.0 MHz	+6.1 to -5.4 IRE units
3.58 MHz	+3.6 to -3.3 IRE units
4.2 MHz	+7.4 to -6.4 IRE units
Chrominance-to-luminance gain inequality	+7 to -7 IRE units
Chrominance-to-luminance delay inequality	+60 to -60 ns
Field-time waveform distortion	3 IRE units peak-to-peak
Line-time waveform distortion	2 IRE units peak-to-peak
Short-time waveform distortion	3.5%
Long-time waveform distortion	8 IRE units peak, 3-second settling time
Insertion gain	+5.9 to -5.5 IRE units
Insertion gain variation	
Hourly	+5.9 to -5.5 IRE units
Over one second	+3.5 to -3.3 IRE units
Luminance nonlinearity	10 IRE units
Differential gain	10 IRE units or 10%
Differential phase	3°
Chrominance-to-luminance intermodulation	4 IRE units
Chrominance nonlinear gain	
20-IRE-unit chroma signal	± 5 IRE units
80-IRE-unit chroma signal	± 5 IRE units
Chrominance nonlinear phase	5°
Dynamic gain of picture signal	6 IRE units
Dynamic gain of the synchronizing signal	2.8 IRE units
Transient synchronizing signal nonlinearity	5 IRE units
Signal-to-weighted-random-noise ratio (10 kHz-4.2 MHz)	54 dB
Signal-to-low-frequency-noise ratio (0-10 kHz)	43 dB
Signal-to-periodic-noise ratio (300 Hz-4.2 MHz)	57 dB

**Table 4-2** Audio Signal Transmission Service Channel End-To-End Performance Specifications

PARAMETER	STANDARD
Amplitude response versus frequency Frequency Range 50 to 100 Hz 101 to 7500 Hz 7501 to 15000 Hz	Response Limits +0.5 db to -1.0 dB +0.5 db to -0.5 dB +0.5 db to -1.0 dB
Total harmonic distortion plus noise (4 sec/404 Hz/+18 dBm)	0.5%
Signal-to-noise ratio	56 dB
Insertion gain @ 400 Hz (nominal)	0 dB ± 0.5 dB
Gain difference between channels 50 to 15000 Hz	=1.0 dB
Phase difference between channels	
50 to 100 Hz	=10°
101 to 7500 Hz	= 3°
7501 to 15000 Hz	=10°
Crosstalk plus noise	
50 to 15000 Hz	Crosstalk shall not degrade the measured signal/noise ratio by more than 0.5 dB
Audio-to-video time differential range	25 ms lead
	40 ms lag

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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 (NI) at their location.

The customer or their 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 or other demarcation point may sometimes be necessary to isolate the trouble. The methods of measurement and test signals shall be derived from American National Standards Institute (ANSI) documents ANSI T1.502-1988, "Telecommunications - System M-NTSC Television Signals - Network Interface Specifications and Performance Parameters" and RS-250C-1989, "Electrical Performance for Television Transmission Systems."

### **5.2 QWEST Responsibilities**

QWEST is responsible for all equipment and cable on the QWEST side of the network interface at the customer location.

QWEST is responsible for maintaining the transmission facility between customer locations, which may include an interoffice facility.

QWEST will furnish the customer a trouble reporting telephone number and will initiate action to clear customer trouble within a time period of twenty minutes after receiving the trouble report.

QWEST is committed to a four-hour maximum service restoral time, with a two-hour objective, in the event of a service interruption due to an electronic component failure. If the trouble is caused by a cable failure, the maximum service restoral time is eight hours.

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## **6. Definitions**

### **6.1 Acronyms**

ANSI	American National Standard Institute
CO	Central Office
EU	End-User
FOT	Fiber Optic Terminal
IC	Interexchange Carrier
LATA	Local Access and Transport Area
LEC	Local Exchange Carrier
NC	Network Channel
NCI	Network Channel Interface
NI	Network Interface
NTSC	National Television Systems Committee (Signal)
POT	Point of Termination

### **6.2 Glossary**

#### **American National Standard Institute (ANSI)**

An organization supported by the telecommunications industry to establish performance and interface standards.

#### **Amplitude Response Versus Frequency**

The amplitude response of a channel over the bandwidth provided. It is often called frequency response, and commonly is referred to as a single frequency within the passband.

#### **Bandwidth**

The range of frequencies that contain most of the energy or power of a signal; also, the range of frequencies over which a circuit of system is designed to operate.

#### **Carrier (CXR)**

An organization whose function is to provide telecommunications services.

### **Central Office (CO)**

A local switching system (or a portion thereof) and its associated equipment located at a wire center.

### **Channel**

An electrical or photonic (in the case of fiber optic based transmission systems) communications path between two or more points of termination.

### **Customer Premises**

Denotes a building or portion(s) of a building occupied by a single customer or End-User either as a place of business or residence. Adjacent buildings and the buildings on the same continuous property occupied by the customer not separated by a public thoroughfare, are also considered the customer's premises.

### **dBm**

A decibel in which the reference power is one milliwatt.

### **End-User (EU)**

The term "End-User" denotes any customer of telecommunications service that is not a carrier; except that a carrier shall be deemed to be an "End-User" to the extent that such carrier uses a telecommunications service for administrative purposes, without making such service available to others, directly or indirectly. The term is frequently used to denote the difference between a carrier interface and an interface subject to unique regulatory requirements at non-carrier customer premises (FCC Part 68, etc.).

### **Facilities**

Facilities are the transmission paths between the demarcation points serving customer locations, a demarcation point serving a customer location and a QWEST Communications International Inc. Central Office, or two QWEST Communications International Inc. offices.

### **Fiber Optic Terminal (FOT)**

The terminating or originating portion of a fiber optic system that performs both an electrical to optical conversion and a multiplexing function.

### **Gain/Frequency Characteristic**

The change, plus or minus, in insertion loss or gain of a channel at specified frequencies.

### **Insertion Loss**

Insertion loss is the ratio (expressed in dB) of the power delivered to a specified load at the receiving interface by a specified source at the transmitting interface to the power delivered by the same source directly to an identical load.

### **Interexchange Carrier (IC)**

Any individual, partnership, association, joint-stock company, trust, governmental entity or corporation engaged for hire in interstate or foreign communication by wire or radio, between two LATAs.

### **Intermodulation Distortion**

A measure of the nonlinearity of a channel.

### **IRE Unit**

Unit equal to 1/140 of the peak-to-peak amplitude of the video signal, which is typically one volt. IRE is an acronym for Institute of Radio Engineers, the organization, which defined the unit.

### **Local Access and Transport Area (LATA)**

A geographic area for the provision and administration of communications service. It encompasses designated exchanges that are grouped to serve common social, economic and other purposes.

### **Local Exchange Carrier (LEC)**

The regulated entity providing Access and IntraLATA services.

### **Network Channel (NC) Code**

The Network Channel (NC) code is an encoded representation used to identify both switched and non-switched channel services. Included in the code set are customer options associated with individual channel services, or feature groups and other switched services.

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

The Network Channel Interface (NCI) code is an encoded representation used to identify five (5) interface elements located at a Point of Termination (POT) at a central office or at the Network Interface at a customer location. The Interface code elements are: Total Conductors, Protocol, Impedance, Protocol Options, and Transmission Level Points (TLP).

### **Network Interface (NI)**

The point of demarcation on the End-User's premises at which it is QWEST Communications International Inc. responsibility for the provision of Access or Non-Access Service ends.

### **NTSC (National Television Systems Committee) Signal**

The standard North American television transmission signal format intended for the transmission of 525-line/60-field color or monochrome video and associated audio signals.

### **Ohm**

The unit of electric resistance.

### **Phase Difference, Stereo**

The phase difference at a given frequency between one channel of a stereo pair, used as a reference, and the other.

### **Point Of Termination (POT)**

The physical telecommunications interface that establishes the technical interface, the test point(s), and the point(s) of operational responsibility.

### **Protocol Code**

The Protocol (character positions 3 and 4 of the NCI Code) is a two-character alpha code that defines requirements for the interface regarding signaling and transmission.

**Return Loss**

Denotes a measure of the similarity between the two impedances at the junction of two transmission paths. The higher the return loss, the higher the similarity.

**Signal-To-Noise Ratio (S/N Ratio)**

The ratio of the signal power to the noise power at a given point in a given system (usually expressed in decibels).

**Transmission Service Channel**

A one-way transmission path between two designated points.

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## 7. References

### 7.1 Telcordia Publications

TR-TSV-000338      *Television Special Access and Local Channel Services - Transmission Parameter Limits and Interface Combinations. Issue 2, August 1993.*

### 7.2 American National Standards Institute (ANSI)

ANSI T1.502-1988      *System M-NTSC Television Signals - Network Interface Specifications and Performance Parameters*

EIA/TIA RS-250C-1989      *Electrical Performance for Television Transmission Systems*

ANSI T1.223-1991      Telecommunications - Information Interchange - Structure and Representation of Network Channel (NC) and Network Channel Interface (NCI) Codes for the North American Telecommunications System.

### 7.3 Document Ordering Information

All documents are subject to change and their citation in this document reflects the most current information available at the time of printing. Readers are advised to check status and availability of all documents.

Those who are not QWEST employees may order;

American National Standards Institute (ANSI) documents from:

American National Standards Institute  
Attn: Customer Service  
11 West 42nd Street  
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