U S WEST
Communications, Inc.
Technical Publication

U S WEST COMMERCIAL
VIDEO DATA SERVICE

77345
Issue A
May 1995

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1. Introduction

1.1 Purpose

This document describes U S WEST Fiber Optic Commercial Video Data Service (CVDS) offered by U S WEST to its customers for Intrastate Service. It covers distinguishing service features, technical specifications and defines valid interfaces.

1.2 Reason for Reissue

This is a new publication. If this document is reissued, the reason will be noted in this paragraph.

1.3 Scope

The intent of this document is to describe U S WEST Fiber Optic Commercial Video Data Service . This applies where uncompressed digital video transport is deployed for a customer. This service offering provides two digital data channel interfaces at data rates of either 1.544 Mbit/s or 44.736 Mbit/s for a customer to use with a computer modem or similar communications device between customer locations. Sufficient technical detail is furnished to describe the Network Interfaces (NIs) and Network Channel (NC) option used to configure an end-to-end communications channel link. It is not the intent of this document to provide special ordering information, but to describe the technical features of this service offering.

Throughout the remainder of this publication, the term CVDS shall be used in place of the phrase Commercial Video Data Service.

This CVDS Interface offering is a new option for the current Fiber Optic Commercial Video Service that is described in U S WEST Technical Publication 77326, Issue D. It will not be used with any other Private Line Service.

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Figure

2. Description of Service

2.1 Applicability of Technical Specifications

The technical specifications presented in this document are applicable to U S WEST Fiber Optic Commercial Video Data Service (CVDS) only for Intrastate Service. It does not attempt to describe the transmission equipment used to provide this interface.

2.2 General

U S WEST Fiber Optic CVDS provides two digital data channel interfaces for a customer to use with a computer modem or similar communications device between customer locations. The interface is a new option for the current U S WEST Fiber Optic Commercial Video Service described in the U S WEST Technical Publication 77326
"U S WEST Fiber Optic Commercial Video Service." This applies where uncompressed digital video transport is deployed for a customer.

2.2.1 Transmission Equipment and Facilities Configuration

U S WEST will provide an interface comprised of an electrical and physical channel connection as described in this publication. For example this CVDS could be deployed as shown in Figure 2-1 on page 2-2, where a point-to-point, one-way video system is portrayed. The interface allows the customer to access the allotted data channel via a digital data card. Two-way service requires two one-way Commercial Video Service channels.

There are two choices of service available to the customer depending on the digital bit rate desired. One service is CVDS 1.5 Mbit/s and the other is CVDS 45 Mbit/s. Note, it is explained in Chapter 5 that these data channels will not have the service performance parameters as traditional DS1 or DS3 services. The electrical signal characteristics will be similar however as noted in Chapter 5.

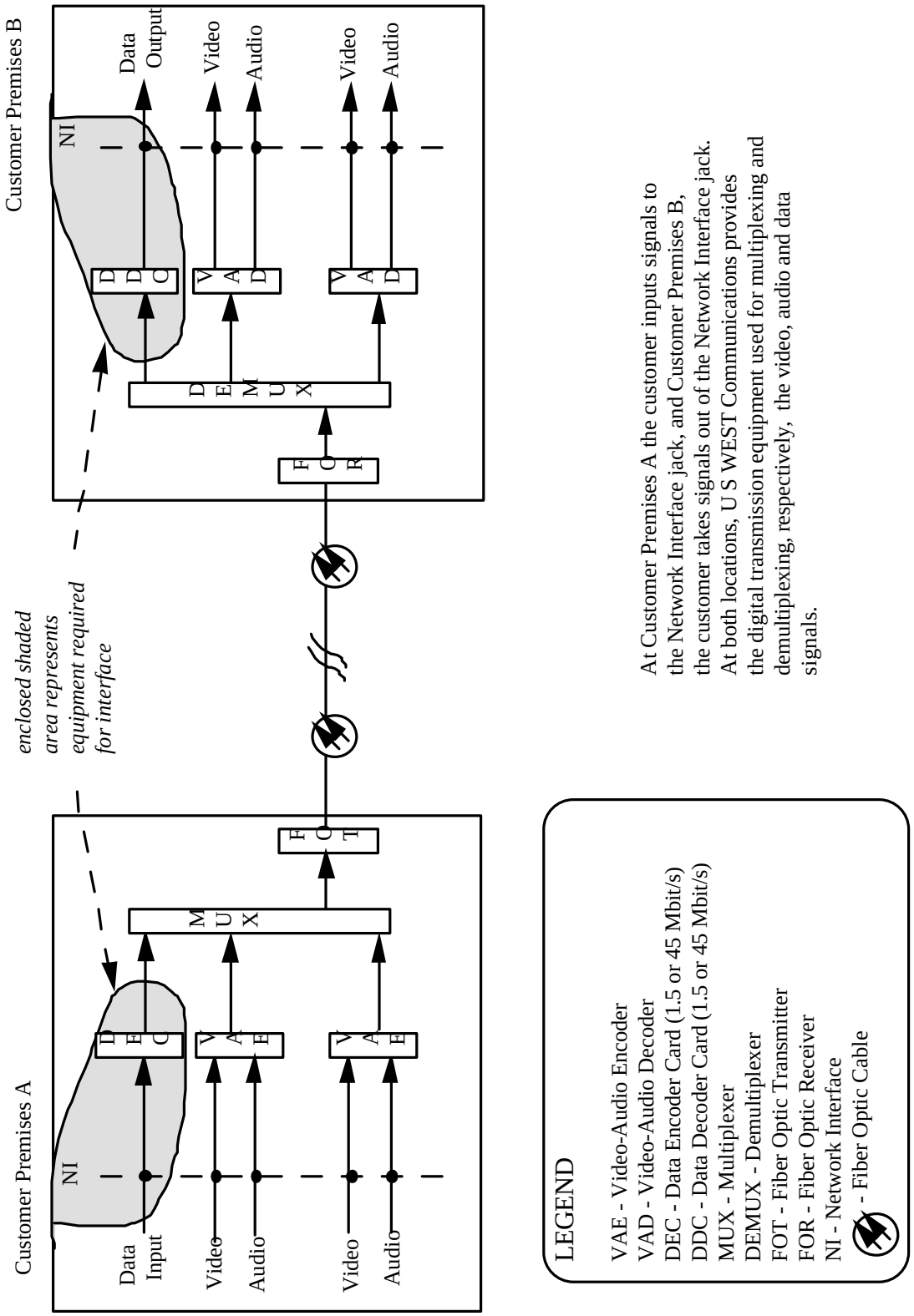

Figure 2-1 U S WEST Fiber Optic CVDS

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3. Channel and Interface Specifications

3.1 General

This chapter provides information about the Network Channel (NC) Code and the Network Channel Interface (NCI) Codes used with U S WEST Fiber Optic Commercial Video Data Service (CVDS). The codes correspond to a typical configuration of Figure 2-1, which should help with understanding what must be ordered to obtain CVDS.

3.2 Network Channel (NC) Code

The Fiber Optic CVDS interface is defined by its NC and 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 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 NC code consists of four character positions as shown in Table 3-1. The first two characters, TZ (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 a particular NC code. For CVDS the options use the characters A and D.

Table 3-1 U S WEST Fiber Optic CVDS NC Code for Intrastate 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 U S WEST.
			Commercial Quality (Note: Meets NTSC "End-to-End" Video/Audio Signal Performance per ANSI T1.502-1988)
		D	Data Channel (Note: The data channel is not subject to ANSI T1.502-1988)

3.3 Network Channel Interface (NCI) Code

The electrical interface with the U S WEST network is described by an NCI code for each end of the service. The interface codes for the service must be specified by the customer when ordering U S WEST Fiber Optic CVDS.

The NCI code identifies five interface elements at the Network Interface (NI). The interface elements are: (1) The number of conductors, (2) protocol, (3) impedance, (4) protocol option, and (5) Transmission Level Point (TLP). The reader may refer to Table 3-2 for a glossary of protocol codes and selected options that apply to CVDS, and to Table 3-3 for a list of applicable impedance codes.

Table 3-2 Glossary of Protocol Codes and Selected Options

Code	Option	Definition
DU		Digital Access Interface (for customer provided equipment)
	JN	No framing format B8ZS without line power 1.544 Mbit/s
	KN	No framing format AMI without line power 1.544 Mbit/s
DS		Electrical 44.736 Mbit/s interface
	44A	No framing format B3ZS 44.736 Mbit/s

Table 3-3 Impedance

Value (ohms)	Code
75 (coaxial cable)	6
100 (twisted pair)	9

The TLP position represents the *direction of service* as noted by one assigned alpha character (the letter "O"). Also, there is a hyphen indicating that *data channel signal level is specified* by U S WEST at both the transmit and receive ends. Table 3-4 indicates how the elements for direction of service and CVDS signal level should be used.

Table 3-4 TLP Position

TLP	Definition
O-	CVDS signal is transmitted from one customer location to U S WEST with a data channel signal level as noted. See Section 4.2.
-O	CVDS signal is received at another customer location from U S WEST with a CVDS signal level as noted. See Section 4.2.

These interface elements are further illustrated and described in the following sections, including three figures (3-1, 3-2 and 3-3) for the two data rates available for CVDS 1.5 Mbit/s and CVDS 45 Mbit/s.

3.3.1 CVDS 1.5 Mbit/s

CVDS 1.5 Mbit/s is defined according to the line code selected by the end-user, which can be either Binary, 8 zero substitution (B8ZS) or Bipolar Alternate Mark Inversion (AMI), as referenced in ANSI T1.102-1993. A no-framed format shall be supported for either line code. They are shown in the following text.

Figure 3-1 shows the NCI Code for 1.5 Mbit/s data channel with no framing format and B8ZS line code without line power. In this example, the signal is being transmitted from the end-user to U S WEST.

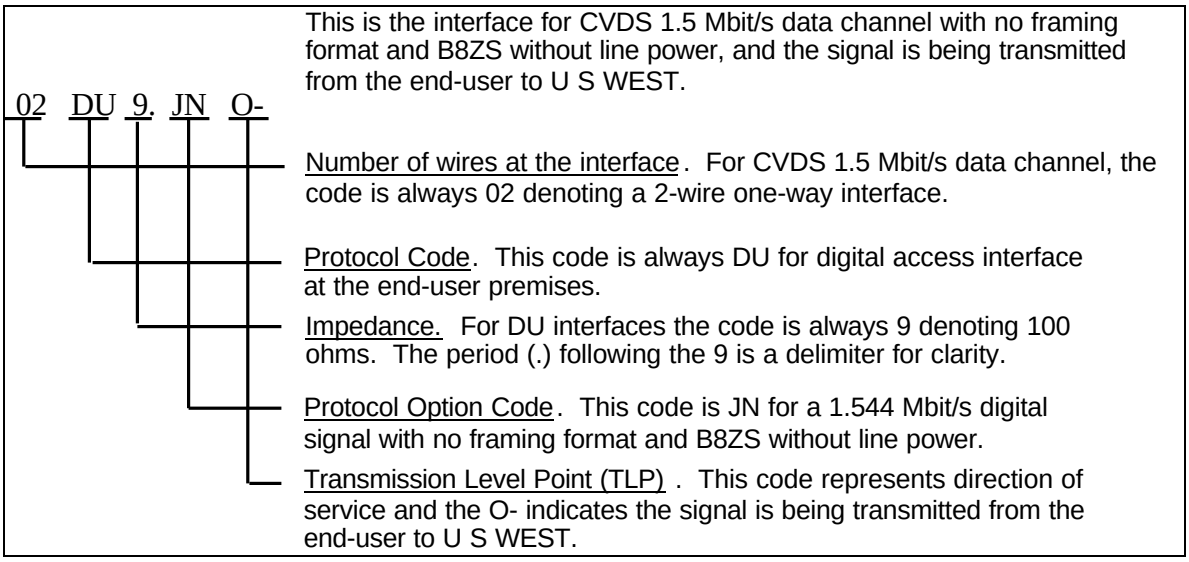

Figure 3-1 CVDS 1.5 Mbit/s No Framing B8ZS Without Line Power NCI Code

Figure 3-2 shows the NCI Code for 1.5 Mbit/s data channel with no framing format and AMI line code without line power. In this example the signal is being transmitted from the end-user to U S WEST.

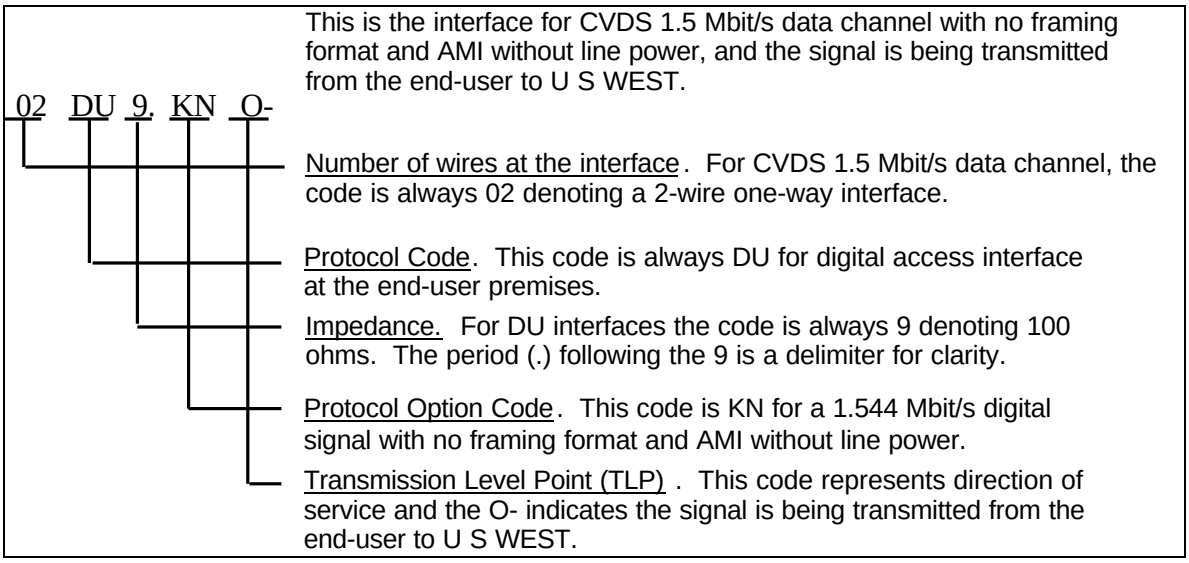

Figure 3-2 CVDS 1.5 Mbit/s No Framing AMI Without Line Power NCI Code

3.3.2 CVDS 45 Mbit/s

CVDS 45 Mbit/s specifies a line code of Binary, 3 zero substitution (B3ZS) with no framing format. Figure 3-3 shows the NCI Code for CVDS 45 Mbit/s. In this example, the signal is being transmitted from the end-user to U S WEST.

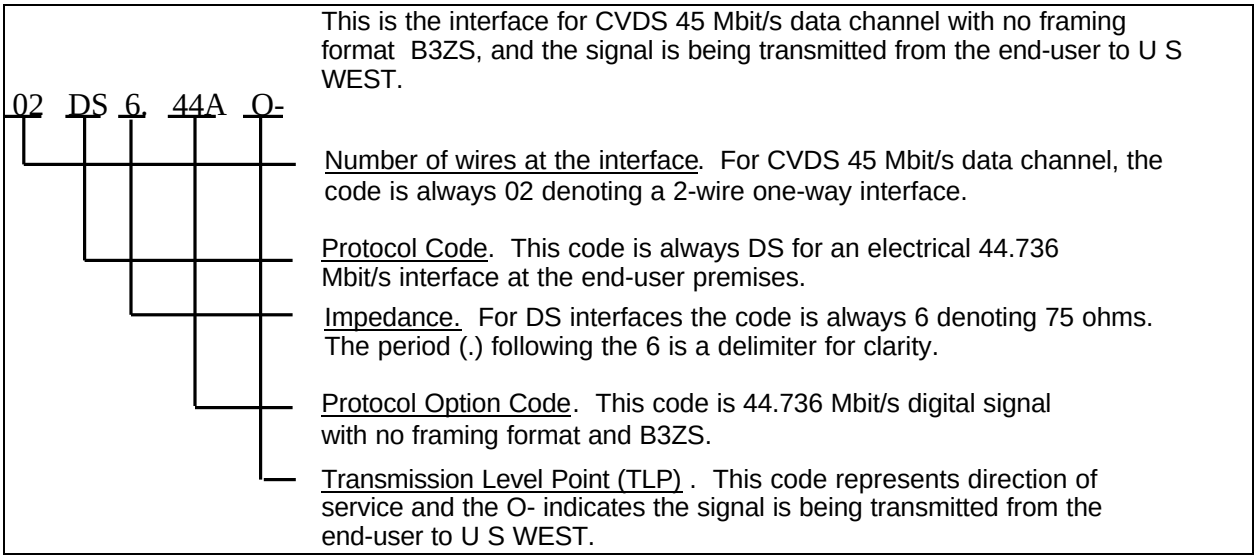

Figure 3-3 CVDS 45 Mbit/s No Framing B3ZS NCI Code

3.4 NCI Code Combinations

The NCI code combinations for the U S WEST Fiber Optic CVDS interfaces are listed in Table 3-5. This table shows both directions of the signal.

Table 3-5 U S WEST Fiber Optic CVDS NCI Code Combinations for Intrastate Service

Television Special Access and Local Channel Service	NC Code	End-User (EU) Transmit NCI Code	End-User (EU) Receive NCI Code
TV3 (1.5 Mbit/s B8ZS) TV3 (1.5 Mbit/s AMI) TV3 (45 Mbit/s)	TZAD	02DU9.JN.O- 02DU9.KN.O- 02DS6.44A.O-	02DU9.JN.-O 02DU9.KN.-O 02DS6.44A.-O
		End-User (EU) Receive NCI Code	**End-User (EU) Transmit NCI Code**
TV3 (1.5 Mbit/s B8ZS) TV3 (1.5 Mbit/s AMI) TV3 (45 Mbit/s)	TZAD	02DU9.JN.-O 02DU9.KN.-O 02DS6.44A.-O	02DU9.JN.O- 02DU9.KN.O- 02DS6.44A.O-

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4. Description of Signal

4.1 General

This chapter provides information about the electrical and physical interface specifications used in provisioning U S WEST Fiber Optic Commercial Video Data Service (CVDS). This will guide the customer in determining how to configure its signal hand-off at each end of the CVDS circuit.

4.2 Electrical Interface Specifications

There are two choices of service available depending on the data channel deployed by the customer and these are supported by the following interface specifications.

- Table 4-1 CVDS 1.5 Mbit/s Interface Specifications
- Table 4-2 CVDS 45 Mbit/s Interface Specifications

Table 4-1 CVDS 1.5 Mbit/s Interface Specifications

Bit Rate	1.544 Mbit/s ± 50 bit/s
Signal Format	B8ZS or AMI line coding
Frame Format	No framing
Power Level	Range of 12.6 dBm to 17.9 dBm in a band no wider than 3 kHz centered at 772 kHz Power in a band no wider than 3 kHz centered at 1.544 Mhz shall be at least 29 dB below that at 772 kHz
Output Pulse Waveform	ANSI T1.102-1993
Pulse Imbalance	Less than 0.5 dB difference between the total power of the positive pulses and the total power of the negative pulses
Jitter Tolerance	ANSI T1.102-1993
Input Line Build Out	0 to 655 ft.
Output Line Build Out	0 to 655 ft.
Input & Output Impedance	100 ohms, balanced
Input & Output Cable Characteristics	22 or 24 gauge ABAM or equiv.
Connector	RJ48C 8-wire jack

Table 4-2 CVDS 45 Mbit/s Interface Specifications

Bit Rate	44.736 Mbit/s ± 20 ppm
Signal Format	B3ZS line coding
Power Level	Range of -1.8 dBm to 5.7 dBm in a band no wider than 3 kHz centered at 22.368 Mhz; Power in a band no wider than 3 kHz centered at 44.736 Mhz shall be at least 20 dB below that at 22.368 MHz
Output Pulse Waveform	ANSI T1.404-1994
Jitter Tolerance	ANSI T1.404-1994
Input Line Build Out	0 to 450 ft.
Output Line Build Out	0 to 450 ft.
Input & Output Impedance	75 ohms, unbalanced
Input & Output Cable Characteristics	AT&T type 728A or equiv.
Connector	BNC

4.3 Physical Environment Specifications

4.3.1 Connectors

Connection of the CVDS at the Network Interface to an End-User shall be as follows for CVDS 1.5 Mbit/s and CVDS 45 Mbit/s.

The U S WEST Jack Panel will be used as the Network Interface demarcation point with the end-user.

For CVDS 1.5 Mbit/s, configure with a two-wire twisted pair and a RJ48C 8-wire jack min-modular connector as shown in Figure 4-1.

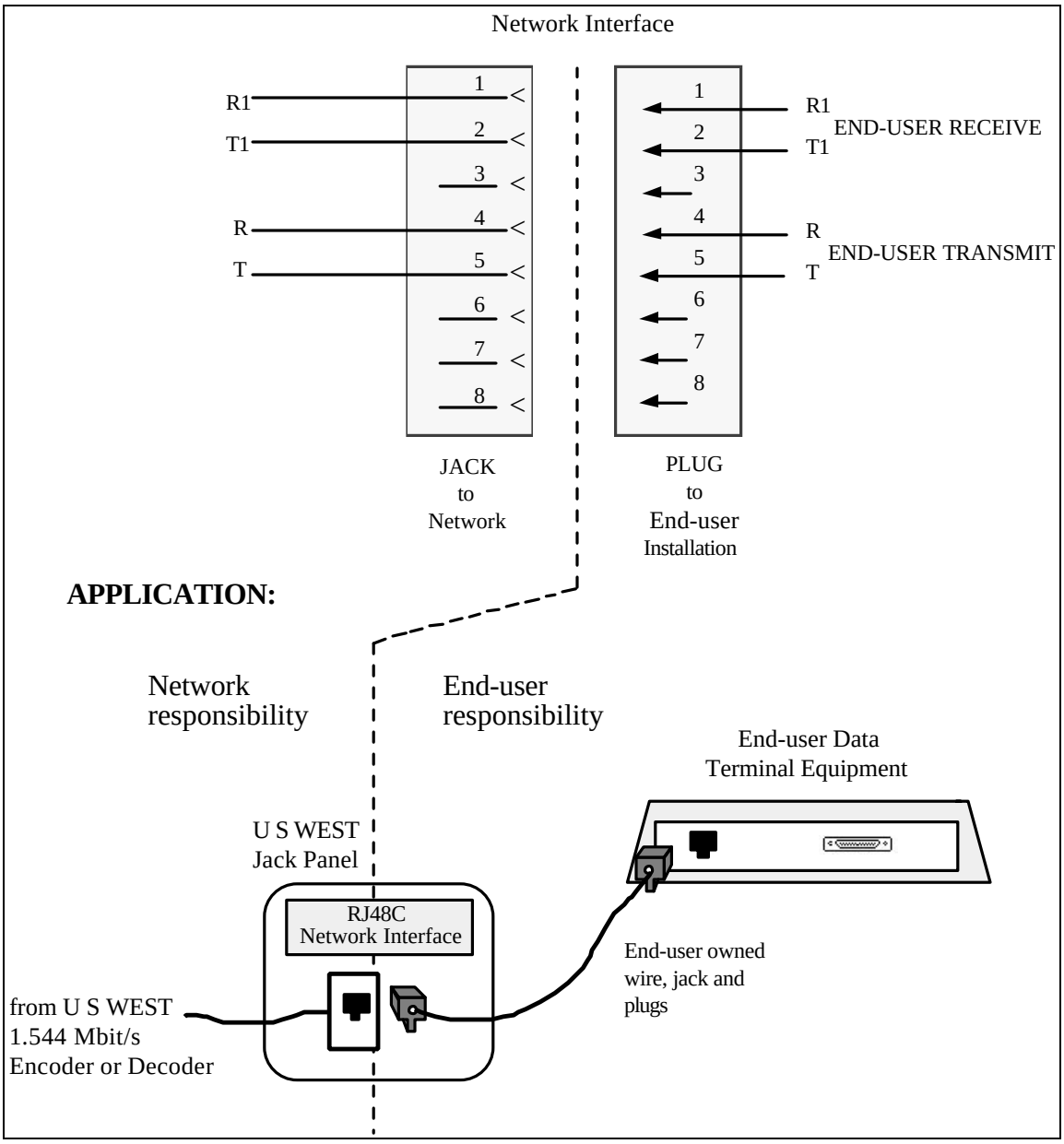

Figure 4-1 CVDS 1.5 Mbit/s Network Interface Connection

For CVDS 45 Mbit/s, configure with a coaxial cable and a Bayonet Quick Connect (BNC) coax connector as shown in Figure 4-2. For a more detailed description of BNC connectors, refer to the Department of Defense Military Specification, MIL-C-39012C, "General Specification for Radio Frequency Coaxial Connectors."

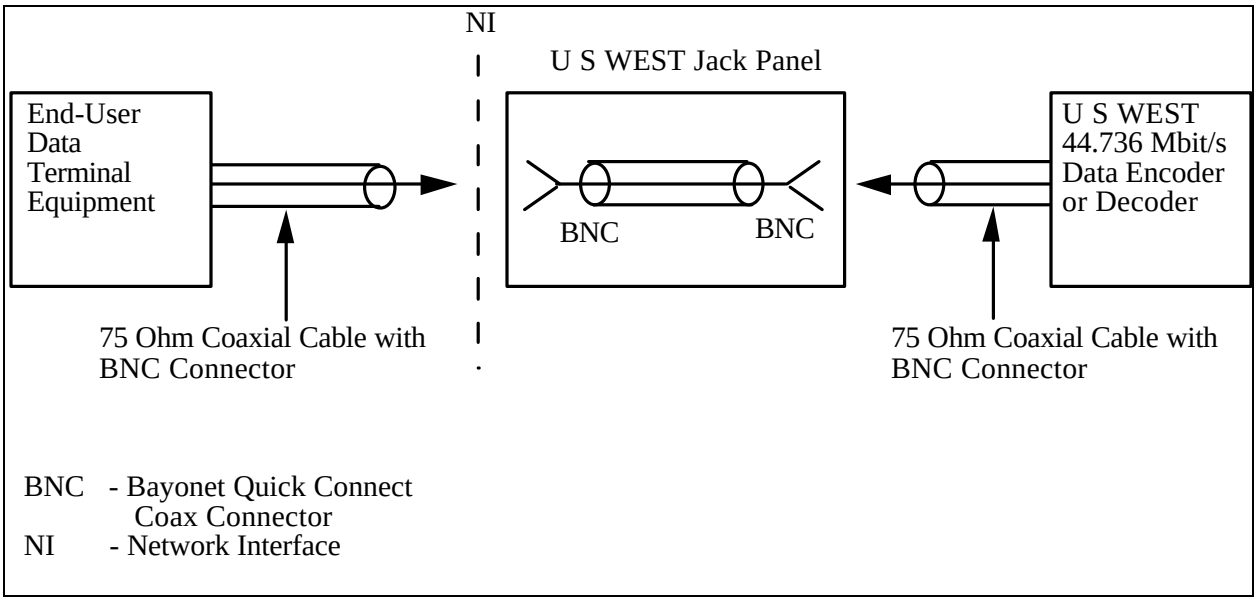

Figure 4-2 CVDS 45 Mbit/s Network Interface Connection

4.3.2 Environmental

The environmental conditions on the customer premises, such as ambient temperature and humidity, shall conform to the parameters specified in Technical Publication 77326, (see Section 8.2). There are no additional requirements for the CVDS that would not already be provided for the Fiber Optic Commercial Video Service.

4.3.3 Power

There are no additional power requirements for the CVDS as it uses the requirements specified for Fiber Optic Commercial Video Service.

5. Performance Specifications

5.1 Performance

U S WEST will provide the appropriate equipment required to meet the customer's needs of U S WEST Fiber Optic Commercial Video Data Service (CVDS) as prescribed in this publication for Intrastate Services. Performance specifications are defined for the data channel only and not for any specific customer application.

U S WEST will not be responsible for clocking or synchronization of any customer service applied to this interface. The U S WEST circuit will not provide a clocking source for the customer equipment. U S WEST will not provide performance monitoring for these CVDS data channel services as it does for DS1 or DS3 services. Though the signals have similar characteristics, the performance assurance is limited to the continuity of the fiber optic facility over which these services are transported.

5.2 Availability

The availability of the U S WEST Fiber Optic Commercial Video Data Service is the portion of time that the data channel is capable of performing its function. Availability is deemed interrupted for any of the following reasons:

- Continuity of the data channel is interrupted.
- Data channel quality is deemed unusable due to transmission service channel impairment of the Commercial Video Service (referring to the optical transport and not a specific video signal).

Customer provided AC power is used to power the CVS system. There is a possibility that electrical surges could interfere with the data channel circuit because the AC power system may not be adequately protected from lightning strikes, or transient line currents. U S WEST does not provide AC power filters or an uninterruptible power source for CVDS.

This service is not offered with automatic protection of a backup circuit; if there is an interruption to the continuity of the data channel, a delay will occur in restoral of service as outlined in Chapter 6, Maintenance, U S WEST Responsibilities.

6. Maintenance

6.1 Customer Responsibilities

The customer is responsible for all equipment and cable on the customer side of the network interface at their location in accordance with the procedures outlined in U S WEST Technical Publication 77326 (see Section 8.2).

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 U S WEST 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. U S WEST will not be responsible for clocking or synchronization of any customer service applied to this interface.

6.2 U S WEST Responsibilities

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

U S WEST is responsible for maintaining the transmission facility between customer locations which may include an interoffice facility.

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

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

7. Definitions

7.1 Acronyms

ANSI	American National Standards Institute
AMI	Alternate Mark Inversion
BNC	Bayonet Quick Connect Coax Connector
B3ZS	Binary, 3 Zero Substitution
B8ZS	Binary, 8 Zero Substitution
CO	Central Office
CVS	Commercial Video Service
CVDS	Commercial Video Data Service
EU	End-User
IC	Interexchange Carrier
LATA	Local Access and Transport Area
LEC	Local Exchange Carrier
NC	Network Channel
NCI	Network Channel Interface
NI	Network Interface
RF	Radio Frequency
TLP	Transmission Level Point

7.2 Glossary

Alternate Mark Inversion (AMI)

A one (mark) pulse which is the opposite polarity as its predecessor.

Carrier (CXR)

An organization whose function is to provide telecommunications services.

Central Office (CO)

A local switching system (or 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.

Decibel (dB)

The logarithmic unit of signal power ratio most commonly used in communications. It is used to express the relationship between two signal powers, usually between two acoustic, electrical, or optical signals; it is equal to ten times the common logarithm of the ratio of the two signal powers. For reference purposes, the output and input signal power is related to a specific level called a dBm, where zero dBm (Log 1 = 0) equals 1 milliwatt (mW) at a specified impedance.

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 (Federal Communications Commission 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 U S WEST Central Office, or two U S WEST offices.

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.

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 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 the U S WEST Communications, Inc. responsibility for the provision of Access or Non-Access service ends.

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.

8. References

8.1 American National Standards Institute Documents

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.*

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

ANSI T1.102-1993 Telecommunications - *Digital Hierarchy - Electrical Interfaces*

ANSI T1.404.1994 Telecommunications - *Network-to-Customer Installation - DS3 Metallic Interface Specification*

8.2 U S WEST Technical Publications

77326 *U S WEST Fiber Optic Commercial Video Service* , Issue D, December 1994

8.3 Department of Defense Military Specifications

MIL-C-39012C General Specification for Radio Frequency Coaxial Connectors.

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