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AMERITECH UNBUNDLED DIGITAL LOOPS TECHNICAL SPECIFICATIONS

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GENERAL

This document describes the Unbundled Digital Loops offered by Ameritech. This service provides a digital transmission path of 64 Kbps, 160 Kbps, 784 Kbps, up to 640 Kbps/6Mbps, or 1.544 Mbps of bandwidth between the customer premises Network Interface (NI) and the central office NI (CO-NI).

1. INTRODUCTION

1.1. PURPOSE

The intent of this document is to provide customers, service providers, and equipment manufacturers with a description of the service, and operational characteristics and interface descriptions for Ameritech's Unbundled Digital Loops.

1.2. REASON FOR REISSUE

This document is being revised to correct a typographical error in Table B .

1.3. UNBUNDLED DIGITAL LOOPS

Unbundled Digital Loops are transmission paths capable of carrying digital signals from the NI on a customer's premises to an Ameritech central office. Unbundled loops may be provided using a variety of transmission technologies including, but not limited to, copper wire, mid-span repeaters, copper wire based digital loop carrier and fiber optic based digital loop carrier systems. Such technologies can be used singularly or in tandem to provide an unbundled loop.

2. SERVICE DESCRIPTION

2.1. UNBUNDLED DIGITAL LOOPS

An Unbundled Digital Loop is a transmission path that runs from an Ameritech Central Office (CO) (from a main distribution frame or other suitable frame called the CO-NI) to the customer's network interface (CUST-NI) located on the customer's premises.

The transmission parameters associated with the loop as defined above are specified by the following interfaces:

- A 4-wire 64 Kbs digital interface to a transmission path designed to carry digital signals of 64 Kbs.
- A 2-wire 160 Kbs interface transmission path designed to carry digital transmission up to a maximum binary information rate of 160 Kbs.

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- A 4-wire 1.544 Mbps interface transmission path designed to carry digital signals of 1.536 Mbps usable bandwidth.
- A 2-wire digital transmission path designed to carry digital transmissions up to a maximum binary information rate of 784 Kbps.
- A 4-wire digital transmission path designed to carry digital transmissions up to a maximum binary information rate of 784 Kbps over each of two 2-wire transmission paths.
- An asymmetrical 2-wire digital transmission path designed to carry digital transmissions up to a maximum information rate of 640 Kbps in one direction and up to a maximum information rate of 6 Mbps in the opposite direction, simultaneously.

2.2. APPLIED POWER LEVEL

The applied power level of any transmitted signal level must comply with ANSI specification T1.403, T1.410, and T1.601. Continuous voltages applied to these loops must fall within the range of 0 to - 140 volts D.C. with respect to ground potential.

3. NETWORK CHANNEL AND NETWORK CHANNEL INTERFACE CODES

3.1. GENERAL

Network Channel (NC) codes describe, in standard format, the characteristics of the service channel. Network Channel Interface (NCI) codes describe the physical and electrical characteristics of the NI. These coding schemes are fully described in Bellcore Special Report SR-ST5-000307, Industry Support Interface (IS): NC/NCI Code Dictionary.

3.2. NC CODES*

The NC codes currently available for Unbundled Digital Loops are shown in Table A .

**Table 1.
Table A - NC Codes**

NC Code	Option Code Char 3	Option Code Char 4
XD 64 Kbps	A	-
UB 160 Kbps	-	-

HC 1.544 Mbps	(X) *	- I (23 B+D) U (24 B)
LX 784 Kbps	-	-
LX 640 Kbps/6 Mbps	-	-

* (x) = Any valid code.

3.3. NCI CODES

NCI codes describe the NI. Table B shows the currently available NCI codes for Unbundled Digital Loops.

Table 2.
Table B - NCI Codes

NCI Code		Description
CUST - NI	CO - NI	
02IS5	02QC5.OOS	ISDN Basic Rate w/2B1Q Format
04DU5.64	04QC5.OOQ	64 Kbps DS-0A Format
04DU9.(X)(X)**	04QB9.11	1.544 Mbps DS-1 Format*
04DS9.(X)(X)**	04QB9.11	1.544 Mbps DS-1 Format*
02NO9.	02QB9.00 A	ADSL Compatible Loop (2 Wire)
02NO5.	02QB5.00 H	HDSL Compatible Loop (2 Wire)
04NO5.	04QB5.00 H	HDSL Compatible Loop (4 Wire)

* See SR-ST5-000307 for a detailed listing of NC/NCI codes.

** (X) = Any valid code.

4. TECHNICAL SPECIFICATIONS

4.1. GENERAL

This section details the technical characteristics, available configurations, signaling capabilities (if any), transmission performance parameter limits, and information concerning the compatible network interfaces for each of the Unbundled Digital Loops.

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4.2. TRANSMISSION PERFORMANCE

The transmission performance parameter limits for Unbundled Digital Loops are found in the following listed Bellcore documents.

64 Kbps Loops

- Technical Reference TR-NWT-000341, Digital Data Special Access Service

160 Kbps Loops

- TR-TSY-000776, Network Interface Description for ISDN Customer Access
- TR-NWT-000397, ISDN Basic Access Transport System Requirements
- TR-NWT-000393, ISDN Basic Access Digital Subscriber Lines

784 Kbps Loops

- ANSI Report No. 28. A Report on High-Bit-Rate Digital Subscriber Lines (HDSL).

1.544 Mbps Loops

- Technical Reference TR-NWT-000054, High Capacity Digital Service (1.544Mb/s) Interface Generic Requirements for End Users
- Technical Reference TR-INS-000342, High Capacity Digital Special Access Service. Transmission Parameter Limits and Interface Combination.

640 Kbps/6 Mbps Loops

- ANSI T1.413-1995. Asymmetric Digital Subscriber lines (ADSL).

4.2.1. TRANSIT DELAY

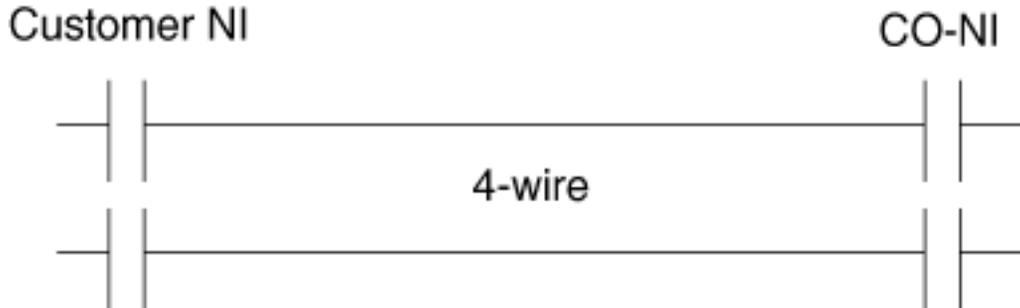
One way transit delay for a DS-1 loop may be as much as 500 to 600 microseconds.

One way transit delay for 160K bps and 64K bps loops may be as much as 2.5 milliseconds.

4.3. INTERFACE ILLUSTRATION

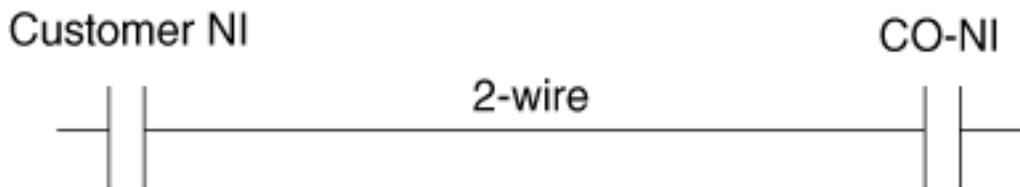
4.3.1. 64 KBPS INTERFACE

Figure 1. 64 Kbps Digital Loop Configuration



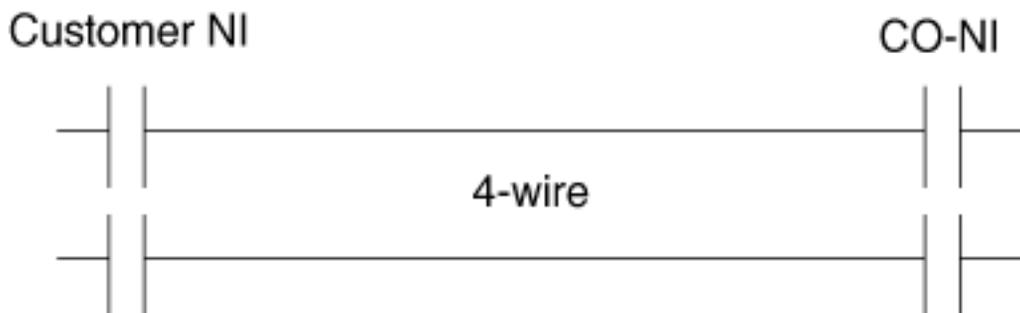
4.3.2. 160 KBPS INTERFACE

Figure 2. 160 Kbps Digital Loop Configuration



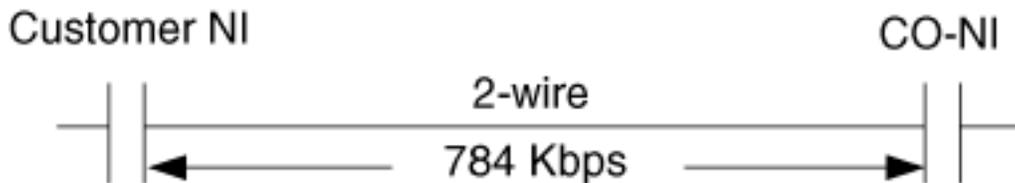
4.3.3. 1.544 MBPS INTERFACE

Figure 3. 1.544 Mbps Digital Loop Configuration



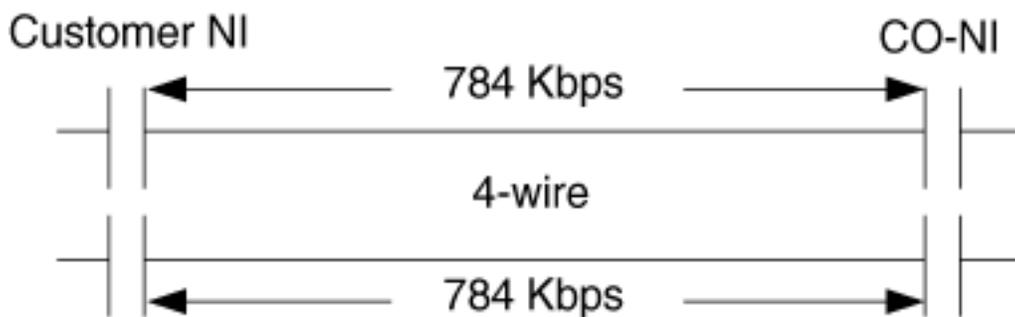
4.3.4. 784 KBPS 2-WIRE INTERFACE

Figure 4. 784 Kbps 2-Wire Digital Loop Configuration



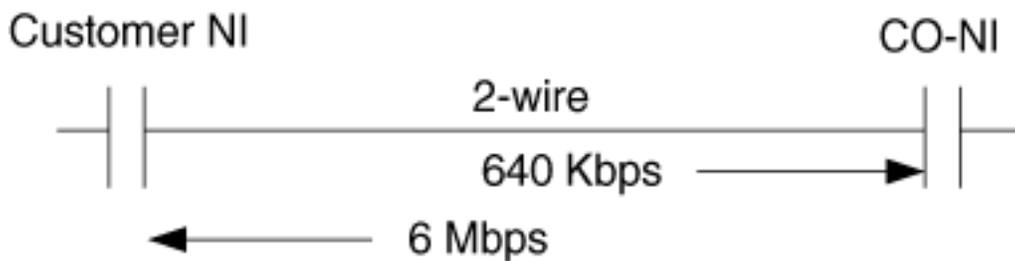
4.3.5. 784 KBPS 4-WIRE INTERFACE

Figure 5. 784 Kbps 4-Wire Digital Loop Configuration



4.3.6. 640 KBPS/6 MBPS 2-WIRE INTERFACE

Figure 6. 640 Kbps/6 Mbps 2-Wire Digital Loop Configuration



5. REFERENCES

1. American National Standards Institute (ANSI) T1.601-1992, ISDN Basic Access Interface for Use on Metallic Loops for Application on the Network Side of the NT1 (Layer 1 Specifications)

2. American National Standards Institute (ANSI) T1.403-1989, Carrier-to-Customer Installation DS-1 Metallic Interface
3. American National Standards Institute (ANSI) T1.410-1992, Carrier-to-Customer Metallic Interface Digital Data at 64 K BITS/S and Subrates
4. American National Standards Institute (ANSI) Report No. 28, February 1994. A Report on High-Bit-Rate Digital Subscriber Lines (HDSL)
5. American National Standards Institute (ANSI) T1.413-1995, Network and Customer Installation Interfaces—Asymmetric Digital Subscriber Line (ADSL) Metallic Interface
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9. Bellcore Technical Reference TR-NWT-000341, Digital Data Special Access Service
10. Bellcore Technical Reference TR-NWT-000054, High Capacity Digital Service (1.544 Mb/s) Interface Generic Requirements for End Users
11. Bellcore Technical Reference TR-INS-000342, High Capacity Digital Special Access Service. Transmission Parameter Limits and Interface Combinations
12. Code of Federal Regulations, Section 47, Part 68 Connection of Terminal Equipment to the Telephone Network
13. AM TR-TMO-000080 , Issue 2, June 1993. Ameritech Services Network Channel and Network Channel Interface Codes - General Availability
14. Bellcore Special Report SR-STS-000307, Industry Support Interface (ISI); NC/NCI Code Dictionary

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