AM-TR-TMO-000114

Metallic Service Interface Specification

(IntraLATA and Special Access Service)

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1. INTRODUCTION

1.1. General

This document describes Metallic Grade IntraLATA and Special Access Services offered by Ameritech to its customers. It covers distinguishing service features, technical requirements, and valid interfaces.

Customers of Special Access Services consist of Interexchange Customers (ICs) and End Users (EUs). This document differentiates the IC from the EU when necessary.

An IC desiring to service a Local Access and Transport Area (LATA) must establish one or more Points of Presence (POPs) within the LATA for connection of its facilities with those of Ameritech. Ameritech will provide facilities from an EU Point of Termination (EU-POT) to an IC Point of Termination (IC-POT) within a LATA. A POT is the physical point where Ameritech's access service terminates and the customer's facilities begin.

IntraLATA service is wholly contained within the LATA. It connects two end user locations, or an end user location and a central office where bridging occurs.

1.2. Purpose

The purpose of this document is to describe Metallic Grade Services interface combinations and technical requirements supported by Ameritech. In particular, it is to provide a quantitative and qualitative description of the services and their interfaces at the customer locations, so that compatible operation will be achieved.

It is not the intent of this document to provide specific ordering information.

The service configurations in this document are offered by Ameritech where appropriate facilities are available. Specific services or arrangements not described in this document may be available through direct negotiation of special arrangements. This document is a companion document to Bellcore TR-NPL-000336, "Metallic and Telegraph Grade Special Access Services."

1.3. Applicability of Technical Requirements

The technical requirements presented in this document are applicable to Metallic Grade Services. Existing services with performance requirements exceeding the requirements in the currently applicable tariff will be maintained to the performance of the currently applicable tariff.

The transport of any signals applied to Ameritech's facilities other than those signals specified in the applicable tariff is not supported. "Derived" functionality beyond those of the tariffed service is not supported.

1.4. Alternative Arrangements

This document attempts to characterize Metallic Grade Services as completely and as accurately as possible. However, characteristics of equipment used by Ameritech to provide service may change and in some locations may differ from the characteristics described here. The facilities described here may not be available in all locations. If cases arise that have not been addressed in this document, Ameritech will cooperate with the customer and attempt to identify solutions to customer problems and needs.

1.5. Organization of Document

This document consists of five sections. A glossary and a references section are also included.

Section 1 addresses general concerns, this document's purpose and applicability, alternative arrangements, and document organization.

Section 2 provides a brief description of the services, including service features and options.

Section 3 covers the technical requirements for the special access services. This includes sketches and technical characteristics. Acceptance limits and immediate action limits are included, where appropriate.

Section 4 includes compatibility tables for access services.

Section 5 covers the technical requirements for the IntraLATA services. Acceptance limits and immediate action limits are included, where appropriate.

2. GENERAL DESCRIPTION

2.1. Description of Services

Metallic Special Access Services, MT1 through MT3, and IntraLATA Metallic Services are nonswitched services used for applications such as alarm, pilot wire, protective relaying, and DC tripping protective relaying.

Equivalent Metallic Facilities (EMF) may be used by Ameritech in lieu of metallic facilities. The EMF channel, if used, will contain DC metallic simulation devices that may limit or distort input signals that do not meet the requirements specified in this document. EMF channels will operate in accordance with the parameters specified in AM TR-TMO-000101, “Digital Performance Specification for DS-3, DS-1 and DS-0 Services.” EMF channels will exhibit delay characteristics comparable to copper facilities.

2.1.1. Special Access Service MT1

Special Access service MT1 provides a metallic or equivalent pair electrical transmission path between an EU-POT and the IC-POT. Signal transfer rates up to 30 baud are supported. This service may utilize EMF in lieu of copper facilities. The transmission path may or may not have DC continuity.

2.1.2. Special Access Service MT2

Special Access service MT2 provides a metallic or equivalent pair electrical transmission path, which may be connected to a number of EU-POTs. The path’s transmission function is dependent upon the EU’s requirements. Industry standard McCulloh alarm signaling, and Bell and Lights are examples of access services provided by MT2. This service is not intended to support frequencies greater than 60 Hz. McCulloh applications are limited to a maximum of 20 network interfaces wired in a series (or equivalent) electrical path. The recommended maximum number of wire centers is three. This service may utilize EMF in lieu of copper facilities. The transmission path may or may not have DC continuity. Signaling speeds are up to 15 bps.

2.1.3. Special Access Service MT3

Special Access service MT3 provides for the transmission of Dc and/or low-frequency (60-Hz) control signals between an EU-POT and the IC-POT. Central office bridging for connection to a

third point is available. This service may utilize EMF in lieu of copper facilities. The transmission path may or may not have DC continuity.

2.1.4. IntraLATA Metallic Service

IntraLATA Metallic Service provides a metallic or equivalent electrical transmission path, which may be connected in arrangements similar to access services MT1, MT2 and MT3, depending on the service ordered. This service may utilize EMF in lieu of copper facilities. This service may or may not have DC continuity.

2.2. Service Configurations

2.2.1. Effective 2-Wire

All Metallic Services MT1 through MT3 and IntraLATA can be provided over Effective 2-Wire facilities.

2.3. Optional Features

2.3.1. Special Access Services MT1 and MT3

Special Access services MT1, MT3 and IntraLATA service may have a second NI bridged to the first.

2.3.2. Special Access Service MT2

Special Access service MT2 and IntraLATA, e.g., McCullough service may be connected to a maximum of 20 EU interfaces. A series or equivalent series electrical path through all NIs is required. A maximum of 5,000 Ohms total loop resistance is allowed for point-to-point services.

3. TECHNICAL REQUIREMENTS - SPECIAL ACCESS SERVICE

3.1. General

Metallic Grade Services are suitable for use as part of the facilities required to provide services such as alarm, protective relaying, and control/remote metering.

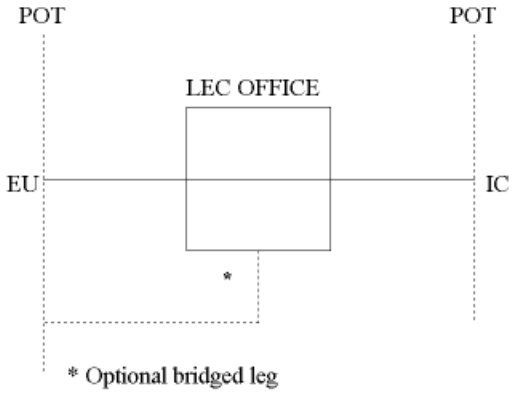
To prevent excessive noise and crosstalk in the telecommunications network, constraints must be placed on the signal power that may be applied at the NI. The signal power limitations contained in the Minimum Protection Criteria for Direct Electrical Connections section of Ameritech's LATA Access Service Tariffs apply to Metallic Services.

3.2. Technical Characteristics of Service

3.2.1. Special Access Service MT1

Special Access service MT1 is provided over a metallic pair (or equivalent) between the EU-POT and the IC-POT. (See Figure 1.) Signal transfer rates up to 30 baud are supported. Maximum and minimum voltages and currents and the minimum leakage resistance are listed below:

Figure 1. Special Access Service MT1

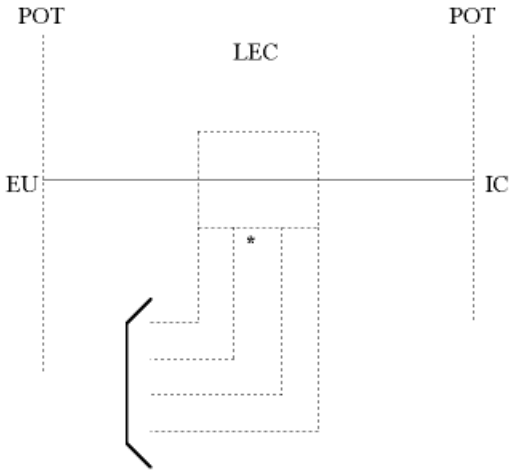


260V..... Maximum DC voltage between conductors
130V (+,-)..... Maximum DC voltage, conductor to ground
4 mA..... Minimum DC current
60 mA..... Maximum DC current
70.7V (20 Hz)..... Maximum peak signal voltage
60 mA (20 Hz)..... Maximum AC current
30 kΩ..... Least DC resistance per loop between conductors and ground
5 kΩ..... Maximum total loop resistance (EU-EU) IntraLATA
2 kΩ..... Maximum total loop resistance (EU-IC) (special access)

3.2.2. Special Access Service MT2

Special Access service MT2 is provided over appropriate metallic or EMF facilities. (See Figure 2.) The service is capable of transporting the three-level signal used in the McCulloh signaling system at speeds up to 15 bps. Maximum voltages and currents are listed below:

Figure 2. Special Access Service MT2



Note: May be up to a maximum of 20 end users (20 cable pairs) at the network interface, or maximum of 5,000 Ohms total loop resistance (PT-PT), not including CPE resistance.

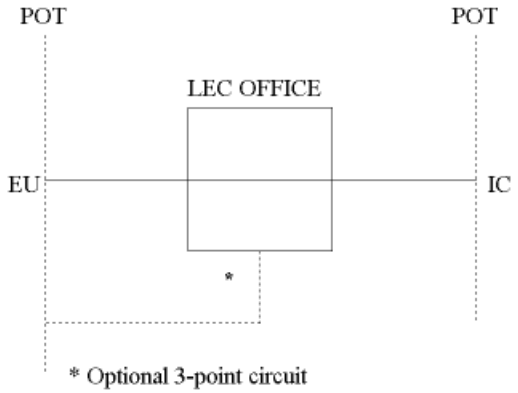
*** Bunching block.**

260V..... Maximum DC voltage between conductors
130V (+,-)..... Maximum DC voltage, conductor to ground
4 mA..... Minimum DC current
21 mA..... Maximum DC current
30 kΩ..... Lowest DC resistance per loop between conductors and ground
.5 mA/CKT/day..... Maximum ground return current

3.2.3. Special Access Service MT3

Special Access service MT3 is provided over a metallic pair or EMF between the EU-POT and the IC-POT. (See Figure 3.) 60-Hz control signals and DC current are transmitted. Maximum voltages and currents and the maximum loop resistance and shunt capacitance are listed below:

Figure 3. Special Access Service MT3



260V..... Maximum DC voltage between conductors
130V (+,-)..... Maximum DC voltage, conductor to ground
4 mA..... Minimum DC current
60 mA..... Maximum DC current
70.7V (60 Hz)..... Maximum peak signal voltage
60 mA (60 Hz)..... Maximum AC current
2 kΩ..... Maximum DC loop resistance for two-point channels
500 Ω..... Maximum DC loop resistance per leg for three-point channels.
1.5 uF..... Maximum shunt capacitance between the conductors on a two-point channel
.5 mA/CKT/day..... Maximum Ground return current

4. NETWORK CHANNEL INTERFACE (NCI) CODE COMPATIBILITY

4.1. NCI Protocol Codes

Table 4-1 shows the NCI protocol codes and selected options supported by Ameritech for Metallic Services.

Table 4-1. Protocol Codes and Selected Options

	Code	Option	Definition
METALLIC	DC		Direct current or voltage
		1	Monitoring interface with serier RC combination (McCulloh format)
		3	Metallic facilities (DC continuity) for dc/low frequency control signals or low speed data (30 baud)

4.2. Compatible NCI Codes

Table 4-2 shows that compatible NCI codes supported by Ameritech.

Table 4-2. Compatible Interface Combinations

	Special Access Service	EU Interface	Interexchange Carrier Interface
METALLIC	MT1 +	2 DC8-3	2 DC8-3
	MT2 +	2 DC8-1	2 DC8-1
	MT3 +	2 DC8-3	2 DC8-3

+ Higher level digital interfaces (DS-1, DS-3 and FC) may also be used at the NI; joint engineering may be required.

4.3. High Capacity Interfaces

For Metallic Grade Services, multiplexed digital interfaces are also available at the NI. When the customer selects a high-capacity interface, the customer is required to supply the system and channel assignment data.

While the high-capacity digital interfaces are available for the Metallic Grade Services at the NI, they are not illustrated in this document. These interfaces are illustrated in the Technical References TR-NPL-000342 describing High Capacity Digital Special Access services.

5. TECHNICAL REQUIREMENTS - INTRALATA SERVICE

5.1. General

Metallic Grade Services are suitable for use to provide services such as alarm, protective relaying, and control/remote metering.

To prevent harm (e.g. excessive noise and crosstalk) in the telecommunications network, constraints must be placed on the signal power that may be applied at the NI. The signal power limitations contained in the Minimum Protection Criteria for Direct Electrical Connections section of Ameritech's LATA Access Service Tariffs apply to Metallic Services.

5.2. IntraLATA Metallic Service

IntraLATA service, depending upon service ordered, will be configured as shown in Figures 1, 2 or 3, between customer interfaces.

IntraLATA service is provided over a metallic pair or EMF between the customer's NIs. Signal transfer rates up to 30 baud, control signals up to 60 Hz and DC current are transported over this service.

Minimum and maximum voltages and currents and maximum resistances and capacitances are listed below.

Table 5-1

INTRALATA METALLIC SERVICE SPECIFICATIONS

Signaling Rate – 30 baud maximum

DC Current

4 mA minimum
60 mA maximum

AC Current

60 mA maximum

DC Loop Resistance (point to point only)

5000 Ohms maximum – Total circuit DC resistance not including the customer's equipment, NI to NI.

Voltages Supported

70.7	vAC	Peak signal voltage (60 Hz)
+ 130	vDC	Maximum conductor to ground
- 130	vDC	Maximum conductor to ground
260	vDC	Maximum between conductors

Leakage Resistance to Ground –30 Ohms

1.5 uF	Maximum shunt capacitance between the conductors on a two-point channel.
1.8 uF	Maximum shunt capacitance between the conductors on a three-point channel.
.5mA/CKT/day	Maximum ground return current.

6. GLOSSARY

Baud

A unit of digital signal rate. The signal rate, in baud, is equal to the reciprocal of the length in seconds of the signal element when all signal elements have equal length. If signal elements are not of equal length, as in “start-stop” character asynchronous operation, the signal rate (in baud) is expressed as the reciprocal of the length of the shortest signal element. The information rate in bits-per-second may be greater than the baud rate because one signal element can represent more than one bit.

Bit

An abbreviation of binary digit; one of the members of a set of two in the binary numeration system, e.g., either of the digits 0 or 1. Also, a unit of information; one bit of information is sufficient to specify one of two equally likely possibilities.

Carrier

See Interexchange Carrier (IC).

Channel

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

Circuit (CKT)

Effective 2-Wire

A condition that permits the simultaneous transmission in both directions over a channel, but it is not possible to ensure independent information transmission in both directions.

Equivalent Metallic Facility (EMF)

End User (EU)

Any individual, partnership, association, corporation, government agency, or any other person or entity that (a) obtains a common line or uses a pay telephone in the operating territory of the LEC, or (b) subscribes to serves provided by an IC or uses the services of an IC when the IC provides service(s) for its own use.

Facilities

An cable, poles, conduit, microwave, or carrier equipment, wire center distributing frames, central office switching equipment, computers (both hardware and software), business machines, etc., used to provide (1) the services offered by the LEC, or (2) the services provided by an IC for its own use or for an IC-EU's use.

IC Terminal Location

See Point of Presence (POP).

Interexchange Customer (IC)

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

Interface Code

A 4-part code that describes the interface between the LEC and the IC or EU. It identifies the number of wires at the interface, the protocol via a protocol code, the nominal impedance, and a protocol option.

Local Access and Transport Area (LATA)

A geographic area established 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)

Point to Presence (POP)

A physical location within a LATA established by an IC for the purpose of obtaining LATA access and LEC-provided access services. POP applies to both switched and dedicated access, although different POPs may be used for different services. Also called IC terminal location.

Point of Termination (POT)

The demarcation point between a LEC and an EU or IC. This point establishes the technical interface, the test point(s), and the point(s) of division of operational responsibility.

Protocol Code

A component of an interface code that is readily associated with the basic electrical function of the interface.

Special Access Service

A service that provides a transmission path with a LATA to directly connect a POT to an EU's premises or to another POT.

Wire Center

The location of one or more local switching systems or a portion thereof. A location at which customer loops converge.

REFERENCES

Publication Number	Title
TR-NPL-000336	Metallic and Telegraph Grade Special Access Services.
TR-INS-000342	High Capacity Digital Special Access Service, Transmission Parameter Limits and Interface Combinations.
TR-TMO-000101	Ameritech Digital Service Transmission Parameters.

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