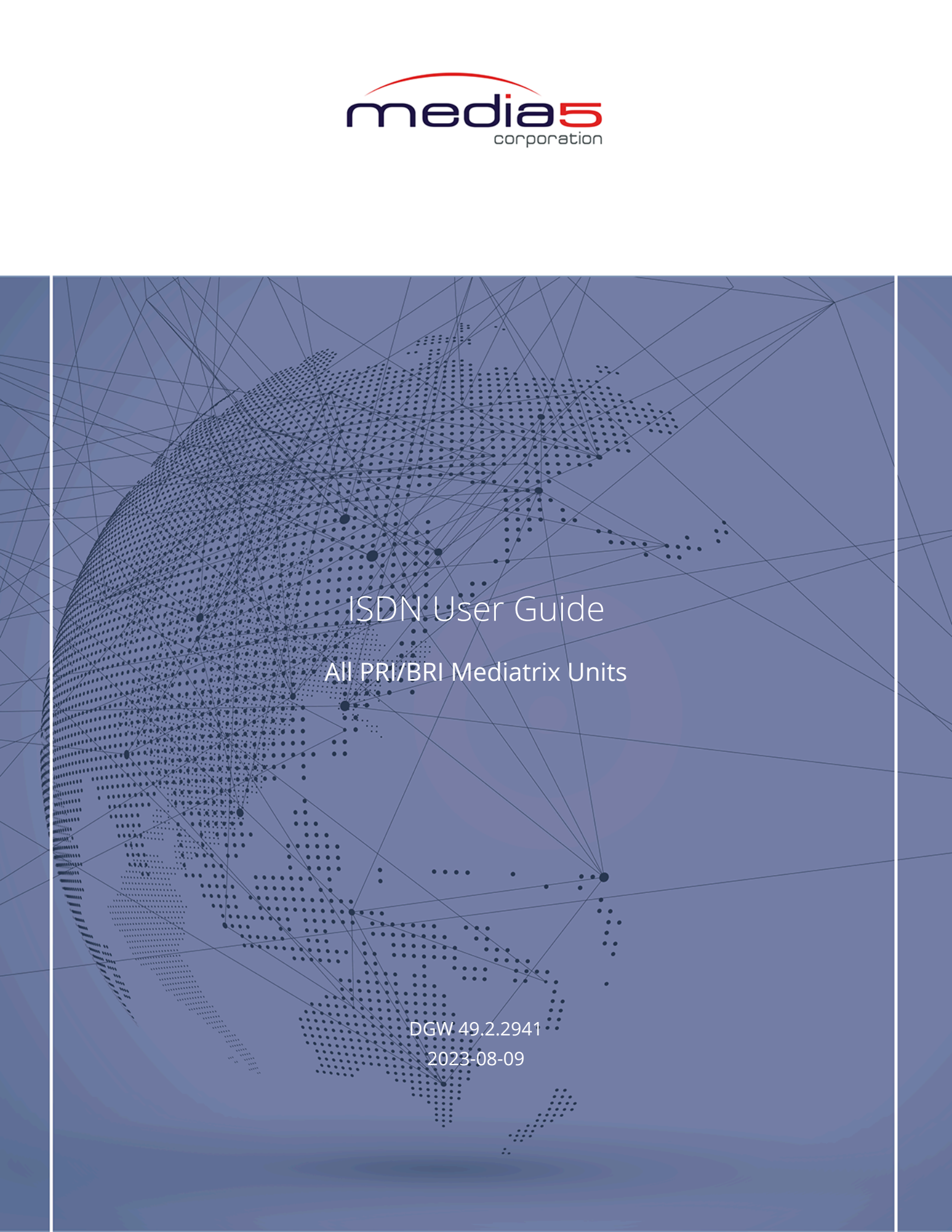


The background of the cover is a dark blue gradient. It features a complex, abstract graphic of a globe or sphere on the left side, composed of a dense grid of small dots. A network of thin, light blue lines connects various points across the globe and extends towards the right side of the page, creating a sense of global connectivity and data flow.

ISDN User Guide

All PRI/BRI Mediatix Units

DGW 49.2.2941
2023-08-09

Table of Contents

Important Information to Know Before Starting	4
Definitions	5
Basic Concepts	6
Integrated Services Digital Network (ISDN)	6
Auto configuration	6
Preset Configuration	7
PRI (E1/T1) Configuration	8
Important Information for North America	8
Supported Signaling Protocols	8
Important PRI Settings	9
Using a Preset Configuration File	10
Associating a PRI Port to a Line Type and Protocol	10
Configuring the E1T1 Interface (PRI)	11
BRI Configuration	12
Important BRI Settings	12
Configuring the BRI Interface	13
Auto-Detecting and Auto-Configuring ISDN Interfaces	16
Verifying the ISDN Status	18

Advanced Concepts	20
Definitions	20
Inband Tones Generation	20
Signal Handling	21
Interop Parameters	22
Channel Allocation Strategy	22
Ressource Management	23
Supplementary Services	23
Default Values for Call Properties	38
Advanced Tasks	40
Enabling ISDN Supplementary Services	40
Configuring Interop Parameters	40
Modifying Port Pinout	41
Exporting a Preset Configuration File	41
Other Advanced ISDN Parameters	42
Cabling Information	43
ISDN Reference Points	43
BRI S/T Connection (RJ-48)	43
PRI Connection (RJ-48)	44
Online Help	46
DGW Documentation	47
Copyright Notice	48

Important Information to Know Before Starting

Before you start, make sure your unit is properly installed. Refer to the [Hardware Installation Guide of your unit](https://documentation.media5corp.com), published on the Media5 Documentation portal at <https://documentation.media5corp.com> and refer to the Cabling Information section.



Caution: The Mediatrix unit ISDN BRI ports are configurable to operate as network or terminal ports. The pin-out of the sockets is switched according to this configuration. Wrong port configurations, wrong cabling or wrong connections to neighbouring equipment can lead to short circuits in the BRI line powering.



Caution: The Mediatrix unit BRI ports can be used as a S or T reference point, but not as U reference points (2-wire). Never connect a U reference point network equipment or telephony line into the Mediatrix unit BRI ports. If you are using an S-BUS, you can simultaneously connect only one unit in NT mode and up to 7 units in TE mode.

Definitions

Term	Description
BRI	Basic Rate Interface
E1	European PRI digital signal carrier. 32 channels (30 voice channels + synchronization and signaling)
ISDN	Integrated Services Digital Network
NT	Network Termination. The endpoint on the telephone switch side.
PRI	Primary Rate Interface
T1	North-American PRI digital signal carrier. 24 channels (23 voice + 1 signaling)
TE	Terminal Equipment, the endpoint on the customer side

Basic Concepts

Integrated Services Digital Network (ISDN)

ISDN is a set of digital transmission protocols defined by a few international standards body for telecommunications, such as the ITU-T. One or the other of these protocols are accepted as standards by virtually every telecommunications carrier all over the world.

ISDN replaces the traditional telephone system so that one or two pairs of telephone wires can carry voice and data simultaneously. It is a fully digital network where all devices and applications present themselves in a digital form. ISDN is a User-Network Interface (UNI) signalling protocol with a user and a network side.

- The user side is implemented in ISDN terminals (phones, terminal adapters, etc.)
- The network side is implemented in the exchange switches of the network operator.
- Both sides have different signaling states and messages.

The Mediatrix unit ISDN interfaces can be configured to work as user (TE) or network (NT) interfaces. Depending on your product, you can configure two types of ISDN interfaces:

- ISDN Basic Rate Interface (BRI)
- ISDN Primary Rate Interface (PRI)

Auto configuration

The ISDN auto configuration is a process by which all ISDN interfaces try several configuration combination in order to obtain a physical link up and then a signaling link up (PRI interfaces only). The process is started using the `Isdn.AutoConfigure` command and can be stopped with the `Isdn.CancelAutoConfigure` command. Starting the command will abruptly terminate all ongoing calls on the ISDN interfaces. Once the auto configuration process completes (successfully or not), a notification is sent reporting the result. If the operation is successful, the following parameters will be set with the values that provided the link up (overwriting the user configuration):

- Endpoint Type
- Clock Mode
- Port Pinout (PRI interfaces only)
- Line Coding (PRI interfaces only)
- Line Framing (PRI interfaces only)

Preset Configuration

The ISDN Preset Configuration contains a set of values for the configuration of the parameters used by the ISDN connections.

The preset configuration files are located in the file system persistent memory. Depending on the Mediatrix unit you are using, the available ISDN Preset configuration files will differ or, it may also be possible that no preset configuration files are available depending on the Profile. Preset configuration files are provided by Media5 or can be user-defined, i.e. the current ISDN configuration was exported from a unit.

Using preset configuration files is especially useful for:

- units that do not use the default values provided by Media5 (for instance, using T1 instead of E1)
- using the same configuration on several units

IMPORTANT: user-defined presets are not kept in the event of a partial or factory reset. Only script files can be used as preset ISDN configuration files.

PRI (E1/T1) Configuration

Important Information for North America

Mediatrix units are configured to default for E1, which is used in most countries in Europe, Middle-East, Africa and Oceania. For the T1 interface used in North America, some settings **MUST** be changed.

Setting	T1 (North America)	E1 (Default)
Line Coding	B8ZS	HDB3
Line Framing	ESF (usually), or SF(D4)	CRC4 (usually), or NO-CRC4
Signaling Protocol	NI2 (usually)	DSS1 (usually)
Preferred Encoding Scheme	u-Law	a-Law
Fallback Encoding Scheme	a-Law	u-Law
Channel Range	1-23	1-30

Supported Signaling Protocols

Protocol	Description
DSS1	Digital Subscriber Signaling System No.1
DMS100	Digital Multiplex System 100
NI2	National ISDN No.2
5ESS	5 Electronic Switching System
QSIG	ECMA's protocol for Private Integrated Services Networks

IMPORTANT: In North America, the official standard is National ISDN2 (NI2). Virtually all 5ESS, DMS100, and GTD-5 switches have been upgraded to use that standard since the early 2000's. The "5ESS" and "DMS100" Signaling Properties settings are provided only for backwards compatibility only with older switches and PBXes, and might not support some functionalities such as Calling Name Delivery.

Important PRI Settings

Endpoint Type, Clock Mode, and Port Pinout

These settings should normally be auto-detected (Step 1)

- In TE (Terminal Equipment) mode, the unit is normally in slave mode and will automatically update its clock from the other (telco) side.
- In NT (Network Termination) mode, the unit is normally in master mode and will provide the clock to the other side.
- For more information on clock reference when using multiple interfaces, refer to the [Mediatix Gateways and ISDN Clock Synchronisation](#) and [Synchronising Unit Operation \(TDM Sync\)](#) published on the [Media5 Documentation Portal](#).

Signaling Protocol

Refer to the [Supported Signaling Protocols](#) (p.8) section.

Fallback Encoding Scheme

Only valid when receiving a SETUP message. The user sending the SETUP message does not indicate an alternative bearer capability.

Channel Range

This is typically used for fractional T1 or E1 service.

- Channels start at 1 and make abstraction of the synchronisation and signaling timeslots.
- Channels outside of the range defined for this field are ignored. For example:
 - Fractional T1 512K: Channel Range 1-8 (corresponds to B channels 1-8, D channel 24)
 - Fractional E1 on ramp 10: Channel Range 1-10 (corresponds to timeslot 0 + B channels 1-10 + D channel 16)
 - Fractional E1 on ramp 10: Channel Range 1-20 (corresponds to timeslot 0 + B channels 1-15 + D channel 16 + B channels 17-21)

Channels Reserved for Incoming Calls and Channels Reserved for Outgoing Calls

- Bearer channels are by default usable for both incoming and outgoing calls. Use this range to reserve channels for incoming or outgoing calls.
- Channels outside of the range defined by **ChannelRange** parameter are ignored.
- Channels reserved in both **IncomingChannelRange** and **OutgoingChannelRange** parameters are considered usable for both incoming and outgoing calls.
- The space character is ignored and duplication is not allowed.
- Channels must be specified in low to high order.

Calling Name Max Length

The value for calls from SIP to ISDN is set to 34 by default, but ranges from 0 to 82. Some telephone companies do not allow customers to pass Calling Name and will drop calls if it is not set to zero.

Interface Configuration

Call properties set in the Call Router have precedence over the default values of the table. For more details on the Call Router, refer to the [Call Router user guide](#) published on the [Media5 Documentation Portal](#).

Using a Preset Configuration File

Before you start

If you are using a user-defined preset configuration file, do not forget to upload it through the file management system, under **Management/File**.

Steps

- 1) Go to **ISDN/Status**.
- 2) In the **ISDN Preset Configuration** table from the **Local Preset** list, choose the preset configuration file you wish to import.

Note: In North America, the PRI_NorthAmerica-NI2.cfg contains the recommended settings for a connexion with most of the telephone operators.

- 3) Click **Apply**.

Result

The preset configuration file will be uploaded to the unit and applied.

Note: In most cases, the unit will be restarted. Please wait a few minutes for the operation to complete, then log-in again into the Web interface of the unit.

ISDN Preset Configuration	
Local Preset:	PRI_NorthAmerica-NI2.cfg ▾ Apply
Preset Name:	Save

Next Step

[Associating a PRI Port to a Line Type and Protocol](#) (p.10)

Associating a PRI Port to a Line Type and Protocol

Steps

- 1) Go to **System/Hardware**.
- 2) In the **PRI Ports Configuration** table, from the **Line Type** selection list, select either E1 or T1.
- 3) From the **Signaling** selection list, associate a type of signaling to the PRI port.
- 4) Click **Apply**.

- 5) Restart the unit.

Result

The selected line type will appear under **ISDN/Primary Rate Interface**. This is an example of a PRI port association.

PRI Ports Configuration			
Port	Line Type	Signaling	
Slot1/E1T1	E1 ▼	Isdn ▼	
Slot3/E1T1	E1 ▼	Isdn ▼	

Next Step

[Configuring the E1T1 Interface \(PRI\)](#) (p.11)

Configuring the E1T1 Interface (PRI)

Before you start

Endpoint Type, Clock Mode, and Port Pinout: These settings should normally be auto-detected , therefore, always use [Auto-Detecting and Auto-Configuring ISDN Interfaces](#) (p.16) procedure first to automatically detect and to automatically configure your PRI interface. The manual configuration of the PRI interface should be used for fine tuning of the configuration.

Information

Note: Before you start, refer to the [Important Information for North America](#) (p.8) section

Steps

- 1) Go to **ISDN/Primary Rate Interface**.

Note: ISDN ports can be configured while they are active. However they are internally disabled to modify the configuration and then re-enabled. All active calls on the port are dropped during this process. Configuration changes should only be performed during planned down times. Most of the ISDN parameters change require a restart of the ISDN service to be applied.

- 2) From the **Select Interface** drop box, select the E1/T1 interface you wish to modify.

Note: Depending on the Mediatrix model, there may be several interfaces.

- 3) Modify the parameters as required.
- 4) Click **Apply**.

Result

Next Step

[Auto-Detecting and Auto-Configuring ISDN Interfaces](#) (p.16)

BRI Configuration

Important BRI Settings



Caution: The Mediatrix unit BRI ports can be used as a S or T reference point, but not as U reference points (2-wire). Never connect a U SCN line or a U TE into the Mediatrix unit BRI ports. If you are using an S-BUS, you can simultaneously connect only one unit in NT mode and up to 7 units in TE mode.

Endpoint Type

- Values used for the Mediatrix unit must be opposite to the value used for the PBX. For instance, if the PBX is set to TE, then the Mediatrix unit must be set to NT.
- When the BRI interface **Signaling Protocol** is set to QSIG, the endpoint type is only used in the second layer (LAPD) since it is a concept that does not exist in QSIG.
- To use a specific interface as the clock reference, this parameter must be set to TE.

Clock Mode

- **Auto** should be the value to use.
- In a BRI configuration, setting the clock mode to slave for a NT endpoint can be set for interop usage, while setting the clock mode to master for a TE endpoint is invalid (slave mode is automatically applied in this case). For more information on Clock Synchronisation, refer to the [Technical Bulletin -Mediatrix Gateways and ISDN Synchronisation](#) and [Technical Bulletin - Synchronising Unit Operation \(TDM Sync\)](#) published on the [Media5 Documentation Portal](#).

Monitor Link State Parameter

When enabled with the **Ignore OPTIONS on no usable endpoints** also enabled under the **SIP/Interop** page, this will influence how the SIP options are answered.

Connection Type

Depends on the equipment to which the Mediatrix unit port is connected to and it must be the same for all interconnected pieces of equipment.

Signaling Protocol

Must match the connected ISDN equipment or network.

Preferred Encoding Scheme

Only G.711 u-Law and G.711 a-Law codecs are allowed. G.711 u-Law may not be supported by DSS1 NT and TE endpoints. It is recommended to use G.711 a-Law as preferred encoding protocol.

Fallback Encoding Scheme

Only valid when receiving a SETUP message. The user sending the SETUP message does not indicate alternative bearer capability.

Calling Name Max Length

The value for calls from SIP to ISDN ranges from 0 to 82.

Exclusive B-Channel Selection

When the parameter is enabled only the requested B channel is accepted when a call is initiated ; if the requested B channel is not available, the call is cleared.

Hook-Flash Keypad

- Set the actual keypad string that is to be considered as a hook-flash in the Hook-Flash Keypad field.
- An ISDN telephone may send INFORMATION messages that contain a “Keypad Facility”. You can thus trigger a supplementary service (Hold, Conference, etc.) by sending a keypad facility.
- Since the keypads can be received via several INFORMATION messages, they are accumulated until they match or reset if the keypad reception timeout (second) has elapsed since the last keypad has been received. The keypad reception timeout can only be modified via SNMP. If the keypad reception timeout is set to 0, it disables the timeout, thus assuming that all keypads will be received in a single INFORMATION message.
- Setting this parameter to an empty string disables the hook-flash detection.
- The permitted keypad must be made up of IA5 characters. See ITU-T Recommendation T.50.

Accepted Progress Causes and Accepted Status Causes

- The space character is not allowed.
- Causes must be specified in low to high order.
- Cause duplication is not allowed.

TEI Negotiation

Only applies on Point to Multipoint connections.

Interface Configuration

Call properties set in the Call Router have precedence over the default values of the **Interface Configuration** table. For more details on the Call Router, refer to the [DGW Configuration Guide - Call Router user guide](#) published on the [Media5 Documentation Portal](#).

Configuring the BRI Interface

Before you start

Always use the Auto-sensing feature to automatically detect and to automatically configure your PRI interface. Use the [Auto-Detecting and Auto-Configuring ISDN Interfaces](#) (p.16) procedure first. The manual configuration of the BRI interface should be used for fine tuning of the configuration.

Information

It is important to take into consideration the following information:

- **Endpoint Type:** Values used for the Mediatrix unit must be opposite to the value used for the PBX. For instance, if the PBX is set to TE, then the Mediatrix unit must be set to NT. When the BRI interface **Signaling Protocol** is set to QSIG, the endpoint type is only used in the

second layer (LAPD) since it is a concept that does not exist in QSIG. NOTE: To use a specific interface as the clock reference, this parameter must be set to TE. For more information on Clock Synchronisation, refer to the [Technical Bulletin - Mediatrix Gateways and ISDN Synchronisation](#) and [Synchronising Unit Operation \(TDM Sync\)](#) published on the [Media5 Documentation Portal](#).

- **Preferred Encoding Scheme:** Only G.711 u-Law and G.711 a-Law codecs are allowed. G.711 u-Law may not be supported by DSS1 NT and TE endpoints. It is recommended to use G.711 a-Law as preferred encoding protocol.
- **Fallback Encoding Scheme:** Only G.711 u-Law and G.711 a-Law codecs are supported. Only valid when receiving a SETUP message. The user sending the SETUP message does not indicate alternative bearer capability.
- **Clock Mode:** "Auto" should be the value to use. In a BRI configuration, setting the clock mode to slave for a NT endpoint can be set for interop usage, while setting the clock mode to master for a TE endpoint is invalid (slave mode is automatically applied in this case). For more information on Clock Synchronisation, refer to the [Technical Bulletin - Mediatrix Gateways and ISDN Synchronisation](#) and [Technical Bulletin - Synchronising Unit Operation \(TDM Sync\)](#) published on the [Media5 Documentation Portal](#).
- **Calling Name Max Length:** The value for calls from SIP to ISDN ranges from 0 to 82.
- **Exclusive B-Channel Selection:** When the parameter is enabled only the requested B channel is accepted when a call is initiated; if the requested B channel is not available, the call is cleared.
- **Monitor Link State Parameter:** When enabled with the **Ignore OPTIONS on no usable endpoints** also enabled under the **SIP/Interop** page, this will influence how the SIP options are answered.
- **Connection Type:** depends on the equipment to which the Mediatrix unit port is connected to and it must be the same for all interconnected pieces of equipment.
- **Signaling Protocol:** Must match the connected ISDN equipment or network.
- **TEI Negotiation :** Only applies on Point to Multipoint connections.
- Call properties set in the Call Router have precedence over the default values of the **Interface Configuration** table. For more details on the Call Router, refer to the [DGW Configuration Guide - Call Router user guide](#) published on the [Media5 Documentation Portal](#).
- In strings, the space character is ignored and duplicating causes is not allowed.
- Some ISDN switches may require that the Sending Complete information element be included in the outgoing SETUP message to indicate that the entire number is included and there are no further destination digits to be sent.
- An ISDN telephone may send INFORMATION messages that contain a "Keypad Facility". You can thus trigger a supplementary service (Hold, Conference, etc.) by sending a keypad facility. Since the keypads can be received via several INFORMATION messages, they are accumulated until they match or reset if the keypad reception timeout (second) has elapsed since the last keypad has been received. The keypad reception timeout can only be modified via SNMP. If the keypad reception timeout is set to 0, it disables the timeout, thus assuming that all keypads will be received in a single INFORMATION message

Steps

- 1) Use the [Auto-Detecting and Auto-Configuring ISDN Interfaces](#) (p.16) procedure first.

- 2) Go to **ISDN/Basic Rate Interface**.
- 3) From the **Select Interface** drop-box, select the BRI interface you wish to modify.

Note: Depending on the Mediatrix model, there may be several interfaces. To configure more than one interface at a time, use the **Apply To The Following Interfaces** table.

- 4) Make all required changes to the displayed parameters.
- 5) Click **Apply**.

Next Step

[Auto-Detecting and Auto-Configuring ISDN Interfaces \(p.16\)](#)

Auto-Detecting and Auto-Configuring ISDN Interfaces

Information

Note: Some parameters cannot be auto configured. For example, the clock mode is configured according to the endpoint type, master for NT and slave for TE.

Steps

- 1) Go to **ISDN/Status**.
- 2) In the **Automatic Configuration** table, from the selection list, choose the interface you wish to auto configure or select all interfaces.
- 3) Click **Start Sensing**.

Note: Launching the Automatic Configuration may terminate abruptly all ongoing ISDN calls. The auto-configuration may take some time to complete and some of the current ISDN configuration settings might be replaced by new values.

Result

Under **ISDN/Status**, the **Physical Link** and **Signaling** fields of each interface should indicate **Up**.

Automatic Configuration	
Status:	--- All --- Start Sensing
Last Result:	None

Slot5/BRI1 [Configure]	
Physical Link: Up	
Signaling: Up	
Bearer Group	
Channel 1: Idle	Channel 2: Idle

Slot5/BRI2 [Configure]	
Physical Link: Up	
Signaling: Up	
Bearer Group	
Channel 1: Idle	Channel 2: Idle

Slot5/BRI3 [Configure]	
Physical Link: Up	
Signaling: Up	
Bearer Group	
Channel 1: Idle	Channel 2: Idle

Slot5/BRI4 [Configure]	
Physical Link: Up	
Signaling: Up	
Bearer Group	
Channel 1: Idle	Channel 2: Idle

Next Step

[Verifying the ISDN Status \(p.18\)](#)

Verifying the ISDN Status

Information

At any time, it is possible to check the status of the ISDN links.

Steps

- 1) Go to **ISDN/Status**
- 2) The **Physical Link** and **Signaling** status will be displayed for each interface.

Result

If the ISDN cables are properly connected and the basic interface settings are correct, the Physical Link should be **Up**.

Note: **Signaling** will also usually be "**Up**" on PRI links. However, in some cases (BRI, On-demand links), it is normal to be in the **Down** state, except for a brief period during call establishment.

Slot4/BRI4 [Configure]	
Physical Link: Up	
Signaling: Down	
Bearer Group	
Channel 1: Idle	Channel 2: Idle

Slot1/E1T1 [Configure]				
Line Type: T1				
Physical Link: Up				
Signaling: Up				
Bearer Group				
Channel 1: Idle	Channel 7: Idle	Channel 13: Idle	Channel 19: Idle	
Channel 2: Idle	Channel 8: Idle	Channel 14: Idle	Channel 20: Idle	
Channel 3: Idle	Channel 9: Idle	Channel 15: Idle	Channel 21: Idle	
Channel 4: Idle	Channel 10: Idle	Channel 16: Idle	Channel 22: Idle	
Channel 5: Idle	Channel 11: Idle	Channel 17: Idle	Channel 23: Idle	
Channel 6: Idle	Channel 12: Idle	Channel 18: Idle		

Slot2/E1T1 [Configure]				
Line Type: E1				
Physical Link: Up				
Signaling: Up				
Bearer Group				
Channel 1: Idle	Channel 9: Idle	Channel 17: Idle	Channel 25: Idle	
Channel 2: Idle	Channel 10: Idle	Channel 18: Idle	Channel 26: Idle	
Channel 3: Idle	Channel 11: Idle	Channel 19: Idle	Channel 27: Idle	
Channel 4: Idle	Channel 12: Idle	Channel 20: Idle	Channel 28: Idle	
Channel 5: Idle	Channel 13: Idle	Channel 21: Idle	Channel 29: Idle	
Channel 6: Idle	Channel 14: Idle	Channel 22: Idle	Channel 30: Idle	
Channel 7: Idle	Channel 15: Idle	Channel 23: Idle		
Channel 8: Idle	Channel 16: Idle	Channel 24: Idle		

Advanced Concepts

Definitions

Term	Definitions
Originating Side	Where the call is initiated on the ISDN network. At the originating side, the USER (TE) uni-side initiates the call by sending a SETUP message towards the NETWORK (NT). Then, the NT interface redirects the call to some other network, for example SS7 or VoIP.
Destination Side	Where the call reaches its ISDN destination. The NT interface at the destination receives the call from another network, then sends a SETUP message over the ISDN link to one or more TE interfaces.
ISDN Interface	A physical ISDN port, either a BRI or PRI interface.
IsdnInterface	This is the 4th layer of the ISDN stack, referred in ITU-T Q.931 (05/98) as the Resource Management and Call Control entities.

Inband Tones Generation

In an ISDN network, most of the call setup tones are played locally by the TE equipments (i.e. telephone handset), although some require that the tones be played inband by the NT peer.

When interworking with other networks occurs, such as in the IsdnInterface, the need for the tones to be played inband is more likely to arise.

The IsdnInterface has configurability to enable inband tones to be played locally, on a per-interface basis. This option is present when the IsdnInterface is acting as both the NT and the TE UNI-side. However, in TE mode only, the ringback tone is played.

The Call Setup tones (dial tone, ringback, etc.) are played in the direction where the call has been initiated. The call disconnection tones are played in both directions, but of course will not arrive to the peer who disconnected the call.

When an inband tone is played, a Progress Indicator IE #8 "Inband information or appropriate pattern available" is added to the ISDN message corresponding to the call state change, and in a PROGRESS ISDN message if no state change is occurring.

On TE interfaces, as soon as the NT peer advertises that it plays inband tones through a Progress Indicator IE #8 or #1, the local inband tones generation is disabled for the rest of the call. Refer to the *UseImplicitInbandInfoEnable* interop parameter for special handling of Progress Indicator #1.

Whenever a tone is played inband locally or when the ISDN peer advertises that inband information is available, the CallManager is notified. The IP media path can then be opened earlier in the call,

and can be closed with some delay after the call disconnection initiation. However, the configuration and associated behaviors of the higher-level entities are out of the scope of this document.

The following tables summarize the inband tones generation behaviour for both NT and TE endpoint types.

Signal IE Handling Enabled	Inband Tones Generation Enabled	Inband Tone Played
No	No	No
No	Yes	Yes
Yes	Don't Care	No

Signal IE Handling Enabled	Signal IE Received	Inband Tones Generation Enabled	NT Peer Advertised Inband Tones	Inband Tone Played
No	Don't care	No	Don't Care	No
Yes	Yes	No	Don't Care	Yes
Yes	No	Don't Care	Don't Care	No
No	Don't Care	Yes	Yes	No

Note: When the signaling protocol is set to QSIG, the Signal IE does not exist so it has no effect on the inband tones generation. These inband tones are played if the inband tones generation is activated on the incoming side of the call.

Signal Handling

The Signal IE is used by the NT ISDN interface to tell its TE interfaces peers that they must generate an inband tone locally. Thus, the Signal IEs are sent by the NT only.

When the Signal IE handling is enabled on a given TE interface, the inband tones will be played towards the IP gateway when a Signal IE is received. On a NT interface, a Signal IE will be inserted in the ISDN messages sent to the TE peer when appropriate.

Note: If the signaling protocol is set to "NI-2" (National ISDN-2) on that interface, the Signal IE handling is forced to be enabled for a NT interface.

Note: When the signaling protocol is set to QSIG, the Signal IE is not used.

Interop Parameters

Interop parameters allow the Mediatrix unit to properly work, communicate, or connect with specific ISDN devices.

Channel Allocation Strategy

The ISDN interface supports 4 allocation strategy modes:

- ascending;
- descending;
- round-robin ascending;
- round-robin descending.

The Channel Allocation Strategy is configurable separately for each ISDN interface.

Ascending

In this mode, the `IsdnInterface` always allocates the free channel that has the lowest number.

Descending

The highest-numbered free channel is allocated.

Round-Robin Ascending

Starting from the enabled channel with the lowest number, the channels are selected increasingly at each allocation.

Round-Robin Descending

Same as round-robin ascending, except that it is exactly the opposite!

Ressource Management

Reservation of Channels for Incoming and Outgoing Calls

Channels can be reserved for incoming calls or for outgoing calls.

The **IncomingChannelRange** and **OutgoingChannelRange** parameters are defined for this purpose.

Supplementary Services

Supplementary Services Support

Three generic protocols are defined for the control of supplementary services, two of which are stimulus, the third being functional.

These protocols are:

- Keypad protocol;
- Feature key management protocol;
- Functional protocol.

The Functional protocol consists of two categories of procedures. The first category, called the separate message approach, uses separate message types to indicate a desired function. The HOLD and RETRIEVE set of messages are identified for this category.

The **FacilityServicesEnable** parameter is used to control the second category, called the common information element procedure, which uses the FACILITY information element.

When the facility services are disabled and the interface receives a FACILITY message, it answers it with a STATUS. When the facility services are enabled, the interface processes the FACILITY messages.

CLIP

In ISDN, the Calling Line Information Presentation (CLIP) is an optional service offered to the called party which provides the calling party's ISDN number. When the service is enabled, a Calling Party Number Information Element (CPN IE) containing the caller's IA5 digits is sent in the SETUP ISDN message.

CLIP is supplemented by privacy rules defined by [CLIR](#) (p.24) and [CLIR Override](#) (p.25). Refer to the diagrams in the [Interaction between CLIP, CLIR, and CLIR override](#) (p.26) section for details.

For all ISDN signaling protocols except QSIG, operation is as follows: on the originating side, the TE interface always sends the Calling Party Number IE (unless CLIP is disabled). It is up to the NT interface at the destination side to apply the appropriate privacy rules. If the originating side is NT, the Calling Party number is sent only if the **Calling Number** parameter is not set to 'Restricted' or if the **Override flag** parameter is set to 'Enabled'.

CLIP is enabled through the **ClipEnable** parameter, which can take the following values:

Disable	Calling Party Number IE is not sent.
Enable	Calling Party Number IE is sent in the SETUP message.
UserOnly	Calling Party Number IE is sent in the SETUP message only if the ISDN interface is configured as a TE.

CLIR

The Calling Line Information Restriction (CLIR) is a supplementary service offered to the calling party to restrict presentation of the calling party's ISDN number to the called party.

CLIR uses the Calling Party Number (CPN) IE's Presentation Indicator (PI) to disable presentation of the calling number to the called party. CLIR can be disabled by the CLIR override option, described later. Refer to the diagrams in the [Interaction between CLIP, CLIR, and CLIR override](#) (p.26) section for details.

For all ISDN signaling protocols except QSIG, operation is as follows: when the service is enabled on a TE originating interface, the Calling Party Number IE's Presentation Indicator field is set to "Restricted" upon transmission of an ISDN SETUP message from TE to NT. However, the TE must include the IA5 digits in the Calling Party Number.

When the service is enabled on a NT interface that receives a call, the Calling Party number IE Presentation Indicator is set to "Restricted" in the calling property returned to the call managing system.

For QSIG, when the service is enabled at the outgoing interface, the **Calling Party number IE Presentation Indicator** parameter is set to 'Restricted'. At the incoming side, this parameter has no effect. However, if the PI flag is set to "Restricted" in the received CPN IE, the calling party number is removed. See [ECMA-148](#) section 8.

CLIR is enabled through the **ClirEnable** parameter, which can take the following values:

Disable	There is no privacy restriction applied on the CLIP service.
Enable	<u>ISDN signaling protocols (except QSIG):</u> - TE interface that sends the SETUP message at the originating network side: The PI is set to "Restricted" in the CPN IE inserted in the SETUP message sent to the ISDN. However, the calling number is included in the CPN IE. - NT interface that receives the SETUP message at the originating network side: When receiving the SETUP message, the PI is forced to "Restricted" in the CPN IE received from the TE. The calling number itself is forwarded. <u>QSIG signaling protocol:</u> - Sending a SETUP message: The PI is set to "Restricted" in the CPN IE inserted in the SETUP message sent to the ISDN, unless the CLIR override option is set. However, even if PI is set to "Restricted", the calling number is included in the CPN IE. - Receiving a SETUP message: If PI is set in the received message, the calling party number is removed, unless the CLIR override option is set.

CLIR Override

CLIR override is an option that allows the calling party number to be presented to the destination party even when the Calling Party Number (CPN) IE's Presentation Indicator (PI) is set to "Restricted". This option is typically used for police or emergency services.

For all ISDN signaling protocols except QSIG, operation is as follows: if the CLIR Override is enabled on the NT interface at the originating side, the Calling Party Number IA5 digits is included in the Calling Party Number IEs even if the Presentation Indicator is set to "Restricted".

For QSIG, the Calling Line Information Restriction Override is a service offered at the destination interface. If the CLIR Override is not enabled and the Presentation Indicator is set to "Restricted" then the Calling Number is not presented. See [ECMA-148](#) section 8.

Refer to the diagrams in the [Interaction between CLIP, CLIR, and CLIR override](#) (p.26) section for details.

CLIR override is enabled through the **ClirOverrideEnable** parameter, which can take the following values:

Disable	The parameter has no effect.
---------	------------------------------

Enable	<u>ISDN signaling protocols (except QSIG):</u> - The override option acts on the NT interface of the destination network side. It prevents the number to be removed from the CPN IE inserted in the SETUP message sent to the destination TE. <u>QSIG signaling protocol:</u> - The override option prevents the calling name to be removed from the CPN IE in a received SETUP message.
--------	--

Interaction between CLIP, CLIR, and CLIR override

The following diagrams show how [CLIP](#) (p.23), [CLIR](#) (p.24) and [CLIR Override](#) (p.25) override work together to bring (or not) the calling party number from the call originator to the call destination. Refer to the [ISDN Signaling Protocols \(Except QSIG\)](#) (p.26) and [QSIG Signaling Protocol](#) (p.27) sections for the corresponding diagrams. Call flow must be read from the left (originating network side) to the right (destination network side).

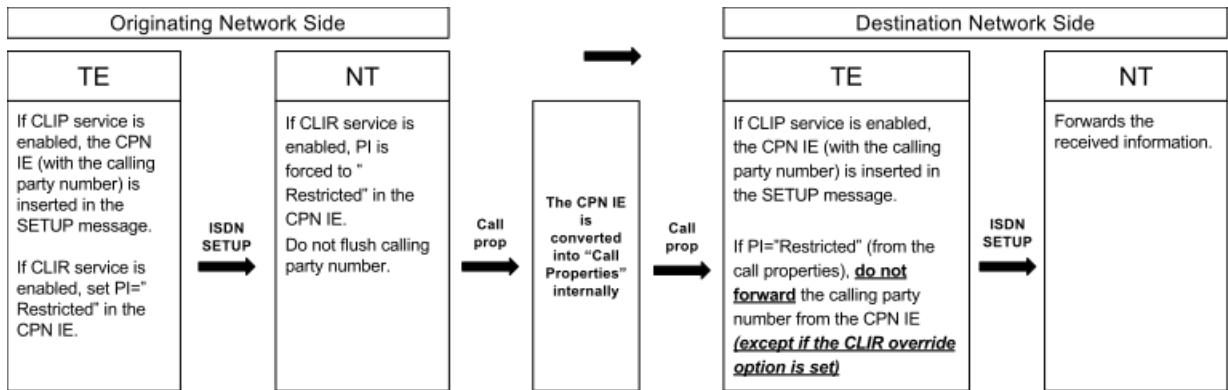
These diagrams also show on which interfaces the **ClipEnable**, **ClirEnable** and **ClirOverrideEnable** parameters have an effect. This is where they must be configured.

ISDN Signaling Protocols (Except QSIG)

The Mediatrix unit can play four different roles:

- TE interface at the Originating Network Side;
- NT interface at the Originating Network Side;
- TE interface at the Destination Network Side;
- NT interface at the Destination Network Side.

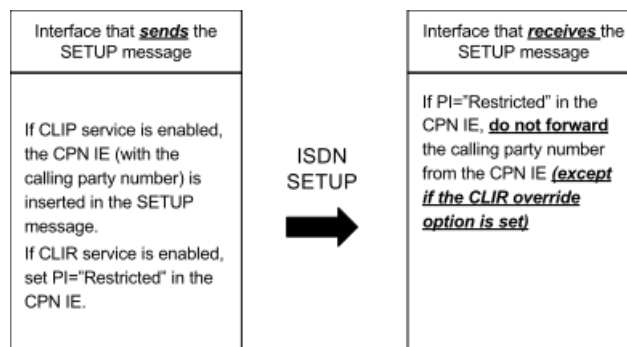
The following diagram illustrates an end-to-end call where all four roles are played by Mediatrix units:



QSIG Signaling Protocol

In QSIG, the ISDN interfaces have a peer-to-peer relationship.

To describe how CLIP/CLIR/CLIR override work together, we only need to identify the interface that sends the SETUP message and the interface that receives it.



COLP

In ISDN, the Connected Line Identification Presentation is an optional service offered at the originating interface by the NT peer. When the service is enabled, a Connected Line Identification Presentation Element containing the connected number IA5 digits is sent under some conditions in the CONNECT ISDN message.

On the originating side, the TE interface always sends the Connected Party Number IE, it is up to the NT interface at the destination side to apply the appropriate privacy rules. If the originating side is NT, the Connected Party number is sent only if the Connected Number is not set to Restricted or if the Override flag is enabled.

For QSIG, the Connected Line Information Presentation is also an optional service offered at the outgoing and incoming interface. If available, the Connected Party Number IE containing the connected IA5 digits is included in the CONNECT ISDN message at the outgoing interface. However, the Connected Party Number is not presented at the incoming interface if the Connected Number is "Restricted" and the Override flag is not enabled see [ECMA-148](#), section 6.

The COLP can also be affected by the **uCP_ISDN_COLP_NUMBER** call property in the same way that the **CONP** (p.28) is affected by **uCP_ISDN_CONP_NAME** call property. See **CONP** (p.28) section for more information.

COLR

Generally, the Connected Line Identification Restriction is a service offered to the TE at the originating interface.

When the service is enabled on a TE originating interface, the Connected Party Number IE's Presentation Indicator field is set to "Restricted" upon transmission of an ISDN CONNECT message from TE to NT interface. However, the TE interface must include the IA5 digits in the Connected Party Number.

For QSIG, when the service is enabled at the outgoing interface, the **Connected Party number IE Presentation Indicator** parameter is set to 'Restricted'. At the incoming side, this parameter has no effect. See [ECMA-148](#) section 8.

COLR Override

In ISDN, the Connected Line Identification Restriction Override is a service offered at the originating interface by the NT peer.

If the CLIR Override is enabled on the NT interface at the originating interface, the Connected Party Number IA5 digits are included in the Connected Party Number IEs even if the Presentation Indicator is set to "Restricted".

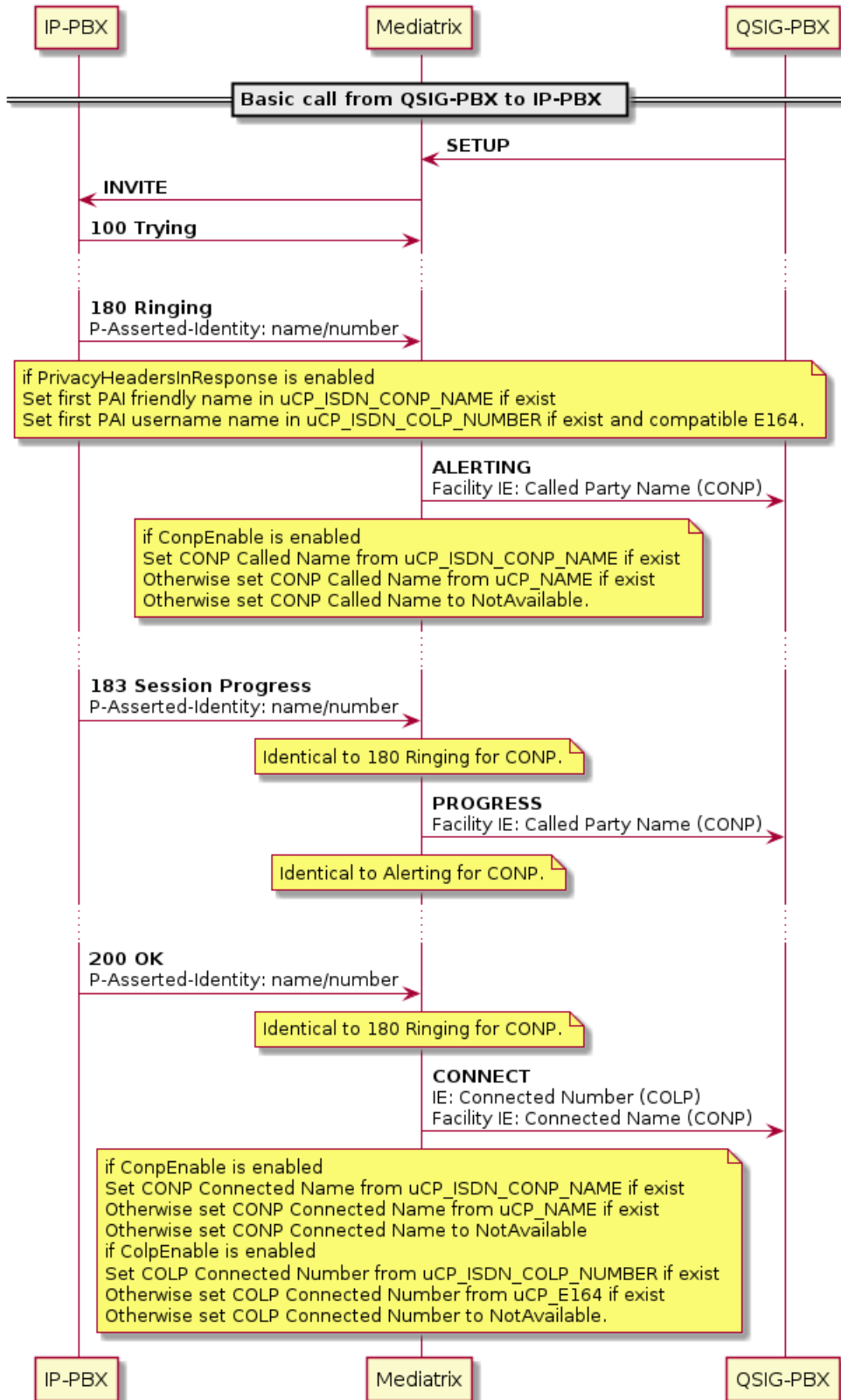
For QSIG, this parameter has no effect. See [ECMA-148](#) section 8.

CONP

The Connected Name identification Presentation (CONP) is a supplementary service which provides the name of the answering or alerting user to the calling user.

For ISDN-PBX to IP-PBX calls, if the **PrivacyHeadersInResponse** parameter is enabled, the **uCP_ISDN_CONP_NAME** call property will be set from the 180 Ringing, 183 Session Progressing, or 200 OK SIP message accordingly to the values of the P-Asserted-Identity SIP header. If the **ConpEnable** is enabled, the ISDN CONP called name and connected name will be set accordingly to the value of the **uCP_ISDN_CONP_NAME** call property respectively in the ISDN Alerting and Connect message.

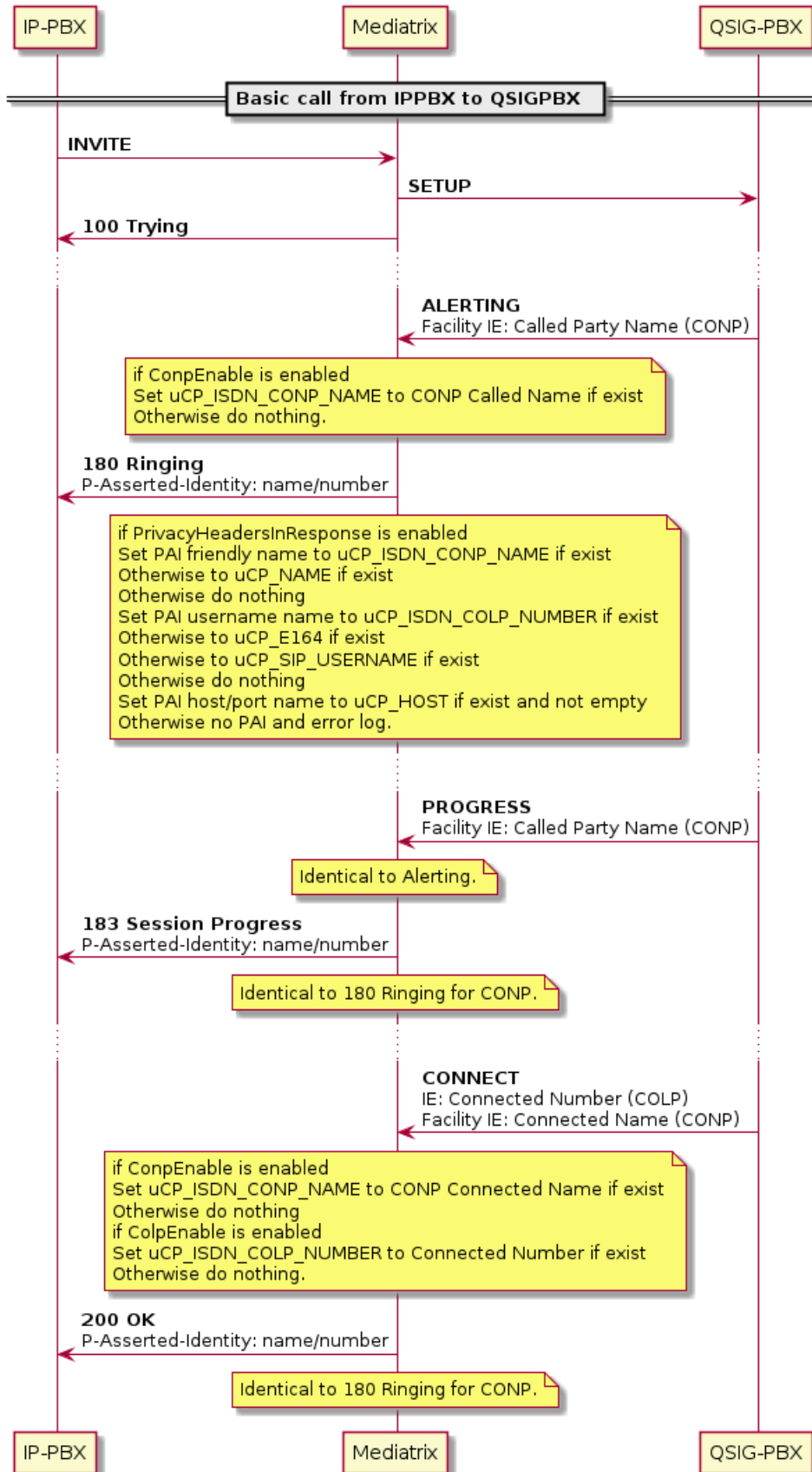
The following diagram shows a detailed call from ISDN-PBX to IP-PBX with the parameters involved on both the IP and ISDN sides.



For IP-PBX to ISDN-PBX calls, if the **ConpEnable** parameter is enabled, the **uCP_ISDN_CONP_NAME** call property will be set from the ISDN Alerting, ISDN Progress, or ISDN Connect from the value

of the Called or Connected Name Facility Information Element. If the **PrivacyHeadersInResponse** parameter is enabled, the P-Asserted-Identity SIP header friendly name will be set to the **uCP_ISDN_CONP_NAME** call property.

The following diagram shows a detailed call from IP-PBX to ISDN-PBX with the parameters involved on both the IP and ISDN sides.



If the number of characters in the connected/called party name exceeds 50, the gateway will truncate the excess characters.

Facility Message Waiting Delay

Upon reception of a SETUP from the remote peer, the interface can optionally wait for a configurable amount of time for a FACILITY message before processing the call. As soon as it receives a FACILITY message or the delay expires, it goes on with normal call processing. The delay is configured via the **MaximumFacilityWaitingDelay** parameter.

MSN (Multiple Subscriber Number)

The Multiple Subscriber Number is a service allowing the TE to configure up to three numbers. This service is available only for a BRI interface configured in TE Point To Multipoint. When this service is enabled in the TE, the Called Party Number (Called E.164) received from IE is matched with these numbers. If the Called Party Number is found, the call can be processed. In the case where the E.164 is not matched, the call is silently discarded.

Notify

The NOTIFY is an ISDN service independent of the HOLD and RETRIEVE. It serves only to notify an ISDN endpoint when the remote peer, usually a SIP endpoint, holds or resumes a call. So a NOTIFY REMOTE HOLD message is sent to the ISDN endpoint when the remote peer puts the call on hold, and a NOTIFY REMOTE RETRIEVAL message is sent when the remote peer resumes the call.

If the ISDN **SignalingChannelOutgoingNotifyEnable** parameter is disabled, no NOTIFY message is sent.

The BRI phone can use this message to inform the user of the new call state, by displaying the remote hold or retrieval message on its LCD screen for example. Note that the BRI phone keeps the voice path opened, so the hold tone or MOH can be heard.

Advice of Charge

To enable the Advice of Charge (AOC) support on the ISDN interface you must enable the FACILITY services and at least one of the following AOC support: AOC-E (End of Call) or AOC-D (During the Call).

Note: Since the AOC from ISDN interface to SIP is currently not supported, enabling the AOC on an ISDN interface configured as TE (user side) is only meaningful when using hairpinning.

Calling Party Name

Calling Party Name can be received and sent through three different methods:

- Facility information element;
- Display information element;
- User-User information element.

When receiving an incoming call, the Calling Party Name value comes from the provided IE, in this order:

- Display
- Facility
- User-User

Calling Party Name is accepted in a Display Information Element only when explicitly identified as a Calling Party Name (i.e. only when "Display Type" = "Calling Party Name" in the information element).

When initiating a call, Calling Party Name is sent according to the method selected in the **CallingNameDelivery** parameter. If the method selected in the **CallingNameDelivery** parameter is not supported for the protocol in use, the default method for this protocol is used. The following table shows which method is used vs configuration of **CallingNameDelivery**:

Protocol	CallingNameDelivery			
	eFacility	eDisplay	eUserUser	eSignalingProtocol
DSS1	IE User-User	IE User-User	IE User-User	IE User-User
Dms100	IE Facility	IE Display	IE Display	IE Display
NI-2	IE Facility	IE Facility	IE Facility	IE Facility
5ESS	IE Facility	IE Facility	IE User-User	IE Facility
QSIG	IE Facility	IE Facility	IE Facility	IE Facility

Call Rerouting

The Call Rerouting supplementary service allows to reroute an incoming public ISDN call (originated from PSTN) within or beyond the private ISDN network (such a PBX) as specified in the ETS30020701, section 10.5. The Rerouting data are received and relayed through a FACILITY message containing a Facility Information Element. The Rerouting data are encoded in a CallRerouting invoke component as specified in the ETS30020701, section 7.

In a Mediatrix typical CallRerouting scenario, when the CallRerouting supplementary service is enabled (the **Isdn.SignalingChannelFacilityServicesEnable** parameter is enabled and the **Isdn.SignalingChannelCallReroutingBehavior** parameter is set to "RelayReroute" or

"ProcessLocally") and a Facility Information Element containing a CallRerouting invoke component is received via a FACILITY message on a TE endpoint (from the private network), the ISDN service parses the CallRerouting data and forward it to the CallManager via a specific CallMessage.

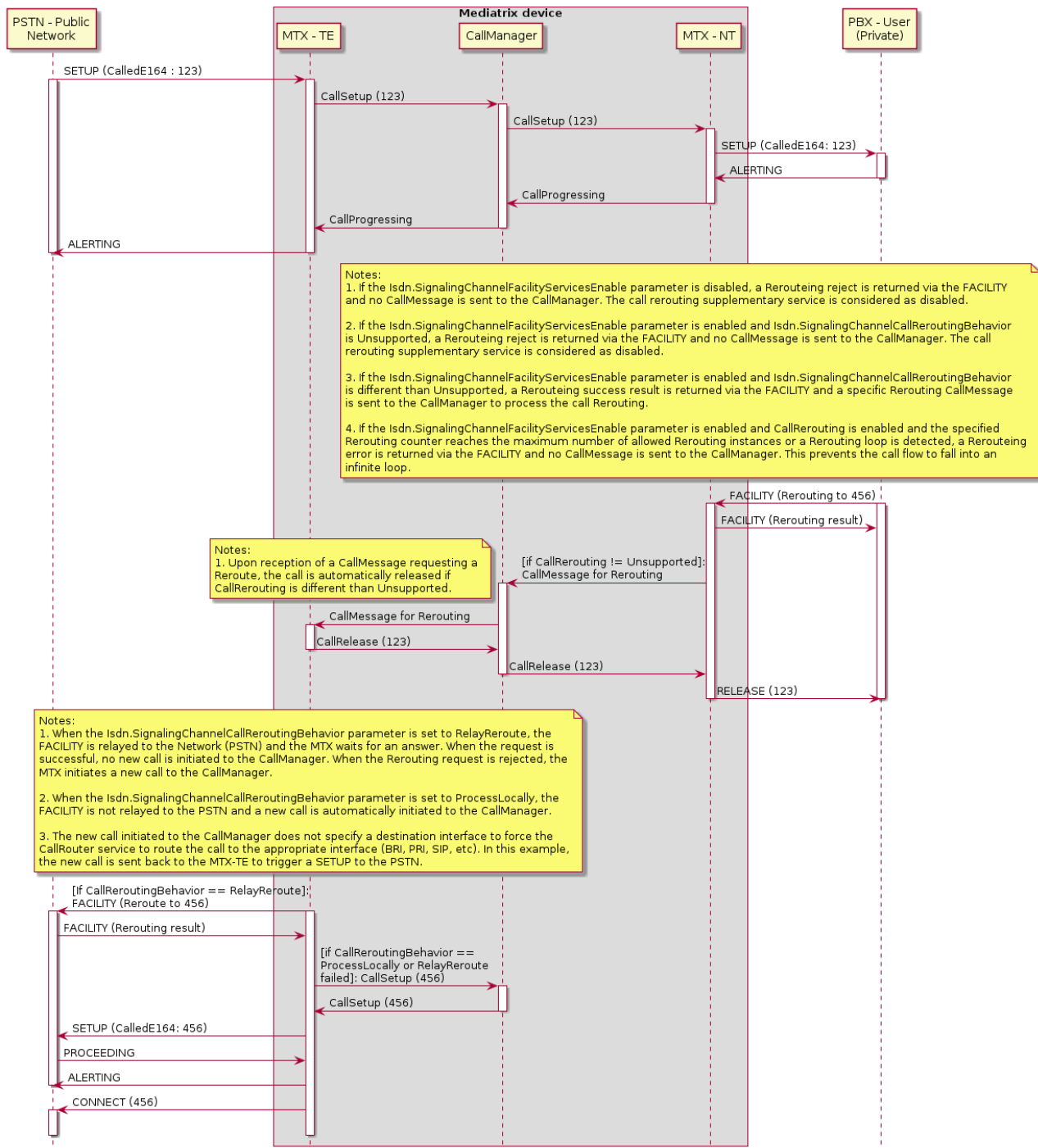
To prevent infinite CallRerouting loops, the ISDN service inspects the rerouteingCounter value and returns an error if a loop is detected or if the maximal rerouteingCounter value allowed by the ETS300 207 01 is reached (>5). When the CallRerouting service is not supported (**Isdn.SignalingChannelFacilityServicesEnable** parameter is disabled or **Isdn.SignalingChannelCallReroutingBehavior** set to "Unsupported"), the CallRerouting request is automatically rejected.

Upon reception of a CallMessage specifying a Rerouting request, the ISDN service inspects the CallRerouting properties set and according to the **Isdn.SignalingChannelCallReroutingBehavior** parameter, the services takes an action. If the parameter is set to "RelayReroute", a Facility Information Element containing a CallRerouteing invoke component is transmitted to the ISDN peer (public network side) via a FACILITY message. The ISDN service waits for an answer from the peer.

If the parameter is set to "ProcessLocally" or a negative CallRerouting answer is received (a negative answer received would mean that the public network side (PSTN) is unable to complete the call Rerouting request), the Isdn service initiates a new call to process locally the call Rerouting request. The new call is requested to the CallManager without specifying a destination interface to force the CallRouter service to select the appropriate route. If the new call is routed to an ISDN interface, the ISDN service sends a SETUP containing a DivertingLegInformation2 invoke component in the Facility IE as specified in the ETS 300 207 01, section 10.2 and section 10.4. The data related to the call diversion set in the DivertingLegInformation2 are transferred from the CallRerouting properties.

Note: Upon reception of the CallMessage requesting a Rerouteing, the ISDN service automatically releases the current call whatever if the **Isdn.SignalingChannelCallReroutingBehavior** parameter is set to "RelayReroute" or "ProcessLocally".

An illustration of a typical ISDN Call Rerouting scenario (Call Forward Unconditionnal) in a Mediatrix device would be as the following sequence diagram:



Default Values for Call Properties

Each ISDN interface can be configured with default values for the following parameters in the Calling Party Number IE and the Called Party Number IE.

These default values apply only to outgoing ISDN calls:

Information Element (IE)	Parameter	Configuration Parameter
Calling Party Number	Type of Number (TON)	DefaultCallingTon
Calling Party Number	Numbering Plan Indication (NPI)	DefaultCallingNpi
Calling Party Number	Presentation Indicator (PI)	DefaultCallingPi
Calling Party Number	Screening Indicator (SI)	DefaultCallingSi
Called Party Number	Type of Number (TON)	DefaultCalledTon
Called Party Number	Numbering Plan Indication (NPI)	DefaultCalledNpi

These parameters provide default values that are inserted in the Calling Party Number IE and the Called Party Number IE when these values are not already provided by the call properties.

Another way to control these values is by using the "Properties Manipulation" feature of the Call Router. This method has precedence over the parameters described here.

The following paragraphs provide additional information on how these parameters work:

- TON and NPI: If the value is not available from the Call Properties, the corresponding value from **DefaultCallingTon**, **DefaultCalledTon**, **DefaultCallingNpi** or **DefaultCalledNpi** parameter is used directly.
- PI: If PI is not available from the Call Properties, its value is determined by the following two steps.
 - First, it is set to the default value defined by "DefaultCallingPi".
 - Second, it can be overridden by the CLIP and CLIR services: the value can be set to "Restricted" by the CLIR service and the value can be set to "NotAvailable" if there is no number to forward.
- SI: Like the other parameters, the **DefaultCallingSi** parameter is ignored if the SI value is provided by the Call Properties. If SI is not provided by the call properties, it is set to the value provided by **DefaultCallingSi** except for one special case: when the **DefaultCallingSi** parameter is set to "Context Dependent", the unit applies internal rules to set SI to the value that makes most sense according to context. These internal rules are as follows:
 - For all signaling protocols except QSIG:
 - If interface is configured as NT (network side), SI is set to "NetworkProvided"
 - If interface is configured as TE (user side), SI is set to "UserProvidedNotScreened"
 - For QSIG signaling protocol:
 - If the calling party number string is not empty, SI is set to "UserProvidedVerifiedAndPassed"
 - If the calling party number string is empty, SI is set to "NetworkProvided"

InformationFollowing Operation

The "informationFollowing" operation is supported for NI2 signaling only.

When a SETUP message is received containing an "informationFollowing" operation, the unit immediately sends a PROCEEDING message. The unit then waits normally for a FACILITY message containing the calling party name, for a maximum time configured with the **MaximumFacilityWaitingDelay** parameter.

The only difference between this behavior and the usual behavior (i.e. without the "informationFollowing" operation), is the immediate sending of the PROCEEDING message before waiting for the calling party name.

Note that the "informationFollowing" operation is mutually exclusive with the configuration parameter **CallProceedingDelay**, which configures a delay before sending the PROCEEDING message. If the PROCEEDING message is sent due to the "informationFollowing" operation, the **CallProceedingDelay** parameter is ignored.

Malicious Call Identification

Malicious Call Identification (MCID) is a supplementary service that enables the service provider to identify the source of malicious calls. A user who receives a malicious call from another network can notify the PSTN of the malicious nature of the call, allowing the offnet system to take action, such as notifying legal authorities.

To invoke the MCID supplementary service, the called user shall send a mCIDRequest invoke component carried by a Facility information element in a FACILITY message.

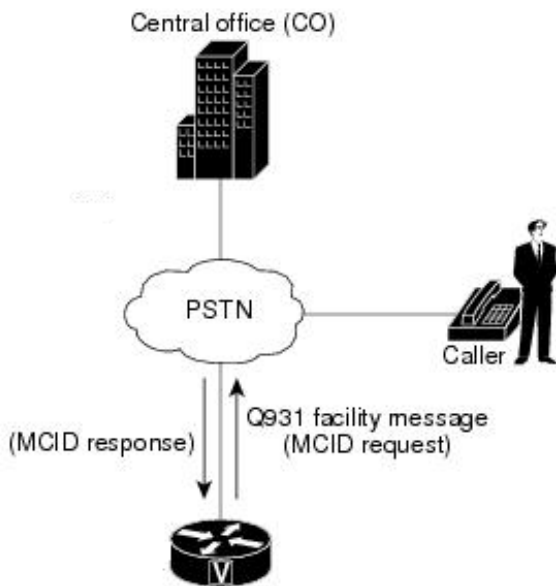
To indicate that the service has been accepted, the network shall send:

- if accepted, a mCIDRequest return result component, or
- if rejected, a mCIDRequest return error component carried by a Facility information element in a FACILITY message

Note: For customer needs, the mCIDRequest invoke can be sent from both Network and User sides. This behavior does not follow the signaling flow in EN 300 130-1 Annex A which stipulates that the mCIDRequest invoke is only sent from the User side to Network side.

To enable the MCID supplementary service, the **Isdn.SignalingChannel.FacilityServicesEnable** and **Isdn.SignalingChannel.McidEnable** parameters must both be set to Enable. Further more, the MCID feature is only available for DSS1 signaling.

An illustration of a typical ISDN MCID scenario in a Mediatrix device:



On the reception of a SIP INFO message containing the **P-Call-Info: malicious** proprietary header, the associated ISDN call will send an ISDN FACILITY message indicating that this call is tagged as malicious.

Default Values for Call Properties

Each ISDN interface can be configured with default values for the following parameters in the Calling Party Number IE and the Called Party Number IE.

These default values apply only to outgoing ISDN calls:

Information Element (IE)	Parameter	Configuration Parameter
Calling Party Number	Type of Number (TON)	DefaultCallingTon
Calling Party Number	Numbering Plan Indication (NPI)	DefaultCallingNpi
Calling Party Number	Presentation Indicator (PI)	DefaultCallingPi
Calling Party Number	Screening Indicator (SI)	DefaultCallingSi
Called Party Number	Type of Number (TON)	DefaultCalledTon
Called Party Number	Numbering Plan Indication (NPI)	DefaultCalledNpi

These parameters provide default values that are inserted in the Calling Party Number IE and the Called Party Number IE when these values are not already provided by the call properties.

Another way to control these values is by using the "Properties Manipulation" feature of the Call Router. This method has precedence over the parameters described here.

The following paragraphs provide additional information on how these parameters work:

- TON and NPI: If the value is not available from the Call Properties, the corresponding value from **DefaultCallingTon**, **DefaultCalledTon**, **DefaultCallingNpi** or **DefaultCalledNpi** parameter is used directly.
- PI: If PI is not available from the Call Properties, its value is determined by the following two steps.
 - First, it is set to the default value defined by "DefaultCallingPi".
 - Second, it can be overridden by the CLIP and CLIR services: the value can be set to "Restricted" by the CLIR service and the value can be set to "NotAvailable" if there is no number to forward.
- SI: Like the other parameters, the **DefaultCallingSi** parameter is ignored if the SI value is provided by the Call Properties. If SI is not provided by the call properties, it is set to the value provided by **DefaultCallingSi** except for one special case: when the **DefaultCallingSi** parameter is set to "Context Dependent", the unit applies internal rules to set SI to the value that makes most sense according to context. These internal rules are as follows:
 - For all signaling protocols except QSIG:
 - If interface is configured as NT (network side), SI is set to "NetworkProvided"
 - If interface is configured as TE (user side), SI is set to "UserProvidedNotScreened"
 - For QSIG signaling protocol:
 - If the calling party number string is not empty, SI is set to "UserProvidedVerifiedAndPassed"
 - If the calling party number string is empty, SI is set to "NetworkProvided"

Advanced Tasks

Enabling ISDN Supplementary Services

Steps

- 1) Go to **ISDN/Services**.
- 2) From the **Select Interface** drop-down, select the interface for which you wish to enable ISDN optional services.
- 3) In the **Services Configuration** table, enable the required ISDN options.

Note: To activate the ISDN hold feature, the **Default Hook Flash Processing** must be set to **Using Signaling Protocol** (Under **Telephony/Services**).

Note: For the Date/Time IE to be sent, the SNTP server must be configured (Under **Network/Host**).

Note: The AOC features are not available in the NI2 and QSIG signaling protocols. Refer to [Configuring the E1T1 Interface \(PRI\)](#) (p.11) to configure the signaling protocol.

Note: To enable AOC support on the ISDN interface, the **Facility Services** parameter and **AOC-E (End-of-Call)** or **AOC-D (During the Call)** parameter must be set to **Enable**. Since the AOC from ISDN interface to SIP is currently not supported, enabling the AOC on an ISDN interface configured as TE (user side) is only meaningful when using hair-pinning.

Note: The **Call Rerouting Behavior** parameter is not available in the NI2 and QSIG signaling protocols. Refer to [Configuring the E1T1 Interface \(PRI\)](#) (p.11) to configure the signaling protocol.

- 4) Click **Apply**.

Configuring Interop Parameters

Information

Interop parameters can be configured for PRI and BRI interfaces.

Steps

- 1) Go to **ISDN/Interop**.

- 2) From the **Select Interface** drop down, choose the interface for which you wish to configure the interop parameters.

Note: To select more than one interface at a time, if available on the unit, use the **Apply To The Following Interfaces** table.

- 3) In the **Interface Configuration** table, complete the fields as required.
- 4) Click **Apply**.

Modifying Port Pinout

Steps

- 1) Go to **ISDN/Primary Rate Interface**.

Note: Not all PRI and/or BRI platforms support Port Pinout.

- 2) In the **Interface Configuration** table, set the **Port Pinout** to reflect your configuration.

Result

Interface Configuration	
Line Type: [Configure]	E1
Endpoint Type:	NT ▼
Clock Mode:	Master ▼
Port Pinout:	NT ▼
Monitor Link State:	Auto ▼
Line Coding:	TE
	NT

Exporting a Preset Configuration File

Before you start

If you are using a user-defined preset configuration file, do not forget to upload it through the file management system.

Steps

- 1) Go to **ISDN/Status**.
- 2) In the **ISDN Preset Configuration** table, in the **Preset Name** field, enter the name for the exported preset configuration file.

Note: We strongly recommend indicating the type of unit and date of export as the name of the preset configuration file. For example: MTXC740_20230215.

3) Click **Save**.

Result

ISDN Preset Configuration	
Local Preset:	--- Suggestion --- Apply
Preset Name:	MTX_XXX_yymmdd.cfg Save

The preset configuration file will be displayed under **Management/File**, in the **Internal files** table.

Other Advanced ISDN Parameters

Although the services can be configured in great part in the Web browser, some aspects of the configuration can only be completed with the MIB parameters by:

- using a MIB browser
- using the CLI
- creating a configuration script containing the configuration parameters

Interop Play Local Ringback When No MediaStream

Configure the **isdn.InteropPlayLocalRingbackWhenNoMediaStream** parameter to set how to play the local ringback when there is no stream. For more details, refer to the [DGW Configuration Guide - Reference Guide](#) published on the [Media5 Documentation Portal](#).

Cabling Information

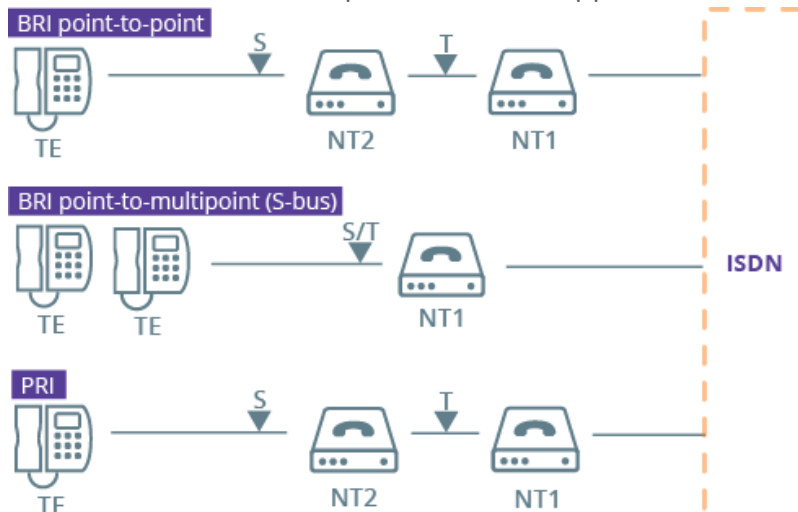
ISDN Reference Points

ISDN specifies a number of reference points that define logical interfaces between the various equipment types on an ISDN access line.

The Mediatrix unit supports the following ISDN reference points:

- S: The reference point between user terminals and the NT2. This is used in point-to-multipoint BRI connections.
- T: The reference point between NT1 (Modem) and NT2 (PBX) devices. This is used in point-to-point PRI/BRI connections.

All other ISDN reference points are not supported.



BRI S/T Connection (RJ-48)



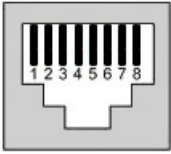
Caution: Always use standard telecommunication cables with a minimum of 26 AWG wire gauge.

BRI S/T connections use two pairs of wires: one pair for transmission and the second pair for reception. It is wired so that pins 3 and 6 are on one twisted pair and pins 4 and 5 are on a second pair according to common wiring standards which meet the TIA/EIA 568A and 568B requirements.



Caution: The Mediatrix unit ISDN BRI ports are configurable to operate as network or terminal ports. The pin-out of the sockets is switched according to this configuration. Wrong

port configurations, wrong cabling or wrong connections to neighbouring equipment can lead to short circuits in the BRI line powering.



Pin#	TE mode	NT mode
1	Not Connected	Not Connected
2	Not Connected	Not Connected
3	Tx +	Rx +
4	Rx +	Tx +
5	Rx -	Tx -
6	Tx -	Rx -
7	Not connected	Not Connected
8	Not connected	Not Connected

PRI Connection (RJ-48)



Caution: Always use standard telecommunication cables with a minimum of 26 AWG wire gauge.

PRI connections use two pairs of wires: one pair for transmission and the second pair for reception. It is wired so that pins 1 and 2 are on one twisted pair and pins 4 and 5 are on a second pair according to common wiring standards which meet the TIA/EIA 568A and 568B requirements.

Note: The Mediatrix unit PRI ports can be used as a T reference point, but not as U reference points (2-wire). Never connect a U PSTN line or a U TE into the Mediatrix unit PRI ports.



Pin #	NT Mode	TE Mode
1	Transmit #2 (+)	Receive #2 (+)
2	Transmit #1 (-)	Receive #1 (-)
3	Not connected	Not connected
4	Receive #2 (+)	Transmit #2 (+)
5	Receive #1 (-)	Transmit #1 (-)
6	Not connected	Not connected
7	Not connected	Not connected
8	Not connected	Not connected

Online Help

If you are not familiar with the meaning of the fields and buttons, click **Show Help**, located at the upper right corner of the Web page. When activated, the fields and buttons that offer online help will change to green and if you hover over them, the description will be displayed.

DGW Documentation

Mediatrix devices are supplied with an exhaustive set of documentation.

Mediatrix user documentation is available on the [Media5 Documentation Portal](#).

Several types of documents were created to clearly present the information you are looking for. Our documentation includes:

- **Release notes:** Generated at each GA release, this document includes the known and solved issues of the software. It also outlines the changes and the new features the release includes.
- **Configuration notes:** These documents are created to facilitate the configuration of a specific use case. They address a configuration aspect we consider that most users will need to perform. However, in some cases, a configuration note is created after receiving a question from a customer. They provide standard step-by-step procedures detailing the values of the parameters to use. They provide a means of validation and present some conceptual information. The configuration notes are specifically created to guide the user through an aspect of the configuration.
- **Technical bulletins:** These documents are created to facilitate the configuration of a specific technical action, such as performing a firmware upgrade.
- **Hardware installation guide:** They provide the detailed procedure on how to safely and adequately install the unit. It provides information on card installation, cable connections, and how to access for the first time the Management interface.
- **User guide:** The user guide explains how to customise to your needs the configuration of the unit. Although this document is task oriented, it provides conceptual information to help the user understand the purpose and impact of each task. The User Guide will provide information such as where and how TR-069 can be configured in the Management Interface, how to set firewalls, or how to use the CLI to configure parameters that are not available in the Management Interface.
- **Reference guide:** This exhaustive document has been created for advanced users. It includes a description of all the parameters used by all the services of the Mediatrix units. You will find, for example, scripts to configure a specific parameter, notification messages sent by a service, or an action description used to create Rulesets. This document includes reference information such as a dictionary, and it does not include any step-by-step procedures.

Copyright Notice

Copyright © 2023 Media5 Corporation.

This document contains information that is proprietary to Media5 Corporation.

Media5 Corporation reserves all rights to this document as well as to the Intellectual Property of the document and the technology and know-how that it includes and represents.

This publication cannot be reproduced, neither in whole nor in part, in any form whatsoever, without written prior approval by Media5 Corporation.

Media5 Corporation reserves the right to revise this publication and make changes at any time and without the obligation to notify any person and/or entity of such revisions and/or changes.



media5corp.com