Meridian 1
Succession 1000
Succession 1000M
Succession 3.0 Software

Meridian BRAnch VOice 1.0

Description, Installation, and Operation

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Revision history

October 2003

Standard 1.00. This document is a new NTP for Succession 3.0. It was created to support a restructuring of the Documentation Library. This document contains information previously contained in the following legacy document, now retired: *Meridian Branch Voice 1.0: Description, Installation, and Operation* (553-3001-203).

Contents

About this document

This document is a global document. Contact your system supplier or your Nortel Networks representative to verify that the hardware and software described are supported in your area.

Subject

This document provides information about the implementation of the Meridian BRAnch VOice 1.0 application. This document describes the BRAnch VOice engineering, installation, configuration, administration, and maintenance.

Note on legacy products and releases

This NTP contains information about systems, components, and features that are compatible with Succession 3.0 Software. For more information on legacy products and releases, click the **Technical Documentation** link under **Support** on the Nortel Networks home page:

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Applicable systems

This document applies to the following systems:

- Meridian 1 Option 11C Chassis
- Meridian 1 Option 11C Cabinet
- Meridian 1 Option 51C
- Meridian 1 Option 61
- Meridian 1 Option 61C

- Meridian 1 Option 61C CP PII
- Meridian 1 Option 81
- Meridian 1 Option 81C
- Meridian 1 Option 81C CP PII
- Succession 1000
- Succession 1000M Chassis
- Succession 1000M Cabinet
- Succession 1000M Half Group
- Succession 1000M Single Group
- Succession 1000M Multi Group

Note that memory upgrades may be required to run Succession 3.0 Software on CP3 or CP4 systems (Options 51C, 61, 61C, 81, 81C).

System migration

When particular Meridian 1 systems are upgraded to run Succession 3.0 Software and configured to include a Succession Signaling Server, they become Succession 1000M systems. Table 1 lists each Meridian 1 system that supports an upgrade path to a Succession 1000M system.

Table 1
Meridian 1 systems to Succession 1000M systems (Part 1 of 2)

This Meridian 1 system...	Maps to this Succession 1000M system
Meridian 1 Option 11C Chassis	Succession 1000M Chassis
Meridian 1 Option 11C Cabinet	Succession 1000M Cabinet
Meridian 1 Option 51C	Succession 1000M Half Group
Meridian 1 Option 61	Succession 1000M Single Group
Meridian 1 Option 61C	Succession 1000M Single Group
Meridian 1 Option 61C CP PII	Succession 1000M Single Group

Table 1
Meridian 1 systems to Succession 1000M systems (Part 2 of 2)

This Meridian 1 system...	Maps to this Succession 1000M system
Meridian 1 Option 81	Succession 1000M Multi Group
Meridian 1 Option 81C	Succession 1000M Multi Group
Meridian 1 Option 81C CP PII	Succession 1000M Multi Group

Note the following:

- When an Option 11C Mini system is upgraded to run Succession 3.0 Software, that system becomes a Meridian 1 Option 11C Chassis.
- When an Option 11C system is upgraded to run Succession 3.0 Software, that system becomes a Meridian 1 Option 11C Cabinet.

For more information, see one or more of the following NTPs:

- *Small System: Upgrade Procedures* (553-3011-258)
- *Large System: Upgrade Procedures* (553-3021-258)
- *Succession 1000 System: Upgrade Procedures* (553-3031-258)

Intended audience

This document is intended for individuals responsible for planning, installing, configuring, administering, and maintaining Meridian BRAnch VOice 1.0.

Conventions

Terminology

In this document, the following systems are referred to generically as "system":

- Meridian 1

- Succession 1000
- Succession 1000M

The following systems are referred to generically as “Small System”:

- Succession 1000M Chassis
- Succession 1000M Cabinet
- Meridian 1 Option 11C Chassis
- Meridian 1 Option 11C Cabinet

The following systems are referred to generically as “Large System”:

- Meridian 1 Option 51C
- Meridian 1 Option 61
- Meridian 1 Option 61C
- Meridian 1 Option 61C CP PII
- Meridian 1 Option 81
- Meridian 1 Option 81C
- Meridian 1 Option 81C CP PII
- Succession 1000M Half Group
- Succession 1000M Single Group
- Succession 1000M Multi Group

The call processor in Succession 1000 and Succession 1000M systems is referred to as the “Succession Call Server”.

Related information

This section lists information sources that relate to this document.

NTPs

The following NTPs are referenced in this document:

- *Features and Services* (553-3001-306)

- *Software Input/Output: Administration* (553-3001-311)
- *Optivity Telephony Manager: System Administration* (553-3001-330)
- *Software Input/Output: Maintenance* (553-3001-511)

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Description

Contents

This section contains information on the following topics:

Product overview

The BRAnch VOice application provides a means of extending key system features to one or more branch offices. The BRAnch VOice card applies voice packetizing techniques to compress calls and a subset of Meridian Customer Defined Network (MCDN) signaling. This compression enables a BRAnch VOice card to send and receive six voice calls and MCDN signaling over just two ISDN bearers. The ISDN bearers can be either Basic Rate Interface (BRI) or Primary Rate Interface (PRI).

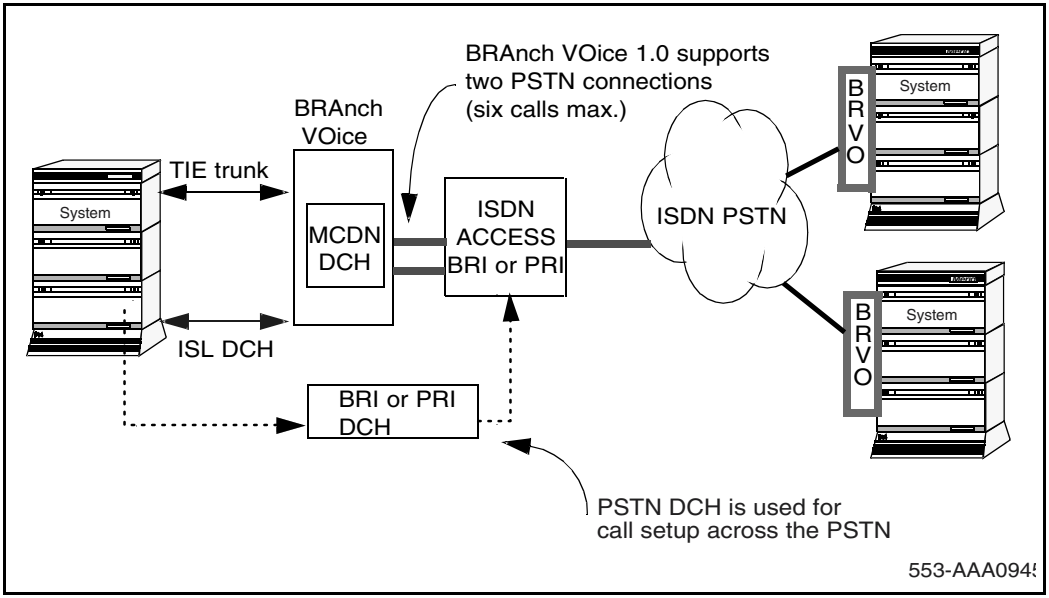
BRAnch VOice uses a dial-up connection over the Public Switched Telephone Network (PSTN) instead of a permanent leased line. The customer can create a “BRAnch VOice network” by installing BRAnch VOice cards at the HQ location and at each branch. Each BRAnch VOice card can establish a PSTN call to any BRAnch VOice card at any location in the network.

BRAnch VOice functions on all systems. BRAnch VOice enables branch offices to use features that exist on a central (HQ) switch. These features

include Network Attendant Services (NAS) and Network Message Services (NMS).

Figure 1 shows the basic BRAnch VOice system architecture.

Figure 1
The BRAnch VOice architecture



BRAnch VOice support for the MCDN feature set

BRAnch VOice supports a subset of the MCDN feature set. The MCDN features that BRAnch VOice supports include:

- Call-associated MCDN features:
  - — Network Attendant Services (NAS)
  - — Network call redirection/transfer/forward/hunting
  - — Trunk Route Optimization (TRO)
  - — Trunk Anti-Tromboning (TAT)
  - — Drop Back Busy (DBB)

- Non-call associated MCDN features:
  - — Network Message Services (NMS)
  - — Network-wide Ring Again (NRAG)

  Note: The basic MCDN feature set includes support for features, such as Calling Party Name Display (CPND) (network) and Calling Line IDentifier (CLID).

The HQ node is typically where the centralized services reside (NMS, NAS).

MCDN transports non-call associated signaling using facility messages, which the Transaction Capabilities Application Port (TCAP) ISDN protocol defines. To *guarantee* delivery of non-call associated messages, the BRAnch VOice network must have a dedicated dial-up connection between the HQ and each branch card.

BRAnch VOice dialing plan overview

BRAnch VOice can integrate into a customer's existing network. BRAnch VOice provides a dial-up connection between locations instead of a permanent leased line. This dial-up connection requires the entry of PSTN numbers in the BRAnch VOice dialing plan. BRAnch VOice supports all dialing plans, including Electronic Switched Network (ESN), Coordinated Dialing Plan (CDP), and Uniform Dialing Plan (UDP).

To *guarantee* support of network features at a branch, a connection to the HQ must be available. You must associate a dialing plan entry with the connection to the HQ.

Private Network Identifier (PNI)

A Private Network Identifier (PNI) refers to a switch customer number. It is necessary for networking between switches and is necessary for the operation of supplementary services, such as NMS. The host switch transports the PNI in facility messages that transmit these supplementary services.

When networking with a remote switch over an MCDN network, the Customer Data Block (CDB) PNI is the PNI for the source switch. The Route

Data Block (RDB) PNI for the source switch *must* match the CDB PNI for the remote switch.

PNIs are necessary when multiple customers share the same D-channel connection between different sites. For sites with a single customer, the PNIs can be the same across the network.

To manage PNIs, BRAnch VOice ensures any MCDN messages that a BRAnch VOice delivers to a node matches the node's Customer Data Block (CDB) PNI. You configure each BRAnch VOice card with the same PNI as the system node that the card is in.

> ***Note:*** Nortel Networks recommends that you make all CDB PNIs and BRAnch VOice RDB PNIs the same across all network nodes for a distinct customer.

BRAnch VOice customer-side dialing plan

On the customer side, you configure six trunks on a single route for each BRAnch VOice card. You build this route into a route list block (RLB) as part of your dialing plan. See Figure 2 on page 19.

BRAnch VOice PSTN-side dialing plan

On the PSTN side, consider BRAnch VOice call management in the context of outgoing and incoming calls. See Figure 3 on page 19.

Outgoing calls

For outgoing calls, the system sends a call to one of units 0 to 5 on the BRAnch VOice card. BRAnch VOice then starts a PSTN call using either unit 6 or 7. If one of the destinations must provide non-call associated services, then BRAnch VOice can be configured to reserve unit 7 for the PSTN connection to the HQ/tandem node. If the call destination is the HQ/tandem node, then BRAnch VOice starts a call using unit 7, the last TN available. BRAnch VOice dials the access code of the ISDN PSTN trunk and the PSTN call starts.

Figure 2
The BRAnch VOice customer-side dialing plan

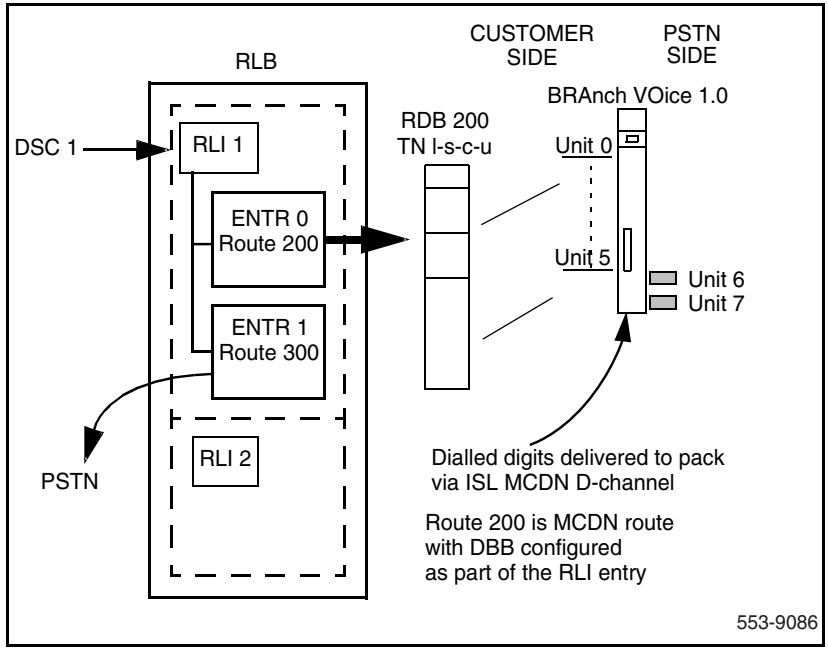
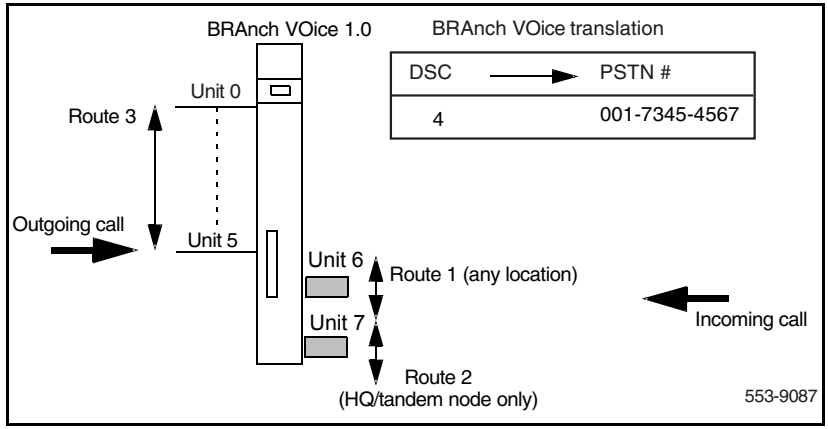


Figure 3
The BRAnch VOice PSTN-side dialing plan



If the system requests a call to a third destination, then BRAnch VOice rejects the call with cause “No channel/circuit available”. BRAnch VOice supports up to six calls to an HQ/tandem node, depending on the availability of BRAnch VOice’s second PSTN-side trunk.

Configure each BRAnch VOice card with an HQ PSTN number (see “BRAnch VOice configuration description” on page 87). If a BRAnch VOice cannot deliver voice or NCA messaging on a direct, point-to-point connection, the BRAnch VOice establishes a different PSTN connection to the HQ/tandem node by referencing the HQ PSTN number.

If users do not specify one of the destinations as being a HQ/tandem node, BRAnch VOice can support any two destinations.

Incoming calls

Incoming calls, in general, can be directed towards BRAnch VOice’s PSTN-side routes using trunk steering codes and the RLBs. In the event of an incoming call from a HQ location, calls are directed to a route associated with unit 7. This ensures calls related to the HQ are always handled by the same PSTN-side trunk.

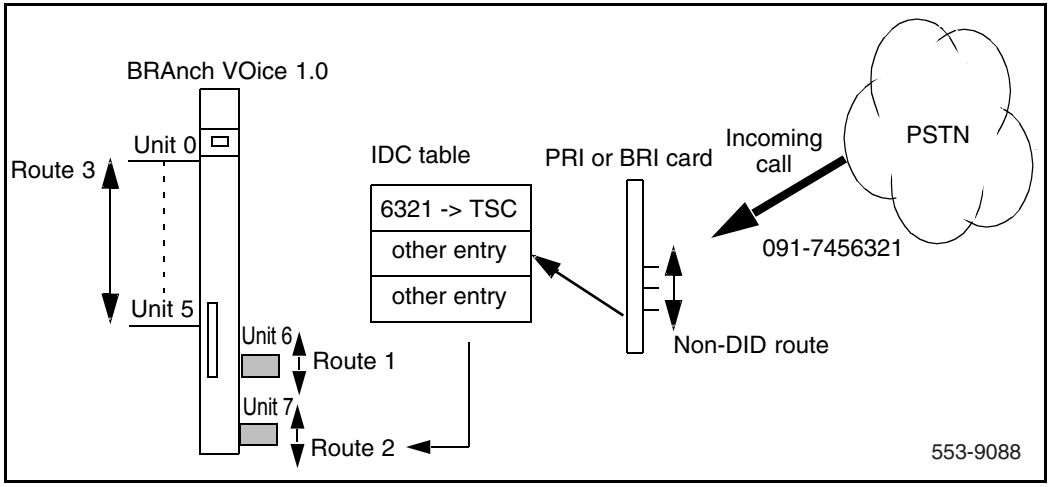
This is done by providing two PSTN numbers for branches if HQ channel reservation is used. One number is used by other branches and one number is reserved for incoming calls from the HQ. Incoming calls from other branches are never directed towards the unit reserved for HQ calls. Incoming calls from the HQ are first directed towards the HQ reserved unit, and if this is busy, then towards the other PSTN units.

> ***Note:*** BRAnch VOice can operate with either DID or non-DID PSTN connectivity.

In Figure 4 on page 21, a call is coming in from the HQ. The PSTN delivers the full DN including the area code (091). In this situation, the PSTN number can be stripped off by using the OVLR prompt associated with the ISDN route. If the OVLR prompt is set to YES, then the user is prompted for the number of digits to delete. The number delivered in this case is 6321, which is associated with a Trunk Steering Code (TSC) using an Incoming DID Digit Conversion (IDC) table. The IDC table directs the call towards the PSTN side unit using a TSC. This method has the advantage of not using access codes to

direct incoming calls. Refer to “Engineer BRAnch VOice cards” on page 51 for more information.

Figure 4
Terminating a PSTN call on a BRAnch VOice



If the user hears a buzzing noise, this means the BRAnch VOice is attempting to initiate a Point-to-Point Protocol (PPP) session and the call is, therefore, terminating correctly. This can also be verified by putting a monitor on the MCDN D-Channel (DCH) and also using LD 32 to check which PSTN unit went busy.

Checking the Dial Plan

Users can make a quick check that the dialing plan, IDC tables, and TSCs are working correctly by simply dialing the PSTN using the DID number used to target BRAnch VOice. For example, to check the dialing plan shown in Figure 4, a user dials the PSTN access code and then 091-7456321 from a normal set on the customer network.

If the user hears a buzzing noise, this means the BRAnch VOice is attempting a Point-to-Point Protocol (PPP) session and the call is, therefore, terminating correctly. This can also be verified by putting a monitor on the MCDN DCH and using LD 32 to check which PSTN unit went busy.

If the user does not hear a buzzing noise and instead receives ringback (for example) then the IDC, the TSC, etc., do not have the correct configuration.

> ***Note:*** This procedure is a test only and is not part of normal BRAnch VOice operation.

Avoiding glare situations

Glare occurs when an incoming and outgoing call contend for the same customer side trunk. BRAnch VOice has outgoing calls presented to its customer side trunks, and BRAnch VOice, in turn, presents incoming calls from branches on the same set of customer-side trunks. To minimize glare situations, the BRAnch VOice customer side trunk members should be configured as linear search (top-down) in the BRAnch VOice route data block. The SRCH prompt in LD 16 specifies how trunk members are selected. BRAnch VOice ensures that incoming calls are presented to the customer-side units using a linear search method (bottom up).

If a new outgoing call arrives at the same time as a new incoming call is presented to BRAnch VOice, BRAnch VOice always gives precedence to the new incoming call and rejects the outgoing call with a cause of “No channel/circuit available”.

Glare can occur between an HQ and a branch if there is no existing call between the HQ and branch; there is only one idle PSTN unit on the HQ BRAnch VOice and only the HQ reserved unit on the branch BRAnch VOice is idle. If both the HQ and branch attempt to call each other at the same time, then both calls fail with cause busy. For voice call setup, this is not a major problem, because both voice calls can simply drop back to PSTN. However, if the calls were being set up to deliver an MCDN facility message, then this is a problem. The solution is to retry call setup after a short random interval. If both HQ and branch release and retry several times after short random intervals, the chances of one side connecting are high and delivery of the MCDN facility message practically guaranteed.

Abnormal operation

Abnormal operation includes situations where the BRAnch VOice card fails or a technician inadvertently and physically removes a BRAnch VOice card.

In either case, the BRAnch VOice DCH goes to a RLS state. However, the BRAnch VOice trunks remain in an IDLE state. If a call is presented when the card has failed or been removed, call processing first checks for the DCH, then reverts to analog EXUT signaling, and then eventually reverts to the next route in the route list block. This can take up to 10 seconds.

However, the trunks can be disabled by using maintenance routines, such as LD 30 running in the background at regular intervals. LD 30 ensures any Enhanced Extended Universal Trunk (EXUT) units (that are not responding) are placed into a disabled state. New calls default to the next route in the RLB immediately.

Multiple-card branches

Large branch offices can have multiple BRAnch VOice cards. External access to these BRAnch VOice cards from other branches is through a single PSTN phone number. The TSC and RLB are used to direct calls to the multiple cards.

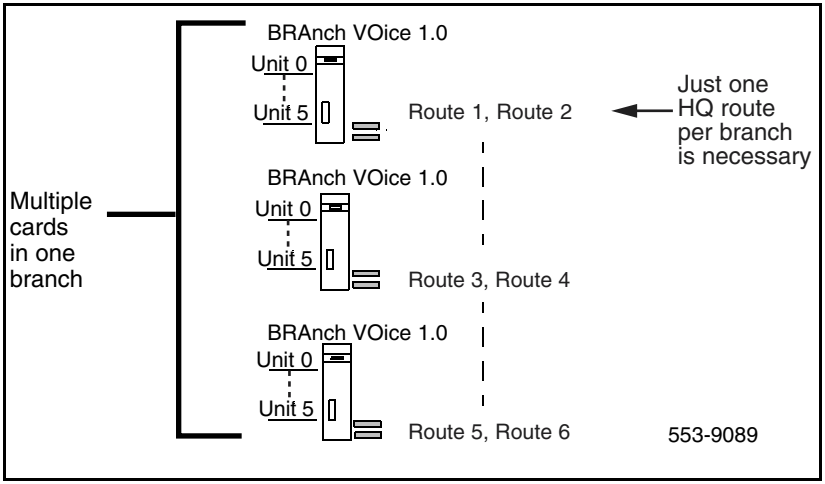
If HQ channel reservation is required for transport of MCDN non-call associated facility message associated with centralized services from a HQ/tandem node, then the HQ channel should be reserved on one of the cards. Facility messages for centralized services are sent over the D-channel associated with the first route in the RLB. If the BRAnch VOice card with the HQ reserved channel is accessed by the first route in the RLB, then the facility messages are routed to this card and guaranteed a channel to the HQ/tandem node.

Therefore, the first card in a multi-card branch must have its PSTN channels separated with one channel in the HQ route and the other in the standard route list. All other cards can have both their PSTN channels in the standard route list.

> ***Note:*** There is no inter-card communication between multiple cards that reside in the same branch.

Figure 5 on page 24 illustrates the configuration of multiple cards in a single branch. Refer to “Engineer multiple BRAnch VOice cards in a branch” on page 56 for further information on multiple-card branches.

Figure 5
Multiple BRAnch VOice cards in a single branch



BRAnch VOice branch ID and card ID

Each BRAnch VOice card must have a unique combination of branch ID and card ID. A Meridian BRAnch VOice 1.0 network can have up to 1,024 branches (numbered 0-1023). Each branch can logically contain up to 16 cards (numbered 0-15). This unique branch ID and card ID combination is necessary so that the PPP driver can configure unique IP addresses, which reside in separate subnets, for each end of every possible point-to-point connection in the network. The customer configures the branch ID and the card ID in the CLI.

Refer to “BRAnch VOice branch ID and card ID” on page 47 for more information.

BRAnch VOice functional description

The BRAnch VOice card emulates an Enhanced Universal Trunk (EXUT) card supporting eight TIE trunk units. BRAnch VOice uses the G.729A codec to make 8:1 (64 kb/s to 8 kb/s) compression on voice calls. BRAnch VOice can route up to three voice (or fax) calls through one PSTN call to the destination BRAnch VOice. Bandwidth in the PSTN call is also necessary for

call control, MCDN signaling, and overhead that is a result of voice packetization. One ISL D-channel connects to each BRAnch VOice card to provide the MCDN signaling control for the eight trunk units.

The BRAnch VOice card partitions the eight available trunk units as follows:

- The first six units (TNs 0-5) present uncompressed voice calls to and from the customer side. See Figure 6 on page 26.
- The last two units (TNs 6 and 7) transport the compressed voice/fax calls over the PSTN side using BRI/PRI ISDN bearer 64 kbps channels. The compressed voice/fax calls function as a data call while on the ISDN bearer.

Figure 6 on page 26 illustrates the basic BRAnch VOice card setup.

Note: For a BRAnch VOice card at a branch, unit 7 must route to the HQ to guarantee delivery of MCDN signaling (only if the customer reserves a HQ connection). Unit 6 can route to either the HQ or to another location.

BRAnch VOice can interface to either BRI or PRI ISDN hardware for PSTN access. If the customer has PRI hardware, multiple BRAnch VOice cards can access the same ISDN PRI route for PSTN access.

Note 1: BRAnch VOice uses the G.729A codec, which provides call compression from 64 kbps to 8 kbps. The codec frame size is 20 ms with voice activity detection set to ON.

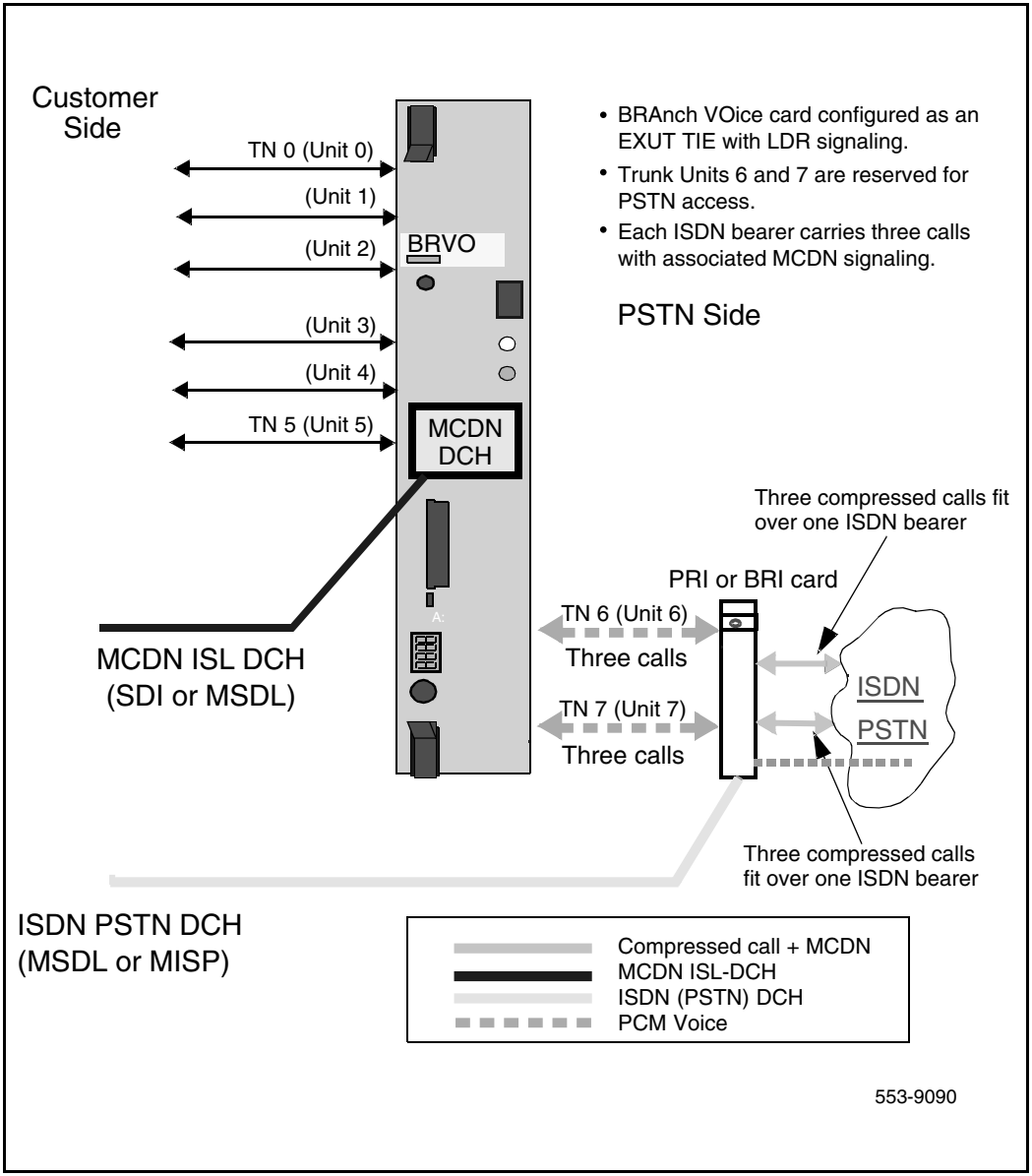
Note 2: If the D-channel fails, BRAnch VOice re-routes calls according to the customer's dialing plan.

Note 3: BRAnch VOice supports any combination of up to three simultaneous voice and fax calls per PSTN call. The PSTN call has a rate of 64 kbps. Each fax can have a maximum rate of 9600 bps.

Note 4: BRAnch VOice cannot use analog PSTN connectivity; BRAnch VOice cannot access analog bearers.

Note 5: BRAnch VOice does not support data modem calls.

Figure 6
Basic BRAnch VOIce setup



BRAnch VOice feature set

Table 2 lists common features that are relevant to BRAnch VOice and whether BRAnch VOice supports them.

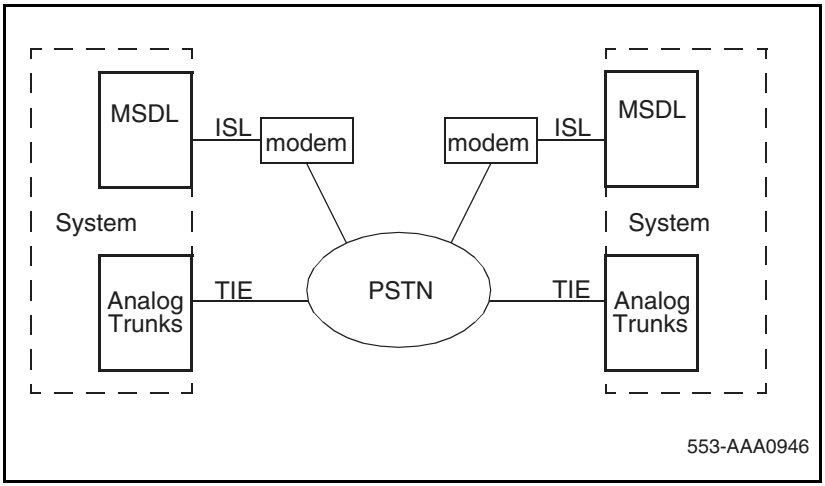
Table 2
Feature set summary for BRAnch VOice

Feature	Feature supported
MCDN supplementary features (call associated)	
Calling line ID	Yes
Network Call Redirection, Call Transfer/Forward/Hunting	Yes
Network Attendant Services (NAS) (NAS slow answer recall, NAS camp-on, NAS call waiting, incoming call indication, NAS equal distribution, NAS anti-tromboning, and NAS Drop Back Busy)	all
Trunk Route Optimization (TRO)	Yes
Network Call Trace (NCT)	No
Remote Virtual Queuing	No
Network Time Synchronization	No
Trunk Anti-Tromboning (TAT)	Yes
MCDN supplementary features (non-call associated)	
Network Automatic Call Distribution	No
Network Ring Again	Yes
NMS	Yes
Network Remote call forward	No
Dialing Plans Supported	
CDP/UDP	Yes

ISDN Serial Link (ISL)

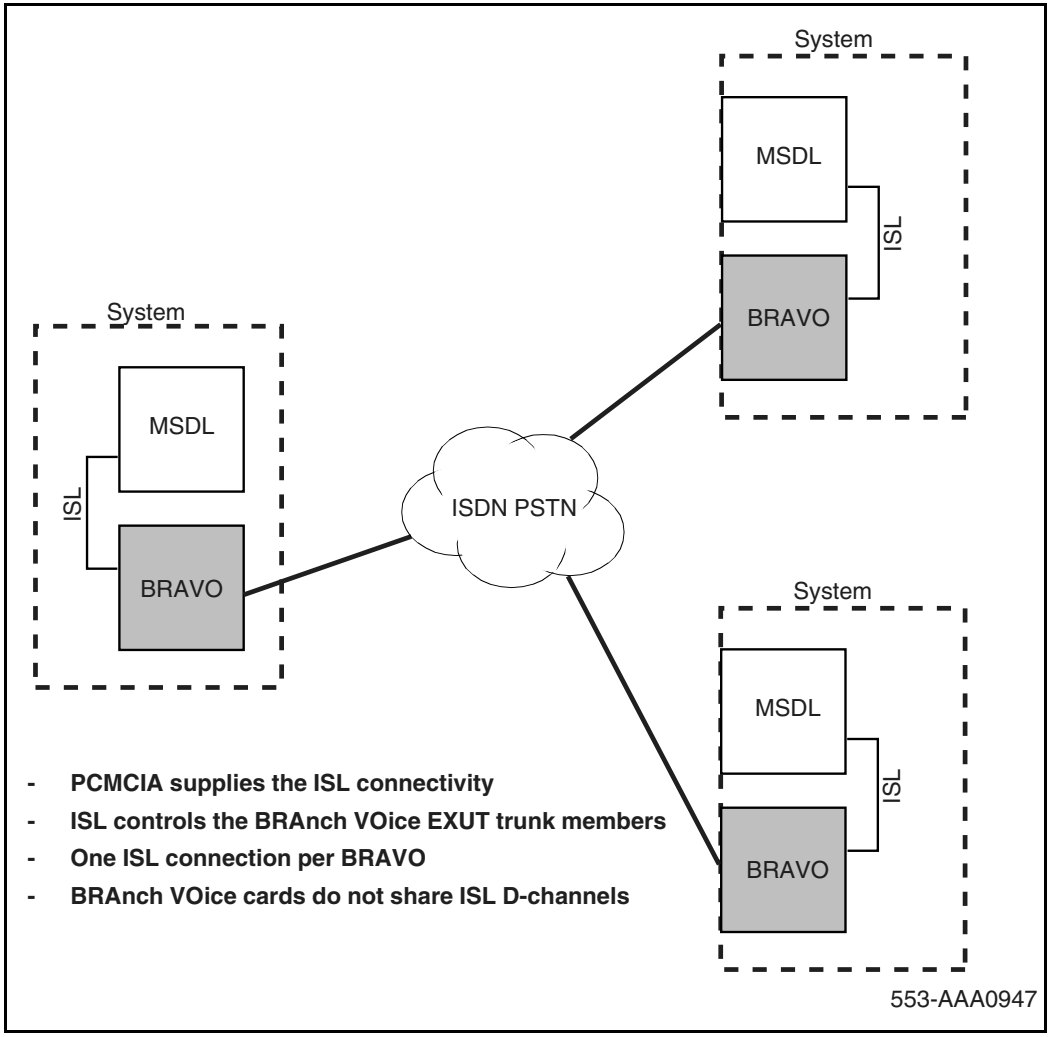
The existing ISL interface offers the flexibility of using ISDN signaling with separate analog and digital bearers. When no PRI exists between two systems, ISL operates in dedicated mode. Figure 7 shows a configuration with dedicated mode ISLs for analog trunks. A dedicated signaling link is established, usually through modems, between the two systems. The signaling information for the selected analog trunks is transported over the ISDN signaling link. The analog TIE trunks are used for user voice and data transport. If the D-channel link is down, call control reverts to conventional in-band, analog trunk signaling.

Figure 7
Dedicated mode ISL with analog trunks



The BRAnch VOice trunk feature emulates a similar ISL configuration with virtual tandem nodes between the systems. Further, instead of a one-to-one connection, you can network multiple switches through a single ISL interface at each site. Figure 8 on page 29 shows a BRAnch VOice ISL configuration with three systems. The BRAnch VOice ISL configuration is in dedicated mode and does not support fallback to analog signaling. The BRAnch VOice card emulates an EXUT with ISL analog trunks.

Figure 8
BRAnch VOice ISL configuration



BRAnch VOice call setup

With BRAnch VOice, two PSTN-side calls can be set up to two different locations or the same location. When the first call seizes a customer-side BRAnch VOice trunk TN, the following events occur:

1 A PSTN call is initiated to the far end

2 A PPP session is set up

3 An H.323 call is placed

MCDN signaling is encapsulated within the H.323 call. If the next call is to a different location, another PSTN call is initiated to the other switch location. Again, the PPP session and the H.323 call follow. Voice calls to each of the two different locations use the PSTN calls that are already in place, up to the three voice call per PSTN call limit.

However, if a call to a third location is routed to BRAnch VOice while calls are established to two other locations, the card rejects the call with a cause of "No channel/circuit available". The switch can then re-direct the call using the next route in its Route List Index.

End-of-Call Timeout parameter

BRAnch VOice provides customers that require MCDN services an opportunity to reduce costs associated with expensive leased lines. BRAnch VOice occasionally opens PPP connections for the transport of non-call associated messaging. MCDN features, such as Network-Wide Ring Again, activate non-call associated messaging.

For optimum performance, the customer can define a timer that keeps the PSTN call up for a configurable length of time after the last voice call ends. There is also a built-in timer that keeps the PSTN call up for six seconds after the BRAnch VOice card has sent or received a non-call associated message. The built-in timer keeps the PSTN call up to allow for a reply to the non-call associated message.

BRAnch VOice fallback to alternative routes

BRAnch VOice cannot handle the simultaneous placement of calls to more than two locations through a single BRAnch VOice card. If the system

attempts to place a call to a third location through a BRAnch VOice card, the BRAnch VOice card rejects the call with a cause of “No channel/circuit available”. This cause enables the MCDN Drop Back Busy feature to work. You use the dialing plan to determine where the call must fall back to. There are three fallback scenarios that you can use in any order:

- Fallback to the same BRAnch VOice card, to attempt to route the call through the HQ node
- Fallback to another BRAnch VOice card, to search for an available route to the desired location
- Fallback to the PSTN, to use a standard, non-BRAnch VOice trunk

Figure 9 on page 32 gives an example of when a BRAnch VOice call must fall back to an alternative route.

1 A call is initiated from location D to location A. One of the BRAnch VOice PSTN-side trunks is set up to location A.

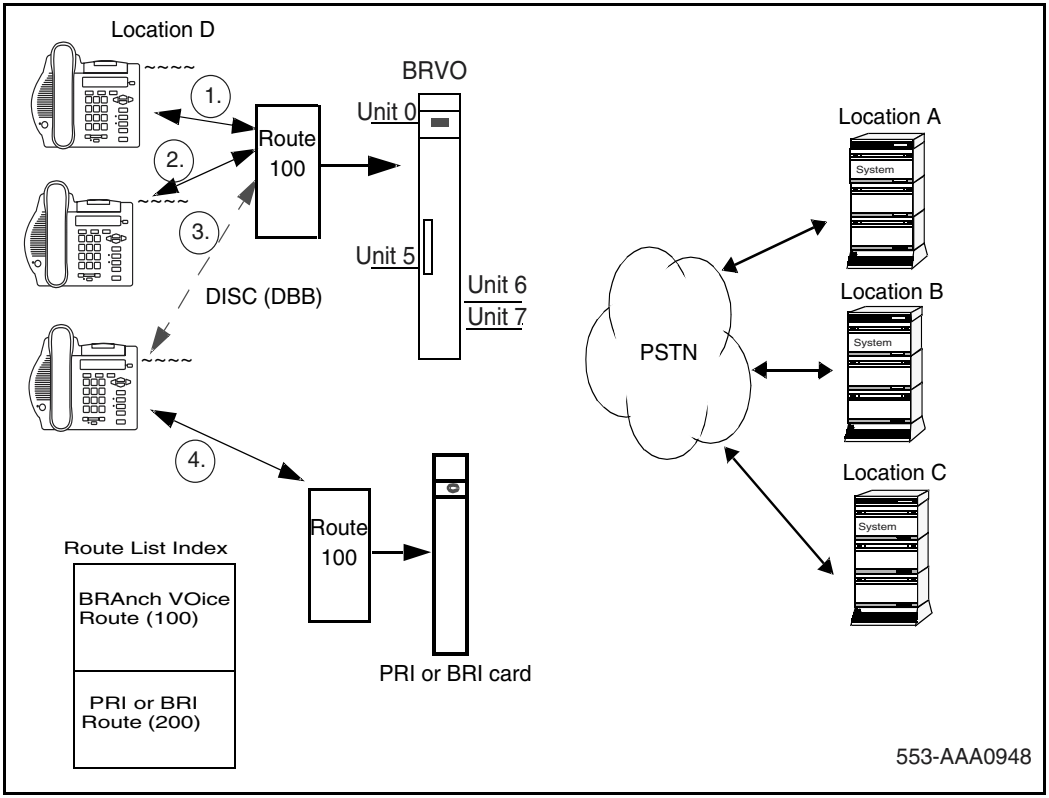
2 Another call is presented to BRAnch VOice in location D. This call requires a connection to location B. The second PSTN-side trunk on BRAnch VOice is set up to location B.

3 A third call is presented to the BRAnch VOice in location D. This call requires a connection to location C. However, the BRAnch VOice has already used all of its PSTN side trunks. The BRAnch VOice rejects the call with a cause of “No circuit/channel available”.

4 The call continues according to the next route in the RLB.

The need for BRAnch VOice fallback to alternative routes can also occur in installations with three or more branches. For example, there are three branches, each with a single BRAnch VOice card. There are six voice calls (two PSTN calls) set up between two of the branches so that their BRAnch VOices have no available channels. A user in the third branch attempts to call one of the other branches. The BRAnch VOice card has available channels and makes the external PSTN call. The PSTN call does not complete, and the original call reroutes to the next entry in the Route List Index with the cause “No channel/circuit available”.

Figure 9
Example of BRAnch VOice fallback to an alternative route



Return to BRAnch VOice network

When the BRAnch VOice failure is recoverable, all new outgoing calls go through the BRAnch VOice network when the situation is back to normal. When all new calls are processed through BRAnch VOice cards, call connections that were established under the “Drop Back Busy” condition are not affected.

BRAnch VOice card physical description

The BRAnch VOice card plugs into the IPE shelf. A maximum of eight cards can fit on one IPE shelf, or five cards per shelf for Small Systems; each

BRAnch VOice card occupies two slots. However, there can be further restrictions based on EMC compliance (refer to the applicable Product Bulletin). The BRAnch VOice card has a management Ethernet port that is accessible through the backplane cable. The BRAnch VOice card has a serial port connection on the faceplate, as well as on the I/O panel. You can only use one of the serial port connections at a time. For access to the BRAnch VOice CLI, you can connect a TTY to the faceplate serial port with the NTAG81CA cable. Alternatively, you can connect a TTY to the backplane serial port with the NTCW84HB and NTAG81BA cables. After initial setup of BRAnch VOice, including the connection of the Ethernet port to your LAN, you can access the BRAnch VOice CLI through Telnet. You can also use the connection to the LAN to send BRAnch VOice alarm messages to various Simple Network Management Protocol (SNMP) managers, including OTM terminals. You can also use the connection to the LAN to upgrade the loadware remotely.

WARNING

The BRAnch VOice card is not user-serviceable. Figure 10 on page 34 is intended for informational purposes only. Do not remove the daughterboard from the motherboard.

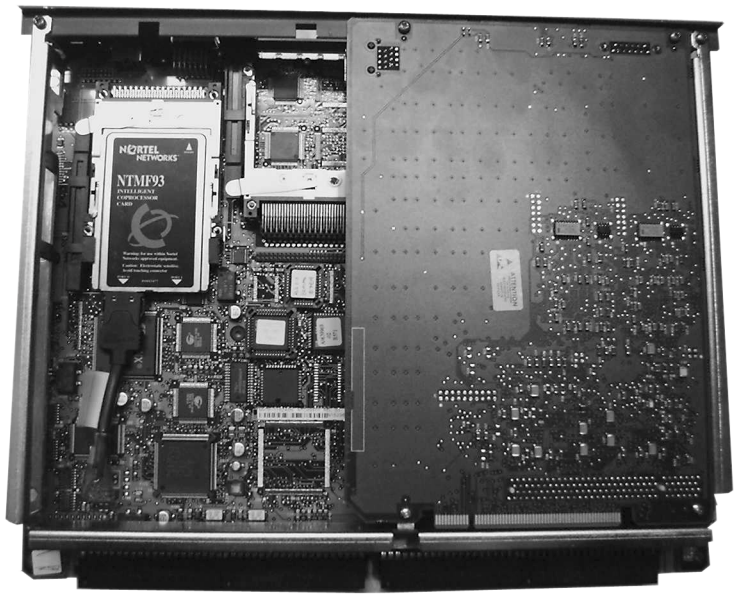
Figure 11 on page 35 shows a faceplate view of the BRAnch VOice card.

PCMCIA cards

The BRAnch VOice card has two Personal Computer Memory Card International Association (PCMCIA) card slots: one on the faceplate (drive A:) and one in-board slot (drive B:). The BRAnch VOice card supports PCMCIA hard disks (Analog Interface Adapter [ATA] interface) or high-capacity PCMCIA flash memory cards for mass storage.

BRAnch VOice uses drive A: for software upgrades. Drive A: does not usually have a PCMCIA card in it.

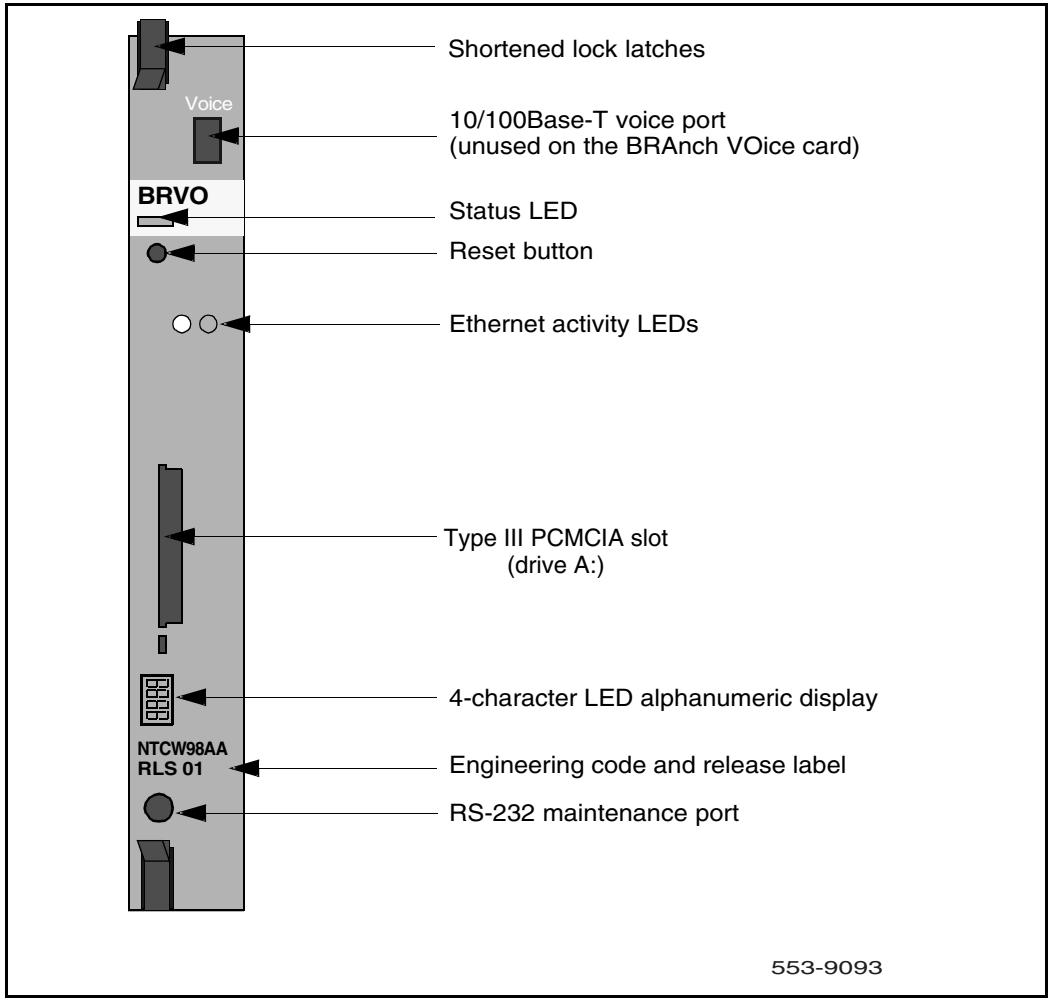
Figure 10
Motherboard and daughterboard



553-9531

Part of the BRAnch VOice package is the D-channel PCMCIA card (NTWE07AA). This PCMCIA card resides in drive B: of the BRAnch VOice card and provides an RS-422 link to the MSDL card (Large Systems) or the SDI/DCH card (Small Systems) in the system. The MSDL and the SDI/DCH cards provide the ISL D-channel interface to the BRAnch VOice card.

Figure 11
BRAnch VOice card faceplate



Supported interfaces

Table 3 is a summary of the interface types that a BRAnch VOice card supports.

Table 3
Interface summary

Interface	Number of connections
DS-30X	1
Card LAN	1
Enhanced IDE	1 (see Note 1)
PCMCIA card (Standard)	2 Type III
Ethernet	2 (see Note 2)
Maintenance RS-232	2

Note 1: This interface is part of the BRAnch VOice card architecture, but BRAnch VOice does not use this interface.

Note 2: BRAnch VOice uses only one of the two Ethernet interfaces—the management interface. BRAnch VOice does not use the Ethernet voice interface (network port).

Engineering guidelines

Contents

This section contains information on the following topics:

Introduction

Large System: Planning and Engineering (553-3021-120) describes general system engineering guidelines. The following information provides engineering guidelines only to plan and implement the Meridian BRAnch VOice 1.0 application.

System software requirements

The BRAnch VOice card emulates an Enhanced Extended Universal Trunk (EXUT) card supporting eight TIE trunk units. BRAnch VOice uses the G.729A codec to make 8:1 (64 kb/s to 8 kb/s) compression on voice calls. BRAnch VOice can route up to three voice (or fax) calls through one PSTN call to the destination BRAnch VOice. Bandwidth in the PSTN call is also necessary for call control, MCDN signaling, and overhead as a result of voice

packetization. One ISL D-channel connects to each BRAnch VOice card to provide the MCDN signaling control for the eight trunk units.

The customer uses the following software overlays to configure *each* BRAnch VOice card:

- LD 16 to configure two or three TIE routes
- LD 17 to configure the D-channel
- LD 14 to configure the eight TIE trunks
- LDs 86, 87, and 90 to configure the dialing plan, such as Network Alternate Route Section (NARS)/Basic Alternate Route Selection (BARS)/Coordinated Dialing Plan (CDP), within the private network

Table 4 lists the software package requirements for BRAnch VOice.

Table 4
System software package requirements for BRAnch VOice

Package mnemonic	Package number	Package description	Comment
ISDN[1]	145	ISDN Base	Required
ISL[1]	147	ISDN Signaling Link	Required
BARS	57	Basic Alternate Route Selection	Either this or NARS required
NARS	58	Network Alternate Route Selection	Either this or BARS required
CDP	59	Coordinated Dialing Plan	Not required if using UDP
NAS	159	Network Attendant Services	Required for NAS functionality
ORC/RVQ[1]	192	Remote Virtual Queuing	Required for fallback operation
FNP	160	Flexible Number Plan	Optional

Table 4
System software package requirements for BRAnch VOice

Package mnemonic	Package number	Package description	Comment
MCDN[2]		The Meridian Customer Defined Network feature set, including NAS, TRO, TAT, NMS, etc.	Optional
IDC	113	Incoming Digit Conversion	Optional, but required for IDC operation
NFCR	49	New Flexible Code Restriction	Optional, but required for IDC operation
DNWK[4]	231	DPNSS network services	Required for fallback operation prior to Rls 24

Note 1: The ISDN (145) and ISL (147) packages are necessary for basic BRAnch VOice operation. For fallback operation, BRAnch VOice requires the Drop Back Busy (DBB) feature. Drop Back Busy depends on ISDN (145) and ORC/RVQ (192).

Note 2: MCDN is a collection of packages that enable individual features.

Note 3: Package 176 (DID to TIE package) is “restricted” in the European market; the “DITI” prompt in LD 15 must be “YES”.

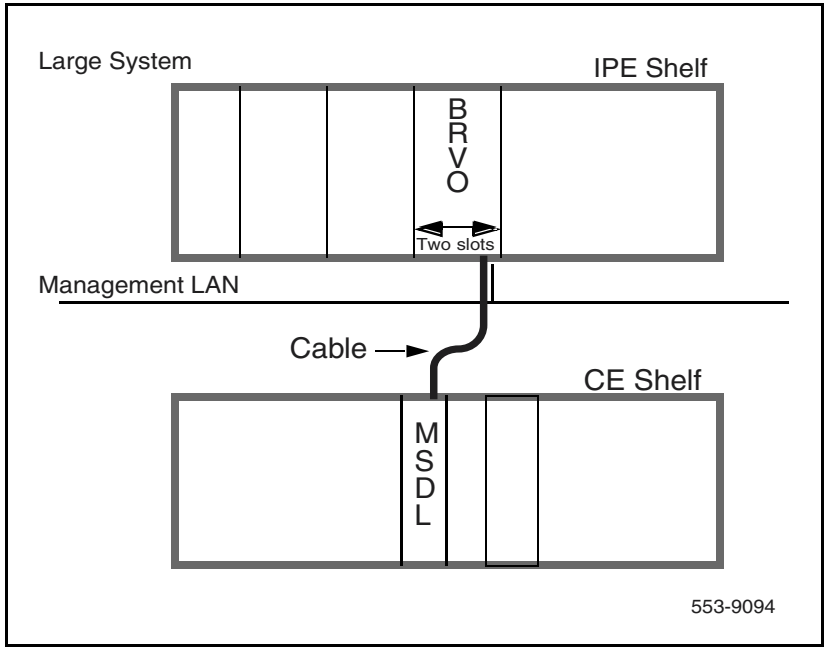
Note 4: Package 231 is required for SBOC operation prior to Rls 24—the SBOC functionality required by BRAnch VOice has been incorporated into Rls 24.

Hardware requirements

System hardware requirements

The BRAnch VOice card takes up two slots and connects to the backplane only in the left-hand slot and it is in this slot where it must be configured. In an IPE shelf, you can connect a BRAnch VOice card to the backplane in slots 0-6 and 8-15. It is important to know which card slot you connected a BRAnch VOice card to when configuring the trunks. Figure 12 on page 40 shows the hardware requirements for Large Systems.

Figure 12
Large System hardware requirements



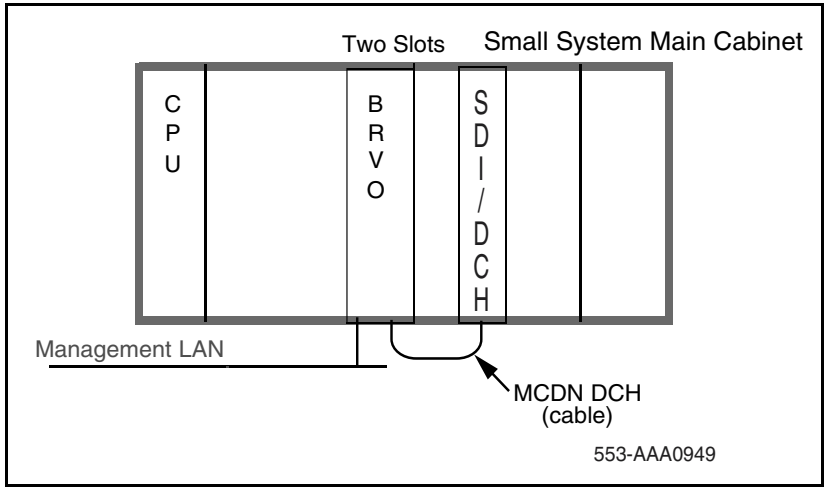
You must wire the I/O panel correctly to access the serial ports, which exit on the high tip/ring pairs. Install the BRAnch VOice card into one of the available slots listed in Table 5.

Table 5
Card slots available for BRAnch VOice

System module	Suitable card slots
NT8D37BA/EC IPE modules	All available IPE card slots
NT8D37AA/DC IPE modules	Slots 0, 4, 8, and 12

For a Small System, install a BRAnch VOice card in either the main cabinet or the expansion cabinet. There are no CE-MUX requirements for BRAnch VOice. Figure 13 on page 41 shows the Small System hardware requirements.

Figure 13
Small System hardware requirements



For Large Systems, each BRAnch VOice card connects to the system through the MSDL card. Connection to the MSDL card is necessary to receive the MCDN ISL D-channel. The MSDL has four serial ports. Each port can support a BRAnch VOice card.

For Small Systems, the SDI/DCH (NTAK02BB or later) card supplies the MCDN ISL D-channel. The SDI/DCH card requires an additional slot in the main cabinet with a CE-MUX connection. The SDI/DCH can support two BRAnch VOice cards.

To help you determine your system hardware requirements, Nortel Networks recommends:

- BRAnch VOice requires access to the PSTN through ISDN PRI/BRI trunks. Make sure non-BRAnch VOice calls requiring access to the PSTN do not block the BRAnch VOice card(s) from generating or receiving PSTN calls.
- Install BRAnch VOice cards in different IPE shelves to minimize the impact of a single IPE shelf failure. This is particularly important for tandem/HQ nodes.

- Include some PSTN trunks with your BRAnch VOice trunks in each network group. Include PSTN trunks to limit intergroup switching when a call to a BRAnch VOice trunk must fall back to a PSTN trunk.
- For Small Systems, place the BRAnch VOice card in the expansion cabinet to save space in the main cabinet.

BRAnch VOice hardware requirements

Table 6 lists the hardware requirements for BRAnch VOice. Each BRAnch VOice order consists of one of each of these items.

> ***Note:*** The D-channel interconnect cable (NTMF04BA or NTWE04AC/AD) that you receive depends on whether you install the BRAnch VOice in a Large System or a Small System.

Table 6
BRAnch VOice hardware requirements

Component	Description
NTCW98AA BRAnch VOice card	An IPE card that provides an integrated way to extend key system features to one or more branch offices.
NTWE07AA D-channel PCMCIA interface card	PCMCIA card that provides an interface between the BRAnch VOice card and the D-channel handler in the system.
NTCW84EA pigtail cable	Cable connects port 0 of the PCMCIA card to a header on the motherboard to enable you to establish a link to the D-channel handler.
NTCW84HB I/O panel cable.	Cable provides access to four ports on the BRAnch VOice card: a serial maintenance port, a management LAN port, a D-channel port, and a serial data port (for CDR data collection).

Table 6
BRAnch VOice hardware requirements

Component	Description
NTMF04BA extension cable (*Large Systems only*)	This extension cable connects the NTCW84HB from the BRAnch VOice card to the NTND26 from the MSDL card.
NTWE04AC/AD SDI/DCH interconnect cable (*Small Systems only*)	This cable connects the NTCW84HB from the BRAnch VOice card to the NTAK19FB cable from the SDI/DCH card. The AC is a 10-foot (3 m) intercabinet version, and the AD is a 1-foot (30 cm) intracabinet version.

Note: The NT8D81AA cable brings all 24 tip/ring pairs to the I/O panel and connects to the NTCW84HB cable.

External equipment requirements

To interface with the BRAnch VOice card, you must access the CLI, which enables you to:

- configure the BRAnch VOice card
- perform maintenance and diagnostics on the card

To access the CLI, you must use a VT100 terminal or a PC emulating a VT100 terminal, or establish a Telnet session. There are three options for connecting a terminal to the BRAnch VOice card:

- directly through a serial connection
- remotely through a modem connection
- connect the BRAnch VOice card to the LAN

You must set the terminal interface to 9600 baud, 8 data bits, 1 stop bit, and no parity.

BRAnch VOice networking configurations

The customer can deploy BRAnch VOice in three different networking configurations:

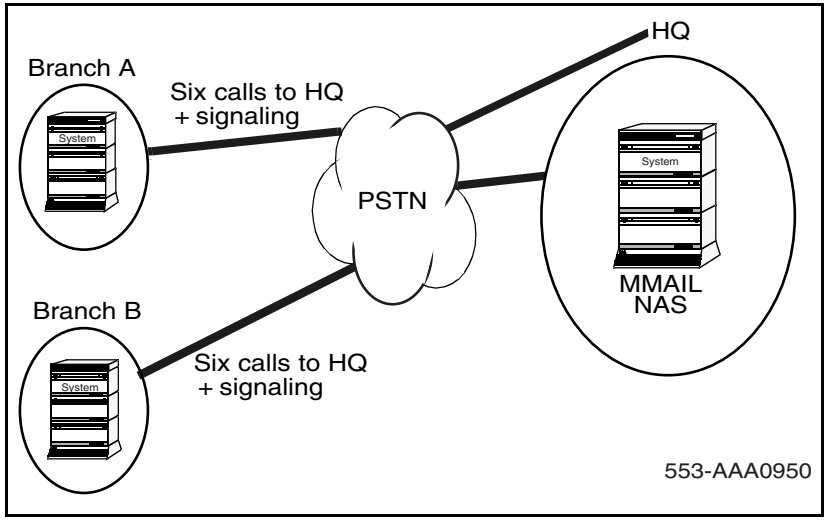
- **Branch/HQ node**—Select this configuration if most of the call traffic is between the branch and the HQ with very little inter-branch traffic.
- **Branch/HQ cluster**—Select this configuration if there is a fairly even mix of branch/HQ and inter-branch call traffic.
- **Extension of the MCDN network**—This configuration enables a customer to extend an MCDN network by using a BRAnch VOice link.

The following three sections provide further details on these networking configurations.

Branch/HQ node

Figure 14 illustrates this configuration. Use this configuration if most of the BRAnch VOice traffic is between the branch and the HQ.

Figure 14
BRAnch VOice configuration: Branch/HQ node



For this configuration, configure the dial plan in the branch BRAnch VOice cards to route all calls to the HQ. This configuration supports up to six calls plus MCDN signaling between the branch and the HQ on each BRAnch VOice card.

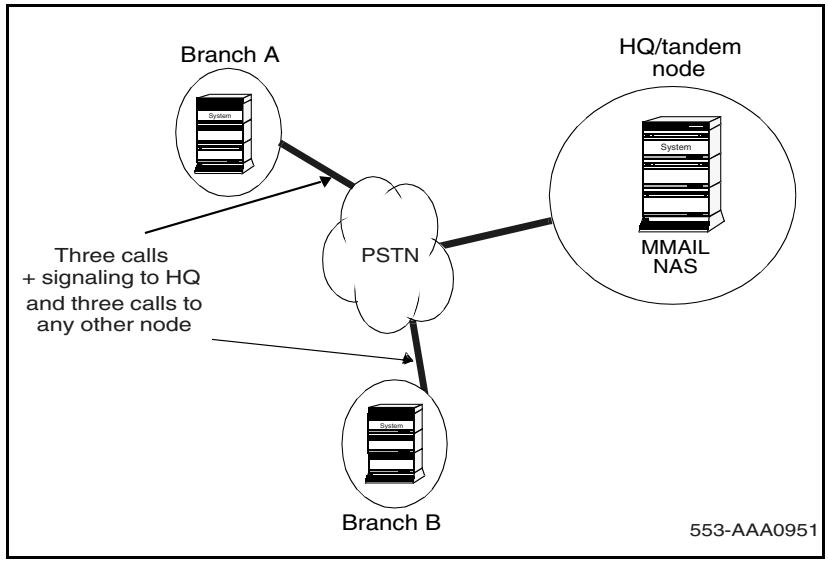
Note 1: The BRAnch VOice cards at the branch route *all* calls to the HQ with this configuration; therefore, there is no need to configure channel reservation.

Note 2: With this configuration, you can still set up BRAnch VOice calls between two branches; however, the BRAnch VOice calls must first pass through the HQ. Therefore, it is best to use this configuration only if the inter-branch traffic is light.

Branch/HQ cluster

Figure 15 illustrates this configuration. Use this configuration if there is a mix of branch/HQ and inter-branch call traffic.

Figure 15
BRAnch VOice configuration: Branch/HQ cluster



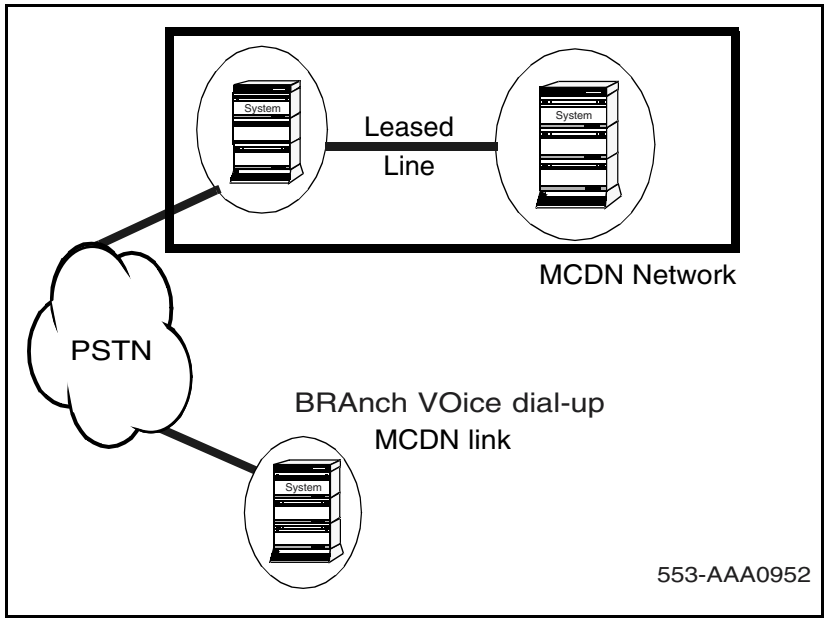
For this configuration, configure the HQ channel reservation flag in at least one BRAnch VOice card in each branch. This guarantees delivery of centralized MCDN services to each branch. NRAG messages are delivered as long as there is a free voice channel available on the selected route.

With this configuration, each BRAnch VOice supports up to three direct calls between the locations. If necessary, BRAnch VOice calls between branches can also travel through the HQ/tandem node.

MCDN network extension

Figure 16 illustrates the MCDN network extension configuration. BRAnch VOice uses the PSTN to route calls and MCDN signaling instead of a leased line. Therefore, you do not need an additional leased line to extend your MCDN network to a branch.

Figure 16
BRAnch VOice configuration: MCDN network extension



BRAnch VOice networking guidelines

The following sections describe general networking guidelines to effectively operate a BRAnch VOice multi-node network.

BRAnch VOice branch ID and card ID

A BRAnch VOice network can contain up to 1,024 branches, or nodes, including the HQ/tandem node. Each branch can logically contain up to 16 BRAnch VOice cards. BRAnch VOice identifies each branch with a unique branch ID number (0-1023); and BRAnch VOice identifies each card within a branch with a card ID number (0-15).

> ***Note:*** Each card in the BRAnch VOice network requires a unique branch ID and card ID combination. If any two cards in the network have the same branch ID and card ID combination, the conflicting cards do not interwork. The conflict generates an SNMP alarm.

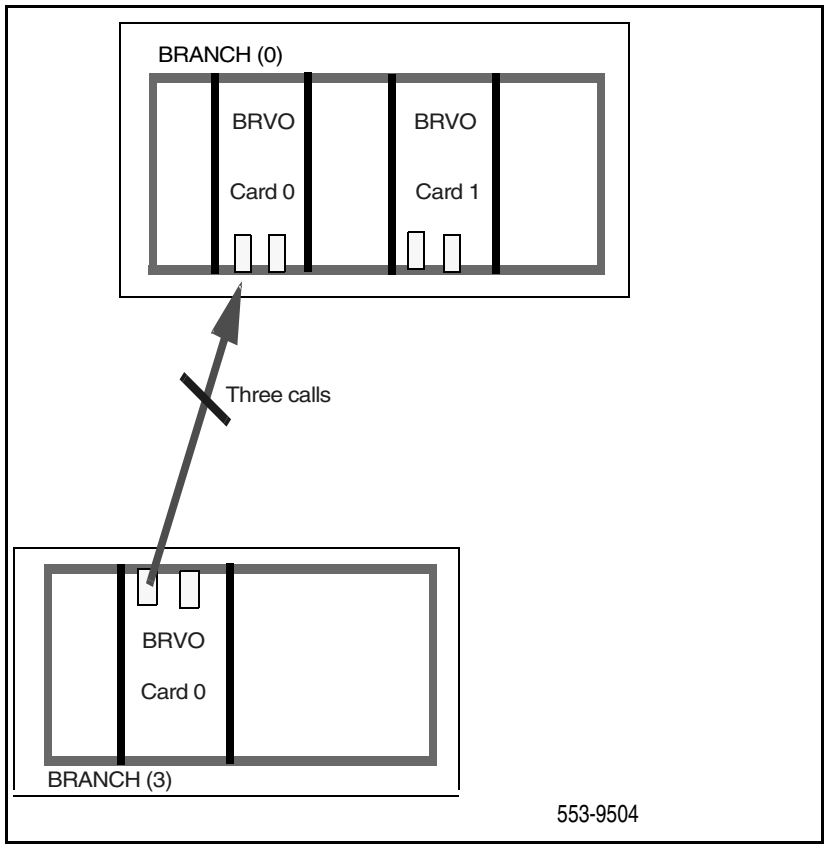
Branch ID

Each BRAnch VOice network node has a unique branch ID and each BRAnch VOice within any node has a card ID in the range of 0-15. Consider the BRAnch VOice network that Figure 17 on page 48 shows.

BRAnch VOice Card 0 in branch 3 makes a PSTN call to branch 0. Both nodes exchange branch ID and card IDs after the PSTN call has been established. Each BRAnch VOice has a state table containing a list of branch identifiers with PSTN connections established. In the case of branch 3, the state table contains the branch ID of branch 0.

Now BRAnch VOice card 0 at branch 3 receives a request to make a call to the PSTN number corresponding to branch 0. Each Dial Plan entry contains both a PSTN number and the branch ID of the destination. BRAnch VOice consults its state table for any existing connections to the destination. Because the state table has the current state of all PSTN calls (including the destination branch ID), the BRAnch VOice knows whether a call to the requested destination already exists.

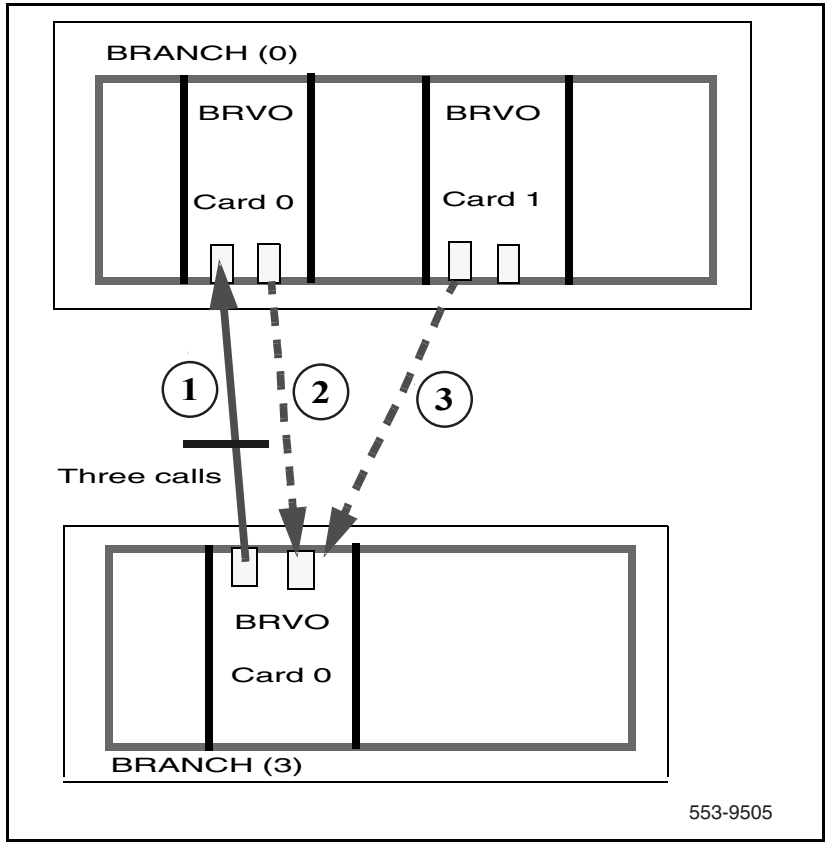
Figure 17
BRAnch VOice branch ID and card ID



Card ID

Each BRAnch VOice within a node has a card ID (0-15). Card IDs are necessary to let BRAnch VOice know whether to activate a multi-link PPP. Consider the BRAnch VOice network that Figure 18 on page 49 shows.

Figure 18
BRAnch VOice card ID



PSTN call #1 is established with three (H.323) calls set up in the 64 kbps pipe. Consider new incoming PSTN call #2 (the fourth H.323 call between the two branches). When this call is presented to card 0 in branch 3, card and branch IDs are exchanged. Card 0 in branch 3 is aware that a call is already up to the branch that the incoming call originated from and is also aware that the card IDs on both ends match.

When the card IDs on both ends match, the two 64 kbps PSTN channels on each BRAnch VOice at either end of the connection can combine to form a single fat (128 kbps) pipe; this is called *multi-linking*.

If one of the H.323 calls on the first pipe disconnects, then BRAnch VOice disables multi-link and transparently reverts packets associated with the fourth call through the *first* PSTN call. The second PSTN connection to BRAnch VOice card 0 drops, thus making optimum use of the available PSTN connections.

Now consider a new incoming PSTN call (#3 in Figure 18). When this PSTN call is established and branch and card IDs are exchanged, BRAnch VOice card 0 in branch 3 is aware that the card IDs *do not* match; hence, multi-link is not activated across the PSTN connections.

BRAnch VOice IP address reservation

BRAnch VOice reserves two IP addresses for each branch ID and card ID combination. The branch IDs and card IDs tell the BRAnch VOice network which IP addresses to use to establish point-to-point PSTN calls between BRAnch VOice cards. Table 7 lists the IP address that BRAnch VOice reserves for each branch ID and card ID combination.

Table 7
BRAnch VOice IP address reservation scheme (Part 1 of 2)

Branch ID	Card ID	Unit number	Local IP address	Terminating IP address
0	0	0 1 2 . 31	10.240.0.0 10.240.0.2 10.240.0.4 . 10.240.0.62	10.240.0.1 10.240.0.3 10.240.0.5 . 10.240.0.63
	1	0 1 . 31	10.240.0.64 10.240.0.66 . 10.240.0.126	10.240.0.65 10.240.0.67 . 10.240.0.127
	15	0 1 . 31	10.240.3.192 10.240.3.194 . 10.240.3.254	10.240.3.193 10.240.3.195 . 10.240.3.255

Table 7
BRAnch VOice IP address reservation scheme (Part 2 of 2)

Branch ID	Card ID	Unit number	Local IP address	Terminating IP address
1	0	0 . 31	10.240.4.0 . 10.240.4.62	10.240.4.1 . 10.240.4.63
	15	0 . 31	10.240.7.192 . 10.240.7.254	10.240.7.193 . 10.240.7.255
B (0 to 0x3FF)	N (0 to 0xF)	C (0 to 0x1F)	---	---
1023	15	0 . 31	10.255.255.192 . 10.255.255.254	10.255.255.193 . 10.255.255.255

Note 1: BRAnch VOice uses units 6 and 7 for PSTN connection. BRAnch VOice reserves the other units for future use.

Note 2: These IP addresses should be reserved for the BRAnch VOice network, and not used by any other devices on the same subnet as the BRAnch VOice card(s).

Engineer BRAnch VOice cards

You can engineer a BRAnch VOice network to make optimal use of the PSTN connections that the BRAnch VOice cards at each branch create.

Channel reservation

In certain call scenarios, a connection to a HQ/tandem node must be guaranteed to ensure delivery of NCA messaging. This is achieved by reserving a channel on BRAnch VOice. **If customers do not want to**

guarantee delivery of NCA messaging, then channel reservation is not required. Channel reservation can be summarized as follows:

1 BRAnch VOice must be configured to call a HQ/tandem node to guarantee delivery of NCA messaging.

2 BRAnch VOice automatically uses channel 7 as the channel reserved for access to the HQ/tandem node.

3 Channel 7 only calls a PSTN number associated with the HQ/tandem node.

4 A BRAnch VOice that has channel reservation active is restricted to three calls to any other branch, unless calls are directed using the HQ/tandem node.

5 A BRAnch VOice that has channel reservation active can make six calls to the HQ/tandem node.

6 A BRAnch VOice that has channel reservation active is configured using three routes. The first route covers the customer side trunks (units 0->5), the last two PSTN-side units are configured on separate routes. Separate routes for the PSTN-side units are necessary to restrict access to the reserved channel (unit 7). For example, only the HQ/tandem node can dial the DID PSTN which terminates on unit 7.

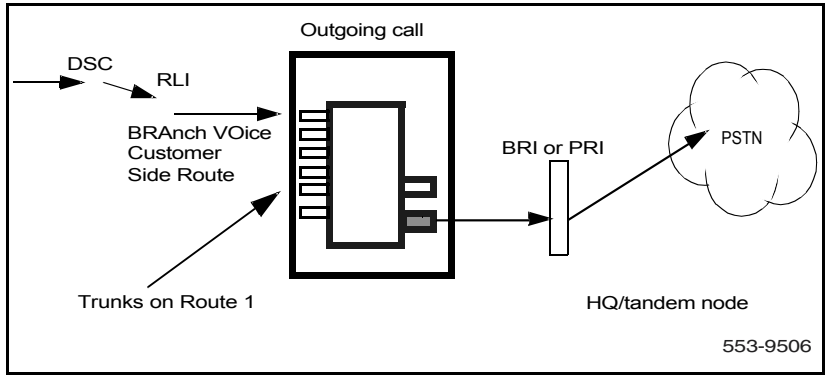
7 When BRAnch VOice has channel reservation active, another BRAnch VOice card is required in the HQ to match this BRAnch VOice card, to fully guarantee that NCA messaging can be delivered by the HQ/tandem node to the required destination. If less cards than branches are provisioned in the HQ, NCA messages are delivered on a “best effort” basis.

8 BRAnch VOice always attempts to deliver NCA messaging or voice calls using a point-to-point connection, regardless of whether channel reservation is configured or not.

Figure 19 on page 53 shows unit 7 reserved for delivery of NCA messaging for centralized services.

In the case of incoming calls from the HQ/tandem node, calls should be directed to the reserved channel using TSCs.

Figure 19
BRAnch VOice reserved PSTN channel - outgoing call



To target the reserved channel, both PSTN side trunk units must be configured on separate routes, and the incoming call must dial unique DID numbers. Each DID number has a corresponding entry in the IDC table.

Incoming calls from the HQ normally use the first DID DN. The associated IDC table steers the call to PSTN trunk unit 7. Incoming calls from any other branch site use the second DID DN. In this case, the associated IDC table steers the call to PSTN trunk unit 6.

Engineer voice calls

When BRAnch VOice attempts to deliver voice calls and experiences congestion, the calls are dropped back to the system with a cause of “no channel/circuit available.” The call is then directed to the next entry in the RLI, which can be a PSTN route or another BRAnch VOice card.

In the case where HQ reservation is employed and a branch-to-branch call cannot be completed directly, the BRAnch VOice card and RLI associated with the dialed number can be set up to direct the call using the HQ/tandem node.

Figure 20 on page 55 shows a typical branch-to-branch scenario, where a user dials a number associated with a remote branch. The call is directed to the first entry in the associated RLI (ENTR 0), which is the BRAnch VOice customer-side route. The relevant BRAnch VOice dial plan entry translates

the dialed number to a PSTN number and normally initiates a PSTN call using unit 6 (the unreserved PSTN-side unit). However if this call cannot be completed, because a PSTN call to another branch already exists on this unit, or if 3 voice calls to the destination branch already exist on this unit, or if congestion is encountered—the destination BRAnch VOice unit 6 can be busy—the call is dropped back into the switch for alternate routing.

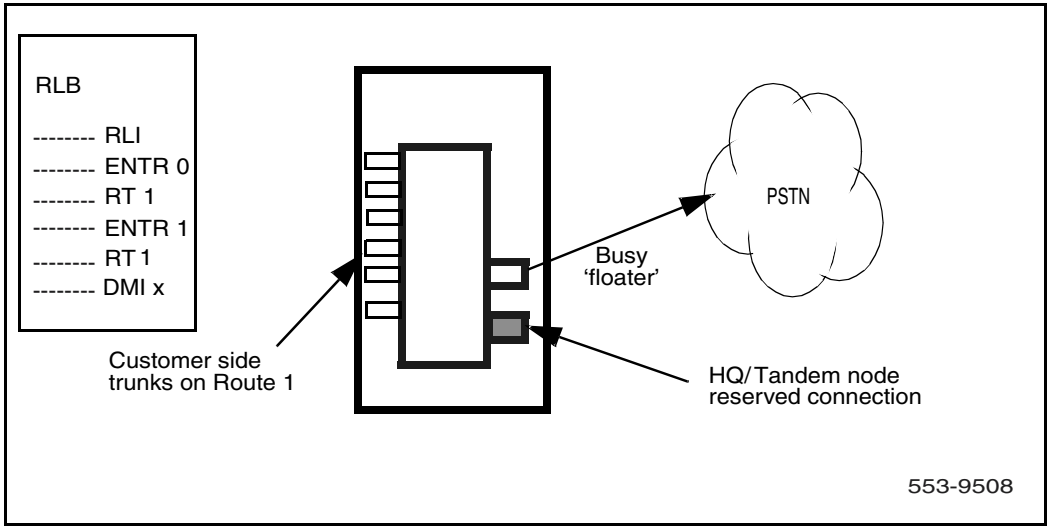
The call is then directed to the second entry in the associated RLI (ENTR 1), which is the same route, but with a DMI to add leading digits to the dialed number. The new number must have a dial plan entry on the BRAnch VOice card *associated with the leading digits added by the digit manipulation*, effectively causing the dialed number to translate to the HQ/tandem node PSTN number. The leading digits added by the digit manipulation in ENTR1 are configured to be deleted in the dial plan entry, thus presenting the correct dialed number to the HQ/tandem node. The HQ/tandem node, in turn, routes the call to the final destination across the network.

> ***Note:*** The additional digits used to re-route the call to the HQ/tandem node must be unique in the BRAnch VOice dial plan, thus using one valid destination in the network-wide numbering plan (for example, “88” could not be used as the prefix to redirect calls if “8” or “88” or “88x” were valid DSCs, as the BRAnch VOice dial plan would not distinguish between the entries).

If PSTN unit 7 in the originating BRAnch VOice card already has three associated voice calls, the call will be dropped back again for alternate routing. The call can then be directed to a third entry in the associated RLI, which can be either another BRAnch VOice card or a standard PSTN trunk.

In the branch-to-HQ/tandem node scenario, BRAnch VOice again sets up a PSTN call associated with the relevant dial plan entry. However, this time the call is directed to the HQ/tandem node; therefore, the BRAnch VOice card can use PSTN unit 7 (the reserved PSTN-side unit). If PSTN unit 7 already has three associated voice calls, the BRAnch VOice card attempts to dial the same PSTN number using the unreserved PSTN-side unit 6. No alternate routing or digit manipulation is necessary in this case, as the BRAnch VOice card is attempting to dial the same location (the HQ/tandem node).

Figure 20
Reserved PSTN channel for voice call tandeming

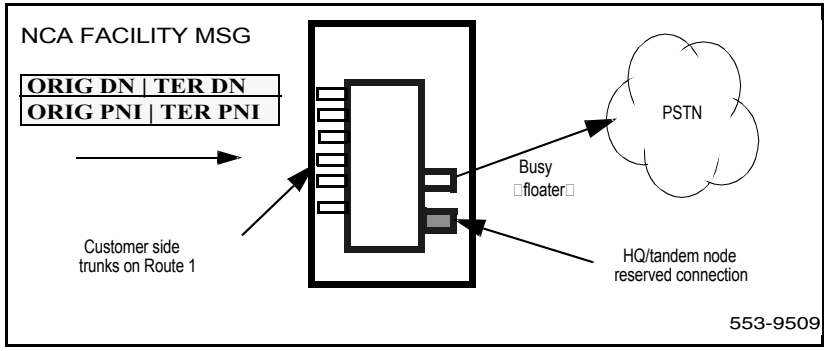


BRAnch VOice—NCA messaging engineering

Facility messages and non-call associated signaling are routed based on the DN information contained in the facility message. Therefore, facility messages can be routed using a dial plan in much the same way as a voice call is routed (for example, using DSCs and RLIs). However, one difference between NCA messaging and voice-call handling is that NCA messages do not get alternate routing by the system in case of congestion. Refer to Figure 21 on page 56.

As Figure 21 shows, a facility message is delivered into the BRAnch VOice card, which uses the relevant dial plan entry to resolve the terminating DN information in the facility to the PSTN number of the destination. If a call to the HQ/tandem node is established, the BRAnch Voice card uses this call to deliver the facility message using the HQ/tandem node. Otherwise, the BRAnch VOice card attempts to deliver the facility message on a direct point-to-point path using the unreserved PSTN-side unit. However, if congestion is encountered as Figure 21 shows, then BRAnch VOice initiates a call on the reserved channel to a HQ/tandem node for guaranteed delivery of the NCA message. The same rules apply for selection of channels in the

Figure 21
BRAnch VOice delivery of NCA messaging



branch-to-branch and branch-to-HQ/tandem node scenarios as described in the previous section.

Engineer multiple BRAnch VOice cards in a branch

If a branch requires more than one BRAnch VOice card, a single BRAnch VOice card can be configured to have a channel reserved for the HQ/tandem node to route all non-call associated traffic for that branch. This approach is recommended to ensure delivery of NCA messages associated with centralized services, such as NMS, but does not necessarily apply to delivery of messages associated with the NRAG feature, which are associated with the route over which the voice calls are being made.

For incoming PSTN calls from the HQ, the PSTN call is directed to the reserved channel using the DID number and route associated with the reserved channel. Incoming voice calls from the HQ/tandem node dial a DID number reserved for cards with the HQ flag configured. The call is then directed to route 1, the reserved channel, as Figure 20 on page 55 shows. If route 1 has reached the three call limit, then the HQ incoming PSTN calls overflow to PSTN-side trunk members associated with route 2. This is supported if the RLI that the incoming HQ/tandem node call terminates on has route 1 and 2 as ENTR 0 and ENTR 1, respectively.

If an incoming call is from another branch, then the incoming DID #2 is reserved only for inter-branch traffic. DID #2 *should never appear in the dial plan of a HQ/tandem node BRAnch VOice*. The incoming call from the other

branch routes to PSTN-side trunk units/channels associated only with route 2. Inter-branch traffic must never terminate on route 1 as Figure 22 on page 58 shows.

Engineer HQ/tandem nodes

As stated previously, to guarantee delivery of NCA messaging, the HQ/tandem node(s) should have enough resources available to deliver NCA messaging to any branch in the network.

To *guarantee* connectivity to each branch, each HQ/tandem node must have at least one BRAnch VOice card for each branch node. This section describes a configuration which guarantees delivery of NCA messaging. To guarantee voice call delivery from branch nodes with multiple BRAnch VOice cards then additional cards must be added to the HQ/tandem node. For example, as Figure 22 on page 58 shows, the medium branch with two BRAnch VOice cards require another card in the HQ/tandem node to guarantee voice connectivity.

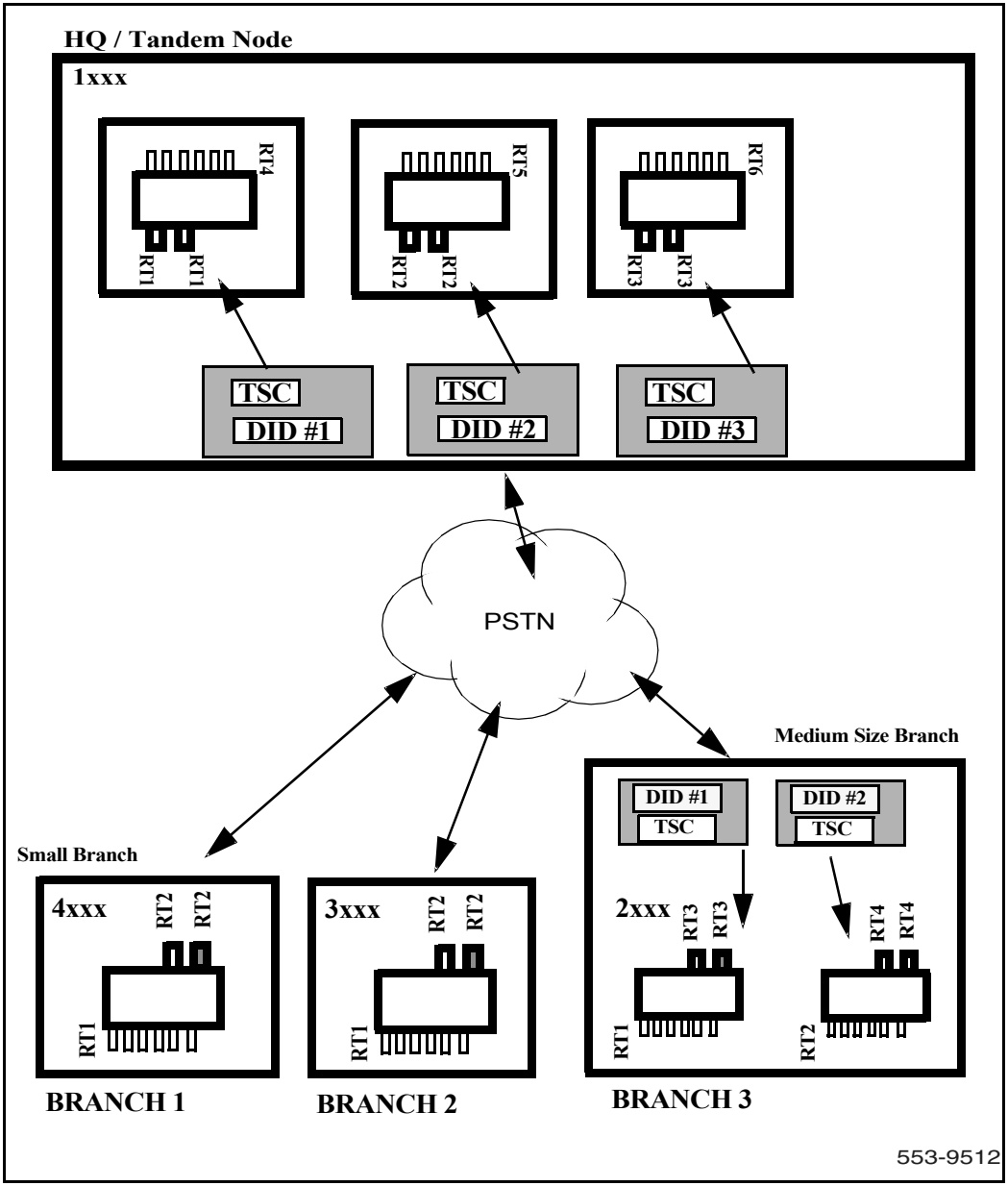
Figure 22 on page 58 shows a typical HQ/tandem node and a number of small and medium-sized branches.

HQ/tandem node BRAnch VOice cards

One BRAnch VOice card is configured in the HQ/tandem node per branch node. Each of the PSTN-side units can be configured on the same route. None of the BRAnch VOice cards in the HQ/tandem node use channel reservation. Each of the BRAnch VOice cards must use a separate route for the customer-side trunks. In this way, voice and NCA messaging destined for a particular branch use the correct BRAnch VOice. Each BRAnch VOice in the tandem node is dedicated for connectivity to a particular branch.

To guarantee delivery of centralized services and voice call access at each branch, the routes used for the customer-side trunks in each of the HQ/tandem node BRAnch VOice cards must not appear in the same RLI. The dialing plan in the HQ/tandem node BRAnch VOice cards must dial the DID number used for accessing the reserved channel at each branch. As each BRAnch VOice in the tandem node is dedicated to a branch, incoming calls must dial separate DID numbers.

Figure 22
BRAnch VOice HQ/tandem node engineering example



Medium-sIzed branch node BRAnch VOice cards

This branch has more than one BRAnch VOice card. The second BRAnch VOice card cannot access the HQ/tandem node for voice calls. The second BRAnch VOice should only be used for inter-branch traffic and should not have the DID number of a HQ/tandem node in its dial plan.

Minimize multiple call hops

To transport multiple voice calls across the PSTN call, BRAnch VOice uses the G.729A voice codec with 20 ms packet size to achieve bandwidth reduction. Voice compression introduces some loss of information and delay in the voice signal, leading to eventual degradation of voice quality across multiple hops. To minimize this effect, it is recommended that the network topology should be engineered to allow no more than two BRAnch VOice hops, or one BRAnch VOice hop to a centralized voice mail system, because of the voice compression employed by mail systems for storage capacity reduction.

Operational Measurements

BRAnch VOice stores Operational Measurements (OMs) to indicate the utilization level of each PPP pipe. Various statistics are provided, such as the number of incoming and outgoing PSTN calls attempted/completed/rejected, the total time spent on voice calls, the total time for PSTN calls (which can be used to measure the cost effectiveness of the BRAnch VOice solution), the number of incoming and outgoing NCA messages, the number of fallback calls, and the number of fax calls.

Advice of Charge (AOC) is generated for the ISDN bearer trunks and not specifically for the BRAnch VOice ISL trunks. Billing for BRAnch VOice calls involves consolidation of CDR records associated with a BRAnch VOice (EXUT) call and the associated ISDN bearer call.

Installation and configuration

Contents

This section contains information on the following topics:

Introduction

This chapter explains how to install and configure the Meridian BRAnch VOice 1.0 card in a system branch node and an HQ/tandem node.

Before you begin

Check the following:

- The management LAN is in position if you plan to connect the BRAnch VOice card to the LAN.

  Note: It is not mandatory to connect the BRAnch VOice card to the management LAN. Configuration and maintenance can also be carried out using a serial connection, and loadware upgrade using the faceplate PCMCIA slot.

- You have an MSDL card (NT6D80) in a Large System, or an SDI/DCH card (NTAK02BB or later) in a Small System.
- You have read and applied "Engineering guidelines" on page 37.
- You must provide one serial cable per BRAnch VOice card. An Ethernet cable is only required if you are connecting to the management LAN, which is **not** mandatory on the BRAnch VOice card. You must match the BRAnch VOice card configuration to your management LAN and your dialing plan.
- The installer must ensure that the relevant patch is installed. Please consult the Product Bulletin for more details.

Installation summary

Table 8 summarizes how to install and configure a BRAnch VOice installation and configuration.

Table 8
Summary of BRAnch VOice card installation and configuration (Part 1 of 2)

Step	Page
Installation preparation	page 63
• Inspect the package contents	page 63
• Take inventory	page 63
• Choose the card slot	page 64
• Install and connect the D-channel PCMCIA interface card	page 66
BRAnch VOice card installation	page 68
BRAnch VOice card cabling	page 69
• Connect the I/O panel cable	page 69
• Connect the serial maintenance port (P2) to a terminal	page 69
• Connect the LAN port (P3) to the management LAN	page 70
• Connect the D-channel interface port (P4) to the MSDL or SDI/DCH card	page 70

Table 8
Summary of BRAnch VOice card installation and configuration (Part 2 of 2)

Step	Page
System software configuration	page 74
• Configure D-channels in LD 17	page 74
• Configure trunk routes in LD 16	page 76
• Configure trunks in LD 14	page 77
• Configure the dialing plan with LDs 86, 87, and 90	page 79
• Configure Incoming Digit Conversion (IDC)	page 83

Installation preparation

The preparation includes the removal of the contents from the package and inspecting the components. You must take inventory and choose the card slots where you plan to install the BRAnch VOice card.

Inspect the package contents

Remove the contents from the package and inspect the equipment. When you remove the contents, follow general precautions recommended by computer and telephone equipment manufacturers:

- Remove items that generate static charge from the installation site.
- Ground your body before handling any equipment.
- Remove equipment carefully from its packaging.
- Inspect the equipment for faults or damage.

Take inventory

After you unpack and inspect, check that all the equipment is at the site before the installation begins. Check the equipment you received against the shipping documents. Make sure you received one D-channel PCMCIA card for each BRAnch VOice card.

Choose the card slot

You can install a BRAnch VOice card in an appropriate IPE card slot in an IPE module. You cannot use the Peripheral Controller card slot marked "*Cont.*" Each BRAnch VOice card fills two slots; however, the BRAnch VOice card connects to the backplane only in the left-hand slot. This means, in an IPE shelf, you can connect a BRAnch VOice card to the backplane in slots 0-6 and 8-15. Refer to Table 9 for more details. It is important to know which card slot you connected a BRAnch VOice card to when enabling the card.

Because BRAnch VOice requires access to all tip/ring pairs at the I/O panel connector, you must install the BRAnch VOice card into one of the available slots as listed in Table 9.

Regardless of whether you plan to network the BRAnch VOice card to the management LAN, you must wire the I/O panel correctly to access the serial ports. (The serial ports exit on the high tip/ring pairs.) Therefore, you must install the BRAnch VOice card into one of the available slots that Table 9 lists.

CAUTION

Before installing the BRAnch VOice card, make sure there are no existing connections at the I/O panel connector associated with that BRAnch VOice card. Cross-connecting wires that transmit a ringing voltage can damage the BRAnch VOice card.

Table 9
Card slots available for BRAnch VOice connection to the LAN

System module	Acceptable card slots
NT8D37BA/EC IPE modules	0-6 and 8-15
NT8D37AA/DC IPE modules	Slots 0, 4, 8, and 12

In Small Systems, you can install the BRAnch VOice card in any card slot from 1 to 10 in the main cabinet or the expansion cabinet.

In NT8D37BA and NT8D37EC (and later vintage) IPE modules, all 16 IPE card slots support 24-pair cable connections. Table 10 shows the cable connections from the backplane to the inside of the I/O panel.

Table 10
NT8D37 cable connections

Backplane slots-shroud rows	I/O panel/cable designation
L0-1,2,3	A
L1-1,2,3	B
L2-1,2,3	C
L3-1,2,3	D
L4-1,2,3	E
L5-1,2,3	F
L6-1,2,3	G
L7-1,2,3	H
L8-1,2,3	K
L9-1,2,3	L
L10-1,2,3	M
L11-1,2,3	N
L12-1,2,3	R
L13-1,2,3	S
L14-1,2,3	T
L15,1,2,3	U

Table 11 describes the NT8D37 cable connections for 12-cable configuration.

Table 11
NT8D37 cable connections for 12-cable configuration

Backplane slots-shroud rows			I/O panel/cable designation
L0-1	L0-2	L0-3	A
L1-1	L1-2	L1-3	B
L2-2	L3-1	L3-2	C
L4-1	L4-2	L4-3	E
L5-1	L5-2	L5-3	F
L6-1	L6-2	L6-3	G
L8-1	L8-2	L8-3	K
L9-1	L9-2	L10-1	L
L10-1	L11-2	L11-2	M
L12-1	L12-2	L12-3	R
L13-1	L13-2	L14-1	S
L14-2	L15-1	L15-2	T

Install and connect the D-channel PCMCIA interface card

Communication between the BRAnch VOice card and the D-channel handlers is through the D-channel PCMCIA interface card. (The D-channel handler is the MSDL for Large Systems and the SDI/DCH for Small Systems.) Before you can install the BRAnch VOice card into its selected slot, you must install and connect the D-channel PCMCIA interface card. Follow the steps in Procedure 1.

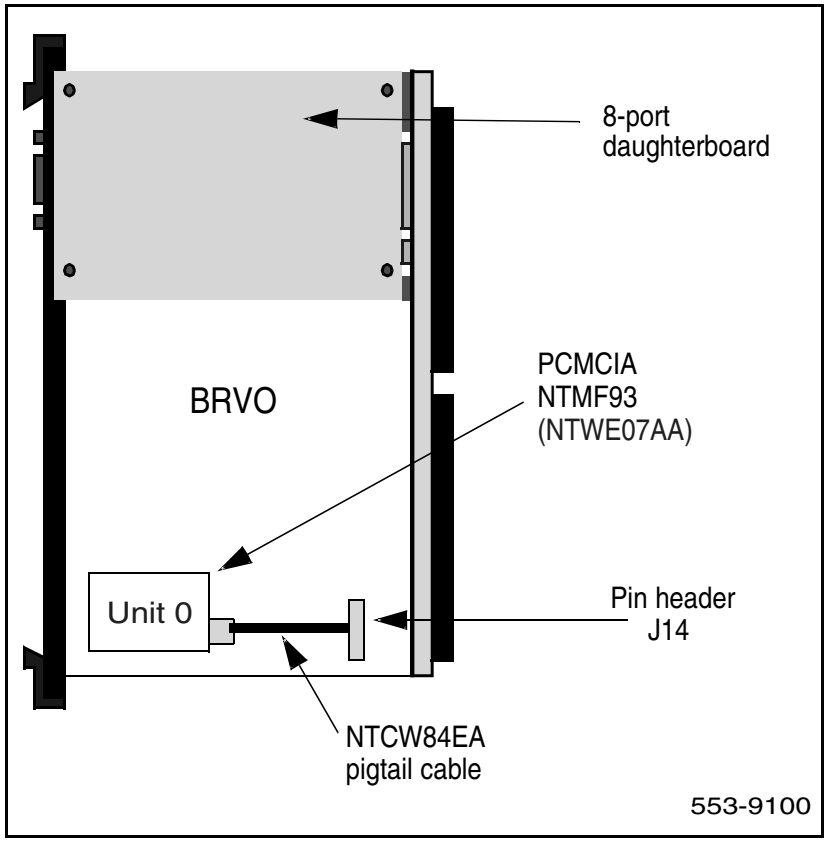
Procedure 1
Installing and connecting the D-channel PCMCIA interface card

Do the following for each BRAnch VOice card:

1 Insert the D-channel interface card in drive B: of the BRAnch VOice card. Drive B: is the PCMCIA slot on the side of the BRAnch VOice card. Refer to Figure 23.

2 Connect Unit 0 of this card to the header (J14) on the side of the BRAnch VOice card using the NTCW84EA pigtail cable.

Figure 23
Connection of the PCMCIA card and pigtail cable (NTCW84EA)



Note 1: This connection routes the RS-422 signals to and from the D-channel unit (P4) on the I/O panel cable.

Note 2: NTWE07AA is the programmed version of NTMF93. When programmed, a small NTWE07AA label is applied to the underside of the PCMCIA card, but the NTMF93 label is not removed.

BRAnch VOice card installation

To install BRAnch VOice cards into an IPE shelf or into a Small System cabinet, follow the steps in Procedure 2.

Procedure 2
Installing the BRAnch VOice card

1. Identify the card slot(s) selected for BRAnch VOice card(s).
2. Pull the top and bottom latches away from the BRAnch VOice faceplate.
3. Insert the BRAnch VOice card into the card guides and carefully push it until it makes contact with the I/O backplane connector.
4. Push the top and the bottom latches towards the faceplate to lock the BRAnch VOice card into the module or cabinet.
5. Observe the faceplate maintenance display for the start-up self-test results and status messages, which appear in the form "**T:xx**". A display of the type "**F:xx**" indicates a failure. Some failures indicate that you must replace the card. Refer to "Display codes" on page 145 for a complete listing and description of the codes.

   Note 1: Once the BRAnch VOice card has successfully booted up, the faceplate alphanumeric display continually cycles through the following codes: EV0x, FV0x, EP0x, FP0x, and BRVO. Refer to Table 15, "BRAnch VOice alarms," on page 150 for an explanation of these codes.

   Note 2: "**F:10**" appears temporarily on the display, which indicates a security device test failure. However, because Meridian BRAnch VOice 1.0 does not use a security device, you can ignore this message.
6. Complete the cabling for the BRAnch VOice card. Refer to "BRAnch VOice card cabling" on page 69 for detailed instructions.
7. Completely configure the BRAnch VOice card in the system software, if you have not done so. Refer to "System software configuration" on page 74 for detailed instructions.

8 Configure the BRAnch VOice card through the CLI. Refer to “BRAnch VOice configuration description” on page 87 for more details.

9 To enable the BRAnch VOice card, load the Network and PE Diagnostic program, LD 32, into the system memory through the system terminal. Execute the **ENLC l s c** command, where **l** is the loop, **s** is the module or shelf, and **c** is the card to enable.

10 Enable the D-channel for the BRAnch VOice card. The D-channel should be enabled. Execute the **ENL DCH x** command, where **x** is the D-channel number.

11 Repeat steps 1 through 6 for each additional BRAnch VOice card in LD 96.

BRAnch VOice card cabling

After you have installed each BRAnch VOice card, you must perform the cabling of each card to complete the installation.

Connect the I/O panel cable

Connect the 50-pin connector of the I/O panel cable (NTCW84HB) to the 50-pin connector on the I/O panel. The other end of the I/O panel cable provides four ports for the following connections:

- A serial port (marked P2) for maintenance access to the BRAnch VOice card (optional)
- A LAN port (marked P3) for remote access and management (optional)
- A D-channel interface port (marked P4) to connect to the MSDL (Large System) or the SDI/DCH (Small System) card (required)
- A serial port (marked P5) is reserved for call details in future releases.

The following sections describe the connections of these four ports.

Connect the serial maintenance port (P2) to a terminal

For permanent serial access to the BRAnch VOice card, connect a maintenance terminal to the serial port (P2) of the I/O panel cable. For temporary access, you can use the NTAG81CA cable to connect to the serial port through the faceplate 8-pin connector.

Note: You cannot have devices on faceplate and I/O panel cable (P2) at the same time.

Make sure the maintenance terminal has the following settings:

- 9600 bps
- 8 data bits
- 1 stop bit
- no parity
- no flow control

Permanent serial connection of a terminal is optional and not necessary if you connect the BRAnch VOice to your management LAN. However, for initial Ethernet configuration of the BRAnch VOice card, you must connect a terminal to the serial port. Ethernet configuration includes entering the BRAnch VOice card's IP address, gateway address, and subnet mask.

Connect the LAN port (P3) to the management LAN

This 10-BaseT Ethernet port (P3) enables connection of remote management and alarm monitoring equipment. The female adapter on the LAN port (P3) allows you to use a standard Ethernet cable to connect directly to the equipment or into the local network. You can connect to the local network through a hub or LAN socket. The delivery of the LAN signals to the I/O panel requires the cabling of all tip/ring pairs. If you require connection to the LAN, install the BRAnch VOice card into any slot that Table 9 on page 64 lists. See "BRAnch VOice IP Address configuration" on page 96 for information on entering IP addresses for menu options.

Connect the D-channel interface port (P4) to the MSDL or SDI/DCH card

To connect the D-channel interface port (P4) to the MSDL card in a Large System, follow the steps in Procedure 3.

Procedure 3
Connecting the D-channel interface port (P4) to the MSDL card (Large Systems)

1. Attach the D-channel interface (P4) to the male connector of the NTMF04BA cable.
2. Attach the female connector of the NTMF04BA cable to the male connector of the NTND26 cable.
3. Attach the female connector of the NTND26 cable to the selected port on the MSDL faceplate. Refer to Figure 24 on page 72.

To connect the D-channel interface port (P4) to the SDI/DCH card in a Small System, follow the steps in Procedure 4.

Procedure 4
Connecting the D-channel interface port (P4) to the SDI/DCH card (Small Systems)

1. Attach the D-channel interface (P4) to the male connector of either the NTWE04AC (10' inter-cabinet) or the NTWE04AD (1' intra-cabinet) cable.
2. Attach the female connector of the NTWE04AC or NTWE04AD cable to Unit 1 of the NTAK19FB I/O panel cable of the SDI/DCH card. Refer to Figure 25 on page 73.

Figure 24
BRAnch VOice cabling setup for Large Systems

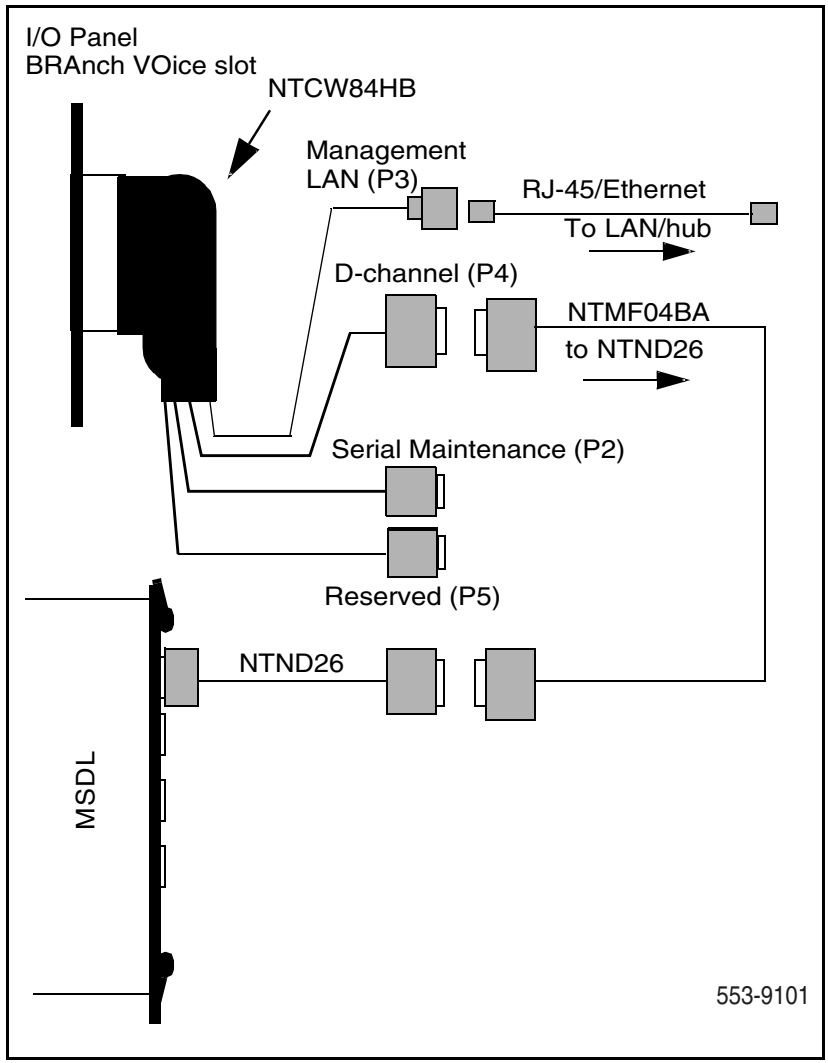
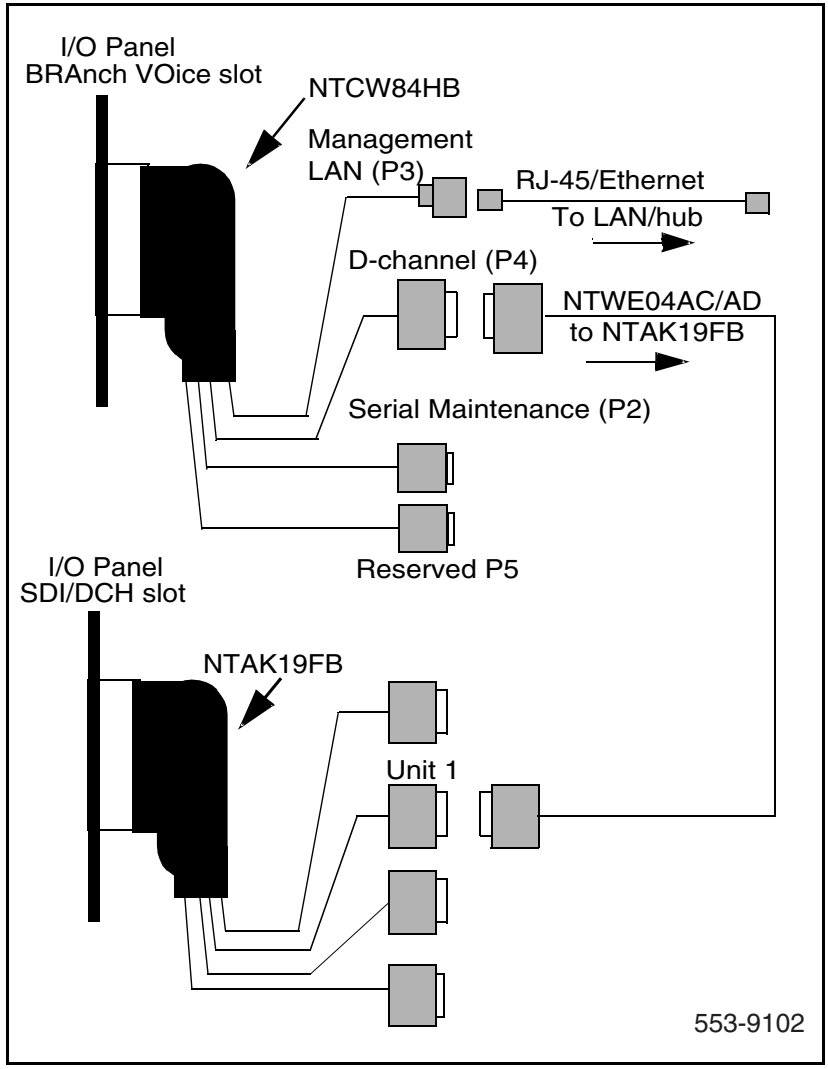


Figure 25
BRAnch VOice cabling setup for Small Systems



System software configuration

In the system software, you must configure the following for BRAnch VOice:

- D-channels for the system's ISL links to BRAnch VOice (one D-channel per BRAnch VOice card)
- the ISL D-channel connection for each BRAnch VOice card
- two or three TIE routes for each BRAnch VOice card
  (two if the two PSTN-side trunks route to the same location; three if the two PSTN-side trunks route to different locations)
- six BRAnch VOice trunks with ISL for voice (customer-side) calls
- two BRAnch Voice trunks for data (PSTN-side) calls
- dialing plan information within the private network
- enable card using LD 32 and enable D-channel using LD 96

The customer must configure BRAnch VOice as an MCDN ISL connection. BRAnch VOice can access the PSTN using either BRI or PRI ISDN hardware. The PSTN-side trunks must support data calls (DSEL = VOD in LD 16). The customer must configure the BRAnch VOice ISL connection as interface type SL1 (MCDN).

The following sections detail the system software configuration required for BRAnch VOice.

LD 15

Make sure that DITI = YES in the customer data block, NET_DATA. The BRAnch VOice connection to the PSTN is a DID to TIE connection.

Configure D-channels in LD 17

The customer must configure one D-channel for each BRAnch VOice card. To configure D-channels for the system's ISL (ISDN Serial Link) links to

BRAnch VOice, access LD 17 using the system terminal. Enter the appropriate responses to the prompts as shown below.

LD 17 – Configure D-channels.

Prompt	Response	Description
REQ	NEW	Add new data.
TYPE	ADAN	Type of data block
-ADAN	NEW DCH x	Action device and number (x is the D-channel number, from 0 to 63)
-CTYP	 MSDL DCHI	Card type For Large Systems For Small Systems and Succession 1000 systems
-GRP	0-7	Network group number for Succession 1000M Multi Group and Meridian 1 Option 81C CP PII
-DNUM	0-15	Device number for I/O ports
-PORT	0-3	Port number for MSDL or SDI/CDH card
-USR	ISLD	User
-IFC	SL1	Interface type for D-channel (MSDN)
--ISLM	8	Integrated services signalling link maximum
-CLOK	INT[1]	Internal clock
-SIDE	USR	(BRAnch VOice is network side)
-RCAP	MWI NAC ND2 TAT	Remote capabilities
-NASA	YES	Allow Network Attendant Services
Note: If you use the external clock controller, set CLOK = EXT (default).		

Configure trunk routes in LD 16

The customer must configure two or three TIE routes for each BRAnch VOice card. The customer must associate the same D-channel with each of these routes. The TIE routes for each BRAnch VOice card are as follows:

- one route for units 0 through 5 of the BRAnch VOice card to cover up to six calls to and from the customer side
- one or two routes for units 6 and 7 to cover up to two calls to and from the PSTN side (up to six voice calls)

  Note: If units 6 and 7 route to the same location, the units can share the same route. If units 6 and 7 route to a different location (for example, unit 6 to another branch and unit 7 to the headquarters [HQ]), then you must configure a separate route for each. BRAnch VOice cards *cannot* share routes with other BRAnch VOice cards.

For a BRAnch VOice card at a branch site:

- The route related to unit 7 must be a route between the branch site and the HQ.
- The route related to unit 6 can be a route to either the HQ or to another branch site. The selection depends on the customer's traffic patterns.

For an HQ BRAnch VOice card, the routes related to units 6 and 7 can be to either the same or different branch sites. If both units 6 and 7 point to the same location, only one PSTN-side route is necessary.

To configure a TIE route, access LD 16 using the system terminal. Enter the appropriate responses to the prompts as shown below.

LD 16 – Define a TIE route for accessing BRAnch VOice trunks. (Part 1 of 2)

Prompt	Response	Description
REQ	NEW CHG	Add or change existing data.
TYPE	RDB	Route Data Block
CUST	xx	Customer number, as defined in LD 15

LD 16 – Define a TIE route for accessing BRAnch VOice trunks. (Part 2 of 2)

Prompt	Response	Description
ROUT	 0-511 0-127	Route number For Large Systems For Small Systems and Succession 1000 systems
TKTP	TIE	BRAnch VOice trunk type
DTRK	NO	Digital trunk route
ISDN	YES	Integrated Services Digital Network
-MODE	ISLD	Mode of operation
-DCH	x	D-channel number for the BRAnch VOice card, defined in LD 17 at the ADAN prompt
-IFC	SL1	Interface type (SL1 for MCDN)
ICOG	IAO	Incoming and outgoing trunk

Configure trunks in LD 14

To configure the system's trunks, access LD 14 using the system terminal. Enter the appropriate responses to the prompts as shown below.

LD 14 – Define a BRAnch VOice trunk with ISL. (Part 1 of 2)

Prompt	Response	Description
REQ	NEW x	Add new data. x = 6 to configure the 6 customer-side trunks on the BRAnch VOice card. x = 1 to configure each of the PSTN-side trunks.
TYPE	TIE	BRAnch VOice trunk type

LD 14 – Define a BRAnch VOice trunk with ISL. (Part 2 of 2)

Prompt	Response	Description
TN	 l s c u c u	Terminal Number For Large Systems For Small Systems and Succession 1000 systems Units 0-5 correspond to the customer side of the BRAnch VOice card. Units 6 and 7 correspond to the PSTN side of the card.
DES	BRVO	This response is necessary to open other BRAnch VOice-specific prompts (see ***Note 1***).
XTRK	EXUT	BRAnch VOice emulates an analog trunk card
CUST	xx	Customer number, as defined in LD 15
RTMB	xx yy	xx = Route number, yy = Member number
CHID	1-8	Channel ID for the trunk (see ***Note 2***)
SIGL	LDR	Loop Dial Repeating
STRI	IMM	Start Arrangement Incoming
STRO	IMM	Start Arrangement Outgoing
SUPN	YES	Answer and disconnect supervision required
CLS	DIP DTN	Class of Service: Dial Pulse or Digitone

Note 1: You can print the trunk data block in LD 21 (LTM) to check that you configured the BRAnch VOice trunks correctly (DES = BRV$ in printout).

Note 2: Because each BRAnch VOice card has a separate D-channel connection, the maximum number of channel IDs per BRAnch VOice is eight. The channel ID increments by one for each BRAnch VOice trunk. The six customer-side trunks have channel IDs 1-6; the PSTN-side trunks have channel IDs 7 and 8.

Configure the dialing plan with LDs 86, 87, and 90

BRAnch VOice supports the Electronic Switched Network (ESN) private network dialing plan with the Coordinated Dialing Plan (CDP), the Uniform Dialing Plan (UDP), and the Flexible Numbering Plan (FNP). FNP supports the international dialing plan. The customer uses BARS and NARS access codes, such as AC1 and AC2, to access different dialing plans.

Dialing plan setup for this feature requires ESN configuration on the system and the configuration of a dialing plan on the BRAnch VOice card. ESN configuration allows the system to route outgoing calls to the BRAnch VOice card. BRAnch VOice's dialing plan configuration allows BRAnch VOice call processing to do the following:

- translate the called party number to the PSTN number of the terminating BRAnch VOice node
- deliver calls to the destination over the PSTN

Use LDs 86, 87, and 90 to configure the dialing plan (such as NARS, BARS, and CDP) within the private network.

ESN configuration

To configure ESN information, access LD 86 using the system terminal. Enter the appropriate responses to the prompts as shown below.

LD 86 – Define ESN information. (Part 1 of 2)

Prompt	Response	Description
REQ	NEW	Add new data.
CUST	xx	Customer number, as defined in LD 15
FEAT	ESN	Electronic Switched Network
...		
CDP	YES	Coordinated Dialing Plan
...		

LD 86 – Define ESN information. (Part 2 of 2)

Prompt	Response	Description
AC1	xx	One- or two-digit NARS/BARS access code 1
AC2	yy	One- or two-digit NARS access code 2
...		

Route List Index configuration

To configure the Route List Index (RLI), do the following:

1. Configure an ESN block and a CDP or UDP number plan.
2. For each entry to an SL1 route in the Route List Data Block (RLB), enable Drop Back Busy (DBA) in LD 86.

LD 86 – Configure Route List Index (RLI) with Drop Back Busy. (Part 1 of 2)

Prompt	Response	Description
REQ	NEW	Add new data.
CUST	xx	Customer number, as defined in LD 15
FEAT	RLB	Route List Data Block
RLI	xx	Route List Index
ENTR	0-63	Route List Entry
...		
ROUT	 0-511 0-127	Route number For Large Systems For Small Systems and Succession 1000 systems
SBOC	RRA	Reroute all for Step Back on Congestion
IDBB	DBA	Enable Drop Back Busy (Drop Back if All routes busy)

LD 86 – Configure Route List Index (RLI) with Drop Back Busy. (Part 2 of 2)

Prompt	Response	Description
...		
DMI	0	Do not use a Digit Manipulation table in the RLB entry for the BRAnch VOice ISL trunk route *unless* that RLB entry is being used specifically to redirect calls using the HQ reserved channel when the destination branch is unreachable directly. In this case, the Dial Plan table entry on the BRAnch VOice should be set up to delete the leading digit(s) inserted by this table. For ESN translations that are not used for NCA messages, digit manipulation can be defined on the BRAnch VOice card itself.

Coordinated Dialing Plan (CDP) configuration

To configure the CDP for BRAnch VOice, access LD 87 from the system terminal. Enter the appropriate responses at the prompts as shown below.

LD 87 – Configure the Coordinated Dialing Plan.

Prompt	Response	Description
REQ	NEW	Add new data.
CUST	xx	Customer number, as defined in LD 15
FEAT	CDP	Coordinated Dialing Plan
TYPE	LSC DSC TSC	Type of steering code
...		
RLB	5	Route List Entry, created in LD 86
...		

Note 1: You must configure a Trunk Steering Code (TSC) to route incoming calls to a PSTN-side trunk unit on the BRAnch VOice card.

Note 2: If you use HQ PSTN Reservation in the branch, you must configure two TSCs for the card that reserves a channel for the HQ.

Other dialing plan configuration

To configure the other dialing plan information for BRAnch VOice, access LD 90 from the system terminal. Enter the appropriate responses at the prompts as shown below.

LD 90 – Configure other dialing plans.

Prompt	Response	Description
REQ	NEW	Add new data.
CUST	xx	Customer number, as defined in LD 15
FEAT	NET	
TRAN	AC1 AC2 SUM	Access code 1, Access code 2, or Summary tables
TYPE	HLOC HNPA LOC NPA NSCL NXX SPN	Type of data block
...		
RLI	20	Route List Index, created in LD 86

Configure Incoming Digit Conversion (IDC)

Note: For a diagram of the Incoming Digit Conversion (IDC) feature, refer to Figure 4 on page 21.

Task summary list

The following is a summary of the tasks in this section:

1 LD 15 – Enable IDC in the Customer Data Block.

2 LD 49 – Create an IDC table.

3 LD 16 – Enable digit conversion in a DID route.

LD 15 – Enable IDC in the Customer Data Block.

Prompt	Response	Description
REQ	CHG	Add new data.
TYPE	FCR	
CUST	 0-99 0-31	Customer number For Large Systems For Small Systems and Succession 1000 systems
-NFCR	YES	New Flexible Code Restriction
-MAXT	1-255	Maximum number of NFCR Trees
-IDCA	YES	Enable IDC
-DCMX	1-255	Maximum number of IDC tables

LD 49 – Create an IDC table. (Part 1 of 2)

Prompt	Response	Description
REQ	CHG	Change existing data.
TYPE	IDC	
CUST	xx	Customer number, as defined in LD 15

LD 49 – Create an IDC table. (Part 2 of 2)

Prompt	Response	Description
DCNO	0-254	The IDC Tree number
IDGT	0-9999 0-9999	DN or DN range to convert What DN or DN range must convert to

LD 16 – Enable digit conversion in a DID route.

Prompt	Response	Description
REQ	CHG	Change existing data.
TYPE	RDB	Route Data Block
CUST	xx	Customer number, as defined in LD 15
ROUT	 0-511 0-127	Route number for DID For Large Systems For Small Systems and Succession 1000 systems
IDC	YES	Use digit conversion for this route.
-DCNO	0-254	IDC Tree number
-NDNO	0-254	IDC table for night mode
-DEXT	(YES) NO	(Allow) prevent digit display

Note: Use of an IDC table with trunk steering codes removes the need for access codes to direct incoming DID calls into BRAnch VOice cards.

Administration using the Command Line Interface

Contents

This section contains information on the following topics:

Introduction

This section describes how to access and perform operations and administration on the BRAnch VOice card. Administration of the BRAnch VOice card is through a Command Line Interface (CLI). Access the CLI through a VT100 terminal or a PC emulating a VT100 terminal. You can access the BRAnch VOice card either through a serial port on the card or through Telnet. The first time you access the BRAnch VOice card must be through a serial port.

Through a series of configuration menus, the BRAnch VOice CLI enables the configuration and viewing of all the BRAnch VOice configuration parameters.

Navigation help

When you select **q** ("QUIT card configuration") from any of the menus, the "Do you wish to Save Card Configuration? (y/n):" prompt appears. Enter **y** to save all configured items on the BRAnch VOice card to various files. These items will survive a card reboot or power-down. Enter **n** to lose any changes to the BRAnch VOice card that you did not save. The BRAnch VOice card loses these changes the next time you reboot or power-down the card.

Administration tasks summary

There are five sets of parameters that you must configure for a BRAnch VOice card. These five configuration areas are:

- General card parameters (branch ID; card ID; HQ channel reservation flag, PSTN number, and branch ID; private network ID; and End of Call Timeout parameter)
- IP address information (card IP address, gateway IP address, and subnet mask)
- Dialing plan information (Access Codes, Location Codes, Distance Steering Codes, and Trunk Steering Codes)
- SNMP trap information (SNMP Manager ID, IP Address, and subnet mask)
- BRAnch VOice software upgrade (from PCMCIA card or IP networked host)
- Setting System time and date

You can use the CLI to upgrade the BRAnch VOice software, either from a PCMCIA card or from a networked host.

Access the CLI

You can access the menus to configure the card through the maintenance port or through Telnet. When you configure the card initially, you must use the serial port, either through the faceplate or through the I/O panel cable. After the card boots up, the login prompt appears. Enter the login ID and password as the following shows:

VxWorks login: **bravoadmin**

Password: **bravoadmin** <not echoed>

You can change the user login and password. See "BRAnch VOice shell commands" on page 139. After you log in, an easy menu system for configuring the card appears (see Figure 26 on page 88).

BRAnch VOice configuration description

Figure 26 on page 88 shows the BRAnch VOice Main Configuration menu, which appears immediately after you log into a BRAnch VOice card.

At the Main Configuration menu, you have the following options:

- Enter **1** to access the General Configuration menu (also called BRAvo Voice Card Parameters menu). There you configure the branch and card IDs; the HQ channel reservation flag, PSTN number, and branch ID; the private network ID; and the End of Call Timeout parameter.
- Enter **2** to access the IP Address Configuration menu. There you can configure the card IP address, the gateway IP address, and the subnet mask. You can revert to Non-Networked Settings if you do not connect the BRAnch VOice card to your network. See "BRAnch VOice IP Address configuration" on page 96.
- Enter **3** to access the SNMP Trap Configuration menu. There you can configure SNMP Managers to receive SNMP alarms and messages. You can use this menu to disable/enable SNMP Traps/Alarms. See "BRAnch VOice SNMP Traps/Alarms Main configuration" on page 99.
- Enter **4** to access the Dial Plan Configuration menu. There you can configure UDP and CDP parameters. See "BRAnch VOice Dial Plan configuration" on page 110.

Figure 26
BRAnch VOice Main Configuration menu

```
*****************************************
*         BRAVO CONFIGURATION MENU        *
*****************************************
* 1 .... General Configuration    (MENU) *
* 2 .... IP Address Configuration (MENU) *
* 3 .... SNMP Trap Configuration  (MENU) *
* 4 .... Dial Plan Configuration  (MENU) *
* 5 .... Upgrade Card Software    (MENU) *
* 6 .... Display System Time             *
* 7 .... Change System Time              *
* 8 .... Save Card Configuration         *
*                                        *
* -------------------------------------- *
* m --> Menu Redisplay                   *
* q --> QUIT Card Configuration          *
*****************************************

Enter Option :
```

- Enter **5** to access the Upgrade Card Software menu. There you can upgrade the BRAnch VOice card software, either from a PCMCIA card or from a networked host.
- Enter **6** to display the system time and date and **7** to configure the system time and date.
- Enter **8** to save the current card configuration. You must do this before exiting the CLI if you have changed any of the cards parameters.
- Enter **m** to refresh the menu display.
- Enter **q** to quit the card configuration and log out.

BRAnch VOice Card Parameters configuration

Figure 27 on page 89 shows the BRAnch VOice Card Parameters menu, which appears after you enter **1** at the Main Configuration menu. By entering

1, **2**, **3**, **4**, **5**, **6**, **7**, **8**, or **9** at the "Enter Option:" prompt, the relevant option shown below will be invoked.

Figure 27
BRAnch VOice Card Parameters menu

```
*****************************************
*       BRAVO CARD PARAMETERS MENU      *
*****************************************
* 1 .... Display Current Card Parameters *
* 2 .... Change Branch ID                *
* 3 .... Change Card ID                  *
* 4 .... Change HQ Channel Reservation   *
* 5 .... Change HQ PSTN Number           *
* 6 .... Change HQ Branch ID             *
* 7 .... Change Private Network ID (PNI) *
* 8 .... Change End of Call Timeout      *
* 9 .... Store Current Card Parameters   *
*                                        *
* -------------------------------------- *
* m --> Menu Redisplay                   *
* r --> Return to MAIN MENU              *
* q --> QUIT Card Configuration          *
*****************************************

Enter Option :
```

Branch ID and card ID

The combination of branch ID and card ID must be unique for every BRAnch VOice card in a BRAnch VOice network. The branch ID is used to group cards that are accessible using the same PSTN number. The card ID is used

to uniquely identify cards that are accessible using the same PSTN number (that is, cards with the same branch ID).

CAUTION

Take extreme care to ensure that no cards in the BRAnch VOice network have the same combination of Branch and card ID. If any two cards in the network have the same combination of Branch and card ID, the conflicting cards will **not** interwork.

At the BRAnch VOice card parameters menu, you have the following options:

- Enter **1** to display the current card parameters.
- Enter **2** to change (or set) the branch ID. Use the branch ID to group BRAnch VOice cards that are available through the same PSTN number (that is, those that are part of the same branch). The branch ID range is 0-(0)-1023.
- Enter **3** to change (or set) the card ID. Use the card ID to separate BRAnch VOice cards that are available through the same PSTN number (that is, those that have the same branch ID). The card ID range is 0-(0)-15.

  Note: The combination of branch ID and card ID *must* be distinct for each BRAnch VOice card in a BRAnch VOice network. If any BRAnch VOice cards in a network have the same branch ID and card ID, the conflicting cards do not interwork. The conflict generates an alarm.

Headquarters Channel Reservation, PSTN Number, and branch ID

To support network features (non-call associated), a connection to the headquarters switch must always be available. Thus, at least one card in a BRAnch VOice branch switch must reserve/dedicate one PSTN channel (up to three calls) for contact with the headquarters switch.

- To set the headquarters channel reservation flag settings, enter **0** if a PSTN channel is **not reserved** for contact with the headquarters switch (default).

- Enter **1** if a PSTN channel **is reserved** for contact with the headquarters switch. If the headquarters channel reservation flag is set to **1**, the PSTN number required to reach the headquarters switch must be configured. The branch ID of the headquarters switch must also be configured. These are required in the delivery of non-call associated between two branch switches where the branch cannot be reached directly (the floating pipe is already connected to a different switch)
- Enter **5** to change (or set) the headquarters PSTN number. If you set the HQ channel reservation flag to **1**, you must configure the PSTN number necessary to reach the headquarters switch.
- Enter **6** to change (or set) the headquarters branch ID. If you set the HQ channel reservation flag to **1**, you must configure the branch ID of the headquarters switch.

  Note: The headquarters PSTN number and branch ID are necessary for the delivery of non-call associated messages between two branch switches when a direct link between the two switches is not available.

Private Network Identifier

- Enter **7** to change (or set) the Private Network Identifier (PNI). A PNI refers to a switch customer number. It is necessary for the interworking between switches and the operation of supplementary services, such as NMS. BRAnch VOice transports the PNI in facility messages that transport these supplementary services. When interworking with a remote switch over an MCDN network, the CDB PNI is the PNI for the source switch and the RDB PNI *must* match the PNI for the remote switch. The PNI range is 0-(0)-32700.

End of Call Timeout parameter

- Enter **8** to change (or set) the End of Call Timeout parameter. This parameter is the length of time that a PSTN call (pipe) remains open after the last BRAnch VOice call on the PSTN pipe has completed. The End of Call Timeout range is 0-(6)-600 seconds.
- Enter **9** to store the current card parameters. You must do this before exiting the CLI if you have changed any of the general card parameters.
- Enter **m** to refresh the menu display.

- Enter **r** to return to the Main Configuration menu.
- Enter **q** to quit the card configuration and log out.

Note: If you make changes to the branch ID and/or the card ID, reboot the card *after* you store the changes. Reboot the card *before* you allow call processing to occur on the card.

Card parameter configuration (example trace)

The following shows an example of setting the general card configuration parameters:

```
*****************************************
*         BRAVO CONFIGURATION MENU        *
*****************************************
* 1 .... General Configuration    (MENU) *
* 2 .... IP Address Configuration (MENU) *
* 3 .... SNMP Trap Configuration  (MENU) *
* 4 .... Dial Plan Configuration  (MENU) *
* 5 .... Upgrade Card Software    (MENU) *
* 6 .... Display System Time             *
* 7 .... Change System Time              *
* 8 .... Save Card Configuration         *
*                                        *
* -------------------------------------- *
* m --> Menu Redisplay                   *
* q --> QUIT Card Configuration          *
*****************************************
Enter Option :  1

*****************************************
*       BRAVO CARD PARAMETERS MENU       *
*****************************************
* 1 .... Display Current Card Parameters *
* 2 .... Change Branch ID                *
* 3 .... Change Card ID                  *
* 4 .... Change HQ Channel Reservation   *
* 5 .... Change HQ PSTN Number           *
* 6 .... Change HQ Branch ID             *
* 7 .... Change Private Network ID (PNI) *
* 8 .... Change End of Call Timeout      *
* 9 .... Store Current Card Parameters   *
*                                        *
* -------------------------------------- *
* m --> Menu Redisplay                   *
```

```
* r --> Return to MAIN MENU              *
* q --> QUIT Card Configuration          *
*****************************************
Enter Option :  1

Current Card Parameters
-----------------------
Branch ID              = 0
Card ID                = 0
HQ Channel Reservation = 0
HQ PSTN Number         = 0
HQ Branch ID           = 0
Private Network ID     = 0
End of Call Timeout    = 0 secs

Enter Option :  2

Enter Branch ID : 1

Abort Request (y/n)  : n

WARNING: After changing Branch ID and/or Card ID the card
         MUST BE REBOOTED prior to attempting call processing.

Enter Option :  3

Enter Card ID : 1

Abort Request (y/n)  : n
```

```
WARNING: After changing Branch ID and/or Card ID the card
         MUST BE REBOOTED prior to attempting call processing.

Enter Option :  4

Enter Headquarters Channel Reservation (Reserve = 1) (Don't Reserve
= 0) : 1

Abort Request (y/n)  : n

Enter Option :  5

Enter Headquarters PSTN Number : 9091313216

Abort Request (y/n)  : n

Enter Option :  6

Enter Headquarters Branch ID : 4

Abort Request (y/n)  : n

Enter Option :  7

Enter Private Network ID : 1

Abort Request (y/n)  : n

Enter Option :  8

Enter End of Call PPP Timeout (in secs) : 10

Abort Request (y/n)  : n

Enter Option :  9

Card Parameters File (/C:/CONFIG/CONFIG1.INI) Saved ...
Enter Option :  1

Current Card Parameters
-----------------------
Branch ID              = 1
Card ID                = 1
HQ Channel Reservation = 1
HQ PSTN Number         = 9091313216
HQ Branch ID           = 4
Private Network ID     = 1
End of Call Timeout    = 10 secs
```

```
Enter Option :  r
****************************************
*         BRAVO CONFIGURATION MENU       *
****************************************
* 1 .... General Configuration    (MENU) *
* 2 .... IP Address Configuration (MENU) *
* 3 .... SNMP Trap Configuration  (MENU) *
* 4 .... Dial Plan Configuration  (MENU) *
* 5 .... Upgrade Card Software    (MENU) *
* 6 .... Display System Time             *
* 7 .... Change System Time              *
* 8 .... Save Card Configuration         *
*                                        *
* -------------------------------------- *
* m --> Menu Redisplay                   *
* q --> QUIT Card Configuration          *
****************************************
```

BRAnch VOice IP Address configuration

Figure 28 shows the BRAnch VOice IP Address menu, which appears after you enter **2** at the Main Configuration menu. By entering **1**, **2**, **3**, **4**, or **9** at the "Enter Option:" prompt, the relevant option shown below is invoked.

Figure 28
BRAnch VOice IP Address menu

```
*****************************************
*          BRAVO IP ADDRESS MENU        *
*****************************************
* 1 .... Display Current IP Settings    *
* 2 .... Change IP Address Settings     *
* 3 .... Revert to Non-Networked Setting *
* 4 .... Store Current IP Settings      *
*                                       *
* 9 .... Reboot Card                    *
*                                       *
* ------------------------------------- *
* m --> Menu Redisplay                  *
* r --> Return to MAIN MENU             *
* q --> QUIT Card Configuration         *
*****************************************

Enter Option :
```

The BRAnch VOice card can be IP networked by configuring the appropriate IP parameters (option **2**).

- card IP Address
- gateway IP Address
- subnet mask

Once the card is IP networked, telnet can be used to access the card.

If the card does not need to be networked (the default settings), you must choose option **3**.

Note: After changing IP Address, the card should be rebooted (option **9**) immediately.

At the IP Address menu, you have the following options:

- Enter **1** to display the current IP Address Settings.
- Enter **2** to change (or set) the IP Address Settings. After you select this option, the CLI prompts you to enter the card IP address, the gateway address, and the subnet mask. Set these parameters correctly to allow Telnet access to the BRAnch VOice card.
- Enter **3** to revert to the Non-Networked (default) Settings. Select these settings if you do not connect the BRAnch VOice card to the network.
- Enter **4** to store the current IP Settings. You must do this before you reboot the card to activate the new IP Settings.
- Enter **9** to reboot the BRAnch VOice card. You must do this for changes to the IP address parameters to take affect.
- Enter **m** to refresh the menu display.
- Enter **r** to return to the Main Configuration menu.
- Enter **q** to quit the card configuration and log out.

IP Address configuration (example trace)

The following shows an example of setting the IP Address parameters:

```
****************************************
*         BRAVO CONFIGURATION MENU       *
****************************************
* 1 .... General Configuration    (MENU) *
* 2 .... IP Address Configuration (MENU) *
* 3 .... SNMP Trap Configuration  (MENU) *
* 4 .... Dial Plan Configuration  (MENU) *
* 5 .... Upgrade Card Software    (MENU) *
* 6 .... Display System Time             *
* 7 .... Change System Time              *
* 8 .... Save Card Configuration         *
*                                        *
* -------------------------------------- *
* m --> Menu Redisplay                   *
* q --> QUIT Card Configuration          *
****************************************

Enter Option :  2

****************************************
*          BRAVO IP ADDRESS MENU         *
****************************************
* 1 .... Display Current IP Settings     *
* 2 .... Change IP Address Settings      *
* 3 .... Revert to Non-Networked Setting *
* 4 .... Store Current IP Settings       *
*                                        *
* 9 .... Reboot Card                     *
*                                        *
* -------------------------------------- *
* m --> Menu Redisplay                   *
* r --> Return to MAIN MENU              *
* q --> QUIT Card Configuration          *
****************************************

Enter Option :  3

Abort Revert to Non-Networked Setting Request (y/n)  : n
IP Configuration File (/C:/BOOTP/BOOTP.1) Saved ...
IP Settings (below) will take effect on card reboot ...
```

```
IP Settings
-----------
Card IP Address    = 10.0.1.2
Gateway IP Address = 10.0.1.1
Subnet Mask        = 255.255.255.240

Enter Option :  2

Change IP Address Settings
--------------------------
Enter Card IP Address    : 47.85.2.71
Enter Gateway IP Address : 47.85.0.1
Enter Subnet Mask        : 255.255.240.0

Abort Request (y/n)  : n
IP Configuration File (/C:/BOOTP/BOOTP.1) Saved ...
IP Settings (below) will take effect on card reboot ...

IP Settings
-----------
Card IP Address    = 47.85.2.71
Gateway IP Address = 47.85.0.1
Subnet Mask        = 255.255.240.0

Enter Option :  9

Reboot Card Option Chosen !!

Abort Reboot Request (y/n)  : n
Card is being rebooted ...

Resetting card...
```

BRAnch VOice SNMP Traps/Alarms Main configuration

Figure 29 on page 100 shows the SNMP Traps/Alarms Main menu, which appears after you enter **3** at the Main Configuration menu. By entering **1**, **2**, **3**, **4**, **5**, or **6** at the "Enter Option:" prompt, the relevant option shown below is invoked.

Each BRAnch VOice card saves its alarms in a file on its hard drive. The 50 most recent traps/alarms raised on the BRAnch VOice card are logged to the file. Through the SNMP Traps/Alarms Main menu, you can view the Log file (option **3**) and clear the Log file (option **5**). If you have connected the card to your LAN, you can route the next alarms to a number of SNMP Managers.

Figure 29
SNMP Traps/Alarms Main menu

```
*****************************************
*   BRAVO SNMP TRAPS/ALARMS MAIN MENU    *
*****************************************
* 1 .... Display Trap Settings           *
* 2 .... Change Trap Settings     (MENU) *
* 3 .... Display Stored Traps Log        *
* 4 .... Display Supported Trap Info     *
* 5 .... Delete Stored Traps Log         *
* 6 .... Store SNMP Trap Settings        *
*                                        *
* -------------------------------------- *
* m --> Menu Redisplay                   *
* r --> Return to MAIN MENU              *
* q --> QUIT Card Configuration          *
*****************************************

Enter Option :
```

OTM workstations can function as SNMP Managers in a BRAnch VOice network. Use the SNMP Traps/Alarms menu to configure an IP address and subnet mask for each SNMP Manager. Refer to Table 15, "BRAnch VOice alarms," on page 150, which details all of the BRAnch VOice alarms.

If you choose option **2**, the menu displays options that facilitate the configuration of SNMP Managers.

Note: OTM supports BRAnch VOice SNMP Traps/Alarms.

At the SNMP Trap Configuration menu, the following options are available:

- Enter **1** to display the current Trap Settings.
- Enter **2** to access the SNMP Traps/Alarms menu so you can change the Trap Settings. At the SNMP Traps/Alarms menu, you can enable/disable the Traps/Alarms. You can add, change, and delete SNMP Managers. See "BRAnch VOice SNMP Traps/Alarms configuration" on page 104.

- Enter **3** to display the Traps/Alarms Log file on the card's hard drive.
- Enter **4** to display the supported trap information.
- Enter **5** to clear the Traps/Alarms Log file from the card's hard drive.
- Enter **6** to store the SNMP Trap Settings. If you have changed the SNMP Trap Settings, do this before you exit the SNMP Traps/Alarms Main menu.
- Enter **m** to refresh the menu display.
- Enter **r** to return to the Main Configuration menu.
- Enter **q** to quit the card configuration and log out.

SNMP Main menu (example trace)

The following shows an example of using the SNMP Traps/Alarms Main menu:

```
****************************************
*        BRAVO CONFIGURATION MENU      *
****************************************
* 1 .... General Configuration    (MENU) *
* 2 .... IP Address Configuration (MENU) *
* 3 .... SNMP Trap Configuration  (MENU) *
* 4 .... Dial Plan Configuration  (MENU) *
* 5 .... Upgrade Card Software    (MENU) *
* 6 .... Display System Time             *
* 7 .... Change System Time              *
* 8 .... Save Card Configuration         *
*                                        *
* -------------------------------------- *
* m --> Menu Redisplay                   *
* q --> QUIT Card Configuration          *
****************************************

Enter Option :  3

****************************************
*   BRAVO SNMP TRAPS/ALARMS MAIN MENU    *
****************************************
* 1 .... Display Trap Settings           *
* 2 .... Change Trap Settings     (MENU) *
* 3 .... Display Stored Traps Log        *
* 4 .... Display Supported Trap Info     *
* 5 .... Delete Stored Traps Log         *
* 6 .... Store SNMP Trap Settings        *
*                                        *
* -------------------------------------- *
* m --> Menu Redisplay                   *
* r --> Return to MAIN MENU              *
* q --> QUIT Card Configuration          *
****************************************
```

```
Enter Option :  1

SNMP Trap/Alarm Settings
------------------------
SNMP Traps are DISABLED

SNMP Manager 1 ->
SNMP Manager 2 ->
SNMP Manager 3 ->
SNMP Manager 4 ->
SNMP Manager 5 ->
SNMP Manager 6 ->
SNMP Manager 7 ->
SNMP Manager 8 ->

Enter Option :  3

*****************************************************************
BRV0104
-------
DSP Startup was successful.

Severity  : Cleared
Status    : Clear
Timestamp : Date (09/07/1999) Time (12:11:10)
*****************************************************************

*****************************************************************
BRV0100
-------
Card Bootup was successful (Application started OK).

Severity  : Cleared
Status    : Clear
Timestamp : Date (09/07/1999) Time (12:11:16)
*****************************************************************

*****************************************************************
BRV0451
-------
D-channel Card Removed. Associated channels to be busied out.
D-Channel Number = 1

Severity  : Major
Status    : Set
Timestamp : Date (09/07/1999) Time (12:11:16)
*****************************************************************
```

```
Enter Option :  5

Delete Stored Traps Log option chosen ...

Abort Request (y/n)  : n
Stored Alarms have been deleted ...

Enter Option :  3

No Alarms have been stored to file ...

Enter Option :  6

Storing SNMP Trap Settings and updating IP Routing Tables ...
Card Parameters File (/C:/CONFIG/CONFIG1.INI) Saved ...

Enter Option :  2
****************************************
*      BRAVO SNMP TRAPS/ALARMS MENU      *
****************************************
* 1 .... Display Trap Settings          *
* 2 .... Enable SNMP Traps/Alarms       *
* 3 .... Disable SNMP Traps/Alarms      *
* 4 .... Add/Change SNMP Manager        *
* 5 .... Delete SNMP Manager            *
* 6 .... Send Test SNMP Trap/Alarm      *
* 7 .... Store SNMP Trap Settings       *
*                                       *
* ------------------------------------- *
* m --> Menu Redisplay                  *
* r --> Return to SNMP MAIN MENU        *
* q --> QUIT Card Configuration         *
****************************************

Enter Option :
```

BRAnch VOice SNMP Traps/Alarms configuration

Figure 30 on page 105 shows the SNMP Traps/Alarms menu, which appears after you enter **2** at the SNMP Traps/Alarms Main menu. By entering **1**, **2**, **3**, **4**, **5**, **6**, or **7** at the “Enter Option:” prompt, the relevant option shown below is invoked.

Figure 30
SNMP Traps/Alarms menu

```
*****************************************
*      BRAVO SNMP TRAPS/ALARMS MENU     *
*****************************************
* 1 .... Display Trap Settings          *
* 2 .... Enable SNMP Traps/Alarms       *
* 3 .... Disable SNMP Traps/Alarms      *
* 4 .... Add/Change SNMP Manager        *
* 5 .... Delete SNMP Manager            *
* 6 .... Send Test SNMP Trap/Alarm      *
* 7 .... Store SNMP Trap Settings       *
*                                       *
* ------------------------------------- *
* m --> Menu Redisplay                  *
* r --> Return to SNMP MAIN MENU        *
* q --> QUIT Card Configuration         *
*****************************************

Enter Option :
```

At the SNMP Traps/Alarms menu, the following options are available:

- Enter **1** to display the current Trap Settings. This option is identical to option **1** in the SNMP Traps/Alarms Main menu.
- Enter **2** to enable the BRAnch VOice card to send Traps/Alarms to the SNMP Managers.
- Enter **3** to disable the BRAnch VOice card from sending Traps/Alarms to the SNMP Managers.

  Note 1: The BRAnch VOice card logs the Traps/Alarms to a file, even when you enabled the sending of alarms to the SNMP Managers.

  Note 2: SNMP Trap Settings (enabled/disabled and SNMP Manager IP Addressing) should be stored by choosing **7**, if the settings are to survive a card reboot.

- Enter **4** to add or change an SNMP Manager. You can configure up to eight SNMP Managers per BRAnch VOice card. You must configure an ID, an IP address, and a subnet mask for each SNMP Manager.

- Enter **5** to delete an SNMP Manager from the BRAnch VOice card.

Test alarm facility

- Enter **6** to send a test alarm (BRV9999) to all of the configured SNMP Managers. For this test to work, you must first enable (option **2**) the sending of alarms to SNMP Managers. Use this test to check the configuration of the SNMP Managers.
- Enter **7** store the SNMP Trap Settings. If you have changed the SNMP Trap Settings, do this before you exit the SNMP Traps/Alarms menu.
- Enter **m** to refresh the menu display.
- Enter **r** to return to the SNMP Traps/Alarms Main menu.
- Enter **q** to quit the card configuration and log out.

SNMP Manager configuration (example trace)

The following shows an example of configuring SNMP Managers:

```
****************************************
*   BRAVO SNMP TRAPS/ALARMS MAIN MENU    *
****************************************
* 1 .... Display Trap Settings           *
* 2 .... Change Trap Settings     (MENU) *
* 3 .... Display Stored Traps Log        *
* 4 .... Display Supported Trap Info     *
* 5 .... Delete Stored Traps Log         *
* 6 .... Store SNMP Trap Settings        *
*                                        *
* -------------------------------------- *
* m --> Menu Redisplay                   *
* r --> Return to MAIN MENU              *
* q --> QUIT Card Configuration          *
****************************************

Enter Option :  2

****************************************
*      BRAVO SNMP TRAPS/ALARMS MENU      *
****************************************
* 1 .... Display Trap Settings           *
* 2 .... Enable SNMP Traps/Alarms        *
* 3 .... Disable SNMP Traps/Alarms       *
* 4 .... Add/Change SNMP Manager         *
* 5 .... Delete SNMP Manager             *
* 6 .... Send Test SNMP Trap/Alarm       *
* 7 .... Store SNMP Trap Settings        *
*                                        *
* -------------------------------------- *
* m --> Menu Redisplay                   *
* r --> Return to SNMP MAIN MENU         *
* q --> QUIT Card Configuration          *
****************************************
```

```
Enter Option :  4

Add/Change SNMP Manager
-----------------------
Enter SNMP Manager ID (1 to 8)     : 1
Enter New SNMP Manager IP Address  : 47.85.2.61
Enter New SNMP Manager Subnet Mask : 255.255.240.0

Abort Request (y/n)  : n

Storing SNMP Trap Settings and updating IP Routing Tables ...
Card Parameters File (/C:/CONFIG/CONFIG1.INI) Saved ...

Enter Option :  4

Add/Change SNMP Manager
-----------------------
Enter SNMP Manager ID (1 to 8)     : 2
Enter New SNMP Manager IP Address  : 192.16.132.12
Enter New SNMP Manager Subnet Mask : 255.255.255.224

Abort Request (y/n)  : n

Storing SNMP Trap Settings and updating IP Routing Tables ...
Card Parameters File (/C:/CONFIG/CONFIG1.INI) Saved ...

Enter Option :  1

SNMP Trap/Alarm Settings
------------------------
SNMP Traps are DISABLED

SNMP Manager 1 -> Address 47.85.2.61 Subnet Mask 255.255.240.0
SNMP Manager 2 -> Address 192.16.132.12 Subnet Mask 255.255.255.224
SNMP Manager 3 ->
SNMP Manager 4 ->
SNMP Manager 5 ->
SNMP Manager 6 ->
SNMP Manager 7 ->
SNMP Manager 8 ->

Enter Option :  2

SNMP Traps/Alarms are now Enabled ...
```

```
Enter Option :  5

Delete SNMP Manager
-------------------
Enter SNMP Manager ID (1 to 8)     : 2

Abort Request (y/n)  : n

Enter Option :  1

SNMP Trap/Alarm Settings
------------------------
SNMP Traps are ENABLED

SNMP Manager 1 -> Address 47.85.2.61      Subnet Mask 255.255.240.0
SNMP Manager 2 ->
SNMP Manager 3 ->
SNMP Manager 4 ->
SNMP Manager 5 ->
SNMP Manager 6 ->
SNMP Manager 7 ->
SNMP Manager 8 ->

Enter Option :  6

SNMP Test Alarm sent to all the configured SNMP Managers ...

Enter Option :  7

Storing SNMP Trap Settings and updating IP Routing Tables ...
Card Parameters File (/C:/CONFIG/CONFIG1.INI) Saved ...
```

OTM configuration for receiving SNMP Traps/Alarms from BRAnch VOice

To use an OTM terminal as an SNMP manager, you must list each BRAnch VOice card in the OTM devices file (**Devices.txt**) located in the **Common Data/Alarm Notification/Control** directory. This file contains the list of systems that OTM monitors. Refer to *Optivity Telephony Manager: System Administration* (553-3001-330) for instructions on adding devices to the devices file. For each BRAnch VOice card that you want to monitor through OTM, you must enter a BRAnch VOice device type, the BRAnch VOice card's IP address, and (optionally) an alias for the BRAnch VOice card.

To ensure that the OTM software version supports BRAnch VOice alarms, check that the BRAnch VOice device type appears in the OTM configuration file (**Config.txt**) located in the **Common Data/Alarm Notification/Control** directory.

Config.txt extract example:

```
.....

device BRAVO 6.1 6.2 6.3 6.4 6.5 6.6 {

1.3.6.1.4.1.562.3.11.4.4.1.7.3.0 string $EventTime "Event Time"

1.3.6.1.4.1.562.3.11.4.4.1.7.4.0 integer $ActiveListStatus "Active Status"
1.3.6.1.4.1.562.3.11.4.4.1.7.5.0 integer $AlarmSeverity "Severity"
1.3.6.1.4.1.562.3.11.4.4.1.7.6.0 integer $AlarmType "Alarm Type"
1.3.6.1.4.1.562.3.11.4.4.1.7.7.0 integer $ProbableCause "Probable Cause"
1.3.6.1.4.1.562.3.11.4.4.1.7.8.0 string $NtpIndex "Ntp Index"
1.3.6.1.4.1.562.3.11.4.4.1.7.9.0 string $CommentData "Common Data"
}
.....
```

Below is an example of an OTM terminal devices file. The OTM terminal is configured to receive SNMP Traps/Alarms from two BRAnch VOice cards.

Devices.txt example:

```
# This file contains a list of specific devices to be monitored by
# Alarm Notification.  As this file may be replaced during a software upgrade,
# it is suggested that any changes be made in a copy and the copy used.
# The following are example definitions:
#
#Meridian1 192.9.200.1 my_m1
#Meridian1 192.9.200.2
#Meridian1 sample_m1
#
BRAVO 47.85.2.71 BRV_OPT11
BRAVO 47.85.2.72 BRV_OPT81
```

BRAnch VOice Dial Plan configuration

Figure 31 on page 111 shows the BRAnch VOice Dial Plan menu, which appears after you enter **4** at the Main Configuration menu. By entering **1**, **2**, **3**, **4**, **5**, or **6** at the “Enter Option:” prompt, the relevant option shown below is invoked.

Figure 31
BRAnch VOice Dial Plan menu

```
*****************************************
*          BRAVO DIAL PLAN MENU         *
*****************************************
* 1 .... Display Dial Plan              *
* 2 .... Access Codes (AC1 & AC2) (MENU) *
* 3 .... Location Codes           (MENU) *
* 4 .... Distance Steering Codes  (MENU) *
* 5 .... Trunk Steering Codes     (MENU) *
* 6 .... Store Dial Plan Changes        *
*                                       *
* ------------------------------------- *
* m --> Menu Redisplay                  *
* r --> Return to MAIN MENU             *
* q --> QUIT Card Configuration         *
*****************************************

Enter Option :
```

BRAnch VOice Dial Plan overview

BRAnch VOice supports both Coordinated Dialing Plans (CDPs) and Uniform Dialing Plans (UDPs).

Coordinated Dialing Plan (CDP)

The CDP allows a customer with a number of local switches to coordinate the dialing plan of the stations at these switches. A telephone user can call any other telephone within the CDP group of switches by dialing a unique three to seven digit number assigned to the telephone. CDP provides the translation and digit manipulation capability that is necessary to implement the coordinated dialing plan. Calls dialled within the CDP format can be terminated locally after digit translation and digit deletion. Or, calls can be routed to a remote switch in the CDP group following digit translation, route selection, and digit deletion and/or insertion. For a Coordinated Dialing Plan, BRAnch VOice supports Distance Steering Codes (DSCs), Trunk Steering Codes (TSCs), and digit manipulation.

Uniform Dialing Plan (UDP)

BRAnch VOice supports Location Codes (LOCs).

BRAnch VOice Dial Plan entry

A BRAnch VOice Dial Plan entry contains the following components:

- **Dial Plan Digits**—These digits are the digits you dial to reach the Dial Plan Entry (LOC, TSC, or DSC).
- **Number of Leading Digits to Delete**—The number of leading digits to delete from the front of the digit string that you dial. This number is normally zero.
- **Leading Digits to Insert**—The digits to insert at the beginning of the digit string that you dial. This string is normally an empty string.

  Note: The digit manipulation defined in the Dial Plan configuration menus does not apply to NCA Facility messages for MCDN features, including NRAG and NMS.

- **PSTN Number**—BRAnch VOice provides a dial-up connection between locations instead of a permanently leased line. The originating BRAnch VOice uses this number to route to the destination BRAnch VOice card. Each dialing plan entry requires a PSTN number.
- **Destination BRAnch VOice branch ID**—The branch ID of the destination BRAnch VOice must be a part of each Dial Plan Entry.

CAUTION

The combination of branch ID and card ID must be distinct for every BRAnch VOice card in a BRAnch VOice network. If any BRAnch VOice cards in a network have the same branch ID and card ID, the conflicting cards do not interwork. The conflict generates an alarm.

Headquarters Dial Plan entry identification

To support network features (non-call associated), a permanent connection to the headquarters switch must be available. You must associate each Dialing Plan Entry with a connection to the headquarters.

To support network features (non-call associated), a connection to the HQ must always be available. A Dialing Plan entry associated with a connection to the headquarters must be identifiable as such.

- Enter **0** if the destination card resides in a branch switch.
- Enter **1** if the destination card resides in a HQ switch.

BRAnch VOice Access Codes (AC1 and AC2) configuration

Figure 32 on page 114 shows the BRAnch VOice Access Codes (AC1 and AC2) menu, which appears after you enter **2** at the Dial Plan configuration menu. By entering **1**, **2**, **3**, or **4** at the "Enter Option:" prompt, the relevant option shown below is invoked.

At the Access Codes (AC1 and AC2) configuration menu, the following options are available:

- Enter **1** to display the current Access Codes, AC1 and AC2.

Figure 32
BRAnch VOice Access Codes (AC1 and AC2) menu

```
*****************************************
*          BRAVO ACCESS CODE MENU       *
*****************************************
* 1 .... Display Access Codes           *
* 2 .... Modify Access Code 1 (AC1)     *
* 3 .... Modify Access Code 2 (AC2)     *
* 4 .... Store Dial Plan Changes        *
*                                       *
* ------------------------------------- *
* m --> Menu Redisplay                  *
* r --> Return to DIAL PLAN MENU        *
* q --> QUIT Card Configuration         *
*****************************************

Enter Option :
```

- Enter **2** to change (or set) AC1. AC1 is the Access Code you dial to call other locations on your network. AC1 ranges from one to four digits in length. AC1 is normally “6” for ESN networks.
- Enter **3** to change (or set) AC2. AC2 is the Access Code you dial to call locations off your network. AC2 ranges from one to four digits in length. AC2 is normally “9” for external/off-net access.
- Enter **4** to store any changes you made to the Access Codes.
- Enter **m** to refresh the menu display.
- Enter **r** to return to the Dial Plan Configuration menu.
- Enter **q** to quit the card configuration and log out.

Access Code configuration (example trace)

The following shows an example of setting the Access Code parameters:

```
****************************************
*         BRAVO ACCESS CODE MENU       *
****************************************
* 1 .... Display Access Codes          *
* 2 .... Modify Access Code 1 (AC1)    *
* 3 .... Modify Access Code 2 (AC2)    *
* 4 .... Store Dial Plan Changes       *
*                                      *
* ------------------------------------ *
* m --> Menu Redisplay                 *
* r --> Return to DIAL PLAN MENU       *
* q --> QUIT Card Configuration        *
****************************************

Enter Option :  2

Enter Access Code 1 Parameters
------------------------------
Access Code Digits                      : 6
NXX (Local Code) Supported     (y/n)    : n
NPA (National) Supported       (y/n)    : n
SPN (International) Supported  (y/n)    : n
LOC (Location) Supported       (y/n)    : y

Abort Request (y/n)  : n

Enter Option :  3

Enter Access Code 2 Parameters
------------------------------
Access Code Digits                      : 9
NXX (Local Code) Supported     (y/n)    : n
NPA (National) Supported       (y/n)    : y
SPN (International) Supported  (y/n)    : y
LOC (Location) Supported       (y/n)    : n

Abort Request (y/n)  : n
```

```
Enter Option :  1


************************************************************
*                   Access Code 1 (AC1)                    *
************************************************************

Access Code 1    = 6
AC1 Dial Plan    = LOC

************************************************************


************************************************************
*                   Access Code 2 (AC2)                    *
************************************************************

Access Code 2    = 9
AC2 Dial Plan    = NPA SPN

************************************************************
```

BRAnch VOice Location Code configuration

Figure 33 on page 117 shows the BRAnch VOice Location Code menu, which appears after you enter **3** at the Dial Plan configuration menu. By entering **1**, **2**, **3**, or **4** at the "Enter Option:" prompt, the relevant option shown below is invoked.

At the Location Code menu, you have the following options:

- Enter **1** to display the current Location Codes.
- Enter **2** to add a Location Code.
- Enter **3** to delete a Location Code.
- Enter **4** to store any Dial Plan changes you made to the Location Codes.
- Enter **m** to refresh the menu display.
- Enter **r** to return to the Dial Plan configuration menu.
- Enter **q** to quit the card configuration and log out.

Figure 33
BRAnch VOice Location Codes menu

```
*****************************************
*         BRAVO LOCATION CODE MENU        *
*****************************************
* 1 .... Display Location Codes          *
* 2 .... Add Location Code               *
* 3 .... Delete Location Code            *
* 4 .... Store Dial Plan Changes         *
*                                        *
* -------------------------------------- *
* m --> Menu Redisplay                   *
* r --> Return to DIAL PLAN MENU         *
* q --> QUIT Card Configuration          *
*****************************************

Enter Option :
```

Location Code configuration (example trace)

The following shows an example of setting Location Codes:

```
****************************************
*          BRAVO DIAL PLAN MENU        *
****************************************
* 1 .... Display Dial Plan             *
* 2 .... Access Codes (AC1 & AC2) (MENU) *
* 3 .... Location Codes           (MENU) *
* 4 .... Distance Steering Codes  (MENU) *
* 5 .... Trunk Steering Codes     (MENU) *
* 6 .... Store Dial Plan Changes       *
*                                      *
* ------------------------------------ *
* m --> Menu Redisplay                 *
* r --> Return to MAIN MENU            *
* q --> QUIT Card Configuration        *
****************************************

Enter Option :  3

****************************************
*        BRAVO LOCATION CODE MENU      *
****************************************
* 1 .... Display Location Codes        *
* 2 .... Add Location Code             *
* 3 .... Delete Location Code          *
* 4 .... Store Dial Plan Changes       *
*                                      *
* ------------------------------------ *
* m --> Menu Redisplay                 *
* r --> Return to DIAL PLAN MENU       *
* q --> QUIT Card Configuration        *
****************************************

Enter Option :  1


************************************************************
*                     Location Codes                       *
************************************************************

No LOC's configured ...

************************************************************
```

```
Enter Option :  2

Add Location Code
-----------------
Dial Plan Digits                : 413
Num Leading Digits to Delete    : 0
Leading Digits to Insert        :
Destination PSTN Number         : 90035314620987
Destination Branch ID           : 2
Destination  HQ (1) BRANCH (0)  : 1

Abort Request (y/n)  : n

Enter Option :  2

Add Location Code
-----------------
Dial Plan Digits                : 512
Num Leading Digits to Delete    : 0
Leading Digits to Insert        :
Destination PSTN Number         : 90035316464512
Destination Branch ID           : 3
Destination  HQ (1) BRANCH (0)  : 0

Abort Request (y/n)  : n

Enter Option :  1
```

```
************************************************************
*                     Location Codes                       *
************************************************************


LOC Entry
---------
Dial Plan Digits             = 413
Num Leading Digits to Delete = 0
Leading Digits to Insert     =
Destination PSTN Number      = 90035314620987
Destination Branch ID        = 2
Destination Flag (HQ = 1)    = 1


LOC Entry
---------
Dial Plan Digits             = 512
Num Leading Digits to Delete = 0
Leading Digits to Insert     =
Destination PSTN Number      = 90035316464512
Destination Branch ID        = 3
Destination Flag (HQ = 1)    = 0

************************************************************


Enter Option :  3

Delete Location Code
--------------------
Dial Plan Digits     : 413

Abort Request (y/n)  : n
LOC Entry Deleted ...

Enter Option :  1
```

```
*********************************************************
*                     Location Codes                    *
*********************************************************

LOC Entry
---------
Dial Plan Digits             = 512
Num Leading Digits to Delete = 0
Leading Digits to Insert     =
Destination PSTN Number      = 90035316464512
Destination Branch ID        = 3
Destination Flag (HQ = 1)    = 0

*********************************************************
```

BRAnch VOice Distance Steering Codes configuration

Figure 34 on page 122 shows the BRAnch VOice Distance Steering Codes menu, which appears after you enter **4** at the Dial Plan configuration menu. By entering **1**, **2**, **3**, or **4** at the "Enter Option:" prompt, the relevant option shown below is invoked.

At the Distance Steering Codes configuration menu, you have the following options:

- Enter **1** to display the current Distance Steering Codes.
- Enter **2** to add a Distance Steering Code.
- Enter **3** to delete a Distance Steering Code.
- Enter **4** to store any Dial Plan changes you made to the Distance Steering Codes.
- Enter **m** to refresh the menu display.

- Enter **r** to return to the Dial Plan Configuration menu.
- Enter **q** to quit the card configuration and log out.

Figure 34
BRAnch VOice Distance Steering Codes menu

```
*****************************************
*   BRAVO DISTANCE STEERING CODE MENU   *
*****************************************
* 1 .... Display Distance Steering Codes *
* 2 .... Add Distance Steering Code      *
* 3 .... Delete Distance Steering Code   *
* 4 .... Store Dial Plan Changes         *
*                                        *
* -------------------------------------- *
* m --> Menu Redisplay                   *
* r --> Return to DIAL PLAN MENU         *
* q --> QUIT Card Configuration          *
*****************************************

Enter Option :
```

Distance Steering Code configuration (example trace)

The following shows an example of setting Distance Steering Codes:

```
*****************************************
*          BRAVO DIAL PLAN MENU         *
*****************************************
* 1 .... Display Dial Plan               *
* 2 .... Access Codes (AC1 & AC2) (MENU) *
* 3 .... Location Codes           (MENU) *
* 4 .... Distance Steering Codes  (MENU) *
* 5 .... Trunk Steering Codes     (MENU) *
* 6 .... Store Dial Plan Changes         *
*                                        *
* -------------------------------------- *
* m --> Menu Redisplay                   *
* r --> Return to MAIN MENU              *
* q --> QUIT Card Configuration          *
*****************************************
```

```
Enter Option :  4

****************************************
*   BRAVO DISTANCE STEERING CODE MENU    *
****************************************
* 1 .... Display Distance Steering Codes *
* 2 .... Add Distance Steering Code      *
* 3 .... Delete Distance Steering Code   *
* 4 .... Store Dial Plan Changes         *
*                                        *
* -------------------------------------- *
* m --> Menu Redisplay                   *
* r --> Return to DIAL PLAN MENU         *
* q --> QUIT Card Configuration          *
****************************************


****************************************

Enter Option :  1


************************************************************
*                 Distance Steering Codes                  *
************************************************************

Number of DSC Entries = 0

No DSC's configured ...

************************************************************


Enter Option :  2

Add Distance Steering Code
--------------------------
Dial Plan Digits                : 713
Num Leading Digits to Delete    : 1
Leading Digits to Insert        : 9
Destination PSTN Number         : 90035319789781
Destination Branch ID           : 4
Destination  HQ (1) BRANCH (0)  : 0

Abort Request (y/n)  : n
```

```
Enter Option :  2


Add Distance Steering Code
--------------------------
Dial Plan Digits                : 813
Num Leading Digits to Delete    : 0
Leading Digits to Insert        :
Destination PSTN Number         : 90035319734561
Destination Branch ID           : 5
Destination  HQ (1) BRANCH (0)  : 0

Abort Request (y/n)  : n

Enter Option :  1


************************************************************
*                Distance Steering Codes                   *
************************************************************

Number of DSC Entries = 2


DSC Entry (001)
---------------
Dial Plan Digits             = 713
Num Leading Digits to Delete = 1
Leading Digits to Insert     = 9
Destination PSTN Number      = 90035319789781
Destination Branch ID        = 4
Destination Flag (HQ = 1)    = 0


DSC Entry (002)
---------------
Dial Plan Digits             = 813
Num Leading Digits to Delete = 0
Leading Digits to Insert     =
Destination PSTN Number      = 90035319734561
Destination Branch ID        = 5
Destination Flag (HQ = 1)    = 0

************************************************************
```

```
Enter Option :  3

Delete Distance Steering Code
-----------------------------
DSC Entry Number     : 002

Abort Request (y/n)  : n
DSC Entry (002) has been deleted

Enter Option :  1


*********************************************************
*                Distance Steering Codes                *
*********************************************************

Number of DSC Entries = 2


DSC Entry (001)
---------------
Dial Plan Digits             = 713
Num Leading Digits to Delete = 1
Leading Digits to Insert     = 9
Destination PSTN Number      = 90035319789781
Destination Branch ID        = 4
Destination Flag (HQ = 1)    = 0


DSC Entry (002)
---------------
This entry has been deleted ....

*********************************************************
```

BRAnch VOice Trunk Steering Codes configuration

Figure 35 on page 126 shows the BRAnch VOice Trunk Steering Codes configuration menu, which appears after you enter **5** at the Dial Plan configuration menu. By entering **1**, **2**, **3**, or **4** at the "Enter Option:" prompt, the relevant option shown below is invoked.

At the Trunk Steering Codes menu, you have the following options:

- Enter **1** to display the current Trunk Steering Codes.
- Enter **2** to add a Trunk Steering Code.

Figure 35
BRAnch VOice Trunk Steering Codes menu

```
*****************************************
*      BRAVO TRUNK STEERING CODE MENU     *
*****************************************
* 1 .... Display Trunk Steering Codes    *
* 2 .... Add Trunk Steering Code         *
* 3 .... Delete Trunk Steering Code      *
* 4 .... Store Dial Plan Changes         *
*                                        *
* -------------------------------------- *
* m --> Menu Redisplay                   *
* r --> Return to DIAL PLAN MENU         *
* q --> QUIT Card Configuration          *
*****************************************

Enter Option :
```

- Enter **3** to delete a Trunk Steering Code.
- Enter **4** to store any Dial Plan changes you made to the Trunk Steering Codes.
- Enter **m** to refresh the menu display.
- Enter **r** to return to the Dial Plan configuration menu.
- Enter **q** to quit the card configuration and log out.

Trunk Steering Codes configuration (example trace)

The following shows an example of setting Trunk Steering Codes:

```
*****************************************
*          BRAVO DIAL PLAN MENU         *
*****************************************
* 1 .... Display Dial Plan              *
* 2 .... Access Codes (AC1 & AC2) (MENU) *
* 3 .... Location Codes           (MENU) *
* 4 .... Distance Steering Codes  (MENU) *
* 5 .... Trunk Steering Codes     (MENU) *
* 6 .... Store Dial Plan Changes        *
```

```
*                                       *
* ------------------------------------- *
* m --> Menu Redisplay                  *
* r --> Return to MAIN MENU             *
* q --> QUIT Card Configuration         *
*****************************************

Enter Option :  5

*****************************************
*     BRAVO TRUNK STEERING CODE MENU    *
*****************************************
* 1 .... Display Trunk Steering Codes   *
* 2 .... Add Trunk Steering Code        *
* 3 .... Delete Trunk Steering Code     *
* 4 .... Store Dial Plan Changes        *
*                                       *
* ------------------------------------- *
* m --> Menu Redisplay                  *
* r --> Return to DIAL PLAN MENU        *
* q --> QUIT Card Configuration         *
*****************************************
```

```
Enter Option :  1


************************************************************
*                   Trunk Steering Codes                   *
************************************************************

Number of TSC Entries = 0

No TSC's configured ...

************************************************************


Enter Option :  2

Add Trunk Steering Code
-----------------------
Dial Plan Digits                : 213
Num Leading Digits to Delete    : 0
Leading Digits to Insert        :
Destination PSTN Number         : 90035391234543
Destination Branch ID           : 7
Destination  HQ (1) BRANCH (0)  : 0

Abort Request (y/n)  : n

Enter Option :  2

Add Trunk Steering Code
-----------------------
Dial Plan Digits                : 313
Num Leading Digits to Delete    : 0
Leading Digits to Insert        :
Destination PSTN Number         : 90035391456123
Destination Branch ID           : 8
Destination  HQ (1) BRANCH (0)  : 0

Abort Request (y/n)  : n
```

```
Enter Option :  1


************************************************************
*                   Trunk Steering Codes                   *
************************************************************

Number of TSC Entries = 2


TSC Entry (001)
---------------
Dial Plan Digits              = 213
Num Leading Digits to Delete = 0
Leading Digits to Insert      =
Destination PSTN Number       = 90035391234543
Destination Branch ID         = 7
Destination Flag (HQ = 1)     = 0


TSC Entry (002)
---------------
Dial Plan Digits              = 313
Num Leading Digits to Delete = 0
Leading Digits to Insert      =
Destination PSTN Number       = 90035391456123
Destination Branch ID         = 8
Destination Flag (HQ = 1)     = 0

************************************************************
Enter Option :  3

Delete Trunk Steering Code
--------------------------
TSC Entry Number      : 001

Abort Request (y/n)  : n
TSC Entry (001) has been deleted
```

```
Enter Option :  1


************************************************************
*                   Trunk Steering Codes                   *
************************************************************

Number of TSC Entries = 2


TSC Entry (001)
---------------
This entry has been deleted ....


TSC Entry (002)
---------------
Dial Plan Digits             = 313
Num Leading Digits to Delete = 0
Leading Digits to Insert     =
Destination PSTN Number      = 90035391456123
Destination Branch ID        = 8
Destination Flag (HQ = 1)    = 0

************************************************************


Enter Option :
```

BRAnch VOice Software Upgrade

Figure 36 shows the BRAnch VOice Software Upgrade menu, which appears after you enter **5** at the Main Configuration menu. By entering **1**, **2**, or **9** at the "Enter Option:" prompt, the relevant option shown below is invoked.

Figure 36
BRAnch VOice Software Upgrade menu

```
*****************************************
*      BRAVO SOFTWARE UPGRADE MENU      *
*****************************************
* 1 .... Upgrade from PCMCIA Card       *
* 2 .... Upgrade from Networked Host    *
*                                       *
* 9 .... Reboot Card                    *
*                                       *
* ------------------------------------- *
* m --> Menu Redisplay                  *
* r --> Return to MAIN MENU             *
* q --> QUIT Card Configuration         *
*****************************************

Enter Option :
```

The BRAnch VOice card software can be upgraded by two different methods:

- Upgrade using a BRAnch VOice software image on a PCMCIA card (option **1**). Refer to "BRAnch VOice software upgrade from a PCMCIA card" on page 132 for an example.
- Upgrade using a BRAnch VOice software image on an IP networked host (option **2**). Refer to "BRAnch VOice Software Upgrade from a networked host (example trace)" on page 134 for an example.

  Note 1: The BRAnch VOice PCMCIA drive is /A: (*see card faceplate*). The BRAnch VOice card must be IP networked to facilitate option 2.

  Note 2: You **must** reboot the BRAnch VOice card before the new loadware executes.

- Enter **m** to refresh the menu display.
- Enter **r** to return to the Main Configuration menu.
- Enter **q** to quit the card configuration and log out.

BRAnch VOice software upgrade from a PCMCIA card

To upgrade the BRAnch VOice software from a PCMCIA card, there must be a card with the appropriate software in the PCMCIA slot on the faceplate. You must know the filename of the upgrade file; it is normally /A:/BRAVO.MMS. The following shows an example of upgrading from a PCMCIA card:

```
****************************************
*        BRAVO CONFIGURATION MENU      *
****************************************
* 1 .... General Configuration    (MENU) *
* 2 .... IP Address Configuration (MENU) *
* 3 .... SNMP Trap Configuration  (MENU) *
* 4 .... Dial Plan Configuration  (MENU) *
* 5 .... Upgrade Card Software    (MENU) *
* 6 .... Display System Time             *
* 7 .... Change System Time              *
* 8 .... Save Card Configuration         *
*                                        *
* -------------------------------------- *
* m --> Menu Redisplay                   *
* q --> QUIT Card Configuration          *
****************************************

Enter Option :  5

****************************************
*      BRAVO SOFTWARE UPGRADE MENU     *
****************************************
* 1 .... Upgrade from PCMCIA Card        *
* 2 .... Upgrade from Networked Host     *
*                                        *
* 9 .... Reboot Card                     *
*                                        *
* -------------------------------------- *
* m --> Menu Redisplay                   *
* r --> Return to MAIN MENU              *
* q --> QUIT Card Configuration          *
****************************************
```

```
Enter Option :  1

Upgrade BRAVO Software from PCMCIA Card
---------------------------------------
Use Default file .. /A:/BRAVO.MMS  (y/n)  : y

Abort Request (y/n)  : n

Upgrading ... Please Wait ...

Opening file /A:/BRAVO.MMS
File /A:/BRAVO.MMS opened
File Length = 0x001749e0
Bank Size = 0x00200000
Updating sector: 0..1..2..3..4..5..6..7..8..9..10..11..file read
complete
  Program Address = 0xf9800000
  Checksum = 0x8c9c4b7f
  length = 0x1749e0
Upgrade completed OK
Reboot the pack to run new loadware

Enter Option :  9

Reboot Card Option Chosen !!

Abort Reboot Request (y/n)  : n
Card is being rebooted ...

Resetting card...
```

BRAnch VOice Software Upgrade from a networked host (example trace)

To upgrade the BRAnch VOice software from a networked host, the BRAnch VOice card must have a connection to the IP network. You must have the following information:

- the IP address of the host that contains the upgrade file
- the login username and password to access the host
- the directory on the host that contains the upgrade file
- the name of the upgrade file (for example, bravo.mms)

The following shows an example of upgrading from a networked host:

```
****************************************
*      BRAVO SOFTWARE UPGRADE MENU       *
****************************************
* 1 .... Upgrade from PCMCIA Card        *
* 2 .... Upgrade from Networked Host     *
*                                        *
* 9 .... Reboot Card                     *
*                                        *
* -------------------------------------- *
* m --> Menu Redisplay                   *
* r --> Return to MAIN MENU              *
* q --> QUIT Card Configuration          *
****************************************
```

```
Enter Option :  2

Upgrade BRAVO Software from Networked Host
------------------------------------------
Enter Host IP Address  : 192.31.2.187
Enter Username         : bravocfg
Enter Password         : upgrade2
Enter Directory Name   : /BRAVO/upgrade
Enter Filename         : bravo.mms

Abort Request (y/n)  : n

Upgrading ... Please Wait ...

Connecting to 192.31.2.187...
connected to 192.31.2.187 OK
File Length = 0x001749e0
Bank Size = 0x00200000
Updating sector:
16..17..18..19..20..21..22..23..24..25..26..27..file read complete
  Program Address = 0xf9a00000
  Checksum = 0x8c9c4b7f
  length = 0x1749e0
Upgrade completed OK
Reboot the pack to run new loadware

Enter Option :  9

Reboot Card Option Chosen !!

Abort Reboot Request (y/n)  : n
Card is being rebooted ...

Resetting card...
```

Configure BRAnch VOice system/card date and time

There is a real-time clock on the BRAnch VOice card. Enter **6** at the Main Configuration menu to display the current date and time. If the date and time are incorrect, enter **7** at the Main Configuration menu to change the date and time.

> ***Note:*** After you set the date and time, the date and time updates correctly across card reboots and turning the power off for the card.

System/card date and time configuration (example trace)

The following is an example of viewing and changing the date and time.

```
*****************************************
*        BRAVO CONFIGURATION MENU       *
*****************************************
* 1 .... General Configuration    (MENU) *
* 2 .... IP Address Configuration (MENU) *
* 3 .... SNMP Trap Configuration  (MENU) *
* 4 .... Dial Plan Configuration  (MENU) *
* 5 .... Upgrade Card Software    (MENU) *
* 6 .... Display System Time             *
* 7 .... Change System Time              *
* 8 .... Save Card Configuration         *
*                                        *
* -------------------------------------- *
* m --> Menu Redisplay                   *
* q --> QUIT Card Configuration          *
*****************************************
Enter Option :  6

Current System Time : Date (09/07/1999) Time (15:19:35)

Enter Option :  7

Change System Date and Time
---------------------------
Year   (1990 to 2037) : 2000
Month  (1 to 12)      : 2
Day    (1 to 29)      : 29
Hour   (0 to 23)      : 23
Minute (0 to 59)      : 12
Second (0 to 59)      : 00
Abort Change System Date and Time Request (y/n)  : n
```

```
Enter Option :  6

Current System Time : Date (29/02/2000) Time (23:12:02)

Enter Option :
```

Note: The new date and time take affect when you enter **n** and press **Return** at the "Abort Change System Date and Time Request (y/n):" prompt.

Configuring a new BRAnch VOice card

The first time a new board boots, it has no IP Address information stored. It attempts to resolve its IP address using the BOOTP protocol. To access the card configuration menus, **+++** (followed by pressing **Return**), must be entered when prompted (see Card Bootup Sequence Extract below). The login prompt is presented if this is done correctly.

Card Bootup Sequence Extract:

```
...
Getting IP over BOOTP via network interface lnIsa0
Enter +++ to escape to Shell for manual configuration
interrupt: lnIsa: no carrier
+++ <rtn>
escape sequence detected -  configure network manually...
...
VxWorks login: bravoadmin
Password: bravoadmin <not echoed>
....
```

From the IP Address Configuration menu, perform the following operations:

1. Change IP Address Settings (if the card is to be IP networked), **or**
2. Revert to Non-Networked Settings (if the card is not IP networked)

   Note: If the card is to be IP networked, the card could be rebooted and the rest of the card configuration performed through a remote Telnet session at a later date.

From the Main Configuration menu, set the system date and time.

From the General Configuration menu, perform the following operations:

1. Configure the branch ID.
2. Configure the card ID.
3. Configure the Headquarters Channel Reservation Flag.
4. Configure the Headquarters PSTN number (if necessary).
5. Configure the Headquarters branch ID (if necessary).
6. Configure the PNI (can be left as zero).
7. Configure the End of Call Timeout.
8. Store the Current Card Parameters.
9. Reboot the card.

After the card has rebooted, configure the Dialing Plan and SNMP Trap/Alarm Settings (if required).

Note 1: Changes to the Dialing Plan and Card Parameters take effect immediately. The changes only survive a card reboot if the "Store Dial Plan Changes" and "Store Card Parameters" options are invoked.

Note 2: Changes to the IP Addressing should be followed by an immediate card reboot.

CAUTION

Take extreme care to ensure that no cards in the BRAnch VOice network have the same combination of Branch and card ID. If any two cards in the network have the same combination of Branch and card ID, the conflicting cards do **not** interwork.

BRAnch VOice shell commands

When you exit the menu system, a command line interface, the *BRAnch VOice shell*, is available. Enter **help** or **?** at the "BRAVO>" shell prompt to list the available shell commands and their descriptions. Enter **configureCard** or **menu** at the "BRAVO>" shell prompt to access the Main Configuration menu of the menu system.

The following shows an example of quitting the card configuration and listing the available shell commands:

shell prompt, the 'main menu' of the simple menuing system is displayed.

```
****************************************
*         BRAVO CONFIGURATION MENU        *
****************************************
* 1 .... General Configuration    (MENU) *
* 2 .... IP Address Configuration (MENU) *
* 3 .... SNMP Trap Configuration  (MENU) *
* 4 .... Dial Plan Configuration  (MENU) *
* 5 .... Upgrade Card Software    (MENU) *
* 6 .... Display System Time             *
* 7 .... Change System Time              *
* 8 .... Save Card Configuration         *
*                                        *
* -------------------------------------- *
* m --> Menu Redisplay                   *
* q --> QUIT Card Configuration          *
****************************************
```

```
Enter Option :  q

Do you wish to Save Card Configuration ? (y/n)  : y
Saving Card Configuration ...
.....
.....
Dial Plan File (/C:/TABLE/DPTABLE.1) Saved ...
Card Parameters File (/C:/CONFIG/CONFIG1.INI) Saved ...
IP Configuration File (/C:/BOOTP/BOOTP.1) Saved ...

BRAVO> help
bravoHelp:
```

bravoHelp	Complete Command List. (help or ? are aliases)
configureCard	Card Configuration Menus. (**menu** is an alias)
swVersionShow	Prints out software version.
shellPasswordSet	Change the current username and password.
displayDchanStatus	Display D-Channel Status and Configuration Info.
upgradeXa	8051XA Firmware Upgrade.
xaSend	Send commands to the 8051XA.
loader	D-Channel PCMCIA card (/B:) software upgrade.
reformatCdrive	Reformat /C: drive (Lose Configuration Files).
archiveConfigToPcmcia	Copy configuration files to PCMCIA card (/A:).
copyConfigFromPcmcia	Copy configuration files from PCMCIA card (/A:).
archiveOMsToPcmcia	Copy OM files to PCMCIA card (/A:)
displayOMFiles	Display the contents of the OM files.
copy	Copy file command (syntax : copy "src", "dest")
rm	Remove file command (syntax : rm "file")
printAlarmInfoOn	Turn ON printing of SNMP Alarm Info to the console.
printAlarmInfoOff	Turn OFF printing of SNMP Alarm Info to the console.
pingHost	Ping a remote host. (syntax : pingHost "ipAddress")
routeAdd	Add a route to the network routing table.
routeNetAdd	Add destination route network to network routing table.
routeDelete	Delete a route from the network routing table.
routeShow	Display the current host and network routing tables.
ifShow	Display IP parameters.
sysReboot	Reboot the card.
i	Display the current task status list.

Use the **shellPasswordSet** command to change the current login ID and password for the BRAnch VOice card. The default is **bravoadmin** for both.

The BRAnch VOice card prompts you for the new login ID and password after you confirm the old login ID and password.

The following commands take parameters:

synopsis: ***routeAdd*** *"IP address of route destination","IP address of gateway to destination"*
synopsis: ***routeNetAdd*** *"IP address of network destination","IP address of gateway to destination"*
synopsis: ***routeDelete*** *"IP address of route destination","IP address of gateway to destination"*
synopsis: ***pingHost*** *"IP address of remote host"*

For example:

BRAVO> **routeAdd "47.85.6.83", "47.85.0.1"**

Other commands that take parameters are **upgradeXa**, **xaSend**, **loader**, **copy** and **rm**.

The syntax and usage of these commands can be seen in the following sections.

Note: All other commands available from the BRAnch VOice shell do not take parameters.

D-Channel PCMCIA card upgrade

Before beginning this procedure, ensure the BRAnch VOice D-channel is disabled — use **DIS DCH X** in LD 96. To upgrade the D-channel PCMCIA card, follow the steps in Procedure 5.

Procedure 5
Upgrading the D-channel PCMCIA card

1. Copy the upgrade file to an ATA flash PCMCIA card and insert into slot A of the BRAnch VOice card.
2. Log in to the BRAnch Voice card and exit the CLI menu to the BRAnch VOice shell.
3. At the BRAnch VOice shell prompt, type the following:

   BRAVO> **copy "/A:pcmXX .bin","/C:pcmXX .bin"**

   Note: XX refers to the version of the file.

4 After the upgrade file is copied, type the following:

BRAVO> **loader '1',"/C:pcmXX.bin"**

The card then reports on how the download is proceeding. Once programming is complete, the card automatically reboots.

5 Once reboot completes, the PCMCIA upgrade file can be deleted from drive C:. Enter the shell and type the following:

BRAVO> **rm "/C:pcmXX.bin"**

8051XA auxiliary processor upgrade

To upgrade the 8051XA auxiliary processor, follow the steps in Procedure 6.

Procedure 6
Upgrading the 8051XA auxiliary processor

1 Disable the BRAnch VOice card on the switch.

2 Log in to the BRAnch Voice card and exit the CLI menu to the BRAnch Voice shell.

3 At the BRAnch Voice shell, enter the **upgradeXa** command (syntax below) followed by the sector erase sequence.

BRAVO> **upgradeXa "server IP","username","passwd","path", "file"**

4 Reboot the card. The card will boot using the correct bank of code and FPGAs.

Note: 8051XA upgrade onboard with non-networked settings (that is, without Ethernet); this upgrade image must be on a PCMCIA card ("/A:").

BRAVO> **upgradeXa "10.0.1.2","bravoadmin","bravoadmin", "/A:","xaFile.bin"**

Maintenance

Contents

This section provides information on the following topics:

Introduction

This chapter describes Meridian BRAnch VOice 1.0 maintenance tools. This chapter provides the procedures to:

- identify the BRAnch VOice faults
- locate damaged equipment
- correct problems by repairing or replacing damaged equipment
- check the operation of the BRAnch VOice card after you have made corrections or replacements

Maintenance overview

Identify problems step-by-step. A problem can have more than one cause. To identify the cause, a knowledge of BRAnch VOice operation is necessary.

When you identify the cause, you can correct the problem by replacing the damaged card or connecting accidentally disconnected cables.

The system and the BRAnch VOice provide integrated diagnostic indicators and software and hardware tools. These diagnostic facilities make system troubleshooting easier and reduce mean-time-to-repair (MTTR).

This document looks at the maintenance of the BRAnch VOice equipment. It requires that the system operate correctly before you use a diagnostic test to find the BRAnch VOice card problems.

Large System: Maintenance (553-3021-500) describes how to maintain the complete system. This chapter describes how to maintain the BRAnch VOice card as an integrated part of the system.

BRAnch VOice diagnostic tools

Use diagnostic tools to perform troubleshooting on the system including problems with the BRAnch VOice. When you use a diagnostic test to find BRAnch VOice problems, more than one of these tools can be necessary.

System diagnostic tools include:

- LED indicators
- display codes
- card self-tests
- sanity monitoring
- overlay commands

LED indicators

System cards are equipped with red LED indicators and module power supplies are equipped with green LED indicators. These indicators show the status of each card or power supply.

BRAnch VOice maintenance LED indicator

The BRAnch VOice has a card LED indicator at the top of the faceplate. The card LED is a red LED that indicates the status of the card. Under normal conditions, the LED remains off. The LED can be on for the following reasons:

- the card is rebooting
- the card is active, but there are no enabled trunks on the card
- the card is damaged

If the LED is on when the card has enabled trunks and the card does not reboot, the card is damaged. The card is also damaged if the LED flashes or is not bright. Replace a faulty card. Package the damaged card and return it to the repair center.

Display codes

The BRAnch VOice has a four-digit alphanumeric maintenance display on the faceplate. The maintenance display indicates the development of the internal self-test in the form “T:xx”. Table 12 lists the maintenance codes with their explanations.

Table 12
BRAnch VOice alphanumeric display codes (Part 1 of 3)

Self-test code	Description
T:00	Initialization
T:01	Testing internal RAM
T:02	Testing ALU
T:03	Testing address modes
T:04	Testing boot ROM
T:05	Testing timers
T:06	Testing watchdog
T:07	Testing external RAM

Table 12
BRAnch VOice alphanumeric display codes (Part 2 of 3)

Self-test code	Description
T:08	Testing host DPRAM
T:09	Testing DS30 DPRAM
T:10	Testing security device
T:11	Testing flash memory
T:12	Programming PCI FPGA
T:13	Programming DS30 FPGA
T:14	Programming CEMUX FPGA
T:15	Programming DSP FPGA
T:16	Testing CE-MUX interface
T:17	Testing EEPROM
T:18	Booting 486, waiting for response with self-test information
T:19	Waiting for application start-up message from 486
T:20	CardLAN enabled, waiting for Request Configuration Message
T:21	CardLAN in operation, A07 enabled, display now under host control
T:22-99	Reserved for future diagnostic use
EV0x	Enabled Voice (Customer-side) BRAnch VOice trunks
FV0x	Free Voice trunks
EP0x	Enabled PSTN-side BRAnch VOice trunks
FP0x	Free PSTN-side trunks
UP00	Upgrade to on-board flash has started (0% complete)

Table 12
BRAnch VOice alphanumeric display codes (Part 3 of 3)

Self-test code	Description
UPnn	Upgrade to on-board flash in progress (nn% complete)
UPOK	Upgrade to on-board flash correctly completed
UPF	Upgrade to on-board flash failed

Self-test

A self-test is automatically performed by each BRAnch VOice card when you insert it into an IPE module, Small System, or Succession 1000, or when you power up or reboot the card.

The self-test function performs checks on the hardware, including memory tests, bus checks, timer tests, and programmable device checks. Checksum tests are carried out on application storage space, and the most recently loaded application with a good checksum is selected for execution. The progress and results of each self test is reflected on the faceplate alphanumeric display. The T:xx code corresponding to each test is shown in Table 12 “BRAnch VOice alphanumeric display codes” on page 145. Failure of a particular test (xx) is indicated by F:xx. The self-test function is useful on first installation of the BRAnch VOice card, as it automatically runs on card insertion and provides an immediate indication of the card’s operation status.

Successful completion of the self test and application startup sequence is indicated by the faceplate display continually cycling through the following codes: EV0x, FV0x, EP0x, FP0x, and BRVO. Table 13 on page 148 describes the self-test.

Table 13
BRAnch VOice self-test sequence

Item tested	Description of action
Processor/Co-processor	Read and store processor ID. Run processor self-test.
On-board flash memory	Check the amount of flash installed. Perform checksum testing of diagnostics, application, configuration areas, BIOS, and OS.
DRAM	Check the amount of DRAM installed. Perform R/W test.
PCI Chipset	Perform R/W test on selected registers.
System I/O Controller	Perform R/W test on selected registers.
PCMCIA Controller	Perform R/W test on selected registers.
DS-30X Interface	Test shared memory and perform loopback test over DS-30 FPGA.
CE-MUX Interface	Test shared memory and perform loopback test over CE-MUX LCA.
PCMCIA DSP card(s)	Check the presence of DSP cards and begin diagnostic tests on DSP cards, if present.
PCMCIA flash card(s)	Check the presence of flash memory and check the configuration information.

Sanity monitoring

Sanity monitoring is a background routine that checks the operation of system resources, such as memory allocation for CPU activity. This background routine tries to restore normal system operation if the system performance degrades to a low level. If all else fails, this routine restarts the BRAnch VOice card to try to restore it to normal operation. If the soft reset is not successful, a full board level reset is initiated.

Overlay commands

The system performs diagnostics for every card as part of the daily routines. You can also perform diagnostics from a maintenance terminal or the SMP (when equipped). See *Large System: Maintenance* (553-3021-500).

The BRAnch VOice card appears as an Enhanced Extended Universal Trunk card to the system. You can use all important system maintenance commands for an Enhanced Extended Universal Trunk card with BRAnch VOice. Enable and disable the BRAnch VOice units in the Network and Peripheral Equipment Diagnostics program, LD 32. The BRAnch VOice card also terminates a D-channel from the system. This D-channel should be disabled before rebooting or removing the BRAnch VOice card, and enabled when putting the BRAnch VOice card into service. Table 14 lists some of the commands used to control the BRAnch VOice status and functions. The BRAnch VOice card executes the commands transparently to the system.

Table 14
Commands to enable/disable and test BRAnch VOice channels

Overlay	Command	Operation performed
LD 32	DISC/ENLC	Disable/Enable indicated card
LD 32	DISU/ENLU	Disable/Enable indicated channel
LD 32	STAT	Get status of indicated card/channel
LD 96	DIS DCH x	Where x is the number of the D-channel to be enabled or disabled
LD 96	ENL DCH x	Where x is the number of the D-channel to be enabled or disabled

Fault detection and isolation through alarms

There are different conditions that can occur that prompt BRAnch VOice to send SNMP Alarms/Traps to assigned SNMP Managers. You can configure up to eight SNMP Managers through the BRAnch VOice configuration menus in the Command Line Interface (CLI). You must configure an IP address, gateway, and subnet mask for each SNMP Manager. OTM can be

used as an SNMP Manager. See “OTM configuration for receiving SNMP Traps/Alarms from BRAnch VOice” on page 109.

BRAnch VOice stores information concerning the last 50 most recent traps/alarms raised by the BRAnch VOice card. You can view the file containing this information from the BRAnch VOice CLI. Table 15 lists system alarms that are important to BRAnch VOice.

Table 15
BRAnch VOice alarms (Part 1 of 3)

Alarm	Alarm Interpretation and Intervention Required
	Alarm Clearance—No intervention required
BRV0100	Card Bootup was successful (Application started OK).
BRV0104	DSP Startup was successful.
BRV0150	D-channel restored. Associated Channels are back in service.
	Minor Alarms—No immediate intervention required
BRV0200	The Real Time Clock has been reset (Corrupt Settings Detected). The System Date and Time should be reconfigured.
BRV0201	The Companding Law has not been received from the switch. (A-Law default settings have been chosen).
BRV0202	Compand Law sent to the DSP upon timer expiration.
	Major Alarms—Intervention required
BRV0300	Failed to allocate RTP packet.
BRV0301	TSM reserve channel failure.
BRV0302	DSP device failure. Operating on reduced capacity.
BRV0303	Fatal error in DSP task.

Table 15
BRAnch VOice alarms (Part 2 of 3)

Alarm	Alarm Interpretation and Intervention Required
BRV0304	Error writing file. Check if disk is full.
BRV0308	Address Translation Failure. Dial Plan table doe not exist.
BRV0309	TSM channel unexpectedly closed.
	Major Alarms—Intervention Required
BRV0404	Unable to read BOOTP File.
BRV0406	Unable to initialize memory pool. Card must be rebooted.
BRV0408	Unable to read Address Translation Table File.
BRV0409	Unable to read Card Parameters File.
BRV0415	Card Bootup was not successful (Task Initialization Failure).
BRV0418	H.323 Stack Initialization Failure.
BRV0450	D-channel loss of signal. Associated channels to be busied out.
BRV0451	D-channel card removed. Associated channels to be busied out.
	Critical/Major Alarms—Intervention Required
BRV0500	Branch and card ID Handshake Failure. No response from far end Branch.
BRV0501	Branch ID Handshake returned unexpected value. Far end branch ID is equal to local branch ID.
BRV0502	Branch ID Handshake returned unexpected value. Does not match value in Address Translation Table for this PSTN DN.

Table 15
BRAnch VOice alarms (Part 3 of 3)

Alarm	Alarm Interpretation and Intervention Required
BRV0503	PPP Master-Slave Negotiation Failure. No response from far end PPP Master Branch.
BRV0504	PPP Master-Slave Negotiation Failure. No response from far end PPP Slave Branch.
BRV0505	Primary channel in PPP bundle initialization Failure. Secondary channel timeout waiting for primary to establish.
BRV0506	Point-to-Point Protocol (PPP) Connection Setup Failure.
BRV0507	Unexpected Card Resource Manager State.
BRV0508	Application Message Queue Corrupted.

Replacing the BRAnch VOice card

The BRAnch VOice card is based on flash EEPROM technology. This technology allows you to remove the BRAnch VOice card from the IPE shelf without losing the configuration data. To replace the BRAnch VOice card, follow the steps in Procedure 7.

Procedure 7
Replacing the BRAnch VOice card

1. Disable the BRAnch VOice card by accessing LD 32 and executing the **DISC l s c** command, where **l** = loop, **s** = shelf or module, and **c** = card in the module. Disable the D-channel by accessing LD 96 and executing the **DIS DCH x** command, where **x** is the D-channel number.
2. Remove the card from its card slot in the IPE module.
3. Remove all PCMCIA cards from the damaged BRAnch VOice card (i. e. the internal PCMCIA card plus associated NTCW84EA pigtail cable and the PCMCIA card installed in the faceplate slot, if any.

4 Transfer all PCMCIA cards to the new BRAnch VOice card.

Note: This procedure moves all software, configuration, and records to the replacement BRAnch VOice card.

5 Install the new BRAnch VOice card into the IPE module card slot.

6 Enable the new card by executing the **ENLC l s c** command from LD 32. Enable the D-channel by executing the **ENL DCH x** command from LD 96.

7 Configure the new installed BRAnch VOice card.

8 Package the damaged BRAnch VOice card and ship it to the repair center.

Appendix A: Product integrity

Contents

This section provides information on the following topics:

Reliability

The Mean Time Between Failure (MTBF) determines reliability. The BRAnch VOice card's MTBF is 36.95 years.

Environment specifications

Nortel Networks measured performance in relation to temperature and shock under test conditions. Table 16 on page 156 describes the results.

Refer to Table 16 for a display of acceptable temperature and humidity ranges for the BRAnch VOice card.

Table 16
BRAnch VOice environment specifications

Specification	Minimum	Maximum
Normal Operation		
Recommended	15° C	30° C
	10% Relative Humidity (non-condensing)	55%
Absolute	0° C	45° C
	5% Relative Humidity (non-condensing)	95%
Rate of change	Less than 1° C per three minutes	
Temperature Cycles	0° C to 65° C—1° C per minute for three cycles	
Storage		
Long term	-50° C	70° C
	0% Relative Humidity (non-condensing)	95%
Short term (less than 72 hours)	-40° C	70° C
	0% Relative Humidity (non-condensing)	95%
Temperature Shock		
In 3 minutes	-50° C	25° C
In 3 minutes	70° C	25° C

Electrical regulatory standards

The following three tables list the safety and electronmagnetic compatibility regulatory standards for the BRAnch VOice card. The tables list the regulations by geographic area. Specifications for the BRAnch VOice card meet or exceed the requirements of these regulations.

Safety

Table 17 lists the safety regulations met by the BRAnch VOice card.

Table 17
Safety regulations

Regulation Identifier	
UL 1459	Safety, United States, CALA
CSA 22.2 225	Safety, Canada
EN 41003	Safety, International Telecom
EN 60950/IEC 950	Safety, International
AS3260, TS001 - TS004, TS006	Safety/Network (Australia)
Jate	Safety/Network (Japan)

Electromagnetic compatibility (EMC)

Table 18 lists the electromagnetic emissions regulations met by the BRAnch VOice card.

Table 18
Electromagnetic Emissions (Part 1 of 2)

Regulation Identifier	
FCC part 15 Class A	United States Radiated Emissions
CSA C108.8	Canada Radiated Emissions

Table 18
Electromagnetic Emissions (Part 2 of 2)

Regulation Identifier	
EN55022/CISPR 22 CLASS B	Radiated Emissions (Basic Standard)
AS/NZS 3548	EMC (Australia/New Zealand)

Table 19 lists the electromagnetic immunity regulations that the BRAnch VOice card complies with.

Table 19
Electromagnetic Immunity

Regulation Identifier	
CISPR 22 Sec. 20 Class B	I/O conducted noise
IEC 801-2 (level 4)	ESD (Basic Standard)
IEC 801-3 (level 2)	Radiated Immunity (Basic Standard)
IEC 801-4 (level 3)	Fast Transient/Burst Immunity (Basic Standard)
IEC 801-5 (level 4, preliminary)	Surge Immunity (Basic Standard)
IEC 801-6 (preliminary)	Conducted Disturbances (Basic Standard)
AS/NZS 3548	EMC (Australia/New Zealand)

List of Terms

AOC

Advice of Charge.

ATA

Analog Terminal Adapter.

BARS

Basic Alternate Route Selection.

BRI

Basic Rate Interface.

CALA

Caribbean and Latin America.

CDB

Customer Data Block.

CDP

Coordinated Dialing Plan.

CDR

Call Detail Recording.

CE-MUX

Common Emitter/MUltipleXed.

CLI

Command Line Interface.

Core switch

The system that performs call termination, switching, and routing.

CLS

Class of Service.

CO

Central Office.

CPDN

Calling Party Display Name Display.

CPE

Customer Premises Equipment.

CPU

Central Processing Unit.

C7LIU

The VPS card on which the SS7 application exists.

DBB

Drop Back Busy.

DCH

D-channel.

DID

Direct Inward Dialing.

DN

Directory Number.

DSC

Distance Steering Code.

DSP

Digital Signal Processor.

ESN

Electronic Switched Network.

EXUT

Enhanced Extended Universal Trunk.

flash memory

Electrically erasable non-volatile memory.

FNP

Flexible Numbering Plan.

Glare

Glare occurs when an incoming and outgoing call contend for the same customer-side trunk. You can reduce glare by using opposite trunk member search methods for outgoing and incoming calls.

HQ

Headquarters. The main switch in a network, which provides centralized services such as NMS and NAS.

IDC

Incoming DID Digit Conversion.

IDE

Integrated Drive Electronics.

IGCC

ISDN Gateway Call Control.

I/O

Input/Output.

IP

Internet Protocol.

IPE

Intelligent Peripheral Equipment.

ISDN

Integrated Services Digital Network.

ISL

ISDN Serial Link.

MCDN

Meridian Customer Defined Network.

MISP

Multi-purpose ISDN Signaling Processor.

MMCS

Multi-Media Carrier Switch.

MSDL

Multi-purpose Serial Data Link.

MTBF

Mean Time Between Failure.

management LAN

LAN used for transporting BRAnch VOice configuration, maintenance packets, alarms, and loadware upgrade files.

multi-linking

When the bandwidth of two or more individual data channels is combined to provide a single, high-bandwidth logical channel by a PPP session.

MWI

Message Waiting Indicator.

NANP

North America Numbering Plan.

NARS

Network Alternate Route Selection.

NAS

Network Attendant Services.

NCA signaling

Non-call associated signaling.

NCT

Network Call Trace.

NFCR

New Flexible Code Restriction.

NMS

Network Message Services.

Non-call associated signaling

Non-call associated signaling is based on the ISDN Transaction Capabilities Application Part (TCAP). TCAP is used to activate and report the outcome of supplementary service operations performed without a related call. Because no call exists to provide an application association, TCAP provides a reference. This operation is the transaction part of TCAP.

NPA

Numbering Plan Area.

NXX

Numbering Plan Exchange.

OA&M

Operations, Administration, and Maintenance.

OM

Operational Measurement.

OTM

Optivity Telephony Manager. A Nortel Networks proprietary Windows™ application that you can use to administer the Succession 1000M, Succession 1000, and Meridian 1 systems.

PBX

Private Branch Exchange. A telephony switch the a customer owns privately.

PCM

Pulse Code Modulation.

PCMCIA

Personal Computer Memory Card International Association. This organization has defined a plug-in disk the size of a credit card for use in PCs.

PNI

Private Network Identifier.

PPP

Point-to-Point Protocol.

PRI

Primary Rate Interface.

PSTN

Public Switched Telephone Network.

RLB

Route List Block.

RLI

Route List Index.

SDI

Serial Data Interface.

SNMP

Simple Network Manager Protocol.

TAT

Trunk Anti-Tromboning.

TRO

Trunk Route Optimization.

TSC

Trunk Steering Code.

TSM

Telephony Services Manager.

TTY

Teletypewriter.

UDP

Uniform Dialing Plan.

UIP

Universal ISDN Protocol.

UIPC

Universal ISDN Protocol Control.

UIPE

Universal ISDN Protocol Engine.

VPS

Voice Processing Server.

WAN

Wide Area Network.

XUT

Universal Trunk Card (Analog Trunk).

Index

Meridian 1, Succession 1000,
Succession 1000M

Meridian BRAnch VOice 1.0

Description, Installation, and Operation

Information is subject to change without notice. Nortel Networks reserves the right to make changes in design or components as progress in engineering and manufacturing may warrant. This equipment has been tested and found to comply with the limits for a Class A digital device pursuant to Part 15 of the FCC rules, and the radio interference regulations of Industry Canada. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses and can radiate radio frequency energy, and if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at their own expense.
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