

## Contents

Executive Summary.....	ES-1
1. Introduction.....	1-1
1.1 Relationship With National ISDN - 1, 2, and 3, and National ISDN-95, -96, -97, -98, and -99 .....	1-2
1.2 Identification of Differences From NI-99 Special Report .....	1-2
1.3 Relationship With National ISDN Terminal Equipment Generic Guidelines for 1996, 1997, 1998, and 1999 .....	1-3
2. NI-2000 - Summary Feature Descriptions .....	2-1
2.1 Basic Rate Interface (BRI) Features and Capabilities.....	2-1
2.1.1 BRI Access, Call Control and Signaling.....	2-1
2.1.1.1 ISDN BRI Layer 1 .....	2-1
2.1.1.2 4:1 TDM Method for ISDN Basic Access.....	2-1
2.1.1.3 ISDN BRI Layer 2 .....	2-2
2.1.1.4 BRI Circuit-Mode Call Control .....	2-2
2.1.1.4.1 Basic Call Control.....	2-2
2.1.1.5 Uniform Cause Values and Location Identifiers - Subset .....	2-2
2.1.1.6 BRI Terminal Initialization.....	2-3
2.1.1.7 Service Profile Identifier.....	2-3
2.1.1.8 Parameter Downloading .....	2-3
2.1.1.8.1 Parameter Downloading - Version 2 (Extensions for Virtual Key Service) .....	2-4
2.1.1.8.2 Download Additional Data for Softkey Operations - Parameter Downloading - Version 2.1 .....	2-4
2.1.1.9 Automatic SPID.....	2-4
2.1.1.10 Default Services for Terminals .....	2-5
2.1.1.11 BRI Interworking with Signaling System #7 (SS7) .....	2-5
2.1.1.12 ISDN BRI Packet-Mode Call Control .....	2-6
2.1.1.12.1 User Originated, On-Demand B-Channel Packet on BRI.....	2-6
2.1.1.12.2 Conditional Notification .....	2-6
2.1.2 Uniform Interface Configurations for Basic Rate Interfaces .....	2-6
2.1.2.1 Single User With Multiple Applications .....	2-7
2.1.2.2 Two Users Sharing a BRI.....	2-7
2.1.2.3 More Than Two B-Channel Terminals on a BRI (Passive Bus).....	2-7
2.1.2.4 Associated Group Indicator .....	2-7
2.1.2.5 DN Sharing over Multiple Call Types (CTs) on an Integrated Terminal.....	2-8
2.1.2.6 DN Sharing over Multiple Terminals .....	2-8
2.1.2.7 Non-Initializing Terminals (NITs) .....	2-8

2.1.2.7.1	Assignment of Feature Keys to Default TSP (NITs).....	2-8
2.1.2.7.2	Features Available to NITs .....	2-9
2.1.2.8	Support of 2 Simultaneous Voice Calls on Different B-Channels from a Single TEI .....	2-9
2.1.2.9	Support for Retrieving an Active Call or Setting Up a New Call on an Idle B-Channel with a Conference Call Active on the Other B-Channel .....	2-9
2.1.2.10	Support for Retrieving a Conference Call on an Idle B-Channel with an Active Non-Conference Call on the Other B-Channel .....	2-10
2.1.2.11	Support of Multiple Non-EKTS DNs on a Single TEI....	2-10
2.1.3	Basic Rate Interface Features.....	2-11
2.1.3.1	Electronic Key Telephone Service (EKTS).....	2-11
2.1.3.1.1	Multiple Directory Numbers per Terminal.....	2-11
2.1.3.1.2	Analog Member in an EKTS Group.....	2-11
2.1.3.1.3	Multiple Directory Number Appearances/Call Appearance Call Handling .....	2-11
2.1.3.1.4	Hold/Retrieve.....	2-12
2.1.3.1.5	Bridging/DN-Bridging.....	2-12
2.1.3.1.6	Intercom Calling .....	2-12
2.1.3.1.7	Membership in a Multiline Hunt Group (MLHG).....	2-12
2.1.3.1.8	Abbreviated Ringing and Delayed Ringing.....	2-12
2.1.3.1.9	Automatic Bridged Call Exclusion .....	2-13
2.1.3.1.10	Manual Bridged Call Exclusion.....	2-13
2.1.3.1.11	Allow EKTS DNs and Call Appearances to be Restricted to Originating or Terminating Only.....	2-13
2.1.3.1.12	Allow EKTS DNs and Call Appearances to be Restricted to Originating and Priority Incoming Only .....	2-13
2.1.3.2	ISDN Call Forwarding (I-CF) .....	2-14
2.1.3.2.1	Call Forwarding Variable (CFV).....	2-14
2.1.3.2.2	Call Forwarding Interface Busy (CFIB).....	2-15
2.1.3.2.3	Call Forwarding Don't Answer (CFDA) .....	2-15
2.1.3.2.4	ISDN Call Forwarding Variable Customer Group (CFVCG) .....	2-15
2.1.3.2.5	Redirecting Number.....	2-16
2.1.3.2.6	Redirecting Reason .....	2-16
2.1.3.2.7	Call Forwarding Intragroup Only .....	2-16
2.1.3.2.8	Call Forwarding Incoming Only.....	2-16
2.1.3.2.9	CFIB Incoming Only .....	2-16
2.1.3.2.10	CFDA Incoming Only .....	2-16
2.1.3.3	Call Forwarding Over Private Facilities (CFPF).....	2-17

2.1.3.4	ISDN Call Hold .....	2-17
2.1.3.5	ISDN Flexible Calling .....	2-17
2.1.3.5.1	Three and Six-Way Conference.....	2-17
2.1.3.5.2	Simultaneously Assign 3-Way and 6-Way Conference to Controller .....	2-18
2.1.3.5.3	Consultation Hold.....	2-18
2.1.3.5.4	Conference Hold and Retrieve.....	2-18
2.1.3.5.5	Drop Last Call on Conference .....	2-18
2.1.3.5.6	Implicit Call Transfer .....	2-18
2.1.3.5.7	Explicit Call Transfer .....	2-19
2.1.3.6	Additional Call Offering (ACO) - Unrestricted (Circuit-Mode Only) .....	2-19
2.1.3.6.1	Notification and Call Reference Busy Limits...	2-19
2.1.3.7	Calling Number Identification Services (CNIS) for BRI2-20	
2.1.3.7.1	Delivery of Network-Provided Calling Number.....	2-20
2.1.3.7.2	Privacy of Calling Number .....	2-20
2.1.3.7.3	Delivery of Redirecting Number .....	2-20
2.1.3.7.4	Privacy of Redirecting Number .....	2-20
2.1.3.7.5	Delivery of Redirecting Reason.....	2-21
2.1.3.7.6	Privacy Change Allowed (PCA).....	2-21
2.1.3.7.7	Calling Party Number Subaddress.....	2-21
2.1.3.7.8	Screening .....	2-21
2.1.3.7.9	Ability to Segregate Number Delivery on Intra- BBG/Inter-BBG Basis .....	2-21
2.1.3.7.10	Allow Number Privacy Change to be Generally Available to All Users Without Subscription .....	2-22
2.1.3.8	ISDN Display Service.....	2-22
2.1.3.9	Automatic Callback - Intraswitch (ACB-I) .....	2-22
2.1.3.9.1	Automatic Callback - Any Designated Call .....	2-23
2.1.3.9.2	Automatic Callback - Interswitch - Circuit Mode Data.....	2-23
2.1.3.10	Message Service .....	2-23
2.1.3.11	MLHG.....	2-23
2.1.3.11.1	Analog Members in Hunt Group .....	2-24
2.1.3.11.2	Linear Hunting .....	2-24
2.1.3.11.3	Circular Hunting .....	2-24
2.1.3.11.4	Uniform Hunting .....	2-25
2.1.3.11.5	Stop Hunt .....	2-25
2.1.3.11.6	Queuing and Delay Announcement.....	2-25
2.1.3.11.7	Calls Waiting Lamps .....	2-25
2.1.3.11.8	Make Busy .....	2-25
2.1.3.12	Basic Business Group .....	2-26
2.1.3.12.1	Semi-Restricted Originating Access.....	2-26

2.1.3.12.2	Semi-Restricted Terminating Access .....	2-26
2.1.3.12.3	Semi-Restricted Line .....	2-26
2.1.3.12.4	Fully-Restricted Originating Access.....	2-27
2.1.3.12.5	Fully-Restricted Terminating Access .....	2-27
2.1.3.12.6	Fully-Restricted Line .....	2-27
2.1.3.12.7	Denied Originating .....	2-27
2.1.3.12.8	Special Intercept Announcement.....	2-27
2.1.3.12.9	Denied Terminating .....	2-27
2.1.3.12.10	Simulated Facility Groups (SFGs) for In and Out Calls .....	2-27
2.1.3.12.11	Distinctive Alerting - Indication (DA-I).....	2-28
2.1.3.13	Business Group Dial Access Features .....	2-28
2.1.3.13.1	ISDN Business Group Dialing Plan (BGDP-I).....	2-28
2.1.3.13.2	Manual/Direct Connect.....	2-28
2.1.3.13.3	Expensive Route Warning Tone.....	2-28
2.1.3.13.4	BBG-I Abbreviated Dialing for Circuit-Mode Calls .....	2-28
2.1.3.13.5	Dial Access to Private Facilities .....	2-29
2.1.3.13.6	Dial Access to Automatic Flexible Routing ...	2-29
2.1.3.13.7	Customer Access Treatment Code Restrictions.....	2-29
2.1.3.13.8	Code Restriction and Diversion.....	2-29
2.1.3.13.9	Direct Outward Dialing .....	2-30
2.1.3.13.10	Direct Inward Dialing .....	2-30
2.1.3.14	ISDN Call Pickup .....	2-30
2.1.3.14.1	ISDN Directed Call Pickup .....	2-30
2.1.3.15	Attendant Access .....	2-31
2.1.3.16	Station Message Detail Recording (SMDR).....	2-31
2.1.3.17	Access to Analog POTS and Centrex Features .....	2-31
2.1.3.18	ISDN Calling Name Identification Services.....	2-33
2.1.3.18.1	Redirecting Name Delivery .....	2-34
2.1.3.18.2	Personal Name Delivery (Intra-Basic Business Group).....	2-34
2.1.3.18.3	Link Calling Name Presentation to Calling Number.....	2-34
2.1.3.18.4	Calling Identity Delivery and Suppression.....	2-35
2.1.3.18.5	ISDN Delivery Feature Deactivation/Reactivation.....	2-35
2.1.3.19	Limitations and Restrictions for 911 Calls .....	2-35
2.1.3.20	Music On Hold .....	2-35
2.1.3.21	Remote Access to ISDN Call Forwarding.....	2-35
2.1.3.22	Call Park .....	2-36
2.1.3.23	Smart Attendant Service (SAS).....	2-36
2.1.3.23.1	Busy Lamp Field (BLF).....	2-36

2.1.3.24	Dual PIC .....	2-37
2.2	PRI Features and Capabilities .....	2-37
2.2.1	PRI Access, Call Control and Signaling .....	2-37
2.2.1.1	PRI Layer 1 .....	2-37
2.2.1.2	PRI Layer 2 (Circuit) .....	2-38
2.2.1.3	PRI Call Control and Signaling .....	2-38
2.2.1.3.1	Basic Call Control for Circuit-Mode Calls .....	2-38
2.2.1.3.2	Multiple DS1 Facilities Controlled by a Single D-Channel .....	2-38
2.2.1.3.3	D-Channel Backup .....	2-39
2.2.1.3.4	Access to Selected Primary Rate Services on a Per-Call Basis .....	2-39
2.2.1.3.5	Primary Rate Interworking with SS7 .....	2-39
2.2.1.4	Uniform Cause Values and Location Indicators - Subset .....	2-39
2.2.1.5	RESTART Procedures .....	2-40
2.2.1.6	SWF-DS1 .....	2-40
2.2.1.7	PRI Packet-Mode Call Control .....	2-40
2.2.2	Primary Rate Interface Features .....	2-41
2.2.2.1	Calling Number Identification Services (CNIS) for PRI .....	2-41
2.2.2.1.1	Delivery of Network-Provided Calling Number .....	2-41
2.2.2.1.2	Privacy of Calling Number .....	2-41
2.2.2.1.3	Delivery of Redirecting Number .....	2-41
2.2.2.1.4	Privacy of Redirecting Number .....	2-42
2.2.2.1.5	Delivery of Redirecting Reason .....	2-42
2.2.2.1.6	Screening Functions .....	2-42
2.2.2.1.7	Number Privacy Generally Available .....	2-42
2.2.2.1.8	Billing Number Selection (Subset) .....	2-43
2.2.2.1.9	Delivery of User Provided Not Screened Calling Party Numbers as Network Provided .....	2-43
2.2.2.1.10	Calling Number Delivery for 911 Calls .....	2-43
2.2.2.2	Call-by-Call Service Selection .....	2-44
2.2.2.3	ISDN Calling Name Identification Services for PRI .....	2-45
2.2.2.4	PRI Two B-Channel Transfer (Subset) .....	2-45
2.2.2.5	PRI 1+ or 0+ Dialing .....	2-46
2.2.2.6	Dual PIC .....	2-46
2.3	Packet Data Features and Capabilities .....	2-46
2.3.1	Public Packet Switched Network Call Control Features, X.25 .....	2-46
2.3.1.1	CUG, CUG/OA, CUG/IA .....	2-47
2.3.1.2	Reverse Charging, Reverse Charging Acceptance .....	2-47
2.3.1.3	Recognized Private Operating Administration (RPOA) Selection .....	2-47
2.3.1.4	IC Preselection .....	2-47
2.3.1.5	CCITT Data Terminal Equipment (DTE) Facilities .....	2-47

2.3.2	Public Packet Switched Network Call Control Features, X.75 and X.75' .....	2-48
2.3.2.1	X.75 Interface .....	2-48
2.3.2.2	Multilink Procedures on X.75/X.75' .....	2-49
2.3.2.3	Support of X.75 End Office Connections .....	2-49
2.3.2.4	X.75' Utilities .....	2-49
2.3.3	Packet Numbering and Routing .....	2-50
2.3.3.1	PMD Routing and Digit Analysis Requirements.....	2-50
2.3.3.2	Numbering Plan Internetworking per TR-TSY-000448 and GR-301-CORE .....	2-50
2.3.4	User-to-User, Packet (Fast Select and Fast Select Acceptance) .....	2-50
2.3.5	ISDN X.25 Supplementary Services.....	2-51
2.3.5.1	ISDN Local Charging Prevention.....	2-51
2.3.5.2	One-Way Logical Channel, Outgoing/Incoming.....	2-51
2.3.5.3	Incoming/Outgoing Calls Barred.....	2-51
2.3.5.4	Default Throughput Class Assignment.....	2-51
2.3.5.5	Nonstandard Default Packet Sizes.....	2-51
2.3.5.6	Nonstandard Default Window Sizes.....	2-52
2.3.5.7	Flow Control Parameter Negotiation (FCPN) .....	2-52
2.3.5.8	Throughput Class Negotiation (TCN) .....	2-52
2.3.5.9	Transit Delay .....	2-53
2.3.5.10	User Testing.....	2-53
2.3.6	MLHG - Packet.....	2-54
2.3.7	ISDN Calling Number Identification Service - Packet .....	2-54
2.3.8	Basic Business Group and Business Group Dial Access Features ..	2-54
2.3.8.1	Inclusion of Packet in BBG .....	2-54
2.3.8.2	Inclusion of Packet in Business Group Dialing Plan.....	2-54
2.4	Operations Capabilities .....	2-55
2.4.1	Switch Loopback.....	2-55
2.4.2	BRI Point-to-Point eoc.....	2-55
2.4.3	ISDN Inspect.....	2-56
2.4.3.1	Feature Key.....	2-56
2.4.3.2	Idle Call Appearance .....	2-56
2.4.3.3	Inspection of Reserved Call Appearances .....	2-56
2.4.4	BRI Layer 1 Surveillance.....	2-57
2.4.5	PRI Surveillance Layer 1 (Near End) .....	2-57
2.4.6	BRI/PRI Layers 2 and 3 Surveillance .....	2-57
2.4.7	PRI Layer 1 - ESF and Operations.....	2-58
2.4.8	Logging and Processing Terminal Endpoint Identifier (TEI) Abnormalities.....	2-58
2.4.9	Test System Controller/Remote Test Unit (TSC/RTU).....	2-58
2.4.10	Metallic Testing .....	2-58
2.4.11	Digital Test Access Unit (DTAU) .....	2-59
2.4.12	BRI Test Control.....	2-59

2.4.13	Loopback Testing .....	2-60
2.4.14	Cold Start Verification .....	2-60
2.4.15	Loop Performance Verification .....	2-60
2.4.16	Protocol Monitoring .....	2-60
2.4.17	BRI Multipoint eoc .....	2-60
2.4.18	PRI D-Channel Backup Maintenance .....	2-61
2.4.19	Trouble Detection Requirements .....	2-61
2.4.20	Call Trace .....	2-61
2.4.21	Automatic Internal Administration (AIA) .....	2-62
2.4.22	Network Traffic Management (NTM) .....	2-62
2.4.23	Network Data Collection .....	2-62
2.4.24	Transaction Language 1 (TL1) Messages .....	2-63
2.4.25	Memory Administration Parameters .....	2-63
2.4.26	Basic Rate Interface Verification (BRIV).....	2-63
2.4.27	Packet Handler Loopback Test Line .....	2-64
2.4.28	PRI B-Channel Availability Signaling Procedures .....	2-64
2.4.29	Logging of Clearing Subnetwork Identification (CSI) .....	2-65
2.4.30	D-Channel Message Performance Monitoring and Control .....	2-65
2.5	Cross-Platform Capabilities .....	2-65
2.5.1	ISDN - Personal Communications Service Interworking .....	2-65
2.5.1.1	Registration.....	2-66
2.5.1.2	PCS Calling .....	2-66
2.5.1.3	Automatic Link Transfer (ALT).....	2-67
2.5.1.4	PCS Supplementary Services .....	2-68
2.5.1.5	Profile Management.....	2-68
2.5.1.6	PCS Call Screening.....	2-68
2.5.2	PCS - BRI Multiplexing.....	2-69
3.	Feature Availability Summary .....	3-1
4.	NI-2000 Incremental Feature Availability Matrices .....	4-1
4.1	Features Supported by Three Suppliers in NI-2000, But Less Than Three in NI-99.....	4-2
4.2	Features Supported by Two Suppliers in NI-2000, But Less Than Two in NI-99.....	4-3
5.	National ISDN 1998, 1999, and 2000 - Availability Matrix .....	5-1
	Appendix A: Summary of Changes From NI-99 Special Report.....	A-1
	References .....	References-1
	Glossary .....	Glossary-1



## List of Tables

Table 4-1.	BRI Features .....	4-2
Table 4-2.	PRI Access, Call Control, and Signaling.....	4-2
Table 4-3.	PRI Features .....	4-2
Table 4-4.	BRI Features .....	4-3
Table 4-5.	PRI Features .....	4-3
Table 4-6.	Operations Capabilities.....	4-3
Table 5-1.	BRI Access, Call Control, and Signaling .....	5-2
Table 5-2.	Uniform Interface Configurations for BRIs .....	5-3
Table 5-3.	BRI Features .....	5-4
Table 5-4.	PRI Access, Call Control, and Signaling.....	5-12
Table 5-5.	PRI Features .....	5-13
Table 5-6.	Packet Data Features and Capabilities.....	5-15
Table 5-7.	Operations Capabilities.....	5-17
Table 5-8.	Cross-Platform Capabilities.....	5-19
Table A-1.	Items That Have Been Added.....	A-2
Table A-2.	Items That Have Been Deleted.....	A-3
Table A-3.	Items With Changed Availability Status .....	A-4