APPENDIX A

Network Specifications

VCs per AXIS Shelf	2028
VCs per IPX Shelf (NPC 16M processor card)	1024
LCons per IPX Shelf (NPC 16Mprocessor card)	850
Connections per IPX Shelf (NPC 16M processor card)	850
VCs per IPX Shelf (NPC 32 M processor card)	1024
LCons per IPX Shelf (NPC 32M processor card)	1000
Connections per IPX Shelf (NPC 32M processor card)	1000
VCs per IPX Routing Node	1024
VCs per IGX Routing Node	1024
Connections per IPX Routing Node	1024
Connections per IGX Routing Node	1024
Interface Shelf trunks per Routing Hub	16
Networking Trunks per Routing Hub	32
(up to 16 of these can be used for Interface Shelf Trunks)	
VCs per Routing Hub (BCC 32M processor card)	5000 grouped
LCons per Routing Hub (BCC 32M processor card)	1000
Connections per Routing Hub (BCC 32M processor card)	5000 grouped connections
Routing Nodes in a flat network (NPC 16M)	63
Routing Nodes in a flat network (NPC 32M, BCC 32M)	100
Routing Nodes in a domain (BCC 32M, NPC 32)	63

*All IPX nodes must be equipped with NPCs.

Broadband Trunk Interfaces

Trunk Interfaces:	T3 and E3
Trunk Protocol:	Asynchronous Transfer Mode (ATM)
Trunks per Node:	32 DS3 or E3 trunks per BPX of which 16 can be shelf trunks
	1 active DS3 or E3 trunk per IPX
Trunk Bandwidth:	96,000 cells/sec. (T3)
	80,000 cells/sec. (E3)
	353,208 cells/sec (OC3)
Trunk Capacity:	1221 inter-domain virtual circuits per BNI trunk.

Narrowband Trunk Interfaces

North American:	T1
	Fractional T1 (minimum of 4 DS0s)
	T2
International:	CEPT E1
	Subrate, 64 Kbps to 1.920 Mbps
	Japanese "Y1"
Trunk Bandwidth:	1.536 Mbps, 8,000 FastPackets/sec. (T1)
	1.984 Mbps, 10,333 FastPackets/sec. (framed E1)
	2.048 Mbps, 10,666 FastPackets/sec. (unframed E1)
	Subrate and fractional T1 depend on data rate selected

Narrowband Channel Interfaces

Frame Relay:	Channelized T1: 56 Kbps, N x 64 Kbps, up to 1.536 Mbps.
	Channelized E1: G.703, N x 64 Kbps, up to 1.984 Mbps. V.35: configurable from 56 Kbps to 2.048 Mbps
Data:	V.35: 56 Kbps to 1.344 Mbps.
	RS-449: 56 Kbps to 1.344 Mbps.
Voice:	Channelized T1
	Channelized E1
	Channelized Japanese
	"TTC" DC5A and E&M channel associated signaling
	FAX/high-speed modem

ATM T3 Trunk Interface (BNI-T3, LM-3T3)

Line Rate:	44.736 Mbps 20 ppm, asynchronous.
Line Code:	B3ZS.
Signal Level:	DSX-3.
Framing Format:	C-bit parity is monitored. No other framing or control bits in the DS3 frame are either altered or monitored.
Protocol:	Physical Layer Convergence Protocol per AT&T Publication TA-TSY-000772 and 000773.
ATM Cell Rate:	96,000 cells/sec. Limited to 80,000 cells/sec. when interfacing with StrataCom IPX.
Alarms Sent:	AIS. Remote
Alarms Received:	AIS. Loss of Signal. Remote. Loss of Framing.
Line Errors Counted:	BPV. Parity Bit Errors.
Jitter:	Meets ACCUNET T45 specification (Pub 54014).
Connector:	75 ohm BNC.
Recommended Cable Lengths:	900 feet (275 m.) max. using specified cable. 450 feet (150 m.) to a DS3 crossconnect.
Indicators:	Card status.Port status.

ATM E3 Trunk Interface (BNI-E3, LM-3E3)

Line Rate:	34.368 Mbps 20 ppm, asynchronous.
Line Code:	HDB3.
Signal Level:	CCITT G.703.
Framing Format:	CCITT G.804, G.832.
Port Interface:	75 ohm unbalanced.
Barrier:	Fully barriered per EN 41003.
ATM Cell Rate:	80,000 cells/sec.
Jitter:	per CCITT G.823
ATM Layer Protocol:	per CCITT I.361 with HEC.
Port Alarm Processing:	AIS. Loss of Signal. Remote Alarm Indication. Loss of Framing.
Line Errors Counted:	BPV. Parity Bit Errors.
Connector:	75 ohm BNC.
Max. E3 Cable Lengths:	900 feet (275 m.) using specified cable.
Indicators:	Card status. Port status.

ATM OC3 Trunk Interface (BNI-OC3, LM-OC3

Line Rate:	155.20 Mbps	
Line Code:	NRZ	
Signal Level:	Max	Min
MMF TX	–8 dBm	–15 dBm
MMF RX	–8 dBm	–28 dBm
SMF LR TX	0 dBm	–5 dBM
SMF LR RX	–10 dBm	–34 dBm
Framing Format:	STS-3c, STM1	
Port Interface:	LMI, ILMI	
ATM Cell Rate:	353,208 cells/sec.	
Jitter:	< 0.01 UI p-p, < 0.1 UI rms	
ATM Layer Protocol:	LMI, ILMI	
Port Alarm Processing:	LOS, LOF, LOP, Path AIS, Path Yellow	
Line Errors Counted:	Section BIP8, Line BIP24, Line FEBE, Path BIP8, Path FEBE	
Connector:	MMF SC SMF FC/PC	
Max. Cable Lengths:	MMF ~ 2 KM SMF IR ~20 KM SMF LR ~40 KM	
Indicators:	Card status. Port status.	

ATM Service Interface (ASI-1, LM-2T3)

Capacity	2 ports per card.
Interface:	T3
Line Rate:	96,000 cells/sec.
No. of channels per card:	1000
No. of channels per node:	1000 or 5000 (grouped)
VPI Addressing Range:	0–255 (UNI), 0-1023 (NNI_7
VCI Addressing Range:	1–4095
Queues:	32, 16 per line (port) includes CBR, VBR, and ABR queues.

ATM Service Interface (ASI-1, LM-2E3)

Capacity	2 ports per card.
Interface:	E3
Line Rate:	80,000 cells/sec.
No. of channels per card:	1000
No. of channels per node:	1000 or 5000 (grouped)
VPI Addressing Range:	0–255 (UNI), 0-1023 (NNI_
VCI Addressing Range:	1–4095
Queues:	32, 16 per line (port) includes CBR, VBR, and ABR queues.

ATM Service Interface (ASI-2, LM-OC3)

Capacity	2 ports per card.
Interface:	OC3
Line Rate:	353,208 cells/sec.
No. of channels per card:	1000
No. of channels per node:	1000 or 5000 (grouped
VPI Addressing Range:	0–255 (UNI), 0-1023 (NNI_
VCI Addressing Range:	1–4095
Queues:	24, 12 per line (port) includes CBR and VBR queues.

Flat Networks

Number of Nodes:	48 max. (with NPC with 16 M) 63 max. (with NPC or BCC)
Network Capacity:	1008 trunks max.
Node Capacity:	16 FastPacket trunks/node (IPX) 32 ATM trunks/node (BPX) of which 16 can be shelf trunks
Connections per node:	1024 max, or for the BPX, 5000 grouped.
Hops per connection	10 max.
Frame relay ports per node:	127

Structured Networks

Network Size, max.	384 nodes (junction nodes with PCC controllers) 504 nodes (junction nodes with NPC or BCC controllers) 8192 inter-domain virtual circuits max.
Domains per network	8 max.
Nodes per domain	48 max. with PCC in junction nodes 63 max. with NPC and/or BCC in junction nodes
Junction nodes per network	8 max. (with PCC controllers). 32 max. (with NPC or BCC controllers).
Junction nodes per domain	1 minimum, 2 recommended.
Connections per node	
junction node	512 inter-domain plus 500 intra-domain
local node	1000 intra-domain
Connections per inter-domain trunk	213 (NTC) 1221 (ATM)
Connections per intra-domain trunk	
local trunk	Bandwidth limited only
intra-domain jct. trunk	63
Hops per connection	10 near end local 3 inter-domain 10 far end local max.

Network Synchronization

Network Clock	One clock source per domain must be defined. Network clock cannot propagate across domain boundary.
Node Clock	44.736 MHz, 50 Hz (Stratum 3 per A T&T Pub 62411). Internal 8 KHz and 192 KHz clocks for synchronizing network interfaces.
Clock Sources:	Internal, free-running oscillator. Phase-locked to any appropriate network interface. External input at T1 or E1 rate.
Clock Output:	Single clock output at T1 or E1 rate for synchronizing co-located IPX node(s) or CPE.
Clocking Hierarchy:	Network-wide or domain-wide (for structured networks) clock selection.

Network Management

NMS Terminal:	SUN Microsystems and StrataCom Rel. 8.1 StrataView Plus, Informix, Wingz, Motif, and HP OpenView software required for network management, Frame Relay connection provisioning, graphical display of network status, statistics gathering and display, and automatic downloading of software.
Control Terminal:	DEC VT100 or equivalent terminal for basic system configuring and alarm monitoring.
Remote Alarm Reporting:	Autodial modem may be connected to one of two control ports on each node for automatic reporting of network alarms.
Remote Diagnostics:	Autoanswer modem may be connected to one of two control ports on each node for remote diagnostic access by StrataCom ISC or other authorized personnel.
Network Control Ports:	Three ports per node, two with RS 232C interface, one with Ethernet LAN interface. (Nodes with PCC controller have only the two RS-232 ports).
Alarm Notification:	Status of all trunks and nodes in network distributed to and stored by each individual node. Reported to StrataView Plus terminal at connecting node.
External Alarms:	Meets Bellcore Compatibility Bulletin #143 and AT&T Technical Reference PUB 43801 DS1 (T1) facility alarm requirements.
Structured Network Management	Centralized or de-centralized NMS supported