

# Software Product Description

PRODUCT NAME: StrataCom IPX 16/32 System Software, Version 6.0

SPD 45.43.00

## DESCRIPTION

StrataCom® IPX® 16/32 System Software is produced by StrataCom, Inc. and distributed and warranted by Digital Equipment Corporation. The StrataCom IPX 16/32 System Software provides operating system support for the StrataCom IPX 16 or IPX 32 System Unit. Together, the hardware and software provide the functionality described below.

The StrataCom IPX 16 and IPX 32 are digital network processing systems that are used to interconnect computers, PBXs, and other communications equipment in a private corporate network environment. The StrataCom IPX 16 and IPX 32 systems can also be used to build public (PTT or carrier-owned) digital networks providing Frame Relay services and Private Virtual Network services to customers. The digital networks integrate data, voice, video, and FAX over high-speed digital transmission services.

The IPX 16 and IPX 32 are large systems capable of backbone network applications, such as interconnecting corporate offices and manufacturing sites. The IPX 16 and IPX 32 are both floor-standing units. The IPX 16 is a single-shelf system with 16 card slots. The IPX 32 is a double-shelf system with 32 card slots. Each system has one or two Processor Control Cards (PCCs) and up to four AC or DC power supplies.

The IPX 16 and IPX 32 cabinets both have an internal bus bandwidth of 32.768 Mbits/second, which can be used to transport user traffic (this includes traffic originating from user devices connected to the cabinet, traffic terminating on user devices connected to the cabinet, and traffic transiting through the cabinet) up to a maximum of 26.88 Mbits/second.

The IPX 16 can support up to eight T1, E1, or Subrate trunk lines and up to eight T1/D4 or E1 circuit lines. The remaining card slots are available for voice and data ports, allowing up to 96 voice connections and up to 72 data connections.

The IPX 32 can support up to 16 T1 or 14 E1 trunk lines and up to 16 T1/D4 or 15 E1 circuit lines. The remaining card slots are available for voice and data

ports, allowing up to 192 voice connections and up to 200 data connections.

### *Packet Trunk Interfaces*

The IPX trunk cards, which provide the FastPacket® switching layer of an IPX network, provide T1, E1, Fractional T1, Fractional E1, and X21 or V35 Subrate interface options.

The Digital T1 Interface Group (DTI) provides a DSX interface to T1 trunks in conformance with AT&T® Publication 62411, Accunet® T1.5 Service Description. D4 framing is provided.

The Digital T1 Interface Group consists of two card types: the T1 Transmitter/Receiver module (TXR) and the Protection Interface Module (PIC). There are two DTI configurations available for the IPX 16 and IPX 32: the DTI5 and the DTI7. The DTI5 configuration uses five slots, allowing space for three TXRs (two active, one redundant) and two PICs (one active, one redundant). The DTI7 configuration uses seven slots, allowing space for five TXRs (four active, one redundant) and two PICs (one active, one redundant).

The Network Trunk Card and T1 Back Card Pair support T1 Extended Superframe Format (ESF) and conform to AT&T Publication 54016. There is no support for Facility Data Link (FDL). B8ZS line coding is implemented as specified in AT&T Publication 62411.

The Network Trunk Card and T1 Back Card Pair provide interfaces to Fractional T1 trunks. The T1 interface conforms to AT&T Publication 54019B, Accunet Spectrum of Digital Services—Intermediate Bit Rates. The following line speeds are supported: 256 kbps, 384 kbps, 512 kbps, 768 kbps, and 1344 kbps.

The Network Trunk Card and E1 Back Card Pair provide an E1 interface in conformance with CCITT G.703, G.704, and G.732. 120 Ohm balanced and 75 Ohm balanced or unbalanced interfaces are supported.

**Note:** Special coax. adapter cables are needed in Italy to interface with SIP 75 Ohm coax. equipment.

The Network Trunk Card and E1 Back Card Pair support the following features for time slot 0 (TSO):

- Selectable CRC-4, as specified in CCITT G.704.
- Alarms handling with bit 3 of frames not containing the frame alignment signal will comply with G.732.
- National Bits are user-selectable and can be read.

The Network Trunk Card and E1 Back Card Pair support a selectable option for the transmission of unblocked (full 32 slots), reserve time slot 0, or reserve time slot 0 and time slot 16. Also supported by this card pair are Fractional E1 trunks made with any combinations and numbers of time slots (to build a trunk speed from 64 kbits/s to 1.92 Mbits/s, in units of 64 kbits/s).

The Network Trunk Card and Subrate Back Card Pair provide an interface in conformance with either CCITT V.11/X.21, V.35, or MIL188/RS-449 interfaces (all three connectors are supplied on the Subrate Back Card; the one connector to use is configured in software).

The Network Trunk Card and Subrate Back Card Pair support the following features:

- Supported trunk rates include 64 kbps, 128 kbps, 256 kbps, 384 kbps, 512 kbps, 768 kbps, 1.024 Mbps, 1.536 Mbps, and 1.920 Mbps as Fractional E1 or Subrate services.
- Behaves as a DTE interface.
- Synchronizes to trunk clocking with the option of looping the clock back towards the DCE trunk side (not applicable to X.21).
- Provides a limited variety of EIA control leads which can be monitored by the system operator.

The IPX 16/32 supports traffic bridging between all supported trunks within the same node, including T1, E1, Fractional T1, Fractional E1, and Subrate.

#### *Circuit-Mode Network Interface Ports*

An adaption layer at the edge of the FastPacket network provides standard interface ports to devices serviced by the network, including circuit mode interfaces for both voice and data devices. These interfaces generate packets from information presented to the interface ports and deliver streams of packets to the system bus for transmission over the FastPacket network. Interface options include T1 and E1 digital voice ports, and RS232/V.24, V.35, RS422/449, and X.21/V.11 data interface ports.

The Digital T1 Interface (DTI) card group provides for up to four active T1/D4 ports. The DTI Group provides a DSX interface to T1 circuit lines in conformance with AT&T Publication 62411. D4 framing is provided.

The Channelized Interface Pad (CIP) and E1 Back Card Pair provide an E1 circuit line interface in conformance with CCITT G.703, G.704, and G.732. 120 Ohm balanced and 75 Ohm balanced or unbalanced interfaces are supported. CIP cards require additional IPX cards (the Voice Data Pad (VDP), and optionally the Voice Compressor/Decompressor (VCD)) to perform voice processing. For most voice applications, usage of the CIP card will also imply the use of external echo cancellation equipment.

The Channelized Data Pad (CDP) and E1 Back Card Pair provide an E1 circuit line interface in conformance with CCITT G.703, G.704, and G.732. 120 Ohm balanced and 75 Ohm balanced or unbalanced interfaces are supported. The CDP card includes all the necessary hardware to perform functions equivalent to the older VDP and VCD card. Hence, the CDP card supports:

- StrataCom-proprietary Voice Activity Detection (VAD), which is a voice compression feature likely to bring a 2:1 compression ratio in average.
- CCITT standard voice compression algorithm G.721 (32 kbps) PCM A-law or  $\mu$ -law encoding on a per-channel basis
- Programmable voice channel gain between -8 and +6dB Automatic modem/FAX detection.

In addition, the CDP card also supports:

- CCITT standard voice compression algorithms recently standardized under G.723 (24 kbps ADPCM), G.726 (16 kbps ADPCM).
- Local and remote loopbacks.
- Optional E1 or T1 voice echo cancellation with the addition of a piggyback board to the CDP card (two different Integrated Echo Cancellers exist, E1-specific and T1-specific). The piggyback board must be factory installed, so CDP, CDP/E1 echo canceller, or CDP/T1 echo canceller must be specified when ordering. The echo cancelling function can be disabled.
- Subrate, standard rate, and super-rate data connection transport from a CDP to another CDP, SDP, or LDP. It is also possible to use the CDP in a Fractional T1 or E1 interfacing mode.

Note that logical (voice or data) connections between CDP and CIP cards are not supported.

The Synchronous Data PAD (SDP) supports various back card physical interfaces including RS232C, RS232D, RS422/RS449, V.35, and X.21/V.11. The SDP supports line speed rates up to 1.344 Mbps.

The RS2323/V.24 Back Cards provide RS232/V.24 data ports that conform to CCITT V.24, EIA RS232-C, and EIA RS232-D.

The RS422/RS449 Back Cards provide RS422/RS449 data ports that conform to EIA RS422/RS449.

The V.35 Back Card provides V.35 data ports that conform to CCITT V.35.

The SDP supports X.21/V.11 data connections (via an adapter cable). This connection conforms to CCITT X.21/V.11. There is no software support for lead naming. X.21 support is for leased service only.

The Low Speed Data PAD (LDP) supports RS232C and RS232D Back Card physical interfaces for low-speed data applications. The LDP supports line speed interfaces up to 19.2 kbps.

All Data Port Interfaces transmit data transparently at the bit, byte, and protocol level. Protocols that are transmitted transparently include, but are not limited to: X.25/HDLC, DECnet/DDCMP, SNA/SDLC, BISYNC, LAT, DECnet/HDLC, and TCP/IP.

#### *Voice Functions*

Either the Channelized Data Pad (CDP) card or the Voice/Data Processor Model D (VDP/D) card support  $\mu$ -law PCM. The card controls the assembly and disassembly of voice and data samples, performs speech detection and echo suppression, and determines whether specific voice channels are used to transmit modem-type traffic. Typically, each CDP can handle up to 30 voice channels and one signaling timeslot, or up to  $31 \times 64$  kbits data connections, or a combination of both.

The CDP card supports A-law PCM and is similar in function to the VDP/A.

The CDP card (if it does not have an Integrated Echo Canceller hardware option) supports a mixture of  $\mu$ -law and A-law channels on the same physical line.

Both the CDP card and the VDP cards provide a selectable Voice Activity Detection (VAD) feature. The VAD feature distinguishes between silence and speech on voice channels. This allows the IPX to not utilize trunk bandwidth for the transmission of silence. The VAD feature provides a user-programmable voice volume threshold, below which inputs are treated as "silence."

The VDP card sends voice samples to the Voice Compression Detection (VCD) card for Adaptive Differential Pulse Code Modulation (ADPCM). The VDP and VCD operate as a pair via a utility bus. The VCD converts voice samples from the standard 64 kbps PCM format to the compressed 32 kbps format and back again using the industry standard ANSI T1/Y1 ADPCM algorithm. This is a user-selectable feature.

The CDP card is equipped with all the necessary hardware to do ADPCM voice compression/decompression onboard.

The VDP and the CDP cards automatically disable ADPCM when they detect analog data transmission at rates higher than 4800 bps, such as required for high-speed FAX or modem connections.

The CIP, the VDP, and the VCD cards working together can support  $\mu$ -law PCM to A-law PCM conversion within a single IPX system unit. This conversion is accomplished via application of the ADPCM compression technique. This allows for trans-Atlantic and trans-Pacific voice trunking.

The CDP cards also support  $\mu$ -law to A-law PCM conversion using ADPCM compression.

#### *Packet-mode Network Interface Ports*

With the optional Enhanced Frame Relay software license, it is possible to use an IPX network to provide Frame Relay services to Frame Relay Customer Premise Equipments (CPE). Refer to the Software Product Description for IPX Enhanced Frame Relay (SPD 43.53.xx) for more details.

#### *Network Configuration Guidelines*

StrataCom IPX 16/32 System Software, Version 6.0 must be loaded to all IPX 16/32 System Units within a given IPX network.

IPX 16 and IPX 32 System Units may co-exist in the same IPX network, but all must be operating with Version 6.0 System Software.

Two IPX System Units must be connected via a T1, E1, or subrate trunk line to form a minimum IPX network.

Voice connections in an IPX network require either:

- A minimum of two VDPs or VDP/VCD pairs, one at each end of the connection, along with a minimum of one CIP/BC-E1 card pair at each end of the connection. Each VCD card in a system unit must be paired with a corresponding VDP card.
- A minimum of one CDP/BC-E1 or CDP/BC-T1 pair, one at each end of the connection.

Interoperability of the StrataCom IPX 16 or IPX 32 with various types of ancillary equipment is determined by conformance to specific interface specifications. Interoperability of the StrataCom IPX 16 or IPX 32 with specific OEM equipment, including but not limited to PBXs, echo cancellers, and channel banks, is explicitly not warranted by Digital Equipment Corporation.

**INSTALLATION**

Digital recommends that StrataCom IPX 16 or IPX 32 hardware and software installation services be purchased with the product. These services provide for installation of the hardware and software by an experienced Digital specialist.

*Customer Responsibilities*

Before product installation can be done by Digital, the customer must:

- Install, and demonstrate as operational, the necessary synchronous communication line(s).
- Obtain, install, and demonstrate as operational any modems, CSUs, channel banks, echo cancellers, or other equipment and facilities necessary to interface to Digital's communication equipment.
- Make available for a reasonable period of time, as mutually agreed to by Digital and the customer, all hardware, communication facilities, and terminals that are to be used during installation.

**HARDWARE REQUIREMENTS**

One of the following system hardware units is required to run the StrataCom IPX 16/32 System Software Product.

StrataCom IPX 16 CEPT/CISPR System Unit, Processor Control Card Model H, Flash EPROM, 48VDC, 600W power supply, StrataCom IPX 6.0 System Software License	DIXSA-BJ
StrataCom IPX 16 CISPR System Unit, Processor Control Card Model H, Flash EPROM, 48VDC, 600W power supply, StrataCom IPX 6.0 System Software License	DIXSA-BK
StrataCom IPX 16 CEPT/CISPR System Unit, Processor Control Card Model H, Flash EPROM, 240VAC, 600W power supply, StrataCom IPX 6.0 System Software License	DIXSA-BL
StrataCom IPX 16 CISPR System Unit, Processor Control Card Model H, Flash EPROM, 208VAC, 600W power supply, StrataCom IPX 6.0 System Software License	DIXSA-BM
StrataCom IPX 32 CEPT/CISPR System Unit, Processor Control Card Model H, Flash EPROM, two 48VDC, 600W power supplies, StrataCom IPX 6.0 System Software License	DIXSA-CJ
StrataCom IPX 32 CISPR System Unit, Processor Control Card Model H, Flash EPROM, two 48VDC, 600W power supplies, StrataCom IPX 6.0 System Software License	DIXSA-CK

StrataCom IPX 32 CEPT/CISPR System Unit, Processor Control Card Model H, Flash EPROM, two 240VAC, 600W power supplies, StrataCom IPX 6.0 System Software License	DIXSA-CL
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StrataCom IPX 32 CISPR System Unit, Processor Control Card Model H, Flash EPROM, two 208VAC, 600W power supplies, StrataCom IPX 6.0 System Software License	DIXSA-CM
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**Other Hardware Requirements**

As part of Digital's set of software product services, remote diagnostic support of the StrataCom IPX 16 and IPX 32 may be available from a Digital Support Center. To receive this remote diagnostic service, a CODEX Motorola® 3220 modem is required to be connected to the Control Terminal port of the Processor Control Card located in at least one of the StrataCom IPX System Hardware Units. The customer must maintain a dial-in communications line to the modem.

**OPTIONAL HARDWARE**

The StrataCom IPX 16 and 32 can be uniquely configured to fit the requirements of the customer's network. The following hardware options can be ordered individually depending on the configuration of the customer's network.

*Processor Group Modules for Redundancy*

Processor Control Card model H with 8MB RAM and Flash EPROM	DIXCA-DD
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*Trunk Interface Group Modules*

Network Trunk Card (NTC) Model D	DIXTA-AD
E1 Back Card/Single Port	DIXTA-BA
T1 Back Card/Single Port	DIXTA-BB
Subrate Back Card/Single Port (3 connectors)	DIXTA-BC
Transceiver Card Model D (TXR/D)	DIXTA-CA <sup>1</sup>
Protection Interface Card/8 Port (PIC)	DIXTA-DA <sup>1</sup>
DTI-5 Utility Bus (for TXR/PIC only)	DIXTA-XA <sup>1</sup>
DTI-7 Utility Bus (for TXR/PIC only)	DIXTA-XB <sup>1</sup>

**Note:**

1. The TXR and PIC cards, and the corresponding utility buses will retire in September 1993. They are replaced by the NTC front card and T1 back card, which are currently available.

*FastPacket Voice PAD Group Modules*

Channelized Data Pad card, no echo canceller (CDP)	DIXVA-FA
Channelized Data Pad card with T1 echo canceller	DIXVA-FB
Channelized Data Pad card with E1 echo canceller	DIXVA-FC
Utility Bus (VDP-UB)	DIXVA-CA <sup>1</sup>
Voice Compressor Decompressor (VCD)	DIXVA-BA <sup>1</sup>
Voice Data Pad Model E, A-law (VDP/A)	DIXVA-DA <sup>1</sup>
Voice Data Pad Model D, $\mu$ -law (VDP/ $\mu$ )	DIXVA-DB <sup>1</sup>
Channelized Interface Port Model B (CIP/B)	DIXVA-EB <sup>1</sup>

**Note:**

1. The VDP, VCD, and CIP cards, and the corresponding utility bus will retire in September 1993. They are replaced by the CDP front card and T1, E1, or Subrate back cards, which are currently available.

*FastPacket Data PAD Group Modules*

Synch Data Pad Model C (SDP)	DIXDA-AF
SDP Back Card/4 Port/RS232D (SDI)	DIXDA-AG
SDP Back Card/4 Port/V.35 (SDI)	DIXDA-AD
SDP Back Card/4 Port/RS422/499 (SDI)	DIXDA-AE
Low Speed Data PAD Model C (LDP)	DIXDA-BF
LDP Back Card/4 Port/RS232C (LDI)	DIXDA-BB
LDP Back Card/8 Port/RS232C (LDI)	DIXDA-BC
Utility Bus (SDP-UB or UB-240)	DIXDA-CB

*Frame Relay PAD Group Modules*

Frame Relay PAD Model D (FRP)	DIXFA-AD
FRP Back Card/4 Port/V.35 Model B, 2.048 Mbps (FRI)	DIXFA-BB

*Power Supplies*

Power Supply 600W 48VDC	DIXPA-BC
Power Supply 600W 240VAC	DIXPA-BE

*Miscellaneous*

IPX Local Bus 1 Slot	DIXMA-AA
IPX Front Face Plate	DIXMA-BA
IPX Back Plate 1 Slot	DIXMA-CA
IPX Rail Kit Short	DIXMA-CH
IPX Rail Kit Long	DIXMA-CI

**SOFTWARE REQUIREMENTS**

None

**OPTIONAL SOFTWARE***Application Software*

IPX 16/32 DFM Software, V6.0: QB-GKVAA-WA  
 IPX 16/32 Priority Bumping, V6.0: QB-MTVAA-WA  
 IPX 16/32 Enhanced Frame Relay Software, V6.0:  
 QB-MTWAA-WA

*Network Management Software*

Note that IPX 16/32 System Software, Version 6.0 REQUIRES at least one StrataView/Plus 2.0.1 or later network Management Station in order to be supported by Digital. Refer to the Software Product Description for StrataView Plus 2.0.1 (SPD 38.46.xx) for more details.

IPX 16/32 Configuration Save and Restore, V6.0:  
 QB-0G5AA-WA

**SOFTWARE LICENSING**

A separate software license is required for each StrataCom IPX 16 or IPX 32 System Hardware Unit. This license is included with each purchase of a StrataCom IPX 16 or IPX 32 System Unit as listed in the *HARDWARE REQUIREMENTS* section.

The software may be copied in its entirety solely for back-up or archival purposes, or for downline loading to all properly licensed StrataCom IPX System Hardware Units within a network.

This software is furnished under the licensing provisions of Digital Equipment Corporation's Standard Terms and Conditions. For more information about Digital's licensing terms and policies, contact your local Digital office.

**ORDERING INFORMATION**

The StrataCom IPX 16/32 System Software is factory-installed in Flash EPROM, which resides on the Processor Control Card within the StrataCom IPX 16 or IPX 32 System Hardware Unit. Additional System Software media and documentation kits for back-up purposes are available.

**SOFTWARE PRODUCT SERVICES**

A variety of service options are available from Digital. For more information, contact your local Digital office.

**SOFTWARE WARRANTY**

Warranty for this software product is provided by Digital with the purchase of a license for the product. The software product is warranted to conform to the Software Product Description (SPD). Digital will remedy any non-conformance when it is reported to Digital by the customer during the warranty period.

The warranty period is one year. The warranty period begins when the software is installed or thirty days after delivery to the end-user, whichever occurs first, and expires 360 days later. All warranty related support for this software will end 180 days after release of a subsequent version.

Warranty is provided in the country of purchase in accordance with the provisions of Digital's Standard Terms and Conditions of Sale. Digital will provide the following services if the customer encounters a problem when using licensed software under normal conditions as defined by the SPD:

- If Digital also determines the problem to be a defect in the Software Product, Digital will provide remedial service on site if necessary to apply a temporary correction or make a reasonable attempt to develop an emergency bypass if the software is inoperable,
- Assist the customer in preparing a Software Performance Report (SPR). If a customer diagnosis indicates the problem is caused by a defect in the Software Product, the customer may submit an SPR to Digital.

Digital will respond to a problem reported in an SPR that is caused by a defect in the current, unaltered release of the Software Product. The response will provide temporary corrections, useful emergency by-passes and/or notice of the availability of the corrected software code.

Telephone support may be available from the Digital Telephone Support Center. Please contact your local Digital office for information on the provision of telephone support as part of the warranty.

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