

SYNCHRONY®

AD-10/FR2 AND AD-10

*Integrated Voice
and Data Access*



TimePlex Group

Networking Your World



TimePlex®
Synchrony® AD-10

SYNCHRONY

Hybrid packet data and circuit
switched networking

Analog PABX access

Integral voice compression

Packetized data options

Fax handling

Access to EXPRESS
SWITCHING® backbones

Cost efficient wide area
connectivity

Full remote network management

Fully modular for cost-effective
deployment

Fully Year 2000 Compliant



[The AD-10/FR2 and AD-10]



*Voice over Frame Relay
full-featured voice
and data access devices
incorporating voice
compression, dynamic
bandwidth contention,
and data access.*

Voice and Data Integration

SYNCHRONY AD-10 Systems—the AD-10 and AD-10/FR2 Series—provide network operators with an opportunity to reduce the running costs of their branch networks, by integrating multiple traffic types over one networking infrastructure designed to respond to the needs of each application.

The AD-10 leverages the efficiencies of packetized data alongside circuit switching to ensure dynamic bandwidth allocation to voice, fax, and data traffic on a single aggregate, up to 384 kbps.

The AD-10/FR2 integrates voice and data and delivers enterprise networking features over frame relay networks.

From the TimePlex rich heritage of voice and data networking, AD-10 Systems incorporate extensive voice handling capabilities including signaling and compression based upon the highest quality voice techniques including ADPCM and Code Excited Linear Prediction (CELP) to as low as 5.33 kbps.

PABXs can be attached to an AD-10 System to provide voice contention (analog PABXs) and off-site telephone extensions using FXS/FXO options.

Call Routing

The AD-10/FR2 provides complete call processing and switches each call independently, which minimizes implementation costs, recurring operations costs, and number of ports needed. Additionally, call routing eliminates tandem calls on the network and can limit the bandwidth used by voice calls to enhance data performance. Calls can be routed through AD-10/FR2s, so the voice network can be fully meshed at minimum cost.



[The AD-10/FR2 and AD-10]

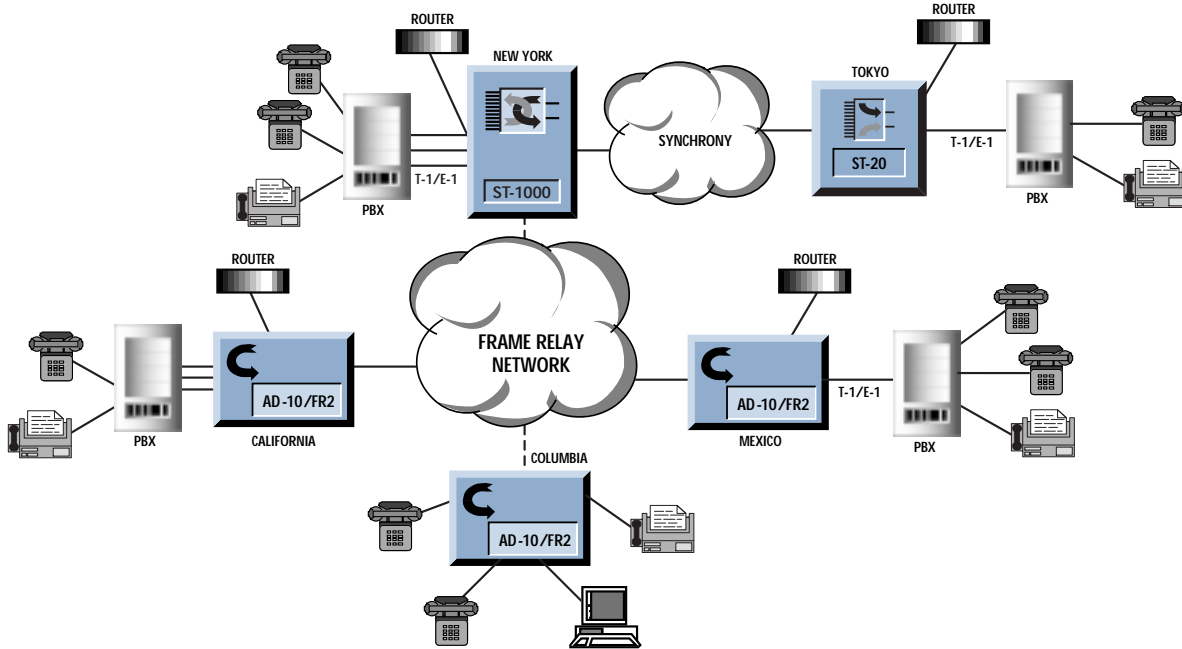


Figure 1
Example of AD-10/FR2 Applications

Call Processing

The AD-10/FR2 builds on the voice switching capability by providing complete call processing and digit translation. Call processing features include:

- > Complete end-to-end flexibility independent of voice interfaces
- > E&M analog interface ports, which can connect to digital PBX interface ports directly without conversion equipment
- > Digit translation, which provides a unified dialing scheme capable of 20 digit translation and 40 digit outpulsing
- > R2 voice signaling protocol support

AD-10/FR2 Central Site Termination

The ST-1000/ST-20 can act as central site termination for multiple FR2s. These platforms provide voice and data interoperability with AD-10/FR2s as well as high density call-by-call switching. This allows larger regional or central site hubs then would be available by stacking AD-10/FR2s.

Data Networking

Bursty data can be transported in a packet mode for maximum efficiency or in a TDM mode for minimum delay in the AD-10. Up to 16 ports of asynchronous, bisynchronous, and SDLC/ HDLC data can be passed through the AD-10 at data rates from 1.2 kbps to 56 kbps.

AD-10 Systems provide branch access to the ST-20 and ST-1000 regional and central site switching nodes. Traffic between these switching nodes incorporates the SYNCHRONY revolutionary EXPRESS SWITCHING infrastructure to make efficient use of wide area bandwidth. This ensures that unused bandwidth is made available to both frame based data, such as bursty LAN internetworking traffic, as well as switched voice or other CBR traffic.

The AD-10 aggregate, operating at 19.2, 56, 64 or 128 kbps can terminate directly on the ST to allow seamless networking of voice and data traffic on the SYNCHRONY network.



[The AD-10/FR2 and AD-10]

Voice Over Frame Relay/Voice Over IP

The AD-10/FR2 provides integrated voice transmission over IP and voice and data over frame relay thereby providing a single-product solution.

Ethernet-based IP transmission and serial frame relay trunks support full T-1 and E-1 throughput. Voice traffic originating on the AD-10/FR2 subscriber interface can be transported across either a frame relay or ethernet UDP/IP trunk. In the event that one trunk should fail, the other trunk can be used as the alternate route to the destination.

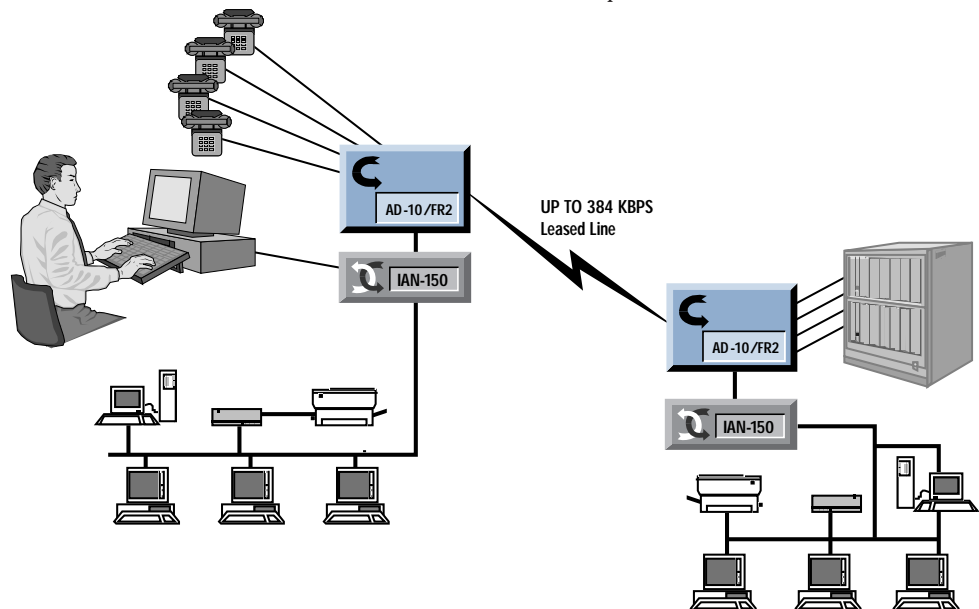
This voice over IP and frame relay gateway combination provides the following benefits:

- > Both voice over IP and voice over frame relay can run concurrently
- > Voice calls can be switched from an IP network to a frame relay network

The AD-10/FR2 provides industry-recognized, high-quality voice compression technology and features:

- > ITU G.728 LD-CELP at 16 kbps, providing standards-based performance comparable to 32 kbps ADPCM
- > E-CELP algorithms operating at 4.8, 7.47, and 9.6 kbps, providing industry-leading quality at each rate
- > ITU G.729 CSA-CELP providing standards-based performance comparable to 16 kbps ATC. (optional)
- > Adaptive silence suppression minimizing bandwidth usage during speech pauses, while maintaining natural conversation flow
- > Integral echo cancellation in excess of 45 msec ensuring voice quality for off-net calls
- > Sophisticated lost packet recovery features which help to maintain consistent quality through public frame relay networks
- > Low-delay voice encoding and adaptive jitter buffer build out minimizing end-to-end speech delay
- > Transparent fax support providing normal fax operation at 2400, 4800, 7200, and 9600 bps.

Figure 2
Example of AD-10
Point-to-Point Application





[The AD-10/FR2 and AD-10]

Frame Relay Networking

The AD-10/FR2 is both a data/voice FRAD and a frame relay switch and is easy to integrate into existing data networks. It supports both the DTE and DCE sides of the UNI interface and functions as a frame relay network to attached devices, including routers and front-end processors.

Circuit Switched Services

AD-10 Systems provide a method for contention for voice and data traffic over 56 or 64 kbps wide area connections.

Voice Capabilities

AD-10 Systems can be connected to many different voice systems. In addition, the signaling information from analog PABXs can be interpreted to allocate bandwidth only when two individuals wish to speak across the network. By combining this bandwidth contention with voice compression, the AD-10 can make very efficient voice networks. Voice traffic can be compressed to 4.8 kbps and combined with sub-rate data channels as small as 2.4 kbps. Some of the bandwidth available to voice traffic can also be shared with packetized data for maximum cost effectiveness.

Digital Interface

The AD-10/FR2 simplifies cabling, installation, and expansion. The system provides direct T-1/E-1 interfaces for voice ports, eliminates unnecessary digital-to-analog conversions and subsequent distortion, and simplifies tuning of the voice ports so that the volume levels are more consistent across all ports.

Flexible and Cost Efficient Interconnectivity

TimePlex networking solutions emphasize features and functions that efficiently utilize wide area resources and simplify management of the network. Multiple voice compression techniques, combined with alternative data transmission capabilities, ensure that AD-10 Systems can be used in changing networking environments.

Network Management

Overall management of an AD-10-based network is simplified by the SYNCHRONY Network Management System (SNMS). This application resides under HP OpenView providing industry leading management tools including trouble ticketing and configuration management.

AD-10/FR2 is managed through a console port that can be a window on an SNMS workstation. An SNMP-based agent is available for the AD-10/FR2 that allows the unit to be managed through HP OpenView.

AD-10 AND AD-10/FR2

Full Connectivity and Control

V.35 and V.24 WAN connectivity
Voice and data support
Central site network management
On-line reconfiguration

Voice Handling

Analogue PABX signaling
Bandwidth contention
-48V DC ringer
FXS/FXO
E&M signaling

Voice Compression

5.33 kbps to 16 kbps CELP
7.47 kbps to 32 kbps ATC
4.8 kbps to 9.6 kbps E-CELP

Express Switching

Dynamic bandwidth allocation
Multiple Quality of Service support
Subrate grooming

Wide Area Support

V.35 and V.24 WAN connectivity options
Speeds to 128 kbps (point-to-ST network)
Speeds to 384 kbps (point-to-point)
Speeds to 2 meg (Frame Relay)

Special Data Handling Features

Subrate data from 1.2 kbps
Packetized data to 56 kbps
TDM data options

Voice Trunking

Hunt group options

Fax Handling

Full Group III fax handling
Fax transport over compressed circuits

Base Unit Capacity

Core Card: Single network interface (V.35/RS422), RS232/RS485 console interface

Stack Cards: One to four stack modules for data or network interfaces

Voice Cards: Eight voice card slots
Dual RJ21HX telco connectors

Ringer: Optional ring generator and -48V DC/DC convertor

Analog Voice/Fax Card

Capacity: One voice channel per card; eight channels per system
Bit Rate: ATC from 7.4 to 32 kbps
G.729 CS-ACELP at 8 kbps
G.728 LD-CELP at 16 kbps
G.726 ADPCM at 32 kbps
E-CELP at 4.8, 7.47, 9.6 kbps
Echo Cancellation: Per CCITT G.165 for near-end echoes delayed by 0 to 45 msec

Fax Compression: Group III fax support at 2.4, 4.8, 7.2, and 9.6 kbps with auto fallback

Signaling: DTMF, immediate and wink start

Electrical: FXO loop start, FXS loop start, 2/4 wire E&M

Digital Voice/Fax Card

Capacity: Four voice channels per card; 30 channels per system
Bit Rate: ATC from 7.4 to 32 kbps
G.728 LD-CELP at 16 kbps
E-CELP at 4.8, 7.47, 9.6 kbps
Echo Cancellation: Per CCITT G.165 for near-end echoes delayed by 0 to 45 msec
Fax Compression: Group III fax support at 2.4, 4.8, 7.2, and 9.6 kbps with auto fallback
Signaling: DTMF, CAS, CCS, R2
Electrical: T-1/SF/ESF, CCITT G.703/704 on T-1/E-1 subscriber module

Alarm Relay

Contacts: Normally open, common, normally closed
Activation: Programmable based on alarm event

Physical/Environmental

AC Line: 90-125 VAC or 180-250 VAC (auto-range) 47 to 63 Hz
DC Line: -42 to -54 VDC (option)
Power: 200 watts max. (low watt unit) 550 watts max. (high watt unit)
Environmental: 0° to 50°C (operating ambient); 20° to 80°C (storage ambient); 0 to 95% relative humidity, non-condensing
Size: 13.3 cm H x 45.5 cm W x 45.7 cm D (5.25" x 17.6" x 18")
Weight: 11.5 kg. (25.5 lbs) max.

AD-10/FR2

Frame Relay Interfaces

Capacity: One to four trunks; 256 DLCIs per unit
Bit Rate: Standard rates from 9.6 kbps to 2.0 mbps
Clocking: Internal, external, split TX loop
Format: Frame relay FRF.1 UNI DTE/DCE
LMI: ITU Q.933 Annex-A ANSI T-1.617 Annex-D
Electrical: RS422/V.11/V.36 RS232/V.28/V.35

FRAD Data Interfaces

Capacity: Three ports
Bit Rate: 75 bps to 115.2 kbps asynchronous 1200 bps to 2.0 mbps synchronous
Clocking: Internal, external, split, asynchronous
Protocols: Asynchronous, HDLC, SDLC, bisync
Electrical: RS422/V.11/V.36 RS232/V.28/V.35
Connector: DB25 female

Control Port

Type: ASCII command line
Bit Rate: 1.2 to 9.6 kbps async
Security: Password controlled with two assignable levels
Electrical: RS232 or RS485 (selectable)
Connector: DB9 male
Access Device: Serial ASCII terminal
Unit Configuration: Software and configuration is resident in non-volatile memory. Download software upgrades locally and remotely. Local control/monitor of all units in network.

TimePlex Forum Membership

Frame Relay Forum
ATM Forum
IPNSS



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