



Mitel 5000 Network Communications Solutions Technical White Paper

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Executive Summary

The Mitel® 5000 Network Communications Solutions is a family of products built on an advanced hardware architecture that optimizes the latest in Voice over IP technology, while leveraging over a decade of telephony-feature development by Mitel and over 38 years of industry experience. The system addresses the communication needs of the Small and Medium Business (SMB) market with world-class applications, open architecture interfaces and user-friendly features.

Our complete line of products spanning IP, digital, and mixed hybrid solutions, as well as, high-value Applications enable customer choice, flexibility, and cost savings in an SMB environment, while affording investment protection, as well as, growth potential.

Overview

As time progressed from end of the 20th century to the 21st century, many notable transitions have taken place in the communications infrastructure. Interoffice voice communications are commonly sent over public and private data networks, employees are increasingly more mobile with their office tools by their side, interconnectivity among different vendors is becoming easier, and business applications development is at an all-time high. With these changes, more businesses are realizing the efficiency and inherent benefits of deploying a voice communications system on their existing data network infrastructure.

The Mitel 5000 is built on a hardware architecture that is optimized for voice communication over Internet protocol. Whether you are connecting offices together over a data network, or you are deploying IP phones to employees in or out of the office, the system is designed to accommodate your needs. In addition to full IP support, the Mitel 5000 family of products supports the blending of IP and digital phones together in the same system. The system supports up to 250 IP phones as well as 96 digital phones, along with capacity up to 74 trunk circuits. Additionally, this advanced communications platform supports a host of Mitel's world-class applications, designed to address a wide array of business needs. With a market that demands IP-centric solutions, the Mitel 5000 addresses the needs of the small- to medium-business market.

The Mitel 5000 Network Communications Solutions family of products includes:

- Mitel CS-5200 Communication Server
- Mitel CS-5400 Communication Server
- Mitel CS-5600 Communication Server
- Mitel Digital Expansion Interface (DEI)

Business Challenge

In today's competitive business environment, precision and cost efficiency are the prime focus of business managers. Employees are scattered geographically and multitasking more than previously imagined possible. Organizations depend on multiple software applications to help accomplish these tasks and to keep business moving swiftly. Reliability is paramount. Every minute of up time counts and interruptions are simply not acceptable. Small remote offices, connected to central operations on large wide area networks, need to survive as their own entity (independently) if a connection is disrupted. Organizations need an IP platform that blends into its data solution, pulling voice, data and software applications into a cohesive communications environment.

Mitel Solution

Since 1969, Mitel has been producing telecommunications equipment and software that uniquely address the needs of small, medium and large businesses. The Mitel 5000 Network Communications Servers were developed to address the high-tech challenges that face businesses today, allowing them to achieve new goals and standards that set them apart from their competition.

The Mitel CS-5600, CS-5400 and CS-5200 Communication Servers leverage years of Mitel's software development in communications, combining best-in-class user features with state-of-the-art core system architecture. The Mitel 5000 software is built on a platform that efficiently combines the best of both data networking and TDM (switching) architectures. As an IP-centric system, it provides a complete solution for pure IP deployments, as well as hybrid, mixed deployments consisting of both IP and digital phones—perfect for those businesses that need to manage the transition from digital to IP. The combination of Ethernet and TDM within the system means that all of the resources needed to deploy a system are built directly into the communication servers.

Some of the more notable features built-in to the units are:

- The system is designed to be a voice component within the data network
- First and foremost, the system is optimized to support Voice over IP (VoIP)
- Multiprotocol phones support
- Digital phones support
- IP Networking capability is native and ready for use
- Basic voice mail
- Voice mail storage on compact flash
- Conferencing
- Fax over IP (T.38)
- Compact data form factor design
- Linux-based operating system
- Full-featured WAN fail survivability within a networked system
- Remote database programming
- Web-based diagnostics
- A host of industry-leading system and phone user features
- Add-on Applications support and easy interfacing

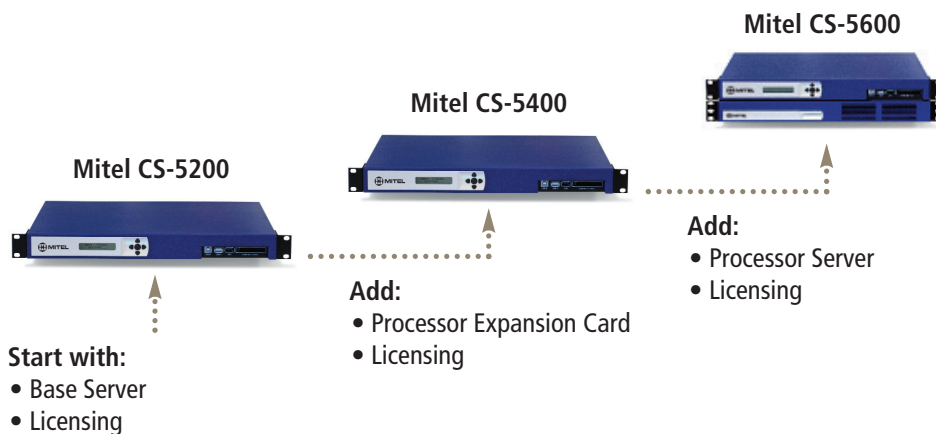
This system can be networked over IP to other Mitel 5000 Communication Servers or Mitel Axxess® systems** to perform seamlessly as one.

If discrete digital networking is desired, the system can also be networked through T-1/E-1/PRI or a combination of T-1/E-1/PRI and IP.

Solution Description

Mitel 5000 Communication Servers

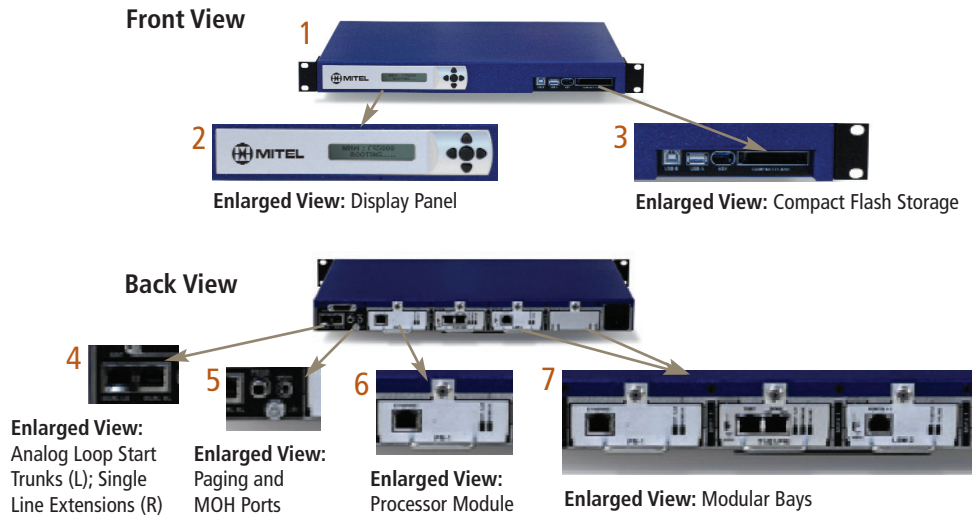
1. Mitel 5000 Communication Servers are built for growth using a common base server in a 1U rack mountable chassis. A Mitel CS-5200 is comprised of a base server and proper licensing. The Mitel CS-5400 is comprised of a base server, a processor expansion card, and related licensing. The flagship, Mitel CS-5600, is comprised of a base server, processor expansion card, processing server, and related licensing. The stackable component and license design of this family yields perfect growth opportunity for growing businesses. The transition from one server to the next is accomplished without hardware or software obsolescence.



2. The Mitel CS-5200 supports a maximum range of 25-75* IP phones. The Mitel CS-5400 supports a maximum range of 75-175* IP phones (depending on configuration and use). And the Mitel CS-5600 supports up to 250* IP phones.

* Depending on network configuration and use.

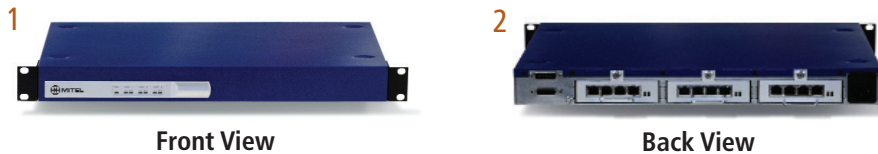
** Axxess v7.0 or later (T-1/PRI) or Axxess v8.231 or later (IP Networking).



1. The front of the server provides an LCD for status, start-up information and initial configuration. Once on the network, the system is managed entirely over the network using Mitel’s programming tools, such as Session Manager and System Manager.
2. Other components located on the front of the server include connections for USB and compact flash storage. The USB connections are used for administration and diagnostics. The compact flash is used for voice mail and software storage.
3. The base system includes two loop start and two single line circuits.
4. Also available are Paging and Music-On-Hold ports.
5. The chassis provides four modular bays: The first bay is populated with the central processor. The two primary functions of the central processor are to run call processing and voice processing (i.e., voice mail). The Mitel CS-5200 and Mitel CS-5400 Communication Servers come complete with a four-port or eight-port basic voice mail system for a cost effective solution in smaller system configurations. Basic voice mail uses compact flash for voice storage. Larger voice mail configurations up to 32-ports can be created by attaching Mitel’s external voice mail solutions.
6. The remaining three bays are for trunk expansion. Loop Start Modules containing two circuits can be added to each of the three bays for a total of six (plus the two that are included in the base system). In addition, these bays may also be used for T-1/E-1/PRI/BRI modules.
7. The Mitel CS-5600 has the same expansion options as the other communication servers. This includes the items mentioned above. The primary differences are rather straightforward. The Mitel CS-5600 uses Enterprise Messaging instead of Basic Voice Mail, as well as a second 1U chassis. The dual 1U chassis design of the Mitel CS-5600 delivers a maximum IP phone capacity of 250, and offers customers the highest level of call processing performance for heavy use environments.

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Mitel Digital Expansion Interface (DEI)



1. The system can also support digital phones if desired by expanding it with an Mitel Digital Expansion Interface. This interface is built on a separate 1U rack mountable chassis.
2. The chassis provides three bays that can be populated by Digital Phone Modules (DEM). Each module supplies 16 circuits for Mitel digital phones for a possible total of 48 phones per Digital Expansion Interface. Two Digital Expansion Interfaces can be attached to either any Mitel 5000 communication server to allow expansion up to 96 digital phones per server.

Solution Description Summary



Mitel CS-5200 or CS-5400 with two Mitel DEIs

Ultimately, the system effectively provides the hardware infrastructure needed for a range of cost-effective solutions, starting with the small office (five to 10 users) requiring WAN fail survivability, to the large office of 250+ users. In addition to the two single line connections included in the base system, a four port module can be added and / or individual digital circuits can be split into two analog lines by utilizing Single Line Adapters (SLA). Also, transparent networking allows for a seamless mix of up to 99 geographical dispersed or local systems. This flexibility allows the system to adapt to a large variety of capacity needs.

Mitel CS-5200 / CS-5400 / CS-5600 Communication Servers

Base Features

- 1U Rack Mount Chassis
- Dual 1U Chassis (CS-5600)
- Linux Operation System
- Integrated 4 or 8-port Basic Voice Mail
- Basic Unified Messaging
- Compact Flash for Storage
- Page Port
- Music on Hold Port
- Dual Analog Trunk Interface
- Dual Single Line Station Interface
- Modular Processor Bay
- Three Modular Expansion Bays
- Ad Hoc Conferencing
- 2-line LCD Display Panel
- Two USB ports
- Security Key Port

Capacities

- 175-250 IP Phones (CS-5600)
- 75-175 IP Phones (Mitel CS-5400)
- 25-75 IP Phones (Mitel CS-5200)
- Two Digital Expansion Interfaces
- 96 Digital Phones
- Two Analog Phones per Digital Port (External Adapter Required)
- Dual T1/E1 (with enhanced echo cancellation) and PRI Modules
- Three Basic Rate Modules
- One (Single Line Module) SLM-4
- SLM-8
- Three Analog Trunk Modules
- 80+ Hours of Voice Mail Storage

Expansion

- Up to Two Digital Expansion Interfaces
 - 1U Rack Mount Form Factor
 - Three Modular Bays
 - Supports up to Three Digital Phone Modules (16 ports each)
- External Voice Mail
- Mitel and 3rd Party Applications
- Mitel CS-5200 Upgrades to Mitel CS-5400
- Mitel CS-5400 Upgrades to Mitel CS-5600

IP Phones and Peripherals

- Mitel 5212 and 5224 IP Sets
- Mitel 5330 IP Set
- Mitel 5340 IP Set
- Mitel Model 8622 IP Phone
- Mitel Model 8662 IP Phone
- Mitel Model 8664 Wireless Phone
- Mitel Model 8665 Wireless Phone
- Mitel Model 8668 Wireless Phone
- Mitel Model 8601 SIP Soft Phone
- Mitel Attendant Console
- Mitel Model 8500 Digital Phone
- Mitel Model 8520 Digital Phone
- Mitel Model 8560 Digital Phone
- Mitel Model 8564 Wireless Digital Phone
- Mitel Model 8565 Wireless Digital Phone
- Mitel Gigabit Ethernet (GigE) Stand
- Mitel Wireless LAN (WLAN) Stand

Trunk Interfaces

- Up to Three Dual T1/E1 and PRI Modules
- Up to Three Analog Trunk Modules
- Up to Three Basic Rate Modules
- SIP Gateways
- MGCP Gateways
- Two Analog Loop Start ports (on board)

Management

- Network Based Administration Client
- Centralized Web Browser Administration (Optional)
- Web Browser Based Diagnostics
- Automatic Diagnostic Delivery via SMTP

Protocol Support

- Session Initiation Protocol (SIP)
- Media Gateway Control Protocol (MGCP)
- Phones support 802.1p/q; 802.3af; ToS; TFTP
- 802.11
- RTP / UDP / TCP
- CSTA
- TSAPI
- TFTP

SPECIFICATIONS

System Features

- Account Codes
 - Forced
 - Forced on Toll Calls
 - Standard
 - Optional
 - Administrator Station Programming
 - Advanced CO Interfaces
 - Analog Phone Support
 - Attendant Console
 - Automatic Call Distribution (ACD)
 - ACD Agent ID
 - ACD/UCD Hunt Members Spanning Nodes
 - Agent Help
 - Automatic Daylight Saving Time
 - Automatic Route Selection (ARS)
 - Call Accounting System
 - Call Routing to Public Network
 - Caller ID
 - Calling Line Identity Presentation (CLIP) for UK Single-Line Sets
 - Database Back-Up
 - Database Restore
 - Database Save
 - Desktop Interface (through Ethernet)
 - Diagnostics
 - Digital Phone Support
 - Digital Networking (ISDN Based)
 - Direct Inward System Access (DISA)
 - Emergency Outgoing Access
 - Fax over Internet Protocol (based on T.38 standard)
 - Extension Lists
 - House Phones
 - Hunt Groups (75)
 - ACD and UCD
 - Announcement Recording
 - Automatic Camp-On
 - Overflow Recording
 - Playback Device Capability
 - Recall Recording
 - Send Camp-On Notifications to Members in DND
 - IP Networking
 - Keymaps
 - Multilingual Voice Prompts: Japanese (Katakana characters), Spanish, American and British English
 - Multiprotocol Phone Support
 - Music-on-Hold
 - External Music Source (1)
 - Silence
 - Ring Back
 - Tick Tone
 - Night Answer
 - Off-Premise Extension (OPX)
 - Open Architecture Interfaces (OAI)
 - System Level (ASAI, MVIP, CSTA, TSAPI, ASCII)
 - Operator Console
 - Paging (10 zones)
 - Passwords
 - Peer-to-Peer Audio for IP Devices
 - Privacy
 - Programmable Hunt Group Wrap-Up
 - Remote ACD Hunt Group
 - Secondary Extension Appearance
 - Single Line Sets
 - System Alarm Display and Reporting
 - System Forwarding
 - System Hold
 - System OAI Events
 - System OAI Third-Party Call Control
 - System Speed Dialing
 - Toll Restriction
 - Multiple Classes, Day and Night Trunks
 - Uniform Call Distribution (UCD)
- UPS Monitoring
Database Configuration Utility (Axxess to 5000)

Station Features

- Automatic Call Access
- Automatic Camp-On to Busy Stations, Trunks and ARS
- Background Music
- Busy Trunk / Station Callback (Queue)
- Call Forwarding (On or Off Premises)
 - All Calls
 - If Busy
 - If No Answer
 - If No Answer or Busy
- Caller ID Name / Number Toggle
- Configurable Caller ID Propagation
- Call Screening
- Call Transfer (On or Off Premises)
 - To Hold
 - To Park
 - To Ring
- Call Waiting (Camp-On)
 - Outside and Intercom Calls
 - Off-Hook Ringing
- Conferencing
 - Four Parties per Conference
 - Five simultaneous conferences of four
- Data Calls
- Directed Call Pick-Up (Reverse Transfer)
- Directory (IC, CO and Feature)
- Do-Not-Disturb Messages
- Emergency Call
- Feature Buttons
- Feature Directory
- Group Call Pick-Up
- Group Listen
- Group Remove / Replace from UCD / Hunt Groups
- Handsfree Answer
- Hookflash Capability
- Hot Keys
- Individual Hold and Recall
- Microphone Mute
- Off-Hook Voice Announce
- On-Hook Dialing
- Power Fail Transfer (supports 2 loop start trunks and 2 single line stations)
- Programmable Feature Codes
- Redial
- Remote Feature Programming
- Self-Test Function
- Station Password
- Station Speed Dialing
- Station-to-Station Messaging
- Station-to-Station Intercom Calls
- User-Programmable Keys
- User-Programmable Ring Tone

Messaging Features

- Phantom Extension
- Automated Attendant Application with Recall Destination
- Automated Attendant Recall Destination
- Basic Unified Messaging
- Call Diversion
- Call Screening
- Cancel Unheard Messages
- Cascading Remote Message Notification
- Centralized Voice Mail Support
- Custom Call Routing Announcements with Digit Translation
- Directory Services
- Email Integration*
- Fax-on-Demand*
- Fax Recognition*
- System Group Lists
- Inbound and Outbound Faxing*
- Information Storage
- Message Notification / Retrieval
- Record-A-Call
- Return Call via Caller ID or to an Extension
- Speech enabled applications*
- Schedule Time-based Application Router (STAR)
- Supervised Transfer
- Voice Mail
- Voice Mail Networking (Digital and / or AMIS)
- Undelete Message
- Unified Messaging*

*Requires Voice Mail server

Signaling Interfaces

- Automatic Number Identification (ANI)
- Caller ID
- Direct Inward Dialing (DID)
- Dialed Number Identification Service (DNIS)
- E&M
- MGCP
- PRI National ISDN-2 Support
- SIP (via SIP Server Software)
- T1 / OPX / Disconnect
- Trunk Group PRI Call-by-Call
- Two Stage Caller Identification

Trunk Interfaces

- DID
- ISDN PRI, ISDN BRI
- Loop Start
- SIP to Gateways
- MGCP to Gateways
- T1

Target Market

The Mitel 5000 Network Communications Solutions are primarily designed to meet the needs of the small- to medium-sized business market. However, within this market, the platform is horizontally positioned. Mitel's business applications are placed on this platform to address the unique needs of several vertical markets such as health care, automotive, manufacturing, real estate, education and financial services.

In today's competitive business environment, companies realize the need to optimize their organization by deploying technology that allows them to operate more effectively. Blending their phone system into their data network and enterprise application infrastructure affords them efficiency, effectiveness and ultimately the competitive edge they need to succeed.

Many businesses today operate from a large central location with geographically disbursed smaller entities. The challenge is that these smaller entities require the same applications and associated features from their communications system as in their central location without duplicating the overhead required to obtain their needs. Furthermore, these remote locations need to survive independently if WAN communication is disrupted from the organization's central location.

Additionally, to be effective, organizations need to allow their associates to do their jobs when they are away from their organization's central location or even their remote locations. Home offices and telecommuting employees are becoming increasingly more common. They should be able to take advantage of the same effective applications that they would if they were working in the organization's primary location. Our solution offers SMBs highly competitive offerings and options designed for the home-office and telecommuter user in mind.

When customer contact and efficiency comes first, contact centers utilizing Voice over IP infrastructure also require a sophisticated call center application within the data and voice network.

Other companies watch technology as it is introduced and understand that the Voice over IP technology has great value in their organizations. However, they are simply not ready to deploy it completely. A digital solution satisfies their immediate needs, but they need the flexibility to implement the new technology and take advantage of its inherent benefits, when they are ready.

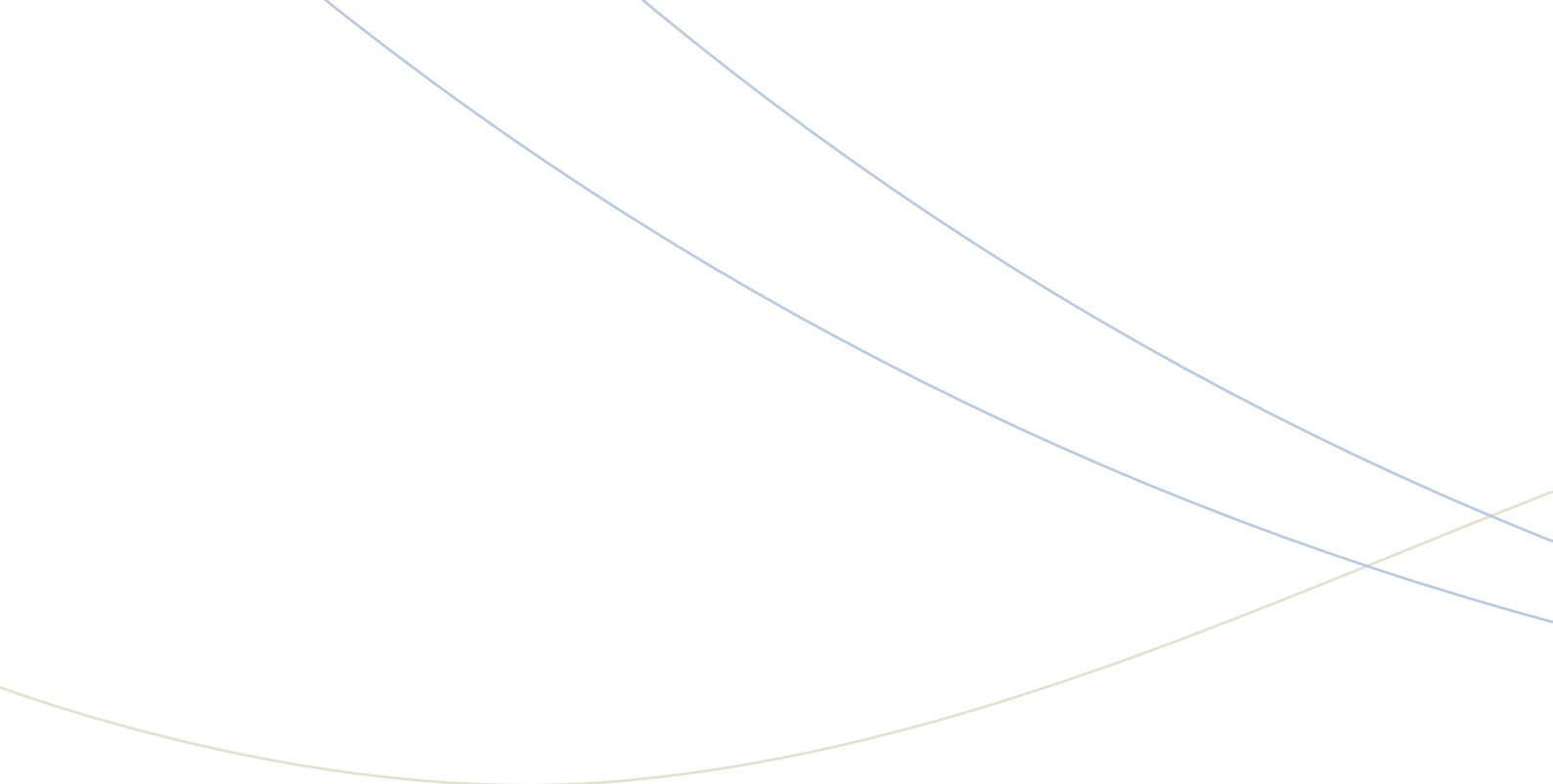
The Mitel 5000 Network Communications solutions address all of these types of organizational needs. Voice over IP, digital and a multitude of applications make this product the right choice for many organizations.

Summary

The Mitel 5000 Network Communications Solutions family of products is built on an advanced hardware architecture that optimizes the latest in Voice over IP technology, while still providing the benefits of digital technology. It leverages Mitel's software development in call processing and integrated applications. The system effectively addresses the extensive communication needs of the SMB market with open architecture interfaces and user-friendly features.

Contact Information

For current detailed information on this product, please visit our Web site at:
www.mitel.com



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