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Enabling Live Communications at the Edge of IP Networks

Mediatrix® 3000 Series

The Mediatrix 3000 Series allows enterprises to lower communications costs over any IP link.

The Mediatrix 3000 Series, featuring R2 CAS E1, ISDN E1 PRI, T1 PRI, BRI, or FXS/FXO interfaces, provides an ideal solution for enterprise voice applications or for connecting to a service provider's broadband access.

With FXO interfaces, it is the ideal solution to deploy private or hosted toll bypass networks. It provides a simple, transparent and cost-effective way of maintaining a connection to the PSTN.

The Mediatrix 3000 Series also allows Service Providers, and System Integrators to deploy secure systems and generate additional revenue streams.

Key Benefits

- Feature rich carrier grade product.
- Analog FXS/FXO, ISDN BRI, ISDN T1/E1 PRI, or R2 CAS E1 interface ports
- Deployable in SIP VoIP networks.
- Up to 60 simultaneous calls.
- Secured SIP signalling and media transmission.
- User programmable call handling.
- Security management using SNMPv3. Hardware ready and capable to support SRTP and SIP over TLS.
- Proven voice algorithms implemented on dedicated DSP engine for enhanced voice quality on each interface card.
- Fax over IP support, including T.38.
- Multiple codec support.
- Can support local VoIP network.
- Remote management capabilities.
- May be synchronized via the Remote clock synchronization feature ('Master' unit required) – Mediatrix 3400 models.

Product Overview

Designed specifically for enterprise applications, the Mediatrix 3000 Series gateways make use of existing broadband access equipment to connect to any standards-based VoIP network.

The Mediatrix 3000 series gateways meet the requirements of enterprises that want to connect their Analog or ISDN/R2 CAS equipment, such as PBXs, through a FXS, BRI, or PRI interface to an IP network or as a gateway to the PSTN.

The Mediatrix 3000 Series offers security features such as TLS, SRTP, certificates management, and HTTPS designed to bring enhanced security for the network management, SIP signalling and media transmission aspects.

The Mediatrix 3000 series is targeting:

- Enterprises with branch offices and remote offices, including SOHOs.
- Enterprises seeking access to the benefits of Voice over IP without discarding existing legacy equipment.
- Enterprises wishing to implement Voice over IP through a gradual, transparent, and cost-effective migration.
- Multi-tenant / multi-dwelling units and premises wishing to implement Voice over IP while maintaining existing wiring and handsets.
- Enterprises looking to implement secure RTP (SRTP).

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MIP-GES090119 3000ProductBrochure

Applications

The Mediatrix 3000 series allows any office to use an existing IP network for lower-cost voice communications.

The Mediatrix units link any standard R2 CAS E1, ISDN E1 PRI, T1 PRI, BRI, or FXS connection to the IP network and deliver the clarity of toll quality voice for a comprehensive VoIP solution.

T.38 FoIP, fax bypass, and modem bypass capabilities ensure that the Mediatrix 3000 series seamlessly transport voice and data services. The Mediatrix 3000 series offer flexibility and scalability for VoIP network integration and low bandwidth voice.

With configurable NT/TE BRI/PRI ports, call-switching, and user-programmable call routing (including caller/called ID), Mediatrix 3000 gateways integrate smoothly into existing PBX and PSTN networks.

The Mediatrix 3000 series provides a gateway to the PSTN for IP-based PBX and Key Systems. Thereby, it allows the deployment of VoIP Remote Line Extension and Branch Office Connectivity solutions without sacrificing any local PSTN access points.

By connecting CO lines from a selected site to VoIP networks, the Mediatrix 3000 series enable service providers and enterprises to use VoIP connections between pre-determined local networks.

Models

The Mediatrix 3000 Series comes in the following models:

Model	Interfaces	VoIP Call Capacity
Mediatrix 3208	1 x 6 FXO ports + 2 FXS ports card	Up to 8
Mediatrix 3216	2 x 6 FXO ports + 2 FXS ports card	Up to 16
Mediatrix 3308	1 x 7 FXS ports + 1 FXO port card	Up to 7
Mediatrix 3316	2 x 7 FXS ports + 1 FXO port card	Up to 14
Mediatrix 3404	5 BRI ports	Up to 8
Mediatrix 3408	10 BRI ports	Up to 16
Mediatrix 3531	1xT1 interface	Up to 23
Mediatrix 3532	2xT1 interface	Up to 46
Mediatrix 3621	1xE1 interface	Up to 15
Mediatrix 3631	1xE1 interface	Up to 30
Mediatrix 3632	2xE1 interface	Up to 60
Mediatrix 3716	1 x 6 FXO ports + 2 FXS ports card 1 x 7 FXS ports + 1 FXO port card	Up to 16
Mediatrix 3731	1xT1/E1 port 7 FXS ports	Up to 37
Mediatrix 3732	1 x 6 FXO ports + 2 FXS ports card 1xT1/E1 card	Up to 38
Mediatrix 3734	1xT1/E1 port 5 BRI ports	Up to 38
Mediatrix 3741	7 FXS ports 5 BRI ports	Up to 15
Mediatrix 3742	1 x 6 FXO ports + 2 FXS port card 5 BRI ports	Up to 15

Functional Description

☒ Enhanced Security

- HTTPS, for the exchange of Configuration File and web pages.
- SRTP with MIKEY or SDES.
  - Supported Cypher
    - AES – 128 bits
- MIKEY key management protocol (RFC 3830 and 4567).
- SDES key management protocol (RFC 4568).
- X.509 Certificate management.
- TLS transport method.
  - Supported Key Exchange Mechanism:
    - RSA
    - Diffie-Hellman
  - Supported Cyphers (minimum):
    - AES (128 and 256 bits)
    - 3DES (168 bits)

☒ BRI Ports

The Mediatrix 3000 Series is equipped with ISDN Basic rate interface S/T transceiver capable of NT and TE operating mode conform to ITU-T I.430 and TBR 3 [8, 4].

☒ E1/T1 Ports

The Mediatrix 3000 Series is equipped with E1/T1 PRI or R2 CAS transceiver capable of NT and TE operating mode.

☒ FXS Ports

The Mediatrix 3000 Series is equipped with Central Office quality SLICs (Subscriber Line Interface Circuit) supporting all the BORSCHT (Battery feed, Overvoltage

protection, Ringing, Signaling, Coding, Hybrid, Testing) functions and thus meeting most worldwide telephony standards. Station line length can reach up to 450 m of internal cabling in the 2-wire “loop start” signaling arrangement.

The FXS extensions support On-Hook audio transmission, thus providing many advanced CLASS features such as message waiting indication, Caller-ID FSK transmission and such.

The sinusoidal ringing signal frequency can be modified by software. Typical values range from 20 to 50 Hertz, 20 Hertz being the default frequency. Each extension provides its own ring generator and is capable of supplying up to 3 RENs (Ringer Equivalence Number).

Default settings for the FXS extensions are such that BellCore/North American standards are met. On request, port settings may be modified to comply with other known international standards. Software-configurable port setting for international requirements is available.

FXO Ports

The Mediatrix 3000 ports benefit from all the advanced telephony CLASS features available today. On-Hook reception of Caller-ID information can be processed internally by the DSP engine. Also, the FXO ports permit features such as Selective Ringing and message waiting to be used by the main controlling software.

Default settings for the FXO ports are such that BellCore/North American standards are met. On request, port settings may be modified to comply with other known international standards. Software-configurable port setting for international requirements is available.

Fax Interface

The Mediatrix 3000 Series can handle G3 fax transmissions at speeds up to 14.4 kbps. Automatic fax mode detection is also available on all ports, as well as Real-Time Fax-Over IP with T.38 protocol stack. Data handling and synchronization, formerly T.4 and T.30 protocols, are processed by the embedded DSP and CPU.

Quality of T.38 fax transmissions is dependent upon the system configuration, type of call control system used, type of Mediatrix units deployed, as well as the model of fax machines used. Should some of these conditions be unsatisfactory, performance of T.38 fax transmissions may vary and be reduced below expectations.

LAN ports

The Mediatrix 3000 Series is equipped with 4 LAN ports on all models, for connection to a PC or router. Note that these connectors are only used to contact the unit on the LAN side.

PSTN Bypass (Mediatrix 3404/3408 Models)

In the event of a power failure, the bypass feature permits users to make and receive calls even when the Mediatrix 3000 is not operating. The Mediatrix 3000 **BRI 3** and **BRI 4** connectors may either act as a PSTN bypass. For instance, if you decide to connect a PSTN line into the *BRI 4* connector, you can use a BRI telephone connected into the *BRI 3* connector to make calls.

During normal operation, the direct connection between the *BRI 3* and *BRI 4* connectors is switched out through commuting relays and both ports resume normal functions. When power is removed from the Mediatrix 3000, the relay setting is restored to a connected state and the PSTN line can be used as an emergency line. Consequently, a BRI telephone used on the other port is directly connected to this PSTN line. When the power is restored, this automatically removes the Bypass connection; this means that any ongoing call on the Bypass connection is terminated.

Housing and Power

The Mediatrix 3000 is designed to be a rack-mount, desk-mount, or wall-mount installation.

The unit is powered by a standard power cord receptacle (IEC 320 – C14) for universal AC input internal SMPS.

SIP Specific Features

The Mediatrix 3000 Series supports the SIP signaling protocol as an endpoint entity. It can communicate directly with other endpoints (direct IP call) or register to a SIP call agent should the user request to.

Additional Features

Fully Configurable “PSTN-Like” Experience

The Mediatrix 3000 Series generates all the familiar tones commonly heard on a standard telephone network. For example, a dial tone is heard as soon as the handset is lifted. Call progress tones such as ringback and busy are also supported.

The Mediatrix 3000 Series can be configured to accept almost any type of telephone number. Service providers can configure the Mediatrix 3000 Series to behave like the PSTN. For example users can dial “1” and ten numbers when placing a long distance call in North America, or numbering formats common to European countries can be implemented, to emulate the PSTN as much as possible.

Remote Configuration / Easy Management

The Mediatrix 3000 Series can be integrated seamlessly within an existing administrative environment. SNMP support allows device-related adjustment parameters to be modified and polled remotely. Implementation of a web interface provides user-friendly access to common parameters. Firmware upgrade and configuration files are downloaded via a HTTP, FTP, TFTP, or HTTPS server. Auto-provisioning of Mediatrix units is performed with added security through configuration file encryption and HTTP digest authentication.

Industry Standard Protocols

The Mediatrix 3000 Series is designed to support all major industry standards used today, as well as those that will be implemented at a later date. Because of this specific design characteristic, the Mediatrix 3000 Series integrates with existing telephone, fax, and data equipment such as PCs and routers.

Supported Standards

Vocoders

- G.711 (a-law, μ-law) with optional VAD support
- G.723.1
- G.726
- G.729a
- G.729ab

IP Telephony Protocols

- SIP
  - RFC 3261
  - RFC 3262
  - RFC 3263

Real-Time Transport Protocols

- RTP/RTCP
  - RFC 1889
  - RFC 1890
  - RFC 2833
  - RFC 3389

Network Management Protocols

- SNMPv3
- DHCP
  - RFC 2131
  - RFC 2132
- TFTP
  - RFC 1350
- Syslog
  - RFC 3164
- HTTP 1.0
  - RFC 1945
- HTTP 1.1
  - RFC 2616
- HTTPS
- Basic and digest HTTP authentication
  - RFC 2617
- TR-069 for massive deployments (optional feature available at purchase time)

Data Features

- PPPoE client
  - RFC 1332
  - RFC 1661
  - RFC 1334
  - RFC 1994
  - RFC 2516
  - RFC 1471
  - RFC 1472
  - RFC 1473
  - RFC 1877
  - Note: some PPPoE RFCs are implemented partially.
- TFTP or HTTP auto-provisioning
- DHCP server
- NAPT

QoS

- ToS
- DiffServ
- 802.1p
- 802.1Q

Voice Signaling

- Euro ISDN EDSS-1 / ETSI PRI/NET5
- Euro ISDN EDSS-1 / ETSI BRI/NET3
- ETS 300 012-1 (ITU-T I.430)
- ETS 300 402-2 (ITU-T Q.921)
- ETS 300 403-1/2 (ITU-T Q.931)

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- ETS 300 102-2 (ITU-T Q.931)
- ETS 300 402-1 (ITU-T Q.921)
- ETS 300 403-2 (ITU-T Q.931)
- ETS 300 102-1 (ITU-T Q.931)
- ISDN speech, audio and data (Fax Gr 4, UDI 64, RDI 64)
- ECMA-143 (QSIG-BC)

☒ ISDN Signaling

- Euro ISDN EDSS-1 / ETSI PRI/NET5
- ETS 300 011 (ISDN PRI UNI)
- ETS 300 012-1 (ITU-T I.430)
- ETS 300 402-2 (ITU-T Q.921)
- ETS 300 403-1/2 (ITU-T Q.931)
- ETS 300 102-2 (ITU-T Q.931)
- ISDN NI-2 (US T1 PRI)
- ISDN DMS100 (US T1 PRI)
- ISDN 5ESS (US T1 PRI)
- ISDN speech, audio and data (Fax Gr 4, UDI 64, RDI 64)

☒ CAS Signaling (Mediatrix 3600 Series)

- E1 R2 Digital Line Signalling (ITU-T Q.421)
- E1 R2 MFC Interregister Signalling (ITU-T Q.441)
- E1 R2 Brazil Digital Line Signalling (ABNT PN
- 03:012.04-021)
- E1 R2 Brazil MFC Interregister Signalling (ABNT
- PN 03:012.04-022)

☒ Echo Cancellation

- G.168

General Specifications

☒ Display

- Ready LED
- In-Use LED
- LAN activity LED
- WAN activity LED
- Power status LED
- Link status LED on each interface port

☒ Interfaces

Mediatrix 3208 / 3216
- 6 FXO ports + 2 FXS ports card
- 1 or 2 cards
- Up to 16 simultaneous calls

Mediatrix 3308 / 3316
- 7 FXS + 1 FXO ports card
- 1 or 2 cards
- Up to 14 simultaneous calls

Mediatrix 3404 / 3408 – BRI
- 5 x ISDN BRI ports software configurable as NT or TE per card
- 1 or 2 BRI cards
- 8 or 16 simultaneous calls
- Configurable point-to-point, point-to-multipoint and connector pinout
- Cut-through relay for emergency operation (bypass connection)

Mediatrix 3531 / 3532 –T1
- 23 or 46 simultaneous calls
- 1 or 2 ISDN PRI ports
- NT/TE software configurable

Mediatrix 3621 / 3631 / 3632 –E1
- 15, 30 or 60 simultaneous calls
- 1 or 2 ISDN/R2 CAS PRI ports
- NT/TE software configurable

Mediatrix 3716
- 1 x 7 FXS ports + 1 FXO port card
- 1 x 6 FXO ports + 2 FXS ports card
- Up to 16 simultaneous calls

Mediatrix 3731
- 1xT1/E1 card software configurable as NT or TE
- 7 FXS ports + 1 Bypass port card
- Up to 37 simultaneous calls

Mediatrix 3732
- 1 x 6 FXO ports + 2 FXS ports card
- 1xT1/E1 card software configurable as NT or TE
- Up to 38 simultaneous calls

Mediatrix 3734
- 1xT1/E1 card software configurable as NT or TE
- 5 x ISDN BRI ports card software configurable as NT or TE
- Up to 38 simultaneous calls

Mediatrix 3741
- 7 FXS ports + 1 Bypass port card
- 5 x ISDN BRI ports card software configurable as NT or TE
- Up to 15 simultaneous calls

Mediatrix 3742
- 6 FXO ports + 2 FXS port card

- 5 x ISDN BRI ports card software configurable as NT or TE
- Up to 15 simultaneous calls

Power

- AC: Standard power cord receptacle (IEC 320 – C14) for universal AC input internal SMPS.
- Seamless switch over period if the client UPS detects a power loss and activates within 8 ms.
- Country-specific power cord

Casing / Installation

- Casing: Metal casing
- Installation: The Mediatrix 3000 Series is designed to be a rack-mount, desk-mount, or wall-mount installation.

Product Architecture Details

- Supports multiple concurrent communications using any vocoders.
- DSP-based DTMF detection and generation.
- DSP-based fax relay
- Embedded IPv4 TCP/IP stack with configurable QoS implemented by:
  - ToS byte at Network layer 3
  - 802.1p at Data Link layer 2
- Network parameters assigned via DHCP

Real Time Fax Router Technical Specifications

- Automatic selection between voice and fax.
- Fax over IP
- T.38 Fax relay (9.6 k, 14.4 k)
- G.711 Fax and Modem Bypass
- Clear channel (G.711) or T.38

Ethernet	10/100 BaseT Ethernet
Data Link	Ethernet
Network	IP (Internet Protocol)
Transport	TCP / UDP
Protocols	Group 3 Fax Clear channel (G.711), G.726 or T.38 Real Time Fax Over IP protocol Stack
Fax Data Compression	MH
Fax Transmission	Up to 14.4 kbps

Digital Line Interface (T1/E1)

- Connection to a T1 or E1 line
- RJ-45 connectors
- Generation of Selective Ring

Digital Line Interface (BRI)

- Direct connection to a S/T interface (PBX or telephone)
- RJ-45 connectors

Analog Line Interface (FXS)

- RJ-11 connectors
- Direct connection to a fax machine or telephone (Internal installation and internal cabling)
- DC feeding of the access line protected for over voltage
- Loop current detection and hook flash detection capable
- Generation of Selective Ring

Trunk Type	Loop Start: capable of Wink and Immediate signalization
Ring Source	45 VRMS max @ 20 up to 50 Hz (selectable) sine signal
Nominal Impedance	BellCore compliant 600/900 ohms default setting. Impedance Software Configurable.
Ring Drive Capacity	Up to 3 ringer equivalents (3 RENs) per extension
Loop Current Range	15 to 32 mA factory set. Default 20 mA regulated
Ring Trip Detection Time	2 ring cycles max
On-Hook Voltage	-48 VDC
Freq. Response	200 Hz to 3400 Hz ± 2 dB (Tx/Rx)
Return Loss	500-3200 Hz: 30 dB

PSTN Interface (FXO)

- Programmable line interface
- Programmable loss plan
- Built-in transient/surge protection
- RJ-11 connectors
- Detection of Selective Ring

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Trunk Type	Loop Start
Ring Detection	22 VRMS min, 15 Hz to 68 Hz (configurable by parameter)
Nominal Impedance	AC and DC impedance software configurable to support most countries worldwide.
Ringer Equivalence	0.1 REN

Miscellaneous Audio Specifications

- Software-adjustable dynamic and static jitter buffer protection.
- Programmable by country: Call progress tone generation including dial tone, busy tone, ring back and error tones.
- Silence detection/suppression level software adjustable.

DTMF Tone Detection

16-Digit DTMF Decoding	0 to 9, *, #, A, B, C, D
Permitted Amplitude Tilt	High frequency can be +2 dB to -8 dB relative to low frequency
Dynamic Range	-35 dBm to +3 dBm per tone
Frequency Accept	± 1.5% of nominal frequencies
Minimum Tone Duration	40 ms, can be increased with software configuration
Interdigit Timing	Detects like digits with a 40 ms interdigit delay

DTMF Tone Generation

Per Frequency Nominal	-6 dBm to -4 dBm
Frequency Deviation	Less than 1%

Call Routing

- Local switching
- Interface hunt groups
- Routing Criteria
  - Interface
  - Calling/called party number
  - Time of day, day of week, date
  - ISDN bearer capability
- Number manipulation functions
  - Replace numbers
  - Add/remove digits
  - Multiple remote gateways
  - PLAR
- Call properties manipulations
- SIP header manipulations

Power Consumption

Model	Voltage/ Freq.	Current (mA)	Power (W)	VA
3404	120Vac	200	12	24
	240Vac	130	13	31
3408	120Vac	230	13.5	28
	240Vac	150	14	36
3631	120Vac	240	15	29
	240Vac	160	16	38
3632	120Vac	290	18	35
	240Vac	185	19	44
3531	120Vac	240	15	29
	240Vac	160	16	38
3532	120Vac	290	18	35
	240Vac	185	19	44

Thermal Dissipation (W)

Model	Voltage/ Freq.	Current (mA)	Dissipa-tion (W)
3404	120Vac	200	12
	240Vac	130	13
3408	120Vac	230	13.5
	240Vac	150	14
3631	120Vac	240	15
	240Vac	160	16
3632	120Vac	290	18
	240Vac	185	19
3531	120Vac	240	15
	240Vac	160	16
3532	120Vac	290	18

Model	Voltage/ Freq.	Current (mA)	Dissipa-tion (W)
	240Vac	185	19

Operating Environment

Operating Temperature	0°C to 40°C
Humidity	Up to 85 %, non-condensing
Storage	-20°C to +70°C

Dimensions and Weight

Unit Dimensions	Height: 4.4 cm (1.73 in) Width, no mounting brackets: 44.5 cm (17.5 in) Width, with mounting brackets: 48.5 cm (19 in) Depth: 20.5 cm (8 in)
Unit Weight	Mediatrix 3404/3531/3631: 2.8 kg (6.2 lb) Mediatrix 3408/3532/3632: 3.0 kg (6.6 lb)

Other measurements available upon request.

Standards Compliance

Agency Approvals

- UL
- CE Marking
- FCC

Safety Standards

- UL60950-1: 2003 1st Edition
- CAN/CSA-C22.2 No. 60950-1-03 1st Edition April 1, 2003
- IEC 60950 (1st Edition 2001 With all national deviations)

Emissions

- FCC Part 15:2004 Class B
- EN55022 (2006) Class B
- EN61000-3-2 (2000) Harmonic current emissions
- EN61000-3-3 (1995) Voltage fluctuations and flicker (with amendment A1)

Immunity

EN55024 (1998), with amendments A1 and A2 including the following:

- EN61000-4-2 (1995), ESD
- EN61000-4-3 (1996), Radiated RF
- EN61000-4-4 (1995), Burst Transients
- EN61000-4-5 (1995), Surge
- EN61000-4-6 (1996), Conducted RF
- EN61000-4-11 (1994), Voltage Dips and Interruptions

Telecom

- FCC Part 68:Subpart D, January 31, 2001 (Mediatrix 3300 Series,Mediatrix 3500 Series, Mediatrix 3731, Mediatrix 3741)
- Industry Canada (CS-03, Issue 9, Part VI, Amendment 2, April 1, 2006) (Mediatrix 3300 Series, 3500 Series, Mediatrix 3731, Mediatrix 3732, Mediatrix 3741, Mediatrix 3742)
- TBR3:1995 (with amendments A1: 1997) (Mediatrix 3400 Series)

  Clauses 9.2.1, 9.2.6, 9.2.7, 9.2.9, 9.2.10, 10.1 to 10.6, 10.8, 10.10, 11.1 to 11.3, 11.4.2, 11.4.4, 11.4.5, 11.5
- TBR4:1995 (with amendments A1: 1997) (Mediatrix 3600 Series, (Mediatrix 3732, Mediatrix 3742)

  Clauses 9.2, 9.3.5, TC25002/4/5, TC27002/4/5, TC27003/11/12/15/19/27/28/31/40/42/46/58/404/411/413/414/417, TC28005/12/406/424, TC24020, TC10002/4/10

Mediatrix SDK (Software Development Kit)

- Enables developers and content authors to create rich, integrated VoIP applications for their specific requirements
- Available for download free of charge at http://mediatrixsdk.media5corp.com

Warranty

All Mediatrix products carry Media5 Corporation's standard three-year warranty. An extended warranty is also available.

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