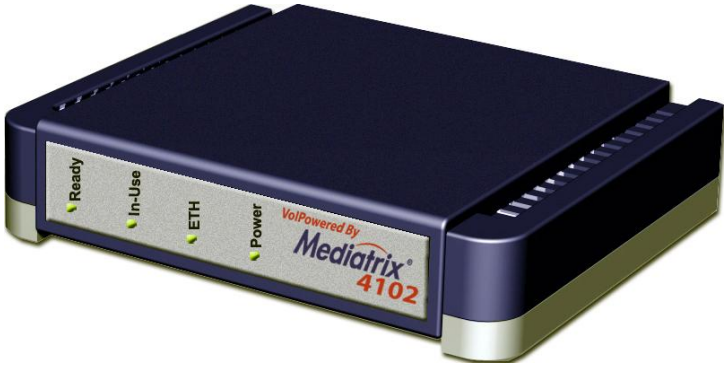
media5 corporation

Enabling Live Communications at the Edge of IP Networks

Mediatrix® 4102/4102S

The Mediatrix® 4102 is a Security-Ready, VoIP gateway allowing Service Providers and Enterprise Networks to connect SOHOs, Remote Workers and Branch Offices to an IP network, while preserving investment in analog telephones and faxes.



Key Benefits

☒ New Package for VoIP FXS Interfaces

- Hardware ready to support Security (SIP over TLS, SRTP, MiKEY)
- Secured SIP signalling and media transmission
- Replacement of Mediatrix 1102/2102

☒ Best Total Cost of Ownership

- Ease of deployment & management with autoprovisioning
- Protect analog telephony investments with the VoIP benefits

☒ Best Price Quality Ratio

- High Voice Quality and Reliability
- Industry-proven T.38 fax
- Wide support of countries

Product Overview

The Mediatrix 4102 connects up to two analog phones and/or faxes, as well as a PC or a home router to a broadband modem.

The Mediatrix 4102 offers security features such as SIP over TLS, SRTP, certificates management, and HTTPS designed to bring enhanced security for the network management, SIP signalling and media transmission aspects. It interfaces seamlessly with the full Mediatrix portfolio of products in secure networks.

The Mediatrix 4102 also uses its innovative TAS (Transparent IP Address Sharing) technology and an embedded PPPoE client to allow the PC (or router) connected to the second Ethernet port to have the same public IP address, eliminating the need for private IP addresses or address translations. The 4102 also supports high compression codecs simultaneously on both analog voice ports, saving valuable bandwidth.

As with all Mediatrix devices, the 4102 provides a web interface, giving users convenient access to the unit for initial set-up. The devices can also auto-provision by fetching their encrypted configuration from a TFTP or HTTP server making installation secure and transparent to the end-users. To further facilitate deployments, factory loaded configurations are possible.

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Functional Description

Enhanced Security

- • HTTPS, for the exchange of Configuration File and web pages.
- SRTP with MIKEY and 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)

FXS Ports

The Mediatrix 4102 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 ports 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 (for North America only). Each port provides its own ring generator and is capable of supplying up to 4 RENs (Ringer Equivalence Number).

Default settings for the FXS 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 4102 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.

Analog Modem Interface

The Mediatrix 4102 can be used with analog modems. When configured correctly, modems with high rate capabilities (for instance, V.90) will automatically fall back within the transmission range supported.

Quality of modem transmissions is dependent upon the system configuration, quality of the analog lines, as well as the number of analog-to-digital and digital-to-analog conversions. Modem performance may therefore be reduced below the optimum values stated above.

PPPoE and Transparent IP Address Sharing

The Mediatrix 4102 is equipped with a second RJ-45 Ethernet port designed to connect a PC. With PPPoE client and transparent IP address sharing, the Mediatrix 4102 makes the use of an external router unnecessary in most residential applications. The Mediatrix patent pending technology on transparent IP address sharing allows both Ethernet ports to be used with a single IP address from the service provider in a user-friendly way, without the configuration complexities of an integrated NAT. The Mediatrix 4102 is simply inserted between the PC and the DSL or cable modem, without a need for users to reconfigure their unit each time a new application is added or altered on their PC. The Mediatrix 4102 intelligently selects which packets are intended for the telephones and sends them through. It then directs all other packets directly to the PC.

Housing and Power

The Mediatrix 4102 is designed to be a desktop installation and can be wall-mounted as well.

The unit is powered by an external off-line power supply connected to the AC main with a standard IEC-320 power cord.

Models

There are two models of the Mediatrix 4102:

- **Mediatrix 4102**: For non-secure applications.
- **Mediatrix 4102S**: For security-enabled applications (DGW2.0).

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SIP Specific Features

The Mediatrix 4102 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.

MGCP/NCS Specific Features

The Mediatrix 4102 uses a Call Agent to provide specific services.

Additional Features

☒ Fully Configurable "PSTN-Like" Experience

The Mediatrix 4102 provides 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 4102 can be configured to accept almost any type of telephone number. For instance, it would be quite simple to configure a network of Mediatrix units to act as a module of a PBX, having its users dial three numbers to reach an extension. It is also very easy to configure the Mediatrix 4102 to behave like the PSTN, for example users can dial "1" and ten numbers when placing a long distance call in North America.

☒ Remote Configuration / Easy Management

The Mediatrix 4102 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 (CPU and DSP code) and configuration files are downloaded via a TFTP or HTTP server. Auto-provisioning of Mediatrix units is performed with added security through configuration file encryption and HTTP digest authentication.

☒ Industry Standard Protocols

The Mediatrix 4102 has been designed to support all major industry standards used today, as well as those that will eventually be implemented at a later date. Because of this specific design characteristic, the Mediatrix® 4102 can be integrated with existing telephone, fax and LAN/WAN equipment such as bridges, routers and switches.

Supported Standards

The following standards are supported:

☒ Vocoders

- G.711 (a-law, μ-law)
- G.726 (40, 32, 24, 16 kbit/s)
- G.729ab

☒ IP Telephony Protocols

- SIP
  - RFC 3261
- MGCP
  - RFC 3435
- PacketCable™ network-based call signaling (NCS) protocol, PKT-SP-EC-MGCP-I01-990312

☒ Real-Time Transport Protocols

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

☒ Network Management Protocols

- SNMPv3
- HTTP 1.0
  - RFC 1945
- Basic and digest HTTP authentication
  - RFC 2617
- DHCP
  - RFC 2131
  - RFC 2132
- TFTP
  - RFC 1350
  - RFC 2347
  - RFC 2348
  - RFC 2349
- Syslog
- TR-069 for massive deployments (optional feature available at purchase time)

☒ Data Features

- PPPoE client
  - RFC1332, RFC1661, RFC1334, RFC1994, RFC2516, RFC1471, RFC1472, RFC1473, RFC1877. Note: some PPPoE RFCs are implemented partially.
- TFTP or HTTP auto-provisioning
- Transparent IP address sharing (Mediatrix patent pending technology allowing the same IP address to be shared between both Ethernet ports and distinguishing voice traffic from data traffic)

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- DHCP server
- STUN client

QoS

- ToS
- DiffServ
- 802.1p
- 802.1Q
- STUN
  - RFC 3489

General Specifications

Display

- Power LED
- Ethernet activity LED
- Activity/In-Use LED indication on FXS ports
- Ready LED

Connectors

- 2 x RJ-11 connectors, analog phone/fax (FXS) interface
- 2 x RJ-45 connectors, 10/100 BaseT Ethernet access (autosense: up to 100 Mbps)
- automatic MDI / MDIX detection, meaning that the RJ-45 connectors adapt to the type of cable connected to them (no need to cross over cable)

Power

- External off-line power supply connected to the AC main with a standard IEC-320 power cord.
- Seamless switch over period if the client UPS detects a power loss and activates within 8 ms.
- Country-specific models.

Casing / Mechanical

- Casing: Desktop (Plastic ABS UL94 V0).
- Installation: The Mediatrix 4102 is designed for the desktop or can be wall-mountable.

Product Architecture Details

- Supports up to two concurrent communications
- DSP-based DTMF detection, generation and synthesis
- DSP-based echo cancellation (G.168)
- DSP-based fax/data relay
- Embedded operating system with 32-bit real-time multitasking Kernel
- Embedded IPv4 TCP/IP stack with configurable QoS implemented by:
  a) ToS byte at Network layer 3
  b) 802.1p at Data Link layer 2
- Network parameters assigned via DHCP

Real Time Fax Router Technical Specifications

Automatic selection between voice and fax

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 Protocols	Up to 14.4 kbps

Analog Line Interface (FXS)

- Two 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	50 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 4 ringer equivalents (4 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

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Miscellaneous Audio Specifications

- Software input and output level adjustable within the range -30 dB to +20 dB.
- Software-adjustable dynamic and static jitter buffer protection.
- Programmable by country: Call progress tone generation including dial tone, busy tone, ringback and error tones.
- DSP-based echo control device.
- 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	Within 1.5% of nominal values

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

MTBF Value (preliminary evaluation)

The estimated Mean Time Before Failure (MTBF) value of the Mediatrix 4102 is **750,000** hours at 25 degrees Celsius ambient temperature (excluding the power adaptor). It has been defined using RelCalc v5.0, Bellcore method (LimitedStress - Method I, Case 3).

Power Consumption

Voltage/Freq.	Current (mA)	Power (W)	VA
12 Vdc (All ports off hook)	450	5.4	5.4
12 Vdc (All ports ringing into 4REN)	475	5.7	5.7

Operating Environment

Operating Temperature	0°C to 45°C
Humidity	Up to 85 %, non-condensing
Storage	-40°C to +85°C

Dimensions and Weight

Height	31 mm
Width	127 mm
Depth	99 mm
Weight	170 g

Standards Compliance

Agency Approvals

- CE Marking
- FCC

Safety Standards

- UL60950 3rd Edition (2000)

Emissions

- FCC Part 15 (1998) Class B
- EN55022 (1994) Class B, with amendments A1 and A2
- EN61000-3-2 (1995) Harmonic Current Emissions
- EN61000-3-3 (1995) Voltage Fluctuations and Flicker

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☒ Immunity

- EN55024 (1998) and A1 (2001) 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 (1995), Voltage Dips and Interruptions

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 products carry Media5 Corporation's standard three-year hardware and software warranty.
An extended warranty is available.

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MIP-GES080927 4102TechnicalSpecifications