



The Mediatrix® 2102 is a high-quality and cost efficient VoIP gateway connecting SOHOs to an IP network, while preserving investment in analog telephones and faxes.

It allows Services Providers to deploy rapidly and economically their solutions in smaller premises and it is the ideal solution for remote line connection to larger private networks.

## Key Benefits

### Voice Functionalities

- Carrier-grade voice quality
- T.38 support
- High compression Codecs support
- PSTN bypass option available for emergency calls

### Ease of configuration

- Automatic firmware and configuration file download
- SNMP and web management
- TFTP, HTTP or HTTPS auto-provisioning

### Security

- Support for SNMPv3
- Encrypted configuration files support
- HTTP Digest authentication
- HTTPS support

### Network functionalities

- Transparent IP Address Sharing
- PPPoE and DHCP client
- STUN Support
- Interoperable with equipment from leading industry vendors

## Mediatrix® 2102

### 1-port and 2-port VoIP Access Device



### Mediatrix 2102 Overview

The Mediatrix 2102 connects up to two analog phones and/or faxes, as well as a PC or a home router to a broadband modem.

The Mediatrix 2102 enables cost-effective VoIP deployments in residential and SOHO applications.

With an embedded PPPoE client and its innovative Transparent IP Address Sharing technology, the Mediatrix 2102 and the PC or router connected to the second Ethernet port have the same public IP address, eliminating the need for private IP addresses or address translations.

The Mediatrix 2102 has the additional benefit of supporting high compression codecs simultaneously on both analog voice ports, thus saving valuable bandwidth.

As all other Mediatrix devices, the 2102 provides web interface, giving users a convenient access to the unit for initial set-up. The devices can also auto-provision by fetching their encrypted configuration from a TFTP, HTTP or HTTPS server making installation secure and transparent to the end-users. To further facilitate deployments, factory loaded configurations are possible.

In addition, an optional intelligent PSTN bypass allows Mediatrix 2102 users to make emergency calls and maintain their phone service in the event of a power outage or network failure.

## Functional Description

### FXS Ports

The Mediatrix 2102 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 450m 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 2102 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 2102 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.

### Bypass Connection

In addition to the two phone/fax ports, the Mediatrix 2102 has a third RJ-11 connector used to connect to a standard PSTN line. During normal operation, this line is not used. The first port of the Mediatrix 2102 gets connected to the PSTN line through a commuting relay, if one of the three following conditions occurs: 1) Power is removed from the Mediatrix 2102; 2) The IP network is down; 3) The user dials a pre-configured digits sequence (e.g. "911") indicating to the Mediatrix 2102 that the user wants to make an emergency call.

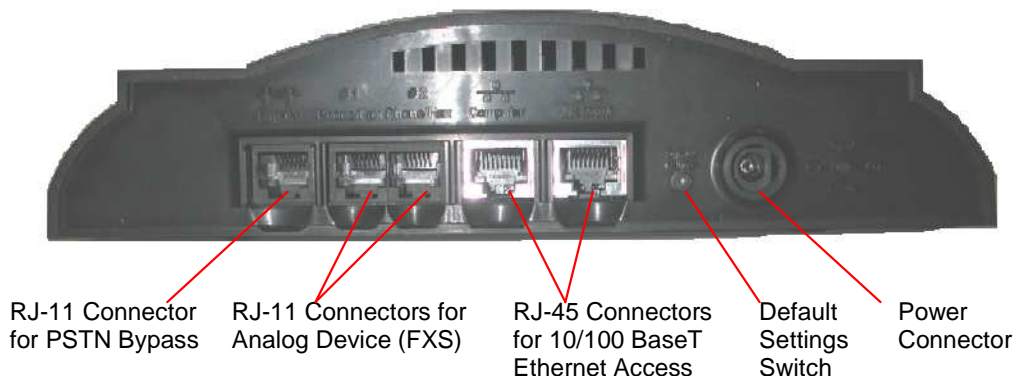
Consequently, a user on port one can place phone calls through this PSTN Bypass line. Port one stays connected to the PSTN line until: 1) Power is back; 2) The IP network is back up; 3) No active call is taking place. This ensures that following a return to normal conditions, an on-going call does not get disconnected from the PSTN.

The PSTN bypass feature embeds the Mediatrix patent-pending technology on intelligent VoIP routing, which includes the ability to automatically redial a number over the PSTN. **The PSTN Bypass on the Mediatrix 2102 is an optional feature that must be requested at purchase.**

### PPPoE and Transparent IP Address Sharing

The Mediatrix 2102 is equipped with a second RJ-45 Ethernet port designed to connect a PC. With PPPoE client and transparent IP address sharing, the Mediatrix 2102 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

Back view of the Mediatrix® 2102



a user-friendly way, without the configuration complexities of an integrated NAT. The Mediatrix 2102 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 2102 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 2102 is designed to be a desktop installation and can be wall-mounted as well.

The unit is powered by an external 12 Vdc wall plug power supply.

### SIP Specific Features

The Mediatrix 2102 supports the SIP signalling 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.

### Full Integration with the *DiaL* IPCS Communication Server

When a number is dialed, the Mediatrix 2102 contacts the *DiaL* IPCS Communication Server and the server searches through its internal database to translate the dialed number to a corresponding IP address. If there is no match, the server will locate a gateway and place the call on the public switched telephone network (PSTN).

### Additional Features

#### Fully Configurable “PSTN-Like” Experience

The Mediatrix 2102 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 2102 can be configured to accept almost any type of telephone number. Service providers can configure the Mediatrix 2102 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 2102 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, HTTP 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 2102 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 2102 can be integrated with existing telephone, fax and data equipment such as PCs and routers.

### Supported Standards

<b>Vocoders</b>	<ul style="list-style-type: none"> <li>• G.711 (a-law, <math>\mu</math>-law) with optional VAD support</li> <li>• G.723.1a</li> <li>• G.726</li> <li>• G.729a</li> <li>• G.729ab</li> </ul>
<b>IP Telephony Protocols</b>	<ul style="list-style-type: none"> <li>• SIP – RFC3261</li> </ul>
<b>Real-Time Transport Protocols</b>	<ul style="list-style-type: none"> <li>• RTP/RTCP – RFC1889, RFC1890, RFC2833, RFC3389</li> <li>• Hook Flash Relay (RFC2833)</li> </ul>
<b>Network Management Protocols</b>	<ul style="list-style-type: none"> <li>• SNMPv3</li> <li>• DHCP – RFC2131, RFC2132</li> <li>• TFTP – RFC1350, RFC2347, RFC2348, RFC2349</li> <li>• Syslog – RFC3164</li> <li>• HTTP 1.0 – RFC1945</li> <li>• Basic and digest HTTP authentication – RFC2617</li> <li>• HTTPS - RFC2818, RFC2246, RFC2459</li> </ul>
<b>Data Features</b>	<ul style="list-style-type: none"> <li>• PPPoE client – RFC1332, RFC1661, RFC1334, RFC1994, RFC2516, RFC1471, RFC1472, RFC1473, RFC1877. Note: some PPPoE RFCs are implemented partially.</li> <li>• TFTP, HTTP or HTTPS auto-provisioning</li> <li>• 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)</li> <li>• DHCP server</li> <li>• STUN client</li> </ul>
<b>QoS</b>	<ul style="list-style-type: none"> <li>• ToS</li> <li>• DiffServ</li> <li>• 802.1p</li> <li>• 802.1Q</li> <li>• WFQ</li> </ul>

## General Specifications

### Display

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

### Connectors

- Standard model: 2 RJ-11 connectors, analog phone/fax (FXS) interface
- 1-port FXS model: 1 RJ-11 connector, analog phone/fax (FXS) interface
- 1 RJ-11 connector, PSTN bypass (Optional)
- 2 RJ-45 connectors, 10/100 BaseT Ethernet access with auto MDI/MDIX (Ethernet cable not required).

### Power

- External 12 Vdc wall plug power supply.
- Seamless switch over period if the client UPS detects a power loss and activates within 8 ms.
- Country-specific models

### Casing / Installation

Casing: Desktop (Plastic ABS UL94 V0).

Installation: The Mediatrix 2102 is designed for the desktop or can be wall-mountable.

### Product Architecture Details

- Supports two concurrent communications using any vocoders.
- DSP-based DTMF detection and generation.
- DSP-based fax relay
- Embedded operating system with 32-bit real-time multitasking Kernel.
- 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

<b>Ethernet</b>	10/100 BaseT Ethernet
<b>Data Link</b>	Ethernet II
<b>Network</b>	IP (Internet Protocol)
<b>Transport</b>	TCP / UDP
<b>Protocols</b>	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

### Analog Line Interface (FXS)

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

<b>Trunk Type</b>	Loop Start
<b>Ring Source</b>	50 VRMS max @ 20 up to 50 Hz (selectable) sine signal
<b>Nominal Impedance</b>	BellCore compliant 600/900 ohms default setting.
<b>Ring Drive Capacity</b>	Up to 4 ringer equivalents (4 RENs) per port
<b>Loop Current Range</b>	15 to 32 mA factory set. Default 20 mA regulated
<b>Ring Trip Detection Time</b>	2 ring cycles max
<b>On Hook Voltage</b>	-48 VDC
<b>Freq. Response</b>	200 Hz to 3400 Hz $\pm 3$ dB (Tx/Rx)
<b>Return Loss</b>	600-3400 Hz: 30 dB

### Miscellaneous Audio Specifications

- Software input and output level adjustable within the range of -36 dB to +12 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.
- Silence detection/suppression level software adjustable.

### DTMF Tone Detection

<b>16-Digit DTMF Decoding</b>	0 to 9, *, #, A, B, C, D
<b>Permitted Amplitude Tilt</b>	High frequency can be +2 dB to -8 dB relative to low frequency
<b>Dynamic Range</b>	-35 dBm to +3 dBm per tone
<b>Frequency Accept</b>	$\pm 1.5\%$ of nominal frequencies
<b>Minimum Tone Duration</b>	40 ms, can be increased with software configuration
<b>Interdigit Timing</b>	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%

**Standards Compliance**

<b>Agency Approvals</b>	<ul style="list-style-type: none"> <li>● UL</li> <li>● CE Marking</li> <li>● Anatel</li> <li>● NOM</li> <li>● A-Tick</li> <li>● FCC</li> </ul>
<b>Safety Standards</b>	<ul style="list-style-type: none"> <li>● UL60950-1</li> <li>● CAN/CSA-C22.2 No. 60950-1</li> <li>● AS/NZS 60950-1</li> <li>● IEC 60950-1:2001, with all national deviations</li> <li>● Resolution 238:2000</li> <li>● NOM-019-SCFI-1998</li> </ul>
<b>Emissions</b>	<ul style="list-style-type: none"> <li>● FCC Part 15 (1998) Class B</li> <li>● EN55022 (1994) Class B, with amendments A1 and A2</li> <li>● AS/NZS CISPR 22 Class B</li> <li>● EN61000-3-2 (2000)</li> <li>● EN61000-3-3 (1995) with amendment A1</li> <li>● Resolution 237:2000 (Title II)</li> </ul>
<b>Immunity</b>	<p>EN55024 (1998), with amendments A1 and A2 including the following:</p> <ul style="list-style-type: none"> <li>● EN61000-4-2 (1995), ESD</li> <li>● EN61000-4-3 (1996), Radiated RF</li> <li>● EN61000-4-4 (1995), Burst Transients</li> <li>● EN61000-4-5 (1995), Surge</li> <li>● EN61000-4-6 (1996), Conducted RF</li> <li>● EN61000-4-11 (1994), Voltage Dips and Interruptions</li> </ul>
<b>PSTN Bypass</b>	<ul style="list-style-type: none"> <li>● FCC Part 68:Subpart D</li> <li>● Industry Canada CS-03 Issue 8 Part 1</li> <li>● TBR 21:January 1998</li> <li>● AS/ACIF S002 – 2001</li> <li>● AS/ACIF S003 – 2001</li> <li>● Cofetel</li> </ul>

**MTBF Value**

The Mean Time Before Failure (MTBF) value of the Mediatrix 2102 is 250 000 hours at 25 degrees Celsius ambient temperature. It has been defined using RelCalc v5.0, Bellcore method (LimitedStress - Method I, Case 3), Desktop unit without the external power supply.

**Power Consumption****Measurements at the DC input:**

**Idle Mode, 12Vdc** I = 375 mA P = 4.5 W

**Ring Mode (worst case, 4 REN load); 12Vdc** I = 600 mA P = 7.2 W

**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** 4.6 cm x 20.2 cm x 13.9 cm  
1.8 in. x 8 in. x 5.5 in.

**Package Dimensions** 7 cm x 25 cm x 21.5 cm  
2.8 in. x 9.8 in. x 8.5 in.

**Unit Weight** 454 g (0.75 lb.) without power supply

**Package Weight** 1 kg (2.21 lbs.) with US wall-mount power supply  
978.5 g (2.16 lbs.) with US or European universal power supply

Other measurements available on request.

**Warranty**

All Mediatrix products carry Mediatrix Telecom's standard one-year warranty. An extended warranty is also available.

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