

# E1 GSM Gateway / Channel Bank with 30 x GSM Interface(s) 90 SIMs per E1 Interfaces

## Product Overview:

Aries introduces the latest E1 GSM Gateway with 90 SIMs (3 SIMs per each GSM channel - 90 SIMs per E1). Each GSM channel individual programmable to work with any of the 3 SIMs assigned to that GSM channel according to the "user" programmed time-table ("user" programmed time-of-day schedule). This enables the user to program a least-cost operation so that traffic, at any time-of-day, is only directed to the preferred SIM (out of the 3 SIM cards per GSM channel) - which shall activate only according to the "user" programmed time-table ("user" programmed time-of-day schedule). The latest compact E1 GSM Gateway solution integrates the E1 interface to the GSM network to provide the user with 30, GSM links (90 SIMs) for mobile communications with an integrated E1 interface.

The E1 GSM Gateway / E1 GSM Channel Bank offers numerous applications for operators, which include terminating VoIP, VoATM, VoFR, VPN, DCME E1 / T1 traffic directly into the GSM network, connecting remote (distant) locations over GSM networks, providing rural connectivity over GSM networks, last mile connectivity over GSM networks, quick basic telephony provisioning, corporate business fixed to mobile / mobile to fixed, GSM connectivity for river boats, costal cruise ships, fixed network back-up via GSM, VPN connectivity between two corporate networks, mobile back-up solutions for corporate businesses with high security requirements, and many more applications.

The E1 GSM gateway also replaces the cumbersome fixed wireless terminals and provides accurate answer supervision and line disconnect supervision, plus a host of other advantages, which include fast connection times (very short PDD) and high ASR rates that compete with the industry's best.



10842, N 127th Place, Scottsdale, AZ 85259, U.S.A.

**Phone:** +1 480-816-8672    **Fax:** +1 480-451-6693

**Website:** [www.ariestelecom.com](http://www.ariestelecom.com)    **E-mail:** [info@ariestelecom.com](mailto:info@ariestelecom.com)

## **Aries offers both E1 GSM Gateways and T1 GSM gateways / GSM channel banks with the following features:**

- The interface of the network side is E1 Digital Interface with CAS R2 digital signaling.
- The interface on the user side is up to 30 x GSM links (90 SIMs per E1 - 3 SIM per channel).
- Accurate answer supervision and disconnect supervision.
- Each GSM channel individual programmable to work with any of the 3 SIMs, according to the user programmed time-of-day schedule. This enables the user to program a least-cost operation so that traffic of each GSM channel is directed to the preferred SIM (out of the 3 SIM cards per channel) - which shall be activated only according to the "user" programmed time-table ("user programmed time-of-day schedule).
- GSM Gateway to automatically "call" a "user" programmed number at a "user" programmed time-of-day, once every 24 hours to confirm to the operator that each GSM channel is in operation.
- Pre-Paid Balance Enquiry: GSM Gateway automatically enquire each PRE-PAID GSM SIM card for balance minutes / balance credits and sending an SMS message with this information to a "user" programmed number at a "user" programmed time-of-day.
- Mix 'n' Match 3 SIM per channel and 1 SIM per channel GSM access cards.
- Unique caller ID blocking feature (if network allows)
- Echo cancellation up to 128ms. provided - optional
- PRI ISDN (Euro ISDN) Q.931 signaling available - optional
- Remote access monitoring over TCP/IP network - optional
- Unique out-bound calling, user programmable, access feature.
- All 30, GSM channels are dual band - 900MHz and 1800MHz with auto-sense / auto-switching capability.
- All 30, GSM channels are dual band - 900MHz and 1900MHz with auto-sense / auto-switching capability.

## **Features and Highlights**

- Compact, 30 GSM terminals (90 SIMs per E1) in a 19-inch chassis.
- GSM is integrated to the E1 Interface.
- Exceptional voice quality. The two wire trans-hybrid analog path (present in the Fixed Wireless Terminals) is eliminated in the innovative design, resulting in improved voice quality, clearer voice and superior channel separation by reducing the susceptibility to echoes that result from the analog two wire trans-hybrid VF paths.
- Provides accurate billing information ("answer supervision" and "line disconnect supervision") - not provided by Fixed Wireless Terminals.
- Integrated, optional, E1 Echo-Canceller to cancel echo tails from inherent delays of VoIP / VoFR networks - 64ms. uni-directional, 128ms. uni-directional and 64ms. bi-directional options available.
- Lower cost - resulting from complete, GSM to E1 integration.
- Plug-And-Play. Easy to install. Takes only minutes to install and start service.

## Ours Integrated E1 / T1 GSM Channel Bank - PROS

## Third Party, component solutions comprising of E1 / T1 Channel Banks and 24 (T1) / 30 (E1) Fixed Wireless Terminals - CONS

|   |   |
|---|---|
| 1. Integrated and Compact. 24 (T1), or 30, (E1) GSM channels in a compact 6U high, 19-inch rack-mountable shelf.  | 1. Discreet and poorly managed solution comprising of a channel bank and discreet and 24 (T1) / 30 (E1) Fixed Wireless Terminals.   |
| 2. Integrated, Single Power Input: -48VDC or AC Mains. Both options are provided.   | 2. Individual, 24 (T1) / 30 (E1) Fixed Wireless Terminals with 30, separate power inputs. Difficult to manage.  |
| 3. 3.5dB gain, external antennas with 2 meter Rg174 cable and antenna trays. Easy to manage.  | 3. Absence of External Antennas provides no additional signal gain.   |
| 4. Offers Remote and Integrated Graphical User Interface (GUI) Management to monitor all GSM channels. This option allows the USER to view and monitor the status of ALL 24 / 30 GSM channels, including FAULTS on any of the individual GSM channels, remotely, over a TCP-IP network. | 4. No management facility to monitor the GSM terminals remotely, or to view the channel or fault status on any of the GSM channels.   |
| 5. Integrated, 64ms. and 128ms. Echo-Canceller option. This option allows the USER to install a 64ms. / 128ms. Echo Canceller in the same 19-inch chassis, to effectively remove any echoes resulting From VoIP and VoFR network delays.  | 5. No option of ANY Echo-Canceller, which are often essential and required in VoIP and VoFR call termination, owing to unacceptable echoes which often result from network delays.  |
| 6. Direct E1 - A Law to GSM Conversion, or, Direct T1 Mu Law to GSM conversion, with patented (patent pending) noise reduction technology. Greatly improves voice quality and voice clarity.  | 6. Poor coupling of analog lines (from the E1/ T1 channel banks) to GSM Fixed Wireless Terminals often results in the analog lines picking up a lot of GSM transmission noise often resulting in unacceptable voice quality and poor quality service.           |
| 7. Greater product reliability. Integration results in greater product reliability and results in less downtime resulting from a low failure rate.  | 7. Poor product reliability resulting from low integration, poor management and a high number of individual components that are required to be managed (24 or 30 individuals Fixed Wireless Terminals, each with separate power supplies, and the channel bank. |

## Ours Integrated E1 / T1 GSM Channel Bank - PROS

8. Unique dial-out, user programmable access. USER PROGRAMMABLE, call directory interface. This optional feature, unique to E1 / T1, GSM Multiplexer, allows the USER to program "out-bound" calls (GSM Network to E1 / T1), to be restricted to a list of USER pre-programmed numbers only. This feature can be used to provide limited access to out-going calls (GSM Network to E1 / T1), on dedicated channels, which the service provider may wish to RESERVE only for its SUBSCRIPTION CUSTOMERS wishing to use out-bound long-distance services (GSM Network to E1 / T1), through VoIP / VoATM networks.

This option also allows the USER to RESTRICT, or to ALLOW all calls originating from the GSM Network to E1 / T1 VoIP / VoATM Gateway.

9. Accurate CALL METERING resulting from accurate answer-supervision and line-disconnect supervision since the integrated E1 / T1, GSM Channel Bank derives its answer-supervision (required for the call-metering function), from the SS7 based GSM Network Signaling / GSM Switch.

10. Low Cost. Integration also results in cost reduction when compared with a component based, discreet solution comprising of a T1 / E1 channel bank PLUS 24 / 30 Fixed Wireless Terminals.

## Third Party, component solutions comprising of E1 / T1 Channel Banks and 24 (T1) / 30 (E1) Fixed Wireless Terminals - CONS

8. No USER PROGRAMMABILITY to RESTRICT or ALLOW calls based a USER PROGRAMMABLE directory. No such feature is provided, or offered in the Fixed Wireless Terminal Channel Bank solution.

9. Unreliable CALL METERING resulting from a battery reversal based, or VAD based (Voice Activated) answer supervision, which is based on analog technology and prone to errors. A VAD based answer supervision offers unreliable CALL METERING, in comparison with the integrated E1 / T1, GSM Channel Bank which derives its answer-supervision (required for the call-metering function), from the SS7 based GSM Network Signaling / GSM Switch.

10. Higher cost. The cost appears to be even higher, the absence of any available features, and if poor product management, poor product integration resulting in lower product reliability is taken into consideration.

# Technical Specifications

## E1 Interface Card

|   |   |
|---|---|
| Number of E1 Interfaces                                   | One<br>Number of GSM Channels = 30<br>Number of SIMs per each GSM Channel = 3<br>Total number of SIMs per E1 = 90   |
| Conformity  | G.703   |
| Frame Structure   | As per ITU-T (CCITT) G.704  |
| Signaling   | Channel Associated Signaling<br>(R2 Generic) in accordance with<br>ITU-T Q.421, and ITU-T Q.422<br>Complies to both ITU-T Q.421,<br>and ITU-T Q.422.<br>*PRI ISDN (Euro ISDN) Signaling optional<br>Extra |
| PCM Sampling Rate   | 8000 samples / second.  |
| Encoding Law  | A Law   |
| Bit Rate  | 2048Kbps 50ppm.   |
| Code  | HDB3  |
| Nominal Impedance   | 120 Ohms Standard<br>(75 Ohms Optional)   |
| Connector   | RJ45 (120 Ohms Impedance)   |
| Peak Voltage of a mark<br>For 120 Ohms Balanced Interface | 3.0 Volt 0.3 Volt.  |
| Pulse Mask  | As per ITU-T (CCITT) Rec. G.703   |
| Output Jitter   | <0.05UI (in the frequency range<br>of 20Hz to 100KHz).  |
| Permissible Attenuation                                   | 6dB at 1MHz   |
| Return Loss at:   |   |
| 51.2 KHz to 102.4 KHz.                                    | > 12dB  |
| 102.4 KHz to 2048 KHz                                     | > 18dB  |
| 2048 KHz to 3072 KHz                                      | > 14dB  |
| Jitter Tolerance  | As per ITU-T (CCITT) G.823  |
| Loss and Recovery of Frame Alignment                      | As per Clause 3 of ITU-T<br>(CCITT) G.732   |
| Loss and Recovery of Multi-Frame Alignment                | As per Clause 5.2 of ITU-T<br>(CCITT) G.732   |

## Power Supply Card

|                                   |   |
|-----------------------------------|---|
| Input DC voltage                  | -48V DC ( nominal )                               |
| Range of input                    | -40V to -60V DC                                   |
| Output voltages                   | +5V   |
| Full Load Output Current          | 18A@5VDC  |
| Input Voltage Reversal Protection | Provided in the Card                              |
| Over Current Protection           | 20A for +5V                                       |
| Short Circuit Protection          | Current limit - 20A. Recovers on removal of short |
| Under Voltage                     | < 4.5V  |
| Over Voltage                      | 5.4V to 5.6V                                      |
| Efficiency at full load           | >80%  |
| Ripple at full load               | <5mVrms   |
| Spike at full load                | <50mV   |
| Power Consumption                 | 120 Watts (Worst Case)                            |

## GSM Access Card

|                             |  |
|-----------------------------|--|
| Number of GSM Interfaces    | 1 ~ 90 (Stackable, 1 thru 90).   |
| Type                        | Dual Band EGSM 900 MHz<br>and EGSM 1800 MHz.   |
| Compliance                  | Compliant with ETSI GSM<br>Phase 2+ standard (Normal MS)<br>Class 4 (2W @ 900MHz)<br>Class 1 (1W @ 1800 MHz) |
| Approvals                   | Fully Type Approved to GSM<br>Standards  |
| SIM Interface Internal Tray | Toolkit Class 2.<br>3V Reader  |
| Voice Features              | Full Rate, Enhanced Full Rate<br>And Half-Rate (FR/EFR/HR)   |
| DTMF                        | Dual Tone Multi FrequencyFunction (DTMF)<br>Dialing Support  |

## Alarms

An alarm shall be displayed in LED L1 / L2 for the following reasons

|    |                              |
|----|------------------------------|
| 1. | Invalid SIM Card             |
| 2. | Unregistered SIM Card        |
| 3. | Faulty SIM Card              |
| 4. | Faulty GSM Module            |
| 5. | GSM Access Card Out of Range |

## Echo Canceller Card

- Provides voice echo cancellation of up to 64ms / 128ms (bi-directional) or 128ms (uni-directional) Echo Cancellation.
- Conforms to ITU-T G.165 and ITU-T G.168
- G.164 /G.165 disable tone detection
- Non-Linear Processor with Comfort Noise Insertion
- Narrow-Band Detector
- Eliminates long echo tail.

## E1 Echo Canceller - E1 Interface (Optional)

|  |  |
|--|--|
| Number of Interfaces   | 2,<br>1 - Input (RJ-45)<br>1 - Output (RJ-45)            |
| Conformity   | G.703  |
| Frame Structure  | As per ITU (CCITT) G.704                                 |
| Signaling  | Pass-Through   |
| PCM Sampling Rate  | 8000 Samples / sec                                       |
| Encoding Law   | A Law as per ITU (CCITT) G.711                           |
| Bit Rate   | 2048 Kbps $\pm$ 50 ppm                                   |
| Code   | HDB3   |
| Nominal Impedance  | 120 $\Omega$ balanced                                    |
| Peak Voltage of a mark<br>For 120 $\Omega$ Balanced interface  | 3.0 V $\pm$ 0.3 V  |
| Peak Voltage of a space<br>for 120 $\Omega$ Balanced interface | 0 V $\pm$ 0.3 V  |
| Nominal Pulse Width  | 244 ns   |
| Pulse Mask   | as per ITU (CCITT) Rec. G.703                            |
| Output Jitter  | < 0.05 UI (in the frequency range of 20Hz<br>to 100 KHz) |
| Permissible Attenuation  | 6 dB at 1 MHz  |
| Return Loss at:  |  |
| 51.2 KHz to 102.4 KHz  | > 12dB   |
| 102.4 KHz to 2048KHz   | > 18dB   |
| 2048KHz to 3072 KHz  | > 14dB   |
| Jitter Tolerance   | As per ITU (CCITT) G.823                                 |
| Loss and recovery of frame alignment :                         | As per clause 3 of ITU (CCITT) G.732                     |
| Loss and recovery of multiframe alignment :                    | As per clause 5.2 of ITU (CCITT) G.732                   |

## Mechanical Specifications:

|               |                           |
|---------------|---------------------------|
| Rack Mounting | Standard 19-Inch DIN Rack |
| Height        | 6U (265 mm)               |
| Depth         | 290 mm                    |
| Width         | 19-inch (477mm)           |
| Weight        | 12Kgs. (Net)              |

## Ordering Information

| Sr. No. | Part No.     | Product Description  | Qty       |
|---------|--------------|--|-----------|
| 1.      | E1-015       | Control Card, E1 Interface Card  | 01        |
| 2.      | E1-000 / 005 | 19" Shelf 3U High (Sub-rack) to accommodate 30 GSM Channels with Connectorized Backplane 6U High   | 01        |
| 3.      | E1-010       | (-) 48VDC Power Supply Card  | 02        |
| 4.      | E1-090       | Dual Port GSM Interface Card - GSM terminals connect to an E1 interface, 15 Cards (max) per system   | 15 (max.) |
| 5.      | E1-030-ANT   | External Antennas with 2 Meter Connectorized cable   | 30        |
| 6.      | E1-150W      | Power Supply (External) AC to DC Converter Portable External Converter Universal AC Input [93VAC-276VAC, 47Hz-63Hz] to DC Output [(-) 48VDC] | 01        |

Common Equipment

### Optional

|    |            |   |    |
|----|------------|---|----|
| 7. | E1-EC64-U  | E1 Echo Canceller Card, provides <b>64ms</b> of unidirectional echo cancellation. 1 Card required for every E1-GSM Shelf              | 01 |
| 8. | E1-EC128-U | <b>OR</b><br>E1 Echo Canceller Card provides <b>128ms</b> of unidirectional echo cancellation. 1 Card required for every E1-GSM Shelf | 01 |

### Optional

|    |           |   |    |
|----|-----------|---|----|
| 9. | E1-TCP-IP | TCP-IP remote access for configuration<br>Option allows the user to access, configure and control the E1-GSM / E1 Channel Bank equipment over a TCP-IP network. 1 Required for every E1-GSM Shelf | 01 |
|----|-----------|---|----|

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