ORION TELECOM NETWORKS INC.

E1-PRI GSM-90

E1 PRI ISDN GSM Gateway with 30 x GSM Intertface(s) 90 SIMs per E1 Interfaces PRI ISDN Q.931 Signaling (EURO ISDN)

Product Brochure & Data Sheet

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Product Overview:

The E1 PRI ISDN Q.931 (EURO ISDN) GSM Gateway with 90 SIMs (3 SIMs per each GSM channel - 90 SIMs per E1). The compact E1 PRI ISDN GSM Gateway solution integrates the E1 PRI ISDN interface to the GSM network to provide the user with 30, GSM links (90 SIMs) for mobile communications with an integrated E1 interface. Each GSM channel is individually 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 E1 PRI ISDN GSM Gateway offers numerous applications for operators, which include terminating VoIP, VoATM, VoFR, VPN, DCME E1 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 PRI ISDN 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.

T1 GSM Channel Bank is also available.

Orion offers both E1 PRI ISDN GSM Gateways and T1 GSM gateways / GSM channel banks with the following features:

- The interface of the network side is E1 Digital Interface with PRI ISDN Q.931 (EURO ISDN) signaling.
- The interface on the user side is up to 30 x GSM links (90 SIMs per E1 - 3 SIMs per channel).
- Accurate answer supervision and disconnect supervision, from SS7 based GSM Network signaling / GSM Switch.
- 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 (optional).

- 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 (optional).
- Mix 'n' Match 3 SIM per channel and 1 SIM per channel GSM access cards.
- Unique Caller ID blocking / Caller ID disabling feature (if network allows)
- Echo cancellation up to 128ms. provided - optional
- PRI ISDN (Euro ISDN) Q.931 signaling.
- Remote access monitoring over TCP/IP network - optional
- Unique out-bound calling, user programmable, access feature (optional).
- All 30, GSM channels are dual band - 900MHz and 1800MHz with auto-sense / auto-switching capability.
- Optional: All 30, GSM channels are dual band - 850MHz 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 PRI ISDN Interface.
- Exceptionally clear 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.

Advantage over fixed wireless Terminals solutions

Integrated E1GSM Channel Bank - PROS

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

Integrated E1GSM Channel Bank - PROS	Third Party, component solutions comprising of E1 Channel Banks and 30 (E1) Fixed Wireless Terminals - CONS
1. Integrated and Compact. 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 30 (E1) Fixed Wireless Terminals.
2. Integrated, Single Power Input: -48VDC or AC Mains. Both options are provided.	2. Individual, 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 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 with patented (patent pending) noise reduction technology. Greatly improves voice quality and voice clarity.	6. Poor coupling of analog lines (from the E1 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 30 individuals Fixed Wireless Terminals, each with separate power supplies, and the channel bank.

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8. Unique dial-out,user programmable access. USER PROGRAMMABLE, call directory interface. This optional feature, unique to E1, GSM Multiplexer, allows the USER to program "out-bound" calls (GSM Network to E1), 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), 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), 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 (optional).	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. Accurate CALL METERING resulting from accurate answer-supervision and line-disconnect supervision since the integrated E1, GSM Channel Bank derives its answer-supervision (required for the call-metering function), from the SS7 based GSM Network Signaling / GSM Switch.	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, GSM Channel Bank which 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 E1 channel bank PLUS 30 Fixed Wireless Terminals.	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
Digital Interface 2048 Kbps

Number of E1, PRI ISDN interfaces	1 - (User or Network Modes - Configurable)
Conformity (Electrical)	G. 703
Frame Structure	As per ITU (CCITT) G.704
Signaling	PRI ISDN (Euro ISDN) signaling as per ITU-T Rec. Q.921, Q.931
PCM Sampling Rate	8000 samples / sec
Encoding Law	A Law as per ITU (CCITT) G.823
Bit Rate	2048 Kbps ± 50 ppm
Code	HDB3
Nominal impedance	120 balanced
Connector Type	RJ-45
Pulse Mask	As per ITU (CCITT) Rec. G.703
Output Jitter	<0.05 UI (in the frequency range of 20Hz -100 Khz)
Permissible Attenuation	6dB at 1 MHz
Return Loss at:	
51.2 Khz to 102.4 Khz	>12dB
102.4 Khz to 2048 Khz	>18dB
2048KHz to 3072KHz	>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 multi frame Alignment	As per clause 5.2 of ITU (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 ~ 30 (Stackable, 1 thru 30).
Number of SIM Cards per GSM Interface:	3 SIMs per GSM Channel 90 SIMs per E1
Type	Dual Band EGSM 900 MHz and EGSM 1800 Mhz. **Optional** Dual Band 850 MHz - 1900 MHz
Compliance	Compliant with ETSI GSM Phase 2+ standard (Normal MS) Class 4 (2W @ 900MHz) Class 1 (1W @ 1800 MHz)
Approvals	Fully Type Approved to GSM Standards
SIM Interface Internal Tray	Toolkit Class 2. 3V Reader
Voice Features	Full Rate, Enhanced Full Rate And Half-Rate (FR / EFR / HR and AMR)
Caller ID	Enable / Disable - User Selectable

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.	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	1
	1 - Input
	1 - Output
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 ± 50 ppm
Code	HDB3
Nominal Impedance	120Ω balanced
Peak Voltage of a mark For 120 Ω Balanced interface	3.0 V ± 0.3 V
Peak Voltage of a space for 120 Ω Balanced interface	0 V ± 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 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-PRI	Control Card, E1 PRI ISDN Interface Card	**01**
2.	E1-000 / 005-PRI	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-PRI	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

*Rows 1–3 are grouped under the vertical label **Common Equipment**.*

Optional

Sr. No.	Part No.	Product Description	Qty
7.	E1-EC64-U	E1 Echo Canceller Card, provides **64ms** of unidirectional echo cancellation. 1 Card required for every E1-GSM Shelf	01
8.	E1-EC128-U	**OR** E1 Echo Canceller Card provides **128ms** of unidirectional echo cancellation. 1 Card required for every E1-GSM Shelf	01

Optional

Sr. No.	Part No.	Product Description	Qty
9.	E1-TCP-IP	TCP-IP remote access for configuration 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

Technical specification are subject to change without notice.
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