

Dialogic® I-Gate® 4000 Session Bandwidth Optimizer Mobile Backhaul

Datasheet

The Dialogic® I-Gate® 4000 Session Bandwidth Optimizer Mobile Backhaul (I-Gate 4000 SBO-MB) is a standalone system that can optimize bandwidth and increase bandwidth capacity significantly in the backhaul segments of both 2G and 3G mobile networks. Because it optimizes Abis and Iub data streams, including both ATM and IP-based Iub streams, the I-Gate 4000 SBO-MB can provide a cost-effective and efficient strategy for increasing backhaul capacity, resulting in significantly reduced capital and operational expenses.

The I-Gate 4000 SBO-MB can also accept native IP and PCM streams and transmit the combined optimized stream over TDM and/or IP.

Along with Abis and Iub optimization, the I-Gate 4000 SBO-MB leverages statistical multiplexing and grooming techniques developed by Dialogic that have been shown in field trials to typically double the capacity of backhaul links while preserving the quality and integrity of the original data traffic through Quality of Service (QoS) protection techniques.



Features

Leverages special bandwidth and IP packet rate optimization technologies developed by Dialogic, while preserving the quality and integrity of the original data traffic

Uses unparalleled bandwidth optimization algorithms and techniques to optimize mobile backhaul data sessions

Combines high-quality payload optimization and QoS protection techniques

Supports multiple topologies, such as point to point, point to multi-point, drop and continue, data offload, and ring

GUI-based management system with runtime reports showing traffic mix, comparative bandwidth, and QoS behavior

99.9995% (five-nines) availability through a fully redundant 1 RU platform

Supports a wide range of transmission infrastructures

Benefits

Enables cost-effective optimization and increased capacity for mobile backhaul segments in 2G and 3G mobile networks

Reduces backhaul bandwidth usage by up to 50% without degrading original data sessions as shown in field trials

Can deliver substantial CAPEX and OPEX savings in 2G and 3G mobile backhaul segments

Works with a wide range of mobile backhaul designs and topologies for effective optimization

Enables ease of operation and supplies a snapshot of important statistics on demand

Provides high reliability in a small footprint at the hardware, software, and network levels

Can be used in terrestrial, microwave, and radio link installations, and over TDM or Ethernet links

Efficient Mobile Backhaul Optimization

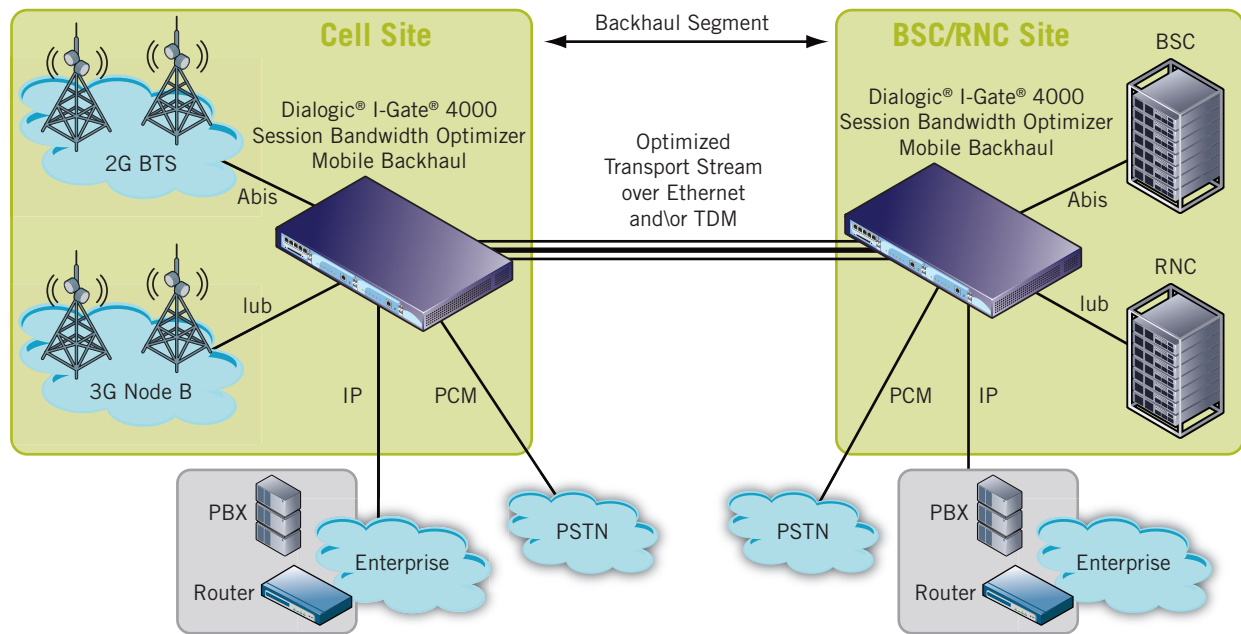


Figure 1. Dialogic® I-Gate® 4000 Session Bandwidth Optimizer Mobile Backhaul in a Backhaul Segment on a Mobile Network

The I-Gate 4000 SBO-MB can optimize bandwidth in the backhaul segments of both 2G (Abis) and 3G (Iub) streams (ATM and IP-based). In addition to Abis and Iub optimization, the SBO-MB can also be used to simultaneously take in PCM and IP streams, optimize all of these streams and transmit the optimized stream over Ethernet and/or TDM. See Figure 1 for an example of a sample configuration. Because units are placed within the current physical backhaul segment, optimizing with the I-Gate 4000 SBO-MB is not as disruptive or costly as other alternatives for increasing bandwidth capacity, such as adding expensive leased lines, deploying fiber, adding microwave spectrum, or moving to Ethernet ring. The I-Gate 4000 SBO-MB can also be used in addition to other options for increasing bandwidth capacity and can coexist with them.

Key Performance Indicators

The I-Gate 4000 SBO-MB monitors and maintains key performance indicators (KPI) by which mobile backhaul infrastructure performance is measured. These include delay, jitter, bit error rate, and availability. Adherence to prescribed KPIs is critical to maintaining high subscriber Quality of Experience (QoE) and to meeting Service Level Agreements (SLAs) for voice and data services.

Application Topologies

The I-Gate 4000 SBO-MB supports a wide range of deployment strategies, including these topologies:

- Point to Point (PTP)
- Point to Multi-Point (PTMP)
- Drop and Continue
- Ring
- Data Offload

For more information about these application topologies, see “Dialogic® I-Gate® 4000 Session Bandwidth Optimizer Mobile Backhaul – Application Topologies” Technology Brief.

XMS Management System

xMS Management System provides the network operator with an enhanced Fault, Configuration, Performance and Security management tool to manage a network of I-Gate 4000 SBO-MB terminals. The xMS provides an easy to use web-based interface with a logical step-by-step approach to provisioning and event handling.

The xMS provides a rich set of reports for the operator, depicting the traffic and operational information of the I-Gate 4000 SBO-MB terminals. It also provides a very sophisticated alarm and event handling mechanism to help the operator troubleshoot the network and isolate faults. Runtime configuration provides the ability to change the working parameters of the I-Gate 4000 SBO-MB without the need to reset the terminal and disrupt traffic. Figure 2 shows a snapshot of the configuration and bandwidth usage.

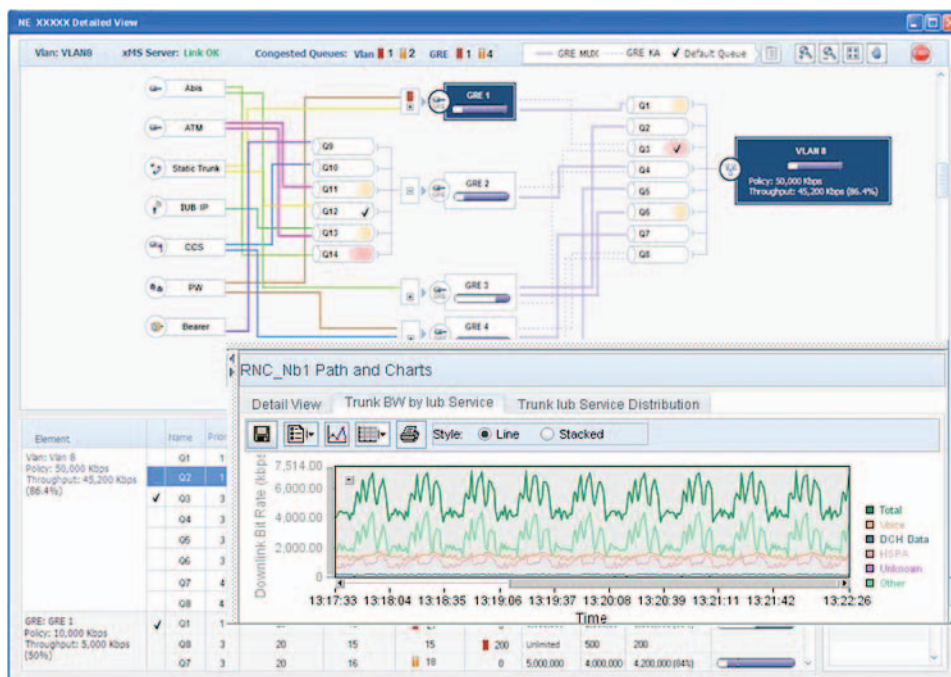


Figure 2. Dialogic® I-Gate® 4000 Session Bandwidth Optimizer Mobile Backhaul XMS Showing a Snapshot of the Configuration and Bandwidth Usage

Technical Specifications

Traffic Handling

Abis Interface Optimization	<ul style="list-style-type: none"> • Unique VAD enhancing optimization • Payload Priority Selection (PPS) mechanisms • Silence and Idle patterns removal • All GSM voice codec and data types (HSCSD, GPRS, EDGE) • Up to 12 E1 lines supported
ATM-Based Iub Interface Optimization	<ul style="list-style-type: none"> • ATM header optimization • Idle cell removal • AAL header optimization
IP-Based Iub Interface Optimization	<ul style="list-style-type: none"> • Header optimization and aggregation for all layers up to the RLC (included)
Native IP and VoIP Optimization	<ul style="list-style-type: none"> • Header optimization and packet aggregation • Statistical multiplexing
PBX Optimization	<ul style="list-style-type: none"> • Unique VAD enhancing optimization • Smart Payload Priority Selection (PPS) mechanisms • Silence and Idle pattern removal
Bearer	<ul style="list-style-type: none"> • Over IP network or PSTN (using Gigabit/Fast Ethernet ports) — IP-GRE • Over TDM network using MLPP • Combined IP and TDM networks
Auto Detection	<ul style="list-style-type: none"> • Automatic TRX allocation detection for Abis traffic and AAL for ATM-based Iub traffic
Payload Aggregation	<ul style="list-style-type: none"> • Static RTP multiplexing • Statistical multiplexing among all types of traffic
Traffic Congestion Control	<ul style="list-style-type: none"> • Payload Priority Selection (PPS) mechanism for PBX and Abis • Tail Drop
Embedded Cross-Connect	<ul style="list-style-type: none"> • Any-to-any trunk DS0 channel for all configured DS0s
Pseudo-Wire Emulation Edge-to-Edge (PWE3)	<ul style="list-style-type: none"> • SAToP (Structure-Agnostic TDM over Packet) — RFC 4553 • CESoPSN (Circuit Emulation Service over Packet-Switched Network) — RFC5086
QoS Management	<ul style="list-style-type: none"> • Multiple queues management • IP packet classification and marking • Multiple congestion avoidance • Scheduling and Shaping • Policing • H-Qos
QoS Protection	<ul style="list-style-type: none"> • Operator-configurable threshold
Jitter Buffer	<ul style="list-style-type: none"> • Adaptive • Up to 60 msec network jitter for Abis traffic • Up to 300 msec network jitter (for PBX traffic)

Technical Specifications *(continued)*

Silence Suppression for Abis and PBX POI Traffic

- PBX:
- G.711, Ap.2, G.729A, Annex B
 - G.729A, Ap2 (G.711)
 - G.723.1, Annex A

Abis:

- GSM-AMR, GSM 06.94

Fax Support (for PBX POI Traffic)

- Group 3 fax calls
- ITU-T T.38 fax relay or pass through to G.711, according to a configuration parameter
- V.27, V.29 and V.17 (up to 14.4 kbps)
- Packetization period: 40 msec
- Fax redundancy: 1+1, 1.2 and 1+3 - Operator configurable
- Supports voice-to-fax switchover and fax-to-voice switchback

DTMF Support (for PBX and PSTN POI traffic)

- Detection and generation according to RFC 2833 (in-band)

Voice Codecs

- G.711 PCM @64 kbit/sec (A-law and μ -law)
- G.729, CS-ACELP @ 8 kbit/sec
- G.723.1, ACELP / MPMLQ @ 5.3, 6.3 kbit/sec
- GSM-AMR (all rates)

Traffic Links

- Terrestrial, microwave, and satellite

Tunneling

- Over GRE (Generic Routing Encapsulation)
- Up to 16 GRE tunnels

Mobile Network Interface Protocols

Abis Interface

- GSM R99, 3GPP 08 Series specifications
- Codec: FR, EFR, HR, AMR (all rates)
- Data services: EDGE, GPRS, HSCSD

Iub Interface (ATM- and IP-Based)

- 3GPP specifications
- Data services: HSPA, DCH-R99

Network Interfaces

Gigabit Ethernet Ports

Interface

- Complies with IEEE 802.3u
- Auto-negotiation
- Full Duplex

Connector

- RJ45

VLAN Tag

- IEEE 802.1q
- Up to 32 VLANs

Technical Specifications *(continued)*

E1 Interfaces

Electrical Characteristics	<ul style="list-style-type: none">• Complies with ITU-T Recommendation G.703
Impedance	<ul style="list-style-type: none">• 120Ω balanced
Frame Structure	<ul style="list-style-type: none">• Complies with ITU-T Recommendation G.704
Line Code	<ul style="list-style-type: none">• HDB3
CRC-4 and E Bit Use	<ul style="list-style-type: none">• Configurable
Return Loss	<ul style="list-style-type: none">• Complies with ITU-T Recommendation G.703 paragraph 6.3.3 and with ETSI ETS 300166

T1 Interfaces

Electrical Characteristics	<ul style="list-style-type: none">• Complies with ITU-T Recommendation G.703, ANSI T1.102
Impedance	<ul style="list-style-type: none">• 100Ω balanced
Frame Structure	<ul style="list-style-type: none">• Complies with ITU-T Recommendation G.704, ANSI T1.107
Multi-Frame	<ul style="list-style-type: none">• SF (12 frames)/ESF (24 frames) — configurable
Line Code	<ul style="list-style-type: none">• AMI/B8ZS — configurable
Return Loss	<ul style="list-style-type: none">• Complies with ITU-T Recommendation G.703 paragraph 6.3.3 and with ETSI ETS 300166

IP Protocols

Management	<ul style="list-style-type: none">• SNMP V2 (RFC 1907) -- for runtime configuration, status, alarm notifications, and operator actions• FTP (RFC 959) -- for software and map download/upload
IP version	<ul style="list-style-type: none">• IPv4
Quality of Service	<ul style="list-style-type: none">• TOS marking (operator configurable)• 802.1p (for IP-based lub traffic)
Time Protocol	<ul style="list-style-type: none">• SNTP (RFC 2030 V.4)
Routing	<ul style="list-style-type: none">• Static• MAC learning (for IP-based lub)• Supports Virtual Loopback Interface
Others	<ul style="list-style-type: none">• IP (RFC 791)• UDP (RFC 768)• IP over Ethernet (RFC 1042)• ICMP (RFC 792)• ARP (RFC 826)• PMTUD (RFC 1191)

Technical Specifications *(continued)*

Redundancy and High Availability

Main Module	<ul style="list-style-type: none">• 1:1 MPTM, MPTH, or MPTI redundancy
Power Supply	<ul style="list-style-type: none">• 1:1 DCPS redundancy• Load sharing
Power Feed	<ul style="list-style-type: none">• 2 independent power feed connections through main and redundant DCPS
Fan Tray	<ul style="list-style-type: none">• 6 fans• Fan Turbo mode support
Ethernet Link Protection	<ul style="list-style-type: none">• 1:1 (based on ELET port redundancy modes)
Availability	<ul style="list-style-type: none">• 99.9995% (five-nines)
Additional High Availability Features	<ul style="list-style-type: none">• Hitless Hot module swapping — Hot extraction/insertion of modules• Hitless Hot Software upgrade — No effect on traffic• Runtime configuration
Temperature Control	<ul style="list-style-type: none">• Built-in temperature sensors• Fan Turbo mode• Alarms: High & Extreme High Temperature

System Synchronization

Clock Standards	<ul style="list-style-type: none">• IEEE1588v2• SyncE
Clock Source	<ul style="list-style-type: none">• 2 clock sources can be standard TDM input bit streams for any configured TDM interface• 2 clock sources can be SyncE input for any configured Ethernet ports• If all clock sources fail, Hold-Over on the last synchronized external clock source is performed (with an accuracy of ± 1 PPB per 24 hours)• Internal clock with accuracy of Stratum 3E
Internal Timing Module	<ul style="list-style-type: none">• Operation modes: Complies with ITU-T recommendations G.812 and G.813• Jitter/Wander tolerance/transfer complies with AT&T TR-62411 and Telcordia GR-1244 Stratum 3 specifications• Jitter specifications comply with ITU-T G.823, G.824, and ANSI T1.101

Power

DC Power Input	<ul style="list-style-type: none">• -48 VDC / -60 VDC (nominal)• -40.5 VDC / -72 VDC (min/max)
Power Consumption	<ul style="list-style-type: none">• 175 Watts

Technical Specifications *(continued)*

Operation and Maintenance

Maintenance Loopback for TDM Links	<ul style="list-style-type: none">• Local (Inward)• Remote (Line)
Status Monitoring	<ul style="list-style-type: none">• Comprehensive built-in test• Runs continuously
Alarms	<ul style="list-style-type: none">• TDM links/interfaces• Ethernet links/interfaces• GRE failure• Hardware failures• CPU utilization above threshold
Alarm Severity Levels	<ul style="list-style-type: none">• Critical• Major• Minor• Warning
Status LEDs	<ul style="list-style-type: none">• Green (OK)• Amber (Standby/Not Faulty)• Red (Faulty)• Off (Out of Configuration)
Alarm LEDs	<ul style="list-style-type: none">• Topmost alarm indication• Red (Critical/Major)• Amber (Minor)
Other Alarms	<ul style="list-style-type: none">• Temperature: High, Extremely High
Lamp Test	<ul style="list-style-type: none">• All LEDs activated within 30 seconds• Activated through Dialogic® xMS Management System

Environmental Conditions

Electro Magnetic Compatibility	<ul style="list-style-type: none">• Europe<ul style="list-style-type: none">— EN 300 386 V1.4.1 (2008-04)— FTZ 1TR9:04-2008— Emission: EN55022— Immunity: EN61000-4 2, 3, 4, 5, 6, 11• North America<ul style="list-style-type: none">— FCC rules CFR 47 part 15 Class A• Canada<ul style="list-style-type: none">— ICES-003 Class A• Japan<ul style="list-style-type: none">— VCCI V-3/2001.04• Australia/NZ<ul style="list-style-type: none">— CISPR 22:2006
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Technical Specifications *(continued)*

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| Product Safety | <ul style="list-style-type: none"> • UL 60950-1:2007 (2nd Edition) for US (*) • CAN/CSA-C22.2 No. 60950-1-07 (2nd Edition) for Canada (*) • CE EN60950-1:2006+A11:2009 • CB IEC60950-1:2005 2nd Ed (*) |
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| Environmental Standards | <ul style="list-style-type: none"> • ETSI: <ul style="list-style-type: none"> — EN 300 019-2-1 Class 1.2 for Storage conditions (weather-protected, not temperature-controlled storage locations) — EN 300 019-2-2 Class 2.3 for Transportation conditions (public transportation) — EN 300 019-2-3 Class 3.2 for Operational conditions (stationary use in weather-protected locations) — with 25°C / 50°C • Bellcore — GR-63 (selected sections) • EU Directive 2002/95/EC (Restriction of Hazardous Substances - RoHS) • EU Directive 2002/96/EC (Waste Electrical and Electronic Equipment [WEEE]) • China RoHS |
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| Operating Temperature Range
Operating Humidity Range | <ul style="list-style-type: none"> • -5°C to 50°C • Altitude 4000 meter according to GR-63 • 10% RH to 95% RH |
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| Storage Temperature Range
Storage Humidity Range | <ul style="list-style-type: none"> • -40°C to 70°C • 10% RH to 95% RH |
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| Power Supply | <ul style="list-style-type: none"> • ETSI EN 300 132-2 for DC |
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(*) Selected models

Physical Characteristics

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| Dimensions | <ul style="list-style-type: none"> • Width: 435 mm (17.1 in) — mounting brackets not included • Height: 44.45 mm (1.75 in — 1U) • Depth: 448 mm (17.6 in) |
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| Weight | <ul style="list-style-type: none"> • 5.7 Kg (full redundant protected system) |
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| Cabinet | <ul style="list-style-type: none"> • Can be installed in 19-inch or 23-inch cabinets and with wall mount |
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Approvals, Compliance, and Warranty

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|----------------------------|---|
| Hazardous substances | RoHS compliance information at www.dialogic.com/rohs |
| Country-specific approvals | Call your local Dialogic sales representative |
| Warranty | Call your local Dialogic sales representative |



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06/11 12465-03