

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

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 VoIP 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	Benefits
Leverages special bandwidth and IP packet rate optimization technologies developed by Dialogic, while preserving the quality and integrity of the original data traffic	Enables cost-effective optimization and increased capacity for mobile backhaul segments in 2G and 3G mobile networks
Uses unparalleled bandwidth optimization algorithms and techniques to optimize mobile backhaul data sessions	Reduces backhaul bandwidth usage by up to 50% without degrading original data sessions as shown in field trials
Combines high-quality payload optimization and QoS protection techniques	Can deliver substantial CAPEX and OPEX savings in 2G and 3G mobile backhaul segments
Supports multiple topologies, such as point to point, point to multi-point, drop and continue, data offload, and ring	Works with a wide range of mobile backhaul designs and topologies for effective optimization
GUI-based management system with runtime reports showing traffic mix, comparative bandwidth, and QoS behavior	Enables ease of operation and supplies a snapshot of important statistics on demand
99.9995% (five-nines) availability through a fully redundant 1 RU platform	Provides high reliability in a small footprint at the hardware, software, and network levels
Supports a wide range of transmission infrastructures	Can be used in terrestrial, satellite, and radio link installations, and over TDM or Ethernet links

Efficient Mobile Backhaul Optimization

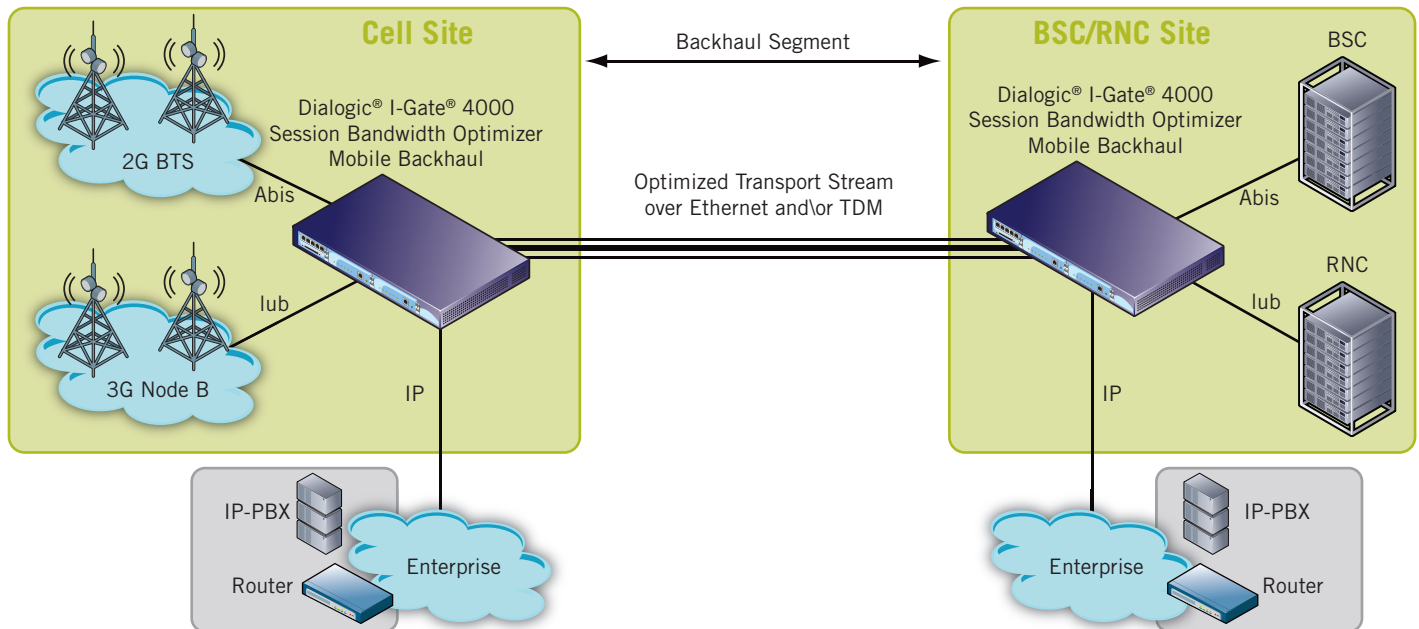


Figure 1. Dialogic® I-Gate® 4000 Session Bandwidth Optimizer Mobile Backhaul in a Backhaul Segment on a Mobile Network

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 VoIP 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 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.

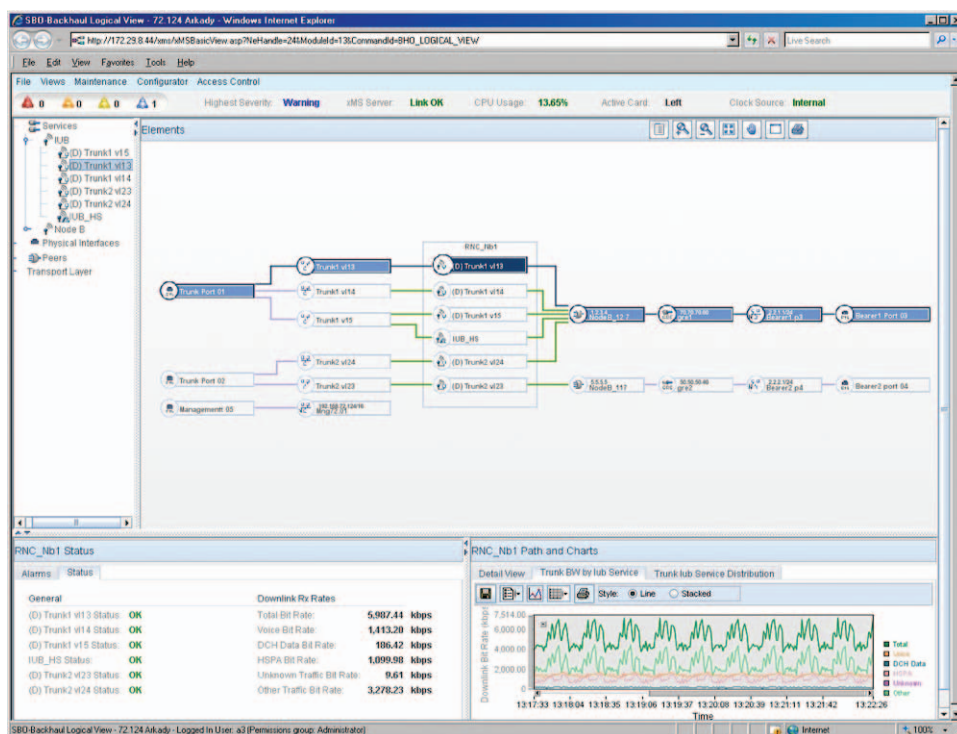


Figure 2. Dialogic® I-Gate® 4000 Session Bandwidth Optimizer Mobile Backhaul XMS Showing a Snapshot of the Configuration and Bandwidth Usage

Technical Specifications

Traffic Handling

Abis Interface Optimization

- I-Gate Unique VAD enhancing optimization
- Payload Priority Selection (PPS) mechanisms
- Silence and Idle patterns -- removal
- All GSM voice Codec and Data type (HSCSD, GPRS, EDGE)
- Supports up to 16 E1's

ATM-based Iub Interface Optimization

- ATM header optimization
- Idle cell removal
- AAL header optimization

IP-based Iub Interface Optimization

- Header optimization and aggregation for all layers up to the RLC (included)

Technical Specifications *(continued)*

Native IP and VoIP Optimization	<ul style="list-style-type: none"> • Headers optimization and Packets aggregation • Statistical multiplexing
Bearer	<ul style="list-style-type: none"> • Over IP network or PSN (using Gigabit / Fast Ethernet ports) -- IP-GRE • Over TDM network using MLPPP • Combined IP and TDM networks
Auto Detection	<ul style="list-style-type: none"> • Automatic TRX allocation detection for Abis traffic and AAL for the ATM-based Iub traffic
Payload Aggregation	<ul style="list-style-type: none"> • Static RTP Multiplexing • Statistical Multiplexing between all types of traffic
Traffic Congestion Control	<ul style="list-style-type: none"> • Payload Priority Selection mechanism (PPS) for Abis • Tail Drop • DCAM
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
Jitter Buffer	<ul style="list-style-type: none"> • Adaptive • Up to 120 msec network jitter (for Abis traffic)
Silence Suppression (for Abis traffic)	<ul style="list-style-type: none"> • GSM-AMR, GSM 06.94
Traffic Links	<ul style="list-style-type: none"> • Supports: terrestrial links, microwave links, satellite links
Tunneling	<ul style="list-style-type: none"> • Over GRE (Generic Routing Encapsulation) • Up to 16 GRE tunnels
QoS Protection	<ul style="list-style-type: none"> • Tail Drop mechanism • Payload Priority Selection mechanisms

Mobile Network Interfaces Protocols

Abis Interface	<ul style="list-style-type: none"> • GSM R99, 3GPP 08 Series specifications • Codec: FR, EFR, HR, AMR all rates • Data services: EDGE, GPRS, HSCSD
Iub interface (ATM and IP based)	<ul style="list-style-type: none"> • 3GPP specifications • Data services: HSPA, DCH-R99

Network Interfaces**Gigabit Ethernet Ports**

Interface	<ul style="list-style-type: none"> • Complies with IEEE 802.3u • Auto-negotiation • Full Duplex
Connector	<ul style="list-style-type: none"> • RJ45
VLAN Tag	<ul style="list-style-type: none"> • 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

STM-1 / OC-3 Interface

Characteristics	<ul style="list-style-type: none"> ITU G.703, G.813, G.825, G.783, G.957 and Telcordia GR-253
STM-1 Frame	<ul style="list-style-type: none"> ITU G.707
Line code	<ul style="list-style-type: none"> NRZ
STM-1 Payload	<ul style="list-style-type: none"> 63 E1 (AU4) or 3x21 E1 (AU3)
OC-3 Payload	<ul style="list-style-type: none"> 3x28 DS1 (STS-1)
Fiber optic coupling	<ul style="list-style-type: none"> Single Mode (1310 nm)
Receiver Maximum Input Optical Power	<ul style="list-style-type: none"> -7dB
Receiver Sensitivity	<ul style="list-style-type: none"> -29dB
Connector type	<ul style="list-style-type: none"> SFP - S1.1.1310 nm (optical or electrical)

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 v4)
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 • 1:1 MPSX 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 • Support for Fan Turbo mode
Ethernet Link Protection	<ul style="list-style-type: none"> • 1:1 (based on ELET/ELS4 ports redundancy modes)
Availability	<ul style="list-style-type: none"> • 99.9995 % (five 9's)
Additional High Availability Features	<ul style="list-style-type: none"> • Hitless Hot-module swapping -- Hot extractions/insertions of modules • Hitless Hot Software Upgrade -- Non-traffic-affecting • 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"> • Two clock sources can be standard TDM input bitstreams of any configured TDM interface • Two clock sources can be SyncE input of any configured Ethernet ports • In case of failure of all clock sources, 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 voltage input	<ul style="list-style-type: none"> • -48 VDC / -60 VDC (nominal) • -40.5 VDC / -72 VDC (min/max)
Max DC current	<ul style="list-style-type: none"> • 7A
Max DC power consumption	<ul style="list-style-type: none"> • 284W

Maximum power consumption for typical configurations

Max DC current	<ul style="list-style-type: none"> • 4.8A (with MPSX full configuration) • 4.4A (with MPTM full configuration) • 3A (with non-redundant configuration)
Max DC power consumption	<ul style="list-style-type: none"> • 194W (with MPSX full configuration) • 178W (with MPTM full configuration) • 120W (with non-redundant configuration)

Technical Specifications *(continued)*

Operation and Maintenance

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 sec. • Activated through xMS
Maintenance Loopback for TDM links	<ul style="list-style-type: none"> • Local (Inward) • Remote (Line)

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
Product Safety	<ul style="list-style-type: none"> • UL 60950-1:2007 for US • CAN/CSA -C22.2 No. 60950-1-07 for Canada • CE EN60950-1:2006+A11:2009 • CB IEC60950-1:2005 2nd Edition
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

Technical Specifications *(continued)*

Operating Temperature Range	• -5°C to 50°C
Operating Humidity Range	• Altitude 4000 meters according to GR-63 • 10% RH to 95% RH
Storage Temperature Range	• -40°C to 70°C
Storage Humidity Range	• 10% RH to 95% RH
Power Supply	• ETSI EN 300 132-2 (for DC)

Physical Characteristics

Dimensions	• Width: 435 mm (17.1") - not including mounting brackets • Height: 44.45 mm (1.75" - 1U) • Depth: 448 mm (17.6")
Weight	• 5.7 Kg (full redundant system)
Installation	• Can be installed in 19" or 23" cabinets or relay racks, or as wall mount, or on top of any rigid infrastructure (desktop)

Approvals, Compliance, and Warranty

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

For More Information

For more information about the product discussed in this datasheet, contact your local Dialogic representative. Worldwide contact information is available online at www.dialogic.com/contact.



www.dialogic.com

Dialogic Inc
1504 McCarthy Boulevard
Milpitas, California 95035-7405
USA

Dialogic and I-Gate are registered trademarks of Dialogic Inc. or a subsidiary ("Dialogic"). Dialogic's trademarks may be used publicly only with permission from Dialogic. Such permission may only be granted by Dialogic's legal department at the address provided above. Other names of actual companies and products mentioned herein are the trademarks of their respective owners.

Dialogic encourages all users of its products to procure all necessary intellectual property licenses required to implement their concepts or applications, which licenses may vary from country to country. None of the information provided in this Datasheet other than what is listed under the section entitled Technical Specifications forms part of the specifications of the product and any benefits specified are not guaranteed. No licenses or warranties of any kind are provided under this datasheet.

Dialogic may make changes to specifications, product descriptions, and plans at any time, without notice.

Any use case(s) shown and/or described herein represent one or more examples of the various ways, scenarios or environments in which Dialogic® products can be used. Such use case(s) are non-limiting and do not represent recommendations of Dialogic as to whether or how to use Dialogic products.