

Dialogic® I-Gate® 4000 Media Gateways

IP Telephony Media Gateways

Datasheet

Dialogic® I-Gate® 4000 Media Gateways are designed for telecom operators seeking a competitive advantage by moving to an operationally efficient and service-centric IP network. I-Gate 4000 Media Gateways deliver fixed-line toll-quality voice in a compact footprint to satisfy Voice-over-IP (VoIP) and Voice-over-TDM telephony requirements in low- and medium-scale port densities.

I-Gate 4000 Media Gateways leverage sophisticated DSP technology, and have set a benchmark for voice quality in TDM and IP telephony, while preserving end-to-end service transparency for voice, fax, modem, and video calls. By combining high-quality bandwidth optimization, reliability, and scalability with open standards-based interfaces, the I-Gate 4000 Media Gateway Series can enable powerful operational and capital expense saving solutions for both incumbent and alternative service providers.



This datasheet discusses the following products:

- Dialogic® I-Gate® 4000 EDGE Media Gateway — low-to-medium port density
- Dialogic® I-Gate® 4000 PRO Media Gateway — medium-to-high port density

Features

Proven bandwidth optimization technology for circuit-switched networks extended to VoIP networks

Field-proven voice processing technology and advanced codec implementations, coupled with a rich set of bandwidth optimization and voice quality protection techniques

Bandwidth-efficient and reliable transport of CCS for SS7, PRI, and QSIG and CAS, despite network impairments

Highly efficient signal detection and processing techniques

99.99995% (six 9s) availability

Combines high-quality bandwidth optimization, reliability, and scalability with open standards-based interfaces

Supports wide range of transmission infrastructure

Benefits

Delivers packet voice quality that equals established PSTN standards

Enables carriers to realize bandwidth savings of up to 16:1

Delivers bandwidth savings, full signaling robustness, and a high CCR along with enabling cost-effective network topologies based on the optimal location of signaling gateways at a small number of strategic sites

Provides unrivaled voice, fax, modem, and video call completion rates with exceptional quality, allowing an operator to curtail expenses while capturing billable minutes

Provides high reliability

Enables a powerful operational and capital expense saving solution

Can be used in terrestrial, radio link, and satellite installations

Field-Proven Voice Quality over TDM and IP Networks

The I-Gate 4000 Media Gateway Series is built by a team with over two decades in the telephony compression market, and have been deployed by hundreds of carriers in more than 100 countries for voice, fax, modem, video, and signaling traffic. The I-Gate 4000 Media Gateway Series enables carriers to bridge the gap between circuit-switched and next-generation Voice-over-IP (VoIP) networks by delivering packet voice quality that equals established PSTN standards.

Bandwidth Savings without Compromising Voice Quality

Field-proven voice processing technology and advanced codec implementations, coupled with a rich set of bandwidth optimization and voice quality protection techniques, enable carriers to realize bandwidth savings of up to 16:1 with I-Gate 4000 Media Gateways.

Bandwidth-Efficient and Reliable Signaling Transport

The unmatched ability of I-Gate 4000 Media Gateways to support bandwidth-efficient and reliable transport of Common Channel Signaling (CCS) for SS7, PRI, and QSIG and Channel Associated Signaling (CAS), despite network impairments, can deliver further bandwidth savings, full signaling robustness, and a high Call Completion Rate (CCR). In addition to bandwidth savings, this capability enables cost-effective network topologies based on the optimal location of signaling gateways at a small number of strategic sites.

Cost-Effective Fax, Modem, and Video Services

The highly efficient signal detection and processing techniques of I-Gate 4000 Media Gateways provide unrivaled highest voice, fax, modem, and video call completion rates with the exceptional quality, allowing the operator to curtail expenses while capturing billable minutes.

Flexible Interoperation

I-Gate 4000 Gateways are built with total openness in mind — ready to interoperate with standards-compliant transmission and switching network elements. The gateways are consistent with next-generation network architecture models, offering proven interoperability with multivendor softswitches based on standard protocols such as MGCP, H.248, and SIGTRAN.

Static Trunking Applications

Despite continuing decreases in bandwidth costs, many international routes and national long-distance networks still have high transmission prices or limited available transmission bandwidth. For telecom operators carrying voice traffic over costly or bandwidth-limited transmission links, static trunking systems provide a distinctive solution for realizing substantial savings on bandwidth, equipment, and operations, more efficient utilization of deployed network resources, and new opportunities for improved competitiveness and increasing profitability.

Applications that can benefit from static trunking include:

- Transmission of long-distance international and domestic telephony traffic
- Interconnection of MSC switches in mobile networks
- Backhaul transmission between MSC switches and Points of Interconnection (POI) to the PSTN
- Call center and business process outsourcing
- Backup protection networks

Wireline or Mobile Interswitch Transport Savings

In a static trunking solution, the traffic transmitted between PSTN and/or MSC switches is compressed by an I-Gate 4000 EDGE Gateway or I-Gate 4000 PRO Gateway connected to one of the switches and decompressed at a remote I-Gate 4000 EDGE Gateway or I-Gate 4000 PRO Gateway connected to the second switch. The compressed traffic can be carried over IP or TDM networks. See Figure 1 for an example.

With the I-Gate 4000 Media Gateway Series, carriers can build one IP transport network and use it for both voice and data — enjoying the cost-efficiencies of converged IP transport prior to undertaking a full-fledged network migration. Carriers can use their existing IP infrastructure and bypass the TDM transmission core without compromising existing quality or stability, while preserving PSTN switch investment (for example, switches and OSS).

Since the same I-Gate 4000 EDGE Gateway or I-Gate 4000 PRO Gateway can be used for both static trunking and softswitch-controlled VoIP services, the I-Gate 4000 Media Gateway Series offers a smooth evolution path from traditional TDM switches and transmission links to all-IP next-generation networks. Carriers with a TDM switching infrastructure can initially leverage the static trunking capabilities of the I-Gate 4000 Media Gateway Series to lower costs by transporting voice over their packet-based data networks. Utilizing the same infrastructure, carriers can then migrate to a more flexible and cost-effective switched IP network by adding a softswitch platform to their networks.

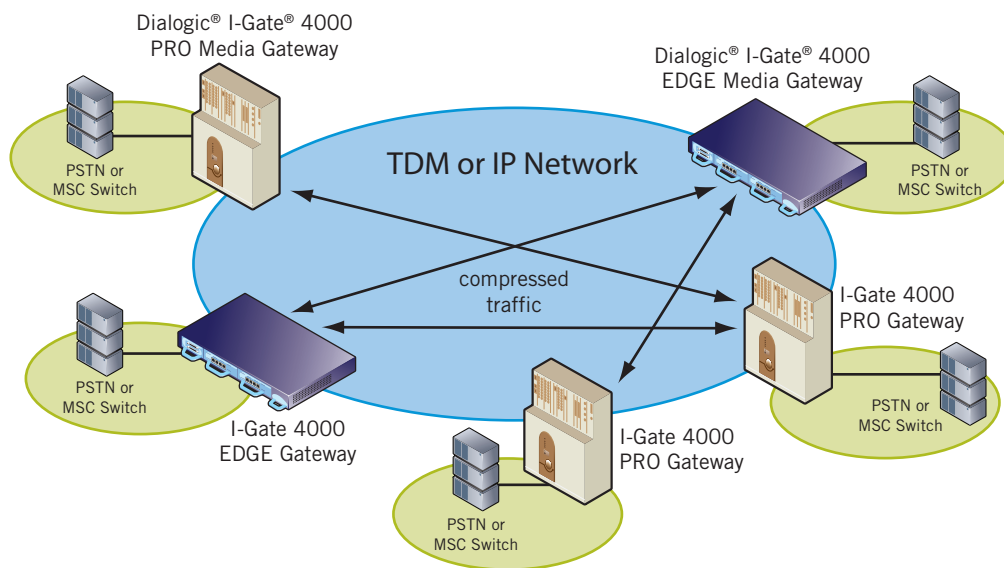


Figure 1. Wireline or Mobile Interswitch Transport

Mobile Network Point of Interconnection

A significant number of calls between mobile phones and PSTN phones require transport through the PSTN long-distance switching and transmission infrastructure. The mobile network operator often has to pay the wireline operator very high fees for long-distance service. By using a static trunking solution that compresses the traffic between the MSC site and a POI site near the local PSTN switch, the mobile operator can achieve significant savings by avoiding the need to pay long-distance fees. See Figure 2 for an example.

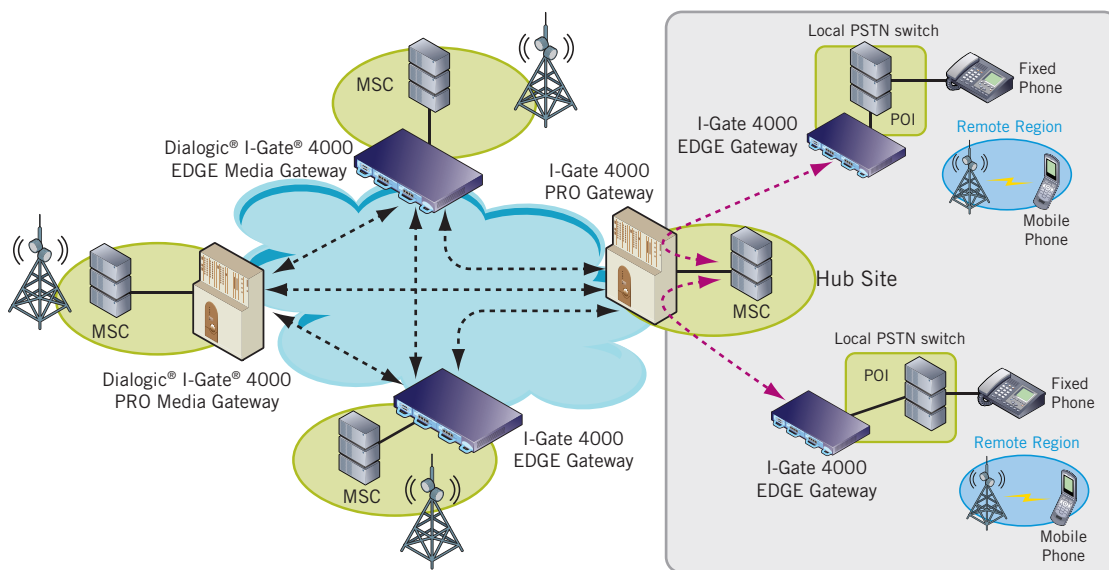


Figure 2. Inter-MSC and Point-of-Interconnection

Static Trunking in Satellite and Radio Link Applications

The high-compression techniques and voice quality protection mechanisms of I-Gate 4000 Media Gateways enable a cost-effective solution for satellite and radio link routes over TDM or IP links. A static trunking solution with I-Gate 4000 Gateways can be deployed either in a single-route point-to-point configuration, or in a point-to-multipoint configuration (supporting multiple bearer links), thus handling traffic to multiple destinations. See Figure 3 for an example. Furthermore, the smart End-to-End Compression feature of the I-Gate 4000 Media Gateway Series can contribute to additional CAPEX and OPEX savings in applications encompassing call paths through several compression and decompression segments (hops).

As the I-Gate 4000 Media Gateway Series supports an in-band management feature, management traffic can be carried through the same bearer link that interconnects two distant sites, thus allowing the operator to manage remote I-Gate 4000 Media Gateways from a central (hub) site, with no need for separate management links.

In addition, the embedded cross-connect feature, which supports any-to-any cross-connection between E1/T1 64 kbps DS0 channels, allows operators to reduce overall expenses in applications requiring interconnection to multiple narrow bandwidth (thin-route) satellite links and in ring-topology microwave applications including drop/insert nodes.

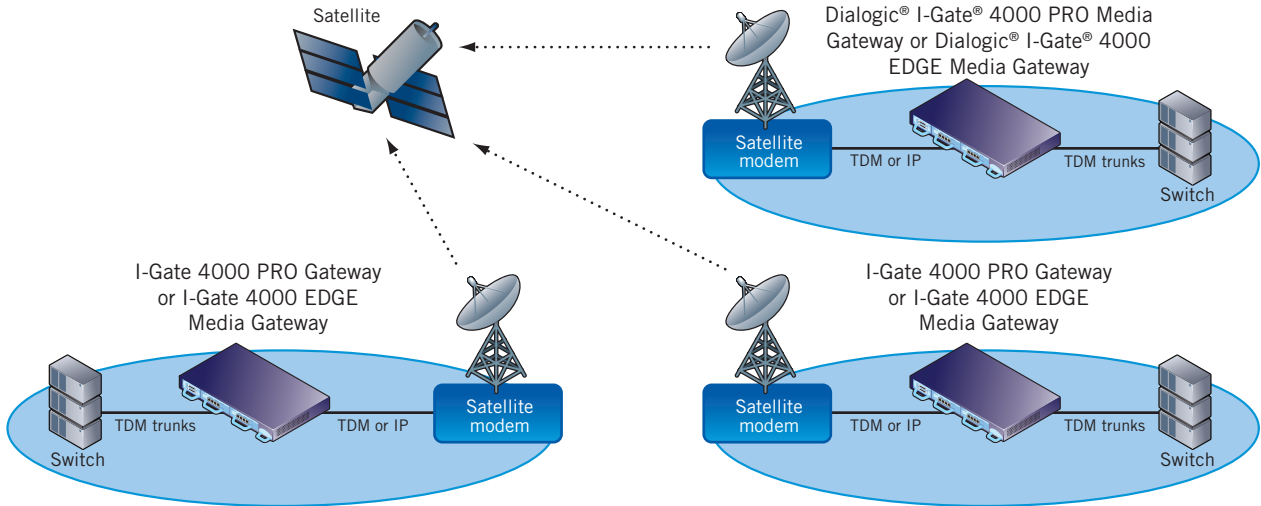


Figure 3. Satellite Static Trunking

Softswitch-Based Packet Toll/Tandem and Other Services

I-Gate 4000 Media Gateways can be controlled by a softswitch using MGCP, H.248/Megaco, or SIGTRAN. Through standards support, the I-Gate 4000 Media Gateway Series enables carriers to deploy next-generation VoIP switching solutions for applications such as domestic and international long-distance services, wireline or wireless network tandem switching, Class 4 switch replacement, and PRI trunking. See Figure 4 for examples of VoIP switching applications.

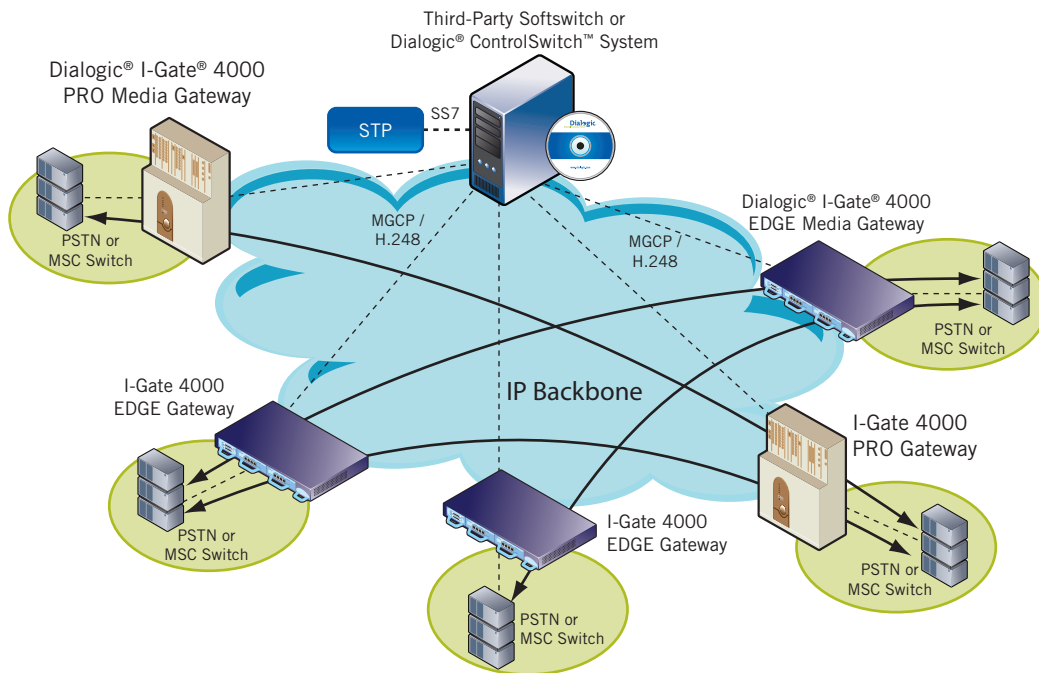


Figure 4. VoIP Switching Applications

Technical Specifications

Technical Specifications for Both Dialogic® I-Gate® 4000 EDGE Media Gateway and Dialogic® I-Gate® 4000 PRO Media Gateway

Operation Mode

Softswitch-controlled mode (MGCP v1.0, H.248/Megaco)
Standalone static trunking (without softswitch)

Traffic Processing

Signal Detection and Classification (Voice, Fax, VBD, Video, DTMF, signaling)
Silence Suppression (Voice Activity Detection and Comfort Noise Injection)
Router-agnostic and bandwidth-efficient RTP Multiplexing mechanism
Bandwidth-efficient signaling transmission mechanism (SS7, PRI, CAS)

Voice Codecs

G.711 PCM @64 kbps A-law/ μ -law
G.729A(+B) CS-ACELP @8 kbps
G.723.1 ACELP /MPMLQ @5.3, 6.3 kbps
EFR @12.2 kbps

Echo Cancellation

ITU G.168 and G.165 compliant
Up to 128 msec echo tail length
Dynamic EC enabling

Fax

Group 3 fax calls
V.27, V.29 and V.17 (up to 14.4 kbps)
ITU T.38 fax relay or passthrough mode
V.34 fax (V.Fax) — Passthrough mode

Voice Band Data (Modem)

V.22, V.23, V.32, V.34, V.90 and V.92 modems
Passthrough mode

Video

Automatic detection and reliable transmission of H.324 video calls

DTMF Handling

DTMF tones transfer according to RFC2833
MGCP/H.248 — DTMF package support

Network Jitter Compensation

Adaptive jitter buffer up to 300 msec

Technical Specifications *(continued)*

Clear Channel

64 kbps (G.711), VAD OFF, EC OFF
RFC4040 Clear Mode

Signaling

Bandwidth-efficient and robust signaling transport over IP
ISDN support: ISDN-PRI though IUA SIGTRAN Protocol (RFC3057)
M3UA

Embedded Cross-Connection

Any-DS0 to any-DS0
Operator-configurable

Security

Embedded firewall
Access list
IP Sec protocol (RFC2401)

Quality of Service

Smart end-to-end compression quality protection
QoS protection control mechanism — Operator-configurable threshold
DiffServ (TOS field)
ITU Q.50 Interface protocol

TDM Interfaces

E1 complying with ITU G.703 and G.704
T1 complying with ITU G.703 and G.704

IP Protocols

IPv4
RTP (RFC3550)
RTCP (RFC3551)
SNMPv2 (RFC1907)
FTP (RFC959)
SNTP (RFC2030 v4)
IP (RFC791)
UDP (RFC768)
IKE (RFC2409)
ESP (RFC2406)
ISA KMP (RFC2407, 2408)

Technical Specifications (continued)

IP Routing Protocols

RIPv1 (RFC1058)

RIPv2 (RFC2453)

Static routing

Redundancy

Softswitch redundancy support

Fan redundancy and turbo mode

Reliability

99.99995% (six 9s)

Hot module swapping

Hitless SW upgrade

Runtime configuration

Power

DC power input -48 VDC / -60 VDC (nominal)

Internal Clock Accuracy

4.7 ppm (Stratum 3)

Electro-Magnetic Compatibility

Europe	EN300 386 V1.3.2 (2003-05) Emission — EN55022 Immunity — EN61000-4-2,3,4,5,6,11
North America	FCC rules CFR 47 part 15
Canada	ICES-003
Japan	VCCI V-3/2001.04
Australia/NZ	CISPR 22:04

Product Safety

UL60950.1:2003 (US) (selected models)

CAN/CSA-C22.2 No.60950-1-03 for Canada (selected models)

CE EN60950-1:2001

CB-Safety: IEC 60950-1:2001 (selected models)

Technical Specifications *(continued)*

Electro-Magnetic Compatibility

Europe	EN300 386 V1.3.2 (2003-05) Emission — EN55022 Immunity — EN61000-4-2,3,4,5,6,11
North America	FCC rules CFR 47 part 15
Canada	ICES-003
Japan	VCCI V-3/2001.04
Australia/NZ	CISPR 22:04

Product Safety

UL60950.1:2003 (US) (selected models)
CAN/CSA-C22.2 No.60950-1-03 for Canada (selected models)
CE EN60950-1:2001
CB-Safety: IEC 60950-1:2001 (selected models)

Approvals, Compliance, and Warranty

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

Additional Technical Specifications for Dialogic® I-Gate® 4000 EDGE Media Gateway

Total Capacity

Up to 496 simultaneous calls (any codec or combination of codecs)

Signaling

CAS-R1 (static trunking)
CAS-R2
CAS-R1.5 (switched)

QoS Management

Multiple queues
IP packet classification and marking
Multiple congestion avoidance mechanisms
Scheduling and shaping
Policing

Ethernet Interfaces

100BaseT (Fast Ethernet)
VLAN Tag — IEEE 802.1q

Technical Specifications *(continued)*

Redundancy

Main module	1:1 redundancy
Power input	1:1 redundancy
Power supply	1:1 redundancy
IP link	
TDM Bearer	

Power

AC power input	240 VAC / 100 VAC (nominal)
Max. DC power consumption	80 Watts
Max. AC power consumption	105 Watts

Additional Technical Specifications for Dialogic® I-Gate® 4000 PRO Media Gateway

Total Capacity

- Up to 13,392 simultaneous G.729A and/or G.723.1 and/or EFR calls
- Up to 16,800 simultaneous G.711 calls

Signaling

- CAS-R1 (DS3 or OC3, MGCP package)
- CAS-R2 (CAS tunneling, static trunking)

DSP Pooling Functionality

Ability to oversubscribe to maximize system utilization for low-Erlang deployments

Border Gateway Capability

- Support IETF MIDCON model
- IMS architecture-compliant

Transcoding Capability

- Voice
- Fax
- DTMF

Ethernet Interfaces

- Gigabit Ethernet — optical and electrical interfaces
- 100BaseT
- VLAN Tag — IEEE 802.1q

TDM Interfaces

- DS3 complying with ANSI T1.102 and T1.107
- STM-1/OC3 (optical and electrical) complying with ITU G.703, G.707, G.813, G.825, G.783, G.957, and GR-253

Technical Specifications *(continued)*

IP Routing Protocols

IS-IS (RFC1195)

Redundancy

E1/DS1 TDM Interface cards	1:N redundancy
DS-3 TDM Interface cards	1:N redundancy
OC-3 / STM-1, SONET/SDH Interface card	1:1 redundancy
DSP cards	1:N redundancy
CPU, TDM-switch fabric, and Layer 2/3-switch fabric card	1:1 redundancy
Power Feed	1:1 redundancy
Clock	1:1 redundancy
100BaseT and 1 Gigabit Ethernet ports	1:1 link redundancy
OC-3/STM-1 SONET/SDH	1:1 link redundancy

Power

Max. DC power consumption 795 Watts

Environmental Standards

ETSI — ETS 300 019

Telcordia — 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)

Operating Temperature Range

-5°C to 50°C

Dimensions

Height	25 in. max (635 mm)
Width	17.44 in. (444 mm)
Depth	10.82 in. (274 mm)
Weight	30 kg (fully populated)



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