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Ubigate iBG1004™

System Description

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The purposes of Safety Concerns are to ensure user's safety and to prevent property losses.
Please read this document care fully for porper use.

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TRADEMARKS

Ubigate iBG1004 is a registered trademark of SAMSNUG Electronics.
All other company and product names may be trademarks of the respective companies with which they are associated.

This manual should be read before the installation and operation, and the operator should correctly install and operate the product by using this manual.

This manual may be changed for the system improvement, standardization and other technical reasons without prior notice.

If you have a question for the content of manual or want to obtain further information on the updated manual, please contact the homepage below.

Homepage: http://www.samsungdocs.com

GENERAL USER INFORMATION

Radio Frequency Interference

The Ubigate iBG1004 has been tested and found to comply with the limits for a Class A digital device, pursuant to FCC Part 15 Rules.
These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his/her own risk.

FCC Requirements

The Ubigate iBG1004 complies with FCC Part 68 Rules and requirements adopted by Administrative Council for Terminal Attachment (ACTA).

FCC Part 68

The FCC Part 68 label is located on the bottom of the chassis.
The label contains:

- Product Identifier Number
- FCC Registration Number
- Ringer Equivalence Number (REN)

NOTE
If requested, this information must be provided to your telephone company.

Unauthorized Modifications

Any change or modifications performed on this equipment that are not expressly approved in writing by SAMSUNG ELECTRONICS, CO., LTD. could cause non-compliance with the FCC rules and void the user's authority to operate the equipment.

Telephone Connection Requirement

A plug and jack is used to connect this equipment to the premises wiring and telephone network must comply with the FCC Part 68 rules and requirements adopted by the ACTA.
A compliant telephone cord and modular plug is provided with this product which is designed to connect to a compatible Standard Modular jack.
Connection to the telephone network should be made by using standard modular telephone jacks, type RJ-11C. The RJ-11C plug and/or jacks used must comply with the FCC Part 68 rules.

CIRCUIT TYPE	MODULE TYPE	FACILITY INTERFACE CODE	NETWORK JACK
LOOP START LINE	FXO T1E1	02LS2 04DU9.DN 04DU9.1KN 04DU9.1SN 04DU9.1SN (PRI)	RJ11C RJ48C
DID LINE	FXS T1E1	02RV2.T 04DU9.BN	RJ11C RJ48C
E & M TIE LINE	T1E1	04DU9.BN	RJ48C

Ringer Equivalence Number

The REN is used to determine the number of devices to be connected to a telephone line. If the total allowable REN load is exceeded, the phone circuit may fail to ring. In most cases, the total REN for a telephone line should not exceed Five (5).
Contact Local Telephone Company, to be certain about the number of devices connected to a line, which is determined by the total REN.
For earlier products, the REN is separately shown on the label.

Incidence of Harm

The telephone company will notify you in advance about the temporary discontinuation of service, if the Ubigate iBG1004 is causing harm to the telephone network.
In case advance notification is not feasible, the telephone company will notify the customer as soon as possible and you will also be advised about your right to file a complaint with the FCC, if it is necessary.

Changes to Telephone Company Equipment or Facilities

The telephone company may make changes in its facilities, equipment, operations or procedures that could affect the operation of the equipment.
If this happens, the telephone company will provide advance notice in order for you to make necessary modifications to maintain uninterrupted service.

Service Center

If you need assistance during troubleshooting, please contact out local office SAMSUNG ELECTRONICS, CO., LTD. for repair or warranty information.
If the trouble is causing harm to the telephone network, the telephone company may request you to remove the equipment from the network until the problem is resolved.

Field Repairs

Only technicians certified on the Ubigate iBG1004 are authorized by SAMSUNG ELECTRONICS, CO., LTD. to perform system repairs.
Certified technicians may replace modular parts of a system to repair or diagnose trouble. Defective modular parts can be returned to SAMSUNG ELECTRONICS, CO., LTD. for repair.

General

Connection to party line service is subject to state tariffs. Contact the State Public Utility Commission, Public Service Commission or Corporation Commission for information.

Direct Inward Dialing (DID)

If the equipment is not operating as per the **Proper Answer Supervision** mentioned in FCC Part 68 rules, then it is a violation.
Rules of PROPER ANSWER SUPERVISION:

1. Always On the following DID calls, the Equipment returns Answer Supervision to the Public Switched Telephone Network (PSTN)
   - Answered by the called station.
   - Answered by the attendant.
   - Routed to a recorded announcement that can be administered by the Customer Premises Equipment (CPE) user.
   - Routed to a dial prompt.
2. Always this equipment returns answer supervision on all DID calls forwarded to the PSTN.
   Permissible exceptions are:
   - A call is unanswered.
   - A busy tone is received.
   - A reorder tone is received.

Equal Access Requirements

Through the use of access codes, this equipment is capable of providing user's access to interstate providers of operator services. Modification of this equipment by call aggregators to block access dialing codes is a violation of the Telephone Operator Consumers Act of 1990.

Electrical Safety Advisory

Parties responsible for equipment requiring AC power should consider including an advisory notice in their customer information suggesting them to use a surge

arrestor. Telephone companies report that electrical surges, typically lightning transients, are very destructive to customer terminal equipment connected to AC power sources. This has been identified as a major nationwide problem.

Music on Hold Warning

In accordance with US copyright laws, a license may be required from the American Society of Composers, Authors and Publishers (ASCAP) or other similar organizations if copyright music is transmitted through the **Music on Hold** feature.

SAMSUNG ELECTRONICS, CO., LTD. hereby disclaims any liability arising out of failure to obtain such a license.

Direct Inward System Access (DISA) Warning

The lines used for the DISA feature must have the disconnected Supervision option provided by the telephone company.

As it is impossible to control who may access your DISA line it is suggested that you do not turn this feature on unless you intend to use it. If you do use this feature, it is good practice to frequently change pass codes and periodically review your telephone records for unauthorized use.

Safety Warnings

High touch current earth connection is essential before making telecommunication network connection.

Energy Hazard-careful treatment is needed.

Every wire for communication should be larger than 26 AWG.

Double pole/neutral fusing.

Underwriters Laboratories

The Ubigate iBG1004 has been tested to comply with Safety Standards in the United States and Canada. This system is listed with Underwriters Laboratories. The cUL Mark is separately shown on the label.

Installation Safety Guidelines and Warnings

Safety Recommendations

The Safety Warnings that appear in this document (such as the one below) indicate a procedure that can harm you if not done correctly.

Electric hazard exists. Verify the power is turned off. Do not work on energized equipment. Working on energized equipment can result in serious electrical shock.

To avoid electric shock, do not connect Safety Extra-Low Voltage (SELV) circuits (found in LAN ports) to Telephone-Network Voltage (TNV) circuits (found in WAN ports).

This equipment must be installed and maintained by properly trained service personnel. Make sure the proper electrical service is available before plugging the unit and turning it on. Disconnect the telecommunication lines before unplugging the main power connector.

Cover Panels

Do not operate the Ubigate iBG1004 with missing blank faceplates and cover panels. These covers prevent exposure to hazardous voltages and currents inside the chassis. They are important to maintaining proper air flow through the chassis. They also prevent Electromagnetic Interference (EMI) that might disrupt other equipment.

Laser radiation and EMI are present when the router cover panel is open.

Electrostatic Discharge (ESD) Warning

Observe the following guidelines to minimize the potential for Electrostatic Discharge (ESD) damage, which can cause intermittent or complete component failures.

When handling Ubigate iBG1004 or its components, wear grounding wrist straps to avoid ESD damage to the equipment. Do not directly touch the backplane with your hand or any metal tool, or you could shock yourself.

1. Always use an ESD wrist strap or ankle strap, and verify that it is in direct contact with your skin. Avoid contact between the component and your clothing as it causes ESD damage.
2. When handling any component that is removed from the chassis, verify that the equipment end of your ESD strap is attached to one of the ESD points on the chassis.
3. Use care when installing or uninstalling modules or interface cards. Tighten the captive installation screws to ensure a proper connection when inserting modules or interface cards.
4. When removing or installing a component, always place it component-side up on an antistatic surface, in an antistatic card rack. If you are returning a component, place it in an electrostatic bag before packing it.

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INTRODUCTION

Purpose

Ubigate iBG1004™ System Description describes general information for Ubigate iBG1004.

Document Content and Organization

This description is composed of two Chapters, two Annexes, and the Abbreviation.

CHAPTER 1. Introducing Ubigate iBG1004

Describes Ubigate iBG1004 overview and specifications.

CHAPTER 2. Hardware Overview

Describes the hardware overview.

ANNEX A. Cable Specifications

Describes cable specifications.

ANNEX B. Open Source Announcement

Open source announcements for this product.

ABBREVIATION

Describes the acronyms used in this description.

Conventions

The following types of paragraphs contain special information that must be carefully read and thoroughly understood. Such information may or may not be enclosed in a rectangular box, separating it from the main text, but is always preceded by an icon and/or a bold title.

WARNING
Provides information or instructions that the reader should follow in order to avoid personal injury or fatality.

CAUTION
Provides information or instructions that the reader should follow in order to avoid a service failure or damage to the system.

CHECKPOINT
Provides the operator with checkpoints for stable system operation.

NOTE
Indicates additional information as a reference.

Information for Product and Technical Support

For questions regarding the product and technical supports:
http://www.samsungnetwork.com

Revision History

EDITION	DATE OF ISSUE	REMARKS
00	03. 2010.	First edition
01	08. 2010.	Modified Open Source Announcement

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LIST OF FIGURES

CHAPTER 1. Introducing Ubigate iBG1004

Chapter1 describes Ubigate iBG1004 overview and specifications.

Ubigate iBG1004 Overview

Main Features, Functions and Benefits

Ubigate iBG1004 is a Multi-Service Business Gateway which provides routing, security, and voice gateway features.
Here are highlights of Ubigate iBG1004's features.

Versatility

- WAN: HDLC, Frame Relay, Multi-link Frame Relay (MFR), Point to Point Protocol (PPP), Multi-Link PPP (MLPPP), and PPP over Frame Relay
- LAN: 100 Mbps Metro Ethernet, Virtual Local Area Network (VLAN), and 802.1q
- QoS: DiffServ, Auto QoS, Link Fragmentation and Interleaving (LFI), Priority Queuing, Class-Based Weighted Fair Queuing (CBWFQ), and Frame Relay PVC Queuing

Rock-Solid but Flexible Security

IPSec, Generic Routing Encapsulation (GRE), Layer 2 Tunneling Protocol (L2TP), Triple Data Encryption Standard (3DES)/Advanced Encryption Standard (AES), and Firewall.

Ubigate iBG1004 Specifications

Product Specification

Item			Specification
System Memory			– Typical: 512 MB – Maximum: 1 GB
u-SD Flash Memory			– Typical: 1 GB – Maximum: 2 GB * For normal operation, only Samsung certified u-SD should be used.
Boot Flash Memory			2 MB
AC Power Supply			– Input Voltage: 100~240 V – Frequency: 50~60 Hz – Power Consumption: 72 W
Temperature	Operating	High	113°F (+45°C)
		Low	32°F (0°C)
	Non-Operating	High	158°F (+70°C)
		Low	-13°F (-25°C)
Humidity (Operating)			5 to 90%, non-condensing
Dimension			– Height: 2.56-inch (65 mm) – Width: 14.17-inch (360 mm) – Depth: 11.81-inch (300 mm)
Weight			3 kg
Altitude			0 to 13,123 ft (0 to 4, 018 m)
Regulatory & Safety Compliance			– KCC Type Approval/EMC Registration – IEC 60950-1/EN 60950-1/UL 60950-1 – EN 55022/EN 55024/EN 61003-3-2/ – EN 61003-3-3 – FCC Part 15 Class A – FCC Part 68

Ethernet Interface Specification

Item	Specification
Data flow	Full-duplex or half-duplex
Connectors	RJ-45
Data speed	10/100 Mbps, auto negotiating

Memory

Ubigate iBG1004 supports the following types of memory:

- Double-Data-Rate II Synchronous Dynamic Random Access Memory (DDR II SDRAM): This type of memory stores the running configuration and routing tables. It also buffers packets at the network interfaces. The base configuration shipped from the factory has 512 MB of main memory. The Small Outline Dual In-line Memory Module (SODIMM) slot can be used to upgrade the main memory to a maximum of 1 GB.
- Internal Flash Memory: Ubigate iBG1004 includes 2 MB of internal flash memory which is used to boot the router. Ubigate iBG1004 also has 1 GB of internal flash memory to store application software and user configuration information.

Power Supply

Ubigate iBG1004's Power Supply Module provides +12 VDC with an AC input between 100 and 240 VAC.

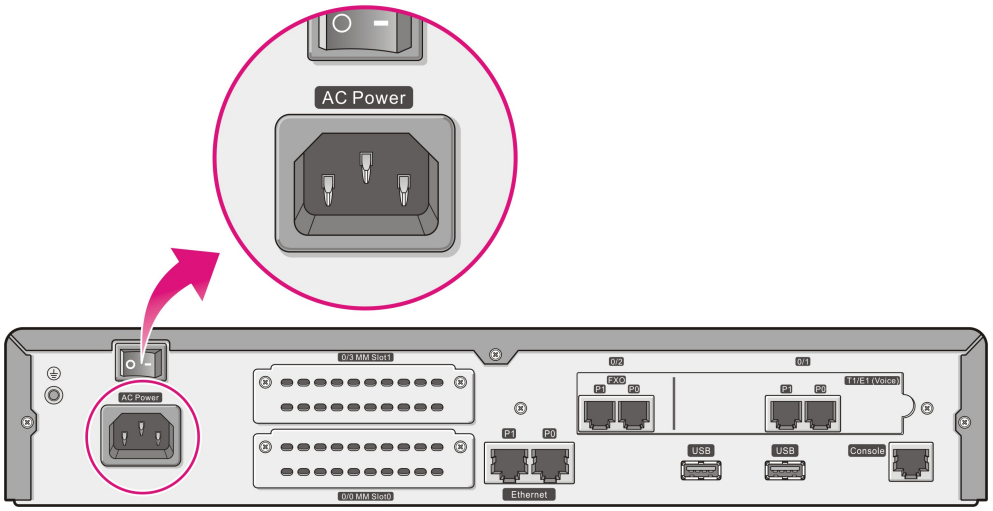

Figure 1.1 Power Supply

Ventilation

There is a cooling fan on the right side of the system which pushes internal air out, so that the air goes through the system out to the right side. On both sides, there is a grid of holes where air comes in and goes out. When installing Ubigate iBG1004, ensure to make room around the system in order not to block air flow.

Figure 1.2 Ventilation

Real-Time Clock

Ubigate iBG1004 provides a real-time clock so that Ubigate iBG1004 can maintain the correct date and time.

Ubigate iBG1004 Software Features

Switch/Router Features

The following table lists the switch/router features supported by iBG1004.

Category	Features and Licenses	
Layer 2 Protocols	VLAN (802.1q, Port)	
WAN Protocols	– HDLC – FR/MLFR, PPP/MLPPP – PPP over FR, Multi-Link PPP over FR – FR Congestion Management and Traffic Policing	
Routing Protocols	– Static Routing – BGP v4, OSPF v1/v2, RIP v1/v2 – IGMP v1/v2/v3 – PIM-SM/SSM, DVMRP – VRRP – Policy-Based Forwarding/Routing	
Quality of Service	DiffServ	– Classification (MF, Flow Label) – Marker (SrTCM/TrTCM) – Policing/Shaping – Queuing (CBQ, PQ) – Congestion Avoidance (WRED)
	– Bandwidth Guarantee – LFI – Mapping of IP DSCP field to Frame Relay DE bit – QoS for FR PVC – Inter-PVC QoS – Queuing for IPSec Encryption Engine	
Load Balancing	– Per Flow (ECMP) – Per Packet	
Performance	Routing	– IPv4 Forwarding: 130 Kpps – Max. Route Table Size: 10 K – Max. MAC Table Size: 1 K

Category	Features and Licenses
Management	– Multilevel Administration Access (MLA) – SNMP v1/v2/v3 – CLI, Telnet, SNTP, TFTP, DHCP, SSHv2 – MIBs – Logging & Reporting, Diagnostic – System Image rollback
AAA Client	– RADIUS – TACACS+

Security Features

The following table lists the security features supported by iBG1004.

Category	Features and Licenses
Secure Connectivity	– IPSec for Site to Site – IPSec for Remote Access – hub-and-spoke support – Encryption (DES, 3DES, AES) – L2TP, GRE – Data Integrity (MD5, SHA-1) – Authentication (XAUTH) – Key Management (Manual, IKE v1 (PKI, Pre-shared)) – NAT Traversal
Internal Security	– AAA – ACL – MAC Address Filtering
Attack Defense	– Route mode – Packet Filtering – Stateful Packet Inspection – NAT (1:1, N:1, Reverse, Dynamic) – ALG (FTP, DNS, TFTP, RPC, HTTP (WEB), and SMTP) – Application Content filtering (Java, ActiveX) – DoS/DDoS Protection – IP/TCP fragment attack protection – IP Spoofing Protection – URL Filtering – DMZ
Management	– Reporting – Logging

Category	Features and Licenses	
Performance	Firewall	– Performance: 60 Kpps – Concurrent Sessions: 64 K – Sessions setup rate: 500 sessions/s
	VPN	– Performance: 80 Mbps – Maximum Tunnels: 200 – Tunnel Setup rate: 3 tunnels/s

Voice Features

The following table lists the security features supported by iBG1004.

Category	Features and Licenses
System Interface and Signaling	– Analog FXS, FXO – Analog DID (Direct Inward Dial) – BRI – T1-CAS E & M, FXO, FXS – E1-CAS R2 MFC/DTMF – T1/E1 ISDN PRI Q.931, T1/E1 Q.SIG – T1 R1 – CAMA Trunk
System Features	– PSTN Fallback, Survivable Telephony – Call Admission Control (CAC) – FAX over IP – Distinctive dial tone, Distinctive ring – Number Analysis and Routing – Local Voice Busy Out (LVBO) – DTMF Signaling over IP – Early Media Handling – Private Line Automated Ringdown (PLAR) – Audible/Visible MWI for Analog Phone – Hunt-Group (Policy, Transfer, Forwarding) – Station Group – Time Schedule service (time-of-day, day-of-week)

Category	Features and Licenses
Supplementary Services	– Caller ID/Name – Call Forwarding always/busy/no-answer – Call Hold/Retrieve – Call Pickup Group/Direct/Universal – Call Transfer Blind/Attended – Call Transfer with 3-way consultation – Call Waiting – Incoming Call Blocking – 3-way conference – N-way conference – Call Park – Follow-Me – Last Number Redial – Do Not Disturb – Call Return – Music-On-Hold – Tone-On-Hold
Protocols	– SIP, H.323, RTP/RTCP, cRTP, S/MIME, TLS, sRTP – HTTP Digest Authentication
DSP Features	– Codec: G.711, G723.1, G.726, G.729 A – Echo Cancellation (G.168-2002) – Comfort Noise Generation (CNG) – Voice Activity Detection (VAD) (G.729AB) – Tone-MF/DTMF – Tone-Dial, Ringback, Busy, Congestion, Wait, Hold – Progressing, Howling, Programmable, etc.
Performance	– BHCA: 1,500 – CPS: 0.42 – Max Stations: 50 – AHT: 120 – Concurrent Calls: 50

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CHAPTER 2. Hardware Overview

Chapter2 describes the hardware overview.

Ubigate iBG1004 should be installed on a desktop or 19-inch rack.
The front side has LED indicators. The rear side has console port, T1/E1 ports, and Fast Ethernet UTP ports. All cabling, including power cable, are installed from the rear side.

Ubigate iBG1004 Routing Engine

The Routing Engine (main board) contains a central processor of the router, core peripherals, memory, and external interfaces including a serial management port, two Fast Ethernet ports, two USB ports. In addition, it has two mini-module slots to accommodate interface cards in order to support serial, ADSL, and Ethernet port. It also has a variety of voice ports consisting of FXS, FXO, PRI, or BRI. Lastly, iBG1004 has an internal slot to accommodate an optional module called IOM (Internal Option Module). With IOM, iBG1004 can support additional enhanced functionality.

Ubigate iBG1004 Chassis

The following figure is an isometric view of the system, with the main chassis without the external enclosure.

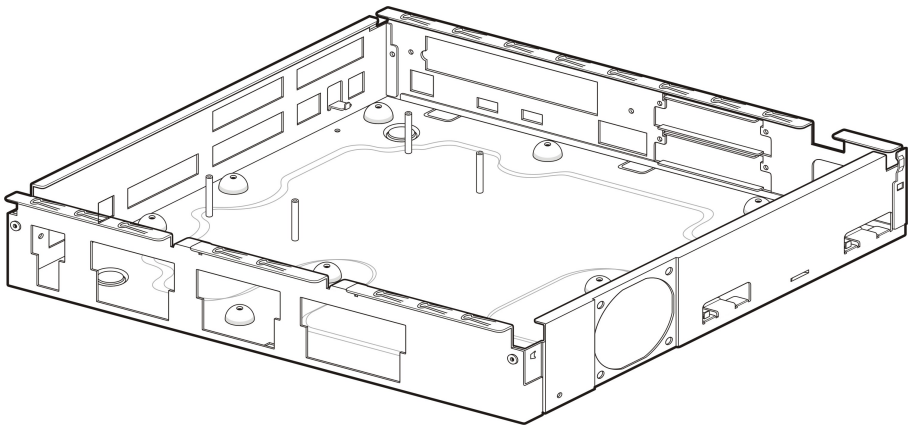

Figure 2.1 Isometric View

Ubigate iBG1004 Boot Sequence

All circuitry within Ubigate iBG1004 is reset to its initial state by the reset circuitry on the main board.
During normal operation, the reset circuitry monitors an internal power supply of the main board and, after it reaches a normal operating level, generates a reset pulse to the routing processor and all of the other circuitry on the main board.
The main board reset circuitry also includes a watchdog timer.
The watchdog timer causes Ubigate iBG1004 reset if the programmed interval elapses without the processor triggering the watchdog.
Ubigate iBG1004 boot is the sequence of software-driven events starting from the reset pulse to the loading and running of the application image.
On reset, the processor starts executing instruction from a specific location in the boot flash. This first software run is the boot loader. After CPU memory controller initialization, the boot loader locates, verifies, and runs a boot image located in the internal flash storage. The boot image then continues with the necessary initialization, decompresses, and moves itself to RAM. Once the boot image is moved to RAM, control is given to boot software residing in RAM.
At this point the additional initialization of hardware and driver software is performed before SNOS (Samsung Network Operating System) can be loaded onto RAM from flash. The SNOS software prepares Ubigate iBG1004 for forwarding packets through the interfaces at which time Ubigate iBG1004 is fully up and running.
There are various software services that support the application software. These include a file system, logging, monitoring, validation of downloaded image and flash update.

Ubigate iBG1004 Front Side

The front side of the Ubigate iBG1004 has LEDs in order to indicate the system's performance and operation status as shown in figure below.

Figure 2.2 Ubigate iBG1004 Front View

Proper LED status is shown in the following table.

LED	Indication & Color	Description
⏻ (Power)	Solid blue	Power supply installed and operating normally.
	Amber	Power supply installed but power fault condition detected.
	Off	Power supply not present or Power supply malfunctioning.
SYS	Solid green	System is operating normally.
	Solid red	System is not operating normally.
	Amber	System diagnostic mode.
	Off	Router is not receiving power.
IOM	Solid green	IOM (Internal Option Module) card present and operational.
	Solid red	IOM card present but not operational.
	Off	IOM card not present.
FAN	Solid green	Fan is operating properly.
	Solid red	Fan is malfunctioning.
	Off	Fan has been stopped by user configuration.
0, 1 (MM Slot)	Solid green	A mini-module is installed and operating normally.
	Solid red	A mini-module is installed but a critical fault has been detected.
	Amber	User alarm detected.
	Off	A mini-module is not installed.

LED	Indication & Color	Description
Link0, 1 (Ethernet)	Solid green	Ethernet port link is detected.
	Off	Ethernet port link is not detected.
Act0, 1 (Ethernet)	Blinking Amber	Indicates transmit/receive activity with speed 10/100 Mbps.
	Off	No activity.

Ubigate iBG1004 Rear Side

Ubigate iBG1004 rear side has several interface ports and slots as shown in figure below. Power connector, power switch, and ground stud are also located in the rear side.

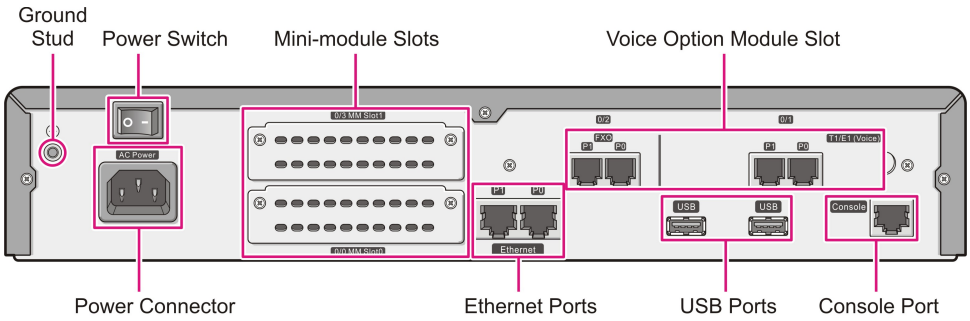

Figure 2.3 Ubigate iBG1004 Rear View

Description of each part is as follows.

Connector	Description
Ground stud	A screw hole for grounding lug
Power switch	Switch to turn on or off the power supply
Power connector	AC power connector
Mini-module slots	Optional mini-modules to support additional interfaces such as ADSL, serial, and Ethernet module can be plugged into these slots.
Voice option module slot	A voice option module can be plugged into this slot. One is pre-assembled in the factory in order to meet different deployment needs. The following voice option modules are present: – 2 FXO + 4 FXS – 2 FXO + 8 FXS – 2 FXO + 16 FXS – 2 FXO + 2 T1/E1 – 2 T1/E1 + 4 FXS – 2 FXO + 4 BRI
Ethernet ports	Fast Ethernet LAN connection
USB ports	Supports USB2.0 interface
Console port	Serial port for local monitoring and configuring

Console Port

The console port is an RS-232 asynchronous serial port that operates at up to 9,600 bps. The console port is activated immediately after system resets and allows the system operator to directly control the system using the Command Line Interface (CLI).

USB Port

The Universal Serial Bus (USB) port is USB 2.0 compliant. USB interface (Type A) is configured as a host. This port can accommodate a USB flash memory module which can be used to store a system software or configuration file. It is strongly recommended to use Samsung-certified USB flash memory module on iBG1004. Contact your local Ubigate dealer in order to get a Samsung-certified USB flash memory.

Ethernet Port

The Ubigate iBG1004 has two 10/100 Mbps Ethernet ports. Use a Category 5 (minimum) Ethernet cable with RJ-45 connectors to connect to the network via an Ethernet port.

Mini-Modules

ATOP-1 (1-Port ADSL Over POTS Mini-Module)

This mini-module provides an ADSL interface connecting to the Central Office through a POTS line. The module has one ADSL port and one Ethernet port. The ADSL port should be connected with POTS network. However, the Ethernet port is for use in other iBG models. Therefore, the Ethernet port should not be connected to any other device or port.

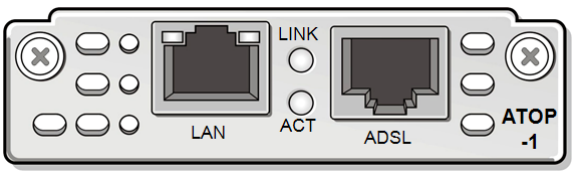

Figure 2.4 ATOP-1 Mini-Module

The following table explains the LEDs states in detail.

LED	Indication & Color	Description
LINK	Green	Link is established.
	Blinking Green	Link is not established.
	Off	Port is not connected.
ACT	Green	Transmit/Receive is not active.
	Blinking Green	Transmit/Receive is active.
	Off	Port is not enabled.

ATOI-1 (1-Port ADSL Over ISDN Mini-Module)

This mini-module provides an ADSL interface connecting to the Central Office through an ISDN line. The module has one ADSL port and one Ethernet port. The ADSL port should be connected with ISDN. However, the Ethernet port is for use in other iBG models. Therefore, the Ethernet port should not be connected to any other device or port.

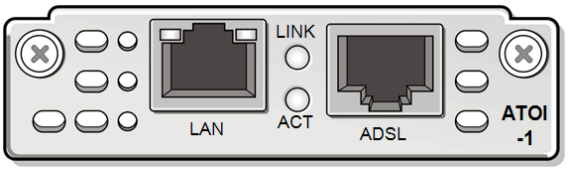

Figure 2.5 ATOI-1 Mini-Module

The following table explains the LEDs states in detail.

LED	Indication & Color	Description
LINK	Green	Link is established.
	Blinking Green	Link is not established.
	Off	Port is not connected.
ACT	Green	Transmit/Receive is not active.
	Blinking Green	Transmit/Receive is active.
	Off	Port is not enabled.

WTE-2SM (2-Port Serial Mini-Module)

This mini-module provides two serial ports, each running in either DTE or DCE mode at a data rates up to 8.0 Mbps. The interface mode for each port may be independently selected as V.35, RS-232/V.28, RS-449/V.11, EIA-530, EIA-530A, or X.21/RS-422.

Figure 2.6 WTE-2SM Mini-Module

The following table explains the LEDs states in detail.

LED	Indication & Color	Description
RDY	Green	All diagnostics pass, and the module is operational.
	Off	Power down or removal status.
LNK 0 LNK 1	Green	Green indicates normal operation. The module is connected to an external DSU, and the signals, TA (DTE available) and CA (DCE available) are active.
	Red	Red indicates serial interface error. A possible cause might be mismatch between serial cable and interface type or operation mode.
	Amber	Loopback mode is on
	Off	LED off indicates that the port is neither connected to the DSU nor in loopback mode.

LMF-4M (4-Port Fast Ethernet Mini-Module)

This module provides four 10/100 Base-T Ethernet ports.

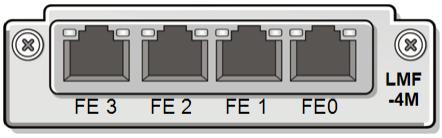

Figure 2.7 LMF-4M Mini-Module

The following table explains the LEDs states in detail.

LED	Indication & Color	Description
Link (Left LED)	Solid Green	Link is established with speed 10/100 Mbps.
	Off	Link failure or no connection.
Activity (Right LED)	Blinking Orange	Blinking orange indicates transmit/receive activity with speed 10/100 Mbps.
	Off	No activities.

Internal Option Module (IOM)

An IOM can be plugged into the IOM slot. An IOM can be used to support additional enhanced applications. (Currently, no IOM is supported. IOMs will be released in the future.)

DSP

iBG1004 has an on-board DSP which is used to process VoIP packets and analog/digital voice signal. Depending on sub-models, iBG1004 supports different DSP channel capacities.
The following table lists the number of channels supported by each sub-model for different CODECs.

CODEC	Except for iBG-1004D2/UKB	iBG-1004D2/UKB (A certain iBG1004 sub-model with 2 FXO + 2 T1/E1
G.711 10ms	64	96
G.711 20ms	64	128
G.711 30ms	64	128
G.711 40ms	64	128
G.711 50ms	64	128
G.711 60ms	64	128
G.729a 10ms	16	64
G.729a 20ms	16	64
G.729a 30ms	16	64
G.729a 40ms	16	64
G.729a 50ms	16	64
G.729a 60ms	16	64
G.726 10ms	16	64
G.726 20ms	16	64
G.726 30ms	16	64
G.726 40ms	16	64
G.726 50ms	16	64
G.726 60ms	16	64

CODEC	Except for iBG-1004D2/UKB	iBG-1004D2/UKB (A certain iBG1004 sub-model with 2 FXO + 2 T1/E1
G.723 30ms	16	64
G.723 60ms	16	64

The following table shows the information on VoIP data packets generated by each CODEC.

CODEC	Voice payload size		Ethernet packet size (bytes)	Data rate per call	
	Packet interval (ms)	Size (bytes)		Packet/s (Simplex)	Kbps
G.711 (64)	5	40	118	200	188.8
G.711 (64)	20	160	238	50	95.2
G.729a (8)	20	20	98	50	39.2
G.723.1 (6.3)	30	24	102	33.3	27.2
G.723.1 (5.3)	30	20	98	33.3	26.1
G.726 (32)	20	80	158	50	63.2
G.726 (24)	20	60	138	50	55.2

Port Numbering

This section describes the port number conventions used by Ubigate iBG routers. Ports on a network module are numbered in a format: *network module slot-number/port-number*, and ports on a mini-module are numbered in a format: *network module slot-number/mini-module slot number/port-number*.
Network modules are numbered from right to left, starting with slot number one. If there is more than one row, the bottom row is numbered first, from right to left, starting at slot one, then the next row up is numbered, from right to left, starting with the next slot number based on the lower rows last (left most) numbered slot. The main board is considered as network module slot 0.
Mini-modules are numbered from right to left, starting with slot number zero. If there is more than one row, the bottom row is numbered first, from right to left, starting at slot zero, then the next row up is numbered, from right to left, starting with the next slot number based on the lower rows last (left most) numbered slot.
Ports on any mini-module or network module are numbered from right to left, starting with port number zero. If there is more than one row of ports on a given module, the bottom row is numbered first, from right to left, starting at port zero, then the next row up is numbered, from right to left, starting with the next port number based on the lower rows last (left most) numbered port.

iBG1004 Port Numbering

The main system of an iBG1004 is considered as network module slot 0.
Thus, built-in ports on the system such as Ethernet ports are numbered in *0/x* format. Specifically, the Fast Ethernet ports are numbered 0/0 and 0/1, starting from right to left.

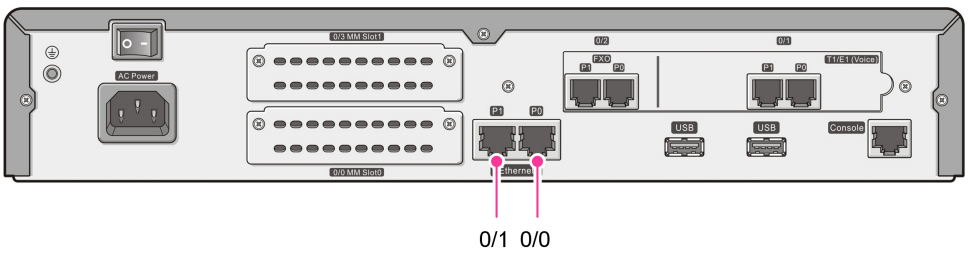

Figure 2.8 iBG1004 Port Numbering

iBG1004's voice option modules are considered to consist of two mini-modules according to the iBG1004 design concept. For instance, in figure above, two T1/E1 PRI ports and two FXO ports are considered two mini-modules.

Therefore, iBG1004 has four mini-module slots for the purpose of port numbering. The mini-module slot in the lower row has mini-module slot number 0. The mini-module slots in the upper row are numbered 1, 2, and 3, starting from the right. Thus, FXS or voice T1/E1 ports at the right most side are numbered in 0/1/x format. FXO ports are numbered in 0/2/x format. The ADSL port in the ADSL mini-module plugged into the lower slot is numbered 0/0/0.

ANNEX A. Cable Specifications

Console Port Cable

Cable Shape

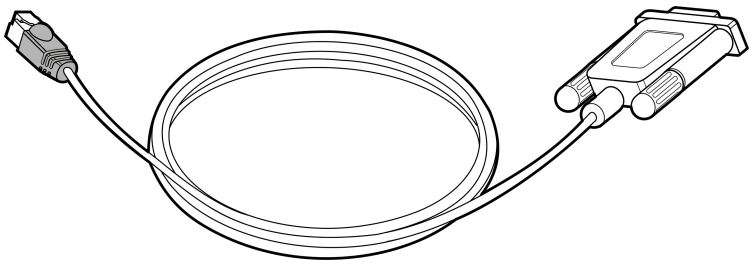

Figure A.1 Console Port Cable

Cable Signaling and Pinout

Console Port (DTE)	RJ-45 to RJ-45Rollover Cable	RJ-45 to DB-9 Terminal Adapter(connected to Rollover Cable)	Console Device
Signal	**RJ-45 Pin**	**DB-9 Pin**	**Signal**
RTS	1	8	CTS
DTR	2	6	DSR
TxD	3	2	RxD
GND	4	5	GND
GND	5	5	GND
RxD	6	3	TxD
DSR	7	4	DTR
CTS	8	7	RTS

Ethernet Cable

Cable Shape

- Cable Length: 6 feet
- Standard, Straight-Through Wiring (both ends are the same)
- 10/100/1000 Base-T interfaces

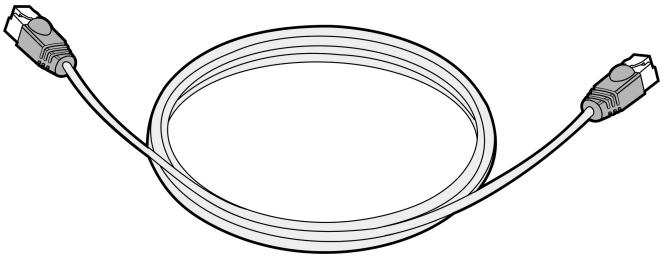

Figure A.2 Ethernet LAN Interface Cable

Cable Signaling and Pinout

RJ45 Pin #	Wire Color (T568A)	1000Base-T Signal
1	White/Green	BI_DA+
2	Green	BI_DA-
3	White/Orange	BI_DB+
4	Blue	BI_DC+
5	White/Blue	BI_DC-
6	Orange	BI_DB-
7	White/Brown	BI_DD+
8	Brown	BI_DD-

T1/E1 Cable

Cable Shape

- RJ-48C to RJ-48C Cable

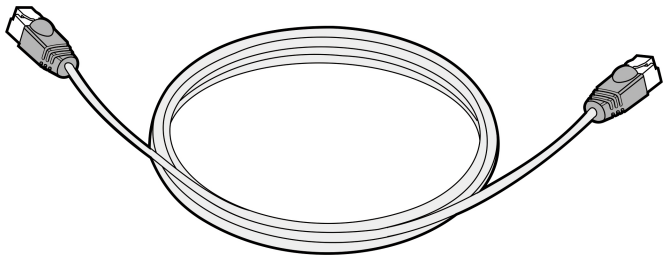

Figure A.3 T1/E1 WAN Interface Cable

Cable Signaling and Pinout

Pin	Signal		Pin	Signal
1	RXRING	←	4	TXRING
2	RXTIP	←	5	TXTIP
4	TXRING	→	1	RXRING
5	TXTIP	→	2	RXTIP

ATOP-1, ATOI-1 Port Cable

Cable Shape

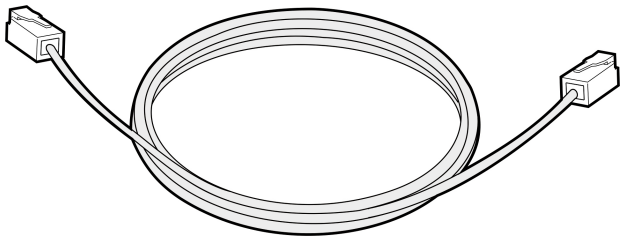

Figure A.4 ATOP-1, ATOI-1 Port Cable

Cable Signaling and Pinout

RJ-11 connector		RJ-11 connector	
Pin	**Signal**	**Signal**	**Pin**
1	-	-	1
2	-	-	2
3	Ring	Ring	3
4	Tip	Tip	4
5	-	-	5
6	-	-	6

BRI-S/T Port Cable

Cable Shape

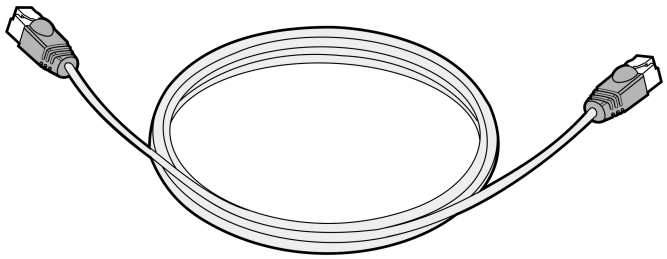

Figure A.5 BRI-S/T Port Cable

Cable Signaling and Pinout

8 Pin1	NT2	Polarity
3	Receive	+
4	Transmit	+
5	Transmit	–
6	Receive	–

1) Pins 1, 2, 7 and 8 are not used.
2) NT refers to network terminating layer 1 aspects of NT1 and NT2 functional groups.

RJ-21 Champ Connector Cable

Cable Shape

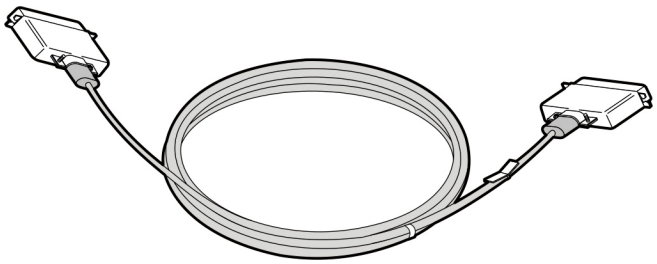

Figure A.6 RJ-21 Champ Connector Cable

Cable Signaling and Pinout

RJ-21(Left)	RJ-21(Right)	Signal name	RJ-21(Left)	RJ-21(Right)	Signal name
1 26	1 26	TIP 1 RING 1	14 39	14 39	TIP 14 RING 14
2 27	2 27	TIP 2 RING 2	15 40	15 40	TIP 15 RING 15
3 28	3 28	TIP 3 RING 3	16 41	16 41	TIP 16 RING 16
4 29	4 29	TIP 4 RING 4	17 42	17 42	-
5 30	5 30	TIP 5 RING 5	18 43	18 43	-
6 31	6 31	TIP 6 RING 6	19 44	19 44	-
7 32	7 32	TIP 7 RING 7	20 45	20 45	-
8 33	8 33	TIP 8 RING 8	21 46	21 46	-
9 34	9 34	TIP 9 RING 9	22 47	22 47	-
10 35	10 35	TIP 10 RING 10	23 48	23 48	-

RJ-21(Left)	RJ-21(Right)	Signal name	RJ-21(Left)	RJ-21(Right)	Signal name
11 36	11 36	TIP 11 RING 11	24 49	24 49	-
12 37	12 37	TIP 12 RING 12	25 50	25 50	-
13 38	13 38	TIP 13 RING 13	-	-	-

FXO, FXS Port Cable

Cable Shape

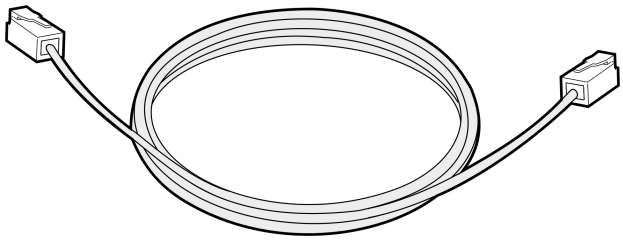

Figure A.7 FXO, FXS Port Cable

Cable Signaling and Pinout

RJ-11 connector		RJ-11 connector	
Pin	Signal	Signal	Pin
1	-	-	1
2	-	-	2
3	Ring	Ring	3
4	Tip	Tip	4
5	-	-	5
6	-	-	6

Serial Port Cable (X.21 DCE)

Cable Shape

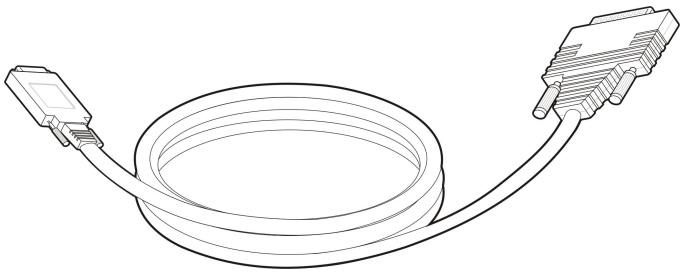

Figure A.8 Serial Port Cable (X.21 DCE)

Cable Signaling and Pinout

SMART Serial		DB15 Female	
PIN	**Signal**	**Signal**	**PIN**
21GND	-	-	-
SHELL	-	Shield GND	1
26GND	GND	Circuit GND	8
-	Not Used	Not Used	
8	O_RTS/CTS	INDICATION+	5
9	O_DTR/DSR+	INDICATION-	12
11	I_CTS/RTS+	CONTROL+	3
10	I_DSR/DTR+	CONTROL-	10
5	I_RXD/TXD+	TRANSMIT+	2
18	I_RXD/TXD-	TRANSMIT-	9
2	O_TXCE/RXC+	TIMING+	6
15	O_TXCE/RXC-	TIMING-	13
1	O_TXD/RXD+	RECEIVE+	4
14	O_TXD/RXD-	RECEIVE-	11
SHELL	-	-	SHELL

Serial Port Cable (X.21 DTE)

Cable Shape

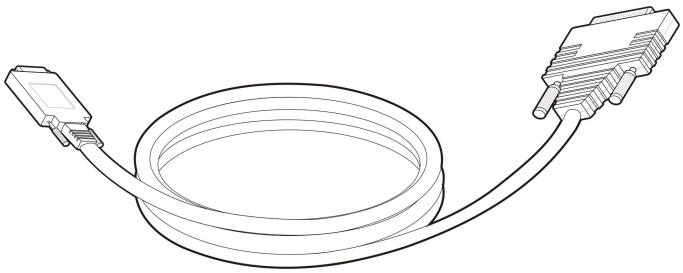

Figure A.9 Serial Port Cable (X.21 DTE)

Cable Signaling and Pinout

SMART Serial		DB15 Male	
PIN	Signal	Signal	PIN
21GND	-	-	-
24GND	-	-	-
SHELL	-	Shield GND	1
26GND	GND+	CCT GND	8
-	Not Used	Not Used	-
11	I_CTS/RTS+	INDICATION+	5
10	I_DSR/DTR+	INDICATION-	12
8	O_RTS/CTS+	CONTROL+	3
9	O_DTR/DSR+	CONTROL-	10
1	O_TXD/RXD+	TRANSMIT+	2
14	O_TXD/RXD-	TRANSMIT-	9
4	I_RXC/TXCE+	TIMING+	6
17	I_RXC/TXCE-	TIMING-	13
5	I_RXD/TXD+	RECEIVE+	4
18	I_RXD/TXD-	RECEIVE-	11
SHELL	-	-	SHELL

Serial Port Cable (RS232 DCE)

Cable Shape

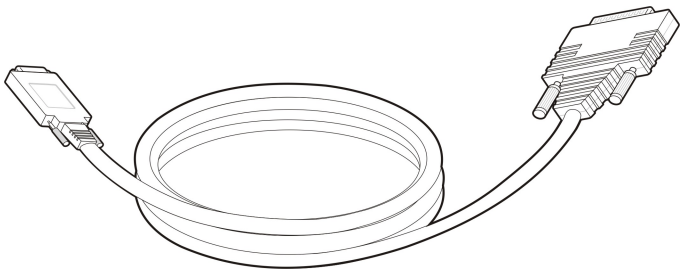

Figure A.10 Serial Port Cable (RS232 DCE)

Cable Signaling and Pinout

SMART Serial		DB25 Female	
PIN	**Signal**	**Signal**	**PIN**
23GND	-	-	-
SHELL	-	Shield GND	1
6	B_DCD/DCD+	DCD	8
19GND	GND+	GND	7GND
11	I_CTS/RTS+	RTS	4
12	I_DSR/DTR+	DTR	20
13	B_LL/LL+	LTST	18
26GND	GND+	GND	-
8	O_RTS/CTS	CTS	5
7	O_DTR/DSR+	DSR	6
5	I_RXD/TXD+	TXD	2
18GND	GND+	GND	-
4	I_RXC/TXCE+	TXCE	24
17GND	GND+	GND	-
3	B_TXC/TXC+	TXC	15
16GND	GND+	GND	-
2	O_TXCE/RXC+	RXC	17
15GND	GND+	GND	-

SMART Serial		DB25 Female	
PIN	**Signal**	**Signal**	**PIN**
1	O_TXD/RXD+	RXD	3
14GND	GND+	GND	-
SHELL	-	-	SHELL

Serial Port Cable (RS232 DTE)

Cable Shape

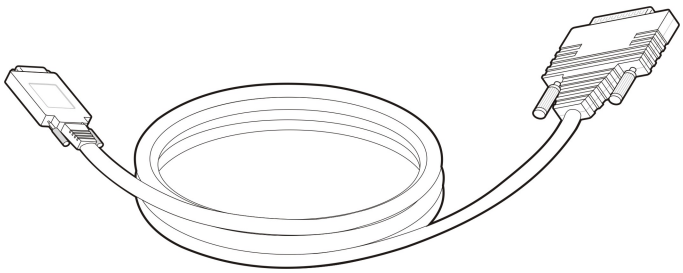

Figure A.11 Serial Port Cable (RS232 DTE)

Cable Signaling and Pinout

SMART Serial		DB25 Male	
PIN	**Signal**	**Signal**	**PIN**
23GND	-	-	-
24GND	-	-	-
SHELL	-	Shield GND	1
6	B_DCD/DCD+	DCD	8
19GND	GND+	GND	7GND
11	I_CTS/RTS+	CTS	5
12	I_DSR/DTR+	DSR	6
13	B_LL/LL+	LTST	18
26GND	GND+	GND	-
8	O_RTS/CTS	RTS	4
7	O_DTR/DSR+	DTR	20
1	O_TxD/RxD+	TXD	2
14GND	GND+	GND	-
2	O_TXCE/RXC+	TXCE	24
15GND	GND+	GND	-
3	B_TXC/TXC+	TXC	15
16GND	GND+	GND	-
4	I_RXC/TXCE+	RXC	17

SMART Serial		DB25 Male	
PIN	**Signal**	**Signal**	**PIN**
17GND	GND+	GND	-
5	I_RxD/TxD+	RXD	3
18GND	GND+	GND	-
SHELL	-	-	SHELL

Serial Port Cable (RS449 DCE)

Cable Shape

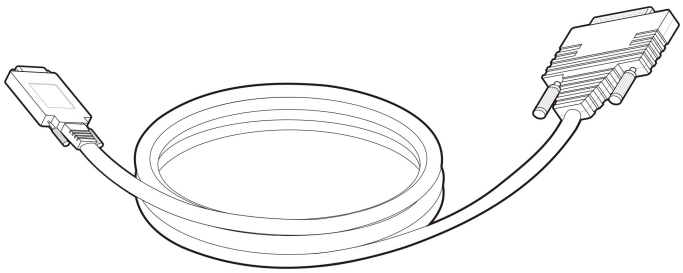

Figure A.12 Serial Port Cable (RS449 DCE)

Cable Signaling and Pinout

SMART Serial		DB37 Female	
PIN	**Signal**	**Signal**	**PIN**
SHELL	-	Shield GND	1
11	I_CTS/RTS+	RS+	7
10	I_CTS/RTS-	RS-	25
22GND	-	SG	19GND
-	-	RC	20GND
12	I_DTR/DSR+	TR+	12
25	I_DTR/DSR-	TR-	30
8	O_RTS/CTS+	CS+	9
9	O_RTS/CTS-	CS-	27
5	I_RXD/TXD+	SD+	4
18	I_RXD/TXD-	SD-	22
4	I_RXC/TXCE+	TT+	17
17	I_RXC/TXCE-	TT-	35
3	B_TXC/TXC+	ST+	5
16	B_TXC/TXC-	ST-	23
2	O_TXCE/RXC+	RT+	8
15	O_TXCE/RXC-	RT-	26
1	O_TXD/RXD+	RD+	6

SMART Serial		DB37 Female	
PIN	**Signal**	**Signal**	**PIN**
14	O_TXD/RXD-	RD-	24
7	O_DTR/DSR+	DM+	11
20	O_DTR/DSR-	DM-	29
6	B_DCD/DCD+	RR+	13
19	B_DCD/DCD-	RR-	31
13	B_LL/LL+	LL	10
26GND	GND+	SC	37
SHELL	-	-	SHELL

Serial Port Cable (RS449 DTE)

Cable Shape

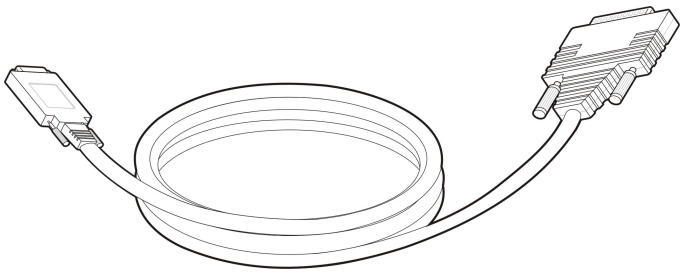

Figure A.13 Serial Port Cable (RS449 DTE)

Cable Signaling and Pinout

SMART Serial		DB37 Male	
PIN	Signal	Signal	PIN
SHELL	-	Shield GND	1
8	O_RTS/CTS	RS+	7
9	O_RTS/CTS-	RS-	25
22GND	-	SG	19
24GND	-	RC	20
7	O_DTR/DSR+	TR+	12
20	O_DTR/DSR-	TR-	30
11	I_CTS/RTS+	CS+	9
10	I_CTS/RTS-	CS-	27
1	O_TXD/RXD+	SD+	4
14	O_TXD/RXD-	SD-	22
2	O_TXCE/RXC+	TT+	17
15	O_TXCE/RXC-	TT-	35
3	B_TXC/TXC+	ST+	5
16	B_TXC/TXC-	ST-	23
4	I_RXC/TXCE+	RT+	8
17	I_RXC/TXCE-	RT-	26
5	I_RXD/TXD+	RD+	6

SMART Serial		DB37 Male	
PIN	**Signal**	**Signal**	**PIN**
18	I_RXD/TXD-	RD-	24
12	I_DTR/DSR+	TR+	11
25	I_DTR/DSR-	TR-	29
6	B_DCD/DCD+	RR+	13
19	B_DCD/DCD-	RR-	31
13	B_LL/LL+	LL	10
26GND	GND+	SC	37
SHELL	-	-	SHELL

Serial Port Cable (V.35 DCE)

Cable Shape

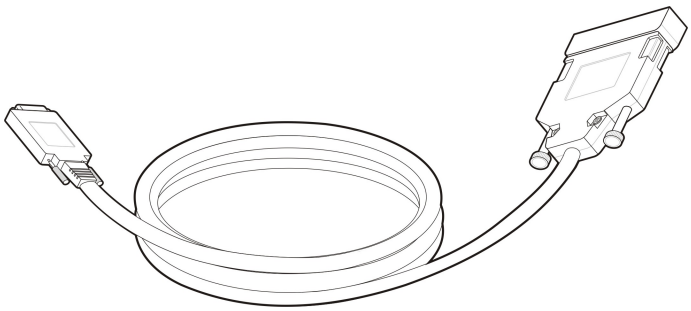

Figure A.14 Serial Port Cable (V.35 DCE)

Cable Signaling and Pinout

SMART Serial		V.35 RECEPT.	
PIN	**Signal**	**Signal**	**PIN**
22GND	-	-	-
23GND	-	-	-
SHELL	-	Shield GND	A
11	I_CTS/RTS+	RTS	C
12	I_DSR/DTR+	DSR	H
8	O_RTS/CTS	CTS	D
7	O_DTR/DSR+	DSR	E
6	B_DCD/DCD+	RLSD	F
19GND	GND+	-	-
13	B_LL/LL+	LT	K
26GND	-	GND	BGND
5	I_RXD/TXD+	SD+	P
18	I_RXD/TXD-	SD-	S
1	O_TXD/RXD+	RD+	R
14	O_TXD/RXD-	RD-	T
4	I_RXC/TXCE+	SCTE+	U
17	I_RXC/TXCE-	SCTE-	W

SMART Serial		V.35 RECEPT.	
PIN	Signal	Signal	PIN
2	O_TXCE/RXC+	SCR+	V
15	O_TXCE/RXC-	SCR-	X
3	B_TXC/TXC+	SCT+	Y
16	B_TXC/TXC-	SCT-	AA
SHELL	-	-	SHELL

Serial Port Cable (V.35 DTE)

Cable Shape

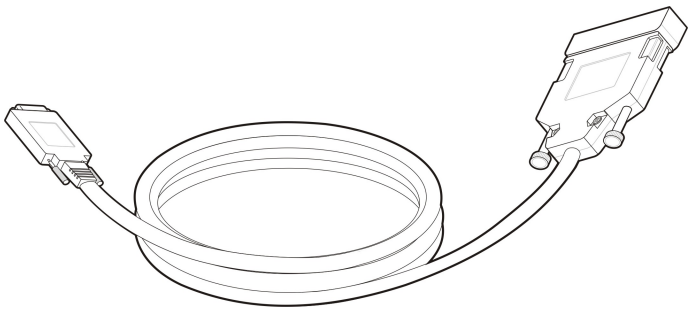

Figure A.15 Serial Port Cable (V.35 DTE)

Cable Signaling and Pinout

SMART Serial		V.35 RECEPT.	
PIN	**Signal**	**Signal**	**PIN**
22GND	-	-	-
23GND	-	-	-
24GND	-	-	-
SHELL	-	Shield GND	A
8	O_RTS/CTS	RTS	C
7	O_DTR/DSR+	DTR	H
11	I_CTS/RTS+	CTS	D
12	I_DSR/DTR+	DSR	E
6	B_DCD/DCD+	RLSD	F
19GND	GND+	-	-
13	B_LL/LL+	LT	K
26GND	GND	GND	BGND
1	O_TXD/RXD+	SD+	P
14	O_TXD/RXD-	SD-	S
5	I_RXD/TXD+	RD+	R
18	I_RXD/TXD-	RD-	T
2	O_TXCE/RXC+	SCTE+	U

SMART Serial		V.35 RECEPT.	
PIN	Signal	Signal	PIN
15	O_TXCE/RXC-	SCTE-	W
4	I_RXC/TXCE+	SCR+	V
17	I_RXC/TXCE-	SCR-	X
3	B_TXC/TXC+	SCT+	Y
16	B_TXC/TXC-	SCT-	AA
SHELL	-	-	SHELL

Serial Port Cable (RS530A DTE)

Cable Shape

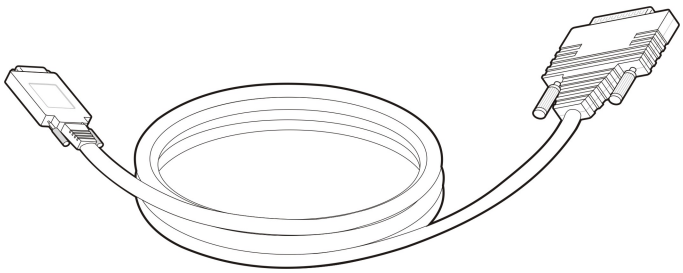

Figure A.16 Serial Port Cable (RS530A DTE)

Cable Signaling and Pinout

SMART Serial		DB25 Male	
PIN	Signal	Signal	PIN
21GND	-	-	-
22GND	-	-	-
24GND	-	-	-
SHELL	-	-	1
8	O_RTS/CTS	RTS+	4
9	O_RTS/CTS-	RTS-	19
7	O_DTR/DSR+	DTR+	20
20GND	GND+	GND	23GND
11	I_CTS/RTS+	CTS+	5
10	I_DSR/RTS-	CTS-	13
1	O_TXD/RXD+	TXD+	2
14	O_TXD/RXD-	RXD-	14
2	O_TXCE/RXC+	TXCE+	24
15	O_TXCE/RXC-	TXCE-	11
3	B_TXC/TXC+	TXC+	15
16	B_TXC/TXC-	TXC-	12
4	I_RXC/TXCE+	RXC+	17
17	I_RXC/TXCE-	RXC-	9

SMART Serial		DB25 Male	
PIN	Signal	Signal	PIN
5	I_RXD/TXD+	RXD+	3
18	I_RXD/TXD-	RXD-	16
12	I_DSR/DTR+	DSR+	6
25GND	GND	GND	-
6	B_DCD/DCD+	DCD+	8
19	B_DCD/DCD-	DCD-	10
13	B_LL/LL+	LL	18
26GND	GND	GND	7
SHELL	-	-	SHELL

Serial Port Cable (RS530 DTE)

Cable Shape

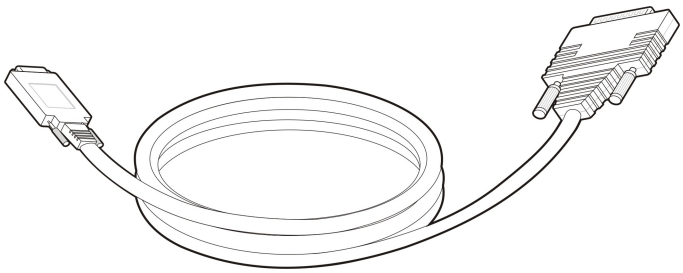

Figure A.17 Serial Port Cable (RS530 DTE)

Cable Signaling and Pinout

SMART Serial		DB25 Male	
PIN	Signal	Signal	PIN
21GND	-	-	-
23GND	-	-	-
24GND	-	-	-
SHELL	-	Shield GND	1
8	O_RTS/CTS	RTS+	4
9	O_RTS/CTS-	RTS-	19
7	O_DTR/DSR+	DTR+	20
20	O_DTR/DSR-	DTR-	23
11	I_CTS/RTS+	CTS+	5
10	I_DSR/RTS-	CTS-	13
1	O_TXD/RXD+	TxD+	2
14	O_TXD/RXD-	TxD-	14
2	O_TXCE/RXC+	TxCE+	24
15	O_TXCE/RXC-	TXCE-	11
3	B_TXC/TXC+	TxC+	15
16	B_TXC/TXC-	TXC-	12
4	I_RXC/TXCE+	RXC+	17
17	I_RXC/TXCE-	RXC-	9

SMART Serial		DB25 Male	
PIN	Signal	Signal	PIN
5	I_RXD/TXD+	RXD+	3
18	I_RXD/TXD-	RXD-	16
12	I_DSR/DTR+	DSR+	6
25	I_DSR/DTR-	DSR-	22
6	B_DCD/DCD+	DCD+	8
19	B_DCD/DCD-	DCD-	10
13	B_LL/LL+	LL	18
26GND	GND	GND	7
SHELL	-	-	SHELL

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ABBREVIATION

A

AAA	Authentication, Authorization and Accounting
ACTA	Administrative Council for Terminal Attachment
ADSL	Asymmetric Digital Subscriber Line
AES	Advanced Encryption Standard
AHT	Average Handle Time
ASCAP	American Society of Composers, Authors and Publishers

B

BGP	Bolder Gateway Protocol
BHCA	Busy Hour Call Attempts
BRI	Basic Rate Interface

C

CAC	Call Admission Control
CAS	Channel Associated Signaling
CAMA	Centralized Automatic Message Account
CBQ	Class Based Queuing
CLI	Command Line Interface
CNG	Comfort Noise Generation
CODEC	Coder/Decoder
CPE	Customer Premises Equipment

D

DCE	Data Communication Equipment
DES	Data Encryption Standard
DDoS	Distributed Denial of Service
DDR	Double Data Rate

DHCP	Dynamic Host Configuration Protocol
DID	Direct Inward Dialing
DISA	Direct Inward System Access
DMZ	Demilitarized Zone
DNS	Domain Name System
DoS	Denial of Service
DSCP	Differentiated Services Code Point
DSP	Digital Signal Processor
DTE	Data Terminal Equipment
DTMF	Dual Tone Multi-Frequency
DVMRP	Distance Vector-Multicast Routing Protocol

E

ECMP	Equal-Cost Multipath
EMI	Electromagnetic Interference
ESD	Electrostatic Discharge

F

FR	Frame Relay
FTP	File Transfer Protocol
FXO	Foreign Exchange Office
FXS	Foreign Exchange Station

G

GRE	Generic Routing Encapsulation

H

HDLC	High-level Data Link Control
HTTP	Hypertext Transfer Protocol

I

IGMP	Internet Group Management Protocol
IKE	Internet Key Exchange
IOM	Internal Option Module
IP	Internet Protocol
IPSec	Internet Protocol Security
ISDN	Integrated Services Digital Network

L

L2TP	Layer 2 Tunneling Protocol
LAN	Local Area Network
LFI	Link Fragmentation and Interleaving
TLS	
LVBO	Local Voice Busy Out

M

MAC	Media Access Control
MFC	Microsoft Foundation Class Library
MFR	Multi-link Frame Relay
MIB	Main Information Block
MLA	Multilevel Administration Access
MLPPP	Multi-Link PPP
MWI	Message Waiting Indication

N

NAT	Network Address Translation

O

PKI	Public Key Infrastructure
OSPF	Open Shortest Path First

P

PIM-SM	Protocol Independent Multicast-Sparse Mode
PIM-SSM	Protocol Independent Multicast-Specific Source Multicast
PLAR	Private Line Automated Ringdown
POTS	Plain Old Telephone Services
PPP	Point to Point Protocol
PQ	Priority Queuing
PRI	Primary Rate Interface
PSTN	Public Switched Telephone Network
PVC	Permanent Virtual Circuit

Q

QoS	Quality of Service

R

RADIUS	Remote Authentication Dial In User Service
REN	Ringer Equivalence Number
RIP	Routing Information Protocol
RPC	Remote procedure call
RTCP	RTP Control Protocol
RTP	Real-time Transport Protocol

S

SDRAM	Synchronous Dynamic Random Access Memory
SELV	Safety Extra-Low Voltage
SHA	Secure Hash Algorithm
SMTP	Simple Mail Transfer Protocol
SNMP	Simple Network Management Protocol
SNOS	Samsung Network Operating System
SNTP	Simple Network Time Protocol
SODIMM	Small Outline Dual In-line Memory Module
SSH	Secure Shell

T

TACACS	Terminal Access Controller Access-Control System
TCP	Transmission Control Protocol
TFTP	Trivial File Transfer Protocol
TLS	Transport Layer Security
TNV	Telephone-Network Voltage

U

URL	Uniform Resource Locator
USB	Universal Serial Bus
UTP	Unshielded Twisted Pair

V

VAD	Voice Activity Detection
VDC	Volts Direct Circuit
VLAN	Virtual Local Area Network
VoIP	Voice over Internet Protocol
VPN	Virtual Private Network
VRRP	Virtual Router Redundancy Protocol

W

WAN	Wide Area Network
WRED	Weighted Random Early Detection

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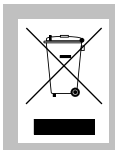

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Ubigate iBG1004

System Description

SAMSUNG ELECTRONICS

SAMSUNG DIGITall
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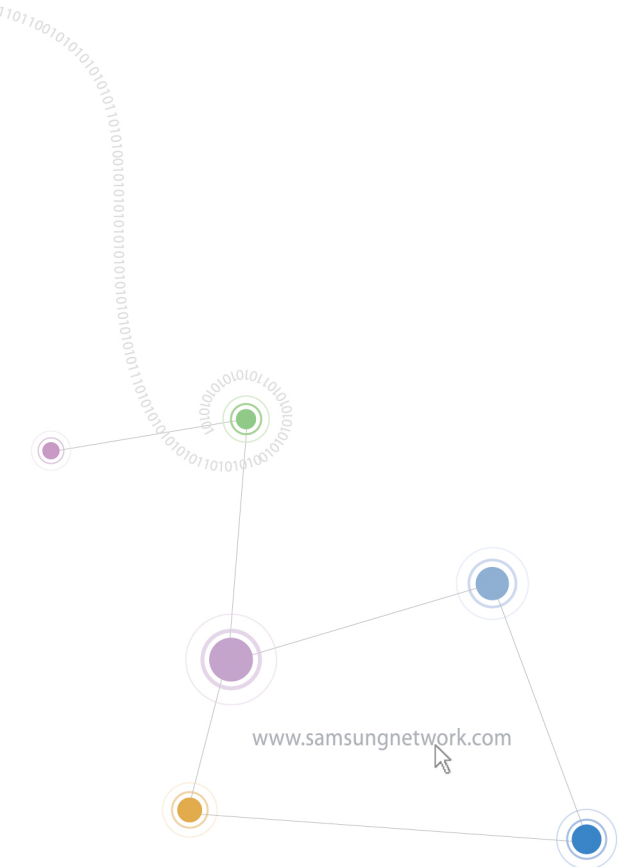
Ubigate iBG1004™

System Description



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