



### IBS10G

#### Intelligent 10G Bypass Switch

##### Product Description

Silicom Intelligent Bypass switch (IBS) is an active external Bypass switch that protects network integrity from network failures and network maintenance. The Silicom intelligent Bypass switch (IBS) generates the heartbeat and controls the mode of operation.



The Silicom Intelligent Bypass switch (IBS) supports four modes of operations: Inline, Bypass, Tap and Linkdrop. In Inline mode, the IBS diverts inline network traffic to attached in-line network system. In Bypass mode, the IBS does not divert the traffic to the attached in-line network system and diverts it to other network link. In Tap mode, incoming traffic in port NET0 is mirrored to port MON0 and incoming traffic in port NET1 is mirrored to port MON1. In Linkdrop mode the IBS disables the links on the network ports (NET0, NET1). The IBS simulates switch / router cable disconnection.

The IBS generates the heartbeat packets and transmits the heartbeat packet to the in-line Monitor / Network appliance port, the Monitor Network appliance receives the heartbeat packets and transmits it to its other port (bridges the heartbeat packet). The IBS detects back the heartbeat packet and maintains the Inline mode.

The IBS sets to Bypass, Tap or Linkdrop when it does not receive back the heartbeat packet from the Network / Monitor appliance. When the Network / Monitor appliance recovers, it transmits back the heartbeat packet and the Intelligent switch sets to Inline. The IBS bypasses its Ethernet Monitor ports on event of power failure, Link failure, in-line software application system hang or user request.

The IBS includes Double Bypass Safe architecture. The Silicom Double Bypass safe architecture is based on two Bypass routing circuitry: An Active Bypass circuitry and Passive Bypass circuitry. If the internal active bypass routing circuitry fails, the passive Bypass routing circuitry is activated.

##### The IBS can be configured using:



## The IBS can be configured using:

- Simple CLI configuration management via a serial communication console port, Ethernet port using Telnet or SSH
- Web interface management interface
- SNMP

The IBS includes two duplex LC ports for network ports, two 2 SFP+ ports for the attached in-line network system, serial port (RJ-11) and Ethernet port (RJ-45). The IBS support 10 Gigabit Multimode Fiber (10GBase-SR) and 10 Gigabit single mode (10GBase-LR) network standards.

The IBS1U is a 1U host system supports up to four intelligent bypass switches (IBS). The Bypass Switch Host can support up to four intelligent Bypass Switch modules. The Bypass switch host includes two redundant 110 – 220 V AC power supply or two redundant -48 DC power supply.

Figure: 1 – Front panel view of IBS



Figure: 2 – Front panel view of IBS with 4 modules



## Key Features

- Self generating heartbeat pulses – No driver or management port is required to generate pulses
- Sets to Bypass when it detects in-line system failure
- Sets to Bypass when it detects in-line system link failure
- Sets to Bypass when it detects in-line software application system hang
- Sets to Bypass on Power failure
- Sets to Normal when it detects in-line system recovery
- Double Safe Bypass architecture with two routing circuitries
- Two on Board Watch Dog Timer (WDT) Controllers
- Software programmable time out interval
- Support Two ports link feature – if one of the network ports link fails it will drop the link on the other network port as well
- Independent Bypass / Normal / Tap /Linkdrop operation in every module
- Supports up to four modules in a chassis
- Supports 6 different TAP mode of operation
- Simple CLI configuration management via serial port

- HTTP/HTTPS management interface via network management port
- Telnet management interface via network management port
- SSH management interface via network management port
- Supports SNMP version 1, 2c, 3 (SHA, AES)
- Support for SNMP multi trap destinations
- Supports remote log
- Supports TACACS+
- Support for TACACS multi users
- Supports NTP
- Supports time zone
- Supports remote save/restore backup configuration
- Two redundant power supplies
- Support power supply monitoring
- Optional -48V DC power supplies

#### **IBS10G-SR**

- Supports Short Range Fiber 10 Gigabit Ethernet (10GBase-SR 62.5um)

#### **IBS10G-SR5**

- Supports Short Range Fiber 10 Gigabit Ethernet (10GBase-SR 50um)

#### **IBS10G-LR**

- Supports Long Reach Fiber 10 Gigabit Ethernet (10GBase-LR)

#### **IBS10G-ERSR**

- Supports Extended Reach Fiber 10 Gigabit Ethernet (10GBase-ER) on the Network Ports
- Supports Short Range Fiber (10GBase-SR) 10Gigabit Ethernet on the Monitor Ports

### **Technical Specifications**

<b>Bypass Specifications</b>	
<b>WDT Interval (Software Programmable)</b>	Routing Transmit heart beat packet every 3mS – 10Sec. Default 5mS Verification packets received every 10mS – 50Sec. Default 20mSec Double Bypass Transmit heart beat packet every 300mS – 60Sec. Default 7Sec Verification packets received every 1S – 253Sec. Default 20Sec

<b>Production Default Specifications</b>	
<b>Mode at Power up</b>	Bypass
<b>Heartbeat</b>	Activated
<b>Bypass Switch is ready and in-line device responds to heartbeat</b>	Change to Normal
<b>In-line device responds to heartbeat</b>	Normal
<b>in-line device does not respond heartbeat</b>	Bypass
<b>Mode at Power Off</b>	Bypass
<b>Heartbeat Packet</b>	Internetwork Packet Exchange
<b>IBS1UP: Bypass Switch 1U Host System Technical Specifications</b>	
<b>Dockings</b>	Front holders
<b>Voltage Input</b>	AC: 90-240 VAC Auto-Select -48 (-75 – -36) VDC
<b>Power Consumption</b>	160W maximum – When 4 IBS modules are installed
<b>Size</b>	444mm x 339.3mm x 44 mm ( 17.48" x 13.358" x 1.732") Wide x Depth X Height
<b>Operating Humidity</b>	0%–90%, non-condensing
<b>Operating Temperature</b>	0°C – 50°C (32°F – 122°F)
<b>Storage Temperature</b>	-20°C–65°C (-4°F–149°F)
<b>EMC Certifications</b>	Class B FCC / CE / VCCI
<b>MTBF*</b>	> 150,000 hours
<b>IBS1U: Bypass Switch 1U Host System LEDs / Connector Specifications</b>	
<b>LEDs</b>	(2) Power LED – Green, Power is on, LED per power supply
<b>IBS10G-SR (62.5um) – Fiber Gigabit Ethernet Technical Specifications – (10GBase-SR) Adapters</b>	
<b>IEEE Standard / Network topology</b>	Fiber Gigabit Ethernet, 10GBase-SR (850nm)

<b>Data Transfer Rate</b>	20Gbit/s in full duplex mode per port
<b>Cables and Operating distance</b>	Multimode fiber:62.5um 137m maximum at 62.5 um **Theoretical Distance – Defined as half a distance as stated by the IEEE 802.3 standard
<b>Output Transmit Power</b>	Typical: -2.6 dBm Minimum: -3 dBm
<b>Optical Receive Sensitivity</b>	Typical: -14.6 dBm Maximum: -11.1 dBm
<b>Insertion Loss ( Passive: Normal Mode)</b>	Typical: 0.8 dB Maximum: 1.9 dB
<b>Insertion Loss ( Passive: Bypass Mode)</b>	Typical: 0.8 dB Maximum: 1.9 dB
<b>Voltage</b>	12V +/-5%
<b>Power Consumption</b>	23.64W 1.97 A at 12V: Typical all ports operate at 10Gbit/s
<b>Size</b>	173.3mm x 164.9mm x 20 mm ( 6.822" x 6.73" x 0.787") Wide x Depth X Height
<b>Operating Humidity</b>	0%–90%, non-condensing
<b>Operating Temperature</b>	0°C – 40°C (32°F – 104°F)
<b>Storage Temperature</b>	-20°C–65°C (-4°F–149°F)
<b>EMC Certifications</b>	Class B / FCC / CE / VCCI
<b>Safety</b>	UL
<b>MTBF*</b>	> 150,000 hours

#### IBS10G-SR: LED and Connector Specifications

<b>LEDs:</b>	<p>Network / Monitor ports:  Link LED – (Green) On Link partner is detected.  Activity LED – (Yellow) Blinks on activity.  Power – Green power is on  Normal – Green, Switch in Normal mode.  SysOK – Yellow when Sys is OK,  WDT – Blink Yellow when WDT is activated  Light Yellow WDT time out  Off: WDT is disable  Bypass – Red when bypass, off on Normal  Alarm – Red on system alarm</p>
<b>Connectors:</b>	<p>Network: 2 LC Duplex  Monitor: 2 SFP+  Management  RJ-11 serial port</p>

	RJ-45 Ethernet // optional for future use
<b>IBS10G–SR5 (50um) – Fiber Gigabit Ethernet Technical Specifications – (10GBase-SR5) Adapters:</b>	
<b>IEEE Standard / Network topology:</b>	Fiber Gigabit Ethernet, 10GBase-SR (850nm)
<b>Data Transfer Rate:</b>	20Gbit/s in full duplex mode per port
<b>Cables and Operating distance:</b>	Multimode fiber:50um 50um, 400MHz/Km 33m 50um, (OM2)500 MHz/Km 41m 50um, (OM3)2000MHz/Km 150m Theoretical Distance – Defined as half a distance as stated by the IEEE 802.3 standard
<b>Output Transmit Power:</b>	Typical: -2.6 dBm Minimum: -3 dBm
<b>Optical Receive Sensitivity:</b>	Typical: -14.6 dBm Maximum: -11.1 dBm
<b>Insertion Loss ( Passive: Normal Mode)</b>	Typical: 0.8 dB Maximum: 1.9 dB
<b>Insertion Loss ( Passive: Bypass Mode)</b>	Typical: 0.8 dB Maximum: 1.9 dB
<b>Voltage:</b>	12V +/-5%
<b>Power Consumption:</b>	23.64W 1.97 A at 12V: Typical all ports operate at 10Gbit/s
<b>Size:</b>	173.3mm x 164.9mm x 20 mm ( 6.822" x 6.73" x 0.787") Wide x Depth X Height
<b>Operating Humidity:</b>	0%–90%, non-condensing
<b>Operating Temperature:</b>	0°C – 50°C (32°F – 104°F)
<b>Storage Temperature:</b>	-20°C–65°C (-4°F–149°F)
<b>EMC Certifications:</b>	Class B / FCC / CE / VCCI
<b>Safety:</b>	UL
<b>MTBF*:</b>	> 150,000 hours
<b>IBS10G-SR5: LED and Connector Specifications</b>	
<b>LEDs:</b>	Network / Monitor ports: Link LED – (Green) On Link partner is detected. Activity LED – (Yellow) Blinks on activity. Power – Green power is on Normal – Green, Switch in Normal mode

	<p>SysOK – Yellow when Sys is OK,  WDT – Blink Yellow when WDT is activated  Light Yellow WDT time out  Off: WDT is disabled  Bypass – Red when bypass, off on Normal  Alarm – Red on system alarm</p>
<b>Connectors:</b>	<p>Network: 2 LC Duplex  Monitor: 2 SFP+  Management  RJ-11 serial port  RJ-45 Ethernet // optional for future use</p>
<b>IBS10GP-LR – Fiber 10Gigabit Ethernet Technical Specifications – (10G Base-LR) Adapters</b>	
<b>IEEE Standard / Network topology</b>	Fiber Gigabit Ethernet, 10GBase-LR (1310nM)
<b>Data Transfer Rate</b>	20Gbit/s in full duplex mode per port
<b>Network ports Cables and Operating distance</b>	Single mode fiber: 5000m maximum at 9 um **
<b>Output receive sensitivity:</b>	10.3dbm
<b>Output transmit power:</b>	(-8.2 to 0.5) dbm
<b>Insertion Loss ( Passive: Normal Mode)</b>	Typical: 1.2 dB Maximum: 1.6dB
<b>Insertion Loss ( Passive: Bypass Mode)</b>	Typical: 1.2 dB Maximum: 1.6dB
<b>Voltage</b>	12V +/-5%
<b>Power Consumption</b>	24.6W 2.07 A at 12V: Typical all ports operate at 10Gbit/s
<b>Size</b>	173.3mm x 164.9mm x 20 mm ( 6.822" x 6.73" x 0.787")
<b>Operating Humidity</b>	0%–90%, non-condensing
<b>Operating Temperature</b>	0°C – 40°C (32°F – 104°F)
<b>Storage Temperature</b>	-20°C–65°C (-4°F–149°F)
<b>EMC Certifications</b>	Class B FCC / CE / VCCI /
<b>Safety</b>	UL
<b>MTBF*</b>	> 150,000 hours

### IBS10GP-LR: LED and Connector Specifications

<b>LEDs</b>	<p>Network / Monitor ports:            Link LED – (Green) On Link partner is detected.            Activity LED – (Yellow) Blinks on activity.            Power – Green power is on            Normal – Green, Switch in Normal mode.            SysOK – Yellow when Sys is OK,            WDT – Blink Yellow when WDT is activated            Light Yellow WDT time out            Off: WDT is disabled            Bypass – Red when bypass, off on Normal            Alarm – Red on system alarm</p>
<b>Connectors</b>	<p>Network: 2 LC Duplex            Monitor: 2 SFP+            Management            RJ-11 serial port            RJ-45 Ethernet // optional for future use</p>

### IBS10GP-ER – Fiber 10Gigabit Ethernet Technical Specifications – (10G Base-ER) Adapters:

<b>IEEE Standard / Network topology:</b>	Fiber Gigabit Ethernet, 10GBase-ER (1550nm) on Network Ports.
<b>Data Transfer Rate:</b>	20Gbit/s in full duplex mode per port
<b>Network ports Cables and Operating distance:</b>	<p>Single mode fiber:            20000m maximum at 9 um **,            **Defined as half of the total link. 40,000m total link</p>
<b>Voltage:</b>	12V +/-5%
<b>Size:</b>	173.3mm x 164.9mm x 20 mm ( 6.822" x 6.73" x 0.787")
<b>Operating Humidity:</b>	0%–90%, non-condensing
<b>Operating Temperature:</b>	0°C – 40°C (32°F – 104°F)
<b>Storage Temperature:</b>	-20°C–65°C (-4°F–149°F)
<b>EMC Certifications:</b>	Class B FCC / CE / VCCI /
<b>MTBF*:</b>	> 150,000 hours

### IBS10GP-ER: LED and Connector Specifications

<b>LEDs:</b>	<p>Network / Monitor ports:            Link LED – (Green) On Link partner is detected.            Activity LED – (Yellow) Blinks on activity.            Power – Green power is on            Normal – Green, Switch in Normal mode.            SysOK – Yellow when Sys is OK,            WDT – Blink Yellow when WDT is activated            Light Yellow WDT time out            Off: WDT is disabled            Bypass – Red when bypass, off on Normal</p>
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	Alarm – Red on system alarm
<b>Connectors:</b>	Network: 2 LC Duplex Monitor: 2 SFP+ Management RJ-11 serial port RJ-45 Ethernet // optional for future use
<b>Fiber 10Gigabit Ethernet Technical Specifications – (10G Base-ER/SR) Adapters:</b>	
<b>IEEE Standard / Network topology:</b>	Fiber Gigabit Ethernet, 10GBase-ER (1550nm) on Network Ports. Fiber Gigabit Ethernet, 10GBase-SR (850nm) on Monitor Ports
<b>Data Transfer Rate:</b>	20Gbit/s in full duplex mode per port
<b>Network ports Cables and Operating distance:</b>	Single mode fiber: 20000m maximum at 9 um **, **Defined as half of the total link. 40,000m total link
<b>Voltage:</b>	12V +/-5%
<b>Size:</b>	173.3mm x 164.9mm x 20 mm ( 6.822" x 6.73" x 0.787")
<b>Operating Humidity:</b>	0%–90%, non-condensing
<b>Operating Temperature:</b>	0°C – 40°C (32°F – 104°F)
<b>Storage Temperature:</b>	-20°C–65°C (-4°F–149°F)
<b>EMC Certifications:</b>	Class B FCC / CE / VCCI
<b>MTBF*:</b>	> 150,000 hours
<b>IBS10GP-ERSR: LED and Connector Specifications</b>	
<b>LEDs:</b>	Network / Monitor ports: Link LED – (Green) On Link partner is detected. Activity LED – (Yellow) Blinks on activity. Power – Green power is on Normal – Green, Switch in Normal mode SysOK – Yellow when Sys is OK, WDT – Blink Yellow when WDT is activated Light Yellow WDT time out Off: WDT is disabled Bypass – Red when bypass, off on Normal Alarm – Red on system alarm
<b>Connectors:</b>	Network: 2 LC Duplex Monitor: 2 SFP+ Management RJ-11 serial port RJ-45 Ethernet // optional for future use

## Functional Description

Figure: 3 – Normal Mode Functional Block Diagram

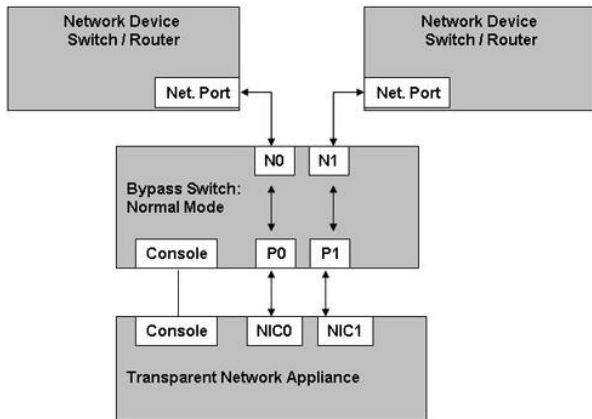


Figure: 4 – Bypass Mode Functional Block Diagram

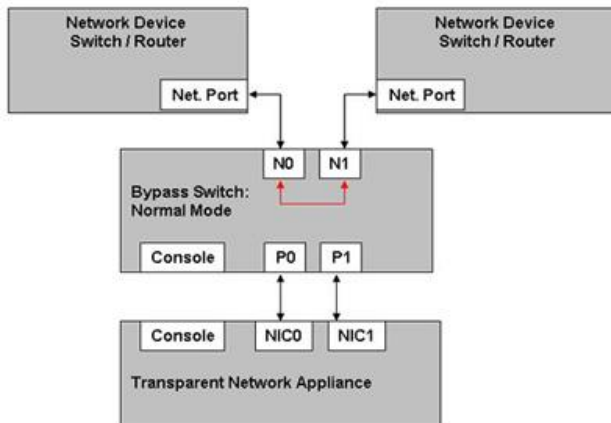


Figure : 5- Tap Mode Functional Block Diagram

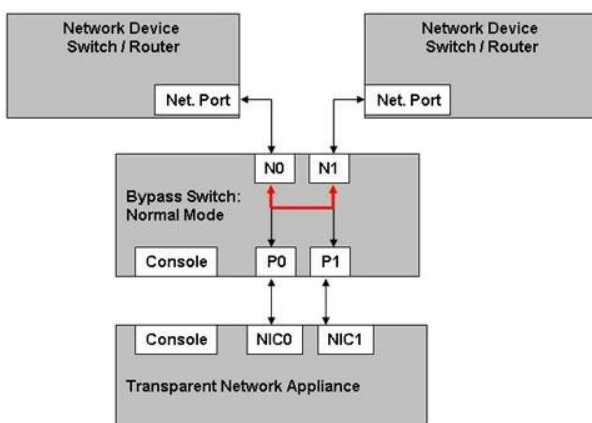
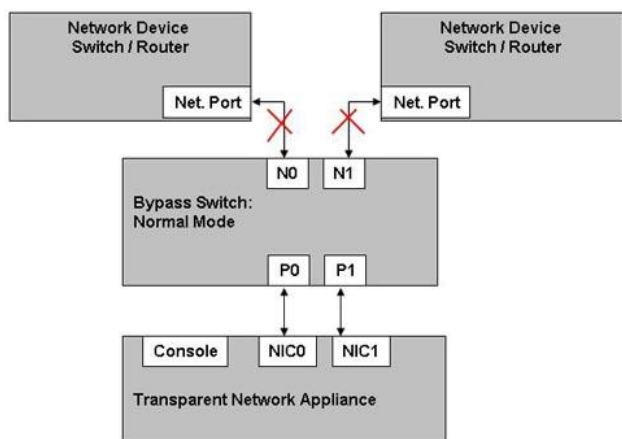


Figure : 6- Linkdrop Mode Functional Block Diagrama



Order Information

IBS	System Format	Media	Media Type	Power Cord	-R
IBSP: Intelligent Bypass Switch	1U: 1U	10G: 10Gb	SR: Short Range LR: Long Reach ER: Extended Reach	-US -EU -CN -48V	ROHS

P/N	Description	Notes
IBS10GP-SR	10 Gigabit (SR) fiber Intelligent Bypass Switch	10G – Multimode fiber:62.5um
IBS10GP-SR5	10 Gigabit (SR) fiber Intelligent Bypass Switch	10G – Multimode fiber:50um
IBS10GP-LR	10 Gigabit (LR) fiber Intelligent Bypass Switch	10G – Singlemode
IBS10GP-ER	10 Gigabit (ER) fiber Intelligent Bypass Switch	10G – ER on the Network and Monitor ports
IBS10GP-ERSR	10 Gigabit (ER) fiber Intelligent Bypass Switch	10G – ER on the Network ports, SR on the Monitor ports
IBS1UP-US	Intelligent Bypass Switch 1U host system	1U host system,(90-240 VAC Auto-Select), US cable
IBS1UP-EU	Intelligent Bypass Switch 1U host system	1U host system,(90-240 VAC Auto-Select), EU cable

<b>IBS1UP-CN</b>	Intelligent Bypass Switch 1U host system	1U host system,(90-240 VAC Auto-Select), CN cable
<b>IBS1U-48</b>	Intelligent Bypass Switch 1U host system	1U host system,(-75 – -36) VDC
<b>IBS10G1UP-1SR-EU</b>	1U w/ 10 Gigabit Fiber (SR) Intelligent Bypass Switch	Multimode fiber:62.5um 1U host, EU cable
<b>IBS10G1UP-1SR5-EU</b>	1U w/ 10 Gigabit Fiber (SR) Intelligent Bypass Switch	Multimode fiber:62.5um 1U host, EU cable
<b>IBS10G1UP-1LR-US</b>	1U w/ 10 Gigabit Fiber (LR)Intelligent Bypass Switch	Single mode, 1U host, US cable
<b>IBS10G1UP-1LR-CN</b>	1U w/ 10 Gigabit Fiber (LR) Intelligent Bypass Switch	Single mode, 1U host, CN cable
<b>IBS10G1UP-1LR-48</b>	1U w/ 10 Gigabit Fiber (LR)Intelligent Bypass Switch	Single mode, 1U host, -48V redundant power supply
<b>IBS10G1UP-1ER-EU</b>	1U w/ 10 Gigabit Fiber (ER)Intelligent Bypass Switch	10G – ER on the Network and Monitor ports, 1U host, EU cable
<b>IBS10G1UP-1ERSR-US</b>	1U w/ 10 Gigabit Fiber (ER)Intelligent Bypass Switch	10G – ER on the Network ports, SR on the Monitor ports 1U host, US cable
<b>IBS10G1UP-2SR-EU</b>	1U w/ Two 10 Gigabit (SR) Intelligent Bypass Switch	2 x Multimode fiber:62.5um , 1U host, EU cable
<b>IBS10G1UP-2SR-48</b>	1U w/ Two 10 Gigabit (SR) Intelligent Bypass Switch	2 x Multimode fiber:62.5um 1U host, -48V redundant power supply
<b>IBS10G1UP-2SR5-EU</b>	1U w/ Two 10 Gigabit (SR) Intelligent Bypass Switch	2 x Multimode fiber:50um 1U host, EU cable
<b>IBS10G1UP-1LR-1SR</b>	1U w/ Two 10 Gigabit Intelligent Bypass Switch. One (LR) and one (SR)	1 x Single mode, 1x Multimode, 1U host, EU cable

Note: Model P/N

–US: Includes US power cables, redundant power supply (90-240 VAC Auto-Select)

-EU: Includes EU power cables, redundant power supply (90-240 VAC Auto-Select)

-CN: Includes CN power cables, redundant power supply (90-240 VAC Auto-Select)

-48: redundant power supply (-75 – -36) VDC

