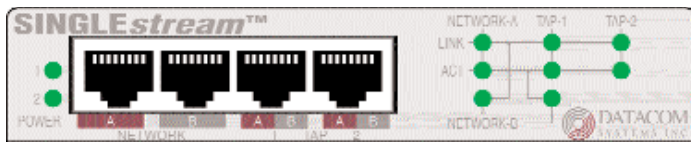


SINGLEstream™ Link Aggregation Tap



SS-100 series



SS-1000 series



SS-2000 series

SS-100 series SS-1000 series

SS-2000 series

USERguide

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Proprietary Notice

This document contains proprietary information about the SINGLEstream™ Link Aggregator and is not to be disclosed or used except as authorized by written contract with Datacom Systems, Inc.

Compliance Testing

CAUTION: Changes or modifications to this unit not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

CE *Certifications*

This equipment has been tested and found to meet the radiated and conducted emission limits for a **Class A** product of **EN 55022** to the **EMC Directive 89/336/EEC** requirements.

This equipment has been tested and found to meet the immunity levels for **Class 1** tested to **level 2** for **EN 6100-4-2**, **level 3** for **EN 61000-4-3**, **level 1** for **EN 61000-4-4**, and **level 3** for **EN 61000-4-5** to the **EN 50082-1** requirements and meets the **Class A** requirements for **EN 61000-3-2** and **EN 61000-3-3**.

This equipment has completed the Product Safety Review and found to meet the **Low Voltage Directive 72/23/EEC (1993)** requirements.

NOTE: This equipment has been tested and found to comply with the limits for a **Class A** digital device, pursuant to **Part 15** of the **FCC 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 own expense.



These explanatory labels are included in the information for the user in accordance with the requirements of IEC 60825-1.



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What Shipped?

SS-100 series

- 1 — SS-100, or SS-101, or SS-102, or SS-103
- 2 — Switching AC Adaptors
- 2 — AC Power Cords
- 1 — Warranty Card
- 1 — Quick Installation Guide
- 1 — *USERguide*

SS-1000 series

- 1 — SS-1000BT-BT, or SS-1001BT-BT, or SS-1002BT-BT, or SS-1003BT-BT, or SS-1004BT-BT, SS-1000BT-BT+6C, or SS-1001BT-BT+6C, or SS-1002BT-BT+6C, or SS-1003BT-BT+6C, or SS-1004BT-BT+6C, or SS-1000BT-SX, or SS-1001BT-SX, or SS-1002BT-SX, or SS-1003BT-SX, or SS-1004BT-SX, or SS-1000LX-BT, or SS-1000LX-SX, or SS-1000SX-BT, or SS-1000SX-BT+4C, or SS-1000SX-BT+8C, or SS-1000SX-SX, or SS-1000SX-SX+4C, or SS-1000SX-SX+8C
- 2 — Switching AC Adaptors
- 2 — AC Power Cords
- 1 — Warranty Card
- 1 — Quick Installation Guide
- 1 — *USERguide*

SS-2000 series

- 1 — SS-2000BT-BT, or SS-2001BT-BT, or SS-2002BT-BT, or SS-2003BT-BT, SS-2000BT-SX, or SS-2001BT-SX, or SS-2002BT-SX, or SS-2003BT-SX
- 2 — Switching AC Adaptors
- 2 — AC Power Cords
- 1 — Warranty Card
- 1 — Quick Installation Guide
- 1 — *USERguide*

SINGLEstream™ Summary Information

SINGLEstream™	NETWORK PORT SPEED Mb	Function	MONITOR PORT SPEED Mb	PASSIVE DOESN'T BREAK LINK	Relay FAILOVER	TCP Reset	Redundant Power	Supports PoE
SS-100	10/100BT	Tap	2—10/100BT	YES	NO	NO	YES	YES
SS-101	100BT	Tap	2—100BT	YES	NO	NO	YES	YES
SS-102	10/100BT	Tap	2—10/100BT	NO	YES	YES	YES	NO
SS-103	100BT	Tap	2—100BT	NO	YES	YES	YES	NO
SS-1000BT-BT	10/100/1000BT	Tap	2—10/100/1000BT	NO	YES	NO	YES	NO
SS-1001BT-BT	1000BT	Tap	2—1000BT	NO	YES	NO	YES	NO
SS-1002BT-BT	10/100/1000BT	Tap	2—10/100/1000BT	NO	YES	YES	YES	NO
SS-1003BT-BT	1000BT	Tap	2—1000BT	NO	YES	YES	YES	NO
SS-1004BT-BT	100BT	Tap	2—10/100/1000BT	NO	YES	NO	YES	NO
SS-1000BT-BT+6C	10/100/1000BT	Tap	6—10/100/1000BT	NO	YES	NO	YES	NO
SS-1001BT-BT+6C	1000BT	Tap	6—1000BT	NO	YES	NO	YES	NO
SS-1002BT-BT+6C	10/100/1000BT	Tap	6—10/100/1000BT	NO	YES	YES	YES	NO
SS-1003BT-BT+6C	1000BT	Tap	6—1000BT	NO	YES	YES	YES	NO
SS-1004BT-BT+6C	100BT	Tap	6—10/100/1000BT	NO	YES	NO	YES	NO
SS-1000BT-SX	10/100/1000BT	Tap	2—1000SX	NO	YES	NO	YES	NO
SS-1001BT-SX	1000BT	Tap	2—1000SX	NO	YES	NO	YES	NO
SS-1002BT-SX	10/100/1000BT	Tap	2—1000SX	NO	YES	YES	YES	NO
SS-1003BT-SX	1000BT	Tap	2—1000SX	NO	YES	YES	YES	NO
SS-1004BT-SX	100BT	Tap	2—1000SX	NO	YES	NO	YES	NO
SS-1000LX-BT	1000LX	Tap	2—1000BT	YES SM splitter	NA	NA	YES	NA
SS-1000LX-SX	1000LX	Tap	2—1000SX	YES SM splitter	NA	NA	YES	NA
SS-1000SX-BT	1000SX	Tap	2—10/100/1000BT	YES MM splitter	NA	NA	YES	NA
SS-1000SX-BT+4C	1000SX	Tap	4—10/100/1000BT	YES MM splitter	NA	NA	YES	NA
SS-1000SX-BT+8C	1000SX	Tap	8—10/100/1000BT	YES MM splitter	NA	NA	YES	NA
SS-1000SX-SX	1000SX	Tap	2—1000SX	YES MM splitter	NA	NA	YES	NA
SS-1000SX-SX+4C	1000SX	Tap	4—1000SX	YES MM splitter	NA	NA	YES	NA
SS-1000SX-SX+8C	1000SX	Tap	8—1000SX	YES MM splitter	NA	NA	YES	NA
SS-2000BT-BT	2—10/100/1000BT	Taps	2—10/100/1000BT	NO	YES	NO	YES	NO
SS-2001BT-BT	2—1000BT	Taps	2—10/100/1000BT	NO	YES	NO	YES	NO
SS-2002BT-BT	2—10/100/1000BT	Taps	2—10/100/1000BT	NO	YES	YES	YES	NO
SS-2003BT-BT	2—1000BT	Taps	2—1000BT	NO	YES	YES	YES	NO
SS-2004BT-BT	2—100BT	Taps	2—10/100/1000BT	NO	YES	NO	YES	NO
SS-2005BT-BT	2—100BT	Taps	2—10/100/1000BT	NO	YES	YES	YES	NO
SS-2007BT-BT	2—100BT	Taps	2—1000BT	NO	YES	NO	YES	NO
SS-2000BT-BT+4C	2—10/100/1000BT	Taps	4—10/100/1000BT	NO	YES	NO	YES	NO
SS-2001BT-BT+4C	2—1000BT	Taps	4—1000BT	NO	YES	NO	YES	NO
SS-2002BT-BT+4C	2—10/100/1000BT	Taps	4—10/100/1000BT	NO	YES	YES	YES	NO
SS-2003BT-BT+4C	2—1000BT	Taps	4—1000BT	NO	YES	YES	YES	NO
SS-2004BT-BT+4C	2—100BT	Taps	4—10/100/1000BT	NO	YES	NO	YES	NO
SS-2005BT-BT+4C	2—100BT	Taps	4—10/100/1000BT	NO	YES	YES	YES	NO
SS-2000BT-SX	2—10/100/1000BT	Taps	2—1000SX	NO	YES	NO	YES	NO
SS-2001BT-SX	2—1000BT	Taps	2—1000SX	NO	YES	NO	YES	NO
SS-2002BT-SX	2—10/100/1000BT	Taps	2—1000SX	NO	YES	YES	YES	NO
SS-2003BT-SX	2—1000BT	Taps	2—1000SX	NO	YES	YES	YES	NO
SS-2004BT-SX	2—100BT	Taps	2—1000SX	NO	YES	NO	YES	NO
SS-2000SX-SX	2—1000SX	Taps	2—1000SX	YES MM splitter	NA	NO	YES	NA
SS-2000LX-SX	2—1000LX	Taps	2—1000SX	YES SM splitter	NA	NO	YES	NA
SS-2000SX-SX+6C	2—1000SX	Taps	6—1000SX	YES MM splitter	NA	NO	YES	NA

NOTES: 1) SS-100 series, SS-1000 series with splitters and SS-2000 series with splitters pass layer one and layer two errors thru the Network Ports; 2) SS-1000 series and SS-2000 series without splitters do not pass layer one or layer two errors thru the Network Ports; 3) All SINGLEstream™ series taps do not pass layer one or layer two errors to the Monitor Ports; 4) Standard split ratio on fiber taps is 50/50

SINGLEstream™ Overview — Datacom Systems' SINGLE *stream™* Series Link Aggregation Taps provide a superior solution for 24x7 monitoring of full-duplex Ethernet links.

While traditional Ethernet taps might enable full-duplex monitoring of all traffic on a network link, they transmit the data to the monitoring device (e.g. analyzer, IDS, probe) in two separate half-duplex streams. Not only does this require the monitoring device to have two network interface cards (NIC), it also requires that the device be capable of combining and processing both streams of data in order to monitor both sides of the conversation. Not all monitoring devices have that capability.

The SINGLE *stream™* Series Link Aggregation Taps faultlessly combines the two data streams, allowing any connected monitoring device to receive a full-duplex stream of data with one NIC.

Additionally, the SINGLE *stream™* Series Link Aggregation Taps provides a unique feature to help manage network resources - a second monitor port. With an extra monitor port, two devices (such as an analyzer and an intrusion detection device) can receive the same full-duplex transmission, so there will never be contention for access to the network link.

Although ideal for placement in networks where utilization is consistently under 50% on each side, the SINGLE *stream™* Series Link Aggregation Taps can help prevent data overload and dropped packets due to traffic "bursts" - sudden, temporary increases in bandwidth utilization. A built-in memory buffer can manage overflows in data transmission and can allow seamless continuity of full-duplex monitoring.

Just like all of Datacom Systems' tap products, the SINGLE *stream™* Series Link Aggregation Taps is completely non-intrusive. The SINGLE *stream's™* redundant power supply and industry-leading "don't break the link" fault-tolerant design has been thoroughly tested. Even if power is lost to the tap, network traffic will continue to flow uninterrupted.

SINGLEstream™ Features and Benefits

- Simple plug-and-play solution – requires no additional configuration of external monitoring devices.
- Connect any protocol analyzers, probes, intrusion detection systems and such for permanent In-Line monitoring of full-duplex links — eliminates the need for network connectors to be disconnected and connected each time a segment needs to be monitored.
- Proven industry leading, non-intrusive, fault-tolerant.
- The SS-100 and SS-101 feature the passive In-Line design which ensures network uptime even if power is not available to the SINGLEstream™ Link Aggregation Taps. (This distinctive feature is not available in the SS-102, SS-103, SS-1000 series or SS-2000 series.)
- (SS-100) Operates at 10 Mbps or 100 Mbps and supports full-duplex and half-duplex auto-negotiation.
- (SS-1000 and SS-2000 series) Operates at 10 Mbps, 100 Mbps, or 1,000 Mbps and supports full-duplex and half-duplex auto-negotiation.
- Two monitor ports allow two devices to simultaneously monitor the same link, providing extended security and analysis options, while eliminating contention for network access.
- Memory buffer manages traffic burst exceeding 100% of a single NIC utilization preventing data overload, dropped packets, and maintains continuity of full-duplex monitoring.
- Redundant power assures uninterrupted monitoring by eliminating power single point of failure — seamless monitoring even if the main power source is unavailable. (This feature is not available in the SS-1000BT-AT or SS-1000SX.)
- The SS-100 and SS-101 won't break the link even if power is lost to the tap — never lose packets. (This distinctive feature is not available in the SS-102, SS-103, SS-1000 series or SS-2000 series.)
- Transparent to the network – will not interfere with data.
- (SS-100 series) Easy to install – optional rack mount available in two models, either 3 unit rack mount chassis (RMC-3) 1U high or 14 unit rack mount chassis (RMC-14) 4U high.
- (SS-1000 and SS-2000 series) Easy to install – optional rack mount available in 2 unit rack mount chassis (RMC-2) 1U high.

Advantage Over Traditional SPAN Monitoring

- SPAN ports often lose excess data due to limited buffering support – the SINGLEstream™ Link Aggregation Tap contains a memory buffer on each side of the full-duplex link to enable seamless monitoring without losing data, even when 100% utilization is exceeded on the monitoring device's single NIC.

SS-100 Introduction — Using the SS-100, two monitoring devices can receive the combined traffic from both sides of a network conversation and only one Network Interface Card (NIC) is needed by each monitoring device to see all the combined traffic.

SS-100 Application — Figure 1 depicts a typical SS-100 Link Aggregation Tap Application. Two monitoring devices receive all the combined traffic from both sides of the network conversation. Only one network interface card (NIC) is used by each device to see the combined traffic.

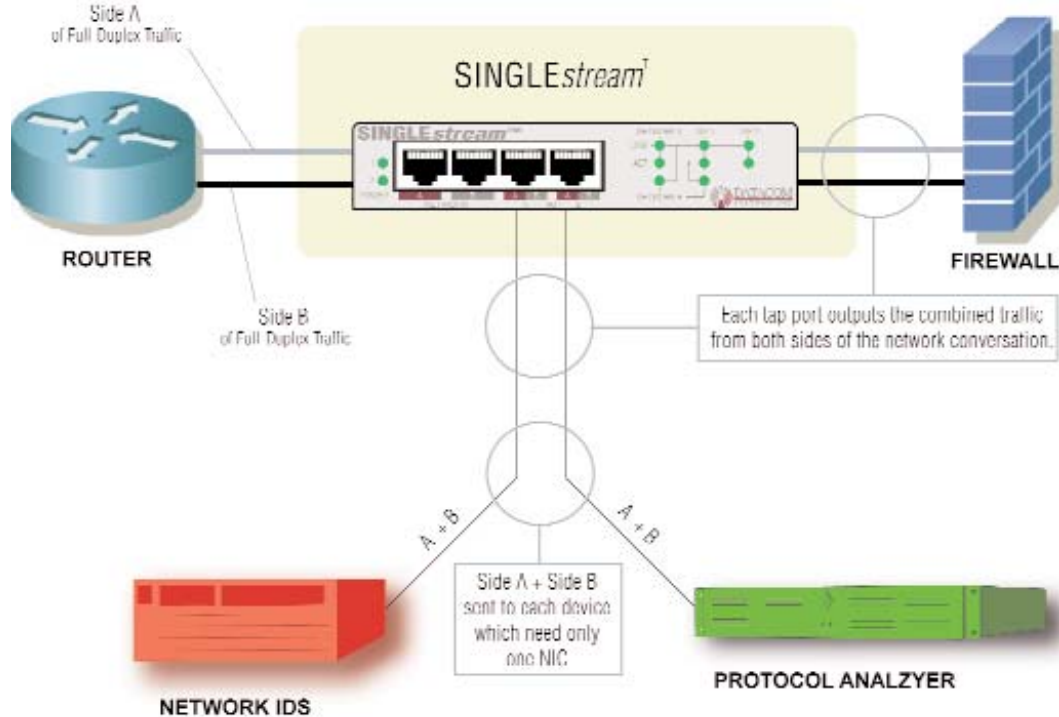


Figure 1 - SINGLEstream™ Application

SS-100 with MX16100E/Tsl — Figure 2 depicts a typical SS-100 Link Aggregation Tap with a MX16100 switch. Move two analyzers in and out of 16 links for roving analysis. Tap into your link with a SS-100 and get the ability to receive aggregated data from the network link. Connect an IDS device to the SS-100's second monitor port for 24x7 monitoring. Eliminates contention for access to the same SPAN port. Use up to 16 SS-100s.

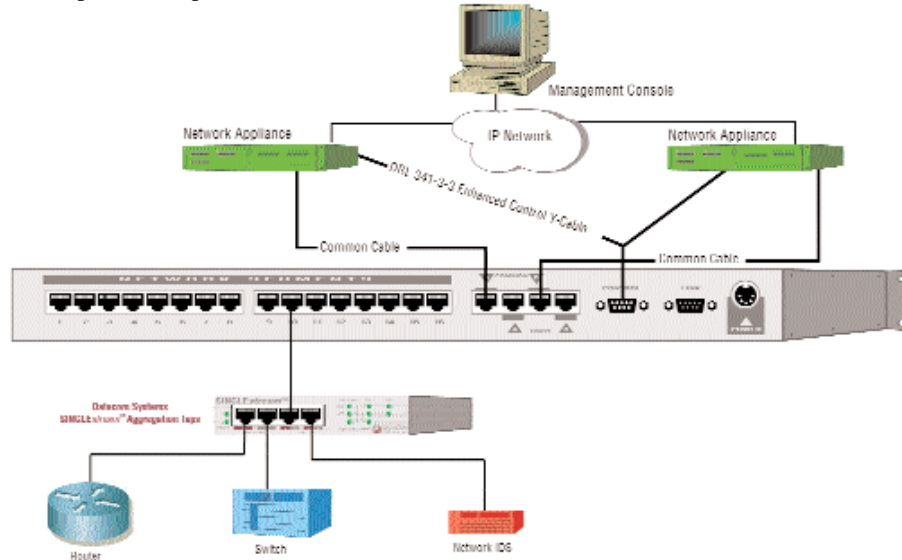


Figure 2 - SINGLEstream™ with MX16100E/Tsl Application

SS-100 with 2X16FD-SY — Figure 3 depicts two SS-100 Link Aggregation Tap with a 2X16FD-SY switch. Either Network Analyzer may be moved in and out of any of the 16 tapped links non-intrusively for roving full-duplex analysis. Or leave the second analyzer and intrusion detection device permanently In-Line on any of the 16 ports for 24x7 full-duplex analysis and monitoring.

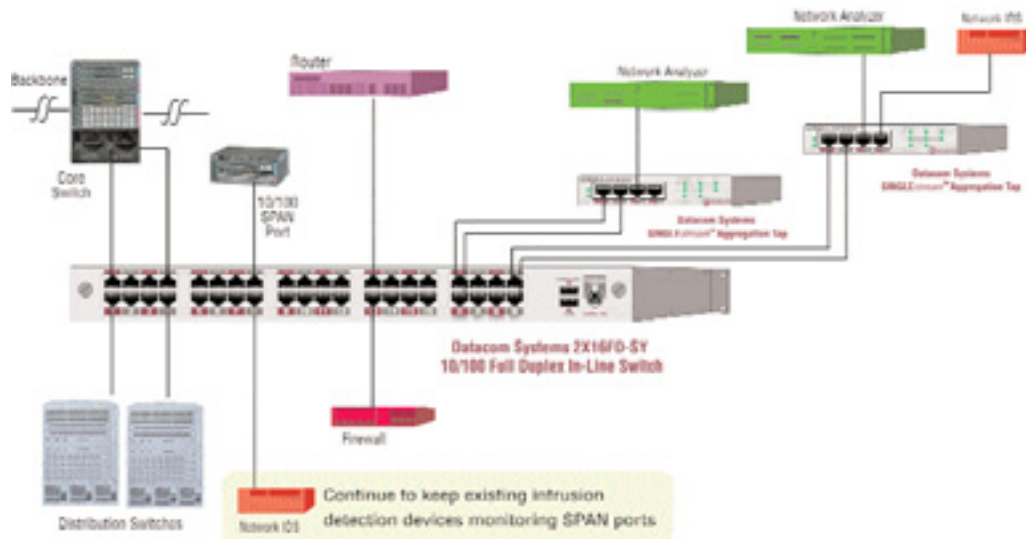


Figure 3 - SINGLEstream™ with 2X16FD-SY Application

SS-100 Hardware Description — Figure 4 illustrates the SS-100 Link Aggregation Tap front panel. This is the location for all cable connections and status LEDs.

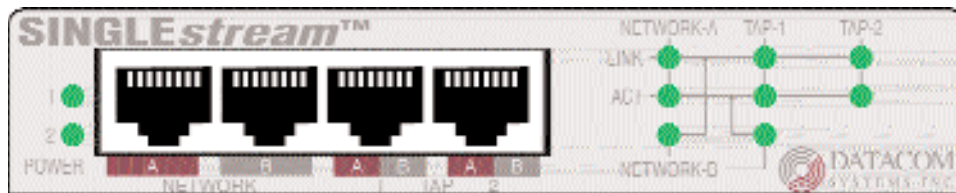


Figure 4 - SS-100 Front Panel

An explanation of each rear panel legend follows:

!!! - **End-device LINK LEDs must indicate “LINK” PRIOR TO POWERING THE TAP to ensure correct passive tap functionality during loss of power.**

POWER 1 and 2 — Two power supplies are provided. Use of the second power supply is strongly recommended to assure uninterrupted monitoring. Furthermore, connecting the second power supply to a different external power source circuit than the first power supply eliminates power as a single point of failure. The **POWER 1** and **2** LEDs illuminate indicating power 1 and 2, respectively, are on. Either LED not illuminated indicates a defective power source and immediate replacement is required to insure redundant power integrity.

NETWORK A, B — These ports are RJ45 connectors used for connection by insertion to the network, providing the ultimate in network integrity.

TAP 1 A/B and 2 A/B — These RJ45 connector ports are cabled to the NIC **MONITOR** card Port RJ45 connectors of each network monitoring tool.

!!! - **End-device LINK LEDs must indicate “LINK” PRIOR TO POWERING THE TAP to ensure correct passive tap functionality during loss of power.**

LINK — The **NETWORK-A LINK** LED illuminates indicating link has been established between the NETWORK A connector and NETWORK A device. The **NETWORK-B LINK** LED illuminates indicating link has been established between the NETWORK B connector and NETWORK B device.

NOTE: If you are properly connected, NETWORK-A and NETWORK-B “LINK” LEDs remain illuminated simultaneously.

The **TAP 1 LINK** LED illuminates indicating link has been established between the TAP 1 connector and monitoring device NIC (network interface card.) The **TAP 2 LINK** LED illuminates indicating link has been established between the TAP 2 connector and monitoring device NIC.

ACT — The **NETWORK A** and **NETWORK B ACT** LEDs illuminate as data is passed back and forth between the NETWORK A and NETWORK B devices.

The **TAP 1 ACT** LED illuminates as data is passed to the TAP 1 monitoring device. The **TAP 2 ACT** LED illuminates as data is passed to the TAP 2 monitoring device.

SS-100 Functional — Figure 5 illustrates the SS-100 Link Aggregation Tap functional diagram legend which is located on the rear panel next to the **POWER 1** and **POWER 2** connectors.

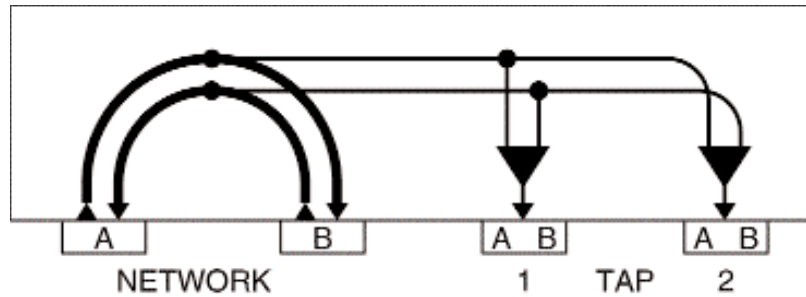


Figure 5 - SS-100 Functional

SS-100 Specifications

Feature	Specification
Channel	One 10/100 In-Line
Cable Type	CAT 5E
Port Connectivity: NETWORK A NETWORK B TAP 1 A/B TAP 2 A/B	RJ45 RJ45 RJ45 RJ45
Distance Limit	100 meter maximum length between network end-points. Tap, typically 1 meter.
Power Requirements	Two external power supplies 5 VDC, 1 A
Operating Temperature	0° to 40° C (32° to 104° F)
Storage Temperature	-30° to 65° C (-22° to 149° F)
Humidity	Less than 95° C non-condensing
Dimensions	1.10" (H) x 5.75" (W) x 5.75" (D) (includes RMC-3 panel bracket) 28 mm (H) x 146 mm (W) x 146 mm (D)
Weight	Unit - 12 ounces; Shipping - 2 pounds

SS-100 Hardware Installation — Figure 6 illustrates the typical SS-100 Link Aggregation Tap hardware installation.

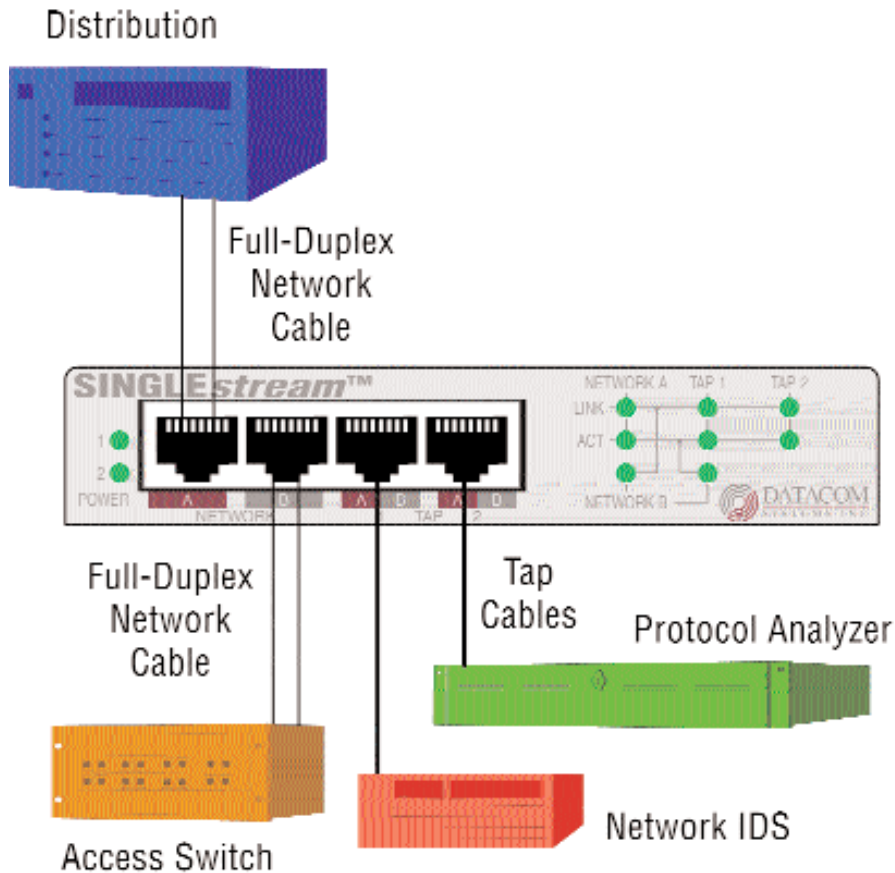


Figure 6- SS-100 Hardware Installation

To connect the SS-100 into the network, refer to **FIGURE 6** and follow these steps:

Step 1. Two power supplies are provided. Use of the second power supply is strongly recommended to assure uninterrupted monitoring. Connect both power supply barrel connectors into the **POWER 1** and **2** ports, respectively, of the SINGLEstream™. Plug the power Supplies into the external power source, furthermore, connecting the second power supply to a different external power source circuit than the first power supply eliminates power as a single point of failure. The **POWER 1** and **2** LEDs illuminate indicating power 1 and 2, respectively, are on. Either LED not illuminated indicates a defective power source and immediate replacement is required to insure redundant power integrity.

IMPORTANT: *The maximum length of 100 meters must not be exceeded between end-points.*

Step 2. Connect one of the network cables to the SS-100 RJ45 port **NETWORK A** connector. The **NETWORK-A LINK** LED illuminates indicating link has been established between the NETWORK A connector and NETWORK A device.

SS-101 and SS-102 ONLY: *Network devices that DO NOT automatically negotiate Rx/Tx pin-out differences between devices to establish link typically require a cross-over cable. If needed, connect the cross-over cable as follows:*

Equipment-Equipment Hookup	Crossover Cable Connection
PC - PC	B
PC/Router - Switch	NONE
Switch - Switch	A

NOTE: Let the “LINK” LEDs be your guide. *If you are properly connected, NETWORK-A and NETWORK-B “LINK” LEDs remain illuminated simultaneously.*

Step 3. Connect the other network cables to the SS-100 RJ45 port **NETWORK B** connector. The **NETWORK-B LINK** LED illuminates indicating link has been established between the NETWORK B connector and NETWORK B device.

!!!: *The network link is bidirectional Tx/Rx path sensitive and correct connection is indicated by simultaneously illuminated NETWORK-A and NETWORK-B LINK LEDs. When connecting the second network device causes the first LINK LED to go out and both LINK LEDs are NOT illuminated, the network connection is backwards. Reverse NETWORK-A and NETWORK-B connections and link will be established.*

The **NETWORK A** and **NETWORK B ACT** LEDs illuminate as data is passed between the NETWORK A and NETWORK B devices.

Step 4. Connect one tap cable from the **TAP 1** port connector into the IDS monitoring NIC. The **TAP 1 LINK** LED illuminates indicating link has been established between the TAP 1 connector and IDS monitoring NIC. The **TAP 1 ACT** LED illuminates as data is passed to the TAP 1 IDS.

Step 5. Connect the other tap cable from the **TAP 2** port connector into the protocol analyzer NIC. The **TAP 2 LINK** LED illuminates indicating link has been established between the TAP 2 connector and analyzer NIC. The **TAP 2 ACT** LED illuminates as data is passed to the TAP 2 analyzer.

SS-1000 Introduction — Using the SS-1000, two monitoring devices can receive the combined traffic from both sides of a network conversation and only one Network Interface Card (NIC) is needed by each monitoring device to see all the combined traffic.

SS-1000 Application — Figure 11 depicts a typical SS-1000 Link Aggregation Tap Application. Two monitoring devices receive all the combined traffic from both sides of the network conversation. Only one network interface card (NIC) is used by each device to see the combined traffic.

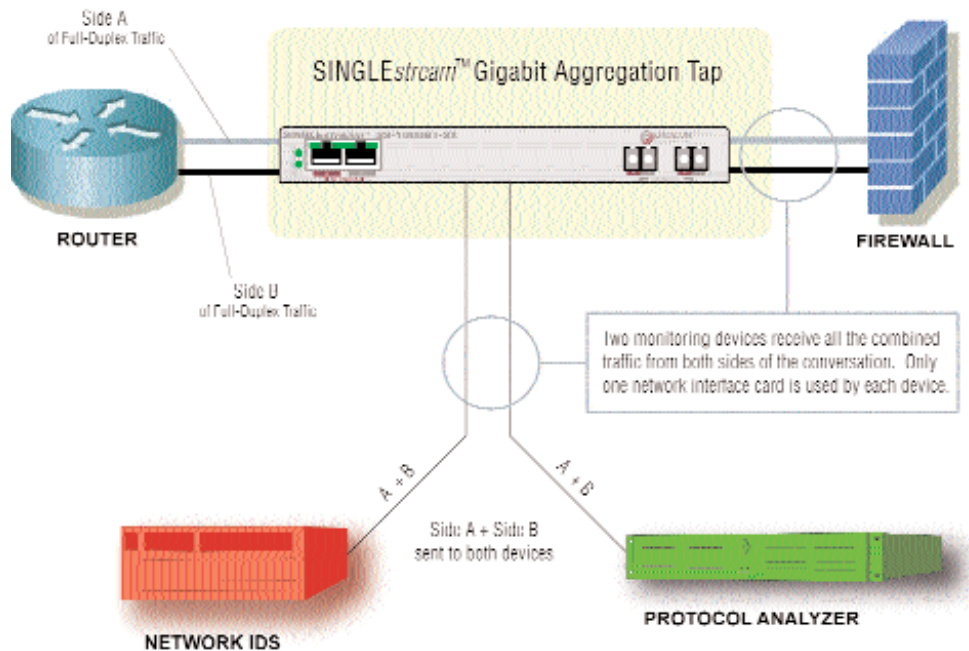


Figure 11 - SS-1000 Application

SS-1000 Hardware Description

Figure 12 illustrates the SS-1000BT-BT Link Aggregation Tap front panel, **Figure 13** illustrates the SS-1000BT-SX Link Aggregation Tap front panel, and **Figure 14** illustrates the SS-1000SX(LX)-BT Link Aggregation Tap.

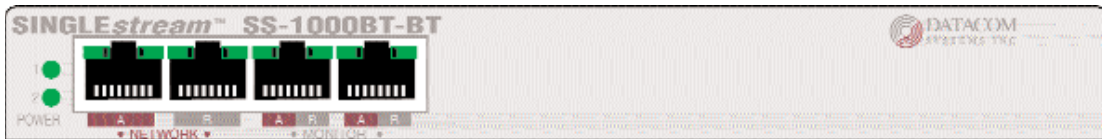


Figure 12 - SS-1000BT-BT Front Panel



Figure 13 - SS-1000BT-SX Front Panel



Figure 14 - SS-1000SX(LX)-BT Front Panel

An explanation of each front panel legend follows:

POWER 1 and 2

Two power supplies are provided for each module. Use of the second power supply is strongly recommended to assure uninterrupted monitoring. Furthermore, connecting the second power supply to a different external power source circuit than the first power supply eliminates power as a single point of failure. The **POWER 1** and **2** LEDs illuminate indicating power 1 and 2, respectively, are on. Either LED not illuminated indicates a defective power source and immediate replacement is required to insure redundant power integrity.

NETWORK ports: **A** and **B**

These ports are either:

- 1) RJ45 connectors used for connection to network segments. These jacks have integrated LEDs that display line status and line speed of each port. See **Table 1** for LED display codes.

OR

- 2) Duplex-LC connectors used for connection to network segments. The LED located between the duplex-LC connectors is solid green indicating link has been established between the respective **NETWORK** Rx port and network device Tx port.


LED Display Code				
Code	Left LED		WITH LINK OR DATA Right LED	Code
Link	Solid Green		Green	1,000 Mbs
Data	Flashing Green		Orange	100 Mbs
			OFF	10 Mbs

Table 1 - LED Display Codes

MONITOR ports: **A/B** and **A/B**

These ports are either:

- 1) RJ45 connectors used for connection to monitor devices. These jacks have integrated LEDs that display line status and line speed of each port. See **Table 1** for LED display codes.

OR

- 2) Duplex-LC connectors used for connection to monitor devices. The LED located between the duplex-LC connectors is solid green indicating link has been established between the respective **MONITOR** Rx port and monitor device Tx port.

SS-1000 Functional — Figure 15 illustrates the SS-1000BT-BT, Figure 16 illustrates the SS-1000BT-SX, and Figure 17 illustrates the SS-1000SX(LX)-BT, Link Aggregation Tap functional diagram legend which is located on the rear panel next to the **POWER 1** and **POWER 2** connectors.

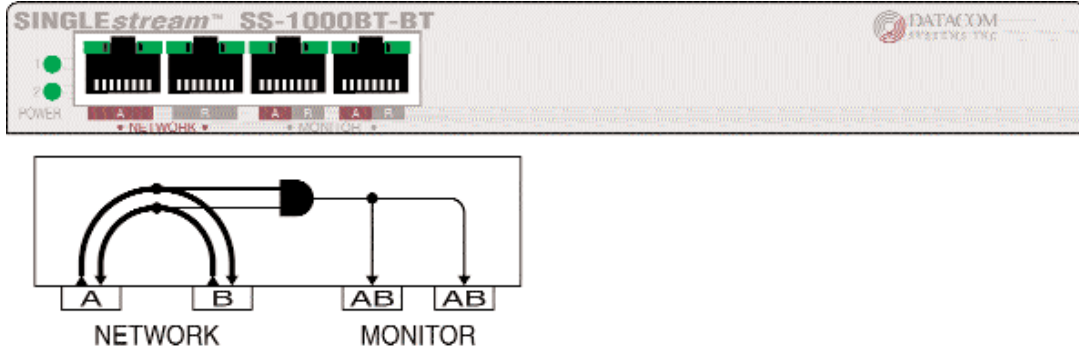


Figure 15 - SS-1000BT-BT Functional

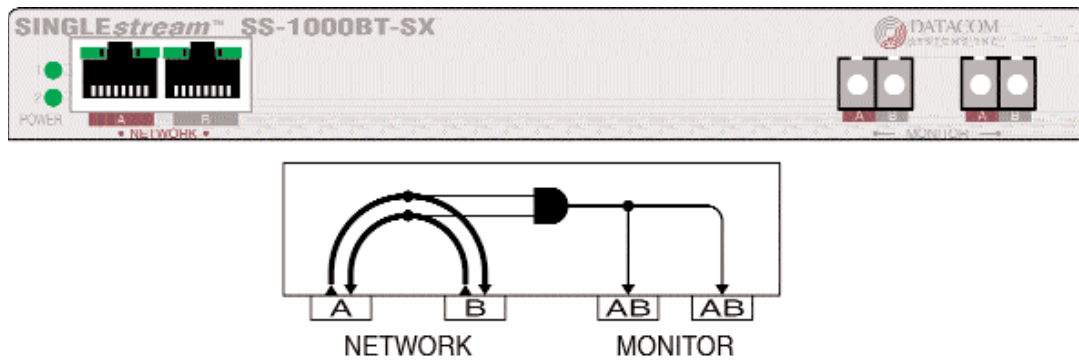


Figure 16 - SS-1000BT-SX Functional

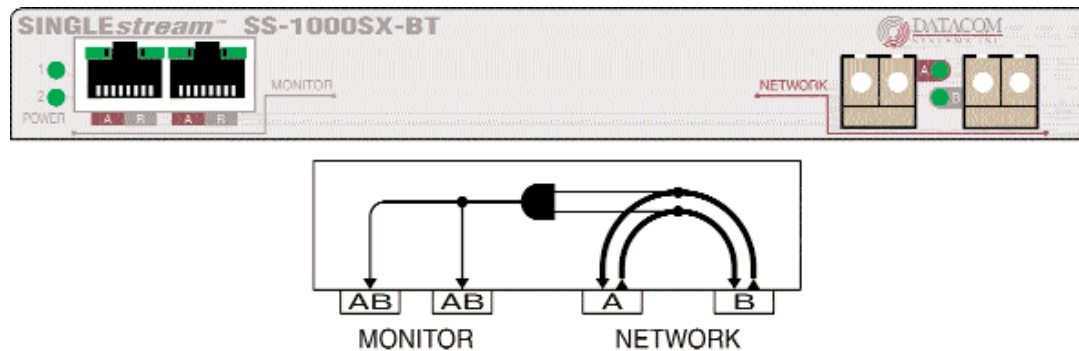


Figure 17 - SS-1000SX(LX)-BT Functional

SS-1000 Specifications

Feature	Specification
Channel	One 10/100/1000 In-Line
Cable Type	Copper: CAT 5E Fiber: 50 or 60 micron (SX); 9 micron (LX)
Port Connectivity: NETWORK A NETWORK B MONITOR A/B MONITOR A/B	RJ45 or Duplex LC RJ45 or Duplex LC RJ45 or Duplex LC RJ45 or Duplex LC
Distance Limit	Copper: 100 meter maximum length between network end-points. Tap, typically 1 meter. Fiber: Varies by cable type
Power Requirements	Two external power supplies 5 VDC, 1 A
Operating Temperature	0° to 40° C (32° to 104° F)
Storage Temperature	-30° to 65° C (-22° to 149° F)
Humidity	Less than 95° C non-condensing
Dimensions	1.10" (H) x 5.75" (W) x 5.75" (D) (includes RMC-3 panel bracket) 28 mm (H) x 146 mm (W) x 146 mm (D)
Weight	Unit - 12 ounces; Shipping - 2 pounds

SS-1000 Hardware Installation — The explanation below will focus on the configuration shown in **Figure 18** which illustrates the typical SS-1000SX(LX)-BT Link Aggregation Tap hardware installation.

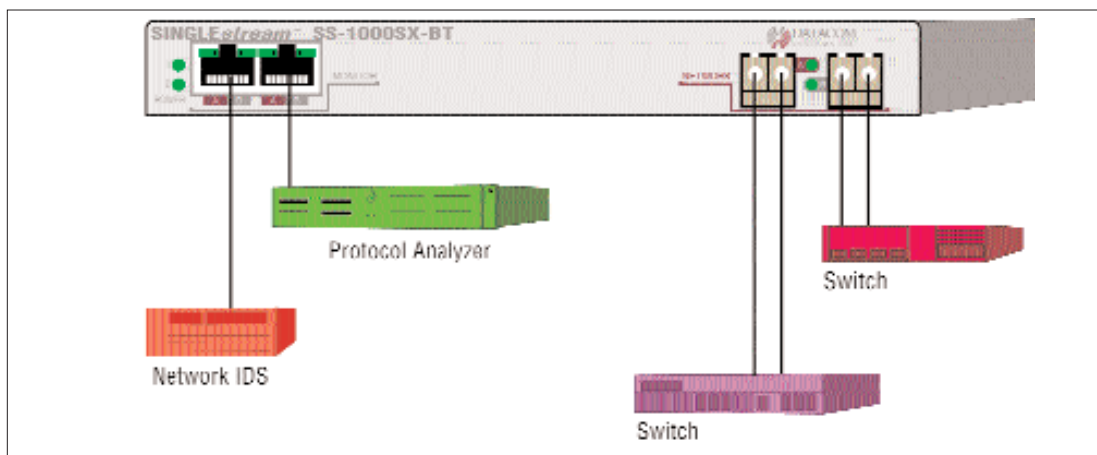


Figure 18 - SS-1000SX(LX)-BT Hardware Installation

To connect the SS-1000SX(LX)-BT, refer to **Figure 18** and follow these steps:

- Step 1.** Two power supplies are provided. Use of the second power supply is strongly recommended to assure uninterrupted monitoring. Connect both power supply barrel connectors into the power 1 and 2 ports, respectively, of the SS-1000SX(LX)-BT. Plug the power supplies into the external power source, furthermore, connecting the second power supply to a different external power source circuit than the first power supply eliminates power as a single point of failure. The **POWER 1** and **2** LEDs illuminate indicating power 1 and 2, respectively, are on. Either LED not illuminated indicates a defective power source and immediate replacement is required to insure redundant power integrity.
- Step 2.** Connect network cables to the SS-1000SX(LX)-BT **NETWORK** Duplex-LC ports. The **NETWORK** LED is solid green indicating a Tx-Rx path link has been established between each network device. When both **NETWORK** port Tx-Rx paths are complete both **NETWORK** LEDs will be solid green. The LED is flashing green when data is passed from the respective network device to the network port.
- Step 3.** Connect monitor cables to the SS-1000SX(LX)-BT **MONITOR** RJ45 ports. The **MONITOR** RJ45 left LED is solid green indicating link has been established between the respective **MONITOR** port and monitor device. See **Table 2** for RJ45 LED display codes. The LED is flashing green when data is passed from the respective network device to the network port.


RJ45 LED Display Code				
Code	Left LED		WITH LINK OR DATA Right LED	Code
Link	Solid Green		Green	1,000 Mbs
Data	Flashing Green		Orange	100 Mbs
			OFF	10 Mbs

Table 2 - RJ45 LED Display Codes

When a SS-1000BT-BT or SS-1000BT-SX is to be installed, follow the previous hardware installation steps using either SS-1000BT-BT or SS-1000BT-SX, as appropriate, in place of SS-1000SX(LX)-BT. SS-1000 installation is similar within the series, just connect network cables to network ports and monitor cables to monitor ports. See **Table 2** for **NETWORK** and **MONITOR** RJ45 LED display codes. The SS-1000BT-SX Dual-LC **MONITOR** LED is solid green indicating link has been established between the respective **MONITOR** Rx port and monitor device Tx port.

SS-2000 Introduction — The SINGLEstream™ 2000 series provides a single turnkey solution for 24x7 monitoring of redundant, failover, two-link Gig Etherchannel and asymmetric Gigabit network segments. It provides the power and flexibility of the popular SINGLEstream™ Gigabit Ethernet Tap with the capability of monitoring two network segments simultaneously, aggregating the data, and sending a single copy to the connected network devices.

SS-2000 Application — **Figure 19** depicts a typical SS-2000 series Link Aggregation Tap Application. The SS-2000 is inserted into a pair of Gigabit Ethernet segments, where you want to connect your monitoring or analysis equipment. It's that simple. No other configuration is necessary.

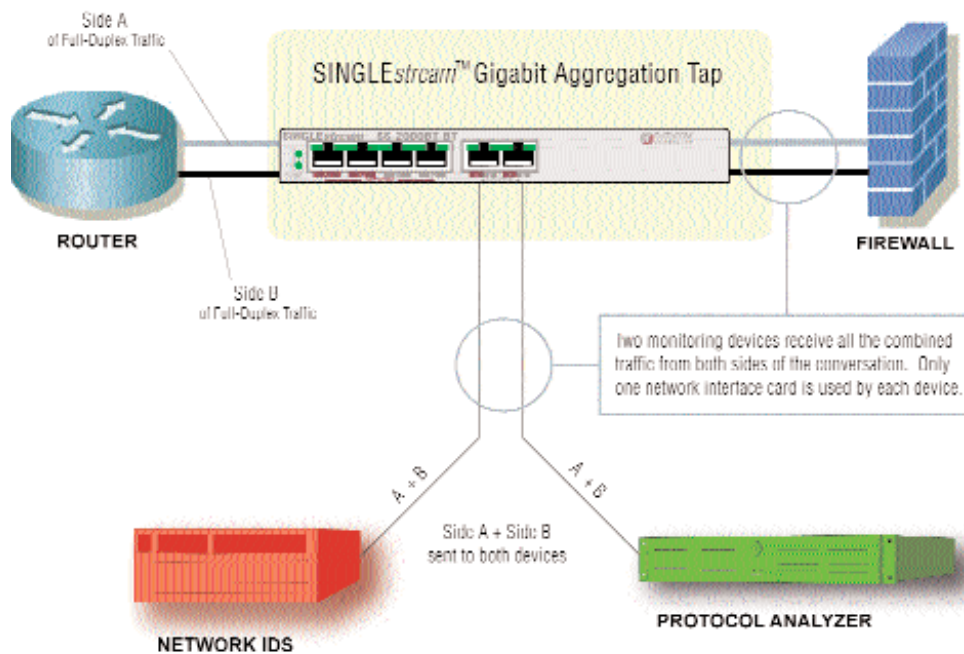


Figure 11 - SS-1000 Application

Asymmetric routing, Gig Etherchannel, and load-balanced environments use multiple paths to send data, reassembling it as the data reaches its destination. The SS-2000 makes monitoring and analyzing multiple data paths less of a challenge for network managers. The SS-2000 aggregates the two streams of data it receives, so networking professionals can receive all the data they need with as little as one tool and one trace file.

Redundant networking systems, used in the event of cable or hardware failure, no longer require more than one device to receive data from both network segments. Leave your monitoring and analysis tools hooked up 24x7 with no need to manually switch or move connections. If one network segment fails, the SS-2000 will still be able to collect data from the secondary segment, so you will never miss a single packet.

Additionally, the SS-2000 provides a second monitor port to help manage network resources. With an extra monitor port, two devices (such as an analyzer and an intrusion prevention device) can receive the same full-duplex transmission, so there will never be contention for access to the network link. You can even keep two identical devices connected to the SINGLEstream™ 2000. In the event that one device fails, the other will continue to collect data from both segments uninterrupted.

SS-2000 Hardware Description — **Figure 20** illustrates the SS-2000BT-BT and **Figure 21** illustrates the SS-2000BT-SX Link Aggregation Tap front panel.



Figure 20 - SS-2000BT-BT Front Panel



Figure 21 - SS-2000BT-SX Front Panel

An explanation of each front panel legend follows:

POWER 1 and 2

Two power supplies are provided for each module. Use of the second power supply is strongly recommended to assure uninterrupted monitoring. Furthermore, connecting the second power supply to a different external power source circuit than the first power supply eliminates power as a single point of failure. The **POWER 1** and **2** LEDs illuminate indicating power 1 and 2, respectively, are on. Either LED not illuminated indicates a defective power source and immediate replacement is required to insure redundant power integrity.

NETWORK ports: **A1, A2, B1, and B2**

These ports are RJ45 connectors used for connection to network segments. These jacks have integrated LEDs, see **Table 3**, that display line status and line speed of each port.


RJ45 LED Display Code				
Code	Left LED		WITH LINK OR DATA Right LED	Code
Link	Solid Green		Green	1,000 Mbs
Data	Flashing Green		Orange	100 Mbs
			OFF	10 Mbs

Table 3 - RJ45 LED Display Codes

MONITOR ports: **A/B** and **A/B**

These ports are either:

- 1) RJ45 connectors used for connection to monitor devices. These jacks have integrated LEDs, see **Table 3**, that display line status and line speed of each port.

OR

- 2) Duplex-LC connectors used for connection to monitor devices. The LED located between the duplex-LC connector is solid green indicating link has been established between the respective **MONITOR** Rx port and monitor device Tx port.

SS-2000 Functional — Figure 22 illustrates the SS-2000BT-BT and Figure 23 illustrates the SS-2000BT-SX Link Aggregation Tap functional diagram legend which is located on the rear panel next to the **POWER 1** and **POWER 2** connectors.

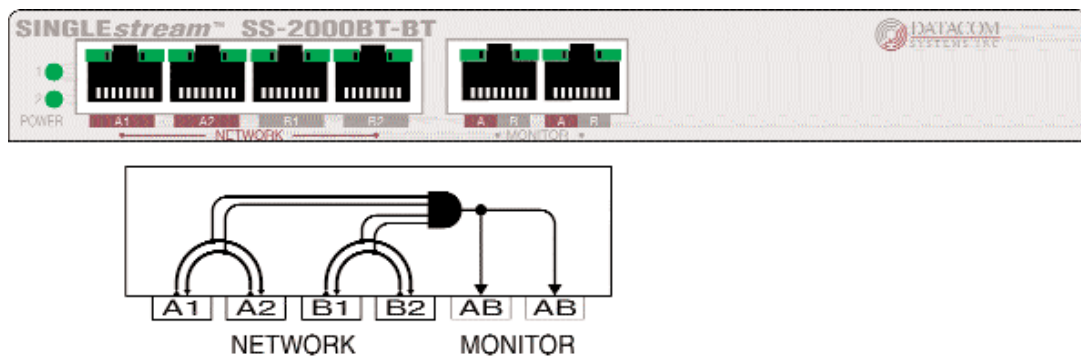


Figure 22 - SS-2000BT-BT Functional

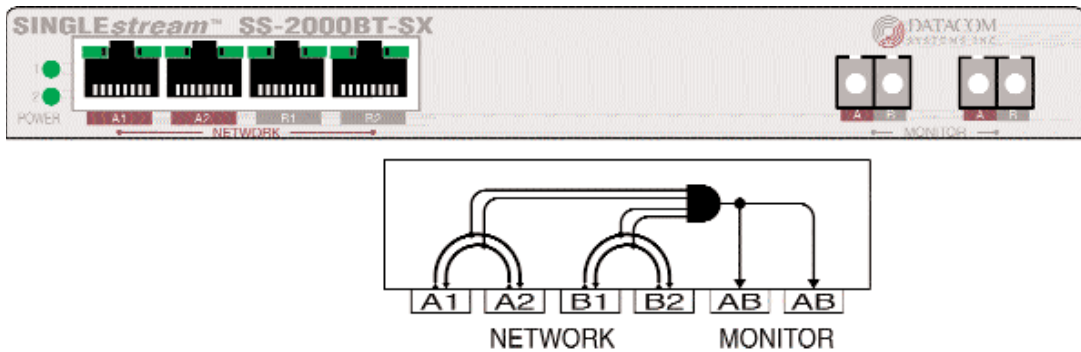


Figure 23 - SS-2000BT-SX Functional

SS-2000 Specifications

Feature	Specification
Channel	Two 10/100/1000 In-Line
Cable Type	Copper: CAT 5E Fiber: 50 or 60 micron (SX)
Port Connectivity: NETWORK A1, A2 NETWORK B1, B2 MONITOR A/B MONITOR A/B	RJ45 RJ45 RJ45 or Duplex LC RJ45 or Duplex LC
Distance Limit	Copper: 100 meter maximum length between network end-points. Tap, typically 1 meter. Fiber: Varies by cable type
Power Requirements	Two external power supplies 5 VDC, 1 A
Operating Temperature	0° to 40° C (32° to 104° F)
Storage Temperature	-30° to 65° C (-22° to 149° F)
Humidity	Less than 95° C non-condensing
Dimensions	1.10" (H) x 5.75" (W) x 5.75" (D) (includes RMC-3 panel bracket) 28 mm (H) x 146 mm (W) x 146 mm (D)
Weight	Unit - 12 ounces; Shipping - 2 pounds

SS-2000 Hardware Installation — The explanation below will focus on the configuration shown in **Figure 22** which illustrates the typical SS-2000BT-BT Link Aggregation Tap hardware installation.

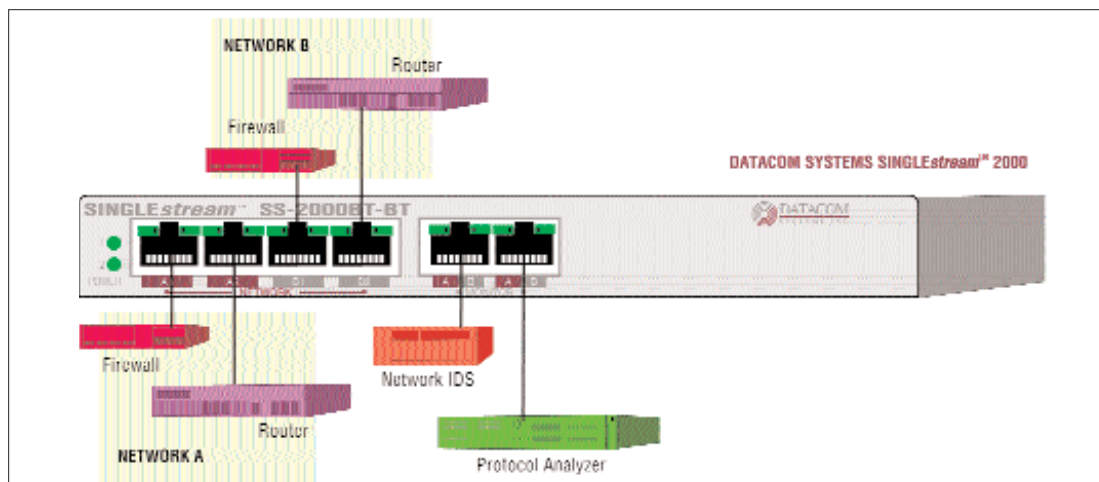


Figure 22 - SS-2000BT-BT Hardware Installation

To connect the SS-2000BT-BT, refer to **Figure 22** and follow these steps:

- Step 1.** Two power supplies are provided. Use of the second power supply is strongly recommended to assure uninterrupted monitoring. Connect both power supply barrel connectors into the power 1 and 2 ports, respectively, of the SS-1000SX(LX)-BT. Plug the power supplies into the external power source, furthermore, connecting the second power supply to a different external power source circuit than the first power supply eliminates power as a single point of failure. The **POWER 1** and **2** LEDs illuminate indicating power 1 and 2, respectively, are on. Either LED not illuminated indicates a defective power source and immediate replacement is required to insure redundant power integrity.
- Step 2.** Connect network cables to the SS-2000BT-BT **NETWORK** RJ45 ports. The **NETWORK** RJ45 left LED is solid green indicating link has been established between the respective **NETWORK** port and network device. See **Table 4** for RJ45 LED display codes. The LED is flashing green when data is passed from the respective network device to the network port.


RJ45 LED Display Code				
Code	Left LED		WITH LINK OR DATA Right LED	Code
Link	Solid Green		Green	1,000 Mbs
Data	Flashing Green		Orange	100 Mbs
			OFF	10 Mbs

Table 4 - RJ45 LED Display Codes

- Step 3.** Connect monitor cables to the SS-1000SX(LX)-BT **MONITOR** RJ45 ports. The **MONITOR** RJ45 left LED is solid green indicating link has been established between the respective **MONITOR** port and monitor device. See **Table 4** for RJ45 LED display codes. The LED is flashing green when data is passed from the respective network device to the network port.

When a SS-2000BT-SX is to be installed, follow the previous hardware installation steps using SS-1000BT-SX, as appropriate, in place of SS-2000BT-BT. SS-2000 installation is similar within the series, just connect network cables to network ports and monitor cables to monitor ports. See **Table 4** for **NETWORK** and **MONITOR** RJ45 LED display codes. The SS-2000BT-SX Dual-LC **MONITOR** LED is solid green indicating link has been established between the respective **MONITOR** Rx port and monitor device Tx port.

Customer Service

This *USERguide* was written to help you get to know your new SINGLEstream™ Link Aggregation Taps quickly and easily. We would welcome any comments or suggestions you may have regarding this *USERguide*. Please send your remarks and recommendations via mail, telephone, facsimile, or Internet E-mail.

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