STARGEN

SFS600 Switch Box

User Guide

Revision Information: Revision 1.0

Hardware Version: SFS600-X0

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Preface

This manual describes use of the SFS600 StarFabric Switch Box for the purpose of evaluating SG1010 StarFabric switch devices and developing software.

Audience

This manual was written for users of the SFS600 Evaluation board, revision SFS600-X0. The revision can be determined by looking on the bottom of the Switch Box. For all other revisions, please obtain support from StarGen.

Overview

This manual contains the following chapters, appendices, and a glossary:

Chapter 1   Introduction – Overview of the SFS600.

Chapter 2   Feature Summary– High level description of the product.

Chapter 3   Operation and Installation – Describes typical installation and configuration of the board.

Appendix A   Bill of Materials - Lists all of the components on the PCB Assembly

References and Additional Information

If you need additional information, please contact StarGen at support@stargen.com or refer to one or more of the following reference documents:

PCI Special Interest Group (PCISIG) Specifications

PCI Local Bus Specification, Revision 2.2

PCI-to-PCI Bridge Architecture Specification, Rev 1.1

PCI Industrial Computer Manufacturers Group (PICMG) Specifications

PICMG 2.17 StarFabric Specification

StarFabric Trade Association

StarFabric Protocol Reference Manual

StarGen Specifications

SG1010 Hardware Reference Manual

SG1010 Data Sheet

Fabric Programmer's Manual

SFS600 Schematics

Revision History

Revision Number	Date dd/mm/yy	Description
1.0	1/05/05	Initial Revision

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Introduction

The SFS600 is a 1U (1.75 inch; 4.445 cm) high form factor box containing a single printed circuit board (PCB) that is used to evaluate the SG1010 StarFabric Switch device.

The SFS600 can be used for the following purposes:

- Evaluation of the SG1010 operation and features
- Evaluation and development of application specific code for the SG1010 and other Starfabric compatible devices
- StarFabric system design
- Use as a general reference for SG1010 design

Features Summary

2

2.1 Main Features

The SG1010 StarFabric Switch Box has the following features:

- SG1010 6 port StarFabric switch device

- Six (6) 2.5 Gbps full-duplex StarFabric serial links available through standard RJ45 front-panel connector

- Link status LEDs for each differential pair. By default only one LED is used per SG1010 link. This can be changed to 4-LED mode by adding JP1

- Register configuration pre-load serial ROM

2.2 SFS600 Switch Box

Figure 2–1 SFS600 Front Panel
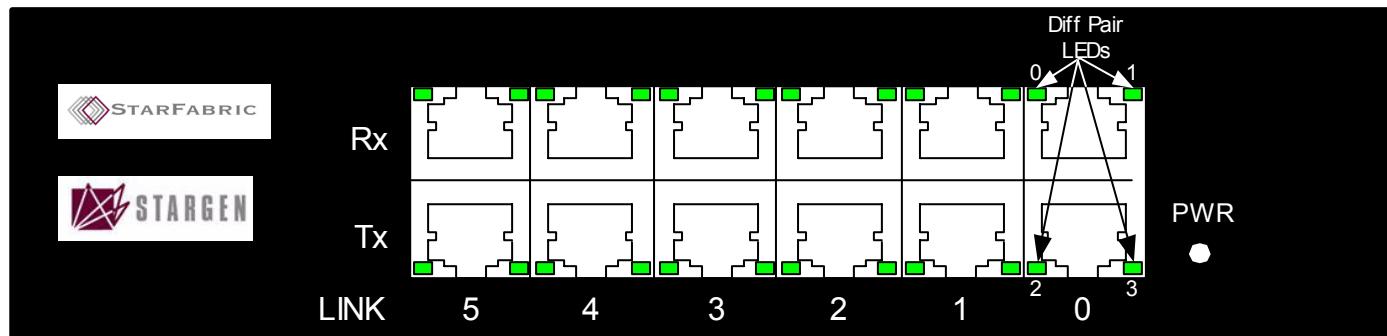
Figure 2–2 SFS600 Rear Panel
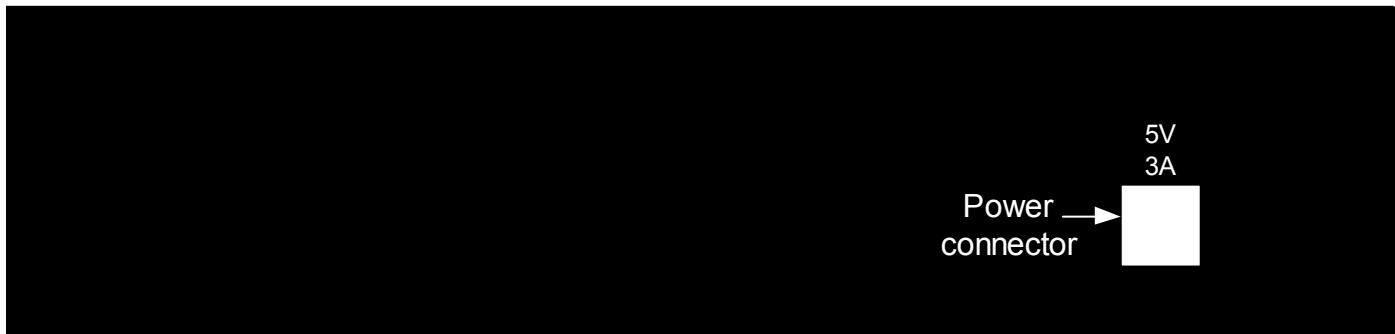
Figure 2–3 SFS600 Printed Circuit Board Design
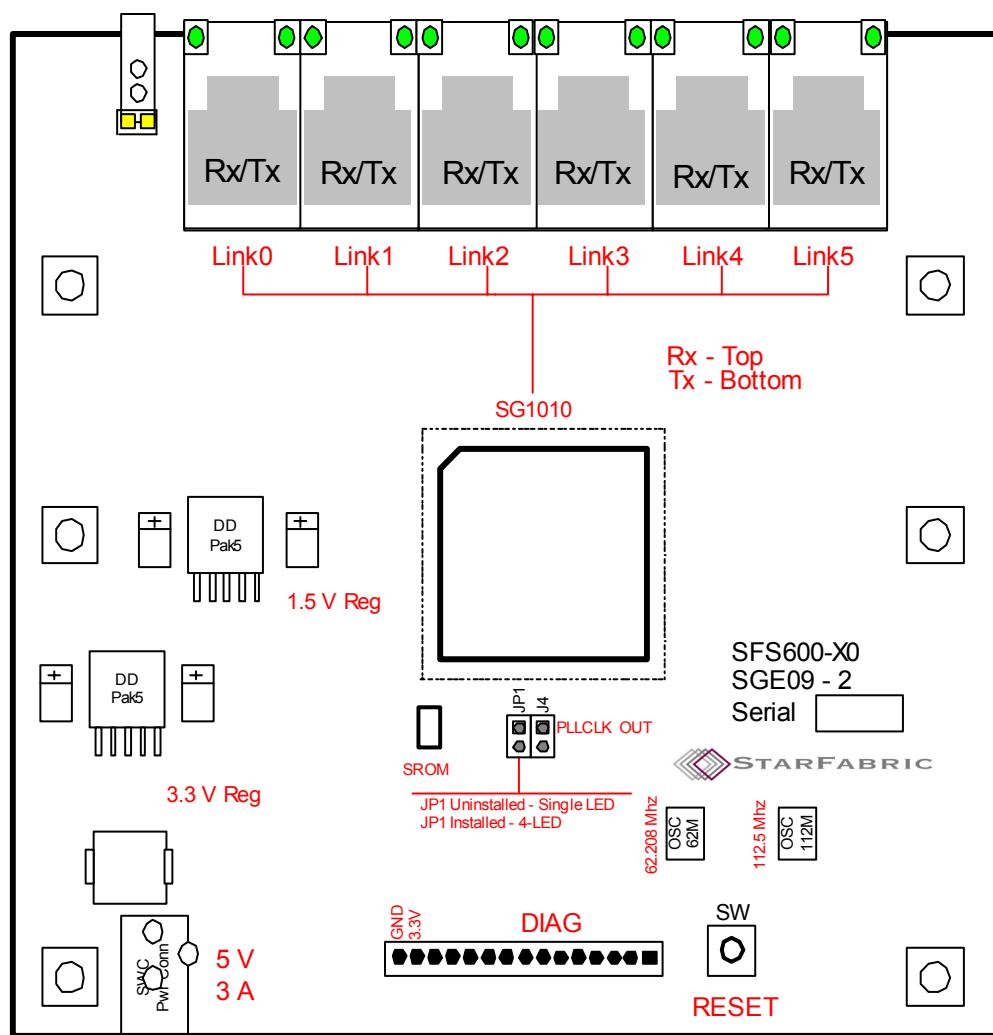
2.3 Status LEDs

The SFS600 contains 4 status LEDs per StarFabric link, one for each receiver differential pair. Please see Figure 2–1 for details on how the LEDs correspond to the differential pairs. These LEDs are integrated into the RJ45 connector. By default the SG1010 is put into single LED mode, one LED is used to indicate the status per StarFabric link. This mode conserves power and provides the status information required for most users. If 4-LED mode is desired, users can populate JP1 as seen in Figure 2–3.

The LED operating modes are described as follows:

1. Four status LEDs for each StarFabric link. (one LED per differential pair).

2. One status LED, the LED associated with differential pair 0, is used for each Starfabric link. If any of the differential pairs is synchronized and traffic is enabled, then the LED will be on. If none of the differential pairs are synchronized, the LED will be off. If at least one of the differential pairs is synchronized and link traffic is disabled, the LED will flash.

The link LED's indicate the state of the associated LVDS receivers as described in Table 2–1.

Table 2–1 Link States

LED State	Description
Off	Link is unsynchronized and traffic is disabled.
Flashing	Link is synchronized but traffic is disabled.
On	Link is synchronized and traffic is enabled.

Operation and Installation

3.1 Hardware Requirements

SFS600 Switch Box (supplied)

External 5V/3A power supply (supplied)

Mains line cord with IEC320 connector to connect to the power supply (supplied for North America)

CAT5/5E patch cables; two per StarFabric link (not supplied)

3.2 Software Requirements

3.2.1 PCI Address Routing Mode

None required. In this mode, the SG1010 acts as a PCI-PCI Bridge as defined in the reference documents section.

3.2.2 Path Routing Mode or Mixed Mode

StarGen Software Development Kit (SDK).

3.3 Installation Procedure

1. Connect main power (100-240VAC) to the power supply and the 5V connector to the SFS600 power connector, located on the back of the chassis. When the power is turned on the LED labeled PWR should be illuminated.

2. Confirm that the jumper settings are correct. The only user-selectable jumper setting is the LED mode. By default the SG1010 is setup in single LED mode. To set 4-LED mode a jumper must be installed in JP1.

3. Insert the link cables into the RJ45 connectors taking care to insure that receive and transmit cables are properly connected. As soon as cables are connected to other powered StarFabric components, LEDs should either turn on or blink/flash. If they don't, check the cabling to insure that a transmitter is connected to a receiver and vice versa. Also insure that the receive/transmit pair are connected to a single link.

3.4 Operation

After the links are connected, and power is applied to the switch box, insure that the Starfabric root device is powered up or started last. The root of any StarFabric will send out a Fabric reset symbol which should set links to the "LED on" state, that is, synchronized with the Traffic Enable set.

If the StarFabric topology connected to an SG1010 is changed, a reset needs to be generated to reinitialize Fabric IDs (FIDs). This reset can be either a Fabric reset from the Root StarFabric device or a physical reset (unplug and replug of the power connector).

Also, care should be taken when hot-plugging links in and out of SG1010's. If the link from another StarFabric device is disconnected from an SG1010 link and then the same link is reinserted into another link of the same SG1010, the SG1010 will believe the link is bundled and the link will become unstable.

3.5 Bundling

High bandwidth applications may require bundled links, 2 links from 1 StarFabric Device are connected to 2 links of another device. If a bundle is detected, the SG1010 automatically combines the 2 links, creating a 5 Gb/s link as opposed to the normal 2.5 Gb/s. There are two restrictions when using bundling 1) The ordering of the links has to be consistent (Low link # -> Low link #) and 2) if non-sequential links are used to create the bundle any links in between can not be used. Table 3–1 provides recommended bundling configurations.

1. Link Ordering (Low -> Low, High -> High)

    The lower link number from 1 StarFabric device has to connect to the lower link number of its link partner.

    Illegal Configuration

    > SG2010 Link 0 -> SG1010 Link 5

    > SG2010 Link 1 -> SG1010 Link 4

    Legal Configuration

    > SG2010 Link 0 -> SG1010 Link 3

    > SG2010 Link 1 -> SG1010 Link 4

2. Using Non-Sequential Link Numbers to Create a Bundled Link

    If contiguous links are not used any links in between can not be used. Using contiguous links is recommended.

    Illegal Configuration (Link 3 from the SG1010 can not connect to another StarFabric device if 2 and 4 are used to create a bundled link)

    > SG2010 1 Link 0 -> SG1010 Link 2

    > SG2010 1 Link 1 -> SG1010 Link 4

    > SG1010 Link 3 -> SG2010 2 Link 0 or SG2010 2 Link 0 (Illegal)

Legal Configuration

SG2010 1 Link 0 -> SG1010 Link 0

SG2010 1 Link 1 -> SG1010 Link 1

SG1010 Link 3 -> SG2010 2 Link 0 or SG2010 2 Link 0

Table 3–1 Recommended Bundling Configurations

SG1010		SG2010	
Link A	Link B	Link A	Link B
0	1	0	1
1	2	0	1
2	3	0	1
3	4	0	1
4	5	0	1

If 2 SG1010's are connected, any AB to AB configuration can be used. For example:

SG1010 (1) Link 0 -> SG1010 (2) Link 2

SG1010 (1) Link 1 -> SG1010 (2) Link 3

3.6 LED Mode Jumper

The factory default operating mode for the SFS600 Box is single LED mode. 4-LED mode can be set by installing a jumper into JP1.

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Bill of Materials

Materials List

```
#  QTY   REFDES      VENDOR    VENDOR PN        PACKAGE     VALUE     PART_SPEC
---------------------------------------------------------------------------------------------------
1   6    XM1-6                                  HOLE_156DI            MOUNTING HOLE 0.156-DIA
2   4    M1-4        3M        SJ5518-0-ND      MECH                  BLACK FEET FOR BOTTOM OF BOX
3   1    R24         ANY       TO PART_SPEC     R0402       40        SMT 1% 0.0625W
4   4    C63-66      ANY       TO PART_SPEC     B           10UF      TANTALUM 10UF 16V
5   2    C177-178    ANY       TO PART_SPEC     C0402       .001UF    X7R SMT 16V 10%
6   6    C189-190,   ANY       TO PART_SPEC     C           22UF      TANTALUM 22UF 16V
         C282-283,
         C288-289
7   68   C1,C5-22,   ANY       TO PART_SPEC     C0402       .01UF     X7R SMT 16V 10%
         C31-52,
         C54-62,
         C79-80,
         C83-84,
         C86,C88,
         C172-173,
         C175-176,
         C260,
         C269-275
8   10   R43,R46,    ANY       TO PART_SPEC     R0402       1K        SMT 1% 0.0625W
         R50,
         R53-54,
         R56,
         R105-107,
         R118
9   17   C2-4,       ANY       TO PART_SPEC     C0603       .1UF      X7R SMT 16V 10%
         C23-30,
         C142,
         C144-148
10  1    R26         ANY       TO PART_SPEC     R0402       10        SMT 1% 0.0625W
11  6    R44-45,     ANY       TO PART_SPEC     R0402       1.75K     SMT 1% 0.0625W
         R51-52,
         R55,R57
12  2    R16,R89     ANY       TO PART_SPEC     R0402       6.2       SMT 5% 0.0625W
13  2    R3,R25      ANY       TO PART_SPEC     R0402       100       SMT 1% 0.0625W
14  11   R1,R27-35,  ANY       TO PART_SPEC     R0402       10K       SMT 1% 0.0625W
         R117
15  2    C53,C159    ANY       TO PART_SPEC     C0402       .068UF    Y5V SMT 16V 20%
16  1    R23         ANY       TO PART_SPEC     R0402       180       SMT 1% 0.0625W
17  2    R17,R88     ANY       TO PART_SPEC     R0402       43        SMT 1% 0.0625W
18  25   R4-15,      ANY       TO PART_SPEC     R0402       120       SMT 5% 0.0625W
         R18-22,
         R36-42,
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        R116
 19  1   U3          ATMEL      AT25640N-10SC-2.7   8PSOIC                    ATMEL AT25640N-10SC-2.7
 20  1   OSC2        CARDINAL C CPPFXC7L-BD-112.5PD 5X7SMD     112.5MHZ   112 MHZ OSC 20PPM
 21  1   OSC1        CARDINAL C CPPFXC7L-BD-62.208PD 5X7SMD    62.208MHZ  62.208 MHZ OSC 20PPM
 22  1   LP1          CHICAGO MI 7511A85            2P                     LIGHT PIPE
 23  1    DS1          CHICAGO MI CMD15-21VYC/TR8     SMT-1206              1206 YELLOW LED 2.0V
 24  2   L1,L6        COILCRAFT  0805CS-821X_BC       0805CS     820NH
 25  4   L2-3,L5,L7  COILCRAFT  0603CS-R12X_BC        0603CS     120NH
 26  1   L4           COILCRAFT DS1608C-153          DS1608C    15UH      15UH POWER INDUCTOR
 27  1   M5          CUI        DTS050300UDC-P5P     PWR                   5V 3A POWER SUPPLY
 28  1   U2          DALLAS SEM DS1830AS             SOIC                  DS1830A
 29  4   M28-31       ELEC FASTE SEE PART_SPEC        MECH                4-40 X 3/16 LONG PHILLIPS FLAT HEAD
UNDE
 30  6   M6-11        ELEC FASTE SEE PART_SPEC        MECH                SCREW 6-32 X 1/4 LONG PHILLIPS PAN
HEAD
 31  1   XS1          IRONWOOD E SG-BGA-6010         X272PBGA             SOCKET FOR SG1010 272BGA
 32  1   U5           LINEAR TEC LT1764AEQ-3.3        DDPAK5              LDO 3.3V 3A
 33  1   U6           LINEAR TEC LT1963AEQ-1.5        DDPAK5              LDO 1.5V 1.5A
 34  24  L22-39,      MURATA     DLW21HN900SQ2L       CM3_2X1_6           HIGH FREQ COMMON MODE CHOKES
         L45-50
 35  1   SW1          OMRON      B3S-1000             PBSWITCH            B3S-1000 PUSH BUTTON MOMENTARY SWITCH
 36  2   R2,R70       PANASONIC  EZJS2YC822           R0805              VARIABLE RES, ESD PROTECTION
 37  1   M16          STARGEN    SFS600CV             MECH               SWITCHBOX_COVER
 38  1   M17          STARGEN    SFS600BS             MECH               SWITCHBOX_BASE
 39  1   U4           STARGEN    SG1010               272PBGA            STARFABRIC 6 PORT SWITCH
 40  1   L14          SUMIDA     CDRH125-100MC        12X12      10UH    4A 25 MILLIOHM
 41  1   J3           SWITCHCRAF RAPC722              CNSWRAPC72         2.1 MM MINI POWERJACK CONN
 42  14  M12-15,      TECH-ETCH  187S32-.17-08        MECH               SHIELDING SNAP-ON MOUNTING .32 X
.11 X .
         M18-27
 43  1   J4           TYCO       644695-2             CAMP644695         SINGLE ROW 2 PIN .1 HEADER
 44  1   J1           TYCO       1-644695-5           SIP-15P            SINGLE ROW 15 PIN .1 HEADER
 45  1   JP1          TYCO       644695-2             CAMP644695         SINGLE ROW 2 PIN .1 HEADER
 46  1   J2           XMULTIPLE  XRJD-S-26-8-8-5      RJ12STACKE         12 PORT DUAL STACKED RJ45 W/LED
    ----
     247
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Do Not Install List

RefDes	Value
R16,R89	6.2
R30,R32	10K
R88	43
OSC2	112.5 Mhz
L6	
SW1	
J4	
J1	

Glossary

LVDS	Low Voltage Differential Signaling
PCI	Peripheral Component Interconnect
PLL	Phase Lock Loop
SROM	Serial Read-Only Memory