



Installation and Operation Manual

DA-6804+D

Single- and Dual-Channel 3G HD-SDI, 1.5 G HD-SDI, and SD-SDI Distribution Amplifiers

Edition B

175-100192-00

Publication Information

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- Support Contacts: <http://www.imaginecommunications.com/services/technical-support/>
- eCustomer Portal: <http://support.imaginecommunications.com>

DA-DH6804+D

Dual 1 × 4 3-Gb/s HD-SDI Distribution Amplifiers

DA-DHR6804+D

Dual 1 × 4 3-Gb/s HD-SDI Distribution Amplifiers with Reclocking

DA-DS6804+D

Dual 1 × 4 SD-SDI Distribution Amplifiers

DA-DSR6804+D

Dual 1 × 4 SD-SDI Distribution Amplifiers with Reclocking

Installation and Operation Manual

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About This Manual

This manual details the features, installation procedures, operational procedures, and specifications of the following DA-6804+ series distribution amplifiers:

- **DA-DH6804+D**: Dual 1×4 3-Gb/s HD-SDI distribution amplifiers
- **DA-DHR6804+D**: Dual 1×4 3-Gb/s HD-SDI distribution amplifiers with reclocking
- **DA-DS6804+D**: Dual 1×4 SD-SDI distribution amplifiers
- **DA-DSR6804+D**: Dual 1×4 SD-SDI distribution amplifiers with reclocking

Intended Audience

This manual is written for engineers, technicians, and operators responsible for the installation, setup, and/or operation of the DA-6804+ series of distribution amplifiers.

Revision History


Table P-1 Manual Revision History

Edition	Date	Revision History
A	February 2010	Initial release
B	May 2011	Product changes

Writing Conventions

To enhance your understanding, the authors of this manual have adhered to the following text conventions:

Table P-2 Manual Style and Writing Conventions

Term or Convention	Description
Bold	Indicates dialog boxes, property sheets, fields, buttons, check boxes, list boxes, combo boxes, menus, submenus, windows, lists, and selection names
<i>Italics</i>	Indicates email addresses, the names of books or publications, and the first instances of new terms and specialized words that need emphasis
CAPS	Indicates a specific key on the keyboard, such as ENTER, TAB, CTRL, ALT, or DELETE
Code	Indicates variables or command-line entries, such as a DOS entry or something you type into a field
>	Indicates the direction of navigation through a hierarchy of menus and windows
hyperlink	Indicates a jump to another location within the electronic document or elsewhere
Internet address	Indicates a jump to a website or URL
 NOTE:	Indicates important information that helps to avoid and troubleshoot problems

Obtaining Documents

Technical documents can be viewed or downloaded from our website. Alternatively, contact your Customer Service representative to request a document.

Unpacking/Shipping Information

This product was carefully inspected, tested, and calibrated before shipment to ensure years of stable and trouble free service.

Unpacking a Product

- 1 Check equipment for any visible damage that may have occurred during transit.
- 2 Confirm that you have received the front and back module for the correct product.

- 3 Contact your dealer if any item on the packing list is missing.
- 4 Contact the carrier if any item is damaged.
- 5 Remove all packaging material from the product and its associated components before you install the unit.

Product Servicing

DA-6804+ series modules are not designed for field servicing. All hardware and firmware upgrades, modifications, or repairs require you to return the modules to the Customer Service center.

Returning a Product

In the unlikely event that your product fails to operate properly, please contact Customer Service to obtain a Return Authorization (RA) number, and then send the unit back for servicing.

Keep at least one set of original packaging, in the event that you need to return a product for servicing. If the original packaging is not available, you can purchase replacement packaging at a modest cost or supply your own packaging as long as it meets the following criteria:

- Withstands the weight of the product
- Holds the product rigid within the packaging
- Leaves at least two inches of space between the product and the container
- Protects the corners of the product

Ship products back to us for servicing prepaid and, if possible, in the original packaging material. If the product is still within the warranty period, we will return the product prepaid after servicing.



Safety Standards and Compliances

You can find the *6800+ Safety Instructions and Standards Manual* on the *Harris Infrastructure and Networking Documentation and Product Resources DVD*, or download it from our website.

Safety Terms and Symbols

This product manual uses the following safety terms and symbols to identify certain conditions or practices. See the **6800+ Safety Instructions and Standards Manual** for more information.

Table P-3 Safety Terms and Symbols

Symbol	Description
	WARNING: Identifies conditions or practices that can result in personal injury or loss of life — high voltage is present. Uninsulated dangerous voltage within the product's enclosure may be sufficient to constitute a risk of electric shock to persons.
	CAUTION: Identifies conditions or practices that can result in damage to the equipment or other property. Important operating and maintenance (servicing) instructions are included in the literature accompanying the product.

Restriction on Hazardous Substances (RoHS) Directive

Directive 2002/95/EC — commonly known as the *European Union (EU) Restriction on Hazardous Substances (RoHS)* — sets limits on the use of certain substances found in electrical and electronic equipment. The intent of this legislation is to reduce the amount of hazardous chemicals that may leach out of landfill sites or otherwise contaminate the environment during end-of-life recycling. The Directive, which took effect on July 1, 2006, refers to the following hazardous substances:

- Lead (Pb)
- Mercury (Hg)
- Cadmium (Cd)
- Hexavalent Chromium (Cr-VI)
- Polybrominated Biphenyls (PBB)
- Polybrominated Diphenyl Ethers (PBDE)

In accordance with this EU Directive, products sold in the European Union will be fully RoHS-compliant and “lead-free.” Spare parts supplied for the repair and upgrade of equipment sold before July 1, 2006 are exempt from the legislation. Equipment that complies with the EU directive will be marked with a RoHS-compliant symbol, as shown in [Figure P-1](#).



Figure P-1 RoHS Compliance Symbol

Waste from Electrical and Electronic Equipment (WEEE) Directive

The *European Union (EU) Directive 2002/96/EC on Waste from Electrical and Electronic Equipment (WEEE)* deals with the collection, treatment, recovery, and recycling of electrical and electronic waste products. The objective of the WEEE Directive is to assign the responsibility for the disposal of associated hazardous waste to either the producers or users of these products. As of August 13, 2005, producers or users are required to recycle electrical and electronic equipment at end of its useful life, and must not dispose of the equipment in landfills or by using other unapproved methods. (Some EU member states may have different deadlines.)

In accordance with this EU Directive, companies selling electric or electronic devices in the EU will affix labels indicating that such products must be properly recycled. Contact your local sales representative for information on returning these products for recycling. Equipment that complies with the EU directive will be marked with a WEEE-compliant symbol, as shown in **Figure P-2**.



Figure P-2 WEEE Compliance Symbol

1

Introduction

The DA-6804+D series of distribution amplifiers distributes serial digital signals according to SMPTE259C, 292M, 424M and DVB-ASI standards (compatibility depends on the model selected).

The following modules are available:

- DA-DH6804+D is a dual channel 3 Gb/s HD/SD-SDI distribution amplifier
- DA-DHR6804+D is a dual channel 3 Gb/s HD/SD-SDI distribution amplifier with reclocking capability
- DA-DS6804+D is a dual channel SD-SDI distribution amplifier
- DA-DSR6804+D is a dual channel SD-SDI distribution amplifier with reclocking capability

Each distribution amplifier consists of a front and back module, and operates in FR6802+ series frames, occupying two slots. Ten distribution amplifiers can be loaded into a frame.

Each distribution amplifier contains two inputs and eight outputs, and can be configured for either single channel use (**1×8_ACO** or **1×8**) or independent dual-channel use (**2_1×4**). Each FR6802+ frame can provide up to 20 channels for serial digital signal distribution.

DA-6804+D “green” power-saving distribution amplifiers shut down automatically if no input signal is detected. Power consumption is partially reduced if the module is receiving input, but is not connected to a 75Ω load.

DA-6804+D modules can be set up, controlled, and monitored either at the card edge, or remotely, using an Ethernet connection. Web browser and CCS remote control require either an ICE6800+ module, or a 6800+ETH module installed in the frame. CCS remote control provides additional control functions not included in local control mode.

Main Features

All Models

The main features of the DA-6804+D series are listed below:

- Passes signals at data rates from 5 Mb/s to 540 Mb/s (DA-DS6804+D and DA-DSR6804+D) or from 5 Mb/s to 3 Gb/s (DA-DH6804+D and DA-DHR6804+D)
- Four selectable channel configurations:
 - **1x8_ACO**: 1 input to 8 outputs with auto changeover
 - **1x8_In_1**: SDI In_1 is distributed to 8 outputs
 - **1x8_In_2**: SDI In_2 is distributed to 8 outputs
 - **2_1x4**: 2 independent inputs, each distributed to four outputs as either **SDI In_1 to SDI Out_1** (1-4), or **SDI In_2 to SDI Out_2** (1-4)
- Input signal presence detection and report
- Automatic input cable equalization
- Selectable + 6dB gain to use external passive 75Ω 2x1 splitter (via CCS only)
- Selectable input EQ bypass
- Automatic power saving mode if no input signal is detected, or if no output load is detected
- Local and remote control
- Hot swapping capability

DA-DSR6804+D and DHR6804+D Models

DA-DSR6804+D and DHR6804+D modules also include the following features:

- Reclocking capability for 270 Mb/s SMPTE signals (DA-DSR6804+D), or 270 Mb/s, 1.485 Gb/s, and 2.97 Gb/s SMPTE signals (DA-DHR6804+D)
- Three selectable reclocking modes (automatic, manual, enforce bypass)
- Automatic bypassing of the reclock stage if signal is not lockable
- Reclock status and data rate report
- Automatic slew rate control for output signal

Front Module



Figure 1-1 DA-6804+D Front Module

Back Module

DA-6804+D series modules cannot be installed in 6800/7000 series frames.

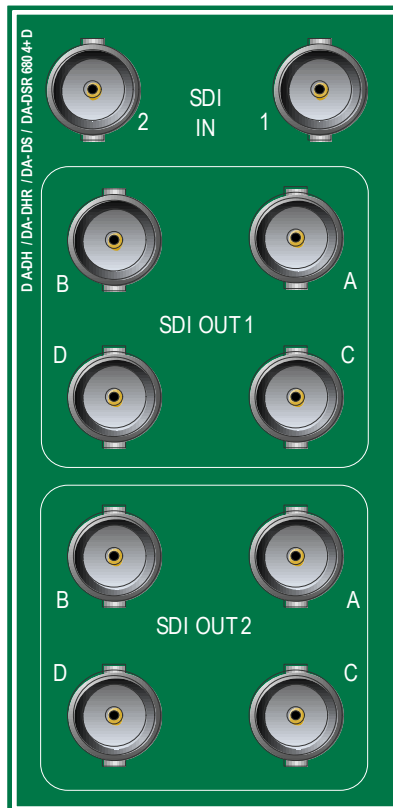


Figure 1-2 DA-6804+D Series Back Module

Signal Flow

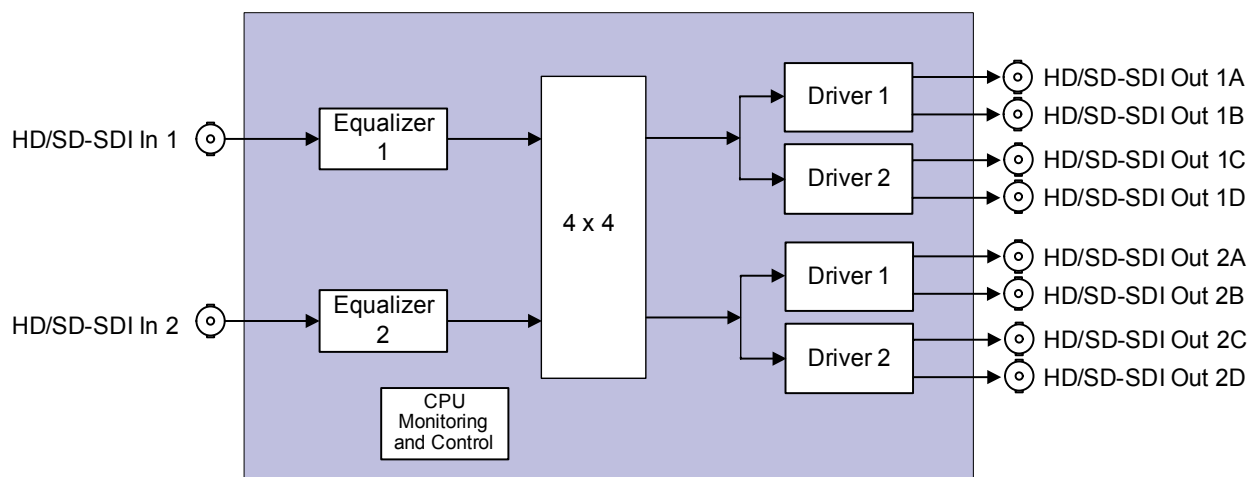


Figure 1-3 DA-DH6804+D Signal Flow Diagram

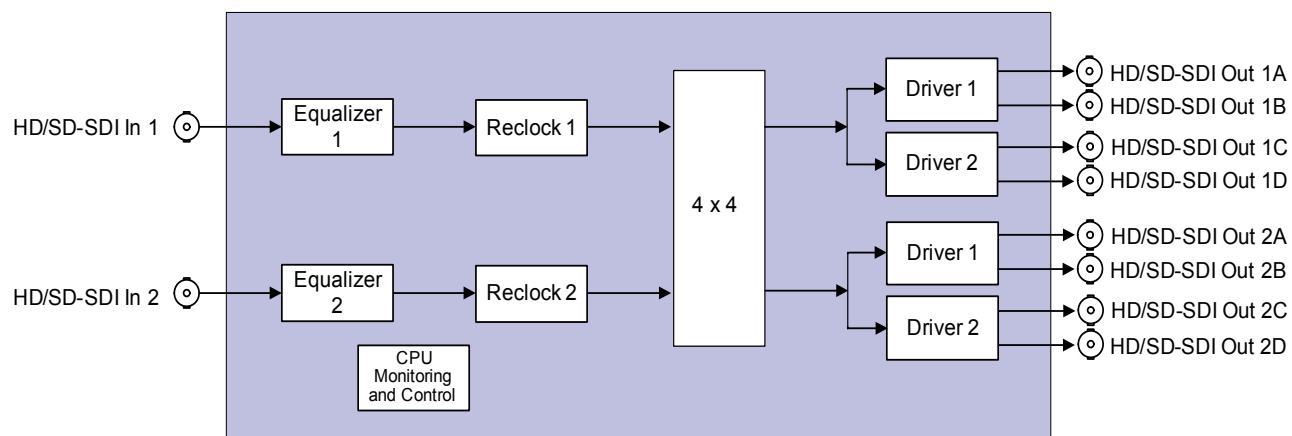


Figure 1-4 DA-DHR6804+D Signal Flow Diagram

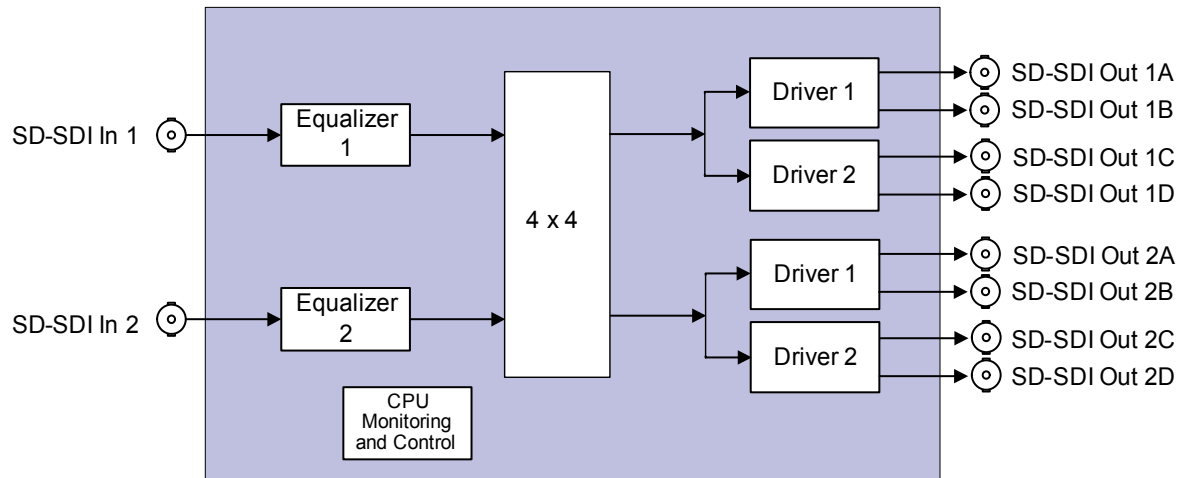


Figure 1-5 DA-DS6804+D Signal Flow Diagram

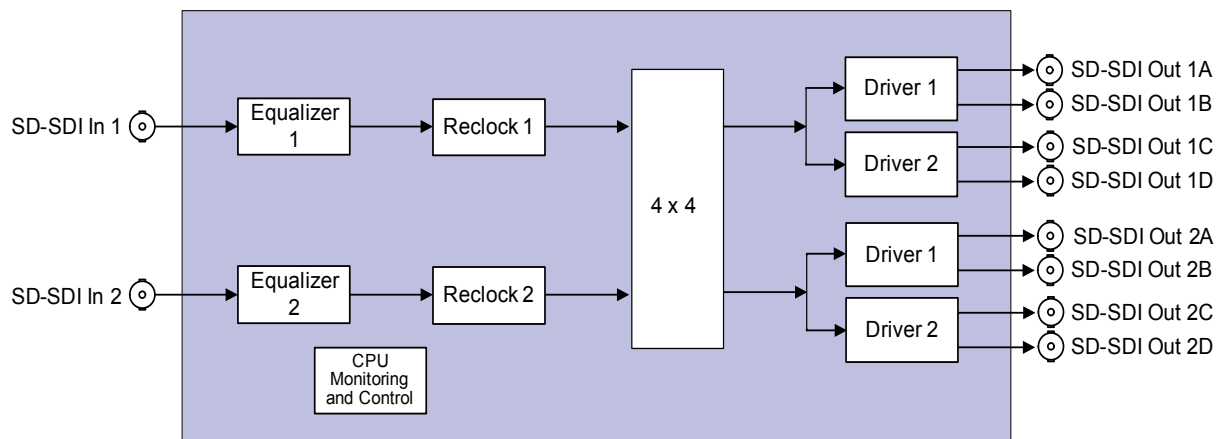


Figure 1-6 DA-DSR6804+D Signal Flow Diagram

Maximum 6800+ Frame Power Ratings

Table 1-1 describes the maximum allowable power ratings for 6800+ frames. Note the given maximums before installing any 6800+ modules in your frame.

DA-6804+D series modules cannot be installed in 6800/7000 series frames.

Table 1-1 Maximum Power Ratings for 6800+ Frames

6800+ Frame Type	Max. Frame Power Dissipation	Number of Usable Slots	Max. Power Dissipation Per Slot
FR6802+XF (AC power supply)	120 W	20	6 W
FR6802+XF48 (DC power supply)	105 W	20	5.25 W
FR6802+QXF (AC or DC power supply)	120 W	20	6 W
FR6822+ (AC or DC power supply)	120 W	20	6 W

2

Installation



CAUTION: Before installing this product, read the *6800+ Series Safety Instructions and Standards* manual shipped with the *Harris Infrastructure and Networking Documentation and Product Resources* DVD. The document is also downloadable from our website and contains important information about the safe installation and operation of 6800+ series products.

Before you install DA-6804+D series modules, perform the following:

- Remove the anti-static shipping pouch, if present, and all other packaging material.
Retain the original packaging materials for possible re-use.
- Check the equipment for any visible damage that may have occurred during transit.
- Your DA-6804+D package includes a front module, back module, and *Harris Infrastructure and Networking Documentation and Product Resources* DVD. Contact your Customer Service representative if parts are missing or damaged. See [Unpacking/Shipping Information](#) on page vi for information about returning a product for servicing.

Jumpers J1 and J2 (DA-DSR6804+D and DA-DHR6804+D)

To set the reclocker mode for the DA-DSR6804+D and DA-DHR6804+D at the card-edge, use Jumper **J1** (for channel 1) and Jumper **J2** (for channel 2). The reclocker remains in **AUTO** mode if no jumper is set.

Table 2-1 J1 and J2 Jumper Settings

Jumper Selection	Pin Setting	Label	Description
J1/J2 (Channel 1/ Channel 2)	1/2	AUTO_1/2	Input signal locked at one of these data rates: <ul style="list-style-type: none"> ■ 2.97 Gb/s* ■ 1.485 Gb/s* ■ 270 Mb/s If not lockable, signal automatically bypasses reclocker
	3/4	3.0G_1/2	Input signal locked at 2.97 Gb/s*; if not lockable, signal automatically bypasses reclocker
	5/6	HD_1/2	Input signal locked at 1.485 Gb/s*; if not lockable, signal automatically bypasses reclocker
	7/8	SD_1/2	Input locked at 270 Mb/s; if not lockable, signal automatically bypasses reclocker
	9/10	BYPASS_1/2	Enforces signal bypass reclocker

*Not applicable to the DA-DSR6804+

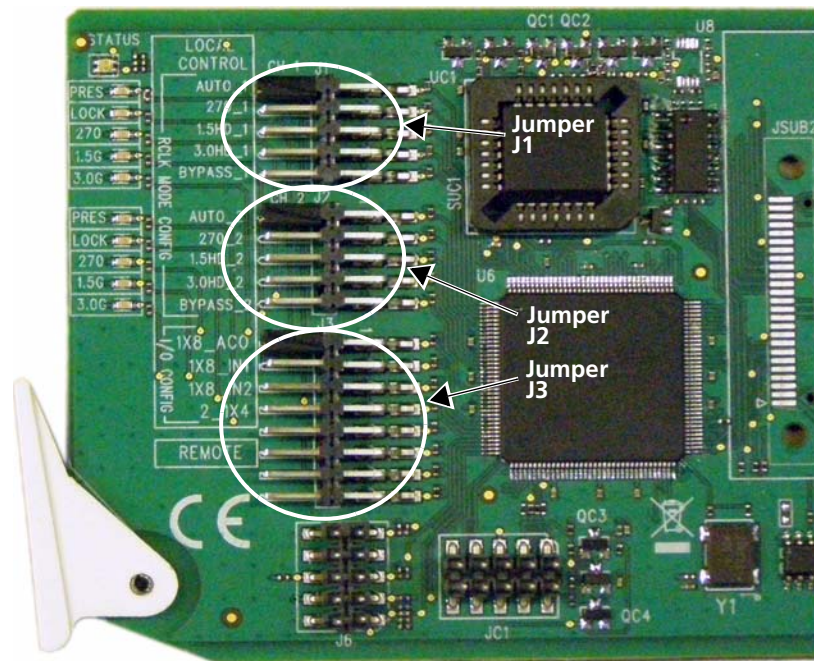


Figure 2-1 Locations for Jumpers J1, J2, and J3

Jumper J3

Jumper **J3** sets the control modes for all of the DA-6804+D modules (see [Figure 2-1](#) for the jumper location).

Table 2-2 J3 Jumper Settings

Pin Setting	Label	Description
1/2	1x8_ACO	Locally configures distribution amplifier as single channel (1x8) with automatic changeover
3/4	1x8_IN1	Locally configures distribution amplifier as single channel (1x8); input is from IN 1
5/6	1x8_IN2	Locally configures distribution amplifier as single channel (1x8); input is from IN 2
7/8	2_1x4	Locally configures distribution amplifier as dual channel (2-1x4)
11/12	REMOTE	Enables remote control via CCS; when set to REMOTE , J3 pins 1-8 are not functional

Installing and Removing Modules

Installation

DA-6804+D series modules cannot be installed in 6800/7000 series frames. See the appropriate 6800+ series frame installation and operation manual for details on installing and operating the frame.

Always install the back module before the front module. Follow these steps:

- 1 Remove the necessary number of blank back plates from the frame.
Do not discard blank back plates. They may be needed for future configurations.
- 2 Inserting the bottom lip of the back module into the required frame slot, and then screw it into place.
Ensure that the EMI gaskets on the right side of the back module remain in place during the installation. The EMI gaskets fit tightly.
- 3 Insert the front module into the slot holding the corresponding back module.
- 4 Attach the necessary cables to the back module.

Removal

When removing DA-6804+D series products, always remove the front module first.

3 Operation

Approximately three seconds after powering up, the DA-6804+D module should be fully operational. The module can be set to either local (card-edge) or remote (CCS network) control, using the **J3** jumpers setting described on [page 9](#).

The current software version of a DA-6804+D module can only be viewed using a CCS-enabled control panel or a CCS software application. Default settings cannot be recalled on this module.

Automatic Changeover

The signal at **SDI In_1** is distributed to 8 outputs. If the signal at **SDI In_1** is lost, the outputs are switched to **SDI In_2** (the module must be able to detect a signal at **SDI In_2**). Using the **Hysteresis** parameter, you can set the amount of delay before the module switches over to **SDI In_2**, and before the problem is reported to CCS.

When the signal returns at **SDI In_1**, the outputs automatically switch back to **SDI In_1** from **SDI In_2**.

Reclocking

The DA-DSR6804+D can reclock 270 Mb/s SD-SDI signals; the DA-DHR6804+D, can reclock 270 Mb/s, 1.485 Gb/s, and 2.97 Gb/s SMPTE signals. If the input data is not at one of those rates, the reclocker function will not function. Instead, the signal will pass through the module.

LED Displays

LEDs on the front edge of the front module report the operating status when the power is on and signal is applied. The system status and signal condition LEDs are shown in [Figure 3-1](#). The individual LEDs are described on [page 12](#).

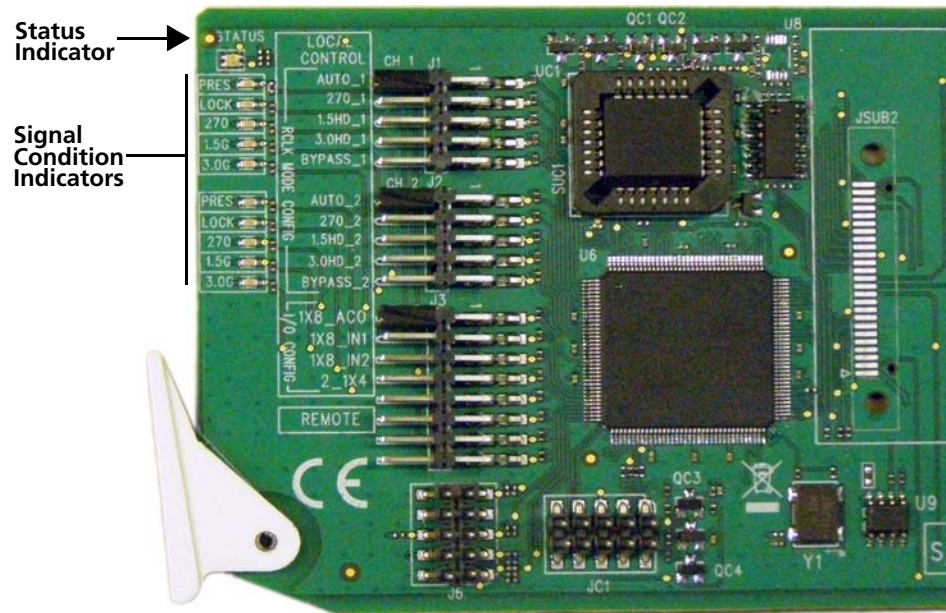


Figure 3-1 LED Locations

Status Indicator

Table 3-1 Status Indicator LED Descriptions

LED Color	Meaning
Off	There is no power to the module; the module is not operational.
Red	The module detects an alarm condition.
Green	There is power to the module; the module is operating properly.

Signal Condition Indicators

Table 3-2 Signal Condition LED Descriptions

Name	Color	Function
PRES	Green	Input signal is present
	Off	Input signal is absent
LOCK	Green	Input signal is locked
	Off	Input signal is unlocked and appears on the outputs
270	Green	Input signal is reclocked at 270 Mb/s
	Off	Input signal is not reclocked

Table 3-2 Signal Condition LED Descriptions (*Continued*)

Name	Color	Function
1.5G	Green	Input signal is reclocked at 1.485 Gb/s
	Off	Input signal is not reclocked
3.0G	Green	Input signal is reclocked at 2.97 Gb/s
	Off	Input signal is not reclocked

Alarms for the DA-6804+D modules are logged and monitored by software control applications. See the your software control user manual or online help for more information.

Table 3-3 Alarm Definitions

Alarm Name	Alarm Description	Alarm Level
Ch. 1 and 2 Loss of Input	The input signal for the designated channel is missing.	Major
Ch. 1 and 2 Loss of Lock	The input signal for the designated channel is not locked.	Major

Web Browser Control



NOTE: This interface requires an Ethernet connection. Your frame must have an 6800+ETH or ICE6800+ module installed.

To use this control method, open a web browser and enter the IP address of the frame in the **Address** field, and then click **Enter** at the **6800+ Control Interface** display.

A tree view of the frame and its contents is displayed at the left of the screen. Click the **+** button (or click on the component name) to expand the tree view. Information corresponding to the selection is displayed in the control pane to the right of the tree view.

Click the **-** button to collapse the tree view.

When you select the frame and slot for a distribution amplifier module location, the software displays the item list in the tree view and the item values on the control panel.

Read-only parameters are displayed as black characters with a grey background. Adjustable parameter values are displayed as black characters with a white background; these boxes appear grey if Jumper **J3** is set to **LOCAL**.

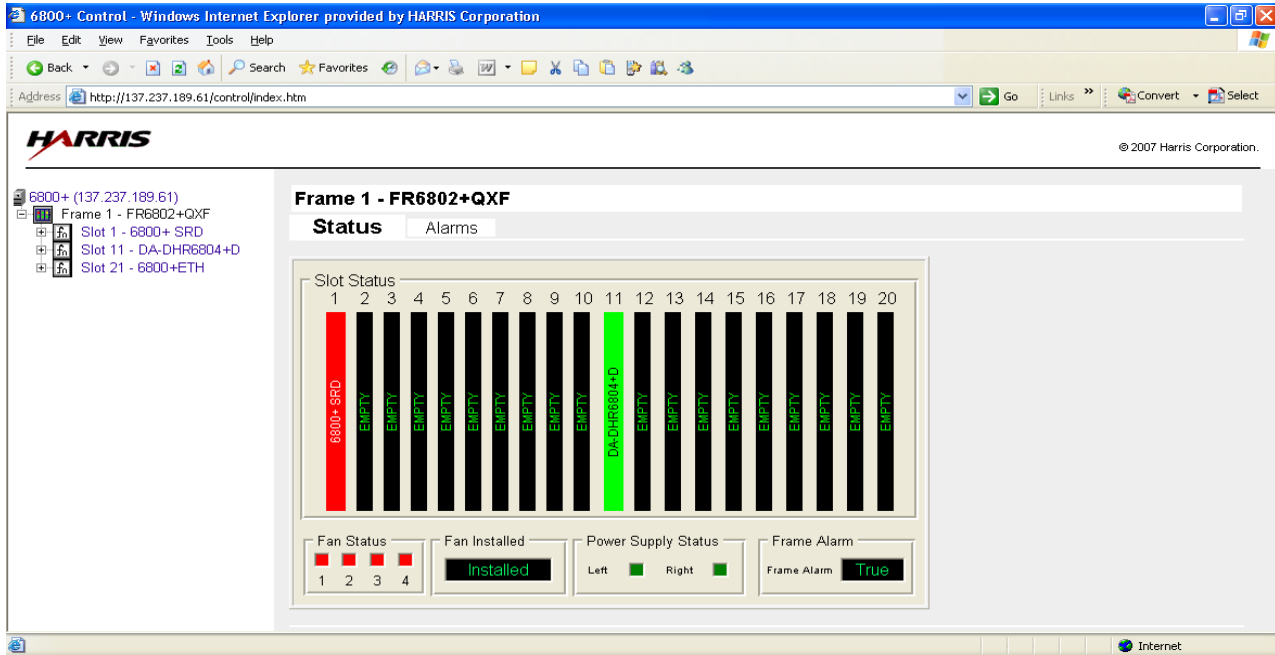


Figure 3-2 Web-Enabled Control Display

CCS Navigator Control

In CCS Navigator, when you select the frame and slot for the module location, the software displays the item values on the control pane.

Read-only parameters values are displayed as green characters on a black background. Adjustable parameter values are displayed as black characters on a white background; these boxes appear grey if Jumper **J3** is set to **LOCAL**.

Operating Notes

When you set the control parameters on DA-6804+D series distribution amplifiers, observe the following:

- If you make changes to certain parameters, other related parameters may also be affected.
- When you change a parameter, the effect is immediate. However, the module requires up to 30 seconds to save the latest change. After 30 seconds, the new settings are saved and will be restored if the module loses power and must be restarted.

Table 3-4 Remotely Controlled Parameters
Bold text = Default setting [RO] = Read only/feedback

Path	Parameter	Range	Description
Processing	Serial Number [RO]	String	Serial number for the module
	License Key	String	License key number for the module
Other	Output Config.	<ul style="list-style-type: none"> ■ Ch.1 1×8 with ACO ■ Ch.1 1×8 ■ Ch.2 1×8 ■ 2×4 	Selects module output configuration as dual 1×4 or 1×8, 1 input routed to all outputs; or 1×8 with input 2 routed to all outputs
	Ch.1 and Ch. 2 Signal Present [RO]	<ul style="list-style-type: none"> ■ No ■ Yes 	Indicates if the input signal for the designated channel is present
	Ch.1 and Ch.2 Loss of Input Alarm	<ul style="list-style-type: none"> ■ Disabled ■ Enabled 	Enables or disables the Loss of Input alarm for the designated channel
	Current Input [RO] (valid in 1×8 with ACO mode output configuration)	<ul style="list-style-type: none"> ■ N/A ■ Ch. 1 ■ Ch. 2 	Indicates if the input signal is channel 1 or channel 2
	Ch. 1 and Ch. 2 Slew Rate	<ul style="list-style-type: none"> ■ SD ■ HD ■ Auto 	Controls output/rise fall time for the designated channel <ul style="list-style-type: none"> ■ SD – Output rise/fall time complies with SMPTE 259M ■ HD – Output rise/fall time complies with SMPTE 424M /292M ■ Auto – Automatically selects proper rise/fall time based on incoming signal
	Hysteresis	0.1 to 0.5 seconds	Sets the period between loss of signal and automatic changeover; CCS is automatically notified
	Green Mode	<ul style="list-style-type: none"> ■ Enabled ■ Disabled 	Enables or disables the use of the power-saving (“green”) mode
	Out 1A to Out 2D Cable Fault [RO]	<ul style="list-style-type: none"> ■ Yes ■ No 	Reports termination fault or loss of signal for the corresponding output
	Ch.1 and Ch.2 Data Rate [RO]	<ul style="list-style-type: none"> ■ Unknown ■ 270 Mb/s ■ Bypass ■ HD ■ 3G 	Displays the locked data rate for the designated channel
	Ch. 1 and Ch.2 Re-Clocking Mode (DA-DHR6804+D and DA-DSR6804+D)	<ul style="list-style-type: none"> ■ Auto ■ 270 Mb/s ■ Bypass ■ HD ■ 3G 	Selects the reclock rate for the designated channel input
	Ch.1 and Ch.2 Loss of Lock Alarm	<ul style="list-style-type: none"> ■ Disabled ■ Enabled 	Enables or disables Loss of Lock alarm on the designated channel

4 Specifications

Inputs

Table 4-1 Electrical Channel Input Specifications

Item	Specification
Number of inputs	2
Signal type	<ul style="list-style-type: none"> ■ DA-DH6804+D and DA-DHR6804+D: 3G-SDI, HD-SDI, SD-SDI, ASI ■ DA-DS6804+D and DA-DSR6804+D: SD-SDI, ASI
Connector	BNC per IEC 169-8
Impedance	75Ω
Return loss	<ul style="list-style-type: none"> ■ All models: >15 dB, 5 MHz to 1.5 GHz ■ DA-DH6804+D and DA-DHR6804+D: >10 dB, 1.5 GHz to 3.0 GHz
Maximum signal level	0.88 V
Cable equalization	<ul style="list-style-type: none"> ■ All models: 0 – 1,312 ft (0 – 400 m) for 270 Mb/s ■ DA-DH6804+D and DA-DHR6804+D: <ul style="list-style-type: none"> ■ 0 – 656 ft (0 – 200 m) for 1.5 Gb/s ■ 0 – 410 ft (0 – 125 m) for 3.0 Gb/s

Outputs

Table 4-2 Electrical Channel Output Specifications

Item	Specification
Number of outputs	8
Signal type	<ul style="list-style-type: none">■ DA-DH6804+D and DA-DHR6804+D: 3G-SDI, HD-SDI, SD-SDI, ASI■ DA-DS6804+D and DA-DSR6804+D: SD-SDI, ASI
Connector	BNC per IEC 169-8
Impedance	75Ω
Return loss	<ul style="list-style-type: none">■ All models: >15 dB, 5 MHz to 1.5 GHz■ DA-DH6804+D and DA-DHR6804+D: >10 dB, 1.5 GHz to 3.0 GHz
Signal amplitude	800 mV ± 10%
DC offset	0.0 V ± 0.5 V
Rise and fall time	<ul style="list-style-type: none">■ All models: 400-700 ps for SD-SDI, ASI■ DA-DH6804+D and DA-DHR6804+D:<ul style="list-style-type: none">■ <270 ps for HD-SDI■ <135 ps for 3G-SDI
Overshoot	<10%
Reclocking rates	<ul style="list-style-type: none">■ DA-DS6804+D and DA-DSR6804+D: 270 Mb/s■ DA-DH6804+D and DA-DHR6804+D: 270 Mb/s, 1.485 Gb/s, 2.97 Gb/s
Jitter	<ul style="list-style-type: none">■ DA-DH6804+D and DA-DHR6804+D:<ul style="list-style-type: none">■ <0.3 UI for 3G-SDI■ <0.2 UI for HD-SDI■ All models: <0.2 UI for SD-SDI, ASI

Temperature

Table 4-3 Temperature Specifications

Item	Specification
Performance Temperature	41° to 104°F (5° to 40°C)
Operating Temperature	32° to 122°F (0° to 50°C)

Power Consumption

Table 4-4 Power Consumption Specifications

Item	Specification
Normal Mode	<3.8 W
Sleeping (Green) Mode	<1.5 W

Start-Up Time

Module start-up time is approximately 3 seconds.

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