

DiGiCo SD Rack

Provisional - October 2010



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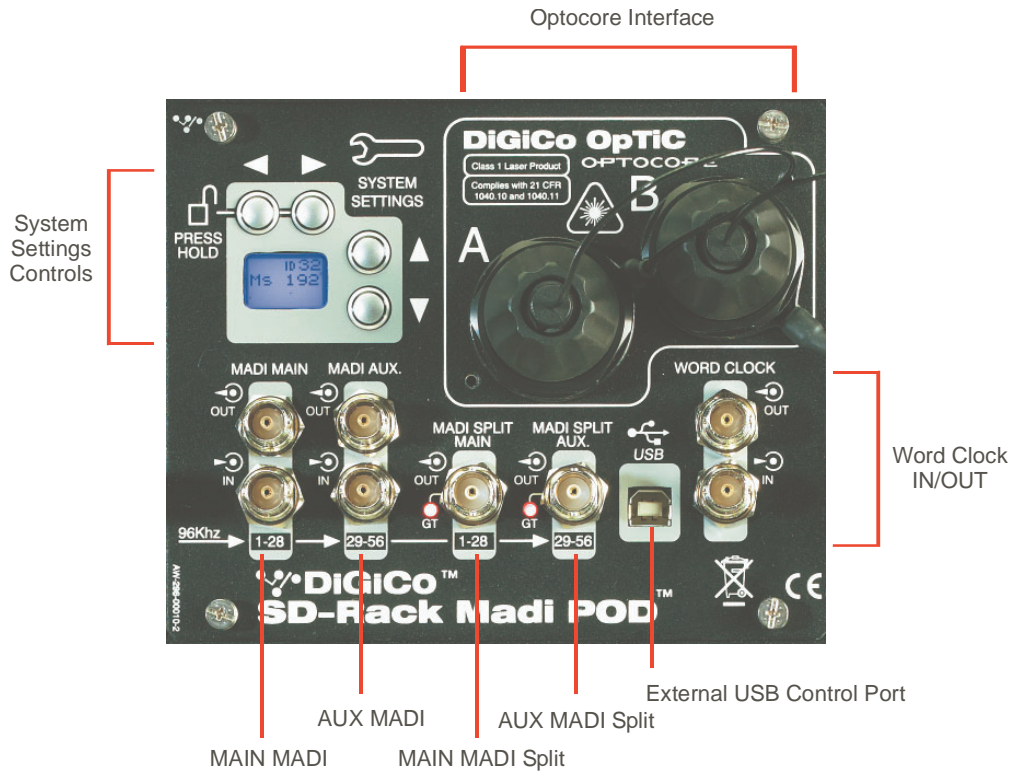
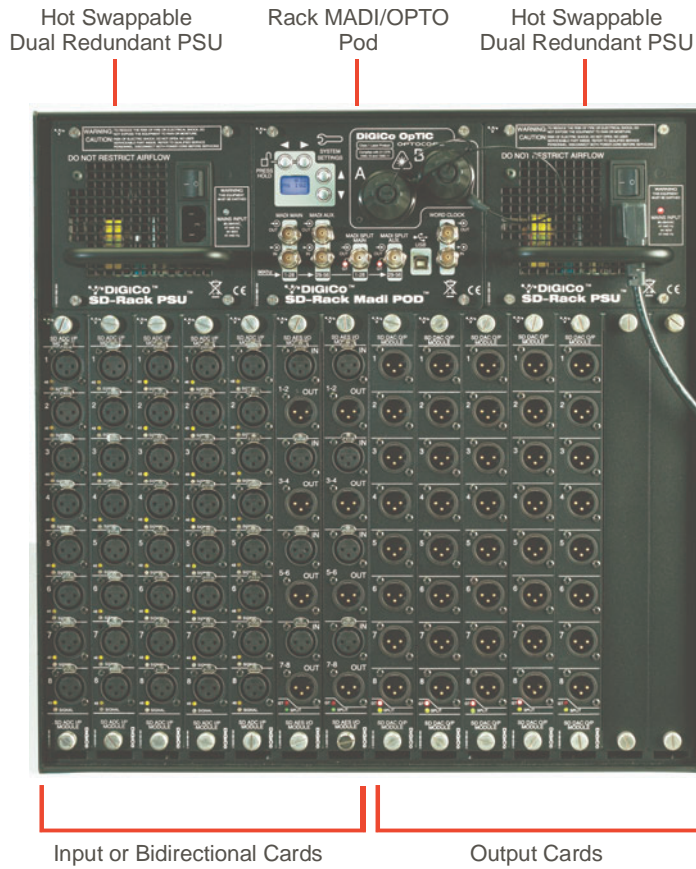
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SD Rack

1.1 Introduction

1.1.1 Product Overview

The DiGiCo SD Rack is.....



1.2 SD Rack Power

The SD rack has dual redundant hot swappable power supplies. The rack should be operated with both powersupplies on whenever possible.

1.3 SD Rack Clocking

The SD Rack will receive clock sync from the connected console in normal operation. It can run at 48KHz or 96kHz when clocked by the console. It is capable of running at 192KHz but this has not yet been implemented in current console software.

The SD Rack can also receive sync from its own internal clock at several different sample rates - see section 1.6.9 Rack Sample Rate. Additionally the rack can receive sync from an external word clock source when the word clock is connected to the rack's word clock in port.

1.4 SD Rack Cards

Several rack I/O card options are available - I/O cards normally provide blocks of 8 signals.

A rack can be fitted with up to 14 I/O cards providing up to 56 inputs and 56 outputs.

Card options are:

Analogue Mic/Line Input card on XLR

Analogue Line Output card on XLR

AES Input card on XLR or BNC

AES Output card on XLR or BNC

AES Bidirectional I/O card on XLR or BNC

Aviom card (16 outputs occupying 2 rack slots) - CAT5 connector

AES42 Mic Input card on XLR



MIC/LINE

AES42

AES IN

AES I/O

ADAT

AES O

LINE OUT

AVIOM

1.4.1 Analogue Mic/Line Input card (ADC)

The 8 Mic/Line input ADC card has 2 indicators on each socket.
 The orange indicator shows the status of +48V Phantom Power On/Off.
 The green indicator shows signal present and this turns red when the signal is close to clipping.

+48V Phantom Power Indicator _____
 Signal Present/Clip Indicator _____



1.4.2 Analogue Line Output card (DAC)

The 8 Line output DAC card has 2 indicators at the bottom of the card.
 The red indicator shows the status of Gain Tracking On/Off.
 The yellow indicator shows the status of the card Split On/Off.

Gain Tracking On/Off Indicator _____
 Split On/Off Indicator _____



1.5 Splits & Gain Tracking

1.5.1 Split Options

The SD Rack has several different Split options.

1) Each input slot (block of 8 sockets on an input card) can be split to its relevant output slot. So slot 1 would be split to slot 8, slot 2 to slot 9 and so on. These split signals can be automatically Gain Tracked so that any change in the analogue gain on the input socket is compensated by the opposite change in digital trim on the relevant output socket.
 The output cards have LED indicators showing Split ON/OFF and Gain Tracking ON/OFF status.

2) There are 2 dedicated MADI split ports on BNC connectors labelled MADI Split Main (MadiSM) and MADI Split Aux (MadiSX).
 These ports can provide either 2 independent split signals at 48KHz or a pair of split signals that contain MADI channels 1-28 and 29-56 at 96KHz.
 These outputs can also have automatic Gain Tracking applied to them on a per split basis. Eg. Main Split with Gain Tracking On and Aux Split with Gain Tracking Off

1.5.2 Gain Tracking

Gain Tracking can be controlled from the Rack LCD Menu system or optionally by an SD Series console.
 With Gain Tracking switched ON the digital trim on the split outputs works in direct relation to the analogue gain that is applied to the relevant (same numbered) input socket. Any change in the analogue gain at the input results in the opposite change being applied to the digital trim of the output split socket.
 If the analogue gain of an input socket starts at 0dB and with Gain Tracking On is raised to +10dB, the output split level will remain constant because it will have had a -10dB change applied to it in real time.

The correct procedure to follow is to set an acceptable level of analogue gain on each input before switching the Gain Tracking function on. Once the Gain Tracking function is active it should not be switched off without careful consideration.

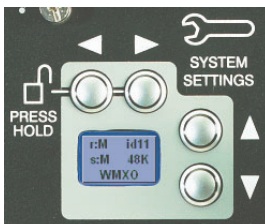
There is also a Gain Track Reset function which sets the split output digital trim to zero. This function should also be treated with due care because using it on an active split will potentially change the output level by a large amount.

1.6 Using the SD Rack Menu System

The LCD Menu System on the rack MADIPod is normally in a locked state and cannot be accessed.

The main display will be visible and if the rack is not connected to an SD console the background colour will be light blue.

If an SD console is connected and the rack is correctly receiving control data from it, the display will flash green.



Pressing and holding the 2 buttons marked with left and right arrows for 2 seconds unlocks the Menu System. During the 2 seconds the display will be red and say "Locked" and when unlocked, the display will turn green and say "Unlocked".

The Up/Down buttons scroll through the pages in the Menu System and the Left/Right buttons are used to select each item within pages that have multiple items. When an item's value can be changed the Up/Down arrows are used for this.

If the rack is left in an idle state for 2 minutes, it will relock itself.

Please refer to the following diagram for menu navigation details.

SD Rack

												LOCKED		OPEN											
PSU A < 5V > 5.00V		PSU B < 5V > 5.00V		PSU A < 7V > 7.00V		PSU B < 7V > 7.00V		PSU A < 15V > 15.00V		PSU B < 15V > 15.00V		PSU A < .15V > 15.00V		PSU B < .15V > 15.00V											
< SL1 > ADC 240310		< SL2 > RxAES 21209		< SL3 > DAC 171109		< SL4 > empty		>>>>		< SL14 > empty															
Version < host > 123456		Version < fpga > 123456		Version < font > 123456																					
Default Rack YES >				Default Rack SURE >																					
r:M id11																									
s:M 48K																									
WMX0																									
Set Opto ID NoCard		Set Opto ID < 11 >		Set Opto ID < 12 >		Set Opto ID < 13 >		Set Opto ID < 14 >		Set Opto ID < 15 >		Set Opto ID < 16 >		Set Opto ID < 17 >		Set Opto ID < 18 >		Set Opto ID < 19 >		>>>>		Set Opto ID < 23 >			
								Fibre Speed 1G >		Fibre Speed < 2G >															
USB select Opto >				USB select < Rack >																					
		Set Sync < INT >		Set Sync < AUTO >		Set Sync < WCLK >		Set Sync < RxM >		Set Sync < RxX >		Set Sync < OPTO >													
INT SampRt < 44K1 >		INT SampRt < 48K >		INT SampRt < 88K2 >		INT SampRt < 96K >		INT SampRt < 176K >		INT SampRt < 192K >															
						Routng Mode < AUTO >		Routng Mode < RxM >		Routng Mode < RxX >		Routng Mode < OPTO >													
		MadiSM Split < OFF >		MadiSM Split < ON >		MadiSM Split < GT >																			
				MadiSM SampRt < SYS >		MadiSM SampRt < SYS/2 >																			
		MadiM type < 56ch >		MadiSM type < SD rck >		MadiSM type < 64ch >																			
		MadiSX Split < OFF >		MadiSX Split < ON >		MadiSX Split < GT >																			
				MadiSX SampRt < SYS >		MadiSX SampRt < SYS/2 >																			
		MadiM type < 56ch >		MadiSX type < SD rck >		MadiSX type < 64ch >																			
				Split Sl1>8 < OFF >		Split Sl1>8 < ON >		Split Sl1>8 < GT >																	
				Split Sl2>9 < OFF >		Split Sl2>9 < ON >		Split Sl2>9 < GT >																	
				Split sl3>10 < OFF >		Split sl3>10 < ON >		Split sl3>10 < GT >																	
						Osc to Outpts OFF >		Osc to Outpts < ON >		Osc to Outpts < SURE >		Osc to Outpts < DONE >													
Osc dB < 0 >		Osc dB < .1 >		Osc dB < .2 >		Osc dB < .3 >		Osc dB < .4 >		Osc dB < .12 >		Osc dB < .18 >		Osc dB < .24 >		Osc dB < .30 >		Osc dB < .36 >		Osc dB < .42 >		>>>>		Osc dB < .96 >	
				Osc Frequ < 20 >		Osc Frequ < 100 >		Osc Frequ < 500 >		Osc Frequ < 1K >		Osc Frequ < 4K >		Osc Frequ < 10K >		Osc Frequ < 18K >		Osc Frequ < 22K >							

1.6.1 PSU Readings

This page shows readings for all rack PSU voltages. No adjustment is possible from the menu.

PSU A < 5V > 5.00V	PSU B < 5V > 5.00V	PSU A < 7V > 7.00V	PSU B < 7V > 7.00V	PSU A < 15V > 15.00V	PSU B < 15V > 15.00V	PSU A <.15V> 15.00V	PSU B <.15V> 15.00V
--------------------------	--------------------------	--------------------------	--------------------------	----------------------------	----------------------------	---------------------------	---------------------------

1.6.2 I/O Card Code Versions

This page shows the type of card detected in each rack slot and the firmware version installed on the card. SLx indicates slot number in the range SL1 to SL14 reading left to right in the rack. Date codes are DD/MM/YY. No adjustment is possible from the menu.

< SL1 > ADC 240310	< SL2 > RxAES 21209	< SL3 > DAC 171109	< SL4 > empty	>>>>	<SL14> empty
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1.6.3 MADi Card Code Versions

This page shows the MADiPod firmware versions installed on the rack. HOST, FPGA and FONT date codes are DD/MM/YY. No adjustment is possible from the menu.

Version <host> 123456	Version <fpga> 123456	Version 123456
-----------------------------	-----------------------------	-----------------------------

1.6.4 Rack Defaults

This page allows the user to set all rack parameters to their DEFAULT values. When the display shows **Default Rack - Yes>**, press the Right arrow button to confirm. The display will now show **Default Rack - Sure>**, press the Right arrow button to confirm. Using the Left arrow button will navigate back from **Sure>** to **Yes>**.

Default Rack YES >	Default Rack SURE >
--------------------------	---------------------------

1.6.5 Main Display

The main display is always visible when the Menu System is in a locked state. It indicates:
 r: = The type of input/output being routed (M=MADI, O=Optocore)
 s: = The rack sync source (M=MADI, O=Optocore, Int=Internal, W=Word Clock)
 idx = The Optocore ID of the rack
 xxK = The sample rate being used by the rack (eg 48KHz)
 WMXO = The sync priority order which defaults to Word Clock, MADI Main, MADI Aux, Optocore
 An upward arrow (^) will appear underneath each of the available sources of sync.

Thus if there is no valid Word Clock or MADI input to the rack, it will automatically sync to Optocore if present. If a valid Word Clock input is then connected to the rack, this will automatically become the sync source for the entire Optocore system. If multiple valid Word Clock inputs are connected to different racks, the rack with the lowest optocore ID that is receiving a Word Clock will become the sync source for the entire Optocore system.

r:M	id11
s:M	48K
WMXO	

SD Rack

1.6.6 Optocore ID & Fibre Speed

These pages show the Optocore ID of the rack in range of 11 to 24 and the fibre speed which is either 1GB or 2 GB. Each rack requires a unique ID so that it can be recognised by the rest of the Optocore system. To change the ID, scroll with the Left/Right buttons until you reach the required number.

The rack fibre speed needs to be set to the same value as all other devices in the Optocore system. The Default is 2GB and this should not be changed unless you have special requirements. There are two possible reasons to change the fibre speed to 1GB:

- 1) If you require distances of optical fibre greater than 350M between individual devices.
- 2) You require compatibility with Optocore's own I/O units, some of which will only operate at the 1GB fibre speed. Please consult your Optocore device documentation for the fibre speed specifications.

NOTE: Using a fibre speed of 1GB will restrict the system's Optocore fibre channel count to 224 I/O at 96KHz.

Set Opto ID NoCard	Set Opto ID < 11 >	Set Opto ID < 12 >	Set Opto ID < 13 >	Set Opto ID < 14 >	Set Opto ID < 15 >	Set Opto ID < 16 >	Set Opto ID < 17 >	Set Opto ID < 18 >	Set Opto ID < 19 >	>>>>	Set Opto ID < 23 >
				Fibre Speed 1G >	Fibre Speed < 2G >						

1.6.7 USB Rack Control

This page allows selection of which rack component can be addressed by the rack USB port. When set to **Opto >**, the internal Optocore board can be addressed for the reprogramming of Optocore firmware - this is not required unless under specific instruction from your distributor or DiGiCo Support. When set to **< Rack**, the general rack control system can be addressed - this feature is not yet implemented (Nov 2010). The Default setting is **< Rack**.

USB select Opto >	USB select < Rack
-------------------	-------------------

1.6.8 Rack Sync Source

This page allows selection of the rack sync source. The Default setting is **<AUTO>** which allows automatic sync selection in the order **WMXO** as detailed in **Main Display** above. This setting can be manually overridden and a specific sync source can be set as either:
<INT> = Internal sync - Rack is Master
<WCLK> = External Word Clock sync - Word Clock input is Master
<RxM> = MADI Main sync - MADI Main input is Master
<RxX> = MADI Aux sync - MADI Aux input is Master
<OPTO> = Optocore sync - Optocore is Master (normally the lowest numbered Optocore ID on the system)

Set Sync <INT>	Set Sync <AUTO>	Set Sync <WCLK>	Set Sync < RxM >	Set Sync < RxX >	Set Sync <OPTO>
----------------	-----------------	-----------------	------------------	------------------	-----------------

1.6.9 Rack Sample Rate

This page allows selection of the rack sample rate. This is only possible if the **Rack Sync Source** is set to internal. Available options are 44.1KHz, 48KHz, 88.2KHz, 96KHz, 176KHz and 192KHz

INT SampRt < 44K1 >	INT SampRt < 48K >	INT SampRt < 88K2 >	INT SampRt < 96K >	INT SampRt < 176K >	INT SampRt < 192K >
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1.6.10 Rack Routing Mode

This page allows selection of the rack routing mode - which external source (MADI or Optocore) is being routed in and out of the rack. The Default setting is **<AUTO>** which allows automatic routing selection where the routing mode follows the sync source setting. This setting can be manually overridden and a specific sync source can be set as either:
<RxM> = MADI Main routing - Input and output routing via MADI Main
<RxX> = MADI Aux routing - Input and output routing via MADI Aux
<OPTO> = Optocore routing - Input and output routing via Optocore

Routng Mode <AUTO>	Routng Mode < RxM >	Routng Mode < RxX >	Routng Mode <OPTO>
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1.6.11 Rack Main and Aux Splits

This page controls the Main (**MadiSM**) and Aux (**MadiSX**) MADi Split functions.

- 1) Each split can be **< OFF >**, **< ON >** or ON with automatic Gain Tracking enabled (**< GT >**).
- 2) The sample rate of the split signal can also be set to be either the same as the rack's current sample rate **< SYS >** eg 96Khz or **< SYS/2 >** which is half of the rack's current sample rate. eg Rack at 96KHz and split at 48KHz.
- 3) The **MADI Type** of the split can be set to standard 56 channel **< 56ch >**, 64 channel **< 64ch >** or **< SD rck >** which will emulate the output of the SD rack and be recognised as such by the receiving MADI device. This last type would be useful if the split was feeding an SD series console.

MadiSM Split < OFF >	MadiSM Split < ON >	MadiSM Split < GT >
	MadiSM SampRt < SYS>	MadiSM SampRt <SYS/2>
MadiM type < 56ch>	MadiSM type <SD rck>	MadiSM type < 64ch>

MadiSX Split < OFF >	MadiSX Split < ON >	MadiSX Split < GT >
	MadiSX SampRt < SYS>	MadiSX SampRt <SYS/2>
MadiM type < 56ch>	MadiSX type <SD rck>	MadiSX type < 64ch>

1.6.12 Rack Card Splits

This page controls the individual output card Split functions.

Each card split can be **< OFF >**, **< ON >** or ON with automatic Gain Tracking enabled (**< GT >**).

Each input slot (block of 8 sockets on an input card) can be split to its relevant output slot. So slot 1 would be split to slot 8, slot 2 to slot 9 and so on.

		Split Slt1>8 < OFF>	Split Slt1>8 < ON >	Split Slt1>8 < GT >
	Split Slt2>9 < OFF>	Split Slt2>9 < ON >	Split Slt2>9 < GT >	
Split sI3>10 < OFF>	Split sI3>10 < ON >	Split sI3>10 < GT >		