

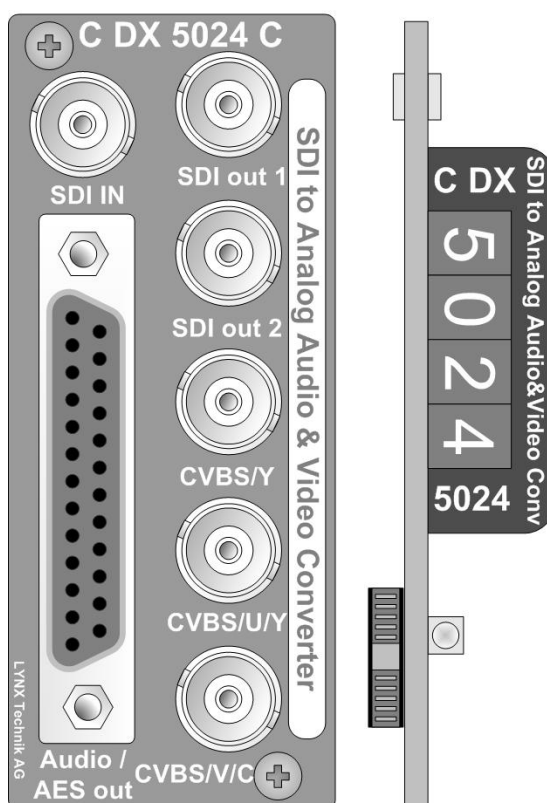
Version 2.0

# Reference Manual

## C DX 5024 C

SDI to Analog Audio & Video Converter

Series 5000  
*CardModule*



© LYNX Technik AG  
Brunnenweg 3  
D-64331 Weiterstadt  
Germany  
[www.lynx-technik.com](http://www.lynx-technik.com)

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# Warranty

LYNX Technik AG warrants that the product will be free from defects in materials and workmanship for a period of two (2) year from the date of shipment. If this product proves defective during the warranty period, LYNX Technik AG at its option will either repair the defective product without charge for parts and labor, or will provide a replacement in exchange for the defective product.

In order to obtain service under this warranty, customer must notify LYNX Technik of the defect before expiration of the warranty period and make suitable arrangements for the performance of service. Customer shall be responsible for packaging and shipping the defective product to the service center designated by LYNX Technik, with shipping charges prepaid. LYNX Technik shall pay for the return of the product to the customer if the shipment is within the country which the LYNX Technik service center is located. Customer shall be responsible for payment of all shipping charges, duties, taxes and any other charges for products returned to any other locations.


This warranty shall not apply to any defect, failure, or damage caused by improper use or improper or inadequate maintenance and care. LYNX Technik shall not be obligated to furnish service under this warranty a) to repair damage resulting from attempts by personnel other than LYNX Technik representatives to install, repair or service the product; b) to repair damage resulting from improper use or connection to incompatible equipment; c) to repair any damage or malfunction caused by the use of non LYNX Technik supplies; or d) to service a product which has been modified or integrated with other products when the effect of such modification or integration increases the time or difficulty servicing the product.

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# Regulatory information

## Europe

### Declaration of Conformity

We	LYNX Technik AG Brunnenweg 3 D-64331 Weiterstadt Germany
<i>Declare under our sole responsibility that the product</i>	
TYPE: C DX 5024 C	
<i>To which this declaration relates is in conformity with the following standards (environments E1-E3):</i>	
EN 55103-1 /1996	
EN 55103-2 /1996	
EN 60950 /2001	
<i>Following the provisions of 89/336/EEC and 73/23/EEC directives.</i>	
	Winfried Deckelmann
Weiterstadt, March 2007	
<i>Place and date of issue</i>	<i>Legal Signature</i>

## USA

### FCC 47 Part 15

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Note: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to the 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

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## Getting Started

### Packaging

The shipping carton and packaging materials provide protection for the module during transit. Please retain the shipping cartons in case subsequent shipping of the product becomes necessary.

### Product Description

The C DX 5024 C is a high quality Audio de-multiplexer and Audio and Video D to A Converter primarily for broadcast and professional applications.

The Module accepts 1 SDI input signal with up to four audio groups embedded. One audio group can be selected and de-multiplexed and output as 4 x balanced analog audio signals and in parallel as 2 x AES3 signals on a Sub D connection. Three re-clocked outputs of the input signal are provided to cascade several modules to de-embed further audio groups if required.

The SDI inputs signal is converted to analog video as CVBS, YC (S-Video) or Component outputs.

The C DX 5024 has a variety of features, which include:

- User selectable audio group (1 through 4)
- 525/625 line standards (Auto detect)
- Two reclocked outputs of input video
- Supports 8 and 10 bit video
- Analog and Digital Audio outputs
- 24 bit audio
- Adjustable 0 dB FS level
- Analog Video Outputs (CVBS, YC, Component)
- 10 Bit Video DA conversion
- Local DIP-switches and LED's for control and status monitoring
- Microprocessor controlled
- Remote control interface
- All settings stored in non-volatile flash ram

The module has a built in micro-controller with local controls, status and alarm indicators and well as internal flash ram for storing setups. Any operational parameters configured and stored into the module are recalled when powered up. Remote control and remote status monitoring is possible when used with the rack frame option and host controller.

CardModules are installed in the series 5000 card frame (R FR 5010) that can accommodate up to 10 CardModules. All modules are hot swappable and Options include full redundant power and a range of controller options.



## Functional Diagram

Figure 1 below is the basic functional diagram for the C DX 5024 C CardModule.

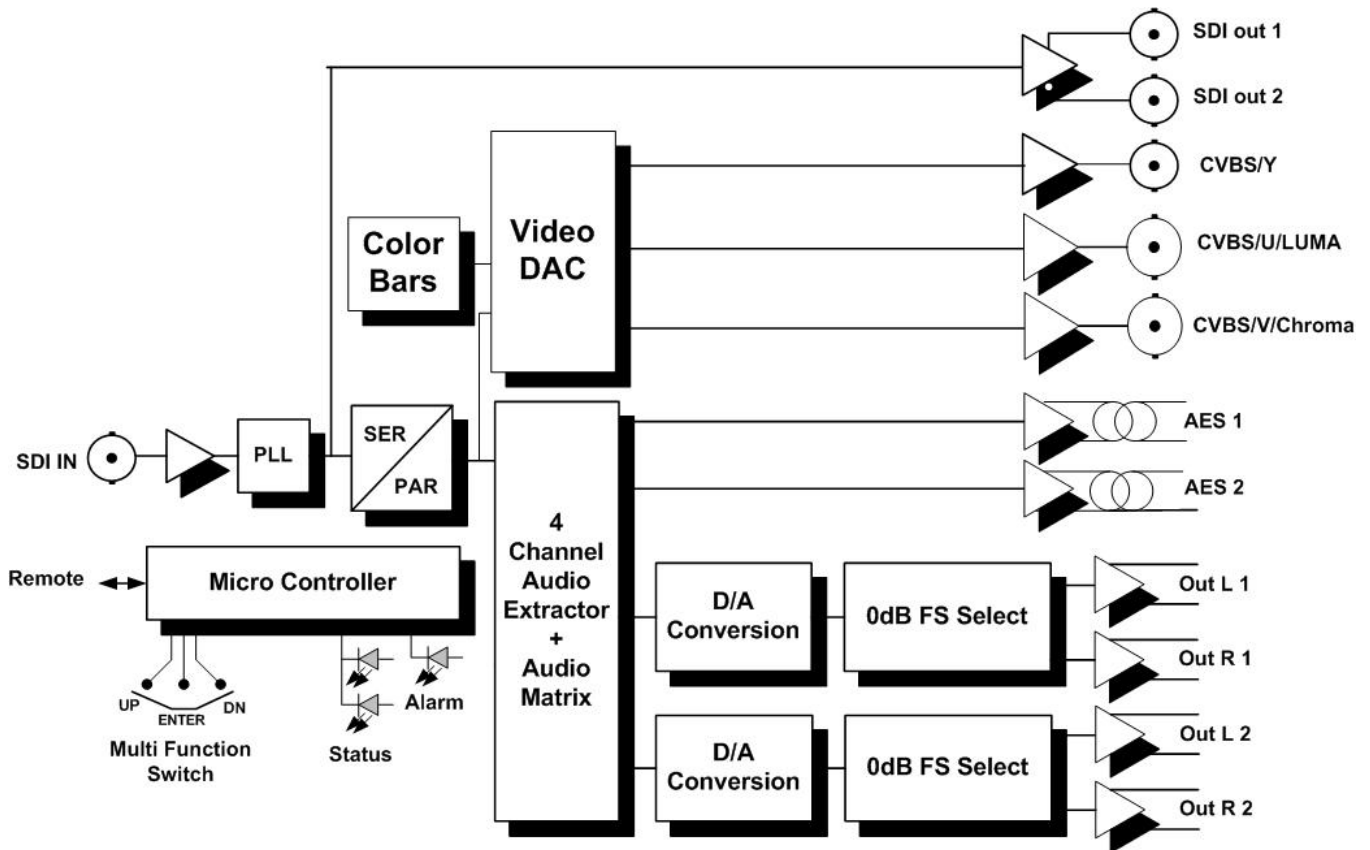


Figure 1- C DX 5024 C Functional Diagram

## Module Layout

Figure 2 shows the physical layout of the C DX 5024 C CardModule and also the connection panel that is fitted to the rear of the rack.

PCB Layout

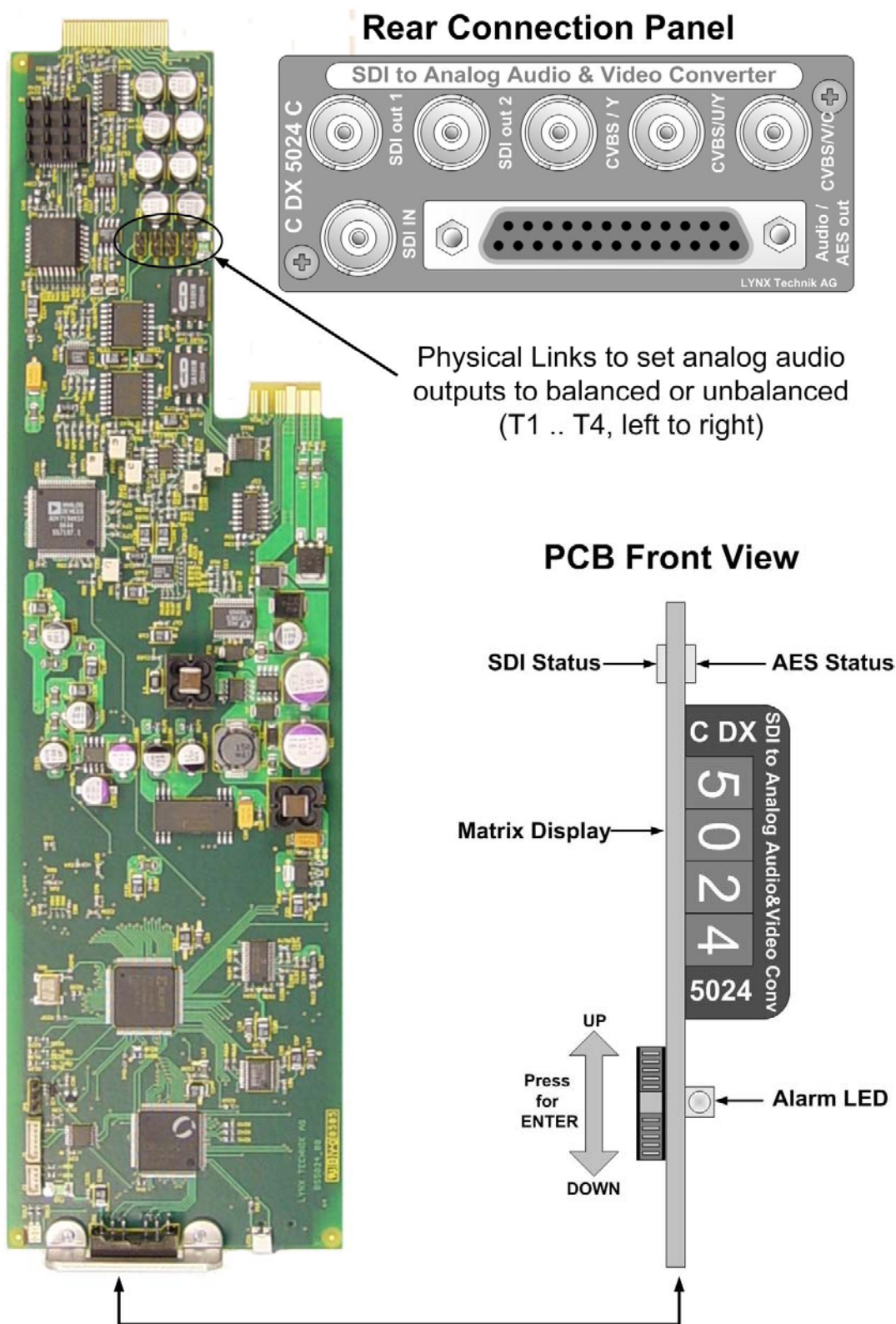


Figure 2 – Module Layout



**Caution**

Use static precautions when handling the PCB. Static discharge could result in serious damage to the module.

## Connections

### Video Connections

The C DX 5024 C CardModule is configured with standard 75 Ohm BNC connectors. Connection is self-explanatory. We recommend the use of high quality video cable for digital video connections to reduce the risk of interference or errors due to excessive cable attenuation. Some guidelines for max cable length are shown below.

250m (820 feet) Belden 8281 (270Mbps/s)

**Note.** Due to the compact design of the connection plate it will be necessary to use a connection tool to secure the BNC video connectors.

# Audio Connections

## Audio Output Connections (balanced)

SubD 25 pin female connector.

Pin Number	Connection	Pin Number	Connection
1	+ Left 1	14	- Left 1
2	GND Left 1	15	+ Right 1
3	- Right 1	16	GND Right 1
4	+ Left 2	17	- Left 2
5	GND Left 2	18	+ Right 2
6	- Right 2	19	GND Right 2
7	+ AES 1	20	- AES 1
8	GND AES 1	21	+ AES 2
9	- AES 2	22	GND AES 2
10		23	
11		24	
12		25	
13			

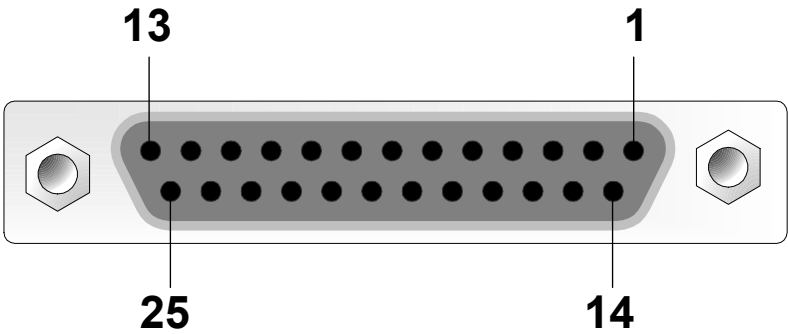


Figure 3 - Audio output connection detail

# Installation



## Caution

The CardModule is shipped in a protective anti-static bag. Please take suitable precautions to avoid static discharge onto any part of the PCB or components when handling module or serious damage could result.

Each Card Module is supplied with a rear connection panel and two mounting screws. Please follow the following procedure for installation of the card module into the Series 5000 Card Frame.

- a) Select a slot in the card frame where the CardModule will be located
- b) Remove the blank connection panel from the rear of the rack (if fitted)
- c) Install the rear connection panel using the screws supplied. Do not tighten the screws fully
- d) Slide the card module into the card frame and carefully check the CardModule easily connects to the rear connection plate. The card should fit easily and should not require excessive force to insert, if you feel any resistance, there could be something wrong with the rear connection panel location. Do not try and force the connection. Remove the rear connection panel and check alignment with the CardModule.
- e) Insert and remove the CardModule a few times to ensure correct alignment and then tighten the two screws to secure the rear connection plate

## Link Settings

### Balanced / Unbalanced Audio

It is possible to set the analog audio outputs to balanced or unbalanced with automatic gain adjustment.

This is done using physical links on the card and the card will need to be removed from the card frame for changes to be made\*. Figure 2 shows the locations.

<b>Link open</b>	<b>= Audio balanced</b>
<b>Link closed</b>	<b>= Audio unbalanced</b> (with automatic gain adjustment)

If the respective link is closed the “-“ pin of the audio output is set to ground.

**\*Note.** It is not necessary to power down the frame to remove the card. All Series 5000 Card Modules can be hot plugged / unplugged.

## Settings and Control

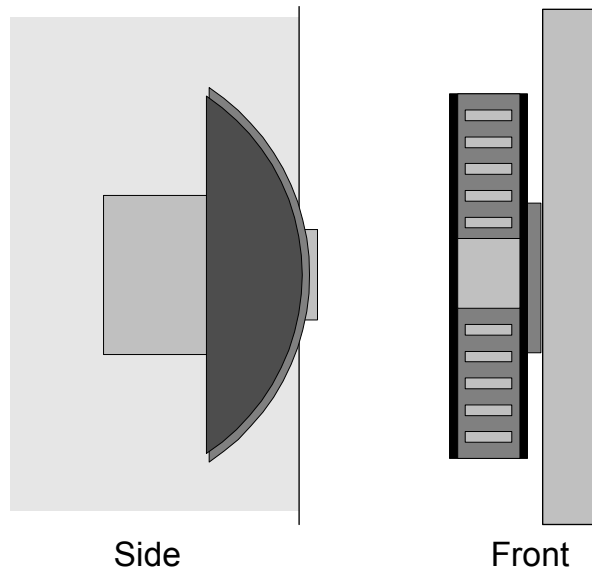
The C DX 5024 C has an integrated micro-controller, which enables the module to be configured and controlled locally using the multifunction switch and 4 character dot matrix display, or from remote when using one of the optional controllers and control software.

Once set, all settings are automatically saved in non-volatile internal memory. (Flash ram) The module will always recall the settings used prior to power down.

## Multi Function Switch

The CardModule is equipped with a multi-function switch located on the front bottom edge of the card (refer to figure 2)

### Multi-function Switch



### Switch Operations

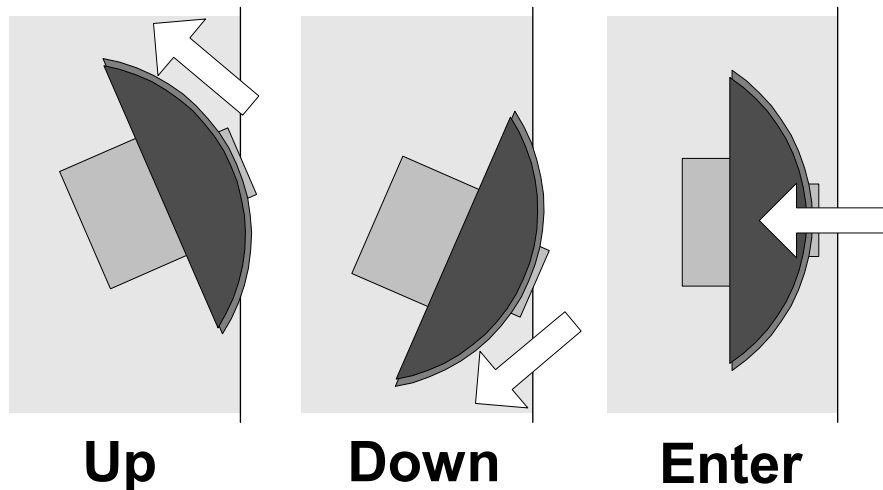


Figure 3 – Switch Operation

## Using the Local Display Menus

Making local adjustments to the module is done using the multifunction switch and the integrated 4-character dot matrix display (figure 3). The menu system is layered, and navigation through the system is done using the **UP** and **DOWN** functions of the switch. **ENTER** is used to move between menu levels and also enter a selection.

### Navigation

Switch Function	Operation
UP	Move UP within a level
DOWN	Move down within a level
ENTER	Change levels / Make selection

### Local Adjustments Available

All of the critical adjustments to the module are accessible using the local display and multi-function switch.



## Menu Structure

The Menu structure is defined in the next table, and should be used when navigating through the system.

### Notes / Tips.

**ENTER** moves between Levels

**UP/DOWN** moves between items within the level

When you enter a new setting the system will jump back one level in the menu system.

The “back” selection in the menu structure will take you back one level when selected.

When an item is selected which has several setting possibilities the first value displayed will be the value currently stored in the system. The order of the available settings for any menu item in the table supplied does not represent the order the settings will actually be displayed.

If left unattended, the menu will default to the root display after a preset timeout.

### Auto Store

If no parameters are changed for 10 seconds then the current settings will be written into flash memory automatically, this can be seen by the alarm LED flashing yellow four times.

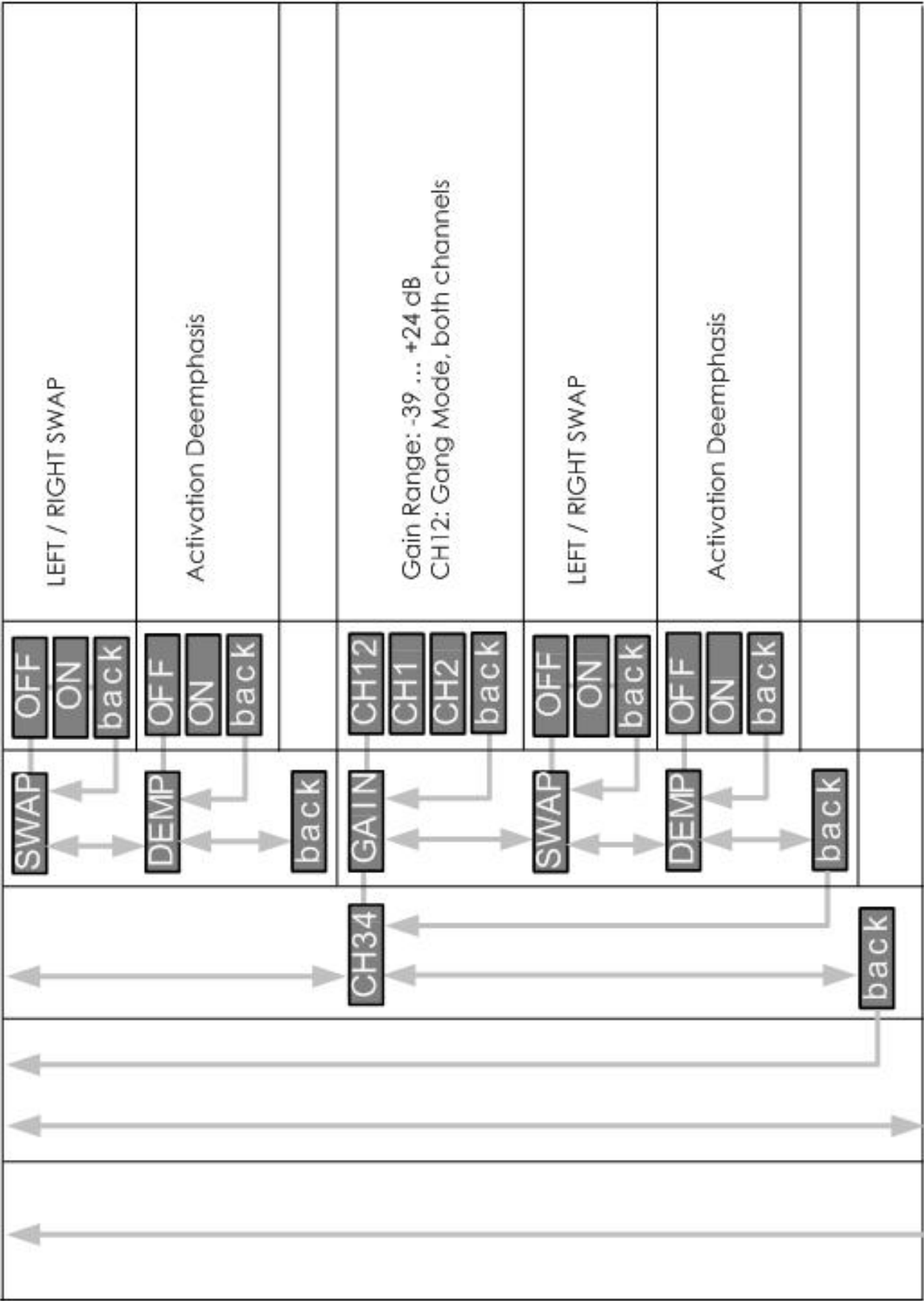
## **Factory Preset Condition**

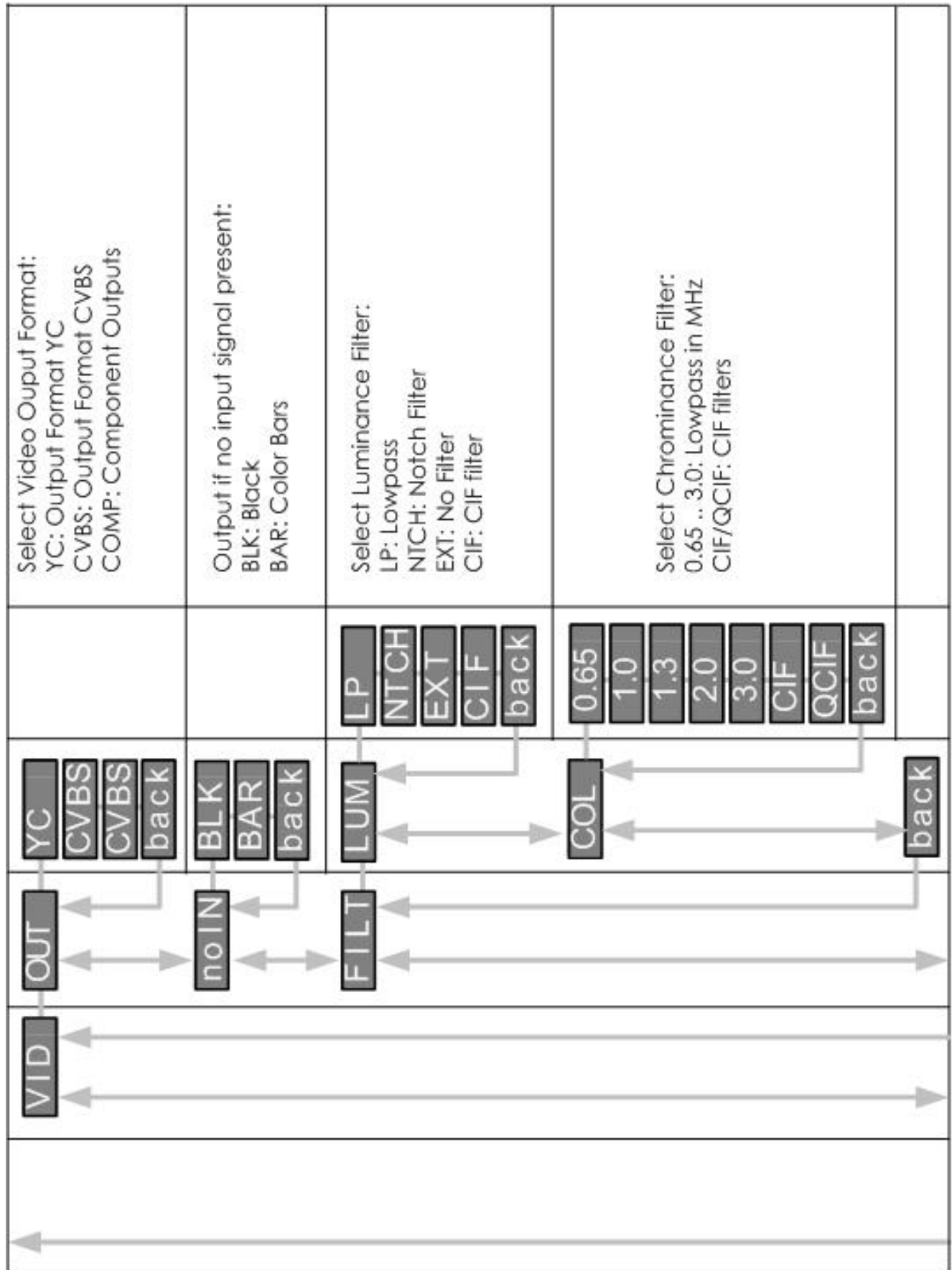
The C DX 5024 C is delivered preset for the following mode of operation:

- Audio Group 1 selected
- Full Scale Level 15dBu (analog Audio)
- Video Output Component
- Test Signal Off

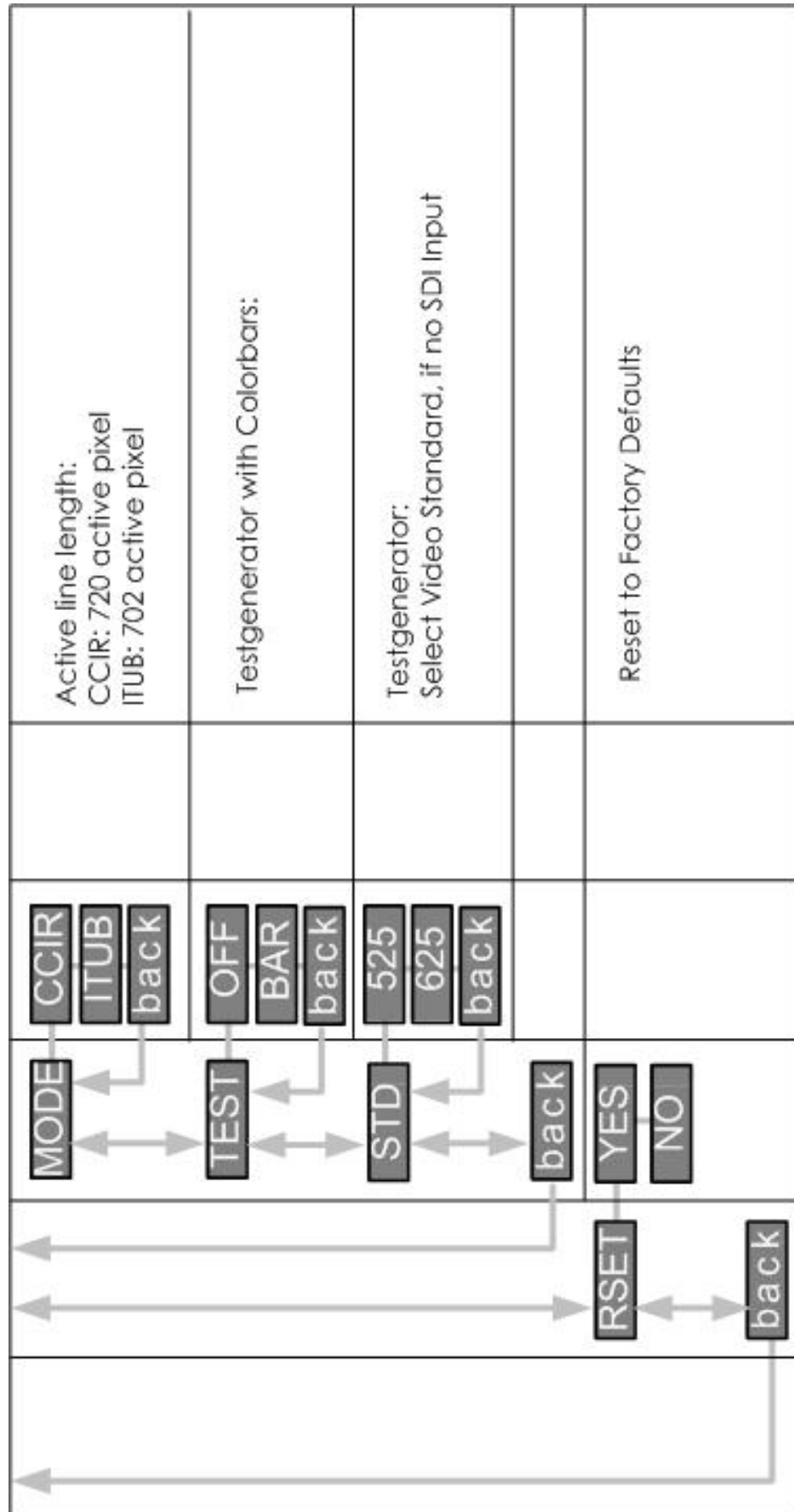
If this is the mode of operation required, then no adjustments are necessary.

ROOT	LEVEL 1	LEVEL 2	LEVEL 3	LEVEL 4	COMMENTS
5024	AUD	GRP	NONE 1 2 3 4 back		"Normal" Root display on module = Module type
		AES	OUT1 OUT2 back	AES1 AES2 back	Select embedded Audio Group for deembedding
		CH12	GAIN back	CH12 CH1 CH2 back	Select deembedded Audio for AES output1
					Select deembedded Audio for AES output2
					Gain Range: -39 ... +24 dB CH12: Gang Mode, both channels





Vertical Blanking Interval (VBI) TRA: transparent BLNK: blanked			<div><div>VBI</div><div>TRA</div><div>BLNK</div><div>back</div></div>
Pedestal ON/OFF			<div><div>PED</div><div>OFF</div><div>ON</div><div>back</div></div>
Adjust Y level: 0.00 .. 1.50			<div><div>Ysc</div><div>000</div></div>
Adjust UV level: 0.00 .. 2.00			<div><div>UVsc</div><div>000</div></div>
Black Setup: Adjust level: -7.5 .. 15.0			<div><div>BRI</div><div>000</div></div>
Luminance undershoot limiter: 1.5, 6, 11 IRE			<div><div>LLIM</div><div>OFF</div><div>1.5</div><div>6</div><div>11</div><div>back</div></div>



## Alarm/LED Status Indicators

The C DX 5024 C module has several LED indicators on the card edge that serve as alarm and status indication for the module. The alarm indicator is visible with the cover fitted to the rack. LED functions are described below. Refer to fig 3 for locations.

### SDI Status Indicator

This is used to indicate the audio status on the incoming SDI stream.

LED Color	Indication
Green	SDI present
Yellow	Video Test Signal active
Red	No SDI signal present

### AES Status Indicator

This indicates the status of the embedded audio in the selected audio group

LED Color	Indication
Green	Selected Audio group present
Yellow	No Audio Group selected
Red	Selected Audio group not present

### Alarm Indicator

A Single alarm LED is provided which can be seen while the rack cover is fitted and provides a general alarm indication for the module.

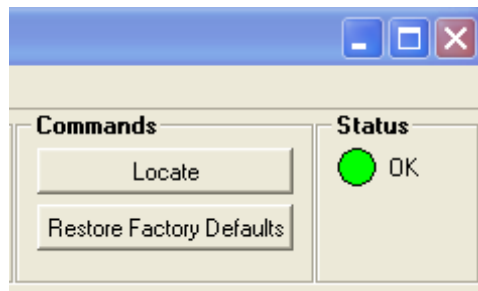
Color	Indication
Green	SDI present and selected audio group present
Yellow	No Audio embedded in selected group or Video Test Signal active
Red	SDI input is missing and/or Audio missing in selected group



## Locate Function

For larger systems which may have multiple MiniModules of the same type in a single rack, or multiple rack systems on a large central control system we have added a useful utility which will help to visually locate a suspect module quickly (When used in conjunction with the optional control system and software)

Once the specific module has been selected on the control system there is a locate button on the top of the GUI:



Locate Function in Control System

When Locate is selected the status indicator on the GUI and the module LED`s will flash yellow in the following continuous sequence.

### **3 short flashes.... Pause.... 3 short flashes ...**

This uses the alarm LED located on the front of the module and in some cases any channel or status LED`s that may be used in the module.

Use of the locate function will not interfere with the normal operation of the module.

For more details on this feature please check the documentation supplied with the controller software.

## Specifications *(C DX 5024 C)*

### Digital Video Input

SDI Video	1 x Serial Digital Video. SMPTE 259 A-D
Embedded Audio	SMPTE 272 M-C
Input impedance	75 Ohm (BNC connector)

### Digital Video Output

Signal (Video)	2 x reclocked Serial Digital Video. SMPTE 259A-D
Output impedance	75 Ohm (BNC connector)

### Performance (Digital Video)

Cable Equalization	250m (Belden 8281 / 270Mbit/s)
Input return loss	15dB (270 MHz)
Output level	0.8v p-p (nominal)
Output return loss	> 15 dB (270 MHz)
Jitter	< 0.2 UI

### Analog Video Outputs

Signal	CVBS or S-Video (Y/C) or Component (selectable)
Return Loss	>35dB (5,75MHz)
Signal to noise	>60 dB
Impedance	75 Ohm (BNC connector)

### Analog Audio Outputs

Signal	2 x Stereo analog audio (balanced or unbalanced)
Impedance	< 50 Ohm (Sub D 25 pin Connector)
Max. Output level	24dBu into 10kOhms
0 dB FS level	-39 .. +24 dbu in 0.5 db steps

### Performance (Analog Audio)

SNR	>85dB (20Hz to 20kHz, A-weighted)
Distortion	<0.01% (20Hz to 20kHz)
Frequency response	+/- 0.25dB (20Hz to 20kHz)
Crosstalk	<-85dB (20Hz to 20kHz)

### Digital Audio Outputs

Signal	2 x AES 3 (48kHz)
Impedance	110 Ohm (Sub D 25 pin Connector)

### Electrical Specifications

Operating Voltage	+12V DC
Power Consumption	7 W
Safety	IEC 60950/ EN 60950/VDE 0805

### Mechanical

Size	283mm x 78mm
Weight	Card module 120g, connection panel 50g

### Ambient

Temperature	5°C to 40°C Maintaining specifications
Humidity	Max 90% non condensing

### Supplied Accessories

Documentation	C DX 5024 C Reference Manual
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## Available Options

Below is a list of related products for the C DX 5024 C CardModule. Please refer to product brochures or our web site for more detailed information.

Model	Description
R FR 5010	Series 5000 Rack Frame (empty) with single power supply
R PS 5010	Redundant power supply for the R FR 5010 Card Frame
R CT 5020	Rack controller for the R FR 5010 Card Frame
R CT 5030	Master controller with TCP/IP interface for the R FR 5010 Card Frame
R CT 5010	Rack Bus Extension for the R FR 5010 Card Frame. In combination with R CT 5020/5030

## Parts List

Due to the very dense design and miniature surface mount technology the module is not field serviceable. The information for a replacement assembly is below.

### **C DX 5024 C CardModule (complete)**

Description SDI to Analog Audio & Video Conv.

Model Number C DX 5024 C

Part Number 6.155.507.550

### **Sub Assemblies:**

#### **C DX 5024 Processing Board only (BS 5024 D)**

Part Number 6.155.507.555

#### **Rear Connection Panel for C DX 5024C (MA5028\_A)**

Part Number 6.155.009.221

# Service

If you are experiencing problems, or have questions concerning your C DX 5024 CardModule please contact your local distributor for assistance.

We offer a fixed cost service exchange program for defective Series 5000 CardModules out of Warranty. Please contact your distributor or check our web site for details on this program.

More detailed information and product updates may be available on our web site:

**[www.lynx-technik.com](http://www.lynx-technik.com)**

You will also find links to contact us directly for assistance.

## Contact Information

Please contact your local distributor; this is your local and fastest method for obtaining support and sales information.

LYNX Technik can be contacted directly using the information below.

<b>Address</b>	LYNX Technik AG Brunnenweg 3 D-64331 Weiterstadt Germany.
<b>Website</b>	<a href="http://www.lynx-technik.com">www.lynx-technik.com</a>
<b>E-Mail</b>	<a href="mailto:info@lynx-technik.com">info@lynx-technik.com</a>

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