



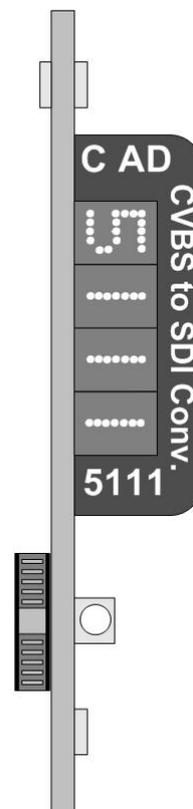
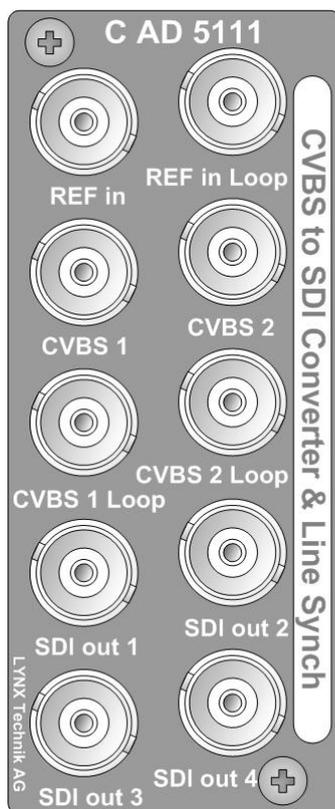
Version 1.3A

# Reference Manual

## C AD 5111

### CVBS to SDI Converter & Line Synchronizer

Series 5000  
*CardModule*



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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 AD 5111	
<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, December 2003	
<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 AD 5111 is a high performance 12 Bit Video A/D Converter for analog PAL/NTSC composite signals and is designed primarily for broadcast and professional applications.

One out of two loop-through input signals can be selected. The input architecture is differential to assure optimal resistance against distortion. Automatic Gain Control is integrated into the input stage. PAL/ NTSC Input detection is automatic. Either an external loop-through reference or the internal rack reference (black burst signal) can be used to line-synchronize the four SDI outputs.

The C AD 5111 features a wide range of available adjustments (via optional Rack Controller) basic adjustments are possible using via the local multi-function switch and integrated display.

CardModules are installed in the series 5000 card frame 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 AD 5111 CardModule.

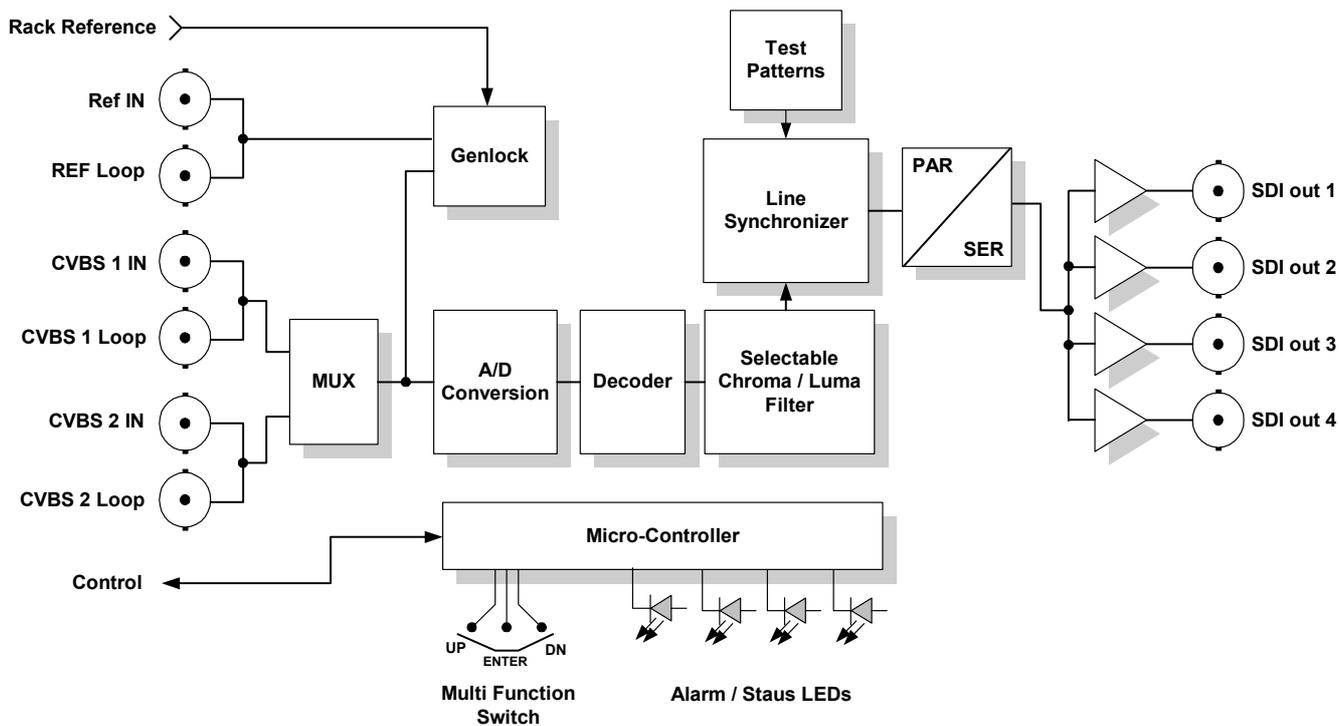
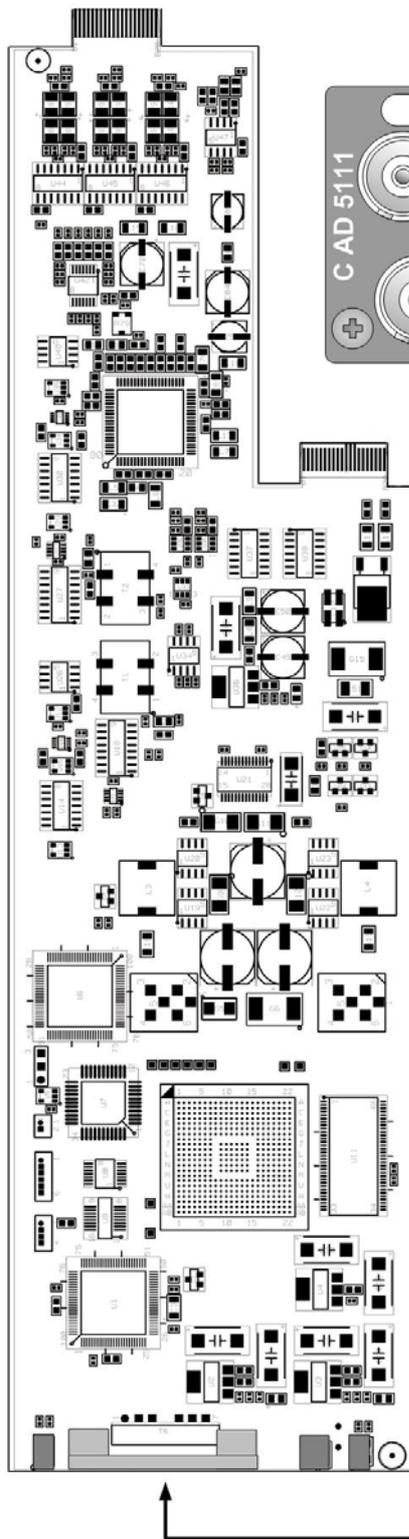


Figure 1- C AD 5111 Functional Diagram

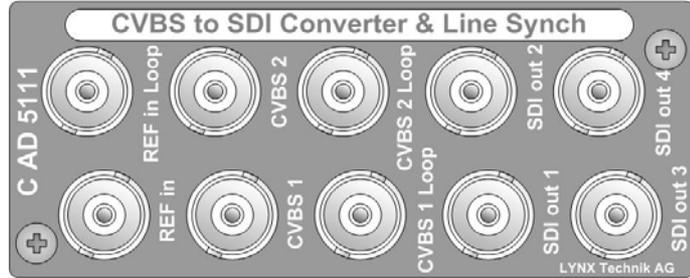
## Module Layout

Figure 2 shows the physical layout of the C AD 5111 CardModule and also the connection panel which is fitted to the rear of the rack.

## PCB Layout



## Rear Connection Panel



## PCB Front View

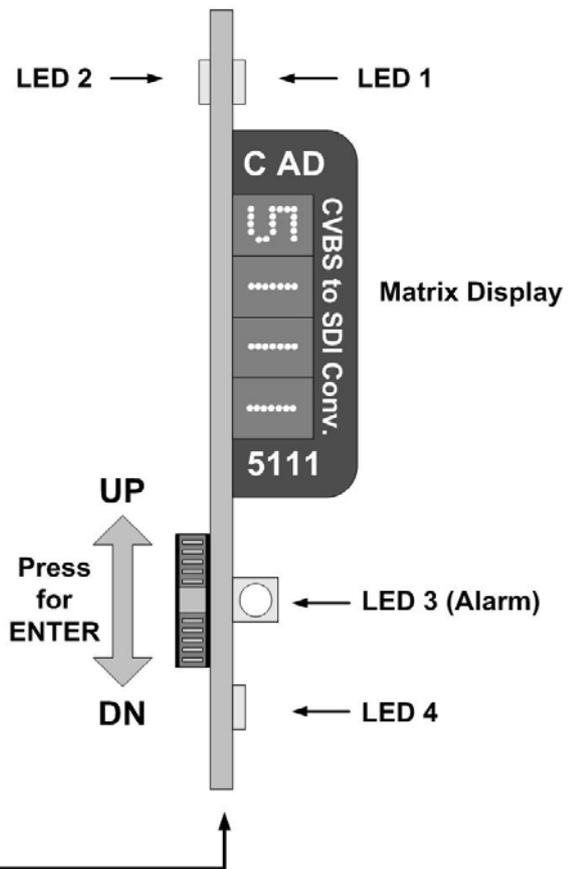
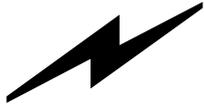


Figure 2 – Module Layout



### **Caution**

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

## **Connections**

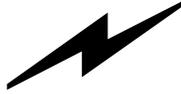
### **Video Connections**

The C AD 5111 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 (270Mbits/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.

# 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

## Settings and Control

The C AD 5111 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.

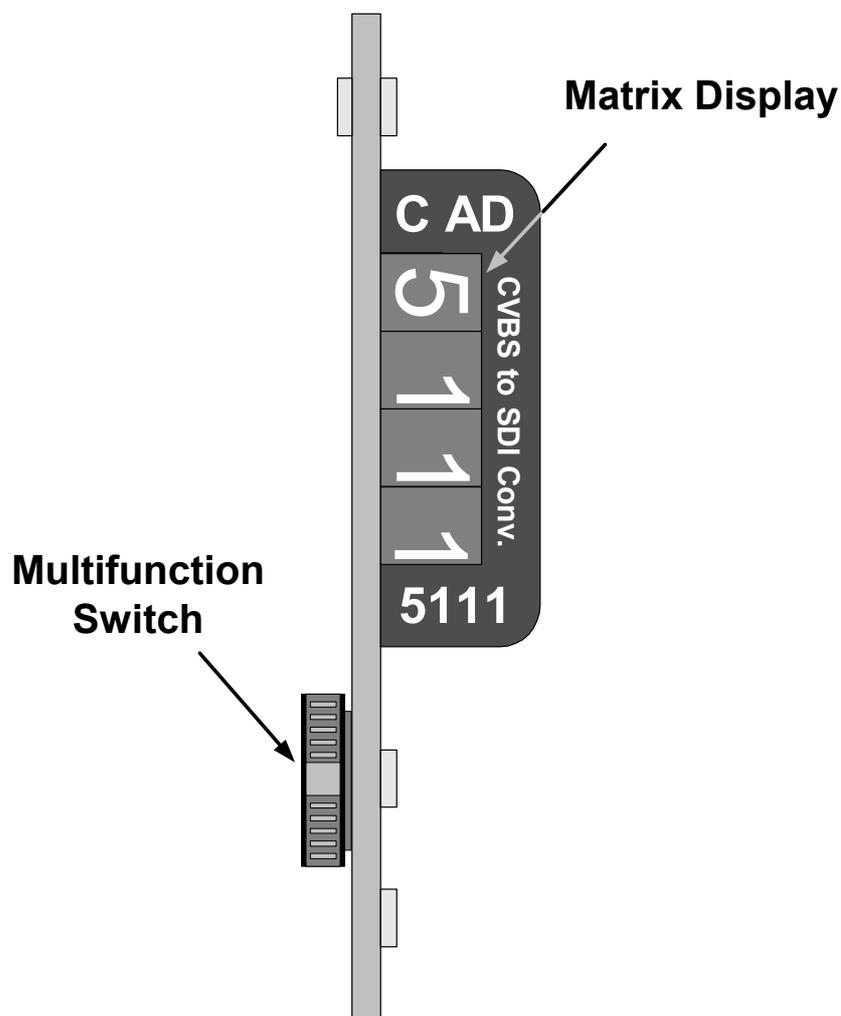
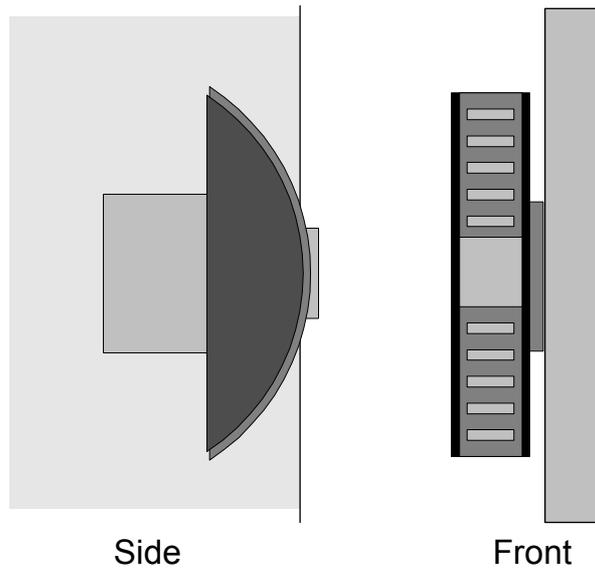


Figure 3 – Switch and Display Location

## Multi Function Switch

The CardModule is equipped with a multi-function switch located on the front bottom edge of the card (refer to figure 3)

### Multi-function Switch



### Switch Operations

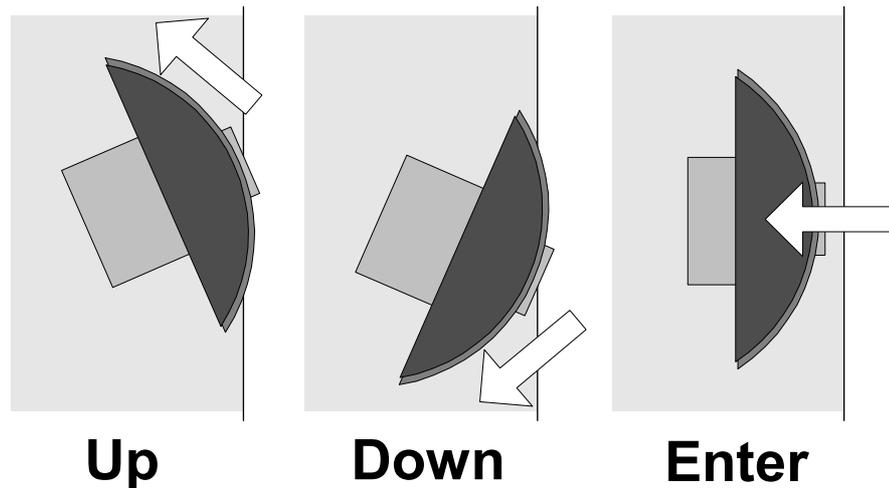


Figure 4 – Switch Operation

## 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, these include:

- Input Signal 1/2 select
- External / Rack Internal line sync reference select
- Analog input filter on/off
- Genlock mode
- Luma-/ chroma filter settings
- Luma/ Chroma Comb mode
- Auto-/ manual gain control
- Hue, Chroma, Pedestal, Gain
- CTI mode (Color Transition Improvement)
- Test signal select

## 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

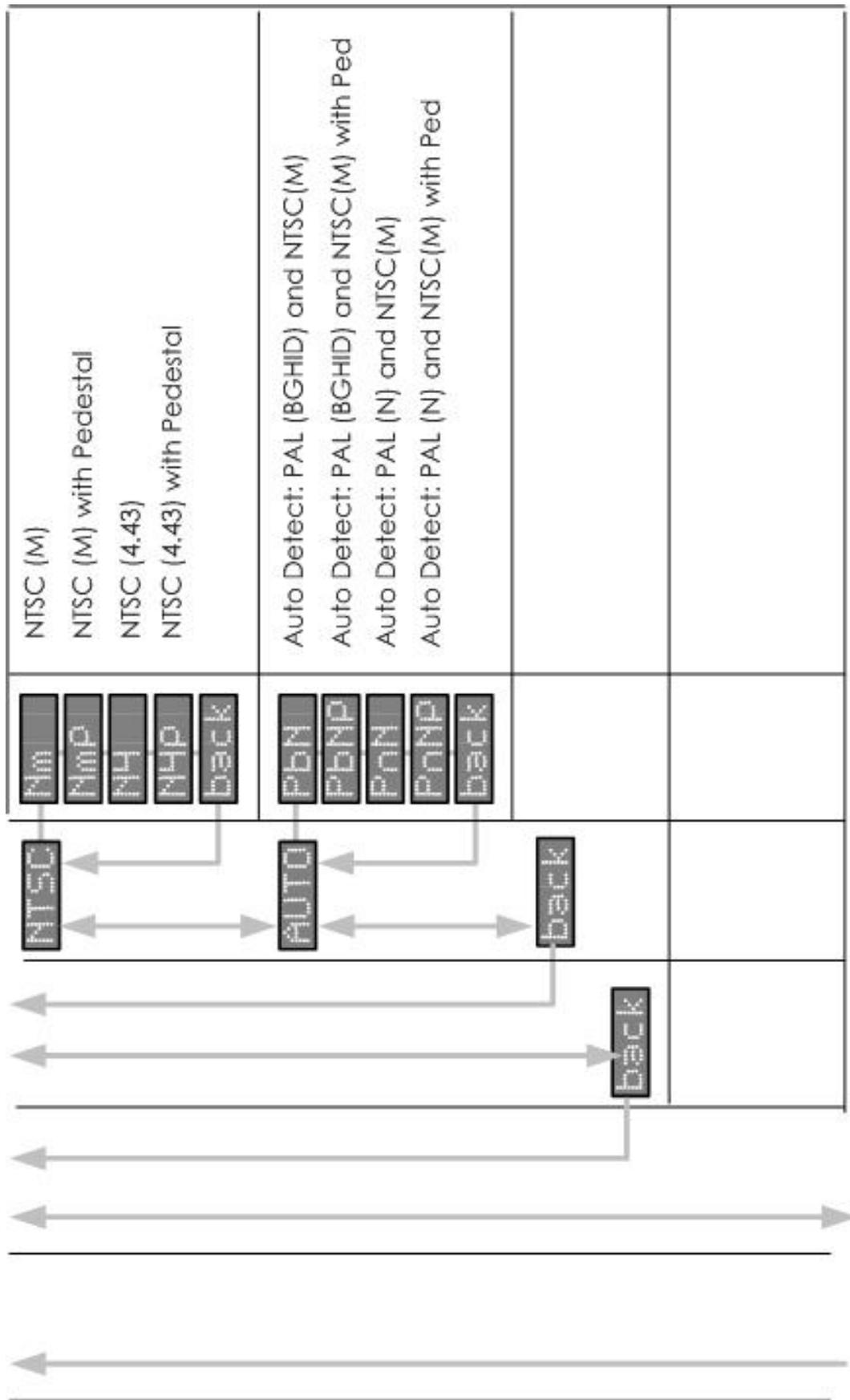
When you enter a new setting the system will jump back one level in the menu system.

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

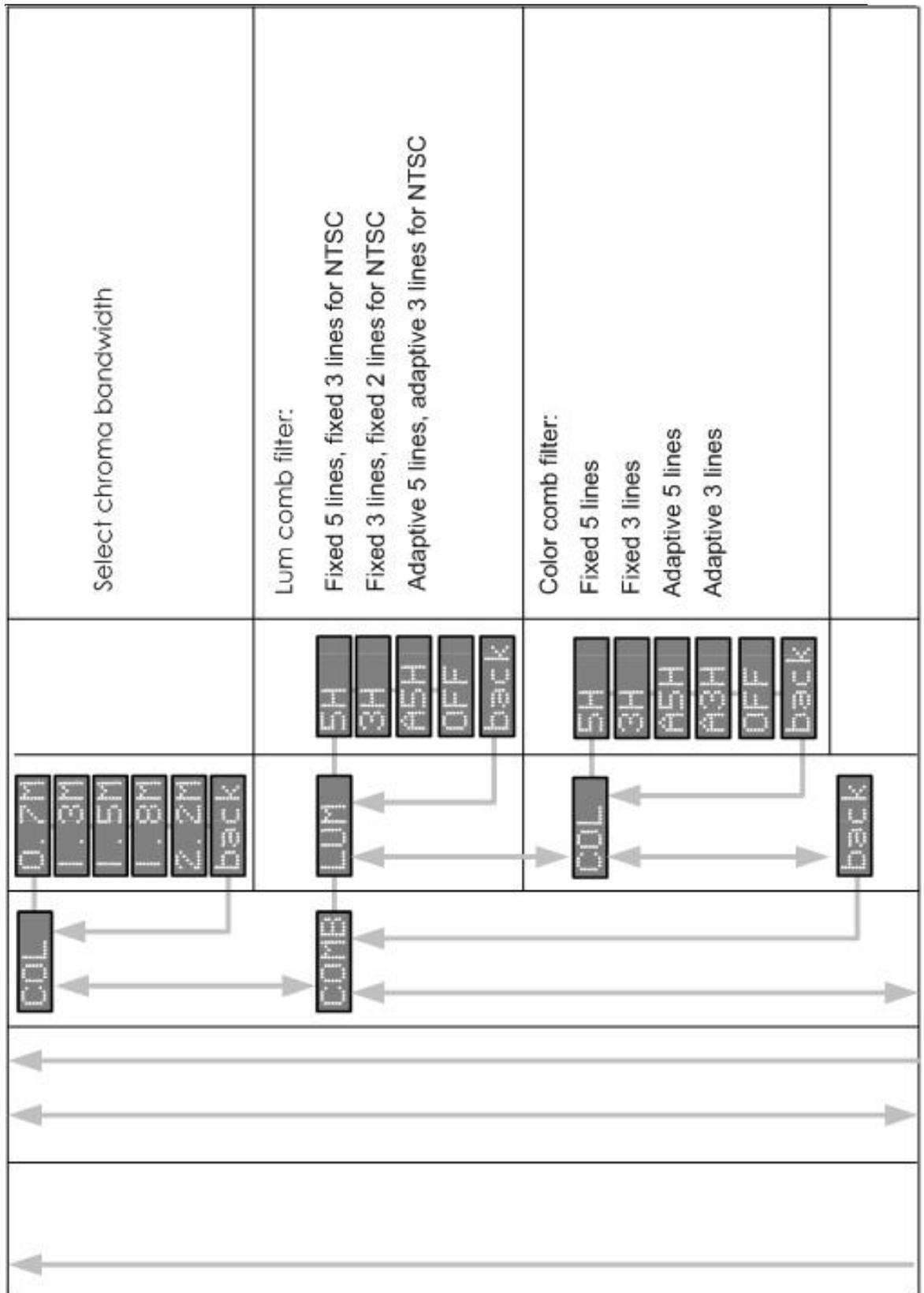
When an item is selected which has several setting possibilities the first value displayed will be the value currently stored in the system. The order of the available settings for any menu item in the table supplied does not represent the order the settings will actually be displayed.

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

ROOT	LEVEL 1	LEVEL 2	LEVEL 3	LEVEL 4	COMMENTS
5111	IN	SIG	IN 1 IN 2 back		"Normal" Root display on module = Module type
		FILT	OFF FLAT ENH back		Input signal select
		STD	PAL	Pb PnP Pm PmP PcN PcNp back	Analog filter selection
					PAL (BGHID) PAL (N) with Pedestal PAL (M) PAL (M) with Pedestal PAL combination (N) PAL combination (N) with Pedestal



<p>LO Q = "Video Tracking Mode" for inputs with poor signal quality                  HI Q = VCXO mode, for inputs with high quality signals</p>		<p>LO Q                  HI Q                  back</p>	<p>VID</p>	<p>GENL</p>
<p>EXT = set reference to external input                  INT = set reference to rack reference                  OFF = set reference to video input with minimum delay</p>		<p>EXT                  INT                  OFF                  back</p>	<p>SREF</p>	
<p>Enter line delay, max. 6 lines</p>	<p>0000</p>	<p>LINE                  0000                  back</p>	<p>DELAY</p>	
<p>Enter pixel delay                  0 ..... 1715 for NTSC                  0 ..... 1727 for PAL                  automatic wrap to next line when limit reached</p>	<p>0000</p>	<p>PIXL                  0000                  back</p>	<p>back</p>	
<p>Select luminance filter:                  NN1: Narrow Notch 1                  NN2: Narrow Notch 2                  NN3: Narrow Notch 3                  WN1: Wide Notch 1                  WN2: Wide Notch 2</p>		<p>NN1                  NN2                  NN3                  WN1                  WN2                  0000                  BACK</p>	<p>LUM</p>	<p>FILT</p>
<p>Select lowpass filter:                  1 (= 0.5 MHz)                  ...18 (= 5.5 MHz)</p>		<p>0000</p>		
		<p>BACK</p>		





<p>Color Transition Improvement: Level 1..4</p>	<p>Select test signal BARS = Color Bars BRED = Color Bars with Red Field BLK = Black PATH = PLL/Equaliser pathological test signal</p>	<p>Select video standard for test signal: AUTO: Last detected input standard is used</p>	<p>Restore factory defaults</p>	
<p>CTI</p> <p>OFF</p> <p>0000</p> <p>back</p>	<p>TEST</p> <p>SLCT</p> <p>BARS</p> <p>BRED</p> <p>BLK</p> <p>PATH</p> <p>OFF</p> <p>back</p>	<p>STD</p> <p>AUTO</p> <p>525</p> <p>525</p> <p>back</p>	<p>RSET</p> <p>NO</p> <p>YES</p>	
<p>back</p>	<p>back</p>	<p>back</p>	<p>back</p>	<p>back</p>

## Factory Preset Condition

The C DA 5111 is delivered programmed and preset for the following mode of operation:

Input	<b>Input 1</b>
Analog Filter Standard	<b>FLAT PAL Pb (BGHID) or NTSC (auto detect)</b>
Genlock Reference	<b>HI Q Internal (Rack Reference)</b>
Line delay	<b>0000</b>
Pixel delay	<b>0000</b>
Lum filter	<b>LP 18 (5,5 MHz)</b>
Chroma filter	<b>1.8 MHz</b>
Chroma Comb filter	<b>PAL: adaptive 5 H NTSC: adaptive 3H</b>
Luma Comb filter	<b>PAL: adaptive 5 H NTSC adaptive 3H</b>
VBI	<b>PROC (processed)</b>
CTI	<b>OFF</b>
AGC Lum	<b>Auto</b>
AGC Col	<b>Auto</b>
Hue, Pedestal	<b>0</b>
Chroma, Gain	<b>128</b>
Test Signal	<b>Bars</b>
Test Signal Standard	<b>Auto</b>

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

These settings can be recalled at any time by selecting reset from the menu system.

## 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.

---



# Alarm/LED Status Indicators

The C AD 5111 module has integral LED indicators, which serve as alarm and status indication for the module. Function is described below.

## Status Indicators

3 status LED`s are provided on the front edge of the module, LED 1, LED 2, LED 4 (figure 2)

LED	Color	Indication
1	Green	Input Present
	Red	No Input
2	Green	PLL locked (Video and Ref)
	Yellow	Video PLL Locked, Ref PLL unlocked
	Red	PLL unlocked
4	Green	525 Mode
	Yellow	625 mode

## Alarm Indicator

There is also a single alarm LED on the lower edge of the module LED 3. This is visible through the card frame front cover and provides a general indication of the module status.

LED Color	Indication
Green	Signal present and PLL locked
Yellow	Test Signal Selected
Red	No input signal, PLL unlocked

LED **OFF** indicates power is lost, or there is a power supply fault.

## Locate Function

For larger systems which may have multiple cards 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 alarm LED will flash yellow in the following continuous sequence.

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

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 AD 5111)

## Inputs (video)

Signal	NTSC -(M/N), PAL (B/D/G/H/I/M/N), one out of two loop-through inputs selectable. AC coupled, differential inputs
Input Impedance	75 Ohms
Connection	BNC

## Inputs (ext reference)

Signal	Composite sync (black burst)
Input Impedance	75 Ohms
Connection	BNC

## Outputs

Signal	4 x serial 4:2:2 SMPTE 259M-C (270 Mbps)
Output Level	0.8V p-p
Jitter	< 0.2UI
Connection	BNC
Output Impedance	75 Ohms

## Operating Modes

CCVS	NTSC/ PAL decoding modes can be adjusted according to the application. See remote adjustable parameters. Parameter settings can be stored in remote operation.
Test	Built in Color Bars, EQ pathological, black flat field

## Performance

Quantization	12 Bits for Luma and Chroma
Frequency Response	$\pm 0,15$ dB ...5,0 MHz, $\pm 0,2$ dB ...5,5 MHz for Luma
Sampling	54 MHz (4 x oversampling)
Filters	Selectable Luma/Chroma comb filters (5 line, adaptive), various Luma / Chroma filters
Processing Delay	Min. 3.5 lines plus adjustable 1..6 line delay
S/N Ratio	< -60 dB (unweighted to 5,75 MHz)

## Electrical Specifications

Operating Voltage	+ 12 VDC
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 AD 5111 Reference Manual
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## Available Options

Below is a list of related products for the C AD 5111 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 5010	Rack Bus Extension for the R FR 5010 Card Frame. In combination with R CT 5020

## 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 AD 5111 CardModule (complete)**

Description	CVBS to SDI Converter
Model Number	C AD 5111
Part Number	6.155.008.200

### **Sub Assemblies:**

#### **C AD 5111 Processing Board only (BS5018 B)**

Part Number	6.155.007.220
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#### **Rear Connection Panel for C AD 5111 (MA5018)**

Part Number	6.155.007.210
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# Service

If you are experiencing problems, or have questions concerning your C AD 5111 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.

**Address** LYNX Technik AG  
Brunnenweg 3  
D-64331 Weiterstadt  
Germany

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

**E-Mail** [info@lynx-technik.com](mailto:info@lynx-technik.com)

LYNX Technik manufactures a complete range of high quality modular products for broadcast and Professional markets, please contact your local representative or visit our web site for more product information.



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