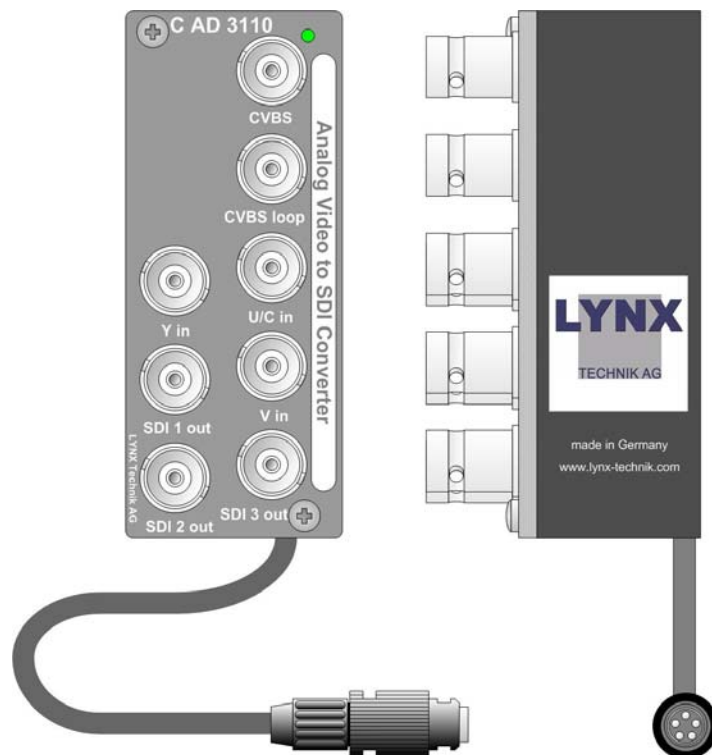


Reference Manual

C AD 3110 - 2

Analog Video to SDI Converter

Series 3000
MiniModules



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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.

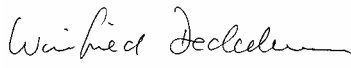
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Regulatory information

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 3110	
<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, January 2004	
<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 3110 is a high quality 12 bit video analog to digital converter designed primarily for broadcast and professional applications.

The Module accepts analog component (CAV), composite (CVBS) or Luma/ Chroma separated (S-Video) signals and converts these into 8 or 10 Bit SDI video signals (SMPTE 259M-C). Three separate SDI outputs are provided. The Module is dual standard (PAL/NTSC) and Input detection is automatic. One passive loop through of the CVBS signal is provided.

The C AD 3110 has a variety of features, which include:

- Component YUV, composite and S Video inputs (selectable)
- 12 bit A/D conversion with 8 or 10 bit output
- Low pass video re-construction filter
- 5 line adaptive Luma and Chroma comb filters
- Automatic gain control for analog inputs
- 3 digital SDI (4:2:2) outputs
- Dual standard with automatic detection
- Internal Color Bars and Black test signals
- Local DIP-switches and LED's for control and status monitoring
- Microprocessor controlled
- Remote control interface

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 or R CT 3000 service adaptor and LYNX software.

Remote control offers access to more features.

Adjustments possible from the remote controller or service adaptor include:

- Adjustable Coring function
- Adjustable Gain, Chroma Gain, Pedestal and Hue
- Luma / Chroma shaping filter for YC (S-Video) and CVBS modes
- Luma, Chroma Comb filter mode (off, 3h, 5h, adaptive)
- Automatic Gain Control mode (manual, auto, reference select)
- CTI: Color Transition Improvement
- Test signal select (color bars, color bars over red, black, pll / equalizer pathological)

The C AD 3110 is part of the 3000 series of MiniModules, which offer high quality, modularity and flexibility in a very small form factor ideal for applications where space is at a premium.

The modules can be used either stand alone using the optional power supply brick, or as part of a tightly integrated space saving system where up to 10 MiniModules can be mounted utilizing the optional LYNX R FR 3005/3010 rack housing. This includes integrated power supply and optional remote control interfaces.

Functional Diagram

Figure 1 below is the basic functional diagram for the C AD 3110 MiniModule.

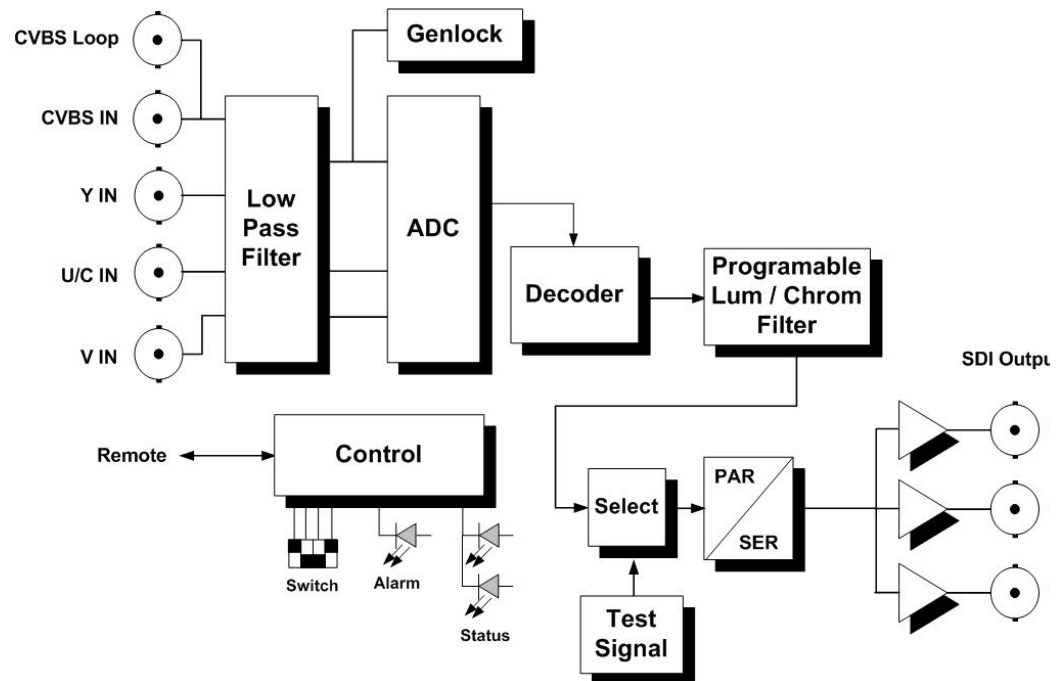


Figure 1- C AD 3110 Functional Diagram

Module Layout

Figure 2 shows the physical layout of the C AD 3110 MiniModule. Connections are made through standard 75 Ohm BNC video connections. Module configuration is set via a small dip-switch located behind an access hole in the bottom of the module.

If the module is being used in a stand alone application then the optional power supply (R PS 1 E, R PS 1 U or R PS 3001-3) is required to power the module (not shown)

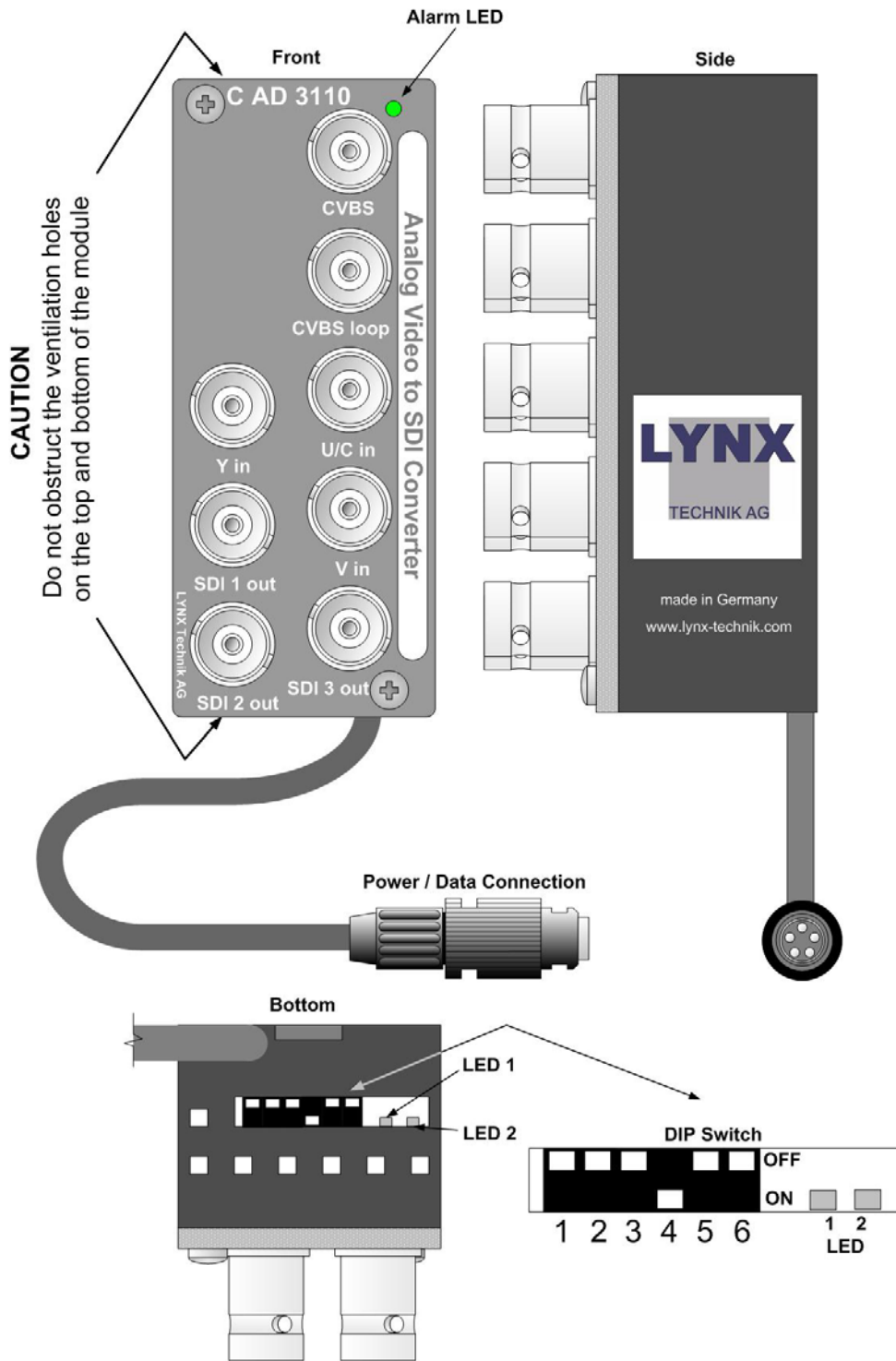


Figure 2 – Module Layout

Connections

Video Connections

The C AD 3110 MiniModule is configured with standard 75 Ohm BNC connectors. Connection is self-explanatory. We recommend the use of high quality video cable suitable for digital video connections to reduce the risk of interference or errors due to excessive cable attenuation.

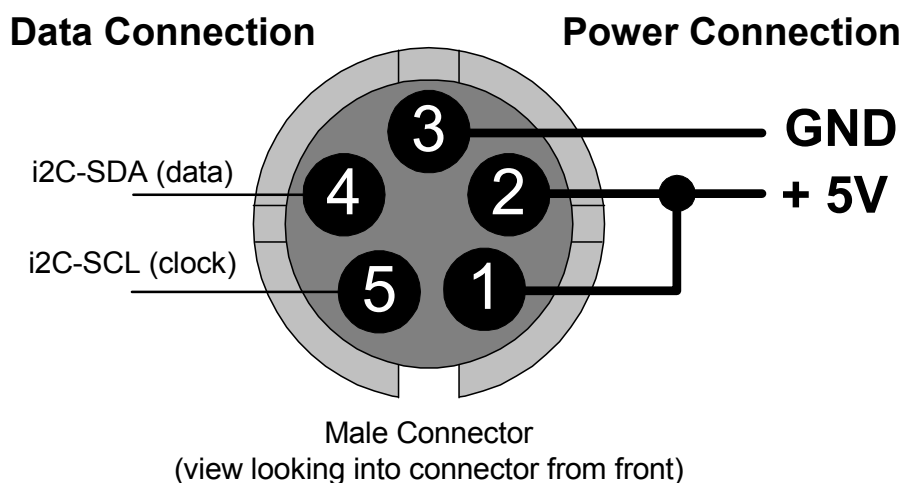
Note. Due to the compact design of the module it will be necessary to use a connection tool to secure the BNC video connectors to the module.

Power Connections

If using the module in a stand-alone application use the separate R PS 1 E (for Europe), R PS 1 U (USA) power brick option or the R PS 3001-3 desk power supply.

DC Power Connector

The MiniModule has a captive power lead fitted to the module, with a male 5 pin locking bayonet connector. This connection provides DC power and also data connectivity to the module. Connector wiring is shown below.



Caution

Only use the optional LYNX R PS power modules. Ensure the 5-pin power connector is locked securely in place.



Installation

Mechanical

Stand Alone Operation

The C AD 3110 MiniModule can be used in a stand alone application. There are two options for the use of the module in this way.

- a) Using the R FR 3005 Rack Frame 1 option. This allows up to any 10 of the MiniModules to be secured onto a rack frame assembly for 19 inch rack mounting. This keeps the modules secured, organized and out of the way. The R PS 3001 power brick option or the R FR 3010 option is required to power each module. Please refer to the R FR 3005 Reference Manual supplied with this option for more details.
- b) Single Use. The MiniModule can be powered independently with the R PS 3001 option and used in any location where this functionality is required.



Caution. Care needs to be taken when using the module in this way, as it is not physically secured. Keep the module away from the floor to avoid the risk of someone stepping or tripping on the unit, and locate the unit away from excessive sources of heat and any sources or moisture.

If using more than one MiniModule in any installation, the R FR 3005/3010 Rack frame combination is highly recommended.

Multiple Units

Most applications will require more than one MiniModule, which can include any of the available Series 3000 MiniModule product range. There are two options for mounting multiple units.

- a) Using the R FR 3005 Rack Frame option. This allows up to any 10 of the MiniModules to be secured onto a rack frame assembly for 19 inch rack mounting. The R PS 3001 power brick option or the R FR 3010 option is required to power each module. Please refer to the R FR 3005 Reference Manual for more details.

- b) Using the R FR 3010 Rack frame extension option. Can be combined with the R FR 3005 Rack frame option. Each module plugs into a connection bus, which provides common power for all modules. (no R PS external power supplies are needed). Remote control and status monitoring of all modules is possible with the addition of the R CT 5020 rack controller and R CT 5030 master controller options. Please refer to the respective reference manuals for these options for details of mechanical installation.

The very small size and density of the MiniModules combined with the available rack frame options allows the addition of a complex and custom signal distribution system without taking any additional front rack space. The rack frames are designed for installation in the back of 19-inch racks where there is normally plenty of available space. Ideal for mobile truck installations and facility expansions where space is at a premium.

Electrical Installation.

Stand Alone Operation

The MiniModule requires the R PS 3001 power brick option for stand-alone operation. Three versions are available: R PS 3001 E for European markets, R PS 3001 U for the US markets and the universal IEC desk power supply R PS 3001-3. Please ensure you have the correct power option for your region. The connection to the module is made with a small 5-pin connector, which has a twist bayonet securing system. Please make sure the connection is solid and locked in place. A strain relief is included within the module to prevent excessive strain on the connection.

Signal connections should be made with care, please ensure connections are correct and compatible equipment is feeding / receiving the signals from the module or damage can result.



Caution. Only use the optional Lynx R PS 3001 power modules. Ensure the 5-pin power connector is locked securely in place.



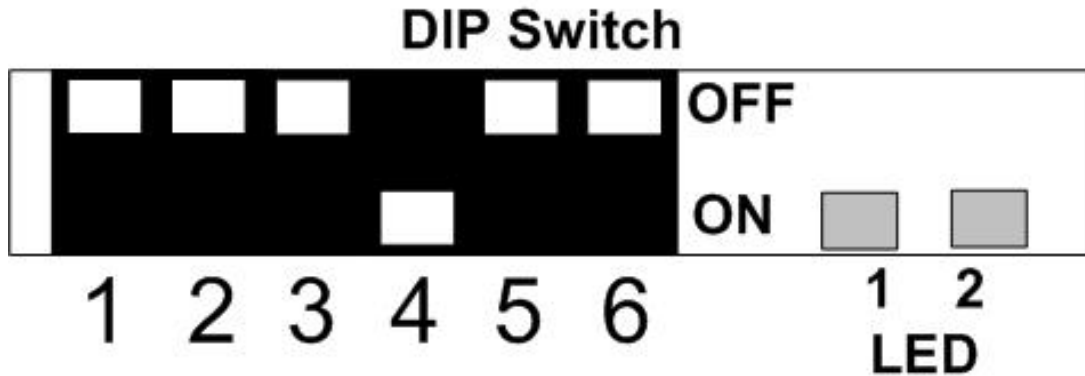
Caution. Care needs to be taken when using the module in this way, if it is not physically secured. Keep the module away from the floor to avoid the risk of someone stepping or tripping on the unit, and locate the unit away from excessive sources of heat and any sources or moisture.

Multiple Units

When installing multiple MiniModule units it is recommended you use the R FR 3005 Rack Frame 1 and / or R FR 3010 Rack Frame 2 options. Please refer to the documentation supplied with these options for details on electrical installation.

Settings and Control

The C AD 3110 is configured via the integral 6-position dip-switch. This is located on the bottom of the module and can be accessed through the cutout provided (fig 2)



Switch Settings

Below the switch settings for the 4-position dip-switch are defined. Please see the section following the table for more detail on the switch function.

Switch	Setting	Function
1	ON	Local control enabled
	OFF	Local control disabled
2	ON	Studio quality input signals
	OFF	Low quality input signals
3	ON	Color Bars / Color Bars over red / Black / pll - EQ pathological*
	OFF	Input Video
4	ON	CVBS (Composite) Input mode select**
	OFF	YUV input mode select*
5	ON	S-Video input Select
	OFF	Makes selection of SW3 active
6	ON	CTI (color transition improvement) ON
	OFF	CTI (color transition improvement) OFF

*Step through test patterns by toggling SW3 (within two seconds)

Only if SW5 is set to **OFF

Switch Function Detail

Dip Switch 1

Enables or disables local control

ON this will enable local control

OFF this disables local control, the module can only be controlled via remote control

Dip Switch 2

Studio Quality input or Low Quality input. When set to **ON** this will set the internal PLL to use a VCXO for low jitter mode. When set to **OFF** this enables the PLL to follow low quality inputs

Dip Switch 3

Test on / off select. When set to **ON** this will insert the internal test signal which will then be present on the SDI outputs. When set to **OFF** this will pass the input video signal. Switching twice within two seconds activates the next pattern in the following sequence: - color bars – color bars over red – black signal – PLL/EQ pathological.

Dip Switch 4

CVBS or YUV input select. When set to **ON** This sets the module to convert CVBS (composite) inputs. When set to **OFF** the YUV (component) input mode is selected. **Note.** Switch 4 must be set to **OFF** to make switch 3 active.

Dip Switch 5

S-Video select. When set to **ON** this will enable the S-Video input (Luma / Chroma). When set to **OFF**, this will enable the selection made on Switch 3.

Dip Switch 6

CTI – Color Transition Improvement. This function improves the sharpness of color transitions depending on the contrast. When set to **ON** this will enable CTI. When set to **OFF**, this will disable CTI.

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 front LED flashing yellow four times.

Factory Preset Condition

The C AD 3110 is delivered preset for the following mode of operation:

- CVBS (composite) operation
- Video re-construction lowpass filter enabled
- Y full bandwidth
- Auto clamp
- Automatic gain luma (*referenced to black/sync voltage level*)
- Automatic gain chroma (*referenced to color burst*)
- Chroma filter selected
- Chroma Gain 0dB
- Pedestal 0
- Gain 0dB
- Hue 0°
- High Q mode

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

Enhanced Operation Control

An enhanced set of control parameters and adjustments are possible when the module is connected into a LYNX control system or if the module is connected to the optional Service Adaptor (R CT 3000), this will enable:

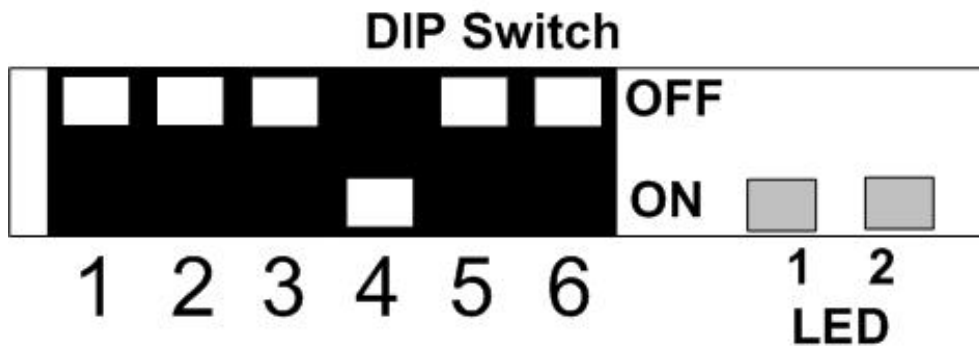
- Direct access to all of the A/D converters adjustments and enhanced settings
- Setting and programming the modules internal Flash Ram with initialization data (which is automatically recalled on power up)

Alarm/LED Status Indicators

The C DA 3110 module has built in LED indicators, which serve as alarm and status indication for the module. Function is described below.

Module Edge Status LED

2 Status LEDs are provided on the module edge, which have three color states



LED 1	Indication
Red	<i>Not used</i>
Yellow	625 Mode
Green	525 Mode
LED 2	Indication
Red	No Sync detected
Yellow	Sync present but PLL Unlocked
Green	Sync present PLL Locked

Front Panel Alarm Indicator

Alarm LED

There is also a single alarm LED on the front side of the module, which is designed for quick and easy indication of a problem condition in installations where visible access to the bottom of the module is not convenient.

LED Color	Indication
Green	Input signal present (PLL lock / signal lock)
Yellow	No Signal / PLL Locked / Test Pattern Selected.
Red	No Signal / PLL Unlocked

Locate Function

For large systems which have many modules in various locations we have added a utility which will help visually identify a module quickly. (When used in conjunction with the optional control system and software)

Once the module has been identified on the control system it is possible to initiate the "locate" function and flash the module LEDs 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 as well as any module edge LEDs 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 AD 3110)

Inputs

Analog Inputs (selectable)	NTSC -(M/N), PAL (B/D/G/H/I/M/N), Y / R-Y / B-Y, Y / C (S-Video)
Sync Input	On Y or CVBS
Connection type	BNC (75 Ohm)
Return Loss	> 35 dB to 5,75 MHz

Outputs

SDI Outputs	3 x Serial Digital Video (270 Mbit) SMPTE 259M- C. 8 bit or 10 bit (selectable)
Connection type	BNC (75 Ohm).
Loop Output	Passive loop of CVBS input is provided

Operating Modes

CAV	A/D conversion for CAV signals
YC	A/D conversion for chroma / luma separated systems (S-Video)
CVBS	NTSC/ PAL decoding modes allowing the decoding modes to be adjusted according to the application. Parameter settings can be stored with remote operation.
Test	color bars / color bars over red / black signal / PLL-EQ pathological.

Performance

Quantization	12 bits for Luma and Chroma
Frequency Response	$\pm 0,15$ dB ...5,0 MHz $\pm 0,20$ dB ...5,5 MHz
Sampling	54 MHz (4x oversampling)
Filters	Selectable Luma/Chroma comb filters (3, 5 line, adaptive), various Luma / Chroma filters
S/N Ratio	< -61 dB (unweighted to 5,75 MHz)

Electrical Specifications

Operating Voltage	+ 5VDC
Power Consumption	3,5 VA
Connection	DC input via 5 pin locking bayonet connector
Safety	IEC 60950/ EN 60950/VDE 0805

Mechanical

Size	85.5mm x 35.3mm x 27 mm + connectors
Weight	250g

Ambient

Temperature	5°C to 35°C Maintaining specifications -20°C to +70°C Storage
Humidity	Max 80% non condensing

Supplied Accessories

Documentation	C AD 3110 Reference Manual and quick ref guide
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Available Options

Below is a list of available options for the C AD 3110 MiniModule. Please refer to product brochures or our web site for more detailed information.

Model	Description
R PS 3001 E	External brick power supply module for Series 3000 MiniModules. European market version. 100-240 VAC input, +5V DC output.
R PS 3001 U	External brick power supply module for Series 3000 MiniModules. USA market version. 110-240 VAC input, +5V DC output.
R PS 3001-3	External desk power supply module for Series 3000 MiniModules. 110-240 VAC input, +5V DC output.
R FR 3004	Mounting Support for 4 MiniModules with power bricks R PS 3001
R FR 3005	Rack Frame 1. This is a basic 19 inch rack mountable frame which can accommodate 10 MiniModules with power bricks R PS 1 or can be extended with the R FR 3010.
R FR 3010	Rack Frame 2. This is a card cage with integrated central power supply, optional redundant power supply and optional controller, which can accommodate 10 MiniModules. Can be combined with R FR 3005
R PS C15	1.5m cable extension to connect one MiniModule to R FR 3010
R PS C25	2.5m cable extension to connect one MiniModule to R FR 3010
R PS 3010	Redundant power supply for the R FR 3010 card cage
R CT 5020	Rack controller for the R FR 3010 rack frame
R CT 5010	Rack Bus Extension for R FR 3010 rack frame. In combination with R CT 5020
R CT 3000	Service Adapter for remote configuration of one MiniModule via PC or Palm

Parts List

Due to the very dense design and high level of integration there are no user serviceable electronic assemblies within the C AD 3110 module.

C AD 3110 Mini Module (complete)

Description	Analog Video to SDI Conv.
Model Number	C AD 3110
Part Number	6.155.001.270

Service

If you are experiencing problems, or have questions concerning your C AD 3110 MiniModule please contact your local distributor for assistance.

We offer a fixed cost service exchange program for defective Series 3000 MiniModules 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

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
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