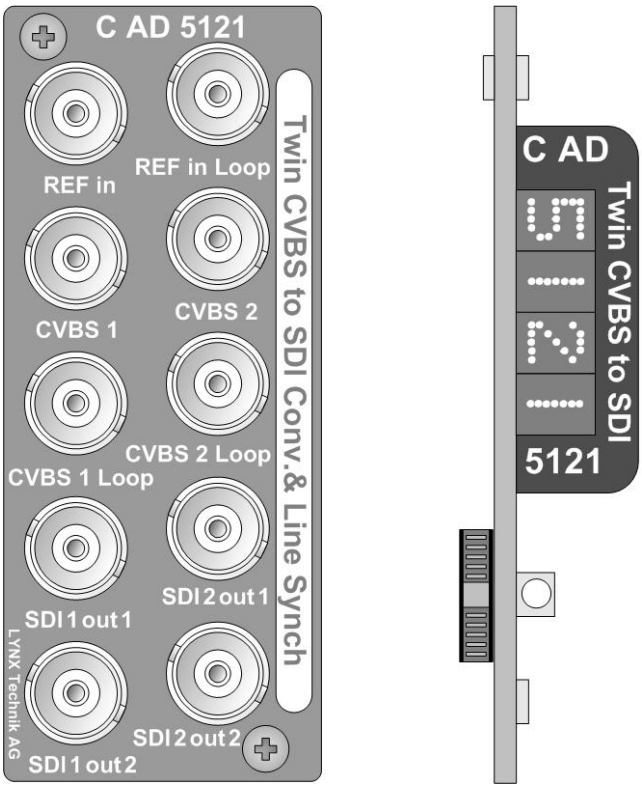
Version 1.2

Reference Manual

C AD 5121

CVBS to SDI Converter & Line Synchronizer

Series 5000 CardModule



Brunnenweg 3
D-64331 Weiterstadt
Germany
www.lynx-technik.com

Warranty

LYNX Technik AG warrants that the product will be free from defects in materials and workmanship for a period of two (2) years 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.

THIS WARRANTY IS GIVEN BY LYNX TECHNIK WITH RESPECT TO THIS PRODUCT IN LIEU OF ANY OTHER WARRANTIES, EXPRESS OR IMPLIED. LYNX TECHNIK AND ITS VENDORS DISCLAIM ANY IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. LYNX TECHNIK`S RESPONISIBILITY TO REPAIR AND REPLACE DEFECTIVE PRODUCTS IS THE SOLE AND EXCLUSIVE REMEDY PROVIDED TO THE CUSTOMER FOR BREACH OF THIS WARRANTY. LYNX TECHNIK AND ITS VENDORS WILL NOT BE LIABLE FOR ANY INDIRECT, SPECIAL, INCIDENTIAL, OR CONSEQUENTIAL DAMAGES IRRESPECTIVE OF WHETHER LYNX TECHNIK OR THE VENDOR HAS ADVANCE NOTICE OF THE POSSIBILITY OF SUCH DAMAGES.

Regulatory information

Europe

Declaration of Conformity

We LYNX Technik AG
Brunnenweg 3
D-64331 Weiterstadt
Germany

Declare under our sole responsibility that the product

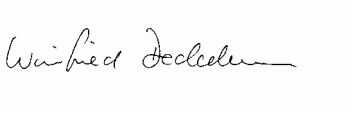
TYPE: C AD 5121

To which this declaration relates is in conformity with the following standards (usage in environment E1 – E3):

EN 55103-1 /1996
EN 55103-2 /1996
EN 60950 /2001

Following the provisions of 89/336/EEC and 73/23/EEC directives.

Winfried Deckelmann



Weiterstadt, December 2004

Place and date of issue *Legal Signature*

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

Contents

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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 5121 is a high performance twin 12 Bit Video A/D Converter for analog PAL/NTSC composite signals and is designed primarily for broadcast and professional applications.

Two loop-through input signals are converted independently, the inputs can be selected per channel. 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 SDI outputs.

The C AD 5121 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 5121 CardModule.

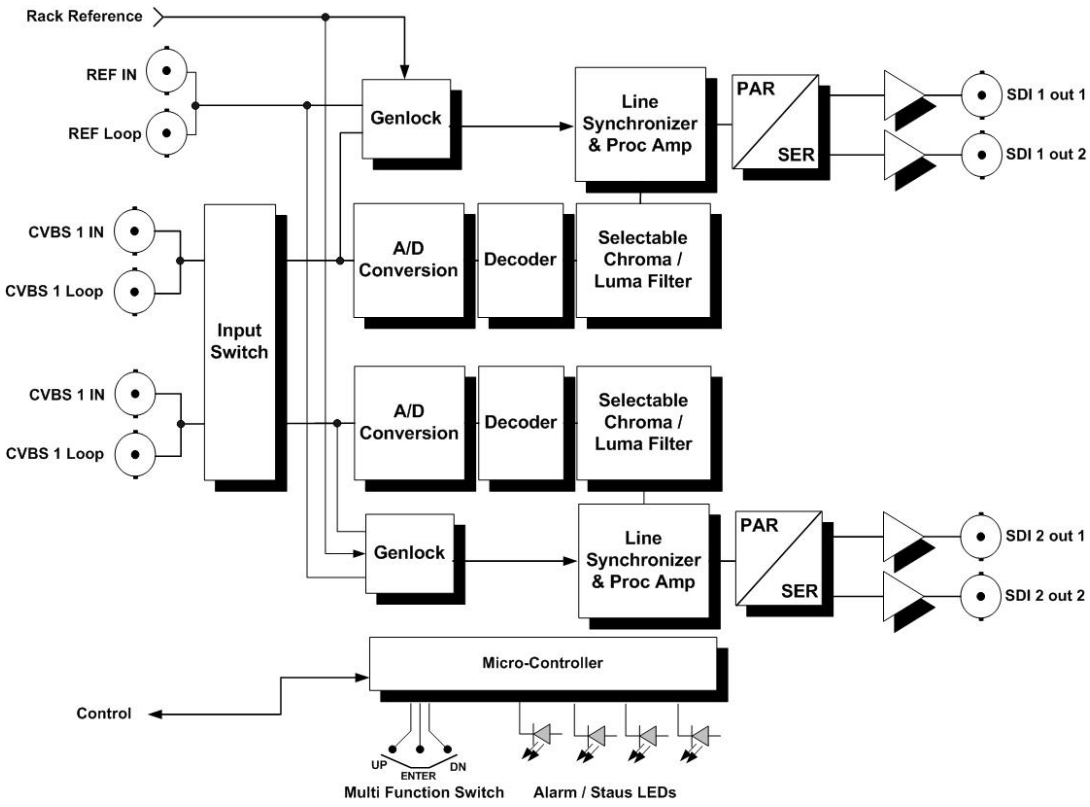


Figure 1- C AD 5121 Functional Diagram

Module Layout

Figure 2 shows the physical layout of the C AD 5121 CardModule and also the connection panel which is fitted to the rear of the rack.

PCB Layout

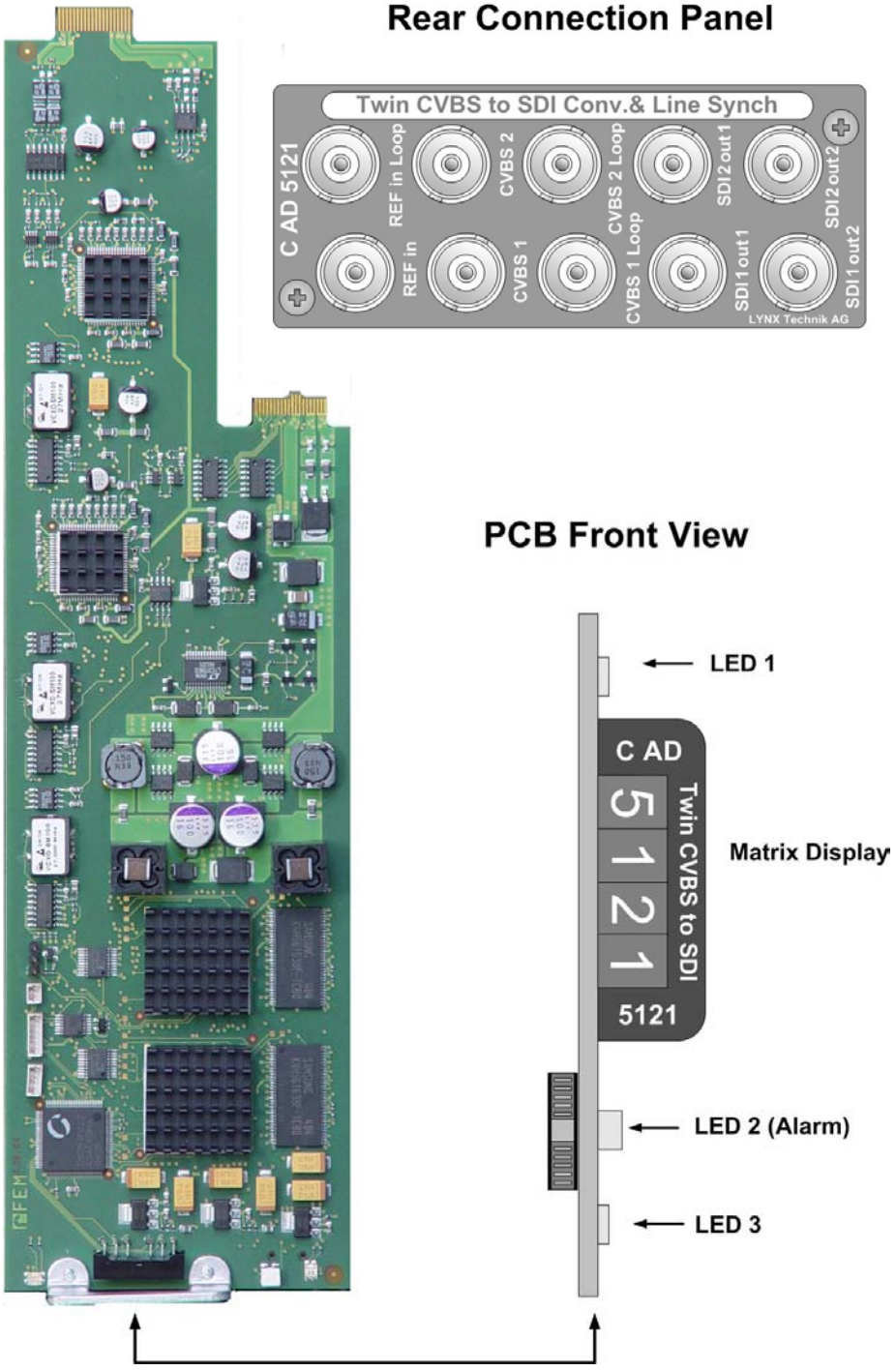


Figure 2 – Module Layout

Caution

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

Connections

Video Connections

The C AD 5121 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 5121 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.

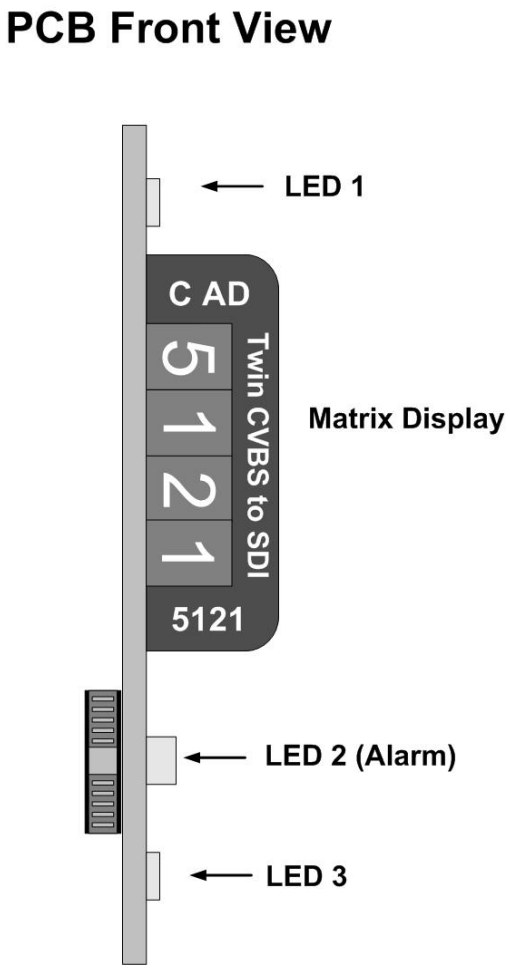


Figure 3 – Switch and Display Location

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)

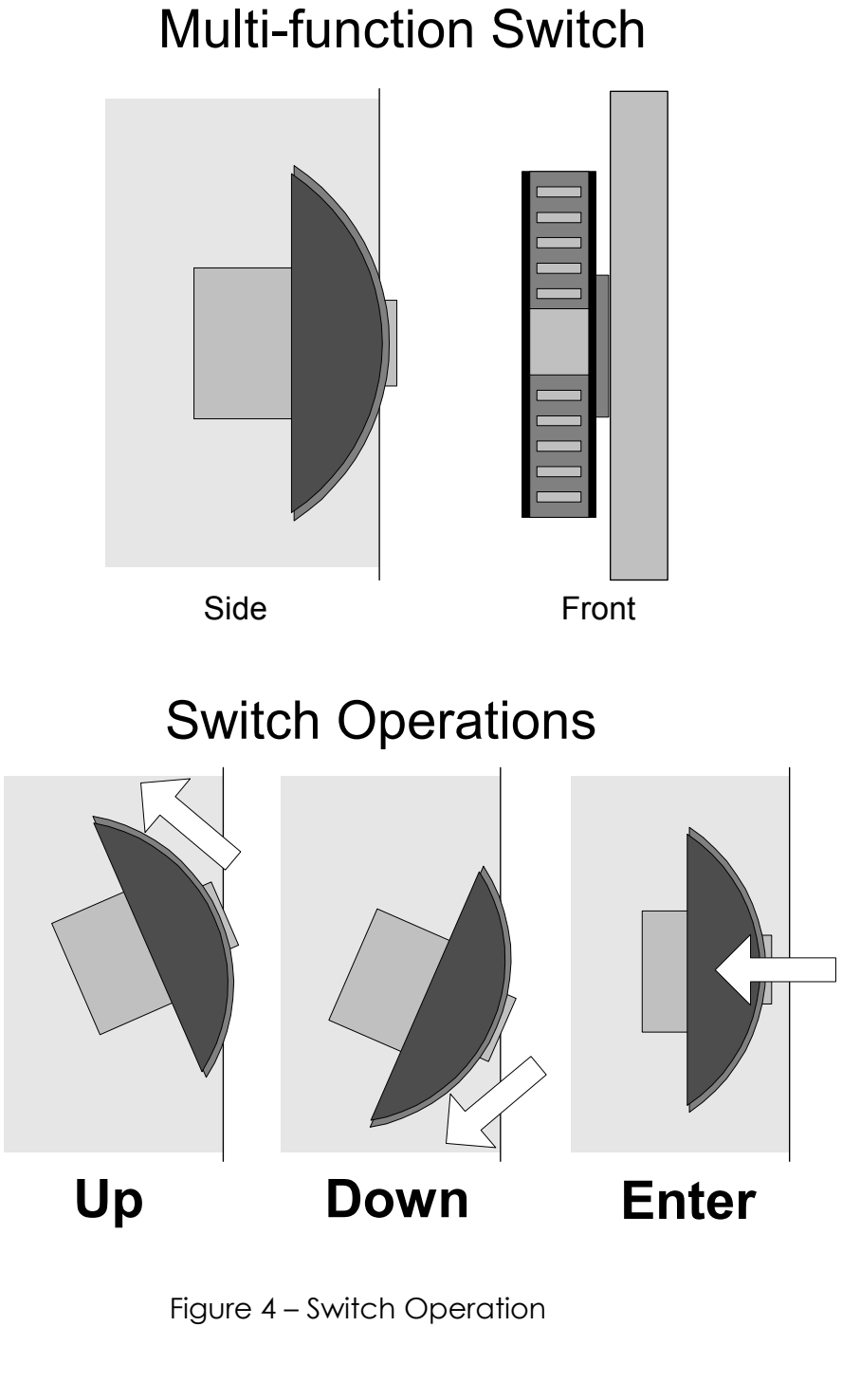


Figure 4 – Switch Operation

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:

- External / Rack Internal sync reference select
- Analog input filter on/off
- Genlock mode
- Luma-/ chroma filter settings
- Luma/Chroma Comb mode
- Auto-/ manual gain control
- CTI (Color Transition Improvement)
- Digital Noise Reduction (Removal of small Luma details)
- Test signal select

A set of extended adjustments is possible when using a controller option and LYNX control software. Adjustments (in addition to the basic adjustments above) include:

- Adjustable Luma / chroma filters
- Adjustable Coring function
- Adjustable Contrast, Saturation, Brightness and Hue
- Automatic Gain Control mode reference 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

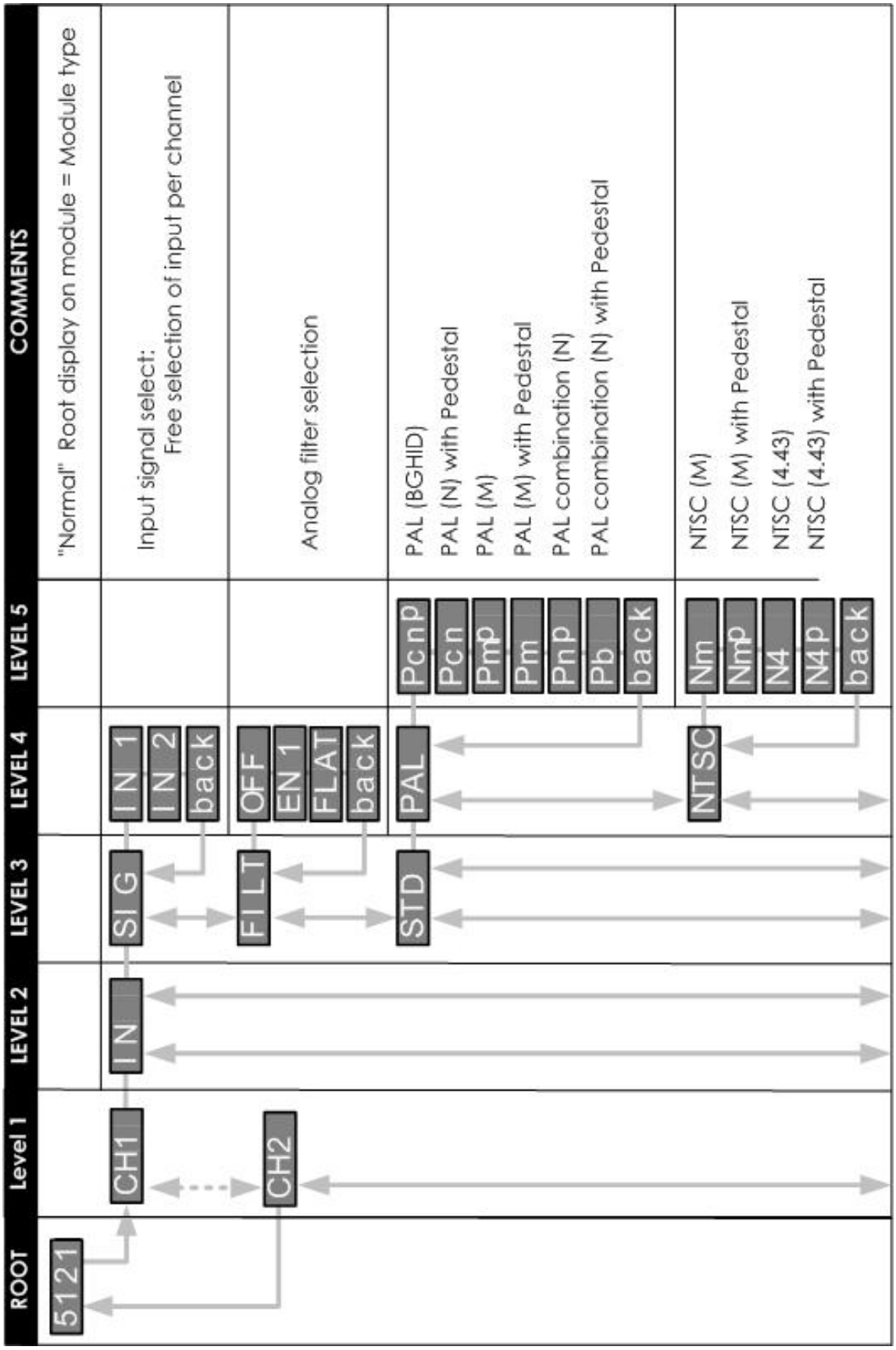
UP/DOWN moves between items within the level

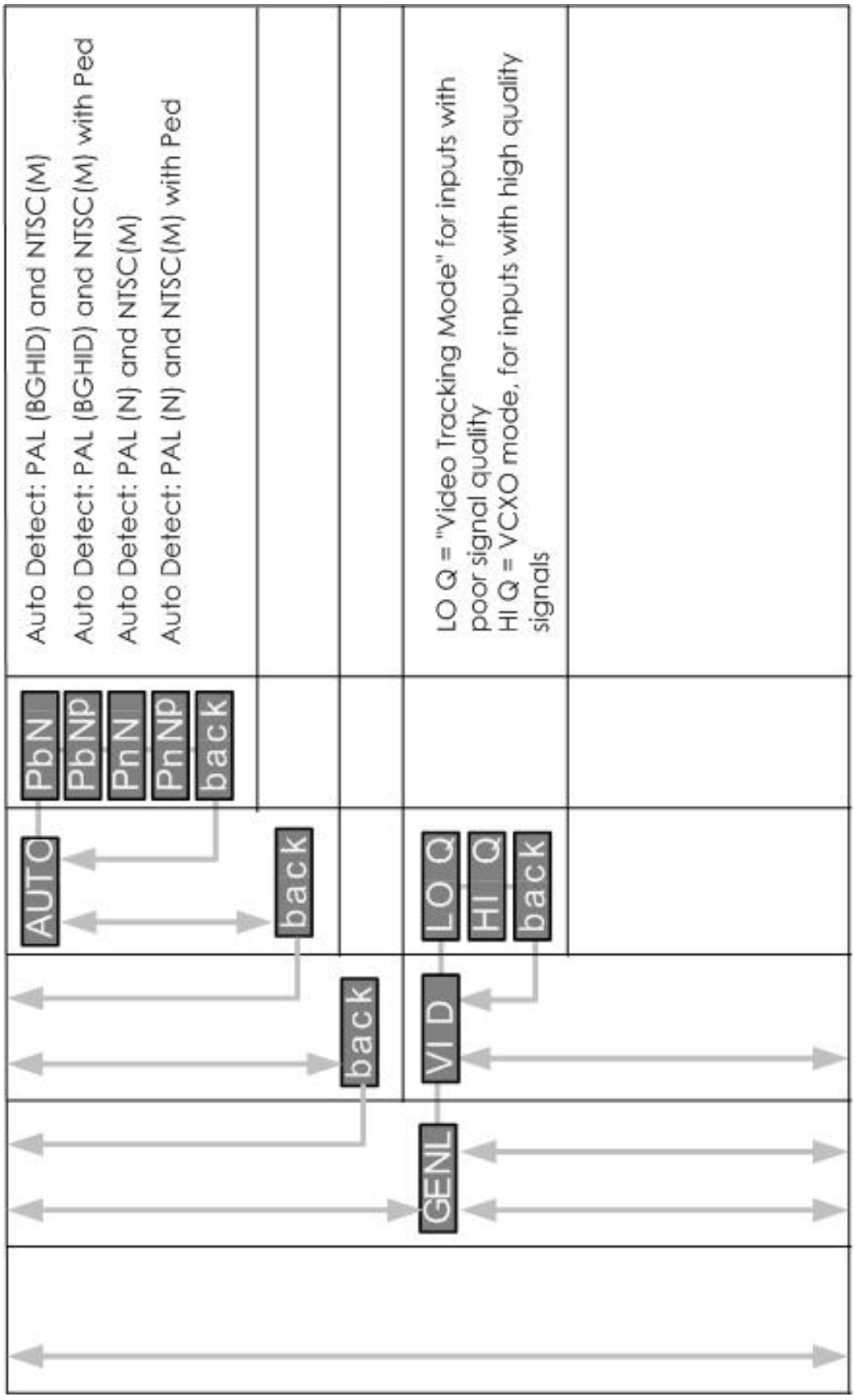
When you enter a new setting the system will jump back one level in the menu system.

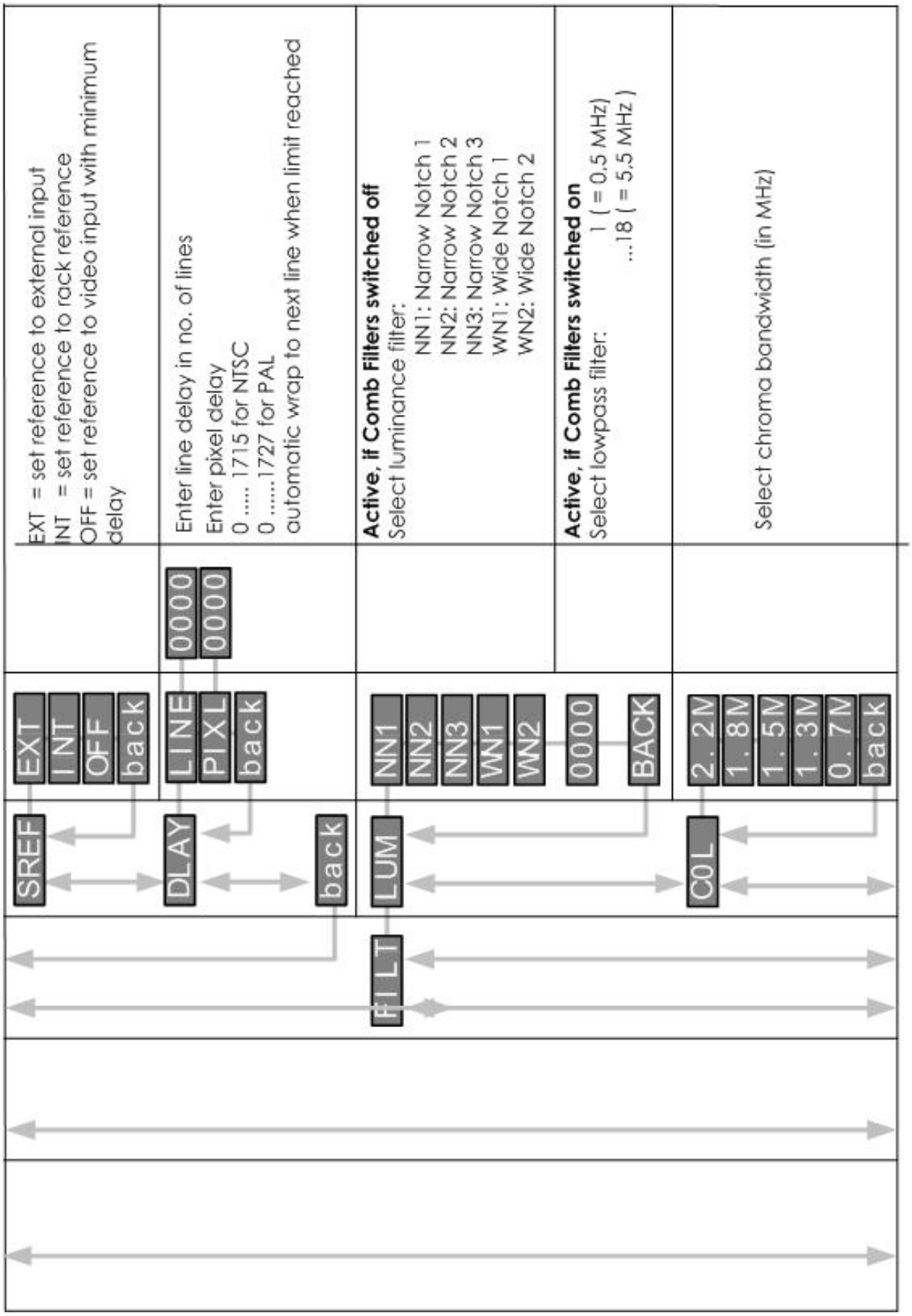
The "back" selection in the menu structure will take you back one level when selected.

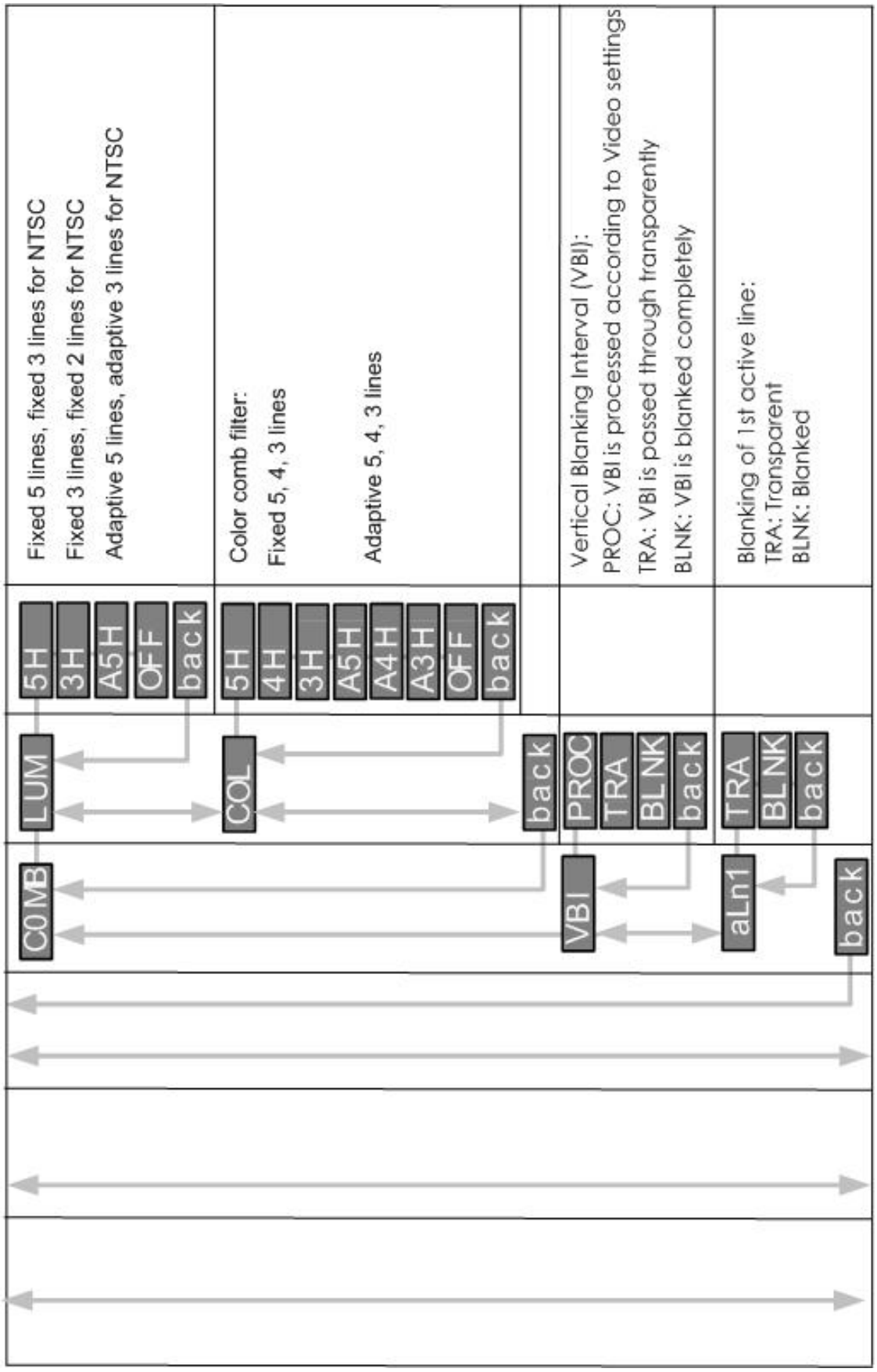
When an item is selected which has several setting possibilities the first value displayed will be the value currently stored in the system. The order of the available settings for any menu item in the table supplied does not represent the order he settings will actually be displayed.

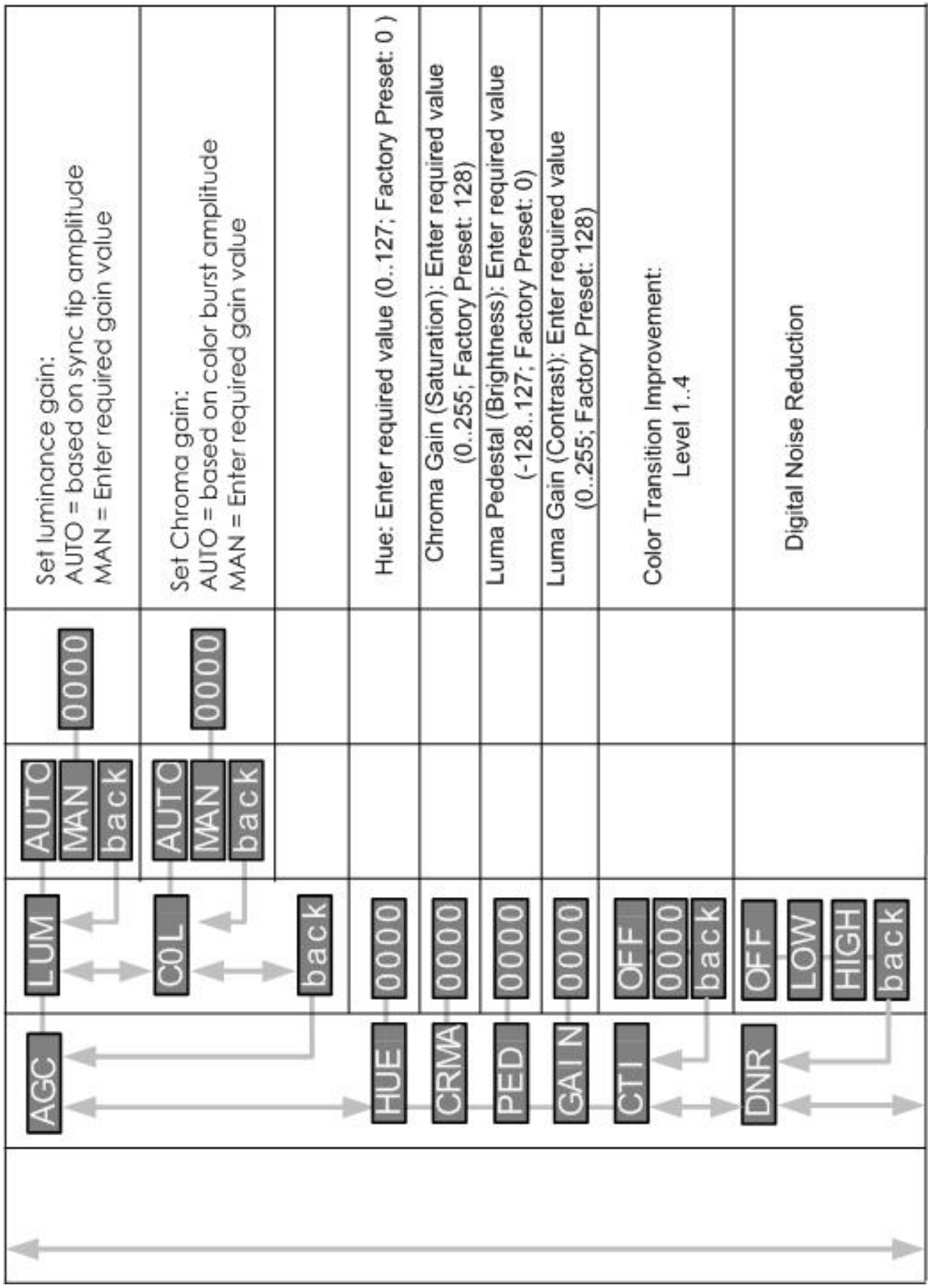
If left unattended, the menu will default to the root display after a preset timeout.

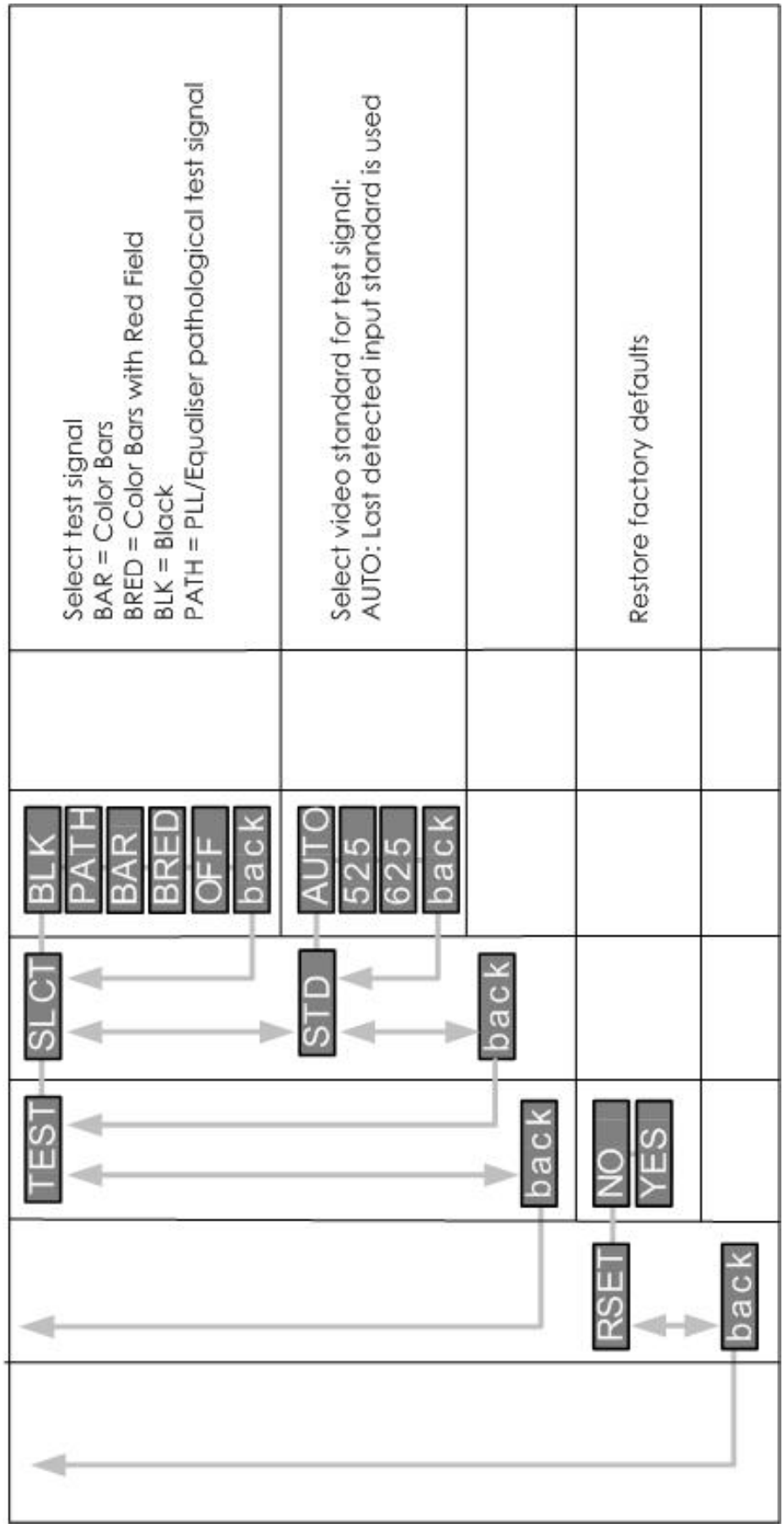

ROOT
Level 1
LEVEL 2
LEVEL 3
LEVEL 4
LEVEL 5
COMMENTS
5121
CH1
CH2
IN
SIG
IN 1
IN 2
back
FILT
OFF
EN 1
FLAT
back
STD
PAL
Pcnp
Pcn
Pmp
Pm
Pnp
Pb
back
NTSC
Nm
Nmp
N4
N4p
back
"Normal" Root display on module = Module type
Input signal select:
Free selection of input per channel
Analog filter selection
PAL (BGHID)
PAL (N) with Pedestal
PAL (M)
PAL (M) with Pedestal
PAL combination (N)
PAL combination (N) with Pedestal
NTSC (M)
NTSC (M) with Pedestal
NTSC (4.43)
NTSC (4.43) with Pedestal


Auto Detect: PAL (BGHID) and NTSC(M)
Auto Detect: PAL (BGHID) and NTSC(M) with Ped
Auto Detect: PAL (N) and NTSC(M)
Auto Detect: PAL (N) and NTSC(M) with Ped
LO Q = "Video Tracking Mode" for inputs with poor signal quality
HI Q = VCXO mode, for inputs with high quality signals
PbN
PbNP
PnN
PnNP
back
AUTO
back
back
LO Q
HI Q
back
VI D
GENL


SREF
EXT
INT
OFF
back
DLAY
LINE
PIXL
back
0000
0000
back
FILT
LUM
NN1
NN2
NN3
WN1
WN2
0000
BACK
COL
2.2N
1.8N
1.5N
1.3N
0.7N
back
EXT = set reference to external input
INT = set reference to rack reference
OFF = set reference to video input with minimum delay
Enter line delay in no. of lines
Enter pixel delay
0 ..... 1715 for NTSC
0 ..... 1727 for PAL
automatic wrap to next line when limit reached
Active, if Comb Filters switched off
Select luminance filter:
NN1: Narrow Notch 1
NN2: Narrow Notch 2
NN3: Narrow Notch 3
WN1: Wide Notch 1
WN2: Wide Notch 2
Active, if Comb Filters switched on
Select lowpass filter: 1 (= 0,5 MHz)
...18 (= 5,5 MHz)
Select chroma bandwidth (in MHz)


Fixed 5 lines, fixed 3 lines for NTSC
Fixed 3 lines, fixed 2 lines for NTSC
Adaptive 5 lines, adaptive 3 lines for NTSC
5H
3H
A5H
OFF
back
LUM
Color comb filter:
Fixed 5, 4, 3 lines
Adaptive 5, 4, 3 lines
5H
4H
3H
A5H
A4H
A3H
OFF
back
COL
COMB
back
Vertical Blanking Interval (VBI):
PROC: VBI is processed according to Video settings
TRA: VBI is passed through transparently
BLNK: VBI is blanked completely
PROC
TRA
BLNK
back
VBI
Blanking of 1st active line:
TRA: Transparent
BLNK: Blanked
TRA
BLNK
back
aLn1
back


AGC
LUM
AUTO
MAN
back
0000
Set luminance gain:
AUTO = based on sync tip amplitude
MAN = Enter required gain value
COL
AUTO
MAN
back
0000
Set Chroma gain:
AUTO = based on color burst amplitude
MAN = Enter required gain value
back
HUE
0000
Hue: Enter required value (0..127; Factory Preset: 0)
CRMA
0000
Chroma Gain (Saturation): Enter required value
(0..255; Factory Preset: 128)
PED
0000
Luma Pedestal (Brightness): Enter required value
(-128..127; Factory Preset: 0)
GAIN
0000
Luma Gain (Contrast): Enter required value
(0..255; Factory Preset: 128)
CTI
OFF
0000
back
Color Transition Improvement:
Level 1..4
DNR
OFF
LOW
HIGH
back
Digital Noise Reduction


Select test signal
BAR = Color Bars
BRED = Color Bars with Red Field
BLK = Black
PATH = PLL/Equaliser pathological test signal
Select video standard for test signal:
AUTO: Last detected input standard is used
Restore factory defaults
TEST
SLCT
BLK
PATH
BAR
BRED
OFF
back
STD
AUTO
525
625
back
back
back
RSET
NO
YES
back

Factory Preset Condition

The C DA 5121 is delivered programmed and preset for the following mode of operation:

Input Select:	
Channel 1	**Input 1**
Channel 2	**input 2**
Analog Filter	**OFF**
Standard	**PAL Pb (BGHID) or NTSC (auto detect)**
Genlock	**HI Q**
Reference	**Internal (Rack Reference)**
Line delay	**0000**
Pixel delay	**0000**
Lum filter	**LP 18 (5,5 MHz)**
Chroma filter	**1.5 MHz**
Chroma Comb filter	**PAL: adaptive 4 H** **NTSC: adaptive 3H**
Luma Comb filter	**PAL: adaptive 4 H** **NTSC adaptive 3H**
VBI	**TRA**
CTI	**OFF**
DNR	**LOW**
AGC Lum	**Auto**
AGC Col	**Auto**
Hue, Pedestal	**0**
Chroma, Gain	**128**
Test Signal	**OFF**
Test Signal Standard	**Auto**

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.

Test signal output if no input

The C AD 5121 provides a set of test signals (color bars, colors over red field, black, pathological PLL/EQ) per channel. This can be activated in normal operation.

If no input signal is available a blue screen will be activated on the output. This can be deactivated with the LYNX C3_local SW. Then the last selected test signal will be activated in the output if no input is applied.

Alarm/LED Status Indicators

The C AD 5121 module has integral LED indicators, which serve as alarm and status indication for the module. Function is described below.

Status Indicators

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

LED	Color	Indication
1	Green	Input 1: Video and Reference present or Video present and REF OFF selected
	Yellow	Input 1: Video present, Reference missing Or Test signal selected
	Red	Input 1: Video and Reference missing
2	Green	Input 2: Video and Reference present or Video present and REF OFF selected
	Yellow	Input 2: Video present, Reference missing Or Test signal selected
	Red	Input 2: Video inputs missing

Alarm Indicator

There is also a single alarm LED on the lower edge of the module LED 2. This is visible through the card frame front cover and provides a general indication of the module status.

LED Color	Indication
Green	Signals and Reference present or Signals present and REF OFF
Yellow	LED1 or LED 2 yellow
Red	No input signals

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 5121)*

Inputs (video)	
Signal	NTSC -(M/N), PAL (B/D/G/H/I/M/N), two loop-through inputs. 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	2 x serial 4:2:2 SMPTE 259M-C (270 Mbps)
Output Level	0.8V p-p
Jitter	< 0.2UI
Return loss	> 15dB
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, PLL pathological, EQ pathological, black flat field
Performance	
Quantization	12 Bits for Luma and Chroma
Frequency Response	± 0,15 dB ...5,0 MHz, ± 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	Adjustable pixel, line, delay up to 6 lines
S/N Ratio	< -61 dB (unweighted to 5,75 MHz)
Electrical Specifications	
Operating Voltage	+ 12 VDC
Power Consumption	8 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 5121 Reference Manual

Available Options

Below is a list of related products for the C AD 5121 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 5030	**Master controller for the R FR 5010 Card Frame with TCP/IP interface**
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 5020/5030**

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 AD 5121 CardModule (complete)

Description	Twin CVBS to SDI Converter
Model Number	C AD 5121
Part Number	5.155.001.250

Sub Assemblies:

C AD 5121 Processing Board only (BS5028_B)

Part Number	6.155.001.255

Rear Connection Panel for C AD 5121 (MA5018)

Part Number	6.155.007.210

Service

If you are experiencing problems, or have questions concerning your C AD 5121 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

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

E-Mail 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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Notes