LYNX
TECHNIK AG

Version 1.0

Reference Manual

C DA 5220 BS

Dual AES to Analog Audio Converter

Series 5000 CardModule

C DA 5320 BS

Dual AES to Analog Audio Converter

AUD 1L out   AES 1 in

AUD 1R out   AES 2 in

AUD 2L out

LYNX Technik AG   AUD 2R out

C DA

Dual AES to Analog Conv.

5220

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

Declare under our sole responsibility that the product

       TYPE: C DA 5220 BS

To which this declaration relates is in conformity with the following standards:
    EN 55103-1 /1996
    EN 55103-2 /1996
    EN 60950 /1997
Following the provisions of 89/336/EEC and 73/23/EEC directives.

                   Winfried Deckelmann

Weiterstadt, June 2003

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 DA 5220 BS is a high quality dual channel AES to analog audio converter (D/A) designed primarily for broadcast and professional applications.

The Module accepts two balanced AES digital inputs and converts these to balanced line analog audio signals. The module provides automatic detection of input sampling rate (32KHz, 44.1KHz, 48KHz and 96KHz). The 0dB full scale ranging point is adjustable, as well as output gain level. AES inputs are isolated with transformers. Local presets / adjustments and alarms are provided and remote control and status monitoring is possible when used with the rack frame option and host controller

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 DA 5220 BS CardModule.
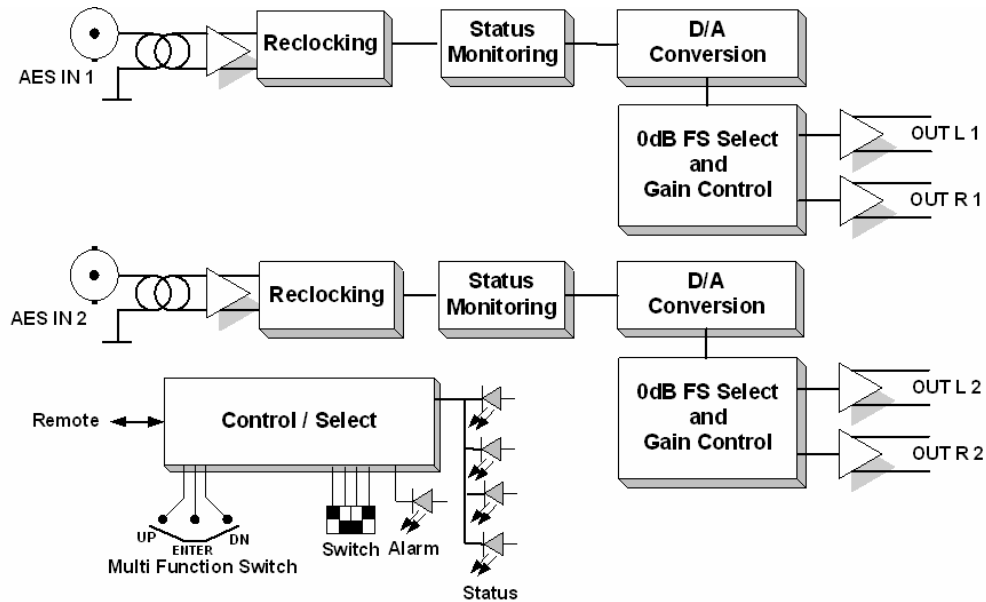
Figure 1- C DA 5220 BS Functional Diagram

Module Layout

Figure 2 shows the physical layout of the C DA 5220 BS CardModule and also the connection panel that is fitted to the rear of the rack.

PCB Layout

Rear Connection Panel

PCB Front View
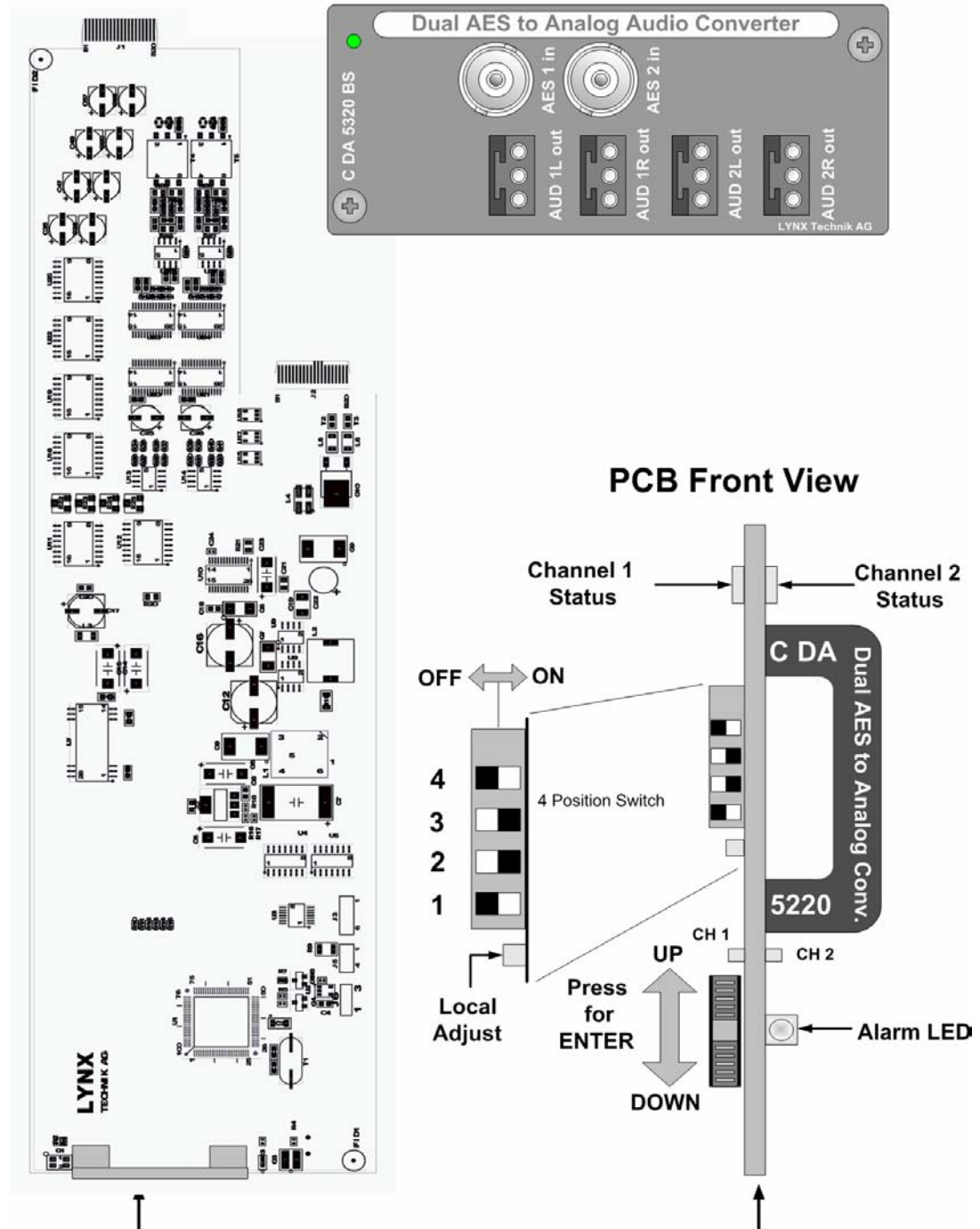
Figure 2 – Module Layout
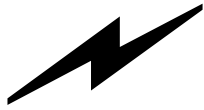
Caution

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

Connections

Audio Connections

The C DA 5220 BS CardModule is configured for BNC input (AES3 id) audio connections and Weco screw terminal connections for the balanced audio outputs. These connectors should be wired in accordance with the tables below. Please use high quality screened cable to prevent the introduction of noise and interference to the audio signals (twisted pair suitable for balanced audio signals).

Audio Input Connections (unbalanced)

Standard 75 Ohm BNC connections are used for AES digital audio inputs.

Audio Output Connections (balanced)

The audio outputs are provided on Weco screw terminal connectors (male). Connection information is provided below.

Pin Number	Connection
1	Positive (+)
2	GND
3	Negative (-)

Weco male connector

1 2 3
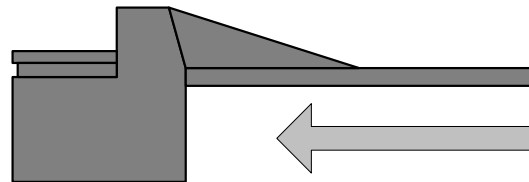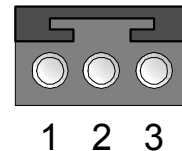
Weco female connector

1 2 3

Figure 3 - Audio output connection detail

Audio Output Connections (un-balanced)

Although the module is designed primarily for balanced line audio connections it is possible to make un-balanced audio connections to the module. **NOTE**. When used in this manor certain technical specifications of the module cannot be maintained.

Wiring for balanced audio

Screen

Balanced Pin Identification

GND

+ Input / output

- Input / output

Wiring for un-balanced audio

Signal

Screen / GND

Twisted pair blanced audio
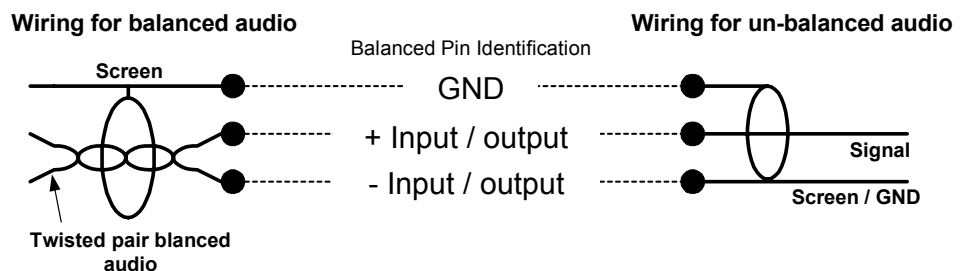
Figure 4 – Audio wiring detail

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

Settings and Control

The C DA 5220 BS has an integrated micro-controller, which enables the module to be configured and controlled locally using the multifunction switch 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.
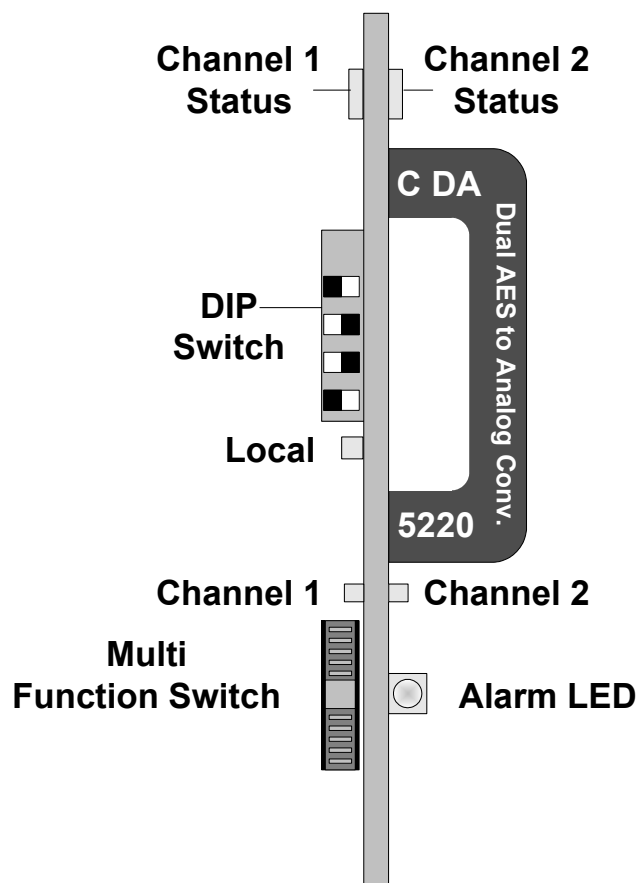
Figure 3 – Switch / LED Locations

Multi Function Switch

The CardModule is equipped with a multi-function switch located on the front bottom edge of the card (see Fig 3/4). The Dip-switch is used to enable the use of the Multifunction switch.

Multi-function Switch

Dip Switch

OFF ⟺ **ON**

Side   Front

Switch Operations

4
3
2
1

Local Adjust LED

Up   Down   Enter
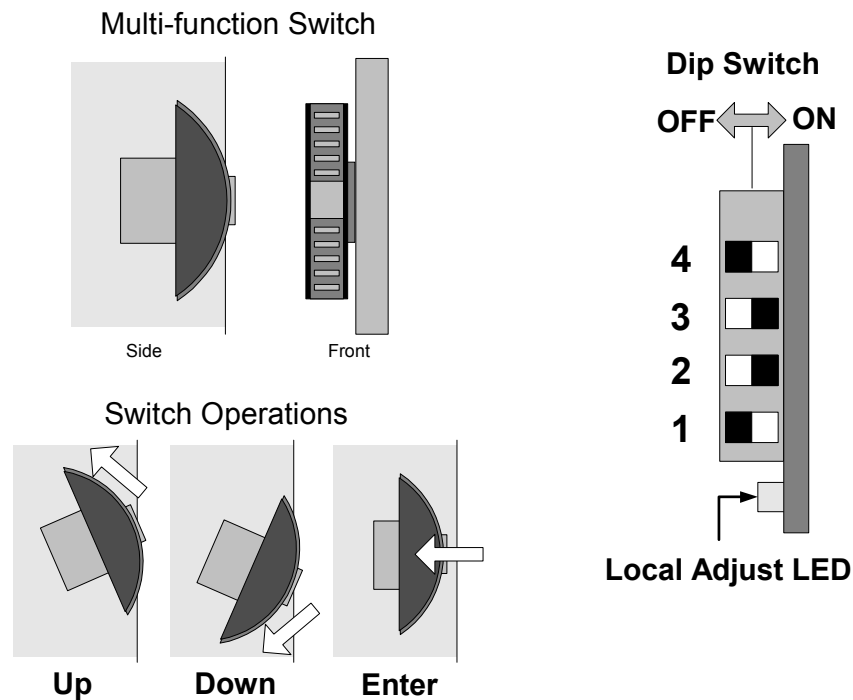
Figure 4 – Switch Operation

Dip 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 adjustment enabled
	OFF	Local adjustment disabled
2	ON	High FS range (18dBu or 24dBu)*
	OFF	Low FS range (12dBu or 15dBu)*
3	ON	If Switch 2 = *low range* then FS = 15dBu If Switch 2 = *high range* then FS = 24dBu
	OFF	If Switch 2 = *low range* then FS = 12dBu If Switch 2 = *high range* then FS = 18dBu
4	ON	Set gain for selected channel to unity (0dB)
	OFF	Normal operation

* Range depends on the setting of Switch 3

Switch Function Detail

All settings are stored in Flash Ram inside the module (see Auto Store section in this manual). Settings will be recalled on power up.

Dip Switch 1

This switch enables local control using the multifunction switch. **ON** enables local control and makes selections on the switch active, and **OFF** disables local control (locking out any local changes)

Note.

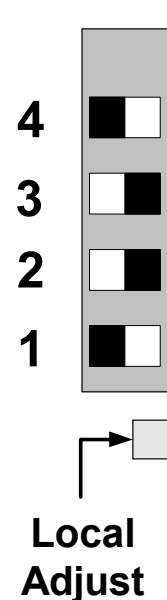*There is a small LED next to dip-switch position 1 [local adjust enable]. This LED must be **ON** [green] before any local configuration changes to the module will be recognized. If Switch 1 is already set to **ON** but the LED is **OFF** then toggle switch 1 **ON-OFF-ON** to enable local control.*

4
3
2
1

Local Adjust

Switch 2 – This switch is used to select either high or low full scale (FS) gain range for the module. Selecting **ON** will set the high FS range which can be either 18 or 24 dBu (depending on the setting of Switch 3) Selecting **OFF** will set low FS range which can be either 12 or 15 dBu (depending on the setting of Switch 3)

Switch 3 – This is used in conjunction with Switch 2 and will select one of the two possible values determined by the setting of Switch 2. (Refer to table on previous page)

Switch 4 – This switch is used to set unity gain on the currently selected channel. **ON** will set unity gain* **OFF** will provide for adjustment of gain.

*Unity gain is set as soon as the multifunction button is moved.

Gain Adjustment Procedure.

Please follow the following simple procedure for setting the audio gain level of the C DA 5220 BS.

1. Set switch 1 to **ON** [enable local adjustment]. Conform the local LED is on, If not toggle switch **ON-OFF-ON** until LED 1 is on

2. Set switch 4 to **ON**

3. Observe the channel LEDs for the currently selected channel. Press **ENTER** on the multifunction Switch to switch between channels.

4. Using the multifunction switch select **UP** or **DOWN** to make gain adjustments in the selected channel. Holding **UP** or **DOWN** on will result in fast increment/decrement.

5. When complete set switch 1 to **OFF**.

Factory Preset Condition

The C DA 5220 BS is delivered with stored presets for the following functionality.

- Full Scale (FS) Range LOW
- Full Scale = 15dBu
- Normal operation

No further adjustments are needed if this is the functionality desired.

Alarm/LED Status Indicators

The C DA 5220 BS 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.

Channel Condition Indicators

One LED is provided for each channel **LED 1 = Channel 1** and **LED 2 = Channel 2** (fig 3)

LED Color	Indication
Green	AES input OK
Yellow	AES parity error
Red	AES input missing

Front Panel Alarm Indicator

There is also a single alarm LED on the front side of the module, (figure2) 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	Normal = Both inputs OK
Yellow	AES parity error or one input lost
Red	Both inputs missing
OFF	Power supply failure

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.

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 DA 5220 BS)*

Inputs

Signal	2 x unbalanced AES3 id inputs through isolation transformers
Impedance	75 Ohms
Connection type	BNC
Level	1 V pp nom.
Return Loss	> 15 dB (32 KHz - 100KHz)

Outputs

Signal	2 x balanced stereo outputs (one stereo output per channel)
Connection	Weco Screw connector
Impedance	50 Ohm
Max Level	24 dBu into 10K Ohms
0dB FS level	Selectable (12dBu, 15dBu, 18dBu or 24dBu)
Gain	Adjustable between -90dB to 6dB (in 0.5dB increments)

Performance

Sampling	Auto detection (32KHz, 44KHz, 48KHz or 96KHz)
Quantisation	24 bits
Noise Floor	< -90 dBu (A-weighted)
Distortion	< 0.002% (20 Hz to 20 KHz)
Frequency Response	+\- 0.2dB (20 Hz to 20 KHz)
Crosstalk	< -90dB (20 Hz to 20 KHz)

Electrical Specifications

Operating Voltage	12 VDC
Power Consumption	5W
Safety	IEC 950/ EN 60950/VDE 0805

Mechanical

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

Ambient

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

Supplied Accessories

Documentation	C DA 5220 BS Reference Manual

Available Options

Below is a list of related products for the C DA 5220 BS 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 DA 5220 BS CardModule (complete)
Description   Dual AES to Analog Audio Conv.
Model Number   C DA 5220 BS
Part Number   6 155 009 240

Sub Assemblies:

C DA 5220 BS Processing Board only. (BS 5011)
Part Number   6 155 006 240

Rear Connection Panel (MA 5013_B)
Part Number   6 155 007 291

Service

If you are experiencing problems, or have questions concerning your C DA 5220 BS 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.
Phone	+ 49 (0) 6150 1817 0
Fax	+ 49 (0) 6150 1817 10
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