



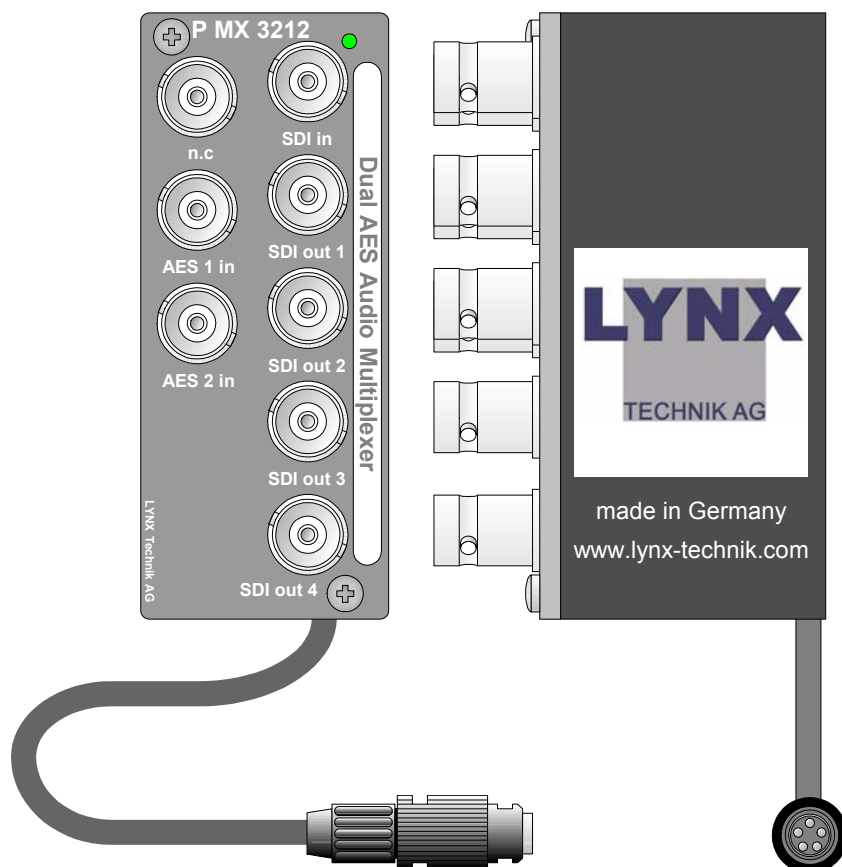
Version 1.0

# Reference Manual

## P MX 3212 B

### Dual AES Audio Multiplexer

Series 3000  
*MiniModules*



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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) 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.

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# Regulatory information

## Europe

### Declaration of Conformity

We	LYNX Technik AG Sandstrasse 7 D-64404 Bickenbach Germany
<i>Declare under our sole responsibility that the product</i>	
TYPE: P MX 3212 B	
<i>To which this declaration relates is in conformity with the following standards:</i>	
EN 55103-1 /1996	
EN 55103-2 /1996	
EN 60950 /1997	
<i>Following the provisions of 89/336/EEC and 73/23/EEC directives.</i>	
	Winfried Deckelmann
Bickenbach, January 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 P MX 3212 B is a high quality digital AES Audio multiplexer (Audio Embedder) designed primarily for broadcast and professional applications.

The Module accepts 2 external AES3-id inputs (combined into one audio group) and multiplexes this into the incoming SDI video input. Group insertion is selectable (1 through 4). Four separate SDI outputs of the video, with embedded audio are provided. Existing audio groups can be overwritten, deleted or passed transparently. Four separate SDI outputs of the embedded signal is provided which could be used to cascade several modules for additional audio group insertion. The Module uses standard 75-Ohm (BNC) interconnections.

The P MX 3212 has a variety of features, which include:

- User selectable audio groups. (1...4)
- 525 and 625 line standard. (auto detect)
- Supports 4:3 / 16:9 aspect ratios.
- 270 and 360Mbits/s (auto detect)
- Supports 20 and 24 bit audio.
- Supports 8 and 10 bit video.
- Selectable bypass of audio sample rate conversion

- EDH insertion back into outgoing SDI data streams.
- Video to green if SDI input lost.
- No audio insertion if audio input lost.
- Supports asynchronous and synchronous audio inputs. (Asynchronous audio between 30KHz and 48KHz)
- 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, status monitoring and error reporting is possible when used with the R FR 3010 rack frame option and host controller. For stand alone control, the R CT 3000 Service Adapter option is available.

The P MX 3212 B 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 P MX 3212 B MiniModule.

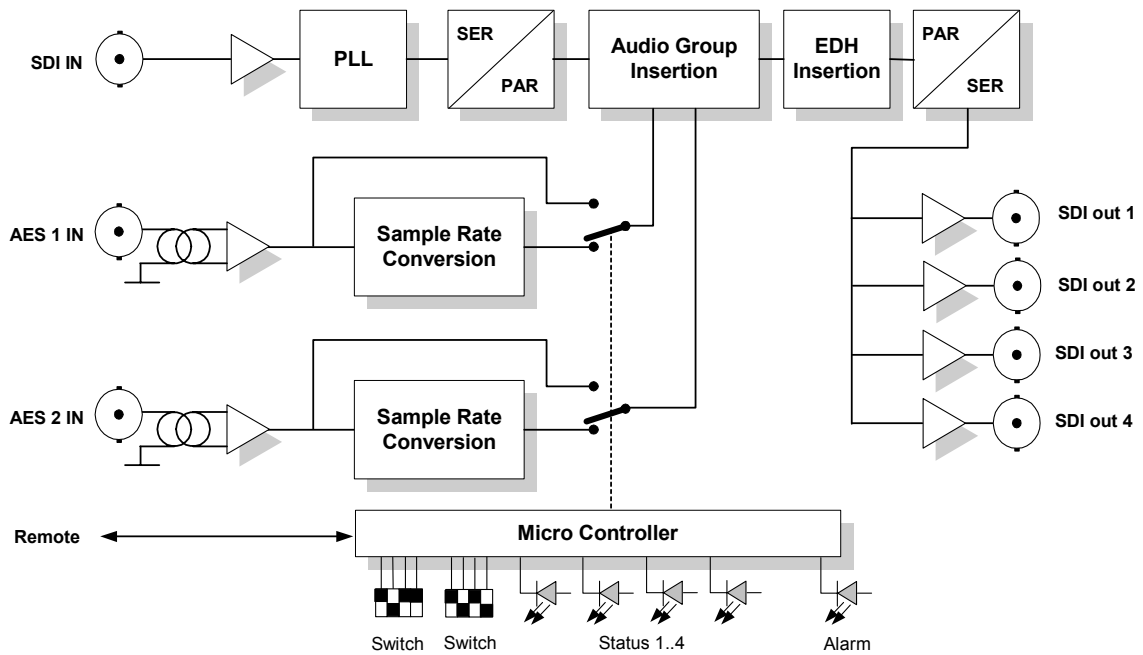


Figure 1- P MX 3212 Functional Diagram

## Module Layout

Figure 2 shows the physical layout of the P MX 3212 B MiniModule. Video and Audio I/O is made through standard 75 Ohm BNC video connections. Module configuration is set via a small dip-switches located behind access holes in the bottom of the module.

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

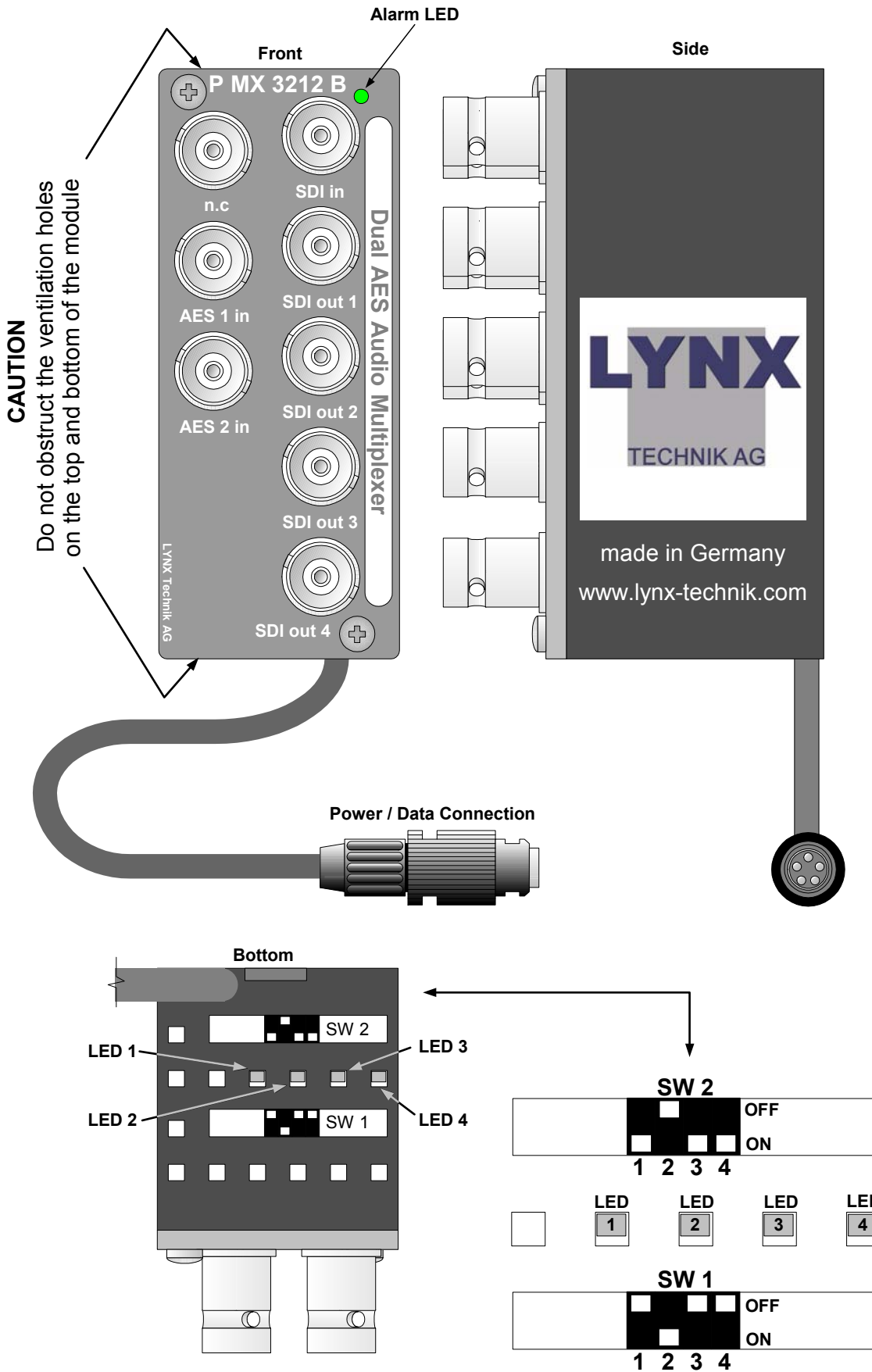


Figure 2 – Module Layout

# Connections

## Audio / Video Connections

The P MX 3212 B MiniModule is configured with standard 75 Ohm BNC connectors. Connection is self-explanatory. We recommend the use of high quality cable suitable for digital video / audio connections to reduce the risk of interference or errors due to excessive cable attenuation.

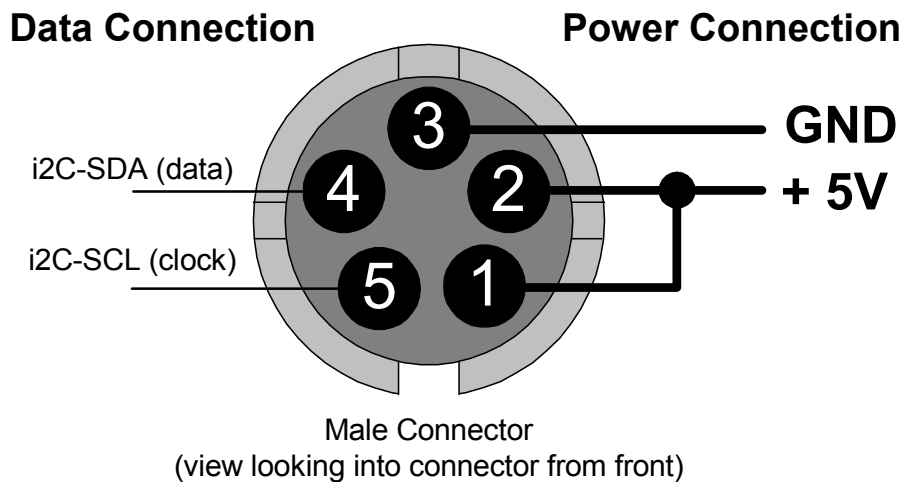
**Note.** Due to the compact design of the module it will be necessary to use a connection tool to secure the BNC video connectors to the module.

## Power Connections

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

### 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. Please make sure the brick is not connected to the main supply when making the DC power connection to the module. Ensure the 5-pin power connector is locked securely in place.

# Installation

## Mechanical

### Stand Alone Operation

The P MX 3212 B 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 1 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 1 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. Two versions are available R PS 3001 E for European markets and R PS 3001 U for the US markets. 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 1 power modules. Please make sure the brick is not connected to the main supply when making the DC power connection to the module. 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 P MX 3212 is configured via 2 integrated 4-position dip switches (SW1 and SW2) as shown below. (Figure 3)

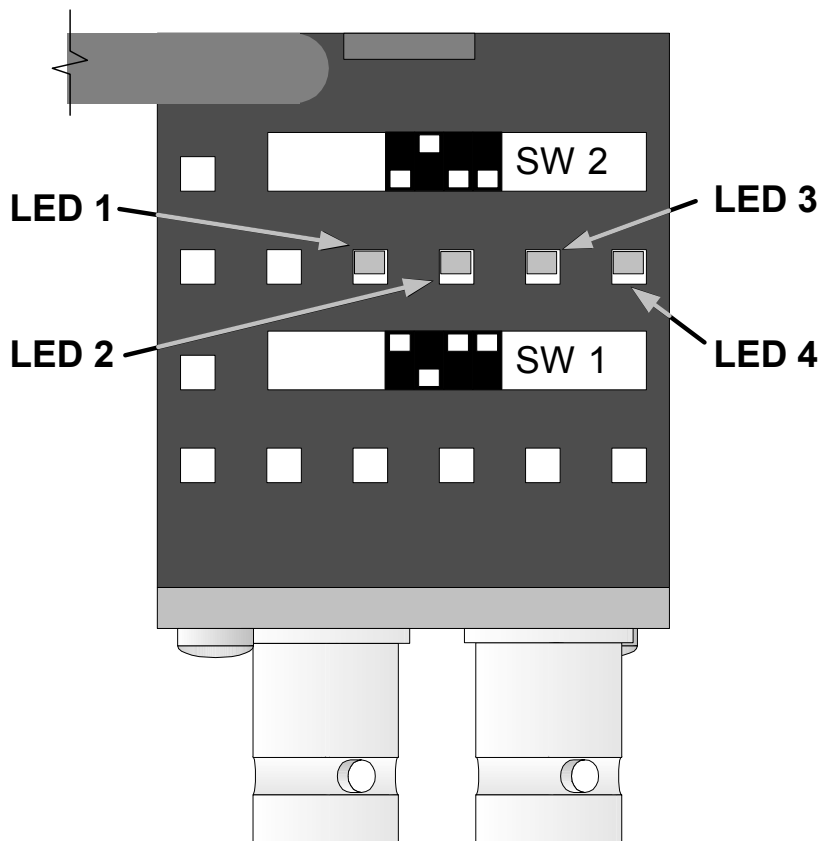


Figure 3. Switch and LED locations



## Switch Settings

Below the switch settings for the two 4-position dip-switches (SW1 and SW2) are defined. Please see the section following the table for more detail on each switch function.

SW 1		
Position	Set	Function
1	ON	Local Adjustment Enabled
	OFF	Local Adjustment Disabled
2	ON	24 bit AES output
	OFF	20 bit AES output
3	ON	Delete ALL incoming embedded AES audio
	OFF	ONLY replace Audio group selected with SW2
4	ON	Sample rate conversion selected (48KHz)
	OFF	No sample rate conversion performed

SW 2		
Position	Set	Function
1	ON	Audio Group 1 selected
	OFF	
2	ON	Audio Group 2 selected
	OFF	
3	ON	Audio Group 3 selected
	OFF	
4	ON	Audio Group 4 selected
	OFF	

### Service Adapter

*This module is complex by design. Configurations are much easier with the R CT 3000 Service Adapter. This provides a simple PC GUI for configuration use. Settings can be quickly changed and stored to the module flash ram. No local switch settings are necessary. A single Service Adapter can be used for all MiniModules.*

## 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 dip-switches. **ON** enables local control and makes selections on the dipswitch active, and **OFF** disables local control (locking out any local changes)

#### **Note.**

*When Switch 1 is initially switched to **ON**, the static settings currently set on the dip-switches may not reflect the actual configuration stored in the module. This is because all settings can be changed from the remote control system or via the Service Adapter. This overrides the local dip switches regardless of Switch 1 ON/OFF setting. To ensure the module reads the local dip switch settings it is recommended to toggle Switch 1 **ON-OFF-ON** before making any local changes to the dip switches.*

### SW1 Dip Switch 2

*20 / 24 bit operation.* When set to **ON** the AES audio output will be 24 bits wide (which is normal). When set to **OFF** the AES audio output can be set to 20 bits, which is sometimes necessary for downstream equipment which may not be compatible with 24 bits operation.

### **SW1 Dip Switch 3**

*Delete embedded audio.* When set to **ON** this will delete **ALL** incoming AES audio signals on the input SDI signal (if any). When set to **OFF** only the channels selected for embedding (using SW2) will be overwritten. Any remaining audio, which was present on the incoming SDI signal will pass transparently.

### **SW1 Dip Switch 4**

*Sample rate conversion ON/OFF.* This is used to select sample rate conversion for the module. This setting applies both input audio signals. When set to **ON** (asynchronous) all incoming audio will be sample rate converted to 48 KHz. (input range 30KHz to 48KHz). When set to **OFF** the sample rate conversion will be bypassed. If bypassed, all incoming audio must be synchronous to the input SDI signal. This is useful if the module is to work with Dolby audio data where the audio should not be resampled.

### **SW2 Dip Switch 1 through 4**

*Select Audio Groups.* These four switches are used to select which audio groups are to be embedded into the incoming SDI video. **ON** selects the audio group and **OFF** deselects it.

### **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 P MX 3212 B is delivered preset for the following mode of operation:

### **Switch 1**

1. ON: Local adjustments enabled
2. ON: 24 bit AES
3. OFF: Only replace audio group selected
4. OFF: Sample rate conversion bypassed

### **Switch 2**

1. ON: Audio Group 1 Selected
2. OFF
3. OFF
4. OFF

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

# Alarm/LED Status Indicators

The P MX 3212 B module has built in LED indicators, which serve as alarm and status indication for the module. Function is described below. The Indicators are found on the bottom of the module and can be seen through the access holes provided. (Figure 2 or 3)

## Channel Condition Indicator

4 channel Status LED are provided on the module edge and can be seen through the access holes (figures 2 or 3). One LED is provided for each audio group, which is three color, and has several indication states.

LED Color	Indication
Off	No audio present on SDI I/P and none inserted
Green	No audio present on SDI I/P and audio is inserted
Green short blink	Audio present on SDI input (AES1, AES2 or both) and being deleted
Green flashing	Audio group present on SDI input, and is being overwritten by the embedder
More than one Yellow LED on	User error. More than one group is selected.
All LEDS Yellow	User error. Locked * audio group 4 has been selected
Red	Group selected for embedding, but no AES is present, or audio is not synchronous with video (if sample rate converter is deactivated)

### \*Note

*When working in 525 mode with 24 Bit audio selected then only the first three groups can be embedded. Group 4 is locked. In 525 mode with 20-bit audio all four groups are accessible.*

## Front Panel Alarm Indicator

There is also a single alarm LED on the front side of the module, (Figure 2) 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. This LED is three color and has several indication states.

LED Color	Indication
Green	All OK
Yellow*	Warning. Only one AES signal present or user configuration error**
Yellow Flashing	Used for “locate” function and also an indication when data is being stored to flash ram
Red	Fatal error condition ***

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

\*This indication has to be enabled using remote control either by using a remote controller or the RCT 3000 Service Adapter.

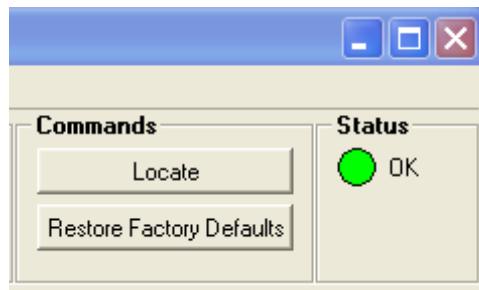
\*\*Example of user configuration error is the module is trying to insert an audio group but no AES audio data is being supplied to the module.

\*\*\* Some examples are: no SDI video present, selected audio missing, SDI processing errors, audio processing errors, power up / initialization failure etc.

## 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 (P MX 3212 B)

## Inputs (video)

Signal	1 x SDI 4:2:2 SMPTE 259M-CD (270 / 360 Mbps)
Connection	BNC
Impedance	75 Ohms
Return loss	> 15dB (270 MHz)
Max cable length	250 m (270 MHz)

## Inputs (audio)

Signal	2 x AES 3id SMPTE 272M-ABCDEFG
Connection	BNC
Impedance	75 Ohms

## Outputs

Signal	4 x SDI 4:2:2 SMPTE 259M-CD (270 / 360 Mbps) with EDH
Connection	BNC
Impedance	75 Ohms
Jitter	< 0.2 ui

## Operating Modes

Embedding	Embed audio 2 x AES (one group) in one of four user selectable groups in the SDI input stream
Delete	Delete all selected audio groups.

## Performance

AES input sample rate	48 KHz synchronous or 30 KHz...48KHz asynchronous
AES sample size	20 or 24 bit
Control	Local settings (dip switch) and via remote with LYNX controller
Status Monitoring	Local LED`s

## Electrical Specifications

Operating Voltage	+ 5VDC
Power Consumption	3.5VA
Connection	DC input via 5 pin locking bayonet connector
Safety	IEC 950/ EN 60950/VDE 0805

## Mechanical

Size	85.5mm x 35.3mm x 38.7mm + 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	P MX 3212 B Reference Manual and Quick Ref Guide
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## Available Options

Below is a list of available options for the P MX 3212 B MiniModule. Please refer to product brochures or our web site for more detailed information.

<b>Model</b>	<b>Description</b>
<b>R PS 3001 E</b>	<b>External brick power supply module for Series 3000 MiniModules. European market version. 100-240 VAC input, +5V DC output.</b>
<b>R PS 3001 U</b>	<b>External brick power supply module for Series 3000 MiniModules. USA market version. 110-240 VAC input, +5V DC output.</b>
<b>R FR 3004</b>	<b>4 Module mounting frame. This is a small mechanical mounting bracket for 4 MiniModules. Can be mounted with screws on any surface.</b>
<b>R FR 3005</b>	<b>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.</b>
<b>R FR 3010</b>	<b>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</b>
<b>R PS C15</b>	<b>1.5m cable extension to connect one MiniModule to R FR 3010</b>
<b>R PS C25</b>	<b>2.5m cable extension to connect one MiniModule to R FR 3010</b>
<b>R PS 5010</b>	<b>Redundant power supply for the R FR 3010 card cage</b>
<b>R CT 5020</b>	<b>Rack controller for the R FR 3010 rack frame</b>
<b>R CT 5010</b>	<b>Rack Bus Extension for R FR 3010 rack frame. In combination with R CT 5020</b>
<b>R CT 3000</b>	<b>Service Adapter for remote configuration of one MiniModule via PC or Palm</b>

## Parts List

Due to the very dense design and high level of integration there are no user serviceable electronic assemblies within the P MX 2312 B module.

### **P MX 3212 B Mini Module (complete)**

Description	Dual AES Multiplexer
Model Number	P MX 3212 B
Part Number	6.155.000.290

## Service

If you are experiencing problems, or have questions concerning your P MX 3212 B 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](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 Sandstraße 7 64404 Bickenbach Germany.
<b>Phone</b>	+ 49 (0) 6257 938017
<b>Fax</b>	+ 49 (0) 6257 938025
<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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