# LYNX

**TECHNIK AG**

**Version 1.2**

# Reference Manual

## P TG 5010 D
### SDI & AES Test Generator

*Series 5000* *CardModule*
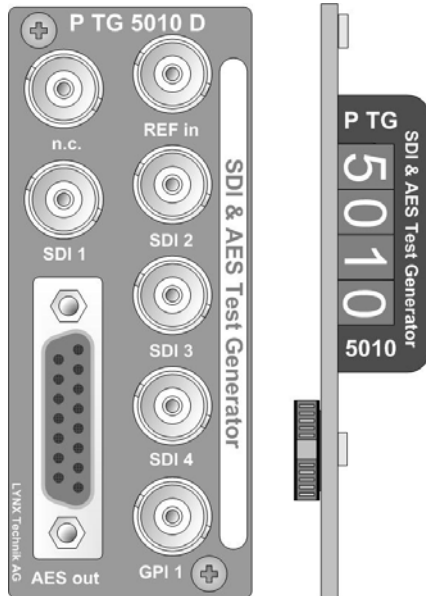
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# Warranty

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
*Declare under our sole responsibility that the product*

        TYPE: P TG 5010 D

*To which this declaration relates is in conformity with the following standards (environments 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, October 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 P TG 5010 D is a high quality SDI & AES Testgenerator designed primarily for broadcast and professional applications.

Multiple different test patterns can be selected on four independent SDI outputs including moving test patterns, e.g. moving zone plate.

Two AES test tone generators with gain control are provided on two separate outputs. The audio test tones can also be embedded into the SDI outputs.

On all four SDI outputs an 8 character text box can be activated with independent text input.

The unit has a Reference input (analog video) for synchronization to studio. If a Reference signal is applied, the outputs can be delayed vs. studio up to 1 frame in 37ns steps.

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.

## Key Features

- o 4 independent SDI outputs

- o Multiple testpattens including moving patterns

- o 2 AES outputs

- o Audio frequency adjustable in 1 Hz steps

- o Gain control for Audio signals

- o Audio can be embedded into the SDI outputs

- o Dual standard operation (525/625)

- o Reference input

- o Delay range up to 1 frame max in 37ns increments

- o Text box with 8 characters per SDI output

- o Local multi function switch, LEDs and matrix display for local control and status monitoring

- o Microprocessor controlled

- o Flash Ram storage for settings

- o Remote control interface

# Functional Diagram

Figure 1 below is the basic functional diagram for the P TG 5010 CardModule. The audio path is shown in detail as separate diagram.
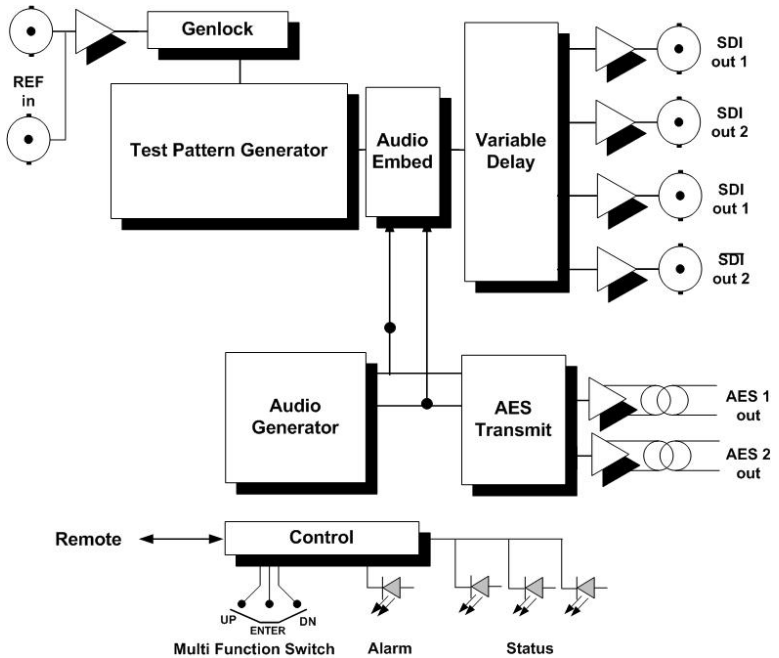


Figure 1- P TG 5010 D Functional Diagram

# Module Layout

Figure 2 shows the physical layout of the P VD 5010 CardModule and also the connection panel which is fitted to the rear of the rack.
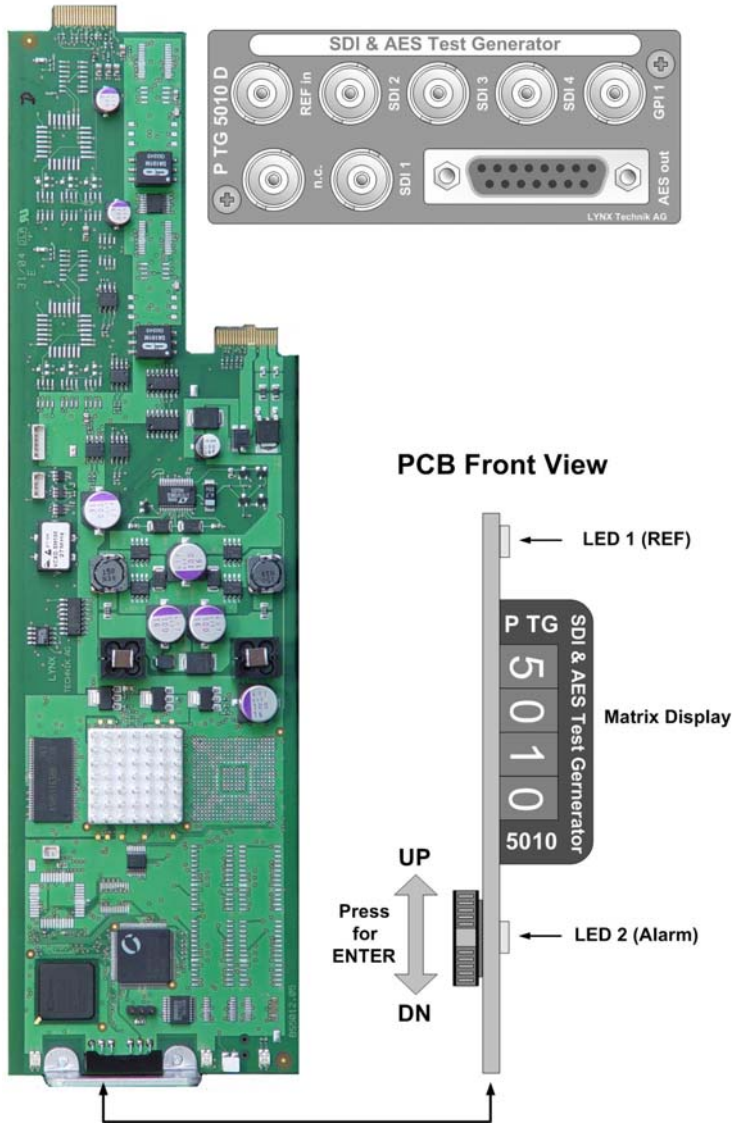
## PCB Layout



## PCB Front View

Figure 2: Physical layout P TG 5010 D

# Connections

## Video Connections

The P TG 5010 D CardModule is configured with standard 75 Ohm BNC connectors. Connection is self-explanatory. We recommend the use of high quality cables for digital video and audio 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.

# Audio Connections

The P TG 5010 D CardModule is configured for Sub D connections. These connectors should be wired in accordance with the table 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 Connector (balanced)

SubD 15-pin female connector

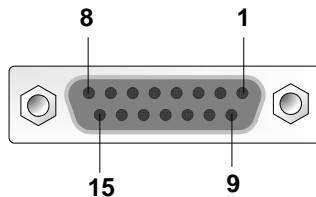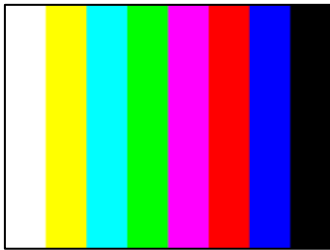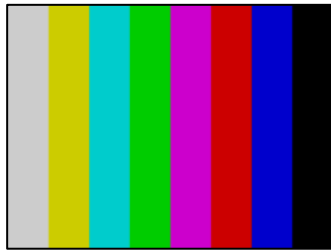| Pin Number | Connection | Pin Number | Connection |
|---|---|---|---|
| 1 | + AES OUT 2 | 9 | - AES OUT 2 |
| 2 | GND AES OUT 2 | 10 | + AES OUT 1 |
| 3 | - AES OUT 1 | 11 | GND AES OUT 1 |
| 4 | | 12 | |
| 5 | | 13 | |
| 6 | | 14 | |
| 7 | | 15 | |
| 8 | | | |



Figure 3 - Audio connection detail

# Test Patterns

**Full Frames:** Red, Green, Blue, Yellow, Magenta, Cyan
White, Black
**Ramp Signals**: Y up, Y down, Y-Cr-Cb, Cr, Cb



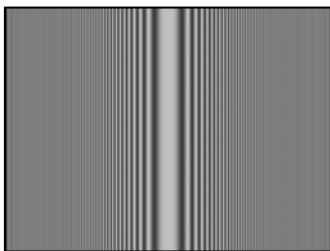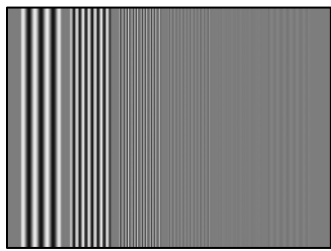Color Bars 100%



Color Bars 75%
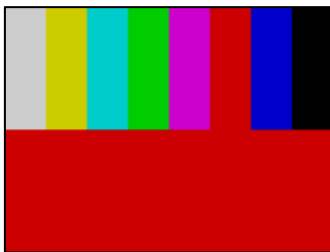


Color Bars 75% over Red
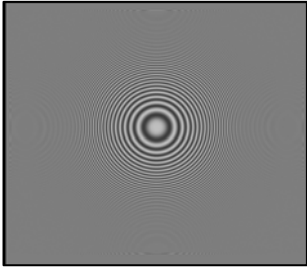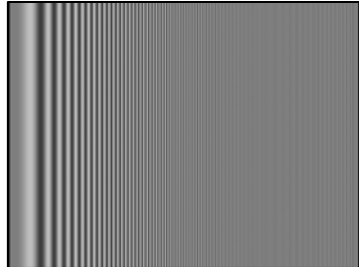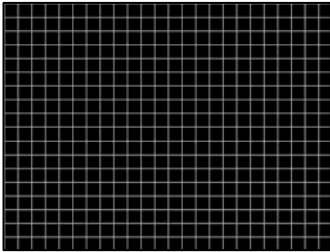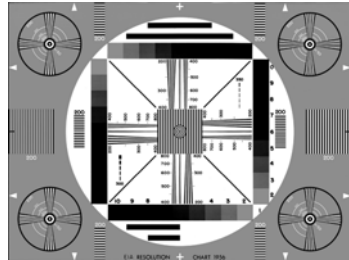


SMPTE Bars



Center Sweep



Multi Burst

Zone Plate

Frequency Sweep

Convergence Grid

EIA 1956
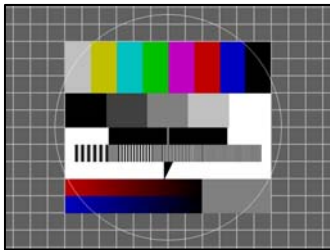
Transmitter ID1
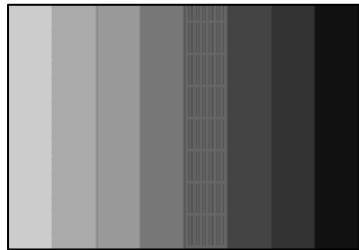
Staircase

Transmitter ID 2



Pathological EQ-PLL
(Pathological EQ,
 Pathological PLL)

**Moving Test patterns:**
White Flash, Black Flash (every 8th frame)
Moving Zoneplate
        IRT (with test tone for Lip synch)

# 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 P TG 5010 D 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.

## PCB Front View
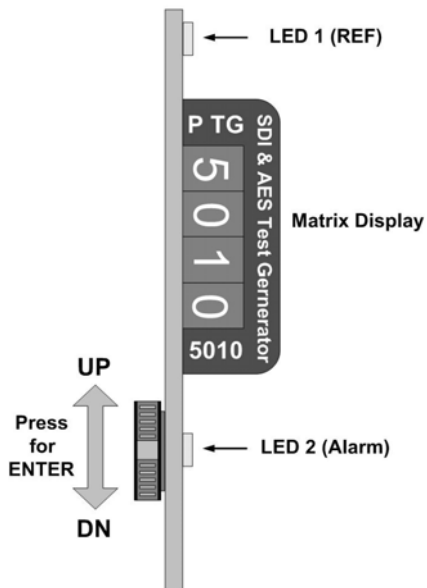


Figure 4 – Switch and Display Location

# 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

Side           Front
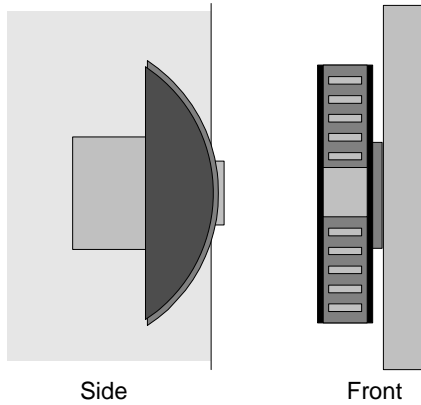
## Switch Operations

**Up**       **Down**      **Enter**
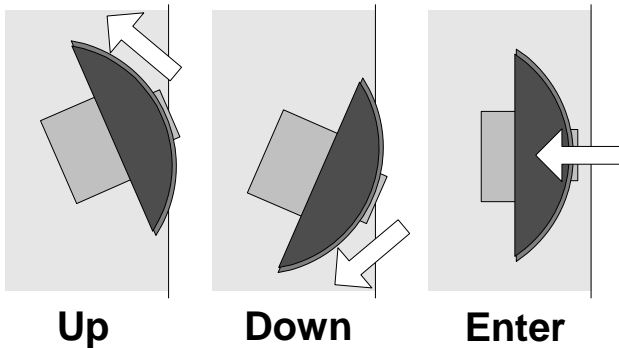
Figure 4 – Switch Operation

# 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 |

# 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 | COMMENTS |
|---|---|---|---|---|
| 5010 | | | | "Normal" Root display on module = Module type |
| | REF | STD | AUTO / 525 / 625 / back | Select video standard. |
| | | SRC | OFF / EXT / INT / back | Select Reference Source. OFF: No external reference. EXT: Reference input board. INT: Rack Reference |
| | | DLAY | LINE / PIXL / back | Select Line Delay: 0..524 / 624. Select Pixel Delay: 0..1715 / 1727 |
| | TEXT | back | | |
| | | X / Y | 0000 / 0000 | Position Text Box: X: Horizontal Position: 0..800. Y: Vertical Position: 46..478 / 572 |

Select Color of Text Box:
FGND: Color Characters
BGND: Background Color

Select Bit Width: 20 or 24 Bits

Select Audio Frequency: 20..20.000 Hz

Activate left channel pause / interupt

Audio Gain: -60 dB .. 0 dB

| | | |
|---|---|---|
| FGND / BGND | back | |
| BITS | 20 / 24 / back | |
| FREQ | 0000 | |
| PAUS | OFF / ON / back | |
| GAIN | LEFT / RGHT | |
| | back | |
| AES1 / AES2 | | |

Video Test Signal Select (SDI Channels 1..4):

Full Black
Full Red
Full Green
Full Blue
Full Cyan
Full Magenta
Full Yellow
Full White
Path EQ
Path PLL
Path EQ/PLL
75 % Bars
75% Bars / RED
Y Ramp up
Y Ramp down
Cb Ramp up
Cr Ramp up
YCrCb Ramp up
Staircase
100% bars
Multiburst
Freq. Sweep
reserved
SMPTE Bars
Zoneplate
CenterSweep
EIA 1956
Grid
reserved
Transmitter ID1
Transmitter ID2

OUT

CH1
CH2
CH3
CH4

| Menu | Options | Description |
|------|---------|-------------|
| TEXT | none / LYNX / user / back | Activate Text Box:<br>none: OFF<br>LYNX: Text „LYNX" shown<br>user: User defined input via GUI SW |
| BGND | OFF / ON / back | Activate Background for Text Box:<br>OFF: No background - transparent<br>ON: Background with selected color |
| AES | OFF / ON / back | AES embedding into all SDI channels |
| RSET | YES / NO | Restore factory defaults |
| back | | |

## Factory Preset Condition

The P TG 5010 is delivered with stored presets for the following functionality.

| | |
|---|---|
| Test Pattern: | **Color Bars** |
| Text box: | **Not active** |
| Video Delay: | **0** |
| Audio Embedding: | **active** |
| Audio level: | **-9 dBFS** |
| Audio Frequency: | **1kHz** |
| Audio Pause left: | **OFF** |

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

## 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 P TG 5010 module has integral LED indicators, which serve as alarm and status indication for the module. Function is described below.

### Reference Status Indicator

One status LED is provided on the PCB: LED 1 (Figure 4) for indication of the standard of the external reference

| LED | Color | Indication |
|-----|-------|------------|
| **1** | Green | Ref = 525/60 Hz |
| | Yellow | Ref = 625/50 Hz |
| | Red | External Ref = invalid or 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 | Normal Operation |
| Yellow | Reference missing |
| Red | Board Failure |

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 *(P TG 5010 D)*

| Reference Input | |
|---|---|
| Signal | Composite analog sync, 525/60Hz or 625/50Hz |
| Detection | Automatic |
| Connection | BNC |
| **Digital Video Outputs** | |
| Signal | SDI (SMPTE 259M-C) |
| Connection | BNC |
| Impedance | 75 Ohms |
| Return Loss | > 15dB (270 MHz) |
| Jitter | < 0.2 UI |
| **Audio Outputs** | |
| Signal | AES 3 (balanced) |
| Connection | Sub D 25, 110 Ohm |
| **Electrical Specifications** | |
| Operating Voltage | + 12 VDC |
| Power Consumption | Approx 7.0VA |
| 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 | P TG 5010 D Reference Manual |

# Available Options

Below is a list of related products for the P TG 5010 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 with TCP/IP Interface 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.

**P TG 5010 D CardModule (complete)**
Description          SDI & AES Testgenerator
Model Number    P TG 5010 D
Part Number      5.155.007.310

**Sub Assemblies:**

**P TG 5010  Processing Board only (BS 5012 I)**
Part Number           6.155.007.307

**Rear Conn. Panel for P TG 5010 D (MA 5005)**
Part Number           6.155.008.371

# Service

If you are experiencing problems, or have questions concerning your P TG 5010 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