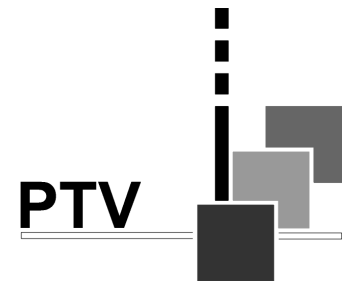


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PT 5210 VariTime™ Digital Sync Generator



Operating Manual

Please note:

This manual includes the following supplements that are placed at the back of the manual:

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1 Safety

Read this chapter carefully before installation and use of the instrument.

1.1 Introduction

Adjustment, maintenance and repair of the exposed equipment shall be carried out only by qualified personnel who are aware of hazards involved.

1.2 Safety Precautions

For the correct and safe use of the instrument, it is essential that both operating and servicing personnel follow generally accepted safety procedures in addition to the safety precautions specified in this manual. Specific warning and caution statements, where applicable, are found throughout this manual. Note that warning and caution statements and/or symbols are marked on the instrument as well.

This manual provides technical information important for safe operation of the equipment. Please refer to the relevant sections of the manual for technical specifications, installation and operating instructions.

Special attention must be paid to the following issues:

- ◆ Protective earthing of the instrument is required for the accessible terminals to be safe. (IEC 1010-1 Safety class I instrument)
- ◆ The actual environmental conditions must be checked against the specification.
- ◆ Mains voltage must be inside the specified range.

The opening of covers or removal of parts, except those to which access can be gained by hand, is liable to expose live parts and terminals.

If adjustment, maintenance, or repair of the opened instrument is unavoidable, it must only be carried out by a skilled person who is aware of the hazards involved.

1.3 Use of Caution and Warning Statements



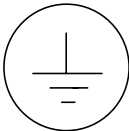

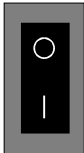
Caution

Used to indicate correct operation or maintenance in order to prevent damage to, or destruction of equipment or other property.

Warning

Used to indicate a potential hazard that requires correct procedures or practices in order to prevent personal injury.

1.4 Symbols

Symbol	Explanation:
	Caution, risk of electric shock.
	Caution (refer to accompanying documents)
	Protective conductor terminal.
	Alternating current
	Off (supply – mains switch). On (supply – mains switch).

1.5 Impaired Safety Protection

Whenever it is likely that safe operation is impaired, the instrument must be made inoperative and secured against unintended operation. The appropriate servicing authority must be informed.

For example, safety is likely to be impaired if the instrument fails to perform the intended functions or shows visible damage.

WARNING: Protection provided by the equipment may be impaired, if the equipment is used in a manner not specified by this manual.

1.6 Technical Assistance

Technical assistance may be obtained from your local DK-Audio customer support organization or from:

DK-Audio A/S

Marielundvej 37D

DK-2730 Herlev

Denmark

Phone: +45 4485 0255

Fax: +45 4485 0250

E-Mail: helpdesk@ptv.dk

Website: <http://www.Dk-audio.com>

2 General Service Information

2.1 Safety

Before any attempt is made to repair the instrument the **Safety** section must be read to prevent personal injury.

Warning: For reasons of safety, please use only original parts for the power supply and all parts connected to or adjacent to live circuits.

Please consult the section Service Hints as well for more details.



ATTENTION

2.2 Electrostatic Sensitive Devices

All ICs and many other semi-conductors are susceptible to electrostatic discharges (ESD). Careless handling during repair can reduce lifetime drastically.

When repairing, make sure that you are connected to the same potential as the mass of the set via a wrist wrap with resistance. Keep components and tools also at this potential.

2.3 Use of the Service Instructions

Troubleshooting is best carried out on a functional level using block diagrams. Reference is made to Chapters - "Instrument Block Diagram" and "Circuitry Description" for an overall description of the instrument.

Fault finding to component level will, however, require the use of appropriate circuit diagrams.

2.4 Block Diagram Symbols Description

Various symbols and conventions are used in the block diagram and a short description of these is given below:

The bold text within the block gives the function provided by the block.

Text shows the major components in the block or stage.

The text/number in the lower right hand corner of the block shows on which board and on which sheet of the appropriate circuit diagram the block can be found.

A dotted functional block (or stage) means that the block is either an option or not used in all versions of the instrument.

3 Introduction and Applications

3.1 Introduction

The PT 5210 VariTime™ Digital Sync Generator is designed with the multiple delays of digital television installations in mind, but also fulfills all synchronization requirements when used with a combination of digital and traditional analog video systems.

Each of the reference black outputs can be individually timed in fine steps over the complete sequence. Serial digital black and test signals can be timed with a resolution of 37 ns over a ± 1 field range; analog black burst and test signals are timeable in steps of half a subcarrier period over a ± 4 fields sequence for PAL and ± 2 fields sequence for NTSC. Analog color black burst is still routinely used for timing purposes, even in digital installations, where processing delays are often on the order of several fields. The VariTime™ Digital Sync Generator has been designed to provide the accurate heartbeat of both analog and digital systems, both now and in the future.

The PT 5210 VariTime™ Digital Sync Generator is a multistandard sync generator. The generator may be used as a master generator or as a genlocked slave generator. The basic generator supplies two analog black burst signals and a genlock function which genlock to composite video and continuous waves.

A number of available options allow the production of other output signals. These include:

- ♦ Analog Test Signal Generator
- ♦ SDI Test Signal Generators
- ♦ Digital Audio Generator
- ♦ LTC Output

The PT 5210 is completely multistandard. All the analog outputs are switchable between NTSC and PAL, and all the SDI outputs are switchable between the 525/59.94 and 625/50 systems.

In the future, when the distribution of serial digital signals are used for genlocking, a SDI Genlock option can be included.

3.2 Applications

The PT 5210 can be used in a multitude of different applications. The PT 5210 can function as the master in anything from a small edit suite to a large broadcast station. When operating as master a selection between two different oven-controlled oscillators are possible. Genlock to both continuous and TV signals is also possible.

The main application of the PT 5210 is to synchronize equipment by supplying individually timeable reference signals. Depending upon the options installed the PT 5210 can deliver:

- ♦ Analog black burst
- ♦ Serial digital black
- ♦ Serial digital colorbar
- ♦ Analog or serial digital test signals
- ♦ AES/EBU audio or 48 kHz clock

All analog generators can operate in both PAL and NTSC and digital generators can operate in both serial digital 625/50 and 525/59.94 systems. In multistandard operations, the PT 5210 can supply all systems simultaneously.

The generator can be genlocked to PAL, NTSC or SDI (*Serial Digital*). When the generator is genlocked to a 625-line system, the 525-line outputs are free-running but with the frequency reference obtained from the genlock signal. The 525-line and 625-line outputs are thus frequency-locked to each other. Supplying several genlocked formats simultaneously has proven very useful for both multistandard applications and standards converter applications.

There are test signal generators, which can supply analog and SDI. A selection of different test patterns is included. User test strings can be included in the test signal generator outputs. Up to eight user-programmable characters are included in the test signal, located near the bottom of the test signal displayed on a picture monitor.

Embedded audio can be selected for the SDI outputs. The audio on the SDI black/CB generators is selectable as silence on/off. The audio embedded in the SDI test signal outputs includes test signals with an audible indication of right and left channel.

AES/EBU digital audio is available on both XLR and BNC connectors. AES/EBU output signals include test signals with an audible indication of right and left channel. AES/EBU output signals are always locked both the 525-line and 625-line outputs. In multistandard operations, this permits direct connection between AES/EBU audio signals in 525- and 625- lines environments. The output from the audio test signal generator can also be programmed to supply a 48 kHz clock reference for equipment which can only genlock to 48 kHz signals.

Serial digital genlock is not used very much today but it is expected that its use will in the future be more widespread. Today many studios operate as digital islands in an analog world, but in not so distant future the situation will be analog islands in a digital world. In this future, the SDI genlock module will be the solution.

The LTC time code module transfers the time code signal in the incoming reference signal (typically black burst) to a separate LTC output. This system is used for distribution of a real-time clock signal in larger studio complexes.

Eight instrument presets have been included to simple changes of the mode. These presets are used when studios have to be configured differently to suit different applications. Each preset has a 16 character string designation which is displayed whenever the preset is active.

Signal validation typically used when two SPGs are connected in a changeover setup has been included in the PT 5210. Signal level testing is performed in separate circuits, which transmit a simple signal to the changeover unit that all generators are operating. If the signal fails, the changeover is operating. If this signal fails, the changeover unit switches to the back-up generator. This system permits a simpler changeover unit, which makes for greater reliability. The system also monitors the back-up unit even when it is not in use.

A remote function enabling a fast instrument setup has also been included. This function can be used when two generators are used in a changeover setup. If one of the generators breaks down, the data can be transmitted directly to a new spare generator, programming is quickly and reliably, or the some data are used for up-and download with the RS232 interface connected to a PC.

4 Product Data

4.1 Safety Characteristics

This apparatus has been designed and tested in accordance with the safety Class I requirements of the IEC publication 1010-1 ("Safety Requirements for Electrical Measuring Apparatus"), and is safe as supplied. This manual contains information and warnings, which must be followed during operation to ensure operator and service personnel safety.

4.2 Performance Characteristics

Characteristics expressed in numerical values with stated tolerances are guaranteed tolerances, when the instrument is calibrated at 20-30°C and after 20 min. warm-up. Specified non-tolerance numerical data indicate typical values at nominal ambient temperature (25°C) and reflects an average performance.

4.3 Versions

The PT 5210 VariTime™ Digital Sync Generator is multistandard, operating simultaneously with both M-NTSC and PAL signals.

The following standard configurations have been defined:

PT 5210 /00

- ♦ 1 genlock input:
configure loop-through or single-ended 75 Ω , NTSC, PAL, 5 MHz, 10 MHz, 4.43 MHz or 3.58 MHz
- ♦ 2 individually timeable black burst outputs
- ♦ 1 transparent output of genlock signal

PT 5210 /01

- ♦ 1 genlock input:
configure loop-through or single-ended 75 Ω , NTSC, PAL, 5 MHz, 10 MHz, 4.43 MHz or 3.58 MHz
- ♦ 1 transparent output of genlock signal
- ♦ 4 individually timeable black burst outputs

PT 5210 /02

- ♦ 1 genlock input:
configure loop-through or single-ended 75 Ω , NTSC, PAL, 5 MHz, 10 MHz, 4.43 MHz or 3.58 MHz
- ♦ 1 transparent output of genlock signal
- ♦ 6 individually timeable black burst outputs

PT 5210 /03

- ♦ 1 genlock input:
configure loop-through or single-ended 75 Ω , NTSC, PAL, 5 MHz, 10 MHz, 4.43 MHz or 3.58 MHz
- ♦ 1 transparent
- ♦ 8 individually timeable black burst outputs

PT 5210 /04

- ♦ 1 genlock input:
configurate loop-through or single-ended 75 Ω , NTSC, PAL, 5 MHz, 10 MHz, 4.43 MHz or 3.58 MHz
- ♦ 1 transparent output of genlock signal
- ♦ 2 individually timeable black burst outputs
- ♦ 2 jointly timeable SDI black/colorbar outputs

PT 5210/05

- ♦ 1 genlock input:
configurable loop-through or single-ended 75 Ω , NTSC, PAL, 5 MHz, 10 MHz, 4.43 MHz or 3.58 MHz
- ♦ 2 individually timeable black burst outputs
- ♦ 1 transparent output of genlock signal
- ♦ 2x2 jointly timeable SDI black/colorbar output pairs

PT 5210/06

- ♦ 1 genlock input:
configurable loop-through or single-ended 75 Ω , NTSC, PAL, 5 MHz, 10 MHz, 4.43 MHz or 3.58 MHz
- ♦ 1 transparent output of genlock signal
- ♦ 2 individually timeable black burst outputs
- ♦ 3x2 jointly timeable SDI black/colorbar output pairs

PT 5210/07

- ♦ 1 genlock input:
configurable loop-through or single-ended 75 Ω , NTSC, PAL, 5 MHz, 10 MHz, 4.43 MHz or 3.58 MHz
- ♦ 1 individually timeable black burst outputs
- ♦ 4 transparent output of genlock signal
- ♦ 2 jointly timeable SDI black/colorbar output pairs

PT 5210/08

- ♦ 1 genlock input:
configurable loop-through or single-ended 75 Ω , NTSC, PAL, 5 MHz, 10 MHz, 4.43 MHz or 3.58 MHz
- ♦ 1 transparent output of genlock signal
- ♦ 4 individually timeable black burst outputs
- ♦ 2x2 jointly timeable SDI black/colorbar output pairs

PT 5210/09

- ♦ 1 genlock input:
configurable loop-through or single-ended 75 Ω , NTSC, PAL, 5 MHz, 10 MHz, 4.43 MHz or 3.58 MHz
- ♦ 1 transparent output of genlock signal
- ♦ 6 individually timeable black burst outputs
- ♦ 2 jointly timeable SDI black/colorbar output pairs

4.4 Options

4.4.1 PT 8601 Analog Test Signal Generator

Output Signals:

- ♦ Colorbar
 - NTSC: SMPTE
 - PAL: EBU 75%, Colorbar 100%, Split Field 75% with gray, and Split Field 75% with red
- ♦ Window 15%
- ♦ Window 20%
- ♦ Window 100%
- ♦ Cross Hatch
- ♦ PLUGE
- ♦ Safe area
- ♦ Shallow ramp
- ♦ Multiburst
- ♦ 75% Red
- ♦ Black burst

4.4.2 PT 8602 SDI Test Signal Generator 1

Output Signals:

- ♦ Colorbar
 - 525 line: SMPTE
 - 625 line: EBU 75%, EBU 75% (8 bit), Colorbar 100%, Split Field 75% with gray, and Split Field 75% with red
- ♦ SDI checkfield
- ♦ Shallow ramp
- ♦ Digital Timing Test Pattern
- ♦ Black

Embedded sound and EDH may be added to the test signals.

All signals are generated with 10 bit except otherwise is specified.

4.4.3 PT 8603 SDI Test Signal Generator 2

Output Signals:

- ♦ Colorbar
 - 525 line: SMPTE
 - 625 line: EBU 75%, EBU 75% (8 bit), Colorbar 100%, Split Field 75% with gray, and Split Field 75% with red
- ♦ SDI checkfield
- ♦ Shallow ramp
- ♦ Digital Timing Test Pattern
- ♦ Black
- ♦ Window 15%
- ♦ Window 20%
- ♦ Window 100%
- ♦ Cross hatch
- ♦ PLUGE
- ♦ Multiburst
- ♦ 75% Red

Embedded sound and EDH may be added to the test signals.

All signals are generated with 10 bit except otherwise is specified.

4.4.4 PT 8604 Multiple Parallel Black Burst Outputs

An additional 6 outputs are connected in parallel to one of the black burst outputs included as standard.

4.4.5 PT 8605 AES/EBU Audio Generator

Serial digital audio generator with test tones.

Output:

Single-ended 75 Ω with a BNC connector, balanced 110 Ω with an XLR connector.

Signal outputs:

- ♦ Stereo 800 kHz: No click
- ♦ Stereo 1 kHz: No click
- ♦ Stereo EBU 1 kHz: Single click in Ch. A
- ♦ Stereo BBC 1 kHz: Single click in Ch. A, dual click in Ch. B
- ♦ Mono EBU 1 kHz: Single click in both Ch. A and Ch. B
- ♦ Mono BBC 1 kHz: No click
- ♦ Dual 1 kHz in Ch. A,
400 Hz in Ch. B: No click
- ♦ 48 kHz reference:

Levels:

Silence, 0, -9, -12, -14, -16, -18, and -20 dBFS

4.4.6 PT 8606 SDI Digital Genlock

SDI digital genlock module with active loopthrough.

4.4.7 PT 8607 Longitudinal Time Code Module

The LTC module transfers VITC time code from the analog genlock input to a balanced XLR LTC output.

4.4.8 PT 8608 Black Burst Module

2 individually timeable black burst outputs.

4.4.9 PT 8609 SDI Black and Colorbar Module

2 jointly timeable SDI black and colorbar outputs.

Output signals:

- ♦ Output Signals:
- ♦ Black
- ♦ Colorbar
 - 525 line: SMPTE
 - 625 line: EBU 75% and Colorbar 100%

4.4.10 PT 8610 High Precision OCXO

High precision oven-controlled master crystal oscillator.

4.5 Summarized Data, Standard Instrument

Based on the relevant ITU, SMPTE, EBU, and AES/EBU specifications.

4.5.1 Master Frequency Reference

27 MHz master frequency: Better than 0.25 ppm (0-50°C, ref. 25°C)
Aging: < 0.1 ppm/month

4.5.2 Analog Black Burst Outputs

Connector: BNC
Output impedance: $75\ \Omega \pm 0.5\ \Omega$
Return loss: >36 dB, to 5 MHz
Sync amplitude: PAL: -300mV $\pm 2\%$
NTSC: -286mV $\pm 2\%$
Burst amplitude: PAL: 300mV $\pm 2\%$
NTSC: 286mV $\pm 2\%$
Timing range: PAL: ± 4 fields
NTSC: ± 2 fields
Timing resolution: 0.5° fsc
Sc-H phase: Default 0° , adjustment $\pm 180^\circ$, resolution $< 1^\circ$
S/N ratio: 60 dB unweighted to 5 MHz
Jitter: Burst jitter: $\pm 0.5^\circ$
Sync jitter: ± 0.5 ns (based on design and burst jitter value)

4.5.3 Analog Genlock

Input: $75\ \Omega$ looped through or two $75\ \Omega$ terminated inputs (menu configurable)
Return loss: >36 dB to 6 MHz

4.5.3.1 Genlock Signal(M-NTSC or G-PAL)

Amplitude: Nominally ± 3 dB
S/N ratio: >26 dB
Sc-H phase: Nominally $\pm 45^\circ$
Pull-in range fsc: ± 20 Hz
Jitter when locked to burst: $< 0.5^\circ$
Jitter when locked to sync: < 2 ns
Timing range: PAL: ± 4 fields
NTSC: ± 2 fields
Timing resolution: $0.5^\circ f_{sc}$

4.5.3.2 Genlock Signal

Continuous frequency reference: Subcarrier or 5/10 MHz
Amplitude: 1 V ± 3 dB

4.5.4 Analog Genlock Transparent Channel

The analog genlock signal is transferred directly to a transparent output.

Output impedance: $75\ \Omega$
Return loss: >36 dB to 6 MHz

4.5.5 Remote Control

All functions can be controlled and checked by using the serial remote interface.

The parallel remote interface can control various major generator functions. Control is by means of TTL compatible ground closure.

Interface connector: 9 pole female sub-D, internally configured to serial RS232C or parallel ground closure

4.5.6 Fast Setup

Readout of the entire instrument setting is possible with a single command from the remote.

The data read can be transferred in the same format to another unit to set up the unit, or two units can be directly connected and the setting copied from one unit to the other.

4.5.7 Changeover Control

Error signal to control changeover unit. A changeover unit can use this signal to switch to a second SPG in a dual SPG system.

4.5.8 Presets

Eight preset setups are stored in a nonvolatile memory.

The presets have names consisting of up to 16 letters. The preset name is displayed when the preset is active.

4.6 Environmental Conditions

4.6.1 Regulations and Standards

- ♦ EN 50081-1/1994 (emissions)
- ♦ EN 50082-1/1992 (immunity)
- ♦ FCC Rules & Regulations, Part 15, Subpart J, Level B (emissions)

4.6.2 Climatic Conditions

Temperature range:	<u>Storage:</u>	-20 - +60°C
	<u>Ambient operating:</u>	+5 - +45°C
Humidity:	Non condensing (IEC 721)	

4.6.3 Mechanical Requirements

Vibration:

Limit range for storage and transport:

30 min. in each of three directions, 10 to 150 Hz; 0.7 mm_{p-p} and 50 m/s² max acceleration. According to IEC-Publ. 68, test Fc.

NOTE:

Unit mounted on vibration table without shock absorbing material.

Bump:

Limit range for storage and transport:

1000 bumps of 100 m/s² sine, 6 ms duration in each of 3 directions. According to IEC-Publ. 68, test Eb.

4.6.4 Safety:

IEC1010-1

4.7 Power Supply

Voltage:	90 - 250 VAC
Frequency:	48 - 65 Hz
Power consumption:	Maximum 90 VA with all options included

4.8 Mechanical Data

19" rack mount cabinet.

Height:	44 mm (1.73")
Width:	483 mm (19")
Depth:	490 mm (19.3")
Weight:	6 kg (13.2 lbs)

4.9 Summarized Data, Options

4.9.1 PT 8601 Analog Test Signal Generator

Connector:	BNC
Output impedance:	75 Ω \pm 0.5 Ω
Return loss:	>36 dB, to 5 MHz
Sync amplitude:	PAL: -300 mV \pm 2% NTSC: -286 mV \pm 2%
Burst amplitude:	PAL: 300 mV \pm 2% NTSC: 286 mV \pm 2%
Video accuracy:	Nominal \pm 1 %
Timing range:	PAL: \pm 4 fields NTSC: \pm 2 fields
Timing resolution:	0.5° f _{sc}
Sc-H phase:	Default 0°, adjustment \pm 180°, resolution <1°
S/N ratio:	60 dB unweighted to 5 MHz
Jitter:	Burst jitter: \pm 0.5° Sync jitter: 0.5 ns (based on design and burst jitter value)

Output Signals:

- ♦ Colorbar
 - NTSC: SMPTE
 - PAL: EBU 75%, Colorbar 100%, Split Field 75% with gray, and Split Field 75% with red
- ♦ Window 15%
- ♦ Window 20%
- ♦ Window 100%
- ♦ Cross hatch
- ♦ PLUGE
- ♦ Safe area
- ♦ Shallow ramp
- ♦ Multiburst
- ♦ 75% Red
- ♦ Black burst

Source identification:

A text string with up to 8 characters can be added to the signal.
 Positioned in upper right corner.
 Hight 32 lines (16 lines per field).

4.9.2 PT 8602 SDI Test Signal Generator 1

Format:	270 Mb/s component. Complies with ITU-R BT 656 and SMPTE 259M
Data Format:	Scrambled NRZI 270 Mbit/sec
Connectors:	2 BNC
Output impedance:	75 Ω
Return loss:	> 15 dB, 5 to 270 MHz
Amplitude:	800 mV \pm 10%
Jitter:	< \pm 0.25 ns
Timing range:	525/60: \pm 1 field 625/50: \pm 1 field
Resolution:	37.5 ns (one-half clock cycle on the 13.5 MHz clock)

Auxiliary data:

- ♦ EDH on/off
- ♦ Embedded audio test tones on/off.
Audio group 1, four channels.
(described under the PT 8605 AES/EBU Audio Generator below.)
- ♦ Auxiliary data off.

Output Signal:

- ♦ Colorbar
525 line: SMPTE
625 line: EBU 75%, EBU 75% (8 bit), Colorbar 100%, Split Field 75% with gray, and
Split Field 75% with red
- ♦ SDI checkfield
- ♦ Shallow ramp
- ♦ SDI black
- ♦ SDI timing test.

Source identification:

A text string with up to 8 characters can be added to the signal.
 Positioned in upper right corner.
 Hight 32 lines (116 lines per field)

4.9.3 PT 8603 SDI Test Signal Generator 2

Format:	270 Mb/s component. Complies with ITU-R BT 656 and SMPTE 259M
Data format:	Scrambled NRZI 270 Mbit/sec
Output impedance:	75 Ω
Connectors:	2 BNC
Return loss:	>15 dB, 5 to 270 MHz
Amplitude:	800 mV \pm 10%
Jitter:	< \pm 0.25 ns
Timing range:	525/60: \pm 1 field 625/50: \pm 1 field
Resolution:	37.5 ns (one half clock cycle on the 13.5 MHz clock)

Auxiliary data:

- ♦ EDH on/off
- ♦ Embedded audio test tones on/off.
Audio group 1, four channels
(described under the PT 8605 AES/EBU Audio Generator below)
- ♦ Auxiliary data off Output Signals:
- ♦ Colorbar
525 line SMPTE
625 line EBU 75%, EBU 75% (8 bit), Colorbar 100%, Split Field 75% with gray, and
split Field 75% with red
- ♦ SDI checkfield
- ♦ Shallow ramp
- ♦ SDI black
- ♦ SDI timing test
- ♦ Window 15%
- ♦ Window 20%
- ♦ Window 100%
- ♦ Cross hatch
- ♦ PLUGE
- ♦ Multiburst
- ♦ 75% Red

Source identification:

A text string with up to 8 characters may be superimposed on the output signal.
Positioned in upper right corner.
Hight 32 lines (116 lines per field).

4.9.4 PT 8604 Multiple Parallel Black Burst Outputs

Connector:	6 BNC
Output impedance:	75 Ω \pm 0.5 Ω
Return loss:	>36 dB, to 5 MHz
Sync amplitude:	PAL: -300 mV \pm 2% NTSC: -286 mV \pm 2%
Burst amplitude:	PAL: 300 mV \pm 2% NTSC: 286 mV \pm 2%
Timing:	Equal to BB2 output, max. delay 50 ns
Sc-H phase:	Equal to BB 2 output
S/N ratio:	60 dB unweighted to 5 MHz
Jitter:	\pm 0.5 ns

4.9.5 PT 8605 AES/EBU Audio Generator

Output:	1 AES3/EBU pair
Sampling frequency:	48 kHz
Data rate:	3.072 Mbit/s
<u>Single-ended output:</u>	BNC according to AES3 ID
Output impedance:	75 Ω \pm 20%
Amplitude:	1.0 V \pm 10%
Rise and fall time:	30 - 44 ns
Jitter:	<20 ns
<u>Balanced output:</u>	XLR according to AES3 1992
Output impedance:	110 Ω \pm 20%
Amplitude:	Typically 3 Vpp

Rise and fall times:	5 - 30 ns
Jitter:	< 20 ns
Coding:	Linear PCM, 20-bits twos complement binary, bi-phase mark

Outputs signals:

♦ Stereo 800 kHz:	No click
♦ Stereo 1 kHz:	No click
♦ Stereo EBU 1 kHz:	Single click in Ch. A
♦ Stereo BBC 1 kHz:	Single click in Ch. A and double click in Ch. B
♦ Mono EBU 1 kHz:	Single click in both Ch. A and Ch. B
♦ Mono BBC 1 kHz:	No click
♦ Dual 1 kHz in Ch. A, 400 Hz in Ch. B.:	No click
♦ 48 kHz reference	
Levels:	Silence, 0, -9, -12, -14, -16, -18, and -20 dBFS
Pre-emphasis:	None
Audio reference word clock output:	48 kHz ¹

4.9.6 PT 8606 SDI Digital Genlock

Connector:	BNC
Input impedance:	75 Ω
Format:	270 Mb/s component. Complies with SMPTE 259M and ITU-R BT.656

4.9.7 PT 8607 Longitudinal Time Code Module

Time code on the analog genlock input is transferred to the LTC output.

4.9.7.1 Input, VITC Code Data, G-PAL

Norm:	EBU Tech 3097-E
Amplitude:	550 mV $\pm 5\%$
Bit rate:	1812.5 ± 0.2 kb/s
Position:	Line 6 - 22

4.9.7.2 Output, LTC Code Data, G-PAL

Amplitude:	Typically 2 Vpp
Ringing/Tilt:	< 5% pp
Impedance:	< 30 Ω
Timing:	Output data starts within 20 μ s after start of the frame of the input genlock signal

4.9.7.3 Input, VITC Code Data, M-NTSC

Norm:	ANSI/SMPTE 12M 1986
Amplitude:	570 mV $\pm 5\%$
Bit rate:	1789.77 ± 0.2 kb/s
Position:	Line 10 - 20

4.9.7.4 Output, LTC Code Data, M-NTSC

Amplitude:	Typically 2 Vpp
Ringing/Tilt:	< 2% pp
Impedance:	< 30 Ω
Timing:	Output data starts 6.2 lines $\pm 20\mu\text{s}$ after start of the frame of the input genlock signal

4.9.8 PT 8608 Black Burst Module

Connector:	2 BNC
Output impedance:	75 $\Omega \pm 0.5 \Omega$
Output signal:	Two black bursts; NTSC, PAL or both
Return loss:	>36 dB, to 5 MHz
Sync amplitude:	PAL: -300mV $\pm 2\%$ NTSC: -286mV $\pm 2\%$
Timing range:	PAL: ± 4 fields NTSC: ± 2 fields
Timing resolution:	0.5° f _{sc}
Sc-H phase:	Default 0°, adjustment $\pm 180^\circ$, resolution <1°
S/N ratio:	60 dB unweighted to 5 MHz
Jitter:	Burst jitter: $\pm 0.5^\circ$ Sync jitter: ± 0.5 ns (based on design and burst jitter value)

4.9.9 PT 8609 SDI Black and Colorbar Module

Format:	270 Mb/s component Complies with ITU-R BT 656 and SMPTE 259M
Data format:	Scrambled NRZI 270 Mbit/sec
Connectors:	2 BNC
Output impedance:	75 Ω
Return loss:	> 15 dB, 5 to 270 MHz
Amplitude:	800 mv $\pm 10\%$
Jitter:	<0.25 ns (measuring setup, 10% of clock)
Timing range:	525/60: ± 1 field 625/50: ± 1 field
Resolution:	37.5 ns (one half clock cycle on the 13.5 MHz clock)

Auxiliary data:

- ◆ EDH on/off
- ◆ Embedded audio silence on/off, audio group channel
- ◆ Auxiliary data off

Output Signal:

- ◆ SDI black
- ◆ Full field colorbar:

525 fine:	SMPTE
625 line:	EBU 75% and Colorbar 100%

4.9.10 PT 8610 High Precision OCXO

Frequency stability:	< ± 0.1 ppm (-20 – +60°C)
Aging:	< ± 0.001 ppm/day after 30 days of operation (short-term) < ± 0.1 ppm/year after 30 days of operation (long-term)
Frequency adjustment (externally):	± 3 ppm

5 Accessories

5.1 Accessories

Item:	Quantity:	Ordering Number:
Mains cable, EURO	1	5322 321 11284
Mains cable, US		5322 321 11285
Mains cable, UK		5322 321 11286
Instruction Manual	1	9499 491 02211
Rubber foot selfadhesive	4	5322 462 44434

5.2 Options

Description:	Ordering Number:
PT 8601: Analog Test Signal Generator	9499 086 01001
PT 8602 SDI Test Signal Generator 1	9499 086 02001
PT 8603: SDI Test Signal Generator 2	9449 086 03001
PT 8604 Multiple Parallel Black Burst Outputs	9449 086 04001
PT 8605 AES/EBU Audio Generator	9449 086 05001
PT 8606 SDI Digital Genlock	9449 086 06001
PT 8607 Longitudinal Time Code Module	9449 086 07001
PT 8608 Black Burst Module	9449 086 08001
PT 8609 SDI Black and Colorbar Module	9449 086 09001
PT 8610 High Precision OCXO	9449 086 10001
PM 8552 Rack Mounting Kit	9449 085 52001
Service Manual	9499 495 02111
9 Pole Male Connector	5322 265 10886
9 Pole Female Connector	5322 265 10887

6 Installation


6.1 Initial Inspection

Check the contents of the shipment for completeness and possible transport damage. If the contents are incomplete or damaged, a claim should be filed with the carrier immediately and the DK-Audio Sales or Service organization should be notified in order to facilitate the repair or replacement of the instrument.

6.2 Safety Instruction

6.2.1 Earthing

Before any other connection is made, the instrument must be connected to a protective earth conductor in one of the following ways:

- ♦ via the three-core mains cable
- ♦ via the protective earth terminal marked 

Before connecting the equipment to the mains of the building installation, the proper functioning of the protective earth lead of the building installation needs to be verified.

Warning: Any interruption of the protective conductor inside or outside the instrument, or disconnection of the protective earth terminal, is likely to make the instrument dangerous. Intentional interruption is prohibited.

6.3 Mains Voltage Cord and Fuses

Different power cords are available for the various voltage outlets.

Note:

If the mains plug has to be adapted to the local situation it should only be done by a qualified person.

This instrument is equipped with a tap-less switch mode power supply that covers most nominal voltage ranges in use: 90-250V AC RMS. This obviates the need to adapt to the local mains voltage.

The mains frequency is 48-65 Hz.

Warning: This instrument shall be disconnected from all voltage sources when renewing a fuse.

Mains fuse rating: 1.6 A delayed action, 250 V.

The mains fuseholder is located on the rear panel of the instrument.

If the mains fuse has to be replaced please proceed as follows:

1. Remove the mains cable
2. Lift the plastic cover (fuseholder) by means of 2 small screwdrivers (simultaneously)
3. Insert the new fuse into the top of the fuseholder
4. Re-insert the cover (fuseholder)

Warning: Make sure that only fuses of the required rating, voltage, and of the specified type are used for replacement.

The use of repaired (jumpered) fuses and/or the short-circuiting of the fuse holder is prohibited.

Fuses must only be replaced by a qualified person who is aware of the hazards involved.

6.4 Rack Mounting

This PTV instrument is delivered in a 19" cabinet. Four selfadhesive rubber feet are supplied together with this instrument.

If several cabinets are mounted in a 19" rack, special attention must be paid to the temperature inside the rack.

The PT 5210 is equipped with cooling fan and air inlet on the front.

If the PT 5210 is mounted between other instruments with high surface temperature, this cooling may not be sufficient. Under these circumstances, it is recommended to make space between the instruments, and to establish forced circulation (cooling) in the rack.

6.4.1 Installation of Rack Mounting Kit PM 8552

The rack slides mount in any rack with a front-to-rear spacing between 18 and 27 inches. Reserve clearance between the rear panel of the instrument and the cabinet panel for connectors and to provide necessary air circulation.

Mounting of Slide Tracks

1. Mount the chassis section of the rack slide kit to the instrument with the snap latch at the rear. Make sure that the screws are secured.
2. Mount the rails using the hardware shown in the figure. Align the stationary sections both horizontally and in level.

Installing of the Instrument

1. Pull the slide-out section to the fully extended position.
2. Insert the instrument chassis section into the slide-out sections.
3. Press the snap latches and push the instrument towards the rack frame until the latches snap into their holes.
4. Press the stop latches again and push the instrument totally into the rack.
5. Fix the instrument by means of the front panel screws.

After installation, the slide tracks might need to be slightly adjusted to ensure smooth operation. To do so, pull the instrument halfway out, slightly loosen the screws holding the tracks to the front rail, and allow the tracks to settle to an unbound position. Tighten the screws and by pulling the instrument in and out several times ensure smooth operation.

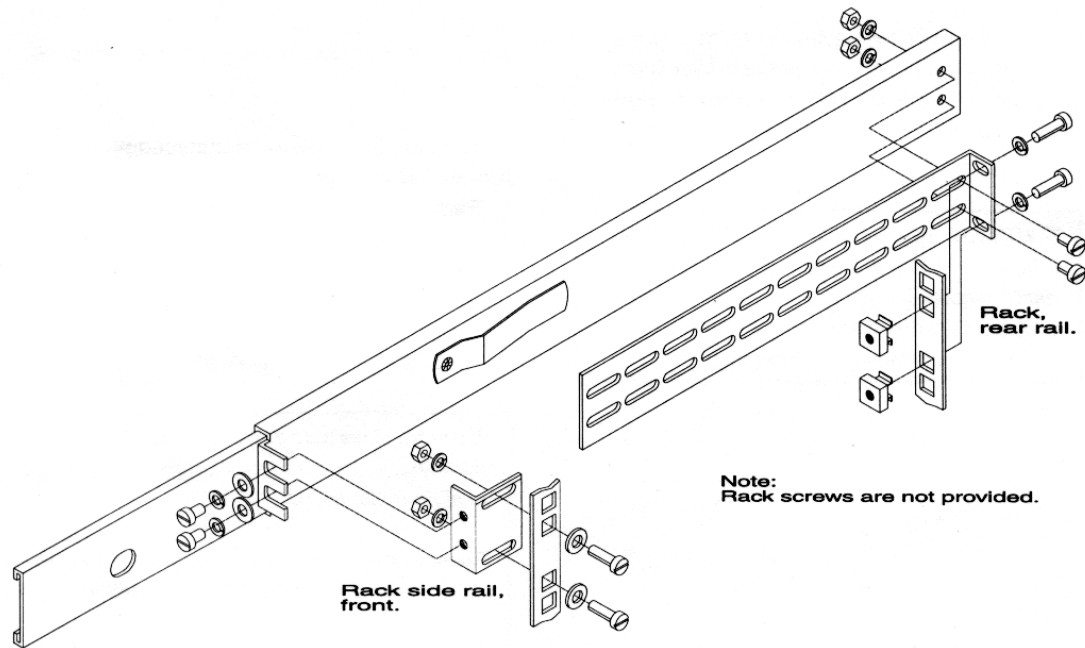


Fig. 5-1 Installation of PM 8552

Removal of the Instrument

Be sure that all cabling is disconnected before removing the instrument.

1. Loosen the screws in the rack frame and pull the instrument forward until the stop latches snap into their holes.
2. Press the stop latches and remove the instrument.

6.5 Cleaning

- Disconnect the instrument from the mains voltage supply before cleaning
- Use only a damp cloth
- Make sure that no liquid is spilled inside the instrument

6.6 Configuration

6.6.1 Remote Interface

Move cable from connector SER (XR1) to PAR (XM1) on Main Board (Unit 1) to change from standard RS232 to simple ground-closure.

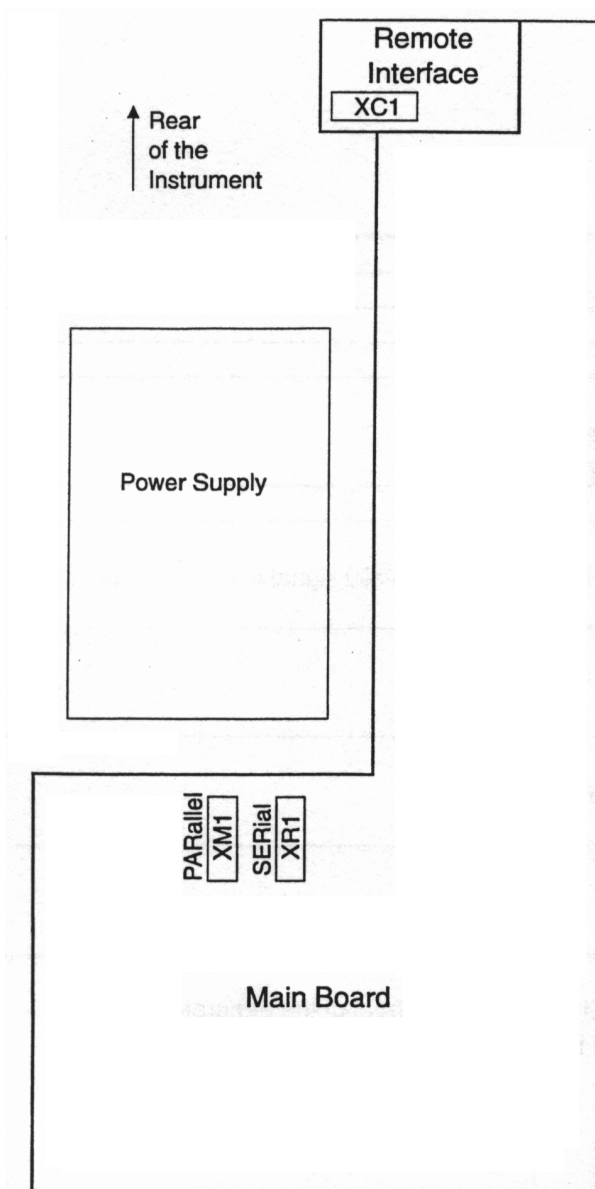


Fig. 5-2 Location of Connectors SER and PAR

6.6.2 Disabling of Level Detectors

It is possible to disable level detectors by solder in the code field (PP1) on the Main Board (Unit 1). Please refer to Fig. 5-3 for location of PP1. To disable a level detector, solder the level signal in column A to column B (+5V).

Row	Level error signal from rear panel connectors:	Connector inside the instrument:
1	ANL BB1	
2	ANL BB2	
3	SDI BLK3 / ANL BB3 / ANALOG BLACK BURST 3-4-5-6-9-10	XA1 (*)
4	SDI BLK4 / ANL BB4	XA1 (*)
5	SDI BLK7 / ANL BB7 / ANL SIG7	XB1 (*)
6	SDI BLK8 / ANL BB8	XB1 (*)
7	SDI BLK5 / ANL BB5	XC1 (*)
8	SDI BLK6 / ANL BB6	XC1 (*)
9	SDI SIG	XJ1 (**)

*) Connector mounted on Sync Generator (Unit 2)

**) Connector mounted on Main Board (Unit 1)

Example:

-To disable level error from ANL BB1, solder A1 to B1

-To disable level error from SDI BLK8, solder A6 to B6

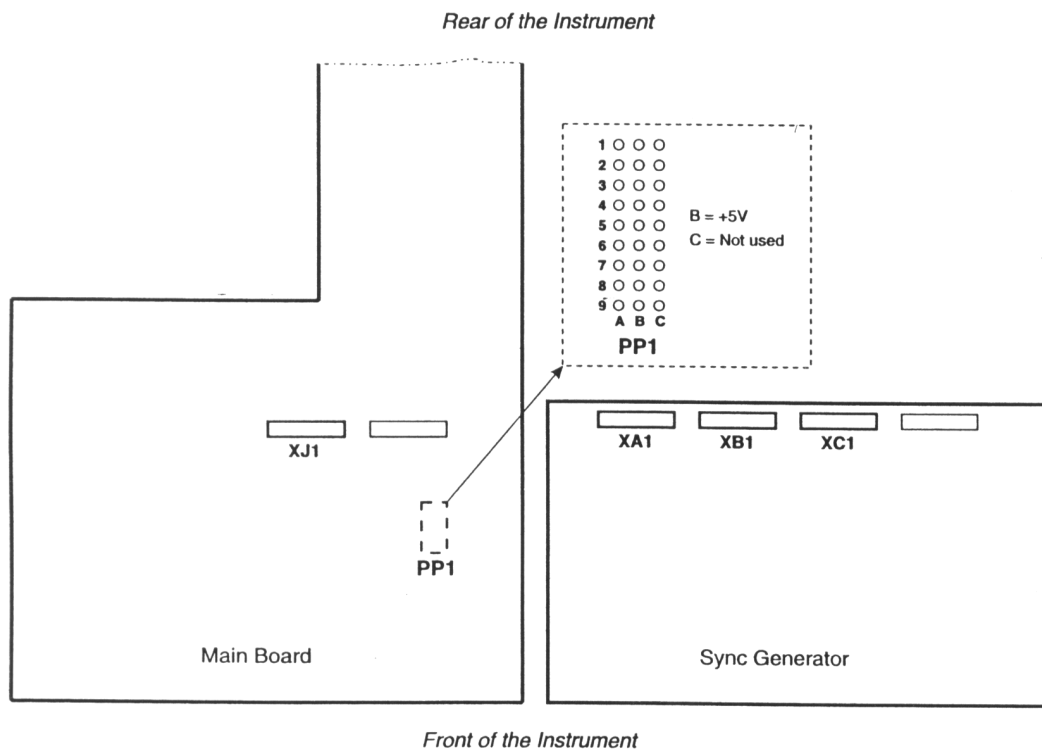


Fig. 5-3 Location of Code Field (PP1)

6.7 Access to and Replacement of Parts

6.7.1 Safety

The opening of covers or removal of parts, except those to which access can be gained by hand, is liable to expose live parts.

The instrument must be disconnected from all voltage sources before performing any adjustment, replacement, maintenance, or repair, which requires the instrument to be opened. If repair of the opened instrument is unavoidable, it must only be carried out by a skilled person who is aware of the hazards involved. To guarantee safety only original spare parts must be used.

6.7.2 Access to the Units

To gain access to the units, remove the screws that secure the top cover of the instrument and lift the cover up.

6.7.3 Installation of Options

The installation instruction is included with the option.

7 Operating Instructions

7.1 General Information

All operational controls and configurations are conveniently carried out from the front panel.

The two-line-by-40-characters LCD display, in conjunction with 4 cursor keys and an **EXECUTE** button, allows easy and intuitive operation of the PT 5210 Varitime™ Digital Sync Generator.

The cursor keys are used to call relevant menus on the display: the top line of the display shows the current status/selection or other current menu choices.

In the upper right corner of the display is an indication of cursor keys used in the active menu.

◀ and ▶ indicate that the right and left arrow buttons can be used; a ▲ indicates that the up button can be used; a ▼ indicates that the down button can be used; a ⬥ indicates that the up and down button can be used; and an **E** indicates that the **EXECUTE** button can be used.

The bottom line of the display indicates new selections or enables changes to parameter setting.

7.2 Front Panel Controls



The ▲ button allows the user to exit the current menu and enter a higher-level menu, or to change parameter.



The ▼ button allows the user to select new menus or sub-menus, or to change parameters.



The ◀ and ▶ are used to scroll horizontally in the menus and to select the individual characters when naming presets and written text into the video full field test signals.

PRESET

The **PRESET** button provides fast access to the instrument presets when switching between different standard applications.

OUTPUT




The **OUTPUT** button provides a fast access to output signal selection on the test signal generators.

GENLOCK

The **GENLOCK** button indicates whether genlock has been selected. Use the button to switch between locked and unlocked mode. The type of genlock mode is selected via the menu system.

7.3 Display Information

To guide the user through operations, symbols of the push buttons, which can be activated at a particular time will appear on the right side of the display.

	Indicates which arrow buttons are active.
E	Indicates that the EXECUTE button must be pressed to activate the required selection.
< >	Indicates the position of the cursor on the menu line.
[]	Indicates that changes to individual characters or digits are possible in timing and naming menus.
...	Indicates that more items are available on the menu line.
	Indicates that the panel is locked. Four different locked modes are available. The padlock will be only visible when the “performed” function is locked.
ESC	To abandon changes, place the cursor on ESC and press also  .
SAVE	To save a changed parameter, place the cursor on SAVE and press the EXECUTE button.

7.4 Indicators and Connections

7.4.1 Front Panel Indicators

POWER ON

A green LED that indicates when DC power is available from the internal DC supply.

WARNING

A red LED that indicates the instrument has detected an irregularity. A more thorough description is given in the display. More errors can be checked in the error log function.

UNLOCKED

A red LED that indicates when genlock mode is enabled but no correct genlock signal is found on the active genlock input. In this case, the generator switches automatically to internal mode until a valid genlock signal becomes available.

7.4.2 Rear Panel connections

Note:

The function of some of the output/input connectors on the rear panel depends upon the functional modules/options included your generator and the functional configuration.



Safety Ground (chassis).

On/Off button

Mains switch

ON: When "I" is pressed.

OFF: When "O" is pressed.

Mains Connector

Mains voltage receptacle.

REMOTE

Connector for remote control of the modulator.

The remote connector can be configured either as standard RS 232 or as simple ground-closure. The configuration is done internally on the Main Board - Unit 1, please see Chapter 6 for location. The instrument is set to RS 232 from factory.

Ground-Closure Remote

When the remote connector is configured for parallel ground-closure control a limited number of function can be controlled.

CHANGEOVER

Remote connector to connect the Sync Pulse Generator directly to a PT 5211 VariTime™ Sync Changeover Unit. This connector is used in set-up with two SPG's and an automatic changeover unit.

ANALOG GENLOCK A/B

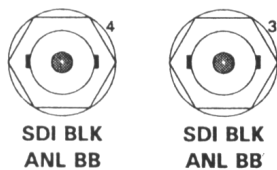
Two analog genlock inputs included as standard. The inputs can be configured either as looped through or 75 Ω terminated.

GENLOCK MONITOR

Buffered 75 Ω output of the selected genlock signal.

ANL BB (Outputs 1 and 2)

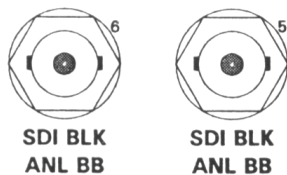
Two standard included outputs with black burst signals.

Outputs 3 and 4**Output Options:**

Not included.

Black burst signals.

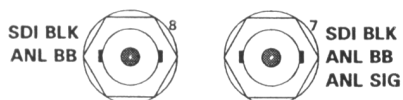
One pair of SDI black or colorbar.

Outputs 5 and 6**Output Options:**

Not included.

Black burst signals.

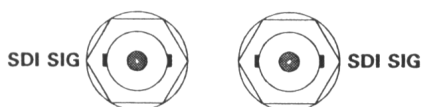
One pair of SDI black or colorbar.

Output 7 and Output 8**Output Options:**

Not included.

Two black burst signals.

One pair of SDI black or colorbar.

SDI SIG**Output Options:**

Not included.

One pair of SDI test signal outputs.

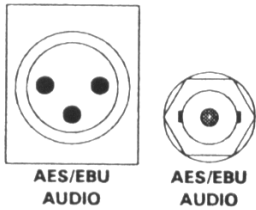
The number of test signals depends upon which SDI test signal generator is mounted.

SDI GENLOCK IN/OUT**Output Options:**

Not included.

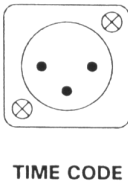
Active loop-through of SDI genlock input.

AES/EBU AUDIO



Output Options:
Not included.
AES/EBU digital audio test signal output.

TIME CODE



Output Options:
Not included.
Output of LTC time code. The time code signal is transferred from the VITC time code in the incoming analog genlock signal.

Note:

When the PT 8604 Multiple Parallel Black Burst option is included, Outputs 3,4,5,6,9 and 10 contain a copy of the output on the BB2 output.

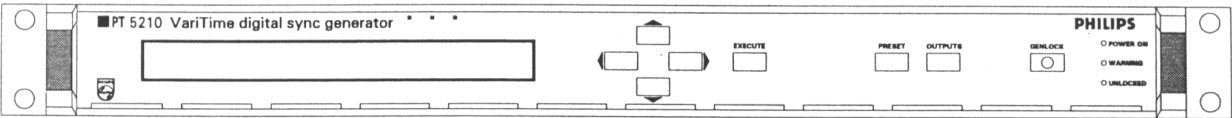


Fig. 6-1 Front of the Instrument

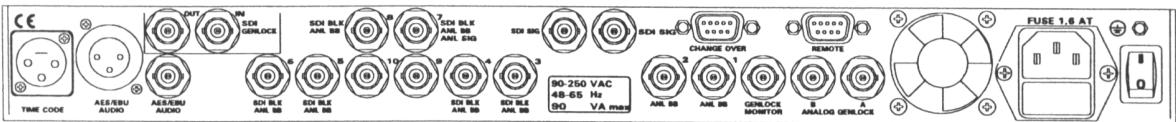


Fig. 6-2 Rear of the Instrument

7.5 Panel Operation

The PT 5210 VariTime™ Digital Sync Generator may be equipped with different modules dependent on version. The menu system always reflects the modules installed. The operation of each of the modules is described below, although it is impossible for all the modules to be installed in one instrument at one time.

7.5.1 Power Up

A diagnostic routine is performed at power-on. After a normal startup, the SPG continues to the status display. If a failure is detected an error message is displayed.

Normal Startup

```
PT 5210 VariTime SPG Power-up diagnose.
```

This message is shown for approx.: **1.5 sec.**

After a successful test the following message is shown:

```
PT 5210 VariTime SPG Power-up diagnose.  
Internal test passed
```

The instrument stops if errors are detected. The diagnose may be continued if you press the **▲**, **▼**, **◀**, or **▶**. When the power-up diagnose program is finished, the instrument may be used, but excluding the erroneous function(s). The "WARNING" LED will continuously indicate an error.

Please see Appendix A for the list of errors detectable during power-up.

After internal test has been shown for approx. 2 seconds, the following display will appear for approx. 5 seconds or until a key has been pressed.

```
PT 5210 VariTime digital SPG  
Version: 1.9 - 1.1
```

7.5.2 Status Displays

If a preset was active at the previous power-down, this preset is automatically recalled and the preset status display is shown. The preset status display shows the number and name of the active preset.

```
PT 5210 VariTime digital SPG      ◀ ▶  
PRESET (8):name of preset      ...
```

If genlock is activated in the preset and no genlock signal is identified, the status display will change to the genlock status display indicating UNLOCKED.

If no preset is active then genlock status display will be displayed.

Use the **◀** and **▶** buttons to select the status displays you want.

Note:

The status displays for the various options are only available when the options are installed.

Status: Preset

PT 5210 VariTime Digital SPG	◀ ▼ ▶
NO PRESET ACTIVE	...

PT 5210 VariTime Digital SPG	◀ ▼ ▶
PRESET (1):name of preset	...

Status: Genlock

Genlock:A	◀ ▼ ▶
Signal:PAL Burst Status: GENLOCKED	...

Genlock:Internal	◀ ▼ ▶
Signal:-----Status:-----	...

The genlock status display shows the input selected for genlock and the format of genlock selected. If the signal is NTSC or PAL the display will also indicate whether sync lock or burst lock is being used.

Status: Analog test signal generator

Analog signal:PLUGE	◀ ▼ ▶
System:PAL w/PAL ID Text:STUDIO 3	...

The analog test signal generator status display shows the signal output from the generator and the system selected. If there is text inserted into the test signal, then this text is also displayed.

Status: SDI test signal generator

SDI signal:PLUGE	◀ ▼ ▶
System:525/59.94 Test:USERTEXT	...

The serial digital test generator status display shows the signal output from the generator and the system selected. If there is text inserted into the test signal then this text is also displayed.

Status: AES/EBU Audio Generator

AES/EBU:Stereo BBC 1kHz	◀ ▼ ▶
Level:-9dBFS Timing:NTSC Phase 1	...

The status display for the AES/EBU digital audio generator shows the output signal and level of the audio. The five NTSC phases or the PAL timing phase is also displayed.

7.6 Menu Operation

Pressing the ▼ button in the status menu will cause the main menu to appear. This is the main route of access to all functions. If the control panel is locked, the padlock symbol will be flashing. Depending on which type of lock is used, it may have to be removed before some operations are allowed.

To exit the STATUS menu, press the ▼ button and move to the main menu:

MENU: <ANALOG-BLACK> SDI-BLACK&CB	◀ ◆ ▶
...	

MENU: <ANALOG-SIGNAL> SDI-SIGNAL	◀ ◆ ▶
...	

MENU: <AES-EBU> GENLOCK PRESET	◀ ◆ ▶
...	

MENU: <CONFIG>	◀ ◆ ▶
...	

Note:

If one or more of the options are not installed, the keyword will be missing in the menu.

Select one of the menus and go on to the next menu, e.g.:

MENU: ANALOG-BLACK, configure	◀ ◆ ▶
SUBMNU: <BB1>BB2	

If more than the standard two analog black burst generators are included in your setup, then the extra generators will also be available in this menu.

The menus have basically the same structure and the same procedure is used with all the menus.

Select one of the items in the menu displayed

- Make a selection in the next menu below
- Use the arrow buttons as indicated in the icon field
- Select **SAVE** and press **EXECUTE** to store the setting
- Select **ESC** and press **▲** button to escape the menu
- or
- Select the next menu level, i.e. 2NDMNU
- or
- Confirm the selection by pressing **EXECUTE** (E is shown in the icon area)

Note:

SAVE does not appear until a parameter is changed.

Unintended changes are cancelled by selecting **ESC** and returning to the level above.

7.7 Detailed Description of Menus

7.7.1 Menu: ANALOG-BLACK, Analog Black Burst Generator

This is the menu for setting the parameters for the analog black burst outputs. The number of selection entries in the analog black burst menu varies with the number of black burst generators installed.

The analog black burst outputs are named BBn, n being the number of the connector on the back of the instrument. The SDI Blacks are named SBn-m, n-m indicating the numbers of the connectors on the rear of the instrument.

Note:

When a PT 8604 Multiple Parallel Black Burst Outputs option is included in your setup, BB2 is connected to the BB3, 4, 5, 6, 9 and 10 outputs.

Setting of the ANALOG-BLACK generators:

```
MENU:ANALOG-BLACK, configure      ◀ ⬢ ▶
SUBMNU:<BB1>BB2
```

- Use the ▲ and ▼ buttons to select BB1
- Then press ▼ to enter the submenu for BB1

```
SUBMNU:ANALOG-BLACK/BB1,select      ◀ ⬢ ▶
2NDMNU:<SYSTEM> TIME  ScH-PHASE COPY
```

The 2NDMNU allows changes to be made in the parameters for the BB1 output.

To change from NTSC to PAL, select SYSTEM

```
2NDMNU:../BB1/SYSTEM, select      ◀ ⬢ ▶
SUSTEM:<NTSC>                     SAVE  ESC
```

Operation:

- Use the ▲ and ▼ buttons to find the system setting you want.
- When the desired system appears in the display, move the cursor to **SAVE** and press
- **EXECUTE** to change the system setting
- If no change is desired, move the cursor to **ESC** and press ▲
Leaving the function takes you back to the ANALOG-BLACK/BB1 submenu.

Analog black burst generator system options:

- ♦ NTSC
- ♦ PAL
- ♦ PAL w/PAL ID

When the system "PAL w/PAL ID" is selected, a pulse indicating PAL Field 1 is included Line 7.

Note:

If the PAL Field 1 pulse in Line 7 is inserted, it is independent of the Sc-H phase setting. If the Sc-H phase has been adjusted, the Line 7 pulse will identify the field as if the phase had not been changed from the nominal setting.

Note:

When changing the system from PAL to NTSC you must check the timing adjustment: a valid PAL timing may NOT be valid in NTSC. If the timing is not valid in NTSC then it will be reset to +0,+0,+0.

To change the delay/advance timing for the BB1 output, select TIME.

2NDMNU:.. /BB1/TIME, edit delay	◀ ▶
V:<+1> H:+008 T: +00124.3	SAVE ESC

Operation:

- Use the ◀ or ▶ buttons to select V, H, or T
- Then use the ▲ and ▼ buttons to change the setting
Changes to the timing are instantaneous, i.e. any changes are reflected immediately in the output signal
- When the desired setting appears in the display, move the cursor to SAVE and press
- **EXECUTE** to change the setting

The timing can be adjusted by coarse or fine adjustment parameters. The coarsest adjustment is field (V) the finest is time (T), and line (H) is in between. The T value is in nanoseconds.

- The T value can be changed by using the ▲ and ▼ buttons to adjust the smallest step for the adjustment, but a faster method is to press **EXECUTE** when the cursor is on the T value. This opens an editor in which each of the time digits can be changed using the ▲ and ▼ buttons
- Positions are selected by using the ◀ and ▶ buttons
- To exit the editor press **EXECUTE**
- When the desired delay setting appears in the display, move the cursor to SAVE and press
- **EXECUTE**
- If no changes are desired, move the cursor to ESC and press ▲
Leaving the function takes you back to the ANALOG-BLACK/BB1 submenu.

To change the Sc-H phase of the BB1 output, select ScH-PHASE

2NDMNU:.. /BB1/SCH-PHASE, EDIT	◀ ▶
ScH-PHASE:<+5deg>	SAVE ESC

The default Sc-H phase for the BB outputs is 0 degrees. The value can be changed in steps of 1 degree.

Operation:

- Use the ▲ and ▼ buttons to change the Sc-H phase
Change to the Sc-H phase is instant, i.e. any change made in the display is reflected immediately in the output signal
- When the desired setting appears in the display, move the cursor to SAVE and press
- **EXECUTE**
- If no change is desired, move the cursor to ESC and press ▲
Leaving the function takes you back to the ANALOG-BLACK/BB1 submenu.

To copy the setting from another ANALOG-BLACK output to this ANALOG-BLACK output, select COPY.

2NDMNU:../BB1/COPY, select	◀ ▶
COPY CONFIG, FROM:<BBn>	OK ESC

Operating:

- Use the ▲ and ▼ buttons to select the source BB generator
- When the required source appears in the display, move the cursor to OK and press **EXECUTE**
- If no change is desired, move the cursor to ESC and press ▲
Leaving the function takes you back to the ANALOG-BLACK/BB1 submenu

Note: Copying will clear an active preset.

7.7.2 Menu: GENLOCK

This is the menu for setting the genlock parameters.

It is always possible to genlock to analog signals; but the PT 8606 SDI Digital Genlock option is necessary in order to genlock to digital signals. The standard genlock inputs are designated A and B, and they can be either configured to signals terminated with 75 Ω or configured as a high impedance loop-through.

The genlock function can be configured to different inputs and signals. Which signals are valid for each of the inputs depends on the setting in the Genlock menu.

Select: GENLOCK

MENU : GENLOCK, select input	◀ ▶
INP:<A PAL Burst> SYS TIME	OK ESC

Operation:

- When an input has been configured to a specific type of genlock, this will be shown in the genlock select input menu
- Use the ▲ and ▼ buttons to scroll through the different input options (with attached genlocked types)
- Then move the cursor to OK and press **EXECUTE** button to change the selection (OK is only visible for other selections than the active)
- If no change is desired, move the cursor to ESC and press ▲

The types of inputs available are:

- ♦ A xxxxxx: Input A terminated 75 Ω
- ♦ B xxxxxx: Input B terminated 75 Ω
- ♦ A-B xxxxxx: Input A and B looped through, high impedance
- ♦ Internal: The standard internal OCXO used as reference
- ♦ Internal 2: The optional PT 8610 OCXO used as reference
- ♦ SDI xxxxx: The optional PT 8606 SDI Digital Genlock module used for genlock input

Included with the selection is a description of the signal type used for the genlock. For instance "A-B PAL Burst" indicates that loop-through A-B is configured for PAL burst lock.

*To change the genlock system for the input selected, select **SYS** in the **GENLOCK** menu.*

SUBMNU:GENLOCK/SYSTEM, select		◀ ▶
SYSTEM:<PAL Burst>	SAVE	ESC

Operation:

- Use the ▲ and ▼ buttons to select the system format of genlock for the input
- When the new format appears on the display, then move the cursor to **SAVE** and press **EXECUTE** to change the signal format
- If no change is desired, move the cursor to **ESC** and press ▲
Leaving the function takes you back to the GENLOCK menu.

Note:

The input is now configured to the new genlock type. The input will not be active, before not active genlock input type has been changed. To active the input, select **OK** in the **GENLOCK** menu and press **EXECUTE**.

Note:

Regardless of your selection, the **GENLOCK** button on the front can always be used to switch between internal and the last used/saved external genlock configuration.

Which signals are available to the different genlock inputs depends upon the type of genlock edited.

Genlock signals available for A, B, and A-B:

- ♦ PAL Burst
- ♦ NTSC Burst
- ♦ 625 Sync
- ♦ 525 Sync
- ♦ 4.43 MHz
- ♦ 3.58 MHz
- ♦ 5 MHz
- ♦ 10 MHz

Genlock signals available for SDI:

- ♦ 525/59.94
- ♦ 626/50

Note:

No Genlock system can be selected when either Internal or Internal 2 is selected.

*To change the genlock timing for the input selected, select **TIME** in the **GENLOCK** menu.*

SUBMNU:GENLOCK/TIME, edit delay		◀ ▶
V:<+0>H:+123 T:+00123.4	SAVE	ESC

Operation:

- Use the ◀ and ▶ buttons to select V, H, or T
- Then use ▲ or ▼ buttons to select the value desired
Changes to the timing are instantaneous, i.e. any changes are reflected immediately in the output signal.

The timing can be adjusted by coarse or fine adjustment parameters. The coarsest adjustment is the Field (V), the finest is Time (T), and Line (H) is between. The T value is in nanoseconds. The timing resolution depends upon the type of signal used for genlock.

- When the desired delay setting appears in the display, move the cursor to **SAVE** and press **EXECUTE**
- If no change is desired, move the cursor to **E S C** and press **▲**.
Leaving the function takes you back to the GENLOCK menu

Note:

The genlock timing can only be changed when the genlock type is a signal containing line and field information.

It is not possible to change timing when the reference is 5/10 MHz subcarrier or internal.

Note:

When changing genlock signal format, for instance, from PAL to NTSC, the timing parameters may become invalid: The timing parameter will then be reset to 0 for the input in question.

7.7.3 Menu: PRESET

MENU:PRESET, select function	◀ ▶
SUBMNU:<RECALL> STORE NAME	...

To recall the Preset, select **RECALL**

SUBMNU:PRESET/RECALL select	◀ ▶
RECALL (8) :< >	OK ESC

Operation:

- Use the **▲** and **▼** buttons to select preset
- When the desired preset appears in the display, move the cursor to **OK** and press **EXECUTE**
- If no change is desired, move the cursor to **ESC** and press **▲**
Leaving the function takes you back to the PRESET menu, or if a preset is recalled the Preset Status display will be activated

Whenever a recall is activated, it will apply to the generator until a value in the operation is altered. If a preset has been canceled, the only way to activate it again is to recall the preset.

If a preset is active when you enter the submenu, the submenu will show the selected preset; otherwise Preset 1 will be selected.

When using the PRESET button:

- ♦ If a preset is active, pressing the **PRESET** button will bring up the recall [number], the number in brackets being the preset currently active
- ♦ If no preset is active, pressing the **PRESET** button will bring up "Recall [1]"
- ♦ The **PRESET** button, if you press it repeatedly, will act like the up button, i.e. the next preset is selected

To store the Preset, select STORE

SUBMNU:PRESET/STORE, select	◀ ▶
STORE (5) :< >	OK ESC

Operation:

- Use the ▲ and ▼ to select the preset to store
- When the desired preset appears in the display, move the cursor to OK and press **EXECUTE**
- If no change is desired, move the cursor to ESC and press ▲
Leaving the function takes you back to the PRESET menu.

To edit the Preset name, select NAME

2NDMNU:PRESETj/NAME, edit name	◀ ▶ E
NAME (3) :<.....>	SAVE ESC

Operation:

- Use the ▲ and ▼ buttons to select the preset to be named
- When the desired preset appears in the display press the button **EXECUTE** to open the text editor
- Use the ▲ and ▼ buttons to select the characters and the ◀ and ▶ buttons to change the position
- Then press the **EXECUTE** button to close the text editor
- Move the cursor to SAVE and press **EXECUTE** to store the name
- If no change is desired, move the cursor to ESC and press ▲
Leaving the function takes you back to the PRESET menu.

7.7.4 Menu: CONFIG

This is the menu for setting parameters not related to the specific output signals.

MENU:CONFIG, select function	◀ ▶
SUBMNU:<LOCK>AUTO-ESC LCD-CONTRAST	...

MENU:CONFIG, select function	◀ ▶
SUBMNU:<DOWNLOAD> RS232 DIAGNOSE	...

- Use the ◀ and ▶ buttons to select the parameter to be change
- Then press the ▼ button to enter the submenu

To change the lockout function for the keyboard, select LOCK

MENU: CONFIG/LOCK, Normal (Off)	◀ ▶
LOCK:<Normal>	On SAVE ESC

MENU: CONFIG/LOCK, Normal (On)	◀ ▶
LOCK:<Normal>	Off SAVE ESC

Description:

The lock function enables/disables different levels of keyboard operation lockout.

Select **NORMAL** for partial keyboard lockout. In this mode, the **GENLOCK**, **PRESET**, and the **OUTPUT** buttons are enabled.

The **GENLOCK** button enables/disables genlock mode (only if the genlock selected is different from internal).

The **PRESET** button operates as a shortcut key to recall presets; stored presets can be recalled but not changed.

The **OUTPUT** button operates as a short-cut key to the signal generators. The button toggles between the all test signal generators, if more than one is installed.

Note:

If the setup has no test signal generator, the OUTPUT button has no function.

Note:

A padlock will be appear in the top right corner of the display of a locked function.

SUBMNU:CONFIG/LOCK, Panel (Off)			◀ ▶
LOCK:<Panel>	On	SAVE	ESC

SUBMNU:CONFIG/LOCK, Panel (On)			◀ ▶
LOCK:<Panel>	Off	SAVE	ESC

Select PANEL for maximal lockout. In this mode no operations are possible, except unlock.

SUBMNU:CONFIG/LOCK, Download (On)			◀ ▶
LOCK:<Download>	Off	SAVE	ESC

SUBMNU:CONFIG/LOCK, Download (Off)			◀ ▶
LOCK:<Download>	On	SAVE	ESC

To lock the download function, select DOWNLOAD

SUBMNU:CONFIG/LOCK, Diagnose (Off)			◀ ▶
LOCK:<Diagnose>	On	SAVE	ESC

SUBMNU:CONFIG/LOCK, Diagnose (On)			◀ ▶
LOCK:<Diagnose>	Off	SAVE	ESC

To lock the diagnostic program, select **DIAGNOSE**. The diagnostic program tests the internal functioning of the generator.

Note:

The diagnostic program is nondestructive of generator setting. When the diagnostic program is running, the output signals may be momentarily distorted.

To change the menu auto escape function, select AUTO-ESCAPE.

SUBMNU:CONFIG/AUTO-ESC, select	◀ ▶
AUTO RETURN TO STATUS:<Off> SAVE	ESC

Auto ESC options:

- ◆ Off
- ◆ On

When the instrument is left in a menu mode, the AUTO ESCAPE function returns the instrument to the last active status display if no key has been activated for 60 seconds.

If the auto escape is disabled, the menu mode will remain active.

To change the contrast level of the display, select LCD-CONTRAST.

SUBMNU:CONFIG/LCD-CONTRAST, set	◀ ▶
<■■■■■>	ESC

- Use the ▲ and ▼ keys to change the contrast level of the display

To copy the instrument settings from one generator to another, select DOWNLOAD.

The DOWNLOAD function is used when two generators are directly connected by an RS232 interface cable.

The cable must be connected to the remote connector on both generators.

The generator to be programmed functions as the master in the procedure. The source generator operates undisturbed during the download procedure.

SUBMNU:CONFIG/DOWNLOAD, select	◀ ▶
DOWNLOAD:<Preset#1> OK	ESC

- When the desired download selection is displayed select OK and press **EXECUTE**

SPG download options:

- ◆ Preset #1
- ◆ Preset #2
- ◆ Preset #3
- ◆ Preset #4
- ◆ Preset #5
- ◆ Preset #6
- ◆ Preset #7
- ◆ Preset #8
- ◆ All Presets
- ◆ Complete SPG

Select PRESET #N to download the programming for a specific preset. The programming will be copied to the same preset number in the target generator as is used in the source generator.

Select ALL PRESETS to copy all eight preset.

Select COMPLETE SPG to copy all the user-programmed settings. This function also copies the actual operating conditions for the source generator, whereas the download preset function only copies the presets.

Note:

Whenever the DOWNLOAD functions are used, either the SPG used must be identical or the modules referred to in the presets must be available at the same positions in both generators.

```
Download Complete SPG from Kuxxxxxx  ◀▶E
Press EXECUTE to start download
```

- Press **EXECUTE** within 10 seconds to continue the downloading process, any other button will Escape the menu

```
Download Complete SPG from Kuxxxxxx  ◀▶E
WARNING! About to alter data  OK <ESC>
```

- Use the ◀ and ▶ buttons to select OK and then press **EXECUTE** if you wish to continue the downloading process
The original programming of the preset of the entire instrument will be overwritten if the process continues
- To stop the process, select ESC and then press ▲

```
Download Complete SPG from Kuxxxxxx  ▲
WARNING! Download in progress  <ESC>
```

- To abort the download, press ▲
- The instrument returns to normal operation after completed downloading. If the complete instrument setting has been copied, the instrument will operate according to this setting

CAUTION:

Selecting ESC during the downloading process will not reset to the values in use before the downloading process was started.

ESC will reset the programming of the selected preset number or the entire instrument to its original factory programming !

To configure the RS232 remote communication, select RS232.

```
SUBMNU:CONFIG/RS232, select  ◀▶
2NDMNU:<BAUD-RATE> DATA-BIT  PARITY  ...
```

```
SUBMNU:CONFIG/RS232, select  ◀▶
2NDMNU:<HANDSHAKE>          ...
```

- Use the ▲ and ▼ buttons to select the parameter to be changed
- Then press the ▼ button to enter the submenu for parameter setting in the RS232 interface

To set the RS232 interface speed, select BAUD-RATE

2NDMNU:../RS232/BAUD-RATE, select	◀ ▶
BAUD-RATE:<300>	SAVE ESC

Operation:

- Use the ▲ and ▼ buttons to change the baud rate selection
- When the baud rate you want appears in the display, move the cursor to **SAVE** and press **EXECUTE** to change the setting
- If no change is desired, move the cursor to **ESC** and press ▲
Leaving the function takes you back to the RS232 submenu

Baud rate options:

- ◆ 300
- ◆ 600
- ◆ 1200
- ◆ 2400
- ◆ 4800
- ◆ 9600

To set the number of data bits, select DATA-BIT

2NDMNU:../RS232/DATA-BIT, select	◀ ▶
DATA-BIT:<7>	SAVE ESC

Operation:

- Use the ▲ and ▼ buttons to change the number of data bits
- When the desired number of data bit you want appears in the display, move the cursor to **SAVE** and press **EXECUTE** to change the setting
- If no change is desired, move the cursor to **ESC** and press ▲.
Leaving the function takes you back to the RS232 submenu.

Data bit options:

- ◆ 7
- ◆ 8

To set the parity bit calculation, select PARITY.

2NDMNU:../RS232/PARITY, select	◀ ▶
Parity:<None>	SAVE ESC

Operation:

- Use the ▲ and ▼ buttons to change the parity bit
- When the desired parity bit appears in the display, move the cursor to **SAVE** and press **EXECUTE** to change the setting.
- If no change is desired, move the cursor to **ESC** and press ▲
Leaving the function takes you back to the RS232 submenu.

Parity options:

- ♦ None
- ♦ Odd
- ♦ Even

To set the handshake function, select HANDSHAKE

2NDMNU:../RS232/PARITY, select	◀ ▶
PARITY:<XON/OFF>	SAVE ESC

Operation:

- Use the ▲ and ▼ buttons to change the handshake
- When the desired handshake appears in the display, move the cursor to *SAVE* and press **EXECUTE** to change the setting
- If no change is desired, move the cursor to *ESC* and press ▲
Leaving the function takes you back to the RS232 submenu.

Handshake options:

- ♦ XON/XOFF
- ♦ RTS/CTS

For description of DIAGNOSE submenu please refer to Appendix B.

7.7.5 Menu: ANALOG SIGNAL, Analog Test Signal Generator

This is the menu for setting the parameters for the analog test signal generator output. This menu is only available in generators fitted with the PT 8601 Analog Test Signal Generator option.

MENU:ANALOG-SIGNAL, configure	◀ ▶
SUBMNU:<PATTERN> TEXT SYSTEM	...

MENU:ANALOG-SIGNAL, configure	◀ ▶
SUBMNU:<TIME> Sch-PHASE	...

- Use the ▲ and ▼ buttons to select the parameter to be changed with
- Then press the ▼ button to enter the submenu for the analog test signal generator

To change the output test signal pattern, select PATTERN.

Which patterns are available depends upon the configuration of the test signal generator, i.e. whether the generator output is configured as NTSC or PAL output.

SUBMNU:ANALOG-SIGNAL/PATTERN	◀ ▶
PATTERN:<SMPTE C.Bar>	SAVE ESC

Operation:

- Use the ▲ and ▼ buttons to change the pattern selected
- Changes of the pattern are instantaneous, i.e. that any changes are reflected immediately in the output signal
- When the desired pattern appears in the display, move the cursor to *SAVE* and press **EXECUTE** to change the setting

- If no changes are desired, move the cursor to **ESC** and press **▲**
Leaving the function takes you back to the ANALOG-SIGNAL menu.

Patterns available in the analog test signal generator:

- ◆ Colorbar SMTPE Available only in NTSC mode
- ◆ Colorbar EBU 75% Available only in PAL mode
- ◆ Colorbar 100% Available only in PAL mode
- ◆ C.B. Split Field 75% with gray Available only in PAL mode
- ◆ C.B. Split Field 75% with red Available only in PAL mode
- ◆ Window 15%
- ◆ Window 20%
- ◆ Window 100%
- ◆ Cross Hatch
- ◆ PLUGE
- ◆ Safe Area
- ◆ Shallow Ramp
- ◆ Multiburst
- ◆ 75% Red
- ◆ Black Burst

To change the text inserted in the test pattern, select TEXT.

SUBMNU: ANALOG-SIGNAL/TEXT, edit				◀ ▶ E
USER TEXT:<	>	ON	SAVE	ESC

SUBMNU: ANALOG-SIGNAL/TEXT, edit				◀ ▶ E
USER TEXT:<	>	OFF	SAVE	ESC

Operation:

- To start the editor, select the TEXT field and press **EXECUTE**
- Use the **▲** and **▼** buttons to change the character position
- Scroll through the characters with the **▲** and **▼** buttons. The character being edited will flash during the editing process
- To exit the editor, press **EXECUTE**
- The text string can be turned on or off by using the **▲** and **▼** buttons to select ON/OFF
- When the desired selection appears in the display, move the cursor to **SAVE** and press **EXECUTE**
- If no change is desired, move the cursor to **ESC** and press **▲**
Leaving the function takes you back to the ANALOG-SIGNAL menu.

Note:

Selecting OFF does not clear the text string setting.

Text insertion options:

- ◆ 8 UPPER-case characters can be inserted into the signal and/or the text insertion can be disabled
- ◆ Characters available: A-Z, 0-9, -, _, and space

To change from NTSC to PAL, select SYSTEM.

SUBMNU: ANALOG-SIGNAL/SYSTEM, select		◀ ▶
SYSTEM: <NTSC>	SAVE	ESC

Operation:

- Use the ▲ and ▼ buttons to find the system setting you want
- When the desired system appears in the display, move the cursor to SAVE and press **EXECUTE** to change the system setting
- If no change is desired, move the cursor to ESC and press ▲
Leaving the function takes you back to the ANALOG-SIGNAL men.

Analog signal generator system options:

- ♦ NTSC
- ♦ PAL
- ♦ PAL w/PAL ID

When the system PAL w/PAL ID 7 is selected, a pulse indicating PAL Field 1 is included in Line 7.

Note:

If the PAL Field 1 pulse in Line 7 is inserted, it is independent of the Sc-H phase setting. If the Sc-H phase has been adjusted, the PAL ID pulse will identify the field as if the phase had not been changed from the nominal setting.

When changing the system from PAL to NTSC you must check the timing adjustment: a valid PAL timing may NOT be valid in NTSC. If the timing is not valid in NTSC then it will be reset to +0,+0,+0.

To change the delay/advance timing for the ANALOG-SIGNAL output, select TIME.

SUBMNU: ANALOG-SIGNAL/TIME, edit		◀ ▶
V: <+1> H: +123 T: +00123.4	SAVE	ESC

Operation:

- Use the ▲ and ▼ buttons to select V, H, or T
- Then use the ▲ and ▼ buttons to change the setting
- Changes to the timing are instantaneous, i.e. any changes are reflected immediately in the output signal
- When the desired setting appears in the display, move the cursor to SAVE and press **EXECUTE** to change the setting

The timing can be adjusted by coarse or fine adjustment parameters. The coarsest adjustment is field (V), the finest is time (T), and line (H) is in between. The T value is in nanoseconds.

- The T value can be changed by using the ▲ and ▼ buttons to adjust the smallest step for the adjustment but a faster method is to press **EXECUTE** when the cursor is on the T value. This opens an editor in which each of the time digits can be changed using the ▲ and ▼ buttons
- Positions are selected by using the ◀ and ▶ buttons
- To exit the editor press **EXECUTE**
- When the desired delay setting appears in the display, move the cursor to S A V E and press **EXECUTE**

- If no changes are desired, move the cursor to **ESC** and press **▲**
Leaving the function takes you back to the ANALOG-SIGNAL menu.

To change the Sc-H phase of the ANALOG-SIGNAL output, select ScH-PHASE.

SUBMNU: ANALOG-SIGNAL/SCH-PHASE	◀ ▶
SCH-PHASE: <+0deg>	SAVE ESC

The default Sc-H phase for the ANALOG-SIGNAL output is 0 degrees. The value can be changed in steps of 1 degree.

Operation:

- Use the **▲** and **▼** buttons to change Sc-H Phase
Change to the Sc-H phase is instant, i.e. any change made in the display is reflected immediately in the output signal
- When the desired setting appears in the display, move the cursor to **SAVE** and press **EXECUTE**
- If no change is desired, move the cursor to **ESC** and press **▲**
Leaving the function takes you back to the ANALOG-SIGNAL menu.

7.7.6 Menu: SDI-SIGNAL, Serial Digital Test Signal Generators 1 and 2

This is the menu for setting the parameters for the Serial Digital Test Signal Generator output.

Two different generators are available: the PT 8602 and the PT 8603. The difference is the number of test signal patterns included.

MENU: SDI-SIGNAL, configure	◀ ▶
SUBMNU: <PATTERN> TEXT SYSTEM	...

MENU: SDI-SIGNAL, configure	◀ ▶
SUBMNU: <EDH> EMB.AUDIO-SIGNAL	...

MENU: SDI-SIGNAL, configure	◀ ▶
SUBMNU: <EMB.AUDIO-LEVEL> TIME	...

- Use the **◀** and **▶** buttons to select the parameter to be changed
- Then press the **▼** button to enter the submenu for the Serial digital test signal generator

To change the output test signal pattern, select PATTERN.

Which patterns are available depends upon the configuration of the test signal generator, i.e. whether the generator output is configured as 525/59.94 or 625/50.

MENU: SDI-SIGNAL/PATTERN, select	◀ ▶
PATTERN: <SMPTE C.Bar>	SAVE ESC

Operation:

- Use the **▲** and **▼** buttons to change the pattern selected
- Changes of the pattern are instantaneous, i.e. any changes are reflected immediately in the output signal
- When the desired pattern appears in the display, move the cursor to **SAVE** and press to change the setting

- If no changes are desired, move the cursor to **ESC** and press **▲**
Leaving the function takes you back to the SDI-SIGNAL menu.

Patterns available in the PT 8602 SDI Test Signal Generator:

- ♦ SMPTE Colorbar Available only in 525/59.94 mode
- ♦ Colorbar 100% Available only in 626/50 mode
- ♦ Colorbar EBU 75% Available only in 625/50 mode
- ♦ Colorbar EBU 75% (8 bit) Available only in 625/50 mode
- ♦ C.B. Split Field 75% with gray Available only in 625/50 mode
- ♦ C.B. Split Field 75% with red Available only in 625/50 mode
- ♦ SDI Check Field
- ♦ Shallow Ramp
- ♦ SDI Digital timing
- ♦ SDI Black

Patterns available in the PT 8603 SDI Test Signal Generator 2:

- ♦ SMPTE Colorbar Available only in 525/59.94 mode
- ♦ Colorbar 100% Available only in 626/50 mode
- ♦ Colorbar EBU 75% Available only in 625/50 mode
- ♦ Colorbar EBU 75% (8 bit) Available only in 625/50 mode
- ♦ C.B. Split Field 75% with gray Available only in 625/50 mode
- ♦ C.B. Split Field 75% with red Available only in 625/50 mode
- ♦ SDI Check Field
- ♦ Shallow Ramp
- ♦ SDI Digital timing
- ♦ SDI Black
- ♦ Window 15%
- ♦ Window 20%
- ♦ Window 100%
- ♦ Crosshatch
- ♦ PLUGE
- ♦ Multiburst
- ♦ 75% Red

To change the text inserted in the test pattern, select *TEXT*.

SUBMNU:SDI-SIGNAL/TEXT, edit text	◀ ▶ E
USER-TEXT:< > On SAVE	ESC

SUBMNU:SDI-SIGNAL/TEXT, edit text	◀ ▶ E
USER-TEXT:< > Off SAVE	ESC

Operation:

- To start the editor, select the **TEXT** field and press **EXECUTE**
- Use the **◀** and **▶** buttons to select the character position
- Scroll through the characters with the **▲** and **▼** buttons. The character being edited will flash during the editing process
- To exit the editor, press **EXECUTE**
- The text string can be turned on or off by using the **û** and **ú** buttons to select ON/OFF
- When the desired selection appears in the display, move the cursor to **SAVE** and press **EXECUTE**

- If no change is desired, move the cursor to **ESC** and press **▲**
Leaving the function takes you back to the SDI-SIGNAL menu.

Note:

Selecting OFF does not clear the text string setting.

Text insertion options:

- ♦ 8 UPPER-case characters can be inserted into the signal and/or the text insertion can be disabled
- ♦ Characters available: A-Z, 0-9, -, _, and space

To change from the 525/59.94 system to the 625/50 system, select *SYSTEM*.

MENU:SDI-SIGNAL/SYSTEM, select	◀ ▶
SYSTEM:<525/59.94>	SAVE ESC

Operation:

- Use the **▲** and **▼** buttons to change the system setting
- When the desired signal system appears in the display, move the cursor to **SAVE** and press **EXECUTE** to change the setting
- If no change is desired, move the cursor to **ESC** and press **▲**
Leaving the function takes you back to the SDI-SIGNAL menu.

SDI signal system options:

- ♦ 525/59.94
- ♦ 625/50

Note:

When changing from 625 to 525 lines you must check the timing adjustment. A valid 625 lines timing may NOT be valid in 525 lines. If the timing is not valid in 525 lines then it will be reset.

To enable/disable insertion of EDH information in the SDI-SIGNAL, select *EDH*.

SUBMNU:SDI-SIGNAL/EDH, select	◀ ▶
EDH-INSERTION:<Off>	SAVE ESC

Operation:

- Use the **▲** and **▼** buttons to enable/disable insertion of EDH
- Enabling/disabling of the insertion of EDH is instantaneous, i.e. that any change is reflected immediately in the output signal
- When the desired function appears in the display, move the cursor to **SAVE** and press **EXECUTE** to change the setting
- If no changes are desired, move the cursor to **ESC** and press **▲**
Leaving the function takes you back to the SDI-SIGNAL menu.

EDH insertion options:

- ♦ Off
- On

To select, enable, or disable the audio embedded on the SDI signal, select EMB.AUDIO-SIGNAL.

SUBMNU: SDI - SIGNAL / EMB . AUDIO - SIGNAL	◀ ▶
SIGNAL: <Off>	SAVE ESC

Operation:

- Use the ▲ and ▼ buttons to change the audio signal and audio format
- Change of the audio signal/format is instantaneous, i.e. that any change is reflected immediately in the output signal
- When the desired audio signal/format appears in the display, move the cursor to **SAVE** and press **EXECUTE** to change the setting
- If no changes are desired, move the cursor to **ESC** and press ▲
Leaving the function takes you back to the SDI-SIGNAL menu.

The following signals are available as embedded audio from the SDI Test Signal Generators:

- | | |
|---------------------|--|
| ♦ Off | |
| ♦ Stereo 800 Hz | No click |
| ♦ Stereo 1 kHz | No click |
| ♦ Stereo EBU 1 kHz | Single click in Ch. A |
| ♦ Stereo BBC 1 kHz | Single click in Ch. A, dual click in Ch. B |
| ♦ Mono EBU 1 kHz | Signal click in both Ch. A and Ch.B |
| ♦ Mono BBC 1 kHz | No click |
| ♦ Dual 1 kHz 400 Hz | No click |

To change the level of the audio signal embedded on the SDI-SIGNAL.

SUBMNU: SDI - SIGNAL / EMB . AUDIO - LEVEL	◀ ▶
LEVEL: <Silence>	SAVE ESC

Operation:

- Use the ▲ and ▼ buttons to change the embedded audio signal level
- Change of the embedded audio signal level is instantaneous, i.e. that any change is reflected immediately in the output signal
- When the desired embedded audio signal level appears in the display, move the cursor to **SAVE** and press **EXECUTE** to change the setting
- If no change is desired, move the cursor to **ESC** and press ▲ .
Leaving the function takes you back to the SDI-SIGNAL menu

SDI embedded audio level options:

- ♦ Silence
- ♦ 0 dBFS
- ♦ -9 dBFS
- ♦ -12 dBFS
- ♦ -14 dBFS
- ♦ -16 dBFS
- ♦ -18 dBFS
- ♦ -20 dBFS

*To change the delay/advance timing for the SDI-SIGNAL output, select **TIME**.*

MENU: SDI-SIGNAL/TIME, edit delay				◀ ▶
v: <-1>	H: -12	T: -00123.4	SAVE	ESC

Operation:

- Use the ◀ or ▶ buttons to select V, H, or T
- Then use the ▲ and ▼ buttons to change the setting
- Changes to the timing are instantaneous, i.e. any changes are reflected immediately in the output signal
- When the desired setting appears in the display, move the cursor to **SAVE** and press **EXECUTE** to change the setting

The timing can be adjusted by coarse or fine adjustment parameters. The coarsest adjustment is field (V), the finest is time (T), and line (H) is in between. The T value is in nanoseconds, with a resolution of approximately 37.5 ns.

- The T value can be changed by using the ▲ and ▼ buttons to adjust the smallest step for the adjustment but a faster method is to press **EXECUTE**, when the cursor is on the T value. This opens an editor in which each of the digits can be changed using the ▲ and ▼ buttons with resolution of 37.5 ns
- Positions are selected by using the ◀ and ▶ buttons
- To exit the editor press **EXECUTE**
- When the desired delay setting appears in the display, move the cursor to **SAVE** and press **EXECUTE**
- If no changes are desired, move the cursor to **ESC** and press ▲
Leaving the function takes you back to the SDI-SIGNAL menu.

7.7.7 Menu: AES-EBU, AES/EBU Digital Audio Generator

This is the menu for setting the parameters for the AES/EBU digital audio generator, available as the PT 8605 AES/EBU Audio Generator option.

The generator can supply test tones in different formats or a 48 kHz reference square wave.

MENU: AES-EBU, configure output				◀ ▶
SUBMNU: <SIGNAL> LEVEL TIMING				...

- Use the ◀ and ▶ buttons to select the parameter to be changed
- Then press the ▼ button to enter the submenu for the AES/EBU audio generator

*To select the audio signal output, select **SIGNAL***

SUBMNU: AES-EBU/SIGNAL select				◀ ▶
SIGNAL: <Stereo 800 Hz>				SAVE ESC

Operation:

- Use the ▲ and ▼ buttons to change the audio signal selection
- Changes of the audio signal are instantaneous, i.e. that any changes are reflected immediately in the output signal
- When the desired audio signal appears in the display, move the cursor to **SAVE** and press **EXECUTE** to change the setting
- If no changes are desired, move the cursor to **ESC** and press ▲
Leaving the function takes you back to the AES-EBU menu.

Signal options:

♦ Stereo 800 Hz	No click
♦ Stereo 1 kHz	No click
♦ Stereo EBU 1 kHz	Single click in Ch. A
♦ Stereo BBC 1 kHz	Single click in Ch. A, dual click in Ch. B
♦ Mono EBU 1 kHz	Signal click in both Ch. A and Ch. B
♦ Mono BBC 1 kHz	No click
♦ Dual 1 kHz 400 Hz	No click
♦ 48 kHz reference	No click

Note:

When the 48 kHz reference square wave signal is selected, the signal and level are not adjustable.

To change the level of the AES/EBU audio signal level, select LEVEL.

MENU: AES-EBU/LEVEL select		◀ ▶
LEVEL: <Silence>	SAVE	ESC

Operation:

- Use the ▲ and ▼ buttons to change the audio signal selection
- Changes of the audio signal are instantaneous, i.e. that any changes are reflected immediately in the output signal
- When the desired audio signal appears in the display, move the cursor to **SAVE** and press **EXECUTE** to change the setting
- If no changes are desired, move the cursor to **ESC** and press ▲
Leaving the function takes you back to the AES-EBU menu.

AES/EBU level options:

- ♦ Silence
- ♦ 0 dBFS
- ♦ -9 dBFS
- ♦ -12 dBFS
- ♦ -14 dBFS
- ♦ -16 dBFS
- ♦ -18 dBFS
- ♦ -20 dBFS

Note:

If you select silence, the data bit indicating stereo, mono, or dual sound will continue to be active.

To change the phase timing of the AES/EBU audio data, select *TIMING*.

MENU: AES-EBU/TIMING, select	◀ ▶
TIMING: <PAL>	SAVE ESC

Operation:

- Use the ▲ and ▼ buttons to change the audio signal selection
- Changes of the audio signal are instantaneous, i.e. that any changes are reflected immediately in the output signal
- When the desired audio signal appears in the display, move the cursor to **SAVE** and press **EXECUTE** to change the setting
- If no changes are desired, move the cursor to **ESC** and press ▲
Leaving the function takes you back to the AES-EBU menu.

AES/EBU audio timing options:

- ♦ PAL
- ♦ NTSC Phase 1
- ♦ NTSC Phase 2
- ♦ NTSC Phase 3
- ♦ NTSC Phase 4
- ♦ NTSC Phase 5

Note:

Only one phase is needed for audio in PAL environments, due to the simple relation between the audio sample rate and the PAL system. For audio in NTSC, five different phases are required to be able to synchronize under all circumstances.

7.7.8 Menu: **SDI-BALCK&CB, SDI Black and Colorbar Generator**

This is the menu in which you set the parameters for the serial digital black and colorbar outputs.

The number of selection entries in the menu depends on the number of SDI BLACK&CB generators used. When there are no generators, the menu item is also omitted.

The SDI BLACK&CB outputs are designated SBn-m, n-m being the numbers on the connectors on the rear of the instrument.

The SDI-BLACK&CB generators always supply one pair of two identical outputs.

MENU: SDI-BLACK&CB, configure	◀ ▶
SUBMNU: <SB3-4> SB5-6	...

- Use the ◀ and ▶ buttons to select SB3-4
- Then press ▼ to enter the submenu for SB3-4

SUBMNU: SDI-BLACK/CB/SB3-4, select	◀ ▶
2NDMNU: <PATTERN> SYSTEM EDH	...

SUBMNU: SDI-BLACK&CB/SB3-4, select	◀ ▶
2NDMNU: <EMB.AUDIO>TIME COPY	...

The 2NDMNU allows changes to be made the parameters for the SB3-4 output.

To change the output signal pattern, select *PATTERN*.

2NDMNU:../SB3-4/PATTERN, select	◀ ▶
PATTERN:<Black>	SAVE ESC

Operation:

- Use the ▲ and ▼ buttons to change the audio signal selection
- Changes of the audio signal are instantaneous, i.e. that any changes are reflected immediately in the output signal
- When the desired audio signal appears in the display, move the cursor to **SAVE** and press **EXECUTE** to change the setting
- If no changes are desired, move the cursor to **ESC** and press ▲
Leaving the function takes you back to the SDI-BLACK&CB/SBn-m submenu.

Pattern selection options:

- ♦ SMPTE Colorbar Available only in 525/59.94 mode
- ♦ Colorbar EBU 75% Available only in 625/50 mode
- ♦ Colorbar 100% Available only in 625/50 mode
- ♦ SDI Black

To change output signal system, select SYSTEM

2NDMNU:../SB3-4/SYSTEM, select	◀ ▶
SYSTEM:<525/59.94>	SAVE ESC

Operation:

- Use the ▲ and ▼ buttons to change the audio signal selection
- Changes of the audio signal are instantaneous, i.e. that any changes are reflected immediately in the output signal
- When the desired audio signal appears in the display, move the cursor to **SAVE** and press **EXECUTE** to change the setting
- If no changes are desired, move the cursor to **ESC** and press ▲
Leaving the function takes you back to the SDI-BLACK&CB/SBn-m submenu.

SDI black system options:

- ♦ 525/59.94
- ♦ 625/50

Note:

When changing from 625 to 525 lines you must check the timing adjustment.

A valid 625 lines timing may NOT be valid in 525 lines. If the timing is not valid in 525 lines then it will be reset.

To enable/disable insertion of EDH information, select EDH.

2NDMNU:../SB3-4/EDH, select	◀ ▶
EDH-INSERTION:<Off>	SAVE ESC

Operation:

- Use the ▲ and ▼ buttons to change the audio signal selection
- Changes of the audio signal are instantaneous, i.e. that any changes are reflected immediately in the output signal
- When the desired audio signal appears in the display, move the cursor to **SAVE** and press **EXECUTE** to change the setting
- If no changes are desired, move the cursor to **ESC** and press ▲
Leaving the function takes you back to the SDI-BLACK&CB/SBn-m submenu.

EDH insertion options:

- ♦ On
- ♦ Off

To change the setting for the embedded audio information, select EMB.AUDIO.

2NDMNU:.. /SB3-4/EMB.AUDIO, select	◀▶
EMBEDDED-AUDIO:<Off>	SAVE ESC

Operation:

- Use the ▲ and ▼ buttons to change the audio signal selection
- Changes of the audio signal are instantaneous, i.e. that any changes are reflected immediately in the output signal
- When the desired audio signal appears in the display, move the cursor to **SAVE** and press **EXECUTE** to change the setting
- If no changes are desired, move the cursor to **ESC** and press ▲
Leaving the function takes you back to the SDI-BLACK&CB/SBn-m submenu.

Embedded audio setting options:

- ♦ Silence
- ♦ Off

To change the delay or advance timing, select TIME.

2NDMNU:.. /SB3-4/TIME, edit delay	◀▶
V:<+1> H:+012 T:+00125.4	SAVE ESC

Operation:

- Use the ◀ or ▶ buttons to select V, H, or T
- Then use the ▲ and ▼ buttons to change the setting
- Changes to the timing are instantaneous, i.e. any changes are reflected immediately in the output signal
- When the desired setting appears in the display, move the cursor to **SAVE** and press **EXECUTE** to change the setting

The timing can be adjusted by coarse or fine adjustment parameters. The coarsest adjustment is field (V), the finest is time (T), and line (H) is in between. The T value is in nanoseconds.

- The T value can be changed by using the ▲ and ▼ buttons to adjust the smallest step for the adjustment but a faster method is to press **EXECUTE**, when the cursor is on the T value. This opens an editor in which each of the digits can be changed using the ▲ and ▼ buttons
- Positions are selected by using the ◀ and ▶ buttons
- To exit the editor press **EXECUTE**
- When the desired delay setting appears in the display, move the cursor to **SAVE** and press **EXECUTE**
- If no changes are desired, move the cursor to **ESC** and press ▲
Leaving the function takes you back to the SDI-BLACK&CB/SBn-m submenu.

To copy the setting from another SDI-BLACK&CB output to your SDI-BLACK&CB output, select COPY.

2NDMNU:../SB3-4/COPY, select	◀ ▶
COPY CONFIG.FROM:<SBx-y>	OK ESC

Operation:

- Use the ▲ and ▼ buttons to select the source SB generator.
- When the desired source SDI-BLACK&CB generator appears in the display, move the cursor to **OK** and press **EXECUTE** to copy the setting
- If no changes are desired, move the cursor to **ESC** and press ▲
Leaving the function takes you back to the SDI- BLACK&CB/SBn-m submenu.

Note:

Copying will always clear an active preset, due to the possible change in output signal.

7.8 Resets

7.8.1 Master Reset

The master reset function resets some of the major user programmed parameters in the generator.

The master reset should only be used when the generator has entered a erroneous software loop.

To execute a Master Reset:

- Turn ON the generator while pressing simultaneously the:
◀, ▶, and **EXECUTE** buttons

PT 5210 VariTime SPG Master reset...
Selftest in progress...

After the master reset is done the following display will appear.

```
PT 5210 VariTime SPG Master reset...
      Internal test passed...
```

This message is shown for 1.5 seconds, and then the instrument proceeds to the start-up but includes TEST in the main menu. This TEST menu is only for factory use.

Please see Appendix A for the list of errors detectable during master reset.

The following parameters are reset to factory values:

Parameter:	Factory value:
AUTO ESCAPE	On
PANELLOCK	Off
NORMALLOCK	Off
DIAGNOSE LOCK	Off
RS232-INTERFACE	9600,8, NONE, RTS/CTS
LOCAL LOCK-OUT	Off (RS 232 only)
CONTRAST	17 (middle contrast)

7.8.2 Factory Reset

The Factory Reset function resets **all user-programmed parameters** to the factory-preset.

This function should not be used except in very unusual situations.

To execute the Factory Reset.

- Turn ON the generator while pressing simultaneously the:
 ◀ and ▶ buttons

```
PT 5210 VariTime SPG Master reset...
      Selftest in progress...
```

After the factory reset is done the following display will appear.

```
PT 5210 VariTime SPG Master reset...
      Internal test passed...
```

This message is shown for 1.5 seconds, and then the instrument proceeds to the normal start-up.

Please see Appendix A for the list of errors detectable during factory reset.

8 Remote Interface

8.1 General Information

Two remote interfaces are standard in the instrument:

- ♦ A simple ground closure parallel interface, which allows remote control of some of the major operational parameters of the PT 5210.
- ♦ A serial remote gives control over all the functions of the PT 5210. The serial remote operates by use of an RS 232 communication port.

To select type of remote interface move cable between connectors PAR (XM1) and SER (XR1) on Main Board (Unit 1).

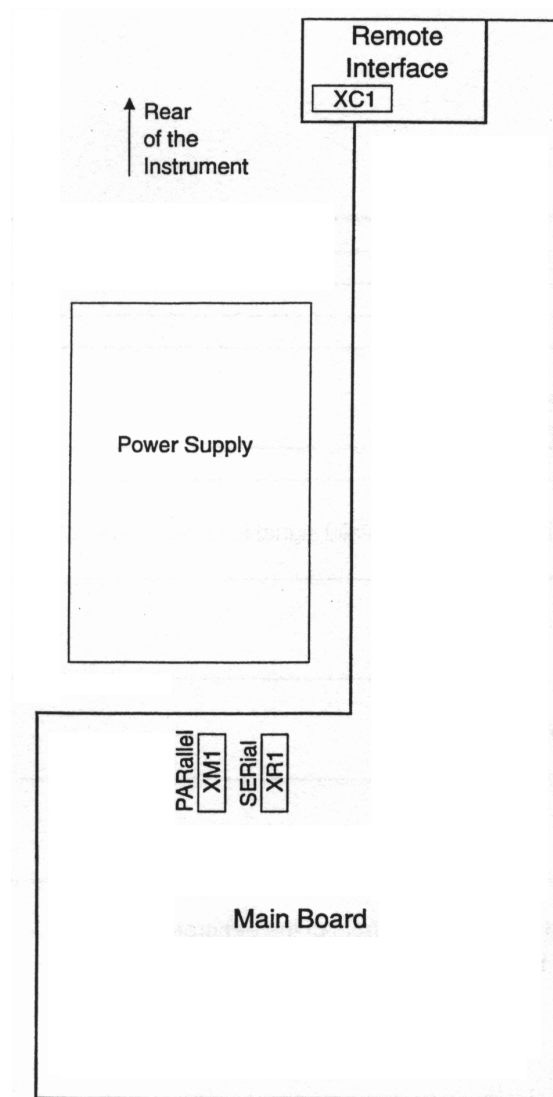


Fig. 8-1 Location of Connectors

8.2 Parallel Remote

The following parameters can be controlled when the remote connector is configured for parallel ground closure control:

- ♦ Recall of preset #1 to #8
- ♦ Selection of genlock mode (equals the function of the **GENLOCK** button on the front of the generator)

8.2.1 Connector Description

Connector type:

9 pin sub-D

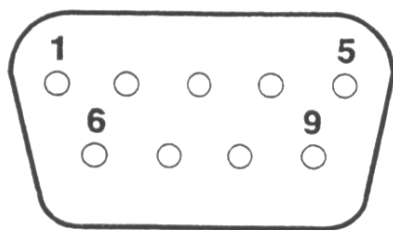


Fig. 8-2 Remote connector seen from rear panel

Pin no.:	Function:
1	Preset 0 (LSB)
2	Preset 1
3	Preset 2 (MSB)
4	Genlock/Preset selection: 0: Selects pin 6 active (pin 1-3 inactive) – genlock. 1: Selects pin 1-3 active (pin 6 inactive) – preset.
5	Ground
6	Genlock selection: (1) 0: Selects external genlock (the result is unlocked if no valid signal is found in the active input). 1: Selects internal reference.
7	Genlock status output: 0: Unlocked (using internal reference) 1: Genlocked or internal.
8	Warning output: (2) 0: Error detected internal in the generator. 1: No errors.
9	Remote enable: 0: Remote enabled. 1: Remote disabled.

(1) The function equals the function of the GENLOCK button on the front of the generator.

(2) The function equals the response of the warning LED on the front of the generator.

Note:

All outputs have internal pull up resistors to +5 V.

Note:

The presets are numbered binary. The binary number is one less than the number used in the menu system on the front of the generator.

Note:

The remote output pins 7 and 8 are active even when the remote is disabled. The remote only has to be configured as parallel.

Schematic of the selections:

Function:	Pin 3 (MSB)	Pin 2	Pin 1 (LSB)		Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
Remote disabled	X	X	X		X	GND	X	OUT	OUT	1
Preset 1	0	0	0		1	GND	X	OUT	OUT	0
Preset 2	0	0	1		1	GND	X	OUT	OUT	0
Preset 3	0	1	0		1	GND	X	OUT	OUT	0
Preset 4	0	1	1		1	GND	X	OUT	OUT	0
Preset 6	1	0			1	GND	X	OUT	OUT	0
Preset 7	1	1	0		1	GND	X	OUT	OUT	0
Preset 8	1	1	1		1	GND	X	OUT	OUT	0
Genlock Internal	X	X	X		0	GND	1	OUT	OUT	0
Genlock External	X	X	X		0	GND	0	OUT	OUT	0

8.3 Serial Remote

The serial remote allows for control of virtually all functions in the generator as well as reading of instrument setting.

The serial remote operates electrically as an IRS 232C communication port. The parameter setting for the RS 232 communication port is described in paragraph 7.7.4, page 7-14.

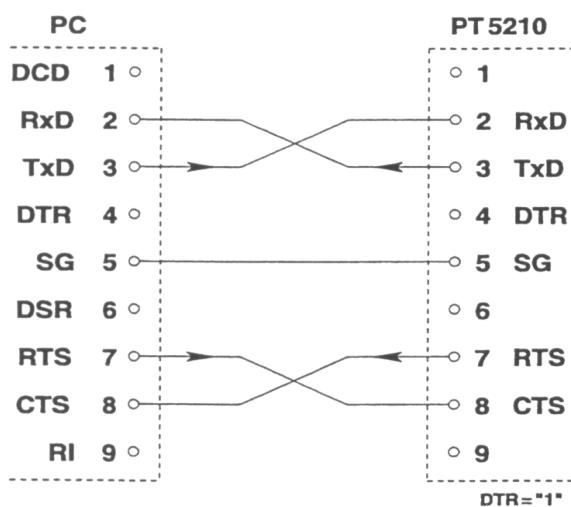


Fig. 8-3 Configuration of cable between PC and PT 5210.

The PT 5210 communication protocol complies with the:

- ♦ SCPI 1995.0:
Standard Commands for Programmable Instruments, Vol I-IV. This protocol which is based on the IEEE 488.2 (IEEE Standard Codes, Formats, Protocols, and Common Commands).

For the description of the commands a basic knowledge of operation of the instrument is assumed.

To use the serial remote a basic knowledge of the SCPI programming and computer control is also recommended. The paper: "A beginner's Guide to SCPI" by Barry Epler, Hewlett-Packard Press®, 1991 can be used to gain the basic knowledge of the ideas behind the SCPI system.

8.4 General Description of the Interface Syntax

8.4.1 General Information

The remote system is organized in a tree structure. The structure defines sub-systems. In order to access command lower in the tree or in different branches the entire command string should be used. Indentation is used to indicate the root level and the branches. The highest level to the left. The complete command always includes all the root levels.

A space between a command string and an option is required, except in a query * where a space is not allowed.

Enter more than one command on a line by using a semicolon ";" as divider. A command line is terminated by <CR> >LF>. If the next command is part of the same command system the separation is a ";" only. If the next command is part of another command system the ";" is followed by a ":",

Parameters are separated from the header by a space. Several parameters are separated by a comma.

Character strings should be placed in single or double quotation marks.

The valid parameter ranges are shown in the command tables. Non valid values generate an error message.

8.4.2 Syntax Elements

;	Semicolon separates two commands of a command line and does not change the path.
:	Colon separates the keywords of a command. In a command line, a colon ":" after a separating semicolon ";" indicates the root control level.
,	Comma separates the parameter command.
?	Question mark identifies a query command (Query commands are formed by adding a question mark to the header).
*	Asterisk identifies a common command. (Common commands consists of a header preceded by an asterisk and possibly followed by one or more parameters)
' or ''	Single or double quote introduces and terminates a character string.
#	Double dagger introduces block data.
Space	Space Character separates header and parameters.
	Parameters divided by a " " indicates an "or" selection between the values shown. Only one value may be used at a time.
[xxxx]	Square brackets indicate an optional specific string parameter used by some command systems.
XXXX	A vertical line through a command indicates a command not implemented. The command is included for future compatibility reasons. The generator will not give any response to these command (error messages are not generated).

8.4.3 Command Syntax

A command consists of a "header" and one or several "parameters". Header and parameters are separated by space.

A header may consist of several keywords.

8.4.4 Syntax of Program Messages

A command or query is called a program message unit. Such a program message unit consists of a header, or a header separated by a space from one or more parameters. The program header separator between the header and the first parameter must be at least one “white space” character. The header consists of one or more mnemonics (key words) describing the command. The parameters in a message unit are also referred to as “Data Elements”. They are mutually separated by a comma (,), which is referred to as “Data Separator”. Furthermore the following rules are valid:

- ♦ Any one of the “white space” characters (dec. 0..9, 11.. 32) may:
 - precede a header
 - precede the Message Terminator
 - be placed in between the header and the parameter
 - be placed in between two consecutive parameters
- ♦ String data in a parameter must be specified between quotes. A quote may either be a “single quote” (dec. 39) or a “double quote” character (dec. 34)

One or more program message units (commands) may be send within a single program message. Program message units are separated by a semicolon (;). A message of one or more units is terminated by a program message terminator.

The program message terminator must be the following code:

- ♦ LF <line feed> (dec.10) code

Note:

Most controller programming languages send the terminator automatically, but allow it to be changed.

Basically there are two types of program headers:

- ♦ Compound headers
 - Commands have a compound header consisting of one of more key words (mnemonics), mutually separated by a colon (:) character. Such as a colon may also precede the header.
- ♦ Command headers
 - The program messages that are standardized are called common commands. Their headers always start with an asterisk (*) character

Each key word in a compound command header represents a node in the command tree. The left most key word is the root node, representing the highest hierarchical level in the command tree. Subsequent keyword represents sub nodes under the root node.

8.4.5 Long and Short Form

Program messages may be sent in either long or short form

- ♦ The long form is the full word
- ♦ The short form is the first character of the long form

The short form in a syntax specification is shown in upper case, and the remaining part of the long form is shown in lower case characters.

Note:

Upper and lower case, as used in syntax specification, is only a notation habit to facilitate distinction between long and short form. The generator itself does not differentiate between upper and lower case characters.

In program messages, either the long or short form may be used in any mix of upper or lower case characters. There is no semantic difference between upper and lower case in program messages.

8.4.6 Syntax of Response Messages

The response to a query is a response message unit, consisting of one or more parameters (data elements). Successive parameters are separated by a comma (,). If there are multiple queries in a program message, the multiple response message units are grouped together in the corresponding response message.

Response message units are separated by a semicolon (;) and are terminated by a response message terminator.

The instrument will always send the response data in capitals. Headers are not sent in the response messages, parameters only.

9 RS232 Communication

9.1 REFERENCE DOCUMENTS

- IEEE 488.2-1987: IEEE Standard Codes, Formats, Protocols, and Common Commands
- SCPI 1995.0: Standard Commands for Programmable Instruments, Vol I-IV.
- “A Beginner’s Guide to SCPI”, Barry Epler, HEWLETT-PACKARD PRESS, 1991,

9.2 CONFIGURATION AND SYNTAX

Control characters of the RS232 interface:

Control character	Function
<Ctrl L> 0C _{hex}	Local lockout switchover. Local lockout is always disabled after powerup
0A _{hex}	Terminator, i.e. newline <LF>

PT 8604 Multiple parallel black burst:

Multiple parallel black burst option is defined as BB2 when programming via RS232 except when requesting the version of the option. In this case a specific command exists.

Buffers

- Receive buffer: 64 bytes
- Transmit buffer: 32 bytes

9.3 COMMANDS SUMMARY

All commands listed consist of both a set- and request-command unless specifically listed in the table as <query only> or <no query>.

Note:

This revision applies to software version 2.3 and later.

9.3.1 Mandated Commands

Command	Parameter	Status after *RST	Remarks
*CLS	-		Clear Status Command
*ESE			
*ESE?			
*ESR?			
*IDN?			Device identification query
*OPC			
*OPC?			
*RST			Reset Command
*SRE			
*SRE?			
*STB?			

Command	Parameter	Status after *RST	Remarks
*TST?			
*WAI			

9.3.2 Required Commands

9.3.2.1 SYSTem Subsystem

Command	Parameter	Status after *RST	Remarks
:ERRor?	-	-	<query only>
:VERSion?	-	-	<query only>
:PRESet			
[:RECall]	<1 to 8>	-	
:STORe	<1 to 8>	-	<no query>
:NAME	<1 to 8>,<string_data>	-	
DOWNload	<1 to 8>	-	<no query>
:UPLoad	<1 to 8>,<block_data>	-	<no query>
:DOWNload		-	<no query>
:UPLoad	<block_data>	-	<no query>

9.3.2.2 STATus Subsystem

Command	Parameter	Status after *RST	Remarks
:OPERation			
[:EVENT]?			
:CONDition?			
:ENABle			
:ENABle?			
:QUESTionable			
[:EVENT]?			
:CONDition			
:ENABle			
:ENABle?			
:PRESet			
:PT5210?	-	-	<query only>

9.3.3 Instrument Commands

9.3.3.1 DIAGnostic subsystem

Command	Parameter	Status after *RST	Remarks
:DISPlay	-		<no query>
:ERRorqueue			
:RESet	-	-	<no query>
:ERRorqueue	-	-	<query only>

9.3.3.2 DISPlay Subsystem

Command	Parameter	Status after *RST	Remarks
:CONTRast	<0 to 20> MIN MAX	16	

9.3.3.3 INPut Subsystem

Command	Parameter	Status after *RST	Remarks
:GENLock			
:INPut	A B A_B SDI INTeRnal INTeRnal2	A	
:SYSTem	PALBurst NTSCburst SYNC625 SYNC525 SDI625 SDI525 F358MHz F443MHz F5MHz F10MHz	PALBurst	
:DElay	<Field>,<Line>,<HTime>	0,0,0	
:GENLock?	-	-	<query only>
:SDIGenlock			
:VERSion?		-	<query only>

9.3.3.4 OUTPut Subsystem

Command	Parameter	Status after *RST	Remarks
:BB1			
:SYSTem	PAL PAL_ID NTSC	PAL	
:DElay	<Field>,<Line>,<HTime>	0,0,0	
:SCHPhase	<179 to +180>	0	
:COPy	BB1 BB2 BB3 BB4 BB5 BB6 BB7 BB8	-	<no query>
:VERSion?	-	-	<query only>
:BB1?	-	-	<query only>
:BB2			
:SYSTem	PAL PAL_ID NTSC	PAL	
:DElay	<Field>,<Line>,<HTime>	0,0,0	
:SCHPhase	<179 to +180>	0	
:COPy	BB1 BB2 BB3 BB4 BB5 BB6 BB7 BB8	-	<no query>
:VERSion?	-	-	<query only>
:BB2?	-	-	<query only>
:BB3?			
:SYSTem	PAL PAL_ID NTSC	PAL	
:DElay	<Field>,<Line>,<HTime>	0,0,0	
:SCHPhase	<179 to +180>	0	
:COPy	BB1 BB2 BB3 BB4 BB5 BB6 BB7 BB8	-	<no query>
:VERSion?	-	-	<query only>
:BB3?	-	-	<query only>

Command	Parameter	Status after *RST	Remarks
:BB4			
:SYSTem	PAL PAL_ID NTSC	PAL	
:DELay	<Field>,<Line>,<HTime>	0,0,0	
:SCHPhase	<179 to +180>	0	
:COPy	BB1 BB2 BB3 BB4 BB5 BB6 BB7 BB8	-	<no query>
:VERSion?	-	-	<query only>
:BB4?	-	-	<query only>
:BB5			
:SYSTem	PAL PAL_ID NTSC	PAL	
:DELay	<Field>,<Line>,<HTime>	0,0,0	
:SCHPhase	<179 to +180>	0	
:COPy	BB1 BB2 BB3 BB4 BB5 BB6 BB7 BB8	-	<no query>
:VERSion?	-	-	<query only>
:BB5?	-	-	<query only>
:BB6			
:SYSTem	PAL PAL_ID NTSC	PAL	
:DELay	<Field>,<Line>,<HTime>	0,0,0	
:SCHPhase	<179 to +180>	0	
:COPy	BB1 BB2 BB3 BB4 BB5 BB6 BB7 BB8	-	<no query>
:VERSion?	-	-	<query only>
:BB6?	-	-	<query only>
:BB7			
:SYSTem	PAL PAL_ID NTSC	PAL	
:DELay	<Field>,<Line>,<HTime>	0,0,0	
:SCHPhase	<179 to +180>	0	
:COPy	BB1 BB2 BB3 BB4 BB5 BB6 BB7 BB8	-	<no query>
:VERSion?	-	-	<query only>
:BB7?	-	-	<query only>
:BB8			
:SYSTem	PAL PAL_ID NTSC	PAL	
:DELay	<Field>,<Line>,<HTime>	0,0,0	
:SCHPhase	<179 to +180>	0	
:COPy	BB1 BB2 BB3 BB4 BB5 BB6 BB7 BB8	-	<no query>
:VERSion?	-	-	<query only>
:BB8?	-	-	<query only>
:SB34			
:PATTerm	BLACK CBEBu CB100 CBSMpte	BLACK	
:SYSTem	SDI525 SDI625	SDI625	
:DELay	<Field>,<Line>,<HTime>	0,0,0	

Command	Parameter	Status after *RST	Remarks
:EDHinsert	OFF ON	OFF	
:EMBAudio	OFF SIlence	OFF	
COPy	SB34 SB56 SB78	-	<query only>
VERSIon?	-	-	<query only>
:SB34?	-	-	
:SB56			
:PATTerri	BLACK CBEBu CB100 CBSMpte	BLACK	
:SYSTem	SDI525 SDI625	SDI625	
:DELay	<Field>,Line>,<HTime>	0,0,0	
:EDHinsert	OFF ON	OFF	
:EMBAudio	OFF SIlence	OFF	
COPy	SB34 SB56 SB78	-	<no query>
VERSIon?	-	-	<no query>
:SB56?	-	-	
:SB78			
:PATTerri	BLACK CBEBu CB100 CBSMpte	BLACK	
:SYSTem	SDI525 SDI625	SDI625	
:DELay	<Field>,Line>,<HTime>	0,0,0,	
:EDHinsert	OFF ON	OFF	
:EMBAudio	OFF SIlence	OFF	
COPy	SB34 SB56 SB78	-	<no query>
VERSIon?	-	-	<no query>
:SB78?	-	-	
:ASIGnal			
:PATTerri	CBSMpte CBEBu CB100 CBGRey75 CBRed75 WIN15 WIN20 WIN100 CROShatch PLUGe SAFearea SHALlowramp MULTiburst RED75 BLACKburst	CBEBu	
:TESTinsert	OFF ON <string_data>	OFF,"ANALOG"	
:SYSTem	PAL PAL_ID NTSC	PAL	
:DELay	<Field>,Line>,<HTime>	0,0,0	
:SCHPhase	<-179 to 180>	0	
:VERSIon?	-	-	<query only>
:ASIGnal?	-	-	
	-		
:SDISignal			
:PATTerri	CBSMPTe CBEBu CBEBu8 100 CBGRey75 CBRed75 SDICheck SHALlowramp DTIMing BLACK WIN 15 WIN 20 WIN100 CROShatch PLUGe MULTiburst RED75	CBEBu	
:TESTinsert	OFF ON <string_data>	OFF,"DIGITAL"	
:SYSTem	SDI525 SDI625	SDI625	
:EDHinsert	OFF ON	OFF	
:EMBAudio			

Command	Parameter	Status after *RST	Remarks
:SIGNAL	OFF S800Hz S1kHz SEBu1kHz SBBc1kHz MEBU1kHz MBBC1kHz DUAL	OFF	
:LEVEL	SILence DB0FS DB9FS DB12FS DB16FS DB18FS	SILence	
:DELAY	<Field>,<Line>,<HTime>	0,0,0	
:VERSION?	-	-	<query only>
:SDISIGNAL?	.	.	
:AUDIO			
:SIGNAL	S800Hz S1kHz SEBu1kHz SBBc1kHz MEBU1kHz MBBC1kHz DUAL F48kHz	S800Hz	
:LEVEL	SILence DB0FS DB9FS DB12FS DB14FS DB16FS DB184FS DB20FS	SILence	
:TIMING	PAL NTSC1 NTSC2 NTSC3 NTSC4 NTSC5	PAL	
:VERSION?	-	-	<query only>
:AUDIO?	-	-	
:TIMECODE			
:VERSION?	-	-	<query only>
:BBMULTI			
:VERSION?	-	-	<query only>

9.4 COMMANDS EXPLANATION

9.4.1 Mandated Commands

- ***CLS** **CLEAR STATUS**

Clear the error queue. Reset of the event registers has NOT been implemented in this version.

- ***ESE** **STANDARD EVENT STATUS ENABLE COMMAND**

The device accepts this command but does not respond to it.

- ***ESE? STANDARD EVENT STATUS ENABLE QUERY**

The device accepts this command but does not respond to it.

- ***ESR?** **STANDARD EVENT STATUS REGISTER QUERY**

The device accepts this command but does not respond to it.

- ***IDN? IDENTIFICATION QUERY**

The response contains four fields:

Field 1: Company name

Field 2: Product name

Field 3: KU number

Field 4: Firmware level, i.e. software revisions for Mainboard-OSC

Example:

*IDN? response: *ProTeleVision,PT5210,KU123456,1.0-1.2*

- ***OPC OPERATION COMPLETE**

The device accepts this command but does not respond to it.

- ***OPC?** **OPERATION COMPLETE QUERY**

The device accepts this command but does not respond to it.

- ***RST** **RESET**

Resets the device to factory preset status. The three presets are NOT reset, i.e. any user preset will NOT be erased. The internal errorqueue and the SCPI errorqueue will also be reset. Finally the device and any optional units will be reset.

- ***SRE SERVICE REQUEST ENABLE**

The device accepts this command but does not respond to it.

- ***SRE? SERVICE REQUEST ENABLE QUERY**

The device accepts this command but does not respond to it.

- ***STB? READ STATUS BYTE QUERY**

The device accepts this command but does not respond to it.

- ***TST? SELF-TEST QUERY**

The device accepts this command but does not respond to it.

- ***WAI** **WAIT TO CONTINUE**

The device accepts this command but does not respond to it.

9.4.2 Required Commands

9.4.2.1 SYSTem commands

- **SYSTem:ERRor?**

Command for reading an SCPI error message from the error queue. See paragraph: *Error codes for a complete list of error codes.*

Example:

`SYST:ERR?` response: `-102,"Syntax error"`

- **SYSTem:VERSion?**

Command for reading the SCPI version to which the RS232 implementation complies.

Example:

`SYST:VERS?` response: `1995.0`

- **SYSTem:PRESet[:RECall]**

Command to recall a stored generator configuration from a preset. Three user presets from 1 to 8 are available.

Example:

`SYST:PRES:REC 3` recall preset 3 in the generator
`SYST:PRES:REC?` response: `3, i.e. preset 3 is currently active`

- **SYSTem:PRESet:STORe**

Command to store the actual configuration in a preset. Eight user presets from 1 to 8 are available.

Example:

`SYST:PRES:STOR 8` store configuration in preset 8

- **SYSTem:PRESet:NAME**

Command for naming a user preset. Three user presets from 1 to 8 are available. Number of characters in the name are limited to sixteen, 16.

Example:

`SYST:PRES:NAME 2,"WHAT"` name preset number 2 "WHAT"
`SYST:PRES:NAME? 2` response: `"WHAT"`

- **SYSTem:PRESet:DOWNload**

Command for downloading, i.e. reading a complete preset from a PT 5210. Eight user presets from 1 to 8 are available.

Example:

`SYST:PRES:DOWN 4` download content of preset 4

- **SYSTem:PRESet:UPLoad**

Command for downloading, i.e. reading a complete preset from a PT 5210. Eight user presets from 1 to 8 are available.

Example:

SYST:PRES:UP 4, #aaa... upload block data aaa to preset 4

- **SYSTem:PRESet:DOWNload**

Command for downloading, i.e. reading a complete PT 5210 configuration incl. all presets.

Example:

SYST:DOWN download the complete PT 5210

- **SYSTem:PRESet:UPLoad**

Command for uploading, i.e. storing a complete PT 5210 configuration incl. all presets.

Example:

SYST:UP #aaa... upload block data aaa to PT 5210

9.4.2.2 STATus commands

- **STATus:OPERAction[:EVENT]?**

The device accepts this command but does not respond to it.

- **STATus:OPERation:CONDition?**

The device accepts this command but does not respond to it.

- **STATus:OPERation:ENABLE**

The device accepts this command but does not respond to it.

- **STATus:QUESTionable[:EVENT]?**

The device accepts this command but does not respond to it.

- **STATus: QUESTionable:CONDition?**

The device accepts this command but does not respond to it.

- **STATus: QUESTionable:ENABLE**

The device accepts this command but does not respond to it.

- **STATus:PT5210?**

Command to read the internal error status of the generator. If errors are detected use the command: **DIAGnostic:ERRorqueue?** to read the specific error.

Response	Description
"No errors"	No errors have occurred after power up.
"Active error"	The generator presently has an error.
"No active error"	The generator presently has no error, but one or more errors have been detected after power up.

Example:

STAT:PT5210? response: "No active error"

9.4.3 Instrument Commands

9.4.3.1 DIAGnostic commands

- **DIAGnostic:DISPlay**

The device accepts this command but does not respond to it.

- **DIAGnostic:ERRorqueue:RESet**

Command to reset the internal error queue of the generator. The errorqueue is a circular queue consisting of five entries.

Example:

DIAG:ERR:RES reset the five elements in the errorqueue

- **DIAGnostic:ERRorqueue?**

Command to read an entry in the error queue and point to next entry in the errorqueue. This command should be executed five times to read the complete errorqueue.

Example:

DIAG:ERR? response: -108, "Parameter not allowed"

9.4.3.2 DISPlay commands

- **DISPlay:CONTrast**

The device accepts this command but does not respond to it.

9.4.3.3 INPut commands

- **INPut:GENLock:INPut**

Command for selecting the genlock input. Possible selections are

Input:	Description:
A	A
B	B
A_B	A-B, i.e. loop through
SDI	SDI Genlock, (ONLY available with option PT 8606)
INTernal	Internal
INTernal2	High precision reference, (ONLY available with option PT 8610)

When selecting a new input, the system for that particular input will apply.

Example:

INP:GENL:INP A_B select input A/B as the genlock signal
INP:GENL:INP? response: *A_B*

- **INPut:GENLock:SYSTem**

Command for selecting the genlock system. Possible selections are

System:	A;B&A_B	SDI:	Description:
PALBurst	X		PAL burst lock
NTSCBurst	X		NTSC burst lock
SYNC625	X		625 sync lock
SYNC525	X		525 sync lock
SDI625		X	625/50 lock
SDI525		X	525/59.95 lock
F358MHz	X		3.58 MHz lock
F443MHz	X		4.43 MHz lock
F5MHz	X		5 MHz lock
F10MHz	X		10 MHz lock

Note:

When the input has been selected as Internal or Internal2, issuing this command will result in an error, namely: **-200, "Execution error"**. This error will also occur if selecting a system which is invalid for the active input.

Example:

INP:GENL:SYST F358MHz

set system to 3.59 MHzlock

INP:GENL:SYST?

response: *F358 MHz*

- **INPut:GENLock:DElay**

Command to set the delay for the genlock input. The delay is defined by three parameters

<Field>, **<Line>**, **<HTime>**

where **<Field>** sets the field offset, **<Line>** sets the line offset and **<HTime>** sets the horizontal time in ns, i.e.

HTime(PAL<64000.0ns

HTime(NTSC)<63492.1ns

Note:

It is not possible to select timing when the genlock system is 3.58 MHz, 4.43 MHz, 5 MHz, or 10 MHz or the input is set to internal or internal2. This will result in an execution error, namely: **-200,"Execution error"**.

Also it is not possible to select a delay outside the range of the selected system. See table below.

Analog				Digital			
PAL, 625 Lines		NTSC, 625 Lines		D1, 625 Lines		D1, 525 Lines	
Field:	Line:	Field:	Line:	Field:	Line:	Filed:	Line:
-3	-0,...,-312	-	-	-	-	-	-
-2	-0,...,-311	-	-	-	-	-	-
-1	-0,...,-312	-1	-0,...,-262	-	-	-	-
-0	-0,...,+311	-0	-0,...,-261	-0	-0,...,-312	-0	-0,...,-262
+0	+0,...,+312	+0	-0,...,+262	+0	+0,...,+311	+0	-0,...,+261
+1	+0,...,+311	+1	-0,...,+261	+1	+0	+1	+0
+2	+0,...,+312	+2	+0	-	-	-	-
+3	+0,...,+311	-	-	-	-	-	-
+4	+0	-	-	-	-	-	-

Example:

INP:GENL:DEL+2,+5,+123.5 set delay to 2 field, 5 line & 123,5 ns
 INP:GENL:DEL? response: +2,+005,+00123.5

- **INPut:GENLock?**

Command to display the status and the settings of the genlock. The respond is defined as:

<lock info>,<input>,>system>,<Field>,<Line>,<HTime>

where **<lock info>** is either GENLOCKED or UNLOCKED. For an explanation concerning the rest of the response see the commands: INP:GENL:INP, INP:GENL:SYST and INP:GENL:DEL.

Note:

The response will always return the above six parameters. But when selecting the input as INTERNAL the parameters **<system>,<Field>,<Line>,<HTime>** will have no meaning. Also when selecting the system as a timing, e.g. 3.58 MHz, the parameters **Field>,<Line>,<HTime>** will have no meaning. In these cases the returned values should be discarded and only the relevant parameters should be used.

Example:

INP:GENL? response: UNLOCKED,A,NTSCBURST,+1,212,00000.2
 INP:GENL? response: UNLOCKED,A,F358 MHz,+0,+0,+0
 INP:GENL? response: UNLOCKED,INTERNAL,NA, +0,+0,+0

- **INPut:SDIGenlock:VERSion?**

Command to display the version of the optional PT 8606 SDI Genlock. The response contains four fields:

- Field 1: Company name
- Field 2: Type name
- Field 3: KU number
- Field 4: Not available for this option, i.e. the returned value is 0.

Example:

INP:SDIG:VERS? Response: ProTeleVision,PT 8606,KU123456,0

9.4.3.4 OUTPut commands

- **OUTPut:BB1:SYSTem**
- **OUTPut:BB2:SYSTem**

Command to select the system of the standard Black Burst module in the PT 5210. Systems available are:

System:	Description:
PAL	PAL
PAL_ID	PAL with line 7 pulse
NTSC	NTSC with setup

Example:

OUTP:BB1:SYSTPAL_ID set system for BB module 1 to PAL with line 7 pulse
 OUTP:BB1:SYST? response: PAL_ID

- **OUTPut:BB3:SYSTem**
- **OUTPut:BB4:SYSTem**
- **OUTPut:BB5:SYSTem**
- **OUTPut:BB6:SYSTem**
- **OUTPut:BB7:SYSTem**
- **OUTPut:BB8:SYSTem**

Command to select the system of an optional PT 8608 Black Burst module in the PT 5210.
Systems available are:

System:	Description:
PAL	PAL
PAL_ID	PAL with line 7 pulse
NTSC	NTSC with setup

Example:

OUTP:BB7:SYSTPAL_ID

set system for BB module 7 to PAL with line 7 puls

OUTP:BB7:SYST?

response: *PAL_ID*

- **OUTPut:BB1:DELaY**
- **OUTPut:BB2:DELaY**

Command to set the delay of the standard Black Burst module in the PT 5210. The delay is defined by three parameters:

<Field>,<Line>,<HTime>

where **<Field>** sets the field offset, **<Line>** sets the line offset and **<HTime>** sets the horizontal time in ns, i.e.

HTime(PAL)<64000.0ns

HTime(NTSC)<63492.1ns

Note:

It is not possible to select a delay outside the range of the selected system. See table below.

Analog			
PAL, 625 Lines		NTSC, 625 Lines	
Field:	Line:	Field:	Line:
-3	-0,...,-312	-	-
-2	-0,...,-311	-	-
-1	-0,...,-312	-1	-0,...,-262
-0	-0,...,+311	-0	-0,...,-261
+0	+0,...,+312	+0	-0,...,+262
+1	+0,...,+311	+1	-0,...,+261
+2	+0,...,+312	+2	+0
+3	+0,...,+311	-	-
+4	+0	-	-

Example:

OUTP:BB7:DEL-0,-0,-3245.2

set delay for BB module 2 to -2 field, -4 line & -3245.2ns

OUTP:BB7:DEL?

response: *-2,-004,-03245.2*

- OUTPut:BB3:DElay
- OUTPut:BB4:DElay
- OUTPut:BB5:DElay
- OUTPut:BB6:DElay
- OUTPut:BB7:DElay
- OUTPut:BB8:DElay

Command to set the delay of an optional PT 8608 Black Burst module in the PT 5210. The delay is defined by three parameters:

<Field>,<Line>,<HTime>

where **<Field>** sets the field offset, **<Line>** sets the line offset and **<HTime>** sets the horizontal time in ns, i.e.

HTime(PAL)<64000.0ns

HTime(NTSC)<63492.1ns

Note:

It is not possible to select a delay outside the range of the selected system. See table below:

Analog			
PAL, 625 Lines		NTSC, 625 Lines	
Field:	Line:	Field:	Line:
-3	-0,...,-312	-	-
-2	-0,...,-311	-	-
-1	-0,...,-312	-1	-0,...,-262
-0	-0,...,+311	-0	-0,...,-261
+0	+0,...,+312	+0	-0,...,+262
+1	+0,...,+311	+1	-0,...,+261
+2	+0,...,+312	+2	+0
+3	+0,...,+311	-	-
+4	+0	-	-

Example:

OUTP:BB7:DEL-0,-0,-3245.2

set delay for BB module 7 to -0 field, -0 line & -3245.2ns

OUTP:BB7:DEL?

response:-0,-000,-03245.2

- OUTPut:BB1:SCHPhase
- OUTPut:BB2:SCHPhase

Command to set the Sch-Phase of the standard Black Burst module in the PT 5210. The Sch-Phase value must be in the range:

-180<Sch-Phase<=+180

Example:

OUTP:BB2:SCHP-160

set the SchPhase for BB module 2 to -160deg

OUTP:BB2:SCHP?

response: -160

- **OUTPut:BB3:SCHPhase**
- **OUTPut:BB4:SCHPhase**
- **OUTPut:BB5:SCHPhase**
- **OUTPut:BB6:SCHPhase**
- **OUTPut:BB7:SCHPhase**
- **OUTPut:BB8:SCHPhase**

Command to set the Sch-Phase of an optional PT 8608 Black Burst module in the PT 5210.
The Sch-Phase value must be in the range:

-180<Sch-Phase<=+180

Example:

OUTP:BB5:SCHP 180

set the Sch-Phase for BB5 to +180deg

OUTP:BB5:SCHP?

response:180

- **OUTPut:BB1:COpy**
- **OUTPut:BB1:COpy**

Command to copy the configuration of a black burst module to a standard Black Burst module in the PT 5210, i.e. the black burst module which is part of the command will be updated.

Example:

OUTP:BB2:COPBB7

copy configuration from BB7 to BB2

- **OUTPut:BB3:COpy**
- **OUTPut:BB4:COpy**
- **OUTPut:BB5:COpy**
- **OUTPut:BB6:COpy**
- **OUTPut:BB7:COpy**
- **OUTPut:BB8:COpy**

Command to copy the configuration of a black burst module to a standard Black Burst module in the PT 5210, i.e. the black burst module which is part of the command will be updated.

Example:

OUTP:BB5:COPBB3

copy configuration from BB3 to BB5

- **OUTPut:BB1:VERSion?**
- **OUTPut:BB2:VERSion?**

Command to display the version of the standard Black Burst module in the PT 5210. The response contains four fields:

Field 1: Company name

Field 2: Type name, which in this case is NA, not available

Field 3: KU number

Field 4: Software version for the black burst module

Note:

The response from this command is identical for both BB module 1 and 2.

Example:

OUTP:BB1:VERS?

response: *ProTeleVision,NA,KU123456,2.1*

- **OUTPut:BB3:VERSion?**
- **OUTPut:BB4:VERSion?**
- **OUTPut:BB5:VERSion?**
- **OUTPut:BB6:VERSion?**
- **OUTPut:BB7:VERSion?**
- **OUTPut:BB8:VERSion?**

Command to display the version of the standard Black Burst module in the PT 5210. The response contains four fields:

Field 1: Company name

Field 2: Type name

Field 3: KU number

Field 4: Software version for the black burst module

Note:

The response from this command is identical for BB modules placed on the same board, e.g. module 7 & 8.

Example:

OUTP:BB1:VERS?

response: *ProTeleVision,PT8608,KU123456,2.0*

- **OUTPut:BB1?**
- **OUTPut:BB2?**

Command to display the complete settings of the standard Black Burst modules in the PT 5210. The response contains five fields:

<System>,<Field>,<Line>,<HTime>,<SchPhase>

For an explanation of the response, see the commands: *OUTP:BBn:SYST,OUTP:BBn:DEL* and *OUTP:BBn:SCHP*, where *n:1or2*

Example:

OUTP:BB1?

response: *PAL,+2+123,+12345.5,-160*

- **OUTPut:BB3?**
- **OUTPut:BB4?**
- **OUTPut:BB5?**
- **OUTPut:BB6?**
- **OUTPut:BB7?**
- **OUTPut:BB8?**

Command to display the complete settings of an optional PT 8608 Black Burst module in the PT 5210. The response contains five fields:

<System>,<Field>,<Line>,<HTime>,<SchPhase>.

For an explanation of the response, see the commands: *OUTP:BBn:SYST,OUTP:BBn:DEL* and *OUTP:BBn:SCHP*, where *n:3-8*

Example:

OUTP:BB3?

response: PAL,+2+123,+12345.5,-160

- **OUTPut:SB34:PATtern**
- **OUTPut:SB56:PATtern**
- **OUTPut:SB78:PATtern**

Command to select the pattern of an optional PT 8609 SDI Black/Color bar module in the PT 5210. Patterns available are:

Pattern	SDI625:	SDI525:	Description
BLACK	X	X	Black
CBSMpte		X	SMPTE Color Bar
CBEBu	X		EBU Color Bar
CB100	X		100% Color Bar

Note:

Not all the patterns are available in both systems. Trying to select a pattern not available in the active system will result in an error, namely: **-200,"Execution error"**

Example:

OUTP:SB78:PATT CSBM

set the pattern in SB module 78 to SMPTE Color Bar

OUTP:SB78:PATT?

response: CBSMPTE

- **OUTPut:SB34:SYSTem**
- **OUTPut:SB56:SYSTem**
- **OUTPut:SB78:SYSTem**

Command to select the pattern of an optional PT 8609 SDI Black/Color bar module in the PT 5210. Systems available are:

System:	Description:
SDI625	625/50 system
SDI525	525/59.94 system

Note:

If the pattern becomes invalid when selecting a new system, the pattern will change according to:

CBSMpte	->CBEBU
CBEBU	->CBSmpte
CB100	->CBSMpte

Example:

OUTP:SB34:SYST SDI525

set the pattern in SB module 34 to 525/59.94

OUTP:SB34:SYST?

response: SDI525

- **OUTPut:SB34:DELay**
- **OUTPut:SB56:DELay**
- **OUTPut:SB78:DELay**

Command to set the delay of an optional PT 8609 SDI Black/Color bar module in the PT 5210. The delay is defined by three parameters:

<Field>,<Line>,<HTime>

where **<Field>** sets the field offset, **<Line>** sets the line offset and **<HTime>** sets the horizontal time in ns, i.e.

HTime(PAL)<64000.0ns

HTime(NTSC)<63492.1ns

Note:

It is not possible to select a delay outside the range of the selected system. See table below.

Digital			
D1, 625 Lines		D1, 525 Lines	
Field:	Line:	Field:	Line:
-0	-0,...,-312	-0	-0,...,-262
+0	+0,...,+311	+0	-0,...,+261
+1	+0	+1	+0

Example:

OUTP:SB56:DEL+0,0312,+74.0 set the delay in SB module 56 to +0 filed, +312 line & +74.0ns

OUTP:SB56:DEL? response: +0,+3122,+00074.2

- **OUTPut:SB34:EDHinsert**
- **OUTPut:SB56:EDHinsert**
- **OUTPut:SB78:EDHinsert**

Command to select the pattern of an optional PT 8609 SDI Black/Color bar module in the PT 5210. Possible selections are **ON** or **OFF**.

Example:

OUTP:SB78:EDH OFF set the EDH insertion in SB module 78 to OFF

OUTP:SB78:EDH? response: *OFF*

- **OUTPut:SB34:EMBaudio**
- **OUTPut:SB56:EMBaudio**
- **OUTPut:SB78:EMBaudio**

Command to select the pattern of an optional PT 8609 SDI Black/Color bar module in the PT 5210. Possible selections are **OFF** or **SILence**.

Example:

OUTP:SB34:EMBSIL set the embedded sound in SB module 34 to silence

OUTP:SB34:EMB? response: *SILENCE*

- **OUTPut:SB34:COPy**
- **OUTPut:SB56:COPy**
- **OUTPut:SB78:COPy**

Command to copy the configuration of an SDI Black/Color bar module to another SDI Black/Color bar module in the PT 5210, i.e. the SDI Black/Color bar module which is part of the command will be updated.

Example:*OUTP:SB34:COPSB56*

copy configuration from SB module 56 to SB module 34

- **OUTPut:SB34:VERSion?**
- **OUTPut:SB56:VERSion?**
- **OUTPut:SB78:VERSion?**

Command to display the version of the standard Black Burst module in the PT 5210. The response contains four fields:

Field 1: Company name

Field 2: Type name

Field 3: KU number

Field 4: Software version for the PT 8609 SDI Black/Color bar module

Example:*OUTP:SB34:VERS?*response: *ProTeleVision,PT8609,KU123456,2.0*

- **OUTPut:SB34?**
- **OUTPut:SB56?**
- **OUTPut:SB78?**

Command to display the complete settings of an optional PT 8609 Black Burst module in the PT 5210. The response contains seven fields:

<Pattern>,<System>,<Field>,<Line>,<HTime>,<EDHinsert>,<EMBAudio>

For an explanation of the response, see the commands: OUTP:SBn:PATT, OUTP:SBn:SYST,OUTP:SBn:DeL,OUTP:SBn:EDH, and OUTP:SBn:EMB, where n:34, 56, or 78l.

Example:*OUTP:SB56?*response: *SDI625,CBEBU,+0,+001,+12345.5,OFF,OFF*

- **OUTPUT:ASIGnal:PATtern**

Command to select the pattern of an optional PT 8601 Analog Test Signal Generator in the PT 5210.

Patterns available are:

Pattern:	PAL:	NTSC:	Description:
CBSMpte		X	SMPTE Color Bar
CBEBu	X		EBU Color Bar
CB100	X		100% Color Bar
CBGRey75	X		Split field Color bar w/75% grey
CBRed75	X		Split field Colorbar w/75% red
WIN15	X	X	Window 15%
WIN20	X	X	Window 20%
WIN100	X	X	Window 100%
CROSShatch	X	X	Cross Hatch
PLUGe	X	X	Pluge
SAFerea	X	X	Safe area
SHALlowramp	X	X	Shallowramp
MULTiburst	X	X	Multiburst
RED75	X	X	75% Red
BLACKburst	X	X	Black burst

Note:

Not all the patterns are available in both systems. Trying to select a pattern not available in the active system will result in an error, namely: **-200, "Execution error"**.

Example:

OUTP:ASIG:PATT SAF set the pattern in the generator to safe area
OUTP:ASIG:PATT? response: *SAFEAREA*

- **OUTPut:SDISignal:TEXTinsert**

Command to insert a text into the pattern of an optional PT 8601 Analog Test Signal Generator in the PT 5210. Three parameters are possible, i.e. **OFF**, **ON** or some text, "**TEXT**".

Note:

To switch the text on/off use the parameters: ON or OFF. To alter the actual text: use "TEXT". The text is limited to eight characters and the range is limited to the characters A-Z, 0-9, - (hyphen), _ (underscore) or space. When queering the generator about the text, the string returned will always be eight characters wide.

Example:

OUTP:SDIS:TEXT"ANALOG" set the test in the generator to ANALOG
OUTP:SDIS:TEXT ON switch text in the pattern ON
OUTP:SDIS:TEXT? response: *ON,"ANALOG"*

- **OUTPut:ASIGnal:SYSTem**

Command to select the system of an optional PT 8601 Analog Test Signal Generator in the PT 5210. Systems available are:

System:	Description:
PAL	PAL
PAL_ID	PAL with line 7 pulse
NTSC	NTSC with setup

Note:

If the pattern becomes invalid when selecting a new system, the pattern will change according to:

CBSMpte	->CBEBU
CBEBU	->CBSMpte
CBEBU8	->CBSMpte
CB100	->CBSMpte
CGRey75	->CBSMpte
CBRed75	->CBSMpte

Example:

OUTP:ASIG:SYSTE PAL_ID set the system in the generator to PAL with line 7 pulse
OUTP:ASIG:SYST? response: *PAL_ID*

- **OUTPut:ASIGnal:DElay**

Command to set the delay of an optional PT 8601 Analog Test Signal Generator in the PT 5210.

The delay is defined by five parameters:

<Field>,<Line>,<HTime>

where **<Field>** sets the field offset, **<Line>** sets the line offset and **<HTime>** sets the horizontal time in ns, i.e.

HTime(PAL) <64000.0ns

HTime(NTSC)<63492.1ns

Note:

It is not possible to select a delay outside the range of the selected system.

See table below:

Analog			
PAL, 625 Lines		NTSC, 625 Lines	
Field:	Line:	Field:	Line:
-3	-0,...,-312	-	-
-2	-0,...,-311	-	-
-1	-0,...,-312	-1	-0,...,-262
-0	-0,...,+311	-0	-0,...,-261
+0	+0,...,+312	+0	-0,...,+262
+1	+0,...,+311	+1	-0,...,+261
+2	+0,...,+312	+2	+0
+3	+0,...,+311	-	-
+4	+0	-	-

Example:

OUTP:ASIG:DeL -2,-4,-3245.2

set the delay in the generator to -2 field, -4 line & -3245.2ns

OUTP:ASIG:DEL?

response:-2,-004,-03245.2

- **OUTPut:ASIGnal:SCHPhase**

Command to set the Sch-Phase of an optional PT 8601 Analog Test Signal Generator in the PT 5210.

The Sch-Phase value must be in the range:

-180<Sch-Phase<=+180

Example:

OUTP:ASIG:SCHP-123

set the Sch-Phase in the generator to -123deg

OUTP:ASIG:SCHP?

response: -123

- **OUTPut:SB78:VERSion?**

Command to display the version of an optional PT 8601 Analog Test Signal Generator in the PT 5210. The response contains four fields:

Field 1: Company name

Field 2: Type name

Field 3: KU number

Field 4: Software version for the analog test signal generator

Example:

OUTP:ASIG:VERS? response: *ProTeleVision,PT8601,KU123456,2.1*

- **OUTPut:ASIGnal?**

Command to display the complete settings of an optional PT 8601 Analog Test Signal Generator in the PT 5210. The response contains eight fields:

<Pattern>,<Test insert>,<Text>,<System>,<Field>,<Line>,<HTime><SchPhase>

For an explanation of the response, see the commands: *OUTP:ASIG:PATT*,
OUTP:ASIG:TEXT,*OUTP:ASIG:SYST*, *OUTP:ASIG:DEL*, AND *OUTP:ASIG:SCHP*.

Example:

OUTP:ASIG? response:
CBEBU,OFF"ANALOG",PAL,+2,+123,+12345.5,-160

- **OUTPut:SDISignal:PATtern**

Command to select the pattern of an optional PT 8602 or PT 8603 SDI Test Signal Generator in the PT 5210. Patterns available are:

Pattern:	PAL:	NTSC:	Description:
CBSMpte		X	SMPTE Color Bar
CBEBu	X		EBU Color Bar
DBEBu8	X		EBU Color Bar 8 bit
CB100	X		100% Color Bar
CBGRey75	X		Split field Color bar w/75% grey
CBRed75	X		Split field Color bar w/75% red
SDICheck	X	X	SDI Check field
SHALlowramp	X	X	Shallowramp
DTIMing	X	X	Digital Timing Test Signal
BLACk	X	X	Serial black
WIN15	X	X	Window 15% ¹
WIN20	X	X	Window 20% ¹
WIN100	X	X	Window 100% ¹
CROSShatch	X	X	Cross hatch ¹
PLUGe	X	X	Pluge ¹
SAFArea	X	X	Safe area ¹
MULTiburst	X	X	Multiburst ¹
RED75	X	X	75% Red ¹

1) These patterns are only available in option PT 8603

Note:

Not all the patterns are available in both systems. Trying to select a pattern not available in the active system will result in an error, namely: **-200,"Execution error"**

Example:

OUTP:SDIS:PATT WIN15 set the pattern in the generator to window 15%
OUTP:SDIS:PATT? response: *WIN15*

- **OUTPut:SDISignal:TEXTinsert**

Command to insert a text into the pattern of an optional PT 8602 or PT 8603 SDI Test Signal Generator in the PT 5210. Three parameters are possible, i.e. **OFF**, **ON** or some text, "**TEXT**".

Note:

To switch the text on/off use the parameters: ON or OFF. To alter the actual text: use "TEXT". The text is limited to eight characters and the range is limited to the characters A-Z, 0-9, - (hyphen), _ (underscore) or space. When queering the generator about the text, the string returned will always be eight characters wide.

Example:

OUTP:SDIS:TEXT"DIGITAL" set the test in the generator to DIGITAL
OUTP:SDIS:TEXT OFF switch text in the pattern OFF
OUTP:SDIS:TEXT? response: *OFF,"DIGITAL"*

- **OUTPut:SDISignal:SYSTEM**

Command to select the system of an optional PT 8602 or PT 8603 SDI Test Signal Generator in the PT 5210. Systems available are:

System:	Description:
SDI625	625/50 system
Sdi525	525/59.94 system

Note:

If the pattern becomes invalid when selecting a new system, the pattern will change according to:

CBSMpte	->CBEBU
CBEBU	->CBSMpte
CBEBU8	->CBSMpte
CB100	->CBSMpte
CGRey75	->CBSMpte
CBRed75	->CBSMpte

Example:

OUTP:SDIS:SYST SDI625 set the system in the generator to 625/50
OUTP:SDIS:SYST? response: *SDI625*

- **OUTPut:SDISignal:EDHinsert**

Command to select the pattern of an optional PT 8602 or PT 8603 SDI Test Signal Generator in the PT 5210. Possible selections are **ON** or **OFF**.

Example:

OUTP:SDIS::EDH OFF set EDH insertion in the generator to OFF
OUTP:SDIS:EDH? response: *OFF*

- **OUTPut:SDISignal:EMBAudio:SIGNAL**

Command to select the signal of the embedded audio in an optional PT 8602 or PT 8603 SDI Test Signal Generator in the PT 5210. Possible selections are:

System:	Description:
OFF	Off
S800HZ	Stereo 800 Hz
S1KHZ	Stereo 1 kHz
SEBu1KHZ	EBU Stereo 1kHz
SBBC1KHZ	BBC Stereo 1 kHz
MEBu1KHZ	EBU Mono 1 kHz
MBBC1KHZ	BBC Mono 1 kHz
DUAL	Dual Sound

Example:

OUTP:SDIS:EMB:SIGN S1KHZ set the embedded audio signal in the generator to stereo 1kHz

OUTP:SDIS:EMB:SIGN? response: *S1KHZ*

- **OUTPut:SDISignal:EMBAudio:LEVel**

Command to select the level of the embedded audio in an optional PT 8602 or PT 8603 SDI Test Signal Generator in the PT 5210. Possible selections are:

Signal:	Description:
SiLence	Silence
DB0FS	0 dB
DB9FS	-9 dB
DB12FS	-12 dB
DB14FS	-14 dB
DB16FS	-16 dB
DB18FS	-18 dB
DB20FS	-20 dB

- **OUTPut:SDISignal:DELAy**

Command to set the delay of an optional PT 8602 or PT 8603 SDI Test Signal Generator in the PT 5210.

The delay is defined by three parameters:

<Field>,><Line>,<HTime>

where **<Field>** sets the field offset, **<Line>** sets the line offset and **<HTime>** sets the horizontal time in ns, i.e.

HTime(PAL) **<64000.0ns**

HTime(NTSC) **<63492.1ns**

Note:

It is not possible to select a delay outside the range of the selected system. See table below:

Digital			
D1, 625 Lines		D1, 525 Lines	
Field:	Line:	Field:	Line:
-0	-0,...,-312	-0	-0,...,-262
+0	+0,...,+311	+0	-0,...,+261
+1	+0	+1	+0

Example:

OUTP:SDIS:DEL-0,-12,-148.0 set the delay in the generator to -0 field, -12 line & -148.0 ns

OUTP:SDIS:DeL? response:-0,-012,-00148.0

- **OUTPut:SDISignal:VERSion?**

Command to select the signal of the embedded audio in an optional PT 8602 or PT 8603 SDI Test Signal Generator in the PT 5210. The response contains four fields:

Field 1: Company name

Field 2: Type name

Field 3: KU number

Field 4: Software version for the PT 8602 or PT 8603 SDI Test Signal Generator

Example:

OUTP:SDIS:VERS? response: *ProTeleVision,PT8609,KU123456,2.0*

- **OUTPut:SDISignal:EMBAudio:SIGNal**

Command to display the complete setting of an optional PT 8602 or PT 8603 SDI Test Signal Generator in the PT 5210. The response contains ten fields:

<Pattern>,<Text insert><Text>,<System>,<EDH>,<EMBAudio signal>,<EMBAudio level><Field>.<Line>,<Ftime>

For an explanation of the response, see the commands:

OUTP:SDIS:PATT,OUTP:SDIS:TEXT,OUTP:SDIS:SYST,OUTP:SDIS:EDH,OUTP:SDIS:EMB:S IGN,OUTP:SDIS:EMB:LEV and OUTP:SDIS:Del.

Example:

OUTP:SDIS? response:
CBEBU,OFF"DIGITAL",SDI625,OFF,DUAL,DBM9FS,+0,+001,+12345.5

- **OUTPut:AUDio:SIGNal**

Command to select the audio signal in an optional PT 8605 AES/EBU Audio Generator in the PT 5210. Possible selections are:

System:	Description:
S800HZ	Stereo 800 Hz
S1KHZ	Stereo 1 kHz
SEBu1KHZ	EBU Stereo 1 kHz
SBBC1KHZ	BBC Stereo 1 kHz
MEBu1KHZ	EBU Mono 1 kHz
MBBC1KHZ	BBC Mono 1 kHz
DUAL	Dual Sound
F48KHZ	48 kHz

Example:

OUTP:AUD:SIGN DUAL set the audio signal in the generator to dual sound

OUTP:AUD:SIN? response: *DUAL*

- **OUTPut:AUDio:LEVel**

Command to select the audio level in an optional PT 8605 AES/EBU Audio Generator in the PT 5210. Possible selections are:

Signal:	Description:
SILence	Silence
DB0FS	0 dB
DB9FS	-9 dB
DB12FS	-12 dB
DB14FS	-14 dB
DB16FS	-16 dB
DB18FS	-18 dB
DB20FS	-20 dB

Example:

OUTP:AUD:LEV DB20FS

set the audio level in the generator to -20 dB

OUTP:AUD:LEV?

response: *DB20FS*

- **OUTPut:AUDio:TIMing**

Command to select the audio timing in an optional PT 8605 AES/EBU Audio Generator in the PT 5210. Possible selections are:

Timing::	Description:
PAL	
NTSC1	Phase AES0
NTSC2	Phase AES1
NTSC3	Phase AES2
NTSC4	Phase AES3
NTSC5	Phase AES4

Example:

OUTP:AUD:TIM NTSC3

set the audio timing in the generator to NTSC3

OUTP:AUD:TIM?

response: *NTSC3*

- **OUTPut:AUDI:VERSion?**

Command to display the version of an optional PT 8605 AES&EBU Audio Generator in the PT 5210. The response contains four fields:

Field 1: Company name

Field 2: Type name

Field 3: KU number

Field 4: Not available for this option, i.e. the returned value is 0.

Example:

OUTP:AUD:VERS?

response: *ProTeleVision,PT8609,KU123456,2.0*

- **OUTPut:AUdio?**

Command to display the complete settings of an optional PT 8605 AES/EBU Audio Generator in the PT 5210. The response contains three fields:

<Signal>,<Level>,<Timing>

For an explanation of the response, see the commands: OUTP:AUD.SIGN, OTUP:AUDL:LEV, and OUTP:AUDTIM.

Example:

OUTP:AUD?

response: *DUAL, SILENCE, NTSC3*

- **OUTPut:TIME:VERSion?**

Command to display the version of an optional PT 8607 Longitudinal Time Code Module in the PT 5210. The response contains four fields:

Field 1: Company name

Field 2: Type name

Field 3: KU number

Field 4: Not available for this option, i.e. the returned value is 0.

Example:

OUTP:AUD:VERS?

response: *ProTeleVision,PT8609,KU123456,2.0*

- **OUTPut:BBMulti:VERSion?**

Command to display the version of an optional PT 8604 Multiple Parallel Black Burst Outputs in the PT 5210. The response contains four fields:

Field 1: Company name

Field 2: Type name

Field 3: KU number

Field 4: Not available for this option, i.e. the returned value is 0.

Note:

This option is an attachment to BB2, i.e. when programming the setup for this option BB2 should be used, except for the version command.

Example:

OUTP:BBM:VERS?

response: *ProTeleVision,PT8609,KU123456,2*

9.5 ERROR CODES

9.5.1 Command errors [-199, -100]

Error Number	Error string. [description/explanation/example]:
-100	Command error. The command is invalid or incorrect.
-101	Invalid character. A command or parameter contains an invalid character, e.g. a header containing an ampersand, SYST:VERS&.
-102	Syntax error. An unrecognized command or datatype was encountered, e.g. a string was received when the generator didn't accept strings.
-103	Invalid separator. A separator was expected, but an illegal character was encountered, e.g. the semicolon was omitted after a command, *IDN?:SYST:ERR?;
-104	Data type error. A data element different than one allowed was encountered, e.g. numeric data was expected but string data was encountered.
-108	Parameter not allowed. More parameters was received than expected for the command, e.g. the *IDN?; command accepts no parameters, so receiving *IDN? 2; is not allowed.
-109	Missing parameter. Fewer parameters were received than expected for the command.
-110	Command header error. An error was detected in the command header.
-111	Header separator error. A character which is not a legal header separator was encountered, e.g. no white space followed the header, thus SYST:PRES:NAME"MACRO" is an error.
-112	Program mnemonic too long. The header contains more than twelve characters.
-113	Undefined header. The header is syntactically correct, but is not defined for the device.
-114	Header suffix out of range. The command is invalid because the value of the numeric suffix attached to the program mnemonic is out of range, e.g. OUTP:ALAR3? Is illegal because only 2 alarm outputs exists.
-120	Numeric data error. An error in the numeric data was encountered.
-121	Invalid character in number. An invalid character for the data type was encountered, e.g. an alpha in a decimal value.
-123	Exponent too large. The magnitude of the exponent was larger than 32000.
-124	Too many digits. The mantissa of a decimal numeric data element contained more than 255 digits.
-128	Numeric data not allowed. A legal numeric data was received, but the device does not accept one.
-130	Suffix error. An error in the suffix was encountered.
-131	Invalid suffix. The suffix is syntactically incorrect.

Error Number	Error string. [description/explanation/example]:
-134	Suffix too long. The suffix contains more than twelve characters.
-138	Suffix not allowed. A suffix was encountered after a numeric element, which does not allow suffixes.
-140	Character data error. An error in the character was encountered.
-150	String data error. An error in the string data was encountered.
-151	Invalid string data. A string data element was expected, but was invalid for some reason, e.g. an END message was received before the terminal quote character.
-158	String data not allowed. A string data element was received but was not allowed by the device.
-160	Block data error. There is an error in the block data received.
-161	Invalid block data. A block data was expected, but was invalid for some reason.
-170	Expression error. There is an error in the expression received.

9.5.2 Execution errors [-299, -200]

Error Number	Error string. [description/explanation/example]:
-200	Execution error.
-220	Parameter error. Indicates that a program data element related error occurred.
-222	Data out of range. Indicates that a legal program data element was received but could not be executed because the interpreted values was outside the range as defined by the device, e.g. the command OUTP:SIGN:GAIN 2.5; is illegal since the gain can not exceed 2 dB.
-223	Too much data. Indicates that a legal program data element of block, expression, or string type was received that contained more data than the device could handle due to memory or related device-specific requirements.
-224	Illegal parameter value. Used where exact value, from a list of possibles, was expected.
-233	Invalid version. Indicates that a legal program data element was parsed but could not be executed because the version of the data is incorrect to the device.
-241	Hardware missing. Indicates that a legal program command or query could not be executed because of missing device hardware.

9.5.3 Device specific errors [-399, -300]

Error Number	Error string. [description/explanation/example]:
-300	Device-specific error.
-350	Queue overflow. A specific code entered into the queue in lieu of the code that caused the error. This code indicates that there is no room in the queue and an error occurred but was not recorded.
-360	Communication error. A communication error on the serial port was detected.
-361	Parity error in program message. Parity bit not correct when data received on the serial port.
-362	Framing error in program message. A stop bit was not detected when data was received, e.g. a bad rate mismatch.
-363	Input buffer overrun. Software or hardware input buffer on serial port overflows.

9.5.4 Query errors [-499, -400]

Error Number	Error string. [description/explanation/example]:
-400	Query error. An error occurred during a query.
-410	Query INTERRUPTED. Indicates that a condition causing an INTERRUPTED Query error occurred.
-420	Query UNTERMINATED. Indicates that a condition causing an UNTERMINATED Query error occurred.
-430	Query DEADLOCKED. Indicates that a condition causing a DEADLOCKED Query error occurred.

10 B. Menu: CONFIG/DIAGNOSE

The diagnose submenu is used to perform internal test of both the basic instrument and the optional installed modules.

The output signals will be undisturbed during the standard diagnose routines.

```
SUBMNU:CONFIG/DIAGNOSE, select    ◀◀▶▶E
SELECT:<Main> Options  RS232      ...
```

```
SUBMNU:CONFIG/DIAGNOSE, select    ◀◀▶▶E
SELECT:<Display> Keyboard Memory  ...
```

```
SUBMNU:CONFIG/DIAGNOSE, select    ◀◀▶▶E
SELECT:<Configuration> ErrorQueue ...
```

Use the ◀ 4 and ▶ buttons to select the diagnose to be performed. Then press the **EXECUTE** button to enter the submenu.

10.1 DIAGNOSE/Main

The MAIN test includes testing correct functioning of the functions installed in PT 5210 without any options installed.

The tested functional sections includes:

- ♦ Main board
- ♦ Black burst output 1 and 2
- ♦ Oscillator board.

All these tests are performed in a sequence.

```
2NDMNU:../DIAGNOSE/Main          ^
Testing main board                >>>>
```

Description:

When the test is running, this will be indicated by a number of arrows on the right side of the display. When a total of five arrows are displayed, the test is finished. If no errors have been found, a message OK will appear on the display to indicate that the test has been completed; otherwise the message FAIL will appear.

To continue testing on the next main section press the **EXECUTE button. To cancel further testing press the ^ button.**

```
2NDMNU:../DIAGNOSE/Main          ^
Testing black burst unit          >>>>
```

Description:

When the test is running, this will be indicated by a number of arrows on the right side of the display. When a total of five arrows are displayed, the test is finished. If no errors have been found, a message OK will appear on the display to indicate that the test has been completed; otherwise the message FAIL will appear.

To continue testing on the next main section press the **EXECUTE** button. To cancel further testing, press the **▲** button.

Note:

The black burst unit tested is the two standard included black burst generators.

```
2NDMNU:../DIAGNOSE/Main      ▲  
Testing oscillator board      >>>>>
```

Description:

When the test is running, this will be indicated by a number of arrows on the right side of the display. When a total of five arrows are displayed, the test is finished. If no errors have been found, a message OK will appear on the display to indicate that the test has been completed; otherwise the message FAIL will appear.

To continue testing on the next main section press the **EXECUTE** button. To cancel further testing, press the **▲** button.

To perform the main test once more, press the **EXECUTE** button. To return to the previous menu level, press the **▲** button.

10.2 B.2 DIAGNOSE/Options

The OPTIONS test includes testing correct function of the optional installed modules in PT 5210.

The first testing of the installed option is started automatically when entering the menu.

To continue with the next options press the **EXECUTE** button. When all options have been tested use the **▲** button to return to the previous menu.

```
2NDMNU:../DIAGNOSE/Options    ▲  
Testing PTxxxx/yyy in (nnnn)  >>>>>
```

Description:

This test is divided into a series of tests. Each of the options which were detected during power-up is detected for correct operation one by one.

When the test is running, this will be indicated by a number of arrows on the right side of the display. When a total of five arrows are displayed, the test is finished. If no errors have been found, a message OK will appear on the display to indicate that the test has been completed; otherwise the message FAIL will appear.

To continue testing on the next main section press the **EXECUTE** button. To cancel further testing, press the **▲** button.

During the test the display indicates which option is being tested. The syntax for the display is the following:

PTxxx: indicates the type number for the option.
PT8601 indicates that the PT 8601 Analog Test Signal Generator is being tested.

yyy: indicates that the installed option is a special version option designed according to special requirements.

[nnnn]: indicates an optional parameter. This parameter identifies the output connector(s) the option is using. This parameter is required when several identical options are installed.

To repeat the test of all the option(s) press the **EXECUTE** button. To return to the previous menu level, press the **▲** button.

Note:

Options which were not detected during power up will not be tested.

Note:

The PT 8610 High Precision OCXO is not tested as a separate option. The test is performed together with the oscillator board test in the main test routine.

10.3 B.3 DIAGNOSE/RS232

2NDMNU: ../DIAGNOSE/RS232 ▲
Please insert a loopback connector!!

Description:

The RS232 port is tested using a loopback connector. This loopback connector is simply a connector where RxD (pin 2) is connected to TxD (pin 3), and RTS (pin 7) is connected to CTS (pin 8).

When the test is running, this will be indicated by a number of arrows on the right side of the display. When a total of five arrows are displayed, the test is finished. If no errors have been found, a message **OK** will appear on the display to indicate that the test has been completed; otherwise the message **FAIL** will appear.

To continue testing on the next main section press the **EXECUTE** button. To cancel further testing, press the **▲** button.

10.4 B4. DIAGNOSE/Display

```
2NDMNU:../DIAGNOSE/Display      ^
abcdefghijklmnopqrstuvwxyz-1234567890+,.
```

```
ABCDEFGHIJKLMNOPQRSTUVWXYZ_!"#$%&/0=?;:
abcdefghijklmnopqrstuvwxyz-1234567890+,.
```

Description:

This test will test the graphic display. During this test the above two displays will alternate with a frequency of approximately 1.6 seconds. The test is a visible test only.

To return to the previous menu level press the ^ button.

10.5 B.5 DIAGNOSE/Keyboard

```
2NDMNU:../DIAGNOSE/Keyboard      ^
Press button: xxxxxx              >>>>>
```

Description:

The keyboard test is testing the response of the buttons on the front of the instrument. To perform the test press the button indicated.

The xxxxx will be replaced by a button name in the following sequence: LEFT, DOWN, RIGHT, EXECUTE, PRESET, OUTPUT, GENLOCK.

The requested button has to be pressed within a given time. The arrows to the left in the display indicate the time to press the button, i.e. the button should be pressed before five arrows are visible.

The display will change as soon as the correct button has been pressed or a time-out occurs.

To restart the keyboard test press the **EXECUTE** button. In case any time-out occurs the key will be marked as FAIL. To return to the previous menu level press the ^ button.

Note:

The ^ is NOT tested. This test is performed by use of ^ button when leaving the menu.

10.6 B.6 DIAGNOSE/Memory

```
2NDMNU:../DIAGNOSE/Memory      ^
Testing memory: ROM              >>>>>
```

Description:

There are two types of memory to test:

- ♦ ROM
- ♦ RAM

When the test is running, this will be indicated by a number of arrow on the right side of the display. When a total of five arrows are displayed, the test is finished. If no errors have been

found, a message OK will appear on the display to indicate that the test has been completed; otherwise the message FAIL will appear.

To continue testing on the next main section press the **EXECUTE** button. To cancel further testing, press the **▲** button.

When both memory types have been tested a message stating the result of the complete test will appear.

The RAM check is done by writing and reading the sequence 0x55 and 0xAA to/from each memory position in the RAM. Since this operation involves moving the content out of the RAM, there is a potential risk of losing that data if the apparatus is switched off during the test. A built-in safety procedure will detect such an error during power-up and will report a general failure in the RAM. If this happens a factory reset will be performed.

To perform the main test once more, press the **EXECUTE** button. To return to the previous menu level, press the **▲** button.

10.7 B.7 DIAG NOSE/Configuration

The Diagnose Configuration displays the units detected during power up. The identification may include type number (PTxxxx), Serial Number (KUxxxxxx), and when available the software version.

2NDMNU:../DIAGNOSE/Configuration	◀▶
(MAIN):PT5210, KU000000, 01.9	ESC

Description:

The main board is identified by the type number of the instrument (PT 5210) and the serial number for the basic instrument. The software version is the software version of the master controller.

2NDMNU:../DIAGNOSE/Configuration	◀▶
(OSC):---,KU000000, 02.1	ESC

Description:

The oscillator board is identified by the serial number of the basic instrument and the software version of the oscillator board.

2NDMNU:../DIAGNOSE/Configuration	◀▶
(BB12):---,KU000000, 02.1	ESC

Description:

BB12 Indicates the two standard installed black burst generators. These two black burst generators are identified by the serial number of the basic instrument and the software version of the black burst generators

BB12 Indicates as well that the black burst generator uses output 1 and 2

Option PT 8601 Analog Test Signal Generator

2NDMNU:../DIAGNOSE/Configuration	◀▶
(ANALS):PT8601, KU000000, 02.1	ESC

Description:

ANLS Indicates an optional installed PT 8601 Analog Test Signal Generator. The PT 8601 Analog Test Signal Generator is identified by the serial number and the software version of the option

ANLS Indicates as well that the module uses the output marked ANIL SIG (output number 7)

Option PT 8602 or PT 8603 SDI Test Signal Generators

2NDMNU:../DIAGNOSE/Configuration	◀▶
(SDIS):PT8602, KU000000, 02.1	ESC

Description:

SDIS Indicates an optional installed SDI Test Signal Generator. The type number is either PT 8602 OR PT 8603. The difference between these two generators is the number of patterns available. The generator is also identified by the serial number and the software version

SDIS Indicates as well that the module uses the two outputs marked SDI SIG

Option PT 8604 Multiple Parallel Black Burst Outputs module

2NDMNU:../DIAGNOSE/Configuration	◀▶
(BBMU):PT8604, KU000000, NA	ESC

Description:

- BBMU Indicates an optional installed PT 8604 Multiple Parallel Black Burst Output module. PT 8604 Multiple Parallel Black Burst Output module is identified by the serial number. No software version is available for this option
- BBMU Indicates as well that the module uses the connectors marked ANALOG BLACK BURST (connector number 3, 4, 5, 6, 9, and 10)

Option PT 8605 AES/EBU Audio Generator

2NDMNU:../DIAGNOSE/Configuration	◀ ▶
(AES):PT8605, KU000000, NA	ESC

Description:

- AES Indicates an optional installed PT 8605 AES/EBU Audio Generator. The PT 8605 AES/EBU Audio Generator is identified by the serial number. No software version is available for this option
- AES Indicates as well that the module uses the two outputs marked AES/EBU AUDIO (One XLR 110 Ω balanced and one BNC 75 Ω single ended output)

Option PT 8606 SDI Genlock module

2NDMNU:../DIAGNOSE/Configuration	◀ ▶
(SDIG):PT8606, KU000000, NA	ESC

Description:

- SDIG Indicates an optional installed PT 8606 SDI Genlock module. The PT 8606 SDI Genlock module is identified by the serial number. No software version is available for this option
- SDIG Indicates as well that the module uses the two connectors marked SDI GENLOCK IN and OUT

Option PT 8607 Longitudinal Time Code module

2NDMNU:../DIAGNOSE/Configuration	◀ ▶
(TIME):PT8607, KU000000, NA	ESC

Description:

TIME	Indicates an optional installed PT 8607 Longitudinal Time Code module. The PT 8607 Longitudinal Time Code module is identified by the serial number. No software version is available For this option
TIME	Indicates as well that the module uses the XLR connector marked TIME CODE

Option PT 8608 Black Burst module

2NDMNU:../DIAGNOSE/Configuration	◀ ▶
(BB34):PT8608, KU000000, 00.0	ESC

Description:

BB34, BB56 and BB78	Indicates any optional installed PT 8609 Black/Color bar modules. The PT 8609 Black/Color bar modules are identified by the serial number and the software version of the option
BB34	Indicates as well that the module uses output 3 and 4
BB56	Indicates as well that the module uses output 5 and 6
BB78	Indicates as well that the module uses output 7 and 8

Note:

The PT 8608 Black Burst modules will have different serial numbers and may have different software versions.

Option PT 8609 Black/Color bar module

2NDMNU:../DIAGNOSE/Configuration	◀ ▶
(SB34):PT8609, KU000000, 02.1	ESC

Description:

SB34, SB56 and SB78	Indicates any optional installed PT 8609 Black/Color bar modules. The PT 8609 Black/Color bar modules are identified by the serial number and the software version of the option
SB34	Indicates as well that the module uses output 3 and 4
SB56	Indicates as well that the module uses output 5 and 6
SB78	Indicates as well that the module uses output 7 and 8

Note:

The PT 8609 Black/Color bar modules will have different serial numbers and may have different software version.

10.8 B.8 DIAGNOSE/ErrorQueue

2NDMNU:../DIAGNOSE/ErrorQueue (1)	◀▶
E(006):Level detector at BB3	ESC

Description:

The errorqueue displays the history of detected internal errors including the hardware level detector circuits which surveys the output signals. The errorqueue stores the last detected five errors. The errors are numbered from 1 to 5 and may be scrolled by pressing the ▲ or the ▼ button. The detected error is identified by an error number and a describing text. The errors list can be found in Appendix A.

To leave the errorqueue unchanged, select ESC and press the ▲ button.

To reset the errorqueue, press the **EXECUTE** button, then select OK and press the **EXECUTE** button. The "WARNING" LED will be switched OFF.

2NDMNU:../DIAGNOSE/ErrorQueue	◀▶
Reset ErrorQueue question	OK <ESC>

Note:

If any error is active, the error will be detected immediately again after reset and the "WARNING" LED will be switched ON again. The display is switched to the error status display.

