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PT 5202 Compact VariTime™ Sync Generator



User's Manual

PT 5202 Compact VariTime™ Sync Generator

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2 Safety

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

2.1 Introduction

The instrument described in this manual is designed to be used by properly trained personal only.

Only qualified personnel who are aware of hazards involved shall carry out adjustment, maintenance and repair of the exposed equipment.

2.2 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.

Warning and caution statements and/or symbols are marked on the instrument as well.

Special attention must be paid to the following issues:

- ◆ Protective grounding 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, only a skilled person who is aware of the hazards involved must carry it out.

2.3 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.

2.4 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.

The instrument is NOT equipped with a mains interruption switch, and thus to be made inoperative by unplugging its mains connection lead, or by other means prior of the instrument

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

2.5 Technical Specification

This manual provides technical information important for safe operation of the equipment.

Please refer to chapter **4 Product Data** for information regarding technical specifications and to chapter **6 Installation** and chapter **7**

Operating Instructions regarding instructions for use.

Technical assistance may be obtained from your local DK-Technologies sales representative or from:

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Marielundvej 37D

DK-2730 Herlev

Denmark

Phone: +45 44 85 02 55

Fax: +45 44 85 02 50

E-Mail: info@dk-technologies.com

Website: <http://www.DK-Technologies.com>

2.5.1 Equipment Ratings

The instrument can be used with a mains voltage supply of:

Voltage:

90-250 VAC

Frequency:

47-63 Hz

The power Consumption:

Does not exceed 25 Watts.

The instrument is designed for the following environmental conditions:

Indoor use

Altitudes up to 2000m

Temperatures between 5°C and 45°C

Maximum relative humidity of 80% for temperatures up to 31°C decreasing linearly to 50% relative humidity at 40°C.

The instrument is equipped with a number of input and output terminals as described in chapter **4 Product Data**

The terminals are protected from becoming live by means of basic insulation and protective screening.

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 operations or shows visible damages.

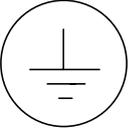


2.6 Electrostatic Sensitive Devices

All IC 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 component and tools at this potential.

2.7 Symbols

Symbol	Explanation:
	Caution, risk of electric shock.
	Caution (refer to accompanying documents)
	Protective conductor terminal.
	Alternating current

3 Introduction and Applications

3.1 Introduction

The PT 5202 Compact VariTime™ Sync Generator includes all basic features for professional sync, timing and test signals in one half-sized box.

The new digital studios need cost efficient and reliable synchronisation for the main equipment to work reliably. For this purpose PTV offers the PT 5202 as the fully integrated solution eliminating any costs associated with modular structures, support of many different signal types and extensive operating facilities.

Analog Black Burst is still routinely used for timing purposes, also in digital installations, where processing delays are often on the order of several fields.

The PT 5202 Compact VariTime™ Sync Generator is designed with the multiple delays of digital television installations in mind, but also fulfils all synchronisation requirements when used with a combination of digital and traditional analog video systems.

The PT 5202 Compact VariTime™ Sync Generator is a multi-standard sync generator and provides sync and test signals for both NTSC, PAL and for SDI outputs of 525/59.94 and 625/50 systems.

Each of the reference Black Burst outputs and the Test Signal Generator output can be individually selected in system (NTSC/PAL) and timed in fine steps over the complete sequence. The NTSC output format is selectable with or without set-up.

The serial digital black and test signals can be timed with a resolution of 37 ns over a ± 1 field range.

The analog black bursts are timeable in sub-nanosecond resolution over a ± 4 fields sequence for PAL and ± 2 fields sequence for NTSC.

The timing of analog Test Signal Generator follows the timing of the SDI generator, i.e. with a 37ns resolution but over a ± 4 fields sequence for PAL and ± 2 fields sequence for NTSC.

3.2 Configuration

The PT5202 comes with integrated frontplate control based on a 2-by-40 characters LCD display and navigation buttons. This guides the operator through the selections in the various menus to make the appropriate selection and store the settings.

In the menus all programmable parameters can be managed, e.g. system, timing test signals and audio parameters.

The frontpanel also includes separate pushbuttons can directly call the main outputs, e.g. BB's, SDI and Audio. Four presets are directly accessible from the front.

In addition to the frontpanel operation the PT 5202 Compact VariTime™ Sync Generator has also PC Remote Control. A Windows application program supplied with the instrument makes it easy to manage all timing, patterns and audio features in one screen.

The settings for the PC Remote Control are either loaded from the PC or downloaded from the generator. When the settings are loaded from the PC the data is transferred immediately to the generator, overwriting the actual state.

At exit from the panel, data is stored in a file on the PC for later use.

Four presets can be stored in the instrument and also in 4 separate files on the PC. Any preset can then be recalled either from the PC or from the generators internal memory.

Communication between PT 5202 and PC via standard RS-232 protocol makes it possible to use any kind of PC.

3.3 Applications

The PT 5202 is designed to manage slave as well as master operations as a stand-alone unit. In systems where PT 5202 operates as a master the reference is locked to an internal, high stability **TCXO** oscillator (**T**emperature **C**ompensated **X**tal **O**scillator)

For use in slave applications the genlock function is used.

The genlock function features genlock to NTSC and PAL video signals, Black Burst house sync or a 10 MHz reference clock, e.g. from a GPS receiver. The genlock function features passive loop-through, and has a common timing facility for the generator.

4 Product Data

4.1 Safety Characteristics

This apparatus has been designed and tested in accordance with the safety Class I requirements of the EN/IEC publication EN 61010-1 (“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 25°C and after 20 min. warm-up. Specified numerical data without tolerances indicate typical values at nominal ambient temperature (25°C) and reflect an average performance.

4.3 Summarised Data

The instrument has been developed based on the latest, relevant ITU, SMPTE, EBU, and AES/EBU specifications.

4.3.1 Master Frequency Reference TCXO

Temperature drift:	± 2.5 ppm (0-50°C, ref. 25°C)
Ageing:	± 1 ppm/year; first year then better
Adjustment tolerance	\pm Hz (@20-25°C)

4.3.2 Analog Genlock

Input:	75 Ω looped through
Return loss:	>36 dB to 6 MHz

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

Amplitude:	Nominally ± 3 dB
S/N ratio:	>26 dB
Input Sc-H phase:	Nominally $\pm 45^\circ$
Pull-in range f_{sc} :	± 50 Hz
Jitter when locked to burst:	< 0.5°
Jitter when locked to sync:	< 5 ns

4.3.2.2 Timing Facilities

Timing range:	PAL:	± 4 fields
	NTSC:	± 2 fields

4.3.2.3 Timing Resolution

Analog Black Burst:	0.15 ns
Video, analog and digital:	37 ns

4.3.2.4 Genlock Signal (Continuous frequency)

Continuous frequency reference:	10 MHz
Amplitude:	1 V ± 3 dB

4.3.3 Analog Black Burst Outputs

Connector:	BNC
Output impedance:	75 Ω \pm 0.5 Ω
Return loss:	>36 dB, to 5 MHz
Sync amplitude:	PAL: -300mV \pm 2% NTSC: 40 IRE \pm 0.8IRE (-286mV \pm 2%)
Burst amplitude:	PAL: 300mV \pm 2% NTSC: 40 IRE \pm 0.8IRE (286mV \pm 2%)
Set-up (NTSC)	7.5IRE or 0 IRE (selectable)
Timing range:	PAL: \pm 4 fields NTSC: \pm 2 fields
Timing resolution:	0.5° at f_{sc}
Sc-H phase:	Default 0°, adjustment \pm 180°, resolution <1°
S/N ratio:	60 dB un-weighted to 5 MHz

4.3.4 Video Signal Generator

4.3.4.1 SDI Output

Connector:	BNC
Output impedance:	75 Ω \pm 0.5 Ω
Format:	270 Mb/s serial, complies with ITU-R BT 656 and SMPTE 259 M
Return loss:	>15 dB, 5 – 270 MHz
Timing range:	PAL: \pm 1 field NTSC: \pm 1 field
Timing resolution:	37 ns
Jitter:	< 0,20 UI
Rise and fall time:	0.75 – 1.50 ns
Embedded Audio:	1kHz stereo in Group 1, channels 1-4 Levels: -20dB _{FS} for 525 lines -18dB _{FS} for 625 lines Silence Off

4.3.4.2 Analog Output

This output is primarily for testing purposes, as its colour phasing is unlocked to the Black Burst outputs.

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: 40 IRE \pm 0.8IRE (-286 mV \pm 2%)
Burst amplitude:	PAL: 300 mV \pm 2% NTSC: 40 IRE \pm 0.8IRE (286 mV \pm 2%)
Set-up (NTSC)	7.5IRE or 0 IRE (selectable)
Video accuracy:	Nominal \pm 2 %
Timing range:	PAL: \pm 1 fields NTSC: \pm 1 fields
Timing resolution:	37 ns,
Sc-H phase:	Default 0°, adjustment \pm 180°, resolution: 1.4°
S/N ratio:	50 dB un-weighted to 5 MHz

4.3.4.3 Source Identification on SDI and VIDEO out

Patterns with identification	EBU colourbar and SMPTE Colourbar
Text position	Fixed in left hand side and upper part Scrolling up and down
Text size and characters	16 characters in one line ASCII characters 0..9, A..z; _(underscore) and -(minus)

4.3.4.4 Common Test Signals, SDI and VIDEO out

All signals are in standard 4x3 aspect ratio.

Patterns dedicated for PAL:	EBU Colour Bar 75% Color Bar + Red CCIR18 Multiburst
-----------------------------	--

Patterns dedicated for NTSC:	SMPTE Colour Bar FCC Colour Bar
------------------------------	------------------------------------

Patterns common for NTSC/PAL:	Colour Bar ITU801 Colour Bar 100% 75% Red Crosshatch PLUGE SDI Check Field Digital Grey Staircase 5 step Staircase 10 step 15 kHz Black/White White 100% Black Window 10% Window 15% Window 20% Window 100%
-------------------------------	--

4.3.5 AES/EBU Audio Generator

Serial digital audio generator with test tones.

Connector:	XLR
Output format:	Balanced 110 Ω \pm 20% According to AES3 1992
Amplitude:	3V _{PP} Typically
Data bit rate:	3.072 Mbit/s
Rise and fall time:	5-30 ns
Coding:	Linear, 20-bits two's complement binary bi-phase mark
Pre-emphasis:	None
Timing:	+10.4 μ s to -9.6 μ s in 0.8 μ s steps

4.3.5.1 AES/EBU Output Signals

Tones:	Stereo 500 Hz Stereo 1 kHz Stereo EBU 1 kHz, single click in channel A Stereo 8 kHz
Click rate:	1 or 3 s.

Levels:	Silence
	0 dBFS
	-9 dBFS
	-12dBFS
	-15 dBFS
	-16 dBFS
	-18 dBFS
	-20 dBFS

4.3.6 Wordclock (WCLK) Output

Connector:	BNC
Output impedance:	75 Ω
Output characteristics:	HC-MOS clock, 0 – 5 V un-terminated
Reference output:	44.1 or 48 kHz

The 48 kHz is frequency and phase locked to the video.

The 44.1kHz is the CD audio sample frequency and frequency locked to the video frequency

4.3.7 Analog Audio Generator

Connector:	XLR
Output format:	Balanced 30 Ω Balanced by active circuitry.
Reference amplitude:	0 dBu, corresponding to 775 mV
Distortion:	< 1 %

4.3.7.1 Analog Audio Output Signals

Tones:	Stereo 500 Hz, no click Stereo 1 kHz, no click Stereo EBU 1 kHz, single click in channel A Stereo 8 kHz, no click
Click rate:	1 or 3 s.
Levels:	+10 dBu +8 dBu +7 dBu +6 dBu +5 dBu +4 dBu +3 dBu +2 dBu +1 dBu 0 dBu -1 dBu -2 dBu -3 dBu -4 dBu -5 dBu -6 dBu -7 dBu -8 dBu -9 dBu -10 dBu -11 dBu

-12 dBu
 -13 dBu
 -15 dBu
 -18 dBu
 -20 dBu
 -24 dBu
 -27 dBu
 -30 dBu
 -33 dBu
 -36 dBu
 Silence

4.3.8 Remote Control

Input Interface:	RS-232 port, 9 pole D-sub, male
Protocol:	SCPI based
Baud rate.	9600 kbit
Parity	None
Handshake	None

4.3.9 Presets

Four preset set-ups can be stored in the unit. Besides essential data for the individual Presets all user accessible parameters for the outputs are included and stored in non-volatile memory.

The Presets are named Preset 1–4 in the unit.

In the frontplate each preset is identified by:

Name (24 characters, no space)

In the PC Remote Control each preset is identified by:

Name (24 characters, no space)

Author

Date of modification

The Windows application program displays the preset name in the Preset Status box in the System Status window, when the preset is active.

4.4 Environmental Conditions

4.4.1 Regulations and Standards

- ♦ EN 55103-1
- ♦ EN 55103-2

4.4.2 Climatic Conditions

Temperature range:

Storage: -30° - +70°C (41°F – 113°F)

Ambient operating: +5° - +45°C (-22°F - +158°F)

Humidity:

Non condensing (IEC 721)

4.4.3 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.

4.4.4 Safety

Comply with EN 61010-1-1

4.5 Power Supply

Voltage: 100 - 240 VAC

Frequency: 47 - 63 Hz

Power consumption: 22 W

4.6 Mechanical Data

Mechanical data for cabinet

Height: 42 mm (1.65")

Width: 217 mm (8.54")

Depth: 400 mm (17.3")

Weight: 2.5 kg (5.5 lbs)

Mechanical data for cabinet fitted with 19" rack mount

Height: 44 mm (1.73")

Width: 442 mm (18.4")

Depth: 400 mm (17.3")

Weight: 2.8 kg (6.2 lbs)

Mechanical data for two cabinets side by side, fitted with 19" rack mount

Height: 44 mm (1.73")

Width: 442 mm (18.4")

Depth: 400 mm (17.3")

Weight: 5.3 kg (11.7 lbs)

5 Accessories

Item:	Quantity:	Ordering Number:
Mains cable, EURO	As required	4008 105 00020
Mains cable, US	As required	4008 105 00030
Mains cable, UK	As required	4008 105 01390
Interface cable	1	4008 105 05220
Rack Mount kit	1	4008 107 60420
CD-ROM	1	4008 002 96030

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-Technologies Sales or Service organisation should be notified in order to facilitate the repair or replacement of the instrument.

6.2 Safety Instruction

6.2.1 Grounding

Before any other connection is made, the instrument must be connected to a protective earth conductor via the three-core mains cable.

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 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, a qualified person should only do it. This instrument is equipped with a tap-less switch mode power supply that covers most nominal voltage ranges in use: 100-240V AC RMS. This obviates the need to adapt to the local mains voltage.

The mains frequency is 47-63 Hz.

Warning: This instrument is intended not to have the fuse renewed. If the fuse is damaged the power supply unit is also affected.

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

1. Remove the mains cable
2. Unscrew all 11 screws of the top cover
3. Disconnect the power connector from the main PCB and the internal ground cable from the chassis
4. Unbolt the power inlet from the rear panel and the PCB from the chassis stand-off's
5. Replace power supply unit and assemble in reverse order

The power supply is a safety and service part. The ordering number is 4008 109 86650

6.4 Rack Mounting

The PT 5202 Compact Varitime™ Sync Generator is in a half size 19" rack cabinet. The instrument is intended for rack mounting as well as desktop use. A rack mount kit for conventional 19" rack is included.

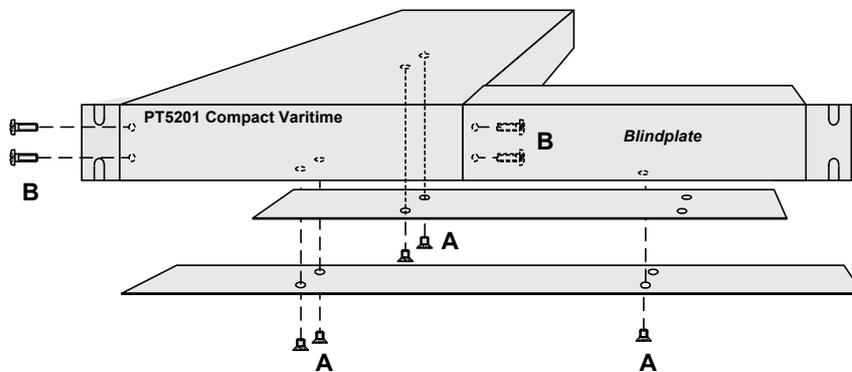
When the Sync Generator is used in desk top applications it is recommended to mount the four self-adhesive rubber feet, included in the rack mount kit.

The included rack mount kit features ability to mount one or two units in a 19" rack system. The rack mount instruction, see below, specifies the parts.

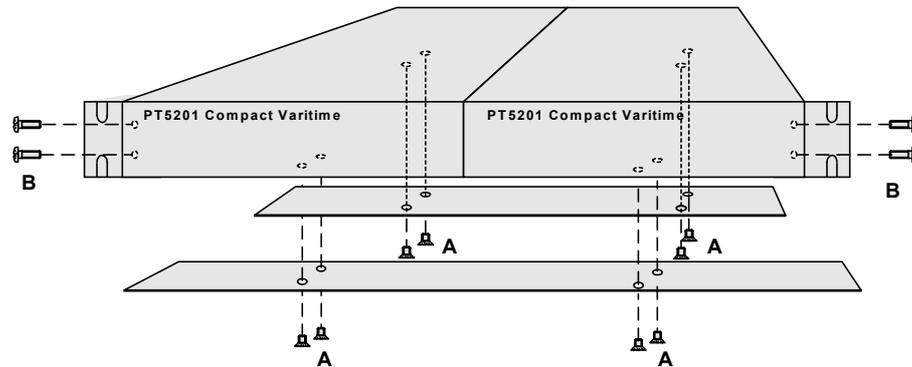
6.4.1 Rack Mount Instructions

The PT 5202 is delivered with the following mounting parts:

- | | | |
|-------|--------------------------------------|----------|
| 1 pc. | Side bracket | |
| 1 pc. | Blind plate including rack mount ear | |
| 2 pc. | Support base plates | |
| 4 pc | Pan head screws M2.5x6 | B |
| 8 pc. | Countersink screws M2.5x6 | A |
| 4 pc. | Pan head screw M6x16 for rack frame | |
| 4 pc. | Rack frame clips/nuts M6 | |
| 4 pc. | Rubber feet (for table top use) | |



Single PT 5202 with Blind plate



Double set of PT 5202

The PT 5202 has no built-in cooling fan and will therefore rely on air convection from the air vent holes in the front, back and sides of the cabinet. Do not cover the air vent holes.

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

If the PT 5202 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.

6.5 Access to and Replacement of Parts

Safety

The opening of covers or removal of parts, expects 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, only a skilled person who is aware of the hazards involved must carry it out. To guarantee safety only original spare parts must be used.

Access to the Units

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

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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 5202 Compact 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 or written text into the video full field test signals.

EXECUTE

The **EXECUTE** button is used to store the selection in the appropriate menus. A <SAVE> pops up when the parameter has been changed.

PRESET

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

BB, SDI and AUDIO

These 3 buttons provides a fast access to output signal selection on the test signal generators.

GENLOCK

The **GENLOCK** button opens the menu Genlock. 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.
- 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

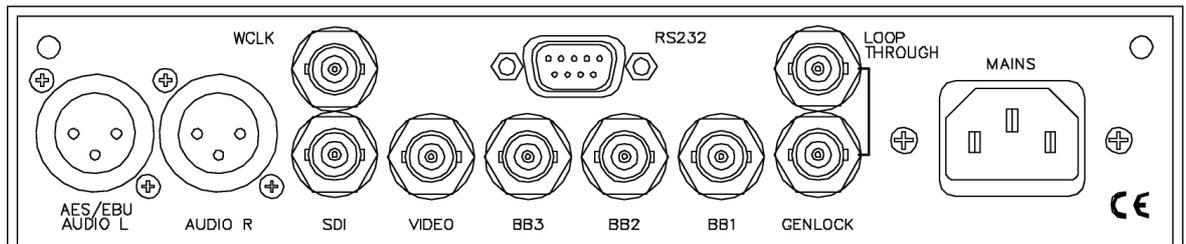
7.4.1 Front Panel Indicators

LCD Panel:

The LCD with the backlighting is the main indicator on the front. Messages on operating condition are read in the **STATUS** menu.

UNLOCKED

A red LED that indicates when genlock mode is enabled but no correct signal is found on the 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

All electrical specifications are specified under Product Data.

Brief description of connections:

Mains Connector

Mains voltage receptacle.

RS232

This rear panel connector is intended to interface the unit to PC control using a COM port. The connector is a D-SUB 9 pole male configured for RS232 communication based on SCPI protocol. See chapter 8 Remote Interface for a technical description.

Connecting the interface cable from the PC to the unit special attention must be paid to the power source of both parties. When the controlling PC is mains power operated the ground potential of the mains power supply for both instruments has to be taking in consideration. To reduce problems concerning different mains power ground potential both instruments need to have common mains power source.

Negligence of this matter can cause damages to the PT 5202 or the PC COM port

GENLOCK

Genlock inputs configured as loop through input.

BB1 to BB3

Three individual Black Burst outputs

Video

Analog composite Video Output in either PAL or NTSC format.

Note: This output is primarily for testing purposes and is not usable as a timing reference as the output is not consistently locked to the BB's. The colour framing (Sch phasing) of this output may randomly be one of four at power-up.

SDI

Serial Digital Video output, 270Mbit/s. Connector type 50 Ohm BNC.

WCLK

Wordclock output for AES/EBU, 48 kHz or 44.1kHz.

AUDIO R

Right audio output when analog audio is selected

AES/EBU and AUDIO L

Output of AES/EBU digital audio or left analog audio.

7.5 Panel operation

The PT 5202 Compact Varitime™ Digital Sync Generator may be equipped with fixed set of generators. The operation of each of the generator is described below.

7.5.1 Power Up

At power on a message is displayed on the LCD: PT 5202 Start-up until the instrument is operative.

Start up

```
PT 5202 Start-up
```

This message is shown for approx.: **1.5 sec** and the PT5202 continues to the Status displays.

7.5.2 Status Displays

A number of status displays are available for the main function. The default status window is the Genlock. Use the ◀ and ▶ buttons to select the status displays you want.

Status: Genlock

```
Genlock: ◀ ▼ ▶
Signal: PAL          Status: GENLOCKED ...
```

With Internal lock selected

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

The genlock status display shows the input selected for genlock and the format of genlock selected.

If genlock is activated but no genlock signal is identified, the status display will change to the indicating UNLOCKED condition.

Status: SDI test signal generator

```
SDI: EBU Colorbar ◀ ▼ ▶
SYSTEM: NTSC 7.5% +Text +Audio ...
```

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

As the analog Video output is derived from the same data as the SDI output, the selected signal and line number system will be the same.

Note: Text is only present on EBU and SMPTE colourbars

Status: Audio Generator

```
Audio: AES/EBU: Stereo 1kHz ◀ ▼ ▶
Level: -9 dBFS          WCLK: 48kHz ...
```

The status display for the AES/EBU digital audio generator shows the output signal and level of the audio. In case of analog audio is output, the text **AES/EBU** is exchanged with **ANALOG** and only **LEVEL** is displayed.

Status: Preset

```
PT 5202 PRESET STATUS:      ◀ ▼ ▶
NO PRESET ACTIVE           ...
```

```
PT 5202 PRESET STATUS      ◀ ▼ ▶
PRESET (1):name of preset  ...
```

Status: Black Burst generators

```
BLACK BURST :              ◀ ▼ ▶
1:PAL w.ID  2:NTSC 0%    3:NTSC 7.5% ...
```

The Black Burst generator (#1 to #3) status display shows the system selected.

NOTE: the display returns automatically to the GENLOCK status after approx. 1 minute.

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

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

```
PT 5202 COMPACT VARITIME SPG  ◀ ◆ ▶
MENU:<GENLOCK>  BLACK-BURST  SDI  ...
```

```
PT 5202 Compact Varitime SPG  ◀ ◆ ▶
MENU:<AUDIO>  PRESETS  CALIBRATION  ...
```

```
PT 5202 Compact Varitime SPG  ◀ ◆ ▶
MENU:<RESET>  ...
```

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

```
MENU:BLACK-BURST, configure  ◀ ◆ ▶
SUBMNU:<BB1>  BB2  BB3
```

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: BLACK-BURST, Analog Black Burst Generator

This is the menu for setting the parameters for the analog black burst outputs. The analog black burst outputs are named BBn.

Setting of the ANALOG-BLACK generators:

```
MENU: BLACK-BURST, configure      ◀ ◆ ▶
SUBMNU:<BB1>  BB2  BB3
```

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

```
SUBMNU: BLACK-BURST/BB1,select    ◀ ◆ ▶
2NDMNU:<SYSTEM> TIMING  ScH-PHASE
```

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

Use the ◀ and ▶ buttons to select to select parameter.

To change from NTSC to PAL, select SYSTEM

```
2NDMNU:../BB1/SYSTEM, select      ◀ ◆ ▶
SYSTEM:<NTSC 7.5 % >              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 BLACK-BURST/BB1 submenu.

Analog black burst generator system options:

- ◆ NTSC 7.5 %
- ◆ NTSC 0 %
- ◆ PAL
- ◆ PAL w. ID

When the system "PAL w. ID" is selected, a pulse indicating PAL Field 1 is included Line 7. NTSC 7.5% is with 7.5 IRE set-up, while 0% is without set-up.

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/TIMING, 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 BLACK-BURST/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 BLACK-BURST/BB1 submenu.

7.7.2 Menu: GENLOCK

This is the menu for setting the genlock parameters.

Select: GENLOCK

```

MENU : GENLOCK, select           ◀◆▶
SUBMENU:<SYSTEM> TIMING         ESC

```

Operation:

- Use the ◀ and ▶ to select parameter
- Then press ▼ to enter the submenu
- To escape the menu move the cursor to ESC and press ▲

To change the signal for the genlocking, select SYSTEM in the GENLOCK menu.

```

SUBMNU:GENLOCK/SYSTEM, select   ◀◆▶
SYSTEM:<PAL>                       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.

Genlock signals options:

- ◆ PAL
- ◆ NTSC
- ◆ 10 MHz
- ◆ Internal

If a genlock source has been selected but isn't present, the PT5202 switches automatically to INTERNAL reference oscillator

To change the genlock timing, select TIMING in the GENLOCK menu.

```

SUBMNU:GENLOCK/TIMING, 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 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 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 parameters can be changed even when the PT5202 is UNLOCKED.

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:PRESETS, select function      ◀◆▶
SUBMNU:<RECALL> STORE NAME          ...
```

To recall the Preset, select RECALL

```
SUBMNU:PRESETS/RECALL select      ◀◆▶
RECALL (4):<NAME of PRESET>       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 cancelled, 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.

To store the Preset, select STORE

```
SUBMNU:PRESETS/STORE, select      ◀◆▶
STORE (3):<      >                 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:PRESETS/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: SDI, Serial Digital Test Signal Generator

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

```
MENU:SDI, select          ◀◆▶
SUBMNU:<SYSTEM> TIMING PATTERN    ...
```

```
MENU:SDI, select          ◀◆▶
SUBMNU:<EMB.AUDIO> ANL.SETTINGS    ...
```

```
MENU:SDI, select          ◀◆▶
SUBMNU:<TEXT >                ...
```

- Use the ◀ 4 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.

```
SUBMNU:SDI/PATTERN, select    ◀◆▶
PATT.:<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:

- ◆ SMPTE Colorbar Available only in 525/59.94 mode
- ◆ FCC Colorbar Available only in 525/59.94 mode
- ◆ EBU Colorbar Available only in 625/50 mode
- ◆ 75% colorbar, ITU-R BT.801
- ◆ 100% Colourbar
- ◆ 75% Colorbar + Red Available only in 625/50 mode
- ◆ 75% Red
- ◆ CCIR 18 Multiburst Available only in 625/50 mode
- ◆ Window 10%
- ◆ Window 15%
- ◆ Window 20%
- ◆ Window 100%
- ◆ 15 kHz Black/white
- ◆ White 100%
- ◆ Black
- ◆ SDI Check Field
- ◆ Digital Grey
- ◆ 5 step staircase
- ◆ 10 step staircase
- ◆ Crosshatch
- ◆ PLUGE

NOTE: Text can be inserted only on the EBU colour bar and on the SMPTE Colourbar

To modify the inserted text, select TEXT.

```
SUBMNU:SDI/TEXT, select      ◀◆▶
2NDMNU:<EDIT>  MOVEMENT      ESC
```

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

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

```
SUBMNU: SDI/TEXT, edit      ◀◆▶
TEXT:<PT 5202 COMPACT >  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 ▲ and ▼ buttons to select ON/OFF
- When the desired text has been programmed, 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.

Embedded audio Options:

- ◆ Off
- ◆ Silence
- ◆ Stereo 1 kHz No click

The embedded audio levels are fixed:

- ◆ -18 dBFS for 625 lines
- ◆ -20 dBFS for 525 lines

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

```

MENU: SDI../TIMING, 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 37 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 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.

To change the ScH-Phase of the analog video, select ANL.SETTINGS.

```

SUBMNU:SDI../ANL.SETTINGS, select  ◀◆▶
ScH-PHASE:< +15 deg>                SAVE  ESC
```

Operation:

- Use the ▲ and ▼ buttons to change the ScH-phase
- Change of the ScH-Phase is instantaneous, i.e. that any change is reflected immediately in the output signal
- When the desired ScH-Phase is found, 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.

7.7.5 Menu: AUDIO, Audio Generator

MENU :AUDIO, select	◀◆▶
SUBMNU:<Analog> AES/EBU	ESC

- Use the ◀ and ▶ buttons to select the format to be changed
- Use the ▲ and ▼ buttons to enter the level below

SUBMNU: AES-EBU, configure	◀◆▶
2NDMNU:<TONE> LEVEL TIMING	..ESC

SUBMNU: AES-EBU, configure	◀◆▶
2NDMNU:<SYSTEM> WCLK CLICK	...ESC

To select the audio signal, Select signal

2NDMNU: AES-EBU/TONE, select	◀◆▶
TONE :<Stereo 500 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 500 Hz
- ◆ Stereo 1 kHz
- ◆ Stereo 8 kHz
- ◆ Stereo EBU 1 kHz Single click in Ch. A

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

2NDMNU: 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
- ◆ -15 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 rate of the AES/EBU audio click, select **CLICK**.*

```
2NDMNU:AES/EBU/CLICK, select  ◀◆▶
CLICK :<1 sec>                SAVE  ESC
```

Operation

- Use the ▲ and ▼ buttons to change the click rate
- Changes of the click rate is instantaneous, i.e. that any changes are reflected immediately in the output signal
- When the desired audio click rate 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 click rate options:

- ◆ 1 sec
- ◆ 3 sec

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

```
2NDMNU:AES/EBU/TIMING, select  ◀◆▶
TIMING:< 0.0 us>                SAVE  ESC
```

Operation:

- Use the ▲ and ▼ buttons to change the audio timing
- Changes of the audio signal are instantaneous, i.e. that any changes are reflected immediately in the output signal
- When the desired audio timing 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:

- ◆ -9.6 μs to 10.4μs in 0.8μs steps

*To change the audio system, select **SYSTEM**.*

```
2NDMNU:AES/EBU/SYSTEM, select  ◀◆▶
SYSTEM:<PAL>                    SAVE  ESC
```

Operation

- Use the ▲ and ▼ buttons to change the audio timing
- Changes of the audio signal are instantaneous, i.e. that any changes are reflected immediately in the output signal
- When the desired audio timing 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.

System options:

- ◆ PAL
- ◆ NTSC

To change the sampling reference clock, wordclock, select WCLK.

2NDMNU:AES/EBU/WCLK, select	◀◆▶
WCLK :<44.1 kHz>	SAVE ESC

Operation

- Use the ▲ and ▼ buttons to change the wordclock frequency
- Changes of the wordclock is instantaneous, i.e. that any changes are reflected immediately in the output signal
- When the desired wordclock frequency 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:

- ◆ -48.0 kHz
- ◆ 44.1 kHz

The 48 kHz is phase locked to the video signal

The 44.1 kHz is only frequency locked to the video signal.

To configure the analog audio, select ANALOG AUDIO

SUBMENU:AUDIO/ANALOG, select	◀◆▶
2NDMNU :<TONE> LEVEL CLICK	ESC

- Use the ◀ and ▶ buttons to select parameter
- Use the ▼ button to enter the level below

To select the audio signal, Select signal

2NDMNU:..ANALOG/TONE, select	◀◆▶
TONE :<Stereo 500 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 ANALOG menu.

Signal options:

- ◆ Stereo 500 Hz
 - ◆ Stereo 1 kHz
 - ◆ Stereo 8 kHz
 - ◆ Stereo EBU 1 kHz
- Single click in Ch. A

To change the level of the ANALOG audio level, select LEVEL.

2NDMNU:..ANALOG/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:

- ◆ +10 dBu to -12 dBu in steps of 1 dB
- ◆ --15 dBu
- ◆ -18 dBu
- ◆ -20 dBu
- ◆ -24 dBu
- ◆ -27 dBu
- ◆ -30 dBu
- ◆ -33 dBu
- ◆ -36dBu

To change the rate of the ANALOG audio click, select CLICK.

2NDMNU:../ANALOG/CLICK, select	◀◆▶
CLICK:<1 sec>	SAVE ESC

Operation

- Use the ▲ and ▼ buttons to change the click rate
 - Changes of the click rate is instantaneous, i.e. that any changes are reflected immediately in the output signal
 - When the desired audio click rate 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.*

ANALOG AUDIO click rate options:

- ◆ 1s
- ◆ 3s

7.7.6 Menu: CALIBRATION

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

```
MENU: CALIBRATION, select      ◀ ◆ ▶
SUBMENU: <ADJUST> MIN MAX      SAVE      ESC
```

Description.

The internal TXCO reference can be adjusted in this menu.

Connect a general purpose frequency counter (better than 0.1ppm in tolerance) to the Black Burst 1 output.

Follow the operation description below:

Operation:

- Use the ◀ and ▶ buttons to select the parameter
- Selecting MAX and MIN shows the maximum and minimum ranges of the oscillator
- Selecting ADJUST enables the fine adjustment using the ▲ and ▼ buttons to adjust
- When the frequency of 4.500,000 MHz has been achieved, move 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 CALIBRATION menu.

7.7.7 Menu: RESET

To reset the generator to another system

```
SUBMENU: RESET/ SYSTEM      ◀ ◆ ▶
SYSTEM: <NTSC 7.5%>          SAVE      ESC
```

Operation:

- Use the ▲ and ▼ buttons to select the system to select
- Move the cursor to SAVE and press **EXECUTE** to store the system
- If no change is desired, move the cursor to ESC and press ▲ .
Leaving the function takes you back to the RESET menu.

Options:

- ◆ PAL
- ◆ NTSC 0%
- ◆ NTSC 7.5%

7.8 Windows Application Program

7.8.1 How to Get Started

These instructions tell you how to connect your PT 5202 to your PC for the very first time.

1. Using the interface cable connect PT 5202 to your PC by selecting COM1 (or COM2) on your PC and the D-SUB connector on the PT 5202 rear panel.
2. Connect the PT 5202 Compact VariTime™ Sync Generator unit to the mains using the power cord.
3. Place the CD-ROM in the drive of your PC. Copy the PT 5202 PC Remote Control program to your hard drive and install the software by double click on the icon. The application software will search for previous settings in form of an INI file and will not find it. Click OK to no INI file found. The PC Remote Control program starts with an illustration of the front panel.
4. You are now ready to start communication between the unit and the PC Remote Control. In the PT 5202 PC Remote Control toolbar click on Connect and Connect Using, which allows you to open the communication and synchronises the settings.
 - Using Generator Settings will transfer the current settings of the unit to the PC Remote Control.
 - PC Settings will transfer the initial settings of PC Remote Control to the PT 5202

Viewing the entire configuration is done through clicking on View and System Status. To modify the settings for a specific generator double click inside the boundaries of the settings of each generator.

7.8.2 Application S/W Description

The PC Remote Control is designed to serve as operating panel for PT 5202 Compact VariTime™ Sync Generator solely. It will not work with other PTV products. All settings, configurations and calibration of Sync Generator are executed from the PC Remote Control interface. The application can be run both online with the PT 5202 connected to the PC or offline using the software in a special DEMO MODE.

As mentioned in the introduction the PC Remote Control program will operate on any Windows® operating system by Windows® 95 and newer versions, including Windows® NT. The interface application software is intended to run from the hard drive of a PC; but the application can also be executed from the CD-ROM itself, a network or other media. If the media is write-protected or for other reasons the interface cannot install an INI file on the media, the last stored settings are read again.

7.8.3 Detailed Menu Description

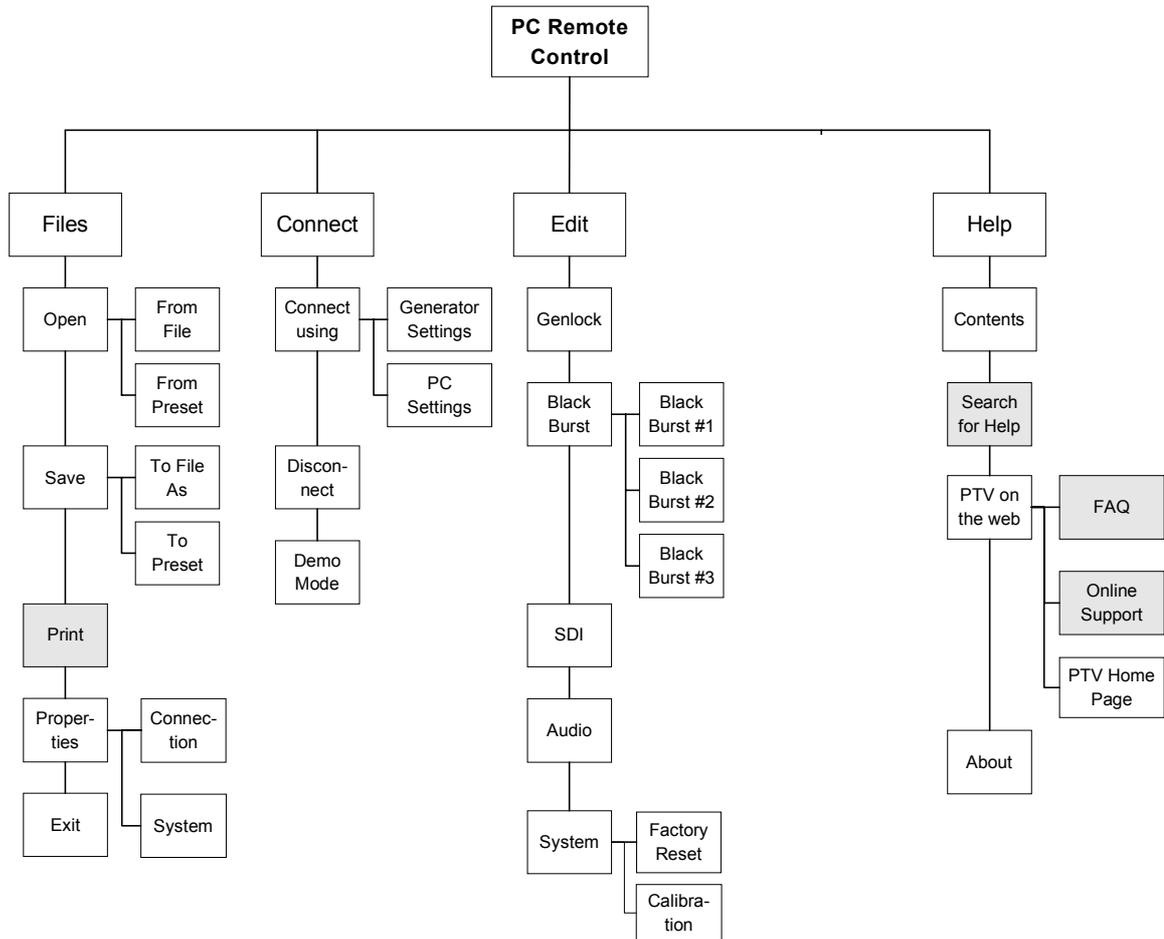


Fig. 1: Menu tree of the PT 5202 PC Remote Control (shaded boxes are not implemented)

7.8.3.1 Status display:

A detailed Status window is opened when the application program is opened and provides a view of settings of all outputs.

Besides information on timing, pattern and audio types and tones, the Status gives information on instrument serial no., S/W release, Preset Status and serial communication (SCPI) status. Editing of the settings is accessible by double click on each generator. By double click on a generator the corresponding generator window opens and enables editing.

A Status Bar is shown below the Status window. This bar provides information on communications from the PC Remote Control to the connected unit.

The Status Bar states if a unit is present or not (connected/disconnected), which COM port is selected and baud rate. Also it shows if the PC Remote Control program is used in Demo Mode.

7.8.3.2 Files Menu

The menus under Files are similar in nature to other Windows® applications. Here are menus featuring opening and saving presets and files. Furthermore the RS232 interface communication details and lock of calibration and editing are handled here.

7.8.3.2.1 Open

The Open menu enables you to open an already existing file or preset. Performing an Open command will read the file or preset settings into the PC Remote Control and give a connected unit the same set of configuration.

From File: Opening an already existing file will read the settings into the PC Remote Control and give a connected unit the same set of configuration.

From Preset: Opening an already existing preset will read the settings into the PC Remote Control and give a connected unit the same set of configuration and leave the unit in the given preset status.

7.8.3.2.2 Save

The Save function enables you to save the current configuration into a file on the hard drive or as preset loaded in the memory of the connected unit.

To File: Save To File will store the current configuration into a file on the hard drive. The file can be read by the Windows applications only and can be given any name.

To Preset: Save To Preset enables you to store the current configuration into the memory of the connected unit. The preset can be given a name and a date and these data will be recognised by the PC Remote Control. The unit can hold 4 different configurations in its preset bank and these can be selected from the front panel.

7.8.3.2.3 Print:

Not available

7.8.3.2.4 Properties

The Properties menu serve as control for the RS232 interface communication details, the calibration, and the editing lock.

Connection the Connection menu enables you to modify the status of the RS232 interface communication port and indicate the default Baud rate and Flow Control. In the Port settings the communication port is selectable from COM1-COM4.

System: Checking the Lock Editing option will disable editing of the PT5202. Checking the Lock Calibration will disable user calibration.

7.8.3.2.5 Exit:

The Exit menu will close the PC Remote Control and save the current settings in an INI file on the hard drive. If the media, from where the PC Remote Control program is executed, is write protected or you click on **No** to the question "Save changes to PT 5202 PC Remote Control?" no data are saved.

7.8.3.3 Connect Menu

The features under the Connect menu serve as controls for the communication to the PT 5202 unit.

7.8.3.3.1 Connect Using

The Connect Using menu opens the communication between the PC Remote Control and a unit connected. The communication between the PC Remote Control and the unit can be established in two modes depending on operation.

Generator Settings: The communication can be established by the PC Remote Control reading the current settings of the unit. To open the communication click on the desired functionality.

PC Settings: The communication can be established by the PC Remote Control writing its current/last settings. To open the communication click on the desired functionally.

7.8.3.3.2 Disconnect

Disconnect is used to abort communication between the PC Remote Control program and a connected unit before disconnecting the interface cable.

7.8.3.3.3 Demo Mode:

The Demo Mode is a way to demonstrate and operate the PC Remote Control offline. In this mode it is not necessary to connect a PT 5202. Running the program in Demo mode give you access to all the output features of the unit and access to store a set-up as a file. A set-up saved as a file can be uploaded to the unit at any time, when a unit is connected.

7.8.3.4 Edit Menu

The menus under Edit all give direct access to the edit window to the given generator or access to the calibration routine.

7.8.3.4.1 Genlock

The Genlock facility enables you to lock all outputs of the PT 5202 to a number of relevant video and clock sources. The outputs of PT 5202 are locked to the source in frequency and phase.

System: System refers to the list of relevant video and clock sources PT 5202 is able to use as external reference.
PAL and **NTSC** mode PT 5202 will expect a video signal of the given system.
Internal mode: all outputs of PT 5202 are locked to the internal high stability TCXO oscillator.
10 MHz mode: the source is expected to be a 10 MHz reference. The internal oscillator will be locked to the reference and PT 5202 will act as in Internal Mode. Due to the internal reference the timing feature is disabled. When the reference source is valid and the oscillator circuit is in lock, the "Genlocked" LED on the front panel, will be lit.

Timing: All outputs of PT 5202 are timeable with reference to the Genlock video signal. All outputs are timed in parallel in resolution of the individual output. For timing details see Black Burst menu.

7.8.3.4.2 Black Burst

All three Black Burst outputs are digitally generated under the VariTime™ system and are independent in timing and generation of TV system (NTSC/PAL). The three Black Burst generators (BB1 – BB3) are identical in operation and functionality.

Black Burst Black Bursts are digitally generated under the VariTime™ system and is independent in timing and generation of TV system (NTSC/PAL). The VariTime™ system has a resolution of 0.15 ns and the timing range of 4 fields for NTSC and 8 fields for PAL.

System: The VariTime™ outputs are able to generate Black Burst in the following formats:
PAL, PAL with ID, NTSC 7.5%, and NTSC 0%

- Timing:* The VariTime™ unit is generating Black Burst with a resolution of 0.15 ns and the timing range of 4 fields for NTSC and 8 fields for PAL.
Field, Line and Offset can be modified within their relevant limits.
- Edit of the number of Fields, Lines or Offset of ns to be advanced or delayed can be done in 3 ways.
The modifications are typed directly in the edit boxes using number keys and sign.
Incrementing or decrementing by the up/down buttons, or using the timing bar.
Using the timing bar by grabbing the pointer with the mouse cursor and moving it, for quick timing.
- ScH-Phase:* The VariTime™ system features adjustment of the ScH-Phase in the range of $\pm 180^\circ$ in a resolution of 1° , operated using the up/down buttons, or typed in directly.

7.8.3.4.3 SDI+Video

The Video signal generator contains 23 basic patterns and signals, including Colour Bars for the respective TV systems. The video outputs deliver signals in two formats simultaneously, Analog Composite (Video output) and SDI (SDI output) and has a common 4 or 8 fields timing range with 37 ns resolution.

NOTE: *The analog video output, which is primarily meant for testing purposes, is **NOT** consistently locked to the BB's and therefore the colour-frame (ScH phasing) may randomly be one of 4 at power up. Consequently this output is not recommended for timing purposes.*

SDI and Analog Settings.

The SDI output features separate settings for embedded audio.

The Analog Composite output features ScH-Phase adjustment in 1° resolution.

Common settings:

System The Video and SDI outputs generate patterns in **NTSC 7.5%/525-lines**, **NTSC 0%/525lines** and **PAL/625lines** systems.
One common system for both output at a time.

Timing: The VariTime™ unit is generating Analog and Digital test signal outputs with a resolution of 37 ns and the timing range of 4 fields for NTSC and 8 fields for PAL.

Field, Line and Offset can be modified within their relevant limits.

Edit of the number of Fields, Lines or Offset in ns to be advanced or delayed can be done in 3 ways.

The modifications are typed directly in the edit boxes using number keys and sign.

Incrementing or decrementing by the up/down buttons, or using the timing bar.

Using the timing bar by grabbing the pointer with the mouse cursor and moving it, for quick timing.

ScH-Phase: The VariTime™ system features adjustment of the ScH-Phase for the analog test signal generator in the range of $\pm 180^\circ$ in a resolution of 1° , operated using the up/down buttons, or typed in directly.

Pattern: The video signal generator contains basic patterns and signals, including Colour Bars for the respective TV systems.

The list of signals consists of patterns for NTSC and PAL.
The video output signals are generated in two formats simultaneously, Analog Composite (Video output) and SDI (SDI output).

<i>Text</i>	Text may be added to two test patterns: EBU colourbar and SMPTE colourbar. The text can be set ON or OFF Characters available: 0..9, A..z, _(underscore), -(minus).
<i>Movement</i>	The text can either be stationary or scrolling up and down.
SDI Settings:	The SDI output features common timing and separate settings for embedded audio.
Analog Settings:	The Analog Composite output features common timing with the SDI output. Only Sch-Phase is adjusted in 1° resolution in the separate item.

7.8.3.4.4 Audio

PT 5202 contains two independent audio generators, Analog Audio and AES/EBU digital audio and a WordClock output (WCLK).

Due to common rear connectors, only one audio generator can be active at a time.

The AES/EBU generator features selectable sample rate, video reference lock, timing and a number of tones and levels.

The Analog Audio generator features four tones in a large number of levels and right channel identification.

<i>Output</i>	Selectable between Analog audio and digital AES/EBU. Some of the fields in the menu may be greyed out, indicating that this parameter is not valid for that format.
<i>System</i>	In Genlocked mode the AES/EBU generator locks to both video systems and in Internal mode the audio generator is locked to the internal reference.
<i>Timing</i>	Editing can be done in 3 ways. The modifications are typed directly in the edit box using number keys. Incrementing or decrementing by the up/down buttons, or using the timing bar. Using the timing bar by grabbing the pointer with the mouse cursor and moving it, for quick timing.
<i>Click Period</i>	Selected by ticking off the appropriate field
<i>Wordclock</i>	Selectable between standard 48kHz and CD-audio sample frequency of 44.1kHz.
<i>Tone</i>	Selectable in the field between a number of frequencies.
<i>Level</i>	Selectable by using the scroll bar.

7.8.3.4.5 System

The System menu enables you to calibrate the main oscillator using this PC Remote Control. Also all video outputs can be set to the same TV system (NTSC/PAL) during a Factory Reset. Performing a Factory Reset replace all current settings with the settings the unit has from factory and will not affect any of the four user presets.

<i>Factory Reset:</i>	Factory Reset overwrites all current settings with the settings the unit has from factory. The reset is selectable between: NTSC 7.5% , NTSC 0% or PAL
-----------------------	--

The factory settings are listed in 12.4 Reset Configuration.

Note: Factory Reset will not affect the memory of any of the four user presets.

Calibration: The calibration menu enables you to calibrate the unit without taking it out of a rack and out of service. The unit is calibrated using this PC Remote Control and a general-purpose counter connected to the BB1 terminal. This adjustment will affect the frequency of the main oscillator only; no other circuits needs frequent calibration. To secure the factory calibration the unit is secured with a calibration lock function

Calibration procedure:

1. Turn on the unit and connect it to a PC running the PC Remote Control program.
2. Connect a general-purpose counter (better than 0.1ppm in tolerance) to the Black Burst output.
3. Unlock the calibration mode in Files/Properties/System and enter the calibration menu at Edit/System/Calibration
4. Click on Unlock and expect a TTL clock at 4.5 MHz on the BB1 connector. There is now access to calibrate the main oscillator and using the up/down buttons to calibrate the BB1 outputs to 4,500,000 Hz.
5. The calibration is stored in the unit by clicking on Save. By clicking on Cancel at any time before clicking on Save the calibration mode will be terminated and the unit will hold the present calibration.

Note: Make sure to lock the calibration mode in Files/Properties/System to ensure no calibration is made by mistake.

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8 Remote Interface

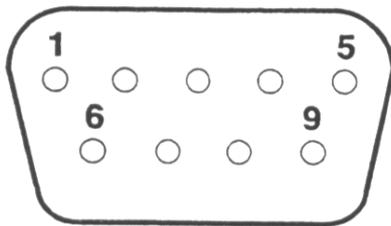
Reference documents

IEEE 488.2-1987: IEEE Standard Codes, Formats, Protocols, and Common Commands
 SCPI 1995.0: Standard Commands for Programmable Instruments, Vol I-IV.

8.1 General Description of the Interface Syntax

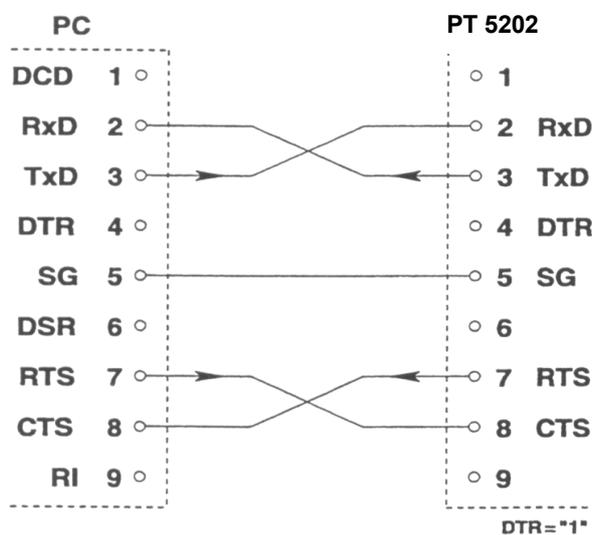
8.1.1 Connector Description

Connector type:
 9 pin sub-D male



8.1.2 Protocol

The serial remote operates electrically as an RS 232C communication port. The parameter setting for the RS232 communication port is to selection of COM ports 1 to 4. Baud rate is default 9600. No flow control.



Typical configuration of a cable between PC and PT5202. Flow control is not supported.

NOTE: A standard “NULL-MODEM” cable may be used as well.

The PT 5202 communication protocol complies with the:

- ◆ SCPI 1995.0:
 Standard Commands for Programmable Instruments, Vol I-IV. This protocol that 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 interface 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.

8.1.3 Configuration and Syntax

Control characters of the RS232 interface:

	Control character	Function
	0A _{hex}	Terminator, i.e. new line <LF>

Buffers:

Receive buffer: 512 bytes
Transmit buffer: 128 bytes.

Serial port:

The 9-pin RS232 connector consists of

Pin	Name	Description
1:	DCD	Not used
2:	RxD	Receiver pin
3:	TxD	Transmitter pin
4:	DTR	Not used
5:	SG	Signal ground
6:	DSR	Not used
7:	RTS	Request to send
8:	CTS	Clear to send
9:	RI	Not used.

8.1.4 General Information

The remote system is organised 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 is 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. A comma separates several parameters.

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.

8.1.5 Syntax Elements

;	Semicolon separates two commands of a command.
:	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.

8.1.6 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.

8.1.7 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 line feed character may be used as the program message terminator

- ◆ 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 or 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 standardised 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.

8.1.8 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.

8.1.9 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 line feed (LF).

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

9 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>

9.1 Mandated Commands

Command	Parameter	Status after *RST	Remarks
*CLS	-		Clear Status Command
*ESE			
*ESE?			
*ESR?			
*IDN?			Device identification query
*OPC			
*OPC?			
*RST			Reset Command
*SAV	<1 to 4 >		
*RCL	<1 to 4 >		
*SRE			
*SRE?			
*STB?			
*TST?			
*WAI			

9.2 Required Commands

9.2.1 SYSTEM Subsystem

Command	Parameter	Status after *RST	Remarks
:ERRor?		-	<Query only>
:VERSion?		-	<Query only>
:PRESet			
[:RECall]	<1 to 4>		
:STORe	<1 to 4>		
:NAME	<1 to 4>,<name>		Note 1
:AUTHor	<1 to 4>,<author name>		Note 1
:DATE	<1 to 4> [,<year>,<month>,<day>]		

9.2.2 STATus Subsystem

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

9.3 Instrument Commands

9.3.1 INPut Subsystem

Command	Parameter	Status after *RST	Remarks
:GENLock			
:SYSTem	INTernal PALBurst NTSCburst F10MHZ	INTernal	
:DELay	<Field>,<Line>,<HTime>	0,0,0	
:CALibrate			
:ENABLe	OFF ON		
:ADJust	UP DOWN MIN MAX		
:STORE	-		<No query>
:GENLock?	-	-	<Query only>

9.3.2 OUTPut Subsystem

Command	Parameter	Status after *RST	Remarks
:BB1			
:SYSTem	PAL PAL_ID NTSC JNTSC	Depends on factory reset: PAL, NTSC, or JNTSC	Note 2
:DELay	<Field>,<Line>,<Htime>	0,0,0	
:SCHPhase	<-179 to 180>	0	
:BB1?	-	-	<Query only>
:BB2			
:SYSTem	PAL PAL_ID NTSC JNTSC	Depends on factory reset: PAL, NTSC, or JNTSC	Note 2
:DELay	<Field>,<Line>,<Htime>	0,0,0	

Command	Parameter	Status after *RST	Remarks
:SCHPhase	<-179 to 180>	0	
:BB2?	-	-	<Query only>
:BB3			
:SYSTem	PAL PAL_ID NTSC JNTSC	Depends on factory reset: PAL, NTSC, or JNTSC	Note 2
:DELay	<Field>,<Line>,<Htime>	0,0,0	
:SCHPhase	<-179 to 180>	0	
:BB3?	-	-	<Query only>
:TSGenerator			
:PATtern	See chapter 12, PT 5202 Signals	Depends on factory reset: CBEBu or CBSMpte	
:SYSTem	PAL NTSC JNTSC	Depends on factory reset: PAL, NTSC, or JNTSC	Note 2
:DELay	<Field>,<Line>,<Htime>	0,0,0	
:SCHPhase	<-179 to 180>	0	1,4° resolution
:EMBAudio	See chapter 12, PT 5202 Signals	OFF	Digital output only
:TEXT	ON OFF <string data>	OFF	
:TEXT?			<query only>
:MOVement	ON OFF	OFF	
:TSGenerator?	-	-	<query only>
:AUDio			<No query>
[:OUTPut]	ANALog AESebu	AESebu	
:ANALog			
:SIGNal	See chapter 12, PT 5202 Signals	S1KHZ	
:LEVel	See chapter 12, PT 5202 Signals	0	
:CLICk	1 3	3	
:ANALog?			
:AESebu			
:SYSTem	PAL NTSC	Depends on factory reset: PAL or NTSC	Note 2
:SIGNal	See chapter 12, PT 5202 Signals	S1KHZ	
:LEVel	See chapter 12, PT 5202 Signals	Depends on factory reset: -18 or -20	
:TIMing	See chapter 12, PT 5202 Signals	0	48kHz only
:WORDclock	F441KHZ F48KHZ	F48KHZ	

Command	Parameter	Status after *RST	Remarks
:CLICk	1 3	3	
:AESebu?			

Note 2: The system selected depends on the factory reset applied. Another system for the factory reset may be selected by means of the PC Remote Control software delivered with the instrument. See also chapter **Reset Configuration**

- *SRE? SERVICE REQUEST ENABLE QUERY
The device responds to this command but the functionality has not been implemented in this version, i.e. the answer should be ignored.
- *STB? READ STATUS BYTE QUERY
The device responds to this command but the functionality has not been implemented in this version, i.e. the answer should be ignored.
- *TST? SELF-TEST QUERY
The device accepts this command but the functionality has not been implemented in this version.
- *WAI WAIT TO CONTINUE
The device accepts this command but does not respond to it because the functionality has not been implemented in this version.

10.2 Required Commands

10.2.1 SYSTem Commands

- SYSTem:ERRor?
Command for reading an SCPI error message from the error queue. See chapter **11 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. Four user presets from 1 to 4 are available.

Example:

`SYST:PRES:REC 3` recall preset 3.

- SYSTem:PRESet:STORe
Command to store the actual configuration in a preset. Four user presets from 1 to 4 are available.

Example:

`SYST:PRES:STOR 2` store configuration in preset 2

- SYSTem:PRESet:NAME
Command for naming a user preset. Four user presets from 1 to 4 are available. The number of characters in the name is limited to sixteen, 16, and must NOT contain spaces.

Example:

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

- SYSTem:PRESet:AUTHor
Command for naming the author of a user preset. Four user presets from 1 to 4 are available. Number of characters in the name are limited to sixteen, 16, and may NOT contain spaces.
Example:
SYST:PRES:AUTH 1,"Monroe" name author of preset number 2 to "Monroe"
SYST:PRES:AUTH? 2 response: "MONROE"
- SYSTem:PRESet:DATE
Command for settings the date of a user preset. Four user presets from 1 to 4 are available. The date should be entered as year, month, day.
Example:
SYST:PRES:DATE 4,00,6,1 date preset number 2 to june1, 2000
SYST:PRES:DATE? 4 response: 00,06,01

10.2.2 STATus Commands

- STATus:OPERation[:EVENT]?
- STATus:OPERation:CONDition?
- STATus:OPERation:ENABle
- STATus:QUEStionable[:EVENT]?
- STATus:QUEStionable:CONDition?
- STATus:QUEStionable:ENABle
The device accepts and responds to these commands, but the functionality has not been implemented in this version, i.e. any answer should be ignored.
- STATus:PRESet?
The device returns the status of the user preset, i.e. whether a user preset is active or not.

Examples:

STAT:PRES?

response: 2, i.e. preset 2 is active

STAT:PRES?

response: OFF, i.e. no preset is active

10.3 Instrument Commands

10.3.1 INPut Commands

- INPut:GENLock:SYSTem

Command for selecting the genlock system. Possible selections are

System	Description
INTernal	Internal
PALBurst	PAL burst lock
NTSCburst	NSTC burst lock
F10MHZ	10 MHz lock

Example:

INP:GENL:SYST

F10MHZ

set system to 10MHz lock

INP:GENL:SYST?

response: F10MHZ

- 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

If this command is issued when the genlock system is internal or 10MHz the timing will be saved and restored whenever PALBurst or NTSCBurst is selected.

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

ANALOG			
PAL, 625 lines		NTSC, 525 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:

INP:GENL:DEL +2,+5,+123.5
INP:GENL:DEL?

set delay to 2 field, 5 line & 123.5ns
response: +2,+005,+00123.5

- INPut:GENLock:CALibrate:ENABLE
Command to enable calibration of the internal 10 MHz oscillator reference. This command must be issued before using the INP:GENL:CAL:ADJ command

Example:

INP:GENL:CAL:ENAB ON
INP:GENL:CAL:ENAB?

enable calibration of the internal 10 MHz reference
response: ON

- INPut:GENLock:CALibrate:ADJust
Command to calibrate the internal 10 MHz reference. The reference is adjusted by setting a parameter, which may be UP, DOWN, MIN or MAX. It is NOT possible to access and/or issue the actual values.

Example:

INP:GENL:CAL:ADJ UP
INP:GENL:CAL:ADJ DOWN
INP:GENL:CAL:ADJ MAX
INP:GENL:CAL:ADJ MIN

increment the 10 MHz reference
decrement the 10 MHz reference
set the reference to maximum deviation
set the reference to minimum deviation

- INPut:GENLock:CALibrate:STORE
Command to store the current setting of the internal 10 MHz reference.
- INPut:GENLock?
Command to display the status and the settings of the genlock. The response is defined as
<lock info>,<system>,<Field>,<Line>,<HTime>

where **<lock info>** is either **GENLOCKED** or **UNLOCKED**.

For an explanation regarding the rest of the response see the commands: *INP:GENL:SYST* and *INP:GENL:DEL*.

When selecting Internal or 10MHz system, 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.

Examples:

INP:GENL?

response:

UNLOCKED,NTSCBURST,+1,+212,+00000.2

INP:GENL?

response:

GENLOCKED,F10MHZ,+1,+0,+0

INP:GENL?

response:

GENLOCKED,PALBURST,+1,+1,+1234

10.3.2 OUTPUT Commands

- [OUTPut:BB1:SYSTem](#)
- [OUTPut:BB2:SYSTem](#)
- [OUTPut:BB3:SYSTem](#)

Command to select the system of the three Black Burst output. Systems available are

System	Description
PAL	PAL
PAL_ID	PAL with line 7 pulse
NTSC	NTSC with setup
JNTSC	NTSC no setup

Example:

OUTP:BB1:SYST PAL_ID

set system for BB output 1 to PAL with line 7 pulse

OUTP:BB1:SYST?

response: *PAL_ID*

- [OUTPut:BB1:DELay](#)
- [OUTPut:BB2:DELay](#)
- [OUTPut:BB3:DELay](#)

Command to set the delay of the three Black Burst output. 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.

$HTime(PAL) < 64000.0ns$

$HTime(NTSC) < 63492.1ns$

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

ANALOG			
PAL, 625 lines		NTSC, 525 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:BB2:DEL -2,-4,-3245.2 set delay for BB output 2 to -2 field, -4 line & -3245.2ns
OUTP:BB2:DEL? response: *-2,-004,-03245.2*

- OUTPut:BB1:SCHPhase
- OUTPut:BB2:SCHPhase
- OUTPut:BB3:SCHPhase

Command to set the Sch-Phase of the three Black Burst output. The Sch-Phase value must be in the range

$$180 < \text{Sch-Phase} \leq +180$$

Example:

OUTP:BB2:SCHP -160 set the SchPhase for BB output 2 to -160deg
OUTP:BB2:SCHP? response: *-160*

- OUTPut:BB1?
- OUTPut:BB2?
- OUTPut:BB3?

Command to display the complete settings of the three Black Burst output. 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: 1-3

Example:

OUTP:BB1? response: *PAL,+2,+123,+12345.5,-160*

- OUTPut:TSGenerator:PATTern

Command to select the pattern of the SDI and Video outputs. Refer to chapter 12, **PT 5202 Signals** for a description of the patterns available.

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

Example:

OUTP:TSG:PATT WIN100 set the pattern for a 100% window
OUTP:TSG:PATT? response: *WIN100*

- OUTPut:TSGenerator:SYSTem

Command to select the system of the SDI and Video outputs. Systems available are

System	Description
PAL	PAL
NTSC	NTSC with setup
JNTSC	NTSC no setup

If the current pattern is invalid in the selected system, the pattern will be reset to a valid pattern in the new system. See chapter chapter 12, **PT 5202 Signals**, for the pattern-reset list.

Example:

OUTP:TSG:SYST PAL set the system for PAL
OUTP:TSG:SYST? response: *PAL*

- OUTPut:TSGenerator:DElay

Command to set the delay of the SDI and Video outputs.. 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

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

ANALOG			
PAL, 625 lines		NTSC, 525 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:TSG:DEL -2,-4,-3245.2

set the delay for the SDI to -2 field, -4 line & 3245.2ns

OUTP:TSG:DEL?

response: -2,-004,-03245.2

- OUTPut:TSGenerator:SchPhase

Command to set the Sch-Phase of the SDI and Video outputs. The Sch-Phase value must be in the range

180 < Sch-Phase <= +180

Example:

OUTP:TSG:SchP -123

set the SchPhase for -123deg

OUTP:TSG:SchP?

response: -123

- OUTPut:TSGenerator:EMBaudio:SIGNal

Command to select the signal of the embedded audio in the SDI output. Refer to chapter chapter **12, PT 5202 Signals**, for a description of the signals available.

Example:

OUTP:TSG:EMB:SIGN

set the embedded audio to OFF

OUTP:TSG:EMB:SIGN?

response: OFF

OUTPut:TSGenerator:TEXT

Command to insert a text string into SMPTE or EBU Pattern. Three parameters are possible, i.e. **ON**, **OFF** or some text, "**TEXT**".

Note: max 16 characters: characters supported: 0..9, A..z, _(underscore and -(minus)).

Example:

OUTP:TSG:TEXT ON

switches the text in the pattern ON

OUTP:TSG:TEXT "PT5202-SPG"

sets text string to PT5202-SPG

OUTP:TSG:TEXT?

Response: ON, "PT5202-SPG"

OUTPut:TSGenerator:TEXT?

Returns TEXT parameter setting: ON or OFF and Text string.

OUTPut:TSGenerator:MOVement

Command to set the TEXT as fixed or moving up and down.

Parameters: **ON**, **OFF** and **?**

Example:

OUTP:TSG:MOVement ON switches the text in the pattern movement to ON

OUTP:TSG:MOVement? Response: ON

- OUTPut:TSGenerator?

Command to display the complete settings of the SDI and Video outputs. The response contains seven fields:

<Pattern>, **<System>**, **<Field>**, **<Line>**, **<HTime>**, **<SchPhase>**, **<EmbAudio>**

For an explanation of the response, see the commands: *OUTP:TSG:PATT*, *OUTP:TSG:SYST*, *OUTP:TSG:DEL*, *OUTP:TSG:SCHP* and *OUTP:TSG:EMB:SIGN*.

Example:

OUTP:TSG? response: *CBEBU, PAL, +2, +123, +12345.5, -160, OFF*

- OUTPut:AUDio:OUTput

Command to select the output of the audio signal. The output may be either analog or AES/EBU audio.

Example:

OUTP:AUD:OUTP AES select AES/EBU as the audio output

OUTP:AUD:OUTP? response: *AESEBU*

- OUTPut:AUDio:ANALog:SIGNal

Command to select the audio signal of the analog audio output signal. Refer chapter **12, PT 5202 Signals**, for a description of the analog audio signals available.

Please note that the settings will be updated even though the output of the audio signal has been selected as AES/EBU. The settings will take effect the next time the analog audio output is selected.

Example:

OUTP:AUD:ANAL:SIGN S1KHZ set the analog audio signal to Stereo 1kHz

OUTP:AUD:ANAL:SIGN? response: *S1KHZ*

- OUTPut:AUDio:ANALog:LEVel

Command to select the audio level of the analog audio output signal. Refer to chapter **12, PT 5202 Signals**, for a description of the analog audio levels available.

Please note that the settings will be updated even though the output of the audio signal has been selected as AES/EBU. The settings will take effect the next time the analog audio output is selected.

Example:

OUTP:AUD:ANAL:LEV 4 set the analog audio level to +4 dBu

OUTP:AUD:ANAL:LEV? response: *4*

- OUTPut:AUDio:ANALog:CLICk

Command to select the click rate for the audio signal of the analog audio output signal. Refer to chapter **12, PT 5202 Signals**, for a description of the analog audio levels available. The click rate can be a click every 1 or 3 seconds.

Please note that the settings will be updated even though the output of the audio signal has been selected as AES/EBU. The settings will take effect the next time the analog audio output is selected.

Example:

```
OUTP:AUD:ANAL:CLIC 3      set the click rate to every 3 seconds
OUTP:AUD:ANAL:CLIC?      response: 3
```

- OUTPut:AUDio:ANALog?

Command to display the complete settings of the analog audio output. The response contains three fields:

<Signal>, <Level>, <Click>

For an explanation of the response, see the commands: *OUTP:AUD:ANAL:SIGN*, *OUTP:AUD:ANAL:LEV* and *OUTP:AUD:ANAL:CLIC*.

Example:

```
OUTP:AUD:ANAL?           response: S1KHZ,SILENCE,1
```

- OUTPut:AUDio:AESebu:SYSTem

Command to select the audio system of the AES/EBU audio output signal. Possible selections are PAL or NTSC

Please note that the settings will be updated even though the output of the audio signal has been selected as ANALOG. The settings will take effect the next time the AES/EBU audio output is selected.

Example:

```
OUTP:AUD:AES:SYST PAL    set the AES/EBU audio system to PAL
OUTP:AUD:AES:SYST?      response: PAL
```

- OUTPut:AUDio:AESebu:SIGNal

Command to select the audio signal of the AES/EBU audio output signal. Refer to chapter **12, PT 5202 Signals**, for a description of the AES/EBU audio signals available.

Please note that the settings will be updated even though the output of the audio signal has been selected as ANALOG. The settings will take effect the next time the AES/EBU audio output is selected.

Example:

```
OUTP:AUD:AES:SIGN S500HZ set the AES/EBU audio signal to Stereo 500Hz
OUTP:AUD:AES:SIGN?      response: S500HZ
```

- OUTPut:AUDio:AESebu:LEVel

Command to select the audio level of the AES/EBU audio output signal. Refer to chapter **12, PT 5202 Signals**, for a description of the AES/EBU audio levels available.

Please note that the settings will be updated even though the output of the audio signal has been selected as ANALOG. The settings will take effect the next time the AES/EBU audio output is selected.

Example:

```
OUTP:AUD:AES:LEV -12     set the AES/EBU audio level to -12dBFS
OUTP:AUD:AES:LEV?       response: -12
```

- OUTPut:AUDio:AESebu:TIMing
Command to select the audio timing of the AES/EBU audio output signal. Refer to chapter **12, PT 5202 Signals**, for a description of the AES/EBU audio timing available. Please note that the settings will be updated even though the output of the audio signal has been selected as ANALOG. The settings will take effect the next time the AES/EBU audio output is selected.

Example:

```
OUTP:AUD:AES:TIM -1.6      set the AES/EBU audio timing to -1.6us
OUTP:AUD:AES:TIM?         response: -1.6
```

- OUTPut:AUDio:AESebu:WORDclock
Command to select the sample rate of the AES/EBU generator and of the Wordclock output. The frequency can be either 44.1 or 48 kHz. Please note that the settings will be updated even though the output of the audio signal has been selected as ANALOG. The settings will take effect the next time the AES/EBU audio output is selected.

Example:

```
OUTP:AUD:AES:WORD F441KHZ set the sample rate to 44.1 kHz
OUTP:AUD:AES:WORD?       response: F441KHZ
```

- OUTPut:AUDio:AESebu:CLICK
Command to select the click rate for the audio signal of the AES/EBU audio output signal. Refer to chapter **12, PT 5202 Signals** for a description of the analog audio levels available. The click rate can be a click every 1 or 3 seconds. Please note that the settings will be updated even though the output of the audio signal has been selected as ANALOG. The settings will take effect the next time the AES/EBU audio output is selected.

Example:

```
OUTP:AUD:AES:CLIC 1      set the click rate to every 1 second
OUTP:AUD:AES:CLIC?      response: 1
```

- OUTPut:AUDio:AES?

Command to display the complete settings of the AES/EBU audio output. The response contains six fields:

<System>,<Signal>,<Level>,<Timing>,<WordClock>,<Click>

For an explanation of the response, see the commands: OUTP:AUD:AES:SYST, OUTP:AUD:AES:SIGN, OUTP:AUD:AES:LEV, OUTP:AUD:AES:TIM, , OUTP:AUD:AES:WORD and OUTP:AUD:AES:CLIC.

Example:

```
OUTP:AUD1:AES?          response: PAL,S500HZ,-12,-1.6,F441KHZ,1
```

11 Error Codes

11.1 Command Errors [-199, -100]

Error Number	Error string [description/explanation/example]
-101	Invalid character A command or parameter contains an invalid character, e.g. a header containing an ampersand, SYST:VERS&.
-102	Syntax error An unrecognised command or data type was encountered, e.g. a string was received when the generator didn't accept strings.
-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
-112	Program mnemonic too long The header contains more than twelve characters.
-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:BB12? is illegal because only 3 BBs exist
-121	Invalid character in number An invalid character for the data type was encountered, e.g. an alpha in a decimal value.
-124	Too many digits The mantissa of a decimal numeric data element contained more than 255 digits.

11.2 Execution Errors [-299, -200]

Error Number	Error string [description/explanation/example]
-200	Execution error
-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:BB1:SCHP 200; is illegal since the SchPhase can not exceed 180deg.

11.3 Device Specific Errors [-399, -300]

Error Number	Error string [description/explanation/example]
-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 baud rate mismatch.
-363	Input buffer overrun Software or hardware input buffer on serial port overflows .

12 PT 5202 Signals

Symbols:

PAL: Only in 625-lines PAL system.

NTSC: Only in 525-lines NTSC system

X: Both PAL and NTSC systems

12.1 Video Patterns.

	Remote name	PT 5202
CBAR		
SMPTE C.Bar	CBSMpte	NTSC
EBU C.Bar	CBEBu	PAL
FCC C.Bar	CBFCc	NTSC
C.Bar ITU801	CBEBu8	X
100% C.Bar	CB100	X
75% C.Bar+Red	CBRed75	PAL
75% Red	RED75	X
M.BURST		
CCIR Line18	CCIR18	PAL
WINDOW		
Window 10%	WIN10	X
Window 15%	WIN15	X
Window 20%	WIN20	X
Window 100%	WIN100	X
15kHz BI/Wh	BLWH15KHZ	X
White 100%	WHITe100	X
Black	BLACk	X
SPECIAL		
SDI Check Field	SDICheck	X
Digital Grey	DGRey	X
LINEARITY		
Staircase 5step	STAircase5	X
Staircase 10step	STAircase10	X
PATTERNS		
Crosshatch	CROShatch	X
PLUGE	PLUGe	X

12.2 Pattern Selections after System Change

The tables apply, when one or more signals only exist in one system.

VIDEO GENERATOR:			
PAL Specific patterns:			
EBU C.Bar	→		SMPTE C.Bar
75% C.Bar+Red	→		SMPTE C.Bar
CCIR Line18	→		SMPTE C.Bar
NTSC specific patterns:			
SMPTE C.Bar	→		EBU C.Bar
FCC C.Bar	→		EBU C.Bar

12.3 Audio Signals

	Remote name	Embedded	Analog	AES/EBU
Signals				
Off	OFF	X		
Silence	SILence	X		
Stereo 500 Hz	S500HZ		X	X
Stereo 1 kHz	S1KHZ	X	X	X
Stereo EBU 1 kHz	SEBU1KHZ		X	X
Stereo 8 kHz	S8KHZ		X	X
Digital audio Levels				
Silence	SILence		X	X
0 dBFS	0			X
-9 dBFS	-9			X
-12 dBFS	-12			X
-15 dBFS	-15			X
-16 dBFS	-16			X
-18 dBFS	-18			X
-20 dBFS	-20			X
Analog audio Levels				
+10 dBu	10		X	
+8 dBu	8		X	
+7 dBu	7		X	
+6 dBu	6		X	
+5 dBu	5		X	
+4 dBu	4		X	
+3 dBu	3		X	
+2 dBu	2		X	
+1 dBu	1		X	
0 dBu	0		X	
-1 dBu	-1		X	
-2 dBu	-2		X	
-3 dBu	-3		X	
-4 dBu	-4		X	
-5 dBu	-5		X	

	Remote name	Embedded	Analog	AES/EBU
-6 dBu	-6		X	
-7 dBu	-7		X	
-8 dBu	-8		X	
-9 dBu	-9		X	
-10 dBu	-10		X	
-11 dBu	-11		X	
-12 dBu	-12		X	
-13 dBu	-13		X	
-15 dBu	-15		X	
-18 dBu	-18		X	
-20 dBu	-20		X	
-24 dBu	-24		X	
-27 dBu	-27		X	
-30 dBu	-30		X	
-33 dBu	-33		X	
-36 dBu	-36		X	
Silence	SILence		X	
Digital AudioTiming				
-9.6 μ s	-9.6			X
-8.8 μ s	-8.8			X
-8.0 μ s	-8.0			X
-7.2 μ s	-7.2			X
-6.4 μ s	-6.4			X
-5.6 μ s	-5.6			X
-4.8 μ s	-4.8			X
-4.0 μ s	-4.0			X
-3.2 μ s	-3.2			X
-2.4 μ s	-2.4			X
-1.6 μ s	-1.6			X
-0.8 μ s	-0.8			X
+0.0 μ s	+0.0			X
+0.8 μ s	+0.8			X
+1.6 μ s	+1.6			X
+2.4 μ s	+2.4			X
+3.2 μ s	+3.2			X
+4.0 μ s	+4.0			X
+4.8 μ s	+4.8			X
+5.6 μ s	+5.6			X
+6.4 μ s	+6.4			X
+7.2 μ s	+7.2			X
+8.0 μ s	+8.0			X
+8.8 μ s	+8.8			X
+9.6 μ s	+9.6			X
+10.4 μ s	+10.4			X

12.4 Reset Configuration

Whenever the SCPI command ***RST** is issued the actual settings will be reset according to the following:

	PAL	NTSC 7.5% setup	NTSC 0% setup
BB1-3:			
System	PAL	NTSC	JNTSC
Delay	0,0,0.0	0,0,0.0	0,0,0.0
ScH-Phase	0	0	0
SDI Video			
Pattern	CBEBu	CBSMpte	CBSMpte
System	PAL	NTSC	JNTSC
Delay	0,0,0.0	0,0,0.0	0,0,0.0
ScH-Phase	0	0	0
Embedded Audio	OFF	OFF	OFF
AES/EBU Audio	On	On	On
System	PAL	NTSC	NTSC
Signal	S1KHZ	S1KHZ	S1KHZ
Level	-18	-20	-20
Timing	0	0	0
Click	3	3	3
Wordclock	F48KHZ	F48KHZ	F48KHZ
Signal	S1KHZ	S1KHZ	S1KHZ
Analog Audio			
Signal	S1KHZ	S1KHZ	S1KHZ
Level	0	0	0
Click	3	3	3

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