

MSG-5300

Master Sync Generator

Guide to Installation and Operation

M3006-9900-101

21 Mar 2014



A **BELDEN** BRAND

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SAFETY COMPLIANCE



This equipment complies with:
EN 60950-1 (2nd edition) directive 2006/95/EC
CSA C22.2 No. 60950-1 (2nd edition)
UL 60950-1 (2nd edition)

The power cord supplied with this equipment meets the appropriate national standards for the country of destination.

WARNING An appropriately listed/certified mains supply power cord must be used for the connection of the equipment to the mains voltage at either 120V~ or 240V~. The socket-outlet shall be installed near the equipment and shall be easily accessible.

Protective grounding of the instrument is required for the accessible terminals to be safe (EN 60950-1).

CAUTION This equipment is meant to be installed in a restricted-access location.

Disconnect power cord before servicing.

These servicing instructions are for use by qualified service personnel only.

To reduce the risk of electric shock, do not perform any servicing other than that contained in the operating instructions unless you are qualified to do so. Refer all servicing to qualified service personnel.

ELECTROMAGNETIC COMPATIBILITY



This equipment has been tested for verification of compliance with FCC Part 15, Subpart B requirements for Class A digital devices.

NOTE: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.



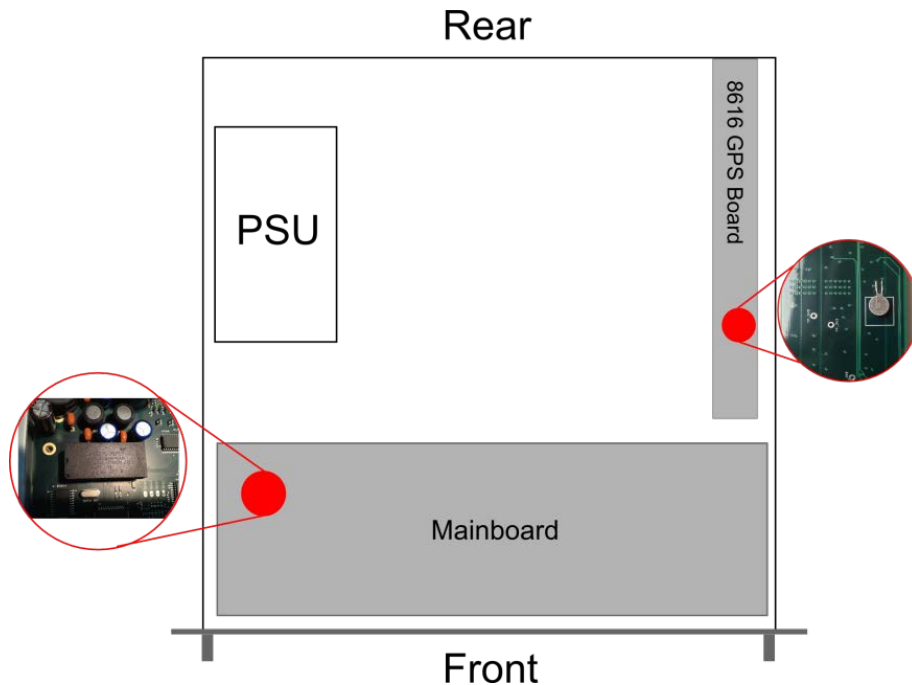
This equipment has been tested and found to comply with the requirements of the EMC directive 2004/108/CE:

- EN 55022 / EN 55016-2-3 / EN 55014-1 Emissions
- EN 55103-2 Annex A and B Immunity
- EN 61000-3-2 Harmonic current emission limits
- EN 61000-3-3 Limitation of voltage changes, voltage fluctuations and flicker
- EN 61000-4-2 Electrostatic discharge immunity
- EN 61000-4-3 Radiated electromagnetic field immunity – radio frequencies
- EN 61000-4-4 Electrical fast transient immunity
- EN 61000-4-5 Surge immunity
- EN 61000-4-6 Conducted emissions immunity
- EN 61000-4-11 Voltage dips, short interruptions and voltage variations immunity

Disposal and Recycling information

Batteries:

Your Miranda MSG-5300 comes with at least one lithium carbon monofluoride battery (Li-CF_x) located on the main printed circuit board. The MSG-OPT-8616 GPS option card comes with at least one manganese lithium battery (LiMn₂O₄). The batteries are used for backup and should not need to be replaced during the lifetime of the equipment.



Before disposing of your Miranda equipment, please remove all batteries as follows:

- 1 Make sure the AC power cord is unplugged from the power outlet;
- 2 Remove the protective cover from your equipment;
- 3 Gently remove each battery from its casing, using a blunt instrument such as a screwdriver for leverage if necessary.
- 4 Dispose of the batteries and equipment according to your local environmental laws and guidelines

WARNING:

Be careful not to short-circuit the batteries - adhere to the appropriate ESD practices. Do not dispose of batteries in a fire as they may explode. Batteries may explode if damaged or overheated. Do not dispose of batteries as household waste. Do not dismantle, open or shred batteries. Keep batteries out of the reach of children. In the event of a battery leak, do not allow battery liquid to come in contact with skin or eyes. Seek medical help immediately in case of ingestion, inhalation, skin or eye contact, or suspected exposure to the contents of an opened battery.

For more information about recycling, please contact Miranda Technologies.

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1 MSG-5300 Master Sync Generator

1.1 Introduction

The MSG-5300 HD-SD Master Sync Generator is specially designed to fit into HD as well as SD digital and mixed digital/analog video installations, and it provides signals for synchronization, fault finding and checking of the entire digital chain. Because of its many parallel outputs, the MSG-5300 is ideal for supplying the video production facility with all commonly-used test signals for alignment, but also generates stand-by patterns.

The basic generator is available as an SD or HD-SD gen-lockable sync with 2 Black Burst outputs. In the HD-SD version it has furthermore 4 Tri-Level sync outputs available. A dual AES/EBU digital audio generator is also included in the base units.

The Miranda MSG-5300 can be assembled at the factory with a number of optional modules that tailor it to specific applications.

Up to two Quad Test Signal generators can be added to the basic unit, making up to 8 different HD or SD SDI test signals with audio tones available at a time. The HD-SD SDI generator is switchable between 625 and 525 lines and the various HD formats, and can superimpose three lines of text on the video signals. With complex test patterns, the text is automatically placed in black text fields.

The MSG-5300 is gen-lockable to a traditional Black Burst signal, but can also be locked onto a 5MHz or 10MHz continuous wave. It can even lock onto a 525-line video signal and still generate PAL, 625-line SD-SDI signals and HD SDI signals in the major parts of formats.

Each of the outputs can be individually timed: SD-SDI signals can be timed in steps of 37 ns over a ± 1 field range; HD-SDI and Tri-Level Sync signals in steps of 6.7 ns, the analog Black Bursts and test pattern outputs are timeable in steps of 0.5° of subcarrier over a ± 4 field sequence for PAL and ± 2 field sequence for NTSC.

The stability of the internal reference oscillator ensures accurate signals when the MSG-5300 is acting as a standalone reference generator.

AES/EBU digital audio is available on both XLR and BNC connectors. The generator module has two built-in generators, which can be programmed independently with silence or with tones that include signals with audible left/right indication. The AES/EBU output signals are always locked both to the 525-line and 625-line outputs. In multi-standard operations, this permits direct connection between AES/EBU generators in 525-line and 625-line environments. A separate word-clock signal is available on a BNC connector.

1.2 Applications

The MSG-5300 can be used in a multitude of different applications, e.g. delivering signals for a video switcher, as a master and as backup Sync Pulse Generator (SPG) and as a general video signal generator.

In small studios and in OB-vans it can work as an SPG while also delivering test signals at the same time. It also operates in dual redundant configurations when used with an MSG-5211 Changeover Unit. Built-in fault detection circuitry automatically switches from main to backup to keep disruptions to a minimum.

In digital distribution networks where data compression is used, a stationary test signal will not reveal if the line is in a "freeze" mode. A moving bar added to the standby pattern will show if the line is open and if the time and date appears in the pattern, this is a good indication that the line is not frozen.

The time information can be locked onto VITC, LTC, or the internal video reference. The time can be offset to cope with delays in distribution, MPEG-2 coding and transmission. It also ensures that the “true” time can be displayed at the reception point.

Six complete instrument presets have been included to enable quick changes in operation mode. Each of the set-ups may be given names with a string of up to a 16 character.

In automated applications, the RS232 remote control interface provides full control over all functions of the generator. Parameters for each output can be adjusted remotely and a complete set-up can be transmitted to and from the instrument.

A Telnet (Ethernet) interface is also available. As with the RS232 interface, the Telnet interface provides full control over all functions of the generator. With the limitation that complete presets cannot currently be transmitted through Telnet, the commands and responses are the same as with the RS232 interface.

2 Product Data

2.1 Performance Characteristics

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

2.2 Versions

The generator is based on two basic versions, one for SD-SDI and analog applications and one for HD-SD SDI and analog applications. The HD SD version includes the Tri-level Sync option (MSG-OPT-8611). Both versions are genlockable sync pulse generators with further 2 x Black Burst outputs as well. Both versions also include a dual AES/EBU audio generator. To the basic configuration a number of units can be added.

The apparatus is a multi-format, simultaneously covering SD-SDI (625/525), analog PAL and analog NTSC and the extended version with additional HD Tri-level sync outputs as well as HD-SDI test signal outputs.

The HD SD-SDI generator works in 16 different HD formats plus the SD-SDI formats 625 and 525 lines, where the Tri-Level sync option (MSG-OPT-8611) works with 20 different HD formats.

2.3 Options

<i>Option Name</i>	<i>Function</i>	<i>Part Number</i>
MSG-OPT-8608	Dual Black Burst Generator	9449 086 08001
MSG-OPT-8611 *	Quad HD Tri-Level Sync Generator	9449 086 11001
MSG-OPT-8612	Quad HD-SD SDI Test Signal Generator	9449 086 12001
MSG-OPT-8616	GPS Genlock and LTC Generator	9449 086 16001
MSG-OPT-8635 *	Dual AES/EBU Audio Generator	9449 086 35001
MSG-OPT-8643	SNTP server module	9449 086 43001

* NB – although they appear in the “Options” list, the Quad Tri-Level HDTV Sync Generator (option MSG-OPT-8611) is included as standard equipment in the 5300HD, and the Dual AES/EBU Audio Generator (option MSG-OPT-8635) is included as standard equipment in the MSG-5300SD and the 5300HD

2.4 Basic Instrument – Description and Technical Specifications

2.4.1 Master Frequency Reference

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

2.4.2 Analog Genlock

Input: 75 Ω looped through or two 75 Ω terminated inputs (menu configurable)
Return loss: > 38 dB to 6 MHz

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

Amplitude: Nominally ± 3 dB
S/N ratio: > 26 dB
SCH phase: Nominally ± 45°
Pull-in range fsc: ± 20 Hz
Jitter when locked to burst: < 0.5°
Jitter when locked to sync: < 2 ns
Timing range: PAL: ± 4 fields
NTSC: ± 2 fields
Timing resolution: 0.5° fsc

2.4.4 Genlock Signal

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

2.4.5 Analog Genlock Transparent Channel

The analog genlock signal is transferred via an AC-coupled amplifier to a transparent output.

Output impedance: 75 Ω
Return loss: > 36 dB to 6 MHz

2.4.6 Analog Black Burst Outputs

Number of outputs: 2, independently timeable
Connector: BNC
Return loss: 75 Ω ± 0.5 Ω
Sync Amplitude: PAL: -300 mV ± 2%
NTSC: -286 mV ± 2%
Burst Amplitude: PAL: -300 mV ± 2%
NTSC: -286 mV ± 2%
Timing range: PAL: ± 4 fields
NTSC: ± 2 fields

Timing resolution:	0.5° fsc
SCH phase:	Default 0°, adjustment ± 180°, resolution < 1°
S/N ratio:	60 dB unweighted to 5 MHz
Jitter:	Burst jitter: ± 0.5° Sync jitter: ± 0.5 ns (based on design and burst jitter value)
Output monitoring:	Continuous of output level with error flag on “Changeover” connector. Detectors can be disabled

2.5 Communication interface

The MSG-5300 is equipped with a 9 pole male D-Sub connector which provides RS232 communication to the instrument. Please see section 7 for more information about remote control of the MSG-5300.

An Ethernet port provides a Telnet interface for remote control and an optional SNTP v4 Time Server; MSG-OPT-8643. The SNTP option requires that a MSG-OPT-8616 GPS genlock module is installed.

If both the computer and the MSG-5300 are configured with a static IP address (and the same Subnet Mask) a straight-through or crossover Ethernet cable can be used to connect the computer and the MSG-5300 directly.

2.6 Changeover Control

A built-in fault detection circuitry determines when to send an error flag to the MSG-5211 Changeover Unit. The detector for each output can be disabled internally, so the user can determine which signals will participate in the automatic switching decision.

2.7 Presets

Six complete instrument presets are stored in a non-volatile memory.

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

2.8 Options – Description and Technical Specifications

2.8.1 MSG-OPT-8608 Dual Black Burst Generator

NB – These specifications also apply to the built-in Dual Black Burst generator

2 Black Burst generators individually configurable to PAL or NTSC

Number of outputs:	2 with independent timeable outputs
Connectors:	2 x BNC
Output Impedance:	75 Ω ± 0.5 Ω
Return loss:	> 36 dB, up to 5 MHz
Sync Amplitude:	300 mV ± 2%, (PAL), 286 mV ± 2%, (NTSC)
Burst Amplitude:	300 mV ± 2%, (PAL), 286 mV ± 2%, (NTSC)
Timing range:	± 4 fields (PAL), ± 2 fields (NTSC)
Timing resolution:	0.5° of subcarrier
SCH phase:	Default 0°, adjustment ± 180°, resolution < 1°
S/N ratio:	Better than 60 dB unweighted to 5 MHz
Jitter:	< ± 0.5 ns

2.8.2 MSG-OPT-8611 Quad HD Tri-Level Sync Generator

NB - One card installed in base MSG-5300HD

Four generators individually configurable to 20 HD Tri-Level Sync formats.

Number of outputs: 4 with independent timeable outputs
 HD Formats: 720p, 1080i, 1080p. Frame rates as listed in table 1

Format	Tri-Level Sync	Gen-lock to BB/SDI	
1080p/60	x		HD 1080p
1080p/59.94	x		
1080p/50	x		
1080p/30	x		
1080p/29.97	x	x	
1080p/25	x	x	
1080p/24	x		
1080p/23.98	x		
1080i/30	x		HD 1080i
1080i/29.97	x	x	
1080i/25	x	x	
1080sF/30	x		HD 1080sF
1080sF/29.97	x	x	
1080sF/25	x	x	
1080sF/24	x		
1080sF/23.98	x		
720p/60	x		HD 720p
720p/59.94	x	x	
720p/50	x	x	
720p/30	x		
720p/29.97	x	x	
720p/25	x	x	
720p/24	x		
720p/23.98	x		
576i/25 (625)		x	SD
487i/29.97 (525)		x	

Table 1: HD Tri-Level sync formats supported by MSG-5300HD

Connectors: 4 x BNC
 Output Impedance: 75 Ω
 Return loss: > 30 dB, 5 to 30 MHz
 Amplitude: 600 mV_{pp} ± 2%
 Jitter: < ± 2%

2.8.3 MSG-OPT-8635 Dual AES/EBU Audio Generator

NB – One card installed in all MSG-5300SD and MSG-5300HD generators

Outputs: 2 x AES/EBU pairs
 Sampling frequency: 48 KHz

Data rate:	3.072 MBit/s
Type of outputs (Configurable):	Silence, tone or word-clock
Linear coding:	PCM, 20 bit two's complement binary, bi-phase mark coding
Single ended outputs:	BNC, according to AES3 ID
Output Impedance:	75 Ω \pm 20%
Amplitude:	1.0 V \pm 10%
Rise and fall time:	30-44 ns
Balanced outputs:	XLR, according to AES3 1992
Output Impedance:	110 Ω \pm 20%
Amplitude:	3V _{pp} typical
Rise and fall time:	10-30 ns
Jitter:	< 20 ns
Word clock output:	Single ended, BNC
Output Impedance:	75 Ω
Amplitude:	2.5 V _{pp} in 75 Ω

Output signals:

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

Output levels:	Silence, 0, -9, -12, -15, -16, -18, -20 dBFS
Pre-emphasis:	None

Audio reference word clock output: 48 KHz squarewave

Note: When the 110 Ω XLR output is used with the 48 kHz clock signal, it should be terminated by 110 Ω in order to obtain reliable transmission.

2.8.4 MSG-OPT-8612 Quad HD-SD Serial Digital Test Signal Generator

Four generators individually configurable with HD and SD test signals.

Number of outputs:	4 with independent timeable outputs
HD Formats:	720p, 1080i, 1080p. Frame rates as listed in table 2

Signals:

- **Video:** EBU Color Bar, 75% with 100% white; Color Bar, 100%, with 100% white; SDIcheckfield; PLUGE; window signals; clapper board; luminance ramp; combination pattern with selectable color bar - white ramp - LIP SYNC - 75% red; Black, full field; white, full field from -5% to 105% in 5% increments; white, window from 5% to 105% in 5% increments; cross hatch, 16 x 9
- **Text:** Moving text string with up to 3 lines of 16 characters each line inserted in the test signals
- **Audio:** Test-tones embedded in the HD-SD SDI signals.

Format	Tri-Level Sync	Gen-lock to BB/SDI	
1080p/60	x		HD 1080p
1080p/59.94	x		
1080p/50	x		
1080p/30	x		
1080p/29.97	x	x	
1080p/25	x	x	
1080p/24	x		
1080p/23.98	x		
1080i/30	x		HD 1080i
1080i/29.97	x	x	
1080i/25	x	x	
1080sF/30	x		HD 1080sF
1080sF/29.97	x	x	
1080sF/25	x	x	
1080sF/24	x		
1080sF/23.98	x		
720p/60	x		HD 720p
720p/59.94	x	x	
720p/50	x	x	
720p/30	x		
720p/29.97	x	x	
720p/25	x	x	
720p/24	x		
720p/23.98	x		
576i/25 (625)		x	SD
487i/29.97 (525)		x	

Table 2: HD-SD serial digital test signals supported by MSG-5300HD

Connectors: 4 x BNC
Output Impedance: 75 Ω \pm 1%
Return loss: > 15 dB, 5 to 1.5 GHz
Amplitude: 800 mV_{pp} \pm 2%
Jitter Timing resolution: < \pm 1/2 frame

- HD: 6.7 ns
- SD: 6.7 ns

2.8.5 MSG-OPT-8616 GPS Genlock and LTC Generator

GPS active antenna input:
Connectors: 1 x BNC
Input Impedance: 50 Ω
Active amplifier supply voltage: 3.3 V
Max power consumption: 0.165 W

LTC outputs A, B:
LTC A: 1 x XLR, balanced output, 110 Ω
LTC B: 1 x BNC, balanced output, 50 Ω

Output voltage: 1 V_{pp}
Timing: ± 500 ms
Step size: 6.7 ns

Stability:
Accuracy: 15 ns
Absolute long term drift: > 15 µs
Absolute short term drift: > 1 µs

Supported LTC formats:
625 lines, 25 FPS, (PAL)
525 lines, 29.97 FPS, (NTSC - dropframe)
525 lines, 29.97 FPS, (NTSC - non dropframe)
30 FPS
24 FPS

Standard boot up time (depending on sky view):
Cold start: 44 s
Warm start: 18 s

Included features:
Selectable switching for daylight saving time: 1: None
2: Confirm
3: Auto

Individual timing offset for both LTC outputs: ± 500 ms offset range

2.8.6 Ethernet port and MSG-OPT-8643 SNTPv4 Time Server Option

The MSG-5300 is equipped with a IEEE 802.3 10 BASE-T Ethernet network connection. The Ethernet connection is fully compatible with 100/1000 BASE-T for both full and half duplex with auto-negotiation and automatic polarity detection and correction.

Connectors: 1 x RJ45
1 x Female 9 Pin D-SUB
1 x Male 9 Pin D-SUB

- IPv4
- Ethernet protocols:
 - DHCP Client.
Provides automatic configuration of IP address if a DHCP server is available in the network.
 - Telnet Server.
Provides remote control of the MSG-5300 over the network.
Default Port: 23 (TCP)
 - SNTP Server with MSG-OPT-8643 option, also requiring MSG-OPT-8646 GPS Genlock module installed.
Simple Network Time protocol version 4. (Unicast)
Port: 123 (UDP)
 - NetFinder.
Provides easy configuration of the MSG-OPT-8643 module.
Port: 3040 (UDP)

- RS232 Remote control.
- Changeover control.

2.8.7 Level detectors

All sync pulse generator outputs have built-in level detectors:

Analog Video Signals:

Alarm limits: < -3dB or > +7dB

SDI:

Measures both current and voltage. When either one is more than 2dB down, the alarm is set.

AES/EBU:

Alarm limits for BNC outputs: < 0.75V or > 2.7V

Alarm limits for balanced outputs: < 2.4V or > 10V

Alarm limit for Wordclock: < 1.25V

Response time for detection: Approx. 2ms.

2.9 Mechanical and Environmental Specification

2.9.1 Climate Conditions

Ambient temperature: 5° C to 45° C (41° F to 113° F)

Limit range of Storage and Transportation: -20° C to 60° C (-4° F to 140° F)

Humidity: Non-condensing (IEC 721)

2.9.2 Mechanical Requirements

Vibration:

Limit range for storage and transport: 30 min. in each of three directions, 10 to 150 Hz; 0.7 mmp-p and 50 m/s² max acceleration. According to IEC-Publ. 68, test Fc.

Note: Unit mounted on vibration table without shock absorbing material.

Shocks:

Limit range for storage and transport: 1000 shocks of 100 m/s² sine, 6 ms duration in each of 3 directions. According to IEC-Publ. 68, test Eb.

2.10 Power Supply

Voltage:	100-240 VAC
Frequency:	50/60 Hz
Power consumption:	Maximum 90 Watts with all options included

2.11 Mechanical Data

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

3 Installation


3.1 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 Miranda Technologies Partnership Sales or Service organization should be notified in order to facilitate the repair or replacement of the instrument.

3.2 Safety Instruction

3.2.1 Grounding

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

- Via the three-core mains cable
- Via the protective earth terminal marked 

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

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

3.2.2 Mains Voltage Cord and Fuses

Different power cords are available for the various voltage outlets.

Note: If the mains plug has to be adapted to the local situation it should only be done by a qualified person. This instrument is equipped with a tap-less switch mode power supply that covers most nominal voltage ranges in use: 100-240V AC RMS. This obviates the need to adapt to the local mains voltage.

The mains frequency is 50-69 Hz.

WARNING: This instrument shall be disconnected from all voltage sources when replacing a fuse.

Mains fuse rating: 1.6 A delayed action, 250 V

The mains fuse holder is located on the rear panel of the instrument.

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

1. Remove the mains cable
2. Lift the plastic cover (fuse holder) by means of 2 small screwdrivers (simultaneously)

3. Insert the new fuse into the top of the fuse holder
4. Re-insert the cover (fuse holder)

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

The use of repaired (jumped) fuses and/or the short-circuiting of the fuse holder is prohibited. Fuses must only be replaced by a qualified person who is aware of the hazards involved.

3.3 Rack Mounting

This instrument is delivered in a 19" cabinet. Four self-adhesive rubber feet are supplied together with this instrument.

If several cabinets are mounted in a 19" rack, special attention must be paid to the temperature inside the rack. The MSG-5300 is equipped with cooling fan and air inlets on the front, bottom and at the sides. If the MSG-5300 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.

3.4 Cleaning

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

3.5 GPS Antenna and cable connection

The MSG-OPT-8616 option is delivered with an active antenna and 12 meters of cable selected for the unit. Some installations, however, may need to use their own antenna or run longer cables. This section explains what to look out for.

Antenna requirements and specifications

The application always requires an active antenna, running 3.3 volts. There are two types of active antennas that may be considered: Helix or Patch. The differences are the physical design and the area of the sky which is covered. A Helix antenna has a physical shape of a pole and covers the widest area of the sky. It also has to be physically bigger, to pick up RF signals, compared to the Patch antenna. The Patch antenna can be smaller but does not cover the sky as well as the Helix antenna. The Helix antenna may be preferred on buildings, because of the slightly better performance, but the Patch antenna suits most needs and also fits well on OB vans, roofs etc.

Different antennas have different gains which will permit different cable lengths. The typical gain level is about +30 dB. An active antenna draws current in the region of 5 - 20 mA. It is important not to draw more current than 50 mA to avoid damaging the GPS circuit. In the case of a short circuit, the GPS receiver shuts down the supply voltage.

Cable loss budget

It is very important to carefully consider the cable loss when using custom cables longer than the 12 meter RG58 cable supplied. The GPS RF frequency is 1575 MHz, so all further loss calculations will be at this specific frequency.

The GPS receiver requires a minimum signal strength of -140 dBm to lock to a satellite. The GPS satellites are specified to deliver signals strengths between -123 dBm and -130 dBm at the earth surface. With a typical antenna gain of 30 dB, the power level out of the antenna is in the range of -97 dBm. This allows a maximum loss of 43 dB in the cable, before the locking threshold of -140 dBm is reached. It is advisable to keep a margin of about 5 dB from the locking threshold. Clouds, snow and rain will degrade the performance. Below are some examples of cable losses:

Cable type	Loss/100 m @ 1.5 GHz	Max length, 35 dB loss
RG58	110 dB*	31 m
RG213	44 dB*	75 m
Belden 9913F7	20.5dB	150 m

* Note: RG58 and RG213 are found in various low-loss versions.
See datasheet for specific cable used.

Table 4: Cable types.

Antenna and cable installation and usage

The placement of the antenna is important for the overall performance. The antenna must not be obstructed in any way. This obstruction could be caused by trees, roofs etc. What may seem less obvious is tall walls near the antenna which may decrease the performance. This is because the RF-signal may reflect of the wall and the antenna could receive both the direct and reflected signals which may confuse the receiver circuit. Always install the antenna where there is a clear sky-view.

Important: Connect the cable to both the antenna and the MSG-5300 antenna input, before the unit is powered up. The GPS receiver calculates the noise floor on power-up and the connection with the antenna has to be established at this moment.

On power up, check that the text "GPS: none" on the front display changes to "GPS: ok" after a short time. This will confirm the connection works correctly. The final step is to seal the connection to prevent corrosion when exposed to humidity.

Electrical requirements:

Antenna:		Receiver:	
Antenna voltage:	3.3 Volts	Receiver input level:	-140 dBm < input < -5 dBm
Antenna maximum power consumption:	50 mA	Receiver input RF frequency:	1575.42 MHz
Antenna minimum gain:	15 dB		
Antenna maximum gain:	50 dB		
Antenna maximum noise figure:	1.5 dB		

4 Operating Instructions

4.1 General Information

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



Figure 3: Front panel

The two-line-by-40-character LCD display, in conjunction with the circular keypad in the center of the panel, allows easy and intuitive operation of the MSG-5300 HD-SD Sync Generator.

The keypad allows navigation through the available 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 the keys that are active in the current menu.
- The bottom line of the display indicates new selections or enables changes to parameter settings.

Several other pushbuttons and status indicators are provided to the right of the keypad.

4.2 Front Panel Controls

4.2.1 Navigation Keypad

The circular keypad in the middle of the front panel is used to navigate through the MSG-5300's operating menu structure.

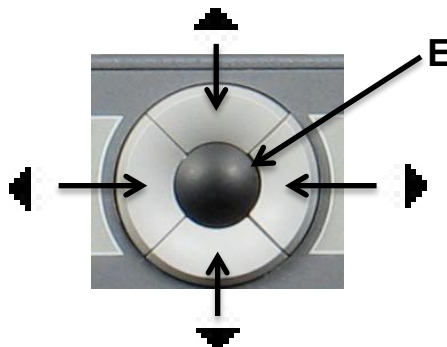






Figure 2: MSG-5300 Navigation Keys and their symbols

The symbols shown in figure 2 are used to represent the keys in the menu descriptions throughout this manual, and in the front panel display screen. In broad terms, their functionalities are:

 (up) allows the user to exit the current menu and enter a higher-level menu, or to change parameters.

 (down) allows the user to select new menus or sub-menus, or to change parameters.

 (left) and  (right) are used to scroll horizontally in the menus and to select individual characters when naming presets and entering text into the video full field test signals.

E (enter) is generally used to enter, activate or confirm a selection.

PRESET

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

OUTPUT

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

GENLOCK

The **GENLOCK** button provides fast switching between locked and unlocked modes. The green LED next to the button indicates that **GENLOCK** has been selected. The type of genlock is selected via the menu.

4.3 Indicators and Connections

4.3.1 Front Panel Indicators


UNLOCKED

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


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

4.4 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 of the buttons in the keypad are active

E Indicates that the E button must be pressed to activate the required selection

 Indicates the position of the cursor on the menu line

[] Indicates that changes to individual characters or digits are possible in timing and naming menus

... Indicates that more items are available on the menu line

-  Indicates that the panel is locked. Four different locked modes are available. The padlock will be only visible when the “performed” function is locked
- ESC To abandon changes, place the cursor on ESC and then press **▲**.
- SAVE To save a changed parameter, place the cursor on SAVE and press **E**.

4.5 Rear Panel Connections

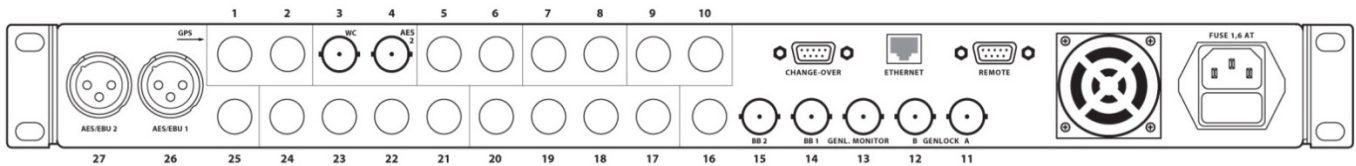


Figure 4: Rear panel

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

Safety Ground (chassis)



Mains voltage receptacle.

REMOTE

Connector for remote control of the MSG-5300. The remote connector is configured as standard RS232. Please see section 7 for detailed information about the RS232 interface.

ETHERNET

Ethernet network interface. The Ethernet interface provides support for remote control through Telnet and the optional MSG-OPT-8643 SNTP Time Server.

The green LED in the Ethernet connector lights up when an Ethernet link is detected. The yellow LED lights up as a result of network traffic.

CHANGEOVER

Remote connector to connect the MSG-5300 HD-SD Sync Generator directly to an MCO-5211 Changeover Unit. This connector is used in set-ups where two MSG-5300 sync generators are connected to the changeover and operated as a master / backup pair.

ANALOG GENLOCK A/B POSITIONS 11-12

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

GENLOCK MONITOR POSITION 13

Buffered 75 Ω output of the selected genlock signal. The signal is AC-coupled.

BB1 and BB2

POSITIONS 14-15

Two standard included outputs with Black Burst signals.

The electrical performance and functionality is the same as the optional MSG-OPT-8616 cards

MSG-OPT-8611 QUAD TRI-LEVEL SYNC OUT

MSG-5300HD **POSITIONS 21-24**
OPTIONAL **POSITIONS 17-20**

MSG-5300SD

OPTIONAL **POSITIONS 21-24**
OPTIONAL **POSITIONS 17-20**

MSG-OPT-8612 QUAD HD/SD TEST SIGNAL GENERATOR

MSG-5300HD
OPTIONAL **POSITIONS 17-20**

MSG-5300SD
OPTIONAL **POSITIONS 17-20**
OPTIONAL **POSITIONS 21-24**

AES/EBU1 AES/EBU digital audio test signal

BNC OUT POSITION 25
XLR OUT POSITION 26

This signal is available on XLR and BNC simultaneously

AES/EBU2 AES/EBU digital audio test signal

BNC OUT POSITION 4
XLR OUT POSITION 27

This signal is available on XLR and BNC simultaneously

Note that when the optional MSG-OPT-8616 GPS is installed this XLR position is replaced by LTC Output A

As a result AES/EBU 2 output is only available on BNC in this case.

WC

POSITION 3

Wordclock, 48KHz, output

MSG-OPT-8616 GPS Genlock and LTC Generator

OPTIONAL **POSITIONS 2, 8, 27**
GPS ACTIVE AMP INPUT (BNC) **POSITION 2**
LTC TIME CODE A OUTPUT (XLR) **POSITION 27**
LTC TIME CODE B OUTPUT (BNC) **POSITION 8**

4.6 Panel Operation

The MSG-5300 HD-SD Sync Generator may be equipped with several different optional modules. The menu system always reflects the modules installed. The operation of each of the modules is described below, although it is impossible for all the modules to be installed in one instrument at one time.

NB. MSG-OPT-XXXX are referred as PTXXXX options when browsing through the LCD menus

4.6.1 Power Up

A diagnostic routine is performed at power-on. After a normal start-up, the MSG-5300 HD-SD Master Sync Generator front panel display shows the start-up message. If a failure is detected an error message is displayed.

Normal Start-up

```
HD-SD Sync.Gen.Power-up diagnose
Selftest in progress ...
```

This message is shown while the test is being performed.

After a successful test the following message is shown:

```
HD-SD Sync. Gen. Frame
Version: 07.-03.0
```

The instrument stops if errors are detected. The diagnosis will be continued if you press any of the front-panel keypad buttons. When the power-up diagnostics program is finished, the instrument may be used, but function(s) for which errors have been detected by the power-up diagnostics will be non-functional.

4.6.2 Status Displays

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

```
HD-SD Preset Status      ◀▶
PRESET (6):name of preset
```

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

If no preset is active then genlock status display will be displayed. Use the ◀ and ▶ buttons to select the status displays you want.

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

Status: Preset

```
HD-SD Preset Status      ◀▶
NO PRESET ACTIVE
```

```
HD-SD Preset Status      ◀▶
PRESET (1):name of preset
```

Status: Genlock

```
Genlock:A                               ◀▶  
Signal:PAL Burst Status: GENLOCKED
```

```
Genlock:Internal                         ◀▶  
Signal:----Status----
```

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

Status: AES/EBU Audio Generator

```
AES/EBU1:Stereo EBU 1kHz                 ◀▶  
Level:-9dBFS Timing:PAL
```

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

Status: DATE-TIME

```
DATE:13-11-05 TIME:14:05:08 ??          ◀▶  
REF: VITC Code STATUS: LOCKED
```

This display shows the current status of date and time i.e. the information inserted into the video signal.

Status: WARNING

```
HD-SD Error/Warning Status:??          ◀▶  
No error detected
```

```
HD-SD Error/Warning Status:??          ◀▶  
No active warning
```

```
HD-SD Error/Warning Status:??          ◀▶  
E(00n):■■■■■■■■■■■■■■■■■■■■■■■■■■■■■■
```

The display shows the error/warnings status. The “No error detector” shows that no errors have been detected. The “No active warning” shows that no errors are present now, but previously-detected errors are stored in the “Errorqueue”. In case of an error condition, the error number is shown in the display.

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

4.6.3 Menu Operation

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

```
HD-SD Sync Generator      ◀▶
<BLACK-BURST> TRI-LEVEL HD-SDI
```

```
HD-SD Sync Generator      ◀▶
<DL-SDI> ANALOG SDI-TSG4 ...
```

Note: Not all of the above options can be installed at a time. For the possible combinations, refer to figure 6. If one or more of the options is not installed, the keyword will be missing in the menu.

```
HD-SD Sync Generator      ◀▶
<SDI-TPG1> SDI-TPG2 SDI-TPG5 ...
```


```
HD-SD Sync Generator      ◀▶
<SDI-TPG2> AES-EBU <GENLOCK> ...
```

```
HD-SD Sync Generator      ◀▶
LTC PRESET <CONFIG> ...
```

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

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

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 E to store the setting
- Select ESC and press  to escape the menu or
- Select the next menu level, i.e. 2NDMNU
- Confirm the selection by pressing E

Note: SAVE does not appear until a parameter is changed. Unintended changes are canceled by selecting ESC and returning to the level above.

4.7 Detailed Description of Menus

4.7.1 Menu: BLACK-BURST generator

This is the menu for setting the parameters for the analog Black Burst outputs. The analog Black Burst outputs are named BB1 and BB2 at the connectors on the back of the instrument. These are the outputs from the Black Burst generator installed as part of the base MSG-5300 unit.

Setting of the BLACK-BURST generator:

```
MENU:BLACK-BURST, configure    ◀▶
SUBMNNU:<BB1>BB2
```

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

```
SUBMNNU:BLACK-BURST/BB1,select  ◀▶
2NDMNNU:<SYSTEM> TIMING SCH-PHASE
```

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

To change from NTSC to PAL, select SYSTEM

Operation:

```
2NDMNNU:../BB1/SYSTEM, select  ◀▶
SYSTEM:<PAL w/PAL ID> SAVE ESC
```

- 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 E 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
- PAL
- PAL w/PAL ID

Note: If the PAL Field 1 pulse in Line 7 is inserted, it is independent of the SCH (SubCarrier to Horizontal) phase setting. If the SCH phase has been adjusted, the Line 7 pulse will identify the field as if the phase had not been changed from the nominal setting. When the system "PAL w/PAL ID" is selected, a pulse indicating PAL Field 1 is included Line 7.

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.

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

Operation:

- Use the ◀ and ▶ buttons to select V, H or T.
- Then, use the ▲ and ▼ buttons to change the setting. Changes to the timing are instantaneous, i.e. any changes are reflected immediately in the output signal
- When the desired setting appears in the display, move the cursor to SAVE and press E 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 E 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 using the ▲ and ▼ buttons
- To exit the editor press E
- When the desired delay setting appears in the display, move the cursor to SAVE and press E
- 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 SCH phase of the BB1 output, select SCH-PHASE

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

Operation:

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

1. Use the ▲ and ▼ buttons to change the SCH.
2. Change to the SCH phase is instant, i.e. any change made in the display is reflected immediately in the output signal
3. When the desired setting appears in the display, move the cursor to SAVE and press EXECUTE
4. If no change is desired, move the cursor to ESC and press ▲ .

Leaving the function takes you back to the BLACK-BURST/BB1 submenu.

4.7.2 Menu: TRI-LEVEL sync generator

This is the menu for setting the parameters for the analog TRI-LEVEL SYNC outputs.

The analog TRI-LEVEL outputs are named TLS1, TLS2, TLS3, TLS4 when the units is mounted in the primary position and TLS5, TLS6, TLS7, TLS8 when the units is mounted in the additional / alternate position as mentioned in the table 6-1 on page 6-30

Setting of the TRI-LEVEL SYNC generator:

```
MENU:TRI-LEVEL, configure      ◀▶
SUBMNU:<TLS1> TLS2 TLS3 TLS4
```

- Use the ◀ and ▶ buttons to select TLS1
- Then press ▼ to enter the submenu for TLS1

```
SUBMNU:TRI-LEVEL/TLS1,select  ◀▶
2NDMNU:<SYSTEM> TIMING
```

The 2NDMNU allows changes to be made in the parameters for the TLS1 output.

To change from one HD TRI-LEVEL format to another, select FORMAT

```
2NDMNU:../TLS1/SYSTEM, select ◀▶
SYSTEM:<HD 1080I/25> SAVE ESC
```

Operation:

- Use the ▲ and ▼ buttons to find the format setting you want.
- When the desired system appears in the display, move the cursor to SAVE and press E to change the format setting.

```
2NDMNU:../TLS1/SYSTEM, select  E ◀▶
SYSTEM:HD 1080I/25 <SAVE> ESC
```

- If no change is desired, move the cursor to ESC and press ▲.

Leaving the function takes you back to the TRI-LEVEL/TLS1 submenu.

Analog TRI-LEVEL SYNC generator system options:

- 1080p/60
- 1080p/59.94
- 1080p/50
- 1080p/30
- 1080p/29.97
- 1080p/25
- 1080p/24
- 1080p/23.96
- 1080i/30

- 1080i/29.97
- 1080i/25
- 720p/60
- 720p/59.94
- 720p/50
- 720p/30
- 720p/29.97
- 720p/25
- 720p/24
- 720p/23.9

Note: When changing from one format to the other you must check the timing adjustment, as the timing in one format may NOT be valid in a different format. If the timing is not valid then it will be reset to +0,+0,+0.

To change the delay/advance timing for the TLS1 output, select TIMING.

```
2NDMNU:../TLS1/TIMING, edit delay ◀▶ E
F:<+1> H:+008 T: +00006.7 SAVE ESC
```

Operation:

- Use the ◀ and ▶ buttons to select F, 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 E to change the setting.

The timing can be adjusted by coarse or fine adjustment parameters. The coarsest adjustment is field (F) the finest is time (T), and line (H) is lines. 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 E 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 E
- When the desired delay setting appears in the display, move the cursor to SAVE and press E
- If no changes are desired, move the cursor to ESC and press ▲ .

Leaving the function takes you back to the TRI-LEVEL/TLS1 submenu.

4.7.3 Menu: GENLOCK

This is the menu for setting the genlock parameters, which are the common reference for the individual timing of each generator.

The standard genlock inputs are designated A and B, and they can be either configured to signals terminated with 75 Ω or configured as a high impedance loop-through.

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

Select: GENLOCK

```
MENU : GENLOCK, select input      ◀▶
<INTERNAL> SYS TIMING ESC
```

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

Operation:

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

Leaving the function takes you back to the GENLOCK menu.

The types of inputs available are:

- A xxxxxx: Input A terminated 75 Ω
- B xxxxxx: Input B terminated 75 Ω
- A-B xxxxxx: Input A and B looped through, high impedance
- Internal: The internal OCXO (Oven Controlled Crystal Oscillator) used as reference

Included with the selection is a description of the signal type used for the genlock. The xxxxxx reflects the genlock system selected in the SYStem submenu. For instance "A-B PAL Burst" indicates that loop-through A-B is configured for PAL burst lock.

Note: The "UNLOCKED" LED is ON when no correct genlock signal is found on the active genlock input.

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

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

Operation:

- Use the \uparrow and \downarrow 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 E to change the signal format.
- If no change is desired, move the cursor to ESC and press ▲ .

Leaving the function takes you back to the GENLOCK menu.

Note: Now the selected genlock system (A, B, Loop-through or Internal) is configured. If the input for this system has not been activated, select OK in the GENLOCK menu and press E

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

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

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

Genlock signals available for GPS:

- 525/59.94
- 626/50

Note: No Genlock system or Timing can be selected when Genlock Input is set to Internal or one of the continuous wave signals.

To change the genlock timing for the input selected, 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 the ▲ and ▼ buttons to select the value desired. Changes to the timing are instantaneous, i.e. any changes are reflected immediately in the output signal.

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

- When the desired delay setting appears in the display, move the cursor to SAVE and press E
- If no change is desired, move the cursor to ESC and press ▲ .

Leaving the function takes you back to the GENLOCK menu

Note: The genlock timing can only be changed when the genlock type is a signal containing line and field information. It is not possible to change timing when the reference is 5/10 MHz, Subcarrier frequency or internal.

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

```
MENU:GENLOCK, select input      ◀▶
<INTERNAL> SYS TIMING ESC

MENU:GENLOCK, select input      ◀▶
<GPS 625/50> SYS TIMING OK ESC
```

4.7.4 Menu: GPS Genlock and LTC output

This is the menu for setting the parameters for the GPS Genlock input and the LTC outputs.

Select: GENLOCK

Operation:

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

Leaving the function takes you back to the GENLOCK menu.

The LTC outputs are named LTC A and LTC B.

Settings of the LTC generator:

```
SUBMNU: LTC, select 13:55:09     ◀▶
LTC A <OFFSET> FORMAT TIME SYNC ESC
```

- Use the ▲ and ▼ buttons to switch between LTC A or B set-up, when marked as shown above. Notice that switching between LTC A and B only determines which generator will be setup, and does not yet alter the outputs.
- Select the parameter you wish to change, and then press ▼ to enter the parameter submenu for the selected LTC generator.

To set offset, select OFFSET:

```
2NDMNU: ../LTC A/OFFSET, edit delay ◀▶
OFFSET: <+0000100000.0>ns OK ESC
```

Each LTC generator can be individually timed, relative to absolute (GPS) time. The offset can be in the range of ± 500 ms, in steps of 6.7 ns.

Operation:

- Use the \blacktriangle and \blacktriangledown buttons to increase/decrease delay. Pressing OK will apply the delay.
- For faster adjustment, you can go into coarse mode. By pressing the E button, you can edit the individual digits. Select a digit by pressing 3 and 4, and edit the offset by pressing \blacktriangle . Notice, that the lowest digit cannot be selected. This is because the step-size is greater than what this digit represents.
- When done, move the cursor to OK and E or move to ESC and press \blacktriangle to cancel.

```
2NDMNU: ../LTC A/FORMAT, select ◀▶
FORMAT: <25.00 FPS> SYNCMODE OK ESC
```

Leaving the function takes you back to the LTC submenu.

To change between formats, select FORMAT Operation:

- Use the \blacktriangle and \blacktriangledown buttons to find the system setting you want.
- When the desired system appears in the display, press OK to confirm. Otherwise move the cursor to ESC
- and press \blacktriangle to cancel.

Leaving the function takes you back to the LTC submenu.

LTC options:

- 24 FPS
- 25 FPS
- 29.97 FPS Non-dropframe (in menu <29.97 NOND>)
- 29.97 FPS Dropframe
- 30 FPS

Note: When selecting 29.97 FPS modes, go to the main LTC menu, and select <SYNC> to reset the frame- counter.

To change how the 29.97 FPS LTC re-sync the frame-counter, select SYNCMODE

```
2NDMNU: ../LTC A/SYNCMODE, edit ◀▶
SYNCMODE:<AUTO> TIME: 00:00 OK ESC
```

When running at 29.97 FPS, the frame counter does not match real-time. One second at 29.97 FPS is a bit longer than a real-time second. Therefore, the LTC time lags behind real time after a while. To prevent this, the LTC generator can re-sync the frame-counter. The LTC generator can do this in three modes: NONE, CONFIRM mode and AUTO mode. When NONE is selected, the frame-counter never resets (you can reset the frame counter manually from the LTC main menu). In CONFIRM mode, the MSG-5300 will ask for confirmation at the time specified in the SYNCMODE menu. In AUTO mode, the frame counter re-syncs automatically, at the time specified in the SYNCMODE menu.

Operation:

- Use the ◀ and ▶ buttons to select mode, hours or minutes.
- Use the ◀ and ▶ buttons to find the mode you want.
- Use the ◀ and ▶ buttons to specify the time at which re-sync shall occur.
- When the desired system appears in the display, press OK to confirm. Otherwise move the cursor to ESC and press ▲ to cancel.

Leaving the function takes you back to the LTC submenu.

To change time and date settings, select TIME

```
2NDMNU: ../LTC A/TIME, select    ◀▶
2NDMNU: <TIMEZONE> DAYLIGHT ESC
```

In the TIME menu, the clock and date, as well as daylight saving parameters, can be setup.

Operation:

- Use the ◀ and ▶ buttons to select the time setting you want alter, then press ▼
- TIMEZONE and DAYLIGHT will open a new menu.

Leaving the function takes you back to the LTC submenu.

To change time zone, select TIMEZONE

```
2NDMNU: ../LTC A/TIMEZONE, edit    ◀▶
TIMEZONE: +01:00 OK ESC
```

In the TIMEZONE menu, you can set the time zone, by offsetting the UTC time in steps of 30 minutes.

Operation:

- Use the ◀ and ▶ buttons to select either hours or minutes.
- Use the ▲ and ▼ buttons to set the desired offset.
- When the desired UTC offset appears in the display, move the cursor to OK and press E

Leaving the function takes you back to the TIME submenu.

To change daylight saving options, select DAYLIGHT

```
2NDMNU: ../LTC A/DAYLIGHT, select    ◀▶
MODE:<AUTO>DST: on START END OK ESC
```

In the DAYLIGHT menu, the daylight savings settings are made. There are three different modes, to choose from. AUTO mode switches to, and back from daylight saving time automatically. This means the time advances one hour, at the chosen start date, and resets at the end date. The MSG-5300 will notice you of this change. In CONFIRM mode, the MSG-5300 does NOT change the time automatically, but will instead notice you and wait for confirmation to switch time. In OFF mode, no daylight saving changes will be made. You can also immediately change the state, by setting DST (daylight saving time) on or off in the menu.

Operation:

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

- Use the ▲ and ▼ buttons to switch between modes, when marked.
- Use the ▲ and ▼ buttons to switch daylight saving on/off, when marked.
- Use the ▼ button on START or END, to setup daylight saving start and end date.
- Press E on OK to confirm settings

Leaving the function takes you back to the TIME submenu.

To change daylight savings start or end date, select START or END

```
3RDMNU:../LTC A/DAYLIGHT/START, edit ◀▶
START DATE:<03>29 HOUR: 02 OK ESC
```

You can set month, day and hour when the switching should occur.

Operation:

- Use the ◀ and ▶ buttons to select month, day or hour.
- Use the ▲ and ▼ buttons to set the desired month/date/time.
- When the desired month/date/time appears in the display, move the cursor to OK and press E to store or press ▲ on ESC to cancel.

Leaving the function takes you back to the DAYLIGHT submenu.

4.7.5 Menu: NETWORK

This is the menu for setting the parameters for the MSG-OPT-8643 Ethernet module.

Ethernet settings:

```
SUBMNU:NETWORK, select ◀▶
<ETHERNET> CONFIG ESC
```

- Use the ◀ and ▶ buttons to select ETHERNET.
- Then press ▼ to enter the ETHERNET submenu.

```
2NDMNU:../NETWORK/ETHERNET ◀▶
<DHCP> IP ADDR SUBNET MASK GATEWAY
```

The following options are available in the ETHERNET menu:

- DHCP - Enable or disable the DHCP client.
- IP ADDR - Manually configure the IP address.
- SUBNET MASK - Manually configure the subnet mask.
- GATEWAY - Manually configure the gateway.
- MAC ADDR - View the PT8643 MAC address.
- NETFINDER - View the NetFinder name.
- ESC - Return to the NETWORK menu.

The DHCP client is enabled by default. When DHCP is enabled, the IP ADDR, SUBNET MASK and GATEWAY menus are read only.

Leaving the function using ESC takes you back to the NETWORK menu.

Disable the DHCP client (Set a static IP address):

```
2NDMNU: .. /NETWORK/ETHERNET      ◀ ▶
DHCP: <On> Off ESC
```

Operation:

- In the ETHERNET submenu, use the ◀ and ▶ buttons to select DHCP and press E to enter the DHCP submenu.
- Use the ◀ and ▶ buttons to select OFF and press E to disable DHCP.
 - When selecting OFF you will automatically enter the IP ADDR submenu.
 - When selecting ON you will automatically return to the ETHERNET submenu.
- If no change is desired, move the cursor to ESC and press ▲.

Leaving the function takes you back to the ETHERNET submenu.

IP Address configuration:

```
3RDMNU: .. /IP ADDR, modify      ◀ ▶
000.000.000.001 OK <ESC>
```

- If not already in the IP ADDR submenu use the ◀ and ▶ buttons in the ETHERNET submenu to select IP ADDR and press E.
- Use the ◀ and ▶ buttons to move the cursor between the fields.
- Use the ▲ and ▼ buttons to change the IP address.
- When the desired IP address has been entered, move the cursor to OK and press E to save the changes.
- If no change is desired, move the cursor to ESC and press ▲.

Leaving the function takes you back to the ETHERNET submenu.

Subnet mask and gateway configuration:

The subnet mask and gateway is configured the same way as the IP address using the SUBNET MASK and GATEWAY menus.

View MAC address:

```
2NDMNU: .. /NETWORK/ETHERNET      ◀ ▶
MAC ADDR: 00:0b:3c:24:ae:5c <ESC>
```

Operation:

- In the ETHERNET submenu use the ◀ and ▶ buttons to select MAC ADDR. Then press the ▼ button to enter the MAC address submenu.

- The MAC address submenu will show the MAC (Media Access Control) address assigned to the unit. This address is globally unique and the first part of the address will always start with 00:0b:3c.
- Use the ↕ buttons to exit the menu.

Leaving the function takes you back to the ETHERNET submenu.

View NetFinder name:

```
2NDMNU:.. /NETWORK/ETHERNET      ◀▶
Unnamed. <ESC>
```

Operation:

- In the ETHERNET sub menu use the ◀ and ▶ buttons to select NETFINDER and press the ▼ button to enter the NetFinder submenu.
 - The NetFinder submenu will show the user assigned name of the MSG-5300.
 - The NetFinder name can be up to 32 characters long.
 - The Netfinder name is on the network used by the PC software MSG-5300 to easily distinguish multiple MSG-5300s from each other.
 - The NetFinder name cannot be changed locally. It must be changed from the PC Software MSG-5300.
 - The NetFinder name is not visible if an Ethernet link has not been established.
 - Please see section 10 for further information about the NetFinder protocol and MSG-5300.
- Use the ↕ buttons to exit the menu.

Leaving the function takes you back to the ETHERNET submenu.

Network configuration:

- In the NETWORK menu, use the ◀ and ▶ buttons to select CONFIG.

```
SUBMNU:NETWORK, select          ◀▶
ETHERNET <CONFIG> ESC
```

- Then press the ▼ button to enter the CONFIG submenu.

```
2NDMNU:.. /NETWORK/CONFIG      ◀▶
<TELNET> PORT RESET PASSWORD ESC
```

The following options are available in the CONFIG menu:

- TELNET - Enable or disable the Telnet Server.
- PORT - View the Telnet port number.
- RESET PASSWORD - Reset the network user name and password to default.

- ESC - Return to the NETWORK menu.

Leaving the function using ESC takes you back to the NETWORK menu.

The Telnet server is used for remote control of the MSG-5300 over the network.

The Telnet Server is enabled by default.

Disable the Telnet server:

```
2NDMNU:.. /NETWORK/CONFIG ◀ ▶
TELNET: <On> Off ESC
```

Operation:

- Use the ◀ and ▶ buttons to select TELNET and press the ▼ button to enter the TELNET submenu.
- Use the ◀ and ▶ buttons to select OFF and press E to disable the Telnet server.
 - The Telnet Enable/Disable function can only be controlled locally.
- If no change is desired, move the cursor to ESC and press ▲.

Leaving the function takes you back to the CONFIG submenu.

View the Telnet port number:

```
2NDMNU:.. /NETWORK/CONFIG ◀ ▶
PORT: 23 <ESC>
```

Operation:

- In the CONFIG submenu use the ◀ and ▶ buttons to select PORT and press the ▼ button to enter the PORT submenu.
 - The Telnet server is as default configured to listen on port 23.
 - The Telnet port number cannot be changed locally. It must be changed from the MSG-5300PC Software.
 - Please see section 10 for further information about the NetFinder protocol and MSG-5300.
- If no change is desired, move the cursor to ESC and press ▲.

Leaving the function takes you back to the CONFIG submenu.

Reset the user name and password to default:

```
2NDMNU:.. /NETWORK/CONFIG ◀ ▶
RESET PASSWORD <OK> ESC
```


Operation:

- In the CONFIG submenu use the ◀ and ▶ buttons to select RESET PASSWORD and press the ▼ button to enter the RESET PASSWORD submenu.
- To reset the user name and password to default use the ◀ and ▶ buttons to select OK and press E.
 - The user name will be reset to **Admin** and the password will be reset to **2730**.
 - The user name and password is case sensitive.
 - The user name and password can each have a length of 16 characters.
 - The user name and password can be configured from the PC software MSG-5300.
 - Please see section 10 for further information about the NetFinder protocol and MSG-5300.
- If no change is desired, move the cursor to ESC and press ▲.

Leaving the function takes you back to the CONFIG submenu.

4.7.6 Menu: PRESET

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

To recall the Preset, select RECALL

```
SUBMNU:PRESET/RECALL select      ◀▶
RECALL (PRESET 1) 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 E.
- If no change is desired, move the cursor to ESC and press ▲.

Leaving the function takes you back to the PRESET menu, or if a preset is recalled the Preset Status display will be activated

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

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

When using the PRESET button:

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

To store the Preset, select STORE

```
SUBMNU:PRESET/STORE, select      ◀▶
STORE1:<PRESET1> OK ESC
```

Operation:

- Use the ▲ and ▼ buttons to select the preset number to store.
- When the desired preset appears in the display, move the cursor to OK and press E.
- 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:PRESET/NAME, edit name    ◀▶
NAME1:<PRESET1> 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 E to open the text editor.
- Use the ◀ button to delete characters while backspacing.
- Scroll through the characters the ◀ and ▶ buttons. The characters being edited will flash during the editing process.
- When the desired character appears, use the ◀ button to move to the next character to be inserted.
- To exit the editor, press E.
- To store the programmed line and status, move the cursor to SAVE and press E
- If no change is desired, move the cursor to ESC and press ▲.

Leaving the function takes you back to the PRESET menu.

```
MENU:CONFIG, select function      ◀▶
SUBMNU:<DATE-TIME> LOCK AUTO-ESC ...
```

```
MENU:CONFIG, select function      ◀▶
SUBMNU:<LCD-CONTRAST> DOWNLOAD ...
```

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

4.7.7 Menu: CONFIG

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

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

To change the lockout function for the keyboard, select LOCK

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

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

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

- Select NORMAL for partial keyboard lockout. In this mode, the **C.BAR**, **M.BURST**, **WINDOW/FLAT**, **SPECIAL**, **LINEARITY**, **PATTERN**, **PRESET**, and the **OUTPUT** buttons are enabled.
- The **PRESET** button operates as a shortcut key to recall presets; stored presets can be recalled but not changed.
- The **OUTPUT** button operates as a short-cut key to the signal generators. The button toggles between all the test signal generators, if more than one is installed.
- **Note:** If the setup has no test signal generator, the **OUTPUT** button has no function.
- **Note:** A padlock will appear in the top right corner of the display of a locked function.

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

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

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

To lock the download function, select DOWNLOAD

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

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

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

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

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

Note: The diagnostic program is non-destructive of generator setting. When the diagnostic program is running, the output signals may be momentarily distorted.

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

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

Auto ESC options:

- Off
- On

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

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

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

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

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

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

The DOWNLOAD function is used when two generators are directly connected by an RS232 interface cable. The cable must be connected to the remote connector on both generators.

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

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

When the desired download selection is displayed select OK and press E

SPG download options:

- Preset #1
- Preset #2
- Preset #3
- Preset #4
- Preset #5
- Preset #6
- All Presets

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

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

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

CAUTION: Selecting ESC during the downloading process will not reset to the values in use before the downloading process was started. ESC will reset the programming of the selected preset number or the entire instrument to its original factory programming!

To view the RS232 remote communication settings, select RS232.

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

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

- The RS232 settings cannot be changed.
- Use the ◀ and ▶ buttons to select the parameter to be accessed.
- Then press the ▼ button to enter the submenu for parameter setting in the RS232 interface.

4.7.8 Menu: HD & SD-SDI, Serial Digital Test Signal Generator

This is the menu for setting the parameters for the MSG-OPT-8612 HD-SD Serial Digital Signal Generator output.

```
MENU:HD-SDI, configure          ◀▶
SUBMNU:<HD1> HD2 HD3 HD4
```

```
SUBMNU:HD-SDI/HD1, Select      ◀▶
2NDMNU:<PATTERN> SYSTEM TIMING ...
```

```
SUBMNU:HD-SDI/HD1, Select      ◀▶
2NDMNU:<AUDIO> TEXT ...
```

- Use the ◀ and ▶ buttons to select the parameter to be changed
- Then press the ▼ button to enter the submenu for the Serial Digital Test Pattern generator

```
2NDMNU:../HD1/PATTERN, select  ◀▶
<COLORBAR> MODIFY SAVE ESC
```

```
2NDMNU:../MODIFY, COLORBAR     ◀▶
MODIFY:<100/0/75/0> SAVE ESCt'
```

To change the output test signal pattern, select PATTERN.

To change the LEVELS of the test signal pattern, select levels.

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 E to store the setting
- Move the cursor to that position, to enable access to a menu below. In this menu the default test pattern can be modified
- If no changes are desired, move the cursor to ESC and press ▲.

Leaving the function takes you back to the HD-SDI/HD1 select submenu.

It is possible to enable user text in the pattern. The user text can be entered for the standard patterns, e.g. color bar, crosshatch, etc.

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

```
2NDMNU: ../HD1/TEXT, select  ◀▶
2NDMNU:<EDIT> SCALE POS MOVEMENT ...
```

```
2NDMNU: ../HD1/TEXT, select  ◀▶
2NDMNU:<TEXT COLOR> BACKGROUND COLOR ...
```

Operation:

- Use the ◀ and ▶ buttons to select the item to change.
- Then press the ▲ button to enter the 2nd menu to change the selected item. To change the output text inserted in the test pattern, select EDIT.

```
2NDMNU:../TEXT/EDIT, select  ◀▶
LINE1:<TEXT1> OFF SAVE ESC
```

Operation:

- Use the ▲ and ▼ buttons to select one of the 3 text lines to edit.
- To open the text line for editing, place cursor on text field and press E
- Use the ◀ button to delete characters while backspacing.
- Scroll through the characters with the ▲ and ▶ buttons. The characters being edited will flash during the editing process.
- When the desired character appears, use the ▶ button to move to the next character to be inserted.

- To exit the editor press E
- Move the cursor to the status field and use ▲ and ▼ to set line On or Off
- To store the programmed line and status, move the cursor to SAVE and press E
- Repeat, until the needed lines have been programmed.
- If no change is desired, move the cursor to ESC and press ▲ .

Leaving the function takes you back to the ../HD1/TEXT, select submenu.

Note: Selecting OFF does not clear the text string.

Text insertion options:

- Up to 3 text lines with maximum 16 characters per line. Programmed text can be enabled or disabled
- Characters available: all characters A-Z in upper case and in lower case, 0-9,-, ,space, and regional characters

Note: To download text strings with regional characters, the RS232 interface has to be configured for 8 data bits.

To change the position of text, select POS

```
2NDMNU:../TEXT/POS, select    ◀▶
X:< +1> V +2 SAVE ESC
```

Operation:

- Use the ▲ and ▼ buttons to change the position of text.
- When the desired position is reached, move the cursor to SAVE and press E.
- If no change is desired, move the cursor to ESC and press ▲ .

Leaving the function takes you back to the ../HD1/TEXT, select 2ndmenu.

Movement options:

- VERTICAL – text moves from top to bottom.
- HORIZONTAL – text moves from left to right.
- BOTH – text moves from the top left corner to the bottom right corner of the screen.
- OFF – no moving text.

Operation:

- Use the ▲ and ▼ buttons to select movement to insert.
- When the desired mode and text appears, move the cursor to SAVE and press E
- If no change is desired, move the cursor to ESC and press ▲ .

Leaving the function takes you back to the HD1/TEXT 2ndmenu

To change from one system to another, select **SYSTEM**.

```
2NDMNU:../HD1/SYSTEM,select  ◀▶
<HD 720P/25> 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 E 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 HD-SDI/HD1,select submenu.

HD-SD SDI signal system options:

- 1080p/60
- 1080p/59.94
- 1080p/50
- 1080p/30
- 1080p/29.97
- 1080p/25
- 1080p/24
- 1080p/23.96
- 1080i/30
- 1080i/29.97
- 1080i/25
- 720p/60
- 720p/59.94
- 720p/50
- 720p/30
- 720p/29.97
- 720p/25
- 720p/24
- 720p/23.9

Setting the embedded audio generator, select **AUDIO**

```
SUBMNU:../HD1/AUDIO, select  ◀▶
2NDMNU:<SIGNAL> LEVEL ...
```

```
SUBMNU:../HD1/AUDIO, select  ◀▶
2NDMNU:<click offset> ...
```

- Use the ◀ and ▶ buttons to select the parameter to change

- Then press the \downarrow button to enter the selected 2nd menu.

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

```
2NDMNU:../AUDIO/SIGNAL,select  ◀▶
SIGNAL:<Off> SAVE ESC
```

Operation:

- Use the \uparrow and \downarrow buttons to change the audio signal and audio format. Change of the audio signal/format is instantaneous, i.e. that any change is reflected immediately in the output signal
- When the desired audio signal/format appears in the display, move the cursor to SAVE and press E to change the setting. If no changes are desired, move the cursor to ESC and press \uparrow .

Leaving the function takes you back to the ../HD1/AUDIO,select 2ndmenu.

The following signals are available as embedded audio from the Dual HD-SD SDI Test Signal Generators:

- Off
- Silence
- Sine
- Click

To change the level of the audio signal embedded on the DL-signal.

```
2NDMNU:S../AUDIO/LEVEL, select  ◀▶
LEVEL:<-12dBFS> SAVE ESC
```

Operation:

- Use the \uparrow and \downarrow buttons to change the embedded audio signal level.
- Changes of the embedded audio signal level are instantaneous, i.e. any change is reflected immediately in the output signal.
- When the desired embedded audio signal level appears in the display, move the cursor to SAVE and press E to change the setting.
- If no change is desired, move the cursor to ESC and press \uparrow .

Leaving the function takes you back to the ../HD1/AUDIO,select 2ndmenu

SDI embedded audio level options:

- 0 dBFS
- -6 dBFS
- -12 dBFS
- -18 dBFS
- -24 dBFS

To change the timing of the CLICK in the LIP sync signal:

```
2NDMNU:../HD1/AUDIO, select      ◀▶
2NDMNU:<CLICK OFFSET> ...
```

```
2NDMNU:../AUDIO CLICK OFFSET, select ◀▶E
OFFSET: +1ns <SAVE> ESC
```

Operation:

- Use the ▲ and ▼ buttons to select CLICK OFFSET. Change of OFFSET CLICK is instantaneous, i.e. any change is reflected immediately in the output signal.
- When the desired group appears in the display, move the cursor to SAVE and press E. If no change is desired, move the cursor to ESC and press ▲.

Leaving the function takes you back to the ../HD1/AUDIO, select 2ndmenu.

To change the delay/advance timing for the HD-SIGNAL output, select TIMING.

Operation:

```
2NDMNU:../HD1/TIMING, edit delay ◀▶
F:< 0> H:000 T:-00123.4 SAVE ESC
```

- Use the ◀ and ▶ buttons to select F, 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 E to change the setting.

The timing can be adjusted by coarse or fine adjustment parameters. The coarsest adjustment is field (F), the finest is time (T), and line (H) is in between. The T value is in nanoseconds, with a resolution of approximately 6.7 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 E 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 6.7 ns.
- Positions are selected by using the ◀ and ▶ buttons.
- To exit the editor, press E.
- When the desired delay setting appears in the display, move the cursor to SAVE and press E
- If no changes are desired, move the cursor to ESC and press ▲.

Leaving the function takes you back to the HD-SDI/HD1 submenu.

4.7.9 Menu: AES-EBU, Dual AES/EBU Digital Audio Generator

This is the menu for setting the parameters the MSG-OPT-8635 Dual AES/EBU Digital Audio Generator.

This generator has two independent AES/EBU outputs which supply test tones or silence. Furthermore, this option has a separate Word-clock output.

Setting the AES/EBU Digital Audio Generator

```
MENU:AES-EBU, configure ◀▶
SUBMNU:<AES-EBU1> <AES-EBU2> ...
```

```
MENU:AES-EBU1, configure output ◀▶
2NDMNU:<SIGNAL> LEVEL TIMING ...
```

Use the ◀ and ▶ buttons to select the parameter to be changed

Then press ↵ button to enter the 2nd menu for the AES/EBU audio generator

To select the audio signal output, select SIGNAL

```
2NDMNU:../AES-EBUx/SIGNAL select ◀▶
SIGNAL:<Stereo 800 Hz> SAVE ESC
```

Operation:

- Use the ▲ and ▼ buttons to change the audio signal selection
- Changes to the audio signal are instantaneous, i.e. 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 E 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-EBUx menu.

Signal options:

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

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

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

```
2NDMNU:../AES-EBUx/LEVEL select ◀▶
LEVEL:<Silence> SAVE ESC
```

Operation:

- Use the ▲ and ▼ buttons to change the audio signal selection.
- Changes to the audio signal are instantaneous, i.e. 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 E 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-EBUx menu.

AES/EBU level options:

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

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

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

```
2NDMNU:../AES-EBUx/TIMING, select  ◀▶
TIMING:<PAL> SAVE ESC
```

Operation:

- Use the ▲ and ▼ buttons to change the audio signal selection.
- Changes to the audio signal are instantaneous, i.e. 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 E to change the setting.
- If no changes are desired, move the cursor to ESC and press ▲.

Leaving the function takes you back to the AES-EBU menu.

AES/EBU audio timing options:

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

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

```
MENU:SDI-TSGx, configure      ◀▶
SUBMNU:<PATTERN> SYSTEM EDH ...
```

```
MENU:SDI-TPGX, configure      ◀▶
SUBMNU:<EMB.AUDIO> TIMING ...
```

4.8 Reset

4.8.1 Factory Reset

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

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

To execute the Factory Reset:

Turn ON the generator while simultaneously pressing the ◀ and ▶ buttons.

After the factory reset is done, a confirming message is shown on the display for 1.5 seconds, and then the instrument proceeds to the normal startup. The following parameters are reset to factory values:

<i>Parameter:</i>	<i>Factory value:</i>
AUTO ESCAPE	On
PANELLOCK	Off
NORMALLOCK	Off
DIAGNOSE LOCK	Off
RS232-INTERFACE	9600, 8, 1, NONE, XON/XOFF
LOCAL LOCK-OUT	Off (RS232 only)
CONTRAST	17 (middle contrast)

4.8.2 Menu: CONFIG/DIAGNOSE

The diagnose submenu is used to perform internal tests of both the basic instrument and the optional installed modules. The output signals will be undisturbed during the standard diagnose routines.

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

The tests that will appear in the SELECT menu are:

- Main
- Options
- Display
- Keyboard
- Memory
- Configuration
- Errorqueue

Use the ◀ and ▶ buttons to select the diagnosis to be performed. Then press the E button to enter the submenu.

DIAGNOSE/Main

The MAIN test verifies that the base components of the MSG-5300 are functioning correctly. Optional components are tested separately.

The tested functional sections include:

- Main board
- Black Burst output 1 and 2
- Oscillator board.

All these tests are performed in a sequence.

Description: Main Board test

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

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

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

Description: Black Burst test

Note: The Black Burst unit tested is the two standard included Black Burst generators.

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

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

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

Description: Oscillator Board test

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

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

To perform the complete main test once more, press the E button.

To return to the previous menu level, press the ▲ button.

DIAGNOSE/Options

The OPTIONS test verifies that the optional modules installed in the MSG-5300 are functioning correctly. Testing of the first installed option is started automatically when entering the menu. To continue with the next option, press the E button. When all options have been tested use the ▲ button to return to the previous menu.

Description:

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

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

To continue testing on the next option, press the E button. To cancel further testing, press the ▲ button.

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

During the test the display indicates which option is being tested. The syntax for the display is the following:

- OPTxxxx: indicates the type number for the option. For example, OPT8616 indicates that the MSG-OPT-8616 GPS Genlock and LTC Generator is being tested.
- yyy: indicates that the installed option is a special version option designed according to special requirements.
- [nnnn]: indicates an optional parameter. This parameter identifies the output connector(s) the option is using. This parameter is required when several identical options are installed.

When the last of the detected options has been tested:

- To repeat the test of all the option(s), press the E button.
- To return to the previous menu level, press the ▲ button.

Note: Options which were not detected during power up will not be tested.

DIAGNOSE/Display

```
2NDMNU:../DIAGNOSE/Display ▲  
abcdefghijklmnopqrstuvwxyz-1234567890+,. .
```

```
ABCDEFGHIJKLMNPOQRSTUVWXYZ_!#$%&/0=?;:  
abcdefghijklmnopqrstuvwxyz-1234567890+,. .
```

Description:

This test will test the graphic display. During this test the above two displays will alternate with a frequency of approximately 1.6 seconds. The test is a visible test only. To return to the previous menu level, press the ▲ button.

DIAGNOSE/Keyboard

```
2NDMNU:../DIAGNOSE/Keyboard ▲  
Press button:   xxxxxx >>>>>
```

Description:

The keyboard test is testing the response of the buttons on the front of the instrument. To perform the test press the button indicated.

The xxxxx will be replaced by a button name in the following sequence: LEFT, DOWN, RIGHT, EXECUTE, PRESET, OUTPUT, C.BAR, WINDOW, SPECIAL, LINEARITY and PATTERN.

The requested button has to be pressed within a given time. The arrows to the left in the display indicate the time to press the button, i.e. the button should be pressed before five arrows are visible.

The display will change as soon as the correct button has been pressed or a time-out occurs.

To restart the keyboard test press the E button. If a time-out occurs the key will be marked as FAIL. To return to the previous menu level, press the ▲ button.

Note: The ▲ is NOT tested in this sequence. It is tested when it is used to exit the menu.

DIAGNOSE/Memory

```
2NDMNU:../DIAGNOSE/Memory ▲  
Testing memory: ROM >>>>>
```

Description:

There are two types of memory to test:

- ROM
- RAM

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

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

When both memory types have been tested, a message stating the result of the complete test will appear.

The RAM check is done by writing and reading the sequence Ox55 and OxAA to/from each memory position in the RAM. Since this operation involves moving the content out of the RAM, there is a potential risk of losing that data if the apparatus is switched off during the test. A built-in safety procedure will detect such an error during power-up and will report a general failure in the RAM. If this happens, a factory reset will be performed.

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

DIAGNOSE/Configuration

The Diagnose Configuration displays the units detected during power up. The identification may include type number (PT5300), Serial Number (KUxxxxxx), and when available the software version.

Description: Main board

The main board is identified by the type number of the instrument (MSG-5300) and the serial number for the basic instrument. The software version is the software version of the master controller.

```
2NDMNU:../DIAGNOSE/Configuration ◀▶
(MAIN):PT5300, KUxxxxxxxx, 01.9 ESC
```

Description: Oscillator

The oscillator board is identified by the serial number of the basic instrument and the software version of the oscillator board.

```
2NDMNU:../DIAGNOSE/Configuration ◀▶
(OSC):--,KUxxxxxxxx, 02.1 ESC
```

Description: Black Burst

BB12 Indicates the two standard installed Black Burst generators. These two Black Burst generators are identified by the serial number of the basic instrument and the software version of the Black Burst generators

BB12 Indicates as well that the Black Burst generator uses output 1 and 2.

```
2NDMNU:../DIAGNOSE/Configuration ◀▶
(BB1):--,KUxxxxxxxx, 02.1 ESC
```

DIAGNOSE/ErrorQueue

```
2NDMNU:../DIAGNOSE/ErrorQueue (1) ◀▶
E(006):Level detector at BB3 ESC
```

Description:

The errorqueue displays the history of detected internal errors including the hardware level detector circuits which surveys the output signals. The errorqueue stores the last detected five errors. The errors are numbered from 1 to 5 and may be scrolled by pressing the ▲ or the ▼ button. The detected error is identified by an error number and a describing text.

```
2NDMNU:../DIAGNOSE/ErrorQueue ◀▶
Reset ErrorQueue? OK <ESC>
```

To leave the errorqueue unchanged, select ESC and press the ▲ button.

To reset the errorqueue, press the E button, then select OK and press the E button. The “WARNING” LED will be switched OFF.

Note: If any error is active, the error will be detected immediately again after reset and the “WARNING” LED will be switched ON again. The display is switched to the error status display.

Errorqueue is reset at power off/on

Status
BLACK BURST <> TRI-LEVEL <> HD-SDI TPG <> AES-EBU <> GENLOCK <> LTC <> NETWORK <> PRESET <> CONFIG

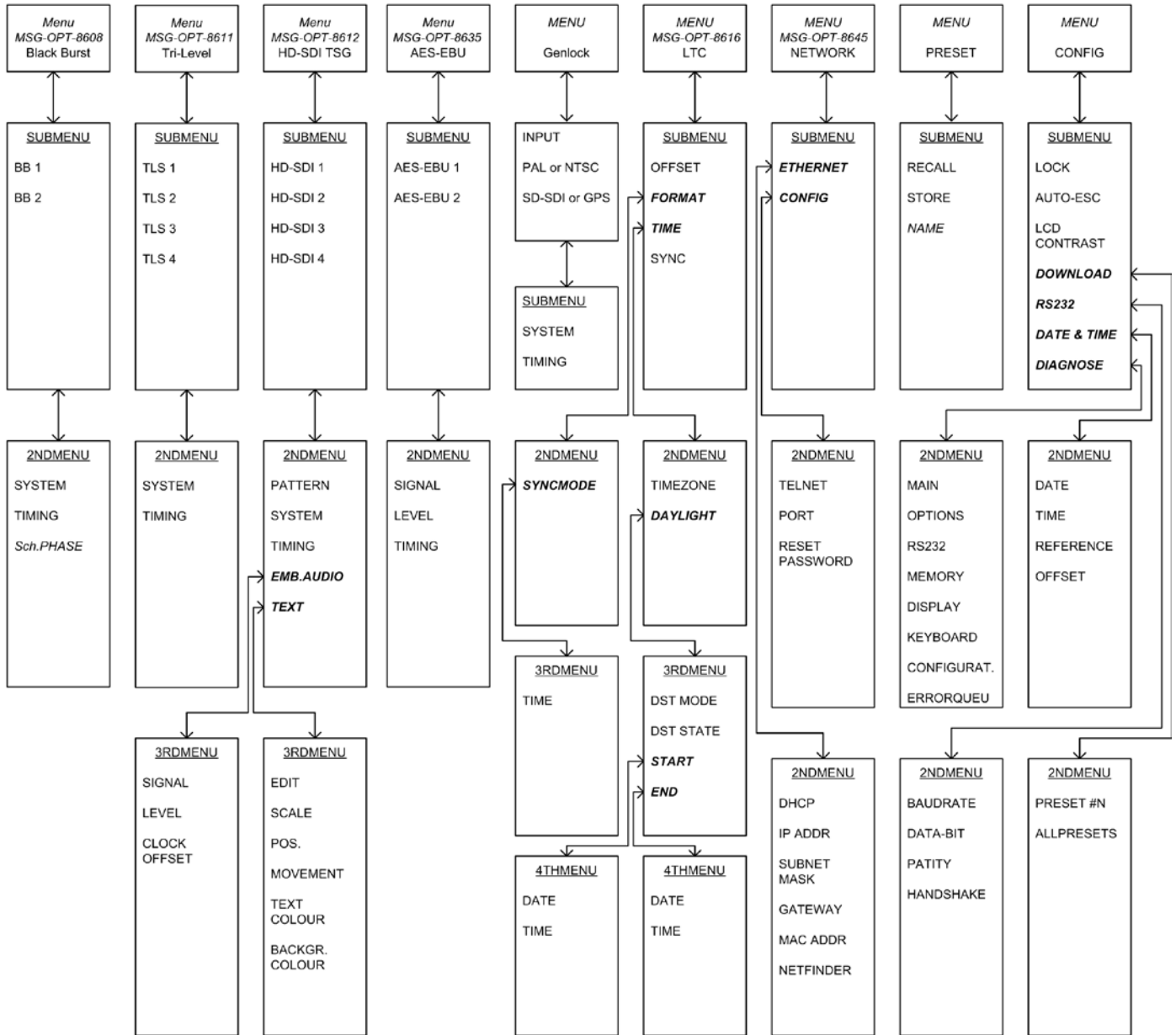


Figure 7: MSG-5300 Menu tree

5 Remote Interface

5.1 General Information

Two remote interfaces are standard in the instrument:

- A serial remote gives control over all the functions of the MSG-5300. The serial remote operates by use of an RS232 serial port.
- A Telnet interface (Ethernet) which gives control over all the functions of the MSG-5300. When the Telnet interface is operating the RS232 serial port is automatically disconnected.

5.2 Serial Remote

The serial remote allows for control of virtually all functions in the generator as well as reading of instrument settings. The serial remote operates electrically as an RS232C communication port.

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

RS232 Settings

Baud rate: 9600 Baud
Data bits: 8
Stop bits: 1
Parity: None
Handshake: XON/XOFF

The RS232 settings cannot be changed.

Buffers

Receive buffer: 64 bytes
Transmit buffer: 32 bytes

Serial Port:

The 9-pin RS232 connector consists of:

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

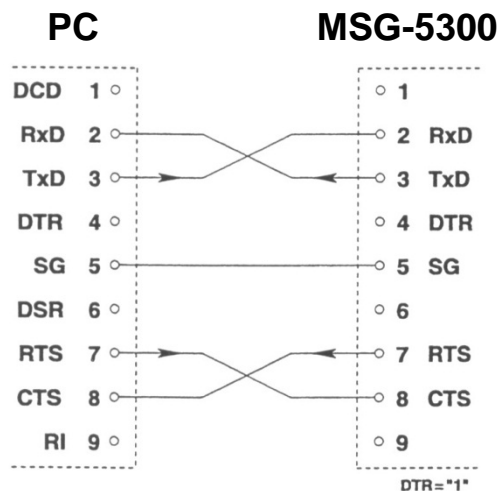


Figure 8: Configuration of cable between PC and MSG-5300

5.3 Telnet Remote – User Name and Password

The Telnet remote allows for control of virtually all functions in the generator with the limitation that presets cannot be up or downloaded using Telnet. When you connect to the MSG-5300 using a standard Telnet client you will be asked for a user name and a password. The user name and password is case sensitive.

- **User name – default:** Admin
- **Password – default:** 2730

5.4 General Description of the Interface Syntax

The MSG-5300 communication protocol complies with the:

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

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

To use the 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.

5.4.1 General Information

The remote system is organized in a tree structure. The structure defines sub-systems. In order to access command lower in the tree or in different branches the entire command string should be used. Indentation is used to indicate the root level and the branches. The highest level 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. Several parameters are separated by a comma.

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

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

5.4.2 Syntax Elements

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

5.4.3 Command Syntax

A command consists of a “header” and one or several “parameters”. Header and parameters are separated by space. A header may consist of several keywords.

5.4.4 Syntax of Program Messages

A command or query is called a program message unit. Such a program message unit consists of a header, or a header separated by a space from one or more parameters. The program header separator between the header and the first parameter must be at least one “whitespace” 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 sent within a single program message. Program message units are separated by a semicolon (;). A message of one or more units is terminated by a program message terminator.

The program message terminator must be the following code:

- LF <line feed> (dec.10) code

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

Basically there are two types of program headers:

- Compound headers - Commands have a compound header consisting of one 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 standardized are called common commands. Their headers always start with an asterisk (*) character

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

5.4.5 Long and Short Form

Program messages may be sent in either long or short form

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

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

Note: Upper and lower case, as used in syntax specification, is only a notation habit to facilitate distinction between long and short form. The generator itself does not differentiate between upper and lower case characters. In program messages, either the long or short form may be used in any mix of upper or lower case characters. There is no semantic difference between upper and lower case in program messages.

5.4.6 Syntax of Response Messages

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

Response message units are separated by a semicolon (;) and are terminated by a response message terminator. The instrument will always send the response data in short form and in capitals. Headers are not sent in the response messages, only parameters.

6 Command reference

6.1 Reference Documents

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

6.2 Configuration and Syntax

Control characters:

<i>Control</i>	<i>Function</i>
<Ctrl L> 0x0C	Local lockout switchover. Local lockout is always disabled after
0x0A	Terminator, i.e. newline <LF>

6.3 Commands Summary

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

6.3.1 Mandated Commands

Command	Parameter	Status after *RST	Remarks
*CLS	-		Clear Status Command
*ESE			
*ESE?			
*ESR?			
*IDN?			Device Identification Query
*OPC			
*OPC?			
*RST			Reset Command
*SRE			
*SRE?			
*STB?			
*TST?			
*WAI			

6.3.2 Instrument Commands

DIAGnostic subsystem

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

DISPlay Subsystem

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

INPut Subsystem

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

OUTPut Subsystem

Command	Parameter	Status after *RST	Remarks
:BB1			
:SYSTem	PAL / PAL ID / NTSC _	PAL	
:DElay	<Field>,<Line>,<HTime>	0,0,0	
:SCHPhase	<179 to +180>	0	
:VERSion?	-	-	<query only>
:BB1?	-	-	<query only>
:BB2			
:SYSTem	PAL / PAL ID / NTSC	PAL	
:DElay	<Field>,<Line>,<HTime>	0,0,0	
:SCHPhase	<179 to +180>	0	
:VERSion?	-	-	<query only>
:BB2?	-	-	<query only>
AES/EBU	AUDIO GENERATOR		
:AUDio1			

:SIGNAL	S800Hz / S1kHz / SEBU1kHz / SBBc1kHz / MEBU1kHz / M1kHz / DUAL / F48kHz / WORDclock	S800Hz	
:LEVEL	SILence / DB0FS / DB9FS / DB12FS / DB15FS / DB16FS / DB18FS / DB20FS	SILence	
:TIMING	PAL / NTSC1 / NTSC2 / NTSC3 / NTSC4 / NTSC5	PAL	
:VERSION?	-	-	<query only>
:AUDIO1?	-	-	<query only>
:AUDIO2			
:SIGNAL	S800Hz / S1kHz / SEBU1kHz / SBBc1kHz / MEBU1kHz / M1kHz / DUAL / F48kHz / WORDclock	S800Hz	
:LEVEL	SILence / DB0FS / DB9FS / DB12FS / DB15FS / DB16FS / DB18FS / DB20FS	SILence	
:TIMING	PAL / NTSC1 / NTSC2 / NTSC3 / NTSC4 / NTSC5	PAL	
:VERSION?	-	-	<query only>
:AUDIO2?	-	-	<query only>
:TLG1-8			
:SYSTEM	OFF / HD1080P60 / HD1080P5994 / HD1080P50 /		
:DELAY	<Field>, <Line>, <HTime>		
:VERSION?	-	-	<query only>
:HD1-8			
:PATTERN	BLACK / SDICheck / PLUGe / LRAMP / CLAPperbrd / COLORbar / COMBination / WINdow / CROSShatch / WHITe		
:MOD	HH / HS / SS, A105 / A100 / A95 / A90 / A85 / A80 / A75 / A70 / A65 / A60 / A55 / A50 / A45 / A40 / A35 / A30 / A25 / A20 / A15 / A10 / A5 / A0 / AM5		Applies only for certain patterns
:SYSTEM	OFF / HD1080I30 / HD1080I2997 / HD1080I25 / HD1080P30 / HD1080P2997 / HD1080P25 / HD1080P24 / HD1080P2398 / HD720P60 / HD720P5994 / HD720P50 / HD720P30 / HD720P2997 / HD720P25 / HD720P24 / HD720P2398 / SD525 / SD625		
:EMBAudio			
:SIGNAL	SILence / SINE / CLICK / OFF		
:LEVEL	DB0FS / DB6FS / DB12FS / DB18FS / DB24FS		
:CLICK	-499 to 500		
:TEXT			
:STRING1	"TEXT1"		
:STRING2	"TEXT2"		
:STRING3	"TEXT3"		
:MOVEMENT	OFF / VERTICAL / HORIZONTAL / BOTH		
:SCALE	1 to 4		
:COLOR	WHITE / YELLOW / CYAN / GREEN / MAGENTA / BLUE / BLACK		
:BACKGROUND	WHITE / YELLOW / CYAN / GREEN / MAGENTA / BLUE / BLACK		
:DELAY	<Field>, <Line>, <HTime>		
:VERSION?	-	-	<query only>
:VERSION?	-	-	<query only>

:DL1-4			
:PATtern	BLACk / SDICheck / PLUGe / LRAMp / CLAPperbrd / COL-Orbar / COMBInation / WINdow / CROSShatch / WHITe		
:MOD	HH / HS / SS, A105 / A100 / A95 / A90 / A85 / A80 / A75 / A70 / A65 / A60 / A55 / A50 / A45 / A40 / A35 / A30 / A25 / A20 / A15 / A10 / A5 / A0 / AM5		Applies only for certain patterns
:SYStem	OFF / HD1080I30 / HD1080I2997 / HD1080I25 / HD1080P30 / HD1080P2997 / HD1080P25 / HD1080P24 / HD1080P2398 / HD1080sF30 / HD1080sF2997 / HD1080sF25 / HD1080sF24 / HD1080sF2398 / HD720P60 / HD720P5994 / HD720P50 / HD720P30 / HD720P2997 / HD720P25 / HD720P24 / HD720P2398 / SD525 / SD625		
:INTERFace	I1 / I2 / I3 / I4 / I5 / I6		
:EMBAudio			
:SIGnal	SILence / SINE / CLICK / OFF		
:LEVel	DB0FS / DB6FS / DB12FS / DB18FS / DB24FS		
:CLick	-499 to 500		
:TEXT			
:STRing1	"TEXT1"		
:STRing2	"TEXT2"		
:STRing3	"TEXT3"		
:MOVement	OFF / VERTical / HORIZontal / BOTH		
:SCAle	1 to 4		
:COLor	WHItE / YELlow / CYAn / GREen / MAGenta / BLUe / BLACk		
:BACKground	WHItE / YELlow / CYAn / GREen / MAGenta / BLUe / BLACk		
:DELay	<Field>, <Line>, <HTime>		
:VERSion?	-	-	<query only>
:LTCGenerator1-2			
:FORMat	<Format>, <Syncmode>, <Hour>, <Min>		24FPS / 25FPS / 2997NOND / 2997DROP / 30FPS, NONE /CONF / AUTO, 0..23, 0..59
:OFFSET	-5000000..4999999		
:TIMEZone	<Hour>, <Min>		-11..+11, 0 / 30
:DAYLight			
:MODE	<Mode>, <State>		AUTO / CONF / AUTO, ON / OFF
:START	<Month>, <Day>, <Hour>		1..12, 1..31, 0..23
:END	<Month>, <Day>, <Hour>		1..12, 1..31, 0..23

6.4 Commands Explanation

6.4.1 Mandated Commands

***CLS CLEAR STATUS**

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

***ESE STANDARD EVENT STATUS ENABLE COMMAND**

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

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

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

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

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

***IDN? IDENTIFICATION QUERY**

The response contains four fields:

- Field 1: Company name
- Field 2: Product name
- Field 3: Serial number (KUxxxxxxx)
- Field 4: Firmware level, i.e. software revisions for Mainboard-OSC

Example: **IDN? response: PTV,PT5230,KU123456,1.0-1.2*

***OPC OPERATION COMPLETE**

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

***OPC? OPERATION COMPLETE QUERY**

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

***RST RESET**

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

***SRE SERVICE REQUEST ENABLE**

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

***SRE? SERVICE REQUEST ENABLE QUERY**

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

***STB? READ STATUS BYTE QUERY**

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

***TST? SELF-TEST QUERY**

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

***WAI WAIT TO CONTINUE**

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

6.4.2 Required Commands

SYSTem commands

SYSTem:ERRor?

Command for reading an SCPI error message from the error queue. See Chapter 9 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. Six user presets from 1 to 6 are available.

Example:

SYST:PRES:REC 3

recall preset 3 in the generator

SYST:PRES:REC?

response: 3, i.e. preset 3 is currently active

SYSTem:PRESet:STORe

Command to store the actual configuration in a preset. Six user presets from 1 to 6 are available.

Example:

SYST:PRES:STOR 6

store configuration in preset 6

SYSTem:PRESet:NAME

Command for naming a user preset. Six user presets from 1 to 6 are available. Number of characters in the name is limited to sixteen (16).

Example:

SYST:PRES:NAME 2, "WHAT"

name preset number 2 "WHAT"

SYST:PRES:NAME? 2

response: "WHAT"

SYSTem:PRESet:DOWNload

Command for downloading, i.e. reading a complete preset from a MSG-5300 . Six user presets from 1 to 6 are available.



WARNING!

This command is currently not supported by the Telnet Interface.
Do not attempt to use it.

Example: *SYST:PRES:DOWN 4*

download content of preset 4

SYSTem:PRESet:UPLoad

Command for downloading, i.e. reading a complete preset from a MSG-5300. Six user presets from 1 to 6 are available.



WARNING!

This command is currently not supported by the Telnet Interface.
Do not attempt to use it.

Example:

SYST:PRES:UP 4, #aaa. . .

upload block data aaa to preset 4

SYSTem:DOWNload

Command for downloading, i.e. reading a complete MSG-5300 configuration incl. all presets.



WARNING!

This command is currently not supported by the Telnet Interface.
Do not attempt to use it.

Example:

SYST:DOWN

download the complete MSG-5300

SYSTem:UPLoad

Command for uploading, i.e. storing a complete MSG-5300 configuration incl. all presets.



WARNING!

This command is currently not supported by the Telnet Interface.
Do not attempt to use it.

Example:

SYST:UP #aaa. . .

upload block data aaa to MSG-5300

STATus commands

STATus:OPERAction[:EVENT]?

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

STATus:OPERation:CONDition?

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

STATus:OPERation:ENABLE

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

STATus:QUESTionable[:EVENT]?

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

STATus: QUESTionable:CONDition?

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

STATus:QUESTIONable:ENABLE

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

STATus:MSG-5300?

Command to read the internal error status of the generator. If errors are detected use the command:

DIAGnostic:ERRORqueue?

to read the specific error.

Response Description:

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

Example:

STAT:PT5300?

response: "No active error"

(Note – there may be occasional references to PT5300 in commands. These apply to the MSG-5300)

6.4.3 Instrument Commands

DIAGnostic commands

DIAGnostic:DISPlay

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

DIAGnostic:ERRORqueue:RESet

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

Example:

DIAG:ERR:RES

reset the five elements in the errorqueue

DIAGnostic:ERRORqueue?

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

Example:

DIAG:ERR?

response: -108,"Parameter not allowed"

DISPlay commands

DISPlay:CONTRast

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

INPut commands

INPut:GENLock:INPut

Command for selecting the genlock input. Possible selections are:

Input:	Description:
A	A
B	B
A B	A-B, i.e. loop through
INternal	Internal

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

Example:

```
INP:GENL:INP A B
```

select input A/B as the genlock signal

```
INP:GENL:INP?
```

response: A B

INPut:GENLock:SYSTem

Command for selecting the genlock system. Possible selections are

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

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

Example:

```
INP:GENL:SYST
```

```
F358MHz set
```

system to 3.59 MHz

clock

```
INP:GENL:SYST?
```

response: F358 MHz

INPut:GENLock:DELay Command to set the delay for the genlock input. The delay is defined by three parameters <Field>,<Line>,<HTime> where <Field> sets the field offset, <Line> sets the line offset and <HTime> sets the horizontal time in ns, i.e.

- HTime(PAL) <64000.0 ns
- HTime(NTSC) <63492.1 ns

Note: It is not possible to select timing when the genlock system is 3.58 MHz, 4,43 MHz, 5 MHz, or 10 MHz or the input is set to internal or internal2. This will result in an execution error, namely: -200, "Execution error".

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

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

Example:

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

INPut:GENLock?

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

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

where <lock info> is either GENLOCKED or UNLOCKED.

For an explanation concerning the rest of the response see

the commands: INP:GENL:INP, INP:GENL:SYST and

INP:GENL:DEL.

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

Example:

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

OUTPut commands

OUTPut:BB1:SYSTem

OUTPut:BB2:SYSTem

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

System:	Description:
PAL	PAL
PAL ID	PAL with line 7
NTSC	NTSC with setup

Example:

OUTP:BB1:SYSTPAL ID

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

OUTP:BB1:SYST?

response: PAL ID

OUTPut:BB1:DELay

OUTPut:BB2:DELay

Command to set the delay of the standard Black Burst module. The delay is defined by three parameters: <Field>, <Line>, <HTime> where <Field> sets the field offset, <Line> sets the line offset and <HTime> sets the horizontal time in ns, i.e.

- HTime(PAL)<64000.0ns
- HTime(NTSC)<63492.1ns

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

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

Example:

OUTP:BB2:DEL-0,-0,-3245.2

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

OUTP:BB2:DEL?

response: -2,-004,-03245.2

OUTPut:BB1:SCHPhase

OUTPut:BB2:SCHPhase

Command to set the Sch-Phase of the standard Black Burst module. The Sch-Phase value must be in the range: -179<SCH-Phase<=+180

Example:

OUTP:BB2:SCHP-160

set the SCHPhase for BB module 2 to -160deg

OUTP:BB2:SCHP?

response: -160

OUTPut:BB1:VERSion?

OUTPut:BB2:VERSion?

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

- Field 1: Company name
- Field 2: Type name, which in this case is NA, not available
- Field 3: Serial number (KUxxxxxx)
- Field 4: Software version for the Black Burst module

Note: The response from this command is identical for both BB modules 1 and 2.

Example:

OUTP:BB1:VERS?

response: PTV,NA,KU123456,2.1

OUTPut:BB1?

OUTPut:BB2?

Command to display the complete settings of the standard Black Burst modules. 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: equals 1 or 2

Example:

OUTP:BB1?

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

OUTPut:AUDio1:SIGNal

OUTPut:AUDio2:SIGNal

Command to select the audio signal in the built-in Dual AES/EBU Audio Generator.

Possible selections are:

System:	Description:
S800HZ	Stereo 800 Hz
S1KHZ	Stereo 1 kHz
SEBu1KHZ	EBU Stereo 1kHz
SBBC1KHZ	BBC Stereo 1 kHz
MEBu1KHZ	EBU Mono 1 kHz
M1KHZ	Mono 1 kHz
DUAL	Dual Sound
F48KHZ	Wordclock (48 kHz)

Example:

OUTP:AUD1:SIGN DUAL

set the audio signal in the generator to dual sound

OUTP:AUD1:SIGN?

response: DUAL

OUTPut:AUDio1:LEVel

Command to select the audio level in the built-in Dual AES/EBU Audio Generator. Possible selections are:

Signal:	Description:
SILence	Silence
DB0FS	0 dB
DB9FS	-9 dB
DB12FS	-12 dB
DB15FS	-15 dB
DB16FS	-16 dB
DB18FS	-18 dB
DB20FS	-20 dB

Example:

OUTP:AUD1:LEV DB20FS

set the audio level in the generator to -20 dB

OUTP:AUD1:LEV?

response: DB20FS

OUTPut:AUDio1:TIMing

Command to select the audio timing in the built-in Dual AES/EBU Audio Generator. Possible selections are:

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

Example:

OUTP:AUD1:TIM NTSC3

set the audio timing in the generator to NTSC3 *OUTP:AUD1:TIM?*

response: NTSC3

OUTPut:AUDio1:VERSion? Command to display the version of in the built-in Dual AES/EBU Audio Generator. The response contains four fields:

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

Example:

OUTP:AUD1:VERS?

response: PTV,PT8635,KU123456,2.0

(note – the internal Dual AES/EBU Audio Generator model number is 8635)

OUTPut:AUDio1?

Command to display the complete settings of the built-in Dual AES/EBU Audio Generator The response contains three fields: <Signal>,<Level>,<Timing>.

For an explanation of the response, see the commands:

OUTP:AUDn:SIGN, OTUP:AUDn:LEV and OUTP:AUDn:TIM, where n is 1 or 2.

Example:

OUTP:AUD1?

response: DUAL, SILENCE, NTSC3

:OUTPut:TLG1:SYSTem

:OUTPut:TLG2:SYSTem

:OUTPut:TLG3:SYSTem

Command to select the system of the standard MSG-OPT-8611 Tri-Level Sync Generator.

This option is installed by default in the MSG-5300HD.

Available systems are:

OFF	OFF
HD1080P60	HD 1080P/60
HD1080P5994	HD 1080P/59.94
HD1080P50	HD 1080P/50
HD1080I30	HD 1080I/30
HD1080I2997	HD 1080I/29.97
HD1080I25	HD 1080I/25
HD1080P30	HD 1080P/30
HD1080P2997	HD 1080P/29.97
HD1080P25	HD 1080P/25
HD1080P24	HD 1080P/24
HD1080P2398	HD 1080P/23.98
HD1080sF30	HD 1080sF/30
HD1080sF2997	HD 1080sF/29.97
HD1080sF25	HD 1080sF/25
HD1080sF24	HD 1080sF/24
HD1080sF2398	HD 1080sF/23.98
HD720P60	HD 720P/60
HD720P5994	HD 720P/59.94
HD720P50	HD 720P/50
HD720P30	HD 720P/30
HD720P2997	HD 720P/29.97
HD720P25	HD 720P/25
HD720P24	HD 720P/24
HD720P2398	HD 720P/23.98

example:

:outp:tlg5:syst HD1080sF2398;

sets system to HD 1080sF/23.98

:outp:tlg5:syst?;

response: HD1080sF2398

:OUTPut:TLG1:DELay

:OUTPut:TLG2:DELay

:OUTPut:TLG3:DELay

Command to set the delay of a MSG-OPT-8611 Tri-Level Sync Generator. The delay is defined by three parameters:

<Field>, <Line>, <HTime>

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

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

system	SYSTem	MIN	MAX
HD 1080P/60	HD1080P60	-0,-562,0.0	0,562,14808.1
HD 1080P/59.94	HD1080P5994	-0,-562,0.0	0,562,14822.9
HD 1080P/50	HD1080P50	-0,-562,0.0	0,562,17771.0
HD 1080I/30	HD1080I30	-0,-562,0.0	0,562,29622.9
HD 1080I/29.97	HD1080I2997	-0,-562,0.0	0,562,29652.4
HD 1080I/25	HD1080I25	-0,-562,0.0	0,562,35548.8
HD 1080P/30	HD1080P30	-0,-562,0.0	0,562,29622.9
HD 1080P/29.97	HD1080P2997	-0,-562,0.0	0,562,29652.4
HD 1080P/25	HD1080P25	-0,-562,0.0	0,562,35548.8
HD 1080P/24	HD1080P24	-0,-562,0.0	0,562,37030.3
HD 1080P/23.98	HD1080P2398	-0,-562,0.0	0,562,37067.2
HD 1080sF/30	HD1080sF30	-0,-562,0.0	0,562,29622.9
HD 1080sF/29.97	HD1080sF2997	-0,-562,0.0	0,562,29652.4
HD 1080sF/25	HD1080sF25	-0,-562,0.0	0,562,35548.8
HD 1080sF/24	HD1080sF24	-0,-562,0.0	0,562,37030.3
HD 1080sF/23.98	HD1080sF2398	-0,-562,0.0	0,562,37067.2
HD 720P/60	HD720P60	-0,-374,0.0	0,375,22215.5
HD 720P/59.94	HD720P5994	-0,-374,0.0	0,375,22237.7
HD 720P/50	HD720P50	-0,-374,0.0	0,375,26659.9
HD 720P/30	HD720P30	-0,-374,0.0	0,375,44437.7
HD 720P/29.97	HD720P2997	-0,-374,0.0	0,375,44482.0
HD 720P/25	HD720P25	-0,-374,0.0	0,375,53326.6
HD 720P/24	HD720P24	-0,-374,0.0	0,375,55548.8
HD 720P/23.98	HD720P2398	-0,-374,0.0	0,375,55604.2

example:

```
:OUTPut:TLG5:del 0,1,144.0;
```

sets delay to 1 line and 144.0 ns

```
:OUTPut:TLG5:del?;
```

response: +0,+001,+00141.4 (rounded)

```
:OUTPut:HD1:PATtern :OUTPut:HD2:PATtern :OUTPut:HD3:PATtern
```

Command to select the pattern of an optional MSG-OPT-8612 HD Test Pattern Generator. Patterns available are:

- BLACK
- SDICheck
- PLUGe
- LRAMp
- CLAPperbrd
- COLORbar
- COMBInation
- WINdow
- CROSshatch
- WHITe

example:

OUTP:HD2:PATT BLACK

sets the pattern in the HD module BLACK

OUTP:HD2:PATT?

response: BLACK

Some patterns have modifications.

Patterns:

- COLOrbar
- COMBlnation

have the following modifications:

- HH - 100/0/100/0
- HS - 100/0/75/0
- SS - 75/0/75/0

Patterns:

- WINdow
- WHITe

have the following modifications:

AM5	-5% White
A0	0% White
A5	5% White
A10	10% White
A15	15% White
A20	20% White
A25	25% White
A30	30% White
A35	35% White
A40	40% White
A45	45% White
A50	50% White
A55	55% White
A60	60% White
A65	65% White
A70	70% White
A75	75% White
A80	80% White
A85	85% White
A90	90% White
A95	95% White
A100	100% White
A105	105% White

example:

:outp:dl5:patt:mod ss;
sets pattern modification to 75/0/75/0 for patterns COLORBAR and COMBINATION

:outp:dl5:patt:mod?;
response: SS

:outp:dl5:patt:mod AM5;
sets pattern modification to -5% white level for patterns WINDOW and WHITE

:outp:dl5:patt:mod?;
response: AM5

Trying to select modification not available for given pattern will result in an error, namely -224, "Illegal parameter value".

trying to select modification for non-modifiable patterns results in: -200, "Execution error".

:OUTPut:HD1:SYSTem

:OUTPut:HD2:SYSTem

:OUTPut:HD3:SYSTem

Command to select the system of an optional MSG-OPT-8612 HD Test Pattern Generator. Available systems are:

OFF	OFF
HD1080I30	HD 1080I/30
HD1080I2997	HD 1080I/29.97
HD1080I25	HD 1080I/25
HD1080P30	HD 1080P/30
HD1080P2997	HD 1080P/29.97
HD1080P25	HD 1080P/25
HD1080P24	HD 1080P/24
HD1080P2398	HD 1080P/23.98
HD720P60	HD 720P/60
HD720P5994	HD 720P/59.94
HD720P50	HD 720P/50
HD720P30	HD 720P/30
HD720P2997	HD 720P/29.97
HD720P25	HD 720P/25
HD720P24	HD 720P/24
HD720P2398	HD 720P/23.98
SD525	SD 487I/29.97 (525)
SD625	SD 576I/25 (625)

example:

:outp:dl5:syst HD1080P2398;
sets system to HD 1080P/23.98

:outp:dl5:syst?;
response: HD1080P2398

:OUTPut:HD1:EMBAudio:SIGnal

:OUTPut:HD2:EMBAudio:SIGnal

:OUTPut:HD3:EMBAudio:SIGnal

Command to select the signal of the embedded audio on MSG-OPT-8612 HD Test Pattern Generators. Available signals are:

SILence	Silence
SINE	1 kHz sine
CLICK	1 kHz sine with click
OFF	No embedded audio

example:

:outp:dl5:emb:sign off;
sets embedded audio to off

:outp:dl5:emb:sign?;
response: OFF

:OUTPut:HD1:EMBaudio:LEVel
:OUTPut:HD3:EMBaudio:LEVel
:OUTPut:HD4:EMBaudio:LEVel

Command to select the level of the embedded audio on MSG-OPT-8612 HD Test Pattern Generators. Available levels are:

DB0FS	0 dB Full Scale
DB6FS	-6 dB Full Scale
DB12FS	-12 dB Full Scale
DB18FS	-18 dB Full Scale
DB24FS	-24 dB Full Scale

example:

:outp:dl5:emb:level DB12FS;
sets embedded signal level to -12 dB Full Scale

:outp:dl5:emb:lev?;
response: DB12FS

:OUTPut:HD1:EMBaudio:CLick
:OUTPut:HD3:EMBaudio:CLick
:OUTPut:HD6:EMBaudio:CLick

Command to select the click timing of the embedded audio on MSG-OPT-8612 HD Test Pattern Generators. Available values are (in milliseconds):

-499 . . . 500

example:

:outp:dl5:EMBaudio:CLick -200;
sets embedded audio click to -200 ms

:outp:dl5:emb:cli?;
response: -200

:OUTPut:HD1:TEXT:STRing1
:OUTPut:HD4:TEXT:STRing2
:OUTPut:HD5:TEXT:STRing3

Command to insert one or more (up to 3) text strings into the pattern on MSG-OPT-8612 HD Test Pattern Generators. Three parameters are possible, i.e. OFF, ON and some text, "Text".

Note: To switch the text on/off use the parameters ON or OFF. To alter the actual text use "TEXT". The text is limited to sixteen characters. Only printable members of standard ASCII character set (7-bit) are available. Using other values will result in -360,"Communication error".

example:

`:OUTPut:HD5:TEXT:STR3 "HI THERE";`
sets text line 3 in HD5 to "HI THERE"

`:OUTPut:HD5:TEXT:STR3 ON;`
switch text line 3 ON

`:OUTPut:HD5:TEXT:str3?;`
response: ON,"HI THERE"

:OUTPut:HD1:TEXT:MOVement
:OUTPut:HD4:TEXT:MOVement
:OUTPut:HD5:TEXT:MOVement

Command to set movement of text on MSG-OPT-8612 HD Test Pattern Generators. Available possibilities are:

OFF	Text is stationary
VERTical	Vertical movement
HORizontal	Horizontal movement
BOTH	Movement in both directions

example:

`:OUTPut:HD5:TEXT:mov both;`
sets text movement to both directions

`:OUTPut:HD5:TEXT:mov?;`
response: BOTH

:OUTPut:HD1:TEXT:SCAlE
:OUTPut:HD4:TEXT:SCAlE
:OUTPut:HD5:TEXT:SCAlE

Command to set text scale on MSG-OPT-8612 HD Test Pattern Generators. Available possibilities are: 1, 2, 3 and 4.

example:

`:OUTPut:HD5:TEXT:sca 3;`
sets text scale to 3

`:OUTPut:HD5:TEXT:sca?;`
response: 3

:OUTPut:HD1:TEXT:COLor
:OUTPut:HD4:TEXT:COLor
:OUTPut:HD5:TEXT:COLor

Command to set color of text on MSG-OPT-8612 Test Pattern Generators. Available colors are:

- WHIte
- YELlow
- CYAn
- GREen
- MAGenta
- BLUe
- BLAck

example:

`:OUTPut:HD5:TEXT:col mag;`
sets text color to magenta

`:OUTPut:HD5:TEXT:color?;`
response: MAGENTA

:OUTPut:HD1:TEXT:BACKground
:OUTPut:HD4:TEXT:BACKground
:OUTPut:HD5:TEXT:BACKground

Command to set background color of text on MSG-OPT-8612 HD Test Pattern Generators. Available colors are:

- WHIte
- YELlow
- CYAn
- GREen
- MAGenta
- BLUe
- BLAck

example:

`:OUTPut:HD5:TEXT:back mag;`
sets text background color to magenta

`:OUTPut:HD5:TEXT:background?;`
response: MAGENTA

:OUTPut:HD1:DELay
:OUTPut:HD4:DELay
:OUTPut:HD5:DELay

Command to set the delay of a MSG-OPT-8612 HD Test Pattern Generator. The delay is defined by three parameters:

<Field>, <Line>, <HTime>

where <Field> is the field offset, <Line> is the line offset and <HTime> sets the horizontal time in ns

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

system	SYSTem	MIN	MAX
HD 1080I/30	HD1080I30	-0,-562,0.0	0,562,29622.9
HD 1080I/29.97	HD1080I2997	-0,-562,0.0	0,562,29652.4
HD 1080I/25	HD1080I25	-0,-562,0.0	0,562,35548.8
HD 1080P/30	HD1080P30	-0,-562,0.0	0,562,29622.9
HD 1080P/29.97	HD1080P2997	-0,-562,0.0	0,562,29652.4
HD 1080P/25	HD1080P25	-0,-562,0.0	0,562,35548.8
HD 1080P/24	HD1080P24	-0,-562,0.0	0,562,37030.3
HD 1080P/23.98	HD1080P2398	-0,-562,0.0	0,562,37067.2
HD 720P/60	HD720P60	-0,-374,0.0	0,375,22215.5
HD 720P/59.94	HD720P5994	-0,-374,0.0	0,375,22237.7
HD 720P/50	HD720P50	-0,-374,0.0	0,375,26659.9
HD 720P/30	HD720P30	-0,-374,0.0	0,375,44437.7
HD 720P/29.97	HD720P2997	-0,-374,0.0	0,375,44482.0
HD 720P/25	HD720P25	-0,-374,0.0	0,375,53326.6
HD 720P/24	HD720P24	-0,-374,0.0	0,375,55548.8
HD 720P/23.98	HD720P2398	-0,-374,0.0	0,375,55604.2
SD 487I/29.97 (525)	SD525	-0,-262,0.0	0,262,63548.8
SD 576I/25 (625)	SD625	-0,-312,0.0	0,312,63993.3

example:

`:OUTPut:HD5:del 0,1,144.0;`
sets delay to 1 line and 144.0 ns

`:OUTPut:HD5:del?;`
response: +0,+001,+00141.4 (rounded)

`:OUTPut:HD5:del -0,-561,-144.0;`
sets delay to -561 lines and 144.0 ns

`:OUTPut:HD5:del?;`
response: -0,-561,-00141.4 (rounded)

`:OUTPut:HD5:del -0,-562,0.0;`
sets delay to -562 lines and 0.0 ns

`:OUTPut:HD5:del?;`
response: -0,-562,-00000.

:OUTPut:HD1?
:OUTPut:HD4?
:OUTPut:HD5?

Command to display complete setting of the MSG-OPT-8612 HD Test Pattern Generator. The response contains 8 fields:

<Pattern>, <Text>, <System>, <Audio signal>, <Audio level>, <Field>, <Line>, <HTime>

OUTPut:LTCG1:FORMat

OUTPut:LTCG2:FORMat

Command to set the format of the LTC generator module. The delay is defined by four parameters: <Format>, <Syncmode>, <Hour>, <Min> where <Format> sets the format to one of the format listed in table 10, <Syncmode> sets the mode to reset the framecounter (see table 11), <Hour> sets the sync hour and <Min> sets the sync minute. The sync mode is only relevant for 29.97 frames per second, as other formats always stays synchronized to real time.

24FPS	24 Frames pr second
25FPS	25 Frames pr second
2997NOND	29.97 Frames pr second, non drop
2997DROP	29.97 Frames pr second, drop frame
30FPS	30 Frames pr second

Table 10: LTC Generator formats

NONE	No synchronization (Only manual sync.)
CONF	Confirm synchronization. Press E to confirm.
AUTO	Auto synchronization. No need to do

Table 11: LTC Generator Sync modes

<Hour>, <Min> sets the time, when the frame counter shall be resynced. The hour can be set to a number between 0 and 23. The minutes can be set between 0 and 59.

example:

`:OUTPut:LTCG1:FORMat '24FPS','NONE',0,0;`
Sets the format to 24 frames per second, the sync mode and time is not relevant for this mode.

`:OUTPut:LTCG1:FORMat '24FPS','NONE',0,0;`
response: 24FPS,NONE,0,0

`:OUTPut:LTCG1:FORMAT '2997DROPF','AUTO',23,30;`

Sets the format to 29.97 frames per second, drop frame. The frames counter will reset at 23:30, automatically.

`:OUTPut:LTCG1:OFFSET`

`:OUTPut:LTCG2:OFFSET`

Offsets the LTC generator ± 0.5 seconds relative to the absolute GPS time. Time is in nano seconds.

example:

`:OUTPut:LTCG2:OFFSET 3000;`

Sets the LTC generator to have frame 0 start 3 micro seconds before the GPS time seconds.

`:OUTPut:LTCG2:OFFSET?;`

response: 3000

6.5 Communication Error Codes

6.5.1 Command Errors [-199, -100]

Error Number	Error string [description/explanation/example]
-100	Command error. The command is invalid or incorrect.
-101	Invalid character. A command or parameter contains an invalid character, e.g. a header containing an ampersand, SYST:VERS&
-102	Syntax error. An unrecognized command or datatype was encountered, e.g. a string was received when the generator did not accept strings.
-103	Invalid separator. A separator was expected, but an illegal character was encountered, e.g. the semicolon was omitted after a command, *IDN?:SYST:ERR?;
-104	Data type error. A data element different than one allowed was encountered, e.g. numeric data was expected but string data was encountered.
-108	Parameter not allowed. More parameters were received than expected for the command, e.g. the *IDN?; command accepts no parameters, so receiving *IDN? 2; is not allowed.
-109	Missing parameter. Fewer parameters were received than expected for the command, e.g. OUTP:BB1:DEL2,2; is missing one parameter.
-110	Command header error. An error was detected in the command header.
-111	Header separator error. A character which is not a legal header separator was encountered, e.g. no white space followed the header, thus SYST:PRES:NAME"MACRO" is an error.
-112	Program mnemonic too long. The header contains more than twelve characters.
-113	Undefined header. The header is syntactically correct, but is not defined for the device.

-114	Header suffix out of range.
	The command is invalid because the value of the numeric suffix attached to the program mnemonic is out of range, e.g. OUP:BB12? Is illegal because only 8 BB's exists.
-120	Numeric data error.
	An error in the numeric data was encountered.
-121	Invalid character in number.
	An invalid character for the data type was encountered, e.g. an alpha in a decimal value.
-123	Exponent too large.
	The magnitude of the exponent was larger than 32000.
-124	Too many digits
	The mantissa of a decimal numeric data element contained more than 255 digits.
-128	Numeric data not allowed.
	A legal numeric data was received, but the device does not accept one.
-130	Suffix error.
	An error in the suffix was encountered.
-131	Invalid suffix.
	The suffix is syntactically incorrect.
-134	Suffix too long.
	The suffix contains more than twelve characters.
-138	Suffix not allowed.
	A suffix was encountered after a numeric element, which does not allow suffixes.
-140	Character data error.
	An error in the character was encountered.
-150	String data error.
	An error in the string data was encountered.
-151	Invalid string data.
	A string data element was expected, but was invalid for some reason, e.g. an END message was received before the terminal quote character.
-158	String data not allowed.
	A string data element was received but was not allowed by the device.
-160	Block data error.
	There is an error in the block data received.
-161	Invalid block data.
	A block data was expected, but was invalid for some reason.
-170	Expression error.
	There is an error in the expression received.

6.5.2 Execution Errors [-299, -200]

Error Number	Error string [description/explanation/example]
-200	Execution error.
-220	Parameter error. Indicates that a program data element related error occurred.
-222	Data out of range. Indicates that a legal program data element was received but could not be executed because the interpreted values was outside the range as defined by the device, e.g. the command OUTP:BB1:SCHP 200; is illegal since the SCH Phase cannot exceed 180 deg.
-223	Too much data. Indicates that a legal program data element of block, expression, or string type was received that contained more data than the device could handle due to memory or related device-specific requirements.
-224	Illegal parameter value. Used where an exact value, from a list of possible values, was expected.
-233	Invalid version. Indicates that a legal program data element was parsed but could not be executed because the version of the data is incorrect to the device.
-241	Hardware missing. Indicates that a legal program command or query could not be executed because of missing device hardware.

6.5.3 Device specific Errors [-399, -300]

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

6.5.4 Query Errors [-499, -400]

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

7 Error & Message Codes

Code	Description
E(001)	POWER FAILURE: -5VOLT
E(002)	POWER FAILURE: 12VOLT
E(003)	TEMPERATURE FAILURE
E(005)	Temperature warning
E(006)	Level error at Bbn
E(006)	Level error at SDI-TSGn
E(006)	Level error at ANALOG TPGn
E(006)	Level error at SDI TPGn
E(006)	Level error at TLSBOARD1
E(006)	Level error at UNKNOWN OPTION
E(002)	Configuration error
E(002)	Multiple errors
Black Burst units, type 01x:	
E(010)	General failure: BBn
E(011)	No contact to BBn
E(012)	Error writing to BBn
E(013)	No response from BBn
E(014)	Error reading from BBn
SDI Test Signal generators, type 02x:	
E(020)	General failure: SDI-TSGn
E(021)	No contact to SDI-TSGn
E(022)	Error writing to SDI-TSGn
E(023)	No response from SDI-TSGn
E(024)	Error reading from SDI-TSGn
AES/EBU unit, type 03x:	
E(030)	General failure: AES/EBU
E(031)	No contact to AES/EBU
E(032)	Error writing to AES/EBU
E(033)	No response from AES/EBU
E(034)	Error reading from AES/EBU
OSC unit, type 08x:	
E(080)	General failure: OSC
E(081)	No contact to OSC
E(082)	Error writing to OSC
E(083)	No response from OSC
E(084)	Error reading from OSC
ROM MEMORY unit, type 09x:	
E(090)	General failure: ROM MEMORY
E(094)	Error reading from ROM MEMORY
E(095)	Checksum error: ROM MEMORY
RAM MEMORY unit, type 10x:	
E(100)	General failure: RAM MEMORY
KEYBOARD unit, type 11x:	
E(110)	General failure: KEYBOARD
E(111)	No contact to KEYBOARD
E(112)	Error writing to KEYBOARD

E(113)	No response from KEYBOARD
E(114)	Error reading from KEYBOARD
LCD ADC unit, type 12x:	
E(120)	General failure: LCD ADC
E(121)	No contact to LCD ADC
E(122)	Error writing to LCD ADC
E(123)	No response from LCD ADC
E(124)	Error reading from LCD ADC
TEMP ADC unit, type 13x:	
E(130)	General failure: TEMP ADC
E(131)	No contact to TEMP ADC
E(132)	Error writing to TEMP ADC
E(133)	No response from TEMP ADC
E(134)	Error reading from TEMP ADC
POWER ADC unit, type 14x:	
E(140)	General failure: POWER ADC
E(141)	No contact to POWER ADC
E(142)	Error writing to POWER ADC
E(143)	No response from POWER ADC
E(144)	Error reading from POWER ADC
LEVEL DETECTOR unit, type 15x:	
E(150)	General failure: LEVEL DETECTOR
E(151)	No contact to LEVEL DETECTOR
E(152)	Error writing to LEVEL DETECTOR
E(153)	No response from LEVEL DETECTOR
E(154)	Error reading from LEVEL DETECTOR

SERIAL REMOTE, type 16x: (these are two line error message)	
E(160)	No response from RS232 Check cable & RS232 settings
E(161)	Error downloading from RS232 Checksum error receiving data

Code	Description
M(001)	Parallel remote operating Local lockout
M(002)	Serial remote operating Goto local?
M(003)	Serial remote operating Local lockout