

Functional Description and Specifications

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December 11, 2009

Module GB

Master Black Burst Generator

Supplement to the “Installation & Systems Manual RUBIDIUM SERIES”

Alpermann+Velte

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A1 Revision History

No.	Date	Subject
0.2	December 11, 2009	Preliminary documents, changes without notice.
1.0		First released document.

A2 Copyright

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A3 General Remarks

This manual is a supplement to the "Installation & Systems Manual RUBIDIUM SERIES". Please read the below listed chapters of the "Installation & Systems Manual RUBIDIUM SERIES", as these chapters are necessary for the safe and proper use of the Rubidium module "GB".

- A3 Warranty,
- A4 Unpacking/Shipping/Repackaging Information,
- A5 Safety Instructions,
- A6 Certifications & Compliances,
- Plug-In a Module,
- Remove a Module.

1 Module GB

1.1 Description

This module serves as a stand-alone master video generator. The module is fitted with an oven-controlled 27 MHz reference oscillator which has been adjusted to an atomic clock reference upon delivery. A 10-bit D/A converter generates the analogue signals out of the internal digital data stream.

Set-up and configuration of this module can be done connecting a PC to the RUBIDIUM housing or establishing an Ethernet connecting via the RUB IE module.

The front panel label **GB** visibly identifies where each module is located. The serial number is located on the bottom side of the lower circuit board of each module.

The standard hardware of this module has all of the following key features:

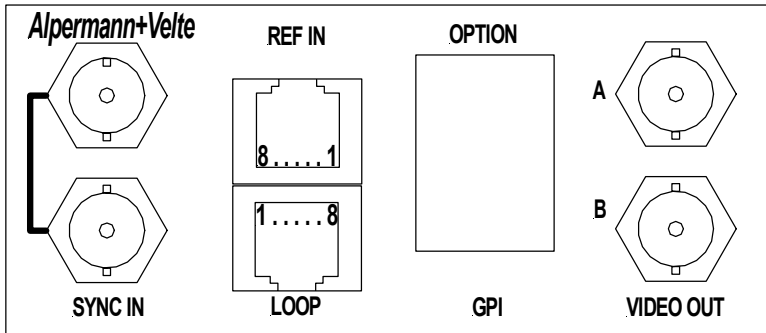
- Two black burst outputs.
- Standard analogue video input (PAL, NTSC, 576i/p, 480i/p, 720p, 1080i/p, bi-level and tri-level sync compatible), as genlock input for the black burst outputs.
- 10 MHz continuous wave input for synchronization as alternative to video synchronization.
- "Hot Swapping", i.e. it is possible to insert or remove a module without interrupting the operation of other modules in this frame.
- Failure relay, connected to the FAIL_A and FAIL_B pins of the **RLC** connector at the rear of the frame.
- RS232 and TC_link (RLC connector) interfaces to have access to the internal bus of the chassis.
- Four programmable function keys on the front panel.
- Flash memory containing the firmware, so configuration and updates are possible via a PC connection.
- Reference input signals (PPS, time and date data string).

There is a wide range of applications for which this module can be used. The standard software enables a user to use the basic hardware with the most popularly used functions. More and special customer defined applications can be realised by loading a special firmware into the unit.

The modular concept of the **RUBIDIUM SERIES** and the programmable parts of this module enhances the flexibility of our system, i.e. two basically identical modules could be used in different applications. This can be achieved either with the same software but with different configurations (e.g. to have outputs of different video formats or different synchronization modes available), or with different programming of the firmware. See chapter about "Software Tools" to get a description of the configuration/programming of the standard module.

1.2 Rear Panel and Connections

Connections at GB



4 x BNC VIDEO OUT: Black burst outputs.

2 x BNC SYNC: Input and loop-through output for video or 10 MHz.

Pin assignments:

REF IN RJ45 jack	LOOP RJ45 jack
1: PPS IN	1: PPS IN – loop-through from REF IN.PPS IN
2: RXD IN	2: RXD IN – loop-through from REF IN.RXD IN
3: -	3: -
6: -	6: -
4: GND	4: GND
5: -	5: -
7: -	7: -
8: -	8: -

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Signal descriptions:

GND	Signal ground.
SYNC	Sync input, analogue video or 10 MHz continuous wave.
VIDEO OUT	Black burst output.
PPS IN	PPS IN accepts a seconds pulse.
RXD IN	RXD IN accepts a serial data string with time and date information. This input accepts RS232 signals.

1.3 Specifications

SYNC

Connector	BNC (IEC169-8), 75 Ω
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SYNC: Signal = Video

Format	CVBS analogue video signal: PAL 625/50, NTSC 525/60, 480i/p, 576i/p, 720p, 1080i/p, bi-level and tri-level sync signals
Signal level	1 V \pm 6 dB

SYNC: Signal = 10 MHz

Format	10 MHz, sinusoidal
Signal level	0,8 - 5 Vpp

VIDEO OUT

Connector	BNC (IEC169-8), 75 Ω
Output impedance	75 Ω
Format	<ul style="list-style-type: none"> • PAL 625/50, with or without 8 Field Ident Pulse at line 7. • NTSC 525/60
Signal level	1 V \pm 2 %
8 Field Ident Pulse	<p>Identifies the 8 field sequence in the video system PAL 625/50. Can be switched off.</p> <p>Level: 100% white</p> <p>Width: 20 μs</p> <p>Start: 12 μs after horizontal reference.</p>

PPS IN

Connector	Pin 1 RJ45 REF IN and LOOP
Characteristic	<p>Typical input signal: 5 V impulse</p> <p>Input impedance: \approx 100 kΩ</p> <p>Input "Low": -2,0 to +1,7 V</p> <p>Input "High": +2,8 to +12,0 V</p>

RXD IN

Connector	Pin 2 RJ45 REF IN and LOOP
Characteristic	<p>Typical input signal: RS232</p> <p>Input impedance: \geq 30 kΩ</p> <p>Input "Low": -15,0 to +1, V</p> <p>Input "High": +2,8 to +15,0 V</p> <p>Frequency: 0 - 1 MHz</p>

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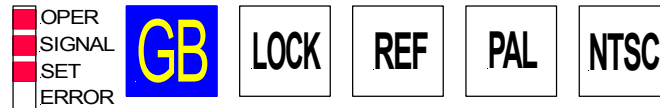
Others:

Operating voltage	12 - 30 VDC
Power consumption	max. 4 W
Weight	0.28 kg
Mechanical	2 circuit boards (W x D): 100 x 160 mm / 3.94 x 6.30 inch Rear panel: Rub H1: 103 x 44 mm / 4.06 x 1.73 inch Rub H3: 8HP, 3RU
Environmental characteristics, operating	Temperature: 5°C - 40°C Relative humidity: 30% - 85%, non-condensing
Environmental characteristics, non-operating	Temperature: -10°C - +60°C Relative humidity: 5 - 95%, non-condensing

1.4 Features

1.4.1 Function Keys, Lamps and LEDs

The module has four illuminated buttons (keys and lamps) and four LEDs (Light Emitting Diodes) at the front. Basically the functions of these in- and outputs are programmable utilising the “Keys” function of one of the configuration tools.



The following functions for the **lamps** are provided for this module:

Function	Description	Recommended Lamp
LOCK	Lights up, if the video PLL has locked to the reference.	F1: LOCK
REF	Lights up, if the video PLL has detected a reference signal.	F2: REF
PAL	Lights up, if video standard = PAL has been selected.	F3: PAL
NTSC	Lights up, if video standard = NTSC has been selected.	F4: NTSC

The following functions for the **LEDs** are provided for this module:

Function	Description	Recommended LED
OPER	Lights up, if the module is operating.	OPER
SIGNAL		SIGNAL
SET	Lights up during configuration of the module.	SET
ERROR	Lights up, if any error has been detected. Please watch the Status Monitor to detect the source of an error.	ERROR

1.5 Software Update

Software updates require a (windows operating system) computer and the "RUBIDIUM CONFIGURATION" program. You can download the latest version of the program from: http://www.alpermann-velte.com/serv_e/software_e/software_e.html).

Please check the **PC** connector at your RUBIDIUM housing: there is an USB or RS232 (with a DSUB9 connector) interface installed. You now need the same interface at your computer.

The new firmware should already be stored as a **.tcf** file at your computer.

Please now execute the following steps:

1. Connect your computer to the **PC** connector of that RUBIDIUM frame where the module has been plugged.

In case of an RS232 interface: Use a straight (1:1) connection between the **PC** connector at the RUBIDIUM frame and the RS232 of the computer.

In case of an USB interface: Use a USB A-B cable between your computer and the RUBIDIUM frame.

Switch on the power of all units.

2. Execute "Rubidium Config.exe" on your computer. Select the "Port" according to the interface (USB, RS232) you are using.
3. Select the module (unit 1, 2, 3 ...).
4. Select "Flash Update" in the *File* menu.
5. Open the **.tcf**-file. Standard name: "Rubidium GB v.v.vvv.tcf".
v.v.vvv stands for a revision no., e.g. 2.0.171.

Click the OK button, update starts. Click the OK button at the end.

6. Update is finished now. We recommend to check module's configuration utilizing the "RUBIDIUM CONFIGURATION" program.

<i>During the flash update the operation of the module stops!</i>

2 Status Monitor

2.1 Open the Status Monitor

The RUBIDIUM SERIES HTTP server, located in the **Rub IE** module, offers a status monitor. Please refer to the “Functional Descriptions and Specifications IE” manual for a detailed description of how to access the RUBIDIUM SERIES system and how to open the RUBIDIUM homepage.

- At the RUBIDIUM homepage click on “Configuration” to open the **Configuration** page.



- Click on the blue button which represents the module (**GB**).
- Click on the button **Monitoring** to open the status monitor of this module.

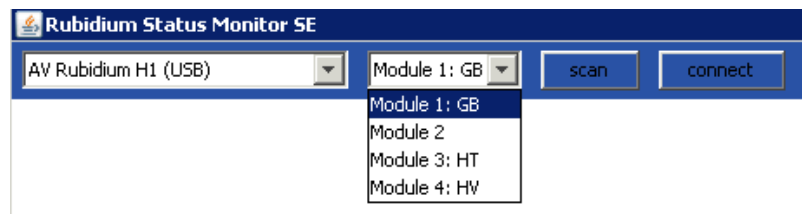


RubStatSE.exe.

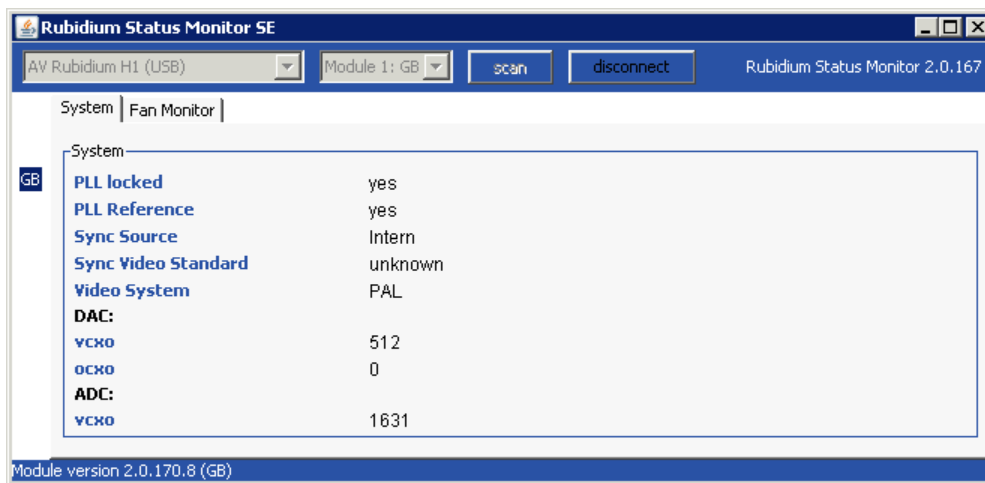
Alternatively there is a Monitoring Program which uses the serial or USB connection of the RUBIDIUM housing. This program is part of the “Rubidium Series, config software” packet you can download at:

http://www.alpermann-velte.com/serv_e/software_e/software_e.html).

Execute this program, select the COM port or USB connection and press the **scan** button to get a list of the modules plugged to this housing. Select the module and press the **connect** button.



2.2 Status: System



3 The Rubidium Configuration Tools

3.1 The Rubidium Configuration PC Program

Please refer to the

“Installation & Systems Manual RUBIDIUM SERIES”

for a general description of this program and how to install it. In this document please notice the chapter “The Rubidium Configuration PC Program” and its subchapters:

- Overview
- Installation
- Connection to RUBIDIUM SERIES Chassis
- Starting the Program
- Store, Load and Update the Configuration on your PC
- The “Profile” Tab: Store and Load Configurations on the Module

The program RUBIDIUM CONFIGURATION uses various tab cards. With one click on the button **Configure** all available and currently activated tabs of this specific module are displayed.

Any changes at a tab will immediately be stored at the module. If you enter a number or a text press the **tabulator key** at the PC’s keyboard afterwards.

3.2 The Rubidium Series HTTP Server

Please refer to the

“Installation & Systems Manual RUBIDIUM SERIES”

for a functional overview and for an installation description of this program. In this document please notice the chapter “The Rubidium Series HTTP Server” and its subchapters:

- Overview, Connecting the IE Module
- IP Configuration, the Rubidium Homepage
- Browser Requirements
- Access to a RUBIDIUM SERIES Module
- The “Profile” Page: Store and Load Configurations on the Module or on the PC

As soon as a communication to a single module has been established, the **Configuration** page gives a list of all the links, which correspond to all the currently available or used pages of this specific module.

Changes at a page will not be stored at the module automatically. At the bottom of each page there are two buttons which should be used to store or load the module’s configuration:

Button **Save To Module**:

- Click on this button to transfer all settings on this page to the module.

Button **Reload From Module**:

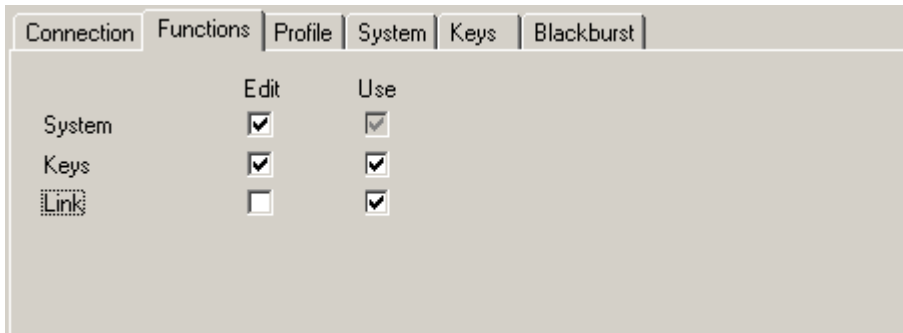
- Click on this button to load the current configuration of the module.



Every time you click on the blue button which indicates the module under configuration a **Reload** will be done automatically.

3.3 “Functions”

Click on **Functions** to see all applicable tabs/pages listed, and to activate or deactivate tabs/pages. For example (screen shot of the PC program tab):



A tab/page reflects a function of the module. The columns **Edit** and **Use** determine whether the function in the module is activated/deactivated and whether user configuration of that specific function is allowed or not.

Click on the applicable **Edit** and/or **Use** check boxes to activate/deactivate a function:

Edit	Use	
		Function is deactivated, the tab/page is not visible.
√	√	Function is activated, the tab/page is visible and configurable.
	√	Function is activated but the tab/page not visible and therefore not configurable.

- We suggest that you deactivate the **Use** check boxes of all functions you are presently not using.
- We suggest that you deactivate the **Edit** check boxes of all functions you are presently not configuring. That avoids unintentional operating and malfunctions.

List of functions:

Profile	Store and Load Configurations on the Module (*)
System	Module Identification, Reset, SNMP, Fan Control ... (*)
Keys	Keys, Lamps and LEDs
Blackburst	Configuration of the Black Burst Generator
Link	Communication between Modules

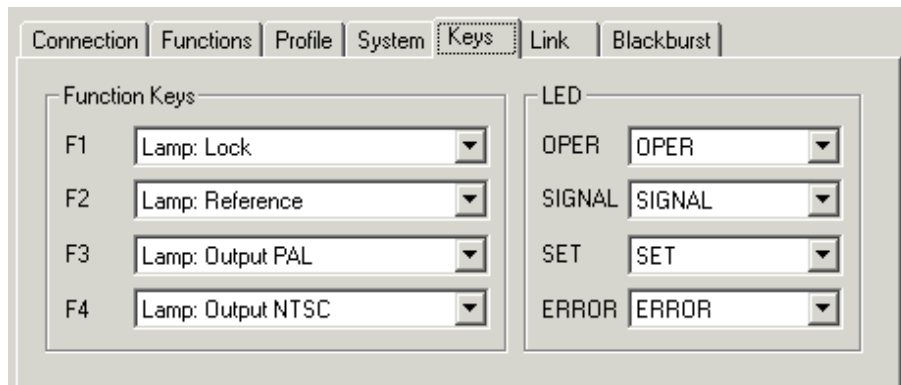
(*) refer to “Installation & Systems Manual RUBIDIUM SERIES”

3.4 “Keys”: Keys, Lamps and LEDs

The GB module has four illuminated buttons (keys and lamps) and four LEDs (Light Emitting Diodes). Basically the functions of these in- and outputs are programmable.

*Some functions are assigned to special options, and therefore are not applicable with the standard firmware. For further information please contact **Alpermann+Velte**.*

Configuration (example shows a screen shot of the PC program tab):



Function Keys (and Lamps)

Four keys F1, F2, F3 and F4 can get a function independently from each other. Select a function from the dropdown list. This selects the function of the lamps as well.

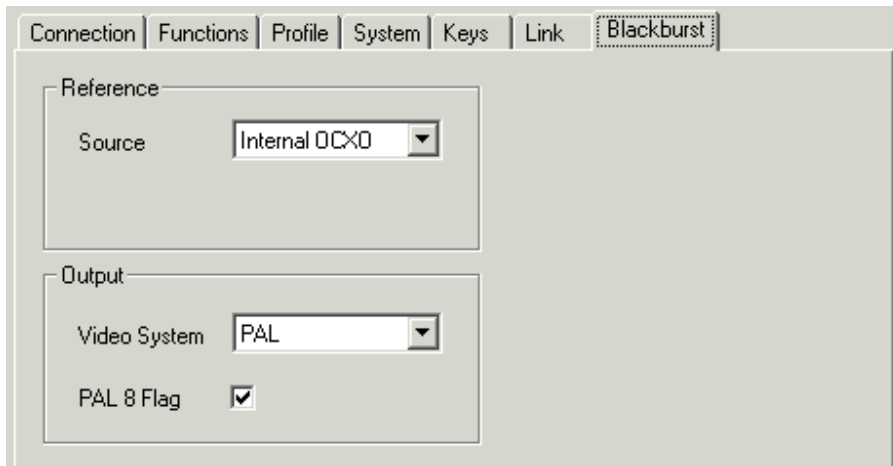
LED

Four LEDs (named OPER, SIGNAL, SET and ERROR) can get a function independently from each other. Select a function from the dropdown list.

3.5 “Blackburst“: Configuration of the Black Burst Generator

Two identical black burst outputs are provided.

Configuration (example shows a screen shot of the PC program tab):



Reference

Select the source of the reference signal:

Source: Internal OCXO Internal reference.

Output

Select the output format of the black burst:

Video System: PAL, NTSC

The outputs will be disabled for a few seconds if the video system switches.

PAL 8 Flag: Switches the 8 Field Ident Pulse on or off.

This pulse indicates the first field of the sequence in the system PAL 625/50.

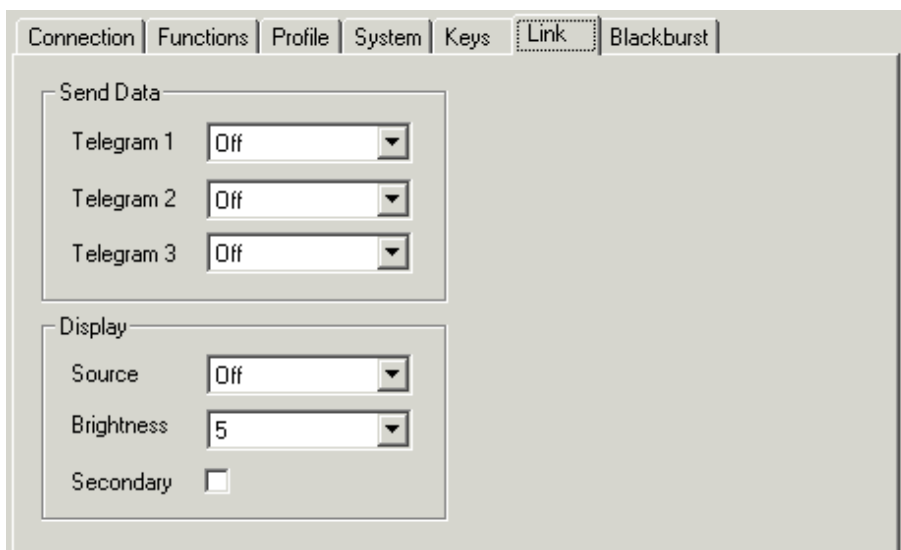
3.6 “Link”: Communication between Modules

Link uses the Rubidium internal TC_link interface to transmit or receive data. This interface is shared by all the modules in one frame, and via the **RLC** connector it is possible to link further modules at different frames.

In case that the selected module should transmit data, **Link** selects the channel and the kind of data. The receiving module must select this channel as a reader input.

In case that the selected module should receive data, the **Link** function has to be activated (**Use**), and the selected channel (“Telegram” 1 or 2 or 3) has to be switched off.

Configuration (example shows a screen shot of the PC program tab):



Send Data

Three channels (**Telegram 1 - 3**) have been provided to transmit data in a time code format. For each channel a function can be selected from the drop-down list:

Off This channel will not be used to transmit data, data can be received.

Display

Adjust the parameters controlling the display of a RUBIDIUM **D1** chassis.

Source Select the kind of data to be sent and displayed:

Off No data will be sent from this module.

Brightness Adjust the brightness of the LEDs, steps 1 to 7.

Secondary A click on this check box addresses the “secondary” display. Without a click the “primary” display will be addressed.