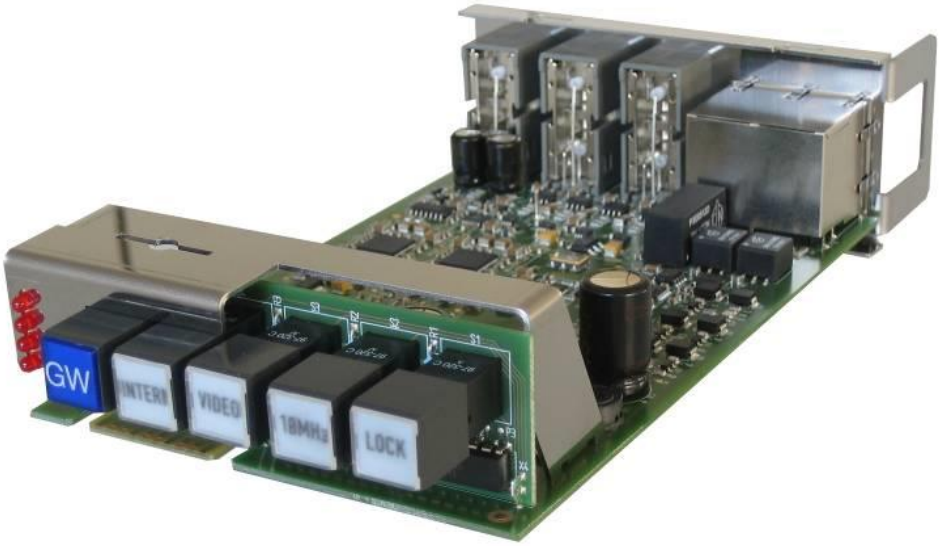
plura

TIMING SOLUTIONS

Rubidium Series

RUB GW

Master Word Clock Generator



Functional Description and Specifications
Supplement to the “Installation & Systems Manual RUBIDIUM SERIES”
Version: 2.3
January 11, 2024

CONTENTS

A1 Revision History

No.	Date	Subject
0.n		Preliminary documents, changes without notice.
1.0	January 11, 2010	First released document.
1.1	February 01, 2010	Revised.
2.0	March 18, 2011	Revised.
2.1	August 26, 2019	Changed address of Plura Europe GmbH.
2.2	November 30, 2020	Re-formatted in new design.
2.3	January 9, 2024	Updated download links and update instructions.

A2 Copyright

For further information please contact your local dealer or:

Plura Europe GmbH
Binger Weg 12
D- 55437 Ockenheim
Phone: +49 6725 918 006-70
Fax: +49 6725 918 006-77
E-Mail: info@plurainc.com
Internet: http://www.plurainc.com

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 "GW".

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

1 Module GW

1.1 Description

This module serves as a stand-alone master audio clock generator. It internally generates two independent selectable fundamental sample clocks: FS1/FS2 = 32 or 44.1 or 48 or 96 kHz. The four Word Clock outputs can individually adjusted to one of these two fundamental clocks.

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 **GW** 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:

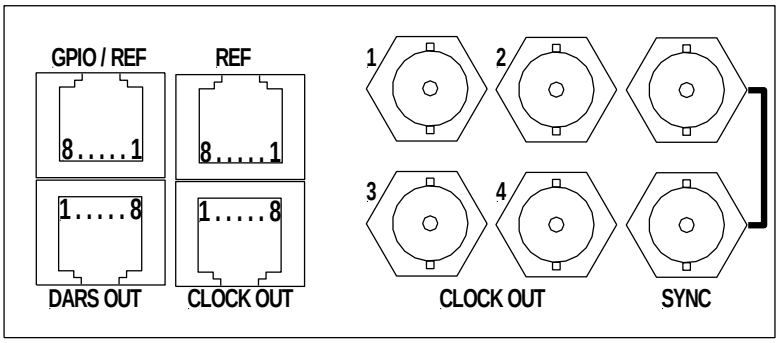
- Four Word Clock output stages. The frequency of each output can be selected as FS1 x 1, FS1 x 64, FS1 x 256, FS2 x 1, FS2 x 64, FS2 x 256. The output level can be adjusted between 1 and 6 Vpp. The output stages are capable of driving long coax cables.
- Standard analogue video input (PAL, NTSC, 576i/p, 480i/p, 720p, 1080i/p, bi-level and tri-level sync compatible), as genlock input for Word Clock synchronization.
- 10 MHz continuous wave input for Word Clock 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).
- Four digital in- or outputs (GPIO) may be used in special applications.

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 different Word Clock frequencies 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 GW



4 x BNC CLOCK OUT: Word Clock outputs.

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

Pin assignments:

GPIO / REF RJ45 jack	REF RJ45 jack
1: PPS IN – loop-through from REF.PPS IN 2: RXD IN – loop-through from REF.RXD IN 3: GPIO_1 6: GPIO_2 4: GND 5: GND 7: GPIO_3 8: GPIO_4	1: PPS IN 2: RXD IN 3: - 6: - 4: GND 5: - 7: - 8: -

DARS OUT RJ45 jack	CLOCK OUT RJ45 jack
1: GND 2: GND 3: SIGNAL 2 + 6: SIGNAL 2 – 4: SIGNAL 1 – 5: SIGNAL 1 + 7: GND 8: GND	1: CLOCK 3 – same as BNC 3 2: GND 3: CLOCK 2 – same as BNC 2 6: GND 4: GND 5: CLOCK 1 – same as BNC 1 7: CLOCK 4 – same as BNC 4 8: GND

Signal descriptions:

GND	Signal ground.

SYNC	Sync input, analogue video or 10 MHz continuous wave.

CLOCK OUT CLOCK 1 - 4	Word Clock outputs, frequency and level adjustable.

SIGNAL 1 – SIGNAL 1 +	Reserved for a balanced DARS output.

SIGNAL 2 – SIGNAL 2 +	Reserved for a balanced DARS 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.

GPIO_1 / GPIO_2 GPIO_3 / GPIO_4	General Purpose Inputs/Outputs, programmable functions. Each I/O may be used as input or output for digital signals according to application.

1.3 Specifications

SYNC

Connector	BNC (IEC169-8), 75 Ω

SYNC: Signal input = 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 ± 6 dB

SYNC: Signal input = 10 MHz

Format	10 MHz, sinusoidal
Signal level	0.8 – 5.0 Vpp

CLOCK OUT, CLOCK 1 - 4

Connector	BNC (IEC169-8), 75 Ω, in parallel connected to RJ45 CLOCK OUT
Output impedance	75 Ω. The output stages are capable of driving long coax cables.
Frequencies	32 kHz x 1, x 64, x 256, 32/1.001 kHz x 1, x 64, x 256, 44,1 kHz x 1, x 64, x 256, 44,1/1.001 kHz x 1, x 64, x 256, 48 kHz x 1, x 64, x 256, 48/1.001 kHz x 1, x 64, x 256, 96 kHz x 1, x 64.
Signal level	Adjustable output level: 1.0 to 6.0 Vpp unterminated 0.5 to 3.0 Vpp @ 75 Ω

PPS IN

Connector	Pin 1 RJ45 REF and REF/GPIO
Characteristic	Typical input signal: 5 V impulse Input impedance: ≈ 100 kΩ Input "Low": -2.0 to +1.7 V Input "High": +2.8 to +12.0 V

RXD IN

Connector	Pin 2 RJ45 REF and REF/GPIO
Characteristic	Typical input signal: RS232 Input impedance: ≥ 30 kΩ Input "Low": -15.0 to +1.7 V Input "High": +2.8 to +15.0 V Frequency: 0 – 1 MHz

GPIO

Input specification	Input "Low": -15.0 to +1.7 V Input "High": +2.8 to +15.0 V Impedance: ≥ 30 kΩ Frequency: 0 - 1 MHz
Output specification	Open Collector output of an NPN Darlington transistor. Internal 33k pull-up resistor. Max. power dissipation: 250 mW. "High" state: 3.6 V (no load). For higher switching levels an external pull-up to a positive power source of less than or equal to 24 VDC is needed, typically 1 kΩ when connected to an external +5 VDC power source. "Low" state: output switched to GND. Max. collector current: 200 mA DC, not fused. Collector-emitter saturation voltage: @20mA: typ. 0.72 V (≤ 0.85 V) @100mA: typ. 0.9 V (≤ 1.1 V) Frequency: 0 - 1 kHz.

Others:

Operating voltage	12 - 30 VDC
Power consumption	max. 5 W
Weight	0.4 kg approx.
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

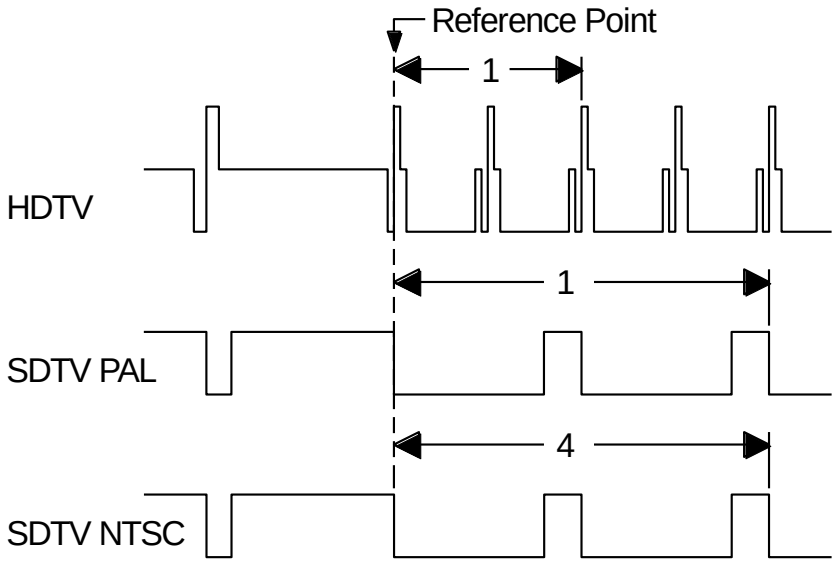
1.4 Sync Considerations

If the digital audio is related to video signals in any way, it is important to lock the audio samples to the video frame. Every video frame should have the same number of audio samples associated with it. The following mathematical relationship shall be given precisely:

Sample Rate kHz	Sample per TV or Film Frame			
	24 Hz	25 Hz PAL, SECAM	30 Hz	30/1.001 Hz NTSC
32	4000/3	1280	3200/3	16016/15
48	2000	1920	1600	8008/5
44.1	3675/2	1764	1470	147147/100
32/1.001	-	-	-	3200/3
48/1.001	-	-	-	1600
44.1/1.001	-	-	-	1470

The rising edge of the word clock signal is treated as the timing reference point.

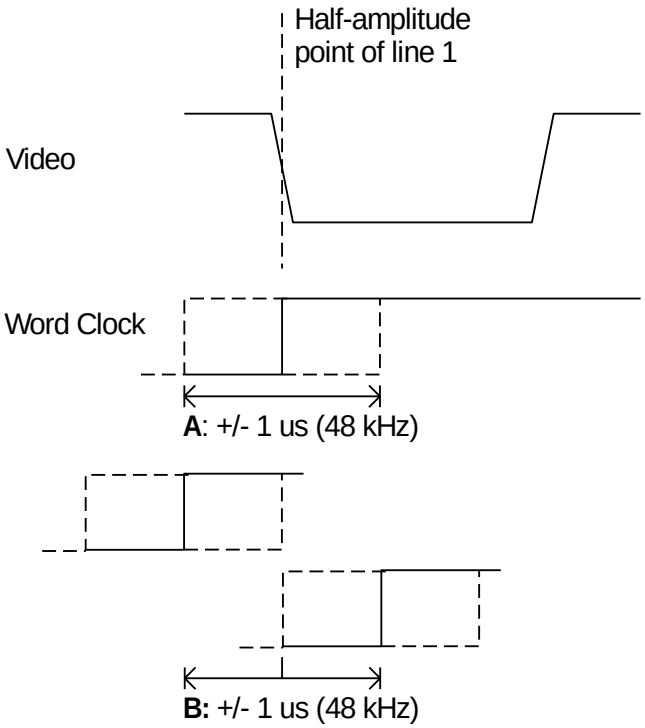
The reference point of a video signal shall be the half-amplitude point of the leading edge of the synchronization pulse of line 1 of the television signal on every frame - except for NTSC television signals where the reference point corresponds to line 4. This is in accordance with the signal alignment recommended by SMPTE RP 168.



According to AES Recommended Practice these are the tolerances of the timing relation ship between sync signal input and audio signal output (± 5 % of the audio frame period, timing **A** of figure below):

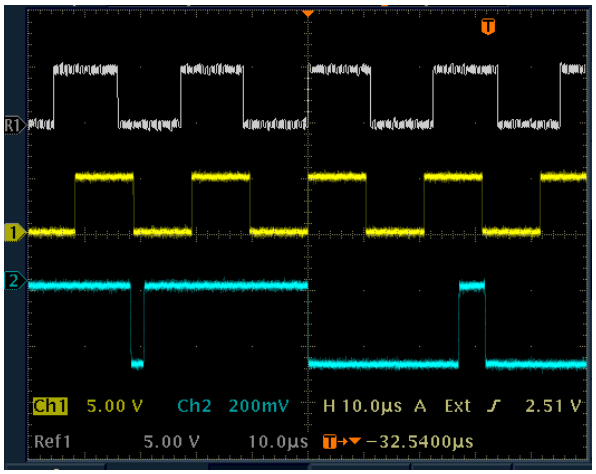
	Synchronisation Window µs	
Sample Rate f_s kHz	$1/f_s$	
32	31.25	± 1.6
44.1	22.68	± 1.1
48	20.83	± 1.0
96	10.42	± 0.5

There is an additional phase tolerance of ± 5 % of the audio frame period allowed (timing **B** of figure below).

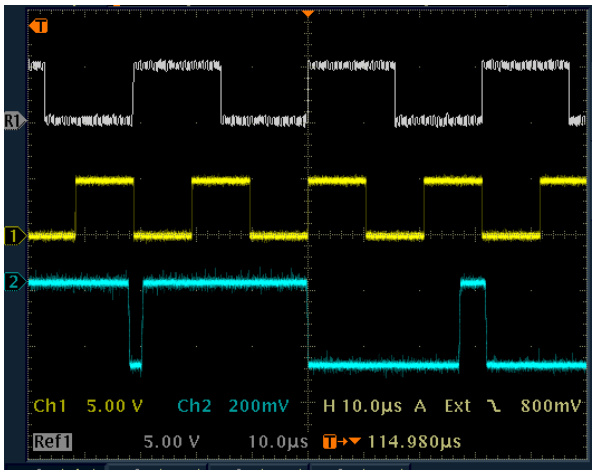


The GW Word Clock Generator exceeds these requirements to a great extent. The following pictures show word clock outputs synchronized to video signals.

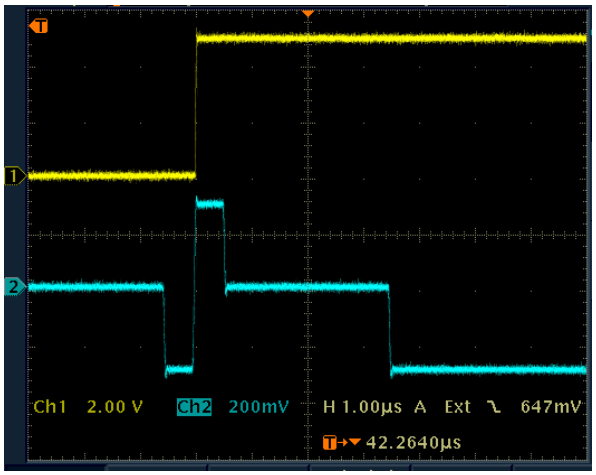
Slow 44.1 kHz and slow 48 kHz locked to NTSC video:



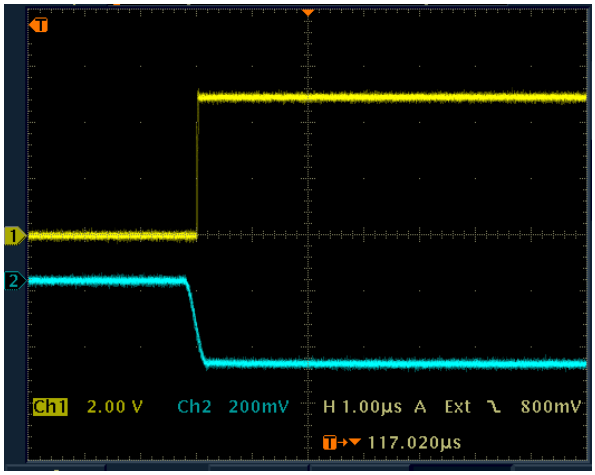
32 kHz and 48 kHz locked to PAL video:



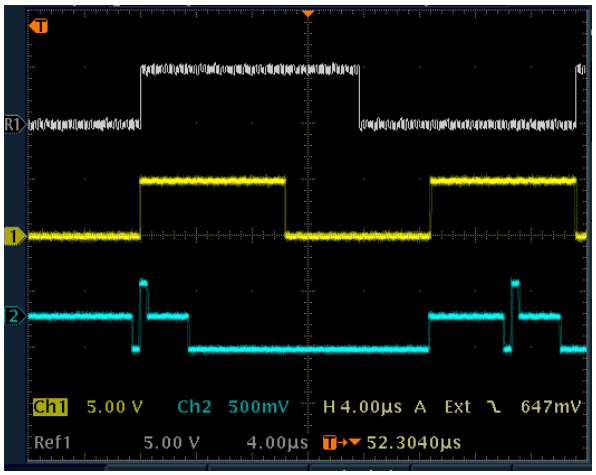
Locked to a Trilevel Sync (720p50):



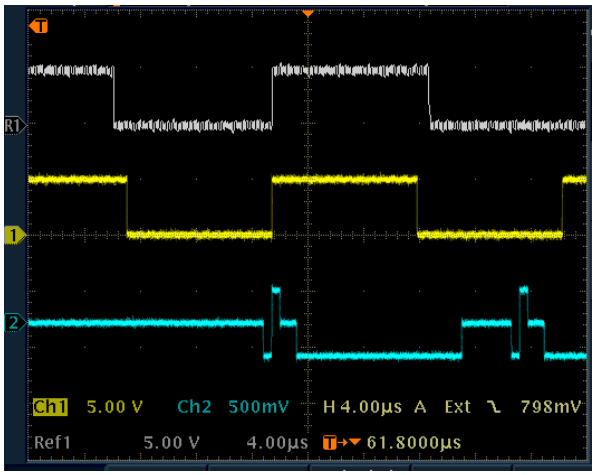
Locked to PAL line 1:



32 and 48 kHz locked to 720p50 HDTV:



44.1 and 48 kHz locked to 1080i50 HDTV:



1.5 Jitter Considerations

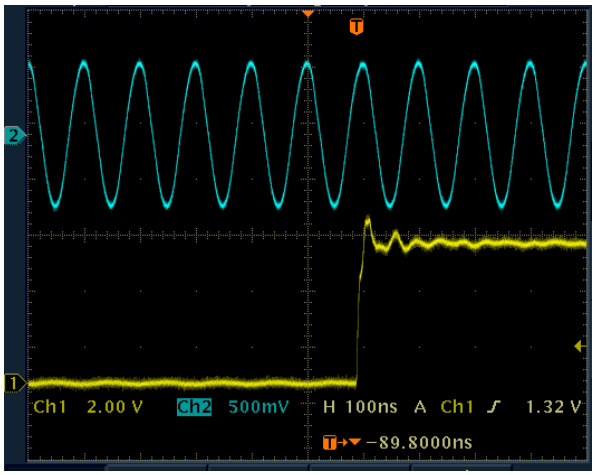
Video frame rates are obviously very much slower than digital audio. European broadcast – for example – has 25 frames per second so each video frame will contain 1920 audio frames (48 kHz sample rate). There will be many (e.g. 1920) clocks between the reference marks with a potential to drift away resulting in a less stable output ("jitter").

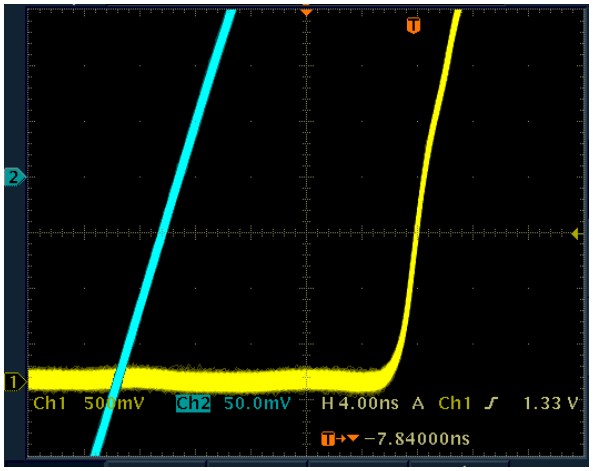
Free running outputs or outputs locked to a 10 MHz signal will show less jitter.

Jitter according to AES3:
The peak value of the intrinsic jitter at the output shall be less than 0,025 UI (UI = shortest nominal time interval in the digital audio coding scheme), this corresponds to ± 4 ns at 48 kHz sample rate.

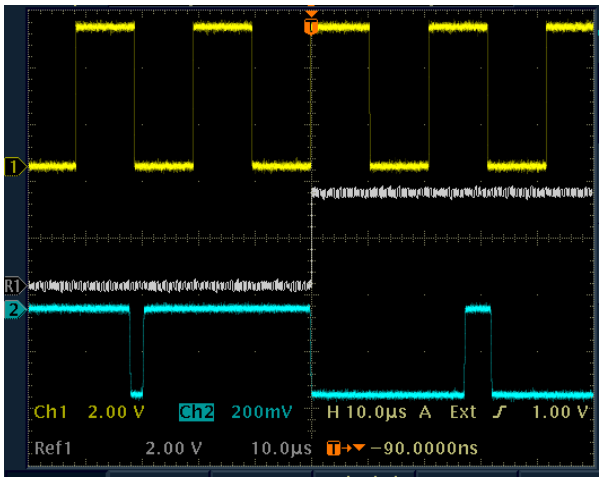
The following pictures show jitter measurements performed with a digital storage oscilloscope with the display set to infinite persistence, measurement time = 5 minutes.

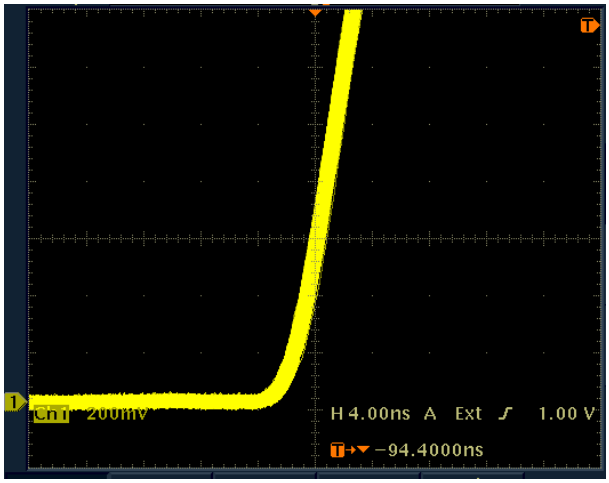
Sync mode = 10 MHz. Jitter measurement made with a 32 kHz word clock output divided externally by 2 (= 16 kHz, this gives an integer number of the ratio 10 MHz to 16 kHz) against the 10 MHz input signal:





Sync mode = Video. This measurement was made with the internal odd/even field pulse against the 48 kHz output:





1.6 Software Update

Software updates require a (Windows operating system) computer and the "RUBIDIUM CONFIGURATION" program.

Important: Please make sure to always use the latest version of the program. You can download it from:

https://plurainc.com/products/gw/.

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 GW version.tcf".
   "version" stands for a revision no., e.g. 2.11.10.

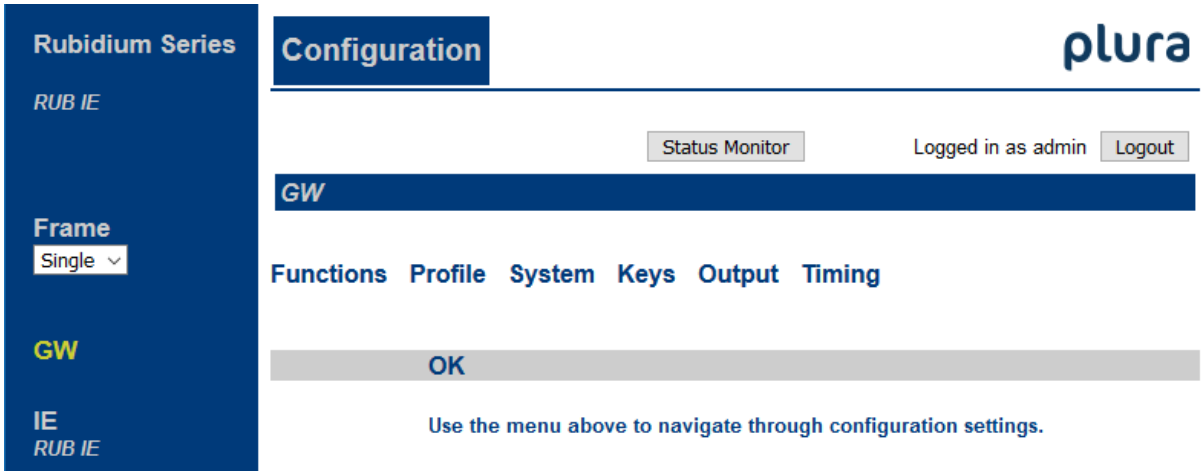
   Click the OK button, update starts. Click the OK button at the end.
6. Update is finished now. We recommend checking module's configuration utilizing the "RUBIDIUM CONFIGURATION" program.

During the flash update the operation of the module stops!

2 Status Monitor

2.1 Status Monitor by the IE Module

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.



- On the left click on "GW".
- Click on the button "Status Monitor" to open the "GW" status monitor.

Requirements:

- Please have Java Runtime Environment 1.6.0 or higher installed (for example download at www.java.com).
- Java should be installed as a browser plug-in (a Windows installation will do this automatically if you download Java from the source mentioned above).
- The Status Monitor works with all operating systems which support Java.

2.2 Status Monitor by a PC Program

The PC program **RubStatSE.exe** uses the **PC** interface (RS232 or USB) of the RUBIDIUM housing. This program is part of the "Rubidium Series, config software" packet you can download at:

https://plurainc.com/products/gw/.

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.

Requirements:

- Please have Java Runtime Environment 1.6.0 or higher installed (for example download at www.java.com).
- For a Windows operating system: Please follow the description of **RubStatSE_Readme.txt**.
- For a Linux operating system: Available on request.

2.3 Status Monitor: System – Setup and Status

System | Fan Monitor

Set-up

GW

Version	2	
Synchronization:		
source	video	
video frame rate	24, 25, 30, 50, 60	
video standard	4: 601 625/2:1 i	
Fundamental Sample Clocks:		
fs 1	48 kHz	
fs 2	32 kHz	
Clock Outputs:		
	Frequency	**Level**
out 1	fs1 x 1	5.0 V
out 2	fs1 x 1	5.0 V
out 3	fs1 x 1	5.0 V
out 4	fs1 x 1	5.0 V

Status

System:		
warmed up	yes	
ext. sync to	video	
27 MHz controlled by	D/A	
PLL mode	intern	
10 MHz PLL locked	no	
10 MHz present	no	
voltage D/A	0,96V (1200)	
voltage A/D	0,98V (980)	
voltage D/A adjust	1,70V (2120)	
voltage A/D best	0,98V (976)	
Timing:		
	Generator 1	**Generator 2**
video detected	yes	yes
video locked	yes	yes
audio locked	yes	yes
Reference:		
pps detected	no	
pps valid	no	
serial ref. detected	no	
serial ref. valid	no	
serial ref. format	Meinberg Standard	
Error:		
out 1	0	
out 2	0	
out 3	0	
out 4	0	
general	0	
lock lost	0	

Setup informs about the configuration - manually selected or internally set:

Version		2	GW hardware version
Synchronization:			
source		video	sync mode – manually selected
video frame rate		24, 25, 30, 50, 60	"even" frame rates or NTSC frame rates (fr/1.001)
video standard		4: 601 625/2:1 i	detected input video standard
Fundamental Sample Clocks:			
fs 1		48 kHz	selected fs rate 1
fs 2		34 kHz	selected fs rate 2
Clock Outputs:			
	Frequency	Level	
out 1	fs1 x 1	5.0 V	selected OUT 1 configuration
out 2	fs1 x 1	5.0 V	selected OUT 2 configuration
out 3	fs1 x 1	5.0 V	selected OUT 3 configuration
out 4	fs1 x 1	5.0 V	selected OUT 4 configuration

Status indicates the internal system status.

System:

warmed up	yes	"warmed up" a few seconds after power-on
ext. sync to	video	internal switch: video or 10 MHz
27 MHz controlled by	D/A	internal switch: D/A or PLL
PLL mode	intern	internal switch: intern or 10 MHz
10 MHz PLL locked	no	"yes" if locked to 10 MHz
10 MHz present	no	10 MHz detected
voltage D/A	0.96 V	VCXO control voltage - if PLL Mode = intern
voltage A/D	0.98 V	measurement of the VCXO control voltage
voltage D/A adjust	1.70 V	VCXO adjustment before first delivery. Could give the degree of aging of the oscillator.
voltage A/D best	0.98 V	control voltage measured during "lock" will be stored as "best value", gives the preset value after next power-on.

Timing: Status of both the internal clock generators during video synchronization.

	Generator 1	Generator 2
video detected	yes	yes
video locked	yes	yes
audio locked	yes	yes

Reference: Status of a connected real-time reference.

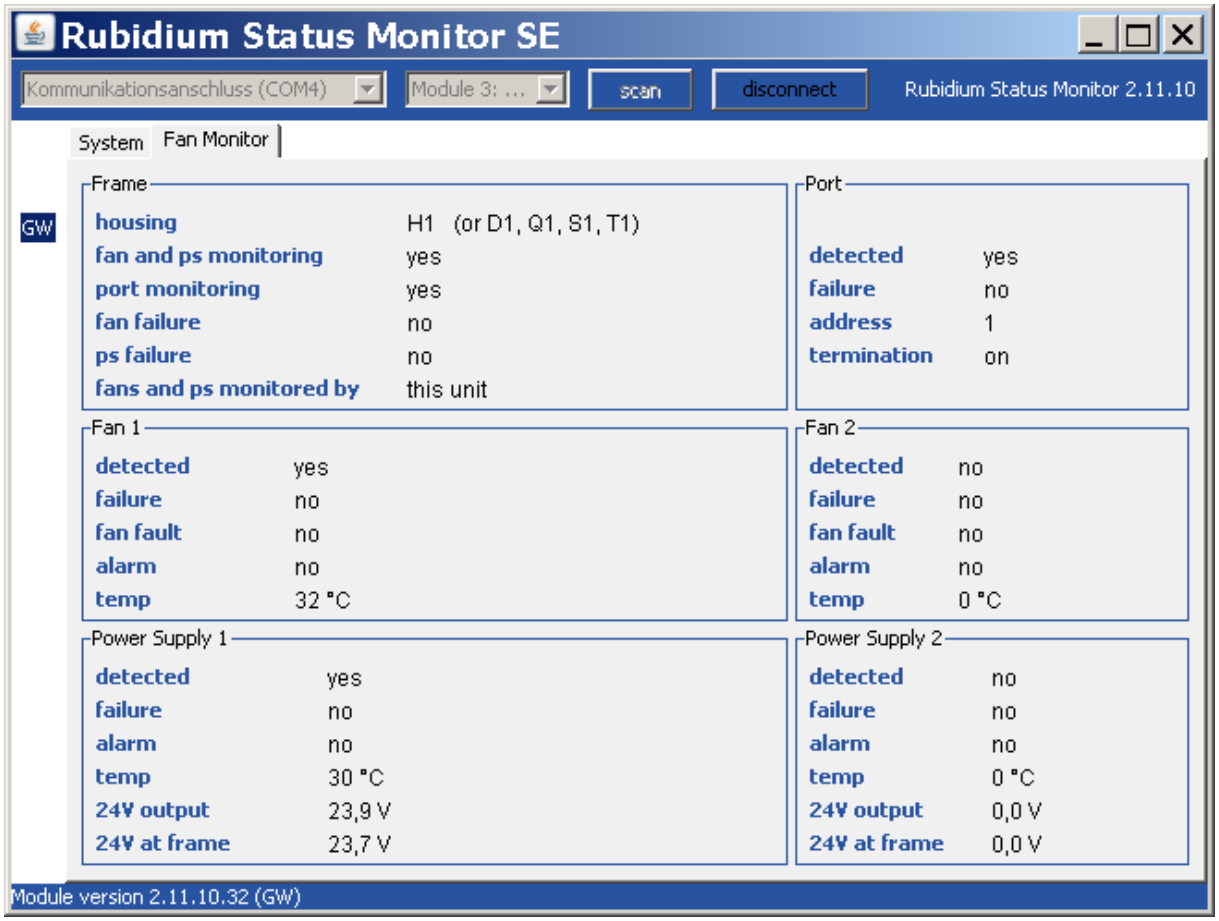
pps detected	no	PPS detected once yes/no
pps valid	no	PPS currently valid yes/no
serial ref. detected	no	real-time data string detected once yes/no
serial ref. valid	no	real-time data string currently valid yes/no
serial ref. format	Meinberg Standard	selected real-time data protocol

Error: Indication of detected errors.

out 1 ... out 4	0	error bits for each output channel: bits 0/1: Operational amplifier control. bit 2: Setup value (level) out of valid range
general	0	error bits, service only.
lock lost	0	counts lost of "lock" in case of video or 10 MHz synchronisation [0 – 255].

2.4 Status of Fan and Power Supplies

This module – as all configurable RUBIDIUM modules – is able to monitor the fan and power supplies which are plugged to the same housing as "GW".



Please refer to the document "Installation & Systems Manual RUBIDIUM SERIES" for a detailed description.

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 following 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

The RUBIDIUM SERIES HTTP server is located in the **RUB IE** module. A 10/100Base-T Ethernet connection and a web browser allow access to the RUBIDIUM system.

Please refer to the

"Installation & Systems Manual RUBIDIUM SERIES"

for a functional overview and for an installation description of this program. You will find the chapter "The RUBIDIUM SERIES HTTP Server" and its subchapters:

- Overview, Connecting the IE Module
- IP Configuration, the Rubidium Homepage
- 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 links to those pages which are actually enabled for a configuration.

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**:

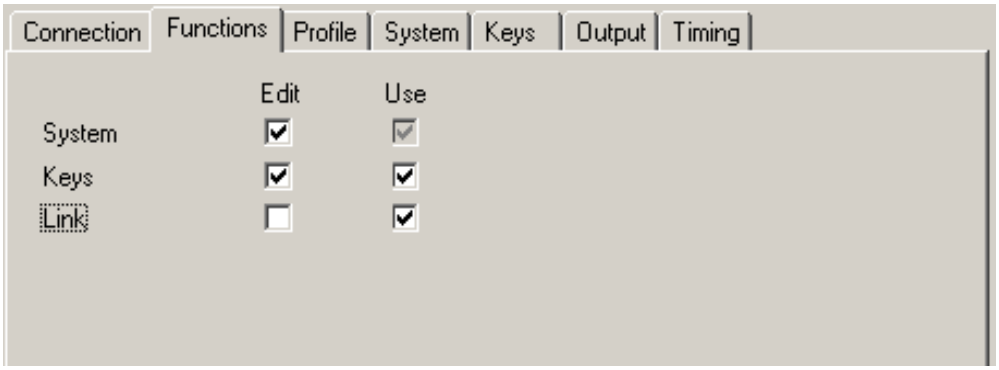
- Click on this button to load the current configuration of the module.

GW	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:

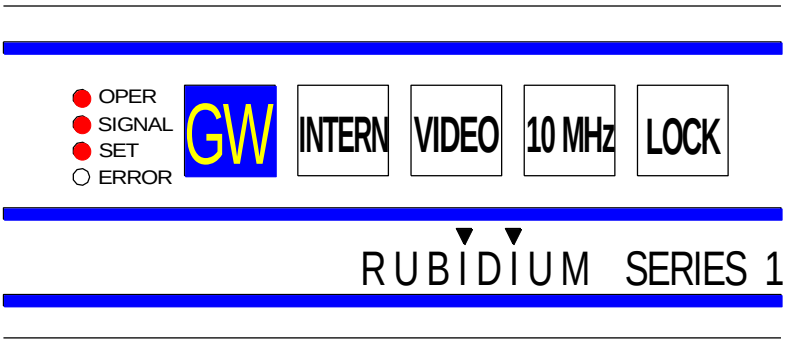
Profile	Store and Load Configurations on the Module (*)
System	Module Identification, Reset, SNMP, Fan Control
Keys	Keys and Lamps, LEDs and GPIOs
Output	Configuration of the Frequency Outputs
Timing	Selection of the Mode of Synchronization
Link	Communication between Modules

(*) refer to "Installation & Systems Manual RUBIDIUM SERIES"

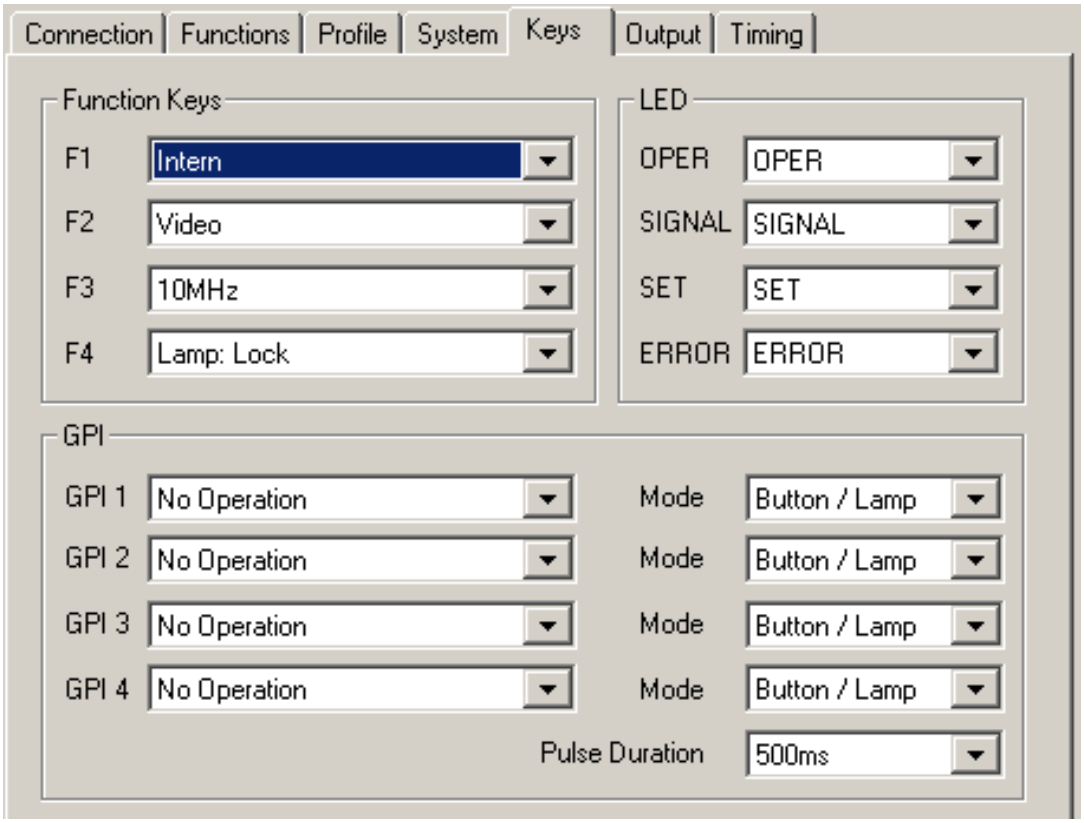
3.4 “Keys”: Keys and Lamps, LEDs and GPIOs

The GW module has four GPIOs (General Purpose Inputs/Outputs), the RUB1 module additionally 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 presented by the configuration tool maybe assigned to special options, and therefore are not applicable with the standard firmware. For further information please contact **Plura**.



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



The following functions for the **keys** are provided for this module (this gives a function for the lamp of the key as well):

Function	Description	Recommended Key
INTERN	Select synchronization source = "Internal". Function of the lamp: See "Lamp: INTERN".	F1: INTERN
VIDEO	Select synchronization source = "Video". Function of the lamp: See "Lamp: VIDEO".	F2: VIDEO
10 MHz	Select synchronization source = "10 MHz". Function of the lamp: See "Lamp: 10 MHz".	F3: 10 MHz
ERROR RESET	Resets all error messages. LED ERROR switches off. Function of the lamp: See "Lamp: LOCK".	F4: LOCK

The following functions for the **lamps** are provided for this module (these functions set the key in a "no operation" mode"):

Function	Description	Recommended Lamp
Lamp: INTERN	Lights up during synchronization source = "Internal".	F1: INTERN
Lamp: VIDEO	In case of synchronization source = "Video": Lights up, if video PLL has locked. Flashes, if video PLL is unlocked.	F2: VIDEO
Lamp: 10 MHz	In case of synchronization source = "10 MHz": Lights up, if a 10 MHz signal is present. Flashes, if no 10 MHz signal is present.	F3: 10 MHz
Lamp: LOCK	Lights up, if the Word Clock frequencies have locked to an external source (video, 10 MHz).	F4: LOCK

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

Function	Description	Recommended LED
OPER	Lights up, if the module is operating. Flashes once per second, if there are valid signals of a real-time reference at connector REF (PPS IN, RXD IN).	OPER
SIGNAL	Lights up, if video or 10 MHz has been connected.	SIGNAL
SET	Lights up after the warm-up phase.	SET
ERROR	Lights up, if any error has been detected. Watch the Status Monitor to find the source of an error. All errors will be reset by activating a key or a GPIO with function "Error Reset".	ERROR
OFF	This LED is off.	

The following functions for the **GPIOs** configure a pin to be **Input**:

Function	Description	Recommended GPIO
INTERN	Switch to synchronization source = "Internal".	GPIO_1
VIDEO	Switch to synchronization source = "Video".	GPIO_2
10 MHz	Switch to synchronization source = "10 MHz".	GPIO_3
ERROR RESET	Resets all error messages. LED ERROR switches off.	GPIO_4

Additionally, the input characteristic is selectable. Valid selection:

Mode	Description
Button/Lamp	Function will be triggered receiving a falling edge ("High" → "Low") [recommended].
Inv. Button/Lamp	Function will be triggered receiving a rising edge ("Low" → "High").

The following functions for the **GPIOs** configure a pin to be **Output**:

Function	Description	Recommended GPIO
Lamp: INTERN	Active during synchronization source = "Internal".	GPIO_1
Lamp: VIDEO	Active during synchronization source = "Video": Statically, if video PLL has locked. Toggles, if video PLL is unlocked.	GPIO_2
Lamp: 10 MHz	Active during synchronization source = "10 MHz": Statically, if a 10 MHz signal is present. Toggles, if no 10 MHz signal is present.	GPIO_3
Lamp: LOCK	Active if the Word Clock frequencies have locked to an external source (video, 10 MHz).	GPIO_4

Additionally, the output characteristic is selectable. Valid selection:

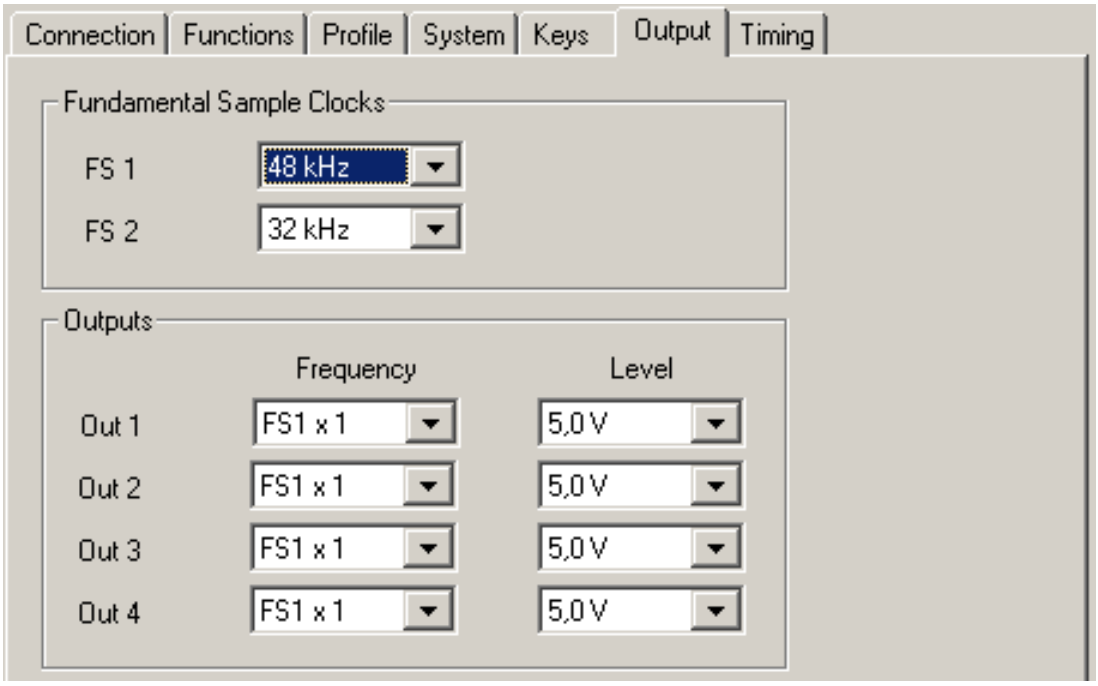
Mode	Description
Button/Lamp	Statically, active "Low" [recommended]
Inv. Button/Lamp	Statically, active "High"
Switch/On Pulse	Pulse, active "Low"; pulse width selectable from 100 ms to 2 s. Pulse will be generated at event entry.
Inv. Switch/Off Pulse	Pulse, active "High"; pulse width selectable from 100 ms to 2 s. Pulse will be generated at the end of the event.

Pulse Duration The pulse width is selectable as 100 ms, 200 ms, 500 ms, 1 s, 2 s. This selection refers to all GPIO outputs set to a pulse mode.

3.5 “Output”: Configuration of the Frequency Outputs

The GW module has four Word Clock outputs. Frequency and output level are individually programmable.

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



Fundamental Sample Clocks

Select two independent fundamental sample clocks FS 1 and FS 2 independently:

32 kHz / 44,1 kHz / 48 kHz / 96 kHz / slow 32 kHz / slow 44.1 kHz / slow 48 kHz.

The “slow” sample rates are available only when the video standard selected is 23.98, 29.97 or 50.94 frame rate based. They refer to 32 kHz, 44.1 kHz or 48 kHz multiplied by 1000/1001 to maintain the frame sequence normally associated with 24, 30 and 60 fps video.

Outputs

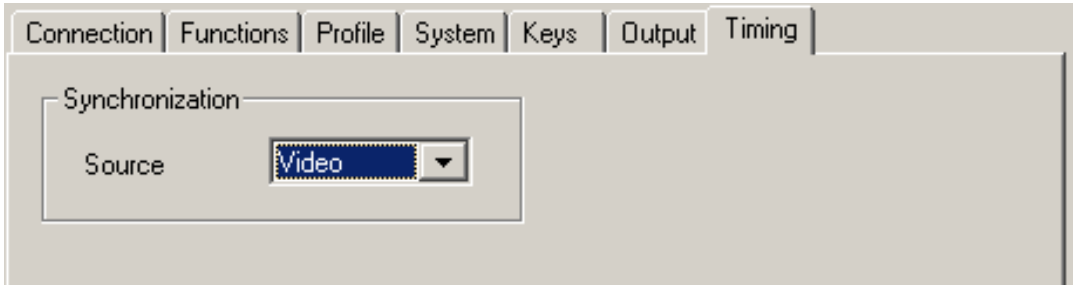
Select frequency and output level for each output individually:

Frequency:	FS1 x 1, FS1 x 64, FS1 x 256, FS2 x 1, FS2 x 64, FS2 x 256 Restriction: 96 kHz x 256 is not possible.
Level:	1.0 to 6.0 Vpp – no termination. Divide the value by 2 if terminated with 75 Ω.

3.6 “Timing”: Selection of the Mode of Synchronization

The Word Clock output can be synchronized to the internal oscillator or to an external source.

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

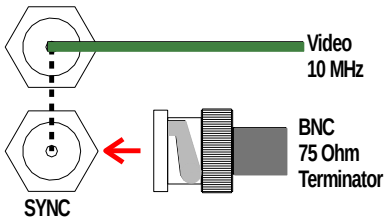


Synchronization

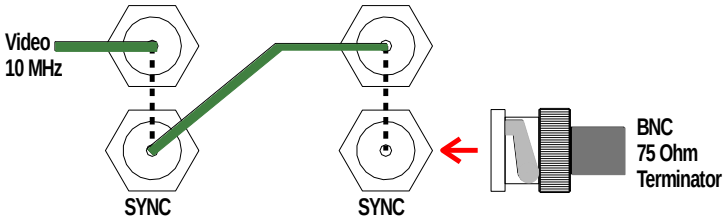
Select the source of synchronization:	
Internal	Internal oscillator.
Video	Analogue video signal, connected to BNC SYNC. Please notice chapter “Specifications”.
10 MHz	10 MHz signal, connected to BNC SYNC. Please notice chapter “Specifications”.

In case of “Source = Video” or “Source = 10 MHz”: Terminate the input at the end!

1:1 connection:



Loop-through to further devices:



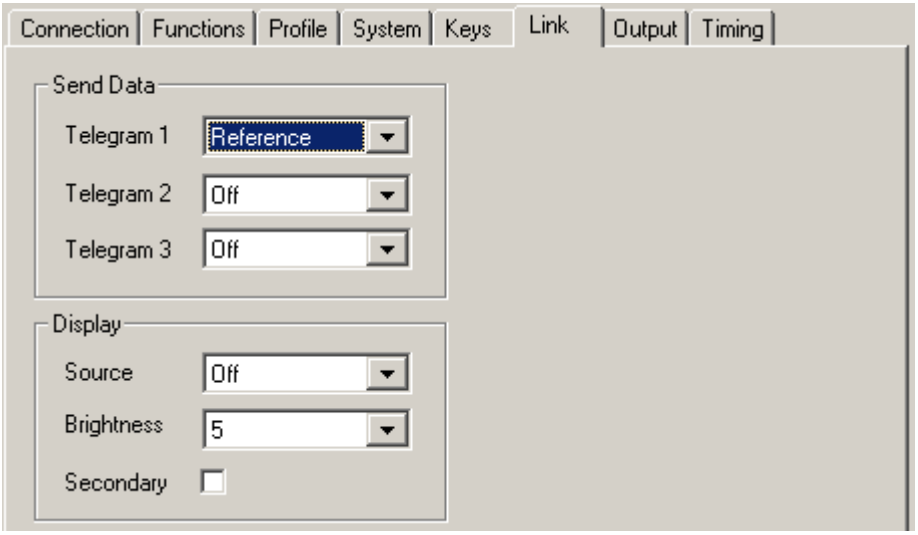
3.7 “Link”: Communication between Modules

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.
Reference	This channel transfers time and date (UTC) every second as long as there are valid signals of a real-time reference at connector REF (PPS IN, RXD IN).

Display

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

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

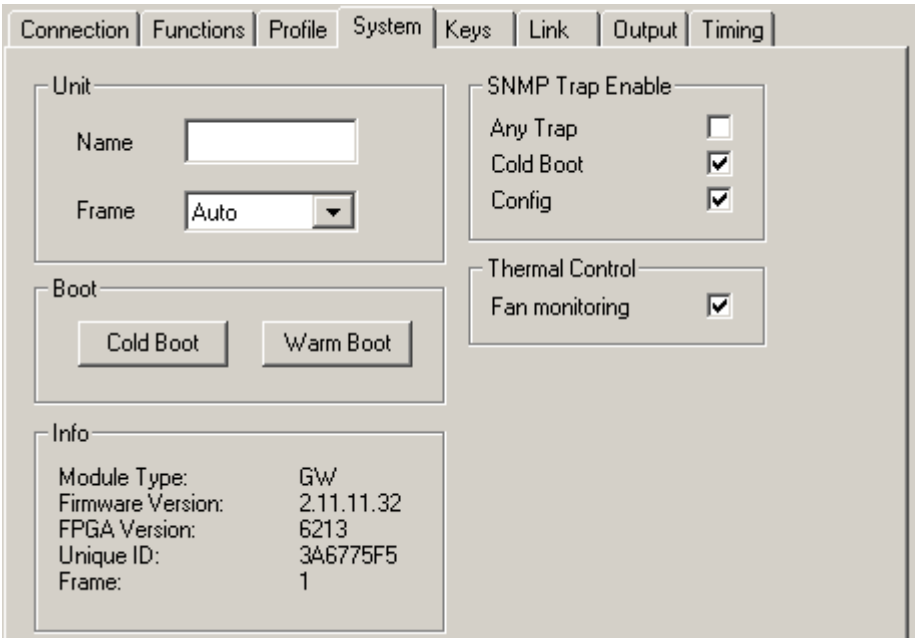
Off	No data will be sent from this module.
Reference Time	Time (UTC) of the external real-time reference, HH:MM:SS.
Reference Date	Date (UTC) of the external real-time reference, day/month/year.

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.

3.8 “System“: Identification, Reset, SNMP, Fan Control

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



Unit

Name:	The connected module can get a name. You may enter, change, or verify this name at this window.
Frame:	Modules in a network can be uniquely identified by a frame number and the module’s position within the frame. In a single frame system, you may select “Single” or “Auto” at this set-up. If a system is built-up of more than one frame, each frame has to receive a unique address (adjusted at the fan module). If you select “Auto”, the module will request this frame number automatically and will show it on the info box. Likewise, it is possible to select a frame number manually.

Boot

Cold Boot:	Do a cold boot of the module.
Warm Boot:	Do a warm boot of the module.

Info

Displays module’s status information.

SNMP Trap Enable

Activate the “Any Trap” check box to enable the SNMP functionality in general. If not checked, this module will not send any SNMP traps.
The individual traps can be enabled/disabled by a click on the corresponding check box.
Please notice the chapter “Alarms by SNMP Traps” as well.

Thermal Control

At least one module of each frame should have the fan monitoring activated. This enables the power supply monitoring – for power supplies within this frame - as well.

Contact Us

plura®

Corporate Offices:
Plura Broadcast, Inc.
Ph: +1-602-944-1044
Sales@plurainc.com

Plura Europe GmbH
Ph: +49-6725-918006-70
Sales@plurainc.com

Plura MEA
Ph: +971-50-715-9625
Sales@plurainc.com

Plura Asia
Ph: +82-10-6688-8826
Sales@plurainc.com