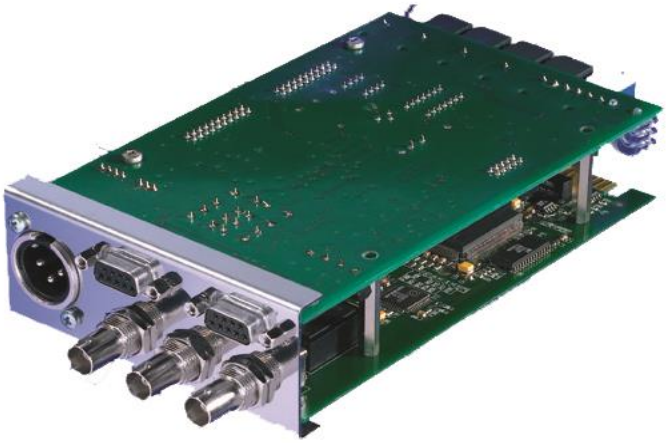
plura®

TIMING SOLUTIONS

Rubidium Series

RUB AT
RUB AV

Analogue Video Time Code of the RUBIDIUM SERIES System



Functional Description and Specifications
Supplement to the “Installation & Systems Manual RUBIDIUM SERIES”
Version: 3.6
January 11, 2024

CONTENTS

A1 Revision History

No.	Date	Subject
0.n		Preliminary documents, changes without notice.
1.0	January 12, 2005	First released document
1.1	January 27, 2005	Description of AV modules added. Revised.
1.2	August 05, 2005	Revised. New Chapter: Options
2.0	March 30, 2007	Completely revised. Introducing hardware version 2.
3.0	March 30, 2011	New Jam Sync features described. Completely revised.
3.1	May 24, 2011	Some amendments.
3.2	June 29, 2012	"Signal description" in chapter "Rear Panel and Connections" revised.
3.3	August 23, 2012	New Jam Sync feature: Checkbox *Ignore "Read Offset"*. "LTC Generate": drop-down list "gain" revised.
3.4	October 1, 2019	Changed address of Plura Europe GmbH.
3.5	November 30, 2020	Re-formatted in new design.
3.6	January 9, 2024	Updated download links and update instructions.

The latest document describes the functions of the latest module's software. You can download the latest software version from:

https://plurainc.com/products/at/

A2 Copyright

Printed in Germany.

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 Rubidium module **AT** or **AV**.

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

1 Modules AT and AV

1.1 Introducing the AT Module

The hardware consists of an analogue video channel, time code in/outputs, serial interfaces as well as some general-purpose interfaces, which may be used for various special applications (GPI in/outputs).

A **PC** or the **RUB IE** module is required for the configuration of this module.

Configuration, status monitor etc. identify this module as **AT**. RUB1 version modules visibly show this id on a button at the front panel, RUB3 version modules at the rear panel. 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:

- "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.
- Analogue video input, e.g. as the source for reading VITC or as genlock input for LTC synchronization.
- Analogue video output (a video signal must be present on the input side), e.g. for character insertion (time code, text) or for VITC output.
- LTC input, LTC output.
- Four programmable function keys, lamps and LEDs on the front panel (RUB1 version only).
- Flash memory containing the firmware, so configuration and updates are possible via a PC connection. You can download the latest version of the program from:

  https://plurainc.com/products/at/

- Local serial interface, selectable as RS232 or RS422 or RS485. This interface can be used for remote control and for real-time data exchange.
- Four digital in- or outputs and one relay contact may be used in special applications.

There is a nearly unlimited 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 software/firmware into the unit.

The modular concept of **RUB AT RUB AV** and the programmable parts of this module enhances the flexibility of our system, i.e. two basically identical modules could be used in completely different applications. This can be achieved either, with the same software but with different configurations (e.g. one module serves as time code reader, other module as time code generator), or with different programming of the firmware. See chapter about "Software Tools" to get a description of the configuration/programming of this module.

1.2 Introducing the AV Module

The hardware consists of an analogue video channel with character inserter and VITC in/output.

A **PC** or the **RUB IE** module is required for the configuration of this module.

Configuration, status monitor etc. identify this module as **AV**. RUB1 version modules visibly show this id on a button at the front panel, RUB3 version modules at the rear panel. 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:

- "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.
- Analogue video input, e.g. as the source for reading VITC.
- Analogue video output (a video signal must be present on the input side), e.g. for character insertion (time code, text) or for VITC output.
- Flash memory containing the firmware, so configuration and updates are possible via a PC connection. You can download the latest version of the program from:

https://plurainc.com/products/at/

There is a nearly unlimited 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 software/firmware into the unit.

The modular concept of **RUB AT RUB AV** and the programmable parts of this module enhances the flexibility of our system, i.e. two basically identical modules could be used in completely different applications. This can be achieved either, with the same software but with different configurations (e.g. one module serves as time code reader, other module as time code generator), or with different programming of the firmware. See chapter about "Software Tools" to get a description of the configuration/programming of this module.

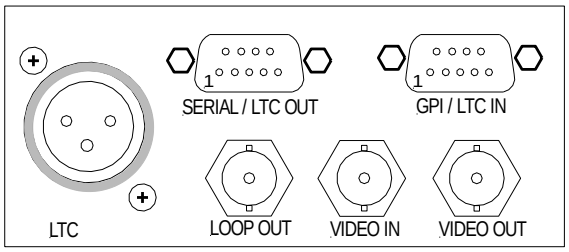
1.3 Remark to Different Hardware Versions of Modules

Starting in the second quarter of 2007, a new release of AT/AV modules (version 2) will be shipped. Hardware and firmware are not fully compatible to version 1 modules. The main difference in the hardware is a change of the denotation of the BNC connectors. The new version will deliver enhanced functionality. Version 2 is downwards compatible to version 1.

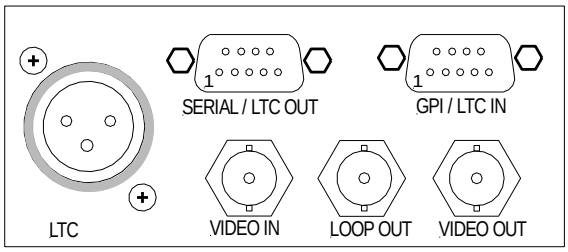
The PC Program RUBIDIUM CONFIGURATION indicates the version at the "System" tab. Example: "Module Type = AT" or „Module Type = AT (v2)".

1.4 Rear Panels and Connections

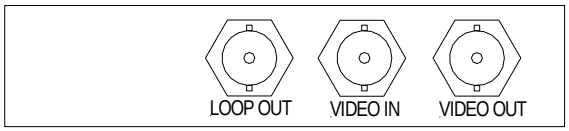
Connections at RUB AT – hardware version 1



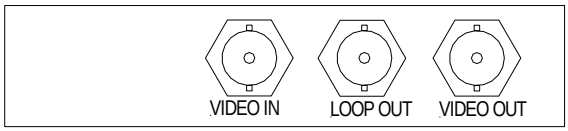
Connections at RUB AT – hardware version 2



Connections at RUB AV – hardware version 1

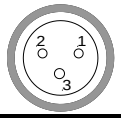


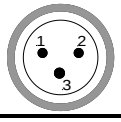
Connections at RUB AV – hardware version 2



Pin assignments

The LTC connector may be an input or an output:

LTC input 1: GND 2: LTC_IN_A 3: LTC_IN_B	XLR3F female 

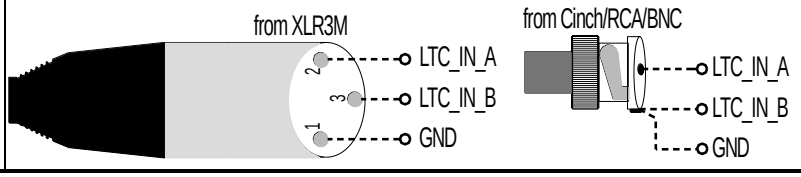
LTC output 1: GND 2: LTC_OUT_A 3: LTC_OUT_B	XLR3M male 

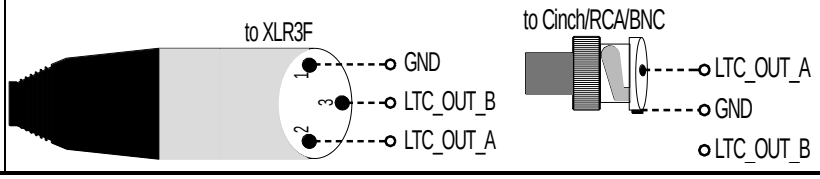
SERIAL/LTC OUT DSUB9F female	1: T-_TxD 2: T+_CTS 3: LTC_OUT_A 4: LTC_OUT_B 5: GND 6: R-_RTS 7: R+_RxD 8: GPI_3 9: GPI_4

GPI/LTC IN DSUB9F female	1: GPI_1 2: GPI_2 3: GPI_3 4: GPI_4 5: GND 6: 24V 7: GPI_5 8: LTC_IN_A 9: LTC_IN_B

Signal descriptions

GND	Signal ground.

LTC_IN_A, LTC_IN_B	LTC (Linear Time Code) input. Connections: balanced signal unbalanced signal 

LTC_OUT_A, LTC_OUT_B	LTC (Linear Time Code) output. Connections: balanced use unbalanced use 

T-_TxD T+_CTS R-_RTS R+_RxD	In- or outputs of the local serial interface. One of the following specifications may be selected during configuration: RS485 Signals T- and T+, balanced in/output. RS422 Signals T- and T+ = balanced output, signals R- and R+ = balanced input. RS232 TxD = transmit line, unbalanced data output. CTS = clear to send, handshake input. RTS = request to send, handshake output. RxD = receive line, unbalanced data input.

GPI_1 ... GPI_4	General Purpose Interface, may be used as input or as output for digital signals according to application.

GPI_5	Relay contact (normally open). The relay contact shortens this pin to GND.

24V	24 V DC voltage output, 200 mA reversible fused. This output corresponds to the voltage output of the inserted "Power Supply" module. Please notice the power supply specifications. Using this output please make sure not to exceed the total power rating of the "Power Supply" module.

1.5 Specifications

Video Input VIDEO IN

Format	CVBS analogue video signal: PAL 625/50, NTSC 525/60
Connector	BNC (IEC169-8), 75 Ω
Signal level	• 1 V ± 15 mV - if used for VITC or character insertion. • 1 V ± 6 dB - if used only as VITC reader input or as genlock input for the time code generator.
VITC input	According to ANSI/SMPTE 12M-1-2008

Video Output LOOP OUT

Format	Same as video input (pass-through output of VIDEO IN)
Connector	BNC (IEC169-8), 75 Ω

Video Output VIDEO OUT

Format	Same as video input
Connector	BNC (IEC169-8), 75 Ω
Gain	1 ± 1% (adjustable ± 4%)
VITC output	According to ANSI/SMPTE 12M-1-2008

LTC Input

Format	According to ANSI/SMPTE 12M-1-2008
Connector	Balanced signals LTC_IN_A and LTC_IN_B: • Via 3-pin XLR female (according to IEC 268-1). • Via 2 pins of the 9-pin DSUB female GPI/LTC IN.
Input impedance	18 kΩ
Frame rates	24, 25, 30, 30-Drop
Signal level	100 mV_{p-p} - 5 V_{p-p}
Frequency	1.6 - 2500 frames/s

LTC Output

Format	According to ANSI/SMPTE 12M-1-2008
Connector	Balanced signals LTC_OUT_A and LTC_OUT_B: • Via 3-pin XLR male (according to IEC 268-1). • Via 2 pins of 9-pin DSUB female SERIAL/LTC OUT.
Output impedance	< 50 Ω
Frame rates	24, 25, 30, 30-Drop
Signal level	Adjustable 150 mV_{p-p} - 4.9 V_{p-p}

GPI

GPI_1 ... GPI_4: Input specification	Input "Low": -2.0 to +1.0 V Input "High": +3.0 to +24.0 V Impedance: 4.7 kΩ Frequency: 0 - 1 MHz
GPI_1 ... GPI_4: Output specification	Open Collector output of an NPN transistor at 4k7 pull-up resistor (5 VDC). Max. power dissipation: 200 mW. "High" state: 4.3 V (no load). "Low" state: output switched to GND. Max. collector current: 100 mA DC, fused by a 100 mA auto-recovery fuse. Collector-emitter saturation voltage: @100 mA: typ. 200 mV (≤ 600 mV), @10mA: typ. 90 mV (≤ 250 mV). Frequency: 0 - 150 kHz.
GPI_5: SPST-NO relay	Contact resistance: 0.2 Ω Max. switching power: 10 W Max. switching voltage: 175 VDC Max. switching current: 0.5 A Max. transportable current: 0.8 A

24V

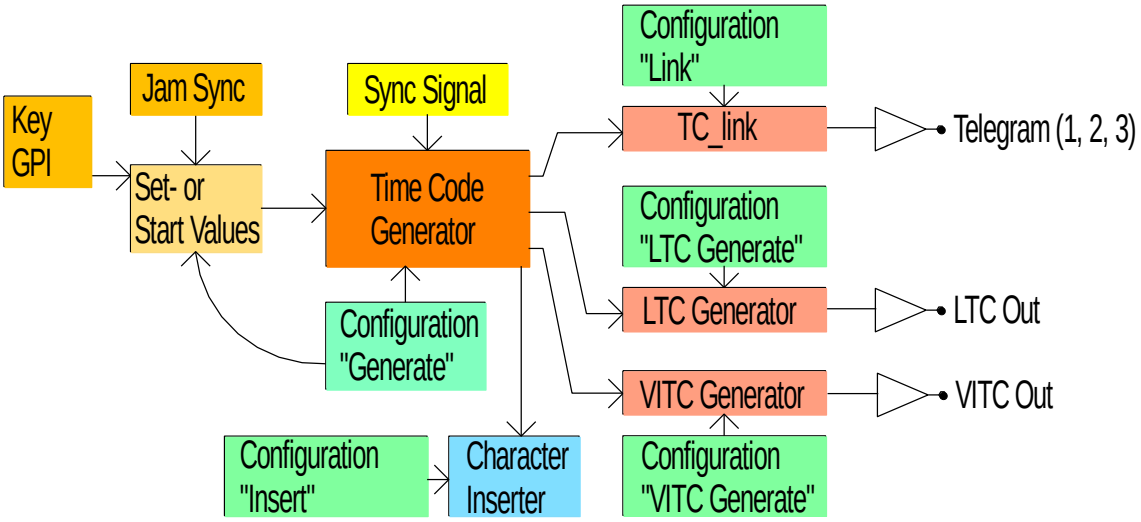
Output of the DC power supply of this module, normally = 24 VDC.	Reversible fused. A continuous current of up to 120 mA can be applied over the whole specified operating temperature range. At an ambient temperature of e.g. 22 °C the output switches to a high-resistance state after a few seconds if a current of 300 mA is applied.

Others

Operating voltage	12 - 30 VDC
Power consumption	AT(V1, V2) module: max. 4.5 W AV(V1, V2) module: max. 2.8 W
Weight	AT module: 0.4 kg approx. AV module: 0.2 kg approx.
Mechanical AT	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
Mechanical AV	Circuit board (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: 4HP, 3RU
Environmental character-istics, operating	Temperature: 5 °C to 40 °C Relative humidity: 30 % to 85 %, non-condensing
Environmental character-istics, non-operating	Temperature: -10 °C to +60 °C Relative humidity: 5 % to 95 %, non-condensing

1.6 Features

1.6.1 Standard Features of the Time Code Generator



Basically, there is one time code generator which outputs the time addresses and the binary groups (user bits) in various time code formats: As LTC, as VITC, or as a telegram of the Rubidium TC_link interface. The generator's data can be visibly inserted in video windows, of course.

Overview of the basic features:

Frame rate	Selectable: 24, 25, 30, 30 Drop.
Genlock mode	Selectable: Internal, video, LTC read, second pulse.
Colour lock mode	Selectable in the television system 625/50 (PAL).
Start value for the time or the user bits	Settable: Manually via a programmed button/GPI or via a configuration tool or utilizing the Jam Sync function.
LTC output level	Adjustable.
VITC lines	Selectable.
Jam Sync application	Various operating modes - see chapter "The Jam Sync Function".
Video window	Time and user bits can be visibly displayed. Various formats are selectable, as well as size, position ...

A RUB1 version AT module has four programmable LEDs at the front.

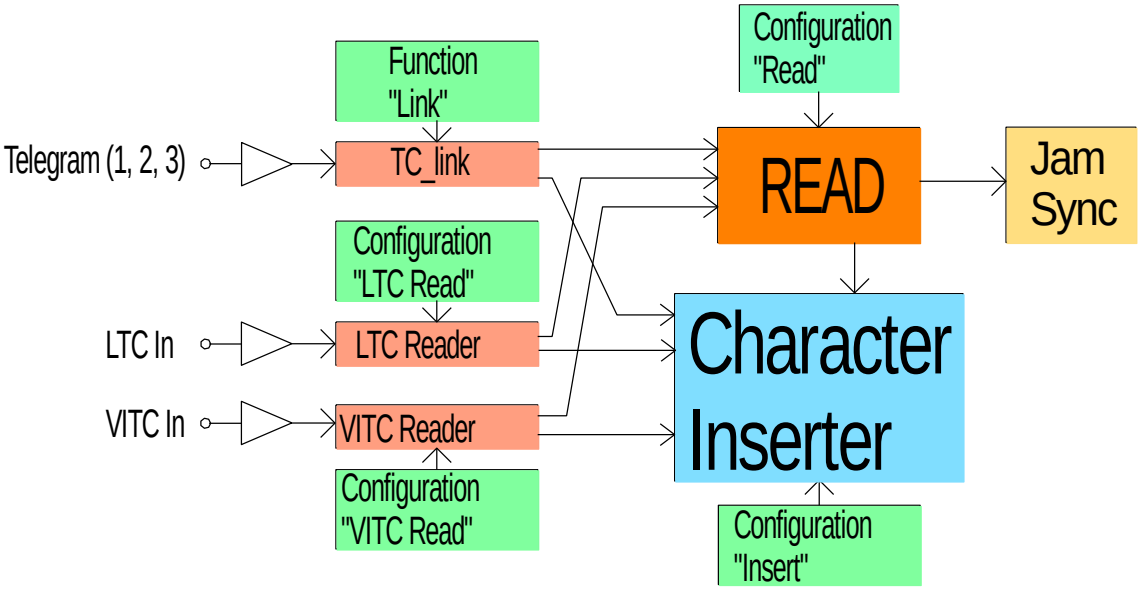
The **Gen Sync Status** function for a **LED** indicates the status of the phase and frequency synchronization of the time code generator, depending on the mode of sync selection (for configuration please refer to chapter "Keys: Keys and Lamps, LEDs and GPIs").

Selection at "Generate"	Description of LED Function "Gen Sync Status"
Sync = Internal	LED is permanently off.
Sync = Video	LED lights up during video lock. LED flashes slowly during the fine trim procedure. LED flashes fast if video synchronization is lost.
Sync = LTC Read	LED lights up during source lock (LTC signal at REF_IN_A, REF_IN_B). LED flashes slowly during the fine trim procedure. LED flashes fast if LTC synchronization is lost.
Sync = Second Pulse	LED lights up during lock to the external PPS (signal input at GPI_1). LED flashes slowly during the fine trim procedure. LED flashes fast if PPS synchronization is lost.

The **PAL8** function for a **LED** indicates the status of a colour lock operating mode of the time code generator (for configuration please refer to chapter "Keys: Keys and Lamps, LEDs and GPIs"). Colour lock can be switched on by checking the PAL8 checkbox at the "Generate" function.

LED	Description of LED Function "PAL8"
Lights up	Colour frame correction is running, the colour frame flag of the time code is set, status = "colour frame lock".
Flashes fast	Colour frame correction is selected and running, the colour frame flag has been set formerly, but currently no colour field sequence can be detected, the colour frame flag of the time code is not set.
Flashes slowly	Colour field sequence can be detected, but the operating mode is not selected. No colour frame correction is running, the colour frame flag of the time code is not set.
Off	Currently no colour field sequence can be detected and either it couldn't until now or one of the following adjustments is not selected: Frame rate = 25, Sync = video, PAL8 not checked. No colour frame correction is running, the colour frame flag of the time code is not set.

1.6.2 Standard Features of the Time Code Reader



Each time code format has its own time code reader. Each reader is able to visibly insert the data in a video window. Each reader can – with selectable priority – transfer the data to the "general reader" (Read). The following functions are only available for the "general reader":

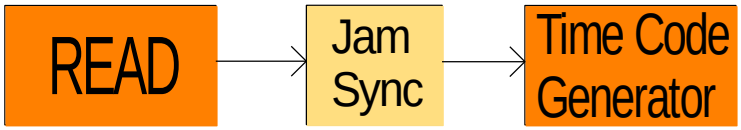
- Jam Sync, i.e. the data transfer of the reader data to the time code generator.
- Decoding the MTD data of the Plura Timer System.
- Decoding a date.

Overview of the basic features:

Frame rate	Selectable: 24, 25, 30, 30 Drop, automatic.
VITC/LTC priority	Selectable.
VITC lines	Selectable.
VITC threshold	Settable or automatic.
Decoding MTD data	Selectable for one-time code source.
Decoding a date	Various formats selectable.

1.6.3 Synchronization by Jam Sync

The **Jam Sync** function transfers time code of the "general reader" to the time code generator. Examples of application are all the different time code converter functions, as there are LTC-to-LTC converter, LTC-to-VITC converter, VITC-to-LTC converter etc.



Use a button or a GPI or a configuration tool to activate this function.

Overview of the basic features:

Which data should be transferred to the time code generator?	Selectable: Only the time addresses Only the binary groups (user bits). Time and user bits. Transfer the time into the user bits. Transfer the user bits into the time addresses.
What should the time code generator do if no time code can be read?	Operating mode selectable: Continuous mode (unlimited flying wheel). Generator stops after a programmed number of frames. After the time code generator has received data from the reader the Jam Sync function will be switched off (single jam).
Is it possible to add or subtract a time offset?	Yes, it is possible to program a "hours:minutes:seconds:frames" offset.

Please refer to chapter **"Jam": The Jam Sync Function** for the details of configuration.

RUB1 version AT modules have programmable LEDs and GPIs.
The **Jam** function for an **LED** or a **GPI** indicates the status of a Jam Sync mode (for configuration please refer to chapter "Keys: Keys and Lamps, LEDs and GPIs").

LED / GPI (lamp)	Description of the LED "Jam" Function
Lights up	The generator accepts the reader data during a continuous Jam Sync.
Flashes slowly	No time code can be read during a continuous Jam Sync.
Flashes fast	"Single Jam" currently is active.
Off	Jam Sync is switched off.

There are several Jam Sync operating modes available. The detailed description of these modes is given here. Except for the "Single Jam" mode all modes will be selected out of the "Mode" drop-down list.

Single Jam

This function will be switched off automatically (Jam Mode = OFF) after the time code generator has once received data from the reader. If - according to the set-up at "Values" - a time transfer has been selected, the time addresses of the generator will be set by the time addresses of the read time code, after that the time will be count continuously. After power-on a Single Jam mode is cleared.

Single Jam can be activated by a click on a button at the configuration tool, or by a programmed key or GPI.

Continuous

Continuous Jam Sync. This mode swaps the generator to a free-running mode if there is no time code input (unlimited flying wheel).

Cont. 1Frame

Jam Sync with one-frame drop-out compensation. This mode forces the generator to stop if there is no time code input for more than one frame and a transfer of time data has been selected.

Cont Wheel

Jam Sync with programmed drop-out compensation. This mode forces the generator to stop if there are no time code input for more than a programmed number of frames and a transfer of time data has been selected.

Start

This mode operates as a one-time Jam Sync. Unlike the "Single Jam" this mode remains active, so with every start-up of the module the one-time transfer occurs. The one-time Jam Sync waits until the generator reaches the **Genlock**, i.e. after power-on the generator has to lock to the selected source signal, after that the data from the read time code will be transferred to the generator.

Convert

In all other Jam Sync operating modes, the generator reads the time code time and only accepts it if the time is plausible and in an ascending continuous order. But with this "converter" function all read values including standing or even non-continuous values directly and exactly will be converted into the requested time code format. If no time code is read, the generator stops.

A time code, which is badly readable or incomplete, will pass these disturbances to the outputted time code.

Example for this application: VITC-to-LTC converter. The VITC of a frozen (still) image or during a single step motion is directly transferred to the generated LTC.

Diff Cont. and **Diff Stop**

Although the Jam Sync function examines the read time values for plausibility and ascending order, it cannot be prevented in all cases that the generated time code has frame jumps. For example, now and then a frame jump occurs if read time code and generated time code are not synchronized to each other. Nevertheless, selecting the Jam Sync function **Diff Cont.** or **Diff Stop** a clean regeneration can be achieved.

In this mode new read time values to be transferred to the generator have to be up-counting. A "reverse" or "still" time code will be ignored. The generator however only

synchronizes to the read time values if the time difference between reader and generator time exceeds an adjustable threshold. The “Diff Cont.” and the “Diff Stop” mode differ in case no reader values are being transferred: At “Diff Cont.” the generator continues to count the time on its own (continuous Jam Sync without flywheel option), at “Diff Stop” the generator stops counting after a programmed number of frames (“Wheel”).

This procedure sets the generator time equal to the read time at the beginning - for example with the start of a video tape. After that dropouts or phase shifting will not lead to a discontinuous time code output. Each time, if – for example after stopping and restarting the tape - again a difference of ≥ threshold occurs, the generator is automatically locked to this new read time code.

This function uses the value of the flywheel (“Wheel”) as the threshold for the difference. The allowed range of values is 2 - 20 frames. If the current value does not lie within this range the threshold will automatically be set to 4 frames.

Please notice the following remarks concerning this procedure and the choice of the threshold:

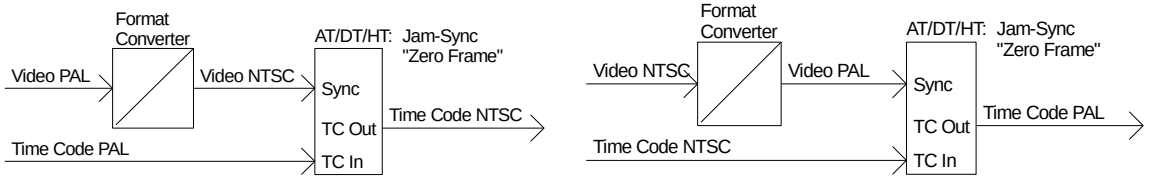
If a time difference greater than the threshold has been detected, the generator accepts the reader values for the next two seconds to get in sync. During this period the incoming time code should stabilize (for example a recorder should reach the normal play speed). If during this period no synchronization has been reached, the generated values compared to the incoming time code now can have any difference up to the threshold value.

If there is no synchronization between the incoming time code and the generated time code, a continuous drift against each other will take place and a time difference will built up. If the difference exceeds the threshold, a "hard" correction takes place. With the "Continuous" Jam Sync function you would have a one frame jump quiet often in this case, with the "Diff" Jam Sync function you would have a jump of the size of the threshold rarely. The more briefly however you choose the production time, the more highly the probability for an error free re-generation, because the difference will not reach the threshold.

Zero Frame

The generator accepts the reader values only if the frame count of the reader values equals to 00. Even if there are different frame rates of reader and generator time code, both time codes will be aligned exactly at the start of each second.

This mode should be selected for a frame rate conversion. In case of a video format conversion (e.g. PAL to NTSC or vice verse) the original time code should be connected to the time code input and the converted video should be connected to the video input of the Rubidium module. Thus, the converted time code will be synchronised to the converted video.



1.6.4 Standard Features of the Video Channel

Video channel	• VITC lines insert enabled/disabled • Character insert enabled/disabled

1.6.5 Standard Features of the Character Inserter

Character inserter	• Video windows selectable (time code or text) • Brightness adjustable • Transparency adjustable • Position selectable • Size selectable • Format selectable

Example of a character insertion:

1.6.6 Other Standard Features

4 illuminated keys at the AT module - RUB1 version only	Programmable functions
4 illuminated LEDs at the AT module - RUB1 version only	Programmable functions
4 GPIs at the AT module	Programmable functions

For configuration please refer to chapter “Keys: Keys and Lamps, LEDs and GPIs”.

1.7 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/at/

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.

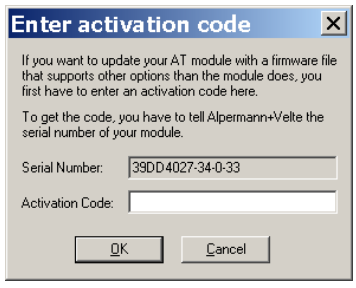
2. Execute "Rubidium Config.exe" on your computer. Select the "Port" according to the interface (USB, RS232) you are using.

3. Select the module (unit 1, 2, 3 ...).

4. If you are sure about the hardware version of the module, you can omit this step. Otherwise click button *Configure* and verify the version at the "System" tab in the info box. Example: "Module Type = AT" or "Module Type = AT (v2)". Click button *Disconnect*.

5. Select "Flash Update" in the *File* menu.

6. Open the **.tcf**-file. Standard names:
   "Rubidium AT version.tcf" or "Rubidium AT (v2) version.tcf" or
   "Rubidium AV version.tcf" or "Rubidium AV (v2) version.tcf".
   "version" stands for a revision no., e.g. "2.11.16".

	In case of changing the options of the module the flash update stops and a request appears. Update can be done only after entering an activation code. Please write down the serial number shown at your screen and request an activation code from Plura company. Now start the update process again.

   Press OK to start the update. At the end press OK again.

7. Update is finished now. We recommend checking module's configuration utilizing the "RUBIDIUM CONFIGURATION" program.

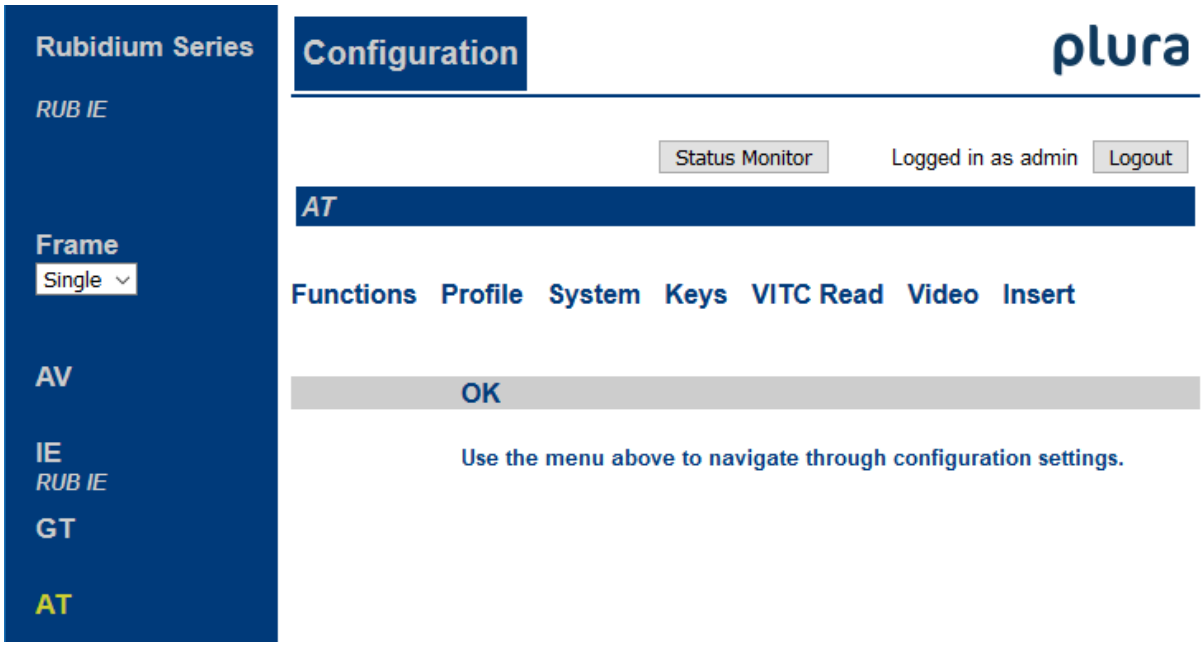
During flash update the operation of the module stops!

2 Status Monitor

2.1 Status Monitor by 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.

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



- On the left, click on the button of type **AT** or **AV**, respectively.
- Click on the button **Status Monitor** to open the status monitor.

Requirements:

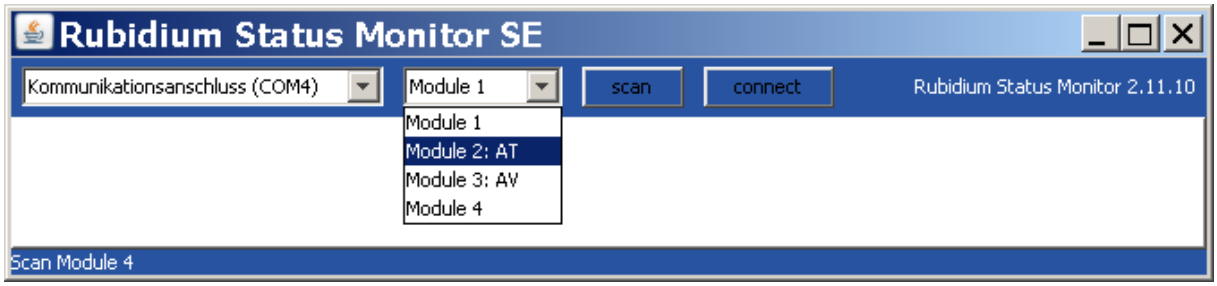
- Please have Java Runtime Environment 1.6.0 or higher installed (for example download at www.java.com).
- Java should be installed as a browser plug-in (a Windows installation will do this automatically if you download Java from the source mentioned above).
- The Status Monitor works with all operating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

2.2 Status Monitor by 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/at/

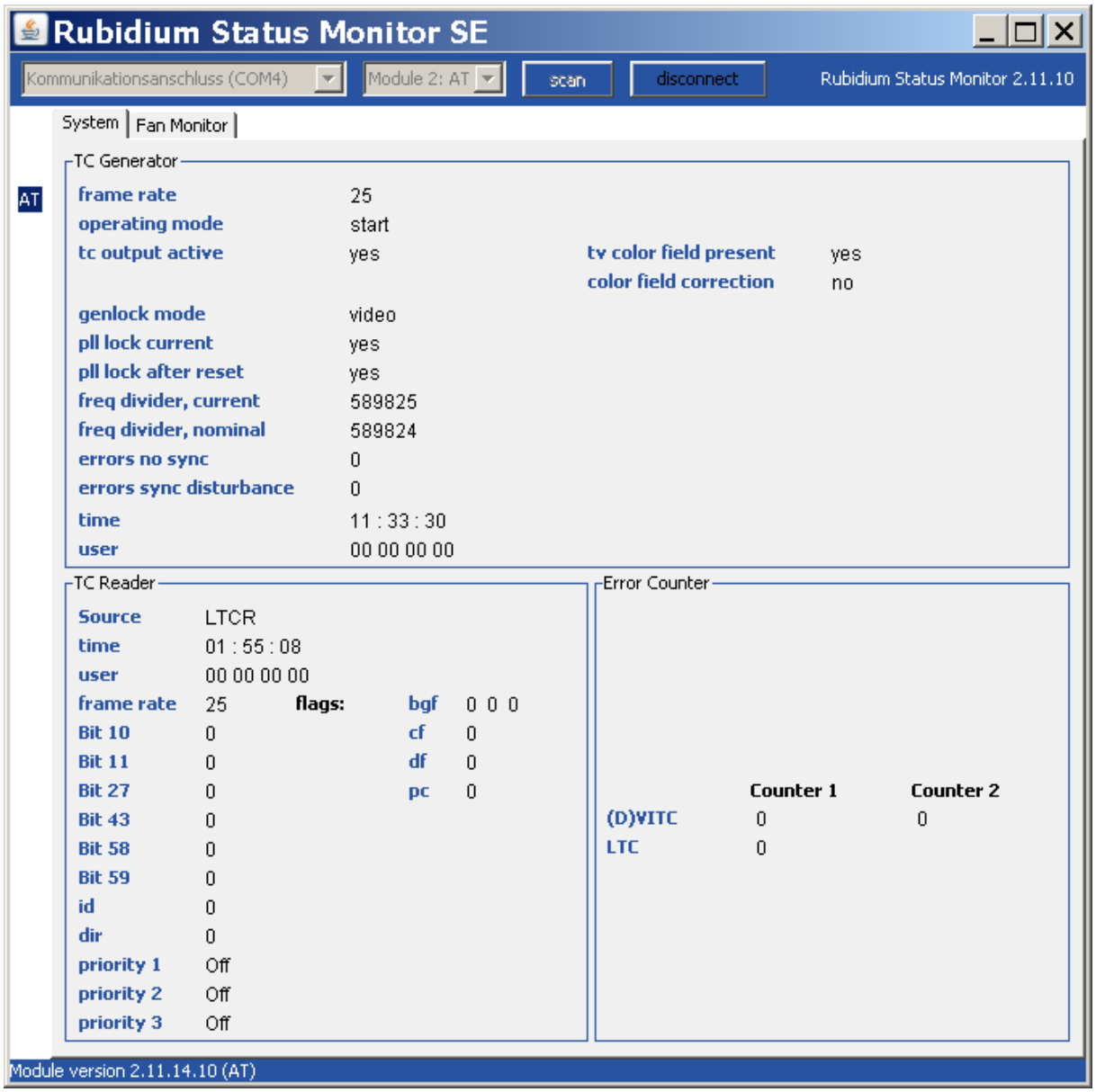
Execute this program, select the COM port or USB connection and press the **scan** button to get a list of the modules plugged to this housing. Select the module and press the **connect** button.



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 “System”: TC Generator and TC Reader



TC Generator: Status and set-up information.

TC Reader: Status and set-up information.

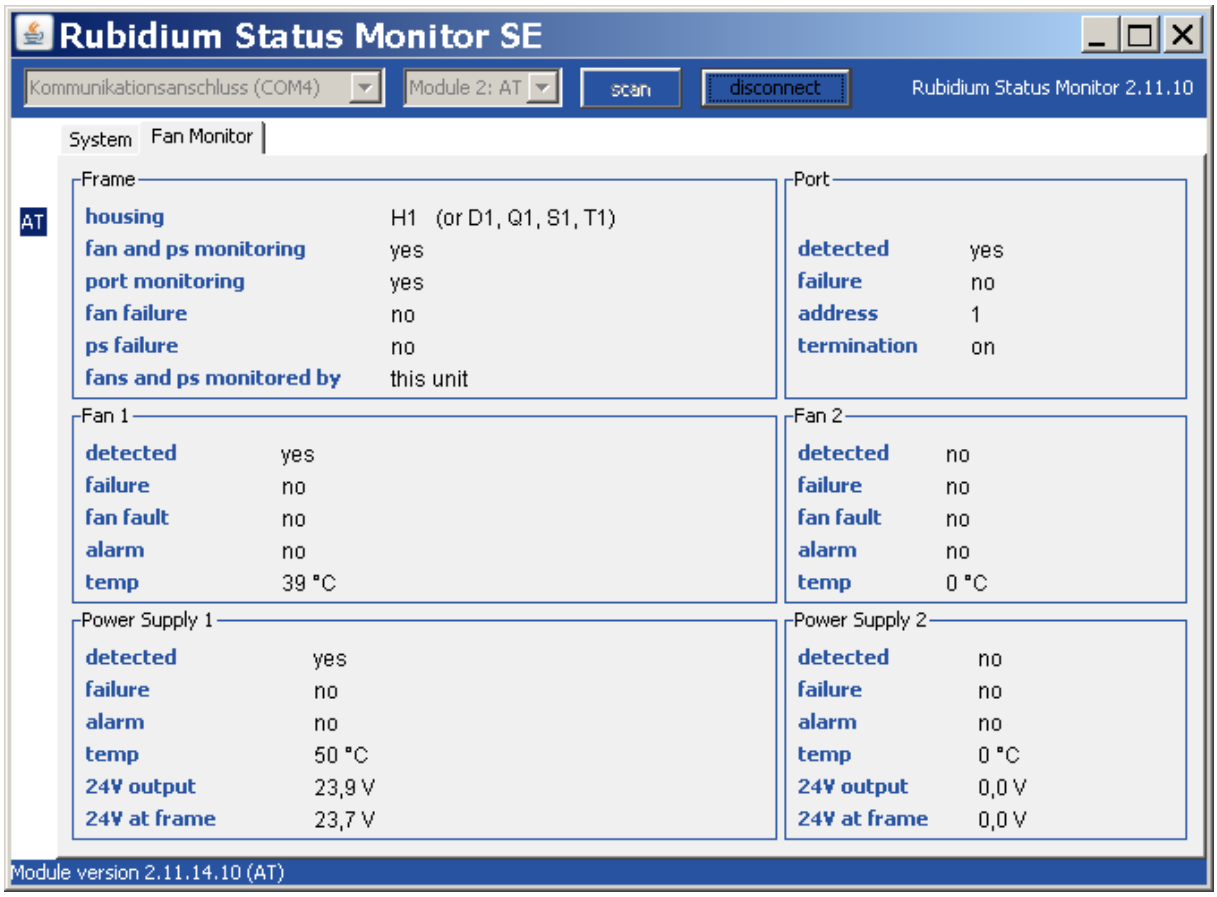
Error Counter: Counting time code reader errors:

	Counter 1	Counter 2
(D)VITC	Discontinuity of the VITC time addresses	Error with respect to VITC of 1st and 2nd field
LTC	Discontinuity of the LTC time addresses	

The counters reset to zero if the corresponding time code reader will be disabled.

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 this module.



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**:

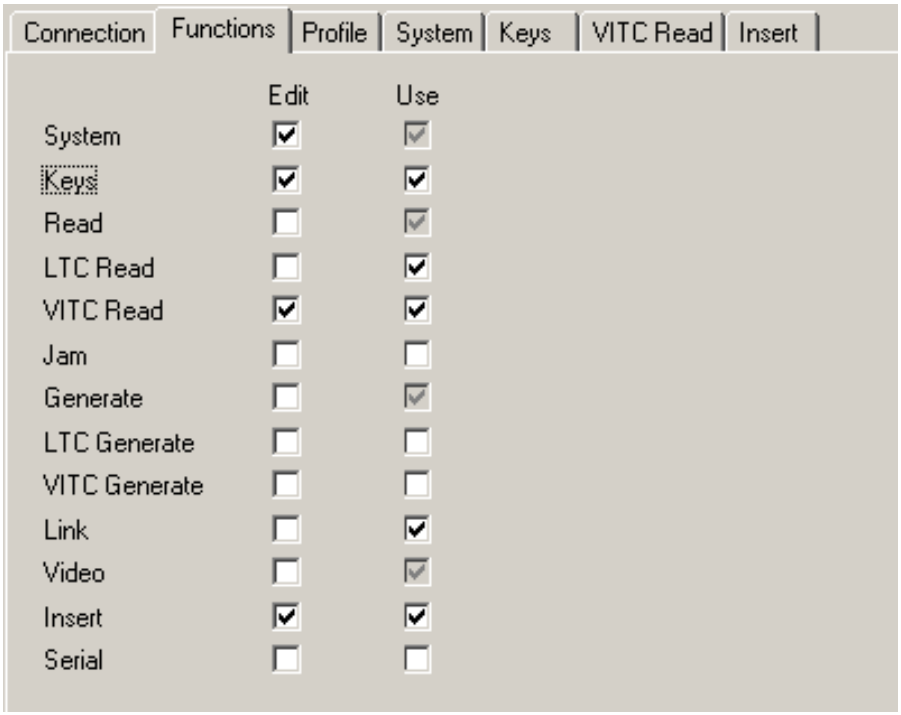
- Click on this button to load the current configuration of the module.

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

List of functions:

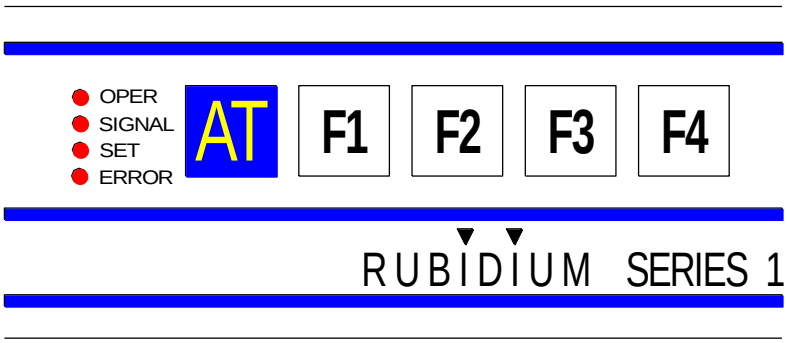
Profile	Store and Load Configurations on the Module (*)
System	Identification, Reset, SNMP, Fan Control
Keys	Keys and Lamps, LEDs and GPIs (AT module only)
Read	Configuration of the "General Reader"
LTC Read	LTC Reader Functions (AT module only)
VITC Read	VITC Reader Functions
Jam	Jam Sync Functions
Generate	Basic Set-Up of the Time Code Generator
LTC Generate	LTC Generator Functions (AT module only)
VITC Generate	VITC Generator Functions
Link	Communication between Modules
Video	Video System and General Set-Up of the Video Channel
Insert	Set-Up of all Video Windows
Serial	Serial Interfaces (AT module only)

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

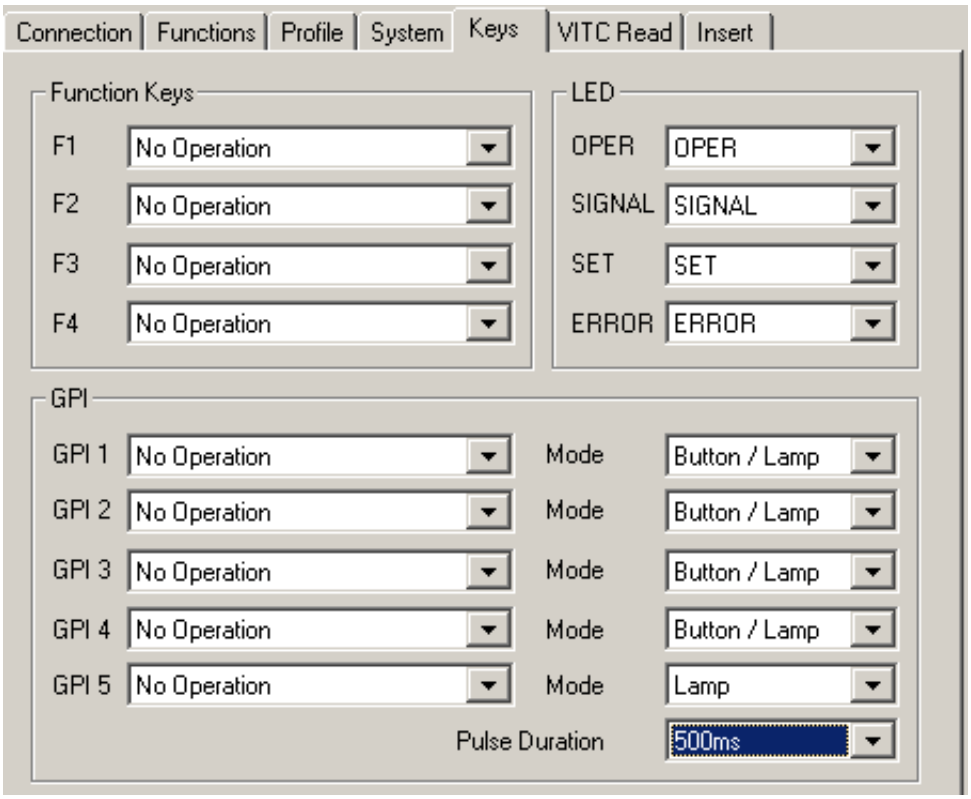
3.4 “Keys”: Keys and Lamps, LEDs and GPIs

The AT module has four GPIs (General Purpose Interface), the RUB1 version 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):



Function Keys (and Lamps)

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

This drop-down list is identical to the drop-down list of GPI functions.

Please refer to the document "RUB AT/DT/HT/XT Application: GPI Functions" for a description of the available functions. You can download it from:

https://plurainc.com/products/at/

GPI

Four GPIs can get a function independently from each other, as an input or as an output. Additionally, the switching characteristic is selectable. GPI 5 always will be an output.

Input: Edge sensitive as a push button or level sensitive as a toggle switch.

Output: Level sensitive as a lamp or a pulse with selectable pulse duration.

Select from the drop-down lists.

Please refer to the document "RUB AT/DT/HT/XT Application: GPI Functions" for a description of the available functions. You can download it from:

https://plurainc.com/products/at/

LED

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

Available functions:

OPER	Lights up during normal operating mode.
SIGNAL	Lights up as long as time code can be read.
SET	Lights up as long as any PC program (configuration or status monitor program) has established a connection to the module by the PC interface.
ERROR	Indicates an error.
Gen Sync Status	Indicates the status of the phase and frequency synchronization of the time code generator (refer to chapter "Standard Features of the Time Code Generator").
Jam	Indicates the status of the Jam Sync mode (refer to chapter "Synchronization by Jam Sync").
PAL 8	Indicates the status of the colour lock mode (refer to chapter "Standard Features of the Time Code Generator ").
Storing Profile	Lights up shortly after storing a profile.

More functions are optional available.

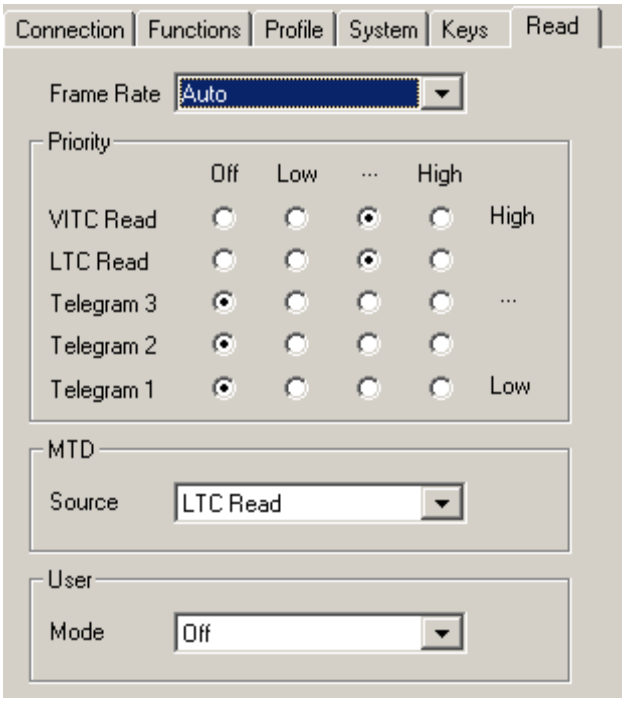
3.5 “Read”: Configuration of the “General Reader”

AT and AV modules are equipped with time code readers for the following time code formats:

LTC (AT module only),
VITC,
and time code via telegram (1, 2, 3) of the internal Rubidium “TC_link“ interface.

“Read“ is a “general reader” which receives data from the special readers mentioned above. The current values of this reader can be visibly inserted in a video window and are available for the Jam Sync function. The special readers can be individually switched off or can be assigned with a priority.

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



Fram Rate The frame rate of the incoming time code can be detected automatically or can be fixed to a value. Select the appropriate function from the drop-down list. In case of **Auto** the frame rate will be set by the frame rate of the special reader.

Priority

All the time code readers can be individually switched off or can be assigned with a priority. In case that more than one reader is active the priority determines which reader transfers its data to the general reader. If the same priority level has been selected for several readers a second priority rule applies corresponding to the list above: The reader at the top of the list has the highest priority.

To use one of the “Telegram” readers activate the **Link** function – see “Link“.

MTD

Decoding of the binary groups of the time code according to the MTD format – e.g. to visibly insert an MTD timer in a video window – is possible for one source only. Select the source (the special reader) from the drop-down list.

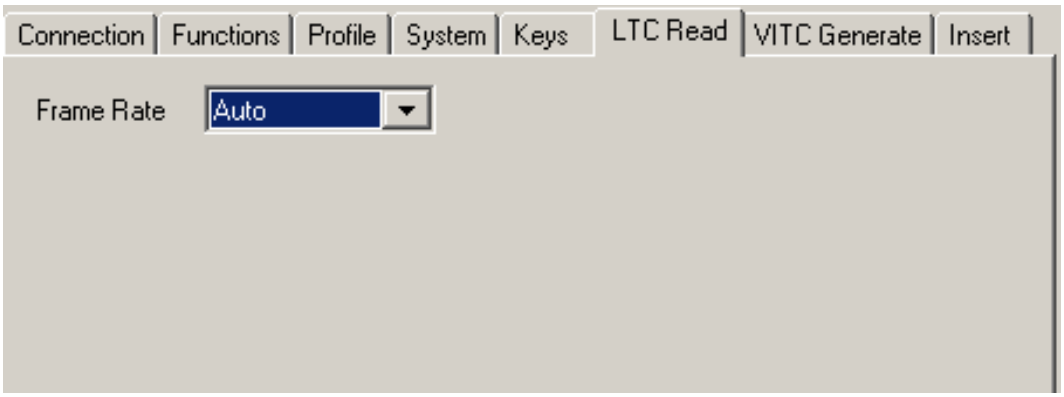
User

If the binary groups of the time code are of a special format, which should be decoded e.g. to get a date or to visibly insert an MTD timer in a video window, the correct format should be selected from the drop-down list.

3.6 “LTC Read”: LTC Reader Functions

The AT module is equipped with an LTC time code reader.

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

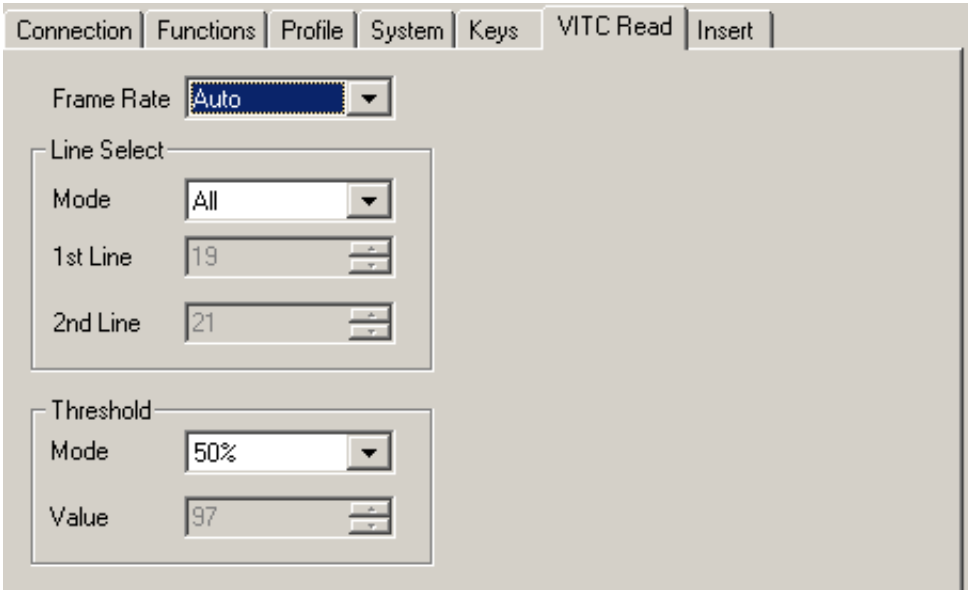


Frame Rate The frame rate of the LTC can be detected automatically or can be fixed to a value. Select the appropriate function from the drop-down list.

3.7 “VITC Read”: VITC Reader Functions

AT and AV modules are equipped with a VITC time code reader.

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



Frame Rate The frame rate of the VITC can be detected automatically or can be fixed to a value. Select the appropriate function from the drop-down list.

Line Select

VITC reader line selection: The VITC of the lowest line within the selected line range (each field) will be read. If this VITC carries plausible data, further lines then will be ignored.

Mode	*Off*	No VITC will be read.
	Lines	Line range: Only two lines - the “1st Line“ and the “2nd Line“.
	Block	Line range: All lines from “1st Line“ to “2nd Line“ (included).
	All	The whole available line range will be processed automatically.
1st Line	1st line (mode = “Lines“) or start line (mode = “Block“), valid input = 6 - 30.	
2nd Line	2nd line (mode = “Lines“) or last line (mode = “Block“), valid input = 6 - 30.	

Threshold

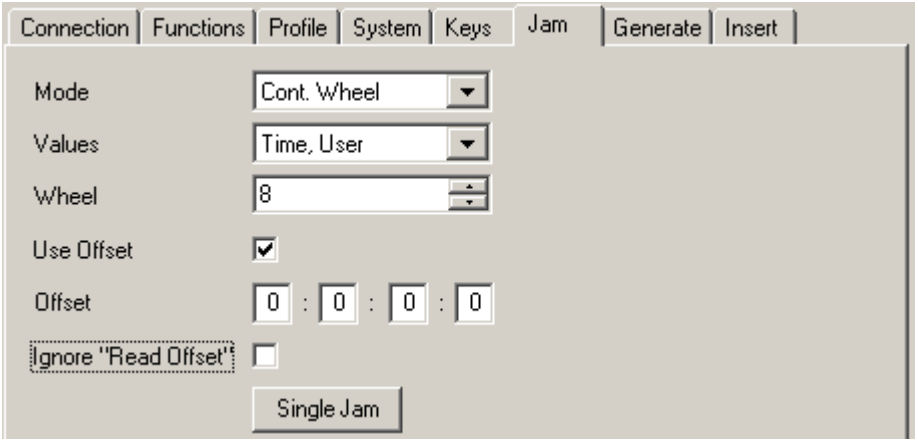
Select the data threshold. **50%** is the standard (factory) setting.

Mode	*Auto*	Automatic adaptation to the VITC data level.
	50 %	Fixed to a 50 % value, based on a nominal video and VITC data level.
	Manual	Enter a value manually, e.g. to find out the limits of the threshold values.
Value	If “Mode = Manual” is selected: Enter a value.	

3.8 “Jam”: The Jam Sync Function

The **Jam Sync** function transfers time code of the “general reader” (Read) to the generator.

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



Mode

Please refer to chapter “Synchronization by Jam Sync” for a detailed description.	
Off	Jam Sync is switched off.
Continuous	Continuous Jam Sync.
Cont. 1Frame	Jam Sync with one-frame drop-out compensation.
Cont Wheel	Jam Sync with programmed drop-out compensation.
Start	One-time Jam Sync, active after power-on.
Convert	Time code conversion even at “still” time code input.
Diff Cont.	Continuous Jam Sync if time difference exceeds a threshold value. Generator continues to count if time code input fails.
Diff Stop	Jam Sync if time difference exceeds a threshold value. Generator stops counting if time code input fails.
Zero Frame	Jam Sync at frames = 00 of the time code input. Suitable for format conversions.

Values

The Jam Sync treats the time information and the binary groups (user bits) independently:	
Time	Time information of read → time of generator. The content of the binary groups (user bits) of the generated time code is determined by the selection “User Mode” of the generator function.
User	Binary groups of read → binary groups of generator. The time of the generator counts independently from the read time.
Time, User	Time information of read → time of generator, and binary groups of read → binary groups of generator.
Time to User	Time information of read → binary groups of generator. The time of the generator counts independently from the read time.
User to Time	Binary groups of read → time of generator.

Wheel

Number of frames for the drop-out compensation in the "Cont Wheel" mode.

Use Offset

If selected a programmed offset will be added to the time of the reader.

A negative offset can be achieved as follows: Subtract the time or the number of frames by which the output should be delayed with respect to the input from 24 hours – considering the current frame rate. Example: For a delay of 10 frames in a 30 frames system the offset should be 23:59:59:20.

Offset

You can program a "hours:minutes:seconds:frames" offset.

Utilizing the PC program, you have to press the **tabulator key** at the PC's keyboard to store the offset, utilizing the HTTP server press the **Save To Module** button.

Ignore "Read Offset"

This concerns the "Read Offset to 00:00:00:00" and "Read Offset to 10:00:00:00" operation modes switched on by a key or GPI function.

If checked: The generator receives and generates the original reader values, regardless of the "Read Offset" function. If any "Read Offset" operating mode is switched on, the generator values will then be different from the processed reader values.

If not checked: If any "Read Offset" operating mode is switched on, the generator will receive and generate these processed reader values.

The offset which you can enter at this page will be added to the values transferred from the reader – independent from clicking this checkbox or not.

Single Jam

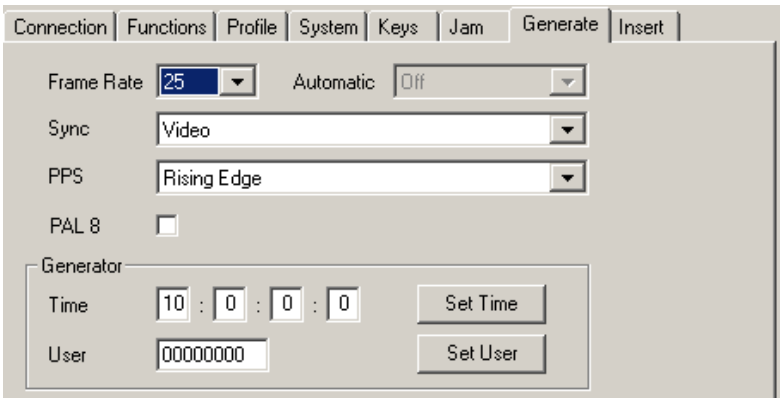
The **Single Jam** will be switched off automatically (Jam Mode = OFF) after the time code generator has once received data from the reader. If - according to the set-up at "Values" - a time transfer has been selected, the time addresses of the generator will be set by the time addresses of the read time code, after that the time will be count continuously. After power-on a Single Jam mode is cleared.

Single Jam can be activated by a click on this button, or by a programmed key or GPI.

3.9 “Generate”: Basic Set-Up of the Time Code Generator

There is one-time code generator which feeds the different time code outputs – see chapter “Standard Features of the Time Code Generator”. You can adjust the frame rate and the source of the synchronization signal. The time code generator can receive start values manually or by the “Jam Sync” function.

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



Frame Rate Adjust the frame rate of the generator. If you are working in a television surrounding, the frame rate has to be selected according to the television signal:

Frame rate	Television signal
25	625/50 (PAL)
30 df	525/59.94 (NTSC)

Sync Select the source of the synchronization signal:

Internal	Internal reference.
Video	Video signal connected to VIDEO IN.
LTC Read	External LTC signal connected to LTC IN.
PPS	External pulse per second (PPS) connected to GPI_1.

PPS Select the reference edge if **Sync** = “PPS” has been selected:
Rising Edge
Falling Edge

PAL 8 Activate this check box if colour frame identification in the time code is required. This selection applies in the system 625/50 (PAL) only. Select “Sync = Video” and connect a video or black-burst signal with the colour frame identification (white line) at line 7.

Generator

The time and the binary groups (user bits) can receive start values.

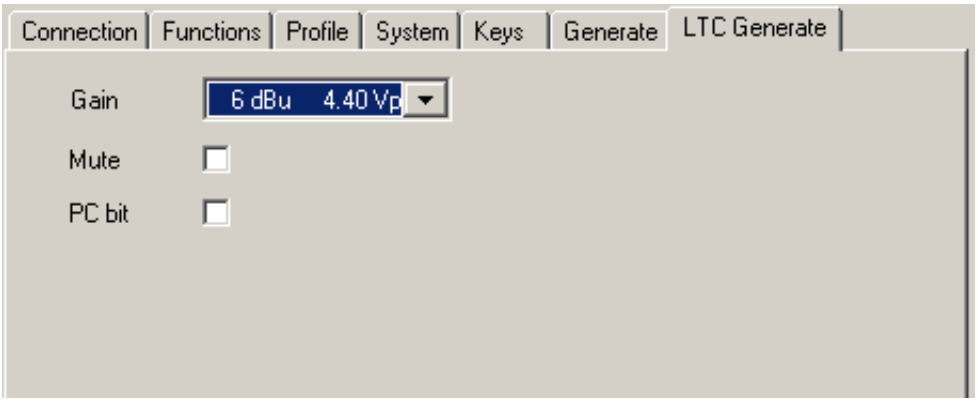
Time Enter a time value: HH:MM:SS:FF. Click on the **Set Time** button to transfer the values to the module.

User “User“ denotes the binary groups of the time code. These are 8 digits, values in the range 0 - 9 and A – F will be accepted. Click on the **Set User** button to transfer the values to the module.

3.10 “LTC Generate”: LTC Generator Functions

AT modules can output the data of the time code generator in an LTC format.

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



Gain Select the output level from the drop-down list.

The values in this list refer to a use of balanced signals for output and input, i.e. V_{PP} (= peak-to-peak value) will be the difference between LTC_OUT_A and LTC_OUT_B. V_{PP} will be half of the indicated value if unbalanced signals are used, i.e. the peak-to-peak value of the single LTC_OUT_A or LTC_OUT_B signal.

Correspondence between balanced use and unbalanced use:

Use of balanced signals	Use of unbalanced signals
+12 dBu / 8.7 V_{PP}	+6 dBu / 4.4 V_{PP}
+6 dBu / 4.4 V_{PP}	0 dBu / 2.2 V_{PP}
0 dBu / 2.2 V_{PP}	–6 dBu / 1.1 V_{PP}
–6 dBu / 1.1 V_{PP}	–12 dBu / 0.55 V_{PP}

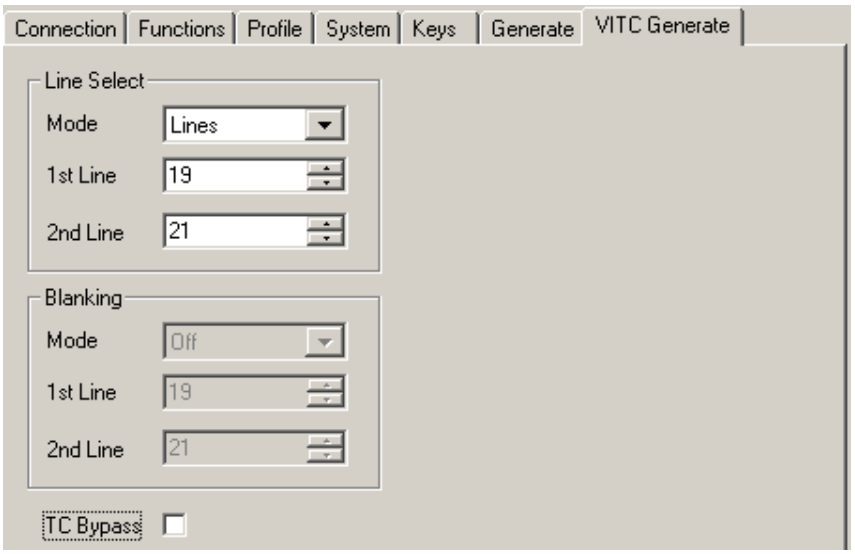
Mute LTC output mute on/off.
This function can be programmed for a key or a GPI input as well.

PC bit If checked: The polarity of the synchronization word of the LTC output will be stabilised. The polarity correction bit is put in a state, so that every 80-bit word contains an even number of logical zeros. The polarity correction bit is bit no. 27 in the 525/60 system, no. 59 in the 625/50 system. Checking this checkbox is helpful if you do some LTC measurements with an oscilloscope.

3.11 “VITC Generate”: VITC Generator Functions

AT and AV modules can output the data of the time code generator in a VITC format.

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



Line Select

Mode	*Off*	No VITC will be generated.
	Lines	VITC generated in only two lines: The “1st Line“ and the “2nd Line“.
	Block	VITC in all lines from “1st Line“ to “2nd Line“ (included).
1st Line	1st line (mode = “Lines“) or start line (mode = “Block“), valid input = 6 - 30.	
2nd Line	2nd line (mode = “Lines“) or last line (mode = “Block“), valid input = 6 - 30.	
Note: If “1st Line“ is equal to “2nd Line“ only one VITC line will be generated.		

Blanking

This feature is currently not available for AT/AV modules.

TC Bypass

The following automatic mode can be enabled: Only in case that there is no VITC present in the incoming video the VITC generator will be enabled. If there is already a VITC then no new VITC will be inserted. For this feature the VITC reader has to be enabled.

Additionally, there is a “TC Bypass” function available programming a key or GPI (function **Keys**). This function differs from the automatic “TC Bypass” function described above. Enabled via key or GPI, no VITC will be generated, even if there is no VITC present in the incoming video. Please refer to the document “RUB AT/DT/HT/XT Application: GPI Functions” for a description of this function. You can download it from: https://plurainc.com/products/at/

3.12 “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.

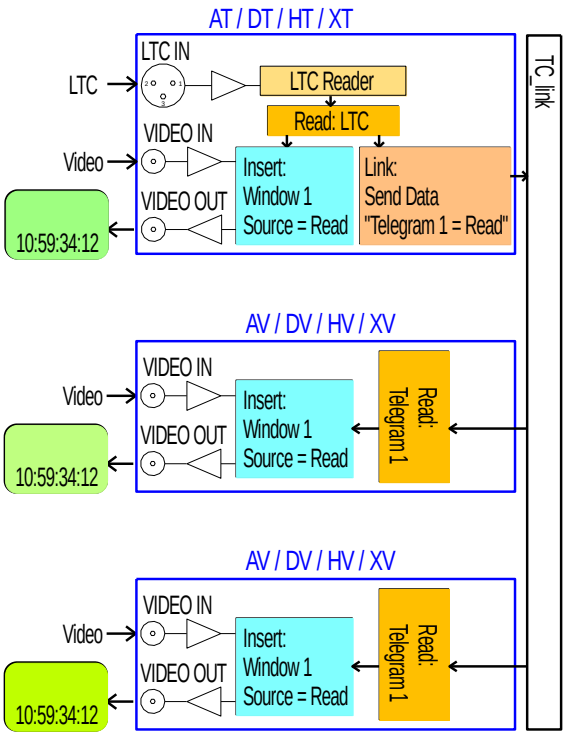
In case that the selected module should transmit data, **Link** selects the channel and the kind of data. The receiving module must select this channel as a reader input (see “Read”).

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.

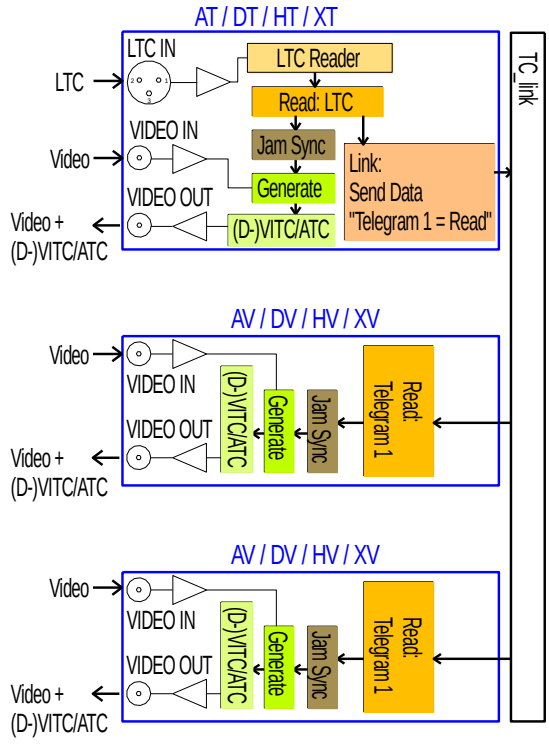
Typical application:

A master LTC time code is, for example, connected to a AT module which reads the time code and distributes it internally to AV/DV/HV/XV modules (as many as you like, in any combination).

Example 1: Time code visibly inserted into different video channels.

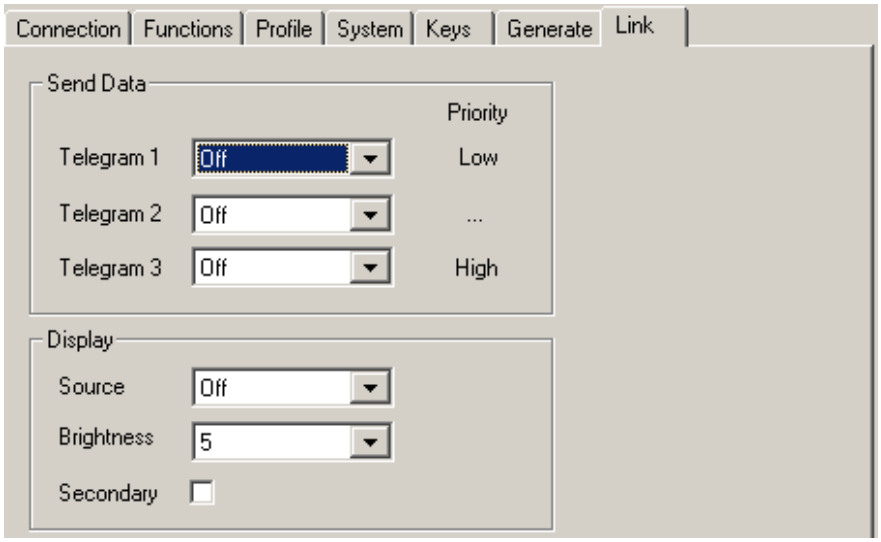


Example 2: Converting LTC into a video time code (VITC, D-VITC, ATC) for different video channels.



Both examples can be combined into a single application.

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



Send Data

Three channels have been provided: **Telegram 1**, **Telegram 2**, **Telegram 3**.
For each channel select the kind of data which should be sent:

Off	This channel will not be used to transmit data, data can be received.
Gen	Data of the time code generator, frame wise.
(D-) VITC Gen	Data of the time code generator, field wise with field flag.
Read	"General" reader data ("Read" – dep. on reader selection and priority).
LTC Read	Data of the LTC reader, frame wise.
(D-) VITC Read	Data of the VITC reader, field wise with field flag.

Display

Sending data to the RUBIDIUM **D1** or **Q1** display:

Source Select the kind of data:

Off	No data will be sent from this module.
Gen Time	Time of the time code generator.
Gen User	Binary groups (user bits) of the time code generator.
Read Time	Time of the time code reader.
Read User	Binary groups (user bits) of the time code reader.

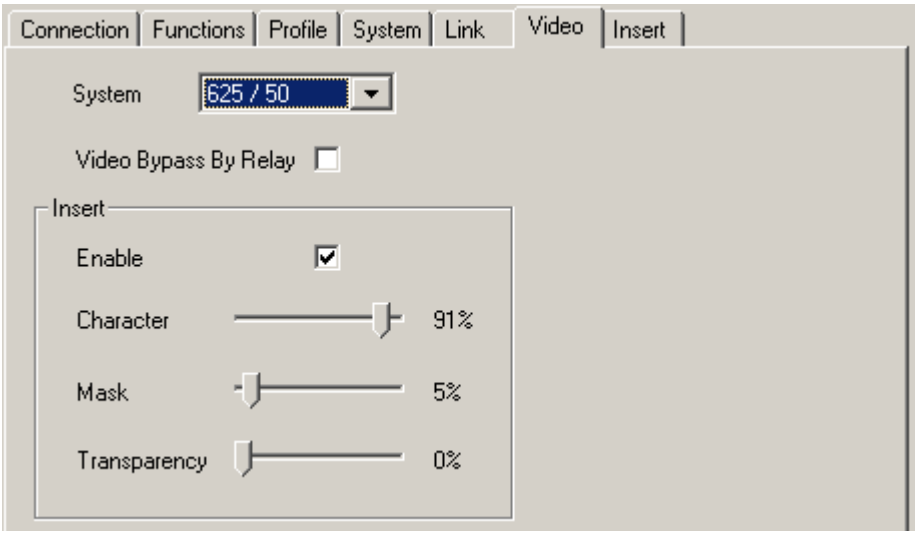
Brightness Adjust the brightness of the LEDs, steps 1 to 7.

Secondary Address the "secondary" display instead of the "primary" display.

3.13 "Video": Video System and General Set-Up of the Video Channel

AT and AV modules are equipped with an analogue CVBS video channel.

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



System Select the video standard:

Auto	Auto-detect of the video standard.
625/50	PAL system.
525/59.94	NTSC system.

It is recommended not to use the "Auto" mode if the module operates only at one video standard.

Video Bypass By Relay Option B only (Video Bypass Relay): Enables to manually switch to video bypass.

Insert

Enable If this checkbox is activated: All video windows which have the "visible" checkbox activated (see the **Insert** tab) will be inserted in the video signal.

If this checkbox is deactivated: Bypass of the video signal, i.e. all the video windows will be switched off.

If you change the "Character", "Mask" and "Transparency" setup you should verify the changes, so make sure to have a video window inserted, and connect the video output to a video control monitor.

Character Draw the slider to adjust the brightness of all the inserted characters.

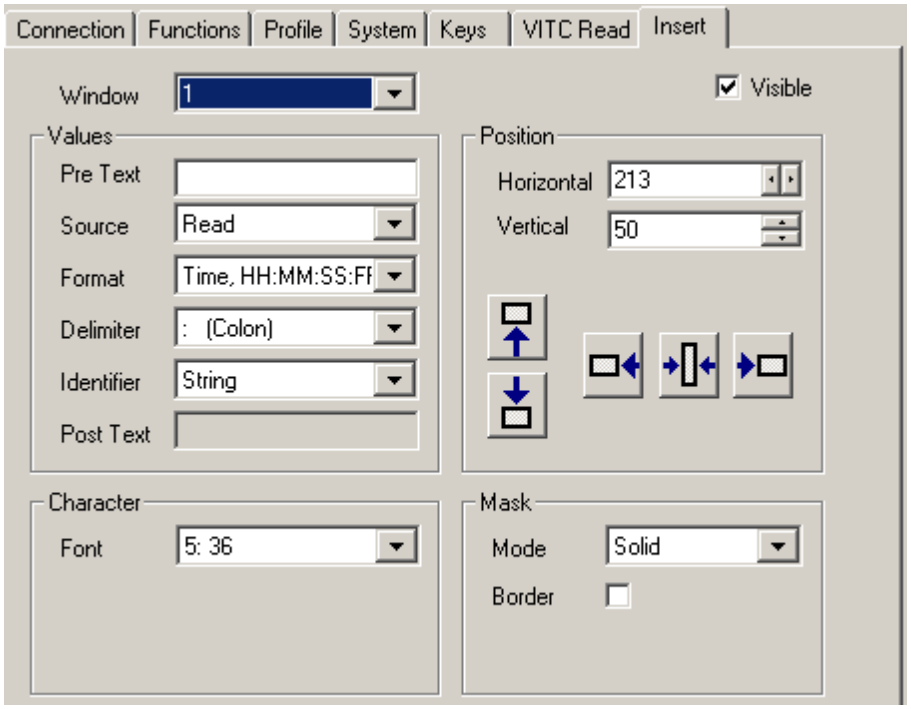
Mask Draw the slider to adjust the brightness of all the background masks.

Transparency Draw the slider to adjust the mixing of video signal and character insertion.

3.14 “Insert”: Set-Up of all Video Windows

Each video window can get an individual set-up. It is recommended to connect the video output to a video control monitor so you can verify the changes immediately.

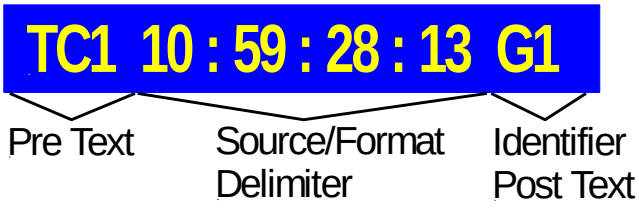
Configuration (example shows a screen shot of the PC program tab):



Window Select the video window, all the following set-ups refer to this window.

Visible Click on the control box to select “visible” (window insertion switched on) or not visible (window insertion switched off).

Values



Pre Text A text can be placed right before the source characters.

Source Select the data source from the drop-down list:

Read	Data of the “general reader” (please refer to chapter “Read: Configuration of the General Reader” as well). The data contain time and binary groups (user bits) of a time code, perhaps a date (configuration “User – Mode“ necessary), perhaps MTD data (configuration “MTD – Source“ necessary).
Generate	Data of the internal time code generator. The data contain time and binary groups (user bits), therefore you are free to select

any "time" or "user" format from the **Format** drop-down list.

Identifier shows: Letter: G
String: G1 or G2 (field indication)

Reference Time & date of a "Reference" telegram. The RUBIDIUM module which sends these data has to get the following set-up: At the **Link** function choose "Telegram" (1 or 2 or 3) = "Reference" at the "Send Data" box.
The time comprises hours, minutes, seconds, but no frames.

LTC Read Data of the LTC reader. The data contain time and binary groups (user bits), therefore you are free to select any "time" or "user" format from the **Format** drop-down list.

Identifier shows: Letter: L
String: LR

VITC Read Data of the VITC reader. The data contain time and binary groups (user bits), therefore you are free to select any "time" or "user" format from the **Format** drop-down list.

Identifier shows: Letter: V
String: VR1 or VR2 (field indication)

VITC Generate Data of the internal time code generator. The data contain time and binary groups (user bits), therefore you are free to select any "time" or "user" format from the **Format** drop-down list.

Identifier shows: Letter: V
String: VG1 or VG2 (field indication)

Telegram 1 – 3 Time code of the selected telegram. The data contain time and binary groups (user bits). The RUBIDIUM module which sends these data has to transmit a telegram in a time code format: At the **Link** function choose "Telegram" (1 or 2 or 3) = "Gen" or "Read" or a similar time code telegram.

Serial Data received from the serial interface. This is provided for special applications.

IRIG-B Data of an "IRIG-B" telegram.
The RUBIDIUM module which sends these data has to get the following set-up: At the **Link** function choose "Telegram" (1 or 2 or 3) = "IRIG-B" at the "Send Data" box. These data contain day of year, hours, minutes, seconds, and 1/10 seconds.

Format Select the representation of the data from the drop-down list. The **Delimiter** can be selected independently to separate pairs or groups of characters.

Text only This format displays no data of the selected source. At "Pre Text" or "Post Text" you can enter a text. If "Post Text" has not been used, a source identifier can be displayed choosing "Identifier".

The following formats are provided to display a **time**:

Time, HH:MM:SS:FF Time of a time code, hours:minutes:seconds:frames.

Time, HH:MM:SS Time, hours:minutes:seconds.

Time, MM:SS:FF	Time of a time code, minutes:seconds:frames.
Time, HH:MM	Time, hours:minutes.
Time, MMMM:SS	Time, minutes:seconds. Hours will be converted to minutes. Minutes are displayed with four digits, range 0000 – 1439.
Time, MM:SS	Time, minutes:seconds.
Time, SS:FF	Time of a time code, seconds:frames.

User bits (binary groups) of a time code can be presented in following formats:

User, 8 Digits	All eight digits, in a hexadecimal way: 0 – 9, A – F.
User, 6 Digits	The six most significant digits, hexadecimal 0 – 9, A – F.
User, 4 Digits	The four most significant digits, hexadecimal 0 – 9, A – F.
User, 1st Digit	The most significant digit, hexadecimal 0 – 9, A – F.
User, ASCII	If the user bits contain a character set conforming to ASCII, these (four) characters are displayed.

A **date** can be decoded out of two sources: "Source = Reference" or "Source = Read". If "Read" has been selected, the date has to be decoded out of the binary groups of a time code before, so choose the correct date format at "User – Mode" at the **Read** function (please refer to chapter "Read: Configuration of the General Reader"). The following formats are provided:

Date, DD MM YYYY	Day-month-year, with four digits for the year.
Date, MM DD YYYY	Month-day-year, with four digits for the year.
Date, YYYY MM DD	Year-month-day, with four digits for the year.
Date, DD MM YY	Day-month-year, with two digits for the year.
Date, MM DD YY	Month-day-year, with two digits for the year.
Date, YY MM DD	Year-month-day, with two digits for the year.

Please notice the document "RUB AT/DT/HT/XT Application: Read and Insert Time & Date". You can download it from:

https://plurainc.com/products/at/

MTD Data can be decoded out of one source, which has to be selected from MTD – Source" at the **Read** function (please refer to chapter "Read: Configuration of the General Reader"). The selection at "Insert – Source" has no effect anymore, but it is recommended to select "Read" from the drop-down list. **MTD Data** include different timers, real-time & date, and more. Please choose:

MTD Time A – F	Current value of the selected stop timer A – F.
MTD Time	The local real-time decoded out of the MTD data.
MTD Date	The local date decoded out of the MTD data.
MTD Main 1 – 3	Current value of the selected "Main" time 1 – 3.

Please notice the document "RUB AT/DT/HT/XT Application: Read and Insert MTD Timer". You can download it from:

https://plurainc.com/products/at/

IRIG-B data can be decoded if you select "Source = IRIG-B":

IRIG-B	Day-of-year:hours:minutes:seconds:1/10. "Day-of-year" is displayed with three digits, range 001 – 366.

Delimiter	Select the delimiter from the drop-down list. The delimiter separates pairs or groups of characters according to the selection at "Format".
Identifier	You can add a source identifier following the source characters. Select from the drop-down list:
	Off — No source identifier.
	Letter — One character, e.g. "G" for generator, "R" for reader etc.
	String — Two characters plus possibly a field identifier, e.g. "VR1" stays for VITC reader data of the first field.
	Frame Pair — First (.0) or second (.1) frame identifier of a frame pair in progressive video formats with 50/60 frames or field identifier in interlaced video formats.
Post Text	Instead of an identifier ("Identifier = Off") you can add a text following the source characters.

Position

Horizontal	Adjust the horizontal position of the video window: Enter a number or click on the increment/decrement buttons at the right side of the box. A step width of 1 corresponds to a shift of 74 ns (13.5 MHz clock) of the video window.
Vertical	Adjust the vertical position of the video window: Enter a number or click on the increment/decrement buttons at the right side of the box. A step width of 1 corresponds to one video line.
	Click on these buttons to set the video window at the upper/lower border of the screen. The horizontal position will be left unchanged.
	Click on these buttons to set the video window at the most left/centre/most right position of the screen. The vertical position will be left unchanged.

Character

Font Select the character font from the drop-down list. The standard firmware has the following fonts provided:

Font	Pixel Matrix H x V (***1**)	Roughly maximum No. of characters side by side (***2**)	Roughly maximum No. of windows one beneath the other (***2**)	
			625/50	525/59.94
1: 16	10 x 16	64	32	28
2: 20	12 x 20	52	26	22
3: 24	14 x 24	44	22	18
4: 28	16 x 28	40	18	16
5: 36	20 x 36	32	14	12
6: 48	27 x 48	24	11	9
7: 64	35 x 64	18	8	7
8: 72	39 x 72	16	7	6

***1** Pixel clock: Horizontal = 13.5 MHz, vertical = one video line.

***2** Valid for a standard monitor set-up (no under scan mode).

It is possible to create own character fonts. Please refer to the document "Rubidium Series Font Compiler" for details, available at
https://plurainc.com/products/at/

Mask

A background mask can be added to the character insertion. Select from the drop-down list:

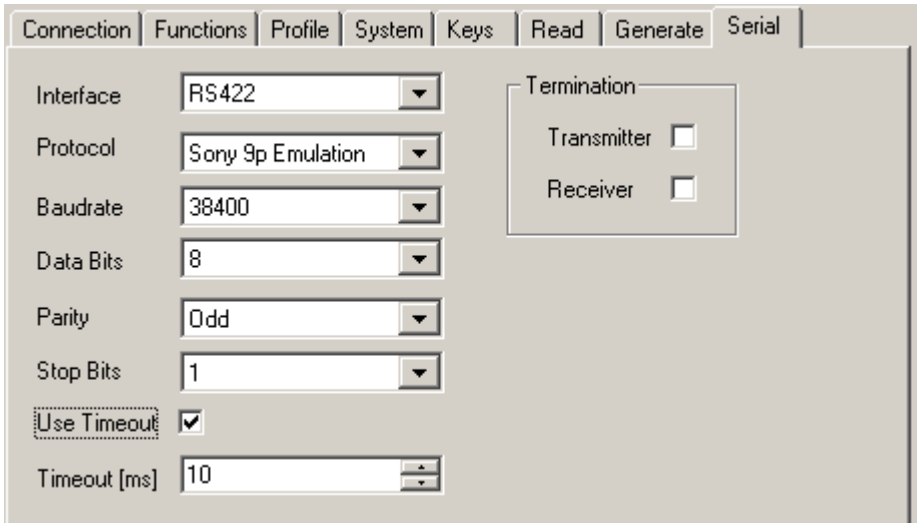
Mode: *Off* No background mask.
Solid With background mask.

3.15 “Serial”: Serial Interfaces

The AT module is equipped with a serial interface (in- and output pins at the SERIAL connector). The electrical format could be selected according to RS232 or RS422 or RS485 standard.

Please refer to the document “Rubidium AT/DT/HT/XT Modules: Serial Remote Control“ for details, available at https://plurainc.com/products/at/.

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



Interface Select the electrical interface

Off	Interface switched off
RS232	Interface according to RS232 standard
RS422	Interface according to RS422 standard
RS485	Interface according to RS485 standard

Protocol Select a data protocol from the drop-down list

Baudrate Choose the baud rate:
2400 / 4800 / 9600 / 19 200 / 38 400 / 57 600 / 115 200

Data Bits *7* or *8* data bits

Parity Select the parity mode

None	Without parity
Even	Even parity bit
Odd	Odd parity bit

Stop Bits *1* or *2* stop bits

Use Timeout A timeout may be used for synchronization.

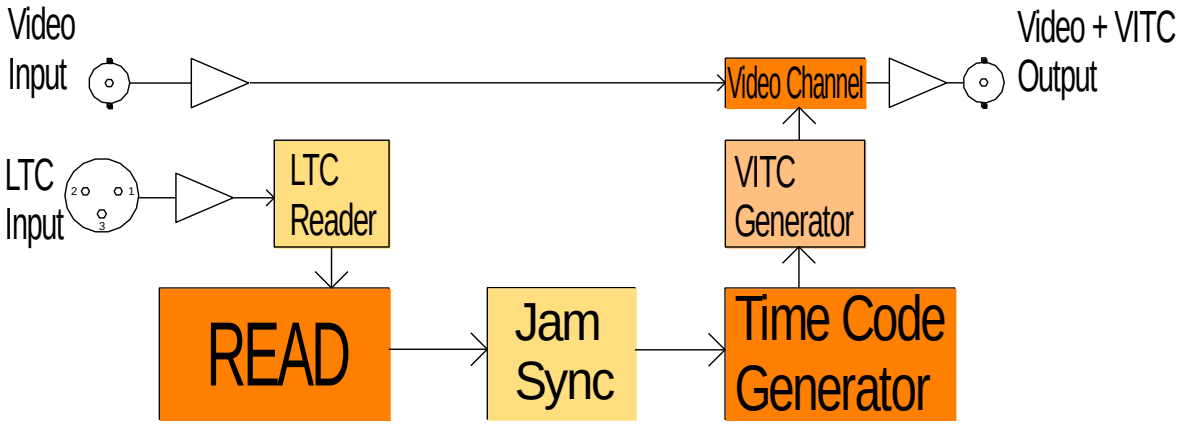
Timeout [ms] Choose a timer value for the timeout counter. Please choose a value suitable to the selected baud rate.

Termination If RS422 has been selected, the transmitter and the receiver can get a termination. If RS485 has been selected, the transmitter can get a termination.

4 Applications

4.1 Various Time Code Converters

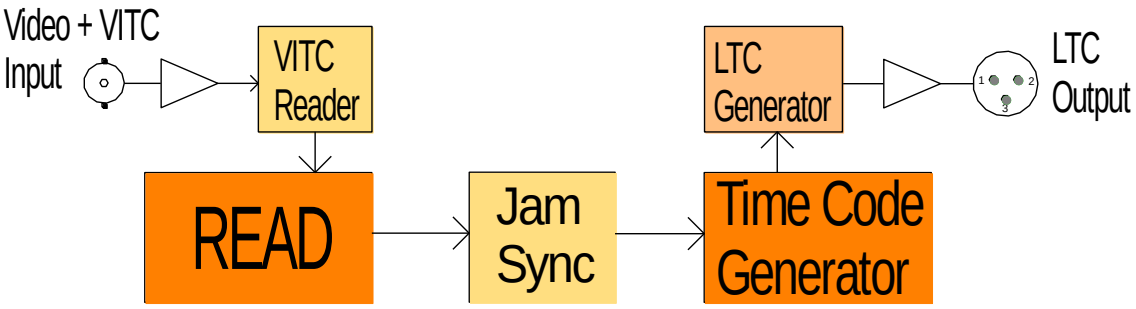
AT application: LTC to VITC converter



Please refer to the document "RUB AT/DT/HT/XT Application: LTC to VITC Converter" for more information. You can download it from:

https://plurainc.com/products/at/

AT application: VITC to LTC converter



Please refer to the document "RUB AT/DT/HT/XT Application: VITC to LTC Converter" for more information. You can download it from:

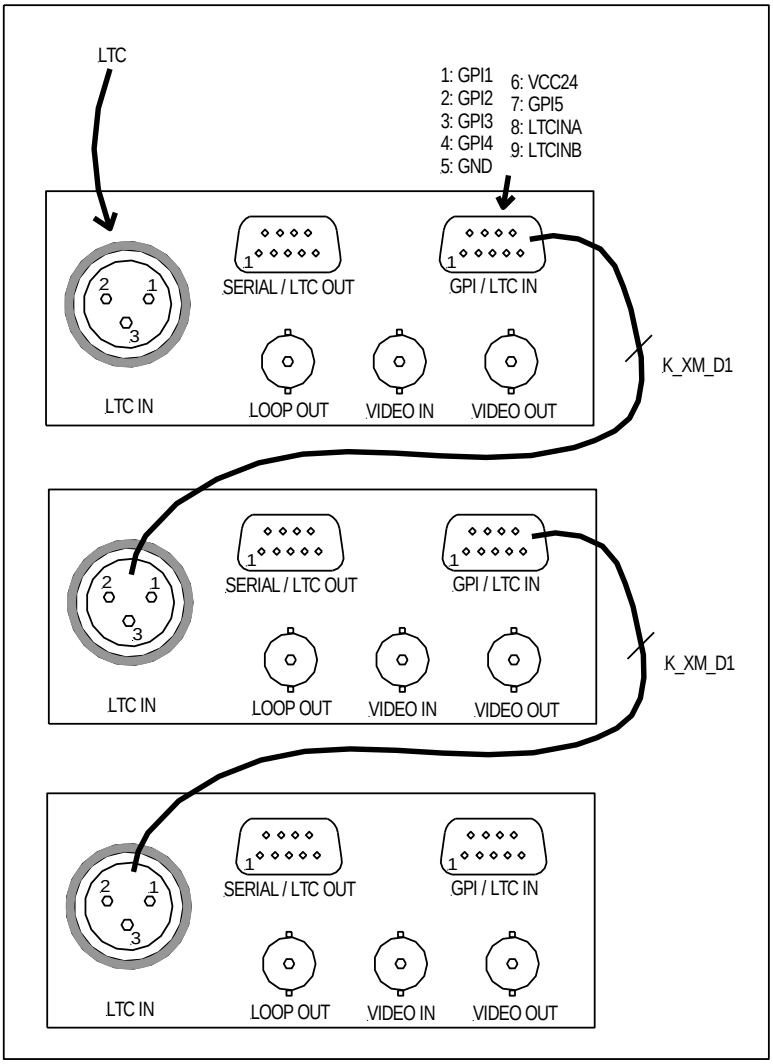
https://plurainc.com/products/at/

4.2 AT Modules: LTC Input + Loop Output

Using cable K_XM_D1, for balanced signals and cable length < 150 m:

K_XM_D1	XLR3M DSUB9M GND 1 ——— 5 GND LTC_1 2 ——— 8 LTC_1 LTC_2 3 ——— 9 LTC_2 Shield]——[Shield
Looping LTC signal	Example: 3-core shielded cable (Belden 9533): GND = red, LTC_1 = white, LTC_2 = black.

Application diagram:



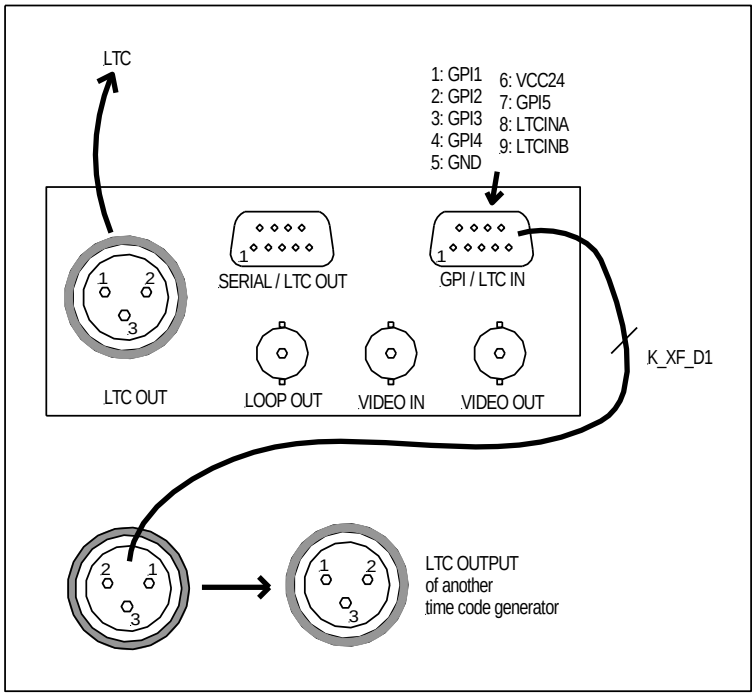
K_XM_D1

4.3 AT Modules: LTC Output + LTC Input

Using cable K_XF_D1, for balanced signals and cable length < 150 m:

K_XF_D1	XLR3F DSUB9M GND 1 ——— 5 GND LTC_1 2 ——— 8 LTC_1 LTC_2 3 ——— 9 LTC_2 Shield ——— Shield
LTC Input Adapter	Example: 3-core shielded cable (Belden 9533): GND = red, LTC_1 = white, LTC_2 = black.

Application diagram:



K_XF_D1

5 Options

5.1 Option B: Video Bypass Relay

With this option the module is equipped with a bypass relay:

- The bypass relay appears in the video input to output path, not in the video loop path.
- The main functionality is to maintain the video path even in an event of power failure.

The bypass relay can be switched remote controlled by a GPI function: A function key or one of the GPI inputs can be programmed with the "GPI: Relay Bypass" function. Please refer to the document "RUB AT/DT/HT/XT Application: GPI Functions". You can download it from:

https://plurainc.com/products/at/

Technical data of the relay:

Initial insulation resistance	100 MΩ minimum
Initial contact resistance	50 mΩ maximum
Max switching power	24 W
Max switching current	1 A
Max switching voltage	24 V

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