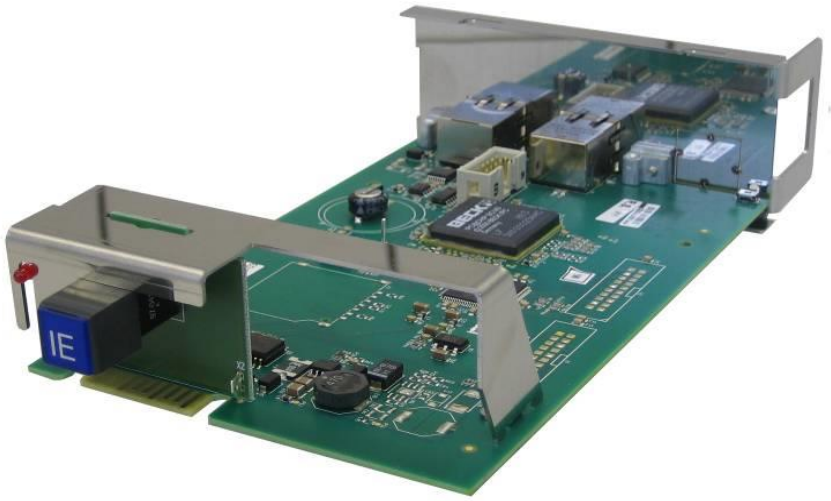
plura

TIMING SOLUTIONS

Rubidium Series

RUB IE
RUB PM

Ethernet Functionality of the RUBIDIUM SERIES System



Functional Description and Specifications
Supplement to the “Installation & Systems Manual RUBIDIUM SERIES”
Version: 2.3
December 2, 2020

CONTENTS

A1 Revision History

No.	Date	Subject
0.n		Preliminary documents, changes without notice.
1.0	February 28, 2013	This new document describes the Ethernet functionality of module IE (version 2, since March 2011) and module PM, based on version 3.1 of document '*Functional Description and Specifications IE Module*'.
1.1	May 16, 2013	More features of the log file.
2.0	June 05, 2014	Completely revised. New GUI of our RUBIDIUM web browser.
2.1	September 4, 2019	Changed address of Plura Europe GmbH.
2.2	July 13, 2020	Minor formatting changes.
2.3	December 2, 2020	Re-formatted in new design.

Due to constant product development the features of these modules are subject to change. The current functional description always refers to the current software and the current configuration tool.

You can download the latest version of the standard software from

https://www.plurainc.com.

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A3 General Remarks

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

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

1 RUB Ethernet Modules

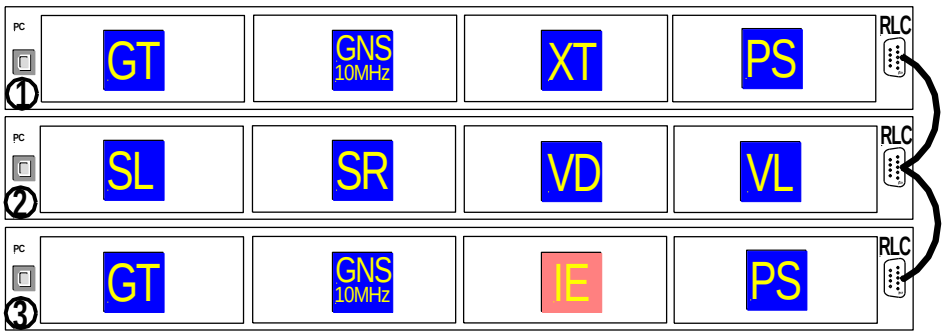
1.1 Overview

IE and **PM** modules have a stand-alone Ethernet "mini server" integrated. This offers access to all configurable modules of a Rubidium system, even in different chassis, utilizing the internal "TC_link" interface. Main features are the abilities to setup each module and to open the status monitor of each module.

SNMP, NTP, and other functions are optionally available (please refer to chapter "Options").

IE modules are made for Ethernet functionality only.

PM modules are power supplies with Ethernet functionality. You can read all details about the power supply in the document '*Functional Description and Specifications PM-PS-PT*'.



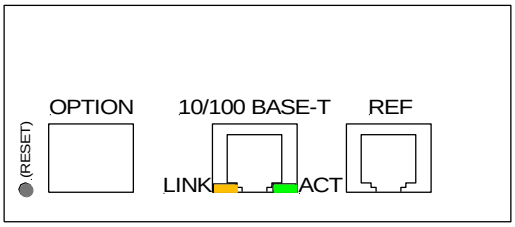
A front panel label **IE** or **PM** visibly identifies RUB1 version modules. RUB3 version modules have this label at the rear plate. A serial number is located on the bottom side of the circuit board of each module. Apart from setting the network parameters, an initial set-up of these modules is not provided for standard operations. The integrated HTTP server is located in a flash memory and can get a flash update.

Survey of the basic features:

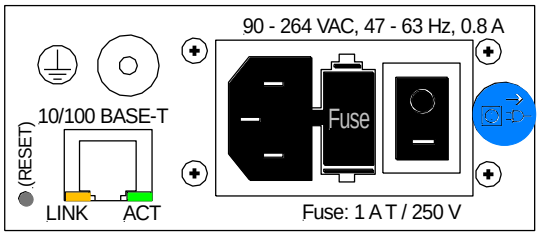
- 10/100Base-T Ethernet with integrated WEB server.
- 'Hot Swapping', i.e. it is possible to insert or remove a module without interrupting the operation of other modules in this frame.
- Failure relay, connected to the FAIL_A and FAIL_B pins of the **RLC** connector at the rear of the frame.
- RS232 and TC_link (RLC connector) interfaces to have access to the internal bus of the chassis.
- RUB1 version: Red LED (OPER) at the front panel indicates that the module is ready.
- Enables to setup all configurable modules of a Rubidium system.
- Enables to open the status monitor of each configurable module.
- Orange-coloured LED (LINK) – integrated in the RJ45 jack at the rear panel – lights up if connection to the Ethernet network has been established.
- Green LED (ACT) – integrated in the RJ45 jack at the rear panel – flashes during Ethernet activity.

1.2 Rear Panel, Connections, Specifications

Rear of RUB1 IE



Rear of RUB1 PM



Common technical data:

Mechanical	Circuit board (W x D): 100 x 160 mm / 3.94 x 6.30 inch Rear panel: RUB1: 103 x 44 mm / 4.06 x 1.73 inch RUB3: 4HP, 3RU
Environmental characteristics, operating	Temperature: 5 °C to 40 °C Relative humidity: 30 % to 85 %, non-condensing
Environmental characteristics, non-operating	Temperature: -10 °C to +60 °C Relative humidity: 5 % to 95 %, non-condensing
Ethernet	Connector: RJ45 jack Technology: 10/100Base-T
RESET	There is a RESET button behind a small (Ø 2.6 mm) hole. Press this button to do a cold boot of the Ethernet functionality.

Additional technical data of **IE** modules:

Operating voltage	12 - 30 VDC
Power consumption	≤ 1.8 W
Weight	0.3 kg approximately
REF connector	1 I/O – depending on option 2 I/O – depending on option 3 n. c. 4 GND 5 24 VDC OUT (200 mA reversibly fused) 6 n. c. 7 GND 8 n. c.

Additional technical data of **PM** modules:

Power supply	Please refer to document: *'Functional Description and Specifications PM-PS-PT'*
Power consumption	Electronic part: ≤ 1.9 W; entire module: ≤ 9.4 W
Weight	0.5 kg approximately

2 Identification of Modules in a RUBIDIUM System

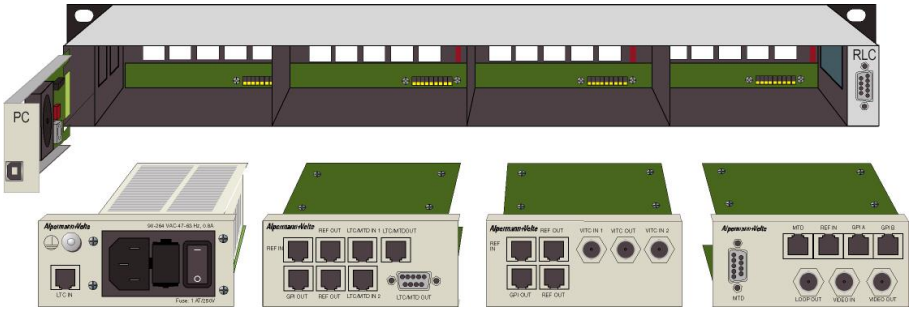
The browser identifies any configurable module by its **slot** within the frame (chassis), and by its **frame number**.

2.1 The Slots

RUB1 chassis, front view:

Slot 1 Slot 2 Slot 3 Slot 4

RUB1 chassis, rear view:



Slot 4 Slot 3 Slot 2 Slot 1

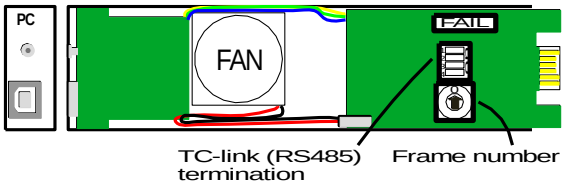
RUB3 chassis, rear view (some modules require one slot, others two slots):

21 - - - - - - - - - - - - - - - - - - - 1

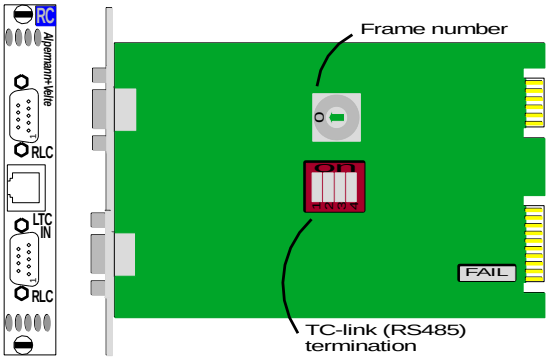
2.2 Frame Number

Setting the frame number: at **RUB1** chassis with a rotary switch at the **fan module**,
at **RUB3** chassis with a rotary switch at the **RC module**.

Fan module

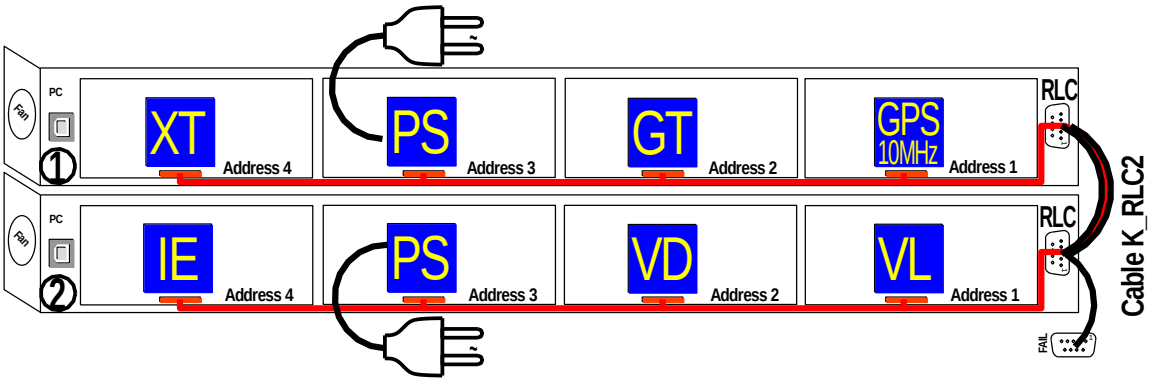


RC module



A system of a single frame normally receives the number 0 (= single frame).

If more than one chassis is connected by the **RLC** connectors, different frame numbers should be selected. Such a system receives a pre-installation upon delivery. In this case, labels are attached to each frame showing the numbers. If you install your own system, please select the numbers manually.

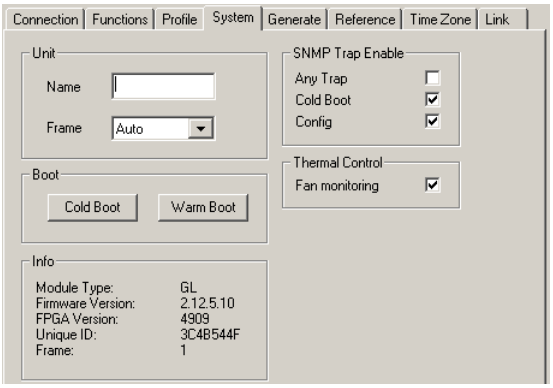


Each module has to know its frame number.

It can automatically detect the frame number, that is the default set-up, or it can receive a number manually.

This set-up can be done at the **Frame** entry at the **System** page of one of our configuration tools.

The **Info** box gives a feedback about the detected or accepted frame number.



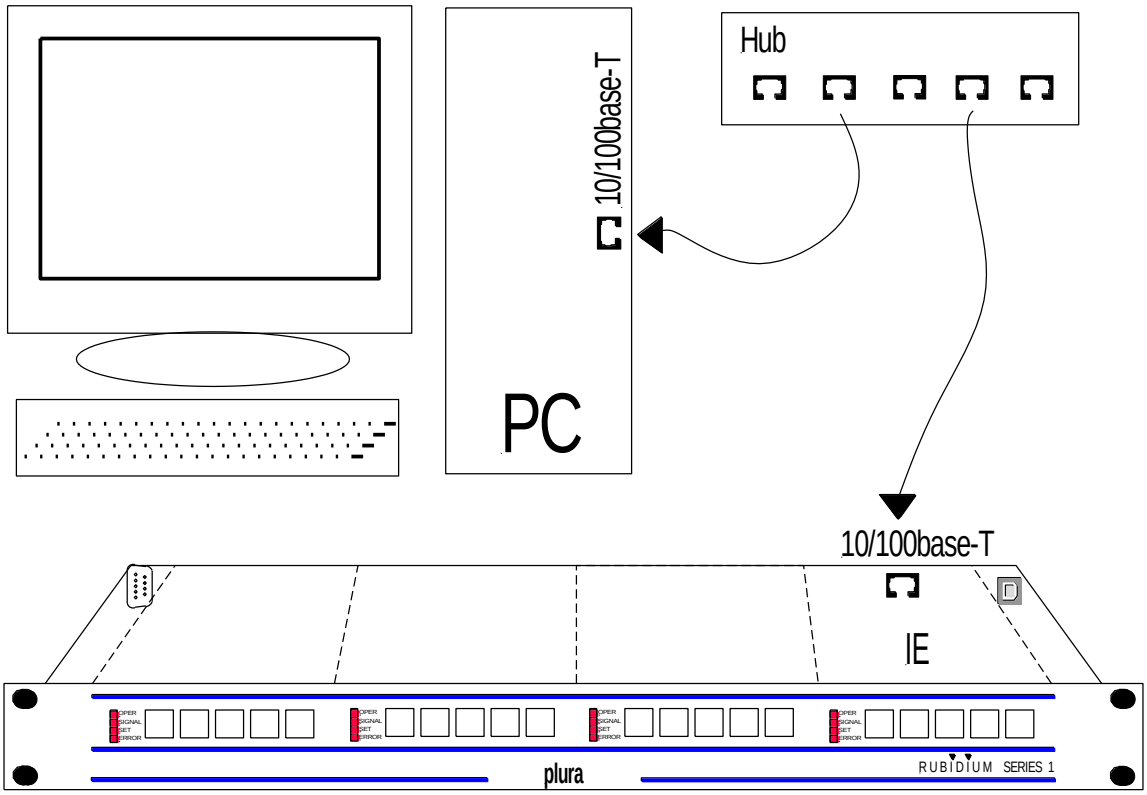
3 The RUBIDIUM SERIES HTTP Server

3.1 Overview, Connecting the RUB Ethernet Module

The RUBIDIUM SERIES HTTP server was developed to provide a uniform and easy way to setup all configurable modules.

The HTTP server is located in any RUB Ethernet module (**IE** or **PM**) and can be accessed via 10/100Base-T Ethernet and a web-browser.

- Each RUB Ethernet module has a RJ45 connector for Ethernet interface. Connect a straight CAT5 cable if you use a hub or a switch. Use a crossover cable if you connect to the Ethernet card of your computer directly.



The following chapters describe the first steps and all the basic possibilities of the configuration via browser. Please refer to the module's operating manual for a detailed description of the specific configuration of the module, i.e. the choice of functions and corresponding parameters.

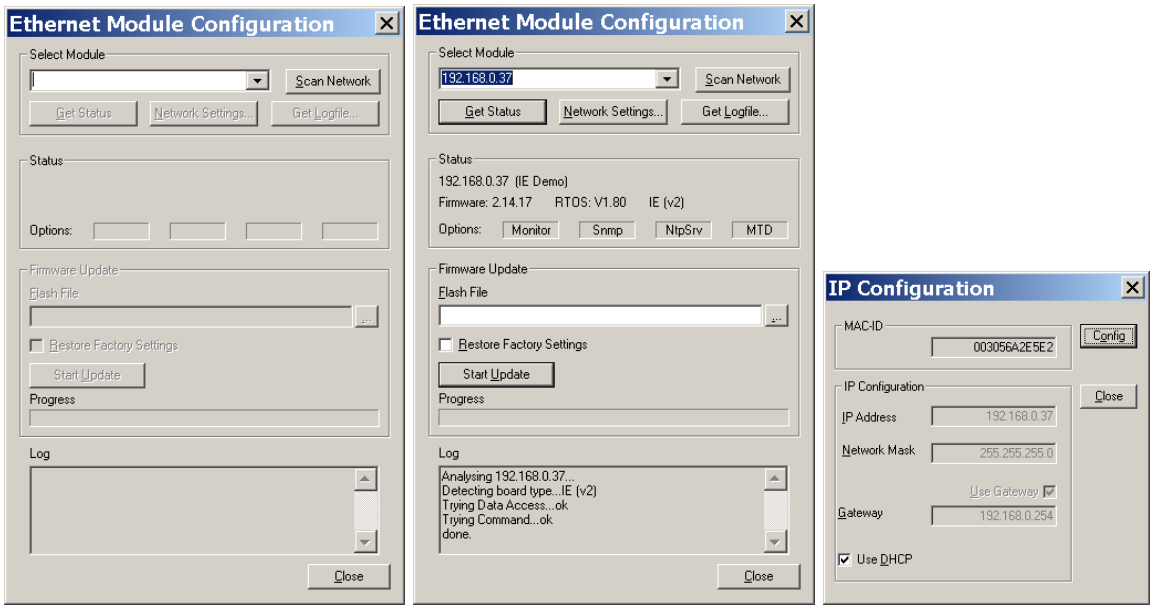
3.2 Network Set–Up

The computer which you have to use for the network set–up must be connected to the same network as the RUB Ethernet module. If you have a firewall running, please disable it or make the UDP port 8001 available for incoming and outgoing traffic.

You need the "**Rubidium Config**" ( ) program. It is included on the product CD or available at:

https://www.plurainc.com.

- Please copy this program to your computer.
- Turn on the power of all units.
- Start the "**Rubidium Config**" program.
- Now choose "*Ethernet Module Configuration...*" from the "*Tools*" menu. The following screen will appear:

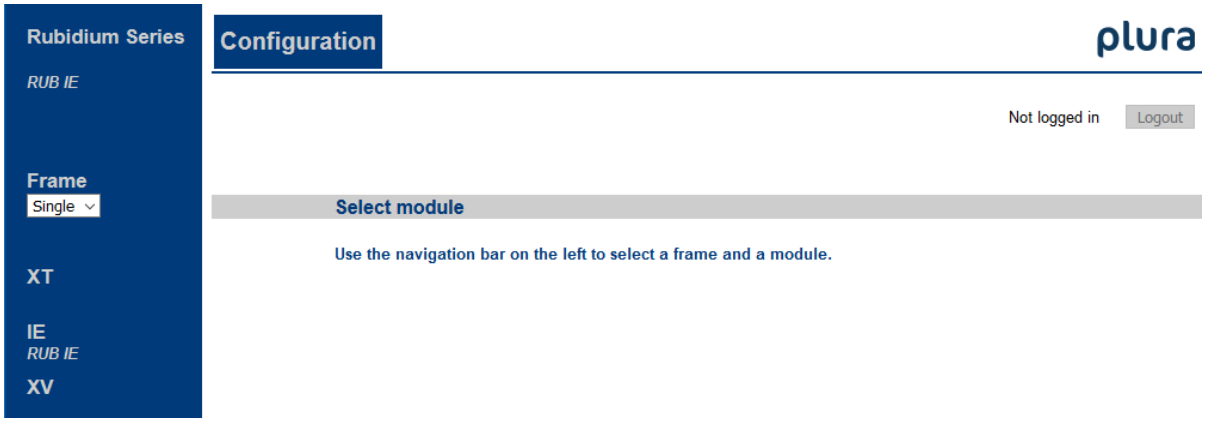


- Press "*Scan Network*" to search for RUB Ethernet units. All units found in the local network will be listed. Now choose the unit from the list. Clicking "*Get Status*" will fill in the information at the "Status" box.
- Click "*Network Settings...*", and adjust the parameters like IP Address, Network Mask, Gateway, and DHCP. Then click "*Config*" to store this set–up.
- The IP configuration now is complete. Close the "*IP Configuration*" dialog. A new network scan is started automatically, and the configured IP address will be shown in the list.
- Now you can close all dialogs.

3.3 The Rubidium Homepage

To open the RUBIDIUM homepage, start an Internet Browser and type in the IP address of the RUB Ethernet module.

The RUBIDIUM homepage:

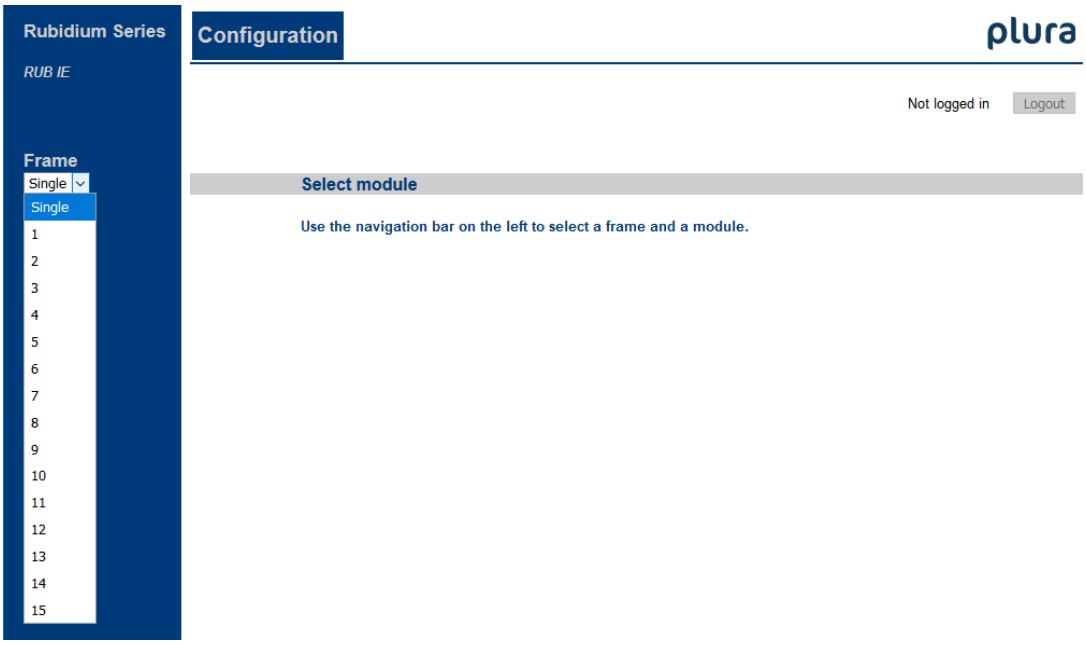


- Place a direct link on your PC desktop to have an easy access to the RUBIDIUM SERIES system next time.

3.4 Accessing a Configurable Module

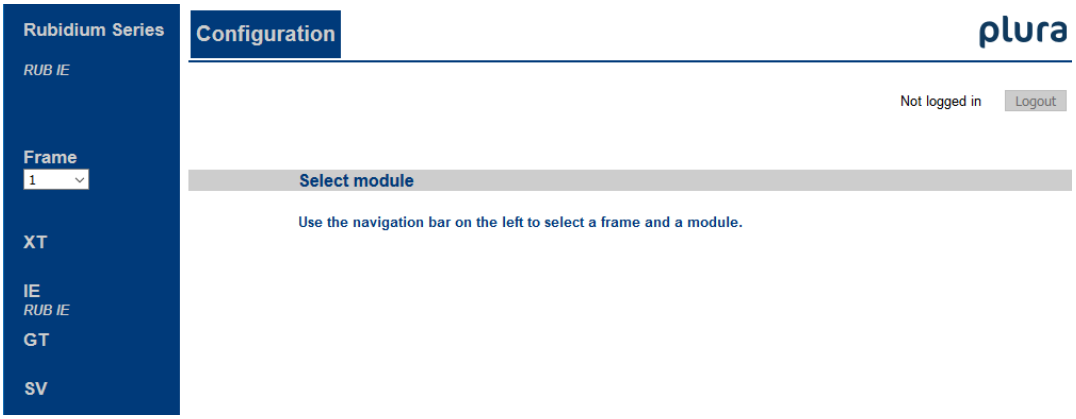
3.4.1 The First Steps

As described at chapter "*Identification of Modules in a RUBIDIUM System*", each RUBIDIUM chassis can be identified by its address. If you have opened the start page (**Configuration**), the next step will be to select the address of the chassis.

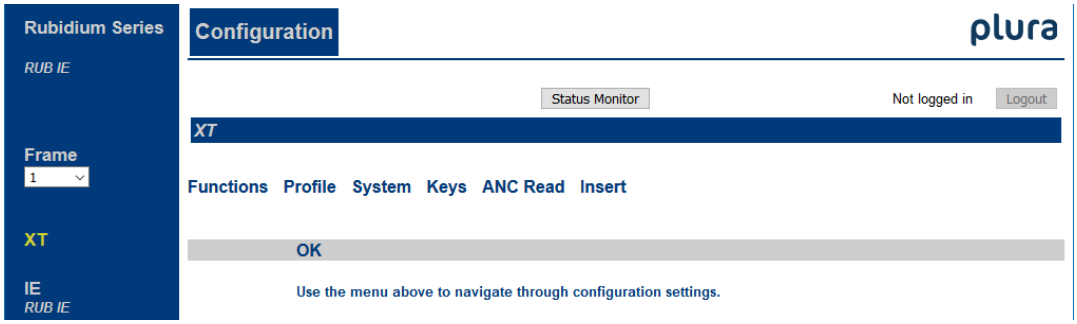


1st step: Select the frame (chassis) number with drop-down list **Frame**. A single frame system will be identified with "*Single Frame*". As soon as the system consists of more than one frame, all frames must have different addresses.

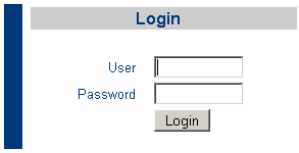
All configurable modules found will be indicated by their labels. Example: modules **XT** – **IE** – **GT** – **SV** at slots 1 – 2 – 3 – 4 of the identified chassis. RUB1 frames have four slots at maximum, RUB3 frames 21 slots. If you move the cursor over a label, a tooltip will show the slot of this module, e.g. at GT: Frame 1, Unit 3 .



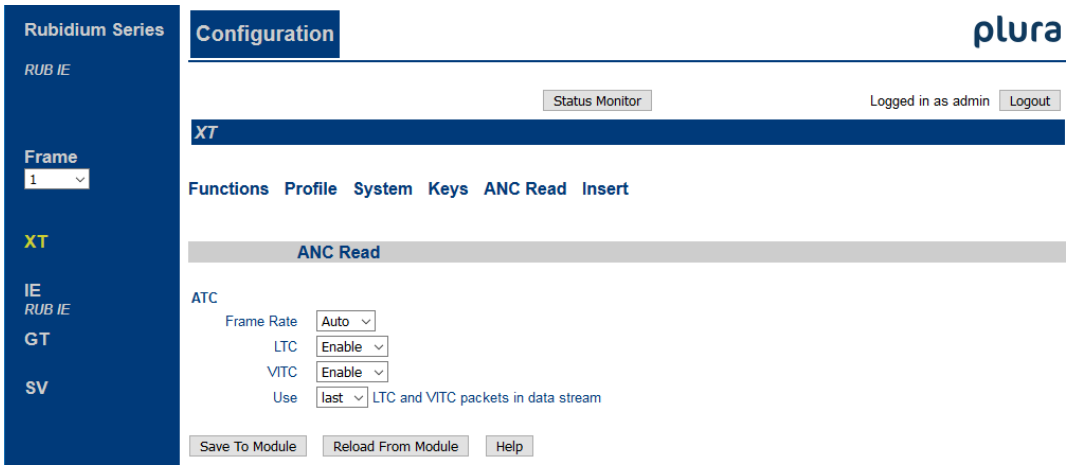
2nd step: Select the module: Click on a label to gain access to this module. A menu appears which shows a list of all configuration pages which are currently available, for example for XT module:



3rd step: Open a configuration page: With a click on one of these entries of the menu a configuration page will be opened where you can see and change parameters (e.g. page "*ANC Read*"). If it is the first time that you try to open a configuration page, you have to pass the **LOGIN**:



At delivery, the password of the "**admin**" user (administrator) is "**admin**". The login status will show the user name if you have successfully logged in. Click button **Logout** if you want to log out.



A configuration page represents a function of the module, for example "ANC Read = *Ancillary Data Reader*" of the XT module. The configuration page shows the current parameters, which now can be checked and changed.

Changes on a parameter will not be stored automatically. There are two buttons at each page which should be used to transfer the parameters:

Save To Module: Click this button to store the changes on the module.

Reload From Module: Click this button to refresh the configuration page.

3.4.2 Enable and Disable Functions: The "Functions" Page

Each module offers numerous functions. There belongs one configuration page to each function. Basically, there are three states for a function:

State	Example: "ANC Read" function at XT module
Function enabled, configuration page available.	The *Ancillary Data Reader* is switched on. Parameters, like frame rate, can be adjusted via the "ANC Read" configuration page.
Function enabled, configuration page not available. This avoids any unintentional operating.	The *Ancillary Data Reader* is switched on. You have to activate the configuration page before you can change any parameter.
Function disabled, configuration page not available.	The *Ancillary Data Reader* is switched off.

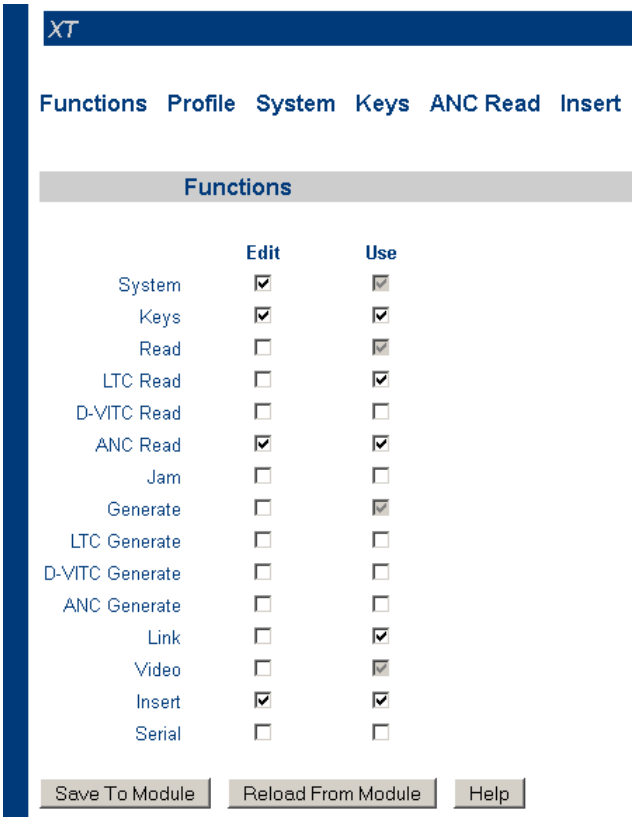
This example shows that for the XT module presently the configuration pages **Functions**, **Profile**, **System**, **Keys**, **ANC Read**, and **Insert** are available.

Functions **Read**, **LTC Read**, **Generate**, **Link**, and **Video** presently are in use (switched on), but the configuration pages are not available.

Configuration pages **Functions** and **Profile** are available always.

The **Functions** page allows switching on or off configuration pages.

Save To Module: Changes on this page will not be stored automatically. Click this button to store the changes on the module.



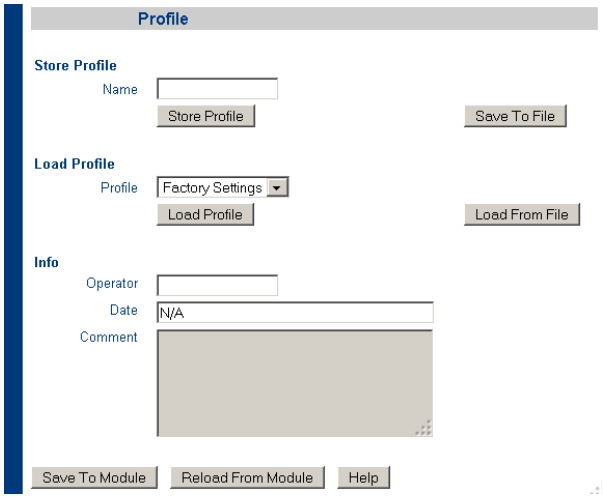
The **Edit** and **Use** checkboxes define the state of a function:

Edit	**Use**	State of a function
		Function disabled; corresponding configuration page not available.
√	√	Function enabled; corresponding configuration page available.
	√	Function enabled; corresponding configuration page not available. This avoids any unintentional operating.

3.4.3 Store and Load Set-Ups: The “Profile” Page

The current set-up of the module can be stored:

- in a file on your computer,
- as a profile on the module.



Store the current set-up in a file on your computer

The following reasons – for example – may be given to store the current set-up of a module in a file on your computer:

A The current set-up should be saved.
B The set-up of this module should be transferred to another module of same type.
C For service purposes, the current set-up should be sent by email as an attachment.

The current set-up of the module will be stored, not any profiles saved in the flash memory of the module itself. Storing in a file will create a “**.tci**“ file at the end.

- Click the **Save To File** button. If you were requested to confirm the storing of data, please do this. The file browser opens. Select any folder and a name for the file. The type of the file should be “**.tci**“.
- Button **Load From File** enables to load a set-up from a file.

Store the current set-up as a profile on the module

Standard modules have a flash memory to store different set-ups. A complete set-up stored to the module is called a “profile”.

Store Profile

Name If you want, you can enter a name to identify the profile.

Store Profile Click this button to open the “Store Profile“ window. Select a number or a name from the “Profile“ drop-down list, if you want you can add more information at the “Operator”, “Date”, and “Comment” fields, then click “ok” to start the storage procedure. This procedure stores the current set-up of the module at a separate memory location on the module.

Load Profile

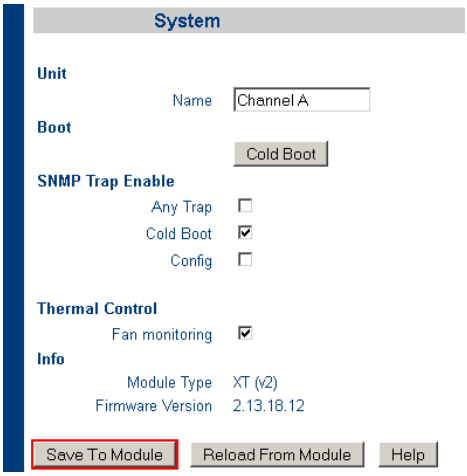
Load Profile Click this button to open the “Load Profile“ window. Select a number or a name from the drop-down list, then click “ok” to load the profile. This will interrupt the operating mode of the module. The current set-up of the module will be replaced.

Selecting “**Factory Settings**“ from the drop-down list sets the module in the default state.

3.4.4 Name and Reset of a Module: The “System“ Page

The **System** page enables, among other things, to:

- assign a name to a module,
- restart a module.

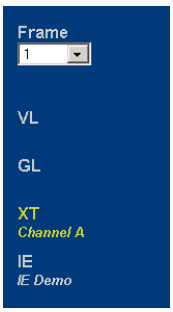


Assign a name

Unit

Name You can assign a name to each configurable module. Enter a text with 10 characters at maximum. This name appears wherever this module can be found. This facilitates locating a specific module especially if several modules of the same type are present in a system.

Example: XT module named “Channel A“.



Reset

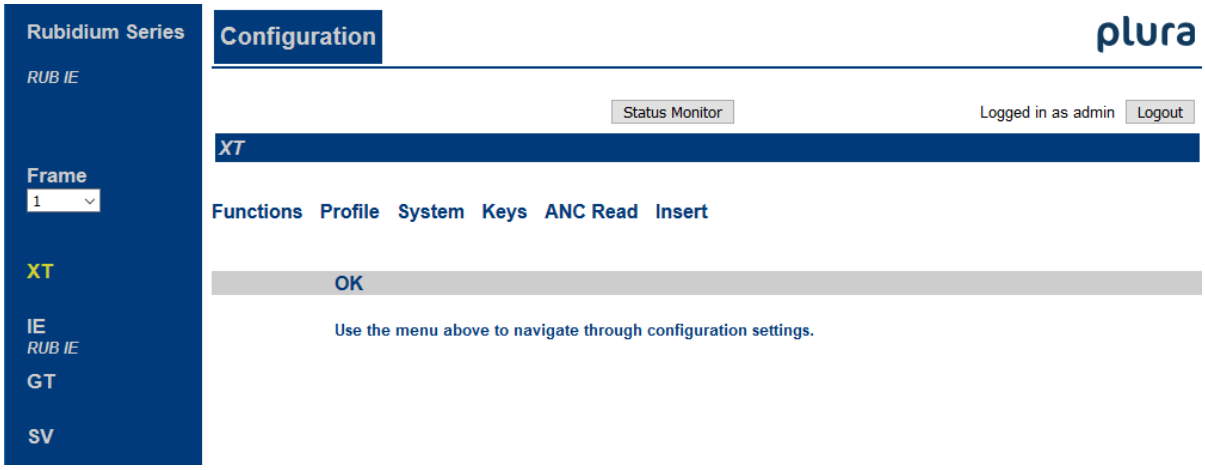
Boot

Cold Boot Clicking this button enables a restart of the module. At first, a message box appears to remind you that the operation of the module will stop during restart. You have to confirm this message to do the restart.

Please refer to the module’s operating manual for information about this page.

3.4.5 The Status Monitor of a Module

Click button Monitoring or Status Monitor to open the status monitor of the selected module.



Basically, each configurable module offers a status monitor. Opening the status monitor will not require a **LOGIN**, because that will not make any changes at module's configuration.

Requirements:

- Please have the current version of *Java Runtime Environment* 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.

Please refer to the module's operating manual for a detailed description of the status monitor.

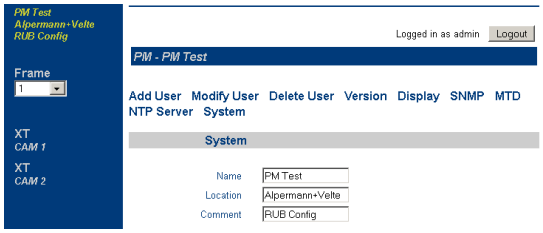
3.5 The RUB Ethernet Module

3.5.1 Accessing the RUB Ethernet Module

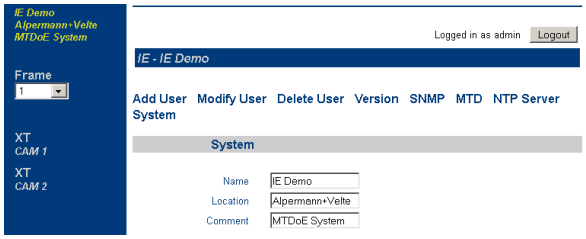
RUB Ethernet modules currently are the modules **IE** and **PM**. There may be more than one Ethernet modules in one RUBIDIUM system. Accessing an Ethernet module is only possible using an Internet browser and typing in the IP address of the RUB Ethernet module.

Example: A RUB1 chassis assembled with modules **PM** – **XT** – **XT** – **IE**:

IP address of the **PM** module:



IP address of the **IE** module:

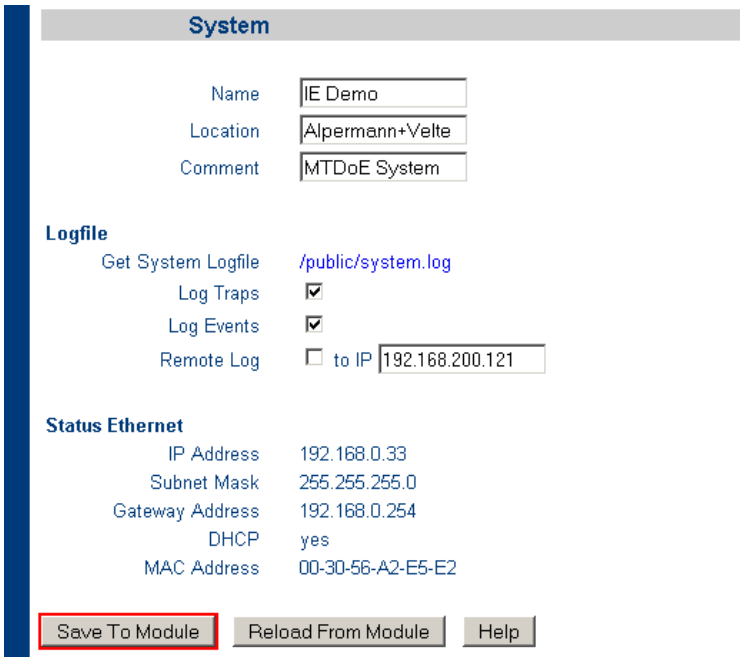


The Ethernet module accessed via browser will be indicated always at the top of the list at the left border of the screen. You will see the label (**IE** or **PM**) and all entries at Name, Location, and Comment at configuration page **System**. It is highly recommended to use these entries, because this simplifies accessing the right module in a system. Access the Ethernet module with a click on the **IE** or **PM** label. A horizontally arranged menu appears. Clicking any entry in this menu will open a configuration page of the Ethernet module.

Further Ethernet modules which are present in the same system cannot be shown. It is not possible to find and configure an Ethernet module via any other Ethernet module.

3.5.2 System: Name, Log File, and Ethernet Status

Click on **System** in the menu to open the configuration page **System**.



Name
Location
Comment

It is highly recommended to use these entries, because this simplifies accessing the right module in a system.

Save To Module Click this button to store the changes to the module.

Logfile

Get System Logfile RUB Ethernet modules create a log file for service purposes. Click on **/public/system.log** to open this file.

Log Traps If clicked, traps will produce entries in the log file.
The Ethernet module and any configurable RUB module can send a trap. Regarding configurable RUB modules, the '*SNMP Trap Enable*' checkboxes at the **System** page have to be noticed (please refer to the '*Functional Description and Specifications*' of the module).

Log Events If clicked, events will produce entries in the log file.
Events will be sent mainly from RUB changeover modules ('**S**' modules) in case of errors or warnings (please refer to the '*Functional Description and Specifications*' of the module).

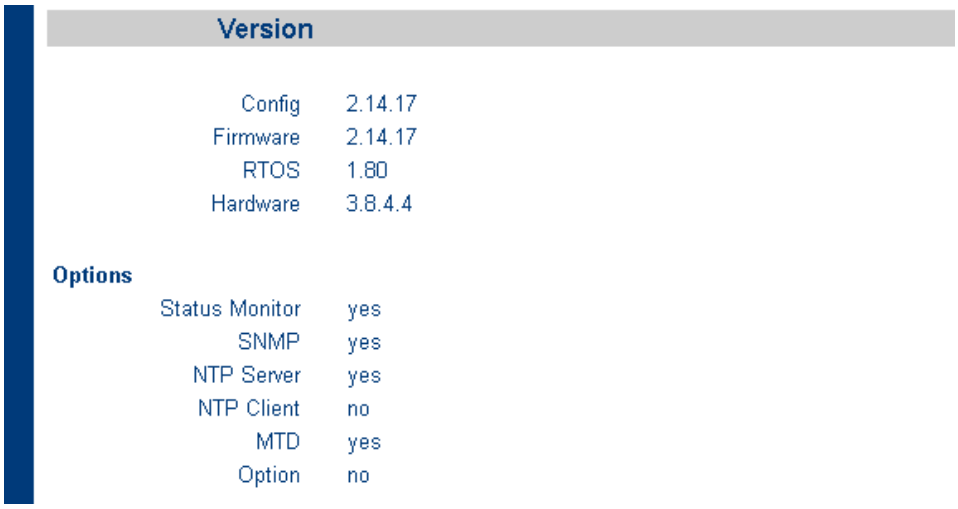
Remote Log You can enter an IP address to which every entry can be sent. The **Syslog** protocol is used. The **Facility** number is used as follows:

0 message from the Ethernet module
1 traps
2 events

Status Ethernet Shows the current IP parameters of the RUB Ethernet module.

3.5.3 Version: Status of Hardware, Firmware, and Options

Click on **Version** in the menu to open the configuration page **Version**.



This page shows information about hardware, firmware, and installed options.

3.5.4 Displaying the Login Status

The home page (**Configuration**) displays the login status:

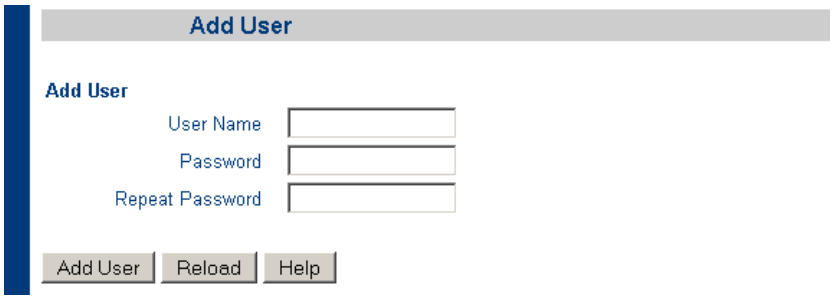
Currently not logged in:

Currently logged in as user “admin”. You can log out clicking button “Logout”:

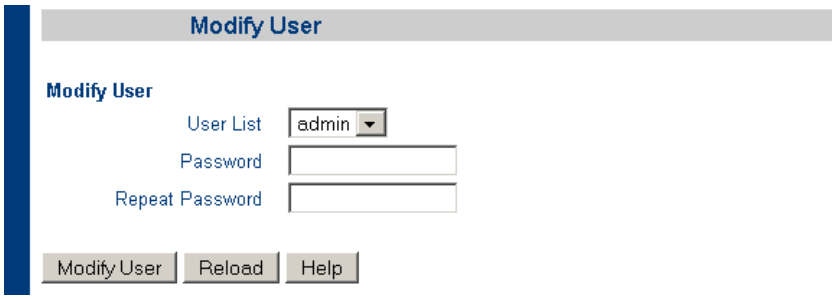
3.5.5 User and Password Management: Add, Modify, and Delete

You can add, modify or delete users.

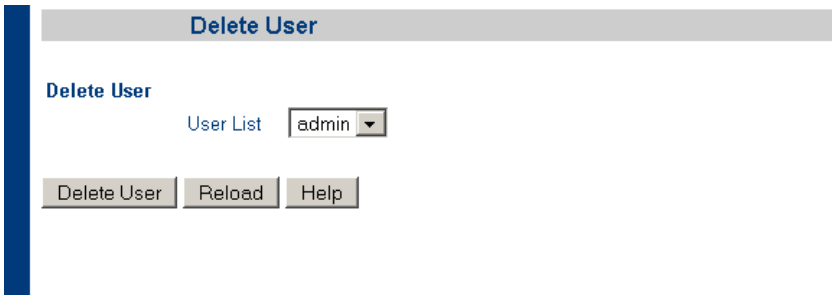
Add user:



Modify user:



Delete user:



Hint: In the event that all passwords are lost, even the "admin" – "admin" access is denied, a firmware update will help. Before starting the update click "**Restore Factory Settings**". Please notice chapter "Software Update" for detailed information.

This update will set **everything** to default, even IP parameters and passwords. Access via "admin" – "admin" will then be possible again.

4 Software Update

Software updates require a computer with the "Rubidium Config" program, and an Ethernet interface (RUB Ethernet module and computer connected to the same network). When using a firewall, ensure that the computer can connect to the module on TCP ports 20, 21, 23 and 954 and on UDP ports 123, 161 and 8001 for both incoming and outgoing traffic.

Current module firmware – with all combinations of standard options – is available at:
https://www.pluralinc.com.

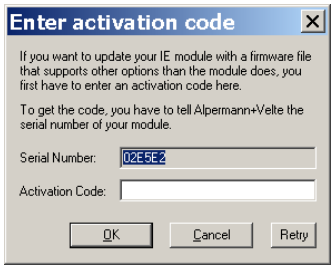
Store your update file on your computer.

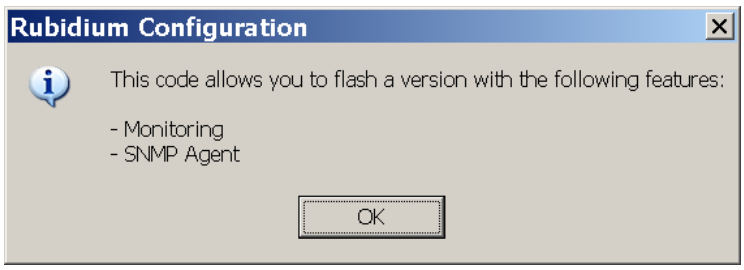
Now execute the following steps:

1. Be sure that RUB Ethernet module and computer are connected to the same network and that they can reach each other at the ports listed above. Disable any firewall that might block the "Rubidium Config" program.
2. Start the "Rubidium Config" program.
3. Choose "IE Module Configuration…" from the "Tools" menu.
4. Press "Scan network" and choose the module from the list. The "status" box now shows the current firmware version and installed options.
5. Click the Browse ("…") button to search for the update file.
6. Only if it is necessary to restore the factory settings, click "Restore Factory Settings". This will reset IP parameters and passwords as well!

   Press "Start Update".

   If you want to change RUB Ethernet module's options, an activation code will be needed. A message appears as shown on the left. Please copy the serial number shown at your message. Request an activation code from Plura company by sending this serial number together with the information about all options the RUB Ethernet module should have at the end. Plura will send you the activation code in return. Please copy this code in the corresponding window and press the "OK" button.





   A confirmation as shown on the right appears. Press the "OK" button.

7. During flash update, the Ethernet operation of the module stops! The module reboots after flash update. A "Reboot complete" message appears. Press the "OK" button.
8. An "Update complete" message appears. Press the "OK" button. Update is finished now.

5 Options

IE-C	NTP Client – for **IE** modules only. The IE module communicates via Ethernet with an NTP server, receives a time & date reference, and synchronizes this way other RUBIDIUM modules. Please refer to the 'NTP Client' manual. This option cannot be combined with other options.
IE-M **PM-M**	MTDoE – for **IE** or **PM** modules. The RUB Ethernet module communicates via Ethernet with MTDoE devices like displays, studio clocks, and MTD control units. It transfers a time & date reference and MTD data received via TC_link from an MTD generator. Please refer to the 'MTD System' manual. This option includes option **-N** (NTP Server). This option may be combined with option **-S** (SNMP).
IE-N **PM-N**	NTP Server – for **IE** or **PM** modules. The RUB Ethernet module becomes a time & date reference for other devices in this network. Please refer to the 'NTP Server' manual. This option may be combined with option **-S** (SNMP).
IE-S **PM-S**	SNMP Agent – for **IE** or **PM** modules. The RUB Ethernet module can be used as an SNMP Network Element. You can easily monitor and control the RUBIDIUM system using centralized network management software. Please refer to the 'SNMP Agent' manual. This option may be combined with option **-N** (NTP Server) or option **-M** (MTDoE).
IE-R3 **IE-R10** **PM-R3** **PM-R10**	Timer Request Protocol – for **IE** or **PM** modules. Third party equipment like multiviewers can request and operate with timers of the MTDoE system. Up to three (**R3**) or ten (**R10**) units can connect to the Rubidium system at the same time. Please refer to the 'Timer Request Protocol' manual. This option includes options **-M** (MTDoE) and **-N** (NTP Server). This option may be combined with option **-S** (SNMP).
PM-Q	OLED Display – for RUB1 version **PM** modules only. The PM module can be equipped with a display at the front. The display can show data transmitted from other modules via internal TC_link interface. Please refer to the '*Functional Description and Specifications PM-PS-PT*' manual. This option may be combined with all other options for a **PM** module.

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