



TIMING SOLUTIONS

Rubidium Series



RUB IE-C

NTP Client Interface for Synchronizing to an NTP Server

Functional Description
Supplement to the “Functional Description and Specifications Module IE”
Version: 1.4
December 3, 2020





CONTENTS

| | | |
|----------|---|-----------|
| A1 | REVISION HISTORY | |
| A2 | COPYRIGHT | |
| A3 | GENERAL REMARKS | |
| 1 | NTP CLIENT | 5 |
| 1.1 | DESCRIPTION | 5 |
| 1.2 | HINTS | 5 |
| 1.3 | CONFIGURATION | 6 |
| 1.4 | SYNCHRONIZATION | 7 |
| 1.5 | STATUS | 7 |
| 1.6 | TROUBLESHOOTING | 9 |
| 2 | APPLICATION | 10 |
| 2.1 | OUTPUT OF TIME & DATE REFERENCE SIGNALS | 10 |
| 2.2 | TIME REFERENCE OF THE RUBIDIUM SYSTEM | 11 |
| 2.2.1 | GT/GI System | 11 |



A1 Revision History

| No. | Date | Subject |
|-----|--------------------|---|
| 0.n | May 06, 2008 | Preliminary documents, changes without notice. |
| 1.0 | June 09, 2008 | First released document. |
| 1.1 | June 16, 2008 | The NTP Client configuration page now shows the IP address of the reference. |
| 1.2 | September 25, 2008 | Two NTP-Server possible. Additional description in "Configuration" and "Status". Added section "Synchronization". |
| 1.3 | September 4, 2019 | Changed address of Plura Europe GmbH. |
| 1.4 | December 3, 2020 | Re-formatted in new design. |

A2 Copyright

Copyright © Plura Europe GmbH 2002-2020. All rights reserved. No part of this publication may be reproduced, translated into another language, stored in a retrieval system, or transmitted, in any form or by any means, electronic, mechanical, photocopying, recording, or otherwise without the prior written consent of Plura Europe GmbH.

Printed in Germany.

Technical changes are reserved.

All brand and product names mentioned herein are used for identification purposes only and are trademarks or registered trademarks of their respective holders.

Information in this publication replaces all previously published information. Plura Europe GmbH assumes no responsibility for errors or omissions. Neither is any liability assumed for damages resulting from the use of the information contained herein.

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 "Functional Description & Specifications Module IE" manual. It describes a special feature of the **IE** module realized by an optional firmware and an additional hardware.



1 NTP Client

1.1 Description

The “Network Time Protocol” (NTP) is used for time synchronization within networks. The NTP servers are queried by NTP clients, which then can synchronize their internal clocks accordingly.

The IE module with option “C” (which stands for NTP client) can connect to such a server and synchronize to it. In case of a successful synchronization, it provides a reference signal on the “REF OUT” port which can be used by connected RUBIDIUM modules (e.g. GT, GI, AI + option D) for synchronizing purposes (see chapter “2.1 Output of Time & Date Reference Signals”).

The IE module with option “C” thus gives a RUBIDIUM system the possibility to synchronize to an NTP server over Ethernet.

1.2 Hints

The IE module sends time requests every 64 seconds to the selected server.

If you choose an Internet time server please choose a server which is closest to the client – in a network sense.

In general, the organization which operates the time server does not guarantee a permanent, uninterrupted operation free of disturbances.

The accuracy achieved is in the range 2 – 50 ms, and it is dependent on the symmetry and speed of the Internet path between server and client.

It is strongly recommended not to run other tasks of the IE module during normal operation, because that might disturb the output of the reference signals. This concerns for example the configuration of other RUBIDIUM modules or the usage of the status monitor.



1.3 Configuration

Open the configuration page of the “NTP Client” by clicking the red dot in the web interface and select “NTP Client” from the menu.

The screenshot shows the configuration page for the NTP Client in the Plura web interface. The page is titled "Configuration" and is part of the "IE - RUB IE" module. The user is logged in as "admin". The page has a sidebar with navigation options: Rubidium Series, RUB IE, Frame (1), XT, IE (RUB IE), GT, and SV. The main content area is titled "NTP Client" and contains the following settings:

- Enable:**
- Remote Hosts:**

| | Primary | Secondary |
|--------------|-------------------------|--------------|
| Host | 192.168.0.94 | 192.168.0.95 |
| Stratum | 1 | n/a |
| Reference | GPS | n/a |
| Poll Count | 44 | 0 |
| Failed Polls | 0 | 0 |
| Last Poll | 12:00:24 2019-09-04 UTC | n/a |
| Active Host | Primary | |
- Automatic Changeover:**
- Last Auto Changeover:** n/a
- Manual Changeover:**
- Changeover Count:** 0
- Client:**
 - Output Protocol: Meinberg Std, 2400/7e2 + PPS
 - Current Date/Time: 12:00:29 2019-09-04 UTC
 - Drift Correction: 0.00 ppm
 - Sync after reset: yes
 - Lock: yes
 - Last Sync: 12:00:24 2019-09-04 UTC
 - Use server port:

At the bottom of the page, there are three buttons: "Save To Module", "Reload From Module", and "Help".

Here you can set the IP addresses of up to two NTP servers (“Primary” and “Secondary”). If you need just one server, put its address in “Primary” and set “Secondary” to “0.0.0.0”.

Use the button “Changeover” to switch between the servers. Note that this will interrupt the second pulse and may cause irregularities in the attached modules.

If you wish an automatic changeover, activate the appropriate checkbox. See section 1.4 for more information. This setting is the default and recommended.

Remarks

- Every change in the settings causes the seconds pulse to be interrupted and a new synchronization is started. Avoid frequent changes during normal operation.
- Don’t use DNS names, since they can not be resolved.
- No NTP queries will be sent to IP addresses that end with a “0” (aka. Network addresses) or with a “255” (aka. Broadcast addresses).
- To ensure an accurate time base, use only reliable time servers. Some public servers can differ from real time within several seconds.



1.4 Synchronization

The NTP Client checks the entered IP address and starts synchronizing with the associated server.

Upon the first synchronization, two requests are sent within a short time. If this leads to a successful synchronization, the "sync" and "lock" status are set to "yes". If in sync, the seconds pulse is sent via the "REF" port.

During normal operation, a request is sending every 64 seconds.

If the currently active server is not reachable and "Automatic Changeover" is active, the NTP Client switches to the other server, if it has a valid address. Now synchronization is done with the second server as described above.

In case of the second server getting unreachable, a changeover to the first one takes place and so on.

After five minutes of not being synced, the status "lock" is set to "no" and delivered via the "REF" port to the connected module.

1.5 Status

On the same page where you did the configuration, you can also get information about the synchronization status of your NTP client.

Here is a short description of the elements:

| Element | Description | Examples |
|------------|---|--------------------------------------|
| Stratum | <p>Presents the stratum value that was received from the configured server. This value tells the distance of the server to a reference clock. A server that is directly connected to a reference device (e.g. an atomic clock or a GPS clock or a radio clock) would have stratum 1. Any server that synchronizes to a stratum 1 server has stratum 2 and so on.</p> <p>If the stratum field indicates "n/a", no value has been received yet. Please refer to chapter "1.6 Troubleshooting" for help on this topic.</p> | 1 2 3 ... 15 |
| Reference | <p>If the configured server has a stratum of 2 or more, it is synced to another server with a stratum that is lower by 1 (e.g. a stratum-3 server is synced to a stratum-2 server). The IP address of that "lower stratum" server is shown here.</p> <p>If the stratum of the configured server is 1 or 0, the reference field shows an up to 4-character ASCII string. This string describes the reference as shown in the example's column on the right.</p> <p>If the reference field indicates "n/a", no value has been received yet. Please refer to chapter "1.6 Troubleshooting" for help on this topic.</p> | ACTS, GPS, PTB, 192.168.0.1 |
| Poll Count | The number of queries that have already been sent to the server. | 4869 |



| | | |
|----------------------|---|-------------------------------|
| Failed Polls | The number of queries that could not be sent or have not been answered. Generally this is due to an unreachable server (refer to chapter "1.6 Troubleshooting"). | 0 |
| Last Poll | The time and date (UTC, 24h) of the last query that was sent to the server. If there wasn't any query yet, "n/a" is shown. This time changes about every 64 seconds (the display does not update automatically – use the button "Reload From Module" to check for changes). | 13:09:11 2008-05-26 UTC |
| Active Host | Shows the host that is currently used for synchronization. | Primary, Secondary |
| Last Auto Changeover | The time and date of the last automatically initiated changeover; "n/a" if no changeover took place yet. Reset upon change of the host addresses. | 13:09:11 2008-05-26 UTC |
| Changeover Count | Number of automatic changeovers. Reset upon change of the host addresses. | 0 |
| Current Date/Time | Current date and time when the page was loaded. Matches the time provided as a serial data output. | 13:09:11 2008-05-26 UTC |
| Drift Correction | Some external factors like temperature cause the internal oscillator's frequency to differ from a nominal value. These differences are measured and corrected by the value that is displayed here. | 66 ppm |
| Sync | This element shows "yes" if a valid time could be retrieved at least once. While this is "no", no output is made on the "REF" port. | yes / no |
| Lock | Shows whether the internal time is locked to the NTP time | yes / no |
| Last Sync | Time and date of the last successful synchronization. Shouldn't be older than approx. 64 seconds during normal operation. Shows "n/a" if no sync was conducted. | 13:09:11 2008-05-26 UTC |



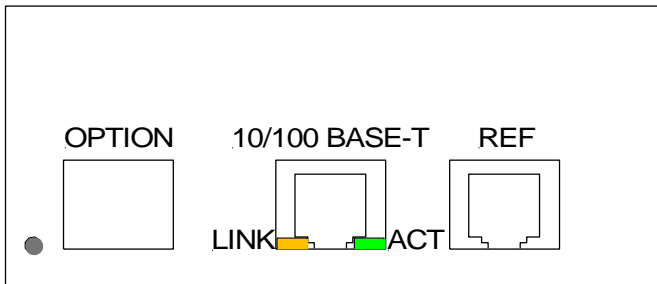
1.6 Troubleshooting

| Problem | Solution |
|--|--|
| The stratum or reference field shows "n/a", although the configured server is valid. | Be sure that the configured server can be reached by the IE module. Is there any firewall that could potentially affect network traffic? |

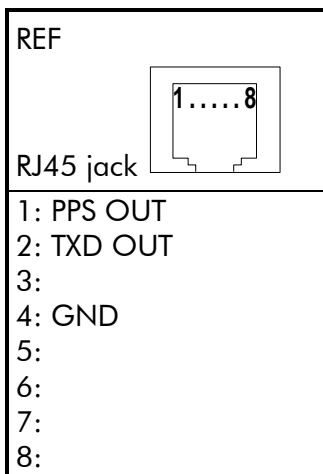


2 Application

2.1 Output of Time & Date Reference Signals



Connections at the rear panel of the IE module with option "C"



Signal descriptions

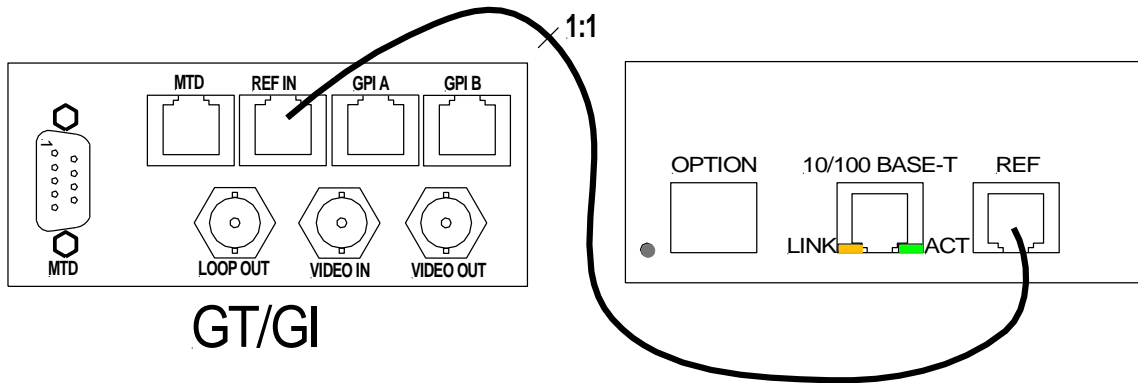
| | |
|---------|---|
| GND | Signal ground. |
| PPS OUT | Pulse Per Second output. Positive going pulse, pulse width ≈ 250 ms. Reference mark = positive (leading) edge. |
| TXD | RS232 signal TxD = transmit line, unbalanced data output. Serial data string, output of time & date, time zone = UTC, "Meinberg Standard" format, 2400/7/E/2. |



2.2 Time Reference of the RUBIDIUM System

2.2.1 GT/GI System

GT/GI Connection



GT/GI Configuration

Setting at the **"Reference"** function:

Setting at the **"Time Zone"** function:

Setting at the **"Generate"** function:

Regarding the phase synchronization of the LTC output of a GT module it is recommended to use a video/black-burst signal if you are working with television signals (select "Sync = Video"), otherwise use the internal oscillator (select "Sync = Internal"). This avoids any frame discontinuities of the time code during the day due to an unstable PPS signal. The time synchronization at 3 o'clock at night (according to the setting at **"Reference"**) will correct the time addresses of the time code, this may result in generating a frame discontinuity at this particular moment.



Contact Us



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



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

GERMANY



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



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

S. KOREA

