POWER AUTOMATION TECHNOLOGIES

DIGSI 5 QUICK NOTES	
DIGSI-5-QN0006:	**PTP:**

This Quick Note provides a variety of information related to testing of PTP and SIPROTEC 5 Protection Relays. Please also refer to:

- DIGSI 5 Quick Note 3
- Siemens Application Note SIP5-APN-022
- Siemens Application Note SIP5-APN-028

We recommend in your early use of PTP:

- When a new network switch is being used for the first time and its settings have not been proven, first test with a direct clock to protection relay connection – proving PTP clock-to-protection relay. Then introduce the network switch and the VLAN settings (it is normal practice to have PTP running via its own VLAN).
- Initially, have only one PTP source on the network (remember PTP is broadcast) - to eliminate conflicts (especially if non PTP aware switches are being used).
- Connect a Tekron PTP Translator in to the network – this provides a useful intermediate test point to check PTP signals.
- SIPROTEC 5 relays can sync to a secondary time source if the primary time source fails. If a secondary source is set and active, keep this in mind when testing.

Remember that PTP is a TAI/UTC[*1] based time protocol:

- If adjusting just the local time in the source clock (by adjusting UTC offset) the protection relay will not alter its time.
- If testing the source clock 'daylight saving' change by transitioning start/end of daylight saving time, this may not affect the protection relay as the clock UTC time does not alter. The protection relay will only update its time for daylight saving if settings in the relay match the same start/end times.
- SIPROTEC 5 relays can be set to sync from a primary source with secondary backup. If the active source is PTP, daylight savings is controlled by the relay settings. If the active source is IRIG-B then daylight savings is controlled by the clock settings. **[Need to actually test and confirm]**

[1] PTP is actually TAI based (International Atomic Time). In 1972 TAI was the same as UTC but since then UTC has had 37 leap seconds added (to-date) to account for the slowing of earth's rotation. As leap second information is included within the PTP protocol, the relay works out and internally uses the UTC equivalent.

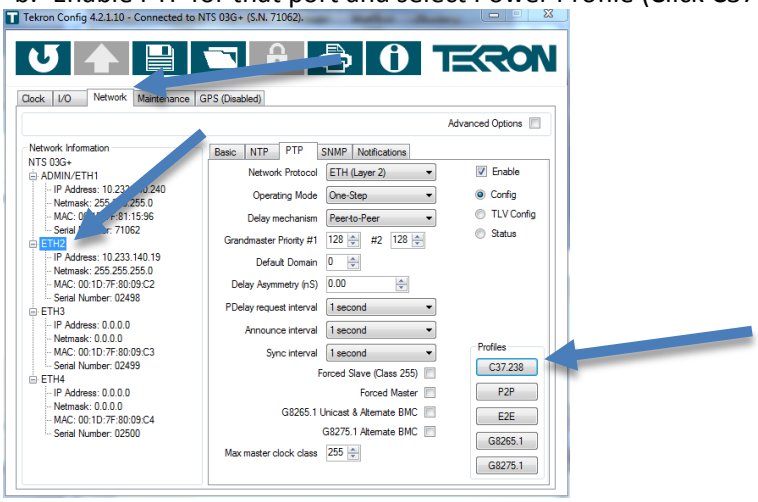
HV Power Measurements & Protection Ltd
Unit 4, 1 Porters Ave, Eden Terrace, Auckland
P O Box 26-074, Epsom, Auckland 1030, New Zealand
Tel: +64-9- 377 2001
Fax: +64-9- 302 2142

QUICK GUIDE TO: Basic setup (without VLAN)

1) Tekron clock (with PTP licence)

a. Assign IP address for Tekron clock Ethernet port being used

b. Enable PTP for that port and select Power Profile (Click C37.238 Profile)

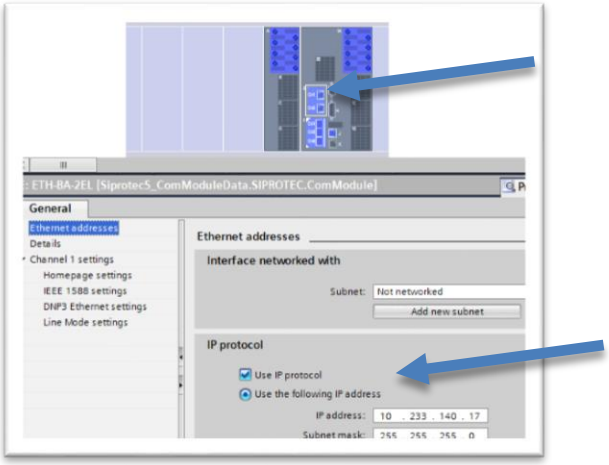


C37.238 is the Power Profile
P2P is Peer-to-Peer variation
E2E is Edge-to-Edge variation
Peer-to-Peer can be used when all network switches support PTP, Edge-to-Edge is intended for where some network switches do not.

2) SIPROTEC 5 Relay

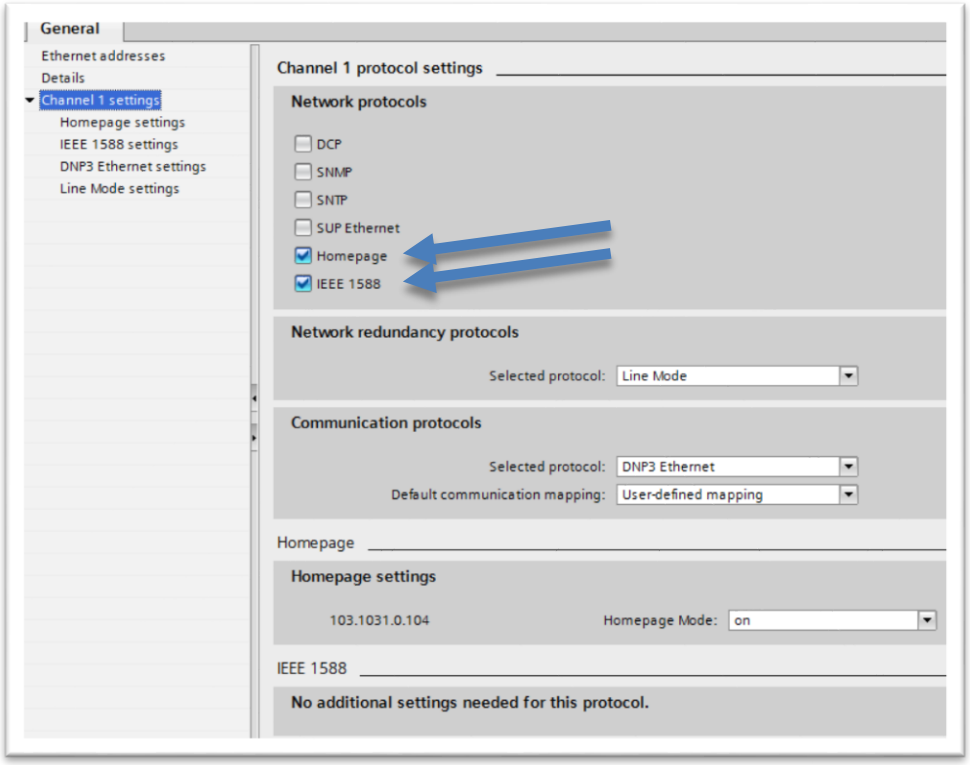
This example assumes Port E is an Ethernet interface and is to be used for SCADA and Time Sync. 'Port F' or the Remote Engineering 'Port J' may also be used.

a. Set 'Port' E IP address within the same subnet as used in 1a

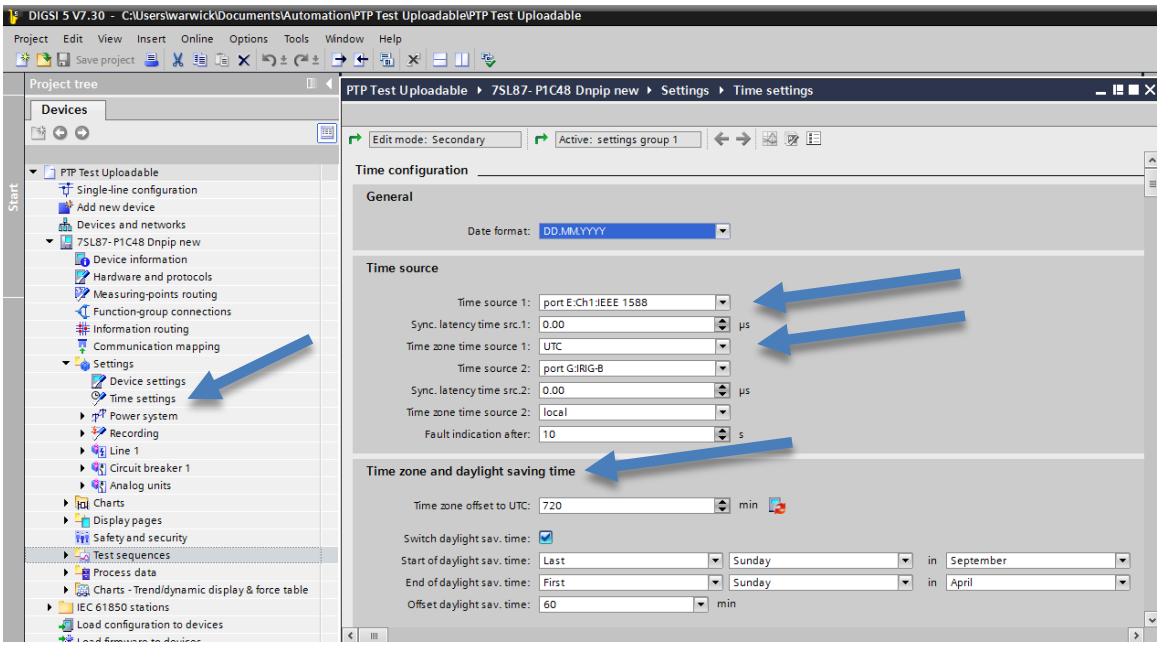


HV Power Measurements & Protection Ltd
Unit 4, 1 Porters Ave, Eden Terrace, Auckland
P O Box 26-074, Epsom, Auckland 1030, New Zealand
Tel: +64-9- 377 2001
Fax: +64-9- 302 2142

b. Enable IEEE 1588 (and for test purposes the “Homepage”)



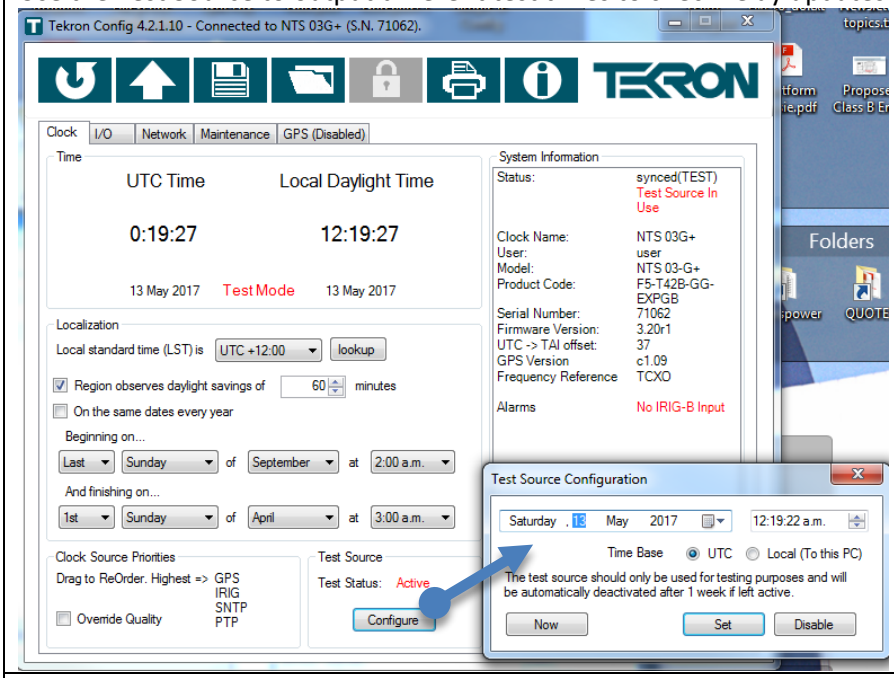
c. Select Time Source 1 to be Port F



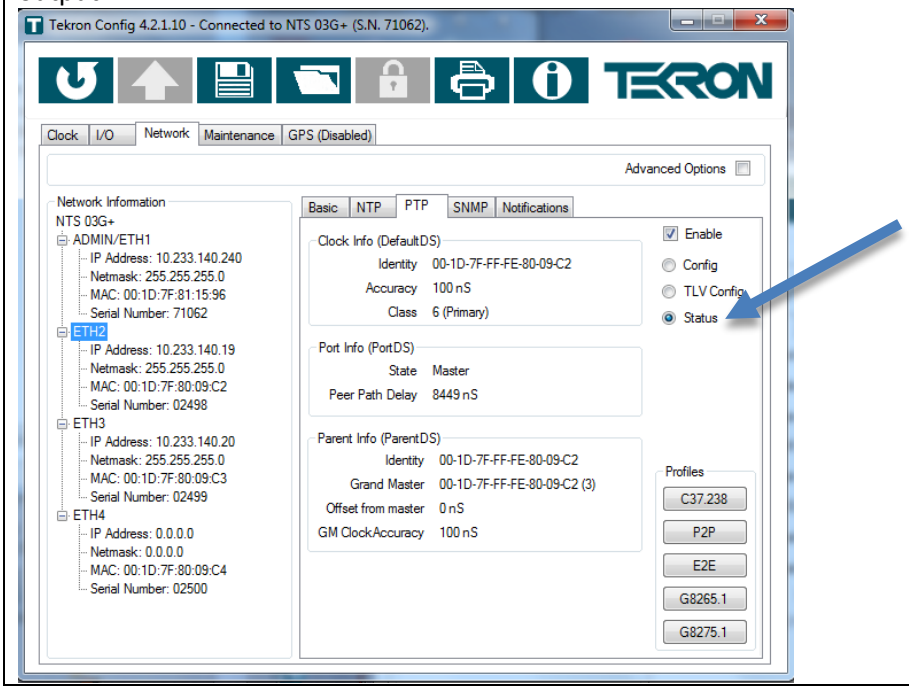
HV Power Measurements & Protection Ltd
Unit 4, 1 Porters Ave, Eden Terrace, Auckland
P O Box 26-074, Epsom, Auckland 1030, New Zealand
Tel: +64-9- 377 2001
Fax: +64-9- 302 2142

QUICK GUIDE TO: Useful features and information available in Tekron clocks

Use the Test Source to output different test times to check relay updates and daylight saving changes.



On the PTP tab, selecting the Status radio button will display useful status information on the PTP output.



HV Power Measurements & Protection Ltd
Unit 4, 1 Porters Ave, Eden Terrace, Auckland
P O Box 26-074, Epsom, Auckland 1030, New Zealand
Tel: +64-9- 377 2001
Fax: +64-9- 302 2142

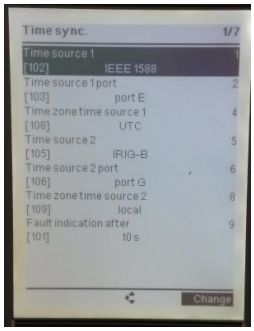
QUICK GUIDE TO: Useful information available via SIPROTEC 5 relays and DIGSI 5

Relay front panel

To alter time related settings via the front panel:
From the Menu…. Settings/General/Time Sync

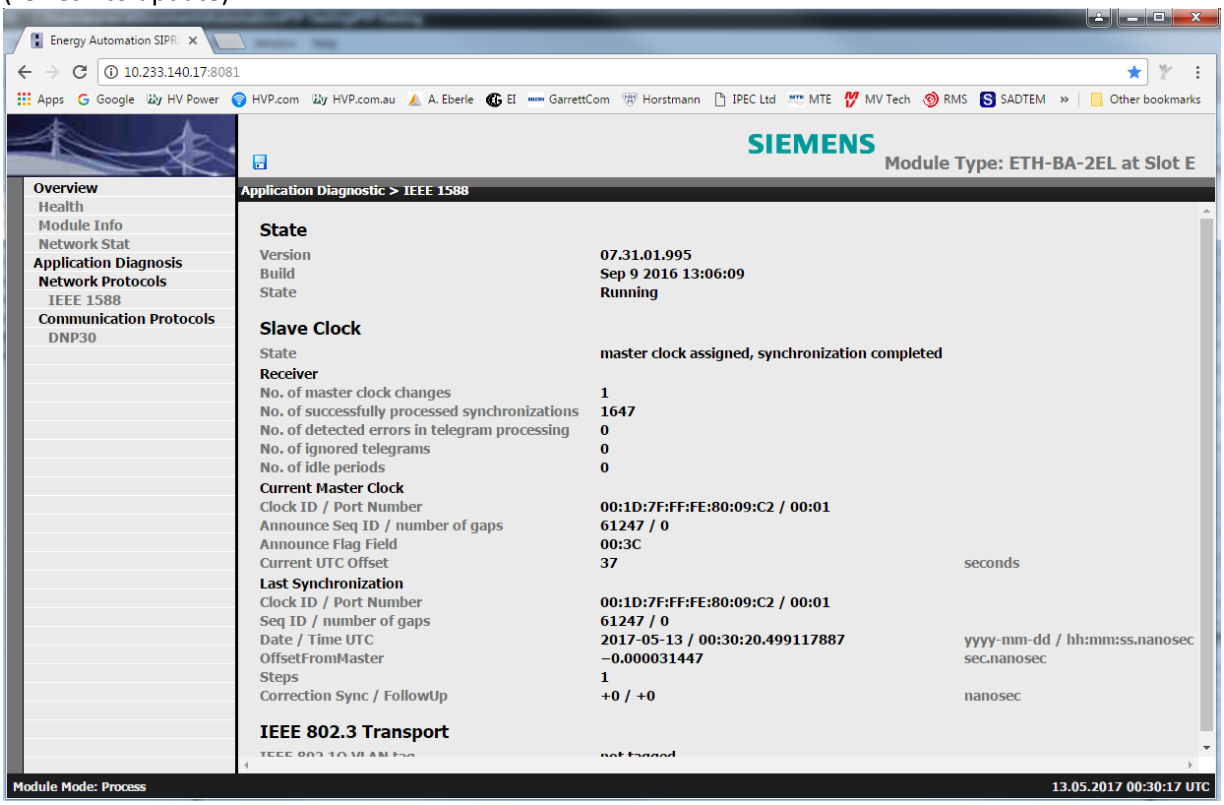
To see or set the current time (live):
From the Menu….Device Functions/Date & Time

(Time cannot be set if external synchronisation sources are valid)



Ethernet Interface Webpage

(refresh to update)



Time at bottom right of screen is the UTC time from the relay when screen was opened/last refreshed.

The address to use in the browser to access the different web pages are:

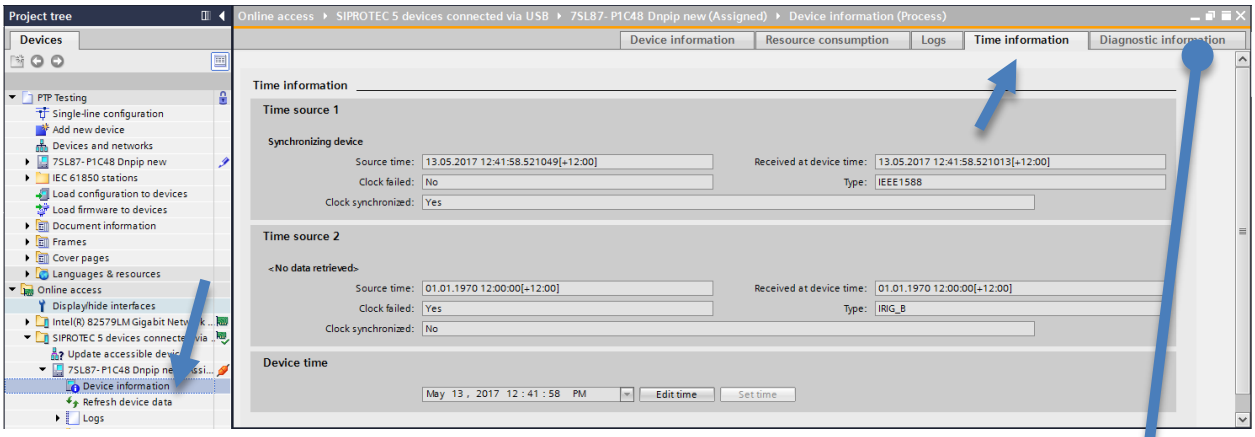
- Port J: http://IP:8080 (where IP = IP address of Port J)
- Port E: http://IP:8081
- Port F: http://IP:8082
- Port N: http://IP:8083
- Port P: http://IP:8084

HV Power Measurements & Protection Ltd
Unit 4, 1 Porters Ave, Eden Terrace, Auckland
P O Box 26-074, Epsom, Auckland 1030, New Zealand
Tel: +64-9- 377 2001
Fax: +64-9- 302 2142

Via Online Access to Relay

Time Information:

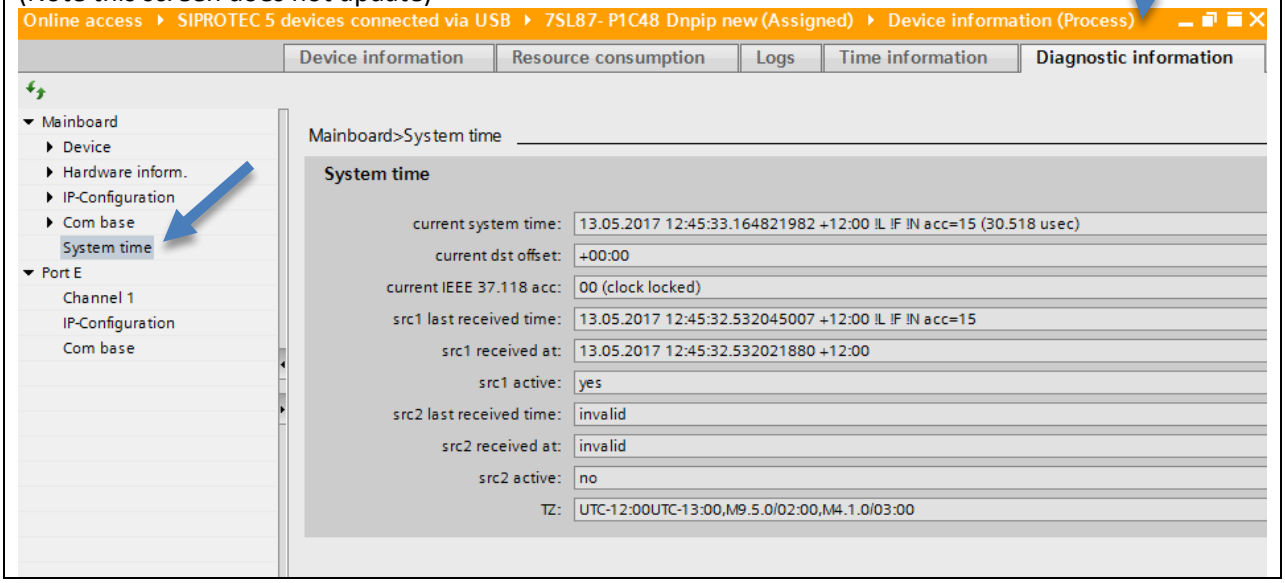
Select Device Information in left tree, then the Time information tab located at the upper right
(Note this screen updates each 15 seconds)



System Time:

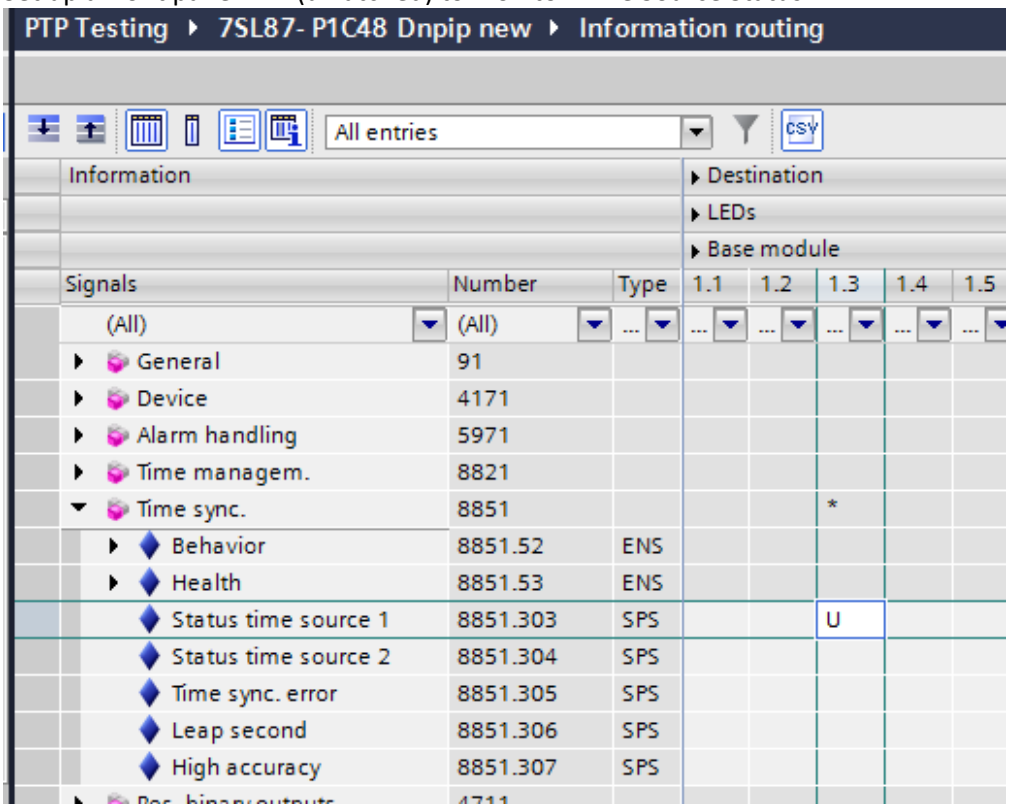
Further information is available via System Time

From above screen , click “Diagnostic Information tab”, the on left tree select Mainboard/System time
(Note this screen does not update)



HV Power Measurements & Protection Ltd
Unit 4, 1 Porters Ave, Eden Terrace, Auckland
P O Box 26-074, Epsom, Auckland 1030, New Zealand
Tel: +64-9- 377 2001
Fax: +64-9- 302 2142

Set up a front panel LED (unlatched) to monitor Time Source Status



HV Power Measurements & Protection Ltd
Unit 4, 1 Porters Ave, Eden Terrace, Auckland
P O Box 26-074, Epsom, Auckland 1030, New Zealand
Tel: +64-9- 377 2001
Fax: +64-9- 302 2142