



MINT PLC settings

VERSION 1.0 EN





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2 Table of Revisions

| Date | Version | Description of Changes | Status | Author | |
|------------|---------|------------------------|--------|-----------------|--|
| 19-01-2024 | 1.0 | Initial draft | | Femke Parthoens | |



3 Firmware settings

The firmware version can be found in the top right corner (FW: YYYY.X.X LTS) and should match the software version, which can be found in the change notes of the library that is being used. To update the firmware, select "Firmware Update" from the main menu.

Project Name: ---

HW: 04 FW: 2024.0.0 LTS MAC: A8:74:1D:0E:C1:98

Figure 1: Firmware settings

4 System services

Select "System Services" from the main menu and check if these settings are deactivated:

- DATALOGGER
- ETHERNET IP
- OPCUA
- PROFINET CONTROLLER
- PROFINET DEVICE
- TRACING

If they are activated, unmark the tick box in the Activation column to deactivate them, and click "Apply and reboot" to finalise.

| Configuration | | | | | | | | |
|---------------------|--|-----------------|------------|--|--|--|--|--|
| System Services | | | | | | | | |
| Service ID | Service Name | Factory Default | Activation | | | | | |
| APP MANAGER | App Manager | | | | | | | |
| DATALOGGER | Data Logger | V | | | | | | |
| EHMI | PLCnext Engineer HMI | | | | | | | |
| ETHERNET IP | EtherNet/IP (slave device) | V | | | | | | |
| FWM | Firewall Manager | | | | | | | |
| GRPC LOCAL SERVER | gRPC Remote Procedure Calls (Local) | | | | | | | |
| IEC | IEC 61131-3 Runtime for PLCnext Engineer | | | | | | | |
| LINUX SYSLOG | PLCnext Syslog adapter | | | | | | | |
| NETLOAD LIMITER | Netload Limiter | | | | | | | |
| OPCUA | OPC UA Server | 1 | | | | | | |
| OPCUA CLIENT | OPC UA Client | | | | | | | |
| OPCUA PUBSUB | OPC UA PubSub | | | | | | | |
| PLCNEXT STORE | PLCnext Store Connector | | | | | | | |
| PROFICLOUD | Proficloud | V | | | | | | |
| PROFINET CONTROLLER | Profinet Controller | | | | | | | |
| PROFINET DEVICE | Profinet Device | | | | | | | |
| SOFTWARE UPDATE | Software Update via Device and Update Management | | | | | | | |
| TRACING | Trace Controller | | | | | | | |

Discard Apply and reboot

Figure 2: System services



5 Firewall settings

Select "Firewall" from the main menu and check if the firewall has started in the General Configuration. If not, mark the Activation tick box to start the firewall.

In the Basic Rules of the Basic Configuration, change the Action column of the last 4 items (Seq. 6, 7, 8 and 9) to "Reject".

Click "Apply" to confirm.

| wall | | | | | | | | | |
|--|--|----------------------------------|--|--|---|--|--|--|--|
| | | | | | | | | | |
| stem M | essage | | | | | | | | |
| onfigurati | ion status = OK | | | | | | | | |
| | | | | | | | | | |
| stem S | tatus | | | | | | | | |
| t of activ | vated firewall rules | | | Show Rules | | | | | |
| | | | | | | | | | |
| neral C | onfiguration | | | | | | | | |
| itus | | | | Start V (Current: st | tarted) | | | | |
| ivation | | | | | | | | | |
| | | | | Activated: Firewall is started. After system restart the firewall will be activated | | | | | |
| | | | | | | | | | |
| asic Con | figuration User (| Configuration | | | | | | | |
| ICMP C | figuration User Configuration | Configuration | | When deactivated, pings | to the Controller are blocked | | | | |
| ICMP C Incomir Outgoin | figuration User (configuration Ig ICMP requests acc g ICMP requests acc | Configuration epted | | When deactivated, pings When deactivated, pings | to the Controller are blocked | | | | |
| ICMP C Incomir Outgoin | figuration User of configuration g ICMP requests acc g ICMP requests acc | Configuration repted epted | | When deactivated, pings When deactivated, pings | to the Controller are blocked | | | | |
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| ICMP C Incomir Outgoin asic Ru Seq. | figuration User (configuration ig ICMP requests acc g ICMP requests acc les Direction Input | Configuration epted epted | Protocol | When deactivated, pings When deactivated, pings To Port 123 | to the Controller are blocked from the Controller are blocked Comment NTP (Network Time Protocol) | Action Accept v | | | |
| ICMP C Incomir Outgoin asic Ru Seq. 1 | figuration User (configuration g ICMP requests acc g ICMP requests acc les Direction Jinput Input | configuration repted epted | Protocol UDP TCP | When deactivated, pings When deactivated, pings To Port 123 41100 | to the Controller are blocked from the Controller are blocked Comment NTP (Network Time Protocol) Remoting (e.g. PLCnext Engineer) | Action Accept v Accept v | | | |
| sic Con ICMP C Incomir Outgoin Outgoin Seq. 1 2 3 | figuration User (configuration g ICMP requests acc g ICMP requests acc les Direction Input Input Input | epted | Protocol UDP TCP TCP | When deactivated, pings When deactivated, pings To Port 123 123 141100 22 | to the Controller are blocked from the Controller are blocked Comment NTP (Network Time Protocol) Remoting (e.g. PLCnext Engineer) SSH | Action Accept Accept Accept Accept Accept | | | |
| ICMP C Incomir Outgoin asic Ru Seq. 1 2 3 4 | figuration User (configuration g ICMP requests acc g ICMP requests acc les Direction Input Input Input Input | epted epted | Protocol UDP TCP TCP | When deactivated, pings When deactivated, pings Image: Image of the section | to the Controller are blocked from the Controller are blocked Comment NTP (Network Time Protocol) Remoting (e.g. PLCnext Engineer) SSH HTTP | Action Accept Ac | | | |
| ICMP C Incomin Outgoin Cutgoin Seq. 1 2 3 4 5 | figuration User (configuration g ICMP requests acc g ICMP requests acc les Direction Input Input Input Input Input | epted epted | Protocol UDP TCP TCP TCP | When deactivated, pings When deactivated, pings Image: Image of the sectivated | to the Controller are blocked from the Controller are blocked Comment NTP (Network Time Protocol) Remoting (e.g. PLCnext Engineer) SSH HTTP HTTPS, Proficioud, eHMI | Action Accept Ac | | | |
| ICMP C Incomir Outgoin Assic Ru Seq. 1 2 3 4 5 6 | figuration User (configuration g ICMP requests acc g ICMP requests acc les Direction Input Input Input Input Input Input | epted epted | Protocol UDP TCP TCP TCP TCP | When deactivated, pings When deactivated, pings To Port 123 41100 22 80 443 4840 | to the Controller are blocked from the Controller are blocked Comment NTP (Network Time Protocol) Remoting (e.g. PLCnext Engineer) SSH HTTP HTTPS, Proficioud, eHMI OPC UA | Action Accept Reject X | | | |

Figure 3: Firewall settings

Discard Apply



6 Network Time Protocol (NTP) clock synchronisation

Select "Date and Time" from the main menu and make sure all server hostnames (0.pool.ntp.org, 1.be.pool.ntp.org, and 2.europe.pool.ntp.org) have a minimum polling of 1 minute and 4 seconds, and a maximum polling of 36 hours, 24 minutes and 32 seconds applied. To change the polling interval, click the pencil icon on the right of each server hostname, modify the Min. polling time and/or Max. polling time and click "OK". Finally, click "Apply" to confirm.

| AXC F 2152 2404267 | Conf | iguration | | |
|-----------------------------------|-----------------------|---|---------|---------------|
| | Real Tin Current t | me Clock imestamp (DD.MM.YYYY hhrmm:ss) 06-12.2024 13:26:29 Refre | h | |
| Overview | NTP Clien | t Configuration | | |
| + Diagnostics | No. | Server Hostname | Comment | |
| | 1 | 0.pool.ntp.org | | 2 🗙 |
| Configuration | 2 | 1.be.pool.ntp.org | | 2 x |
| Network | 3 | 2.europe.pool.ntp.org | | Ø 🗙 |
| PLCnext Store | | | | |
| Proficioud Services | | | | |
| Date and Time | | | | Discard Apply |
| System Services | | | | |
| with product | | | | |

Figure 4: NTP clock synchronisation

6.1 Troubleshooting

Follow these steps if the synchronisation does not work.

To setup the NTP, the PLC needs internet access to the NTP server. Open an SSH tunnel to the Linux core of the PLC, for example with PuTTY, and use the following command to check the connection:

ping 8.8.8.8

Create a root user in Linux and set the password to¹:

sudo passwd root

And enter the root user mode:

su

Set the date and time to the correct UTC time, either by using a command, or by configuring it in the PLC:

date -s "YYYY-MM-DD hh:mm:ss"

Now, edit the settings of the NTP server:

cd / etc

¹ The password can be modified, but unless there is a good reason to change it, using this one is preferred. If the password is changed, please make sure to remember it.



nano ntp.conf

...

And add the following line:

tos maxdist 20

| GNU nano 4.9.3 | | |
|-----------------------|--|--|
| This is the most 1 | basic ntp configuration file | |
| The driftfile must | t remain in a place specific to this | |
| # machine - it record | rds the machine specific clock error | |
| driftfile /var/lib/r | ntp/drift | |
| # This should be a : | server that is close (in IP terms) | |
| to the machine. | Add other servers as required. | |
| # Unless you un-com | ment the line below ntpd will sync | |
| f only against the 1 | local system clock. | |
| tos maxdist 20 | | |
| # Using local hardwa | are clock as fallback | |
| Disable this when | using ntpd -q -g -x as ntpdate or it will sync to itself | |
| server 0.pool.ntp.ot | tg minpoll 4 maxpoll 6 | |
| server 1.be.pool.ntp | p.org minpoll 4 maxpoll 6 | |
| server 2.europe.pool | 1.ntp.org minpoll 4 maxpoll 6 | |
| server 127.127.1.0 | | |
| fudge 127.127.1.0 st | tratum 14 | |
| Defining a default | t security setting | |
| restrict -4 default | notrap nomodify nopeer noquery | |
| restrict -6 default | notrap nomodify nopeer noquery | |
| | | |
| | | |
| restrict 127.0.0.1 | # allow local host | |
| restrict ::1 | <pre># allow local host</pre> | |
| | | |
| | | |
| | | |
| | | |

Figure 5: PuTTY

Press Ctrl + S and Ctrl + X in the WBM to restart the NTP daemon and click "Apply" in the previously opened Date and Time window. Wait 2 minutes and open the inquiry program.

ntpq –q

The ntpq -p command queries the NTP daemon (ntpd) on a Linux system, to retrieve information about its synchronised peers. Running ntpq -p displays a table-like output with detailed columns:

- **remote**: Hostname or IP address of each NTP peer.
- **refid**: Reference ID used by the NTP peer for synchronisation.
- **st**: Stratum level of the NTP peer.
- t: Type of peer (I for local, u for unicast, b for broadcast).
- when: Time in seconds since last successful communication.
- **poll**: Interval in seconds between NTP queries.
- **reach**: Octal representation of success/failure history.
- **delay**: Round-trip delay time to the peer (ms).
- **offset**: Time difference between system's clock and peer's clock (ms).
- **jitter**: Variability in round-trip times (ms).

Symbols like *, +, -, # denote the synchronisation status: * preferred, + candidate, - viable but not selected, # rejected.



Example

| remote | refid | st | t | when | poll | reach | delay | offset | jitter |
|------------------|---------------|-------|-----|--------|------|--------|--------|--------|--------|
| | | ===== | === | ====== | | ====== | | | |
| LOCAL(0) | .LOCL. | 14 | ι | 462 | 64 | 200 | 0.000 | +0.000 | 0.002 |
| *ntp2.belbone.be | 10.0.0.5 | 2 | u | 63 | 64 | 377 | 5.789 | +1.020 | 0.914 |
| +vps-7d02b399.vp | 152.78.229.49 | 2 | u | 3 | 64 | 377 | 12.236 | -1.561 | 0.577 |

This output indicates the local clock (LOCAL(0)), a selected NTP peer (*ntp2.belbone.be), and a candidate peer (+vps-7d02b399.vp). In summary, the presence of a selected (*) peer ensures continuous clock synchronisation through the NTP protocol in a Linux environment. You can test this by changing the internal clock, wait a few minutes, and check the time using:

date