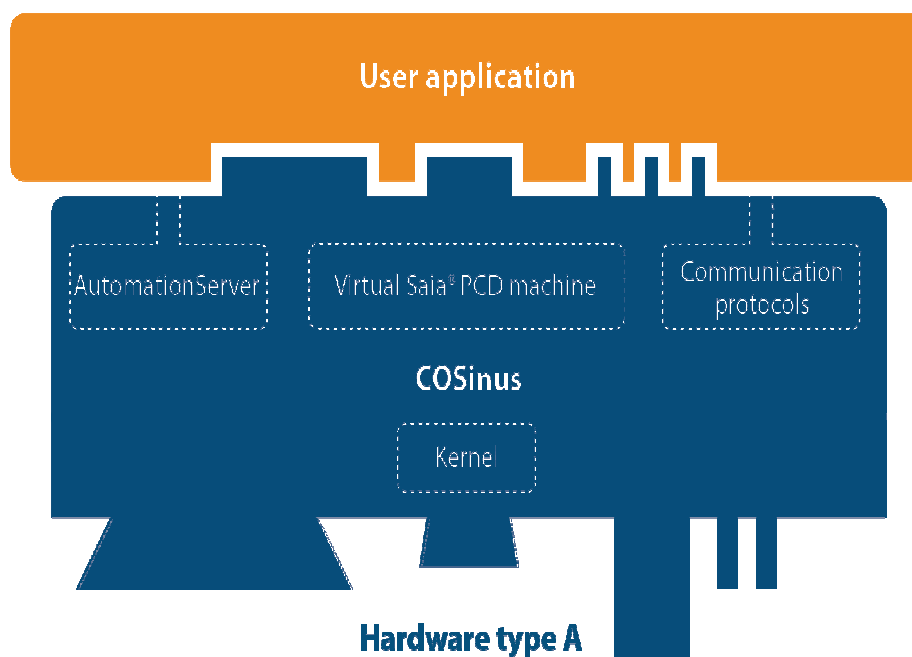




What's New in COSinus 1.22.xx



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1 Introduction

1.1 Foreword

This new version of PCD Classic 1.22.nn firmware, identified in this document as COSinus, contains a mix of new features as well as enhancements of existing functionality.

This document describes what COSinus encloses and gives you valuable information to help you get the most out of it.

Saia-Burgess Controls AG has systematically and carefully designed, developed and tested COSinus on the different PCD systems and we had acquired the confidence that it achieves a very high reliability.

1.2 Standard Disclaimer

Neither Saia-Burgess Controls Ltd. nor anyone else who has been involved in the creation, production or delivery of COSinus shall be liable for any direct, indirect, consequential or incidental damages (including damages for loss of business profits, business losses, business interruption, loss of data and the like) arising out of the use or inability to use the firmware, or any other claim by any part even if Saia-Burgess Controls AG has been advised of the possibility of such damages. In the event that Saia-Burgess Controls AG is liable for any damages, liability shall be limited to the amount paid for the software under the terms and conditions of this agreement.

2 COSinus installation and compatibility

2.1 List of PCD systems

The information being in this document applies to the following PCD Classic PLCs:

- PCD1.M0160E0
- PCD1.M2xx0 PCD1.M2110R1 included
- PCD2.M5xx0
- PCD3.Mxxx0
- PCD3.Mxx60 PCD3.M6860 included
- PCD7.D4xxxT5F

More information about these devices is available on internet site <http://www.saia-support.com>

2.2 Compatibility of COSinus with the PCD types

The table hereafter presents the corresponding COSinus FW for the different PCD types as the required minimal HW revision

COSinus compatibility with PCD types and HW revision

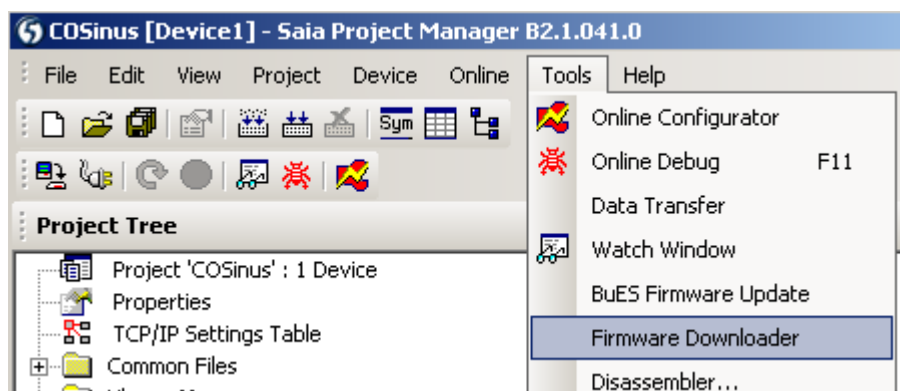
PCD System	Hardware revision	COSinus FW
PCD1.M0xx0, PCD1.M2xx0	*	Version A PCD1.M2xx0_1.22.xx.blk
PCD1.M2110R1	Version \$A	PCD1.M2xx0_1.22.xx.blk
PCD2.M5xx0	Version A	PCD2.M5xx0_1.22.xx.blk
PCD3.M2x30 (WAC and Compact)	Version A	PCD3.Mxxx0_1.22.xx.blk
PCD3.M3020, PCD3.M3120	** Version E modification 48	
PCD3.M3230, PCD3.M3330, PCD3.M5xx0, PCD3.M6xx0	** Version D	
PCD3.Mxx60	Version A	PCD3.Mxx60_1.22.xx.blk
PCD7.D4xxxT5F	Version A	PCD7.D4xxxT5F_Prog_1.22.xx.blk

Note: * On PCD1 (except PCD1.M2110R1) hardware revision F is required to use the S-Monitoring function and LON FT-10.

** For the PCD3 systems older than listed the firmware 1.10.xx is the last firmware which can be installed.

2.3 Firmware update

On all systems the firmware can be easily updated using the PG5 Firmware Downloader:



2.4 Compatibility with previous Firmware versions

COSinus integrates many new functionalities and extensions, on the other hand all the features of previous FW version are kept on and therefore actual PCD programs will run on COSinus.

2.5 PG5 requirement

PCD running COSinus can be programmed with PG5 V2.0 and PG5 V1.4 but to have the whole benefit of the new COSinus functionalities and extensions PG5 V2.1 is required.

3 COSinus description

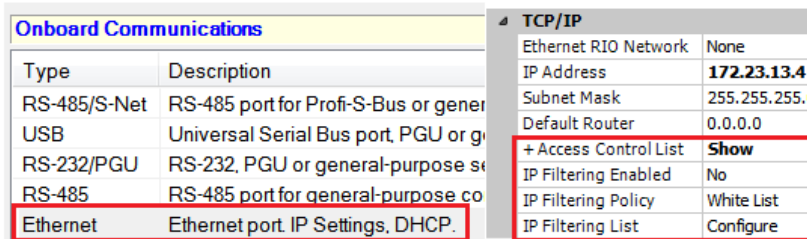
3.1 IP filtering

The new IP access check functionality allows filtering of incoming IP packets, based on the source IP address. The filtering can be done using two different modes:

White list: All packets are dropped by default and IP addresses in the list are accepted. This configuration is the most common setup.

Black list: All packets are accepted by default and IP addresses in the list are dropped.

The configuration parameters are located in the 'Ethernet' slot, under the 'Onboard Communications' category.



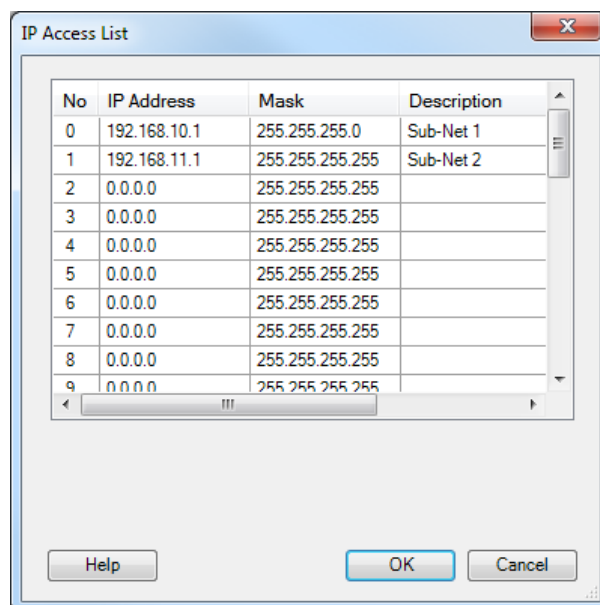
To configure the filtering, first set the 'Access Control List' property 'Show' in order to display the following properties:

Set the 'IP Filtering Enabled' to 'Yes' for the PCD to apply the filtering rules.

'IP Filtering Policy' can be one of 'White List' or 'Black List'.

To display the 'IP Filtering List', press the "..." button after 'Configure'.

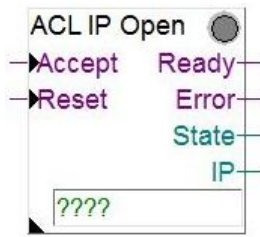
Then the following dialog box is displayed, where the IP addresses and IP address ranges can be defined.



In this particular example, the PCD will accept any requests on IP address 192.168.10.0 to 192.168.10.255 and any requests on IP address 192.168.11.1. All other requests will be rejected.

It is also possible control the 'Access Control List' function using the FBoxes defined in the 'S-Fup Communication library'. This library has been extended with 2 new FBoxes allowing access to the IP filtering functions at runtime.

The 'ACL IP Open' FBox allows adding dynamically an IP address to the accepted list. This FBox can be used to open an IP address for a Mail server in order to be able to send a mail.



The 'ACL IP Filter' FBox allows switching on or off the IP filter function.



3.2 Dynamic password for FTP (service key)

A dynamic password for FTP and FTP over HTTP was introduced. This mechanism simplifies a lot the download mechanism of our tools such as the Web Editor. Instead of providing the Web-Server password, FTP user name and password, it is sufficient to provide the Service Key defined in the Device Configurator of PG5.

Properties	
Device : PCD3.M5560	
Firmware	
Firmware Version	From 1.22.00 or more recent and compatible
Memory	
User Code/Text/DB Memory	2 MBytes ROM
Extension Text/DB Memory	1 MBytes RAM
User Code/Text/DB Memory Backup (Flash)	On File System
User File System Size (Flash)	128 MBytes
Program Directory	Onboard Flash
Options	
Reset Output Enable	Yes
XOB 1 Enabled	No
Run/Stop Switch Enable	Yes
Time Zone Code	
Service Key	rtu54vw56pt89

3.3 FTP passive mode

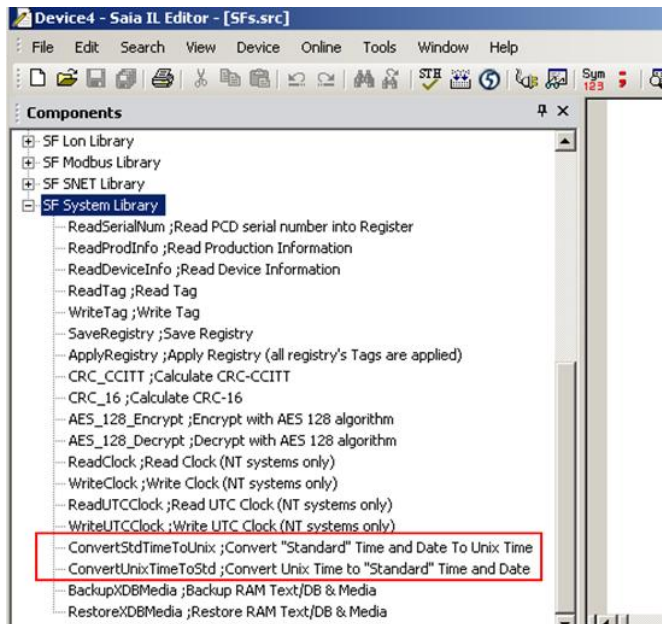
The PCD FTP server was extended to be able to handle the FTP passive mode. The FTP mode is give by the FTP client and therefore there is no configuration to do on PCD side. Most of the time, the FTP passive mode is required if the connection is done via routers.

3.4 Interpreter extensions

3.4.1 New System Functions

Some new System Functions (SF) have been added to the System Library.

3.4.1.1 SFs to convert "standard" time <-> UNIX Time



- ConvertStdTimeToUnix

SF to convert a "Standard" date and time format to UNIX time.

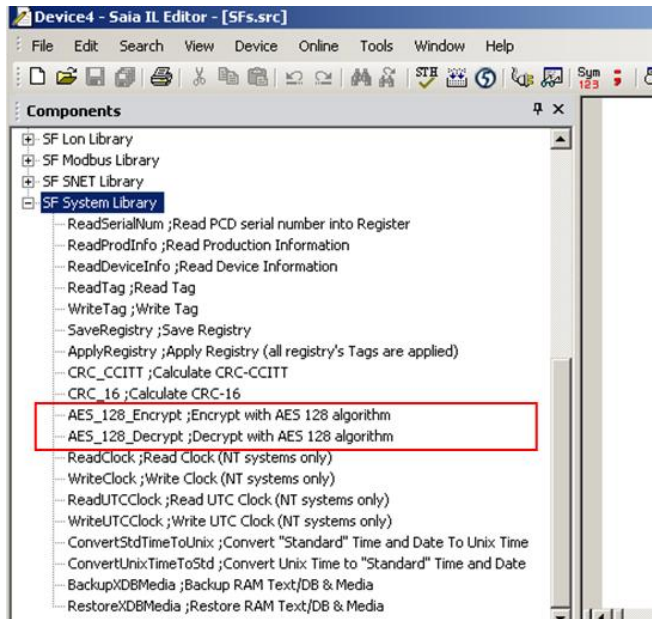
```
CSFS.SF.CLOCK.Library ;Library number
S.SF.CLOCK.ConvertStdTimeToUnix;Convert "Standard" Time and Date To Unix Time
Year ;1 R|K IN, Register or constant containing Year
Month ;2 R|K IN, Register or constant containing Month
Day ;3 R|K IN, Register or constant containing Day
Hour ;4 R|K IN, Register or constant containing Hour
Minute ;5 R|K IN, Register or constant containing Minute
Second ;6 R|K IN, Register or constant containing Second
UnixTime ;7 R OUT, Register to receive converted time in UNIX format
Status ;8 R OUT, Status
```

- ConvertUnixTimeToStd

SF to convert an Unix time to a "Standard" date and time format.

```
CSF S.SF.CLOCK.Library ;Library number
S.SF.CLOCK.ConvertUnixTimeToStd ;Convert Unix Time to "Standard" Time and Date
UnixTime ;1 R IN, Unix Time
Year ;2 R OUT, Register to receive Year
Month ;3 R OUT, Register to receive Month
Day ;4 R OUT, Register to receive Day
Hour ;5 R OUT, Register to receive Hour
Minute ;6 R OUT, Register to receive Minute
Second ;7 R OUT, Register to receive Second
Status ;8 R OUT, Status
```


3.4.1.2 SFs for AES128 encryption/decryption



- AES 128 encryption algorithm

SF to encrypt Data with AES 128 algorithm (Advanced Encryption Standard).

The key has a fix length of 128 bits (16 bytes) and the data length has to be a multiple of 16 bytes.

```
CSF S.SF.SYS.Library ;Library number
  S.SF.SYS.AES_128_Encrypt ;Encrypt with AES 128 algorithm
  Key ;1 DB|X|R IN, Contains the 128-bit key (16 bytes)
  Data ;2 DB|X|R IN, Contains data to encrypt
  K 16 ;3 R|K IN, Nbr of bytes contained in the data
  Encrypted_Data ;4 DB|X|R OUT, Encrypted data copied as an array of bytes
  Error ;5 R OUT, Error code
```

- AES 128 decryption algorithm

SF to decrypt Data with AES 128 algorithm (Advanced Encryption Standard).

The key has a fix length of 128 bits (16 bytes) and the data length has to be a multiple of 16 bytes.

```
CSFS.SF.SYS.Library ;Library number
  S.SF.SYS.AES_128_Decrypt ;Decrypt with AES 128 algorithm
  Key ;1 DB|X|R IN, Contains the 128-bit key (16 bytes)
  Emcrypted_Data ;2 DB|X|R IN, Contains data to decrypt
  K 16 ;3 R|K IN, Nbr of bytes contained in the data
  Data ;4 DB|X|R OUT, Decrypted data copied as an array of bytes
  Error ;5 R OUT, Error code
```

3.5 Modbus extensions

The Modbus RTU implements a strict validation of the inter-character time during message reception (both on client or server side). By default, an inter-character time of 1.5 character time is taken into account. This strict limitation can now be made more flexible. A parameter has been included to enable either 1.5 (default), 2.0 or 2.5 inter-character time checks.

In order to enable this, a new Modbus F-BOX library is available and shall be installed.

Another new feature in Modbus is the ability to stop a Modbus server running for TCP/IP or UDP. The implementation for the MODBUS RTU/ASCII OFF was already done in previous versions. For TCP or UDP, the implementation is only available using IL code.

3.6 Mapping of the PCD3+ interrupts

The interrupt entries, 'Int0' and 'Int1', available in the terminal block of the PCD3.Mxx60 - PCD3 Plus - can now be mapped to flags. A new 'Onboard Inputs/Output' slot has been defined where the media mapping can be configured.

The screenshot displays a software configuration window with several panels:

- Protocol List Table:**

Section	Description
IP Transfer Protocols	FTP, HTTP Direct Protocols, ODM.
IP Protocols	DNS, SMTP, SNMP protocols.
HTTP Portal	HTTP Portal Communication For PCD Over Private Netw
- Onboard Inputs/Outputs Table:**

I/O	Type	Description
I/O 0	2 Digital Inputs	2 digital inputs - interrupts Int0/Int1 (Terminalblock).
- Onboard I/O Slots Table:**

Slot	Type	Description
Slot 0		
Slot 1		
Slot 2		
Slot 3		
+		
- Properties Panel (I/O 0 : 2 Digital Inputs):**
 - Media Mapping Digital Inputs:**
 - Media Mapping For Digit: Yes
 - Media Type For Digital Ir: Flag
 - Number Of Media for Dig: 8
 - Interrupts:**
 - Interrupt IX0: On rising edge
 - XOB Number For Interru: 20
 - XOB Start Info For Inter: 0
 - Interrupt IX1: On rising edge
 - XOB Number For Interru: 21
 - XOB Start Info For Inter: 0
 - Media Mapping For Digital Inputs Enabled:**

Select 'Yes' to enable the media mapping for the digital inputs; a cyclic actualization of the media s...