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HISTORY

Rev	Date	Comment	Author
A	29-Apr-2021	Initial	Thomas Wiedebusch
B	08-Mar-2023	Pulse mode Off, Radio to Customer mode, Interface USB-IrDA	Thomas Wiedebusch
C	23-Nov-2023	Flow Chart introduced, functions extended	Thomas Wiedebusch

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REVIEWS

Rev	Date	Reviewer	Department

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ABBREVIATIONS

Builder Operator	Operator of the "FW-Update Builder" assembling the "FW-Update Safe"
DLL	Dynamic Link Library
FW	Firmware, hardware depending software
FW-Update	Firmware update
FW-Update Builder	Builder of the "FW-Update Safe", tool to select all needed components and to encrypt the "FW-Update Safe"
FW-Update Loader	Software for decryption of the "FW-Update Safe" and host for the "FW-Update Software"
FW-Update Process	The process of installing the firmware
FW-Update Safe	Encrypted container of all components needed for the "FW-Update Process" during offline operation
FW-Update SW	Software executing the "FW-Update Process"
Genesis	Legacy Name of Cordonel
HW	Hardware
LUT	Loop up table holding the metrologie correction values
Metrology	GENESISFLOW is the application contolling the calculation of the flow
Offline Operation	Without connection to the Xylem-Network
Online Operation	Directly or via VPN connected to the Xylem-Network
PCB ID	Printed Circuit Bord Identifier, unique identification number of the Cordonel HW
SW	Software
Update Opertor	Operator executing the "FW-Update Process"
VPN	Virtual Private Network

Table 1.1 Abbreviations

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1. Introduction

A general introduction of the “FW-Update package” is referenced by [FWU_PK].

1.1 Content

This document gives a brief overview of the “FW-Update Software”. This software is the worker who updates the FW on a Cordonel™.

1.2 System Overview

Two hardware systems can be used for the firmware update:

- USB-IrDA: The IrDA Plug-In adaptor is directly connected via USB to the PC. No driver installation is required.
- Micro-MOXA: The IrDA Plug-In adaptor is connected via a box containing an interface with a high noise immunity for harsh environments. A driver needs to be installed to support the RS485-4W interface.

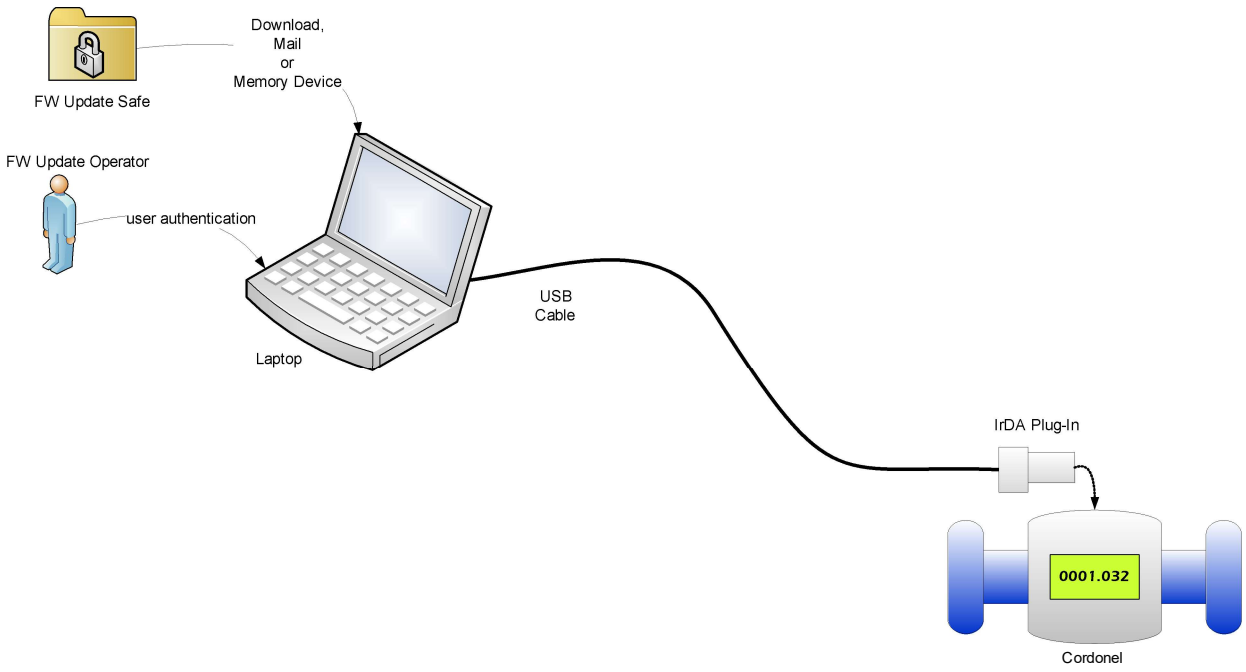


Figure 1.1 FW-Update with USB-IrDA – Offline Operation

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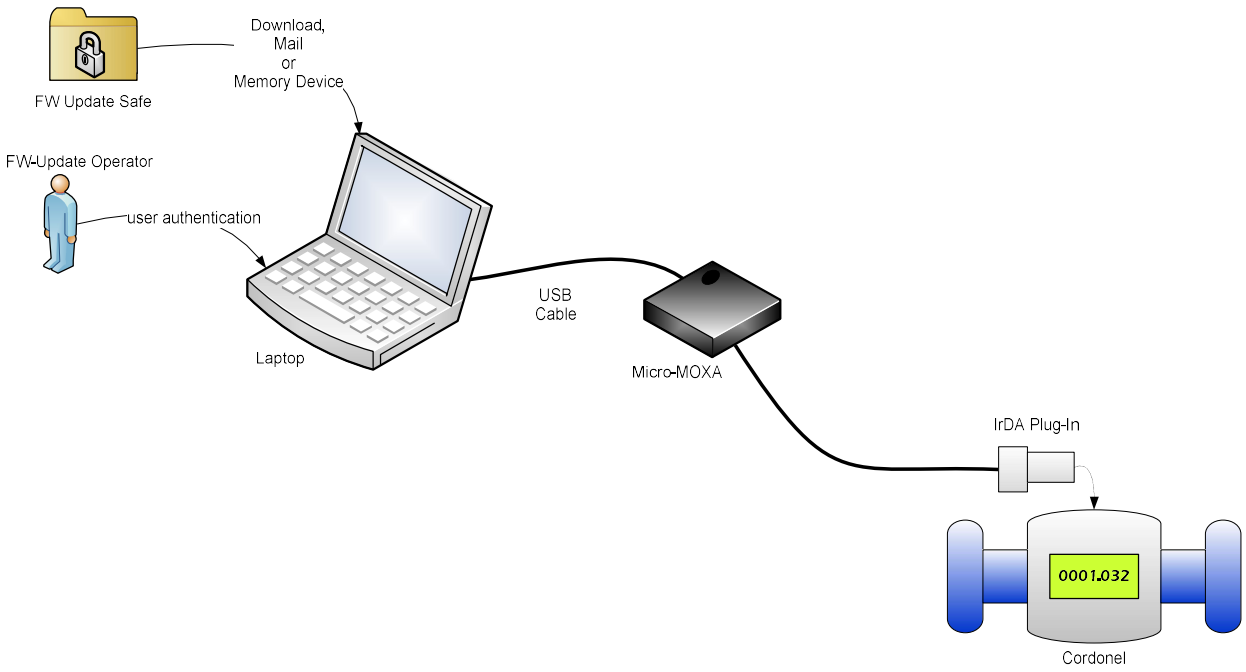


Figure 1.2 FW-Update with Micro-MOXA – Offline Operation

The FW-update is an offline operation. During this there is no need being connected to the Xylem™ network.

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1.3 FW-Update Software Functions

The “FW-Update SW” is the worker who updates the Cordonel, logs all processing steps, being able to analyse those on later inspection, and restores some important settings. Due to the strong update capability check, it avoids an installation of incompatible firmware.

The “FW-Update SW” base functions:

- Auto-detection of communication port and connected Cordonel,
- Generating a “FW-Update Report” file with all executed processing steps,
- Authentication with the password level 8 or, on missing or destroyed password file, with the skeleton key,
- Switching OFF the pulse output on IrDA to free the IrDA for standard communication and reminding the original settings of the pulse output to a file,
- Activate the radio using the customer encryption key,
- Release display to normal operation and switch LED off,
- Store all previously adjusted settings,
- Read, verify and log password file,
- Reading out all configurations before the update,
- Listing all installed files on the Cordonel before the update,
- Reading out the installed firmware of the Cordonel before the update,
- Carrying out an update-capability-check for “Core Revision”, “Metrology Version”, “Region”, “Radio Frequency” and “Meter Size”,
- Lock update on failed update-capability-check,
- Free memory space for the update procedure by erasing unnecessary files from the Cordonel file system,
- Carrying out the FW-Update procedure,
- Set date and time,
- Read, verify and log LUT,
- Recovery register settings to factory settings if required,
- Reading out all configurations after the update,
- Restoring the password file,
- Validate password file by login with password level 8,
- Restoring necessary files for operational need which previously may have been erased,
- Listing all files after the update,
- Calculate remaining life time and battery power consumption,
- Release display to normal operation for accumulated volume and flow rate,
- Restoring the pulse output to original settings.

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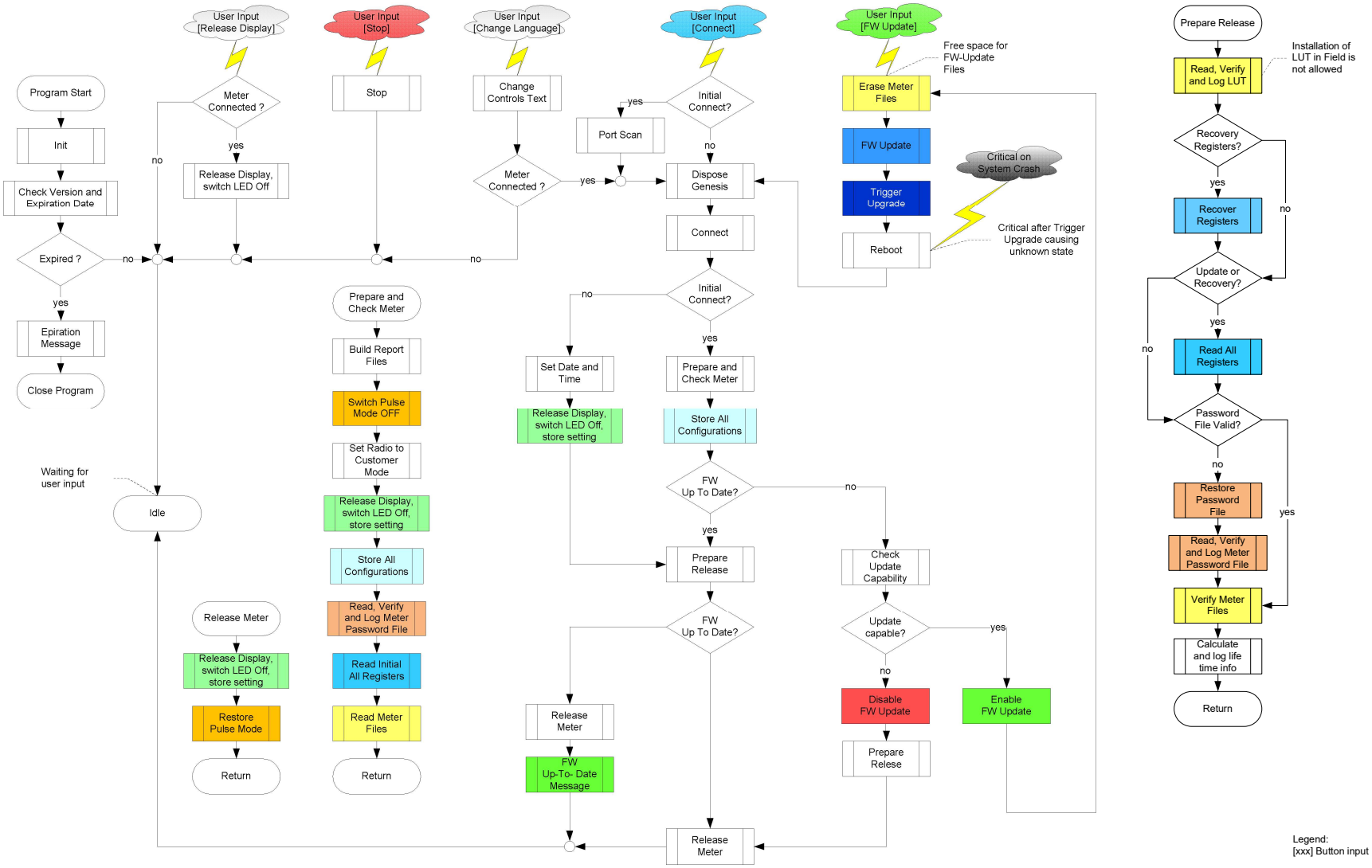


Figure 1.3 FW-Update Software – Flow Chart

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2. Prerequisites

2.1 Hardware Requirements

- PC with MS-Windows™ 10 Operating system.
- USB-IrDA or Micro-MOXA with IrDA head.

2.2 Software Requirements

Microsoft™ .NET framework 4.7.2 has to be installed in advance.

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3. Installation

3.1 FW-Update Software Installation

The “FW-Update Software” is included in the “FW-Update Safe”. It can neither be installed nor executed without the “FW-Update Loader” as this software will not be delivered as executable (*.exe). The execution will directly be started with a button on the “FW-Update Loader”.

3.2 USB-IrDA Setup

The USB-IrDA hardware does not require any setup or driver installation. The interface is going to be detected automatically by the “FwUpdateSw”.

3.3 Micro-MOXA Driver Installation and Setup

For the Micro-MOXA internally using the UPort 1130 Series with on serial port (here shown a type 1250 with two serial ports), a driver has to be installed and setup with administrator rights.

Link to the Micro-MOXA driver (08-Mar-2023):

https://www.moxa.com/en/support/search?psid=114473

After installation this device is visible on Multi-port serial adapters and mapped to one Port (COM & LPT) named MOXA UPort Com Port 1 (COMxx) assigned to a serial COMxx interface.

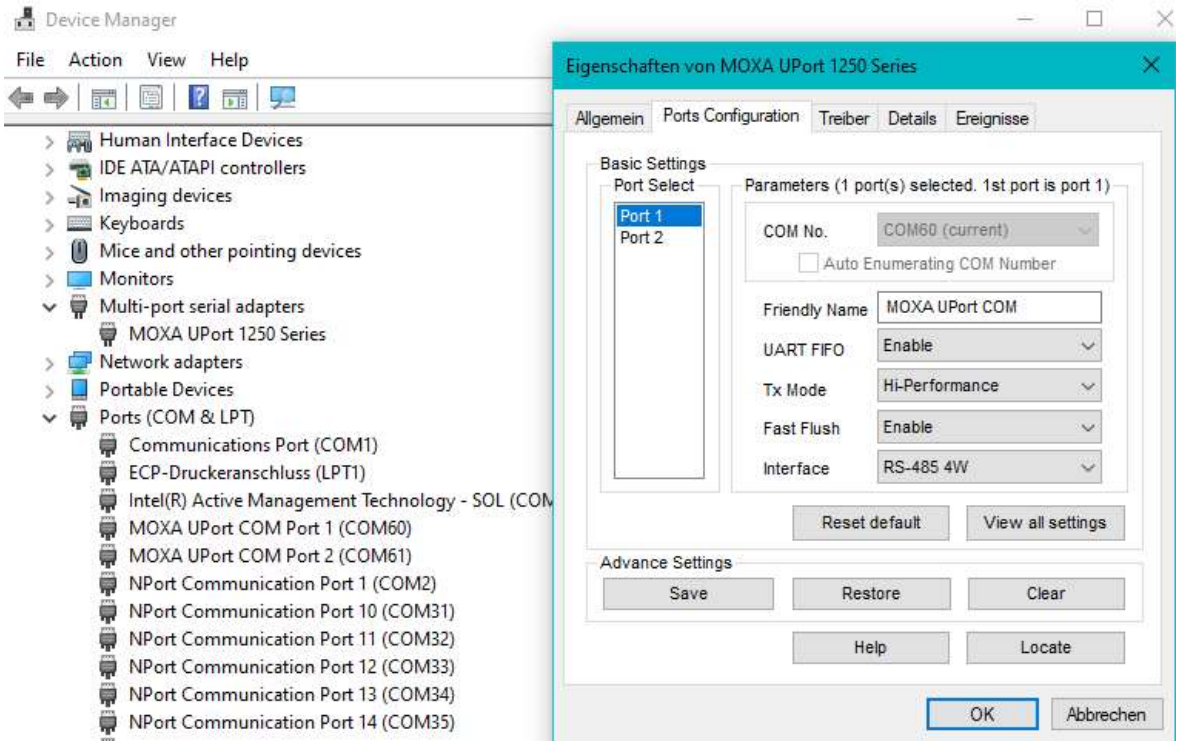


Figure 3.1 Setup Micro-MOXA – RS-485 4W

The setup has to be done to RS485 4W according to the setups shown in the figure above.

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4. Security

The software is protected by a license for a specific version and has an expiration date.

Key Values:

- License control in Laatzen DB – SW will exit immediately if not licensed or the validation date is expired,
- The “FW-Update SW” is not delivered in an executable format. It has a special format which needs to be loaded and executed by the “FW-Update Loader”,
- All sensitive information will be directly exchanged between the “FW-Update Loader” and the “FW-Update SW” without intermediate storage to hard disk.

5. Confidence Notice

The Update Operator cannot influence the update process. There is nothing, which can be made wrong. The “FW-Update SW” takes the responsibility for the entire process.

Even if the update cannot be performed, the Cordonel™ will remain fully functional. The only critical point is after the “burn” command (internal idiom is TRIGGER_UPGRADE). This will take all downloaded applications on overwrite the current once.

If for some reason the process will be interrupted at this step, the “FW-Update SW” will proceed with the next connection and finalize the operation. A possible cause of an interruption may be a power loss due to a low battery of the update operator PC, some environmental events like rain, thunderstorm or light exposure, or the lost of the communication by e.g. slipping out of the IrDA plug-in or disconnection of the USB cable from the PC.

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6. Operational Warning

ATTENTION:

All logging files installed in the Cordonel will be erased during the “FW-Update Procedure” and generated from the scratch as empty files after the FW update. Clarify with the customer in ADVANCE if he needs these files. If so, the FW update has to be dismissed until these files are read using e.g. the DIAVASO software.

After the FW update the logging will proceed as usual.

7. Operating Instructions

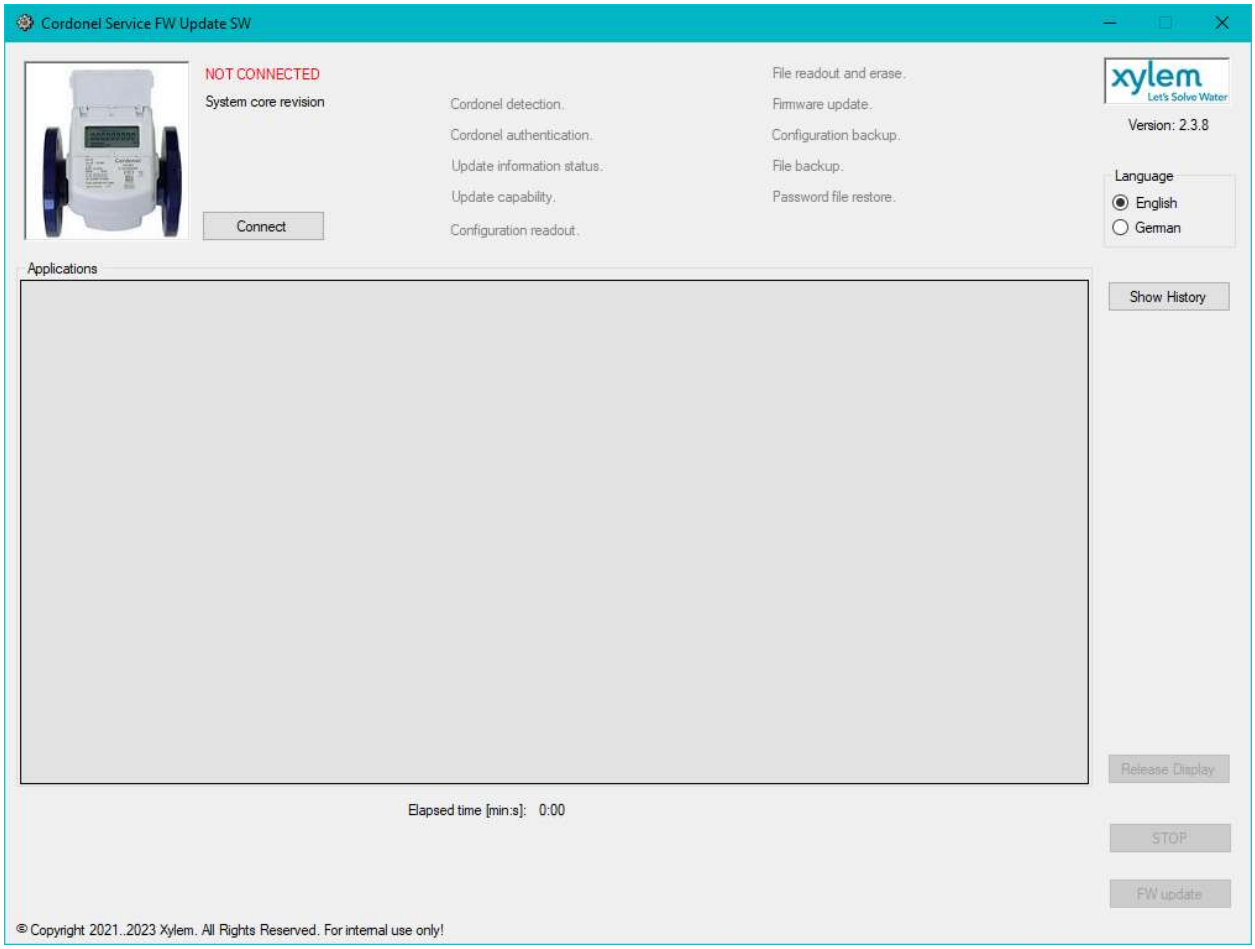


Figure 7.1 Start Screen

Attach the IrDA plugin to the Cordonel and the USB cable to the PC.

Tip: Click the [Show History] to observe detailed information about the ongoing update procedure!

Start the process:

Press [Connect] to start the port auto-detection and establish the connection to the Cordonel.

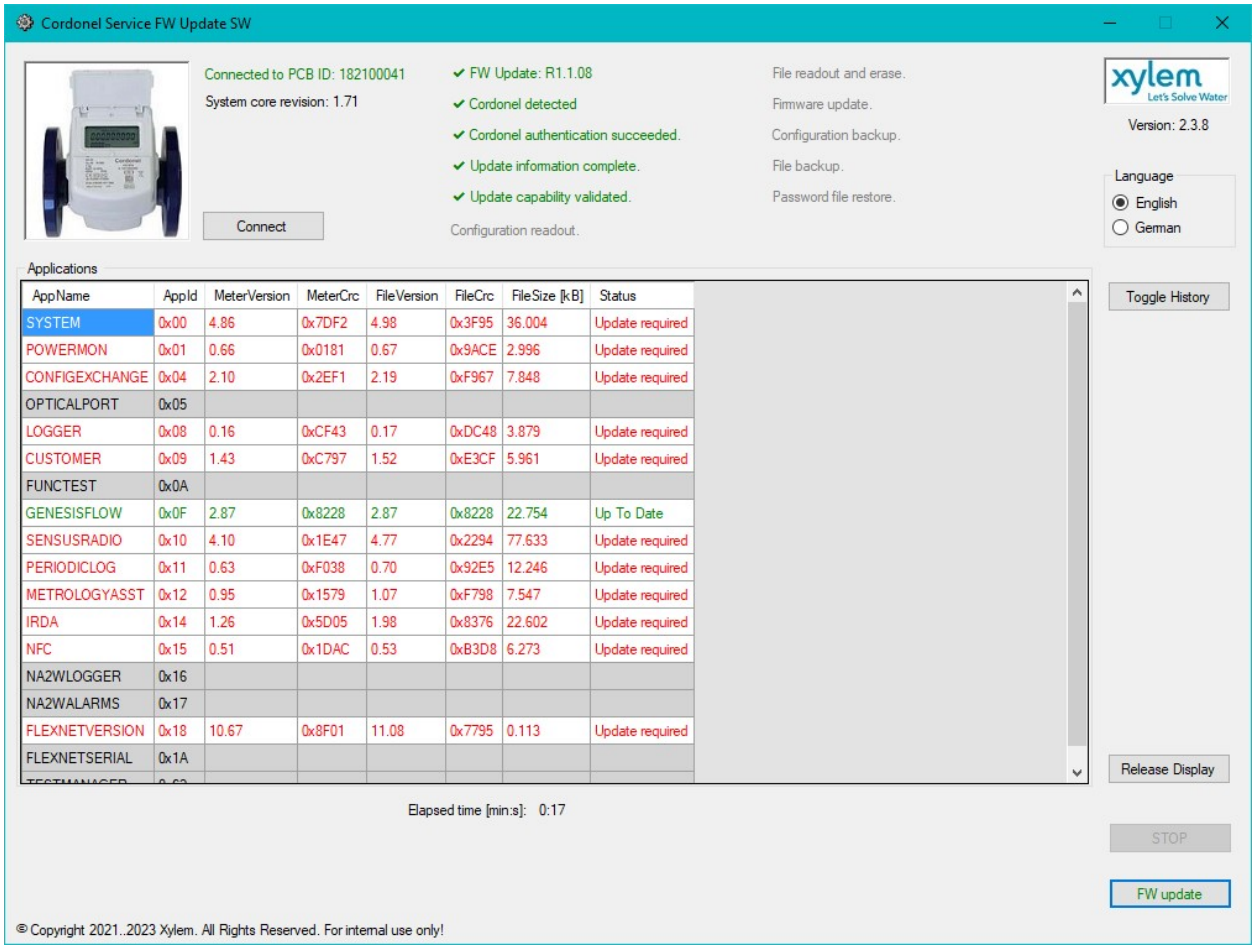
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After the detection and connection to the Cordonel™, the information of the outstanding update process will be displayed. For this all installed applications will be read and compared to the required applications contained in the actual “FW-Update package”. The name of the update package will be displayed as first entry in the processing sequence (here: “FW update R1.1.08”). The actual installed FW version can be read using the “FLEXNETVERSION” information:

Here:

Installed MeterVersion “10.67” => meaning “1.0.67”,

New required FileVersion “11.08” => meaning “1.1.08”:



AppName	AppId	MeterVersion	MeterCrc	FileVersion	FileCrc	FileSize [kB]	Status
SYSTEM	0x00	4.86	0x7DF2	4.98	0x3F95	36.004	Update required
POWERMON	0x01	0.66	0x0181	0.67	0x9ACE	2.996	Update required
CONFIGEXCHANGE	0x04	2.10	0x2EF1	2.19	0xF967	7.848	Update required
OPTICALPORT	0x05						
LOGGER	0x08	0.16	0xCF43	0.17	0xDC48	3.879	Update required
CUSTOMER	0x09	1.43	0xC797	1.52	0xE3CF	5.961	Update required
FUNCTEST	0x0A						
GENESISFLOW	0x0F	2.87	0x8228	2.87	0x8228	22.754	Up To Date
SENSUSRADIO	0x10	4.10	0x1E47	4.77	0x2294	77.633	Update required
PERIODICLOG	0x11	0.63	0xF038	0.70	0x92E5	12.246	Update required
METROLOGYASST	0x12	0.95	0x1579	1.07	0xF798	7.547	Update required
IRDA	0x14	1.26	0x5D05	1.98	0x8376	22.602	Update required
NFC	0x15	0.51	0x1DAC	0.53	0xB3D8	6.273	Update required
NA2WLOGGER	0x16						
NA2WALARMS	0x17						
FLEXNETVERSION	0x18	10.67	0x8F01	11.08	0x7795	0.113	Update required
FLEXNETSERIAL	0x1A						

Figure 7.2 Main Screen - Ready For Update

The “FW-Update Process History” shows detailed information about the ongoing process:

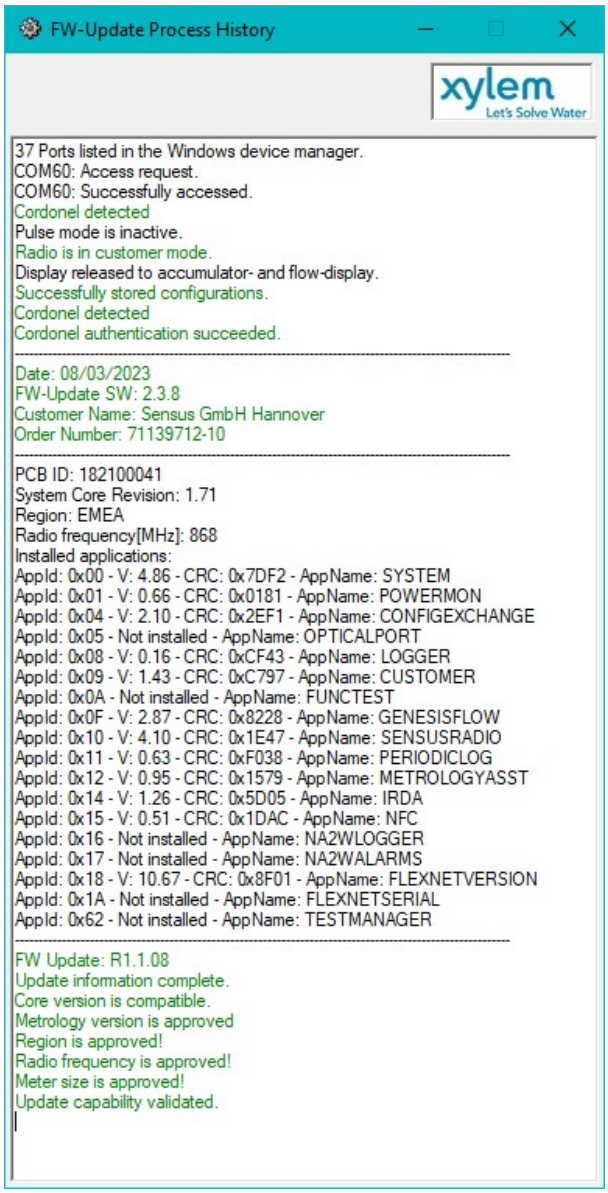


Figure 7.3 History Window - Ready For Update

Press [FW update] to start the update procedure.

During the update process the Cordonel display will show:

IdLE
8888

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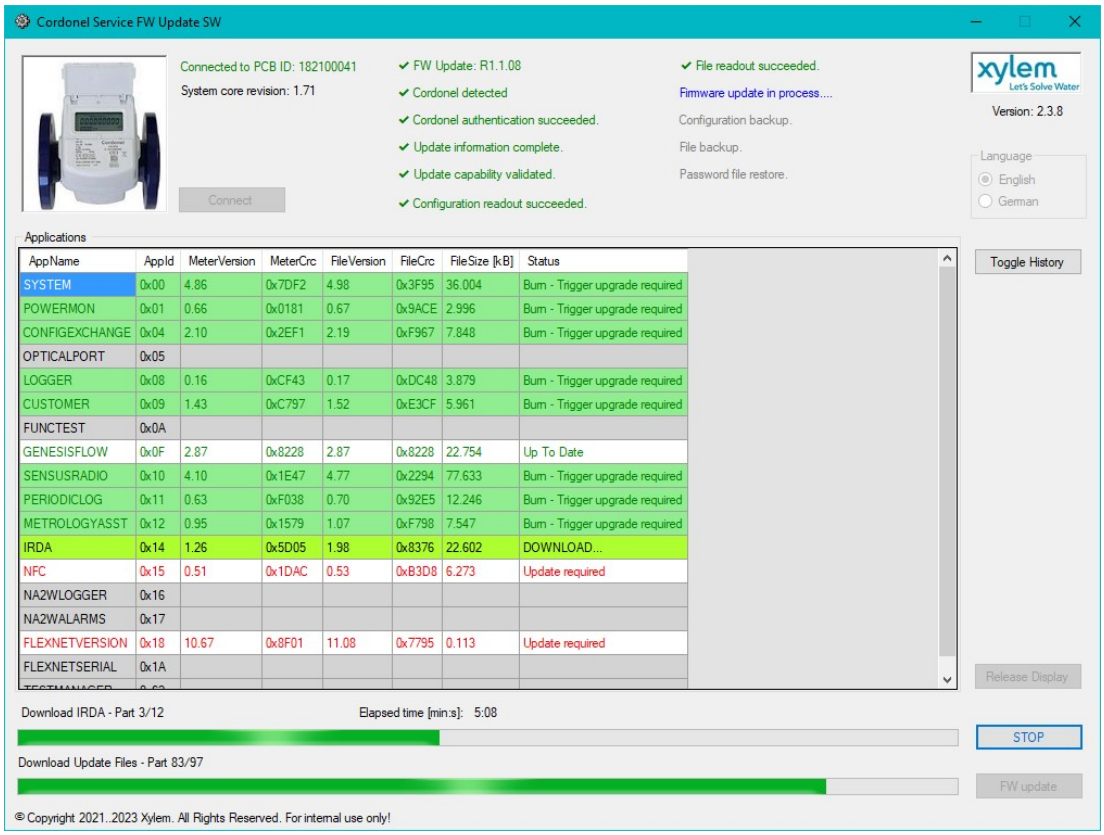


Figure 7.4 Update Ongoing

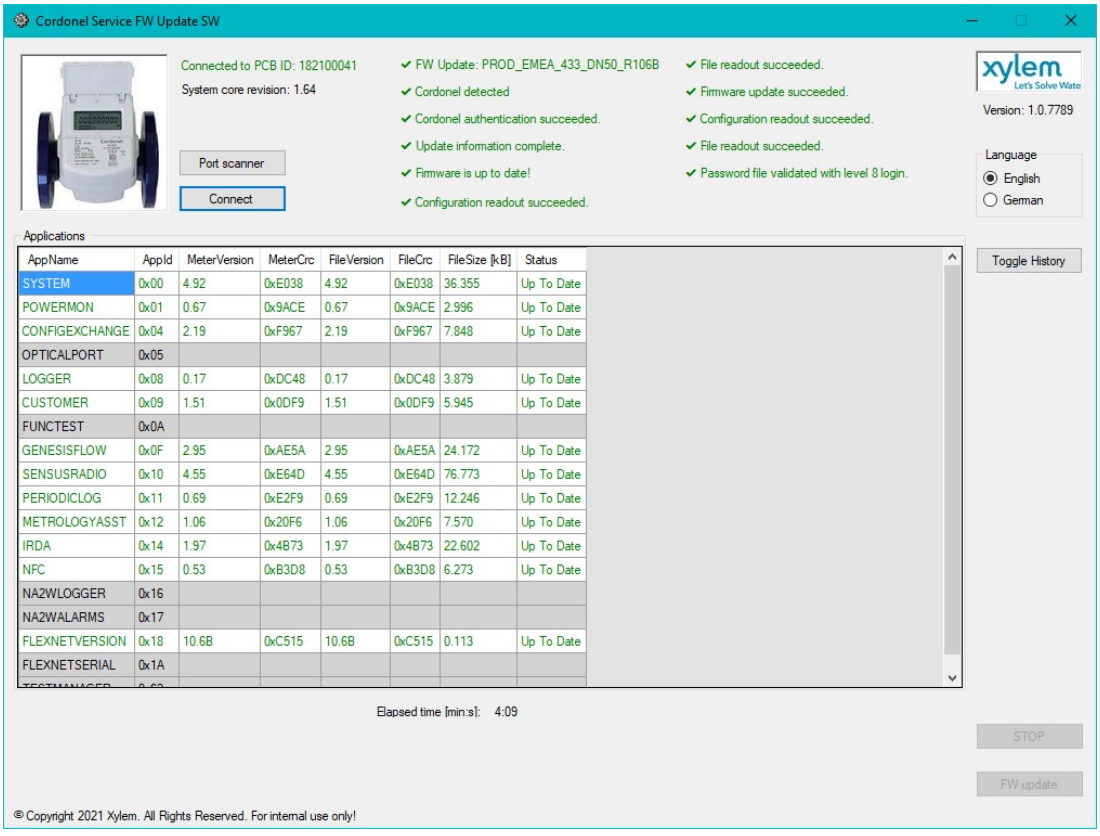


Figure 7.5 Update Successful

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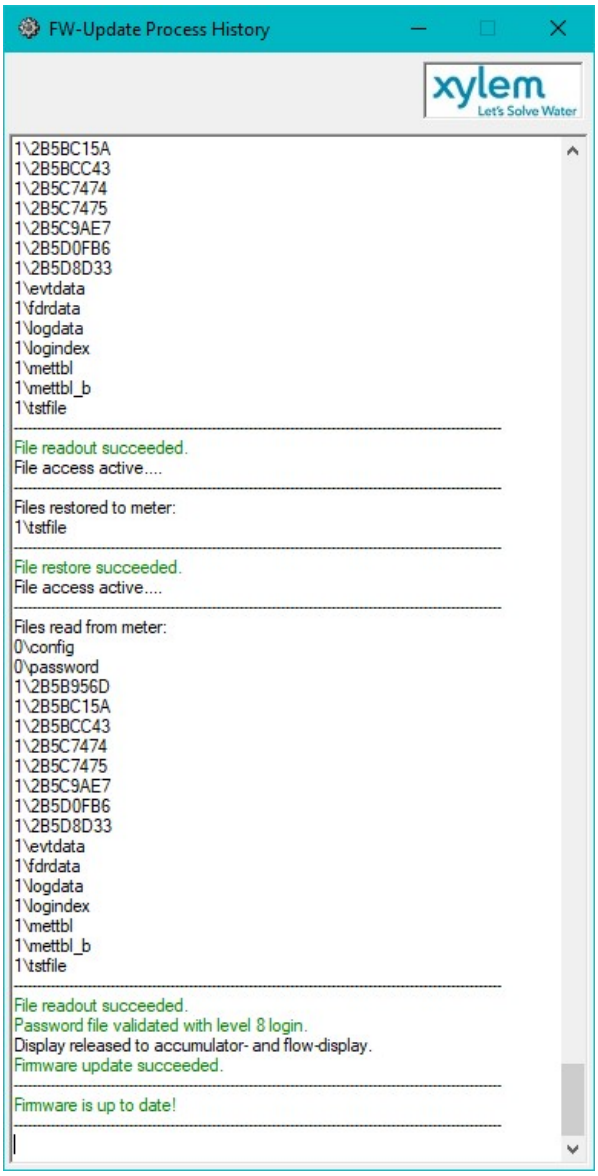


Figure 7.6 History Window – Firmware Up To Date

After successfully update it returns to a normal display state showing the accumulated volume.

Tip: If the display does not show the accumulated volume, press [Release Display] to remove the

IdLE
9999

and switch back to normal display operation. The "IdLE 9999" indicates a successfully updated Cordonel.

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8. Trouble Shooting

Cordonel connection cannot be established:

- Check USB connection to Micro-MOXA or USB-IrDA
- Check IrDA-Plugin Head: Is it locked into the plug-in bay?
- Check daylight or artificial light exposure as the IrDA connection is very light sensitive, cover the device with a box or blanket.

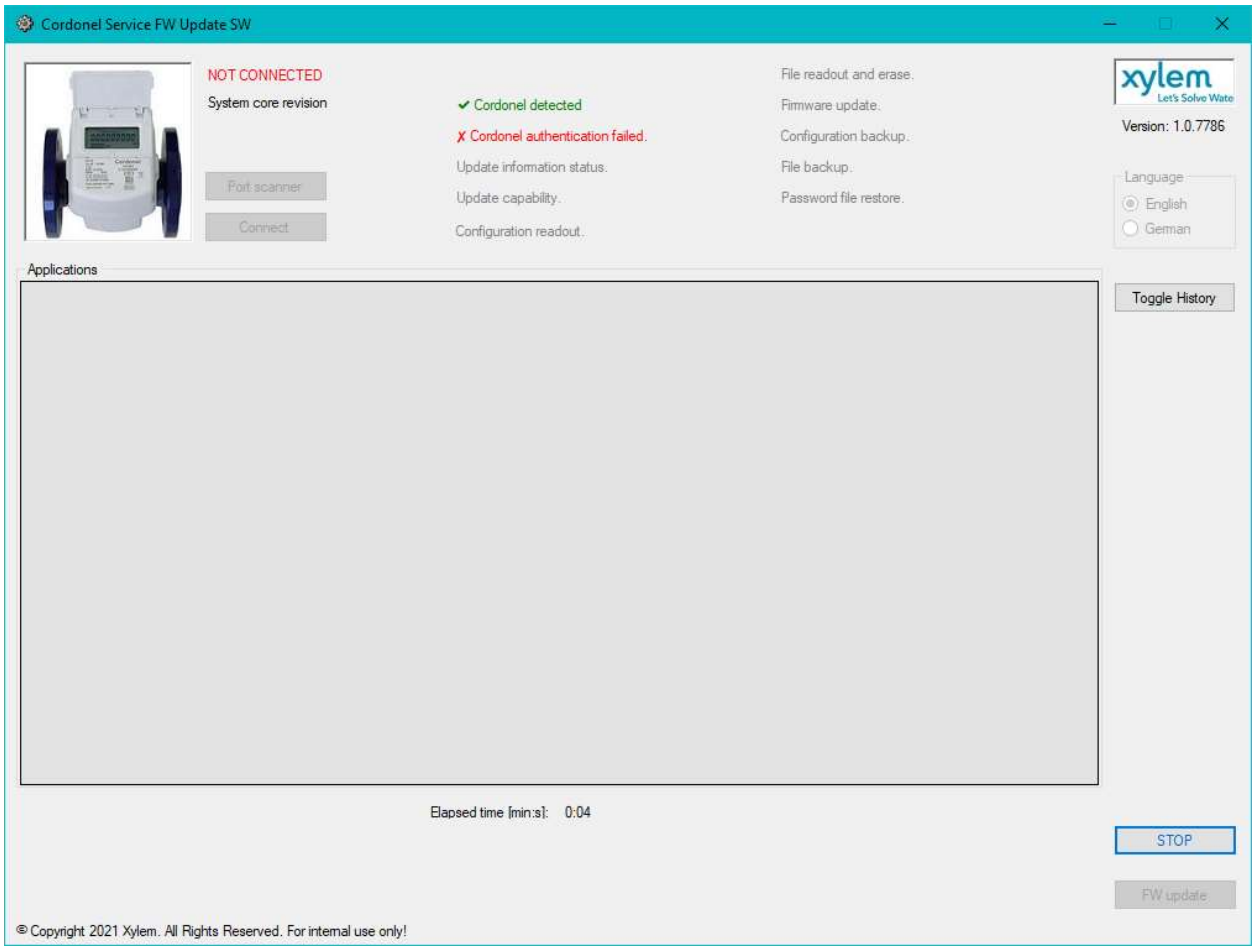


Figure 8.1 Authentication Failed

The Cordonel authentication failed:

- Timeout on connection, retry with [Connect],
- Password file corrupted, cannot be fixed, a new safe is needed.

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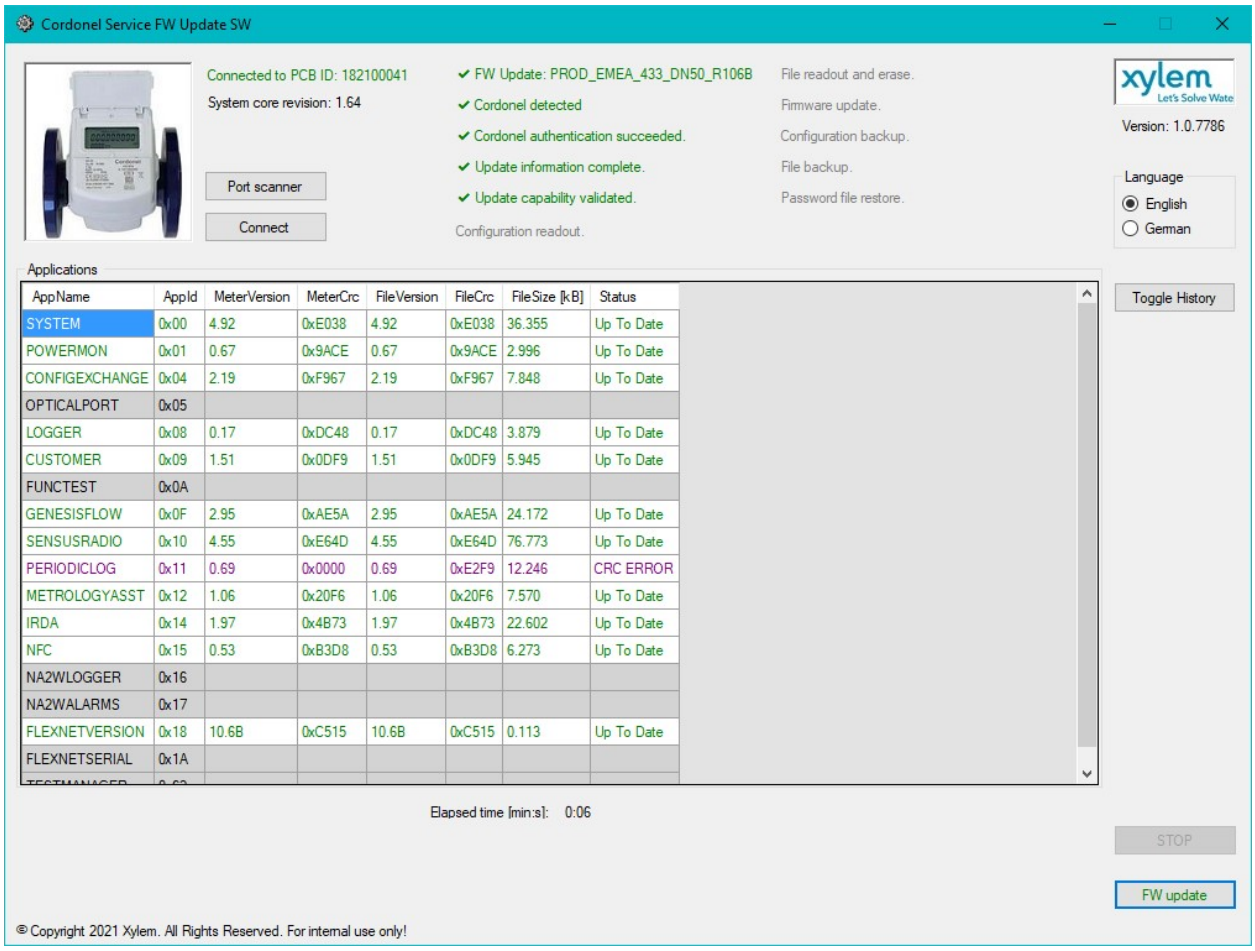


Figure 8.2 CRC ERROR

CRC error:

- From time to time a communication problem indicates a wrong CRC. As this is doubtful, press [Connect] again to correct this message.

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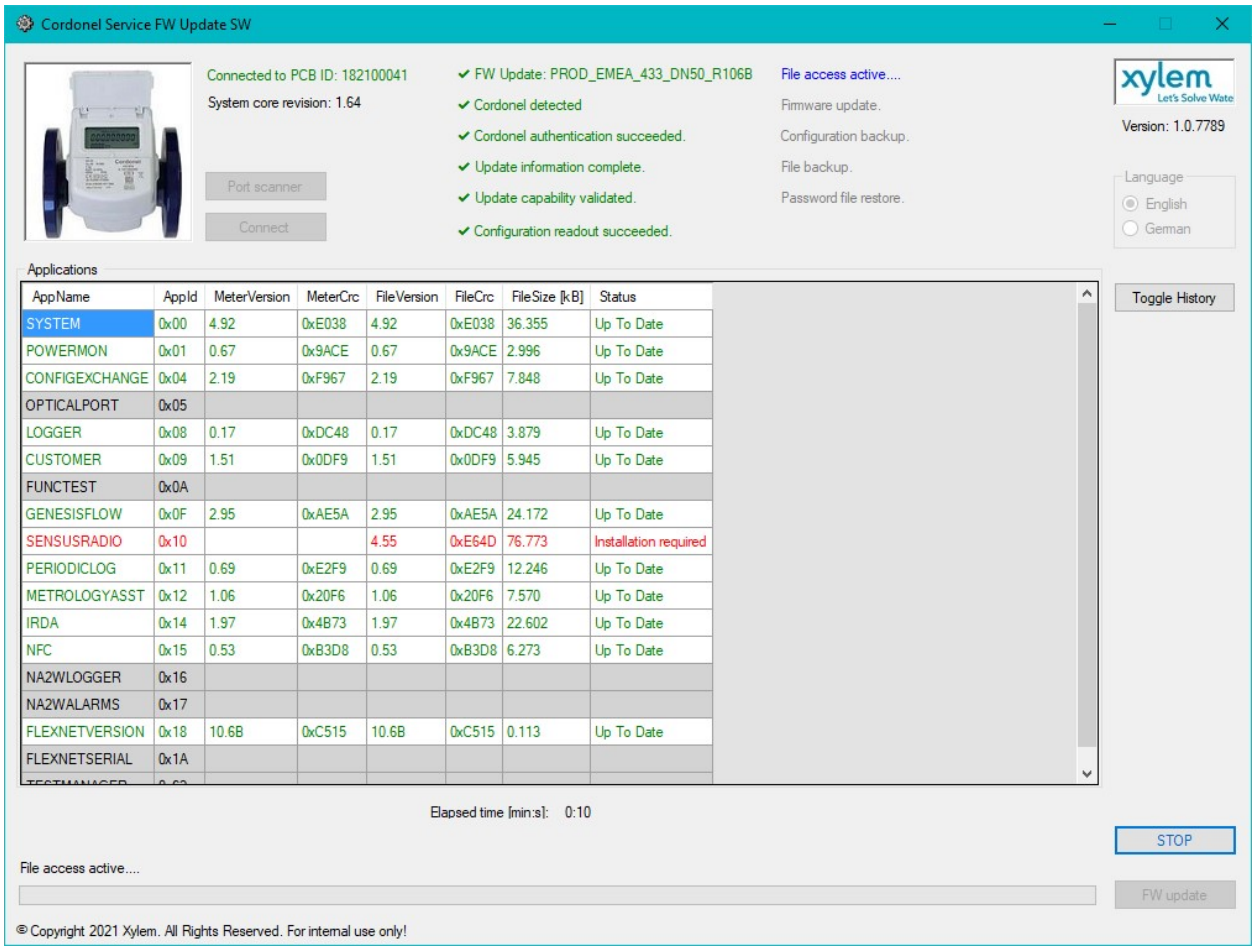
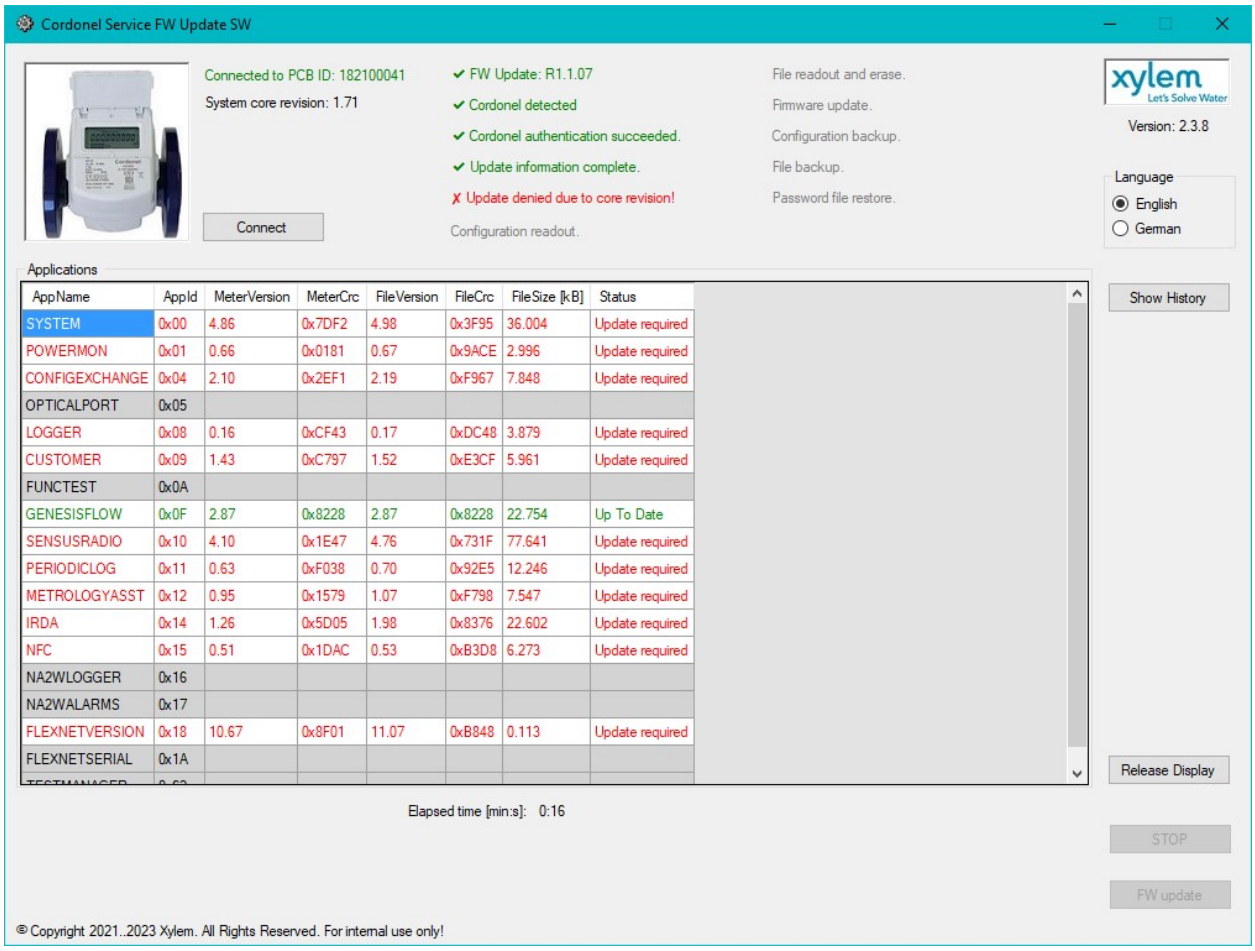


Figure 8.3 Missing Application

Missing Application:

- From time to time a communication problem indicates a missing application. As this is doubtful, press [Connect] again to correct this message.

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AppName	AppId	MeterVersion	MeterCrc	FileVersion	FileCrc	FileSize [kB]	Status
SYSTEM	0x00	4.86	0x7DF2	4.98	0x3F95	36.004	Update required
POWERMON	0x01	0.66	0x0181	0.67	0x9ACE	2.996	Update required
CONFIGEXCHANGE	0x04	2.10	0x2EF1	2.19	0xF967	7.848	Update required
OPTICALPORT	0x05						
LOGGER	0x08	0.16	0xCF43	0.17	0xDC48	3.879	Update required
CUSTOMER	0x09	1.43	0xC797	1.52	0xE3CF	5.961	Update required
FUNCTEST	0x0A						
GENESISFLOW	0x0F	2.87	0x8228	2.87	0x8228	22.754	Up To Date
SENSUSRADIO	0x10	4.10	0x1E47	4.76	0x731F	77.641	Update required
PERIODICLOG	0x11	0.63	0xF038	0.70	0x92E5	12.246	Update required
METROLOGYASST	0x12	0.95	0x1579	1.07	0xF798	7.547	Update required
IRDA	0x14	1.26	0x5D05	1.98	0x8376	22.602	Update required
NFC	0x15	0.51	0x1DAC	0.53	0xB3D8	6.273	Update required
NA2WLOGGER	0x16						
NA2WALARMS	0x17						
FLEXNETVERSION	0x18	10.67	0x8F01	11.07	0xB848	0.113	Update required
FLEXNETSERIAL	0x1A						

Figure 8.4 Main Screen - Incompatible Core Revision

This package cannot be installed!

The update capability check will deny an update due to not matching core revision .

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The history window will show detailed information:



Figure 8.5 History Window – Incompatible Core Revision

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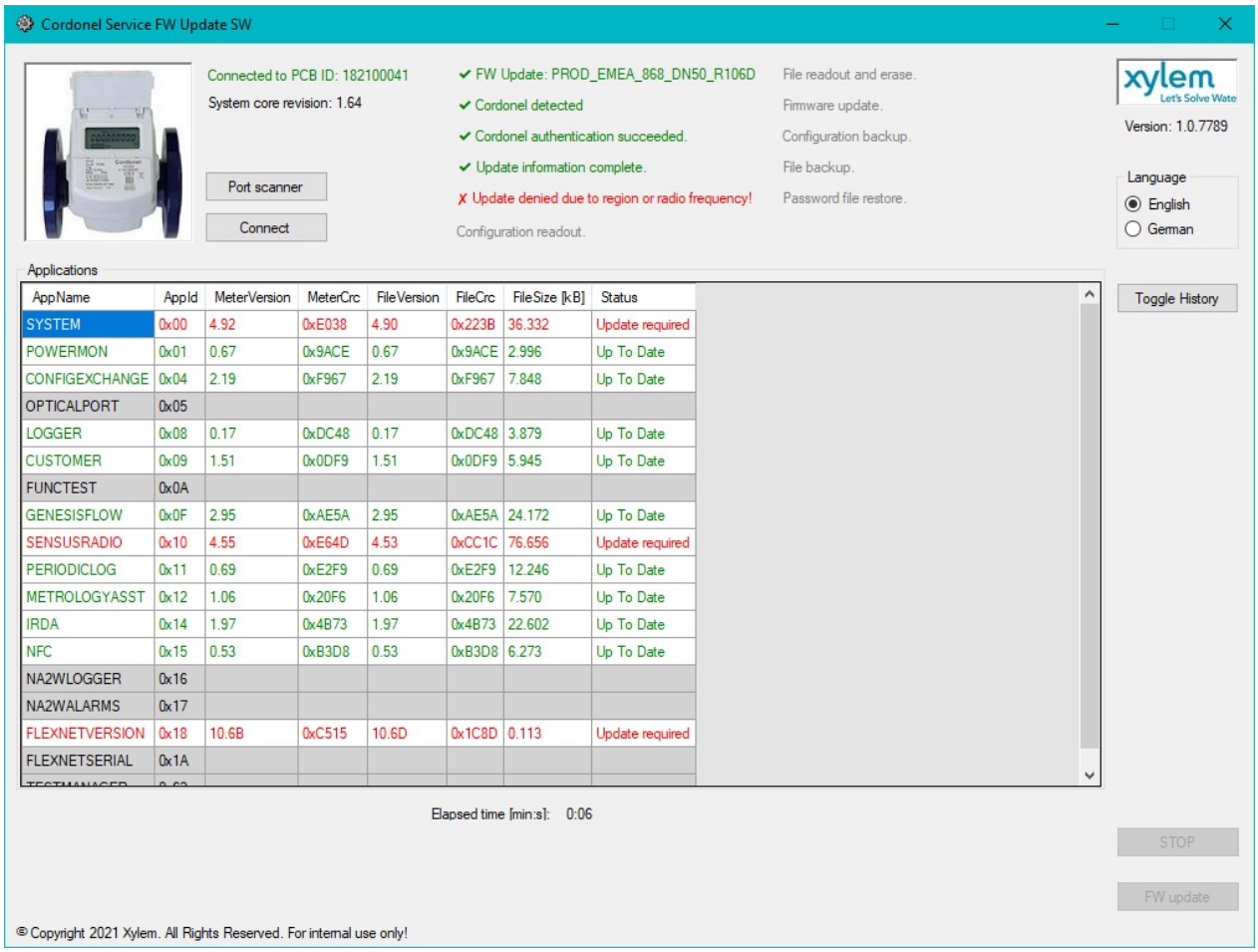


Figure 8.6 Main Screen - Wrong Radio Frequency

This package cannot be installed!

The update capability check will deny an update due to not matching radio frequency.

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The history window will show detailed information:



Figure 8.7 History Window - Wrong Radio Frequency

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9. Contacts

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Thomas Wiedebusch	Software development	thomas.wiedebusch@t-wiedebusch.de +49 179 146 04 93
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Roland Drabesch	Lead - Software development	roland.drabesch@xylem.com +49 5102 743 225

Table 9.1 Contacts

10. References

[FWU_MRD] **Cordonel Service FW-Update Process MRD**; *Published: SENSUS GmbH*; Author: Thomas Wiedebusch; Edition: September 2020 - Revision B

[FWU_BLD] **Quick Reference Cordonel Service FW-Update Builder**; *Published: SENSUS GmbH*; Author: Thomas Wiedebusch; Edition: Mar 2023 - Revision D

[FWU_LDR] **Quick Reference Cordonel Service FW-Update Loader**; *Published: SENSUS GmbH*; Author: Thomas Wiedebusch; Edition: April 2021 - Revision A

[FWU_PK] **Quick Reference Cordonel Service FW-Update Packet**; *Published: SENSUS GmbH*; Author: Thomas Wiedebusch; Edition: April 2021 - Revision A

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