

M580 CPU Firmware Upgrade to V4.01 and Later

Update Procedure

User Guide

Original instructions

11/2022

EIO0000004716.01

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Safety Information

Important Information

Read these instructions carefully, and look at the equipment to become familiar with the device before trying to install, operate, service, or maintain it. The following special messages may appear throughout this documentation or on the equipment to warn of potential hazards or to call attention to information that clarifies or simplifies a procedure.



The addition of this symbol to a “Danger” or “Warning” safety label indicates that an electrical hazard exists which will result in personal injury if the instructions are not followed.



This is the safety alert symbol. It is used to alert you to potential personal injury hazards. Obey all safety messages that follow this symbol to avoid possible injury or death.

⚠ DANGER
DANGER indicates a hazardous situation which, if not avoided, will result in death or serious injury.
⚠ WARNING
WARNING indicates a hazardous situation which, if not avoided, could result in death or serious injury.
⚠ CAUTION
CAUTION indicates a hazardous situation which, if not avoided, could result in minor or moderate injury.
NOTICE
NOTICE is used to address practices not related to physical injury.

Please Note

Electrical equipment should be installed, operated, serviced, and maintained only by qualified personnel. No responsibility is assumed by Schneider Electric for any consequences arising out of the use of this material.

A qualified person is one who has skills and knowledge related to the construction and operation of electrical equipment and its installation, and has received safety training to recognize and avoid the hazards involved.

Before You Begin

Do not use this product on machinery lacking effective point-of-operation guarding. Lack of effective point-of-operation guarding on a machine can result in serious injury to the operator of that machine.

⚠ WARNING

UNGUARDED EQUIPMENT

- Do not use this software and related automation equipment on equipment which does not have point-of-operation protection.
- Do not reach into machinery during operation.

Failure to follow these instructions can result in death, serious injury, or equipment damage.

This automation equipment and related software is used to control a variety of industrial processes. The type or model of automation equipment suitable for each application will vary depending on factors such as the control function required, degree of protection required, production methods, unusual conditions, government regulations, etc. In some applications, more than one processor may be required, as when backup redundancy is needed.

Only you, the user, machine builder or system integrator can be aware of all the conditions and factors present during setup, operation, and maintenance of the machine and, therefore, can determine the automation equipment and the related safeties and interlocks which can be properly used. When selecting automation and control equipment and related software for a particular application, you should refer to the applicable local and national standards and regulations. The National Safety Council's Accident Prevention Manual (nationally recognized in the United States of America) also provides much useful information.

In some applications, such as packaging machinery, additional operator protection such as point-of-operation guarding must be provided. This is necessary if the operator's hands and other parts of the body are free to enter the pinch points or other hazardous areas and serious injury can occur. Software products alone cannot protect an operator from injury. For this reason the software cannot be substituted for or take the place of point-of-operation protection.

Ensure that appropriate safeties and mechanical/electrical interlocks related to point-of-operation protection have been installed and are operational before placing the equipment into service. All interlocks and safeties related to point-of-operation protection must be coordinated with the related automation equipment and software programming.

NOTE: Coordination of safeties and mechanical/electrical interlocks for point-of-operation protection is outside the scope of the Function Block Library, System User Guide, or other implementation referenced in this documentation.

Start-up and Test

Before using electrical control and automation equipment for regular operation after installation, the system should be given a start-up test by qualified personnel to verify correct operation of the equipment. It is important that arrangements for such a check are made and that enough time is allowed to perform complete and satisfactory testing.

⚠ WARNING

EQUIPMENT OPERATION HAZARD

- Verify that all installation and set up procedures have been completed.
- Before operational tests are performed, remove all blocks or other temporary holding means used for shipment from all component devices.
- Remove tools, meters, and debris from equipment.

Failure to follow these instructions can result in death, serious injury, or equipment damage.

Follow all start-up tests recommended in the equipment documentation. Store all equipment documentation for future references.

Software testing must be done in both simulated and real environments.

Verify that the completed system is free from all short circuits and temporary grounds that are not installed according to local regulations (according to the National Electrical Code in the U.S.A, for instance). If high-potential voltage testing is necessary, follow recommendations in equipment documentation to prevent accidental equipment damage.

Before energizing equipment:

- Remove tools, meters, and debris from equipment.
- Close the equipment enclosure door.
- Remove all temporary grounds from incoming power lines.
- Perform all start-up tests recommended by the manufacturer.

Operation and Adjustments

The following precautions are from the NEMA Standards Publication ICS 7.1-1995 (English version prevails):

- Regardless of the care exercised in the design and manufacture of equipment or in the selection and ratings of components, there are hazards that can be encountered if such equipment is improperly operated.
- It is sometimes possible to misadjust the equipment and thus produce unsatisfactory or unsafe operation. Always use the manufacturer's instructions as a guide for functional adjustments. Personnel who have access to these adjustments should be familiar with the equipment manufacturer's instructions and the machinery used with the electrical equipment.
- Only those operational adjustments actually required by the operator should be accessible to the operator. Access to other controls should be restricted to prevent unauthorized changes in operating characteristics.

About the Book

Document Scope

This user guide explains how to update firmware for M580 CPUs up to V4.01.

Update Procedure

The update procedure is a maintenance operation that consists in changing a CPU's embedded software. It requires the CPU to be in *STOP* mode and disconnected from the systems and applications it effects.

NOTICE

INOPERABLE EQUIPMENT

Stop the CPU before any firmware update or firmware check with Unity Loader or EcoStruxure Automation Device Maintenance software.

Failure to follow these instructions can result in equipment damage.

Validity Note

This document has been updated for EcoStruxure Control Expert version 15.2.

Related Documents

Title of documentation	Reference number
Modicon M580, Hardware, Reference Manual	EIO0000001578 (English), EIO0000001579 (French), EIO0000001580 (German), EIO0000001582 (Italian), EIO0000001581 (Spanish), EIO0000001583 (Chinese)
Modicon M580 Standalone, System Planning Guide for Frequently Used Architectures	HRB62666 (English), HRB65318 (French), HRB65319 (German), HRB65320 (Italian), HRB65321 (Spanish), HRB65322 (Chinese)
Modicon M580 Hot Standby, System Planning Guide for Frequently Used Architectures	NHA58880 (English), NHA58881 (French), NHA58882 (German), NHA58883 (Italian), NHA58884 (Spanish), NHA58885 (Chinese)

You can download these technical publications, the present document and other technical information from our website www.se.com/en/download/.

Product Related Information

The application of this product requires expertise in the design and programming of control systems. Only persons with such expertise are allowed to program, install, alter and apply this product.

⚠ WARNING

UNINTENDED EQUIPMENT OPERATION

Follow all local and national safety codes and standards.

Failure to follow these instructions can result in death, serious injury, or equipment damage.

M580 CPU Firmware Upgrade Procedure

Overview

This document presents a step by step procedure for upgrading an M580 CPU, with a firmware version earlier than V4.01, to firmware version 4.01 or later.

To strengthen the firmware integrity check, the boot loader mechanism embedded in the CPU hardware has been enhanced. Consequently, loading the new boot loader into the CPU hardware requires a 2 step upgrade process.

To migrate a legacy CPU (firmware version 3.x and lower) to the newer firmware version 4.01 and higher, follow the 2 steps set forth in this document:

Step 1 - Upgrade the legacy CPU to migration firmware (LDX format) using Unity Loader, page 9.

Step 2 - Upgrade the migration firmware to the final firmware (SEDP format) using EcoStruxure Automation Device Maintenance (EADM), page 10.

NOTICE

INOPERABLE EQUIPMENT

The following CPU products, with Product Version (PV) 3 or earlier, must not be updated: BMEP581020/H, BMEP582020/H, BMEP582040/H, BMEP583020/H, BMEP583040/H, BMEP584020/H, and BMEP584040/H. Trying to upgrade these CPUs will irretrievably damage the equipment.

Failure to follow these instructions can result in equipment damage.

Downloading EcoStruxure Automation Device Maintenance (EADM)

You can download a copy of EcoStruxure Automation Device Maintenance, and instructions for using it, from the Schneider Electric web site at:

https://www.se.com/fr/fr/download/document/EADM_V3.0/.

Step 1 - Upgrade Legacy Firmware to LDX Format

Before beginning the following process, de-activate your host PC's firewall, if any, in accordance with your company cyber-security and/or system usage policies.

1. Perform this update using either one of the following CPU ports:

- USB port, or
- Ethernet service port (Port 1).

NOTE: This update cannot be performed using the CPU's dual network ports.

2. Open **Unity Loader**.
3. In the **Firmware** tab, in the **PC** list, select the migration LDX file that corresponds to your CPU reference.

For example, migration_BMEH584040.idx.

4. Click the green arrow () to upgrade your CPU with the selected migration file.

5. Wait while your CPU reboots. This may take a few minutes. During reboot, your CPU will not be reachable.

Interrupting the update procedure before it has completed will cause the connection to be lost, and can cause irreparable damage to the CPU.

NOTICE

EQUIPMENT DAMAGE

During the transfer of the firmware file:

- Do not power OFF the CPU.
- Do not power OFF the PC.
- Do not shut down Unity Loader.
- Do not disconnect the communication cable.
- Do not remove or insert the optional SD memory card.

Failure to follow these instructions can result in equipment damage.

6. Check your CPU LED panel. When the **RUN** (green), **ERR** (red) and **IO** (red) LEDs are blinking, proceed to Step 2, page 10.

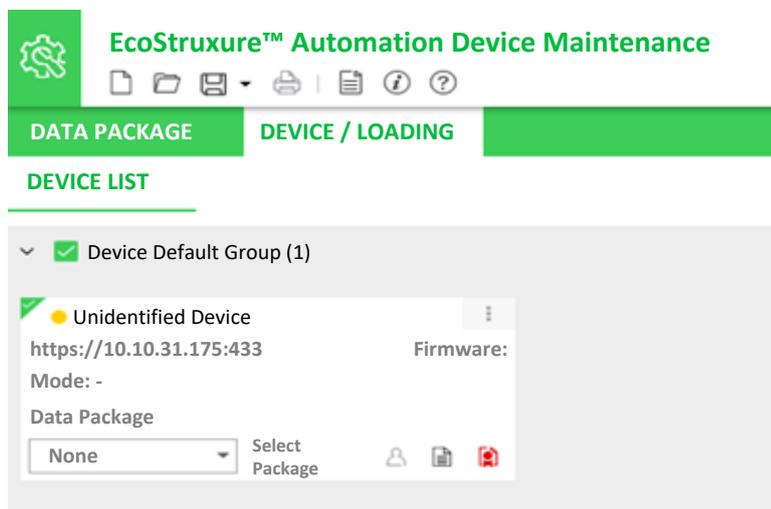
Step 2 - Upgrade Migration Firmware to SEDP Format

NOTE: At this point in the upgrade process you should be able to ping the CPU.

1. Ping the CPU at its default IP address: 10.10.MAC5.MAC6.
2. Open the EcoStruxure™ Automation Device Maintenance (EADM) tool, version 3.0 or later.
3. Save the SEDP firmware upgrade file on your PC.
4. In the **Package Settings** area, click the ellipsis () then, in the navigation dialog, select the folder where you saved your SEDP firmware upgrade file.

5. Click **+ADD** and in the **Add Device** dialog, enter the following:
 - Set **Connection** to **HTTP/HTTPS**.
 - Select the checkbox.
 - Enter the **IP Address** 10.10.MAC5.MAC6.
 - Enter port number **443** (to the right of the IP Address setting).
 - Click **OK**.

The new device appears in the **DEVICE / LOADING > DEVICE LIST**. You can see a yellow bubble indicating the device is reachable, and the text **Select Package** is displayed.



6. In the **Data Package** list, select the firmware that corresponds to your M580 CPU.

NOTE: A certificate invalidity alert may appear.

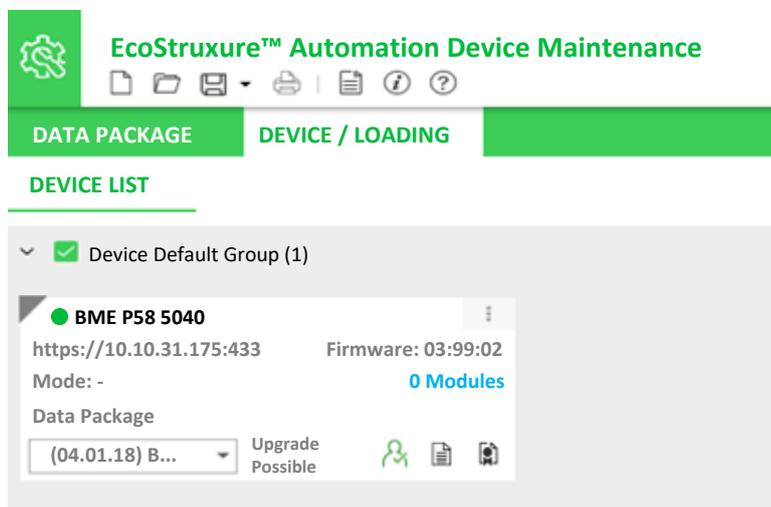
7. Click the red certificate icon (🔴) then in the **Device Certificate** dialog click **Trust Device Certificate**.

You should now see the instruction **Enter Password**.

8. Click the user icon (👤), select **Username** then enter the credentials:
 - **user:** loader
 - **password:** fwdownload

The yellow bubble turns green, and the text **Upgrade Possible** replaces the previous text (**Select Package**).

NOTE: If you are using an out-of-the-box M580 CPU with no application, you can select **Anonymous** login and no user credentials are needed.



9. In the **DEVICE / LOADING > DEVICE LIST**, select the device. The top-left corner turns from black to green and the **Update Firmware** button (located on the right side of the EADM tool task bar) is now enabled.
10. Click **Update Firmware**.
11. If a **Confirmation Required** message displays, click on it to open a menu, then select **Confirm**.
The firmware upgrade process begins.
12. A message is displayed, indicating the percentage of firmware upgrade progress.
NOTE: If there is an application in the CPU, upon reaching 79% of the firmware loading it may no longer be able to reach the CPU. This is because the update of the firmware has been performed and the security certificate of the device has changed. In this case, you will need to re-add your device and repeat steps 2, 3, 4 and 5 to be able to observe that the firmware version has now been correctly upgraded.
13. The firmware update is now complete. We recommend that you cycle power (OFF then ON) to the CPU.

Glossary

A

adapter:

An adapter is the target of real-time I/O data connection requests from scanners. It cannot send or receive real-time I/O data unless it is configured to do so by a scanner, and it does not store or originate the data communications parameters necessary to establish the connection. An adapter accepts explicit message requests (connected and unconnected) from other devices.

ART:

(application response time) The time a CPU application takes to react to a given input. ART is measured from the time a physical signal in the CPU turns on and triggers a write command until the remote output turns on to signify that the data has been received.

C

CPU:

(central processing unit) The CPU, also known as the processor or controller, is the brain of an industrial manufacturing process. It automates a process as opposed to relay control systems. CPUs are computers suited to survive the harsh conditions of an industrial environment.

D

determinism:

For a defined application and architecture, you can predict that the delay between an event (change of value of an input) and the corresponding change of a controller output is a finite time t , smaller than the deadline required by your process.

DRS:

(dual-ring switch) A ConneXium extended managed switch that has been configured to operate on an Ethernet network. Predefined configuration files are provided by Schneider Electric to download to a DRS to support the special features of the main ring / sub-ring architecture.

F

FDR:

(fast device replacement) A service that uses configuration software to replace an inoperable product.

FTP:

(file transfer protocol) A protocol that copies a file from one host to another over a TCP/IP-based network, such as the internet. FTP uses a client-server architecture as well as separate control and data connections between the client and server.

I

IP address:

The 32-bit identifier, consisting of both a network address and a host address assigned to a device connected to a TCP/IP network.

IPsec:

(internet protocol security) An open set of protocol standards that make IP communication sessions private and more robust against cybersecurity attacks for traffic between modules using IPsec, developed by the internet engineering task force (IETF). The IPsec authentication and encryption algorithms require user-defined cryptographic keys that process each communications packet in an IPsec session.

M**MAST:**

A master (MAST) task is a deterministic processor task that is run through its programming software. The MAST task schedules the RIO module logic to be solved in every I/O scan. The MAST task has two sections:

- IN: Inputs are copied to the IN section before execution of the MAST task.
- OUT: Outputs are copied to the OUT section after execution of the MAST task.

Modbus:

Modbus is an application layer messaging protocol. Modbus provides client and server communications between devices connected on different types of buses or networks. Modbus offers many services specified by function codes.

R**RPI:**

(requested packet interval) The time period between cyclic data transmissions requested by the scanner. EtherNet/IP devices publish data at the rate specified by the RPI assigned to them by the scanner, and they receive message requests from the scanner at each RPI.

T**TFTP:**

(trivial file transfer protocol) A simplified version of *file transfer protocol* (FTP), TFTP uses a client-server architecture to make connections between two devices. From a TFTP client, individual files can be uploaded to or downloaded from the server, using the user datagram protocol (UDP) for transporting data.

U**UTC:**

(coordinated universal time) Primary time standard used to regulate clocks and time worldwide (close to former GMT time standard).

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EIO0000004716.01