

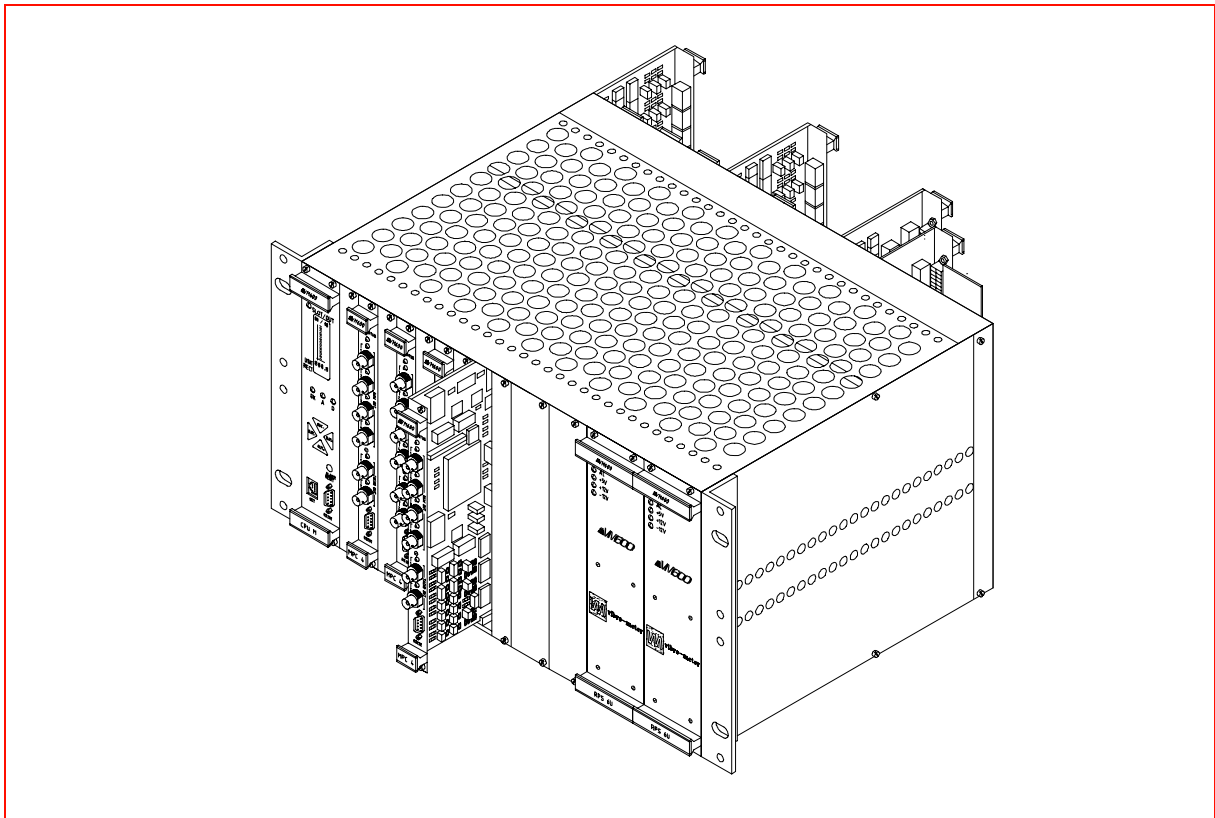


## MANUAL

### Firmware (embedded software) upgrades

for

cards in a VM600 rack



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## REVISION RECORD SHEET

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## PREFACE

### About this manual

This manual describes the procedures for upgrading the firmware (embedded software) used by the cards in a VM600 rack, from Meggitt Sensing Systems' Vibro-Meter® product line.

This includes:

- Upgrading AMC 8 and MPC 4 cards using the Data Loader software.
- Upgrading CPU R cards using the VibroSight System Manager software.

### About Meggitt, Meggitt Sensing Systems and Vibro-Meter

Headquartered in the UK, Meggitt PLC is a global engineering group specializing in extreme environment components and smart sub-systems for aerospace, defence and energy markets.

Meggitt Sensing Systems is the operating division of Meggitt specializing in sensing and monitoring systems, which has operated through its antecedents since 1927 under the names of ECET, Endevco, Ferroperm Piezoceramics, Lodge Ignition, Sensorex, Vibro-Meter and Wilcoxon Research. Today, these operations are integrated under one strategic business unit called Meggitt Sensing Systems, headquartered in Switzerland and providing complete systems, using these renowned brands, from a single supply base.

The Meggitt Sensing Systems facility in Fribourg, Switzerland was formerly known as Vibro-Meter SA, but is now Meggitt SA. This site produces a wide range of vibration and dynamic pressure sensors capable of operation in extreme environments, leading-edge microwave sensors, electronics monitoring systems and innovative software for aerospace and land-based turbo-machinery. This includes the VM600 cards and rack produced for the Vibro-Meter product line.

### Who should use this manual?

This manual is intended for use by qualified installation personnel (for example, system operators, or mechanical and electrical fitters).

---

**NOTE:** Installation personnel **MUST** have the necessary technical training in electronics and/or mechanical engineering (professional certificate/diploma, or equivalent) to enable them to carry out the installation properly and safely.

---

### Adhere to the instructions!

The procedures described in this manual should be strictly adhered to in order to ensure that the associated hardware is properly installed and operated. This ensures that measurement signals are reliable.

The user should adhere to general safety procedures as well as general and specific machine constructor guidelines and instructions.

## **Limitations of this document**

Not all installation and operational possibilities are described in this manual. Nevertheless, several specific configurations are described in detail. These can often be adapted to specific applications (contact Meggitt Sensing Systems for further information).

## **Related documentation**

Further information on products can be found in their corresponding data sheets. These documents can be obtained from your local Meggitt Sensing Systems representative.

## SAFETY

### Symbols and styles used in this manual

The following symbols are used in this manual where appropriate:



#### The WARNING safety symbol

**THIS INTRODUCES DIRECTIVES, PROCEDURES OR PRECAUTIONARY MEASURES WHICH MUST BE EXECUTED OR FOLLOWED. FAILURE TO OBEY A WARNING CAN RESULT IN INJURY TO THE OPERATOR OR THIRD PARTIES.**



#### The CAUTION safety symbol

**This draws the operator's attention to information, directives or procedures which must be executed or followed. Failure to obey a caution can result in damage to equipment.**



#### The ELECTROSTATIC SENSITIVE DEVICE symbol

**This indicates that the device or system being handled can be damaged by electrostatic discharges.**

**Refer to Handling precautions for electrostatic sensitive devices on page viii for further information.**

---

**NOTE:** This is an example of the NOTE paragraph style. This draws the operator's attention to complementary information or advice relating to products or their installation.

---

## Important remarks on safety



**Read this manual carefully and observe the safety instructions before mounting and installing equipment.**

Every effort has been made to include specific safety-related procedures in this manual using the symbols described above. However, operating personnel are expected to follow all generally accepted safety procedures.

Safety procedures should be communicated to all personnel who are liable to operate the equipment described in this manual.

Meggitt Sensing Systems does not accept any liability for injury or material damage caused by failure to obey any safety-related instructions or due to any modification, transformation or repair carried out on the equipment without written permission from Meggitt SA. Any modification, transformation or repair carried out on the equipment without written permission from Meggitt SA will invalidate any warranty.

## Handling precautions for electrostatic sensitive devices

Certain devices can be damaged by electrostatic discharges resulting from built-up static electricity. Because of this, special precautions must be taken to minimize or eliminate the possibility of these electrostatic discharges occurring.



**Read the following recommendations carefully before handling electronic circuits, printed circuit boards or modules containing electronic components.**

- Before handling electronic circuits, discharge the static electricity from your body by touching and momentarily holding a grounded metal object, such as a pipe or cabinet.
- Avoid the build-up of static electricity on your body by not wearing synthetic clothing materials, as these tend to generate and store static electric charges. Cotton or cotton blend materials are preferred because they do not store static electric charges.
- Do not handle electronic circuits unless it is absolutely necessary. Only hold modules by their front panel handles.
- Do not touch printed circuit boards, their connectors or their components with conductive devices or with your hands.
- Put the electronic circuit, printed circuit board or module containing electronic components into an antistatic protective bag immediately after removing it from the system rack.

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# 1 UPGRADING AMC 8 OR MPC 4 CARDS

## 1.1 Introduction

This section describes the procedure for upgrading the firmware used by (stored on) an AMC 8 or MPC 4 card using the Data Loader software.

You should only upgrade (change) the firmware running on a VM600 card when instructed to do so by Meggitt Sensing Systems. You should only use firmware that has been released by Meggitt Sensing Systems.

## 1.2 Procedure

Using software supplied by Meggitt Sensing Systems, the firmware is downloaded from a computer to the non-volatile memory on the card that stores the firmware and the configuration for the card.

Although the following description (and screen shots) use an MPC 4 card and MPC 4 firmware version 062, the procedure is the same for an AMC 8 card and other firmware versions.

### 1.2.1 Prerequisites

The following equipment is required:

- Computer (laptop) running Microsoft® Windows XP.  
The computer must have a serial communications (COM) port available.
- Data Loader software from Meggitt Sensing Systems.
- Serial cable – standard RS-232 cable (wired straight-through).
- VM600 rack containing an AMC 8 or MPC 4 card.
- New firmware for the AMC 8 or MPC 4 card.

Firmware upgrades for AMC 8 and MPC 4 cards require a single file:

- *CardtypeFirmwareversion.dat* – for example, *amc004.dat* or *mpc062.dat*.

### 1.2.2 Data Loader software

Data Loader is a proprietary software tool from Meggitt Sensing Systems used to program VM600 cards that support on-board programming through a serial communications port.

#### 1.2.2.1 Installing the Data Loader software

The Data Loader software is provided as a single executable file (Data Loader.exe), so there is no installation procedure.

Simply copy the Data Loader.exe program to the hard disk of a computer in order to use it.


### 1.2.3 Upgrading the firmware on an AMC 8 or MPC 4 card

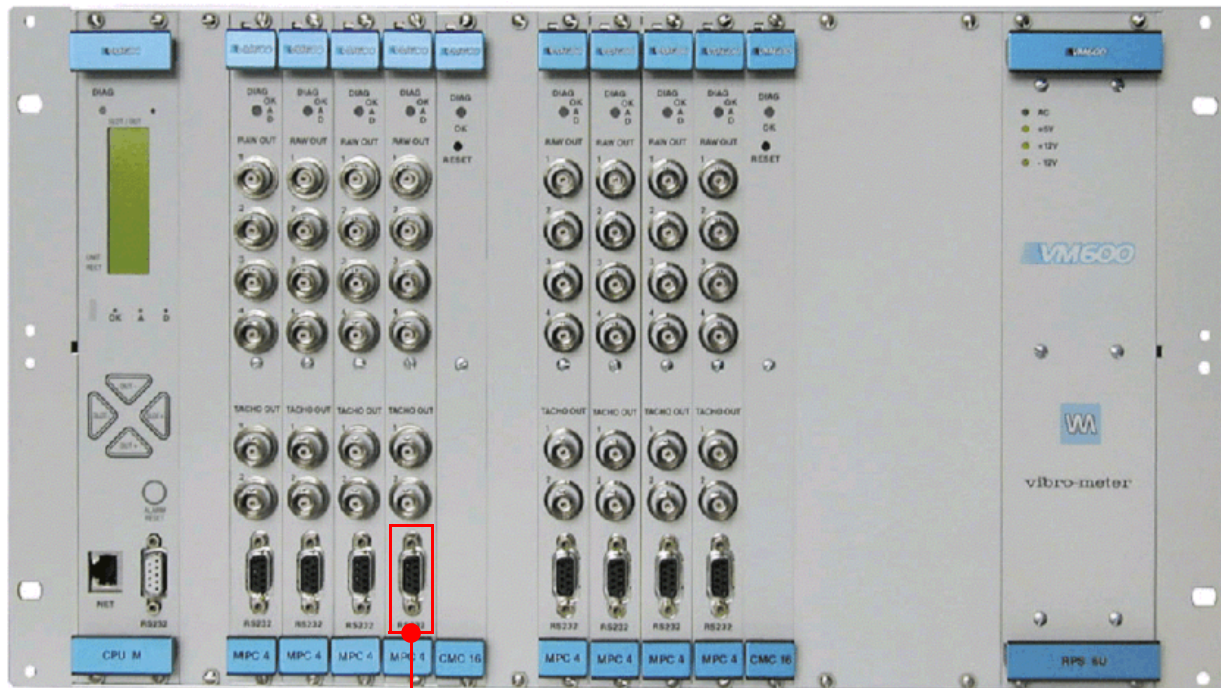
These steps should be performed in the given sequence. Depending on your computer configuration, upgrading the firmware for an AMC 8 or MPC 4 card should take approximately 5 minutes.

To change the firmware versions of an AMC 8 or MPC 4 card using Data Loader:

- 1- Identify the card to be upgraded and locate it in the VM600 rack.

- 2- Connect the computer to the 9-pin D-sub connector on the front panel of the card (see Figure 1-1) using the serial cable.
- 3- On the computer, start the Data Loader software.

Locate and double-click on the  **Data Loader.exe** file to start the software and the Data Loader window will appear (see Figure 1-2).



Serial (RS-232) communications port used for configuration (proprietary protocol).  
DCE 9-pin D-sub connector (female).

**Figure 1-1:** Front view photograph of a typical combined CMS and MPS system using a CPU M in a VM600 rack

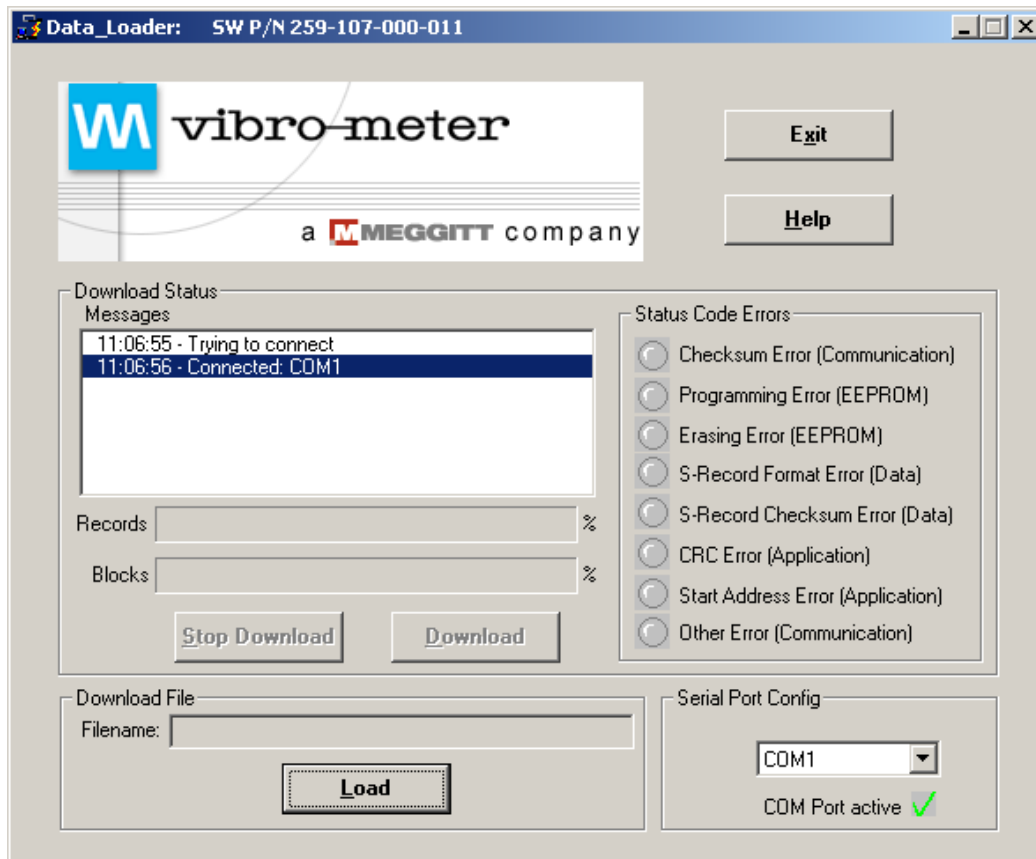



Figure 1-2: The Data Loader window

- 4- Select the serial communications port on the computer that is connected to the card in the rack via the serial cable.  
In the Serial Port Config group box (bottom right), use the drop-down control to select different communication (COM) ports. A green check mark is shown when a valid COM port is selected and active.
- 5- Locate and identify the new firmware for the card with the Data Loader software.  
In the Download File group box (bottom left), click the **Load** button and use the dialog box that appears to navigate the folders on your computer and select the new firmware file (for example,  mpc062.dat), then click **Open**.

---

**NOTE:** Firmware files provided by Meggitt Sensing Systems for use with Data Loader can be identified by their .dat file name extension.

---

The Filename box will be updated with the path and file name for the new firmware.

- 6- Download the firmware to the card in the rack.  
In the Download Status group box (left), click the **Download** button.  
When the “Waiting for synchronization” message appears in the Messages box (see Figure 1-3), turn off and turn on the power supply to the VM600 rack. This will reset the rack and synchronize the card to the Data Loader.

When synchronized, the Data Loader software will automatically start to download the firmware to the card. Progress indicators (in records and blocks) shows the amount of the download that has been completed (see Figure 1-3).

**NOTE:** The Records indicator show the progress of the current block of firmware being downloaded.  
The Blocks indicator shows the overall progress of the download.  
A complete download should require less than 5 minutes.

7- Confirm that the download was successful.

After a download, the on-board programming functionality of the card will perform cyclic redundancy check (CRC) calculations to verify the integrity of the new firmware before using it. Any errors in the downloaded firmware are reported using the Status Code Error indicators (right), which are explained in Appendix A: Data Loader.

For the Data Loader software, verify that the “Download Successful” message appears in the Messages box (see Figure 1-3) and that no Status Code Errors are shown.

For the card, verify that the card restarts and that the DIAG/STATUS indicator on the front panel is on. During normal operation, this LED shows green (on continuously). If


this is not the case, refer to the  *MPS hardware manual* (Meggitt Sensing Systems document ref. MAMPS-HW/E).



Figure 1-3: The Data Loader after a successful download

- 8- When you are finished, close the Data\_Loader software.  
In the main window (top right), click **Exit**.

#### 1.2.4 Checking the firmware version of an AMC 8 or MPC 4 card

You can check the firmware version running on an AMC 8 or MPC 4 card using the MPS software (MPS1 or MPS2) from Meggitt Sensing Systems.

---

**NOTE:** AMC 8 and MPC 4 cards contain one type of firmware that can be changed by the user.

---

Checking the firmware versions running on a card can help to decide if you need to update the firmware.

The procedure to check the firmware version of an AMC 8 or MPC 4 card using the MPS software is slightly different depending on whether the VM600 rack is stand-alone (that is, no “system controller”) or the VM600 rack contains a CPU M or CPU R card acting as a “system controller”.

In general, to check the firmware versions of an AMC 8 card using the MPS software:

- 1- Use **Communications > From AMC > Read System Identification**.

The System Identification window that appears includes the AMC Software Part Number.

In general, to check the firmware versions of an MPC 4 card using the MPS software:

- 1- Use **Communications > From MPC > Read System Identification**.

The System Identification window that appears includes the MPC Software Part Number.

For further information, refer to the  *MPS1 Configuration software for machinery protection systems* manual (Meggitt Sensing Systems document ref. MAMPS1-SW/E).

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## 2 UPGRADING CPU R CARDS

### 2.1 Introduction

This section describes the procedure for upgrading the firmware used by (stored on) a CPU R card using the VibroSight System Manager software.

You should only upgrade (change) the firmware running on a VM600 card when instructed to do so by Meggitt Sensing Systems. You should only use firmware that has been released by Meggitt Sensing Systems.

### 2.2 Procedure

Using software supplied by Meggitt Sensing Systems, the firmware is downloaded from a computer to the non-volatile memory on the card that stores all of the firmware and the configuration for the card.

---

**NOTE:** A CPU R card contains two types of firmware that can be changed by the user: base system firmware and applications firmware. These can be updated independently or at the same time.

---


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**NOTE:** For a redundant system (that is, a VM600 rack with two CPU R / IOC R card pairs installed), only one CPU R card should be installed in the rack and have its firmware changed at any one time. During an upgrade procedure, the “other” CPU R card should be removed to ensure it is not turned on (although both IOC R cards can remain installed).

Also for a redundant system, the order in which the CPU R cards have the firmware changed is not important: Master CPU R followed by Inactive CPU R, or Inactive CPU R followed by Master CPU R.

---

---

**NOTE:** The firmware for each VibroSight card must be changed individually using the  **Change Firmware** tool (from System Manager’s Maintenance tools). However, as each card updates its firmware independently of the VibroSight software (once the firmware has been downloaded to the card and the card’s internal on-board programming has started), firmware updates can be performed on multiple cards in parallel.

---



**Never do any of the following while upgrading a CPU R card’s firmware:**

- Turn the power supply to the rack off and on.
- Disconnect the card from the network.
- Remove a CPU R card from the rack during the firmware change procedure. Always wait until the firmware change has been confirmed as successful, which can require up to 10 minutes.

Although the following description (and screen shots) use a specific firmware version, the procedure is the same for other firmware versions.

## 2.2.1 Prerequisites

The following equipment is required:

- Computer (laptop) running Microsoft® Windows Server 2003, Windows XP, Windows Vista or Windows 7 (32-bit).

The computer must have an Ethernet port available.

- VibroSight System Manager software from Meggitt Sensing Systems.
- Ethernet cable – standard Cat 5 cable (wired straight-through).
- VM600 rack containing at least one CPU R / IOC R card pair.

The CPU R card to be upgraded must be connected via its associated IOC R cards' Ethernet port to the same network as the computer that runs VibroSight System Manager.

- New firmware for the CPU R card.

Firmware upgrades for CPU R cards require up to two files:

- `base-system-640-011-001-xxx.tgz`
- `applications-640-012-001-xxx.tgz`

(Where `xxx` is the version number of the firmware found in the file name.)

---


**NOTE:** Each VM600 card contains two types of firmware that can be changed by the user: base system firmware and applications firmware.

---

## 2.2.2 VibroSight System Manager software


VibroSight System Manager is one of the software modules that forms the VibroSight® Total Monitoring Solution, a highly integrated software suite from Meggitt Sensing Systems' Vibro-Meter® product line for CMS and MPS applications.


---

**NOTE:** Further information can be found in the VibroSight software data sheet or the  *VibroSight* help (*VibroSight.chm*).

---

### 2.2.2.1 Installing the System Manager software

Refer to the  *Getting Started with VibroSight* installation guide (Meggitt Sensing Systems document ref. 660-010-006-20xA) for information on installing the complete VibroSight software suite – including System Manager.

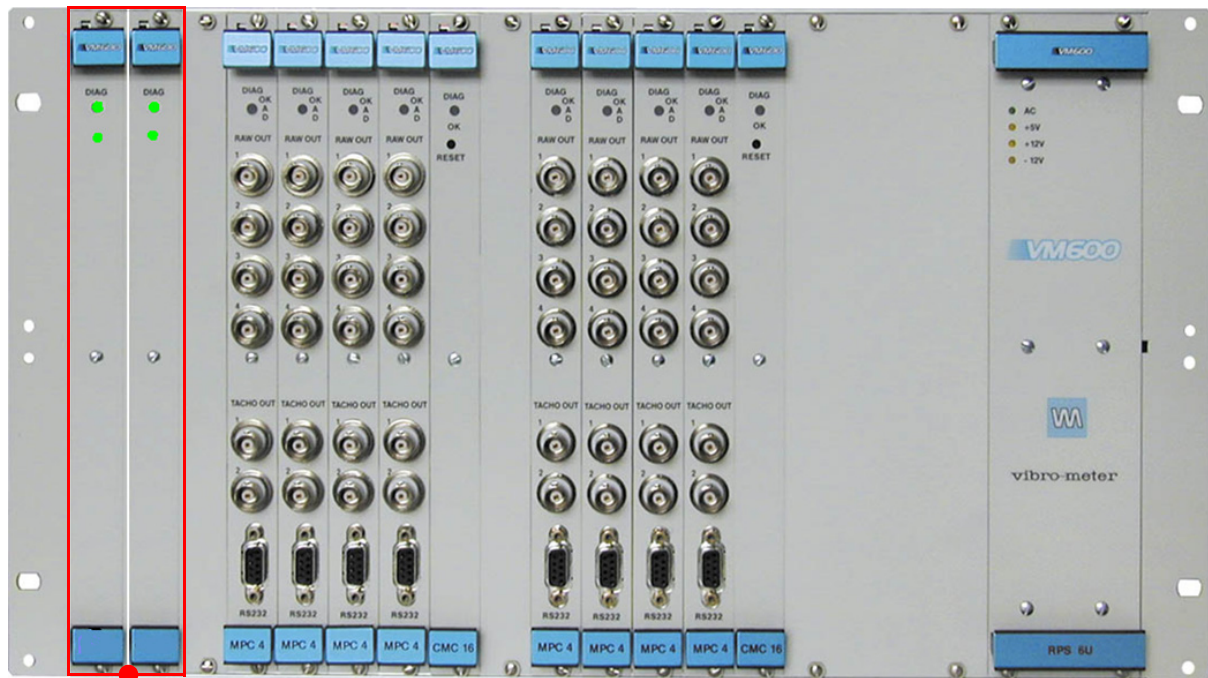
Refer to the  *VM600 CPU R and IOC R redundant card pair* manual (Meggitt Sensing Systems document ref. MACPUR/E) for information on installing only VibroSight System Manager.

## 2.2.3 Upgrading the firmware on a CPU R card

These steps should be performed in the given sequence. Depending on your computer configuration, upgrading the firmware for a CPU R card should take less than 10 minutes.

To change the firmware versions of a CPU R card using System Manager:

- 1- Identify the card to be upgraded and locate it in the VM600 rack (see Figure 2-1).
- 2- Ensure that the VM600 rack is turned on and connected to the same network as your computer. (It is also possible to make a direct connection between the VM600 rack and the computer, bypassing the network.).





A redundant system with two CPU R / IOC R card pairs installed.  
The Ethernet (8P8C) communications port used for configuration is on each CPU R card's associated IOC R card in the rear of the VM600 rack.


**Figure 2-1:** Front view photograph of a typical combined CMS and MPS system using CPU Rs in a VM600 rack

- 3- On the computer, start the VibroSight  System Manager software in one of the following ways:
  - Click **Start > All Programs > Meggitt > VibroSight 2 > System Manager**.
  - Double-click the VibroSight shortcut  installed on your desktop as part of the installation procedure to start the VibroSight Welcome Centre, then click the System Manager.

**NOTE:** If a VibroSight Software Licensing window appears, click the **Continue Evaluation** button to start using VibroSight. Contact Meggitt Sensing Systems for information concerning licences.

The software starts and the System Manager window appears. By default, VibroSight System Manager starts with VibroSight Hosts (left) as the default view in the System Explorer window.

- 4- Select the  Devices view in the System Explorer and expand the  CPU R cards node to see a list of all of the CPU R cards that the computer can see.


- 5- Select the card, for example,  ZC01234 (12.345.67.890) to be upgraded from the Devices view.

---

**NOTE:** You should identify a CPU R card by its serial number (xxxxxxx) as the IP address (xxx.xxx.xxx.xxx) can be easily changed. The serial number of a CPU R can be found on the sticker (label) attached to a backplane connector on the card. It is also available on the final production test report for the card.

---

The Actions area (right) of the System Manager will show the operations that are available for the card you have selected.

- 6- Click  **Change Firmware** in the Maintenance group in the actions area. (If you cannot see the Actions area, click **View > Actions**.)

The Change Firmware window appears, listing the current version information for the card in the Firmware Status area. It might be necessary to scroll down to see the base system and applications firmware versions.

- 7- Click **Add** and use the dialog box that appears to navigate the folders on your computer and select the new firmware file or files (\*.tgz). Multiple files can be selected by CTRL+clicking or SHIFT+clicking on them. Then click **Open**.

---

**NOTE:** Firmware files provided by Meggitt Sensing Systems for use with System Manager can be identified by their .tgz file name extension. (A .tgz file is a compressed archive file format.)

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**NOTE:** The default firmware (embedded software) directory is:  
C:\Program Files\Meggitt\VibroSight 2\Firmware

---

- 8- If there are multiple firmware upgrades, that is, both base system and applications firmware, ensure all the files are added to the Firmware Files area of the Change Firmware window. If not, repeat step 6 to add the second .tgz file.
- 9- Click **Finish** to start the firmware upgrade.

The IP address of the card will disappear from the Devices view of the System Explorer for the duration of the firmware upgrade, for example,  ZC01234 (). When the firmware upgrade is complete, the IP address of the card will return, for example,  ZC01234 (12.345.67.890).

---

**NOTE:** The upgrade should require less than 10 minutes.

---

- 10- Confirm that the download was successful.

For the System Manager software, the success of the upgrade procedure can be verified using 2.2.4 - Checking the firmware versions of a CPU R card.

For the card, verify that the card restarts and that the STATUS and DATA indicators on the front panel are on. During normal operation, the STATUS LED shows green (on continuously) for the Master CPU R and orange (on continuously) for the Inactive CPU R.

If this is not the case, refer to the  *VM600 CPU R and IOC R redundant card pair manual* (Meggitt Sensing Systems document ref. MACPUR/E).

- 11- For a redundant system, remove this CPU R card from the rack and install the “other” CPU R. Then repeat steps 5 to 10 for the second (“other”) CPU R card.

---

**NOTE:** For a redundant system, after the firmware for both CPU R cards has been changed (one card at a time), either insert both CPU Rs into the rack at the same time or turn the power supply to the rack off and on to ensure that the CPU R on the left (lower slot number) becomes the Master CPU R.

---

## 2.2.4 Checking the firmware versions of a CPU R card

You can check the firmware versions running on a CPU R card using the Maintenance tools in VibroSight System Manager.

---

**NOTE:** CPU R cards contain two types of firmware that can be changed by the user: base system firmware and applications firmware.

---

Checking the firmware versions running on a card can help to decide if you need to update the firmware.

To check the firmware versions of a CPU R card using VibroSight System Manager:


- 1- Select the  card from the Devices view of the System Explorer.

---

**NOTE:** You should identify a CPU R card by its serial number (for example, ZC01234) as the IP address (for example, 12.345.67.890) can be easily changed.

---

The Actions area of the System Manager will show the operations that are available for the card you have selected.

- 2- Click  **Change Firmware** in the Maintenance group in the actions area.  
(If you cannot see the Actions area, click **View > Actions**.)

The Change Firmware window appears, listing the current version information for the card in the Firmware Status area. It might be necessary to scroll down to see the base system and applications firmware versions.

When finished, click **Cancel** to close the Change Firmware window.

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## 3 CUSTOMER SUPPORT

### 3.1 Contacting us

Meggitt Sensing Systems' worldwide customer support network offers a range of support including 3.2 Technical support and 3.3 Sales and repairs support. For customer support, contact your local Meggitt Sensing Systems representative. Alternatively, contact our main office:

Customer support  
Meggitt SA  
Route de Moncor 4  
PO Box 1616  
CH-1701 Fribourg  
Switzerland

Telephone: +41 (0)26 407 11 11  
Email: [energysupport@ch.meggitt.com](mailto:energysupport@ch.meggitt.com)  
Web: [www.meggittsensing.com](http://www.meggittsensing.com)

### 3.2 Technical support

Meggitt Sensing Systems' technical support team provide both pre-sales and post-sales technical support, including:

- 1- General advice
- 2- Technical advice
- 3- Troubleshooting
- 4- Site visits.

---

**NOTE:** For further information, contact Meggitt Sensing Systems (see 3.1 Contacting us).

---

### 3.3 Sales and repairs support

Meggitt Sensing Systems' sales team provide both pre-sales and post-sales support, including advice on:

- 1- New products
- 2- Spare parts
- 3- Repairs.

---

**NOTE:** If a product has to be returned for repairs, then it should be accompanied by a completed Failure report form, included on page 3-3.

---

### 3.4 Customer feedback

As part of our continuing commitment to improving customer service, we warmly welcome your opinions. To provide feedback, complete the Customer feedback form on page 3-5 and return it Meggitt Sensing Systems' main office (see 3.1 Contacting us).

## FAILURE REPORT FORM

If the product has to be returned to Meggitt Sensing Systems for repairs, then:

- 1- Complete this failure report form.
- 2- Attach a photocopy of this report to the faulty unit and retain the original copy for your records.
- 3- Send the product together with the attached failure report form to Meggitt SA by registered post.

---

**NOTE:** Please provide as much information as possible in order to assist fault diagnosis.

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**NOTE:** A failure report must be sent with each faulty product.

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### Contact details:

Name \_\_\_\_\_ Job title \_\_\_\_\_  
 Company \_\_\_\_\_ Email \_\_\_\_\_  
 Address \_\_\_\_\_  
 Country \_\_\_\_\_ Post code \_\_\_\_\_  
 Telephone \_\_\_\_\_ Fax \_\_\_\_\_  
 Signature \_\_\_\_\_ Date \_\_\_\_\_

### Product details:

Product type: \_\_\_\_\_  
 Serial number (S/N): \_\_\_\_\_ Part number (P/N): \_\_\_\_\_  
 Meggitt SA order number: \_\_\_\_\_  
 Date of purchase: \_\_\_\_\_ Site where installed: \_\_\_\_\_

**Is the failure** (put an  where appropriate):

Continuous?                       Intermittent?                       Temperature dependent?

### Description of failure:

---



---



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*(Continue overleaf)*







## APPENDIX A: DATA\_LOADER

**Table A-1:** Explanation of Data\_Loader status code errors

Status code errors (displayed by Data_Loader)	Reason
Checksum Error (Communication)	Communications fault
Programming Error (EEPROM)	EEPROM fault
Erasing Error (EEPROM)	EEPROM fault
S-Record Format Error (Data)	Data fault
S-Record Checksum Error (Data)	Data fault
CRC Error (Application)	Application fault
Start Address Error (Application)	Application fault
Other Error (Communication)	Serial communications fault

### Notes

An EEPROM is an electrically erasable programmable read-only memory – a type of non-volatile memory used for permanent data storage in electronic devices.

S-Record is an ASCII text file format, originally from Motorola, used to encode binary data.

A CRC is a cyclic redundancy check – an error checking code calculated to detect changes to raw computer data.

**Table A-2:** Keyboard shortcuts for Data\_Loader

Key name	Action
TAB	Move to next field
SHIFT+TAB	Move to previous field
SPACE	Press a button
ESC	Cancel an action
ALT+X	Close the program
ALT+F4	Close the program
ALT+D	Download the firmware
ALT+S	Stop the download
ALT+L	Load a (firmware) file
ALT+H	Display the help
ALT+SPACE	Display the menu
ALT+DOWN ARROW	Select a serial communications (COM) port
ENTER	Initialize the selected serial communications (COM) port

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