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Application note 008

Replacing an XMx16 card in a VibroSight machinery monitoring system

This application note explains how to configure a spare XMx16 card so that it can be used as a replacement for an existing XMx16 card in a VibroSight machinery monitoring system

PRODUCTS AFFECTED

Applicable to all VibroSight® VM600 XMx16 card-based machinery monitoring systems.

THE ISSUE

When a VM600 XMx16 card (XMC16, XMV16 or XMVS16) in a VibroSight machinery monitoring system is replaced by a spare XMx16 card, the replacement XMx16 must be the same as the existing XMx16 card. This includes the IP settings and the NTP settings configured for the card, and the versions of firmware running on the XMx16 card.

XMX16 CARD FACTORY ASSIGNED DEFAULTS

An XMx16 card (XMC16, XMV16 or XMVS16) is supplied by Meggitt Sensing Systems with the factory assigned defaults described below.

NOTE: For more information on factory assigned defaults, refer to the *XMx16 / XIO16T card pair factory assigned defaults* topic in the VibroSight help.

Ethernet port

The XMx16 card is configured to use its Ethernet port (so the corresponding XIO16T card's Ethernet port should be disabled).

NOTE: Only one Ethernet port for an XMx16/XIO16T card pair should be enabled at any one time.

Therefore, when an XMx16/XIO16T card pair is connected to a network for the first time, the XMx16 card's Ethernet port (front of the VM600 rack) must be used.

This factory assigned default setting can be changed using the **IP Settings** command in VibroSight System Manager so that the Ethernet connection for a card pair can use the corresponding XIO16T card's Ethernet port (rear of the VM600 rack).

Dynamic host configuration protocol

The XMx16 card is configured to use the dynamic host configuration protocol (DHCP) to assign an IP address to the XMx16 card's Ethernet port.

Therefore, when an XMx16/XIO16T card pair is connected to a network, a DHCP server should be available on the network in order for an IP address to be automatically assigned to the XMx16 card's Ethernet port. If no DHCP server is available on the network, the XMx16 card will use auto IP to assign itself a link-local IP address in the range 169.254.1.0 to 169.254.254.255.

This factory assigned default setting can be changed using the **IP Settings** command in VibroSight System Manager so that a static IP address can be manually assigned to an XMx16/XIO16T card pair.

Network time protocol

The XMx16 card is configured for operation without an NTP server (NTP-free), that is, no network time protocol (NTP) server is required as the local clock of the host computer running the VibroSight Server software is used as the time reference for the VibroSight machinery monitoring system.

NOTE: Starting with VibroSight 2.11.1, a VibroSight system can be deployed for operation either without an NTP server (NTP-free) or with an NTP server.
For VibroSight 2.11.0 and earlier, this factory assigned default setting must be changed to use an NTP server of sufficient quality (NTP stratum level) as the time reference because XMx16 cards running versions of firmware compatible with VibroSight 2.11.0 and earlier will not start data acquisition until they have established communication with an NTP Server.

This factory assigned default setting can be changed using the **NTP Settings** command in VibroSight System Manager so that an NTP server that is available on the same network as the VibroSight machinery monitoring system can be used as the time reference by an XMx16/XIO16T card pair.

Firmware

The firmware for an XMx16/XIO16T card pair is stored in non-volatile memory on the XMx16 card. When an XMx16 card is supplied, it is with the latest versions of firmware that were released to production when the card was manufactured and tested. This consist of two firmware components that can be changed by a user: the base system firmware and the applications firmware.

NOTE: XMx16 card firmware is packaged and distributed as a .tgz file (a compressed archive file format) with PNRs such as 640-010-001-xxx for the (applications) firmware and 640-003-001-xxx for the base system firmware. In these PNRs, the 640-xxx-001-xxx denotes the packaging of the firmware in the tgz file format.
After the .tgz file is unpacked by VibroSight System Manager and the firmware is uploaded to an XMx16 card, the dialog box displayed by VibroSight System Manager's **Change Firmware** command shows the current version of firmware with PNRs such as 640-010-000-xxx for the (applications) firmware and 640-003-000-xxx for the base system firmware. In these PNRs, the 640-xxx-000-xxx denotes the actual unpacked firmware that is running on the card.

Therefore, it is possible that the version of firmware running on an XMx16 card supplied as a spare is not the same as the version of firmware running on an existing XMx16 card in a VibroSight machinery monitoring system. For example:

- If a VibroSight machinery monitoring system is using the latest version of VibroSight software and the latest compatible version of XMx16 card firmware, then the version of firmware running on a spare XMx16 card might need to be changed to the latest version in order to be compatible with this VibroSight system.
- If a VibroSight machinery monitoring system is using an earlier version of VibroSight software and a compatible version of XMx16 card firmware, then the version of firmware running on a spare XMx16 card might need to be changed to an earlier version in order to be compatible with this VibroSight system.

When replacing an XMx16 card in an existing VibroSight machinery monitoring system with a spare XMx16 card, it is necessary to ensure that the version of firmware running on the replacement XMx16 card is the same as the version of firmware running on the existing XMx16 card.

NOTE: In general, it is strongly recommended that a VibroSight machinery monitoring system uses the latest version of VibroSight software and the latest compatible version of XMx16 card firmware.

The factory assigned versions of firmware running on an XMx16/XIO16T card pair can be changed using the **Change Firmware** command in VibroSight System Manager so that different versions of firmware can be used. For example, so that all XMx16/XIO16T card pairs of the same type in a VM600 rack are running the same version of firmware.

NOTE: For more information on VibroSight software and XMx16 card firmware compatibility, refer to the VibroSight software release notes or the *VibroSight software and VM600 XMx16 card firmware compatibility* topic in the VibroSight help.

MANAGING XMX16 CARDS

The VibroSight software uses a client-server architecture to distribute the functional requirements of the system across several software modules and VibroSight System Manager provides the tools to manage a VibroSight machinery monitoring system's hardware and firmware, including XMx16 cards. This includes configuring IP settings and NTP settings, and changing firmware versions.

NOTE: The hardware of an XMx16/XIO16T card pair is fully software configurable so there are no jumpers or switches that need to be manually configured when replacing an XMx16 card.

REPLACING AN XMX16 CARD IN A VIBROSIGHT MACHINERY MONITORING SYSTEM WITH A SPARE XMX16 CARD

To replace an XMx16 card (XMC16, XMV16 or XMVS16) in a VM600 rack with a spare XMx16 card, follow the procedures described below.

Establishing the configuration and firmware versions of the existing XMx16 card

To establish the configuration and firmware versions of the existing XMx16 card:

1- Ensure that the power supply to the VM600 rack is turned on and that the rack is connected to the same network as the computer running the VibroSight software.

2- Start VibroSight System Manager.

In VibroSight System Manager, the Devices tree structure view of the System Explorer window (left) lists of all of the VibroSight-compatible devices that can be seen on the network. The Actions window (right) lists the commands that are available for the device selected in the s System Explorer window.

3- In the System Explorer window, expand the node for the type of XMx16 card (XMC16, XMV16 or XMVS16) to be replaced.

The devices that are available on the network are listed in a serial number and (IP address) format, for example, xxxxxxx (xxx.xxx.xxx.xxx).

4- In the System Explorer window, select the specific XMx16 card to be replaced.

NOTE: Normally, you should identify an XMx16 card by its serial number (xxxxxxx) as the IP address can be easily changed.

5- In the Actions window, click the **IP Settings** command in order to display the IP Settings dialog box as shown in Figure 1 and Figure 2 and record (note down) the following information for each card of the XMx16/XIO16T card pair:

- Whether the **Use DHCP server**, **Use static IP** or **Disabled** option button is selected.
- If the **Use static IP** option button is selected, record also the static IP address, subnet mask and default gateway information.

Then click **Cancel** to close the dialog box and continue.

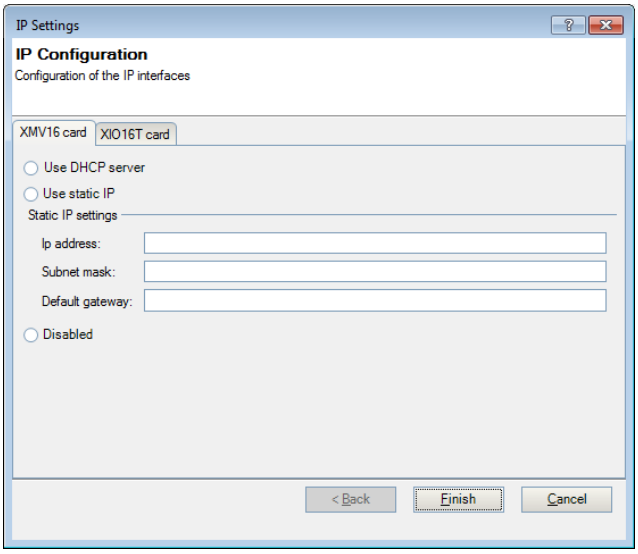

Figure 1: IP Settings (XMx16) dialog box

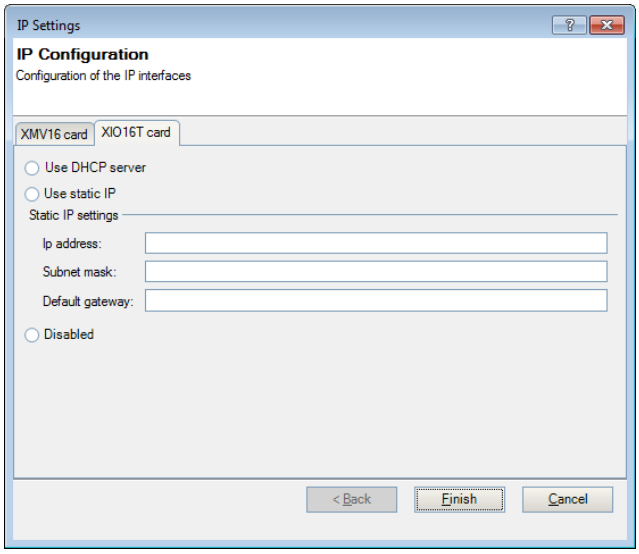

Figure 2: IP Settings (XIO16T) dialog box

6- In the Actions window, click the **NTP Settings** command in order to display the NTP Settings dialog box as shown in Figure 3 and record (note down) the following information for the card:

- Whether the **Use NTP server** or **Disabled** option button is selected.
- If the **Use NTP server** option button is selected, record also the **NTP server** information (typically, an IP address).

Then click **Cancel** to close the dialog box and continue.

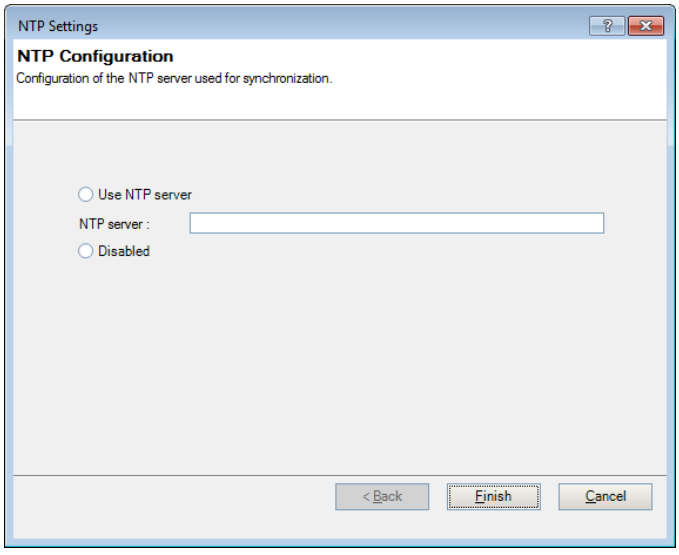

Figure 3: NTP Settings dialog box

7- In the Actions window, click the **Change Firmware** command in order to display the Change Firmware dialog box as shown in Figure 4 and record (note down) the following information for the card:

- The current version of the **Base System** and (applications) **Firmware** versions listed under Firmware Status. (It may be necessary to scroll down to see the Base System and Firmware versions.)

Then click **Cancel** to close the dialog box and continue.

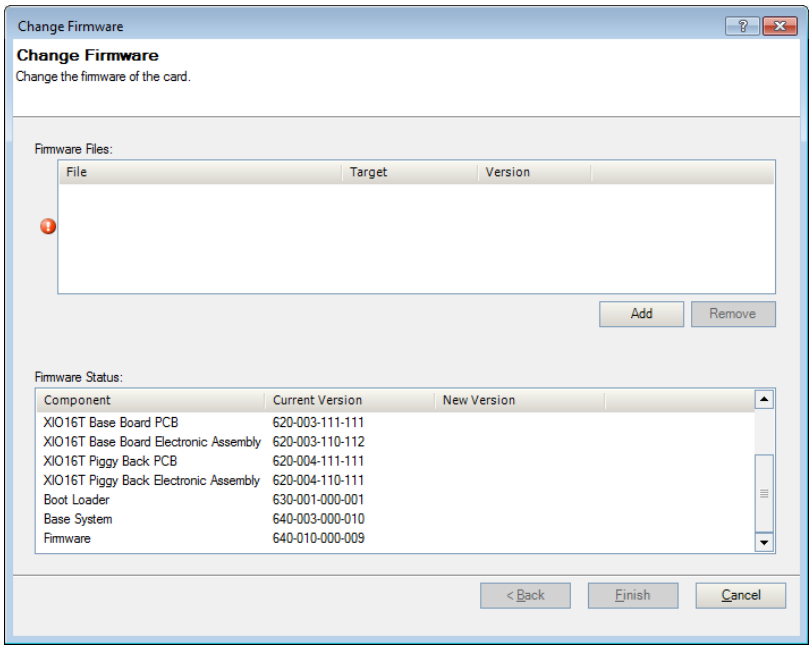

Figure 4: Example Change Firmware dialog box

Replacing the existing XMx16 card in the VM600 rack

Operating personnel should remember to observe handling precautions for electrostatic sensitive devices when handling XMx16 cards. Failure to do this may result in cards becoming damaged by electrostatic discharges.

Before inserting a card in the rack, check visually that none of the connector pins are bent.

NOTE: XMx16 cards are hot-swappable, therefore it is not necessary to turn off (or disconnect) the VM600 rack power supply before replacing an XMx16 card.

To replace the existing XMx16 card in the front of the VM600 rack:

1- Disconnect the external cables connected to the card, if any.

2- Unfasten the two captive fixing screws at the top and at the bottom of the front panel and remove the card from the rack.

3- On the front panel, simultaneously push the upper handle upwards and the lower handle downwards with your thumbs, in order to cause the card to move forwards by 1 to 2 mm. Then pull on both handles together (with equal force) to extract the card from the rack.

4- Install the replacement card in the rack and fasten the two captive fixing screws at the top and at the bottom of the front panel.

5- Reconnect any cables to the card.

6- Connect the replacement XMx16 card to the network using its front panel Ethernet port (front of the VM600 rack).

NOTE: When an XMx16 card or XMx16/XIO16T card pair is connected to a network for the first time, the XMx16 card's Ethernet port (front of the VM600 rack) must be used.

If the XMx16/XIO16T card pair to which the replacement XMx16 card belongs was using the XIO16T Ethernet port (rear of the VM600 rack), then it is necessary to reconfigure the XMx16 card's Ethernet port as follows:

- In VibroSight System Manager, select the replacement XMx16 card in the Devices view of the System Explorer window and use the **IP Settings** command in the Actions window to display the IP Settings dialog box.
- On the XMx16 card tab of the IP Settings dialog box, select the **Disabled** option button to disable the XMx16 card's Ethernet port so that only the XIO16T card's Ethernet port is used.
- Disconnect the replacement XMx16 card from the network (front panel Ethernet port, front of the VM600 rack) and connect the corresponding XIO16T card's Ethernet port (rear of the VM600 rack) to the network.

However, if the XMx16/XIO16T card pair to which the replacement XMx16 card belongs was using the XMx16 Ethernet port (front of the VM600 rack), then it is not necessary to reconfigure the XMx16 card's Ethernet port as just described.

Establishing the configuration and firmware versions of the replacement XMx16 card

To establish the configuration and firmware versions of the replacement XMx16 card, follow the procedure described in Establishing the configuration and firmware versions of the existing XMx16 card on page 3 but with the replacement XMx16 card selected in VibroSight System Manager.

Configuring and changing the firmware versions of the replacement XMx16 card

NOTE: Updating the firmware of a device (card or module) is a special task that can, if used unintentionally or incorrectly, lead to malfunctioning of the device and affect proper function of data acquisition.
For XMx16 cards, this can take up to 5 minutes.

It is highly recommended that firmware updates are only performed in accordance with the operating procedures for the machinery being monitored and that appropriate precautions are taken at the control system level (such as DCS or PLC).

For example, alarms and relay outputs should be ignored (bypassed or inhibited) in order to avoid false trips of the machinery being monitored.

NOTE: When changing the firmware of an XMx16 card, never do any of the following:
Turn the power supply to the device off.
Disconnect the device from the network.
Remove and re-insert (hot-swap) the device.
Always wait until a firmware change has been confirmed as successful (approximately 5 minutes) before continuing.

If the configuration and firmware versions of the replaced (existing) XMx16 card and the replacement XMx16 card are different, then the replacement XMx16 card should be updated to be same as the replaced XMx16 card.

Using the information recorded (noted down) in Establishing the configuration and firmware versions of the existing XMx16 card on page 3 for the replacement XMx16 card, follow the applicable steps described below:

1- Ensure that the power supply to the VM600 rack is turned on and that the rack is connected to the same network as the computer running the VibroSight software.

2- Start VibroSight System Manager.

3- In the System Explorer window, select the replacement  XMx16 card.

NOTE:	Normally, you should identify an XMx16 card by its serial number (xxxxxxx) as the IP address can be easily changed.

4- If required to change the IP settings for the XMx16 card, in the Actions window, click the **IP Settings** command in order to display the IP Settings dialog box and enter the information that was recorded (noted down) for each card of the replaced (existing) XMx16/XIO16T card pair.

Then click **Finish** to close the dialog box and continue.

5- If required to change the NTP settings for the XMx16 card, in the Actions window, click the **NTP Settings** command in order to display the NTP Settings dialog box and enter the information that was recorded (noted down) for the replaced (existing) XMx16 card.

Then click **Finish** to close the dialog box and continue.

6- If required to change the versions of firmware running on the XMx16 card, in the Actions window, click the **Change Firmware** command in order to display the Change Firmware dialog box.

Click the **Add** button and use the dialog box that appears to navigate the folders on the computer and select the required firmware file, then click **Open**.

The .tgz file is added to the list of firmware updates in the Firmware Files area of the Change Firmware window.

NOTE:	XMx16 card firmware files provided by Meggitt Sensing Systems can be identified by their .tgz file name extension.

NOTE:	The default firmware directory for VM600 XMx16 cards is: C:\Program Files\Meggitt\VibroSight 2\Firmware\VM600\XMx16 (These files are copied to the computer as part of the VibroSight software installation process.)

7- If two firmware changes are required (for example, both Base System and Firmware), repeat step 6 to add the second .tgz file.

8- Click **Finish** to start the firmware upgrade process.

The XMx16 card will disappear from the Devices tree-view of the System Explorer for the duration of the firmware upgrade process (approximately 5 minutes). When the firmware upgrade is complete, the XMx16 card will appear again.

Final checks

After replacing an XMx16 card in a VibroSight machinery monitoring system, the following checks are recommended to ensure that the system continues to operate as expected:

- Ensure that the STATUS and DATA LEDs on the front panel of the replacement XMx16 card are both green.

  Green STATUS and DATA LEDs indicate that one or more VibroSight Servers are connected to the XMx16 card and the card is acquiring data (therefore, the card has a valid configuration and is operating normally).

- Ensure that the VibroSight  Server software for the system does not display any unfamiliar messages concerning the replacement XMx16 card.

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.

In this publication, a dot (.) is used as the decimal separator and thousands are separated by thin spaces. Example: 12345.67890.

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