



Technical Note

MxMessageSystem

1. Abstract

The **MxMessageSystem** is a communication system where participants can send and receive messages. A message is distributed to all participants. The **MxMessageSystem** can be established over **MxBus-** and over **IP connections**.

The **MOBOTIX** cameras and in future the **MxDisplay+** can actively share the **MxMessageSystem** by receiving messages via **Events** and sending messages via **Actions-Profiles**. Beside this, the camera can act as **gateway only**, too. The latter means that messages are only routed from the **MxBus** to the **IP network** and vice versa.

The **MxMessageSystem** was developed in order to uncouple the camera from the **MxBus** module software. Future **MxBus** modules will work over the **MxMessageSystem** only.

Advantages of the **MxMessageSystem** are the reduction of configuration steps, as well as eliminating the limitation of **MxBus** modules being connected and used on the **MxBus** at the same time.

Verfasser	Berichtsname	Entwurf	Vers.	Schutz	Änderungsdatum	Datei	Seite
sbr	MxMessageSystem	0	1	0	Mi., 09. Sep.. 2015	20150730_TechNote_Messagesystem_EN	1/8

2. What is the MxMessageSystem?

The MxMessageSystem is a communication system based on name-oriented messages, where each participant receives the message, connected to MxBus or the IP network. A message must have a unique name with a maximum length of 32 Byte. Each participant can send and receive messages. In addition, MOBOTIX cameras and the MxDisplay+ can forward messages to their connected IP network. By this, the MxMessageSystem is spanned over the MxBus and IP network. So, there are two roles, participant and gateway. A maximum of 32 devices can share the MxMessageSystem over the IP network.

3. Which devices do currently support the MxMessageSystem?

Product	Type	Function	Information
x14, x24, x15, x25	Camera	Gateway and/or participant	> SW 4.3.4.50
MxDisplay	Display	X	not available
MxDisplay+	Display	Gateway and/or participant	available in future releases
MxKeypad	MxBus module	participant	
MxBellRFID	MxBus module	participant	
Mx-DoorMaster	MxBus module	participant	
IO-Module	MxBus module	X	not available
Mx-232-IO-Box	MxBus module	participant	Serial Interface via MxUSB only
Mx-GPS-Box	MxBus module	participant	
Mx-Input-Box	MxBus module	participant	
Mx-Output-Box	MxBus module	participant	
Mx-Proximity-Box*	MxBus module	participant	

* not available at the moment

4. How can a messages be defined in MxBus modules?

Precondition: The module must support the MxMessageSystem (ref. 3.) and must not be in classical mode either (ref. 7.3.)

In order to use MxMessages a message must be programmed first. Open the cameras "Admin-Menu --> Message Configuration for MxBus Modules" and hit the "Load configuration of connected devices" button.

- Go to "Edit messages" and create a new one. The message itself can be up to 32 Byte long and can contain all types of characters except ".", "/" or ". The scope of each message can be defined:
 - "Internal": Distribute to all devices on the MxBus. The camera does simply relay the message but does not react to it.
 - "Local": Within the camera (not transferred via the network). The camera does not simply forward the message it can react on such a message if configured, too.

- "Global": Across all cameras within the current LAN if the camera has been activated to distribute messages. (No VPN or firewall transmission possible at the moment).

Edit messages

- Link the previously defined message to either an input or output. If bound to an input, the message will be sent if the input condition is valid. If the message is linked to an output, the output will be switched if the message is being received.

Input 1

Input 2

Output 1

Output 2

This example toggles the output if the input is being triggered.

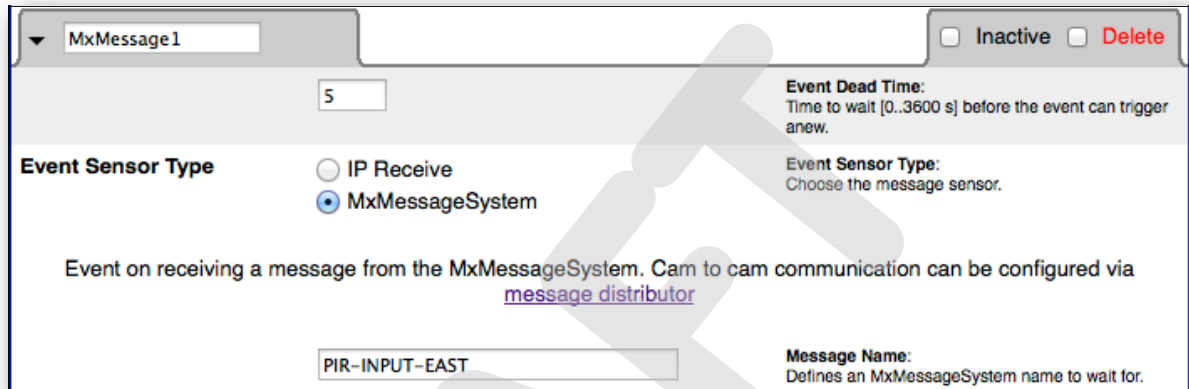
- Write the config either to a single device or, if more settings were made, to all of the connected devices at once.
- Parameter can be embedded in a message. This was already implemented for future purposes

5. How can a message be defined in cameras (camera is participant)?

The camera is able to send and receive MxMessages, too. The procedure is similar to IP-Notifies.

5.1. Camera as receiver

- Create a new event for the incoming message under:
"Setup Menu --> Event Overview --> Message Events"



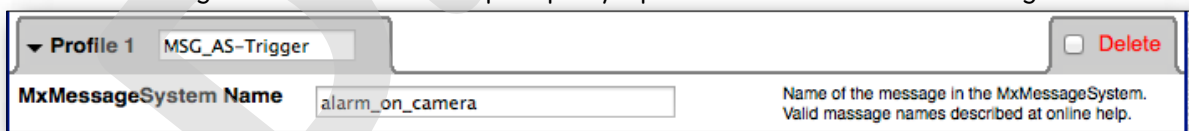
The screenshot shows a configuration window for an event named "MxMessage1". It includes a numeric input field with the value "5", an "Event Dead Time" description, radio buttons for "Event Sensor Type" (with "MxMessageSystem" selected), a descriptive text about receiving messages, a "Message Name" input field containing "PIR-INPUT-EAST", and "Inactive" and "Delete" buttons.

It is important to know that the message name must be equal to the message being sent by another device.

- This event profile can be used to trigger the recording or other actions.

5.2. Camera as sender

- Shall the camera act as a sender the following steps must be performed:
- A new message profile needs to be created and configured. This is being done in the camera's "Admin-Menu --> Message Profiles for Action Groups". Specify a profile name as well as the message.



The screenshot shows a configuration window for a message profile named "Profile 1 MSG_AS-Trigger". It features an "MxMessageSystem Name" input field with the value "alarm_on_camera" and a "Delete" button.

- Like all other actions the camera can do, the MxMessage must be combined with an event.
"Setup-Menu --> Action Group Overview"

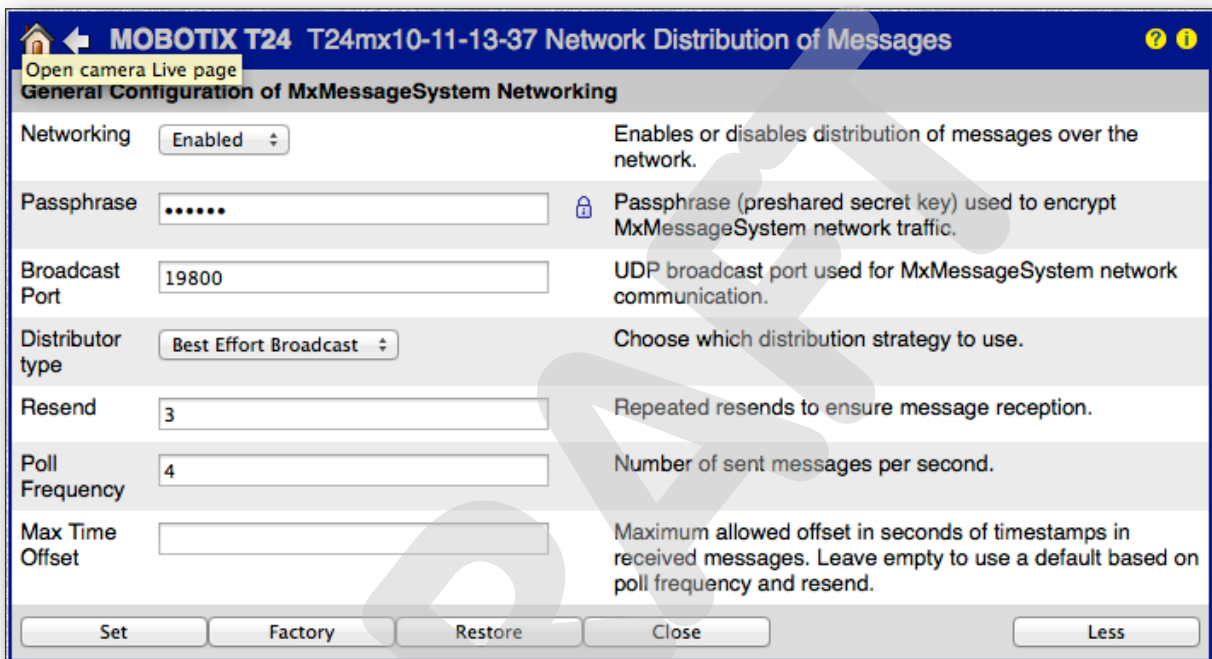


The screenshot shows an "Action" configuration table with columns for "Actions", "Value", and "Explanation".

Actions	Value	Explanation
Action 1	MxMessageSystem: MSG_AS-Trigger	Action Type and Profile: Select the Action Profile to be executed.
<input type="checkbox"/> Delete	0	Action Timeout: If this action runs longer than the time specified [0..3600 s], it is aborted and returns an error; 0 to deactivate.

6. How can the camera be configured as gateway?

If messages must be distributed not only on the local MxBus, the camera must forward those to other cameras. This feature must be actively enabled under "Admin-Menu --> Network Distribution of Messages". Two types of distribution methods are available. The „Best Effort Broadcast“. Messages are broadcasted through the entire network and each configured camera will receive the message. All cameras must be time synchronized with a maximum offset of two seconds, otherwise the message receiving is not certain.



MOBOTIX T24 T24mx10-11-13-37 Network Distribution of Messages

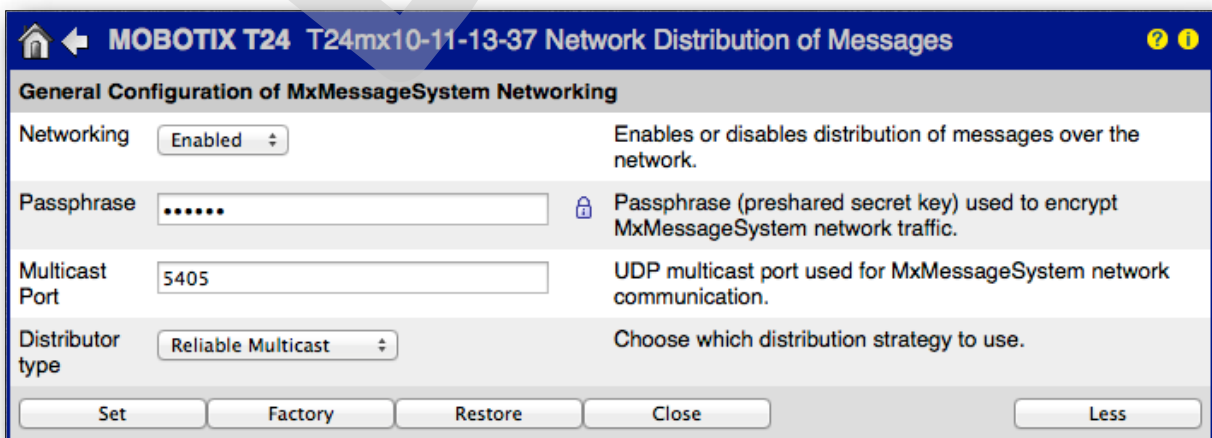
Open camera Live page

General Configuration of MxMessageSystem Networking

Networking	Enabled	Enables or disables distribution of messages over the network.
Passphrase	Passphrase (preshared secret key) used to encrypt MxMessageSystem network traffic.
Broadcast Port	19800	UDP broadcast port used for MxMessageSystem network communication.
Distributor type	Best Effort Broadcast	Choose which distribution strategy to use.
Resend	3	Repeated resends to ensure message reception.
Poll Frequency	4	Number of sent messages per second.
Max Time Offset		Maximum allowed offset in seconds of timestamps in received messages. Leave empty to use a default based on poll frequency and resend.

Buttons: Set, Factory, Restore, Close, Less

And the "Reliable Multicast" where the messages are distributed to up to 32 cameras even the cameras are not time synchronized.



MOBOTIX T24 T24mx10-11-13-37 Network Distribution of Messages

Open camera Live page

General Configuration of MxMessageSystem Networking

Networking	Enabled	Enables or disables distribution of messages over the network.
Passphrase	Passphrase (preshared secret key) used to encrypt MxMessageSystem network traffic.
Multicast Port	5405	UDP multicast port used for MxMessageSystem network communication.
Distributor type	Reliable Multicast	Choose which distribution strategy to use.

Buttons: Set, Factory, Restore, Close, Less





7. Important Information

7.1. General

- Number of messages per device is limited to 32
- The power offered through the MxBus is limited, depending on the used device as listed in the FAQ section.
- Number of gateways is limited to 32 devices if "Reliable Multicast" is activated
- Input-, Output- and Proximity-Box communicate via MxMessage only
- Mx232-IO-Box, MxKeypadRFID, MxBellRFID and the MxDoorMaster are able to handle MxMessages and classical mode simultaneously
- MxMessageSystem does not work via MxUSB
- Name-oriented Message: name must be unique
- Message length: max. 32 Byte

7.2. Analysis MxMessageSystem via LEDs of MxBus-modules

Error messages are being displayed on the left LED on each device.

Pattern	LED	Explanation
Green/Red/Off blinking		Uncrypted communication OK. Error in message system.
Blue/Red/Off blinking		Uncrypted communication OK. Message configuration exceeds the allowed size.
Green/red blinking		Communication OK. Error in message system.
Red/blue blinking		Communication OK. Message configuration exceeds the allowed size.

7.3. Classical Mode of MxBus-modules

What does the "Classical Mode" mean? It means that the used device is part of a door station application and/or the auto-configuration will use the device as described. The classical mode supports only one module per module type. Means, that for instance the simultaneous usage of two MxKeypads in classical mode on the same MxBus is not possible. The classical mode must be activated in the "Admin-Menu --> Manage MxBus Modules".

Devices					
Device Type	Serial Number	SW Version	HW Version	Use in Classic Mode	Status Details
MX-232-IO-Box	7019362	1.0.2.0	1.3	<input checked="" type="checkbox"/>	Running Deactivate
Termination				Off	



8. FAQ

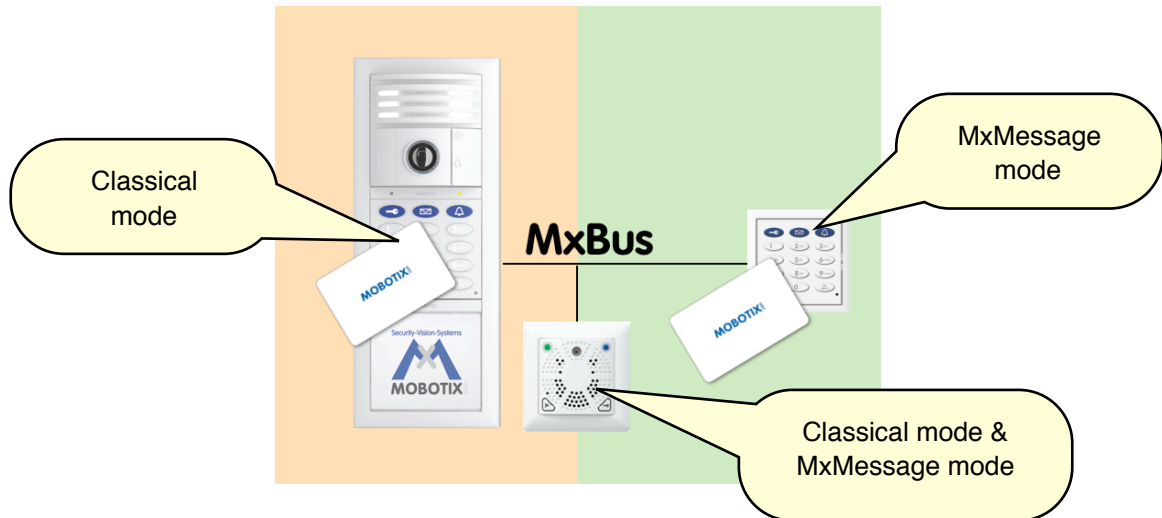
- Does M12 cameras support the MxMessageSystem?
 ==> No, the MxMessageSystem requires an MxBus connection as well as camera firmware >4.3.0.14. All features and the support of all modules is given with firmware version >4.3.4.50.
- How many watts does each MxBus module require?
 See technical data sheets.

Product	Type	Power Consumption max. (Watt)
MxKeypad	MxBus module	1
MxBellRFID	MxBus module	1
Info Module	MxBus module	0,5
Info Module Mx2Wire+	Ethernet	0
Mx-DoorMaster	MxBus module	1
IO Module	MxBus module	1
Mx-232-IO-Box	MxBus module	1
Mx-GPS-Box	MxBus module	1
Mx-Input-Box	MxBus module	1
Mx-Output-Box	MxBus module	1,5
Mx-Proximity-Box	MxBus module	1,5

- How many watts does a camera or the display provide on the MxBus?
 ==> This depends on the camera model:
 - c25, i25, p25: 1 Watt
 - D25, M25, T25: 3 Watt
 - D15, M15, S15, V15: 3 Watt
 - MxDisplay+: tbd.
- How much power does the MxBPA-Box offer?
 ==> 6 watt if it is powered with a power supply of 12-24V and 9 Watt if powered with 24V or more.
- In order to allow also 3rd party devices to talk MxMessages a SDK is currently under development.
- Is it possible to run multiple, for instance MxBellRFID or MxKeypadRFID modules simultaneously on the same MxBus?
 ==> Yes, this is possible, although limitations do exist:
 - The power consumption of the MxBus must be considered and must not be exceeded
 - Leaving messages is only possible on devices running in classical mode
 - Classical mode is required if time scheduled access is needed
 - Configuration of RFID tags must be done through the camera GUI

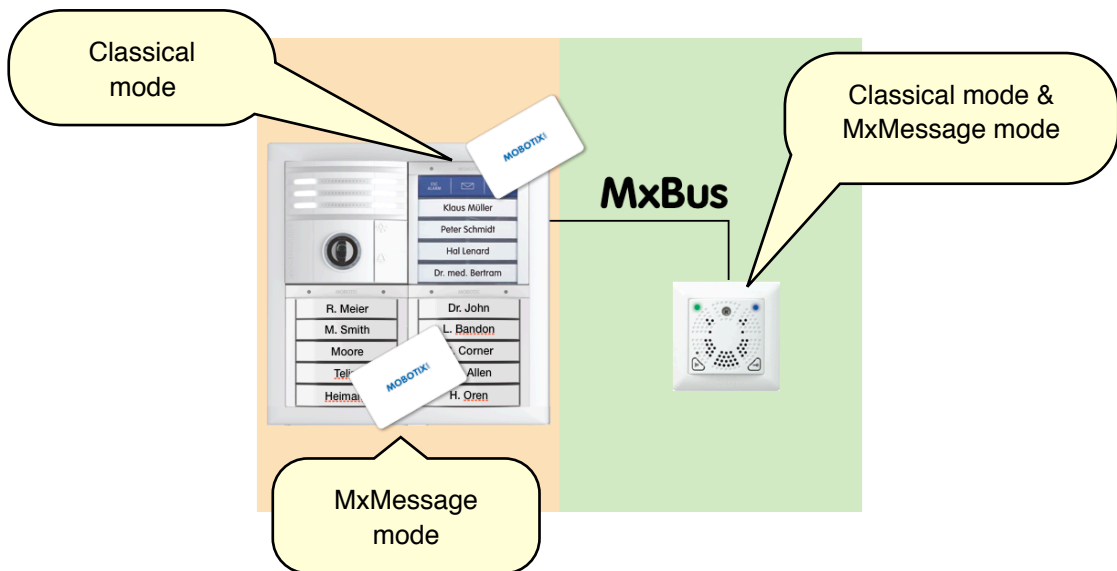
Examples:

1) Accessing and leaving a building is only possible with either a PIN code or an RFID tag.



The pin code on the second MxKeypadRFID must be confirmed with OK instead of the key button. Visitors may also use the T25 as a regular door station and therefore may leave also message. In order to do so the outer KeyRFID module must run on classical mode whereas the inner module must run on MxMessage mode.

2) Multiple door bells



Multiple MxBellRFID modules are possible, however, only one MxBellRFID must be assigned to the classical mode. This module must have the blue command bar. All other MxBellRFID modules must run in the MxMessage mode. They do not support the functions of the blue command bar e.g. leaving messages.