

M-BUS Master Application

User Manual

Version 1.0

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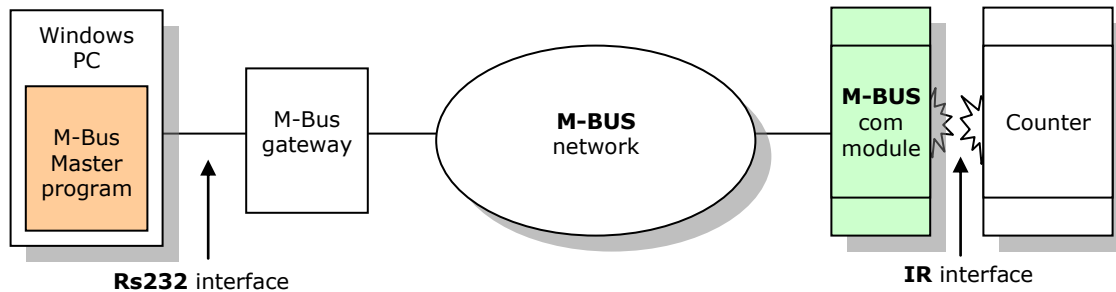
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2. Preface

2.1. System description

This document describes the usage of the **M-Bus master application**.

The **M-Bus master** software application gives an easy way to manage an M-Bus communication module. Even if the module can be completely controlled by a generic application, the present software hides for the most part the complexity of the M-Bus protocol and allow a better decoding of the quantities provided by the Counter connected to the module itself. Even more, it allows a diagnostic detection and it offers also the possibility to save the measures captured.



2.2. Hardware Requirements

To use this system you need at least:

- one com module connected to
- one electronic counter
- a M-Bus gateway (level converter)
- a Windows PC

2.3. Software Requirements

The application is developed for Windows and consists in a simple executable file. It doesn't require any installation procedure. The minimum requirements are:

- Windows XP/2000
- Microsoft .NET Framework ver. 1.1

3. Get ready in few steps

3.1. Preliminary checks

In order to use successfully the present application, we assume that you are working with a system like the one introduced in the paragraph 2.1. Then be sure that:

- All the physical links are operating
- The gateway, the communication module and the counter are powered-on

3.2. Application start-up

Copy the executable file of the application in your working folder and run it. Once in the application, you will see a sequence of panels, briefly described below:

PANEL	DESCRIPTION
COUNTERS	Management of the Interface database.
READINGS	Readings control. Window to show the current readings snapshot.
CONFIGURATION	Interface settings through the M-Bus protocol
COMMANDS	Energy counters reset. Selection of sub-parameters. M-Bus protocol maintenance functions.
COMMUNICATION	Monitor window to display the data in raw format
STORAGE	Reading storage management

In the configuration panel, **select the right COM port** you plan to use to communicate with the M-Bus gateway. Select also the right speed (by default, the interfaces are set to work at 2400 baud).

3.3. Adding a new interface

This paragraph described how to add new com modules into an M-Bus network.

Method 1

- ✓ Go to the counter panel
- ✓ Enter a convenient alias name for the interface
- ✓ Enter the interface ID (present on the module label)
- ✓ Press the ADD button (in the management section)
- ✓ Go to the configuration panel
- ✓ Select from the interface list box the interface just added
- ✓ Select the set primary address radio button
- ✓ **Enter a valid M-Bus primary address**
 - Please note that each interface comes with the default primary address 00. You have to change it by the configuration panel to avoid conflicts.
- ✓ Press the send button



Tip!

If you have more than one module to add to the M-Bus network, you can first make a physical connection of all the modules and then configure them one by one. It is possible because the method 1 is based on unambiguous addresses (the interface IDs).

Method 2

- ✓ Go to the counter panel
- ✓ Run the automated procedure for discovering M-bus devices
- ✓ Once it succeeds, enter a convenient alias
- ✓ Press the ADD button (in the discover interfaces section)

The counter is added with its default settings (its interface ID; primary address 00).

Please note that each interface comes with the default primary address 00. You have to change it by the configuration panel to avoid conflicts.



Warning!

The research process used by this automated method is based on the M-Bus primary address.

*By default, each communication module has primary address 00 o, in order to use this **method you have to connect every interface one by one to the physical link**, otherwise more than one interface will answer to the same poll request.*

3.4. read out the values

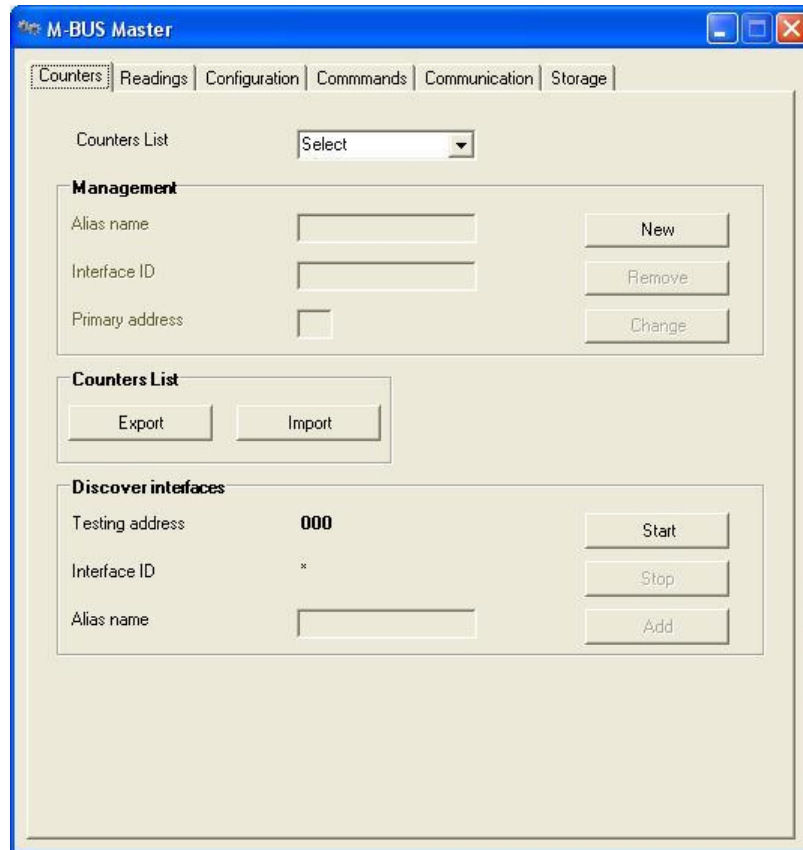
- ✓ Go to the readings panel
- ✓ From the interface list box select the wanted interface
- ✓ Press the read out button to get a new measure snapshot

4. Basic functions

The basic functions allow you to:

- Handle the local database of the communication modules
- Perform the research of new modules
- Read out snapshots of the measures provided by the counters connected to the communication modules
- Make the essential configuration of the M-Bus parameters for each module

4.1. The counters panel



4.1.1. Management

All the operations made in this section affects a local database of the interface (a simple XML file created in the working folder of the application). The communication on the M-Bus network is not involved here.

New

The new button allow you to add a new interface.

Once clicked, you have to enter an alias name, for an easy identification of the interface, and the interface ID (written on the communication module label). You will have to assign the M-Bus primary address by the configuration panel (see below).



Tip!

If you have more than one module to add to the M-Bus network, you can first make a physical connection of all the modules and then configure them one by one using the new button. Then go to the configuration panel and, for each interface, change the primary address (see **par. 4.2.2**).

Remove

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This button allow you to remove an interface from the local database. You have first to select the wanted interface from the interface list-box.

Change

The change button allow you to make changes to the database. We have here two possibilities:

Case 1: you don't have configured yet the primary address.

All the operation made on the interface were made locally. You can change both the alias and the interface ID.

Case 2: you have already assigned the primary address.

You have already made a communication with the remote interface In order to avoid any possible mistake, you can only change the alias name.

4.1.2. Interfaces list

As told before, the local database of the communication interfaces is stored locally into an XML file. If you want install the M-Bus master application on different PCs, can be useful to transport the database from a station to another one. Click to the **export** button if you want to easily access to the XML file of your original PC in order to saving it somewhere. Then, on the target PC, click on the **import** button and find out the location where you have previously exported the XML file.

4.1.3. Discover interfaces

There is an embedded research function for the detection of the new interfaces. The method consists of a process that scan the M-Bus network starting from the primary address 00. The start button **run** the process. Once the process finds out a new interface, it ask you whether or not you want to **add** the new interface to the local database. In case yes, you have to fill-in the alias textbox with a convenient string. In case not you have to decide whether (**continue**) or not (**stop**) to proceed with the scanning process.

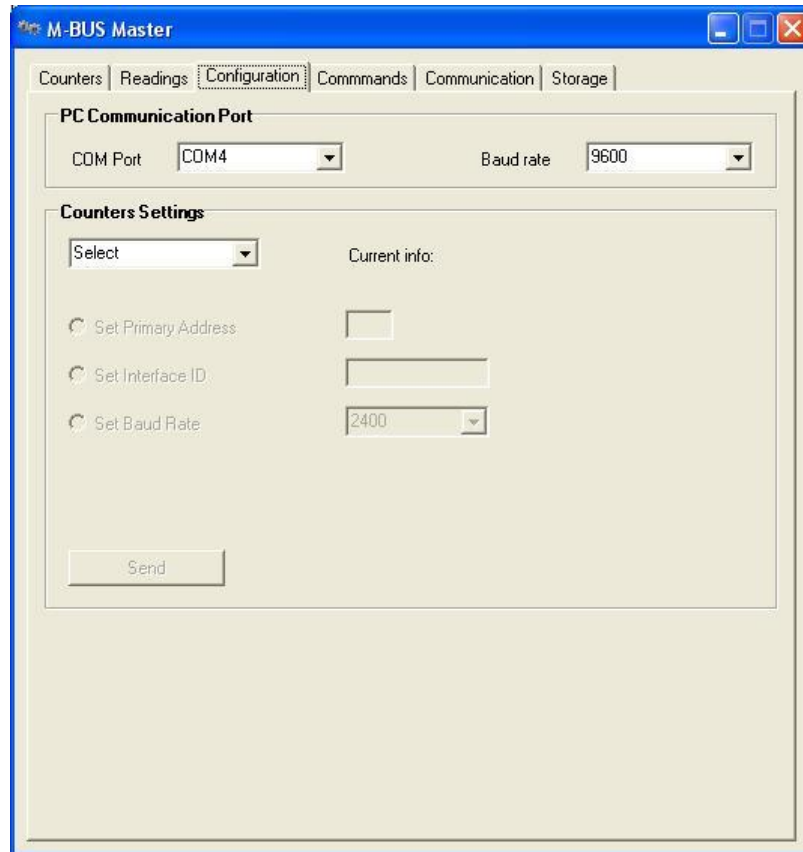


Warning!

The research process used by this automated method is based on the M-Bus primary address.

By default, each communication module has primary address 001 so, in order to use this method you have to connect every interface one by one to the physical link, otherwise more than one interface will answer to the same poll request.

4.2. Configuration



4.2.1. COM Port

The first section of the configuration panel allow you to select which COM port is dedicated to the communication with the M-Bus gateway. It allows also to select the speed in use on your M-Bus network.

4.2.2. Interface parameters

This second section allow the configuration of a specified communication module.

Before setting any parameter, you have first to select the module you want to configure from the module list box. Once selected a module, you can:

- Set/change the primary address
- Change the Interface ID
- Change the communication speed

Primary address

When you select an interface from the list box, the set primary address radio button is automatically checked. You probably would have to work with this configuration function when:

- You have added manually a new interface and you have to set the its primary address.
- You have added a new interface with the automated procedure and you have to set a primary address different from the default.

Note that to work with an interface for reading the values, a primary address is necessary (and probably it would be different from the default 00!).

Interface ID

The program allow also to change the interface ID. This parameter is otherwise known as secondary address in the M-Bus

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literature. A modification of this parameter is not strictly required, because the secondary address is unique for each communication module, so: be very careful if you plan to change it!

Anyway, by this command you won't be able to change some fixed part of the product identification (like, for example, the manufacturer, that's a component of the whole secondary address).

Baud rate

By this function, you can change the communication baud rate to comply your network behaviour.

Note that in case of changing, you have to keep track of the setting for each module (if they work on different speed) because the program doesn't save it.

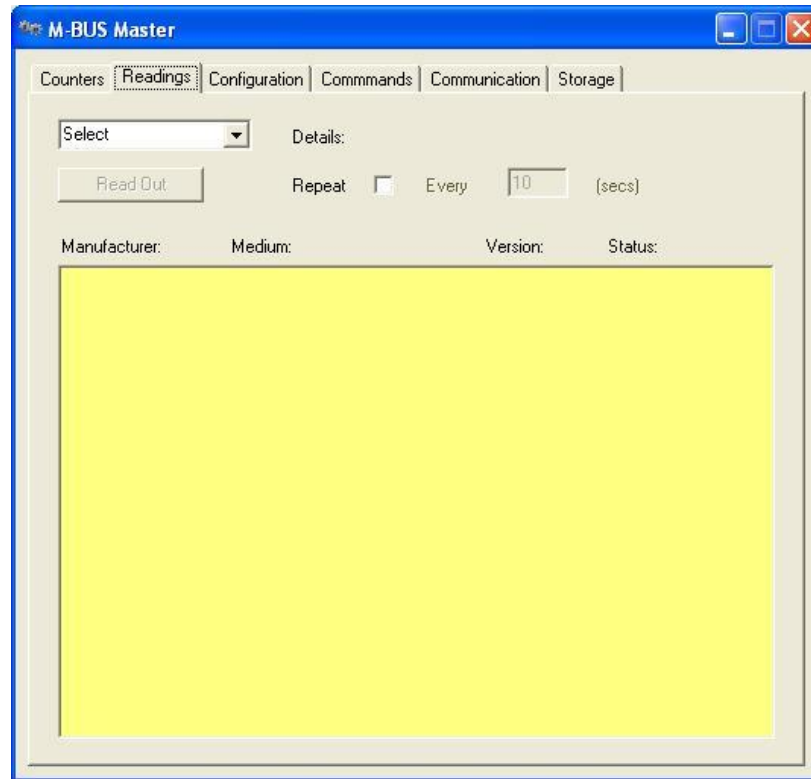


Tip!

If you aren't able to access anymore to a specified interface, probably one or more parameters are different from what you expect (perhaps due to a wrong configuration).

You can reset the interface to its default behaviour by the reset button placed on the module front panel. (Please refer to the paper user guide for details about the default settings).

4.3. Readings



This panel handles the communication with the M-Bus modules to get out the measures captured by the electronic counters. You can control one interface at time by selecting it from the interface list box. Once selected the wanted interface, just click to the **readout** button to get a new snapshot.

In case of success, the values with a clear description are displayed in the yellow window. Some other general information are also shown:

- The device type
- The device manufacturer code
- The medium under control (always electricity)
- The interface version number
- The M-Bus protocol state (in case it is not OK, we suggest to perform a reset by the button placed on the interface front panel).

On failure, a error message with an indication of the possible problem is displayed.

To perform a **continuous readings**, flag the "repeat" check-box and, in case, enter the poll timeout value with your convenience. This option is useful, for example, in junction with the storage feature (see the advanced functions chapter for details).

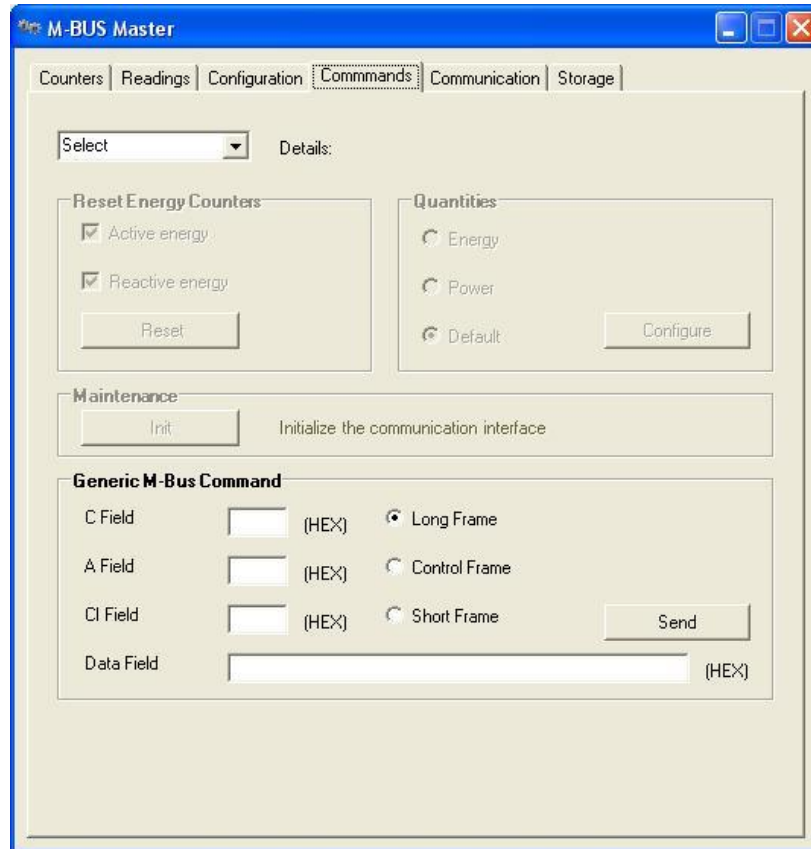


Warning!

*The M-Bus protocol supports frames 256 bytes long. This size is vastly less then the amount of data provided by some of the counters (the three-phase counters). That's why the interface sends by default only a subset of all the quantities available.
Please refer to the commands paragraph (5.1.2) to have more information about how to customize the list of quantities.*

5. Advanced functions

5.1. Commands



The commands panel collects a list of functions useful at runtime to manage the behaviour of the M-Bus interface and the behaviour of the measuring instrument attached to the interface.

Concerning the counter, you can:

- Require the reset of the internal energy counters (active and reactive energy)

Concerning the interface you can:

- Select the quantities that the interface has to send
- Reset the M-Bus protocol state by a maintenance command
- Send to the interface a generic M-Bus command (a deep knowledge of the M-Bus protocol itself is strongly recommended)

In order to perform any command, you have first to select your target from the interface list box.
Note that, in any case, you will be prompted for a confirmation.

5.1.1. Resetting the energy counters

The first section allow to reset the energy registers internal to the measuring instrument connected to the M-Bus interface. Just check the type of registers you want to reset (the ones related to the active energy, the ones for the reactive energy or both) and click to the reset button.

5.1.2. Handling the parameter set

As stated in the paragraph dedicated to the readings, the amount of measures available exceeds in some case the M-Bus protocol data packet size. The M-Bus interface must comply this limit and therefore it truncates any information that eventually exceed it. By default, however, it handles only a defined subset of quantities in order to send data frames less than 256 bytes long.

If you want to change the default behaviour asking the interface to send some quantities different from the ones sent by default, you can follow two ways:

- You can use the present application to enable some predefined and limited subsets
- You can use any commercial application that support the M-Bus protocol to work with any single quantity. In this case, please refer to the M-Bus protocol reference manual for a detailed description of the commands available to force the transmission of a customized subset of quantities.

The application supports the following settings

- Default profile: transmission of the most relevant quantities (active energy and power, current, voltage, power factor, frequency).
- Energy profile: enable the transmission of details related to the energies (active exported, reactive tariff 1 and 2, imported and exported).
- Power profile: transmission of details about instantaneous quantities (active and reactive power, power factor, current, voltage, chained voltage, frequency).

Note that some important differences may occur if you are using an M-Bus interface Type 1 (energy counter) or type 2 (analyzer) because the first one handles only the energy quantities.

Profile	Interface type	
	1 - Energy counter	2 - Analyzer
Default	Active energy T1, T2 (imported) Active Power Tariff in use Status	Active energy T1, T2 (imported) Active Power Voltage Current Power factor Frequency Tariff in use Status
Energy	Active energy T1, T2 (exported) Reactive energy T1, T2 (imported, exported) Tariff in use Status	Active energy T1, T2 (exported) Reactive energy T1, T2 (imported, exported) Tariff in use Status
Power	* Not supported *	Active Power Reactive Power Voltage Chained Voltage (with three phase counter only) Current Power factor Frequency Tariff in use Status

5.1.3. Protocol maintenance

In case of problems with the M-Bus protocol communication, you can try a reset of the network protocol state by the Init command. It initializes the protocol at data link level for the selected interface (SND_NKE command)

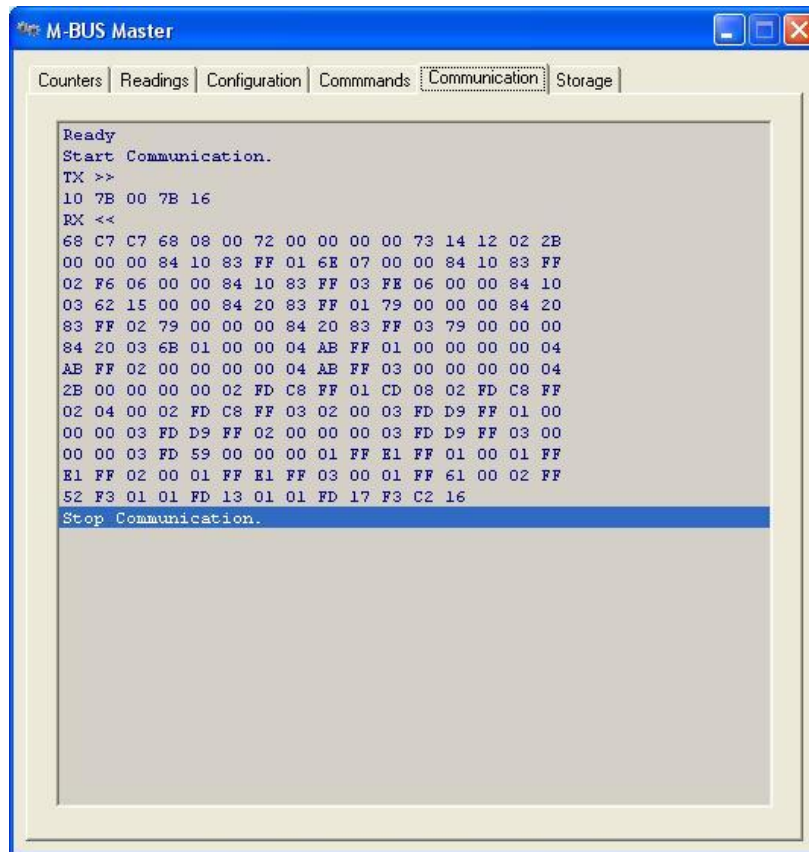
5.1.4. Generic M-Bus command

The last section allow you to send a generic M-Bus command to one device in the network.

Here, you can build-up a frame filling the necessary fields with free values.

A good knowledge of the M-Bus protocol is of course required and, in any case, the result of the requested actions are completely under the user's responsibility.

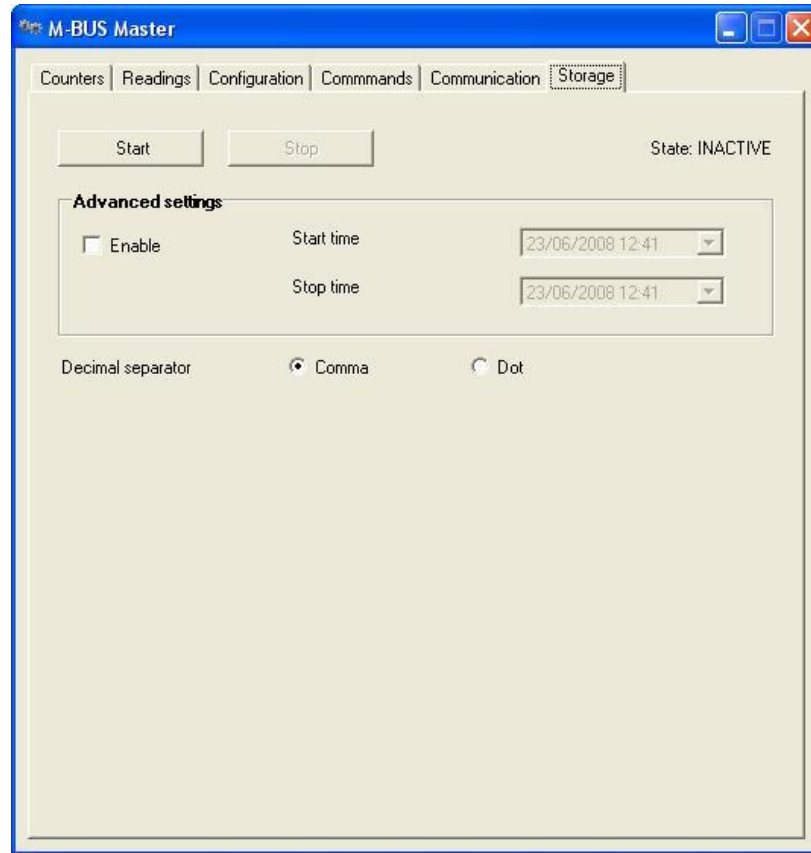
5.2. Communication



The communication panel is dedicated to a monitor window which displays a dump of the data sequence exchanged on the M-Bus network between the application and the remote interfaces. It can be useful mainly for diagnostic or to improve the knowledge of the M-Bus communication.

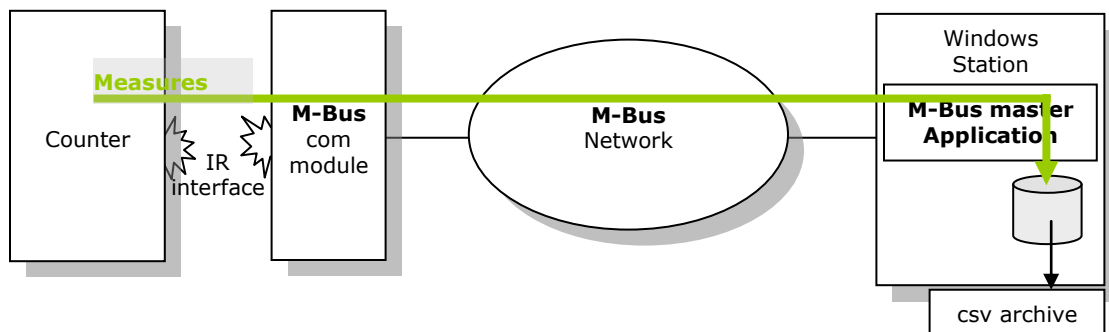
For the interpretation of the raw sequences dumped, a knowledge of the protocol is required.

5.3. Storage



This panel controls the storage feature that allow you to store the incoming measures into .csv (comma separated values) archives that can be imported into the most common applications (like for example Microsoft Access and Microsoft Excel). The storage works in junction with the readings functionality:

- Go to the storage panel and enable the function (see below for details)
- Go to the readings panel, select the wanted interface and click the readout button (eventually flagging the repeat checkbox to enable continuous readings)



Path of the measured data.

All the .csv files are created in the M-Bus master application working folder. Each file has a name automatically assigned using the alias name entered into the local interface database.

5.3.1. Main controls

Start button: enable the storage

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Stop button: stop the storage process

An information label placed at the top right corner of the panel, reports the current state of the storage process.

5.3.2. Advanced settings

The program offers the possibility of a time controlled storage activity enabling the “advanced settings” section and selecting from the boxes the initial and the final date and time.

If you leave the start and the stop time at the same value, the storage will remain always active.

To enable the advanced settings section, you have to flag the enable check-box.

5.3.3. Decimal separator

Due to the international conventions concerning the numerical data formats, you may want to select the decimal separator (comma or dot). The decision involves only the data saved into the .csv files.