iSMA-B-AAC20

User Manual

M-Bus Network

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1 Introduction

This manual contains information about M-Bus protocol in the iSMA-B-AAC20 controllers. M-Bus devices can be connected directly only to the iSMA-B-AAC20-M hardware version with M-Bus interface (max. 20 devices) and with firmware version 5.1 and above. The M-Bus devices can be also connected to all iSMA-B-AAC20 controllers with firmware 5.1 and above using M-Bus-IP gateway.

1.1 Revision history

Rev	Date	Description
1.0	22.11.2016	• First edition
1.1	20.04.2017	• Added action "Reset Stat" in network components

2 M-Bus kit

To serve M-Bus protocol (both connected to Local interface or by IP gateway) the iSMA-B-AAC20 controller uses iSMA_MBus kit.

2.1 Importing bundle with kits

Before installation M-Bus kit, one has to add bundle of kits to the WorkPlace (possibly as a part of the package of various kits in a zip file). To add the M-Bus kit:

Step 1: Open Work Place, expand Tools and then choose Sedona Installer;

Step 2: In the Sedona Installer, choose Import Sedona environment files;

Step 3: Add bundle of kits, click Next and Import;

Step 4: Your package imports successfully.
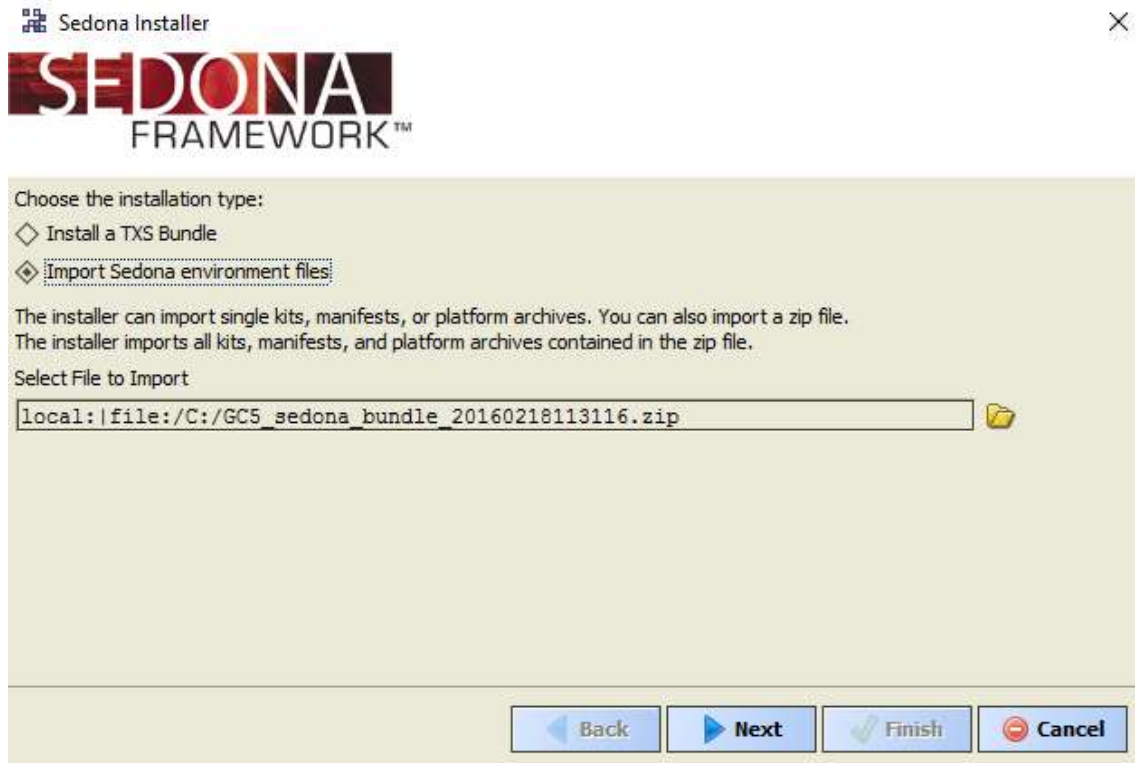
Figure 1 – Sedona Installer

2.2 Install kits in AAC20 device

After successful import all packages, upload the files to your device using the Kit Manager Application from the Sedona Tools.

WARNING! Before programming M-Bus, please check if you are using the latest kit version. The latest kits are available on GC5 support website: www.support.gc5.pl

To install selected components:

Step 1: Open Work Place, expand Sedona Application, then Sedona Tools and then double click Kit Manager;

Step 2: In the Kit Manager, you can manage your kits on the Sedona device;

Step 3: Select M-Bus or any other kit, then you can click Next, Finish and Restart Device;

Step 4: Your components install successfully.

Figure 2 - Kit Manager installing M-Bus kit

2.3 Remove M-Bus kits

To remove selected components:

Step 1: Open Work Place, expand Sedona Application, then Sedona Tools and then choose double click Kit Manager;

Step 2: In the Kit Manager, you can manage your kits on the Sedona device;

Step 3: Uncheck iSMA_Mbus or any other kit, then you can click Next, Finish and Close;
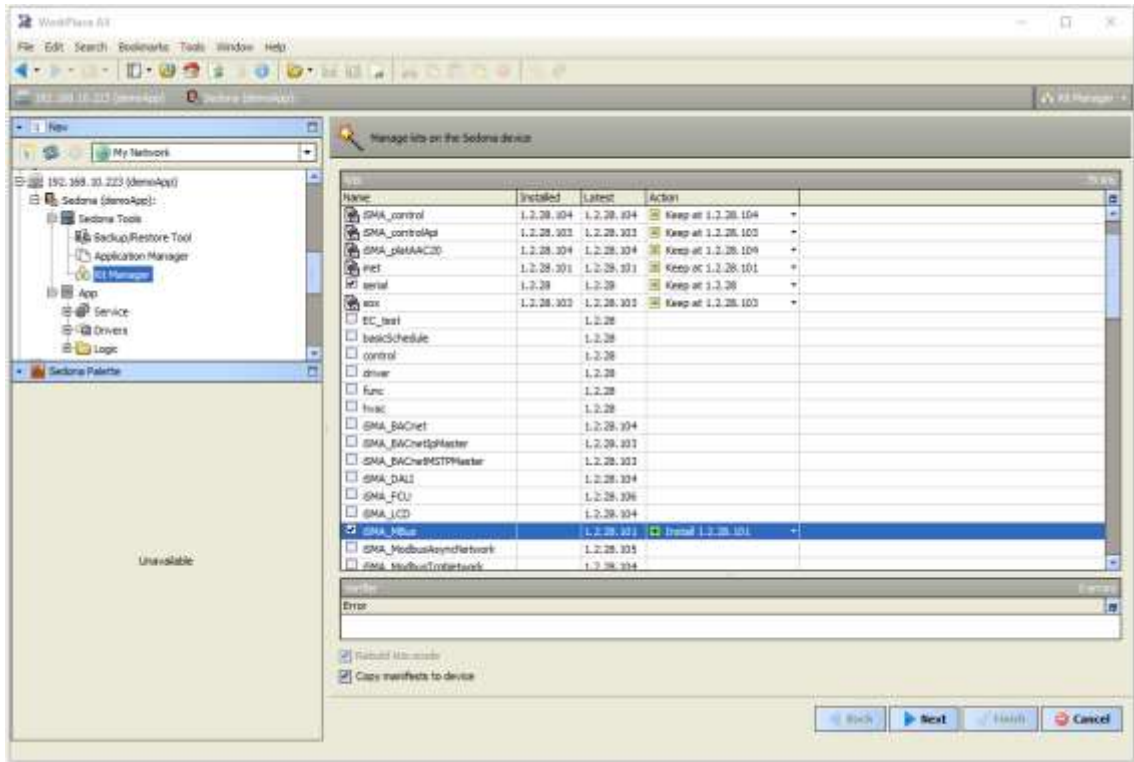
Step 4: Your components uninstall successfully.
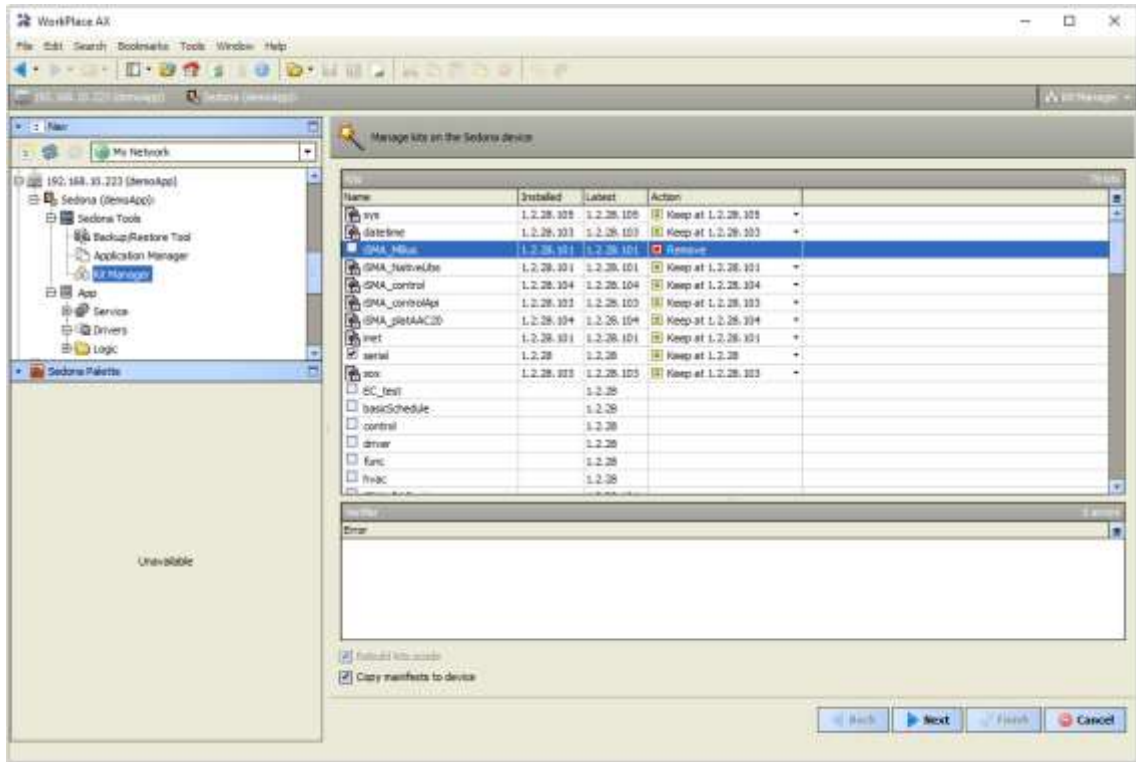
Figure 3 - Kit Manager removing M-Bus kit

3 About M-Bus

The M-Bus (Meter Bus) was developed to fill the need for a system for the networking and remote reading of utility meters, for example to measure the consumption of gas or water in the home. This bus fulfills the special requirements of remotely powered or battery driven systems, including consumer utility meters. When interrogated, the meters deliver the data they have collected to a common master, for example, DDC controller or a hand-held computer, connected at periodic intervals to read all utility meters of a building.

3.1 M-Bus topology and cable

The M-Bus is a hierarchical system, with communication controlled by a master (for example the iSMA-B-AAC20-M). The M-Bus consists of the master, a number of slaves (end-equipment meters) and a two-wire connecting cable. The slaves are connected in parallel to the transmission medium - the connecting cable.

Figure 4 - M-Bus connection topology

A two-wire cable (jYStY N*2*0.8 mm) is used as the transmission medium for the M-Bus. The maximum distance between the s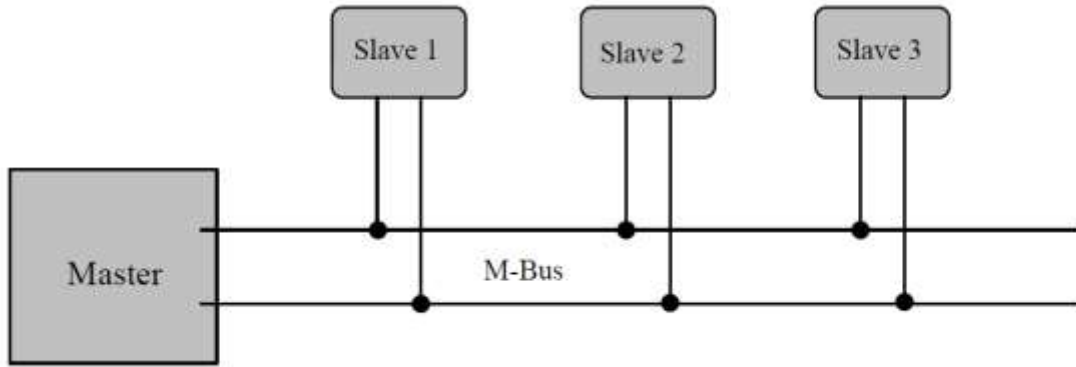lave and the repeater is 350 m; this length corresponds to a cable resistance of up to 29 Ω. This distance applies for the standard configuration having baud rate between 300 and 9600 baud rate, and maximum of 250 slaves. The maximum distance can be increased by limiting the baud rate and using fewer slaves, but the bus voltage in the Space state must at no point in a segment fall below 12 V, because of the remote powering of the slaves. In the standard configuration the total cable length should not exceed 1000 m, in order to meet the requirement of a maximum cable capacitance of 180 nF.

3.2   M-Bus addressing

M-Bus devices are using two types of addressing:

Primary – This address is assigned by user in commissioning process (all new M-Bus devices have this address, set by factory to 0). This type of address has limited range from 0 to 250.

Secondary – This address has wider range than primary and in default contains device serial number. All out of box devices connected to the bus have unique secondary address.

4 M-Bus kit components

M-Bus kit contains two types of communication:

Local Device – for devices connected directly to the iSMA-B-AAC20-M (this connection required special hardware version equipment with the M-Bus interface). This type of communication is using two components:

- MbusLocalNetwork – Main component responsible for handling local interface,
- MbsuLocalDevice – Component responsible for handling devices connected to local interface.

IP Device – for devices connected by M-Bus-IP gateway (for all types of hardware version):

- MbusIPNetwork – Main component responsible for connection to the M-Bus-IP gateway,
- MbsuIPDevice – Component responsible for handling devices connected to the M-Bus-IP gateway.

iSMA_Mbus kit has not devices points components available for user's use. The devices points are added automatically during points discover process.

This kit contains component MbusFolder to segregate the devices and points. For WorkPlace user, this component has special view which help to manage devices and points.

4.1   M-Bus Local Network component

This component is responsible for servicing M-Bus devices connected directly to the iSMA-B-AAC20-M M-Bus interface. The max. number connected to the iSMA-B-AAC20 is 20 and this is hardware limitation (built in M-Bus power supply).
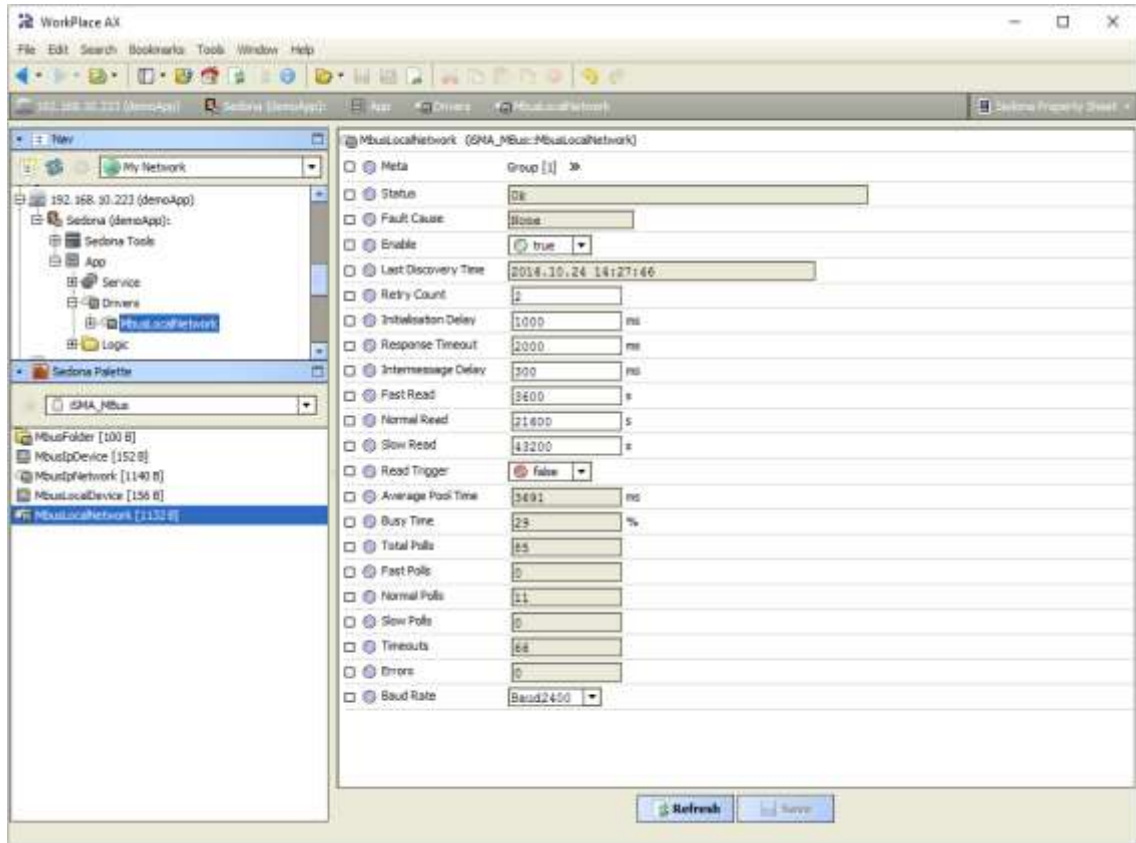

Figure 5 - M-Bus Local Network property sheet view

This component has the following actions:

Search Primary Address – Discover devices connected to the M-Bus Local interface by primary address.
Note: WorkPlace user can install special view for this kit and enter searching range.
- In action pop up window user can enter finally range of Primary Address. In this case, searching will start from 0 to entered address (max number 250).
- User can also enter searching rage in action pop up window by doing simple calculation:
Range Number = Start Address * 256 + End Address, for example to search range from 10 to 20 user must enter 2580 (10*256 + 20=2580).
WARNING! All new devices have default Primary Address set to 0, it is recommended to search by Secondary Address for new devices.

Search Secondary Address – Discover devices connected to the M-Bus Local interface by Secondary Address. This address contains device serial number assigned in factory. This action is recommended for the first bus commissioning.

Read Network – Force devices data read,

Reset Stats – Reset network statistic and start calculating from 0.

The component has the following slots:

Status – Component current status,

Fault Cause – Fault cause description,

Enabled – Enable/Disable M-Bus Local Network,

Last Discovery Time – Last success discovery action time,

Retry Count – Max. error messages (CRC error, lost messages) before device down,

Initialization Delay – Delay time after initialization message,

Response Timeout – Max. device responses time from device request,

Inter Message Delay – Time between messages sending to device,

Fast Rate – Time between device read in „Fast" mode poll frequency,

Normal Rate – Time between device read in „Normal" mode poll frequency,

Slow Rate – Time between device read in „Slow" mode poll frequency,

Read Trigger – Remote force device data read trigger,

Average Poll Time – Status of average time for sending/receiving one message,

Busy Time – Status of percentage of M-bus network usage,

Total Polls – Status of total number of messages,

Fast Polls – Status of number of messages in sending „Fast" mode,

Normal Polls – Status of number of messages in sending „Normal" mode,

Slow Polls – Status of number of messages in sending „Slow" mode,

Timeouts – Status of number of lost messages, the difference between sending and receiving messages,

Errors – Status of number of error messages (for example with wrong CRC),

Baud Rate – Default network M-Bus Local port baud rate, available options: 300, 600, 1200, 2400, 4800, 9600, 19200, 38400.

Parameters like: Retry Count, Initialization Delay, Response Timeout, Inter Message Delay and baud rate are used in device discover action. If it is required those parameters in the devices can have the different settings than network (the devices connected to the bus can have the different communications parameters).

4.2   M-Bus Local Device

M-Bus Local Device is component for servicing M-Bus devices connected to the iSMA-B-AAC20-M M-Bus interface (this connection required special hardware version equipment with M-Bus interface).

There are two ways to add M-Bus Local Device to application:

Manual – By drag and drop from Sedona Palette to network component. In this case, user must know M-Bus device address (Primary or Secondary).

Automatically – By using discover action in network component. For the first commissioning it is recommended to use search by secondary address. And then assign Primary Address. All new devices have factory default Primary Address set to 0.

WARNING! ALL discovered devices are placed in DiscoveredDevices folder. In this folder devices are read <u>only once</u> and for normal use and read they must be moved from this folder and placed directly or to another MbusFolder under MbusLocalNetwork component.
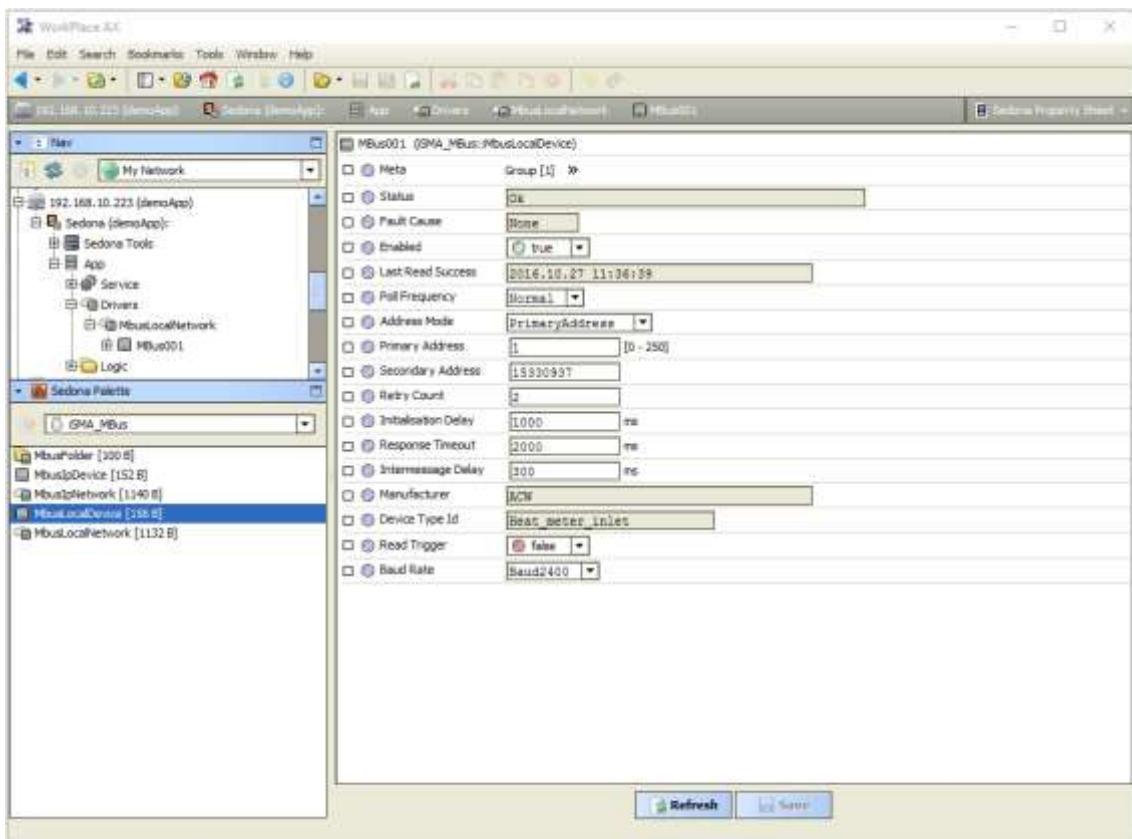
Figure 6 - M-Bus Local Device property sheet view

This component has the following actions:

Read – Force device data read,

Set Primary Address – Set Primary Address to the device (range from 0 to 250), this action automatically set Address Mode to Primary Address,

Discover Points – This action decodes device message and creates points according to device specification.

The component has the following slots:

Status – Component current status,

Fault Cause – Fault cause description,

Enabled – Enable/Disable M-Bus Local Device,

Last Read Success – Last proper success device read time,

Poll Frequency – Device read frequency (times defined in network component),

Address Mode – Define device communication type address (Primary or Secondary),

Primary Address – Device Primary Address,

Secondary – Device Secondary Address,

Retry Count – Max. error messages (CRC error, lost messages) before device down,

Initialization Delay – Delay time after initialization message,

Response Timeout – Max. device responses time from device request,

Inter Message Delay – Time between messages sending to device,

Manufacturer – Manufacture description read from device (read only),

Device Type Id – M-Bus Device Type ID read from device (read only),

Read Trigger - Remote force device data read trigger,

Baud rate – Device read baud rate available options:
300, 600, 1200, 2400, 4800, 9600, 19200, 38400.

4.2.1 M-Bus Local Device points

iSMA_Mbus kit has not devices points components available in Sedona Palette for user's use. The devices points are added automatically during the points discover process. In discover process, the response message is decoded and based on this information the iSMA-B-AAC20 creates corresponding points components. iSMA_Mbus kit is using two types of components:

Numeric – for numeric values,

String – for other values than numeric like description, time etc.

Note: M-Bus device always responses by full message, so the number of components has not influence on network traffic. To maintain order user can delate unused components.

4.3   M-Bus IP Network

This component is responsible for servicing M-Bus devices connected to the iSMA-B-AAC20 controller by IP network and IP-M-Bus gateway. The max. number connected to the bus is limited by gateway specification.

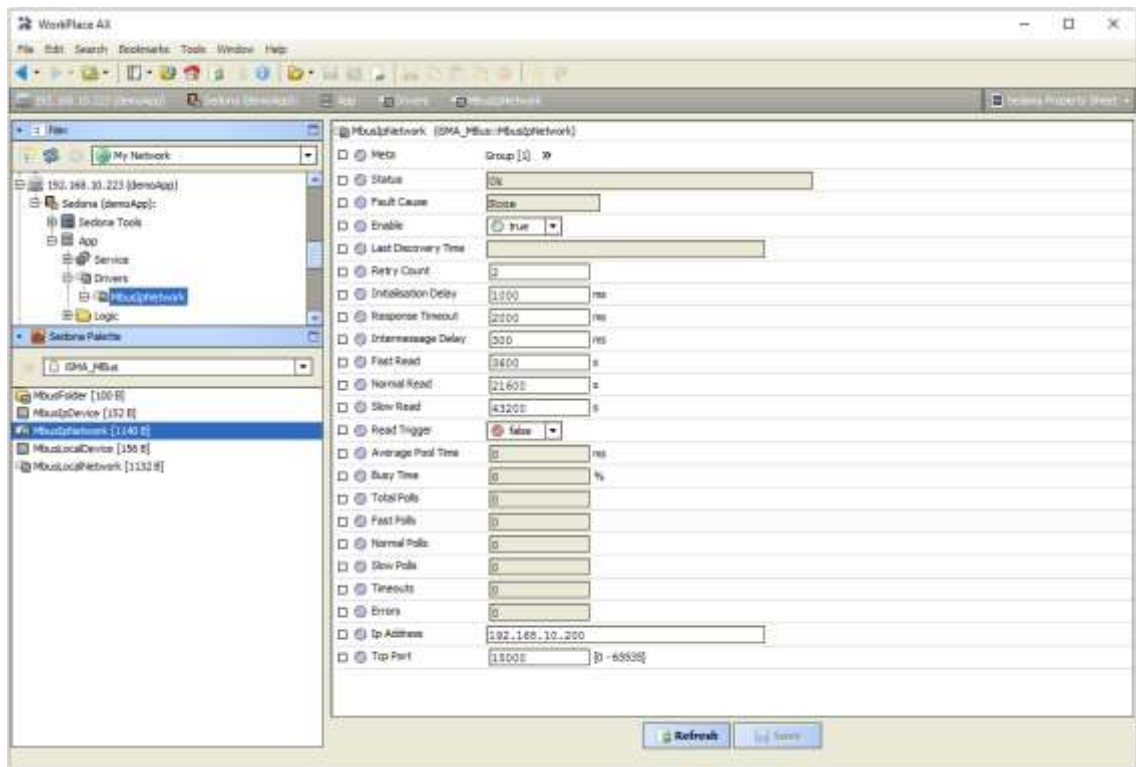*Figure 7 - M-Bus IP Network property sheet view*

This component has the following actions:

Search Primary Address – Discover devices connected to the M-Bus Local interface by Primary Address.
Note: WorkPlace user can install special view for this kit and enter searching range.
- In action pop up window user can enter finally range of Primary Address. In this case searching will start from 0 to entered address (max number 250).
- User can also enter searching range in action pop up window by doing simple calculation:
Range Number = Start Address * 256 + End Address, for example to search range from 10 to 20 user must enter 2580 (10*256 + 20=2580).

WARNING! All new devices have default Primary Address set to 0, it is recommended to search by Secondary Address for new devices.

Search Secondary Address – Discover devices connected to the M-Bus Local interface by Secondary Address. This address contains part of the device serial number and is assigned in factory. This action is recommended for the first bus commissioning.

Read Network – Force devices data read,

Reset Stats – Reset network statistic and start calculating from 0.

The component has the following slots:

Status – Component current status,

Fault Cause – Fault cause description,

Enabled – Enable/Disable M-Bus Local Network,

Last Discovery Time – Last success discovery action time,

Retry Count – Max. error messages (CRC error, lost messages) before device down,

Initialization Delay – Delay time after initialization message,

Response Timeout – Max. device response time from device request,

Inter Message Delay – Time between messages sending to device,

Fast Rate – Time between device read in „Fast" mode poll frequency,

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Read Trigger – Remote force device data read trigger,

Average Poll Time – Status of average time for sending/receiving one message,

Busy Time – Status of percentage of M-bus network usage,

Total Polls – Status of total number of messages,

Fast Polls – Status of number of messages in sending „Fast" mode,

Normal Polls – Status of number of messages in sending „Normal" mode,

Slow Polls – Status of number of messages in sending „Slow" mode,

Timeouts – Status of number of lost messages, the difference between sending and receiving messages,

Errors – Status of number of error messages (for example with wrong CRC),

IP Address – Gateway IP address,

TCP Port – Gateway TCP IP port number.

Parameters like: Retry Count, Initialization Delay, Response Timeout and Inter Message Delay are used in device discover action. If it is required those parameters in devices can have the different settings than network (devices connected to the bus can have the different communications parameters).

4.4   M-Bus IP Device

M-Bus IP Device is component for servicing M-Bus devices connected to M-Bus IP gateway. All types of iSMa-B-AAC20 can use this type of communication.

There are two ways to add M-Bus IP Device to application:

Manual – By drag and drop from Sedona Palette to network component. In this case user must know M-Bus device address (Primary or Secondary).

Automatically – By using discover action in network component. For the first commissioning it is recommended to use search by secondary address. And then assign primary address. All new devices have factory default primary address set to 0.

WARNING! ALL discovered devices are placed in DiscoveredDevices folder. In this folder devices are read only once and for normal use and read they must be moved from this folder and placed directly or to another MbusFolder under MbusLocalNetwork component.
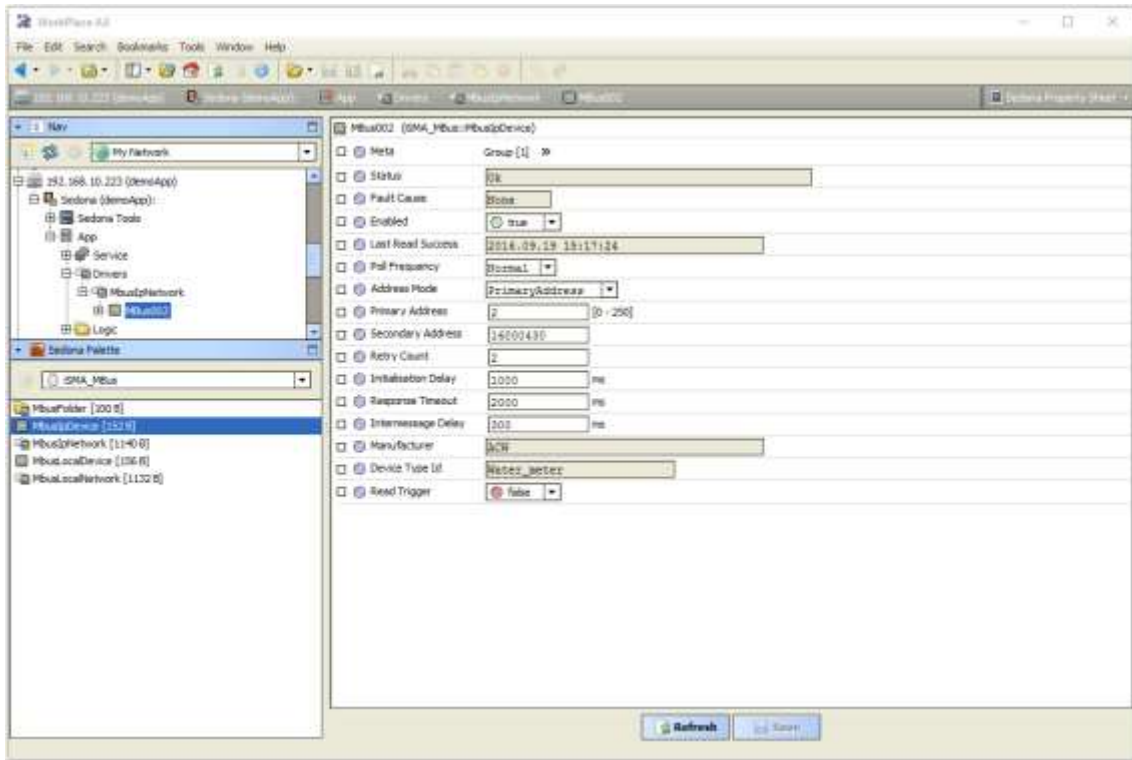
Figure 8 - M-Bus IP Device property sheet view

This component has the following actions:

Read – Force device data read,

Set Primary Address – Set Primary Address to the device (range from 0 to 250), this action automatically set Address Mode to Primary Address,

Discover Points – This action decodes device message and creates points according to device specification.

The component has the following slots:

Status – Component current status,

Fault Cause – Fault cause description,

Enabled – Enable/Disable M-Bus IP Device,

Last Read Success – Last proper success device read time,

Poll Frequency – Device read frequency (times defined in network component),

Address Mode – Define device communication type address (Primary or Secondary),

Primary Address – Device Primary Address,

Secondary – Device Secondary Address,

Retry Count – Max. error messages (CRC error, lost messages) before device down,

Initialization Delay – Delay time after initialization message,

Response Timeout – Max. device response time from device request,

Inter Message Delay – Time between messages sending to device,

Manufacturer – Manufacture description read from device (read only),

Device Type Id – M-Bus Device Type ID read from device (read only),

Read Trigger - Remote force device data read trigger.

4.4.1 M-Bus IP Device points

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