

Fieldbus Overview

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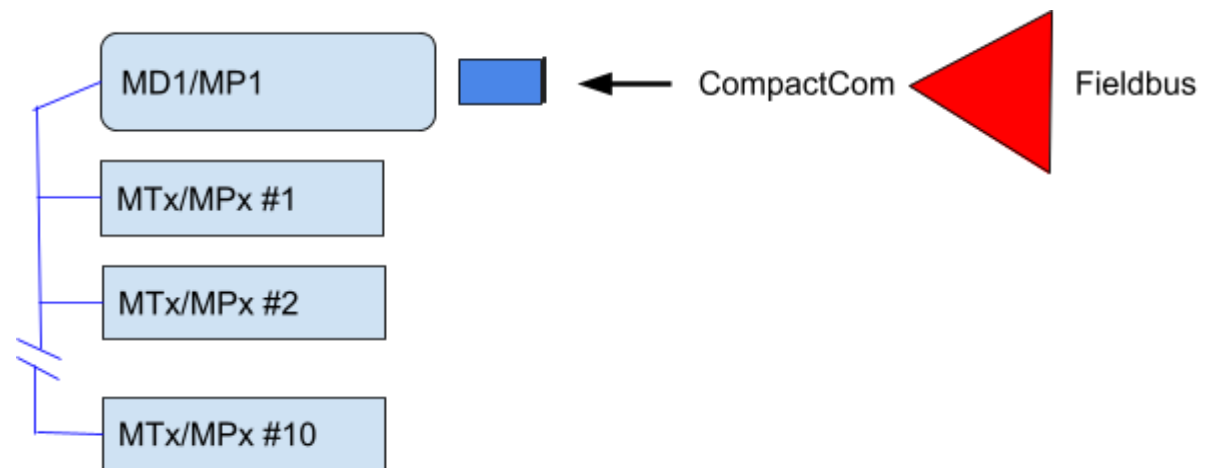
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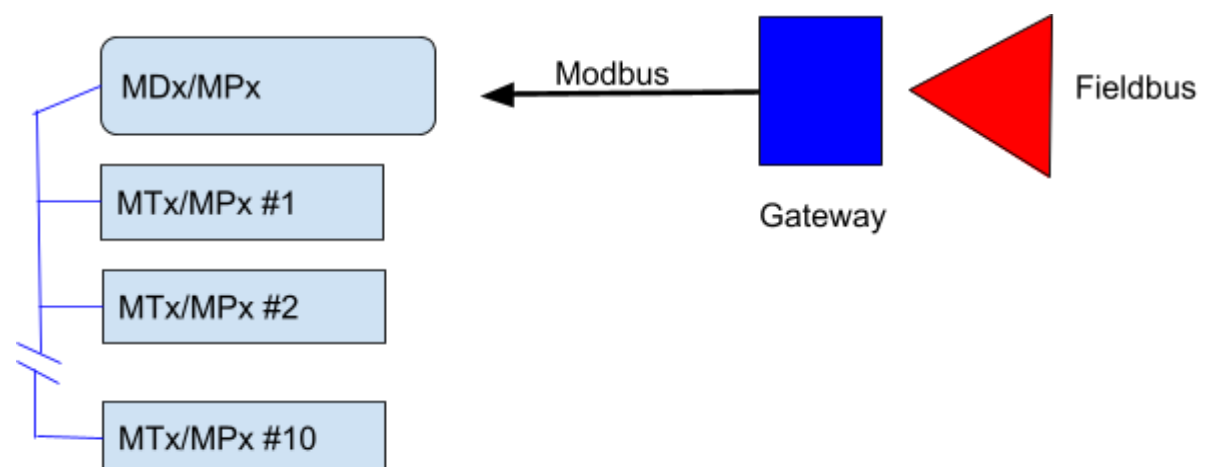
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Section 1 - Introduction



Connecting to Fieldbus via HMS Anybus CompactCom



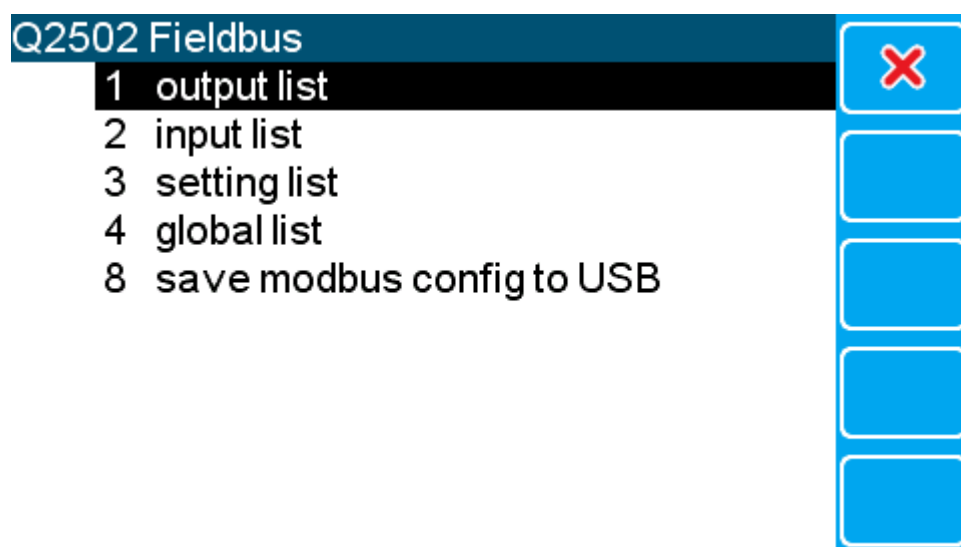
Connecting to Fieldbus via HMS Anybus Modbus Gateway

The fieldbus connection is able to access data from up to 10 loadcell transmitters or processors. The data is collected in the display by the fieldbus **data concentrator**.

Section 2 - Setting up fieldbus in ModWeigh

ModWeigh is highly configurable and you can select only the data variables you want on the fieldbus. The default setup has a list of the commonly used inputs, outputs and settings that would be used via the comms and varies based on product type (batch weigher, weigh feeder etc).

To customise these lists use the menu **Q2502 Fieldbus** for each loadcell Transmitter (MTx) and Processor (MPx) on the system.



Each list can be edited to set up which data variables are:-

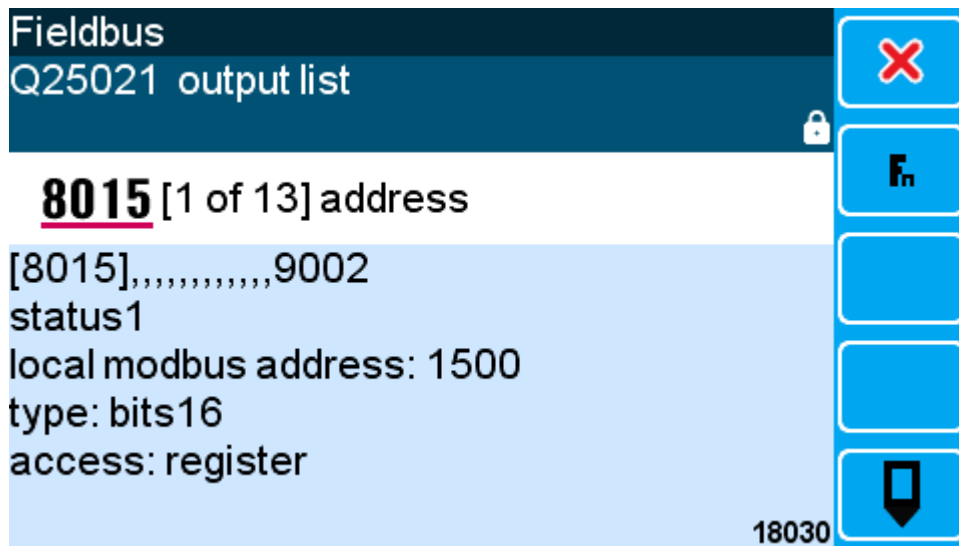
- Output using the cyclic data to the fieldbus (output list).
- Input using the cyclic data from the fieldbus (input list).
- Accessed from the fieldbus using acyclic calls (setting list).

The global list is an advanced feature outside the scope of this discussion.

These lists are limited to:-

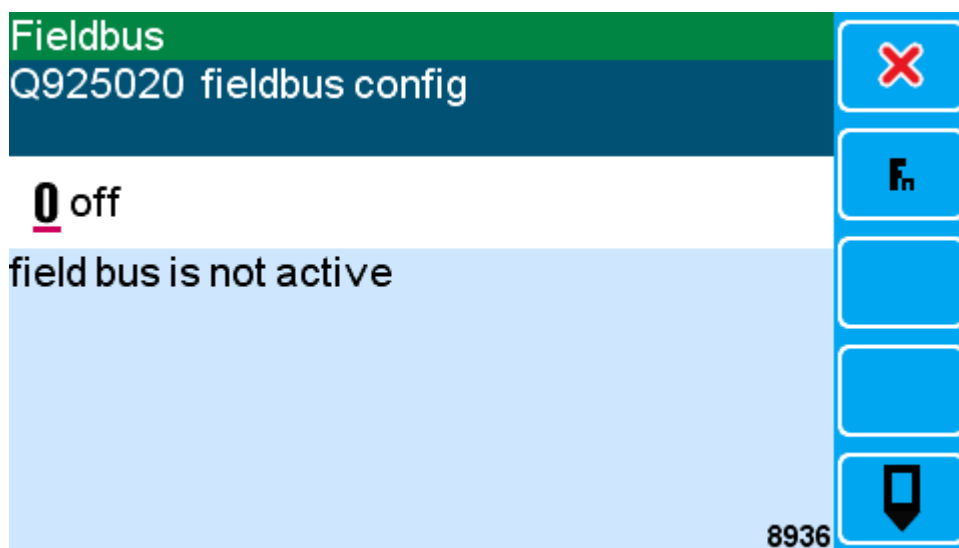
- 32 output variables.
- 16 input variables.
- 16 setting variables.

Looking at the output list for example.



The list shows the modweigh register address of each data variable in this list. Data variables can be inserted and deleted with the soft keys. The left and right arrow keys move from variable to variable.

To start fieldbus open the menu **Q925020 fieldbus config** on the display/processor that contains the CompactCom or will be collecting the data using the **data concentrator**. Only one display on a system can be running the fieldbus.



Initially the fieldbus will be off. Editing this setting gives the following options:-

1. **auto** - if units are added later this will automatically update the fieldbus tables to include them, which will stop communication with a PLC (not recommended).
2. **locked** - the fieldbus tables will not change when loadcell transmitters/processors are added or removed. This is the recommended option as PLC communication will not be affected.
3. **rebuild** - updates the fieldbus tables if units have been added or removed and then returns to locked. The PLC will need to be updated to reflect the changes.

4. **clear data** - clears the fieldbus tables and turns off.

Enter **2** to start the fieldbus. When the fieldbus is first started it will build the tables from all the loadcell units. This will take a minute or two after which you will see the following information including the total number of bytes in the outputs and inputs.

Fieldbus

Q925020 fieldbus config

2

locked

field bus active
1 transmitters
40 bytes for 13 outputs
20 bytes for 7 inputs

8936

✖

F_n

⬇

Please note: The current MD1/MP1 products are limited to a total of 256 output bytes and 256 input bytes in the cyclic data. Edit the lists to remove unneeded data variables if you are approaching this limit.

Once the fieldbus is running you can save the configuration files to a USB drive by using **Q925029 save config to USB**. This is done on the display/processor that is running the fieldbus.

Fieldbus

Q925029 save fieldbus config to USB

0

off

set to 1 to save setup, using USB drive on MD1, in folder:-
\\ModWeigh\\FieldBus, to file:-
51 MD1 53633 Fieldbus XXX.xxx

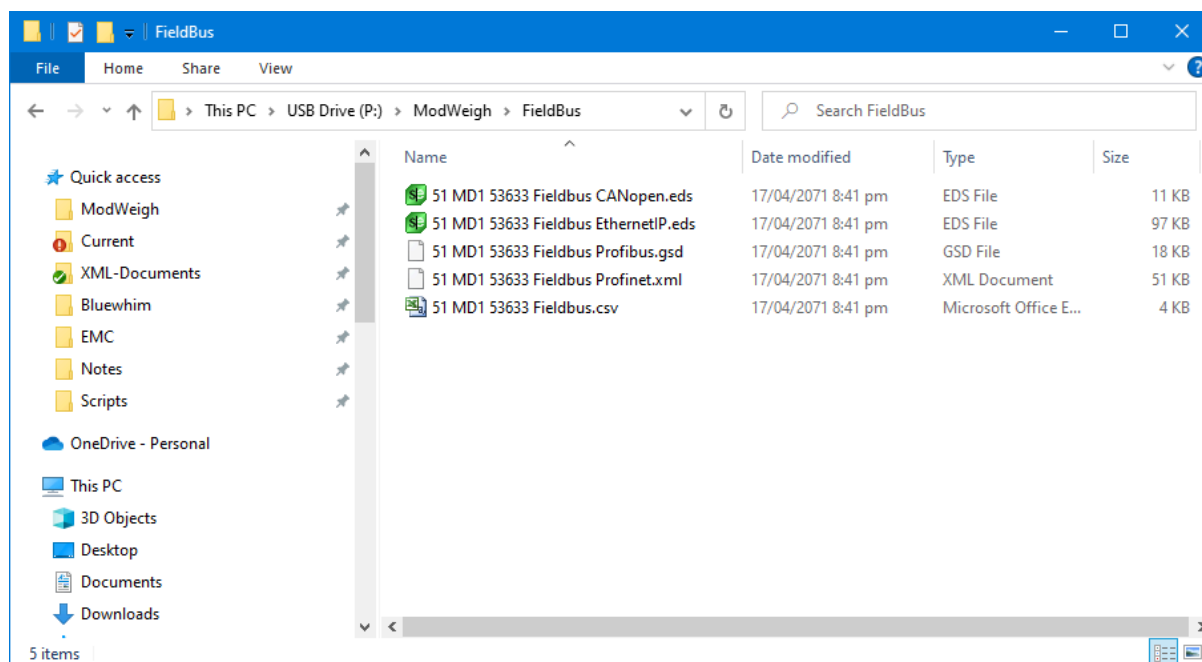
8934

✖

F_n

⬇

The USB drive will now have all the configuration files for the different fieldbuses we support and a .CSV spreadsheet file with the data table.



The .CSV spreadsheet has the following fields:-

Data Address	The address for acyclic fieldbus access
Data Name	The data variable register name
Scope	Output, Input or Setting
Size	Number of bytes
Type	Type of information: real32, signed32, bits16 or bool
Modbus Access	Modbus function code access: coil or register
Display ID	Modbus slave address of the display running fieldbus
Display Modbus Address	Register address of the data variable in the data concentrator
Controller ID	Loadcell controller slave address that owns this data variable
ModWeigh Address	Register address of the data variable in the loadcell controller
Min	Minimum value
Max	Maximum value
Default	Default value
Decimal Places	Number of decimal places to show.
Units	Numerical units of the data variable (Kg, m/s etc)

Bit Names	Comma separated list of bit names for bit16 data variables, may contain empty names for unused bits.
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Sample fieldbus configurations can be downloaded using the following links.

[ModWeigh 61 fieldbus configuration](#)

[ModWeigh 64 fieldbus configuration](#)

[ModWeigh 65 fieldbus configuration](#)

[ModWeigh 93 fieldbus configuration](#)

[ModWeigh 94 fieldbus configuration](#)

[ModWeigh 95 fieldbus configuration](#)






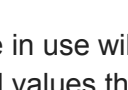
[ModWeigh 96 fieldbus configuration](#)

Note: these configurations only apply to a system with a single controller and the default settings.

Section 3 - Using CompactCom modules






A CompactCom module can be fitted to either an MD1 or an MP1 on the system. Only one CompactCom is used and collects I/O from all units via the COM2 RS485 port, running MWBUS (default).

To set up the CompactCom there is **Q92501 CompactCom** in the display menu.






Q92501 CompactCom	
1 DHCP enable	≠ 
2 IP address	
3 subnet mask	
4 node address	
5 data rate	
0 save & restart CompactCom	

Only settings that are used by the specific CompactCom module in use will have an effect. Once the CompactCom settings have been edited to the desired values then they are saved and the CompactCom is restarted using **Q925010 save & restart CompactCom**. This

setting also shows information about the CompactCom that is fitted including its type and serial number.







CompactCom	
Q925010 save & restart CompactCom	
0 off	
M40 module fitted: Module OK	
EtherNet/IP 2-Port BB DLR S/No:A02C5BA1	
(not factory tested)	
8948	

For Ethernet the settings related to the IP address need to be set up.







CompactCom	
Q925011 DHCP enable	
1 on	
EtherNet/IP 2-Port BB DLR	
	
	
8548	

DHCP Enable is turned on by default which means the CompactCom will obtain its IP address from a DHCP Server on the network if one is present. This is the normal case for industrial switches that assign an IP address to each ethernet port.

If DHCP Enable is turned off then the IP address and Subnet Mask must be manually entered.

CompactCom	
Q925012 IP address	
<u>192</u>	
[192].168.0.1	
DHCP is enabled - EtherNet/IP 2-Port BB	
DLR	
(0.0.0.0)	
25800	

The default IP address is 192.168.0.1 but this can be changed by editing the setting (if DHCP Enable is off). Each part of the IP address can be entered using the keypad. The left and right arrow keys are used to move along the IP address.

CompactCom	
Q925013 subnet mask	
<u>255</u>	
[255].255.255.0	
DHCP is enabled - EtherNet/IP 2-Port BB	
DLR	
(0.0.0.0)	
25900	

The default subnet mask is 255.255.255.0 but this can be changed by editing the setting (if DHCP Enable is off). Each part of the subnet mask can be entered using the keypad. The left and right arrow keys are used to move along the IP address.











After the CompactCom settings have been adjusted they must be saved and the CompactCom module restarted using the setting **Q925010 save & restart CompactCom**.

Section 4 - Using MODBUS gateways or masters

A MODBUS gateway or master can be used to collect the outputs and update the inputs of the data concentrator in a display/processor.

- A CompactCom module is not fitted in this case.
- A MD2/MP2 can run the fieldbus data concentrator instead of using a MD1/MP1 if desired (the MD2/MP2 does not support CompactCom modules).
- Only one display/processor is used to run the fieldbus (data concentrator) and collects I/O from all units via the COM2 RS485 port, running MWBUS (default).
- Once the fieldbus is set up and active on a display or processor the MODBUS protocol can be used to read and write the outputs and inputs in a single MODBUS function (read/write multiple registers function code 0x17).
- This is much faster than collecting all the data from individual units. This feature can be used with the Anybus modbus gateway to allow a single gateway to be used with multiple loadcell transmitters/processors (up to 10).

Ensure that **Q925042 modbus word order** = 0 and **Q925043 modbus address base** = 0.

Modbus	
Q925042 modbus word order	
0 off	
High endian (4321)	
	
	
18044	
Modbus	
Q925043 modbus address base	
0 off	
Address Base 0	
	
	
18046	

To set this up in the modbus gateway or modbus master refer to the generated .CSV spreadsheet and fill in the correct values. Go to menu **Q925020 fieldbus config** to view the total number of bytes in the inputs and outputs, these will be the values for write byte count and read byte count respectively. The quantity to write and read will be half those values because each register is 2 bytes.

REQUEST	
Slave Address	0x33 (51) - the Display ID (modbus slave address) of the display running fieldbus.
Function Code	0x17 (23) - read/write multiple registers.
Read Starting Address	0x0BB8 (3000) - the Display Modbus Address of the output registers in the data concentrator.
Quantity to read	0x0014 (20) - number of registers to read.
Write Starting Address	0x0DAC (3500) - the Display Modbus Address of the input registers in the data concentrator.
Quantity to write	0x000A (10) - number of registers to write.
Write Byte Count	0x14 (20) - number of bytes to write.
Write Data	20 bytes of data to be written into the input registers of the data concentrator.
CRC	16 bit modbus CRC

RESPONSE	
Slave Address	0x33 (51) - the Display ID (modbus slave address) of the display running fieldbus.
Function Code	0x17 (23) - read/write multiple registers.
Read Byte Count	0x28 (40) - number of bytes to read.
Read Data	40 bytes of data read from the output registers of the data concentrator.
CRC	16 bit modbus CRC

Notes:

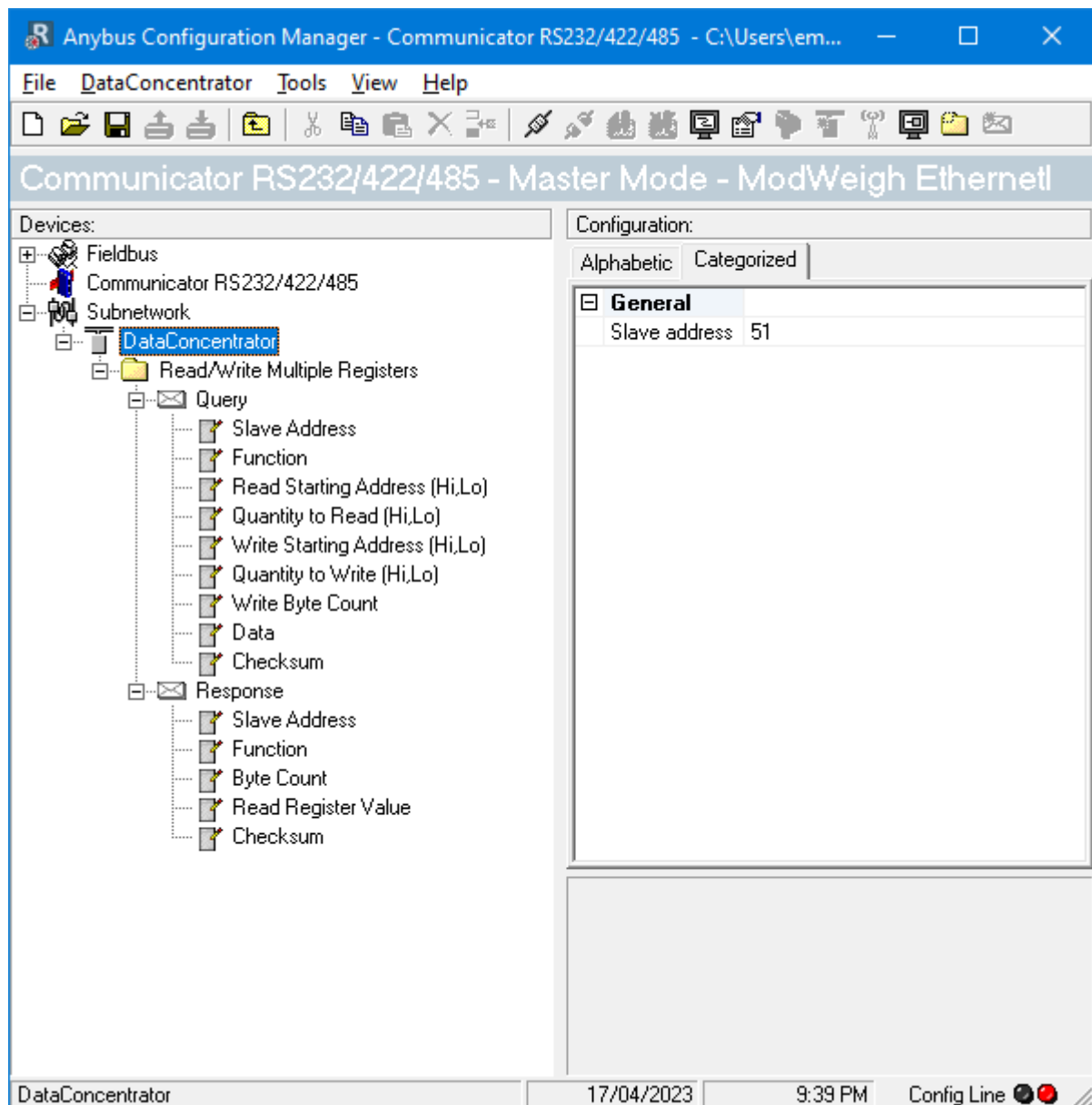
1. The starting address does not have an offset and no byte swapping is needed because of the settings in modbus word order and modbus address base shown earlier.
2. The MODBUS gateway or master can be connected to any COM1 RS232 port of any ModWeigh unit in the system or to the COM3 RS485 port of one MR1 unit.

Anybus Gateway setup

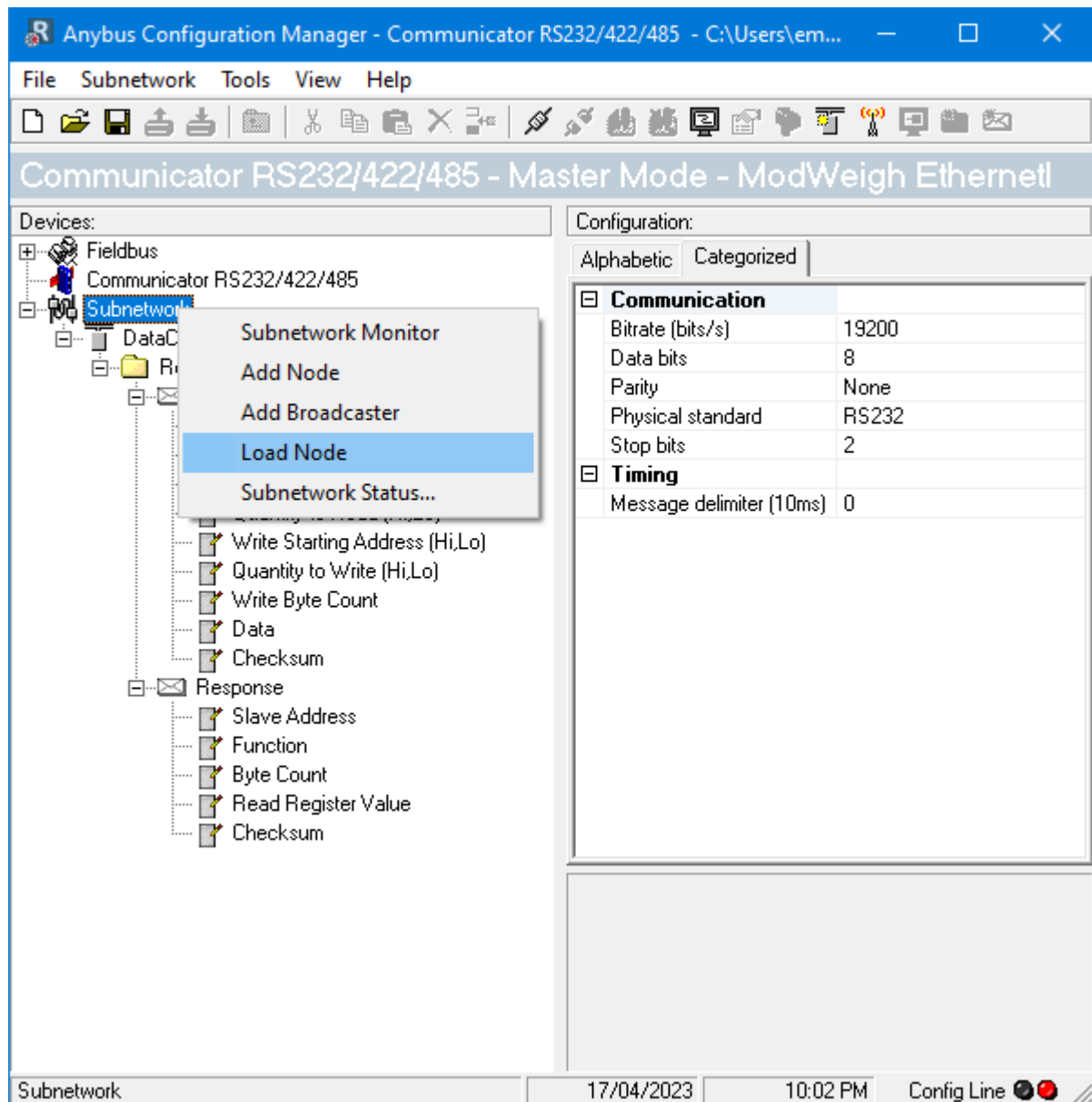
A zip file containing a sample setup for a system with a single 95 belt weigher and an Anybus Gateway can be downloaded from:

<https://ak.emc.co.nz/modweigh/downloads/fieldbus/ModWeighGatewaySetup.zip>

The file ModWeighEIP-FieldBus.cfg can be opened in **Anybus Configuration Manager - Communicator RS232-422-485** (downloaded from HMS website) and modified to suit.



The zip file also contains DataConcentrator.xml that can be used to create a read/write node in another configuration by right clicking the Subnetwork icon and using Load Node.



Section 5 - EthernetIP information

To connect to the CompactCom the following information is used.

Assembly 150 Consuming Data (O->T)

Assembly 100 Producing Data (T->O)

Acyclic Data Access

Class: 162 (0xA2)

Instance: Data Address

Attribute: 5

Section 6 - Profinet information

Company Name: EMC Industrial Group Ltd

Vendor-ID: 1612 (0x064C)

Device-ID: 1 (0x0001)

Section 7 - Profibus DP-V1 information

Company Name: EMC Industrial Group Ltd

Vendor-ID: 1612 (0x064C)