DEWESoft®
measurement innovation

CAN output

how to use

Document-Version: 1.2

www.dewesoft.com

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1 Installation

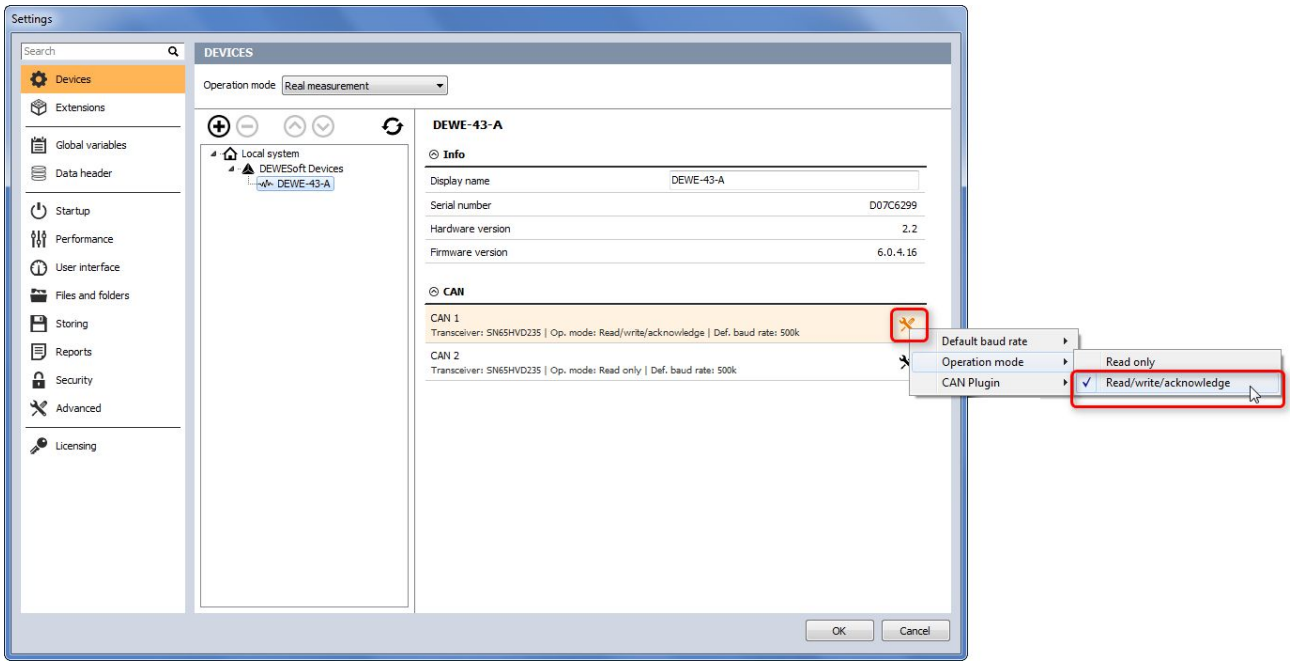
1.1 Download

The CAN output functionality is included in DEWESoft since version 7.0.5 without the need of any additional option. No download required.

1.2 Enabling CAN output

At first we have to make the CAN transmit “Tx” button visible in DEWESoft.

Therefore go to Settings → Settings → DEWESoft Device → and set the according CAN port to “Read/write/acknowledge”.



Hint: Don't forget to use a 120 ohm termination resistor.

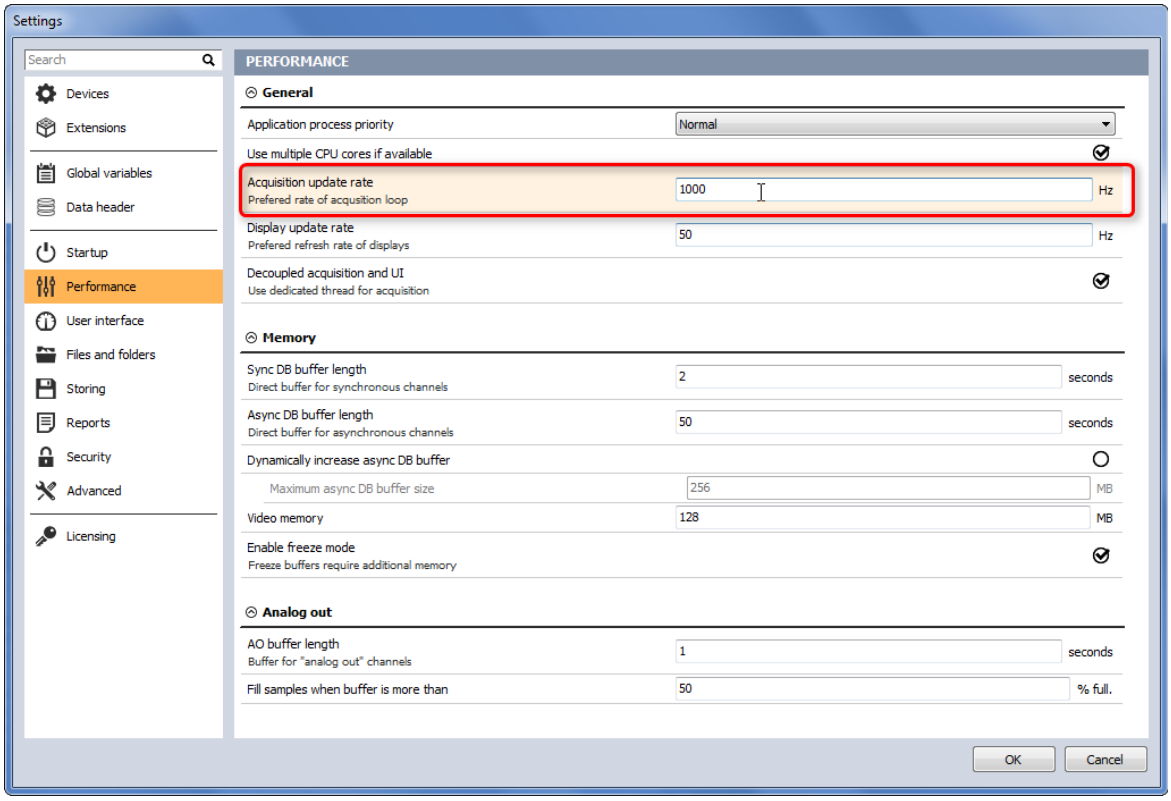
Go to the CAN channel setup and add a new transmit message with the “+Tx” button, then add a channel with the “Add” button. Assign the ID, in this example 14 hex.

For the different sending options please see next pages.

1.3 Acquisition loop time

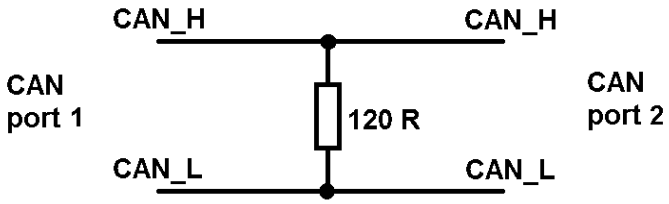
In order to use the big speed improvements of DEWESoft X2 regarding the outputs, you have to change the acquisition loop time from default 50 Hz to e.g. 1000 Hz.

The setting can be found in Settings → Settings → Performance.



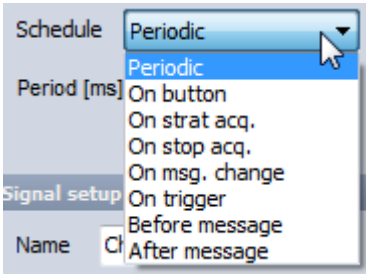
1.4 Test setup

For the next examples we use a “loopback-setup” with a DEWE-43, with CAN1 connected to CAN2 (with termination resistor inside). CAN1 will send the messages, and is therefore set to “Acknowledge”, CAN2 will only receive CAN data.



2 Transmit options

In the “Schedule” field we have several options.

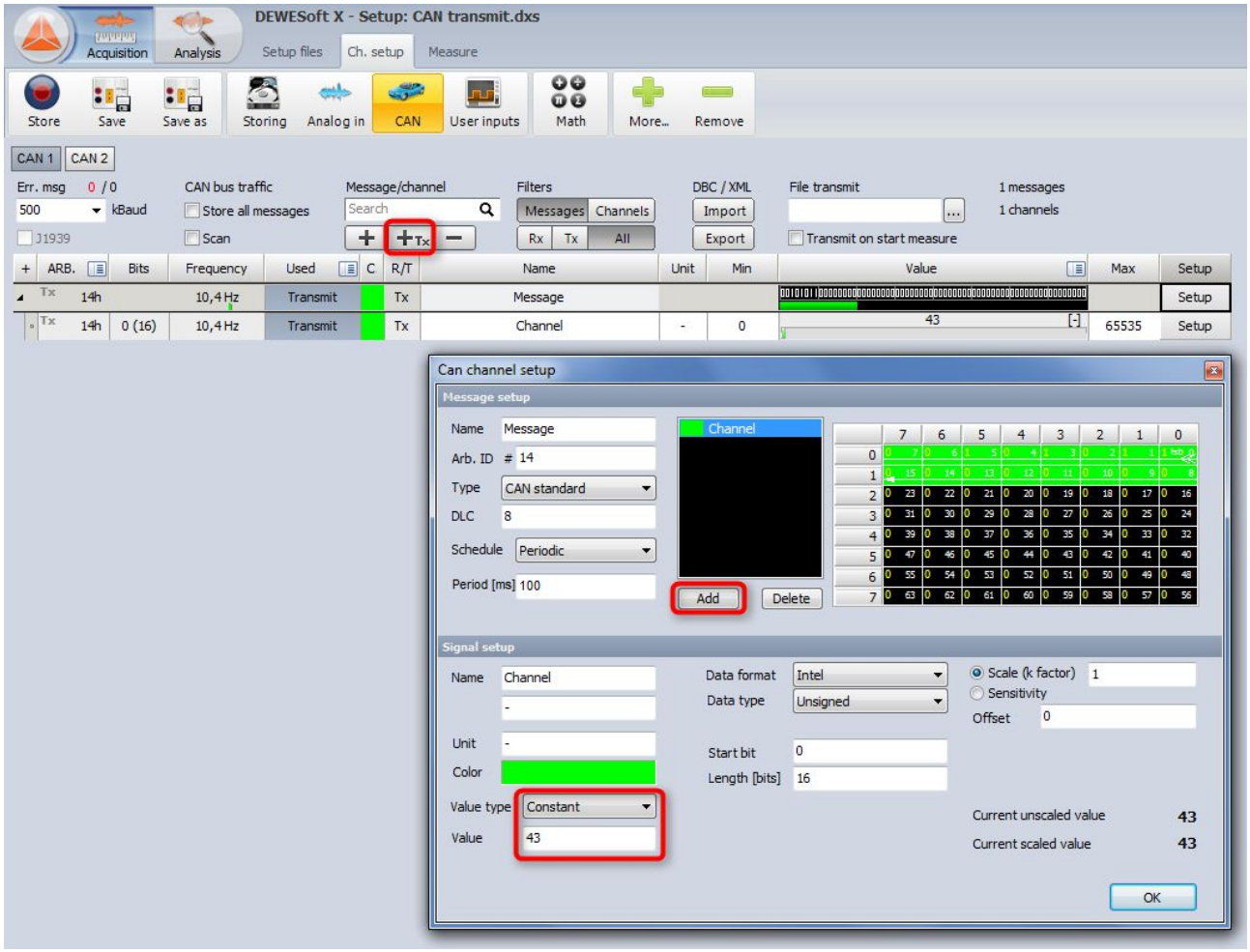


- Periodic → Enter the update rate in [ms], the sent message will automatically be updated
- On button → Specify a “user input” channel first, assign it to a button, the message will be sent during measurement when someone clicks the button
- On start acq. → When switching from Ch Setup to Measure, or when start storing, the message will be sent; option for specifying a delay (waiting time after Start) in [ms]
- On stop acq. → When stopping the measurement, message will be sent
- On msg. Change → message will be transmitted whenever one value of the message changes (at least one bit). So it'll be also send at start.
- On trigger → Enter a channel and trigger level (bigger than or smaller than logic) to send the message
- Before message → Specify another CAN message, before that this one is sent
- After message → Specify another CAN message, after that this one is sent

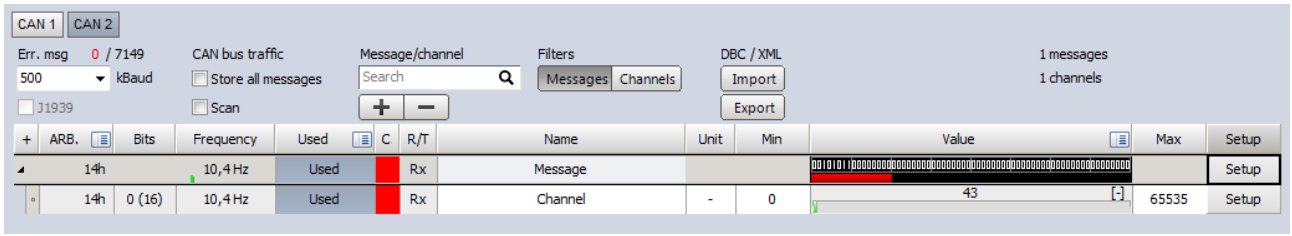
On the next pages there will be examples for the most common used ones.

2.1 Transmit periodic

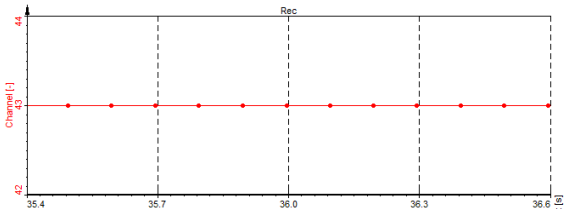
Let's transmit a value periodically, each 100ms. (The maximum output rate depends on the used computer). As "Value type" select a Constant value of e.g. 43:



In this example we have a DEWE-43, the first CAN port (sending) is connected to the second CAN port (receiving). Go to the second CAN port and add a new message with the "+" button, add one channel, and set Arb. ID to 14.

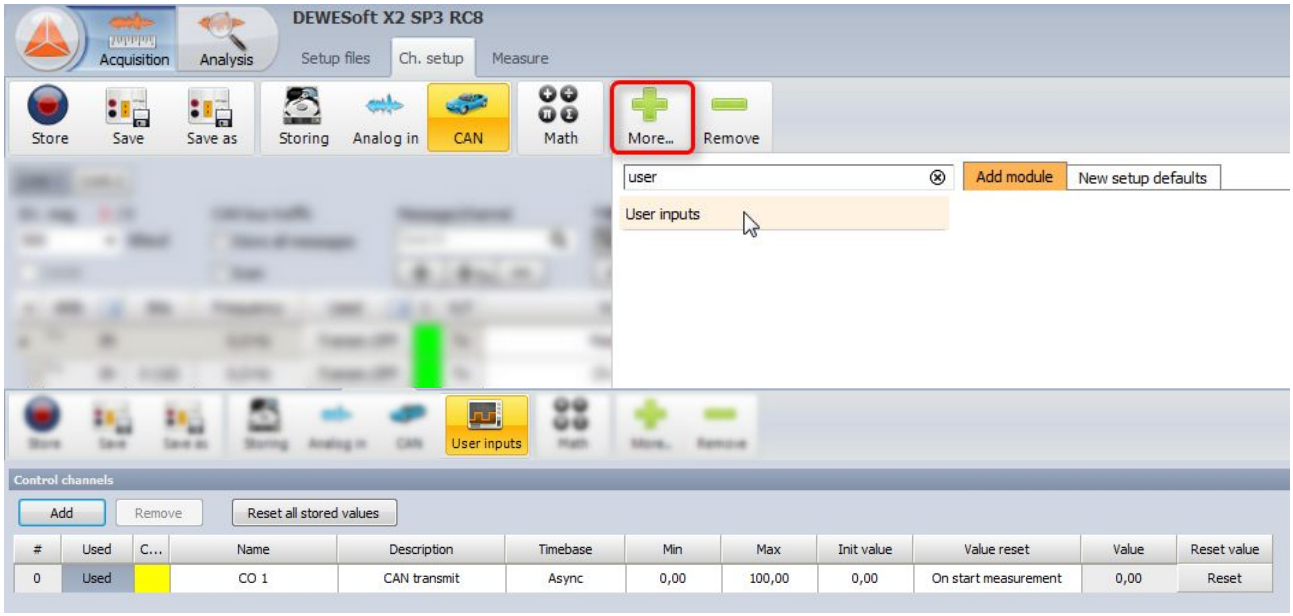


The value received will be "43", in periodic time intervals.

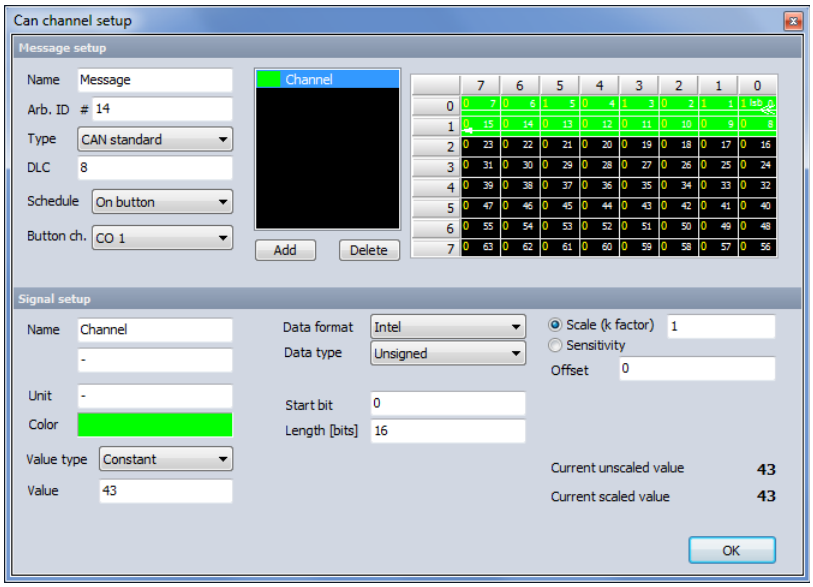


2.2 Transmit on button

At first we need to add a channel for the button, we do this by the clicking the Plus and entering “User inputs”, formerly called “Control channels”.



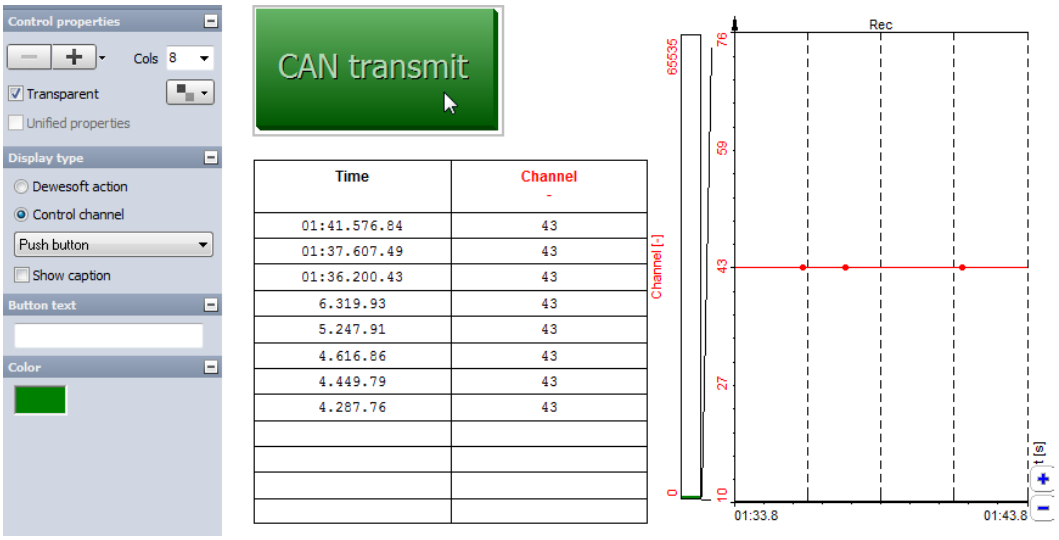
Select “Schedule – On button” and “Button ch. - CO1”. Again, we want to send a constant value of 43 on ID 14, so keep the settings the same.



From the instrument toolbar in Measure mode, we add the Control instrument.

From the control instrument properties on the left side, select “Control channel” and “Push button”.
Then assign the channel “CO1” from the channel list on the right to the instrument.

The Receive CAN channel shows the value of “43”, when pressing the button.

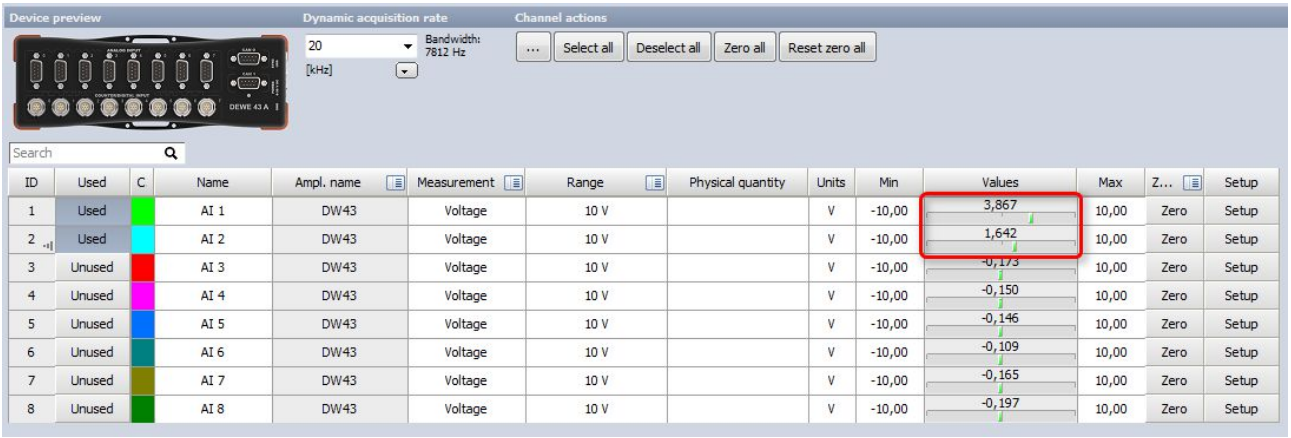


2.3 Transmit a math channel on CAN

In the following experiment we want to subtract two channels by math, and transmit the value over CAN.

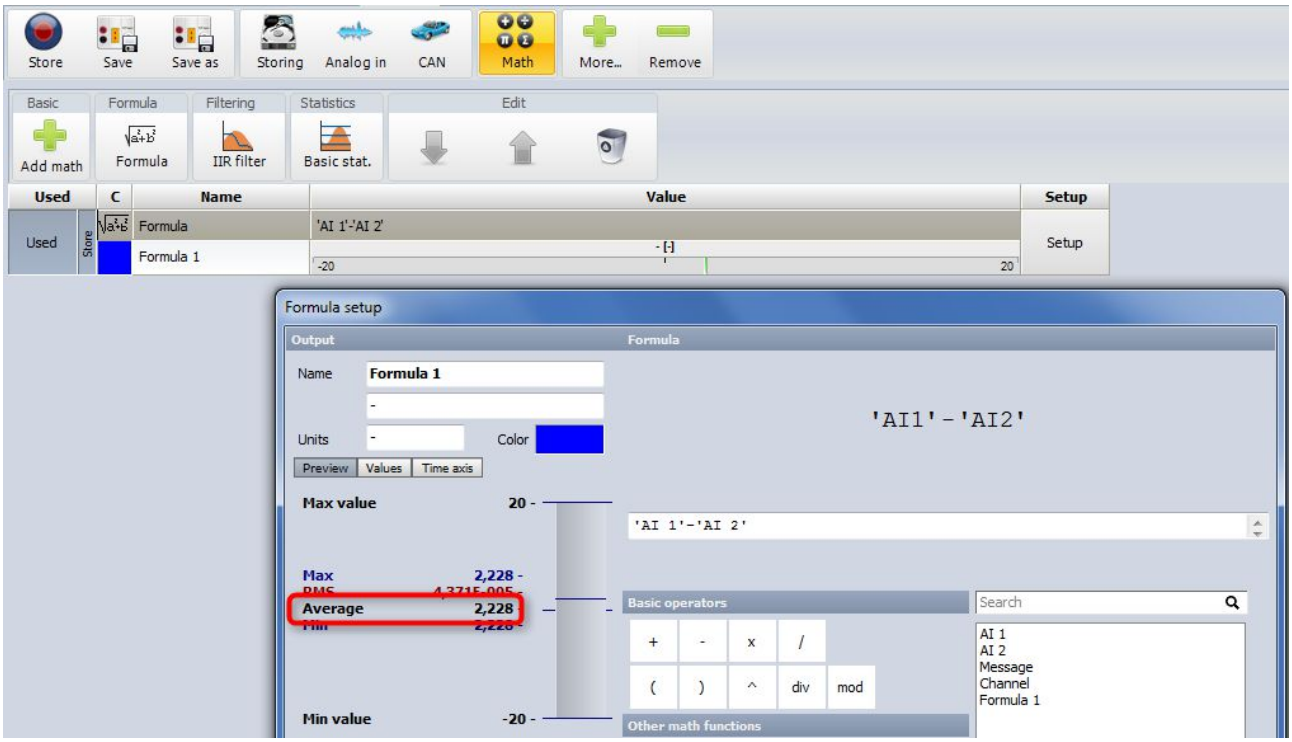
A practical application would be the measurement of voltage and current, then adding a DEWESoft Power module, calculating electrical Power P, Q, S and cos_phi and transferring the results in real-time to a test bed over CAN.

We apply two voltages to the DEWE-43 inputs, AI 1 = 3,867 V and AI 2 = 1,642 V.



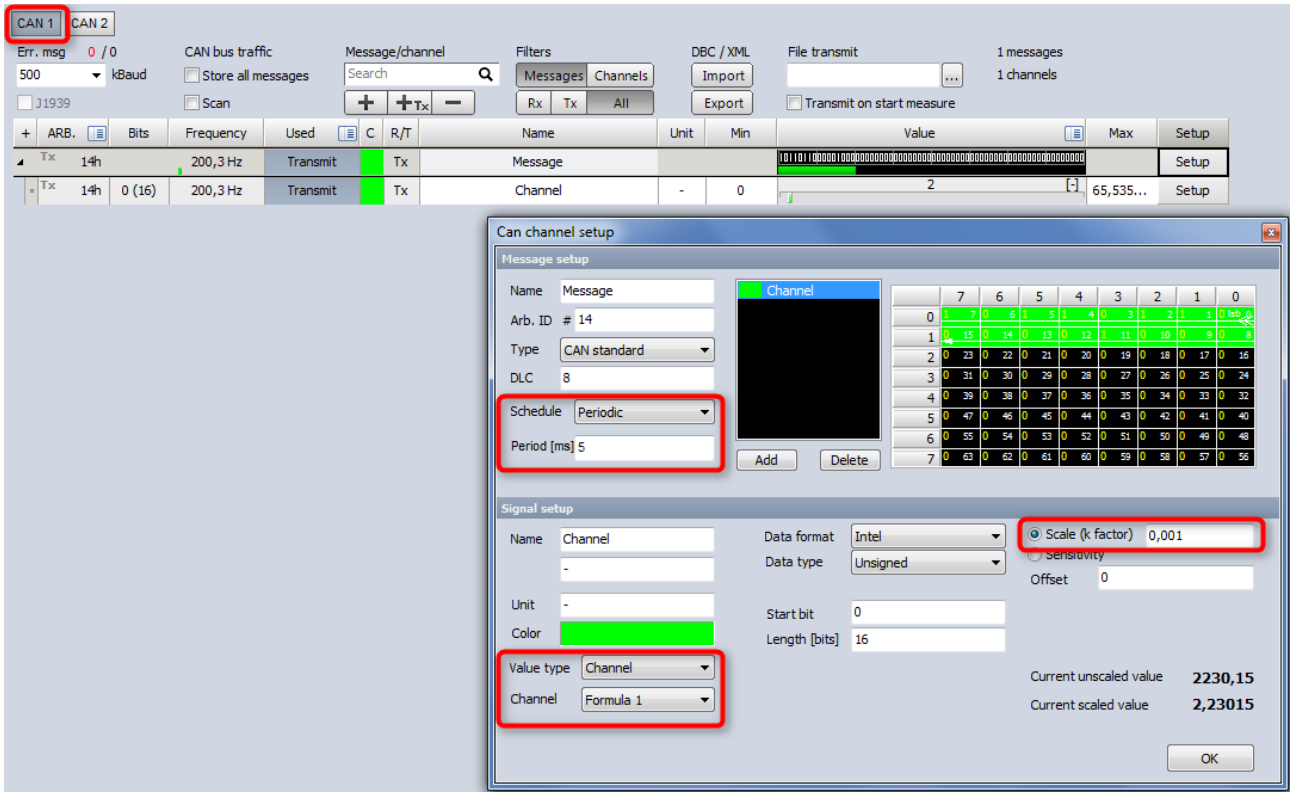
ID	Used	C	Name	Ampl. name	Measurement	Range	Physical quantity	Units	Min	Values	Max	Z...	Setup
1	Used		AI 1	DW43	Voltage	10 V		V	-10,00	3,867	10,00	Zero	Setup
2	Used		AI 2	DW43	Voltage	10 V		V	-10,00	1,642	10,00	Zero	Setup
3	Unused		AI 3	DW43	Voltage	10 V		V	-10,00	-0,173	10,00	Zero	Setup
4	Unused		AI 4	DW43	Voltage	10 V		V	-10,00	-0,150	10,00	Zero	Setup
5	Unused		AI 5	DW43	Voltage	10 V		V	-10,00	-0,146	10,00	Zero	Setup
6	Unused		AI 6	DW43	Voltage	10 V		V	-10,00	-0,109	10,00	Zero	Setup
7	Unused		AI 7	DW43	Voltage	10 V		V	-10,00	-0,165	10,00	Zero	Setup
8	Unused		AI 8	DW43	Voltage	10 V		V	-10,00	-0,197	10,00	Zero	Setup

In the mathematics we add a formula: AI 1 – AI 2. As expected the result is 2,22 V.



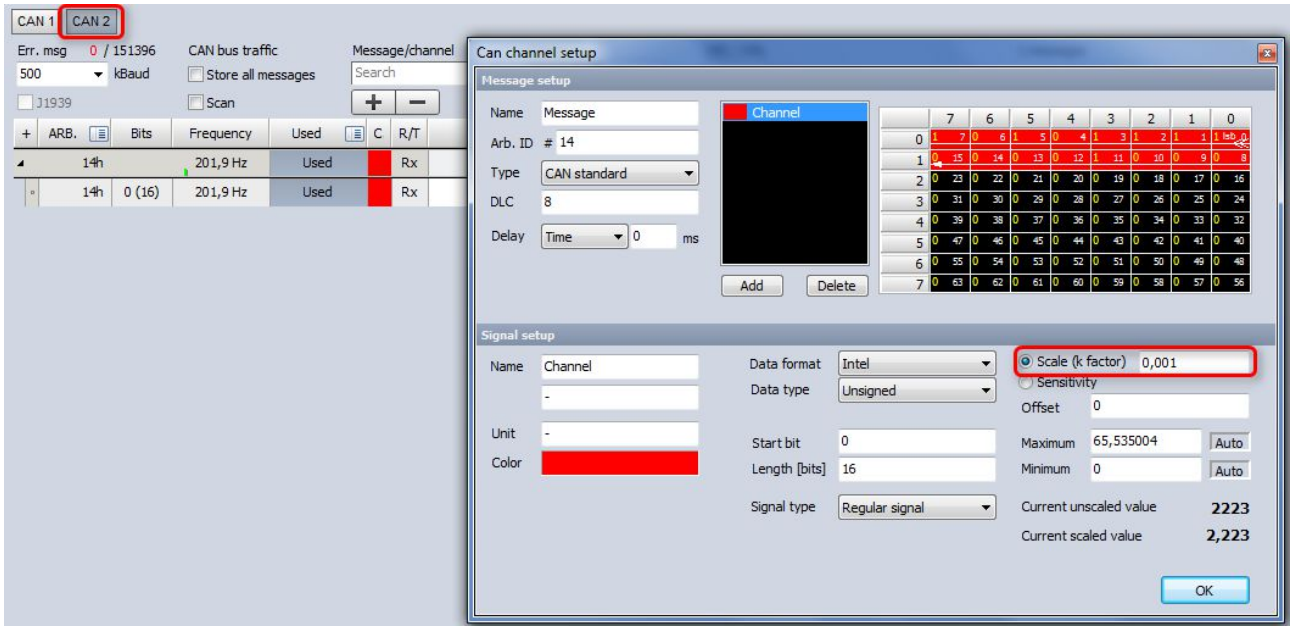
In the CAN 1 port, which is our sending port, we add a message with the "+Tx" button. On Arb. ID 14 we add a channel, transmitting periodically with e.g. 5ms the value (Value type = Channel) of the math formula "Formula 1".

If we would now directly transfer the math value 2,22 over CAN, it would cut all the digits after the comma and transfer a value of 2. Therefore we apply a scaling factor of 0.001 before transferring.

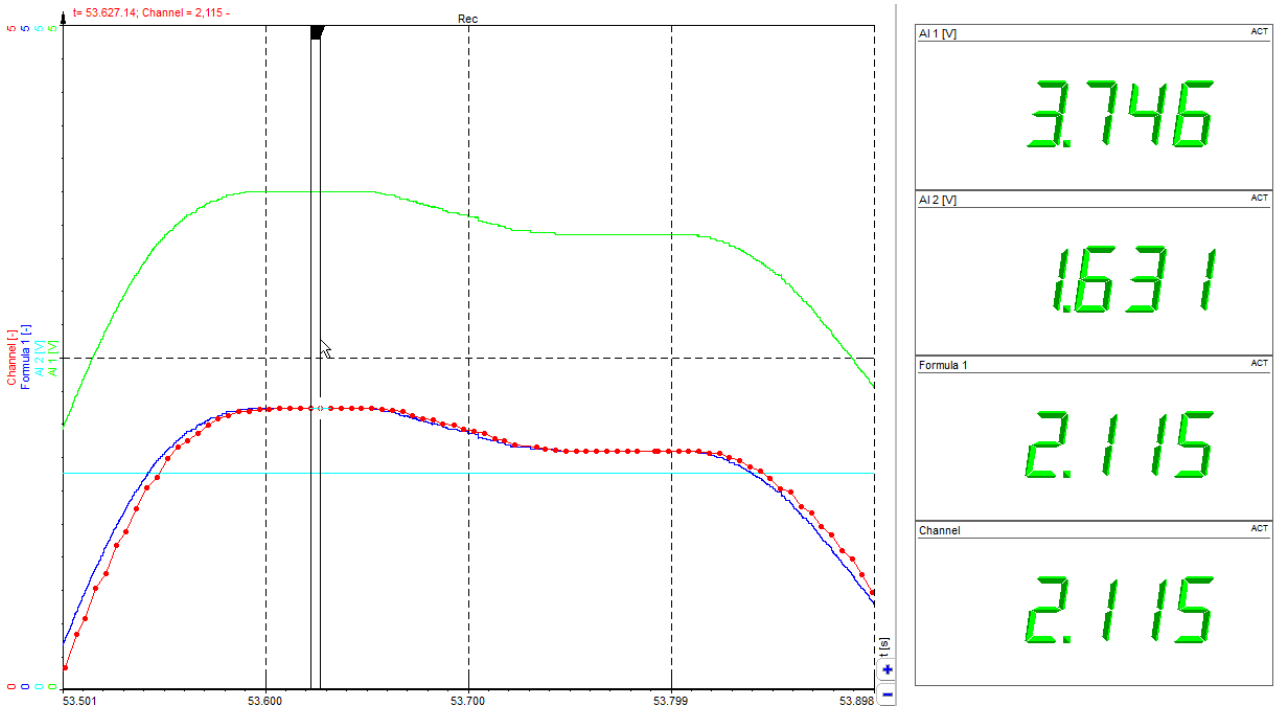


In the CAN 2 receiving port, we add a message with 1 channel on the same Arb. ID.

As we have scaled the data with a factor of 1000 before (scale = 0,001), we need to apply a scaling of 0,001 now when decoding.



The result can be seen in the screenshot below. When we change the voltage on the input, we can see how the math formula (blue) and CAN port (red) follows the input (green) change in real-time (update rate 5 ms).



In the same manner all different data types, like outputs from modules such as Torsional vibration, Combustion analysis or Ordertracking in DEWESoft can be output over CAN.

3 Benchmarks

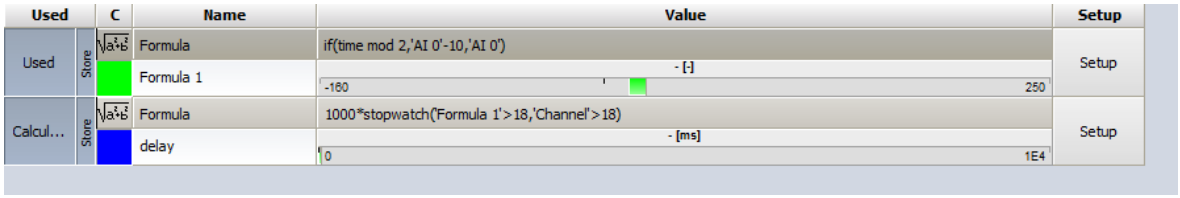
3.1 AI to CAN out – delay time

With the improvements regarding real-time-ability in DEWESoft X2 (faster Acquisition loop time, see chapter 1.3), the question arises how fast an analog input, with some additional calculations, can be processed and sent out on CAN.

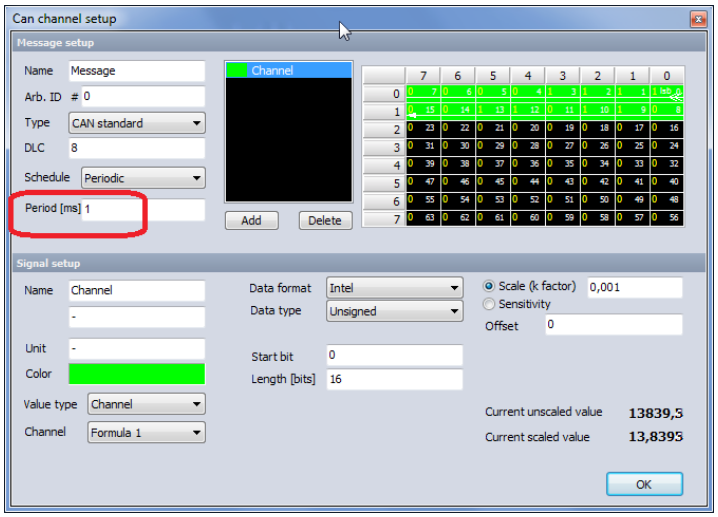
For this test we used a DEWE-43, and connected CAN0 to CAN1.

We subtract a random value (-10) from our analog input channel 'AI 0', periodically every 2 seconds.

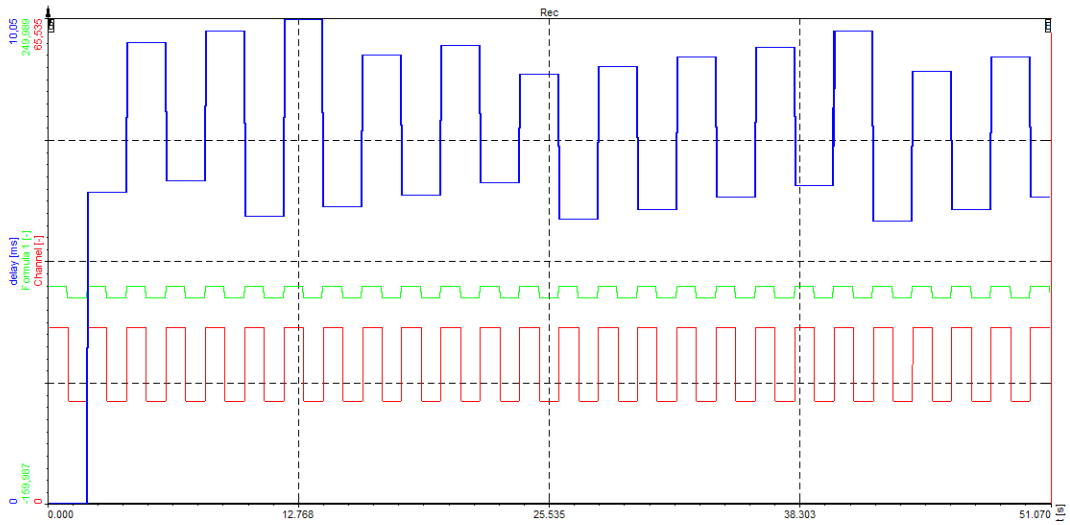
With the other math formula we measure the time delay between the formula result and the received CAN value.



To get the fastest possible output, we set the period time to 1 ms.



Result: The measured delay time AI-to-CAN varies from 5,8 ms … 10,05 ms.



4 Version History

4.1 Documentation Version

Revision number: 101
Last modified: Mon 03 Aug 2015, 16:15

Doc-Version	Date [dd.mm.yyyy]	Notes
1.2	03.08.2015	Added 3.1 AI to CAN out – delay time
1.1	02.06.2015	Changed scale factor handling for “Transmit a math channel on CAN”
1.0	02.06.2015	revision for X2