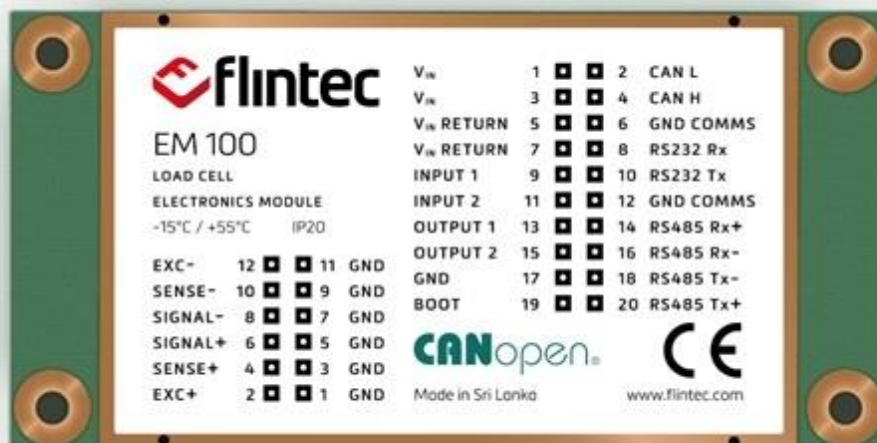


Flintec Device Configuration (FDC) Tool



EM100

V1.0 March 2019

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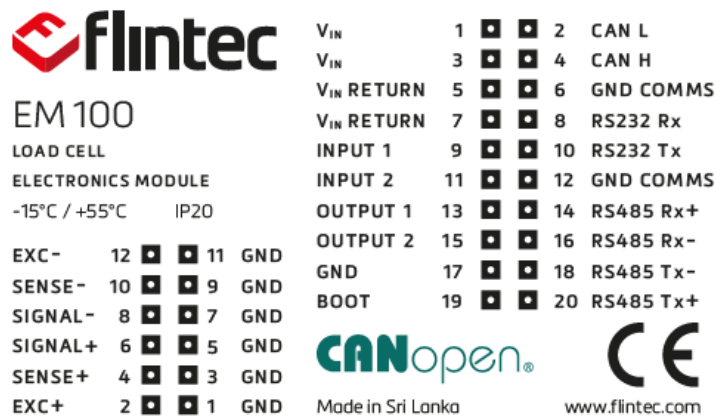
1. FDC Setup

1.1. System Requirements

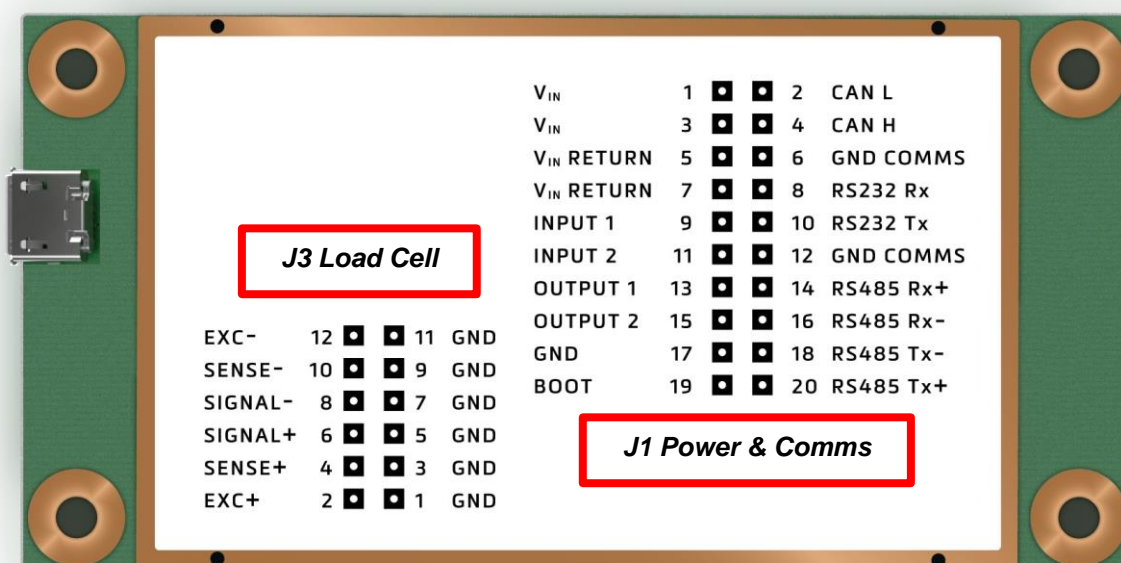
PC System Requirements.

- Display screen size - minimum resolution of 1024x768.
- Windows 7 or Window 10 operating system.
- Microsoft Dot Net Framework v4.5 (automatically downloaded if required).
- Peak System Adaptor (IPEH-002022-210289).

1.2. Pinout of EM100

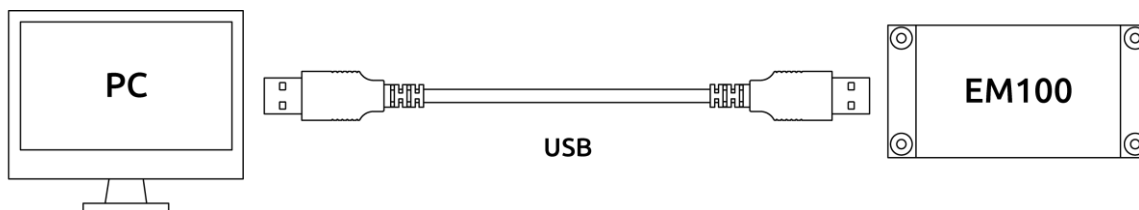


1.1. EM100 Pinout

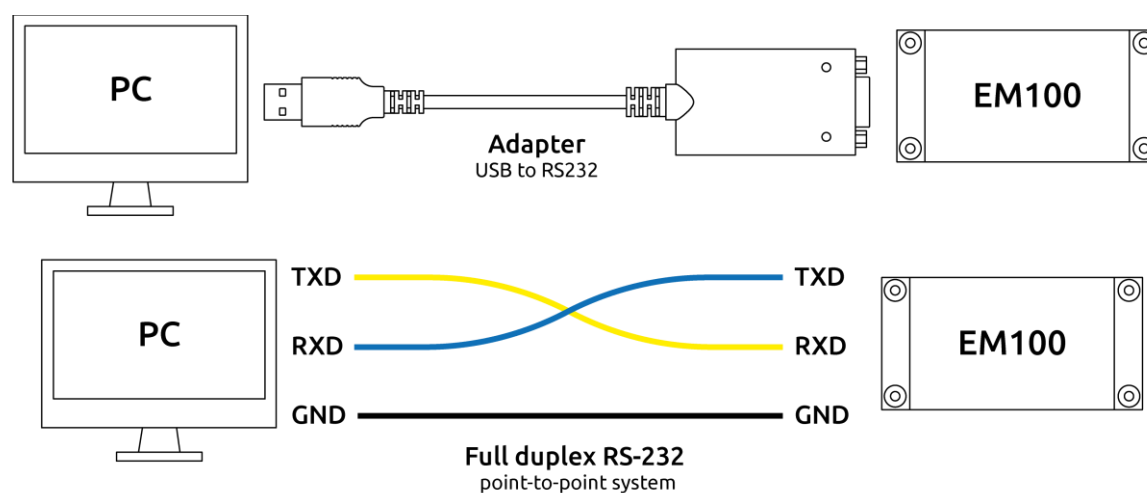


1.2. Connection Methods

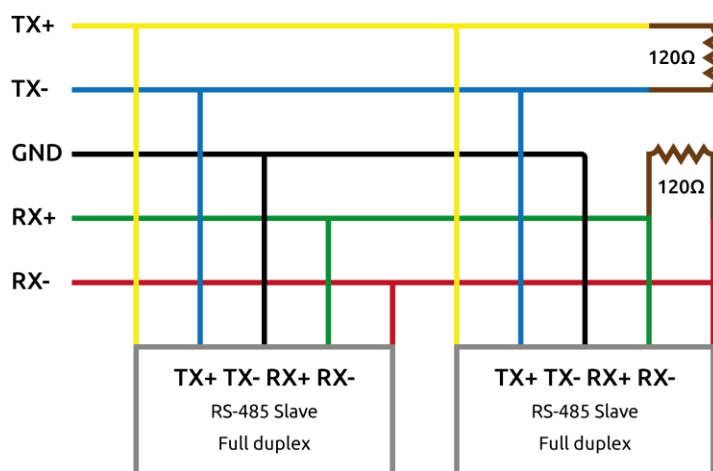
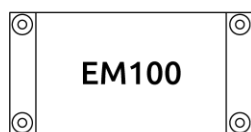
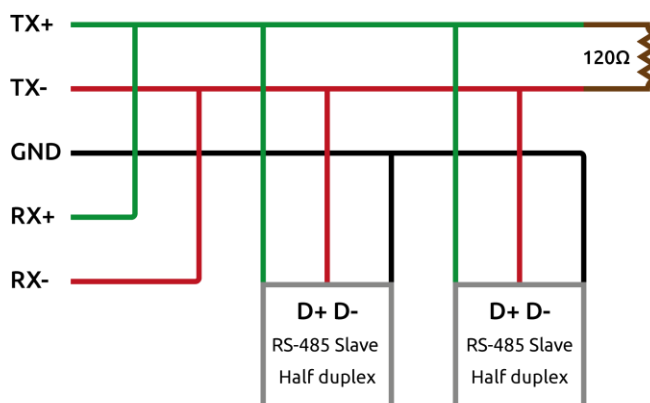
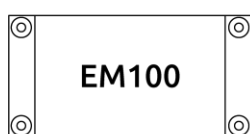
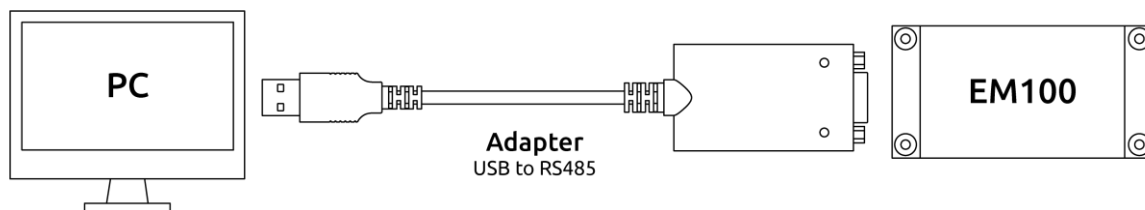
1.2.1. USB Connection



1.2.2. RS-232 Connection

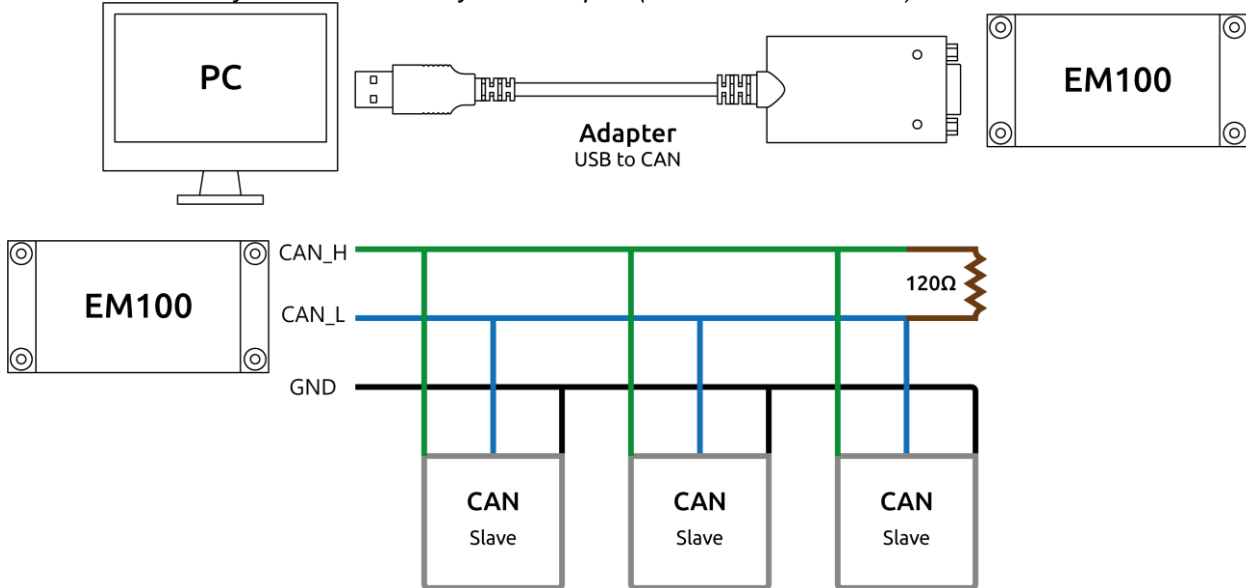


1.2.3. RS-485 Connection

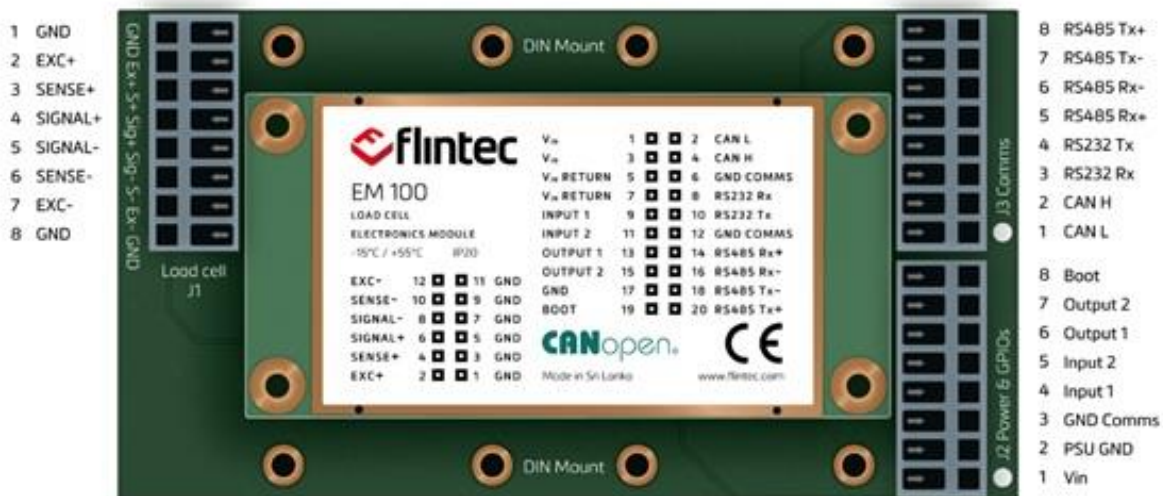


1.2.4. CANopen Connection

Note: FDC will only work with Peak System Adaptor (IPEH-002022-210289).



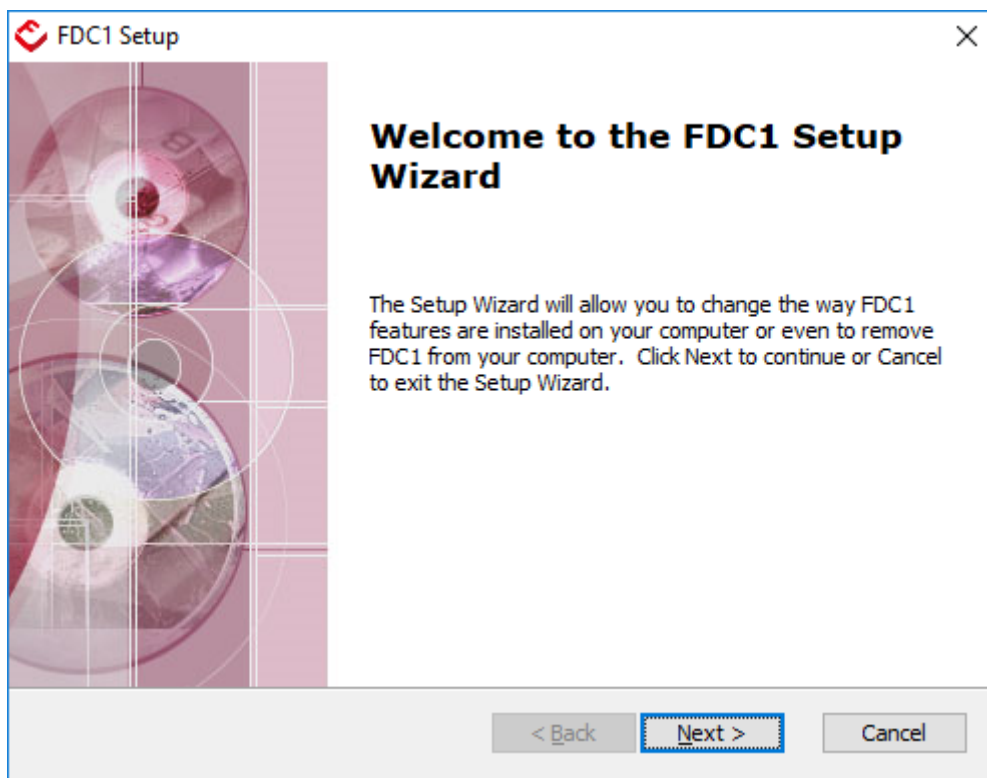
1.2.5. Adaptor Board



1.3. FDC Installation

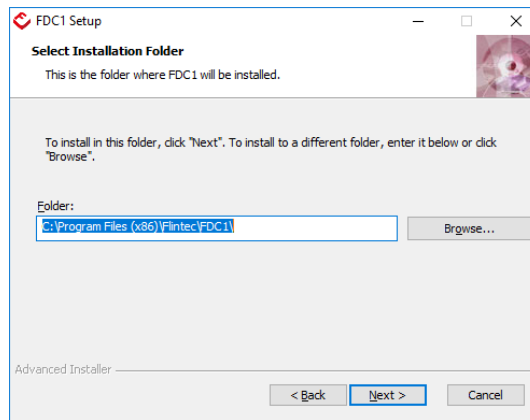
Download the latest copy of FDC from the Flintec website (www.flintec.com).

- Extract the executable file '*.exe' from the zip folder.
- Run the setup/installation file (administration privileges maybe required).
- Press the '**Next**' button to proceed with the installation.

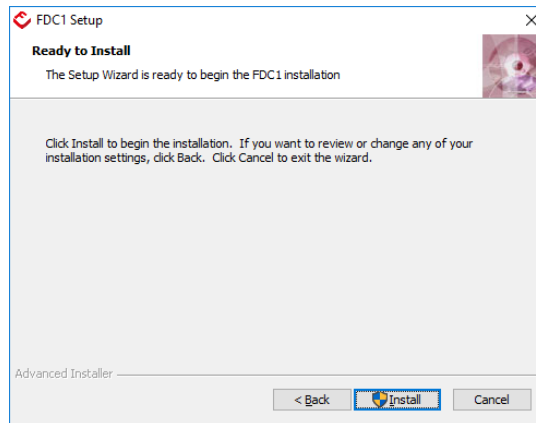


Note: If a previous version of FDC has been installed, this must be uninstalled prior to installation. Use the installation/setup program to uninstall (see section **1.4 Uninstall Previous Versions of FDC** for details).

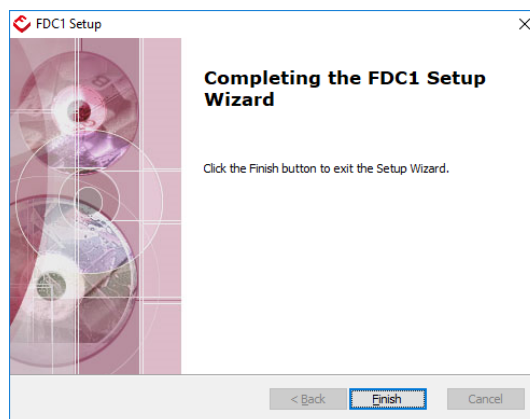
- Press the '**Next**' button (adjust the default directory as required).



- Press the '**Install**' button to start the installation.



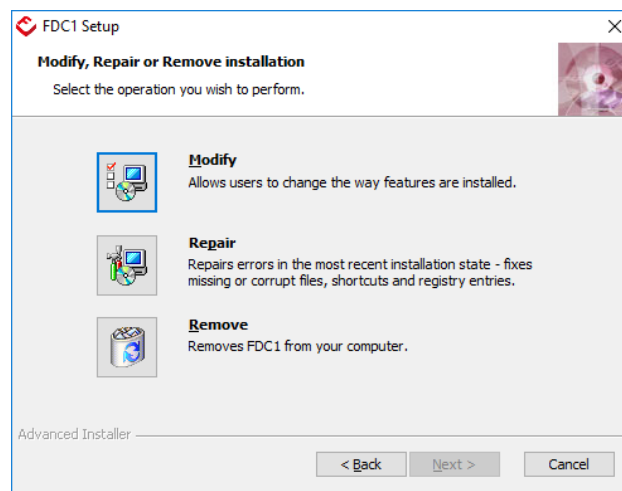
- Press the '**Finish**' button to complete the installation.



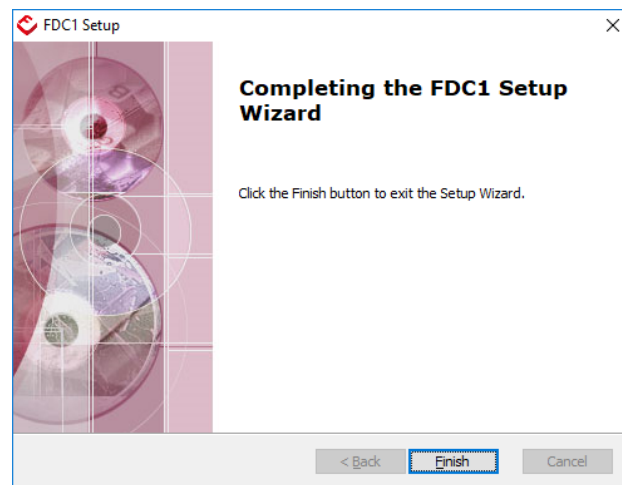
1.4. Uninstall Previous Versions of FDC

1.4.1. Uninstall with FDC Application

- Run the executable application to uninstall.
- Click the '**Remove**' button.
- Press the '**Next**' button to continue the installation removal.



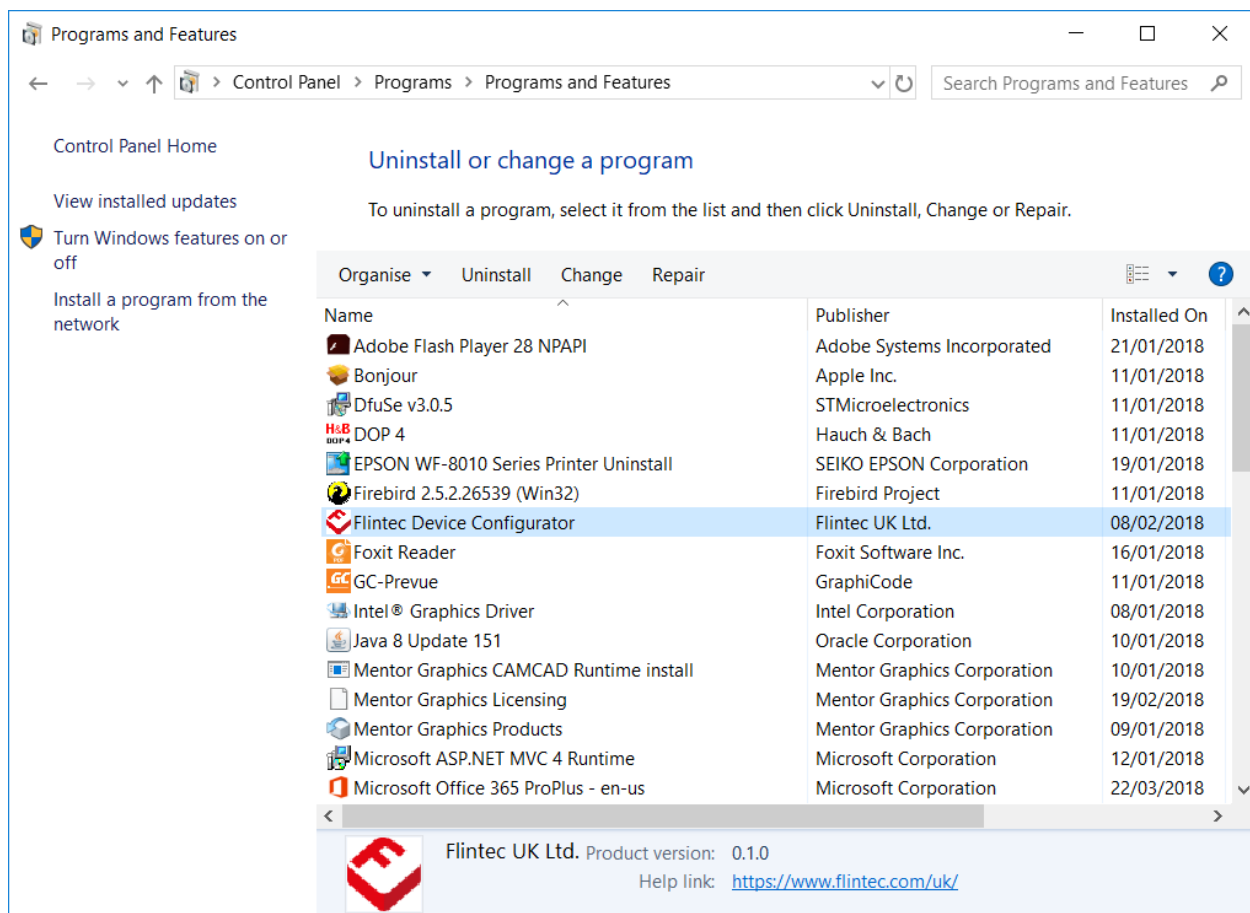
- Press the '**Finish**' button to complete the removal/repair.



1.4.2. Uninstall with Windows

1.4.2.1. Windows 7

- Move the cursor over the start button/Windows logo in the bottom left of the screen.
- Click in the search window and type '**Add Remove**'.
- Select the '**Add Remove Programs**' option in the search window.
- Scroll down to the '**Flintec Device Configurator**' entry.

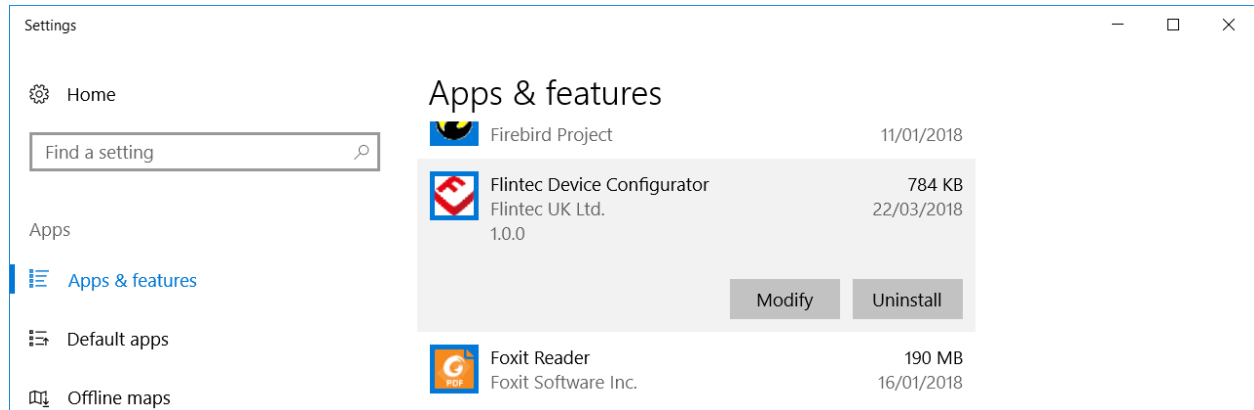


- Click on the entry with the right mouse button to reveal the context menu. Select the '**Uninstall**' option.
- Press the '**Yes**' button to initiate the removal process.



1.4.2.2. Windows 10

- Move the cursor over the start button/Windows logo in the bottom left of the screen.
- Click the right mouse button and select the '**Apps & Features**' in the context menu.
- Scroll down to the '**Flintec Device Configurator**' entry.
- Press the Uninstall button.



1.5. About/Revision FDC



2. Connecting to FDC

2.1. Driver Check

During the first session, it may be necessary for the PC to install appropriate drivers. If using a CAN adaptor or USB-to-serial converter, consult the manufacturer for instructions and latest drivers.

If using the USB CDC connection, the following driver from STMicroelectronics will need to be installed. View the ST.com website for the latest revision:

<http://www.st.com/en/development-tools/stsw-stm32102.html>

A driver installation manual is available from the Flintec website (www.flintec.com).

2.1.1. Device Manager in Windows

Plug in the adaptor and check in the '**Device Manager**' if the driver has been installed correctly.

2.1.1.1. Accessing Device Manager in Windows 7

- Move the cursor over the start button/Windows logo in the bottom left of the screen.
- Click in the search window and type '**Device Manager**'.
- Select the '**Device Manager**' option in the search window.

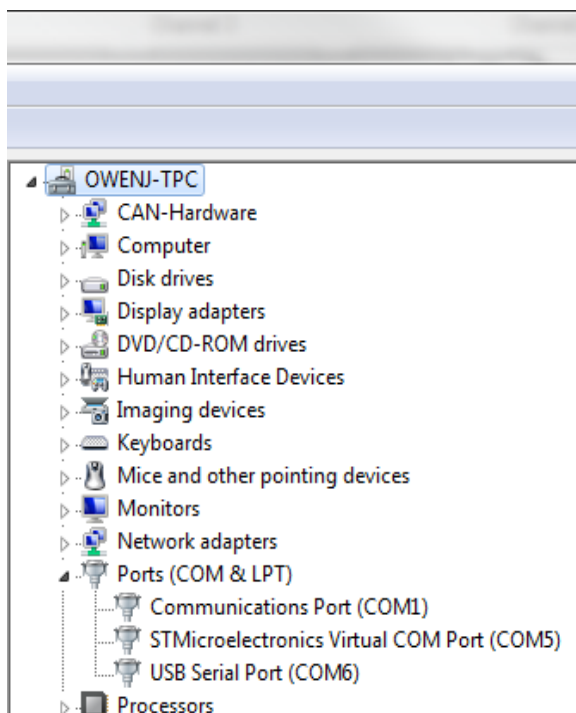
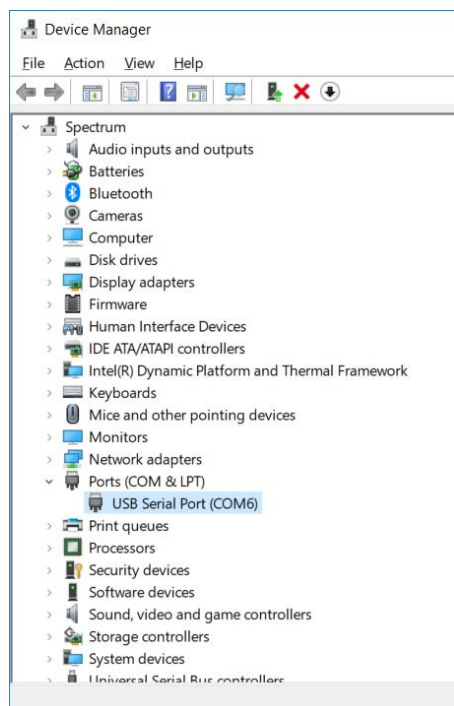
2.1.1.2. Accessing Device Manager in Windows 10

Method 1:

- Move the cursor over the start button/Windows logo in the bottom left of the screen.
- Click the right mouse button and select the '**Device Manager**' in the context menu.
- Expand the '**Ports (COM & LPT)**' group.

Method 2:

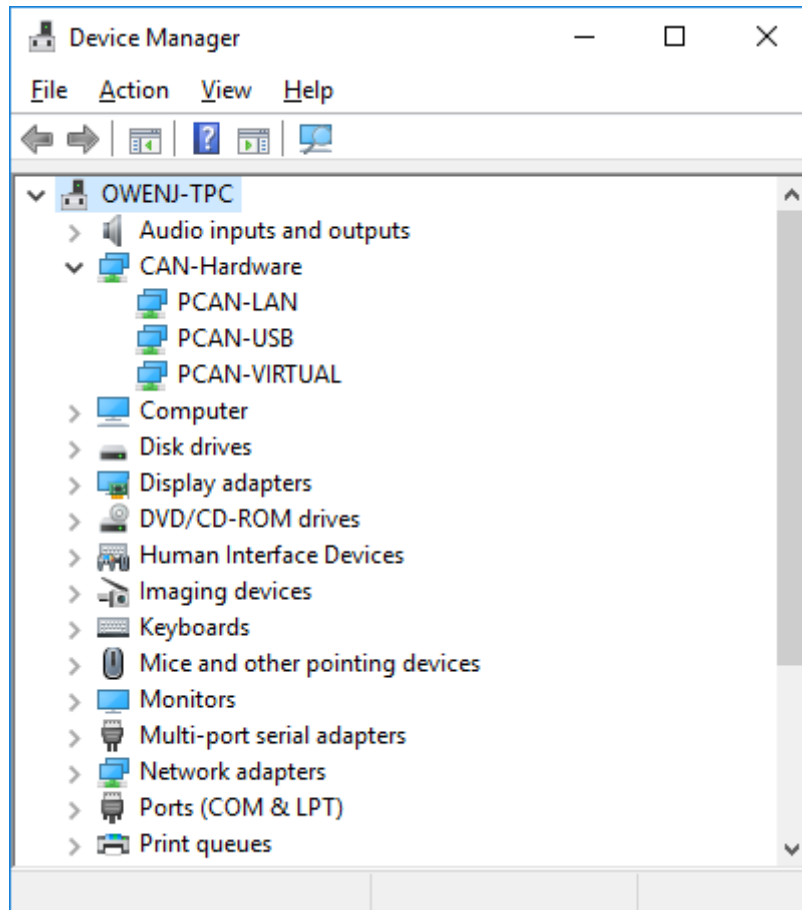
- Move the cursor over to the search window at the bottom left of the screen.
- Click in the search window and type '**Device Manager**'.
- Click on the '**Device Manager**' option that will appear after searching.
- Expand the '**Ports (COM & LPT)**' group.



- Ensure the correct port has been assigned and appears similar to the screenshots above.

2.1.2. CAN Port Driver

- Open the '**Device Manager**' window (see **2.1.1 Device Manager in Windows** section).
- Expand the appropriate listing where the CAN adaptor resides. In this example a Peak System CAN adaptor is used listing under the '**CAN-Hardware**' group.

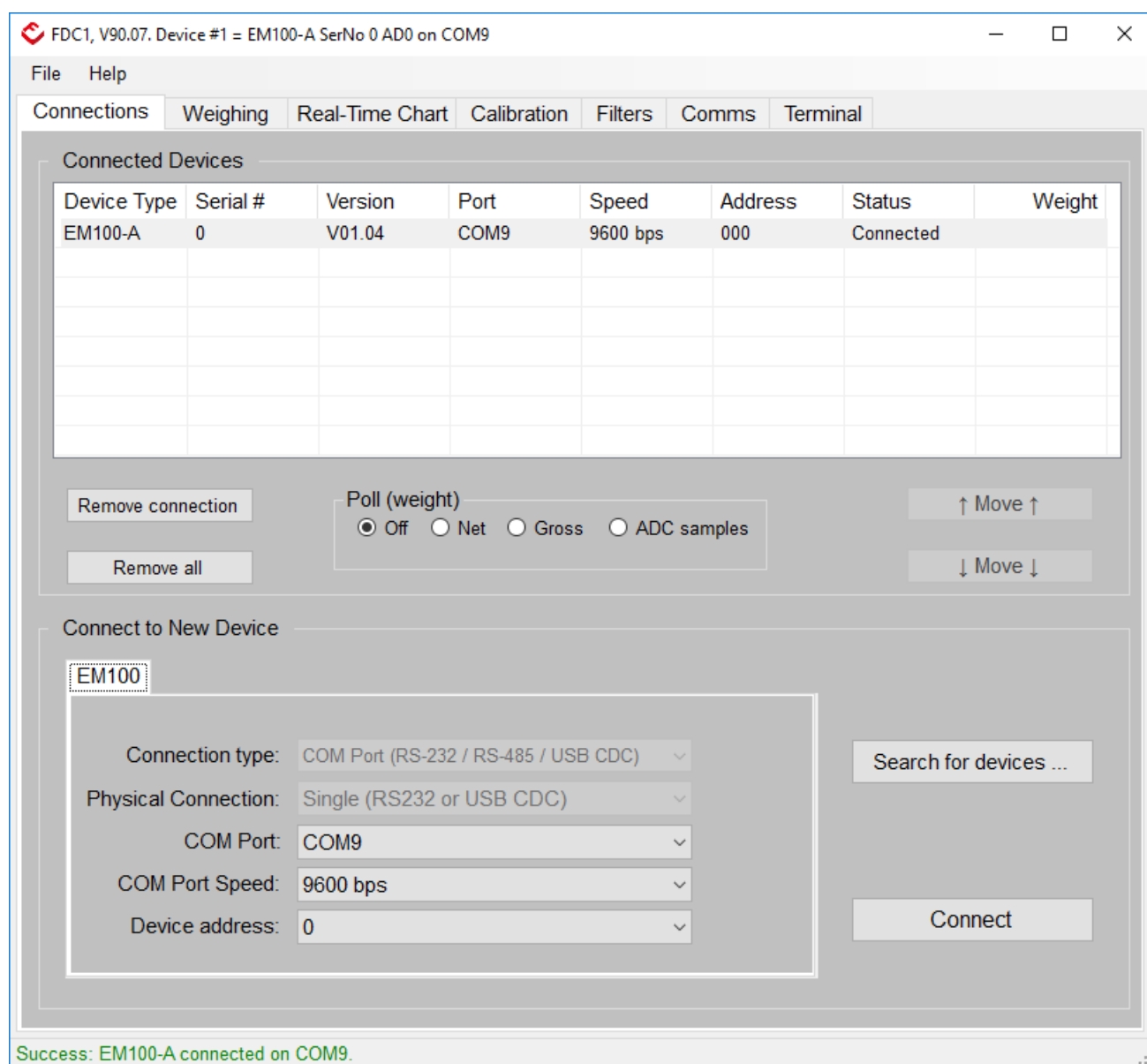


- Ensure the correct port has been assigned and appears similar to the screenshot.

2.2. Serial or USB Communications

2.2.1. Known Communications Setup

- Open FDC application.
- To connect to a device where the communication parameters are known, select the correct setup using the drop-down boxes in the '**Connect to New Device**' section.
- Establish a connection by pressing the '**Connect**' button.



FDC1, V90.07. Device #1 = EM100-A SerNo 0 AD0 on COM9

File Help

Connections Weighing Real-Time Chart Calibration Filters Comms Terminal

Connected Devices

Device Type	Serial #	Version	Port	Speed	Address	Status	Weight
EM100-A	0	V01.04	COM9	9600 bps	000	Connected	

Remove connection Poll (weight) ☒ Off ☐ Net ☐ Gross ☐ ADC samples

Remove all

Connect to New Device

EM100

Connection type: COM Port (RS-232 / RS-485 / USB CDC)

Physical Connection: Single (RS232 or USB CDC)

COM Port: COM9

COM Port Speed: 9600 bps

Device address: 0

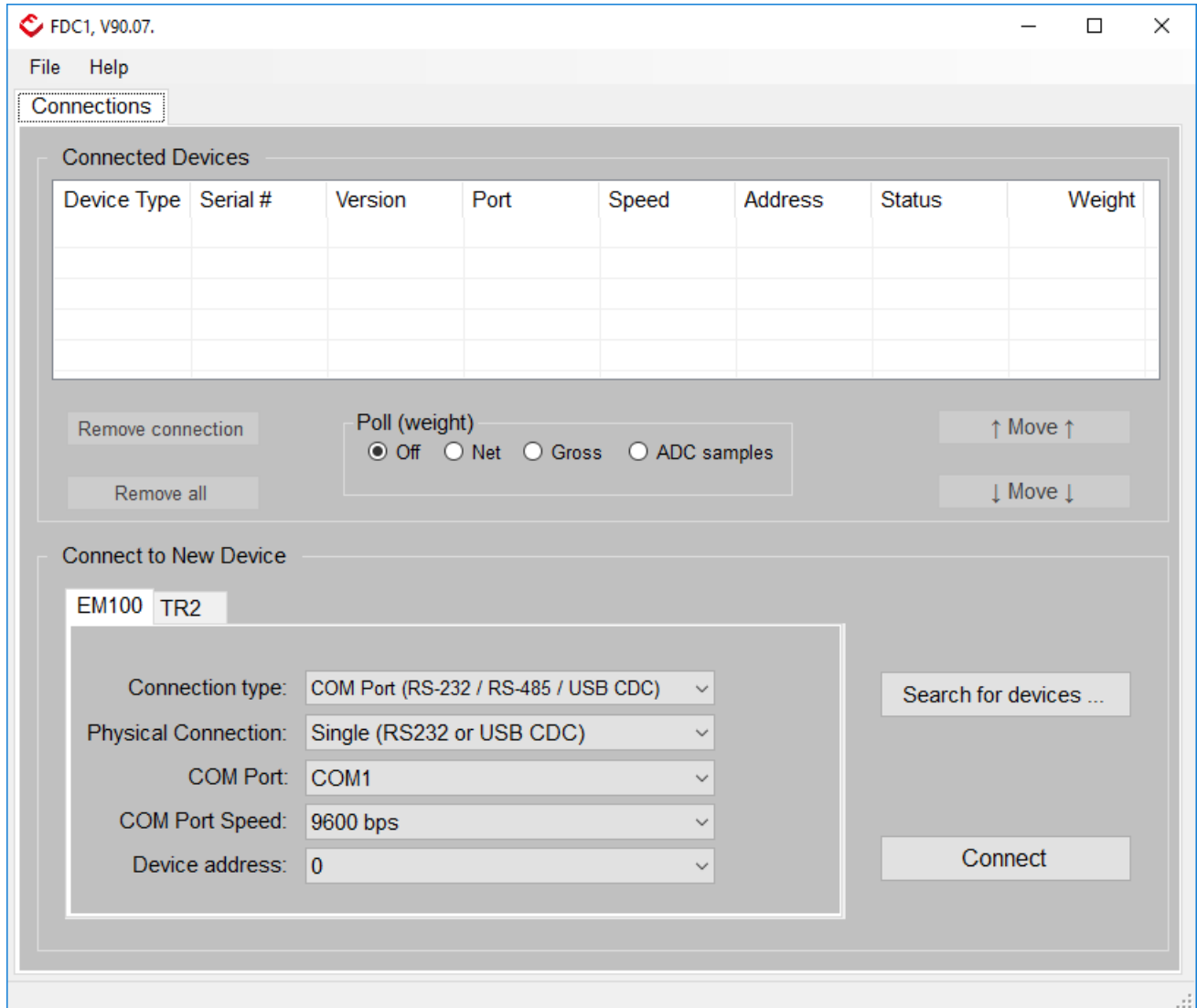
Success: EM100-A connected on COM9.

Note: At the bottom of the main screen, the status window will indicate a green message stating (depending on setup) '**Success: EM100-A connected on COM9**'.

- Highlight the selected device (by clicking on the entry) before moving onto another tab.

2.2.2. Unknown Communications Setup

- Open FDC application.
- Press the '**Search for Devices ...**' button.



FDC1, V90.07.

File Help

Connections

Connected Devices

Device Type	Serial #	Version	Port	Speed	Address	Status	Weight

Remove connection

Remove all

Poll (weight)

☒ Off ☐ Net ☐ Gross ☐ ADC samples

↑ Move ↑

↓ Move ↓

Connect to New Device

EM100 TR2

Connection type: COM Port (RS-232 / RS-485 / USB CDC) ▼

Physical Connection: Single (RS232 or USB CDC) ▼

COM Port: COM1 ▼

COM Port Speed: 9600 bps ▼

Device address: 0 ▼

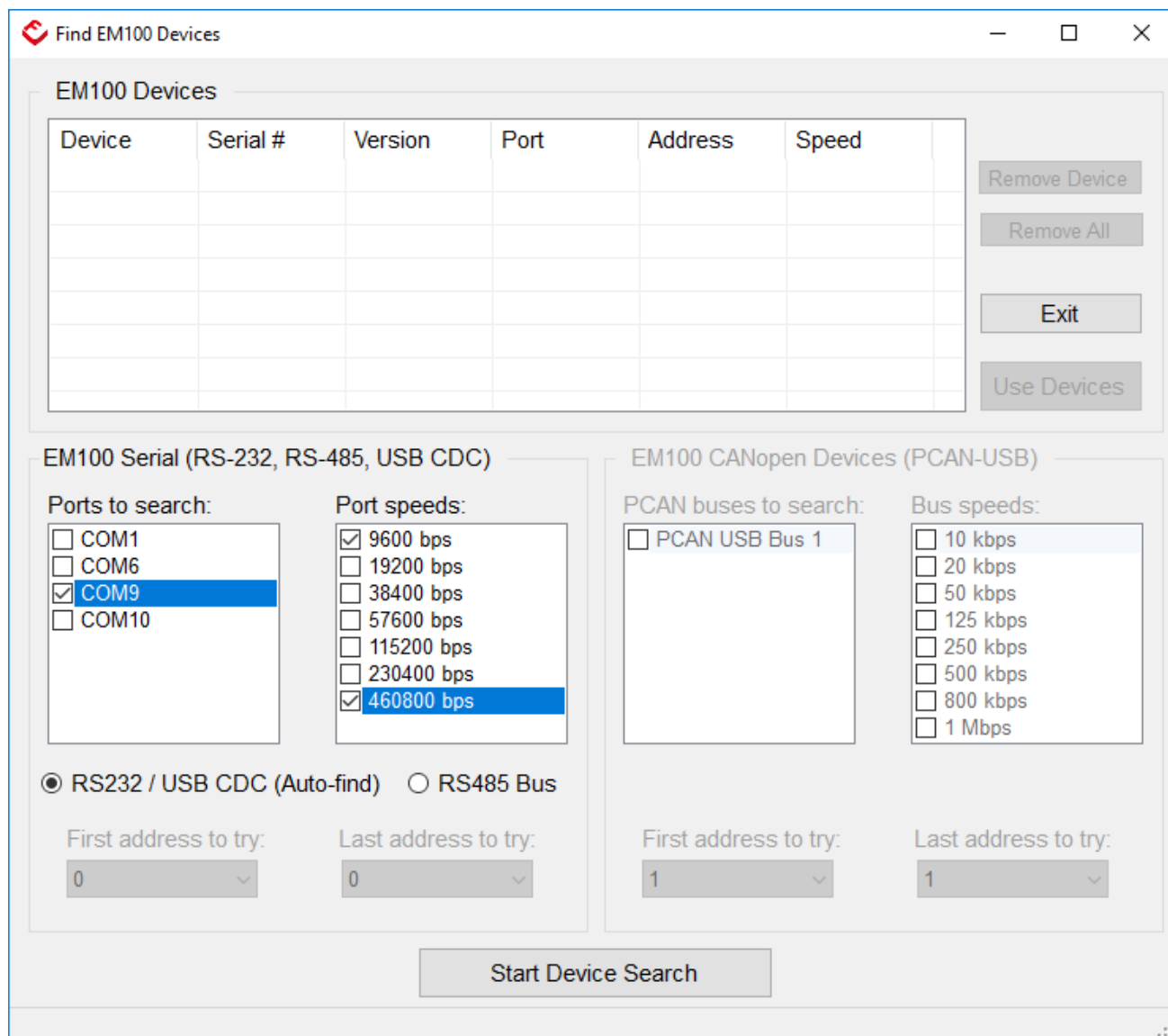
Search for devices ...

Connect

EM100 - FDC User Manual

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- Click the check-boxes for both port and speed to be searched. At least one selection from each list is required otherwise the search button will remain greyed out.
- After the selections have been made press the '**Start Device Search**' button to implement the search.



Find EM100 Devices

EM100 Devices

Device	Serial #	Version	Port	Address	Speed

Remove Device
Remove All
Exit
Use Devices

EM100 Serial (RS-232, RS-485, USB CDC)

Ports to search:

☐ COM1
☐ COM6
☒ COM9
☐ COM10

Port speeds:

☒ 9600 bps
☐ 19200 bps
☐ 38400 bps
☐ 57600 bps
☐ 115200 bps
☐ 230400 bps
☒ 460800 bps

☒ RS232 / USB CDC (Auto-find) ☐ RS485 Bus

First address to try: 0 Last address to try: 0

EM100 CANopen Devices (PCAN-USB)

PCAN buses to search:

☐ PCAN USB Bus 1

Bus speeds:

☐ 10 kbps
☐ 20 kbps
☐ 50 kbps
☐ 125 kbps
☐ 250 kbps
☐ 500 kbps
☐ 800 kbps
☐ 1 Mbps

First address to try: 1 Last address to try: 1

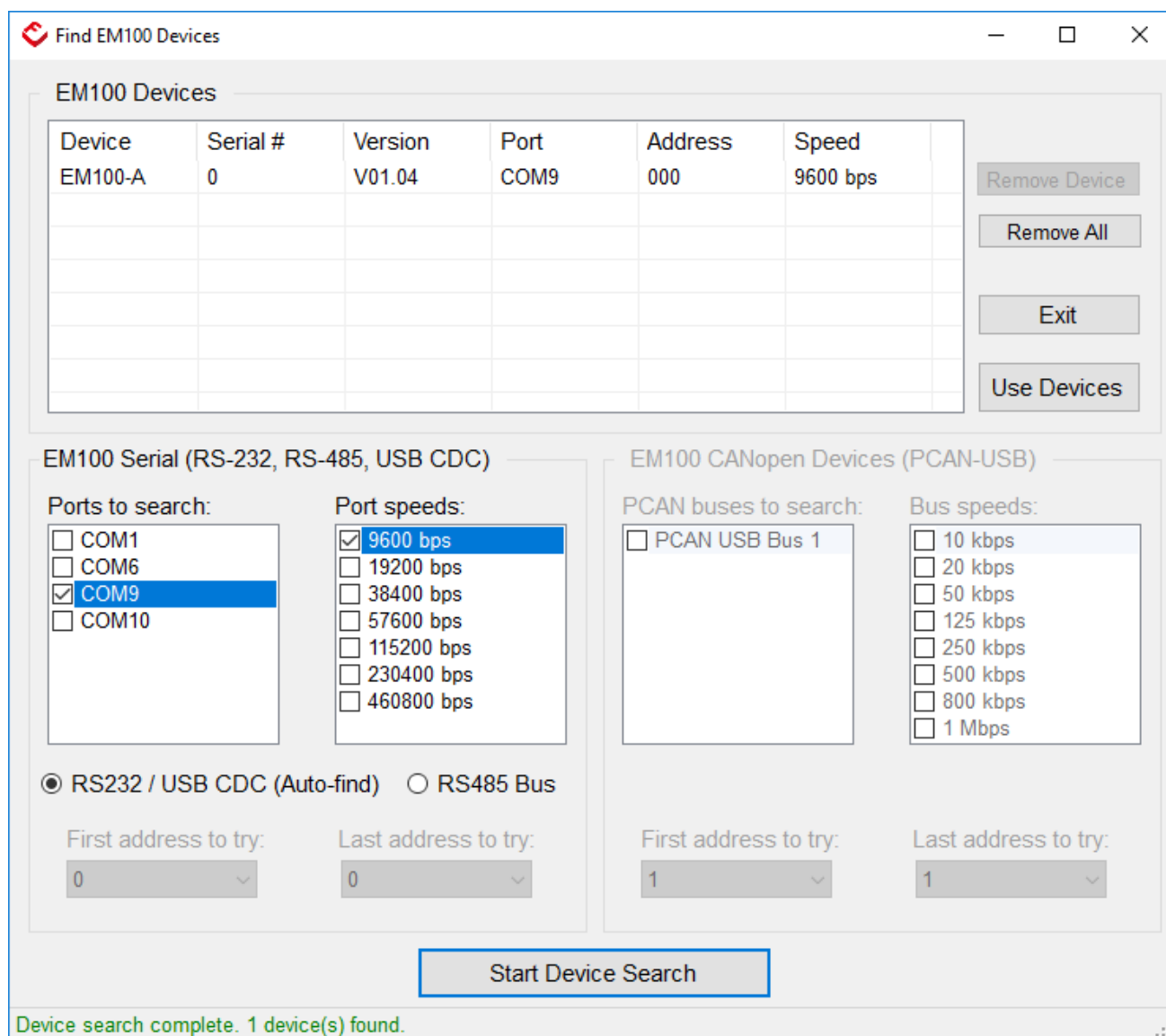
Start Device Search

Note: If the transmit delay time '**TD**' is set to a high value and all the check-boxes are selected, this may take a very long time to search all ports combinations.

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- The window will be populated when it has found a successful comms channel
- The status window at the bottom of the screen will state '**Device search complete. 1 device(s) found**'.



The screenshot shows the 'Find EM100 Devices' window. At the top, there's a title bar with the Flintec logo and window controls. Below the title bar, the window is divided into several sections. The top section, titled 'EM100 Devices', contains a table with columns: Device, Serial #, Version, Port, Address, and Speed. The first row shows 'EM100-A', '0', 'V01.04', 'COM9', '000', and '9600 bps'. To the right of the table are buttons: 'Remove Device', 'Remove All', 'Exit', and 'Use Devices'. Below the table, there are two main configuration sections. The left section is for 'EM100 Serial (RS-232, RS-485, USB CDC)' and includes 'Ports to search:' (with checkboxes for COM1, COM6, COM9, and COM10, where COM9 is selected), 'Port speeds:' (with a list of speeds from 9600 bps to 460800 bps, where 9600 bps is selected), and radio buttons for 'RS232 / USB CDC (Auto-find)' (selected) and 'RS485 Bus'. It also has 'First address to try:' and 'Last address to try:' dropdowns, both set to '0'. The right section is for 'EM100 CANopen Devices (PCAN-USB)' and includes 'PCAN buses to search:' (with a checkbox for 'PCAN USB Bus 1'), 'Bus speeds:' (with a list of speeds from 10 kbps to 1 Mbps), and 'First address to try:' and 'Last address to try:' dropdowns, both set to '1'. At the bottom center is a large 'Start Device Search' button. At the very bottom, a status bar displays the message 'Device search complete. 1 device(s) found.' in green text.

Device	Serial #	Version	Port	Address	Speed
EM100-A	0	V01.04	COM9	000	9600 bps

EM100 Serial (RS-232, RS-485, USB CDC)

Ports to search:

- ☐ COM1
- ☐ COM6
- ☒ COM9
- ☐ COM10

Port speeds:

- ☒ 9600 bps
- ☐ 19200 bps
- ☐ 38400 bps
- ☐ 57600 bps
- ☐ 115200 bps
- ☐ 230400 bps
- ☐ 460800 bps

☒ RS232 / USB CDC (Auto-find) ☐ RS485 Bus

First address to try: 0 Last address to try: 0

EM100 CANopen Devices (PCAN-USB)

PCAN buses to search:

- ☐ PCAN USB Bus 1

Bus speeds:

- ☐ 10 kbps
- ☐ 20 kbps
- ☐ 50 kbps
- ☐ 125 kbps
- ☐ 250 kbps
- ☐ 500 kbps
- ☐ 800 kbps
- ☐ 1 Mbps

First address to try: 1 Last address to try: 1

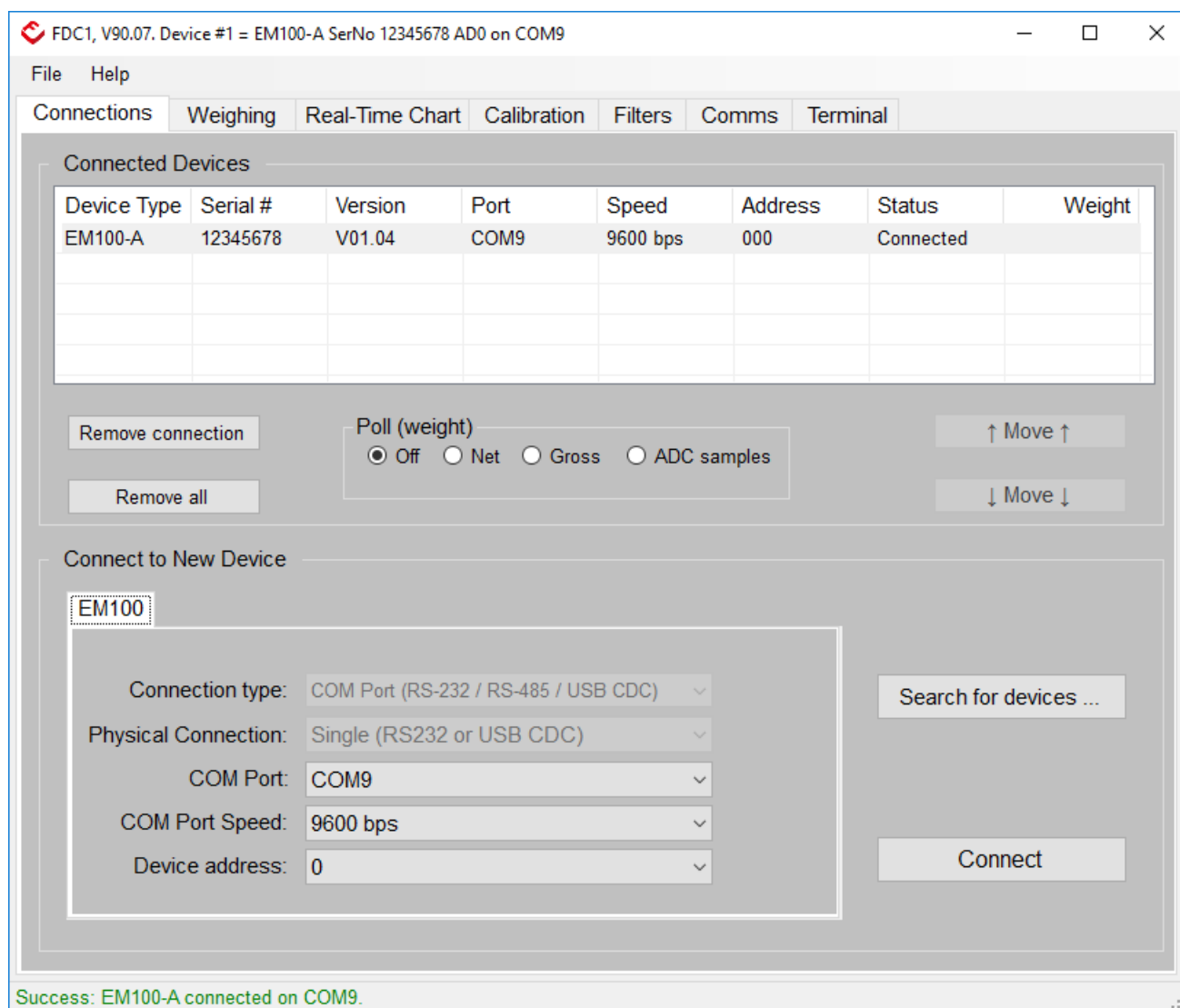
Start Device Search

Device search complete. 1 device(s) found.

- Select the device by clicking on the newly found module in the '**Devices**' window.
- Press '**Use Devices**' button to select and return back to the main window.

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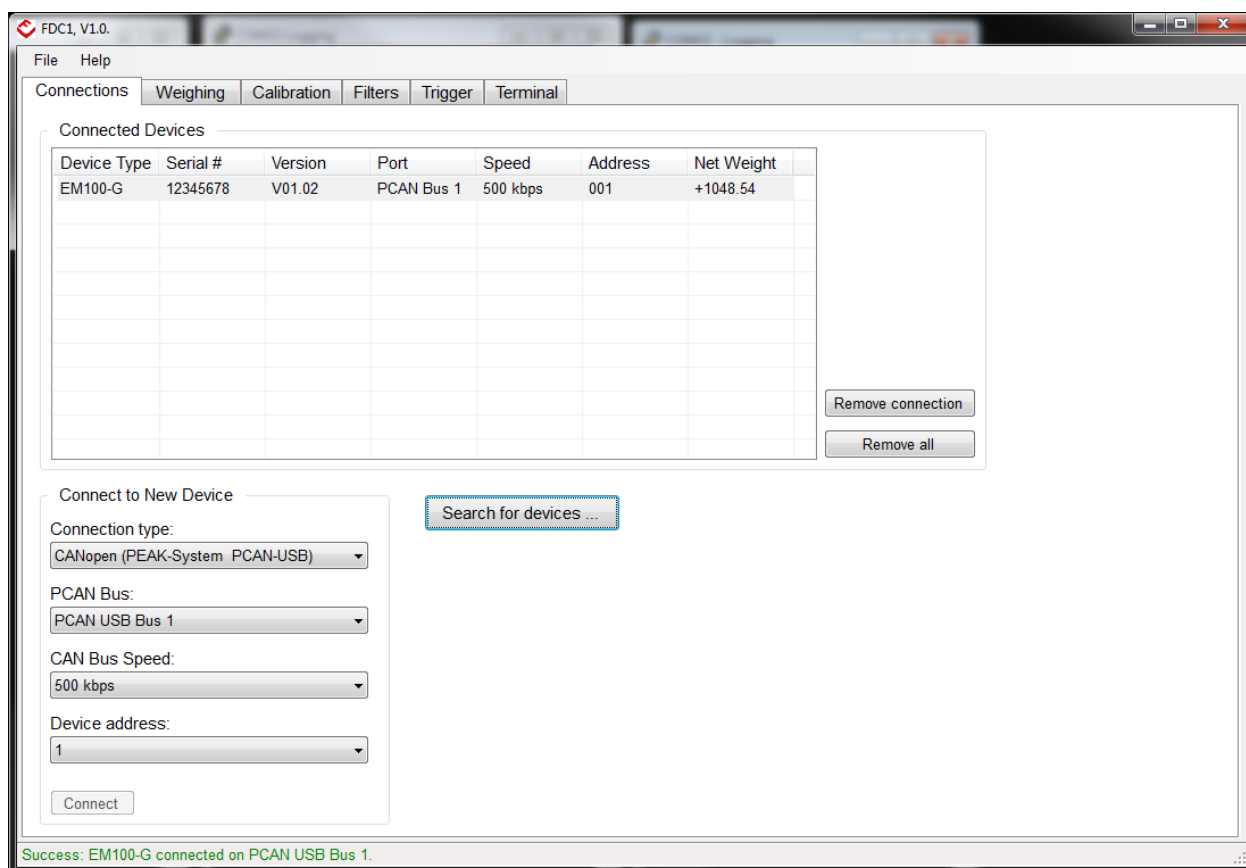


Note: At the bottom of the main screen, the status window will indicate a green message stating (depending on setup) '**Success: EM100-A connected on COM9**'. Click on the device to select before clicking on any of the other tabs.

2.3. CAN Communications

2.3.1. Known Communications Setup

- Open FDC application.
- To connect to a device where the communication parameters are known, select the correct setup using the drop-down boxes in the '**Connect to New Device**' section.
- Establish a connection by pressing the '**Connect**' button.

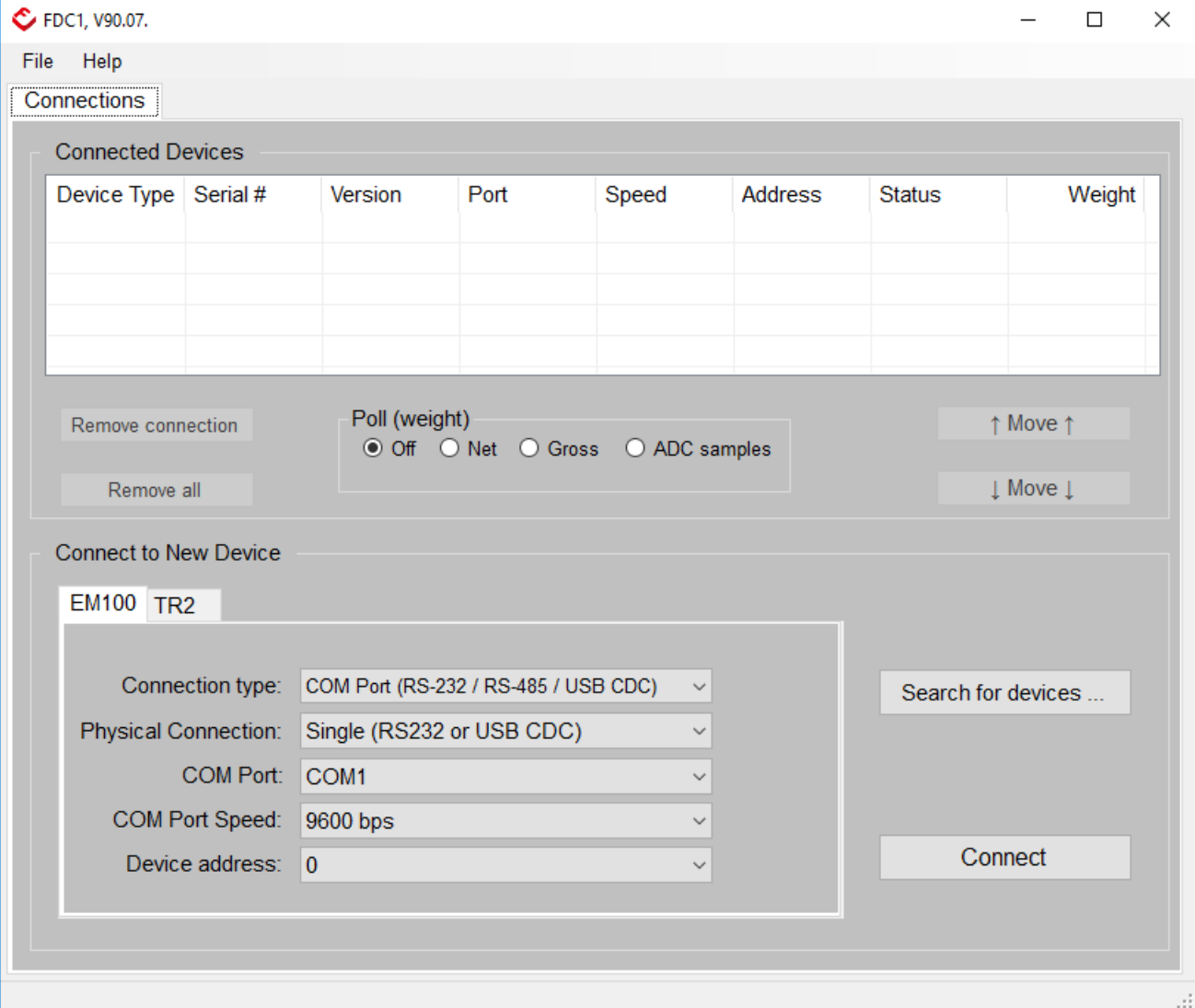


Note: At the bottom of the main screen, the status window will indicate a green message stating (depending upon the CAN adaptor and setup) '**Success: EM100-G connected on PCAN USB Bus 1**'.

- Click on the device to select before clicking on any of the other tabs.

2.3.2. Unknown Communications Setup

- Open FDC application.
- Press the '**Search for Devices ...**' button.



FDC1, V90.07.

File Help

Connections

Connected Devices

Device Type	Serial #	Version	Port	Speed	Address	Status	Weight

Remove connection

Remove all

Poll (weight)

☒ Off ☐ Net ☐ Gross ☐ ADC samples

↑ Move ↑

↓ Move ↓

Connect to New Device

EM100 TR2

Connection type: COM Port (RS-232 / RS-485 / USB CDC) ▼

Physical Connection: Single (RS232 or USB CDC) ▼

COM Port: COM1 ▼

COM Port Speed: 9600 bps ▼

Device address: 0 ▼

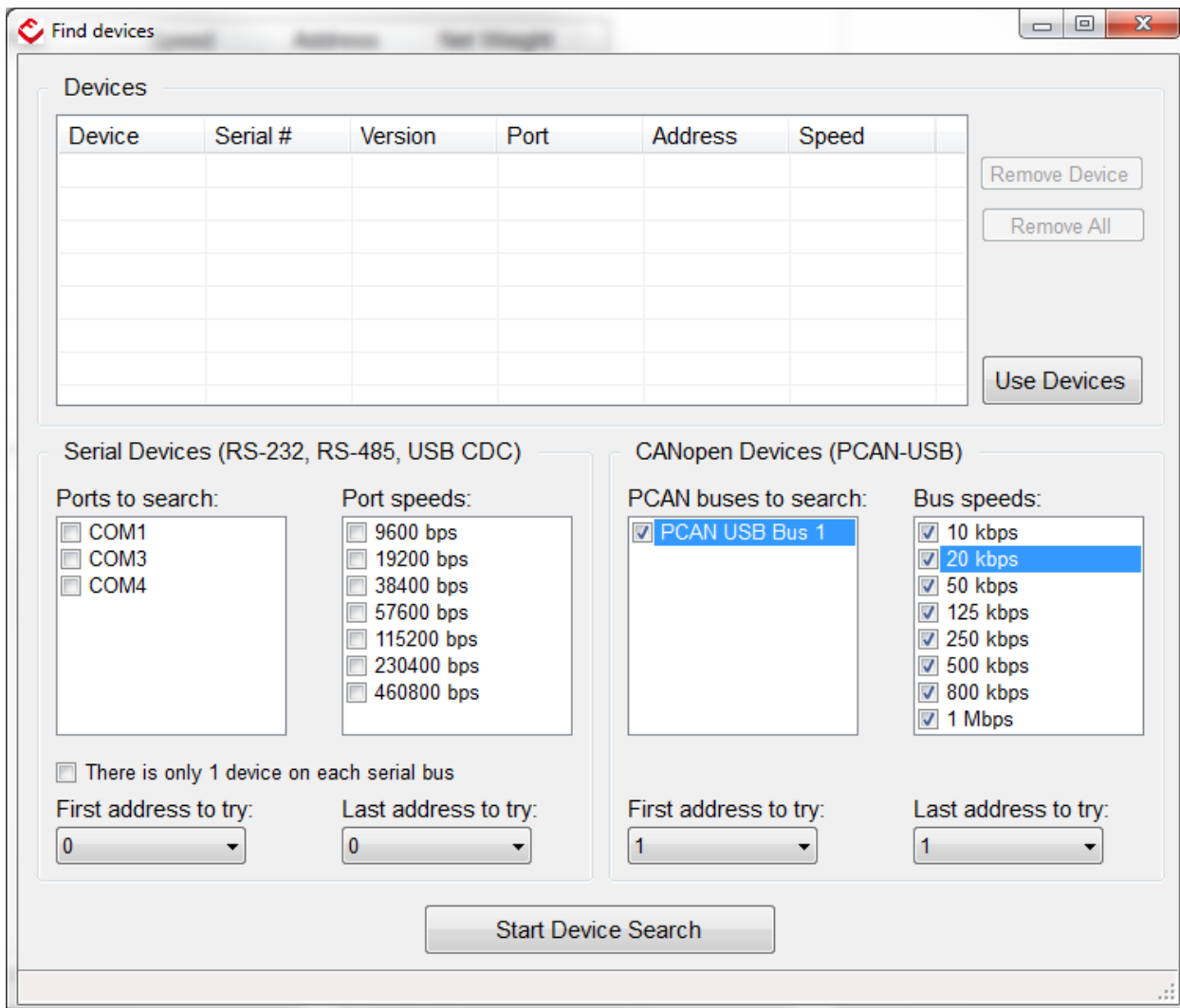
Search for devices ...

Connect

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- In the '**CANopen Devices**' section, click the check-boxes for both port and speed to be searched. At least one selection from each list is required otherwise the search button will remain greyed out.
- After the selections have been made press the '**Start Device Search**' button to implement the search.



The screenshot shows the 'Find devices' window with the following configuration:

Device	Serial #	Version	Port	Address	Speed

Serial Devices (RS-232, RS-485, USB CDC)

Ports to search: ☐ COM1 ☐ COM3 ☐ COM4

Port speeds: ☐ 9600 bps ☐ 19200 bps ☐ 38400 bps ☐ 57600 bps ☐ 115200 bps ☐ 230400 bps ☐ 460800 bps

☐ There is only 1 device on each serial bus

First address to try: 0 Last address to try: 0

CANopen Devices (PCAN-USB)

PCAN buses to search: ☒ PCAN USB Bus 1

Bus speeds: ☒ 10 kbps ☒ 20 kbps ☒ 50 kbps ☒ 125 kbps ☒ 250 kbps ☒ 500 kbps ☒ 800 kbps ☒ 1 Mbps

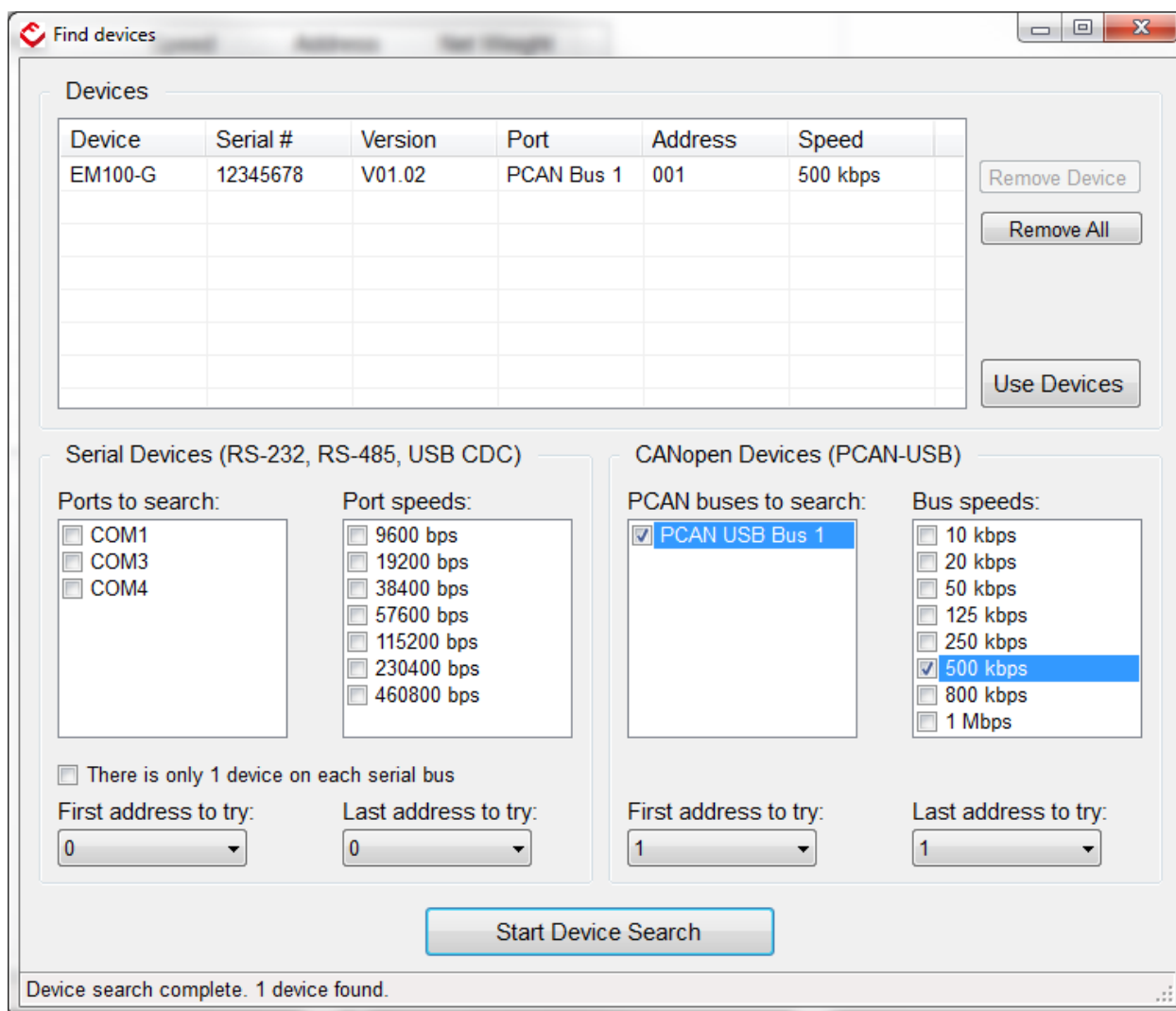
First address to try: 1 Last address to try: 1

Start Device Search

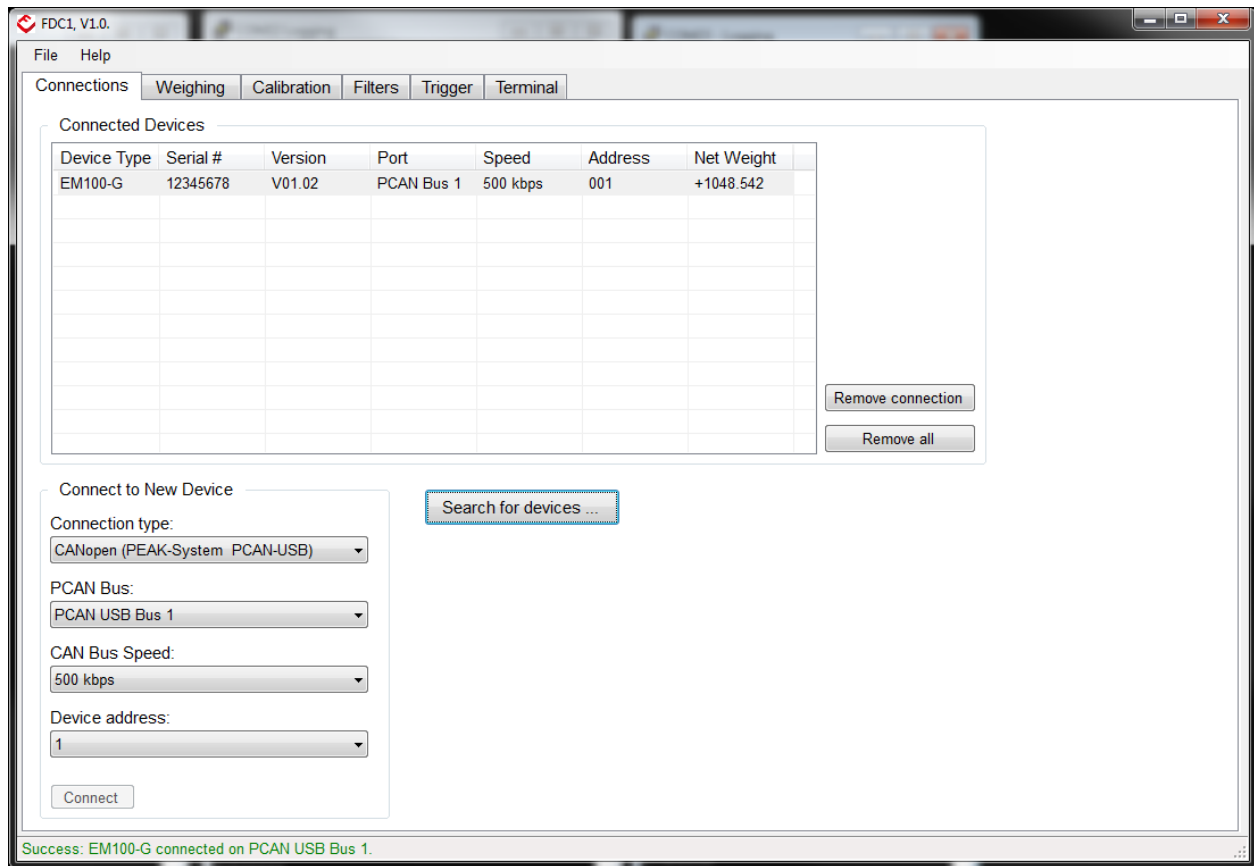
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- The window will be populated when it has found a successful comms channel
- The status window at the bottom of the screen will state '**Device search complete. 1 device found**'.



- Select the device by clicking on the newly found module in the '**Devices**' window.
- Press '**Use Devices**' button to select and return back to the main window.



Note: At the bottom of the main screen, the status window will indicate a green message stating (depending on CAN adaptor and setup) '**Success: EM100-G connected on PCAN USB Bus 1**'.

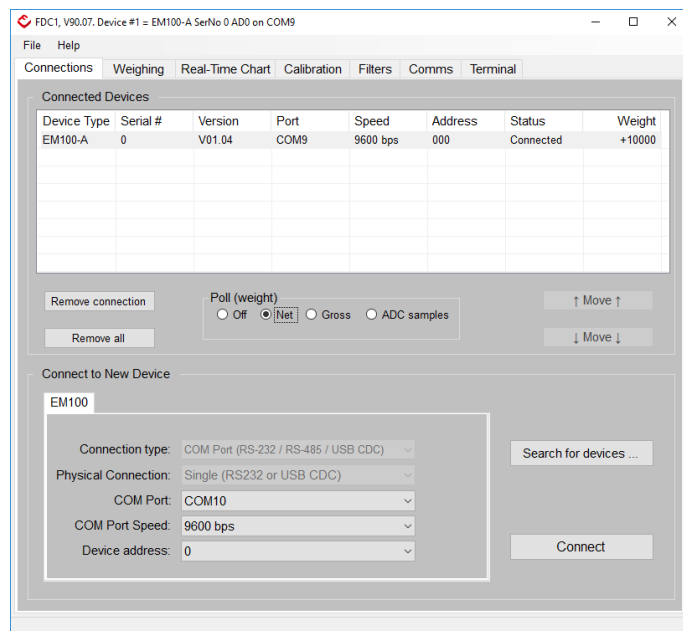
- Click on the device to select before clicking on any of the other tabs.

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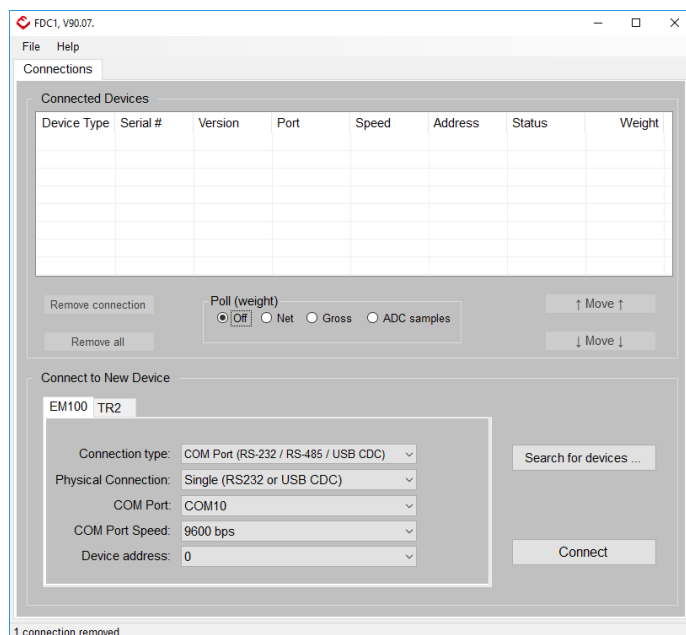
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2.4. Device Removal

- If for any reason, the detected device needs to be removed, press the '**Remove Connection**' button.

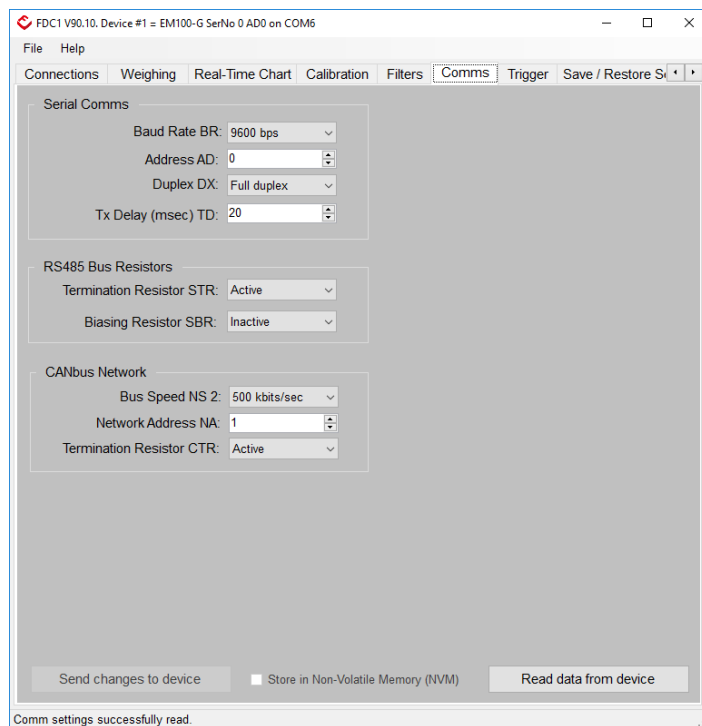


- The Status window at the bottom of the screen will display '**1 Connection Removed**'.



2.5. Additional Communication Settings

- Click on the '**Comms**' tab.
- Additional settings e.g. setting of address, comms mode or 120Ω termination resistance can be set in this tab.
- To save the current session, press the '**Send Changes to Device**' button.
- To save the changes for future sessions, tick the '**Store in Non-Volatile Memory**' check-box before pressing the '**Send Changes to Device**' button.



Note: If changing fundamental communication parameters e.g. Baud-rate, Address etc. this will require the re-negotiation of the comms channel. Also, these changes require a software reset (or hardware reset) to take effect. The configuration will continue to be operational until the reset is applied.

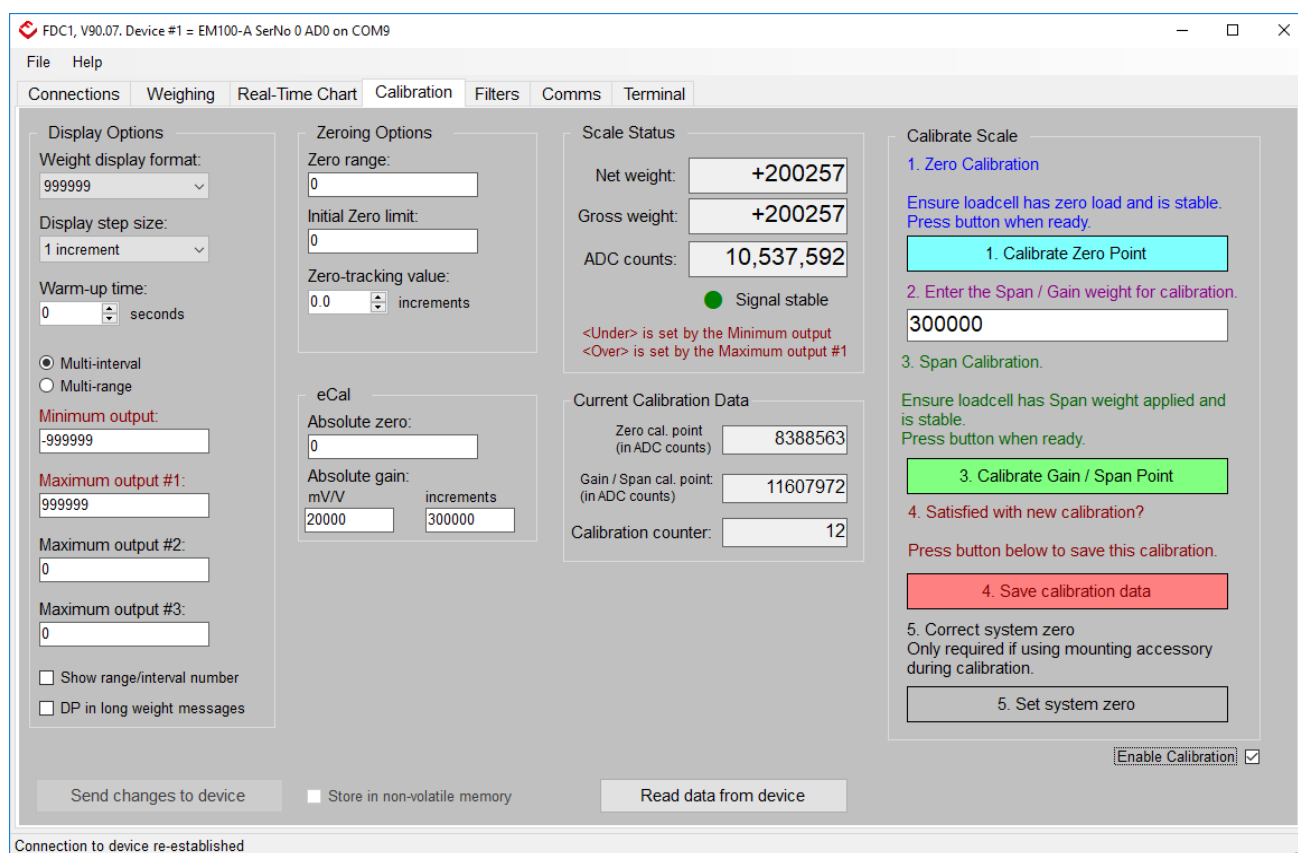
The parameters can be changed and applied only during the current session. If, however, these settings are applied after a power cycle, save the new settings to non-volatile memory.

3. Calibration

3.1. Zero Calibration

3.1.1. Zero Calibration Setup

- Click on the '**Calibration**' tab.
- Tick the '**Enable Calibration**' check-box in the bottom right corner.



FDC1, V90.07, Device #1 = EM100-A SerNo 0 AD0 on COM9

File Help

Connections Weighing Real-Time Chart **Calibration** Filters Comms Terminal

Display Options

Weight display format:
999999

Display step size:
1 increment

Warm-up time:
0 seconds

☒ Multi-interval
☐ Multi-range

Minimum output:
-999999

Maximum output #1:
999999

Maximum output #2:
0

Maximum output #3:
0

☐ Show range/interval number
☐ DP in long weight messages

Zeroing Options

Zero range:
0

Initial Zero limit:
0

Zero-tracking value:
0.0 increments

eCal

Absolute zero:
0

Absolute gain:
mV/V: 20000 increments: 300000

Scale Status

Net weight: +200257

Gross weight: +200257

ADC counts: 10,537,592

Signal stable

<Under> is set by the Minimum output
<Over> is set by the Maximum output #1

Current Calibration Data

Zero cal. point (in ADC counts): 8388563

Gain / Span cal. point (in ADC counts): 11607972

Calibration counter: 12

Calibrate Scale

1. Zero Calibration

Ensure loadcell has zero load and is stable. Press button when ready.

1. Calibrate Zero Point

2. Enter the Span / Gain weight for calibration.

300000

3. Span Calibration.

Ensure loadcell has Span weight applied and is stable. Press button when ready.

3. Calibrate Gain / Span Point

4. Satisfied with new calibration?

Press button below to save this calibration.

4. Save calibration data

5. Correct system zero
Only required if using mounting accessory during calibration.

5. Set system zero

Enable Calibration ☒

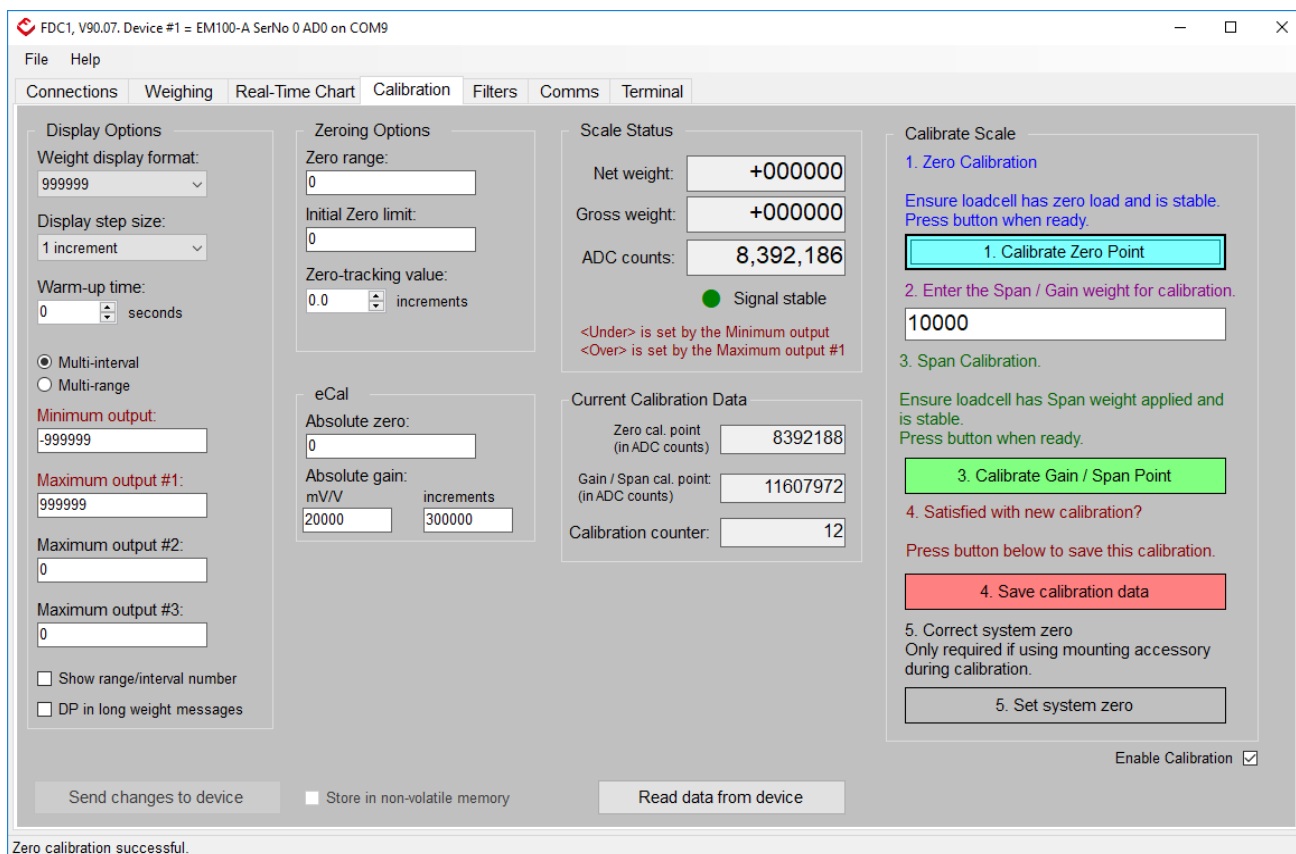
Send changes to device ☐ Store in non-volatile memory Read data from device

Connection to device re-established

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0087171

- Apply the zero (or 0mv/V) point input stimulus by either using unloaded scale or calibration simulator.
- The '**Stable Signal**' indicator should turn green after a couple of seconds (see section 3.3 **Motion Detection Settings** for details on detection window).
- Press the '**Calibration Zero Point**' button.
- Press the '**Save Calibration Data**' button if only making a zero-point adjustment. This will increment the TAC counter by 1.



FDC1, V90.07. Device #1 = EM100-A SerNo 0 ADO on COM9

File Help

Connections Weighing Real-Time Chart Calibration Filters Comms Terminal

Display Options

Weight display format:
999999

Display step size:
1 increment

Warm-up time:
0 seconds

☒ Multi-interval
☐ Multi-range

Minimum output:
-999999

Maximum output #1:
999999

Maximum output #2:
0

Maximum output #3:
0

☐ Show range/interval number
☐ DP in long weight messages

Zeroing Options

Zero range:
0

Initial Zero limit:
0

Zero-tracking value:
0.0 increments

eCal

Absolute zero:
0

Absolute gain:
mV/V: 20000 increments: 300000

Scale Status

Net weight: +000000

Gross weight: +000000

ADC counts: 8,392,186

Signal stable

<Under> is set by the Minimum output
<Over> is set by the Maximum output #1

Current Calibration Data

Zero cal. point (in ADC counts): 8392188

Gain / Span cal. point (in ADC counts): 11607972

Calibration counter: 12

Calibrate Scale

1. Zero Calibration

Ensure loadcell has zero load and is stable.
Press button when ready.

1. Calibrate Zero Point

2. Enter the Span / Gain weight for calibration.

10000

3. Span Calibration.

Ensure loadcell has Span weight applied and is stable.
Press button when ready.

3. Calibrate Gain / Span Point

4. Satisfied with new calibration?

Press button below to save this calibration.

4. Save calibration data

5. Correct system zero
Only required if using mounting accessory during calibration.

5. Set system zero

Enable Calibration ☒

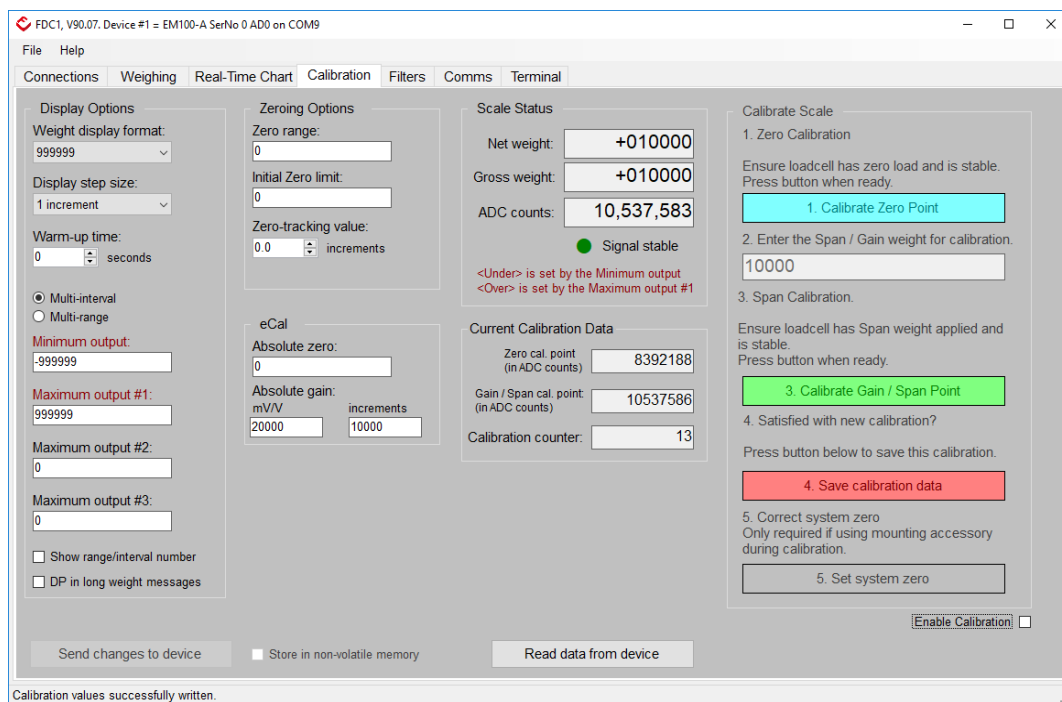
Send changes to device ☐ Store in non-volatile memory Read data from device

Zero calibration successful.

3.2. Span/Gain Calibration

3.2.1. Span/Gain Calibration Setup

- Open FDC application.
- Click on the '**Calibration**' Tab.
- Tick the '**Enable Calibration**' check-box in the bottom right corner.
- Enter the number of divisions required in the '**Gain/Span increments**' field (e.g. 10,000).
- Change the input loading to the required calibration point (e.g. 2mV/V).
- Allow the readings (ADC/Net/Gross) to settle.
- The '**Stable Signal**' indicator should turn green after a couple of seconds (see section 3.3 **Motion Detection Settings** for details on detection window).
- Press the '**Calibration Gain/Span**' button.
- Press the '**Save Calibration Data**' button. This will increment the TAC counter by 1.

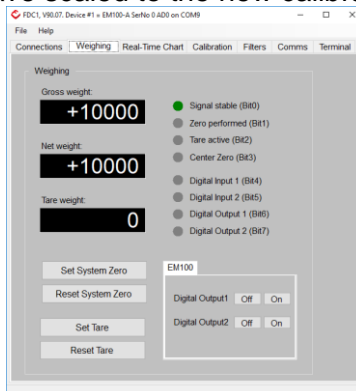


The screenshot shows the 'Calibration' tab of the FDC1 V90.07 software. The interface is divided into several sections:

- Display Options:** Includes 'Weight display format' (set to 999999), 'Display step size' (set to 1 increment), 'Warm-up time' (set to 0 seconds), and radio buttons for 'Multi-interval' and 'Multi-range'.
- Zeroing Options:** Includes 'Zero range' (set to 0), 'Initial Zero limit' (set to 0), and 'Zero-tracking value' (set to 0.0 increments).
- Scale Status:** Shows 'Net weight' (+010000), 'Gross weight' (+010000), and 'ADC counts' (10,537,583). A green dot indicates 'Signal stable'.
- eCal:** Includes 'Absolute zero' (set to 0), 'Absolute gain' (set to 20000 mV/V and 10000 increments), and 'Current Calibration Data' (Zero cal. point: 8392188, Gain / Span cal. point: 10537586, Calibration counter: 13).
- Calibrate Scale:** A list of steps: 1. Zero Calibration, 2. Enter the Span / Gain weight for calibration (10000), 3. Span Calibration, 4. Satisfied with new calibration? (3. Calibrate Gain / Span Point), 5. Correct system zero. Buttons for '1. Calibrate Zero Point', '3. Calibrate Gain / Span Point', '4. Save calibration data', and '5. Set system zero' are visible.
- Buttons:** 'Send changes to device', 'Store in non-volatile memory', and 'Read data from device' are at the bottom.

At the bottom right, there is an 'Enable Calibration' checkbox which is currently unchecked.

Note: The Net/Gross figures will have scaled to the new calibration points.



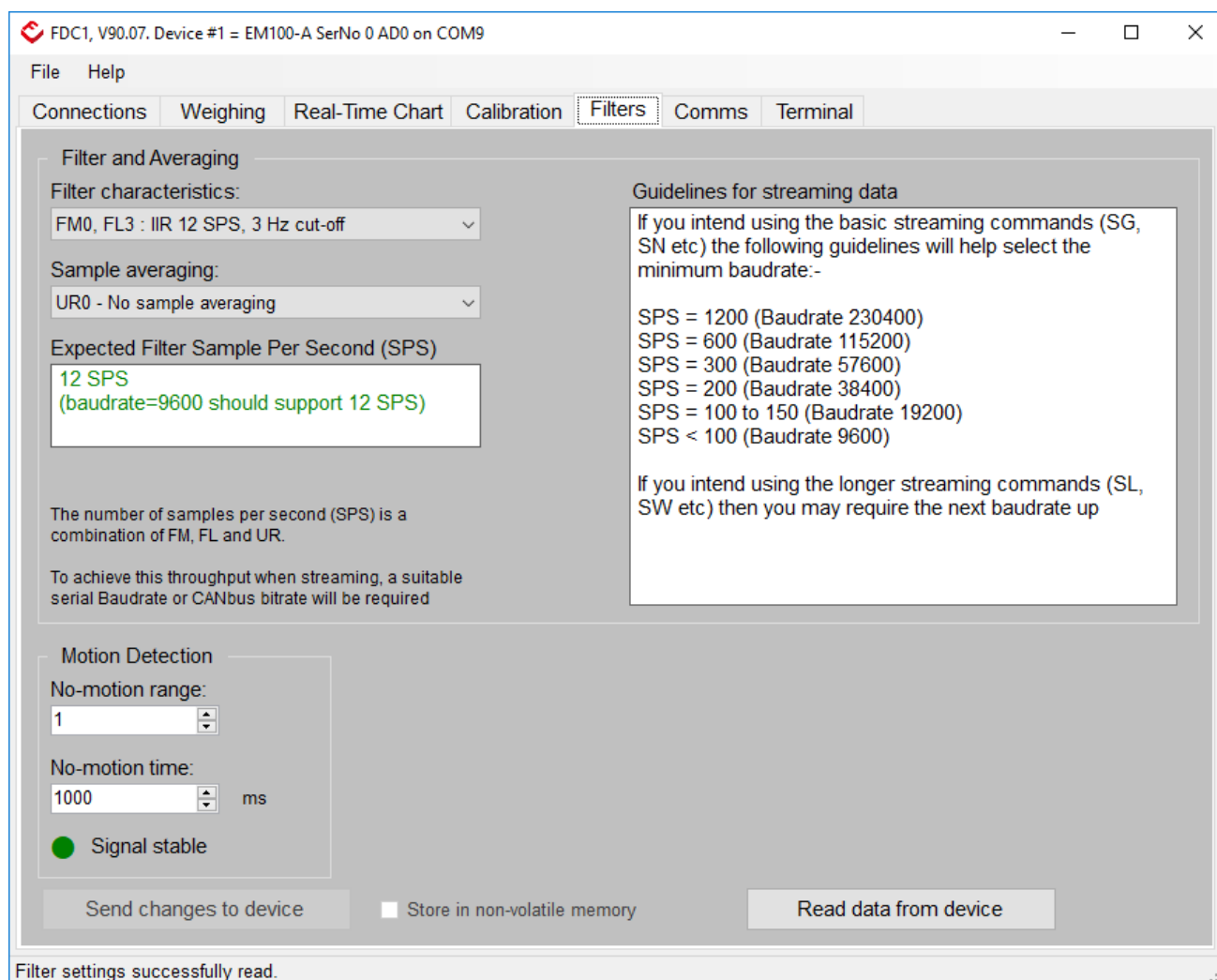
The screenshot shows the 'Weighing' tab of the FDC1 V90.07 software. The interface displays the following information:

- Weighting:** Shows 'Gross weight' (+10000), 'Net weight' (+10000), and 'Tare weight' (0).
- Buttons:** 'Set System Zero', 'Reset System Zero', 'Set Tare', and 'Reset Tare' are visible.
- EM100:** A section with 'Digital Output1' and 'Digital Output2' buttons, each with 'Off' and 'On' options.
- Status Indicators:** A green dot indicates 'Signal stable (B40)'. Other indicators for 'Zero performed (B41)', 'Tare active (B42)', 'Center Zero (B43)', 'Digital Input 1 (B44)', 'Digital Input 2 (B45)', 'Digital Output 1 (B46)', and 'Digital Output 2 (B47)' are shown.

3.3. Motion-Detection Settings

If the '**Stable Signal**' indicator remains red or toggles between states, adjust the '**Motion Detection**' window settings.

- Click on the '**Filters**' tab.
- Scale the '**No-Motion Range**' and '**No-Motion Time**' parameters to sensible values.
- The Factory defaults are set to 1 step and 1000ms respectively.
- Save the changes by pressing the '**Send Changes to Device**' button (tick '**Store in Non-Volatile Memory**' check-box if setting is to be preserved after a reset or power cycle).



FDC1, V90.07. Device #1 = EM100-A SerNo 0 AD0 on COM9

File Help

Connections Weighing Real-Time Chart Calibration **Filters** Comms Terminal

Filter and Averaging

Filter characteristics:
FM0, FL3 : IIR 12 SPS, 3 Hz cut-off

Sample averaging:
UR0 - No sample averaging

Expected Filter Sample Per Second (SPS)
12 SPS
(baudrate=9600 should support 12 SPS)

The number of samples per second (SPS) is a combination of FM, FL and UR.

To achieve this throughput when streaming, a suitable serial Baudrate or CANbus bitrate will be required

Guidelines for streaming data

If you intend using the basic streaming commands (SG, SN etc) the following guidelines will help select the minimum baudrate:-

- SPS = 1200 (Baudrate 230400)
- SPS = 600 (Baudrate 115200)
- SPS = 300 (Baudrate 57600)
- SPS = 200 (Baudrate 38400)
- SPS = 100 to 150 (Baudrate 19200)
- SPS < 100 (Baudrate 9600)

If you intend using the longer streaming commands (SL, SW etc) then you may require the next baudrate up

Motion Detection

No-motion range:
1

No-motion time:
1000 ms

● Signal stable

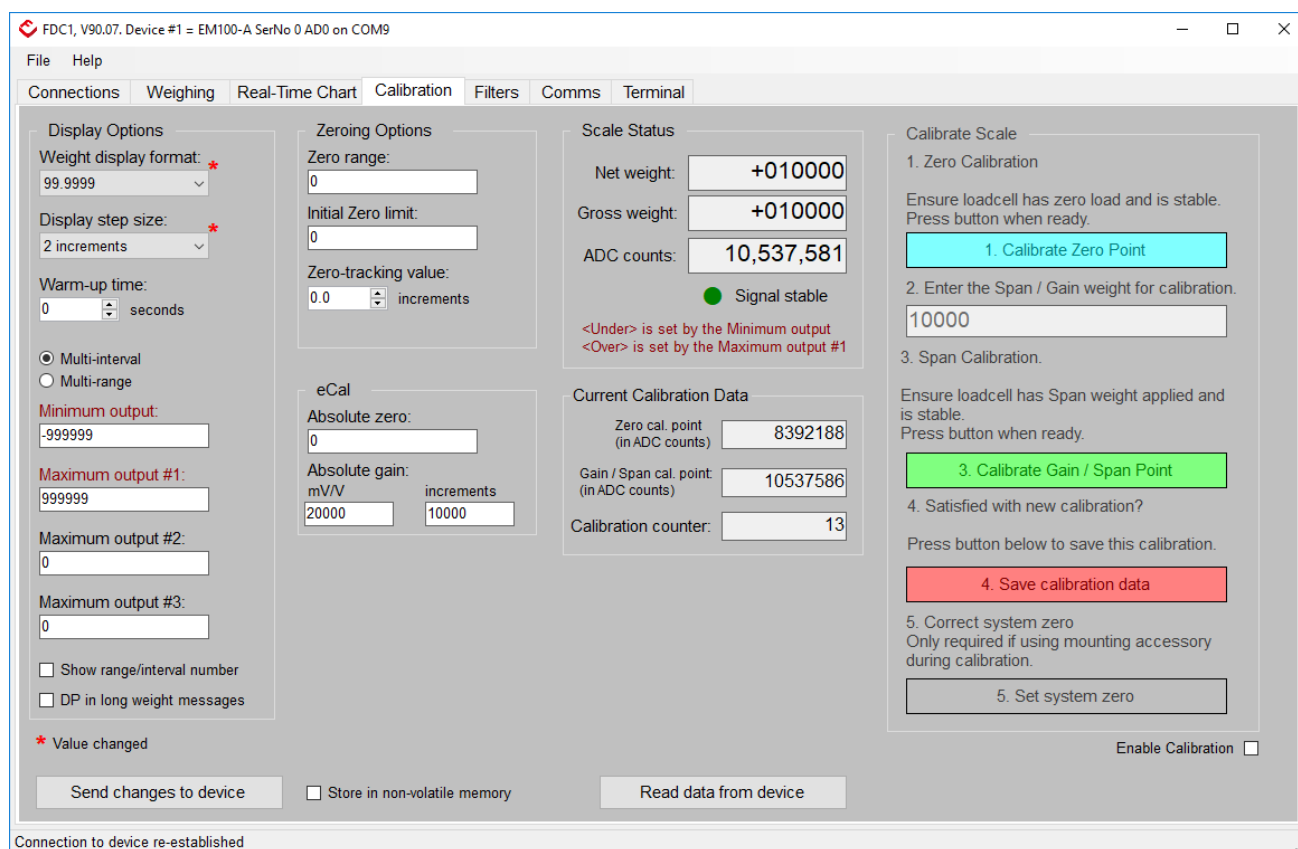
Send changes to device ☐ Store in non-volatile memory Read data from device

Filter settings successfully read.

4. Display Options

4.1. Change Weight Format

- Click on the '**Calibration**' Tab.
- Change the property of the '**Weight Display Format**' drop-down box to the appropriate selection.
- Change the property of the '**Display Step Size**' drop-down box to the desired setting.
- The properties adjusted will be highlighted with a red asterisk to the right. To save the selection, press the '**Send Changes to Device**' button.



FDC1, V90.07. Device #1 = EM100-A SerNo 0 AD0 on COM9

File Help

Connections Weighing Real-Time Chart Calibration Filters Comms Terminal

Display Options

Weight display format: *
99.9999

Display step size: *
2 increments

Warm-up time:
0 seconds

☒ Multi-interval
☐ Multi-range

Minimum output:
-999999

Maximum output #1:
999999

Maximum output #2:
0

Maximum output #3:
0

☐ Show range/interval number
☐ DP in long weight messages

* Value changed

Zeroing Options

Zero range:
0

Initial Zero limit:
0

Zero-tracking value:
0.0 increments

eCal

Absolute zero:
0

Absolute gain:
20000 mV/V 10000 increments

Scale Status

Net weight: +010000

Gross weight: +010000

ADC counts: 10,537,581

Signal stable

<Under> is set by the Minimum output
<Over> is set by the Maximum output #1

Current Calibration Data

Zero cal. point (in ADC counts): 8392188

Gain / Span cal. point (in ADC counts): 10537586

Calibration counter: 13

Calibrate Scale

1. Zero Calibration

Ensure loadcell has zero load and is stable. Press button when ready.

1. Calibrate Zero Point

2. Enter the Span / Gain weight for calibration.

10000

3. Span Calibration.

Ensure loadcell has Span weight applied and is stable. Press button when ready.

3. Calibrate Gain / Span Point

4. Satisfied with new calibration?

Press button below to save this calibration.

4. Save calibration data

5. Correct system zero
Only required if using mounting accessory during calibration.

5. Set system zero

Enable Calibration ☐

Send changes to device ☐ Store in non-volatile memory Read data from device

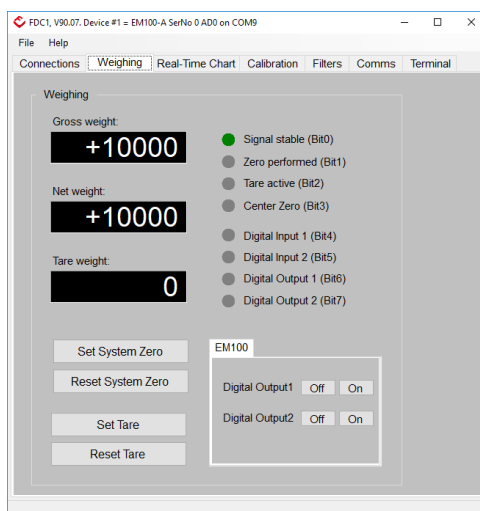
Connection to device re-established

Note: To make the changes permanent, tick the '**Store in Non-Volatile Memory**' check-box before pressing the '**Send Changes to Device**' button.

5. Weighing Functions

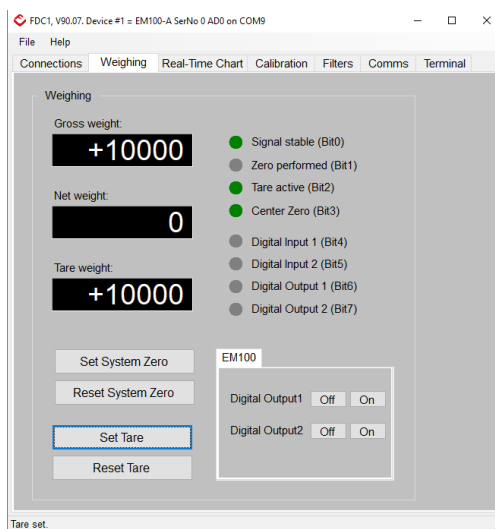
5.1. Weight

- Click on the '**Weighing**' Tab.
- This tab displays the Gross, Net and Tare weights.



5.2. Tare Weight

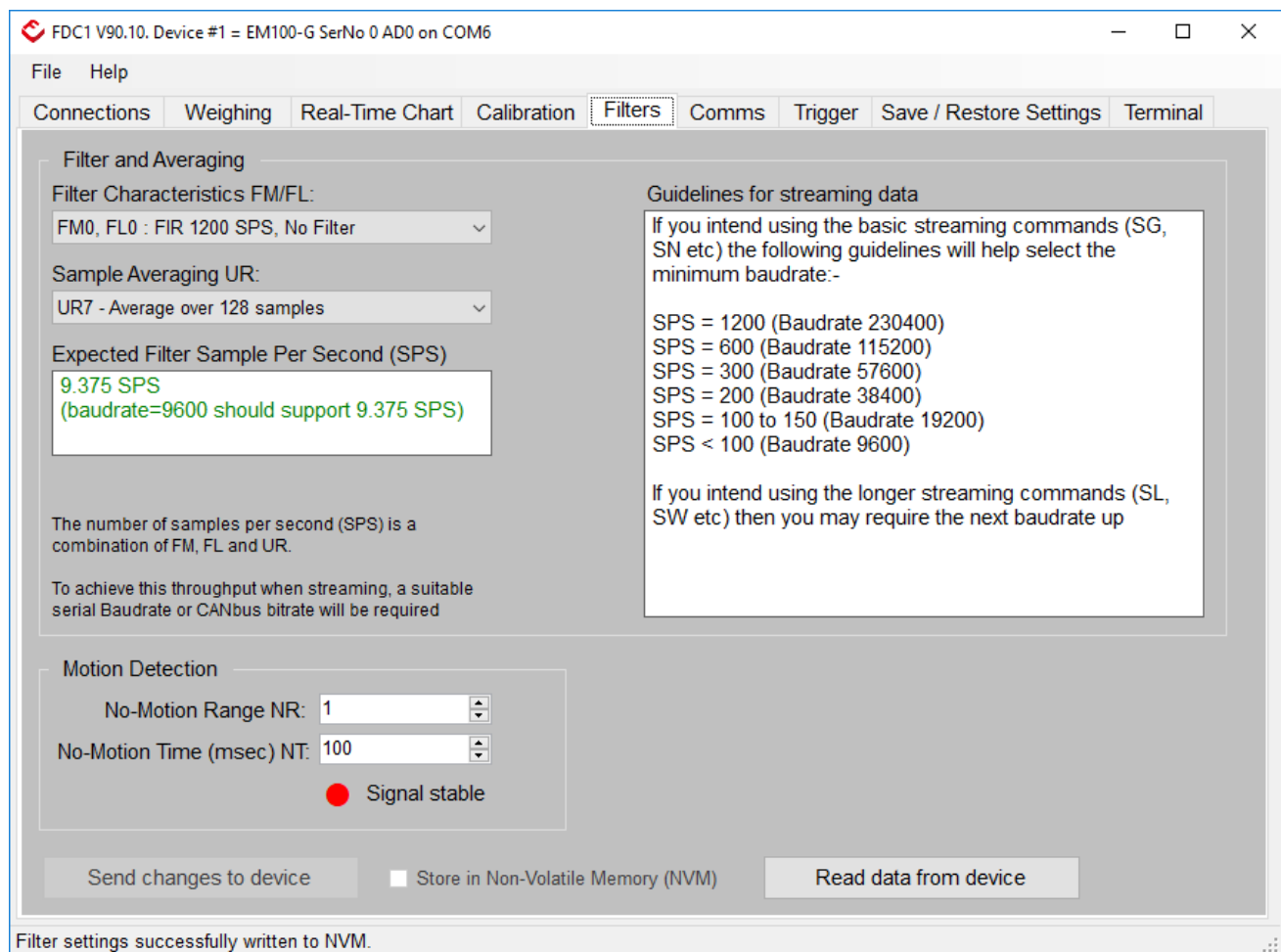
- Click on the '**Weighing**' Tab.
- Press the '**Set Tare**' button to enable a tare weight.



6. Filters

6.1. Filter Settings

- Click on the '**Filters**' Tab.
- Select the required '**Filter Characteristics**' from the drop-down list (FIR & IIR filters with a selection of cut-off frequencies are available).
- Any changes to the filters during the current session can be made by pressing the '**Send Changes to Device**' button. Ticking the '**Store in Non-Volatile Memory**' check-box prior to executing the save command will preserve the settings in subsequent sessions.



The screenshot shows the 'Filters' tab in the FDC1 V90.10 software. The interface includes a menu bar (File, Help) and a toolbar with tabs: Connections, Weighing, Real-Time Chart, Calibration, **Filters**, Comms, Trigger, Save / Restore Settings, and Terminal.

Filter and Averaging

Filter Characteristics FM/FL: FM0, FL0 : FIR 1200 SPS, No Filter

Sample Averaging UR: UR7 - Average over 128 samples

Expected Filter Sample Per Second (SPS): 9.375 SPS (baudrate=9600 should support 9.375 SPS)

Guidelines for streaming data

If you intend using the basic streaming commands (SG, SN etc) the following guidelines will help select the minimum baudrate:-

SPS = 1200 (Baudrate 230400)
 SPS = 600 (Baudrate 115200)
 SPS = 300 (Baudrate 57600)
 SPS = 200 (Baudrate 38400)
 SPS = 100 to 150 (Baudrate 19200)
 SPS < 100 (Baudrate 9600)

If you intend using the longer streaming commands (SL, SW etc) then you may require the next baudrate up

The number of samples per second (SPS) is a combination of FM, FL and UR.

To achieve this throughput when streaming, a suitable serial Baudrate or CANbus bitrate will be required

Motion Detection

No-Motion Range NR: 1

No-Motion Time (msec) NT: 100

Signal stable

Buttons: Send changes to device, Store in Non-Volatile Memory (NVM), Read data from device

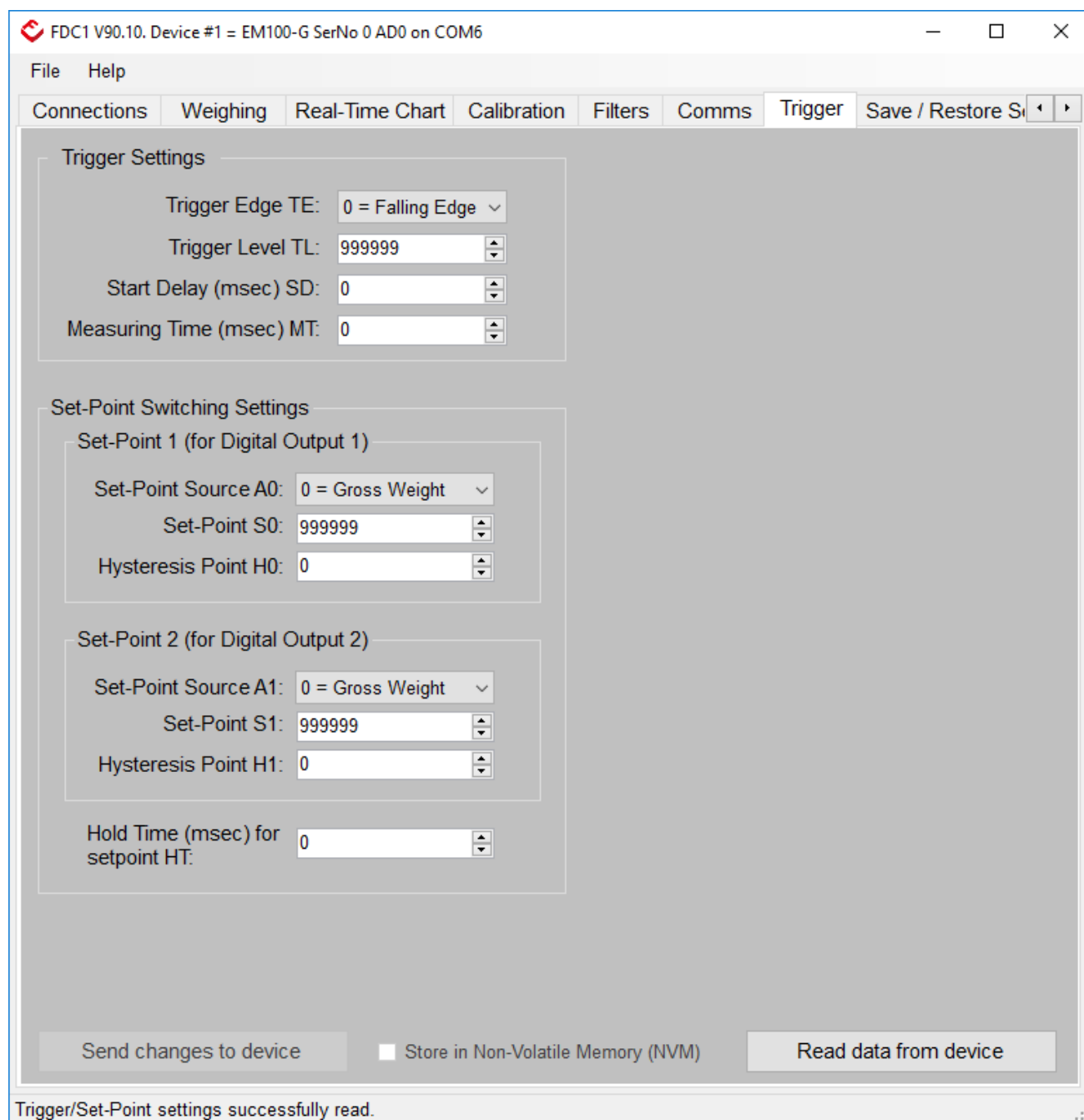
Footer: Filter settings successfully written to NVM.

Note: The Update Rate '**UR**' applies averaging to the ADC samples. Care should be taken when selecting the output rate of the comms port in relation to the ADC sampling rate. It should be fast enough to output the handle the entire message format. A short message (e.g. Get ADC Sample '**GS**' will display **S+02097090**) contains up to 10 ASCII characters. Enough time (Baud-rate periods) should be allocated for the entire message plus the inclusion of start and stop bits. A long message (e.g. Get Data String '**GW**' will display **W+000000+0000000000**) contains up to 19 ASCII characters.

7. Trigger

7.1. Trigger Settings

- Click on the '**Trigger**' Tab.



FDC1 V90.10. Device #1 = EM100-G SerNo 0 AD0 on COM6

File Help

Connections Weighing Real-Time Chart Calibration Filters Comms **Trigger** Save / Restore Settings

Trigger Settings

Trigger Edge TE: 0 = Falling Edge

Trigger Level TL: 999999

Start Delay (msec) SD: 0

Measuring Time (msec) MT: 0

Set-Point Switching Settings

Set-Point 1 (for Digital Output 1)

Set-Point Source A0: 0 = Gross Weight

Set-Point S0: 999999

Hysteresis Point H0: 0

Set-Point 2 (for Digital Output 2)

Set-Point Source A1: 0 = Gross Weight

Set-Point S1: 999999

Hysteresis Point H1: 0

Hold Time (msec) for setpoint HT: 0

Send changes to device ☐ Store in Non-Volatile Memory (NVM) Read data from device

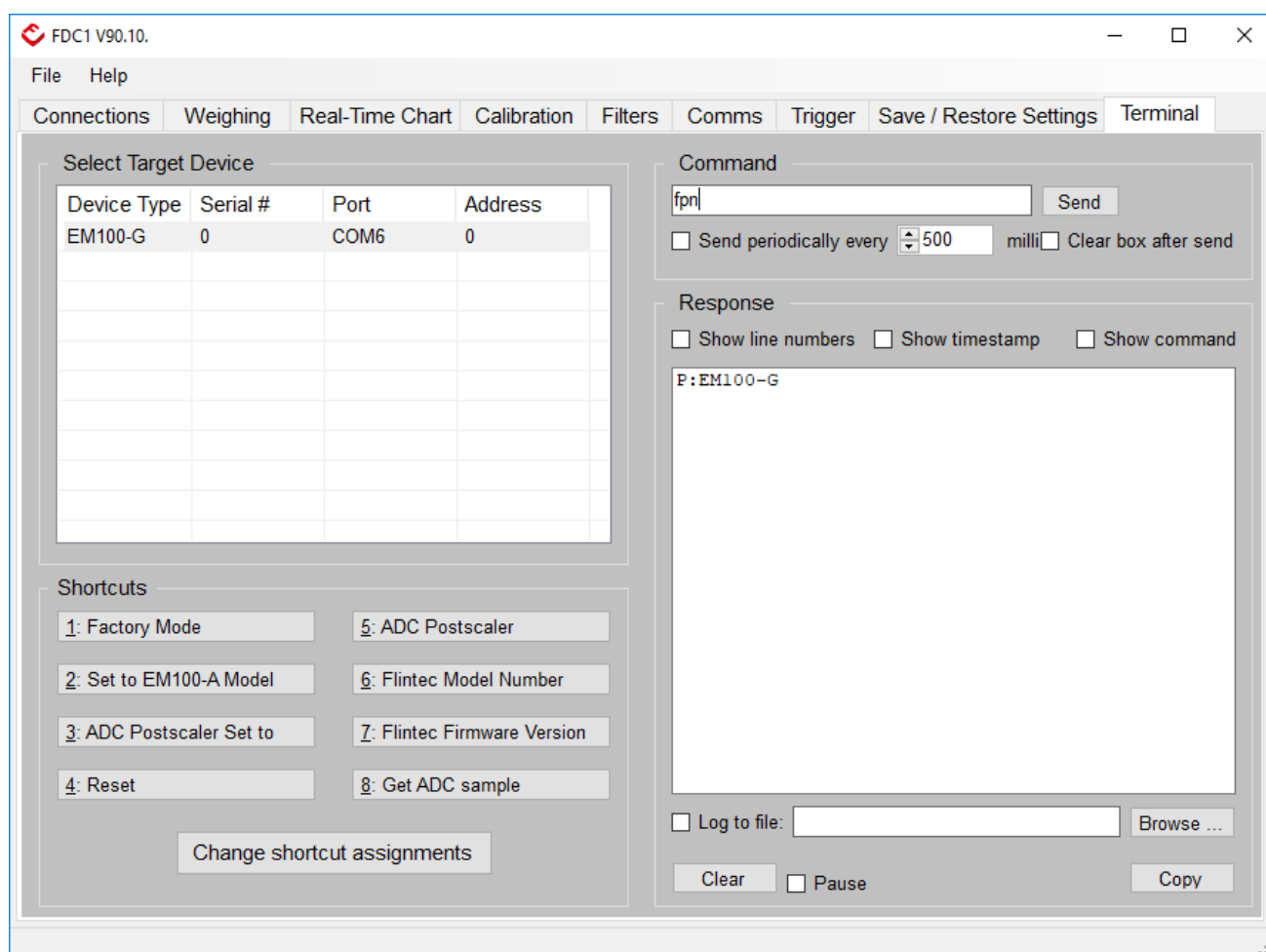
Trigger/Set-Point settings successfully read.

8. Terminal Command Line

8.1. USB/Serial Command Line

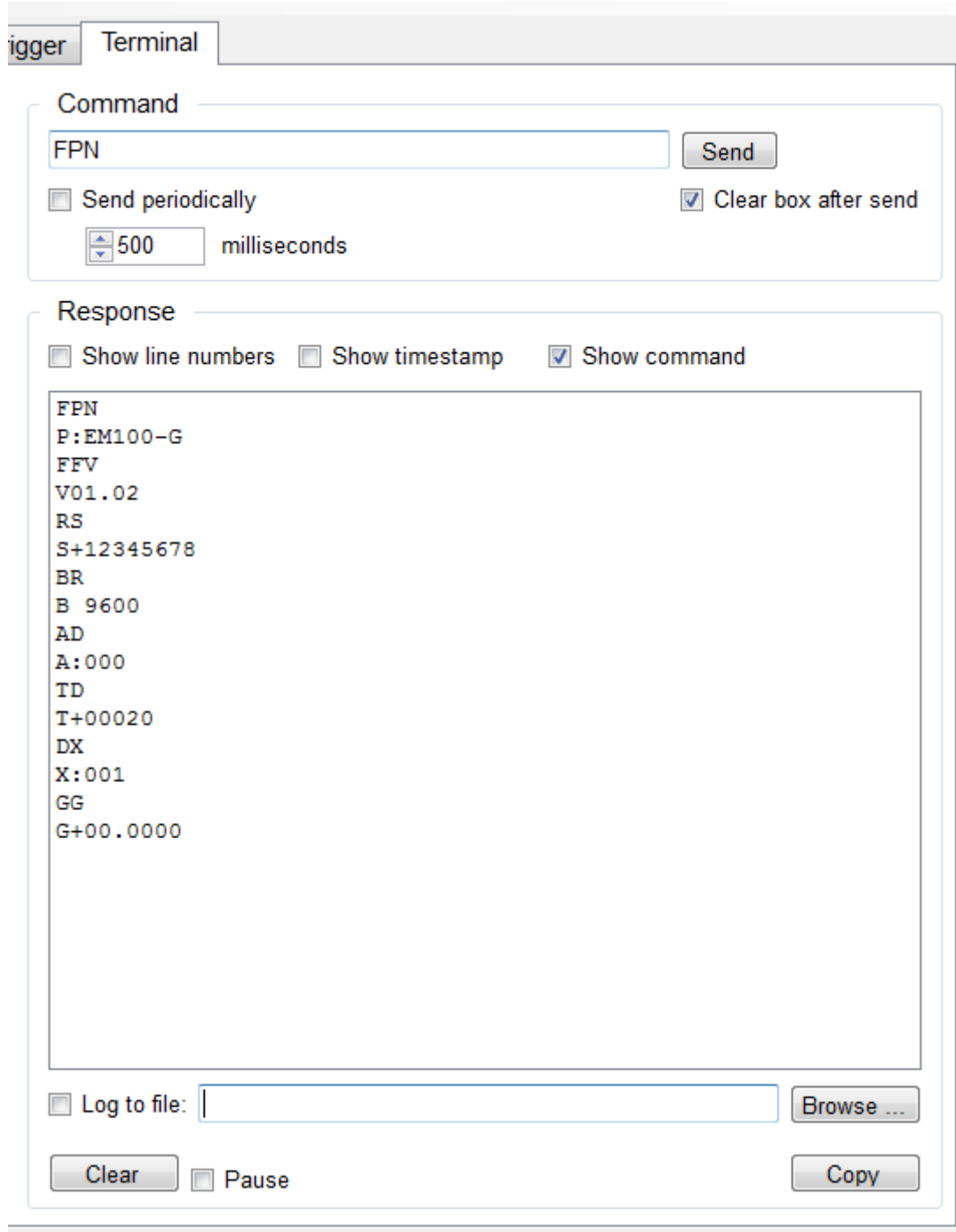
8.1.1. Send Single Command

- Click in the '**Command**' field of the '**Terminal**' tab.
- Type the desired command (not case sensitive).
- Press the '**Send**' button to execute the command.
- Watch the '**Response**' window for any return string.



8.1.2. Clear Response Window

- Press the '**Clear**' button to empty the '**Response**' window.



The screenshot shows the 'Terminal' tab of the EM100 FDC software. The 'Command' section has a text box containing 'FPN' and a 'Send' button. Below it are checkboxes for 'Send periodically' (unchecked) and 'Clear box after send' (checked), along with a spinner box set to '500' milliseconds. The 'Response' section has checkboxes for 'Show line numbers' (unchecked), 'Show timestamp' (unchecked), and 'Show command' (checked). The response area displays a list of commands and their responses: FPN, P:EM100-G, FFV, V01.02, RS, S+12345678, BR, B 9600, AD, A:000, TD, T+00020, DX, X:001, GG, and G+00.0000. At the bottom, there is a 'Log to file:' checkbox with an empty text box and a 'Browse ...' button, a 'Clear' button, a 'Pause' checkbox, and a 'Copy' button.

Trigger Terminal

Command

FPN Send

☐ Send periodically ☒ Clear box after send

500 milliseconds

Response

☐ Show line numbers ☐ Show timestamp ☒ Show command

FPN
P:EM100-G
FFV
V01.02
RS
S+12345678
BR
B 9600
AD
A:000
TD
T+00020
DX
X:001
GG
G+00.0000

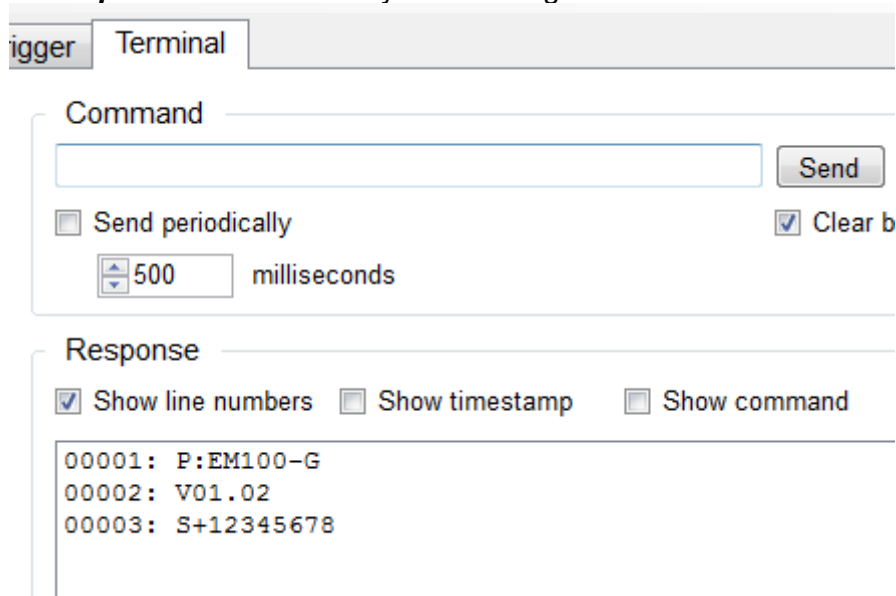
☐ Log to file: Browse ...

Clear ☐ Pause Copy

8.1.3. Response Window Format

8.1.3.1. Line Numbers

- Line numbers can be appended to the '**Response**' window output. Tick the '**Show Line Numbers**' check-box before executing the command.
- Watch the '**Response**' window for any return string.



Trigger Terminal

Command

☐ Send periodically ☒ Clear b

milliseconds

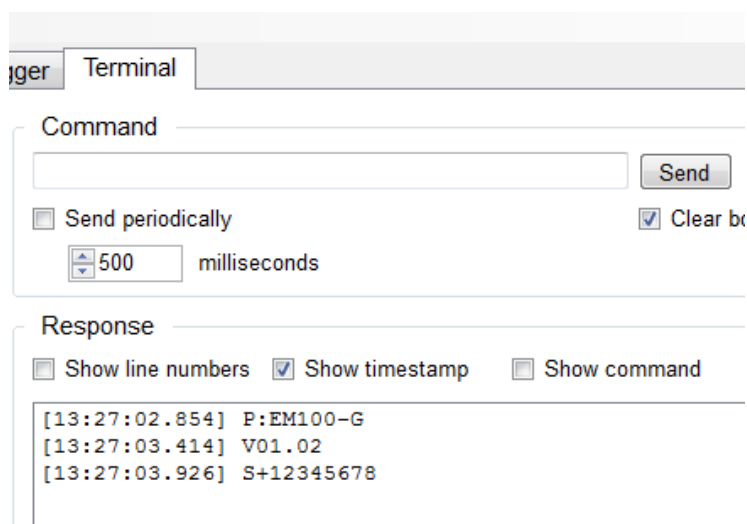
Response

☒ Show line numbers ☐ Show timestamp ☐ Show command

```
00001: P:EM100-G
00002: V01.02
00003: S+12345678
```

8.1.3.2. Time Stamp

- A time stamp can be appended to the '**Response**' window output. Tick the '**Show Time Stamp**' check-box before executing the command.
- Watch the '**Response**' window for any return string.



Trigger Terminal

Command

☐ Send periodically ☒ Clear b

milliseconds

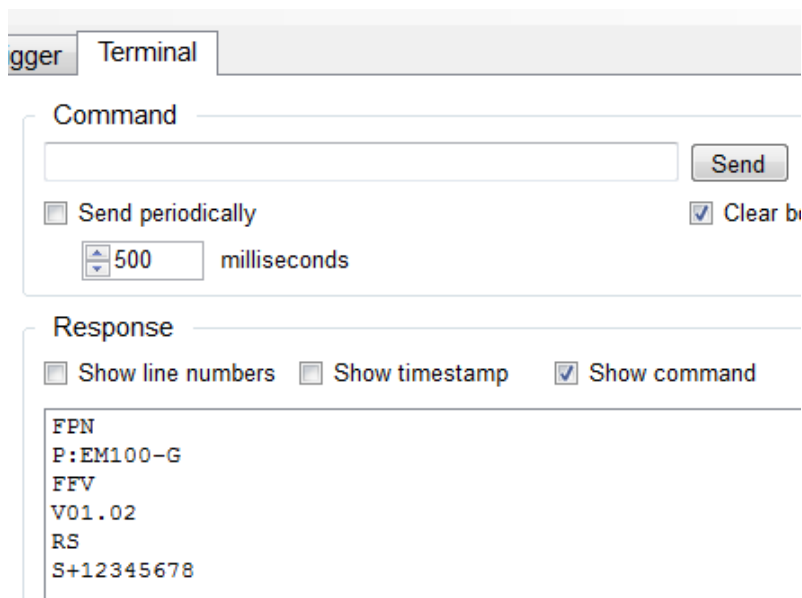
Response

☐ Show line numbers ☒ Show timestamp ☐ Show command

```
[13:27:02.854] P:EM100-G
[13:27:03.414] V01.02
[13:27:03.926] S+12345678
```


8.1.3.3. Show Command

- The entered command can be appended to the '**Response**' window output. Tick the '**Show Command**' check-box before executing the command.
- Watch the '**Response**' window for any return string.



gger Terminal

Command

☐ Send periodically ☒ Clear buffer

milliseconds

Response

☐ Show line numbers ☐ Show timestamp ☒ Show command

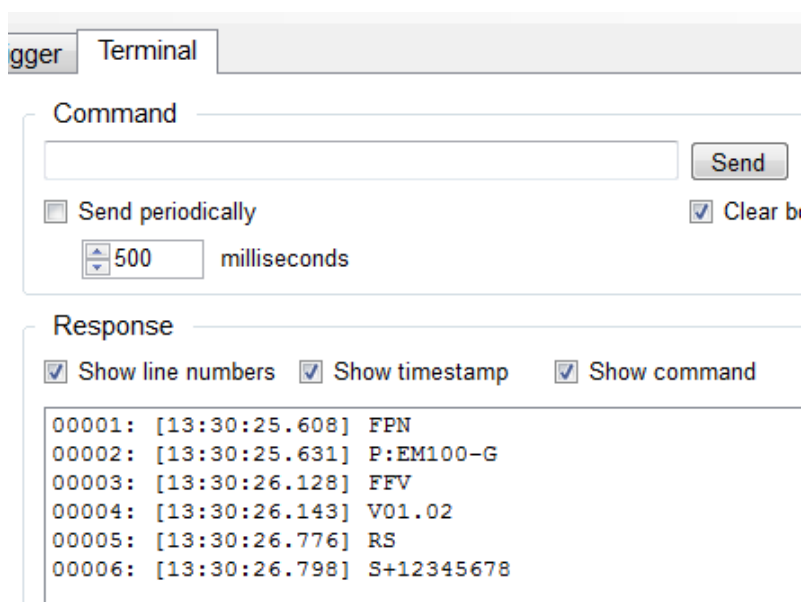
```

FPN
P:EM100-G
FFV
V01.02
RS
S+12345678

```

8.1.3.4. All Formats Enabled

- If all check-boxes are applied the following format will be displayed in the '**Response**' window.



gger Terminal

Command

☐ Send periodically ☒ Clear buffer

milliseconds

Response

☒ Show line numbers ☒ Show timestamp ☒ Show command

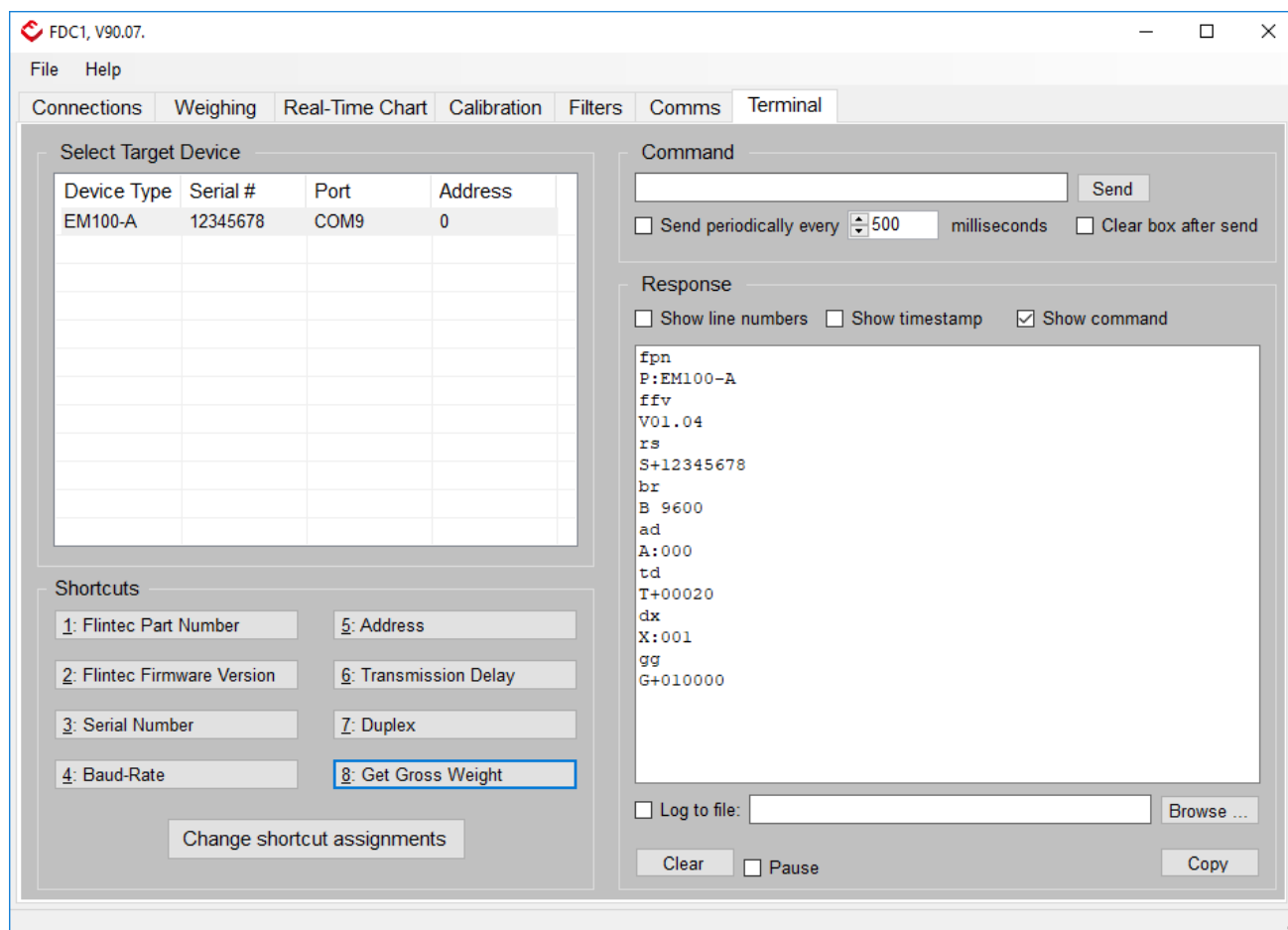
```

00001: [13:30:25.608] FPN
00002: [13:30:25.631] P:EM100-G
00003: [13:30:26.128] FFV
00004: [13:30:26.143] V01.02
00005: [13:30:26.776] RS
00006: [13:30:26.798] S+12345678

```

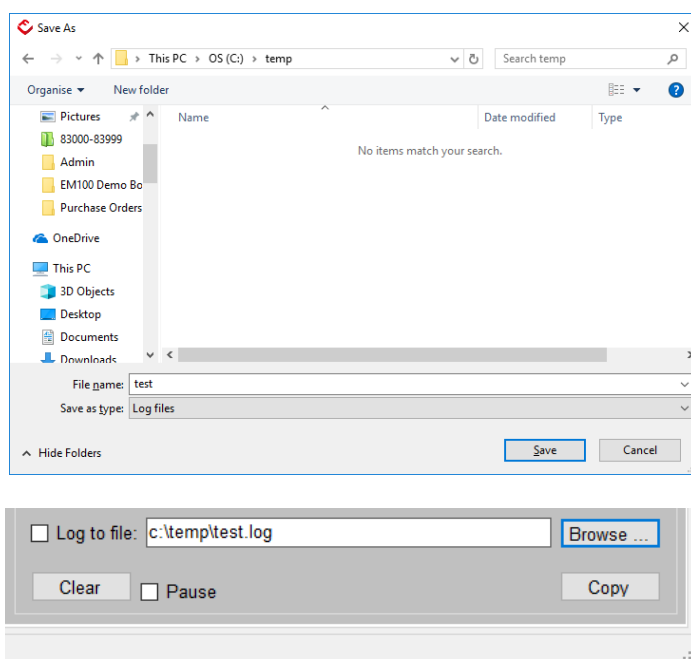
8.1.4. Periodic Command Streaming

- The terminal window can be used to manually stream commands at a user determined rate by adjusting the '**Time Period**' text-box.
- Tick the '**Send Periodically**' check-box to enable the command entered in the '**Command**' text-box (determined by the time set).
- Watch the '**Response**' window for any return string.



8.1.5. Log File

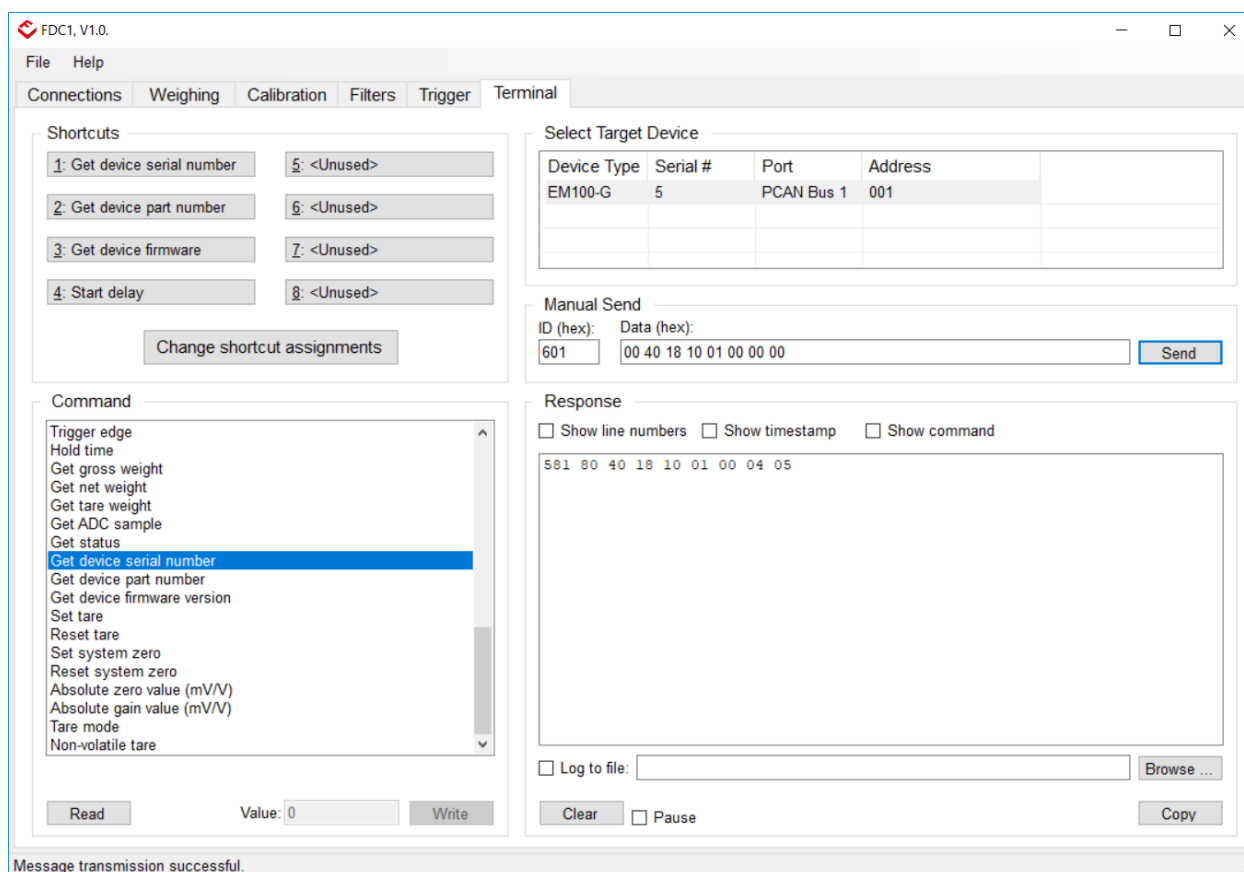
- Press the '**Browse**' button to enter/select a name and location for the log file.
- Press '**Save**' button.
- Ticking the '**Log to File**' check-box will generate the log file (the output file extension is *.log containing all the '**Response**' window output data.
- The output saved to file can be paused by checking the '**Pause**' check-box.
- The '**Copy**' button save the contents of the '**Response**' window to the PCs clip-board for easy cut and paste operations.



8.2. CAN Command Line

8.2.1. Send Single Command

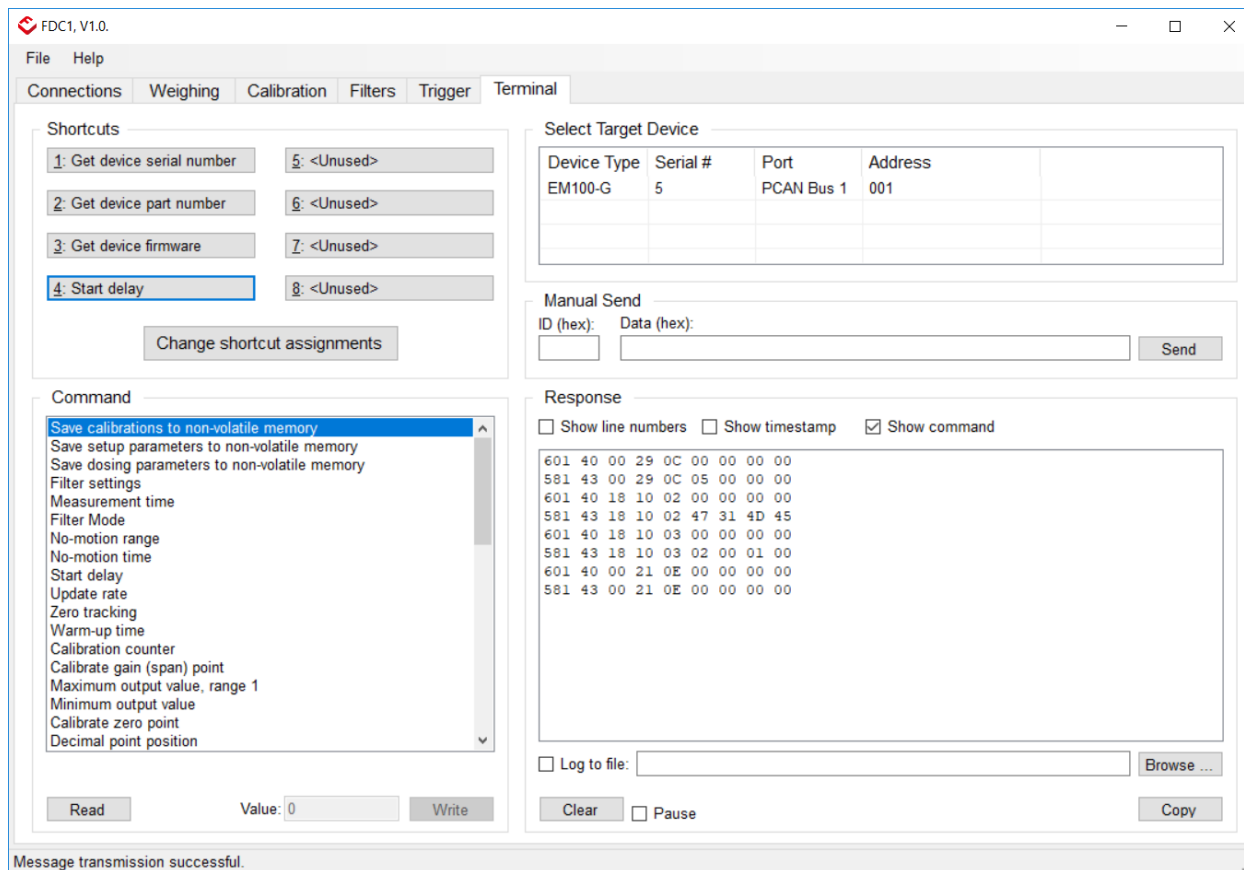
- Click on the '**Terminal**' Tab.
- Click in the '**ID(Hex)**' field.
- Type the CAN command ID in the '**ID(Hex)**' field.
- Click in the '**Data(Hex)**' field.
- Type the CAN command ID in the '**Data(Hex)**' field.
- Press the '**Send**' button to execute the command.
- Watch the '**Response**' window for any return string.



Note: Refer to the user manual for CAN command IDs and indexes. The code used in the example is request the device Vendor ID.

8.2.2. Clear Response Window

- Press the '**Clear**' button to clear the '**Response**' window.



The screenshot shows the FDC1, V1.0 software interface. The 'Terminal' tab is active, displaying a list of shortcuts on the left and a 'Response' window on the right. The 'Response' window shows a list of hexadecimal data points. At the bottom, a status bar indicates 'Message transmission successful.'

Shortcuts

1: Get device serial number	5: <Unused>
2: Get device part number	6: <Unused>
3: Get device firmware	7: <Unused>
4: Start delay	8: <Unused>

Command

- Save calibrations to non-volatile memory
- Save setup parameters to non-volatile memory
- Save dosing parameters to non-volatile memory
- Filter settings
- Measurement time
- Filter Mode
- No-motion range
- No-motion time
- Start delay
- Update rate
- Zero tracking
- Warm-up time
- Calibration counter
- Calibrate gain (span) point
- Maximum output value, range 1
- Minimum output value
- Calibrate zero point
- Decimal point position

Response

☐ Show line numbers ☐ Show timestamp ☒ Show command

```

601 40 00 29 0C 00 00 00 00
581 43 00 29 0C 05 00 00 00
601 40 18 10 02 00 00 00 00
581 43 18 10 02 47 31 4D 45
601 40 18 10 03 00 00 00 00
581 43 18 10 03 02 00 01 00
601 40 00 21 0E 00 00 00 00
581 43 00 21 0E 00 00 00 00
  
```

Clear ☐ **Pause** **Copy**

Message transmission successful.

8.2.3. Response Window Format

8.2.3.1. Line Numbers

- Line numbers can be appended to the '**Response**' window output. Tick the '**Show Line Numbers**' check-box before executing the command.
- Watch the '**Response**' window for any return string.

Response

☒ Show line numbers
 ☐ Show timestamp
 ☐ Show command

```

00001: 581 43 00 29 0C 05 00 00 00
00002: 581 43 18 10 02 47 31 4D 45
00003: 581 43 18 10 03 02 00 01 00
00004: 581 43 00 21 0E 00 00 00 00

```

8.2.3.2. Time Stamp

- A time stamp can be appended to the '**Response**' window output. Tick the '**Show Time Stamp**' check-box before executing the command.
- Watch the '**Response**' window for any return string.

Response

☐ Show line numbers
 ☒ Show timestamp
 ☐ Show command

```

[14:37:31.132] 581 43 00 29 0C 05 00 00 00
[14:37:31.609] 581 43 18 10 02 47 31 4D 45
[14:37:32.206] 581 43 18 10 03 02 00 01 00
[14:37:32.785] 581 43 00 21 0E 00 00 00 00

```

8.2.3.3. Show Command

- The entered command can be appended to the '**Response**' window output. Tick the '**Show Command**' check-box before executing the command.
- Watch the '**Response**' window for any return string.

Response

☐ Show line numbers
 ☐ Show timestamp
 ☒ Show command

```

601 40 00 29 0C 00 00 00 00
581 43 00 29 0C 05 00 00 00
601 40 18 10 02 00 00 00 00
581 43 18 10 02 47 31 4D 45
601 40 18 10 03 00 00 00 00
581 43 18 10 03 02 00 01 00
601 40 00 21 0E 00 00 00 00
581 43 00 21 0E 00 00 00 00

```

8.2.3.4. All Formats Enabled

- If all check-boxes are applied the following format will be displayed in the '**Response**' window.

Response

☒ Show line numbers
 ☒ Show timestamp
 ☒ Show command

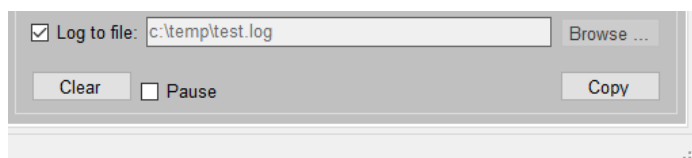
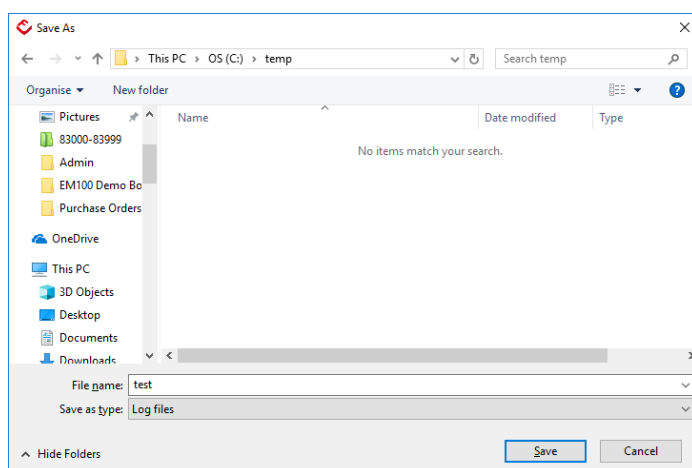
```

00001: [14:39:13.847] 601 40 00 29 0C 00 00 00 00
00002: [14:39:13.850] 581 43 00 29 0C 05 00 00 00
00003: [14:39:14.449] 601 40 18 10 02 00 00 00 00
00004: [14:39:14.451] 581 43 18 10 02 47 31 4D 45
00005: [14:39:14.943] 601 40 18 10 03 00 00 00 00
00006: [14:39:14.945] 581 43 18 10 03 02 00 01 00
00007: [14:39:15.813] 601 40 00 21 0E 00 00 00 00
00008: [14:39:15.816] 581 43 00 21 0E 00 00 00 00

```

8.2.4. Log File

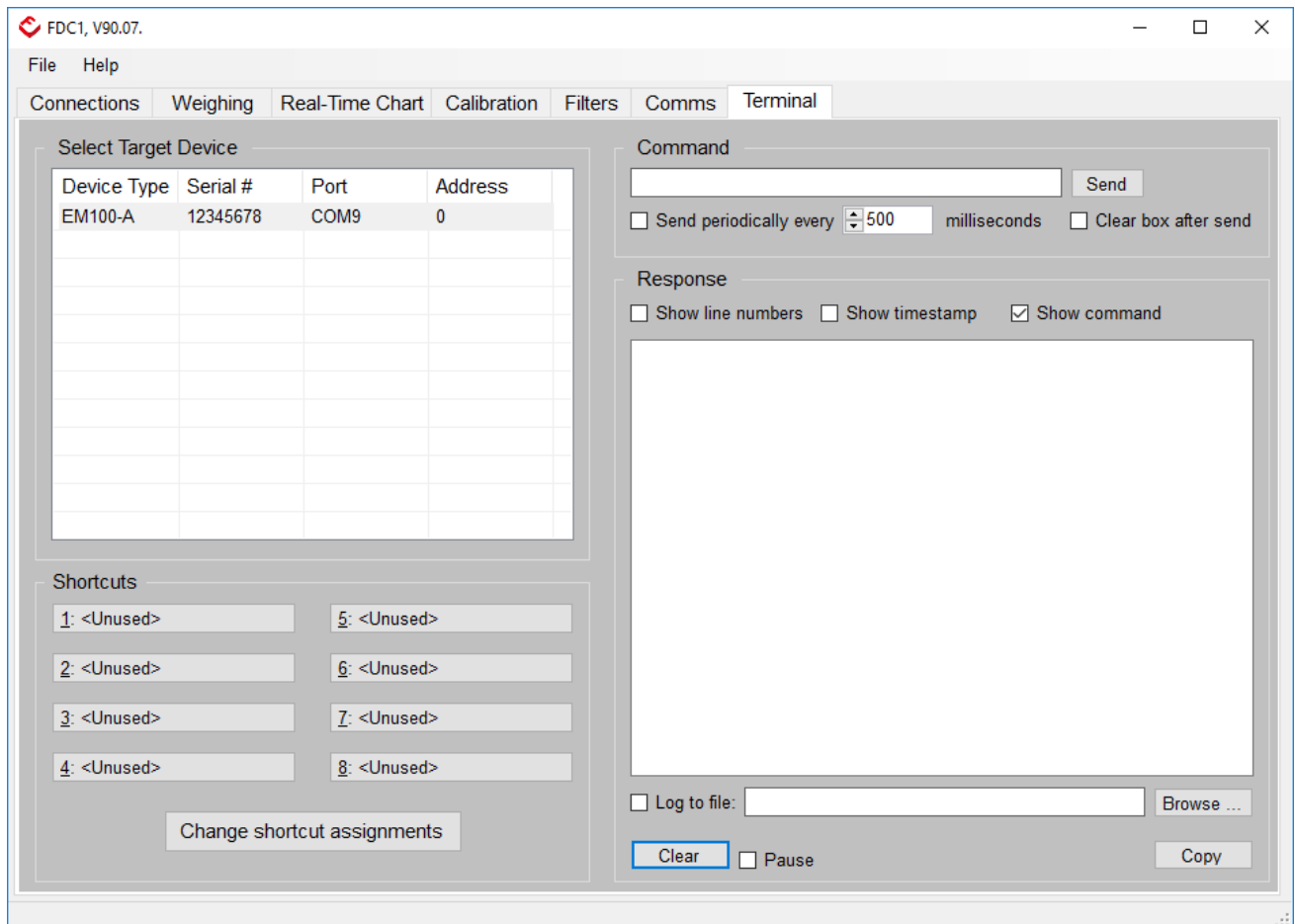
- Press the '**Browse**' button to enter/select a name and location for the log file.
- Press '**Save**' button.
- Ticking the '**Log to File**' check-box will generate the log file (the output file extension is *.log containing all the '**Response**' window output data.
- The output saved to file can be paused by checking the '**Pause**' check-box.
- The '**Copy**' button save the contents of the '**Response**' window to the PCs clip-board for easy cut and paste operations.



8.3. Terminal Shortcuts

8.3.1. USB/Serial Communications

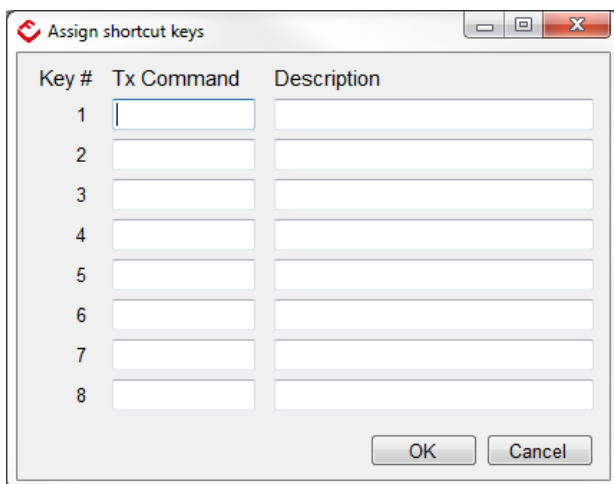
- Click on the '**Terminal**' Tab.
- Click on the '**Change Shortcut Assignments**' button.



EM100 - FDC User Manual

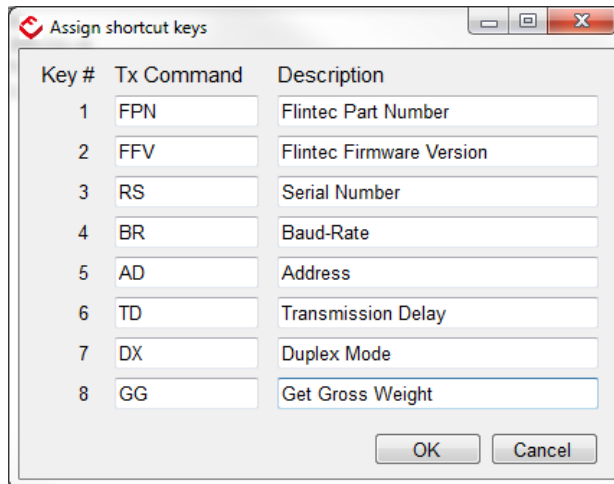
0087171

- Frequently used commands can be assigned to shortcut buttons for ease of use. Type the desired command in the '**Tx Command**' field.
- Assign a note in the '**Description**' field as a reference (optional).
- When finished, press the '**OK**' button to assign the shortcuts.



Key #	Tx Command	Description
1		
2		
3		
4		
5		
6		
7		
8		

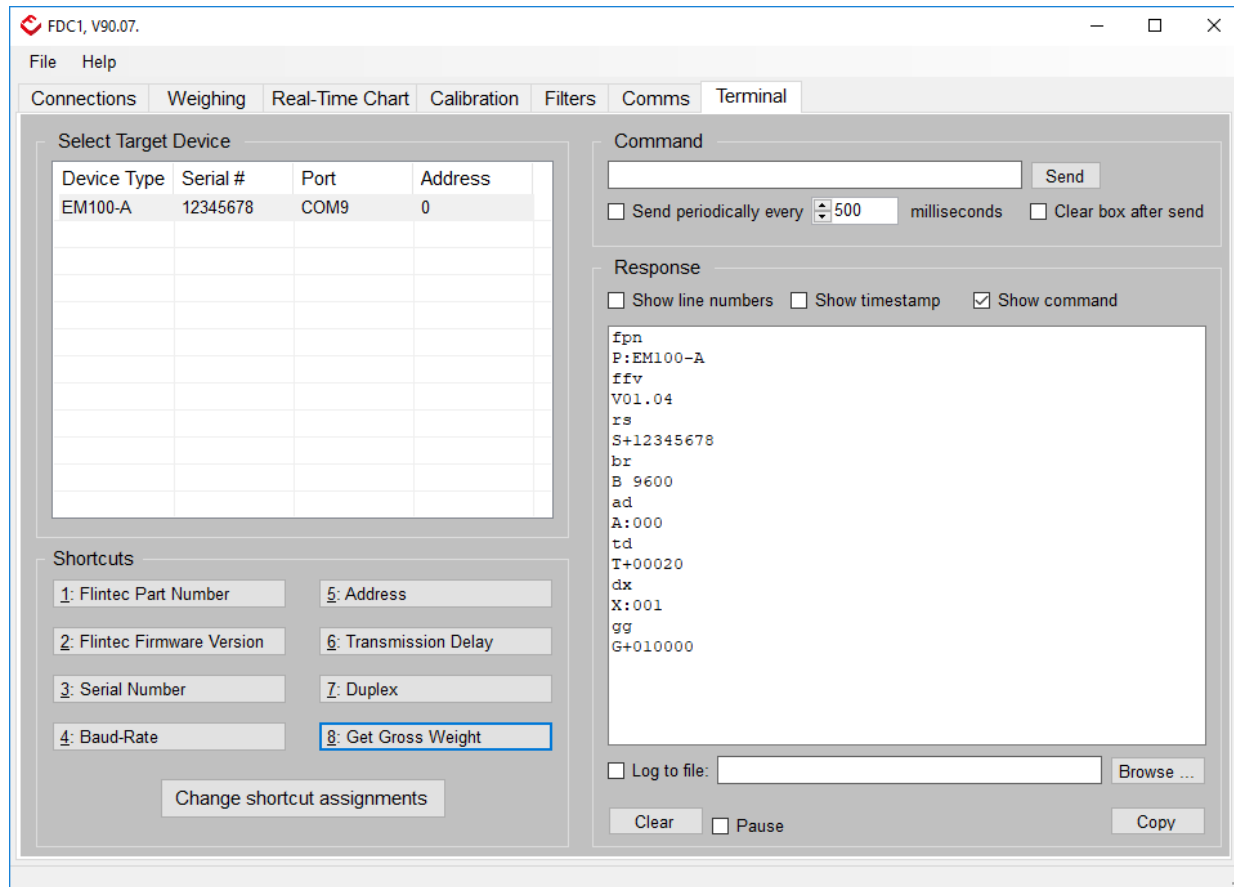
OK Cancel



Key #	Tx Command	Description
1	FPN	Flintec Part Number
2	FFV	Flintec Firmware Version
3	RS	Serial Number
4	BR	Baud-Rate
5	AD	Address
6	TD	Transmission Delay
7	DX	Duplex Mode
8	GG	Get Gross Weight

OK Cancel

- The assigned commands will be updated in the '**Shortcuts**' section.
- Press the shortcut buttons and view the feedback from the device in the '**Response**' window.



FDC1, V90.07.

File Help

Connections Weighing Real-Time Chart Calibration Filters Comms Terminal

Select Target Device

Device Type	Serial #	Port	Address
EM100-A	12345678	COM9	0

Shortcuts

1: Flintec Part Number	5: Address
2: Flintec Firmware Version	6: Transmission Delay
3: Serial Number	7: Duplex
4: Baud-Rate	8: Get Gross Weight

Change shortcut assignments

Command

Send

☐ Send periodically every 500 milliseconds ☐ Clear box after send

Response

☐ Show line numbers ☐ Show timestamp ☒ Show command

```

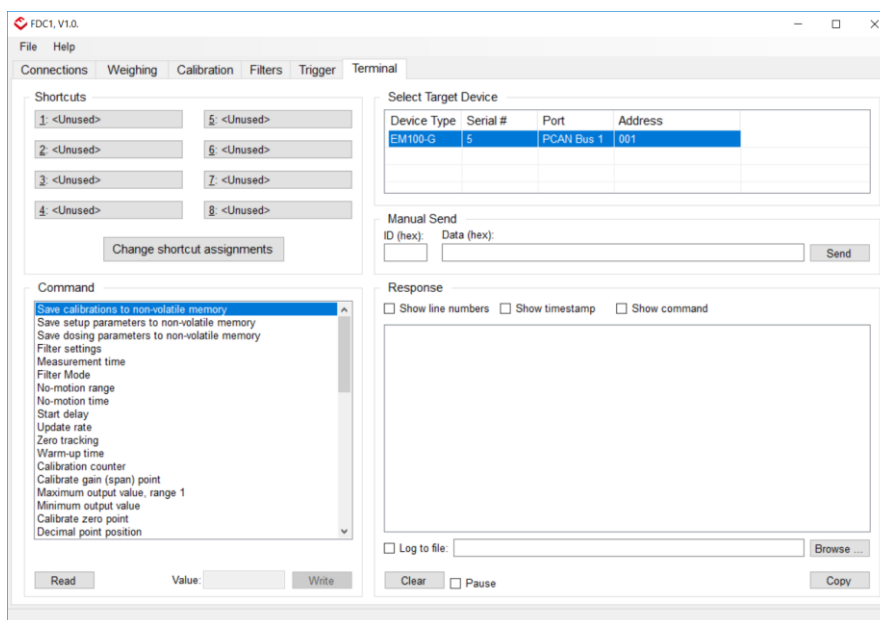
fpn
P:EM100-A
ffv
V01.04
rs
S+12345678
br
B 9600
ad
A:000
td
T+00020
dx
X:001
gg
G+010000
  
```

☐ Log to file: Browse ...

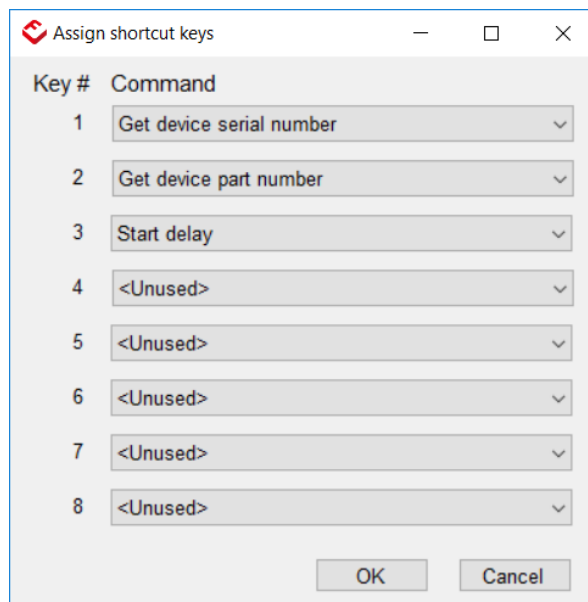
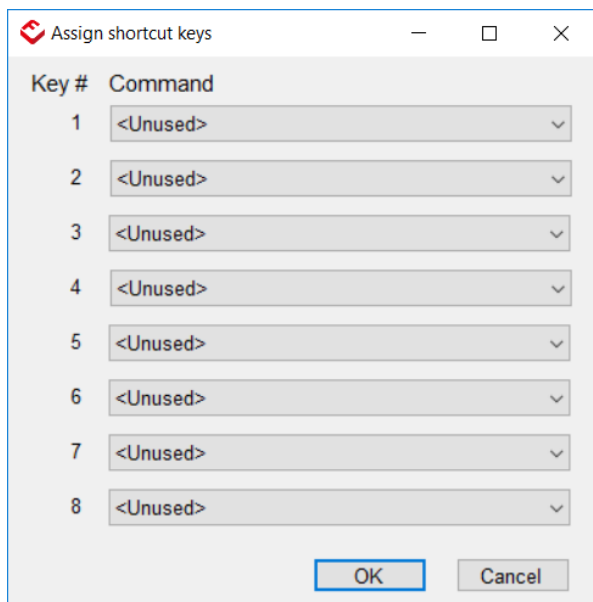
Clear ☐ Pause Copy

8.3.2. CAN Communication

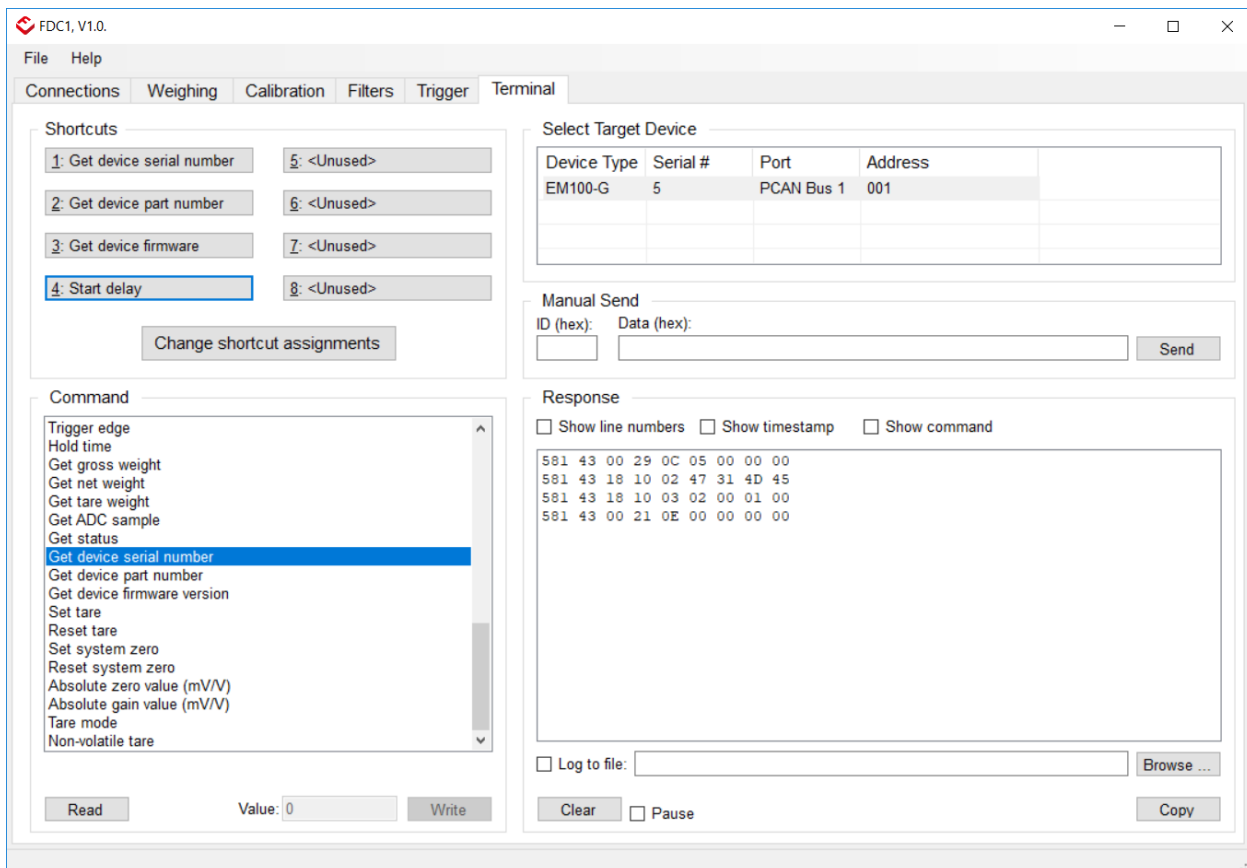
- Click on the '**Terminal**' tab.



- Press the '**Change Shortcut Assignments**' buttons.
- Select the required command descriptions from the drop-down list.
- Confirm the selections by pressing '**OK**' button.



- The assigned commands will be updated in the '**Shortcuts**' section.
- Press the shortcut buttons and view the feedback from the device in the '**Response**' window.



FDC1, V1.0

File Help

Connections Weighing Calibration Filters Trigger **Terminal**

Shortcuts

1: Get device serial number	5: <Unused>
2: Get device part number	6: <Unused>
3: Get device firmware	7: <Unused>
4: Start delay	8: <Unused>

Change shortcut assignments

Select Target Device

Device Type	Serial #	Port	Address
EM100-G	5	PCAN Bus 1	001

Manual Send

ID (hex): Data (hex):

Command

- Trigger edge
- Hold time
- Get gross weight
- Get net weight
- Get tare weight
- Get ADC sample
- Get status
- Get device serial number**
- Get device part number
- Get device firmware version
- Set tare
- Reset tare
- Set system zero
- Reset system zero
- Absolute zero value (mV/V)
- Absolute gain value (mV/V)
- Tare mode
- Non-volatile tare

Read Value: 0 Write

Response

☐ Show line numbers ☐ Show timestamp ☐ Show command

```

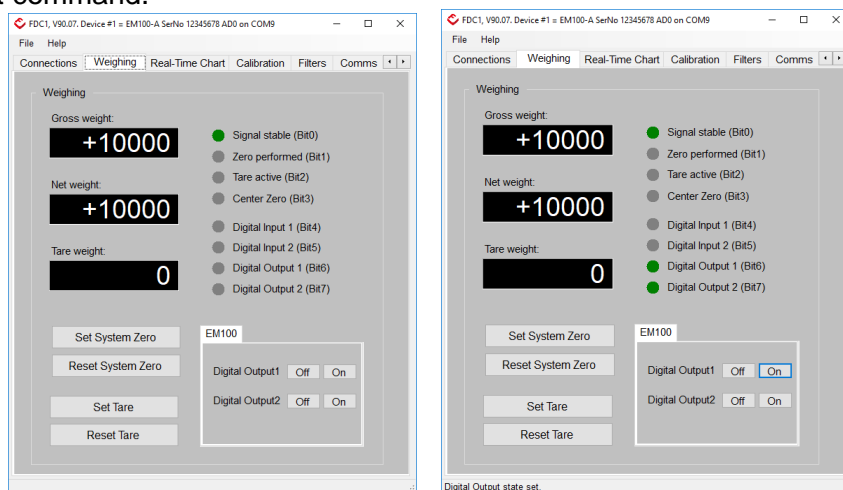
581 43 00 29 0C 05 00 00 00
581 43 18 10 02 47 31 4D 45
581 43 18 10 03 02 00 01 00
581 43 00 21 0E 00 00 00 00
  
```

☐ Log to file: ☐ Pause

9. GPIOs

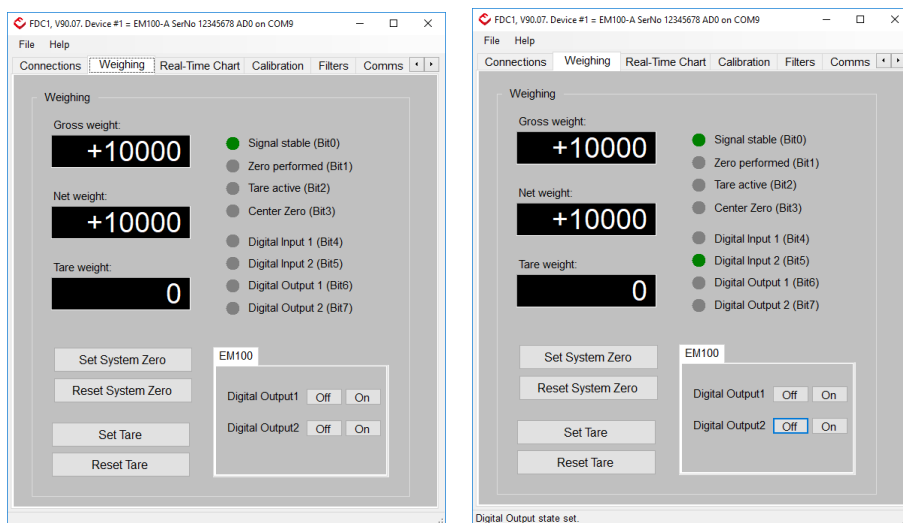
9.1. Change Digital Output Status

- Click on the '**Weighing**' Tab.
- To manually change the logic level of the digital outputs, use the '**On**' or '**Off**' buttons in the EM100 group (alternatively the '**IO**' & '**OM**' commands can be used). The changed condition will be displayed on the digital output indicators. Also, the status window will echo the result of the last command.



9.2. Change Digital Input Status

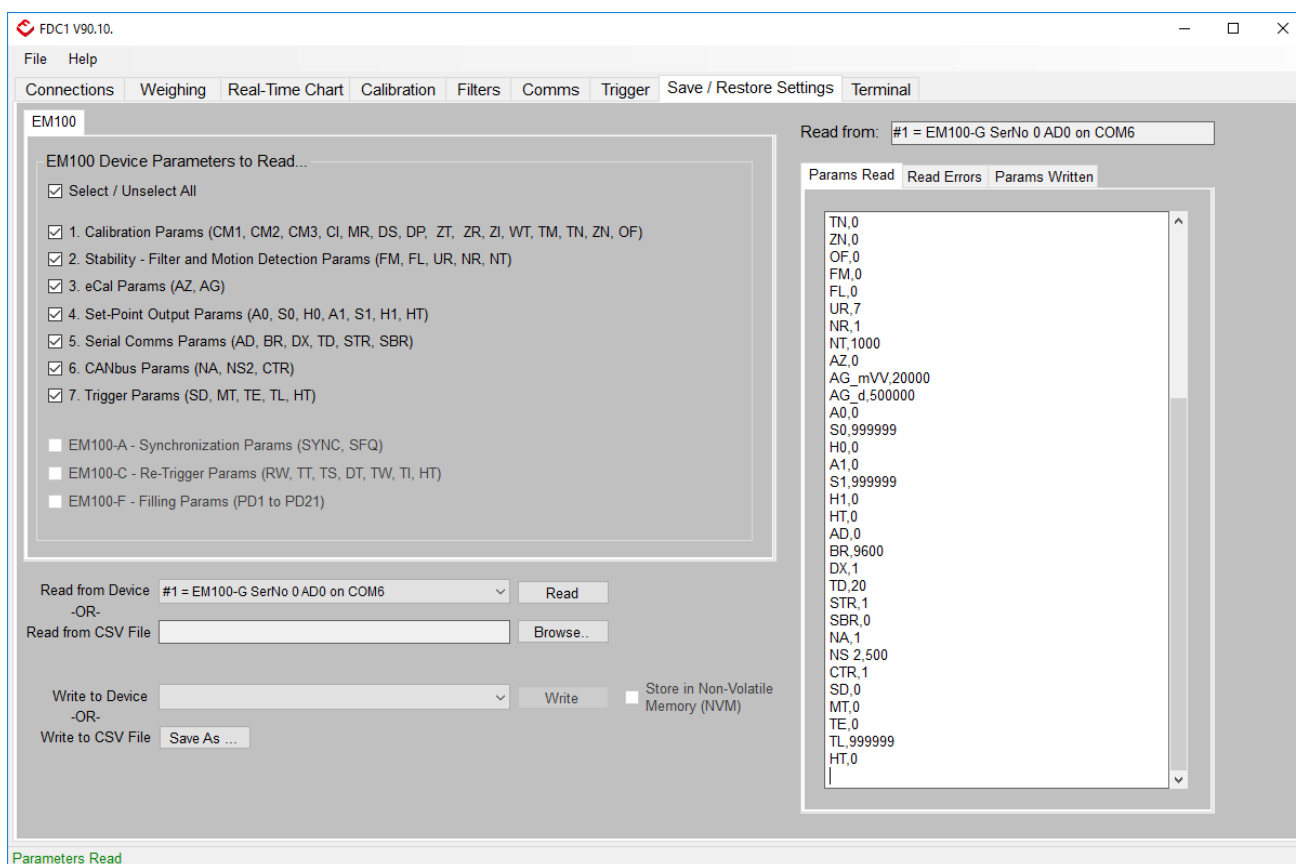
- Click on the '**Weighing**' Tab.
- Apply a logic '**high**' condition to either of the digital inputs. The indicator will detect the presence of the input and display the logic conditions. In this example, '**Digital Input 2**' has been used.



10. Save/Restore Settings

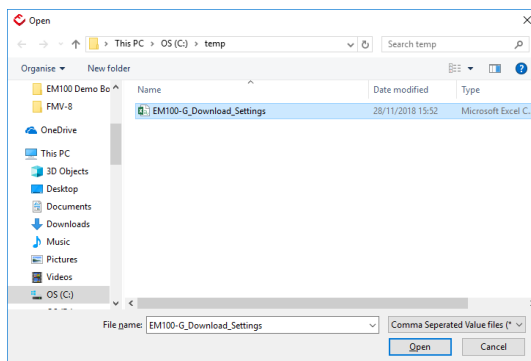
10.1. Recall Settings from EM100

- Click on the '**Save/Restore Settings**' Tab.
- Select to appropriate port number/selection from the '**Read from Device**' drop-down list.
- To select specific features, tick the appropriate check-box beside the function in the '**EM100 Device Parameters section**'.
- Press the '**Read**' button to populate the dialogue window on the left.

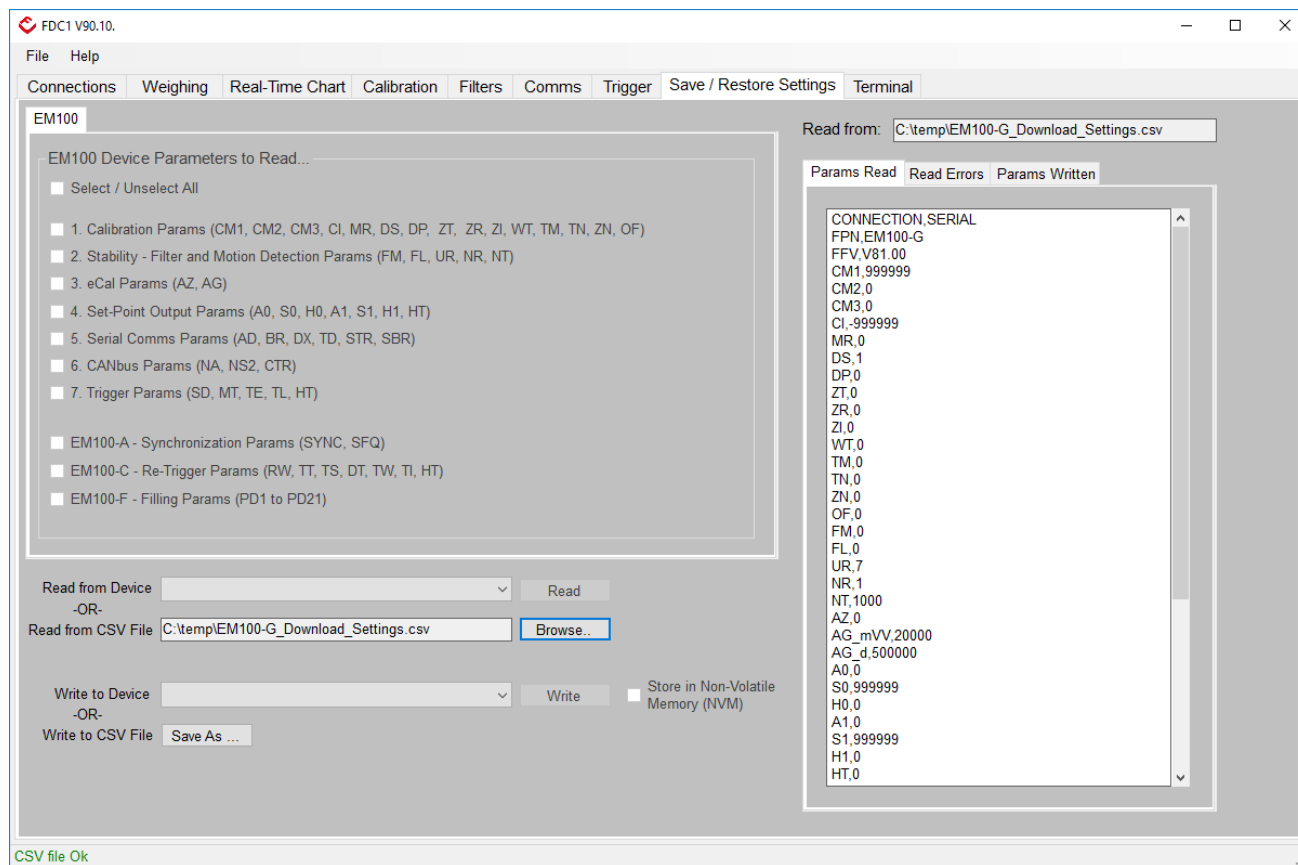


10.2. Recall Settings from File

- Click on the '**Save/Restore Settings**' Tab.
- Click on the '**Browse**' Button at the bottom of the window.
- Select/Navigate to the required filename and location and press the '**Open**' button.

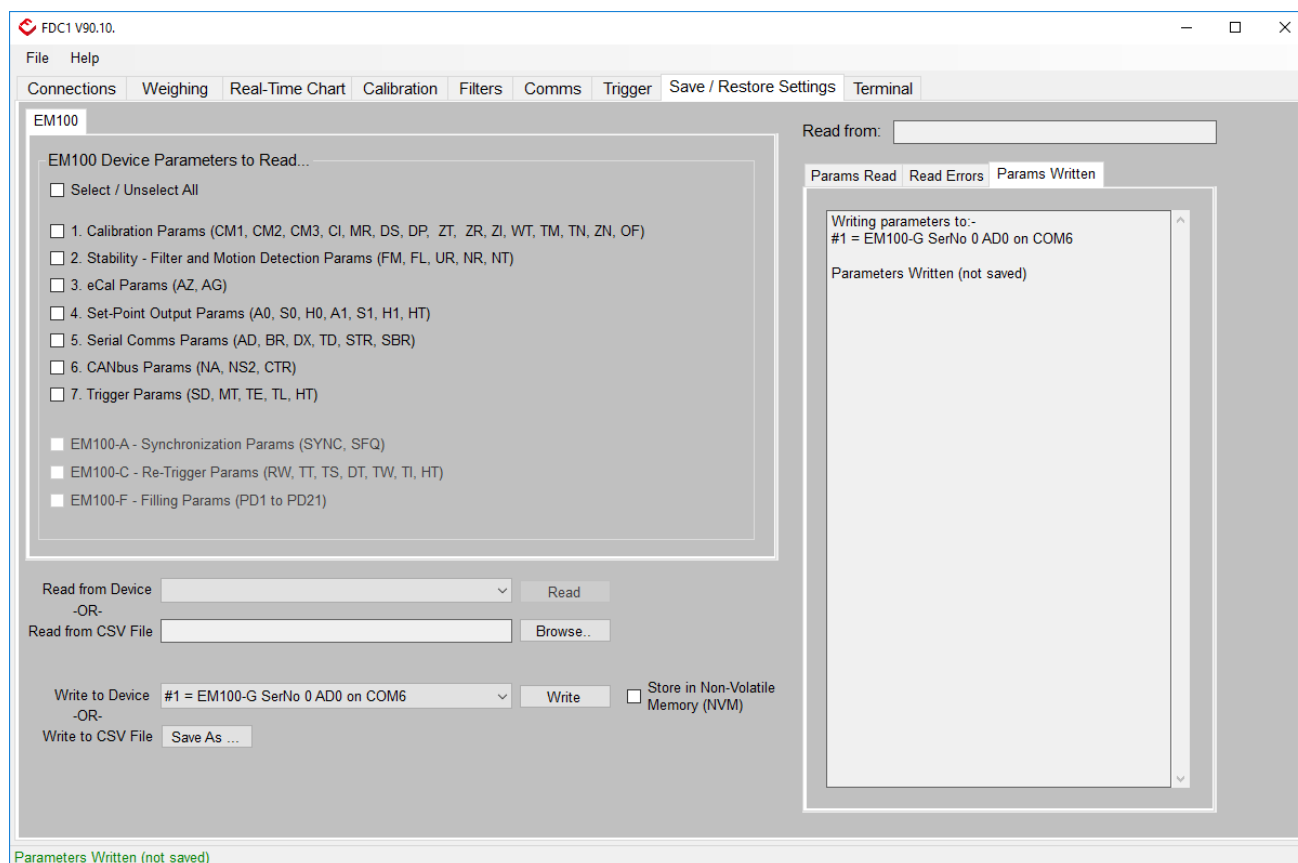


- Successful reading of the file will populate the information window on the left side also the file location & name will appear in the '**Read from CSV File**' text window.



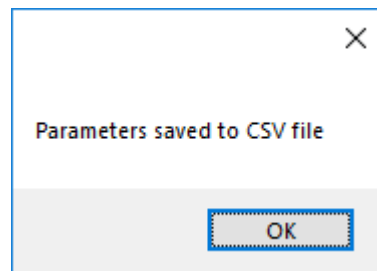
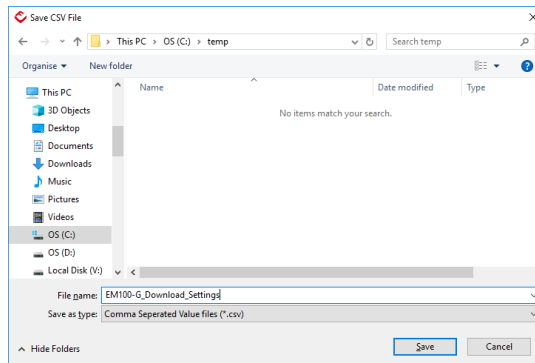
10.3. Save Settings to EM100

- Click on the '**Save/Restore Settings**' Tab.
- Select the appropriate port number/selection from the '**Write to Device**' drop-down list.
- Press the '**Write**' button will update the current device settings to the EM100. This will not be permanently write to non-volatile memory unless the '**Store to Non-Volatile Memory (NVM)**' check-box has ticked.



10.4. Save Settings to File

- Click on the '**Save/Restore Settings**' Tab.
- Press the '**Save As**' button in the '**Write to CSV File**' section.
- Enter the required filename and location and press the '**Save**' button.
- Successful creation of the saved file is indicated by a dialogue box. Click '**OK**'.



11. Real-Time Chart

This tab will not appear if using half-duplex communications as it uses streaming commands '**SG**', '**SN**' & '**SX**'.

11.1. Real-Time Chart Settings

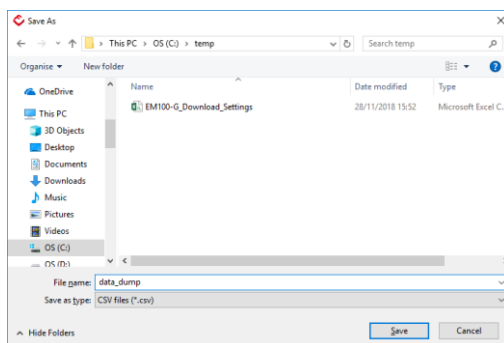
- Click on the '**Real-Time Chart**' Tab.
- Click on the '**Setup**' Tab within the '**Real-Time Chart**'.
- Select the appropriate radio button to enable the readings type from the '**Readings Selection**' section.
- Tick the '**Y-Axis Auto Fit**' check-box in the '**X and Y Axis section**' to auto-scale the graph in the display window.
- Select the '**1sec**' option in the '**Sample Every**' drop-down box in the '**X and Y Axis section**'.
- Enter a suitable value for the time-base (seconds) in the '**X-Axis**' section.
- To start the test running, press the green '**Start**' button at the bottom of the window.



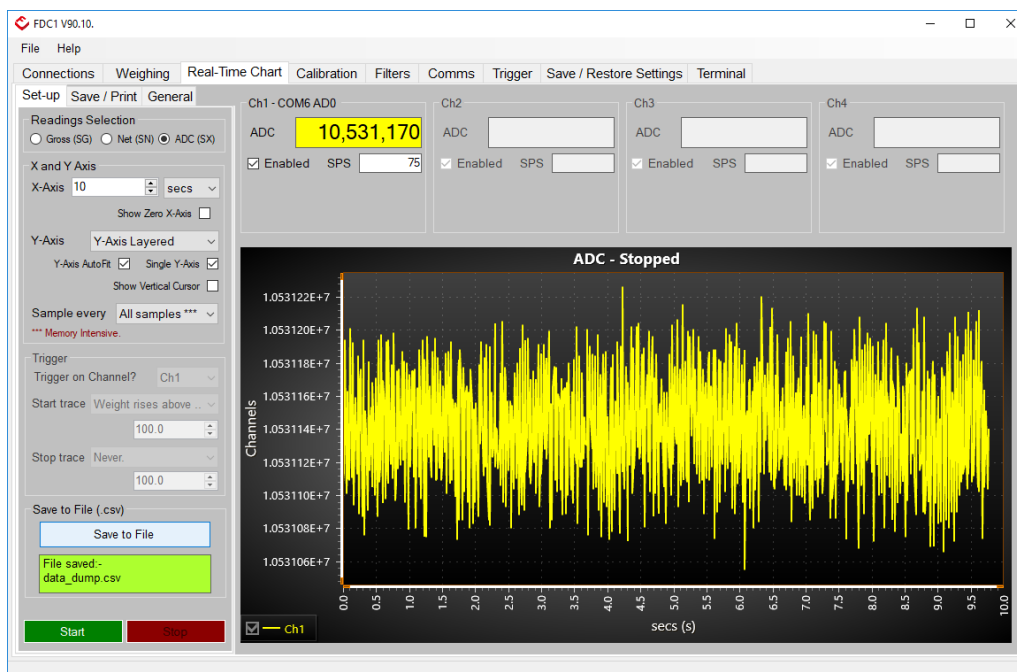
Note: The memory depth of the PC used should be considered before starting the graphing function. To limit the system memory required, several options have been included. Using high sample rates when displaying '**All Samples**' is only advisable when doing short duration testing.

11.2. Saving Graph Data

- Click on the '**Real-Time Chart**' Tab.
- Click on the '**Save/Print**' Tab within the '**Real-Time Chart**'.
- Tick the '**Save to .csv file**' check-box.
- Press the '**New**' button to create a new file name and location.
- Enter a file name in the appropriate directory and press '**Save**' button. The '**Filename (.csv)**' text-box will update with the chosen file name.

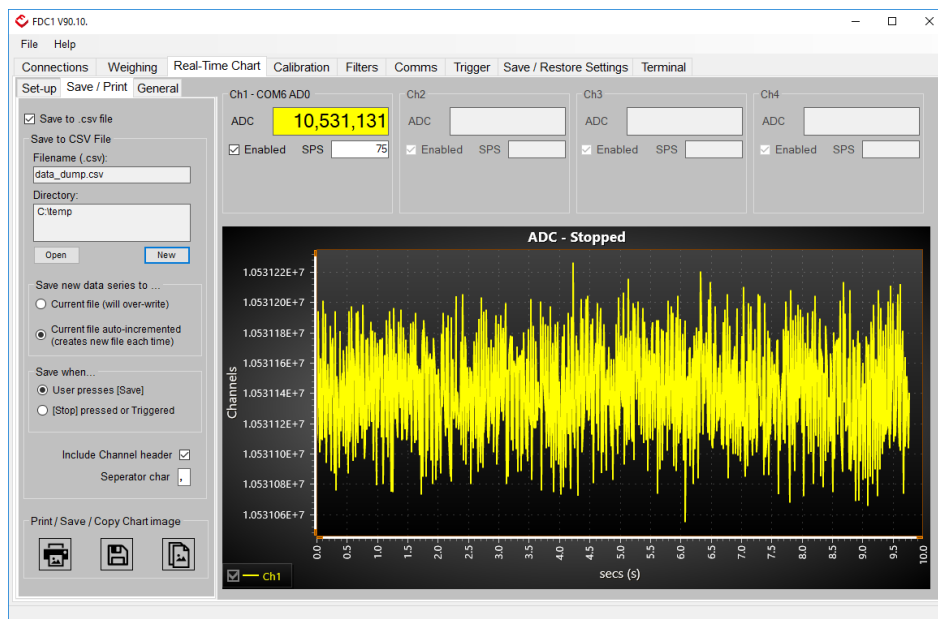


- To save the data points in a CSV file, click on the '**Setup**' Tab within the '**Real-Time Chart**'.
- Press the '**Save to File**' button. This will create the *.csv file, confirmed by the text-window updating with '**File Saved:- xxx.csv**'.

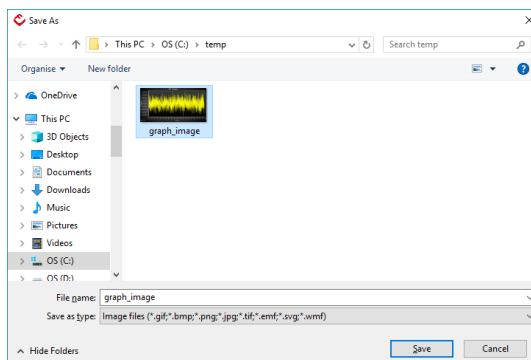


11.3. Saving Graph Image

- Click on the '**Real-Time Chart**' Tab.
- Click on the '**Save/Print**' Tab within the '**Real-Time Chart**'.



- Press the '**Disc**' button symbol at the bottom of the window will save the chart window to an image file (e.g. bmp/jpg etc).
- Enter the image file name and location.



- Alternatively, the '**Printer**' symbol will send the graph image to the default printer, while the '**Copy**' symbol will transfer the graph to the clip-board to cut-and-paste into another document.

