

MS Serial Waters Analyser and Tester (SWAT)

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1. Overview

MS S.W.A.T. is intended for use in loading firmware and diagnosing instrument issues. It runs on all Modular Mass Spectrometer Instruments which includes the Synapt G2 & the Xevo family of instruments. The software works by connecting to the instrument using a secondary communication bus: the service bus com port.

SWAT replaces all existing version of Waters "Sertest" software.

Delete all existing sertest executables ("sertest.exe", "Sertest2.exe" & "Sertest3.exe") and serbus library files ("serbus.dll") that are not part of the masslynx installation prior to using MS SWAT, failure to do so may result in firmware loading issues.

2. Installing MS SWAT

1. MS S.W.A.T. is distributed as a self extracting zip file. This can be run directly from the service note or can be downloaded and executed.
2. When executed it should look like the example Figure 1.

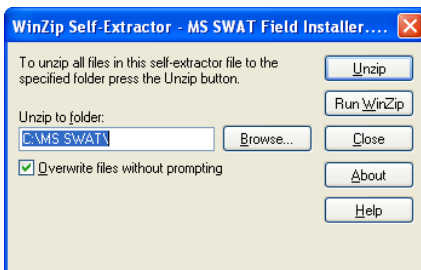


Figure 1

3. By default it will install to C:\MS SWAT\ You may change the target to any valid location including a USB drive, or move the installation afterwards.

3. Connecting to Instrument

1. Once the installer has completed, navigate to the install directory. This should look like the example in Figure 2.

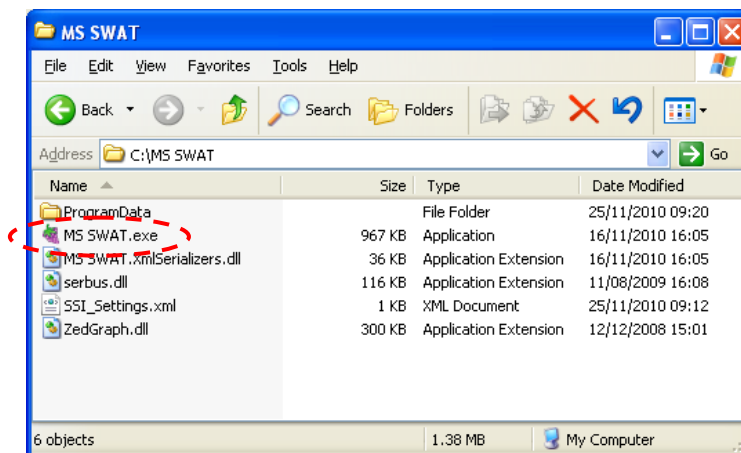


Figure 2

2. Check that you have a Serial Bus connection to the service port on the instrument using a null modem cable (8932388-S) and that the instrument is on.
3. Double Click on MS SWAT.exe shown in Figure 2.
4. The program should come up immediately and try to establish a connection to the instrument. If a connection is establish to the instrument, the software is considered installed correctly.
5. Good connections are denoted by the green checkmarks as shown in Figure 3. Please note the instrument named or numbered will vary depending on what instrument you are connecting to.

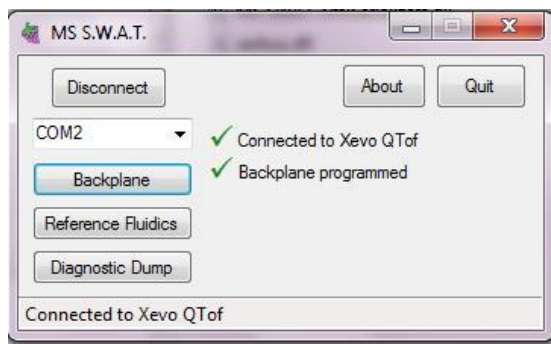


Figure 3

6. From the interface you can connect and disconnect to any com port, access the backplane, the reference fluidics, perform system diagnostics, or load firmware. As earlier noted when first launched it will automatically scan the comm. ports for an open service bus port and establish a connection. By using the disconnect button you can then manually select a port and re-connect.

4. Updating Firmware

Firmware files are currently distributed for each board individually as a .bin file. You can access these files from the Instrument Firmware Service Note which is accessed from the MS SWAT Service Note.

1. To load a new .bin simply drag it onto the Service Utility main window Figure 3 and Figure 4 window should pop open:

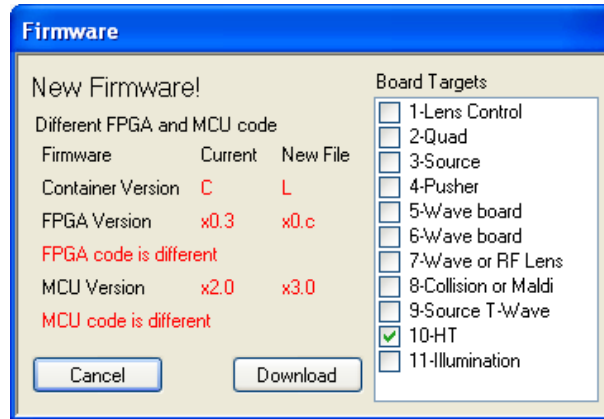


Figure 4

2. The program automatically checks the 'Board Target' box for the firmware that was 'dragged and dropped', if required this can be verified in Table 1 in Appendix 1. If this does not happen see the troubleshooting section.
3. The program also automatically detects which revision of firmware is currently on the board and compares it to the version you are trying to load. Table 1 in Appendix 1 details the Board Targets for each instrument.
4. If the two versions match the comparison text is green, if they differ the text is red. In this example revision L is different in all aspects measured by the program.
5. Please note that even one aspect of difference between the current firmware and the new firmware may make a difference.

Note: The breakdown in changes is provided mainly for interest and administrative purposes.

6. Click 'Download' to start. Once you hit download, the firmware will begin to download and provide a counter of the estimated expected time for the download.

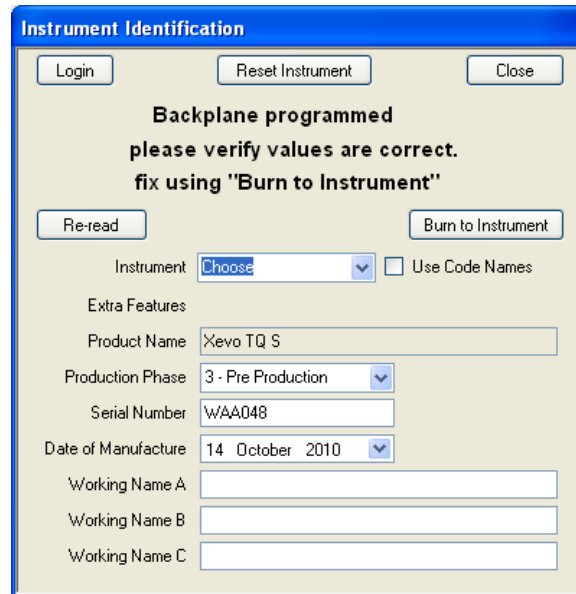
Note: If you are downloading firmware for a T-Wave or S-Wave board the download manager should automatically select all the wave boards on the system and systematically download to each board without any assistance.

7. After the download you will be given the opportunity to reset the board. However it is recommended that once all new firmware is downloaded that the entire instrument including EPC be rebooted per standard processes.

5. Reading Backplane Information

Backplanes do not have firmware versions; instead the programme is identified by the instrument type. If the backplane is programmed as the wrong instrument, it may fail to pump down and/or limit the instrument's functionality.

1. To view the backplane information click on the 'Backplane' button in Figure 3.



The image shows a software window titled "Instrument Identification". At the top, there are three buttons: "Login", "Reset Instrument", and "Close". Below these, a message reads: "Backplane programmed please verify values are correct. fix using 'Burn to Instrument'". Underneath the message are two buttons: "Re-read" and "Burn to Instrument". Below these buttons is a section for "Extra Features" which includes: an "Instrument" dropdown menu currently showing "Choose", a checkbox labeled "Use Code Names" which is unchecked, a "Product Name" text field containing "Xevo TQ S", a "Production Phase" dropdown menu showing "3 - Pre Production", a "Serial Number" text field containing "WAA048", a "Date of Manufacture" dropdown menu showing "14 October 2010", and three empty text fields labeled "Working Name A", "Working Name B", and "Working Name C".

Figure 5

2. When the Backplane viewer/programmer opens (Figure 4) it immediately attempts to read the backplane. If a Lens/Control board is not fitted it will inform you as such, and you will not be able to program the backplane.
3. If the values displayed are correct, no action is necessary, and you can close the window.
4. If you need to set the instrument type choose it from the drop down "Instrument" menu.
5. If you have to set the instrument type or serial number, please inform GSS.
6. There should be no need to update or change to Production Phase or Date of Manufacture. If you believe this is required contact GSS prior to doing so.
7. If you can't find your instrument contact GSS for support.
8. Once all white fields have been updated, use the "burn to instrument" button to update the backplane. To verify it has worked either use the "Re-read" button, or close and re-open the backplane manager.

Note: The Reset Instrument button allows you to restore the backplane to the original manufactured state.

6. Reference Fluidics

Reference Fluidics are only applicable to QToF instruments. FSE are only required to use this function if there is a suspected issue with the Reference Fluidics (IDEX PCB).

1. To view the Reference Fluidics Control information click on the 'Reference Fluidics' button in Figure 3.
2. The Reference Fluidics Control pop up box is shown in Figure 6.
3. Confirm 'IDEX Power ON' is checked.
4. Ensure there is no flow on the reference fluidics in Masslynx.
5. Confirm the 'Clock Line', 'Data Line' and 'I2C State' all readback 'OK'.
6. Click the 'Read' Button.
7. The readbacks should be: Kp 3000, Ki 400, Kd 10 and Ki 15000.
8. If the readbacks are not correct, select the values above for the Kp, Ki, Kd and Ki fields and click 'Set'.
9. Confirm the values are set by clicking 'Read'.

The dialog box titled "Reference Fluidics Control" contains the following elements:

- Buttons: "Get Readbacks", "Poll", "polling off", "Close", "More >>", "Set", "Read".
- Fields:
 - IDEX Control Codes: more
 - System: 0 Stopped
 - Pump Status: 0 Stopped
 - Error Codes: \
 - Current State: Unknown
 - State Machine: Idle
 - Queue: Empty
 - Clock Line: Ok
 - Data Line: Ok
 - I2C State: Ok
 - Control Parameters: Kp (3000), Ki (400), Kd (10), Ki (15000)
 - Command Log Table (see below)

	Command	Data 0	Data 1	Data 2	Error Code
Control Sent	0	N/A	N/A	N/A	Bad Command
Readback A	0	0	0	0	Bad Command
Readback B	0	0	0	0	'OK'
Readback C	0	0	0	0	'OK'
Readback D	0	0	0	0	'OK'

Figure 6

7. Diagnostic Dump

The diagnostic tool is opened via the “Diagnostic Dump” button in Figure 3, it opens Figure 7. This tool allows you to rapidly gain a large amount of detailed information about a system in a format that can easily be sent to GSS for diagnostic. When you press “Grab” the utility will automatically obtain data for all the selected categories and store them in a new folder on the desktop labelled as specified under Folder Name. Once complete the diagnostic tool will close and offer to open the directory with the diagnostic data. ‘Advanced’ Options Logging – It is possible to set the diagnostic

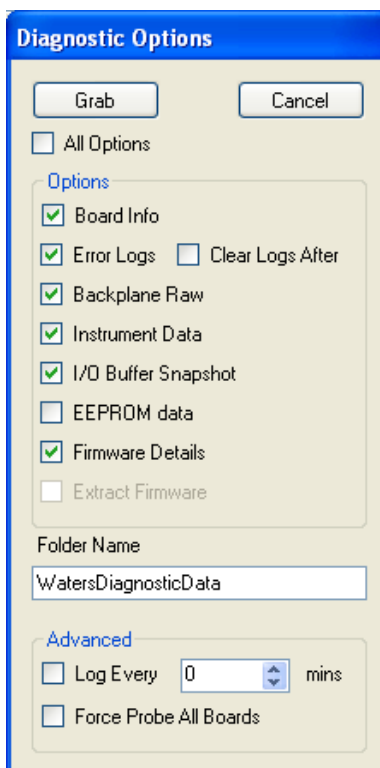


Figure 7

tool to run on a re-current basis to try and catch the instrument in a failure state. In logging mode the instrument will be probed however often selected. **WARNING: this is not meant to be run over the course of weeks. Some of these items if polled at rapid intervals over the course of weeks will cause internal memories to fail.**

‘Advanced’ Options Forced Probing – By default the diagnostic tool will check which boards are responsive once. Selecting this will force the tool to repeatedly query even non-responsive boards for each selected item. At this time Forced Probing does not generate any new useful information when fault finding.

8. Troubleshooting

Connection Issues

“Failed to Find a Service Bus Port”

This occurs when there is no valid serial port to connect to. This can occur for the following reasons:

1. The service bus port is already in use (check all open applications).
2. There is something incorrectly connected to the service bus port.
3. The service cable is disconnected, the wrong type or connected to EPC.
4. The instrument is off.
5. The Source board is not fitted to the instrument.
6. The internal connection between the source board and the side wall of the instrument is disconnected.
7. A cable or the source board is faulty.
8. The backplane is faulty.
9. There is a pinch in the 15way cable between the main electronics and the HT unit or on to the pusher unit.

Updating Firmware Issues

The Firmware pop up box opens but no board is checked.

This can occur when a matching board can't be found. This may occur because the existing firmware is corrupted, or a matching board isn't connected. If you are sure which board is the target, and you think your connection is OK, you can manually check a target and attempt a download. If an error occurs in the first five seconds of download it is likely due to the board being unreachable, therefore check the connection to the appropriate board/unit.

Reference Fluidic Issues

1. Check that you have a valid connection to the instrument.
2. Next check that a Lens Control board is fitted and you can readback the Lens Control firmware.
3. Check the I2C cable between the Lens Control board and the Reference fluidics (IDEX) PCB.
4. Check the 24Vsupply to the Reference fluidics (IDEX) PCB.

Appendix 1

Table 1

Board Targets / Instrument	Xevo TQ MS	Xevo TQ-S	Xevo QTof MS	Xevo G2 QTof / TOF	Synapt G2 & Synapt G2-S
1	Lens Control	Lens Control	Lens Control	Lens Control	Lens Control
2	Dual Quad	Dual Quad	Single Quad	Single Quad	Single Quad
3	Source	Source	Source	Source	Source
4			Pusher	Pusher	Pusher
5	Storage	Storage			Trap Twave
6	ScanWave	ScanWave			IMS Twave
7	Barrier	Barrier	RF Lens	RF Lens	Transfer Twave
8			Collision	Collision	Maldi
9		Source Transfer Twave			Source Twave
10			HT Unit	HT Unit	HT Unit