
AN49503A Evaluation Software User Manual

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Ver1.22**

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Note: AN49503A Evaluation Software is designed with flexibility to fully control AN49503A, It is user's responsibility to understand the operation of AN49503A when evaluating with the provided software to avoid mis-operating AN49503A.

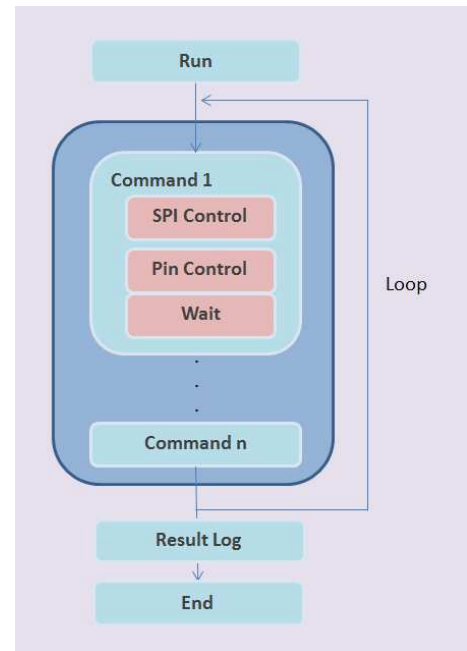
1. Software Overview

AN49503A Evaluation Software is designed for evaluation of Panasonic BMS IC AN49503A. The software allows user to evaluate AN49503A with SPI command sequence set by user and also allows user to export the result for reviewing.

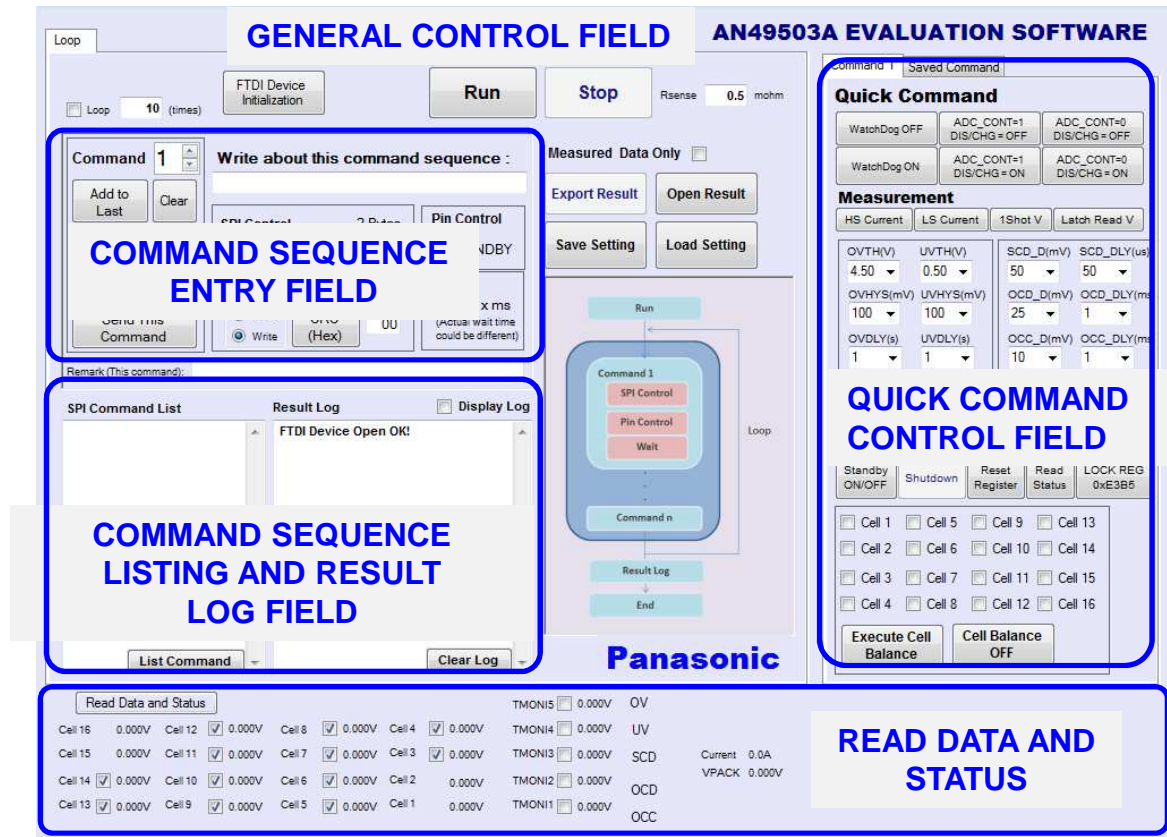
1.1 Features

- a. Program the SPI command in sequence and execute the sequence repeatedly in loop
 - program a SPI command sequence and execute
 - execute the command sequence repeatedly by loop setting
 - program a wait time between each command
 - Pin control (for Standby ON/OFF) between command
- b. Save and load the programmed command sequence for reusability
 - a programmed sequence can be saved and loaded for reuse
 - remark for each command can be added for quick future reference
- c. Result can be exported for post-processing and reference
 - export result in .csv format for easy access and post-processing
 - data only (converted voltage reading) result can be exported
- d. Quick command for quick access to the IC's function
 - provides quick command with pre-programmed command to IC's function control
- e. Simple command entry with customizable CRC entry
 - user may enter only the register address and data to be written or register address and number of register to be read only, and the software will calculate the CRC code and convert it into AN49503A compatible SPI code
 - CRC code may be changed to for CRC verification
- f. Clear information of command sequence and data read
 - provides clear information of the command sequence to be sent in SPI code so that user understand what is the command exactly sent
 - provide feedback on data read

Command Sequence & Loop Concept



1.2 Software Main Screen



1.3 Software Installation and Requirement

1.3.1 Hardware requirement

FTDI MM-FT232H module or equivalent-

This software use FTDI module as conversion device between USB and SPI command to AN49503A

1.3.2 Software installation

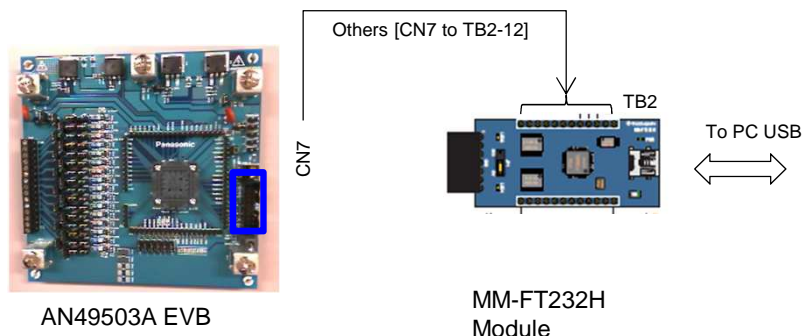
- AN49503A Evaluation Software Ver1.00.exe or later
- Driver for FTDI MM-FT232H is required.

Plug in the device module and install the driver with the provided driver file or download from

<http://www.ftdichip.com/Drivers/D2XX.htm> accordingly.

1.4 Connection

- Connect AN49503A EVB CN7 to MM-FT232H module
- Connect MM-FT-232H module to PC



2 Software Function Explanation

2.1 Command Sequence Entry field

COMMAND SEQUENCE ENTRY FIELD

The screenshot shows the 'COMMAND SEQUENCE ENTRY FIELD' interface. It includes a 'Command' dropdown menu (1), a 'Command control' area with buttons like 'Add to Last', 'Clear', 'Insert Behind', 'Copy', 'Delete', 'Paste', and 'Send This Command' (2), a 'Remark (This command):' text field (3), a 'Write about this command sequence:' text field (4), a 'SPI Control' section with 'Reg Addr' (Hex) and '2 Bytes Write' (Hex) fields, 'Read' and 'Write' radio buttons, and a 'CRC (Hex)' button (5), a 'Pin Control' section with a 'STANDBY' checkbox (5), and a 'Wait' section with a '1 + x ms' input and a note '(Actual wait time could be different)' (6).

Control Explanation

1. Current command – currently editing command
2. Command control – command control area,
 - Add to Last = add new command after last command
 - Insert Behind = add new command after this command
 - Delete = delete currently editing command
 - Clear = clear currently editing command to default setting
 - Copy = copy currently editing command setting
 - Paste = paste copied setting to currently editing command
 - Send This Command = send only this command to AN49503A
3. Remark for each command – add remark to each command, (user may add explanation to this command for future reference)
4. Remark for command sequence – add remark to the command sequence (eg. A title)
5. Standby ON/OFF control – Set if AN49503A go into standby after current SPI command sent
6. Wait time – wait time after the SPI command and Standby ON/OFF control in ms

Note: the actual wait time may be different from set value

7. Read/Write Command Field

- a. Select checkbox “Write” for write command

The screenshot shows the 'SPI Control' section for a write command. It includes 'Reg Addr (Hex)' (01), '2 Bytes Write (Hex)' (0000), 'Read' and 'Write' radio buttons (with 'Write' selected), and a 'CRC (Hex)' button (00).

Reg Addr(Hex) – register address to write to

2 Bytes Write (Hex) – 2 bytes data to be written

CRC(Hex) button – to calculate CRC code

- b. Select checkbox “Read” for read command

The screenshot shows the 'SPI Control' section for a read command. It includes 'Reg Addr (Hex)' (01), 'Read Data <= 128' (1), 'Read' and 'Write' radio buttons (with 'Read' selected), and a 'CRC (Hex)' button (00).

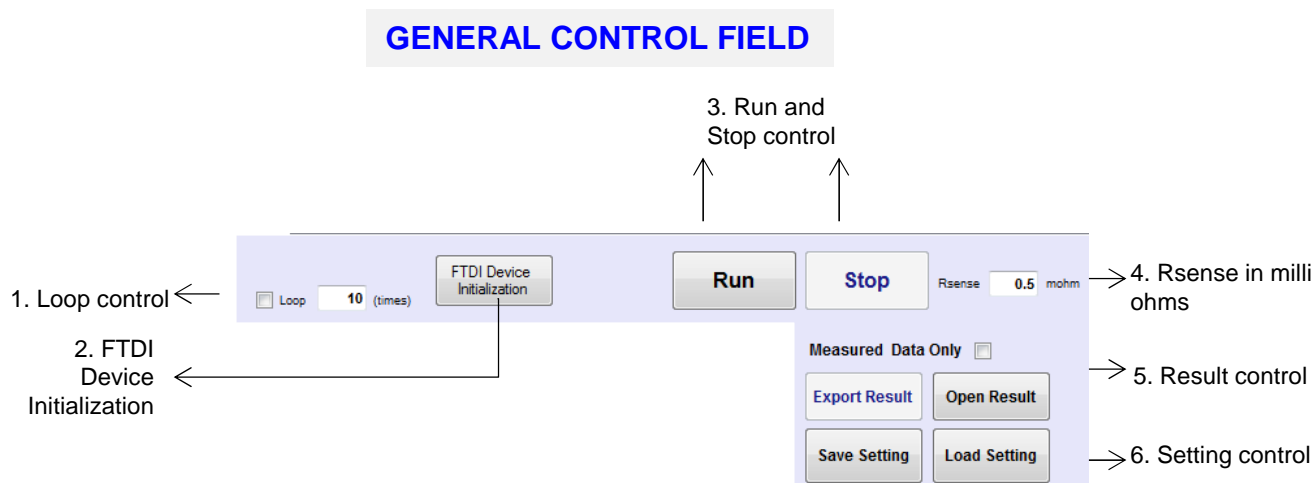
Reg Addr(Hex) – register address to read from

Read Data <= 128 – read registers number

CRC(Hex) button – to calculate CRC code

2 Software Function Explanation

2.2 General Control Field



Control Explanation

1. Loop control – check the checkbox to enable loop operation and enter the loop repetition times
2. FTDI Device Initialization – This software use FTDI module between USB and AN49503A, FTDI device will be initialize during start up of this software. However, when FTDI device is reconnected, initialization is required.
3. Run and Stop Control – Run button start execute the command sequence (with loop set), stop button stop the operation.

Note; Do not execute other function of this software during run.

4. Rsense in milli ohms – enter current sensing

resistor value across SRP and SRN pins for current calculation.

5. Result control – Export or open run result (when “Measured Data Only” checkbox checked, only data registers will be exported.)

Note: Do not perform multiple read command in the command sequence if data registers to be output as it may interrupt with the result listing.

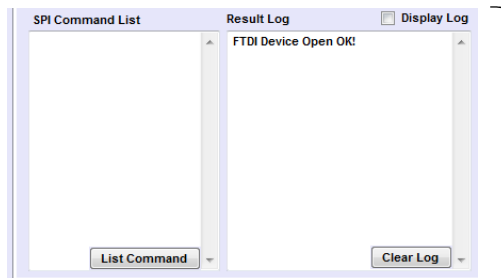
6. Setting control – save and load current command sequence (Rsense data, loop data will be saved together with data set in Command Sequence Entry Field)

2.3 Command Sequence Listing and Result Log Field

COMMAND SEQUENCE LISTING AND RESULT LOG FIELD

SPI Command List Field

- By clicking on “List Command” button, the editing command sequence will be listed in this field, it is listed in SPI command.
- During “Run”, the list of command sequence will also be listed here.



Result Log Field

- By clicking on “Display Log” checkbox, the result will be listed in this field after run
- Read data, SPI communication error, CRC error status will be shown, if any.
- By clicking on “Clear Log” button, it clear the Result Log Field
- When the total run command is too many, the “Display Log” will be disabled.

2 Software Function Explanation

2.3 Quick Command Control Field

QUICK COMMAND CONTROL FIELD

Command 1 Tab

Saved Command

Control Explanation

This software provides some pre-programmed command sequences to control AN49503A which is listed in Quick Command Control Field.

Simply click on any of the quick command, it will sent series of SPI command, and these command will be displayed on the Result Log Field so that user can understand the sequence to control AN49503A easily.

For example: for measurement quick command, such as "1Shot V", the measured result will be listed in Result Log Field.

Note: In this software, it is trying to provide user with customize control to the IC, it is important for users to take precaution when controlling the IC by themselves. For example, two consecutive battery cell shall not be cell balanced at the same time.

Note: These quick command may show only one of the example of control sequence, users are required to modify according to their requirement.

2 Software Function Explanation

2.3 Quick Command Control Field

2.3.1 Command 1 Tab

Quick guide

a. Initialization

(i) After connect FTDI Module Board to PC and AN49503A evaluation

(ii) Wake up AN49503A Evaluation Board

(iii) Execute AN49503A Evaluation Software

(iv) Click FTDI Initialization

=> Confirm the message "..... OK"

(v) Click Watchdog OFF at Quick Command zone

=> Watchdog is ON by default and will go into shutdown after 1 minute if no communication from PC, this step is to disable Watchdog from shutdown the IC

b. One shot voltage measurement

(i) After initialization a., click "1 Shot V"

(ii) Read result will be listed in Log display

c. Continuous voltage measurement

(i) After initialization a. click "ADC_CONT=1 DIS/CHG = OFF" or "ADC_CONT=1 DIS/CHG = ON"

(ii) OR After initialization a. click "ADC_CONT=0 DIS/CHG = OFF" or "ADC_CONT=0 DIS/CHG = ON"

(iii) Click "Latch Read V" to latch ADC result to data register and read

(iv) Read result will be listed in Log display

d. Turn ON watchdog timer

(i) Click "Watchdog ON" button, Watchdog timer will be turned ON

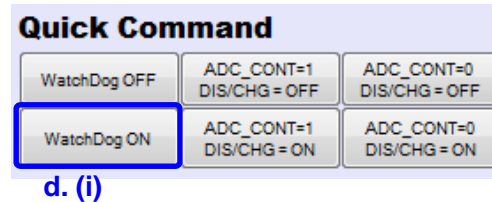
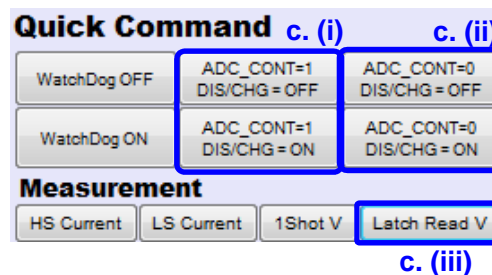
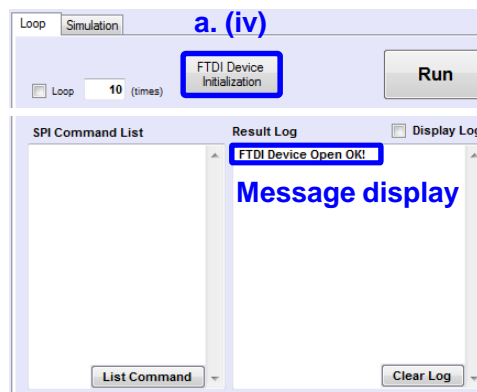
(ii) AN49503A will be shutdown in about 1 minute if no SPI communication is done (the watchdog duration depend on setting or register 0x02)

e. High speed and low speed current measurement

(i) Click "HS current" to measure high speed current

(ii) OR click "LS current" to measure low speed

(iii) read result will be listed in Log display



2 Software Function Explanation

2.3 Quick Command Control Field

2.3.1 Command 1 Tab

Quick guide

f. Protection setting and control

(i) Set threshold, hysteresis, and delay time for over voltage and under voltage.

(ii) Decide if activate FET protection.

(iii) Click “SET” button to send command for setting.

(iv) Set threshold and delay time for short circuit in discharge, over current in discharge, and over current in charge.

(v) Decide if activate FET protection.

(vi) Click “SET” button to send command for setting.

g. Standby mode

(i) Click the “Standby ON/OFF” button to ON and OFF standby mode.

(ii) Status will be displayed in result log.

h. Reset register

(i) Click the “Reset Register” button to reset AN49503A by register 0x01.

(ii) Status will be displayed in result log.

i. Read status

(i) Set the protection setting f. and send the continuous voltage measurement command c.

(ii) Click the “Read Status” button to read status register 0x03.

(iii) Read results will be displayed in result log.

j. Unlock R/WL register

(i) Click “LOCK REG 0xE3B5” button to set LOCK register to 0xE3B5 to unlock R/WL register

k. Cell balance

(i) Select the cell that needs to be balanced. Avoid selecting adjacent cell(n) & cell(n+1) at the same time.

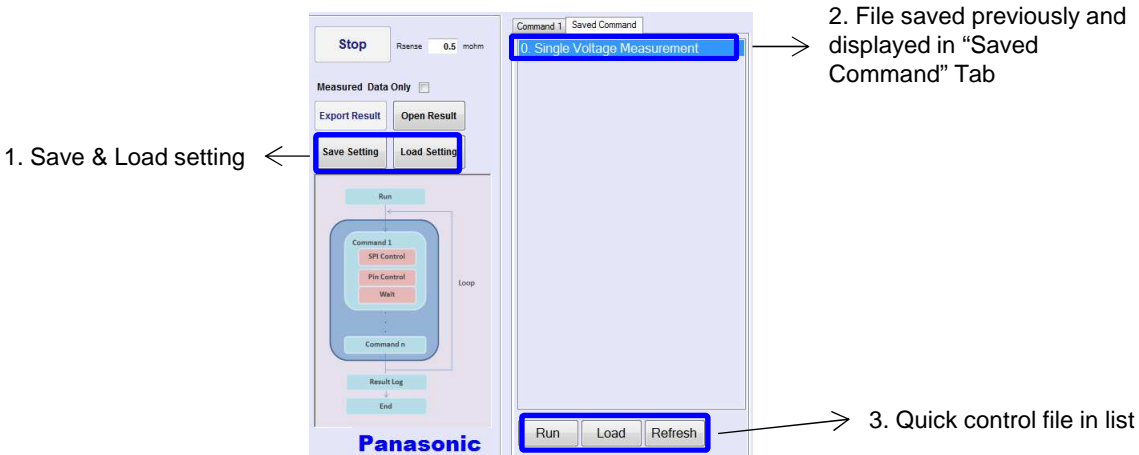
(ii) Click “Execute Cell Balance” button to operate cell balance.

(iii) Click “Cell Balance OFF” to stop cell balance.

2 Software Function Explanation

2.3 Quick Command Control Field

2.3.2 Saved Command



Control Explanation

1. Save & Load setting which are commands set previously. File is in .scw format and saved into folder.
2. After execute the program, the list of file name is displayed in "Saved Command" Tab.
3. Quick control of command files
 - "Run" button => Send command of selected file
 - "Load" button => Load command of selected file
 - "Refresh" button => Refresh file list
 - Double click file => Load command of selected file

2.4 Read Data and Status

Read Data and Status										TMONI5 <input type="checkbox"/> 0.000V OV	
Cell 16	1.094V	Cell 12	<input checked="" type="checkbox"/> 1.095V	Cell 8	<input checked="" type="checkbox"/> 1.094V	Cell 4	<input checked="" type="checkbox"/> 1.096V	TMONI4	<input type="checkbox"/> 0.000V	UV	Current -0.011A VPACK 17.529V
Cell 15	1.093V	Cell 11	<input checked="" type="checkbox"/> 1.094V	Cell 7	<input type="checkbox"/> 0.000V	Cell 3	<input checked="" type="checkbox"/> 1.092V	TMONI3	<input checked="" type="checkbox"/> 2.425V	SCD	
Cell 14	<input checked="" type="checkbox"/> 1.095V	Cell 10	<input checked="" type="checkbox"/> 1.093V	Cell 6	<input checked="" type="checkbox"/> 1.096V	Cell 2	1.095V	TMONI2	<input type="checkbox"/> 0.000V	OCD	
Cell 13	<input type="checkbox"/> 0.000V	Cell 9	<input checked="" type="checkbox"/> 1.095V	Cell 5	<input type="checkbox"/> 0.000V	Cell 1	1.095V	TMONI1	<input checked="" type="checkbox"/> 2.555V	OCC	

Control Explanation

Click "Read Data and Status" button, The voltage of cell 1~16, TMONI1~5, protection status, current and VPACK voltage can be measured and displayed.

Note: Only selected cell and TMONI voltage can be measured and displayed.

3 Troubleshooting

Problem	Solution
a. FTDI initialization return "xxxxx fail"	<ul style="list-style-type: none">=> FTDI device not connected=> FTDI driver not installed=> multiple software opened
b. SPI Communication Error	<ul style="list-style-type: none">=> AN49503A board not connected=> AN49503A not wake up=> CVDD not powered (5V on board)=> CRC code sent not correct (CRC(HEX) button clicked before command sent)
c. voltage measurement result not change	<ul style="list-style-type: none">=> ADC measurement not operating eg. ADC_CONT = 0 (continue ADC not ON) and ADC_TRG =0 (register 0x01 & 0x0A)=> ADC result not latch to cell voltage data register (register 0x0A)