MCEDesigner Application Guide

Step-by-step instructions for setting up motor control system with iMOTION™ ICs

Agenda

1 Run motor with a new iMOTION2.0 system

2 Read/Write register definition

3 Default function definition

4 User function definition

5 Re-usable function definition

6 Trace function definition

7 Fault check and display

8 Script function tuning

iMOTION2.0 MCEDesigner_V2.1.2.0 overview

› Feature:

- Compatible iMOTION 1.0 product

- Script function variables tuning and monitor are available.

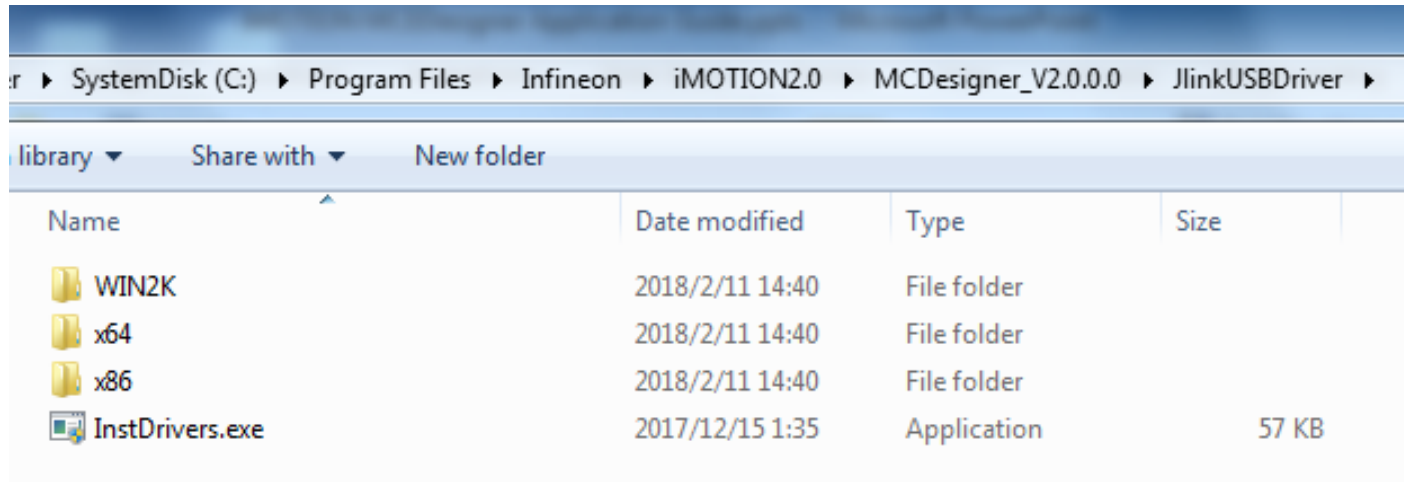- Parameters compared list for review before "Export".

› (1) Prepare firmware and parameters file to be download.

– 1) Get the supported MCE Firmware from Web.

– The new firmware version will always update to Infineon Web.

– http://www.infineon.com/iMOTION

– 2) Using MCEWizard generate parameters file.

– The MCEWizard needs align with firmware version.

– The parameter needs align with hardware and motor.

– See MCEWizard_V2.1.2.0 user guide.pdf.

› **(2) Power on system.**

– 1) Connect debug USB port to PC and Power on motor system.

- After installing MCEDesigner package, the On-board debugger(Jlink virtual COM) has installed automatically.
- If On-board debugger(Jlink virtual COM) driver is not installed or something wrong, please install the driver by point file to MCEDesigner install JlinkUSBDriver folder.

r ▸ SystemDisk (C:) ▸ Program Files ▸ Infineon ▸ iMOTION2.0 ▸ MCDesigner_V2.0.0.0 ▸ JlinkUSBDriver ▸

library ▾   Share with ▾   New folder

Name	Date modified	Type	Size
WIN2K	2018/2/11 14:40	File folder	
x64	2018/2/11 14:40	File folder	
x86	2018/2/11 14:40	File folder	
InstDrivers.exe	2017/12/15 1:35	Application	57 KB

› **(3) Start software.**

- 1) Open .irc file which fits for the selected firmware.

  - Double click .irc file or select irc file after open MCEDesigner.

  - Waiting MCEDesigner check device finishing.

  - There is a warning dialog promote if device is not detected or device is not programed FW/Pars. Or the setting COM port is not available.

 - Press "Cancel" and Check the COM port setting "Preferences->Connection" after press System window.
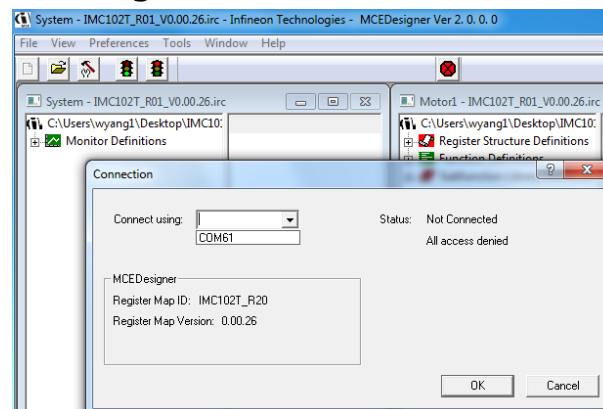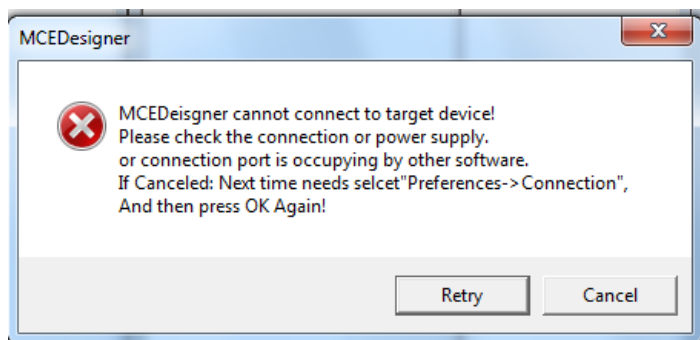
  - After connection, then it will promote the device needs program firmware and parameters files.
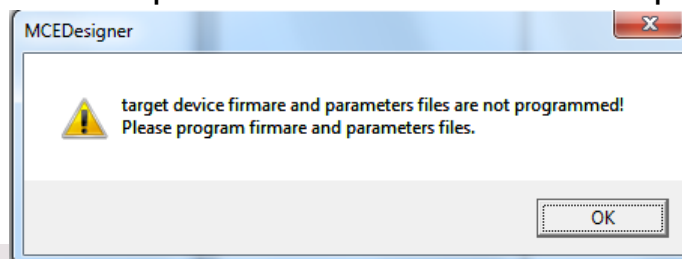
› # (4) Download firmware and parameters file to device.

› 1) Select System windows, Press "Tools->Programmer" at top manual bar.

– Select right Parameter and Firmware File through Browse.. button.

– Then Press Start to program device.

– There is a dialog to show the program result.

– After programming file to device FLASH, it needn't a next programming after power cycle if the FW/Pars are the same.
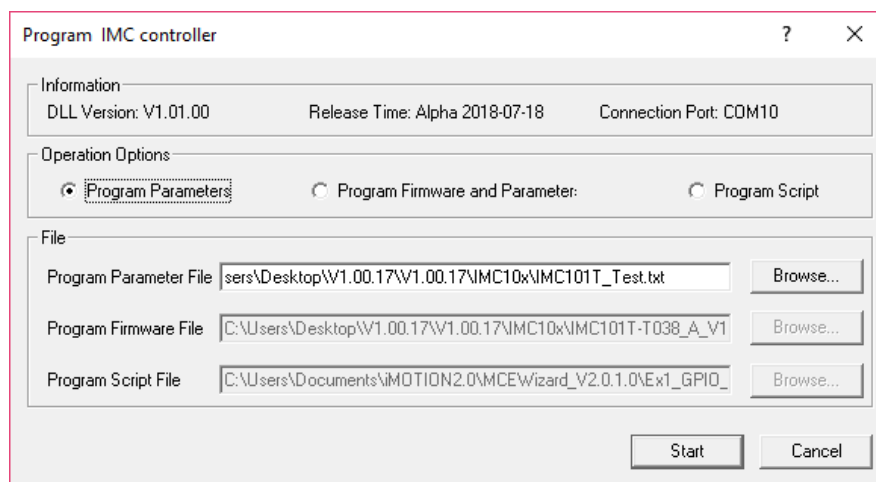
› (4) Update register parameters value in .irc file.

› 1) Update parameters value in .irc file.

  – After program device successful, there is a dialog to user select update parameters in irc file. If user need tune the motor, press Yes.
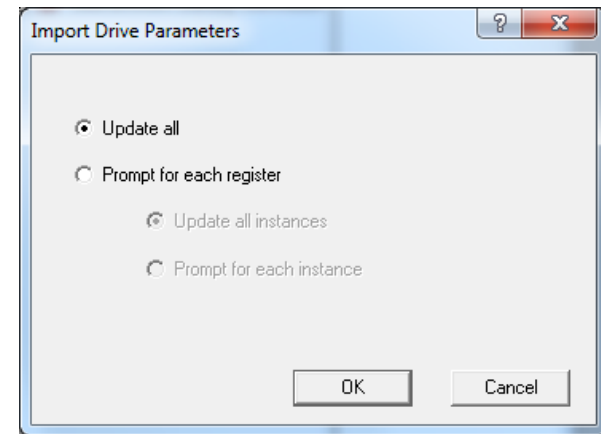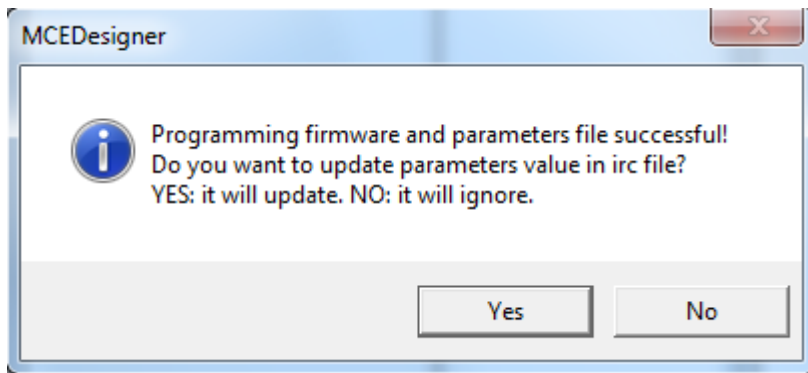
› 2) Update parameters value in .irc file another method.

  – Also, we can import parameters file directly through "File-> Import Driver Parameters".

  – Note: this method only update .irc register value, the parameters in device is the last programmed one.

Run motor with a new iMOTION2.0 system (5)

› # (5) Start Motor with VHz open loop firstly.

› 1) Run VHz open loop to check hardware and current wave.

  – This step is very important for new hardware and parameters configured, if there is some mistake, we can get from Iu/Iv/Iw current wave.

  – If we can get a higher quality current feedback, then we can enter close loop.

  – Note: at this step, we may need adjust parameters related with current sense in MCEWizard , then export txt file and program FLASH to update them.
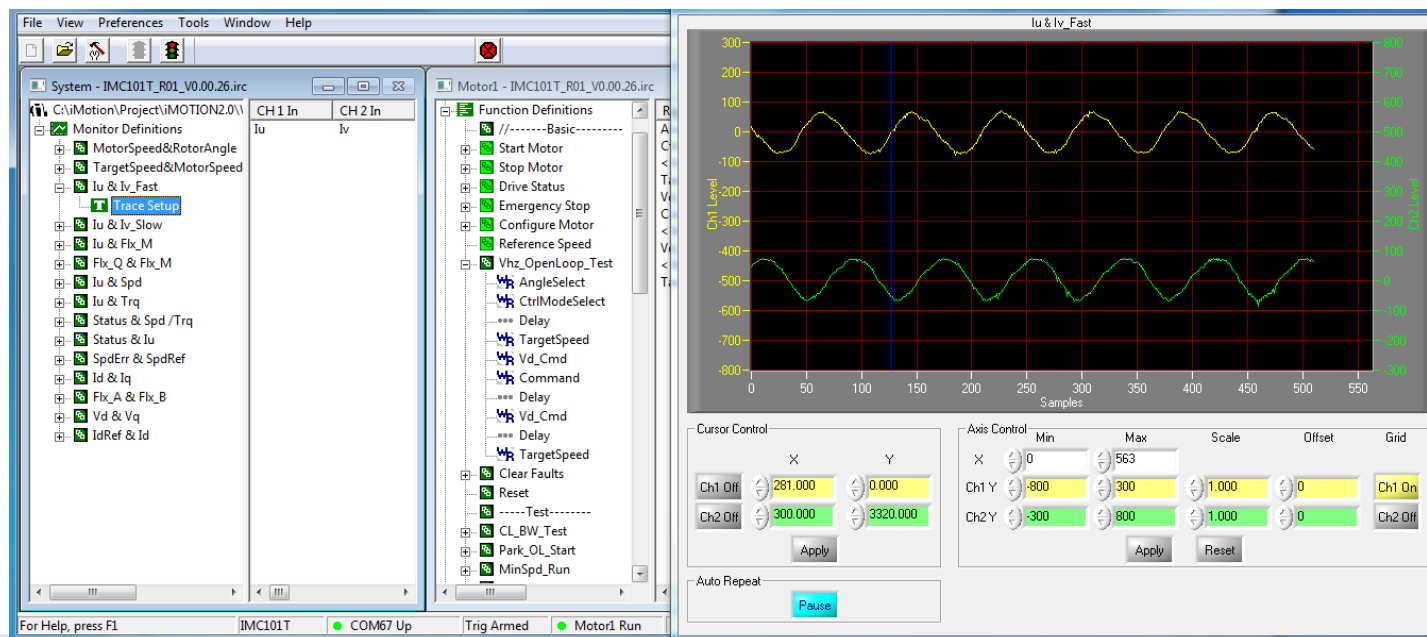
› **(6) Run Motor with close loop and tune system.**

› **1) Run motor in close loop.**

– After confirm the current sample is well and hardware is ok, then we can run close loop.

– Press "Configure" button to change current and speed loop type.
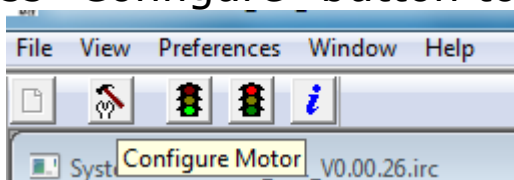
– Then press "Start Motor" button to run at target Speed. Check current wave using trace function.
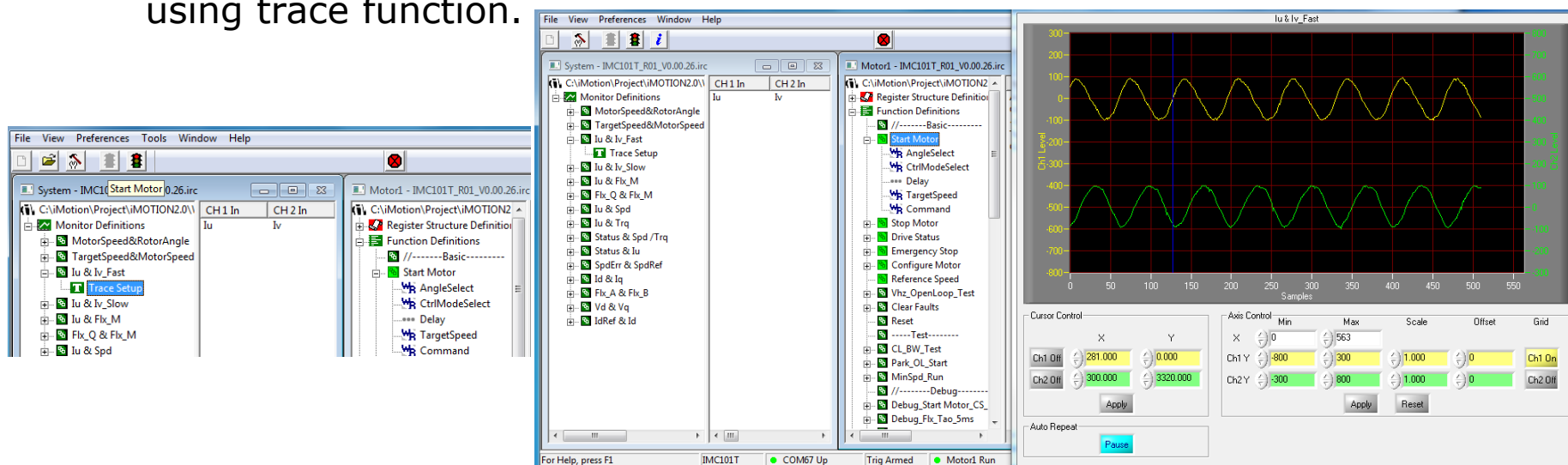
› (7) Update Parameter value.

› Update Parameter temp value in .irc file before export.

  – After system tunes fine, we need to use tuned value for system, right button press parameter register, select "Update Parameter Value".
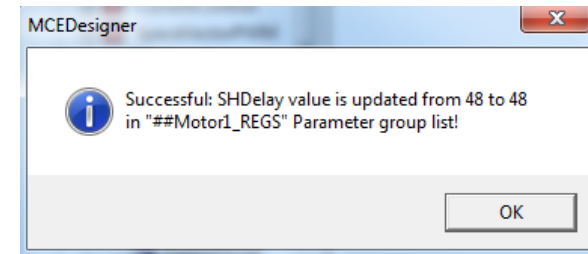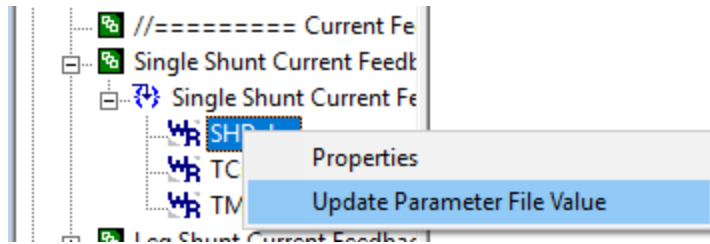
› # (8) Export parameter file.

› ## 1) Export parameter file to be program to device.

- After system tune fine, we export parameter file to be re-use.
- This file can be program to the same system for production.
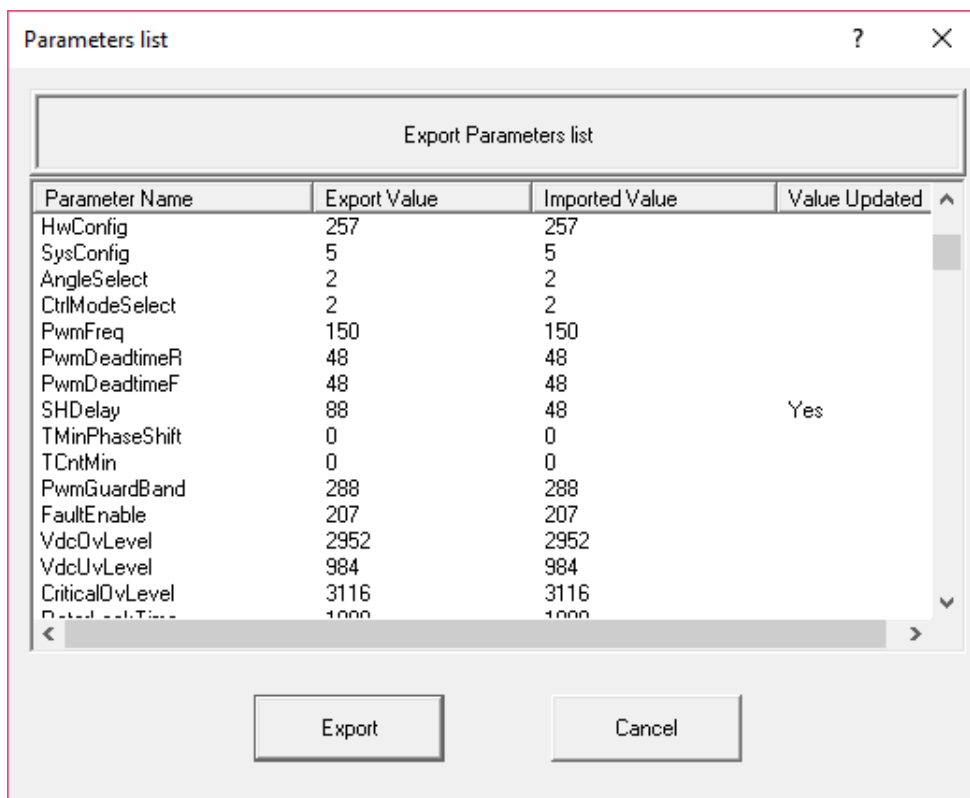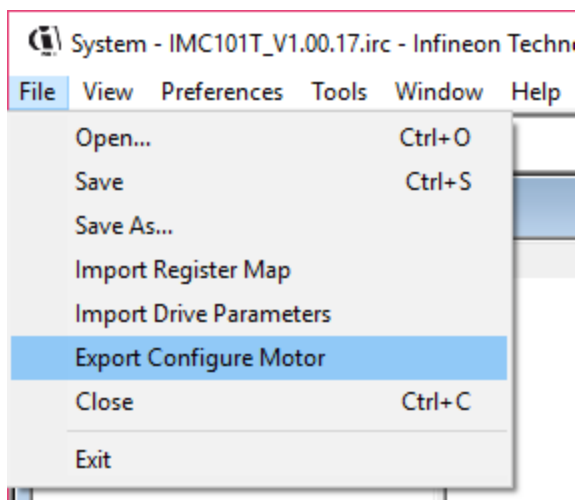
Agenda

1. Run motor with a new iMOTION2.0 system

2. **Read/Write register definition**

3. Default function definition

4. User function definition

5. Re-usable function definition

6. Trace function definition

7. Fault check and display

8. Script function tuning

Read/Write register definition in MCEDesigner

› If user want to add register which is not in .irc file definition for iMOTION2.0. User can define it in "Register Structure Definition".

- Note 1: register define only permitted in reference manual provided. (IMC Software Reference Manual.pdf)

- Note 2: STATIC register type should select "system". DYNAMIC register type should select "MCE".

- Note 3: STATIC register only permitted define in "Read Registers" group.

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Default function definition when tuning motor

› MCEDesigner provides 4 frequently-used function with button related. (Configure 🔧 , Start 🚦 , Stop 🚦 , Emergency Stop ⊗)
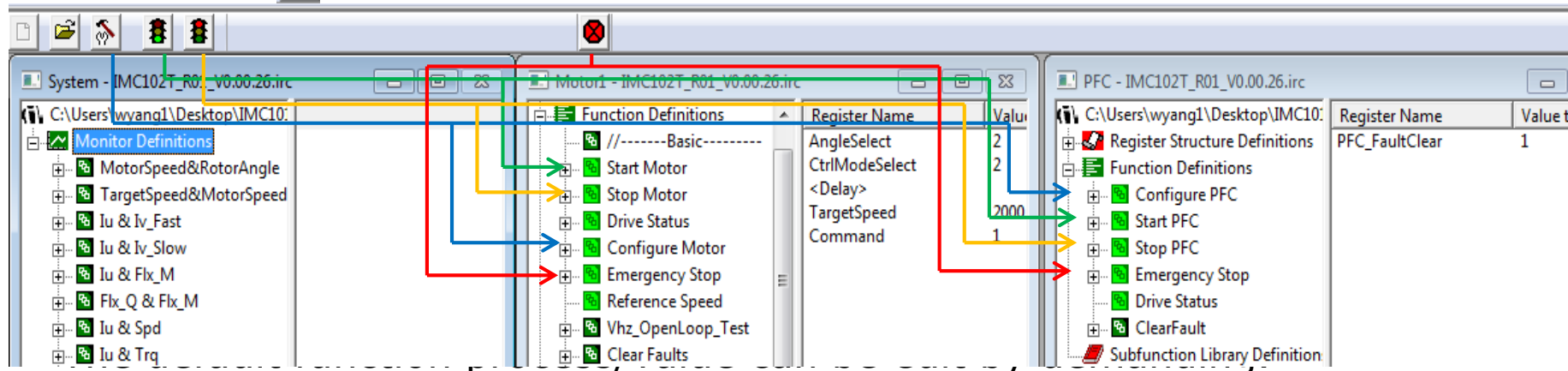

› When system window is activation, each button process will call every part (Motor / PFC) items at one time.

› If one sub-window part is activation, button process will only call this part defined function. Also the information button will show   . Its function process is defined "Drive Status".

› For Motor windows, there is "Reference Speed" function. It converts RPM input value to TargetSpeed value and then write device automatic according Max Speed in parameters file.

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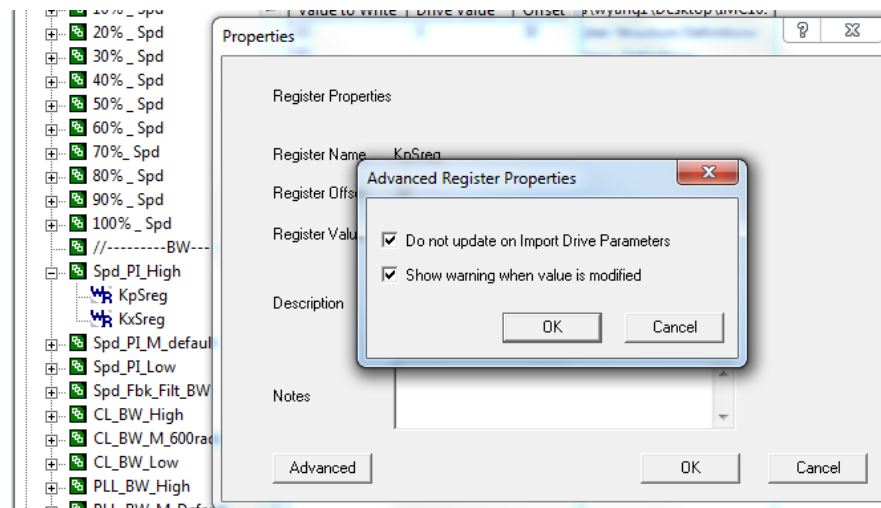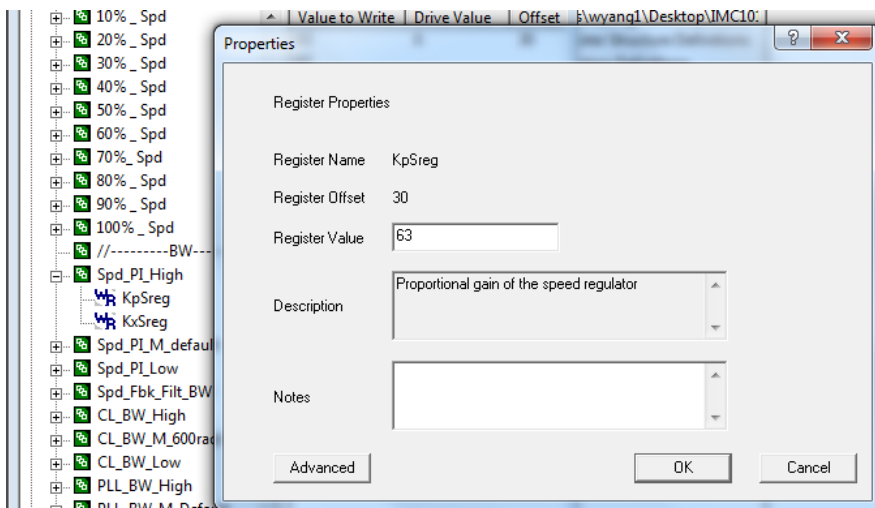
7 Fault check and display

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User function definition when tuning motor

› MCEDesigner provides user definition function.

– It has register write/read, execute delay, process repeat, Subfunction call functions…

– "Add register" for sub level function register group. "Insert register" for the same level function register group.

– Note: Please use different characters for function name when create new.
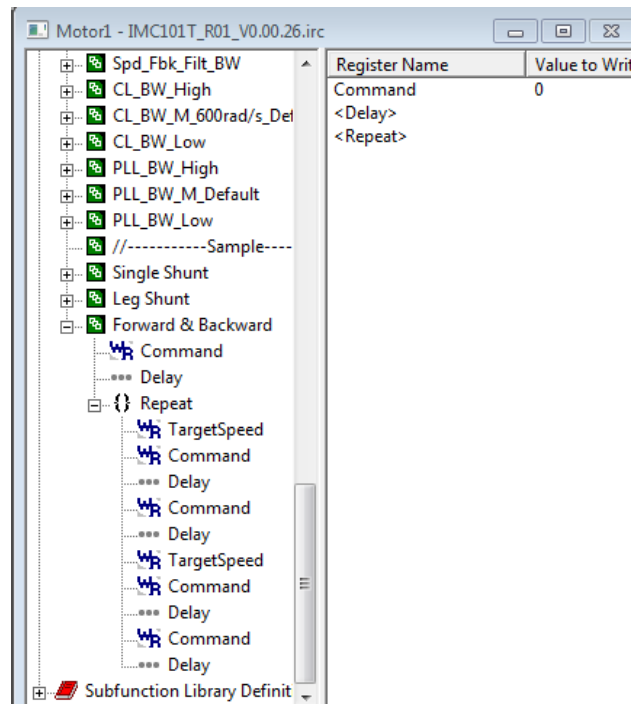
Function definition's register advanced option

› MCEDesigner provides fixed register value in definition function.

– It is useful when tuning to keep a fine parameter.

– For example: we get a fine KpSreg value at motor start up, and we want keep it in the function.

– Select KpSreg and press right button.

– Select "Properties", press "Advanced".

– Select the options "Do not update on Import Driver Parameters".
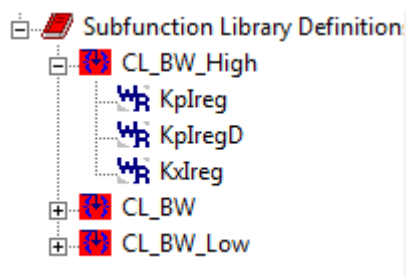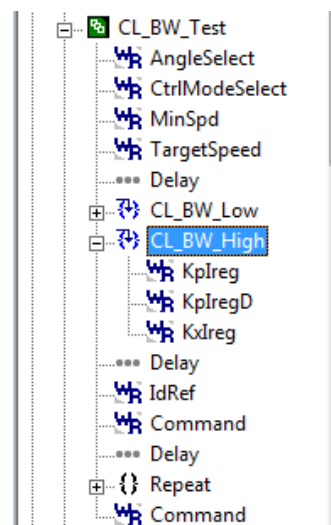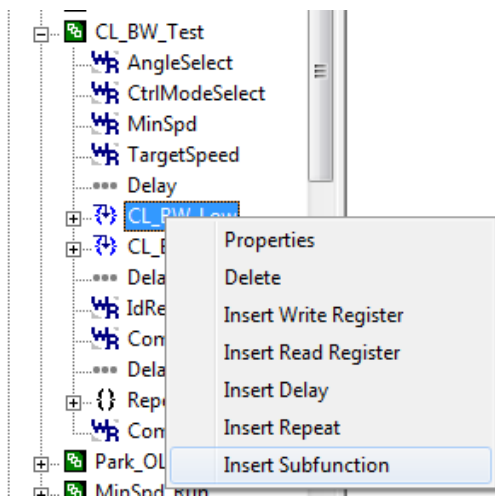
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Re-usable function definition in Subfunction

› If user want to use a process contains multi-register operation that will be used frequency in function group. User can define as a re-usable function in Subfunction Library Definition.


› User can insert Subfunction in function when tune motor.

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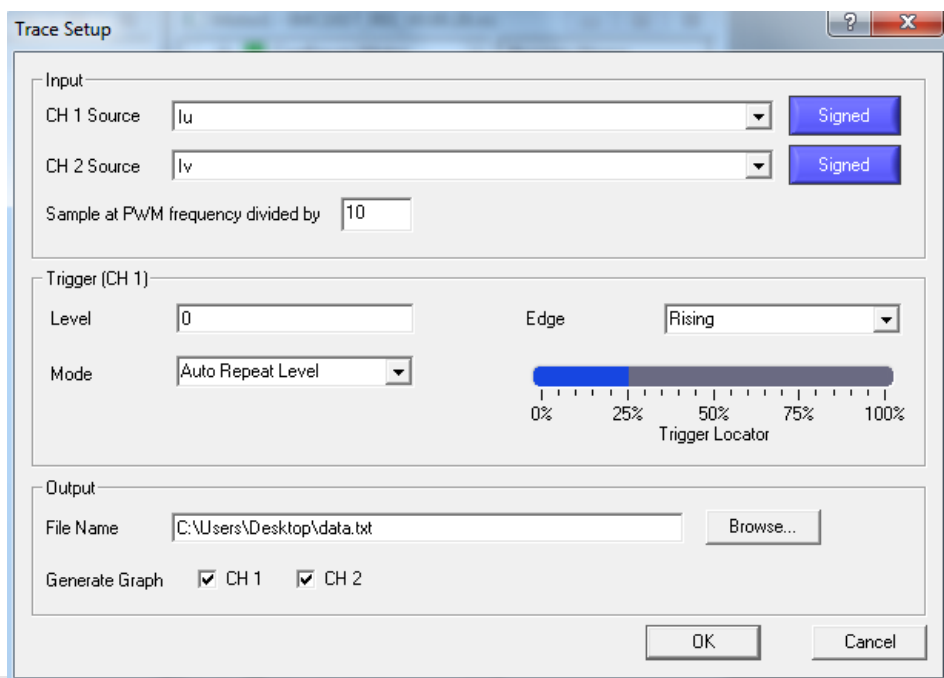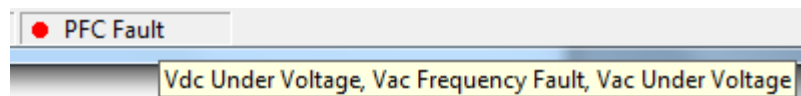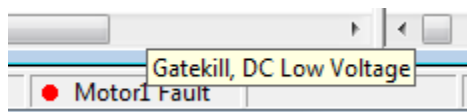 7   Fault check and display

 8   Script function tuning

Trace function definition

- Wave trace function is very important for monitor signals.

  - Default wave trace items are listing in System windows.
  - The corresponding items registers are defined for user tuning motor.
  - User can create addition trace function depend the tuning.
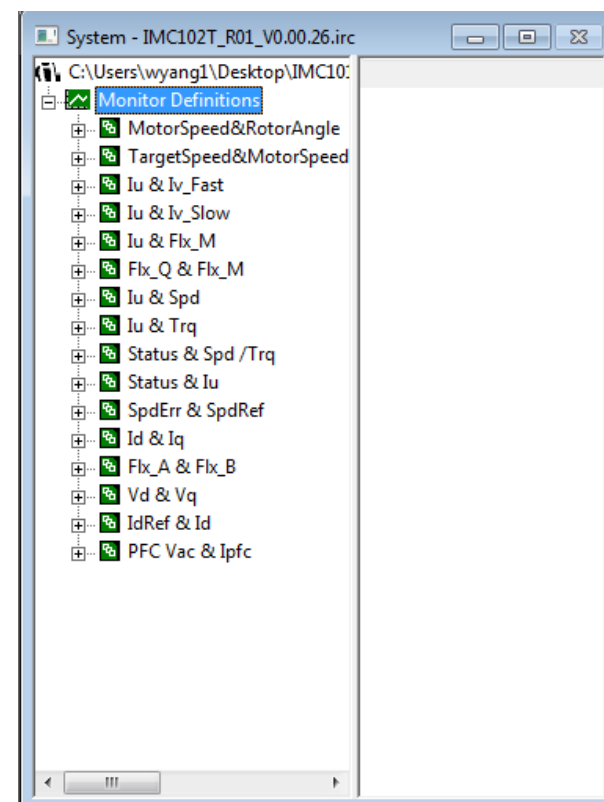
Trace function definition setting

- – Convenient wave trace function setting.

  - – The sample point aligns with PWM frequency. The smaller divided value will get more precision signal variety.

  - – Can be setting different trigger modes.(Only Channel 1 can be trigger source)

  - – Trace edge position can be configuration.

  - – Trace date can be saved in .txt file for further analysis.

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Fault check and display

› When motor system un-masked fault occurs, MCE will stop motor, and MCEDesigner will get fault from Sw-Faults register.
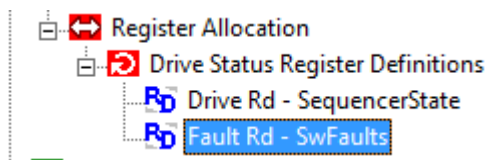
› Faults detail information will display on the bottom strip if move mouse on red LED.

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Script function tuning

› When motor system uses Script function, user can tune and monitor these variables.

– After Script compiled, there is a ".map" file is generated in the same folder with the same name with "IMC101T"/ "IMC102T" / "IMM101T".

Name	Date modified	Type	Size
Ex1_GPIO_Toggle.ldf	2018/7/20 14:13	LDF File	2 KB
Ex1_GPIO_Toggle.mcs	2018/7/20 14:13	MCE Script Coding File	2 KB
Ex1_GPIO_Toggle_IMC101T.map	2018/7/20 14:13	Linker Address Map	3 KB

› After Script GPIO/ADC Pins configuration, user needs to regenerate and program configured parameters(these parameters for power up).

Step1: Configuration ADC/GPIO

Step2: Calculate parameters

Step3: Expert for program parameters

Script function tuning

– After Script compiled, user needs to program the script enable configured parameters and script code to device.
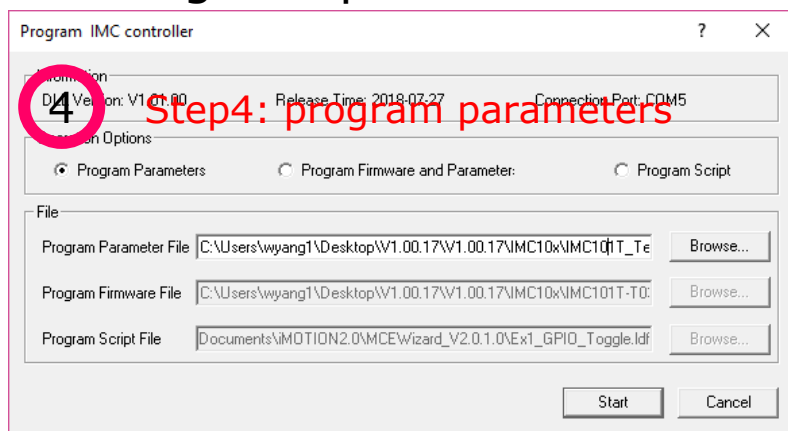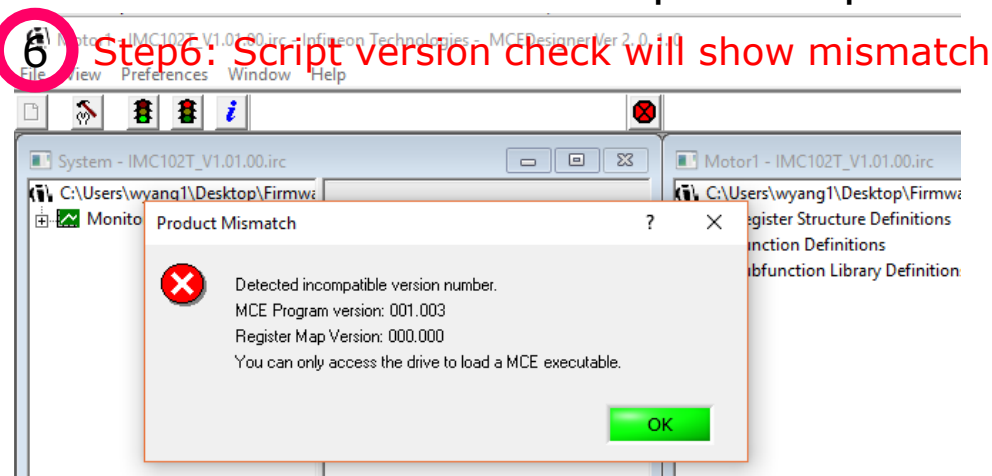

Step4: program parameters
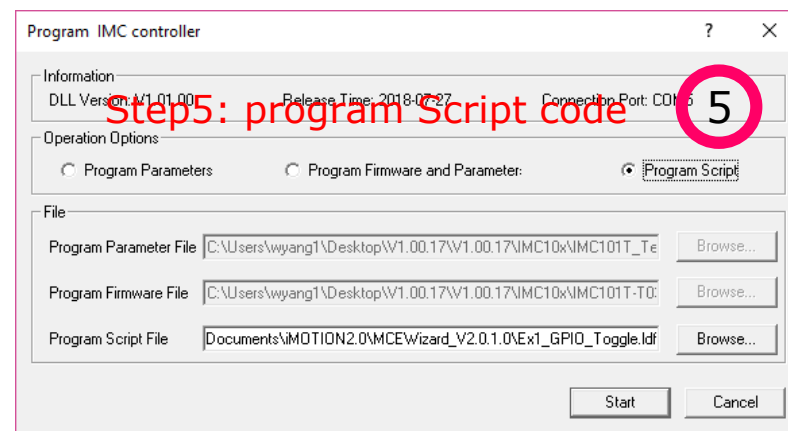
Step5: program Script code

– After Script parameters and code programmer, there is a version check between IRC file and device code. User needs import map file if warning shows like below.
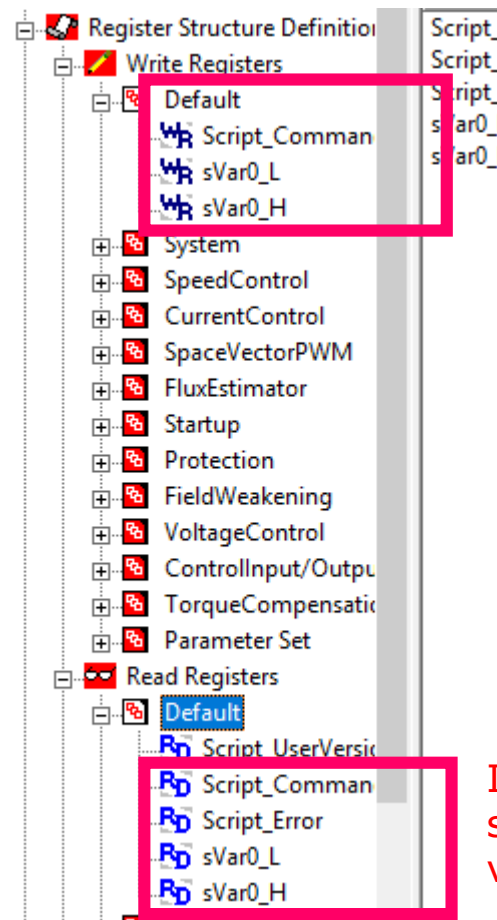
Step6: Script version check will show mismatch

Script function tuning

› When motor system uses Script function, user can tune and monitor these variables.

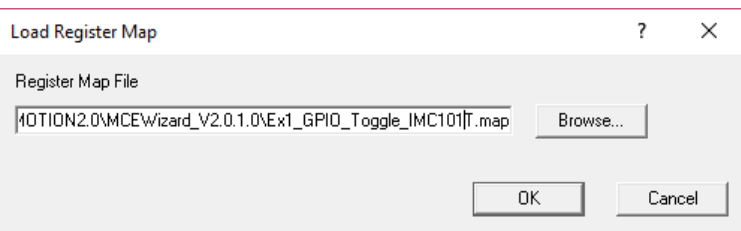– After import the ".map" to MCEDesigner, then the script defined variables can be tune or monitor.
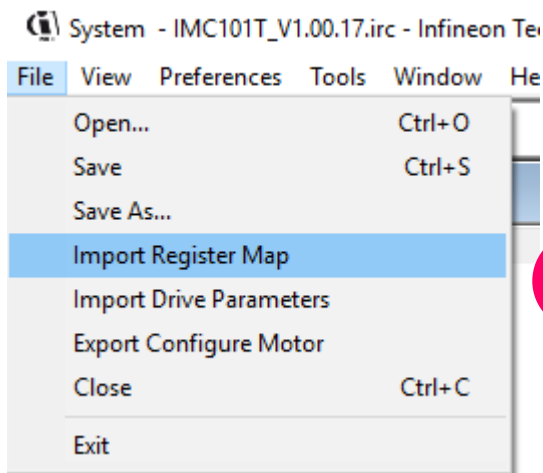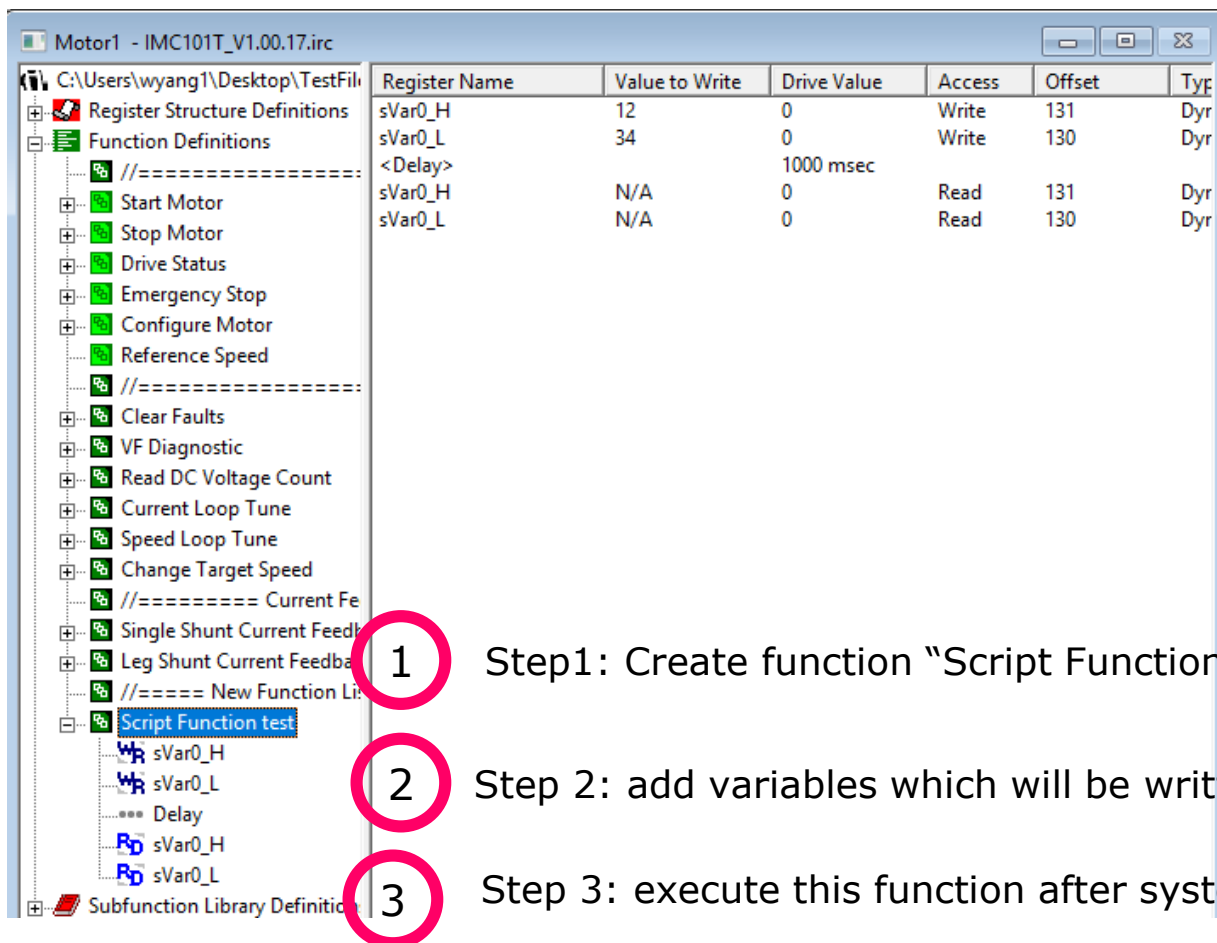

Step7: select action

Imported script write variable

Step 8: select script ".map" file

Imported script read variable

Script function tuning

› When motor system uses Script function, user can tune and monitor these variables.

– Then user can create function for test, for example like below.

1 Step1: Create function "Script Function test"

2 Step 2: add variables which will be written and read.

3 Step 3: execute this function after system connection build up.

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