

# Motionnet Starter Kit

## G9001A-EV, G9002A\_G9103C-EV

### User's Manual

### Application Software

Motionnet Starter Kit																
Tool (T)		Other (O)		Data		Status		Interrupt Status		Error Counter		Cycle Counter				
01 d		104 h		0000 h		0001 h		0000 h		248 d		20 μs		STOP		
Device Number	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15
Device Information	8B	81	00	00	00	00	00	00	00	00	00	00	00	00	00	00
I/O Communication Error Flags	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Input Change Interrupt Setting	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Input Change Interrupt Flags	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Port Data No.1-0	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000
Port Data No.3-2	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000
Device Attribute	G9103C	G9002A														
Device Number	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
Device Information	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
I/O Communication Error Flags	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Input Change Interrupt Setting	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Input Change Interrupt Flags	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Port Data No.1-0	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000
Port Data No.3-2	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000
Device Attribute																
Device Number	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47
Device Information	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
I/O Communication Error Flags	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Input Change Interrupt Setting	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Input Change Interrupt Flags	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Port Data No.1-0	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000
Port Data No.3-2	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000
Device Attribute																
Device Number	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63
Device Information	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
I/O Communication Error Flags	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Input Change Interrupt Setting	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Input Change Interrupt Flags	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Port Data No.1-0	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000
Port Data No.3-2	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000
Device Attribute																

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# 1. Introduction

Thank you for choosing our Motionnet Starter Kit Application software (MNET-STK.exe).

This manual describes the specifications, functions, connections, and usages of our Motionnet Starter Kit Application software (MNET-STK.exe).

Be sure to read this manual thoroughly and keep it handy in order to use the product appropriately.

## 1.1 How to use this manual

1. Reproduction of this manual in whole or in part without permission is prohibited by the Copyright Act.
2. The contents of this manual are subject to change without the prior notice along with the improvement of performance and quality.
3. Although this manual is produced with the utmost care, please contact our sales representative if there are any questions, errors or omissions.

## 1.2 Notice

This document aims to describe the details of the functions of this product. It does not warrant fitness for a particular purpose of the customer. Also, the examples of applications and circuit diagrams in this manual are included only for your reference. Please confirm the features and safety of device or equipment before use.

## 1.3 Confirmation

Please do not use this product in the following conditions. If you need to use in the following conditions, please contact our sales representatives:

1. Any equipment that may require a high reliability or a safety, such as nuclear facilities, electricity or gas supply systems, transportation facilities, vehicles, various safety systems, medical equipment, etc.
2. Any equipment that may directly affect human survival or property.
3. Usages under conditions or circumstances that are not specified in the catalog, manual, etc.

For applications that may cause serious damage to a human life or property due to failure of this product, ensure high reliability and safety by redundant design.

## 2. Information

This manual is the operation manual of the application software(MNET-STK.exe) that operates a control board.

By using this software and Motionnet Starter Kit (G9001A, G9002A\_G9103C-EV), you can learn the Motionnet communication specifications, I/O, and motor control functions using the center device G9001A, local devices G9002A and G9103C.

Please refer to the following manuals along with this manual.

(x: revision)

	Manual Name [Outline]	Document File name	Software File name	Document No.
Hardware Manual	Motionnet Starter Kit User's Manual (Hardware)	MotionnetStarterKit_HardwareManual_VerxE.pdf	—	TA600036-ENx/x
	Motionnet Starter Kit User's Manual (Simple Manual)	MotionnetStarterKit_SimpleManual_VerxJE.pdf		TA600035-ENx/x
Application Software Manual	Motionnet Starter Kit User's Manual (Application Software) [Display of all registers]	MotionnetStarterKit_ApplicationManual_VerxE.pdf	MotionnetStartKit_Application_VxxxJE.zip	TA600037-ENx/x (This document)
Reference	G9001A/G9002A User's Manual			DA70109-4/xE
	G9103C User's Manual			DA70143-1/xE

Please download application software and related materials from our NPM website.

### 2.1 Operating environment

This software is confirmed to operate on Windows 7 and Windows10 (both 32 bit and 64 bit).

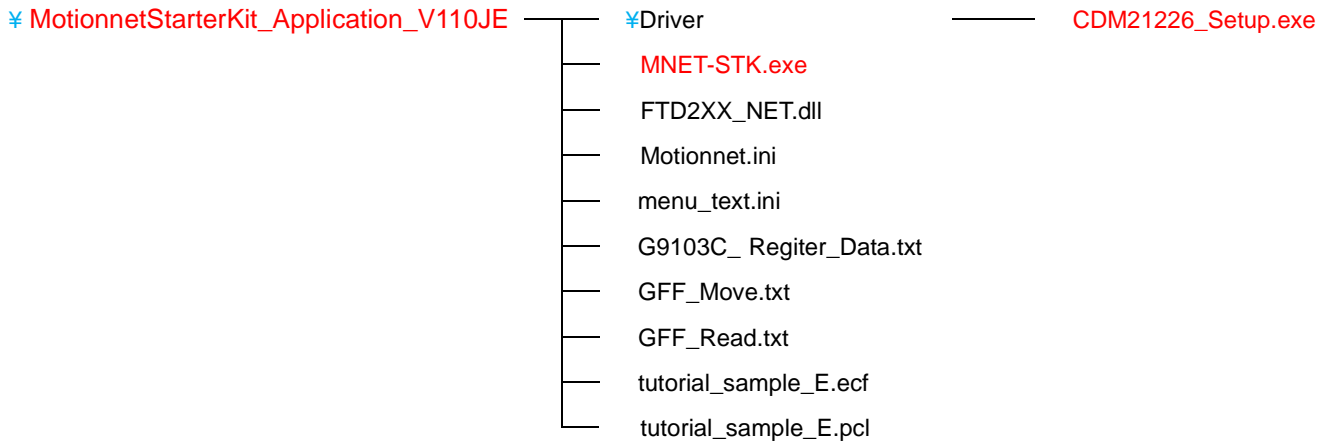
(not confirmed to operate on OS other than the above.)

Please change the power saving setting in your PC so as not to move to "sleep mode" during operation.

## 3. Install the device driver

### 3.1 Folder structure

When unzipping the compressed file ([MotionnetStarterKit\\_Application\\_V110JE.zip](#)), the following folders are generated.



“MNET-STK.exe” is an executable file of the software and “CDM21226\_Setup.exe” is a device driver installer.

“Motionnet.ini”, “menu\_text.ini” are the text files for MNET-STK.

“G9103C\_Regiter\_Data.txt”, “GFF\_Move.txt”, “GFF\_Read.txt”, “tutorial\_sample\_E.ecf”, and “tutorial\_sample\_E.pcl” are the G9103C setting data files for MNET-STK.

### 3.2 Installation

Double-click “CDM21226\_Setup.exe” to launch the installer and follow the instructions on the screen to complete the installation. If you have already installed it, you do not need to install it again.

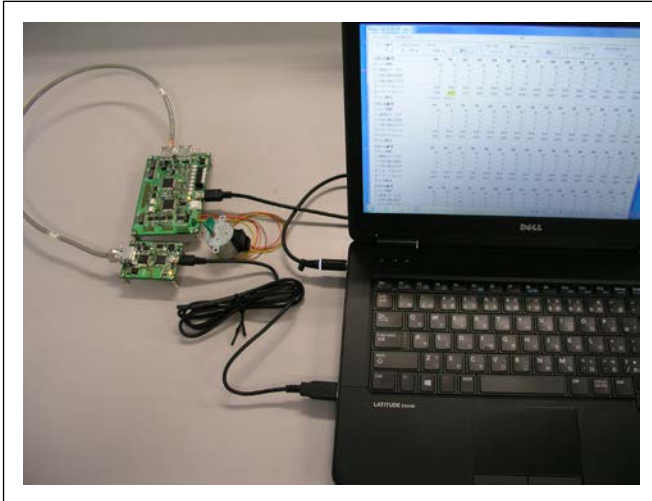


Note: Please download the latest version of the device driver on FTDI's website: (<http://www.ftdichip.com/Drivers/D2XX.htm>).

## 4. Basic operations of software

### 4.1 Start-up software

Make sure that the Motionnet Starter Kit (G9001A-EV, G9002A\_G9103C-EV) is properly connected to your PC. Also, use Motionnet cables to connect the center device board (G9001A-EV) and the local device board (G9002A\_G9103C-EV).



Double-click the executable file, “**MNET-STK.exe**” to open the “main screen” as follows.

#### 4.1.1. Main Screen

Motionnet Starter Kit																
Tool (T)		Other (O)														
Device Number	Address Map	Data														
<input type="text" value="d"/>	<input type="text" value="h"/>	<input type="text" value="h"/>														
Status	Interrupt Status															
<input type="text" value="0000 h"/>	<input type="text" value="0000 h"/>															
Error Counter	Cycle Counter															
<input type="text" value="0 d"/>	<input type="text" value="0 μs"/>															
<input type="button" value="START"/>																
Device Number	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15
Device Information	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
I/O Communication Error Flags	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Input Change Interrupt Setting	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Input Change Interrupt Flags	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Port Data No.1-0	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000
Port Data No.3-2	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000
Device Attribute																
Device Number	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
Device Information	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
I/O Communication Error Flags	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Input Change Interrupt Setting	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Input Change Interrupt Flags	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Port Data No.1-0	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000
Port Data No.3-2	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000
Device Attribute																
Device Number	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47
Device Information	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
I/O Communication Error Flags	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Input Change Interrupt Setting	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Input Change Interrupt Flags	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Port Data No.1-0	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000
Port Data No.3-2	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000
Device Attribute																
Device Number	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63
Device Information	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
I/O Communication Error Flags	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Input Change Interrupt Setting	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Input Change Interrupt Flags	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Port Data No.1-0	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000
Port Data No.3-2	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000
Device Attribute																

This screen shows up to 64 local devices that are connected to G9001A, as well as “Device Information”, “I/O Communication Error Flags”, “input Change Interrupt Setting”, “Input Change Interrupt Flags”, and “Port Data No. 1-0 & 3-2” in the address area of G9001A (512 bytes).

When you click “START” button, the data in “Device Number” of a local device board (G9002A\_G9103C-EV) connected to the center device board (G9001A-EV) are displayed. Also “Status” of G9001A, “Interrupt Status”, “Error Counter”, and “Cycle Counter” values are displayed at the top of the screen.

Device Number	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15
Device Information	8B	81	00	00	00	00	00	00	00	00	00	00	00	00	00	00
I/O Communication Error Flags	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Input Change Interrupt Setting	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Input Change Interrupt Flags	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Port Data No.1-0	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000
Port Data No.3-2	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000
Device Attribute	G9103C	G9002A														

“Device Number” of the local device board (G9002A\_G9103C-EV) connected to the center device board (G9001A-EV) shows “0” (blank) .

If no local device is connected, “256” is displayed in “Error Counter”. (When there is no response even if the maximum 64-local device repeats 4 times, “Error Counter” becomes  $64 \times 4 = 256$ ).

If the local device board (G9002A\_G9103C-EV) is connected, “248” is displayed in “Error Counter” because G9002A and G9103C are mounted on the board.

#### 4.1.2. Writing data to the address area

When you double-click a column where the value of each device is displayed, the value will be highlighted in yellow as shown below, and the cursor moves to “Data” (data input part). Also, the device number of the selected value is set in “Device Number” column, and the address map data of the selected data is set in the “Address Map” column as shown below.

Device Number	00	01	02
Device Information	8B	81	00
I/O Communication Error Flags	0	0	0
Input Change Interrupt Setting	0	0	0
Input Change Interrupt Flags	0	0	0
Port Data No.1-0	0000	0000	0000
Port Data No.3-2	00FF	0000	0000
Device Attribute	G9103C	G9002A	

Enter a value you want in "Data", and click "WRITE" button.

However, if you enter out-of-range value, "WRITE" button disappears. "WRITE" button also disappears when a number other than 00 to 63 is entered in "Device Number".

### 4.1.3. Read and display the status value

Click "START" button to read and display the values of "Status" of the center device board (G9001A-EV) and "Interrupt Status".

Click "READ" button to read and display the current values of "Status" and "Interrupt Status".

The screenshot shows a control panel with two input fields and a button. The first field is labeled "Status" and contains the value "0001" followed by a unit "h". The second field is labeled "Interrupt Status" and contains the value "0000" followed by a unit "h". To the right of these fields is a button labeled "READ".

### 4.1.4. Display the error counter and cycle counter

Click "START" button to read and display the data of Error Counter register and Cycle Counter register of the center device board (G9001A-EV). Data is read periodically using an interrupt timer, and it is displayed when different from the previous data.

The upper limit of "Error Counter" and "Cycle Counter" is "65535".

Click the value of "Error Counter" and issue the counter clear command to display "0" in "Error Counter". See also 4.2.6 "Counter" menu.

The screenshot shows a control panel with two input fields and a button. The first field is labeled "Error Counter" and contains the value "248" followed by a unit "d". The second field is labeled "Cycle Counter" and contains the value "20" followed by a unit "μs". To the right of these fields is a button labeled "STOP".

### 4.1.5. Display the device attributes

Double-click the device name in "Device Attribute" column to display a screen corresponding to the device name. When double-clicking "G9002A", the following screen will be displayed.

The screenshot shows a window titled "Port Data G9002A(IN8/OUT24)" with a close button (X) in the top right corner. Inside the window, there are three input fields: "01" d Device Number, "81" h Device Information, and "00010100" h Device Attribute. Below these fields is a grid of 28 indicator lights arranged in 4 rows (PORT 0 to PORT 3) and 7 columns (7 to 0). PORT 0 has all 7 lights green. PORT 1 has 6 lights red and 1 light blue. PORT 2 has all 7 lights red. PORT 3 has all 7 lights red.

Refer to the section 4.4 "Device Attribute" menus.

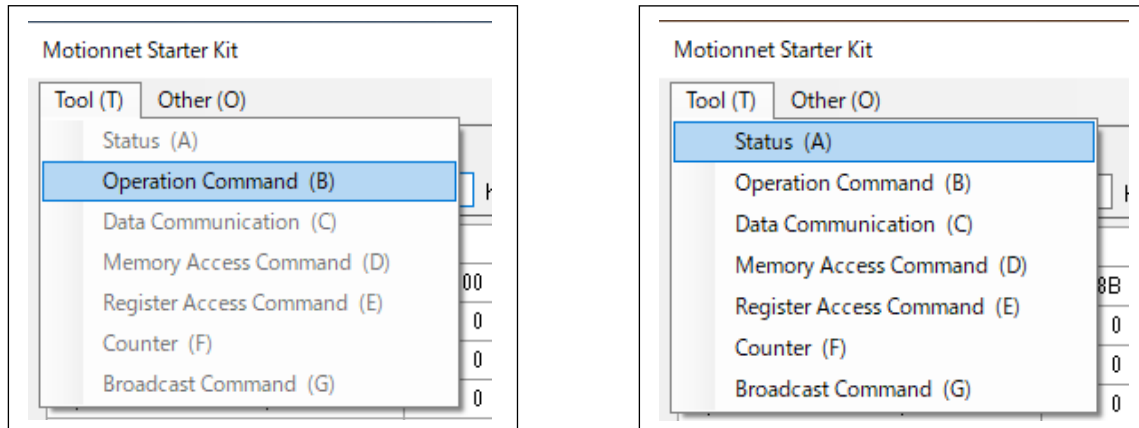


## 4.2 “Tool (T)” menu

Click "Tool (T)" to display the tool menu.

The tool menu is processed using commands (“Status (A)”, “Operation Command (B)”, “Data Communication (C)”, “Memory Access Command (D)”, “Register Access Command (E)”, Counter (F), and “Broadcast Command (G)”).

Before clicking “START” button, only “Operation Command (B)” tool is enabled. Click “START” button to enable all tools.



### 4.2.1. “Status (A)” menu

Click this menu to display the following status screen. You can check the details of each Status and Interrupt Status bit.

**Status** ✕

Status = 1003 h

CEND	1	<input type="checkbox"/>	1 when data transmission FIFO can be written
BRKF	1	<input type="checkbox"/>	1 when receiving a break frame
IOPC	0		1 when the state of the input port with “Input change interrupt setting” set to 1 changes
EIOE	0		1 when a cyclic communication error occurs
EDTE	0	<input type="checkbox"/>	1 when a data communication error occurs
ERAE	0	<input type="checkbox"/>	1 when a local device reception processing error occurs
CAER	0	<input type="checkbox"/>	1 when there is an inappropriate access
	0		
REF	0		1 when there is unsent output port data
TDBB	0		1 when there is transmission data in the data transmission FIFO
RDBB	0		1 when there is received data in the data reception FIFO
	0		
SBSY	1		1 when cyclic communication starts
RBSY	0		1 during reset processing
DBSY	0		1 during system communication or data communication
BBSY	0		When break communication command (0610h) is issued with RENV0 (8) = “1”, 1 until break communication is completed

Interrupt Status = 0000 h

EDN5-0	0	d	Device number when EDTE = “1” in status or ERAE = “1” error occurs
	0		
LNRV	0		1 when local data is not received
ERA3-0	0	d	Display code if packet content does not match local device type
CAE3-0	0	d	Code displayed when unauthorized access to G9001A

Click “READ” button to read and display the current status and interrupt status data.

When clicking “0400h” button, the corresponding status is cleared by adding the weight of the bit to command 0400h if the box to the status bit's is checked. However, it is disabled when bit 9 (MCLR) of RENV0 register is “0”.

## 4.2.2. “Operation Command (B)” menu

Click this menu to display various operation command buttons on the following window.

Device Number					
0100h		Resets the software			
0200h		Resets the transmitting FIFO			
0300h		Resets the receiving FIFO			
0600h		Error count clear command			
0610h		Break communication command			
1000h		System communication to all devices			
1100h		System communication to all devices except those devices excluded from cyclic communication			
1200h	<input type="text" value="00"/> d (00h)	System communication to specified devices			
1300h	<input type="text" value="00"/> d (00h)	Obtain attribute information for the specified devices			
		Attribute Data = 00000000 h	Type <input type="text" value="000"/> h	I/O Setting <input type="text" value="0"/> h	Model Code <input type="text" value="00"/> h
					Data Number <input type="text" value="00"/> h
3000h		Start cyclic communication			
3100h		Stop cyclic communication			

Click “0100h” button to write the software reset command 0100h and reset the center device.

Click “0200h” button to write the transmitting FIFO reset command 0200h and reset only the FIFO for data transmission.

Click “0300h” button to write the receiving FIFO reset command 0300h and reset only the FIFO for data receiving.

Click “0600h” button to write the error counter reset command 0600h and clear the error count register to zero.

Click “0610h” button to write the break communication command 0610h and issue the break communication. However, it is invalid when bit-8 (BKOFr) of RENV0 register is “0”.

Click “1000h” button to write the system communication command 1000h to all devices, to poll all devices sequentially, and to update the “Device Information” column corresponding to the “Device Number”.

Click “1100h” button to write the system communication command 1100h to all devices that are excluded from cyclic communication. It sequentially poll all devices whose “device use” bit is 0 in “device information”, and update the “Device Information” column corresponding to the “Device Number”. The updated contents are the same as for the command 1000h.

Click “1200h” button to write the “Device Number” on the right in addition to the system communication command 1200h to the specified device. It polls only the specified device, and updates the “Device Information” column corresponding to the “Device Number”. The update value are the same as for the command 1000h.

Click “1300h” button to write the “Device Number” on the right in addition to the attribute information acquisition command 1300h of the specified device. It polls the specified device, and the attribute information is copied to the data receiving FIFO. The attribute information and contents (type, I/O setting, model code and the number of data) are displayed.

Click “3000h” button to write the I/O communication(cyclic communication) start command 3000h and start I/O communication(cyclic communication) for devices whose “Device use” bit is “1” in “Device Information”.

Click the “3100h” button to write the I/O communication(cyclic communication) stop command 3100h and stop I/O communication(cyclic communication).

Click “START” button in the main screen to write the software reset command 0100h, the system communication command 1000h to all devices, and the I/O communication (cyclic communication) start command 3000h.

### 4.2.3. “Data Communication (C)” menu

Click this menu to display the following screen.

Manual writing to the transmitting FIFO is performed as follows.

Enter 4-digit hexadecimal data in the data input box and click “WRITE” button to write the data in Transmitting FIFO in G9001A and displayed data in the data display section. Up to 128 words can be written.

If the written data exceeds 128 words, the setting data in the FIFO buffer is not guaranteed.

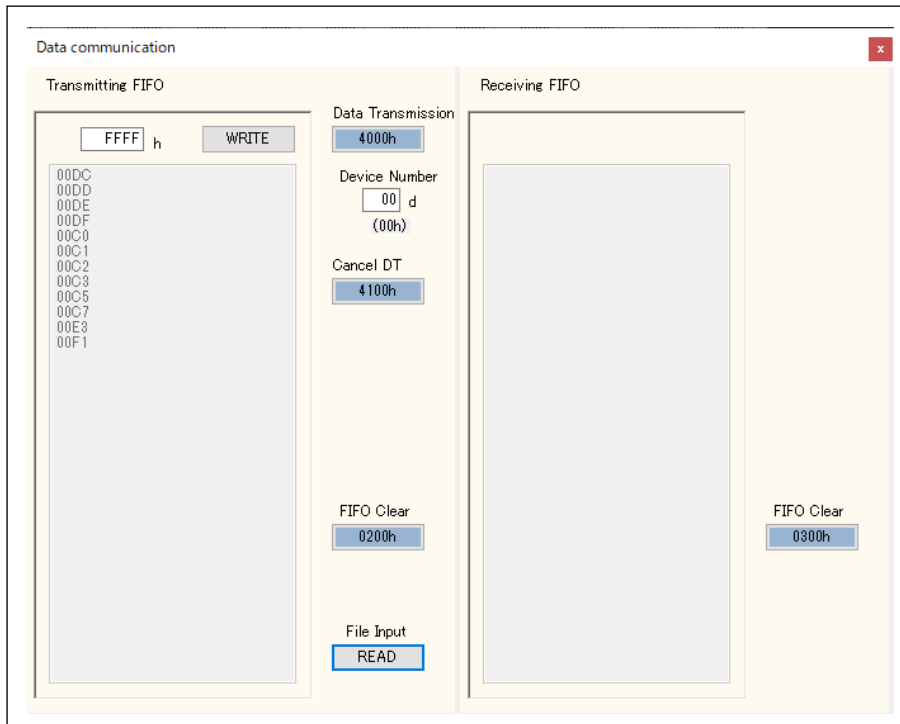
The data written to the FIFO buffer is sent to the device specified by the device number when Data Transmission "4000h" button is clicked. When the data transmission is completed, the data displayed in the display section is deleted.

Click the Communication Cancel "4100h" button to interrupt the data communication and reset the Transmitting FIFO.

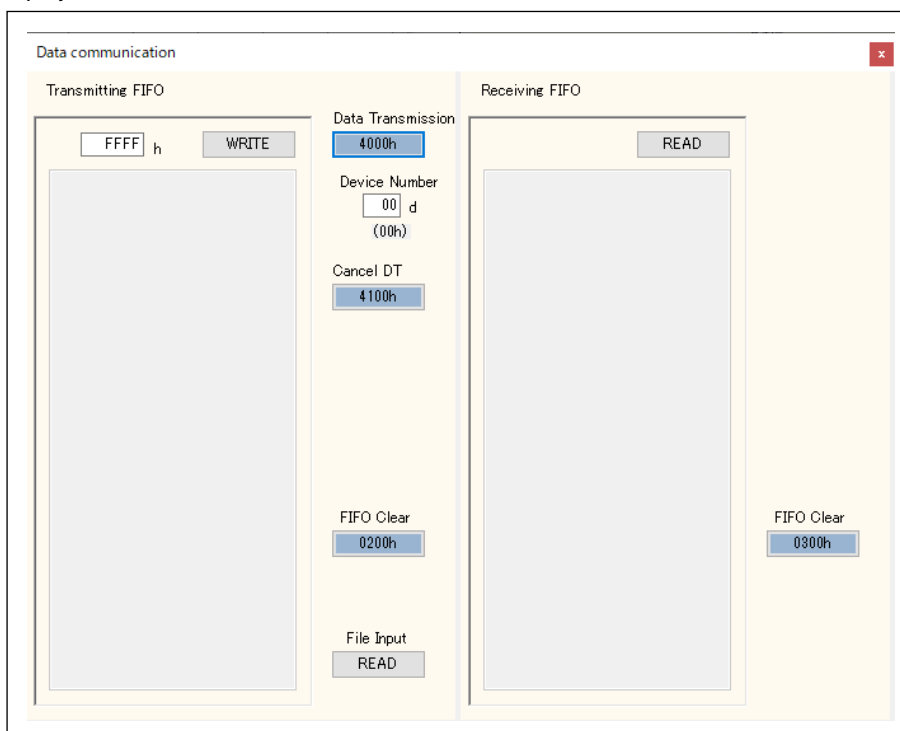
Click the FIFO Clear "0200h" button to reset only the Transmitting FIFO, and deletes the data written in the FIFO buffer and the data displayed in the data display section.

Create a data file for transmission in advance, and click "Read" button to display the file selection screen.

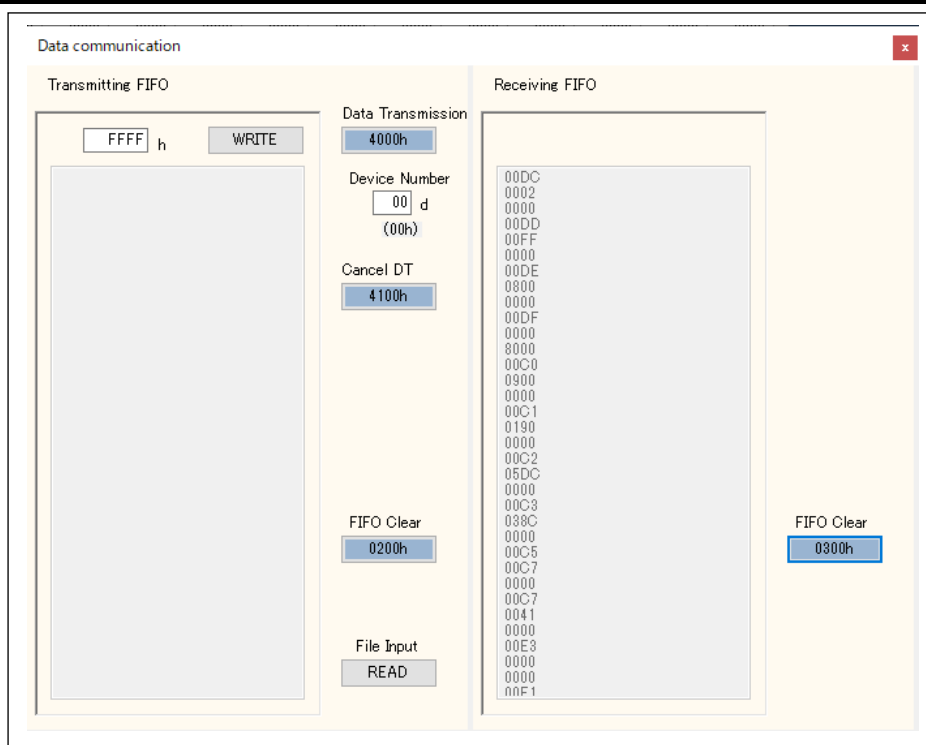
Select the file you created. The data for transmission is written to the Transmitting FIFO in G9001A, and it is displayed on the data display section.



This is the display screen when the "GFF\_Read.txt" file is read.



When a read command is sent to the specified device by clicking "4000h" button, "READ" button is displayed in the receiving FIFO.



Click “READ” button of the Receiving FIFO to read the data stored in the receiving FIFO buffer and display in the data display section. When the receiving FIFO buffer is empty, the “READ” button is deleted.

Click the FIFO Clear “0300h” button in the Receiving FIFO to delete the data stored in the receiving FIFO buffer and the data displayed in the data display section.

Create a file by an editor tool. The following shows the contents of the “GFF\_Move.txt” file as an example.

The first line must be “# GFF #”. Insert a space between # and “GFF”.

The line preceded by “#” is a comment. Blank lines are ignored. Describe data using 4 hexadecimal digits.

The data is written in the FIFO buffer for transmission sequentially from the first line. Describe the data not as to exceed 128 words.

```
# GFF #
# 位置決め動作データ
#####
# RENV1=00000002h 環境設定 1
009C
0002
0000
# RENV2=000000FFh 環境設定 2
009D
00FF
0000
# RENV3=00000800h 環境設定 3
009E
0800
0000
# RENV4=80000000h 環境設定 4
009F
0000
8000
# PRMV=2304 位置決め量
00B0
0900
0000
```

## 4.2.4. “Memory Access Command (D)” menu

Click this menu to open the following screen.

Enter the specified “Device Number”.

When clicking the “5000h” button, data in the I/O buffer is written to the specified device information area in the following steps:

- (1) If the data to the right and the device number are even numbers, write the next device data to the I/O buffer by 2 bytes. If they are odd numbers, write the previous device data to the I/O buffer by 2 bytes
- (2) The device number data  $((n/2) \times 2 \times 2)$  is added to the write command 5000h to “device information” and written.

Click the “5100h” button to write the data in the I/O buffer to the specified “I/O communication error flag” area in following steps:

- (1) Write the data on the right side to 1 bit of device numbers 0-15, 16-31, 32-47, 48-63.
- (2) Write 2-byte data to the I/O buffer
- (3) The device number data  $((n/16) \times 32)$  is added to the write command 5100h to “I/O communication error flag” area and written.

Click the "5200h" button to write the data in the I/O buffer to the specified "input change interrupt setting" area in the following steps:

- (1) Write the data on the right side to 4 bits of device numbers 0-3, ..., 60-63.
- (2) Write 2-byte data to the I/O buffer.
- (3) The device number data  $((n/4) \times 8)$  is added to the write command 5200h to "input change interrupt setting" area and written.

Click the "5300h" button to write the data in the I/O buffer to the specified "input change interrupt flag" area in the following steps:

- (1) Write the data on the right side to 4 bits of device numbers 0-3, ..., 60-63.
- (2) Write 2-byte data to the I/O buffer.
- (3) The device number data  $((n/4) \times 8)$  is added to the write command 5300h to "input change interrupt flag" area and written.

Click the "5400h" button to write the data to the specified "port data" area in the following steps:

- (1) Write the P0 data and P1 data on the right side to the I/O buffer by 2 bytes.
- (2) The device number data  $(n \times 2)$  is added to the write command 5400h to the "port data" area and written.
- (3) Write P2 data and P3 data to the I/O buffer by 2 bytes.
- (4) The device number data  $(n \times 2 + 1)$  is added to the "Port data" area write command 5400h and written.

Click the "6000h" button to read the 1-byte data corresponding to the device number and display on the right side in the following steps:

- (1) The device number data  $((n/2) \times 2 \times 2)$  is added to the read command 6000h in the "device information" area and written.
- (2) 2-byte data in the specified device information area is copied to the I/O buffer.

Click the "6100h" button to read 1-byte data corresponding to the device number and display on the right side in the following steps:

- (1) The device number data  $((n/16) \times 32)$  is added to the read command 6100h in the "I/O communication error flag" area and written.
- (2) 2-byte data in specified I/O communication error frag area is copied to the I/O buffer.

Click the "6200h" button to read 4-bit data corresponding to the device number and display on the right side in the following steps:

- (1) The device number data  $((n/4) \times 8)$  is added to the read command 6200h in the "input change interrupt setting" area and written.
- (2) 2-byte data in the specified input change interrupt setting area is copied to the I/O buffer,

Click the "6300h" button to read 4-bit data corresponding to the device number and display on the right side in the following steps:

- (1) The device number data  $((n/4) \times 8)$  is added to the read command 6300h in the "input change interrupt flag" area and written.
- (2) 2- byte data in the specified input change interrupt flag area is copied to the I/O buffer.

Click the “6400h” button to read out byte by byte and display on the right in the following steps:

- (1) The device number data ( $n \times 2$ ) is added to the read command 6400h in the “port data” area and written.
- (2) 2-byte (P0 and P1 data) content in the specified port data area is copied to the I/O buffer.
- (3) The device number data ( $n \times 2 + 1$ ) is added to the read command 5400h in the “port data” area and written.
- (4) 2-byte (P2 and P3 data) content in the specified “port data” area is copied to the I/O buffer.

## 4.2.5. “Register Access Command (E)” menu

Click this menu to open the following screen.

Register Access Command

RENV0 = 0000 h

MEND	1	<input type="checkbox"/>	Even if the CEND interrupt is masked with “1”, status changes
MBRK	1	<input type="checkbox"/>	Even if the BRKF interrupt is masked with “1”, status changes
MIOP	0	<input type="checkbox"/>	Even if the IOPC interrupt is masked with “1”, status changes
MEIE	0	<input type="checkbox"/>	Even if the EIOE interrupt is masked with “1”, status changes
MEDE	0	<input type="checkbox"/>	Even if the EDTE interrupt is masked with “1”, status changes
MERE	0	<input type="checkbox"/>	Even if the ERAE interrupt is masked with “1”, status changes
MCSE	0	<input type="checkbox"/>	Even if the CAER interrupt is masked with “1”, status changes
	0		
BKOF	0	<input type="checkbox"/>	“1” disables the automatic break function
MCLR	0	<input type="checkbox"/>	Select how to clear status bits (CEND, BRKF, EDTE, ERAE, CAER)
	0		

6500h RENV0 Read Command      5500h RENV0 Write Command

6503h 00 d Receive address register read command

6504h 00 Version information register read command

Click the “5500h” button to write the value in the I/O buffer to RENV0 register.

- (1) If the box to the right of the RENV0 bit is checked, the bit is set to “1” and 2-byte data is written in the I/O buffer.  
If the box is not checked, the bit is set to “0” and 2-byte data is written in the I/O buffer.
- (2) Write the RENV0 write command 5500h.

Click the “6500h” button to copy the value of the RENV0 register to the I/O buffer. The value is read and is displayed to the right of each bit.

Click the “6503h” button to copy the value of the received address register to the I/O buffer. The value is read and is displayed to the right side.

Click the “6504h” button to copy the value of the version information register to the I/O buffer. The value is read and is displayed to the right side.



## 4.2.6. “Counter (F)” menu

Click this menu to open the following screen.

Click the “6501h” button to copy the value of the error counter register to the I/O buffer. The value is read and is displayed on the right side.

Click the “0600h” button to clear the error counter register to zero. The displayed value becomes “0”.

If the “Timer” box is not checked, click the “6502h” button to copy a cyclic period register value to the I/O buffer. The value is read and displayed on the right side. The minimum and maximum cyclic cycle values are also displayed.

If the “Timer” box is checked, reading out is periodically performed using the interrupt timer in the main screen, and the data is displayed if it differs from the previous data. Clicking the “6502h” button is ignored.

## 4.2.7. “Broadcast command (G)” menu

Click this menu to open the following screen.

---

Enter the specified "Group number".

To set the group number, use DSW3-6 (GRP0), 7 (GRP1), 8 (GRP2) on the board, or use RENV2.GN2-0. However, the setting in RENV2.GN2-0 is limited to DSW3-6 (OFF), 7 (OFF), 8 (OFF) [group number 000].

Click the "2001h" button to write the start command (CMSTA substitute command for multiple axes) [0010 0ggg 0000 0001] and can operate multiple axes simultaneously. However, set "1" to RMD(PRMD).MSY and issue the start commands to the target axes.

Click the "2002h" button to write stop (CMSTP substitute command for multiple axes) [0010 0ggg 0000 0002] and stop multiple axes simultaneously. However, set "1" to RMD(PRMD).MSPE.

Click the "2003h" button to write the emergency stop commands (CMEMG substitute command for multiple axes) [0010 0ggg 0000 0003] and stop multiple axes simultaneously.

Click the "2004h" button to write the local LSI reset command (SRST substitute command for multiple axes) [0010 0ggg 0000 0004] and reset multiple axes simultaneously.

Click the "2005h" button to write the counter value latch command(LTCH substitute command for multiple axes) [0010 0ggg 0000 0005] and latch the counter values for multiple axes.

Click the "2006h" button to write an immediate stop command (STOP substitute command for multiple axes) [0010 0ggg 0000 0006] and stop multiple axes simultaneously.

Click the "2007h" button to write the deceleration stop command (SDSTP substitute command for multiple axes) [0010 0ggg 0000 0007] to decelerate and stop multiple axes simultaneously.

Click the "2008h" button to instantly change to the FL speed (FCHGL substitute command for multiple axes) [0010 0ggg 0000 0008] and make multiple axes to run at FL speed simultaneously.

Clicking the "2009h" button immediately changes to the FH speed (the FCHGH substitute command for multiple axes) [0010 0ggg 0000 0009] and writes the multiple axes to run at FH speed simultaneously.

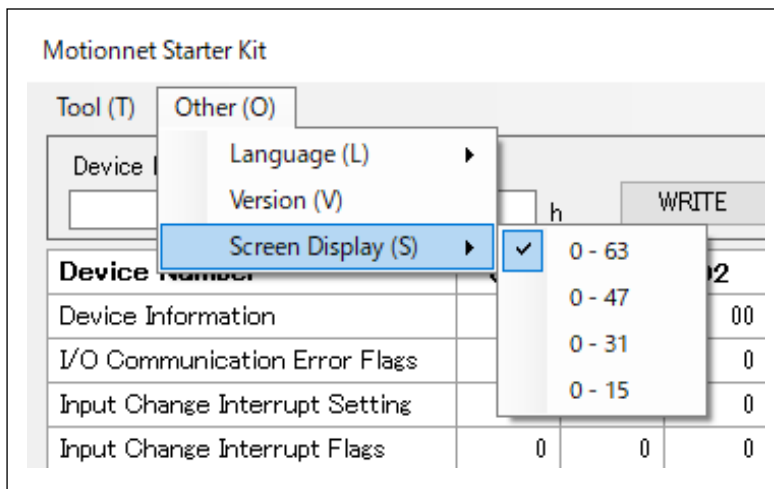
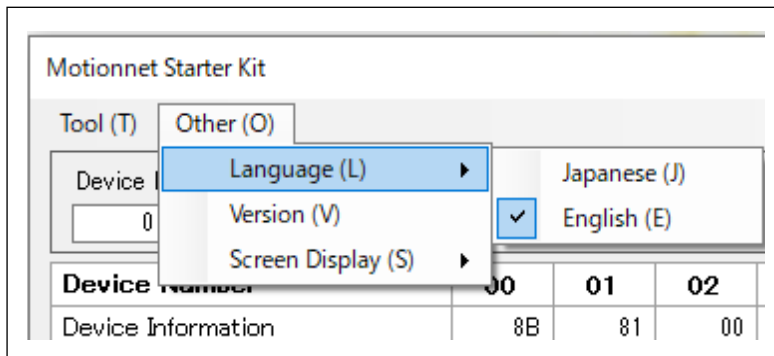
Click the "200Ah" button to write the deceleration command to the FL speed (FSCHL substitute command for multiple axes) [0010 0ggg 0000 000A] and decelerate multiple axes to run at FL speed simultaneously.

Click the "200Bh" button to write the acceleration command (FSCHH substitute command for multiple axes) [0010 0ggg 0000 000B] to the FH speed and accelerate multiple axes to run at FH speed simultaneously.

Click the "200Ch" button to copy the operation pre-register to the register (PRESHF substitute command for multiple axes) [0010 0ggg 0000 000C] and copy the operation pre-register to the registers of multiple axes (speed change, etc.) simultaneously.

## 4.3 “Other (O)” menu

Click "Other (O)" to switch language and to check the software version and the display settings of software.

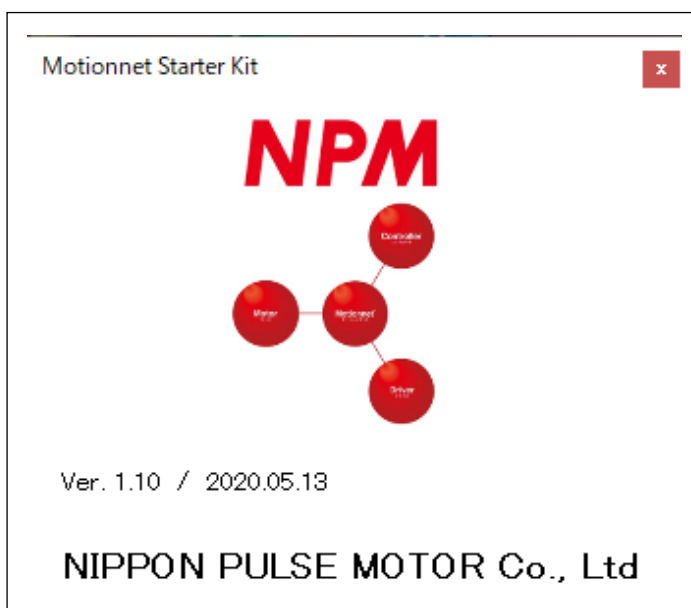


### 4.3.1. “Language (L)” menu

You can choose Japanese and English by default.

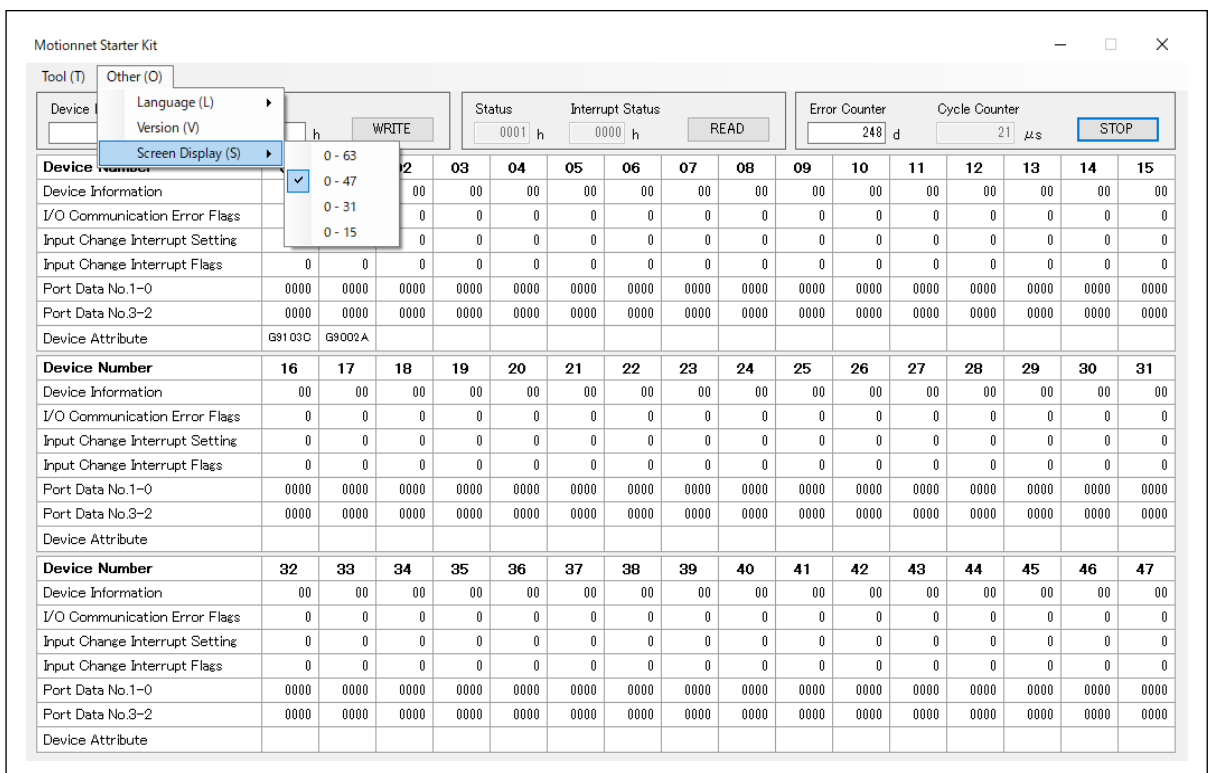
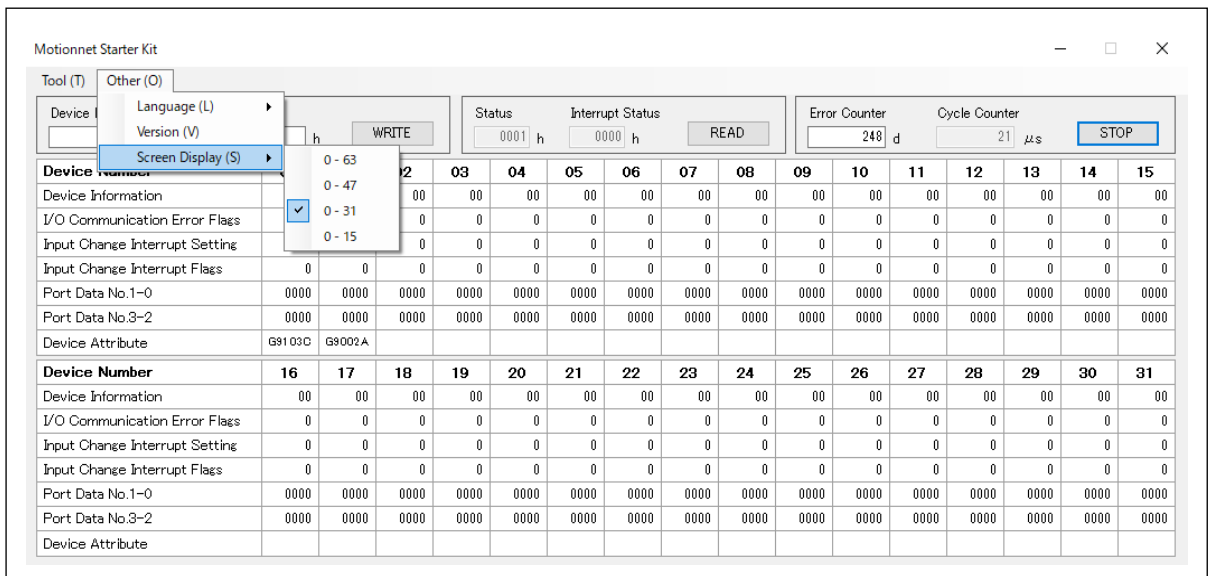
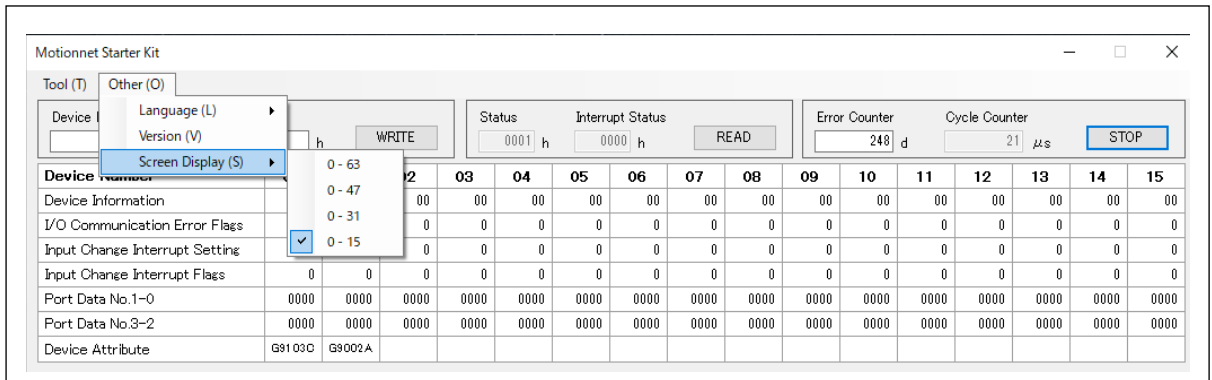
### 4.3.2. “Version (V)” menu

You can check the software version.



### 4.3.3. “Screen Display (S)” menu

You can select the display to show the device numbers 0-63, 0-47, 0-31 or 0-15 in the screen.



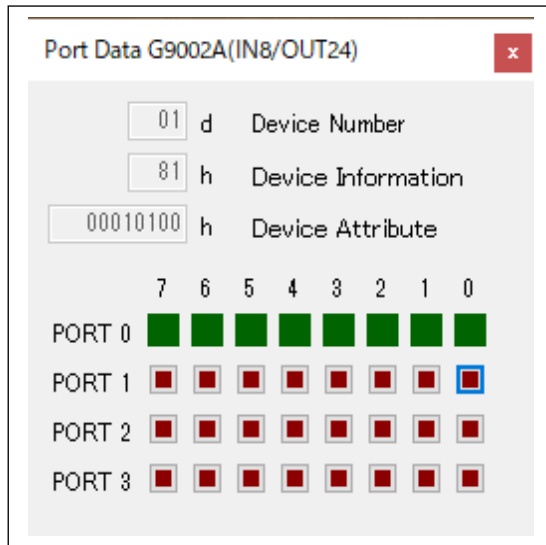
## 4.4 “Device Attribute” menu

This application supports three types of devices: “G9002A”, “G9205A”, and “G9103C”. “G9004A” is not supported.

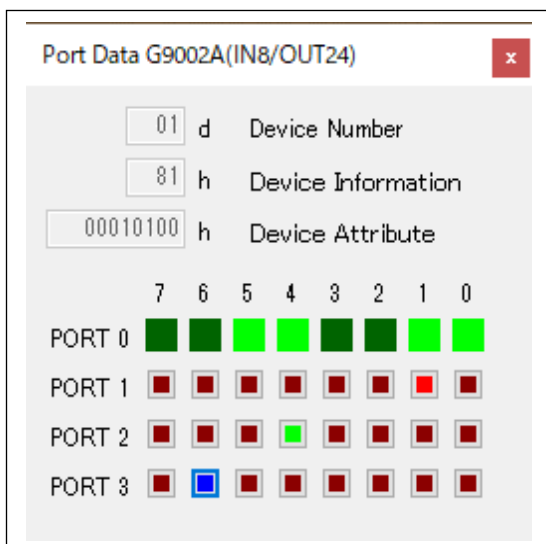
### 4.4.1. “G9002A”, “G9205A” menu

Double-click the device name “G9002A” in the device attribute of the main screen to display the screen corresponding to the I/O setting of the device information. “G9205A”, which has the same function as “G9002A”, is also supported.

The following screen is displayed on the local board (G9002A\_G9103C-EV) of the Motionnet starter kit (G9001A-EV, G9002A\_G9103C-EV).



The screen displays the device number, device information, and device attribute data of the selected “G9002A”. It also displays the 8-bit status of input port PORT0 and the output status of output ports PORT1, PORT2, and PORT3.



When switches 1, 2, 5, and 6 of DSW0 on the local board (G9002A\_G9103C-EV) are ON, bits 0, 1, 4, and 5 of input port PORT0 turn ON. Click the cursor on bit 1 of output port PORT1, bit 4 of PORT2, and bit 6 of PORT3 to show the ON statuses, and to illuminate red in AED02, green in LED05 and blue in LED07 on the local board (G9002A\_G9103C-EV).

At the same time, the port data No. 1-0 and the port data No. 3-2 ae changed.

Motionnet Starter Kit

Tool (T) Other (O)

Device Number: 01 d Address Map: 104 h Data: 0233 h WRITE

Device Number	00	01	02
Device Information	8B	81	
I/O Communication Error Flags	0	0	
Input Change Interrupt Setting	0	0	
Input Change Interrupt Flags	0	0	
Port Data No.1-0	0000	0233	00
Port Data No.3-2	0000	4010	00
Device Attribute	G9103C	G9002A	

The screen corresponding to the I/O setting of "G9205A" information is displayed as follows .

Port Data G9205A(OUT16)

06 d Device Number

82 h Device Information

00F20200 h Device Attribute

7 6 5 4 3 2 1 0

PORT 3

PORT 2

Port Data G9205A(IN8/OUT8)

06 d Device Number

82 h Device Information

00C20200 h Device Attribute

7 6 5 4 3 2 1 0

PORT 1

PORT 2

Port Data G9205A(IN16)

06 d Device Number

82 h Device Information

00820200 h Device Attribute

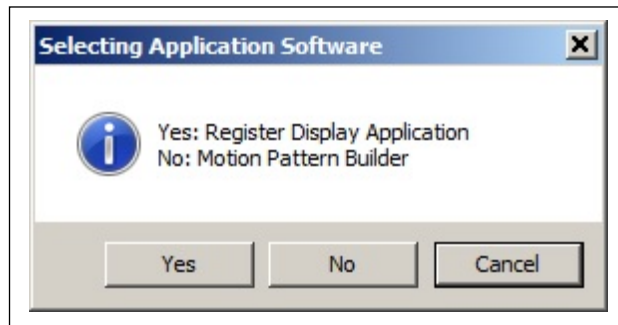
7 6 5 4 3 2 1 0

PORT 0

PORT 1

## 4.4.2. “G9103C” menu

When you double-click the device name “G9103C” displayed in “Device Attribute” on the main screen, the following screen will open.



Click “Yes” to display “Register Display Application”.

Click “No” to display “Motion Pattern Builder”.

When “Motion Pattern Builder” is displayed, “Register Display Application”, or other device number’s “Register Display Application” and “Motion Pattern Builder cannot be displayed.

## 4.4.3. “Register Display Application” menu

This screen displays “Device Number”, “Device Information”, and “Device Attribute” data of the selected “G9103C”. Also it displays each register value, “WRITE” to registers, “START” / “STOP” buttons, and “READ FILE” / “WRITE FILE”.

**Motionnet Starter Kit (G9103C : Register Display Application)**

<input type="text" value="00"/> d	Device Number	<input type="text" value="MSTS"/> <input type="text" value="0000 h"/>	<input type="text" value="IOP"/> <input type="text" value="0000 h"/>
<input type="text" value="8B"/> h	Device Information	<input type="text" value="RENV1"/> <input type="text" value="00000000 h"/>	<input type="text" value="RIRQ"/> <input type="text" value="00000000 h"/>
<input type="text" value="0023810F"/> h	Device Attribute	<input type="text" value="RENV2"/> <input style="color: red;" type="text" value="000000FF h"/>	<input type="text" value="RLTC1"/> <input type="text" value="0"/>
<input type="text" value="RMV"/> <input type="text" value="0"/>	<input type="text" value="PRMV"/> <input type="text" value="0"/>	<input type="text" value="RENV3"/> <input type="text" value="00000000 h"/>	<input type="text" value="RLTC2"/> <input type="text" value="0"/>
<input type="text" value="RFL"/> <input type="text" value="0"/>	<input type="text" value="PRFL"/> <input type="text" value="0"/>	<input type="text" value="RENV4"/> <input type="text" value="00000000 h"/>	<input type="text" value="RLTC3"/> <input type="text" value="0"/>
<input type="text" value="RFH"/> <input type="text" value="0"/>	<input type="text" value="PRFH"/> <input type="text" value="0"/>	<input type="text" value="RENV5"/> <input type="text" value="00000000 h"/>	<input type="text" value="RSTS"/> <input type="text" value="00000000 h"/>
<input type="text" value="RUR"/> <input type="text" value="0"/>	<input type="text" value="PRUR"/> <input type="text" value="0"/>	<input type="text" value="RENV6"/> <input type="text" value="00000000 h"/>	<input type="text" value="REST"/> <input type="text" value="00000000 h"/>
<input type="text" value="RDR"/> <input type="text" value="0"/>	<input type="text" value="PRDR"/> <input type="text" value="0"/>	<input type="text" value="RCUN1"/> <input type="text" value="0"/>	<input type="text" value="RIST"/> <input type="text" value="00000000 h"/>
<input type="text" value="RMG"/> <input type="text" value="0"/>	<input type="text" value="PRMG"/> <input type="text" value="0"/>	<input type="text" value="RCUN2"/> <input type="text" value="0"/>	<input type="text" value="RPLS"/> <input type="text" value="0"/>
<input type="text" value="RDP"/> <input type="text" value="0"/>	<input type="text" value="PRDP"/> <input type="text" value="0"/>	<input type="text" value="RCUN3"/> <input type="text" value="0"/>	<input type="text" value="RSPD"/> <input type="text" value="0"/>
<input type="text" value="RMD"/> <input type="text" value="00000000 h"/>	<input type="text" value="PRMD"/> <input type="text" value="00000000 h"/>	<input type="text" value="RCMP1"/> <input type="text" value="0"/>	<input type="text" value="RSDC"/> <input type="text" value="0"/>
<input type="text" value="RIP"/> <input type="text" value="0"/>	<input type="text" value="PRIP"/> <input type="text" value="0"/>	<input type="text" value="RCMP2"/> <input type="text" value="0"/>	<input type="text" value="RGN0"/> <input type="text" value="00000000 h"/>
<input type="text" value="RUS"/> <input type="text" value="0"/>	<input type="text" value="PRUS"/> <input type="text" value="0"/>	<input type="text" value="RCMP3"/> <input type="text" value="0"/>	<input type="text" value="RGN1"/> <input type="text" value="00000000 h"/>
<input type="text" value="RDS"/> <input type="text" value="0"/>	<input type="text" value="PRDS"/> <input type="text" value="0"/>	<input type="text" value="PRCP3"/> <input type="text" value="0"/>	<input type="text" value="RGN2"/> <input type="text" value="00000000 h"/>
<input type="text" value="RMVY"/> <input type="text" value="0"/>	<input type="text" value="PRMVY"/> <input type="text" value="0"/>	<input type="text" value="RFA"/> <input type="text" value="0"/>	<input type="text" value="RGN3"/> <input type="text" value="00000000 h"/>
<input type="text" value="RIPY"/> <input type="text" value="0"/>	<input type="text" value="PRIPY"/> <input type="text" value="0"/>	<input type="text" value="RCI"/> <input type="text" value="0"/>	<input type="text" value="PRCI"/> <input type="text" value="0"/>

Command	Data	<input type="button" value="STAFH"/> <input type="button" value="STAD"/> <input type="button" value="SDSTP"/>	<input type="button" value="READ FILE"/> <input type="button" value="WRITE FILE"/>
<input type="text" value=""/> h	<input type="text" value="FFFFFFFF"/> h <input type="button" value="WRITE"/>		



Due to the circuit configuration of the local device board (G9002A\_G9103C-EV), general-purpose input/output pins P0-P7 of G9103C are set to general-purpose output in the environment setting 2 (RENV2). They cannot be changed.

For IOP writing, the command (01h) is not required for I/O communication, but it is displayed for internal processing.

You can control the stepping motor driver IC (TB6608FNG) mounted on the local device board (G9002A\_G9103C-EV) to operate the accessory stepping motor PFCU30-24V4GM(1/12) connected to TB1.

Set "0000002h" to RENV1 (Environment setting 1).

The output pulse specification is set to the clock & direction input signals to meet with the stepping motor driver IC (TB6608FNG) mounted on the board.

OUT	DIR	Output pulse specification
	L	CW
	H	CCW

**CW:** Output shaft of the stepping motor PFCU30-24V4GM (1/12) rotates clockwise

To operate in CW direction, select "(+) direction constant operation by command control", "(+) direction origin return operation", or "positioning operation" with a positive value to "PRMV" for the operation mode of PRMD.MOD.

**CCW:** Output shaft of the stepping motor PFCU30-24V4 GM (1/12) rotates counterclockwise

To operate in CCW direction, select "(-) direction constant operation by command control", "(-) direction origin return operation", or "positioning operation" with a negative value to "PRMV" for the operation mode of PRMD.MOD.

When RENV2 (Environment setting 2) is set to "00000FFh", the outputs of general-purpose outputs P0 to P7 are L level outputs.

The P3-P7 pins are connected to each input pins of stepping motor driver IC (TB6608FNG).

P4	P3	Excitation mode
L	H	1-2 phase
H	L	W1-2 phase
L	L	2W1-2 phase

The default setting is 2W1-2 phase excitation mode.

P6	P7	P5	Mode
L	L	L	operable mode
H	L	L	initial mode
x	H	L	enable standby mode
x	x	H	standby mode

The default setting is operable mode.

To change the setting, write the output levels of P0 to P7 to output data (IOPOB) of IOP general-purpose output pin.

In PRMV register, write the value to rotate the output shaft of a stepping motor PFCU30-24V4GM (1/12) once.

When the stepping motor is in 1-2 phase excitation, a shaft rotates once with 48 pulses and with 1/12 gear and 2W1-2 phase excitation mode, so that the value =  $48 \times 12 \times 4 = 2304$  pulses (CW). When driven with -2304 pulses (CCW), the shaft rotates in reverse.

Set the start speed; PRFL = 400, operation speed; PRFH = 1500, acceleration rate; PRUR = 908 (200 ms), speed magnification; PRMG = 199, and operation mode; PRMD = 00000041h.



Read the G9103C setting data file " G9103C\_Regiter\_Data.txt " for MNET-STK and set the data to operate a stepping motor PFCU30-24V4GM (1/12).

Motionnet Starter Kit (G9103C : Register Display Application)

00 d Device Number  
8B h Device Information  
0023810F h Device Attribute

RMV	2304	PRMV	2304	MSTS	0000 h	IOP	0000 h
RFL	400	PRFL	400	RENV1	00000002 h	RIRQ	00000000 h
RFH	1500	PRFH	1500	RENV2	0000C6FF h	RLTC1	0
RUR	908	PRUR	908	RENV3	00000000 h	RLTC2	0
RDR	0	PRDR	0	RENV4	00000000 h	RLTC3	0
RMG	199	PRMG	199	RENV5	00000000 h	RSTS	10000000 h
RDP	0	PRDP	0	RENV6	00000000 h	REST	00000000 h
RMD	00000041 h	PRMD	00000041 h	RCUN1	0	RIST	00000000 h
RIP	0	PRIP	0	RCUN2	0	RPLS	2304
RUS	0	PRUS	0	RCUN3	0	RSPD	0
RDS	0	PRDS	0	RCMP1	0	RSDC	0
RMVY	0	PRMVY	0	RCMP2	0	RGNO	00000000 h
RIPY	0	PRIPY	0	RCMP3	0	RGN1	00000000 h
				PRCP3	0	RGN2	00000000 h
				RFA	0	RGN3	00000000 h
				RCI	0	PRCI	0

Command Data  
 h FFFFFFFF h WRITE

STAFH STAD SDSTP

STAFI STAUD STOP

READ FILE  
WRITE FILE

Write the start command 53h in the column "Command" and click the "WRITE" button.

The output shaft of the stepping motor PFCU30-24V4GM (1/12) rotates once in the clockwise direction.

Click the following buttons to start / stop operation displaying the start command in the column "Command".

"STAFI": FL constant speed start (50h)

"STAFH": FH constant speed start (51h)

"STAD": High-speed start 1 (52h)

"STAUD": High-speed start 2 (53h)

"STOP": Immediate stop (49h)

"SDSTP": Deceleration stop (4Ah)

Change the selection in the PRMD (operation mode), to check continuous operation or origin return operation, etc.

- |   |   |                  |
|---|---|------------------|
| 1 | Continuous (+) rotation controlled by command control             | PRMD = 0000000h  |
| 2 | Continuous (-) rotation controlled by command control             | PRMD = 00000008h |
| 3 | (+) rotation origin return operation                              | PRMD = 0000010h  |
| 4 | (-) rotation origin return operation                              | PRMD = 0000018h  |
| 5 | Positioning operation (specifies the target incremental position) | PRMD = 0000041h  |

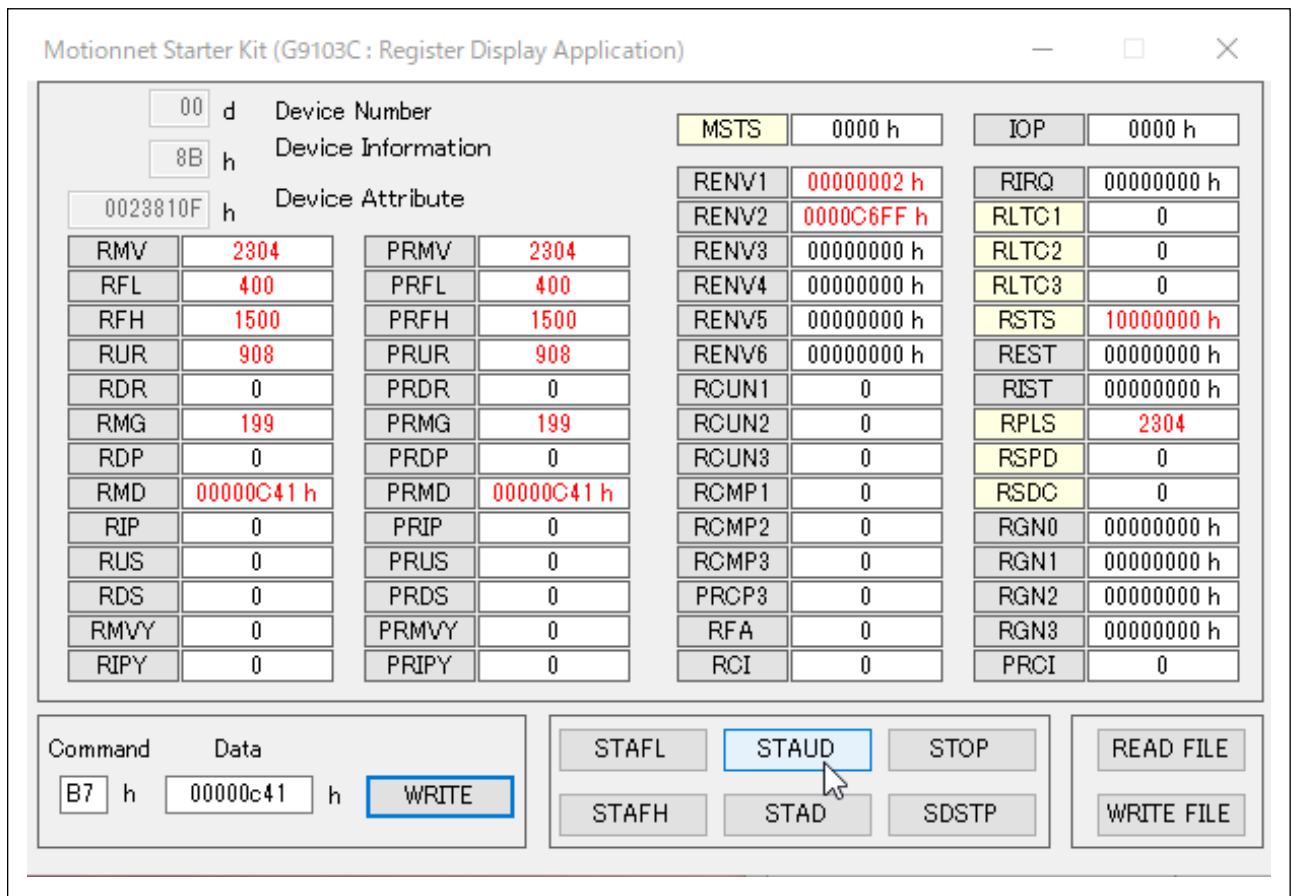
The maximum speed of a stepping motor PFCU30-24V4GM (1/12) is the value listed in the table below. If any larger values are set, "out-of-step" will occur.

P4	P3	Excitation mode	Maximum speed	Feeding amount per rotation
L	H	1-2 phase	375 pps	576
H	L	W1-2 phase	750 pps	1152
L	L	2W1-2 phase	1500 pps	2304

The contents of the set register can be saved with a file name by the "WRITE FILE" button.

You can also load a saved file by the "READ FILE" button.

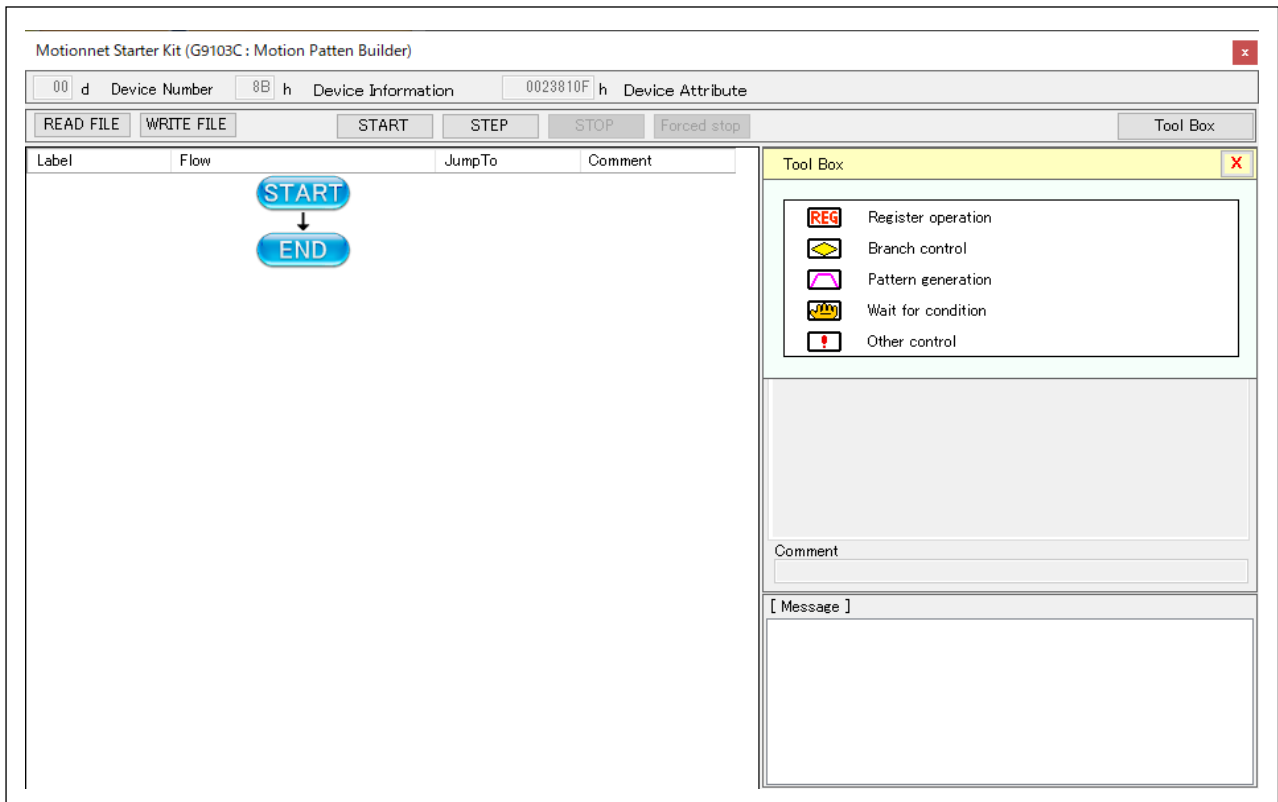
To start a simultaneous start in the broadcast communication, press a start button with setting PRMD.MSY, PRMD.MSPE to "1".



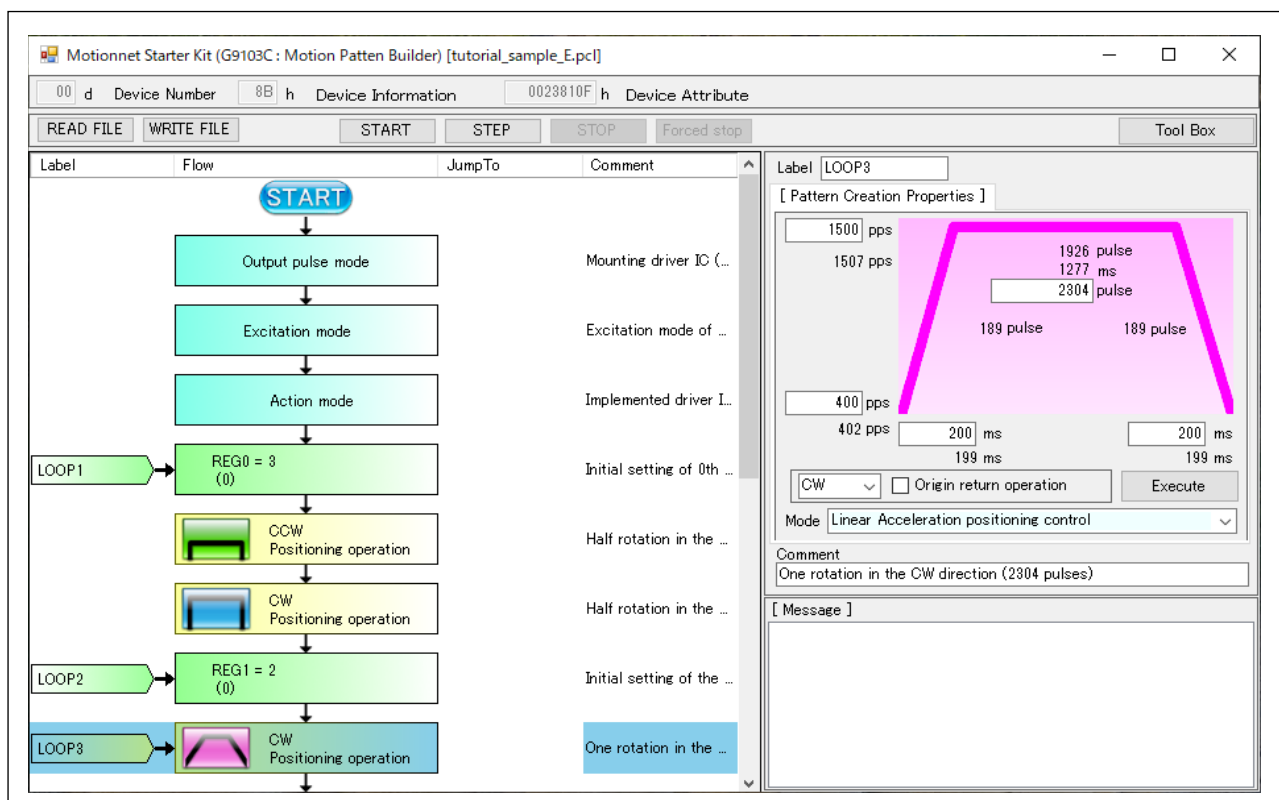
RSTS.CND3-0 become "0001: Waiting for STA input". Set other device numbers similarly. Open "Broadcast command" menu and click the "2001h" button to operate axes specified simultaneously.

#### 4.4.4. “Motion Pattern Builder”

Displays the device number, device information, and device attribute data of the selected “G9103C”, and displays the flowchart creation screen, “READ FILE” / “WRITE FILE” button, “START” / “STEP” / “STOP” / “Forced STOP” button, and “Tool box” button.



Click the “READ FILE” button to display a dialog box where you can select a file. A flowchart is created by reading the G9103C configuration data file “tutorial\_sample\_E.pcl” for MNET-STK.



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Click the "WRITE FILE" button to display a dialog box to save the flowchart on the screen as a text file.

Click the "START" button to check the flow chart. If there is no error, the operation starts, and the ongoing operation being performed will be highlighted. During operation, the "START" and "STEP" buttons are disabled, and the "STOP" and "Forced STOP" buttons are enabled.

When stopped after execution, the "STEP", "STOP" and "Forced STOP" buttons will be enabled. Click the "STEP" button repeatedly to execute the next line.

When the "STOP" button is clicked, the execution of the flowchart stops when the ongoing operation in progress is completed. If a positioning control is in progress, it will take time to stop because of waiting until the positioning control is completed. When stopped, the "START" and "STEP" buttons are enabled, and the "STOP" and "Forced STOP" buttons are disabled.

When the "Forced STOP" button is clicked, execution of the flowchart stops without waiting for the completion of the ongoing positioning control.

When stopped, the "START" and "STEP" buttons are enabled, and the "STOP" and "Forced STOP" buttons are disabled.

Click the "Tool Box" button to display the toolboxes that contain any tools under the box.

If you place the mouse cursor on the stored tool and click the left mouse button, you can drag the tool (the cursor shape changes). Then, drag it to the flowchart side.

You can drag the tool to the flowchart side, and release them to insert in sentences in green.

**Revision**

Revision	Date	Contents
1st	January 29, 2020	Initial Release
2nd	May 25, 2020	<ol style="list-style-type: none"><li>1. Added function to display description by clicking [Register] name in "Register Display Software"</li><li>2. "Register" names of "Register Display Software", MSTSW and IOPW were changed to MSTS and IOP, respectively.</li><li>3. When the "Register Display Software" is initialized, the registers that can be displayed in decimal are displayed in decimal.</li><li>4. Added RMVY / PRMVY, RIPPY / PRIPPY, RCI / PRCI registers to "Register Display Software"</li></ol>



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