

# ET-M8194H

## Motion Control Module

### Quick Start Manual

(Version 3.1)



**ICP DAS CO., LTD.**

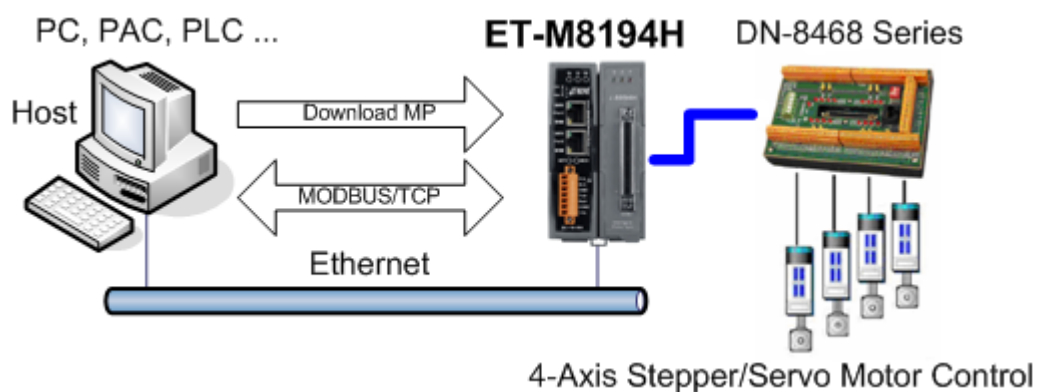
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# 1 ET-M8194H Features

ET-M8194H is an Ethernet based 4-axis stepping/pulse-type motion controller and uses Modbus TCP/IP as a communication protocol between client and server. This intelligent motion controller also has a variety of built in motion control functions, such as 2/3- axis linear interpolation, 2-axis circular interpolation, T/S-curve acceleration/deceleration, various synchronous actions and automatic homing.

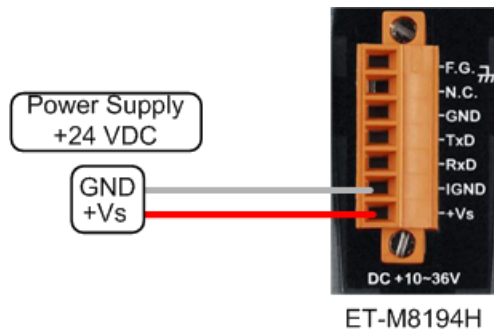


An EzMove utility is provided for configuring the ET-M8194H and assisting the user in writing macro programs and in getting familiar with the ET-M8194H and its motion commands. Furthermore it can be used for motion monitoring and tracking of the motion path.

## 2 Hardware Wiring

### ▪ Power Connection

Connect power supply +Vs (24 VDC) and GND pin to the ET-M8194H +Vs and IGND pin.

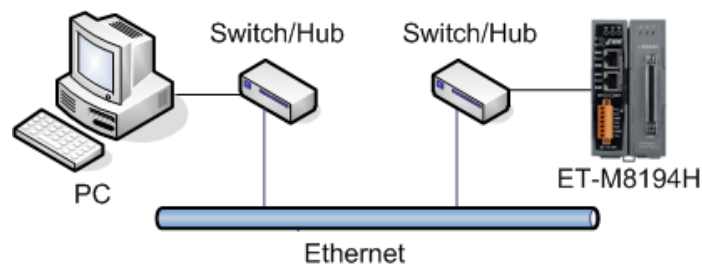


### ▪ Ethernet Connection

There are two ways to establish a connection between PC and ET-M8194H:

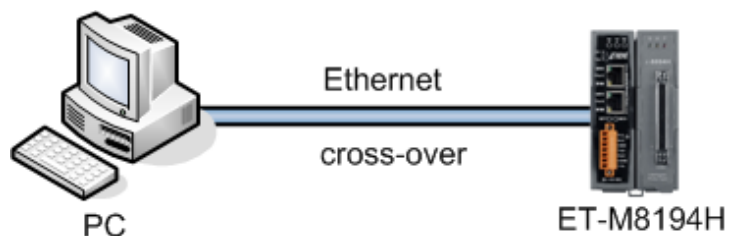
#### a. LAN:

Connect the ET-M8194H and PC through local area network (LAN) by Hub/Switch. Install EzMove on the PC and use this utility to test the connection.



#### b. Direct link:

Connect the PC directly to ET-M8194H. The Ethernet cable does not have to be a cross-over cable; the controller can detect the connection and do the suitable configuration automatically.



### 3 Toolkit Installation

Execute the ET\_M8194H\_Vx.x\_Setup.exe installation program which is on the product CD. Follow the prompts to complete the installation process. The default installation path is C:\ICPDAS\ET-M8194H\.

Installation folder ICPDAS\ET-M8194H\ ET-M8194H (Vx.xx)		description
\Demo Programs	\Demo	Demo programs for <ul style="list-style-type: none"> <li>▪ VS2008 c++,</li> <li>▪ BC Builder 6 c++,</li> <li>▪ dotNet,</li> <li>▪ Visual Basic 6.0</li> </ul>
\Firmware & Libraries	\Firmware	<ul style="list-style-type: none"> <li>▪ ET-M8194H firmware ;                XY represent Ver. X.Y               <ul style="list-style-type: none"> <li>○ EM94H_XY.EXE</li> <li>○ autoexec.bat</li> </ul> </li> <li>▪ i-8094H firmware:               <ul style="list-style-type: none"> <li>○ i8094H.exe</li> <li>○ autoexec.bat</li> </ul> </li> </ul>
	\Libraries	Libraries for <ul style="list-style-type: none"> <li>▪ VS2008 c++,</li> <li>▪ BC Builder 6 c++,</li> <li>▪ dotNet,</li> <li>▪ Visual Basic 6.0</li> </ul>
\Software Tools	\EzMove_Utility	EzMove Utility
	\EzMove_Utility \Demo	Macro Program (MP) examples
	\OCX	OCX for EzMove Utility
	\Language	Language file for EzMove utility
\Manual	ET-M8194H_Manual_vx.xx.pdf	ET-M8194H instruction manual
	ET-M8194H_QuickStart_vx.xx.pdf	ET-M8194H quick start
	EzMove Utility_vx.x.pdf	EzMove instruction manual
	FAQ	FAQ

## 4 Network Settings

In this section the network configuration of the ET-M8194H like the Ethernet IP, mask and gateway will be introduced. The network configuration can either be done through the Ethernet or by using the RS232 cable.

The factory default network setting of the ET-M8194H is as follows:

IP: 192.168.0.16  
Mask: 255.255.255.0  
Gateway: 192.168.0.254

### Method 1 – Setting via Ethernet

The Ethernet setting can be done directly via direct Ethernet connection:

**Step 1: Connect the PC directly to the ET-M8194H without using a hub, switch, or router (Figure 1).**

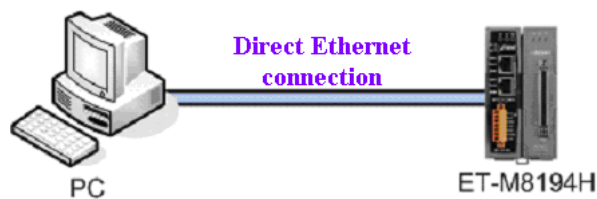


Figure 1: Direct PC to ET-M8194H connection

**Step 2: Set the DIP-switch to “Init”, then power on the ET-M8194H (Figure 2).**



( Dip Switch -- Init )

Figure 2: Dip switch in “Init” position

**Step 3: Execute the EzMove Utility and open the [ET-M8194H Setting by Ethernet] window (Setting →By Ethernet ...).**

**Step 4: Click [Get Setting] (Figure 3). The utility now reads the Ethernet configuration of the ET-M8194H module set into “Init” mode. Make sure that there is only one ET-M8194H module in “Init” mode connected to the Ethernet.**

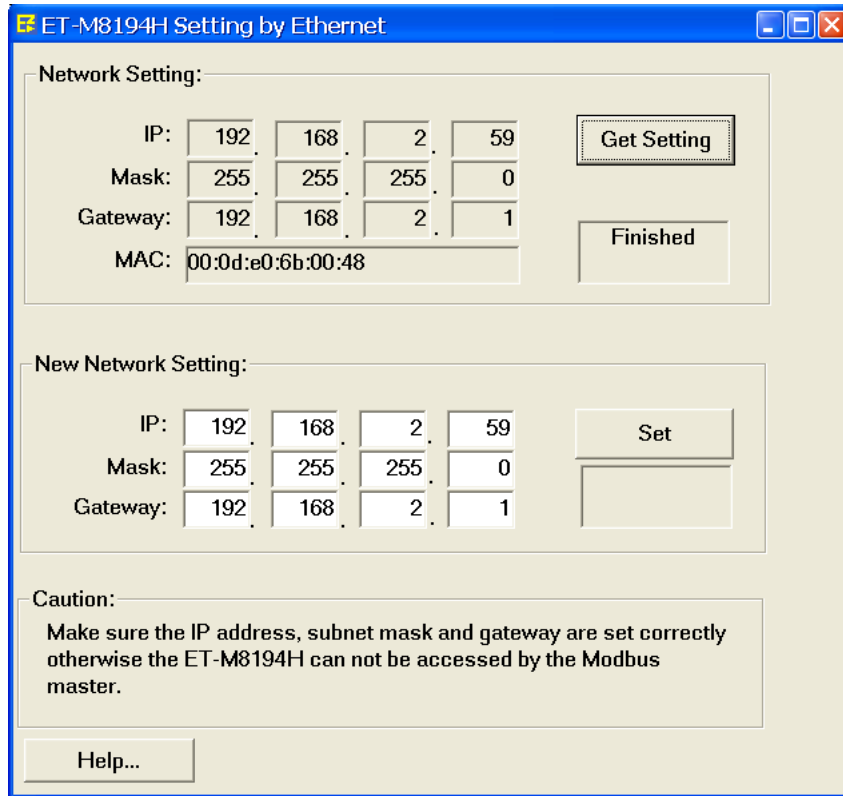


Figure 3: User Interface for ET-M8194H Ethernet configuration via Ethernet

**Step 5: Enter a new Ethernet setting and click the “Set” button.**

**Step 6: After the setting is done switch the dip switch back to “Run” (Figure 4) and power off/on the module.**



( Dip Switch -- Run )

Figure 4: Dip switch in “Run” position

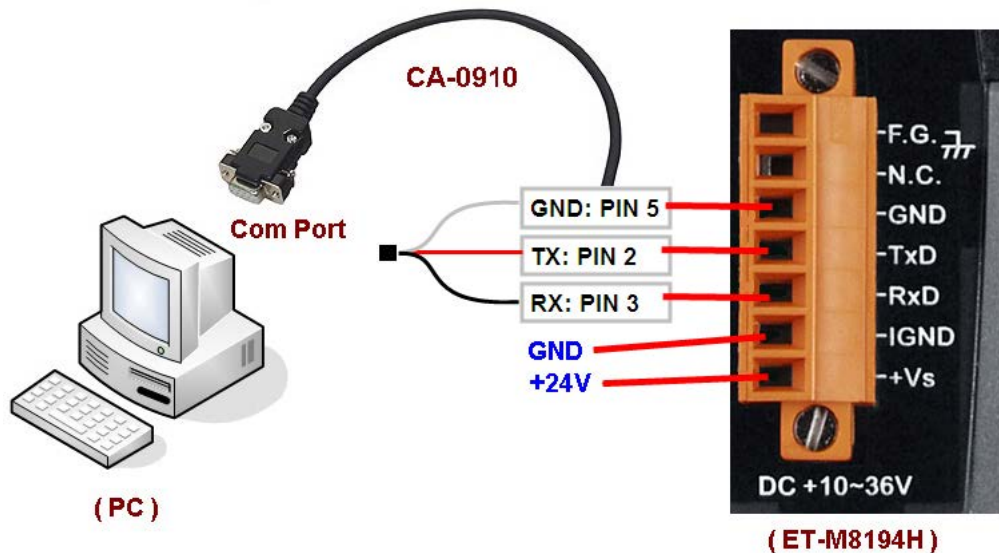
Now the module is ready to be accessed by using the new Ethernet setting.

## Method 2 – Setting via RS-232

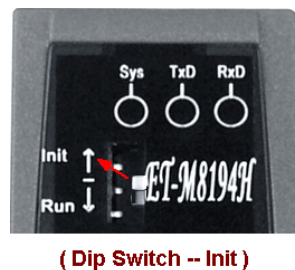
The procedures to read/modify the IP configuration are:

**Step 1: Switch off the ET-M8194H.**

**Step 2: Connect the RS-232 cable (CA-0910) to ET-M8194H. The Tx, Rx and GND pins of CA-0910 have to be connected to the Rx, Tx and GND ports of ET-M8194H. The other end (9-pin, D-sub connector) has to be connected the COM port of desktop/laptop.**



**Step 3:** Set the DIP-switch to “Init”, then power on the ET-M8194H.



( Dip Switch -- Init )

**Step 4:** Execute the EzMove Utility and open the “Network Settings by COM Port” dialog (Figure 5). ([Setting] → [ET-M8194H Setting] → [By COM Port] → [Network])

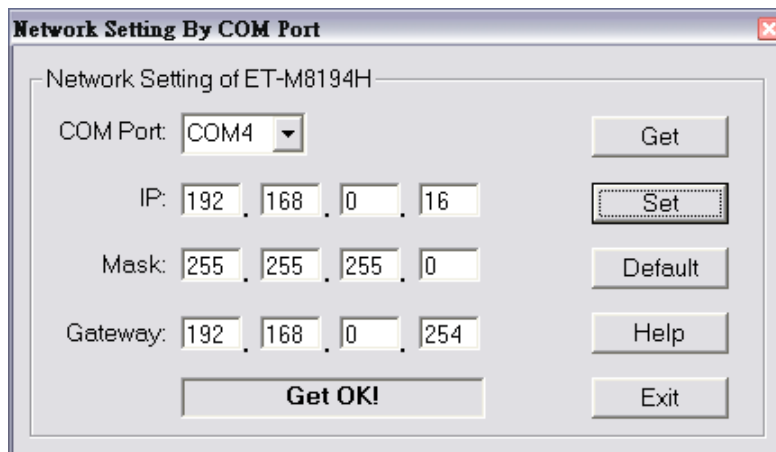


Figure 5: User Interface for ET-M8194H Ethernet configuration via RS232

**Step 5:** Select the COM Port of the PC to which the RS-232 cable (CA-0910) is connected, and then click the **Get** button to display the current IP configuration of the ET-M8194H.

**Step 6:** Modify the configuration by entering new values in the IP, Mask and Gateway fields, and then click the **Set** button to download the IP configuration to the ET-M8194H.



- a. Click the **Default** button and then click the **Set** button to restore the default IP configuration.

**Step 7: Power off the ET-M8194H, and set the DIP-switch to “Run”.**



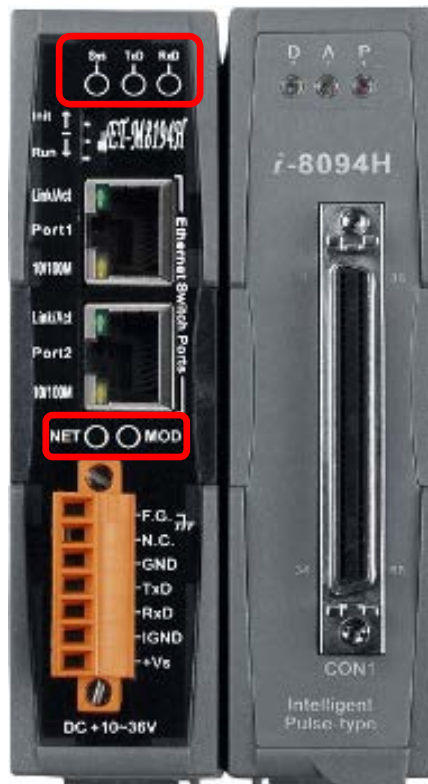
( Dip Switch -- Run )

**Step 8: Power on the ET-M8194H to set the ET-M8194H into run mode.**

**ATTENTION!!!**

Remove the RS-232 cable (CA-0910) from the ET-M8194H after configuration in order to prevent the device from being affected by noises.

## 5 ET-M8194H LED Description



### LED description:

LED	Status	Description
Sys	On	Device is switched on and firmware is running.
	Flashing	Device is switched on and firmware is not running.
	Off	Device is switched off.
Tx	Flashing	Data is transmitted by the ET-M8194H via RS-232.
	Off	No data is sent by the ET-M8194H via RS-232.
Rx	Flashing	The device is receiving data via RS-232.
	Off	No data is being received.
NET	On	Device is connected to Ethernet.
	Flashing	Data is being transmitted via Ethernet.
	Off	Device is not connected to the Ethernet.
MOD	On	Module i-8094H is plugged into ET-M8194H device.
	Flashing	A module different than i-8094H is plugged into ET-M8194H device.
	Off	No module is plugged into the ET-M8194H device.

### LED description of the i-8094H module:

- P is the power indicator,
- A is the FRnet indicator, and
- D is the pulse output indicator.

## 6 Connect to ET-M8194H

For the first time connection click EzMove [menu] -> [Connect] -> [Connect To Remote Device...]. Select the “ET-M8194H” tab in the dialog box as shown in the figure below. Enter the IP address for the ET-M8194H, the connection and Modbus response timeout and then click **Connect** to connect to the ET-M8194H. For disconnection, you can press **Disconnect** in the “Connect” dialog box, or press the **Connect/Disconnect** Button.

The screenshot shows a dialog box titled "Connect To Remote Motion Device". It has two tabs: "ET-M8194H" (selected) and "RS-M8194H". The "ET-M8194H" tab contains the following fields and controls:

- Connect To ET-M8194H Module:**
  - ET-M8194H IP:
  - Timeout for Connecting to the ET-M8194H Module:
    - Timeout:  (ms)
  - Timeout for the Modbus Response:
    - Timeout:  (ms)
- Connect** button
- Modbus Register Order (for long, float, DWORD):**
  - High WORD: Lower Modbus table index
  - High WORD: Upper Modbus table index

Figure 6: First time Ethernet connection

After a successful connection the Utility saves all the connection data to a local file in the directory of the Utility. The next time it is only necessary to click the **Connect** button on the main toolbar to establish a TCP/IP connection with the ET-M8194H module.

# 7 MODBUS Data Display

The MODBUS message window in the EzMove shows the request sent by PC and the response messages received from the ET-M8194H. The "Write Multiple Register" tab displays messages of Function Code 16, and "Read Holding Register" tab displays messages of Function Code 03.

Read Holding Register													Write Multiple Register							
Request Sent													Response:							
No.	TxD	PID	Fid.L	UID	FC	St. Addr.	No.Reg.	BC	Reg. 1	Reg. 2	Reg. 3	Reg. 4	No.	TxD	PID	Fid.L	UID	FC	St. Addr.	No.Reg.
102	07 47	00 00	00 0F	01	10	1F 40	00 04	08	0A 4E	00 01	00 00	03 20	102	07 47	00 00	00 06	01	10	1F 40	00 04
103	07 48	00 00	00 08	01	10	1F 40	00 02	04	0A DB	00 01			103	07 48	00 00	00 06	01	10	1F 40	00 02
104	07 49	00 00	00 0F	01	10	1F 40	00 04	08	0A 4E	00 02	FF FF	FC E0	104	07 49	00 00	00 06	01	10	1F 40	00 04
105	07 4A	00 00	00 08	01	10	1F 40	00 02	04	0A DB	00 02			105	07 4A	00 00	00 06	01	10	1F 40	00 02
106	07 4B	00 00	00 0F	01	10	1F 40	00 04	08	0A 4E	00 01	FF FF	FC E0	106	07 4B	00 00	00 06	01	10	1F 40	00 04
107	07 4C	00 00	00 08	01	10	1F 40	00 02	04	0A DB	00 01			107	07 4C	00 00	00 06	01	10	1F 40	00 02
108	07 4D	00 00	00 09	01	10	1F 40	00 01	02	0A CA				108	07 4D	00 00	00 06	01	10	1F 40	00 01

Read Holding Register													Write Multiple Register																
Request Sent													Response:																
No.	TxD	PID	Fid.L	UID	FC	St. Addr.	No.Reg.						No.	TxD	PID	Fid.L	UID	FC	BC	Reg. 1	Reg. 2	Reg. 3	Reg. 4	Reg. 5	Reg. 6	Reg. 7	Reg. 8	Reg. 9	F
756	07 2F	00 00	00 06	01	03	00 5A	00 10						756	07 2F	00 00	00 23	01	03	20	00 00	00 64	00 00	00 64	00 00	00 00	00 00	00 00	00 00	00 00
757	07 30	00 00	00 06	01	03	00 5A	00 10						757	07 30	00 00	00 23	01	03	20	00 00	00 64	00 00	00 64	00 00	00 00	00 00	00 00	00 00	00 00
758	07 31	00 00	00 06	01	03	00 5A	00 10						758	07 31	00 00	00 23	01	03	20	00 00	00 64	00 00	00 64	00 00	00 00	00 00	00 00	00 00	00 00
759	07 32	00 00	00 06	01	03	00 5A	00 10						759	07 32	00 00	00 23	01	03	20	00 00	00 64	00 00	00 64	00 00	00 00	00 00	00 00	00 00	00 00
760	07 33	00 00	00 06	01	03	00 5A	00 10						760	07 33	00 00	00 23	01	03	20	00 00	00 64	00 00	00 64	00 00	00 00	00 00	00 00	00 00	00 00
761	07 34	00 00	00 06	01	03	00 5A	00 10						761	07 34	00 00	00 23	01	03	20	00 00	00 64	00 00	00 64	00 00	00 00	00 00	00 00	00 00	00 00
762	07 35	00 00	00 06	01	03	00 5A	00 10						762	07 35	00 00	00 23	01	03	20	00 00	00 64	00 00	00 64	00 00	00 00	00 00	00 00	00 00	00 00

## 8 Initialization Table

The Initial Table includes all the commands which are required to initialize the motion chip after power on. It is important that the motion chip setting corresponds to the servo drive setting otherwise the system will not be able to function properly. The Initial Table interface provides an easy and convenient way to enter the initial parameters.

Click on [Menu] -> [Setting] -> [Initial Table], to open the Initial Table.

Function	Parameter	X-Axis	Y-Axis	Z-Axis	U-Axis
Pulse Output Signal	Pulse Output Mode	0	0	0	0
Max Pulse Output Rate	Data (8000 to 4,000,000 PPS)	8000	8000	8000	8000
Hardware Limit Switch (HLMT)	Active Level (forward)	Low Active	Low Active	Low Active	Low Active
	Active Level (reverse)	Low Active	Low Active	Low Active	Low Active
Hardware Limit Stop Mode	Stop Mode	Abrupt Stop	Abrupt Stop	Abrupt Stop	Abrupt Stop
Near Home Sensor	Trigger Level	High Active	High Active	High Active	High Active
Home Sensor	Trigger Level	High Active	High Active	High Active	High Active
Software Limit	Enable Software Limit	Disable	Disable	Disable	Disable
	Software Limit (forward)	100000	100000	100000	100000
	Software Limit (reverse)	-100000	-100000	-100000	-100000
	Position Counter Type	Logic Pos	Logic Pos	Logic Pos	Logic Pos
Set Encoder Parameters	Encoder Input Type	A Quad B	A Quad B	A Quad B	A Quad B
	A Quad B Input Signal Division	1/1	1/1	1/1	1/1
	Trigger Level for Z Phase	High Active	High Active	High Active	High Active
Servo Driver Setting	On/Off	Off	Off	Off	Off
Servo Alarm Setting	Enable Servo Alarm	Disable	Disable	Disable	Disable
	Trigger Level	High Active	High Active	High Active	High Active
In-Position Signal	Enable In-Position Input	Disable	Disable	Disable	Disable
	Trigger Level	High Active	High Active	High Active	High Active
Digital Filter	Input Ports	1	1	1	1
	Filter Time Constant	2	2	2	2
Variable Ring Position Counter	Enable Variable Ring Counter	Disable	Disable	Disable	Disable
	Maximum Value	10000	10000	10000	10000
Triangle Profile Prevention	Enable Triangle Prevention	Disable	Disable	Disable	Disable

## 9 IO Status Table

This interface displays the IO status of all the FRnet modules (128 DI and 128 DO), the daughter board and the motion chip state. The individual FRnet DO state can be set by clicking the corresponding DO button.

Click on the [menu] -> [Tools] -> [IO Status] to open the DIO Status table. Press [Enable] / [Disable] to switch on/off the status polling timer.

The screenshot shows the 'DIO Status' window with the following sections:

- FRnet DO (Click LED to set DO):** A grid of 128 DOs (DO 0 to DO 15) organized into 8 groups (0-7).
- FRnet DI:** A grid of 16 DI signals (DI 0 to DI 15) organized into 8 groups (8-15).
- Polling:** A section with a 'Time Interval' set to 100 [ms] and an 'Enable' button.
- Daughter Board DI Signal:** A grid of 16 signals (Near Home, Home, Index, IN3, MPG (+), MPG (-), In Position, Alarm) organized into 4 axes (X, Y, Z, U).
- Motion Chip Status:** Two identical grids of 16 signals (Axis, Soft Limit (+), Soft Limit (-), HW Limit (+), HW Limit (-), Home Error, Alarm, Emergency, Stop Cmd) organized into 4 axes (X, Y, Z, U).

# 10 Macro Programs

## 10.1 Editing Macro Programs

EzMove provides a simple editor for writing and downloading macro programs to the ET-M8194H.

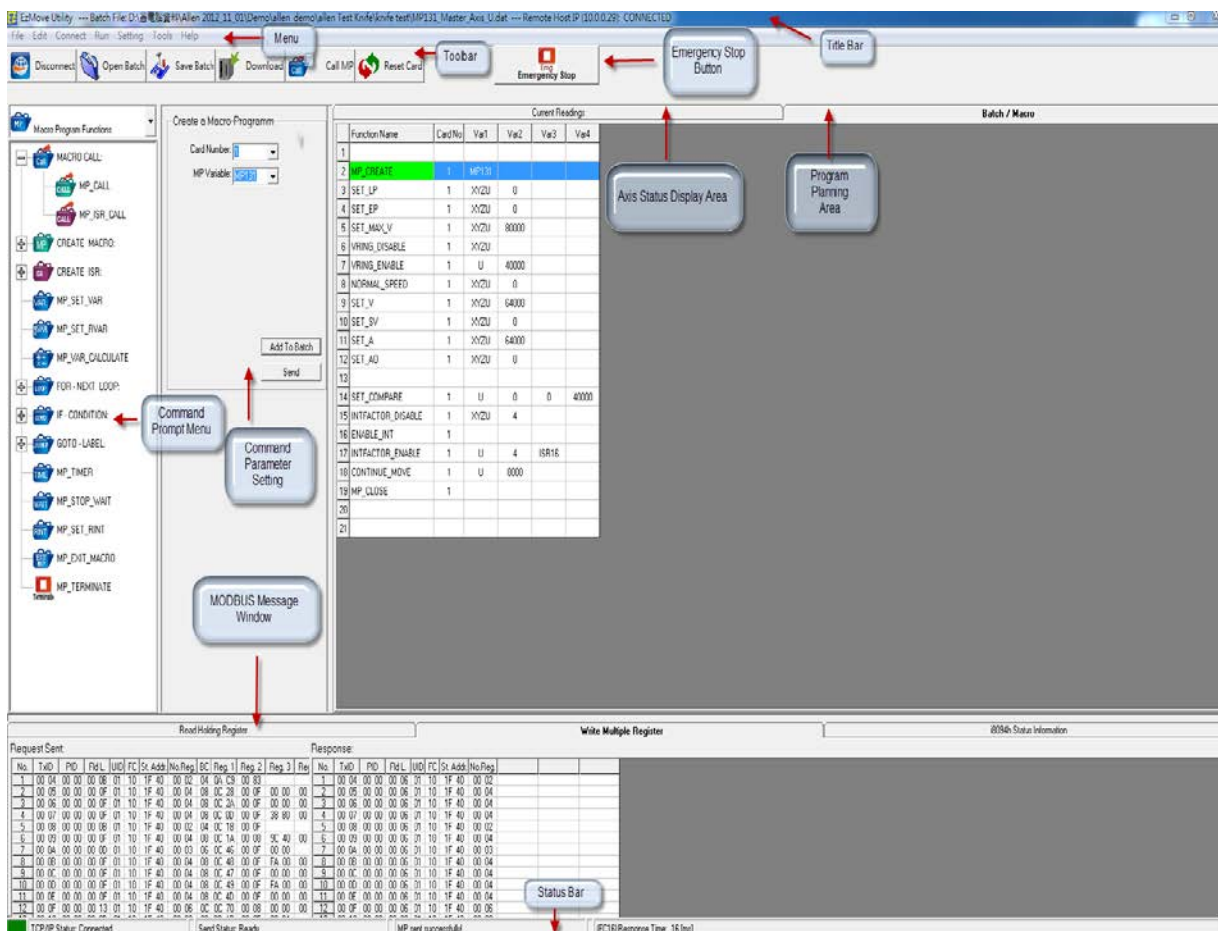


Figure 7: Main EzMove Utility

In the following, a rectangular trajectory in the X-Y plane is used as an example to demonstrate how to use the EzMove to download and run macro program. This example does not require the ET-M8194H module to be connected to any motor drives. After setting up the connection between PC and ET-M8194H, Click “Program Planning Area” (Batch / Macro) tab on the right-hand side (Figure 7). There are two ways to add a command to the editor:

a. Use the "Command Prompt Menu" and "Command Parameter Setting":

Every Macro program has to start with the MP\_CREATE command. The following four steps (Figure 8) show how to add this command to the Macro program editor. Use the mouse to follow the steps in the sequence as indicated in the figure. The MP93 is the name of the macro program.

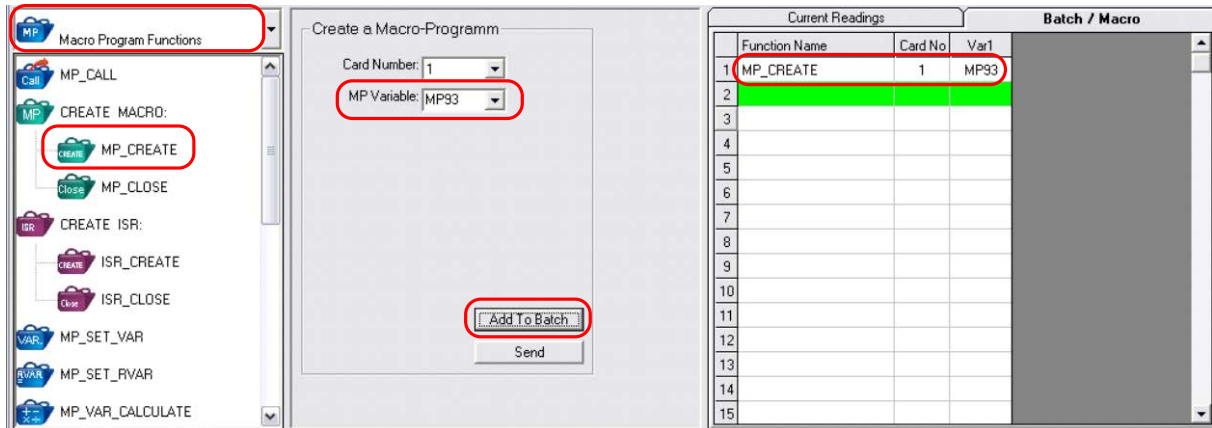
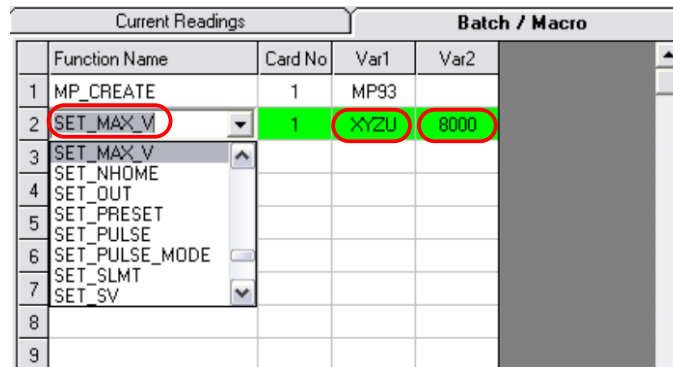


Figure 8: Adding a command to the Macro program editor

b. Use the drop-down menu in the "Program Planning Area".

After the MP\_CREATE function, click on the next row in the "Function Name" field. Enter SET\_MAX\_V or choose the name from the drop-down menu to complete the function name part; then move the cursor to Var1 field and select XYZU; move to Var2 field and enter 8000. The second statement is now complete.





Follow the similar steps described above to complete the macro program definition in the following table:

	Function Name	Card No	Var1	Var2
1	MP_CREATE	1	MP93	
2	SET_MAX_V	1	XYZU	8000
3	NORMAL_SPEED	1	XYZU	0
4	SET_V	1	XYZ	200
5	SET_A	1	XYZ	1000
6	SET_SV	1	XYZ	20
7	SET_AO	1	XYZ	0
8	SET_LP	1	XYZU	0
9	FIXED_MOVE	1	Z	100
10	MP_STOP_WAIT	1	Z	
11	MP_TIMER	1	2000	
12	FIXED_MOVE	1	XY	100
13	MP_STOP_WAIT	1	XY	
14	FIXED_MOVE	1	Z	-100
15	MP_STOP_WAIT	1	Z	
16	FIXED_MOVE	1	Y	800
17	MP_STOP_WAIT	1	Y	
18	FIXED_MOVE	1	X	800
19	MP_STOP_WAIT	1	X	
20	FIXED_MOVE	1	Y	-800
21	MP_STOP_WAIT	1	Y	
22	FIXED_MOVE	1	X	-800
23	MP_STOP_WAIT	1	X	
24	MP_CLOSE	1		

The macro program will take 23 lines where MP\_CREATE statement defines the starting address and does not take memory space. According to the internal configuration of ET-M8194H, each MP has its own size limitation. The size limit of all MP programs can be displayed in the menu [Help] -> [FLine Table]. MP93 is capable of accommodating 32 function lines and is chosen for the example.

## 10.2 Macro Program Download and Execution

### Step 1: Download a macro program to the ET-M8194H

After connecting, users can press the toolbar **Download** button to download a macro program from the editor to the non-volatile memory of the i8094H. The program will not be executed after the download has finished.

### Step 2: Display the motion path

Click on the [menu] -> [Tools] -> [Graph] to open the Graph window. On the “Axis Status Display Area”, users can set the polling time interval. After pressing **Enable** the polling of motion status (e.g. encoder position) starts.

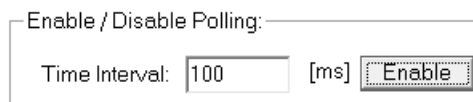


Figure 9: Polling timer setting

### Step 3: Run the macro program

After pressing the toolbar **Call MP** Button, selecting a macro program number (e.g. MP93) and clicking the **Send** button the selected macro starts to execute.

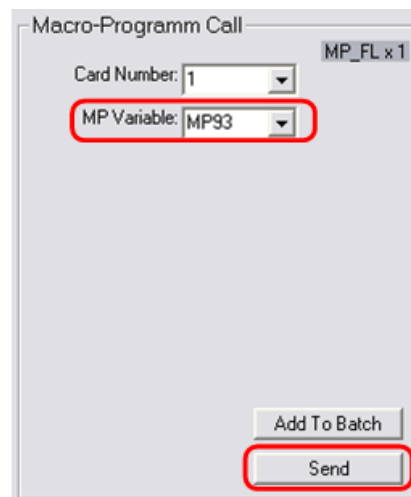


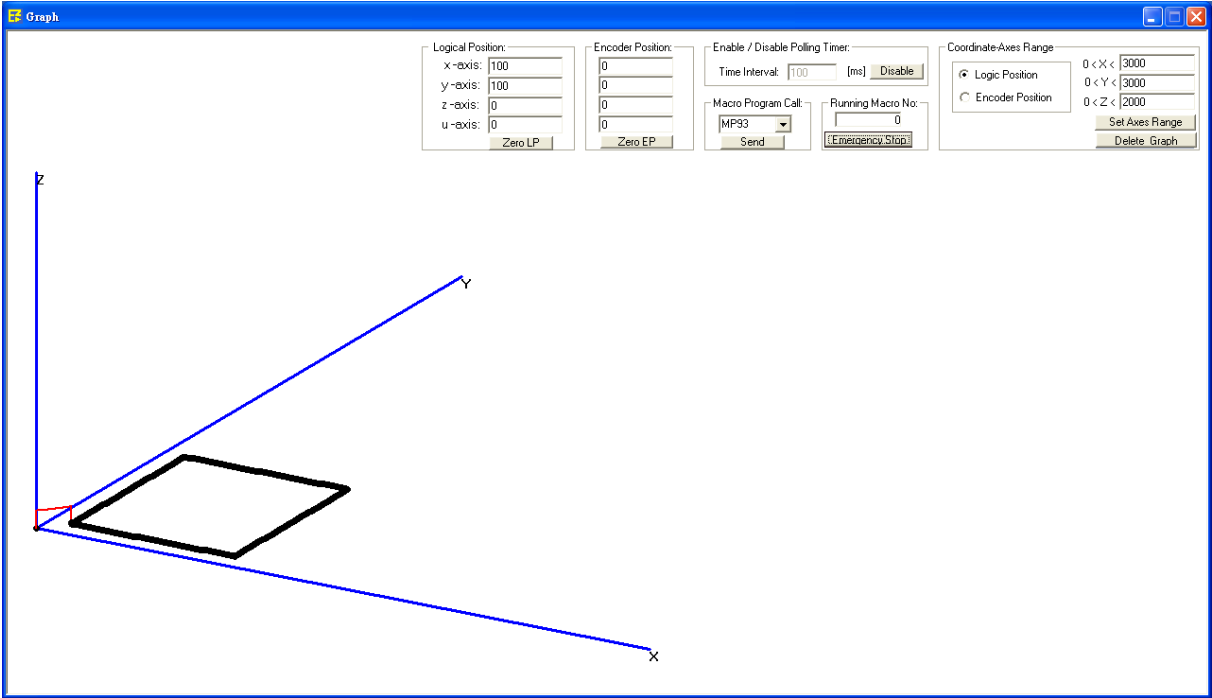
Figure 10: Macro program execution call

Users can add an MP\_CALL statement after MP\_CLOSE command in the editor to immediately execute the macro program after downloading (Figure 11).

Current Readings			Batch / Macro	
Function Name	Card No	Var1	Var2	
18	MP_STOP_WAIT	1	Y	
19	FIXED_MOVE	1	X	800
20	MP_STOP_WAIT	1	X	
21	FIXED_MOVE	1	Y	-800
22	MP_STOP_WAIT	1	Y	
23	FIXED_MOVE	1	X	-800
24	MP_STOP_WAIT	1	X	
25	MP_CLOSE	1		
26				
27	MP_CALL	1	MP93	
28				

Figure 11: Macro program download and execution

Switch back to the Graph window, to monitor the motion path of the executing macro program. The above example is a square on the XY plane.



Execute commands one by one:

When editing a Macro program, the function statements are shown on the screen. Users can execute either one of these statements by directly pressing the Send button.

For example, click on the second row (Figure 12) containing the SET\_MAX\_V command in the Macro editor to open the corresponding parameter input window. Press the Send button of the parameter input window to directly send the command to the ET-M8194H.

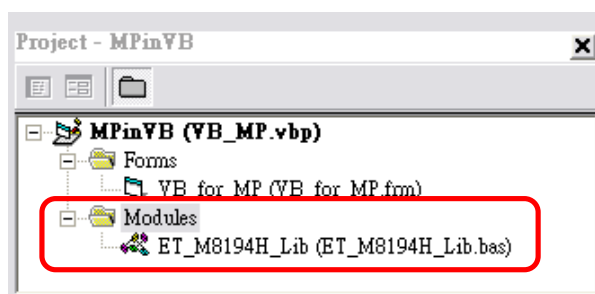
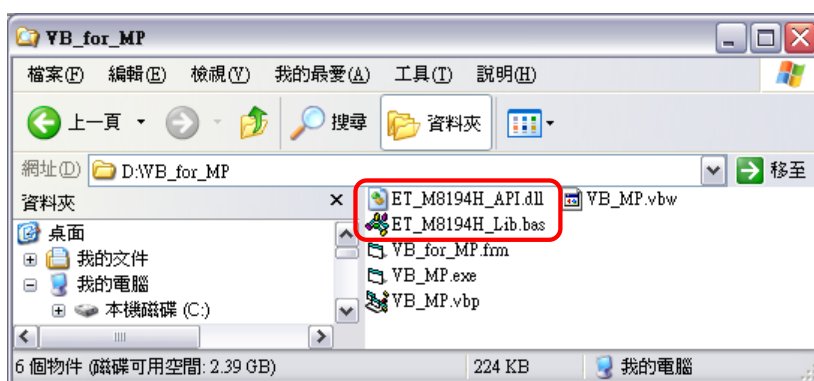
Current Readings		Batch / Macro		
	Function Name	Card No	Var1	Var2
1	MP_CREATE	1	MP93	
2	SET_MAX_V	1	XYZU	8000
3	NORMAL_SPEED	1	XYZU	0
4	SET_V	1	XYZ	200
5	SET_A	1	XYZ	1000
6	SET_SV	1	XYZ	20
7	SET_AD	1	XYZ	0
8	SET_LP	1	XYZU	0
9	FIXED_MOVE	1	Z	100
10	MP_STOP_WAIT	1	Z	
11	MP_TIMER	1	2000	
12	FIXED_MOVE	1	XY	100
13	MP_STOP_WAIT	1	XY	

Figure 12: Single command execution

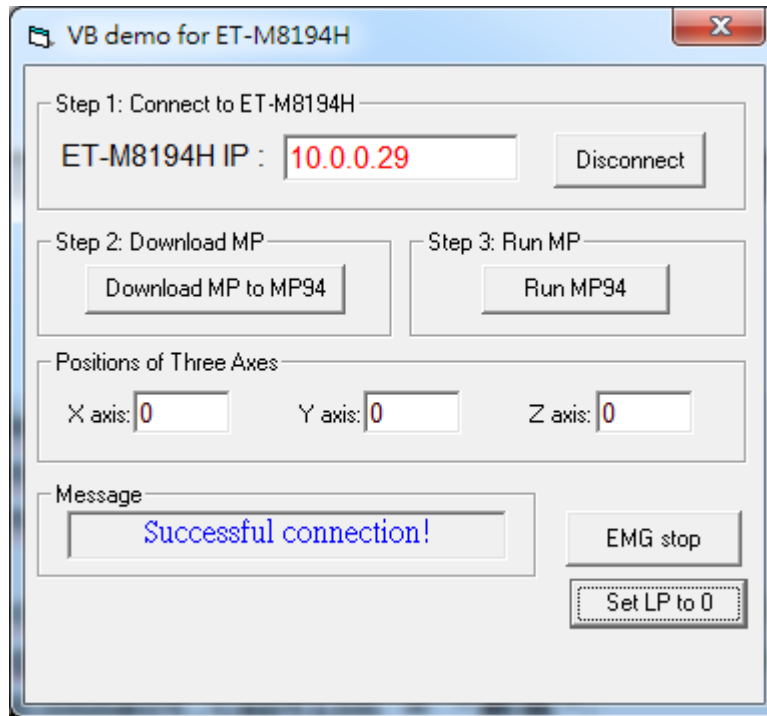
## 11 Macro Programs Example (Visual Basic 6.0)

When using PC as the host controller, user can develop their applications by writing c++, .Net, or Visual Basic 6.0 programs. ICPDAS provides Visual Studio c++, Borland Compiler c++, .NET and Visual Basic 6.0 libraries for the ET-M8194H remote device. The following section describes how to use VB in developing an application.

Copy ET\_M8194H\_API.dll and ET\_M8194H\_Lib.bas from the installation folder (C:\ICPDAS\ET-M8194H\API\_Lib\_Demo\Lib\VB) to VB project folder. In the project, add a new module ET\_M8194H\_Lib.bas to enable the use of ET-M8194H API functions.



In the installation folder (C:\ICPDAS\ET-M8194H\API\_Lib\_Demo\Demo\VB6\Demo2\TC), open project file (VB\_MP.vbp). This project shows a dialog as below:



In the following only code lines for Step 1 ("Connect to the ET-M8194H") and Step 2 ("Download macro program to MP94") are shown. For the remaining parts of program, refer to the VB\_MP.Vbp.

### Step1: Connect to the ET-M8194H

```
Option Explicit
Public handle As Long           'Declare handle variable

Private Sub cmdConnect_Click()  'step 1: connect to ET-M8194H

    If cmdConnect.Caption = "Connect" Then
        lbl_Msg.Caption = "Connecting..."
        DoEvents
        cmdConnect.Enabled = False

        handle = ETM_CONNECT(txtIP.Text, 1000) 'connect to ET-M8194H and record
handle
        If handle > 0 Then           'Successful connection to ET-M8194H if handle >
0.
            cmdConnect.Caption = "Disconnect"
            cmdConnect.BackColor = vbRed
            lbl_Msg.Caption = "Successful connection!"
            cmdDownloadMP.Enabled = True
            cmdRun.Enabled = True
            cmd_EStop.Enabled = True
            ETM_CLEAR_STOP handle, 1, AXIS_XYZU
            cmd_EStop.Caption = "EMG stop"
        Else 'Connection failed
            lbl_Msg.Caption = "Disconnect..."
        End If

        cmdConnect.Enabled = True
        txt_X_axis = "": txt_Y_axis = "": txt_Z_axis = ""
    Else
        ETM_DisConnect handle 'Disconnect ET-M8194H
        cmdDownloadMP.Enabled = False
    End If
End Sub
```

```

cmdRun.Enabled = False
cmd_EStop.Enabled = False
cmdConnect.Caption = "Connect"
cmdConnect.BackColor = &H8000000F
lbl_Msg.Caption = "Disconnect..."
End If

End Sub

```

## Step2: Download macro program to MP94

```

Private Sub cmdDownloadMP_Click() 'Step 2: download macro program

    lbl_Msg.Caption = "Downloading MP..."
    DoEvents
    'Download Macro Program to MP94
    ETM_MP_CREATE handle, 1, MP94 'MP94 - Create is the start of MP downloading
    ETM_MACRO_SET_MAX_V handle, 1, AXIS_XYZU, 8000 'set max velocity to be 8000 pps
    ETM_MACRO_NORMAL_SPEED handle, 1, AXIS_XYZU, 0 'set speed profile,
                                                '0 =>symmetric T curve
    ETM_MACRO_SET_V handle, 1, AXIS_XYZ, 200 'set velocity to be 200 pps
    ETM_MACRO_SET_A handle, 1, AXIS_XYZ, 1000 'set acc to be 1000 pps/sec
    ETM_MACRO_SET_SV handle, 1, AXIS_XYZ, 20 'set start velocity to be 20 pps
    ETM_MACRO_SET_AO handle, 1, AXIS_XYZ, 0 'set AO to be 0
    ETM_MACRO_SET_LP handle, 1, AXIS_XYZU, 0 'set logical position to be 0
    ETM_MACRO_FIXED_MOVE handle, 1, AXIS_Z, 100 'move Z axis 100 pulses
    ETM_MACRO_STOP_WAIT handle, 1, AXIS_Z 'wait until Z axis stops
    ETM_MACRO_TIMER handle, 1, 2000 'delay 2000 ms
    ETM_MACRO_FIXED_MOVE handle, 1, AXIS_XY, 100 'move X,Y axes 100 pulses
    ETM_MACRO_STOP_WAIT handle, 1, AXIS_XY 'wait until X,Y axes stop
    ETM_MACRO_FIXED_MOVE handle, 1, AXIS_Z, -100 'move Z axis -100 pulses
    ETM_MACRO_STOP_WAIT handle, 1, AXIS_Z 'wait until Z axis stops
    ETM_MACRO_FIXED_MOVE handle, 1, AXIS_Y, 800 'move Y axis 800 pulses
    ETM_MACRO_STOP_WAIT handle, 1, AXIS_Y 'wait until Y axis stops
    ETM_MACRO_FIXED_MOVE handle, 1, AXIS_X, 800 'move X axis 800 pulses
    ETM_MACRO_STOP_WAIT handle, 1, AXIS_X 'wait until X axis stops
    ETM_MACRO_FIXED_MOVE handle, 1, AXIS_Y, -800 'move Y axis -800 pulses
    ETM_MACRO_STOP_WAIT handle, 1, AXIS_Y 'wait until Y axis stops
    ETM_MACRO_FIXED_MOVE handle, 1, AXIS_X, -800 'move X axis -800 pulses
    ETM_MACRO_STOP_WAIT handle, 1, AXIS_X 'wait until X axis stops

    ETM_MACRO_MP_CLOSE handle, 1 'end of MP94

    lbl_Msg.Caption = "Complete download!"

End Sub

```

Before clicking the **Run MP94** button open the Graph function of EzMove in order to view the motion path of the executing MP94 macro program.