
STF EtherCAT Connection Guide

With Trio MC4N

Introduction

This document shows how to use Trio EtherCAT host software Motion Perfect to connect and control a Applied Motion Products' STFxx-EC EtherCAT step-servo drive. By following the steps below, you will be able to use Motion Perfect to control the motor via STFxx-EC EtherCAT drive. For more advanced motion control functions, please contact Trio.

Applies to

Trio MC4N-ECAT EtherCAT master controller
STFxx-EC step servo drives and compatible motors

Date

June, 2018

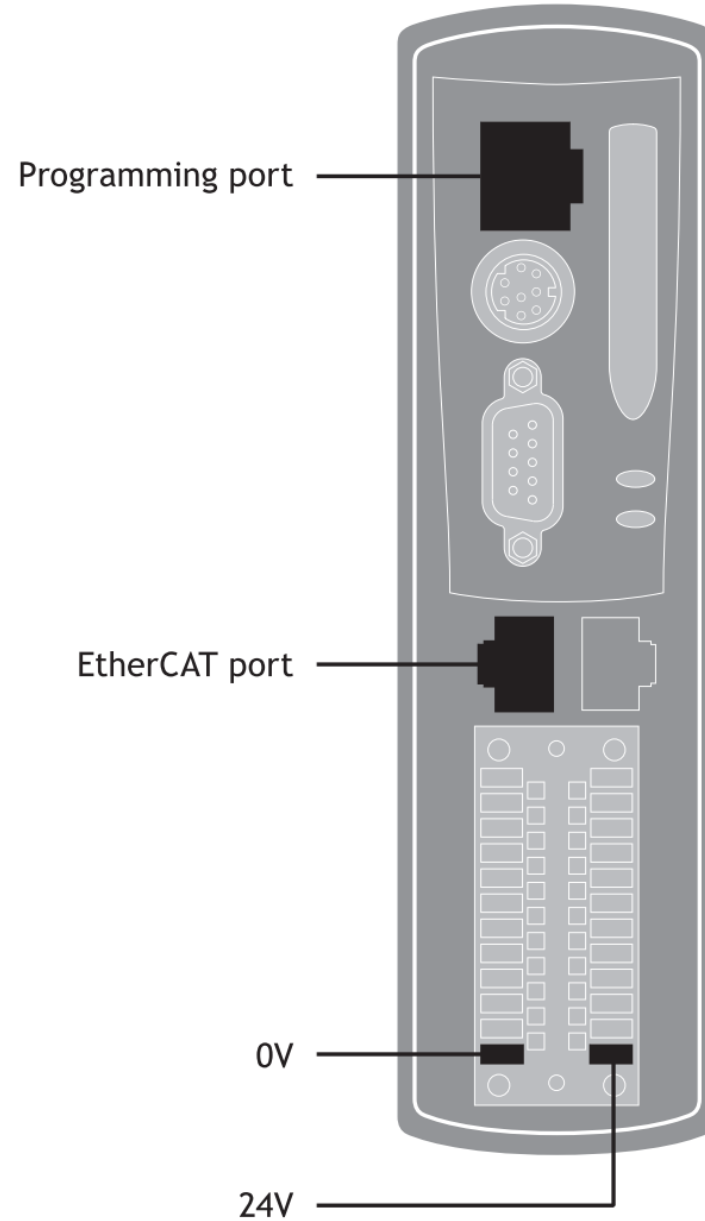
Connection Guide

Step 1 Download EC_EXTEND.TXT configuration file for STFxx-EC drive from Applied Motion Products' website

Step 2 Install Trio Motion Perfect software

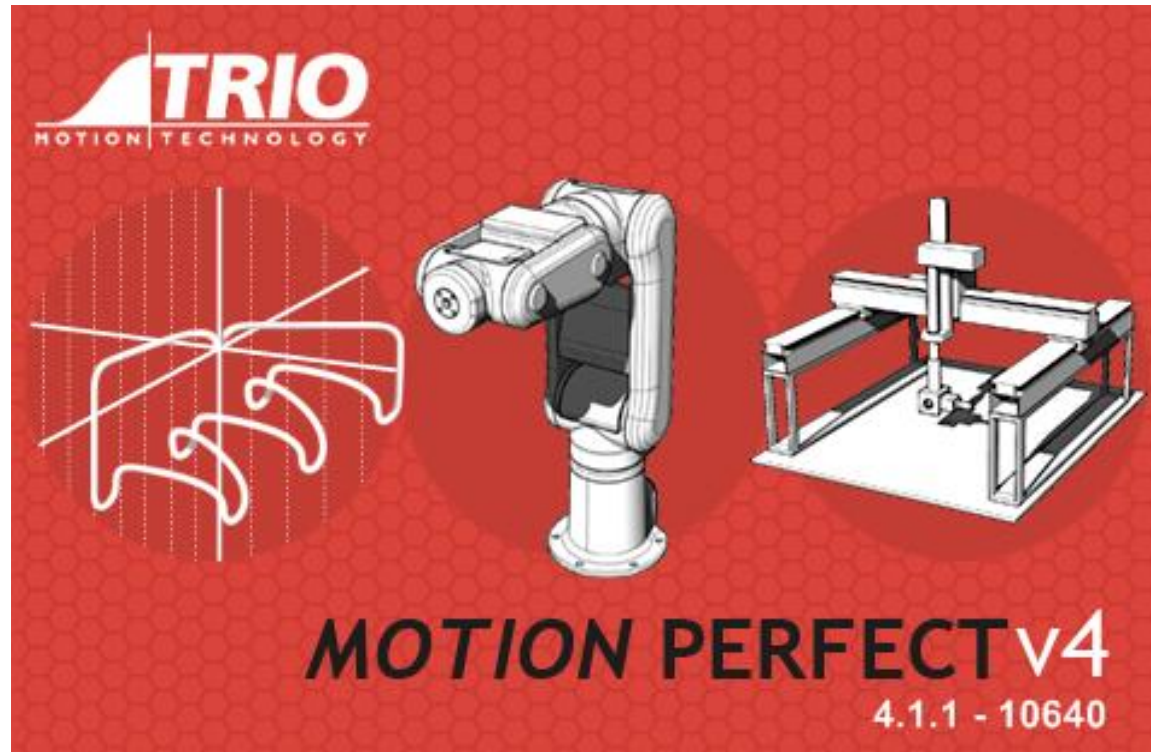
Step 3 Connect the Ethernet cable from PC to the Trio controller MC4N's programming port

Step 4 Connect the Ethernet cable from MC4N's EtherCAT port to the drive's "EtherCAT LINK IN" RJ45 port



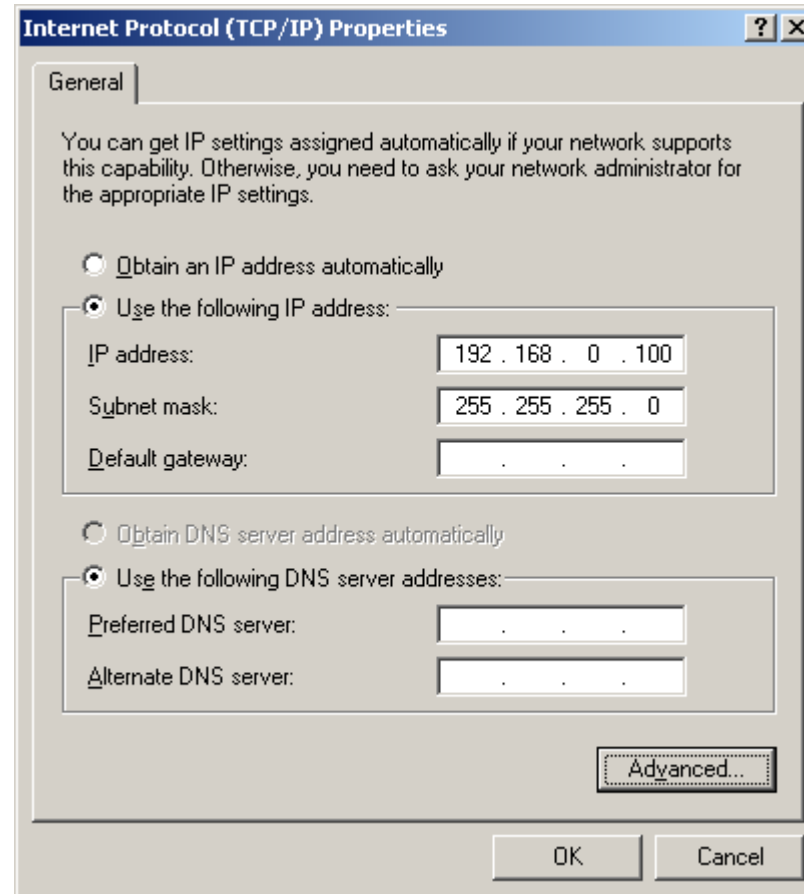
Step 5 Apply power for drive and MC4N

Step 6 Set the IP address for your PC and run Motion Perfect software



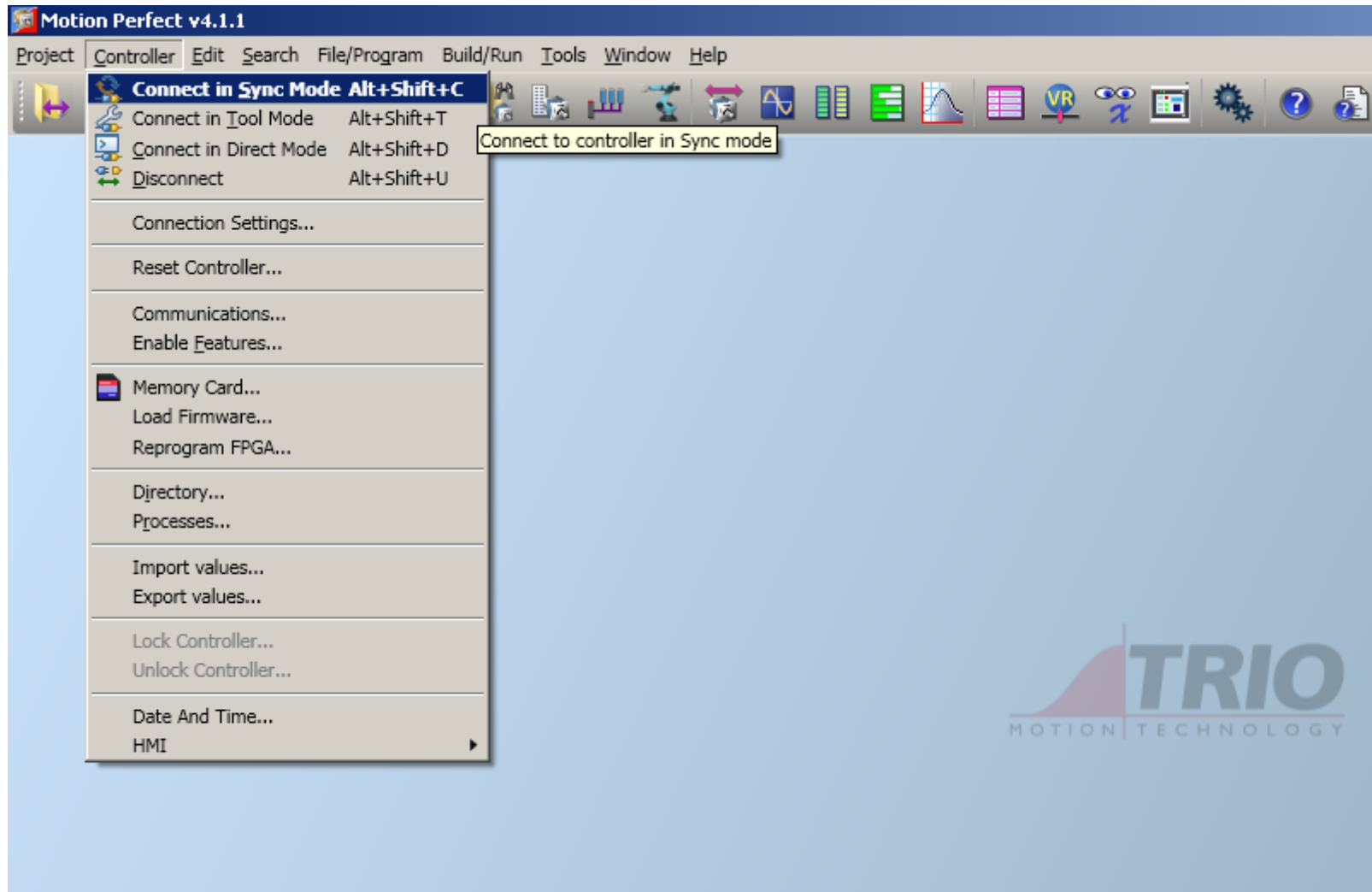
- **IP Setting**

The IP address of MC4N is usually 192.168.0.X, and the subnet mask is 255.255.255.0. You need to set the PC's IP address in the same subnet of Trio MC4N. For example, set PC's IP address to 192.168.0.100 and subnet mask to 255.255.255.0



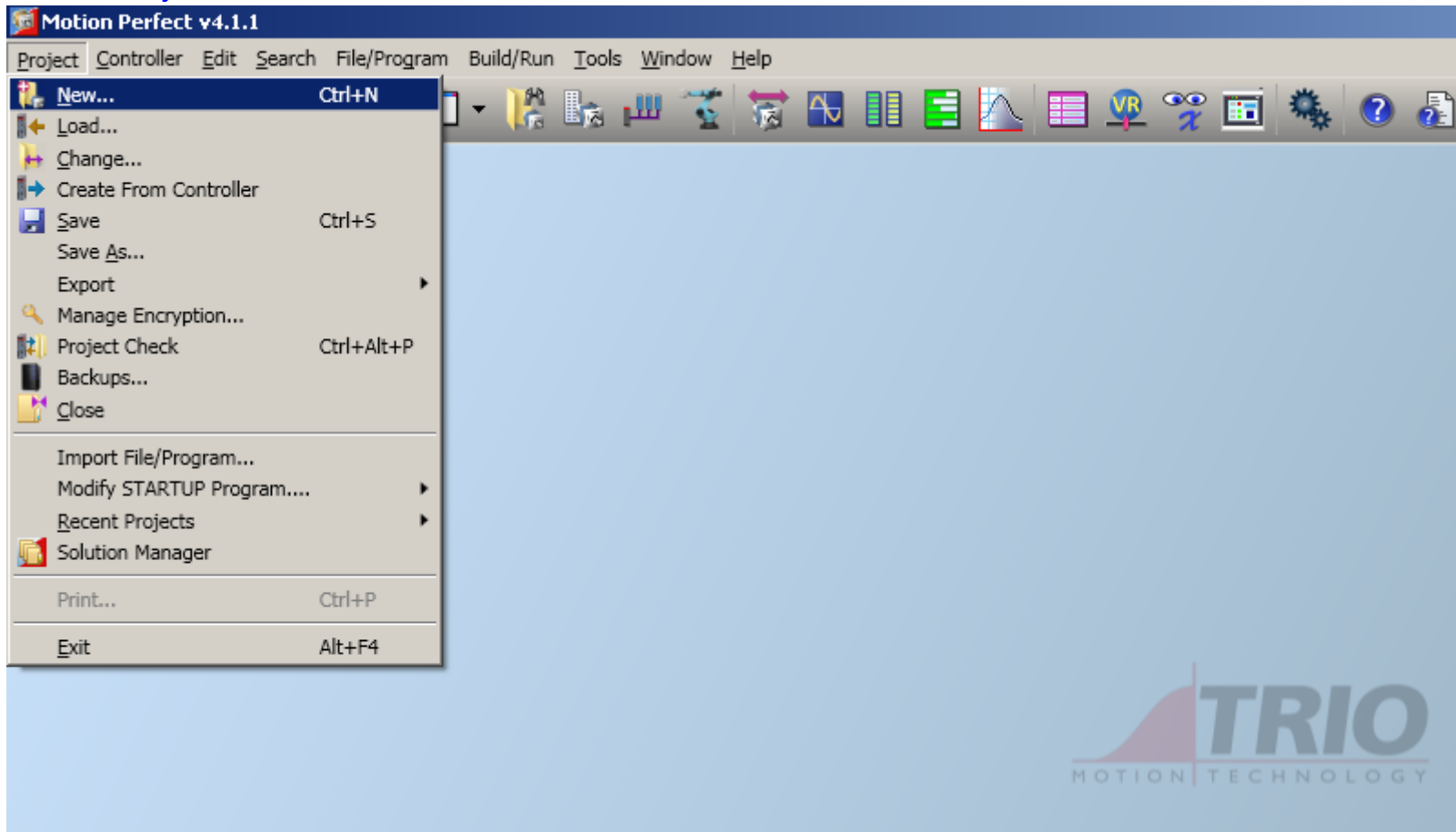
- **Connect to controller in Sync mode**

Click on **Connect in Sync Mode** under **Controller**



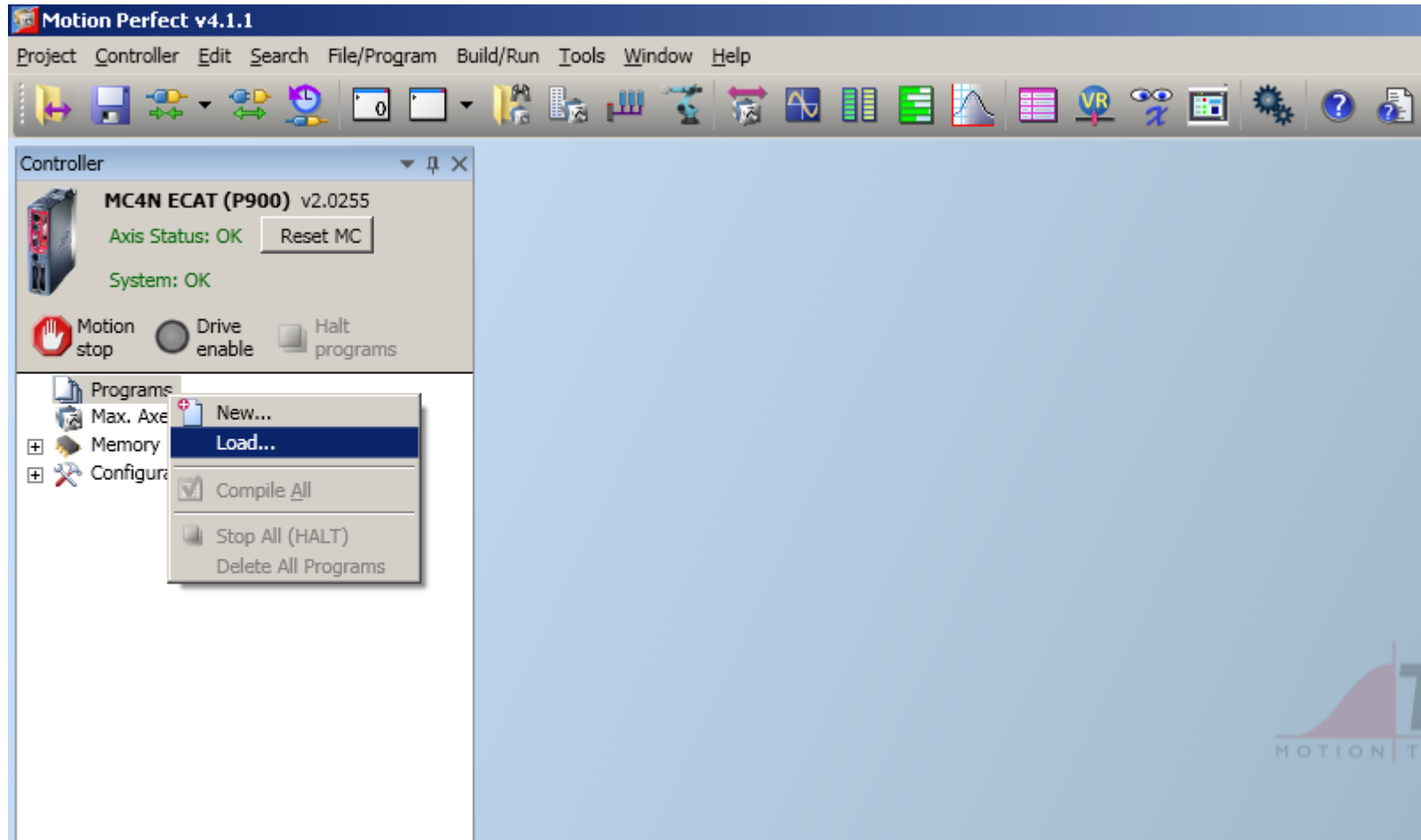
- **Build up a new project file**

Click on **New** under **Project**

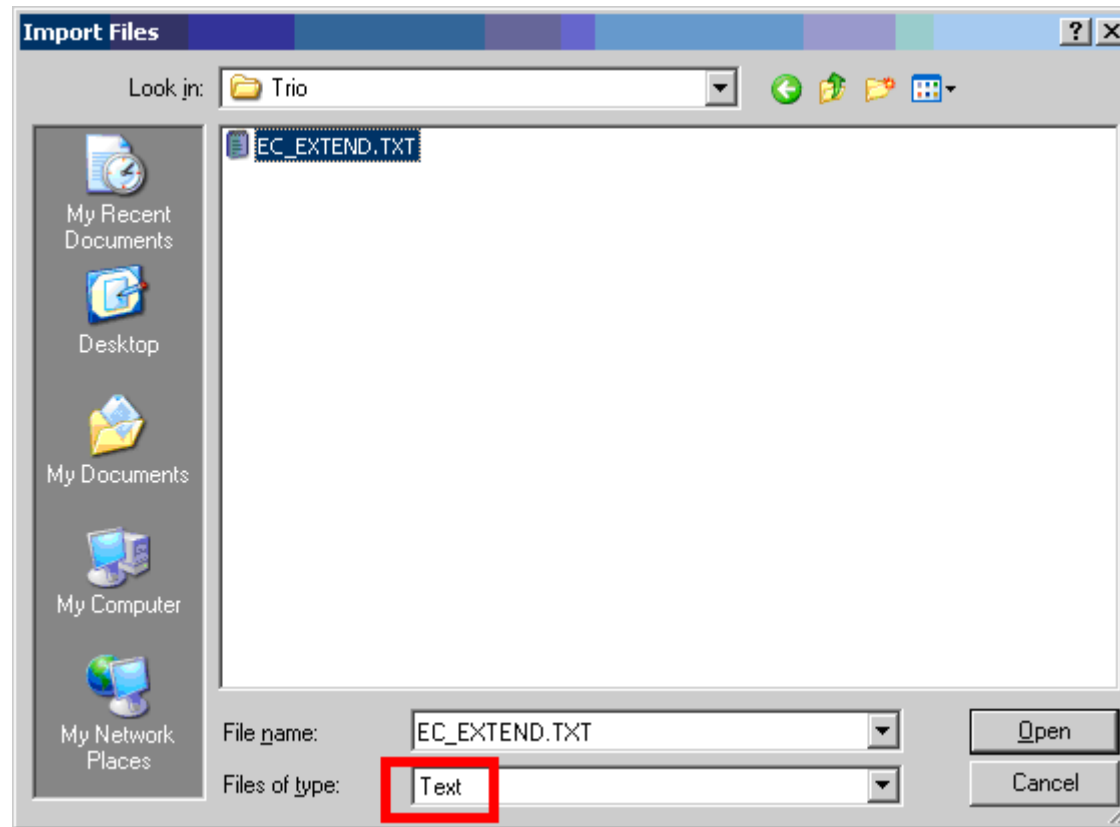


- Load the “EC_EXTEND.TXT” file

Right click on **Programs** and select **Load**

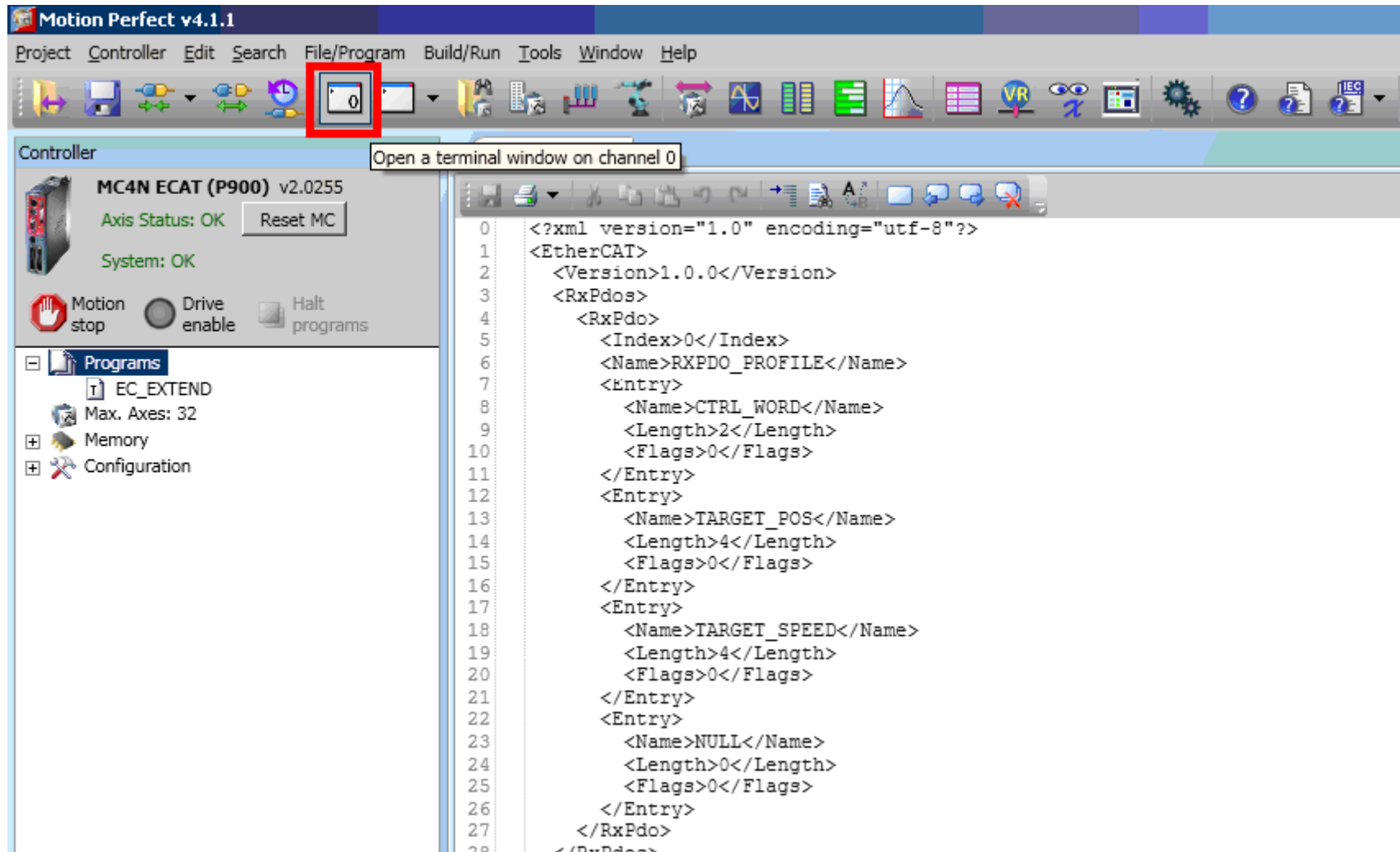


Select the **EC_EXTEND.TXT** file and load it as a text file.



- **Open a terminal window**

Click on **Open a terminal window on channel 0** in the tool bar.



Motion Perfect v4.1.1

Project Controller Edit Search File/Program Build/Run Tools Window Help

Controller **MC4N ECAT (P900) v2.0255**
 Axis Status: OK
 System: OK

Motion stop Drive enable

Programs
 EC_EXTEND
 Max. Axes: 32
 Memory
 Configuration

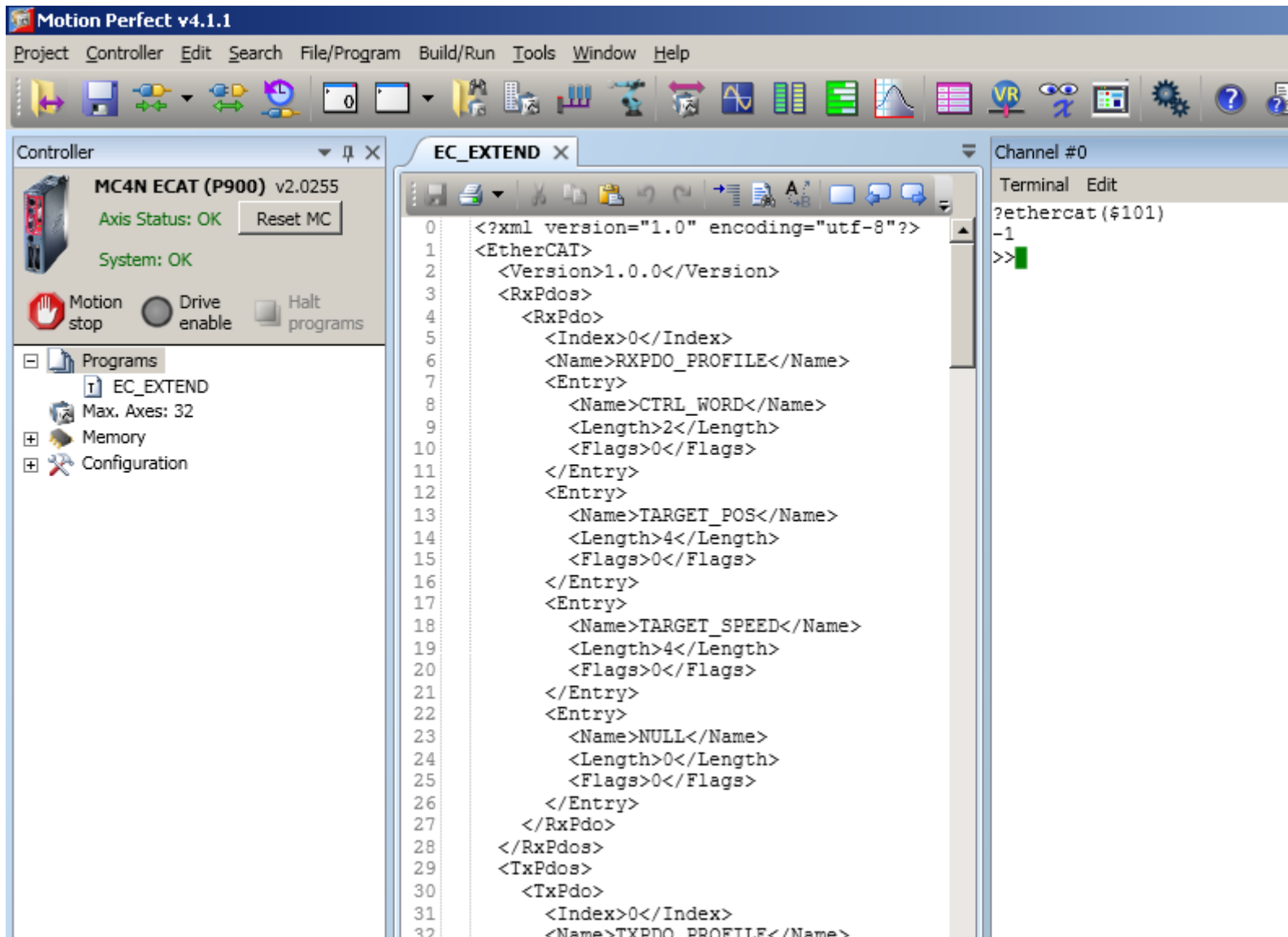
EC_EXTEND

```

0  <?xml version="1.0" encoding="utf-8"?>
1  <EtherCAT>
2    <Version>1.0.0</Version>
3    <RxPdos>
4      <RxPdo>
5        <Index>0</Index>
6        <Name>RXPDO_PROFILE</Name>
7        <Entry>
8          <Name>CTRL_WORD</Name>
9          <Length>2</Length>
10         <Flags>0</Flags>
11        </Entry>
12        <Entry>
13          <Name>TARGET_POS</Name>
14          <Length>4</Length>
15          <Flags>0</Flags>
16        </Entry>
17        <Entry>
18          <Name>TARGET_SPEED</Name>
19          <Length>4</Length>
20          <Flags>0</Flags>
21        </Entry>
22        <Entry>
23          <Name>NULL</Name>
24          <Length>0</Length>
25          <Flags>0</Flags>
26        </Entry>
27      </RxPdo>
28    </RxPdos>
29    <TxPdos>
30      <TxPdo>
31        <Index>0</Index>
32        <Name>TXPDO_PROFILE</Name>
33        <Entry>
  
```

Channel #0
Terminal Edit

Type in **?ethercat(\$101)** in the terminal window. If **EC_EXTEND.TXT** file is correct it will respond **-1**



The screenshot shows the Motion Perfect v4.1.1 software interface. The main window displays the XML content of the EC_EXTEND.TXT file. The XML is as follows:

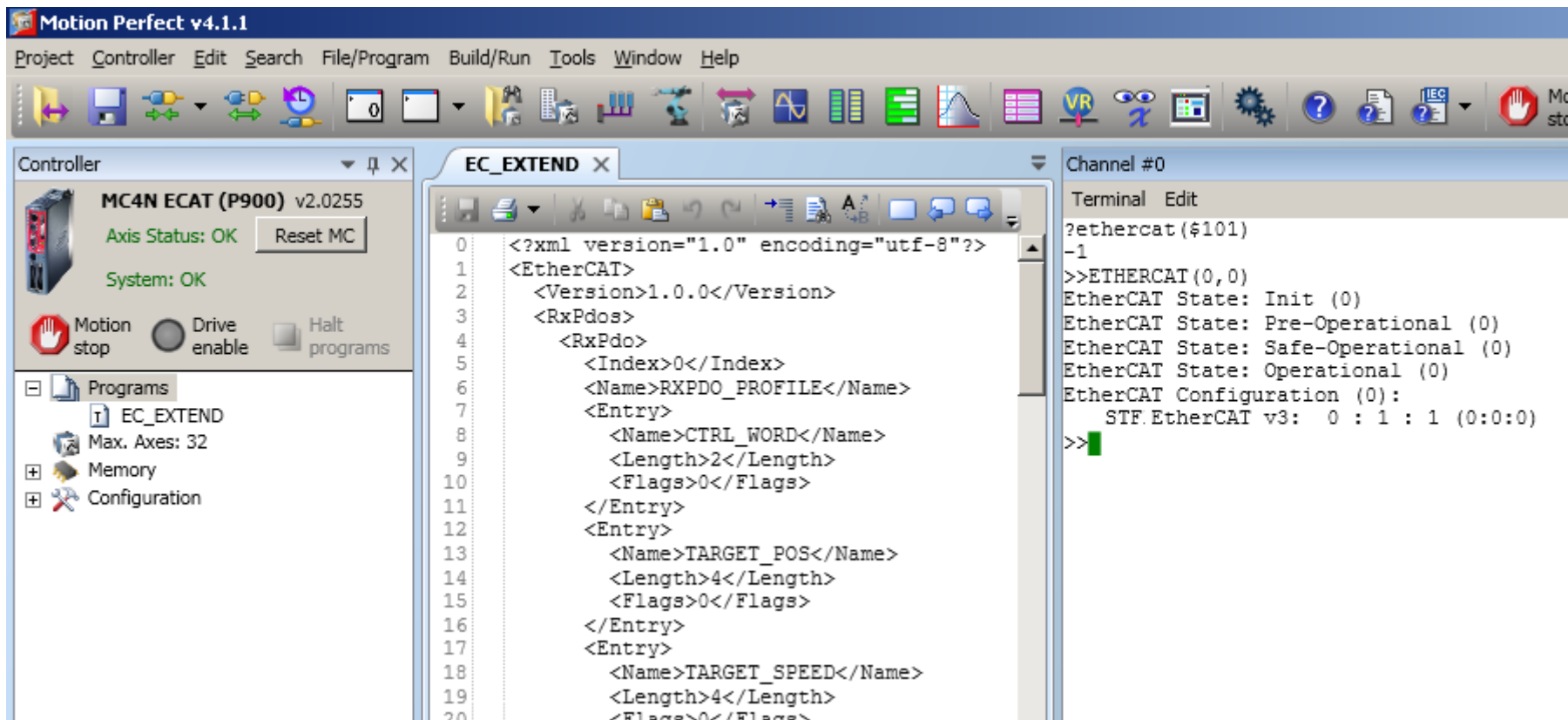
```

0  <?xml version="1.0" encoding="utf-8"?>
1  <EtherCAT>
2    <Version>1.0.0</Version>
3    <RxPdos>
4      <RxPdo>
5        <Index>0</Index>
6        <Name>RXPDO_PROFILE</Name>
7        <Entry>
8          <Name>CTRL_WORD</Name>
9          <Length>2</Length>
10         <Flags>0</Flags>
11        </Entry>
12        <Entry>
13          <Name>TARGET_POS</Name>
14          <Length>4</Length>
15          <Flags>0</Flags>
16        </Entry>
17        <Entry>
18          <Name>TARGET_SPEED</Name>
19          <Length>4</Length>
20          <Flags>0</Flags>
21        </Entry>
22        <Entry>
23          <Name>NULL</Name>
24          <Length>0</Length>
25          <Flags>0</Flags>
26        </Entry>
27      </RxPdo>
28    </RxPdos>
29    <TxPdos>
30      <TxPdo>
31        <Index>0</Index>
32        <Name>TXPDO_PROFILE</Name>

```

The terminal window on the right shows the command **?ethercat(\$101)** being entered, and the response **-1** is displayed, indicating that the file is correct.

Type in **ethercat(0,0)** in the terminal window, and then the drive will go to operational status.



The screenshot displays the Motion Perfect v4.1.1 software interface. On the left, the 'Controller' panel shows 'MC4N ECAT (P900) v2.0255' with 'Axis Status: OK' and 'System: OK'. Below this are buttons for 'Motion stop', 'Drive enable', and 'Halt programs'. The 'Programs' list includes 'EC_EXTEND', 'Max. Axes: 32', 'Memory', and 'Configuration'. The main window shows the XML configuration for 'EC_EXTEND' with the following content:

```

0  <?xml version="1.0" encoding="utf-8"?>
1  <EtherCAT>
2    <Version>1.0.0</Version>
3    <RxPdos>
4      <RxPdo>
5        <Index>0</Index>
6        <Name>RXPDO_PROFILE</Name>
7        <Entry>
8          <Name>CTRL_WORD</Name>
9          <Length>2</Length>
10         <Flags>0</Flags>
11        </Entry>
12        <Entry>
13          <Name>TARGET_POS</Name>
14          <Length>4</Length>
15          <Flags>0</Flags>
16        </Entry>
17        <Entry>
18          <Name>TARGET_SPEED</Name>
19          <Length>4</Length>
20        </Entry>

```

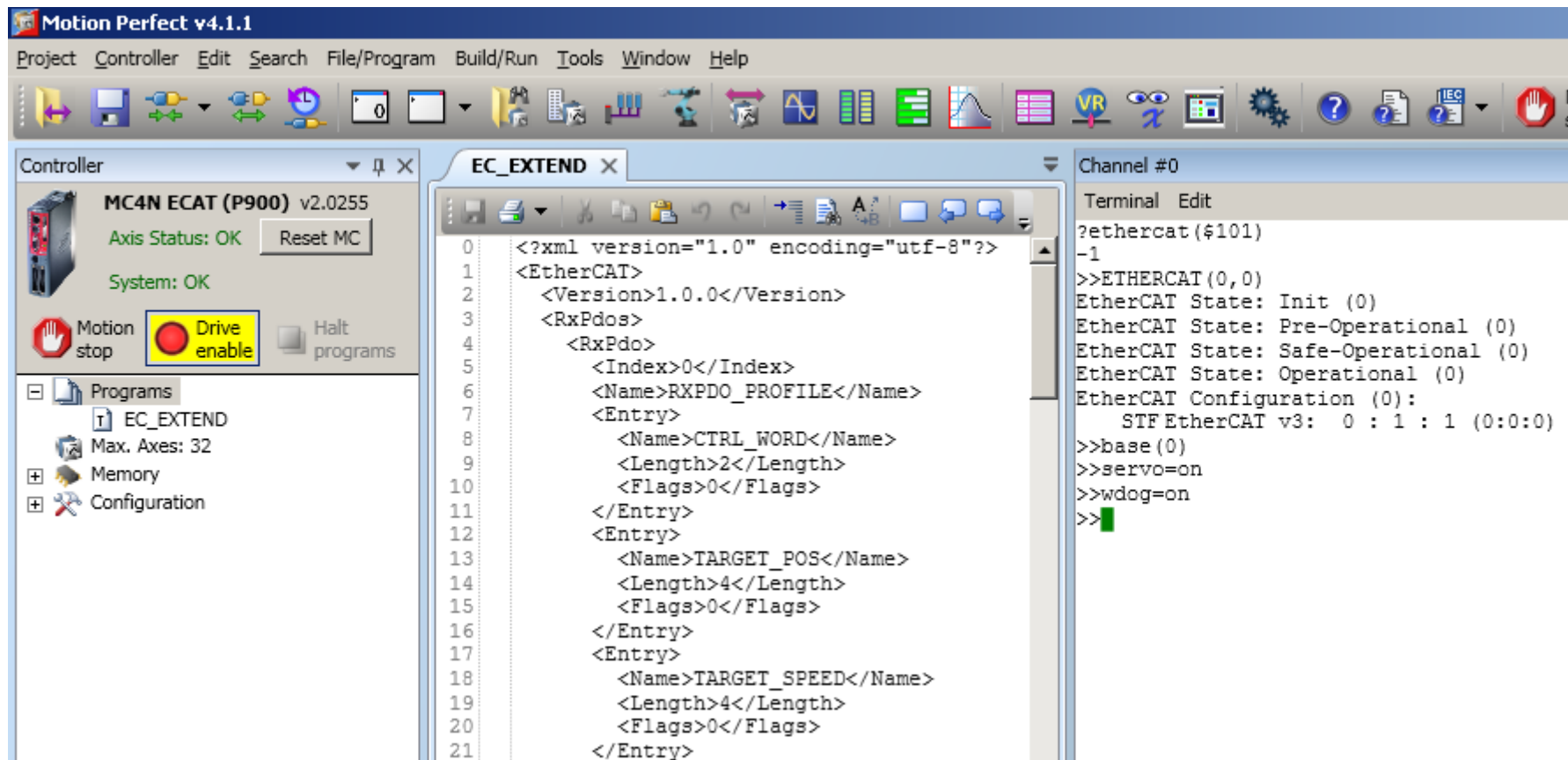
On the right, the 'Terminal Edit' window shows the following output:

```

?ethercat($101)
-1
>>ETHERCAT (0,0)
EtherCAT State: Init (0)
EtherCAT State: Pre-Operational (0)
EtherCAT State: Safe-Operational (0)
EtherCAT State: Operational (0)
EtherCAT Configuration (0):
  STF.EtherCAT v3: 0 : 1 : 1 (0:0:0)
>>

```

Type in **base(0)**, **servo=on** and **wdog=on** in the terminal window, and then the drive will be enabled.



The screenshot displays the Motion Perfect v4.1.1 software interface. On the left, the 'Controller' panel shows 'MC4N ECAT (P900) v2.0255' with 'Axis Status: OK' and 'System: OK'. A 'Drive enable' button is highlighted in yellow. The central 'EC_EXTEND' window shows an XML configuration for EtherCAT, including version, RxPdos, and target parameters. The right 'Terminal Edit' window shows the execution of commands: '?ethercat(\$101)', '>>base(0)', '>>servo=on', and '>>wdog=on', with the drive state transitioning through 'Init (0)', 'Pre-Operational (0)', 'Safe-Operational (0)', and 'Operational (0)'.

```

0  <?xml version="1.0" encoding="utf-8"?>
1  <EtherCAT>
2    <Version>1.0.0</Version>
3    <RxPdos>
4      <RxPdo>
5        <Index>0</Index>
6        <Name>RXPDO_PROFILE</Name>
7        <Entry>
8          <Name>CTRL_WORD</Name>
9          <Length>2</Length>
10         <Flags>0</Flags>
11        </Entry>
12       <Entry>
13         <Name>TARGET_POS</Name>
14         <Length>4</Length>
15         <Flags>0</Flags>
16       </Entry>
17       <Entry>
18         <Name>TARGET_SPEED</Name>
19         <Length>4</Length>
20         <Flags>0</Flags>
21       </Entry>

```

```

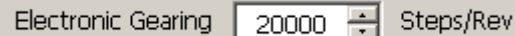
?ethercat($101)
-1
>>ETHERCAT (0,0)
EtherCAT State: Init (0)
EtherCAT State: Pre-Operational (0)
EtherCAT State: Safe-Operational (0)
EtherCAT State: Operational (0)
EtherCAT Configuration (0):
  STF EtherCAT v3: 0 : 1 : 1 (0:0:0)
>>base(0)
>>servo=on
>>wdog=on
>>

```

● Sample move

Type in commands in the terminal window like:

UNITS=20000 // set units to the same value as drive's Electronic Gearing setting in the STF Configurator software

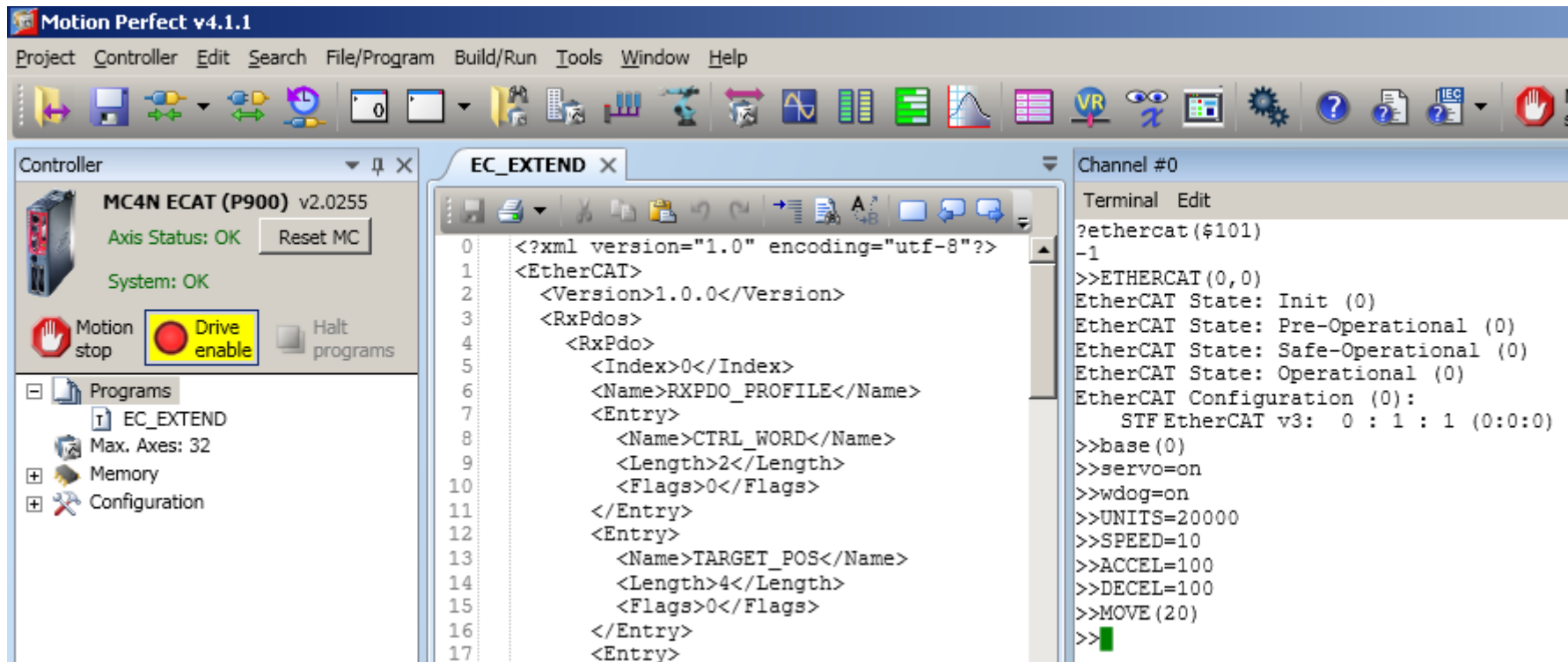


SPEED=10 // set motor speed to 10 rev/sec

ACCEL=100 // set motor acceleration to 100 rev/sec²

DECEL=100 // set motor deceleration to 100 rev/sec²

MOVE(20) // move the motor for 20 revs



Motion Perfect v4.1.1

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 Motion stop Drive enable Halt programs

Programs: EC_EXTEND
 Max. Axes: 32
 Memory
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```

0 <?xml version="1.0" encoding="utf-8"?>
1 <EtherCAT>
2 <Version>1.0.0</Version>
3 <RxPdos>
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5 <Index>0</Index>
6 <Name>RXPDO_PROFILE</Name>
7 <Entry>
8 <Name>CTRL_WORD</Name>
9 <Length>2</Length>
10 <Flags>0</Flags>
11 </Entry>
12 <Entry>
13 <Name>TARGET_POS</Name>
14 <Length>4</Length>
15 <Flags>0</Flags>
16 </Entry>
17 </Entry>
  
```

Channel #0
 Terminal Edit
 ?ethercat(\$101)
 -1
 >>ETHERCAT(0,0)
 EtherCAT State: Init (0)
 EtherCAT State: Pre-Operational (0)
 EtherCAT State: Safe-Operational (0)
 EtherCAT State: Operational (0)
 EtherCAT Configuration (0):
 STF EtherCAT v3: 0 : 1 : 1 (0:0:0)
 >>base(0)
 >>servo=on
 >>wdog=on
 >>UNITS=20000
 >>SPEED=10
 >>ACCEL=100
 >>DECEL=100
 >>MOVE(20)
 >>