# ASCII with TMC modules

## How to use the ASCII mode of Trinamic´s modules

## Introduction

As an alternative to the standard binary mode of Trinamic´s motion modules there is also an ASCII interface which allows to send commands as text strings. All commands usable by the "direct mode" of the TMCL-IDE are supported in similar notation. Keep in mind, although the notation is in ASCII format, the TMCL-IDE sends data in binary mode only.
For first use of the ASCII mode it is recommended to use the volatile ASCII mode. Otherwise, in case the communication can not be established, a change to binary mode and TMCL-IDE is possible only via hardware reset.

## Volatile ASCII mode with GP139

Open the TMCL-IDE. By sending the binary command 139 (enter ASCII mode) with the IDE the ASCII command line interface is entered. To send ASCII commands close the TMCL-IDE to disconnect from the COM-port and open e.g. a terminal program like HyperTerminal witch comes with Windows.

**The standard COM-port settings are:**

| | |
|---|---|
| Bits per Second | 9600 |
| Data bits | 8 |
| Parity | None |
| Stop bits | 1 |
| Flow control | none |

**Switch back to binary mode:**
To leave the ASCII mode and reenter the binary mode enter the command "BIN". The module starts automatically in binary mode after power down if e.g. no ASCII communication could be established.

## Command line Format

As the first character, the address character has to be sent. The address character is "A" when the module address is 1, "B" for modules with address 2 and so on. Then, send the command with its parameters. At the end of a command line a <CR> character has to be sent. Here are some examples for valid command lines:

```
AMVP ABS, 1, 50000      // motor 1
A ROL 0, 500            // motor 0
A MST 0                 // motor 0
ABIN
```

These command would all address the module with address 1. To address e.g. module 3, use address character "C" instead of "A". Please be careful with the motor number (use always 0 for 1-axis modules since TMCL counts from 0). The last command line shown above will make the module return to binary mode.

## Reply Format

After executing the command the module sends back a reply in ASCII format. This reply consists of:

- the address character of the host (host address that can be set in the module)
- the address character of the module
- the status code as a decimal number
- the return value of the command as a decimal number
- a <CR> character

**Example:**
After sending `AGAP 0, 1` the reply would be BA 100 -5000 if the actual position of axis 1 is -5000, the host address is set to 2 and the module address is 1. The value "100" is the status code 100 that means "command successfully executed".

## ASCII commands

All commands usable in direct mode of the TMCL-IDE function in ASCII mode. These are:

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| ROL | ROR | MST | MVP | SAP | GAP | STAP | RSAP | SGP |
| GGP | STGP | RSGP | RFS | SIO | GIO | SAC | SCO | GCO |
| CCO | UF0 | UF1 | UF2 | UF3 | UF4 | UF5 | UF6 | UF7 |

There are also special commands that are only available in ASCII mode:

- BIN: This command quits ASCII mode and returns to binary TMCL mode.
- RUN: This command can be used to start a TMCL program in memory.
- STOP: Stops a running TMCL application.

Please refer to the TMCL reference and programming manual at TechLibCD or www.trinamic.com

## Mode switch: Binary <-> ASCII with GP67

The module can be configured so that it starts up either in binary mode or in ASCII mode. Global parameter 67 is used for this purpose. Bit 0 determines the startup mode: if this bit is set, the module starts up in ASCII mode, else it will start up in binary mode (default). Bit 4 and Bit 5 determine how the characters that are entered are echoed back. Normally, both bits are set to zero. In this case every character that is entered is echoed back when the module is addressed. Character can also be erased using the backspace character (press the backspace key in a terminal program).

When bit 4 is set and bit 5 is clear the characters that are entered are not echoed back immediately but the entire line will be echoed back after the <CR> character has been sent. When bit 5 is set and bit 4 is clear there will be no echo, only the reply will be sent. This may be useful in RS485 systems.

| Bit | | | | Description |
|---|---|---|---|---|
| 5 | 4 | ... | 0 | |
| x | x | x | 0 | Module starts up in binary mode |
| x | x | x | 1 | Module starts up in ASCII mode |
| 0 | 0 | x | x | Echo back each character |
| 0 | 1 | x | x | Echo back complete command |
| 1 | 0 | x | x | No echo, only command reply |

**Examples:**

| Binary | | | | | | Decimal | Description |
|---|---|---|---|---|---|---|---|
| 5 | 4 | 3 | 2 | 1 | 0 | | |
| 0 | 1 | 0 | 0 | 0 | 0 | 16 | Binary mode at startup, echo of entire line after <CR> has been sent. |
| 0 | 1 | 0 | 0 | 0 | 1 | 17 | ASCII mode at startup, echo of entire line after <CR> has been sent. |
| 1 | 0 | 0 | 0 | 0 | 1 | 33 | ASCII mode at startup, no echo, only the reply will be sent. |

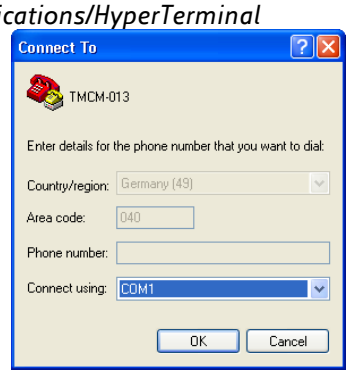
If the module does not respond after the mode switch to the ASCII interface do a hardware reset. Please refer to your modules manual or the application note "Resetting a module to factory defaults" in TMCL-IDE folder.

## HyperTerminal:

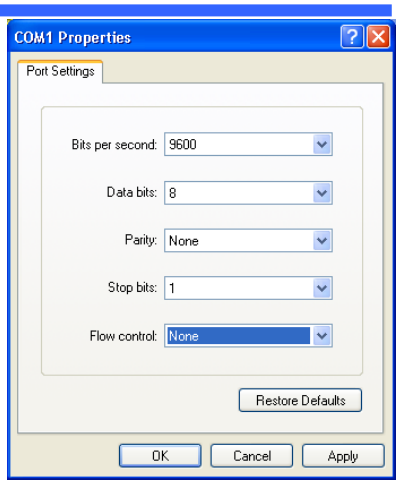
**1.** Make sure the COM port you intend to use is not blocked by an other program.

**2.** Open HyperTerminal. Typical path (Windows XP):
*Start/Programs/Accessories/Communications/HyperTerminal*

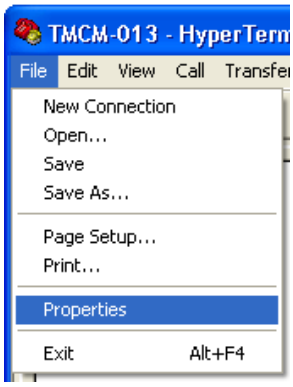

**3.** New connection, choose new name and icon. Click OK.



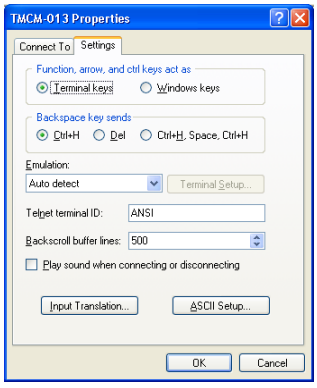

**4.** Choose connection (RS232 is normally COM1). Click OK.



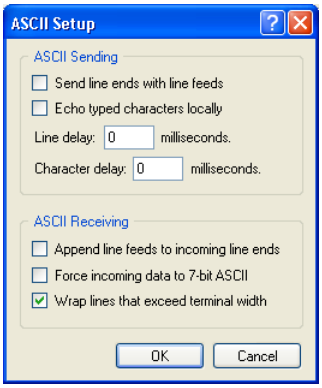

**5.** Make the settings shown above. Click OK



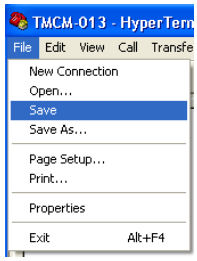

**6.** Choose Properties in HyperTerminal.




**7.** Click ASCII setup button on the Settings tab.




**8.** Make settings shown above. Click OK and click OK again.




**9.** Click File/Save to store this connection. You are ready to send commands now.

To connect or disconnect use this buttons