## Using STEP 7-Micro/WIN32 USS Protocol Instructions with MicroMaster Version 4 Drives.

The information below explains the use of the STEP 7-Micro/WIN32 USS protocol instructions and S7-200 PLC's when they are connected to newer generations (version 4 and greater) of the Micro Master drives. STEP 7-Micro/WIN32 USS protocol instructions were implemented and tested with 3rd generation drives (MM3). Inconsistencies arise with the release of the 4th generation (MM4) drives. This document explains how to successfully use the S7-200 PLC's with the newer generation drives communicating with USS protocol.

Cable and Electrical Connections.
Both the MM3 and MM4 can communicate to the S7-200 PLC using a RS-485 cable. The MM3 drives have a 485 electrical interface connector (D Connector) for communicating through a RS-485 cable.   Therefore, the MM3 connection uses a RS-485 cable with two 485 electrical interface connectors (D Connectors) at each end.
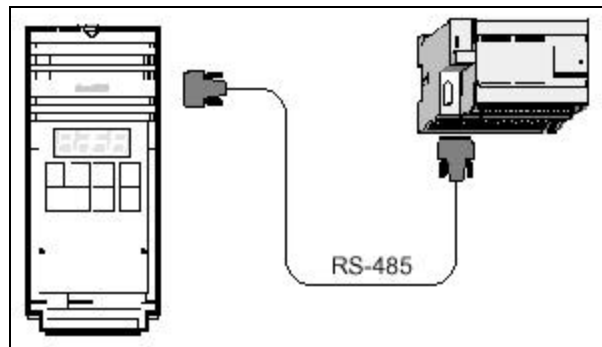
MM3 to S7-200 PLC Connection

In contrast, the MM4 drive uses two caged clamp, screwless terminals. The MM4 connection uses a RS-485 cable with a 485 electrical interface connector (D Connector) for the PLC connection. The two wires at the opposite end of the RS-485 cable must be inserted into the MM4 drive terminal blocks as explained in the following paragraph.
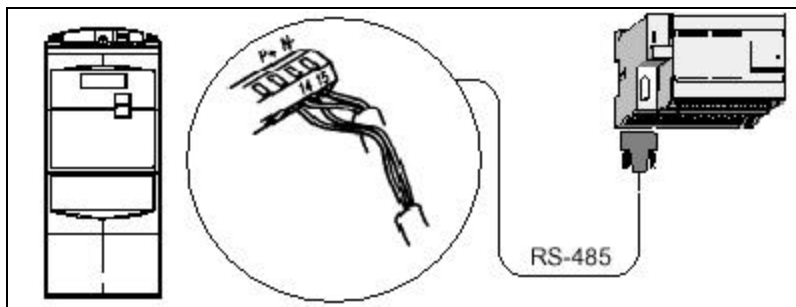

MM4 to S7-200 PLC Connection
(Example using drive model 6SE6420)

To make the cable connection on a MM4 drive, the drive cover(s) must be removed in order to access the terminal blocks. See the MM4 user manual for details about how to remove the covers(s) of your specific drive. The terminal block connections are labeled numerically. Using a Profibus DP connector on the PLC side, connect the A terminal of

the cable to the drive terminal 15. Connect the B terminal of the cable connector to drive terminal 14.

If the PLC is a terminating node in the network, or if the connection is point-to-point, it is necessary to use terminals A1 and B1 (not A2 and B2) of the connector since they allow the termination settings to be set (for example, with DP connector type 6ES7 972-0BA40-0X40). <u>Caution:</u> Make sure the drive covers are replaced properly before supplying power to the unit.

If the drive is configured as the terminating node in the network, then termination and bias resistors must be also be wired to the appropriate terminal connections. As an example, the diagram below illustrates the connections necessary for termination and bias for the MM4, model 6SE6420 drive.
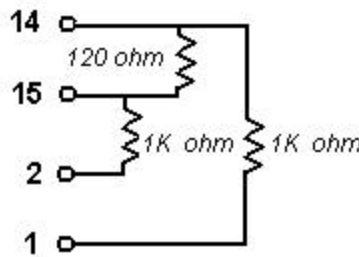
Micro/WIN32 Instruction Set.
All the STEP 7-Micro/WIN32 USS Protocol instructions, except READPM and WRITEPM, work with the 4th generation drives (such as MM4). READPM and WRITEPM are not functional with the 4th generation drives. See control word FAQ for further details (Please refer to last section of this document for web site address that links to *MicroMaster 420 Information.*). In addition, the DIR input to the DRV_CTRL instruction has been reversed for MM4 drives. With MM3 drive use: 0 = CCW, 1 = CW. With MM4 drives use: 1 = CCW, 0 = CW. Alternatively, you can use P1820 to reverse output phase sequence and then leave DRV_CTRL as normal. All other USS Protocol instructions in STEP 7-Micro/WIN32 work normally (the same as with the 3rd generation drives).

Required Parameter Settings for MM4 Drive.
In order to connect the S7-200 PLC to a Micro Master drive, certain parameter settings must be made to the drive. Drive settings are typically configured from the drive's front panel buttons. Prior to making these settings, the drive must be set to the factory defaults. The following table shows the differences between MM3 and MM4 drive parameter settings.

MM3 Parameter	MM4 Parameter	Description
P944 = 1	P0010=30	Reset drive to factory settings (optional)
	P0970=1	Reset drive to factory settings (optional)
	P1820=1	Reverse Output Phase Sequence (Optional)
P0009 = 3	P0003 = 3	Expert Mode. Enable read/write access
P910 = 1	P0700 = 5	Enable Remote Control
	P1000 = 5	Select USS for frequency set point control
P092 = 3/4/5/6/7	P2010 Index 0 = 6	Baud rate as set in USS_INIT, i.e. 6 = 9600
P091 = 0 through 31	P2011 Index 0 = 0 to 31	Default station address of 0

	P2012 = 2	Two words for PZD (USS PZD Length)
	P2013 = 3	Three words for PKW (USS PKW Length)
P093 = 0 - 240	P2014 index 0 = 0-65535ms___	Serial Link Timeout
P094 = 0 – 400.00	P2000	Serial Link Nominal System Setpoint
P095 = 0/1	P2009 index 0	USS Compatibility (optional)
P971 = 0/1	P0971	EEPROM Storage Control

IMPORTANT NOTE: In a complete configuration set up, the motor settings must also be set in addition to the drive parameters. Motor settings are not provided in this document. Please consult your motor and drive documentation for the required motor parameter settings.

Other differences between 3rd and 4th generation drives where STEP7-Micro/WIN32 applications may be affected.

- MM3 drives have parameter numbers up to 971; MM4 drives have 3900 parameters. The USS protocol instructions in STEP 7-Micro/WIN32 will not access drive parameters greater than 971.

- Common parameters between the MM3 and the MM4 drives are located at different addresses.

- MM4 parameters can be several different data types, where the MM3 parameters used in the STEP 7- Micro/WIN32 USS Protocol can only be 'word' values.

- In the USS control word the meaning of bits 11 and 12 have changed. In order to get the motor to run right with MM4, bit 11 should be 0 (on MM3 it was 1). To run left, bit 11 should be set to 1 (it was 0 on MM3 and bit 12 was1). Another alternative for this is to use P1820.

- MM4 baud rate goes to 57.6 Kbaud, but Micro/WIN USS Instruction *only* allows up to 19.2K baud.

Please refer to the following web site addresses for more details and FAQ's about using USS Protocol with MM4 drives.

MicroMaster 420 Information:
http://www4.ad.siemens.de/csinfo/livelink.exe?func=cslib.csinfo&startNode=4000024&table=ProductNodes&lang=en&caller=nl&open0=-547-545-538-516-548-549-&aktprim=0&nodeID0=4000803&siteid=cs&jumpto=549

Standard Drives (General) Information:
http://www4.ad.siemens.de:8080/csintra/livelink.exe?func=cslib.csinfo&objId=4000799&objAction=csBrowse&lang=en&aktprim=0&nodeID0=4000781&siteid=csi

General Notes.

The SIMATIC S7-200 FAQ's are provided to give users of the S7-200 some indication as to how certain tasks can be solved with the S7-200 controller. This information does not purport to cover all details or variations in equipment, nor do they provide for every possible contingency.

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