Beijer HMI

Associated Files:
- Example.VF6 (Written with H-Designer)
- Profile Velocity Continuous -Beijer.qcp

Overview

The Human Machine Interface (HMI) creates a powerful interactive communication system between human operators and machines. This application note describes how to successfully achieve this type of interface to a QuickSilver Controller using Beijer HMI with the Modbus® protocol.

Depending on the Beijer HMI model used, there may be additional settings or options required. The basic description in this document should allow for successful operation. The following application will describe how to use the Profile Velocity Continuous command with the Beijer HT-60 HMI as the host.

For support on the Beijer HMI please contact: info.usa@beijerelectronics.com.

For support on QuickSilver controller contact:support@quicksilvercontrols.com.

It is assumed the reader is familiar with programming QuickSilver's servo controllers. If not familiar with our controllers, read Chapter 1 of the SilverLode User Manual.

Hardware and Software Setup

The Beijer HT-60 HMI has two communication ports to establish communication between the PC and the controller. The PC connects to COM port 1 of the HMI and the QuickSilver controller connects to COM port 2.

RS-232 Cable Connection

Signal Type	PC	COM 1 DB-9 Cable from HT-60
Tx	Pin 2	Pin 3
Rx	Pin 3	Pin 2
Logic Ground	Pin 5	Pin 5

RS-232 Cable Connection

Signal Type	QuickSilver SMI Port	COM 2 DB-25 cable from HT-60
Tx	Pin 2	Pin 3
Rx	Pin 12	Pin 2
Logic Ground	Pin 8	Pin 7

RS-485 Cable Connection

Signal Type	QuickSilver SMI Port	COM 2 DB-25 cable from HT-60
A	Pin 12	Pin 16
B	Pin 2	Pin 14
Logic Ground	Pin 8	Pin 7

Setting Up the QuickSilver Controller

Use the latest version of QuickControl (4.64+) available from the QCI website www.quicksilvercontrols.com - to program the QuickSilver controller. Insure the communication protocol in the initialization program matches that of the Beijer HMI communication parameters. The protocol should be the following:

- Modbus
- 57600 baud rate
- 1 stop bit
- No parity.

Downloading the initialization file will cause the QuickControl software to loose communication. To re-establish communication, change the communication setting in the setup menu to match the above and hit the scan the network button on the QuickControl program. Once the controller is initialized, download the "Profile Velocity Continuous-Beijer.qcp" program. The ACR command filters the torque value of the motor and stores the value to register 11. Register 11 is read by the Beijer HMI

Line# Oper	Label	Command
1:REM		Program uses the PVC command to update the velocity values sent from the HMI
2:EMT		Enable Multi-Tasking
3:REM		The ACR command filters the torque native value and stores the value in register
4:ACR		Analog Continuous Read: "User[11]" = Torque
5:REM		Acceleration is set to 2222222 cps/s
6:WRP		Write 2222222 cps/s to "User or Profile Move Acc[21]" Register
7:REM		Register 22 will be calculated with a 32 bit native velocity value
8:WRP		Write 0 cps to "User or Profile Move Vel[22]" Register
9:REM		PVC command updates the value in register 22 as the velocity of the motor
10:PVC		Profile Velocity Continuous: Acc in "User or Profile Move Acc[21]" Vel in "User or Profile Move Vel[22]"
11:REM		Calculates the incoming RPM value into the Silverlode native value RPM x 537871 = Native velocity value
12:CLD	LOOP	User or Profile Move Vel[22] = User[19] * 537871
13:JMP		Jump to "LOOP"

and displayed. The PVC command will use two registers for acceleration and velocity. The velocity register will be updated every 120uS. For this application, the acceleration register is set to a fixed value and the Beijer HMI will update the velocity register. The QuickSilver controller requires firmware revision 30-11 or higher in order for the PVC command to work.

H-Designer Modbus setup

In the H-designer© software - available from the Beijer website www.beijerelectronics.com - select the Application menu- workstation setup menu and configure the communication settings the same as the QuickSilver controller.   The workstation is setup for COM port 2 and the default address will be the same as the QuickSilver controller Unit ID number. The HMI address should be zero unless the system has multiply HMI's connected. The Application Note example program has the communication already configured.
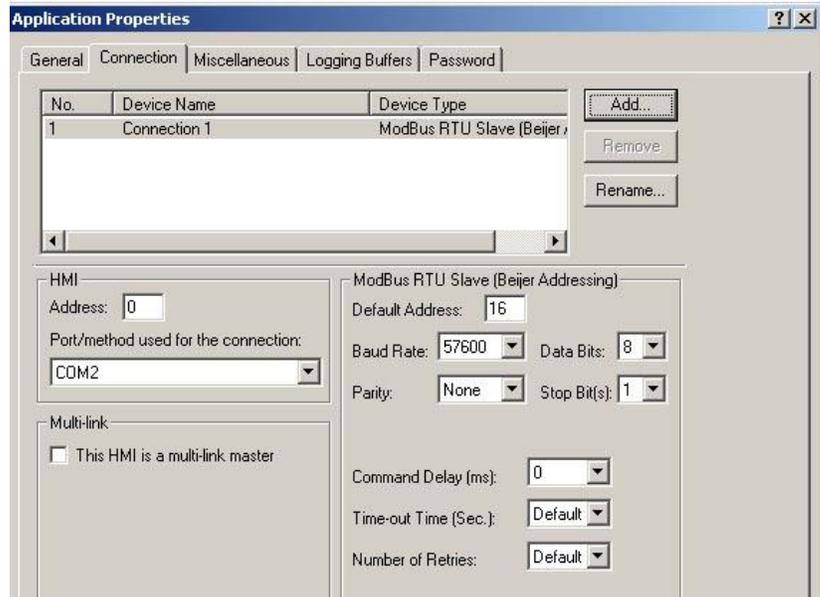
Numeric Display Object

The Numeric Display command uses the device type of D4 as the Modbus® RTU read holding register function. The Modbus® address of 1022 read the values stored in register 11 of the QuickSilver controller. Register 11 contains the native torque values of the motor. The object defines the register as a double word to read a 32-bit value and the format as a signed value to read positive and negative values. For information regarding Modbus register mapping refer to Application Note QCI-AN038 Modbus® Protocol for additional details.
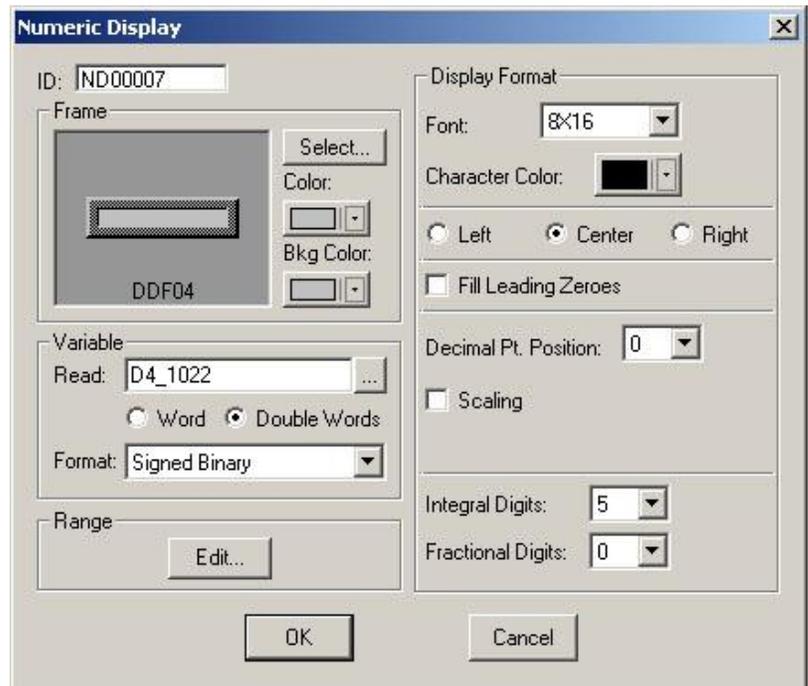
Bar Graph Object

The Deviation Bar Graph object reads the value of a register and converts the data into a bar graph. The bar graph is then displayed on the Beijer HMI. The object reads user register 11 of the QuickSilver controller. Register 11 contains the torque values of the motor. The torque value ranges from a value of –20000 to 20000 STU(SilverLode Torque Unit). Refer to SilverLode User Manual for more information regarding STU. The minimum and maximum value are set accordingly and the format is set to signed binary so the value will display both positive and negative numbers.
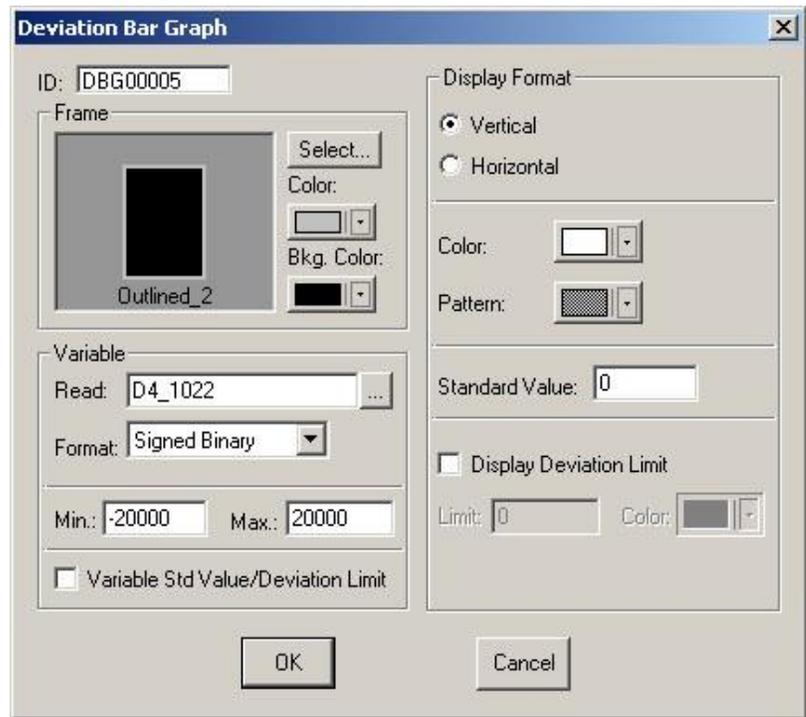
Constant Button Object

The Constant Button object when pressed will send a constant value to the QuickSilver controller. The device type is set to D4 to write the value to the holding register. The Modbus® holding register 1038 is register 19 of the QuickSilver Controller. The value 100 is defined as a double word to send a 32-bit value. The format is set to signed binary for the 32-bit value.

H-Designer Interface Screen

The user interface shows basic functions using Modbus® objects. The user interface will display the torque value and graph the value with the deviation graph object. The deviation will show the direction of the motor by displaying a negative or positive torque. The two constant button objects will send a value of either a 100 or –100 to the controller. The controller will then drive the motor at +/- 100RPM.
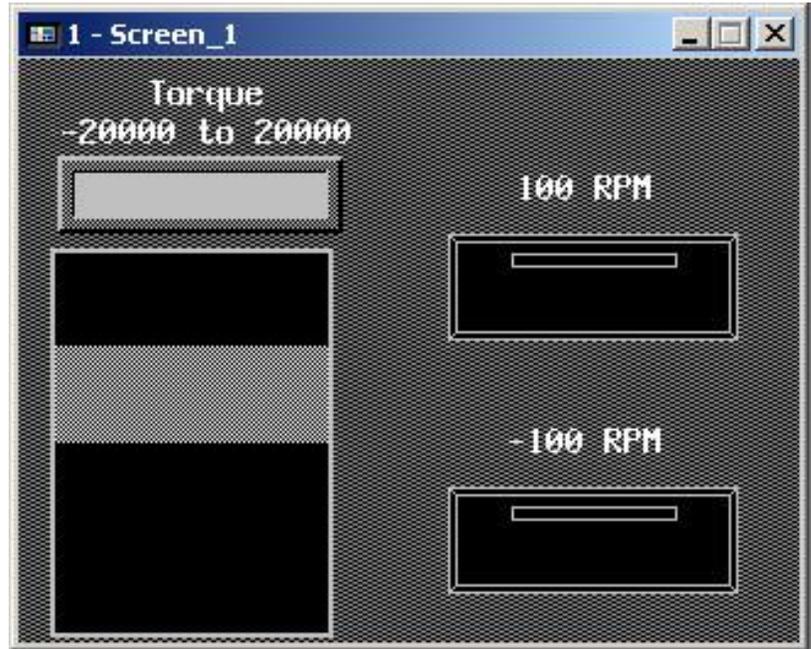
Troubleshooting Tips

Make sure both the HMI and the QuickSilver controller have been setup for the same communication parameters. See the "Hardware and Software Setup" section of this document for the recommended settings. When the HMI communicates with the QuickSilver controller the red LED on the QuickSilver should flash constantly verifying communication. If this is not the case, double-check the wiring. The QuickSilver controller can only communicate with one device at a time, make sure not to communicate with the QuickControl software and have the HMI simultaneously.