

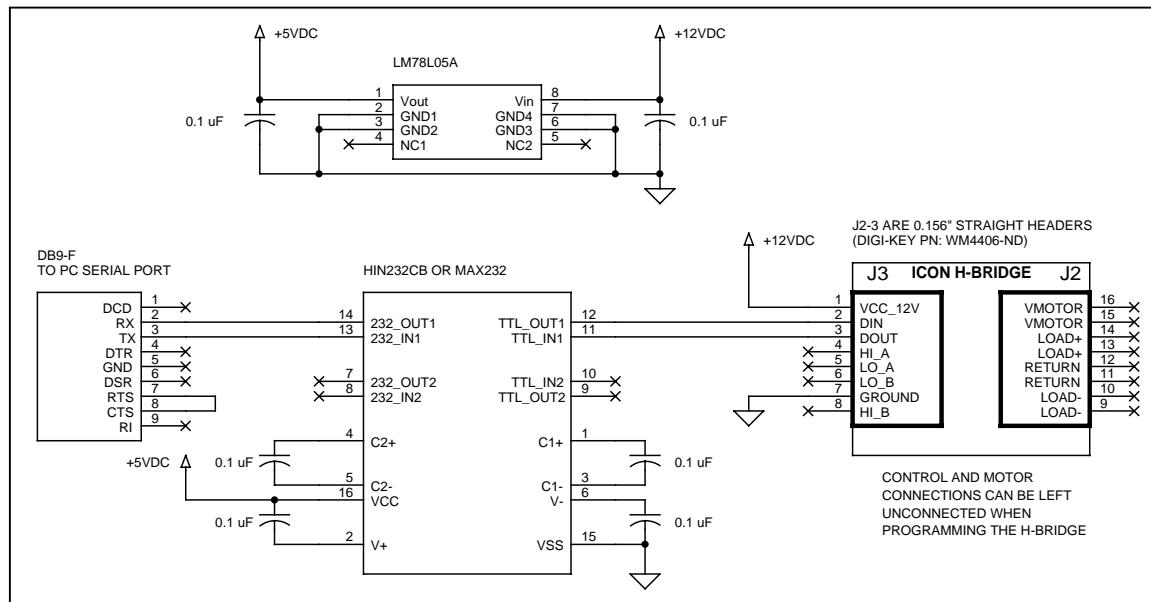
Overview:

In order to operate in direct drive mode the ICON H-bridge (ICON_HB) needs to have its FUNCTION register changed from the default setting (0x03 hexadecimal) to one that has the highest bit of the FUNCTION register set (such as 0x83). In addition, there may be other applications that can make use of the circuit and software described here to modify the ICON_HB registers. For example, it may be easier to modify the ICON_HB default settings via the software described here, than to implement a full communication protocol in a microcontroller that interfaces to the ICON_HB.

Serial Interface Circuitry:

The ICON_HB implements a 2400BPS serial interface to allow users to access its configuration registers. The serial interface (detailed extensively in the ICON_HB datasheet) requires TTL data, in an 8N1 format. The data must match specific timing and content requirements. The circuitry shown here may be used to convert RS232 (logic "1" = -12V) serial data, as from a PC serial port, to TTL levels (logic "1" = 5V).

RS232 <-> TTL Conversion Circuitry



In this schematic the individual control lines and motor connections are not shown, and they do not need to be connected in order to program the ICON_HB. It would be simple enough to add this circuit with connection jumpers so that the ICON_HB could be programmed during testing. By selecting the jumper settings you would then be able to connect to the serial conversion circuitry or the systems normal DIN/DOUT electrical connections.

Early in the development of the ICON_HB the internal oscillator of the controller used for this product was manufactured at a tolerance that allowed for communication at 4800BPS and 9600BPS. Subsequent changes in the manufacturers production techniques don't allow for ICON_HB to be used at these higher baud rates with a high degree of success. **It is recommended that you only operate the ICON_HB at 2400BPS.**

Direct Drive Mode:

Setting the highest bit in the FUNCTION register, storing the new setting in EEPROM, and cycling power, enables Direct Drive mode. This is done through the serial interface with a WRITE command to register 4, followed by a STORE command.

To exit Direct Drive mode short the DDE pads on the MOSFET side of the ICON_HB (this can be done with a small flat screw driver tip), and apply power to the ICON_HB. This will clear the highest bit of the FUNCTION register, and re-enable serial mode. On older firmware revisions you would need to follow this process with a STORE command to ensure the device would power up in serial mode on subsequent power cycles. Later firmware revisions implement the STORE command automatically. See the ICON_HB Errata sheet for information on the firmware differences.

AN607 Software:

This simple software implements the ICON_HB communication protocol and allows the user to modify the various registers of the product.

ICON_HB Programming Software

DATA RECORD

C1 1 C 0 1 2 3 4 5 6 7 8 9 A B 10

Hex Data Sent

1 C 4 0 13 12 3 96 8C 20 65 1 0 0 E1

Hex Data Received

ICON H-BRIDGE COMMANDS

READ **WRITE**

0: STATUS	\$04	4	<input type="text" value=""/>
1: AMPS	\$00	0	Index
2: TEMP	\$13	19	<input type="text" value=""/>
3: FIRMWARE	\$12	18	Value
4: FUNCTION	\$03	3	ENERGIZE
5: AMPS TRIP	\$96	150	DE-ENERGIZE
6: TEMP TRIP	\$8C	140	<input type="text" value=""/>
7: # SAMPLES	\$20	32	STORE
8: BAUD	\$65	101	RESTORE
9: ADDRESS	\$01	1	
10: CAL AMPS	\$00	0	
11: CALTEMP	\$00	0	

SOFTWARE SETTINGS

HB ADDRESS

2.4KBPS
 4.8KBPS
 9.6KBPS

BAUD RATE

To configure the ICON_HB for Direct Drive mode load the Index text box with "4" and the Value text box with "131". Then press the WRITE button followed by the STORE button. Pressing the READ button should show the FUNCTION register loaded with \$83 131. On cycling power a subsequent READ will show the incoming data matches data sent. This is because in Direct Drive mode DOUT mirrors DIN if no fault has occurred.

Bill-of-Materials:

The following components may be used to build the circuit shown in this application note.

Part	Description	Digi-Key PN:
DB9-F	Female DB9, board mount	A23303-ND
RS232 Converter	SOIC-16, 0.3" Converts RS232 data to TTL levels	296-14620-1-ND
5V 100mA regulator	SOIC-8 SMD 5V regulator powers RS232 converter	LM78L05ACM-ND
0.1uF capacitor	0.1uF ceramic capacitor	Any part will do
J2, J3	1x8 0.156" straight headers	WM4406-ND

Conclusion:

Using the test software provided, and the simple circuitry shown here, programming the ICON_HB for Direct Drive mode or modifying the ICON_HB register contents can be done quickly.