Functional Description

DeviceNet™
Tool Changer ID Module

Rev. 1.3

For

DN-TC401
DN-TC401-0.5

HURON NET WORKS

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Revision History

Rev	Date	Note(s)
A.0	12 May 2000	Original for DeviceNet revision 1.1 boards
1.1	22 May 2003	Added DN-TC401-0.5 and DeviceNet revision 2.2 boards
1.2	11 June 2003	Minor edits
1.03	18 Jan 2005	Corrected references to J1 & J2

1. INTRODUCTION

The DN-TC401/DN-TC401-0.5 is a DeviceNet capable ID module specifically designed for robot tool changer applications. This module provides DeviceNet access to several ID values settable on rotary switches. Typical application uses one BCD rotary switch (0..9) to represent Line Number, one BCD rotary switch (0..9) to represent Robot Number, and three BCD rotary switches (0..255) to represent Tool Number.

Interfaces on the DN-TC401/DN-TC401-0.5 includes the following:

DeviceNet Connector – J2

This connector has the standard five DeviceNet signals; V+, V-, CAN_L, CAN_H, and shield drain. The shield drain wire has no connection on the module. The DeviceNet bus power (11 - 25 VDC) is used for all circuitry. On the DN-TC401 revision 1.xx units J1 and J3 were wired in parallel with J2.

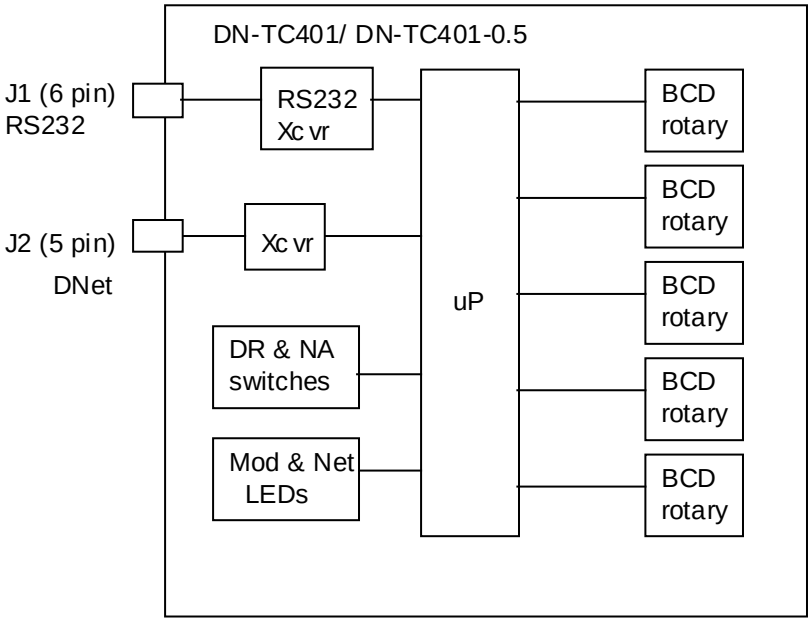
RS232 Connector – J1

This connector is used for firmware flash updates.

Indicators and Switches

- The standard red/greed bi-color DeviceNet Module Status LED and Network Status LED are supported
- Switches allow setting of the DeviceNet Node Address (NA) and Data Rate (DR)
- Five rotary BCD switches for ID assignment as described above.

A block diagram of the module is shown below.



2. APPLICATION

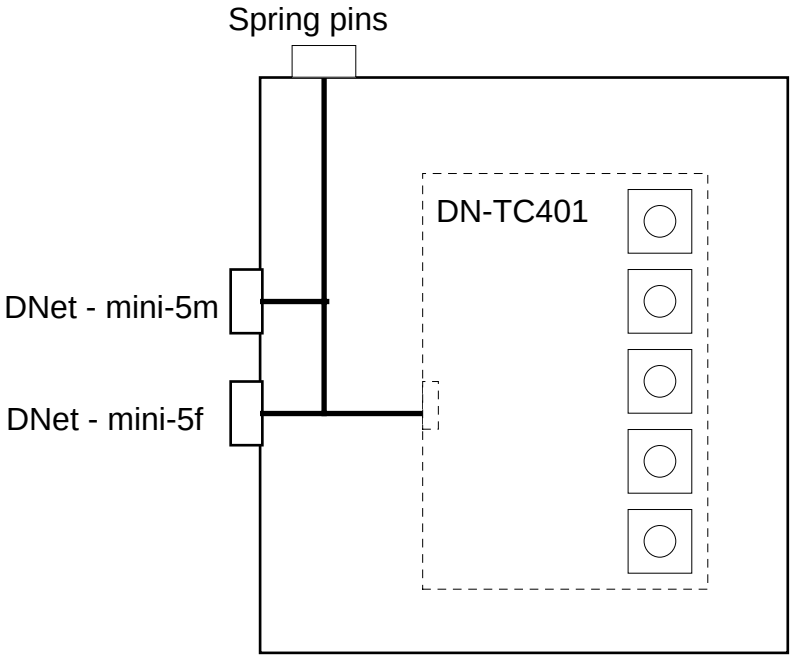
2.1. Mechanical and Mounting

Refer to Mechanical Drawing 2800054 for the DN-TC401 and to Mechanical Drawing 2800046 for the DN-TC401-0.5. Overall dimensions shown in Specifications section.

2.2. Wiring

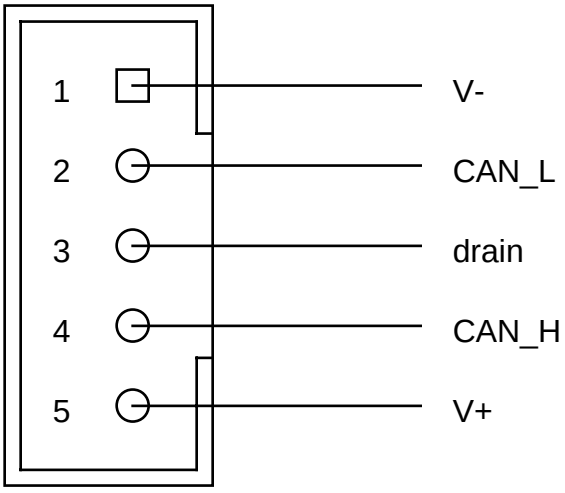
The DeviceNet mini connector(s) will attach to the DN-TC401 via pigtails terminated in a JST connector to mate with a 5-pin JST header S5B-PH-K. DeviceNet connector wiring should be as short as possible to minimize capacitance on the signal lines. These wire harnesses and connectors, except for the JST board headers, are not included as part of the DN-TC401. J1 provides serial connection for program updates.

Example:

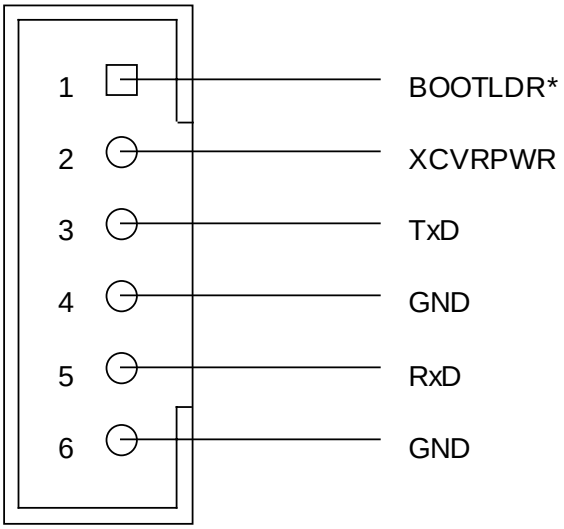


2.3. Pinouts

J2 - 5 pin JST header for the DeviceNet:



J1 – 6 pin JST header for RS232 connector:



pin 1 – BOOTLDR*, pin2 – XCVRPWR, and pin 6 – GND are not used in normal applications.
pins 3, 4, and 5 provide a 3-wire RS232 connection with no handshaking.

3. CONFIGURATION

To configure the Node Address (NA) and the Data Rate (DR) the on-board switch can be used, or a separate DeviceNet configuration tool can be used to program these values over the network. The switch is labeled on the module indicating which switches are used for Data Rate, and which are used for Node Address. The binary value of the switches defines these values. For programming over the network, the Data Rate switches must be set to a binary "11". The factory default values are 63 for the node address and 125 Kbaud for the data rate. Any modification of these values should be done before the module is connected to the DeviceNet network. After the node address has been changed the module will re-start. This can be observed on the Module/Network Status LEDs. The use of a newly set data rate will not happen until the unit is reset by switching the power on then off, or by a reset service over the network.

Five separate rotary BCD switches are available for assignment of ID values as described in the introduction.

4. SPECIFICATIONS

	DN-TC401	DN-TC401-0.5
Mechanical		
Length	68 mm.	52.3 mm.
Width	60 mm.	39.6 mm.
Component height	10 mm.	
Weight	0.8 oz.	0.7 oz.
Environmental		
Operating temperature range	0 to 60 °C	
Storage temperature range	-20 to 85 °C	
Humidity	5 to 95% RH non-condensing	
DeviceNet		
Data rates & configuration	125, 250, 500 kBaud Set via switch or over the network. Non-volatile storage factory default =125	
Node address & configuration	0 to 63 Set via switch or over the network. Non-volatile storage factory default =63	
Connector	JST header	
Indicators	Module and Network Status LEDs	
Bus power consumption (excluding sensors)	60 ma avg. (receive) 110 ma max. (xmit)	
Protocol capabilities*	Group 2 only slave with Explicit, Polled, COS/Cyclic Connections	
Device type	0 (Generic)	

* For a more complete description of protocol capabilities, see document # 2200083, Device Profile for the DN-TC401 or document # 220011, Device Profile for the DN-TC401-0.5.

See below for I/O message content.

I/O Message Content:

There are zero bytes contained in the I/O request Message. The I/O response acontains 2 bytes. The inputs are mapped into the I/O response bytes as shown below.

I/OResponse format (inputs)

Byte	7	6	5	4	3	2	1	0
0	Tool Number							
1	Robot Number				Line Number			

Tool Number range is 0 to 255 based upon three rotary BCD switches.
Robot Number range is 0 to 9 based upon one rotary BCD switch.
Line Number range is 0 to 9 based upon one rotary BCD switch.