# SWFTEC N2 Data Display Module Model N2DSP01

The N2 Data Display Module provides a flexible interface between the Johnson Controls, Inc. N2 Bus and a variety of display types for the display of object data. It is invisible to the system and does not utilize an N2 bus address. It simply watches for the data for an object when the bus master does a background scan or a change of state reading and grabs the data as it goes by. Any number of these can be connected to the bus so long as standard bus loading is maintained. A large number may require adding bus repeaters. Each module supports up to 100 display objects which can be displayed on multiple pages. The module is configured using the N2DISP software for the type of display that it is driving and the objects it is displaying.

The module collects data for active objects in the database from the N2 bus. These objects can include up to 32 characters for a description and up to 6 characters for units. Data fields can be up to 12 digits, 13 characters with the decimal point. The location of the description and data fields are independent and are set in the N2DISP configuration software using X(column) and Y(row) coordinates. The module also supports static text objects. These are text labels that can be up to 32 characters in length. They are located using the same X/Y display device coordinate system. Command objects provide the ability to send commands to the display device. These can be used to change the display attributes that are available for the display being used. Examples are selecting fonts, changing foreground and background colors, selecting background graphics, and changing display brightness. The command objects execute when a new page is selected. For example, using the Reach Technologies, Inc. SLCD products a different background graphic can be loaded for each page and the active data object readings placed at the appropriate locations on the graphic.
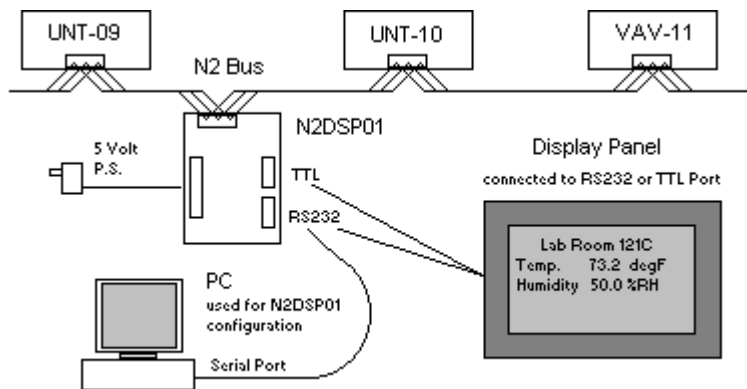
There are two ports on the module for communication to displays. The RS232 serial port and the TTL serial port. The TTL serial port can be configured for true data or inverted data. This is selected in the N2DISP.INI file in the entry for the particular display type. The baud rate for display communications to the RS232 and TTL ports are set in the N2DISP.INI in the entry for the particular display type. The RS232 port is also used to communicate with a Personal Computer for configuration. Configurations are stored in a serial EEPROM memory and are non-volatile requiring no back up battery. The module incorporates an opto-isolated RS485 N2 Bus port providing 1000 volts of isolation for ground loop and spike protection.

Terminals are provided for page up, page down and display toggle. Display toggle can be used to turn on and off backlights, change the brightness or turn the display on and off as determined by the type of display being used. This function is setup in the N2DISP.INI entry for the particular display type. These inputs are active low and can be implemented using a switch to any of the GND terminals. Page 0 is a special diagnostic page used to display offline N2 Bus controller addresses. The module defaults to page 1 on power up.

The module has a built-in watchdog function which monitors communications for the objects currently on the scan. If they do not get read within a certain amount of time the reading for that object on the display will change to ???? question marks indicating that the reading is unreliable. The timeout period is adjustable. An Alarm Output and LED are provided to indicate externally that an object has failed to be read. The output is TTL level 0 to 5 volts 20ma active high. The watchdog timeout feature can be disabled on a per object basis using the N2DISP configuration software.

The Program Mode can be selected using the PROGRAM terminal or using the M terminal of the RS232 Serial Port. This places the module in program mode which uses the RS232 port to communicate with the configuration software on a PC.

The Decade Engineering, Inc. BOB3 TV Video Text Overlay Board gives the N2DSP01 the ability to place the readings on TV. In local mode it produces the video signal and can display the text with various foreground and background colors and a selection of text sizes. In overlay mode the BOB3 can place the readings on top of a video signal that is input to it. For example you can have a live video of the outside weather with the outside air temperature and humidity readings on the screen. You can have live video of a lab room with the room readings on the screen. You can have live video with sound of the mechanical rooms with readings placed on the appropriate equipment locations. The BOB3 supports a character resolution of up to 17 rows by 40 columns. It also has limited graphic capabilities using a user defined character set. SWFTEC makes a carrier board for the BOB3. The BOBTV01 provides terminals for connection to the N2DSP01 and RCA connectors for video input and output. There is also a terminal for 6 digital outputs which can be used with additional equipment to select up to 64 video sources using command objects. So you can have up to 64 pages looking at different locations. This setup can be used with low cost consumer LCD TV Displays.

Specifications:

Dimensions	3.8" x 2.5" x 1"
Power Supply:	5 vdc 100ma, included power supply 5vdc 500ma
Ports:	1 RS232, 1 TTL, 1 RS485
Baud Rates:	1200, 2400, 4800, 9600
Microcontroller:	Microchip PIC16F87 running at 4Mhz
Database Memory:	8K non-volatile EEPROM
RS485 Bus Protocols:	Johnson Controls, Inc. N2OPEN
Supported object types:	AI, AO, BI, BO, ADF and BD
Display Device Protocols:	Configured in the INI file for the N2DISP configuration software. Easy to add more Display Types

Currently Supported: Matrix Orbital Serial LCD, LED and VFD Displays
Scott Edwards Electronics, Inc. Serial LCD and VFD Displays and backpacks

Matrix Orbital and Scott Edwards Electronics sell a wide range of low cost serial displays. These range from 1 line by 16 characters to 4 lines by 40 characters and include monochromatic graphic displays.

Decade Engineering, Inc. BOBII Video Text Overlay Board (puts data on TV)
Decade Engineering, Inc. BOB3 Video Text Overlay Board (puts data on TV)
(BOBTV01 module is available as a carrier for the BOBII or BOB3.)

Reach Technologies, Inc. SLCD Products including NEMA4 Graphic Display Panels. These panels provide complete color graphic capabilites.

VT100 ANSI Terminal. Other terminal emulations are easily added. The VT100 terminal mode will work with PCs running the SWFTEC Graphic Interface System for web browser like access to N2 bus data.

Maximum Display Objects:	100
Maximum Display Pages:	101 including page 0
Maximum Objects per Page:	100 or limited by the available space on the Display Device
Maximum Display Columns:	Determined by the Display Device (up to 16 byte position command)
Maximum Display Rows:	Determined by the Display Device (up to 16 byte position command) The N2DSP01 has independent positioning of the description and data fields
Maximum Command Length:	32 bytes, 64 Characters in ASCII HEX format
Maximum Description Length:	Static Text: 32 Characters Analog: 32 Characters Binary: 26 Characters
Maximum Units Length:	6 Characters
Maximum Data Length:	Analog: 12 digits derived from 32 bit IEEE Floating Point Number Binary: 6 character units
Decimal Point Placement:	Each object's Decimal Point Placement/Precision is configured as Digits Above the Decimal Point and Digits Below the Decimal Point using the N2DISP software. Leading zeros except the one just above the decimal point are replaced by spaces. The module rounds numbers to the Digits Below the Decimal Point setting.
N2DISP Software Requirements:	PC running Windows 98, Me, 2000 or XP with an available RS232 Serial Port or USB Serial Adapter. The COM port can be selected on-screen or by editing the N2DISP.INI file to designate the port. Default is COM1. Preferred 800X600 Screen Resolution. Uses about 5 MB hard drive space.
N2DISP Software Compatibility:	Imports Object Data from *.prn and *.cfg files produced by Johnson Controls, Inc. HVACPRO/WINPRO configuration software tool. Imports Object Data from *.prn and *.cfg files created by HVACPRO from applications produced using the SWFTEC Graphic Program Generator.

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