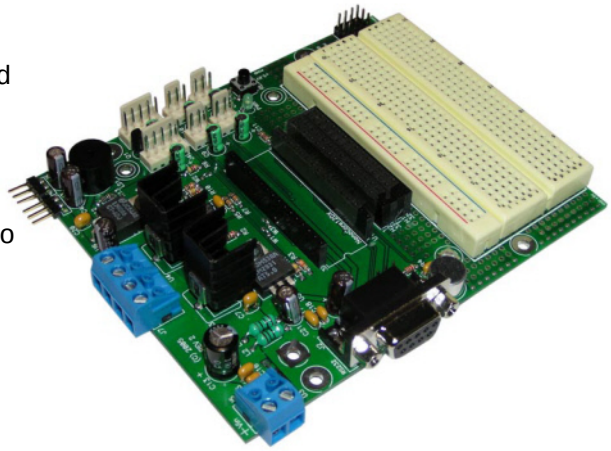
Servo/Sensor/Motor Interface Board for NanoCore12DX™

02/2010

Data Sheet

Description

Designed primarily for robotics and mechatronics applications. this module provides a wide range of features that a user would require to realize these applications using a NanoCore12DX microcontroller module. Support for hobby R/C servos, DC motors, and IR and sonar distance-measuring sensors are the primary features. A solderless breadboard section is provided for additional circuits and experiments that the user may wish to design. Separate voltage regulators are supplied. One provides 6VDC to the servos, for maximum torque, and the other provides 5VDC to the sensors. The desired motor voltage can be supplied to the board from batteries or an AC-powered wall supply. For battery-powered applications, a battery voltage monitoring circuit is implemented. Both a microphone and audio transducer are provided to support interactive applications.



Detailed Features:

- four analog sensor connectors, can be used with IR distance-measuring sensors, accelerometers, etc.
- six connectors for hobby servos (implemented on Port T of the MCU, to enable PWM control)
- one 9-pin serial port connector for programming and communications
- two connectors for Devantech Analog Ultrasonic Ranger (e.g. SRF04)
- separate 6.5 Volt regulator for servos (isolates electrical noise and provides increased torque)
- separate 5 Volt regulator for analog sensors (isolates electrical noise)
- battery voltage monitoring (up to 20 Volts)
- audio transducer for adding sound effects
- microphone so your robot can detect sound
- dual high-current H-bridges (4A continuous, 6A peak)
- convenient pluggable terminal blocks for motor and power connections
- solderless breadboard for customized hardware design
- same mounting hole locations as NanoCore12 School Board (compatible with most hobby robot bases)
- requires 32-pin NanoCore12 module (#NC12DXC32S)
- supplied with schematic and data sheet

ORDER CODE

NanoCore12DX Servo/Sensor/Motor Interface	**NC12DXSSMI**

ACCESSORIES

NanoCore12DXC32 Low-cost 32-pin 9S12C32 microcontroller module	**NC12DXC32S**
Robot Car Bundle, including the above two items + 2 pcs. IR Distance Sensors	**NC12DXRB1**
USB-to-COMport Adapter, with power breakout	**USB2RS232**
Sharp IR Distance-measuring sensor with 3-wire cable	**GP2D120-C**
RS-232 Interface adapter for Xbee radio module	**X232-DBP**

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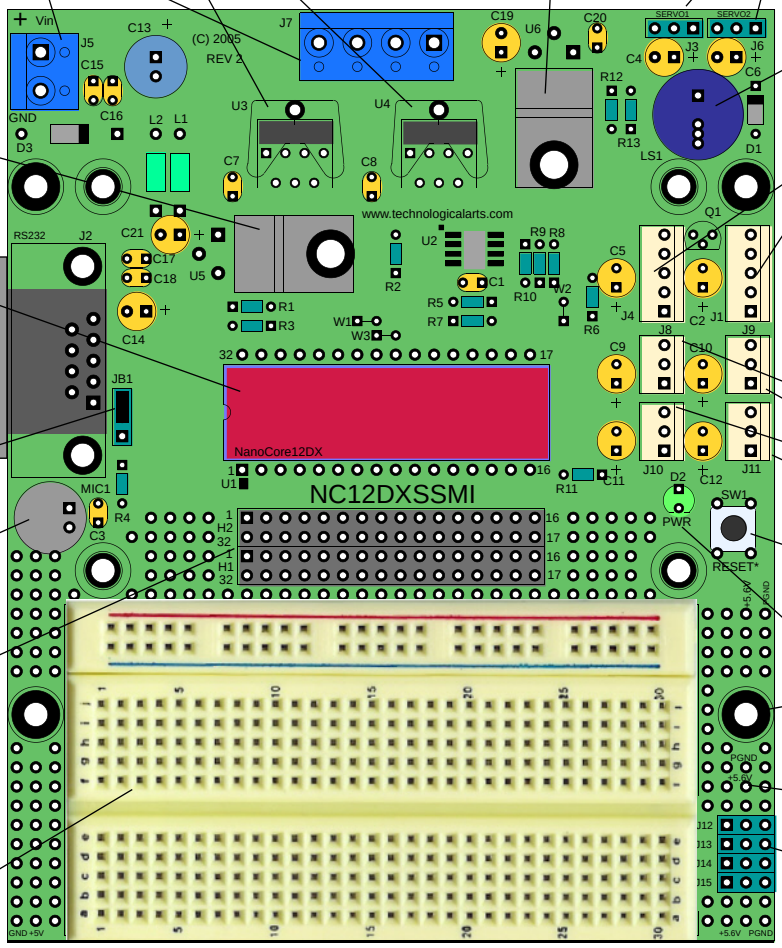
Servo/Sensor/Motor Interface Board



Two high-current H-bridges (TLE5206)

J7 - DC motor connections

IN1=PT2 IN2=PT3 EF=PM3 — ChanB OUT1 OUT2

IN1=PT0 IN2=PT1 EF=PM2 — ChanA OUT1 OUT2

6V voltage regulator for Servos

SERVO1 (J3)
Pin 1 = PT4
Pin 2 = Vservo
Pin 3 = Ground

J3 & J6 connections for two R/C servo motors

SERVO2 (J6)
Pin 1 = PT5
Pin 2 = Vservo
Pin 3 = Ground

pluggable terminal blocks

audio transducer (on PM4)

J5
DC Voltage In (7 to 10V)* + -

5 Volt Regulator for sensors and MCU

U1 - socket for NanoCore12DX module

J2
9-pin RS232 Connector

JB1
select Vdd source for breadboard: default (shown) is Vsharp

microphone (on AN01)

H1 & H2
socket strips for access to MCU signals (pin numbers match NC12DXC32 module)

solderless breadboard 60x5-way tie-points

Connectoions for two SRF0x ultrasonic rangefinders:

J1	**J4**
Pin1=Vsharp	**Pin1=Vsharp**
Pin2=PT7	**Pin2=PT6**
Pin3=PM1	**Pin3=PM0**
Pin4=no connect	**Pin4=no connect**
Pin5=Ground	**Pin5=Ground**

Connections for four Sharp GP2D120 InfraRed sensors (or other analog sensors):

J8 =AN02
J9 =AN03
J10 =AN04
J11 =AN05

Pin1=Vsharp
Pin2=Ground
Pin3=AN0x

Reset button

Power LED

mounting holes (8 places) to mate with most popular robot platforms

6.5V servo voltage can be accessed here for use with other circuits

connections for 4 additional R/C servo motors

J12: SERVO3 (Pin1= PT0, Pin2=Vservos, Pin3=Gnd)
J13: SERVO4 (Pin1= PT1, Pin2=Vservos, Pin3=Gnd)
J14: SERVO5 (Pin1= PT2, Pin2=Vservos, Pin3=Gnd)
J15: SERVO6 (Pin1= PT3, Pin2=Vservos, Pin3=Gnd)

Note: PIN1 of all components is indicated by square pad on circuit board.

***Note: to use higher voltage motors (e.g. 12V or 24V), remove L1 and L2, and supply Vin to MCU module separately (maximum 12V), via pin 32 on H1 or H2. Then motor voltage may be safely applied via J5.**