NuDAM-6024 4-Channel Analog Output Module

1. Introduction

ND-6024 is a 4-channel bipolar analog signal output module. It receives digital commands from a host computer through an RS-485 network. A microprocessor is used to convert digital commands to digital values to send to a DAC. The DAC converts the digital values into analog form. The ND-6024 is designed for safety. With a watchdog function, whenever the host loses contact with the remote NuDAM module, or the microprocessor is down, the module will reset itself and send the safety value to the analog output. The safety value / power-up value can be set by configuration software.

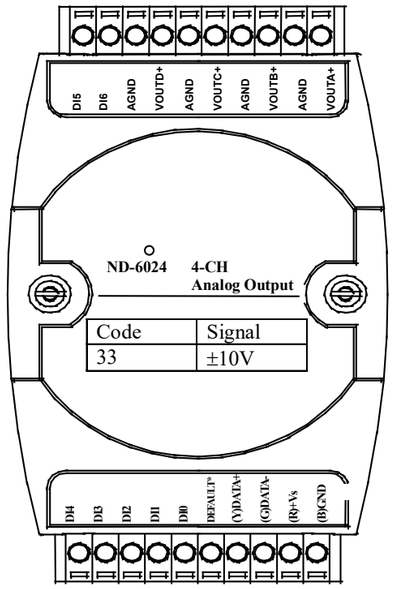
Features

- 4 bipolar analog output channels
- 7 TTL input channels
- Programmable host watchdog timer for host failure protection
- Internal watchdog timer for device failure protection
- Easy programming by software
- Easy installation and wiring

Specifications

- Interface:
  - RS-485, 2 wires
  - Speed (bps): 600, 1200, 2400, 4800, 9600, 19.2k, 38.4k, 57.6k, 115.2k
- Analog Output:
  - Channels: 4
  - Signal output type: differential
  - Accuracy: +/-0.02% of FSR (max.)
  - Output current: ±10uA (max.)
  - DAC Resolution: 12 bits
  - Output Range:+/-10V output
- Digital Input:
  - Channels: 7
  - Input type: TTL
- Storage Temperature Range: -25 to 80 °C
- Operating Temperature Range: -10 to 65 °C
- Power Requirement: +10V to +30V DC Unregulated against power reversal
- Power Consumption: 1.848W
- Case: ABS with captive mounting hardware
- CE Class A Conformity

2. Pin Assignment



Pin Definitions

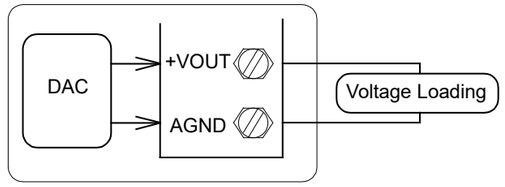
Pin #	Signal	Description
1	DI4	Digital input channel 4
2	DI3	Digital input channel 3
3	DI2	Digital input channel 2
4	DI1	Digital input channel 1
5	DI0	Digital input channel 0
6	DEFAULT*	Initial state setting
7	(Y)DATA+	RS-485 signal, positive
8	(G)DATA-	RS-485 signal, negative
9	(R)+VS	Power supply, +10V to +30V DC
10	(B)GND	Ground
11	VOUTA+	Voltage output A
12	AGND	Analog ground
13	VOUTB+	Voltage output B
14	AGND	Analog ground
15	VOUTC+	Voltage output C
16	AGND	Analog ground
17	VOUTD+	Voltage output D
18	AGND	Analog ground
19	DI6	Digital input channel 6
20	DI5	Digital input channel 5

The module is in DEFAULT mode when the DEFAULT* pin is connected to GND while applying power to the module.
Do not apply any power signal to the DEFAULT* pin. Leave it open or connected to GND.

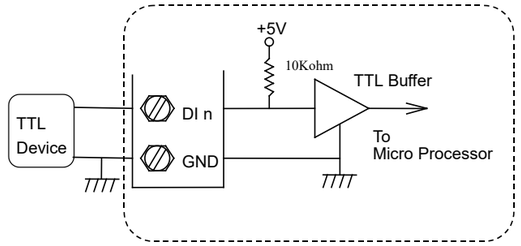
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3. Application Wiring

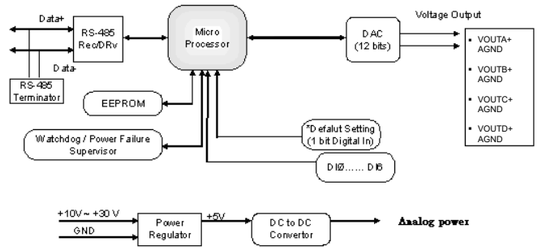
Differential Voltage Output



TTL Input



4. Functional Block Diagram



5. Installation

Equipment for Installation

An existing RS-485 network
NuDAM modules
DC Power supply (+10V to +30V)
Wires for power, communication and I/O signal

Installation Procedure

1. Configure every single NuDAM module under the administration utility.
2. The baud rate setting and calibration procedure must be done under the DEFAULT* mode.
3. The baud rate and check-sum status must be identified with the application network. The address ID must not conflict with other modules on the network.
4. Plug new modules in to the existing network.
5. Use the NuDAM administration utility to check the entire network.

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6. Command Set

There are three categories of NuDAM commands. The first is the ***general commands***, including the set configuration command, read configuration, reset, read module's name or firmware version, etc. Every NuDAM can respond to the general commands. The second is the ***functional commands***, which depends on the functions of each module. Not every module can execute all function commands. The third is the ***special commands*** including functions about the programmable watchdog timer, safe values, and the programmable leading code. All the commands used in the NuDAM analog input module are listed in the following table.

Command	Syntax
General Commands	
Set Configuration	**%(OldAddr)(NewAddr)(InputRange)(BaudRate)(DataFormat)**
Read Configuration	**$(Addr)2**
Read Module Name	**$(Addr)M**
Read Firmware Version	**$(Addr)F**
Reset Status	**$(Addr)5**
Software Reset	**$(Addr)RS**
Functional Commands	
Analog Data Out	**#(Addr)(Port)(OutData)**
Save Power on Analog Value	**$(Addr)4**
Last Value Read Back	**$(Addr)6(Port)**
Digital Input	**$(Addr)8**
Synchronized Sampling	**#****
Read Synchronized Sampling	**$(Addr)9**

Special Commands	
Read Command Leading Code Setting	**~(Addr)0**
Change Command Leading Code Setting	**~(Addr)10(C1)(C2)(C3)(C4)(C5)(C6)**
Set Host Watchdog / Safety Value	**~(Addr)2(Flag)(TimeOut)(SafeA) (SafeB)(SafeC) (SafeD)**
Read Host WatchDog / Safe Value	**~(Addr)3**
Host is OK	**~****
I/O Polarity Setting	**~(Addr)CP(State)**
Read Polarity Setting	**~(Addr)CR**

* ***The module accepts calibration commands, baud rate and checksum configuration settings under the DEFAULT* mode.***

* ***Refer the User's Manual for detailed descriptions of these commands.***

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