NuDAM-6080 Counter/Frequency Input Module

1. Introduction

ND-6080 is a counter / frequency input module. It has two 32-bit counter input channels with built in programmable timer for frequency measurement and supports both photo isolated and non-isolated input mode. The maximum counting value is 4,294,967,295 for counter input channel and the frequency-input range is from 1 Hz to 20 kHz. A programmable digital filter can be enable for both high and low level minimum signal width to reduce noise spike. Besides the programmable threshold for non-isolated input can further reject noise on the input signal level.
The module provides the counter comparator or the alarm function. The alarm limit of two counters can be set independently by programming. The alarm status can be send to digital output channels if this function is ON. The supervisor of a factory can 'see' or 'hear' the alarm if the digital output channel control a real alarm device. The two digital output channel can be set for general purpose used if the alarm is disable. For example, connecting relay devices to DO channels, the NuDAM-6080 can be used to control the high power devices.

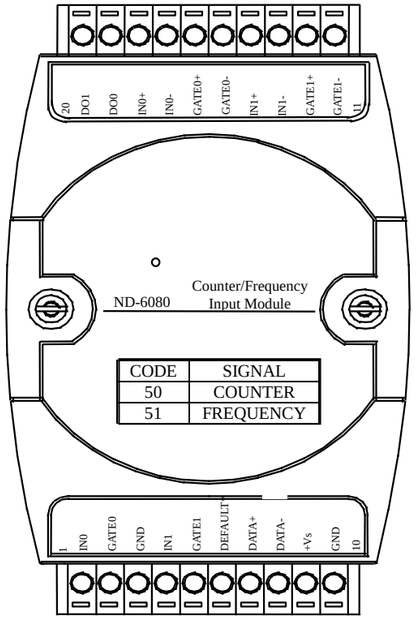
Features

- Two 32 bit counter / frequency input channel
- Two digital output channels of open collector type
- 5000 Vrms isolation voltage for isolated input mode
- External gate control for counter input
- Alarm function with alarm output
- Programmable digital filter for noise rejection
- Programmable threshold setting of trigger level for TTL input mode
- 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
- Counter Input:
  - Channel: two 32 bit counter
  - Input frequency: 20 kHz max.
  - Input mode: isolated or TTL
  - Isolated input level:
    - Logic level 0: +1V max.
    - Logic level 1: +3.5V ~ 30V
  - Current limit resistor: 1.2kΩ (2W)
  - Isolation voltage: 5000 Vrms
  - TTL input level: (programmable threshold)
    - Logic level 0: 0 ~ +5V (default = 0.8V)
    - Logic level 1: 0 ~ +5V (default = 2.4V)
  - Input pulse width > 5 μsec
  - Programmable digital noise filter:
    - 4 μsec. to 1.02 msec
  - Alarm comparator on each counter
- Frequency measurement input:
  - Range: 1 Hz to 20 kHz
  - Programmable input gate time: 0.1/1.0 sec.
- Digital Output:
  - Channel number: 2
  - Output type: open collector transistor
  - Max. loading: 30V/30mA
- Storage Temperature Range: -25 to 80 °C
- Operating Temperature Range: -10 to 70 °C
- Power Requirement: +10V to +30V_{DC} Unregulated with against power reversal
- Power Consumption: 2.0W
- Case: ABS with captive mounting hardware
- CE Class A Conformity

2. Pin Assignment



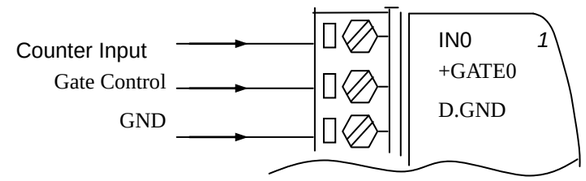
Pin Definitions

Pin #	Signal Name	Description
1	IN0	Non-isolated input channel 0
2	GATE0	External gate control of channel 0
3	GND	Ground for non-isolated input
4	IN1	Non-isolated input channel 1
5	GATE1	External gate control of channel 1
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 ~ +30Vdc
10	(B)GND	Ground
11	GATE1-	Differential negative external gate control of channel 1
12	GATE1+	Differential positive external gate control of channel 1
13	IN1-	Differential negative input of channel 1
14	IN1+	Differential positive input of channel 1
15	GATE0-	Differential negative external gate control of channel 1
16	GATE0+	Differential positive external gate control of channel 1
17	IN0-	Differential negative input of channel 0
18	IN0+	Differential positive input of channel 0
19	DO0	Digital output channel 0 or counter 0 alarm output
20	DO1	Digital output channel 1 or counter 1 alarm output

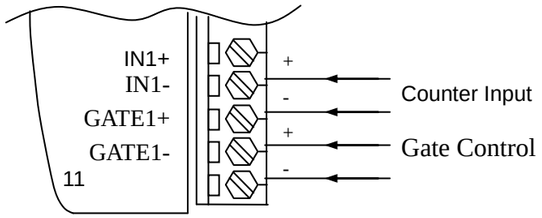
The module is in DEFAULT mode when DEFAULT* pin connected to GND while applying power on the module.
Do not apply any power signal to DEFAULT* pin, just left it open or connected it to GND.

3. Application Wiring

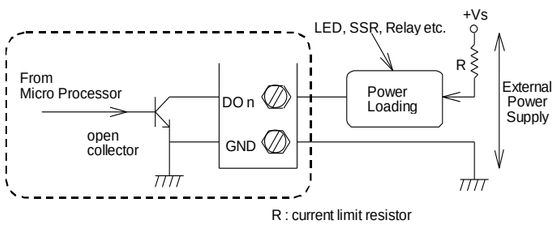
TTL Input



Isolated Input



Discrete Output with Power Load



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4. Installation

Equipment for Installation

A existing RS-485 network
NuDAM modules
DC Power supply (+10V~+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 identity with the application network. The address ID must not be conflict with other modules on the network.
4. Plug the new module to the existing network.
5. Use the NuDAM administration utility to check the entire network.

5. Command Set

There are five categories of NuDAM 6080 commands. The first is the ***configuration counter input commands***, including set configuration command, read configuration, reset, read module's name or firmware version, etc. The second is the ***counter setup commands***, which setup the counter mode, maximum and initial value and start or stop counter function. The third is the ***digital filter & programmable threshold commands,*** which provide the filter and threshold function for noise rejection. The fourth is the ***digital output & alarm commands,*** the digital output can be used as general purpose output or as alarm output by pre-setting counter value. The fifth 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 counter/frequency input module are list in the following table.

Command	Syntax (Checksum Disable)	Syntax (Checksum Enable)
Configuration, Counter Input Command		
Set Configuration	**%(OldAddr)(NewAddr)(InputRange)(BaudRate)(DataFormat)**	
Read Configuration	**$(Addr)2**	
Read Module Name	**$(Addr)M**	
Read Firmware Version	**$(Addr)F**	
Software Reset	**$(Addr)RS**	
Reset Status	**$(Addr)5**	
Set Input Signal Mode	**$(Addr)B(InType)**	
Read Input Signal Mode	**$(Addr)B**	**$(Addr)BR**
Read Counter/Frequency Value in Hexadecimal	**#(Addr)(CounterNo)**	**#(Addr)(CounterNo)R**
Read Counter/Frequency Value in Decimal	**#(Addr)(CounterNo)D**	
Counter Setup Command		
Set Gate Mode	**$(Addr)A(Gmode)**	
Read Gate Mode	**$(Addr)A**	**$(Addr)AR**
Set Maximum Counter Value	**$(Addr)3(CounterNo)(MaxData)**	
Read maximum Counter Value	**$(Addr)3(CounterNo)**	**$(Addr)3(CounterNo)R**
Set Initial Counter Value	**@(Addr)P(CounterNo)(IniData)**	
Read Initial Counter Value	**@(Addr)G(CounterNo)**	**@(Addr)G(CounterNo)R**
Start/Stop Counter Value	**$(Addr)5(CounterNo)(Sstatus)**	
Read Counter Start/Stop Status	**$(Addr)5(CounterNo)**	**$(Addr)5(CounterNo)R**
Clear Counter	**$(Addr)6(CounterNo)**	
Read then Clear the Overflow Flag	**$(Addr)7(CounterNo)**	
Digital Filter & Programmable Threshold Command		
Enable/Disable Digital Filter	**$(Addr)4(Status)**	
Read Filter Status	**$(Addr)4**	**$(Addr)4R**
Set Minimum Input Signal Width at High Level	**$(Addr)0H(MinFData)**	
Read Minimum Input Signal Width at High Level	**$(Addr)0H**	**$(Addr)0HR**
Set Minimum Input Signal Width at Low Level	**$(Addr)0L(MinFData)**	
Read Minimum Input Signal Width at Low Level	**$(Addr)0L**	**$(Addr)0LR**
Set TTL Input High Trigger Level	**$(Addr)1H(ThData)**	
Read TTL Input High Trigger Level	**$(Addr)1H**	**$(Addr)1HR**
Set TTL Input Low Trigger Level	**$(Addr)1H(ThData)**	
Read TTL Input Low Trigger Level	**$(Addr)1L**	**$(Addr)1LR**
Digital Output & Alarm Command		
Enable Alarm	**@(Addr)EA(CounterNo)**	
Disable Alarm	**@(Addr)DA(CounterNo)**	
Set Alarm Limit Value of Counter 0	**@(Addr)PA(ArmData)**	
Read Alarm Limit Value of Counter 0	**@(Addr)RP**	
Set Alarm Limit Value of Counter 1	**@(Addr)SA(ArmData)**	
Read Alarm Limit Value of Counter 1	**@(Addr)RA**	
Set Digital Output Value	**@(Addr)DO(DoData)**	
Read Digital Output and Alarm Status	**@(Addr)DI**	
Special Command		
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)(SafeValue)**	
Read Host WatchDog / Safe Value	**~(Addr)3**	
Host is OK	**~****	

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

**** Please refer the manual in PDF file format in the CD for detail description of these commands.***

6. ADLINK on the Internet

The full version manual can be download from website
http://www.adlink.com.tw/download/manual/index.htm#6000

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