DMD422 Digital Microstepping Drive

Introduction

The DMD422 is a fully digital microstepping drive based on a DSP with advanced control algorithm. It brings a unique level of system smoothness, providing optimum torque and eliminates mid-range instability. Motor self-test and parameter auto-setup technology offers optimum matching with different motors and ease of use. The driven motors can run with much lower noise, less heating, smoother movement than most of the stepper drives on the markets. Its unique features make the DMD422 an ideal solution for applications that require low-speed smoothness and optimum performance. Compared with DMD432 digital stepper drive, DMD422 has smaller size and therefore, lower cost.

Features

- Anti-Resonance, provides optimum torque and eliminates mid-range instability
- Multi-Step allowing a low resolution step input to produce a higher microstep output for smooth system performance
- Microstep resolutions programmable, from full-step to 102,400 steps/rev
- Supply voltage up to +40 VDC
- Output current programmable, from 0.3A to 2.2A
- Pulse input frequency up to 75 KHz
- TTL compatible and optically isolated input
- Automatic idle-current reduction
- Suitable for 2-phase and 4-phase motors
- Support PUL/DIR and CW/CCW modes
- Over-voltage, over-current, phase-error protections

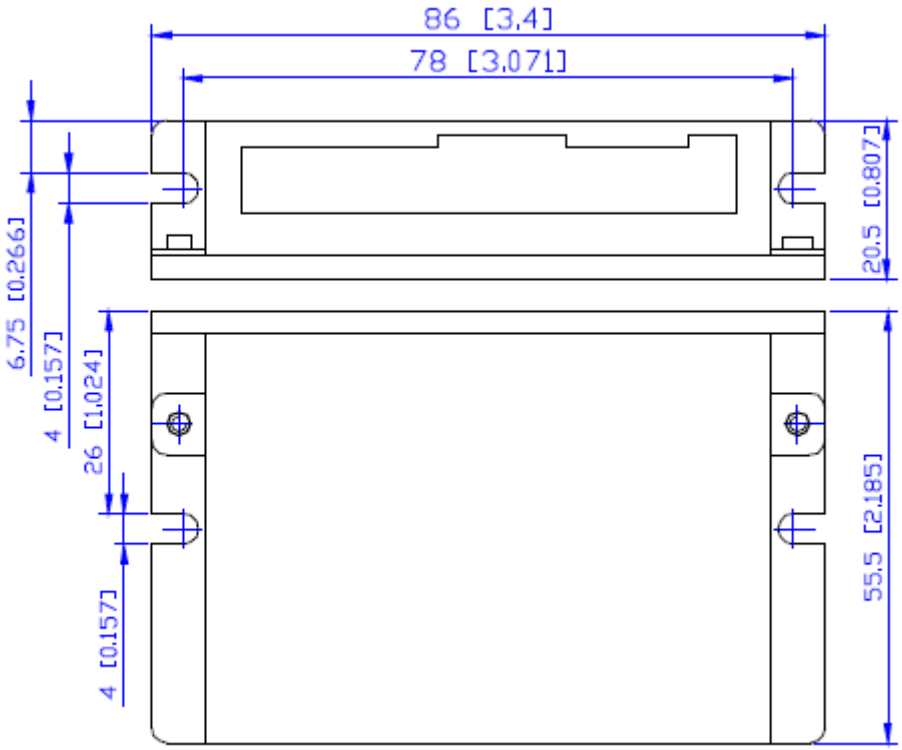
Applications

It can be used in various kinds of machines, such as laser cutters, laser markers, high precision X-Y tables, labeling machines and so on. Its unique features make the DMD422 drive an ideal solution for applications that require low-speed smoothness.

Electronical Specification (Tj = 25ºC/77ºF)

Parameters	DMD422		
	Min.	**Typical**	**Max.**
Output current (A)	0.3	-	2.2 (1.6 RMS)
Supply voltage (VDC)	+20	-	+40
Logic signal current (mA)	7	10	16
Pulse input frequency kHz)	0	-	75
Isolation resistance (MΩ)	500		

Mechanical Specifications (in mm [inch], 1 inch = 25.4 mm)



Pin Assignment and Description

The DMD422 has two connectors, connector P1 for control signals connections, and connector P2 for power and motor connections. The following tables are brief descriptions of the two connectors. For more detailed descriptions of the pins and related issues, please refer to Section 4, 5 and 9 of ***User's Manual for DMD422 Digital Microstepping Drive (Rev.1.0)***

Connector P1 Configurations

Pin Function	Details
PUL	**Pulse signal**: In single pulse (pulse/direction) mode, this input represents pulse signal, each rising or falling edge active (software configurable); 4-5V when PUL-HIGH, 0-0.5V when PUL-LOW. In double pulse mode (pulse/pulse). this input represents clockwise (CW) pulse, active both at high level and low level (software configurable). For reliable response, pulse width should be longer than 7.5μs. Series connect resistors for current-limiting when +12V or +24V used. The same as DIR and ENA signals.
DIR	**DIR signal**: In single-pulse mode, this signal has low/high voltage levels, representing two directions of motor rotation; in double-pulse mode (software configurable), this signal is counter-clock (CCW) pulse, active both at high level and low level (software configurable). For reliable motion response, DIR signal should be ahead of PUL signal by 5μs at least. 4-5V when DIR-HIGH, 0-0.5V when DIR-LOW. Please note that rotation direction is also related to motor-drive wiring match. Exchanging the connection of two wires for a coil to the drive will reverse motion direction.
OPTO	Opto-coupler power supply, and the typical voltage is +5V. Series connect resistors (at the PUL, DIR, ENA terminals) for current-limiting when +12V or +24V used.
ENA	**Enable signal**: This signal is used for enabling/disabling the drive. High level for enabling the drive and low level for disabling the drive. Usually left **UNCONNECTED (ENABLED)**.

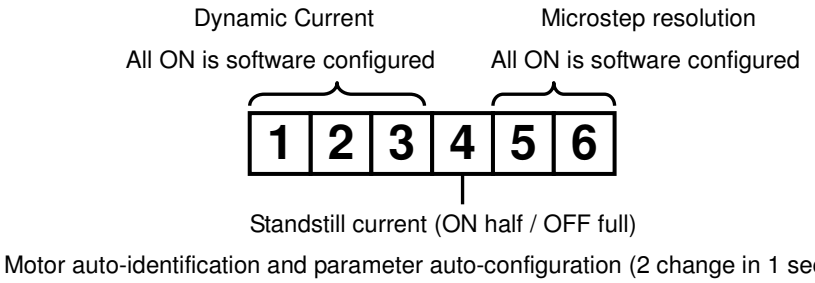
Connector P2 Configurations

Pin Function	Details
+VDC	Power supply, 20~40 VDC, Including voltage fluctuation and EMF voltage.
GND	Power Ground
A+, A-	Motor Phase A
B+, B-	Motor Phase B

Microstep Resolution Selection

Microstep resolutions and output current are programmable, the former can be set from full-step to 102,400 steps per resolution and the latter can be set from 0.3A to 2.2A. Please see more information about **Microstep and Output Current Setting** in Section 13 in **the Manual (Rev.1.0)**.

However, when it's not in software configured mode, this drive uses a 6-bit DIP switch to set microstep resolution and motor operating current, as shown below:



When it's not in software configured mode, microstep resolution is set by SW5 and SW6 of the DIP switch as shown in the following table:

Microsteps / full step	Microsteps / rev. (for 1.8°motor)	SW5	SW6
1 to 512	**Default / Software configured**	**ON**	**ON**
8	**1600**	OFF	ON
16	**3200**	ON	OFF
32	**6400**	OFF	OFF

Current Setting

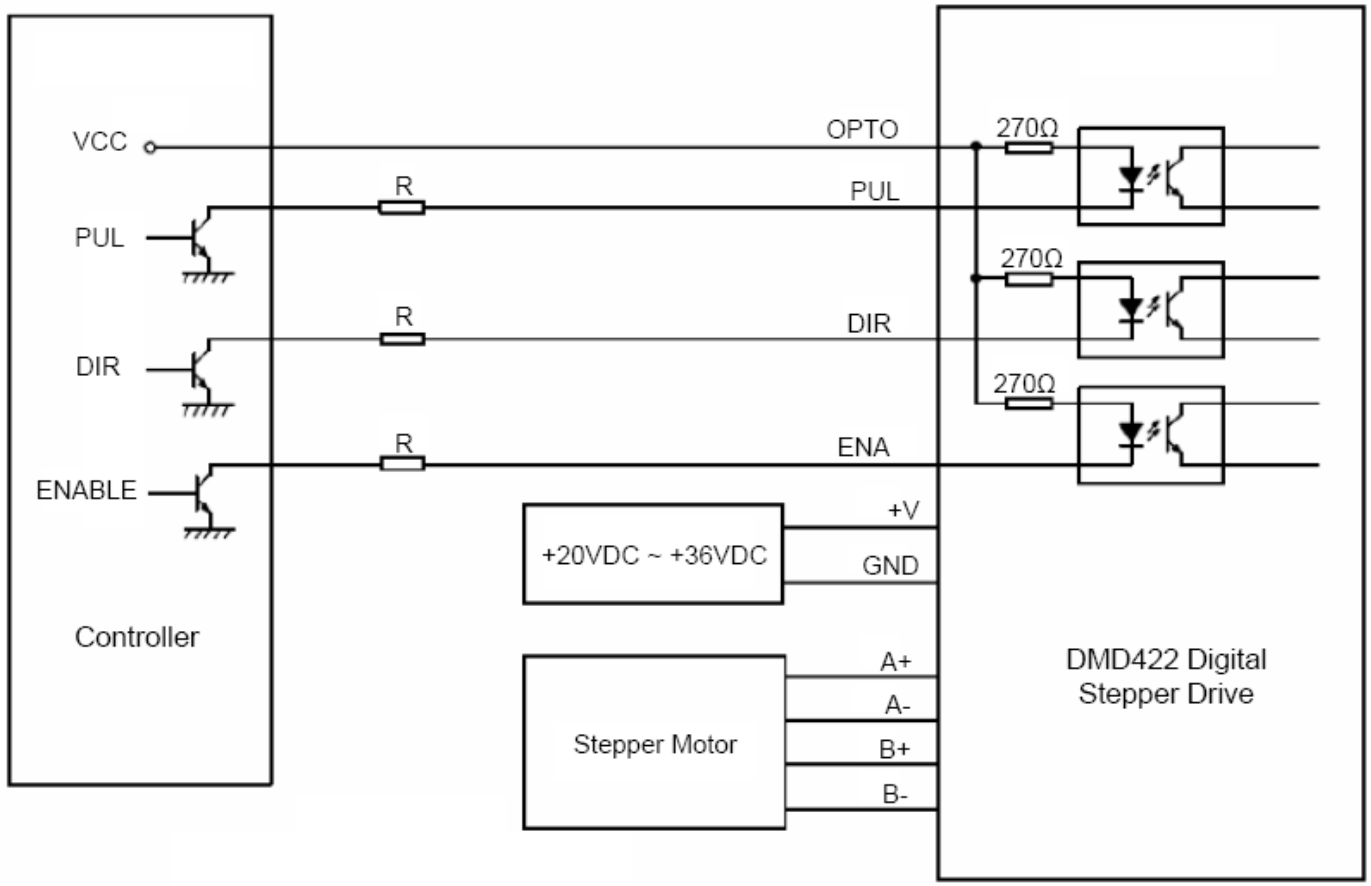
When it's not in software configured mode, the first three bits (SW1, 2, 3) of the DIP switch are used to set the dynamic current. Select a setting closest to your motor's required current.

Peak Current	RMS Current	SW1	SW2	SW3
Default/Software configured (0.3A to 2.2A)		**ON**	**ON**	**ON**
0.5A	**0.35A**	OFF	ON	ON
0.7A	**0.50A**	ON	OFF	ON
1.0A	**0.71A**	OFF	OFF	ON
1.3A	**0.92A**	ON	ON	OFF
1.6A	**1.13A**	OFF	ON	OFF
1.9A	**1.34A**	ON	OFF	OFF
2.2A	**1.56A**	OFF	OFF	OFF

Notes: Due to motor inductance, the actual current in the coil may be smaller than the dynamic current setting, particularly under

high speed condition.

Typical Connection



R=0 if VCC=5V;
R=1K (Power > 0.125W) if VCC=12V;
R=2K (Power > 0.125W) if VCC=24V;
R must be connected to control signal terminal.

*** For full technical and installation details of DMD422 Digital Microstepping Drive, please refer to the ***User's Manual for DMD422 Digital Microstepping Drive (Rev.1.0.)***

(V09.0715)