

Application Note: **OPTO1** I/O_Module_Rack Adapter

Rev. 7 5/9/00

1. Product Description

This Adapter Card plugs into the industry standard I/O Module Rack such as OPTO22[™], making the SmartMotor control the industry standard I/O module. The Adapter receives a DIN or DOUT command from the SmartMotor on the AniLink port and controls up to 16 digital modules on the rack as a group of 8 inputs or outputs.

2. Specifications

2.1 Electrical

Power Requirement:

1) Adapter

The adapter operates on +5V DC. The SmartMotor, through the AniLink connector, will supply this power.

2) Rack

The logic side of the I/O modules on the rack must be of +5V. That is, for output modules, the user must select the modules with the control voltage of +5V (example: ODC5). For input modules, the user must select modules with the supply voltage of +5V (example: IDC5).

The adapter card does not support I/O Modules that require more than 25 mA of the input current.

In order to operate these I/O modules, the rack needs +5V supply. The user must supply this +5V. The current requirement on this +5V depends on how many I/O modules are present on the rack and the type of I/O modules selected. A typical I/O module needs about 20 mA of supply current. But I/O modules from some manufacturer may draw more than 20mA each in worst case. If 16 modules are present on the rack, this means that Vcc (+5V) of over 320 mA is needed.

The +5V for the rack may be supplied from one of the SmartMotor I/O connectors (SmartMotor rev. Q1 and later can supply about a total of 350 mA through the I/O connector.) The user can run wires from the SmartMotor I/O connector to the power terminal block on the rack. Also one of the 4-pin connector J1 or J2 on OPTO1 adapter is an AniLink connector (pin 1: +5V and pin 2:GND) so this can supply +5V to the rack. The user should make sure that the +5V at the rack is close to 5V.

If other peripherals are drawing a current from the SmartMotor and there is no room for the SmartMotor to supply +5V to the rack, then the user must use an external +5V supply for the rack. In this case, the user must make sure that the Smartmotor powers up at the same time with the rack power supply or earlier. If the rack power powers up first, the device on the OPTO1 adapter may latch up, losing the communication with the SmartMotor. If this happens, power down everything, power up SmartMotor first, then power up the rack power.

2.2 Mechanical

Dimensions:

2.8(W) x 1.6 (L) x 0.8 (H) inches

3. Installation

3.1 50-pin connector

The rack must have a standard 50-pin connector or 50-pin card edge to connect to the adapter.

A typical I/O rack has a 50-pin connector or 50-pin card edge or none (terminal block). The adapter can be plugged into to the connector or card edge, but not to the terminal block.

I/O racks made by Grayhill (Part No. 70RCK8-HL, 70RCK16-HL) have both connector and card edge on the racks so they are flexible.





Warning: The adapter card can inadvertently be plugged into the 50- pin connector one position shifted. If the +5V supply from the rack connects to pin 49 of the 50-pin connector and the IC on the adapter happens to be an output low, the IC can be damaged. In order to prevent this, do not install the Vcc jumper at pin 49 on the rack. Also, before connecting the adapter, look on the backside of the board to see the pinout.

Do not install	
these jumpers	I/O Rack



Figure 2: Caution Do Not Install Jumpers

3.2 Anilink connector

One of the 4-pin ports on the OPTO1 board connects directly to the Anilink port on the SmartMotor. See Appendix A for your SmartMotor.

The cable CAB-4P24P (4 pin to 4 pin) can be used for this. The other 4pin port on the board is used for chaining other peripherals to the Anilink port. The pin assignment of the connector is shown below:



Connector for the cable. (molex 50-57-9404)



If using a D-type motor with 15 pin D-sub I/O connector. You can make a cable described below or modify an Animatics opto 1 cable (p/n# CAB-SM4P24P) to match schematic below.



Figure 4: Making Cable for 15 Pin D-sub Connector (D-type SmartMotor)

4. I/O Addressing

There is an address jumper, J3 on the adapter card. When the jumper positions 2 and 3 are off, address A controls Module locations 0 - 7 on the rack and address B controls Module position 8 - 15. So DINA or DOUTA controls the location 0 - 7, and DINB or DOUTB controls position 8 - 15. Therefore, the Module positions are controlled as a group of 8. Before issuing DIN command, the port must be high. So DOUT(A-H)0,255 may have to be issued first.

When the jumper position 2 is closed, address C controls position 0-7 and address D controls position 8-15. See the table below for other addresses.

Jumper State	AniLink Address	Module Position
2 3		
0 0	А	0 – 7
	В	8 – 15
X O	С	0 – 7
	D	8 – 15
0 X	E	0 – 7
	F	8 – 15
X X	G	0-7
	Н	8 - 15

X: Jumper closed O: Jumper off

5. Programming

For detail of the programming language itself, refer to ANIMATICS SmartMotor user's Manual.

APPENDIX A

<u>SECTION A.1:</u> Motor I/O Connector types:

SmartMotors have two types of I/O connectors:

D-SUB type (15pin D-sub connector and 7pin-combination connector)
SQUARE type (MolexTM connectors and 7pin-combination connector)

Refer to Figure A.1 for typical D-sub Motor. Refer to Figure A.2 for typical SQUAERE Motor.

Typical D-Type Motor:



Figure A. 1: D-Sub Type Motor (15pin D-sub connector and 7pin-combination connector)

Typical "SQUARE" Type Motor:



Figure A.2: SQUARE Type Motor (MolexTM connectors and 7pin-combination connector)

<u>SECTION A.2</u>: I/O Connector Pinouts This section provides pinouts for the D-sub connector and Molex I/O connector.

D-sub Connector Pinouts



CN1: 7 PIN COMBO D-SUB MALE CONNECTOR

PIN# NAME		NAME FUNCTIONS	
1	Pin G	Go-Synchronization Pin	
2	+5V OUT	+5V Out	
3	RS232 TX	RS232-Transmit	
4	R5232 RX	R5232-Receive	
5	GND	Signal Ground	
A1	POWER	Power,+24v to 48v	
A2	PWR GND	Power Ground	

		SOFTWARE SELECTABLE I/O PIN FUNCTIONS					
PIN#	NAME			DIGITAL 1/0 (TTL)	ANALOG INPUT (10 bit)		
1	Port A	Step Input I	External Encoder A Input*	5V	0 to 5V		
2	Port 8	Direction Input	External Encoder 8 Input*	5∀	0 to 5V		
3	Port C	Right Limit Input		5V	0 to 5V		
4	Part D	Left Limit Input		5V	0 to 5V		
5	Port E	Anilink Data R	S-485 Signal A	5V	0 to 5V		
6	Port F	Anilink Clock R	S-485 Signal B	57	0 10 5V		
7	Port G	Co-Synchronization Pin Ri	S-485 Adapter ontrol Line	57	0 to 5V		
8	ENCA OUT	Encoder A Output		2			
9	ENCB OUT	Encoder 8 Output					
10	RS232 TX	RS232-Transmit					
11	R\$232 RX	RS232-Receive					
12	+5V OUT	+5Y Dut					
13	GND	Signal Ground					
14	PWR GND	Power Ground					
15	POWER	Power,+24v to 48v					

Figure A. 3: D-Sub Type Motor Pinout

(* SM2315D does not have external encoder capabilities)

Molex connectors SM17xx and 23xx (SmartMotor SQUARE)



Figure A.4: Square Type Motor Pinout (SM17xx and SM23xx)





Figure A. 5: Square Type Motor Pinout (SM34xx)