jw Electronics

SRV-4 MIDI Servo System

Installation and Operating Instructions

Product Description

The SRV-4 is a MIDI-controlled pulse width modulation (PWM) generator for the control of proportional servos and/or logic-switched devices, designed to be fitted as a permanent installation in a piece of equipment. Once installed, simply connecting the power to the unit will start its operation. Upon power-up reset, all eight servo outputs will be set to their nominal centre positions and all logic outputs will be at logic high.

On receipt of a Control Change message on the selected MIDI channel with an identifier in the range set by the control change group switches, the corresponding servo output given by the offset between the incoming message identifier and the base number of the selected group will be updated to reflect the new Control Change message value.

If the servo output affected by the incoming MIDI message is one of those in the range 0 to 3 inclusive, then the same-numbered logic output will go high if the message value is greater than or equal to half range (value 64 on a scale of 0 to 127) and low if the value less than half range.

Installation and Connection

Carefully remove the SRV-4 circuit from its protective packaging, handling the board by its edges only.

Four mounting holes of 3.2 mm diameter are provided on the circuit board to allow it to be fixed inside the instrument which it controls. Suitable methods of fixing include self-adhesive pillars and screws or bolts with insulating spacers. Whatever method is used, ensure that no metal can come into contact with any wiring tracks or components on the circuit board.

The MIDI input to the SRV-4 is via the standard 5-pin DIN connector at the end of the board. All other connections are made using pin headers or sockets as shown below.

MIDI Input

Servo Outputs

Logic Outputs

DC Power Input
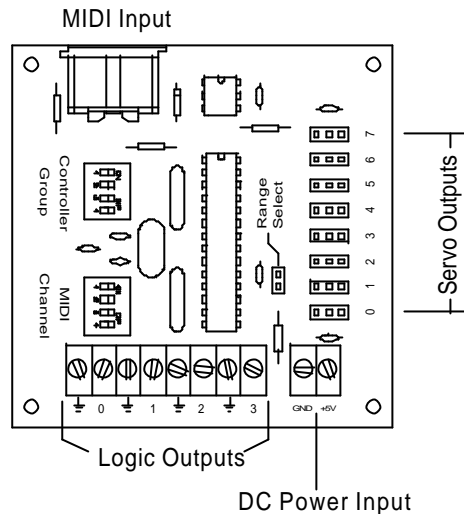
Each three-way servo output connector provides ground, power supply and signal connections, into which the flying lead connector of a proportional servo may be plugged. Ensure that the servo plug is the correct way around with its white lead towards the centre of the circuit board.

The logic outputs are screw terminal types. The signal output of each of these is labelled 0 to 3 inclusive, with a ground connection for each output shown by the ' ' symbol. These outputs are digital, active high.

Power is supplied to the board via a two-way screw terminal block. The SRV-4 requires a DC power supply in the range 4.5 to 5.5 Volts (5V nominal). This supplies both the on-board circuitry and any servos connected to it.

It is essential that the power supply connections are made with the correct polarity. Failure to do so will destroy the SRV-4 device.

Setting the MIDI Channel Number

The SRV-4 can respond to any MIDI channel number in the range 1 to 16, according to the settings of the 4-way switch unit nearest to the logic outputs. Viewed from the board edge nearest the switches, moving a switch slider up turns that switch on and moving it down turns it off. The settings required for each MIDI channel are as below:

MIDI Channel	Sw 4	Sw 3	Sw 2	Sw 1	MIDI Channel	Sw 4	Sw 3	Sw 2	Sw 1
1	OFF	OFF	OFF	OFF	9	ON	OFF	OFF	OFF
2	OFF	OFF	OFF	ON	10	ON	OFF	OFF	ON
3	OFF	OFF	ON	OFF	11	ON	OFF	ON	OFF
4	OFF	OFF	ON	ON	12	ON	OFF	ON	ON
5	OFF	ON	OFF	OFF	13	ON	ON	OFF	OFF
6	OFF	ON	OFF	ON	14	ON	ON	OFF	ON
7	OFF	ON	ON	OFF	15	ON	ON	ON	OFF
8	OFF	ON	ON	ON	16	ON	ON	ON	ON

Setting the Control Change Group Number

The SRV-4 will respond to a group of eight consecutive Control Change messages with an identifier base value according to the settings of the 4-way switch unit nearest the MIDI input connector. The settings required for each Control Change group of values are as below:

Control Change Group	Sw 4	Sw 3	Sw 2	Sw 1	Control Change Group	Sw 4	Sw 3	Sw 2	Sw 1
0 - 7	OFF	OFF	OFF	OFF	64 - 71	ON	OFF	OFF	OFF
8 - 15	OFF	OFF	OFF	ON	72 - 79	ON	OFF	OFF	ON
16 - 23	OFF	OFF	ON	OFF	80 - 87	ON	OFF	ON	OFF
24 - 31	OFF	OFF	ON	ON	88 - 95	ON	OFF	ON	ON
32 - 39	OFF	ON	OFF	OFF	96 - 103	ON	ON	OFF	OFF
40 - 47	OFF	ON	OFF	ON	104 - 111	ON	ON	OFF	ON
48 - 55	OFF	ON	ON	OFF	112 - 119	ON	ON	ON	OFF
56 - 63	OFF	ON	ON	ON	120 - 127	ON	ON	ON	ON

Setting the Output Pulse Width Range

When a 'Range Select' pins are shorted by a jumper link, the low output pulse width range is selected which covers approximately 1.0 to 2.0 ms. When the pins are left open, the high range is selected, covering approximately 0.5 to 2.5 ms. The selection required for any particular application will depend on the sensitivity of the servo devices being used and the movement range required.

Electrical and MIDI Specifications

Supply voltage: 4.5 to 5.5 V DC.
Supply current: 3 mA typical in addition to current drawn by output loads.
Power-up: Initial supply voltage rise rate must be greater than 0.05 V/ms for reliable starting.
Outputs: 20 mA maximum source / sink current per output.
MIDI: Responds to Control Change messages, running status is supported.
PWM range of servo outputs: 0.992 to 2.008 ms pulse width low range, 0.480 to 2.512 ms pulse width high range, Update time: 20.736 ms per output.

Important Note

Since the SRV-4 is intended to form part of an overall system, these instructions are to be considered as being for guidance only. It is assumed that the installer has a level of competence appropriate to the system being constructed. *jw Electronics* will take no responsibility for any accident or damage to personnel or property caused by the mis-use of any of its products.

It is the responsibility of the installer to ensure that any system incorporating this unit conforms to the relevant laws concerning electromagnetic compatibility (EMC) and/or electrical safety.

MIDI Implementation Chart

Function...		Transmitted	Recognised	Remarks
Basic	Default	X	O 1-16	Set by DIP
Channel	Changed	X	X	switches
	Default	X	X	
Mode	Messages	X	X	
	Altered	X	X	
Note :		X	X	
Number :	True voice	X	X	
Velocity	Note ON	X	X	
	Note OFF	X	X	
After	Key's	X	X	
Touch	Ch's	X	X	
Pitch Bender		X	X	
Control		X	O 0 - 127	Set by DIP
Change			in groups	switches
			of 8	
Prog :		X	X	
Change :	True #	X	X	
System Exclusive		X	X	
System :	Song Pos	X	X	
Common :	Song Sel	X	X	
:	Tune	X	X	
System : Clock		X	X	
Real Time : Commands		X	X	
	: Local ON/OFF	X	X	
Aux	: All Notes OFF	X	X	
Message	: Active Sense	X	X	
	: Reset	X	X	
Notes				

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Mode 1 : OMNI ON,  POLY  Mode 2 : OMNI ON,  MONO        O : Yes
Mode 3 : OMNI OFF, POLY  Mode 4 : OMNI OFF, MONO        X : No
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