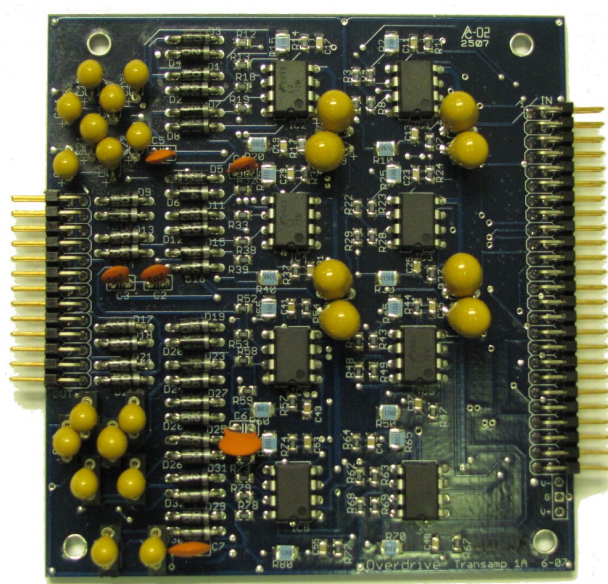


Transamp How-to

Rev 1.0



DESCRIPTION

The Transamp board is for driving hydraulic valves containing coils, sometimes called “torque-motor valves”. The Transamp takes, as input, the stack-EC analog output card signals. The Transamp board consists of an array of sixteen voltage-to-current amplifiers (transconductance amps) capable of driving sixteen valves. The board requires an external +/- 12V supply. The maximum current sink/source is 70mA. The output current range is typically set during manufacturing, but can be changed by the end-user.

The Transamp board is manufactured in PC-104 form factor for ease of integration into PC-104 stacks, but the board does not need to be plugged into a PC-104 bus. It is recommended that the bus headers are not populated, as this increases the length of the bus, possibly introducing signal reflections.

CONNECTOR PINOUTS

The Transamp board has an input connector which is directly compatible with the Diamond Systems “Ruby-MM-1612” analog output card.

The output connector has the same pinout as the input connector, but implements only the first 26 pins.

IN			
AGND	1	2	Input-V0
AGND	3	4	Input-V1
AGND	5	6	Input-V2
AGND	7	8	Input-V3
AGND	9	10	Input-V4
AGND	11	12	Input-V5
AGND	13	14	Input-V6
AGND	15	16	Input-V7
Input-V8	17	18	Input-V9
Input-V10	19	20	Input-V11
Input-V12	21	22	Input-V13
Input-V14	23	24	Input-V15
	25	26	
	27	28	
	29	30	
	31	32	
	33	34	
	35	36	
	37	38	
	39	40	
	41	42	
	43	44	
	45	46	
	47	48	
	49	50	

OUT			
AGND	1	2	Out-A0
AGND	3	4	Out-A1
AGND	5	6	Out-A2
AGND	7	8	Out-A3
AGND	9	10	Out-A4
AGND	11	12	Out-A5
AGND	13	14	Out-A6
AGND	15	16	Out-A7
Out-A8	17	18	Out-A9
Out-A10	19	20	Out-A11
Out-A12	21	22	Out-A13
Out-A14	23	24	Out-A15
	25	26	

POWER	
1	V-
2	G
3	V+

PIN DESCRIPTIONS

Pin Name	Description
AGND	analog ground
Input-V0 to Input-V15	voltage input
Out-A0 to Out-A15	current output
V+	12V supply
V-	-12V supply
G	supply ground

CHANGING THE CURRENT RANGE

There are sixteen 1% resistors which set the output current range, one for each channel (see table below). These gain resistors are normally populated during manufacturing for a given current range, but they can also be changed by the end user, utilizing a soldering iron or two.

The output current range is defined by:

$$R_x = \frac{\text{voltage range}}{\text{current range}}$$

For example, a common configuration of the Transamp board provides +/- 10mA outputs for +/- 5V inputs. The required value for the gain resistor would be:

$$R_x = \frac{5V}{10mA} = 500 \text{ ohms}$$

The following table lists gain resistor values that can be used to achieve typical output current ranges.

Current range (mA)	Gain resistor value (ohms)
10	500
20	250
30	166
40	125
50	100
60	83

The following table lists which gain resistor and filter capacitor pertains to each output:

Out #	Gain Resistor	Filter Capacitor
0	R10	C14
1	R2	C10
2	R20	C20
3	R15	C15
4	R30	C26
5	R25	C21
6	R40	C32
7	R35	C27
8	R50	C38
9	R45	C33
10	R60	C44
11	R55	C39
12	R70	C50
13	R65	C45
14	R80	C56
15	R75	C51

TESTING

The outputs can be tested with an ammeter in series with a load resistor. Make sure the load resistor is of a value that it does not require output voltages above the power supply range ($\pm 12\text{V}$) to achieve the required current. Typically about 150 ohms should suffice during testing. Note that the constant current output may decrease over time as an amplifier heats up, but peak current is supplied for a sufficient period of time for most valves in servo applications.

If a hydraulic servo is oscillating, filter capacitors may be necessary to change the frequency of oscillation of a Transamp circuit containing a highly inductive valve. Refer to the table above listing the filter capacitor for each output. Note that the addition of series inductors can also have the same effect, but would change the resistance of the load.