REX

Relay Expander

by

CircuitWerkes

Quick Reference Guide

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Description

The CircuitWerkes REX Relay Expander is an interfacing device which accepts a wide variety of signals and converts them to multiple contact closure outputs. The inputs are fed to the REX through a DB-9 connector and may be either active-high or active-low. An active-high signal implies that a positive voltage (3-12V in this case) applied to the input corresponds to a logical “true”, while an active-low signal implies that grounding the input corresponds to a logical “true”. to the input The inputs can be optocoupled or the relays can be driven directly by the inputs if chosen by the user.

Each of the six inputs controls a group of four SPST relay outputs allowing for simultaneous control of multiple devices. Also, inputs can be paralleled if the user needs more than four contact closure outputs. The input D-9 connector (see figure 5) is wired as follows:

Pin # 1 = Input 1
Pin # 2 = Input 2
Pin # 3 = Input 3
Pin # 4 = Input 4
Pin # 5 = Input 5
Pin # 6 = Input # 6
Pin # 7 = Active Common LED (High output)
Pin # 8 = Ground
Pin # 9 = Ground

The outputs are brought out on a 50-pin SCSI (RJ-21) connector which interfaces with a standard telco-66 punchblock to allow for easy wiring.

Each of the six channels has an associated “Active” LED on the rear of the board to provide a quick visual reference of activity on the channel. There is also a master “Active” yellow LED which is located on the front of the device.

Operational Overview

The REX is powered by a 9V DC (500 mA) power supply which is provided with the REX on purchase. The REX can also be daisy-chained with other REXs using the screw terminal located next to the coaxial power connector on the board. The REX has two internal voltage regulators to provide power to the board's components. The green LEDs located on the front of the REX indicate that both power supplies (P1 and P2) are operational. The red LED indicates that there has been a failure in one of the two power supplies.

Inputs are supplied to the REX by either grounding or supplying a high voltage to pins 1-6 of the DB-9 connector. These pins correspond to relay groups 1-6. Each relay group must be jumper configured to accept the active high or active low signals. The jumpers for each relay group are adjacent to it's relays on the board. Each relay group has 3 associated jumpers.

Jumper x.1 (with x corresponding to the number of the relay group) is the mode select jumper. The 3 settings are Direct Drive Low (optocouplers are bypassed, relays are activated by grounding input pin, denoted by DD_L); Isolated Low (Inputs are optocoupler isolated, relays are activated by grounding input pin, denoted by I_L); and Isolated High (Inputs are optocoupler isolated, relays are activated by applying 3-12V to input pin, denoted by I_H).

The other two jumpers in each relay group, jumper x.2 and x.3 are reliant on the mode chosen for jumper x.1. If DD_L mode is selected, jumpers x.2 and x.3 are irrelevant and can therefore be in any configuration. If the I_L mode is chosen, jumpers x.2 and x.3 should be set to “L”. If mode I_H is chosen, x.2 and x.3 should be set to “H”. Table 1 and Figures 1-3 on the following pages show the jumper settings for each relay mode.

Jumper	Function
JP X.1	DD_L = Direct Drive Low Mode (Direct relay control, Active-Low) I_L = Isolated Low Mode (Optocoupled, Active-Low) I_H = Isolated High Mode (Optocoupled, Active-High)
JP X.2	L = Active-Low H = Active-High
JP X.3	L = Active-Low H = Active-High
JP 7	On = Pin 7 of DB-9 connector is associated with “Active” LED Off = Pin 7 of DB-9 connector is grounded

Direct Drive (Active Low) Mode (JP X.2 and X.3 N/A)

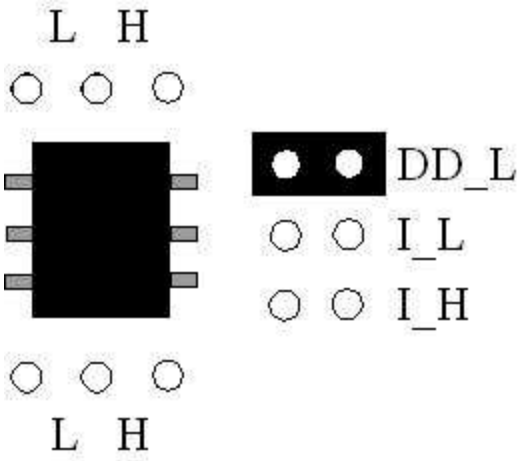
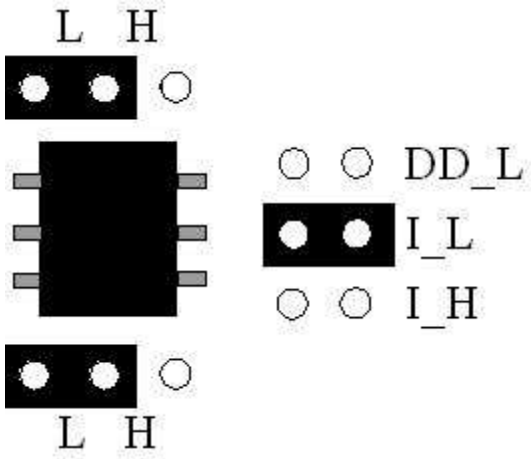


Figure 1

Isolated (Active Low) Mode

Figure 2



Isolated (Active High) Mode

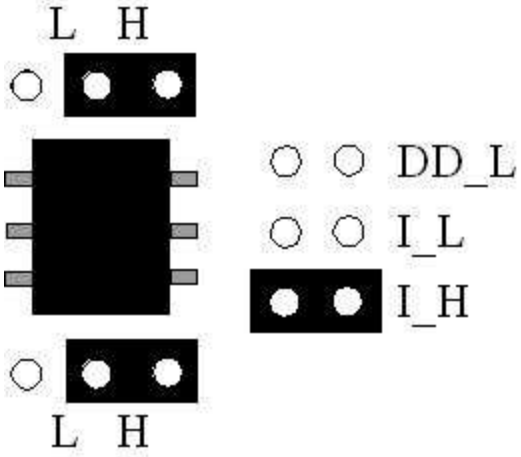
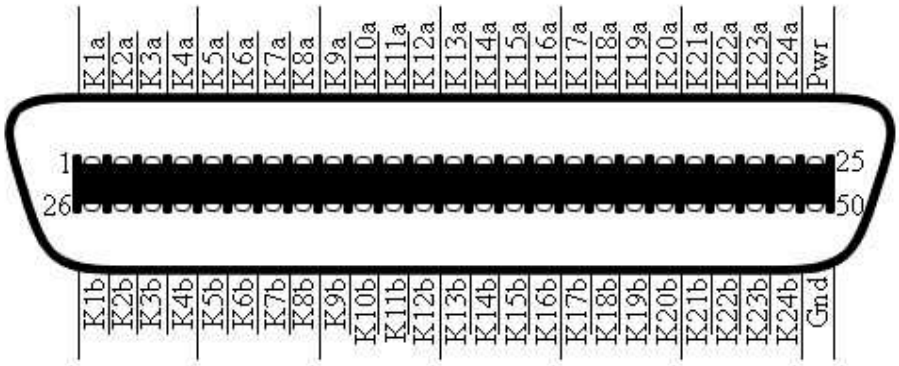
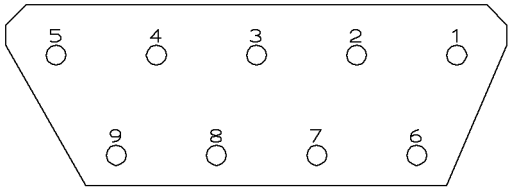


Figure 3



The relay contacts are brought out of the device on the 50-pin RJ-21 connector located next to the DB-9 connector. This connector provides an easy interface to a standard Telco punch block, which can be purchased through CircuitWerkes, or a wide variety of electronics vendors. Figure 4 shows the layout of the RJ-21 connections.

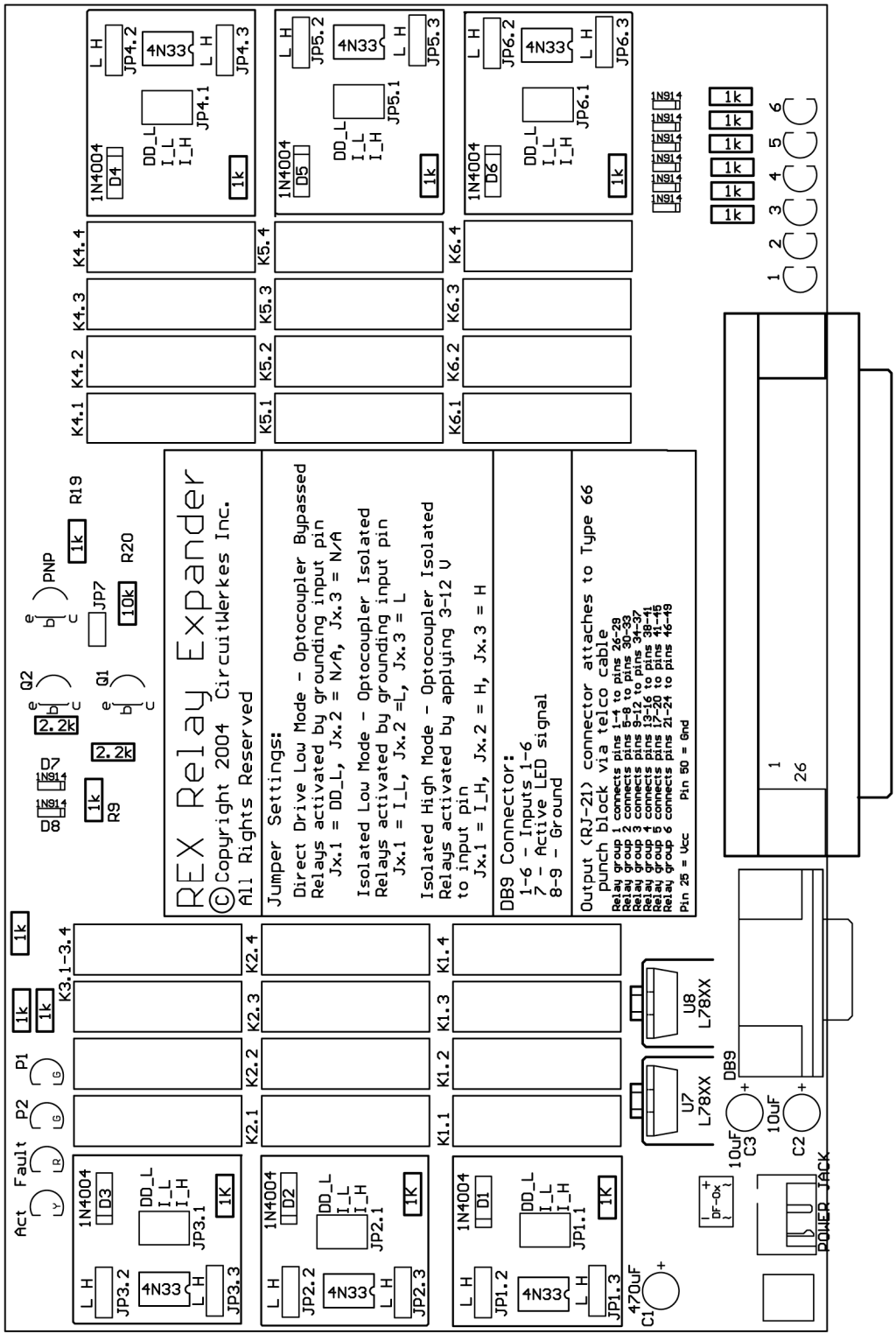
Figure 4



REX D-9 input connector as seen from the front of the REX.

Pin # 1 = Input 1
Pin # 2 = Input 2
Pin # 3 = Input 3
Pin # 4 = Input 4
Pin # 5 = Input 5
Pin # 6 = Input # 6
Pin # 7 = Active LED
Pin # 8 = Ground
Pin # 9 = Ground

Figure 5


REX Relay Expander
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Jumper Settings:
Direct Drive Low Mode - Optocoupler Bypassed
Relays activated by grounding input pin
Jx.1 = DD_L, Jx.2 = N/A, Jx.3 = N/A
Isolated Low Mode - Optocoupler Isolated
Relays activated by grounding input pin
Jx.1 = I_L, Jx.2 =L, Jx.3 = L
Isolated High Mode - Optocoupler Isolated
Relays activated by applying 3-12 V
to input pin
Jx.1 = I_H, Jx.2 = H, Jx.3 = H
DB9 Connector:
1-6 - Inputs 1-6
7 - Active LED signal
8-9 - Ground
Output (RJ-21) connector attaches to Type 66
punch block via telco cable
Relay group 1 connects pins 1-4 to pins 26-29
Relay group 2 connects pins 5-8 to pins 30-33
Relay group 3 connects pins 9-12 to pins 34-37
Relay group 4 connects pins 13-16 to pins 38-41
Relay group 5 connects pins 17-20 to pins 41-45
Relay group 6 connects pins 21-24 to pins 46-49
Pin 25 = Vcc Pin 50 = Gnd
Act
Fault
P1
P2
K1.1
K1.2
K1.3
K1.4
K2.1
K2.2
K2.3
K2.4
K3.1-3.4
K4.1
K4.2
K4.3
K4.4
K5.1
K5.2
K5.3
K5.4
K6.1
K6.2
K6.3
K6.4
JP1.1
JP1.2
JP1.3
JP2.1
JP2.2
JP2.3
JP3.1
JP3.2
JP3.3
JP4.1
JP4.2
JP4.3
JP5.1
JP5.2
JP5.3
JP6.1
JP6.2
JP6.3
JP7
D1
D2
D3
D4
D5
D6
D7
D8
Q1
Q2
R9
R19
R20
U7 L78XX
U8 L78XX
C1 470uF
C2 10uF
C3 10uF
DB9
POWER JACK

REX Wiring Description

Group No.	Relay No.	50-Pin (RJ-21) Connector Pin No.	Standard Wire Color	Telco Block Wire Pair No.
Group 1	K1.1	1	Blue/White	Pair 1
		26	Blue	
	K1.2	2	Orange/White	Pair 2
		27	Orange	
	K1.3	3	Green/White	Pair 3
		28	Green	
	K1.4	4	Brown/White	Pair 4
		29	Brown	
Group 2	K2.1	5	Slate/White	Pair 5
		30	Slate	
	K2.2	6	Blue/Red	Pair 6
		31	Blue	
	K2.3	7	Orange/Red	Pair 7
		32	Orange	
	K2.4	8	Green/Red	Pair 8
		33	Green	
Group 3	K3.1	9	Brown/Red	Pair 9
		34	Brown	
	K3.2	10	Slate/Red	Pair 10
		35	Slate	
	K3.3	11	Blue/Black	Pair 11
		36	Blue	
	K3.4	12	Orange/Black	Pair 12
		37	Orange	
Group 4	K4.1	13	Green/Black	Pair 13
		38	Green	
	K4.2	14	Brown/Black	Pair 14
		39	Brown	
	K4.3	15	Slate/Black	Pair 15
		40	Slate	
	K4.4	16	Blue/Yellow	Pair 16
		41	Blue	
Group 5	K5.1	17	Orange/Yellow	Pair 17
		42	Orange	
	K5.2	18	Green/Yellow	Pair 18
		43	Green	
	K5.3	19	Brown/Yellow	Pair 19
		44	Brown	
	K5.4	20	Slate/Yellow	Pair 20
		45	Slate	
Group 6	K6.1	21	Blue/Violet	Pair 21
		46	Blue	
	K6.2	22	Orange/Violet	Pair 22
		47	Orange	
	K6.3	23	Green/Violet	Pair 23
		48	Green	
	K6.4	24	Brown/Violet	Pair 24
		49	Brown	
	Power Ground	25	Slate/Violet	Pair 25
		50	Slate	

REX Technical Specifications

Relays:	24 SPST relays operate in a variety of modes: SPST relays are rated at 20-VDC, 0.5-A max.
Connections:	
Output:	Output connector – Male 50-pin Centronics (RJ-21) connector, compatible with pre-wired telephone type 66 punchblocks.
Input:	6 opto-isolated inputs accept +5 to 24 V signals in active-high mode and 0V in active-low mode (see "Operational Overview"). Input connector – Female DB-9 connector
Indicators:	Front of box: Yellow (rightmost) LED indicates when any channel is active. Power fault indicator (red LED) turns on if either supply fails. Green LEDs indicate whether each individual power supply is operational. Leftmost green LED indicates PS1, other green LED indicates PS2 status. Back of PCB: Each LED indicates whether channels 1 – 6 are active, respectively.
Power requirements:	8-12 Volt AC/DC, 400 ma., 9Vdc 500 ma. wall transformer supplied
Physical Dimensions:	W 11" x D 5 1/4"' x H 1 ½"
Shipping Weight:	3.0 lbs.
Mounting Options:	RM-01 (1 Rack Unit Height)

Repair / Service Information:

IN THE EVENT OF THE NEED FOR SERVICE OR REPAIR, CALL CIRCUITWERKES AT (352) 335-6555 FOR A RETURN MERCHANDISE AUTHORIZATION NUMBER (RMA). THEN ***CAREFULLY PACKAGE THE UNIT ALONG WITH A NOTE DESCRIBING THE PROBLEM AND SEND IT TO THE ADDRESS BELOW. INCLUDE YOUR TELEPHONE NUMBER, ADDRESS AND E-MAIL, IF AVAILABLE, ON YOUR NOTE.*** CLEARLY INDICATE THE RMA NUMBER ON THE OUTSIDE OF THE BOX. WE CANNOT ACCEPT RETURNS WITHOUT AN RMA. BE SURE TO INCLUDE YOUR ADDRESS (NOT A PO BOX), TELEPHONE NUMBER AND BEST TIME TO CALL.

CircuitWerkes
ATTN: CUSTOMER SERVICE DEPT.
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CircuitWerkes Two Year Limited Warranty

This product is warranted against defects for two years from date of purchase from CircuitWerkes and CircuitWerkes authorized distributors. Within this period, we will repair it without charge for parts and labor. Proof of purchase-date required. Warranty does not cover transportation costs, or a product subjected to misuse, accidental damage, alteration (except as authorized by CircuitWerkes), improper installation, or consequential damages.

Except as provided herein, CircuitWerkes makes no warranties, express or implied, including warranties of merchantability and fitness for a particular purpose. Some states do not permit limitation or exclusion of implied warranties; therefore, the aforesaid limitation(s) or exclusion(s) may not apply to the purchaser. This warranty gives you specific legal rights and you may also have other rights which vary from state to state.