

TC-316 16 CHANNEL DIGITAL OUTPUT CARD FUNCTIONAL DESCRIPTION

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The TC-316 is a 16 channel digital output card, designed to translate multiplexed serial data into discrete, opto-coupler isolated outputs. Considerable flexibility has been provided in configuring the uncommitted 4N33 outputs, including pads for a common emitter buss, squelching diodes, source current limiting resistors, etc. Outputs may be configured to source or sink 5V logic, 12VDC, or 24VDC signals at up to 100MA. Typical applications include:

- Solid state audio source starts and other logic level "closures"
- Projector and deck source control
- Non-dim lighting control
- Audio track switching and muting functions
- Tally and status light drivers/operators panel display
- Rigging/curtain control
- Smoke and special effects control
- Exhaust/ventilation control
- Strobe and special effects projectors
- SMU (Show Monitor Unit/PLC) request/status interface

Specifically, the card is ideal for situations where total isolation is desired (to prevent ground loops, hum, and/or other problems associated with common grounds) and where high current drive is not required. The outputs are directly compatible for most interfaces requesting a "ground closure".

Individual tally LEDs are provided for each channel for status and diagnostics. Note that other 4N33 pin assignment compatible devices may be used, including opto-triacs (MCT-3010) and opto-FETS. The LEDs mimic the current into the opto device (in series) and not the actual output, so that a wide range of voltages and total isolation can be provided.

A toggle switch is provided which will inhibit all outputs in the down or disable position. This eliminates the need to remove the card or data cables during testing or maintenance.

Manual control for test and adjustment is accomplished using the interactive screen diagnostics included with the Show Control computer.

Although designed to fit in a standard card cage, the board may be configured for remote use near the controlled device to minimize cable requirements.

Data and strobe signals are strapped for the polarity provided by Triad controllers; however, jumpers can be made to invert either the strobe or data signals. It is also possible to "daisy chain" two cards in series, for a total of 32 channels from one digital DX output.

Stock configurations of the card are as follows:

TC-316 U	Uncommitted outputs [YELLOW LEDs]
TC-316 G	(Sink) emitters strapped to common buss, squelch diodes provided to collector buss [GREEN LEDs]
TC-316 S	(Source) collectors strapped to collector buss [RED LEDs]

Physical Dimensions:

4.5" x 6.5" printed circuit board
22/44 .156 center gold edge connector

Power Requirements:

+5VDC @ 320 MA, +12V/+24V as required by controlled device, up to 1.6 A total

JUMPERS/SWITCHES

SW1: Enables or disables the digital outputs.

- Pin 1. Connects to ground
- Pin 2. Connects to pin 9 (CLR) of U6 and U7 (74HCT164)
- Pin 3. N/C

U1: Will either contain a 8 pin dip header or an opto isolator (HCPL2531) and is used for input isolation when needed.

- Pin 1. + Opto In (Via R1 from pin 1 of J1 and pin B of edge connector)
- Pin 2. - Data In (TTL) (Pin 5 of J1 and pin 2 of edge connector)
- Pin 3. - Strobe In (TTL) (Pin 6 of J1 and pin C of edge connector)
- Pin 4. + Opto In (Via R2 from pin 1 of J1 and pin B of edge connector_)
- Pin 5. Connects to ground
- Pin 6. Isolated Strobe (TTL)
- Pin 7. Isolated Data (TTL)
- Pin 8. Connects to VCC

Note: If NOT using the HCPL2531 opto then tie pin 2 to pin 7 and pin 3 to pin 6.

J1: J1 is a 6 pin header used for external serial data when the board is not installed in a card frame, and for test points.

- Pin 1. + Opto 5 VDC (Connects to R1 and R2 and B of the edge connector)
- Pin 2. Data Output (Pin 3 of the edge connector)
- Pin 3. Ground
- Pin 4. Pullup resistor to VCC (can be used as tellback)
- Pin 5. Data Input (Pin 2 of the edge connector)
- Pin 6. Strobe Input (Pin C of the edge connector)

Recommended LED current limiting resistors:

LED/DIODE [1]	MIN.	MAX.
5VDC	180/240/330 ohm (can be strapped to VCC) *	
12VDC	560/680/820 ohm	
15VDC	680/820/1.0k ohm	
24VDC	1.2k/1.5k/1.8k ohm	
48VDC	you're on your own	

* In Triad supplied card frames, the LED/Opto power is the +5 VDC VCC and 180 ohm resistors are used.

I/O PORTS**Free Edge Buss Connector
Rear View**

SOLDER SIDE		COMPONENT SIDE	
+5VDC Logic	A	1	+5VDC LED Common
+5VDC Opto	B	2	Data In -
Strobe -	C	3	Data Out
Odd Emitter Buss	D	4	Even Emitter Buss *
Odd Collector Buss	E	5	Even Collector Buss **
Emitter 1	F	6	1 Output 1 Collector
(source when collector is tied high)	2	H	7 Output 2 (sink when emitter is tied low)
	3	J	8 Output 3
	4	K	9 Output 4
	5	L	10 Output 5
	6	M	11 Output 6
	7	N	12 Output 7
	8	P	13 Output 8
	9	R	14 Output 9
	10	S	15 Output 10
	11	T	16 Output 11
	12	U	17 Output 12
	13	V	18 Output 13
	14	W	19 Output 14
	15	X	20 Output 15
	16	Y	21 Output 16
Digital Ground	Z	22	Digital Ground

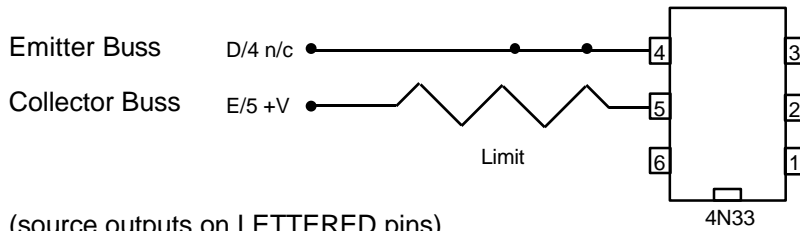
APPLICATIONS

- All outputs are normally uncommitted, optically isolated transistor closures, rated at 100 ma. for sourcing applications.
- Collector and emitter busses are available for independent strapping options as required.
- Uncommitted cards have no connection to emitter or collector busses, and are strapped externally (at the controlled device or on a breakout panel) for any diode protection, limiting resistors, etc.
- Variation codes are as follows:

TC-316G - Active low, current sink, diode protection
 TC-316S - Source card, custom configured for current limit
 TC-316U - Uncommitted opto-isolator outputs

GREEN LEDs
 RED LEDs
 YELLOW LEDs

- To SOURCE voltage, connect a resistor or jumper from common rail (odd/even) to pin 5 (collector) of each opto-coupler and use emitter outputs as source feed. Connect + voltage to collector buss.

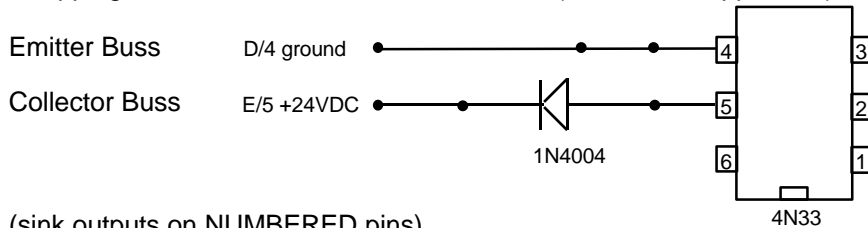


(source outputs on LETTERED pins)

[Used on non-dim lighting drivers, audio switching, etc.]

- To SINK current, connect strap at pin 4 (emitter) to common rail, and tie rail buss feeds to supply ground.

Strapping for CURRENT SINK, RELAY driver (with diode suppresser)



(sink outputs on NUMBERED pins)

This is the normal configuration used for relay, valve and lamp drivers.