

IDV11-C (M8005) Replacement Controller

Model DCQ-2500



The DCQ-2500 is a form, fit and function equivalent for the Digital IDV11-C (M8005). Like the IDV11-C, the DCQ-2500 is a relay output module for the Qbus. It provides 16 latched-reed contact outputs. The outputs are two-wire normally open contacts, used for controlling solenoids, relays, indicators, etc., where isolation from the controlled process must be maintained.

The 16-bit output data are written by program in word or byte and the output data register can be read back.

The design uses DEC I/O interface circuits to interface to the Qbus and user signals plus a high density Field Programmable Gate Array (FPGA) for control circuitry. The FPGA is designed using internal logic symbols in industry standard schematic form. A serial prom loads the schematic symbols into the FPGA following each power up cycle. The use of an FPGA allows ease of design verification through simulation, ease of design improvements and for factory updates when and if needed.

Key Features

- 16 normally open reed contact outputs
- Two-wire connection per output
- Capable of driving up to 60 volt dc (or peak ac) 1A; Pmax. 30W/60VA
- Contact protection
- Read/write output data register
- Module identification code readable by program

Compatibility

- Connector, signal and diagnostic compatible with Digital I/O test connector module
- MDM diagnostic NAIDAC compatible
- XXDP diagnostic CZIXVxx Compatible
- Qbus standard interface circuits (DS8641)
- User interface components are identical to the original design or electrical equivalent
- The internal circuitry is identical to the original Digital design but uses an FPGA to replace the individual gate-level components.
- Follows all Qbus rules and specifications as outlined in Digital's *LSI-11 Bus Spec*, DEC Std 160 17-SEP-81.
- Qbus address switch compatible including switch location and settings

Specifications

All specifications are identical to or superior to the IDV11-C. Designed and manufactured using ISO standard 9001-2008.

| Physical | |
|--|---|
| DCQ-2500-A Controller | Dual-width Qbus card measuring 13.3 cm by 21.3 cm |
| User Connector (J1) | 40-pin Berg header with retainer latches or equivalent |
| Module Extractors | Single extractor, identical location to IDV11-C |
| Maintenance LEDs (D1) Two LEDs, one green and one red | Green - Software controlled Red - Indicates module error |
| Electrical | |
| DCQ-2500-A | 340 mA @ 5.0 volts DC ±12 volts DC not used |
| Bus Loading | 1 DC load, 2.1 AC loads |
| Qbus | |
| MODE Register ID | 042 octal |
| Device Address (E33) | Switch selectable over the 4KW address range. Occupies a 4 word address with two words unused. |
| Interrupt Vector | Not applicable |
| Output Circuits | |
| Number of Outputs | 16 two-wire reed relay contacts |
| Contact Form | SPST normally open contact with contact protection |
| Contact Resistance | Typically 0.2 ohm across the output pins |
| Switching Voltage | 60 Vdc (or peak ac) maximum |
| Switching Current | 1 A maximum; Note above 0..2 A life expectancy is derated |
| Maximum Wattage | 30W dc or 60VA ac |
| Response Time | Typically 1 millisec |
| Life Expectancy | >100,000,000 operating at 0.2A/12V |
| Isolation Voltage | Inputs to Computer GND 1000Vdc or peak ac |
| Interchannel Isolation | 250Vdc or peak ac |
| Switching Rate | 400 Hz maximum |
| Logic '1' output | Contact closed |

| CE Compliance | |
|-----------------------|---------------------------|
| EMC Directive | 2014/30/EU |
| Safety Standard | IEC 60950-1:2005-12 |
| Environmental | |
| Operating Conditions: | |
| Temperature | 10° to 60° C |
| Relative Humidity | 20% to 95% non-condensing |
| Storage Conditions: | |
| Temperature | -40° to 66° C |
| Relative Humidity | 10% to 90% non-condensing |

User Connector J1 Pinout

| Pin | Signal | Pin | Signal |
|-----|------------------|-----|------------------|
| A | GND | B | Key (no pin) |
| C | | D | OUT0/1 (Bit 0) |
| E | OUT0/2 (Bit 0) | F | OUT1/1 |
| H | OUT1/2 | J | OUT2/1 |
| K | OUT2/2 | L | OUT3/1 |
| M | OUT3/2 | N | OUT4/1 |
| P | OUT4/2 | R | OUT5/1 |
| S | OUT5/2 | T | OUT6/1 |
| U | OUT6/2 | V | OUT7/1 |
| W | OUT7/2 | X | OUT8/1 |
| Y | OUT8/2 | Z | OUT9/1 |
| AA | OUT9/2 | BB | OUT10/1 |
| CC | OUT10/2 | DD | OUT11/1 |
| EE | OUT11/2 | FF | OUT12/1 |
| HH | OUT12/2 | JJ | OUT13/1 |
| KK | OUT13/2 | LL | OUT14/1 |
| MM | OUT14/2 | NN | OUT15/1 (Bit 15) |
| PP | OUT15/2 (Bit 15) | RR | |
| SS | | TT | +5Vdc Out |
| UU | | VV | GND |

Ordering Information

| Model | Description |
|-------------|--|
| DCQ-2500-AA | Qbus controller and installation manual. |
| DCQ-2500-A | Qbus controller only. |

Note: Equivalent parts are used when the original parts are obsolete or unavailable.

Address Switch Settings

Switch E33
 Address range 171000-171370
 Factory set to 171000

| | | | | | | | | | |
|-----|----|----|-----|----|----|----|----|----|----|
| 12 | 11 | 10 | 9 | 8 | 7 | 6 | 5 | 4 | 3 |
| 1 | 0 | 0 | 1 | 0 | X | X | X | X | X |
| OFF | ON | ON | OFF | ON | X | X | X | X | X |
| S10 | S9 | S8 | S7 | S6 | S5 | S4 | S3 | S2 | S1 |

Logical 1 = OFF
 Logical 0 = ON

Block Diagram

