

# **7I37COM MANUAL**

**Isolated Anything-IO adapter**

V1.3

This page intentionally almost blank

# Table of Contents

GENERAL .....	1
DESCRIPTION .....	1
OPTION JUMPERS .....	1
CONNECTORS .....	2
CONNECTOR LOCATIONS .....	2
CONTROLLER CONNECTOR .....	3
ISOLATED I/O CONNECTOR .....	4
ISOLATED POWER AND DIODE CLAMP .....	5
INPUT COMMON CONNECTOR .....	6
TERMINAL BLOCK KEYING .....	6
OPERATION .....	7
CONTROLLER REQUIREMENTS .....	7
PINOUT .....	7
POLARITY .....	7
I/O VOLTAGES .....	7
INPUT CHARACTERISTICS .....	7
ISOLATED INPUTS .....	7
INPUT COMMON .....	7
INPUT TIMING .....	7
OUTPUT CHARACTERISTICS .....	8
HIGH SIDE DRIVE .....	8
CLAMP DIODES .....	8
OUTPUT TRANSISTORS .....	8
OUTPUT TIMING .....	8
SPECIFICATIONS .....	9
DRAWINGS .....	10

# GENERAL

## DESCRIPTION

This manual applies to the 7I37COM. The 7I37COM is an 8 output, 16 input isolated I/O interface card. The 7I37COM provides 8 Isolated 48VDC 1A output drivers and 16 Opto-isolated inputs. All output drivers are low saturation voltage MOSFETS for low power dissipation. Clamp diodes are provided for MOSFET protection when driving inductive loads. Each of the 8 output switches has a common + power allowing high side drive of ground referred loads . The 16 opto-isolated inputs have a common negative input and will operate with input voltages from 4 to 24 V. Reverse protection diodes are provided to allow use with AC inputs. The 7I37COM is compatible with the 4I24M, 4I24H, and all Mesa FPGA cards with 50 pin I/O connectors.

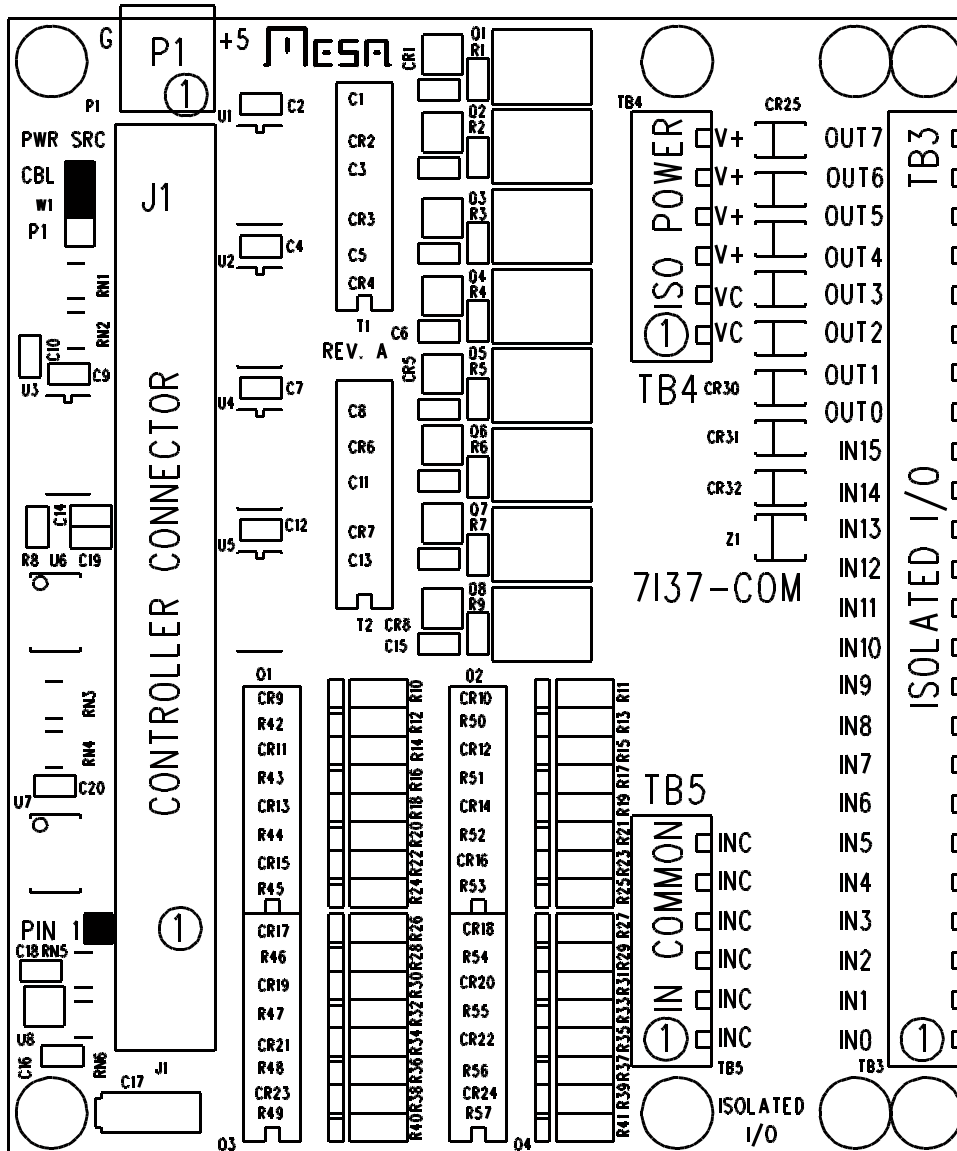
## OPTION JUMPERS

The 7I37COM has a single option jumper: W1. W1 determines if the 7I37COM card gets its power from pin 49 of the controller connector. When W1 is in the up position (default), the 7I37COM cards gets its power from pin 49. When W1 is in the down position, The 7I37COM is disconnected from pin 49 and must be supplied with 5V power on P1.

# CONNECTORS

## 7137COM CONNECTOR LOCATIONS

AUX 5V



# CONNECTORS

## CONTROLLER CONNECTOR

50 pin header connector J1 connects to the IO card that controls the 7I37COM isolated I/O card. This can be a male 50 pin header on the top of the 7I37COM card or a female 50 conductor header on the bottom side of the 7I37COM depending on 7I37COM model:

PIN	FUNCTION	DIRECTION	PIN	FUNCTION	DIRECTION
1	IN0	FROM 7I37COM	25	IN12	FROM 7I37COM
3	IN1	FROM 7I37COM	27	IN13	FROM 7I37COM
5	IN2	FROM 7I37COM	29	IN14	FROM 7I37COM
7	IN3	FROM 7I37COM	31	IN15	FROM 7I37COM
9	IN4	FROM 7I37COM	33	OUT0	TO 7I37COM
11	IN5	FROM 7I37COM	35	OUT1	TO 7I37COM
13	IN6	FROM 7I37COM	37	OUT2	TO 7I37COM
15	IN7	FROM 7I37COM	39	OUT3	TO 7I37COM
17	IN8	FROM 7I37COM	41	OUT4	TO 7I37COM
19	IN9	FROM 7I37COM	43	OUT5	TO 7I37COM
21	IN10	FROM 7I37COM	45	OUT6	TO 7I37COM
23	IN11	FROM 7I37COM	47	OUT7	TO 7I37COM
			49	+5V PWR	TO 7I37COM

Note: all even pins are grounded.

## AUX 5V POWER

Two pin terminal block P1 can be used to supply 5V power to the 7I37COM if the controller cable is too long and voltage drop too high. P1 has the following pinout:

PIN	FUNCTION
1	5V (Square pad)
2	GND

# CONNECTORS

## ISOLATED I/O CONNECTORS

The 7I37COM uses a 3.5 mm pluggable screw terminal blocks TB3 for isolated I/O. TB3 pinout is as follows:

Inputs are on TB3 pins 1 through 16:

<b>PIN</b>	<b>FUNCTION</b>	<b>DIRECTION</b>
1	IBIT0+	TO 7I37COM
2	IBIT1+	TO 7I37COM
3	IBIT2+	TO 7I37COM
4	IBIT3+	TO 7I37COM
5	IBIT4+	TO 7I37COM
6	IBIT5+	TO 7I37COM
7	IBIT6+	TO 7I37COM
8	IBIT7+	TO 7I37COM
9	IBIT8+	TO 7I37COM
10	IBIT9+	TO 7I37COM
11	IBIT10+	TO 7I37COM
12	IBIT11+	TO 7I37COM
13	IBIT12+	TO 7I37COM
14	IBIT13+	TO 7I37COM
15	IBIT14+	TO 7I37COM
16	IBIT15+	TO 7I37COM

# CONNECTORS

## ISOLATED I/O CONNECTORS

Outputs are in TB3 pins 17 through 24:

<b>PIN</b>	<b>FUNCTION</b>	<b>DIRECTION</b>
17	OBIT0+	FROM 7I37COM
18	OBIT1+	FROM 7I37COM
19	OBIT2+	FROM 7I37COM
20	OBIT3+	FROM 7I37COM
21	OBIT4+	FROM 7I37COM
22	OBIT5+	FROM 7I37COM
23	OBIT6+	FROM 7I37COM
24	OBIT7+	FROM 7I37COM

## ISOLATED POWER AND DIODE CLAMP

Power for the isolated outputs is supplied to terminal block TB4. Terminal block TB4 also has the output clamp diode return connection. TB4 pinout is as follows:

<b>PIN</b>	<b>FUNCTION</b>	<b>DIRECTION</b>
1	VCLAMP	FROM 7I37COM
2	VCLAMP	FROM 7I37COM
3	V+ POWER	TO 7I37COM
4	V+ POWER	TO 7I37COM
5	V+ POWER	TO 7I37COM
6	V+ POWER	TO 7I37COM



# CONNECTORS

## INPUT COMMON

All isolated inputs share a common negative input. A 6 pin terminal block, TB5 connects to this common input. TB5 pinout is as follows:

<b>PIN</b>	<b>FUNCTION</b>	<b>DIRECTION</b>
1	-INCOMMON	TO 7I37COM
2	-INCOMMON	TO 7I37COM
3	-INCOMMON	TO 7I37COM
4	-INCOMMON	TO 7I37COM
5	-INCOMMON	TO 7I37COM
6	-INCOMMON	TO 7I37COM

### TERMINAL BLOCK KEYING

The I/O terminal blocks on the 7I37COM are supplied with three 8 pin screw terminal plugs. The power and input common terminal block are supplied with 6 pin screw terminal plugs. To prevent accidental misconnection if wired plugs are removed and replaced, it may be desirable to key the plugs so they can only be inserted in their proper receptacle location. The screw terminal plugs are keyed by clipping certain of the small green polarizing tabs on the screw terminal plugs and installing blocking plugs (these are thin orange plastic pieces) in the corresponding slot in the receptacle. A suggested keying pattern for the terminal blocks is as follows:

TB3: keys at pins 2, 8, 12, 16, 21, 24

TB4: keys at pins 1 and 6

TB5: keys at pins 3 and 4

# OPERATION

## CONTROLLER REQUIREMENTS

### PINOUT

The 7I37COM is intended to operate with I/O cards that have 24 I/O bits and IO module rack type connector pinouts (50 pin connector, all even pins grounded, +5 power on pin 49).

### POLARITY

All controller interface pins are active low. This means a low controller output indicates power applied to an opto-isolated input. A low output activates the corresponding output MOSFET.

### I/O VOLTAGES

The 7I37COM accepts 3.3V or 5V signals and drives the FPGA card with 3.3V signals so is compatible with 5V and 3.3V FPGA and I/O cards.

## INPUT CHARACTERISTICS

### ISOLATED INPUTS

The 7I37COMs opto-isolated inputs have 4.4K Ohm series resistors and reverse input protection diodes across the opto-isolator LEDs. Input current at the maximum 24V input is approximately 5mA. The isolated inputs will work with input voltages from 4 to 24V.

### INPUT COMMON

All inputs share a common negative terminal (input common). This input common is 6 pin terminal block TB5.

### INPUT TIMING

Opto-isolated inputs turn on on ~5 uSec and off in ~25 uSec.

# OPERATION

## OUTPUT CHARACTERISTICS

### HIGH SIDE DRIVE

All 7137COM outputs source power from a common control power connection to a ground referred load. That is the positive control power supply (+5 to +48V) connects to the TB4 isolated power connections (pins 3 through 6). When an output is on, the OBITN+ signal will supply control power to the load. The load should have one lead connected to the OBITN+ signal and the other lead connected to control power negative (commonly ground)

### CLAMP DIODES

The 7137COM provides clamp diodes to limit voltage spikes when driving inductive loads. These clamp diodes connect to TB4 pins 1 and 2 (VC). ***VC must be returned to control power negative (commonly ground) to utilize the clamp diodes.*** The VC connection to control power negative (or ground) should be wired with a separate wire and should not share the input common connection to control negative. This is because the VC line could have transient currents of up to 8A if 8 1A inductive loads were turned off at once.

### OUTPUT TRANSISTORS

The 7137COM outputs are small MOSFET power transistors with an on resistance of approximately 0.25 Ohms, giving a saturation voltage of ~0.25V at full (1A) load.

### OUTPUT TIMING

MOSFET outputs turn on in ~3 uSec and off in ~7 uSec. Output timing and edge rates are usually not suited to step/dir type signals.

## SPECIFICATIONS

	MIN	MAX	UNITS
5V POWER SUPPLY	4.5V	5.5V	VDC
5V POWER CONSUMPTION	---	50	mA
INPUT RANGE	4V	28V	VDC
INPUT CURRENT	---	5	mA
OUTPUT VOLTAGE	---	48V	VDC
OUTPUT CURRENT	---	1A	A
ISOLATION VOLTAGE1	---	500	VDC
(Between controller and any isolated I/O)			
ISOLATION VOLTAGE2	---	100	VDC
(Between isolated inputs and outputs)			
OPERATING TEMP.	0	+70	°C
OPERATING TEMP. (-I version)	-40	+85	°C
OPERATION HUMIDITY	0	95%	NON-COND

# DRAWINGS

