MESA

7I74 MANUAL

8 CHANNEL RS-422 INTERFACE

V1.2

This page intentionally almost blank

Table of Contents

GENERAL

DESCRIPTION

The 7I74 is a 8 channel RS-422/RS-485 interface for Mesa s 25 pin Anything I/O series of FPGA interface cards.The 7I74 has 8 independent receive and transmit channels. Channel 7 has an independent drive enable for bus or 2 wire half duplex systems.

The controller connection is a 25 pin header that matches the pinout of the 5I25 and 6I25 Anything I/O cards. Serial I/O connectors are RJ45 jacks allowing standard CAT5 cables to be used for high speed serial links. The 7I74 also supplies 5V power on the RJ 45 connectors. PTC devices limit maximum 5V current to 1A .

The RJ45 serial interface pinout used is compatible with all of Mesa's serially connected amplifiers and all serially interfaced I/O cards.

HARDWARE CONFIGURATION

GENERAL

Hardware setup jumper positions assume that the 7I74 card is oriented in an upright position, that is, with the 25 pin controller connector is on the left hand side.

DEFAULT CONFIGURATION

| JUMPER	FUNCTION	DEFAULT SETTING
W1	HOST POWER OPTION	UP=HOST 5V

.

CABLE POWER/P1/TB1 POWER SELECTION

The 7I74 can get its operating power from the host cable or from TB1. If less than 1A of remote serial power is needed, cable power can be used. W1 selects whether cable power connects to the 7I74s 5V supply. If W1 is in the "TOP" position, cable power is selected. If W1 is in the "BOTTOM" position, external 5V power must be supplied via TB1.

W1 positions must be set to match the connected FPGA cards power option. If the FPGA card is jumpered to supply 5V power to the 7I74, W1 should be in the "UP" position. If external power is used for the 7I74, W1 must be in the "DOWN" position and the FPGA card jumpered so that it **does not** supply 5V power to the 7I74.

CONNECTORS

CONNECTOR LOCATIONS AND DEFAULT JUMPER POSITIONS
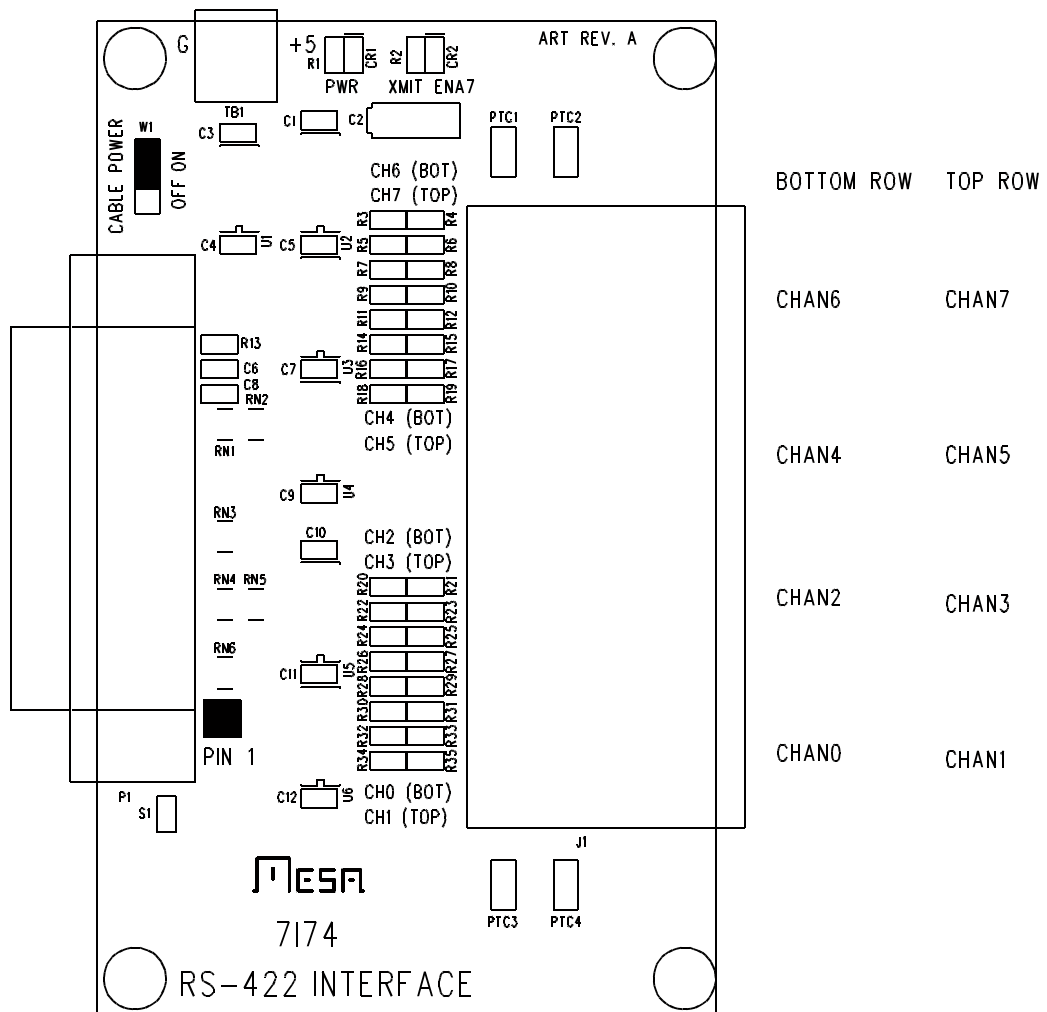
CONNECTORS

CONTROLLER CONNECTOR

Female 25 pin DB-25F P1 is the host interface connector. This connects to the host interface FPGA card with a IEEE-1284 male-male DB-25 cable.

PIN	FUNCTION	DIRECTION	FPGA PRIM I/O	FPGA SEC I/O
1	RX0	FROM 7I74	IO0	IO17
14	RX1	FROM 7I74	IO1	IO18
2	RX2	FROM 7I74	IO2	IO19
15	RX3	FROM 7I74	IO3	IO20
3	TX0	TO 7I74	IO4	IO21
16	TX1	TO 7I74	IO5	IO22
4	TX2	TO 7I74	IO6	IO23
17	TX3	TO 7I74	IO7	IO24
5	RX4	FROM 7I74	IO8	IO25
6	RX5	FROM 7I74	IO9	IO26
7	RX6	FROM 7I74	IO10	IO27
8	RX7	FROM 7I74	IO11	IO28
9	TX4	TO 7I74	IO12	IO29
10	TX5	TO 7I74	IO13	IO30
11	TX6	TO 7I74	IO14	IO31
12	TX7	TO 7I74	IO15	IO32
13	/TXEN7	TO 7I74	IO16	IO33

Pins 18, 19, 20, and 21 are ground. Pins 22, 23, 24 and 25 are either ground or 5V depending on jumper W1 (ground if W1 is "DOWN", 5V if W1 is "UP")

CONNECTORS

AUX 5V POWER

2 pin pluggable terminal TB1 can be used to supply 5V power to the I/O terminals on the7I74. This is suggested for applications where the total power drawn by external devices is more than 1 Amp.TB1 has the following pinout:

PIN	FUNCTION
1	5V
2	GND

RJ45 JACK PINOUT

All RJ-45 jacks have the same pin-out. This pin-out is complementary to the pin-out used on all of Mesa's remote serial devices. When used with Mesa devices a straight through CAT 6 cable is required. In addition to providing full duplex RS-422 communication the CAT6 cable provides a small amount of 5V power to some remote devices.

PIN	FUNCTION	DIR	CAT6 568B COLOR
1	TX-	FROM 7I74	ORANGE/WHITE
2	TX+	FROM 7I74	ORANGE
3	RX-	TO 7I74	GREEN/WHITE
4	GND	FROM 7I74	BLUE
5	GND	FROM 7I74	BLUE/WHITE
6	RX+	TO 7I74	GREEN
7	+5V	FROM 7I74	BROWN/WHITE
8	+5V	FROM 7I74	BROWN

Note that actual signal functions depend on FPGA configuration.

5V cable power is protected by a PTC device with maximum let through current of approximately 3Amps. Connectors are protected in pairs with one PTC device used for 2 connectors.

.

OPERATION

5V POWER

The 7I74 requires ~100 mA of 5V power for operation. This power will increase based on the number of terminated TX outputs used, and power used by external devices.
If only low power external devices are used the 7I74 can be run entirely from cable power. (W1 UP) If more than about 1A of total external power is used. It is suggested that the 7I74 be powered form an external 5V source (W1 DOWN)

RS-485 CAPABLE CHANNEL

Channel 7 of the 7I74 has an output enable and can be used for RS-485 half duplex type applications. For 2 wire half duplex type RS-485 interfaces, the RX+ and TX+ lines and the RX- and TX- lines should be tied together at the 7I74.

INTERFACING WITH MESA SERIAL DEVICES

The 7I74 in intended as an interface to MESA's serial I/O devices that use RS-422 communication and RJ45/CAT5 cable for the serial interface. These devices include the 7I64 Isolated I/O interface, the 8I20 3 phase drive, the 7I66 isolated I/O interface, the 7I69 TTL I/O interface, 7I70 isolated input, 7I71 isolated output, and the 7I73 pendant interface.

Straight through CAT5 or CAT6 cables can be used but CAT6 is recommended for better signal fidelity and lower voltage drop. Make sure you are using straight through cables. Random cables from routers etc are likely to be crossover cables which will not work and may even damage the 7I74/remote device.

SPECIFICATIONS

	MIN	MAX	UNITS
5V POWER SUPPLY	4.75	5.25	VDC
5V POWER CONSUMPTION	---	200	mA
(all outputs loaded with 130 ohm terminations)			
(no serial 5V load)			
5V CURRENT TO EACH I/O CONNECTOR	---	640	mA
MAXIMUM DATA RATE	---	10	MBIT/S
RS-422 INPUT COMMON MODE RANGE	-7	+12	Volts
RS-422 TERMINATION RESISTANCE	118	122	Ohm
RS-422 OUTPUT LOW	—	.8	Volts
(24 mA sink current)			
RS-422 OUTPUT HIGH	VCC-2.5	—	Volts
(24 mA source current)			
OPERATING TEMP.	0	+70	ºC
OPERATING TEMP. (-I version)	-40	+85	ºC
OPERATION HUMIDITY	0	95%	NON-COND

DRAWINGS

PANEL MOUNT
HOLE CENTERS