

7144 MANUAL

8 CHANNEL RS-422 INTERFACE

V1.1

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GENERAL

DESCRIPTION

The 7I44 is a 8 channel RS-422/RS-485 interface for Mesa's Anything I/O series of FPGA interface cards. The 7I44 has 8 independent receive and transmit channels. Each transmit channel has a independent drive enable for bus or 2 wire half duplex systems.

The controller connection is a 50 pin header that matches the pinout of the 4I34M, 4I38, 4I65, 4I68, 5I20, 5I22, 5I23, 7I43 and 7I60 Anything I/O cards. Serial I/O connectors are RJ45 jacks allowing standard CAT5 cables to be used for high speed serial links. The 7I44 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 7144 card is oriented in an upright position, that is, with the 50 pin controller connector is on the left hand side.

DEFAULT CONFIGURATION

JUMPER	FUNCTION	DEFAULT SETTING
W1	CABLE/AUX 5V POWER	TOP = CABLE 5V POWER

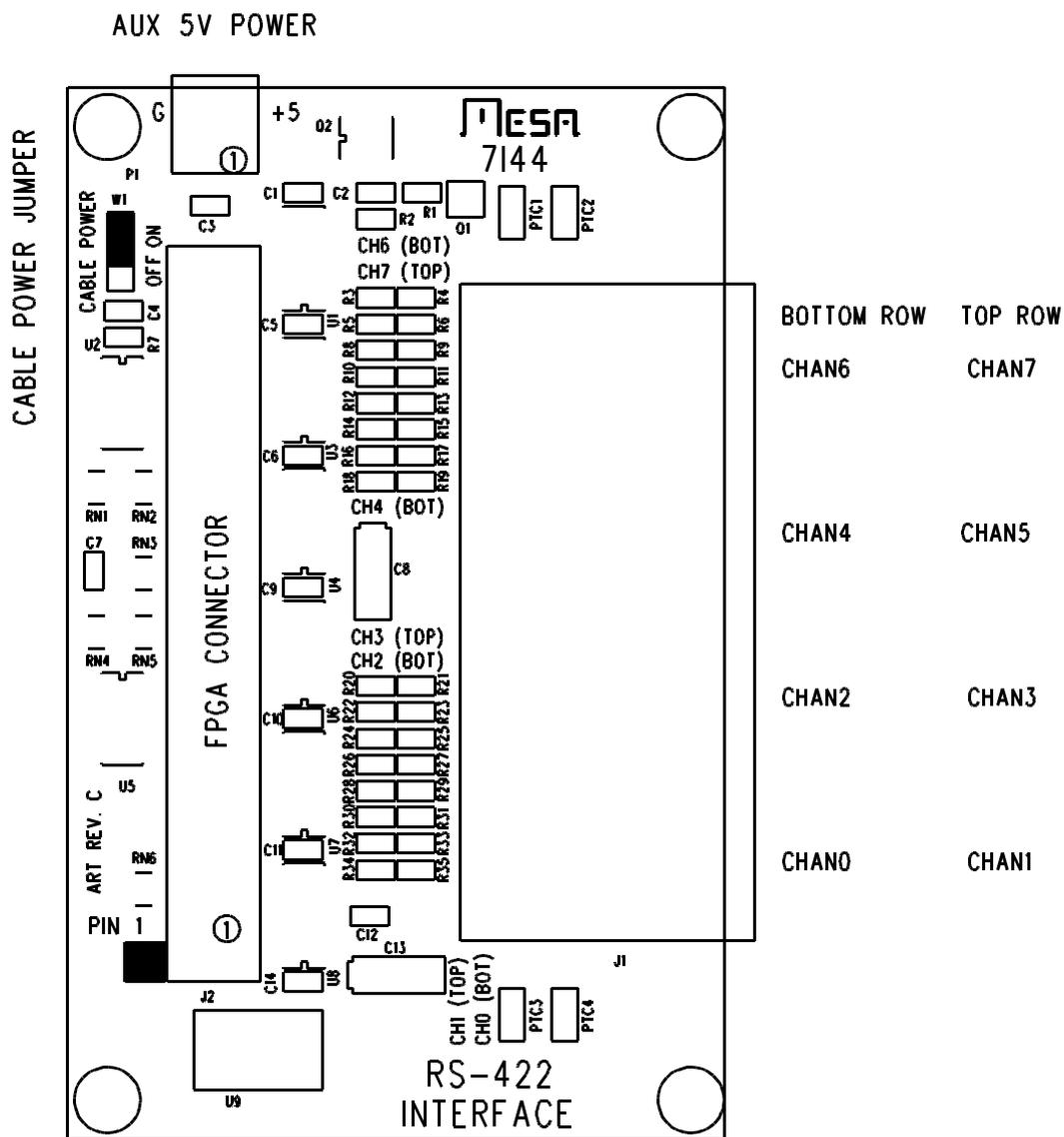
CABLE POWER/P1/TB2 POWER SELECTION

The 7144 can get its operating power from the flat FPGA cable or from P1. For testing and with very low power remote devices, cable power can be used. W1 selects whether cable power connects to the 7144s 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 P1/TB2. If 5V power is supplied externally via P1/TB2, W1 must be in the BOTTOM position or the PC will not start.

Note: Do not connect to 4 pin header connector P1 on REV B or earlier 7144's

CONNECTORS

CONNECTOR LOCATIONS AND DEFAULT JUMPER POSITIONS



CONNECTORS

CONTROLLER CONNECTOR

50 pin header connector J1 connects to the anything I/O card/motion controller. This can be a male 50 pin header on the top of the 7I44 card or a female 50 conductor header on the bottom side of the 7I44 depending on 7I44 model.

PIN	FUNCTION	DIRECTION	PIN	FUNCTION	DIRECTION
1	RX0	FROM 7I44	25	RX4	FROM 7I44
3	RX1	FROM 7I44	27	RX5	FROM 7I44
5	RX2	FROM 7I44	29	RX6	FROM 7I44
7	RX3	FROM 7I44	31	RX7	FROM 7I44
9	TX0	TO 7I44	33	TX4	TO 7I44
11	/TXEN0	TO 7I44	35	/TXEN4	TO 7I44
13	TX1	TO 7I44	37	TX5	TO 7I44
15	/TXEN1	TO 7I44	39	/TXEN5	TO 7I44
17	TX2	TO 7I44	41	TX6	TO 7I44
19	/TXEN2	TO 7I44	43	/TXEN6	TO 7I44
21	TX3	TO 7I44	45	TX7	TO 7I44
23	/TXEN3	TO 7I44	47	/TXEN7	TO 7I44
			49	+5V PWR	TO 7I44

Note: all even pins are grounded.

AUX 5V POWER

2 pin pluggable terminal P1 (REV C and above) or screw terminal block TB2 (Rev B or lower) can be used to supply 5V power to the I/O terminals on the 7I44. This is suggested for applications where the total power drawn by external devices is more than 400 mA. P1/TB2 have the following pinout:

PIN	FUNCTION
1	5V
2	GND

CONNECTORS

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 7I44	ORANGE/WHITE
2	TX+	FROM 7I44	ORANGE
3	RX-	TO 7I44	GREEN/WHITE
4	GND	FROM 7I44	BLUE
5	GND	FROM 7I44	BLUE/WHITE
6	RX+	TO 7I44	GREEN
7	+5V	FROM 7I44	BROWN/WHITE
8	+5V	FROM 7I44	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 7144 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 7144 can be run entirely from cable power. (W1 UP) If more than about 400 mA of total external power is used. It is suggested that the 7144 be powered from an external 5V source (W1 DOWN)

RS-485 CAPABLE CHANNELS

All of the serial channels on the 7144 have output enables 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 7144.

INTERFACING WITH MESA SERIAL DEVICES

The 7144 is 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 7164 Isolated I/O interface, the 8120 3 phase drive, the 7166 isolated I/O interface, the 7169 TTL I/O interface, 7170 isolated input, 7171 isolated output, and the 7173 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 7144/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	°C
OPERATING TEMP. (-I version)	-40	+85	°C
OPERATION HUMIDITY	0	95%	NON-COND

DRAWINGS

