PCIB32

32-Ch Digital I/O Board

Technical Manual

Product Information

Full information about other Arcom products is available via the **Fax-on-Demand System**, (Telephone Numbers are listed below), or by contacting our **WebSite** in the UK at: **www.arcom.co.uk** or in the US at: **www.arcomcontrols.com**

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Arcom Control Systems Ltd operate a company-wide quality management system which has been certified by the British Standards Institution (BSI) as compliant with ISO9001:1994

Microsoft
WindowsNT

FREE Windows NT4.0 Drivers

Visit the 'PC(ISA)bus Boards' page on the Arcom Website,
www.arcom.co.uk/ntdrv10_AR.exe to download.

Preface

Packing List

This product is shipped as follows:
• Board
• User Manual
• Utility Disk
• PCbus Library Datasheet
If any of the above appear to be missing, please telephone Arcom on 01223 411200.

Utility Disk

This product is shipped with a utility Disk which contains:

• PCbus library Manual
• Source Code for all PCbus I/O boards
• A test program called EXAMP-01.EXE

Handling

This board contains CMOS devices which could be damaged in the event of static electricity being discharged through them. At all times please observe anti-static precautions when handling the board and always unpack and install the board in an anti-static working area.
Please ensure that should a board need to be returned to Arcom, it is adequately packed and if a battery is fitted, that it is isolated.

Revision History

Manual	PCB	Comments
Issue A	V1 Issue 2	960927
Issue B	V1 Issue 2	961220
Issue C	V1 Issue 2	970207
Issue D	V1 Issue 2	980119 [ECO2684]

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Contents

Introduction

The PCIB32 is an 8-bit ISA bus add-on board providing 32 channels of digital I/O. The digital I/O is organised into 4 groups of 8 bits. Each I/O channel may be configured as either an input or an output. There is also the facility to define the power up/ reset state of a group of output bits.

Features

- CE compliant design
- 32 channel digital I/O
- Link selectable base address
- Board access LED
- User controlled LED
- Each channel has a current sink capability of   24mA @ 0.45V
       500μA @ 2.7V

- Occupies 8 Bytes of I/O space
- Bit programmable for input or output
- Group selection of power-up/reset state
- 8-bit bus interface
- I/O connector conforms to Arcom Signal Conditioning System (SCS)
- Operating temperature range, +5°C to 55°C
- Power consumption form the host, max 650mA @ +5V
- MTBF: 688,219 hours (using generic figures from MIL-HDBK-217F at benign ground)

Getting Started

- Switch off PC
- Install board in supplied configuration
- Switch on PC
- Run EXAMP-01.EXE (supplied on the utility disk)
- An access/user LED should flash. If not check default link configuration. (Page 5)
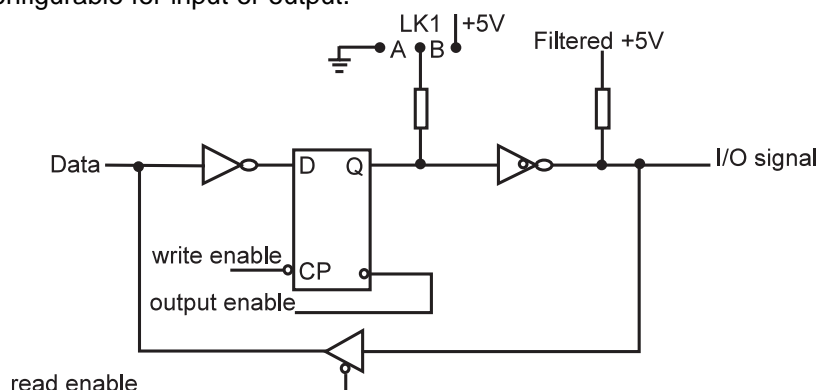
Operation

Reading or Writing to the Registers

Any function can be directly accessed by reading from or writing to the function register at an individual address. Each time the board is accessed the red LED will flash momentarily.

Digital I/O Channels

When a logical '1' is written to a channel, the open-collector driver is turned off and the output is pulled up to a high TTL level by a resistor. When the driver is off, an external signal can drive the line high or low as an input and the input status register can read it. When the driver is written with a '0', the output line is at a TTL low level (sink current) and an external signal should not attempt to drive that signal high.

Since all channels have the open-collector drive configuration, it means each channel is individually configurable for input or output.

Power-up or reset state of outputs

When digital I/O boards are used to control large or crucial items of plant, it is often necessary to define how the output lines power-up. This is because it can take many seconds to boot an operating system and run an application program from reset and begin initialising the system. Each group of eight I/O signals can be selected to be a logical '0', a '1' or 'don't care' at power-up or reset. This is configured using jumpers (see links section). Lines configured as a '1' or '0' are fixed in that state, until the output-enable latch is written.

Note: If a channel is to be configured as an input, it is necessary that the power-up state link for that group of eight channels to be used as outputs is set in the 'A' position. This means that any channels to be used as outputs will be set high, or OFF. A good rule is to keep the channels to be used as inputs and those to be used as outputs in separate groups of eight channels.

The read-back registers connect directly to the I/O connector and therefore reflect the true state of the I/O signal.

I/O Map

The base address + offset indicates which I/O Location is to be accessed. The board has 5 I/O function registers and one special register.

The board must be set on an even address boundary.

I/O Function Registers

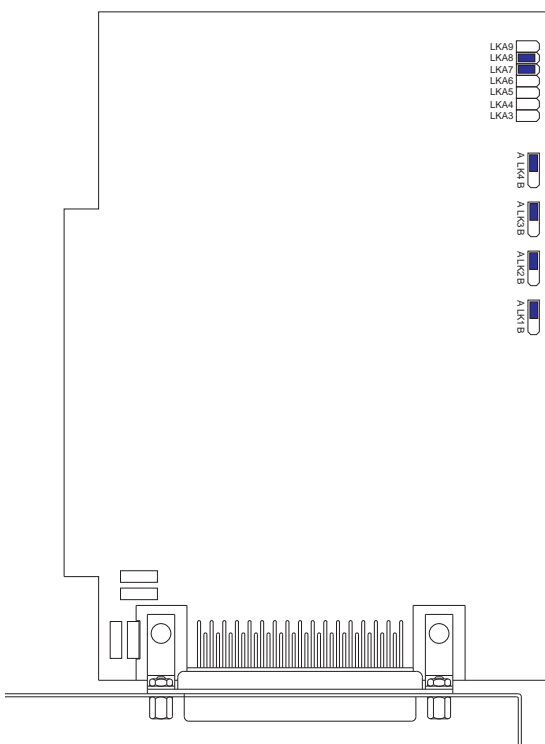| Address offset	Register	Read/write	Register description
00	G0	Read/write	Group 0 Bit 0..7
01	G1	Read/write	Group 1 Bit 0..7
02	G2	Read/write	Group 2 Bit 0..7
03	G3	Read/write	Group 3 Bit 0..7
04	OE	Write	Writing 01 enables outputs of the groups. Writing 00 disables the output buffers.
05	User LED	Write	01 switches on the green LED. 00 will switch it off.

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Links

Address Links

A9   A8   A7   A6   A5   A4   A3
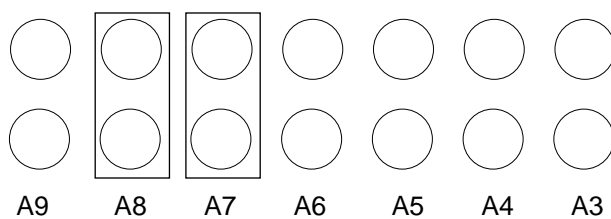
The link positions shown give a base address of 180h.

Power-up State

LK1-LK4

LK1A	Group 0 output state high at power up
LK1B	Group 0 output state low at power up
LK2A	Group 1 output state high at power up
LK2B	Group 1 output state low at power up
LK3A	Group 2 output state high at power up
LK3B	Group 2 output state low at power up
LK4A	Group 3 output state high at power up
LK4B	Group 3 output state low at power up

Default Link Position   User Configuration Record
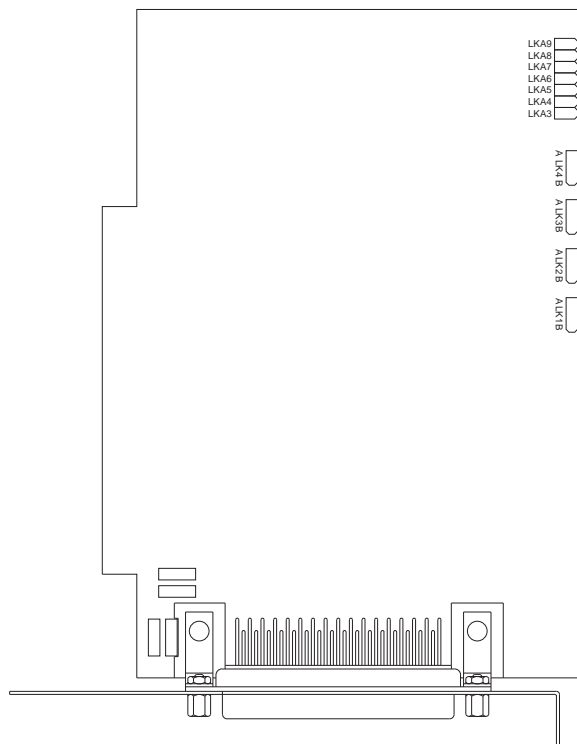
PL2 Connector

Signal Title	D type pin no.	RC pin no.	Comment
+5V	50	50	Filtered
+5V	17	49	Filtered
+12V	33	48	Filtered
-12V	49	47	Filtered
n\c	16	46	
n\c	32	45	
n\c	48	44	
n\c	15	43	
n\c	31	42	
0V	47	41	Filtered
G 3 bit 7	14	40	
G 3 bit 6	30	39	
G 3 bit 5	46	38	
G 3 bit 4	13	37	
G 3 bit 3	29	36	
G 3 bit 2	45	35	
G 3 bit 1	12	34	
G 3 bit 0	28	33	
n\c	44	32	
0V	11	31	Filtered
G0 bit 7	27	30	
G2 bit 6	43	29	
G2 bit 5	10	28	
G2 bit 4	26	27	
G2 bit 3	42	26	
G2 bit 2	9	25	
G2 bit 1	25	24	
G2 bit 0	41	23	
n\c	8	22	
0V	24	21	Filtered
G1 bit 7	40	20	
G1 bit 6	7	19	
G1 bit 5	23	18	
G1 bit 4	39	17	
G1 bit 3	6	16	
G1 bit 2	22	15	
G1 bit 1	38	14	
G1 bit 0	5	13	
n\c	21	12	
0V	37	11	Filtered
G0 bit 7	4	10	
G0 bit 6	20	9	
G0 bit 5	36	8	
G0 bit 4	3	7	
G0 bit 3	19	6	
G0 bit 2	35	5	
G0 bit 1	2	4	
G0 bit 0	18	3	
0V	34	2	Filtered
0V	1	1	Filtered

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Installation for CE Compliance

To maintain compliance with the requirements of the EMC directive (89/336/EEC), this product must be correctly installed. The PC in which the board is housed must be CE compliant as declared by the PC manufacturer. The type of external I/O cable can be chosen according to the notes below:

1. Remove the cover of the PC observing any additional instructions of the PC manufacturer.
2. Locate the board in a spare ISA slot and press gently but firmly into place
3. Ensure that the metal bracket attached to the board is fully seated
4. Fit the bracket clamping screw and firmly tighten this on the bracket
Note: Good contact of the bracket to the chassis is essential
5. Replace the cover of the PC observing any additional instructions of the PC manufacturer
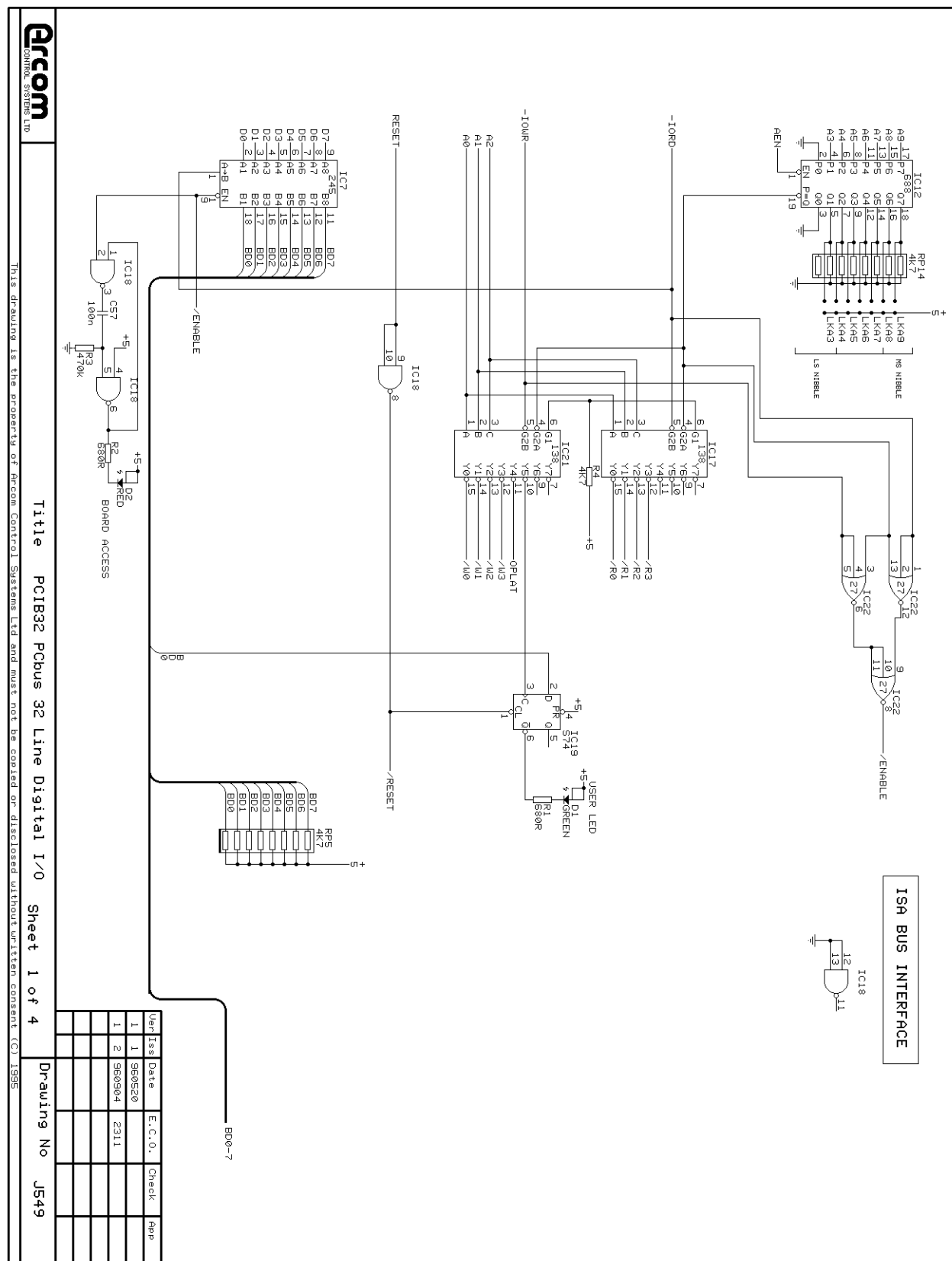
Cable

Cable length 1 Metre or less   :   Ribbon cable satisfactory

Cable 1M to 3M   :   Commercial screened cable gives the protection required

Longer cable or noisy environment :   Use fully screened cable with metal backshells e.g. Arcom CAB50CE
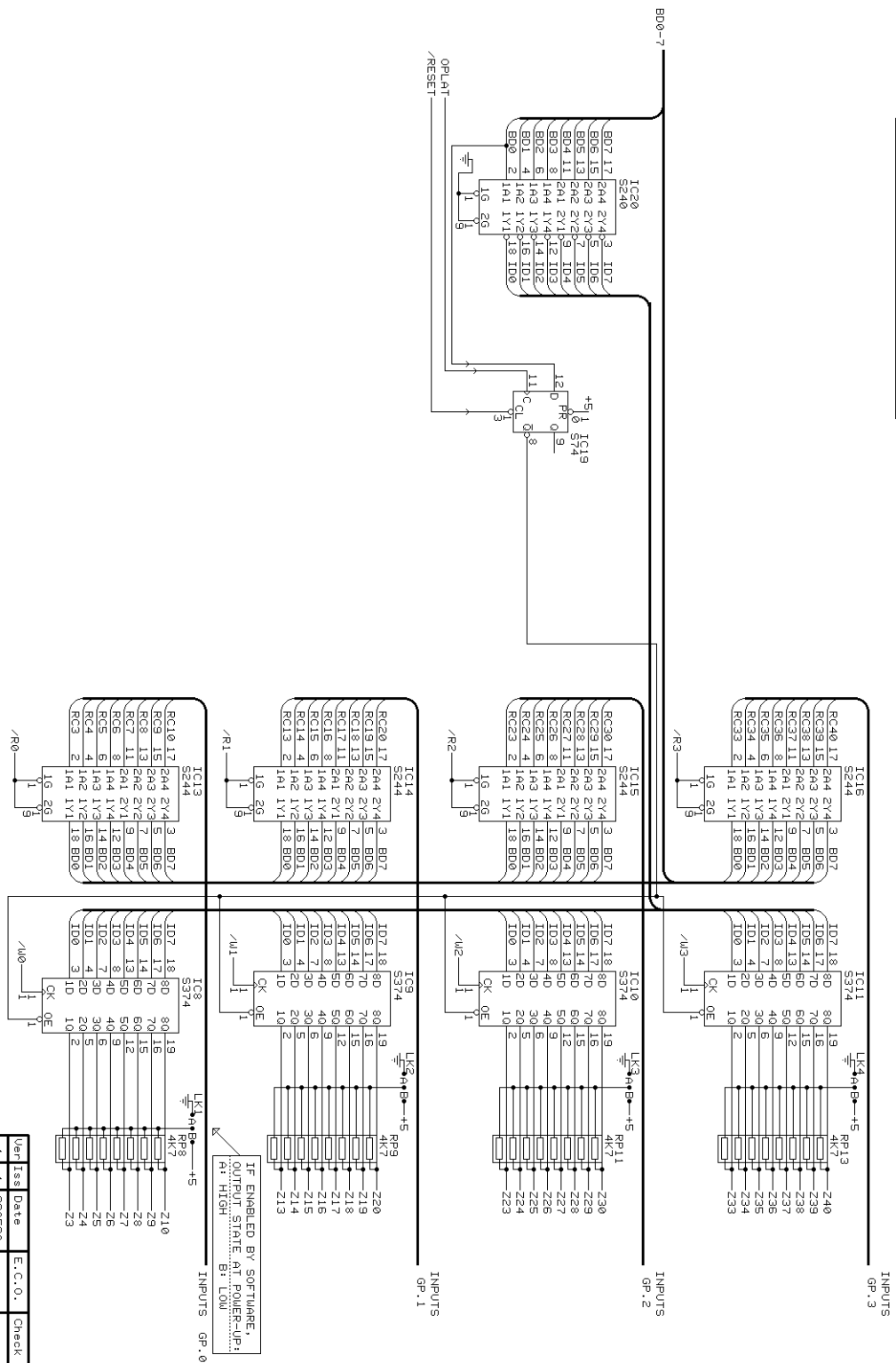
The following standards have been applied to this product:

BS EN50081-1: 1992 Generic Emissions Standard, Residential, Commercial, Light Industry
BS EN50082-1: 1992 Generic Immunity Standard, Residential, Commercial, Light Industry
BSEN55022:   1995 ITE Emissions, Class B, Limits and Methods

Circuit Diagrams

INPUT & OUTPUT REGISTERS

OUTPUT BUFFERS

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Drawing No J549

THE RIBBON-CABLE WIRE NUMBERS START WITH RC
THE D CONNECTOR PIN NUMBERS ON THE
PCB-MOUNTED D CONNECTOR START WITH D
THE I/O PORT NUMBERS ARE GX.Y, WHERE X IS THE
PORT (GROUP) NUMBER AND Y IS THE BIT NUMBER

Ver	Iss	Date	E.C.O.	Check	App
1	1	960520			
1	2	960904	2311		

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Title   PCIB32 PCbus 32 Line Digital I/O   Sheet 4 of 4

Drawing No   J549

		Ver	Iss	Date	E.C.O.	Check	App
		1	1	960520			
		1	2	960904	2311		

50 WAY D SOCKET

PL1

THE RIBBON-CABLE WIRE NUMBERS START WITH RC

THE D CONNECTOR PIN NUMBERS ON THE
PCB-MOUNTED D CONNECTOR START WITH D

THE I/O PORT NUMBERS ARE GX.Y, WHERE X IS THE
PORT (GROUP) NUMBER AND Y IS THE BIT NUMBER

COMPONENT SIDE
RHS

SOLDER SIDE

PL2
IBMCON

A 1
B 31

A 31
B 31

D7
D6
D5
D4
D3
D2
D1
D0
AEN
A0
A1
A2
A3
A4
A5
A6
A7
A8
A9

GND
RESET
+5
+12
GND
IORD
IOWR
GND
+5

TP1
TP2

+5
GND

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