Document Release Note	
From:	Custom Electronics, 57a London Road, Biggleswade, Beds.. SG18 8ED
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Document:	8834 PylonEPC Controller Documentation - Issue 3.3
Works Reference:	8834 Custom Electronics

Reason for Release:

This is a formal release of the 8834 PylonEPC Controller documentation prepared during the design phase of the project.

There are several aims in issuing this document: -

To disseminate information about the 8834 PylonEPC Controller,

To circulate the information to ensure the accuracy, especially of information relating to the hardware design that has been applied.

Accepted on behalf of Custom Electronics:

Signed: ..... Date: .....

8834 PylonEPC Controller Documentation
Issue 3.3

Custom Electronics 8834 PylonEPC Controller

Author: Roger Banks
Status: Released
Client: Custom Electronics

Revision History

Issue	Date	Released	Status	Description
1.0	8.3.99	RSB	Draft	Released for client agreement
2.0	13.5.99	RSB	Draft	Released for client agreement
2.1	4.12.99	RSB	Issued	Addition of 32 input option.
3.0	24.2.00	RSB	Issued	Rear Panel Connector Re-Arrangement
3.1	3.1.01	RSB	Issued	Added Relay Connections FAQ
3.2	16.5.01	RSB	Issued	Addition of 8 AI and DC PSU options.
3.3	25.9.01	RSB	Issued	Addition 9114 expansion serial port FAQ.

File

The present document is stored under the following file name:

Docs/docn/8834Outstation.doc

Scope

The purpose of this document is to provide a reference for the operation, maintenance and application of the 8834 PylonEPC Controller.

Table of Contents

Related Documents

The following document(s) are related to this:

[1] Custom Electronics Data Sheet:8834 Pylon-EPC Controller

[2]

[3]

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1 Introduction

The Pylon EPC Controller is a general purpose, intelligent outstation designed for fast, flexible system building for mission critical control systems.

It employs an embedded PC processor handling all control, supervision and high speed streaming communication protocols, together with a modular I/O system for high integrity plant connection.

The I/O system utilises remnant latching relay outputs to maintain control states during power down and failure situations; together with fully opto isolated revertive (tell-back) inputs indicating equipment status safely. An auto-sensing switched mode PSU powers the unit from either 90-264V a.c. at 47 - 63Hz.

A comprehensive suite of S8000 internal control functions are available with facilities optimised for broadcast applications. These include: full relay and alarm control, rotatable antenna control for selectable rotator types, together with helicopter broadcast autotracking facilities accepting GPS data from popular receivers.

The purpose of this document is to provide a reference for the operation, maintenance and application of the 8834 PylonEPC Controller.

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2 Specification

	PylonEPC Specification
Dimensions:	**483 x 44 x 260mm (basic 1U version)**
	(+50mm clearance on depth required)
Format:	**19" Rackmount**
Supply:	**90 - 264V AC @ 47-63Hz**
Consumption:	**50VA**
Operating Temp:	**5 - 45oC**
RH:	**0 - 95% RH (Non Condensing)**
Weight:	**3.0Kg**
Outputs:	**Relay Contacts - 24V DC @ 1A (Common group = 1A)**
Inputs:	**Volt free relay contacts (12V @ 5mA)**
Workstation Comms:	**RS232 - with options for the following:** **10BaseT Ethernet** **PSTN modem.** **4 wire via Audio channels. (XLR's @ 0dBm)**
Auxilliary Comms:	**RS232 or RS485 for GPS, Compass or other equipment.**
Video:	**- options for the following:** **PC SVGA monitor output** **NTSC composite video BNC** **PAL composite video BNC**
Keyboard/Mouse:	**PC compatible ports**
Printer:	**Parallel PC compatible port**

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3 Front Panel

The front panel of the PylonEPC controller is contained in a 1U 19“ rackmounting format and contains a guarded, illumiated latching push button switch for mains power on/off.

In addition there are eight momentary pushbuttons for use under application specific software control. In many applications these push buttons eliminate the need for a local keyboard.

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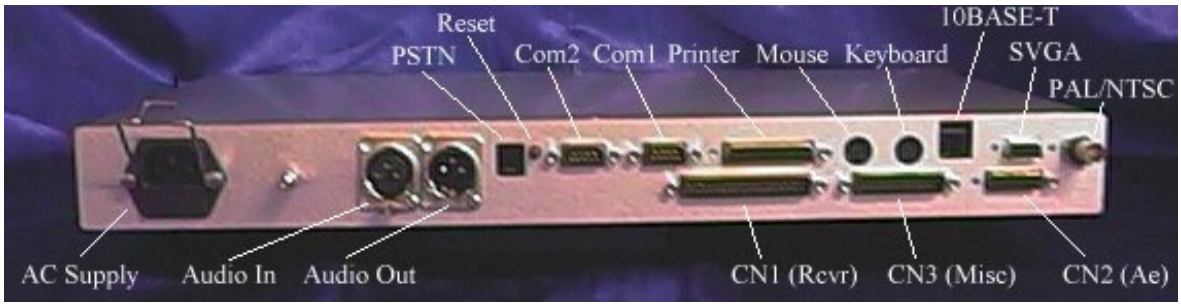
4 Rear Panel



The rear panel of the PylonEPC controller is contained in a 1U 19“ rackmounting format and contains a fused IEC ac mains inlet , together with connectors for the following:

The connector details are now given top row, left to right, then bottom row, left to right.

4.1 CN1 – IEC Fused Inlet for Supply:

This connector interface is primarily designed for supply of AC power to the unit.

	IEC Fused Inlet for Supply
L	**Live**
N	**Neutral**
E	**Earth**

4.2 RJ45 for 10BASE-T Ethernet Option:

This connector interface is primarily designed for 10BASE-T Ethernet connection.

	RJ45 for 10BASE-T Ethernet Option (Conn16)
01	**Tx-**
02	**Tx+**
03	**Rx-**
04	
05	
06	**Rx+**
07	
08	

****

4.3 Keyboard Port:

This connector interface is primarily designed for a PS2 PC compatible keyboard.

	PS2 Keyboard (Conn4)
01	**KBData**
02	
03	**Gnd**
04	**Vcc**
05	**KBClock**
06	

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4.4 Logitech Mouse Port:

This connector interface is primarily designed for a Logitech compatible mouse.

	Logitech Mouse Port (Conn2)
01	**Mdata**
02	
03	
04	
05	**Mclock**
06	

****

4.5 D25S for Printer:

This connector interface is primarily designed for a centronics compatible parallel printer.

	D25S for Printer (Conn3)
01	**/Strobe**
02	**PD0**
03	**PD1**
04	**PD2**
05	**PD3**
06	**PD4**
07	**PD5**
08	**PD6**
09	**PD7**
10	**/Ack**
11	**Busy**
12	**PE**

13	**SLCT**
14	**/AutoFd**
15	**/Error**
16	**/Init**
17	**/SLCTIn**
18	**Gnd**
19	**Gnd**
20	**Gnd**
21	**Gnd**
22	**Gnd**
23	**Gnd**
24	**Gnd**
25	**Gnd**

****

4.6 D9P for Com1:

This connector interface is primarily designed for serial interface to COM1:

	D9P for RS232 Com1: (Conn6)
01	**DCD**
02	**RX**
03	**TX**
04	**DTR**
05	**Gnd**
06	**DSR**
07	**RTS**
08	**CTS**
09	**RI**

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4.7 D9P for Com2:

This connector interface is primarily designed for serial interface to COM2:

	D9P for RS232 & RS485 Com2: (Conn5)
01	**DCD**
02	**RX**
03	**TX (RS485 Rx-)**
04	**DTR (RS485 Tx-)**
05	**Gnd**
06	**DSR**
07	**RTS (RS485 Rx+)**
08	**CTS (RS485 Tx+)**
09	**RI**

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4.8 RJ45 for PSTN Modem Option:

This connector interface is primarily designed for a PSTN modem.

	RJ45 for PSTN Modem Option (Conn12) (RJ11/BT431 Pin No.s)
01	**NC**
02	**Line A (NC in USA option)**
03	**NC (Line A in USA option)**
04	**NC (Line B in USA option)**
05	**Line B (NC in USA option)**
06	**NC**
07	**NC**
08	**NC**

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4.9 RJ45 for 4 Wire Audio Input Option:

This connector interface is primarily designed for 4 wire audio input.

	RJ45 for 4 Wire Audio Input Option (Conn13)
01	**Gnd**
02	**Audio Input #1 to Com1: Rxd (or to modem 2/4 wire hybrid)**
03	
04	
05	
06	
07	**Gnd**
08	**Audio Input #2 to Com2: Rxd**

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4.10 RJ45 for 4 Wire Audio Output Option:

This connector interface is primarily designed for 4 wire audio output.

	RJ45 for 4 Wire Audio Output Option (Conn14)
01	**Gnd**
02	**Audio Output #1 from Com1: Txd (or from modem 2/4 wire hybrid)**
03	
04	
05	
06	
07	**Gnd**
08	**Audio Output #2 from Com2: Txd**

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4.11 RJ45 for Com3: or FSK Modem Option:

This connector interface is primarily designed for com3: comms either direct, or via the FSK modem option.

	RJ45 for Com3: or FSK Modem Option (Conn17)
01	**DCD (or FSK Audio)**
02	**RXD (or FSK Audio)**
03	**TXD**
04	**DTR**
05	**GND**
06	**DSR**
07	**RTS**
08	**CTS**

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4.12 HD15S for SVGA Monitor:

This connector interface is primarily designed for video output to an SVGA monitor.

	HD15S for SVGA Monitor (Conn7)
01	**Red**
02	**Green**
03	**Blue**
04	
05	**Internal link**
06	**Internal link**
07	**Internal link**
08	**Internal link**
09	**Vref**
10	**Internal link**
11	
12	

13	**Hsync**
14	**Vsync**
15	

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4.13 BNC for Composite Video Option:

This connector interface is primarily designed for video output to a composite PAL or NTSC monitor.

	BNC for Composite Video Option (Conn9)
01	**Centre - Composite Video**
02	**Chassis – Ground**

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4.14 CN1 - D37P for Receiver:

This connector interface is primarily designed for control of a receiver using general purpose i/o.

	CN1 – D37P for Receiver
01	**AI3:AGC Positive**
02	**RLY22:Chan5 (+Offset) N/O**
03	**Serial Data Gnd**
04	**RLY25:Video Invert.....N/C**
05	**RLY23:Chan6 .....N/O**
06	**Rly 30 .....N/O**
07	**RLY21:Chan4 (-Offset) N/O**
08	**RLY24:Chan7 .....N/O**
09	**RLY16:Narrow RF .....N/O**
10	**RLY17:ChanO (BCD1)....N/O**
11	**RLY26:Mute .....N/O**
12	**RLY28:Spare 2 .....N/O**
13	**RLY18:Chan1 (BCD2) ...N/O**
14	**RLY29:Spare 3 .....N/O**
15	**RLY19Chan2 (BCD4) ...N/O**
16	**RLY20:Chan3 (BCD8) ...N/O**
17	**RLY27:Spare 1 .....N/O**
18	**RLY31 .....N/O**
19	**Ground**
20	**AGC Negative**
21	**RLY22:Chan5 (+Offset) COM**
22	**Rcvr Ready I/P (Gnd= OK)**
23	**Video Invert.....COM**
24	**RLY23:Chan6.....COM**
25	**RLY30 .....COM**
26	**RLY21:Chan4 (-Offset).COM**
27	**RLY24:Chan7 .....COM**
28	**RLY16:Narrow IF .....COM**
29	**RLY17:Chan0 (BCD1)....COM**
30	**RLY26:Mute .....COM**

31	**RLY28:Spare 2 .....COM**
32	**RLY18:Chan1 (BCD2) ...COM**
33	**RLY29:Spare 3 .....COM**
34	**RLY19:Chan2 .....COM**
35	**RLY20:Chan3 .....COM**
36	**RLY27:Spare 1 .....COM**
37	**Ground (for Rcvr Ready)**

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4.15 CN2 – D15S for Antenna:

This connector interface is primarily designed for control of a steerable antenna using general purpose i/o.

	CN2 – D15S for Antenna
01	**RLY1:Left .....N/O**
02	**RLY2:Right .....N/O**
03	**RLY3:Slow .....N/O**
04	**RLY4:Up .....N/O**
05	**RLY5:Down .....N/O**
06	**AI1:Azimuth Positive**
07	**AI1:Azimuth Negative**
08	**AI2:Elevation Positive**
09	**AI2:Elevation Negative**
10	**RLY1:Left .....COM**
11	**Remote I/P**
12	**RLY2:Right .....COM**
13	**RLY3:Slow .....COM**
14	**RLY4:Up .....COM**
15	**RLY5:Down ..... COM**

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4.16 CN3 – D25P for Miscellaneous:

This connector interface is primarily designed for control of miscellaneous equipment using general purpose i/o.

	CN3 – D25P for Miscellaneous
01	**RLY6:Vertical .....N/O**
02	**RLY7:Horizontal .....N/O**
03	**RLY8:CW .....N/O**
04	**RLY9:CCW .....N/O**
05	**RLY10:North .....N/O**
06	**RLY11:East .....N/O**
07	**RLY12:South .....N/O**
08	**RLY13:West .....N/O**
09	**RLY14:LNA 1 .....N/O**
10	**RLY15:LNA 2 .....N/O**
11	**RLY31 .....COM**
12	**RLY32 .....N/O**
13	**RLY32 .....COM**
14	**RLY6:Vertical .....COM**
15	**RLY7:Horizontal .....COM**
16	**RLY8:CW .....COM**
17	**Ground (for Remote I/P)**
18	**Remote I/P**
19	**RLY9:CCW .....COM**
20	**RLY10:North .....COM**
21	**RLY11:East .....COM**
22	**RLY12:South .....COM**
23	**RLY13:West .....COM**
24	**RLY14:LNA 1 .....COM**
25	**RLY15:LNA 2 .....COM**

4.17 HD44S for 32 Opto Inputs Option:

This optional connector interface is primarily designed for connection to the 32 opto-isolated inputs.

	HD44S for 32 Opto Inputs		
01	**Digital Input 1**	44	**Ground**
02	**Digital Input 2**		
03	**Digital Input 3**		
04	**Digital Input 4**		
05	**Digital Input 5**		
06	**Digital Input 6**		
07	**Digital Input 7**		
08	**Digital Input 8**		
09	**Digital Input 9**		
10	**Digital Input 10**		
11	**Digital Input 11**		
12	**Digital Input 12**		
13	**Digital Input 13**		
14	**Digital Input 14**		
15	**Digital Input 15**		
16	**Digital Input 16**		
17	**Digital Input 17**		
18	**Digital Input 18**		
19	**Digital Input 19**		
20	**Digital Input 20**		
21	**Digital Input 21**		
22	**Digital Input 22**		
23	**Digital Input 23**		
24	**Digital Input 24**		
25	**Digital Input 25**		
26	**Digital Input 26**		
27	**Digital Input 27**		
28	**Digital Input 28**		
29	**Digital Input 29**		

30	**Digital Input 30**		
31	**Digital Input 31**		
32	**Digital Input 32**		

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4.18 DIN41612 A/C for 64 Opto Inputs Option:

This connector interface is primarily designed for connection to the 64 opto-isolated inputs.

	DIN41612 for Opto Inputs		
01A	**Digital Input 1**	01B	**Digital Input 33**
02A	**Digital Input 2**	02B	**Digital Input 34**
03A	**Digital Input 3**	03B	**Digital Input 35**
04A	**Digital Input 4**	04B	**Digital Input 36**
05A	**Digital Input 5**	05B	**Digital Input 37**
06A	**Digital Input 6**	06B	**Digital Input 38**
07A	**Digital Input 7**	07B	**Digital Input 39**
08A	**Digital Input 8**	08B	**Digital Input 40**
09A	**Digital Input 9**	09B	**Digital Input 41**
10A	**Digital Input 10**	10B	**Digital Input 42**
11A	**Digital Input 11**	11B	**Digital Input 43**
12A	**Digital Input 12**	12B	**Digital Input 44**
13A	**Digital Input 13**	13B	**Digital Input 45**
14A	**Digital Input 14**	14B	**Digital Input 46**
15A	**Digital Input 15**	15B	**Digital Input 47**
16A	**Digital Input 16**	16B	**Digital Input 48**
17A	**Digital Input 17**	17B	**Digital Input 49**
18A	**Digital Input 18**	18B	**Digital Input 50**
19A	**Digital Input 19**	19B	**Digital Input 51**
20A	**Digital Input 20**	20B	**Digital Input 52**
21A	**Digital Input 21**	21B	**Digital Input 53**
22A	**Digital Input 22**	22B	**Digital Input 54**
23A	**Digital Input 23**	23B	**Digital Input 55**
24A	**Digital Input 24**	24B	**Digital Input 56**
25A	**Digital Input 25**	25B	**Digital Input 57**
26A	**Digital Input 26**	26B	**Digital Input 58**
27A	**Digital Input 27**	27B	**Digital Input 59**
28A	**Digital Input 28**	28B	**Digital Input 60**
29A	**Digital Input 29**	29B	**Digital Input 61**

30A	**Digital Input 30**	30B	**Digital Input 62**
31A	**Digital Input 31**	31B	**Digital Input 63**
32A	**Digital Input 32**	32B	**Digital Input 64**

This connector can be used with a standard DIN rail mounted terminal panel using the following parts:

64 Way Screw Terminal to IDC Header - Farnell 449-210 or Klippon 022476

64 Way IDC 0.05" Cable Pitch Socket - Farnell 727-921

96 Way DIN41612 C Body a+c populated - Farnell 972-873

In which case the terminal panel connections are as follows:

	Terminal Panel for Opto Inputs Option		
01	**Digital Input 1**	33	**Digital Input 17**
02	**Digital Input 33**	34	**Digital Input 49**
03	**Digital Input 2**	35	**Digital Input 18**
04	**Digital Input 34**	36	**Digital Input 50**
05	**Digital Input 3**	37	**Digital Input 19**
06	**Digital Input 35**	38	**Digital Input 51**
07	**Digital Input 4**	39	**Digital Input 20**
08	**Digital Input 36**	40	**Digital Input 52**
09	**Digital Input 5**	41	**Digital Input 21**
10	**Digital Input 37**	42	**Digital Input 53**
11	**Digital Input 6**	43	**Digital Input 22**
12	**Digital Input 38**	44	**Digital Input 54**
13	**Digital Input 7**	45	**Digital Input 23**
14	**Digital Input 39**	46	**Digital Input 55**
15	**Digital Input 8**	47	**Digital Input 24**
16	**Digital Input 40**	48	**Digital Input 56**
17	**Digital Input 9**	49	**Digital Input 25**
18	**Digital Input 41**	50	**Digital Input 57**
19	**Digital Input 10**	51	**Digital Input 26**
20	**Digital Input 42**	52	**Digital Input 58**

21	**Digital Input 11**	53	**Digital Input 27**
22	**Digital Input 43**	54	**Digital Input 59**
23	**Digital Input 12**	55	**Digital Input 28**
24	**Digital Input 44**	56	**Digital Input 60**
25	**Digital Input 13**	57	**Digital Input 29**
26	**Digital Input 45**	58	**Digital Input 61**
27	**Digital Input 14**	59	**Digital Input 30**
28	**Digital Input 46**	60	**Digital Input 62**
29	**Digital Input 15**	61	**Digital Input 31**
30	**Digital Input 47**	62	**Digital Input 63**
31	**Digital Input 16**	63	**Digital Input 32**
32	**Digital Input 48**	64	**Digital Input 64**

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4.19 D9S for 8 Analogue Input Option:

This connector interface is primarily designed for connection to the 8 analogue input option:

	D9S for 8 Analogue Input Option:	
01	**Analogue Input #8**	(J2/1 internally)
02	**Analogue Input #7**	(J2/3 internally)
03	**Analogue Input #6**	(J2/5 internally)
04	**Analogue Input #5**	(J2/7 internally)
05	**Analogue Input #4**	(J2/9 internally)
06	**Analogue Input #3**	(J2/11 internally)
07	**Analogue Input #2**	(J2/13 internally)
08	**Analogue Input #1**	(J2/15 internally)
09	**Analogue Ground**	(J2/16 internally)

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4.20 4 Pin Quickmate – for 18-72V, 18-36 and 36-72 DC Supply Options:

This connector interface is primarily designed for supply of optional DC power to the unit.

	4 Pin Quickmate (RS225-1626) for 18-72V DC Supply
A	**0v**
D	**+Ve**

5 Internal Switch and Link Options

The 8834 Pylon EPC Controller is supplied pre-configured to the options ordered. This section is provided for reference only.

DIP Switch SW1

This switch selects the base I/O port address of the I/O card in the PC104 address space.

Default setting 0x310

SW1-1	On
SW1-2	Off
SW1-3	On
SW1-4	On
SW1-5	On
SW1-6	Off

Main I/O PCB Links

LK1	AI2+ Non-Isolated	
LK2	AI2+ Isolated	Fitted
LK3	AI2- Non-Isolated	
LK4	AI2- Isolated	Fitted
LK5	AI1+ Non-Isolated	
LK6	AI1+ Isolated	Fitted
LK7	AI1- Non-Isolated	
LK8	AI1- Isolated	Fitted
LK9	AI2+ Isolated	Fitted
LK10	AI2- Isolated	Fitted
LK11	AI1+ Isolated	Fitted
LK12	AI1- Isolated	Fitted

LK13 header linked as follows:

Pin 1 link to Pin 2 and Pin 15

Pin 3 link to Pin 4 and Pin 13

Pin 5 link to Pin 6 and Pin 11

Pin 7 link to Pin 8 and Pin 9

LK14 header linked as follows:

Pin 1 link to Pin 2 and Pin 15

Pin 3 link to Pin 14

Pin 4 link to Pin 13

PC I/O PCB Links

J1	Audio in #1 to Hybrid	Fitted
J2	Audio in #1 to Com1:Rx	
J3	Audio out #1 from Hybrid	Fitted
J4	Audio out #1 from Com1:Tx	
J5	Audio in #1, +ve bias	
J6	Audio in #1, High gain	
J7	VGA Red Terminator	Fitted
J8	VGA Green Terminator	Fitted
J9	VGA Blue Terminator	Fitted
J10	NTSC Select	Fitted
J11	PAL Select	

LK1	Audio in #2, to Com2:Rx
LK2	Audio out #2, from Com2:Tx
LK3	Audio in #2, +ve bias
LK4	+12Vdc to Com2:RI (pin 9)

4 Wire Modem Datacomms:

Move internal modem line cable from Conn11 to Conn10 on PC I/O pcb (8813-002) and set J1, J3, J6 In, with J2, J4, J5 Out.

4 Wire Audio Datacomms to Com1:

PC I/O pcb, set J2, J4, J5 In, with J1, J3, J6 Out.

PSTN MODEM MODULE (MDM336-OPTION) Links

JP2 – 2/4 Fitted

JP2 – 3/4 Fitted

JP1 – IRQ6 Fitted

All other links removed (i.e. Com4: Irq6).

Cable RJ11 pins 2,3,4,5 to Conn11 RJ45 pins 2,3,4,5

PSTN MODEM MODULE (PCM-33M-OPTION) Links

J3 – 3/5 Fitted

All other links removed. (i.e. Com4: Irq6).

Cable RJ11 pins 2,3,4,5 to Conn11 RJ45 pins 2,3,4,5

6 Operation

Operation of 8834 Pylon EPC Controller is dependant on the application specific software installed in the controller. Refer to the specific documentation for the relevant controller software in use for details.

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7 Maintenance

There is no software system maintenance necessary within the system. There are no user-serviceable hardware components within the operator station. There are no regular preventative maintenance activities.

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8 Frequently Asked Questions (FAQ's)

8.1 How Do I Connect the RS232 Communications?

The PylonGDS-EPC controller system is designed to use RS 232 asynchronous communications directly in accordance with popular industry standards. The communications system requires the correct presentation of all RS 232 handshakes with the PC workstation or its inter-posing modems.

The standard 9 pin connections for a PC DTE are as follows:-

Pin	Id
01	DCD
02	RD
03	TD
04	DTR
05	GND
06	DSR
07	RTS
08	CTS
09	RI

The standard PC connections used for a 25 pin DTE are as follows:-

Pin	Id
02	TD
03	RD
04	RTS
05	CTS
06	DSR
07	GND
08	DCD
20	DTR

and a standard 9-25 pin modem cable can be used to present these if necessary to an external DCE.

The 25 pin presentation is directly compatible with EIA standard, RS232C and will operate with all compatible communications equipment (DCE equipment), such as dial-up, leased-line or limited distance modems.

To connect a PC workstation directly to the EPC controller a standard crossover (null modem) cable can be used (see section 8.3).

Whilst it is not recommended, a 3 wire RS232 connection can be adopted at potentially reduced performance at speeds of 9600 or less. In this case, the PC end of the connection must have its' TD, RD and Gnd pins connected through to the controllers RD, TD and Gnd respectively, whilst at both the master and slave end, the following links must be made between

a) RTS and CTS and

b) DTR, DCD and DSR.

Use of the IC476A-F Converter and cable:

An IC476A-F data convertor is available to allow the connection of the RS422/485 bus to the EPC PC compatible comm ports as a 'Local' bus master for the control of slave devices.

This is connected to the PC by a standard 9-25 pin modem cable. The converter is operated in DCE mode and its internal configuration switches are set SW1-4 and SW2 ON with all others OFF.

Fit the communications converter to a free 9 pin RS232 serial port and connect the RS422 cable to the device to control.

The normal bus connection cable is then made up as follows:

Transmit Pair:		D9P
XMIT+ (TXB)	Red	3
XMIT- (TXA)	Black	9
Receive Pair:		D9P
RCV+ (RXB)	White	4
RCV- (RXA)	Black	6
Shield Gnd:		D9P
		5

8.2 How Do I Connect the 10BASE-T Ethernet?

The controller may be connected to a local hub using up to 100m of category 5 UTP cable connected with a “straight“ cable as follows:

EPC			HUB
1	white/orange	Pair 2	1
2	orange/white	Pair 2	2
3	white/green	Pair 3	3
4	blue/white	Pair 1	4
5	white/blue	Pair 1	5
6	green/white	Pair 3	6
7	white/brown	Pair 4	7
8	brown/white	Pair 4	8

The controller may be connected direct to a local PC using up to 100m of category 5 UTP cable connected with a “cross over“ cable as follows:

EPC			PC
1	white/orange	Pair 2	3
2	orange/white	Pair 2	6
3	white/green	Pair 3	1
4			
5			
6	green/white	Pair 3	2
7			
8			

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8.3 How Do I Make Up an RS232 PC-PC File Transfer Cable?

The controller may be connected to a local PC for file transfers as follows:

The connections for intervening 25 way connectors are also shown.

EPC D9S	D25S		D25S	PC D9S
1				
2	3	Rd/Td	2	3
3	2	Td/Rd	3	2
4	20	Dtr/Dsr	6	6
5	7	Ground	7	5
6	6	Dsr/Dtr	20	4
7	4	Rts/Cts	5	8
8	5	Cts/Rts	4	7
9				

****

8.4 What are the Comm port addresses and Irq's used ?

These are as follows:

Com1:	0x3F8	IRQ4	(Rear Panel)
Com2:	0x2F8	IRQ3	(Rear Panel)
Com3:	0x3E8	IRQ5	(LCU/Rotator Modem Option)
Com4:	0x2E8	IRQ6	(PSTN Modem Option)

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8.5 How do I connect UCL Receiver ?

This is done as follows:

RS485 Data Comms:

EPC Com2: pin 4	(Tx-)	UCL Lemo: pin 5
EPC Com2: pin 8	(Tx+)	UCL Lemo: pin 4
EPC Com2: pin 3	(Rx-)	UCL Lemo: pin 3
EPC Com2: pin 7	(Rx+)	UCL Lemo: pin 1

Agc Signal Monitor:

EPC D37: pin 1	(Agc+)	UCL Lemo: pin 3 (optional)
EPC D37: pin 19	(Agc-)	UCL Lemo: pin 6 (optional)

EPC D37: pin 20 – Link to 19 above.

EPC Configuration Form:

Comspec: COM2:9600,e,7,2

Address: 49 (= 0x31)

BaseFreq(MHz): e.g. 10000 (Must be identical to ENG3 Config)

AGCScale: 0.78 for serial AGC. (0.0122 for Analog option).

Com2: RS485 Termination (If not provided externally):

Fit R117 = 120 R

Fit R115 = 4k7 R

Fit R116 = 4k7 R

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8.6 How do I use a PAL or NTSC video Monitor ?

IMPORTANT - To obtain the best display performance from the controller the standard SVGA computer monitor port should be used with a standard SVGA monitor, as composite video monitors do not handle the resolution and sharp colour changes used in PC‘s very well.

The PylonEPC controller contains an optional SVGA to composite video convertor for TV-Out, which can be used as an alternative to display the computer output on an NTSC or PAL monitor at lower performance. This can be useful for temporary configuration, or diagnostic use, where existing composite video monitors are already in use on other equipment in a scheme.

To use the composite video output, the controller must have been factory fitted with either the NTSC or PAL convertor option. A composite video monitor can be connected to the BNC socket on the controller. The controller has to be software configured for composite output as follows:

1. The video BIOS installed must have the NTSC/PAL support enabled, (this is identified by a ‘PylonEPC NTSC/PAL support‘ message on power up). This is normally done on the CPU card when the factory video option is installed, but if not can also be temporarily installed as a TSR using CVgaBios.exe either from the command line or in the system Autoexec.bat file.
2. On startup the system defaults to SVGA monitor mode and must be put into NTSC or PAL mode using the PylonVID.exe program either from the command line or in the system Autoexec.bat file. “PylonVID NTSC“ and “PylonVID PAL“ switch the video into composite NTSC or PAL output respectively and blank any connected SVGA monitor.

If the system subsequently starts Windows95, then the display properties ‘Chips‘ tab can be used to switch between the SVGA and TV outputs. The controller can handle resolutions up to 800x600 pixels, outside of the video window and has panning capability to view the other areas.

Notes: Internal links enable three 75ohm terminating resistors on the RGB outputs of the SVGA connector. This termination is normally provided by the monitor. These links should be fitted if the

composite output is to be used on it‘s own, but if they are fitted and an SVGA monitor is temporarily connected also note that the display will be dimmer.

The only difference between the NTSC and PAL factory options is the xtal frequency used for the FSC clock.

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8.7 What are the BIOS settings for normal operation?

The following settings are important for normal operation of an EPC controller:

Main:

System Time:	[<as reqd>]
System Date:	[<as reqd>]
Diskette A:	[Not Installed]
Diskette B:	[Not Installed]
IDE Adapter 0 Master:	(None)
IDE Adapter 0 Slave:	(None)
Video System:	[EGA / VGA]

Memory Shadow:

Video Shadow:	[Enabled]
D000 - DFFF:	[Disabled]
Limit 64Mb to 48Mb:	[Disabled]

Boot Options:

Verbose Boot:	[Enabled]
Beep after POST:	[Enabled]
Real time clock test:	[Enabled]
Timer interrupt test:	[Enabled]
Boot Sequence:	[A: then C:]
Setup Prompt:	[Enabled]
POST Errors:	[Disabled]
Floppy check:	[Disabled]
Summary screen:	[Enabled]
Extended memory test:	[Enabled]

Keyboard Features:

Numlock: [Auto]

Keyclick: [Enabled]

Keyboard auto-repeat rate [30/Sec]

Keyboard auto-repeat delay [1/2 Sec]

Advanced:

Integrated Peripherals:

Serial Port Com 1: [Enabled]

Serial Port Com 1 Mode: [Normal]

Serial Port Com 2: [Enabled]

Serial Port Com 3: [Enabled]

Parallel Port: [Disabled]

Parallel Port Mode: [Bi-Directional]

Diskette Controller: [Disabled]

IDE Controller: [Disabled]

Ethernet Controller: [Disabled]

Video Controller: [Enabled]

A/D Converter: [Disabled]

PS/2 Mouse: [Enabled]

Advanced Chipset Control:

CPU Clock Selection: [33 MHz]

CPU Clock Low Speed: [8 MHz]

ISA DMA channel (/PDRQ0 and PDACK0):[DMA 2]

ISA DMA channel (/PDRQ1 and PDACK1):[DMA 5]

Programmable interupt request 5 routing: [IRQ 8]

Security:

Supervisor Password is: [Disabled]

User Password is: [Disabled]

Password on Boot: [Disabled]

Diskette access: [User]

Fixed disk boot sector: [Normal]

System backup reminder: [Disabled]

Virus check reminder: [Disabled]

Power:

Power Savings: [Off]

Once these settings are made they can not only be saved before exit to cmos, but can also be written to eeprom as the system defaults (used when the battery or cmos checksum is invalid) using the following command:

TB4EE -C

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8.8 What are the relay connections in relay order?

As follows:

RLY1	N/O=CN2/01	COM=CN2/10
RLY2	N/O=CN2/02	COM=CN2/12
RLY3	N/O=CN2/03	COM=CN2/13
RLY4	N/O=CN2/04	COM=CN2/14
RLY5	N/O=CN2/05	COM=CN2/15
RLY6	N/O=CN3/01	COM=CN3/14
RLY7	N/O=CN3/02	COM=CN3/15
RLY8	N/O=CN3/03	COM=CN3/16
RLY9	N/O=CN3/04	COM=CN3/19
RLY10	N/O=CN3/05	COM=CN3/20
RLY11	N/O=CN3/06	COM=CN3/21
RLY12	N/O=CN3/07	COM=CN3/22
RLY13	N/O=CN3/08	COM=CN3/23
RLY14	N/O=CN3/09	COM=CN3/24
RLY15	N/O=CN3/10	COM=CN3/25
RLY16	N/O=CN1/09	COM=CN1/28
RLY17	N/O=CN1/10	COM=CN1/29
RLY18	N/O=CN1/13	COM=CN1/32
RLY19	N/O=CN1/15	COM=CN1/34
RLY20	N/O=CN1/16	COM=CN1/35
RLY21	N/O=CN1/07	COM=CN1/26
RLY22	N/O=CN1/02	COM=CN1/21

RLY23	N/O=CN1/05	COM=CN1/24
RLY24	N/O=CN1/08	COM=CN1/27
RLY25	N/C=CN1/04	COM=CN1/23
RLY26	N/O=CN1/11	COM=CN1/30
RLY27	N/O=CN1/17	COM=CN1/36
RLY28	N/O=CN1/12	COM=CN1/31
RLY29	N/O=CN1/14	COM=CN1/33
RLY30	N/O=CN1/06	COM=CN1/25
RLY31	N/O=CN1/18	COM=CN3/11
RLY32	N/O=CN3/12	COM=CN3/13

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8.9 How is the TS400 expansion serial board used?

Depending on the project configuration – it is sometimes possible to run out of serial ports. (An example of this would be the combination of:

a) UCL receiver [RS485 on com2:],

b) RFT continuous rotator [level 2 interface on com3:],

c) External 4 wire modem [RS232 on com1:].

If you now want to accept GPS Helipod data, there is no com port for it!).

In this situation, an expansion serial card option can be fitted in place of the internal PSTN modem option, (to use COM5: at 0x2E8 and IRQ10). – The TS400.004 PCB is set up as follows:

Jumper Area E1	Row 2 – A & B linked
	Row 3 – A & B linked
	Row 4 – B & C linked
	Row 5 – B & C linked
	Row 6 – A & B linked
Jumper Area E2	I2 & I3 linked

The com port is then wired internally as follows:

J4 (40w IDC)	Conn11 (RJ45)
Pin 3	Pin 2
Pin 5	Pin 3
Pin 9	Pin 5

Externally these connections then appear on Conn12 (Modem RJ45). – If a PC compatible D9 is required – an adapter cable should be wired as follows:

Conn12 (Modem RJ45)	D9P
Pin 2	Pin 2
Pin 3	Pin 3
Pin 5	Pin 5

8.10 Which Pots adjust the Analog Calibration?

Azimuth (Channel 0) – Zero = VR5, Span = VR6, (range = 51.2 mV)

Elevation (Channel 1) – Zero = VR3, Span = VR4, (range = 36 mV)