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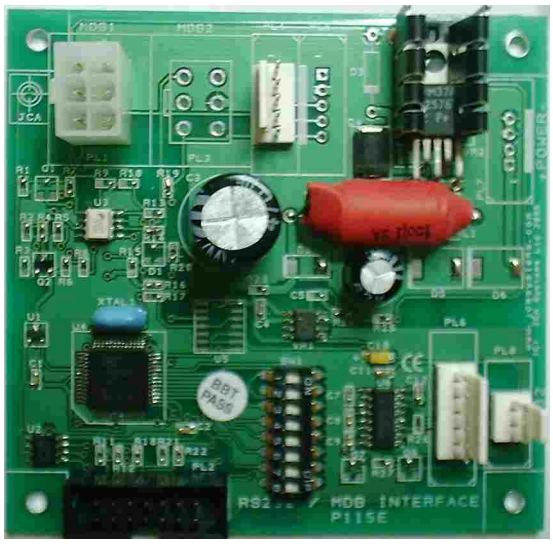


APPLICATIONS GUIDE

P115E MDB SLAVE INTERFACE

Version 3.0

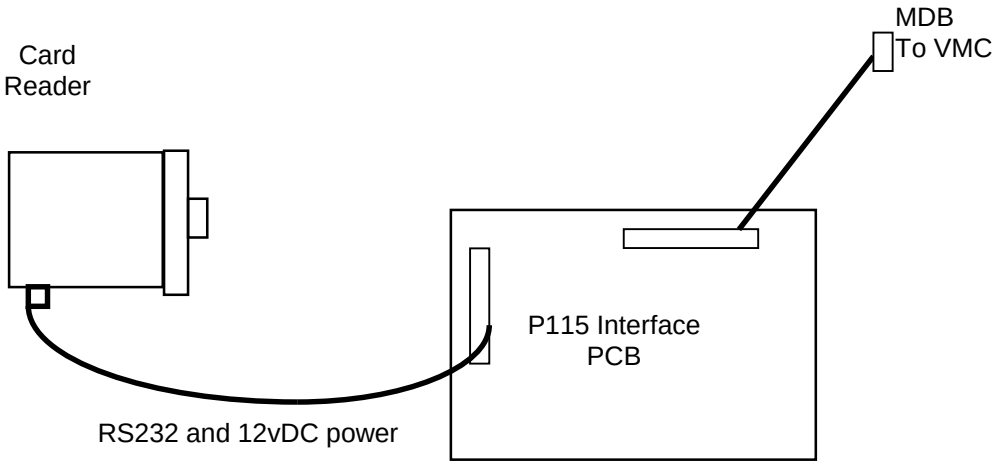
Date: 19 June 2007

1. INTRODUCTION

This interface circuit board enables a stand-alone Card Reader system (Credit Card or “Cashless card”) with a RS232 serial port to work in a vending machine that operates with the "Multi-Drop-Bus" (MDB) protocol. Other payment systems can also make use of the RS232 protocols to load credit into a MDB based vending machine.

The P115E board converts the MDB nominal 34 volt power to 12 volts to provide power for the card reader module, and handles the MDB serial interface communications with the vending machine.

This application note describes how to connect the P115 Issue E board between the Card Reader system and the Vending Machine.



Reference should be made to the MDB Standard (available from NAMA, www.vending.org) for details of the MDB protocols.

2. RS232 Interface to Card Reader

This interface is via a standard RS232 connection. The interface operates at 9600 baud, 8 bits, no parity and 1 stop bit. Refer to the separate document on the CARDLINK protocol for the message structures on this Port

3. DIP Switch Settings

	Function	OFF	ON
Switch 1	MDB Base Address	Card Reader # 1 (10H)	Card Reader # 2 (60H)
Switch 2	MDB Value Scaling Factor	1	10
Switch 3	Decimal Places	2	0
Switch 4	Country Code (ms)	See separate table	
Switch 5	Country Code (ls)		
Switch 6	Send Selection ROW/Column with Authorisation request	Selection Row/Column NOT sent	Selection Row/Column NOT sent
Switch 7	Authorisation Time (ms)	See separate table	
Switch 8	Authorisation Time (ls)		

Country Code Settings

Switch 4	Switch 5	Country Code
OFF	OFF	UK (0044H)
OFF	ON	US (0001H)
ON	OFF	Euro (1978H)
ON	ON	Not Used (0044H)

Authorisation Time Settings

Switch 7	Switch 8	Time (seconds)
OFF	OFF	5
OFF	ON	15
ON	OFF	40
ON	ON	75

4. MDB Interface to Vending machine

The P115E emulates a standard Level 01+ Card reader as defined in the MDB Specification. Depending on the DIP Switch settings, it can respond to either MDB Card Reader #1 on addresses 10H – 17H or Card reader #2 on addresses 60H-67H

It responds to the following MDB Commands (addresses shown for Card Reader #1, add 50H for Card Reader #2):

MDB Command	Hex	Sub Commands	P115E Actions
Reset	10	-	Disables the Card reader, reloads set-up fields on the CARDLINK.
Set-up	11	00 – Config Data	Responds to the VMC with the settings from the DIP switches in the next POLL response
Set-up	11	01 – Max/Min Prices	Message acknowledged only
Poll	12	-	See table of responses
Vend	13	00 – Vend Request	Makes authorisation request Rnnnn on the CARD LINK protocol
Vend	13	01 – Vend Cancel	Sends a Card Reader disable F on the CARDLINK protocol – the card reader must abort any active transaction and credit any funds deducted
Vend	13	02H – Vend Success	Sends Vend OK K on CARDLINK
Vend	13	03 – Vend Fail	Sends Vend fail L on CARDLINK
Vend	13	04 – Session Complete	Closes the current action and disables the card reader (F on the CARDLINK protocol)
Vend	13	05 – Cash Sale	Message acknowledged only
Reader	14	00 – Reader Disable	Disables the card reader (F on the CARDLINK protocol)
Reader	14	01 – Reader Enable	Enables the card reader (G on the CARDLINK protocol)
Reader	14	02 – Reader Cancel	Returns a Cancelled 08H poll response
Expansion	17	00 – Request ID	Returns standard data about the P115E
Expansion	17	FF - Diagnostics	Returns the last error code to the VMC

MDB POLL RESPONSES

Poll response	Hex	P115E Actions/conditions
Just Reset	00	Just reset condition
Configuration	01	Returns Configuration data from the DIP switches
Begin Session	03	Returns “Not yet determined” amount of funds available when a card has been inserted
Session Cancel Request	04	Issued if the card is removed from the card reader unexpectedly
Vend Approved	05	Issued when authorisation received from the card reader
Vend Denied	06	Issued when no authorisation received from the card reader
End Session	07	Issued in response to a Session Complete message from the VMC
Cancelled	08	Issued in response to a Reader Cancel message from the VMC
Peripheral ID	09	Standard data issued in response to an Expansion – request ID command from the VMC
Error	0A	Error codes returned as appropriate
Out of Sequence	0B	Sent if an unexpected command is received from the VMC

Appendix 1 - SPECIFICATION

- **OPERATING ENVIRONMENT**

Operating Temperature	+10°C to +45°C
Storage Temperature	0°C to +60°C
EMC	The P115E PCB is supplied as a component with no intrinsic function under the definition of the EMC Directive. The complete vending machine is subject to EMC conformance. Measures have been taken to minimise EMC effects within the design.
Safety	The P115E PCB is a low voltage device - Note, should a mains power supply be used with the VMC it is recommended that it should conform to a relevant standard such as IEC 950.

- **CARD READER INTERFACE**

Serial	RS232 signals with nominal +/-12 volt signal levels (9600 baud, 8 bits, 1 stop bit no parity)
Power Output	12 volts DC +/- 0.5 volts at 2.0 Amps maximum

- **MDB VENDING MACHINE INTERFACE**

Serial Interface (Peripheral Slave at 9600 baud)

Receive:	Maximum input current (active)	15mA @ 4 volts
	Maximum input current (inactive)	100uA
Transmit:	Minimum sink current (active)	15 mA @ 1 volt
	Maximum leakage current (inactive)	30uA

Power Input

Minimum 20v DC (rectified and optionally filtered)
Nominal 34v DC (rectified and filtered) / 24v DC (rectified only)
Maximum 42.5v DC (ripple upper voltage limit, absolute maximum 45v DC peak)

Maximum current 2.0 Amps

Appendix 2 - Connections

RS232 Card Reader Connector (PL6)

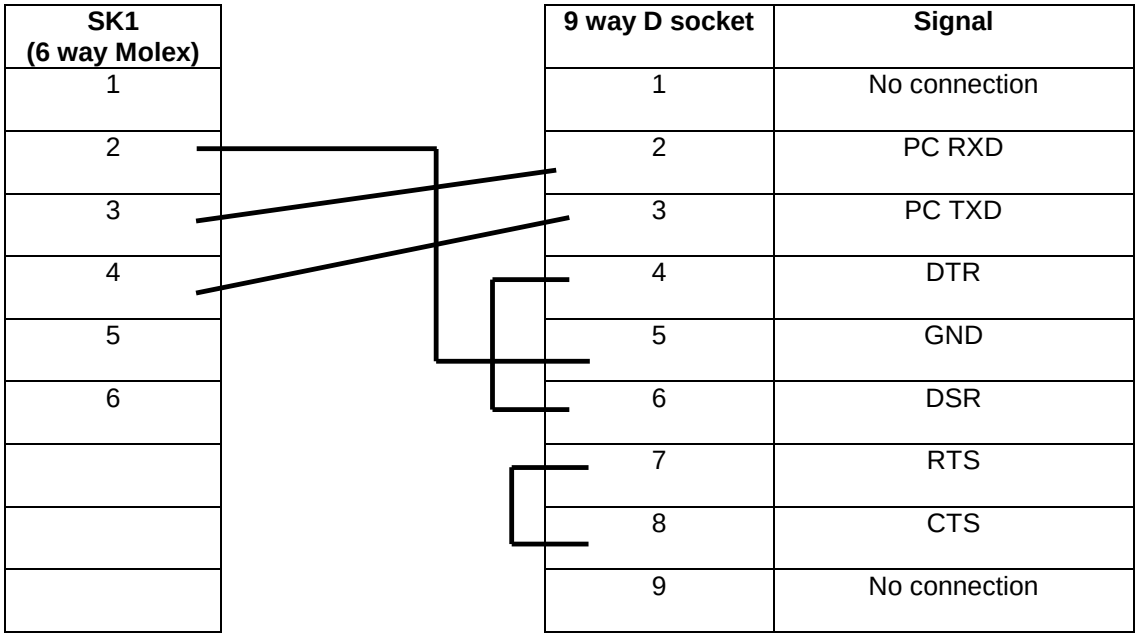
Mating Connector : SK1 - 6 way Molex 6741 series connector, Molex Part Number 22-01-2065, using crimps 08-50-0032

Pinouts

PL6 Pin	Signal
1	0v (power return)
2	0v (data ground)
3	TXD (RS232 data FROM P115E)
4	RXD (RS232 data TO P115E)
5	+12v DC out to card reader
6	+12v DC out to card reader

- **RS232 Connection – example PC connection**

  - SK1 connects to PL6 (Marked "RS232") on the P115 board and the 9 way D socket to the PC serial port.



SK1 (6 way Molex)	9 way D socket	Signal
1	1	No connection
2	2	PC RXD
3	3	PC TXD
4	4	DTR
5	5	GND
6	6	DSR
	7	RTS
	8	CTS
	9	No connection

MDB Connection

This connection is for a standard MDB machine with a nominal 34v DC power supply.

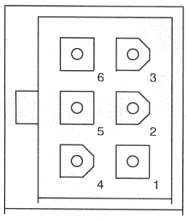
Connect as shown below to PL4 using a 5 way Molex Mini KK 6741 Series connector (Molex 22-01-2055 using crimps Molex 08-50-0032)

P115E INTERFACE BOARD		MDB CONNECTION TO VENDING MACHINE
5 Way SK1		Molex 39-01-2060 with 39-00-0065 terminals
+34v DC	1	1
0v Supply Return	2	2
MDB Master RX	3	3
MDB Master TX	4	4
MDB Comms Common	5	5
		6

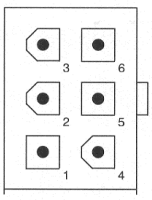
Standard MDB Connections are:

Connector Pin-out:

Line 1 - 34 VDC
Line 2 - DC Power Return
Line 3 - N/C
Line 4 - Master Receive
Line 5 - Master Transmit
Line 6 - Communications Common



Peripheral Connector
Face View
(Sockets)



VMC / Bus Connector
Face View
(Pins)

Appendix 3 – Mechanical Mounting

The P115 Issue E layout is shown below.

The board is 89mm by 86 mm. There are four mounting holes (3.1mm diameter) at each corner. These are suitable for standard 3.1mm “stand-offs”. The mounting holes are on a 76.2mm by 78.8 mm pitch.

The maximum height of the board is 35mm, a clearance of at least 5mm is recommended beneath the board.