APPLICATIONS GUIDE

P104 MDB INTERFACE

Version 4.0 JCM

Date: 20 June 2005

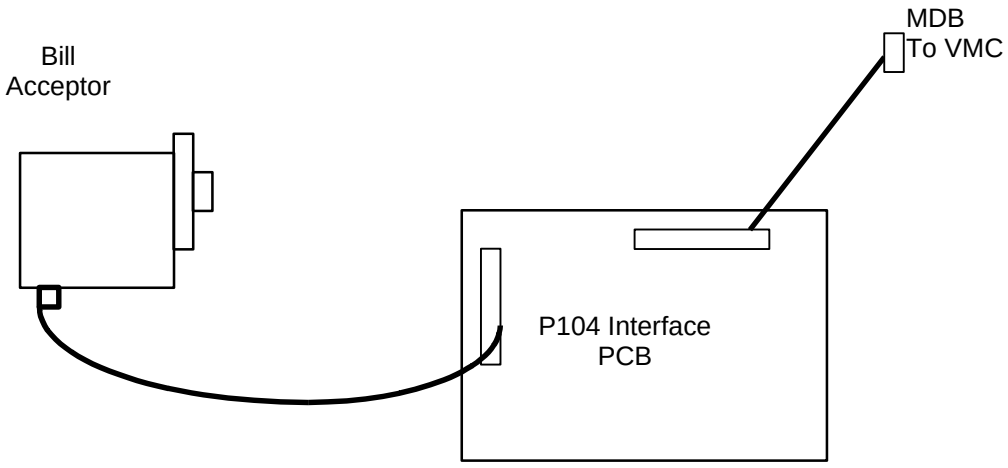
Contents:

1. INTRODUCTION

This interface circuit board enables a standard 12 volt DC, parallel interface, Bill Acceptor / Note Reader to work in a vending machine that operates with the "Multi-Drop-Bus" (MDB) protocol.

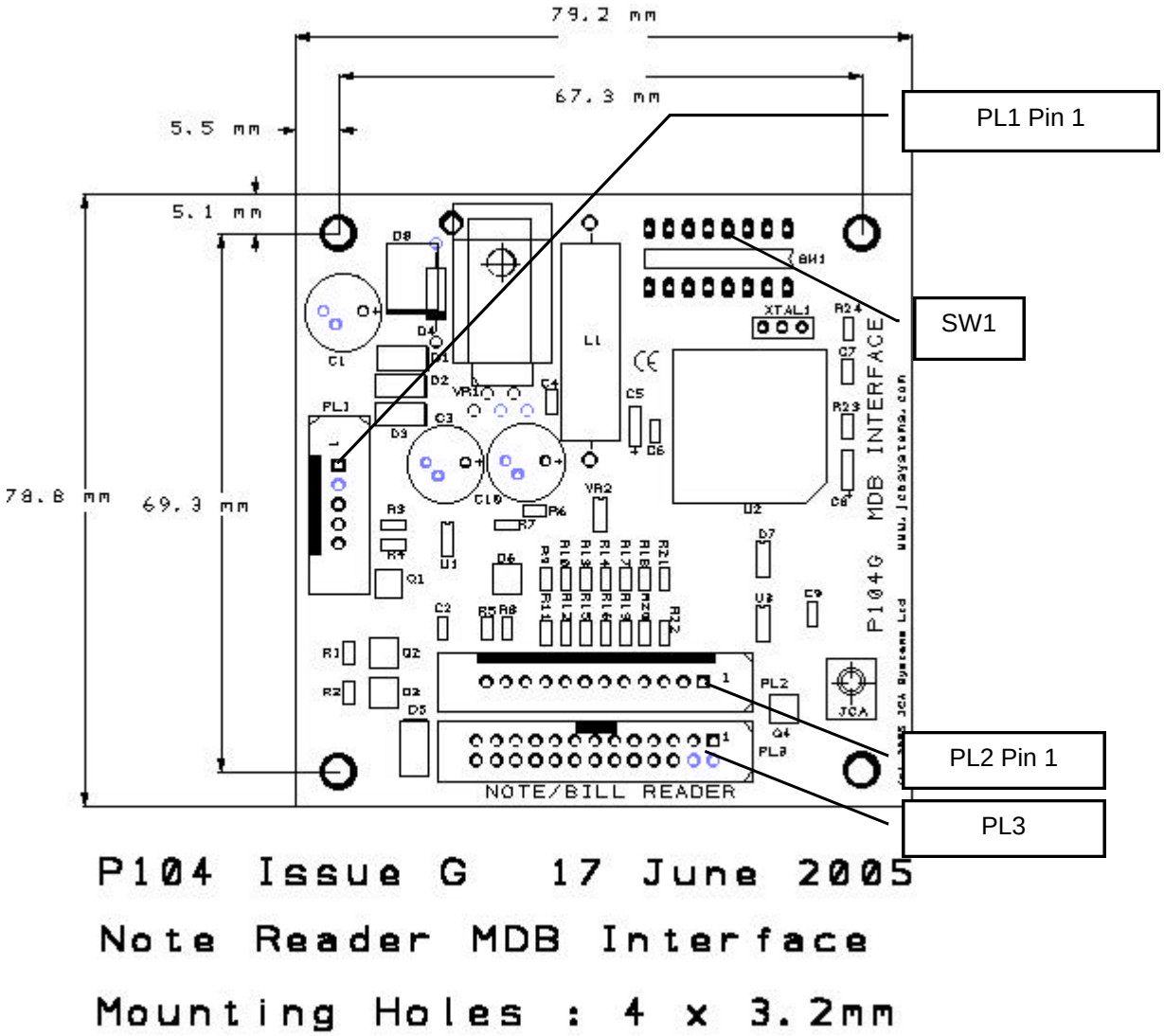
The P104 board converts the MDB nominal 34 volt power to 12 volts for the Bill Acceptor, and handles the MDB serial interface communications with the vending machine. The board will work with up to 6 bill types and operate the escrow function of the bill reader if required.

This application note describes how to connect the P104 Issue G board between the Bill Acceptor and the Vending Machine which has been modified to work with the ID001 interface on the JCM Note Reader.



2. BOARD MOUNTING & LAYOUT

The interface board is 78.8 mm by 79.2 mm with a maximum height of 32mm. The board is mounted using the 4 mounting holes located on each corner. The mounting holes are 69.3mm by 67.3mm apart and are 3.2mm diameter to accept a conventional “stand-off”.



There are three connectors on the board :

PL1	MDB Vending Machine Controller and Machine Power
PL2	Bill Acceptor (Alternative connection, not fitted)
PL3	Ribbon cable connection to JCM note reader

There is one selection switch on the board (SW1) which is used to select the bill values and board functions.

3. BILL ACCEPTOR CONNECTIONS – JCM Version

Connect JCM note reader directly to PL3 using a 26 way ribbon cable.

JCM Switch Settings:
DIP Switches 1, 3 – 8 OFF, Switch 2 ON

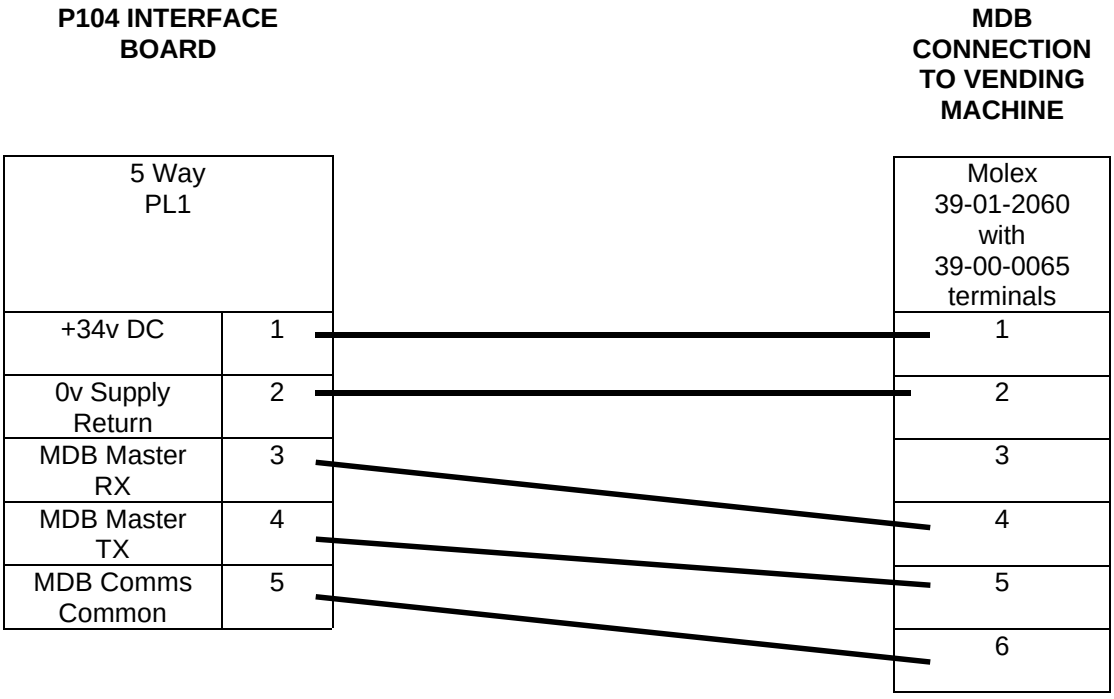
Recommended P104 switch settings:

For Euro operation	Switches 1, 5 and 8 ON, Switches 2, 3, 4, 6, 7 OFF
For UK operation	Switches 1 and 8 ON, Switches 2, 3, 4, 5, 6, 7 OFF

4. STANDARD MDB CONNECTIONS TO VENDING MACHINE

This connection is for a standard MDB machine with a nominal 34v DC power supply. (The unit will operate with a power supply in the range 15v DC to 42v DC).

Connect as shown below to PL1 using a 5 way Molex Mini KK 6741 Series connector (Molex 22-01-2055 using crimps Molex 08-50-0032)



Appendix 1 - SPECIFICATION

- **OPERATING ENVIRONMENT**

Operating Temperature	+10°C to +40°C
Storage Temperature	0°C to +60°C
EMC	The Control 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 Control 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.

- **NOTE READER INTERFACE**

Inputs to P104	Internal 10K ohm pull up to 5 volts Logic Zero < 0.5 volts Logic One >4.0 volts, or open circuit
Outputs from P104	Logic One : open circuit Logic Zero : <0.5volts at 100mA sink current maximum
Power Output	12 volts DC +/- 0.5 volts at 1.25 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 - CONFIGURATION SWITCH SETTINGS

1. GENERAL NOTE SETTINGS

8	7	6	5	4	3	2	1
ESCROW	**ON**	**DP**	**SC1**	**SC0**	NOTE VALUES (See separate table)		

Decimal Point
OFF - 0
ON - 2

Escrow
OFF - Disabled
ON - Enabled

Scaling factor

SC1	SC0	Scaling
OFF	OFF	X 1
OFF	ON	X 10
ON	OFF	X 100
ON	ON	X 1000

Note Values:

Switch 3	Switch 2	Switch 1	Note 1	Note 2	Note 3	Note 4	Note 5	Note 6
OFF	OFF	OFF	1	5	10	20	50	100
OFF	OFF	ON	5	10	20	50	100	200
OFF	ON	OFF	2	5	10	20	50	100
OFF	ON	ON	1	5	10	50	100	200
ON	OFF	OFF	1	2	5	10	50	100
ON	OFF	ON	2	5	10	50	100	200
ON	ON	OFF	1	2	5	10	20	50
ON	ON	ON	1	2	5	10	20	100

2. STANDARD NOTE SETS

8	7	6	5	4	3	2	1
ESCROW	**OFF**	**OFF**	**SET**	Switch Settings as in Appendix 5			

Escrow
OFF - Disabled
ON - Enabled

Select Note Set
OFF - NOTE SET 1
ON - NOTE SET 2

3. RESERVED SWITCH SETTINGS (FOR FUTURE EXPANSION)

8	7	6	5	4	3	2	1
	OFF	**ON**					

Appendix 3 - STANDARD NOTE SETS

NOTE SET 1

Set	Switches				Scaling Factor	Dec Pl	C Code	Note Value (0 – 255)					
	4	3	2	1				1	2	3	4	5	6
1	OFF	OFF	OFF	OFF	1	0	44	1	5	10	20	50	100
2	OFF	OFF	OFF	ON	100	2	44	5	10	20	50	100	200
3	OFF	OFF	ON	OFF	1	0	44	2	5	10	20	50	100
4	OFF	OFF	ON	ON	10	0	44	2	5	10	20	50	100
5	OFF	ON	OFF	OFF	100	2	44	1	5	10	50	100	200
6	OFF	ON	OFF	ON	1	0	44	1	2	5	10	50	100
7	OFF	ON	ON	OFF	1000	2	44	1	2	5	10	50	100
8	OFF	ON	ON	ON	10	0	44	1	2	5	10	20	50
9	ON	OFF	OFF	OFF	10	0	44	5	10	20	50	100	200
10	ON	OFF	OFF	ON	1	0	44	25	50	100	0	0	0
11	ON	OFF	ON	OFF	5	0	44	2	5	10	20	50	100
12	ON	OFF	ON	ON	10000	2	44	5	10	25	50	100	0
13	ON	ON	OFF	OFF	100	2	44	1	2	5	10	50	100
14	ON	ON	OFF	ON	100	2	44	1	2	5	10	20	0
15	ON	ON	ON	OFF	10	0	44	2	5	10	50	100	0
16	ON	ON	ON	ON	500	2	44	1	2	4	10	20	100

NOTE SET 2

Set	Switches				Scaling Factor	Dec Pl	C Code	Note Value (0 – 255)					
	4	3	2	1				1	2	3	4	5	6
1	OFF	OFF	OFF	OFF	1	0	1978	1	5	10	20	50	100
2	OFF	OFF	OFF	ON	100	2	1978	5	10	20	50	100	200
3	OFF	OFF	ON	OFF	1	0	1978	2	5	10	20	50	100
4	OFF	OFF	ON	ON	10	0	1978	2	5	10	20	50	100
5	OFF	ON	OFF	OFF	100	2	1978	1	5	10	50	100	200
6	OFF	ON	OFF	ON	1	0	1978	1	2	5	10	50	100
7	OFF	ON	ON	OFF	1000	2	1978	1	2	5	10	50	100
8	OFF	ON	ON	ON	10	0	1978	1	2	5	10	20	50
9	ON	OFF	OFF	OFF	10	0	1978	5	10	20	50	100	200
10	ON	OFF	OFF	ON	1	0	1978	25	50	100	0	0	0
11	ON	OFF	ON	OFF	5	0	1978	2	5	10	20	50	100
12	ON	OFF	ON	ON	10000	2	1978	5	10	25	50	100	0
13	ON	ON	OFF	OFF	100	2	1978	1	2	5	10	50	100
14	ON	ON	OFF	ON	100	2	1978	1	2	5	10	20	0
15	ON	ON	ON	OFF	10	0	1978	2	5	10	50	100	0
16	ON	ON	ON	ON	500	2	1978	1	2	4	10	20	100

All Note Sets report a "Stacker Capacity" of 600.

Country codes (C Code) are as follows:

44H	UK	(Default)
1978H	Euros	