

"Pescara" Protocol Converter Instruction Manual

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Revision History

Version	Date	Author	Description
1.0	7-Dec-06	A. Graham	Initial Release.
2.0	1-Nov-07	A. Graham	Updated following sundry fixes to code.
2.1	2-Nov-07	A. Graham	Correction of minor errors in previous issue. Option "E" was incorrectly described.
2.2	10/6/11	AJ Tainsh	J2 comment now says Acceptor, J3 comment now says Host.

Introduction

Purpose of Document

This document describes the use of the AES "Pescara" Protocol Converter.

Intended Audience

The intended audience of this document are games manufacturers and operators who wish to interface bill acceptors to their legacy games.

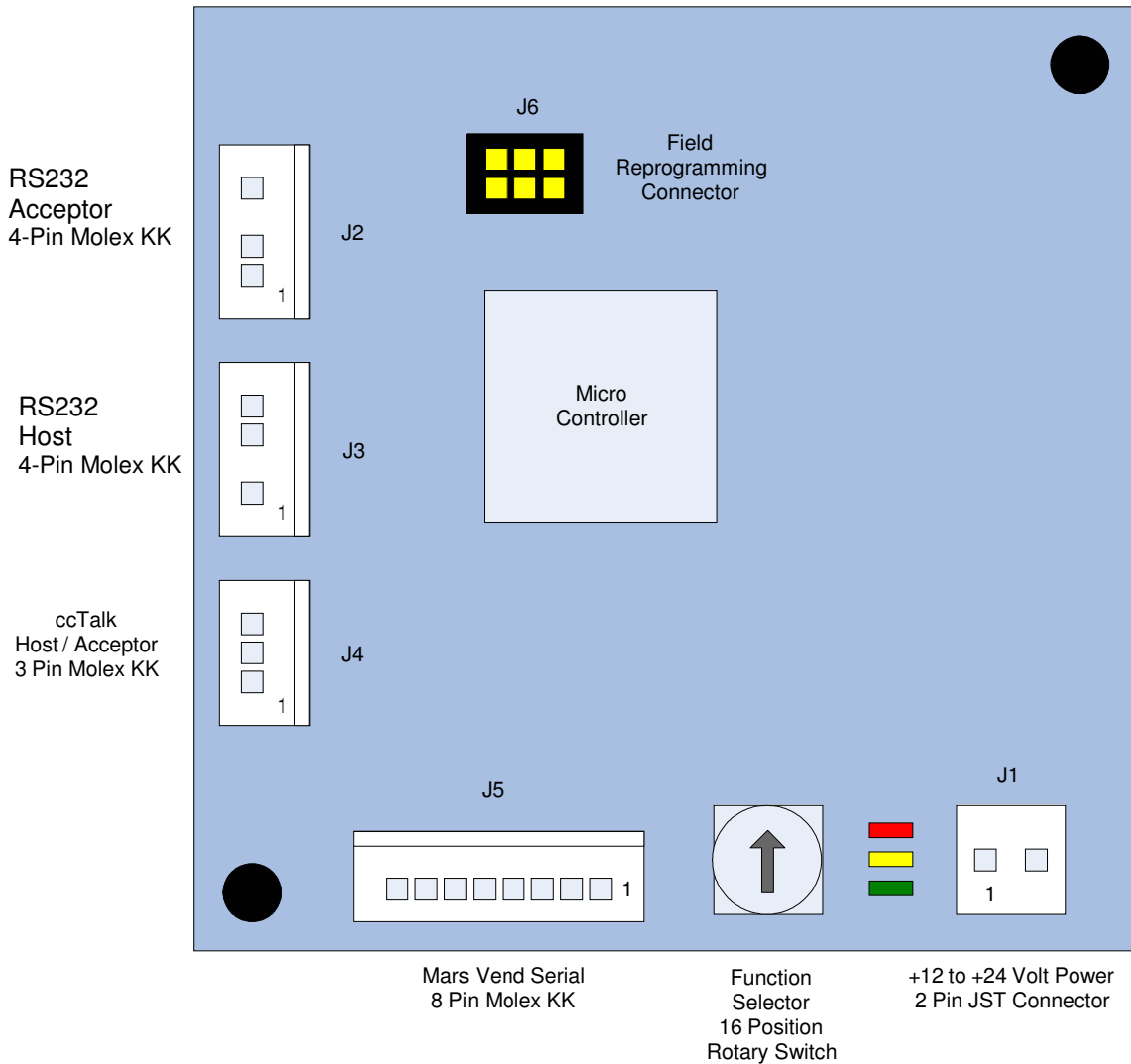
Document Layout

The document first describes the connectors on the Pescara board, with pin-outs for each.

The document then describes the current operational modes of the Pescara board, with instructions of how to connect the board in each supported mode.

Board Layout

The following diagram shows the layout of the Pescara board, with each connector identified. Normally the board is mounted in a plastic enclosure, with only the connectors, LEDs and rotary switch available to the user.



Kindly note the positions of pin 1 on the 4 Molex KK interface connectors versus the JST power connector.

Pescara Board Connections

Power Connection (J1)

A 2-way JST connector (J1) is provided for power to be supplied to the Pescara board.

The pinout of connector J1 is as follows:

Connector J6 (Power)	
Pin Number	Signal
1	12 / 24-Volt Board Supply
2	Ground

Note that the supply to the board must be clean and regulated.

Note the position of pin 1 from the board layout diagram on page 5.

RS232 Acceptor Connector (J2)

A 4-way Molex KK connector (J2) is provided to allow the Pescara board to be connected to a physical acceptor via an RS 232 connector.

Note that although this is a 4-way Molex KK, pin 3 is omitted to help identify the connector.

The pinout of connector J2 is as follows:

Connector J2 (RS232 Acceptor)	
Pin Number	Signal
1	Tx Data (To Acc)
2	Rx Data (From Acc)
3	No Fit
4	Ground

Note the position of pin 1 from the board layout diagram on page 5.

RS232 Host Connector (J3)

A 4-way Molex KK connector (J3) is provided to allow the Pescara board to be connected to a host machine via an RS 232 connector.

Note that although this is a 4-way Molex KK, pin 2 is omitted to help identify the connector.

The pinout of connector J3 is as follows:

Connector J3 (RS232 Host)	
Pin Number	Signal
1	Tx Data (To Host)
2	No Fit
3	Rx Data (From Host)
4	Ground

Note the position of pin 1 from the board layout diagram on page 5.

ccTalk Host / Acceptor Connector (J4)

A 3-way Molex KK connector (J4) is provided to facilitate ccTalk communications.

This connector is used for two different purposes:

- To act as a ccTalk slave port for a Pescara configured to simulate a ccTalk bill validator.
- To act as a ccTalk master port for a Pescara configured to communicate with with a physical ccTalk bill validator.

Note that the operational mode of the Pescara board is set using the 16-way rotary switch which is shown on the board layout diagram on page 5.

The pinout of connector J4 is as follows:

Connector J4 (ccTalk Host / Acceptor)	
Pin Number	Signal
1	No Connect
2	ccTalk Data
3	Ground

Note the position of pin 1 from the board layout diagram on page 5.

Mars Vend Serial Host Connector (J5)

An 8-way Molex KK connector (J5) is provided, *originally* designed to facilitate communications with a machine via a standard "Mars Vend Serial" interface.

When operating in Mars vend serial mode, the pinout of connector J5 is as follows:

Connector J5 (Mars Vend Serial Mode)	
Pin Number	Signal
1	LED Supply
2	RxD / #Enable (From Host)
3	NISR Send (From Host)
4	Interrupt (To Host)
5	Tx Data / Credit (To Host)
6	Cassette Present (To Host)
7	Out Of Service (To Host)
8	Ground

The meaning of the above signals is in accordance with and fully covered by the documentation of the MVS interface.

Note that this connector is *also* used for *different* modes of simple, open-collector pulsing interfaces. In these other modes, the meaning of the pins is changed from the above description to be as follows.

Connector J5 (Other Pulse Modes)		
Pin Number	Signal	Usage
1	LED Supply	
2	Acceptor Enable (From Host)	Pulled low (below 2.5V) to enable acceptance.
3	Escrow Enable (From Host)	Pulled low (below 2.5V) to enable Escrow mode.
4	Busy (To Host)	Pulled low 500 milliseconds before VEND, released 380 milliseconds after last VEND pulse.
5	Vend Pulse (To Host)	Pulled low for 120 milliseconds per pulse, with an 80 millisecond high between pulses.
6	Cassette Present (To Host)	Pulled low if the stacker is OK.
7	Out Of Service (To Host)	Pulled low if the acceptor is working properly.
8	Ground	

The following paragraphs give a brief description of the use / meaning of each of these signals.

The "Acceptor Enable" signal (active low) is used to control whether the physical acceptor is enabled.

In the simplest mode of operation, pull "Acceptor Enabled" low and leave the "Escrow Enable" high (or not connected), meaning escrow is not used.

In **non-Escrow** mode, the completion of stacking a banknote (bill) is indicated by the "Busy" signal being pulled low. 500 milliseconds later a series of pulses are driven on the "Vend Pulse" output, following which the "Busy" signal returns high.

To use **Escrow** mode, the "Escrow Enable" is pulled low by the host.

In this situation, a banknote (bill) is held in Escrow while the Busy and Vend Pulse signals notify the host of the banknote in Escrow.

The host can then either:

- Allow "Acceptor Enable" to return high, which returns the banknote from the Escrow position.
OR
- Allow "Escrow Enable" to return high, which results in the banknote being stacked. Note that, under this circumstance, the pulse train is output once again.

Two types of serial pulse train are supported and these are described later in the document.

Field Reprogramming Connector (J6)

Note that this connector is shown and included here for completeness only. In the unlikely event that a firmware upgrade in the field is required, separate firmware upgrade instructions will be provided by AES.

Otherwise, **no connection** must be made to this connector.

Operational Mode Selection

The operational mode of the Pescara board needs to be selected *prior to applying power to the board*.

This mode selection is achieved by turning the sixteen way rotary switch to the required setting, 0 .. F.

It is necessary to set the rotary switch to a valid setting, not including either of the two "production self test" settings, chosen from the following list.

Setting	Usage	Description	Host	Acceptor
0	Run Production Self Test	Do not select.	Not Applicable	Not Applicable
1	MVS → ccTalk	Connects a host machine with a Mars Vend Serial interface to a ccTalk bill acceptor.	MVS (J5)	CcTalk (J4)
2	MVS → ID003	Connects a host machine with a Mars Vend Serial interface to an ID003 bill acceptor.	MVS (J5)	ID003 (J2)
3	Ardac 2 → ccTalk	Connects a host machine with an Ardac 2 Serial interface to a ccTalk bill acceptor.	Ardac 2 RS232 (J3)	ccTalk (J4)
4	Ardac 2 → ID003	Connects a host machine with an Ardac 2 Serial interface to an ID003 bill acceptor.	Ardac 2 RS232 (J3)	ID003 (J2)
5	ccTalk → ID003	Connects a host machine with a ccTalk Serial interface to an ID003 bill acceptor.	ccTalk (J4)	ID003 (J3) (HOST)
6	GPT 2 → ccTalk (Dynamic Note mapping)	Connects a host machine with a GPT2 2 Serial interface to a ccTalk bill acceptor.	GPT V2 RS232 (J3)	ccTalk (J4)
7	GPT 2 → ccTalk (Default Note Mapping)	Connects a host machine with a GPT2 2 Serial interface to a ccTalk bill acceptor.	GPT V2 RS232 (J3)	ccTalk (J4)
8	Pulse Serial → ccTalk	Connects a host machine using "open collector" inputs and digital outputs to a ccTalk bill acceptor. See later descriptions of differences between the two supported types of pulsing.	MVS (J5)	ccTalk (J4)
9	Scaled Pulse Serial → ccTalk	Connects a host machine using "open collector" inputs and digital outputs to a ccTalk bill acceptor. See later descriptions of differences between the two supported types of pulsing.	MVS (J5)	ccTalk (J4)
A	End Production Self Test	Do not select.	Not Applicable	Not Applicable

Setting	Usage	Description	Host	Acceptor
B	Pulse Serial → ID003	Connects a host machine using "open collector" inputs and digital outputs to an ID003 bill acceptor. See later descriptions of differences between the two supported types of pulsing.	MVS (J5)	ID003 (J2)
C	Scaled Pulse Serial → ID003	Connects a host machine using "open collector" inputs and digital outputs to an ID003 bill acceptor. See later descriptions of differences between the two supported types of pulsing.	MVS (J5)	ID003 (J2)
D	GPT 2 → ID003	Connects a host machine with a GPT2 2 Serial interface to an ID003 bill acceptor.	GPT V2 RS232 (J3)	ID003 (J2)
E	GPT 2 (No Escrow) → ccTalk	Connects a host machine with a GPT2 2 Serial interface to a ccTalk bill acceptor. (Operates without Escrow)	GPT V2 RS232 (J3)	ccTalk (J4)
F	Pulse Serial → ccTalk Demonstration Mode	Connects a host machine using "open collector" inputs to a ccTalk bill acceptor. Note that this is intended as a simple demonstration of pulse generation only. In this mode, Pescara does not take notice of the "Acceptor Enable" signal.	MVS (J5)	ccTalk (J4)

MVS → ccTalk (Switch Position 1)

Use this option for Pescara to interface a host machine with a Mars Vend Serial interface to a ccTalk bill acceptor.

Configuration in this mode is achieved as follows:

1. Select option **1** using the rotary switch.
2. Connect the host machine to the "Mars Vend Serial" interface via Pescara connector J5.
3. Connect a ccTalk bill acceptor to Pescara connector J4.
4. Apply power (12 to 24 volts) to the Pescara board. This is normally the same supply that the bill acceptor requires.

MVS → ID003 (Switch Position 2)

Use this option for Pescara to interface a host machine with a Mars Vend Serial interface to an ID003 bill acceptor.

Configuration in this mode is achieved as follows:

1. Select option **2** using the rotary switch.
2. Connect the host machine to the "Mars Vend Serial" interface via Pescara connector J5.
3. Connect an ID003 bill acceptor to Pescara connector J3.
4. Apply power (12 to 24 volts) to the Pescara board. This is normally the same supply that the bill acceptor requires.

Ardac 2 → ccTalk (Switch Position 3)

Use this option for Pescara to interface a host machine with an Ardac 2 Serial interface to a ccTalk bill acceptor. For Ardac 2 machines communicating with Pescara, one should note the following standard and dynamic banknote (bill) mappings:

Sterling (GB £)

6 banknotes, where the first two are not used. Notes in the third, fourth, fifth and sixth positions have values £5, £10, £20 and £50 respectively.

Dollars (US \$)

6 banknotes, where the second one is not used. Notes in the first and third through sixth positions have values \$1, \$5, \$10, \$20, \$50 respectively.

Euros (EU €)

7 banknotes, where all seven are used. Notes have values €5, €10, €20, €50, €100, €200, €500 respectively.

Other Currencies

In the case of other currencies, a dynamic value-mapping table is built from the values extracted from the bill acceptor. These are sorted in ascending order.

Configuration in this mode is achieved as follows:

1. Select option **3** using the rotary switch.
2. Connect the host machine to the "RS 232 Acceptor" interface via Pescara connector J2.
3. Connect a ccTalk bill acceptor to Pescara connector J4.
4. Apply power (12 to 24 volts) to the Pescara board. This is normally the same supply that the bill acceptor requires.

Ardac 2 → ID003 (Switch Position 4)

Use this option for Pescara to interface a host machine with an Ardac 2 Serial interface to an ID003 bill acceptor.

Please refer to the previous section for a description of the bill value mappings when using different currencies.

Configuration in this mode is achieved as follows:

1. Select option **4** using the rotary switch.
2. Connect the host machine to the "RS 232 Host" interface Pescara connector J3.
3. Connect an ID003 bill acceptor to "RS 232 Acceptor" interface via Pescara connector J2.
4. Apply power (12 to 24 volts) to the Pescara board. This is normally the same supply that the bill acceptor requires.

ccTalk → ID003 (Switch Position 5)

Use this option for Pescara to interface a host machine with a ccTalk Serial interface and to an ID003 bill acceptor.

Configuration in this mode is achieved as follows:

1. Select option **5** using the rotary switch.
2. Connect the host machine to the ccTalk interface via Pescara connector J4.
3. Connect an ID003 bill acceptor to the "**RS 232 Host**" interface Pescara connector J3.
4. Apply power (12 to 24 volts) to the Pescara board. This is normally the same supply that the bill acceptor requires.

Note that in this case only the bill acceptor is connected to the "Host" RS232 connector, rather than the "Acceptor" RS232 connector. This is due to an internal hardware feature of the Pescara electronics.

GPT 2 → ccTalk – Dynamic Banknote Mapping (Switch Position 6)

This is one of three options used for Pescara to interface a host machine with a GPT2 2 Serial interface to a ccTalk bill acceptor.

With this option, the Pescara interrogates the slave bill acceptor and sorts the values of the notes into ascending order. Thus it is the note set within the physical bill acceptor that determines the mapping of accepted notes to GPT 2 note numbers.

The host machine can determine the note mapping using the standard GPT 2 commands.

In this mode, the Escrow facilities are used.

Configuration in this mode is achieved as follows:

1. Select option **6** using the rotary switch.
2. Connect the host machine to the "RS 232 Acceptor" interface via Pescara connector J2.
3. Connect a ccTalk bill acceptor to Pescara connector J4.
4. Apply power (12 to 24 volts) to the Pescara board. This is normally the same supply that the bill acceptor requires.

GPT 2 → ccTalk – Default Banknote Mapping (Switch Position 7)

This is the second of three options used for Pescara to interface a host machine with a GPT2 2 Serial interface to a ccTalk bill acceptor.

With this option, the Pescara builds a table of banknote (bill) values based on *standard* mapping of values to banknote numbers.

The standard mapping is a set of 15 notes with values:

\$1, \$2, \$5, \$10, \$20, \$50, \$100, \$200, \$500, \$1000, \$2000, \$5000, \$10000, \$20000, \$50000

or the equivalent numbers in local currency.

The host machine can determine the note mapping using the standard GPT 2 commands.

In this mode, the Escrow facilities are used.

Configuration in this mode is achieved as follows:

1. Select option **7** using the rotary switch.
2. Connect the host machine to the "RS 232 Acceptor" interface via Pescara connector J2.
3. Connect a ccTalk bill acceptor to Pescara connector J4.
4. Apply power (12 to 24 volts) to the Pescara board. This is normally the same supply that the bill acceptor requires.

Pulse Serial → ccTalk (Switch Position 8)

This is one of two options used for Pescara to interface a host machine with a simple “open collector” interface (as described earlier) to a ccTalk bill acceptor generating one single pulse for every 100 cents / pennies / etc.

As an example, a \$5 banknote (bill) would generate 5 pulses in this mode, \$10 would generate 10 pulses, etc.

Configuration in this mode is achieved as follows:

1. Select option **8** using the rotary switch.
2. Connect the host machine via Pescara connector J5.
3. Connect a ccTalk bill acceptor to Pescara connector J4.
4. Apply power (12 to 24 volts) to the Pescara board. This is normally the same supply that the bill acceptor requires.

Scaled Pulse Serial → ccTalk (Switch Position 9)

This is the second of two options used for Pescara to interface a host machine with a simple “open collector” interface (as described earlier) to a ccTalk bill acceptor. In this mode, Pescara will generate one single pulse for the lowest denomination banknote (bill) recognised by the acceptor. For higher value banknotes a number of pulses equal to the value of this banknote divided by the lowest denomination banknote.

As an example, a \$5 banknote would generate 1 pulse in this mode, \$10 would generate 2 pulses, etc.

Configuration in this mode is achieved as follows:

1. Select option **9** using the rotary switch.
2. Connect the host machine to connector J5.
3. Connect a ccTalk bill acceptor to Pescara connector J4.
4. Apply power (12 to 24 volts) to the Pescara board. This is normally the same supply that the bill acceptor requires.

Pulse Serial → ID003 (Switch Position B)

This is one of two options used for Pescara to interface a host machine with a simple “open collector” interface (as described earlier) to an ID003 bill acceptor generating one single pulse for every 100 cents / pennies / etc.

As an example, a \$5 banknote (bill) would generate 5 pulses in this mode, \$10 would generate 10 pulses, etc.

Configuration in this mode is achieved as follows:

1. Select option **B** using the rotary switch.
2. Connect the host machine to connector J5.
3. Connect an ID003 bill acceptor to Pescara connector J3.
4. Apply power (12 to 24 volts) to the Pescara board. This is normally the same supply that the bill acceptor requires.

Scaled Pulse Serial → ID003 (Switch Position C)

This is the second of two options used for Pescara to interface a host machine with a simple “open collector” interface (as described earlier) to an ID003 bill acceptor. In this mode, Pescara will generate one single pulse for the lowest denomination banknote (bill) recognised by the acceptor. For higher value banknotes a number of pulses equal to the value of this banknote divided by the lowest denomination banknote.

As an example, a \$5 banknote would generate 1 pulse in this mode, \$10 would generate 2 pulses, etc.

Configuration in this mode is achieved as follows:

1. Select option **C** using the rotary switch.
2. Connect the host machine to connector J5.
3. Connect an ID003 bill acceptor to Pescara connector J3.
4. Apply power (12 to 24 volts) to the Pescara board. This is normally the same supply that the bill acceptor requires.

GPT 2 → ID003 (Switch Position D)

Use this option for Pescara to interface a host machine with a GPT2 2 Serial interface to an ID003 bill acceptor.

Configuration in this mode is achieved as follows:

1. Select option **D** using the rotary switch.
2. Connect the host machine to the "RS 232 Host" interface via Pescara connector J2.
3. Connect an ID003 bill acceptor to Pescara connector J3.
4. Apply power (12 to 24 volts) to the Pescara board. This is normally the same supply that the bill acceptor requires.

GPT 2 → ccTalk – No Escrow (Switch Position E)

This is the third of three for Pescara to interface a host machine with a GPT2 2 Serial interface to a ccTalk bill acceptor.

In this mode, Pescara operates without using Escrow facilities.

In this mode, the "default" banknote mapping scheme is used. (See description of switch position 7).

Configuration in this mode is achieved as follows:

1. Select option **E** using the rotary switch.
2. Connect the host machine to the "RS 232 Host" interface via Pescara connector J2.
3. Connect a ccTalk bill acceptor to Pescara connector J4.
4. Apply power (12 to 24 volts) to the Pescara board. This is normally the same supply that the bill acceptor requires.

Pulse Serial → ccTalk – Demonstration (Switch Position F)

This is a further option used for Pescara to interface a host machine with a simple “open collector” interface (as described earlier) to an ID003 bill acceptor generating one single pulse for every 100 cents / pennies / etc.

As an example, a \$5 note would generate 5 pulses in this mode, \$10 would generate 10 pulses, etc.

Note that option this is intended as a simple **demonstration mode only** and it does not take account of the “Acceptor Enable” signal, accepting notes unconditionally. It is **not** intended as an operational mode.

Configuration in this mode is achieved as follows:

1. Select option **F** using the rotary switch.
2. Connect the host machine to connector J5.
3. Connect an ID003 bill acceptor to Pescara connector J3.
4. Apply power (12 to 24 volts) to the Pescara board. This is normally the same supply that the bill acceptor requires.

ccTalk Banknote Encryption Key

In order to communicate with the most secure ccTalk bill validators, Pescara uses "BNV Encryption" on its ccTalk interface.

Some users will be aware that this is based on a six-digit encryption key, held within the ccTalk bill validator. As originally supplied, Pescara defaults to the standard encryption key.

However, some users wish to *change* the encryption key within their bill validators and they have a requirement to be able to change the corresponding encryption key within Pescara.

In order to achieve this, one should power up Pescara with the switch setting in position 1. One can then connect a simple terminal emulator to the RS232 "**Host**" connector (J3).

With the terminal setting at 9600, eight data bits, one stop bit and no parity, one can communicate with the Pescara firmware.

There is no facility to *extract* the current six-digit encryption key, but you must already *know* it to be able to *change* it.

If (say) one wished to change an encryption key from 147692 to 231446, then the following command should be used.

```
bnv 147692 231446
```

Followed by the "Enter" key.

If the change is successful, then Pescara replies "**OK**".

If the change is unsuccessful, then Pescara replies "**Failed**".

Custom Pescara Variants

There have been a number of custom software builds of the Pescara firmware in the past to achieve connectivity not supported by the standard Pescara firmware build.

These are subject to minimum order quantities.

If you have a connectivity requirement that is not covered by the standard Pescara capabilities, please contact Aardvark Embedded Solutions Ltd.

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