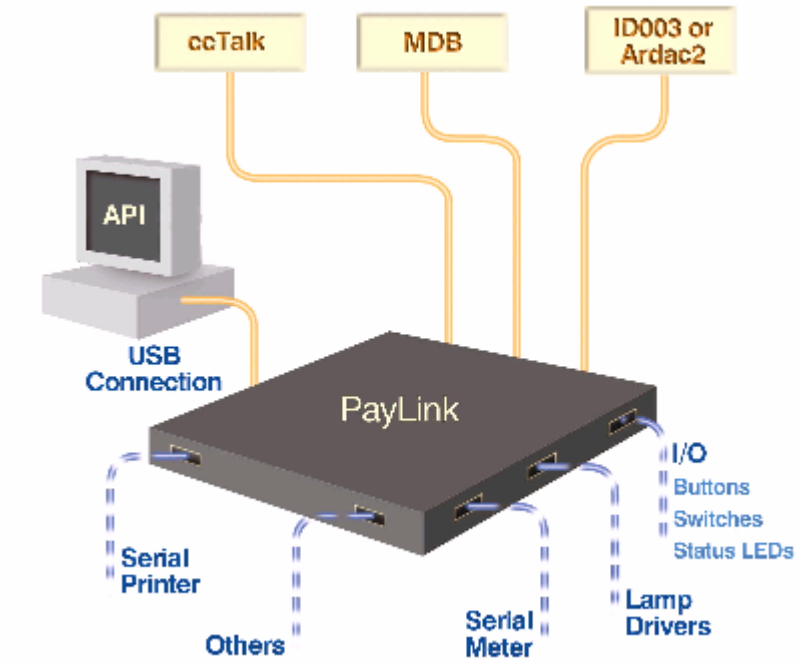
Money Controls

PayLink
Technical Manual



Contents

Figures

Tables

1. Diary of Changes

Issue 1.0……August 2005
- 1st Issue

Issue 1.1…… .November 2005
- Changed the value for cctalk hopper address 10, from 500 to 1
- Corrected a mistake with the pinout for RS232 printer interface
- Change 'red and black' to 'orange and black' for 24V
- Included information on hotswapping
- Above mentioned changes in line with firmware release 4.1.9.6

Issue 1.2……December 2005
- Corrected a mistake with the cctalk connector pinout information.

Issue 1.3……May 2006
- Added hopper level sense support
- Added MDB changer support
- Added hopper power fail support
- Corrected mistakes in Figure 14 and Figure 15
- Added SCH3 Combi Support
- Removed all connector details – referecne now to release drawings.
- Added driver and dll revisions.
- Added additional functions available in AESWDriver and Firmware updater.
- Above mentioned changes in line with firmware release 4-1-10-4

Issue 1.4……November 2006
- Changes to reflect 4-1-10-6 release of software
- Updated the hopper Address vs Value table

2. Overview

2.1 Introduction

PayLink is a simple, compact system that offers trouble free interfacing between a PC and money handling Equipment. **PayLink** allows the rapid integration of a variety of payment peripherals into new machine platforms, without the need for bespoke software.

Designed for use in a wide range of applications

- **Gaming**
- **Amusement**
- **Transportation**
- **Vending**

Interfaces/protocols supported

- **ccTalk**
- **ID003**
- **MDB (Master & Slave)**
- **Ardac 2**
- **RS232 serial**

Products supported

- **SR3**
- **Condor Plus / Condor Premier**
- **SR5**
- **SR5i**
- **Lumina/MC7200**
- **Serial Compact Hopper MK2 (SCH2)**
- **SCH3 Combi**
- **Serial Universal Hopper (SUH)**
- **Ardac 5**
- **Serial ticket printer (GEN2)**
- **MDB Changer (Coin Co - Vortex/Quantum Pro)**

I/O supported

- **16 Outputs (8 High Power – 8 Low Power)**
- **16 Inputs**
- **Serial electronic meter**

2.2 Contents

PayLink does not come with any cables or software. In order to obtain the software CD (drivers, API) please contact your local Money Controls Technical Services Dept.

The verison of software currently available and released is as follows.

PayLink Firmware	**4.1.10.6**
AESWDriver.exe	**1.0.4.8**
Aesimhei.dll	**1.3.2.2**
FTD2XX.dll	**3.0.5.1**
Demo.exe	**1.1.0.2**
MilanDiag.exe	**1.0.2.2**

To obtain a copy of these drivers please contact

Technical Services link: http://www.moneycontrols.com/support/technical_support.asp

PayLink part number: **APCUSBXX00001**

However, Money Controls can provide a development kit, which consists of example cables and a software CD, but this is only available as a 1 off order. Please contact your local Customer Services Dept to place an order.

Customer Services link: http://www.moneycontrols.com/support/customer_support.asp

PayLink development kit part number: **APCUSBXX00002**

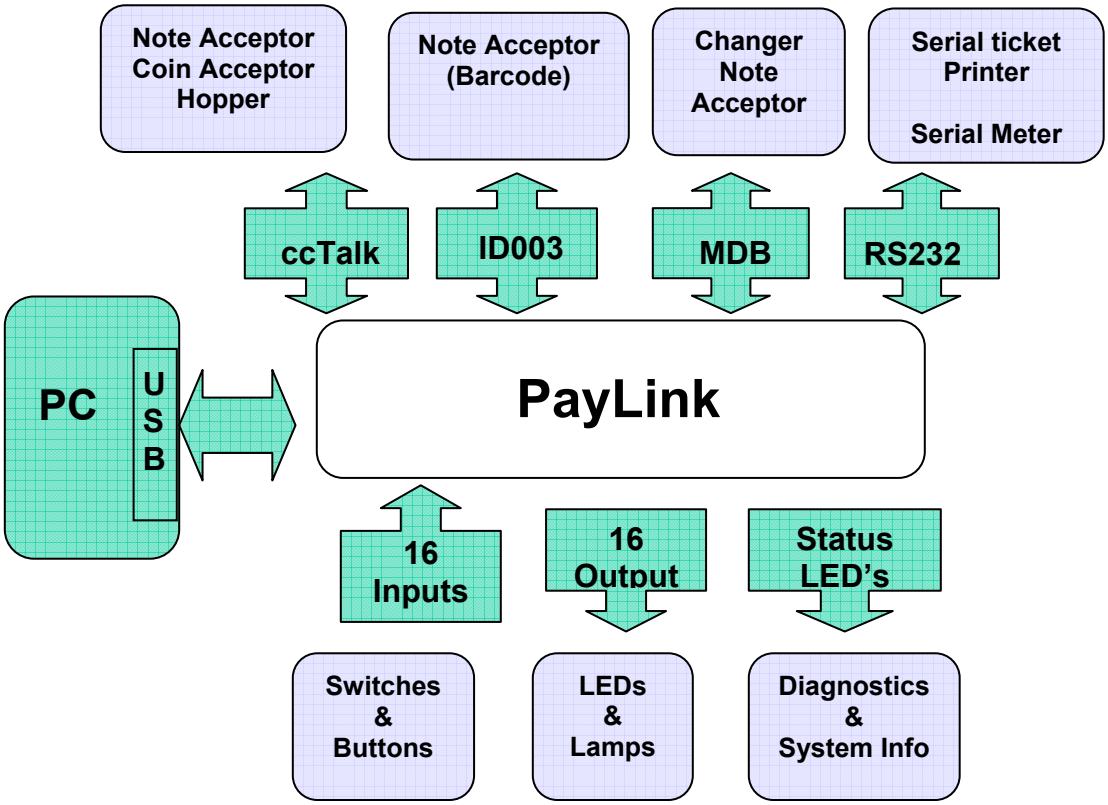
Money Controls recommend purchasing a development kit, in order to aid the integration process in the host machine.
The contents of the **PayLink** Development Kit are as follows:

- **PayLink**
- 1 X cctalk multidrop cable
- 2 X SR5/Lumina cable
- 1 X SR3/Condor Plus cable
- 1 X SCH2 cable – set to address 4
- 1 X SUH cable – set to address 3
- 1 X Serial ticket printer cable
- 1 X Serial meter cable
- 1 X Paylink power cable
- 4 X 20-way headers – for use with inputs/outputs
- 1 X USB Type A – Type B cable
- 1 X Ardac 5 Power cable
- 1 X RJ45-RS232 adapter
- 1 X RJ45 cable
- 1 X MDB Cable

3. Specification

3.1 Functional block diagram

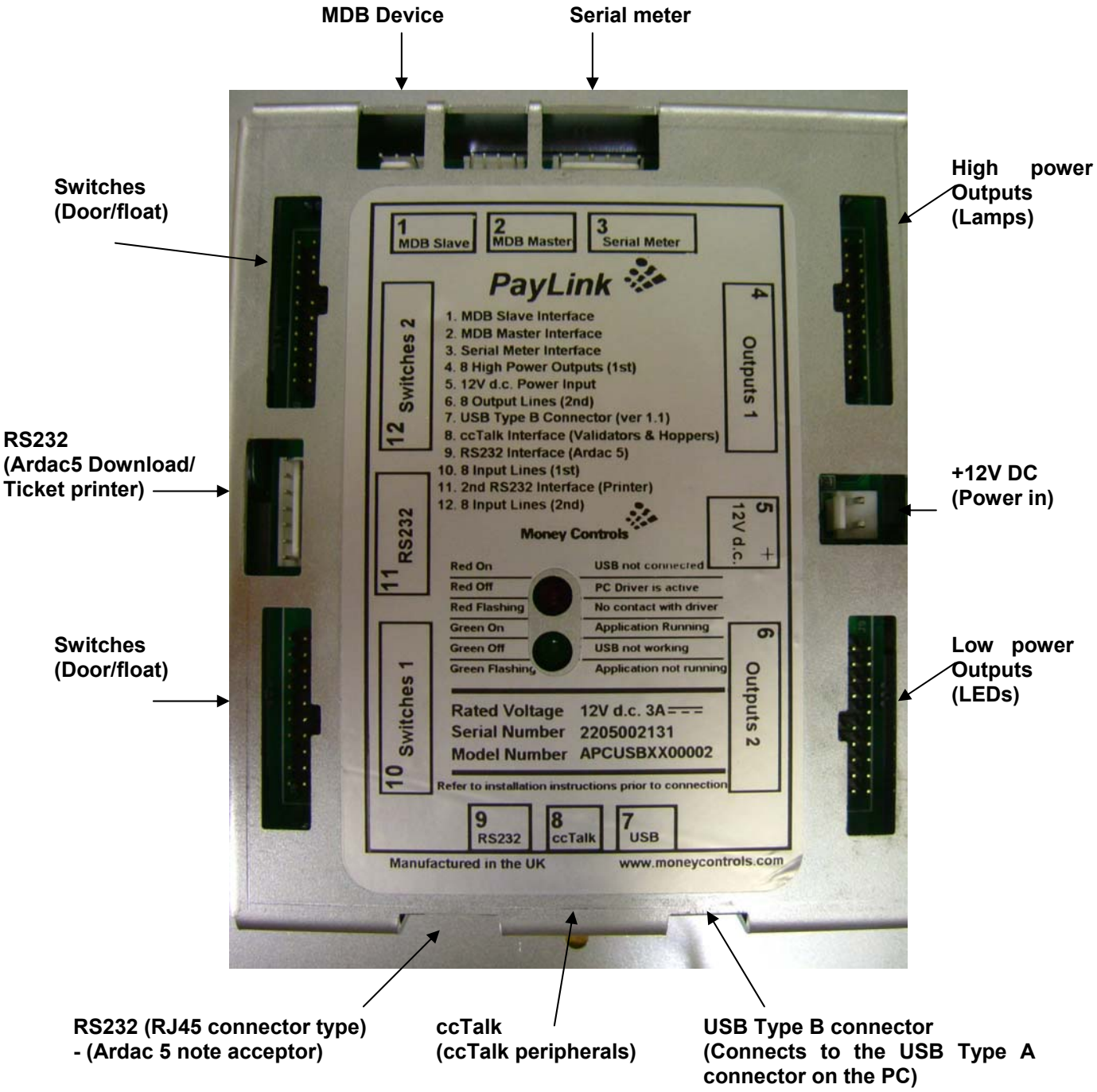
Figure 1: Functional block diagram



3.2 Connector Overview

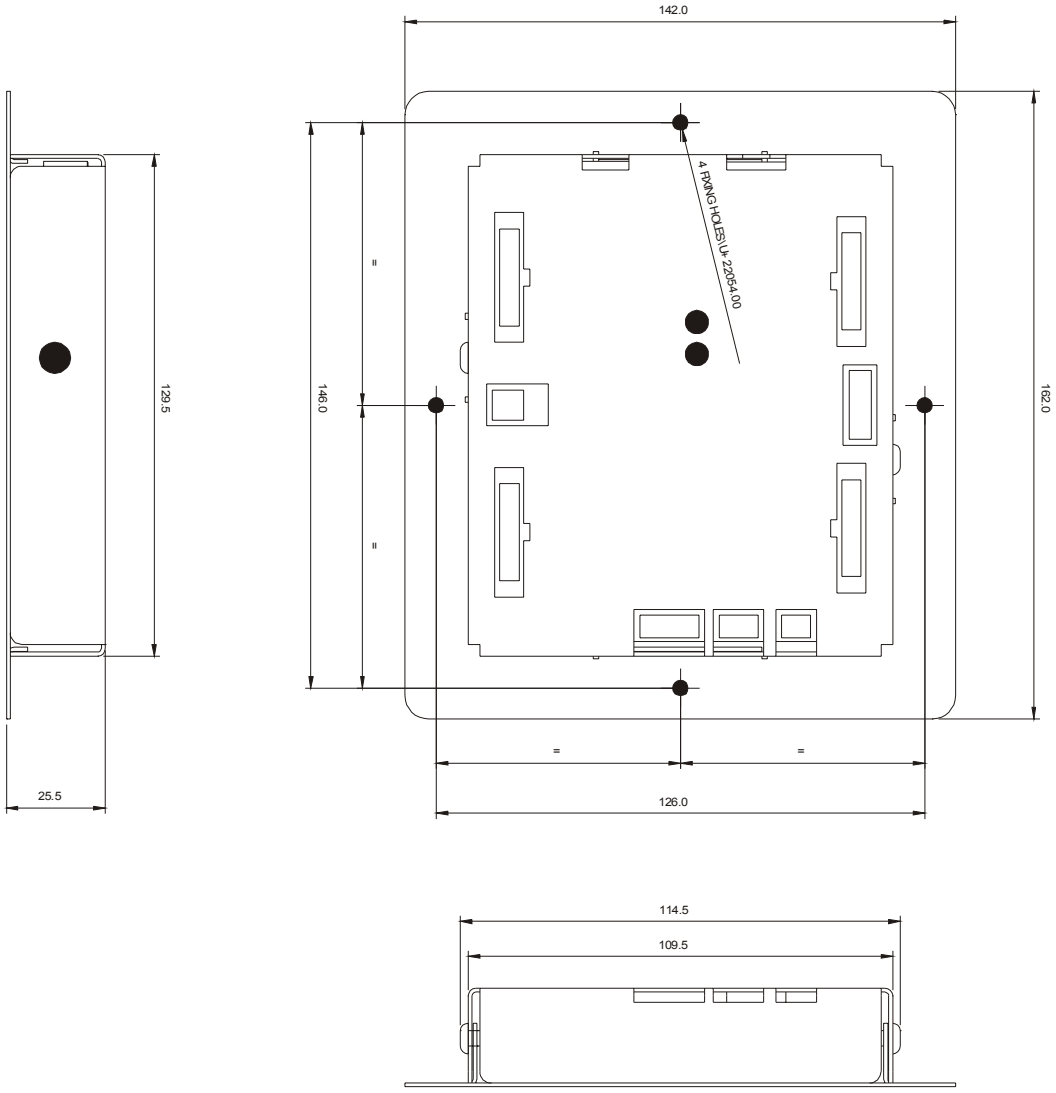
Below is an overview of each connector on **PayLink.**

Figure 2: Connector overview with examples



3.3 Mechanical Dimensions

Figure 3: PayLink mechanical dimensions



3.4 Electrical Specification

Table 1: Electrical Specification

Environmental	
Operating temperature range	0°C to 55°C
Storage temperature range	-20°C to 70°C
Humidity range	Up to 75% RH non-condensing
Electrical - General	
Voltage range	+10.8Vdc to +13.2Vdc (nominal +12Vdc)
Outputs (fuse protected) +12Vdc	2.5A continuous, 5A peak for 200ms
Outputs (fuse protected) +24Vdc	2.5A continuous, 5A peak for 200ms
Electrical – I/O Ports	
16 inputs	Switch inputs 3V3 CMOS thresholds with 3V3 pull-ups, 5mA max.
8 high power outputs	Open drain up to 300mA, max output 36V. (Inductive or resistive)
8 low power outputs	Open drain up to 30mA, max output 12V (resistive only)
Communications Interface	USB Type B interface, V1.1 and above
Protocols support	ccTalk, Ardac 2, ID003, MDB, RS232

4. Installation

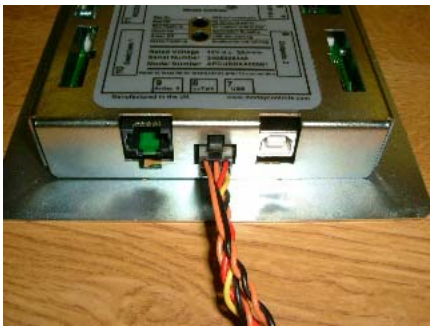
4.1 Hardware installation

PayLink connects to the PC via the USB Type A – Type B cable, during the installation process; the LED indicates the current status of **PayLink**.

Table 2: Status LED table

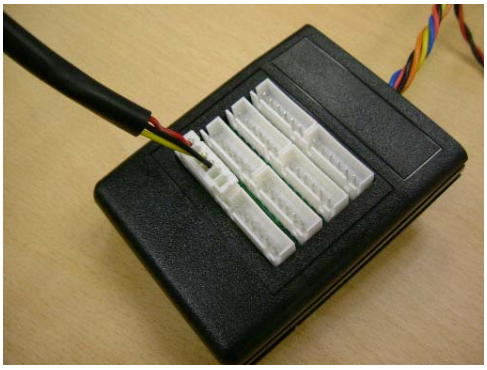
RED on	USB not connected (electrical)
RED off	PC driver is active
RED flashing	No contact with PC driver program
GREEN off	USB not working
GREEN flashing	Application not running
GREEN on	Application running & Peripherals Enabled

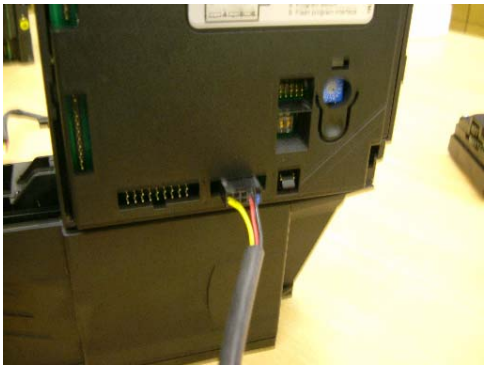
Connect the ccTalk multi drop cable to **PayLink**



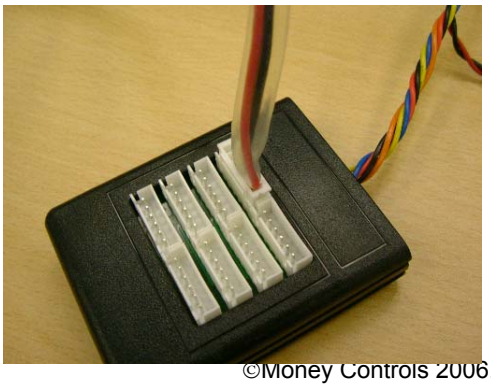
Please note: Only one cctalk coin acceptor is supported at once!

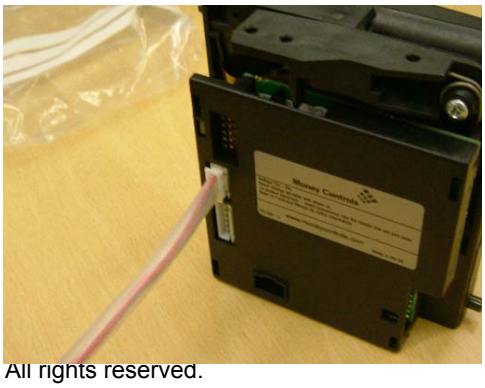
Connect the SR5 cable to the ccTalk multidrop cable and SR5.



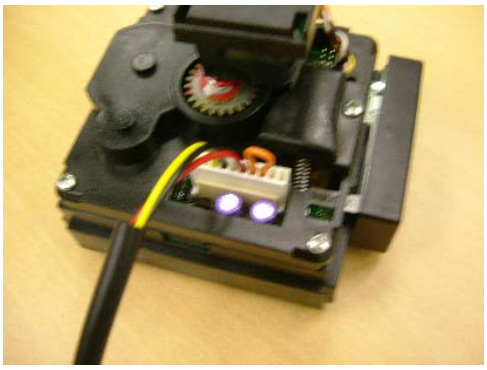


Connect the SR3/Condor Plus cable to the ccTalk multidrop cable and SR3/Condor Plus.

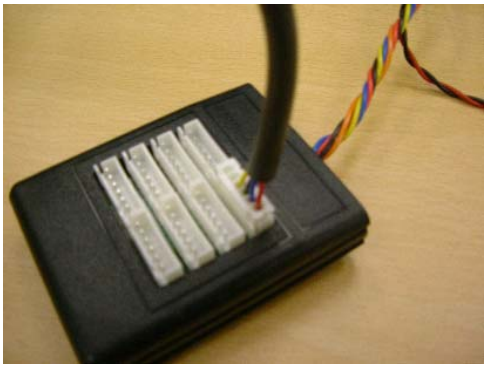
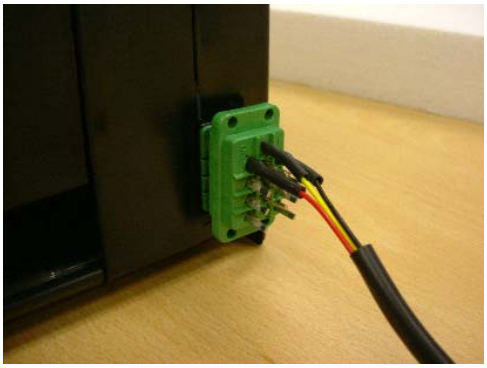




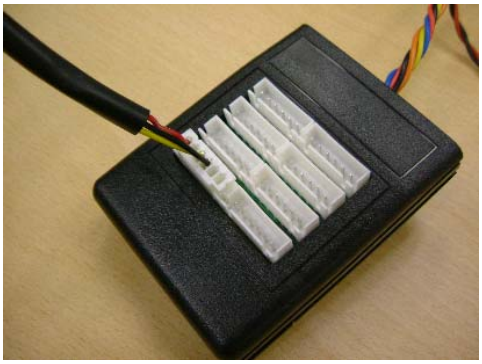
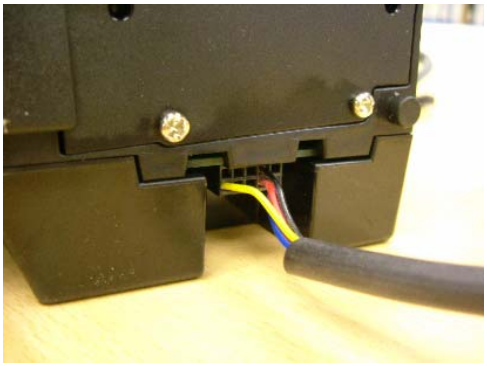
Connect the SCH2 cable to the ccTalk multidrop cable and SCH2.

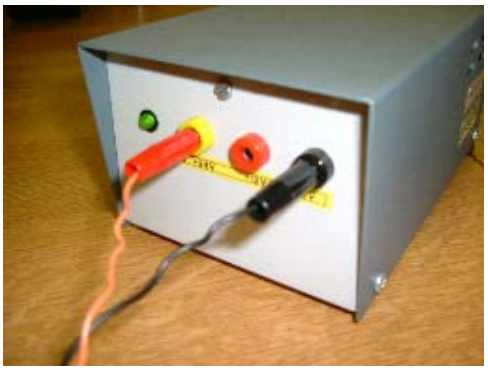
Connect the SUH cable to the ccTalk multidrop cable and SUH.

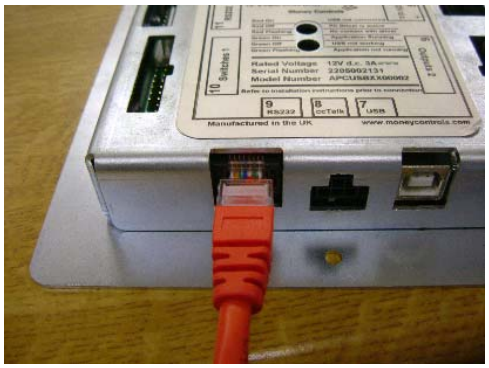
Connect the Lumina cable to the ccTalk multidrop cable and Lumina.

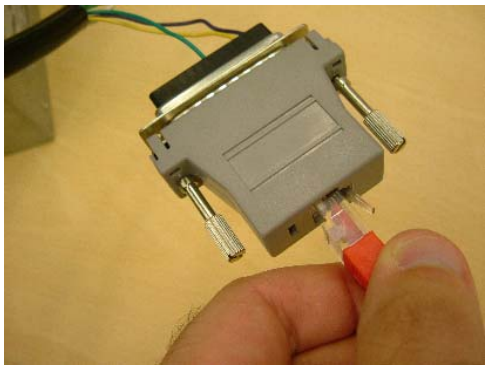



Connect the ccTalk multidrop cable (orange and black) to a +24V dc power supply

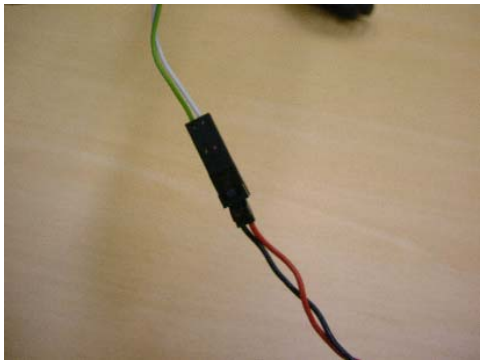


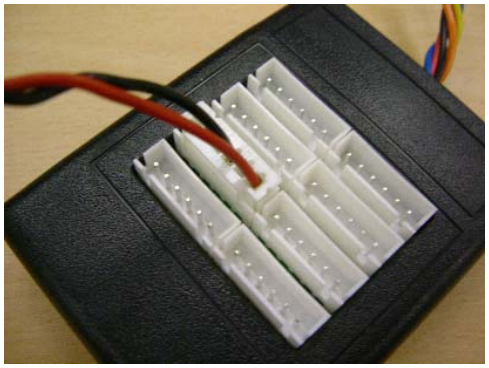
Connect the RJ45 cable to the **PayLink** and Ardac 5 (via the RJ45-RS232 adapter).



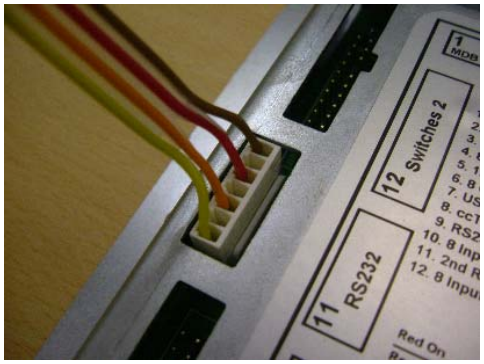


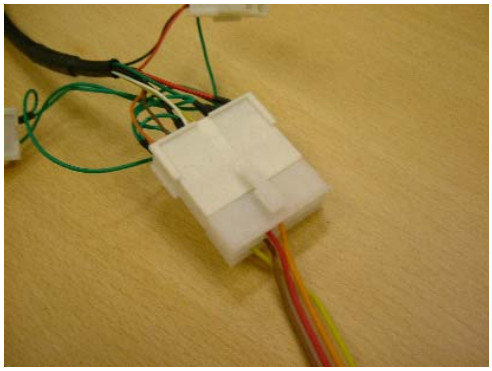
Connect the Ardac 5 power cable to the Ardac 5 and to the multi drop cable.



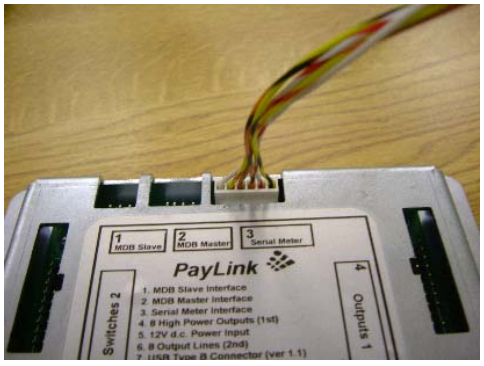


Connect the Serial ticket printer cable to **PayLink** and Serial ticket printer.

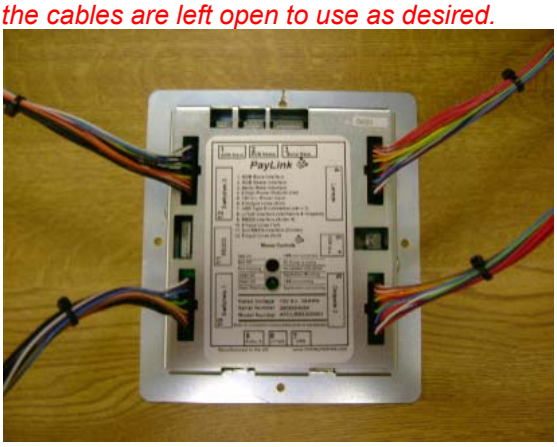




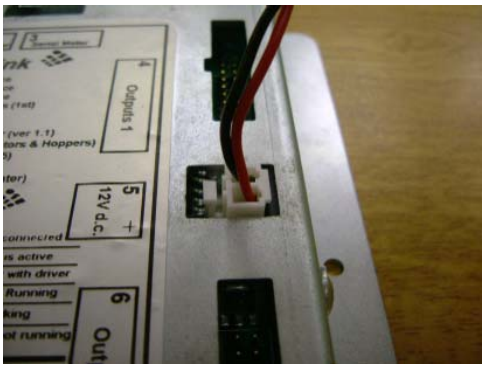
Connect the Serial meter cable to **PayLink** and Serial Meter.

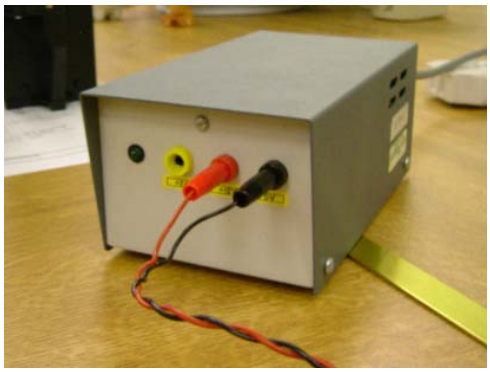


Connect the 4 X 20-way headers to the I/O connectors. *Note: Each 20 way header has a different 'key way' to correspond with the missing pin on the 20-way connectors. The ends of the cables are left open to use as desired.*



Connect **PayLink** to the 2-pin power cable and to a +12V dc power supply. The status LED will show **RED ON**.





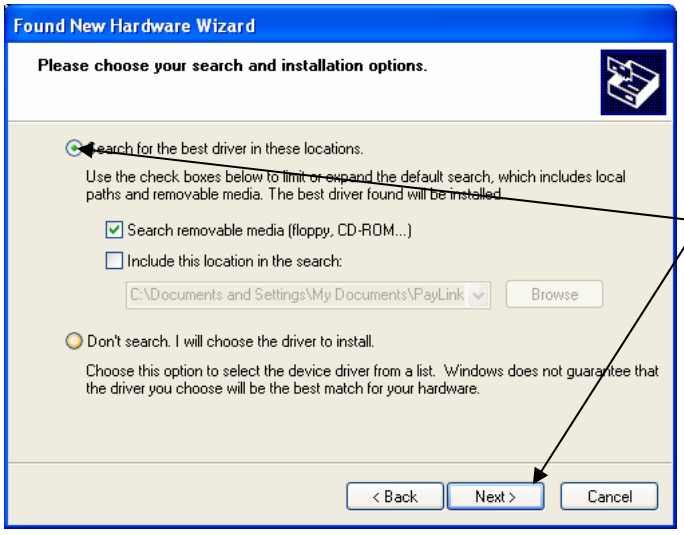
Connect the USB cable to **PayLink** and to the PC.

Windows will indicate that a new USB device has been detected and will prompt for the drivers. The following screen will be shown (this begins the software installation).

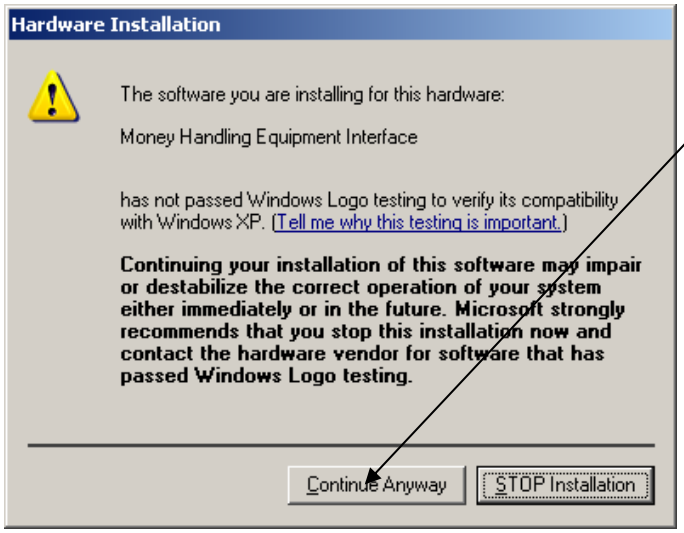
4.2 Software Installation

Note: These instructions are for Windows XP only. Please contact Money Controls for information on installing the software under different operating systems.

Choose **Install from a specific location**, then click **Next**



Choose **Search for the best driver in these locations** then click **Next**

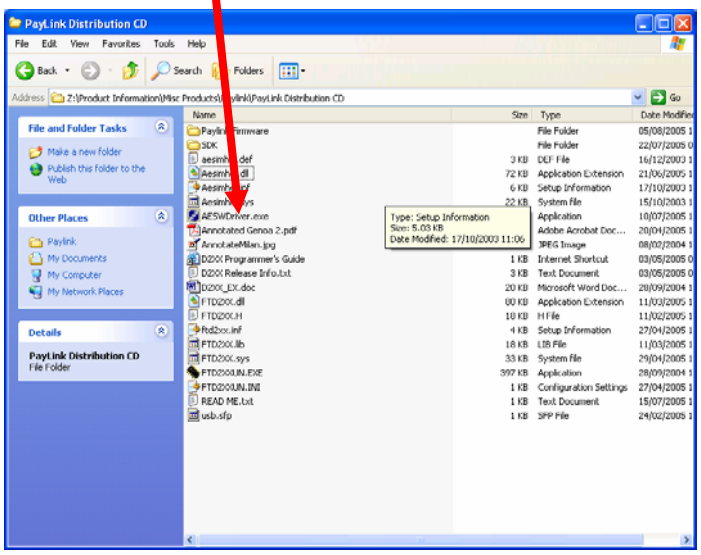


If this screen appears, click **Continue Anyway**

Click **Finish** to complete the software installation for **PayLink**.

To complete the software installation. Take the following step:

In the PayLink Distribution CD there is a file called *Aesimhei.dll* – copy this to C:\Windows\System32



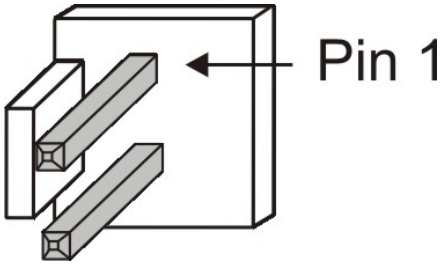
Please note: If this step is not performed, **PayLink** will not function correctly.

Note: At this point, in order to test PayLink. Refer to Section 7 Using PayLink

5. Interface

5.1 Power interface

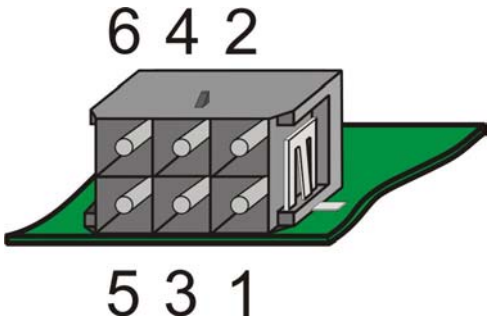
Figure 4: PayLink power interface



Pin	Function
1	GND
2	+12V dc

5.2 ccTalk interface

Figure 5: PayLink cctalk interface

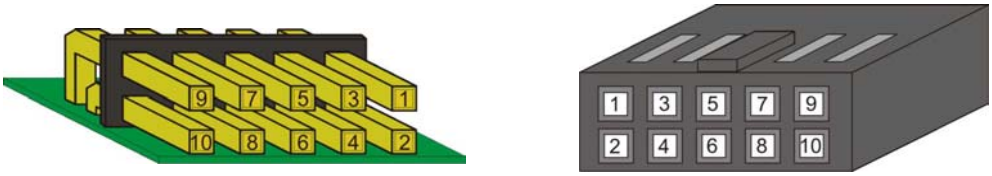


Pin	Function	Pin	Function
1	ccTalk data line	4	+24V Out
2	+12V Out	5	0V In
3	Serial Select / 0V	6	+24V In

IMPORTANT INFORMATION

- **+12V Out is the supply which is provided to PayLink on the 2 pin connector via a polyfuse for protection.**
- **+24V In must be provided by the host machine (in the PayLink development kit, this is shown by orange and black power cables) and is passed through a polyfuse for protection, this becomes +24V Out.**
- **Under no circumstances can any more than 2.5A drawn through the card.**
- **Under no circumstances should PayLink be 'hot swapped'**

Figure 6: Lumina / SR5 ccTalk interface



Pin	Description	Pin	Description	
1	ccTalk data line		**Lumina**	**SR5**
2,3,4,5,6	Not Used			
7	12V	**9**	Not Used	cctalk select line
8	0V	**10**	Not Used	

Figure 7: SR3/Condor Plus ccTalk interface

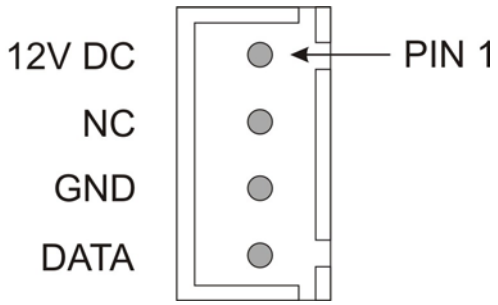
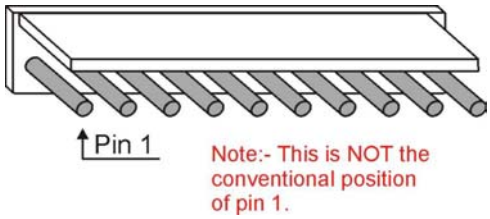


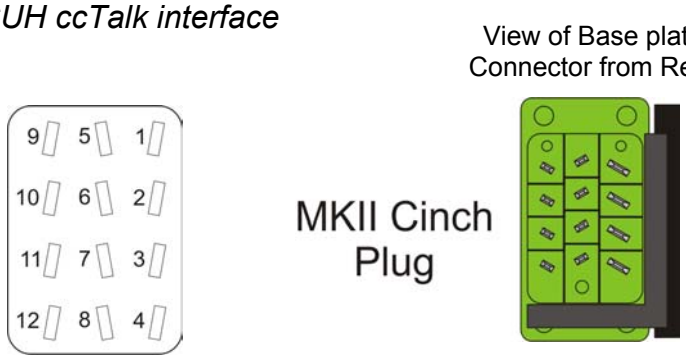
Figure 8: SCH2 ccTalk interface



Pin	Function	Pin	Function
1	Address select 3 - MSB	6,7	0V
2	Address select 2	8	ccTalk data line
3	Address select 1 - LSB	9	N/C
4,5	+Vs	10	/RESET

The address selection process is covered in Section 6.3.

Figure 9: SUH ccTalk interface

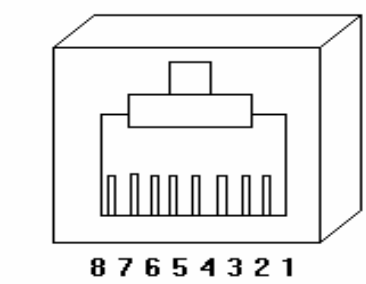


Pin	Function	Pin	Function
1	0V	8	Address Select 2
2,3	N.C.	9	+Vs
4	Address Select 1 - LSB	10,11	N.C.
5	ccTalk data line	12	Address Select 3 - MSB
6,7	N.C.		

The address selection process is covered in section 6.3

5.3 ID003/Ardac 2 interface

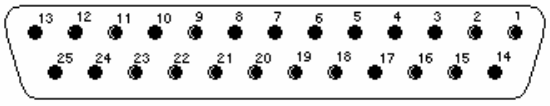
Figure 10: PayLink - ID003/Ardac 2 interface



Pin (PayLink)	Function
3	Rx (Green/White)
4	TX (Blue)
2	GND (Orange)

Figure 11: Ardac 5 - ID003/Ardac 2 interface

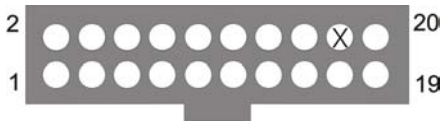
Pin (Ardac5)	Function
2	Rx (Violet)
3	TX (Yellow)
7	GND (Green)



Ardac 5 25 Way D-type (Female) Connector
Important: This view is from the mating side

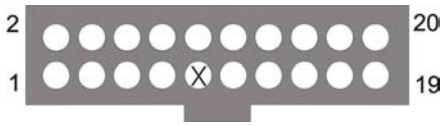
5.4 Auxiliary input/output interface

Figure 12: Connector 4 – High power outputs



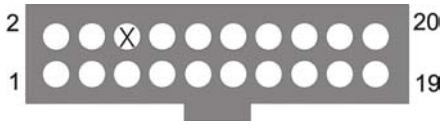
+12V	+12V	N/C	+12V	+12V	+12V	+12V	+12V	Key	+12V
0	1	2	3	N/C	4	N/C	5	6	7

Figure 13: Connector 6 – Low power outputs



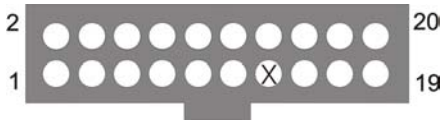
+12V	+12V	N/C	+12V	+12V	+12V	+12V	+12V	N/C	+12V
8	9	10	11	Key	12	N/C	13	14	15

Figure 14: Connector 10 – Switches / Inputs



0V	0V	Key	0V	0V	0V	0V	0V	N/C	0V
0	1	2	3	N/C	4	N/C	5	6	7

Figure 15: Connector 12 – Switches / Inputs



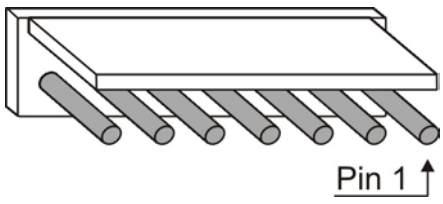
0V	0V	N/C	0V	0V	0V	0V	0V	N/C	0V
8	9	10	11	N/C	12	Key	13	14	15

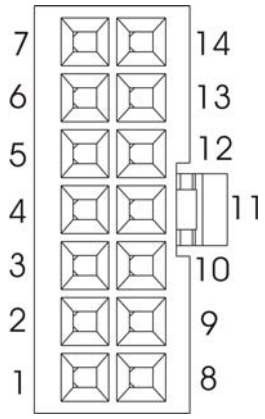
Table 3: I/O Interface

Pin	Conn 4	Conn 6	Conn 10	Conn 12
1	Output 0	Output 8	Input 0	Input 8
2	+12V	+12V	0V	0V
3	Output 1	Output 9	Input 1	Input 9
4	+12V	+12V	0V	0V
5	Output 2	Output 10	Input 2	Input 10
6	N/C	N/C	KEYWAY	N/C
7	Output 3	Output 11	Input 3	Input 11
8	+12V	+12V	0V	0V
9	N/C	KEYWAY	N/C	N/C
10	+12V	+12V	0V	0V
11	Output 4	Output 12	Input 4	Input 12
12	+12V	+12V	0V	0V
13	N/C	N/C	N/C	KEYWAY
14	+12V	+12V	0V	0V
15	Output 5	Output 13	Input 5	Input 13
16	+12V	+12V	0V	0V
17	Output 6	Output 14	Input 6	Input 14
18	KEYWAY	N/C	N/C	N/C
19	Output 7	Output 15	Input 7	Input 15
20	+12V	+12V	0V	0V

5.5 Serial printer interface

Figure 16: PayLink – RS232 Serial Printer Interface

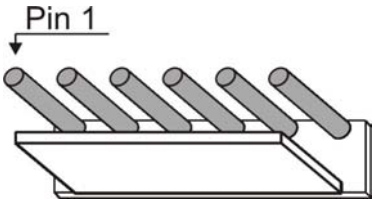




Pin - PayLink	Function	Pin – Serial Printer
1	+24V DC	5
3	TX (from PayLink)	11
5	RX (to PayLink)	12
7	GND	6

5.6 Serial meter interface

Figure 17: PayLink serial meter interface

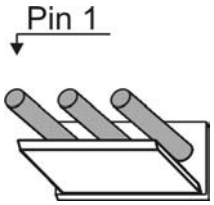


This is a 1 to 1 connection between **PayLink** and the Serial meter.

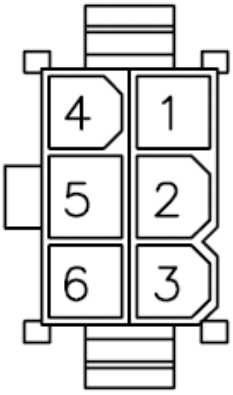
Pin (Meter)	Function	Pin (Meter)	Function
1	SPI Data Output	4	SEC Reset
2	SPI Clock Input	5	+12V Supply
3	SPI Data Input	6	0V Supply

5.7 MDB Device interface

Figure 18: MDB Slave interface



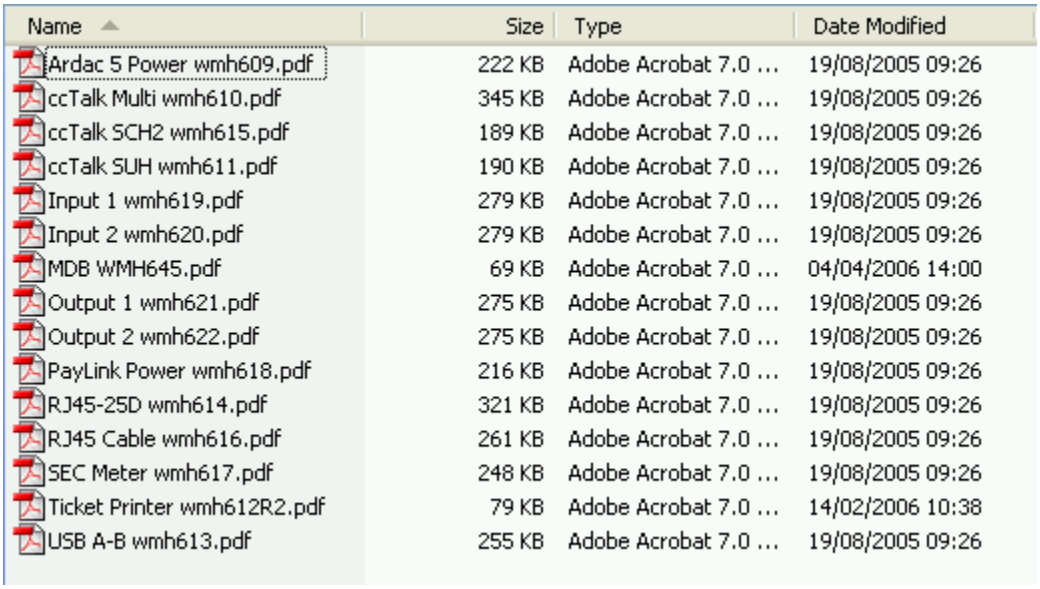
Pin (PayLink)	Function	Pin (MDB)
1	Rx (to PayLink)	5
2	TX (from PayLink)	4
3	Signal GND	6
	0V DC	2
	+V DC	1



Note: The *MDB Master interface* is currently not supported and can be used for special projects only. Please contact Money Controls if you would like further information.

5.8 Connector details

Full drawings and connector details are provided within the \PayLink\PayLink Looms section of the CD.



Name	Size	Type	Date Modified
Ardac 5 Power wmh609.pdf	222 KB	Adobe Acrobat 7.0 ...	19/08/2005 09:26
ccTalk Multi wmh610.pdf	345 KB	Adobe Acrobat 7.0 ...	19/08/2005 09:26
ccTalk SCH2 wmh615.pdf	189 KB	Adobe Acrobat 7.0 ...	19/08/2005 09:26
ccTalk SUH wmh611.pdf	190 KB	Adobe Acrobat 7.0 ...	19/08/2005 09:26
Input 1 wmh619.pdf	279 KB	Adobe Acrobat 7.0 ...	19/08/2005 09:26
Input 2 wmh620.pdf	279 KB	Adobe Acrobat 7.0 ...	19/08/2005 09:26
MDB WMH645.pdf	69 KB	Adobe Acrobat 7.0 ...	04/04/2006 14:00
Output 1 wmh621.pdf	275 KB	Adobe Acrobat 7.0 ...	19/08/2005 09:26
Output 2 wmh622.pdf	275 KB	Adobe Acrobat 7.0 ...	19/08/2005 09:26
PayLink Power wmh618.pdf	216 KB	Adobe Acrobat 7.0 ...	19/08/2005 09:26
RJ45-25D wmh614.pdf	321 KB	Adobe Acrobat 7.0 ...	19/08/2005 09:26
RJ45 Cable wmh616.pdf	261 KB	Adobe Acrobat 7.0 ...	19/08/2005 09:26
SEC Meter wmh617.pdf	248 KB	Adobe Acrobat 7.0 ...	19/08/2005 09:26
Ticket Printer wmh612R2.pdf	79 KB	Adobe Acrobat 7.0 ...	14/02/2006 10:38
USB A-B wmh613.pdf	255 KB	Adobe Acrobat 7.0 ...	19/08/2005 09:26

6. Peripheral Features/Support

6.1 SR3/Condor Plus/SR5/SR5i

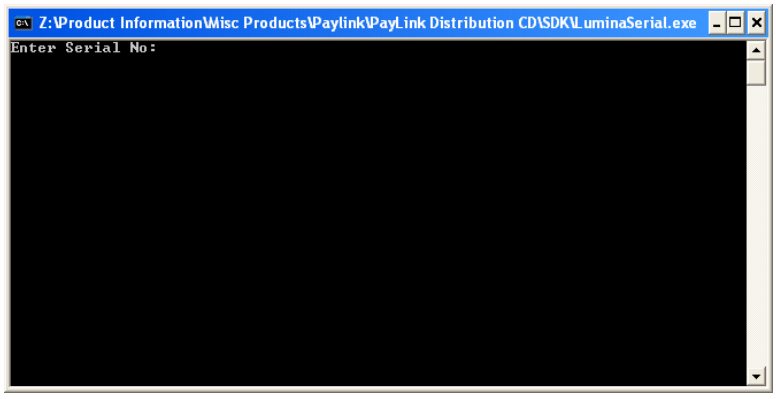
- At present, only one coin acceptor, at address 2, is supported.
- A complex system of routing is provided, which supports the diversion of coins.
- Both individual coins and the entire unit can be easily inhibited.
- The automatic retrieval from the unit of the value of each coin is supported.

6.2 Lumina

- At present, only one note acceptor, at address 40, is supported.
- **PayLink** fully supports the ccTalk encryption scheme needed to communicate with Lumina.
- Both individual notes and the entire unit can be easily inhibited.
- The automatic retrieval from the unit of the value of each note is supported.
- The default Lumina 6-digit security code is 123456. To use a Lumina with a different security code an application is provided. Luminaserial.exe is found in the following directory

PayLink\SDK

Run LuminaSerial.exe – the following screen will be shown:



Enter the Lumina 6-digit security code (found on a label on the top of Lumina) and click **Enter**. This will close the application. **PayLink** will now work with the code specified. To change to a different code, run LuminaSerial.exe again to change the code.

6.3 ccTalk hoppers

- Currently, 8 Hoppers, at addresses 3 to 10, are supported and the pre-set values are linked to the cctalk address (shown below).
- The below hoppers values have been implemented from PayLink firmware version 4-1-9-6 and above.
- The hopper addresses is selected by hardwiring the connector.

Table 4: Hopper address Wiring & Coin Values

X = Connect to +Vs (Pins 4 or 5)			ccTalk Address	Coin Value
Address select 3 (Pin 1)	Address select 2 (Pin 2)	Address select 1 (Pin 3)		
			3	100
		X	4	50
	X		5	25
	X	X	6	20
X			7	10
X		X	8	5
X	X		9	200
X	X	X	10	1

- It is recommend to use only use 24V hoppers.
- 12V SCH2 hoppers can be used, but you must not power via **PayLink**, as the current consumption will be too high. Under no circumstances can any more than 2.5A drawn through the card.
- Hopper level sense is supported in PayLink firmware version 3-1-10-1 and above. See section 7.2 Demo.exe & 11.22 DispenserBlock for information.
- Hopper 'power fail' is supported in PayLink firmware version 3-1-10-1 and above. See section 11.15 Hopper Power Fail support. (1.10.x) for information.

6.4 Ardac 5

- Paylink supports either ID003 or Ardac 2 protocol but not both. In order to convert from Ardac 2 protocol to the ID003 protocol (and vice versa), the necessary firmware needs to be programmed into Paylink. Refer to section 7.4 Upgrading PayLink firmware for information on how to do this.
- Must be powered at 24V as the current consumption at 12V will be too high. Under no circumstances can any more than 2.5A drawn through the card.
- Both individual notes and the entire unit can be easily inhibited.
- The automatic retrieval from the unit of the value of each note is supported.

6.5 Serial ticket printer

- The printer needs to be preloaded with a template.
- Currently only supports Futurelogic GEN2 ticket printer. Please contact Money Controls Technical Services for details.

6.6 MDB Device

- The MDB hardware has always existed on the PayLink PCB. However, the PayLink firmware only supports an MDB Device from version 3-1-10-1 and above.

6.7 Inputs

- 16 Individual external switches are supported by the unit, and are easily accessible by the user's application.
- Provision is made for the user's application to easily use switches in two modes:

1. Key Press - Where a button may be pressed several times and it is important to know how many times
2. State - Where the switch changes over a long time frame and all the application needs to know is where the switch is at any instant.

6.8 Outputs

- 8 Individual external LED's are supported by the unit, and are easily accessible by the user's application.
- 8 high power (lamp) outputs are supported by the unit, and are easily accessible by the user's application.

6.9 Serial meter

- One external meter with an SPI interface corresponding to that defined by Starpoint is supported.
- The **PayLink** board fully supports all 31 of the Starpoint's counters.
- Provision is made to allow the user's application to easily support the BACTA standard for displaying counter values, as well as to implement any other scheme.
- The **PayLink** board continually checks that the meter is operation.

7. Using PayLink

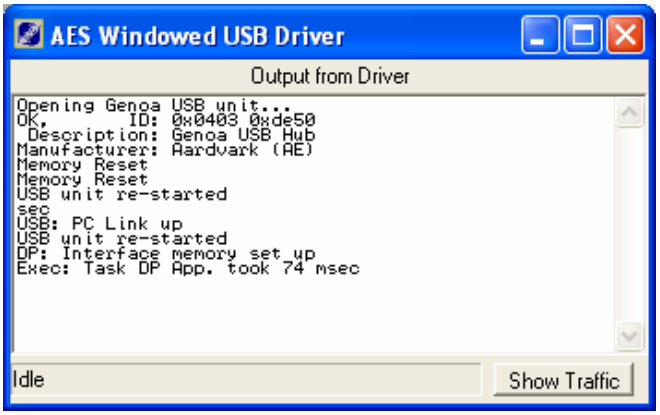
This section shows how to run and use various programs, all of which are provided on the **PayLink** distribution CD.

- **AESWDriver.exe** (the PayLink driver)
- **MilanDiag.exe** (diagnostics program)
- **Demo.exe** (API example)
- **Firmware.exe** upgrade program

7.1 AESWDriver.exe

AESWDriver.exe is found in the **PayLink** directory. When the application is run, the following screen will be shown.

You can output to a log file by adding a parameter to AESWDriver start line. This will generate a time stamped log that will show driver and PayLink events. There will be no GUI when this is performed.



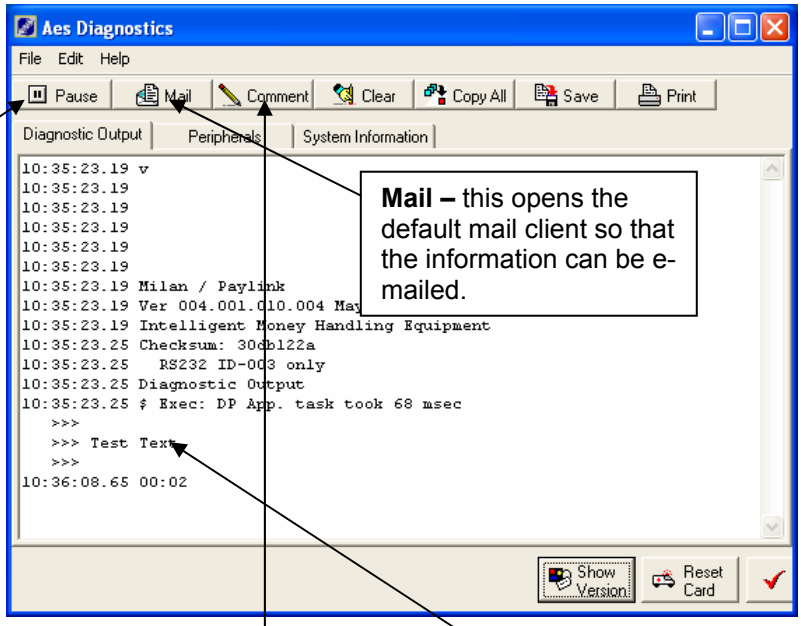
The contents of this screen should be similar to the one shown above. The status LED on **PayLink** will now **Flash GREEN** to indicate that the driver is working correctly.

Refer to Table 2: Status LED table for information.

This driver **MUST** be run before running the demo software.

7.2 MilanDiag.exe

This is a Diagnostics program, which shows various information about **PayLink**, such as the peripherals, which are connected, the version number of PayLink firmware. Diag.exe is found in the following directory: **PayLink\SDK** When the application is run, the following screen will be shown:



Pause – This pauses the application.

Mail – this opens the default mail client so that the information can be e-mailed.

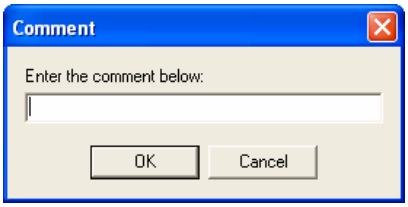
Clear – clears the screen.

Copy all – this copies the shown text to clipboard.

Save – This saves the text in a log file.

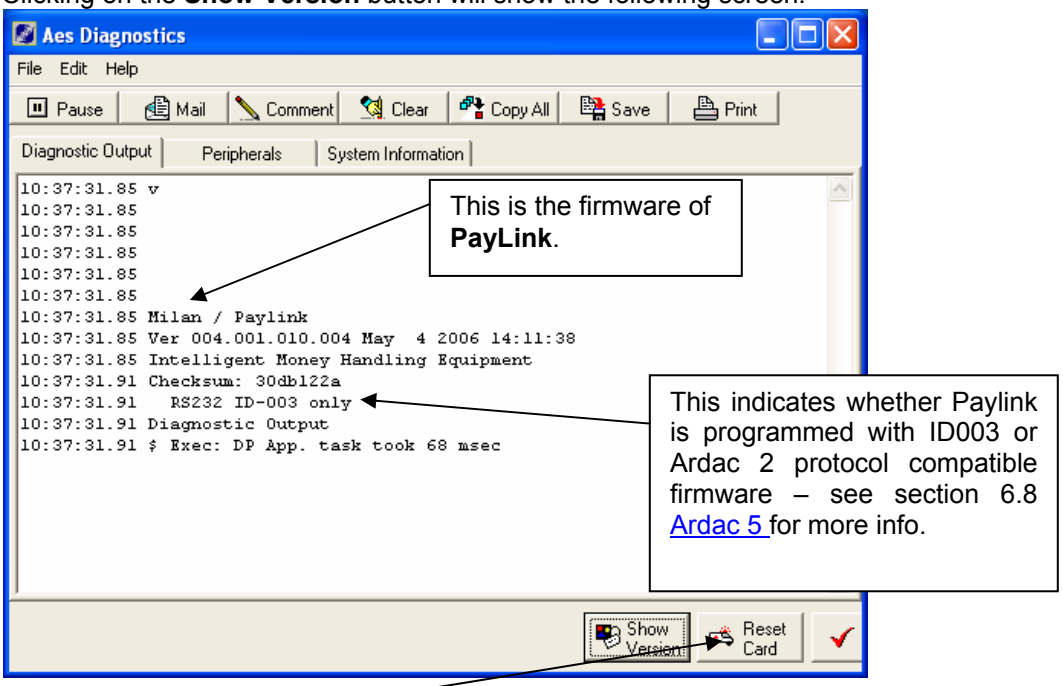
Print – This prints the current text.

Clicking the **Comment** button, allows a comment to be added, the following screen will appear.

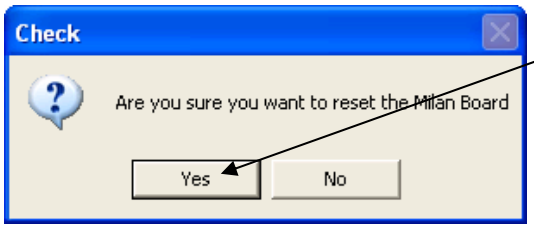


A comment will then appear in the diagnostics window.

Clicking on the **Show Version** button will show the following screen.

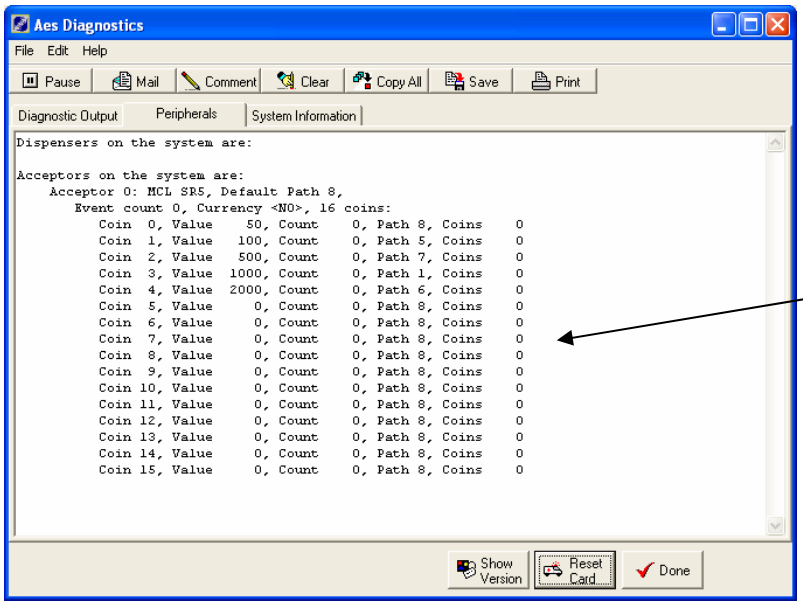


Click on the **Reset Card** button will show the following screen.



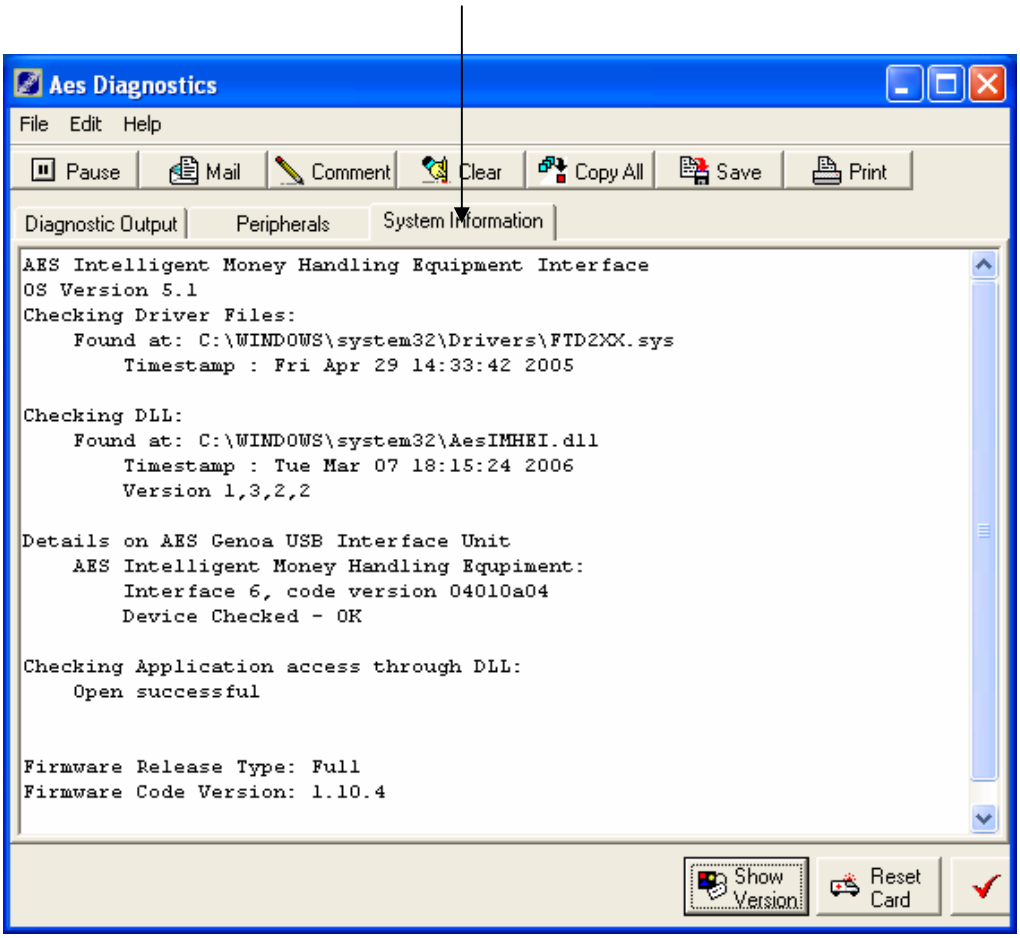
Choose **Yes** to reset **PayLink**.

Click on the **Peripherals** tab to see which peripherals are connected.



This example shows an SR5 coin acceptor, and information about the coin paths and values etc.

Click on the **System Information** tab to display various system information about **PayLink**.



Click **Done** to close the Diagnostics application.

7.3 Demo.exe

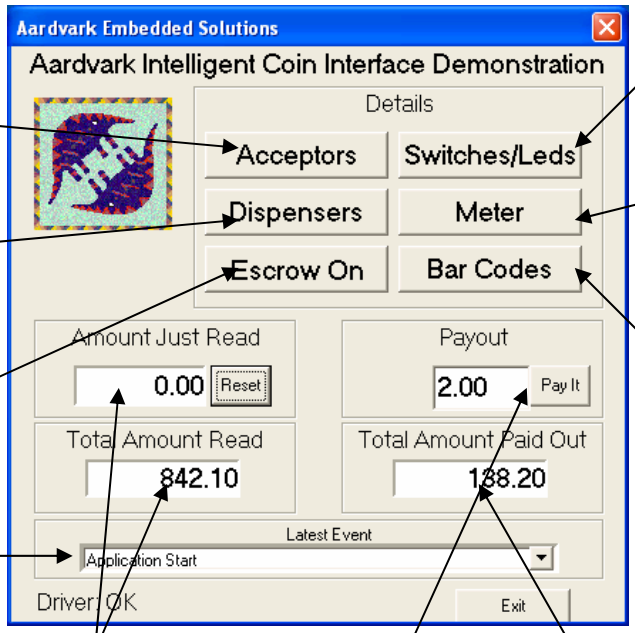
This is an API example, which also doubles up as a quick and easy way to test/demo **PayLink** before the software writing can begin. The application is called Demo.exe and is in the following location: **PayLink\SDK**

Click **Acceptors** to show the current connected Coin/Note acceptors

Click **Dispensers** to show the current connected Hoppers

Click **Escrow** for the Escrow control

The **Latest Event** notifies the application of events that are not to do with money. Faults, misreads etc.



Click **Switches/LEDs** to control the Inputs/outputs

Click **Meter** to show the current connected Serial Meter

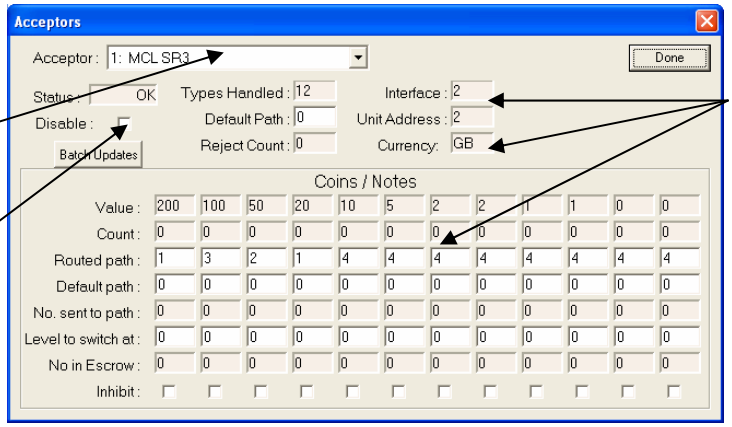
Click **Barcodes** to control the barcode features (Ardac 5/Serial ticket printer)

Coins and notes entered into the peripherals will be displayed in the **Amount Just Read** box. The **Total Amount Read** box is the amount read over the lifetime of the PayLink

The **Payout** box shows the value to be paid out. Click the **Pay It** button to pay out the desired value. **Paylink** will decide how to pay out the value depending on which value hoppers are connected. The **Total Amount Paid Out** shows the amount paid over the lifetime of the PayLink

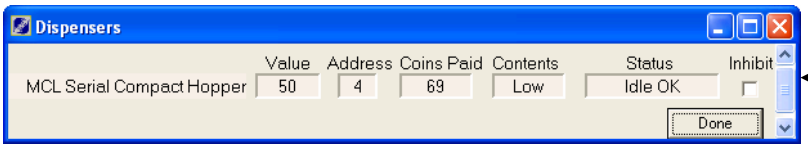
This drop down menu shows the acceptors connected

Click **Disable** to disable the acceptor selected

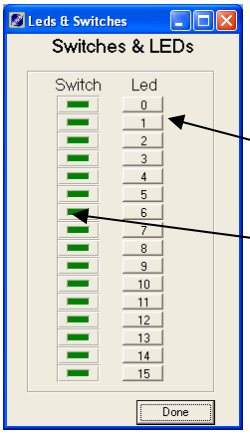


Various information about the selected acceptor such as currency, coins programmed etc

Click **Done** to return to the front screen.



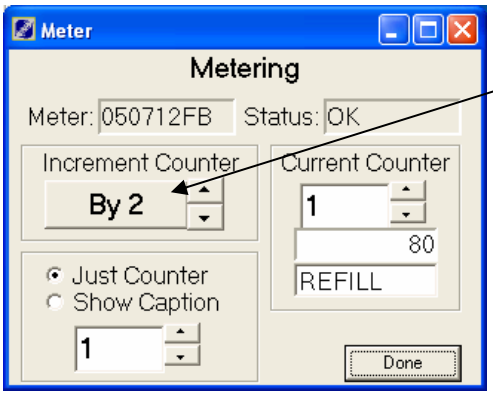
Click on the **Dispensers** button and this screen will be shown. Various information about the connected **Dispensers** is shown.



Click on the Switches/LEDs button to see the following screen.

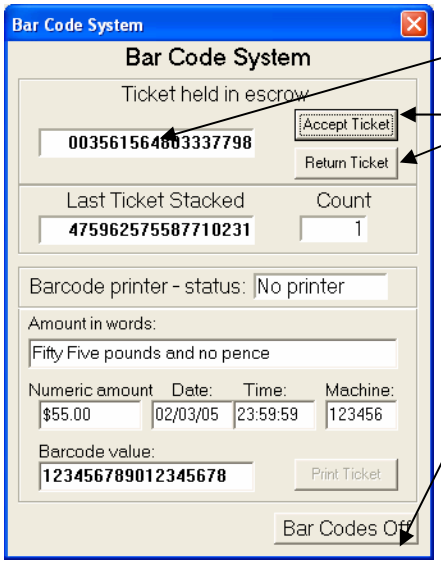
Click on the Led buttons to drive the LED output.

The switch box will light when the switch inputs are activated.



Click on the **Meter** button to show this screen. The counter can be incremented using the **Increment Counter** button.

Click on the **Barcodes** button to show the following screen.



When a barcode is inserted, the number will be shown here. Click **Accept ticket** or **Return ticket** to proceed.

The barcodes screen can be exited using the **Bar Codes Off** button

7.4 Upgrading PayLink firmware

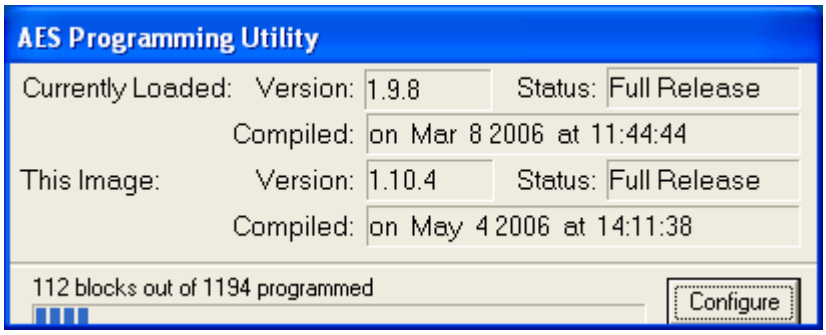
PayLink has an on board flash device, which can be reprogrammed using a small application through the USB link. The application is found in the following directory **PayLink\PayLink Firmware**

The following parameters can be added to the file name to provide enhanced functionality.

/Force - will automatically re-program the PayLink even if the images match.

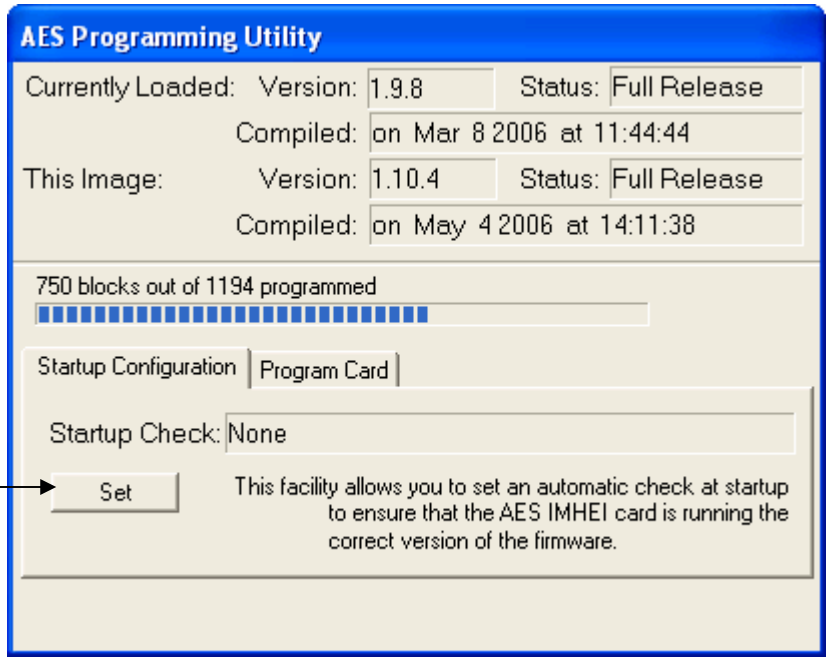
/Check - will cause the loader to exit without showing an window if the PayLink firmware matches, and has no errors.

/Nogui - will never display anything on the screen and will report progress to stdout or a console window if either are available.



Once complete, the **AES Programming Utility** will self terminate.

While running a “Configure” button is accessible. This can be used to access advanced features.



“Startup Configuration” provides the ability to “Set” and “Clear” an entry in the Windows registry that will silently run this copy of the programming utility at system Startup.