

SECTION 1

NV11 MANUAL SET QUICK START AND CONFIGURATION GUIDE

INTELLIGENCE IN VALIDATION

NV11 MANUAL SET – SECTION 1

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1. QUICK START AND CONFIGURATION GUIDE

This section is one part of a complete manual set: most users should use this section of the manual - typical users are software engineers looking at how to make it work, project engineers evaluating their first unit, or installation engineers installing the unit into a host machine.

This section contains the essential information that a user needs to quickly assemble and configure the NV11 validator ready for installation into the host machine.



Information

Validator compatibility.

The NV11 validator is pin for pin compatible with the NV7 / NV8 / NV9 / NV10 series of validators, but **NOT** with earlier versions of the product (NV2 – NV5).

1.1 Assembly

Installing the NV11 is a simple operation, but note that the validator can only be installed **horizontally**:

1. If the validator head has a blanking plate fitted, you will need to remove this **BEFORE** attempting to fit the Note Float module. If the Note Float module is already fitted, please go to step 6
2. Open the validator head by sliding the red release catch on the front of the validator to the left (as indicated in the picture)

Blanking plate



Validator head



Release catch





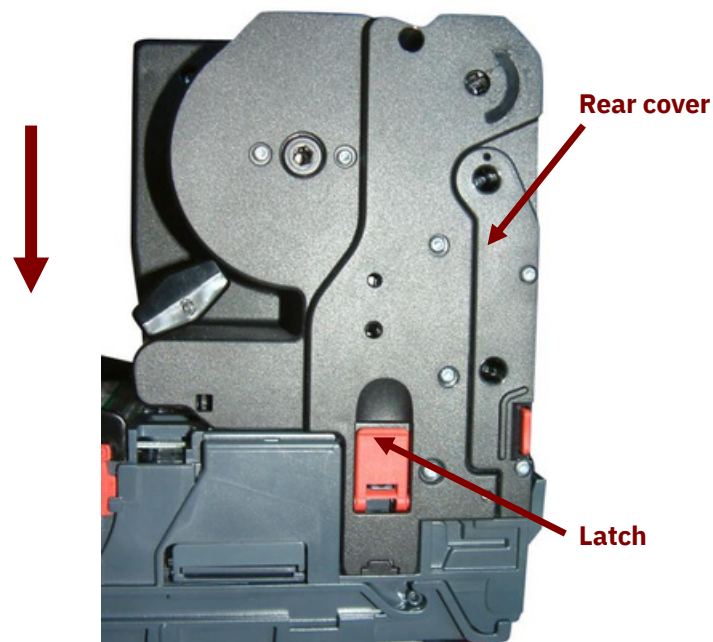
Validator head **MUST** be opened.

Always make sure the validator head has been opened **BEFORE** trying to remove the blanking plate – trying to remove the blanking plate with the validator head closed will cause unit damage.

3. Remove the blanking plate by disengaging the two side clips and lifting the blanking plate upwards



4. Close the validator head and then carefully fit the Note Float module onto the validator head, making sure the rear cover is securely closed and that both latches are lined up correctly



5. Make sure both latches are engaged and closed



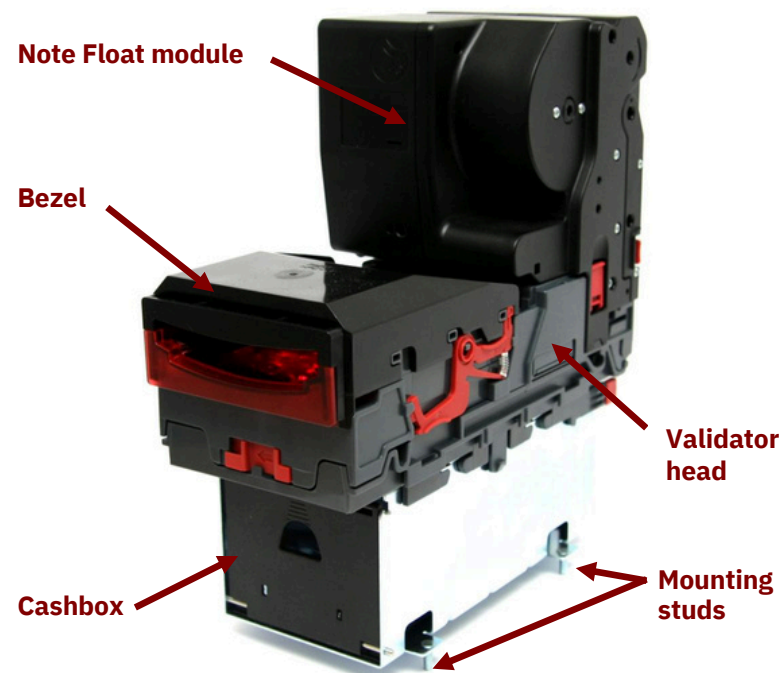
6. The validator can be fitted with a standard or slide-on cashbox of 300 or 600 note capacity



7. If not already attached, the validator can be fitted with a horizontal bezel of your choice.



8. The cashbox is attached to the validator by locating and sliding until the cashbox is clipped securely and secured in the host machine using the studs on the bottom of the cashbox



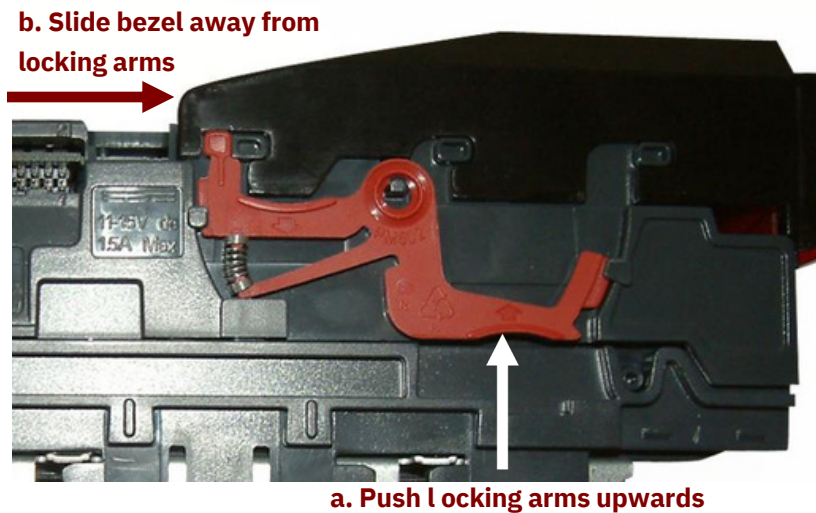
**Information**

Check website for options.

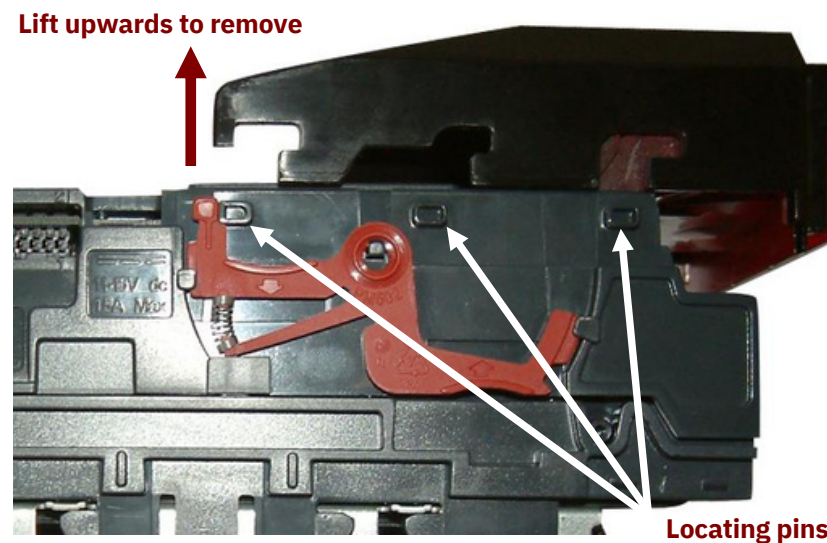
There are many variants of bezel and cashbox type available for the NV11 validator. Please check the ITL website (www.innovative-technology.co.uk) for up to date information on the options available.

1.2 Bezel Removal and Refitting

- The bezel is removed by pushing the red locking arms on both sides of the validator upwards, and sliding the bezel away from the locking arms



- Lift the bezel off once the bezel has been slid fully across and is clear of the locating pins



The bezel is refitted by pushing the bezel back onto the locating pins and sliding backwards until all six pins are engaged in the slots. The locking arms will then spring back and locate into the bezel.

**Caution!**

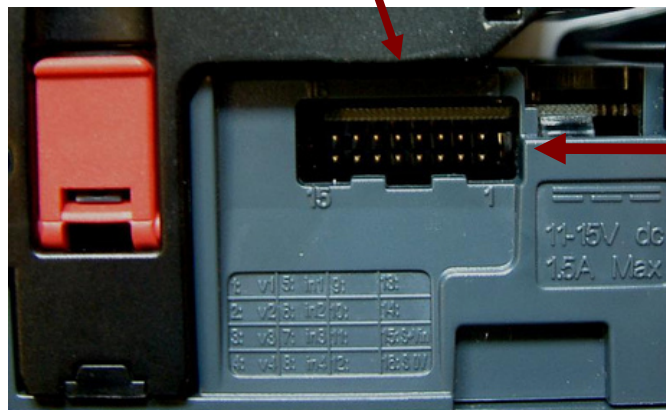
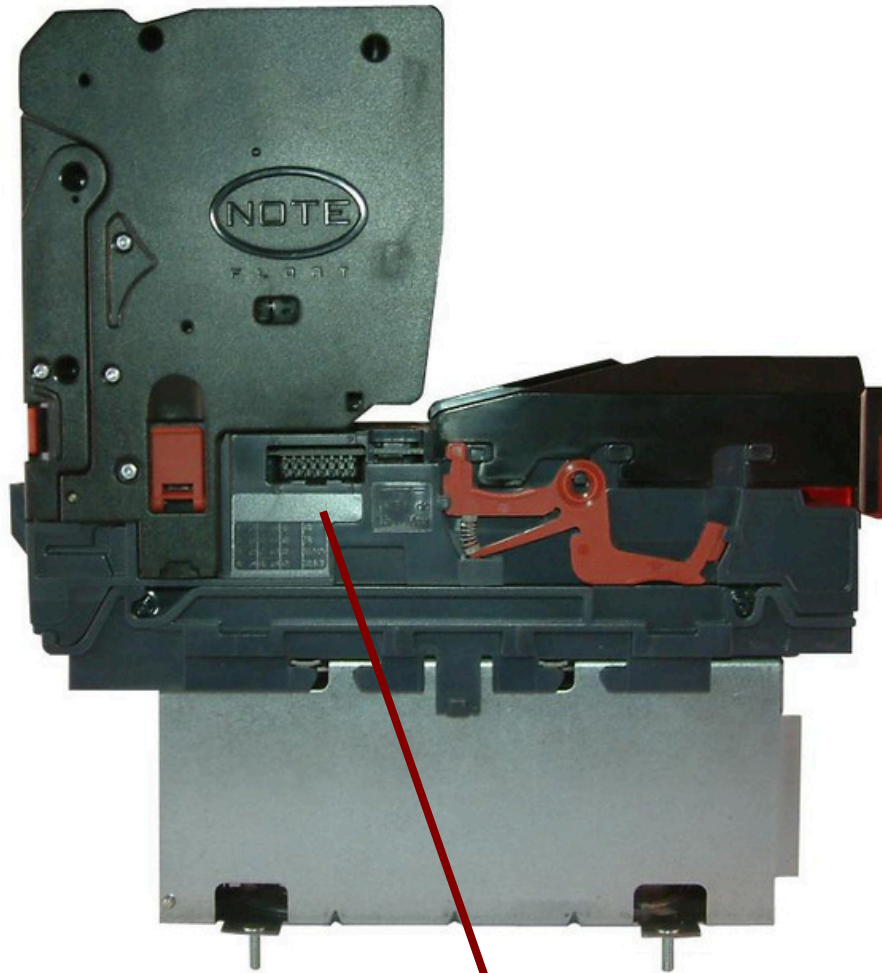
Check locking arms.

Always make sure that **BOTH** locking arms are fully located in the bezel – trying to operate the validator if they are not correctly located can cause unit damage.



1.3 Interfacing

The connector needed to set up and interface with the NV11 validator is easily accessible on the side of the unit:



**Interface
Connector**

1.4 Connector and Pinouts

The NV11 validator has a single connector that is used to allow interfacing and programming.

**Information**

Power always required regardless of connection type.

Power is always required on pins 15 and 16 of the 16 way connector.

The connector is a 16 pin socket used to interface the NV11 to the host machine. The pin numbering of the socket is shown below, as well as an overview of the socket connections:



Pin	Description
1	Serial Data Out (Tx)
5	Serial Data In (Rx)
11	USB Data +
12	USB Data -
13	USB Power (+5V)
15	+ V
16	0V / Ground Connection

To use a USB connection with the NV11, a USB cable fitted with a 16 way connector on one end (ITL Part Number CN00392) should be used. The CN00392 cable fits into the 16 way connector and allows high speed programming and serial communications when used in SSP and ccTalk modes.

When using the USB connection, power must be supplied to the NV11 using the CN00392 cable.

1.5 Configuration

The NV11 does not use DIP switches to configure the unit – configuration and setting is carried out by using a Configuration Button mounted on the front of the Note Float module:



There are several functions available when using the Configuration Button, and these are listed in this table:

Action	Power Status Function	
Press and hold (more than 2 seconds) until the bezel illuminates, then release	Powered ON	Sets validator to Programming mode (SSP)
Press twice (within half a second)	Powered ON	Shows current interface type (see flash count table below)
Press once when Note Float module status LED is flashing (transport error)	Powered ON	Acknowledges that a note blockage has been cleared

Flash Count	Interface
1	SSP
6	ccTalk
6, 1	ccTalk plain (16 bit)
6, 1, 2	ccTalk (8 bit)

The NV11 Validator leaves the factory preset to at least one currency and one interface so that it is ready for immediate installation. The dataset and interface used are shown on the label fixed to the front of the Note Float unit.

1.6 Status Indicators

The NV11 validator has two separate coloured Light Emitting Diode (LED) indicators that are used to show the status of the unit – these are located next to the configuration button on the front of the Note Float module, and behind the front bezel of the NV9USB validator head.

If there is a fault or other issue with the unit, the LEDs will flash as described in subsection 1.9.

1.7 Programming

Full details on programming the NV11 validator can be found in Section 3 of this manual set (ITL Software Support Guide).

1.8 Technical Specifications

The full technical specifications for the NV11 validator can be found in Section 6, Appendix B of this manual set. A brief summary is given here:

DC Voltage	Minimum	Nominal	Maximum
Absolute limits	10.8 V	12 V	13.2 V
Supply ripple voltage	0 V	0V	0.25 V @ 100 Hz
Supply Current			
Standby			350 mA
Running			3 A
Peak (motor stall)			3.5 A

Interface Logic Levels	Logic Low	Logic High
Inputs	0 V to +0.5 V	+3.7 V to +12 V
Outputs (2.2 kΩ pull-up)	+0.6 V	Pull-up voltage of host interface
Maximum current sink	50 mA per output	

**WARNING!**

Use suitable power supply

Ensure that the supply voltage to the NV11 is not lower than 10.8 V and that the power supply can provide sufficient current to avoid incorrect operation and excessive note rejects.

We recommend that your power supply is capable of supplying 12V DC at 4 A.

☐ For 12V operation, use TDK Lambda model SWS50-12. This power supply is available from a variety of suppliers including Farnell (stock code 1184645) and RS (stock code 466-5869).

1.9 NV11 Flash Codes

The NV11 validator has inbuilt fault detection facilities. If there is a configuration or other error either the Note Float module status LED, or the NV9USB validator head front bezel will flash in a particular sequence; a summary of the Flash Codes for both units is shown below:

NV9USB Bezel Flash Codes:

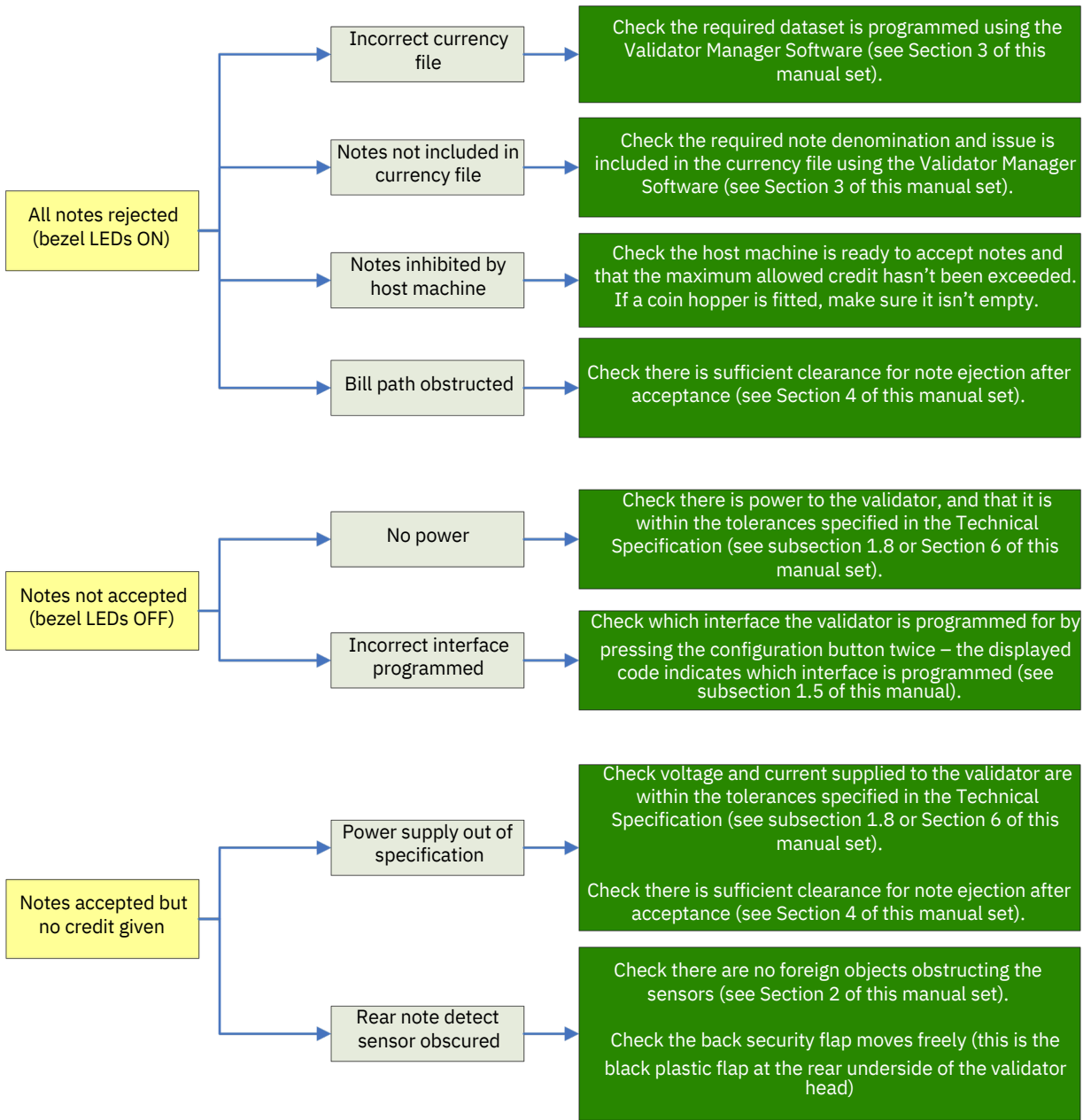
Flashes		Indicated Error	Comments
Long	Short		
0	0	None	
1	2	Note path obstructed	Remove obstruction and follow the cleaning procedure in Section 2 of this manual set
	3	Unit not initialised	Contact ITL technical support
2	2	Cash box problem	Check that the cash box note plate is free to move and the stacker mechanism is in the home position
3	1	Firmware checksum error	Download new firmware
	2	Interface checksum error or unable to set programmed interface	
	3	EEPROM checksum error	
	4	Dataset checksum error	
	5	Incompatible firmware	Check the validator firmware is compatible with the Note Float module
4	1	Power supply too low	Check power supply
	2	Power supply too high	

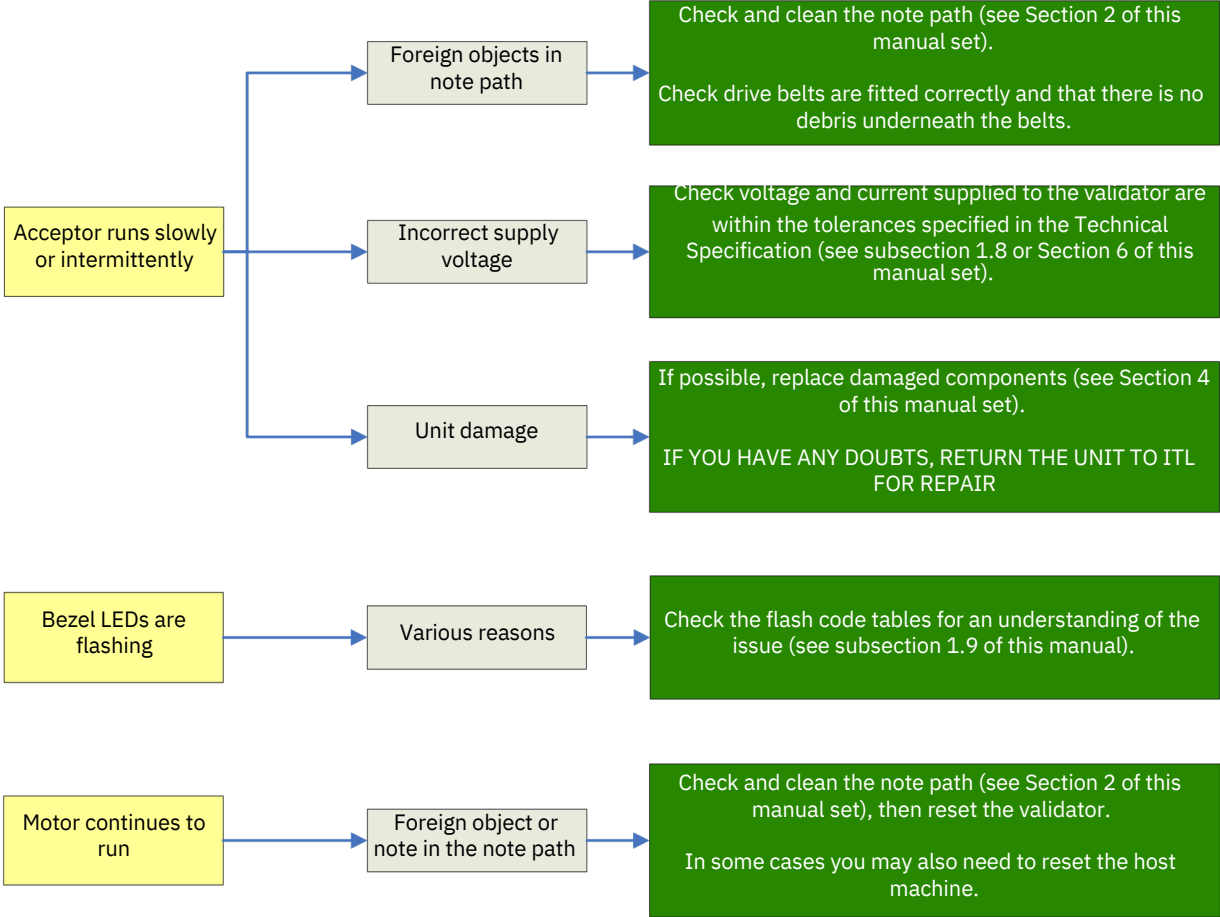
Note Float Module Flash Codes:

Flashes	Indicated Error	Comments
0	None	
Constant flash (1 every second)	Note transport error	Remove trapped note from the Note Float module and press the configuration button once
2	Software error	Download new dataset / firmware
3	Calibration error	Return to service centre for repair
4	Diverter error	Check for trapped notes stopping the diverter returning to the home position
5	Motor timeout	Check for trapped notes stopping the Note Float module tape from moving

1.10 Fault Finding

Please use this flow chart with the Flash Codes in the previous sub-section as an aid to help resolve any configuration or start up problems you might have after installing the NV11 validator





If you are unsure about the cause or how to resolve the problem, please contact ITL’s technical support department. Support contact details can be found on the ITL website (www.innovative-technology.co.uk), or on the last page of this section.

1.11 Frequently Asked Questions

a. Why are there no DIP switches on the unit?

- ☐ The NV11 has no dipswitches. Configuring the unit is carried out by using the configuration button mounted on the front of the Note Float module – see subsection 1.5 of this manual for more information.

b. In what orientation can I use the NV11 validator?

- ☐ The NV11 can only be mounted horizontally - see subsection 1.1 of this manual for more information on mounting the validator. Check the ITL website to see the currently available range of cashboxes and bezels.

c. How do I check which interface has been set?

- ☐ You can check which interface has been selected by using the configuration button mounted on the front of the Note Float module – see subsection 1.3 of this manual for more information.

d. How do I change the interface type?

- ☐ You can change the interface type by using the configuration button mounted on the front of the Note Float module – see subsection 1.5 of this manual for more information.

e. Some or all notes are not accepted

- ☐ Check that no inhibits are set in the Validator Manager software (see Section 3 of this manual set). If the problem persists, contact ITL Support for further assistance.

SECTION 2

NV11 MANUAL SET

FIELD SERVICE MANUAL

INTELLIGENCE IN VALIDATION

NV11 MANUAL SET – SECTION 2

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2. FIELD SERVICE MANUAL

This section is one part of a complete manual set: typically, a field service engineer who is maintaining the product would use this section.

This section contains the essential information that the field engineer needs to clean, maintain and fault find an NV11 validator that is installed in a host machine.

The NV11 validator has been designed to minimise any problems or performance variations over time. This has been achieved by careful hardware and software design; this attention to the design means there is very little user maintenance required.

2.1 Cleaning

The NV11 validator has been designed in a way to prevent damage and airborne contamination reaching the optical sensors; however, depending upon the environment the NV11 may require occasional cleaning or belt changing.



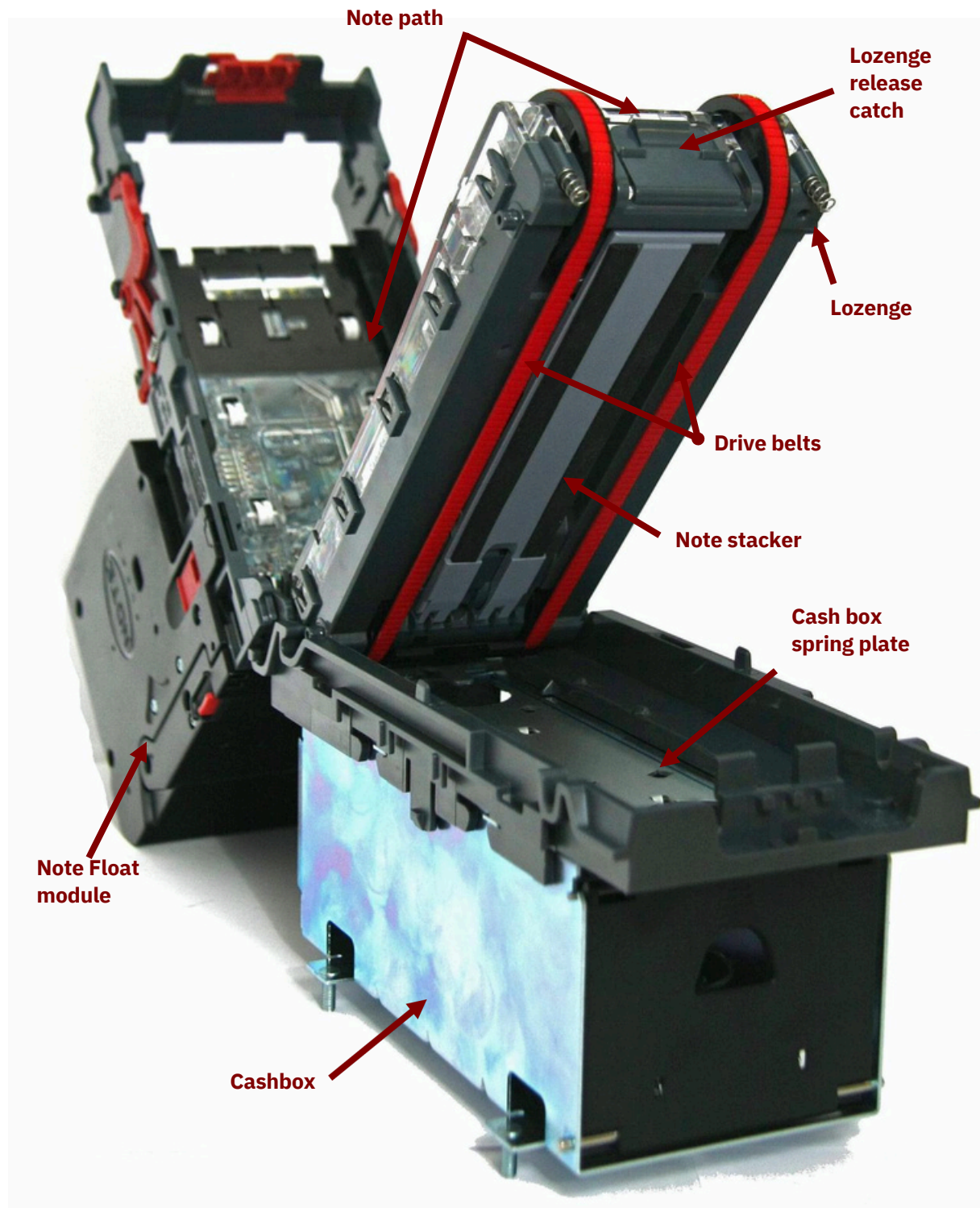
Caution!

Do not use solvent based cleaners on any part of the NV11 unit.

Do not use solvent based cleaners such as alcohol, petrol, methylated spirits, white spirit or PCB cleaner. Using these solvents can cause permanent damage to the unit; only use a mild detergent solution as directed below.

To clean the NV11, open the note path by sliding the red release catch on the front of the validator to the left (as indicated in the picture) - this will allow access to the lozenge and note path



**WARNING!**

Disconnect power **BEFORE**
any cleaning operation

Unless stated otherwise, you should disconnect the power **BEFORE** carrying out any cleaning operations to avoid the risk of causing damage to the validator.



Ideally, you should also remove the Note Float module prior to cleaning the sensors. Removal is a very straightforward task:

**WARNING!**

Do not try to disassemble

Do not attempt to disassemble the Note Float module – there are no user serviceable parts inside and trying to disassemble the module could cause personal injury and will also damage the unit beyond repair.

1. Open both the Note Float side latches as shown

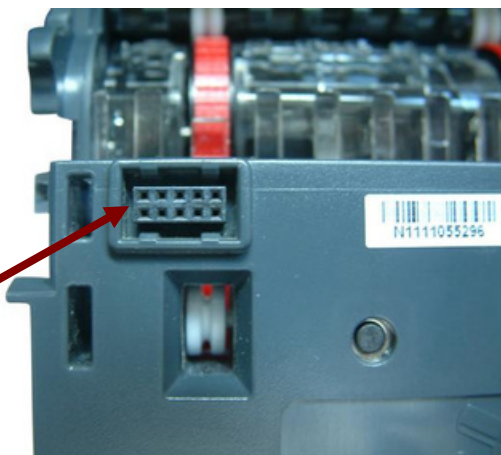


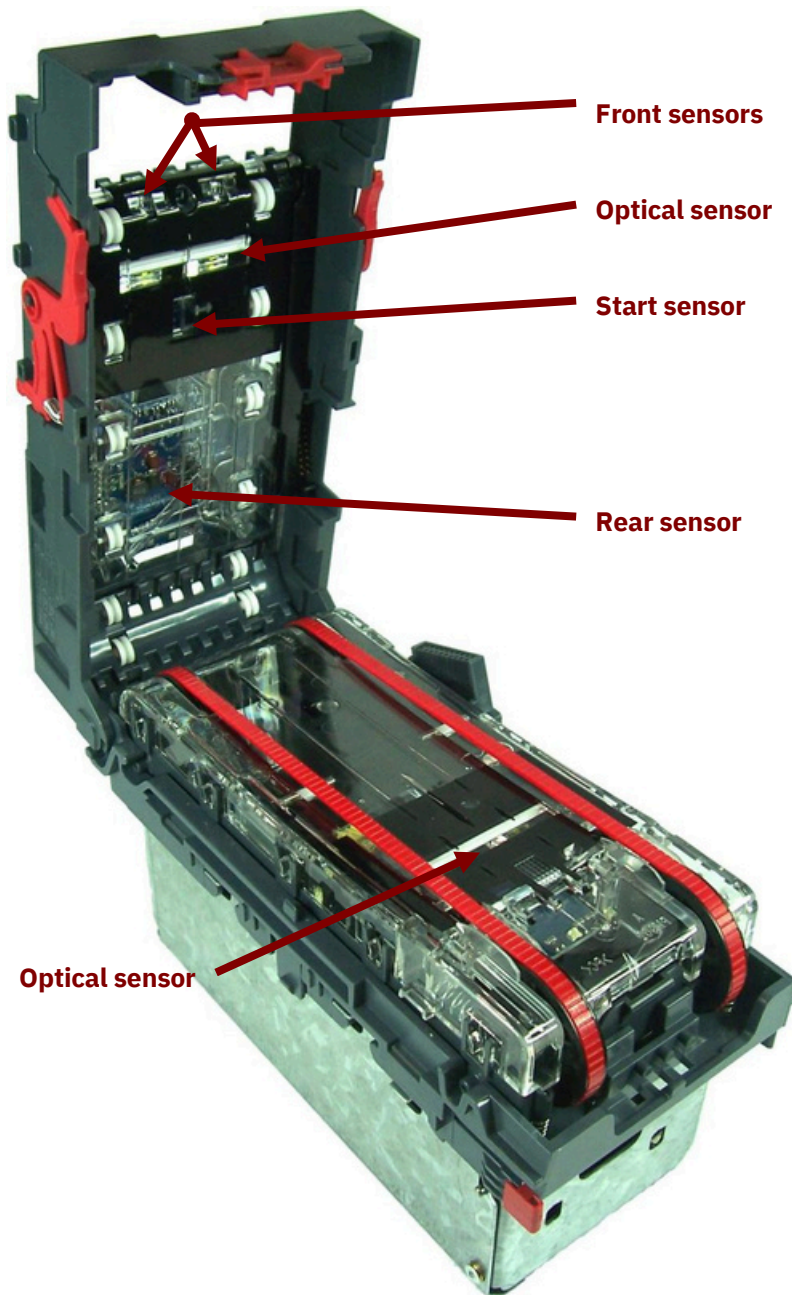
2. Carefully lift the Note Float module upwards and clear of the validator head



3. To refit the Note Float module, reverse the procedure – make sure that the electrical connectors and latches are lined up correctly

Electrical connector





Examine the note paths, lozenge and note stacker for any dirt or debris, and carefully clear and wipe the surfaces of the note paths and lozenge with a soft lint free cloth that has been dampened with a water and mild detergent solution (i.e. household washing up liquid.) - be very careful when cleaning around the sensor lenses and make sure they are clean and dry before closing the cover and restarting the unit. Do not try to polish the sensor lenses – if a lens is badly scratched, contact ITL technical support for advice.

Also check that the note stacker and cash box spring plate are not jammed.

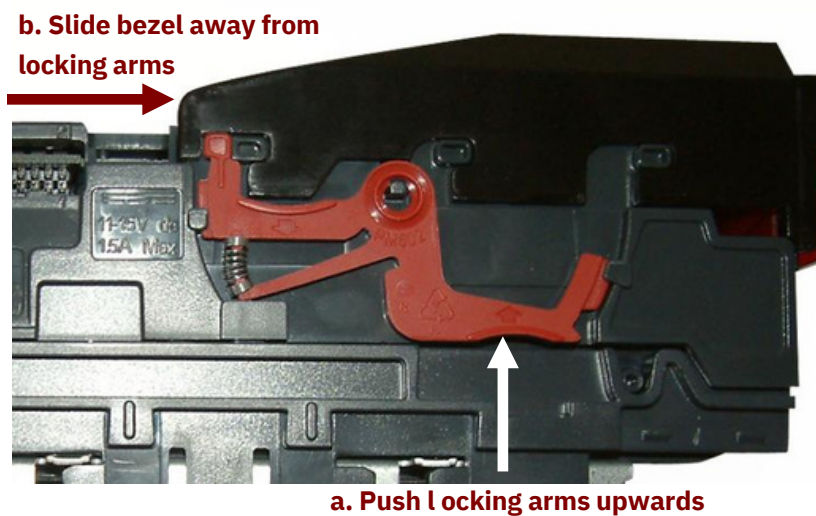
**Caution!**

Be careful cleaning sensors.

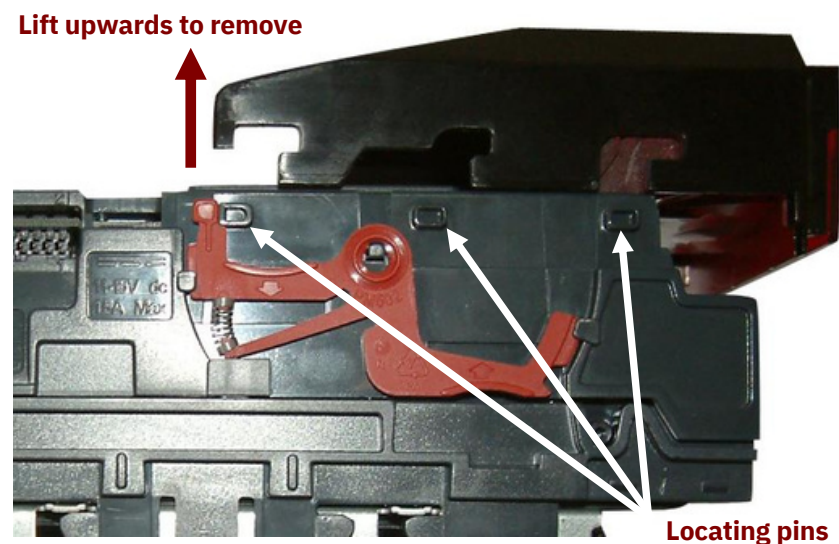
When cleaning the recessed front sensor, use a small soft brush or cotton bud – do not use anything sharp or abrasive.

Cleaning the belts is a simple operation. Ensure the validator is enabled (i.e. bezel lights are illuminated), then remove the bezel:

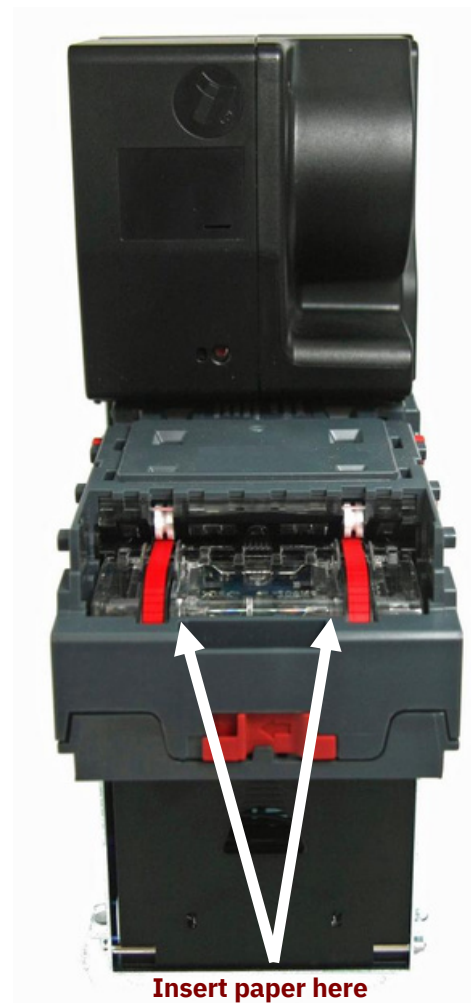
- The bezel is removed by pushing the red locking arms on both sides of the validator upwards, and sliding the bezel away from the locking arms



- Lift the bezel off once the bezel has been slid fully across and is clear of the locating pins



- Insert a piece of paper (which is narrower than the width between the two belts) in the centre of the note path to activate the drive motor
- Use a lint free cloth dampened with water and containing a mild detergent (such as dish detergent) and hold against each drive belt as it turns.



Repeat this procedure until all dust and debris has been removed from both belts. Finally, use a DRY lint free cloth to remove any excess moisture and refit the bezel. The bezel is refitted by pushing the bezel back onto the locating pins and sliding backwards until all six pins are engaged in the slots. The locking arms will then spring back and locate into the bezel.

**Caution!**

Check locking arms.

Always make sure that **BOTH** locking arms are fully located in the bezel – trying to operate the validator if they are not correctly located can cause unit damage.

**Caution!**

Do not use any lubricants.

Do not lubricate any of the note transport mechanism, belts or any part of the note path, as this can affect the operation of the validator.



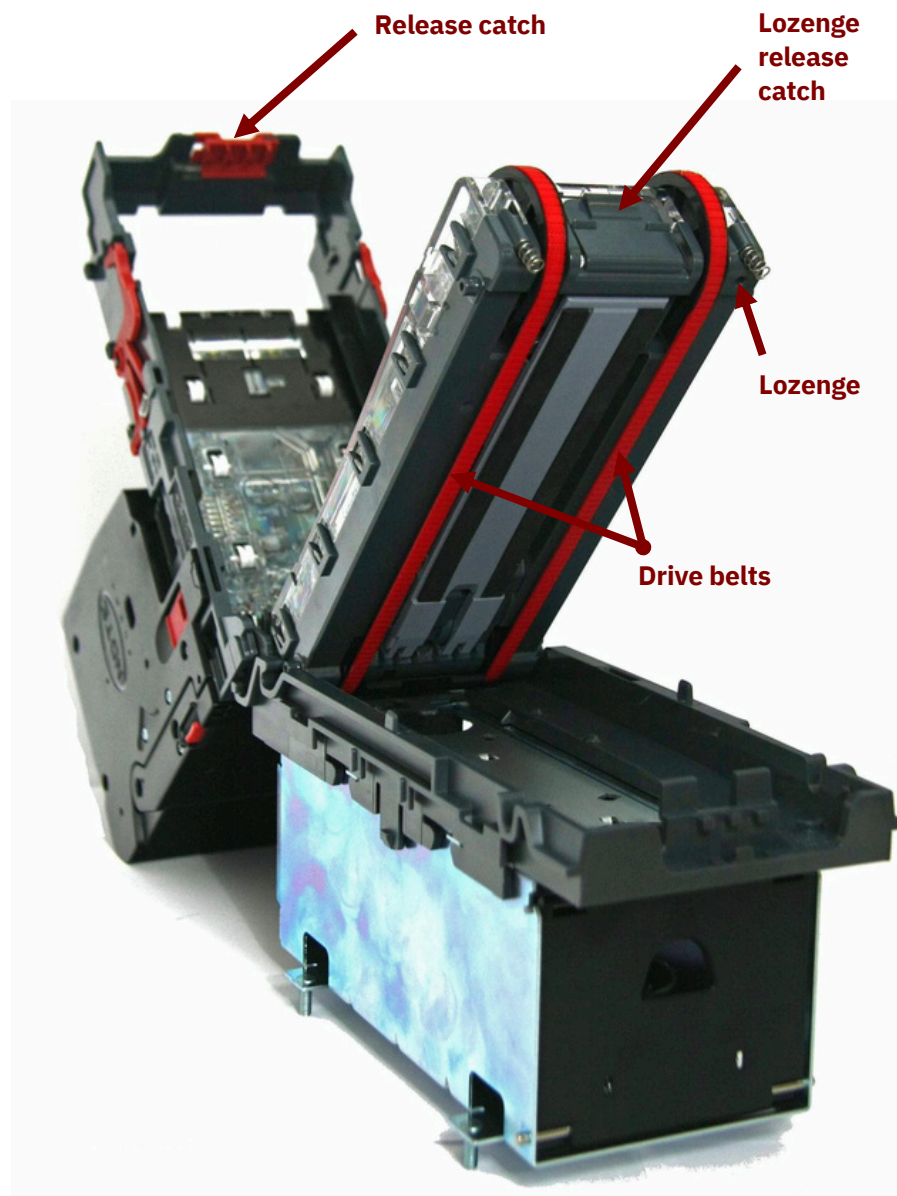
If the belts are worn or damaged, they should be replaced. This is a simple procedure, and is carried out as follows:

**WARNING!**

Do not try to disassemble

Do not attempt to disassemble the validator head or Note Float module – trying to do this could cause personal injury and will damage the unit beyond repair.

- Open the top of the unit using the Release catch
- Release the lozenge by gently pressing the Lozenge release catch
- Remove and place the lozenge on a clean dry surface
- Press in the large wheels to release the belt tension and then remove the belts, sliding them off the smallest wheels first
- Replace the belts by fitting them over the lozenge, largest wheels first
- Reassemble and close the unit



2.2 Fault Finding - Flash Codes

The NV11 validator has inbuilt fault detection facilities. If there is a configuration or other error either the Note Float module status LED, or the NV9USB validator head front bezel will flash in a particular sequence; a summary of the Flash Codes for both units is shown below:

NV9USB Bezel Flash Codes:

Flashes		Indicated Error	Comments
Long	Short		
0	0	None	
1	2	Note path obstructed	Remove obstruction and follow the cleaning procedure in Section 2 of this manual set
	3	Unit not initialised	Contact ITL technical support
2	2	Cash box problem	Check that the cash box note plate is free to move and the stacker mechanism is in the home position
3	1	Firmware checksum error	Download new firmware
	2	Interface checksum error or unable to set programmed interface	
	3	EEPROM checksum error	
	4	Dataset checksum error	
	5	Incompatible firmware	Check the validator firmware is compatible with the Note Float module
4	1	Power supply too low	Check power supply
	2	Power supply too high	

Note Float Module Flash Codes:

Flashes	Indicated Error	Comments
0	None	
Constant flash (1 every second)	Note transport error	Remove trapped note from the Note Float module and press the configuration button once
2	Software error	Download new dataset / firmware
3	Calibration error	Return to service centre for repair
4	Diverter error	Check for trapped notes stopping the diverter returning to the home position
5	Motor timeout	Check for trapped notes stopping the Note Float module tape from moving

2.3 Technical Specifications

The full technical specifications for the NV11 validator can be found in Section 6, Appendix B of this manual set. A brief summary is given here:

DC Voltage	Minimum	Nominal	Maximum
Absolute limits	10.8 V	12 V	13.2 V
Supply ripple voltage	0 V	0V	0.25 V @ 100 Hz
Supply Current			
Standby			350 mA
Running			3 A
Peak (motor stall)			3.5 A

Interface Logic Levels	Logic Low	Logic High
Inputs	0 V to +0.5 V	+3.7 V to +12 V
Outputs (2.2 kΩ pull-up)	+0.6 V	Pull-up voltage of host interface
Maximum current sink	50 mA per output	

**WARNING!**

Use suitable power supply

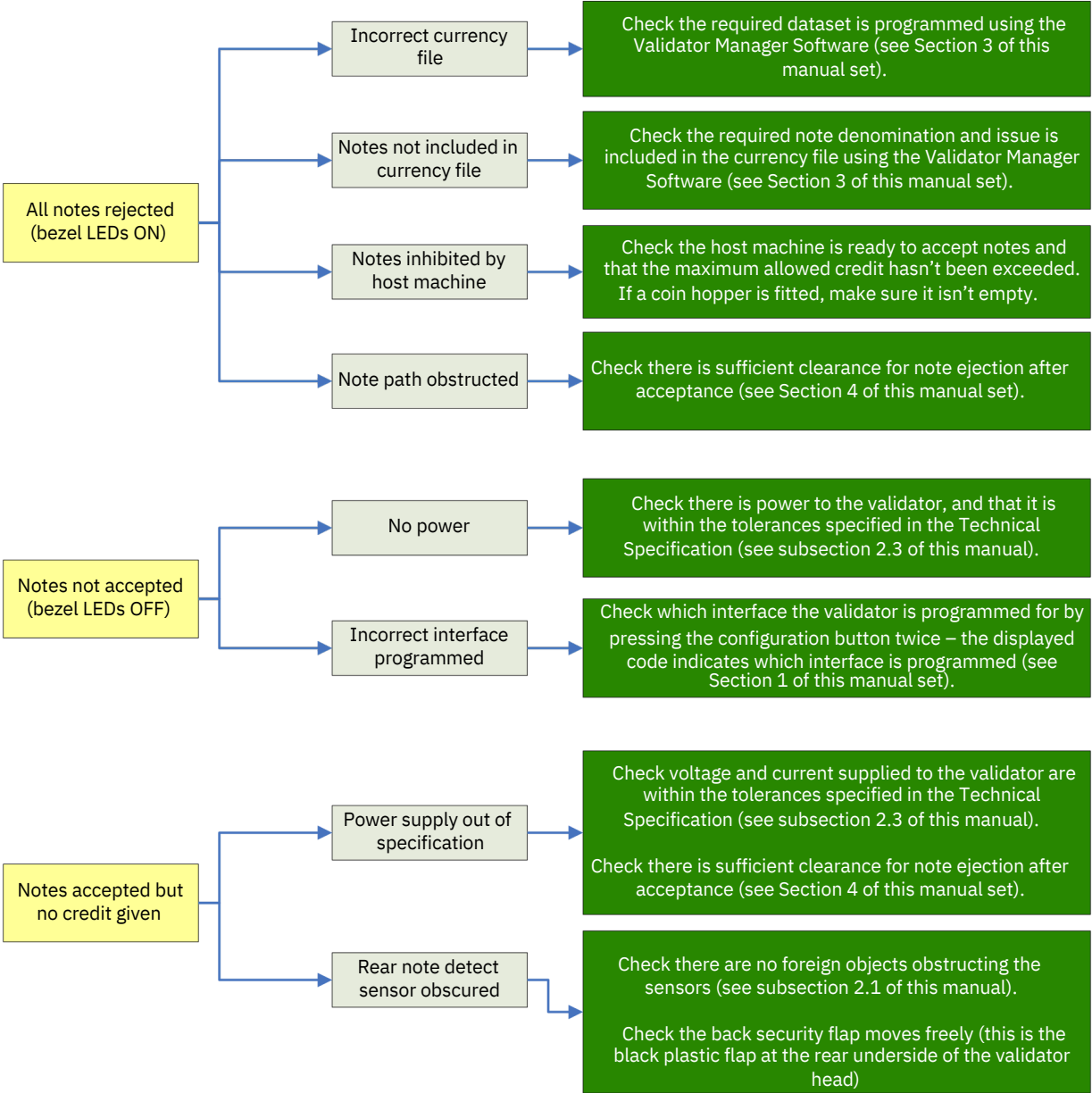
Ensure that the supply voltage to the NV11 is not lower than 10.8 V and that the power supply can provide sufficient current to avoid incorrect operation and excessive note rejects.

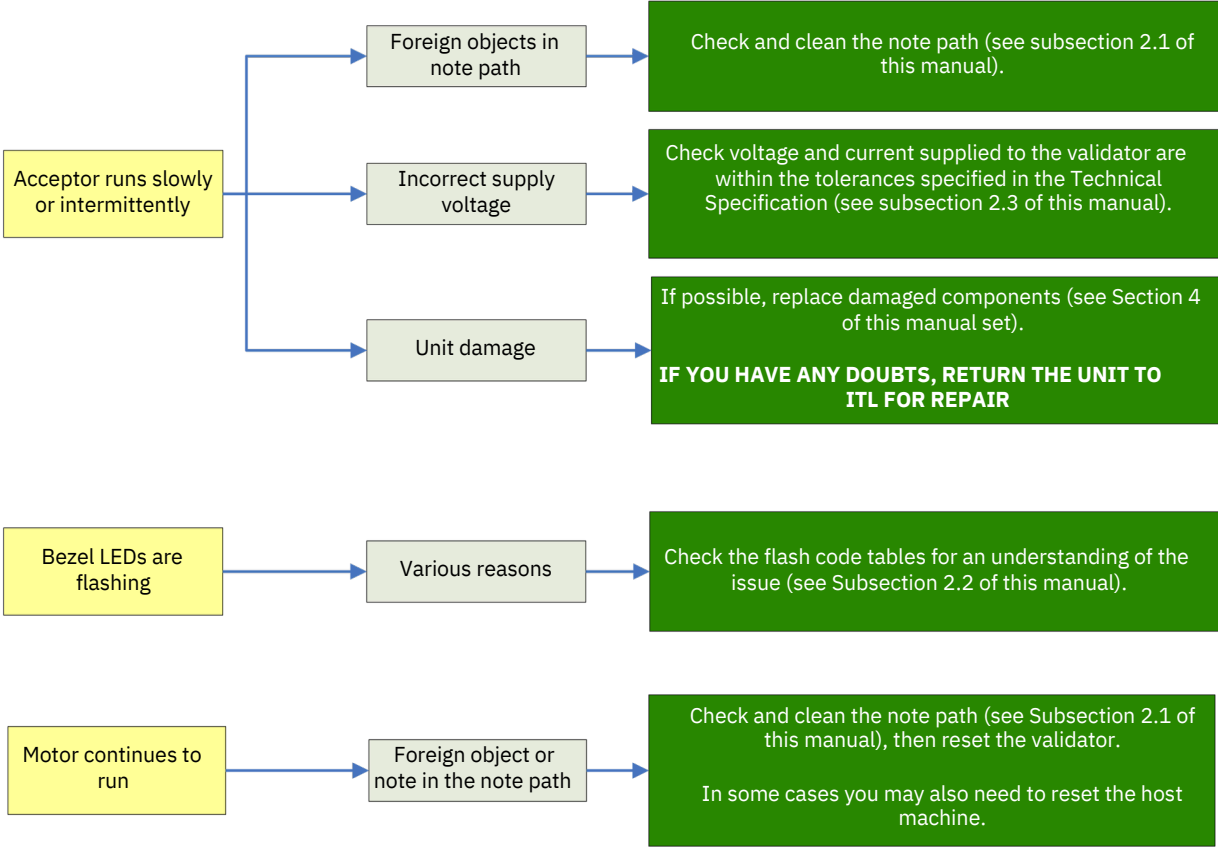
We recommend that your power supply is capable of supplying 12V DC at 4 A.

□ For 12V operation, use TDK Lambda model SWS50-12. This power supply is available from a variety of suppliers including Farnell (stock code 1184645) and RS (stock code 466-5869).

2.4 Fault Finding Flow Chart

Please use this flow chart with the Flash Codes in subsection 2.2 as an aid to help resolve any configuration or start up problems you might have after installing the NV11 validator





If you are unsure about the cause or how to resolve the problem, please contact ITL’s technical support department. Support contact details can be found on the ITL website (www.innovative-technology.co.uk), or on the last page of this section.

2.5 Frequently Asked Questions

a. Why are there no DIP switches on the unit?

- The NV11 has no dipswitches. Configuring the unit is carried out using a configuration button mounted on the front of the Note Float module – see Section 1, subsection 1.5 of this manual set for more information.

b. In what orientation can I use the NV11 validator?

- The NV11 can only be mounted horizontally - see Section 1, subsection 1.1 of this manual for more information on mounting the validator. Please check the ITL website to see the currently available range of cashboxes and bezels.

c. Some or all notes are not accepted

- Check that no inhibits are set in the Validator Manager software (see Section 3 of this manual set). If the problem persists, contact ITL Support for further assistance.

d. How do I clean the validator?

- Follow the instructions given in subsection 2.1 of this manual.

2.6 Spare Parts

Full details of the interface cable connector pinouts, connector types / makes and other related information can be found in Section 4 of this manual set. The user can obtain the following parts for the NV11 validator:

ITL Part Number	Description	Details
CN00215	Ribbon interface cable	Provides connection between DA2 and NV11



ITL Part Number	Description	Details
CN00292	Interface cable	Provides connection between DA2 and NV11

CON1

15

1

16

2

(Front View)

15

1

16

2

(Top View)

5

10

10

1950

10

10

5

16

2

(Bottom View)

CON2

15

1

16

2

(Front View)



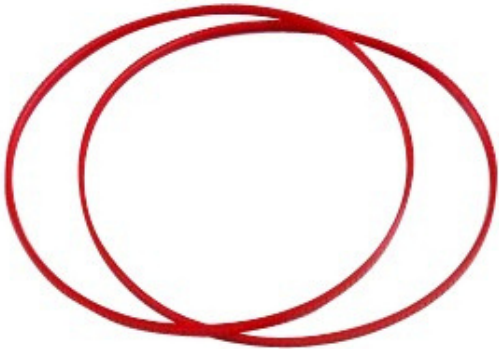
Bezels		
ITL Part Number	Description	
PA00189	Horizontal Bezel Assembly	
PA00268	69mm Fixed Width Horizontal Bezel	No image available
PA00896	Horizontal Bezel Assembly	

Cashboxes		
PA00186	Locking Cashbox Assembly (300L)	A black and silver locking cashbox assembly with a red emergency release button on the front.
PA00192	Slide-on Cashbox Assembly (300S)	A black and silver slide-on cashbox assembly with a red emergency release button on the front.
PA00898	Standard Cashbox Assembly	A black and silver standard cashbox assembly with a red emergency release button on the front.

**Information**

Check website for options.

There are many variants of bezel and cashbox type available for the NV11 validator. Please check the ITL website (www.innovative-technology.co.uk) for up to date information on the options available.

Drive Belts		
FD00106	NV9USB Red Drive Belt	

SECTION 3

NV11 MANUAL SET ITL SOFTWARE SUPPORT GUIDE

INTELLIGENCE IN VALIDATION

NV11 MANUAL SET – SECTION 3

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3. ITL SOFTWARE SUPPORT GUIDE

3.1 PiPS Software

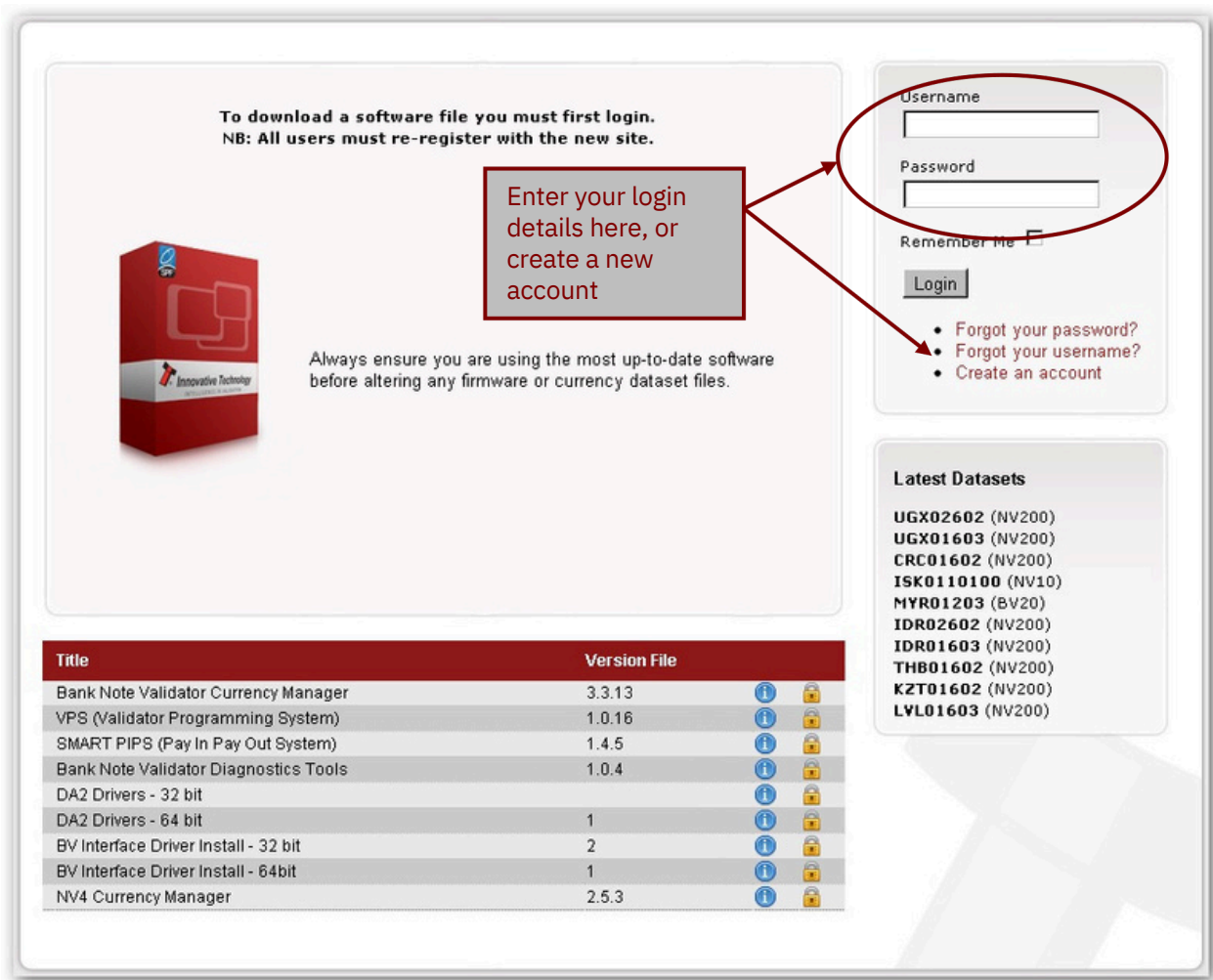
PiPS (Pay in Pay out System) is a software package developed by Innovative Technology Ltd to allow customers to carry out programming, setup and operational tasks on the full range of NV11 devices.

3.1.1 Preparing for Installation

If you do not have the PiPS software on CD, you can easily download it from the Innovative Technology website. Visit www.innovative-technology.co.uk, and select 'Software Download' from the 'Support' tab:

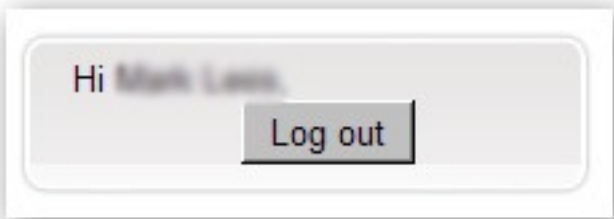


Clicking this link will take you to the software download page. To download any files you must log in as a registered user – if you have not already registered this is a very quick process; just click the 'create an account' link and follow the on-screen instructions.



After logging in, the download screen will change slightly:

Your user name will be displayed in the top right hand corner of the screen



The padlock icon for each file will change from locked to unlocked. To download a file, just click on the padlock icon opposite the file name.



If you want to find more information about the file before you download it, you can click on the blue information icon.



In this case, we want to download the PiPS software, so we click on the padlock icon opposite the 'SMART PIPS (Pay In Pay Out System)' filename:

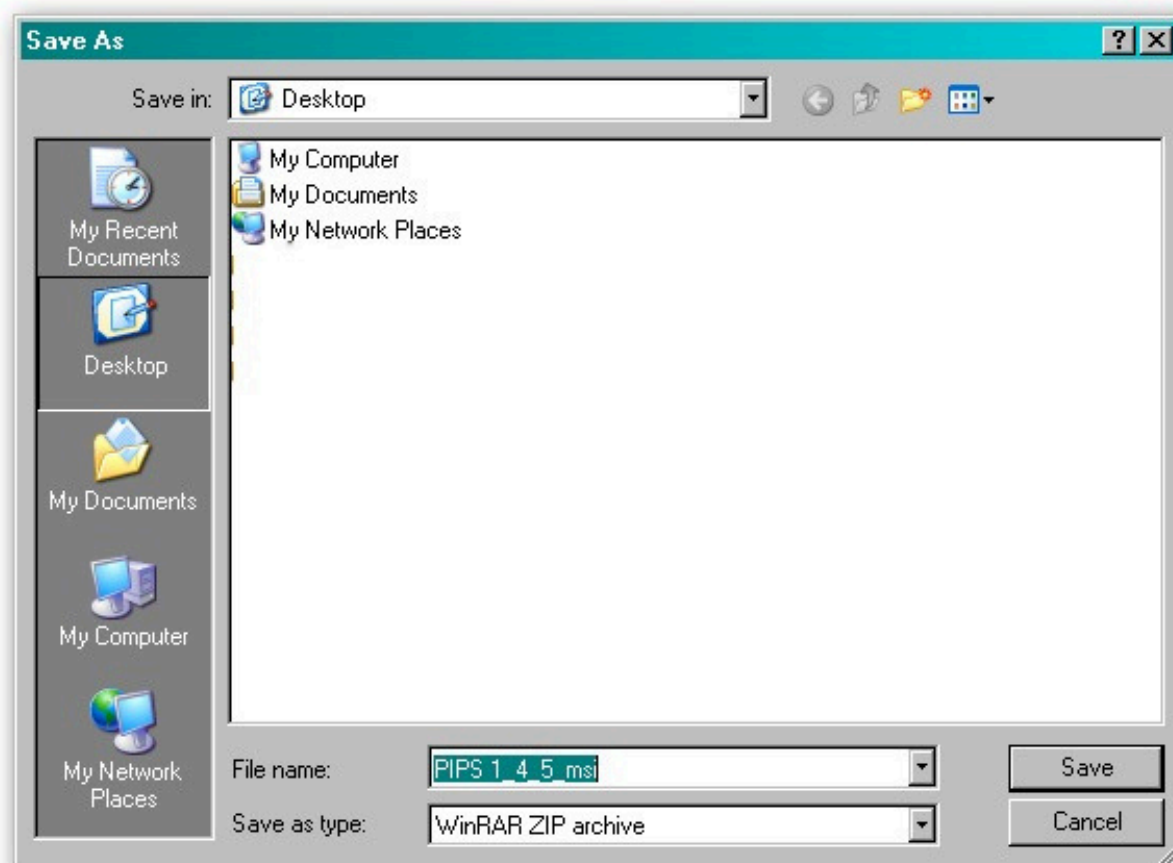


Title	Version	File
VPS (Validator Programming System)	1.0.16	 
Bank Note Validator Currency Manager	3.3.11	 
Bank Note Validator Diagnostics Tools	1.0.4	 
SMART PIPS (Pay In Pay Out System)	1.4.5	 
DA2 Drivers - 32 bit		 
DA2 Drivers - 64 bit	1	 
BV Interface Driver Install - 32 bit	2	 
BV Interface Driver Install - 64bit	1	 
eSSP Developer Kit	2	 
NV4 Currency Manager	2.5.3	 

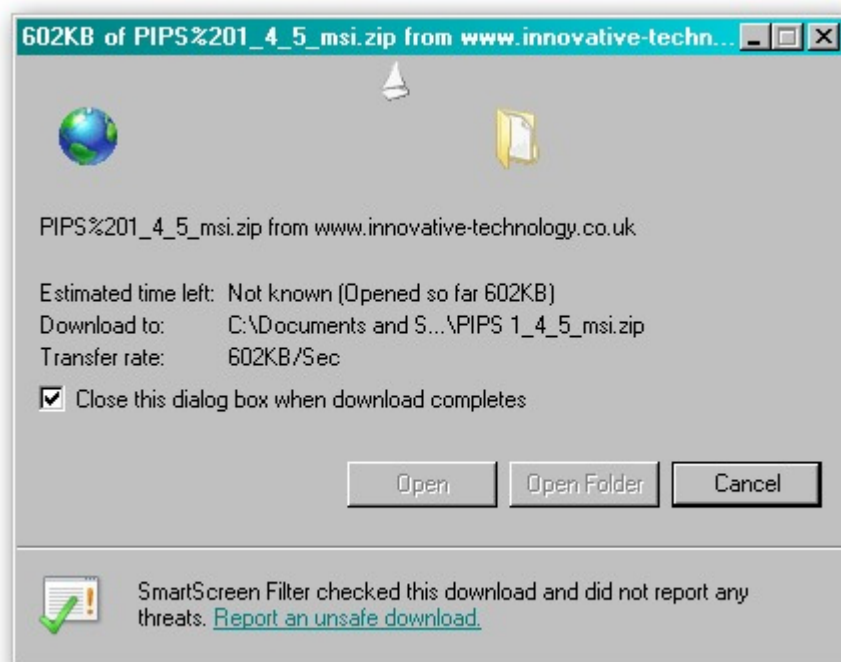
After clicking the link, a file download dialog box will appear – choose the option to **save** the file:



You can save the file anywhere that is convenient, as long as you can remember where it is when you want to install the software.



After choosing where to save the file, a file transfer dialog box will appear showing the progress of the file download:

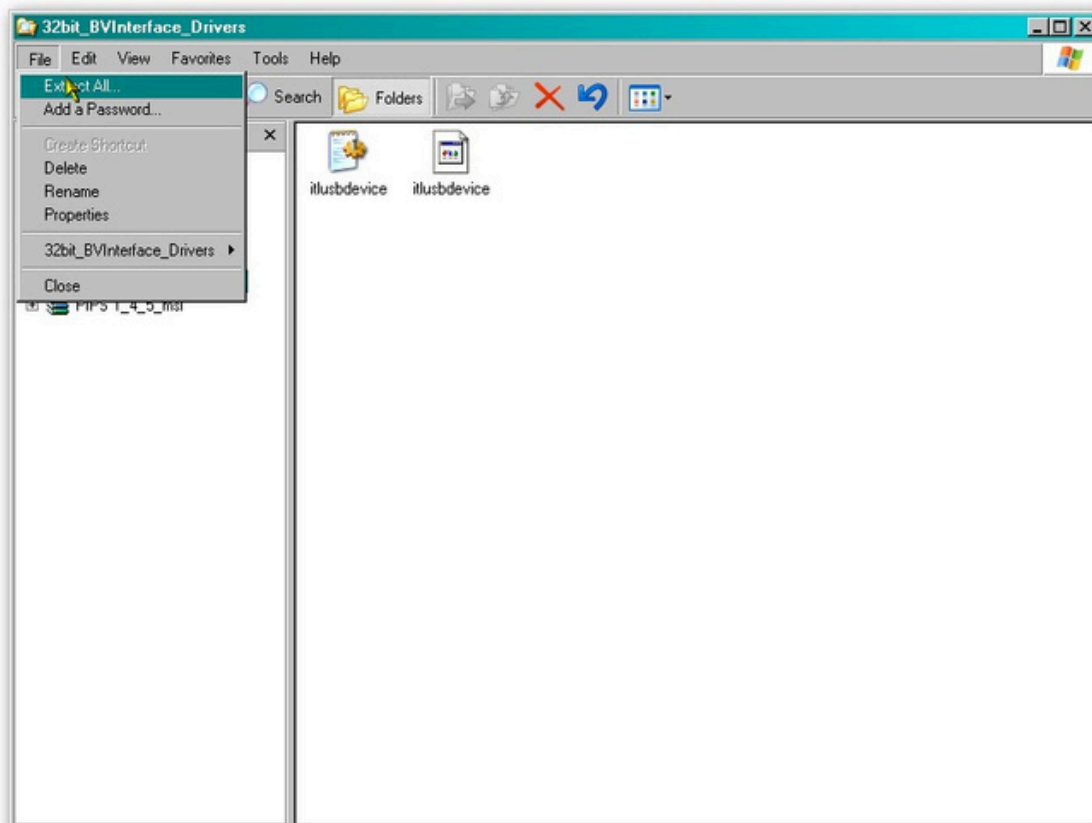


3.1.2BV Interface Drivers

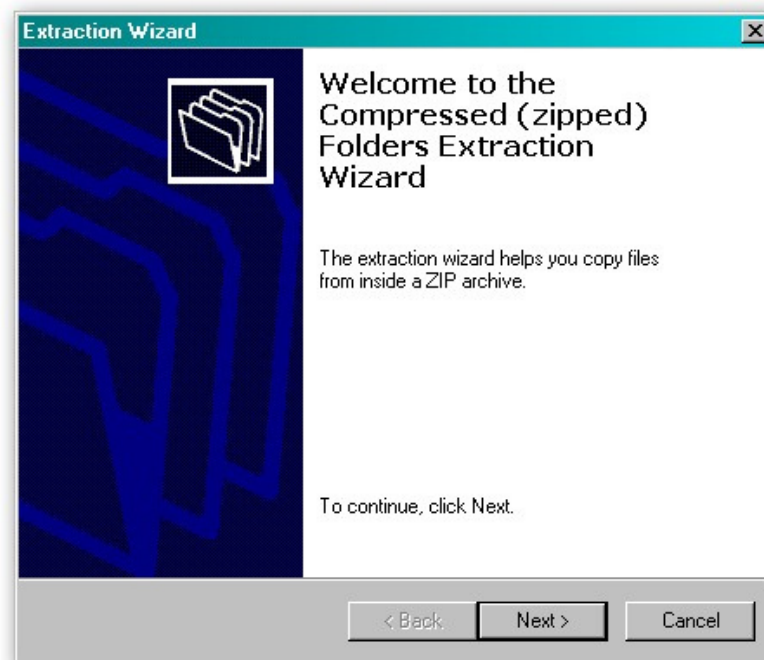
After downloading the Validator Manager software, you will also need to download the Banknote Validator (BV) Interface drivers – two versions are available (32 bit and 64 bit) so choose the correct type for your operating system. Again, remember where you saved the file.



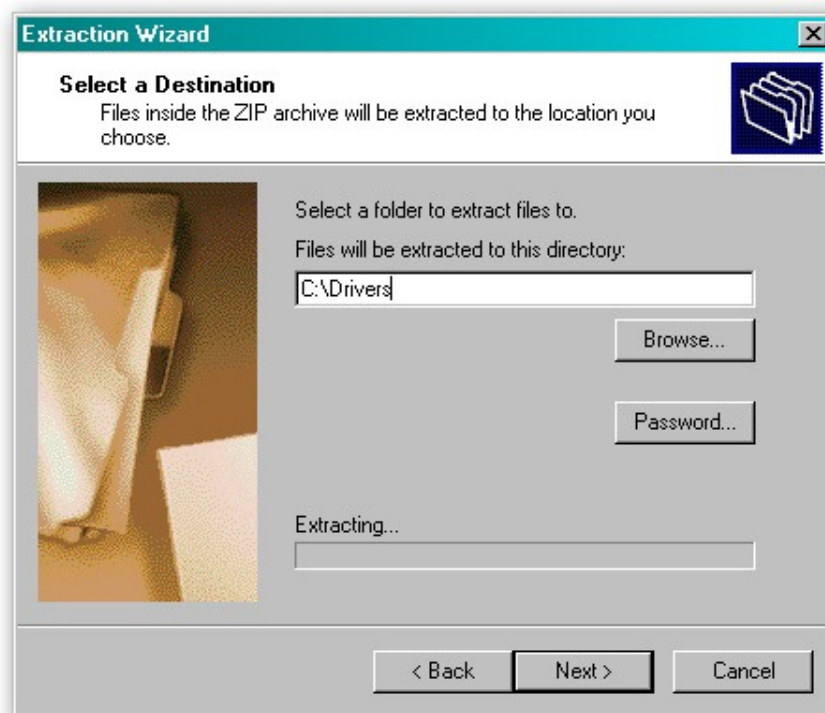
Both files are provided in a 'zipped' (compressed) form – you will need to extract the files from the zipped file before you can install the software or driver. Any version of Windows from Windows 98 onwards can open zipped files; or you may want to use a third party software tool such as Winzip or WinRAR.

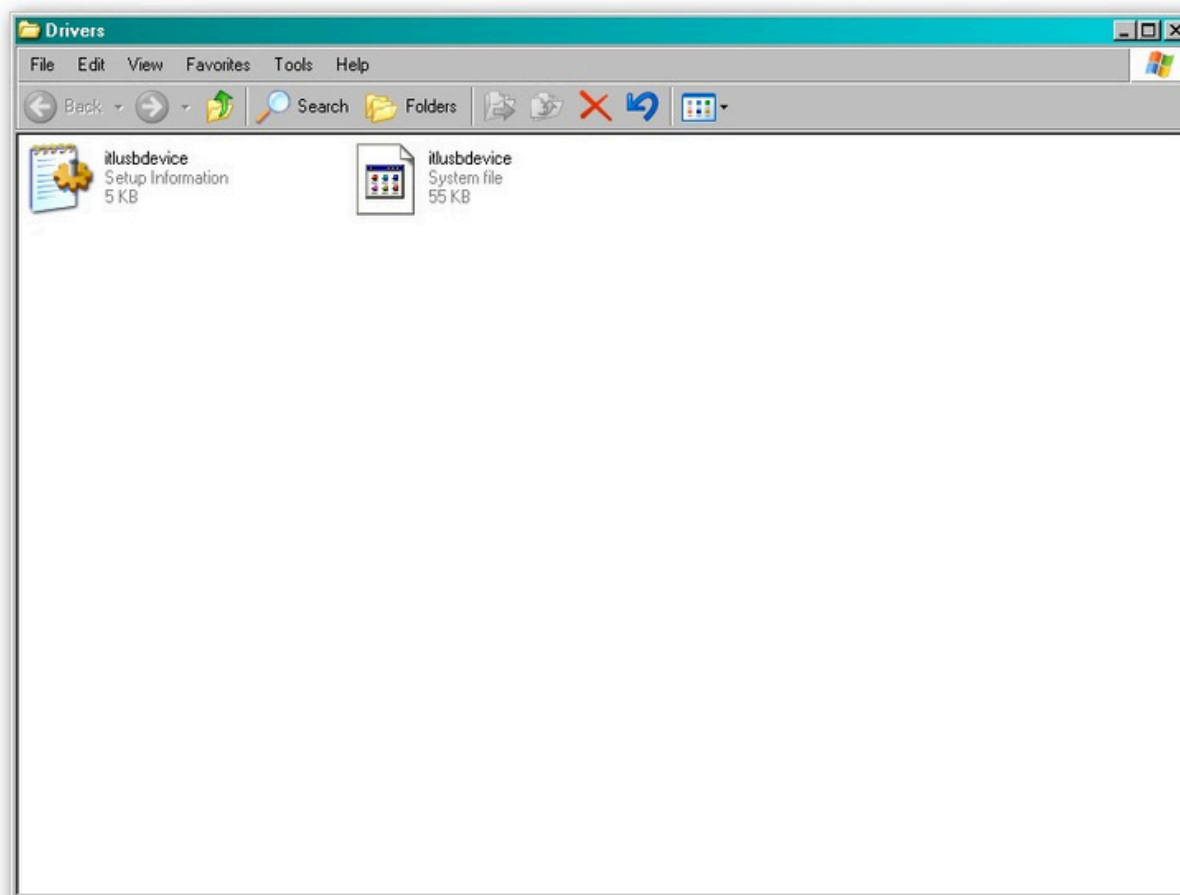
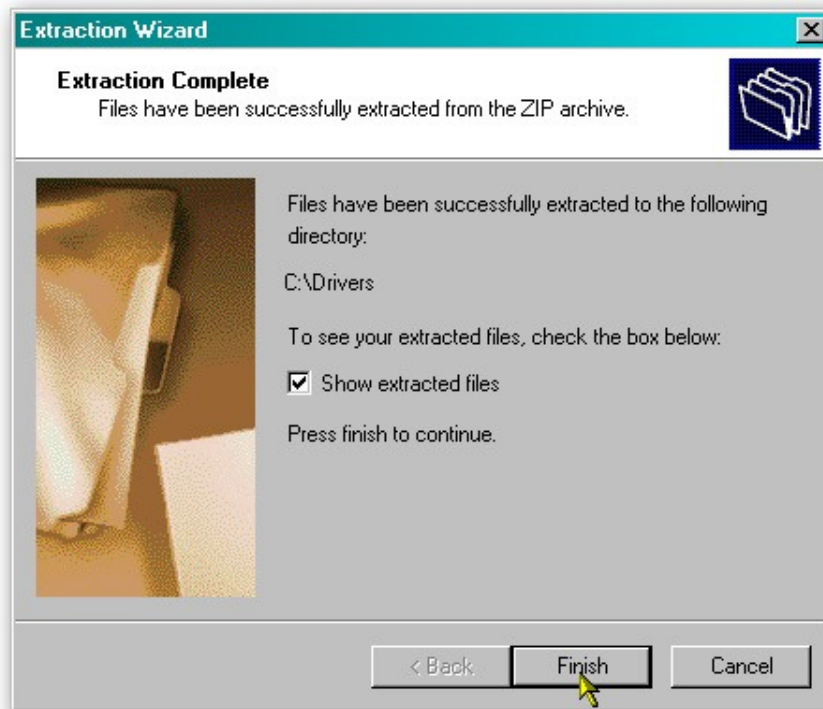


Extract the files to a convenient location – this might be an existing folder, or you may want to save them into a new folder.



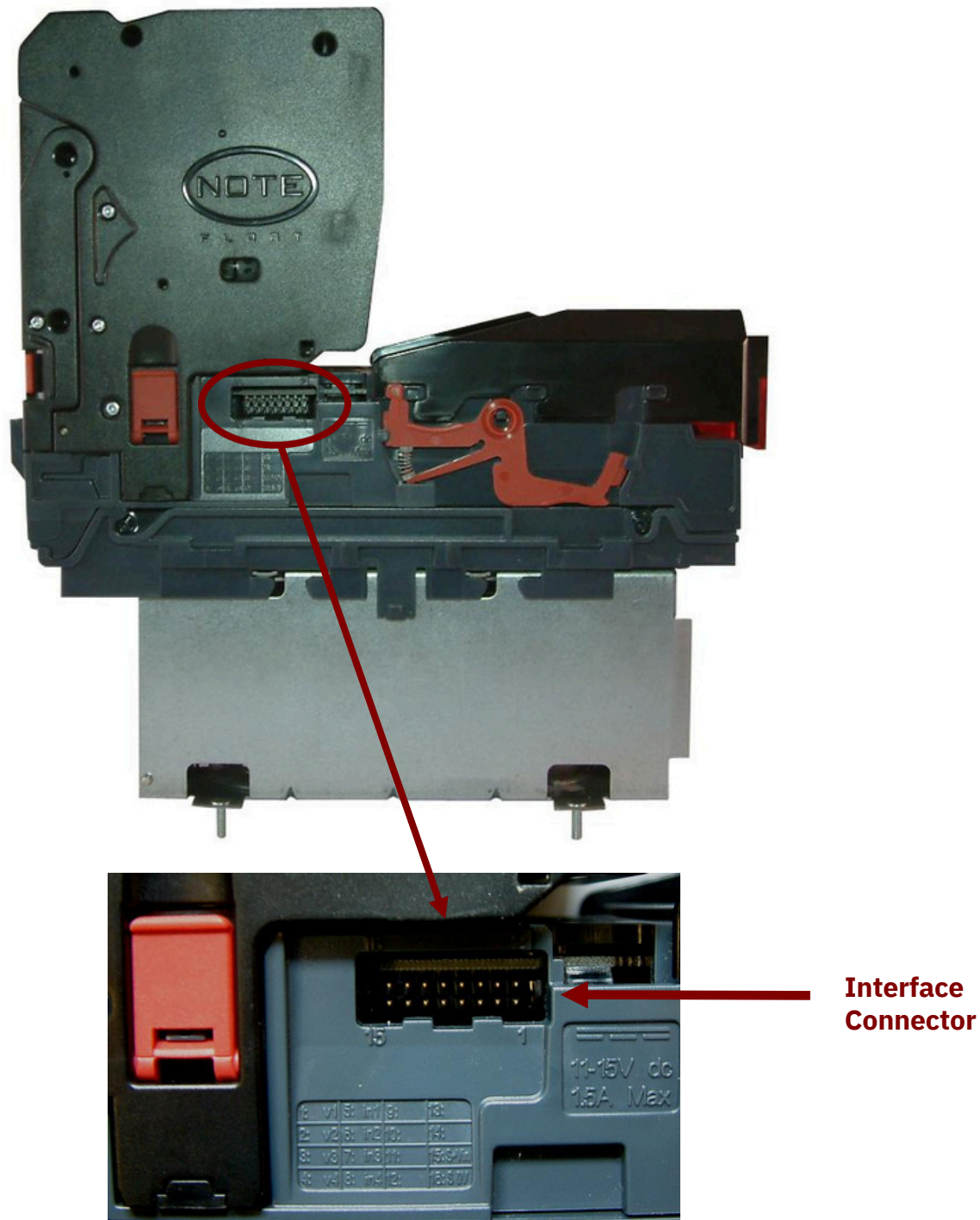
In this example, the BV Interface driver files are being saved into a folder called 'Drivers' on the computers C: drive.





3.1.3 Installing the Drivers

There are several ways to communicate with the NV11 validator, which include using a direct connection from computer to validator with a CN00392 validator to USB cable, or by using a special interface unit called a DA2. Use of the DA2 is not covered here – please refer to ITL Document number GA00338-2 for more information. In this manual we will be using the USB connection method. The connector needed to set up and interface the NV11 validator is easily accessible on the side of the unit:



To use a USB connection with the NV11, a USB cable fitted with a 16 way connector on one end (ITL Part Number CN00392) should be used. The CN00392 cable fits into the 16 way connector and allows high speed programming and serial communications when used in SSP and ccTalk modes. When using the USB connection, power must be supplied to the NV11 using the red and black power leads on the CN00392 cable.

The NV11 validator must be powered up for the interface to be recognised by Windows. If the validator is not in the host machine, you will need to provide power to the 16 way interface connector first. The connection information and pin numbering is as follows:



Pin	Description
1	Serial Data Out (Tx)
5	Serial Data In (Rx)
11	USB Data +
12	USB Data -
13	USB Power (+5V)
15	+ V
16	0V / Ground Connection

Before connecting the USB cable to the computer, make sure that the CN00392 cable is connected to the validator and that the unit is powered up. Once you have carried out these steps, plug the USB cable into the computer.

After connecting the USB cable, Windows should then detect the NV11 validator interface – a ‘Found New Hardware’ bubble or dialog box should appear.

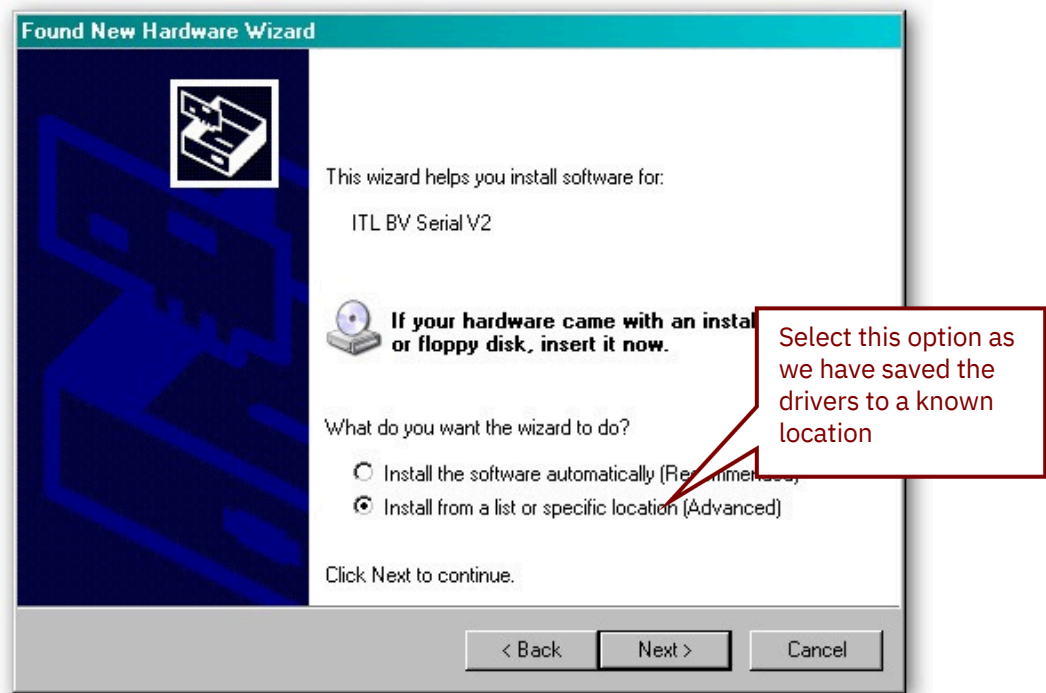


A ‘Found New Hardware’ wizard should then start to guide you through the installation process (this first screen is not always shown on some computers):

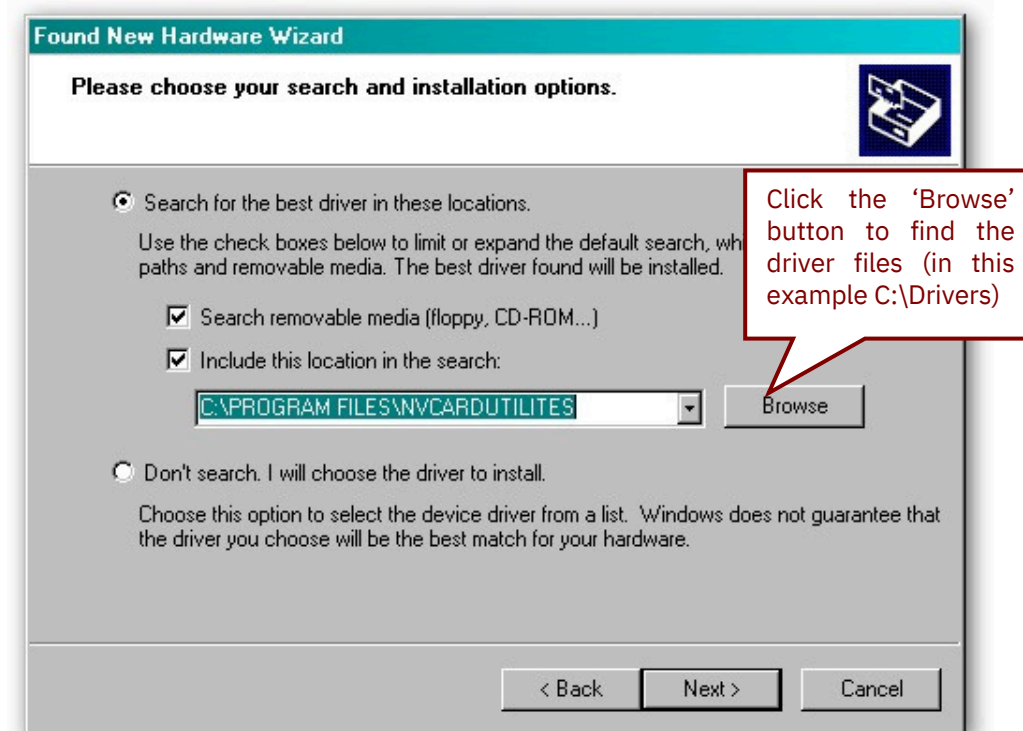


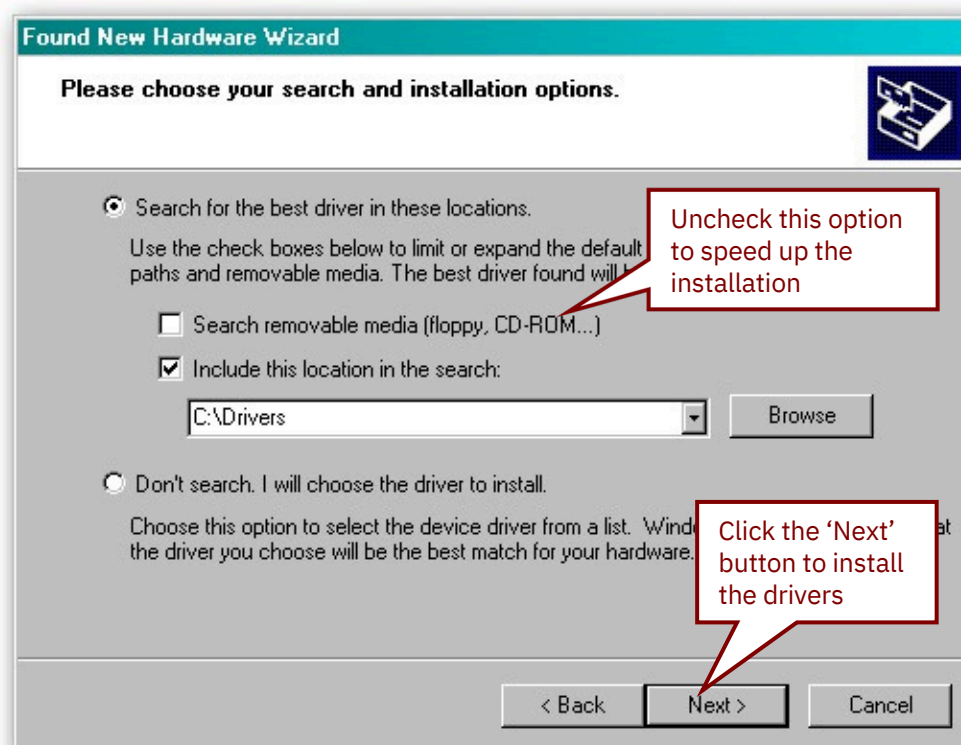
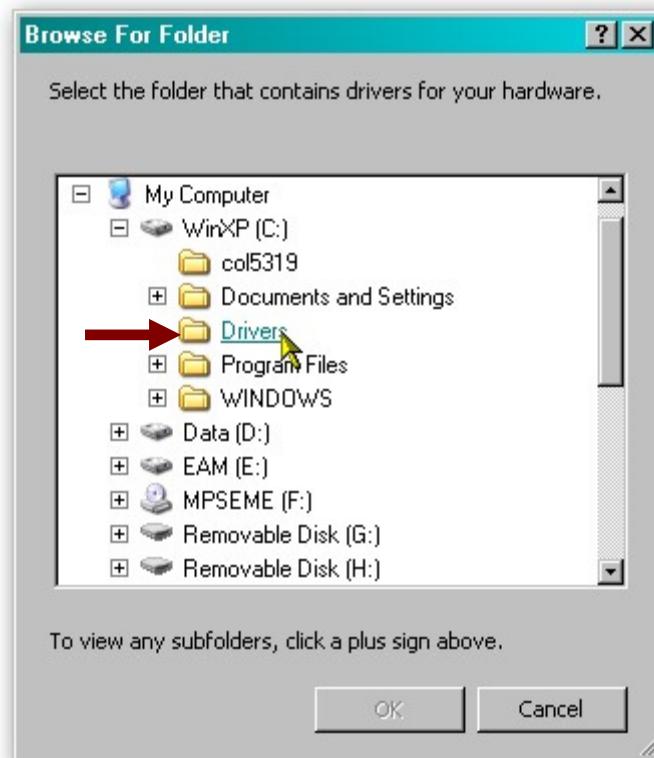
 **Information**
Only use V2 drivers

Please make sure that you are using the V2 drivers for the installation.

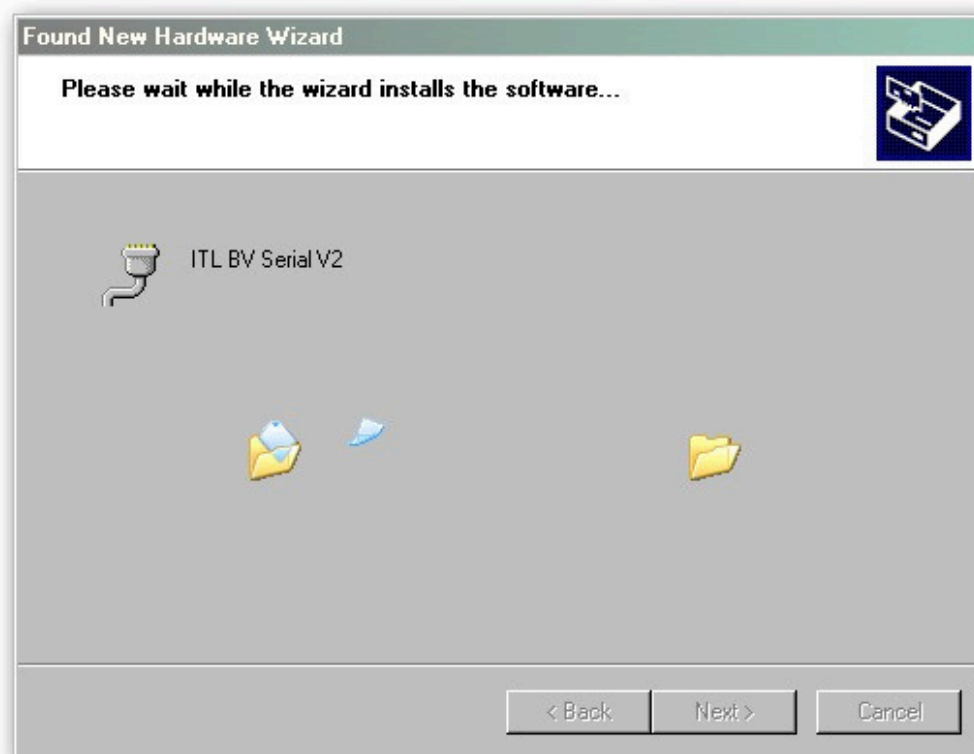
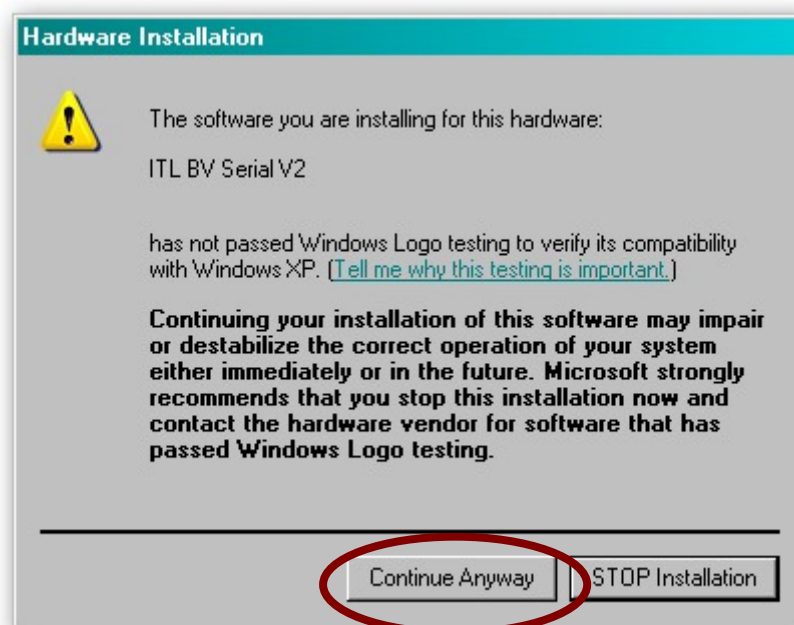


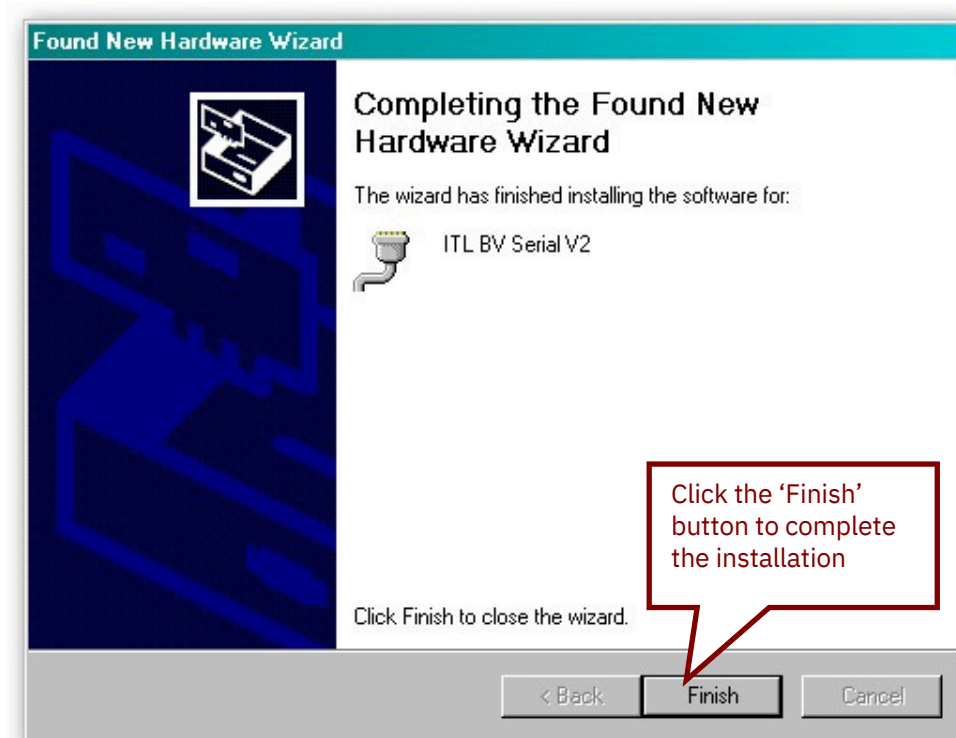
The next dialog box will ask you where to search for the drivers:



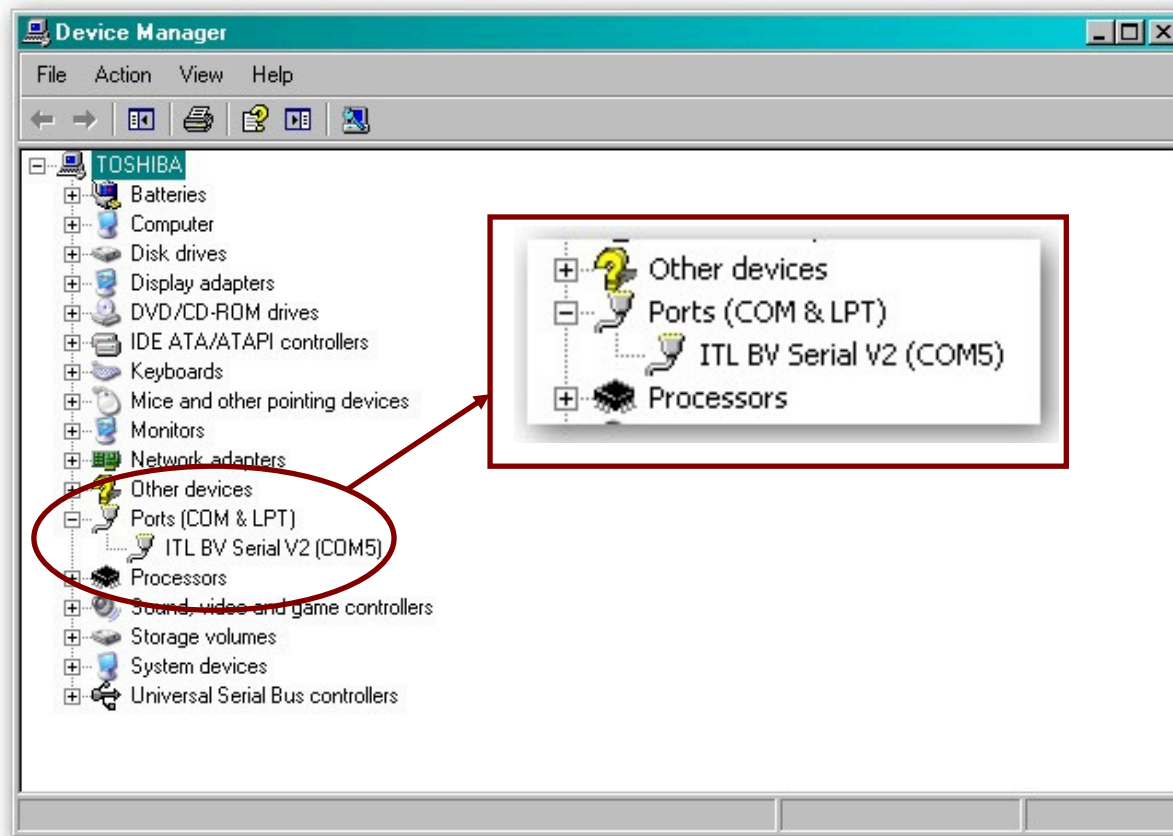


You may see a warning dialog saying that the drivers have not passed Windows logo testing – you can ignore this warning. Just click the 'Continue Anyway' button.





After completing the driver installation you can check that the communications port has been installed correctly. Open Windows Device Manager, and click on the Plus symbol (+) next to the 'Ports' entry. This will expand the list of installed communications ports. You should see an entry for an '**ITL BV Serial V2**' port as shown here:

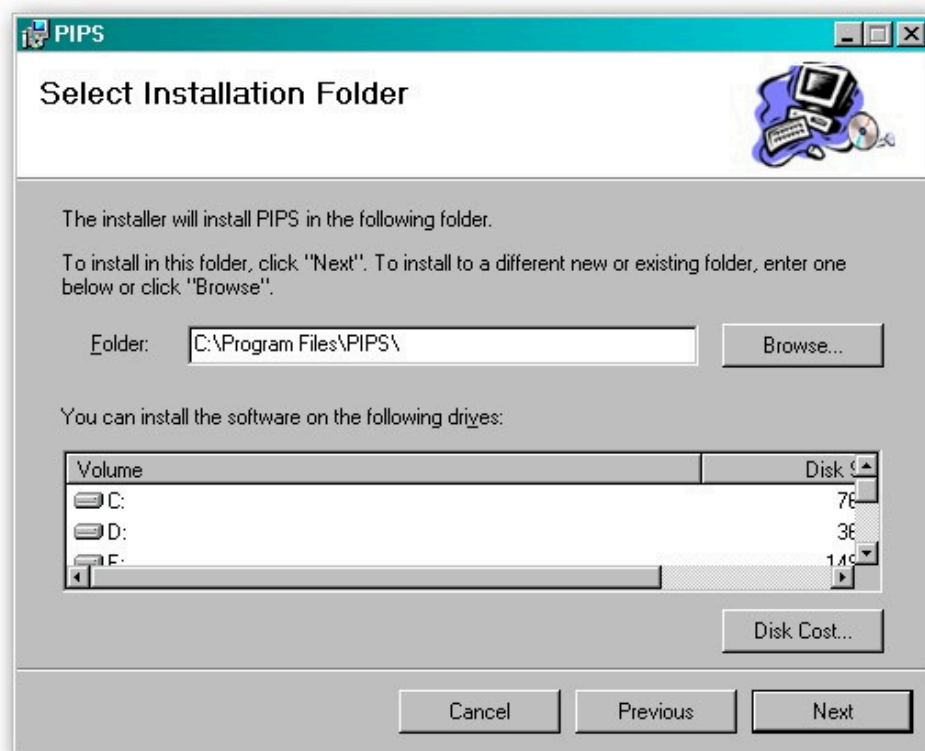


The actual communications port number (in our example COM5) may vary depending on your particular computer configuration.

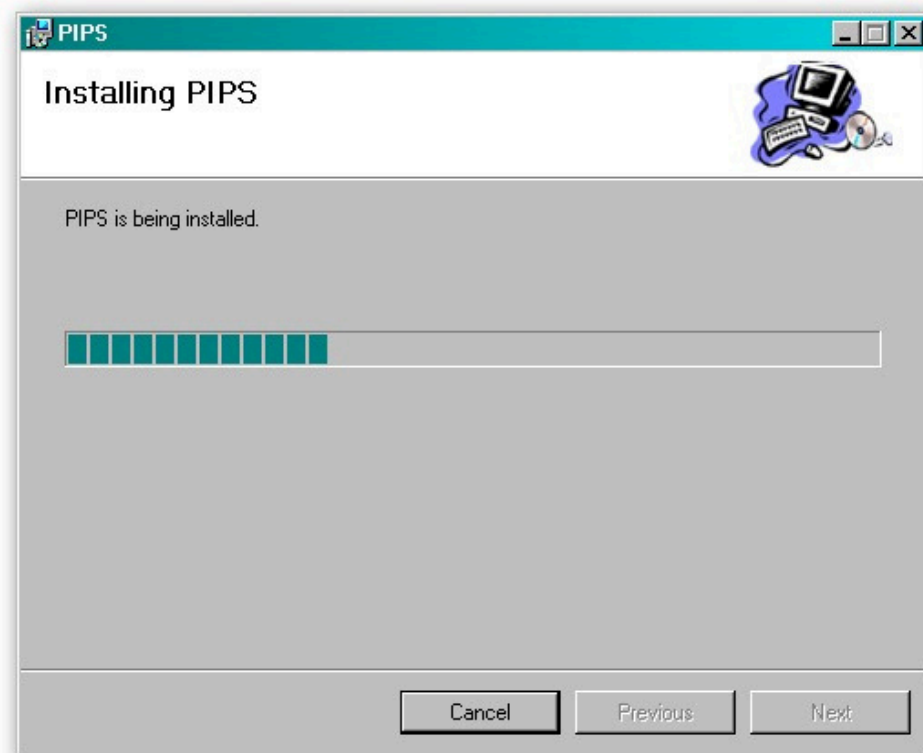
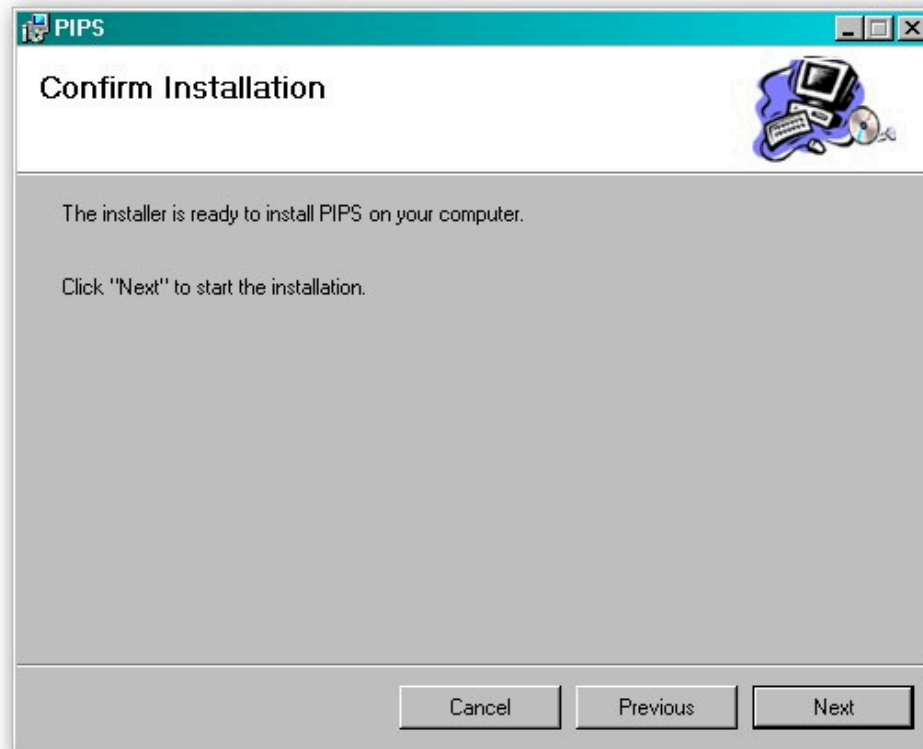
Now the drivers have been correctly installed you can install the Validator Manager software – this is covered next.

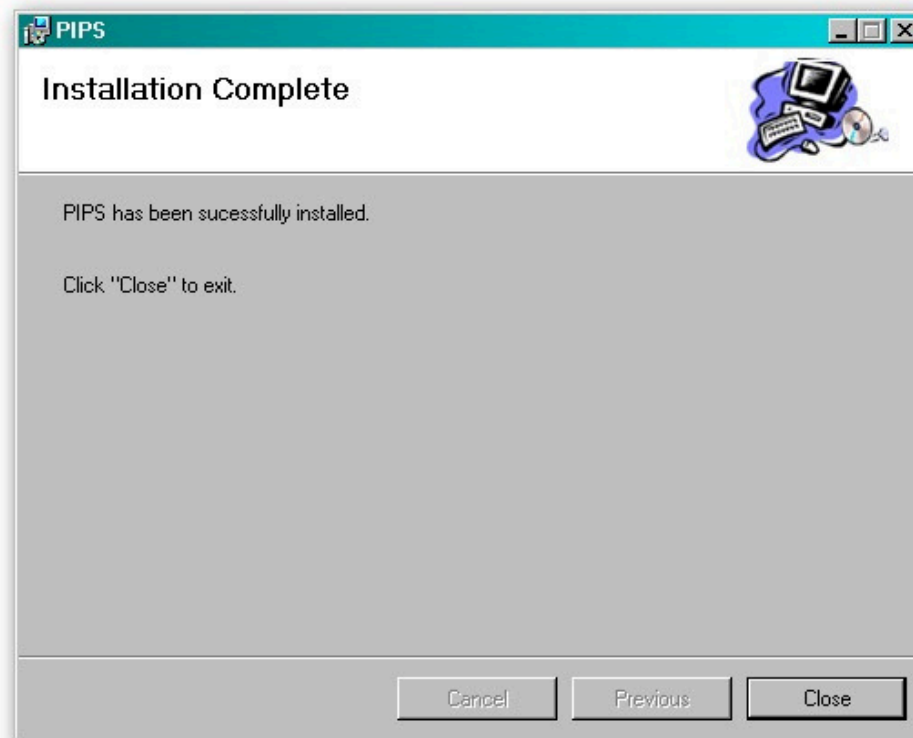
3.1.4 Installing the PiPS Software

Installing the PiPS software is very straightforward. Find the PiPS installation file you downloaded earlier, extract the installation file from the zipped file and double click the file (it has an .msi extension) – this will start the installation process:

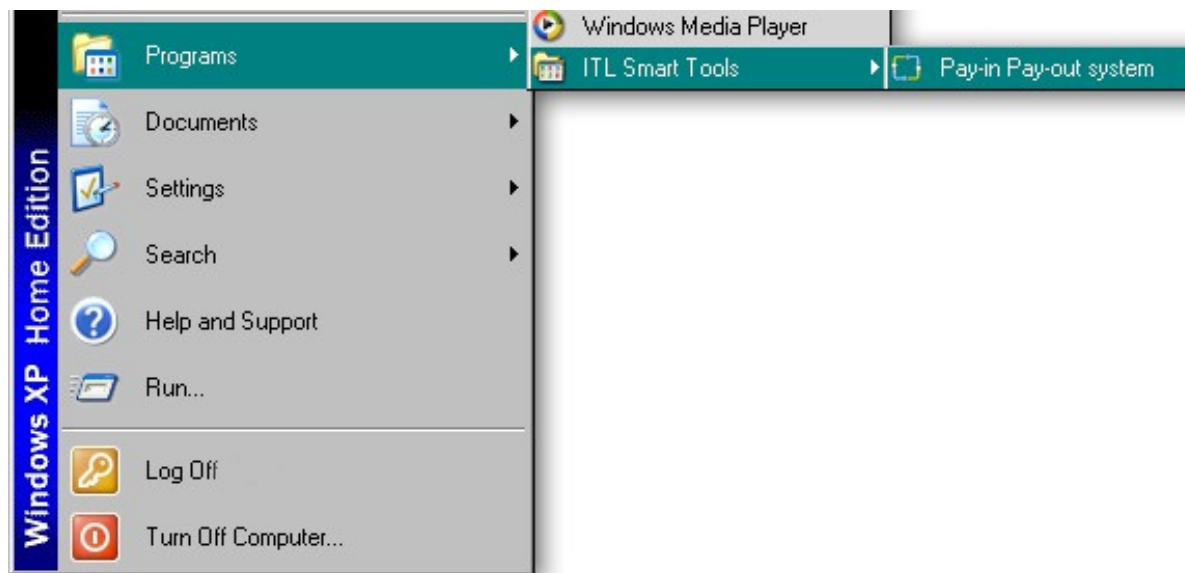


You can choose where you would like to install the software, or just accept the default location (as shown above). Clicking on the 'Next' button will then ask you to confirm the installation:





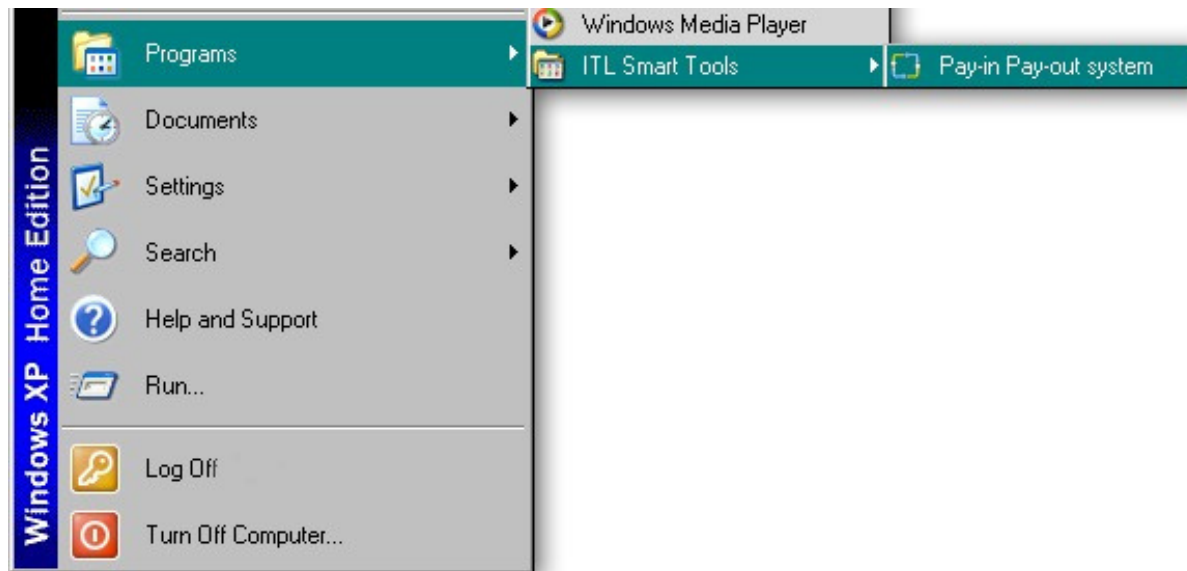
Once the installation is complete, you will have a new program group called 'ITL Smart Tools' in the Windows Start Menu, similar to the one shown here:



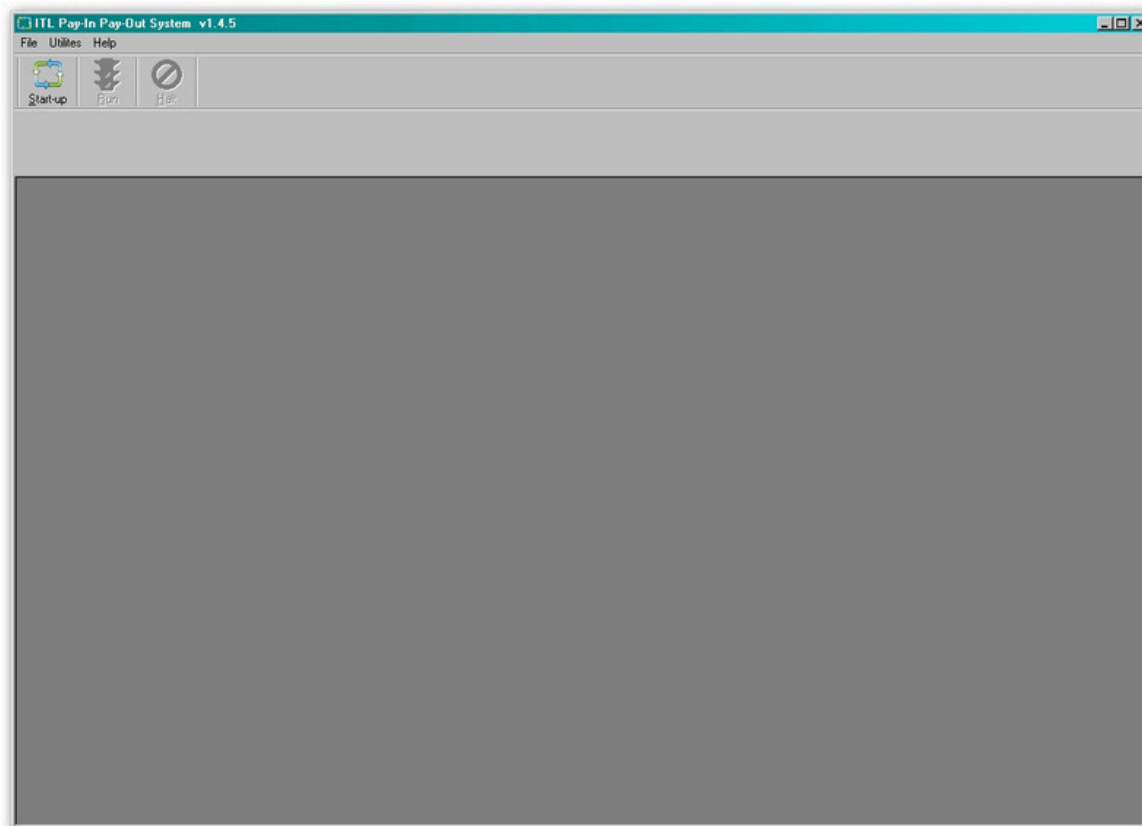
You can run the PiPS software by clicking the 'Pay-in Pay-Out system' menu entry; however, before you can use the PiPS software with an NV11 you will need to make sure that you have installed the BV interface drivers (as described earlier).

3.1.5 Starting the PiPS Software

The PiPS software is launched by clicking the 'Pay-in Pay-out system' entry in the 'ITL Smart Tools' menu group.



The initial program screen looks like this:

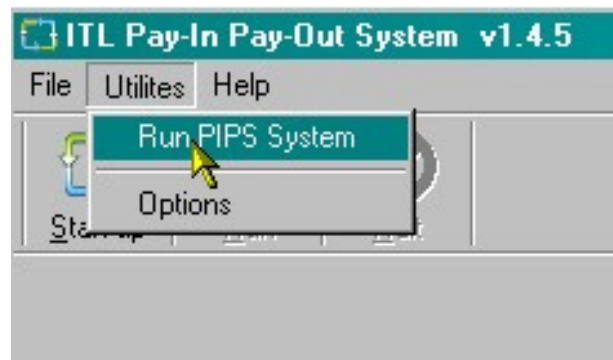


Make sure that the NV11 is powered up and the USB cable is connected before going any further.

Once the NV11 is connected, there are two ways to start the program operation:



Click the 'Start-up' icon

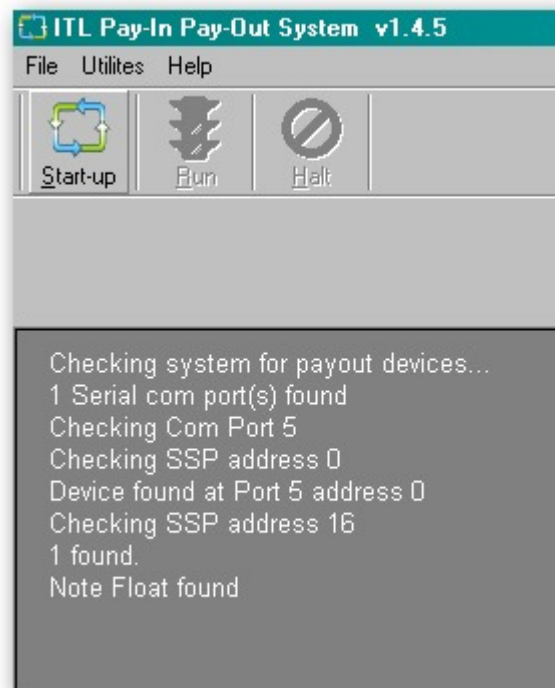


Click 'Utilities', then 'Run PIPS System'

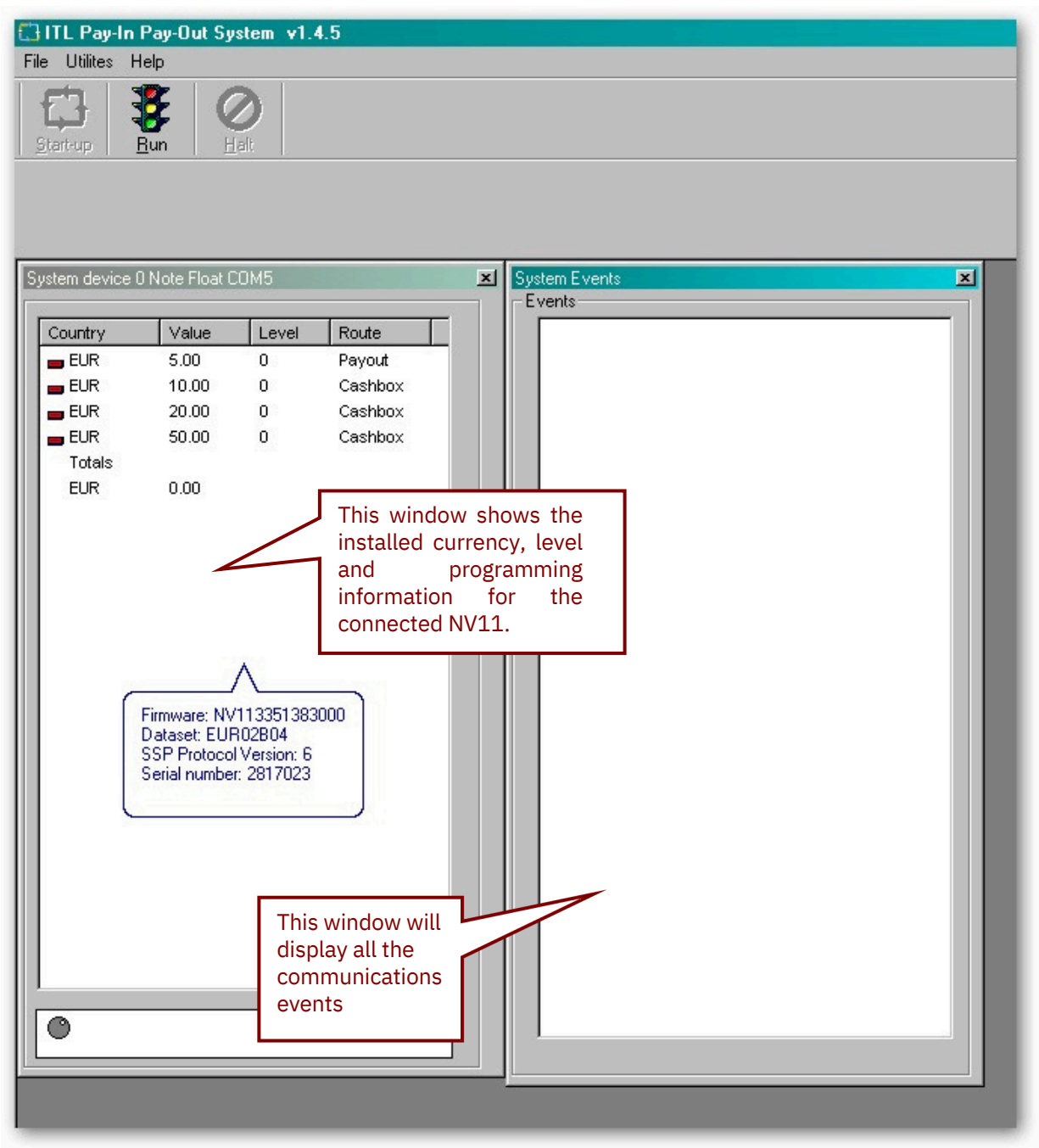
The PiPS software will then start to connect to the NV11. Depending on the number and types of communications ports on your computer, you may get an error message similar to the one shown on the right saying 'Unable to open this port' – this isn't a problem, just click the 'OK' button.



You will see some text in the PiPS program window as the software checks the communications ports for the NV11 (similar to what is shown here) – this text may vary depending on your particular computer configuration.



Once the NV11 unit has been found, two windows will appear on the screen:

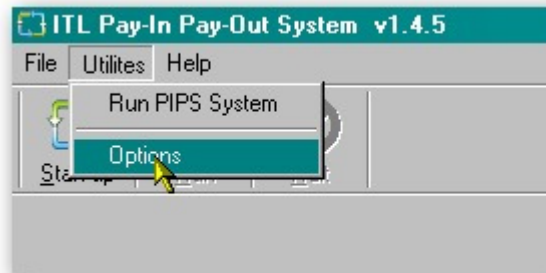


More details of the program options and operations that can be carried out will be covered in the next subsection.

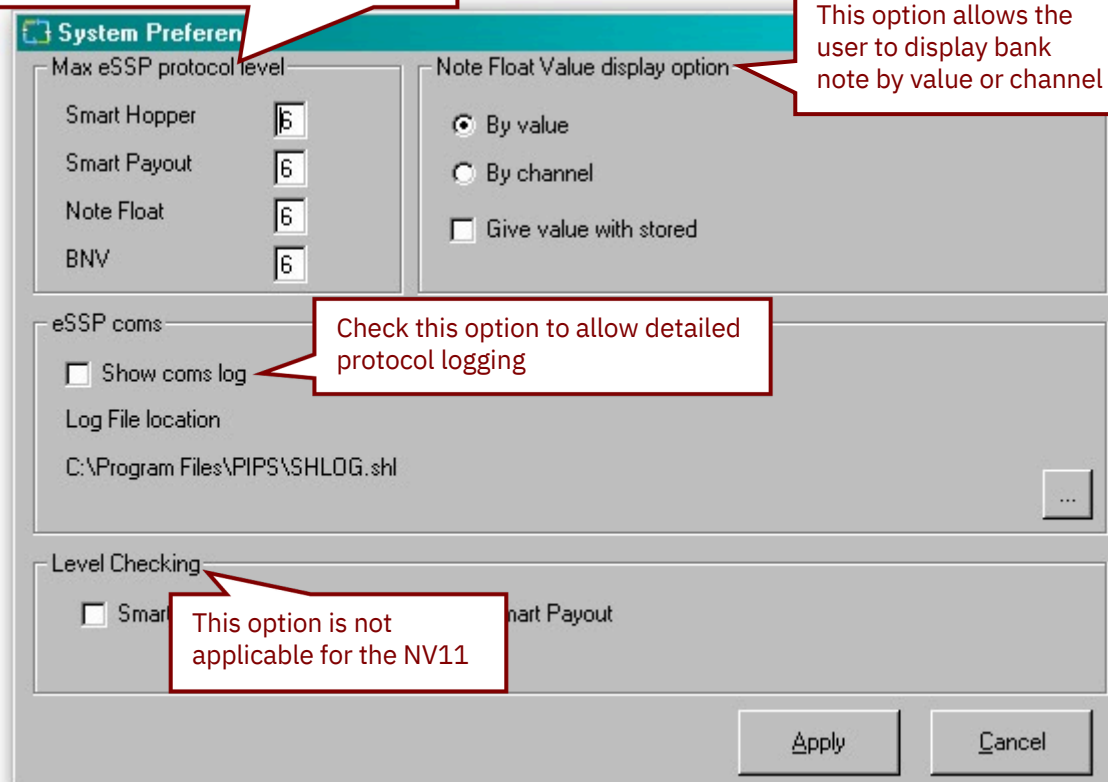


3.1.6 Preferences, Settings and Options

The preferences for the PiPS software are accessible from the Utilities menu (as shown). Click the 'Options' entry to open a new dialog box:



This option sets the protocol version used for communications – contact ITL Technical Support for the current configuration details.



Normally, these preferences should not need changing.

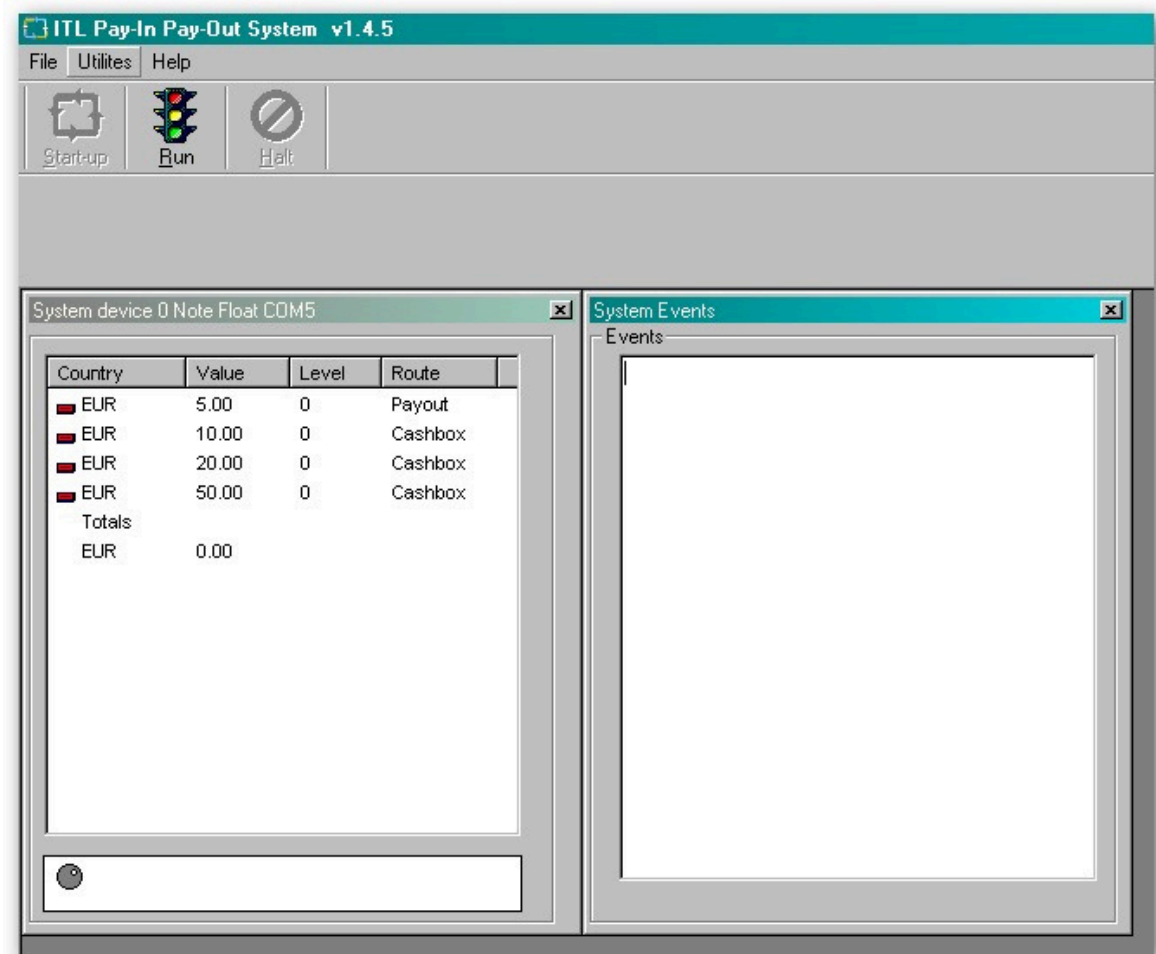
The settings and options for the NV11 vary depending whether the system is in the 'Run' or the 'Halt' state – generally the system will need to be halted before any changes to setup options can be made. Pay in/pay out operations are only available when in 'Run' state.

Halt State

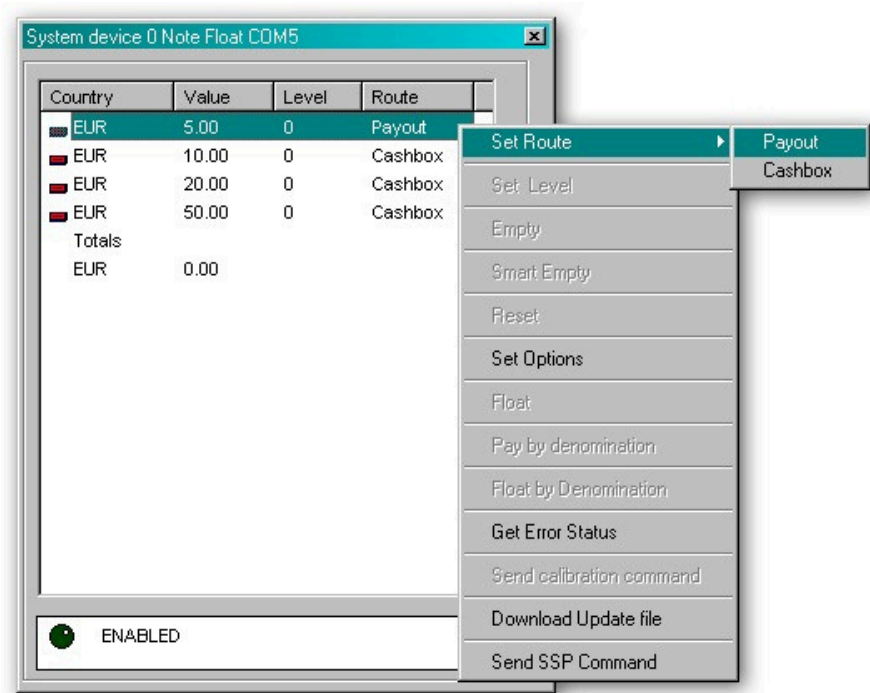
If the system is in 'Halt' state, the user will either have just started the PiPS software, or clicked on the 'Halt' button. The menu bar will look like this:



The main screen should look something like this:



The various settings and options can be accessed from a right click when the mouse cursor is over any of the system device entries:



Halt State Options

Set Route	To set the pay in route for inserted bank notes to either Cashbox or Note Float module, select the desired denomination(s) and click the required route. The system will send the commands to the device and store these preferences so that they will be set again on the next start-up.
Set Options	Using this dialog, the user can setup the device SSP address and eSSP keys by double clicking on the required option.
Get Error Status	This option displays any device error messages in the ‘System Events’ window.
Download Update File	This option allows the user to download an ITL update file to the connected device.
Send SSP Command	This option brings up the SSP communications dialog which allows the user to send individual commands to the connected device.

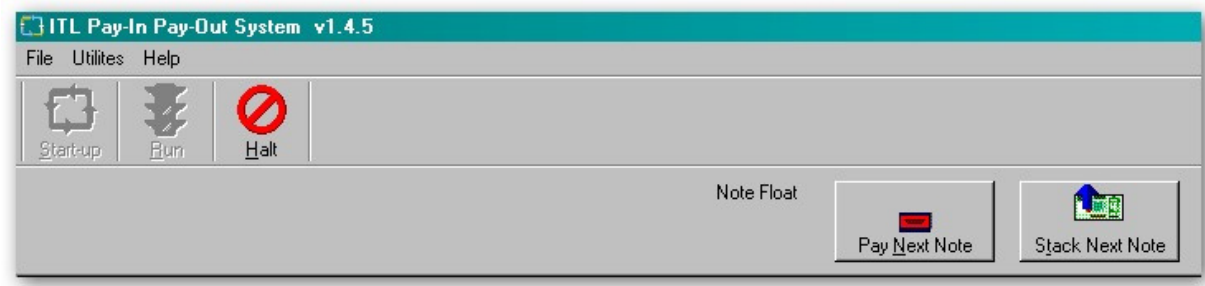
**CAUTION!**

Take care when changing eSSP key

Exercise care when changing the device eSSP key. The user must make a note of the new key and change the host key to match. If the key is not known then device must be returned to ITL for key reset.

Run State

If the system is in ‘Run’ state, the user will have clicked on the ‘Run’ button and the menu bar will look like this:



Run State Options

Set Route	To set the pay in route for inserted bank notes to either Cashbox or Note Float module, select the desired domination(s) and click the required route. The system will send the commands to the device and store these preferences so that they will be set again on the next start-up.
Empty	This command will empty all the stored notes in the connected Note Float module into the device cashbox. After emptying the notes, counters on the device will be reset to zero.
Reset	This command will reset the connected payout device. After reset, the system will re-initialise the device for use.

3.2 Updating Firmware and Datasets

**CAUTION!**

Do not power off

Powering off the NV11 when updating the firmware or dataset can cause the validator to stop working.

The NV11 validator firmware and dataset can be updated very easily using the PiPS software. The process uses NV9USB dataset files which can be downloaded from the Innovative Technology Ltd website:

Select Validator: NV9USB Select Currency: EUR - (Euro)

Search

Display # 20

<< Start < Prev 1 2 Next > End >>

Page 1 of 2

Name	Code	Issue	Validator		
Euro (20-50)	EUR71B02	2	NV9USB		
Euro (5-10-20) MDB Multip	EUR52B02	2	NV9USB		
Euro (5-10-20-50)	EUR02B04	4	NV9USB		
Euro (5-10-20-50)	EUR56B03	3	NV9USB		
Euro (5-10-20-50)	EUR58B03	3	NV9USB		
Euro (5-10-20-50-100-200-	EUR45B15	15	NV9USB		
Euro (5-10-20-50-B-100)	EUR69B03	3	NV9USB		
Euro (B-B-5-10-20-50)	EUR60B03	3	NV9USB		
Euro(10-20-50)	EUR67B03	3	NV9USB		
Euro(5(i)-10(i)-20-50)	EUR74B02	2	NV9USB		
Euro(5(i)-10-20-50)	EUR72B02	2	NV9USB		
Euro(5-10)	EUR04B04	4	NV9USB		
Euro(5-10-20)	EUR70B02	2	NV9USB		
Euro(5-10-20)	EUR10B04	4	NV9USB		
Euro(5-10-20-50)	EUR73B02	2	NV9USB		
Euro(5-10-20-50)	EUR59B03	3	NV9USB		
Euro(5-10-20-50-100)	EUR63B03	3	NV9USB		
Euro(5-10-20-50-100)	EUR61B03	3	NV9USB		
Euro(5-10-20-50-100)	EUR03B03	3	NV9USB		
Euro(5-10-20-50-100-200)	EUR54B03	3	NV9USB		

**Information**

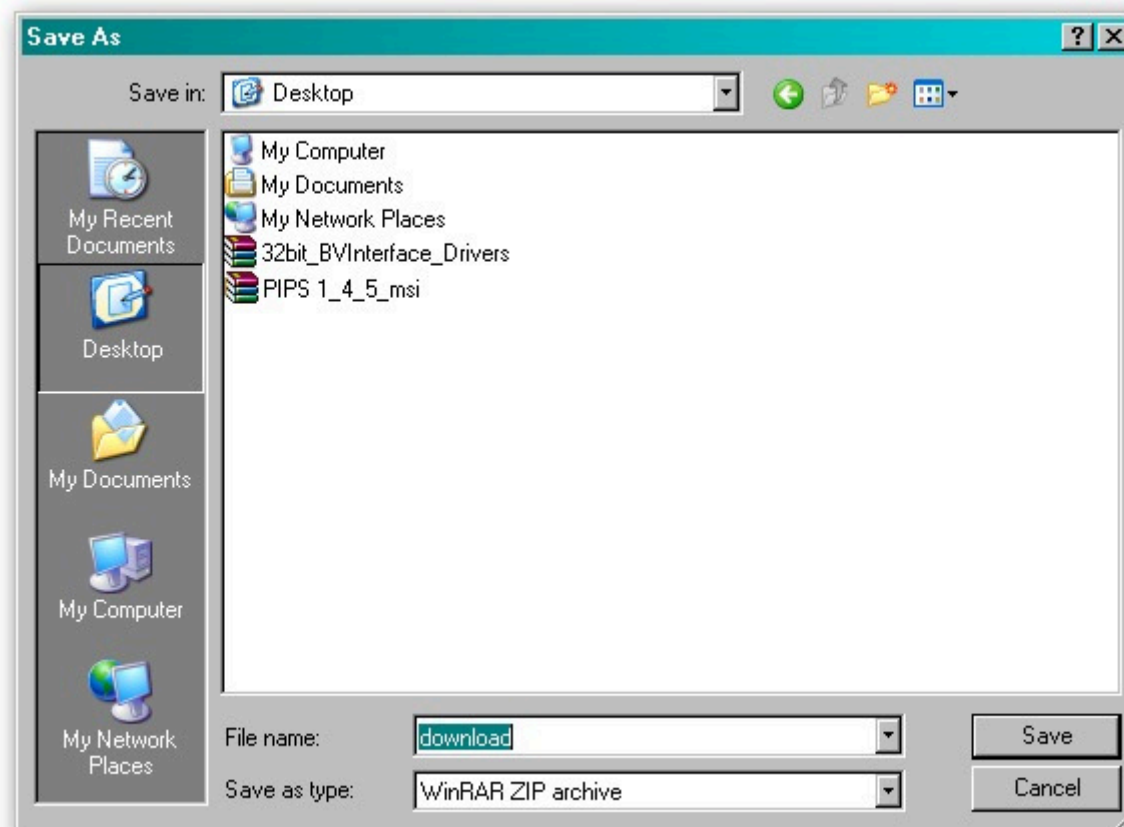
Combined data files

The firmware and dataset files for the NV11 validator are combined into a single file, so both will be updated when you carry out the update.

After selecting the dataset, a dialog will prompt you to save or open the file: select the **Save** option

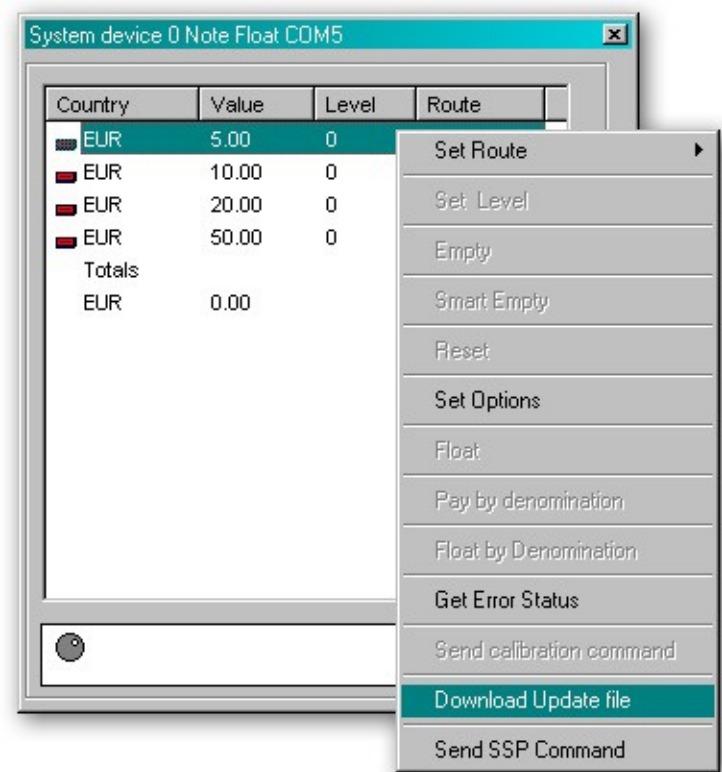


You can then choose where to save the file – choose a location that is convenient for you:

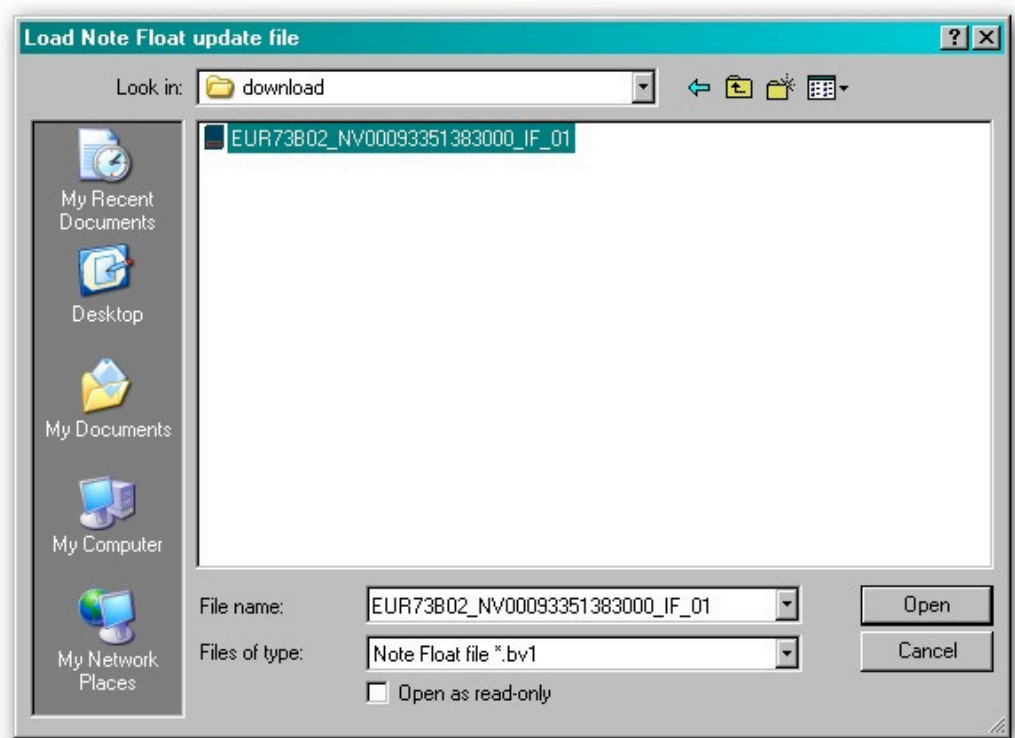


Once the dataset file is saved, unzip the file and you can then start the process to update the NV11 validator by connecting the USB cable and starting the PiPS software as described previously.

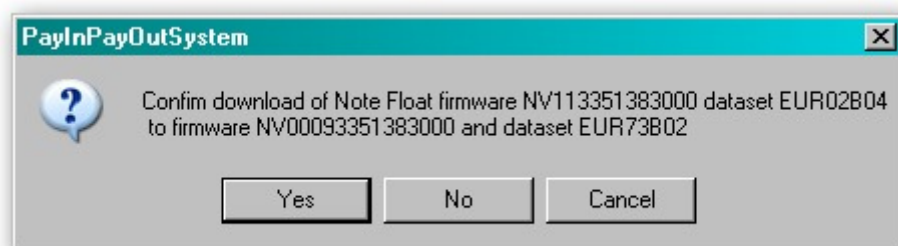
With the PiPS software in 'Halt' mode, right click on one of the currency entries and select 'Download Update File' from the dialog as shown here:



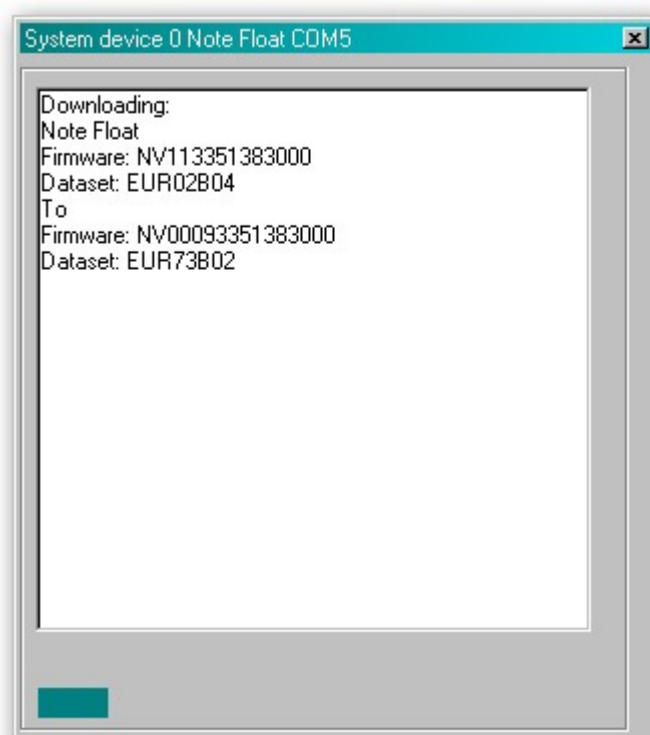
You will then be prompted to select the dataset file you downloaded and unzipped earlier – select the file and click the 'Open' button:



The PiPS software will then ask you to confirm that this is file you want to use to update the NV11 unit with – click the ‘Yes’ button to continue:



A new dialog will then appear showing the update status:



After the reset is complete, the NV11 validator will then be ready for use with the new currency.

3.3 Tools

3.3.1 Diagnostics

There is a dedicated software diagnostics tool for use with the NV11 validator called ‘Bank Note Validator Diagnostics Tools’, and this software can be downloaded from the Innovative Technology Ltd website:

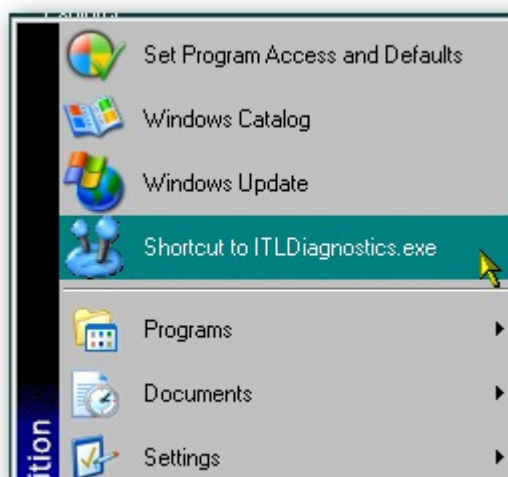
Title	Version	File
Bank Note Validator Currency Manager	3.3.13	 
VPS (Validator Programming System)	1.0.16	 
SMART PIPS (Pay In Pay Out System)	1.4.5	 
Bank Note Validator Diagnostics Tools	1.0.4	 
DA2 Drivers - 32 bit		 
DA2 Drivers - 64 bit	1	 
BV Interface Driver Install - 32 bit	2	 
BV Interface Driver Install - 64bit	1	 
NV4 Currency Manager	2.5.3	 

When the file download dialog box appears, click the ‘Save’ button and select a suitable location to save the file in:

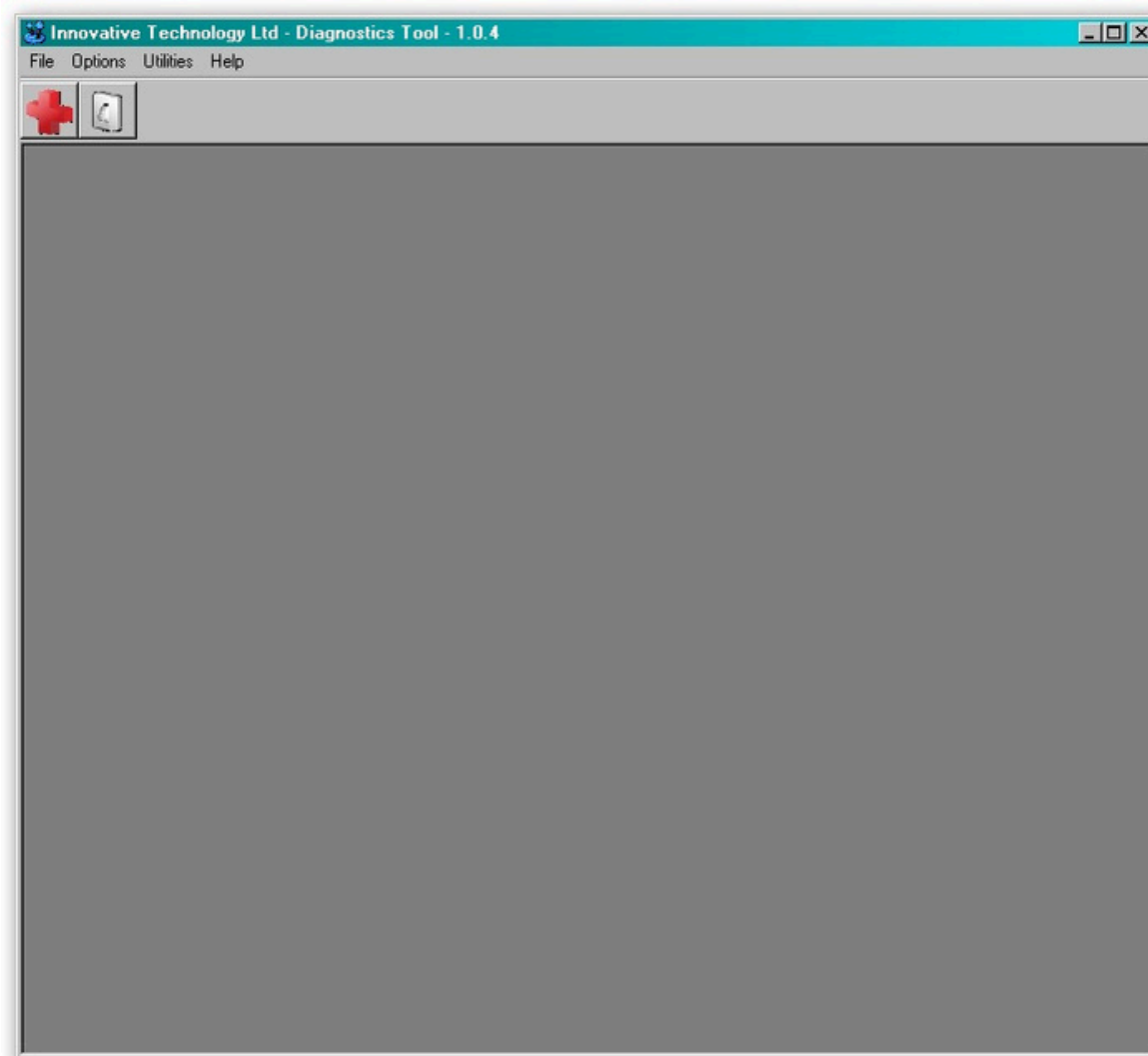


Installing the Diagnostics tools software is done in the same way as the PiPS software - Find the ITLdiagnosticsTools zipped file you just downloaded, extract the installation file from the zipped file and double click the extracted file (it has an .msi extension) – this will start the installation process.

After installing the software, you can run the diagnostics software by selecting the 'Shortcut to ITL Diagnostics.exe' item near the top of the Windows Start menu. Make sure that the NV11 Validator is powered up and the USB cable is connected before starting the program.



The main screen of the diagnostics tools software looks like this:

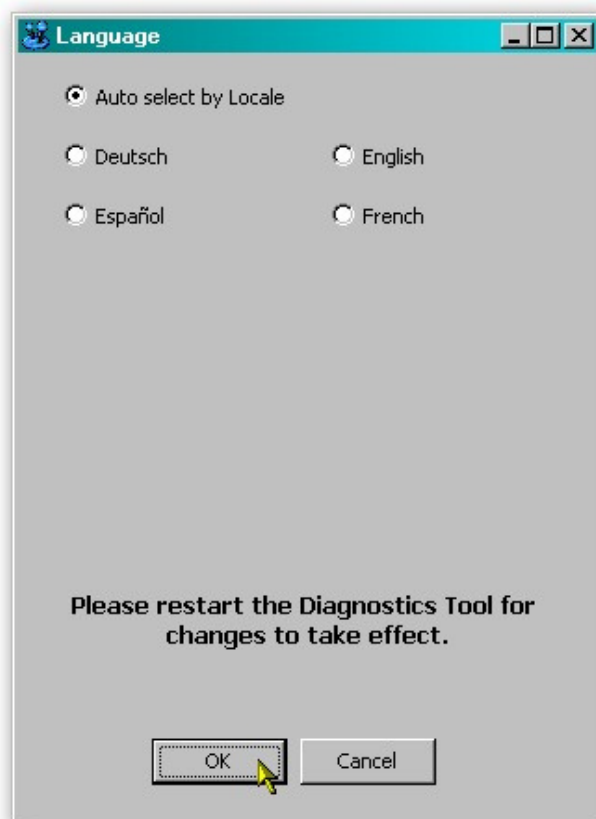


When running the software for the first time, you need to set a few options. These are accessed from the 'Options' menu:



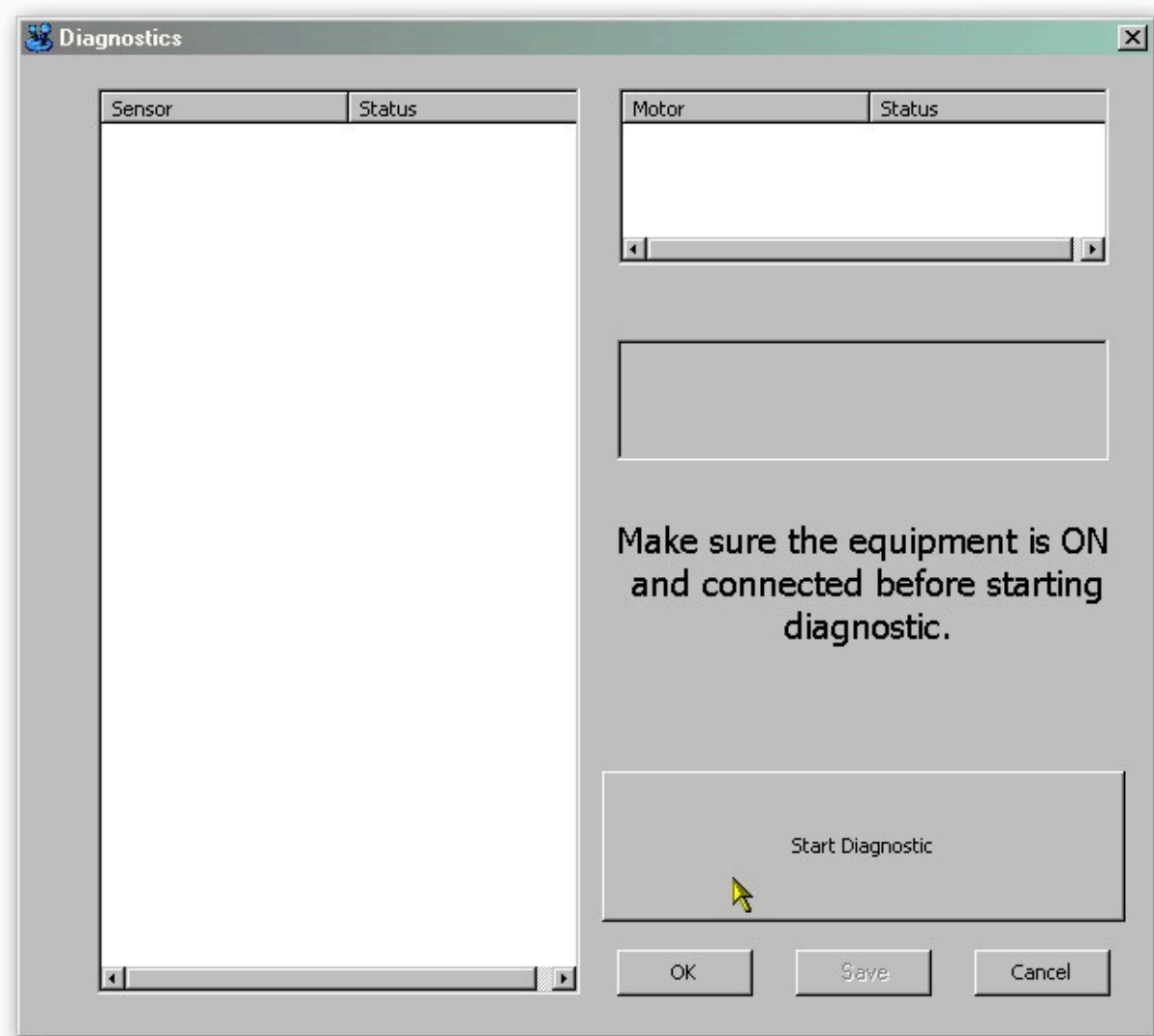
By selecting the 'Serial Port' item from the 'Options' menu you can define which serial port is being used to connect to the NV11 validator. After selecting this option, a new dialog box will open allowing you to choose the correct serial port.

Select the required port from the dropdown list, and then click the 'OK' button to confirm your selection. This will close the dialog box and allow you to select another option from the menu. You shouldn't normally need to change the language setting, as this is determined by the Windows locale settings. You can if you wish select one of four specific languages if needed, as shown below:





Select the 'Diagnostics' item from the 'Utilities' menu to start the diagnostics process (you can also start the diagnostics by clicking on the left hand icon below the menu bar) - this will open the Diagnostics screen:



Click the 'Start Diagnostic' button to start the diagnostic process. The software will then prompt you to insert a special piece of green diagnostics paper (ITL part number LB149). Insert the paper in the same way you would with a bank note – at the end of the diagnostics test the paper will be ejected.



Diagnostics Pass:

A summary of the validator type and related information is displayed here.

Motor test results are shown in this window.

The overall test result is displayed here.

Sensor test results are shown in this window.

Diagnostics

Sensor	Status
X2 UV Reflected 200	OK
X4 UV Reflected 200	OK
X1 IR Reflected 200	OK
X3 IR Reflected 200	OK
X2 IR Reflected 200	OK
X4 IR Reflected 200	OK
X1 Red Reflected 200	OK
X3 Red Reflected 200	OK
X2 UV Through 200	OK
X4 UV Through 200	OK
X2 IR Through 200	OK
X4 IR Through 200	OK
X1 Red Through 200	OK
X3 Red Through 200	OK
Card Read NV 1	OK
Card Read NV 2	OK
Front	OK
Start	OK
Rear Flag	OK
Roller one	OK
Stacker Home	OK
Stacker Opto	OK
Drive Opto	OK
Motor Stacker Full	OK
PSU Monitor	OK
Rear_Note_Detect	OK
NF_Sleeper	OK
NF_Note_Detect	OK
NF_Motor_Current	OK
Lens Position 1	OK
Lens Position 2	OK

Motor	Status
Motor Fwd	OK
Motor Rev	OK
Stacker	OK

Type NV9
Serial Nb. 2817023
Firmware Ver. NV903331339000

PASSED

Start Diagnostic

OK

Save

Cancel

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Diagnostics Fail:

A summary of the validator type and related information is displayed here.

Motor test results are shown in this window – in this example all the motors have passed testing.

The overall test result is displayed here.

Sensor test results are shown in this window – in this example, several sensors have failed during the diagnostics test.

Diagnostics

Sensor	Status
X2 UV Reflected 200	OK
X4 UV Reflected 200	OK
X1 IR Reflected 200	OK
X3 IR Reflected 200	OK
X2 IR Reflected 200	OK
X4 IR Reflected 200	OK
X1 Red Reflected 200	OK
X3 Red Reflected 200	OK
X2 UV Through 200	OK
X4 UV Through 200	OK
X2 IR Through 200	OK
X4 IR Through 200	OK
X1 Red Through 200	OK
X3 Red Through 200	OK
Card Read NV 1	OK
Card Read NV 2	OK
Front	OK
Start	FAIL
Rear Flag	FAIL
Roller one	OK
Stacker Home	OK
Stacker Opto	OK
Drive Opto	OK
Motor Stacker Full	OK
PSU Monitor	OK
Rear_Note_Detect	FAIL
NF_Sleeper	FAIL
NF_Note_Detect	FAIL
NF_Motor_Current	FAIL
Lens Position 1	FAIL
Lens Position 2	FAIL

Motor	Status
Motor Fwd	OK
Motor Rev	OK
Stacker	OK

Type NV9
Serial Nb. 2817023
Firmware Ver. NV903331339000

FAILED

Start Diagnostic

OK

Save

Cancel

Further details on how to use the diagnostics tools and interpret the results can be found in the program help file.

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3.3.2Connections

The NV11 validator has a single connector that is used to allow interfacing and programming.



Information

Power always required regardless of connection type.

Power is always required on pins 15 and 16 of the 16 way connector.

The connector is a 16 pin socket used to interface the NV11 to the host machine. The pin numbering of the socket is shown below, as well as an overview of the socket connections:



Pin	Description
1	Serial Data Out (Tx)
5	Serial Data In (Rx)
11	USB Data +
12	USB Data -
13	USB Power (+5V)
15	+ V
16	0V / Ground Connection

To use a USB connection with the NV11, a USB cable fitted with a 16 way connector on one end (ITL Part Number CN00392) should be used. The CN00392 cable fits into the 16 way connector and allows high speed programming and serial communications when used in SSP and ccTalk modes. When using the USB connection, power must be supplied to the NV11 using the red and black power leads on the CN00392 cable.

The socket connections for the natively supported protocols are shown in the tables below, as is a summary of the interface units needed for other types of operation:



WARNING!

Risk of unit damage

Do not make any connections to the interface socket pins marked **‘Do not connect’** – making connections to these pins could cause severe damage to the unit.

NV11SSP Interface:

Name Pin		Type	Description
1	TxD	Output	Serial data out (Tx)
2	Factory use only		Do not connect
3			
4			
5		Input	Serial data in (Rx)
6	Factory use only		Do not connect
7			
8			
9			
10			
11	USB D+	Data	USB Data +
12	USB D-	Data	USB Data -
13	USB Vcc	Power	USB +V (+5V)
14	Factory use only	Power	Do not connect
15	V In	Ground	+V
16	GND		GND

NV11 ccTalk Interface:

Pin	Name	Type	Description
1	TxD	Output	ccTalk data – must also be connected to pin 5
2	Factory use only		Do not connect
3			
4			
5	RxD	Input	ccTalk data – must also be connected to pin 1
6	Factory use only		Do not connect
7			
8			
9			
10			
11	USB D+	Data	USB Data +
12	USB D-	Data	USB Data -
13	USB Vcc	Power	USB +V (+5V)
14	Factory use only	Power	Do not connect
15	V In	Ground	+V
16	GND		GND

3.4 Frequently Asked Questions

a. Why are there no DIP switches on the unit?

- The NV11 has no dipswitches. Configuring the unit is carried out using a configuration button mounted on the front of the Note Float module – see Section 1, subsection 1.5 of this manual set for more information.

b. Are 64 bit drivers available?

- Both 32 and 64 bit drivers can be downloaded from the ‘Support’ section of the ITL website – please make sure that you are using the correct type of driver for your Operating System.

c. Some or all notes are not accepted

- Check that no inhibits are set in the PiPS software. If the problem persists, contact ITL Support for further assistance.

SECTION 4

NV11 MANUAL SET MECHANICAL AND ELECTRICAL MANUAL

INTELLIGENCE IN VALIDATION

NV11 MANUAL SET – SECTION 4

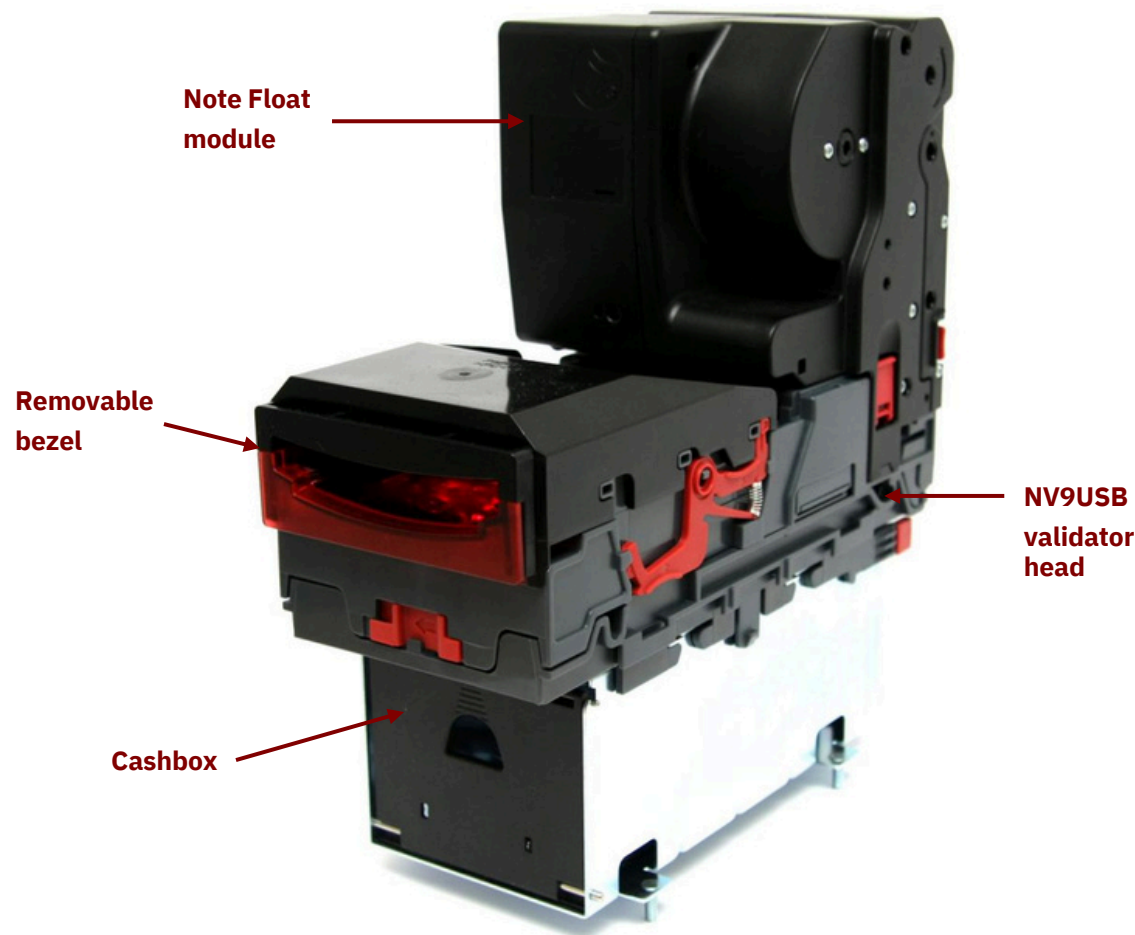
4. 4.1	MECHANICAL AND ELECTRICAL MANUAL	3
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4.5	Technical Specifications	9
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4. MECHANICAL AND ELECTRICAL MANUAL

This section is one part of a complete manual set: Design Engineers who are designing a host machine cabinet, or looking to integrate the NV11 validator into an existing cabinet would need to read this section. This section contains the all the mechanical and electrical information a designer needs to effectively integrate the NV11 validator into a host machine.

4.1 Introduction

The NV11 validator is made up of four basic components: an NV9USB validator head, Note Float module, removable bezel and a cashbox (as shown below):



The NV11 is a device that can accept, validate and store 300 or 600 bank notes of mixed denominations, and also has the capability of storing a further 30 notes in the Note Float module for future payout.

Up to 16 different denominations of bank note can be accepted and stacked, and the Note Float module can be programmed to store and dispense 30 single denomination notes.

The NV11 is a LIFO (Last In First Out) system. This means that only the last note in the Note Float module is available to be paid out or moved to the stacker. Any value note can be routed into the Note Float module using the 'Set Routing' command. It is recommended that only one denomination of the chosen currency is stored in the Note Float module.



NV11
Rear View



NV11
Side View



NV11
Front View



Information

Validator compatibility.

The NV11 validator is pin for pin compatible with the NV7 / NV8 / NV9 / NV10 series of validators, but **NOT** with earlier versions of the product (NV2 – NV5).

The NV11 validator leaves the factory preset to at least one currency and dataset so that it is ready for immediate installation. The NV11 validator works with any NV9USB currency dataset created by Innovative Technology Ltd - datasets can be downloaded from the Support section of the ITL website.

4.2 Assembly and Fitting Instructions

Installing the NV11 is a simple operation, but note that the validator can only be installed **horizontally**:



Information

Validator compatibility.

The NV11 validator is pin for pin compatible with the NV7 / NV8 / NV9 / NV10 series of validators, but **NOT** with earlier versions of the product (NV2 – NV5).

1. If the validator head has a blanking plate fitted, you will need to remove this **BEFORE** attempting to fit the Note Float module. If the Note Float module is already fitted, please go to step 6
2. Open the validator head by sliding the red release catch on the front of the validator to the left (as indicated in the picture)

Blanking plate



Validator head



Release catch

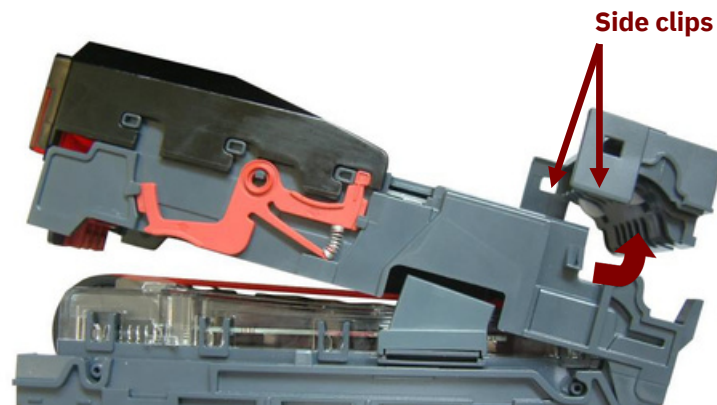


Validator head **MUST** be opened.

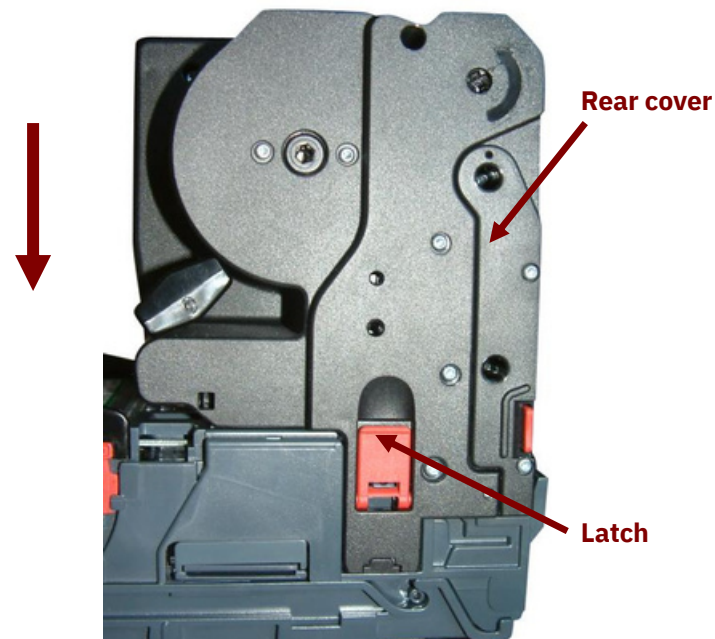
Always make sure the validator head has been opened **BEFORE** trying to remove the blanking plate – trying to remove the blanking plate with the validator head closed will cause unit damage.



3. Remove the blanking plate by disengaging the two side clips and lifting the blanking plate upwards



4. Close the validator head and then carefully fit the Note Float module onto the validator head, making sure the rear cover is securely closed and the latches are lined up correctly



5. Make sure both latches are engaged and closed



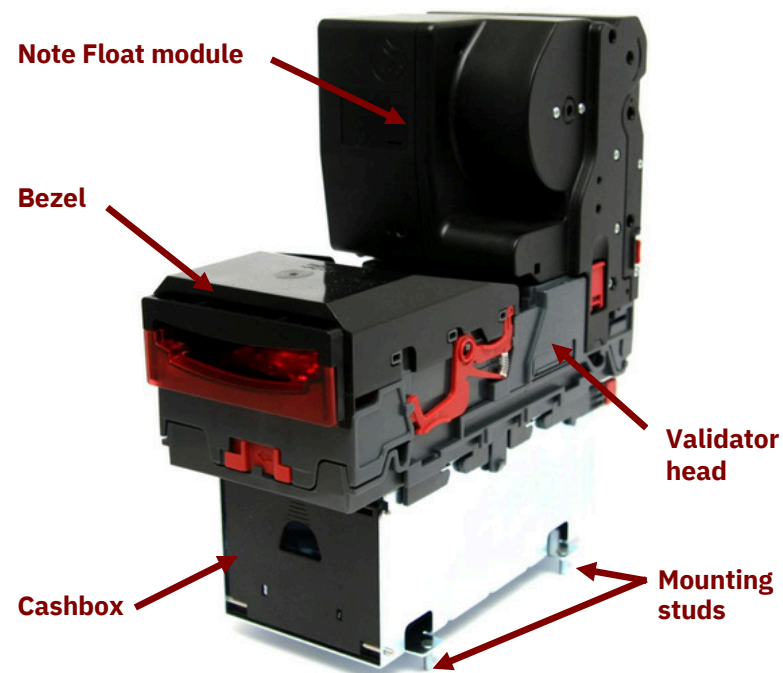
6. The validator can be fitted with a standard or slide-on cashbox of 300 or 600 note capacity



7. If not already attached, the validator can be fitted with a horizontal bezel of your choice.



8. The cashbox is attached to the validator by locating and sliding until the cashbox is clipped securely and secured in the host machine using the studs on the bottom of the cashbox



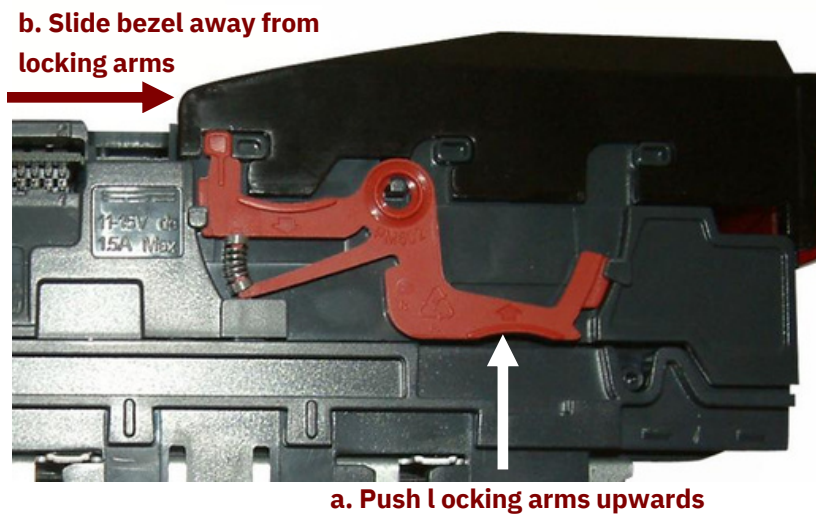
**Information**

Check website for options.

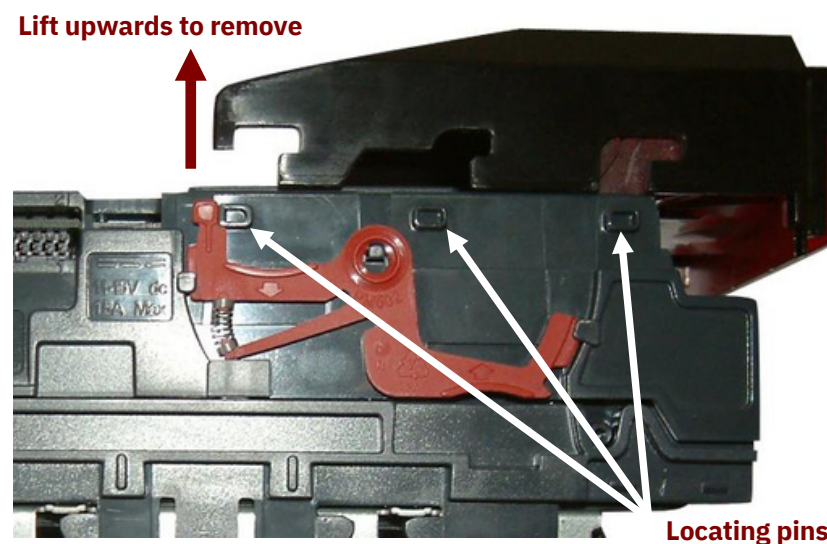
There are many variants of bezel and cashbox type available for the NV11 validator. Please check the ITL website (www.innovative-technology.co.uk) for up to date information on the options available.

4.3 Bezel Removal and Refitting

- The bezel is removed by pushing the red locking arms on both sides of the validator upwards, and sliding the bezel away from the locking arms



- Lift the bezel off once the bezel has been slid fully across and is clear of the locating pins



The bezel is refitted by pushing the bezel back onto the locating pins and sliding backwards until all six pins are engaged in the slots. The locking arms will then spring back and locate into the bezel.



**Caution!**

Check locking arms.

Always make sure that **BOTH** locking arms are fully located in the bezel – trying to operate the validator if they are not correctly located can cause unit damage.

The technical drawings which can be found at the end of this section show all the dimensional information needed to mount the unit.

4.4 Technical Specifications

The full technical specifications for the NV11 validator can be found in Section 6, Appendix B of this manual set. A brief summary is given here:

DC Voltage	Minimum	Nominal	Maximum
Absolute limits	10.8 V	12 V	13.2 V
Supply ripple voltage	0 V	0V	0.25 V @ 100 Hz
Supply Current			
Standby			350 mA
Running			3 A
Peak (motor stall)			3.5 A

Interface Logic Levels	Logic Low	Logic High
Inputs	0 V to +0.5 V	+3.7 V to +12 V
Outputs (2.2 kΩ pull-up)	+0.6 V	Pull-up voltage of host interface
Maximum current sink	50 mA per output	

**WARNING!**

Use suitable power supply

Ensure that the supply voltage to the NV11 is not lower than 10.8 V and that the power supply can provide sufficient current to avoid incorrect operation and excessive note rejects.

We recommend that your power supply is capable of supplying 12V DC at 4 A.

- For 12V operation, use TDK Lambda model SWS50-12. This power supply is available from a variety of suppliers including Farnell (stock code 1184645) and RS (stock code 466-5869).

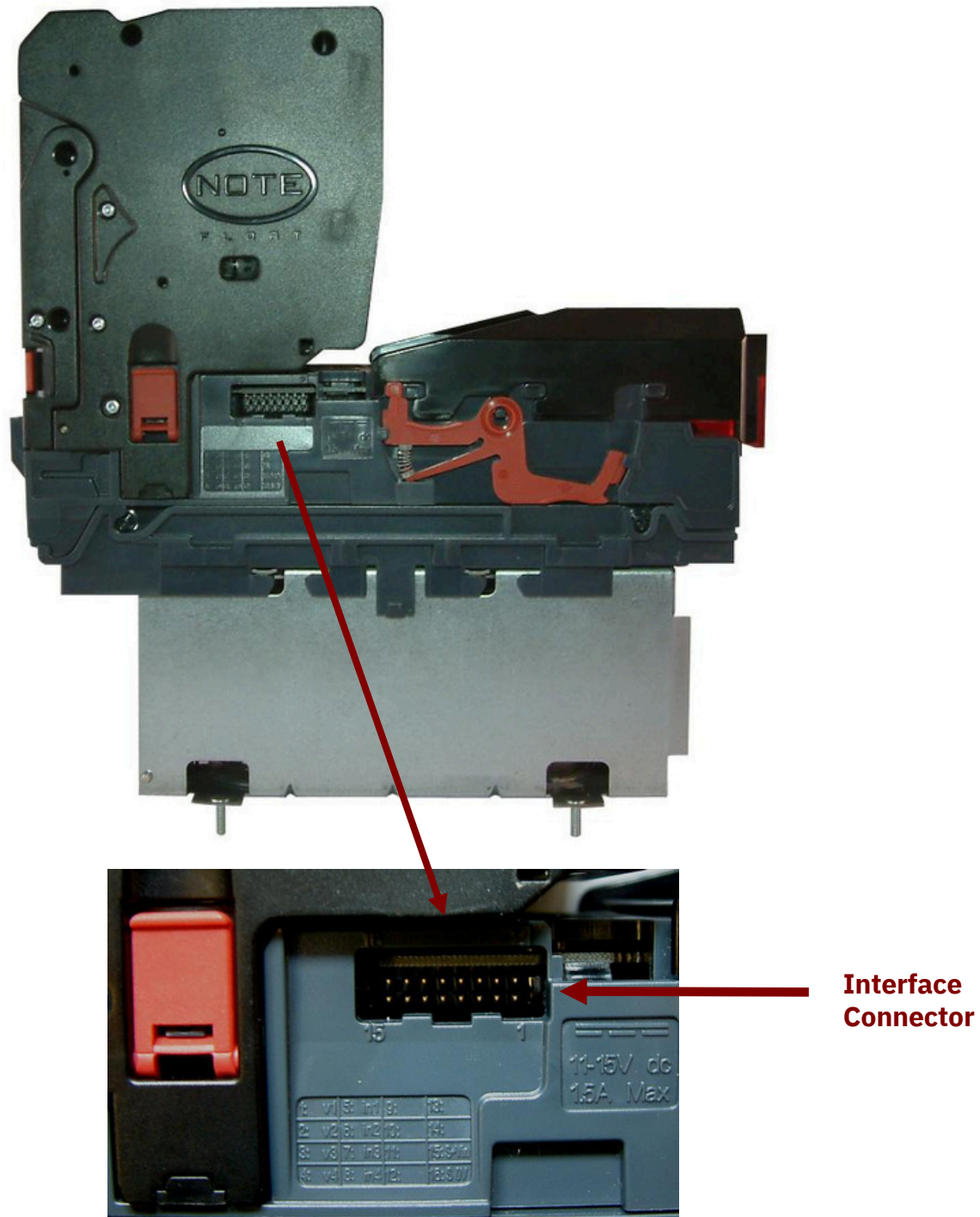
4.5 Cable Specifications

The **minimum** specification for wire used in power cables for the NV11 validator is given here:

	Nominal current rating	Minimum Peak current rating AWG	Cable rating	Insulation rating
	3.0 A	26 3.5 A	4 A	80 °C

Do not use wire of an inferior specification, as this can cause operating problems with the validator.

4.6 Electrical Interfaces



The connector needed to set up and interface the NV11 validator is easily accessible on the side of the unit:



Information

Power always required regardless of connection type.

Power is always required on pins 15 and 16 of the 16 way connector.

The connector is a 16 pin socket used to interface the NV11 to the host machine. The pin numbering of the socket is shown below, as well as an overview of the socket connections:



Pin	Description
1	Serial Data Out (Tx)
5	Serial Data In (Rx)
11	USB Data +
12	USB Data -
13	USB Power (+5V)
15	+ V
16	0V / Ground Connection

To use a USB connection with the NV11, a USB cable fitted with a 16 way connector on one end (ITL Part Number CN00392) should be used. The CN00392 cable fits into the 16 way connector and allows high speed programming and serial communications when used in SSP and ccTalk modes.

When using the USB connection, power must be supplied to the NV11 using the CN00392 cable. The socket connections for the natively supported protocols are shown in the tables below:



WARNING!

Risk of unit damage

Do not make any connections to the interface socket pins marked '**Do not connect**' – making connections to these pins could cause severe damage to the unit.

NV11 SSP Interface:

Name Pin		Type	Description
1	TxD	Output	Serial data out (Tx)
2	Factory use only		Do not connect
3			
4			
5		Input	Serial data in (Rx)
6	Factory use only		Do not connect
7			
8			
9			
10			
11	USB D+	Data	USB Data +
12	USB D-	Data	USB Data -
13	USB Vcc	Power	USB +V (+5V)
14	Factory use only	Power	Do not connect
15	V In	Ground	+V
16	GND		GND

NV11 ccTalk Interface:

Pin	Name	Type	Description
1	TxD	Output	ccTalk data – must also be connected to pin 5
2	Factory use only		Do not connect
3			
4			
5	RxD	Input	ccTalk data – must also be connected to pin 1
6	Factory use only		Do not connect
7			
8			
9			
10			
11	USB D+	Data	USB Data +
12	USB D-	Data	USB Data -
13	USB Vcc	Power	USB +V (+5V)
14	Factory use only	Power	Do not connect
15	V In	Ground	+V
16	GND		GND

4.7 Configuration Button

The NV11 does not use DIP switches to configure the unit – configuration and setting is carried out by using a Configuration Button mounted on the front of the Note Float module:



There are several functions available when using the Configuration Button, and these are listed in this table:

Action	Power Status	Function
Press and hold (more than 2 seconds) until the bezel illuminates, then release	Powered ON	Sets validator to Programming mode (SSP)
Press twice (within half a second)	Powered ON	Shows current interface type (see flash count table below)
Press once when Note Float module status LED is flashing (transport error)	Powered ON	Acknowledges that a note blockage has been cleared

Flash Count	Interface
1	SSP
6	ccTalk
6, 1	ccTalk plain (16 bit)
6, 1, 2	ccTalk (8 bit)

The NV11 validator leaves the factory preset to at least one currency and one firmware interface so that it is ready for immediate installation.

**WARNING!**

Risk of unit damage

When in programming mode, do not turn off the power before the operation is complete as this will make the unit unusable.

4.8 Programming

Full details on programming the NV11 validator using software can be found in Section 3 of this manual set (ITL Software Support Guide).
It is not possible to program the NV11 by the use of a configuration card as this method of programming is not yet implemented.

4.9 Basic Operation

The NV11 validator is a device that can accept, validate and store 300 or 600 bank notes of mixed denominations, and works with any NV9USB currency dataset created by Innovative Technology Ltd.

Validated bank notes are stored in the NV11’s cashbox, and bank notes accepted by the validator are not visible once inside the unit and can only be taken out of the cashbox manually.

The NV11 validator has inbuilt fault detection facilities. If there is a configuration or other error either the Note Float module status LED, or the NV9USB validator head front bezel will flash in a particular sequence; a summary of the Flash Codes for both units is shown below:

NV9USB Bezel Flash Codes:

Flashes		Indicated Error	Comments
Long	Short		
0	0	None	
1	2	Note path obstructed	Remove obstruction and follow the cleaning procedure in Section 2 of this manual set
	3	Unit not initialised	Contact ITL technical support
2	2	Cash box problem	Check that the cash box note plate is free to move and the stacker mechanism is in the home position
3	1	Firmware checksum error	Download new firmware
	2	Interface checksum error or unable to set programmed interface	
	3	EEPROM checksum error	
	4	Dataset checksum error	
	5	Incompatible firmware	Check the validator firmware is compatible with the Note Float module
4	1	Power supply too low	Check power supply
	2	Power supply too high	

Note Float Module Flash Codes:

Flashes	Indicated Error	Comments
0	None	
Constant flash (1 every second)	Note transport error	Remove trapped note from the Note Float module and press the configuration button once
2	Software error	Download new dataset / firmware
3	Calibration error	Return to service centre for repair
4	Diverter error	Check for trapped notes stopping the diverter returning to the home position
5	Motor timeout	Check for trapped notes stopping the Note Float module tape from moving

4.10 Spare Parts

ITL Part Number	Description	Details
CN00215	Ribbon interface cable	Provides connection between DA2 and NV11
Comments: Please consult the tables on the next page for pin out and connector information.		

CN00215 Parts List

Qty	Description	Supplier	Leotronics	Alternative	Molex
2	8 way 2 row 2.54mm pitch friction lock housing	2652-2161		90142-0016	
8	Tin plated crimp socket 22-24 AWG	Leotronics 2653-2000		Molex 90119-0110	
2	Black heat shrink sleeving	---		---	
1	22 AWG stranded 4 core cable, PVC insulated	---		---	

CN215 Connectivity

CON1	CON2	Gauge	Colour	Comments
	Pin			
1	1	24 AWG	Orange	
5	5	24 AWG	Brown	
15	15	24 AWG	Red	V IN
16	16	24 AWG	Black	GND
Notes: Pins 3, 4, 7, 8, 9, 10, 13 and 14 have no crimps fitted Pins 2, 6, 11 and 12 have crimps fitted but these are not connected.				

**WARNING!**

Use correct wire gauges

If you choose to make your own cables, you must make sure that the wire gauges are suitable for use with the validator. The minimum wire gauge for the CN292 cable is **24 AWG**, with **22 AWG** being recommended.

ITL Part Number	Description	Details
CN00292	Interface cable	Provides connection between DA2 and NV11

CON1

15

1

16

2

(Front View)

15

1

16

2

(Top View)

5

10

10

Heat shrink sleeves (black)

1950

Standard 4-core PVC cable

10

10

5

Heat shrink sleeves (black)

16

2

15

1

(Bottom View)

CON2

15

1

16

2

(Front View)

Comments:

Please consult the tables on the next page for pin out and connector information.

CN00292 Parts List

Qty	Description	Supplier	Leotronics	Alternative	Molex
2	8 way 2 row 2.54mm pitch friction lock housing	2652-2161		90142-0016	
8	Tin plated crimp socket 22-24 AWG	Leotronics 2653-2000		Molex 90119-0110	
2	Black heat shrink sleeving	---		---	
1	22 AWG stranded 4 core cable, PVC insulated	---		---	

CN00292 Connectivity

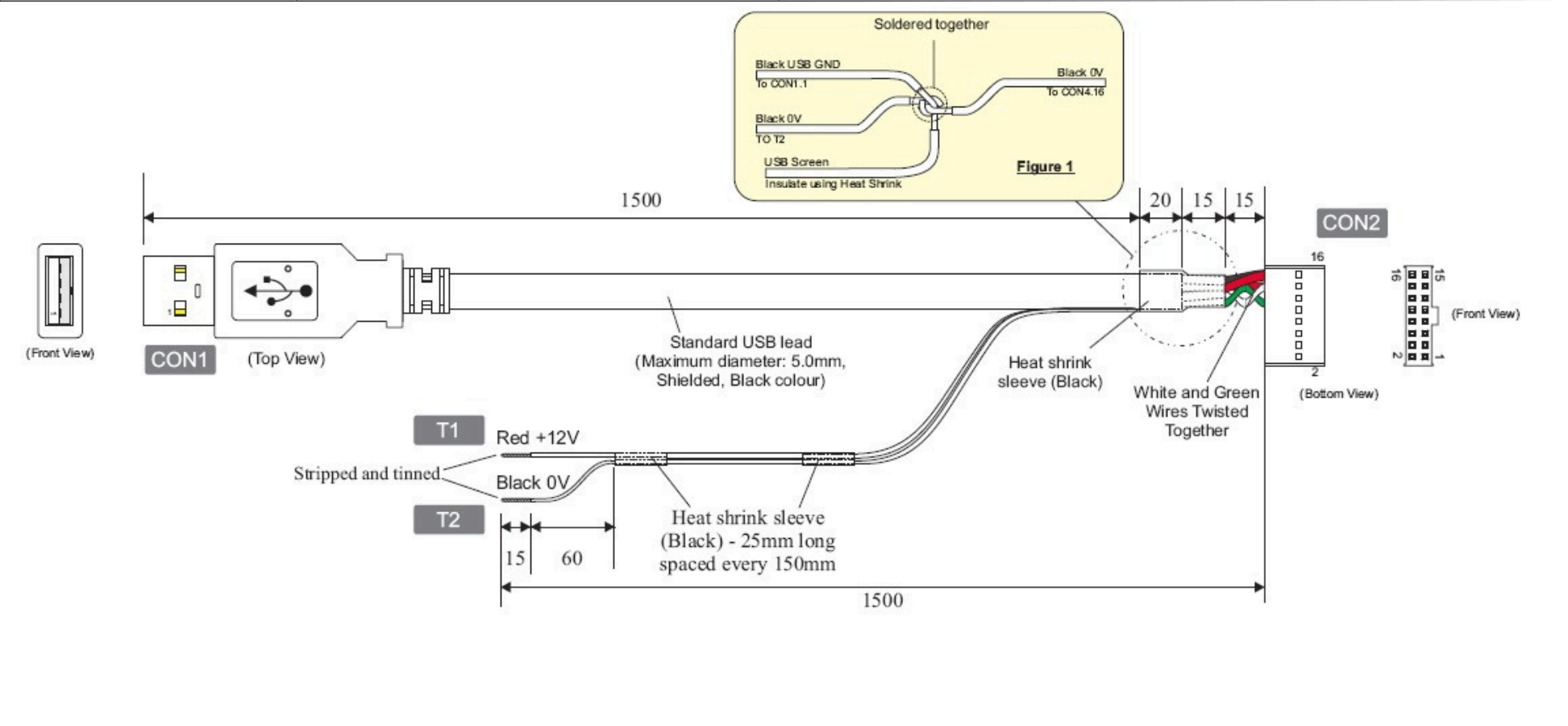
CON1	CON2	Gauge	Colour	Comments
	Pin			
1	1	24 AWG	Orange	
5	5	24 AWG	Brown	
15	15	24 AWG	Red	V IN
16	16	24 AWG	Black	GND
Notes: Pins 3, 4, 7, 8, 9, 10, 13 and 14 have no crimps fitted Pins 2, 6, 11 and 12 have crimps fitted but these are not connected.				

**WARNING!**

Use correct wire gauges

If you choose to make your own cables, you must make sure that the wire gauges are suitable for use with the validator. The minimum wire gauge for the CN292 cable is **24 AWG**, with **22 AWG** being recommended.

ITL Part Number	Description	Details
CN00392	Power and USB Communication Cable	USB 2.0 Compliant Type A to 16 way header cable



Comments:

Please consult the tables on the next page for pin out and connector information.



CN00392 Parts List

Qty	Description	Supplier	Alternative
1	USB 2.0 lead with type A plug	Molex 88728-3400	RS 324-8362
2	8 way 2 row 2.54mm pitch friction lock housing	Molex 90142-0016	Leotronics 2652-2161
9	Gold plated crimp socket 22-24 AWG	Molex 90119-2110	Leotronics 2653-2000
2	Black heat shrink sleeving	---	---
2	26 AWG stranded single core cable, PVC insulated	---	---

CN00392 Connectivity

CON1	CON2	Gauge	Colour	Comments
Pin				
1	13		Red	USB +V (+5V)
2	12		White	USB Data – (twist together with Data +)
3	11		Green	USB Data + (twist together with Data -)
4	16		Black	USB GND - see figure 1 for connection detail
Screen	16		Black	See figure 1 for connection detail
---	16	26 AWG	Black	0V - see figure 1 for connection detail
---	15	26 AWG	Red	+12V - see figure 1 for connection detail
Notes: CON2 pins 1 - 4 have crimps fitted but these are not connected. CON2 pins 5 -10 and 14 have no crimps fitted				

**WARNING!**

Use correct wire gauges

If you choose to make your own cables, you must make sure that the wire gauges are suitable for use with the validator. The minimum wire gauge for the CN392 cable is **26 AWG**, with **24 AWG** being recommended.

Bezels		
ITL Part Number	Description	
PA00189	Horizontal Bezel Assembly	
PA00268	69mm Fixed Width Horizontal Bezel	No image available
PA00896	Horizontal Bezel Assembly	

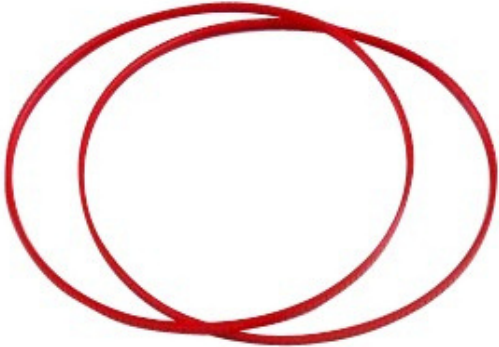
Cashboxes

PA00186	Locking Cashbox Assembly (300L)	A black and silver locking cashbox assembly with a red emergency release handle on the front.
PA00192	Slide-on Cashbox Assembly (300S)	A black and silver slide-on cashbox assembly with a red emergency release handle on the front.
PA00898	Standard Cashbox Assembly	A black and silver standard cashbox assembly with a red emergency release handle on the front.

**Information**

Check website for options.

There are many variants of bezel and cashbox type available for the NV11 validator. Please check the ITL website (www.innovative-technology.co.uk) for up to date information on the options available.

Drive Belts		
FD00106	NV9USB Red Drive Belt	

4.11 Guidance Notes

Cleaning

The NV11 validator has been designed in a way to prevent damage and airborne contamination reaching the optical sensors; however, depending upon the environment the NV11 may require occasional cleaning or belt changing.

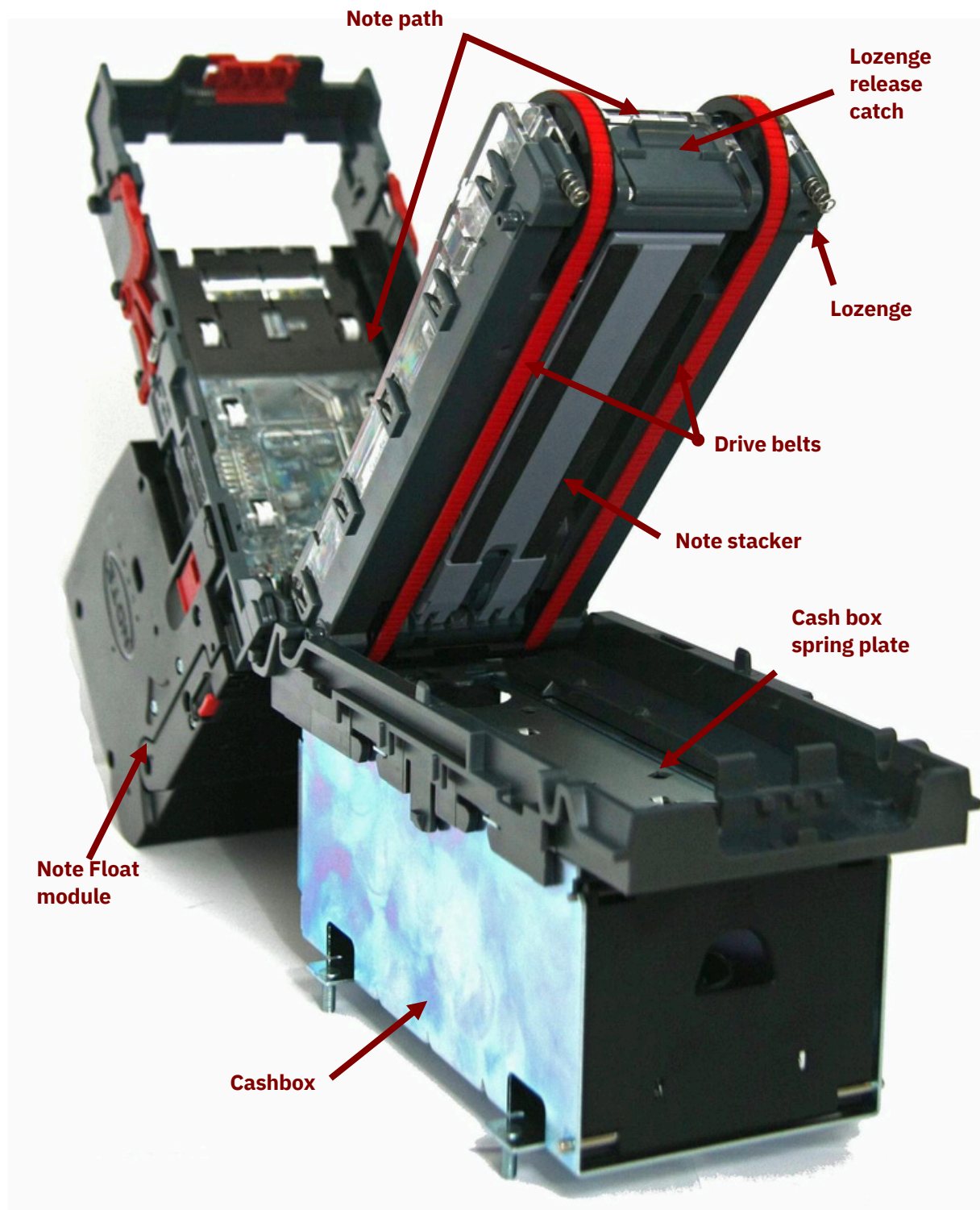
**Caution!**

Do not use solvent based cleaners on any part of the NV11 unit.

Do not use solvent based cleaners such as alcohol, petrol, methylated spirits, white spirit or PCB cleaner. Using these solvents can cause permanent damage to the unit; only use a mild detergent solution as directed below.

To clean the NV11, open the note path by sliding the red release catch on the front of the validator to the left (as indicated in the picture) - this will allow access to the lozenge and note path



**WARNING!**

Disconnect power BEFORE
any cleaning operation

Unless stated otherwise, you should disconnect the power BEFORE carrying out any cleaning operations to avoid the risk of causing damage to the validator.



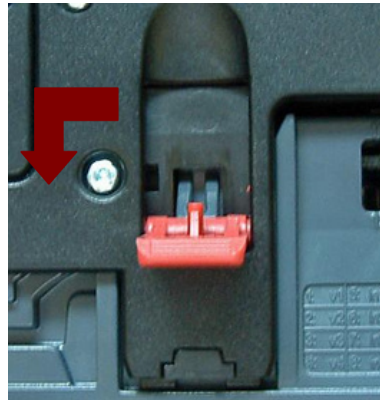
Ideally, you should also remove the Note Float module prior to cleaning the sensors - removal is a very straightforward task:

**WARNING!**

Do not try to disassemble

Do not attempt to disassemble the Note Float module – there are no user serviceable parts inside and trying to disassemble the module could cause personal injury and will also damage the unit beyond repair.

1. Open both the Note Float side latches as shown

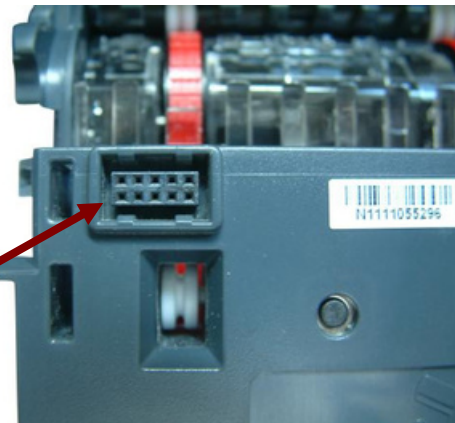


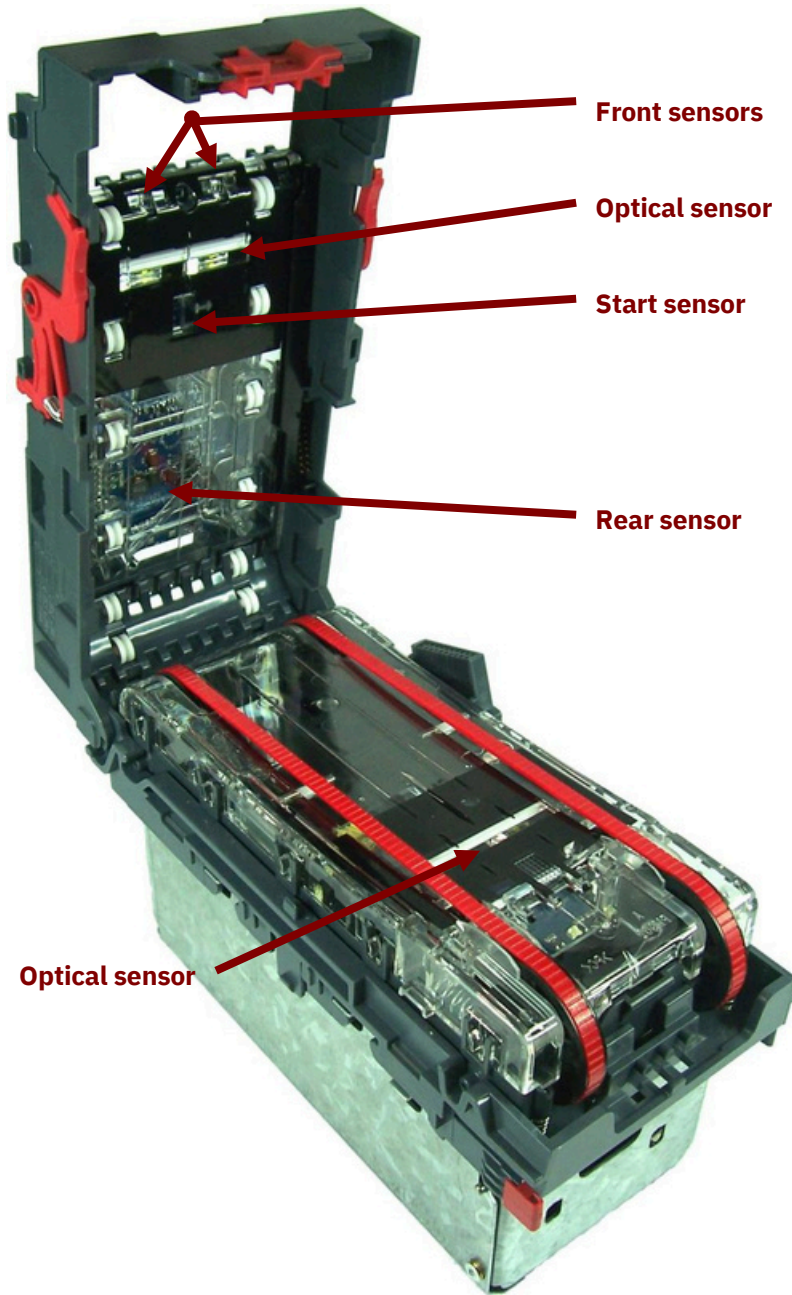
2. Carefully lift the Note Float module upwards and clear of the validator head



3. To refit the Note Float module, reverse the procedure – make sure that the electrical connectors and latches are lined up correctly

Electrical connector





Examine the note paths, lozenge and note stacker for any dirt or debris, and carefully clear and wipe the surfaces of the note paths and lozenge with a soft lint free cloth that has been dampened with a water and mild detergent solution (i.e. household washing up liquid.) - be very careful when cleaning around the sensor lenses and make sure they are clean and dry before closing the cover and restarting the unit. Do not try to polish the sensor lenses – if a lens is badly scratched, contact ITL technical support for advice.

Also check that the note stacker and cash box spring plate are not jammed.

**Caution!**

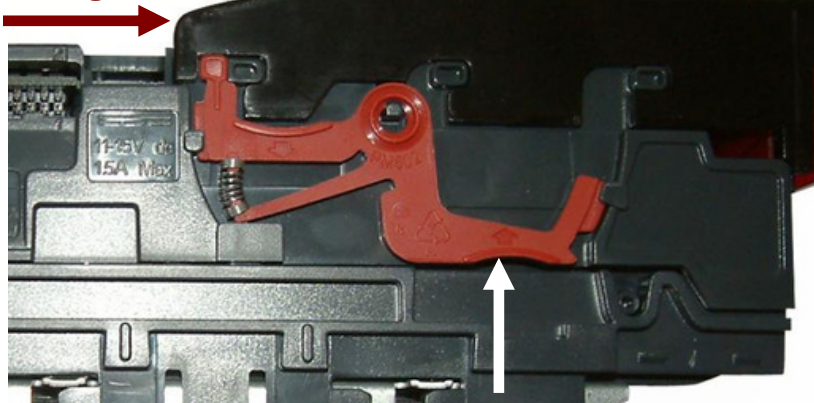
Be careful cleaning sensors.

When cleaning the recessed front sensor, use a small soft brush or cotton bud – do not use anything sharp or abrasive.

Cleaning the belts is a simple operation. Ensure the validator is enabled (i.e. bezel lights are illuminated), then remove the bezel:

- The bezel is removed by pushing the red locking arms on both sides of the validator upwards, and sliding the bezel away from the locking arms

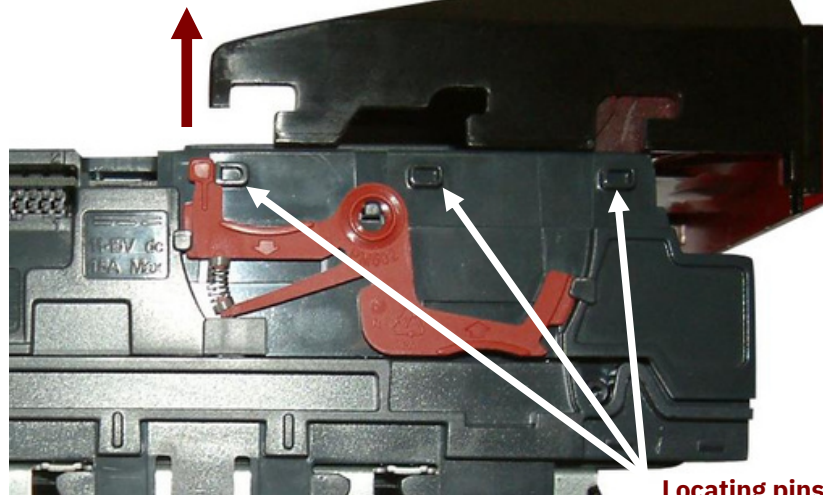
b. Slide bezel away from locking arms



a. Push locking arms upwards

- Lift the bezel off once the bezel has been slid fully across and is clear of the locating pins

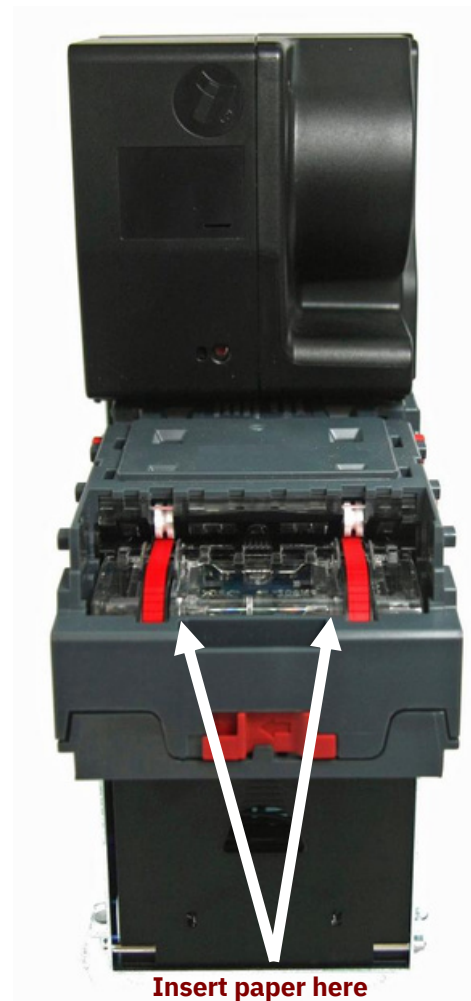
Lift upwards to remove



Locating pins



- Insert a piece of paper (which is narrower than the width between the two belts) in the centre of the note path to activate the drive motor
- Use a lint free cloth dampened with water and containing a mild detergent (such as dish detergent) and hold against each drive belt as it turns.



Repeat this procedure until all dust and debris has been removed from both belts. Finally, use a DRY lint free cloth to remove any excess moisture and refit the bezel. The bezel is refitted by pushing the bezel back onto the locating pins and sliding backwards until all six pins are engaged in the slots. The locking arms will then spring back and locate into the bezel.

**Caution!**

Check locking arms.

Always make sure that **BOTH** locking arms are fully located in the bezel – trying to operate the validator if they are not correctly located can cause unit damage.

**Caution!**

Do not use any lubricants.

Do not lubricate any of the note transport mechanism, belts or any part of the note path, as this can affect the operation of the validator.



If the belts are worn or damaged, they should be replaced. This is a simple procedure, and is carried out as follows:

**WARNING!**

Do not try to disassemble

Do not attempt to disassemble the validator head or Note Float module – trying to do this could cause personal injury and will damage the unit beyond repair.

- Open the top of the unit using the Release catch
- Release the lozenge by gently pressing the Lozenge release catch
- Remove and place the lozenge on a clean dry surface
- Press in the large wheels to release the belt tension and then remove the belts, sliding them off the smallest wheels first
- Replace the belts by fitting them over the lozenge, largest wheels first
- Reassemble and close the unit

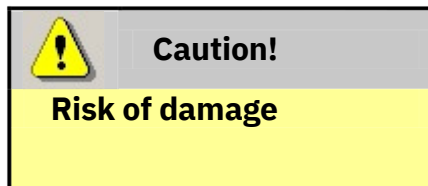


Manual Note Removal

It is unlikely that you will need to manually remove notes from the Note Float module, but there may be occasions where this needs to be done. Depending on the situation, there are two methods that can be used.

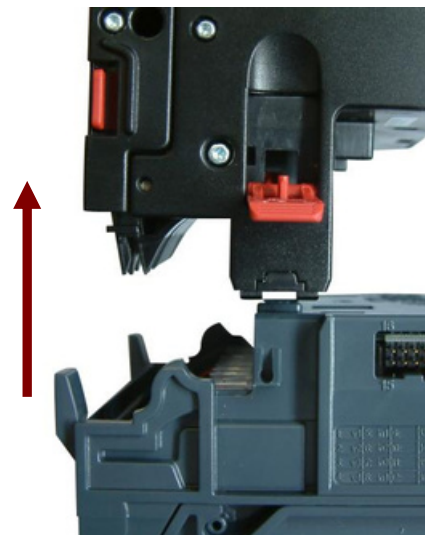
Transport Error:

If the Note Float module status LED is flashing once every second, this indicates a note transport error. To correct the problem, follow the following steps.



If you need to follow this procedure, the NV11 should be powered off and the Note Float module removed from the validator. The rear cover of the Note Float module is mechanically interlocked with the validator head – if you try to force the cover open the module and validator could be damaged beyond repair.

1. Remove the Note Float module from the validator head by opening the two side latches and lifting the module upwards



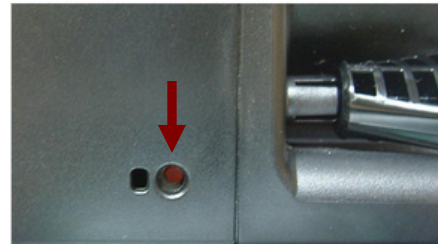
2. Open the Note Float module rear cover by pressing in the two red buttons, then lift the cover



3. Carefully remove the bank note, then close the cover firmly and refit the module onto the validator head



Press the Configuration Button once after powering up the NV11 to decrease the note count by 1



Manual Emptying:

In the unlikely event that you need to remove all the bank notes from the Note Float module, this can be done following the steps below (after removing the Note Float module from the validator head as detailed previously). There is a special cross point tool (ITL part number **PM00979**) used to manually operate the module's transport mechanism – please do not use any other tool as you may damage the mechanism.



Caution!

Risk of serious damage to Note Float module internal mechanism

If you need to follow this procedure, only use the PM00979 cross point tool and take great care not to over wind the mechanism or force past the dead stops – if you do the module will be damaged beyond repair.

1. Remove the PM00979 cross point tool from the stowage location on the side of the Note Float module by pulling the tool away from the module



2. Open the Note Float module rear cover by pressing in the two red buttons, then lift the cover



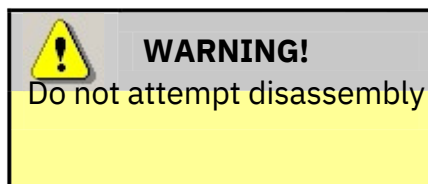
3. Insert the cross head tool into the top drive roller as shown here



4. Turn the roller with the cross point tool **ANTICLOCKWISE** (as indicated by the arrow) until all the bank notes have been removed



After removing all the bank notes, close the rear cover firmly, place the cross point tool back in the stowage position and refit the module onto the validator.



Do not attempt to disassemble the Note Float module or remove the side covers to try and remove any notes inside, as the module will be damaged beyond repair. Always follow the procedure given above.

After removing bank notes manually, an 'EMPTY' command should be run when the unit is powered back up.

Re-Initialisation

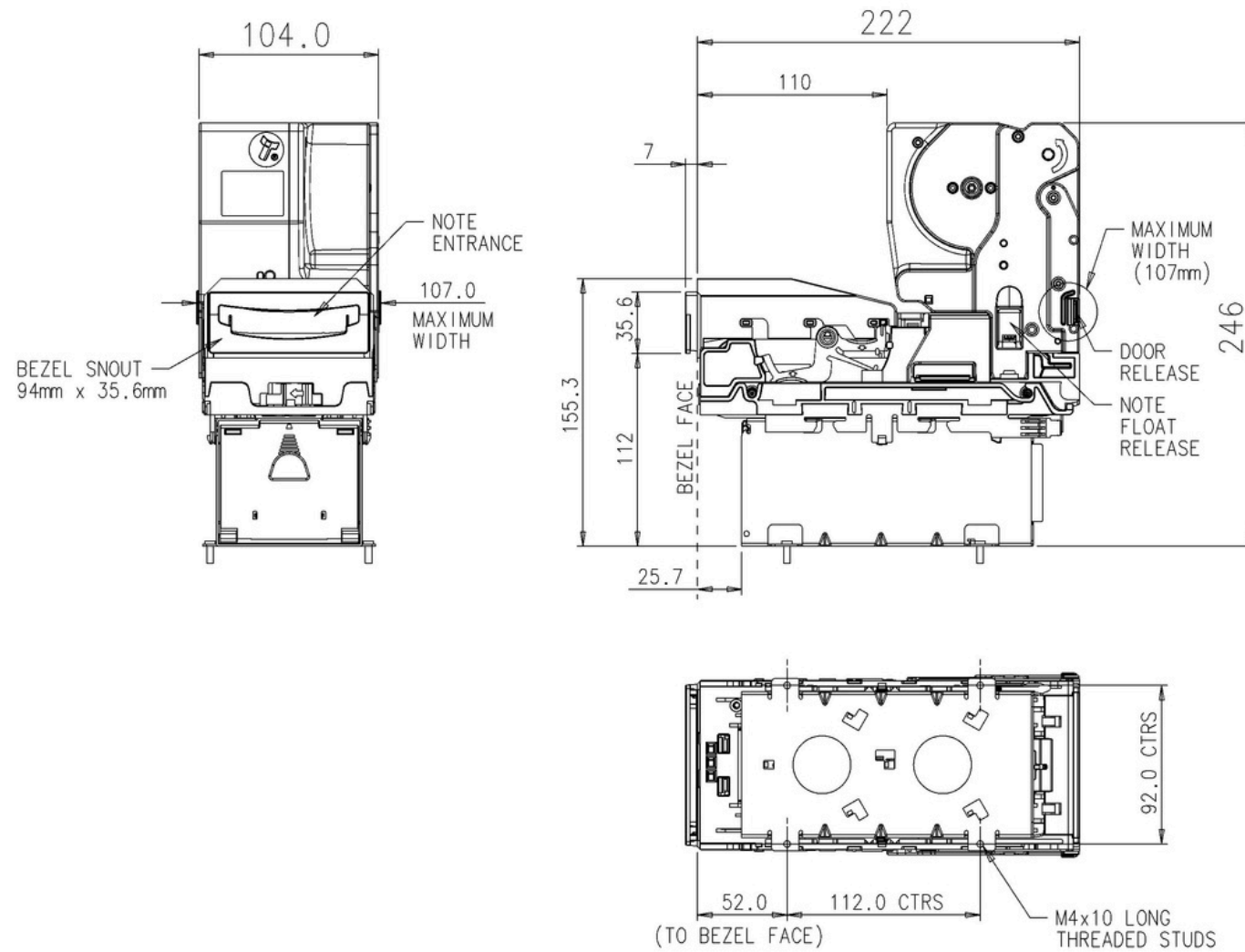
The NV11 validator has an in-built self-calibration system that keeps the optical sensors in optimum operating condition. However if the NV11 is disassembled for any reason it also will need to be re-initialised - re-initialisation can only be carried out by ITL's technical support team.



4.12 Drawings and Schematics

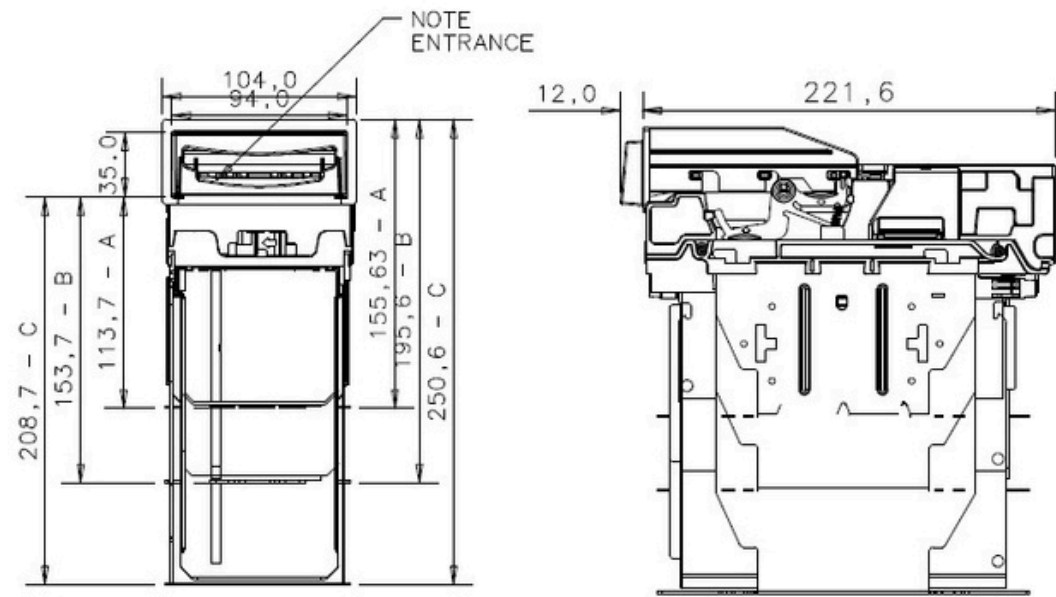
NOTE: If required, IGES 3D models are available on request from ITL technical support.

NV11:

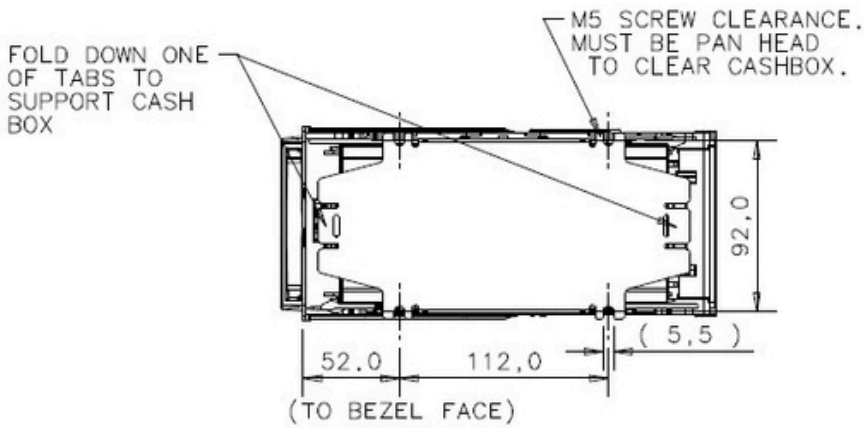


Cashbox Options:

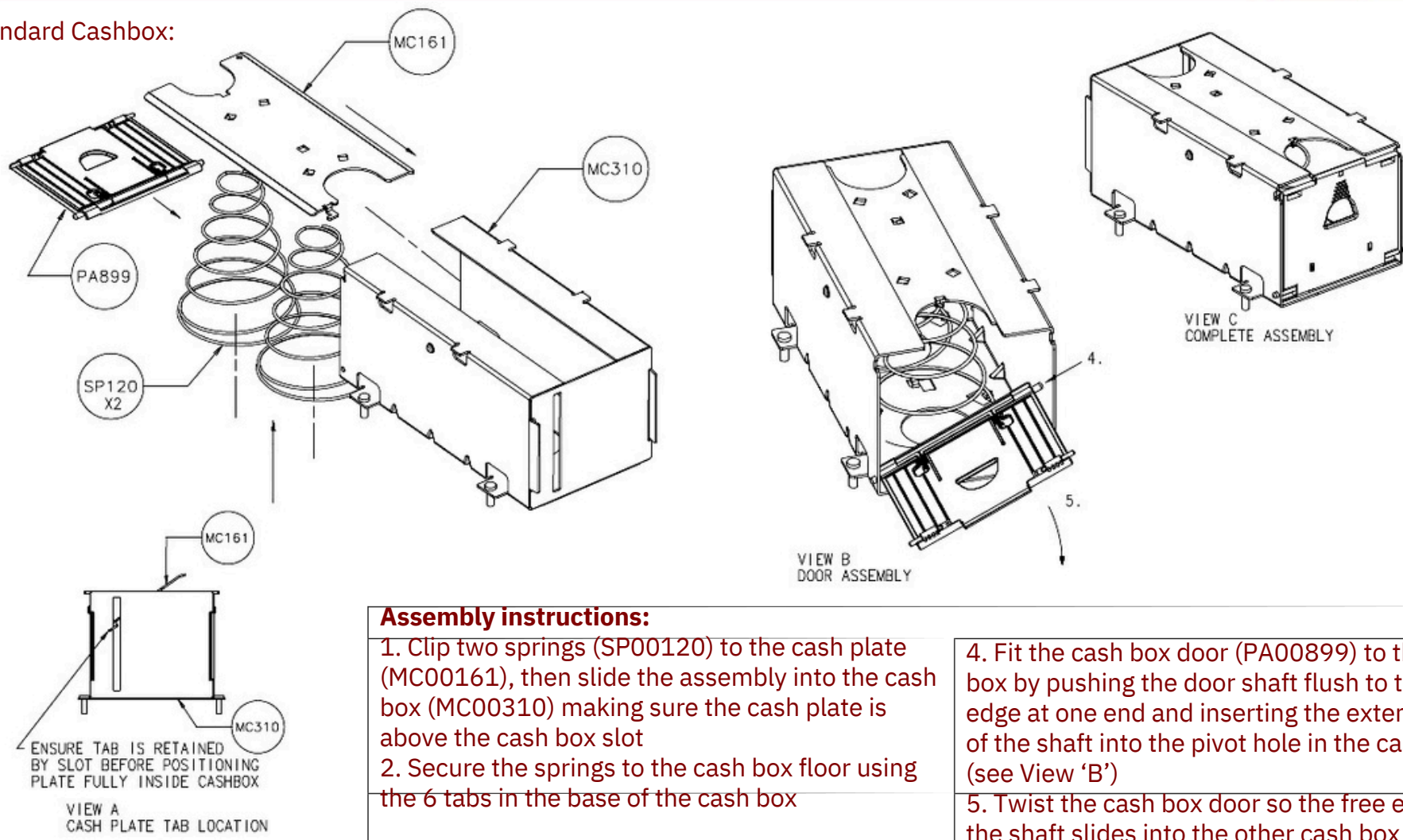
A	300 SLIDE-IN CASH BOX
B	600 SLIDE-IN CASH BOX
C	1000 SLIDE-IN CASH BOX



ACCEPTS NOTES UP TO 82mm x 160mm LONG



Standard Cashbox:



Assembly instructions:		
1. Clip two springs (SP00120) to the cash plate (MC00161), then slide the assembly into the cash box (MC00310) making sure the cash plate is above the cash box slot	4. Fit the cash box door (PA00899) to the cash box by pushing the door shaft flush to the door edge at one end and inserting the extended part of the shaft into the pivot hole in the cash box (see View 'B')	
2. Secure the springs to the cash box floor using the 6 tabs in the base of the cash box	5. Twist the cash box door so the free end of the shaft slides into the other cash box pivot hole (see View 'B')	
3. Twist the cash plate and insert the end tab into the cash box slot (see View 'A'), then push the plate fully into the cash box (see View 'C')	6. Push the cash box door closed (see View 'C')	



SECTION 5

NV11 MANUAL SET

SOFTWARE IMPLEMENTATION GUIDE

INTELLIGENCE IN VALIDATION

Innovative Technology assume no responsibility for errors, omissions, or damages
resulting from the use of information contained within this manual.

NV11 MANUAL SET – SECTION 5

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5. SOFTWARE IMPLEMENTATION GUIDE

5.1 Communication Protocols

The NV11 validator can use two different communication protocols - SSP/eSSP and ccTalk.

Smiley® Secure Protocol (SSP) is a secure serial interface specifically designed to address the problems experienced by cash systems in gaming machines. Problems such as acceptor swapping, reprogramming acceptors and line tapping are all addressed.

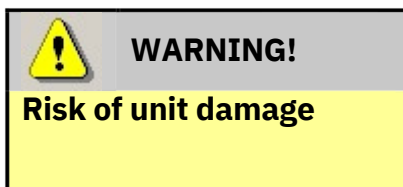
Encrypted Smiley® Secure Protocol (eSSP) is an enhancement of SSP. eSSP uses the same 16 bit CRC checksums on all packets as SSP, but also uses a Diffie-Hellman key exchange to allow the host machine and validator to jointly establish a shared secret key over an insecure communications channel. The encryption algorithm used is AES with a 128-bit key; this provides a very high level of security.

The recommended communication protocol for the NV11 validator is eSSP, as this provides the highest level of data transfer security. A ccTalk interface protocol is also available.

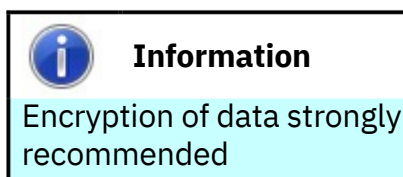
For detailed information and the full protocol specifications please read the following documents, which can be downloaded from the Innovative Technology Ltd website (www.innovative-technology.co.uk):

- ☐ SSP Interface Specification (ITL Document number GA138)
ccTalk Communications Protocol Specification [additional commands]
- ☐ (ITL Document number GA964)
- ☐ ITL Bank Note Reader ccTalk Specification (ITL Document number GA966)

Summaries of the NV11 validator socket connections for the supported interfaces are shown below:



Do not make any connections to the interface socket pins marked '**Do not connect**' – making connections to these pins could cause severe damage to the unit.



It is recommended that all transactions with the NV11 validator be encrypted to prevent commands being recorded and replayed by an external device. If this is not possible, then other (mechanical) measures should be used to prevent physical bus tapping.



NV11 SSP Interface:

Name Pin		Type	Description
1	TxD	Output	Serial data out (Tx)
2	Factory use only		Do not connect
3			
4			
5		Input	Serial data in (Rx)
6	Factory use only		Do not connect
7			
8			
9			
10			
11	USB D+	Data	USB Data +
12	USB D-	Data	USB Data -
13	USB Vcc	Power	USB +V (+5V)
14	Factory use only	Power	Do not connect
15	V In	Ground	+V
16	GND		GND

NV11 ccTalk Interface:

Pin	Name	Type	Description
1	TxD	Output	ccTalk data – must also be connected to pin 5
2	Factory use only		Do not connect
3			
4			
5	RxD	Input	ccTalk data – must also be connected to pin 1
6	Factory use only		Do not connect
7			
8			
9			
10			
11	USB D+	Data	USB Data +
12	USB D-	Data	USB Data -
13	USB Vcc	Power	USB +V (+5V)
14	Factory use only	Power	Do not connect
15	V In	Ground	+V
16	GND		GND

5.2 Configuration Card Programming

It is not possible to program the NV11 by the use of a configuration card as this method of programming is not yet implemented. Full details on programming the NV11 validator using software can be found in Section 3 of this manual set (ITL Software Support Guide).

5.3 SSP and eSSP

Smiley® Secure Protocol (SSP) is a secure serial interface specifically designed to address the problems experienced by cash systems in gaming machines. Problems such as acceptor swapping, reprogramming acceptors and line tapping are all addressed.

Encrypted Smiley® Secure Protocol (eSSP) is an enhancement of SSP. eSSP uses the same 16 bit CRC checksums on all packets as SSP, but also uses a Diffie-Hellman key exchange to allow the host machine and validator to jointly establish a shared secret key over an insecure communications channel. The encryption algorithm used is AES with a 128-bit key; this provides a very high level of security.

The encryption of the SSP protocol ensures superior protection and reliability of the data, which is transferred between validator and host machine. The encryption key is divided into two parts:

- The lower 64 bits are fixed and specified by the machine manufacturer allowing control of which devices are used in their machines.
- The higher 64 bits are securely negotiated by the slave and host at power up, ensuring each machine and each session are using different keys.

The interface uses a master-slave model; the host machine is the master and the peripherals (note acceptor, coin acceptor or coin hopper) are the slaves. Data transfer is over a multi-drop bus using clock asynchronous serial transmission with simple open collector drivers. Each SSP device of a particular type has a unique serial number; this number is used to validate each device in the direction of credit transfer before transactions can take place.



Information

200 ms command spacing

When communicating with the NV11 validator, poll commands should be sent **at least** 200 ms apart.



SSP Commands and Responses

a. Commands

Action	Command Code (Hex)	Command Set
Reset	0x01	Generic
Host Protocol Version	0x06	
Poll	0x07	
Get Serial Number	0x0C	
Synchronisation command	0x11	
Disable	0x09	
Enable	0x0A	
Program Firmware / currency	0x0B (Programming Type)	
Manufacturers Extension	0x30 (Command, Data)	
Set inhibits	0x02	Validator
Display On	0x03	
Display Off	0x04	
Set-up Request	0x05	
Reject	0x08	
Unit data	0x0D	
Channel Value data	0x0E	
Channel Security data	0x0F	
Channel Re-teach data	0x10	
Last Reject Code	0x17	
Hold	0x18	

Action	Command Code (Hex)	Command Set
Enable Protocol Version Events	0x19 (made obsolete in protocol version 6)	Validator
Get Bar Code Reader Configuration	0x23	
Set Bar Code Reader Configuration	0x24	
Get Bar Code Inhibit	0x25 0x26 0x27 0x5C,	
Set Bar Code Inhibit	Options 0x5B 0x3B (route,	
Get Bar Code Data	value/channel (Country code))	
Enable Payout Device *	0x3C (value/channel (Country code))	
Disable Payout Device	0x3F 0x41 0x42 0x43 0x45	Note Float
Set Routing *	(type) 0x52 0x53	
Get Routing *		
Empty		
Get Note Positions *		
Payout Note		
Stack Note		
Set Value Reporting Type *		
SMART empty		
Cashbox Payout Operation Data		

The commands marked with * will respond with the generic response ‘Command cannot be processed’ and an error code of ‘Invalid Currency’ if there are notes inside the Note Float module that do not match the dataset that is installed in the validator.

Notes: Action

Reset:

Host Protocol Version:

Comments

Single byte command, causes the slave to reset

Dual byte command, the first byte is the command; the second byte is the version of the protocol that is implemented on the host.

Single byte command, no action taken except to report latest events.

Single byte command, used to request the slave serial number. Returns 4-byte long integer.

Single byte command, which will reset the validator to expect the next sequence ID to be 0.

Single byte command, the peripheral will switch to its disabled state, it will not execute any more commands or perform any actions until enabled, any poll commands will report disabled.

Single byte command, the peripheral will return to service.

This command allows the manufacturer of a peripheral to send commands specific to their unit

Two-byte command, the first byte is the command and the second enables several different options. Unused bits should be 0.

Single-byte command. All accepted notes will be routed to the stacker and payout commands will not be accepted.

The first byte is the command. The second byte is the selected route, and the remaining bytes are the four-byte value or single byte channel number (depending on the reporting type selected) of the note that the route should be applied to. By default all note values are stacked. For protocol version 6, three extra country code bytes are sent

Single byte command, this will cause all notes to be sent to the stacker for removal.

Single byte command, this will return the number of notes in the Note Float module and the value in each position. The first note in the table is the first note that was paid into the Note Float module - the Note Float module is a LIFO system, so the note that is last in the table is the only one that is available to be paid out or moved into the stacker.

Poll:

Get Serial Number:

Sync:

Disable:

Enable:

Manufacturers

Extension:

Enable Payout Device:

Disable Payout Device:

Set Routing:

Empty:

Get Note Positions:

Action	Comments
Payout Note:	This is a single byte command. The Note Float module will pay out the last note that was stored. This is the note that is in the highest position in the table returned by the Get Note Positions Command. If the payout is possible the Note Float will reply with the generic response 'OK'.
Stack Note:	This is a single byte command. The Note Float module will stack the last note that was stored. This is the note that is in the highest position in the table returned by the Get Note Positions Command. If the stack operation is possible the Note Float will reply with the generic response 'OK'.
Set Value Reporting Type:	Two-byte command. This will set the method of reporting values of notes. There are two options, by a four-byte value of the note or by the channel number of the value from the banknote validator. If the channel number is used then the actual value must be determined using the data from the Validator command Unit Data. The default operation is by 4-byte value.
SMART empty:	Empties the Note Float module of notes, maintaining a count of value emptied. The note counters will be set to 0 after running this command. Use 'cashbox payout operation data' command to retrieve a breakdown of the denominations routed to the cashbox through this operation.
Cashbox Payout Operation Data:	This command can be sent at the end of a SMART Empty, float or dispense operation. Returns the amount emptied to cashbox from the Note Float in the last dispense, float or empty command. The quantity of denominations in the response is sent as a 2 byte little endian array; the note values as 4-byte little endian array and the country code as a 3-byte ASCII array. Each denomination in the dataset will be reported, even if 0 notes of that denomination are emptied.

b. Responses

Action	Command Code (Hex)	Command Set
OK	0xF0 0xF2 0xF3 0xF4	Generic
Command not known	0xF5	
Wrong number of parameters		
Parameter out of range		
Command cannot be processed		
Software Error		
FAIL	0xF6 0xF8 0xFA 0xF1	
Key Not Set	0xEF, Channel Number	
Slave Reset	0xEE, Channel Number	
Read, n	0xED 0xEC 0xCC 0xEB	Validator
Credit, n	0xEA 0xE9 0xE8 0xE6,	
Rejecting	Channel Number 0xE7	
Rejected	0xE1, Channel Number	
Stacking		
Stacked		
Safe Jam		
Unsafe Jam		
Disabled		
Fraud Attempt, n		
Stacker Full		
Note cleared from front at reset		

Action	Command Code (Hex)	Command Set
Note cleared into cash box at reset	0xE2, Channel Number	Validator
Cash Box Removed	0xE3	
Cash Box Replaced	0xE4	
Bar Code Ticket Validated	0xE5	
Bar Code Ticket Acknowledge	0xD1	
Note Path Open	0xE0	
Channel Disable	0xB5	
Dispensing	0xDA, value/channel dispensing 0xD2, value/channel	
Dispensed	dispensed 0xD5, value/channel	Note Float
Jammed	dispensing 0xD6	
Halted	0xDD, value/channel dispensed, value/channel requested	
Incomplete Payout	0xC2	
Emptying	0xC3	
Empty	0xDB, value/channel of note	
Note Stored in Payout *	0xC9, value/channel of note	
Note Transferred to Stacker	0xC6	
Payout Out of Service	0xCA, value/channel of note	
Note Paid into Stacker at Power Up		
Note Paid into Store at Power Up	0xCB, value/channel of note	

Action	Note Dispensed at Power Up	Command Code (Hex) 0xCD,	Command Set
Note Float Removed	Note value/channel of note 0xC7	0xC7	Note Float
Attached Note in Bezel Hold	Note value/channel of note 0xCE	0xCE	
Full SMART Emptying SMART Empty	0xCF 0xB3 0xB4 0xB5	0xCF	
Channel Disable			
* When enabled using option flag.			

Notes:

Action	Comments
--------	----------

- | | |
|------------------------------|--|
| Command Not Known: | Returned when an invalid command is received by a peripheral. |
| Wrong Number Of Parameters: | A command was received by a peripheral, but an incorrect number of parameters were received. |
| Parameter Out Of Range: | One of the parameters sent with a command is out of range. |
| Command Cannot Be Processed: | A command sent could not be processed at that time. |
| Software Error: | Reported for errors in the execution of software e.g.
Divide by zero. This may also be reported if there is a problem resulting from a failed remote firmware upgrade, in this case the firmware upgrade should be redone |
| Key Not Set: | The slave is in encrypted communication mode but the encryption keys have not been negotiated |
| Jammed: | Five-byte response that indicates that the validator is jammed; this is reported until it is un-jammed or reset. It will also become disabled. |

Action	Comments
Dispensing:	Single-byte response indicating that a dispense operation is in progress. The four-byte value of the note or the single byte channel number is reported, depending on the reporting type set. This value will be 0 until the note has passed out of the Note Float module and into a payable position in the validator.
Dispensed:	Response that indicates when the payout has finished a dispense operation; The four-byte value of the note or the single byte channel number is reported, depending on the reporting type set.
Jammed:	Five byte response that indicates that the payout is jammed; this is reported until it is un-jammed or reset. It will also become disabled. The value or channel number of the note being dispensed is also reported.
Incomplete Payout:	This event is given when the payout starts up if a payout or float operation was in progress when the power was removed. The first four bytes after the event code are the value that was dispensed; the next four are the value that was originally requested.
Emptying:	This event is given while the payout is being emptied of notes into the cashbox by the EMPTY command.
Empty:	This event is given at the end of the empty process.
Note Stored in Payout:	This event is given when notes paid in to the payout system are routed to the payout store. For compatibility with the SMART Payout the value of the note is not reported. However if the Note Float is enabled with the option flag VALUE_ON_STORED set, then the value of the note will be reported (see enable payout device command).
Note Transferred to Stacker:	This event is given when a note has successfully been moved from the Note Float and stacked in the cash box. During the process the Stacking event will be given.
Note Float Removed:	This event is reported when the Note Float module is physically disconnected from the validator while the power is on.
Note Float Attached:	This event is reported when the Note Float module is physically attached to the validator while the power is on. The validator and Note Float module will then reset.
Note In Bezel Hold:	This event is reported when the Dispensing note is held in the bezel waiting for the user to remove it.

Action	Comments
Device Full:	This event is reported when the Note Float has reached its limit of stored notes. This event will be reported until a note is paid out or stacked.
Channel Disable:	Indicates all note channels have been inhibited and as such, the unit is disabled. Only reported if using protocol version 7 and above.



Example SSP Communications

Here is an example of the communication between host and slave. Both the typical commands from the host and responses from the validator are detailed.

Host	Slave < OK < OK <	Comments
> SYNC	OK	Synchronisation command
> SET_GENERATOR, [64 bit prime number]	< OK, [64bit slave intermediate key]	Set the encryption key generator
> SET_MODULUS, [64 bit prime number]		Set the encryption key modulus
> REQUEST_KEY_EXCHANGE [64 bit host intermediate key]		Host sends the host intermediate key, slave responds with the slave intermediate key. The encryption key is then calculated independently by both host and slave.
> GET_SERIAL	< OK < [SERIAL NUMBER]	NV11 Serial Number
> SETUP_REQUEST	< OK < [SETUP INFORMATION]	NV11 Setup Route notes of value 0020 to the NV11 Cashbox
> SET_ROUTING, 01 14 00 00 00	< OK < OK < OK	Enable channels 1,2 and 3 Enable NV11
> SET_INHIBIT > 07 > 00	< OK < DISABLED	
> ENABLE	< OK	
> POLL	< OK < NOTE READ	
> POLL	< 00	
> POLL	< OK < NOTE READ < 03	NV11 currently reading a note Note has been recognised as channel 3 (€20)
> POLL	< OK < OK < STACKING	Hold the note in escrow
> HOLD	< OK < CREDIT	Stack the note
> POLL	03 < STACKING < STACKED	Credit given for channel 3 (€20), note stacked
> POLL	< OK	
> POLL		

Full support is available from ITL and local support offices for implementing eSSP - this support includes libraries and example applications. When requesting this information, please specify your preferred language(s) and operating system.

5.4 ccTalk

This section should be read in conjunction with the full ccTalk specification, which can be downloaded from the internet (www.cctalk.org).

ccTalk is a serial communications protocol in widespread use throughout the money transaction industry. Peripherals such as coin acceptors, note validators and hoppers found in a diverse range of automatic payment equipment use ccTalk to communicate with the host controller.

The protocol uses an asynchronous transfer of character frames in a similar manner to RS232. The main difference is that it uses a single two-way communication data line for half-duplex communication rather than separate transmit and receives lines. It operates at TTL voltages and is 'multi-drop' (peripherals can be connected to a common bus and are logically separated by a device address) - each peripheral on the ccTalk bus must have a unique address.

Each communication sequence (a command or request for information) consists of 2 message packets structured in one of the formats detailed below. The first packet will go from the master device to the slave device and then a reply will be sent from the slave device to the master device.

Commands can have 3 primary formats:

- ☐ 8 Bit Checksum – No Encryption
- ☐ 16 Bit CRC – No Encryption
- ☐ 16 Bit CRC – BNV Encryption

As it is possible to use the ccTalk protocol without encryption, suitable physical security should be employed to protect the ccTalk bus.



Information

200 ms command spacing

When communicating with the NV11 validator, Read Buffered Bill events (command 159) should be sent **at least** 200 ms apart.



ccTalk Command Summary

Header 001

Command		Parameters	Example ACK
001 Reset Device		None	X.Y
019 Request Comms Revision		None SEL SEL	EVENT FLAG,
020 Force Empty NV11 Store to Cash Box			EVENT, REMAIN, PAID,
Request Expanded NV11 status			UNPAID, STORED, STORE, FLAG2 ACK / NAK ACK
Clear Total Count	021	SEL	KEY1 – KEY8
Pump RNG	022	R1-R8	KEY, MC
Request Cipher Key	023	None	ACK
Request Variable Set	024	SEL	IN1-IN3, OUT1- OUT3, STR1-STR3
Modify Variable Set	025	SEL, KEY	ACK / NAK
Request Total Count	026	SEL	EVENT / NAK
Enable Payout	027	KEY	FLAG, EVENT,
Dispense NV11 Notes	028	SEL, SEC1-SEC8,	REMAIN, PAID, UNPAID, STORED,
Request NV11 Status	029	BILL CNT SEL	STORE REMAIN EVENT ACK / NAK
Emergency Stop	030	SEL, FUNC SEL	VERSION
Empty NV11 Store to Cash Box	031	SEL, MC SEL	COUNT
Modify Variable MC Set	032	SEL	ACK / NAK
Request RC Version	033	SEL, COUNT	COUNT
Request RC Count	034	SEL	ACK
Modify RC Count	035	None	ACK
Request Current Count	036	3 bytes Encryption key	ACK 'GBP02113'
Read Barcode Data	129	None or Country	ACK ACK
Store Encryption Code	136	Code (2 digit)	3
Switch Encryption Code	137	None	
Request Currency Revision	145	None	
Operate Bi-directional Motors	146	None	
Stacker Cycle	147		
Request Bill Operating Mode	152		



Command	Header	Parameters	Example ACK
Modify Bill	153	Escrow & Stacker	ACK/254
Operating Table	154	0/1	00000111 00000000
Route Bill	155		
Request Bill Position	156	Country Code (2 digit)	100 'GB0010A'
Request Country			10000000000
Scaling	157	Country Code (2 digit)	1 2006
Request Bill ID	159	None	161209
Read Buffered Bill	170	None	00
Events	192		
Request Address	195	None None	4 byte checksum 3
Mode	197	None	
Request Base Year	213	None	(stacker & escrow)
Request Build Code	216 218	None	
Request Last Mod	219 225	None None None	00000 ACK ACK 3 7 1
Date			
Calculate ROM	226 227	Pin1, Pin2, Pin3,	ACK
Checksum	228	Pin4	Inhibit Low, Inhibit High
Request Option	230	Pin1, Pin2, Pin3,	
Flags	231	Pin4	ACK
Request Data		None	0
Storage Av.	232		XX.YY
Enter Pin	241 242	None None Bit	3 byte serial number
Enter New Pin	244 245	Mask	'NV11' 'Bill Validator'
Request Accept		None	
Count		Channels	
Request Insertion		None	
Count		None	
Request Master			
Inhibit		None None None	
Set Master Inhibit			
Request Inhibits			
Set Inhibits			
Perform Self Check			
Request Software			
Version			
Request Serial Number			
Request Product Code			
Request Equipment Category			

Command	Header	Parameters	Example
Request manufacturer ID	246	None	'ITL'
Request Polling Priority	249	None None	200
Simple Poll	254		ACK

Monetary Values

Values are represented as 32 bit unsigned integers (4 bytes) and in the lowest value of currency. For example:

€50.00 would be 0x00001388

When sending or receiving a value the least significant byte is sent first. So in this example [0x88] [0x13] [0x00] [0x00] will be sent.
Each type of note is identified by its value and represented using the standard format outlined above. As an example, the values for Euro notes are:

Note (€)	Hex value	Data to Send
5.00	0x000001F4	[0xF4] [0x01] [0x00] [0x00]
10.00	0x000003E8	[0xE8] [0x03] [0x00] [0x00]
20.00	0x000007D0	[0xD0] [0x07] [0x00] [0x00]
50.00	0x00001388	[0x88] [0x13] [0x00] [0x00]
100.00	0x00002710	[0x10] [0x27] [0x00] [0x00]
200.00	0x00004E20	[0x20] [0x4E] [0x00] [0x00]
500.00	0x0000C350	[0x50] [0xC3] [0x00] [0x00]

Communications Format

ccTalk communication is carried out using the following settings:

Baud rate= 9600bps, Data= 8 bit, No parity, Stop bit= 1bit

Command Format from Host to NV11

[Dst] [Len] [CRC (LSB)] [Header] [Data1] ... [DataN] [CRC (MSB)]

Field	Description
Dst	Destination Address (for a note validator, 40 [0x28])
Len	Number of data bytes in the message
Header	Command
Data	Data attached to Header, specified by Len (1-N)
CRC	[Dst] + [Len] + [Header] + [Data1] + ... + calculated value of CRC16 against Data N

Response Format from the NV11 to Host

ACK message:

[Dst] [00] [CRC (LSB)] [00] [CRC (MSB)]

NAK message:

[Dst] [00] [CRC (LSB)] [05] [CRC (MSB)]

BUSY message:

[Dst] [00] [CRC (LSB)] [06] [CRC (MSB)]

Response:

[Dst] [Len] [CRC (LSB)] [00] [Data1] ... [DataN] [CRC (MSB)]

Field	Description
Dst	Destination Address (for a note validator, 40 [0x28])
Len	Number of data bytes in the message
Header	Reply message [00]
Data	Data attached to Header, specified by Len (1-N)
CRC	[Dst] + [Len] + [Header] + [Data1] + ... + calculated value of CRC16 against Data N. If encryption setting is enabled, encryption is carried out against: [CRC (LSB)] + [Header] + [Data1] + ... + [DataN] + [CRC (MSB)]

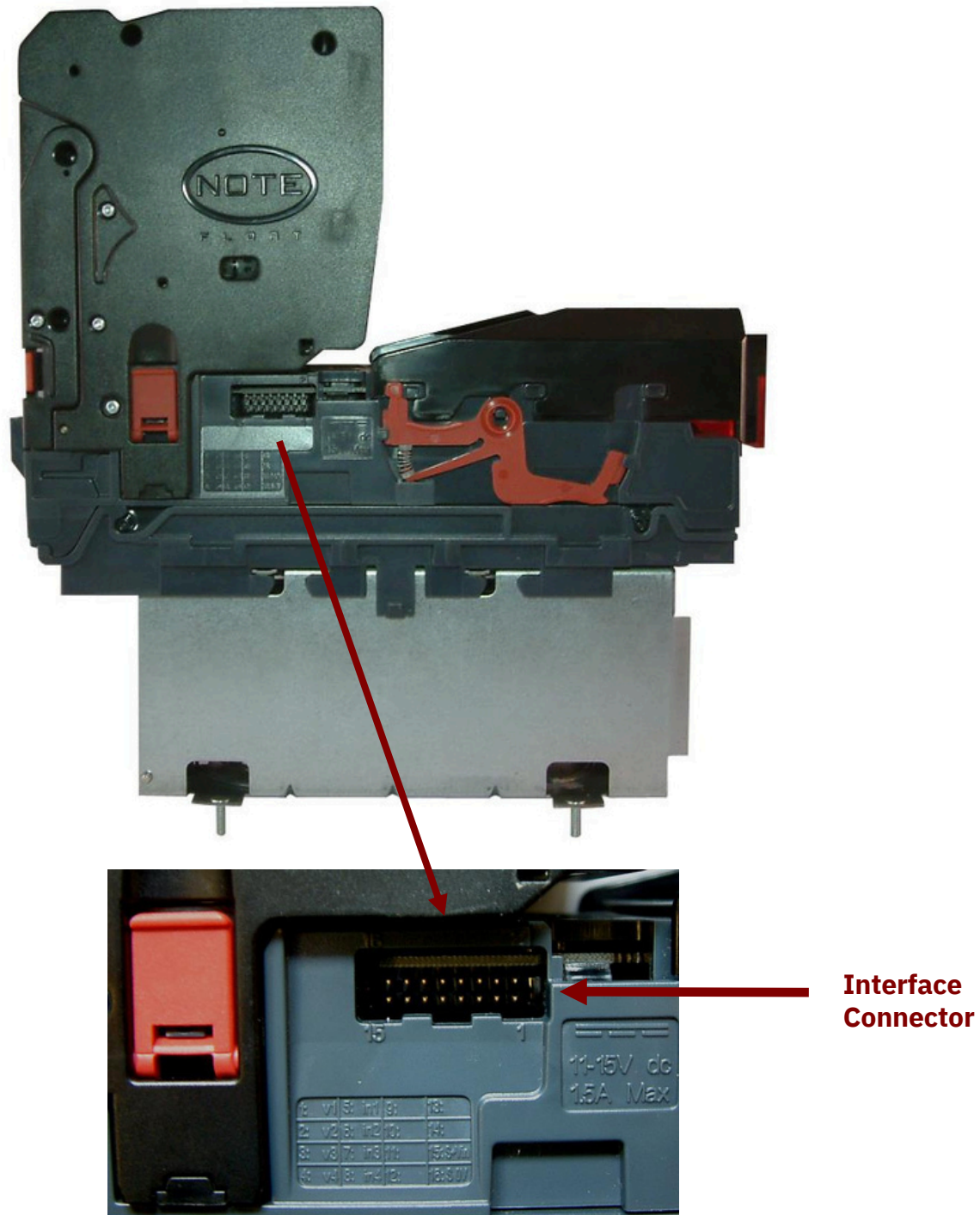
5.5 SSP Escrow Function

To hold a note in the escrow position when using SSP, the POLL command should be replaced with the HOLD command after NOTE READ > 0 for as long as the note is to be held in escrow.

A POLL command will then accept the note; the REJECT command will return the note to the customer

5.6 Connection Options

The NV11 validator has a single connector that is used to allow interfacing and programming:





Information

Power always required regardless of connection type.

Power is always required on pins 15 and 16 of the 16 way connector.

The connector is a 16 pin socket used to interface the NV11 to the host machine. The pin numbering of the socket is shown below, as well as an overview of the socket connections:



Pin	Description
1	Serial Data Out (Tx)
5	Serial Data In (Rx)
11	USB Data +
12	USB Data -
13	USB Power (+5V)
15	+ V
16	0V / Ground Connection

To use a USB connection with the NV11, a USB cable fitted with a 16 way connector on one end (ITL Part Number CN00392) should be used. The CN00392 cable fits into the 16 way connector and allows high speed programming and serial communications when used in SSP and ccTalk modes.

Further details of the cable needed to interface and program the NV11 validator can be found in Section 4 of this manual set (subsection 4.9). When using the USB connection, power must be supplied to the NV11 using the CN00392 cable.



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SECTION 6

NV11 MANUAL SET TECHNICAL APPENDICES

INTELLIGENCE IN VALIDATION

NV11 MANUAL SET – SECTION 6

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6. TECHNICAL APPENDICES

APPENDIX A – PRODUCT APPROVALS

CE Marking

The NV11 unit described in this manual set has been designed to comply with the relevant sections of the following Harmonised European Standards:

- ☐ EN 60950-1:2001
- ☐ EN 60335-2:2002
- ☐ EN 60335-1:2003
- ☐

The unit complies with all the applicable essential requirements of the Standards.

RoHS

The following products, identified by the part numbers listed in the table below, are compliant with the European Union Directive 2002/95/EC of the Restriction of the use of certain Hazardous Substances (RoHS) in Electrical and Electronic Equipment.

Product	Description	Lead free date
NV11	Bank Note Acceptor Assembly	All NV11

We hereby declare that lead (Pb), mercury (Hg), cadmium (Cd), hexavalent chromium (Cr4-6), polybrominated biphenyls (PBB) and polybrominated diphenyl ethers (PBDE), are not intentionally added to our products in amounts exceeding the maximum concentration values as defined by RoHS regulations (except where the application of any of those substances comes within the scope of the RoHS regulations exempted applications).

All compliant products are clearly marked on the product and/or packaging.

All the information provided in this statement of compliance is accurate to the best of our knowledge, as of the date of this publication being issued.

WEEE

The European Union's directive 2002/96/EC on Waste Electrical and Electronic Equipment (WEEE) was adopted by the European Council and Parliament in 2003 with a view to improving the collection and recycling of Waste Electrical and Electronic Equipment throughout the EU, and to reduce the level of non-recycled waste. The directive was implemented into law by many EU member states during 2005 and 2006.



Products and packaging that display the symbol (shown left) indicates that this product must NOT be disposed of with other waste. Instead it is the user's responsibility to dispose of their Waste Electrical and Electronic Equipment by handing it over to an approved reprocessor, or by returning it to the original equipment manufacturer for reprocessing.

APPENDIX B – TECHNICAL SPECIFICATIONS

The information contained here does not form part of a contract and is subject to change without notice. Innovative Technology Ltd operates a policy of continual product development; as such specifications may change from time to time.

Environment:

	Minimum	Maximum
Temperature	+3 °C	+50 °C
Humidity	5 %	95 % non condensing

Power Requirements:

DC Voltage	Minimum	Nominal	Maximum
Absolute limits	10.8 V	12 V	13.2 V
Supply ripple voltage	0 V	0V	0.25 V @ 100 Hz
Supply Current			
Standby			350 mA
Running			3 A
Peak (motor stall)			3.5 A

**WARNING!**

Use suitable power supply

Ensure that the supply voltage to the NV11 is not lower than 10.8 V and that the power supply can provide sufficient current to avoid incorrect operation and excessive note rejects.

We recommend that your power supply is capable of supplying 12V DC at 4 A.

- ☐ For 12V operation, use TDK Lambda model SWS50-12. This power supply is available from a variety of suppliers including Farnell (stock code 1184645) and RS (stock code 466-5869).

Logic Levels:

Interface Logic Levels	Logic Low	Logic High
Inputs	0 V to +0.5 V	+3.7 V to +12 V
Outputs (2.2 kΩ pull-up)	+0.6 V	Pull-up voltage of host interface
Maximum current sink		50 mA per output

General Specifications:

Note Sizes

	Minimum	Maximum
Width	60 mm	82 mm in cashbox 80mm in Note Float module
Length	115 mm	150 mm

Capacity

Storage	300 or 600 notes
Note Float module	30 notes

Weight

NV11	2.2 kg
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Interface Protocol

	eSSP; ccTalk (CC1, CC4)
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APPENDIX C – GLOSSARY OF TERMS

Term	Meaning
A	Ampere
AC	Alternating Current
ACK	Acknowledge
AES	Advanced Encryption Standard
ASSY	Assembly
AV	Average
AWG	American Wire Gauge
AWP	Amusement With Prizes
BNV	Bank Note Validator
ccTalk	Coin Controls Talk
COMMS	Communications
CRC	Cyclic Redundancy Check
DC	Direct Current
DIA	Diameter
DIP	Dual Inline Package
ECB	Electronic Code Book
EEPROM	Electrically Erasable Programmable Read Only Memory
eSSP	Encrypted Smiley® Secure Protocol
FAQ	Frequently Asked Questions
FIFO	First In, First Out
GA	General Assembly
GND	Ground
Hz	Hertz

Term	Meaning
IF	Interface
ITL	Innovative Technology Ltd
LED	Light Emitting Diode
LIFO	Last In, First Out
mA	milliampere
max	maximum
MDB	Multi Drop Bus
min	minimum
mm	millimetre
ms	millisecond
MOD	Modified (or Modification)
NV	Note Validator
PCB	Printed Circuit Board
PDF	Portable Document Format
PiPS	Pay-in Pay-out System
PROM	Programmable Read Only Memory
PSU	Power Supply Unit
QTY	Quantity
RAM	Random Access Memory
ROM	Read Only Memory
Rx	Receive
RoHS	Restriction of the use of certain Hazardous Substances
SIO	Serial Input Output
SSP	Smiley® Secure Protocol
SWG	Standard Wire Gauge



Term	Meaning
SWP	Skill With Prizes
SYNC	Synchronize
TTL	Transistor Transistor Logic
Tx	Transmit
USB	Universal Serial Bus
V	Volt
V_In	Voltage In
WEEE	Waste Electrical and Electronic Equipment



APPENDIX D – ORDERING INFORMATION

The following information is required to order an NV11 validator:

Product	NV11	Consists of NV9USB validator, Note Float module, bezel and cash box
Dataset	Country code and variant	Alternatively supply details of the currency and note types you wish to use
Bezel Size	66 - 85 mm	Please check the NV11 product page on the ITL website for details of the bezels available Please check the NV11 product page on the ITL
Cash Box	300 or 600 note capacity	website for details of the range of available cashboxes
Interface	eSSP; ccTalk	The NV11 can be used with CC1 or CC4 variants of ccTalk

NV11 QUICK REFERENCE GUIDE

This guide is an overview of the configuration available for the NV11. Refer to the manual available on the ITL website for full information on the NV11.

Configuration Button

The NV11 has a Configuration Button located on the front of the Note Float unit. It has the following functions:

Action	Function	Indication
Press and hold until the bezel illuminates (>2 secs) then release	Toggle the NV11 between programming mode ccTalk interface. Current interface indicator	Bezel LED's illuminate until the button is released. When released, the bezel LED's flicker for up to 5 seconds, the validator then resets
Press Twice (within half a second).		Bezel LED's flash a number of times according to the current settings. 1 Flash = SSP 6 Flash = ccTalk
Press once while Note Float Unit status LED is flashing at a constant rate (1Hz) (transport error)	Acknowledge that Note Float Jam has been cleared Toggle programming card acceptance mode	
Press once while Note Float Unit status LED is NOT flashing	Empty all notes from the Note Float to the cashbox.	Bezel LED will flash constantly, programming card can be inserted. See manual for full details.
Press and hold, the bezel will illuminate. Keep holding until bezel light turns off (about 5 seconds) then release.		If the empty is being performed, the operator will hear the motor inside the Note Float moving. Bezel LED will flash during empty procedure.
Press and hold as power is applied (>2 secs) then release	Resets ccTalk key to Default setting*	

*This function will only be possible with the Note Float removed and if the NV9 USB is programmed to ccTalk® mode. It is not possible to reset the key from SSP mode.

Error Flash Codes

The following table details the cause for the status LED on the front of the NV11 flashing:

Flashes	Meaning	Corrective Action
Constant 1Hz	Transport error in Note Float Software Error Calibration Error Diverter Error	Remove power and separate Note Float from validator. Open rear access door and remove jammed note from Note Float. Securely close the door, reseal and apply power. Press configuration button once to return to service.
2	Motor Timeout	Download dataset/firmware file to NV11.
4		Remove and replace power from device. If regularly (or constantly) reporting calibration error, return to service centre for repair.
5		Check for jammed notes preventing the diverter returning to the home position.
		Check for jammed notes preventing the Note Float tape from moving.

If the validator bezel flashes in a sequence of long and short flashes, the following table details the fault reported:

Long Flashes	Short Flashes	Meaning	Corrective Action
1	1	Note path open	Ensure front catch is secure and no debris in path.
	2	Note path Jam	Open the Note Validator note path and check for jammed notes or debris covering a sensor
	3	Cash box Jam	Unit must be returned to service centre for re-initialising
	1	Firmware Checksum	Unit must be returned to service centre for re-initialising
	2	Interface selected	Check that the cash box note plate is free to move and the stacker mechanism is in the home position
2	2	not available in firmware	Download dataset/firmware file to NV11
	3	EEPROM Checksum	Download dataset/firmware file to NV11
	4	Dataset Checksum	Download correct dataset/firmware file to NV11
3	5	Incompatible Validator & Note Float Firmware	Download dataset/firmware file to NV11
		Incompatible Note Float Firmware	Download dataset/firmware file to NV11
		Incompatible Note Float Firmware and Hardware	Check validator firmware is compatible with Note Float firmware
		PSU too Low	Use an older firmware or sent to service centre for upgrade.
		PSU too High	Check the power supply is 12V DC 3.5A
4	6		Check the power supply is no more than 13.2V
	1		
	2		

