

Innovative Technology

POWERING TRANSACTIONS AND INTERACTIONS

NV9USB+ Range User Manual

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NV9USB+ Range Product Information

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Product Overview

The NV9 USB+ Range are versatile banknote validators with cashbox and bezel options to suit all applications, boasting enhanced sensing technology and a high acceptance rate for multi-currency. The NV9 USB+ can be mounted horizontally or vertically and exceptional field reliability make them a truly global product range. A note float module can be added to provide note recycling capability.

Key Features

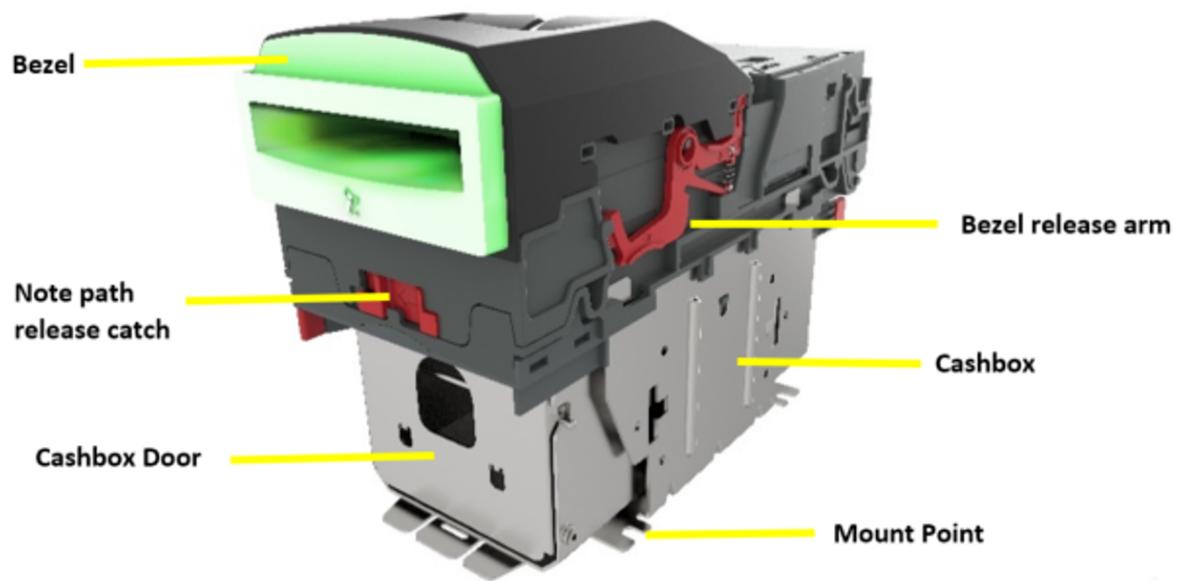
- Exceptional field reliability
 - Enhanced sensing technology
 - Cashbox and bezel options to suit all applications
 - Future proof
 - Add on recycler available. (NV11+)
-

Typical Applications

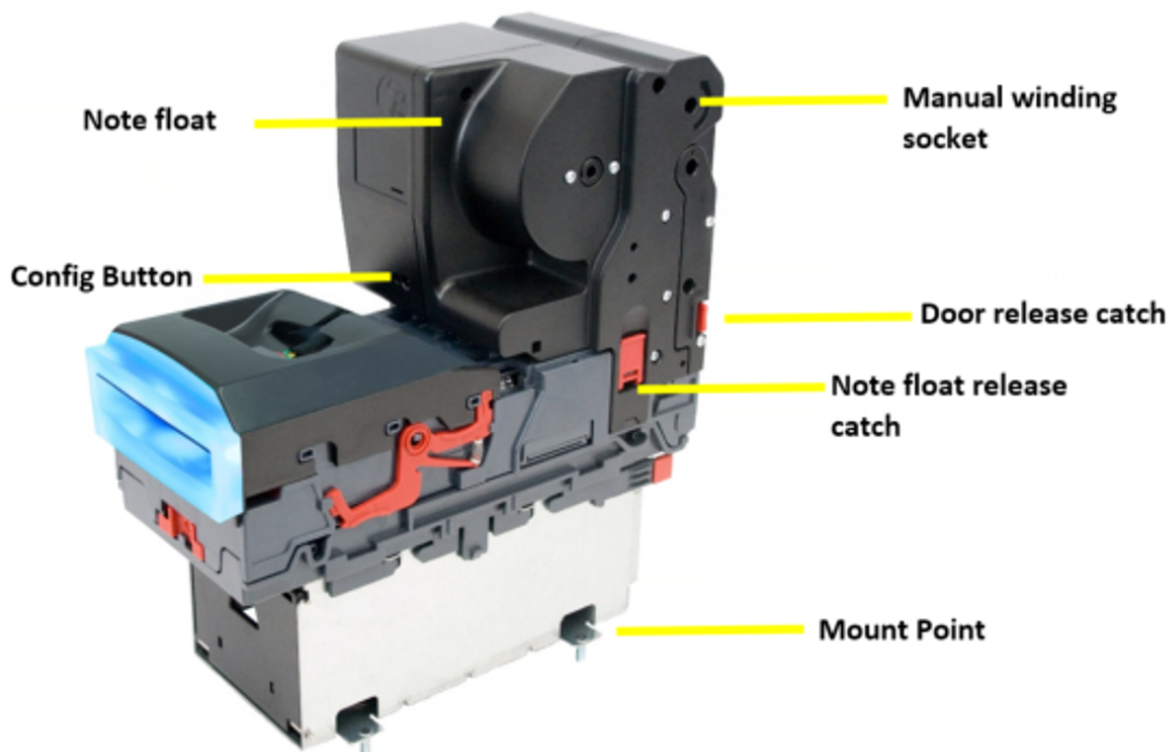
- Amusement
 - Vending
 - Gaming
 - Low-volume Retail
-

Component Overview

NV9USB+



NV11+



Bezel Options

ITL Part Number	Description
PA00188	NV9USB Vertical Up Bezel (82mm)
PA00189	NV9USB Standard Horizontal Bezel (82mm)
PA00190	NV9USB Vertical Up Snout Bezel (82mm)
PA00191	NV9USB Vertical Down Snout Bezel (82mm)
PA00268	NV9USB Horizontal Bezel (69mm)
PA00296	NV9USB Vertical Up/Down Flat Bezel (66mm)
PA00323	NV9USB Vertical Up/Down Flat Bezel (69mm)
PA00896	NV11 Standard Bezel
PA01144	NV9USB+ Rainbow Bezel (82mm)
PA00984	NV9USB Facia Short
PA00985	NV9USB Facia Long
PA03288	NV9 Vertical (BV50 Fitment) Bezel Assembly

Cashbox Options



Some national currencies differ in thickness and circulation practices. Depending on usage, this can impact cash box capacities by 10-15%. Consult with your ITL representative for more details.

ITL Part Number	Description
PA00185	NV9 USB 300 Clip On Cashbox
PA00186	NV9 USB 300 Lockable Cashbox
PA00192	NV9 USB 300 Slide Cashbox
PA00193	NV9USB 600 Clip on Cashbox

ITL Part Number	Description
PA00194	NV9USB 600 Slide In Cashbox
PA00898	NV11+ Standard 300 Clip on Cashbox
PA02580	NV9 USB 600 Lockable Cashbox

NV9USB+ Range Technical Data

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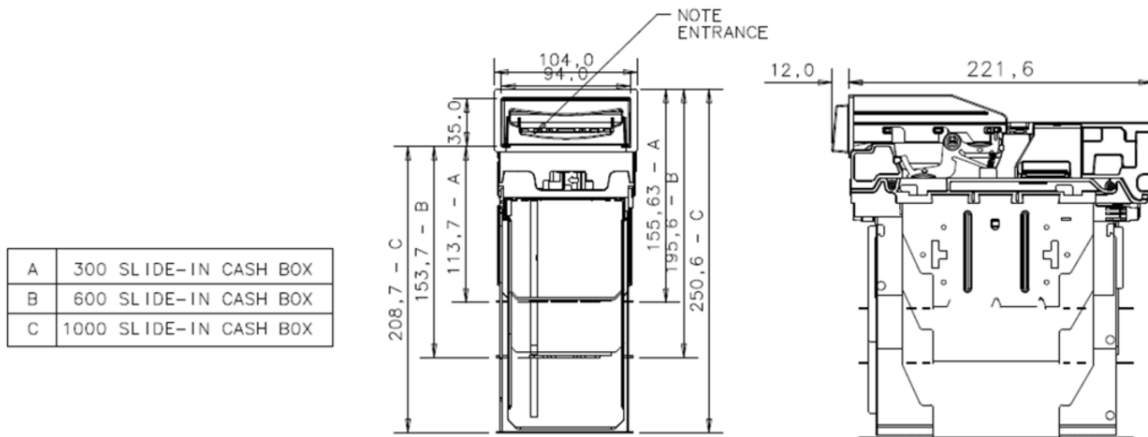
Dimensions

3D drawings in .stp format are available upon request. Please contact support@innovative-technology.com.

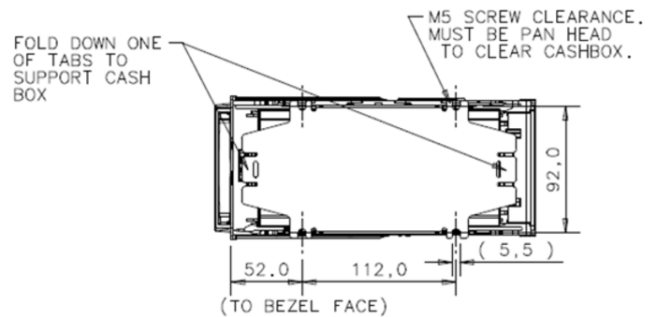


If you specify the required bezel and cashbox type in your inquiry we may send you the correct download link directly in our reply.

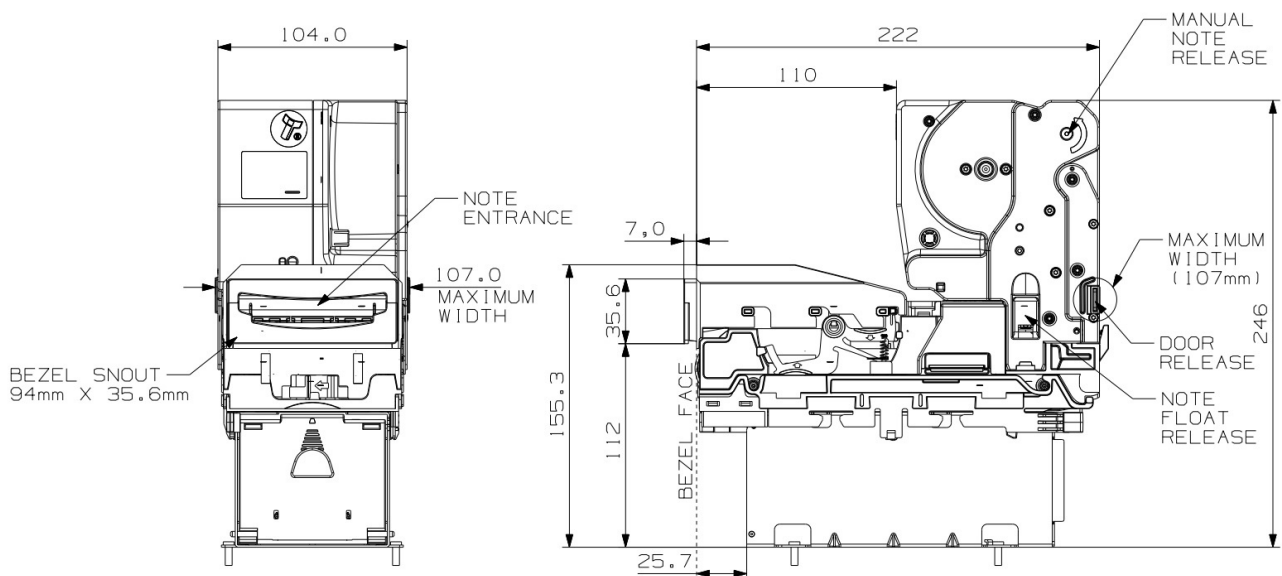
NV9USB+

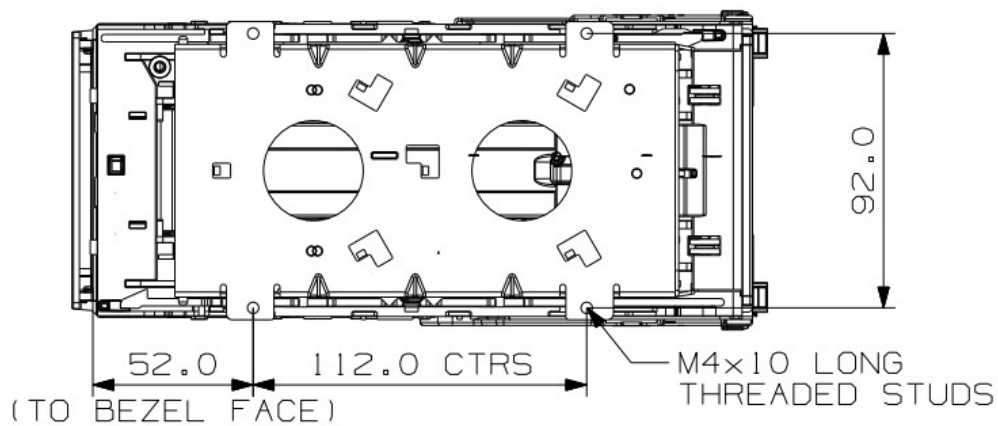


ACCEPTS NOTES UP TO 82mm x 160mm LONG



NV11+





Weight

NV9USB+

Unit	Weight
NV9USB+, 300 Clip Cashbox with Bezel	1.14kg
NV9USB+, 300 Slide Cashbox with Bezel	1.86kg
NV9USB+, 600 Clip Cashbox with Bezel	1.72kg
NV9USB+, 600 Slide Cashbox with Bezel	2.14kg

NV11+

Unit	Weight
NV11+, 300 Clip Cashbox with Bezel	2.22kg

Environmental Requirements

Environment	Minimum	Maximum
Temperature	+3°C	+50°C
Humidity	5%	95% Non-Condensing

Power Requirements

Supply Voltages

Supply Voltage	Minimum	Nominal	Maximum
Supply Voltage (V DC)	10.8V DC	12V DC	14.2V DC
Supply Voltage (with IF5)	18V DC	---	48V DC or 34V AC
Supply Ripple	0V	0V	0.25V @100Hz

Supply Currents

NV9USB+

Supply Current	Minimum	Nominal	Maximum
Standby	---	---	0.2A
Running	---	---	1.0A
Peak	---	---	1.5A

NV11+

Supply Current	Minimum	Nominal	Maximum
Standby	---	---	0.35A
Running	---	---	3.0A
Peak	---	---	3.5A

Power Supply Guidance



The NV9 USB+ Range of products require a stable 12V DC power supply. Please check the power requirements of your host machine and other peripherals to dimension a suitable power environment for your machine setup.

TDK Lambda manufactures suitable power supplies. Please see table below for further details.

Power Supply Unit	Specification	RS Stock Code	Farnell Stock Code	Suitable For
TDK Lambda SWS50-12	+12V DC / 4.3 A	466-5869	1184645	NV9USB+ NV11+

Interface Logic Levels

	Logic Low	Logic High
Inputs	0v to +0.5v	+3.7v to +12v
Outputs with 2K2Ω pull-up resistor	+0.6v	Pull-up voltage of host interface
Maximum Current Sink	50mA per Output	

Reliability Data

The below data refers to the Mean Cycles Between Failure (MCBF) and the Mean Cycles Between Intervention (MCBI). The difference between the two is that a failure would usually require the unit being replaced. Whereas an intervention would be an issue that is easily clearable such as a reset or clearing a note path jam.

A cycle is classed as a note or ticket being either accepted or dispensed. For example; if a unit accepts a note and then dispenses a note as change, it is classed as two cycles.

NV9USB+

MCBF: 200,000 Cycles

MCBI: 100,000 Cycles



It is important to note that when adding a recycler or printer, you are doubling the number of modules. Thus, the MCBF/MCBI will naturally be halved.

NV11+

MCBF: 100,000 Cycles

MCBI: 50,000 Cycles

Media Requirements

Notes

	Minimum	Maximum
Length	90mm	170mm
Width	62mm	82mm

The NV9 range supports multiple currencies and denominations as per the specifications detailed in the table above. Furthermore polymer and windowed notes are in use in a number of countries and so are already fully supported on the NV9 range of validators.

NV9USB+ Range Mechanical Installation

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Compatibility

Hardware Compatibility

Machine Mounting

Assuming the suitable bezel (and cashbox) type has been ordered the NV9 USB+ can be used as fitting replacement for the following products:

- NV7
- NV7M
- NV9

Innovative Technology Ltd. has a policy of continuous product improvement. Due to design changes, older model or product bezels and cashboxes may not be compatible with the current NV9USB+. However, new product deliveries always include a bezel and cashbox that must be used.



Only use the bezel and cashbox delivered with the product!

Considerations will need to be made when adding either the recycler or printer module, as this will increase the space requirements inside the host machine. The host machine software may also not support the recycler or printing module.

Machine Interfacing

By design the NV9USB+ and NV11+ are pin to pin compatible with the fitting replacement products listed above. No changes to existing machine harnessing are required.

Power Supply

It is vital that the product is connected to a power supply being able to provide the required power environment. A weak power supply can lead to unexpected behaviour such as note rejects or missing credits. If you are replacing an older model or product we recommend checking the power supply specifications of the machine. The newer models might have higher power consumption. Refer to [Power Requirements](#) for full power requirement details of the full NV9 USB+ Range.

 A weak power supply may cause malfunction.

Software Compatibility

Interface Protocols

When using the NV9 range of products as a fitting replacement for an older model or product some events such like credits may be given earlier. This is due to improved firmware routines and faster motors being used. This may cause missing events such like credits in those host machines where timeouts are defined for the older model or product. Please contact the machine manufacturer for full compatibility.

 Timing issues may cause missing events such as credits!

Re-programming

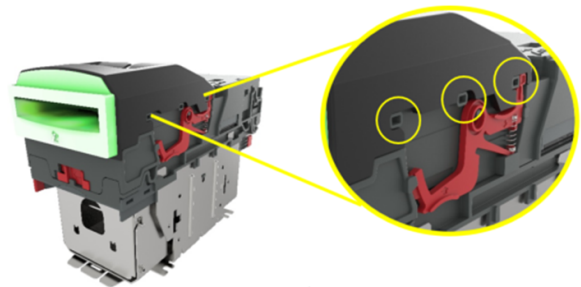
For re-programming the units always use the latest version of Validator Manager, available for download from our website. Newer products may not be fully supported on older versions of Validator Manager. For further details on Re-programming, refer to [Dataset/Firmware Programming](#).

Bezel Mounting

Bezel Fitting

1 Locator lugs

Place bezel down onto validator, ensuring locating lugs go into spaces provided.



2 Lock bezel in place

Slide bezel backwards until you hear release latch arm, click into place.



Bezel Removal

1 Release clips

Pull release clip upwards (1)

With release clip held upwards, you can pull bezel towards front of unit (2).



2 Lift bezel

Now bezel is free of locating lugs, lift bezel upwards (3).



Cashbox Mounting

Below you will find details on how to fit the different cashboxes mentioned in Cashbox Options.

Slide cashboxes are made up of 2 parts. The outer housing and the cashbox itself, which slides in and out of the housing. These are used for when the unit is mounted horizontally.

Clip on cashboxes attach directly onto the validator. These are mainly used for when the unit is mounted vertically.

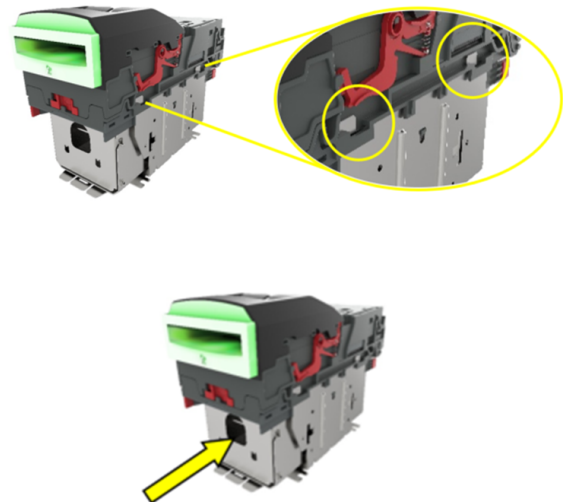
Cashbox Fitting

1 Slide Cashbox

The outer housing has 2 x lugs on either side and these need to be pushed up into the cashbox slots as per the image.

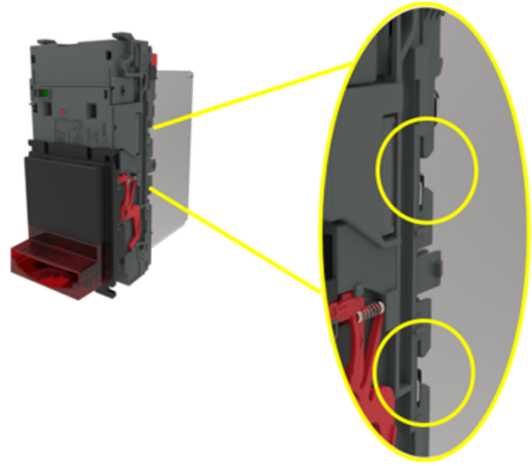
Then slide housing forwards to lock into place.

The outer housing is mounted inside the machine and you simply slide the removable cashbox, inside the outer housing.

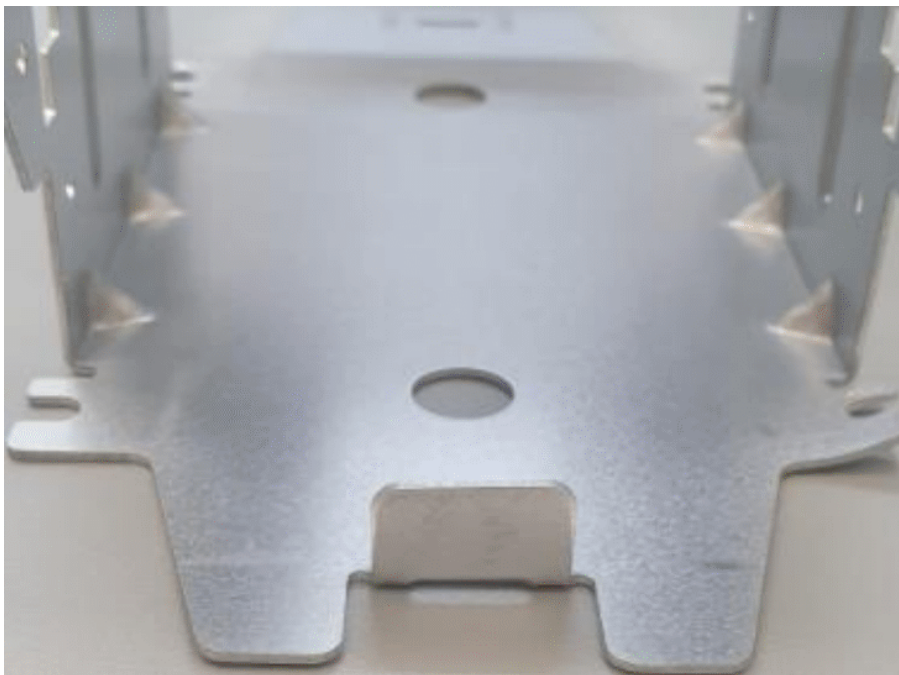


2 Clip-on Cashbox

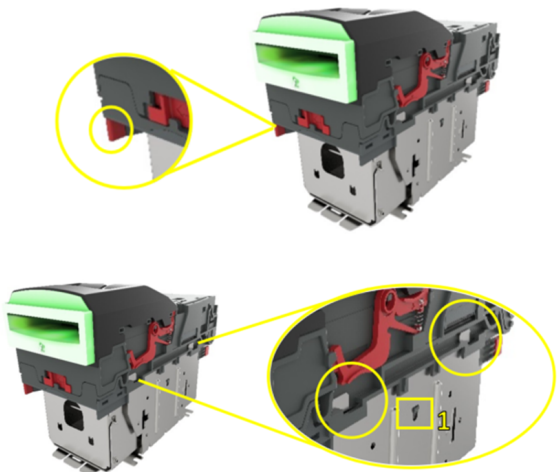
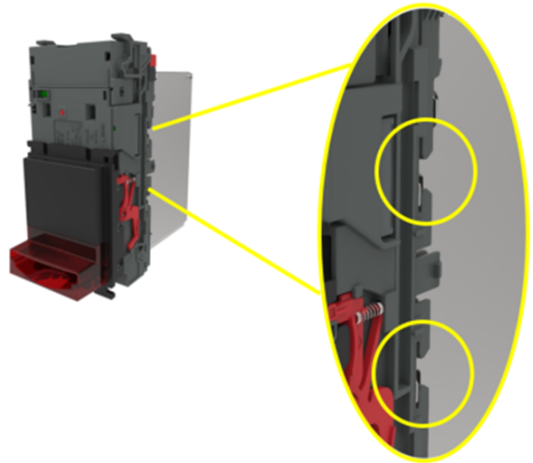
The clip-on cashbox attaches directly to the validator and is identical to the process above.



To improve the fixation of the cashbox is recommended bending the fixing tab to prevent it from falling when handling the validator.



Cashbox Removal

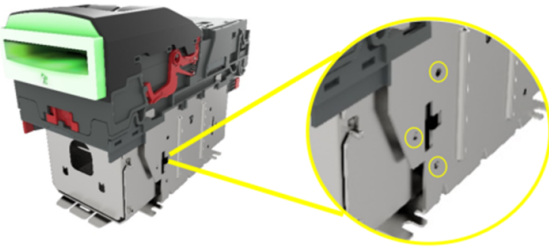
1 Slide Cashbox Remove the cashbox from the outer housing. Pull cashbox release catch away from validator and slide cashbox out. Push the tab (1) seen in the image whilst sliding the outer housing back, so that the locating tabs are free to move away from the validator.	
2 Clip-on Cashbox Simply slide the cashbox back so that the locating tabs are no longer locked in position. You can then pull cashbox away from unit.	

Lock Mounting

The NV9 range has an option for a 300-lockable cashbox. This is designed for a **300-slide** cashbox option.

ITL Part Number: PA00186

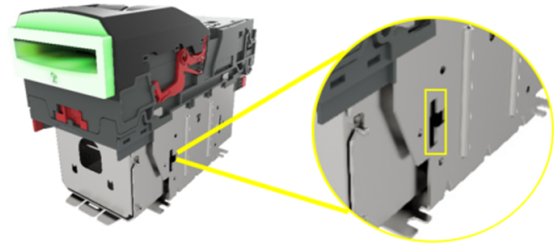
Lock Fitting

1 Screw Holes The lockable door attaches to the cashbox housing via 3 x screw holes, as shown. These can be found on all 4 sides of the cashbox. Front Right; Front Left; Rear Right; Rear Left.	
--	--

2 Locking Cam Slot

You'll also see 4 x slots for each position too. This is where the lock slides into, in order to lock the door in place.

 You want to use the 3 x mounting screw points, on the opposite side of where your lock will be.

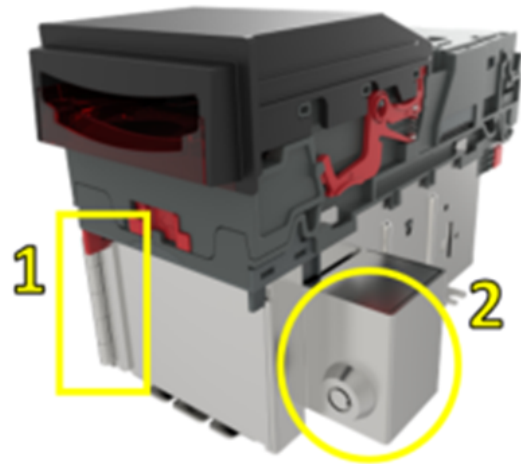


For example: if you want the lock to be Front Right – you would mount the door on the Front Left, so that the door swings round and locks on the side you specified.

3 Lock

Using front right as an example, this specifies the location of the lock (2).
In this case, the door is mounted as seen (1).

Lock specification details can be found below in [Lock Specifications](#).



Lock Specifications

Locks for the NV9 range cashbox are available from Innovative Technology Ltd.

ITL Part Number: PA00650

 PA00650 is a universal lock across a number of our products therefore the website may stock it under a different product's spare list.

However, there are various lock manufacturers and distributors. Refer to [Lock Specifications](#) for details.

Lock Cam

The following Lock Cam needs to be ordered from Innovative Technology Ltd. additionally to the lock for full locking capability.

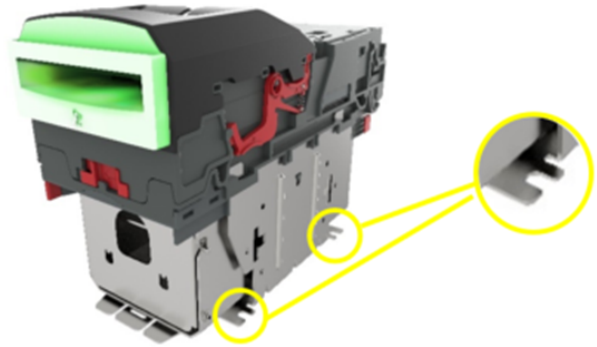
ITL Part Number: MC00186

Machine Mounting

Horizontal Configuration

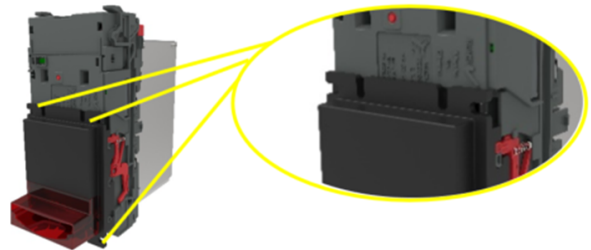
The slide cashbox configuration has 4 mounting points, for each corner.

These should be used to secure the validator to a base/shelf inside the host machine.



Vertical Configuration

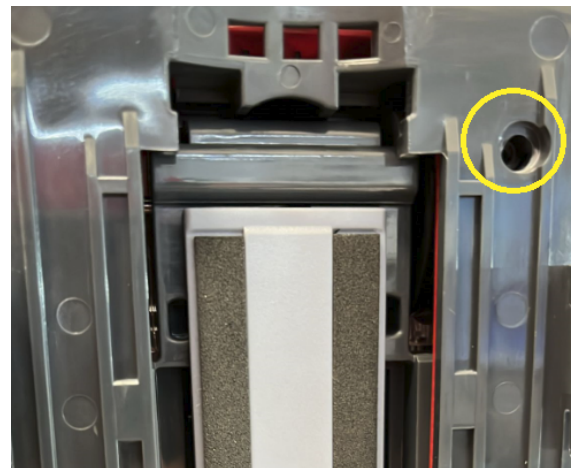
The vertical bezels available to the NV9 range all have mounting locations to allow you to mount the unit to the back of the door.



Lozenge Retention Screw

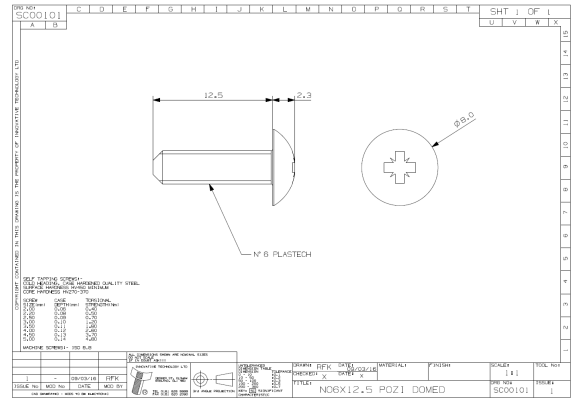
1 Retention screw

A retaining screw must be used to lock the lozenge.



2

- SC00101



Earth Bonding

It is very important that the NV9USB+ is properly bonded to earth. Lack of proper bonding can cause communication issues and other failures.

NV9USB+ Range Software Installation and Configuration

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Introduction

The NV9USB+ and NV11+ leave the factory pre-programmed with dataset and firmware files. However, it is important to ensure your device is kept up to date with the latest dataset and firmware. This section will give you a brief overview of the various update possibilities. For detailed instructions please refer to the relevant manual package supplied with the software or contact support@innovative-technology.com.

Software Downloads

All software from Innovative Technology Ltd is free of charge and can be downloaded from <https://www.innovative-technology.com/support/secure-download> once registered and logged in. If you are not registered, please create an account via the Create an account form. A confirmation email will be sent to the registered email address once all contact details have been successfully submitted.

Drivers

The ITL drivers allow you to connect any of our validators to a compatible Windows device. If you are connecting via an IF17 then you will not need to follow this process as they are signed Microsoft Drivers and should install automatically. If this isn't the case or your computer is disconnected from the network, there is a standalone package included within the driver downloads.

Dataset/Firmware Programming

Validator Manager

General Description

Validator Manager is a utility which allows the user to reprogram any of ITL's validators. Please note that admin rights are required during installation. The validator must be in SSP for the Validator Manager to detect the device.

System Requirements

- Windows 8.1 or above
- .Net Framework 4.5
- 256mb ram
- 50mb hard disk free
- Connected validator with active com port

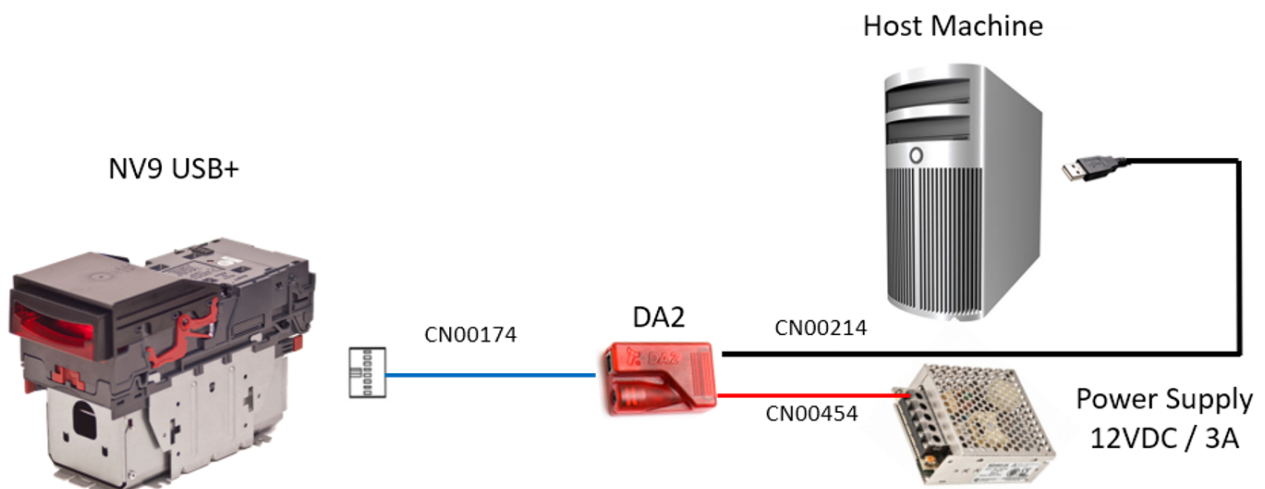


We have seen instances where one of the dll's (itdata1.dll) used in Validator Manager are flagged as a Trojan, this is a false positive and if this happens you will need to add a rule to your antivirus to allow the file to run.

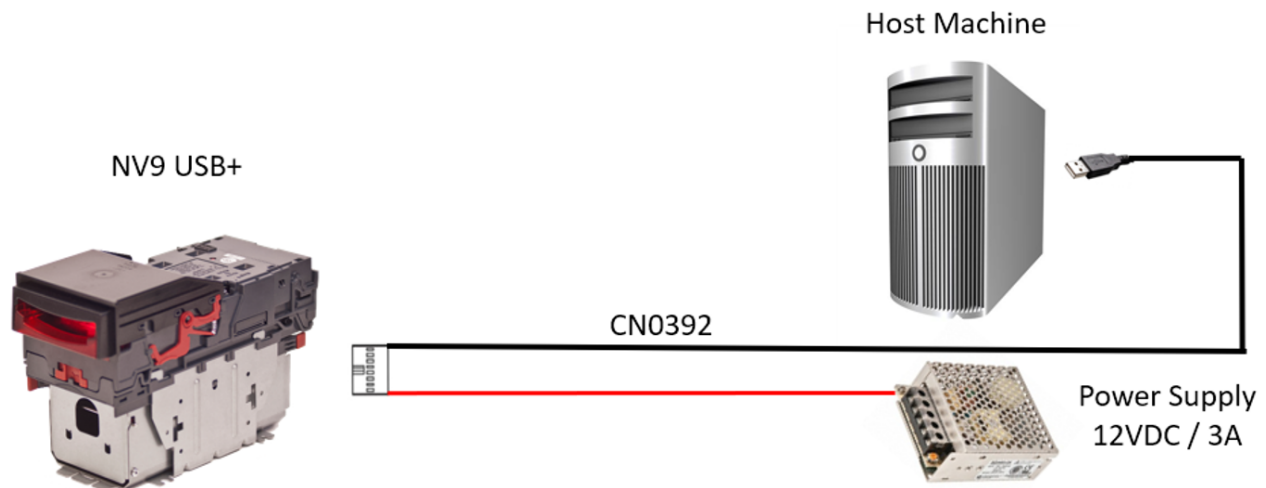
Hardware Setup

DA2 Kit

Connect the power supply to the DA2. Connect the USB cable to the DA2 and to your computer or laptop. Connect the Ribbon cable from the DA2 to the validator.



Direct USB



The connection methods are identical between NV9USB+ and NV11+ products.

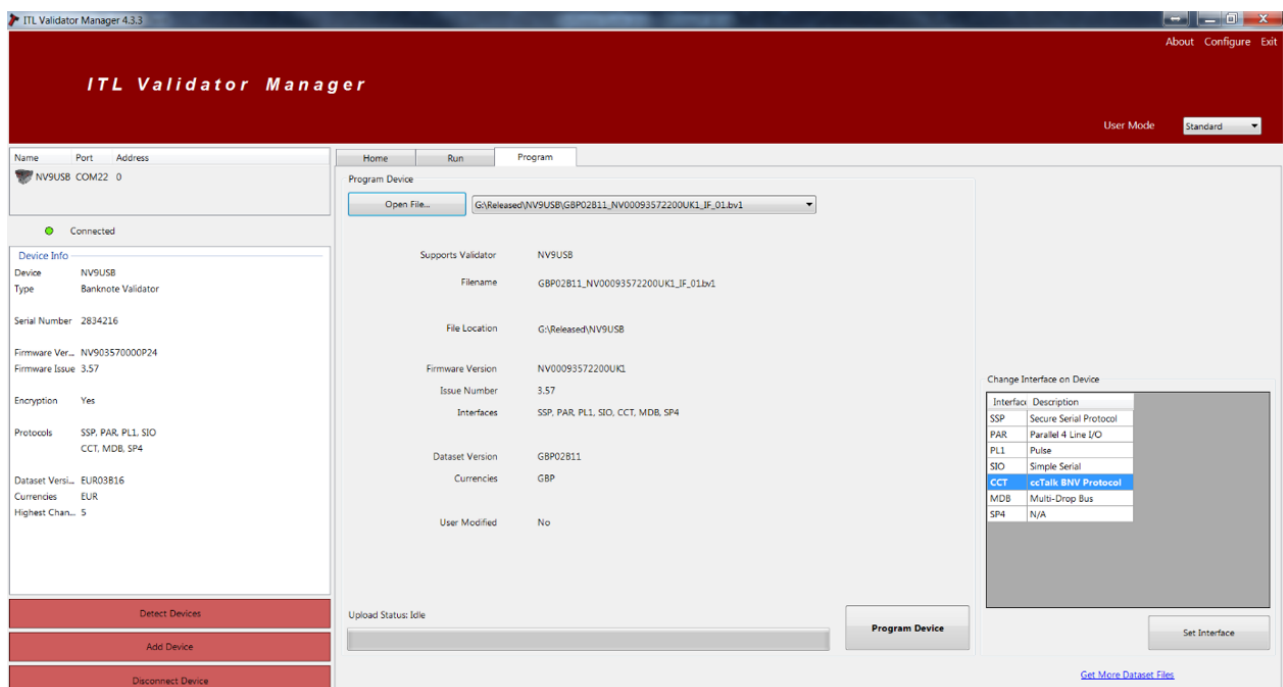
Switching to Programming Mode (SSP)

Before programming via Validator Manager, the device needs to be switched to its programming mode (SSP interface). Please refer to [Switching to Programming Mode \(SSP\)](#) for the procedure for doing this.

Programming the Device

Once you have switched the unit into SSP, open Validator Manager and click detect devices. This will scan all active com ports for a unit, if your validator fails to connect please ensure the correct drivers are installed and the unit is in SSP.

By selecting the Program tab, you can reprogram the validator. To begin the upload, click open file, then browse to the file location before clicking OK.



Once the file has been selected its information will be populated and the Program device tab will become active. Finally hit 'Program Device', the unit's bezel will now begin to flash signaling the update has begun.

- ⓘ Interrupting the download process can result in the unit entering a non-functional state, once the process has started it cannot be halted.

When completed the unit will restart and a pop up box will appear saying Device Programming Complete.

DA3

General Description

The DA3 is a hand-held validator programming system that enables the user to re-program ITL banknote validators in the field, without the use of a PC. Dataset and firmware files for different validator models can be stored on the DA3. Once programmed the user can update or override existing software as well as test the functionality of the validator, away from the host machine.

System Requirements

- Windows 8.1 or above
- .Net Framework 4.5
- 256mb ram
- 50mb hard disk free
- Connected DA3 with active com port
- Data Flash Card (PA01121) **optional**

Re-programming via DA3

To program using the DA3 programmer, you first need to load the DA3 with the necessary files. You will need to use one of our software tools, Device Programming System (DPS) which can be downloaded from our website.

For information on programming the DA3, you can refer to our Device Programming System guide.



Once the files are loaded onto the DA3, the validator can be updated. Simply remove the host machine cable and plug this into the "Host machine" port on the DA3 as shown in the image above. You will then need a ribbon cable to

connect the DA3 to the validator itself, via the “validator” port. The DA3 should now be sat in-line between host and validator, with the DA3 being powered from the host connector.

Now ensure that the unit is in SSP (programming mode - see [Switching to Programming Mode](#)) and on the front side of the DA3, use the mode select button to choose either BNV Match Download or BNV Override download – based on how you set the DA3 up – and simply press the large play button in the middle. Once the download has begun, you will see the blue LED’s start to swirl and will continue to do so until download is complete.

The play button will turn **GREEN** if the download has been completed successfully. If for whatever reason there is an error, the play button will turn **RED** and the download method LED will be flashing an error code for further diagnosing. A table of error codes can be found below:

1 Long flash followed by –

Number of SHORT flashes	Indicated Status / Error
2	No validator connection found
3	No valid download files found
4	Download fail
5	Memory card fail

SMART Update DA3

The DA3 also has a feature called SMART Update, which provides all applicable dataset files for a given currency across our entire product range, into a single file.

Differences from standard DA3:

- SMART Update firmware required on DA3
- SD card with download file, inserted into slot A
- SMART Update method only updates the file on the validator, no settings can be changed.

Our complete SMART Update package, along with full information guide can be downloaded from our software section on our website.

Remote Updates

General Description

The NV9 range of products all support remote update, which is the ability to send an update file via protocol commands. This means that you do not physically have to be stood at the machine, as the host initiates the download via the protocol.

Software Requirements

Remote update relies on a series of packets to be transmitted to the validator and thus only the serial protocols such as SSP and ccTalk allow this feature.

Details of how this is implemented can be found in our SSP implementation guide (GA00973).

You will have to check with the machine manufacturer as to whether this is a feature their software supports.

Configuration Card

General Description

Configuration cards can be used as a quick and simple way of changing certain options just by inserting the paper into the bezel mouth.

An example of the configuration card can be found below, with a full print out version and instructions in [Programming via Configuration Card](#).

NV9/10

Insert this end first

NV9/10

Parallel

Pulse

Enabled pulse

MOB

SSP

ocTalk

SiO

Si 2

CH 1

CH 5

CH 2

CH 6

CH 3

CH 7

CH 4

CH 8

High speed

Low speed

pulse x1

pulse x16

pulse x2

pulse x32

pulse x4

pulse x64

pulse x8

pulse x128

8 bit ocTalk checksum

ocTalk plain/ Binary

Credit hold

No escrow timeout

Select Interface

Select bill disable

Select pulse options

General Options



GA 959 rev 1.4



This feature is not available on the UK special version of firmware.

Hardware Requirements

Re-programming the validator simply requires the relevant fields on the card are filled in with solid black ink, the unit to be in config card mode and then inserting the card into the bezel mouth, as you would a note.

Full instructions on programming via the configuration card can be found in Programming via Configuration Card.

Re-programming via Configuration Card

Re-programming the validator simply requires the relevant fields on the card are filled in with solid black ink, the unit to be in config card mode and then inserting the card into the bezel mouth, as you would a note.

Full instructions on programming via the configuration card can be found in Programming via Configuration Card.

NV9USB+ Range Protocols and Interfacing

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- [ccTalk®](#)
- [CC4](#)
- [SIO and SI2](#)
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- [Binary](#)
- [Pulse](#)

Introduction

The NV9USB+ Range supports standard industry protocols. Interfaces that are not listed may be available upon request. For any queries regarding interfaces that are not listed please contact support@innovative-technology.com.



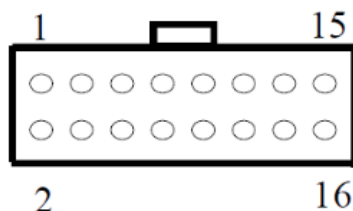
The use of an encrypted protocol (preferable eSSP) is strongly recommended to achieve the highest security.

SSP and eSSP

General Description

Smiley® Secure Protocol (SSP) and Encrypted Smiley® Secure Protocol (eSSP) are field proven secure interfaces specifically designed by Innovative Technology Ltd. to address the problems by cash handling systems in gaming machines. Problems such as acceptor swapping, re-programming acceptors and line tapping are all addressed. This interface is recommended for all new designs. Innovative Technology Ltd. provides full SDK packages upon request including Interface Specification, Implementation Guide as well as source code examples for C++, C#.NET and Linux. Please contact support@innovative-technology.com for further information.

Pin Assignment



Pin	Name	Type	Description
1	Vend 1	Output	Serial Data

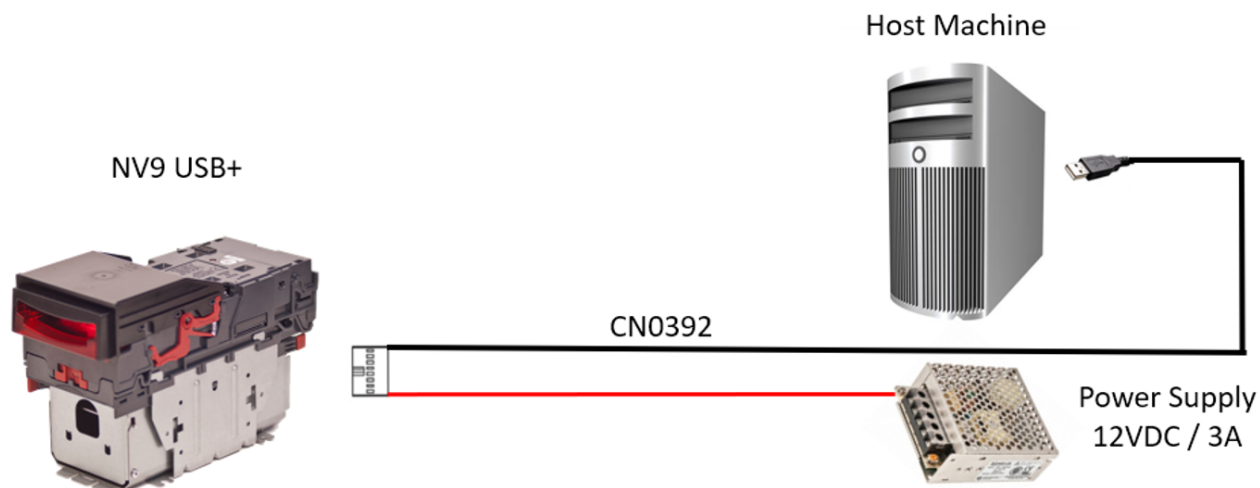
Pin	Name	Type	Description
2	Vend 2	Output	DA3 Data Logging
3	⚠ Not Used		
4			
5	Inhibit 1	Input	Serial Data
6	⚠ Not Used		
7			
8			
9			
10			
11	USB +	Data	USB Data +
12	USB -	Data	USB Data -
13	USB Vcc	Power	USB Vcc (+5VDC)
14	⚠ Factory Use Only – Do Not Connect		
15	+ Vin	Power	+12VDC Supply
16	0V	Power	0V Supply (GND)



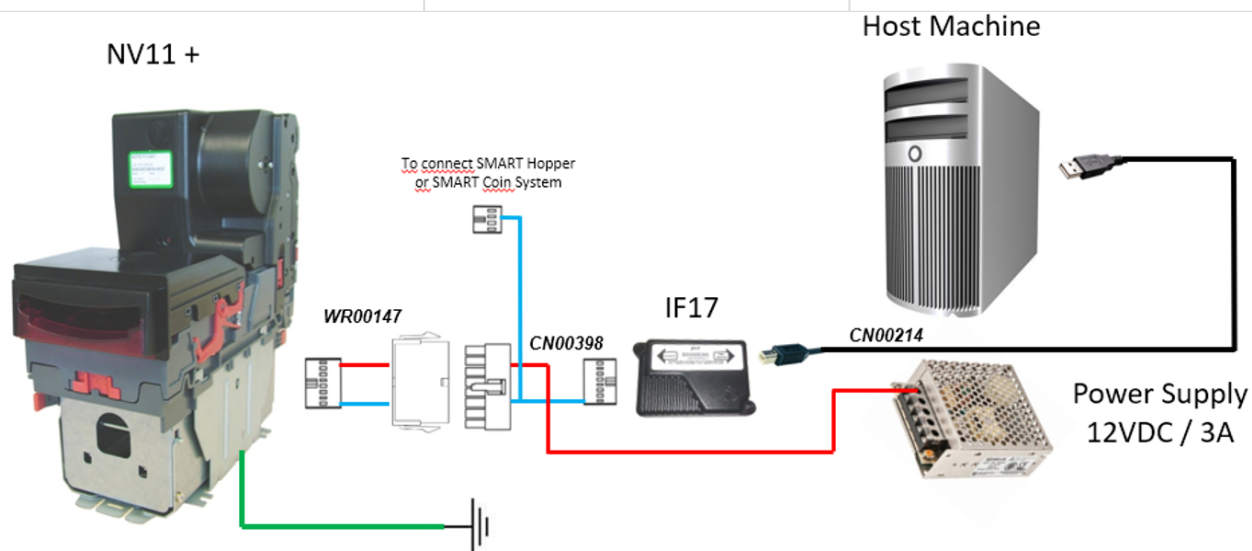
+12VDC and 0V (GND) must always be connected, also when using USB connections.

Setup Examples

The drawings below highlights how to connect the NV9 Range to an SSP or eSSP host machine using available cables and interfaces from Innovative Technology Ltd. Please refer to [Cable Drawings](#) for details.



Type	ITL Part Number	Description
Cable	CN00392	Validator to USB Cable

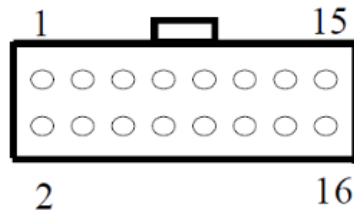


Type	ITL Part Number	Description
Cable	CN00398	Dual SSP Interface Cable
Cable	WR00147	SMART Payout to NV200 Adapter
Cable	CN00214	USB Type A to B
Interface	IF17	TTL to USB Converter

General Description

ccTalk® is a serial communications protocol designed by Money Controls to allow 3-wire interfacing between a host and cash handling peripherals. Please contact support@innovative-technology.com for further information.

Pin Assignment



Pin	Name	Type	Description
1	Vend 1	Output	Serial Data (link to Pin 5)
2	Vend 2	Output	DA3 Data Logging
3	⚠ Not Used		
4			
5	Inhibit 1	Input	Serial Data (link to Pin 1)
6	⚠ Not Used		
7			
8			
9			
10			
11	USB +	Data	USB Data +
12	USB -	Data	USB Data -
13	USB Vcc	Power	USB Vcc (+5VDC)
14	⚠ Factory Use Only – Do Not Connect		

Pin	Name	Type	Description
15	+ Vin	Power	+12VDC Supply
16	0V	Power	0V Supply (GND)

 +12VDC and 0V (GND) must always be connected, also when using USB connections.

ccTalk® DES Encryption

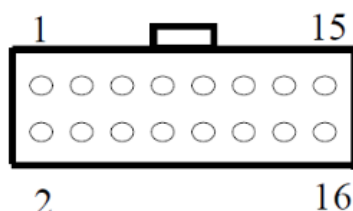
When using ccTalk® DES encryption, the validator and host machine must exchange a secret key which forms the basis of the communication encryption. This exchange is performed in a Trusted Mode maintaining security. The Trusted Mode can only be entered by a physical access to the validator. Please refer to [ccTalk® DES Encryption - Trusted Mode](#) for details.

CC4

General Description

The CC4 protocol is an extension of ccTalk with additional status and payout commands to support the note float recycler unit and thus should be used if wanting to use the NV11+ in ccTalk. Please contact support@innovative-technology.com for the necessary protocol documentation.

Pin Assignments



Pin	Name	Type	Description
1	Vend 1	Output	Serial Data (link to Pin 5)
2	Vend 2	Output	DA3 Data Logging
3	 Not Used		
4			
5	Inhibit 1	Input	Serial Data (link to Pin 1)

Pin	Name	Type	Description
6	⚠ Not Used		
7			
8			
9			
10			
11	USB +	Data	USB Data +
12	USB -	Data	USB Data -
13	USB Vcc	Power	USB Vcc (+5VDC)
14	⚠ Factory Use Only – Do Not Connect		
15	+ Vin	Power	+12VDC Supply
16	0V	Power	0V Supply (GND)

 +12VDC and 0V (GND) must always be connected, also when using USB connections.

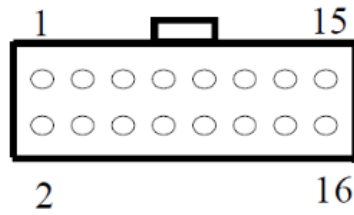
SIO and SI2

General Description

SIO (Serial Input/Output) is a very basic and low level serial communication interface. Messages are not echoed back. SIO uses 300 baud whereby SI2 uses 9600 baud. Please contact support@innovative-technology.com for SIO Interface Specification or other details.

 SIO and SI2 are outmoded and not recommended for new developments!

Pin Assignments



Pin	Name	Type	Description
1	Vend 1	Output	Serial Data (link to Pin 5)
2	Vend 2	Output	DA3 Data Logging
3	⚠ Not Used		
4			
5	Inhibit 1	Input	Serial Data (link to Pin 1)
6	⚠ Not Used		
7			
8			
9			
10			
11	USB +	Data	USB Data +
12	USB -	Data	USB Data -
13	USB Vcc	Power	USB Vcc (+5VDC)
14	⚠ Factory Use Only – Do Not Connect		
15	+ Vin	Power	+12VDC Supply
16	0V	Power	0V Supply (GND)

MDB

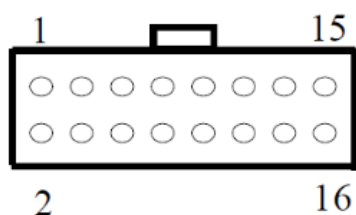
General Description

MDB (Multi-Drop Bus) is used in the vending industry and is now an open standard in the NAMA (National Automatic Merchandising Association) so that all vending and peripheral equipment communicates identically. MDB uses a master-slave model where the VMC (Vending Mechanism Controller) is the master that can communicate with up to 32 slaves (e.g. banknote validator or coin acceptor). Please contact support@innovative-technology.com for further information.



Innovative Technology Ltd. provides full SDK packages including Interface Specification, Implementation Guide as well as source code examples for SSP respectively eSSP only!

Pin Assignment



Pin	Name	Type	Description
1	Vend1	Output	Serial Data Out (Tx)
2	 Not Used		
3			
4			
5	Inhibit1	Input	Serial Data In (Rx)
6	 Not Used		
7			
8			
9			
10			
11			
12			

Pin	Name	Type	Description
13			
14	⚠ Factory Use Only – Do Not Connect		
15	+Vin	Power	+12VDC Supply
16	0V	Power	0V Supply (GND)

IF5 Interface

An NV9USB+ or NV11+ running MDB must use an IF5 MDB Voltage Converter, an external interface box which regulates the power supply and opto-isolates the communication lines. Typically vending machine's power supply higher voltage than the maximum for the NV9USB+ or NV11+ of 12v +/- 10%. The IF5 drops this higher voltage down to the required level.

 Always use an IF5 to connect an NV9USB+ or NV11+ to an MDB machine!



Parallel

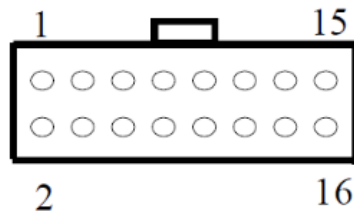
General Description

Parallel is a 4-way output interface. The first 4 channels have their own individual output which means that only a maximum of 4 channels can be used. If a note is recognised the relevant Vend line is set to low for a period of 100 ± 3ms. Pulses outside these limits should be rejected as a precaution against false triggering.



Parallel is an insecure interface and should not be used for new developments!

Pin Assignments



Pin	Name	Type	Description
1	Vend 1	Output	Credit Output Channel 1
2	Vend 2	Output	Credit Output Channel 2
3	Vend 3	Output	Credit Output Channel 3
4	Vend 4	Output	Credit Output Channel 4
5	Inhibit 1	Input	Inhibit Input Channel 1 by holding HIGH, hold LOW to enable
6	Inhibit 2	Input	Inhibit Input Channel 2 by holding HIGH, hold LOW to enable
7	Inhibit 3	Input	Inhibit Input Channel 3 by holding HIGH, hold LOW to enable
8	Inhibit 4	Input	Inhibit Input Channel 4 by holding HIGH, hold LOW to enable
9	Busy	Output	Output Busy Signal. Active LOW when BV50 is in transporting, reading or stacking a note
10	Escrow	Input	Input Escrow Control. Enable escrow function by holding LOW

Pin	Name	Type	Description
11	⚠ Not Used		
12			
13			
14	⚠ Factory Use Only - Do Not Connect		
15	+Vin	Power	+12VDC Supply
16	0V	Power	0V Supply (GND)

Inhibit Control

The Inhibits can be used to either enable or disable the acceptance of those banknotes programmed on channels 1, 2, 3 and 4. The Inhibits are internally held high and must be set to low (GND) to enable banknote acceptance. If no Inhibit is set to low (GND) the Master Inhibit is set and the validator is disabled.

Escrow Control

The NV9USB+ validator has a single note escrow facility. This allows the unit to hold onto the note once validated, and then only stack the note into a cashbox when the host machine confirms that the Vend operation has been completed. Please refer to [Escrow Control](#) for timing diagram and further details.

IF10 Interface

The IF10 is an interface that allows serial SSP to be used in machines without the need of updating the machine software. The IF10 is connected between the validator and the host machine. The IF10 communicates with the validator in serial SSP which gives more security along the length of the cable. The IF10 should be mounted close to the host machine control board where the IF10 converts to the parallel connection.



Binary

General Description

In the event that the machine needs more than 4 denominations to be recognised but the host machine cannot take advantage of the serial communication method then the NV9USB+ validator can be set to give a binary pattern output on the four parallel output pins. If the validator is set to Binary it will issue the vend signals as a binary

pattern on the parallel outputs for 100 ± 3 ms. In this way a maximum of 15 different notes can be accepted and 4 notes individually inhibited.

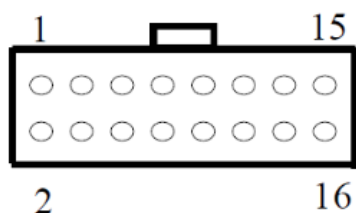
The four channels have their own individual outputs. If a note is recognised the binary representation of the channel number will be pulled low for 100 ± 3 ms. Pulses outside these limits will be rejected as a precaution against false triggering due to noise.

For example, if a note programmed on channel 3 is credited, vend 1 ($2^0 = 1$ decimal) and vend 2 ($2^1 = 2$ decimal) will be active low for 100 ± 3 ms.



Binary is an insecure interface and should not be used for new developments!

Pin Assignments



Pin	Name	Type	Description
1	Vend 1	Output	Credit Output binary $2^0 = 1$ decimal
2	Vend 2	Output	Credit Output binary $2^1 = 2$ decimal
3	Vend 3	Output	Credit Output binary $2^2 = 4$ decimal
4	Vend 4	Output	Credit Output binary $2^3 = 8$ decimal
5	Inhibit 1	Input	Inhibit Input Channel 1
6	Inhibit 2	Input	Inhibit Input Channel 2
7	Inhibit 3	Input	Inhibit Input Channel 3
8	Inhibit 4	Input	Inhibit Input Channel 4
9	Busy	Output	Output Busy Signal
10	Escrow	Input	Input Escrow Control

Pin	Name	Type	Description
11	⚠ Not Used		
12			
13			
14	⚠ Factory Use Only - Do Not Connect		
15	+Vin	Power	+12VDC Supply
16	0V	Power	0V Supply (GND)

Inhibit Control

The Inhibits can be used to either enable or disable the acceptance of those banknotes programmed on channels 1, 2, 3 and 4. The Inhibits are internally held high and must be set to low (GND) to enable banknote acceptance. If no Inhibit is set to low (GND) the Master Inhibit is set and the validator is disabled.

Escrow Control

The NV9 validator has a single note escrow facility. This allows the unit to hold onto the note once validated, and then only stack the note into a cashbox when the host machine confirms that the Vend operation has been completed. Please refer to [Escrow Control](#) for timing diagram and further details.

IF9 Interface

The IF9 is an interface that allows serial SSP to be used in machines without the need of updating the machine software. The IF9 is connected between the validator and the host machine. The IF9 communicates with the unit in serial SSP which gives more security along the length of the cable. The IF9 should be mounted close to the host machine control board where the IF9 converts to the binary connection.

Pulse

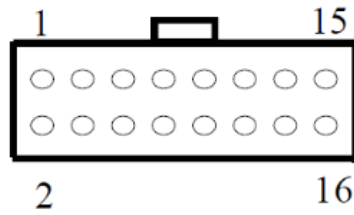
General Description

Pulse can be used for the acceptance of up to 16 channels. When a note is recognised vend 1 (pin 1) will pulse a pre-set number of times. The amount of pulses as well as the high/low pulse ratio is configurable. For programming and configuration please refer to the [Validator Manager](#) guide.



Pulse is an insecure interface and should not be used for new developments!

Pin Assignments



Pin	Name	Type	Description
1	Vend 1	Output	Credit Output Pulse Stream
2	⚠ Not Used		
3			
4			
5	Inhibit 1	Input	Inhibit Input Channel 1
6	Inhibit 2	Input	Inhibit Input Channel 2
7	Inhibit 3	Input	Inhibit Input Channel 3
8	Inhibit 4	Input	Inhibit Input Channel 4
9	Busy	Output	Output Busy Signal
10	Escrow	Input	Input Escrow Control
11	⚠ Not Used		
12			
13			
14	⚠ Factory Use Only - Do Not Connect		
15	+Vin	Power	+12VDC Supply
16	0V	Power	0V Supply (GND)

Inhibit Control

The Inhibits can be used to either enable or disable the acceptance of those banknotes programmed on channels 1, 2, 3 and 4. The Inhibits are internally held high and must be set to low (GND) to enable banknote acceptance. If no Inhibit is set to low (GND) the Master Inhibit is set and the validator is disabled.

Escrow Control

The NV9 USB+ validator has a single note escrow facility. This allows the unit to hold onto the note once validated, and then only stack the note into a cashbox when the host machine confirms that the Vend operation has been completed. Please refer to [Escrow Control](#) for timing diagram and further details.

Credit Hold Function

If this function is enabled, the validator will take the notes as normal but then wait until the escrow line is toggled low/high before it will then give out the pulses per denomination as set. After the pulses have been given, the validator will wait for another low/high toggle until the full value of credit pulses are given.

For example, with a setting of 2 pulses per dollar, a five dollar bill will give 2 pulses 5 times.

A Typical use of this option would be for a Pool table with a game price of \$1. You could insert a \$5 note and press a button that toggles the escrow line and releases the pool balls, this would then allow you to play the first game. The Validator holds onto the remaining credits until the game has finished and the button is pressed again allowing the next game to begin, this continues until all the credits have been used.

The busy line remains low throughout the whole process and the NV9USB+ remains inhibited until all pulses are given.

IF15 Interface

The IF15 is an interface that allows serial SSP to be used in machines without the need of updating the machine software. The IF15 is connected between the NV9USB+ and the host machine. The IF15 communicates with the validator in serial SSP which gives more security along the length of the cable. The IF15 should be mounted close to the host machine control board where the IF15 converts to the pulse connection.

NV9USB+ Range Routine Maintenance

Contents

- [Introduction](#)
 - [Recommended Cleaning Intervals](#)
 - [Recommended Belt Changing Intervals](#)
-

Introduction

The NV9 USB+ Range of products have been designed to minimize any performance variation over time. Much of this is achieved by careful hardware and software design. However, depending upon the environment the validator and/or its modules may at some time require cleaning, belt changing or note path clearing.

Recommended Cleaning Intervals

Innovative Technology Ltd recommends to clean the optical lenses every month or as required. Dirt, dust or other residue leads to bad note acceptance and other performance degradation.

Please refer to [Second Level Support](#) for comprehensive cleaning instructions.

Recommended Belt Changing Intervals

Innovative Technology Ltd recommends that you change the drive belts of the NV9USB+ every 6-12 months or as required, dependent on environmental factors.

If dirt can be seen to be building up or if the belts themselves have had excessive use and are starting to wear, then this time period may not apply and they would need to be swapped sooner.

Please refer to [Second Level Support](#) for comprehensive belt changing instructions.

NV9USB+ Range First Level Support

Contents

- [Checking the Device Configuration](#)
- [Error Flash Codes](#)
- [Status LED Flash Codes](#)
 - NV11+
- [Configuration Button](#)
 - NV9USB+
 - NV11+

Checking the Device Configuration

To check settings on a programmed unit:

1 Power up the unit.

2 Click the red configuration button present inside of the unit twice.

3 Monitor the quantity of flashes made by the front bezel and check flash codes below:

Flashes	Interface	Interface Settings											
		Cct plain	Cct 8-bit	No Escrow Timeout	DES	Low Power	High Speed	Pulse High	Pulse Low	Pulse per £	SIO start dis	Credit Hold	Binary
1	SSP												
2	Pulse							ms/10	ms/10	value		3	
3	MDB												
4	IF30												
5	IF31												
6	Cctalk	1	2	3	4								
7	SIO			3			1				2		
8	Parallel			2									1
9	SP4							ms/10	ms/10	value		3	
10	NS												
11	IF32						1						

Error Flash Codes

If the validator is an error state, the bezel will flash a combination of long and short flashes. The combination and their meanings can be found in the table below:

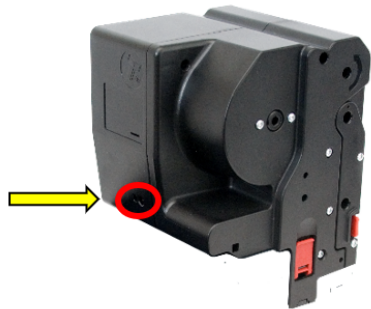
Number of Long Flashes	Number of Short Flashes			
	1	2	3	4
1	Note Path Open	Note Path Jam	Unit not Initialised	Sensor Covered
2	N/A	Cashbox Jam	N/A	N/A
3	Firmware Checksum	Interface Checksum	EEPROM Checksum	Dataset Checksum
4	PSU too Low	PSU too High	N/A	N/A

Status LED Flash Codes

In addition to the bezel flash codes of the NV9USB+ validator, each of the modules have their own status LED to report any errors/status events relating specifically to that module. These can also be found in the tables below:

NV11+

The status LED of the Note Float recycler module is behind the red button, located on the front of the module, as indicated in the image next to the table.

Flashes	Indicated Status / Error	Image
Off	Normal Operation	
Constant flash at 1Hz	Note Transport Error in Note Float	
2 Flashes, pause (repeated)	Software Error	
3 Flashes, pause (repeated)	Calibration Error	
4 Flashes, pause (repeated)	Diverter Error	
5 Flashes, pause (repeated)	Motor Timeout	

Configuration Button

The NV9USB+ and NV11+ both have a configuration button that has several functions available to the user. These are detailed below:

NV9USB+

- Toggle between primary protocol and programming mode (SSP)
 - Press and hold red config button
 - Wait until bezel illuminates, then release button.
 - Unit will flicker, reset and will have toggled upon reset.
- Check current protocol
 - Double click the red config button.
 - Bezel will flash a set number of times
 - Refer to table above, in [Checking the Device Configuration](#).
- Enter configuration card mode
 - Press red config button once
 - Unit will begin to flash, waiting for a configuration card to be inserted.
 - Press button again once, to cancel.

NV11+

Same as above, plus the following functions:

- Empty note float recycler and set counters to zero.
 - Press and hold red config button
 - Wait until bezel illuminates, keep hold of button.
 - Bezel LED will turn off, then release button.
- Acknowledge clearing of jam
 - If a jam has occurred in the note float (status LED flashing constant 1Hz) you will need to confirm that you've cleared it.
 - Press button once, to acknowledge this action.

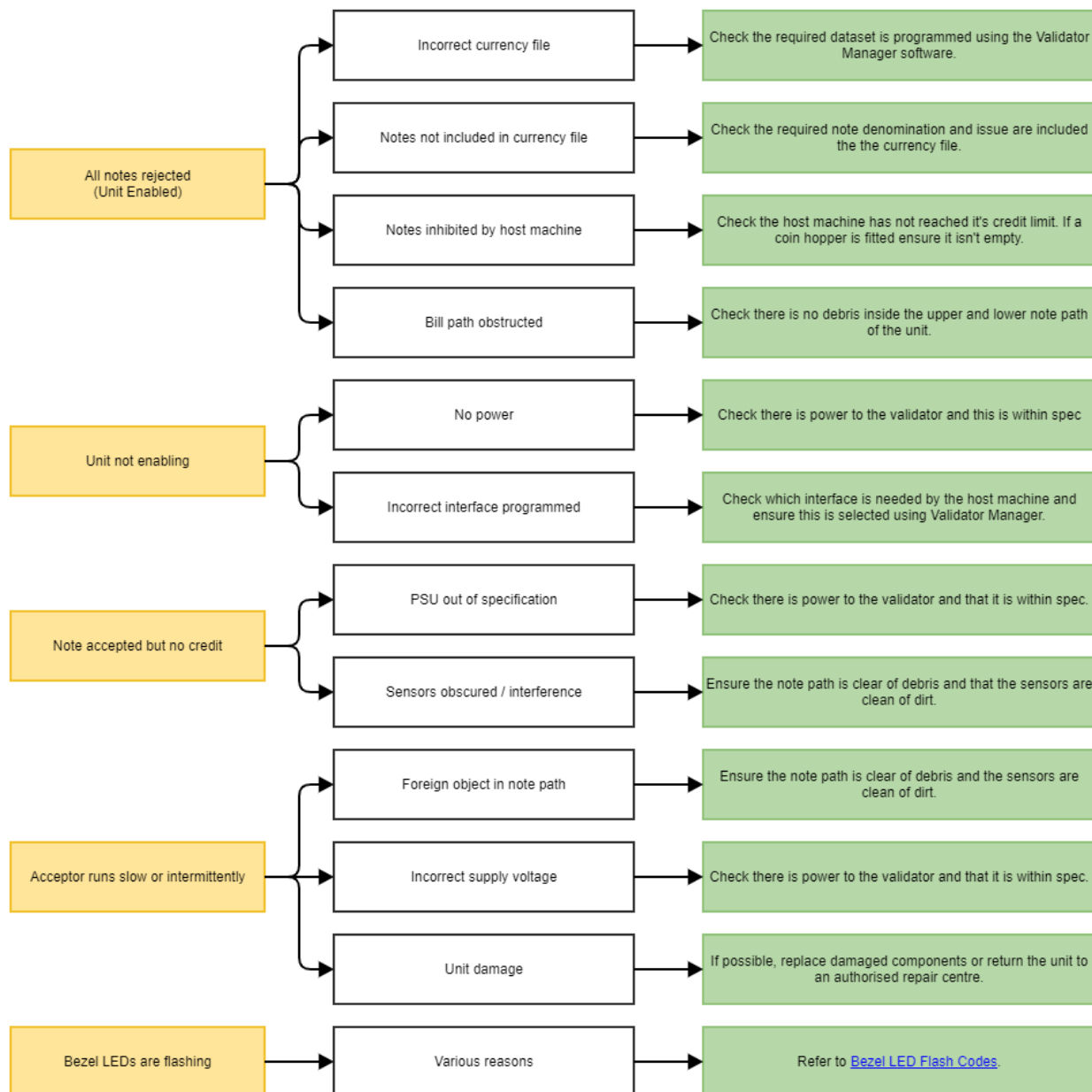
NV9USB+ Range Second Level Support

Contents

- [Fault Finding Flow Chart](#)
 - [Clearing a Jam](#)
 - [Cleaning the Product](#)
 - [NV9USB+/NV11+](#)
 - [Changing the Drive Belts](#)
 - [Clearing a Checksum Error](#)
 - [Testing after an error has been cleared.](#)
 - [Re-Initialize the Sensors](#)
-

Fault Finding Flow Chart

You can use the below chart as an aid, in order to help resolve a number of common issues you might experience.



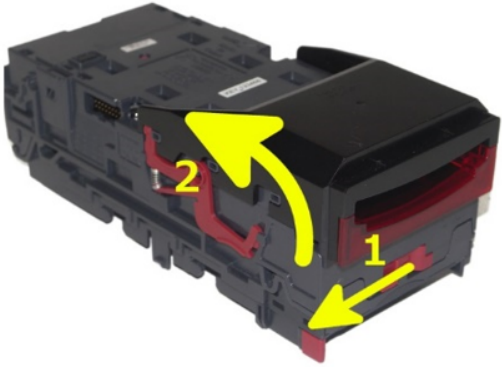
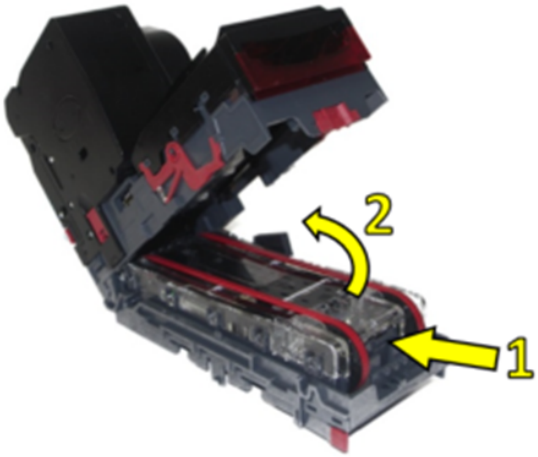
If you are unsure about the cause or how to resolve an issue, please contact the support team: support@innovative-technology.com

Clearing a Jam

1

Power Off

Either unplug the interface cable or switch of power to device/machine.

2 Open the Note Path Slide the red catch to the left (1) Lift up the top half of the unit (2)	
3 Clear Jammed Note If note can be seen in upper note path, remove note and proceed to next step. If note is in lower note path, lift the lozenge. Push grey release tab (1) Lift up lozenge unit (2)	
4 Re-apply Power Close unit back up and re-apply power to unit. It will reset and should no longer be flashing a jam error message.	

Cleaning the Product

NV9USB+/NV11+



Do not use solvent based cleaners such as alcohol, petrol, methylated spirits, white spirit or PCB cleaner. This will result in permanent damage to the NV9USB+, only use a mild detergent.

Dirt, dust or other residue causes bad note acceptance rates and other performance degradation. The recommended cleaning interval is once a month!

1 Power Off Either unplug the interface cable or switch of power to device/machine.	
--	--

2 Open the Note Path Slide the red catch to the left (1) Lift up the top half of the unit (2)	
3 Clean note path and sensors Use a dry linen cloth and/or compressed air, to ensure there is no dirt or debris. Paying attention to sensor locations and drive belts.	

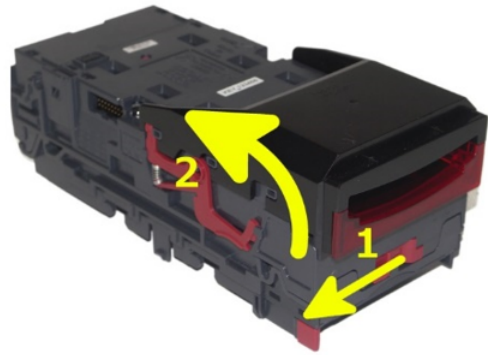
Changing the Drive Belts

1 Power Off Either unplug the interface cable or switch of power to device/machine.	
--	--

2 Open the Note Path

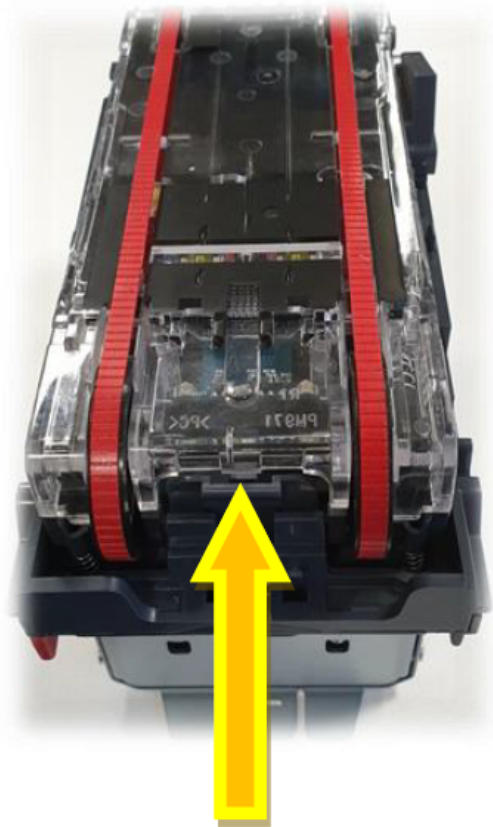
Slide the red catch to the left (1)

Lift up the top half of the unit (2)



3 Remove Lozenge

Press grey release tab to remove lozenge from validator.

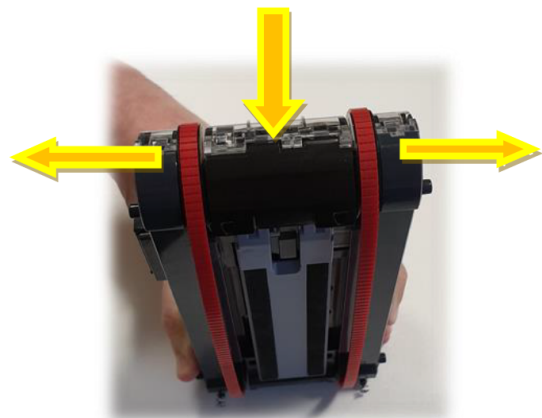


4 Remove Old belts

With the lozenge removed, press both drive wheels inwards to create slack in the belts.

This slack will allow you to remove belts from the lozenge.

 Push the drive wheels down into your desk.



5 Replace with new belts

Place new belts onto drive wheels, push them inwards to allow you enough slack to position belts into place.



Push the drive wheels down into your desk.

Clearing a Checksum Error

The flash code will indicate what type of checksum error the unit is reporting.

This type of error usually occurs if the file is corrupt or an issue occurred during download. Retry download again. If error persists, please contact support.

Bezel Flash Codes		
Long	Short	Checksum Type
3	1	Firmware
	2	Interface
	3	EEPROM
	4	Dataset

Testing after an error has been cleared.

You can use our support tool, Validator Manager to run the unit and check operation.

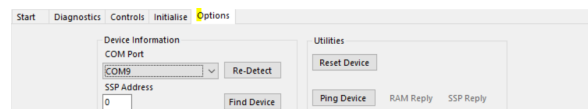
Please refer to our Software Guide for full instructions on how to use ITL Validator Manager.

Re-Initialize the Sensors

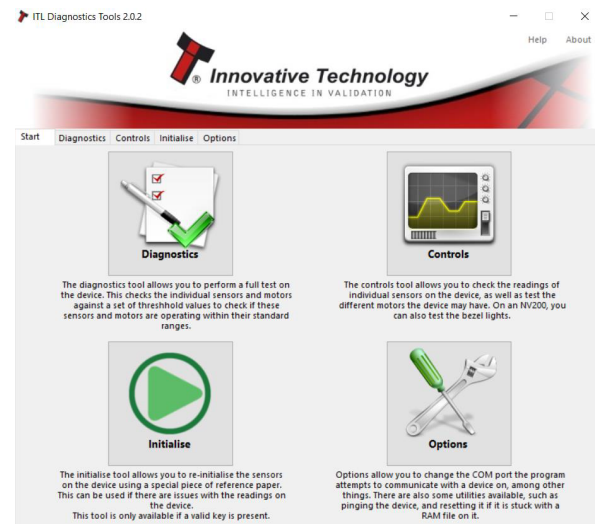


For this procedure, please use ITL Diagnostic Tools (v.2.0.2 and higher) and Green calibration paper LB00149.

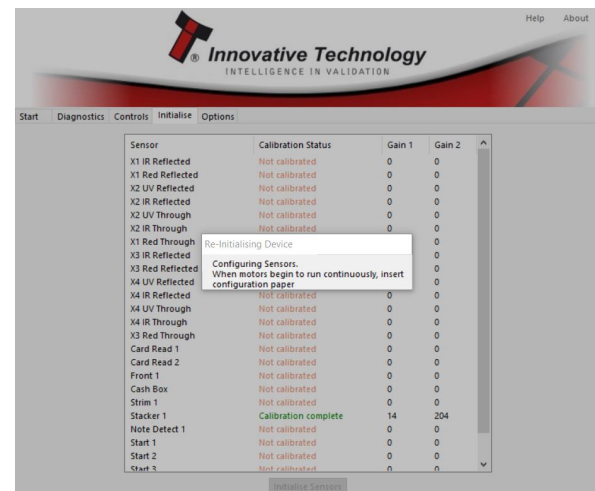
- 1 Connect validator using IF-17/DA2 adapter only, open Diagnostic Tools program and choose active com-port:



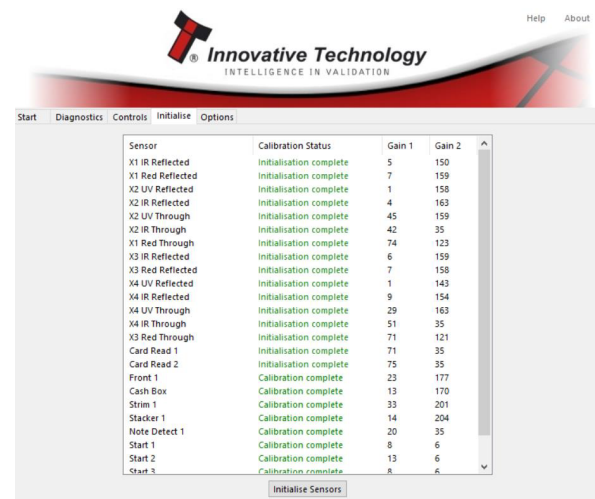
2 Then press “Initialise” button:



3 Validator will start initialization procedure.
Once the motor run continuously, insert green calibration paper



4 Initialization process now complete:
If some of the statuses are red, try to repeat the initialization procedure.
If you have the same result the validator will probably require repairing/some elements replacing.
To receive the initialization file, please contact support@innovative-technology.com



NV9USB+ Range Product Compliance



Please contact support@innovative-technology.com for further details if required.

- RoHS
- EN Directives
- UL
- REACH
- WEEE
- Central Bank Approvals

NV9USB+ Range Appendix

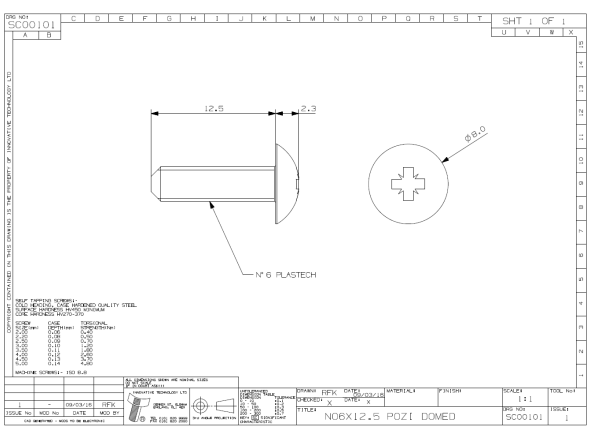
Contents

- Cable Drawings
- Connector Specifications
- Lock Specifications
- Lozenge Retention Screw
- Switching to Programming Mode (SSP)
- ccTalk® DES Encryption - Trusted Mode
- Escrow Control
 - Escrow Timing Diagram
- Low Power Mode Timing Diagram
- File Naming Convention
- Programming via Configuration Card

Cable Drawings

Cable	Description	Drawing
CN00214	USB A to USB B	CN002141

Lozenge Retention Screw

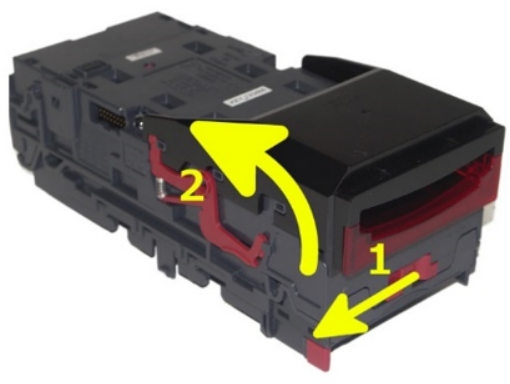
SC00101	NO6X12.5 Pozi Domed	
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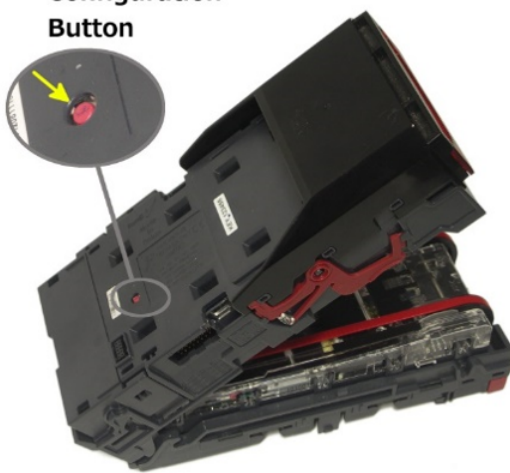
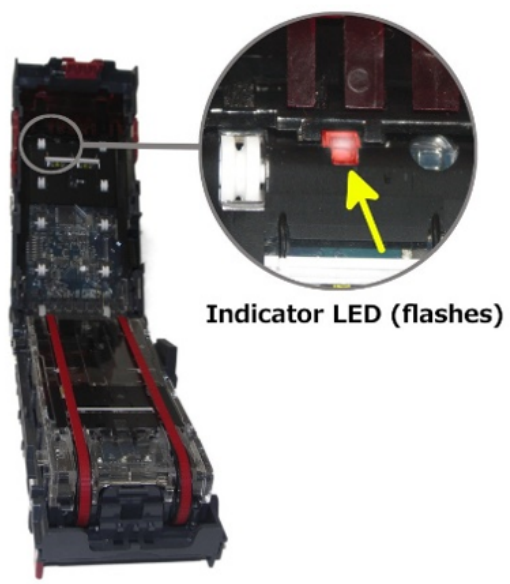
Switching to Programming Mode (SSP)

To switch the validator to SSP, you can utilise the red configuration button. This allows the user to toggle back and forth between its primary interface and SSP. The process is as follows:

- Firstly, check the current interface by double clicking the red button
 - Unit will flash bezel an x number of times, to indicate what protocol it is 1 x flash is SSP
- If SSP is needed, Press and hold red button until bezel light illuminates
- As soon as the bezel illuminates, release button.
- Unit will flicker, reset and start up again in SSP

ccTalk® DES Encryption - Trusted Mode

1 Power off Either unplug the interface cable or switch off the power.	
2 Open Note path Slide the red catch to the left (1) Lift up the top half of the note path (2)	

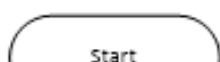
3 Power on With the note path open, apply power	
4 Enter trusted mode Press and hold the configuration button until LED on underside of upper note path starts blinking.	Configuration Button 
5 Observe LED If successful, the LED described above will be blinking. The unit will remain in trusted mode for 30 seconds or until DES key has been exchanged.	 Indicator LED (flashes)

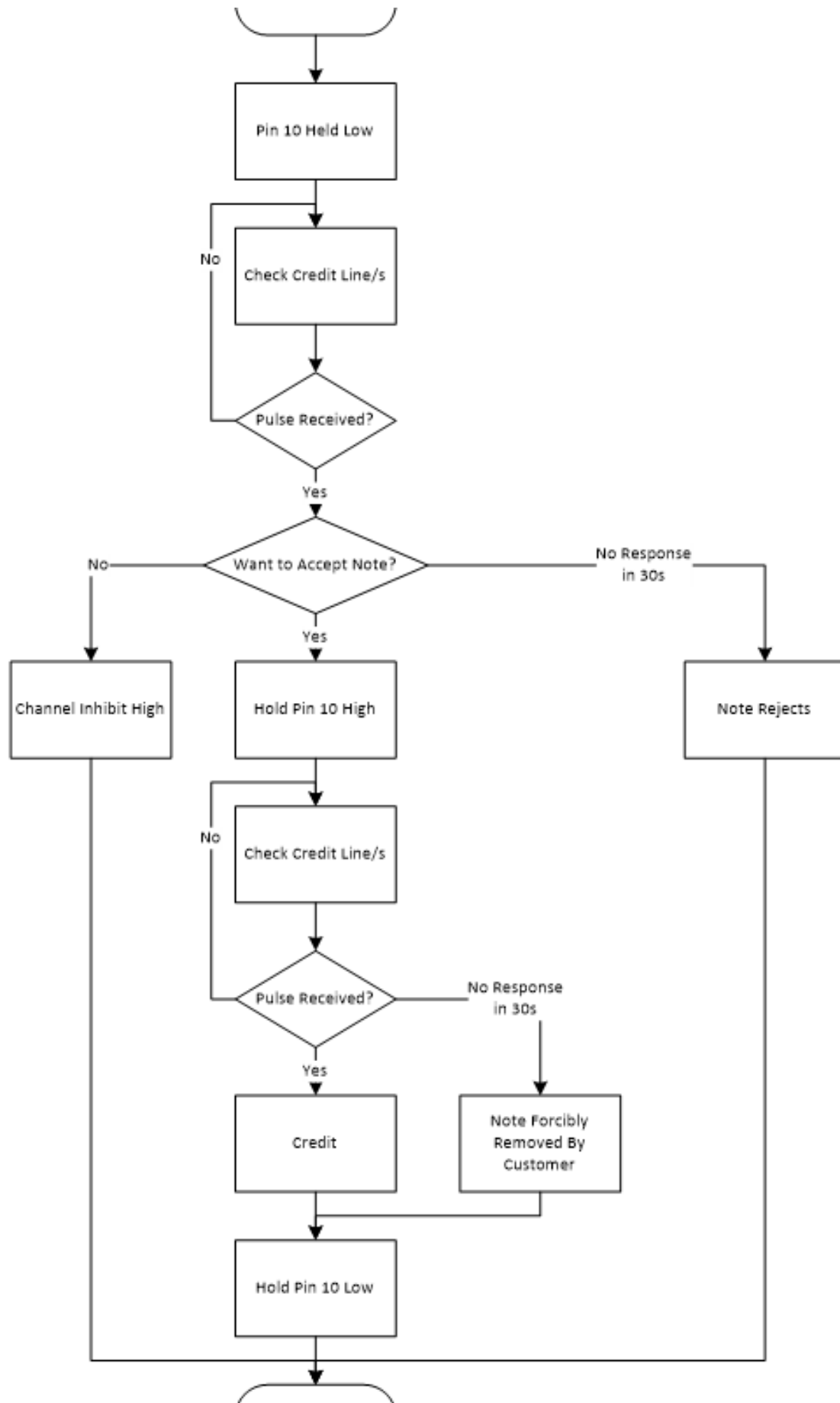
Escrow Control

The NV9USB+ has a single note escrow facility. This allows the validator to hold onto the note once validated, and then only stack the note into a cashbox when the host machine confirms that the Vend operation has been completed.

If no confirmation of the Vend is received, then the note will be returned to the user after 30 seconds. If the host machine itself aborts the transaction by setting the corresponding inhibit input high, the note is returned immediately.

The sequence of operation is as follows:

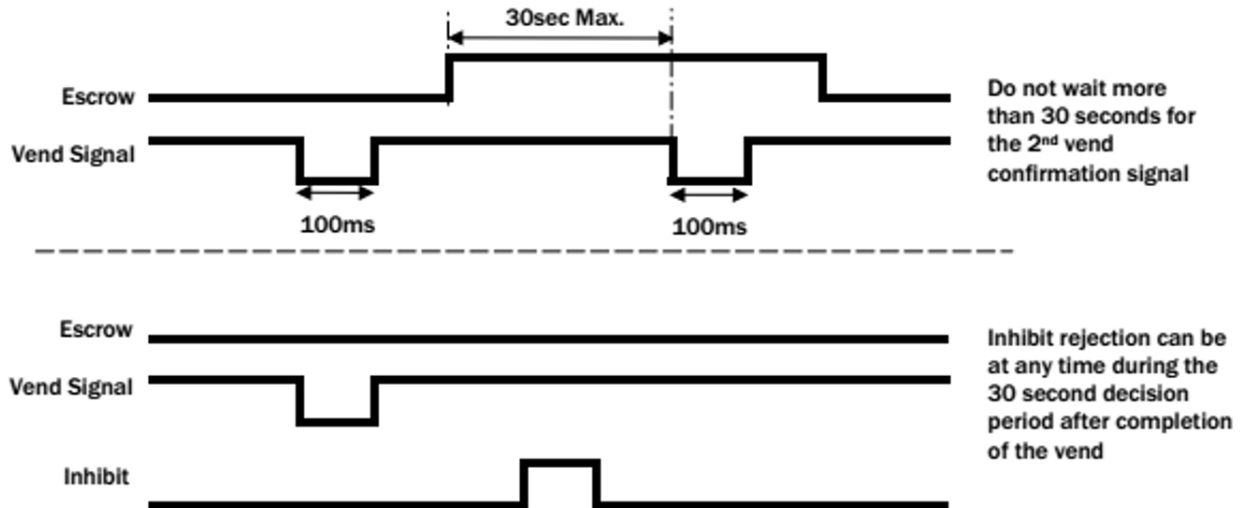




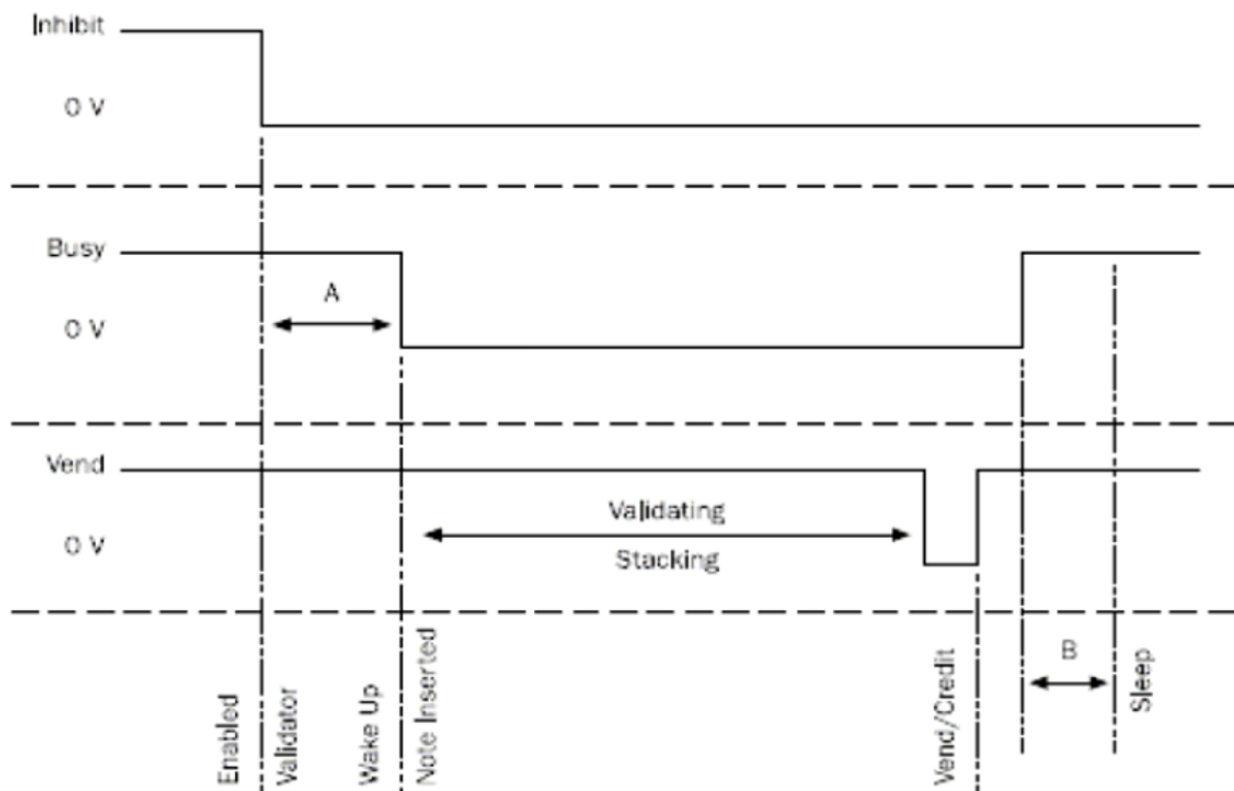
End

❗ Only book the credit on the second vend pulse!

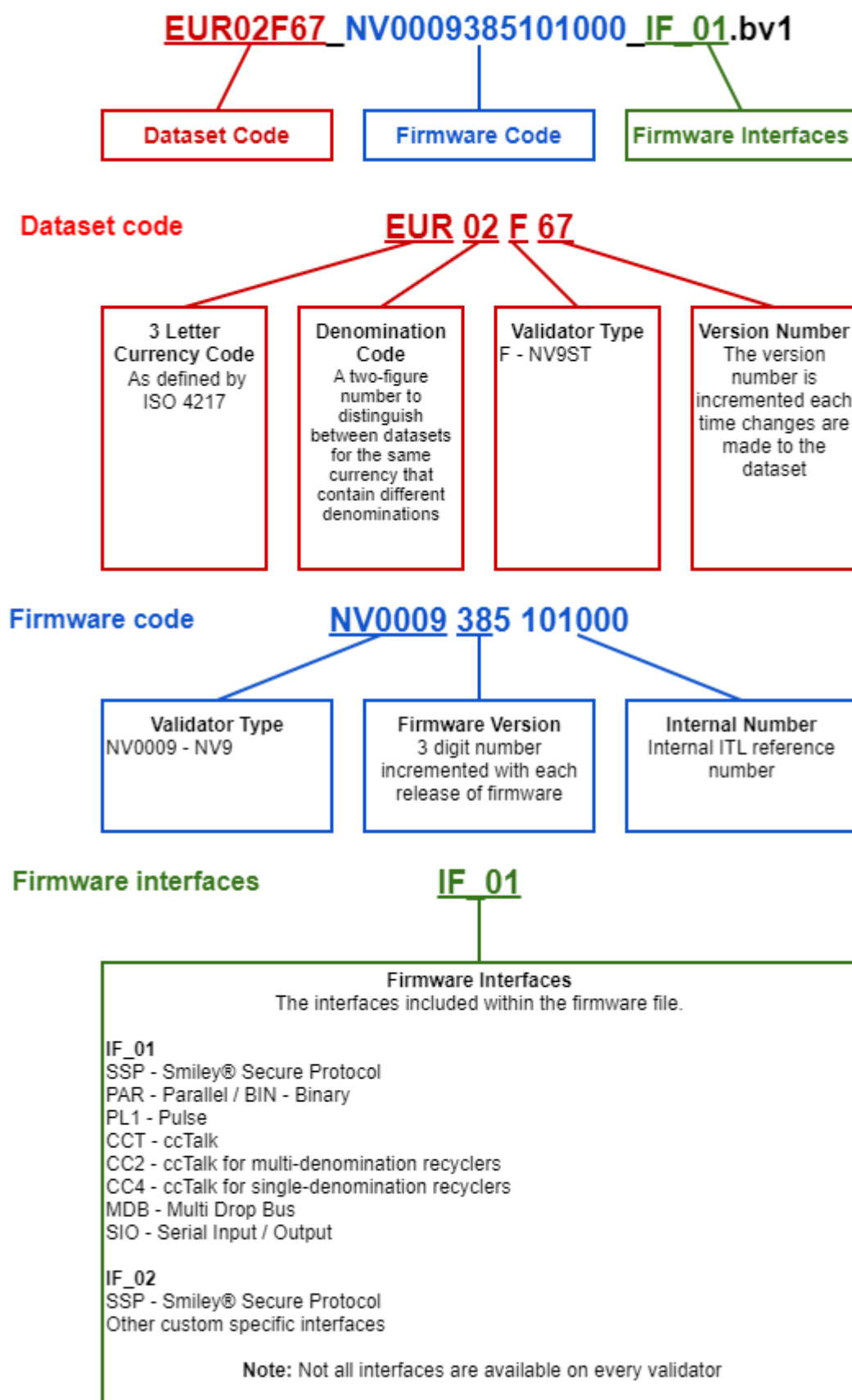
Escrow Timing Diagram



Low Power Mode Timing Diagram



File Naming Convention



Programming via Configuration Card

Please consult the image below for further information on configuration card programming document includes a printable template for the configuration card.

NV9 configuration card (GA00959)



Configuration card cannot be used on UK1 Firmware.

GA959 NV959B/ NV10USB

Configuration Option Programming Card

Innovative Technology

Intellectuality in Validation

NV959B NV10USB

↑

↑

Insert this end first

NV959B NV10USB

↑

Polarity		Pulse
Enabled pulse		MOB
EEP		or Talk
ISO		IS-2
CH-1		CH-5
CH-2		CH-6
CH-3		CH-7
CH-4		CH-8
High speed		Line speed
# pulse x1		# pulse x10
# pulse x2		# pulse x30
# pulse x4		# pulse x50
# pulse x8		# pulse x100
Irish or Talk checkbox		or Talk panel/ Binary
Credit hold		No answer timeout

Select Interface

GOOD	OK	BAD

Printer		Pulse
Enabled pulse		MOB
EEP		or Talk
ISO		IS-2
CH-1		CH-5
CH-2		CH-6
CH-3		CH-7
CH-4		CH-8
High speed		Line speed
# pulse x1		# pulse x10
# pulse x2		# pulse x30
# pulse x4		# pulse x50
# pulse x8		# pulse x100
Irish or Talk checkbox		or Talk panel/ Binary
Credit hold		No answer timeout

Select Interface

GOOD	OK	BAD

Printer		Pulse
Enabled pulse		MOB
EEP		or Talk
ISO		IS-2
CH-1		CH-5
CH-2		CH-6
CH-3		CH-7
CH-4		CH-8
High speed		Line speed
# pulse x1		# pulse x10
# pulse x2		# pulse x30
# pulse x4		# pulse x50
# pulse x8		# pulse x100
Irish or Talk checkbox		or Talk panel/ Binary
Credit hold		No answer timeout

Select Interface

GOOD	OK	BAD

Printer		Pulse
Enabled pulse		MOB
EEP		or Talk
ISO		IS-2
CH-1		CH-5
CH-2		CH-6
CH-3		CH-7
CH-4		CH-8
High speed		Line speed
# pulse x1		# pulse x10
# pulse x2		# pulse x30
# pulse x4		# pulse x50
# pulse x8		# pulse x100
Irish or Talk checkbox		or Talk panel/ Binary
Credit hold		No answer timeout

Select Interface

GOOD	OK	BAD

Printer		Pulse
Enabled pulse		MOB
EEP		or Talk
ISO		IS-2
CH-1		CH-5
CH-2		CH-6
CH-3		CH-7
CH-4		CH-8
High speed		Line speed
# pulse x1		# pulse x10
# pulse x2		# pulse x30
# pulse x4		# pulse x50
# pulse x8		# pulse x100
Irish or Talk checkbox		or Talk panel/ Binary
Credit hold		No answer timeout

Select Interface

GOOD	OK	BAD

Printer		Pulse
Enabled pulse		MOB
EEP		or Talk
ISO		IS-2
CH-1		CH-5
CH-2		CH-6
CH-3		CH-7
CH-4		CH-8
High speed		

GA 959 1-4



Not to scale - Do not print this version.