Innovative Technology

INTELLIGENCE IN VALIDATION

NV9 Spectral

[PA02093]

QUICK START GUIDE

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1 DOCUMENT INTRODUCTION

1.1 Related Documents

This document should be read together with the following:

For SSP/eSSP:

Protocol Manual – SSP (GA138): SSP Interface Protocol Specification for integration

eSSP Implementation Guide (GA973): Information for programmers and integrators

For Software:

Software Manual – GA02037 Software Guide

1.2 Manual Amendments

Rev.	Date	Amendment Details	Issued by
1.1	28/02/2019	Second issue	AA

1.3 Copyright

1.4 Limited Warranty

Innovative Technology Ltd warrants each of its hardware products to be free from defects in workmanship and materials under normal use and service for a period commencing on the date of purchase from Innovative Technology Ltd or its Authorized Reseller, and extending for the length of time stipulated by Innovative Technology Ltd.

A list of Innovative Technology Ltd offices can be found in every section of this manual set. If the product proves defective within the applicable warranty period, Innovative Technology Ltd will repair or replace the product. Innovative Technology Ltd shall have the sole discretion whether to repair or replace, and any replacement product supplied may be new or reconditioned.

The foregoing warranties and remedies are exclusive and are in lieu of all other warranties, expressed or implied, either in fact or by operation of law, statutory or otherwise, including warranties of merchantability and fitness for a purpose.

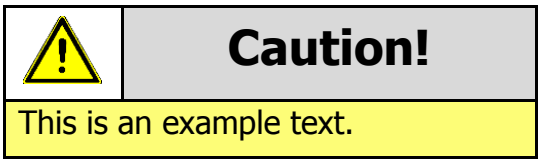
Innovative Technology Ltd shall not be liable under this warranty if it's testing and examination disclose that the alleged defect in the product does not exist or was caused by the customer's or any third person's misuse, neglect, improper installation or testing, unauthorized attempts to repair, or any other cause beyond the range of the intended use. In no event will Innovative Technology Ltd be liable for any

damages, including loss of profits, cost of cover or other incidental, consequential or indirect damages arising out the installation, maintenance, use, performance, failure or interruption of an Innovative Technology Ltd product, however caused.

1.5 Product Safety Information

Throughout this user manual, attention should be drawn to key safety points when using or maintaining the product.

These safety points will be highlighted in a box, like this:



This user manual and the information it contains is only applicable to the model stated on the front cover, and must not be used with any other make or model.

Safety Notice! Read before using this product!

Safety Notice - Warning. Ensure power is removed before allowing access to the inside of this product. Ensure any static build up is discharged before allowing access to any part of this product or media contained. Always earth this product/base plate in accordance with the manual.

For use only in or with complete equipment where the acceptability of the combination is determined by UL LLC. When installed in an end-product, consideration must be given to the following:

- The power supply terminals and/or connectors are: Not investigated for field wiring
- The investigated Pollution Degree is: 2
- The following end-product enclosures are required: Mechanical, Fire

Sicherheitshinweis – Warnung: Es muss sichergestellt werden, dass das Gerät von der Versorgungsspannung getrennt wird, bevor ein Eingriff in das Innere des Gerätes erfolgt. Es muss sichergestellt werden, dass jegliche statische Aufladung des Gerätes entladen wird, bevor auf das Gerät oder auf innerhalb des Gerätes befindliche Objekte zugegriffen wird. Die Erdung des Gerätes muss immer gemäß Handbuch erfolgen.

Nur für die Verwendung in oder mit kompletter Ausstattung, dessen Eignung und Kombination von der UL LLC ermittelt wurde. Bei der Installation in einem Endproduckt, muss folgendes berücksichtigt werden:

- Die Spannungsversorgungsklemmen und/oder Verbinder sind: Feldverkabelung wurde nicht untersucht
- Der untersuchte Verschmutzungsgrad ist: 2
- Folgende Anforderungen an die Gehäuse des Endproduktes sind gefordert: Mechanisch, Feuer

Aviso de seguridad: Asegúrese de que la alimentación está desconectada y de que toda la energía estática es descargada antes de manipular este producto. Conecte a tierra la chapa base de la manera que se indica en el manual.

Solo para uso con dispositivos con los cuales la compatibilidad ha sido certificada por UL LLC. Tras su instalación en producto acabado, tener en cuenta lo siguiente:

- Los conectores y terminales de alimentación son: No se ha investigado/especificado cableado externo.
- El grado de contaminación determinado es: 2
- Los siguientes manuales/certificados de producto final son requeridos: Mecánico, Fuego

Avis de sécurité : Assurez-vous que l'alimentation est coupée et que toute l'énergie statique est déchargé avant de manipuler ce produit. Connecter à la terre, la plaque de base à la manière indiquée dans le manuel.

A utiliser Seulement avec les dispositifs dont la compatibilité a été certifiée par UL LLC. Après son installation dans le produit fini, prendre en considération ce qui suit:-

- Les connecteurs et les bornes d'alimentation sont : cela n'a pas été étudié/spécifié câblage externe.
- Le degré de contamination déterminé est: 2
- Les manuels suivants / les certificats du produit final sont nécessaires : mécanique, incendie

Bezpečnostní upozornění. Před manipulací uvnitř tohoto produktu se ujistěte, že je produkt odpojen od zdroje elektrického napětí. Ujistěte se, že jakýkoliv elektrostatický náboj byl vybit před manipulací s jakoukoliv částí tohoto produktu nebo obsaženým médiem. Vždy uzemněte tento produkt/základovou desku v souladu s návodem.

Pouze pro použití v nebo s kompletním vybavením, kde je přijatelnost kombinace určena UL LLC. Při instalaci v konečném produktu je třeba zvážit nasledující:

- Napájecí svorky a/nebo konektory: Nejsou sledované pro externí kabeláž
- Sledovaný stupeň znečištění je: 2
- Následující krytí konečného produktu jsou požadované: Mechanické, Protipožární

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2 PRODUCT INTRODUCTION

2.1 General Description

The NV9 Spectral is a highly secure and technologically advanced banknote validator, offering casino level security at a mid-range price. State of the art spectral sensors provide high resolution imaging, scanning 1.28 million data points to authenticate the validity of notes. This versatile banknote validator can be mounted horizontally or vertically, with cashbox and bezel options to suit all applications and a micro SD card for data logging.

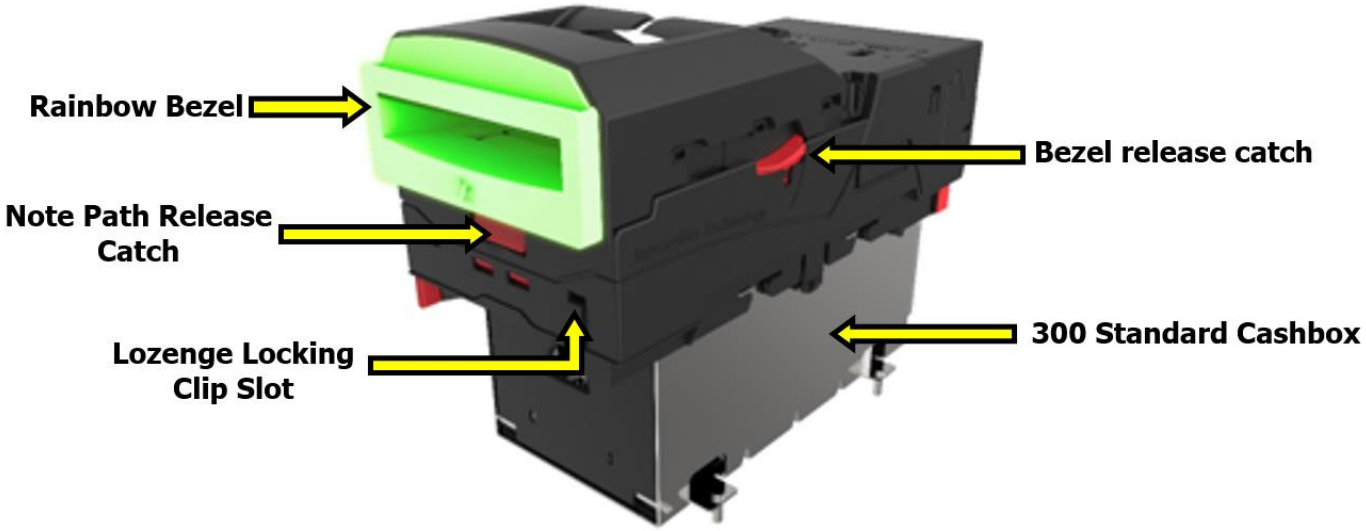
2.2 Key Features

- Micro SD card slot for data logging
- High resolution imaging
- Full note high resolution imaging – 1.28 million data points
- Faster note to note processing
- Suitable for Global Applications
- Exceptional note handling
- Optical and mechanical anti-strimming technology
- Stained note detection
- Modular design – recycler or ticket printer available

2.3 Typical Applications

- Amusement
- Vending

2.4 Component Overview



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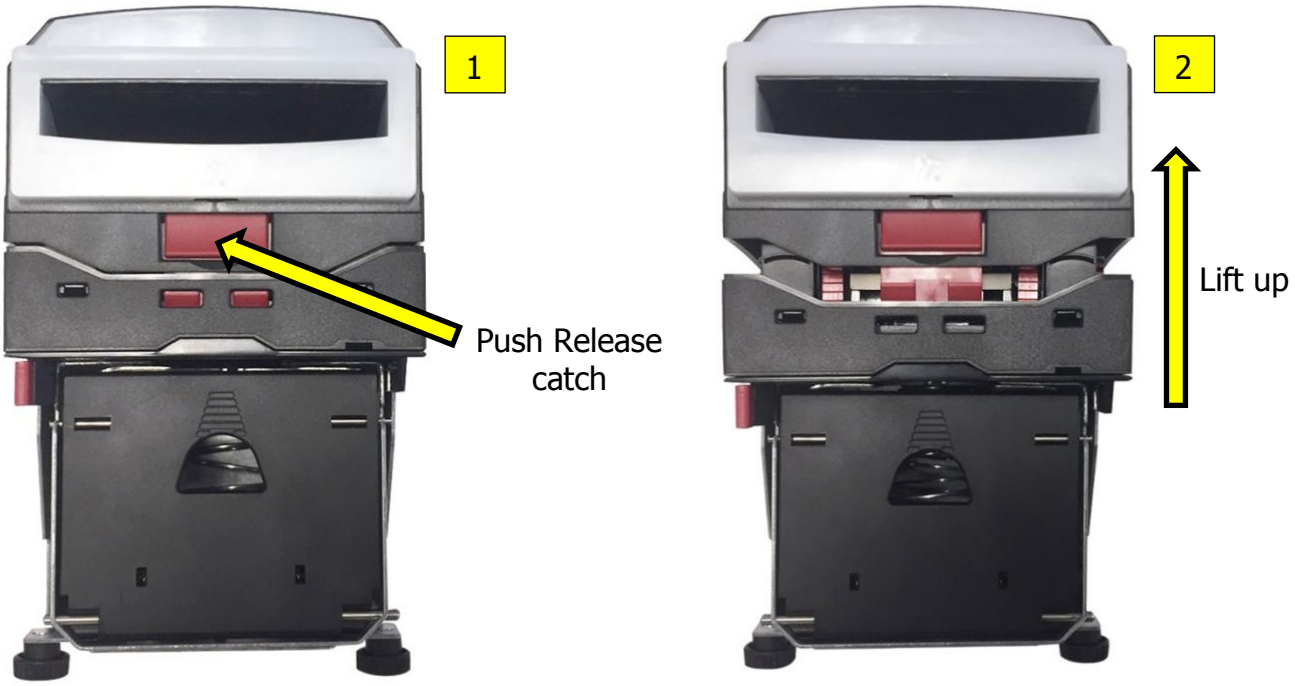
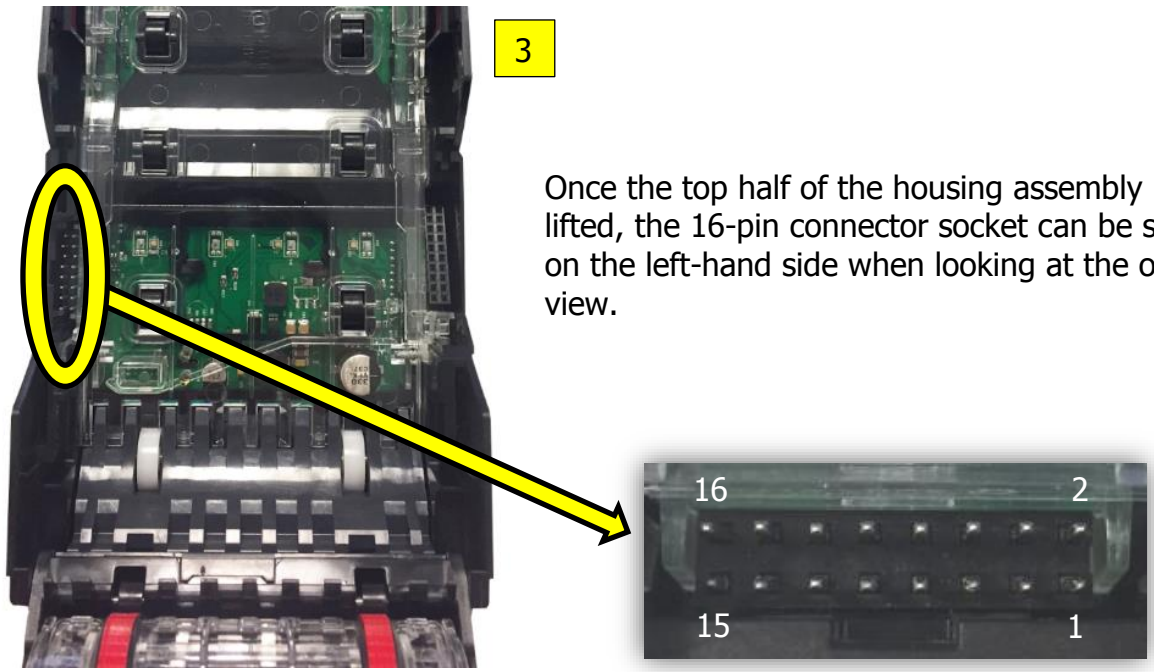
2.4.1 Interface connectors

The connector is a 16-pin socket used to interface the NV9 Spectral to the host machine. The 16-pin socket is hidden within the housing assembly, the housing assembly will need to be opened before accessing the socket. The initial step will be to push the release catch and thereafter to lift the top half of the housing assembly in the upward direction.





Once the top half of the housing assembly is lifted, the 16-pin connector socket can be seen on the left-hand side when looking at the open view.

The pin numbering of the socket is shown below:

Information

Power is required regardless of connection type.

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

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

2.5 Configuration and Fault Codes

The configuration button has multiple functions please refer to section 2.5.1. The common function of the configuration button is to switch the protocol to SSP or otherwise known as programming mode.

Configuration Button

2.5.1 Configuration button functionality

Action	Power status	Function
Press and hold (more than 2 seconds) until the bezel illuminates, then release	Powered ON	Sets validator
Press twice (within half a second)	Powered ON	Shows current interface type (see flash count table below)
Press and hold as validator is powered up	Powered OFF / ON	Resets to factory settings

2.5.1.1 Bezel flash counts

The NV9 Spectral 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 top of the validator head.

Flash Count	Interface
1	SSP
3	MDB
6	ccTalk
7	SIO
8	Parallel

Information

ccTalk and SSP are currently implemented

2.6 Fault codes

Number of LONG flashes	Number of SHORT flashes				
	1	2	3	4	5
1	Note Path Open	Note Path Jam	Unit Not Initialized	Sensor Covered	
2	Cash Box Removed	Cash Box Jam			
3	Firmware Checksum	Interface Checksum	EEPROM Checksum	Dataset Checksum	Note Float Incompatible
4	PSU too Low	PSU too High			

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2.7 Bezel Options

ITL Part Number	Description	Details
PA00189	NV9 USB Standard Bezel (82mm)	http://innovative-technology.com/shop/bezels/nv9-standard-horizontal-bezel-detail
PA00190	NV9 USB Vertical Up Snout Bezel(82mm)	http://innovative-technology.com/shop/bezels/nv9-vertical-up-snout-bezel-detail
PA00188	NV9 USB Vertical Up Bezel (82mm)	http://innovative-technology.com/shop/bezels/nv9-vertical-up-snout-bezel-detail
PA00191	NV9 USB Vertical Down Snout Bezel (82mm)	http://innovative-technology.com/shop/bezels/nv9-vertical-down-snout-bezel-detail

2.8 Cashbox Options

ITL Part Number	Description	Details
PA00185	NV9 USB 300 Clip On Cashbox	http://www.innovative-technology.com/shop/bezels/nv9-300-clip-on-cashbox-detail
PA00186	NV9 USB 300 Lockable Cashbox	http://www.innovative-technology.com/shop/bezels/nv9-300-lockable-cashbox-detail
PA00192	NV9 USB 300 Slide Cashbox	http://www.innovative-technology.com/shop/bezels/nv9-300-slide-cashbox-detail

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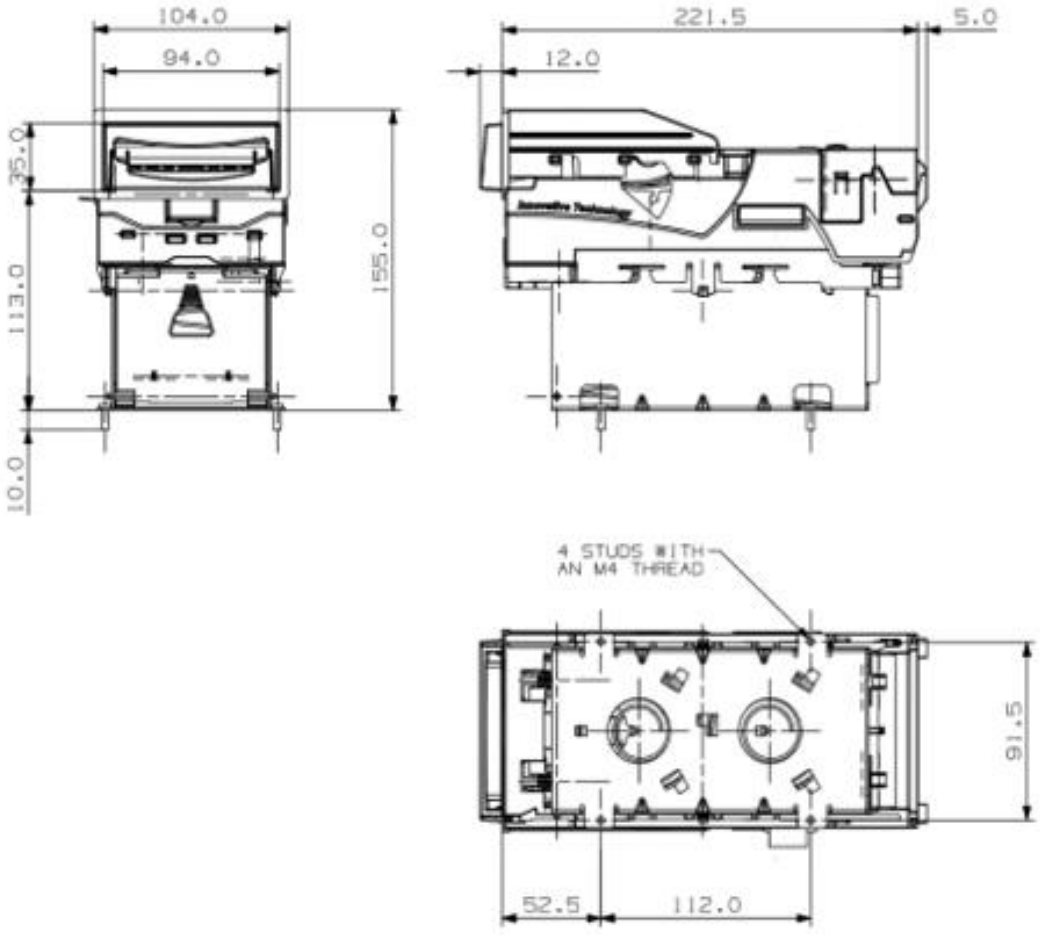
3 TECHNICAL DATA

3.1 Dimensions



3.2 Weight

- Validator =1.05 KG
- Bezel (standard) = 0.10 KG
- Cashbox (slide on) =0.57 KG
- Combined =1.72 KG

3.3 Environmental Requirements

Environment	Minimum	Maximum
Temperature	+5°C / 37.4°F	+50°C / 122°F
Humidity	5%	95% Non-condensing

3.4 Power Requirements

3.4.1 Supply Voltages

Supply Voltage	Minimum	Nominal	Maximum
Supply Voltage (V DC)	+10.8 V DC	+ 12 V DC	+ 13.2
Supply Ripple Voltage	0 V	0 V	0.25 V @ 100 Hz

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3.4.2 Supply Currents

Phase of operation	Current draw (max)
Standby	200mA
Running (RMS)	1 A
Peak	2.5 A

3.4.3 Power Supply Guidance

The NV9 Spectral requires a stable 12 V DC / 3 A power supply. Please check the power requirements of the host machine and other peripherals to dimension a suitable power environment for the machine setup.

Caution!

Power must always be connected.

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

Power Supply Unit	Specification	RS Stock Code	Farnell Stock Code
TDK Lambda SWS50-12	+12 V DC / 4.3 A	466-5869	1184645
TDK Lambda SWS75-12	+12 V DC / 6.3 A	466-5904	1184648
TDK Lambda SWS150-24	+24 V DC / 6.3 A	466-5982	1184653

3.5 Interface Logic Levels

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	

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4 MECHANICAL INSTALLATION

4.1 Power Supply

It is vital that the NV9 Spectral is connected to a power supply being able to provide the required power environment. A weak power supply causes malfunctioning of the NV9 Spectral such like note rejects or missing credits. If the NV9 Spectral is used as a fitting replacement for an older model or product it is recommended to check the power supply specifications of the machine. The power supply of the machine might be designed for the older model or product but not suitable for the NV9 Spectral. The NV9 Spectral might have higher power consumption. Refer to section 3.4 for full power requirement details of the NV9 Spectral.

	Caution!
A weak power supply causes malfunctioning!	

4.2 Software Compatibility

4.2.1 Interface protocols

When using the NV9 Spectral 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 of the NV9 Spectral.

	Caution!
Timing issues may cause missing events such like credits!	

4.2.2 Re-programming

For re-programming the NV9 Spectral contact ITL support. For further details on Re-programming the NV9 Spectral refer to section 5.4.

	Caution!
Older versions of Validator Manager may not support the NV9 Spectral!	

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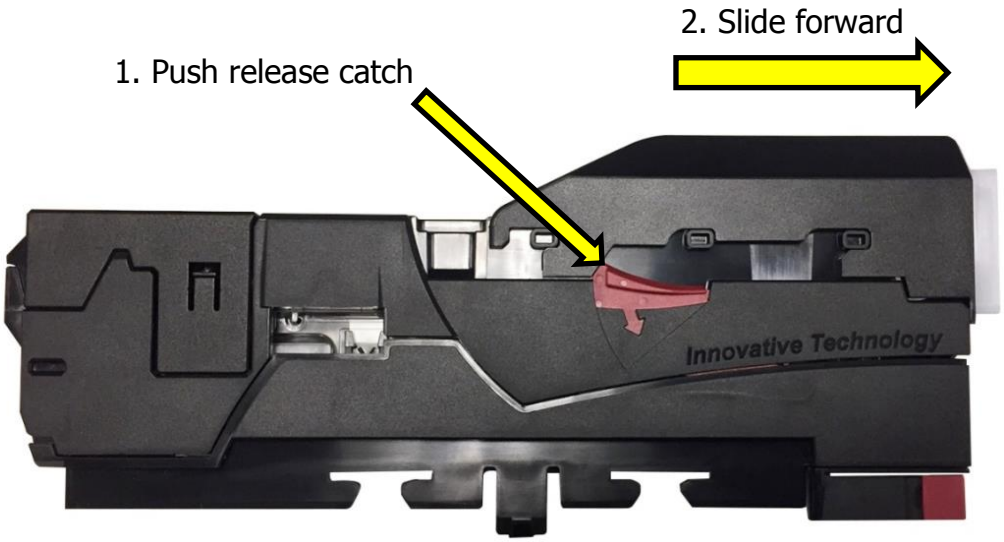
4.3 Bezel Mounting

4.3.1 Bezel Removal

1. Bezel release catch

The bezel is removed by pushing the red bezel latches down on both sides of the validator downwards, and sliding the bezel away from the bezel latches. ensure the bezel has slid forward enough to clear the steep part of the latch.



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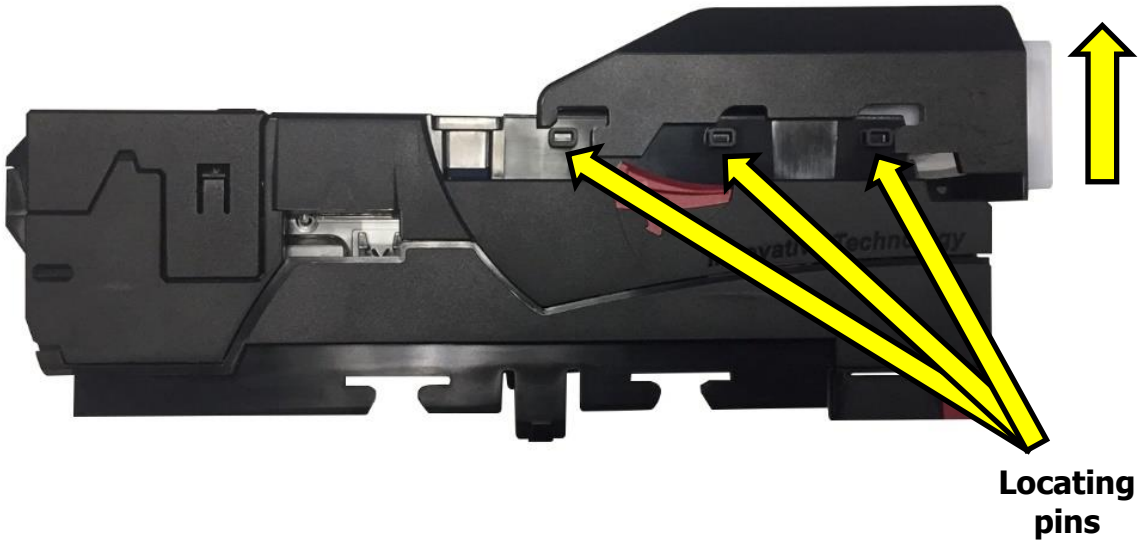
2. Dislocating the bezel from locating pins

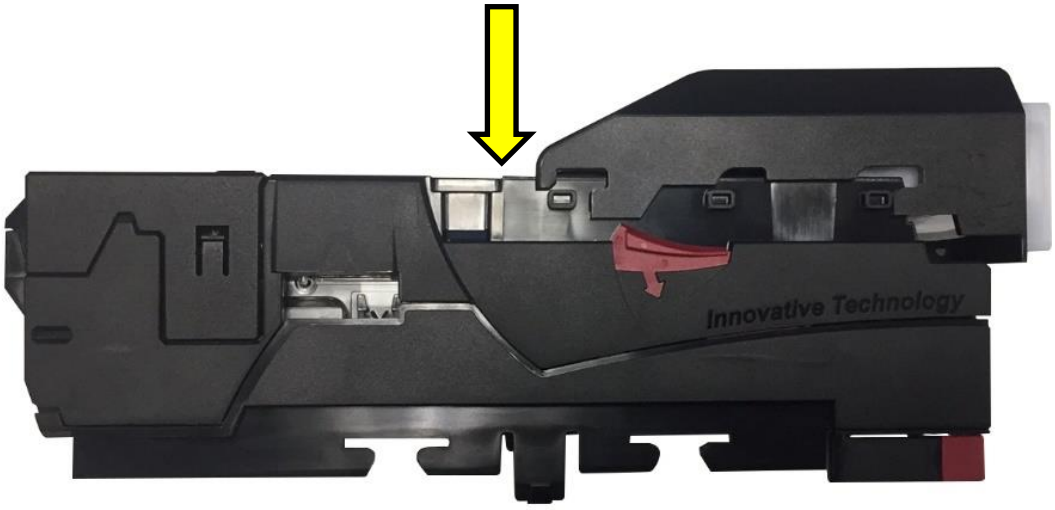
Lift the bezel upwards once it has been slid forward and is clear of the locating pins, the process should not be forceful.



4.3.2 Bezel Fitting

1. **Positioning the bezel for fitting**

When fitting the bezel onto the validator ensure that it sits in place such that it is ready to push down into place, then push down the bezel.



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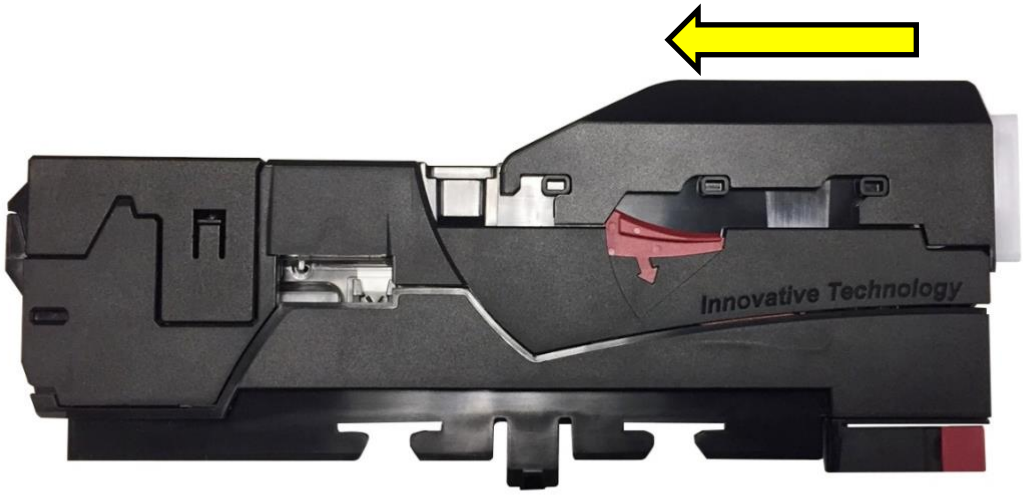
2. **Sliding the bezel into place**

WARNING!

Ensure bezel is secured to the validator

Once the bezel is in place with respect to the locating pins, slide the Bezel back until it clicks into place. ensure that both sides have clicked into place.

Slide back



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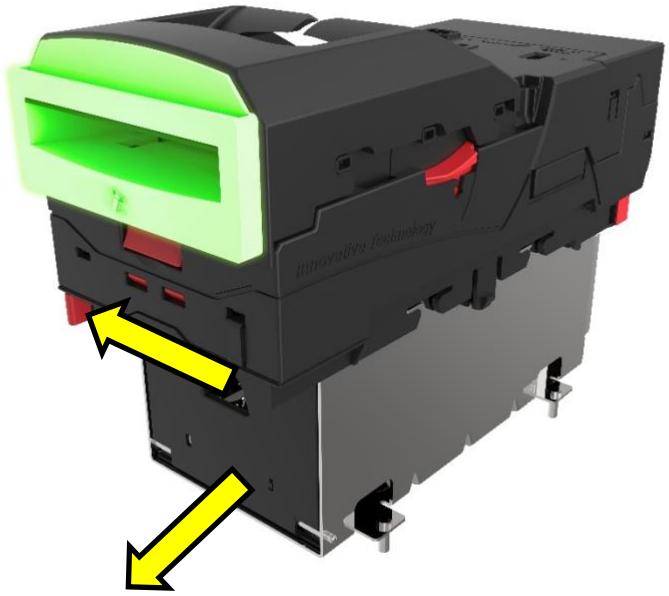
4.4 Cashbox Mounting

4.4.1 Cashbox Removal

To remove the cashbox, push the release catch away from the unit and pull the cashbox forwards.



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5 MAINTENANCE AND CLEANING

5.1 Introduction

Depending upon the environment the NV9 Spectral is running in it may require cleaning, belt changing or note path clearing.

5.2 Cleaning the NV9 Spectral

Disconnect the power **BEFORE** carrying out any cleaning operations to avoid the risk of causing damage to the validator.

5.2.1 Recommended cleaning intervals

Clean the optical lenses every 6 months or more if the unit is in a particularly harsh environment. Dirt, dust or other residue leads to bad note acceptance and other performance degradation. Please refer to the section below (Section 5.2.2) for comprehensive cleaning instructions.

5.2.2 Cleaning the validator

WARNING!

Do not use solvent based cleaners such as alcohol, Petrol, methylated spirits, white spirit or PCB cleaner

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 units; only use a mild detergent solution as directed below.

5.2.2.1 Housing assembly cleaning

The upper housing assembly contains vital sensors for required for optimum operation of the validator, dirt can obscure the light paths which can lead to failure in sensing the note, therefore upper housing assembly should be cleaned using a lint free cloth.

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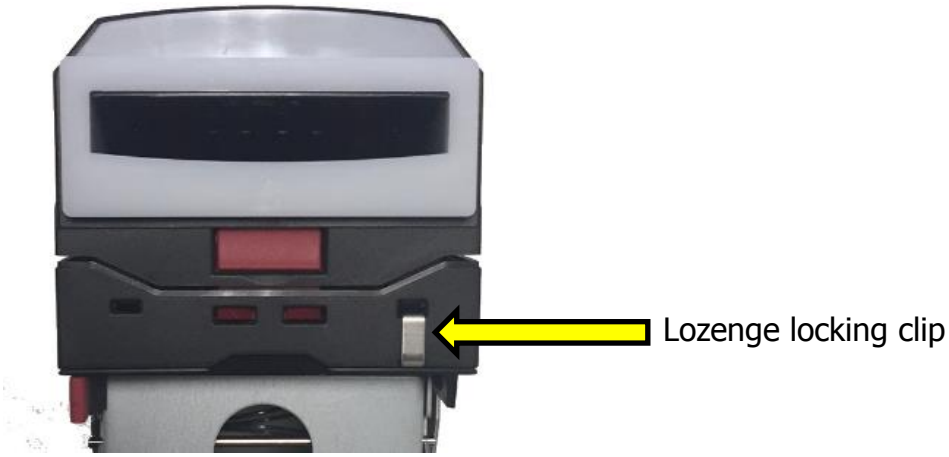
5.2.3 Lozenge removal and cleaning

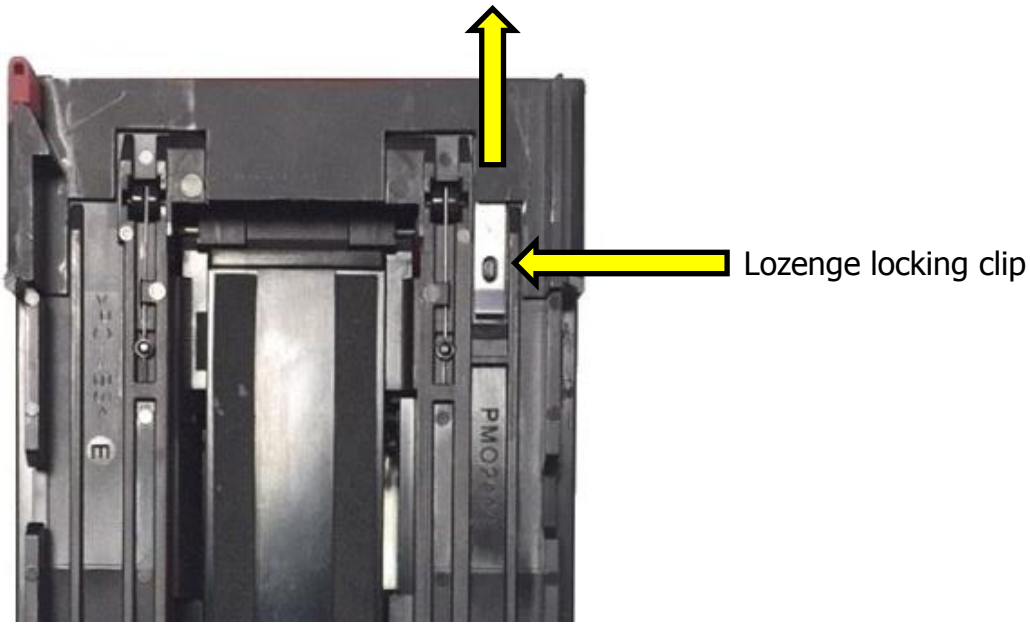
0

1. Locking clip removal

The lozenge is secured into place via a locking clip. To remove the lozenge the locking clip must be removed. Ensure that the cashbox has been removed initially to gain access to the locking pin on the underside of the main housing assembly.

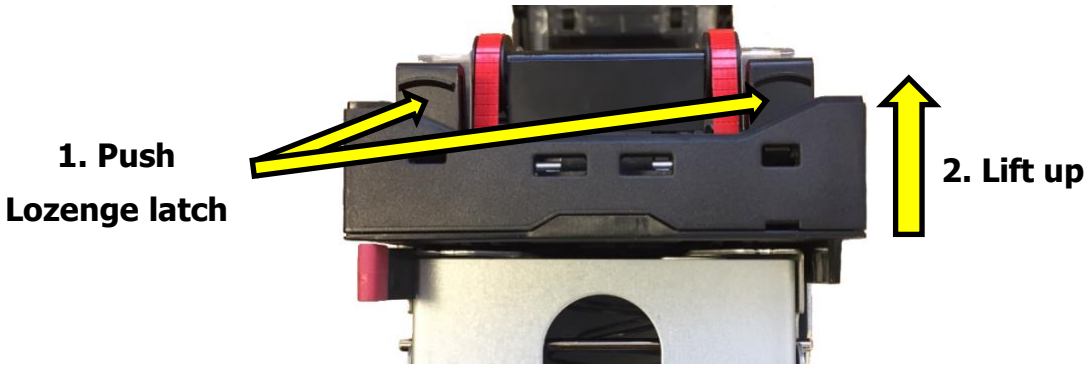


On the underside of the main housing assembly, the locking pin will be visible which will be secured into place by a latch which is part of the main housing assembly mould. Lifting the locking pin upwards and pushing it towards the bezel will free it.



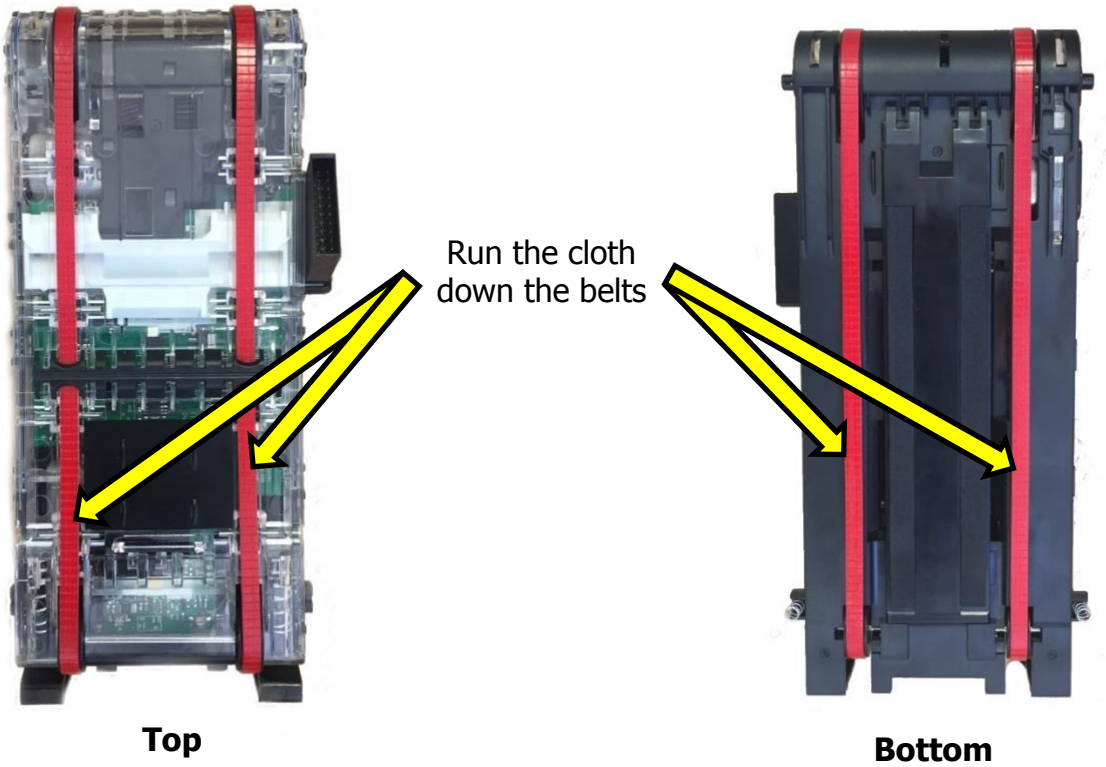
2. Detaching the lozenge from the housing assembly

The Lozenge assembly is secured into place via the latches attached to the lozenge, pushing the lozenge latch (both, Left and right) forwards will release the Lozenge out of the housing assembly.



3. Cleaning the lozenge

A lint free cloth dampened with water and containing a mild detergent (such as dish detergent) can be used to clean the belts on the lozenge, ensure both the top and bottom parts of the lozenge are cleaned.



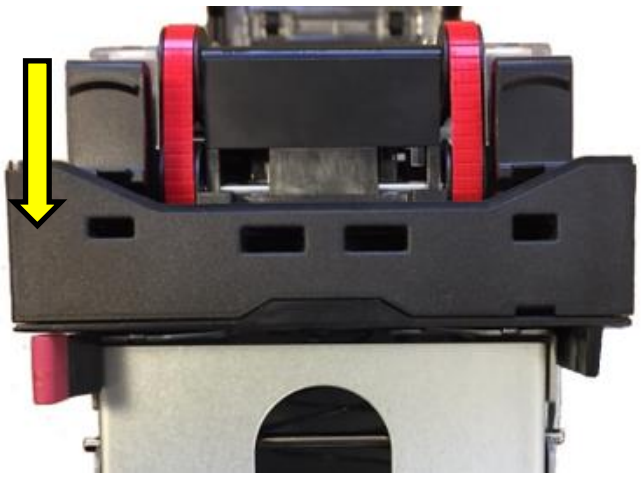
5.2.4 Lozenge fitting

1. Placing the lozenge into place

- When placing the lozenge back into the housing assembly, ensure that the lozenge is secured into the grooves of the rear side of the housing assembly, then simply push down the lozenge.

2. Clicking the lozenge into place

- After the lozenge is in place, a reasonable amount of downward force should allow the lozenge latch to click into place.



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6 SOFTWARE INSTALLATION AND CONFIGURATION

6.1 Introduction

The NV9 Spectral leaves the factory pre-programmed with the latest dataset and firmware files. However, it is important to ensure that the device is kept up to date with the latest dataset and firmware. This section will provide a brief overview of the various update possibilities with the NV9 Spectral. For detailed instructions please refer to the relevant manual package supplied with the software or contact support@innovative-technology.com.

6.2 Software Downloads

All software from Innovative Technology Ltd is free of charge and can be downloaded from the website www.innovative-technology.com/support/secure-download once registered and logged in. If 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.

6.3 Drivers

The ITL drivers allow the validators to connect to a compatible Windows device. If connecting via an IF17 then this process will not need to be followed as the drivers are signed Microsoft Drivers and should install automatically. If this isn't the case or the Computer/Laptop is disconnected from the network, there is a standalone package included within the driver downloads.

6.4 Dataset/Firmware Programming

6.4.1 Validator Manager

6.4.1.1 General Description

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

6.4.1.2 System Requirements

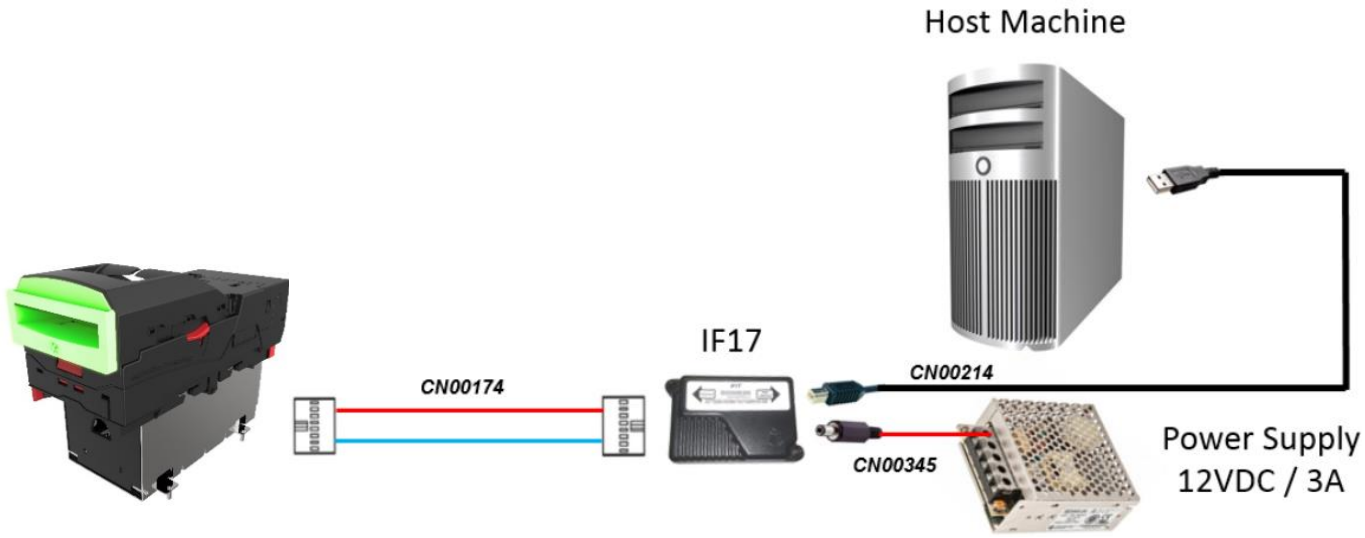
- Windows XP SP3 or above
- .Net Framework 4
- 256mb ram
- 50mb hard disk free
- Connected NV9 Spectral with active com port

Caution!

There have been 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 occurs, a rule will need to be added to the antivirus on the PC or Laptop

6.4.1.3 Hardware Setup

Connect the power supply to the DA2/IF17. Connect one side of the A to B USB cable to the DA2/IF17 and the other end to the computer or laptop.

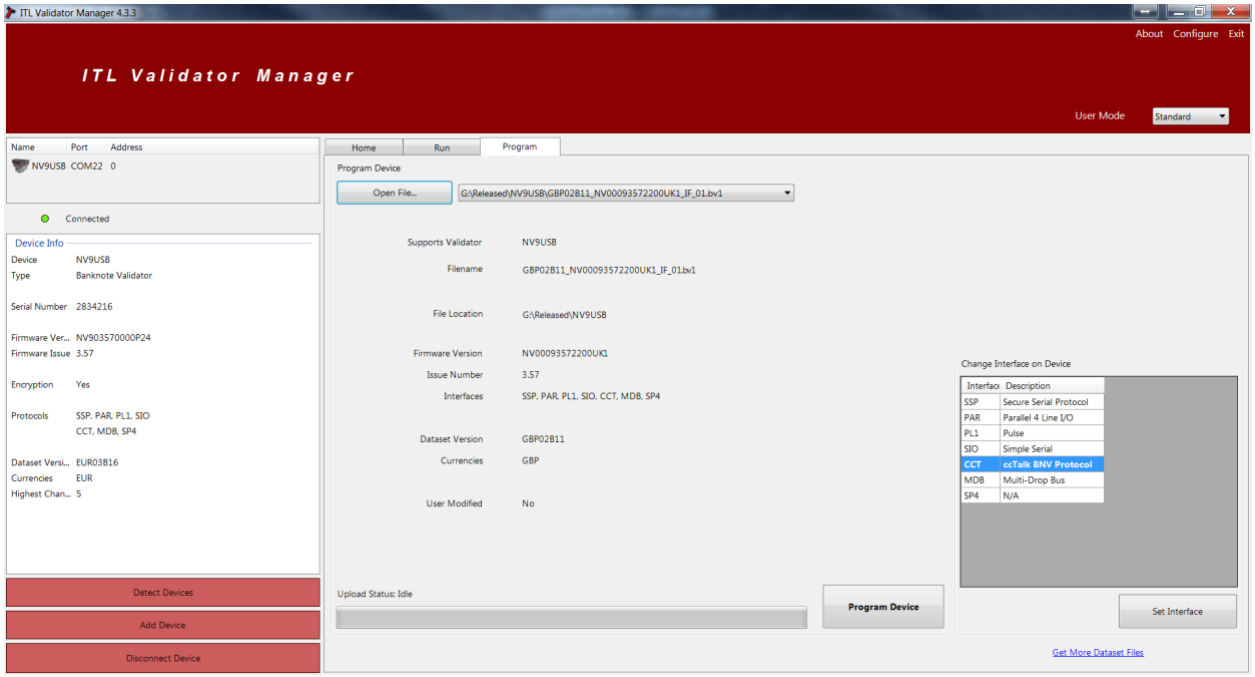


6.4.1.4 Switching to Programming Mode (SSP)

Before programming via the Validator Manager software, the NV9 Spectral needs to be switched to its programming mode (SSP interface). Please refer to section 6 for the procedure for doing this.

6.4.1.5 Programming the device

Once the unit has been switched to SSP, open Validator Manager and click detect devices. This will scan all active com ports for a unit, if the NV9 Spectral fails to connect, please ensure the correct drivers are installed and the unit is in SSP.



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By selecting the Program tab, the NV9 Spectral can be reprogrammed. To begin the upload, click open file, then browse to the file location (usually Downloads) 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.

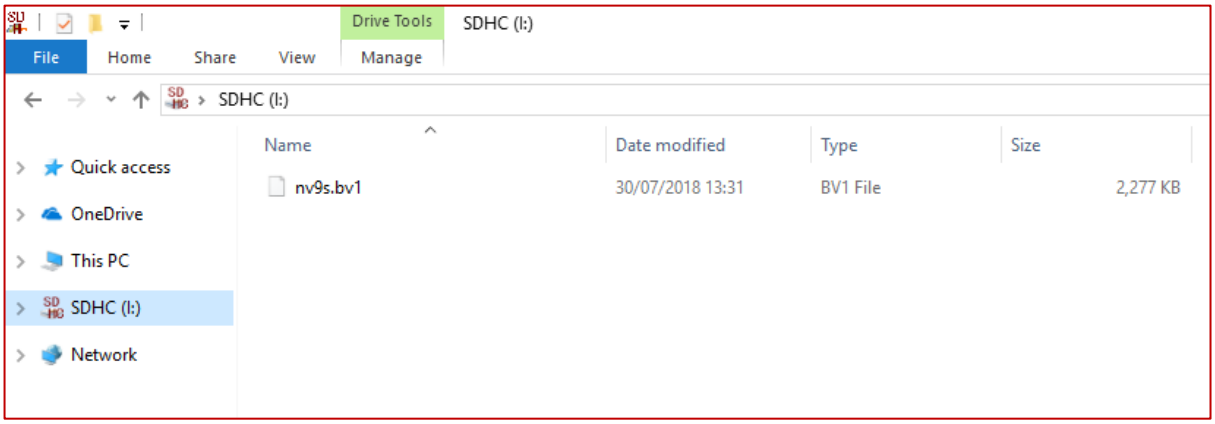
Caution!

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.

6.4.2 Updating using a Micro SD card

Currently the way adopted in updating NV9 Spectral via the micro SD is the following, the firmware file needs to be amended to **nv9s.bv1** and will need to be placed into the micro SD card root folder. Once the SD card is placed into its accommodating slot, the update will commence once the NV9 Spectral has been power cycled. The bezel will flash when updating and then go solid upon completion. Standard update will be developed in the future.



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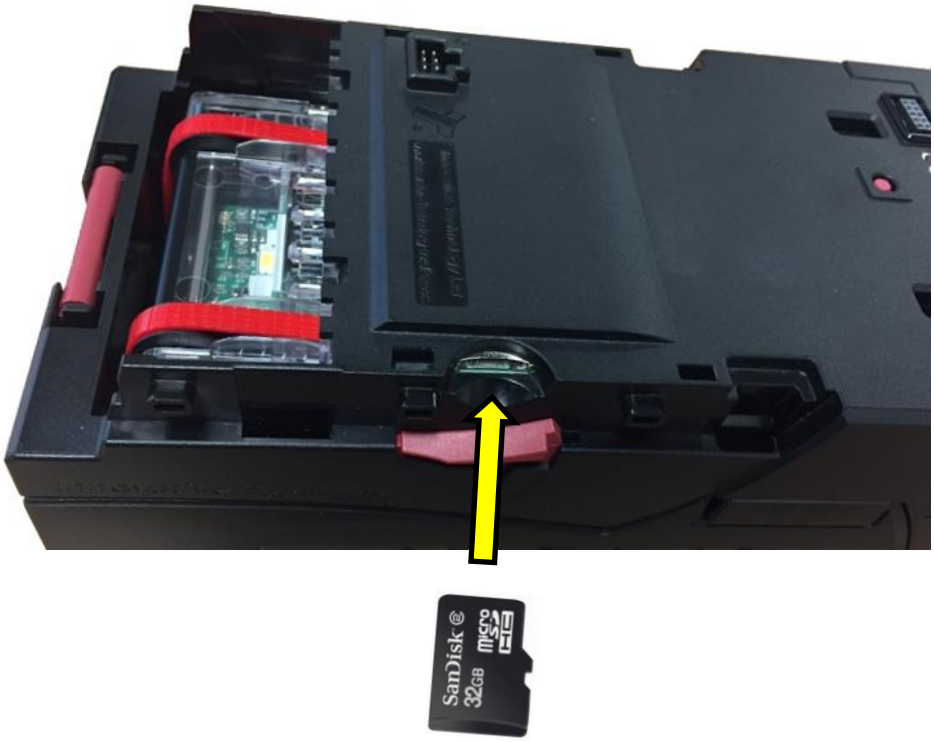
6.5 Micro SD card logging

The NV9 Spectral takes advantage of a micro SD card for data logging (class 4 SD card). The micro SD card slot can be found on the exterior side of the housing assembly after the bezel has been removed, please see image below. ensure there are three files present before inserting the SD card into the slot, the three files are as follows, **hsdata, nv9sl, valaudit.**



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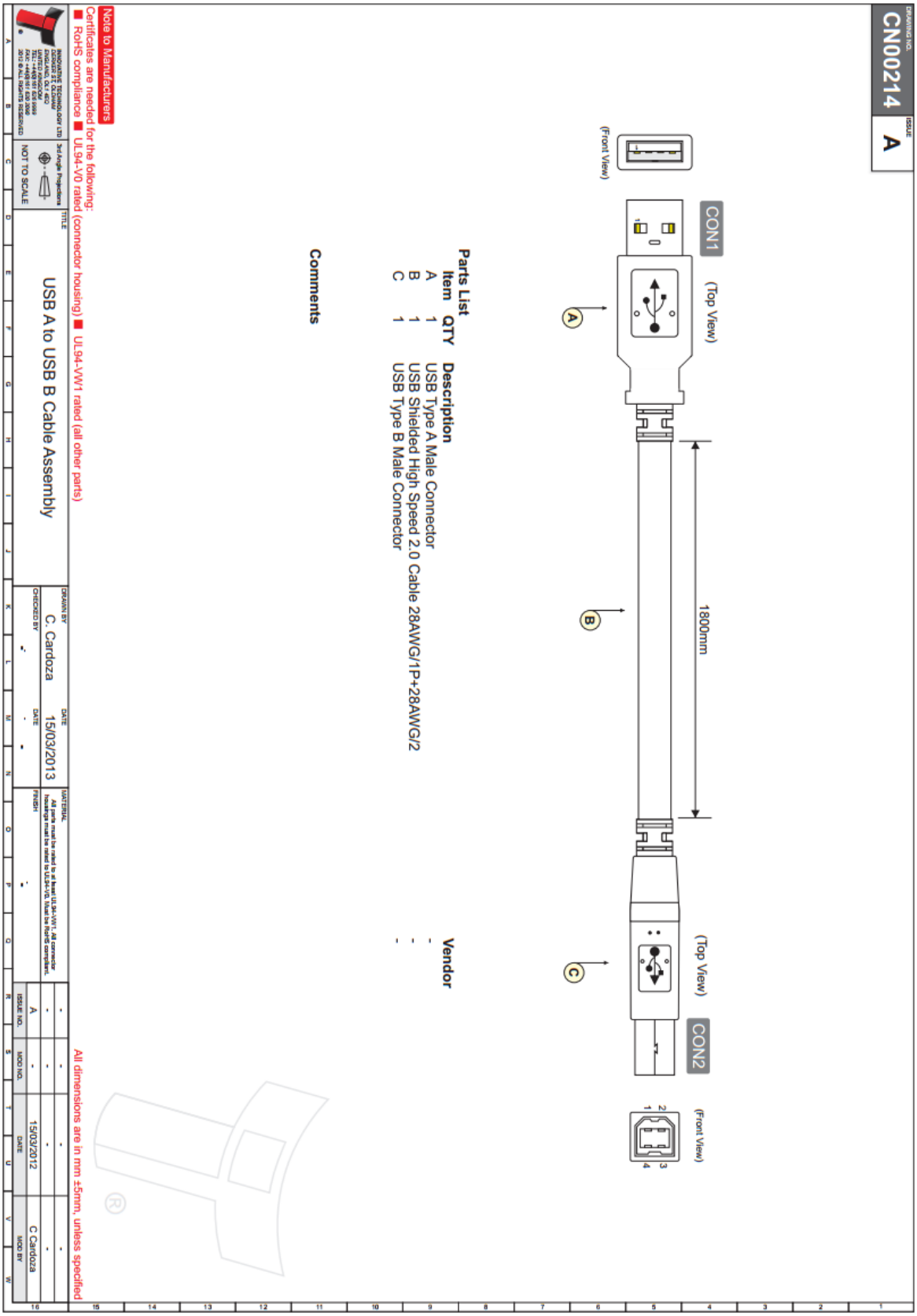
7 APPENDIX

7.1 Cable Drawings

7.1.1 CN214



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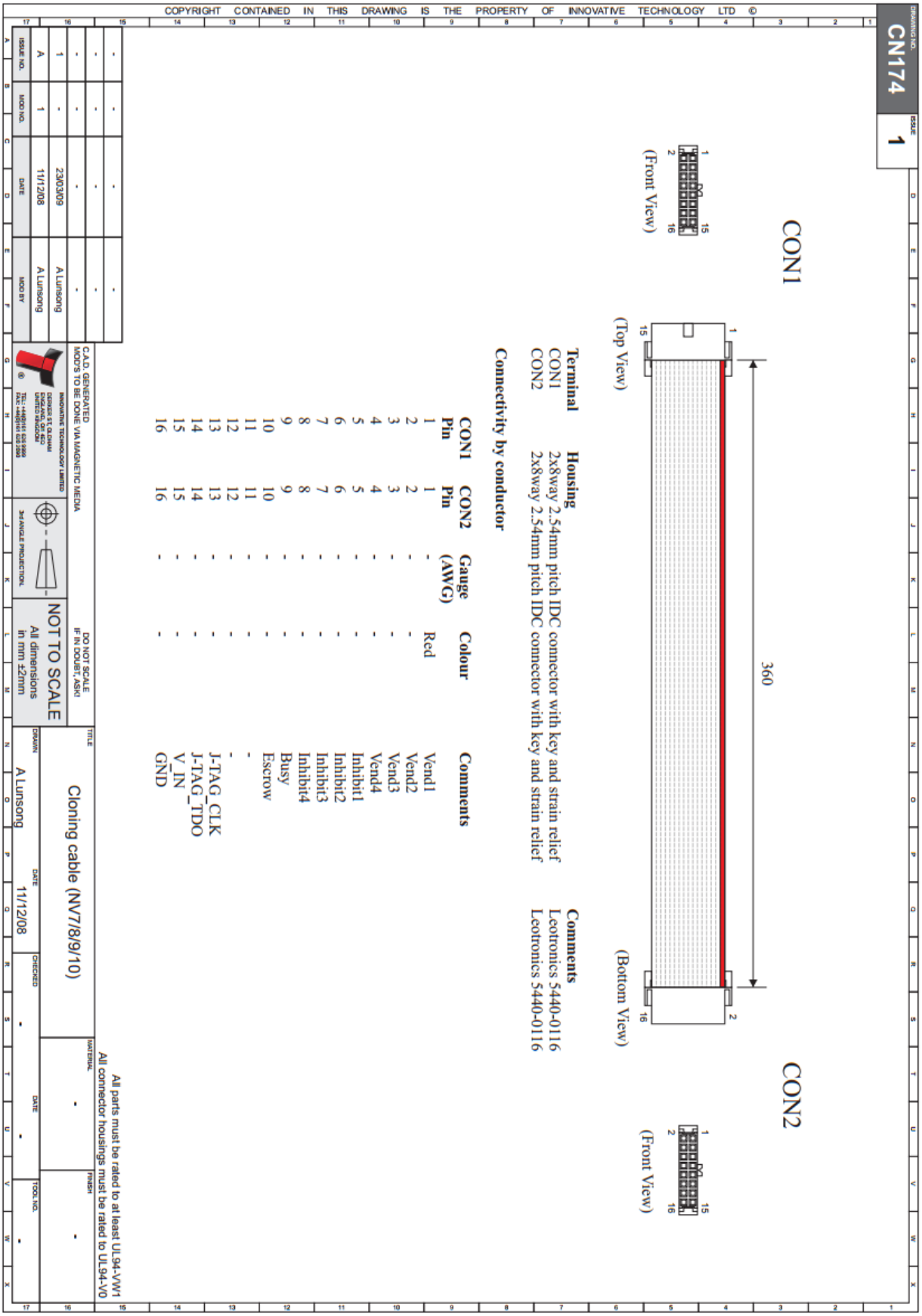
7.1.2 CN174



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7.1.3 CN392