

NV11 OPERATIONS MANUAL

INTELLIGENCE IN VALIDATION





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1 INTRODUCTION

This manual describes the operation of the NV11 Bank Note Validator

This document is intended for those who will:

- Install the NV11 equipment.
- Maintain the NV11 equipment.

Although information is included which will allow a degree of fault diagnosis and repair, it is recommended that for all but simple mechanical repairs, the unit must be returned to an approved service centre for repair.

CAUTIONS



- It is recommended that this product be fitted with a 3 Amp slow blow fuse before use.
- The NV11 validator is pin for pin compatible with NV7/8/9/10, but not pin for pin compatible with the NV2/3/4/4x or 5 series products.
- Never exceed the recommended environmental and electrical limits.
- Do not attempt to lubricate the mechanisms as this may affect the note transport.
- Do not polish the lens as this may alter the optical characteristics.
- If the NV11 validator is disassembled the unit must be re-calibrated and re-initialised, following re-assembly.

WARNING



There are no user serviceable parts inside the Note Float unit. Parts of the equipment are under spring pressure, which may result in personal injury if the unit is disassembled.

- Only suitably trained personnel should carry out any work on this equipment in accordance with all current local, national and international health and safety regulations.
- We recommend that you study this manual as there are many new features permitting new uses and more secure applications.
- If you do not understand any part of this manual please contact the factory, contact details are below, for assistance. In this way we may continue to improve our product.
- The NV11 Validator has been designed to minimise any performance variation over time. Much of this is achieved by careful Hardware and Software design.
- Innovative Technology Ltd has a policy of continual product improvement. As a result the products supplied may vary from the specification described here.

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2 TECHNICAL SPECIFICATION

ENVIRONMENT

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

Table 1 – Environmental Requirements

POWER REQUIREMENTS

Total power requirements of the NV11

Electrical Supply	Minimum	Maximum
Supply Voltage (V DC) Absolute Limits	+10.8 V	+13.2 V
Supply Ripple Voltage	0 V	0.25 V @ 100 Hz
Supply Currents:		
Standby		350mA
Running		3A Peak for 300mS
Motor Stall		3.5A Peak for 300mS

Table 2 – Power Requirements

GENERAL SPECIFICATIONS

Note Sizes	Minimum	Maximum
Width		- Stacked notes 82mm - Note Float Storage and payout 80mm
Length		150mm
Capacity		
Storage	300, 600, and 1000 note stacker sizes available	
Payout	30 x 150mm long notes (longer notes reduce capacity)	
Weight		
Weight	2.2KG when empty	
Interface		
Interface	eSSP (encrypted SSP) , ccTalk	

Table 3 – General Specifications

Interface Logic Levels	Logic Low	Logic High
Inputs	0 V to + 0.5 V	+3.7 V + 12 V
Outputs with 2K2Ω pull up	0.6 V	Pull up voltage of host interface
Maximum Current Sink	50mA per output	

Table 4 - Interface Logic Levels

CAUTION

If the input voltage falls below 10.8 V the NV11 may not operate correctly (will reject notes). The front bezel lights will flash to indicate incorrect conditions.

3 GENERAL DESCRIPTION

The NV11 is the combination of an NV9USB bank note validator and a Note Float unit that stores and dispenses notes. With a 300 note capacity cash box and the capability of storing a further 30 notes in the note float unit for future payout, the NV11 can be utilised to give change or prizes to aid coin hopper starvation. Up to 16 different denominations of bank note can be accepted and stacked. In addition to this, the Note Float unit 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 unit is available to be paid out or moved to the stacker. Any value note can be routed into the Note Float using the Set Routing command. It is recommended that only one denomination of the chosen currency is stored in the Note Float.

Communication with the NV11 is achieved using the eSSP Protocol and ccTalk. Full details of available commands and responses can be found in the SSP Interface Specification (Document number GA138), this is available from the ITL website www.innovative-technology.co.uk. The ccTalk specification has been extended to facilitate the Note Float. Full details are available through the support team (support@innovative-technology.co.uk).

The NV11 can only be operated in horizontal mode with any NV9USB horizontal bezel. The Note Float (part number PA903) can be purchased separately from our sales team (sales@innovative-technology.co.uk) and used in conjunction with a NV9USB.



Please note the Note Float is only compatible with NV9USB units with a rear cover and black connector on top cover as shown here.

The NV11 has a new standard bezel, PA896 (which is of equal width to existing NV9 horizontal bezel) and a new standard cashbox, PA898 (NB: this cashbox will only stack notes up to 150mm, other horizontally mounted cashboxes are available on request). The drawings can be found in **Appendix B – Dimension Drawing**.

4 MACHINE INTERFACES

4.1 STATUS LEDS

There are two status indicators on the NV11, the Bezel LED's and the status LED on the Note Float unit.

During normal operation the Bezel LED's will illuminate while the NV11 is enabled and ready to receive a note. The status LED on the Note Float unit will be off during normal operation.

If the NV11 detects an error that is preventing normal operation, the bezel LED's will indicate the cause of the problem by flashing in a certain sequence as shown in Table 5 - Bezel LED Status Codes

If the Note Float unit detects an error preventing notes being stored, the NV11 will, in most cases, continue to validate notes. All accepted notes are stacked in the cash box. Payout and note storage operations will not be possible in this state. The Note Float unit status LED will indicate the cause of the problem as shown in Table 6 - Note Float Status LED codes. Please see Chapter 8.2 for guidance in resolving these issues.

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

Table 5 - Bezel LED Status Codes

Status	Condition
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

Table 6 - Note Float Status LED codes

For details of possible solutions to the above conditions see chapter 8 - Diagnostics

4.2 HARDWARE

4.2.1 CONFIGURATION BUTTONS

The NV11 has two Configuration Buttons. One is located on the top of the Note Validator unit (inaccessible when the Note Float unit is fitted). The other is located on the front of the Note Float unit. The Note Float unit configuration button has the same functions as the configuration button on the note validator, with the additional function of acknowledging a jam cleared. See chapter 7.5 – Manually Removing Notes for more details.

Action	Function	Indication
Press and hold until the bezel illuminates (>2 secs) then release	Sets the NV11 to programming mode	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)	Current setting indicator	Bezel LED's flash a number of times according to the current settings (see Table 9).
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	

Table 7 - Configuration Button Functions

4.2.2 INTERFACE CONNECTOR PIN DETAILS

The NV11 interface connector is located on the left side of the unit; it has 16 pins (see Figure 1), refer to Table 8 for the pin allocation. Two are used for the 0V and +12V power supply and there are five outputs and five inputs, the remaining four pins are reserved for the USB connection and factory use. An example mating connector is Molex type Part No: 39-51-2160. To take advantage of the USB connectivity, a USB cable (CN392) should be used. The USB cable CN392 fits into the 16-way connector, this can be used for high speed programming and serial communications when used in SSP and SIO modes. When using the USB connection, power must be applied to the NV11 via the 16-pin interface connector using CN392.

A driver file will be required on the computer when connecting to the NV11 using the USB connector. The file required is ITLUSBser.inf and can be downloaded from the ITL website.

The connector pin details are described below (see Table 8); they use an IDC 16-pin 0.1" pitch header with 2 rows of 8 pins.

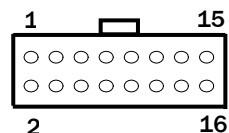


Figure 1 - Pin Detail

4.2.3 CONNECTIONS

Pin	Name	Description
1	TxD	Open collector output. Serial Output pin for eSSP Communications
2	Reserved	Do Not Connect
3	Reserved	Do Not Connect
4	Reserved	Do Not Connect
5	RxD	Serial Input pin for eSSP communications
6	Reserved	Do Not Connect
7	Reserved	Do Not Connect
8	Reserved	Do Not Connect
9	Reserved	Do Not Connect
10	Reserved	Do Not Connect
11	USB	Data Plus
12	USB	Data Minus
13	USB	-V- Bus
14	Reserved	Do Not Connect
15	+Vin	Nominal 12V DC supply
16	0V	0V supply

Table 8 - 16 Pin Connector Details For eSSP

Pin	Name	Description
1	TxD	ccTalk communication data - link to pin 5
2	Reserved	Do Not Connect
3	Reserved	Do Not Connect
4	Reserved	Do Not Connect
5	RxD	ccTalk communication data - link to pin 1
6	Reserved	Do Not Connect
7	Reserved	Do Not Connect
8	Reserved	Do Not Connect
9	Reserved	Do Not Connect
10	Reserved	Do Not Connect
11	USB	Data Plus
12	USB	Data Minus
13	USB	-V- Bus
14	Reserved	Do Not Connect
15	+Vin	Nominal 12V DC supply
16	0V	0V supply

Note: Pins 1 and 5 are connected together in ccTalk interface serial connection.

Table 9 - 16 Pin Connector Details For ccTalk

4.3 COMMUNICATION PROTOCOLS

For maximum security eSSP is the recommended protocol for the NV11. For detailed information and full protocol specification please refer to SSP Interface Specification (Document number GA138), this is available from the ITL website www.innovative-technology.co.uk.

ccTalk interface is also available. The standard ccTalk commands have some additions for the payout functions. Please contact support@innovative-technology.co.uk for more details and documentation on these expansions.

4.3.1 eSSP

The encryption of SSP protocol ensures superior protection and reliability of the data, which is transferred between validator and host machine. The encryption key is 128 bits long, and is divided into two parts. The lower 64 bits are fixed and specified by the machine manufacturer, allowing the manufacturer to control 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. This encryption algorithm is approved by the US military for its advanced security.

eSSP is a secure serial interface specifically designed to address the problems experienced by cash systems in gaming machines. This interface is recommended for all new designs. 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.

The integrity of data transfers is ensured through the use of 16 bit CRC checksums on all packets. 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. Commands are currently provided for coin acceptors, note acceptors and coin hoppers. All current features of these devices are supported.

To help in the software implementation of eSSP, ITL can provide DLL controls and Visual Basic applications on request. Please contact support@innovative-technology.co.uk for more information.

In addition to the standard Note Validator commands/responses, the NV11 also supports the Note Float commands detailed in the SSP specification (ITL Document number GA138).

OTHER INFORMATION:

Minimum time between Polls: - 200ms

Default SSP address: - 0x00

5 MECHANICAL

5.1 REMOVAL OF THE BEZEL



Figure 2 - Bezel Removal

To remove the bezel from the front of the NV11 push upwards on the retaining clips, as shown in Figure 2, to release the bezel. There is one located on either side of the validator. Slide the bezel forward while the bezel is released and lift upwards.

To fit the bezel, line the gaps on the bezel up with the extrusions on the NV11. Press down vertically and then push towards the rear of the validator. The retaining clips will click in automatically once the bezel is back far enough.

5.2 REMOVAL OF NOTE FLOAT UNIT

Disengage latches on each side

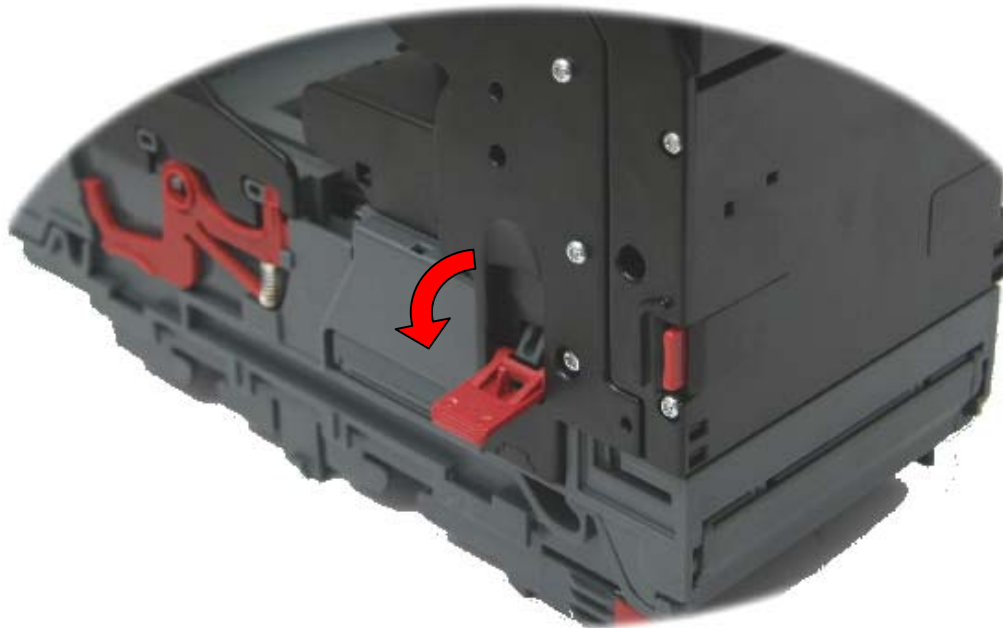


Figure 3 - Disengage Latches

Lift note float away from validator



Figure 4 - Lift Note Float

Fit blanking cover if note float is not to be re-fitted.

5.3 REMOVAL OF BLANKING PLATE



Figure 4 - Removal of Blanking Plate

To remove the blanking plate, slide latch below mouthpiece to open, disengage clips on both sides of the NV9USB, as shown in above, and lift blanking plate upwards. To fit blanking plate, slide latch below mouthpiece to open, and push blanking plate downwards to engage clips on both sides of the NV9USB, as shown in above.

To verify your NV9USB is Note Float compatible a visual inspection is required.



Figure 5 - Non-compatible NV9USB

Figure 5 shows a non-compatible NV9USB. This can be seen by the absence of the removable blanking plate on the rear of the NV9USB.

5.4 FITTING THE NOTE FLOAT UNIT

Remove blanking cover

Carefully align the note float unit and fit in place

Engage the red latches on each side fully



Figure 6 - Engage Catches

5.5 OPEN THE NOTE FLOAT UNIT

Push the door release buttons on both sides of the note float. The door can then be opened. When closing the Note Float door, ensure that it is fully clicked into position.



Figure 7 - Open Rear Door

5.6 REMOVING A NOTE MANUALLY FROM THE NOTE FLOAT

N.B. Ensure power is removed from the unit before attempting the following procedure

To remove a note manually from the note float follow the sticker attached to the back of the note float, as shown below.



Figure 8 - Manual Note Removal

Step 1: Follow procedure 5.5 in the manual

Step 2: Remove note

Step 3: Once unit is closed press the button on the front of the note float. This decreases the note count by 1 and sets note float to acceptance mode.

6 REPROGRAMMING THE NV11

6.1 USING CONFIGURATION CARDS

Configuration Card programming is not currently implemented on the NV11.

6.2 VALIDATOR PROGRAMMING SOFTWARE

Validator Programming Software (VPS) offers the following functions:

- Download pre-prepared files via the DA3 kit.
- Allows for upgrade of firmware version and currency set without the need of a computer or removing the NV11 from the host machine.

6.3 BANK NOTE VALIDATOR CURRENCY MANAGER SOFTWARE

The ITL BNV Currency Manager software offers the following functions:

- Check the firmware version and currency set already loaded on a NV11 unit.
- Program the bill acceptor by downloading pre-prepared download files via the DA2 kit or direct USB connection (CN392 required).
- Adjust the channel on a pre-programmed NV11 to your own requirements.

The NV11 can be connected to a computer via the USB port using either a DA2 kit or CN392 cable.

Note: If attaching a Note Float to a NV9USB a firmware upgrade may be required. These files are available on our website.

7 MAINTENANCE

Maintenance should be carried out at regular intervals to ensure the NV11 continues to perform correctly. The period between maintenance varies according to the environment in which the NV11 is installed, the volume of notes inserted and the quality of notes inserted. A NV11 installed in a dusty area with high usage will require a more frequent maintenance schedule than a NV11 installed in a clean, cool area with low usage. As a guide, the NV11 should be cleaned and its condition checked every 10,000 note inserts. This is only a guide and may be less in certain environments.



There are no user serviceable parts inside the Note Float unit. Parts of the equipment are under spring pressure, which may result in personal injury if the unit is disassembled.

7.1 CLEANING



CAUTION: DO NOT USE SOLVENT BASED CLEANERS SUCH AS ALCOHOL, PETROL, METHOLATED SPIRITS, WHITE SPIRIT or PCB CLEANER. THIS WILL RESULT IN PERMANENT DAMAGE TO THE VALIDATOR, ONLY USE A MILD DETERGENT.

To clean, separate the Note Float Unit from the Note Validator Unit by lifting the red latch on each side of the Note Float Unit. Slide the red release catch on the end of the Note Validator unit to the left, to open the note path. The note path and drive unit are now exposed for cleaning.

Carefully wipe the surfaces with a soft lint free cloth that has been dampened with a water and mild detergent solution (i.e. household washing up liquid). Take particular care around all the sensor lenses (see Figure 9) ensuring they are clean and dry. If a lens has become badly scratched do not attempt to polish it. Contact ITL for further advice, as there may be damage to the optical properties of the lens.

CAUTION: WHEN CLEANING THE "RECESSED" FRONT SENSOR, USE A SMALL SOFT BRUSH OR COTTON WOOL BUD.

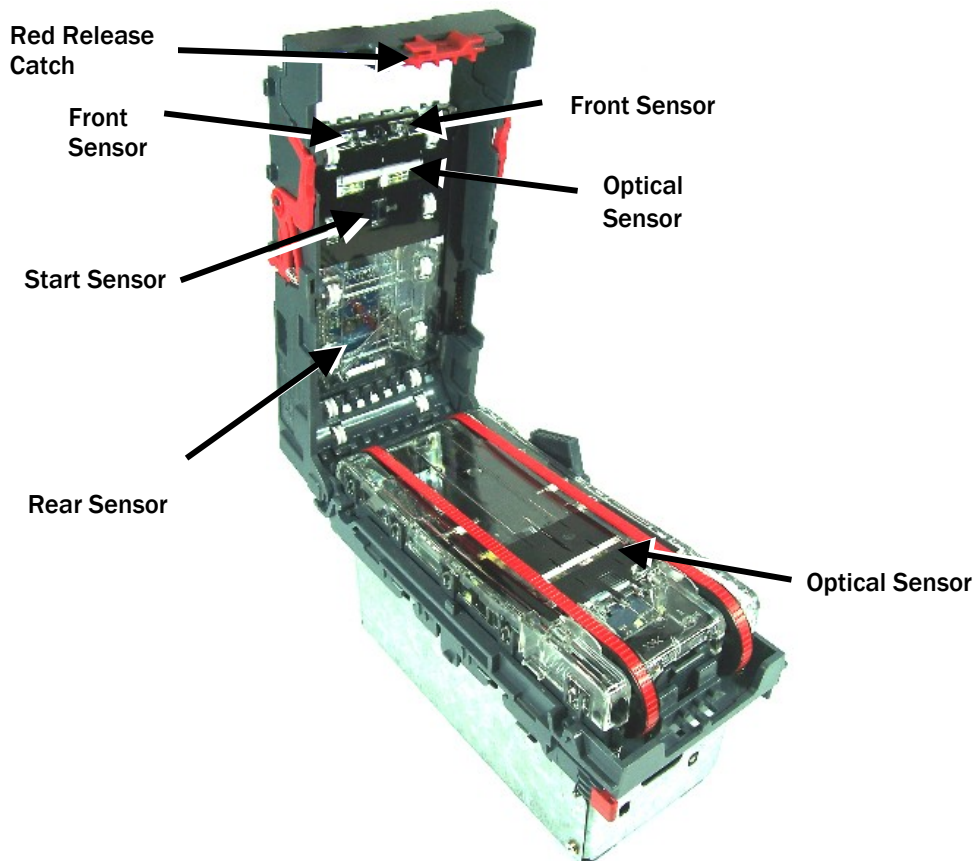


Figure 9 - Sensor Location

7.2 BELT CLEANING

- Ensure the validator is enabled (i.e. Bezel lights are illuminated)
- Remove Bezel.
- 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 containing a mild detergent such as dish detergent and hold it against each drive belt as it turns.
- Repeat steps 3 and 4 until all dust and debris has been removed from both belts.
- Repeat step 3 using a DRY lint free cloth to remove any excess moisture.

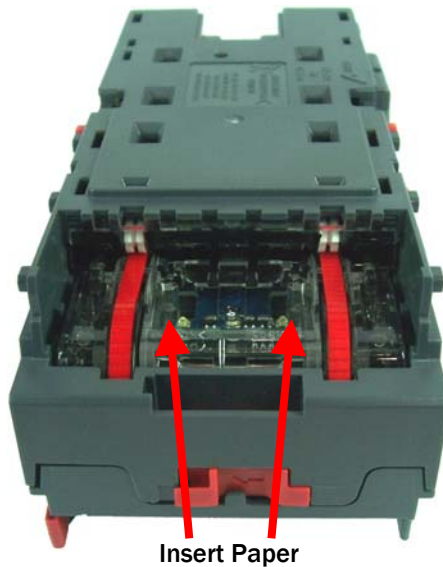


Figure 10 - Belt Access

7.3 DEBRIS CLEARING

- Examine the note paths, lozenge and note stacker for any dirt or debris.
- 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.). Take particular care around all the sensor lenses (see Figure 9), ensuring they are clean and dry.
- Check that the note stacker and cash box spring plate are not jammed.

7.4 BELT CHANGING

- Open the top of the unit using the “Red Release Catch”
- Release the lozenge by gently pressing the “Lozenge Release Catch” (see Figure 11).
- Remove and place the lozenge on a clean dry surface
- 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.

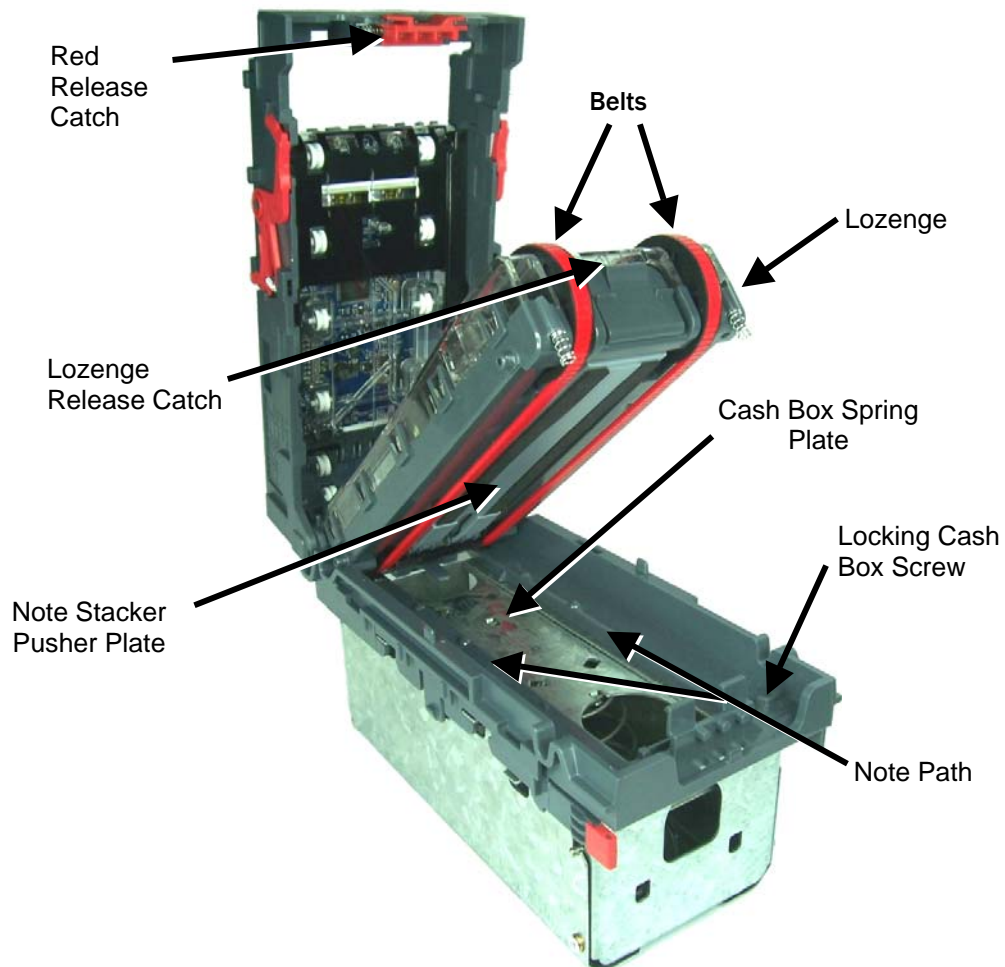


Figure 11 - Belt Removal

7.5 MANUALLY REMOVING NOTES

On occasion, it may be necessary to manually remove notes from the Note Float unit. There are two methods depending on the situation.

If a single note has failed to transport either to or from the Note Float unit the Note Float status LED will flash constantly at a frequency of 1Hz.

To remove the note:

1. Open the cover of the Note Float Unit by pressing the red button on each side
2. The note should now be visible and can be removed.
3. Close the Note Float cover ensuring it clicks securely in place.
4. Press the note float configuration button to acknowledge the note has been cleared.

To remove all notes from the Note Float:

This is done following the steps below. A M5 Hex key is required to perform this operation.

It should only be performed as a last resort.

1. Remove power from the NV11
2. Separate the Note Float Unit from the Note Validator Unit by lifting the red latch on each side of the Note Float Unit
3. Open the cover of the Note Float Unit by pressing the red button on each side
4. Turn the manual drive in the direction of the arrow (anti-clockwise) with a M5 Hex key until all notes are removed
5. Close the Note Float cover ensuring it clicks securely in place.
6. Attached the Note Float unit to the Note Validator unit and secure in place with the red tabs on each side
7. Apply power to the NV11



CAUTION: Do not over wind the mechanism when manually removing all notes. This will cause permanent damage to the unit which will have to be returned to ITL or authorised service centre.

8 DIAGNOSTICS

Although this chapter allows a degree of fault diagnosis and repair, it is recommended that for all but simple mechanical repairs, the unit must be returned to an approved service centre for repair.



There are no user serviceable parts inside the Note Float unit. Parts of the equipment are under spring pressure, which may result in personal injury if the unit is disassembled.

8.1 GENERAL

Symptom	Possible Cause	Corrective Action
All notes are rejected (Bezel LED's are on)	Incorrect currency file programmed	Check that the required dataset is programmed into the validator using the validator manager software.
	Notes are not included in the currency file	Check that the required note denomination and issue is included in the currency file using the validator manager software.
	Notes are inhibited by the host machine	Ensure the machine is ready to accept notes. If a coin hopper is in the machine, ensure it is not empty. Ensure the maximum allowed credit on the host machine has not been exceeded.
Notes are not taken in (no bezel LED's)	Bill path obstructed	Check for necessary clearance for note ejection after acceptance.
	No Power	Ensure the correct specification of power is applied to the validator.
Notes accepted but no credit given	Incorrect interface is programmed	The NV11 can only be used in eSSP mode. Check the host machine is configured to use eSSP
	Power supply outside specification	Ensure correct supply and sufficient current. Also check for necessary clearance for note ejection after acceptance.
Acceptor runs slowly or intermittently	Rear note detect sensor obscured	Ensure no foreign objects are obstructing the sensors.
	Foreign objects in the note path	Clean the note path
	Incorrect voltage level of supply	Ensure correct supply and sufficient current
Bezel LED's are flashing	Damage in the unit	Replace necessary components
		See chapter 8.2 for details of LED status signals
Motor continues to run	Foreign object or note is stuck in the note path	Ensure the note path is clear and reset the validator. It may also be necessary to reset the host machine.

8.2 BEZEL ERROR CODES

Long Flashes	Short Flashes	Meaning	Corrective Action
1	2	Note path Jam	Open the Note Validator note path and check for jammed notes of debris covering a sensor
1	3	Unit not initialised	Unit must be returned to service centre for re-initialising
2	2	Cash box jam	Check that the cash box note plate is free to move and the stacker mechanism is in the home position
3	1	Firmware Checksum	Download dataset/firmware file to NV11
3	2	Interface Checksum	Download dataset/firmware file to NV11
3	3	EEPROM Checksum	Download dataset/firmware file to NV11
3	4	Dataset Checksum	Download dataset/firmware file to NV11
3	5	Incompatible Firmware	Check Note validator firmware is compatible with Note Float firmware
4	1	PSU too Low	Check the power supply is 12V DC 3.5A
4	2	PSU too High	Check the power supply is no more than 13.2V

8.3 NOTE FLOAT ERROR CODES

Flashes	Meaning	Corrective Action
Constant 1Hz	Transport error in Note Float	Removed jammed note from Note Float unit and press configuration button once
2	Software Error	Download dataset/firmware file to NV11
3	Calibration Error	Return to service centre for repair
4	Diverter Error	Check for jammed notes preventing the diverter returning to the home position
5	Motor Timeout	Check for jammed notes preventing the Note Float tape from moving

APPENDIX A - PROGRAM CHECK PROCEDURE

To check settings on a programmed unit:

1. Power on unit
2. Click configuration button on unit twice (like double click on mouse)
3. Monitor bezel led and check flash codes

	Flash count	ccTalk plain	ccTalk 8bit
SSP	1		
ccTalk	6	1 flash	2 flash

Table 9 – NV11 program Check Bezel Codes

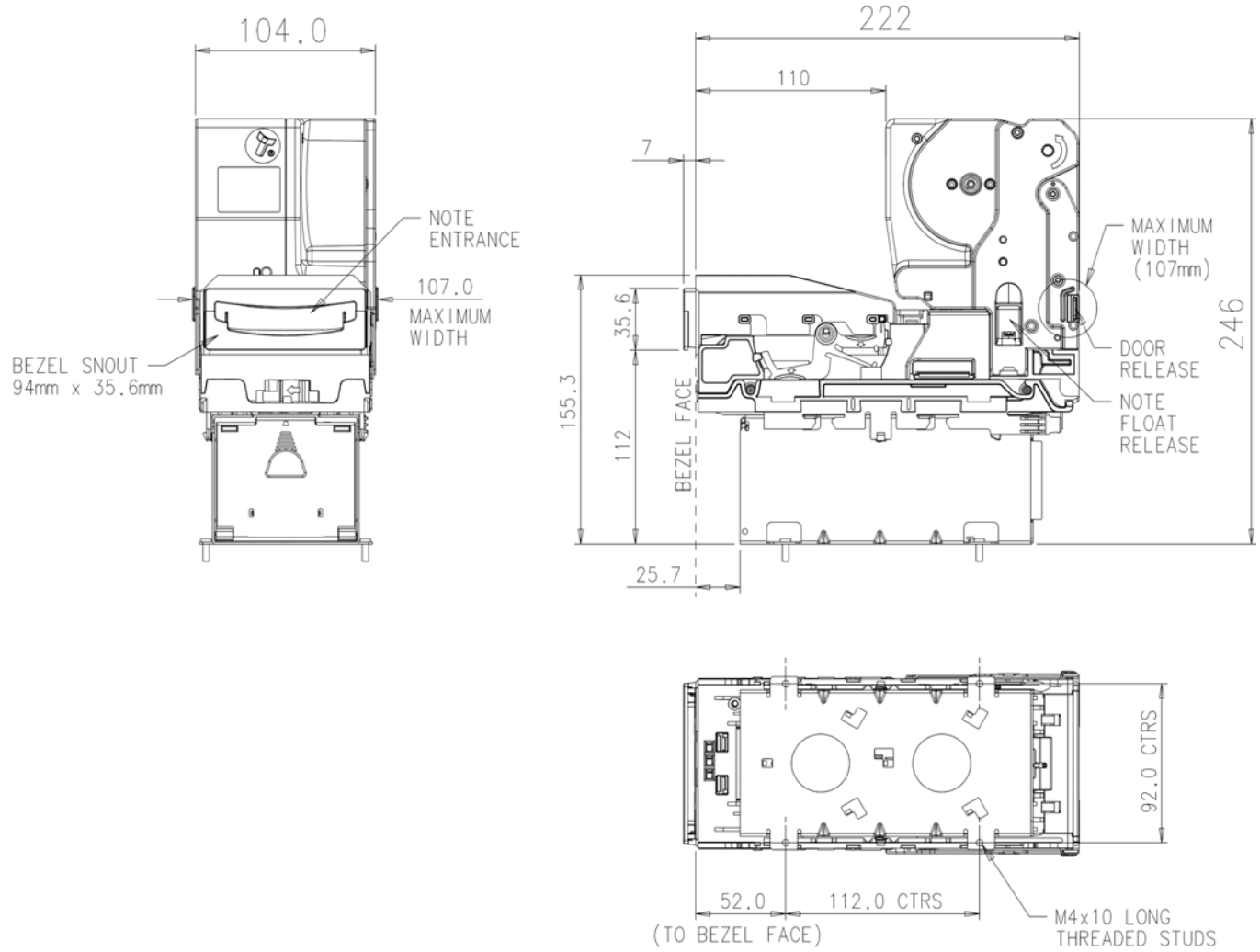
For example:

A SSP interface will only ever flash once

A ccTalk interface with 16 bit checksum, no encryption will flash 6,1

A ccTalk interface with 8 bit checksum, no encryption will flash 6,1,2

APPENDIX B – DIMENSION DRAWING



REVISION HISTORY

INNOVATIVE TECHNOLOGY LTD			
TITLE	NV11 OPERATIONS MANUAL		
DRAWING NO	AUTHOR	DATE	FORMAT
GA963	SR	27/08/10	MS Word 2000

ISSUE	RELEASE DATE	MODIFIED BY	COMMENTS
A	27/08/10	SR	First Draft
B	07/09/10	MH	Second Draft
1	09/09/10	SR	First Release