

Innovative Technology Limited ®

NV7 Bank Note System

The Future of Smiley® Bank Note Handling



Operations Manual

Issue 2

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Introduction

IMPORTANT This Product must be fused with a 2 Amp fuse before use.

This manual describes the operation of the NV7 Bank note Validator as fitted with Firmware Version 1-00

Please note that the NV7 Validator is NOT pin for pin compatible with the NV2/3/4/4X or 5 series products

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 for assistance. In this way we may continue to improve our product.

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Innovative Technology has a number of European and International Patents and Patents Pending protecting this product. If you require further details please contact the factory.

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Scope of Document

This document is intended for those whose will:

- a) Design the NV7 into items of equipment.
- b) Build equipment using the NV7.
- c) Install equipment containing the NV7.
- d) Maintain equipment containing the NV7.

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 is returned to an approved service centre for repair.

CAUTION:

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 NV7 Validator is disassembled the unit must be re-calibrated. In the unlikely event of a problem it is better to have the complete unit checked.

Innovative Technology Ltd has a policy of continual product improvement. As a result the products supplied may vary from the specification described here. Innovative Technology is not responsible for any loss, harm, or damage caused by the installation and use of this product. This does not affect your local statutory rights. If in doubt please contact Innovative Technology for details of any changes. Alternatively visit our web site at

www.innovative-technology.co.uk

General Description

NV7 Validator - the next generation of Smiley® Bank Note validators



Figure 1 – The NV7 and the vertical and universal bezels

The NV7 Bank Note System is a compact note handling mechanism, suitable for most money machines. It will accept up to 16 different denominations of notes in the serial control mode, and will cope with different designs of banknote having the same value such as are found in the United Kingdom.

The NV7 Validator leaves the factory containing at least one currency data set so that it is ready for immediate installation. If it is desired to change the currency data set this may be done using either the NV7 to NV7 currency cloning system or the PC based Currency Management software. New currencies and applications are being tested all the time, so please refer to our web site or contact the factory for information concerning specific currencies if they are not already included on our approved list.

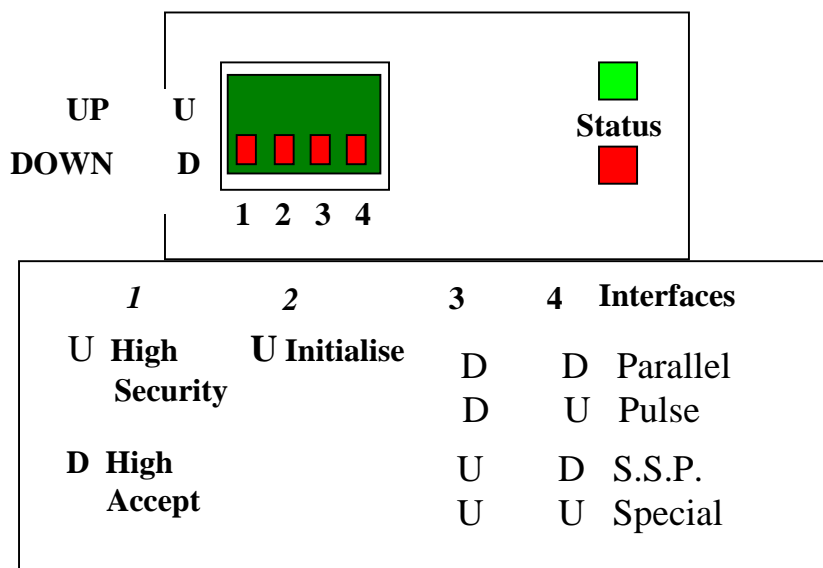
The NV7 has been designed for easy installation in most machines. The new stepped “smiling mouth” allows insertion of notes with one hand and simplifies the note handling mechanism.

Interfacing the Validator is very simple, with the choice of parallel open collector outputs, pulse stream output, SSP secure serial communications, binary, simple serial communications or the MDB interface protocol.

Other communication protocols such as the HII interface will become available in future

NV7 Functionality

– User Display and DIP switches



The two LED's on the top of the unit are used to provide a variety of status signals:
The red status is used to indicate system problems – these are described below

Slow flashing green led Heartbeat (slow = 1 second period)	In normal RUN operation, when the NV7 is ready to read a note, the green status led will flash slowly ("Heartbeat") to signal a "healthy" status.
Flashing red one second period	NV7 is jammed, somewhere in the note path
Fast flashing red (fast = half second period)	NV7 cannot calibrate, sensor(s) may be blocked
Alternately flashing green then red	Stacker is full

Switch 1: High Acceptance / High Security:

Switch 1 allows the operator to alter the security sensitivity of the NV7.

Switch 2: Initialise on power up:

If dipswitch 2 is set to the UP position before power up of the validator, the unit go into initialisation mode.

In this mode, the validator note path motors will run forward and wait a piece of calibration paper to be entered into the front of the validator. After initialisation, the paper will be ejected from the front of the validator. Ensure that dipswitch 2 is set to down again after initialisation.

PLEASE NOTE: ONLY CARRY OUT THIS INITIALISATION UNDER INSTRUCTION FROM INNOVATIVE TECHNOLOGY LTD AND ENSURE THAT YOU USE THE INITIALISATION PAPER AVAILABLE FROM INNOVATIVE TECHNOLOGY LTD.

Environment and Power Requirements

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

Electrical Supply	Minimum	Maximum	
Supply Voltage (V dc) Absolute Limits	11V	15V	
*MDB Versions Supply Voltage	18V	42V	
NOTE: If input voltage falls below 10.5v the NV7 will reject notes			
Supply Ripple Voltage	0	0.25V @100Hz	
Supply Currents			
Standby		350mA	
Validating		1000mA	
Peak (Stacker Motor stall)		1200mA	

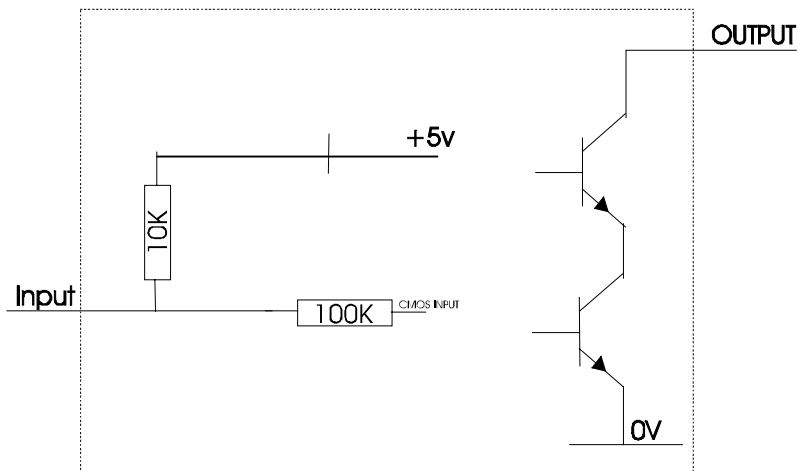
Interfaces: Hardware Description

Interface Logic levels	Logic Low	Logic High
Inputs	$0V < Low < 0.5$	$+3.7V < High < 12V$
Outputs with 10K Ω pull up	0.6V	pull up voltage of host interface
Maximum Current Sink	50mA per output	

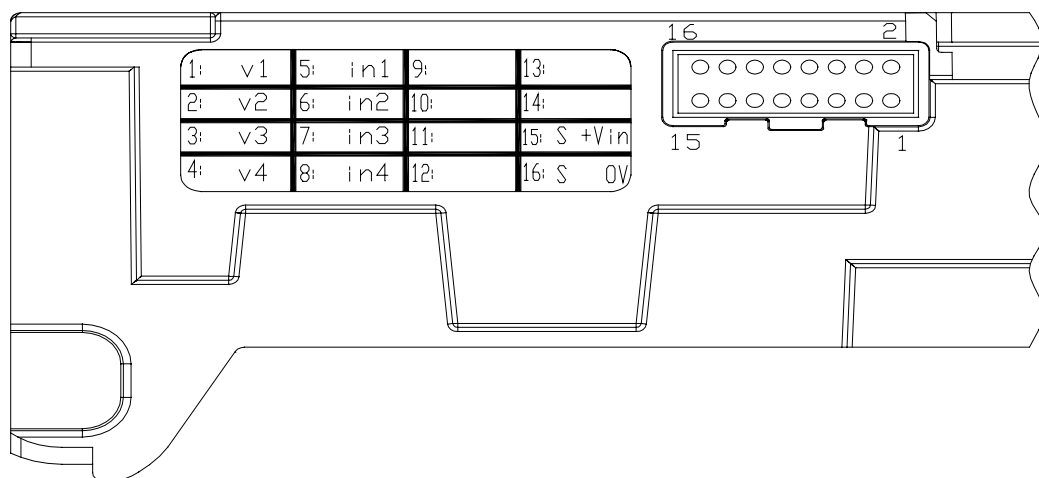
Note that the output low signal is affected by the value of the pull up resistor on the host interface.

All outputs are open collector transistors.

All Inputs are held high to internal +5v via 10K Ω . The input structure is a CMOS gate with anti static protection fitted. Please ensure your signal LOW levels comply with the 74HC CMOS series specification for reliable operation.



16 Pin Connector Details: 16 Pins, 0.1" pitch header, 2 rows by 8 pins



Pin	Name:	Description:
1	Vend 1 (binary bit 1)	Note accepted on Channel 1, Also the Pulse Stream output Also the serial output pin in SSP Serial Mode
2	Vend 2 (binary bit 2)	Note accepted on Channel 2 pulse output Also MEI HI2 Data Line, connect to Inhibit2
3	Vend 3 (binary bit 4)	Note accepted on Channel 3 pulse output Also MEI HI2 Busy Line, connect to Inhibit3
4	Vend 4 (binary bit 8)	Note accepted on Channel 4 pulse output
5	Inhibit 1	Inhibit channel 1 by holding this pin HIGH. To Enable a channel the inhibit must be held LOW. Also the Serial Input pin in RS232 serial mode
6	Inhibit 2	Inhibit channel 2 by holding this pin HIGH
7	Inhibit 3	Inhibit channel 3 by holding this pin HIGH
8	Inhibit 4	Inhibit channel 4 by holding this pin HIGH
9	Busy	NV7 is validating and stacking output. Active low while the NV7 is reading, transporting or stacking a note.
10	Escrow	Operate Escrow function by holding LOW, refer to Escrow section for full details
		NOTE: pins 11 to 14 have no function unless MDB software is downloaded
11	MDB TX	Optically Isolated MDB transmit output
12	MDB TX GND	Optically Isolated MDB transmit output ground
13	MDB RX GND	Optically Isolated MDB transmit input ground
14	MDB RX	Optically Isolated MDB transmit input
15	+Vin	Nominal 12V DC supply
16	0V	0v Supply

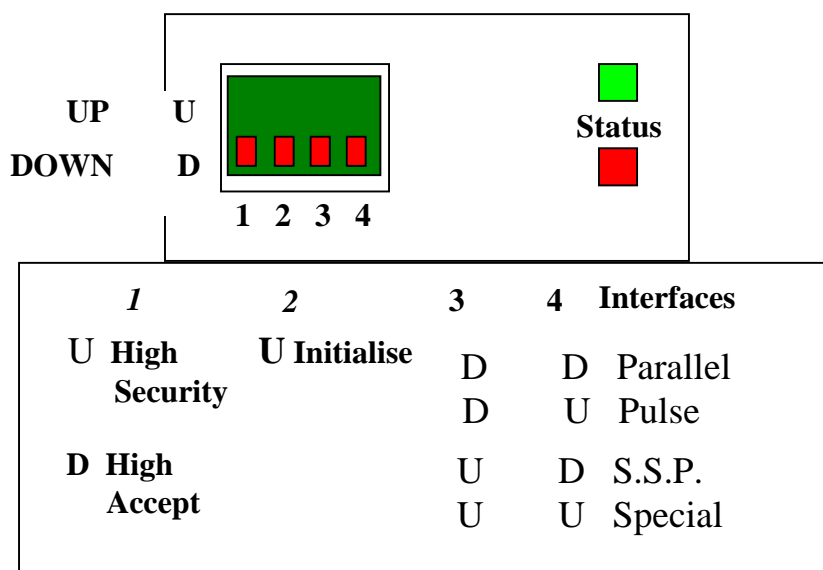
Software Optional Serial Interface Input and Outputs

Note: these interfaces will only work if the relevant interface software is downloaded

Name:	Description:
SSP TxD	Vend 1
SSP RxD	Inhibit 1
HI2 Busy	Vend 3 + Inhibit 3
HI2 Data	Vend 2 + Inhibit 2

Interfaces: Protocols

To select the required interface, the dip switches on the front/top of the NV7 must be set accordingly:-



1: parallel input and output:

To use parallel outputs dip switch 3 and 4 must be down

Vend Signals (Pins 1 to 4). The four channels have their own individual outputs. If a note is recognised then the relevant channel line is pulled low for 100 ± 3 milliseconds. It is recommended that pulses outside these limits are rejected as a precaution against false triggering due to noise.

Busy Output: (Pin 9). This is a general-purpose busy signal. It is active low while the NV7 is in operation.

Escrow Control (Parallel mode): (pin 10). The NV7 has a single note escrow facility. This allows the Validator to hold onto the note once accepted, and then only stack the note in the cash box 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 customer after 30 seconds. If the host machine itself aborts the transaction by raising the corresponding inhibit input high, the note is returned immediately. The sequence of operations is as follows:

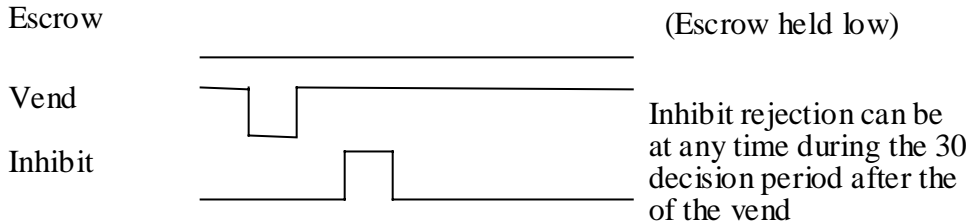
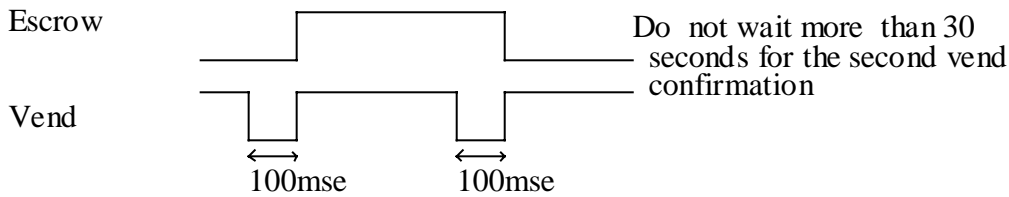
1. Pin 10 held low awaiting note insertion.
2. Note inserted. Validator issues a 100ms pulse on the appropriate channel.
3. The host machine initiates vend process.
4. The host machine raises pin 10 high to indicate that it wants the note. If this is not done within 30 seconds the Validator will return the note.
5. The Validator issues a 100ms pulse on the appropriate channel after pin 10 going high to indicate final acceptance of the note. (If the signal has not been received within 30 seconds it indicates the customer has forcibly retrieved the note and the vend should be aborted.)
6. The vend process is completed.
7. The host machine makes pin 10 low in expectation of the next vend.

The host can force the return of the note to the customer by raising the inhibit line high, at any time before the end of the 30 second time-out. For channels above 4, taking all the inhibits high will cause a note reject.

In the event of a note being forcibly removed from the mouth of the NV7 during the 30 second interval, the NV7 will go out of service for 45 seconds.

Escrow Control (SSP mode): escrow is also possible using the SSP serial Interface. Please refer to SSP Specification GA138 available on the website www.innovative-technology.co.uk.

Escrow Timing Diagram for Parallel Vends:-



Inhibit Operation

Each channel (1 to 4) has its own inhibit input to allow the host machine to refuse specified values of notes. To inhibit a channel, the relevant inhibit input must be held high. To enable a channel the corresponding inhibit must be latched low so that notes may be accepted.

If all four inhibits are high simultaneously then the NV7 will not read in any notes. In this mode, if a note is inserted the motor will run in reverse preventing the insertion of a note. All four inhibits may be connected together to create a 'global' inhibit. In this way the NV7 may be brought in and out of operation by the host machine.

It is also possible to inhibit channels using the SSP interface

2: Pulse Stream Output:

To use pulse stream output dip switch 3 must be down, switch 4 must be up.

When a note is recognised vend 1 will pulse a pre set number times, the number of pulses and the timing is set in the NV7 currency manager programme (and set to default values with supplied dataset).

3: SSP Smiley Secure Protocol

To use pulse stream output dip switch 3 must be up, switch 4 must be down.

Please refer to SSP Specification ITL Drawing GA 138 on the web site.

To help in the software implementation of the SSP protocol, Innovative Technology can provide, C Code, DLL controls and Visual Basic applications on request. Please contact the factory for assistance.

4: Binary Output:

To use binary output dip switches 3 & 4 must both be up and the BIN option of the interface firmware must be loaded into the NV7.

In the event that the machine needs more than 4 notes to be recognised, but the host machine cannot take advantage of the serial communication methods then the NV7 can be set to give a binary pattern output on the four parallel output pins. Refer to the special menu option setting to use this feature.

If the NV7 is set to binary mode it will issue the vend signals as a binary pattern on the parallel outputs for 100 milliseconds. In this way a maximum of 15 different notes can be accepted and controlled.

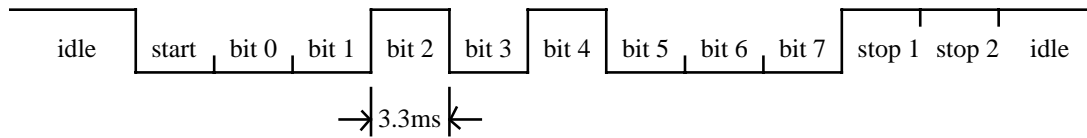
5: Simple Serial Input/Output:

Existing Smiley® NV4 users may already be using the serial input/output facility in conjunction with the parallel inputs. This system is also supported by the NV7 Validator. To use simple serial mode dip switches 3 & 4 must both be up and the SIO option of the interface firmware must be loaded into the NV7. The NV7 Does Not operate in true RS232 mode

Please contact the factory for details of firmware and currency programming protocols.

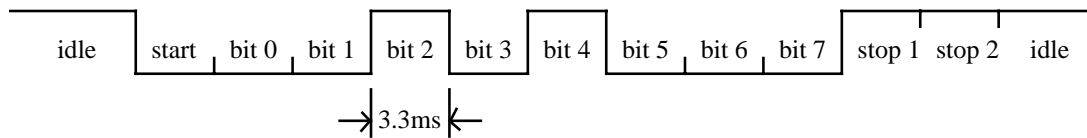
Typical Serial Output: Transmission of the value 20 (decimal), Note not recognised

Vend 1(Pin 1)



Typical Serial Output: Transmission of the value 20 (decimal), Note not recognised

Vend 1(Pin 1)



9600/300 baud Serial Input/Output Mode.

The Validator echoes each valid command it receives. Note that the host does not have to echo messages back to the validator. The output codes indicated in standard '300 baud serial output mode' are supported with the following extensions.

The serial I/O mode will work at 9600 Baud rate if Inhibit 2 line is held low when the NV7 is powered up. The NV7 will not be enabled in serial I/O mode if Inhibit 3 line is held low when the unit is powered up.

Data format: 1 start bit
 8 data bits
 2 stop bits.
 300 baud.

Transmitted codes:

MESSAGE	DECIMAL VALUE
Accept on C1	1
Accept on C2	2
Accept on C3	3
Accept on C4	4
Accept on C5	5
Accept on C6	6
Accept on C7	7
Accept on C8	8
Accept on C9	9
Accept on C10	10
Accept on C11	11
Accept on C12	12
Accept on C13	13
Accept on C14	14
Accept on C15	15
Accept on C16	16
Note Not Recognised	20
Mechanism running slow	30
Strimming attempted	40
Channel 5 Note Rejected (fraud channel)	50
STACKER Full or Jammed	60
Abort During Escrow	70
Note may have been taken to clear jam	80
Validator Busy	120
Validator Not Busy	121
Command Error	255

Recognised Receive Codes:

MESSAGE	DECIMAL VALUE
Inhibit C1	131
Inhibit C2	132
Inhibit C3	133
Inhibit C4	134
Inhibit C5	135
Inhibit C6	136
Inhibit C7	137
Inhibit C8	138
Inhibit C9	139
Inhibit C10	140
Inhibit C11	141
Inhibit C12	142
Inhibit C13	143
Inhibit C14	144
Inhibit C15	145
Inhibit C16	146
Uninhibit C1	151
Uninhibit C2	152
Uninhibit C3	153
Uninhibit C4	154
Uninhibit C5	155
Uninhibit C6	156
Uninhibit C7	157
Uninhibit C8	158
Uninhibit C9	159
Uninhibit C10	160
Uninhibit C11	161
Uninhibit C12	162
Uninhibit C13	163
Uninhibit C14	164
Uninhibit C15	165
Uninhibit C16	166
Enable serial escrow mode	170
Disable serial escrow mode	171
Accept Escrow	172
Reject Escrow	173
Status	182
Enable all	184
Disable all	185

Example protocols are shown in the tables below:

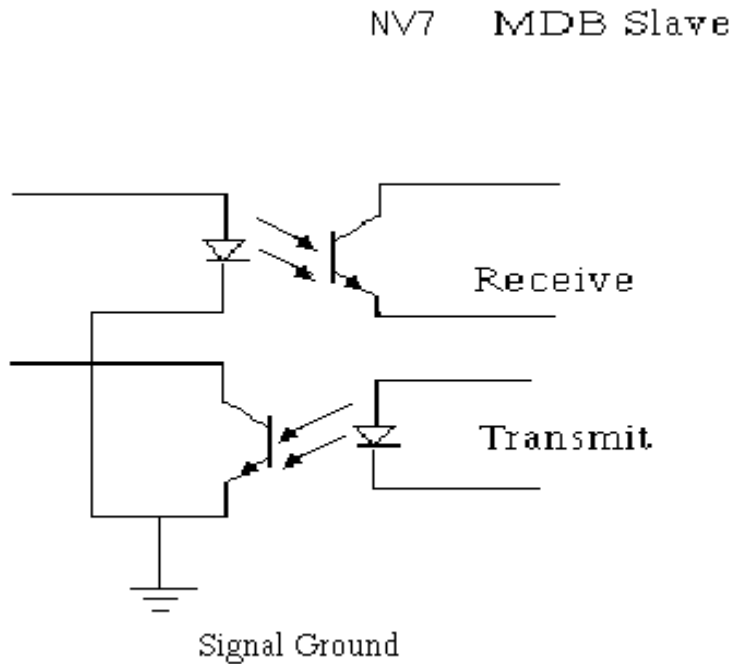
Event	Validator		Host
Note entered into validator Note Accepted Channel 2	Validator Busy Validator Ready Accept on Channel 2	120 → 121 → 2 →	
Note entered into validator Note not recognised Validator has returned note	Validator Busy Validator Ready Note not recognised Validator Ready	120 → 121 → 20 → 121 →	
Software Inhibit Channel 4	Inhibit C4 Channel 4 Inhibited	← 134 134 →	Inhibit C4
Software Enable Channel 4	Uninhibit C4 Channel 4 Inhibited	← 154 154 →	Uninhibit C4
Status Report 3 byte status message	Inhibit status Channels 1-8 Inhibit status Channels 9-16 Escrow On (=1) / Off (=0)	← 182 byte 1 → byte 2 → byte 3 →	Status Request
Turn on Escrow Mode	Escrow Mode Enabled	← 170 170 →	Enable Escrow Mode
Note accept in Escrow Mode Note entered into validator Note Accepted Channel 2	Validator Busy Validator Ready Accept on Channel 2 Accept Escrow Accept on Channel 2	120 → 121 → 2 → ← 172 172 → 2 →	Accept Note in Escrow

6: MDB – Multi-Drop Bus / Internal Communications Protocol

The NV7 MDB validator does have some hardware differences from the standard NV7 validator.

To use the MDB mode dip switches 3 & 4 must both be up and the MDB option of the interface firmware must be loaded into the NV7

Figure 7 – MDB Input / Output circuits



Please refer to the MDB specification for suggested Current drive circuits.

MDB defines a serial bus interface used in electrically controlled vending machines. This is a 9600 Baud Master-Slave system where the NV4X MDB banknote validator is a slave to a master controller. A master has the capability of communicating with 32 peripherals or slaves. The master is defined as the Vending Machine Controller (VMC).

The NV4X MDB banknote validator is assigned a unique address – 00110XXX binary (30H). The VMC will poll the bus to detect the presence of the NV4X MDB validator or to get information on the current status of the validator. The validator will respond when asked for activity with an acknowledge, a negative acknowledgment or a specific reply depending on its current status. Bus crashes are avoided as the validator responds to being polled only by the VMC.

The international country code must be set for the country in which the validator will be operating. This is the international telephone code for that country. The code is represented as two bytes

For the USA the country code is 00 01

For Great Britain the code is 00 44

The scaling factor must also be specified for each validator. All accepted note values must be evenly divisible by this number.

This number would be set to 100 (Hex 64) for the Euro or Great Britain.

The number would be set to 1000 (Hex 03E8) for Romania.

The number of decimal places must also be programmed for each validator

The number would be set to 2 for Euro or USA

The number would be set to 3 for Romania

Adopting the numbers above

£5 would be displayed as 5.00

£10 would be displayed as 10.00

\$1 would be displayed as 1.00

1K Romania would be displayed as 1.000

It is possible for a PC to communicate with an NV7 MDB unit via the 16 way IDC connector using a DA1 kit.

Programming

Validators are normally supplied ready taught from the factory. This section may be skipped unless the validators need to be re-taught with a new note or currency.

The NV7 Validator may only be programmed using the NV7 currency download manager or by cloning from a master unit:

1. Use the NV7 Currency Manager Software, which is supplied with a range of currencies. To use this system you will require a PC running Windows 95/98/NT™, Pentium™ 100MHz or faster with a serial port, and a 12volt dc power supply to power the validator. (© Microsoft and Intel). A list of currently supported currencies is maintained on our web site, and new releases can be downloaded from there. Further details are available from Sales at Innovative Technology Ltd.

2 . NV7 - NV7 Copy (Cloning)

Overview

The facility exists for using an NV7 Bank Note Validator to copy its programme and settings to another NV7. The 'Master' validator will transmit the currency data and upgrade the slave's firmware if necessary.

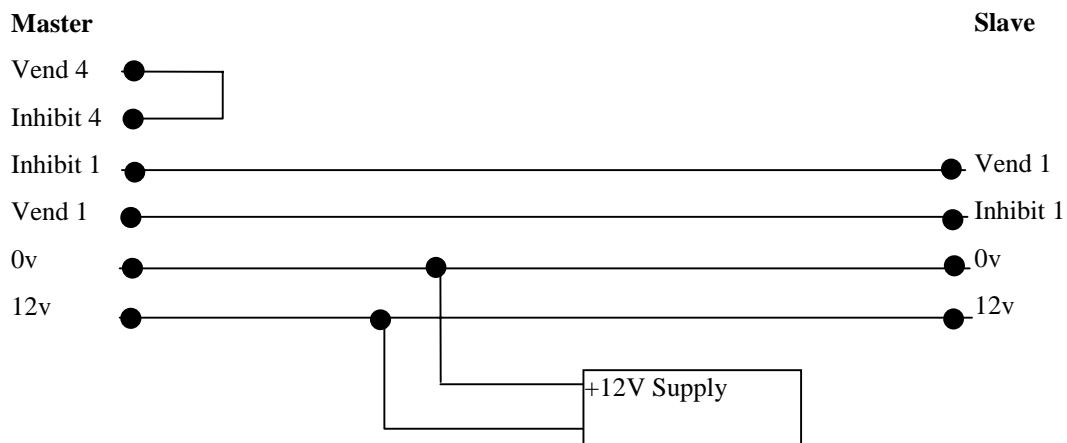
Requirements

Master to have firmware 1.01 or greater

NV7 copy cable assembly.

12V supply.

NV7 Copy Cable Diagram



Start-up configuration

Remove power from slave and master units.

Set dip switches 3 UP and 4 DOWN to select SSP interface mode on both NV7s.

Connect the two units together as above. *Make sure Vend 4 is connected to Inhibit 4 on the master unit.*

Turn on the 12V supply.

The Master unit will update the slave firmware if the version of the master is greater than the slave.

If the master firmware is less than the slave, then the copy process is aborted.

NV7 – NV7 copy process.

Connect NV7 master to slave using copy adaptor and apply power

Master unit will flash RED and GREEN LED if the connector is configured correctly.

RED and GREEN on master flash together – attempting to communicate with slave.

RED and GREEN on master flash alternately - communication established, master waiting for slave to reset.

If communication has been established and slave has reset then the master will read slave firmware version and decide on next action.

If slave firmware version is greater than master: Master RED and GREEN LED's will flash alternately at 1-second rate. No further copy action will take place.

If slave firmware version is same as master then master will start to copy currency data to slave.

If slave firmware version is less than master then master will start to copy firmware data to slave.

Firmware copy:

Master RED LED will blink rapidly during firmware copy (the LED will pause from time to time).

If master RED LED changed to slow blink (1 per second) then communication has been lost and copying should be restarted from beginning.

When firmware copy is complete, slave will reset and Master unit will wait to re-establish communications. (LED flashes as at first stage power-up).

When slave is ready, master will initiate currency data copy.

Currency copy:

Master GREEN LED will blink rapidly during the currency copy process (the LED will pause from time to time).

If master RED LED changed to slow blink (1 per second) then communication has been lost and copying should be restarted from beginning.

When currency copy is complete, Master will show GREEN and RED LEDs continuously and slave will reset.

NV7 – NV7 copy is now complete

Mechanical Installation

The NV7 validator can be supplied with either the Horizontal Bezel (PA189), the Vertical up stacking bezel (PA188), the Vertical up stacking snout bezel (PA190) or the Vertical down stacking snout bezel (PA191).

The NV7 validator can also be supplied with various cash box options.

300 Note Clip on

300 Note Slide in

600 Note Clip on

600 Note Slide in

300 Note Lockable (Lock is not supplied – use with Baton Lock type 6086-00KAL06 with supplied cam)

The clip on cash boxes can be used with the vertical bezel options only. The slide in cash boxes cash boxes can be used with both the horizontal and the vertical bezel options. The lockable cash box can only be used with the horizontal bezel option only.

Changing or removing the bezels:

Push both of the locking arms so that they disengage from the bezel sides. The bezel may then be unhooked from the 6 locating points. To refit push the bezel onto the six locating points. The locking arms will spring back to secure the bezel.

Please make sure **both** locking arms have located correctly.

Calibration and Routine Maintenance

The NV7 Validator has been designed to minimise any performance variation over time. Much of this is achieved by careful hardware and software design. However, depending upon the environment the NV7 may at some time require cleaning or even re-calibration.

Cleaning:

Slide the red catch on the end of the NV7 Validator to open the note path. The note path and lozenge may now be exposed for cleaning. Wipe the surfaces with a soft lint free cloth that has been dampened with a water and detergent solution (such as a household washing up liquid) **NEVER** use a solvent based cleaner such as alcohol, petrol, methylated spirits, white spirit, or PCB cleaner. This will result in permanent damage to the validator. Take particular care around the lenses. If a lens has become badly scratched do not attempt to polish it as this may damage the optical properties.

Re-Calibration:

The NV7 has an in-built self-calibration system that maintains the optical sensors at their best operating point. However if the NV7 is disassembled for any reason it will need to be re-calibrated. This is best done in conjunction with the diagnostics software. - Follow the help menus supplied with this programme.

Fault Finding

Problem	Check:	Solution
Validator will not take notes:	Is the Bezel Illuminated?	Check power supply, Check interface system
	Is the jumper cable connected from the top to the bottom of the validator?	Test cable
Validator runs slowly or intermittently:	Make sure there are no foreign objects in the note path	Clean the note path
	Check voltage level of supply	Ensure correct supply and sufficient current.
	Check for damage	Replace Path components
	Ensure there is no grease on drive belts	Replace belts
Notes pass through the validator but do not give a vend signal	Is the power supply inside specification. Which interface have you selected	Ensure correct supply and sufficient current. Check dip switch settings Check Interface system
Unit rejects genuine notes	Check that the unit has been programmed for this note.	Check Currency on label
	Check the security setting	Adjust security setting
Notes not stacking correctly	Is cash box fitted? Is cash box damaged Incorrect cash box for NV7	Replace cash box

Support Tools

The following support tools are available for use with the NV7 Bank Note Validator:

1. PC Currency Manager Software.
2. Downloads from the Innovative Technology Ltd website: www.innovative-technology.co.uk

1. PC Currency Programming Software.

The NV7 Currency Manager software offers the following functions:

- Teach the NV7 Validator by downloading pre-prepared currency data via the serial communications link.
- Check the firmware version and currency set already loaded on an NV7 unit
- Adjust the channel and pulse configuration on a pre-programmed NV7 to your own requirements
- Download a new version of firmware onto the NV7
- Use diagnostic functions to check validator operation (firmware version 1.04 and greater only)

The software will run on an IBM compatible Personal Computer with Pentium™ processor or equivalent and requires a DA1 which must be fitted to the PC serial port. This program runs under the Windows 95/98/NT™/XP operating system, and requires one free serial port to connect to the NV7. (© Microsoft and Intel).

2. Internet Website support.

The Innovative Technology Ltd website provides the means to download new and updated currency sets and new versions of firmware for the NV7. Visit www.innovative-technology.co.uk for further details. Technical bulletins are also made available. Note the files are password protected to prevent abuse. Periodically the passwords are changed. Please contact sales at Innovative Technology for password updates.

3. Email Support.

If the data you require is not available over the Internet Innovative Technology supports an email system to help customers with unusual requirements. The address is sales@innovative-technology.co.uk

Parts List and Drawing

151413121110987654321

XWVUTSRQPONMLKJIHGFEDCBA

* SUPPLIED WITH VERTICAL OR HORIZONTAL BEZEL.
SPECIFY BEZEL ON ORDERING.

No	PART No	DESCRIPTION	QTY
1	PM300	MAIN HOUSING	1
2	PM301	NOTE PATH	1
3	PM302	LOCK ARM	2
4	PM304	ROLLER	16
5	PM305	VERTICAL SNOUT	1*
6	PM306	VERTICAL BEZEL	1*
7	PM307	NOTE GUIDE	1
8	PM308	NOTE GUIDE COVER	1
9	PM309	LIGHT SHIELD	1
10	PM310	REAR HOUSING	1
12	PM312	LATCH	1
13	PM313	WHEEL COVER	1
14	PM314	HORIZONTAL BEZEL	1*
15	PM315	HORIZONTAL SNOUT	1*
20	PM320	FRONT CASE	1
21	PM321	REAR COVER	1
22	PM322	SCISSOR INNER	1
23	PM323	SCISSOR OUTER	1
24	PM324	PUSH PLATE	1
25	PM325	PUSH DRIVE SHAFT	1
26	PM326	PUSH DRIVE COVER	1
27	PM327	CAPTIVE NUT	1
28	PM328	GEAR CARRIER	1
29	PM329	GEAR 12T 0.5M	2
30	PM330	GEAR 19T/10T 0.635m	2
31	PM331	GEAR 26T-.5m 10T-0.635m	1
32	PM332	GEAR 28T/11T 0.635m	2
33	PM333	GEAR 38T-.5m 11T-0.635m	1
34	PM334	GEAR 18T 0.635m	1
35	PM335	PRESSURE WHEEL	1
36	PM336	BEARING BLOCK	2
37	PM337	NOTE PRESSURE WHEEL	2
38	PM338	NOTE PRESSURE WHL CARRIER	2
39	PM339	DRIVE WHEEL RHS	1
40	PM340	DRIVE WHEEL LHS	1
41	PM341	GEAR 14T 0.635m	1
42	PM342	LENS HOLDER LOWER	2
43	PM343	LENS HOLDER UPPER	2
44	PM344	SEGMENT WHEEL	2
45	PM345	SPRING RETAINER	1
46	PM346	DRIVE BELT	2

No	PART No	DESCRIPTION	QTY
62	MR130	7/0.2 65mm GREEN 5mm STRIPPED	1
63	MR131	7/0.2 65mm PINK 5mm STRIPPED	1
64	MR132	7/0.2 30mm BLUE 5mm STRIPPED	1
65	MR133	7/0.2 30mm ORANGE 5mm STRIPPED	1
55	SP117	BELT TENSION SPRING	2
56	SP119	TORSION SPRING	4
57	SP120	CORNICAL SPRING	2
58	PB140	PRECESSOR PCB	1
59	PB141	SENSOR PCB	1
60	ONI58	INVT INTERCONNECT CABLE	2
61	S20	No4x9, 5mm SCREW	2

DO NOT SCALE

DRAWN: MSK CHECKED: PD DATE: 16-8-01 SCALE: 1:1

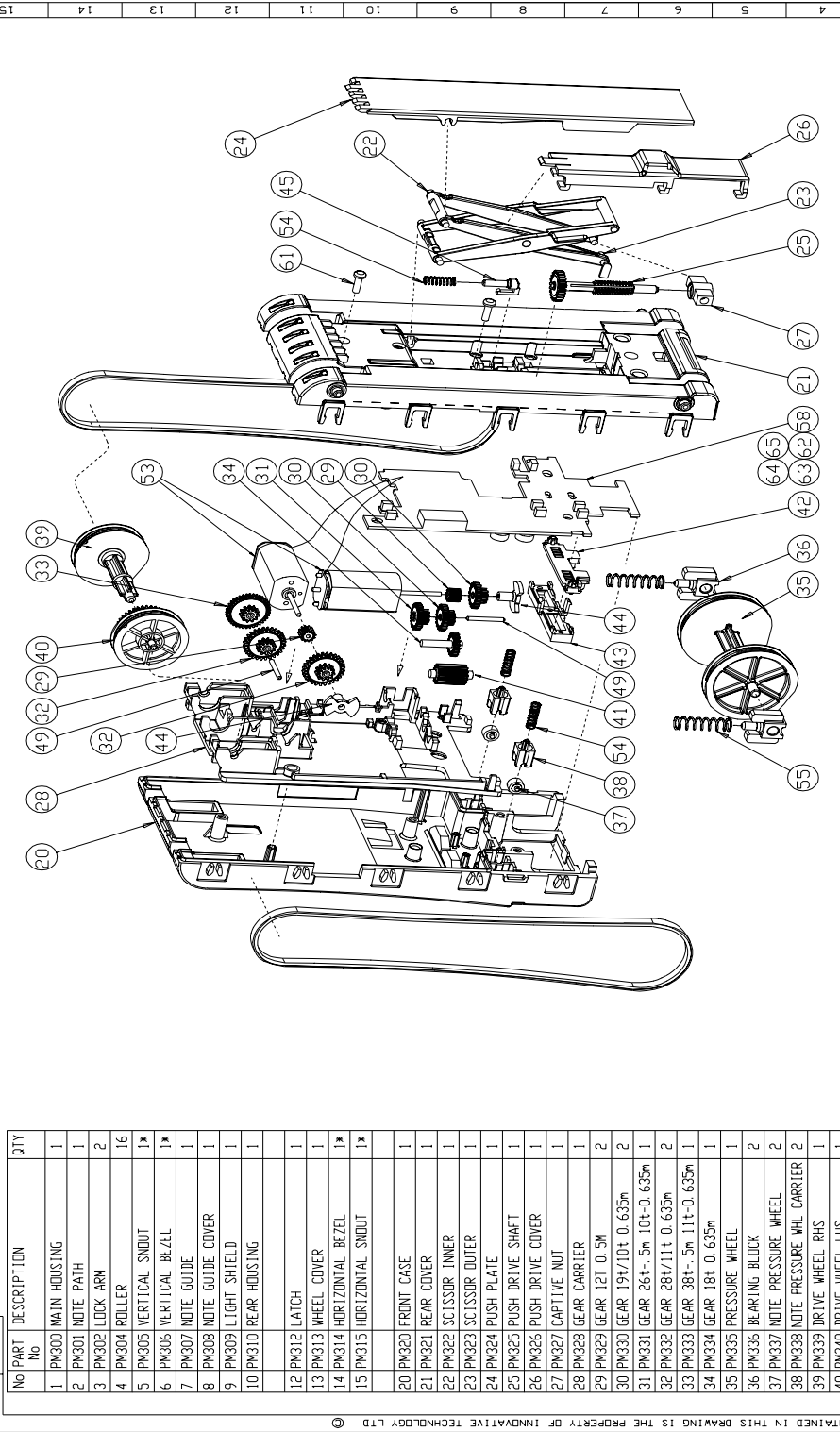
ALL DIMENSIONS IN MILLIMETERS UNLESS OTHERWISE SPECIFIED

C.A.S. GENERATED - NOT TO BE DONE VIA MAGNETIC MEDIA

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ISSUE No. MOD No. DATE MOD BY

SHEET 1 OF 2 GA300 ISSUE 1



No	DESCRIPTION	QTY
1	PM300 MAIN HOUSING	1
2	PM301 NOTE PATH	1
3	PM302 LOCK ARM	2
4	PM304 ROLLER	16
5	PM305 VERTICAL SNOUT	1*
6	PM306 VERTICAL BEZEL	1*
7	PM307 NOTE GUIDE	1
8	PM308 NOTE GUIDE COVER	1
9	PM309 LIGHT SHIELD	1
10	PM310 REAR HOUSING	1
12	PM312 LATCH	1
13	PM313 WHEEL COVER	1
14	PM314 HORIZONTAL BEZEL	1
15	PM315 HORIZONTAL SNOUT	1*
20	PM320 FRONT CASE	1
21	PM321 REAR COVER	1
22	PM322 SCISSOR INNER	1
23	PM323 SCISSOR OUTER	1
24	PM324 PUSH PLATE	1
25	PM325 PUSH DRIVE SHAFT	1
26	PM326 PUSH DRIVE COVER	1
27	PM327 CAPTIVE NUT	1
28	PM328 GEAR CARRIER	1
29	PM329 GEAR 12T 0.5M	2
30	PM330 GEAR 19T/10T 0.635m	2
31	PM331 GEAR 26T+- .5m 10T-0.635m	1
32	PM332 GEAR 28T/11T 0.635m	2
33	PM333 GEAR 38T+- .5m 11T-0.635m	1
34	PM334 GEAR 18T 0.635m	1
35	PM335 PRESSURE WHEEL	1
36	PM336 BEARING BLOCK	2
37	PM337 NOTE PRESSURE WHEEL	2
38	PM338 NOTE PRESSURE WHL CARRIER	2
39	PM339 DRIVE WHEEL RHS	1
40	PM340 DRIVE WHEEL LHS	1
41	PM341 GEAR 14T 0.635m	1
42	PM342 LENS HOLDER LOWER	2
43	PM343 LENS HOLDER UPPER	2
44	PM344 SEGMENT WHEEL	2
45	PM345 SPRING RETAINER	1
46	PM346 DRIVE BELT	2

No	DESCRIPTION	QTY
48	MC156 1/4" ST. STL. BALL	6
49	MC157 RATIO SHAFT	2
50	MC159 CASH BOX COVER	1
51	MC160 OPEN CASH BOX	1
52	MC161 NOTE PLATE	1
53	MR103 JOHNSON MOTOR NF183LG	2
54	SP108 COMPRESSION SPRING	4
55	SP117 BELT TENSION SPRING	2
56	SP119 TORSION SPRING	4
57	SP120 CIRCULAR SPRING	2
58	PRI140 PROCESSOR PCB	1
59	PRI141 SENSOR PCB	1
60	DN158 NV7 INTERCONNECT CABLE	2
61	S20 No4x9.5mm SCREW	2
62	MR130 7/0.2 65mm GREEN 5mm STRIPPED	1
63	MR131 7/0.2 65mm PINK 5mm STRIPPED	1
64	MR132 7/0.2 30mm BLUE 5mm STRIPPED	1
65	MR133 7/0.2 30mm ORANGE 5mm STRIPPED	1

No	DESCRIPTION	QTY
20	20	1
21	21	1
22	22	1
23	23	1
24	24	1
25	25	1
26	26	1
27	27	1
28	28	1
29	29	1
30	30	1
31	31	1
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36	36	1
37	37	1
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41	41	1
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44	44	1
45	45	1
46	46	1
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48	48	1
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54	54	1
55	55	1
56	56	1
57	57	1
58	58	1
59	59	1
60	60	1
61	61	1
62	62	1
63	63	1
64	64	1
65	65	1

DO NOT SCALE

IF IN DOUBT - ASK !!!

ALL DIMENSIONS IN MILLIMETERS

UNLESS OTHERWISE SPECIFIED

FINISH

SCALE

DATE: 18-8-01

CHECKED PD

TITLE: NV7 EXPLODED VIEW

ISSUE No. MTD No. DATE MOD BY

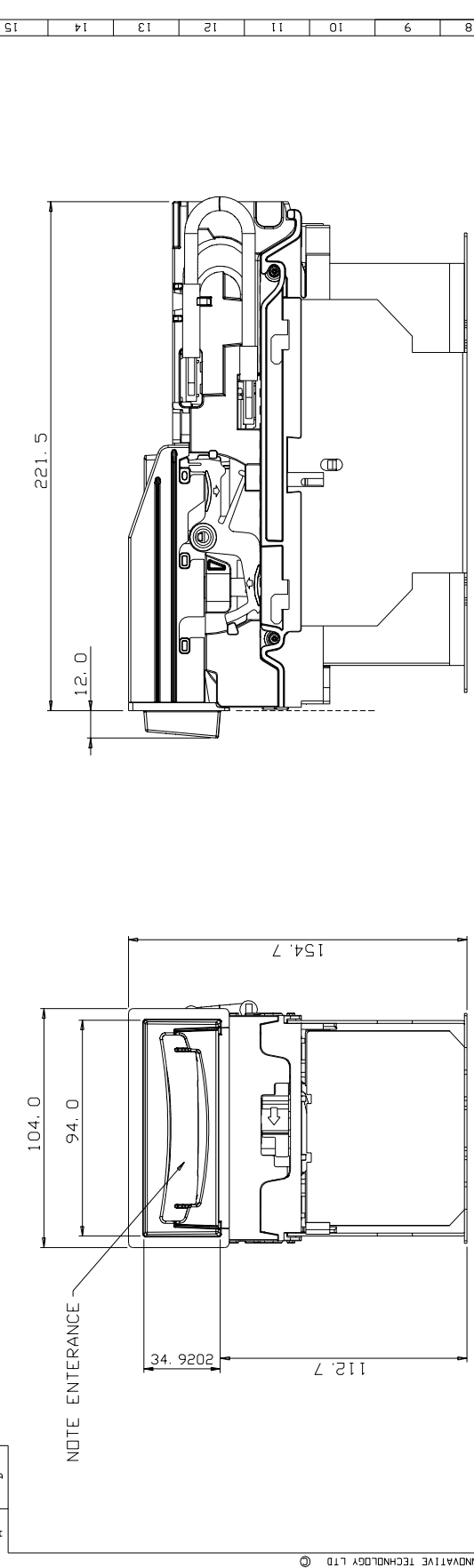
C.A.B. CORP. - MFG'S TO BE DONE VIA INNOVATIVE META

ISSUE No. GA300 SHEET 2 OF 2 FIG. No. GA300

ISSUE 1

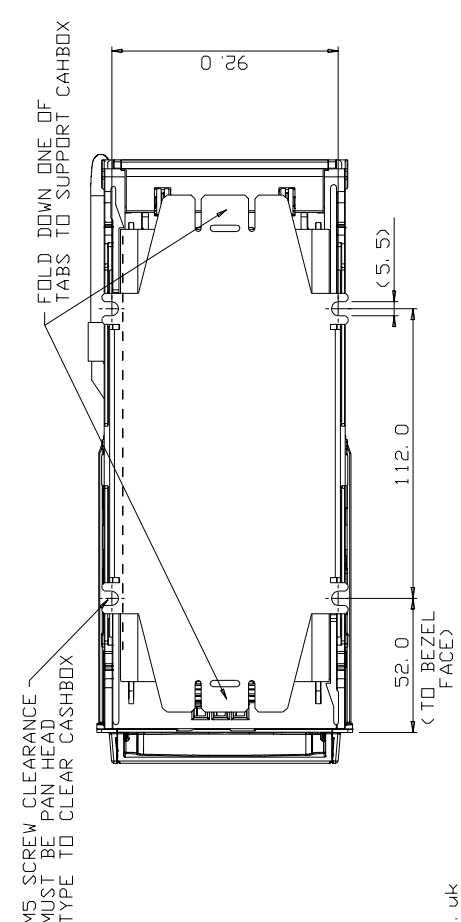
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DRG No GA302
 A B C D E F G H I J K L M N O P Q R S T U V W X

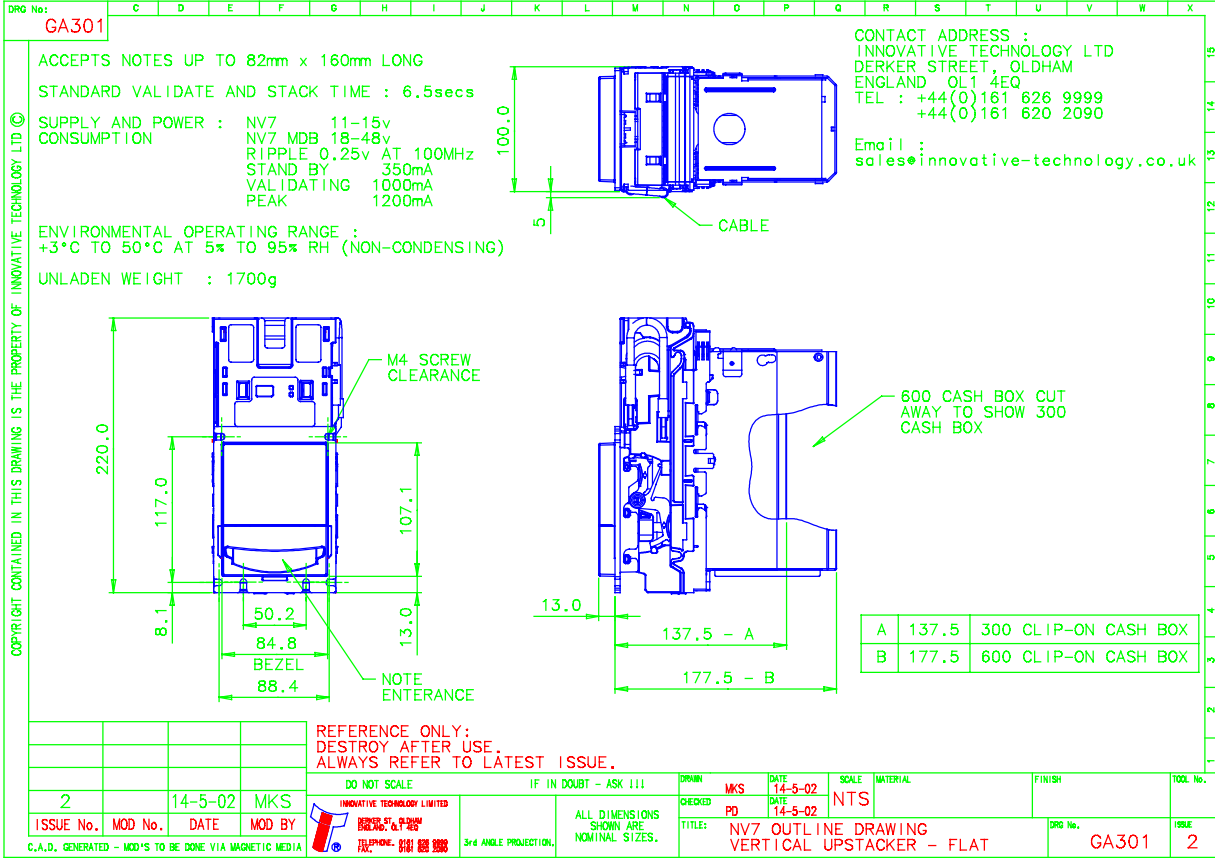


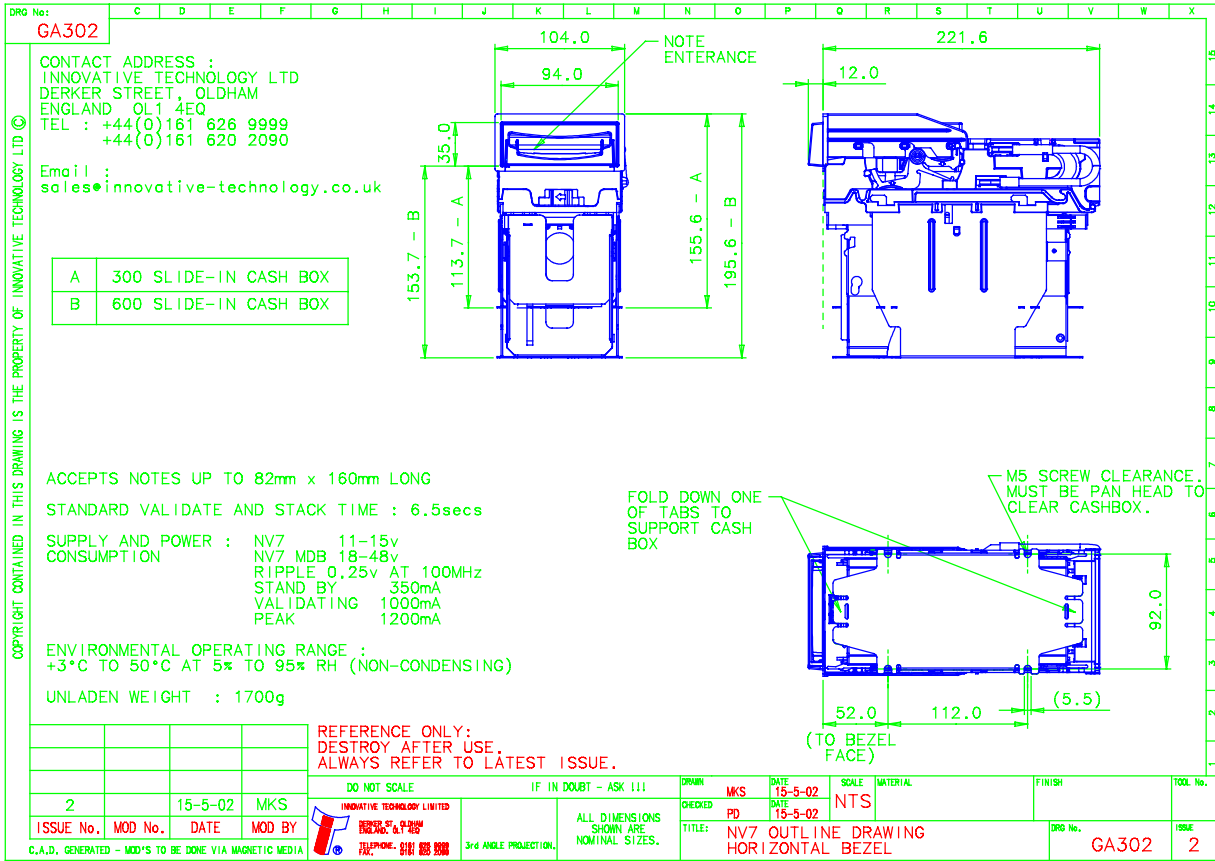
ACCEPTS NOTES UP TO 82mm WIDE x 160 mm LONG
 STANDARD VALIDATE AND STACK TIME : 6.5 secs
 SUPPLY AND POWER : NV7 11-15v
 NV7 MDB 18-48v
 RIPPLE 0.25v @100HZ
 STAND BY 350mA
 VALIDATING 1000mA
 PEAK 1200mA
 ENVIRONMENTAL OPERATING RANGE :
 +3°C TO 50°C AT 5% TO 90% RH (NON-CONDENSING)
 UNLADEN WEIGHT : 1700g

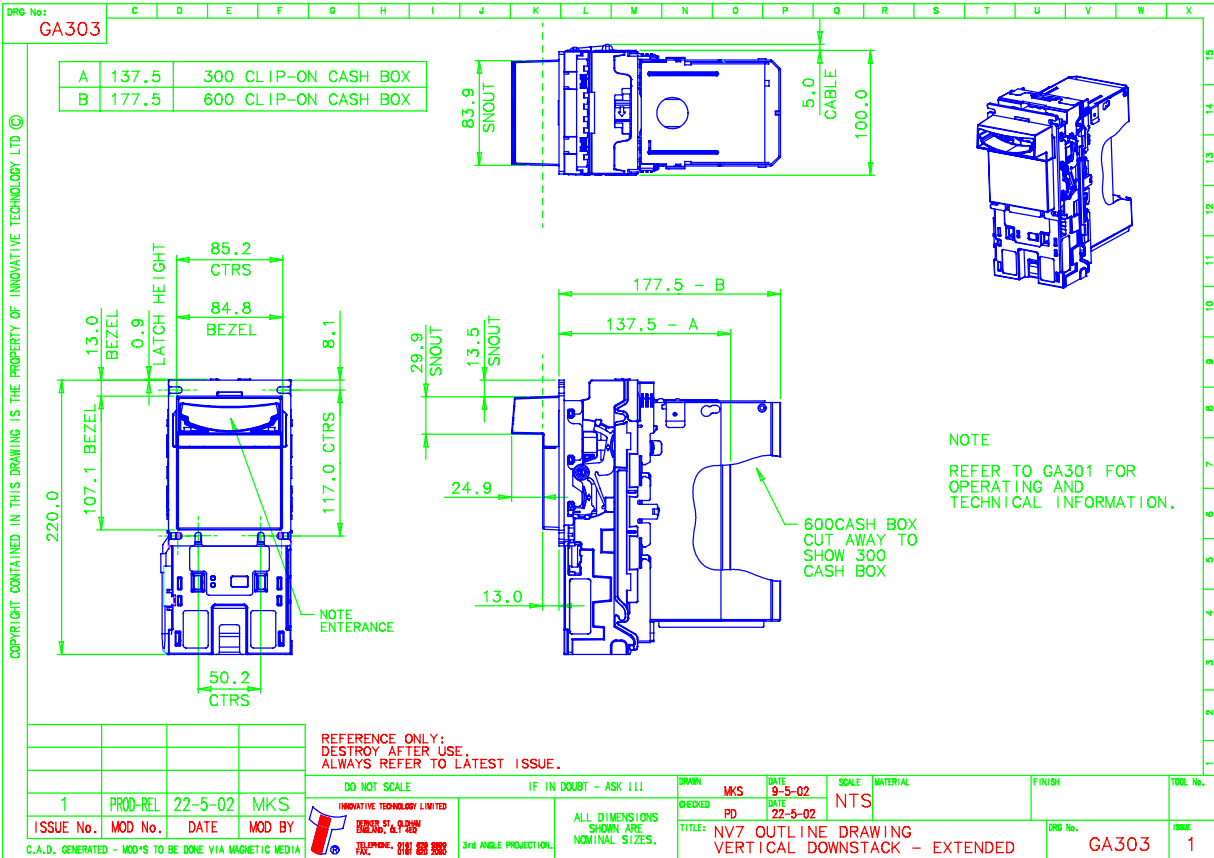
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 Email : sales@innovative-technology.co.uk

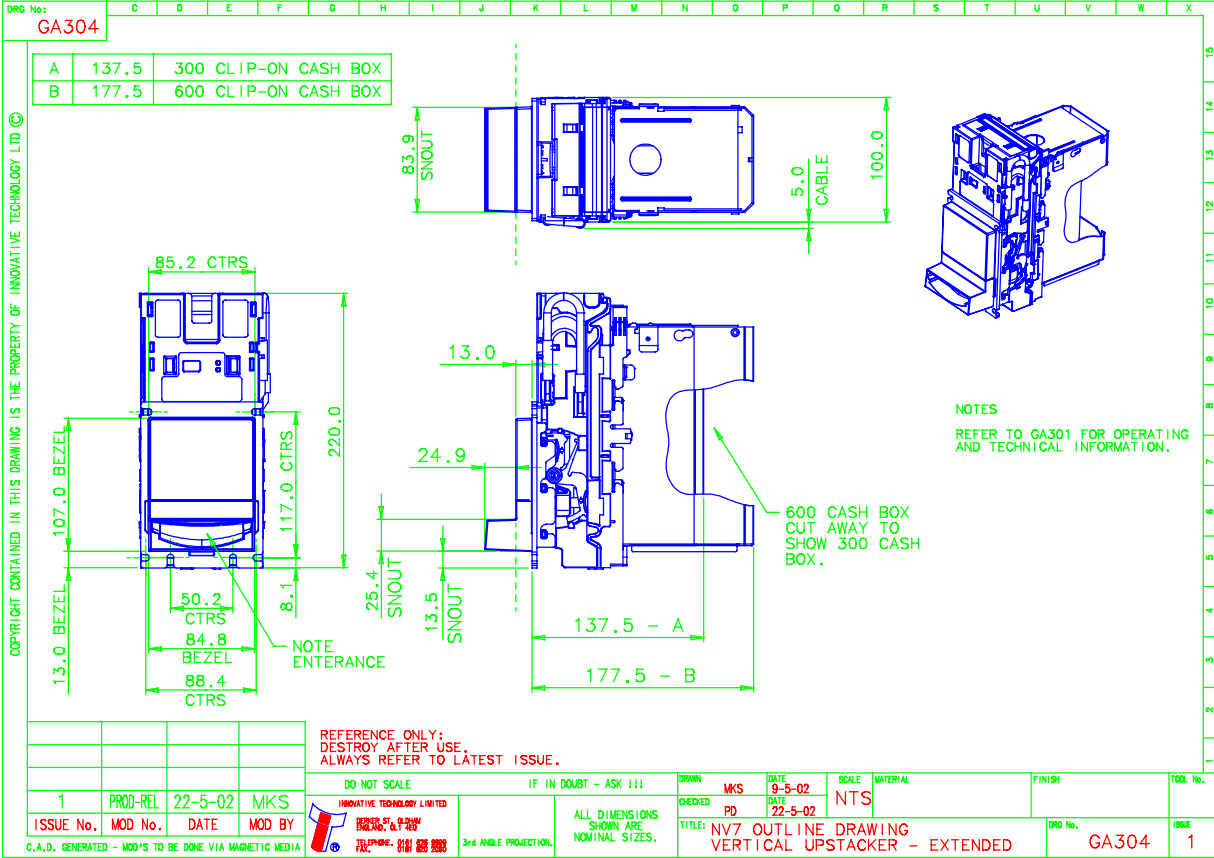


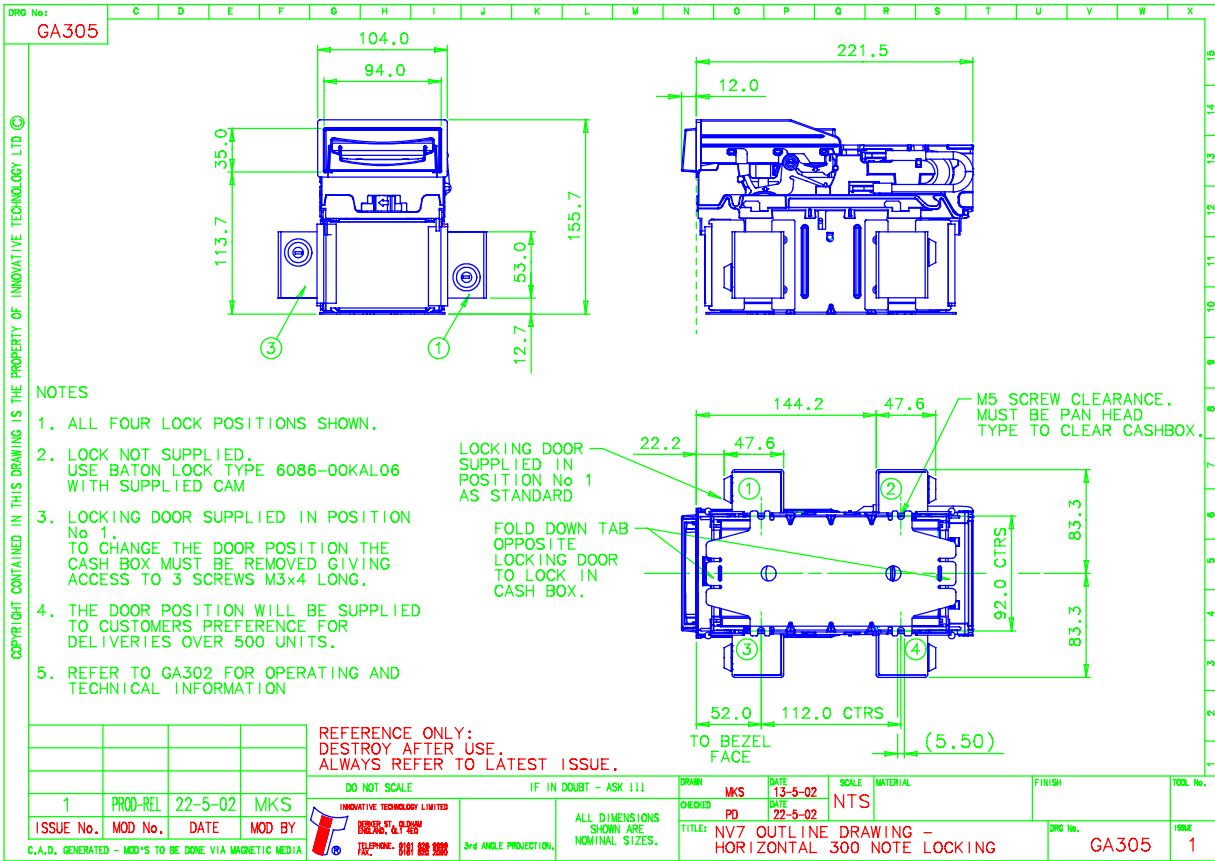
ISSUE No.	M/D No.	DATE	MD BY	DO NOT SCALE	IF IN DOUBT - ASK !!!	DRAWN	MKS	SCALE	MATERIAL	FINISH
1										
ALL DIMENSIONS IN MILLIMETERS UNLESS OTHERWISE SPECIFIED UNLESS OTHERWISE SPECIFIED UNLESS OTHERWISE SPECIFIED										
TITLE NV7 OUTLINE DRAWING - HORIZONTAL										
BRG No. GA302										











Revision History

Issue No.	Mod No.	Date	Done by
Draft A	NA	July 2001	KA
Issue 1	NA	January 2002	TJC
Issue 2	NA	June 2002	TB