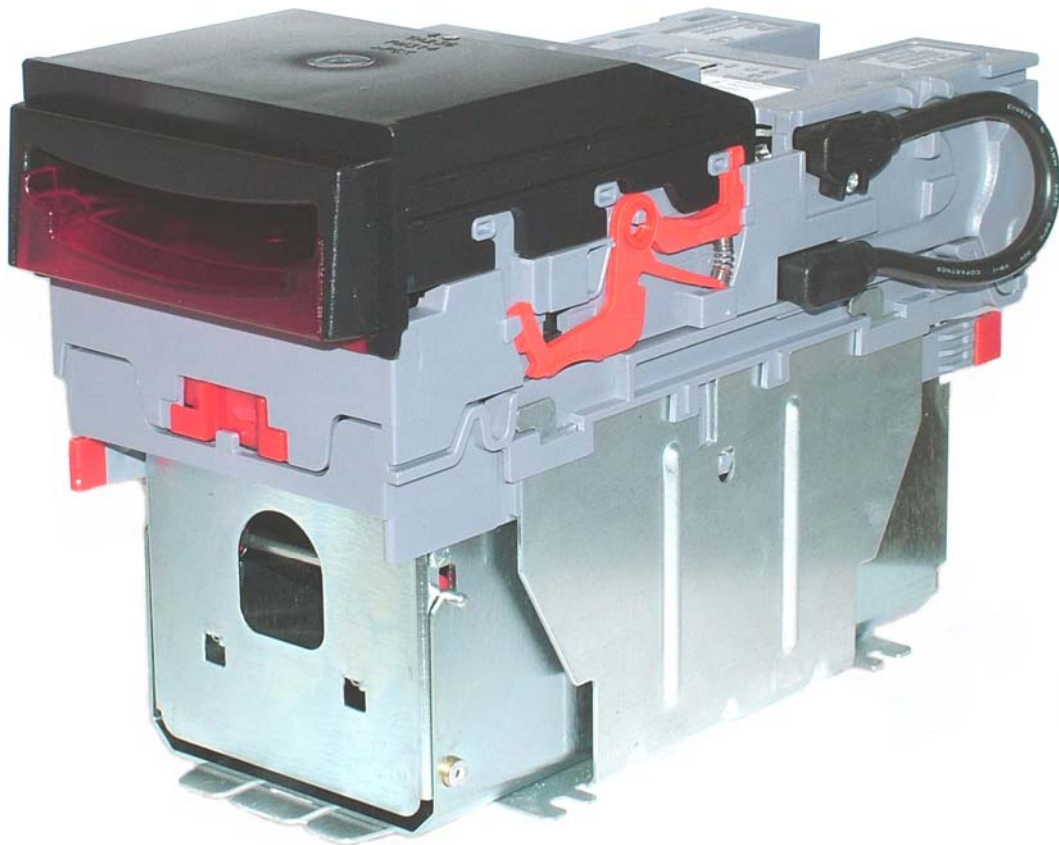


A.u.S. Spielgeräte GmbH
NV9 Bank Note Validating System
The Future of Smiley® Bank Note Handling



Operations Manual
GA326-3

© Copyright ITL 2005

Revision History

A.u.S. Spielgeräte GmbH			
Title:		NV9 Engineers Manual	
Drawing No:	GA326	Project:	
Author:	T. J. Crowley	Date:	29/10/2004
Format:	MS Word	2000	
Issue	Rel Date	Mod By	Comments
Issue 1	29/10/2004	TJC	<i>First draft</i>
Issue 2	21/06/2005	ATG	<i>Second draft</i>
Issue 3	14/07/2005	RJS	<i>First Release</i>
Issue 4	07/10/2005	CC	<i>Second Release</i>

Contents

	Page
1 INTRODUCTION	5
2: SCOPE OF DOCUMENT	6
3: ENVIRONMENT AND POWER REQUIREMENTS	7
4: GENERAL DESCRIPTION	8
5: NV9 USER INTERFACE	9
5.1:DIPswitch Settings	9
5.2:LED Status Codes	10
6: INTERFACES: HARDWARE DESCRIPTION	11
6.1:Interface Connector Pin Details	11
6.2:Input and Output Hardware Circuits	12
6.3:Software Optional Serial Interface Input and Outputs	12
7: MACHINE INTERFACES: PROTOCOLS	13
7.1:Parallel input and output:	13
7.2:Pulse Stream Output	13
7.3: Binary Output - BIN	15
7.4:Simple Serial Input/Output – SIO	15
7.5 Smiley® Secure Protocol - SSP	18
7.6 Multi-Drop Bus / Internal Communications Protocol (IF5) – MDB	19
7.7 CCTalk Protocol – CCT	20
7.8 Extended Interface / USA Serial – NIS	21
8 UPDATING CURRENCY AND FIRMWARE	22
8.1 ITL BNV Download Manager	22
8.2 NV9 – NV9 Copy (Cloning)	22
8.3:NV9 – NV9 copy process.	23
9: MECHANICAL INSTALLATION	24

NV9 Operations Manual GA326-4

9.1:Changing or removing the bezels	24
9.2:Changing or removing cash boxes.....	24
10 ROUTINE MAINTENANCE	25
10.1 Cleaning.....	25
10.2 Note Path Debris Clearing / Belt Changing.....	26
11: FAULT FINDING ANALYSIS	27
12 SUPPORT TOOLS.....	29
12.1 PC Currency Programming Software (ITL BNV Download Manager).....	29
12.2 Website Support	29
12.3 E-mail Support.....	29
APPENDIX A - DRAWINGS	30
APPENDIX B - ESCROW CONTROL.....	35
APPENDIX C - INTERFACE TOOLS DA1 - DA2	36

1 Introduction

This manual describes the operation of the NV9 Bank note Validator as fitted with Firmware Version 3.15 or greater.

Caution

- This Product must be fitted with a **2 Amp** fuse before use.
- The NV9 Validator is pin for pin compatible with NV7/8/10 but **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. Alternatively visit our web site at www.aus.at - **Support**

A.u.S. Spielgeräte GesmbH

Scheydgasse 48
A-1210 Wien

Tel. +43-1-271 66 00
Fax.+43-1-271 66 00 75
Mail: verkauf@aus.at
<http://www.aus.at>

Smiley® and the ITL Logo are international registered trademarks and they are the property of ITL.

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

ITL 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 ITL for details of any changes

2: Scope of Document

This document is intended for those who will:

- Design the NV9 into items of equipment.
- Build equipment using the NV9.
- Install equipment containing the NV9.
- Maintain equipment containing the NV9.

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 be 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 NV9 Validator is disassembled the unit must be re-calibrated/re initialised, following re-assembly.

ITL has a policy of continual product improvement. As a result the products supplied may vary from the specification described here.

3: Environment and Power Requirements

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

Table 1 - Environmental Requirements

Caution:

- If the input voltage falls below 11V the NV9 may not operate correctly (will reject notes). The amber status LED and front bezel lights will flash to indicate incorrect conditions
- It is recommended that the power supply used can supply at least 1.5Amps.

Electrical Supply	Minimum	Maximum
Supply Voltage (V dc) Absolute Limits	11V	14V
MDB IF5 Version Supply Voltage	18V	42V
Supply Ripple Voltage	0	0.25V @100 Hz
Supply Currents:		
Standby		0.35A
Validating		1A
Peak (Stacker Motor stall)		1.5A

Table 2 - Power Requirements

4: General Description

NV9 Validator - the next generation of Smiley® Bank Note Validators

The NV9 Bank Note System is a compact note-validating machine (see figure 1), suitable for most money machines. It will accept up to 16 different denominations of notes in the serial control mode or 4 different notes in parallel mode, and will cope with different designs of banknote having the same value such as are found in the United Kingdom and Scotland.

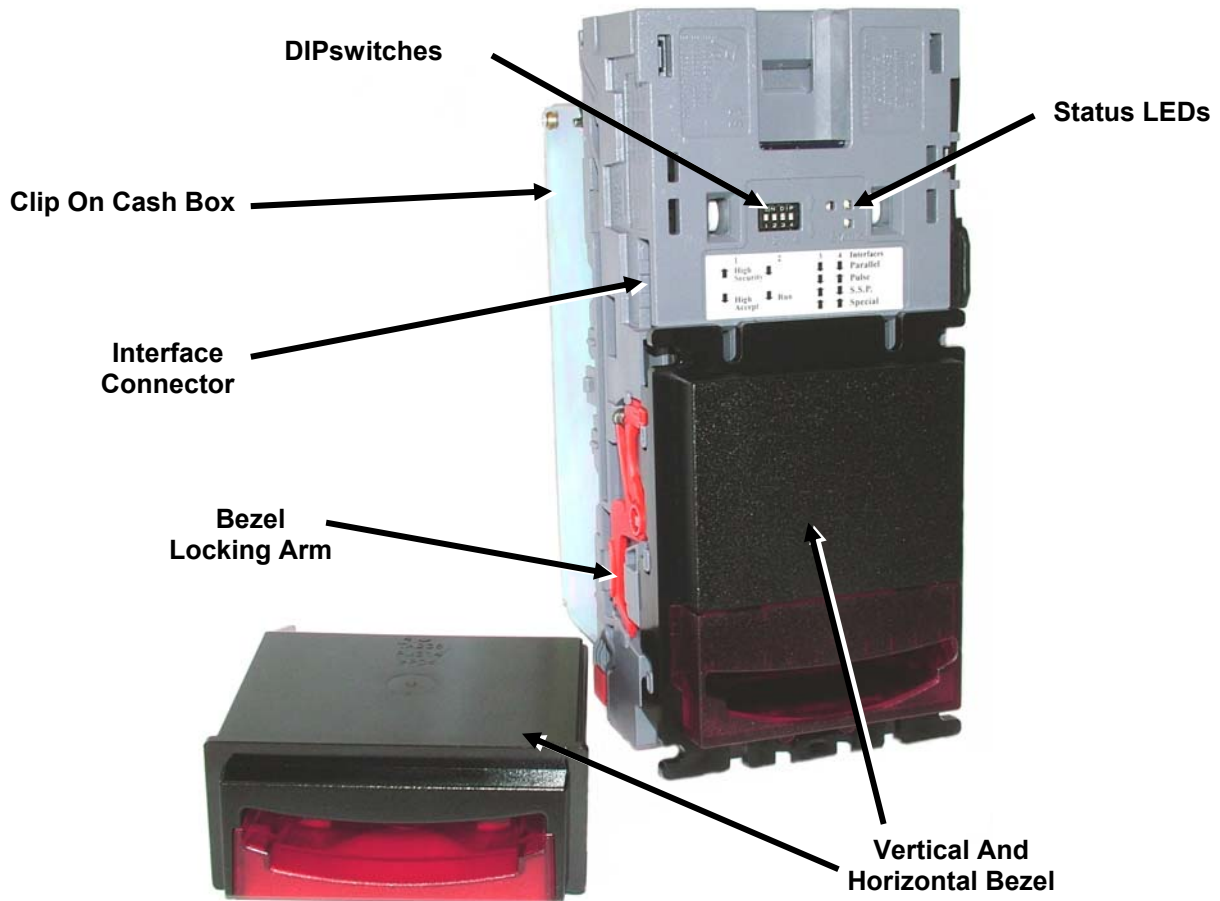


Figure 1 – The NV9 with Vertical and Universal Bezels

The NV9 Validator leaves the factory preset to at least one currency so that it is ready for immediate installation. If it is required to change the currency data set this may be done using either the NV9 to NV9 currency cloning system or the PC based Currency Management software.

New currencies and applications are being tested all the time, 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 NV9 is designed for easy installation in most machines. The 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 the following protocols:

- Parallel open collector outputs.
- Pulse stream open collector output.
- Binary open collector output.
- Smiley® Secure Protocol (SSP) secure serial communications.
- Simple serial I/O communications.
- MDB interface protocol.
- CCTalk
- Extended Interface / USA Serial

5: NV9 User Interface

The user interface with the NV9 is shown below (see figure 2). It is simply a set of four DIPswitches and one red, one amber and one green LED, mounted on the top of the NV9. The DIPswitches set the basic operating mode of the unit, while the LED's indicate the operational status of the NV9.

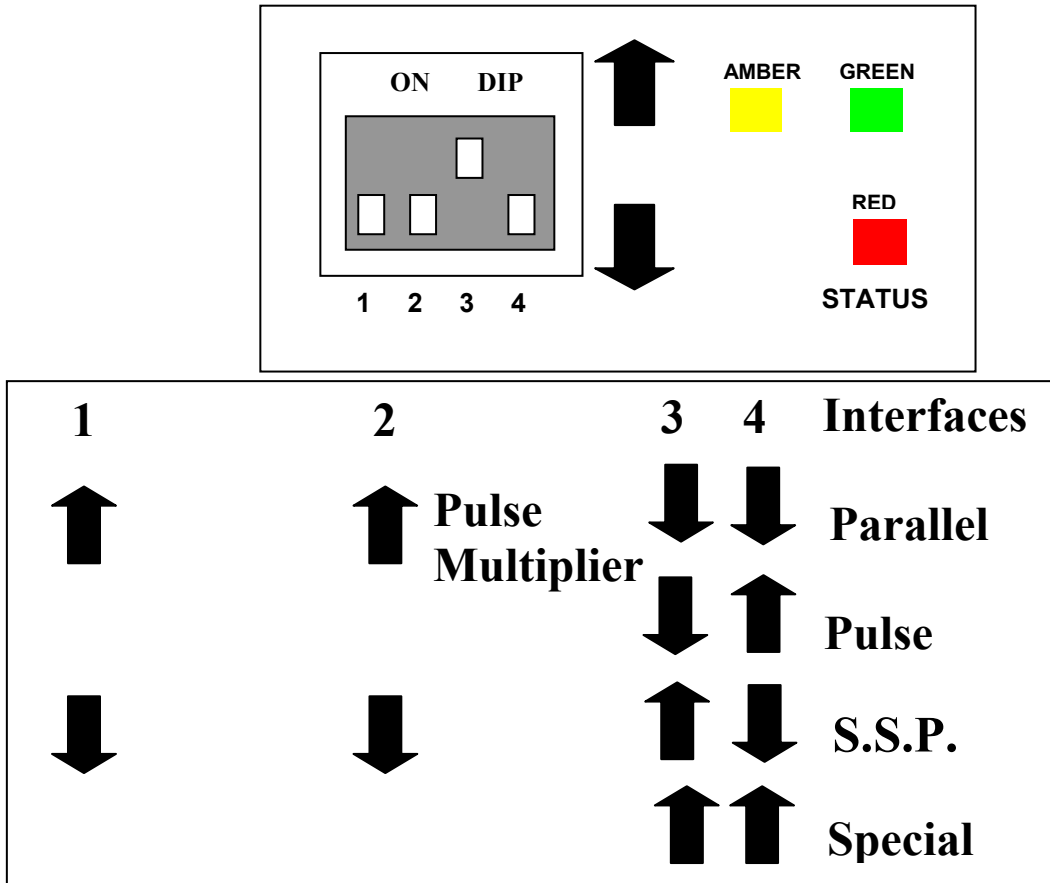




Figure 2 - User Display and DIPswitch Settings

5.1:DIPswitch Settings

The four DIPswitches can be set to a combination of either up  or down  depending on the configuration required for the particular NV9.

Switch 1 – Spare

Switch 1 currently has no function and is reserved for future use.

Switch 2 – pulse multiplier

This switch is used to modify the behaviour of the selected machine interface. Details of the function of this switch are covered in the interfaces' description in this manual.

Currently the only interface to make use of this switch is the pulse mode. In this mode the switch can be used to multiply the number of pulses given by a factor of four. When the switch is down the multiplier is 1, when the switch is up the multiplier is 4.

Switches 3 and 4 – Machine Interface protocol selection

These switches are used to select the machine interface to be used. The NV9 supports four interfaces, as shown below, (see table 1).

NV9 Operations Manual GA326-4

Interface	Switch 3	Switch 4
Parallel	Down	Down
Pulse	Down	Up
SSP	Up	Down
Special	Up	Up

Table 1 - Switch 3 and 4 Machine Interface Selection

The details of the parallel, pulse, and SSP can be found in the machine interface protocols section of this manual.

The special interface depends on the firmware that is used in the NV9, the firmware shipped as standard is the binary interface (World Wide) and CCTalk (UK only). However, there are other options that can be downloaded by the user:

- Binary
- CCTalk
- ITL Simple serial I/O
- MDB

Information on each of these interfaces can be found in the 'machine interfaces protocol section' of this manual.

5.2:LED Status Codes

The three status LED's are located to the right of the DIPswitches on the top of the unit and are used to indicate a variety of status signals.

The red status is used to indicate system problems, while the green status indicates system health; these are described below in table 2.

LED Status	Description
Slow flashing green led Heartbeat (Slow = 1 second period)	In normal RUN operation, when the NV9 is ready to read a note, the green status led will flash slowly ("Heartbeat") to signal a "healthy" status.
Flashing red one second period	NV9 is jammed, somewhere in the note path
Fast flashing red (fast = half second period)	NV9 cannot calibrate, sensor(s) may be blocked
Permanent Red	Memory has been corrupted
Alternately flashing green then red	Stacker is full
Flashing amber and bezel lights	Power supply is incorrect, check specification

Table 2 - LED Status Codes

6: Interfaces: Hardware Description

The NV9 interface connector is located on the left side of the unit; it has 16 pins (see figure 3). 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 future use. An example mating connector is Molex type Part No: 39-51-2160

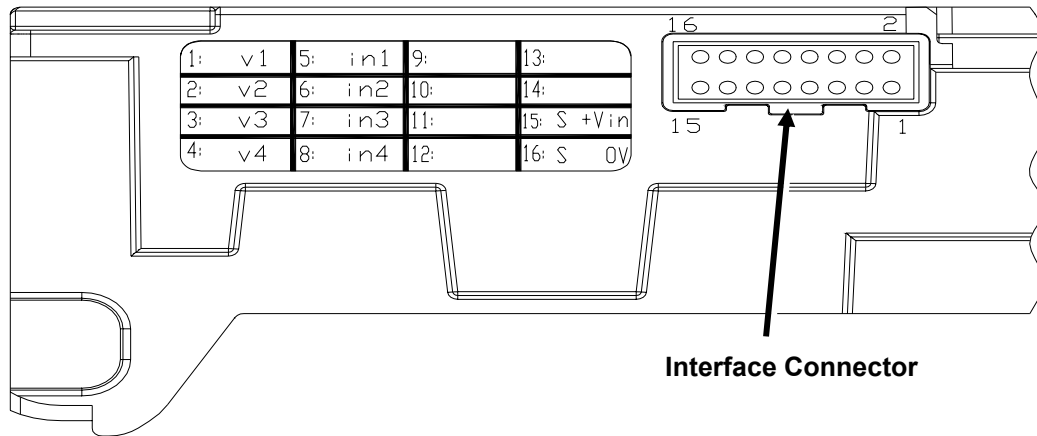


Figure 3 - Interface Connector

6.1:Interface Connector Pin Details

The connector pin details are described below (see table 3); they use a 0.1" pitch header with 2 rows of 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.
3	Vend 3 (binary bit 4)	Note accepted on Channel 3 pulse output
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	NV9 is validating and stacking output. Active low while the NV9 is reading, transporting or stacking a note.
10	Escrow	Operate Escrow function by holding LOW, refer to Escrow section in parallel and binary modes and Escrow Appendix B for full details)
11	Spare	Spare
12	Spare	Spare
13	Spare	Spare
14	Spare	Spare
15	+Vin	Nominal 12V DC supply
16	0V	0v Supply

Table 3 - 16 Pin Connector Details

6.2: Input and Output Hardware Circuits

Caution: The output low signal is affected by the value of the pull up resistor on the host machine interface. Ensure your signal LOW levels comply with the 74HC CMOS series specification for reliable operation, (see figure 4).

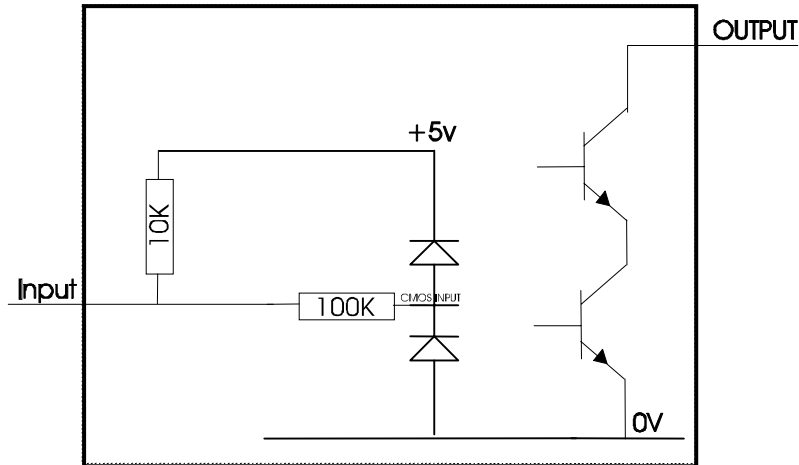


Figure 4 - Input and Output Circuit

- All outputs are open collector transistors.
- All Inputs are held high to internal +5v via 10KΩ. The input structure is a CMOS gate with anti-static protection fitted.

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

Table 4 - Interface Logic Levels

6.3: Software Optional Serial Interface Input and Outputs

Caution: The serial interfaces will only work if the relevant interface software is correctly installed.

Name	Description
SSP TxD	Vend 1
SSP RxD	Inhibit 1

Table 5 - Software Optional Serial Interface Inputs and Outputs

7: Machine Interfaces: Protocols

To select the required interface, the DIPswitches on top of the NV9 need to be set accordingly:

7.1: Parallel input and output:

To use parallel output for 4 notes / channel acceptance, DIPswitches 3 and 4 must be set 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 set low for a period of 100 ± 3 ms. Pulses outside these limits should be 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 NV9 is in operation.

Escrow Control: (pin 10). -Parallel mode: The NV9 uses a single note escrow facility in this mode (see [Appendix B](#)). 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 confirmation of the Vend is not received the note will be returned to the customer after 30 seconds.

If the host machine aborts the transaction by setting the corresponding inhibit input high, the note is returned immediately.

The host machine can force the return of the note to the customer by setting the inhibit line high, at any time before the end of the 30 second time-out. Setting all the inhibits high will cause a note reject.

In the event of a note being forcibly removed from the mouth of the NV9 during the 30 second interval, the NV9 will go out of service for 45 seconds.

Inhibit Operation: Channel 1 to 4 have their own inhibit input to allow the host machine to refuse specified 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 NV9 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 and the bezel will not illuminate.

All four inhibits may be connected together to create a 'global' inhibit. In this way the NV9 may be brought in and out of operation by the host machine.

7.2: Pulse Stream Output

To use pulse stream output for acceptance of up to 16 channel / note acceptance, DIPswitch 3 must be down and DIPswitch 4 must be up.

Vend Signal: (Pins 1) When a note is recognised vend 1 will pulse a pre set number of times, the number of pulses and the timing is set in the ITL BNV validator manager program (and set to default values with supplied dataset).

The number of pulses is multiplied by a factor of four for USA dollar datasets, depending on the position of switch 2. If the switch is down then the number of pulses is as programmed in the dataset output. If the switch is up then four times this number of pulses is output.

Busy Output: (Pin 9). This is a general-purpose busy signal. It is active low while the NV9 is in operation.

Escrow Control: (Pin 10). The NV9 uses a single note escrow facility in this mode (see [Appendix B](#)). 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 confirmation of the Vend is not received the note will be returned to the customer after 30 seconds.

If the host machine aborts the transaction by setting the corresponding inhibit input high, the note is returned immediately.

The host machine can force the return of the note to the customer by setting the inhibit line high, at any time before the end of the 30 second time-out. Setting all the inhibits high will cause a note reject.

In the event of a note being forcibly removed from the mouth of the NV9 during the 30 second interval, the NV9 will go out of service for 45 seconds.

NV9 Operations Manual GA326-4

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.

Note: Channels higher than four cannot be individually inhibited, but will be globally inhibited if inhibits 1 to 4 are inhibited.

If all four inhibits are high simultaneously then the NV9 will not read in any notes. All four inhibits may be connected together to create a 'global' inhibit. In this way the NV9 may be brought in and out of operation by the host machine.

7.3: Binary Output - BIN

To use binary output DIPswitches 3 & 4 must both be up and the BIN option of the interface firmware must be loaded into the NV9.

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 NV9 can be set to give a binary pattern output on the four parallel output pins.

If the NV9 is set to binary mode 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.

Vend Signals: (Pins 1 to 4). 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.

Busy Output: (Pin 9). This is a general-purpose busy signal. It is active low while the NV9 is in operation.

Escrow Control: (pin 10). The NV9 uses a single note escrow facility in this mode (see [Appendix B](#)). 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 is completed. If confirmation of the Vend is not received then the note will be returned to the customer after 30 seconds.

If the host machine aborts the transaction by setting the corresponding inhibit input high on pin 10, the note is returned immediately.

The host machine can force the return of the note to the customer by setting the inhibit line high, at any time before the end of the 30 second time-out. Setting all the inhibits high will cause a note reject.

In the event of a note being forcibly removed from the mouth of the NV9 during the 30 second interval, the NV9 will go out of service for 45 seconds.

Inhibit Operation: Each channels (1 to 4) have their individual 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.

Note: Channels higher than four cannot be individually inhibited, but will be globally inhibited if inhibits 1 to 4 are inhibited.

If all four inhibits are high simultaneously then the NV9 will not read in any notes. All four inhibits may be connected together to create a 'global' inhibit. In this way the NV9 may be brought in and out of operation by the host machine.

7.4: Simple Serial Input/Output – SIO

Existing Smiley® NV4 users may already be using the serial input/output facility in conjunction with the parallel inputs. The NV9 Validator also supports this system. However this interface is not recommended for new designs, the Smiley® Secure Protocol SSP interface is recommended.

Caution:

- The NV9 **does not** support the Simple serial data out only mode as available on NV4. It only supports the serial data Input/Output mode.
- The host machine does not echo messages back to the Validator.
- The NV9 **does not** operate in true RS232 mode. (Only TTL level)
- The NV9 will not be enabled in serial I/O mode if Inhibit 3 line is held low when the unit is powered up

To use simple serial mode, DIPswitches 3 & 4 must both be up and the Simple Serial mode SIO option of the interface firmware must be loaded into the NV9.

Commands are provided to fully control the operation of the NV9, the notes to be accepted and rejected can be set and a single escrow mode can be enabled. In simple serial mode single byte commands are transmitted to the Validator, the Validator echoes each valid command it receives.

NV9 Operations Manual GA326-4

Example transactions are shown below (see table 7):

Event	Validator	Decimal Value	Host
Note entered into validator Note Accepted Channel 2	Validator Busy Validator Ready Accept on Channel 2	120 → 121 → 2 →	
Note entered into validators 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

Table 7 - Example Protocols

7.5 Smiley® Secure Protocol - SSP

Note: Please refer to the Smiley® Secure Protocol (SSP) Specification ITL Drawing GA 138 on the web site for full details of the SSP protocol.

To use SSP mode DIPswitch 3 must be set up and DIPswitch 4 must be set down.

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

Features:

- Serial control of Note / Coin Validators and Hoppers
- 4 wire (Tx, Rx, +V, Gnd) system
- RS232 (TTL) - open collector driver
- High Speed 9600 Baud Rate
- 16 bit CRC error checking
- Data Transfer Mode

Benefits:

- Proven in the field
- Simple and low cost interfacing of transaction peripherals.
- High security control of payout peripherals.
- Defence against surrogate validator fraud.
- Straightforward integration into host machines.
- Remote programming of transaction peripherals
- Open standard for universal use.

7.6 Multi-Drop Bus / Internal Communications Protocol (IF5) – MDB

To use the MDB mode an IF5 interface box must be fitted to the NV9 Validator and DIPswitches 3 & 4 must both be set up, with the MDB option of the interface firmware loaded into the NV9.

Note:

- Please refer to the Multi-Drop Bus specification for the suggested current drive circuits available.
- The NV9 supports the MDB protocol version 1, level 1
- For detailed information and full protocol specification please refer to www.nama.org

MDB defines a serial bus interface used in electrically controlled vending machines (see figure 6). This is a 9600 Baud Master-Slave system where the NV9 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).

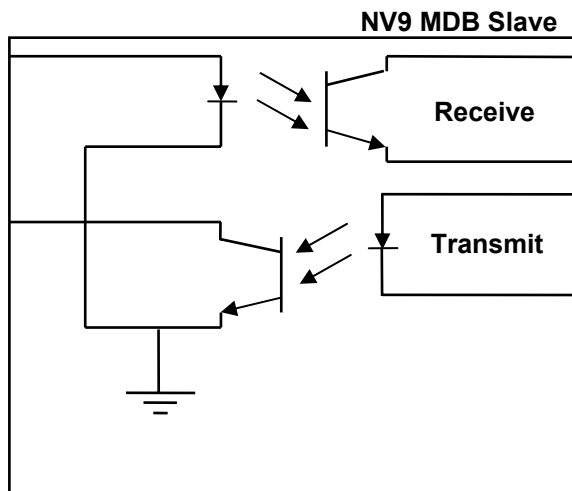


Figure 6 – MDB Opto Isolated Input / Output circuits

The NV9 banknote Validators have a unique address – 00110XXX binary (30H). The VMC polls the bus to detect presence of the NV9 Validators or get information on the current status of the Validators.

The Validators will respond when asked for activity with an acknowledgment, a negative acknowledgment or a specific reply, depending on its current status. Bus crashes are avoided as the Validators respond to being polled only by the VMC.

The international country code must be set for the country in which the Validators 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

7.7 CCTalk Protocol – CCT

The NV9 supports the CCTalk serial protocol for easy interfacing with host machines that support this protocol.

To use CCTalk mode (as in Binary mode etc) set DIPswitches 3 and 4 in the Up position to select 'Special' mode on the validator.

The NV9 must have the CCTalk software loaded using the "advanced" option on the Currency manager program.

Pin out connections on NV9 for CCTalk are shown below (see figure 7) looking at the connection pins on the NV9 interface connector.

Notes:

- For detailed information and full protocol specification please refer to www.cctalk.org

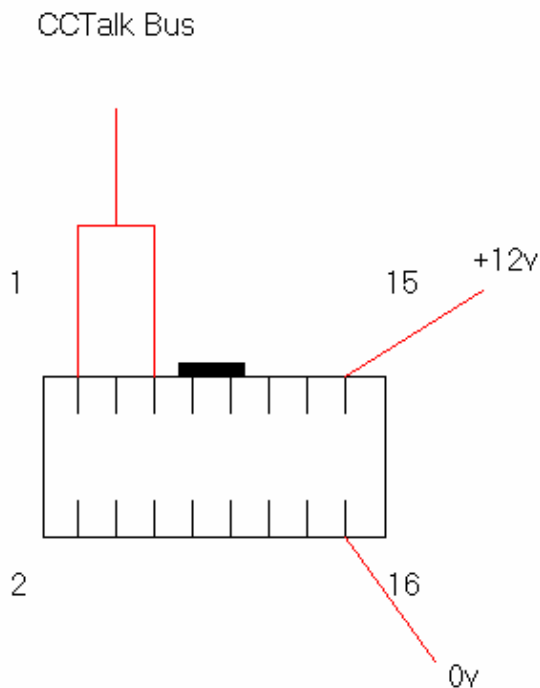


Figure 7 - CCTalk Connection Pins on the NV9

The default encryption key will be set to the key code printed on the label on the NV9. If the key is changed to a new stored key by the host machine, the key can be reset to the default by the following the steps below.

1. Power off NV9.
2. Set all 4 DIPswitches to the Up position.
3. Apply power (no CCTalk comms).
4. Red LED will now be flashing.
5. Set DIPswitches 1 and 2 down.

The code is now reset.

7.8 Extended Interface / USA Serial – NIS

The USA Serial interface is a non-isolated interface serial communications protocol.

There is a single output DATA line from the NV9. There are three control lines, two from the controller "ACCEPT ENABLE" and "SEND" and one from the Validators IRQ (INTERRUPT) (see table 8).

Caution:

- Please note that the NV9 is required to operate on a +12volt DC power supply.
- The NV9 ground must be connected to the ground of the control system.
- For further details on this protocol please refer to the Series 2000 Interface manual (reference number 20105-002850046-PS).

Connection Details:

Signal	NV9
12v	15
0v	16
ACCEPT ENABLE	6
SEND	7
IRQ (INTERRUPT)	2
DATA	1
OUT_OF_SERVICE	3

Table 8 - Extended Interface USA Serial

8 Updating Currency and Firmware

Note: Validators are supplied already programmed from the factory. Please skip this section unless the validators need to be re-programmed with a new note or currency.

The NV9 Validator can only be re-programmed using the ITL BNV download manager 2.9.7 or greater or by cloning from a master unit.

8.1 ITL BNV Download Manager

To use the ITL BNV download manager software, which is supplied with a range of currencies. The system will require you to be running a PC Windows 95/98/NT™2000 or XP Professional, Pentium™ (© Microsoft and Intel).

A list of currently supported currencies is maintained on our web site, and new releases can be downloaded from www.aus.at - Support. Further details are available from verkauf@aus.at

How to register for the first time log in, please refer to [Appendix D](#).

8.2 NV9 – NV9 Copy (Cloning)

Overview

This facility exists for a NV9 Bank Note Validator to copy its program and settings to another NV9. The 'Master' Validator will transmit the currency data and upgrade the slave's firmware. For cloning it is recommended to use the cloning kit 2 (CK2).

Requirements

- Master to have firmware 3.15 or greater
- Cloning kit 2
- 12V power supply.

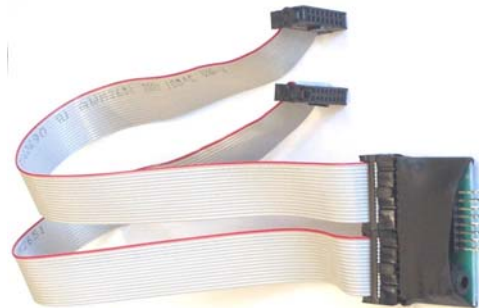


Figure 8 – Cloning Kit 2

Start-up configuration

- Remove power from slave and master units.
- Set DIPswitches 3 up and 4 down to select SSP interface mode on both NV9's.
- Using the NV9 cloning kit (CK2) connect the two units together as above.
- 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.
- If the firmware on the master and slave are the same only the currency will be transferred.

8.3:NV9 – NV9 copy process.

- Connect the NV9 to the master slave using CK2 and 12V power supply
- The Master unit will flash the RED and GREEN LED's if the connector is configured correctly.
- RED and GREEN LED's on the master flash together – attempting to communicate with Slave.
- RED and GREEN LED's on master flash alternately - communication established, master waiting for Slave to reset.
- If communication has been established and the Slave has reset then the Master will read the Slave firmware version and decide on next action.
- If the Slave firmware version is not compatible with 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 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:

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

- Master RED LED will blink rapidly during firmware copy (the LED will pause from time to time).
- When the firmware copy is complete, the 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:

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

- Master GREEN LED will blink rapidly during the currency copy process and the LED will pause from time to time.
- When currency copy is complete, Master will show GREEN and RED LED's continuously and slave will reset.
- NV9 – NV9 copy is now complete.

9: Mechanical Installation

The NV9 validators can be supplied with either of the following bezels, (see figure 9):

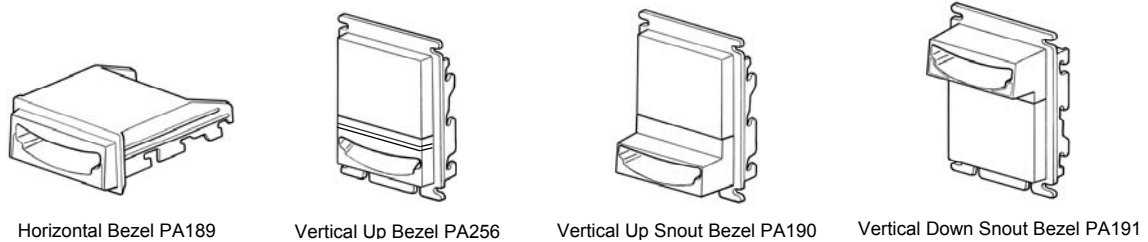


Figure 9 - NV9 Bezels

9.1: Changing or removing the bezels

Caution: Always make sure that **both** the locking arms have fully located in to prevent damage.

Push both of the red locking arms so that they disengage from the bezel sides. The bezel may then be unhooked from the 6 locating points, (see figure 10). To refit push the bezel onto the six locating points (3 each side). The red locking arms will spring back to secure the bezel

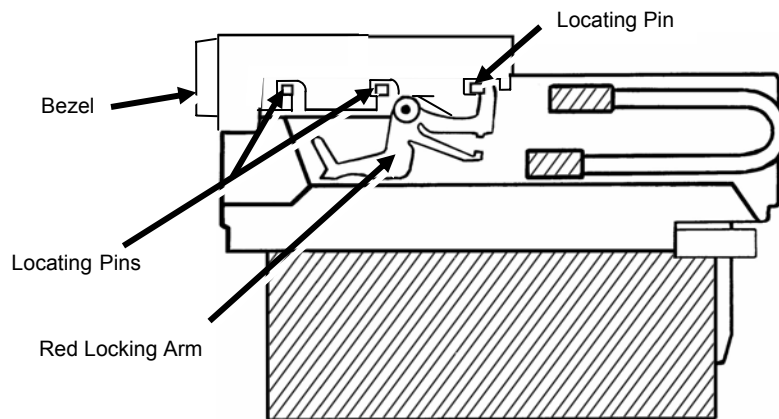


Figure 10 - Bezel and Validator Removal

9.2: Changing or removing cash boxes

The NV9 validators can also be supplied with the various cash box options, (see figure 11).

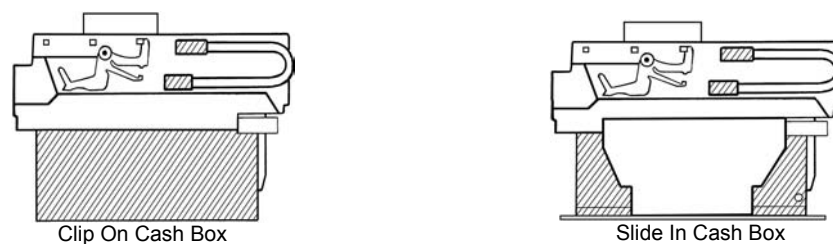


Figure 11 - Clip On and Slide in Cash Boxes

- 300 Note Clip (part no PA185) on for the vertical bezel options only.
- 300 Note Slide in (part no PA192) for both the horizontal and vertical bezel options.
- 600 Note Clip on (part no PA193) for the vertical bezel options only.
- 600 Note Slide in (part no PA194) both the horizontal and vertical bezel options.
- 300 Note Lockable for the horizontal bezel option only (part no PA186). (Lock is not supplied – use with Baton Lock type 6086-00KAL06 with supplied cam)

10 Routine Maintenance

The NV9 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 NV9 may at some time require cleaning, belt changing or note path clearing.

10.1 Cleaning

CAUTION: 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 VALIDATOR, ALWAYS USE A MILD DETERGENT.

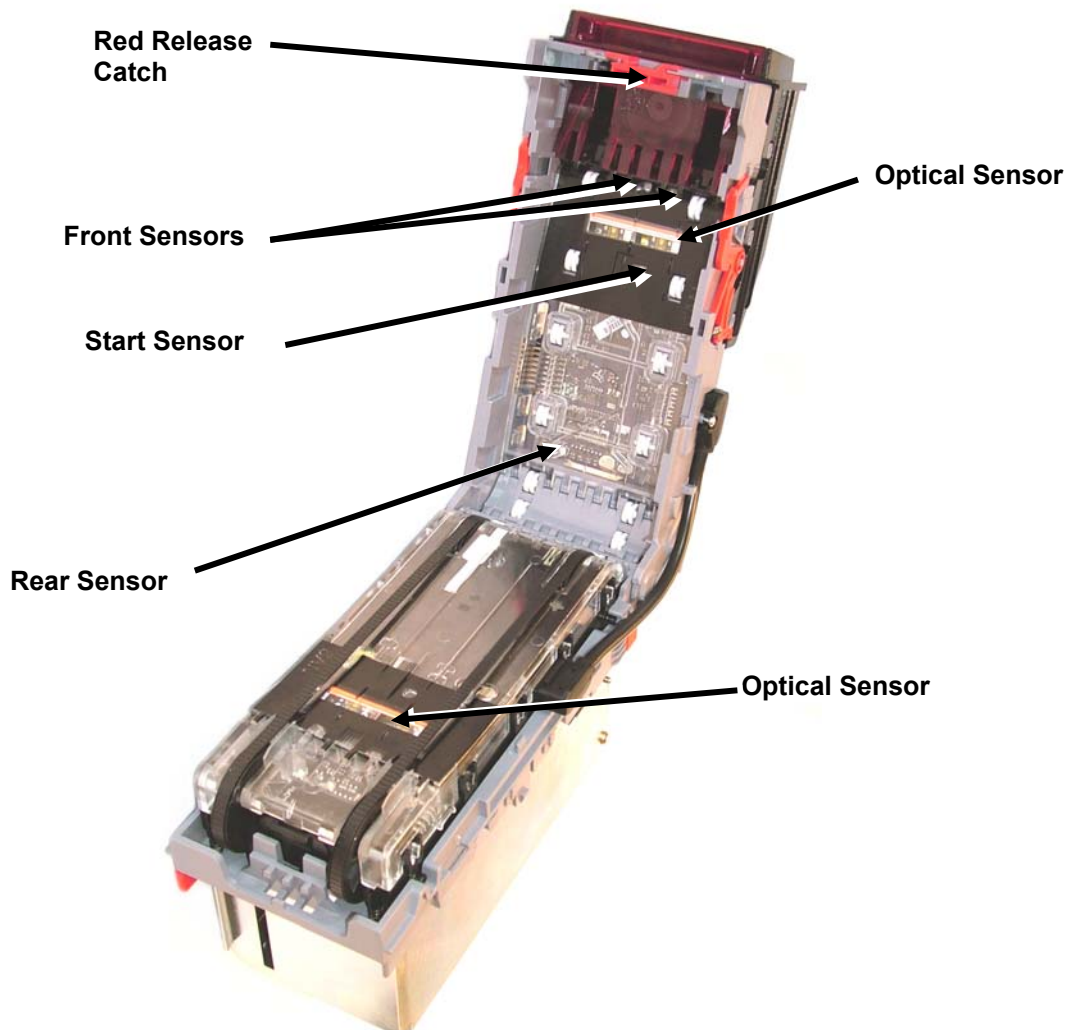
To clean, slide the red release catch on the end of the NV9 Validator to open the note path. The note path and lozenge are now exposed for cleaning.

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 12), ensuring they are clean and dry.

Caution

When cleaning the "recessed" Front Sensors, use a small soft brush or cotton wool bud.

If a lens has become badly scratched do not attempt to polish it. Contact ITL for further advise, as there may be damage to the optical properties of the lens. **Figure 12 - NV9 Sensors**



10.2 Note Path Debris Clearing / Belt Changing

To access the note path and lozenge, slide the red release catch on the end of the NV9 Validator and lift to open. Push the lozenge release catch and lift; the note path and lozenge are now exposed for maintenance (see figure 13).

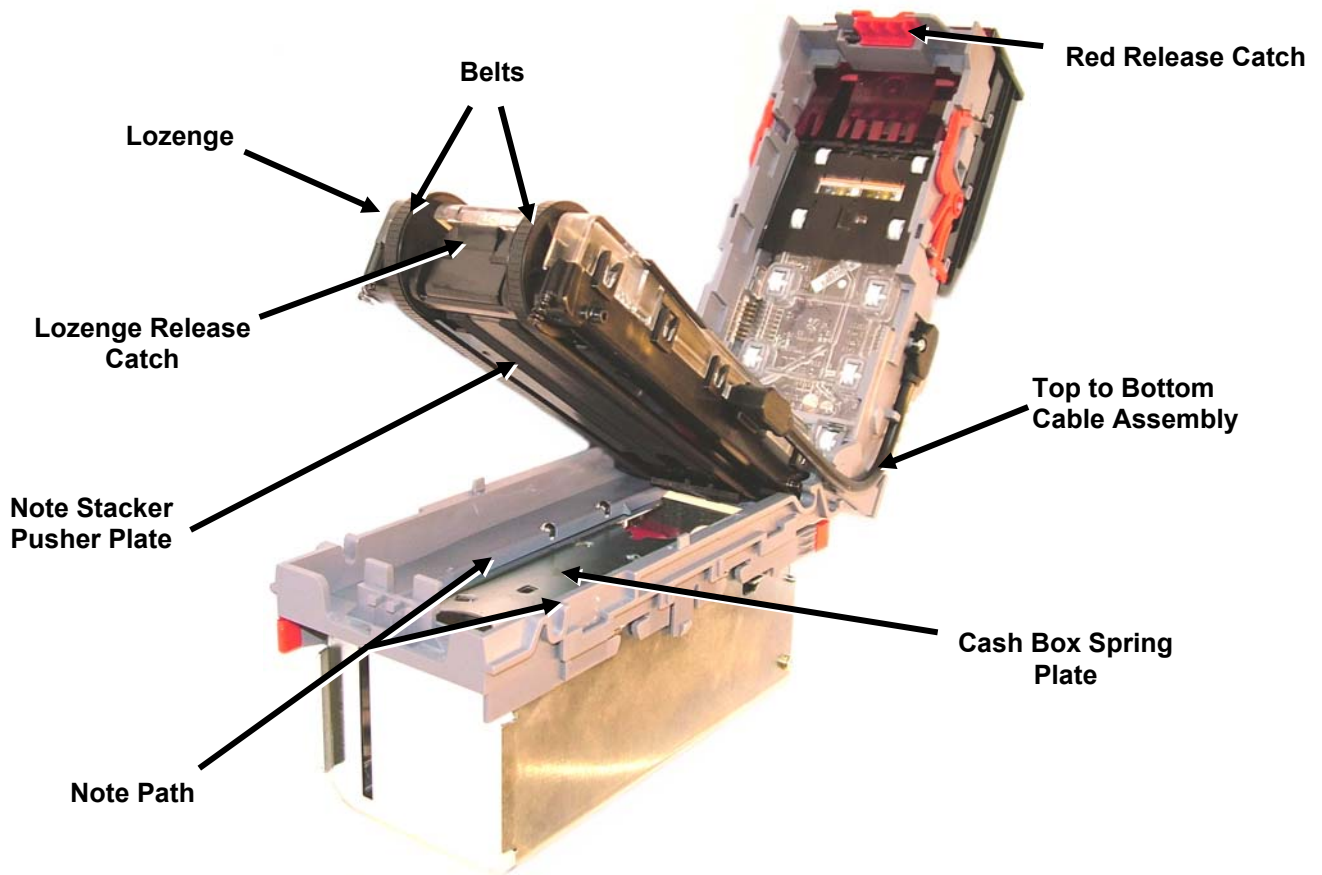


Figure 13 - NV9 Note Path and Lozenge Access

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 12), ensuring they are clean and dry.

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

Belt Changing

With the NV9 lozenge exposed (see figure 13) carefully unplug the bottom connector of the "top to bottom cable assembly" from the lozenge.

Remove and place the lozenge on a clean dry surface and remove the belts, sliding them off the smallest wheels first. Replace the belts using the reverse procedure from the above.

11: Fault Finding Analysis

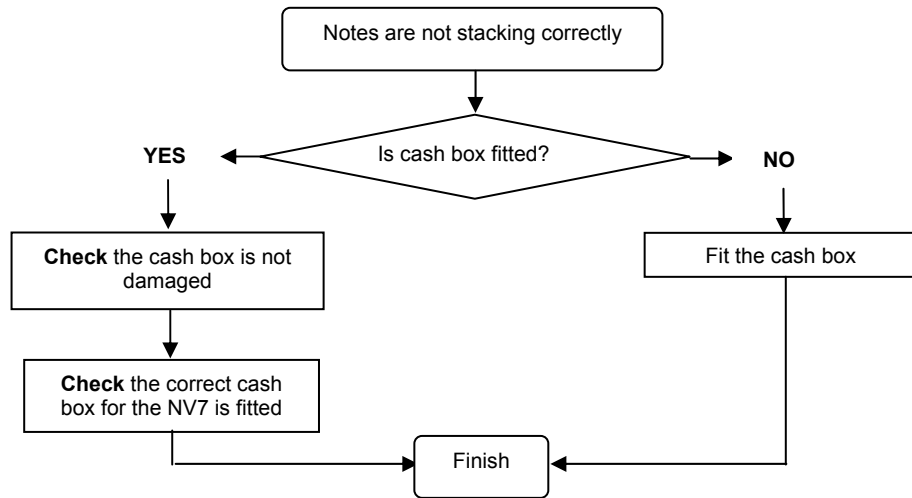


Figure 14 - Notes are not stacking Correctly

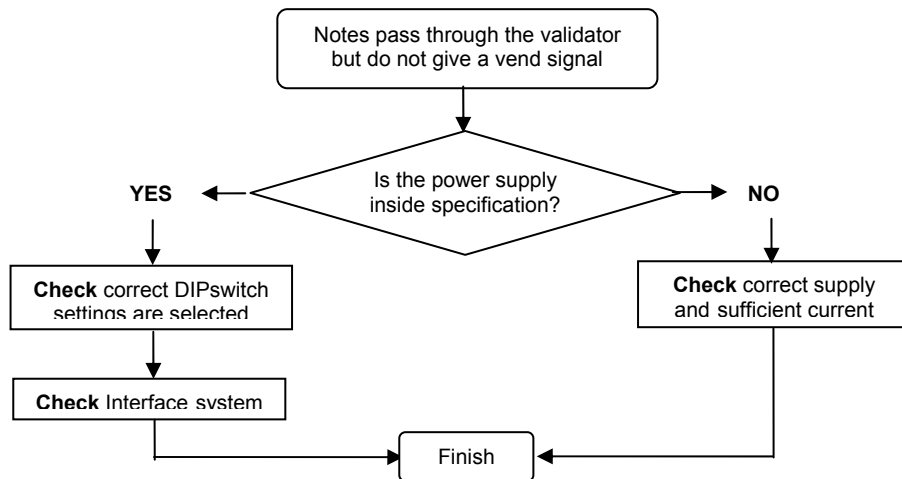


Figure 15 - Notes pass validators with no vend signal

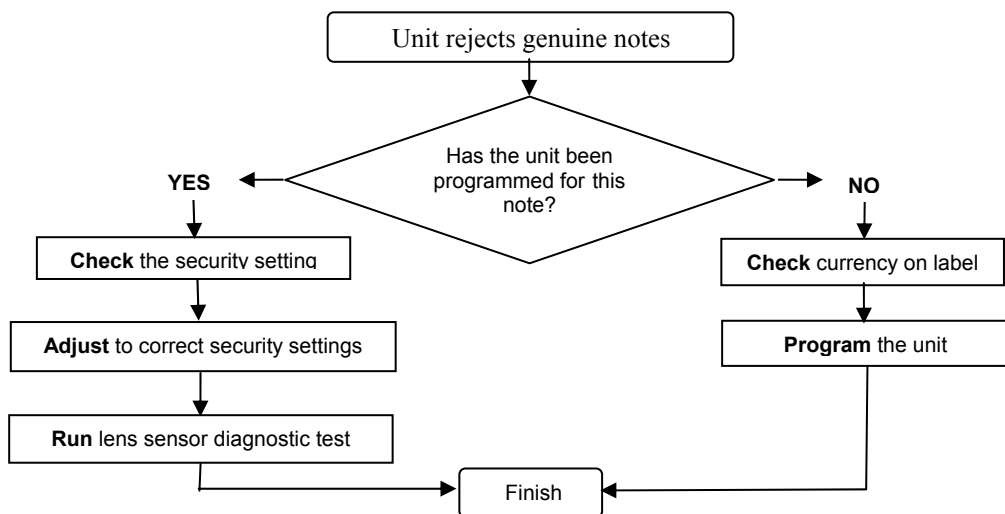


Figure16 - Unit rejects genuine notes

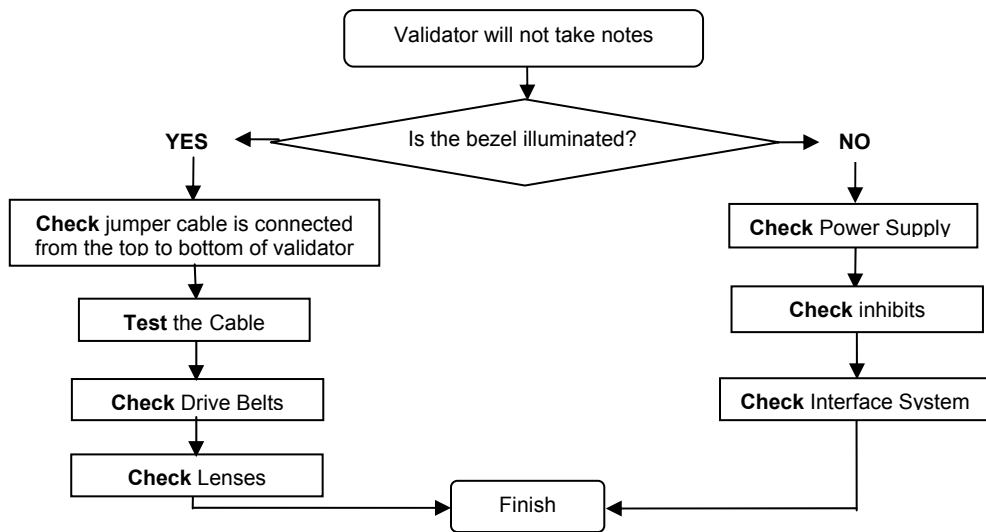


Figure 17 - Validator will not take notes

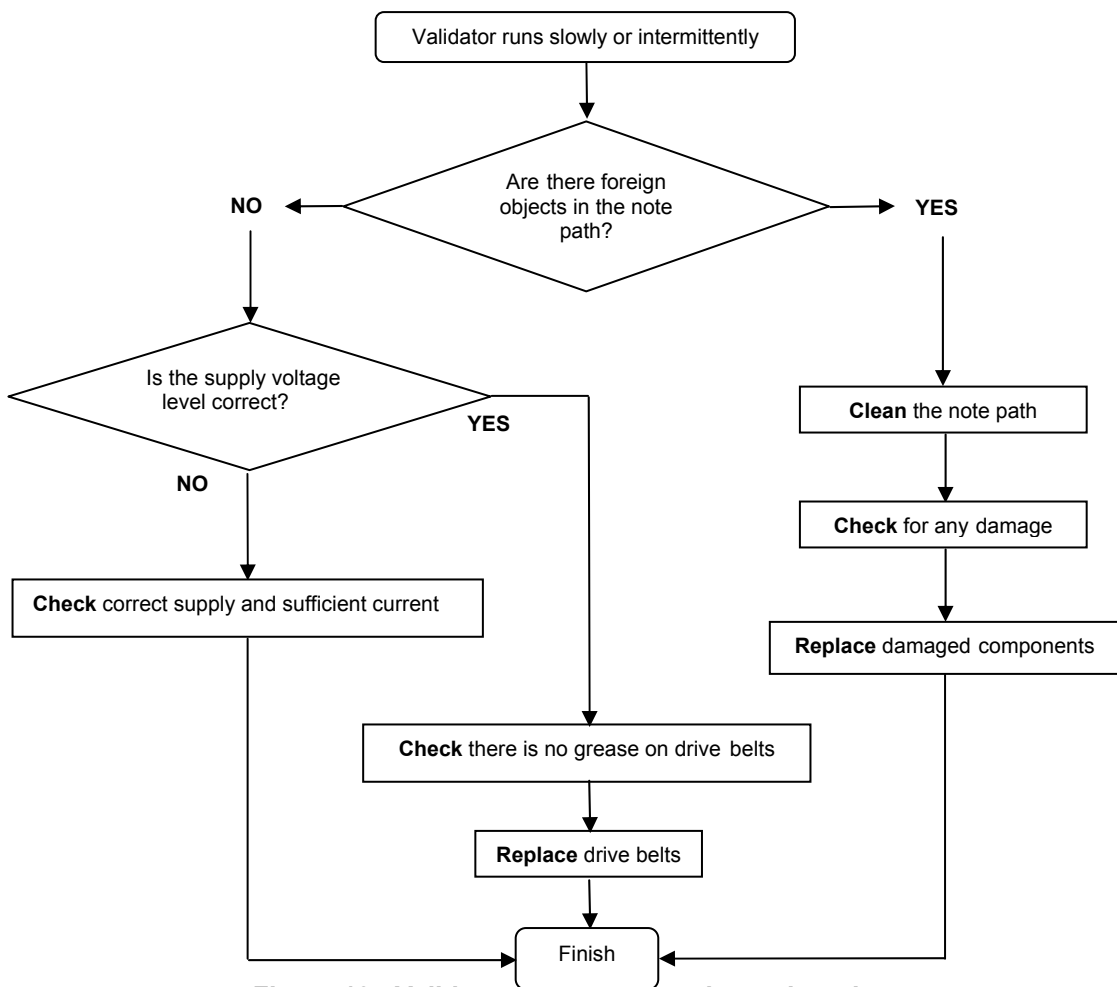


Figure 18 - Validator runs slowly or intermittently

12 Support Tools

The following support tools are available for use with the NV9 Bank Note Validator:

1. ITL BNV download manager Software.
2. Downloads from www.aus.at - Support
3. E-mail Support **verkauf@aus.at**

12.1 PC Currency Programming Software (ITL BNV Download Manager)

The ITL BNV download manager software offers the following functions:

- Program the Validator by downloading pre-prepared currency data via the serial communications link using the DA1 kit or DA2 kit using the USB link.
- Check the firmware version and currency set already loaded on an NV9 unit.
- Adjust the channel and pulse configuration on a pre-programmed NV9 to your own requirements.
- Download a new version of firmware onto the NV9.
- Use diagnostic functions to check Validators operation (firmware version 3.15 and greater only).

The software will run on an IBM compatible Personal Computer with Pentium™ processor or equivalent and requires a DA1 kit fitted to the serial port or DA2 kit fitted to the USB port depending on the operating system that you are using (see [Appendix C](#)).

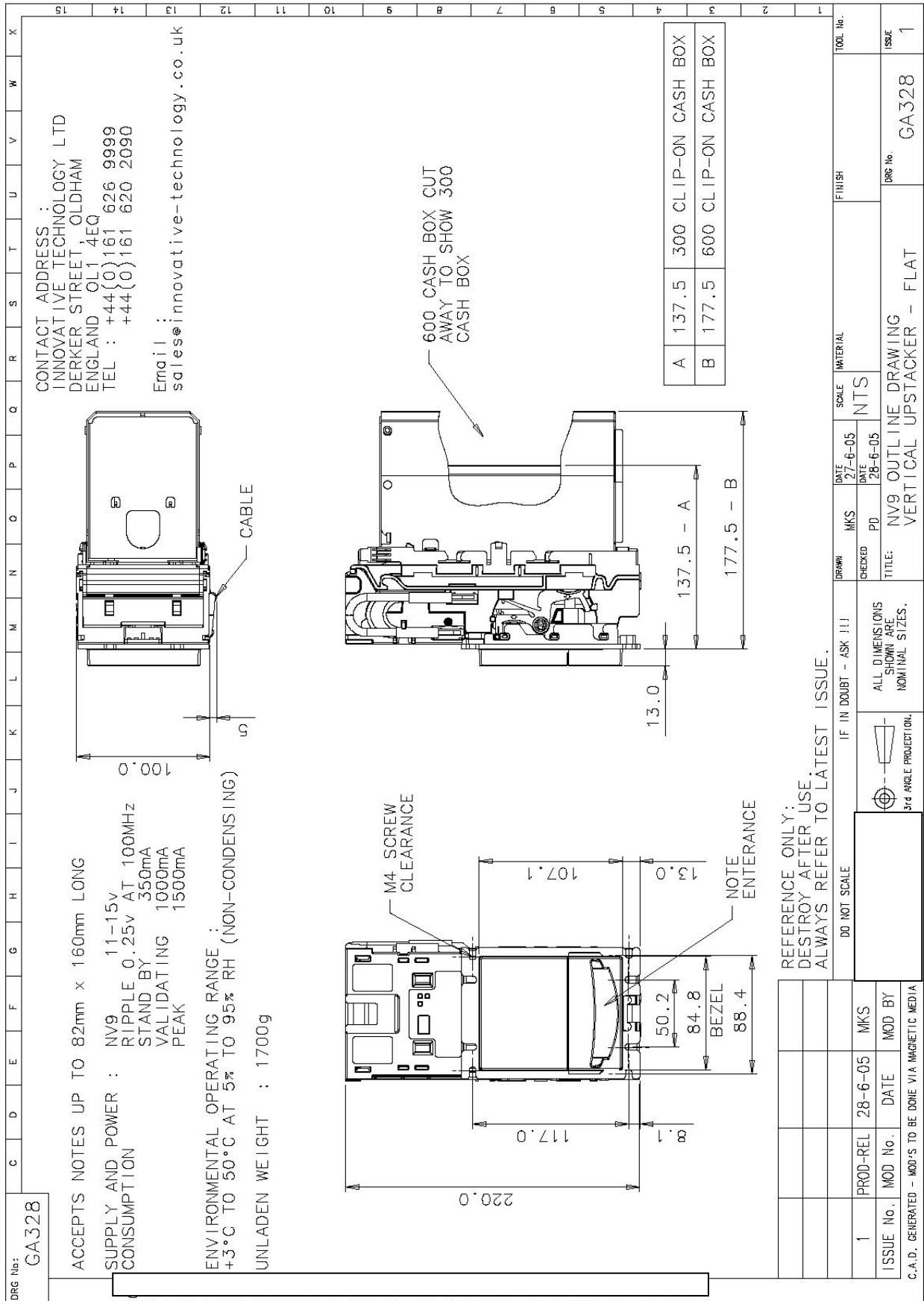
12.2 Website Support

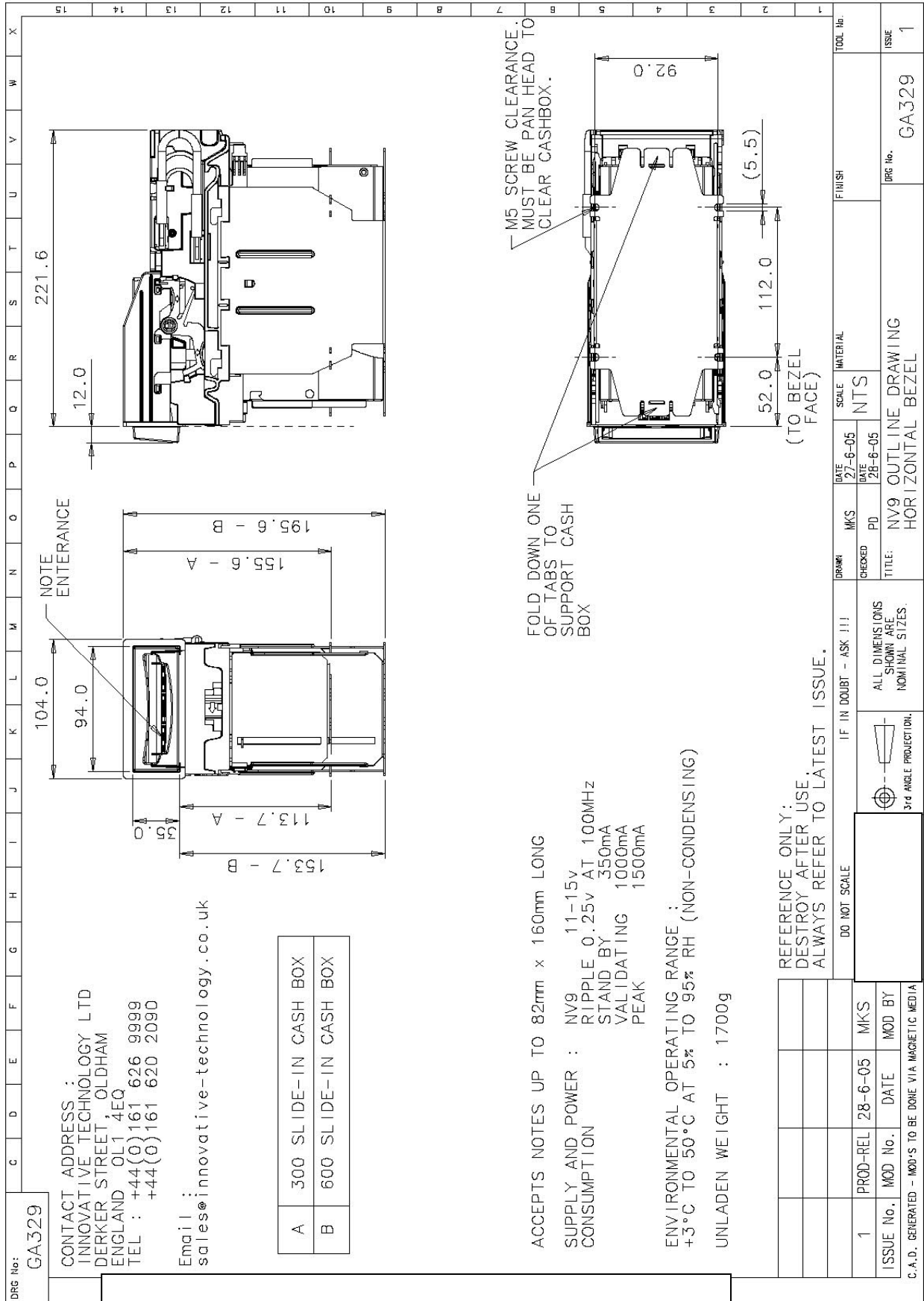
See www.aus.at - Support

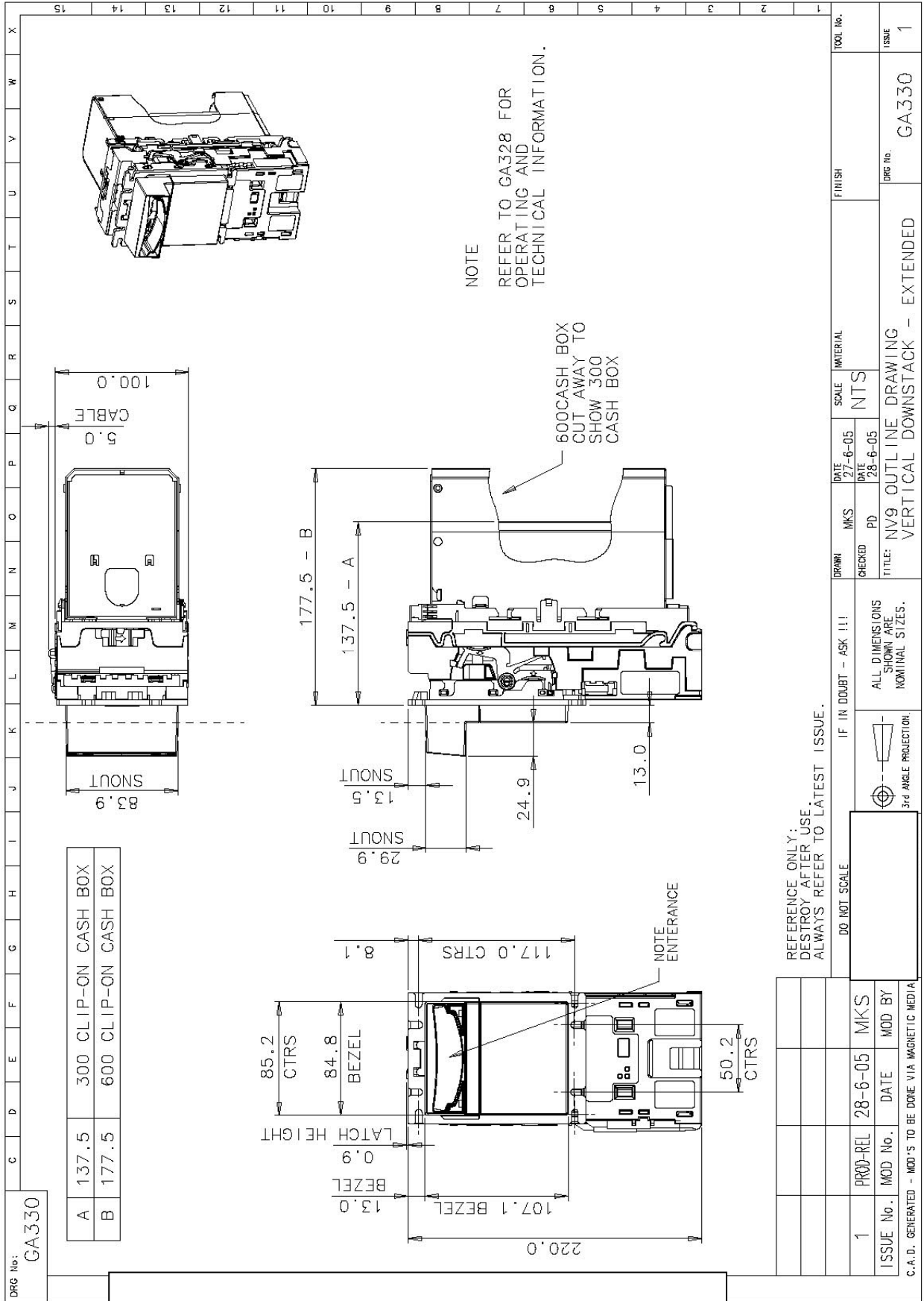
12.3 E-mail Support

If the data you require is not available over the Internet AuS supports an e-mail system to help customers with unusual requirements. The address is **verkauf@aus.at**

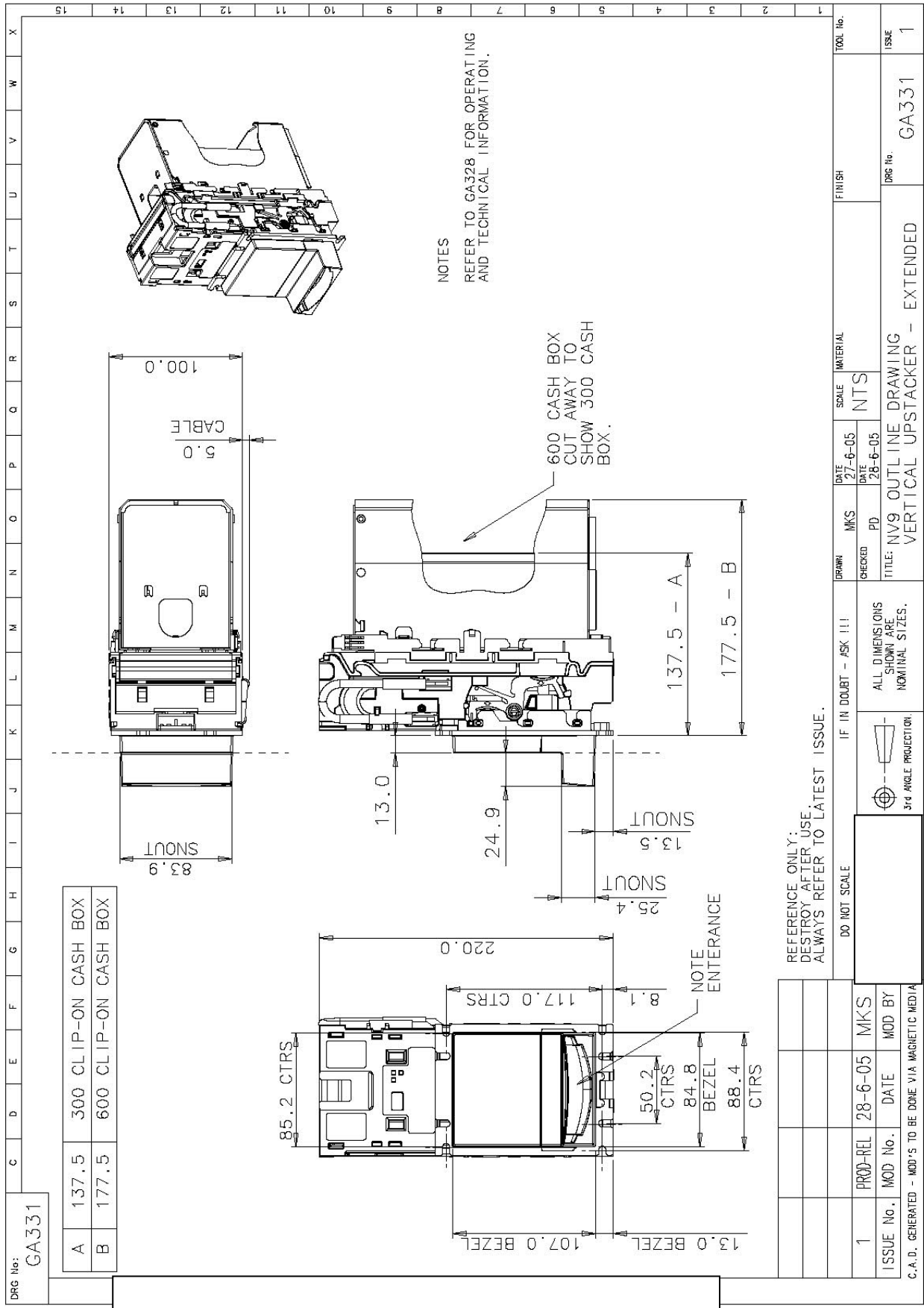
Appendix A - Drawings

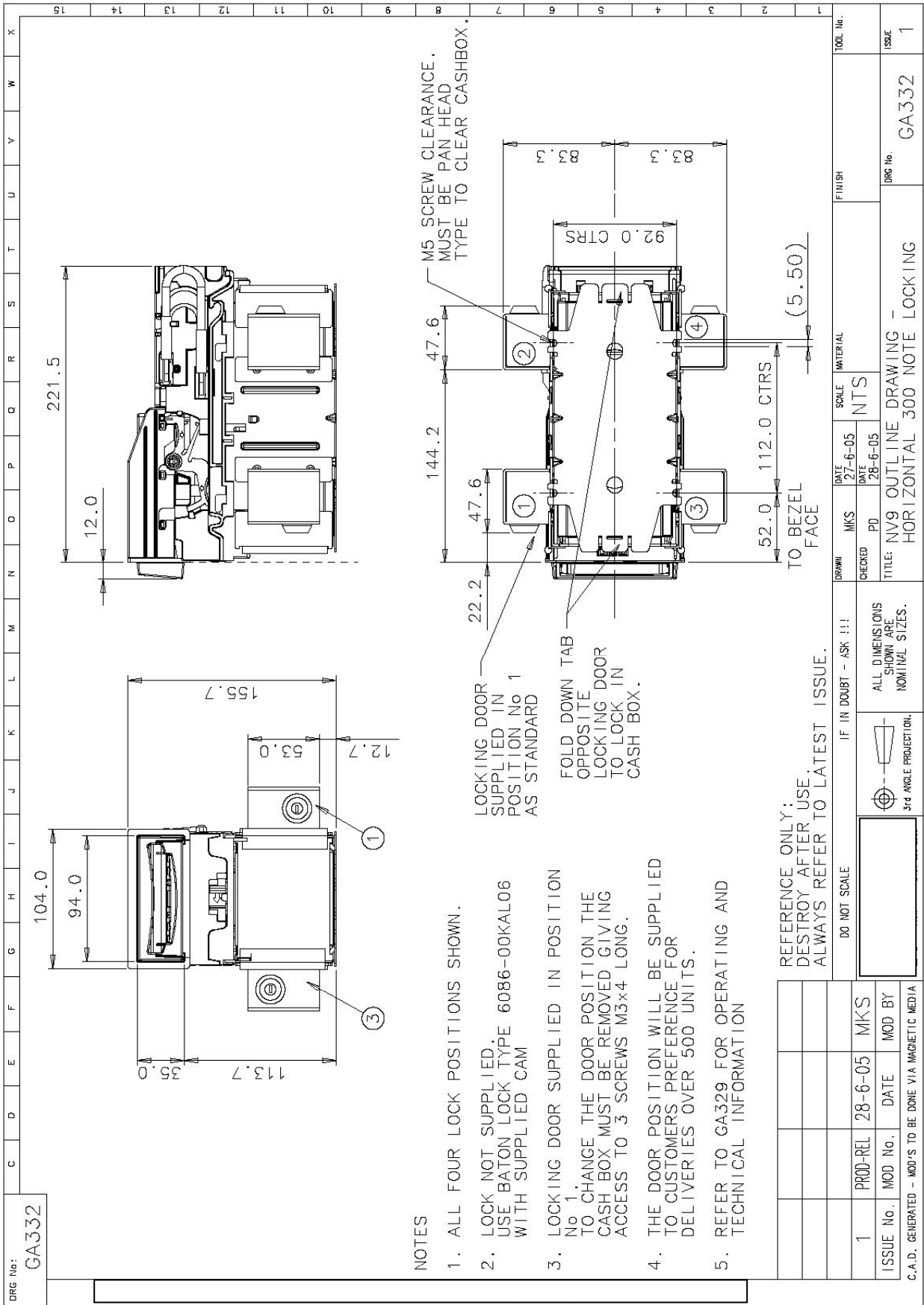






NV9 Operations Manual GA326-4





NOTES

1. ALL FOUR LOCK POSITIONS SHOWN.
2. LOCK NOT SUPPLIED. USE BATON LOCK TYPE 6086-00KAL06 WITH SUPPLIED CAM
3. LOCKING DOOR SUPPLIED IN POSITION No 1.
4. THE DOOR POSITION WILL BE SUPPLIED TO CUSTOMERS PREFERENCE FOR DELIVERIES OVER 500 UNITS.
5. REFER TO GA329 FOR OPERATING AND TECHNICAL INFORMATION

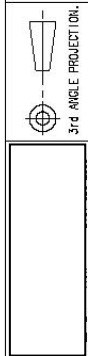
FOLD DOWN TAB OPPOSITE LOCKING DOOR TO LOCK IN CASH BOX.

LOCKING DOOR SUPPLIED IN POSITION No 1 AS STANDARD

REFERENCE ONLY: DESTROY AFTER USE. ALWAYS REFER TO LATEST ISSUE.

DO NOT SCALE

IF IN DOUBT - ASK !!!



ISSUE No.	MOD No.	DATE	MOD BY
1	PROD-REL 28-6-05	28-6-05	MKS
C.A.D. GENERATED - MOD'S TO BE DONE VIA MAGNETIC MEDIA			
DRAWN		MKS	DATE 27-6-05
CHECKED		PD	DATE 28-6-05
SCALE		NTS	
MATERIAL		FINISH	
TITLE: NV9 OUTLINE DRAWING - HORIZONTAL 300 NOTE LOCKING		DRG No. GA332	
TOOL No.		ISSUE	
		1	

Appendix B - ESCROW Control

The NV9 has a single note escrow facility (pin 10). 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, (see figure 19).

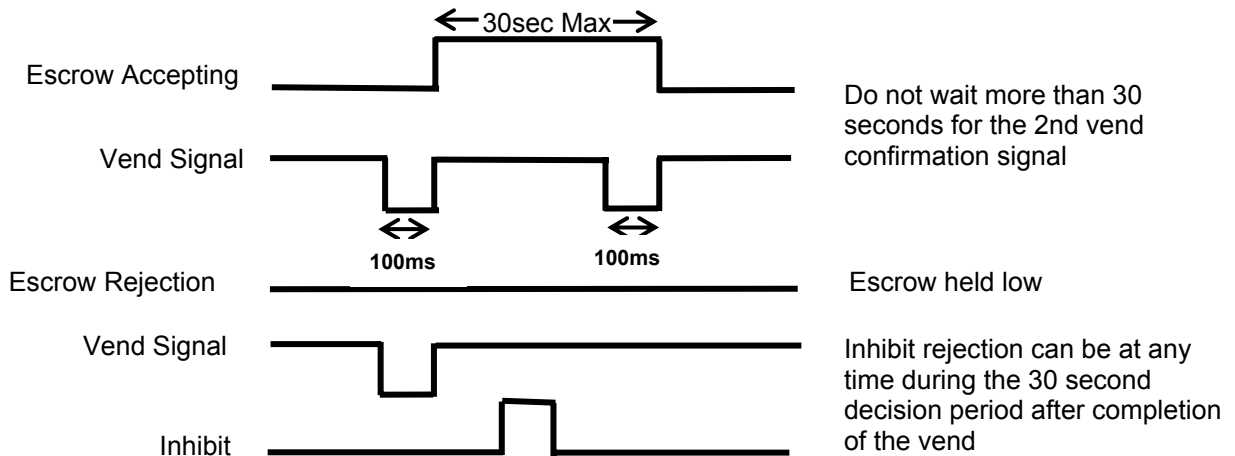


Figure 19 - Escrow Timing Diagram for Parallel Vends

If the host machine itself aborts the transaction by setting the corresponding inhibit input high on pin 10, 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 sets 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 will be aborted.
6. The vend process is completed.
7. The host machine sets pin 10 low in expectation of the next vend.

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

In the event of a note being forcibly removed from the mouth of the NV9 during the 30 second interval, the NV9 will go out of service for 45 seconds.

Note: Escrow Control (SSP mode): Escrow is also possible using the SSP serial Interface.

Appendix C - interface Tools DA1 - DA2

The DA1/2 Kits are designed for the following:

- Connecting of ITL note validators to a PC to upgrade note data and firmware.
- Testing of NV9 note validators independently of the host machine to confirm the validator is working but the host machine may be inhibiting some of the channels.

The DA1 and DA2 Kit comprise of the following components:

DA1	DA2
DA1 adapter board (PA167)	DA2 adapter board
NV9 Adapter to Validator cable (C	USB type-A to Type-B cable
ITL Support CD-ROM for DA1	ITL Support CD-ROM for DA2
Power Cable	DA2 to NV9 cable
Installation Guide	Power Cable
	Installation Guide

Connecting a DA1 to a validator and PC

If you are using Windows 95/98/NT/XP™, Pentium™ (© Microsoft and Intel) operating systems connect the DA1 to the validator as shown below (see figure 1), using the 16-way to 5-way connector. The 3.5mm jack plug and 2 banana plugs are used to supply power to the DA1. Connect +12 volts to the red banana plug and GND (0V) to the black plug.

Plug the 9-way D-type connector into the serial port of the PC and note of the number of the port, as this will be needed later for configuring the software. Once the connections have been made install the appropriate software for the validator you are using.

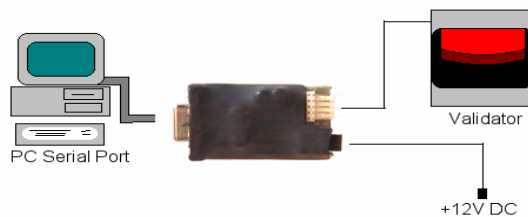


Figure 1 - Connecting DA1 to a NV9 and PC for upgrading

Connecting a DA2 to a validator and PC

If you are using Windows Pentium™ (© Microsoft and Intel) 98, 98SE, 2000, XP Home or XP Professional operating systems, connect the DA2 to the validator as shown below (see figure 2), using NV9 TO DA2 connector. The 3.5mm jack plug and 2 banana plugs are used to supply power to the DA2. Connect +12 volts to the red banana plug and GND (0V) to the black plug.

Plug the USB type Connector into the USB port of the PC. Once the connections have been made install the appropriate software for the validator you are using.

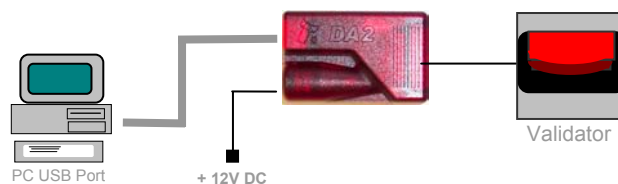


Figure 2 - Connecting DA2 to a NV9 and PC for upgrading

Software Installation

To install the software to upgrade datasets and firmware, insert the CDROM into the PC drive. An installation menu will appear, select the product that you wish to download, and select the software you wish to use. Follow the onscreen instruction to complete the installation. Instructions for configuring and using the software you have installed can be found in the online help for that software. Please contact **A.u.S. Spielgeräte GmbH**, if you require further assistance.