



User Manual

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1 DOCUMENT INTRODUCTION

1.1 Contact Information

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Further Innovative Technology Ltd. representatives can be found on our website. <u>www.innovative-technology.com</u>

1.2 Related Documents

This document should be read together with the following:

For SSP/eSSP:

Protocol Manual – SSP (GA138) : SSP Interface Protocol Specification for integration SSP Implementation Guide (GA973) : Information for programmers and integrators

For other third party interface protocols please contact <u>support@innovative-technology.com</u>.

1.3 Manual Amendments

Rev.	Date	Amendment Details	Issued by
1.0	18/03/2019	First Issue	TW
2.1	20/10/2020	Modify	TW

1.4 Copyright

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1.6 Product Safety Information

Throughout this user manual, we may draw your attention to key safety points that you should be aware of when using or maintaining the product.

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



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

1.7 Disclaimer

Innovative Technology Ltd 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.

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 PRODUCT INTRODUCTION

2.1 General Description

The CBA9 has been designed for the Southeast Asia market simplifying cash handling for OEM's that export throughout the region. Initially available for China, Indonesia, Malaysia, Philippines, Singapore, Taiwan, Thailand & Vietnam, the CBA9 is a cost-effective bill acceptor and boasts a quick transaction time (2-3 seconds) and improved note-to-note processing capabilities. Due to the product's modular design, the CBA9 can be upgraded to add a note recycler to suit customer needs.

2.2 Key Features

Designed for Southeast Asia Enhanced sensing technology Exceptional field reliability MDB remote update

2.3 Typical Applications

The CBA validator can be used in a variety of situations where high security and high-volume bank note acceptance and validation are needed. Some typical applications are:

- Amusement
- Vending
- Retail & Kiosk
- Parking and Ticketing
- Self-Serve and Retail

2.4 Component Overview

CBA9



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CBA11



2.5 Bezel Options

CBA Bezel fully compatible with NV9 range

ITL Part Number	Description	Details
PA00188	NV9USB Vertical Up Bezel (82mm)	http://innovative- technology.com/shop/bezels/nv9-vertical-up- bezel-detail
PA00189	NV9USB Standard Horizontal Bezel (82mm)	http://innovative- technology.com/shop/bezels/nv9-standard- horizontal-bezel-detail
PA00190	NV9USB Vertical Up Snout Bezel (82mm)	http://innovative- technology.com/shop/bezels/nv9-vertical-up- snout-bezel-detail
PA00191	NV9USB Vertical Down Snout Bezel (82mm)	http://innovative- technology.com/shop/bezels/nv9-vertical-down- snout-bezel-detail
PA00268 NV9USB Horizontal Bezel (69mm)		http://innovative-technology.com/shop/nv9-a- nv11-spares/nv9-horizontal-69mm-width-bezel- detail
PA00296 NV9USB Vertical Up/Down Flat Bezel (66mm)		http://innovative-technology.com/shop/nv9-a- nv11-spares/nv9-66mm-vertical-updown-flat- bezel-detail
PA00323	NV9USB Vertical Up/Down Flat Bezel (69mm)	http://innovative-technology.com/shop/nv9-a- nv11-spares/nv9-69mm-width-vertical-updown- flat-bezel-detail
PA00896	NV11 Standard Bezel	http://innovative-technology.com/shop/nv9-a- nv11-spares/nv9-usb-rainbow-bezel-detail

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PA01144	NV9USB+ Rainbow Bezel (82mm)	http://innovative- technology.com/shop/bezels/nv9-vertical-down- snout-bezel-detail
PA00984 NV9USB Facia Short		http://innovative-technology.com/shop/nv9-a- nv11-spares/nv9-usb-facia-short-detail
PA00985	NV9USB Facia Long	http://innovative-technology.com/shop/nv9-a- nv11-spares/nv9-usb-facia-long-detail

2.6 Cashbox Options CBA Cashbox fully compatible with NV9 range

ITL Part Number	Description	Details
PA00185	NV9 USB 300 Clip On Cashbox	http://www.innovative- technology.com/shop/bezels/nv9-300-clip-on- cashbox-detail
PA00186	NV9 USB 300 Lockable Cashbox	http://www.innovative- technology.com/shop/bezels/nv9-300-lockable- cashbox-detail
PA00192	NV9 USB 300 Slide Cashbox	http://www.innovative- technology.com/shop/bezels/nv9-300-slide- cashbox-detail
PA00193 NV9 600 Clip on Cashbox		http://innovative-technology.com/shop/nv9-a- nv11-spares/nv9-600-clip-on-cashbox-detail
PA00194	NV9 600 Slide In Cashbox	http://innovative-technology.com/shop/nv9-a- nv11-spares/nv9-600-slide-in-cashbox-detail
PA00898	NV11 Standard 300 Clip on Cashbox	http://innovative-technology.com/shop/nv9-a- nv11-spares/nv11-standard-cashbox-detail

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3 MECHANICAL INSTALLATION

3.1 Compatibility

3.1.1 Hardware Compatibility

3.1.1.1 Machine Mounting

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

- NV7
- NV7M
- NV9
- BV20
- BV100
- NV9 USB

The CBA may not be used as fitting replacement for the following products:

- NV150
- NV10 USB
- NV200

Please note: Considerations will need to be made when adding either the recycler or printer module, as this will increase the space requirements inside the host machine.

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



3.1.1.2 Machine Interfacing

By design the CBA is pin to pin compatible with the suitable fitting replacement products listed above. No changes to existing machine harnessing are required.

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3.1.1.3 Power Supply

It is vital that the CBA is connected to a power supply being able to provide the required power environment. A weak power supply causes malfunctioning of the CBA such like note rejects or missing credits. If the CBA is used as a fitting replacement for an older model or product we recommend to check the power supply specifications of the machine. The power supply of the machine might be designed for the older model or product but not suitable for the CBA. The CBA might have higher power consumption. Refer to <u>9.4</u> for full power requirement details of the CBA.



3.1.2 Software Compatibility

3.1.2.1 Interface Protocols

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



3.1.2.2 Re-programming

For re-programming the CBA always use the latest version of Validator Manager available for download on our website. Older versions may not support the CBA. For further details on Re-programming the CBA refer to 4.4.



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3.2 Bezel/Nozzle Mounting

3.2.1 Bezel/Nozzle Fitting

1. Locator lugs Place bezel down onto validator, ensuring locating lugs go into spaces provided (1).



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



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3.2.2 Bezel/Nozzle Removal

1. Release clips Pull release clip upwards (1) With release clip held upwards, you can pull bezel towards front of unit (2).



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



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3.3 Cashbox/Baseplate Mounting

Below you will find details on how to fit the different cashboxes mentioned in <u>section</u> <u>2.6.</u>

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

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

3.3.1 Cashbox/Baseplate Fitting

1. Slide Cashbox

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

Then slide housing forwards to lock into place.

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





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2. Clip-on Cashbox

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

3.3.2 Cashbox Removal 1. Slide Cashbox

Remove the cashbox from the outer housing. Pull cashbox release catch away from validator and slide cashbox out.

Push the tab (1) seen in the image whilst sliding the outer housing back, so that the locating tabs are free to move away from the validator.





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2. Clip-on Cashbox

Simply slide the cashbox back so that the locating tabs are no longer locked in position. You can then pull cashbox away from unit.



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3.4 Lock Mounting

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

ITL Part Number: PA00186

Webshop link: <u>https://innovative-technology.com/shop/nv9-a-nv11-spares/nv9-300-lockable-cashbox-detail</u>

Details on the locking position can be found below.

3.4.1 Lock Fitting 1. Screw Holes

The lockable door attaches to the cashbox housing via 3 x screw holes, as shown. These can be found on all 4 x sides of the cashbox. Front Right; Front left Back right; back let.



2. Locking Cam Slot

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

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



For example: if you want the lock to be Front Right – you'd mount the door on the front left. So that the door swings round and locks on the side you specified.

3. Lock

Using front right as an example, this specifies the location of the lock (2). In this case, the door is mounted as seen (1). Lock specification details can be found below in section 3.4.2.



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3.4.2 Lock Specifications

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

ITL Part Number: PA00650

Webshop Link: http://innovative-technology.com/shop/nv200-spares/lock-detail

However, there are various lock manufacturers and distributors. Refer to <u>Appendix</u> <u>11.3</u> for lock specification.

3.4.3 Lock Cam

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

ITL Part Number: MC00186

Webshop Link: <u>https://innovative-technology.com/shop/nv9-a-nv11-spares/locking-</u> cam2013-10-14-08-48-365-detail

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3.5 Machine Mounting

3.5.1 Machine Mounting 1. Horizontal Configuration

The slide cashbox configuration has 4 x mounting points, for each corner. These should be used to secure the validator to a base/shelf inside the host machine.



2. Vertical Configuration

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



3.5.2 Earth Bonding

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



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4 SOFTWARE INSTALLATION AND CONFIGURATION

4.1 Introduction

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

4.2 Software Downloads

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

4.3 Drivers

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

4.4 Dataset/Firmware Programming

4.4.1 Validator Manager

4.4.1.1 General Description

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

4.4.1.2 System Requirements

- Windows 7 or above
- .Net Framework 4 or above
- 256mb ram
- 50mb hard disk free
- Connected CBA with active com port



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this happens you will need to add a rule to your antivirus to allow the file to run.

4.4.1.3 Hardware Setup

Connect the power supply to the DA2/IF17. Connect the USB cable to the DA2/IF17 and to your computer or laptop. Connect the Ribbon cable from the DA2 to the validator.



Please note: the connection methods are identical between CBA9 and CBA11 products.

4.4.1.4 Switching to Programming Mode (SSP)

Before programming via the Validator Manager the CBA needs to be switched to its programming mode (SSP interface). Please refer to <u>APPENDIX 11.4</u> for the procedure for doing this.

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4.4.1.5 Programming the device

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

By selecting the Program tab, you can reprogram the CBA. To begin the upload, click open file, then browse to the file location (usually Downloads) before clicking OK.

TIL Validator Manager 4.3.3		Contraction of the local division of the loc		
				About Configure Exit
ITL Validator Mana	ger			
				User Mode Standard 💌
Name Port Address	Home Run	Program		
WV9USB COM22 0	Program Device			
	Open File G:\Relea	sed\NV9US8\G8P02811_NV00093572200UK1_IF_01.bv1		
Connected				
Device Info	Supports Validator	NV9US8		
Device NV9USB Type Banknote Validator	Filename	GBP02B11_NV00093572200UK1_IF_01bv1		
Serial Number 2834216	File Location	G:\Released\NV9USB		
Firmware Ver NV903570000P24				
Firmware Issue 3.57	Firmware Version	NV00093572200UK1		Change Interface on Device
Encryption Yes	Issue Number	3.57		Interface Description
	Interfaces	SSP, PAR, PL1, SIO, CCT, MDB, SP4		SSP Secure Serial Protocol
Protocols SSP, PAR, PL1, SIO				PAR Parallel 4 Line I/O
CC1, MDB, 5**	Dataset Version	GBP02B11		PL1 Pulse SIO Simple Serial
Dataset Versi EUR03B16	Currencies	GBP		CCT ccTalk BNV Protocol
Currencies EUR				MDB Multi-Drop Bus
Highest Chan 5	User Modified	No		SP4 N/A
Detect Devices	Upload Status: Idle		Program Device	Set Interface
Add Device				
Disconnect Device				Get More Dataset Files

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



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

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4.4.2 DA3

4.4.2.1 General Description

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

4.4.2.2 System Requirements

- Windows XP SP3 or above
- .Net Framework 4
- 256mb ram
- 50mb hard disk free
- Connected DA3 with active com port
- Data Flash Card (PA01121) optional

4.4.2.3 Re-programming via DA3

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

For information on programming the DA3, you can refer to our Software Manual – GA02037.



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

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

Now ensure that the unit is in SSP (programming mode - see <u>appendix 11.4</u>) and on the front side of the DA3, use the mode select button to choose either BNV Match Download or BNV Override download – based on how you set the DA3 up – and simply press the large play button in the middle. Once the download has begun, you will see the blue LED's start to swirl and will continue to do so until download is complete.

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

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

1 Long flash followed by –

4.4.3 Remote Updates

4.4.3.1 Gereral Description

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

4.4.3.2 Software Requirements

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

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

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

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5 PROTOCOLS AND INTERFACING

5.1 Introduction

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



5.2 SSP and eSSP

5.2.1 General Description

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

5.2.2 Pin Assignments



Pin	Name	Туре	Description
1	Vend 1	Output	Serial Data Out (Tx)
2	Vend 2	Output	DA3 Data Logging
3	Vend 3	Output	Not Used
4	Vend 4	Output	Not Used

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5	Inhibit 1	Input	Serial Data In (Rx)
6	Inhibit 2	Input	Not Used
7	Inhibit 3	Input	Not Used
8	Inhibit 4	Input	Not Used
9	Busy	Output	Not Used
10	Escrow	Input	Not Used
11	USB +	Data	USB Data +
12	USB -	Data	USB Data -
13	USB Vcc	Power	USB Vcc (+5VDC)
14	Factory Use Only		Do not connect
15	+ Vin	Power	+12/24VDC Supply
16	0V	Power	OV Supply (GND)

Caution!

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

5.2.3 Setup Examples

The drawings below highlights how to connect the CBA to an SSP or eSSP host machine using available cables and interfaces from Innovative Technology Ltd. For cable drawings please refer to <u>Appendix 11.1</u>.



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Туре	ITL Part Number	Description	Details
Cable	CN00392	Validator to USB Cable	http://www.innovative- technology.com/de/shop/cables/nv9- nv10-usb-host-cable-detail
			Host Machine
CBAI	1		



Туре	ITL Part Number	Description	Details
Cable	CN00398	Dual SSP Interface Cable	http://www.innovative- technology.com/shop/cables/dual-essp- interface-for-smart-hopper-a-smart- payout-detail
Cable	WR00147	SMART Payout to NV200 Adapter	http://www.innovative- technology.com/shop/cables/smart- payout-to-nv200-adaptor-detail
Cable	CN00214	USB Type A to B	http://www.innovative- technology.com/shop/cables/usb-a-to-b- cable-assembly-detail
Interface	IF17	TTL to USB Converter	http://www.innovative- technology.com/shop/accessories/if17- interface-converter-detail

5.3 ccTalk[®]

5.3.1 General Description

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



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Implementation Guide as well as source code examples for SSP respectively eSSP only!

5.3.2 Pin Assignments



Pin	Name	Туре	Description				
1	Vend 1	Output	Serial Data (link to Pin 5)				
2	Vend 2	Output	DA3 Data Logging				
3	Vend 3	Output	Not Used				
4	Vend 4	Output	Not Used				
5	Inhibit 1	Input	Serial Data (link to Pin 1)				
6	Inhibit 2	Input	Not Used				
7	Inhibit 3	Input	Not Used				
8	Inhibit 4	Input	Not Used				
9	Busy	Output	Not Used				
10	Escrow	Input	Not Used				
11	USB +	Data	USB Data +				
12	USB -	Data	USB Data -				
13	USB Vcc	Power	USB Vcc (+5VDC)				
14	Factory Use Only		Do not connect				
15	+ Vin	Power	+12/24VDC Supply				
16	0V	Power	0V Supply (GND)				



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5.3.3 ccTalk[®] DES Encryption

When using ccTalk[®] DES encryption, the CBA and host machine must exchange a secret key which forms the basis of the communication encryption. This exchange is performed in a Trusted Mode maintaining security. The Trusted Mode can only be entered by a physical access to the CBA. Please refer to <u>Appendix 11.6</u> for details.

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5.4 CC4

The CC4 protocol is an extension of ccTalk with additional status and payout commands to support the note float recycler unit and thus should be used if wanting to use the CBA11 in ccTalk. Please contact support for the necessary protocol documentation.

5.4.1 General Description



5.4.2 Pinout



Pin	Name	Туре	Description	
1	Vend 1	Output	Serial Data (link to Pin 5)	
2	Vend 2	Output	DA3 Data Logging	
3	Vend 3	Output	Not Used	
4	Vend 4	Output	Not Used	
5	Inhibit 1	Input	Serial Data (link to Pin 1)	
6	Inhibit 2	Input	Not Used	
7	Inhibit 3	Input	Not Used	
8	Inhibit 4	Input	Not Used	
9	Busy	Output	Not Used	
10	Escrow	Input	Not Used	
11	USB +	Data	USB Data +	
12	USB -	Data	USB Data -	
13	USB Vcc	Power	USB Vcc (+5VDC)	

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14	Factory Use Only		Do not connect		
15	+ Vin Power		+12/24VDC Supply		
16	0V Power		OV Supply (GND)		

Caution!

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

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5.5 SIO and SI2

5.5.1 General Description

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



5.5.2 Pinout



Pin	Name	Туре	Description
1	Vend 1	Output	Serial Data Out (Tx)
2	Vend 2	Output	DA3 Data Logging
3	Vend 3	Output	Not Used
4	Vend 4	Output	Not Used
5	Inhibit 1	Input	Serial Data In (Rx)
6	Inhibit 2	Input	Not Used

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7	Inhibit 3	Input	Not Used
8	Inhibit 4	Input	Not Used
9	Busy	Output	Not Used
10	Escrow	Input	Not Used
11	USB +	Data	USB Data +
12	USB -	Data	USB Data -
13	USB Vcc	Power	USB Vcc (+5VDC)
14	Factory Use Only		Do not connect
15	+ Vin	Power	+12/24VDC Supply
16	ov	Power	OV Supply (GND)

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5.6 MDB

5.6.1 General Description

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



5.6.2 IF5 Interface

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

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5.7 Parallel

5.7.1 General Description

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



5.7.2 Pinout



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

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5.7.3 Inhibit Control

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

5.7.4 Escrow Control

The CBA has a single note escrow facility. This allows the CBA to hold onto the note once validated, and then only stack the note into a cashbox when the host machine confirms that the Vend operation has been completed. Please refer to <u>Appendix 10.8</u> for timing diagram and further details.

5.7.5 IF10 Interface

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

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5.8 Binary

5.8.1 General Description

In the event that the machine needs more than 4 denominations to be recognised but the host machine cannot take advantage of the serial communication method then the CBA can be set to give a binary pattern output on the four parallel output pins. If the CBA is set to Binary it will issue the vend signals as a binary pattern on the parallel outputs for 100 ± 3 ms. In this way a maximum of 15 different notes can be accepted and 4 notes individually inhibited.

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

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



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

5.8.2 Pinout



Pin	Name	Туре	Description
1	Vend 1	Output	Credit Output binary 2 ⁰ = 1 decimal
2	Vend 2	Output	Credit Output binary 2 ¹ = 2 decimal
3	Vend 3	Output	Credit Output binary 2 ² = 4 decimal
4	Vend 4	Output	Credit Output binary 2 ³ = 8 decimal
5	Inhibit 1	Input	Inhibit Input Channel 1
6	Inhibit 2	Input	Inhibit Input Channel 2
7	Inhibit 3	Input	Inhibit Input Channel 3
8	Inhibit 4	Input	Inhibit Input Channel 4
9	Busy	Output	Output Busy Signal

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10	Escrow	Input	Input Escrow Control
11	USB +	Data	Not Used
12	USB -	Data	Not Used
13	USB Vcc	Power	Not Used
14	Factory Use Only		Do not connect
15	+ Vin	Power	+12VDC Supply
16	0V	Power	OV Supply (GND)

5.8.3 Inhibit Control

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

5.8.4 Escrow Control

The CBA has a single note escrow facility. This allows the CBA to hold onto the note once validated, and then only stack the note into a cashbox when the host machine confirms that the Vend operation has been completed. Please refer to <u>Appendix 11.7</u> for further details.

5.8.5 IF9 Interface

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



5.8.5 IF9 Interface

The IF9 is an interface that allows serial SSP to be used in machines without the need of updating the machine software. The IF9 is connected between the CBA and the host machine. The IF9 communicates with the CBA in serial SSP which gives more security along the length of the cable. The IF9 should be mounted close to the host machine control board where the IF10 converts to the binary connection.

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5.9 Pulse

5.9.1 General Description

Pulse can be used for the acceptance of up to 16 channels. When a note is recognised vend 1 (pin 1) will pulse a pre-set number of times. The amount of pulses as well as the high/low pulse ratio is configurable. For programming and configuration please refer to <u>Section 4</u> of this User Manual.



5.9.2 Pinout



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

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5.9.3 Inhibit Control

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

5.9.4 Escrow Control

The CBA has a single note escrow facility. This allows the CBA to hold onto the note once validated, and then only stack the note into a cashbox when the host machine confirms that the Vend operation has been completed. Please refer to <u>Appendix 11.7</u> for further details.

5.9.5 Credit Hold Function

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

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

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

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

5.9.6 IF15 Interface

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

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6 ROUTINE MAINTENANCE

6.1 Introduction

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

6.2 **Recommended Cleaning Intervals**

Innovative Technology Ltd recommends to clean the optical lenses every month or as required. Dirt, dust or other residue leads to bad note acceptance and other performance degradation. Please refer to $\underline{8.4}$ for comprehensive cleaning instructions.

6.3 Recommended Belt Changing Intervals

Innovative Technology Ltd recommends that you change the drive belts of the CBA every 6-12 months or as required, dependant on environmental factors. If dirt can be seen to be building up or if the belts themselves have had excessive use and are starting to wear, then this time period may not apply and they would need to be swapped sooner.

Please refer to 8.5 for comprehensive belt changing instructions.

7 FIRST LEVEL SUPPORT

7.1 Bezel/Status LED Flash Codes

The CBA supports various flash codes that are displayed to the user via the entry bezel. A detailed description of these can be found below.

Interface Flash Codes:

If you double press the red config button the bezel will flash a series of times. Below is a lookup table:

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

Error Flash Codes

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

Number of flashes	Meaning	Corrective Action
1	Note Float Error	Check the Note Float error
2	Note Jammed	Check the Note path and Cashbox, remove jammed Note then repower machine.
3	Internal Checksum	Download dataset/firmware file to CBA11
4	PSU Error	Check the power supply is 12VDC 3.5A. no more than 13.2V

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7.2 Status LED Flash Codes

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

Note Float

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

Flashes	Indicated Status / Error
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



7.3 Configuration Button

The CBA9 and CBA11 both have a configuration button that has several functions available to the user. These are detailed below:

CBA9

- Toggle between primary protocol and programming mode (SSP)
 - Press and hold red config button
 - Wait until bezel illuminates, then release button.
 - \circ $\;$ Unit will flicker, reset and will have toggled upon reset.
- Check current protocol
 - Double click the red config button.
 - Bezel will flash a set number of times
 - Refer to table above, in section 7.1 Bezel LED flash codes
- Enter configuration card mode
 - Press red config button once
 - Unit will begin to flash, waiting for a configuration card to be inserted.
 - Press button again once, to cancel.
 - 0

CBA11

Same as above, plus the following functions:

- Empty note float recycler and set counters to zero.
 - Press and hold red config button
 - Wait until bezel illuminates, keep hold of button.

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- Bezel LED will turn off, then release button.
- Acknowledge clearing of jam
 - If a jam has occurred in the note float (status LED flashing constant 1Hz) you will need to confirm that you've cleared it.
 - Press button once, to acknowledge this action.

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8 SECOND LEVEL SUPPORT

8.1 Introduction

8.2 Fault Finding Flow Chart

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



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

8.3 Clearing a Jam

1. Power Off

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

2. Open the Note Path Slide the red catch to the left (1) Lift up the top half of the unit (2)



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3. Clear Jammed Note

If note can be seen in upper note path, remove note and proceed to next step. If note is in lower note path, lift the lozenge. Push grey release tab (1) Lift up lozenge unit (2)



4. Re-apply Power

Close unit back up and re-apply power to unit. It will reset and should no longer be flashing a jam error message.

8.4 Cleaning the CBA

1. Power Off

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

2. Open the Note Path

Slide the red catch to the left (1) Lift up the top half of the unit (2)



3. Clean note path and sensors Use a dry linen cloth and/or compressed air, to ensure there is no dirt or debris. Paying attention to sensor locations and drive belts.



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8.5 Changing the Drive Belts

1. Power Off

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

2. Open the Note Path

Slide the red catch to the left (1) Lift up the top half of the unit (2)



3. Remove Lozenge Press grey release tab (1) to remove lozenge from validator.



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4. Remove Old belts

With the lozenge removed, press both drive wheels inwards (2) to create slack in the belts.

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

TIP: Pushing the drive wheels down into your desk, helps.

5. Replace with new belts

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

TIP: Pushing the drive wheels down into your desk, helps.

8.6 Clearing a Checksum Error

1. Bezel Flash Code

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

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

1. Re-program Unit

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

8.7 Testing after an error has been cleared

1. Run/test unit

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

Please refer to our GA02037 - Software Guide for full instructions on how to use ITL Validator Manager.



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8.8 Re-initialisation of the sensors

1. Calibrate Unit

Use ITL Diagnostics tool, to recalibrate the validator, using the appropriate calibration paper (LB00149) *Please refer to our GA02037 - Software Guide for full instructions on how to use ITL Diagnostics.*

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9 TECHNICAL DATA

9.1 Dimensions

Note: If required, IGES 3D models are available on request from ITL technical support; support@innovative-technology.com



ACCEPTS NOTES UP TO 82mm x 160mm LONG



9.2 Weight

CBA9

CBA9 300 clip with bezel – 1.41kg

CBA9 300 slide with bezel - 1.86kg

CBA9 600 clip with bezel - 1.72kg

CBA9 600 slide with bezel - 2.14kg

CBA11

CBA9 300 clip with bezel + note float - 2.22kg

9.3 Environmental Requirements

Environment	Minimum	Maximum
Temperature	-5°C	60°C
Humidity	5%	95% Non-condensing

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9.4 **Power Requirements**

9.4.1 Supply Voltages

Supply Voltage	Minimum	Nominal	Maximum
Supply Voltage (V DC)	+ 11.8 V DC	+ 12 V DC	+ 13.2 V DC
Supply Ripple Voltage	0 V	0 V	0.25 V @ 100 Hz

9.4.2 Supply Currents

Supply Current	Minimum	Nominal	Maximum
Standby			0.2 A
Running			1.0 A
Peak			5.0 A

9.4.3 Power Supply Guidance

The CBA requires a stable 12V DC / 4.0 A power supply. Please check the power requirements of your host machine and other peripherals to dimension a suitable power environment for your machine setup.

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

Remove any power supplies from the table below which are not relevant to the product of this user manual

Power Supply <u>Unit</u>	Specification	RS Stock Code	Farnell Stock Code
TDK Lambda SWS50-12	+12 V DC / 4.3 A	466-5869	1184645
TDK Lambda SWS75-12	+12 V DC / 6.3 A	466-5904	1184648
TDK Lambda SWS150-24	+24 V DC / 6.3 A	466-5982	1184653
TDK Lambda SWS300-24	+24 V DC / 13.0 A	494-4651	1085928

• Earth bonding

9.5 Interface Logic Levels

Interface Logic Levels	Logic Low	Logic High	
Inputs	0V to +0.5V	+3.7V to +12V	
Outputs with $2K2\Omega$ pull-up resistor	+0.6V	Pull-up voltage of host interface	
Maximum Current Sink	50mA per Output		

9.6 Reliability Data

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

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

CBA9

MCBF: 200,000 Cycles

MCBI: 100,000 Cycles

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

CBA11

MCBF: 100,000 Cycles

MCBI: 50,000 Cycles

9.7 Media Requirements

Notes:

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

The CBA9 range supports multiple currencies and denominations as per the specifications detailed in the table above. Furthermore polymer and windowed notes are in use in a number of countries and so are already fully supported on the CBA9 range of validators.

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10 COMPLIANCES AND APPROVALS

10.1 EC Declaration of Conformity

- RoHS
- EN Directives
- UL
- REACH
- WEEE

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11 APPENDIX

11.1 Cable Drawings





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11.1.3 WR00147 Smart Payout to NV200 Adaptor Harness

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11.1.4 CN00398 CN00398 Dual ESSP Interface

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11.2	Connector	Specification	JII5		
Туре	Vendor	Part Number	Pins	Pitch	Polarising
Housing	Leotronics	2652-2161	2x8	2.54mm	With Key
Crimp	Leotronics	2653-2000			Female
Housing	Molex	90142-0016	2x8	2.54mm	With Key
Crimp	Molex	90119-2121			Female

11.2 Connector Specifications

11.3 Lock Specifications



11.4 Switching to Programming Mode (SSP)

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

• Firstly, check the current interface by double clicking the red button

 \bullet Unit will flash bezel an x number of times, to indicate what protocol it is. a. 1 x flash is SSP

- If SSP is needed, Press and hold red button until bezel light illuminates
- As soon as the bezel illuminates, release button.
- Unit will flicker, reset and start up again in SSP



- Dataset Revidion.

VALIDATOR IDENTIFICATION:



11.6 ccTalk DES Encryption – Trusted Mode

1. Power Off

• Either unplug the interface cable or switch off the power.

2. Open Note path

• Slide the red catch to the left (1) Lift up the top half of the note path (2)



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3. Power On

• With the note path open, apply power

4. Enter Trusted Mode

Press and hold the configuration button until LED on underside of upper note path starts blinking.



5. Observe LED

 If successful, the LED described above will be blinking. The unit will remain in trusted mode for 30 seconds or until DES key has been exchanged.



11.7 Escrow Control

The CBA has a single note escrow facility. This allows the CBA to hold onto the note once validated, and then only stack the note into a cashbox when the host machine confirms that the Vend operation has been completed. If no confirmation of the Vend is received, then the note will be returned to the user after 30 seconds. If the host machine itself aborts the transaction by setting the corresponding inhibit input high, the note is returned immediately. The sequence of operation is as follows:



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11.7.1 Escrow Timing Diagram



11.8 Low Power Mode Timing Diagram

