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Innovative Technology

INTELLIGENCE IN VALIDATION

BV100

[GA717-4]



USER MANUAL

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1 DOCUMENT INTRODUCTION

1.1 Related Documents

This document should be read together with the following:

For SSP/eSSP protocol description:

[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:

support@innovative-technology.com.

1.2 Manual Amendments

Rev.	Date	Amendment Details	Issued by
1.0	02.02.2017	First Issue	IM

1.3 Copyright

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

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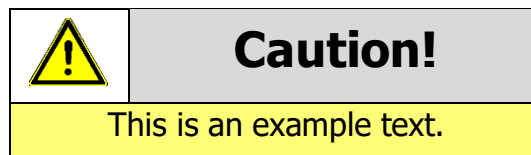
Innovative Technology Ltd has a policy of continual product improvement. As a result the products supplied may vary from the specification described here.

Innovative Technology Ltd does not accept liability for any errors or omissions contained within this document. Innovative Technology Ltd shall not incur any penalties arising out of the adherence to, interpretation of, or reliance on, this standard.

1.5 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.



Safety Notice! Read before using this product!

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

Инструкция по безопасности – Внимание. Убедитесь, что питание отключено, прежде чем разбирать устройство. Убедитесь, что полностью отсутствует статическое напряжение, прежде чем открывать или разбирать устройство. Всегда используйте заземление при эксплуатации устройства/основной платы в соответствии с инструкцией.

Использовать только в полной комплектации, определяемой UL LLC. При установке в конечном продукте, внимание следует уделять следующему:

- Электропитание терминалов и/или коннекторов: Не исследовано в клиентских условиях
- Исследуемая степень загрязнения: 2
- Ограждайте устройство при установке в конечном продукте от следующих видов повреждений: Механическое воздействие, Огонь



2 PRODUCT INTRODUCTION

2.1 General Description

The BV100 is a versatile bill acceptor with modular cashbox options, suitable for most applications. Designed for easy installation the BV100 supports all standard protocols and has a high acceptance rate for multi-currencies. Future-proof, the unit can be updated quickly and easily via USB, PC or handheld programmer.

2.2 Key Features

- Versatile design
- Industry standard protocols
- Quick transactions
- Takes more cash

2.3 Typical Applications

- Gaming
- Amusement
- Vending
- Retail & Kiosk



2.4 Bezel Options

Not depending on width, one only [bezel](#) used in BV100.
See section [3.2](#) for details.

Additionally, for 66mm width -

ITL Part Number	Description	Details
PM00701	BV100 Side Plate Left 66mm	http://innovative-technology.com/shop/bv100-spares/bv100-side-plate-left-66mm-detail
PM00702	BV100 Side Plate Right 66mm	http://innovative-technology.com/shop/bv100-spares/bv100-side-plate-right-66mm-detail

Additionally, for 72mm width -

ITL Part Number	Description	Details
PM00761	BV100 Side Plate Left 72mm	http://innovative-technology.com/shop/bv100-spares/bv100-side-plate-left-72mm-detail
PM00762	BV100 Side Plate Right 72 mm	http://innovative-technology.com/shop/bv100-spares/bv100-side-plate-right-72mm-detail

2.5 Cashbox Options

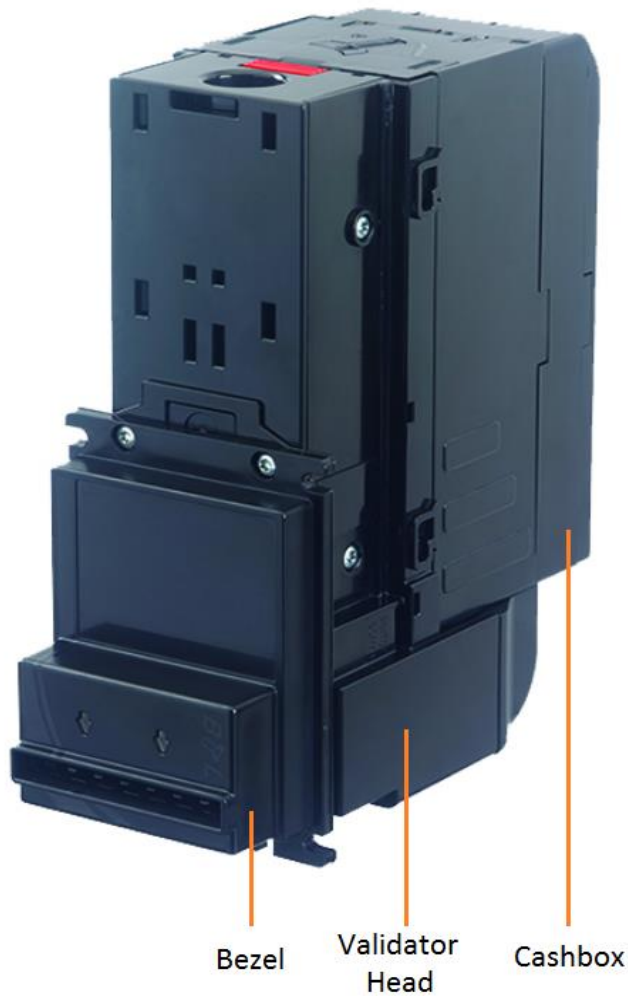
Four cashbox types are available:

ITL Part Number	Description	Details
PA00711	BV100 300 Bill Cashbox	http://innovative-technology.com/shop/bv100-spares/bv100-standard-cashbox-300-bills-detail
PA00712	BV100 550 Bill Cashbox	http://innovative-technology.com/shop/bv100-spares/bv100-550-bill-cashbox-detail
PA00713	BV100 800 Bill Cashbox	http://innovative-technology.com/shop/bv100-spares/bv100-800-bill-cashbox-detail
PA00719	BV100 1050 Bill Cashbox	http://innovative-technology.com/shop/bv100-spares/bv100-1050-bill-cashbox-detail

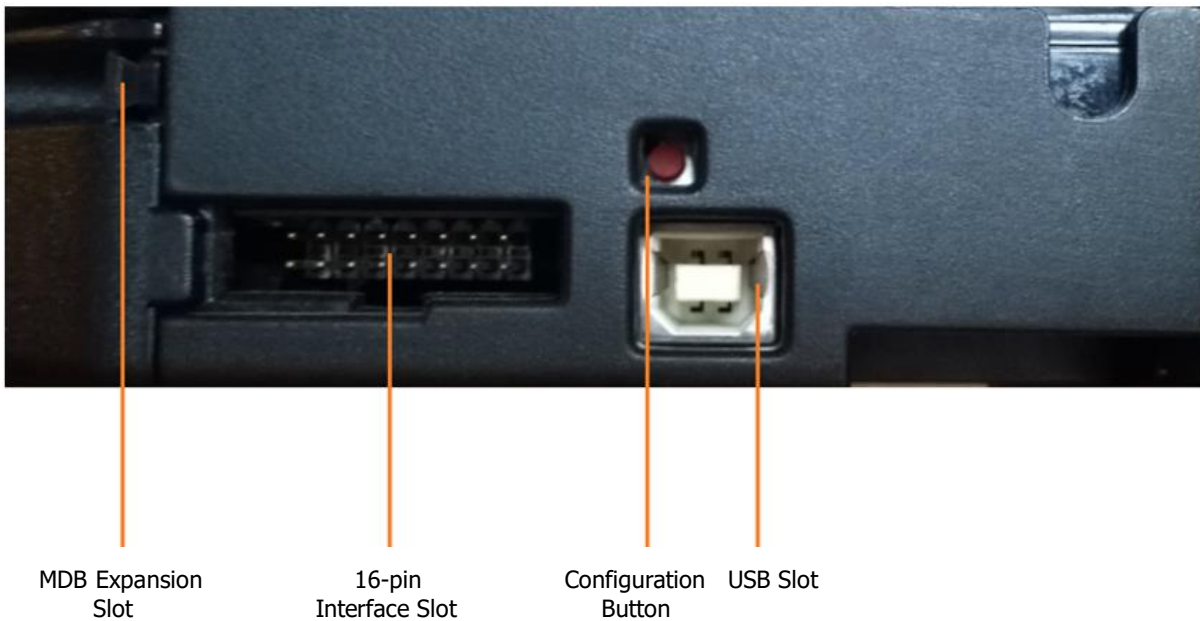


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2.6 Component Overview



2.7 Interfaces



Refer to section [8.2](#) for Configuration Button functions list.



3 MECHANICAL INSTALLATION

3.1 Compatibility

3.1.1 Hardware Compatibility

3.1.1.1 Machine Mounting

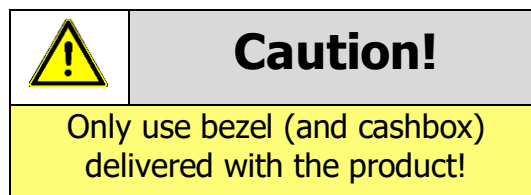
Assuming the suitable bezel type has been ordered the BV100 can be used as fitting replacement for the following products:

- NV4 (NV4 to NV10 Converter Kit may be required)
- NV7
- NV7M
- NV8
- NV8M
- NV9
- NV10 (free place for cashbox requiring)
- BV20 (free place for cashbox requiring)
- BV50 (66 mm only)
- NV9 Range (With Vertical Bezel)

The BV100 may not be used as fitting replacement for the following products:

- NV150
- NV9 Range (With Horizontal Bezel)
- NV200
- Etc.

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 BV100. However, new product deliveries always include a bezel (and cashbox) that must be used.



3.1.1.2 Machine Interfacing

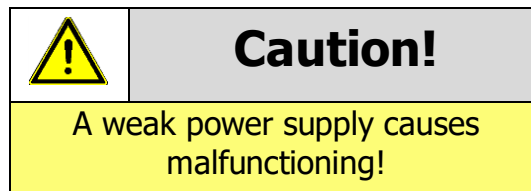
By design the BV100 is pin to pin compatible with the suitable fitting replacement products listed above. No changes to existing machine harnessing are required.



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3.1.1.3 Power Supply

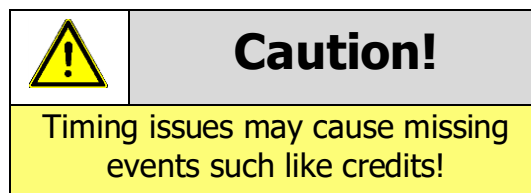
It is vital that the BV100 is connected to a power supply being able to provide the required power environment. A weak power supply causes malfunctioning of the BV100 such like note rejects or missing credits. If the BV100 is used as a fitting replacement for an older model or product we recommend checking 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 BV100. The BV100 might have higher power consumption. Refer to [Section 10.5](#) for full power requirement details of the BV100.



3.1.2 Software Compatibility

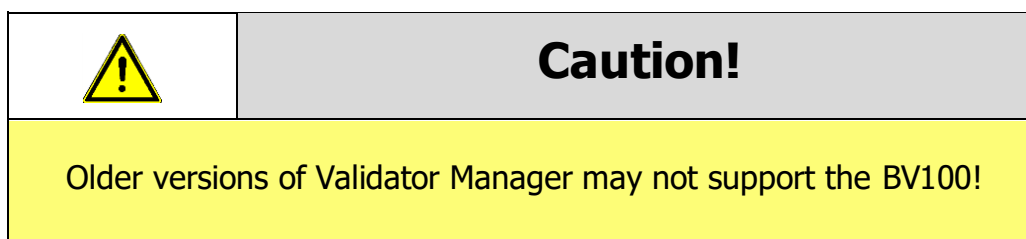
3.1.2.1 Interface Protocols

When using the BV100 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 BV100.



3.1.2.2 Re-programming

For re-programming the BV100 always use the latest version of Validator Manager available for download on our website. Older versions may not support the BV100. For further details on Re-programming the BV100 refer to [4.4.1.5](#).



3.2 Entrance Width settings

3.2.1. 66-mm width setting

1. Mount [Left](#) and [Right 66mm](#) side plates (see section 2.4 for details):



-
2. Use Standard BV100 [bezel](#):

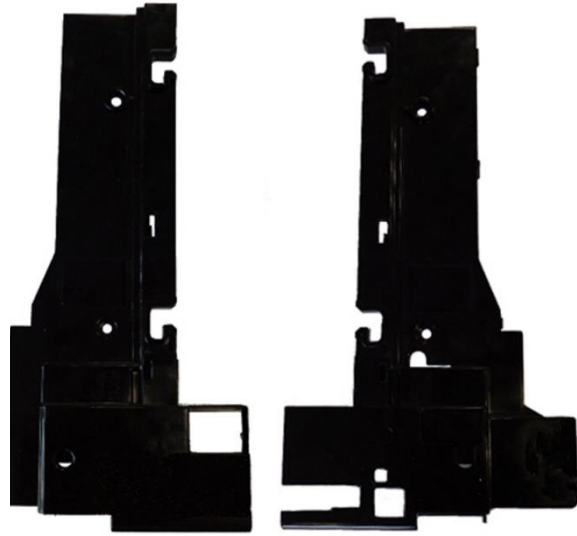


Use **66mm** [dataset file](#)

File can be downloaded from ITL website/downloading section

3.2.2. 72-mm width setting

1. Mount [Left](#) and [Right 72mm](#) side plates (see section 2.4 for details):



-
2. Use Standard BV100 [bezel](#):



Use **72mm** [dataset file](#)

File can be downloaded from ITL website/downloading section

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3.3. Cashbox/Baseplate Mounting

3.3.1. Cashbox/Baseplate Fitting

1. Attach Cashbox Inserting Sleeves into the Grooves



2. Close the cover

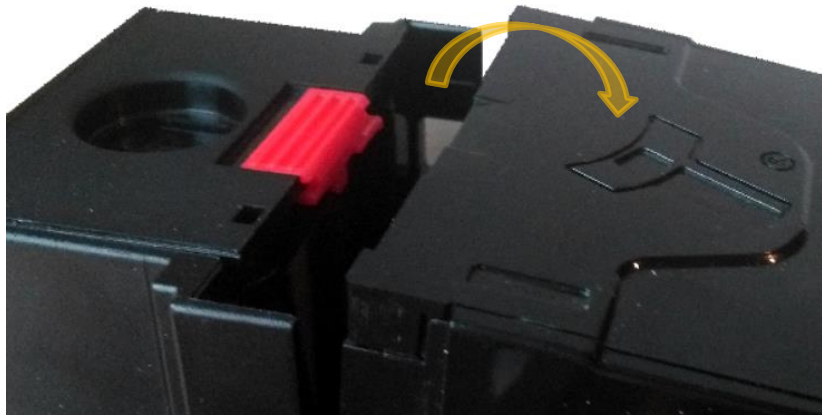


3.3.2. Cashbox Removal

1. Pull Red Plastic Clip



2. Take Off Cashbox

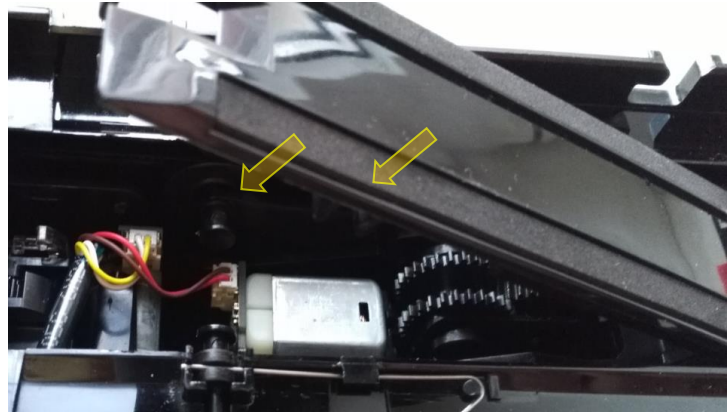


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3.4. Lock Mounting

3.4.1. Lock Fitting

1. Unpick stacker from the clips and take off the stacker



2. Pull off security cover

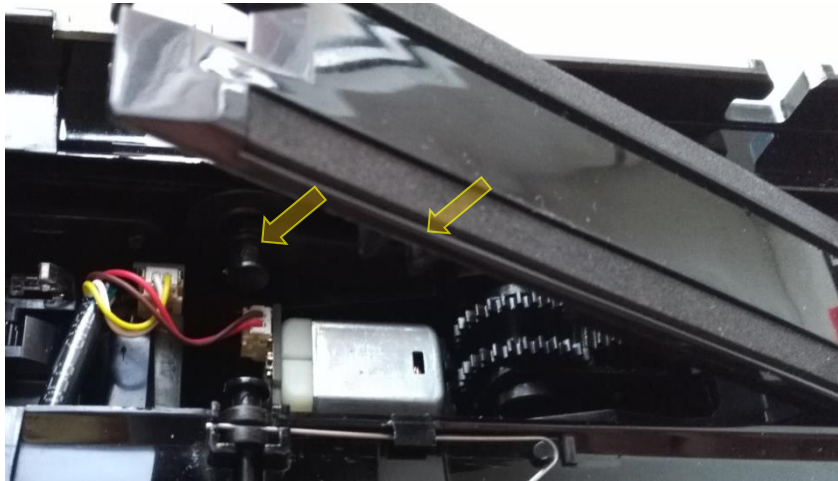


3. Insert [Lock](#) and [locking cam](#) instead of removed part

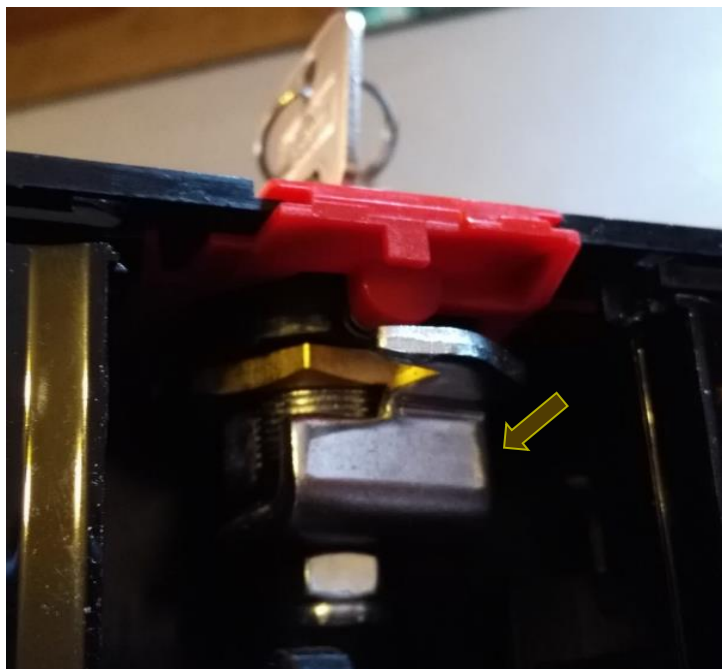


3.4.2. Lock Removing

1. Unpick stacker from the clips and take off the stacker



1. Take off [Lock](#) and [locking cam](#)



3.4.3. Lock Specifications

Locks for the BV100 are available from Innovative Technology Ltd.

ITL Part Number:

PA00650

Webshop Link:

<http://innovative-technology.com/shop/bv100-spares/lock-detail>

However, there are various lock manufacturers and distributors.

Refer to Appendix [12.3](#) for lock specification.

3.4.4. 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:

MC00299

Webshop Link:

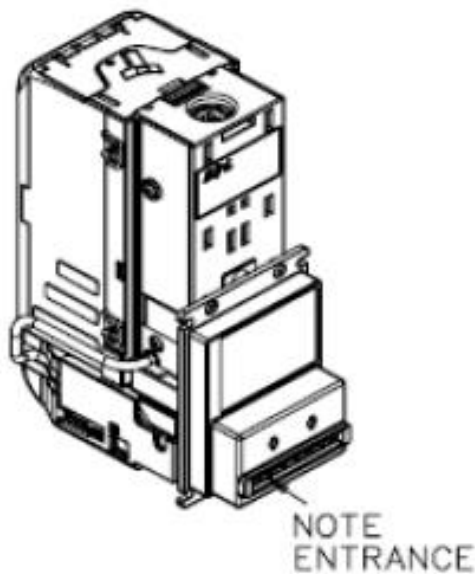
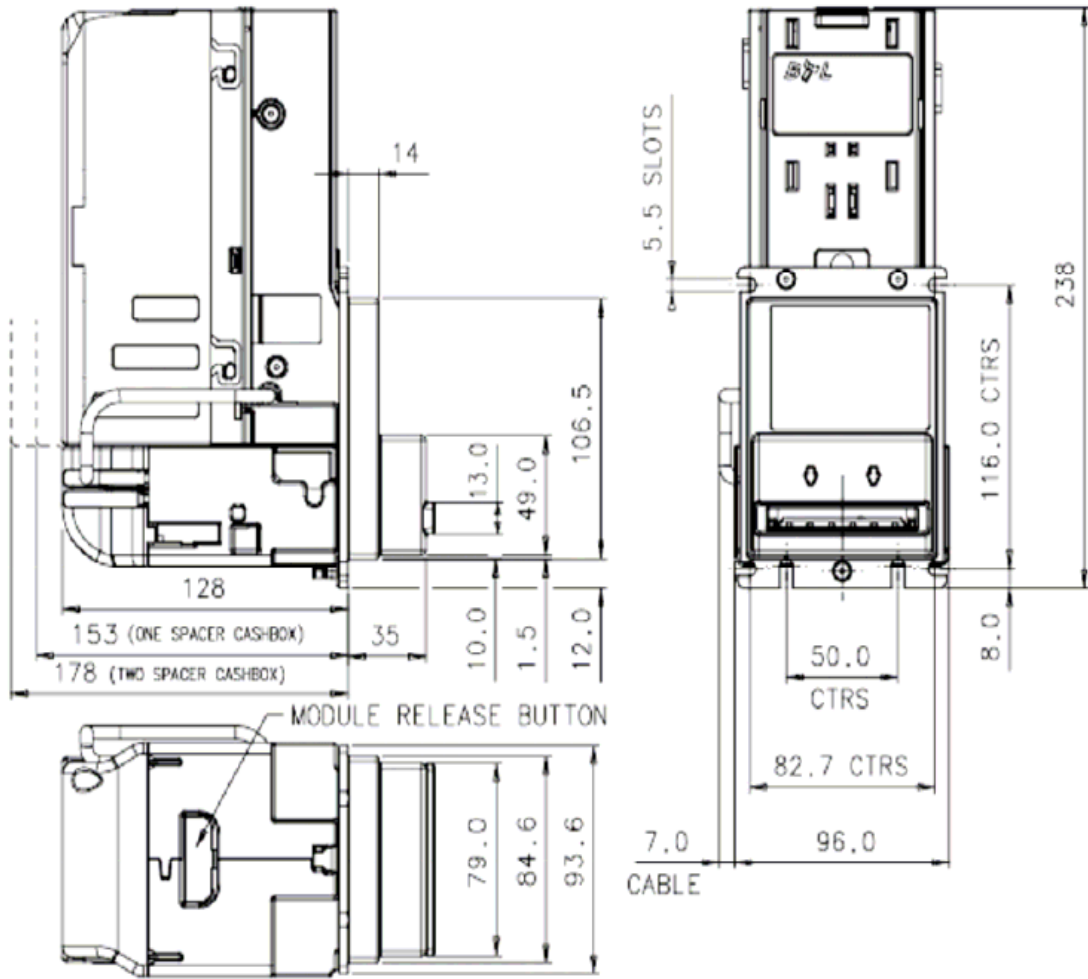
<http://innovative-technology.com/shop/bv100-spares/locking-cam-detail>



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3.5 Machine Mounting

3.5.1. BV100 Position



3.5.2. Earth Bonding

It is very important that the BV100 is properly bonded to earth as described in [3.5.1](#). Lack of proper bonding can cause communication issues and other failures.

	Caution!
Lack of proper earth bonding causes failures!	

3.5.3. Screw Specifications

The scope of delivery does not include screws for machine mounting. See table below for screw specification reference.

Type	Head Diameter		Head Height		Bolt Diameter		Bolt Length	
	Min	Max	Min	Max	Min	Max	Min	Max
Flat Head	7	-	2	-	2.5	4.5	15	42
Pan Head	7	-	2	-	2.5	4.5	15	42



4. SOFTWARE INSTALLATION AND CONFIGURATION

4.1 Introduction

The BV100 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 BV100. 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 www.innovative-technology.com/support/secure-download 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 XP SP3 or above
- .Net Framework 4
- 256mb ram
- 50mb hard disk free
- Connected BV100 with active com port



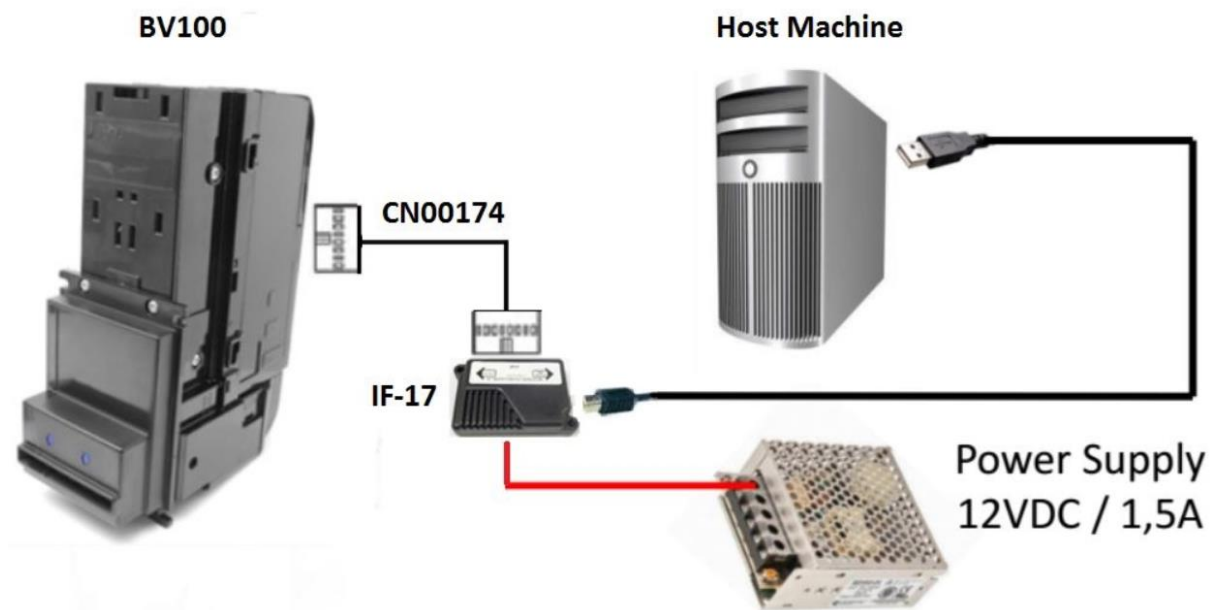
Caution!

In exceptional cases, one of the dll's (itdata1.dll) used in Validator Manager are flagged as a Trojan, this is a false positive and if this happens you will need to add a rule to your antivirus to allow the file to run.

4.4.1.3. Hardware Setup

There are 2 types of connection BV100 to host machine:

1. Connect the [USB cable](#) to [DA2/IF17](#) and your computer or laptop. Connect the [CN00174](#) cable to Validator and [DA2/IF17](#). Connect the [power supply](#) cable to [DA2/IF17](#).



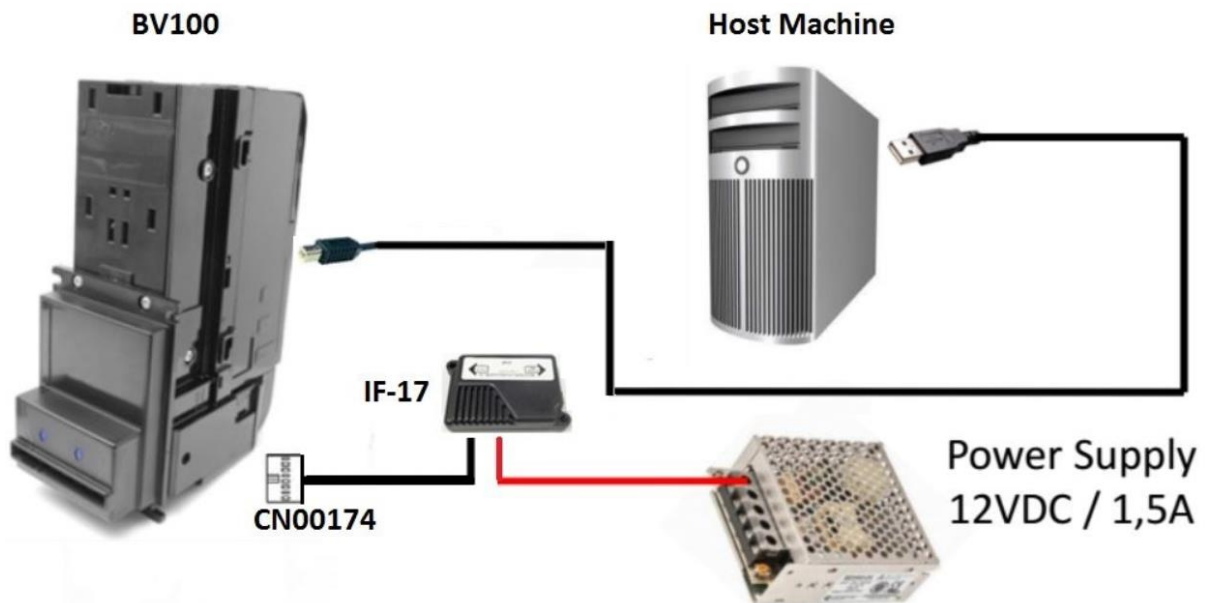
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2. Direct USB connection.

Connect the [USB cable](#) directly your computer or laptop.

Connect the [CN00174](#) cable to Validator and [DA2/IF17](#) to provide power.

Connect the [power supply](#) cable to [DA2/IF17](#).



Cable drawing can be found in Section [12.1](#)

4.4.1.4. Switching to Programming Mode (SSP)

Before programming via the Validator Manager, the BV100 needs to be switched to its programming mode (SSP interface). Please refer to Section [8.2](#) for the procedure for doing this.



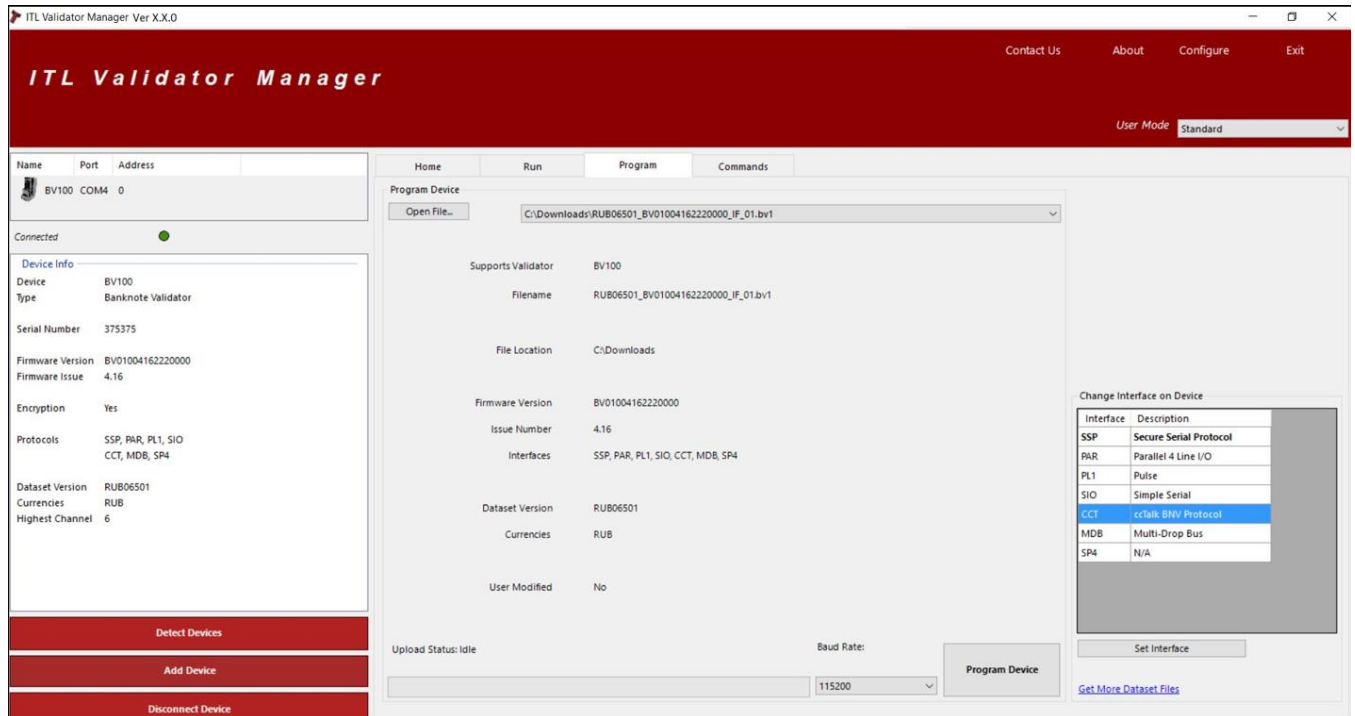
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4.4.1.5. Programming the device

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 BV100 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 BV100. To begin the upload, click open file, then browse to the file location (usually Downloads) before clicking OK.



Once the file has been selected its information will be populated and the Program device tab will become active. Finally hit 'Program Device', the unit's bezel will now begin to flash signaling the update has begun. If it's unable to program device, then incorrect file type was chosen.



Caution!

Interrupting the download process can result in the unit entering a non-functional state, once the process has started it cannot be halted.

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

All the details of Validator Manager using could be found in [ITL Software Manual](#).



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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 re-program 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
- ITL Drivers
- Connected DA3 with active com port
- Device Programming System software (can be downloaded from ITL website)



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4.4.2.3. Re-programming via DA3

1. Open Device Programming System program and add the files you will use.

Set "Match" update mode if you want to update current BV100 dataset after comparing datasets or "override" update mode, which will reprogram unit with chosen file and interface not depending on what is downloaded at the moment:

Device Programming System

ITL DA3 connected. [Change DA3 firmware version](#)

Item	Value
Serial number	0
Firmware version	DA31001212298000
Loaded files	0

Files on DA3...

Device	Dataset	Firmware	Update mode	I/F after update
BV100	RUB06501	416	Override	SSP

Free space: 7,28 M bytes

Import a file

Your library files... Double click to edit and drag and drop to DA3.

Device	Country	Dataset	Firmware	Update mode	Available interfaces	I/F after
BV100	RUSSIA	RUB06501	416	Match	SSP,PAR,PL1,SIO,CCT,MDB,SP4	N/A
BV100	KAZAKHSTAN	KZT01503	416	Match	SSP,PAR,PL1,SIO,CCT,MDB,SP4	N/A

BV100 416 RUSSIA RUB06501

Set Options

Interface co...	Description	Option	Value
<input checked="" type="checkbox"/> SSP	Secure Serial Protocol	Strim function	No change
<input type="checkbox"/> PAR	Parallel 4 Line I/O	Program card	No change
<input type="checkbox"/> PL1	Pulse Output	PSU Monitor	No change
<input type="checkbox"/> SIO	Simple Serial	Channel Inhibits	No change
<input type="checkbox"/> CCT	ccTalk BNV Protocol	Stacker retry time	No change
<input type="checkbox"/> MDB	Multi-Drop Bus vending	SSP Bus Address	No change
<input type="checkbox"/> SP4	Special Pulse Output	eSSP Mandatory	No change

Update mode

Match

Override

Save Cancel

2. Drag and drop dataset for updating in left part of program and press "update files":

Device Programming System

ITL DA3 connected. [Change DA3 firmware version](#)

Item	Value
Serial number	0
Firmware version	DA31001212298000
Loaded files	0

Your Firmware files for update...

Device	Dataset	Firmware	Update mode	I/F after update
BV100	RUB06501	416	Override	SSP

Free space: 7,57 M bytes

DA3 Update Files

Card A

Card B

Import a file

Your library files... Double click to edit and drag and drop to DA3.

Device	Country	Dataset	Firmware	Update mode	Available interfaces	I/F after update
BV100	KAZAKH...	KZT01503	416	Match	SSP,PAR,PL1,SIO,CCT,MDB,SP4	N/A
BV100	RUSSIA	RUB06501	416	Override	SSP,PAR,PL1,SIO,CCT,MDB,SP4	SSP



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3. Connect BV100 to DA3 VALIDATOR slot.
Connect computer/laptop to DA3 HOST MACHINE slot:



4. Using small button choose Match download or Override download depending on requirements, then press big button and downloading process will begin.

After, the BV100 will restart and DA3 button become green color meaning successful reprogramming.

The table below shows an explanation of the error codes displayed on the Mode Indicator LED's if the center RUN button changes color to red. The flash code is shown by a long flash then a number of short flashes:

Cause of failure (number of short flashes)	Cause of failure
2	No validator connection found
3	No valid download files found
4	Download fail
5	Memory Card Fail

All the details of DA3 using could be found in [ITL Software Manual](#).




4.4.3. Remote Update

The BV100 validator supports remote updating.

For SSP protocol, the procedure of updating is described in Section 10 of SSP Implementation Guide ([GA973](#)).

Files remote updating in ccTalk please, contact support@innovative-technology.co.uk

	Caution!
This option is only available for SSP and ccTalk protocols	

4.4.4 Configuration Card

4.4.4.1 General Description

Configuration Card allows user to change configuration options/protocol parameters without PC or DA3.

4.4.4.2 Re-programming via Configuration Card

Following the instruction of [Configuration Card](#) manually print and cut off Configuration card (depending on bezel width 66 or 72 mm) and enter it to validator for changing options/protocol.



5 PROTOCOLS AND INTERFACING

5.1 Introduction

The BV100 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.



Caution!

The use of an encrypted protocol (preferable eSSP) is strongly recommended to achieve the highest security!

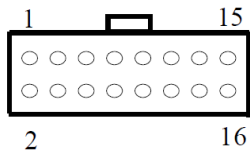
5.2 SSP and eSSP

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	Type	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
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)



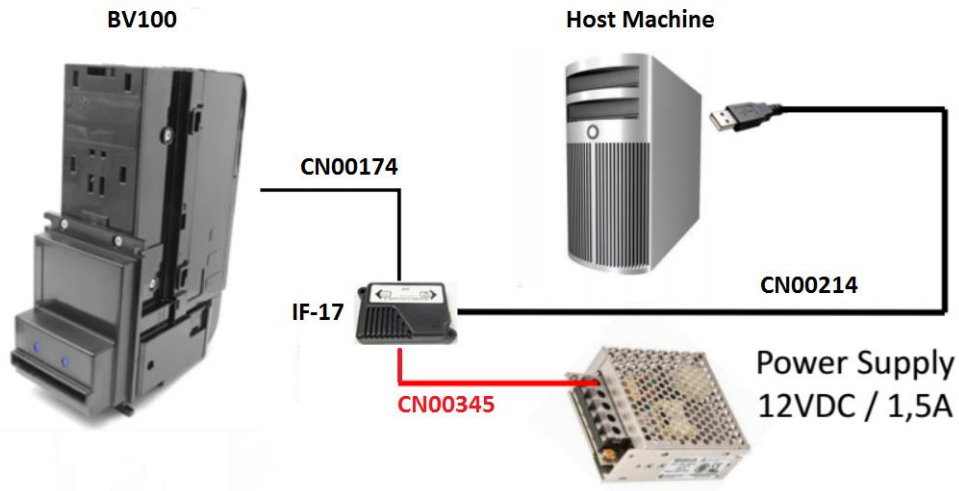
Caution!

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



5.2.3 Setup Examples

The drawing below shows, how to connect the BV100 to an SSP or eSSP host machine using available cables and interfaces from Innovative Technology Ltd. For cable drawings please refer to [10.1](#) Section.




Type	ITL Part Number	Description	Details
Cable	CN00174	Ribbon Cable	http://innovative-technology.com/shop/cables/nv9-nv10-ribbon-cable-detail
Cable	CN00345	DA3 / IF17 / IF18 Power Cable	http://innovative-technology.com/shop/cables/da3-if17-if18-power-cable-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®

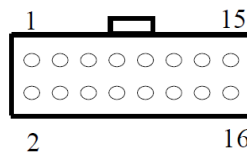
5.3.1 General Description

ccTalk® is a serial communications protocol designed by Money Controls to allow 3-wire interfacing between a host and cash handling peripherals. It is recommended that all communications with the note validator must be encrypted using the encryption key, the default encryption key will be printed on the label of the BV100. To reset the Encryption key to its default value see Configuration Button Option. For detailed information and full protocol specification please refer to www.cctalk.org.

Please contact support@innovative-technology.com for further information.


	Caution!
Innovative Technology Ltd. provides full SDK packages including Interface Specification, Implementation Guide as well as source code examples for SSP respectively eSSP only!	

5.3.2 Pin Assignments



Pin	Name	Type	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)



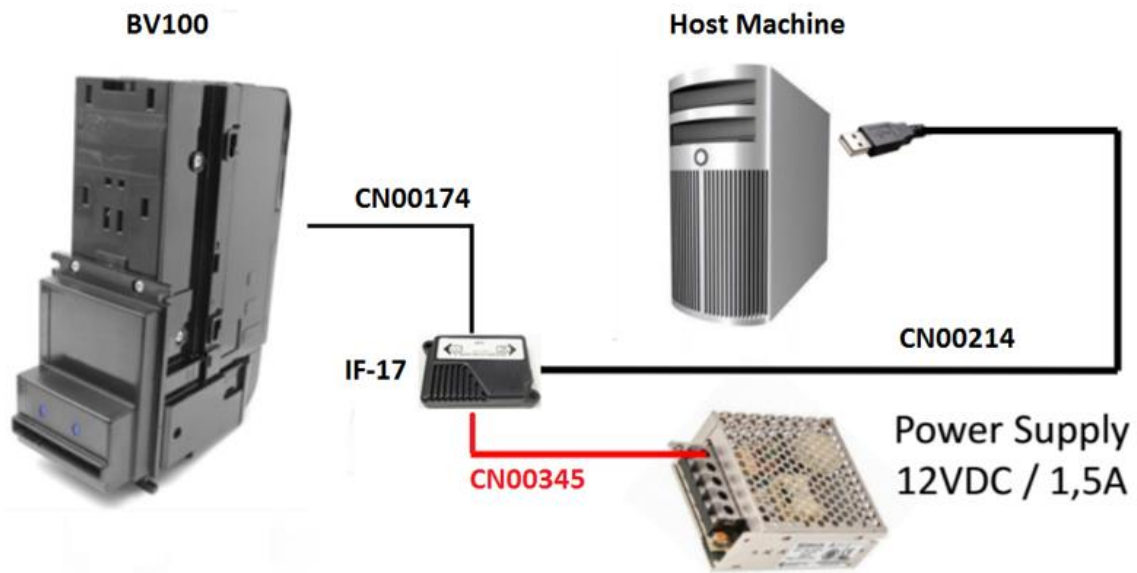
	Caution!
+12VDC and 0V (GND) must always be connected, also when using USB connections.	

5.3.3 ccTalk® DES Encryption

When using ccTalk® DES encryption, the BV100 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 BV100.

5.3.4 Setup example



Same scheme could be used as for SSP connection:



5.4 SIO and SI2

5.4.1 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.

	Caution!
<p>SIO and SI2 are outmoded and not recommended for new developments! The BV100 does not support the simple serial data out only mode. It only supports the serial data input/output mode. The host machine does not echo messages back to the validator. The BV100 does not operate in true RS232 mode. (Only TTL level). To use Serial Input/Output mode, the SIO interface must be programmed</p>	
	Caution!
<p>Innovative Technology Ltd. provides full SDK packages including Interface Specification, Implementation Guide as well as source code examples for SSP respectively eSSP only!</p>	

There are 4 different combinations of SIO available:

-SIO 300 Baud

-SIO 300 Baud (Disabled at Start up) - A software enable must be sent to enable the validator.

-SIO 9600 Baud

-SIO 9600 Baud (Disabled at Start up) - A software enable must be sent to enable the validator.



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BV100 receive/transmit the following Event codes –

Recognised Receive Codes to BV100		Transmitted codes from BV100	
MESSAGE	DECIMAL VALUE	MESSAGE	DECIMAL VALUE
Inhibit C1	131	Note Accept on C1	1
Inhibit C2	132	Note Accept on C2	2
Inhibit C3	133	Note Accept on C3	3
Inhibit C4	134	Note Accept on C4	4
Inhibit C5	135	Note Accept on C5	5
Inhibit C6	136	Note Accept on C6	6
Inhibit C7	137	Note Accept on C7	7
Inhibit C8	138	Note Accept on C8	8
Inhibit C9	139	Note Accept on C9	9
Inhibit C10	140	Note Accept on C10	10
Inhibit C11	141	Note Accept on C11	11
Inhibit C12	142	Note Accept on C12	12
Inhibit C13	143	Note Accept on C13	13
Inhibit C14	144	Note Accept on C14	14
Inhibit C15	145	Note Accept on C15	15
Inhibit C16	146	Note Accept on C16	16
Un-inhibit C1	151	Note Not Recognised	20
Un-inhibit C2	152	Mechanism running slow	30
Un-inhibit C3	153	Strimming attempted	40
Un-inhibit C4	154	Channel 5 Note Rejected (fraud channel)	50
Un-inhibit C5	155	STACKER Full or Jammed	60
Un-inhibit C6	156	Abort During Escrow	70
Un-inhibit C7	157	Note may have been taken to clear jam	80
Un-inhibit C8	158	Validator Busy	120
Un-inhibit C9	159	Validator Not Busy	121
Un-inhibit C10	160	Command Error	255
Un-inhibit C11	161		
Un-inhibit C12	162		
Un-inhibit C13	163		
Un-inhibit C14	164		
Un-inhibit C15	165		
Un-inhibit C16	166		
Enable serial escrow mode	170		
Disable serial escrow mode	171		
Accept escrow	172		
Reject escrow	173		
Status	182		
Enable all	184		
Disable all	185		
Disable escrow timeout	190		
Enable escrow timeout	191		
Request firmware	192		
Request dataset	193		

Example transactions –

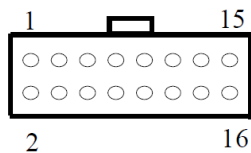


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Event	Validator	Decimal Value	Host
Note entered into validator	Validator Busy	120→	
Note accepted channel 2	Validator Ready	121→	
	Accept on channel 2	2→	
Note entered into validator	Validator Busy	120→	
Note not recognised	Validator Ready	121→	
	Note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

5.4.2 Pinout



Pin	Name	Type	Description
1	Tx, transmit (ttl levels)	Output	Serial Data Output
15	+ Vin	Power	+12VDC Supply
16	0V	Power	0V Supply (GND)





5.5 MDB

5.5.1 General Description

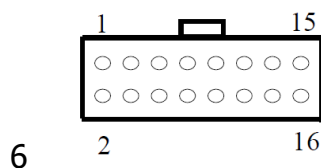
MDB (Multi-Drop Bus) is used in the vending industry and is now an open standard in the NAMA (National Automatic Merchandising Association) so that all vending and peripheral equipment communicates identically. MDB uses a master-slave model where the VMC (Vending Mechanism Controller) is the master that can communicate with up to 32 slaves (e.g. banknote validator or coin acceptor). The BV100 banknote Validators have a unique address – 00110XXX binary (30H). The VMC polls the bus to detect presence of the BV100 Validator or get information on the current status of the validator. 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 either the international telephone code for that country, or the country code taken from ISO4217. The code is represented as two bytes. The initial digit signifies the source of the code. 0 signifies the telephone code is used, 1 signifies ISO4217 has been used.

Please contact support@innovative-technology.com for further information.

	Caution!
Innovative Technology Ltd. provides full SDK packages including Interface Specification, Implementation Guide as well as source code examples for SSP respectively eSSP only!	

	Caution!
The BV100 supports the MDB protocol version 1, level 1.	

5.5.2 Pinout



Pin	Name	Type	Description
1	Tx, transmit (ttl levels)	Output	Serial Data
5	Rx, receive (ttl levels)	Input	Serial Data
15	+ Vin	Power	+12/110VDC Supply
16	0V	Power	0V Supply (GND)




5.5.3 IF5 Interface

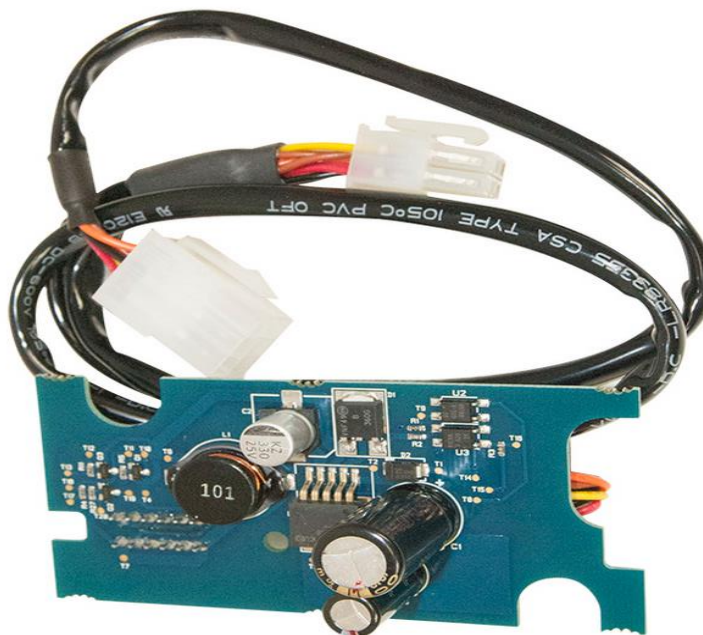
To use the MDB mode an [IF5](#) interface box can be used. –



5.5.4 MDB PSU

	Caution!
An IF5 cannot be used with an MDBPSUBV100	

BV100 can be used with [MDB PSU](#), which allows to use validator directly with MDB applications:



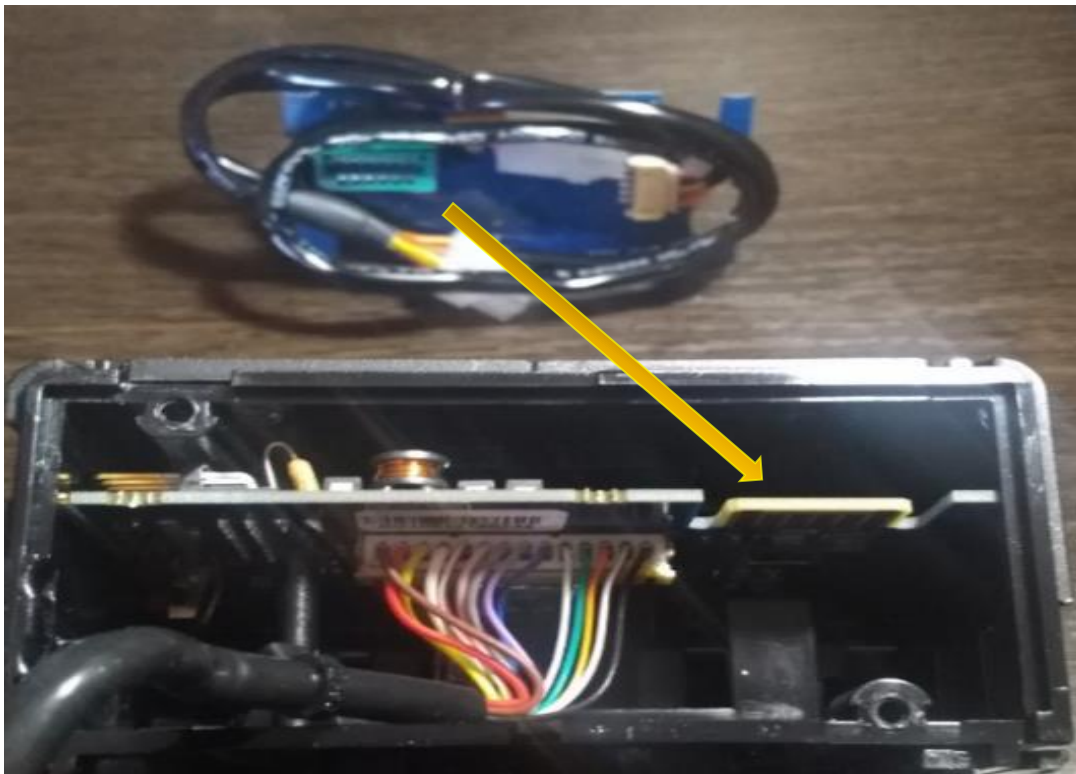
For MDB PSU mounting:

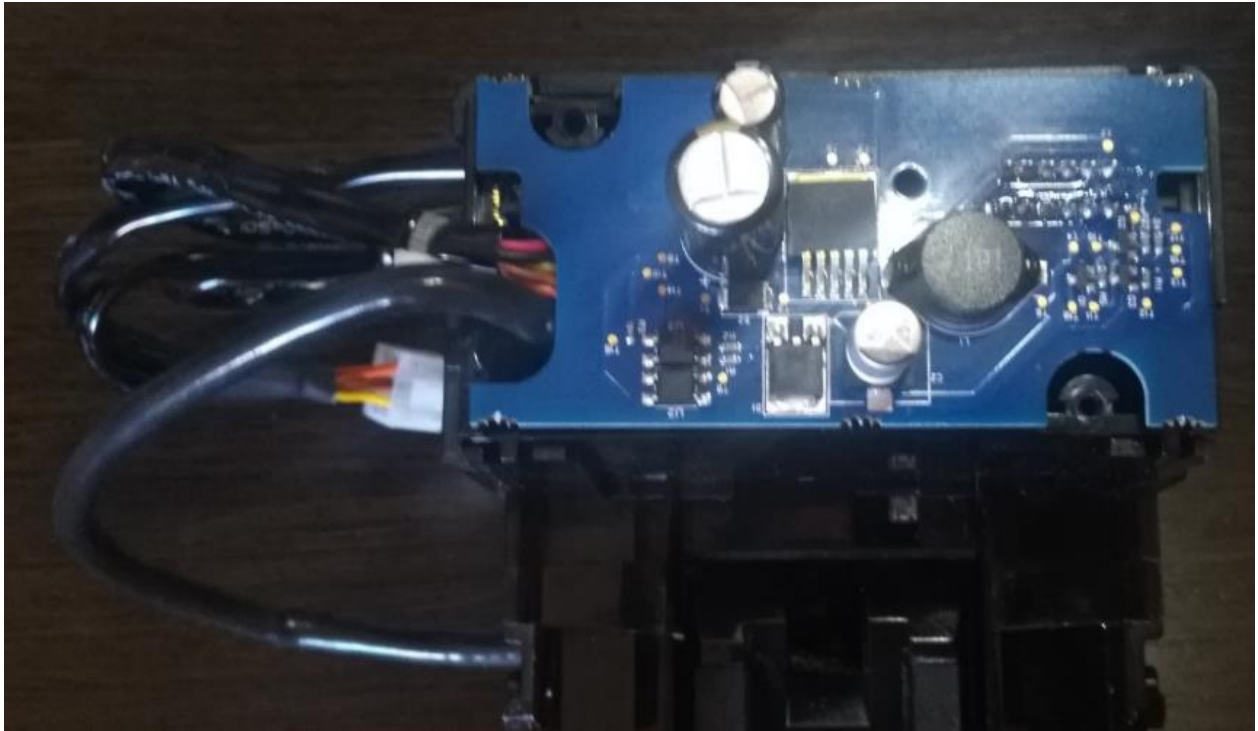
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1. take off back cover, secured with 2 screws:



2. Place MDB PSU into BV100 Board MDB slot





3. Spread the wires and close the cover using 2 screws:




BV100 MDB PSU now installed.

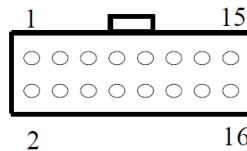
5.6 Parallel

5.6.1 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 $100 \pm 3\text{ms}$. Pulses outside these limits should be rejected as a precaution against false triggering.

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

5.6.2 Pinout



Pin	Name	Type	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)

5.6.3 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 BV100 is disabled.



5.6.4 Escrow Control


The BV100 has a single note escrow facility. This allows the BV100 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. Hold pin 10 Low to enable the single note escrow function. 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 high all the inhibits causes a note reject. In the event of a note being forcibly removed from the mouth of the BV100 during the 30- second interval, the BV100 will go out of service for 45 seconds. Details are in [12.4](#) section.


5.6.5 Busy Control

This is a general-purpose busy signal.
It is active low (Pin 9) while the BV100 is in operation.

5.6.6 Low Power Mode

The Low Power Mode can be used to reduce the power consumption of the BV100 when idle. When the Low Power Mode option is set, the BV100 goes into the Low Power Mode after about 6 seconds after the BV100 is powered up and remains in this state until a note is entered. Following a note insertion, the BV100 returns to Low Power Mode approximately 1 second after a credit is given or note is rejected. Please, refer to [12.5](#) for details.

	Caution!
In Low Power Mode the front sensor is checked every second which can lead to a delay in accepting the note when it is presented!	

	Caution!
Configuration button functions are only available during power up before the BV100 goes into Low Power Mode!	

5.6.7 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 BV100 and the host machine. The IF10 communicates with the BV100 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 parallel connection:




5.7 Binary

5.7.1 General Description

If the machine needs more than 4 denominations to be recognised but the host machine cannot take advantage of the serial communication method then the BV100 can be set to give a binary pattern output on the four parallel output pins. If the BV100 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.

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

5.7.2 Pinout

Pin	Name	Type	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
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)



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 BV100 is disabled.

5.7.4 Escrow Control

The BV100 has a single note escrow facility. This allows the BV100 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. Hold pin 10 Low to enable the single note escrow function. 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 high all the inhibits causes a note reject. In the event of a note being forcibly removed from the mouth of the BV100 during the 30-second interval, the BV100 will go out of service for 45 seconds. Details are in [12.4](#) section.

5.7.5 Busy Control

This is a general-purpose busy signal.
It is active low (Pin 9) while the BV100 is in operation.

5.7.6 Low Power Mode

The Low Power Mode can be used to reduce the power consumption of the BV100 when idle. When the Low Power Mode option is set, the BV100 goes into the Low Power Mode after about 6 seconds after the BV100 is powered up and remains in this state until a note is entered. Following a note insertion, the BV100 returns to Low Power Mode approximately 1 second after a credit is given or note is rejected. Please, refer to section [12.5](#) for details.



Caution!

In Low Power Mode the front sensor is checked every second which can lead to a delay in accepting the note when it is presented!



Caution!

Configuration button functions are only available during power up before the BV100 goes into Low Power Mode!

5.7.7 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 BV100 and the host machine. The IF9 communicates with the BV100 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.



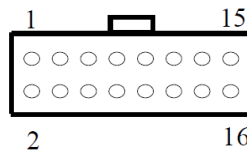
5.8 Pulse

5.8.1 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 [Section 4](#) of this User Manual.

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

5.8.2 Pinout



Pin	Name	Type	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	0V 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 BV100 is disabled.



5.8.4 Escrow Control


Escrow mode for BV100 is available since [4.17](#) firmware. The BV100 has a single note escrow facility. This allows the BV100 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 [12.4](#) for further details.


5.8.5 Busy Control

This is a general-purpose busy signal. It is active low (Pin 9) while the BV100 is in operation.

5.8.6 Low Power Mode

The Low Power Mode can be used to reduce the power consumption of the BV100 when idle. When the Low Power Mode option is set, the BV100 goes into the Low Power Mode after about 6 seconds after the BV100 is powered up and remains in this state until a note is entered. Following a note insertion, the BV100 returns to Low Power Mode approximately 1 second after a credit is given or note is rejected. Please, refer to [12.5](#) for details.

	Caution!
In Low Power Mode the front sensor is checked every second which can lead to a delay in accepting the note when it is presented!	

	Caution!
Configuration button functions are only available during power up before the BV100 goes into Low Power Mode!	

5.8.7 Credit Hold Function

If this function is enabled the BV100 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 BV100 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 BV100 remains inhibited until all pulses are given.

5.8.8 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 BV100 and the host machine. The IF15 communicates with the BV100 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.



6 ROUTINE MAINTENANCE

6.1 Introduction

The BV100 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 BV100 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 [8.2](#) for comprehensive cleaning instructions.



7 FIRST LEVEL SUPPORT

7.1 Bezel LED Flash Codes

The Bezel LED's are used to indicate a variety of status signals as described below.

Number of long flashes	Number of short flashes			
	1	2	3	4
1	Note Path Open	Note Path Jam	Unit not initialized*	Sensor covered
2	Cashbox Removed	Cashbox Jam		
3	Firmware Checksum	Interface Checksum	EEPROM Checksum	Dataset Checksum
4	PSU is too low	PSU is too high		

* - refer to section [9.5](#) for unit initializing.

7.2 Configuration Button Functions

The BV100 has [Configuration Button](#), which allows to perform several functions:

Configuration Button	Power Status	Function
Press and Hold (>2 secs)	Powered ON	Sets BV100 to Programming Mode (SSP protocol)
Press Once (<1 sec)	Powered ON	Enables Configuration Card Programming Mode
Press Twice (within half a second)	Powered ON	Current Setting Indicator
Press and hold as power is applied	Powered OFF/ON	Resets ccTalk key to Default setting



7.3 Checking Power and Communication connections

1. Screened USB 2.0 A-B cable, less than 5-meter length, should be used in case of direct USB connection and when TTL-USB adapter is used.
2. Connecting BV100 via TTL-USB adapters, either IF-17 of DA2 ones should be used.
ITL provides principal electrical scheme of IF-17 adapter, please contact support@innovative-technology.co.uk for details.
3. Power supply parameters details are described in Section [10.4](#).
See also Bezel LED flash codes to identify any validator's errors in section [8.1](#).

7.4 Program check procedure

To check settings on a programmed unit:

1. Power on unit.
2. Click red configuration button on unit twice.
3. Monitor bezel led and check flash codes:

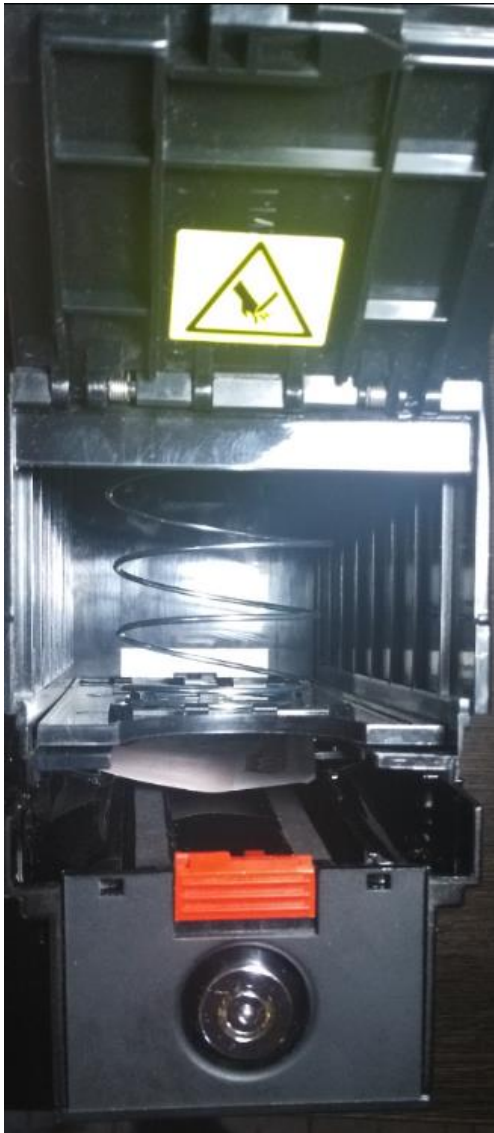
	Flash count	Pulse high	Pulse low	Pulse per dollar	High speed	Disabled	ccTalk plain	Low power	Binary	Credit hold
SSP	1									
Pulse	2	ms/10	ms/10	value						3 flash
MDB	3									
IF30	4									
IF31	5									
ccTalk	6						1 flash	2 flash		
SIO	7				1 flash	2 flash				
Parallel	8								1 flash	
spare	9									
NIS	10									
IF32	11				1 flash					
spare	12									
spare	13									
spare	14									



8 SECOND LEVEL SUPPORT

8.1 Clearing a Jam

1. Press the red latch and softly open and then take off cashbox.



2. Carefully pull the banknote until it's come from validator head outside.



3. Inspect the visible parts of validator for any banknote remains, then attach cashbox. Validator should reinitialize sensors and be ready to work.

Refer to [8.1](#) if validator flashes after procedure with any flash count.



8.2 Cleaning the BV100



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 BV100, only use a mild detergent.



Caution!

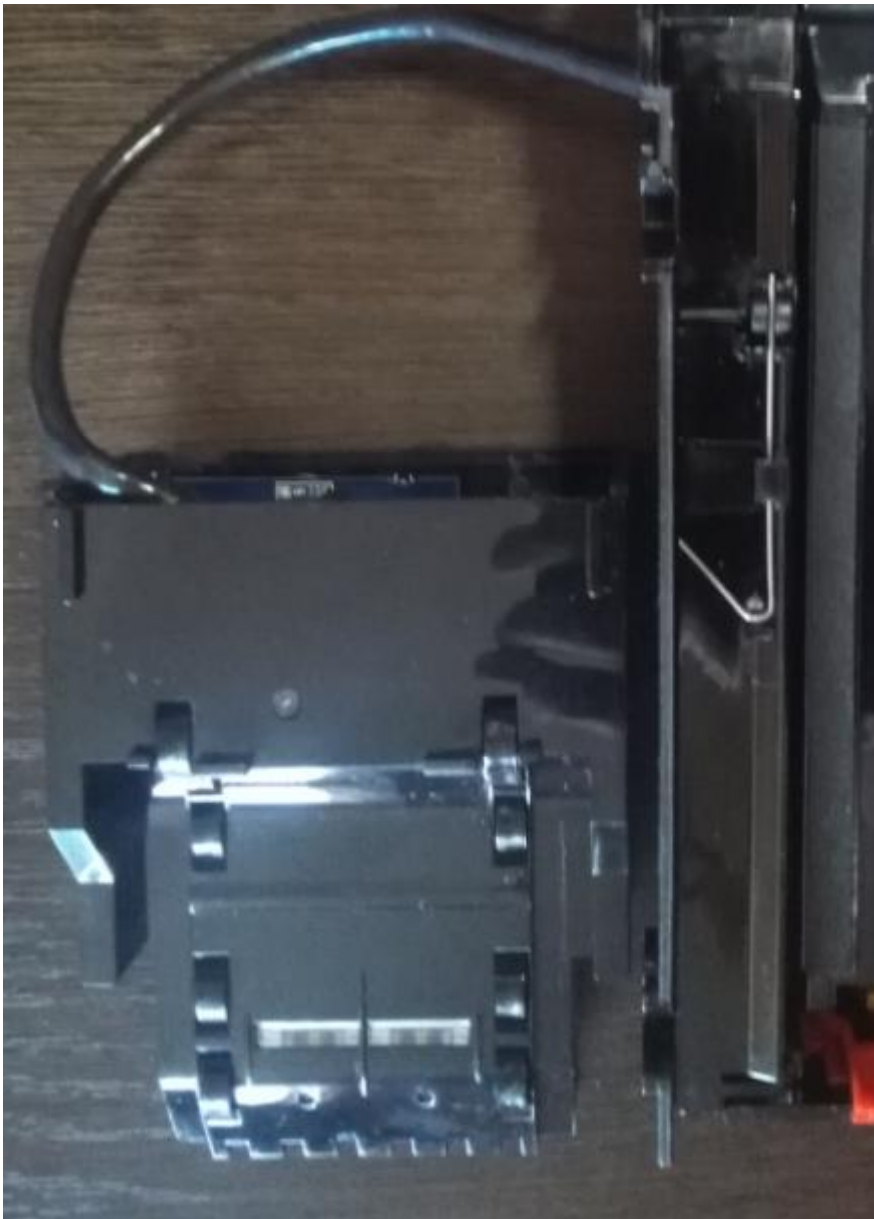
Dirt, dust or other residue causes bad note acceptance rates and other performance degradation. The recommended cleaning interval is once a month!

1. Take off Cashbox, Bezel and Rear cover from BV100 using 3mm hex Allen key:



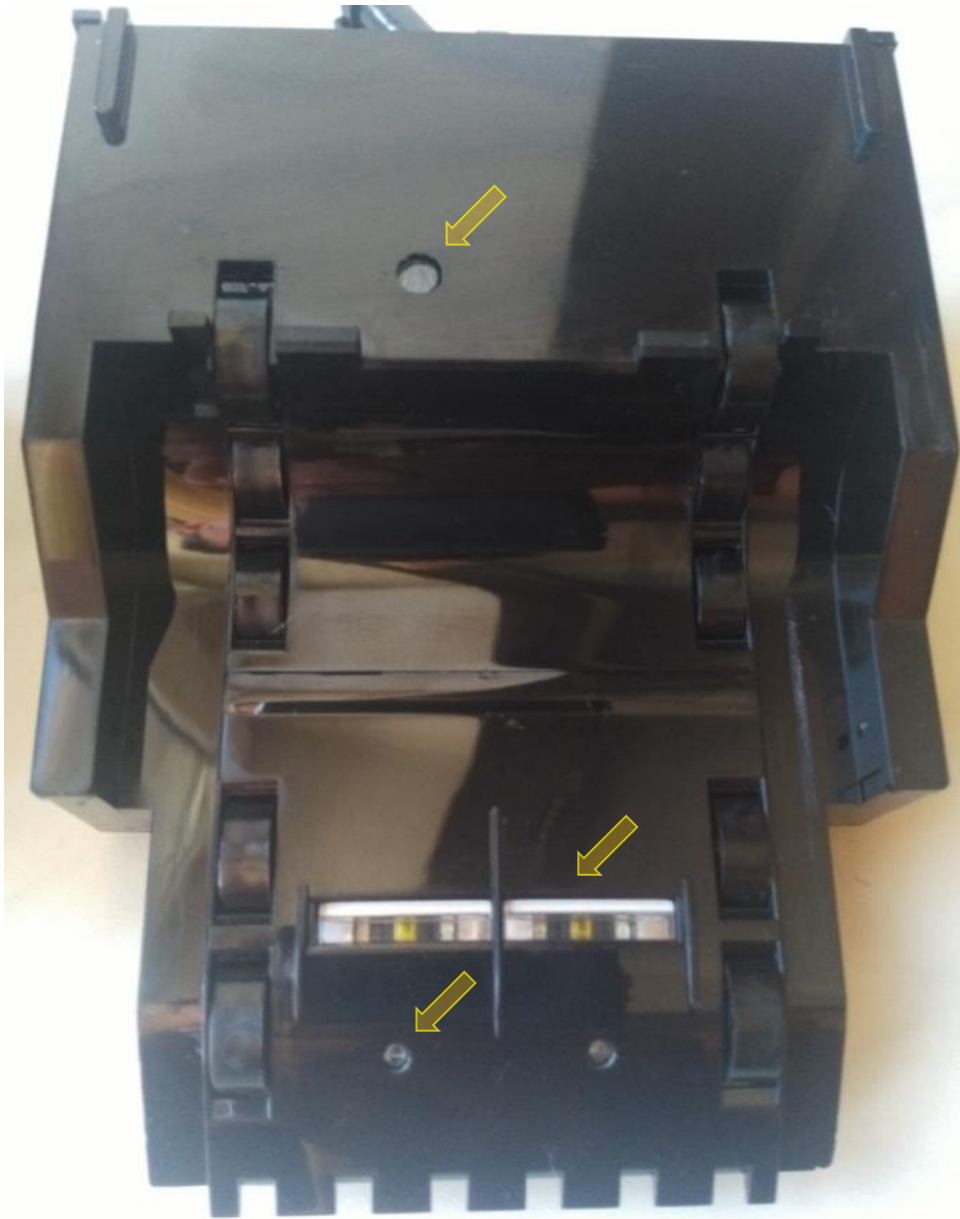
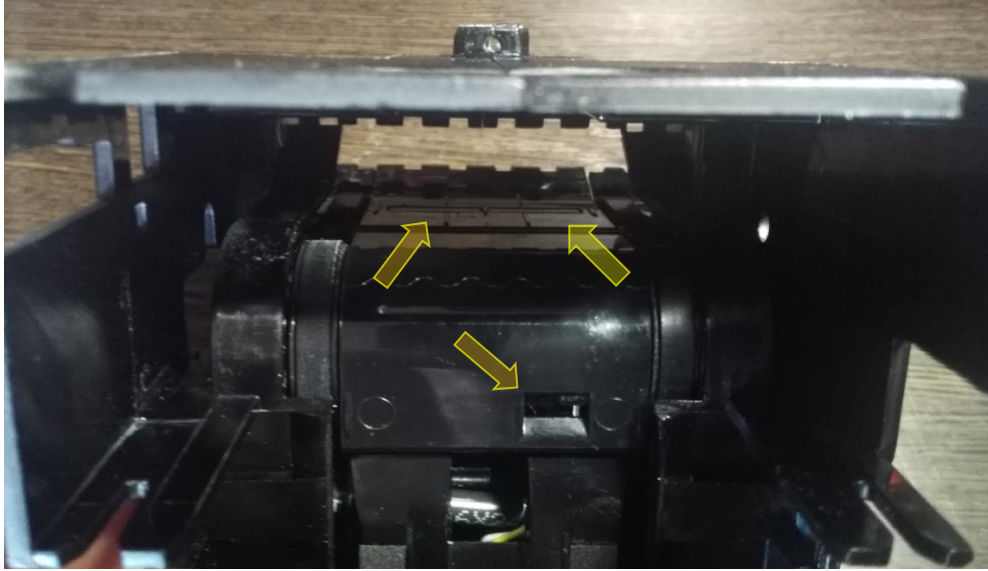
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2. Press upper lech and move out PCB assembly:



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3. Having access to all sensors, wipe them with a piece of cloth:



8.3 Clearing a Checksum Error

According [Flash Codes Table](#), some LED's flashing may indicate CHECKSUM errors. It may happen when, during comparing, validator's checksum does not match with original file's one after some manipulations (updating, repairing, etc.).

In this case, reprogram validator using Validator Manager program as described in [4.7.1.5](#) section. Test validator with several different banknotes after error is removed.

If error persists, use another Dataset file for downloading to localize problem reason.

If error is not disappearing, use EEPROM downloader software.

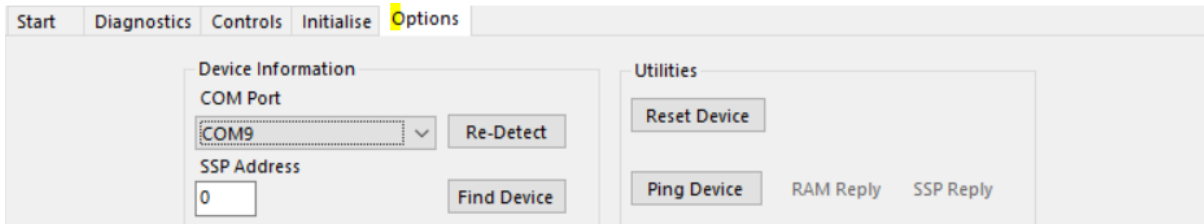
Please, contact support@innovative-technology.co.uk for details.



8.4 Re-initialisation of the sensors

For this procedure, please use ITL Diagnostic Tools (v.2.0.2 and higher) and Green calibration paper [LB00160](#).

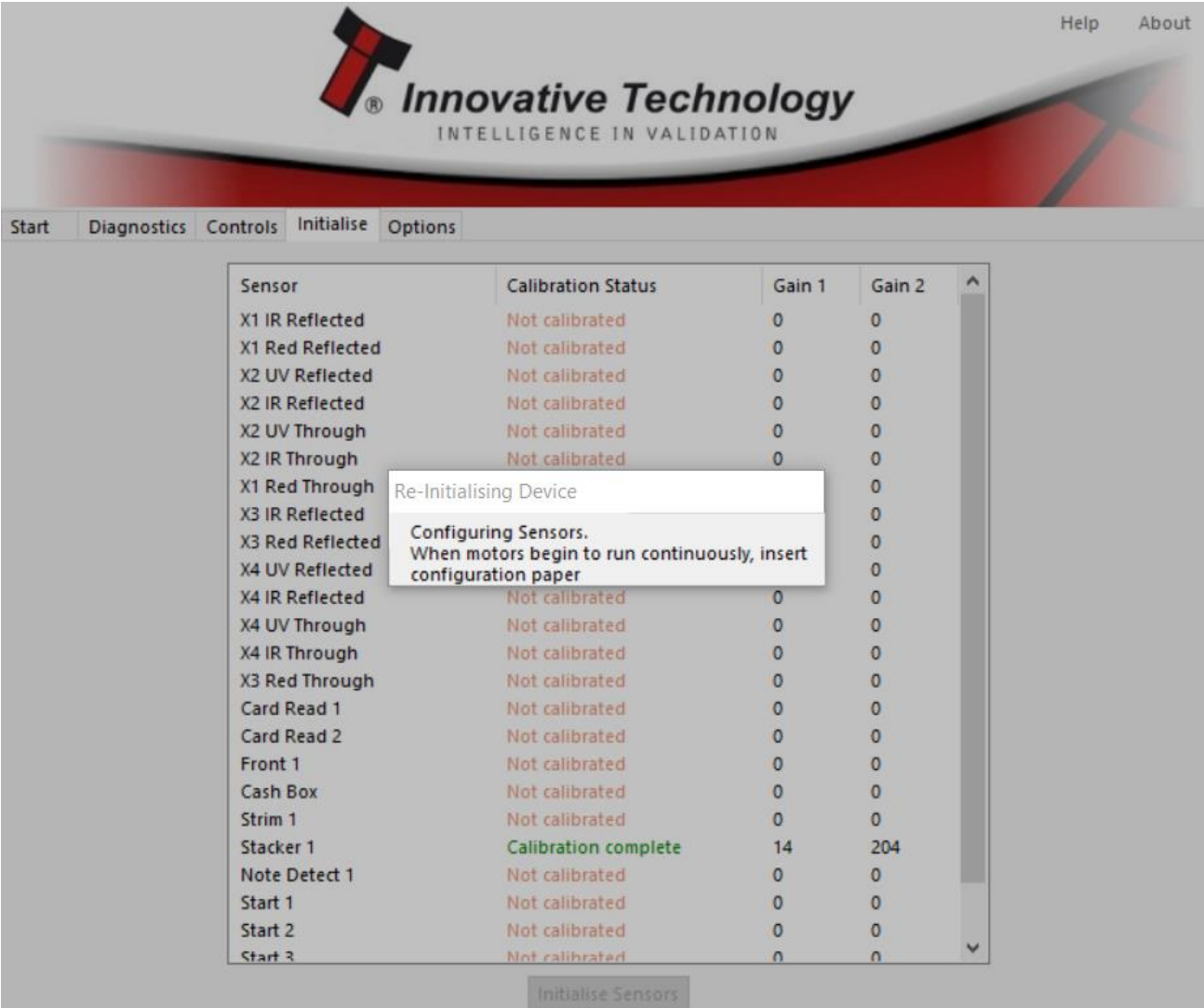
1. Connect validator using IF-17/DA2 adapter only, open Diagnostic Tools program and choose active com-port:



2. Then press "Initialise" button:



- Validator will start initialization procedure.
Once the motor run continuously, insert green calibration paper



The screenshot shows the 'Initialise' tab of the software interface. The table below lists the sensors and their calibration status. A tooltip is displayed over the 'X1 Red Through' sensor, indicating a re-initialization process.

Sensor	Calibration Status	Gain 1	Gain 2
X1 IR Reflected	Not calibrated	0	0
X1 Red Reflected	Not calibrated	0	0
X2 UV Reflected	Not calibrated	0	0
X2 IR Reflected	Not calibrated	0	0
X2 UV Through	Not calibrated	0	0
X2 IR Through	Not calibrated	0	0
X1 Red Through	Re-Initialising Device	0	0
X3 IR Reflected	Not calibrated	0	0
X3 Red Reflected	Not calibrated	0	0
X4 UV Reflected	Not calibrated	0	0
X4 IR Reflected	Not calibrated	0	0
X4 UV Through	Not calibrated	0	0
X4 IR Through	Not calibrated	0	0
X3 Red Through	Not calibrated	0	0
Card Read 1	Not calibrated	0	0
Card Read 2	Not calibrated	0	0
Front 1	Not calibrated	0	0
Cash Box	Not calibrated	0	0
Strim 1	Not calibrated	0	0
Stacker 1	Calibration complete	14	204
Note Detect 1	Not calibrated	0	0
Start 1	Not calibrated	0	0
Start 2	Not calibrated	0	0
Start 3	Not calibrated	0	0

Initialise Sensors

4. Initialization process now complete:

Help About

Innovative Technology
INTELLIGENCE IN VALIDATION

Start Diagnostics Controls **Initialise** Options

Sensor	Calibration Status	Gain 1	Gain 2
X1 IR Reflected	Initialisation complete	5	150
X1 Red Reflected	Initialisation complete	7	159
X2 UV Reflected	Initialisation complete	1	158
X2 IR Reflected	Initialisation complete	4	163
X2 UV Through	Initialisation complete	45	159
X2 IR Through	Initialisation complete	42	35
X1 Red Through	Initialisation complete	74	123
X3 IR Reflected	Initialisation complete	6	159
X3 Red Reflected	Initialisation complete	7	158
X4 UV Reflected	Initialisation complete	1	143
X4 IR Reflected	Initialisation complete	9	154
X4 UV Through	Initialisation complete	29	163
X4 IR Through	Initialisation complete	51	35
X3 Red Through	Initialisation complete	71	121
Card Read 1	Initialisation complete	71	35
Card Read 2	Initialisation complete	75	35
Front 1	Calibration complete	23	177
Cash Box	Calibration complete	13	170
Strim 1	Calibration complete	33	201
Stacker 1	Calibration complete	14	204
Note Detect 1	Calibration complete	20	35
Start 1	Calibration complete	8	6
Start 2	Calibration complete	13	6
Start 3	Calibration complete	8	6

Initialise Sensors

If some of statuses are red, try to repeat initialization procedure.

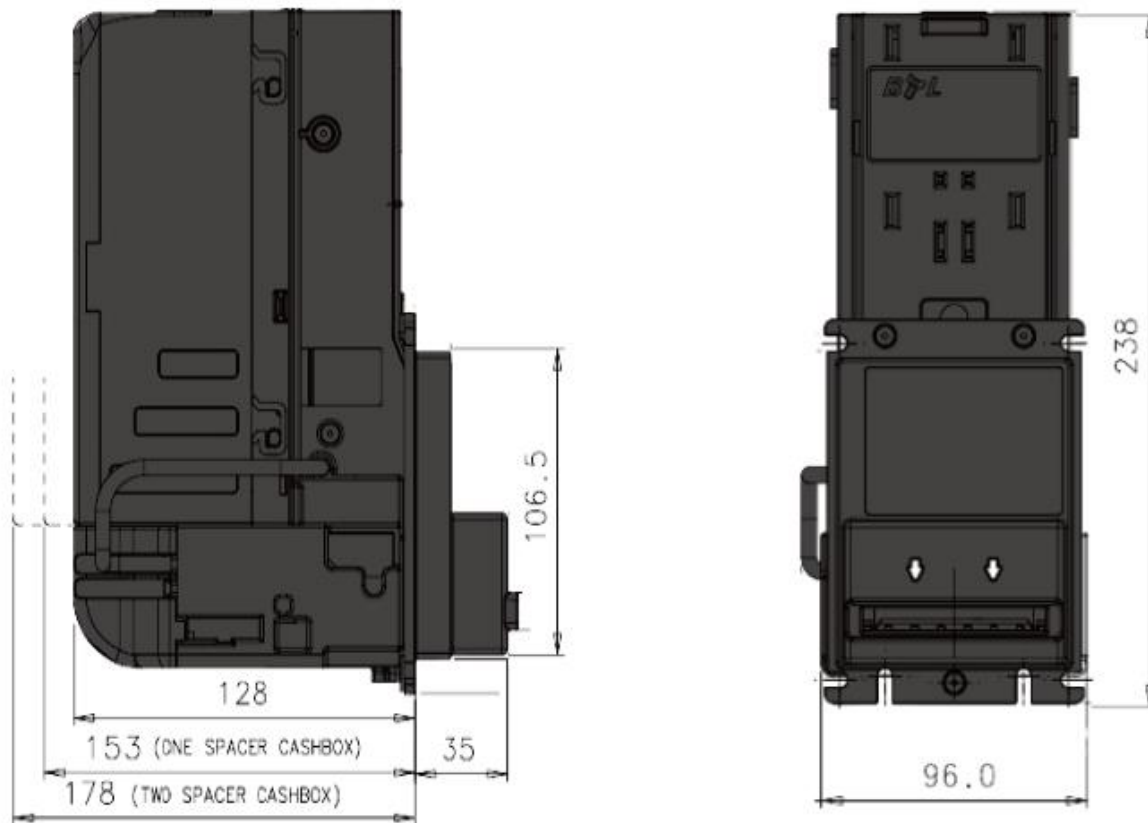
Having same result, probably validator require repairing/some elements replacing.

For initialization file receiving, please, contact support@innovative-technology.co.uk.



9 TECHNICAL DATA

9.1 2D picture



9.2 Weight

- Empty BV100 Validator - 1.0 kg
- Cashbox:
 - With full 300 bills cashbox - 1.3 kg
 - With full 550 bills cashbox - 1.6 kg
 - With full 800 bills cashbox - 1.9 kg
 - With full 1050 bills cashbox - 2.2 kg
- Module:
 - BV100 MDB Power Supply Unit - [BV100MDBPSU](#) - 0.2 kg

9.3 Environmental Requirements

Environment	Minimum	Maximum
Temperature	+3°C	+35°C
Humidity	5%	95% Non-condensing



9.4 Power Requirements

9.4.1 Supply Voltages

Supply Voltage	Minimum	Nominal	Maximum
Supply Voltage (V DC)	+ 11.5 V DC	+ 12 V DC	+ 14.2 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	0.23 A	0.2 A
Running	0.4 A	0.5 A	1.0 A
Peak	1.8 A	2.0 A	3.0 A

9.4.3 Power Supply Guidance

The BV100 requires a stable 12V DC/1.0 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.

Power Supply Unit	Specification	RS Stock Code	Farnell Stock Code
TDK Lambda SWS50-12	+12 V DC / 4.3 A	466-5869	1184645

- 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 2K2Ω pull-up resistor	+0.6V	Pull-up voltage of host interface
Maximum Current Sink	50mA per Output	

9.6 Reliability Data

- MCBF – 200.000

9.7 Media Requirements

- Notes length – 150-180mm,
- Note width – 48-72 mm,
- Polymer and paper notes



10 COMPLIANCES AND APPROVALS

10.1 EC Declaration of Conformity

- RoHS
- EN Directives
- UL
- REACH
- WEEE
- Central Bank Approvals



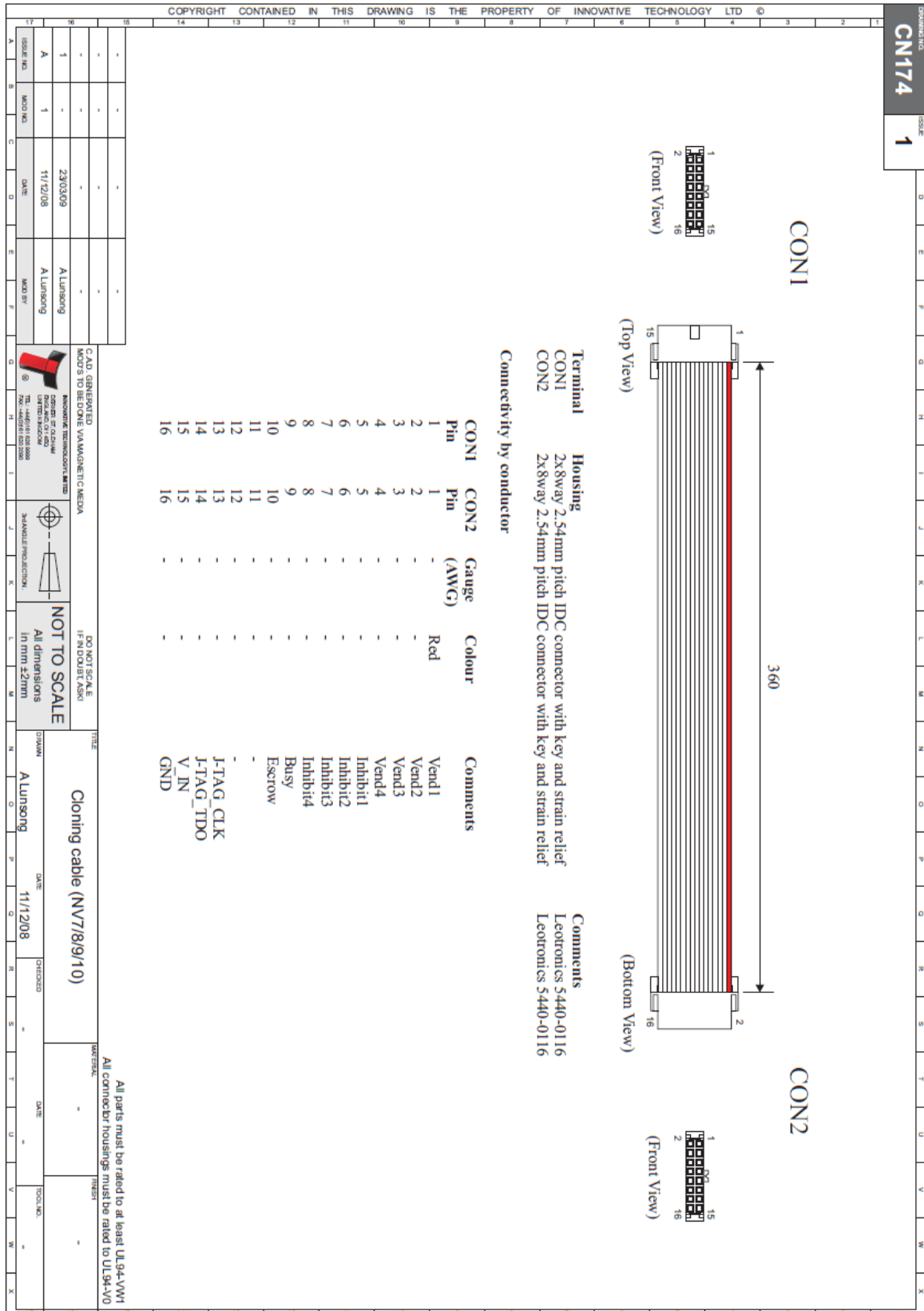
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11 APPENDIX

11.1 Cable drawings

CN00174 Ribbon Cable (validator to IF-17):



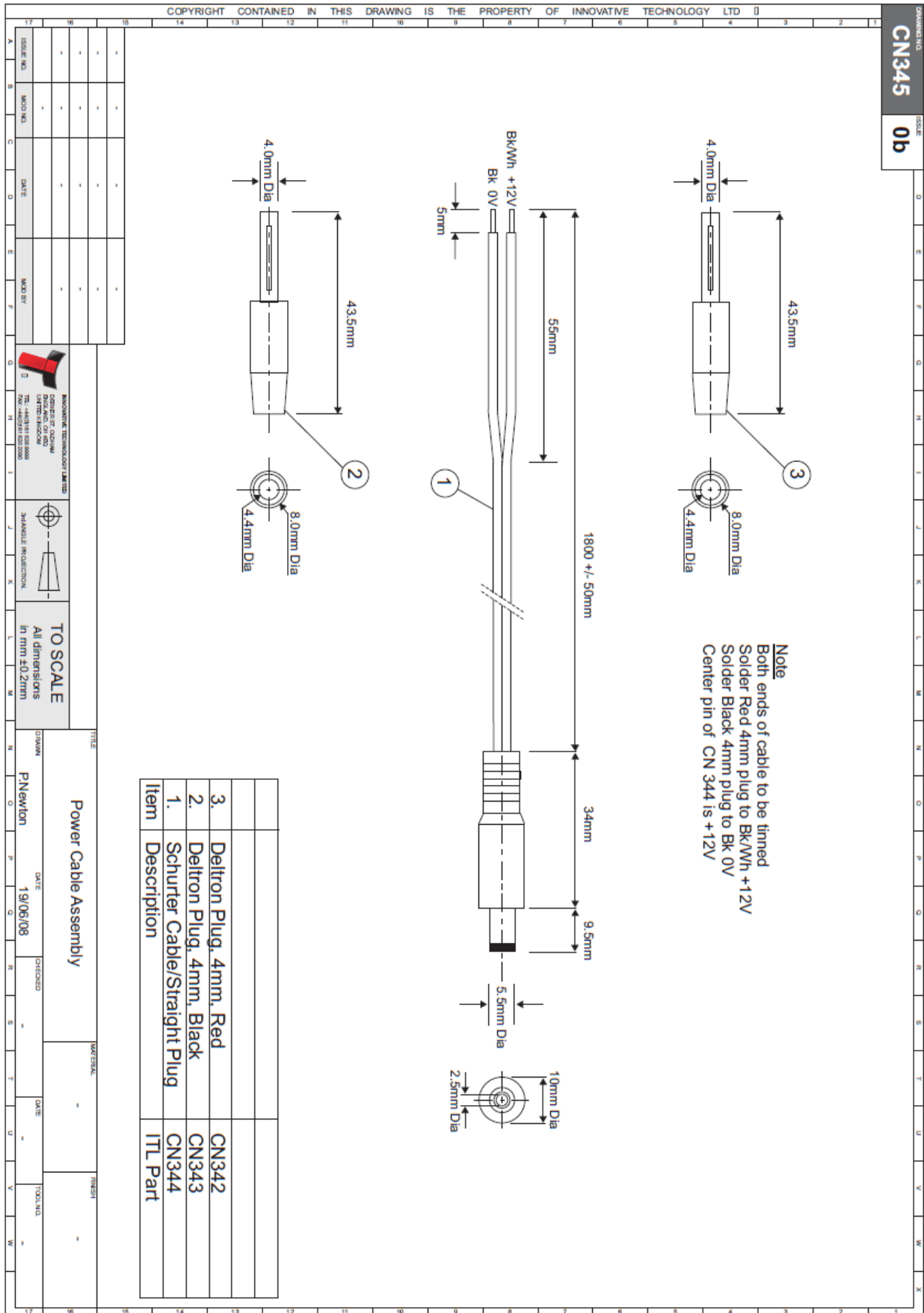
300 mm or longer



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IF17/IF18/DA3 Power Cable:



[CN00214](#) **USB A-B Cable** (host to IF-17):

ITL Part Number	Description	Details
CN214	USB Cable	USB 2.0 Compliant Type A to Type B cable

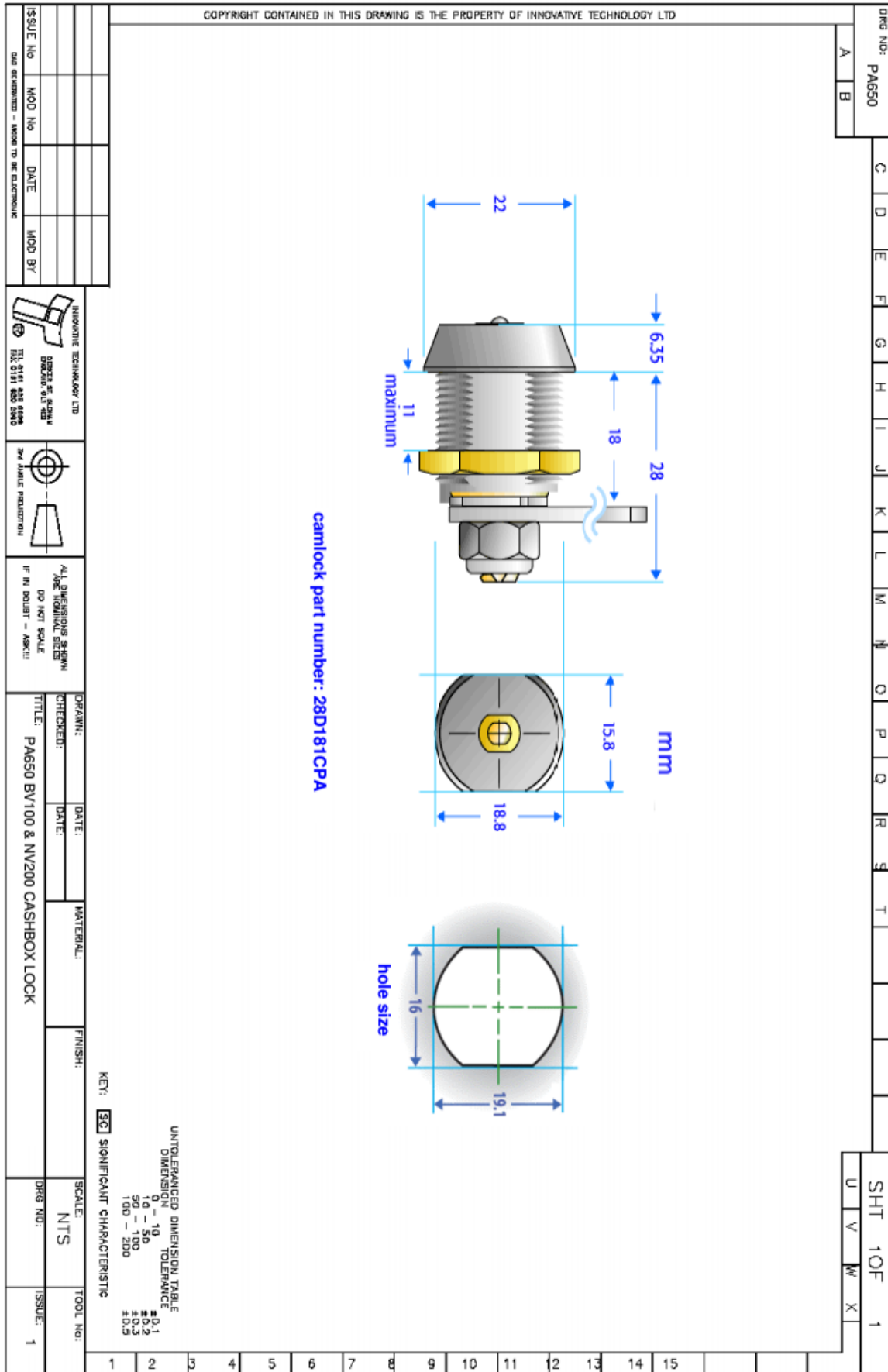
11.2 Connector Specifications

Type	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

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11.3 Lock Specifications



11.4 ccTalk DES Encryption – Trusted Mode

The [DES](#) compatibility can be toggled on/off using Validator Manager version 3.3.12 or later. On the menu select Tools – Set Validator Options. On the General Options tab, the “cct DES encrypted” checkbox will be available when ccTalk® (CCT) interface is set. Click Apply Changes once the validator is configured as required.

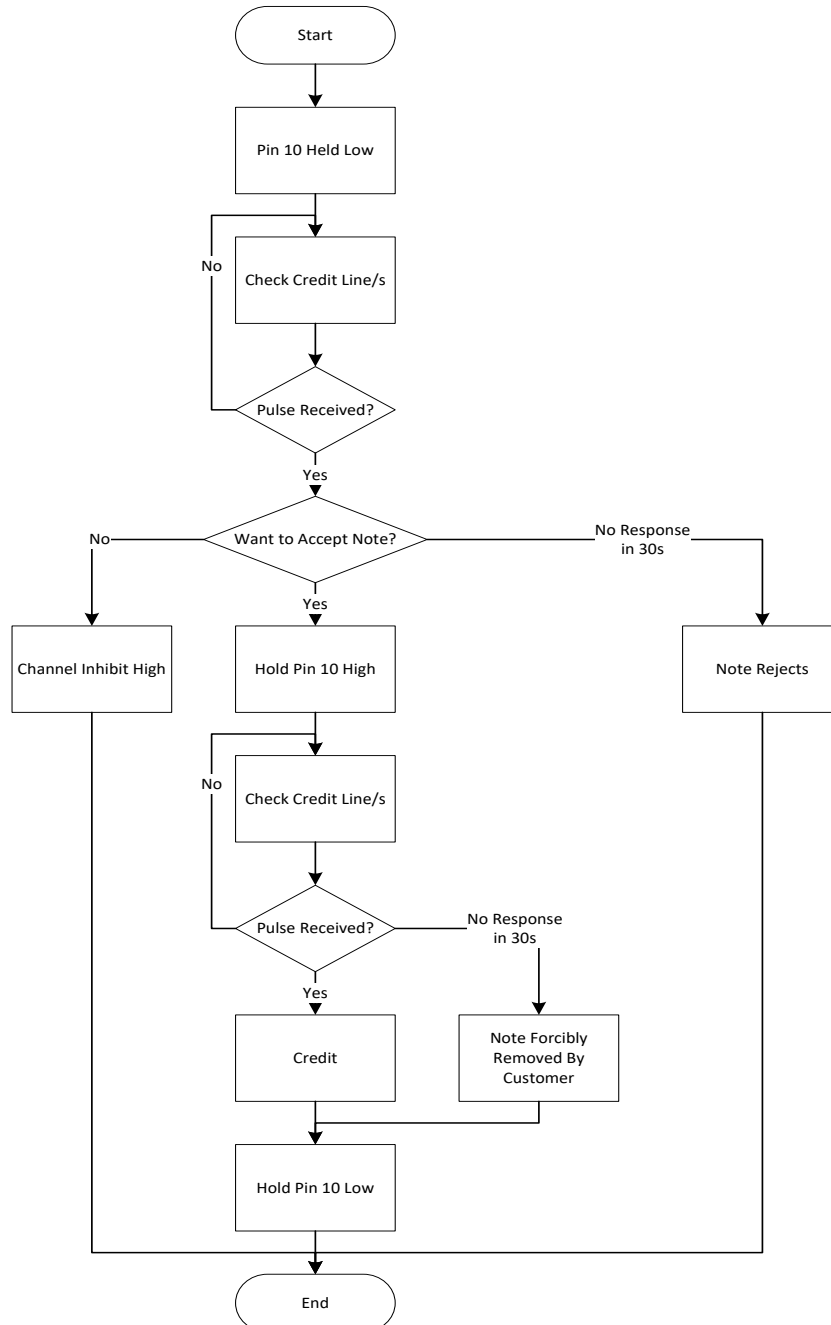
In DES Trusted mode host requests the security keys of peripheral. Once obtained, the keys need not be transferred again until the peripheral is replaced. For key exchanging, please power on unit in ccTalk protocol and wait for a several seconds for key exchanging.


Use configuration button for rollback any previously set ccTalk key to original (see Configuration Button options, section [8.2](#)).



11.5 Escrow Control

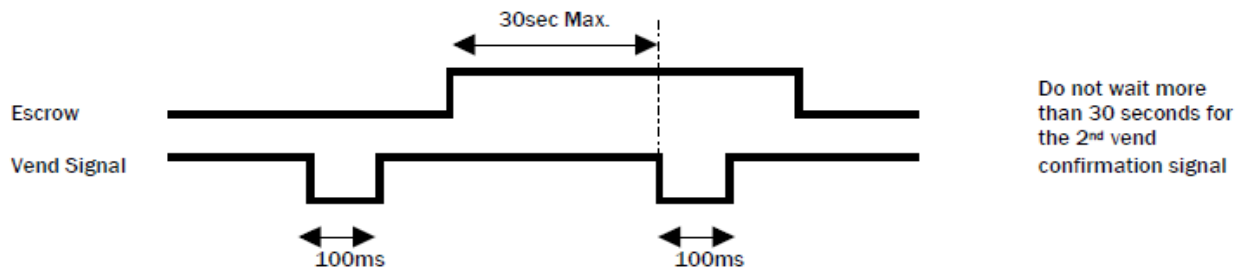
The BV100 has a single note escrow facility. This allows the BV100 to hold onto the note once validated, and then only stack the note into a cashbox when the host machine confirms that the Vend operation has been completed. If no confirmation of the Vend is received, then the note will be returned to 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:



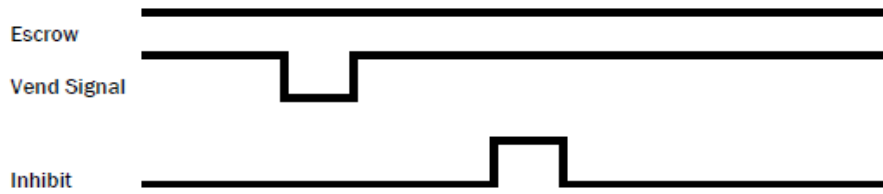
	Caution!
Only book the credit on the second Vend pulse!	



11.5.1 Escrow Timing Diagram




Do not wait more than 30 seconds for the 2nd vend confirmation signal



Inhibit rejection can be at any time during the 30 second decision period after completion of the vend



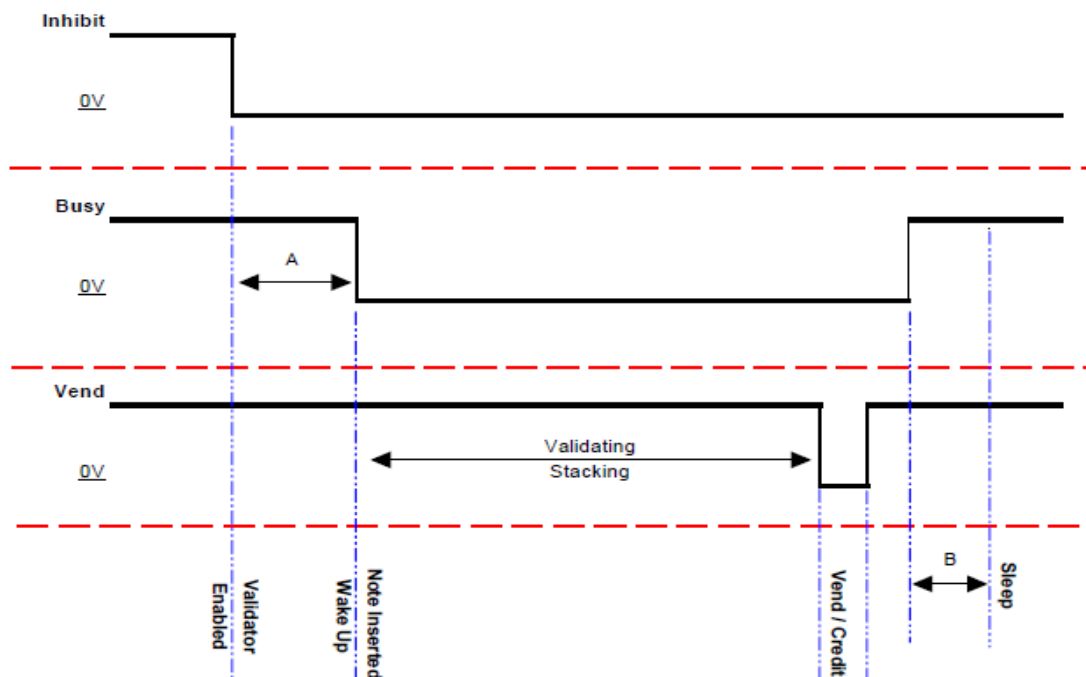
11.6 Low Power Mode Timing diagram

	Caution!
Low Power Mode can ONLY be used with the above Parallel, Pulse and Binary protocols and only be enabled by correctly completing the configuration cards or Validator Manager program	

Low power Mode can be used with all none serial communication protocols to reduce the power consumption of the BV100 when idle. When the BV100 is in this state the current consumption is reduced.

The BV100 goes into low power mode approximately 6 seconds after the validator is powered up and remains in this state until a note is entered (Time A, Figure 10). Following a note insertion, the BV100 returns to Low Power mode approximately 1 second after the Busy line goes High (After credit is given or note is rejected). (Time B, Figure 10).

Low Power mode uses 3 control lines: Vend – Pin 1, Inhibit – Pin 5 and Busy – Pin 9



When the Validator is enabled the Inhibit line is Low and the Busy line is High. This remains the same until a note is inserted (Time A). When a note is inserted under the front sensor the BV100 wakes up and the busy line goes low to indicate that the validator is in use. The busy line remains low during the validating and stacking process and once the note has been successfully validated and stacked the vend line goes low to issue the credit. After the credit is issued the busy line goes high and approximately 1 second after the busy line goes high (Time B) the BV100 goes back into low power mode.



11.7 File Naming Convention

