Innovative Technology

POWERING TRANSACTIONS AND INTERACTIONS

BV30 User Manual

Document Revision - v.1

Exported on 29/04/2026

Change History

Version	Date	Comment
1	13 Dec 2024	Initial Release

Uncontrolled Document Once Exported.
Please visit the Support Hub for the latest Information.

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BV30 Product Information

Contents

General Description

The BV30 is a compact, light-weight bill acceptor ideal for amusement and low value vending applications. Proven field reliability, quick transactions and easy maintenance make the unit future proof.

Exceptional value, the BV30 allows a bill acceptor to be installed for the same price as a coin mech.

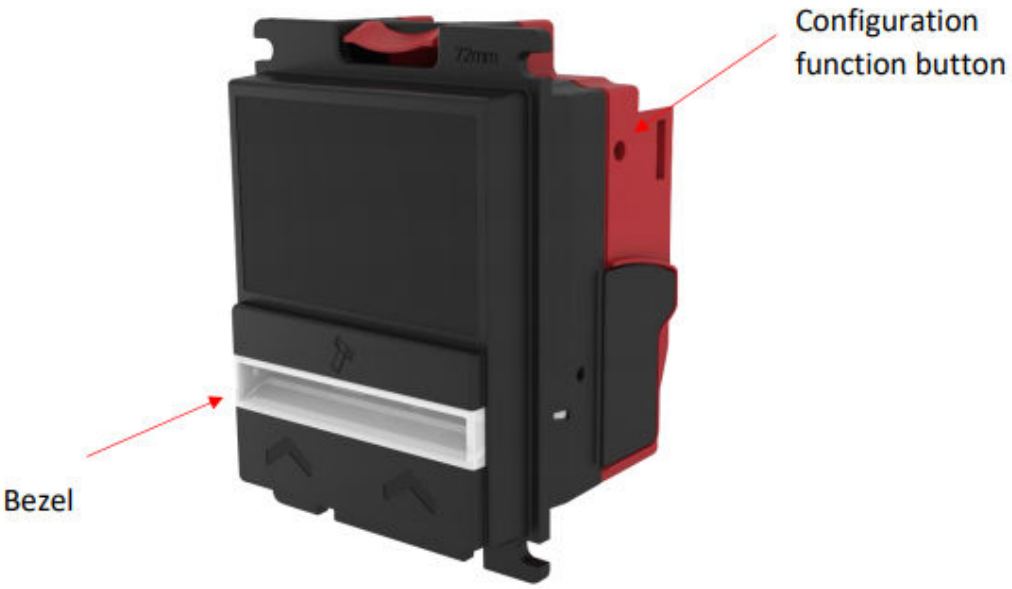
Key Features

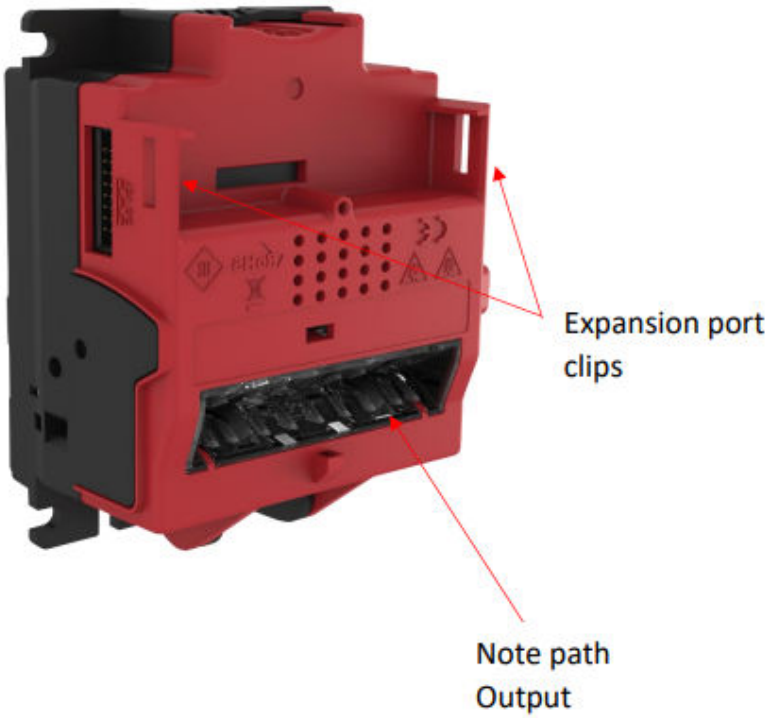
- Compact bill acceptor
- Simple design
- Exceptional value
- Ideal for amusement, kiddie rides & jukebox applications

Typical Applications

- Gaming
- Amusement
- Vending

Component Overview





Bezel Option

The BV30 is fitted with a standard 72mm bezel. This is the only bezel option for this product.

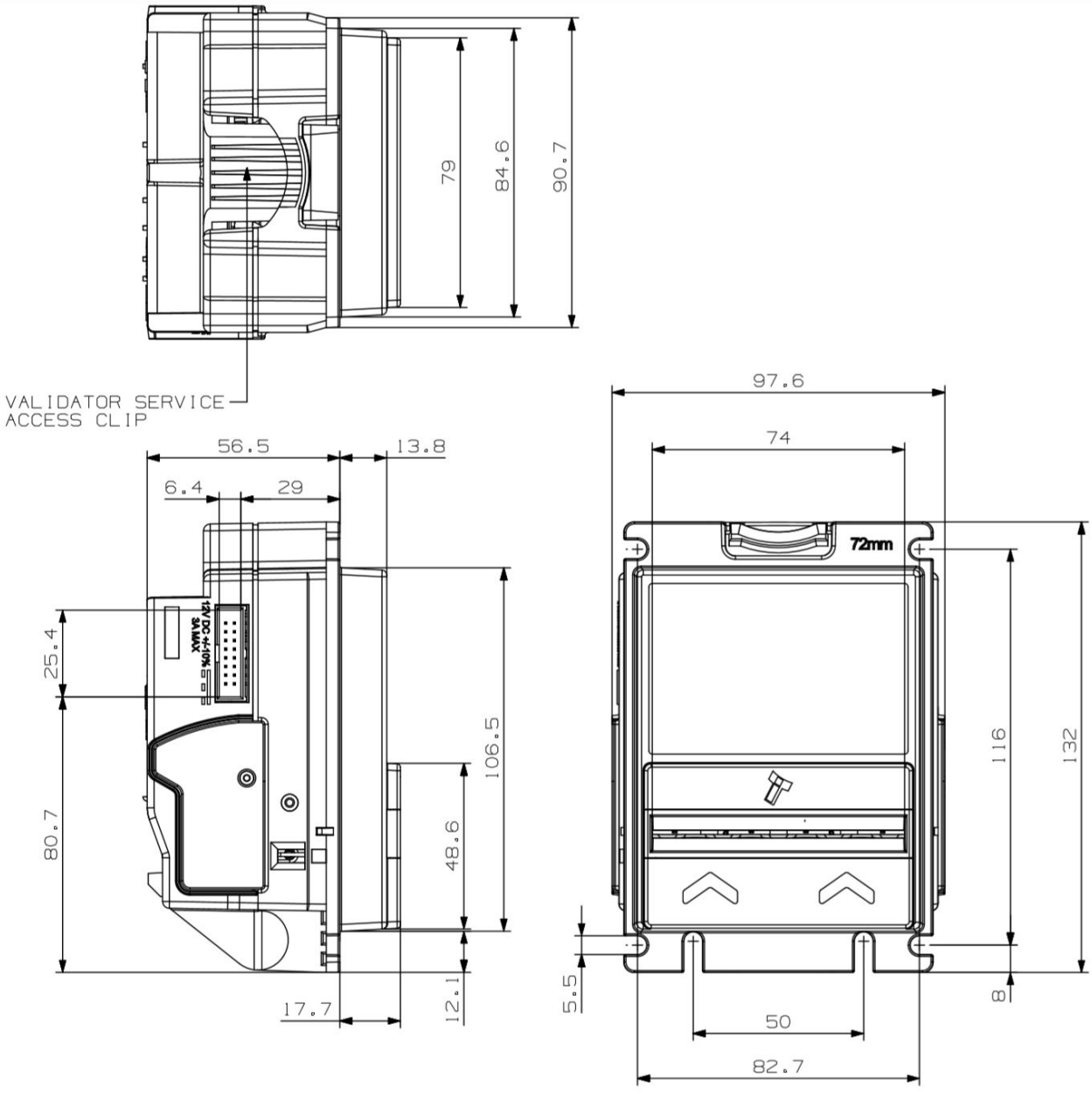
Cashbox Options

The BV30 does not have a built-in cashbox, it is designed to be used in stacker-less/free fall applications. When bank notes are successfully validated the BV30 will transport the note through the validator and drop it out of the back of the unit. A cashbox/bag should be placed under the BV30 to catch the notes, leaving enough space to ensure that the notes are completely clear of the BV30 body.

BV30 Technical Data

Contents

Dimensions



Weight

Product	Weight
BV30 Validator	300g

Environmental Requirements

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

Power Requirements

Supply Voltages

Supply Voltage	Minimum	Nominal	Maximum
Supply Voltage (V DC)	+10.8V DC	+12V DC	+13.2V DC
Supply Ripple Voltage	0V	0V	0.25V @ 100Hz

Supply Currents

Supply Current	Maximum
Standby	0.15A
Running	0.54A
Peak	1.50A

Power Supply Guidance

The BV30 requires a stable 12VDC/1.50A power supply. Please check the power requirements of the host machine and any peripherals connected to the same power supply as the BV30, to ensure that it is capable of meeting the requirements of the BV30.

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

Power Supply Unit	Specification	RS Stock Code	Farnell Stock Code
TDK Lambda RWS-50B-12	+12V DC / 4.3A	839-9626	2452725

Check the power requirements of the host machine and other peripherals to dimension a suitable power environment for the machine setup.

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	

Reliability Data

Below is an explanation outlining the Mean Cycles Between Failure (MCBF) & Mean Cycles Between Interruption (MCBI) for the BV30. Where a cycle is defined as a note accepted or rejected.

The difference between MCBF and MCBI is that a failure is classed as an event which will require a service call – e.g. unit is seeing poor acceptance. Whereas an interruption is an event which store/site staff could rectify without a trained engineer present – e.g. clearing a jam.

The MCBF of the BV30 is 100,000.

Media Requirements

Due to the bezel size of the BV30, it cannot accept notes that are wider than 72mm. The minimum and maximum dimensions for notes in are as follows:

Dimension	Minimum	Maximum
Note Length	150mm	180mm
Note Width	57mm	72mm

BV30 Mechanical Installation

Contents

Hardware Compatibility

Machine Mounting

The BV30 is a suitable fitting replacement for the following ITL products only:

- BV20

Innovative Technology Ltd. has a policy of continuous product improvement. Due to design changes older model or product bezels may not be compatible with the BV30.

Machine Interfacing

By design the BV30 is pin to pin compatible with the suitable fitting replacement products listed above. No changes to the machine harnessing are required.

Power Supply

It is vital that the BV30 is connected to a power supply capable of providing the required power environment. A weak power supply causes malfunctioning of the BV30 such as note rejects or missing credits. If the BV30 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 suitable for the older model or product but not suitable for the BV30.

A weak power supply may cause malfunction

Software Compatibility

Interface Protocols

When using the BV30 as a fitting replacement for an older model or product, some events such as credits may be given faster. This is due to improved firmware routines and faster motors being used. This may cause missing events such as credits in those host machines where timeouts are defined for the older model or product. Contact the machine manufacturer for full compatibility of the BV30.

Re-programming

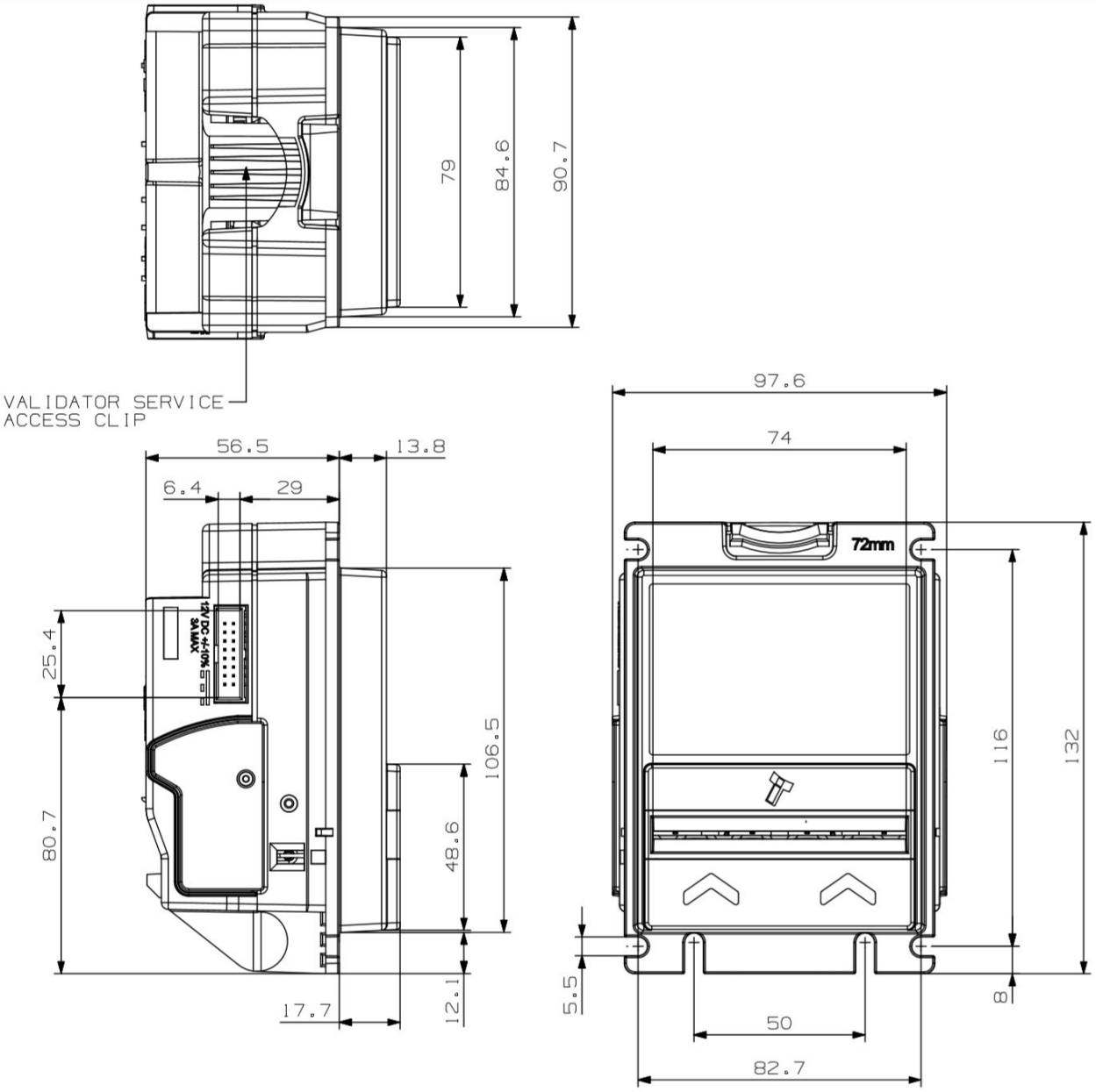
For re-programming the BV30 always use the latest version of Validator Manager, available for download on the Innovative Technology website. Older versions may not support the BV30. For further details on reprogramming refer to Software Installation and Configuration

Older versions of Validator Manager may not support the BV30

Machine Mounting

Mounting Points

The BV30 has mounting points around the bezel to allow secure mounting to the host machine. Refer to the diagram below for the mounting point locations and measurements:



Screw Specification

The scope of delivery does not include screws for machine mounting. See table below for the specifications of the mounting screws:

	Head Diameter		Head Height		Bolt Diameter		Bolt Length	
Type	**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

BV30 Software Installation and Configuration

Contents

Introduction

The BV30 leaves the factory pre-programmed with the latest dataset and firmware files, unless specifically requested. 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 BV30. For detailed instructions please refer to the relevant manual package supplied with the software or contact support@innovative-technology.com.

Software Downloads

All software from Innovative Technology Ltd is free of charge and can be downloaded from the Support Hub once registered and logged in.

Dataset/Firmware Programming

Validator Manager

General Description

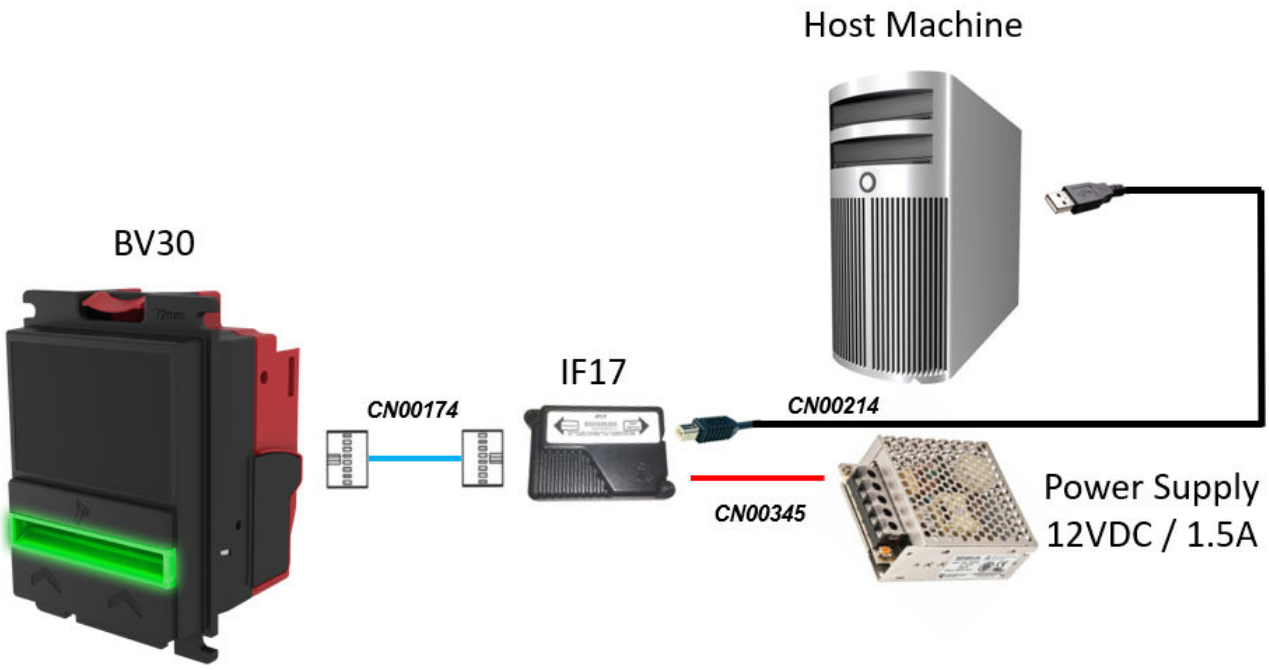
Validator Manager is a utility which allows the user to reprogram any of ITL's banknote and coin validators/ recyclers. Note that admin rights are required during installation. The validator must be in SSP for the Validator Manager to detect the device.

System Requirements

- Windows 8.1 and above
- .Net Framework 4.5
- 256mb ram
- 50mb hard disk free
- Connected BV30 with active com port

Hardware Setup

The connection example below shows how to connect the BV30 to the host machine (PC) using the IF17:



We have seen instances where 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.

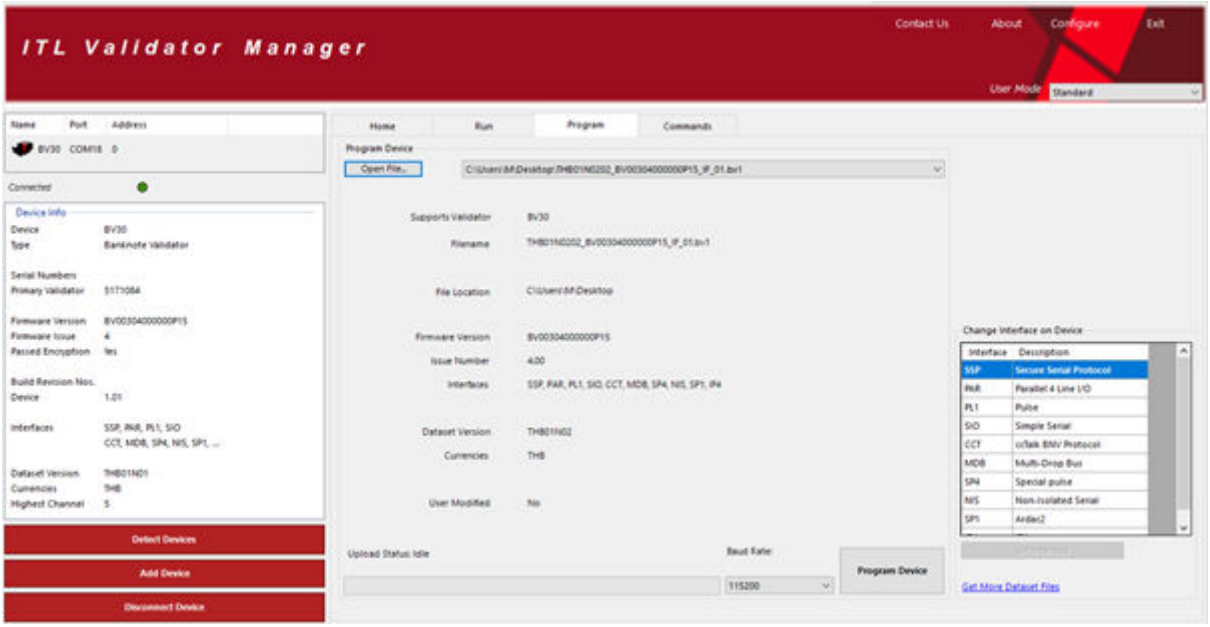
Switching to Programming Mode (SSP)

Before programming via the Validator Manager software tool, the BV30 needs to be switched to its programming mode (SSP interface). Please refer to Switching to Programming Mode (SSP) for instructions on performing this procedure.

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 BV30 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 BV30. 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 signalling the update has begun.

> 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.

Remote Updates

The BV30 supports remote updates via the SSP Protocol. Refer to the SSP implementation guide for information on this remote update process.

> This is a complex operation and incorrect implementation may damage units.

BV30 Protocols and Interfacing

Contents

Introduction

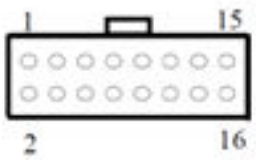
The BV30 supports the industry standard protocols shown in this section. Other interfaces that are not listed may be available on request.

For any queries regarding interfaces that are not listed contact support@innovative-technology.com.

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

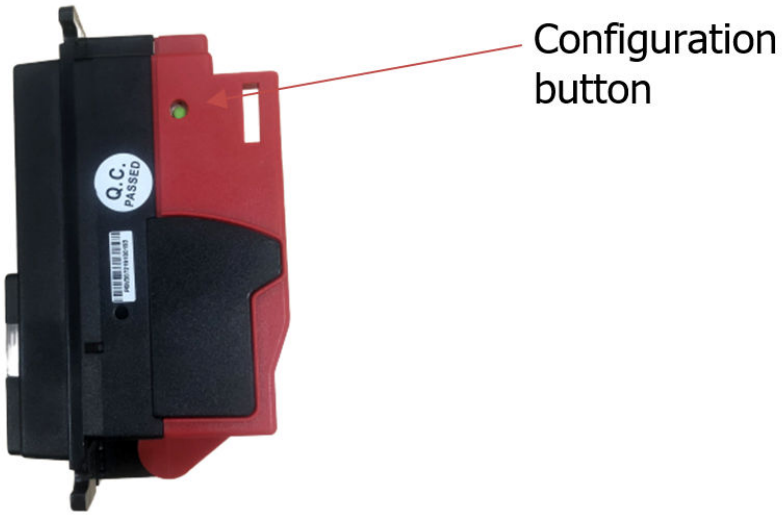
Interface Connector

The BV30 has a 16-pin connector to allow interfacing and programming, this is the same 16-pin connector as the other ITL banknote validators. The pin numbering of the socket is shown below:



User Interface

The BV30 has a multi-function configuration button located on the side of the unit.



The different functions of the configuration button are listed in Configuration Button Functions

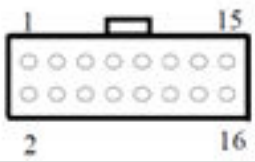
SSP and eSSP

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 API to aid with SSP integration.

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

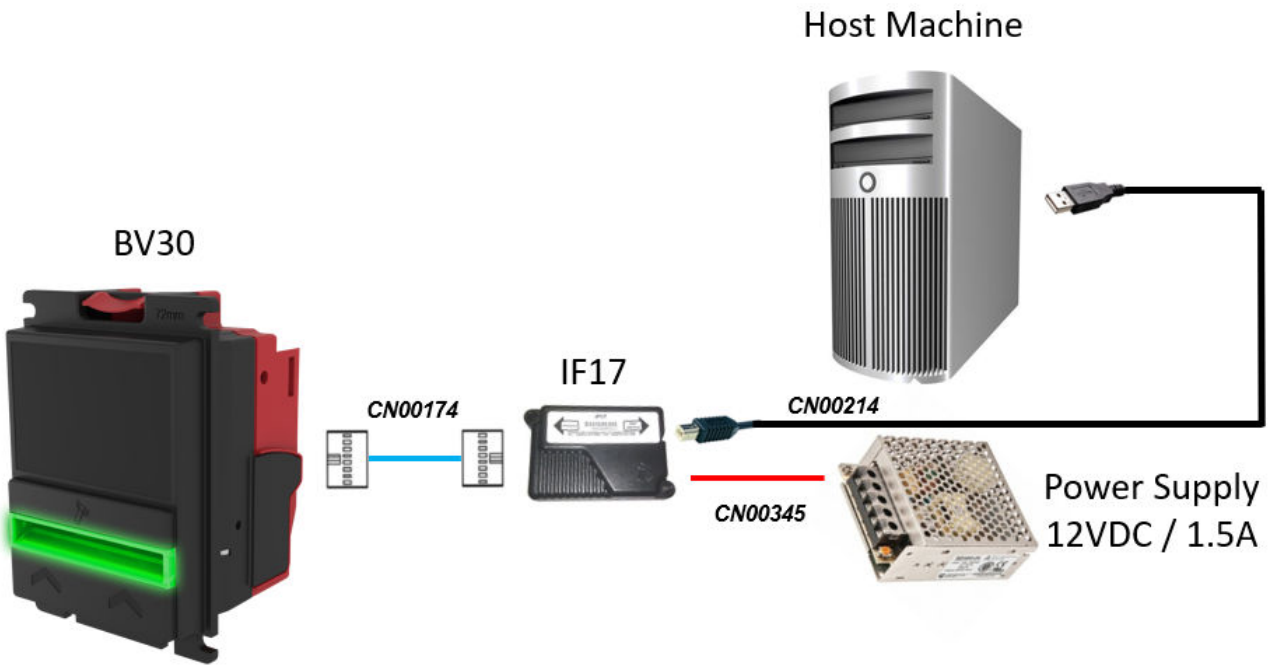
Pin Assignments



Pin	Name	Type	Description
1	**Vend1**	**Output**	**Serial Data Out (Tx)**
2 - 4	⚠ Not Used		
5	**Inhibit1**	**Input**	**Serial Data In (Rx)**
6 - 14	⚠ Not Used		
15	**+Vin**	**Power**	**+12VDC Supply**
16	**0V**	**Power**	**0V Supply (GND)**

Setup Examples

The drawing below highlights how to connect the BV30 to an SSP/eSSP host machine using available cables and interfaces from Innovative Technology Ltd. For cable drawings refer to the BV30 Appendix.



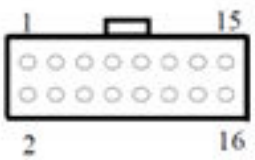
Type	ITL Part Number	Description
Cable	CN00174	Ribbon Cable
Cable	CN00345	DA3 / IF17 / IF18 Power Cable
Cable	CN00214	USB Type A to B
Interface	IF17	TTL to USB Converter

ccTalk

General Description

ccTalk® is a serial communications protocol designed by Money Controls to allow 3-wire interfacing between a host machine and cash handling peripherals.

Pin Assignments



Pin	Name	Type	Description
1	**Vend1**	**Output**	**Serial Data (link to Pin 5)**
2 - 4	⚠ Not Used		

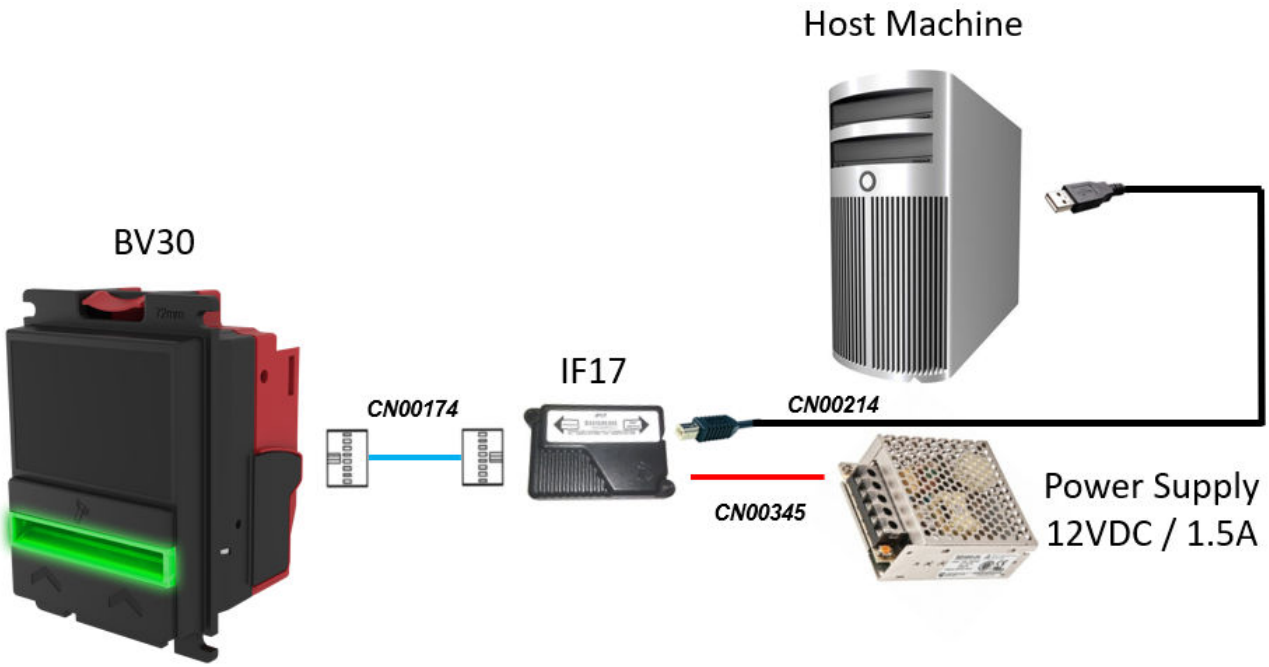
Pin	Name	Type	Description
5	**Inhibit1**	**Input**	**Serial Data (link to Pin 1)**
6 - 14	⚠ Not Used		
15	**+Vin**	**Power**	**+12VDC Supply**
16	**0V**	**Power**	**0V Supply (GND)**

ccTalk DES Encryption

When using ccTalk® DES encryption, the BV30 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 BV30. Please refer to ccTalk DES Encryption for details.

Setup Example Drawings

Same scheme could be used as for SSP connection:



SIO and SI2

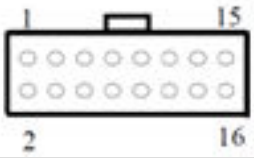
General Description

SIO (Serial Input/Output) is a very basic low-level serial communication interface. Messages are not echoed back. SIO uses 300 baud and SI2 uses 9600 baud.

Please contact support@innovative-technology.com for the SIO Interface Specification if required.

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

Pin Assignments



Pin	Name	Type	Description
1	**Vend1**	**Output**	**Serial Data Out (Tx)**
2 - 4	⚠ Not Used		
5	**Inhibit 1**	**Input**	**Serial Data In (Rx)**
6 - 14	⚠ Not Used		
15	**+Vin**	**Power**	**+12VDC Supply**
16	**0V**	**Power**	**0V Supply (GND)**

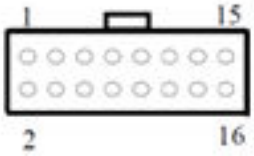
MDB

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).

Contact support@innovative-technology.com for further information.

Pin Assignments



Pin	Name	Type	Description
1	**Vend 1**	**Output**	**Serial Data Out (Tx)**
2 - 4	⚠ Not Used		
5	**Inhibit 1**	**Input**	**Serial Data In (Rx)**

Pin	Name	Type	Description
6 - 14	⚠ Not Used		
15	**+Vin**	**Power**	**+12VDC Supply**
16	**0V**	**Power**	**0V Supply (GND)**

A BV30 running MDB must use an IF5 or the MDB Adapter.

IF5 Interface

An external interface box, which regulates the power supply and opto-isolates the communication lines. Typically the vending machine's power supply is a higher voltage than the maximum for the BV30. The IF5 drops this higher voltage down to the required level.

Type	ITL part number	Description
Interface	PA02061	IF5 KIT - MDB Voltage Converter

MDB Adapter

An IF5 cannot be used with MDB Adapter.

BV30 can be used with the MDB Adapter, which allows you to use the validator directly with MDB applications.

Type	ITL part number	Description
Interface	PA02344	MDB Adaptor

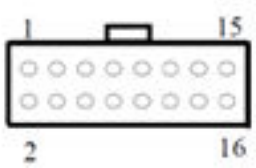
Parallel

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 ± 3ms. Pulses outside these limits should be rejected as a precaution against false triggering.

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

Pin Assignments



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 by holding HIGH, hold LOW to enable**
6	**Inhibit 2**	**Input**	**Inhibit Input Channel 2 by holding HIGH, hold LOW to enable**
7	**Inhibit 3**	**Input**	**Inhibit Input Channel 3 by holding HIGH, hold LOW to enable**
8	**Inhibit 4**	**Input**	**Inhibit Input Channel 4 by holding HIGH, hold LOW to enable**
9	**Busy**	**Output**	**Output Busy Signal. Active LOW when BV30 is in transporting, reading or stacking a note**
10	**Escrow**	**Input**	**Input Escrow Control. Enable escrow function by holding LOW**
11 - 14	⚠ Not Used		
15	**+Vin**	**Power**	**+12VDC Supply**
16	**0V**	**Power**	**0V Supply (GND)**

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 BV30 is disabled.

Escrow Control

The BV30 has a single note escrow facility. This allows the BV30 to hold onto the note once validated, and then only accept the note 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.

Please refer to Escrow Timing Diagram for timing diagram and further details.

Busy Control

This is a general-purpose busy signal. It is active low (pin 9) while the BV30 is in operation.

Low Power Mode

The Low Power Mode can be used to reduce the power consumption of the BV30 when idle. When the Low Power Mode option is set, the BV30 goes into the Low Power Mode after about 6 seconds after the BV30 is powered up and remains in this state until a note is entered. Following a note insertion, the BV30 returns to Low Power Mode approximately 1 second after a credit is given or note is rejected. Please refer to Low Power Mode Timing Diagram for timing diagram and further details.

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!

Configuration button functions are only available during power up before the BV30 goes into Low Power Mode!

IF10

The IF10 is an interface that allows serial SSP to be used in machines without the need to update the host machine software. The IF10 is connected between the BV30 and the host machine. The IF10 communicates with the BV30 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.

Type	ITL part number	Description
Interface	PA02319	IF10 Kit – SSP To Parallel

Binary

General Decription

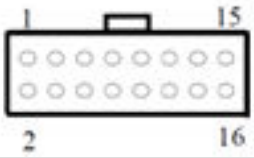
If the host machine needs more than 4 denominations to be recognised but the host machine cannot take advantage of the serial communication method, then the BV30 can be set to give a binary pattern output on the four parallel output pins. If the BV30 is set to Binary, it will issue the vend signals as 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!

Pin Assignments



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 - 14	⚠ Not Used		
15	+Vin	Power	+12VDC Supply
16	0V	Power	0V Supply (GND)

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 BV30 is disabled.

Escrow Control

The BV30 has a single note escrow facility. This allows the BV30 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 Escrow Control for further details.

Busy Control

This is a general-purpose busy signal. It is active low (pin 9) while the BV30 is in operation.

Low Power Mode

The Low Power Mode can be used to reduce the power consumption of the BV30 when idle. When the Low Power Mode option is set, the BV30 goes into the Low Power Mode after about 6 seconds after the BV30 is powered up and remains in this state until a note is entered. Following a note insertion, the BV30 returns to Low Power Mode approximately 1 second after a credit is given or note is rejected. Please refer to Low Power Mode Timing Diagram further details.

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!

Configuration button functions are only available during power up before the BV30 goes into Low Power Mode!

IF9 Interface

The IF9 is an interface that allows serial SSP to be used in machines without the need to update the host machine software. The IF9 is connected between the BV30 and the host machine. The IF9 communicates with the BV30 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.

Type	ITL part number	Description
Interface	PA02318	IF9 Kit – SSP to Binary

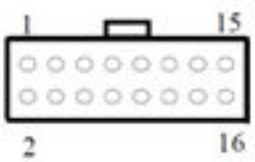
Pulse

General Description

Pulse can be used for the acceptance of up to 16 channels. When a note is recognized, 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 5 of this User Manual.

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

Pin Assignments



Pin	Name	Type	Description
1	**Vend 1**	**Output**	**Credit Output Pulse Stream**
2 - 4	⚠ 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 - 14	⚠ Not Used		
15	**+Vin**	**Power**	**+12VDC Supply**
16	**0V**	**Power**	**0V Supply (GND)**

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 BV30 is disabled.

Escrow Control

The BV30 has a single note escrow facility. This allows the BV30 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. Refer to Escrow Control for further details.

Busy Control

This is a general-purpose busy signal. It is active low (pin 9) while the BV30 is in operation.

Low Power Mode

The Low Power Mode can be used to reduce the power consumption of the BV30 when idle. When the Low Power Mode option is set, the BV30 goes into the Low Power Mode after about 6 seconds after the BV30 is powered up and remains in this state until a note is entered. Following a note insertion, the BV30 returns to Low Power Mode approximately 1 second after a credit is given or note is rejected. Please refer to Low Power Mode Timing Diagram for further details.

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!

Configuration button functions are only available during power up before the BV30 goes into Low Power Mode!

Credit Hold Function

If this function is enabled the BV30 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 BV30 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 BV30 remains inhibited until all pulses are given.

IF15 Interface

The IF15 is an interface that allows serial SSP to be used in machines without the need to update the host machine software. The IF15 is connected between the BV30 and the host machine. The IF15 communicates with the BV30 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.

Type	ITL part number	Description
Interface	PA02321	IF15 Kit – SSP to Pulse

BV30 Service Guide

Contents

Routine Maintenance

Introduction

The BV30 has been designed to minimize any performance variation over time. Much of this is achieved by careful hardware and software design. However, depending upon the environment the BV30 may at some time require cleaning or note path clearing.

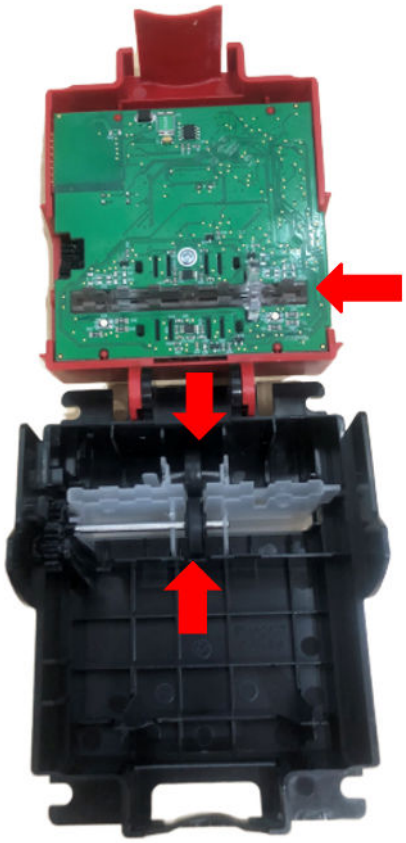
Recommended Cleaning Intervals

Innovative Technology Ltd recommends cleaning the optical lenses every month or as required. Dirt, dust or other residue leads to bad note acceptance and other performance degradation.

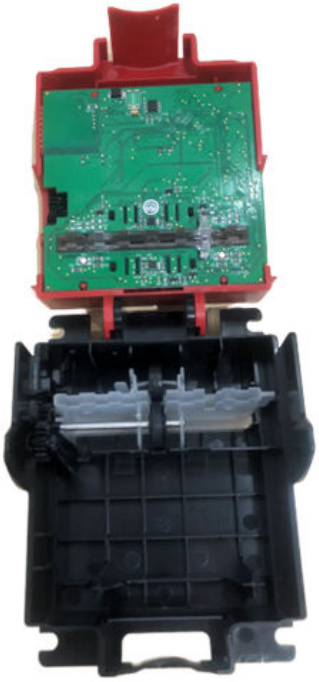
Cleaning the BV30

Disconnect the power **BEFORE** carrying out any cleaning operations to avoid the risk of causing damage to the validator.

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 BV30, only use a clean dry cloth or a mild detergent where absolutely necessary.

Unclip Bezel from BV30 by pressing Lozenge Release Catch and pulling bezel	
Wipe dirt and debris away from the wheel and lightpipe with a piece of cloth	

Clearing a Jam

Press the Lozenge Release Catch and softly pull open bezel	
Carefully pull the banknote from behind BV30 until it has come from validator head.	

Bezel Flash Codes

The BV30 has built in fault detection facilities. If there is a configuration or other error, the BV30 front bezel will flash to indicate the status. Refer to the table below for a summary of the flash codes:

Red Flashes	Blue Flashes	Error	Recommend Action
1	2	Note Path Jam	Check the note path and clear any jammed notes as per Clearing a Jam
	3	Unit Not Initialised	Initialise the unit as per Re-Initialize the Sensors
	4	Sensor Covered	Check the unit for any debris then fully clean the unit as per Cleaning the BV30
3	1	Firmware Checksum	Try to reprogram the firmware/dataset as per Dataset/Firmware Programming

	2	Interface Checksum	Try to reprogram the firmware/dataset as per Dataset/Firmware Programming
	3	EEPROM Checksum	Return to the nearest authorised service centre for repair
	4	Dataset Checksum	Try to reprogram the firmware/dataset as per Dataset/Firmware Programming
4	1	PSU Voltage too Low	Check the power supply meets the specification in Power Requirements
	2	PSU Voltage too High	Check the power supply meets the specification in Power Requirements

Configuration Button Functions

The BV30 has a multi-function configuration button that can perform several operations:

Configuration Button	Power Status	Function
Quick Double Press	Powered ON	Current Interface Indicator (Refer to Communication with the Host for further information)
Press and Hold until Bezel illuminates, then release	Powered ON	Toggle between Primary Protocol and SSP
Press and Hold as Power is Applied	Powered OFF then ON	Resets Encryption Key to Default

Check Power Connection

In cases where the BV30 is not powering on, check that the 16-pin connector is securely connected to the validator. A locating tab ensures that this cannot be connected incorrectly when using the ribbon cable sold by Innovative Technology Ltd.

If the cable is connected correctly, ensure that the cable is in good working condition and is not damaged. Finally, check that the Power Supply is providing the voltage/current required using a voltmeter or multi-meter.

Communication with the Host

If there is no communication between the BV30 and the host machine, check that the 16-pin connector is securely connected to the validator and that there is no damage to the cable.

With the BV30 powered on, check the protocol that is being used to ensure it is configured correctly for the host machine. Configuration Button Functions explains how to check the protocol. Refer to the lookup table below to determine which protocol is currently in use:

Flashes	Interface	Interface Settings											
		CCT Plain	CCT 8-bit	No Escrow Timeout	DES	Low Power	High Speed	Pulse High	Pulse low	Pulse per £	SIO Start disabled	Credit hold	Binary
1	SSP												
2	Pulse							ms/10	ms/10	Value		3	
3	MDB												
4	IF3												
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						

Not all protocols in this table are supported by the BV30, refer to Protocols and Interfacing for a list of supported protocols.

BV30 Product Compliance

EC Declaration of Conformity

- CE
- UKCA
- FCC
- RoHS
- REACH
- WEEE

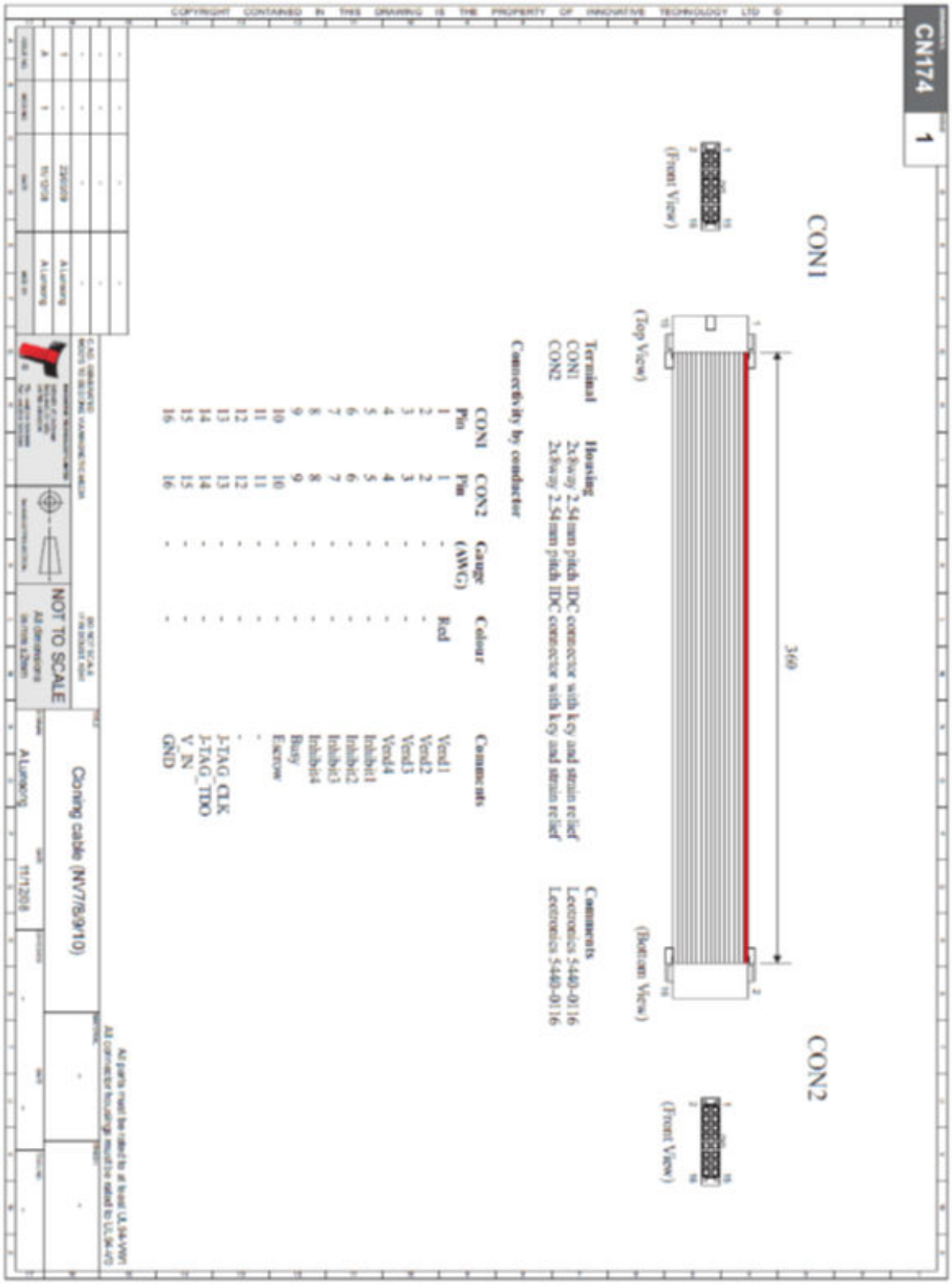
Visit the Support Hub to download the certificates.

BV30 Appendix

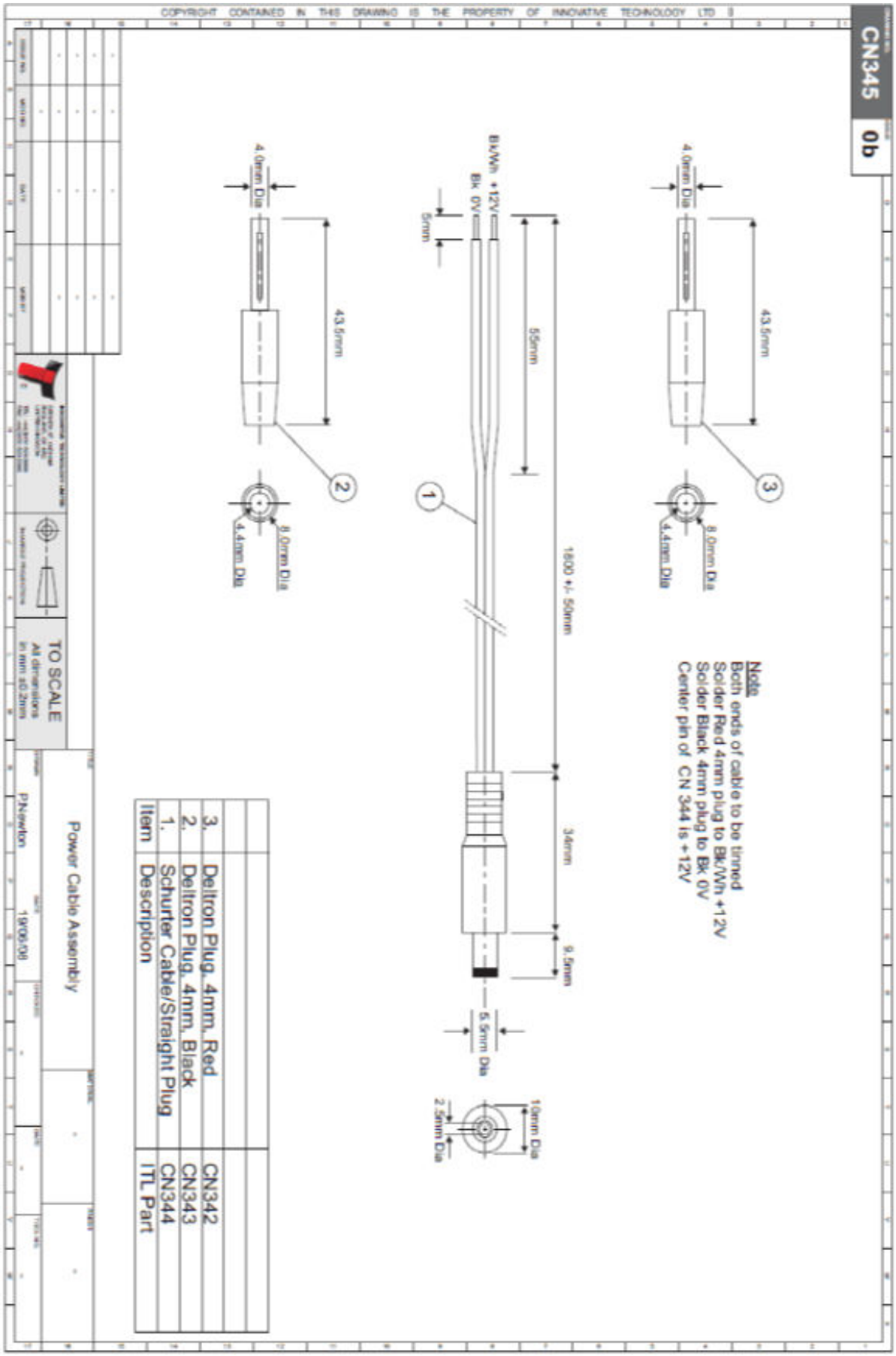
Contents

Cable Drawings

CN00174 Ribbon Cable (Validator to IF17)

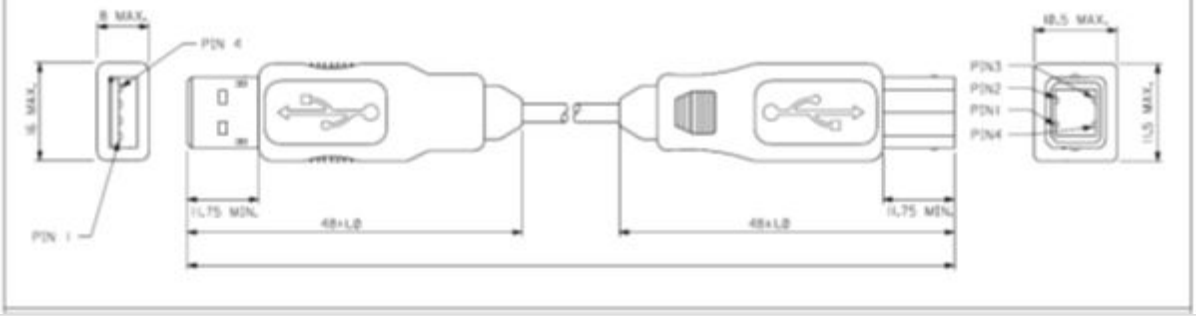


CN00345 DA3/IF17/IF18 Power Cable



CN00214 USB A-B Cable Assembly

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



Connector Specifications

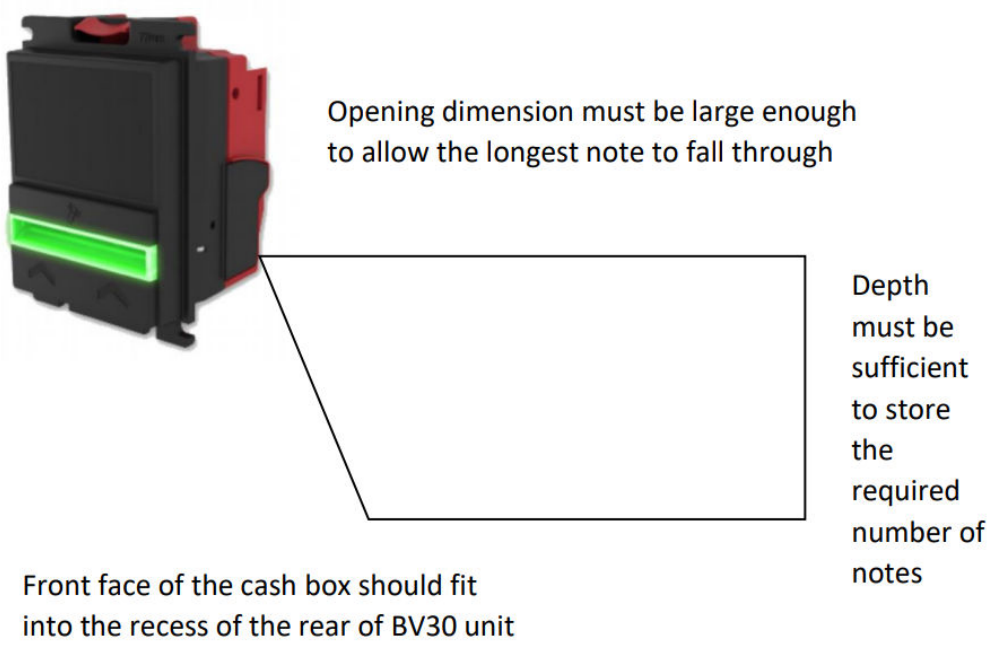
Type	Vendor	Part No.	Pins	Pitch	Polarising
Crimp	Leotronics	2653-2000			Female
Crimp	Molex	90119-2121			Female
Housing	Leotronics	2652-2161	2x8	2.54mm	With Key
Housing	Molex	90142-0016	2x8	2.54mm	With Key

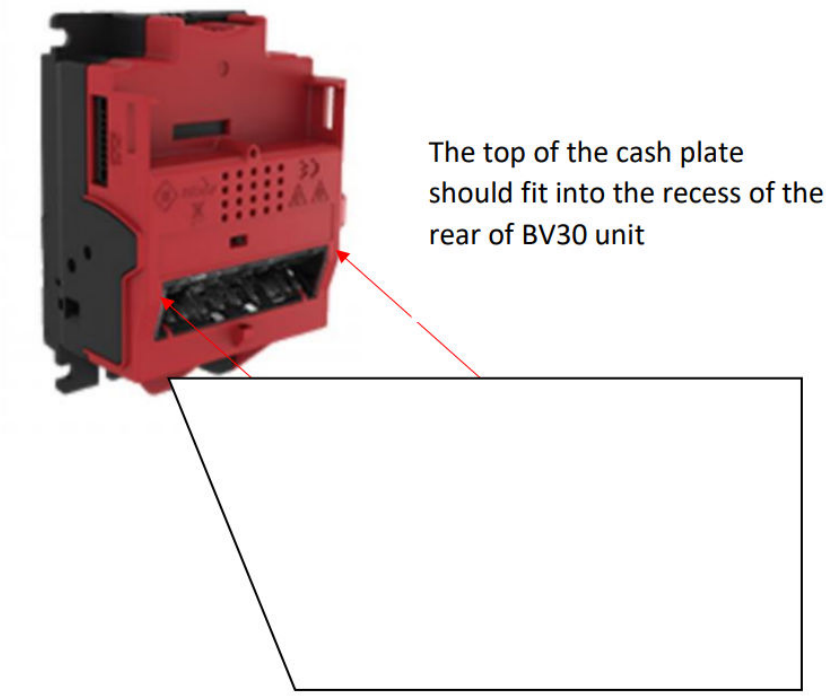
Switching to Programming Mode (SSP)

Press and Hold the Configuration Button for at least 2 seconds whilst the BV30 is powered up. The Bezel LED will flash rapidly to indicate that SSP is being loaded. Once this process has finished the BV30 will reset. The BV30 will now be in Programming Mode (SSP) and allow connection to a PC via a DA2 adapter or connection to a DA3.

Free Fall Cashbox Advice

When installing BV30, adequate space in width and length must be allowed for received notes to be free falling behind BV30. Notes not allowed free falling will cause the validator to malfunction.





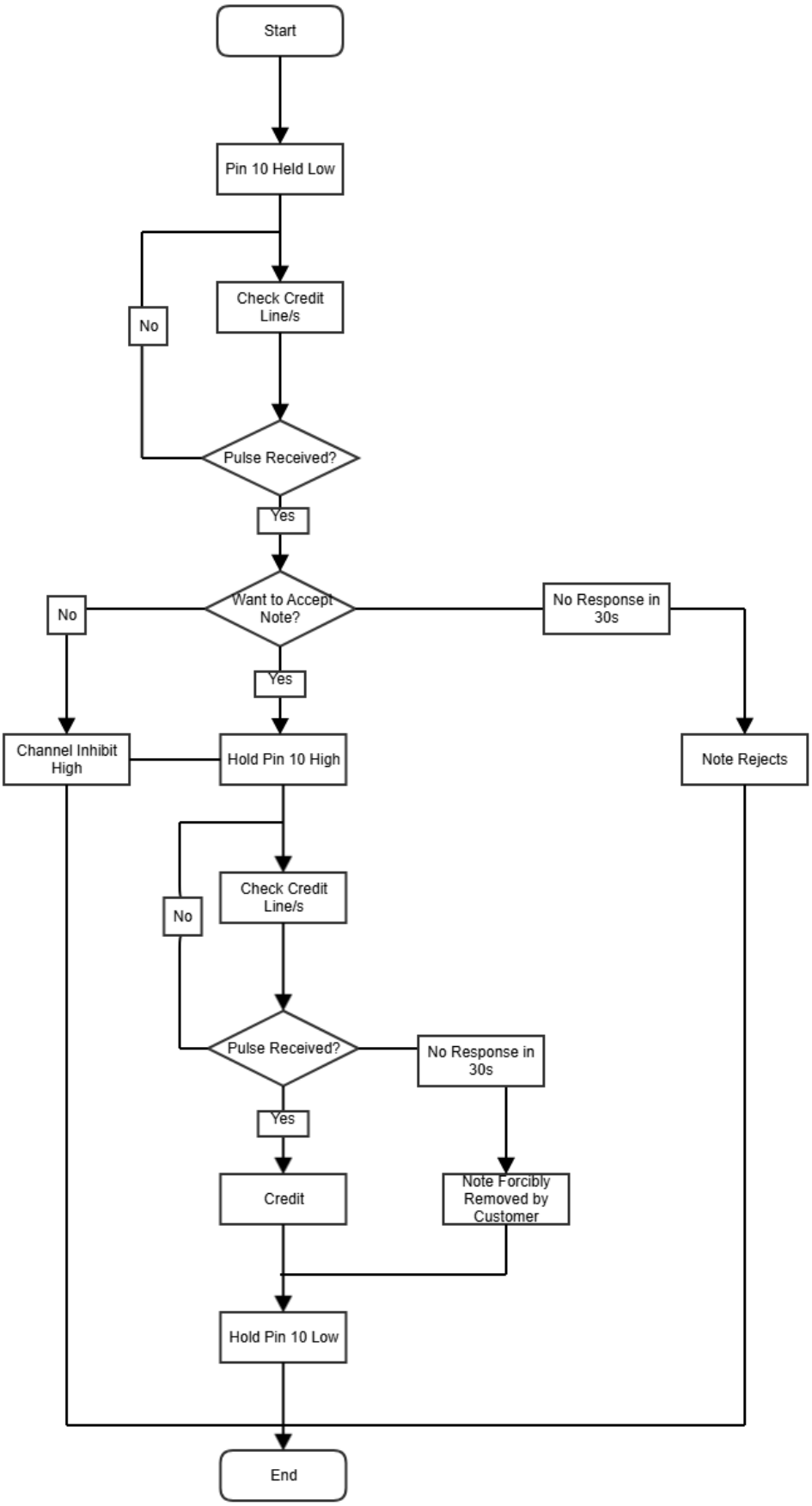
ccTalk DES Encryption - Trusted Mode

The DES compatibility can be toggled on/off using Validator Manager version 5.1 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.

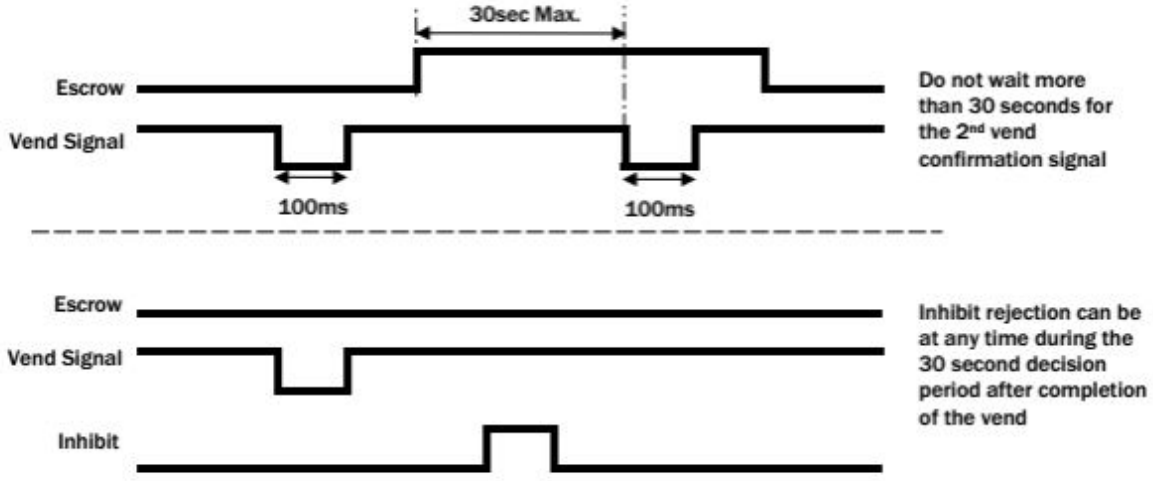
Use configuration button for rollback any previously set ccTalk key to original (see Configuration Button Functions).

Escrow Control

The BV30 has a single note escrow facility. This allows the BV30 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:


Start
Pin 10 Held Low
Check Credit Line/s
No
Pulse Received?
Yes
Want to Accept Note?
No
No Response in 30s
Yes
Channel Inhibit High
Hold Pin 10 High
Note Rejects
Check Credit Line/s
No
Pulse Received?
No Response in 30s
Yes
Credit
Note Forcibly Removed by Customer
Hold Pin 10 Low
End

Escrow Timing Diagram

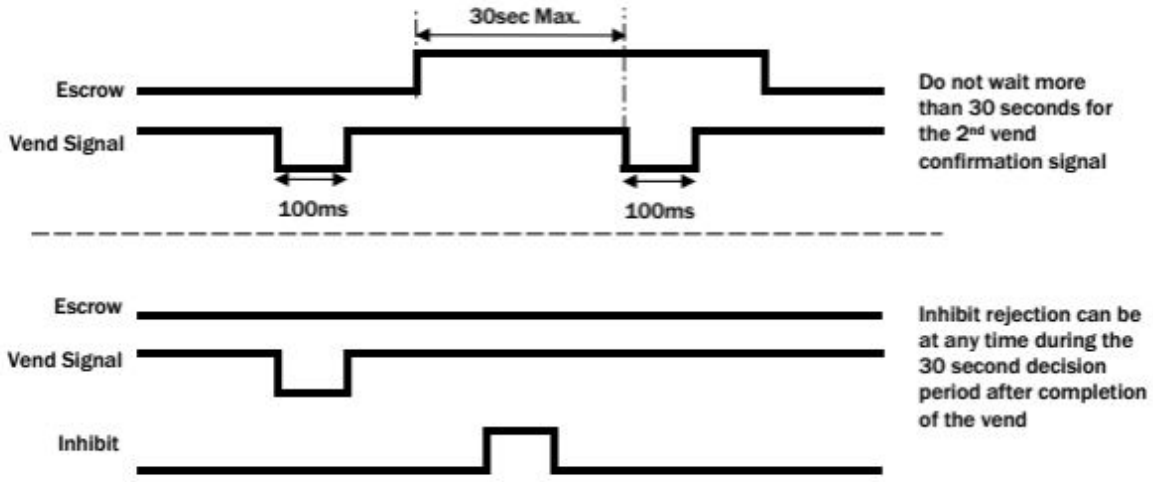


Low Power Mode Timing Diagram

> 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.

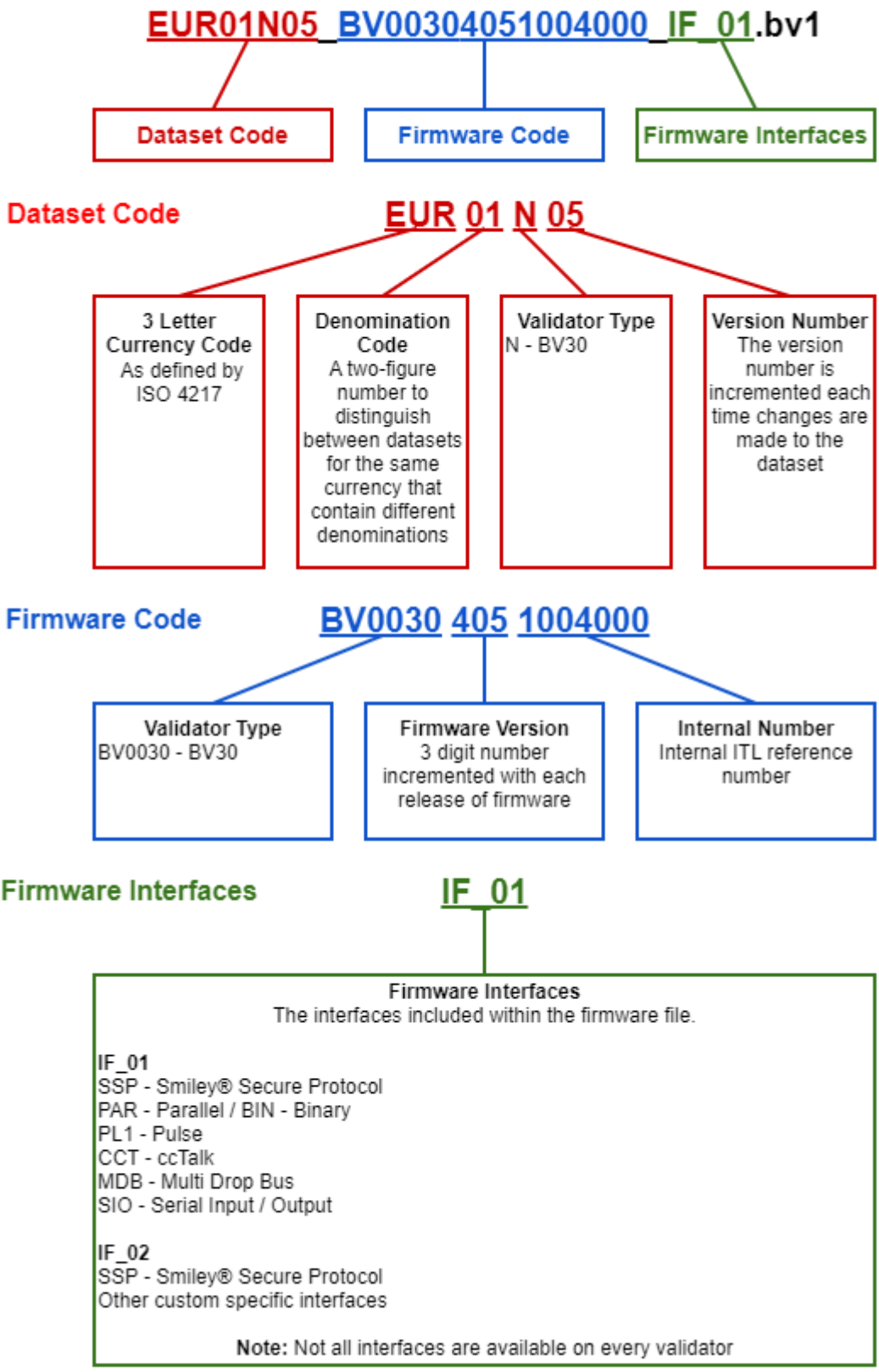
Low Power Mode can be used with all none serial communication protocols to reduce the power consumption of the BV30 when idle. When the BV30 is in this state the current consumption is reduced to approximately 1.2mA. The BV30 goes into low power mode approximately 4 seconds after the validator is powered up and remains in this state until a note is entered (Time A). Following a note insertion the BV30 returns to Low Power mode approximately 1 second after the Busy line goes High (After credit is given or note is rejected). (Time B)

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 BV30 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 BV30 goes back into low power mode.

File Naming Convention



Energy Profile

Purpose of Test

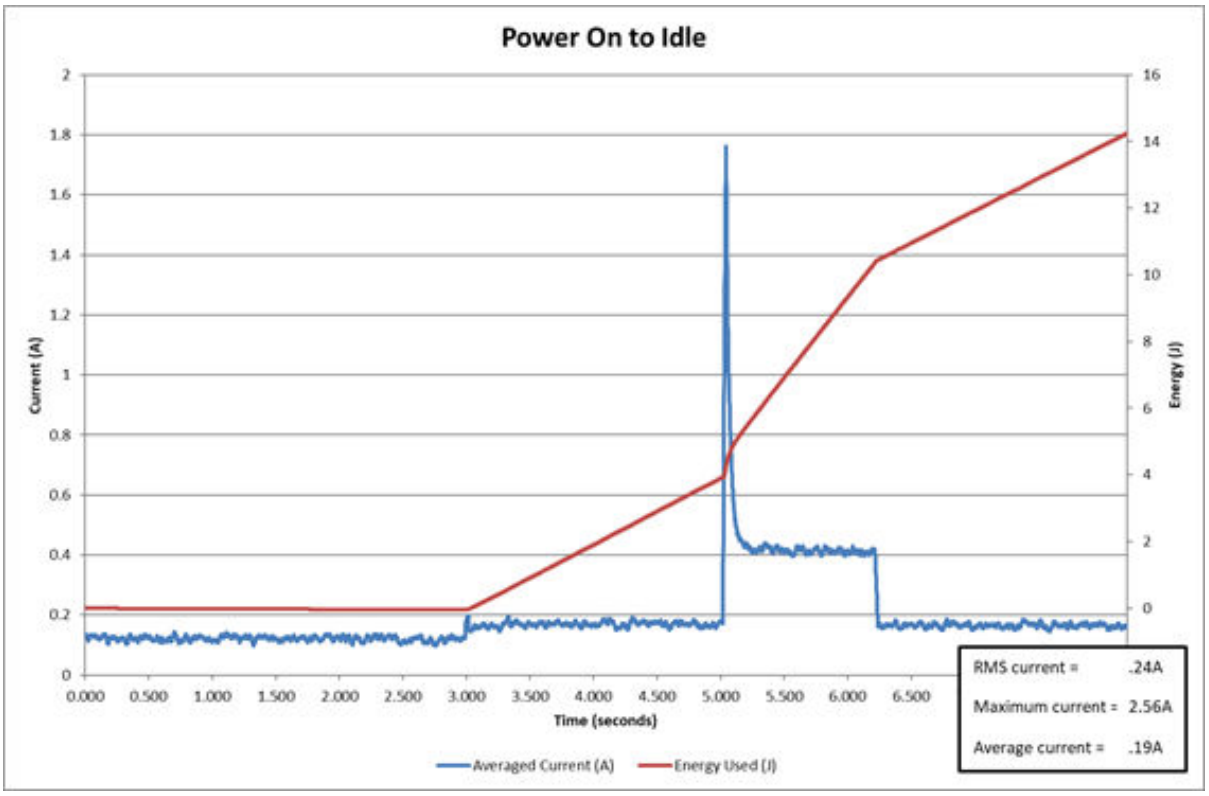
- To test the current usage at various stages of operation.
- SOP ITLUKDOCID-165993146-266 to be used.

Pass/Fail Criteria

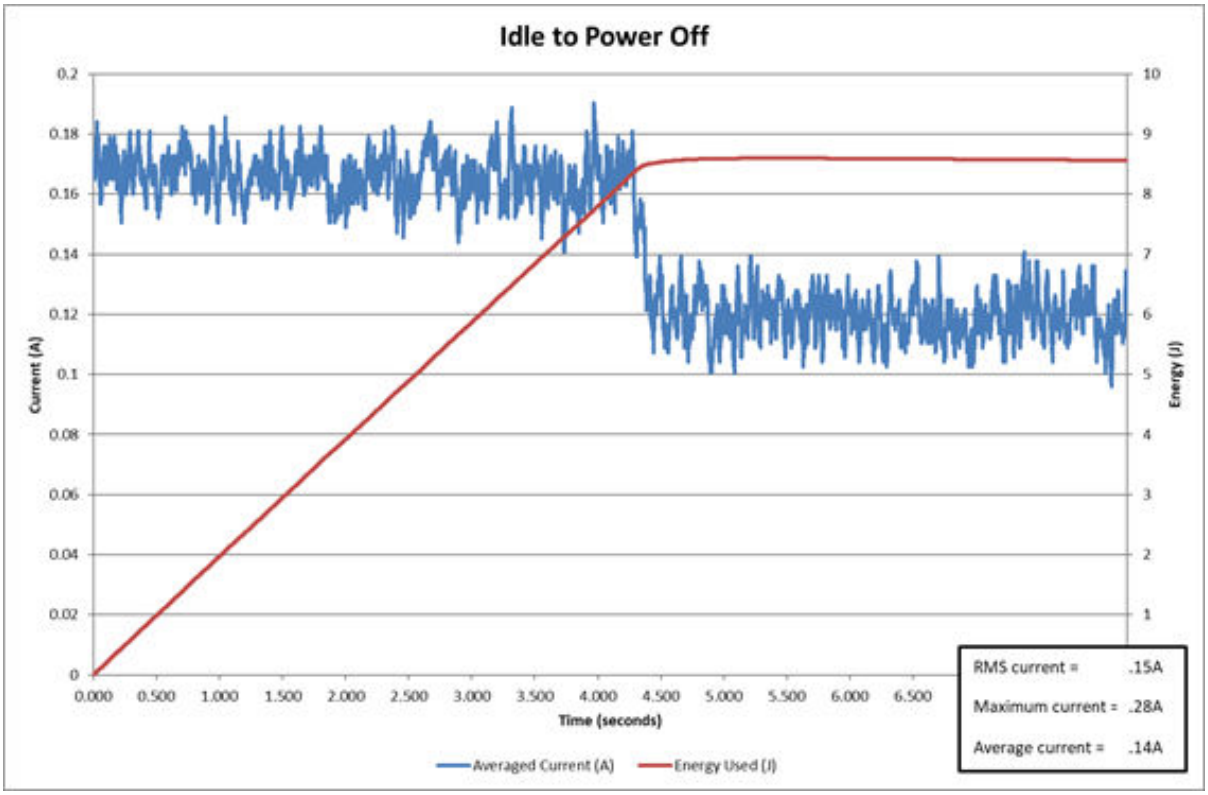
- Pass – Current not exceeding 3A over a prolonged period
- Fail – Current exceeds 3A over a prolonged period
- 3A is the peak current as stated in the product specification for BV30

Result

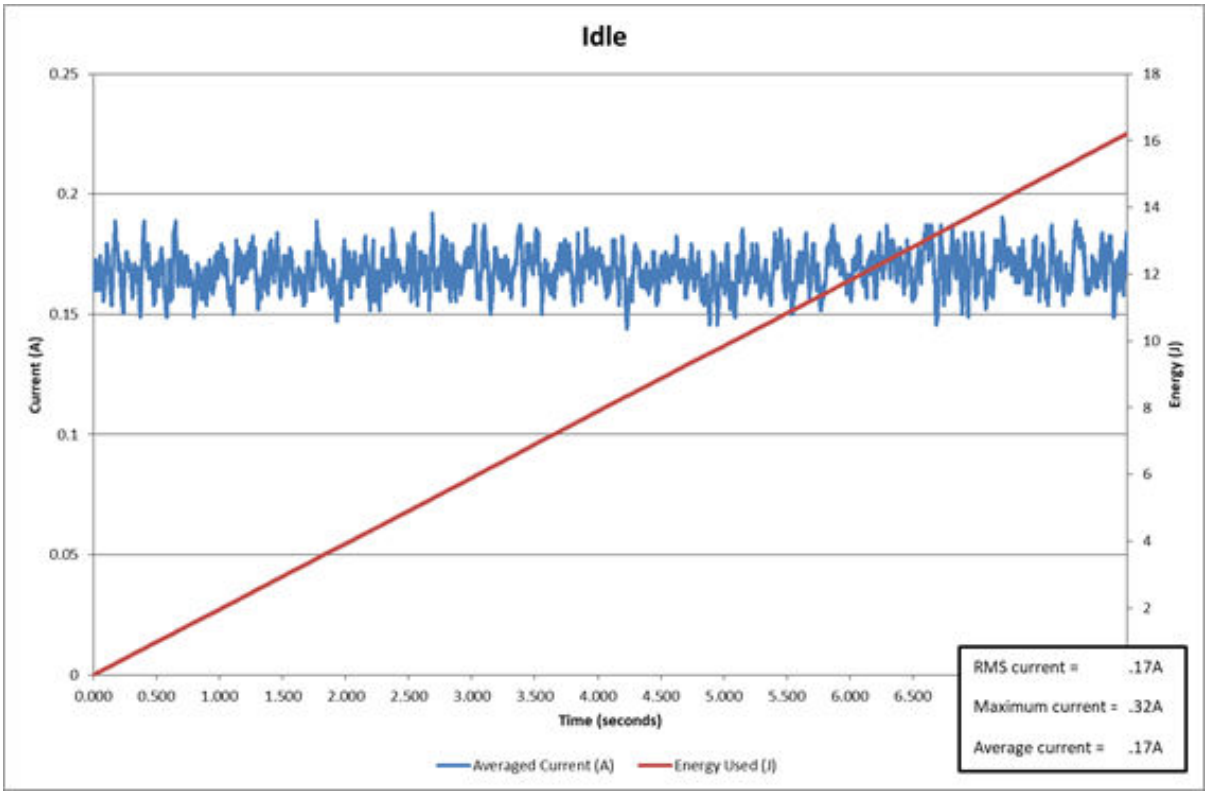
Picture 1: Power On to Idle Waveform



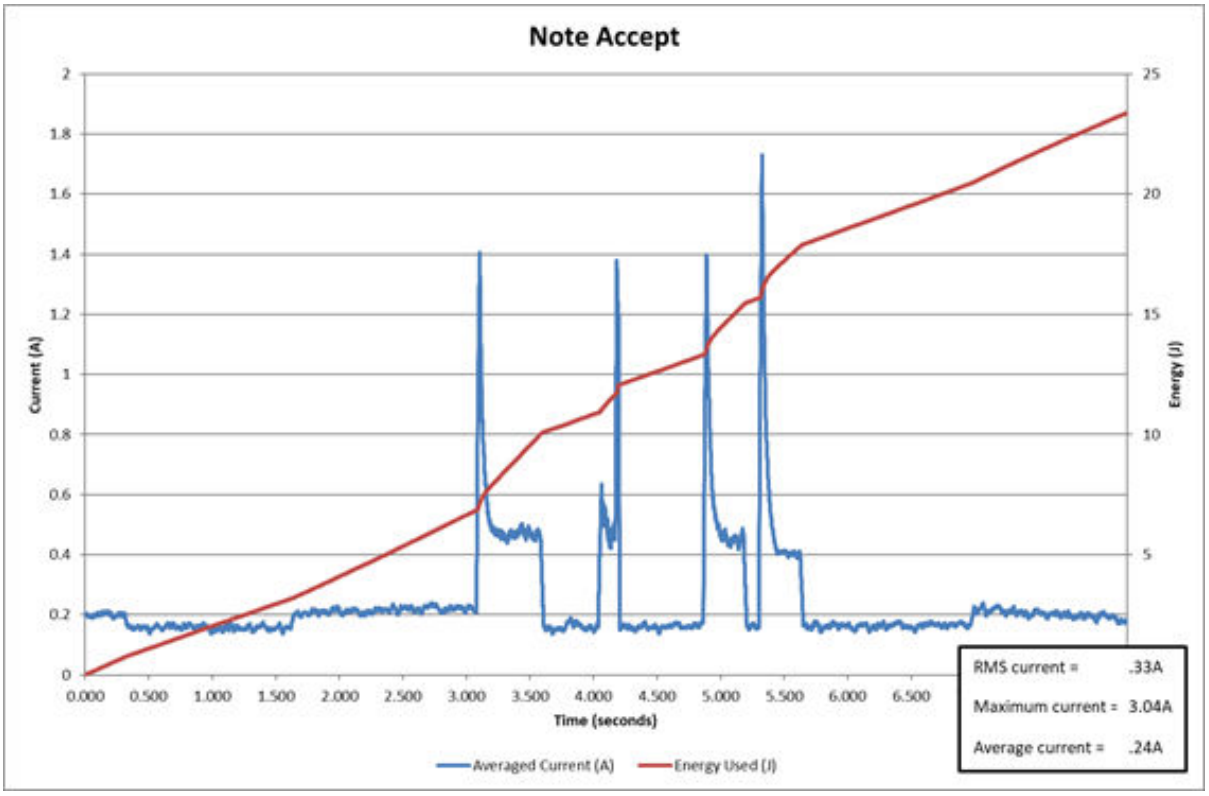
Picture 2: Idle to Power Off Waveform



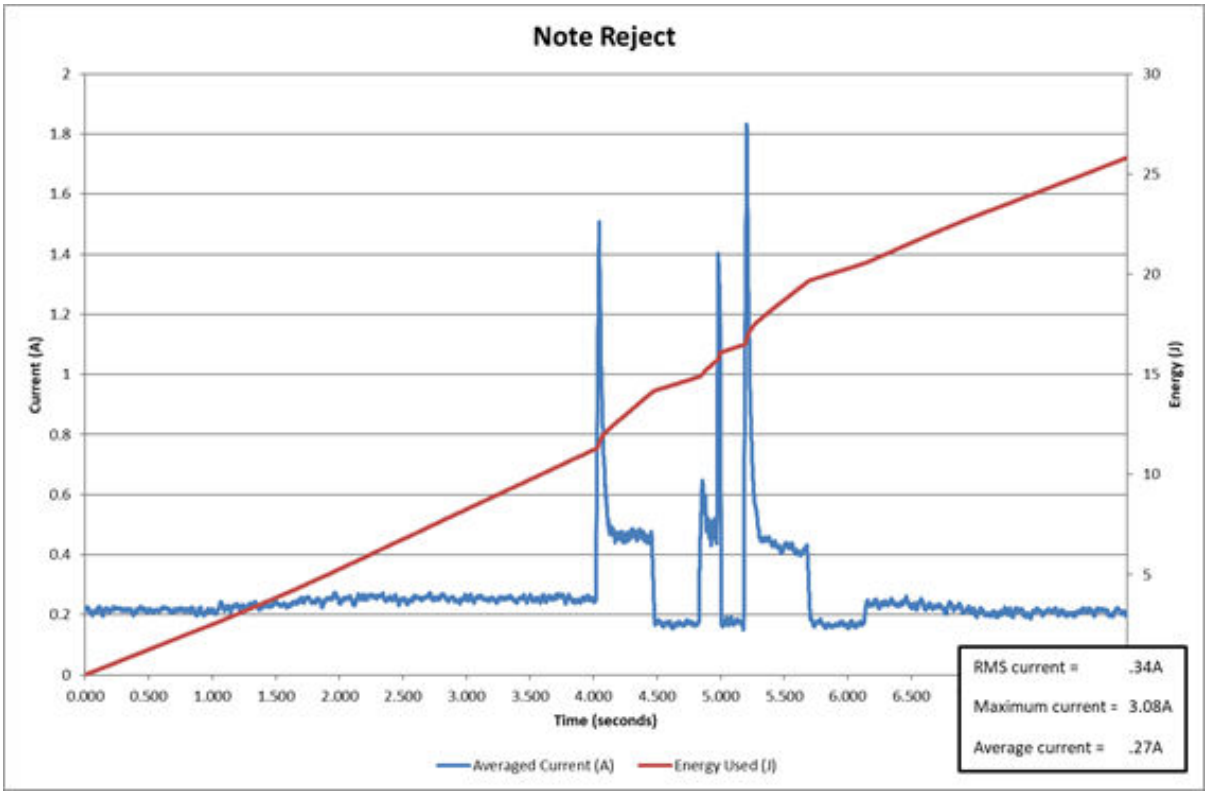
Picture 3: Idle Waveform



Picture 4: Note Accept Waveform



Picture 5: Note Reject Waveform



Picture 6: Note Jam Waveform

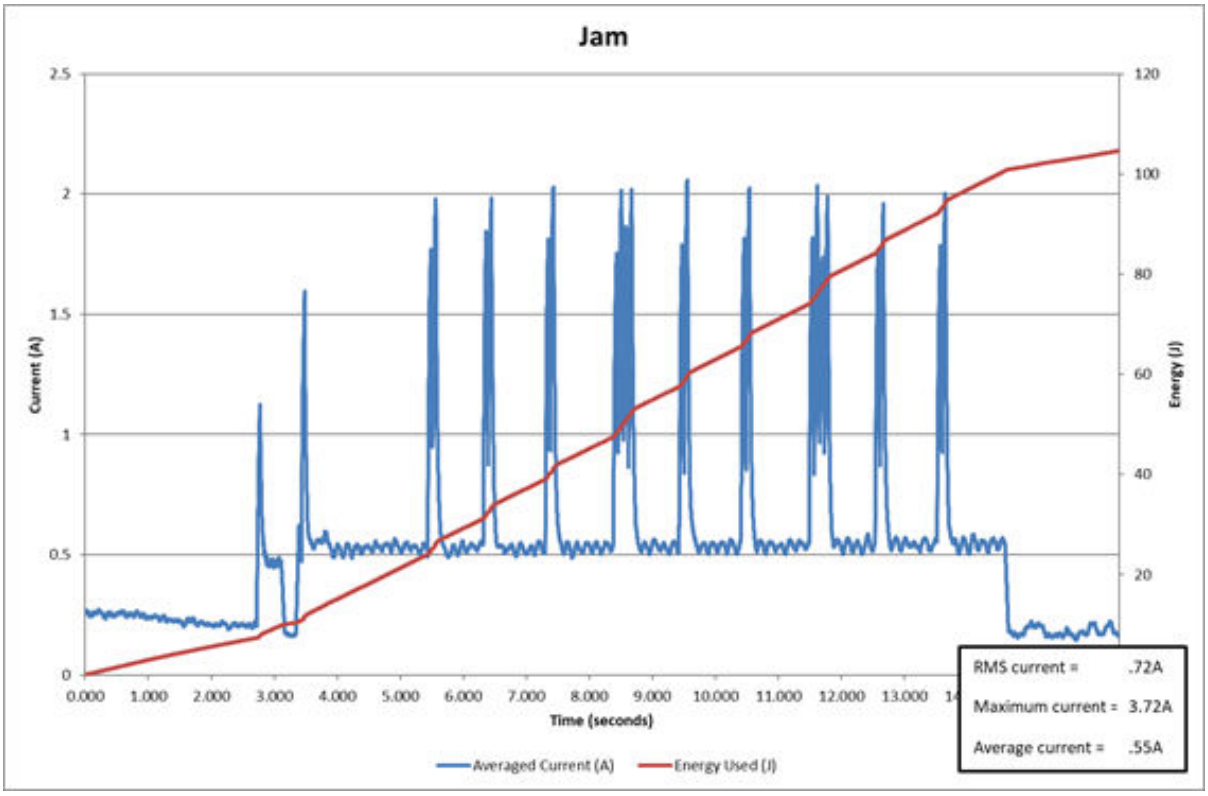


Table 1: Average Current Comparison between Each Unit Tested

Serial No	Power On	Power Off	Idle	Note Accept	Note Reject	Jam
545187	0.19A	0.18A	0.21A	0.24A	0.25A	0.62A
545195	0.2A	0.14A	0.17A	0.26A	0.27A	0.62A
545198	0.19A	0.14A	0.17A	0.26A	0.27A	0.55A

Table 2: Maximum Current Comparison between Each Unit Tested

Serial No	Power On	Power Off	Idle	Note Accept	Note Reject	Jam
545187	2.44A	0.36A	0.36A	3.04A	2.88A	3.4A
545195	2.4A	0.28A	0.32A	2.96A	2.88A	3.6A
545198	2.56A	0.28A	0.32A	2.84A	3.08A	3.72A

Peaks of > 3A were seen for very minimal time periods (µS).

Method & Equipment Used

Method

- BV30 downloaded with the latest firmware provided

- Oscilloscope connected to the BV30 Channel 1 with Current Probe and Channel 2 with the Voltage Probe
- Probes attached to the power lead
- Open, Open Choice Desktop and connect to the oscilloscope
- Starting with power up, the waveform is captured on Open Choice desktop and saved
- Power off, Idle, Pay In, Pay Out and Jam waveforms also saved

Equipment

- 3 x BV30
- NVTools v2.6.2
- cf1 firmware
- BRL Notes
- Tektronix MSO 3014 Oscilloscope
- Tektronix Open Choice Desktop
- Tektronix TCP0020 Current Probe
- Tektronix P6139B Voltage Probe
- Power Supply & Cables

Conclusion and Recommendations

- BV30 operating within product specification

BV30 Disclaimer and Safety Information

Contents

Disclaimer

Innovative Technology:

- Is not responsible for any loss, harm, or damage caused by the installation and use of this product. This does not affect your local statutory rights. If in doubt, contact Innovative Technology for details of any changes.
- Has a policy of continual product improvement. As a result, the products supplied may vary from the specification described here.
- Does not accept liability for any errors or omissions contained within this document. Innovative Technology shall not incur any penalties arising out of the adherence to, interpretation of, or reliance on, this standard.

The contents of this manual set may be subject to change without prior notice.

Product Safety Information

Throughout this user manual, attention should be drawn to key safety points when using or maintaining the product.

These safety points will be highlighted in a box:

This is an example text.

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 model.

⚠ **Danger!**	**IR and UV Radiation**
	• Possible skin or eye damage due to presence of IR and UV radiation internally. Disconnect power before servicing • Use PPE measures • Follow safety precautions given in IEC 62471