

BV100 Operations Manual

Innovative Technology

Secure Banknote Handling Solutions Of The Future



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1. Introduction

This manual describes the operation of the BV100 Bank note Validator as fitted with Firmware Version 4.00 or greater.

CAUTIONS:

- **THIS PRODUCT MUST BE FITTED WITH A 3 AMP FUSE BEFORE USE.**
- **THE BV100 VALIDATOR IS PIN FOR PIN COMPATIBLE WITH NV7/8/9/10, BUT NOT PIN FOR PIN COMPATIBLE WITH THE NV2/3/4/4X OR 5 SERIES PRODUCTS.**
- **DUE TO DIFFERENT NOTE CYCLE TIMES THERE MAY BE TIMING DIFFERENCES FROM THE NV PRODUCTS.**

We recommend that you study this manual as there are many new features permitting new uses and more secure applications.

If you do not understand any part of this manual please contact the factory, contact details are below, for assistance. In this way we may continue to improve our product.

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WARNING

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2. Scope of Document

This document is intended for those who will:

- Install the BV100 equipment.
- Maintain the BV100 equipment.

Although information is included which will allow a degree of fault diagnosis and repair, it is recommended that for all but simple mechanical repairs, the unit must be returned to an approved service centre for repair.

CAUTIONS:

- **NEVER EXCEED THE RECOMMENDED ENVIRONMENTAL AND ELECTRICAL LIMITS.**
- **DO NOT ATTEMPT TO LUBRICATE THE MECHANISMS AS THIS MAY AFFECT THE NOTE TRANSPORT.**
- **DO NOT POLISH THE LENS AS THIS MAY ALTER THE OPTICAL CHARACTERISTICS.**
- **IF THE BV100 VALIDATOR IS DISASSEMBLED THE UNIT MUST BE RE-CALIBRATED AND RE INITIALISED, FOLLOWING RE-ASSEMBLY.**

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

3. Environment and Power Requirements

This section details the Environmental and Power requirements.

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

Table 1 - Environmental Requirements

CAUTION:

- IF THE INPUT VOLTAGE FALLS BELOW 11.5V THE BV100 MAY NOT OPERATE CORRECTLY (WILL REJECT NOTES). THE FRONT BEZEL LIGHTS WILL FLASH TO INDICATE INCORRECT CONDITIONS
- IT IS RECOMMENDED THAT THE POWER SUPPLY USED CAN SUPPLY AT LEAST 2.5 AMPS.

Electrical Supply	Minimum	Maximum
Supply Voltage (V DC) Absolute Limits	+11.5V	+14.2V
MDB IF5 Version Supply Voltage	+18V	+48V DC or 34V AC
MDB Hardware version	+18V	+48V DC
Supply Ripple Voltage	0	0.25V @100 Hz
Supply Currents:		
Sleep (Low Power Mode)		TBC
Standby		230mA
Validating		500mA
Peak (Motor Stall)		2000mA

Table 2 - Power Requirements

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

Table 3 - Interface Logic Levels

4. General Description

BV100 Validator - the next generation of ITL Bank Note Validators

The BV100 Bank Note System is a compact note-validating machine (see figure 1), suitable for most money machines. It will accept up to 16 different denominations of notes in the serial control mode.



Figure 1 – The BV100

The BV100 Validator leaves the factory preset to at least one currency so that it is ready for immediate installation. If it is required to change the currency data set this may be done using the PC based Validator Management software.

Various size cash boxes are available for the BV100, ranging from approximately 350 notes to a maximum of approximately 950 notes (See [Appendix E – Cash Boxes](#) for more information).

A lock can be fitted to the BV100 to secure the cash box in place. A lock such as Camlock, prod ref. 2181D can be used.

New currencies and applications are being tested all the time, please refer to our web site or contact the factory for information concerning specific currencies if they are not already included on our approved list.

The BV100 is designed for easy installation in most machines.

Interfacing the Validator is very simple, with the choice of the following protocols:

SSP	PULSE	PARALLEL	BINARY
CCTALK	SIO	MDB	NIS
IF30	IF31	IF32	

Table 4 – Available Interfaces/Protocols

5. User Interface: Bezel LED's

The Bezel LED's are used to indicate a variety of status signals as described below in table 5.

LED Status	Description
Permanent On	Validator enabled ready to accept notes
Slow flash on power up (1 second period)	Power supply is incorrect, check specification
Slow flash (1 second period)	Validator in Configuration card programming mode
Short flash	Cash box removed

Table 5 – Bezel LED status codes

6. Machine Interface: Hardware

The BV100 interface connector is located on the left side of the unit; it has 16 pins (see figure 2) refer to Table 6 for the pin allocation. Two are used for the 0V and +12V power supply and there are five outputs and five inputs, the remaining four pins are reserved for factory use and should not be connected. An example mating connector is Molex type Part No: 39-51-2160.

It is possible to use the special hardware versions of BV100 in machines operating at 110 Volts or in machines operating at MDB.

The BV100 also has a Configuration Button located above the USB Connector (See Figure 2).

The USB connector can be used to program the BV100 and for communications when used in SSP and SIO modes. When used for programming, no external power supply is required. When used for the communications, power must be applied to the BV100 via the 16 pin interface connector before connecting the USB cable.

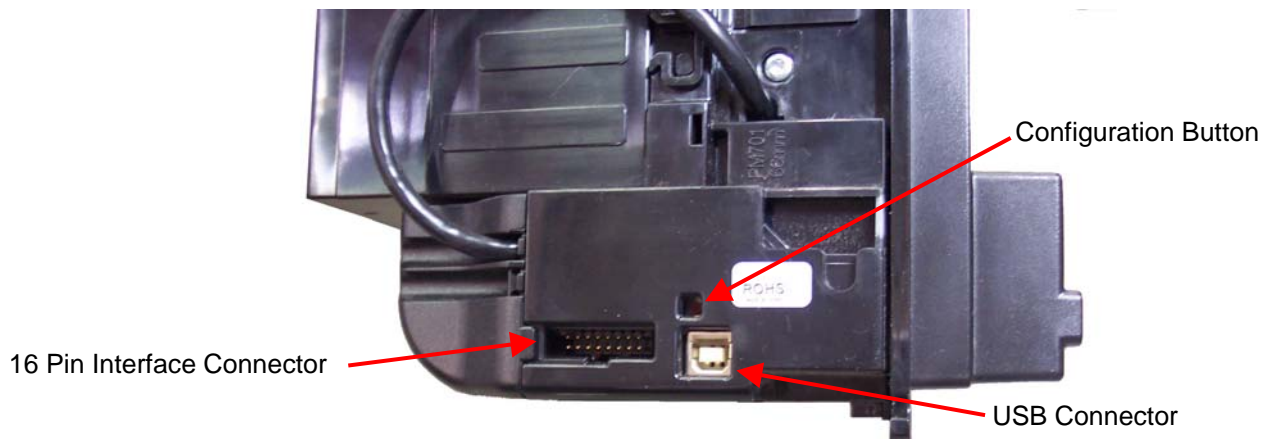
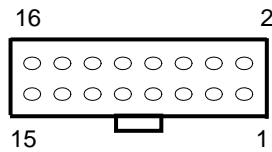


Figure 2 – Interface Connector

6.1 Interface Connector Pin Details

The connector pin details are described below (see table 6); they use an IDC 16-pin 0.1" pitch header with 2 rows of 8 pins.



Pin	Name	Description
1	Vend 1	Open Collector Output. Function changes depending on Machine Interface Protocol. (See individual interface descriptions for details) Also the Pulse Stream output Also the serial Output pin in SSP Serial Mode, and other serial modes
2	Vend 2	Open Collector Outputs. Function changes depending on Machine Interface Protocol. (See individual interface descriptions for details)
3	Vend 3	
4	Vend 4	
5	Inhibit 1	Inhibit channel 1 by holding this pin HIGH. To Enable a channel the inhibit must be held LOW. Also the serial Input pin in SSP Serial Mode, and other serial modes
6	Inhibit 2	Inhibit channel 2 by holding this pin HIGH
7	Inhibit 3	Inhibit channel 3 by holding this pin HIGH
8	Inhibit 4	Inhibit channel 4 by holding this pin HIGH
9	Busy	BV100 is validating and stacking output. Active low while the BV100 is reading, transporting or stacking a note.
10	Escrow	Operate Escrow function by holding LOW (see Appendix B – ESCROW Control for full details)
11	Factory Use Only	Do Not Connect
12	Factory Use Only	Do Not Connect
13	Factory Use Only	Do Not Connect
14	Factory Use Only	Do Not Connect
15	+Vin	Nominal 12V DC supply
16	0V	0V Supply

Table 6 - 16 Pin Connector Details

6.2 Configuration Button Functions

The functions available via the Configuration Function Button are detailed in Table 7

Configuration Button	Power Status	Function
Press & Hold (> 2 sec)	Powered ON	Sets BV100 to Programming Mode (SSP)
Press Once (< 1 sec)	Powered ON	Enables Configuration Card Programming
Press Twice (Within Half a second)	Powered ON	Current Setting Indicator
Press & Hold as power is applied	Powered OFF - ON	Resets ccTalk key to Default setting

Table 7 – Configuration Button Functions

BV100 Programming Mode

Press and Hold the Configuration Button for at least 2 seconds whilst the BV100 is powered up. The Bezel LED will flash rapidly to indicate that SSP is being loaded. Once this process has finished the BV100 will reset. The BV100 will now be in Programming Mode (SSP) and allow connection to a PC via a DA1 or DA2 adapter or connection to a DA3.

Note: This mode can only be cancelled by re-programming with a Configuration Card or via the Validator Manager program. Please ensure you are aware of all the BV100 programmed settings before entering this mode. Failure to restore the original setting will stop the BV100 from operating in the Host machine.

Configuration Card Programming Mode

Press the Configuration Button once whilst the BV100 is powered up. If done correctly the Bezel LED will flash every 1-second. This will allow the insertion of a Configuration Card to change the Firmware Protocol in the BV100. (See Chapter 8 [Using BV100 Configuration Cards](#) for full details). This mode can be cancelled by again pressing the Configuration Button once.

Current Setting Indicator Mode

Press the Configuration Button twice within half a second whilst the BV100 is powered up. The BV100 Bezel LED will then perform a series of flashes to indicate the current settings within the validator. (See Program Check Procedure, page 2 in [Appendix D – Configuration Cards](#))

Encryption Key Reset Function (CCTALK)

Note: This function will only be possible if the BV100 is programmed to CcTalk mode. It is not possible to reset the key from SSP mode.

Press and hold the Configuration Button Whilst the BV100 powered is off. Apply the power and keep the button pressed for several seconds. The ccTalk Encryption key will now be restored to the default setting.

6.3 Hardware Options

In addition to the standard BV100, there are different hardware options available of the BV100 as follows:

- **BV100 – MDB**
The BV100 MDB contains additional hardware for use in Vending machines operating at higher DC levels. The module provides a regulated 12V dc supply to the validator and has Opto isolated inputs and outputs. For further details on the MDB protocol please see chapter 7.7
- **BV100 – 110V**
The BV100 110V contains voltage regulator hardware that allows the BV100 to be used with machines that operate with a 110V AC supply.

7. Machine Interface: Protocols

ITL strongly recommends the use of a Serial protocol (Preferably SSP) to achieve the highest security.

7.1 Parallel Input and Output:

To use Parallel Output for 4-note/channel acceptance the Parallel interface must be programmed into the validator via the Configuration Cards (See [Appendix D – Configuration Cards](#)) or via the ITL BNV Currency Manager program.

Vend Signals: (Pins 1 to 4). The four channels have their own individual outputs. If a note is recognised then the relevant Vend line is set low for a period of $100 \pm 3\text{ms}$. Pulses outside these limits should be rejected as a precaution against false triggering.

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

Escrow Control: (Pin 10) Hold this pin Low to enable the single note escrow function. (See [Appendix B – ESCROW Control](#)).

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.

Inhibit Operation: (Pins 5 – 8) Channel 1 to 4 have their own inhibit input to allow the host machine to refuse specified notes. To inhibit a channel, the relevant inhibit input must be held high. To enable a channel, the corresponding inhibit must be latched low so that notes may be accepted.

If all four inhibits are high simultaneously then the BV100 will be disabled. In this state the bezel LED will not illuminate and if a note is inserted the motor will run in reverse preventing the insertion of the note.

All four inhibits may be connected together to create a 'global' inhibit. In this way the BV100 may be brought in and out of operation by the host machine.

It is possible to operate the BV100 in Low power mode with the Parallel interface. For further details please see Chapter 7.4

7.2 Pulse Stream Output

To use pulse stream output for acceptance of up to 16 note/channel acceptance, The Pulse interface must be programmed into the validator via the Configuration Cards (See [Appendix D – Configuration Cards](#)) or via the ITL BNV Currency Manager program.

Vend Signal: (Pins 1) When a note is recognised vend 1 will pulse a pre set number of times, the number of pulses can be set via the ITL BNV Currency Manager program (and set to default values with supplied dataset). The pulse width can be set either with the ITL BNV Currency Manager program or via the Configuration Cards (See [Appendix D – Configuration Cards](#))

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

Escrow Control: (Pin 10). No escrow function in this mode

Inhibit Operation: (Pins 5 – 8) Channels 1 to 4 have their own inhibit input to allow the host machine to refuse specified values of notes. To inhibit a channel, the relevant inhibit input must be held high. To enable a channel, the corresponding inhibit must be latched low so that notes may be accepted.

If all four inhibits are high simultaneously then the BV100 will be disabled. In this state the bezel will not illuminate and if a note is inserted the motor will run in reverse preventing the insertion of the note.

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

It is possible to operate the BV100 in Low power mode with the Pulse interface. For further details please see Chapter 7.4

Credit Hold Function:

If this function is enabled in pulse mode by Configuration card or ITL BNV Currency Manager program, the validator will take the note as normal but then wait until the escrow line is toggled low/high before. It will then give out the number of pulses per dollar as set on the programming card. After the pulses have been given, the validator will then 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 validator remains inhibited until all pulses are given.

7.3 Binary Output – BIN

To use Binary mode The Binary interface must be programmed into the validator via the Configuration Cards (See [Appendix D – Configuration Cards](#)) or via the ITL BNV Currency Manager program.

In the event that the machine needs more than 4 notes to be recognised, but the host machine cannot take advantage of the serial communication methods then the BV100 can be set to give a binary pattern output on the four parallel output pins.

If the BV100 is set to binary mode it will issue the vend signals as a binary pattern on the parallel outputs for $100 \pm 3\text{ms}$. In this way a maximum of 15 different notes can be accepted and 4 notes individually inhibited.

Vend Signals: (Pins 1 to 4). The four channels have their own individual outputs. If a note is recognised the binary representation of the channel number will be pulled low for $100 \pm 3\text{ms}$. Pulses outside these limits will be rejected as a precaution against false triggering due to noise.

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

Escrow Control: (pin 10). Hold this pin Low to enable the single note escrow function. (See [Appendix B – ESCROW Control](#)).

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

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

Inhibit Operation: (Pins 5 – 8) Channels 1 to 4 have their own individual inhibit input to allow the host machine to refuse specified values of notes. To inhibit a channel, the relevant inhibit input must be held high. To enable a channel the corresponding inhibit must be latched low so that notes may be accepted.

If all four inhibits are high simultaneously then the BV100 will be disabled. In this state the bezel will not illuminate and if a note is inserted the motor will run in reverse preventing the insertion of the note.

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

It is possible to operate the BV100 in Low power mode with the Binary interface. For further details please see Chapter 7.4

7.4 Low Power Option

Notes:

- Low Power Mode can **ONLY** be used with the above Parallel, Pulse and Binary protocols.
- Low power mode can only be enabled by correctly completing the configuration cards or via the ITL BNV Currency manager program.
- In Low Power Mode the front sensor is checked every 1 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 BV100 goes into Low Power mode

Electrical Supply	Minimum	Maximum
Supply Voltage (V DC) Absolute Limits	+11.5V	+14.2V
MDB IF5 Version Supply Voltage	+18V	+48V DC or 34V AC
MDB Hardware version	+18V	+48V DC
Supply Ripple Voltage	0	0.25V @100 Hz
Supply Currents:		
Sleep (Low Power Mode)		TBC
Standby		230mA
Validating		500mA
Peak (Motor Stall)		2000mA

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). 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)

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

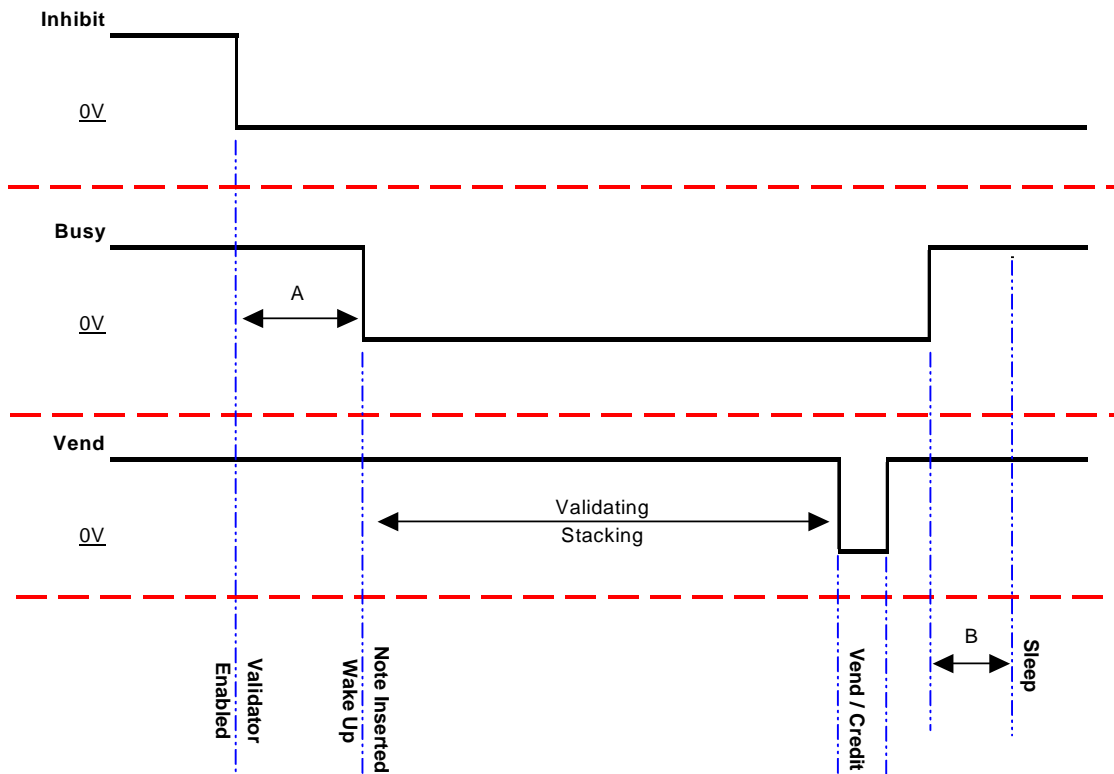


Figure 3 - Low Power Mode Timing Diagram

TIMING DIAGRAM EXPLANATION

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.

7.5 Serial Input/Output – SIO

Existing Smiley® NV4 - NV10 users may already be using the serial input/output facility in conjunction with the parallel inputs. The BV100 Validator also supports this system. However this interface is not recommended for new designs, the Smiley® Secure Protocol SSP interface is recommended.

CAUTION:

- **THE BV100 DOES NOT SUPPORT THE SIMPLE SERIAL DATA OUT ONLY MODE AS AVAILABLE ON NV4 AND EARLIER MODELS NV2 AND NV3. 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 into the validator via the Configuration Cards (See [Appendix D – Configuration Cards](#)) or via the ITL BNV Currency Manager program.

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.

The data is formatted as follows for 300 Baud

1-start bit - 8 data bits - 2 stop bits

Vend 1 (pin 1)

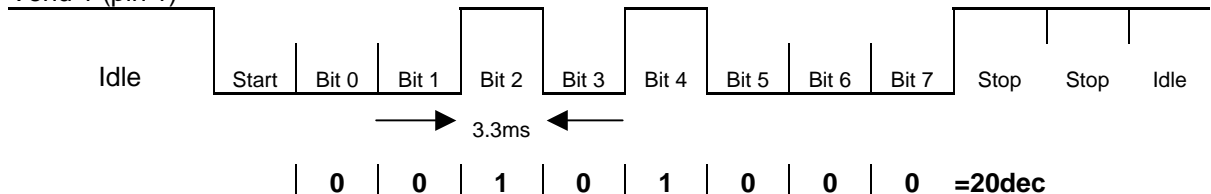


Figure- 4 Typical Serial Output: Transmission of the value 20 (decimal), Note not recognized

The data is formatted as follows for 9600 Baud

1-start bit - 8 data bits - 1-stop bits

Vend 1 (pin 1)

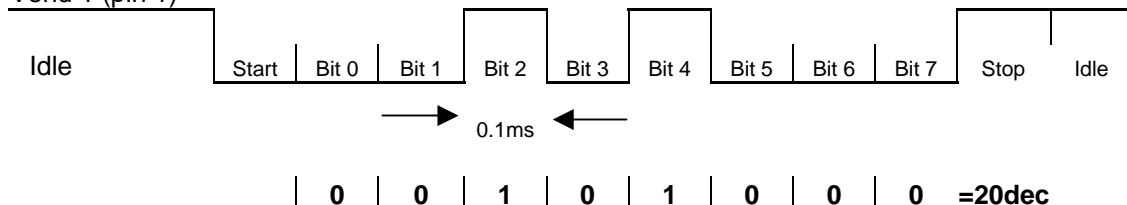


Figure- 5 Typical Serial Output: Transmission of the value 20 (decimal), Note not recognized

The BV100 will receive and 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		

Table 8 - Receive and Transmit Codes

Example transactions are shown below (see table 9):

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

Table 9 - Example Protocols

7.6 Smiley® Secure Protocol - SSP

NOTE: Please refer to the Smiley® Secure Protocol (SSP) Specification (ITLDrawing GA138) on the web site for full details of the SSP protocol.

To use SSP mode The SSP interface must be programmed into the validator via the Configuration Cards (See [Appendix D – Configuration Cards](#)) or via the ITL BNV Currency Manager program, or by pressing and holding the Configuration Button for more than 2 seconds.

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

The interface uses a master slave model, the host machine is the master and the peripherals (note acceptor, coin acceptor or coin hopper) are the slaves.

Data transfer is over a multi-drop bus using clock asynchronous serial transmission with simple open collector drivers. The integrity of data transfers is ensured through the use of 16 bit CRC checksums on all packets.

Each SSP device of a particular type has a unique serial number; this number is used to validate each device in the direction of credit transfer before transactions can take place.

Commands are currently provided for coin acceptors, note acceptors and coin hoppers. All current features of these devices are supported.

Features:

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

Benefits:

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

For detailed information and full protocol specification please refer to SSP Interface Specification ITL (Drawing GA138), this is available from the ITL website www.innovative-technology.co.uk.

To help in the software implementation of the SSP, ITL can provide DLL controls and Visual Basic applications on request. Please contact support@innovative-technology.co.uk for more information.

7.7 Multi-Drop Bus / Internal Communications Protocol (MDB/ICP)

To use the MDB mode an MDB BV100 or an IF5 interface box can be used. The MDB interface must be programmed into the validator via the Configuration Cards (See [Appendix D – Configuration Cards](#)) or via the ITL BNV Currency Manager program,

Note:

- An IF5 cannot be used with an MDB BV100.
- A standard BV100 can only be used in MDB with the addition of an IF5 interface.
- Please refer to the Multi-Drop Bus specification for the suggested current drive circuits available.
- The BV100 supports the MDB protocol version 1, level 1
- For detailed information and full protocol specification please refer to www.vending.org

MDB defines a serial bus interface used in electrically controlled vending machines (see figure 6). This is a 9600 Baud Master-Slave system where the BV100 banknote validator is a slave to a master controller. A master has the capability of communicating with 32 peripherals or slaves. The master is defined as the Vending Machine Controller (VMC).

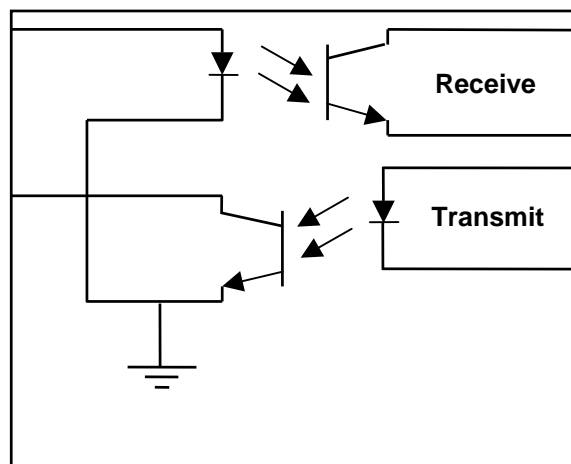


Figure 6 – MDB Opto Isolated Input / Output circuits BV100 MDB Slave

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.

For the USA the country code is 00 01, or 18 40

For Great Britain the code is 00 44, or 18 26.

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

- This number would be set to 100 (Hex 64) for the Euro or Great Britain.
- The number would be set to 1000 (Hex 03E8) for Columbia.

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

- The number would be set to 2 for Euro or USA
- The number would be set to 3 for Columbia

Adopting the numbers above:

- £5 would be displayed as 5.00
- £10 would be displayed as 10.00
- \$1 would be displayed as 1.00
- 1K Columbia would be displayed as 1.000

7.8 CCTalk Protocol – CCT

The BV100 supports the ccTalk serial protocol for easy interfacing with host machines that support this protocol.

To use ccTalk mode The CCT interface must be programmed into the validator via the Configuration Cards (See [Appendix D – Configuration Cards](#)) or via the ITL BNV Currency Manager program,

Pin out connections on BV100 for ccTalk are shown below (see figure 7) looking at the connection pins on the BV100 interface connector as defined in the ccTalk specification. 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 it's default value see Chapter 6.2.

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

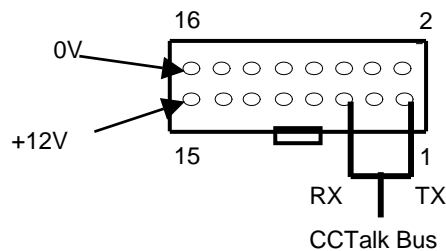


Figure 7 - CCTalk Connection Pins on the BV100

7.9 Other Interfaces available by request from ITL

- NIS – Compatible with Mars Non-Isolated Serial Protocol
- IF30 – Compatible with ID003 protocol
- IF31 – Special interface (Columbia)
- IF32 – Compatible with Cash Code CCnet Protocol

8. Using BV100 Configuration Cards

The Configuration Cards offer the following functions:

- Select required Communication Interface (SSP, ccTalk, Parallel etc).
- Adjust the channel and pulse configuration on a pre-programmed BV100 to your own requirements.

Programming the BV100 with the configuration cards is enabled via the 'Configuration Button' on the right hand side of the BV100 (see Chapter 6.2 [Configuration Button Functions](#)). (For details on how to complete the configuration cards please see [Appendix D – Configuration Cards](#))

- 1) Press the Configuration button once whilst the validator is powered up.
- 2) The bezel LEDs will now flash with a steady heartbeat until a Configuration Card is entered.
- 3) Once the Configuration Card has been entered the validator reads the card and immediately returns it.
- 4) The LEDs then flash rapidly whilst the interface is being changed. If the LEDs flash a number of times slowly, it is an indication of an error (For details of the Error Flash codes please see page 1 of [Appendix D – Configuration Cards](#))
- 5) When the changes are complete the validator resets.

If a configuration card is not entered, this function can be cancelled by pressing the button again Once.

It is now possible to check the programmed settings of the BV100 by pressing the Configuration button twice within half a second. (For details see page 2 of [Appendix D – Configuration Cards](#))

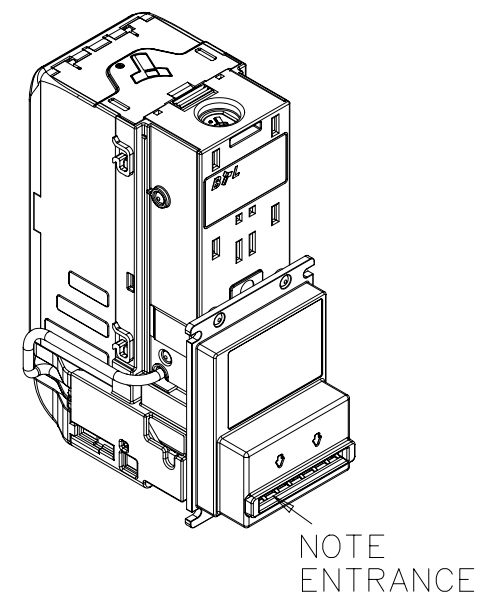
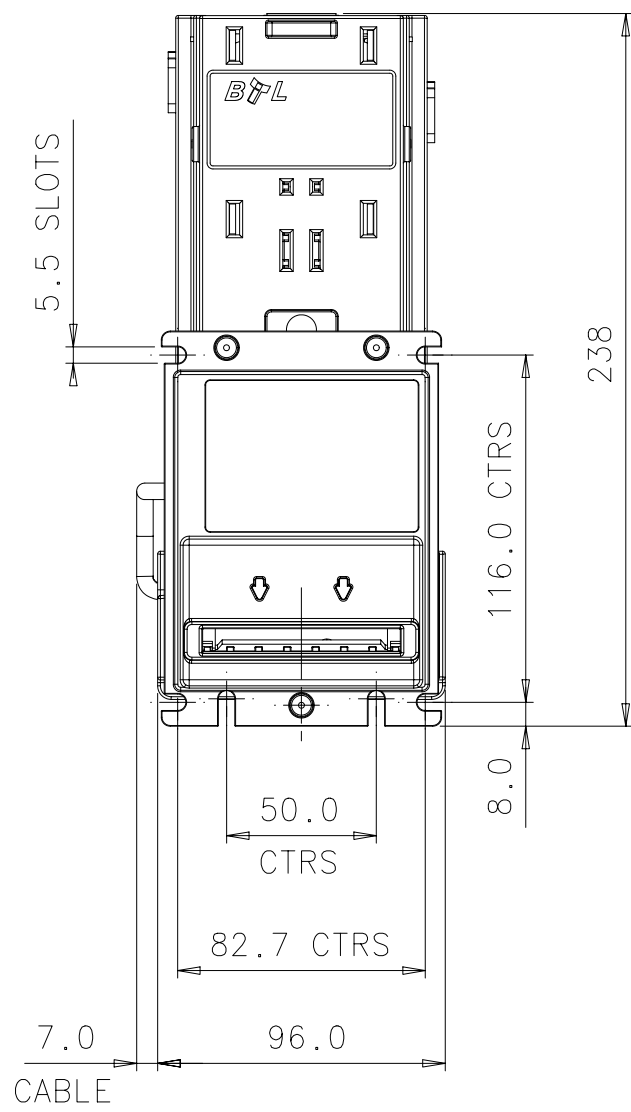
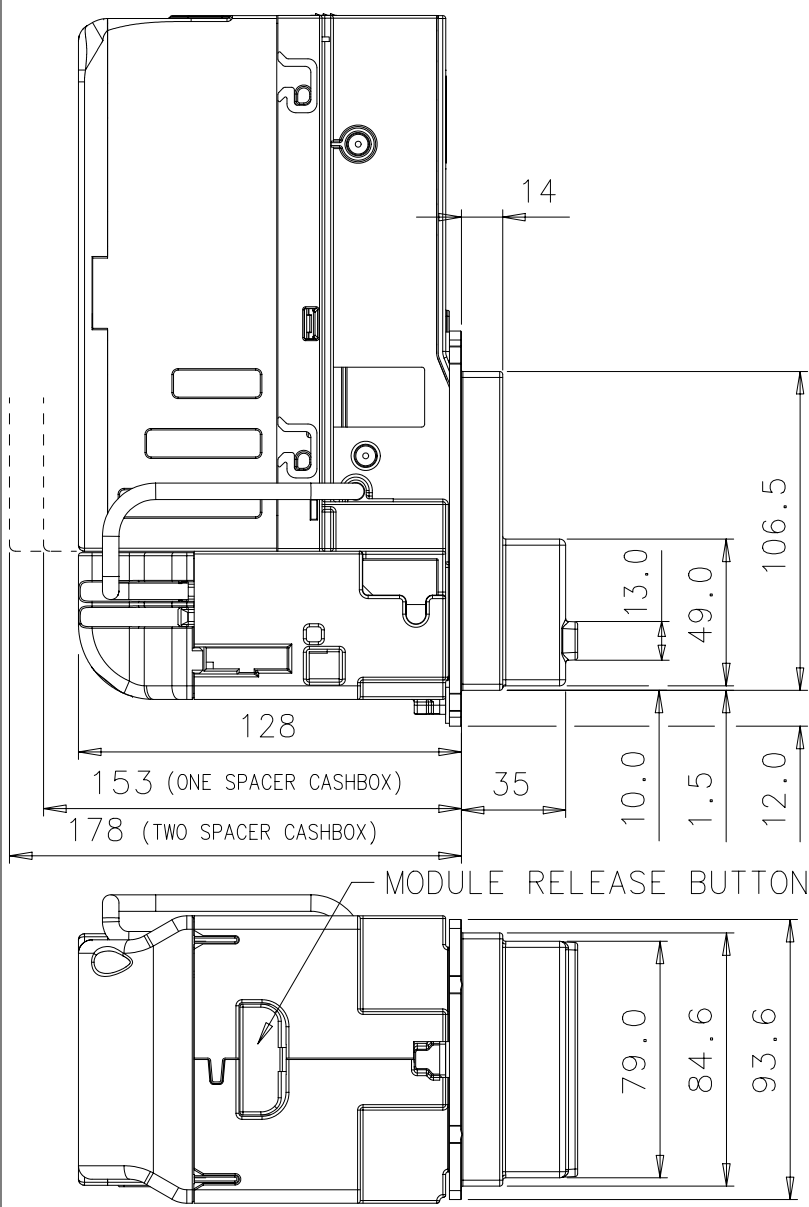
9. Mechanical Installation

The BV100 validator is available with either a 66mm or 72mm Bezel. See drawing number GA700 for dimensions

GA700

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ACCEPTS NOTES UP TO :

1. 65mm x 160mm LONG
2. 72mm x 160mm LONG

SUPPLY AND POWER CONSUMPTION :

VOLTAGE : 11-15v
RIPPLE 0.25V AT 100Hz
STAND BY : 270 mA
VALIDATING : 770 mA
PEAK : 2200 mA
SLEEP : 1.6 mA

ENVIRONMENTAL OPERATING RANGE :
+3°C TO 50°C AT 5% TO 95% RH (NON-CONDENSING)

UNLADEN WEIGHT : 1 KG

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

E	POWER CONSUMPTION FIGURES CHANGED	4-9-07	MKS
ISSUE No.	MOD No.	DATE	MOD BY

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DO NOT SCALE		IF IN DOUBT - ASK !!!		DRAWN	DATE	SCALE	MATERIAL	FINISH	TOOL No.
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TELEPHONE. 0161 626 9999 FAX. 0161 620 2090				TITLE:				DRG No.	ISSUE
3rd ANGLE PROJECTION.		ALL DIMENSIONS SHOWN ARE NOMINAL SIZES.		BV 100 OUTLINE DIMENSIONS				GA700	E

10. Routine Maintenance

The BV100 Validator has been designed to minimise any performance variation over time. Much of this is achieved by careful Hardware and Software design.

However, depending upon the environment in which it is used the BV100 may at some time require re-calibration.

10.1 Re-Calibration

The BV100 has an in-built self-calibration system that maintains the optical sensors at their best operating point. However if the BV100 is disassembled for any reason it will need to be re-calibrated. Re-calibration may only be performed under license from ITL, contact support@innovative-technology.co.uk for further details.

This can be performed in conjunction with the diagnostics software option in the ITL BNV Currency Manager Program and help menus supplied with this program.

11.Support Tools

The following support tools are available for use with the BV100 Bank Note Validator:

- ITL Bank Note Validator Currency Manager Software.
- Configuration Cards.
- Validator Programming System (DA3)
- Downloads from the Innovative Technology Ltd website: www.innovative-technology.co.uk
- E-mail Support via support@innovative-technology.co.uk

11.1 Configuration Cards.

For full details of the use and function of the Configuration Cards please see [Appendix D – Configuration Cards](#)

11.2 ITL Bank Note Validator Currency Manager

NOTES:

- **The Validator must be set to Programming Mode (SSP) when connected to a computer or DA3 and then returned to the original Settings when complete (See Chapter 6.2 [Configuration Button Functions](#)).**
- **ITL BNV Currency Manager 3.2.0 or Higher must be used to access the BV100 functions**
- **Datasets can only be downloaded to a BV100 with the correct bezel width for the currency. For example a USD dataset can only be downloaded to a 66mm BV100. A Euro dataset can only be downloaded to a 72mm BV100**

The ITL BNV Currency Manager software offers the following functions:

- Program the Validator by downloading pre-prepared currency data via the DA1 or DA2 kit.
- Check the firmware version and currency set already loaded on a BV100 unit.
- Adjust the channel and pulse configuration on a pre-programmed BV100 to your own requirements.
- Download a new version of firmware onto the BV100.
- Use diagnostic functions to check Validators operation

The software will run on an IBM compatible Personal Computer with Pentium™ processor or equivalent (see [Appendix F – PC System Specification](#) for operating system requirements). The BV100 can be connected directly via the USB port, or with either a DA1 kit fitted to the serial port or DA2 kit fitted to the USB port. (See [Appendix C – Interface Tools DA1 – DA2](#))

11.3 Validator Programming System (DA3)

The DA3 is a programming system designed to enable the programming of ITL Bank Note Validators in the field without the use of a PC.

Once the DA3 has been programmed the user can:

- Update the existing software within a validator to the latest versions using the BNV Match Download function.
- Reprogram the validator to accept a different currency using the BNV Override Download function
- Test the functionality of the validator away from the Host machine.

For full DA3 operation and functionality details please refer to the DA3 User Manual (Document number GA339)

Note: When using the DA3 BNV Match Download function, any pulses and channel allocations programmed into the BV100 will not be retained. The user must ensure that the required dataset options are set and saved before programming the DA3.

When programming a BV100 using the DA3 BNV Override Download function, the firmware interface is unchanged. A Configuration Card must be used after re-programming if a different interface is required.

11.4 Internet Website Support

The Innovative Technology Ltd website provides the means to download new and updated currency sets and new versions of firmware for the BV100. You can obtain these along with technical bulletins by visiting www.innovative-technology.co.uk

11.5 E-mail Support

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

Appendix A – Exploded Diagrams

Exploded Diagram Parts List

Part No	11.5.1.1 Description	Qty	Drawing number
FD108	note drive belt	2	GA706
LB152	BV note grip pad	2	GA705
MC226	stacker drive shaft	1	GA707
MC230	BV Security tooth	1	GA711
MC235	Brass helical 12t 0.5m	1	Not available as spare, only as part of assembly
MC237	BV stacker thrust washer	1	GA710
MC255	Gearbox shaft	3	Not available as spare, only as part of assembly
MC258	wheel axle	2	GA706
PM700	main frame	1	GA706; GA707
PM701	unit cable side (narrow)	1	GA705
PM761	unit cable side (wide)	1	GA705
PM702	unit side (narrow)	1	GA705
PM762	unit side (wide)	1	GA705
PM704	motor frame - stacker	1	GA710
PM705	module case	1	GA708
PM706	module path	1	GA708
PM707	module cover plate	1	GA708
PM708	front cover plate	1	GA705
PM709	lightguide	2	GA706; GA708
PM710	lightguide shield	2	GA706; GA708
PM711	Calibration strip	2	GA706; GA708
PM712	bill push plate	1	GA705
PM713	outer lift arm	1	GA707
PM714	inner lift arm	1	GA707
PM715	worm wheel - stacker drive	1	GA707
PM716	crank arm gear	1	GA707
PM717	crank arm - extended	1	GA707
PM718	crank arm - recess	1	GA707
PM719	belt drive wheel	2	GA706
PM720	belt drive wheel flange	2	GA706
PM721	flanged roller wheel	6	GA706
PM722	roller bush	2	GA706
PM723	roller wheel - clip in	2	GA706
PM724	pressure wheel	10	GA708
PM726	stacker worm 0.7m	1	GA710
PM727	stacker drive bush	1	GA710
PM728	stacker drive collar	1	Not available as spare, only as part of assembly
PM732	belt tension pulley	2	GA706
PM733	cashbox latch	1	GA705
PM734	cash box body	1	Not available as spare, only as part of assembly

Exploded Diagram Parts List (continued)

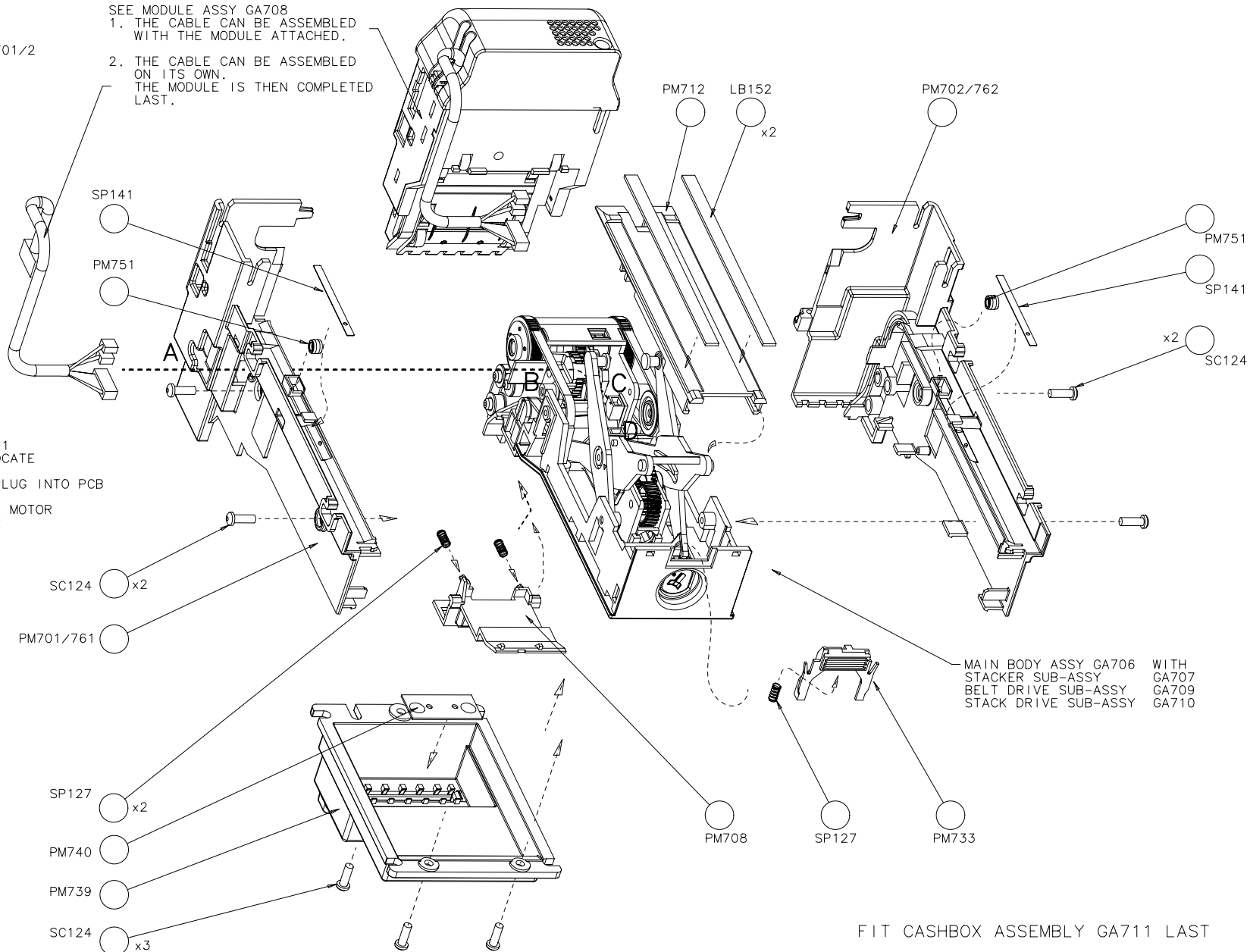
Part No	Description	Qty	Drawing number
PM738	lightpipe - push plate down	1	GA706
PM739	bezel	1	GA705
PM740	Bezel lightguide	1	GA705
PM742	cashbox lid	1	Not available as spare, only as part of assembly
PM745	Start sensor upper lightpipe	1	GA708
PM746	Start sensor lower lightpipe	1	GA706
PM747	Cashbox position lightpipe	1	GA708
PM751	Rear pressure wheel	2	GA705
PM763	Gearbox base plate	1	Not available as spare, only as part of assembly
PM764	Gearbox top plate	1	Not available as spare, only as part of assembly
PM765	Compound gear 1	1	Not available as spare, only as part of assembly
PM766	Compound gear 2	2	Not available as spare, only as part of assembly
PM767	Drive shaft	1	Not available as spare, only as part of assembly
OP111	yellow filter	2	GA706; GA708
SC113	No4x6mm flange head pozi	3	GA708
SC119	M3x10 torx plastite pan head	2	GA706
SC123	M2.6x4 motor screws	2	GA710
SC124	4X12 Torx pan BZP	9	GA705; GA708
SC126	M2x6 motor screw	2	GA709
SP127	board support and cashbox latch	3	GA705
SP141	Ball bearing spring	2	GA705
SP142	3x20.5 lg closed coil spring shaft	4	GA708
SP143	3 x 27.5 lg closed coil spring shaft	6	GA708
SP144	Belt tensioner spring	2	GA706
SP146	BV cashbox door spring	2	Not available as spare, only as part of assembly
CN279	Cable Assy	1	GA708
MR108	stacker motor	1	Not available as spare, only as part of assembly
MR111	belt drive motor	1	Not available as spare, only as part of assembly

1. FIT PADS LB152 TO PUSH PLATE PM712
2. FIT BALL BEARINGS AND SPRINGS TO PM701/2
3. FIT SPRINGS TO FRONT COVER PM708
4. FIT LIGHTGUIDE PM740 TO BEZEL PM739
5. FIT SPRING TO LATCH PM733
6. FIT CABLE - SEE INSTRUCTIONS BELOW.
7. FIT SIDES PM701 / PM702
8. FIT FRONT COVER PM708
9. FIT BEZEL PM739
10. FIT LATCH PM733/SP127
11. (7. FIT CABLE TO MODULE IF REQUIRED)

SEE MODULE ASSY GA708

1. THE CABLE CAN BE ASSEMBLED WITH THE MODULE ATTACHED.
2. THE CABLE CAN BE ASSEMBLED ON ITS OWN. THE MODULE IS THEN COMPLETED LAST.

- A. PASS THE CABLE THROUGH THE SIDE PM701
- B. PASS THE CABLE UNDER THE BELT AND LOCATE IN THE SLOT IN MAIN BODY PM700.
- C. FEED THE CABLE ROUND THE MOTOR AND PLUG INTO PCB
- D. PLUG IN CONNECTORS TO MOTOR PCB :
YELLOW/WHITE TO BELT DRIVE MOTOR
RED/BROWN TO STACKER MOTOR



FIT CASHBOX ASSEMBLY GA711 LAST

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

DO NOT SCALE

IF IN DOUBT - ASK !!!

DRAWN MKS

DATE 20-10-06

SCALE NTS

MATERIAL

FINISH

TOOL No.

CHECKED

DATE

TITLE:

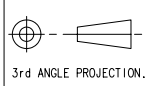
BV100 FINAL ASSEMBLY

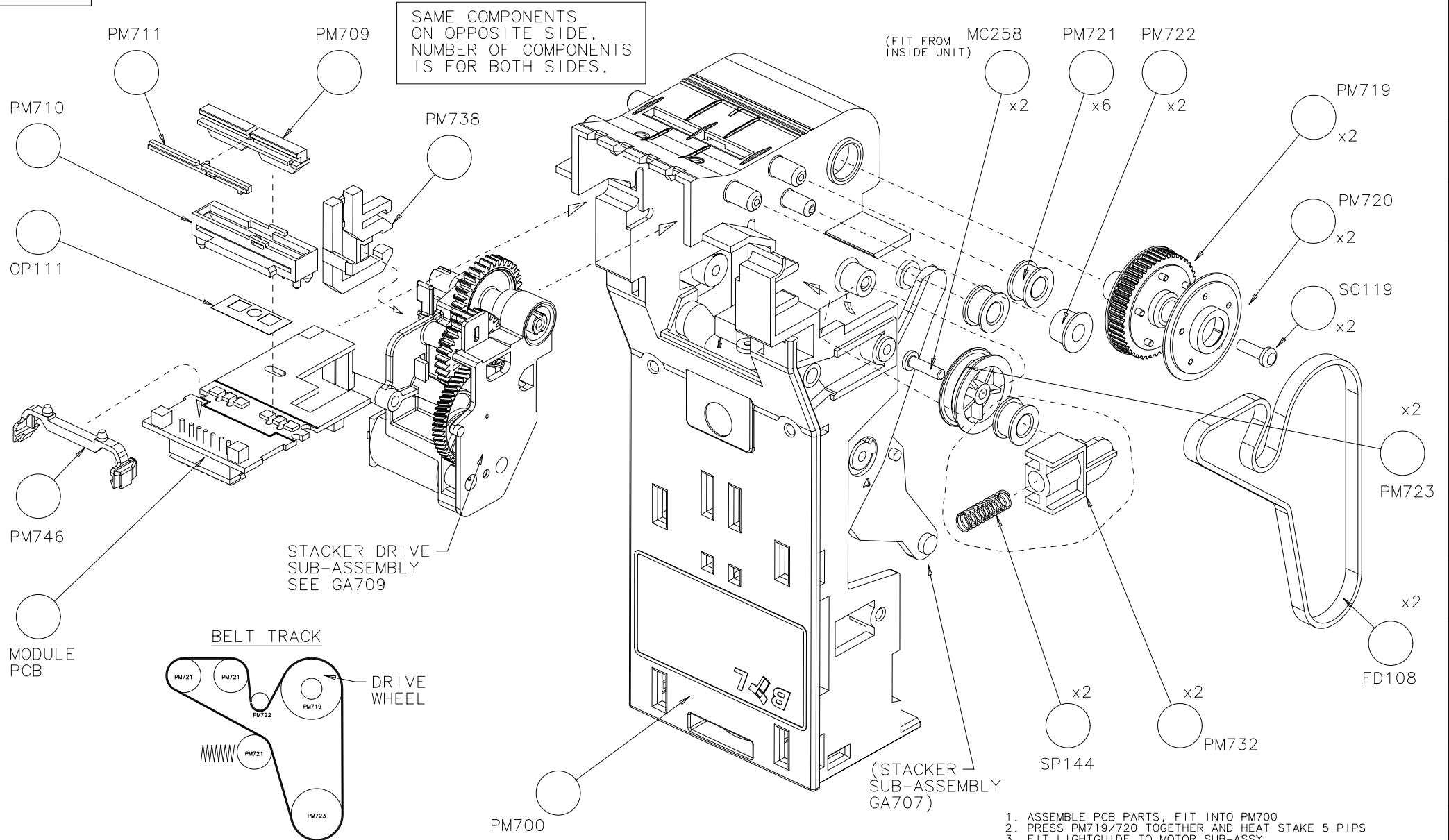
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GA705

ISSUE

B





REFERENCE ONLY:
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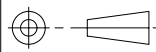
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MKSDATE
19-10-06SCALE
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MATERIAL

FINISH

TOOL No.

CHECKED

DATE

TITLE:

BV MAIN BODY ASSEMBLY

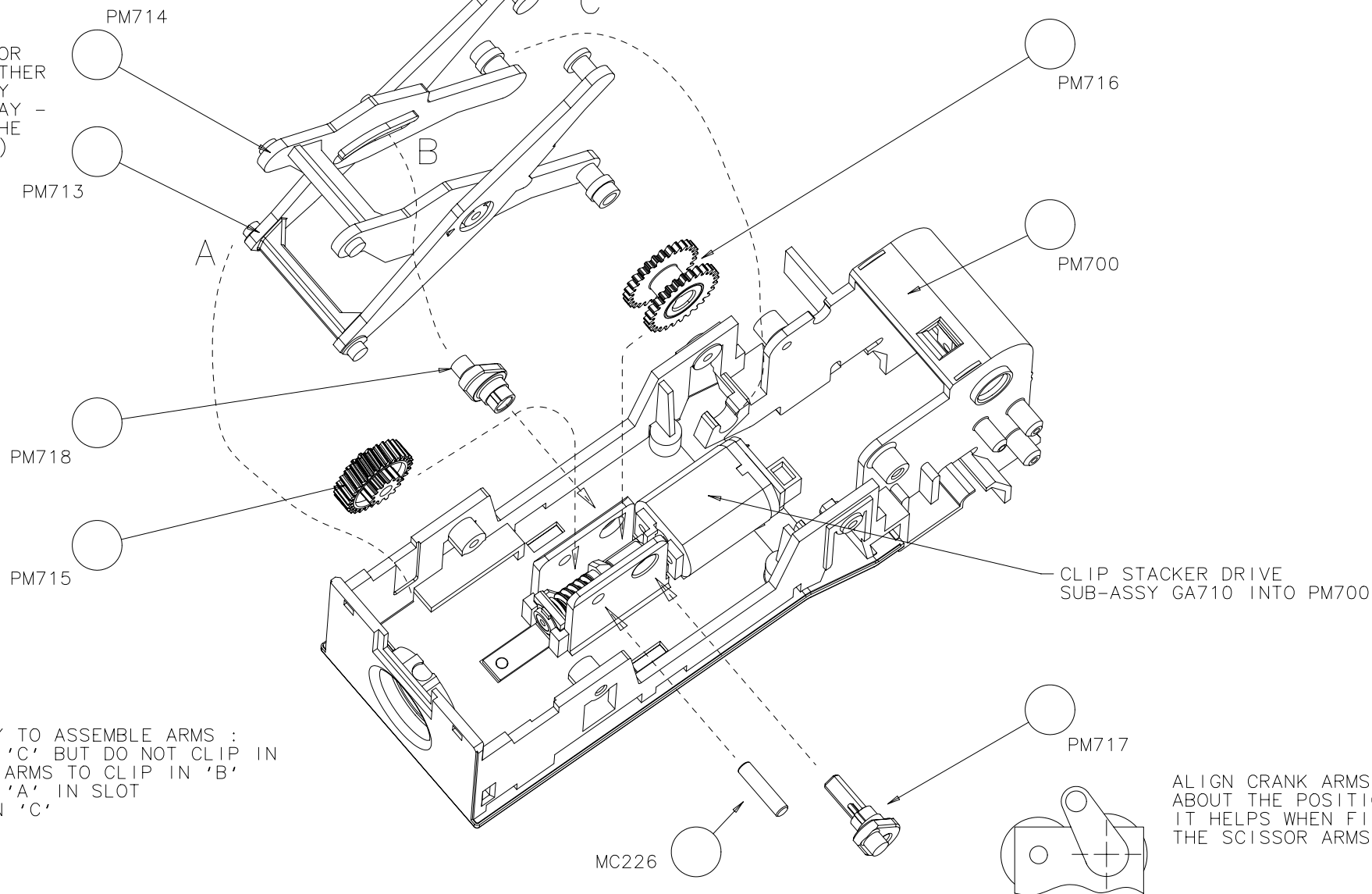
DRG No.

GA706

ISSUE

C

FIT SCISSOR
ARMS TOGETHER
(THEY ONLY
FIT ONE WAY -
LINE UP THE
TRIANGLES)



ONE WAY TO ASSEMBLE ARMS :
LOCATE 'C' BUT DO NOT CLIP IN
DEFORM ARMS TO CLIP IN 'B'
LOCATE 'A' IN SLOT
CLIP IN 'C'

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MKS

DATE

19-10-06

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SCALE

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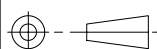
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BV STACKER SUB-ASSEMBLY

DRG No.

GA707

ISSUE

A

1. FIT PARTS TO PCB / FIT WHEELS AND AXLES
2. SCREW PCB TO PATH PM706
3. FIT CASE PM705
4. FIT CABLE/COVER OR FIT ON FINAL ASSY

BREAK OUT COVER TAB
FOR USB CONNECTOR IF
FITTED

OPTION

PCB WITH CABLE
FOR 110V MDB.
BREAK OUT TAB FOR
CABLE AND FIX WITH
1xSC113

x2
SC124

PM707

CN279

CONNECTORS
TO MAIN UNIT

THE CABLE AND COVER CAN
BE FITTED TO THE MODULE
DURING FINAL ASSEMBLY IF NEEDED.
THIS IS BECAUSE IT MAY BE
EASIER TO ASSEMBLE THE MAIN BODY
(SEE ASSY GA706) WITHOUT THE MODULE
HANGING OFF THE END OF THE CABLE.

PM747

PM724

x10

x3

SP143

SP142

PM706

PM745

x3

SP143

x2

SP142

x3

SC113

MODULE PCB

OP111

PM710

PM711

PM709

ASSEMBLE
AND CLIP
TO PCB

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DATE

18-10-06

SCALE

NTS

MATERIAL

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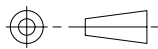
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TITLE:

BV MODULE SUB-ASSEMBLY

DRG No.

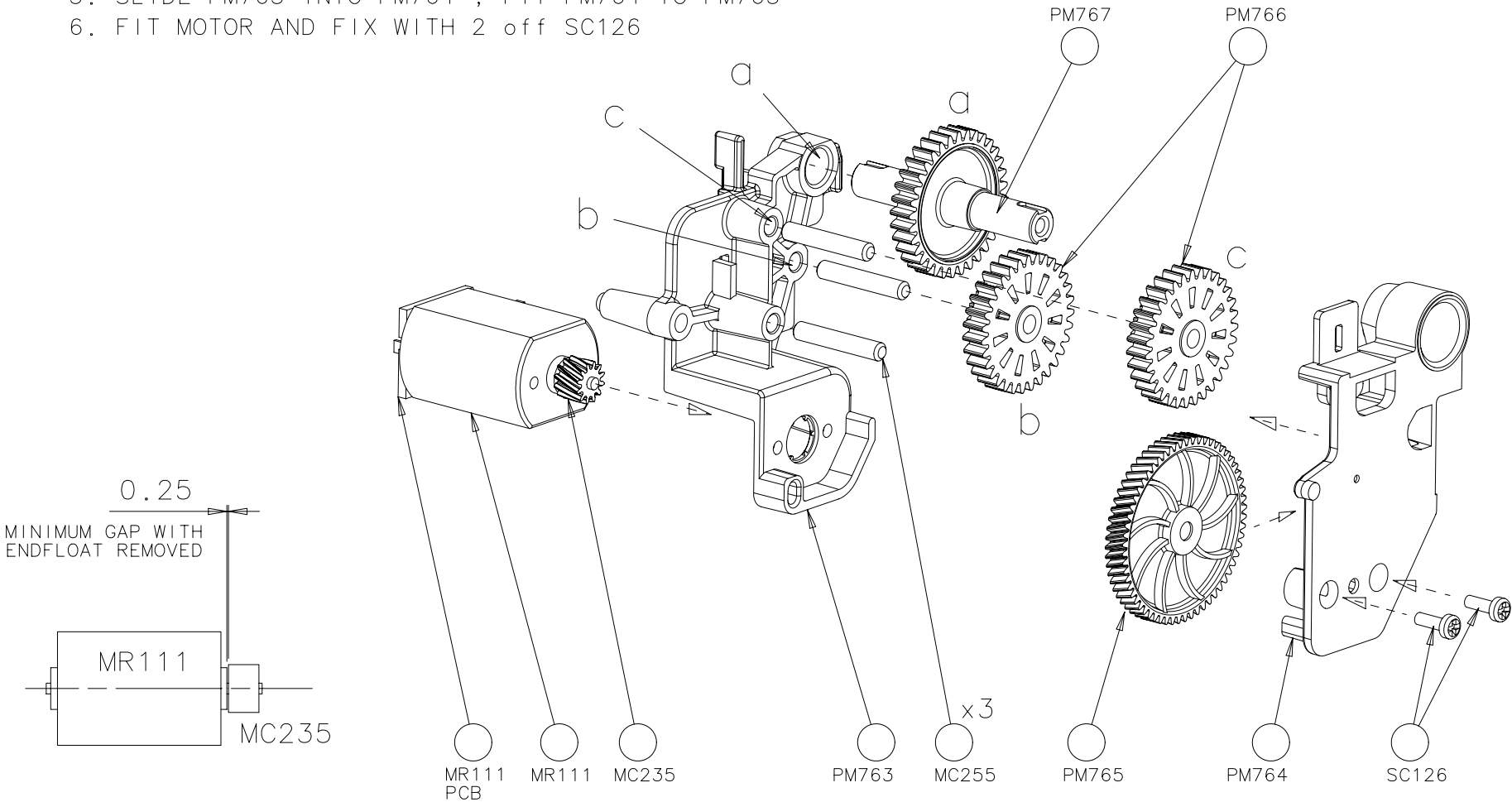
GA708

ISSUE

A

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- 1. PRESS FIT 3 SHAFTS (MC255) INTO PM763
- 2. ASSEMBLE MOTOR (MR111) WITH PCB AND GEAR (MC235)
- 3. SPREAD A SMALL AMOUNT OF GREASE OF THE 3 STEEL SHAFTS.
- 4. FIT GEARS IN ORDER : PM767 (a) PM766 (b) PM766 (c)
- 5. SLIDE PM765 INTO PM764 , FIT PM764 TO PM763
- 6. FIT MOTOR AND FIX WITH 2 off SC126



E		7-3-07	MKS
D		30-1-07	MKS
C		4-1-07	MKS
B		21-12-06	MKS
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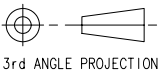
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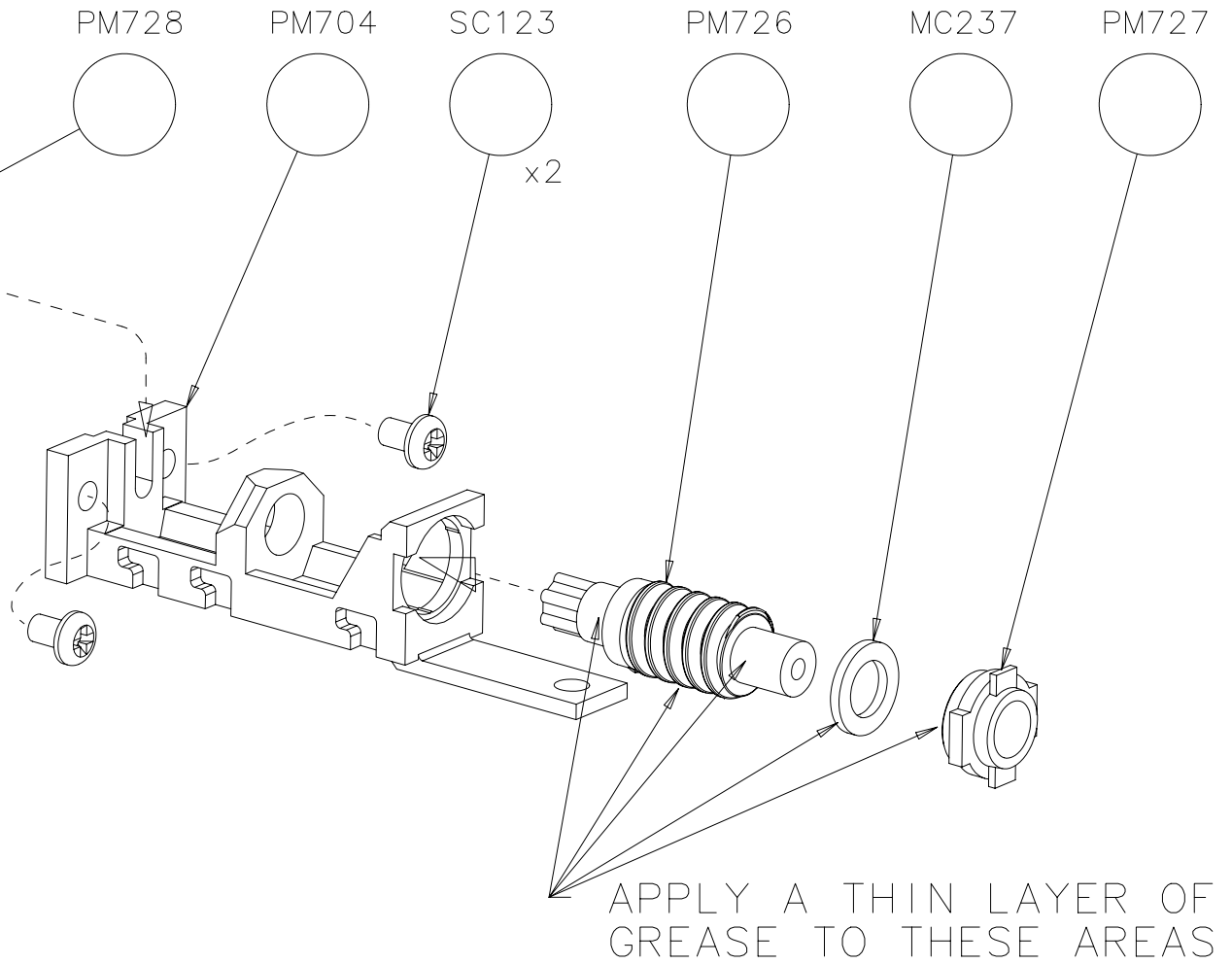
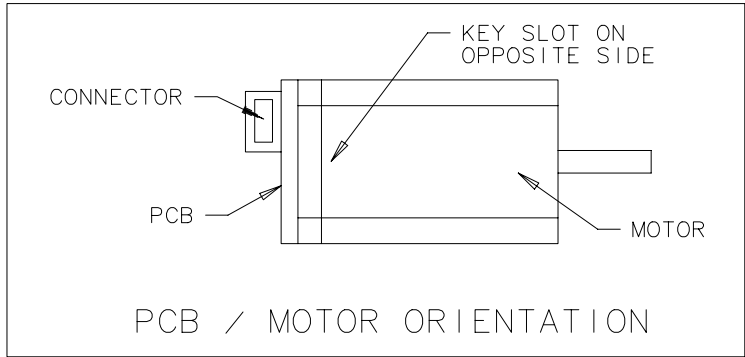
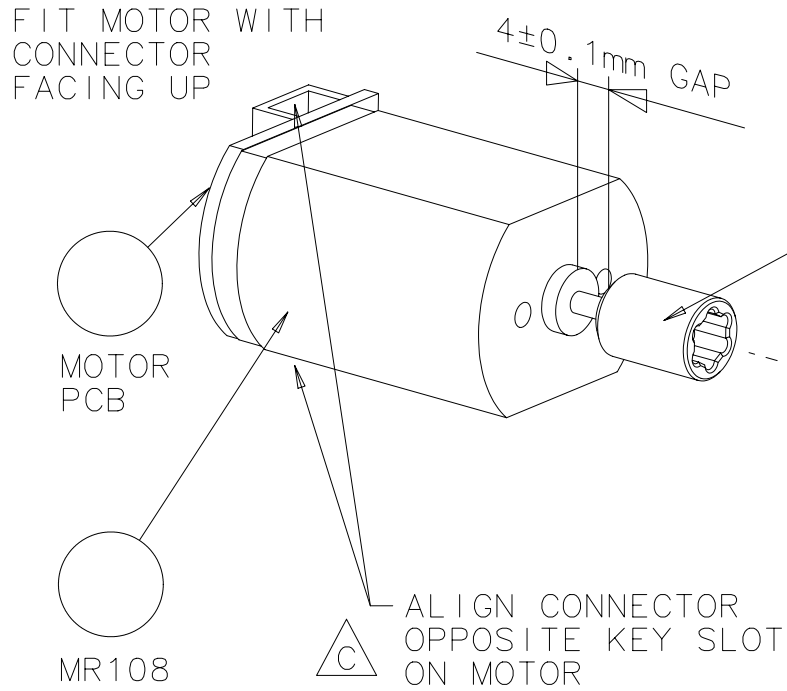
ALL DIMENSIONS
SHOWN ARE
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iss E COMPLETE REDESIGN - WAS WORM/WHEEL DESIGN

DRAWN MKS	DATE 18-10-06	SCALE NTS	MATERIAL	FINISH	TOOL No.
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TITLE: BV BELT DRIVE SUB-ASSEMBLY				DRG No. GA709	ISSUE E

GA710

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C	KEY SLOT WAS ON SAME SIDE AS CONNECTOR	11-10-07	MKS
B	MOTOR/PCB ORIENTATION ADDED	4-1-07	MKS
ISSUE No.	MOD No.	DATE	MOD BY

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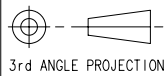
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SHOWN ARE
NOMINAL SIZES.

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CHECKED	DATE				
TITLE: BV STACKER DRIVE SUB-ASSEMBLY				DRG No. GA710	ISSUE C

Appendix B – ESCROW Control

The BV100 has a single note escrow facility (pin 10) used in Parallel and Binary modes. This allows the Validator to hold onto the note once accepted, and then only stack the note in the cash box when the host machine confirms that the Vend operation has been completed. If no confirmation of the Vend is received then the note will be returned to the customer after 30 seconds, (see figure 8).

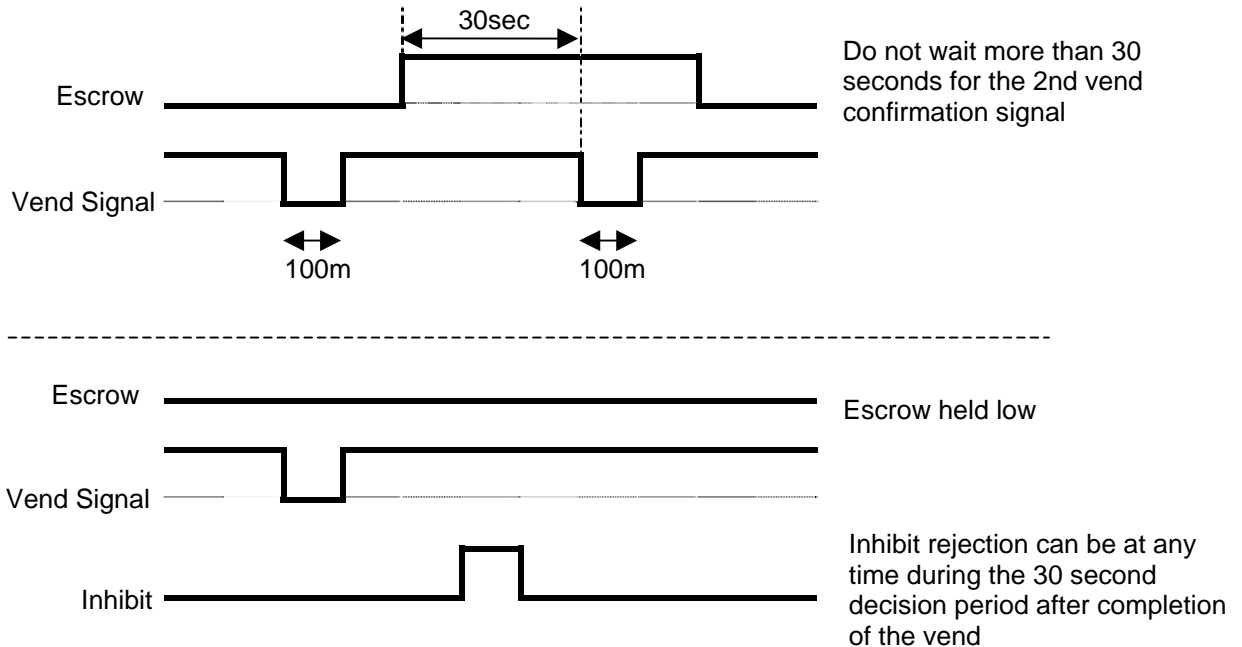


Figure 8 - Escrow Timing Diagram for Parallel Vends

If the host machine itself aborts the transaction by setting the corresponding inhibit input high, the note is returned immediately. The sequence of operations is as follows:

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

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

In the event of a note being forcibly removed from the mouth of the BV100 during the 30-second interval, the BV100 will go out of service for 45 seconds.

Appendix C – Interface Tools DA1 – DA2

The DA1/2 Kits are designed for the following:

- Connecting of ITL Note Validators to a PC for the upgrade and user option setting of Currency and Firmware files.
- Testing note acceptance of Note Validators independent of the host machine to confirm that the validator is working.

The DA1 and DA2 Kits comprise the following components:

DA1	DA2
DA1 adapter board	DA2 adapter board
DA1 to NV7-10 and BV cable	USB type-A to Type-B cable
DA1 to NV4 Cable	DA2 to NV7-10 and BV cable
Power Cable	Power Cable
ITL Support CD-ROM	ITL Support CD-ROM

Connecting a DA1 to a validator and PC

For the PC system specification and set up refer to [Appendix F – PC System Specification](#).

Connect the DA1 to the validator as shown below (see figure 9), using the 16-way to 5-way connector. The supplied 3.5mm jack plug and 2 banana plugs are used to supply power to the DA1 when using a variable Bench power supply (Connect the +12 volts to the red banana plug and GND (0V) to the black plug). Alternatively a Portable DC Power Adapter supplying 12v and 1.5A minimum can be used.

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

NOTE: The Validator must be in Programming mode when connected to a computer and then returned to the Original Settings when the download is complete

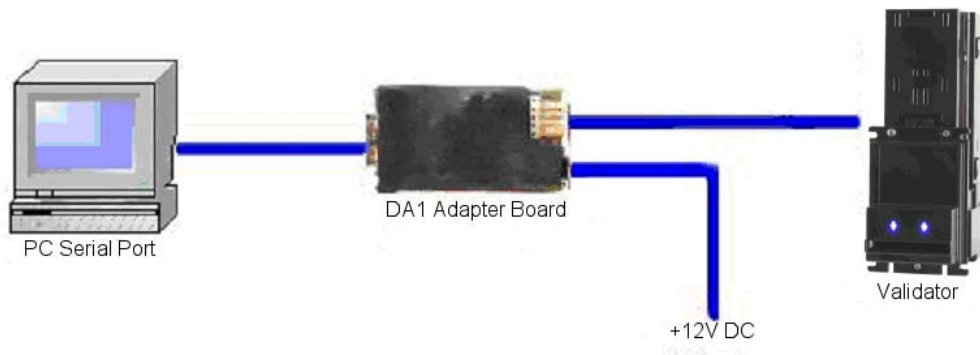


Figure 9 – Connecting DA1 to BV100 and PC for upgrading Validator programs

Connecting a DA2 to a validator and PC



Figure 10 – Connecting DA2 to a BV100 and PC for upgrading Validator Programs

Software Installation

DA1 - To install the ITL BNV Download Manager Software insert the CDROM into the correct PC drive. The CD should automatically run and an installation menu will appear. Double click the ITL BNV Download Manager and follow the on-screen instructions. You can also install the Currency files, Firmware files and the Technical Manuals for each specific product as well as other generic documentation.

The Quick Start Guide for the DA1 is Document number GA151.

DA2 - To install the ITL BNV Download Manager Software insert the CDROM into the correct PC drive. The CD should automatically run and an installation menu will appear. Double click DA2 installation guide (GA338) and follow the instructions relating to your specific Operating System.

NOTE: All files contained on the CD are available from the ITL Website:

www.innovative-technology.co.uk

Please contact support@innovative-technology.co.uk, if you require further assistance.

Appendix D – Configuration Cards

The following pages contain document number GA713. To print the cards, ensure that the page scaling is set to 'none'. Always ensure that the card has printed with the correct dimensions before use.

GA 713 BV Configuration Option Programming



Insert this end first

↑

↑

Interface	SSP	PULSE
	MDB	IF 30
	IF 31	CCTALK
	SIO	PARALLEL
	I/F Spare 4	NIS
	IF 32	I/F Spare 1
	I/F Spare 2	I/F Spare 3
Pulse Settings	High 50ms	High 100ms
	Low 50ms	Low 100ms
	1	4
	2	8
Inhibits	Bill 1	Bill 5
	Bill 2	Bill 6
	Bill 3	Bill 7
	Bill 4	Bill 8
Options	High Speed	cctalk plain
	Start Disabled	cctalk 8 bit chk
	Low Power	Binary
	Credit Hold	option spare 3

204mm

V1.5

66mm

Instructions for use

1 - Cut card around outline - check measurements as printed. Check print options 'Page scaling' is set to 'None' when printing a pdf file to ensure correct size.

2 - Fill in sections as required. Take care to fill in the sections correctly, keep inside the lines and fill boxes fully as example below:



3 - Power-up BV and allow to reset.

4 - Click 'Function' button on BV to access Configuration Mode, BV bezel LEDs should be flashing at 1 second interval.

5 - Enter card into BV in direction indicated by arrows.

6 - Card will be rejected and if configuration was good the, bezel LEDs will flash at a fast rate while programming takes place. TAKE CARE TO ENSURE THE POWER IS NOT REMOVED AT THIS STAGE, THE BV MAY SUFFER PERMANENT DAMAGE !! The BV will then reset.

7 - If an error has occurred, the card will be rejected and the bezel LEDs will flash slowly a number of times to indicate the error cause. (See table below for codes).

8 - IMPORTANT - CHECK THAT THE CONFIGURATION REQUESTED HAS BEEN SET IN THE BV BEFORE USE!

Flash	Error
2	Invalid card read - card entered wrong way round, card mis-read or card wrong version.
3	No interface selection was detected on card.
4	Multiple interface selection detected.
5	Invalid interface selected - the selected interface is not available for this BV.
6	Selected interface not compatible with BV version.
7	Pulse configuration error. Selected pulse options invalid.(e.g. multiple pulse per dollar)
8	ccTalk configuration error. Selected cctalk options invalid. (cctalk 8 bit chk not allowed without ccTalk Plain.)
9	Low power mode not available on this BV version.

Program Check Procedure

To check settings on a programmed unit:

- 1 - Power on unit.
- 2 - Click program set button on unit twice (like double click on mouse).
- 3 - Monitor bezel led and check flash codes on table below

	Flash count	Pulse High	Pulse Low	Pulse per dollar	High speed	Disabled	cctalk plain	cctalk 8 bit	low power	binary	Credit Hold
SSP	1										
Pulse	2	ms/10	ms/10	value							3 flash
MDB	3										
IF 30	4										
IF 31	5										
cctalk	6						1 flash	2 flashes			
SIO	7				1 flash	2 flashes					
Parallel	8									1 flash	
spare	9										
NIS	10										
IF 32	11				1 flash						
spare	12										
spare	13										
spare	14										

For example:

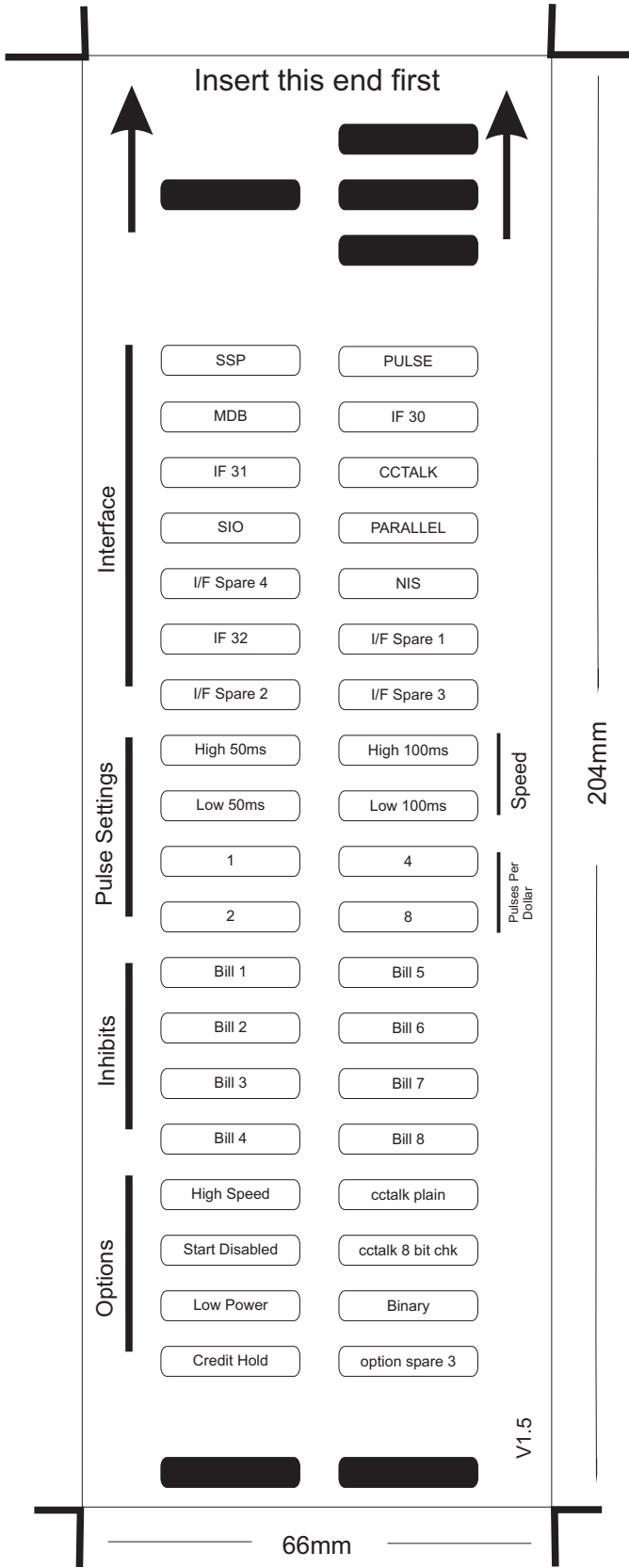
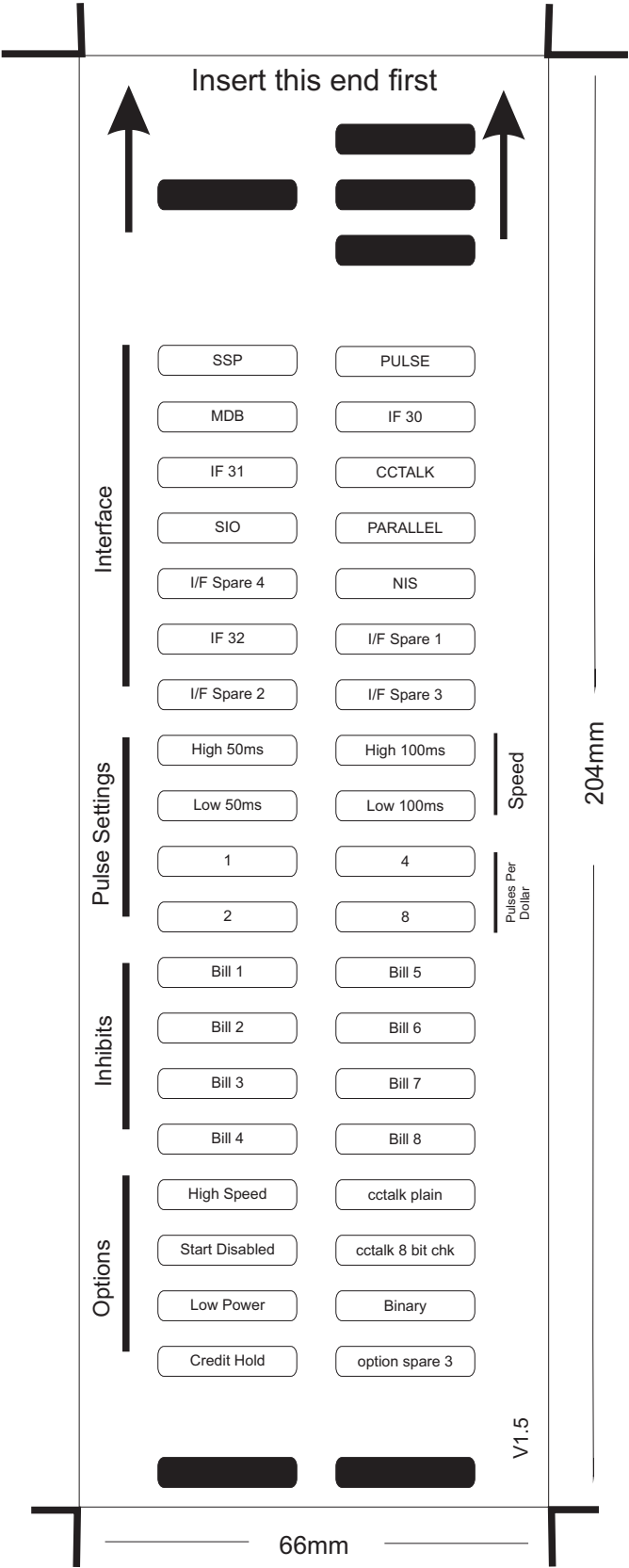
A pulse interface with 50ms high, 100ms low, 2 pulse per dollar will flash as follows 2,5,10,2

A SSP interface will only ever flash once

A cctalk interface with 16 bit checksum, no encryption wil flash 6,1

A cctalk interface with 8 bit checksum, no encryption wil flash 6,1,2

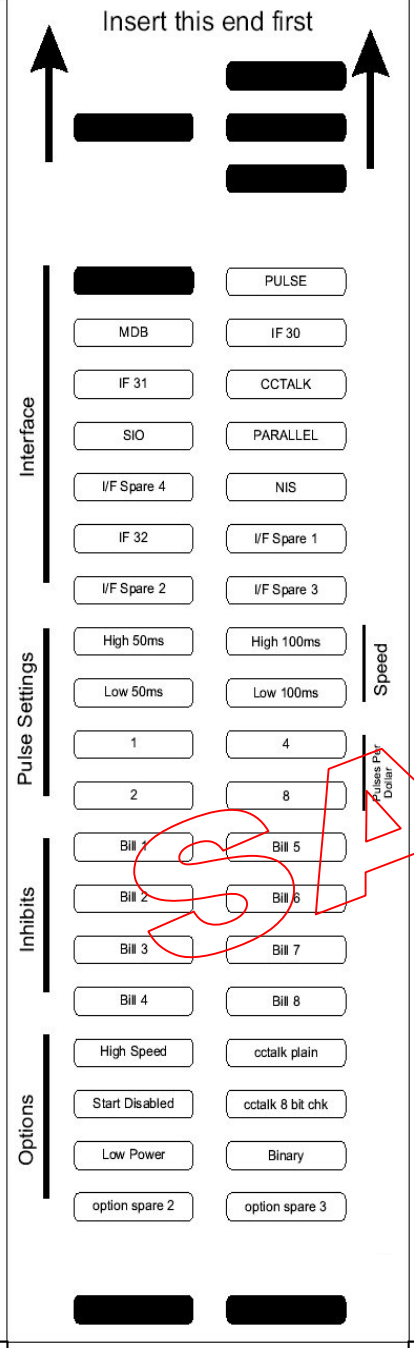
A Binary interface will flash 8,1



Below are some typical examples of completed Configuration Cards.

Note: These Configuration Cards are samples and should not be copied for programming use. Please see document GA713 for useable cards.

Insert this end first



Interface

	PULSE
MDB	IF 30
IF 31	CCTALK
SIO	PARALLEL
I/F Spare 4	NIS
IF 32	I/F Spare 1
I/F Spare 2	I/F Spare 3

Pulse Settings

High 50ms	High 100ms
Low 50ms	Low 100ms
1	4
2	8

Inhibits

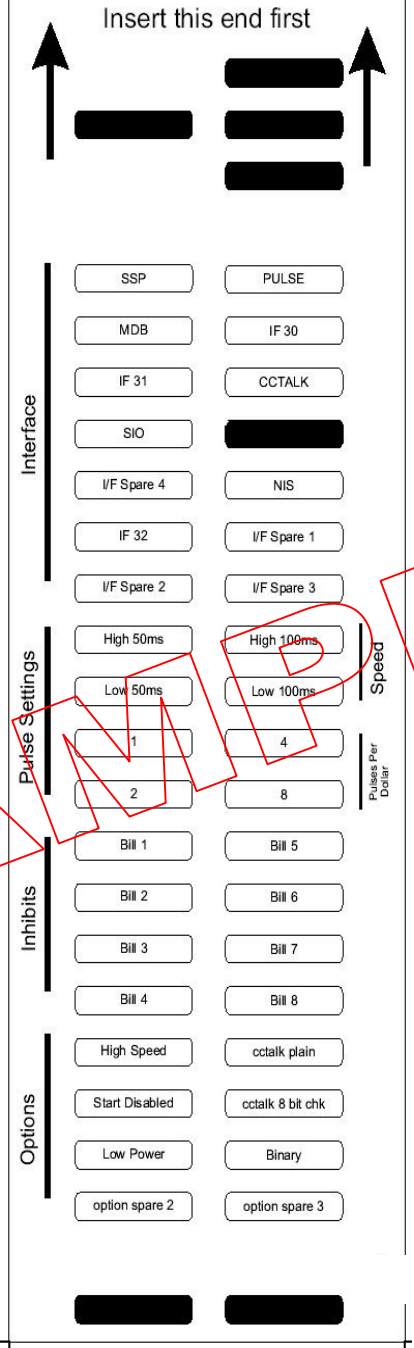
Bill 1	Bill 5
Bill 2	Bill 6
Bill 3	Bill 7
Bill 4	Bill 8

Options

High Speed	cctalk plain
Start Disabled	cctalk 8 bit chk
Low Power	Binary
option spare 2	option spare 3

SSP

Insert this end first



Interface

SSP	PULSE
MDB	IF 30
IF 31	CCTALK
SIO	
I/F Spare 4	NIS
IF 32	I/F Spare 1
I/F Spare 2	I/F Spare 3

Pulse Settings

High 50ms	High 100ms
Low 50ms	Low 100ms
1	4
2	8

Inhibits

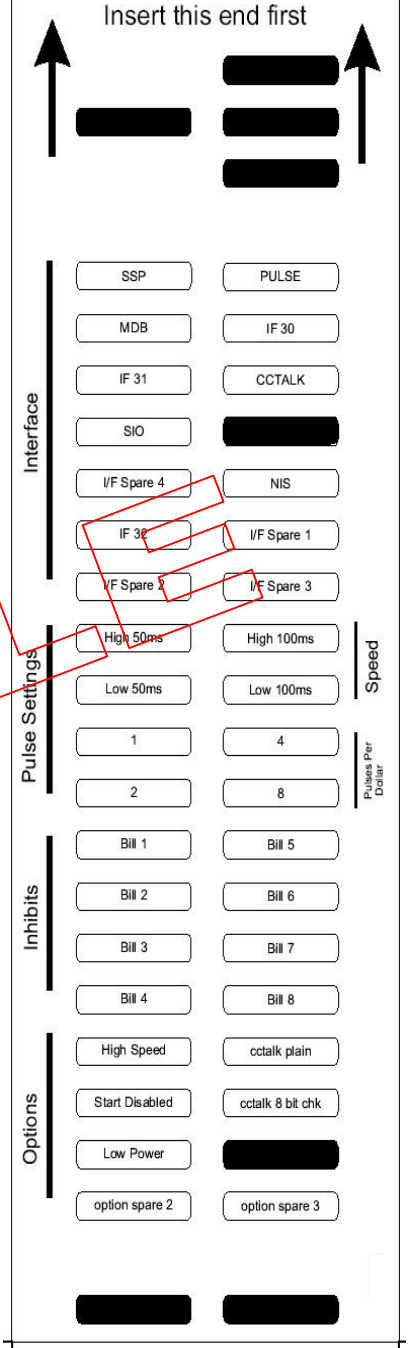
Bill 1	Bill 5
Bill 2	Bill 6
Bill 3	Bill 7
Bill 4	Bill 8

Options

High Speed	cctalk plain
Start Disabled	cctalk 8 bit chk
Low Power	Binary
option spare 2	option spare 3

Parallel

Insert this end first



Interface

SSP	PULSE
MDB	IF 30
IF 31	CCTALK
SIO	
I/F Spare 4	NIS
IF 32	I/F Spare 1
I/F Spare 2	I/F Spare 3

Pulse Settings

High 50ms	High 100ms
Low 50ms	Low 100ms
1	4
2	8

Inhibits

Bill 1	Bill 5
Bill 2	Bill 6
Bill 3	Bill 7
Bill 4	Bill 8

Options

High Speed	cctalk plain
Start Disabled	cctalk 8 bit chk
Low Power	
option spare 2	option spare 3

Binary

Insert this end first

Insert this end first

Insert this end first

<div style="display: flex; justify-content: space-between;"> <div>Interface</div> <div> <div>SSP</div> <div>PULSE</div> <div>MDB</div> <div>IF 30</div> <div>IF 31</div> <div><div style="background-color: black; width: 100px; height: 15px;"></div></div> <div>SIO</div> <div>PARALLEL</div> <div>I/F Spare 4</div> <div>NIS</div> <div>IF 32</div> <div>I/F Spare 1</div> <div>I/F Spare 2</div> <div>I/F Spare 3</div> </div> </div> <div style="display: flex; justify-content: space-between;"> <div>Pulse Settings</div> <div>Speed</div> </div> <div> <div>High 50ms</div> <div>High 100ms</div> <div>Low 50ms</div> <div>Low 100ms</div> <div>1</div> <div>4</div> <div>2</div> <div>8</div> </div> <div style="display: flex; justify-content: space-between;"> <div>Inhibits</div> <div>Pulses Per Dollar</div> </div> <div> <div>Bill 1</div> <div>Bill 5</div> <div>Bill 2</div> <div>Bill 6</div> <div>Bill 3</div> <div>Bill 7</div> <div>Bill 4</div> <div>Bill 8</div> </div> <div style="display: flex; justify-content: space-between;"> <div>Options</div> <div></div> </div> <div> <div>High Speed</div> <div>cctalk plain</div> <div>Start Disabled</div> <div>cctalk 8 bit chk</div> <div>Low Power</div> <div>Binary</div> <div>option spare 2</div> <div>option spare 3</div> </div>	<div style="display: flex; justify-content: space-between;"> <div>Interface</div> <div> <div>SSP</div> <div>PULSE</div> <div>MDB</div> <div>IF 30</div> <div>IF 31</div> <div><div style="background-color: black; width: 100px; height: 15px;"></div></div> <div>SIO</div> <div>PARALLEL</div> <div>I/F Spare 4</div> <div>NIS</div> <div>IF 32</div> <div>I/F Spare 1</div> <div>I/F Spare 2</div> <div>I/F Spare 3</div> </div> </div> <div style="display: flex; justify-content: space-between;"> <div>Pulse Settings</div> <div>Speed</div> </div> <div> <div>High 50ms</div> <div>High 100ms</div> <div>Low 50ms</div> <div>Low 100ms</div> <div>1</div> <div>4</div> <div>2</div> <div>8</div> </div> <div style="display: flex; justify-content: space-between;"> <div>Inhibits</div> <div>Pulses Per Dollar</div> </div> <div> <div>Bill 1</div> <div>Bill 5</div> <div>Bill 2</div> <div>Bill 6</div> <div>Bill 3</div> <div>Bill 7</div> <div>Bill 4</div> <div>Bill 8</div> </div> <div style="display: flex; justify-content: space-between;"> <div>Options</div> <div></div> </div> <div> <div>High Speed</div> <div><div style="background-color: black; width: 100px; height: 15px;"></div></div> <div>Start Disabled</div> <div>cctalk 8 bit chk</div> <div>Low Power</div> <div>Binary</div> <div>option spare 2</div> <div>option spare 3</div> </div>	<div style="display: flex; justify-content: space-between;"> <div>Interface</div> <div> <div>SSP</div> <div>PULSE</div> <div>MDB</div> <div>IF 30</div> <div>IF 31</div> <div><div style="background-color: black; width: 100px; height: 15px;"></div></div> <div>SIO</div> <div>PARALLEL</div> <div>I/F Spare 4</div> <div>NIS</div> <div>IF 32</div> <div>I/F Spare 1</div> <div>I/F Spare 2</div> <div>I/F Spare 3</div> </div> </div> <div style="display: flex; justify-content: space-between;"> <div>Pulse Settings</div> <div>Speed</div> </div> <div> <div>High 50ms</div> <div>High 100ms</div> <div>Low 50ms</div> <div>Low 100ms</div> <div>1</div> <div>4</div> <div>2</div> <div>8</div> </div> <div style="display: flex; justify-content: space-between;"> <div>Inhibits</div> <div>Pulses Per Dollar</div> </div> <div> <div>Bill 1</div> <div>Bill 5</div> <div>Bill 2</div> <div>Bill 6</div> <div>Bill 3</div> <div>Bill 7</div> <div>Bill 4</div> <div>Bill 8</div> </div> <div style="display: flex; justify-content: space-between;"> <div>Options</div> <div></div> </div> <div> <div>High Speed</div> <div><div style="background-color: black; width: 100px; height: 15px;"></div></div> <div>Start Disabled</div> <div><div style="background-color: black; width: 100px; height: 15px;"></div></div> <div>Low Power</div> <div>Binary</div> <div>option spare 2</div> <div>option spare 3</div> </div>

Encrypted Cctalk

**Unencrypted Cctalk with
16-bit Checksum**

**Unencrypted Cctalk
with 8-bit Checksum**

Insert this end first

Insert this end first

Insert this end first

Pulse – Pulse width 50/50 mS 1 Pulse per Dollar	Pulse – Pulse width 50/100 mS 4 Pulses per Dollar	MDB
Interface		
SSP	SSP	SSP
MDB	MDB	PULSE
IF 31	IF 31	IF 30
CCTALK	CCTALK	CCTALK
SIO	SIO	PARALLEL
I/F Spare 4	I/F Spare 4	NIS
IF 32	IF 32	I/F Spare 1
I/F Spare 2	I/F Spare 2	I/F Spare 3
Pulse Settings		
High 100ms	High 100ms	High 50ms
Low 100ms	Low 50ms	High 100ms
4	1	Low 50ms
2	2	Low 100ms
8	8	4
Inhibits		
Bill 1	Bill 1	Bill 1
Bill 2	Bill 2	Bill 2
Bill 3	Bill 3	Bill 3
Bill 4	Bill 4	Bill 4
Bill 5	Bill 5	Bill 5
Bill 6	Bill 6	Bill 6
Bill 7	Bill 7	Bill 7
Bill 8	Bill 8	Bill 8
Options		
High Speed	High Speed	High Speed
cctalk plain	cctalk plain	cctalk plain
Start Disabled	Start Disabled	Start Disabled
cctalk 8 bit chk	cctalk 8 bit chk	cctalk 8 bit chk
Low Power	Low Power	Low Power
Binary	Binary	Binary
option spare 2	option spare 2	option spare 2
option spare 3	option spare 3	option spare 3

v 1.1

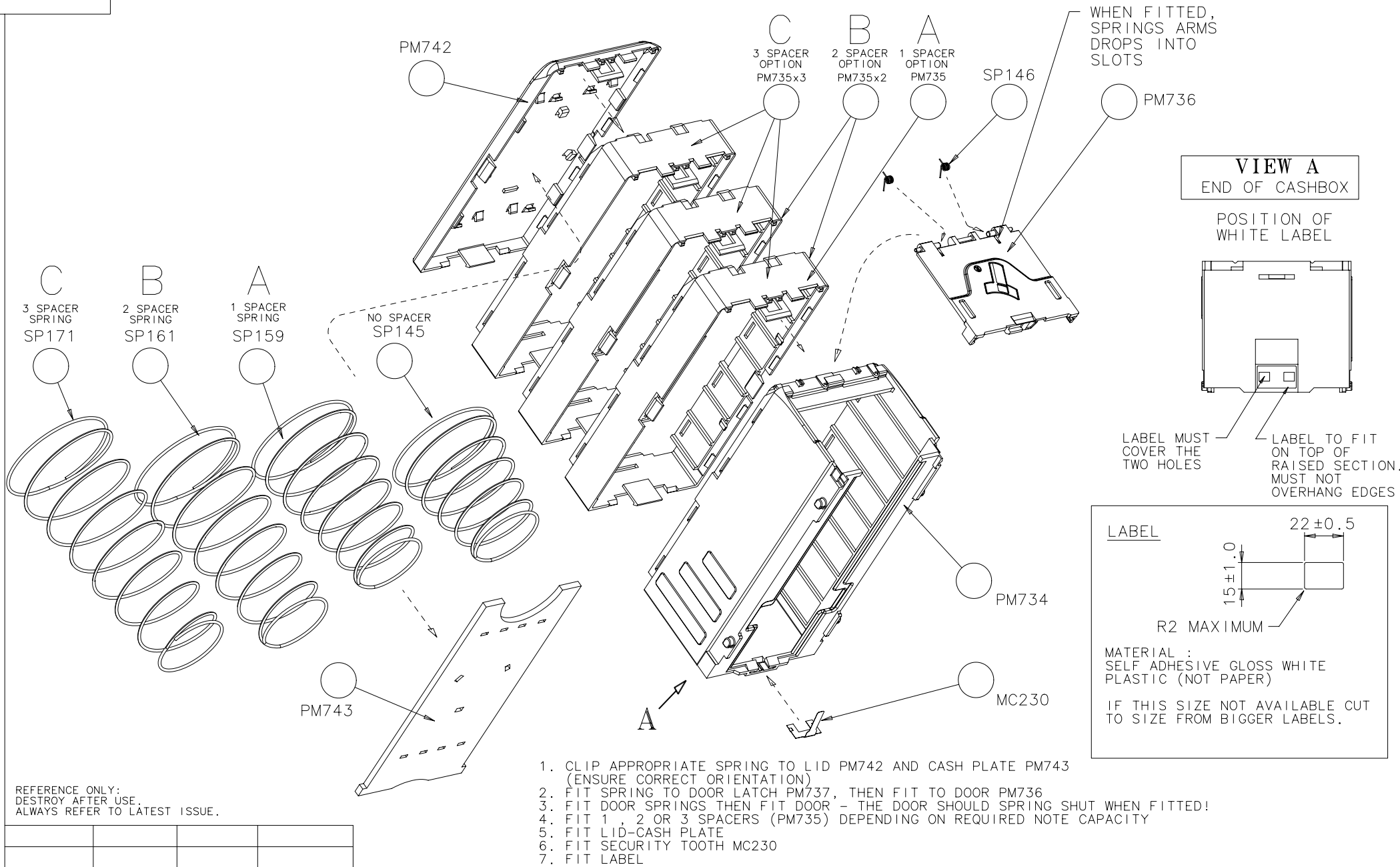
SIO 300-Baud		SIO 300-Baud Starts Disabled		SIO 9600-Baud		SIO 9600-Baud Starts Disabled	
Insert this end first		Insert this end first		Insert this end first		Insert this end first	
<div>Interface</div> <div>SSP</div> <div>PULSE</div> <div>MDB</div> <div>IF 30</div> <div>IF 31</div> <div>CCTALK</div> <div>PARALLEL</div> <div>IF Spare 4</div> <div>NIS</div> <div>IF 32</div> <div>IF Spare 1</div> <div>IF Spare 2</div> <div>IF Spare 3</div>		<div>Interface</div> <div>SSP</div> <div>PULSE</div> <div>MDB</div> <div>IF 30</div> <div>IF 31</div> <div>CCTALK</div> <div>PARALLEL</div> <div>IF Spare 4</div> <div>NIS</div> <div>IF 32</div> <div>IF Spare 1</div> <div>IF Spare 2</div> <div>IF Spare 3</div>		<div>Interface</div> <div>SSP</div> <div>PULSE</div> <div>MDB</div> <div>IF 30</div> <div>IF 31</div> <div>CCTALK</div> <div>PARALLEL</div> <div>IF Spare 4</div> <div>NIS</div> <div>IF 32</div> <div>IF Spare 1</div> <div>IF Spare 2</div> <div>IF Spare 3</div>		<div>Interface</div> <div>SSP</div> <div>PULSE</div> <div>MDB</div> <div>IF 30</div> <div>IF 31</div> <div>CCTALK</div> <div>PARALLEL</div> <div>IF Spare 4</div> <div>NIS</div> <div>IF 32</div> <div>IF Spare 1</div> <div>IF Spare 2</div> <div>IF Spare 3</div>	
<div>Pulse Settings</div> <div>High 50ms</div> <div>High 100ms</div> <div>Low 50ms</div> <div>Low 100ms</div> <div>1</div> <div>4</div> <div>2</div> <div>8</div>		<div>Pulse Settings</div> <div>High 50ms</div> <div>High 100ms</div> <div>Low 50ms</div> <div>Low 100ms</div> <div>1</div> <div>4</div> <div>2</div> <div>8</div>		<div>Pulse Settings</div> <div>High 50ms</div> <div>High 100ms</div> <div>Low 50ms</div> <div>Low 100ms</div> <div>1</div> <div>4</div> <div>2</div> <div>8</div>		<div>Pulse Settings</div> <div>High 50ms</div> <div>High 100ms</div> <div>Low 50ms</div> <div>Low 100ms</div> <div>1</div> <div>4</div> <div>2</div> <div>8</div>	
<div>Inhibits</div> <div>Bill 1</div> <div>Bill 5</div> <div>Bill 2</div> <div>Bill 6</div> <div>Bill 3</div> <div>Bill 7</div> <div>Bill 4</div> <div>Bill 8</div>		<div>Inhibits</div> <div>Bill 1</div> <div>Bill 5</div> <div>Bill 2</div> <div>Bill 6</div> <div>Bill 3</div> <div>Bill 7</div> <div>Bill 4</div> <div>Bill 8</div>		<div>Inhibits</div> <div>Bill 1</div> <div>Bill 5</div> <div>Bill 2</div> <div>Bill 6</div> <div>Bill 3</div> <div>Bill 7</div> <div>Bill 4</div> <div>Bill 8</div>		<div>Inhibits</div> <div>Bill 1</div> <div>Bill 5</div> <div>Bill 2</div> <div>Bill 6</div> <div>Bill 3</div> <div>Bill 7</div> <div>Bill 4</div> <div>Bill 8</div>	
<div>Options</div> <div>High Speed</div> <div>cctalk plain</div> <div>Start Disabled</div> <div>cctalk 8 bit chk</div> <div>Low Power</div> <div>Binary</div> <div>option spare 2</div> <div>option spare 3</div>		<div>Options</div> <div>High Speed</div> <div>cctalk plain</div> <div>Start Disabled</div> <div>cctalk 8 bit chk</div> <div>Low Power</div> <div>Binary</div> <div>option spare 2</div> <div>option spare 3</div>		<div>Options</div> <div>High Speed</div> <div>cctalk plain</div> <div>Start Disabled</div> <div>cctalk 8 bit chk</div> <div>Low Power</div> <div>Binary</div> <div>option spare 2</div> <div>option spare 3</div>		<div>Options</div> <div>High Speed</div> <div>cctalk plain</div> <div>Start Disabled</div> <div>cctalk 8 bit chk</div> <div>Low Power</div> <div>Binary</div> <div>option spare 2</div> <div>option spare 3</div>	

Appendix E – Cash Boxes

There are different capacity cash boxes available for the BV100. The standard cash box will hold approximately 350 notes. Cash box spacers can be added at the factory to increase the capacity. Each spacer will add an extra 200 note capacity with a maximum of 3 spacers. This gives a maximum capacity of approximately 950 notes. See drawing number GA711 for details.

Cash box capacity must be stated at the time of ordering. If no capacity is specified, the standard 350 size will be used.

Note: Cash box spacers can only be added at our factory, and once fitted cannot be removed.



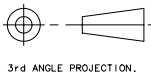
REFERENCE ONLY:
DESTROY AFTER USE.
ALWAYS REFER TO LATEST ISSUE.

E	3 SPACER OPTION ADDED	11-10-07	MKS
D	2 SPACER OPTION ADDED	8-3-07	MKS
C	VIEW A ADDED	31-1-07	MKS
ISSUE No.	MOD No.	DATE	MOD BY

C.A.D. GENERATED - MOD'S TO BE DONE VIA MAGNETIC MEDIA

DO NOT SCALE

IF IN DOUBT - ASK !!!



3rd ANGLE PROJECTION.

ALL DIMENSIONS
SHOWN ARE
NOMINAL SIZES.

DRAWN MKS	DATE 19-10-06	SCALE NTS	MATERIAL	FINISH	TOOL No.
CHECKED	DATE				
TITLE: BV CASHBOX ASSEMBLY				DRG No. GA711	ISSUE E

Appendix F – PC System Specification

The ITL Validator Software has been tested and verified using Windows 2000/XP/Vista™ on a Pentium™ based PC System (© Microsoft and Intel). Full functionality cannot be guaranteed on lower specification systems.