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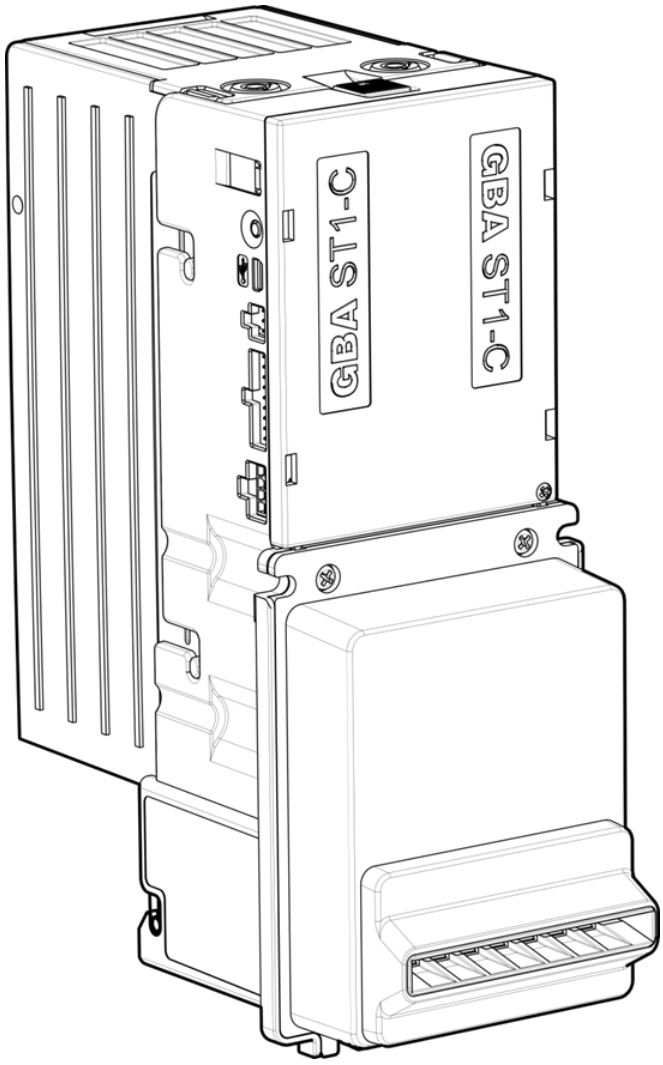
SECURING THE U.S. and the GLOBE

GBA ST1C-UL 110 VAC 12Vdc

Operation Manual



CONTENTS

Section 1

1 INTRODUCTION

This manual describes the operation and maintenance of the GBA ST1C-UL integrated bill validator and stacker.

The GBA ST1C-UL bill acceptor has been specifically designed for use in UL applications that require a 110VAC operation or 12Vdc and require to accept bill widths up to 70mm.

The following features include:

- Integral 100 - 120 Volt AC power regulator (for AC applications)
- Up or Down entry stacking configuration
- Fully illuminated Bill Entry Bezel
- Easy access to bill path for cleaning and servicing
- Cassette options for 100, 300, 600 or 1000 bills, with optional security locks
- Two cassette styles offer front or rear note access
- Multiple Interface Options
- 18 pin connector
- Optional USB port for programming and connection to host controller
- On board Individual bill enable / disable
- UL and RoHS compliance

Please note that all references to “ST1C” in this document mean “ST1C-UL version with integral 100 - 120 Volt AC power regulator”, where applicable.

If you have any questions about this or any other GBA and Microcoin products then please visit our web sites at www.globalbillacceptors.com and www.microcoin.com, or contact your regional sales office for assistance.

1.1 Symbols

The Symbols used in this manual have the following meanings:

Type	Description
⚠ **Danger**	Danger indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.
⚠ **Caution**	Caution indicates a potentially hazardous situation or an unintended use which, if not avoided, could result in death or serious injury.
⚠ **Warning**	Warning indicates a potentially hazardous situation or an unintended use which, if not avoided, may result in minor or moderate injury and/or appreciable material, financial and environmental damage.
ⓘ	Important paragraphs which must be adhered to in practice as they enable the product to be used in a technically correct and efficient manner.

Section 2

2 CARE AND TRANSPORT

2.1 Transport

Shipping	Whenever shipping the product, always use the original packaging, shipping container and/or the appropriate packaging. The packaging protects the product against potential shipping damage.
Inspection	After transport inspect the product before use.

2.2 Storage

Product	Respect the temperature limits when storing the equipment, particularly in summer. Refer to section 4.1 General Specifications for information about storage and operating temperature limits.
Inspection	After long periods of storage inspect the product before use.

2.3 Cleaning and Drying

Product	Use only a clean, soft, lint-free cloth for cleaning. If necessary, moisten the cloth with water or a mix of water and up to 50% Iso-Propyl Alcohol (IPA) . **DO NOT** use more than 50% IPA. Do not use other liquids; these may attack surface coatings. Please observe detailed instructions in section **Error! Reference source not found. Error! Reference source not found.**
Damp products	Dry the product and the accessories at a temperature not greater than 40°C (108°F) and clean them. Do not repack until everything is completely dry.
Cables and plugs	Keep plugs clean and dry. Blow away any dirt lodged in the plugs of the connecting cables.

2.4 Unpacking

Inspect the Bill Acceptor for potential damage sustained in transit. If any damage is present, return the ST1C-UL into the original packaging and notify the carrier immediately. Send a written intent to file a claim to the delivering carrier within 72 hours from delivery. Send a copy of that letter to the shipper. Note that only the consignee can file a claim against the carrier for concealed damages.

If there was no damage sustained in transit, retain the original packaging for immediate storage, future shipping or transporting.

Section 3

3 SAFETY DIRECTIONS & WARRANTY

3.1 General

The following directions should enable the person responsible for the product, and the person responsible for use of the equipment, to anticipate and avoid operational hazards.

The person responsible for the product must ensure that all personnel who install and maintain the product understand these directions and adhere to them.

3.2 Intended Use

Permitted Uses	Bill Note Validation
Adverse Uses	Adverse uses of the equipment include, but are not limited to: • Use of the product without instruction • Use outside of the intended limits • Removal of hazard notices • Opening the product while it is connected to mains power • Modification or conversion of the product • Use of products with obviously recognizable damages or defects
⚠ **Warning**	Adverse use can lead to injury, malfunction and damage. It is the task of the person responsible for the equipment to inform the user about hazards and how to counteract them. The product is not to be operated until the user has been instructed on how to work with it.

3.3 Responsibilities

Person installing or maintaining the product	The person installing or maintaining the product has the following duties: • To understand the safety instructions on the product and the instructions in the user manual • To be familiar with local regulations relating to safety and accident prevention • To inform relevant person in charge immediately if the product and the application becomes unsafe • To ensure that the national laws, regulations and conditions for the operation are respected
⚠ **Warning**	The person installing the product must ensure that the product is used for its intended purpose and that it is operationally safe.
⚠ **Warning**	This product may be installed only by an appropriately trained and qualified technician as per any national regulation.
⚠ **Warning**	Only Astrosys International authorized service workshops are entitled to repair these products.

3.4 Warranty

AstroSystems Inc warrants the GBA ST1C-UL Bill Acceptor for a period of one (1) year from the date of purchase. This warranty extends to the original purchaser of the warranted product, and to each transferee owner of the product, during the term of the warranty.

During the warranty period, manufacturer will repair or replace (at manufacture's option); any parts (up to and including the complete unit) which fail to function properly because of defects in material or workmanship.

This warranty covers the GBA ST1C-UL which has been designed to accept valid currency. Manufacturer is not responsible for consequential damage or performance degradation that results from counterfeit currency, foreign objects, or other objects inserted into the Bill Acceptor.

The product to be repaired under warranty must be delivered to an Authorized Service Centre, inbound freight prepaid. Upon request, owner must show proof of purchase when submitting equipment for service during the warranty period. Repair or installation at the owner's location is NOT included in the warranty. During the warranty period, manufacturer will pay all outbound ground freight charges to the owner's location. If special handling/shipping is desired, owner must assume any shipping charges incurred.

Damage due to electrical overload, negligence, accidents, misuse, abuse, vandalism, or act of God, is not covered by this warranty. Any alteration of the product after manufacture voids the warranty in its entirety.

Manufacturer shall not be liable for any consequential damages as a result of defects in material or workmanship. Any written or applied warranty of this product is strictly limited to the refund of the cost of goods purchased.

Section 4

4 PRODUCT INFORMATION

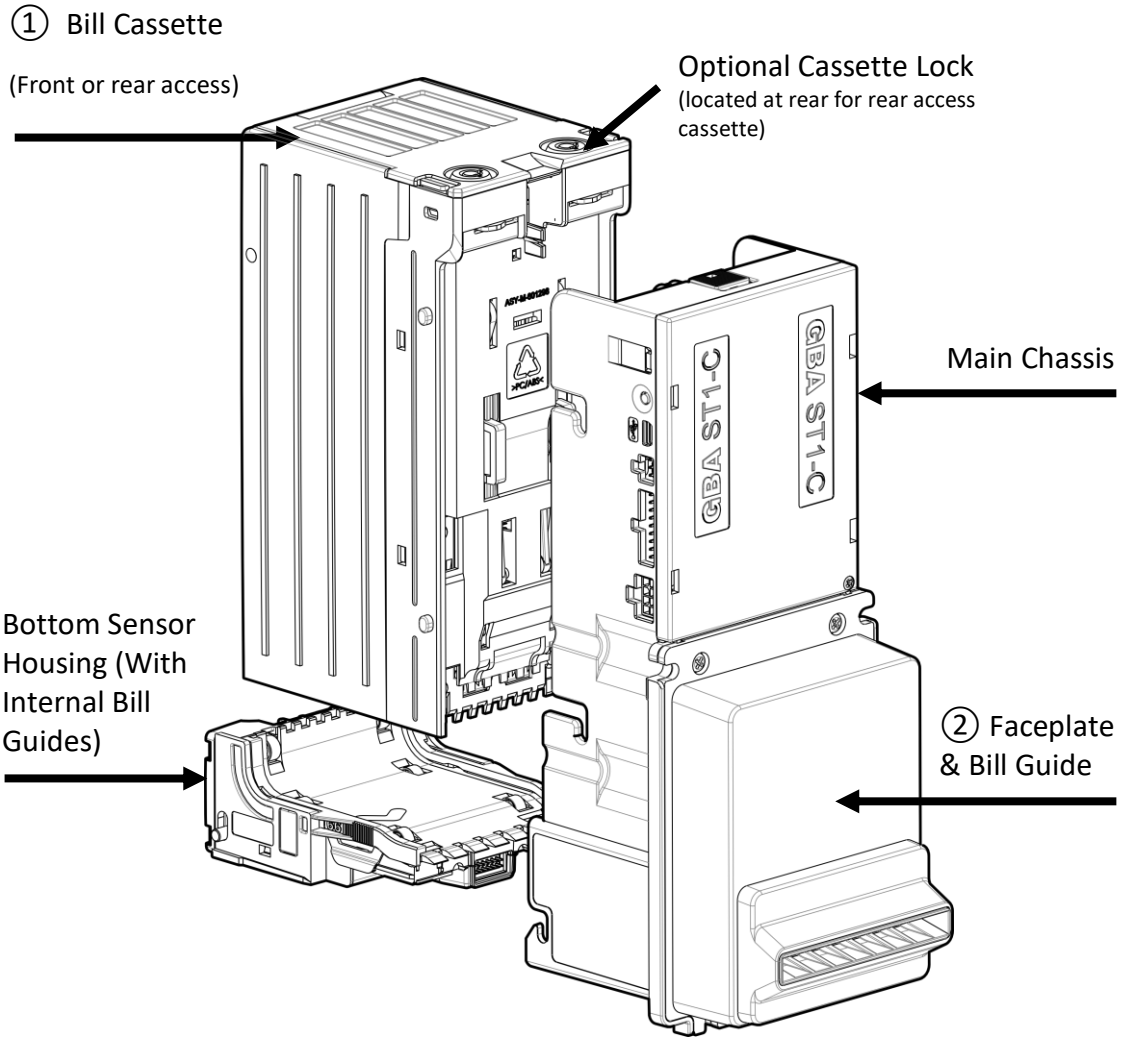
4.1 General Specifications

Bill Insertion:	Up to 32 bill denominations with 4 way insertion
Bill Dimensions:	62 to 70mm wide; 120 to 160 mm long
Bill Acceptance Rate:	Greater than 95%
Cycle Time for Validation and Stack:	Typically less than 3 seconds
Nominal Cassette Capacity:	300 bills, front or rear access
Interfaces Supported:	Pulse Parallel NISR (Serial) BSCP ccTalk ccNet VCCS Refer to separate manuals for more details on each interface.
Power Supply:	110 Volt AC Nominally or 12Vdc
Environmental Range	
(Operating Temperature):	0° to 55°C
(Operating Humidity):	Up to 90% R.H., non-condensing
(Storage Temperature):	-10° to 65°C

4.2 Product Architecture

The GBA ST1C-UL bill acceptor is a modular assembly which can be easily accessed for service and support. It consists of a Main Chassis, Faceplate and Bill Guide, Bottom Sensor Housing and a Bill Cassette. There are interchangeable items depending upon the specific application.

① Bill Cassette (100, 300, 600 or 1000 bill capacity)
② Faceplate & matching Bill Guides to suit 66 or 70mm bill widths.
Internal Bill Guides to suit 66mm or 70mm applications



4.2 Main components of product assembly

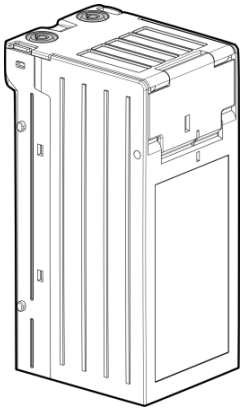
4.3 Bill Cassette

Bill cassettes can be provided with 100, 300, 600 or 1000 note capacity.

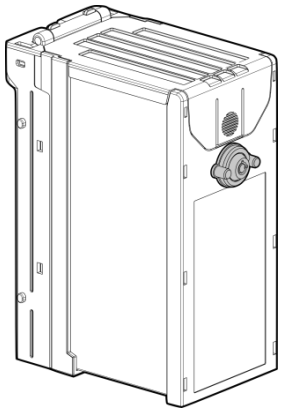
Each cassette may be supplied with tamper-evident security locks

The cassettes may be configured as front access or rear access styles for collecting stored notes.

- 300 Bill Cassette shows a front access style
- 600 Bill Cassette shows a rear access style, with lock fitted



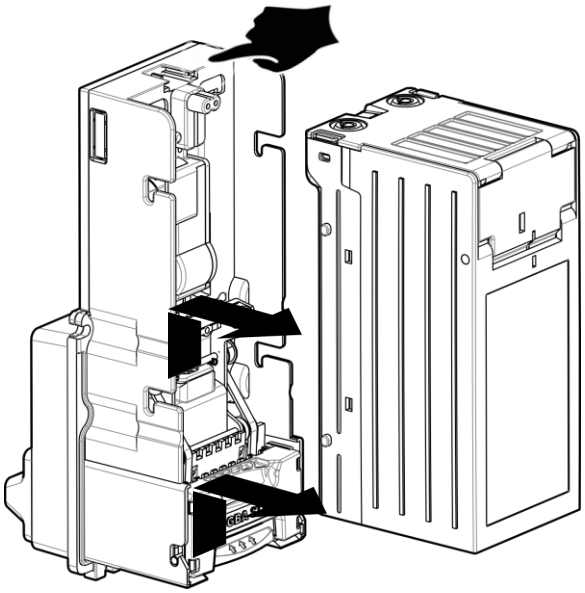
300 Bill Cassette (showing front access)



600 Bill Cassette (showing rear access) style)

Remove the cassette by sliding the cassette clip forwards and lifting the cassette from the GBA ST1C-UL unit.

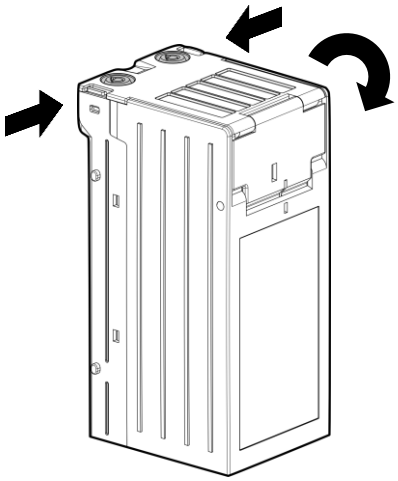
Reverse this action to fit the cassette back into place.



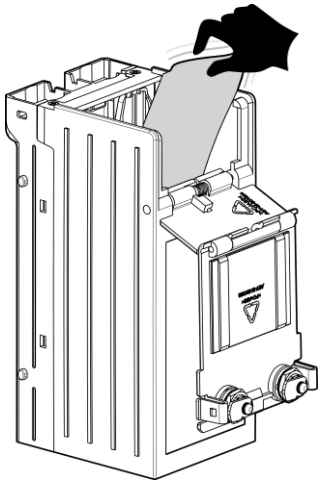
4.4 Opening the Bill Cassettes

To access the bills from each cassette

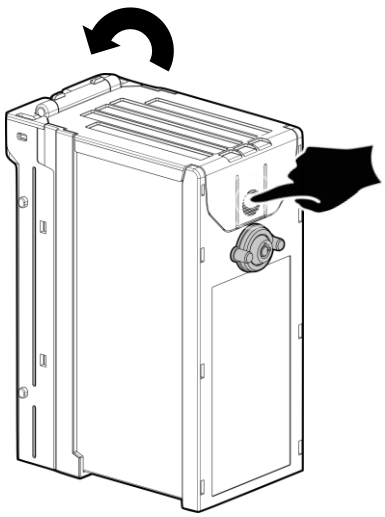
Front Access Cassette	Rear Access Cassette
• Squeeze two tabs	• Press the release button
• Pull back to open the cassette lid	
• Remove stacked bills	



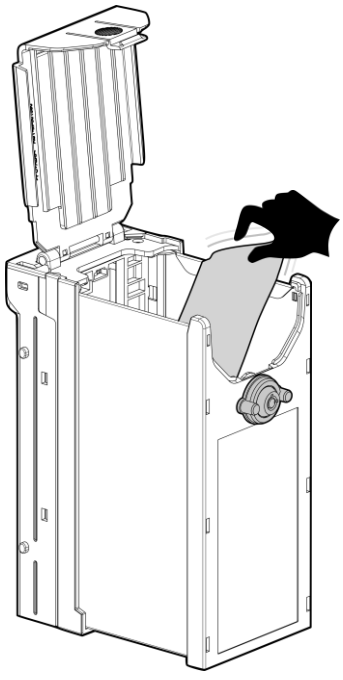
Front Access Cassette
Opening lid



Front Access Cassette
Remove stacked bills



Rear Access Cassette
Opening Lid



Rear access Cassette
Remove stacked bills

4.5 Faceplate Options

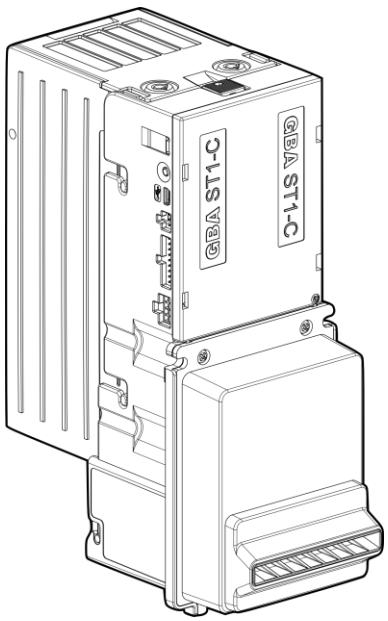
The same faceplate is used for both 66mm bill guides and 70mm bill guides. The design of the bill guide and faceplate is symmetric and it can be mounted in either up or down stacking configuration.

Reminder: *matching internal bill guides need to be mounted to the Lower Sensor Assembly (refer section 6.2).*

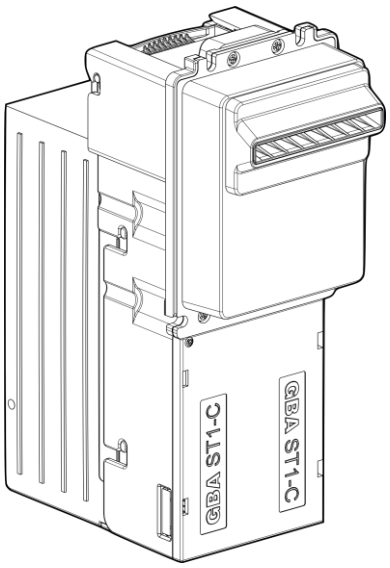
The validator can be mounted in three ways

(i) Standard - the entire faceplate is revealed at the front of the host machine and can be used to mount information decals.
(ii) Security – only the raised area of the faceplate and the bill guide is revealed
(iii) High security - just the illuminated bill guide is visible.

If you have a custom fitment application, do not hesitate to contact your local regional office with your requirement.



4.5.1 Up stacker orientation

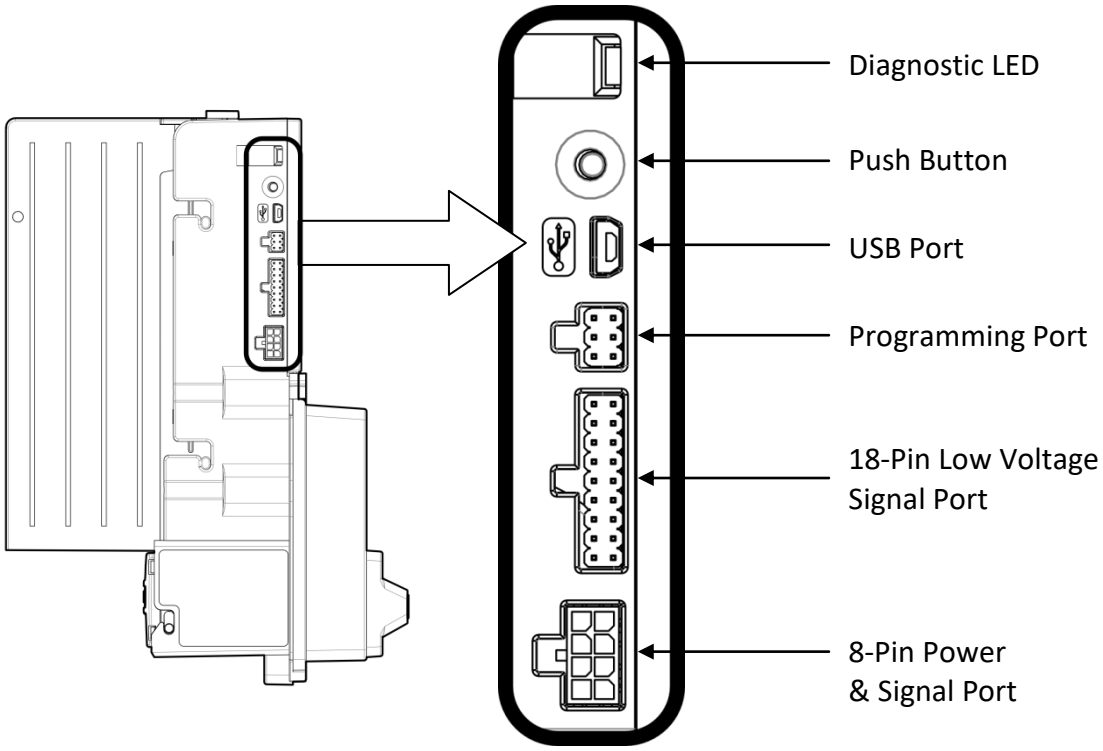


4.5.2 Down stacker orientation

4.6 Connections and User Controls

The GBA ST1C includes the following:

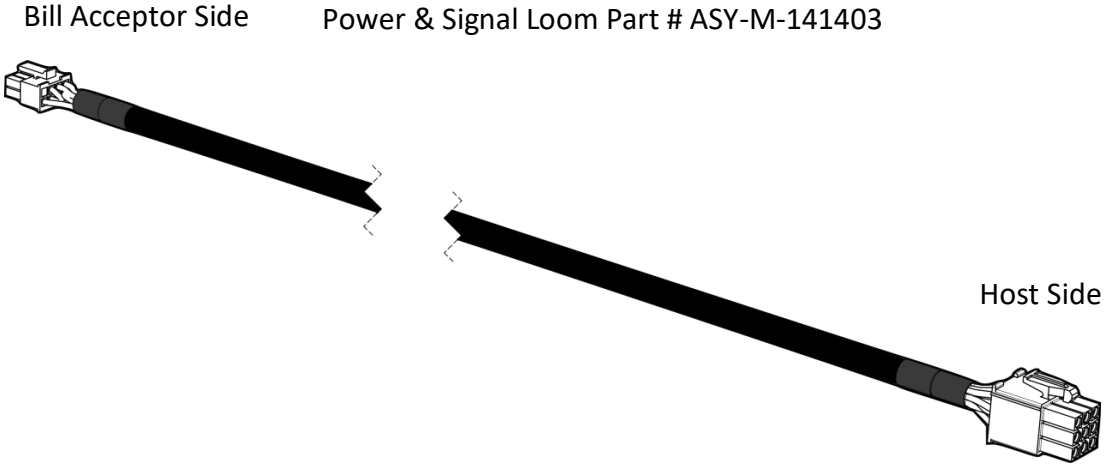
Item	Notes
8 pin port for 100 – 120 Volt AC power and signals to the host machine.	A connection cable is supplied with the validator. See section 5.3 for more details
18 pin port for 12Vdc operation and low voltage signals to the host machine	See section 5.4 for more details
6 pin port for programming and calibrating the validator	This requires a programming loom which connects to a Microcoin VAL 364 USB to Serial Dongle. See section 4.7
User Push Button and Diagnostic LED	See separate technical bulletin for more details
USB port	See section 5.5 for more details
DIP Switch	See separate technical bulletin for more details



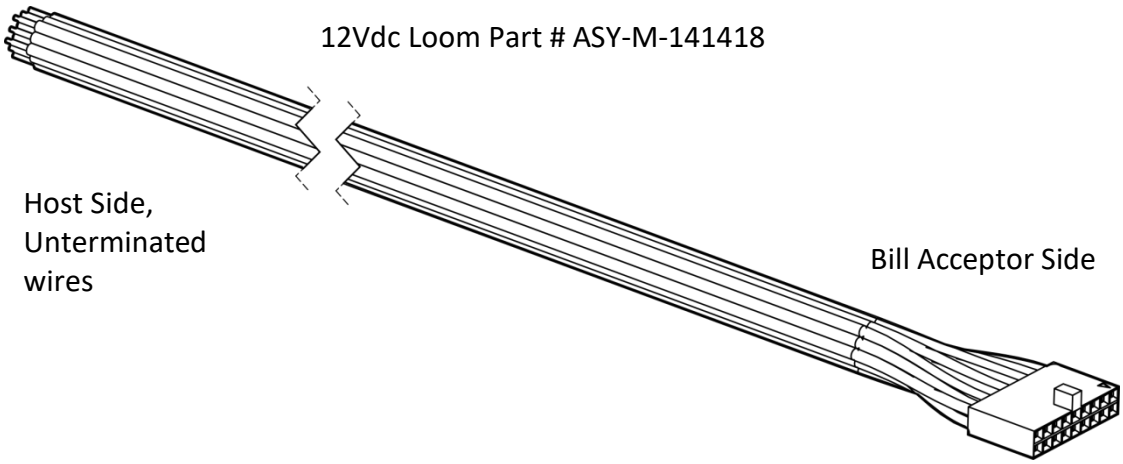
4.6 - Location of connectors and user controls

4.7 Wiring Looms

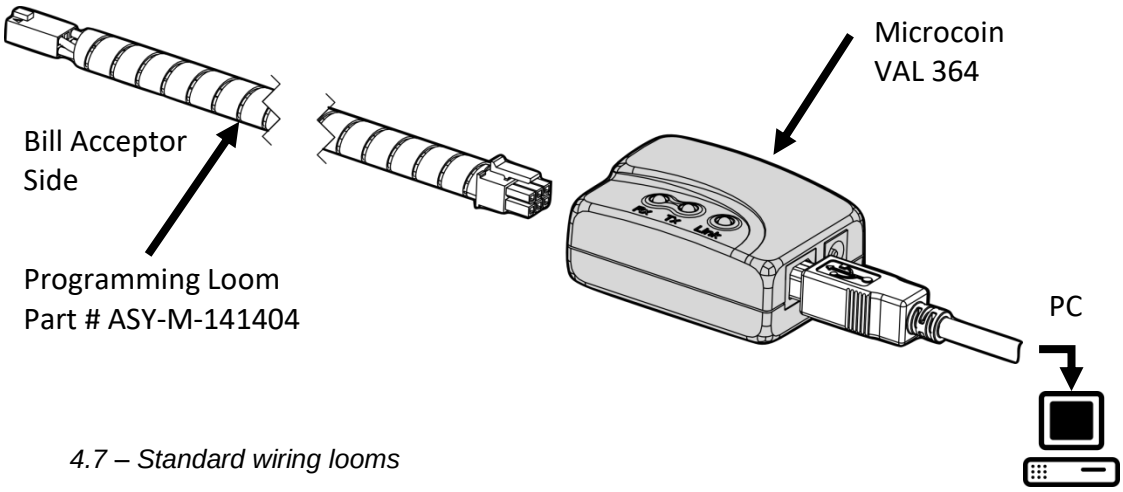
4.7.1 110VAC operation



4.7.2 12Vdc operation



4.7.3 Programming Loom (optional)



4.7 – Standard wiring looms

ASY Part #	Description	Host Side Connector Part #
ASY-M-141403	110VAC Power & Signal Loom	AMP 9 Pin, c-172169-1
ASY-M-141404	Programming Loom	Connects to Microcoin VAL 364
ASY-M-141418	12Vdc Power & Signal Loom	Connects to 18 pin port

Section 5

5 ELECTRICAL INTERFACE SPECIFICATION

⚠ **Caution**	ST1C-UL 110VAC is supplied from the mains voltage line; please observe all applicable national and local legislations and regulations during the installation and use of this device. It is the sole responsibility of the customer to familiarize themselves with the product and install it correctly.
⚠ **Caution**	ST1C-UL 110VAC needs to be powered from a current limited supply that is adequately protected, taking into consideration local installation wiring conditions

5.1 Power Requirements

Power Consumption (Typical):	15W
Supply Voltage:	100 to 120 Volts AC
Input current (Typical):	0.35A/115 Volts AC

5.2 Safety Standards

ST1C-UL 110VAC complies with the following regulations and directives:

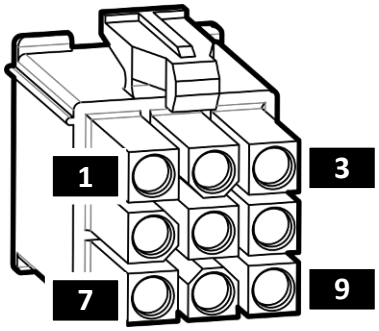
Safety Standards:	UL60950-1
EMC Emission / Immunity:	EN55022: 2010 EN61000-3-3: 2008 EN55024 (EN61000-4-2):2010 EN55024 (EN61000-4-3):2010 EN55024 (EN61000-4-4):2010 EN55024 (EN61000-4-5):2010 EN55024 (EN61000-4-6):2010 EN55024 (EN61000-4-11):2010

5.3 110VAC Power Connector

5.3.1 9-pin connector Details

Connector on the wiring loom: TE Connectivity /Amp Mate-N-Lock 9-pin Female Pin P/N 170362-1, with male crimps P/N 172169-1

Pin	Function
1	120 VAC Neutral Inhibit.
2	120 VAC Neutral Enable.
3	120 VAC Hot Enable.
4	120 VAC Hot Power
5	No Connection
6	120 VAC Neutral Power
7	Bill Acceptor Relay Contact (Normally Open)
8	Bill Acceptor Relay Contact (Common)
9	No Connection
Ground	Ring terminal should be screwed to the grounded frame



Power & Signal Loom Connector (Host Side)

5.3.2 Output Relay Rating

CONTACTS Ratings (Resistive load):	Max. switched power: 30 W or 250 VA UL Rating: • 2 A at 125VAC General Use • 1 A at 30 VDC Resistive
GENERAL DATA	**Life Expectancy** Minimum operations **Electrical** 1 x 10^5 at 2 A 120 VAC Res. **Operate Time (typical)** 5 ms at nominal coil voltage **Release Time (typical)** 1 ms at nominal coil voltage **(with no coil suppressions)**

Note 1): All values at 20°C (68°F).
Note 2): Please observe AWG current carrying capacity limits.

5.3.3 High Voltage Enable

The ST1C can be enabled or inhibited using the 9-pin connector as follows:

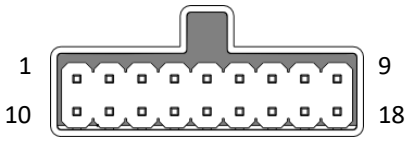
Pin		Function
1	110 VAC Neutral Inhibit.	Connect to 120 VAC Neutral to disable acceptor. If this is left floating, it may disable acceptor, based on the state of the 120VAC Hot Enable line.
2	110 VAC Neutral Enable.	Connect to 120 VAC Neutral to enable acceptor. Leave floating to disable acceptor.
3	110 VAC Hot Enable.	Connect to 120 VAC Hot to enable acceptor. Leave floating to disable acceptor.

Note: You should connect only one of these three pins.

5.4 12Vdc Low Voltage Signal Port

5.4.1 18-pin Connector Details

Recommended mating connector: TE Connectivity / Amp - 5-102398-7 - Connector, Header, IDC, 2.54mm, 18way



View looking at the validator

Pin		Function	Pin		Function
1	Out	Credit Pulses[1]	10	Out	Alarm
2	Out	Ready To Send for Serial Mode	11		12 Volt DC Input[6]
3	In	Serial / Pulse Select Line	12	In	Enable Validator[3][2]
4		DC Ground	13	Out	Power for Alarm LED
5	Out	Transmit (TTL level RS232)	14	In	Serial – Ready to Send or Receive (TTL level RS232)
6	Out	Parallel Vend Channel 1	15	Out	Parallel Vend Channel 5
7	Out	Parallel Vend Channel 2	16	In	Alternate Receive (TTL level RS232)[5]
8	Out	Parallel Vend Channel 3	17	Out	Parallel Vend Channel 6
9	Out	Parallel Vend Channel 4	18	In	Parallel Escrow Control[4]

Notes:

1. All outputs pull the pin to ground when active
2. When using Low Voltage Enable input on this connector, do not connect High Voltage Enable pins to avoid conflicts in the control logic. See table below
3. The Enable Validator input can be configured for Active Low (validator is in service when the input is pulled to ground) or Active High. If the ST1C is fitted with a DIP switch, this input can be over-ridden by the “Always Enable” switch.
4. The Escrow Control Input is always configured as Active Low
5. For serial protocols, the data line can be connected to either pin 14 or 16
6. The 12 Volt DC input is provided for low voltage operation only.

5.4.2 Low Voltage Enable

The logic for the Enable Validator input on pin 12 is:

Condition	Input status	Validator Status
Active Low	Low	Enabled
	Disconnected	Inhibited
	High	Inhibited
Active High	Low	Inhibited
	Disconnected	Inhibited
	High	Enabled

5.4.3 Signal Specifications

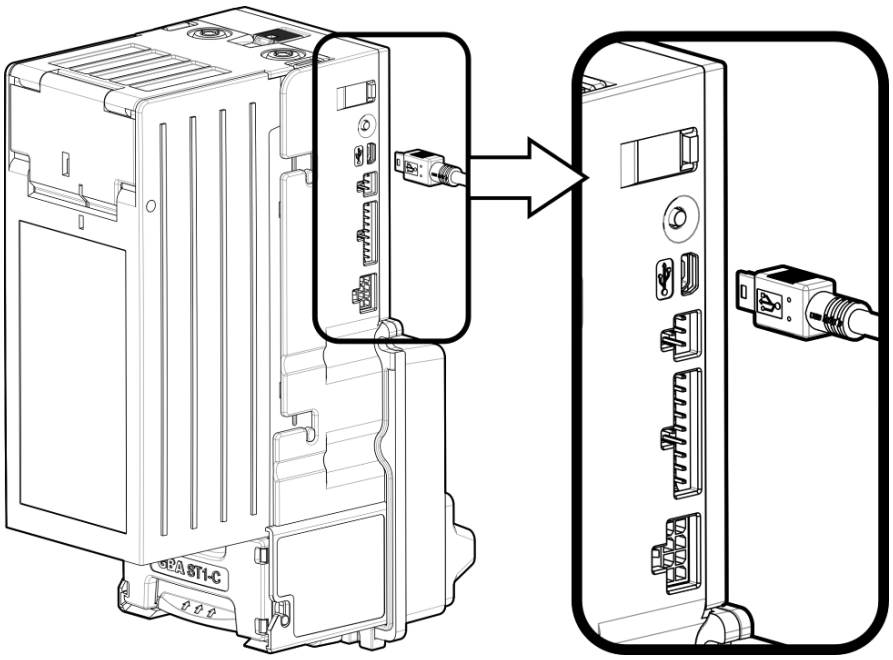
Open Collector outputs:	
Maximum Open Voltage	40V
Maximum Sink Current	50mA @ 12VDC
Maximum Output Low Voltage:	0.4VDC
Minimum Output High Voltage:	2.4VDC

Input low level voltage:	0…. 1V
Input high level voltage:	3…..12V (typically 3… 5V)
Input pull up to 5V:	21K Ω

5.5 USB Port

The ST1C USB port is compliant as a USB 2.0 full speed host or device and is fitted with a mini-AB socket. The USB port can be used to:

- Connect a USB memory device to reprogram the validator with new firmware and bill dataset
- Connect to a USB port on the machine controller. The validator will enumerate as a serial port device for compatibility. Please contact your local regional office for the relevant device drivers.



5.5 USB Mini-A or Mini-B Cable

Section 6

6 MAINTENANCE & OPERATION

6.1 Cleaning the Validator Bill Path

Equipment Required	
1.	Cotton swab or a lint-free cloth.
2.	Cleaning solution: A mix of water and up to 50% Iso-Propyl Alcohol (IPA) is recommended.

ⓘ	**DO NOT** use more than 50% IPA. **NEVER** use solvent-based cleaning agents, such as Amberclens, pure alcohol, petrol, methylated spirit or white spirit on this product as the unit will be severely damaged.

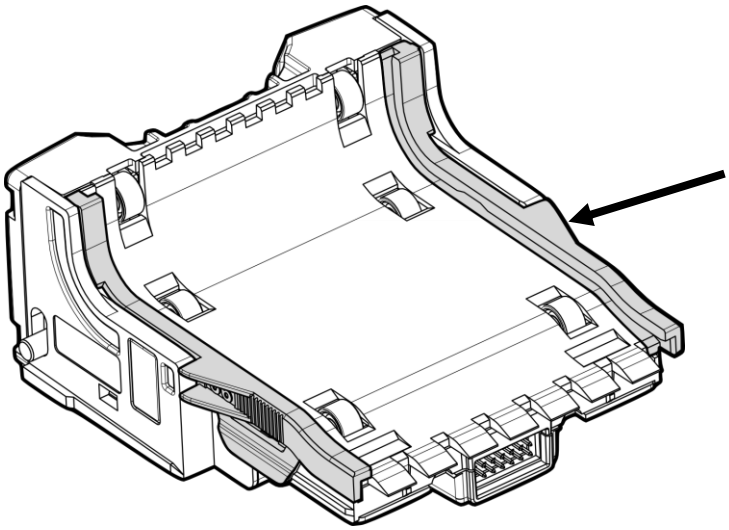
1. Ensure the power supply to the GBA ST1C unit is switched OFF.
2. Remove the Cassette.
3. Lift up the purple Access Latch on the back of the Lower Sensor Assembly, and gently slide the module out of the Channel Assembly – see section 6.2.
4. Using a cotton swab, or lint-free cloth, wetted with cleaning solution and applying light force only, carefully clean all sensor windows in both halves (upper and lower) of the bill path. If a sensor window has become badly scratched do not attempt to polish it, contact your local regional office for further advice.
5. Continue with the swab, or lint-free cloth, to clean the rest of the bill path, including sprung rollers.
6. Visible parts of belts can be cleaned by wiping with a cleaning solution-soaked cotton swab or wipe. It is not possible to clean the whole belt surface without removing the belts from the unit.
7. Use an additional swab or cloth to dry the cleaned area, if required.

6.2 Lower Sensor Housing

The lower sensor assembly has an internalised connection to the main chassis, so there is no cable to disconnect. To remove the housing lift the access latch and gently slide back.

To refit the assembly, slide it forward until the retaining bar clicks into place.

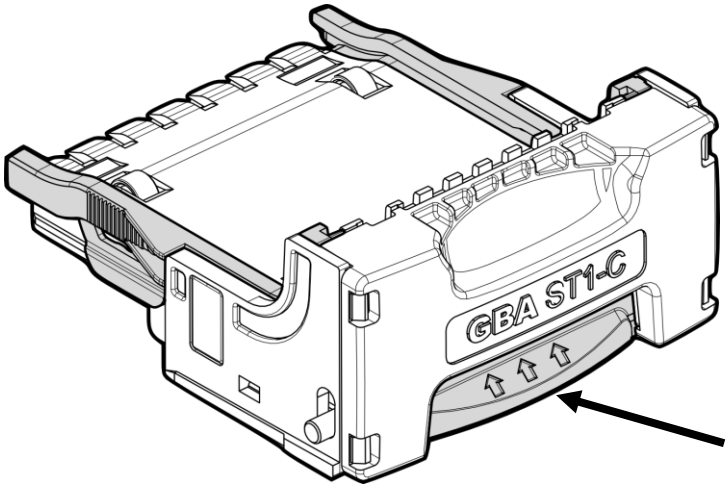
Note that the black internal bill guides must be fitted for either 66 or 70mm applications. They can be provided as a kit, which includes a matching note guide.



Internal Bill Guides

Two options matched with the external bill guides:

- 66mm kit ASY-M-111445
- 70mm kit ASY-M-111446

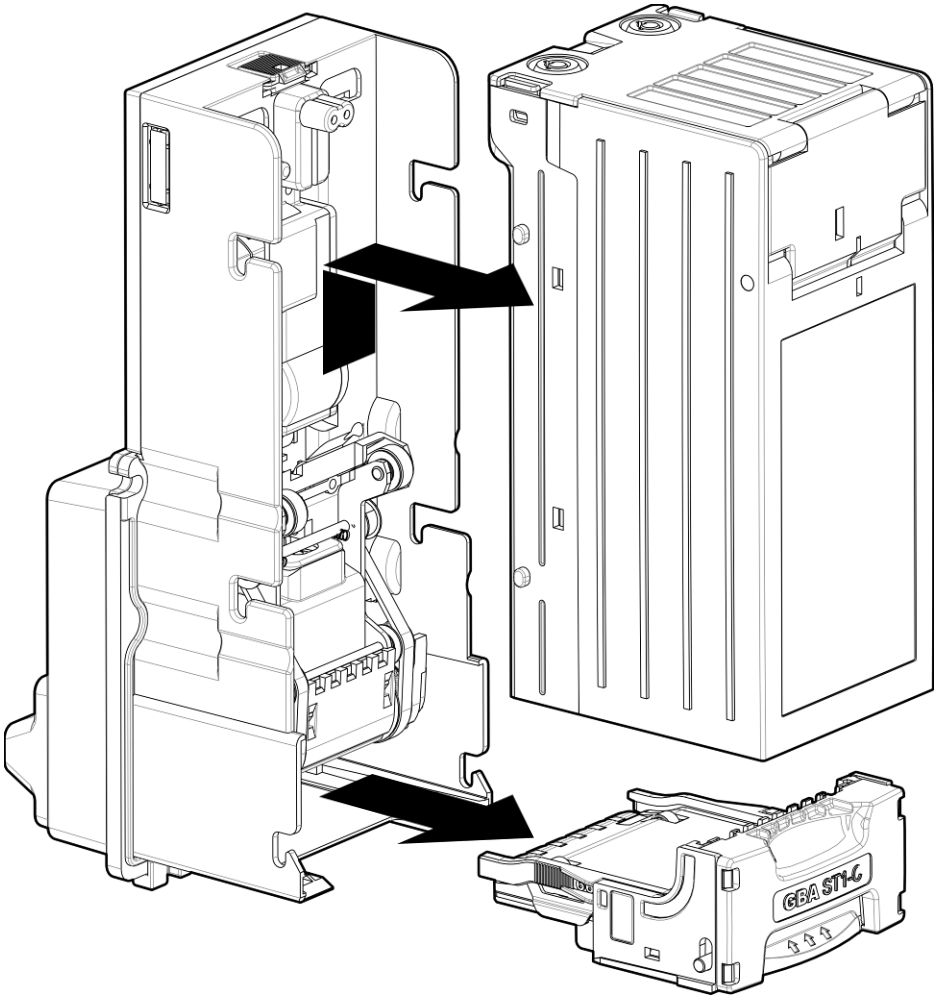


Access Latch

6.2 Image of Lower Sensor Assembly

6.3 Clearing a Bill Jam

1. Ensure the power supply to the GBA ST1C-UL unit is switched OFF.
2. Remove the Cassette.
3. Lift up the purple Access Latch on the back of the Bottom Sensor Assembly, and gently slide the module out of the Channel Assembly.
4. Clear the jammed bill(s) from the bill acceptor.
5. Re-assemble unit and switch the power supply back ON.

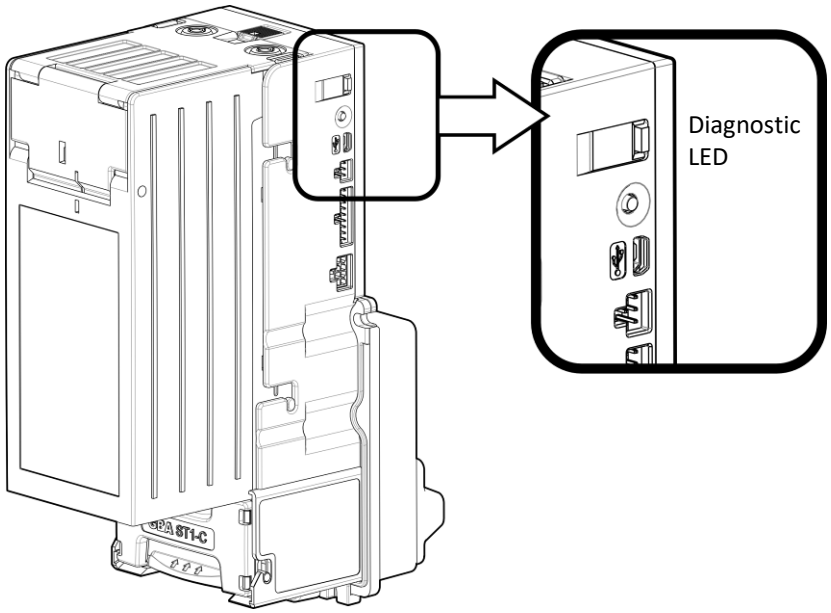


6.3 - Image of bill path access

Section 7

7 DIAGNOSTICS & TROUBLESHOOTING

7.1 Diagnostics



7.1 Image of side view of ST1C showing diagnostic LED

7.1.1 Diagnostic LED

The GBA ST1C has the facility to communicate validator status by the use of a tri coloured Diagnostic LED located on the side of the unit. This enables enhanced diagnostics for the user and for factory personnel when assisting customers over the phone or by email. The following functionality describes the operation of the LED:

Indication	Status
Standby Modes	
Steady Green	Unit Operational
Steady Orange	Unit Inhibited by Host Controller
Steady Red	Unit out of order – Hard Fault
Active Modes	
Flashing Green	Unit Validating
Flashing Red	Soft Fault – Check Unit (e.g. stacker full)
Flashing Orange	Sensors read low – clean lenses
Program Modes	
Fast Flashing Green	Bill Enable – Programming Mode
Fast Flashing Red	Bill Disable – Programming Mode
Fast Flashing Orange	Primary Calibration – Programming Mode

7.1.2 Diagnostic LED – Bill Reject Codes

If a bill is rejected then a flash code is given when the bill is removed (the LED will flash red or orange a number of times):

Cause of Bill Rejection	Number of flashes
Unrecognised bill	1 Red
Optical Anti String Gate was triggered	2 Red
Bill Inhibited in the configuration or by DIP switch	3 Red
Bill Inhibited by the Host	3 Orange
Bill slipped or was held by the user as it was scanned	4 Red
Bill inserted skewed	5 Red
Bill is too long or two bills inserted	6 Red

7.1.3 Illuminated Bill Guide Patterns

The illuminated bill guide can be configured to flash different patterns according to the validator state. The standard patterns are:

ST1C State	Pattern
Out of Service - fault	Bill Guide off
Not accepting bills at the request of the host controller	Flashes momentarily every 2.5 seconds
In service, waiting for a bill	Bill Guide on
In service, handling a bill	Flashes continuously

7.2 Troubleshooting

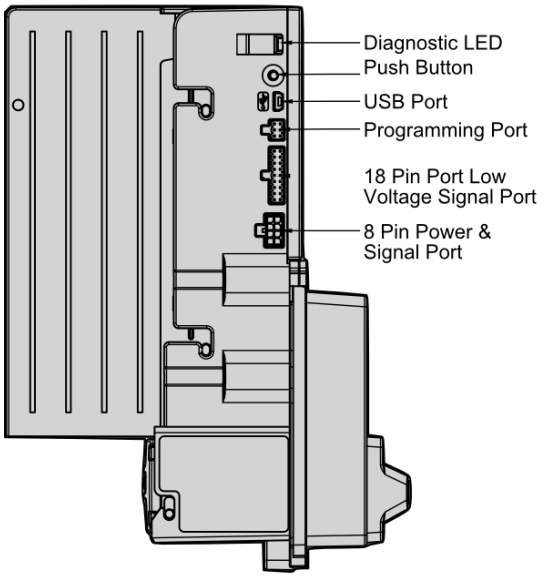
The following information is presented for customers' guidance in identifying problems with the GBA ST1C. It does not necessarily cover every possible situation.

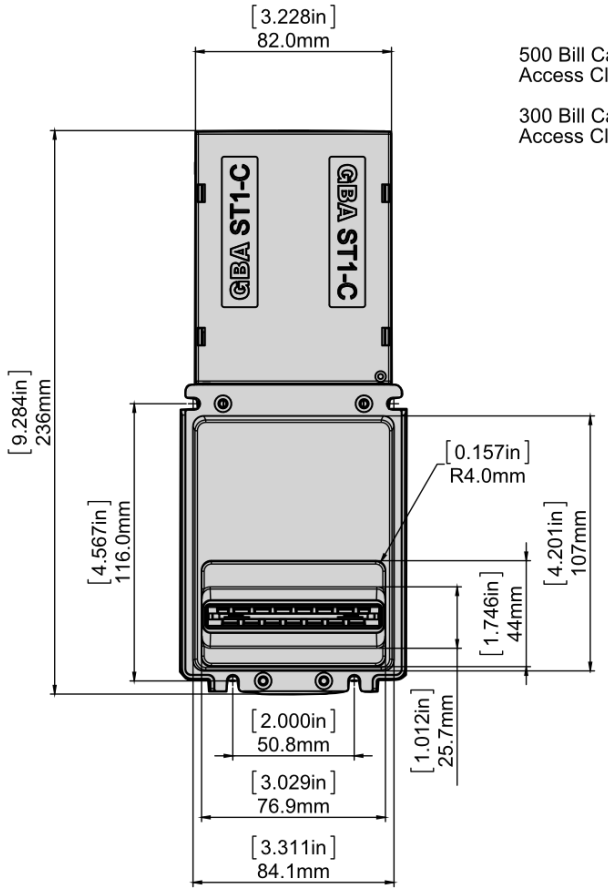
Problem Symptoms	Possible Cause	Investigate	Possible Solution
Unit does not work when power is applied - belt motor does not run, status LED is off, and illuminated bill guide is off.	1. Power supply not switched on. 2. Power supply not connected. 3. Poor electrical connection(s). 4. Unit is in "Low Power" mode and is waiting for a bill to be inserted	1. Power supply and power cable. 2. Diagnostics indicator or illuminated bill guide. 3. Interface cable assemblies. 4. Insert a bill and check if the ST1C starts up.	1. Ensure power to validator is connected and turned on. 2. Ensure Interface cable is connected firmly and correctly.
All programmed bills are rejected	1. Acceptance inhibited for all bills. 2. Optical Sensors damaged or dirty 3. "Ready To Punch" sensor not working.	1. Software configuration. 2. Remove Bottom Sensor Assembly and inspect	1. Use on-board button or GBA Talk to enable required bills. 2. Clean lenses in bill path. Then recalibrate the validator.
Poor or no acceptance of one or more programmed bills	1. Bill acceptance inhibited. 2. Poor sensor readings. 3. Insufficient power supply capacity.	1. Bill inhibit settings. 2. Bottom Sensor Assembly fitting. 3. Bill path cleanliness.	1. Use on-board button or GBA Talk to enable required bills. 2. Use GBA Talk to check sensor levels and re-calibrate if necessary. 3. Clean validator bill path.
Bills fail to stack correctly	1. "Ready To Punch" sensor not working. 2. Stacker motor not working. 3. Stacker mechanism not working.	1. Stacker motor cable connections. 2. Stacker jams. 3. Damaged / distorted bill in cassette.	1. Ensure all cables are connected properly. 2. Ensure cassette is located correctly and free from damage.
Unit does not communicate with host machine	1. Incorrect interface selected. 2. Poor electrical connection(s).	1. Configuration of validator. 2. Interface cable assembly.	1. Use on-board button or GBA Talk to select required interface. 2. Ensure Interface is connected firmly and correctly.
Belt motor and/or stacker motor runs continuously after power ON	1. Poor electrical connection(s)	1. Internal harnessing.	1. Ensure Interface cable is connected firmly and correctly.
Unit does not provide credit for accepted bill	1. Incorrect interface selected. 2. Poor electrical connection(s).	1. Configuration of validator. 2. Interface cable assembly.	1. Use on-board button with Program Card or GBA Talk to select required interface. 2. Ensure Interface cable is connected firmly and correctly.

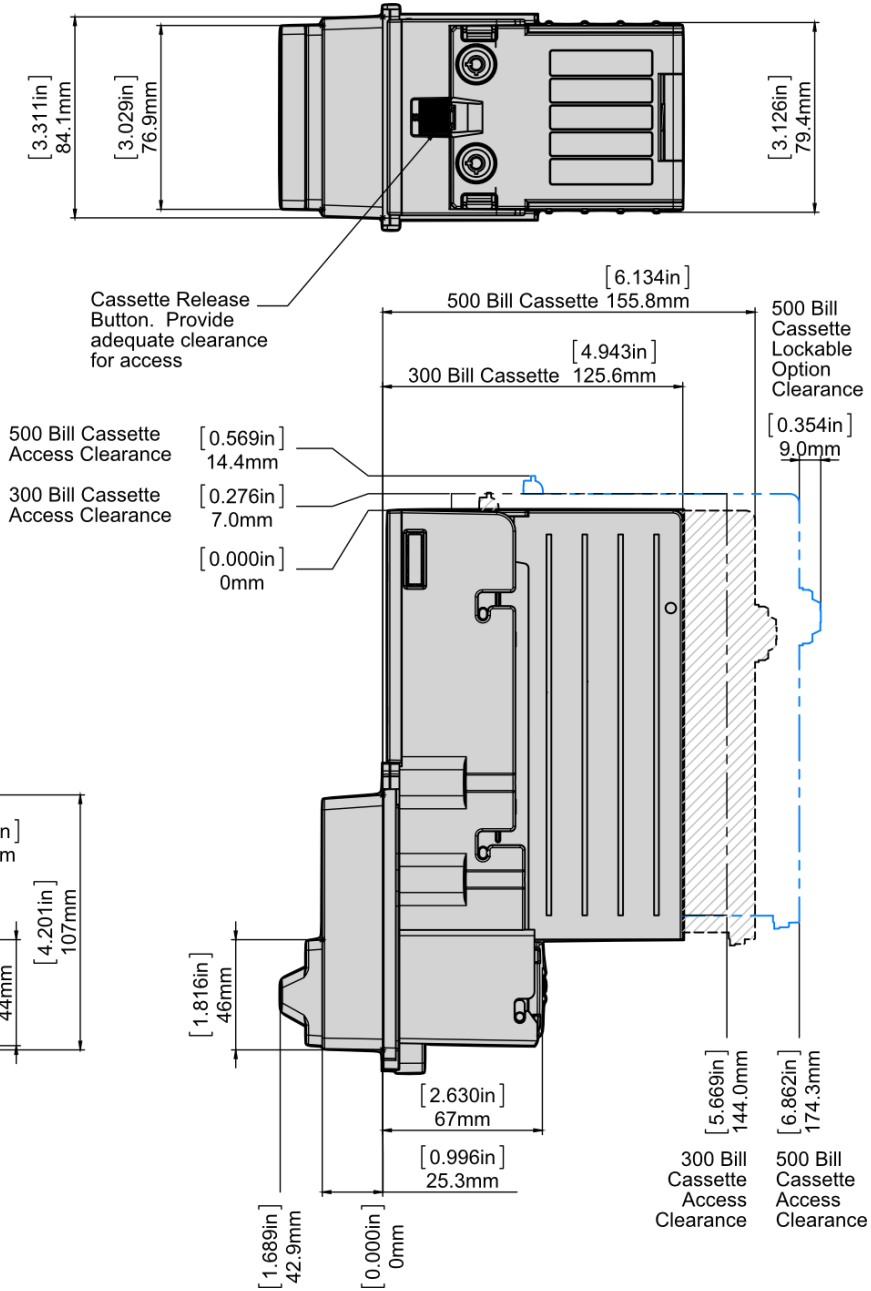
Section 8

8 DIMENSIONAL DRAWINGS

8.1 Upstacker / Downstacker







3RD ANGLE PROJECTION

Section 9

9 About US

ABOUT US
Company Profile:

Established in May, 1989
Quality integrated, high-tech pedestrian and vehicle access security systems, loss control products and designs are the outstanding advantages you receive from TURNSTILES.us. Since 1989, we've proudly offered the best Security Turnstiles to greatly increase the Security of your Agency, Business, or Organization. We're GSA licensed and are the chosen Provider of Security Turnstiles by a number of respected Organizations and Businesses.

Technology:

For high quality Gate Monitoring and Access Control, we provide EntraPASS Global Edition Security Management Software. EntraPASS Global Edition Software is highly flexible and easily expandable for every application It and can be integrated with various types of devices as necessary.

Our Work:

TURNSTILES.us focuses on the needs of our clients. Our vast experience with a variety of installation types gives us a tremendous working knowledge of available technology; we work with the customer's IT, Facility, and Security Management Teams to arrive at the best possible solution for each unique installation.
Our Engineers understand the need for properly installed and durable high tech security systems, and we guarantee our service will satisfy. Our continued growth is due to our product knowledge and attention to detail. In addition to high quality products, TURNSTILES.us provides the highest quality Engineering, AutoCAD Drafting, Documentation, Warranty, Maintenance, and Remote Desktop Assistance.

Strategic Alliances:

We have selected the very best manufacturing partners across all sections of our business. As a security systems integrator, we recommend the toughest, most reliable products to satisfy our customers' needs.