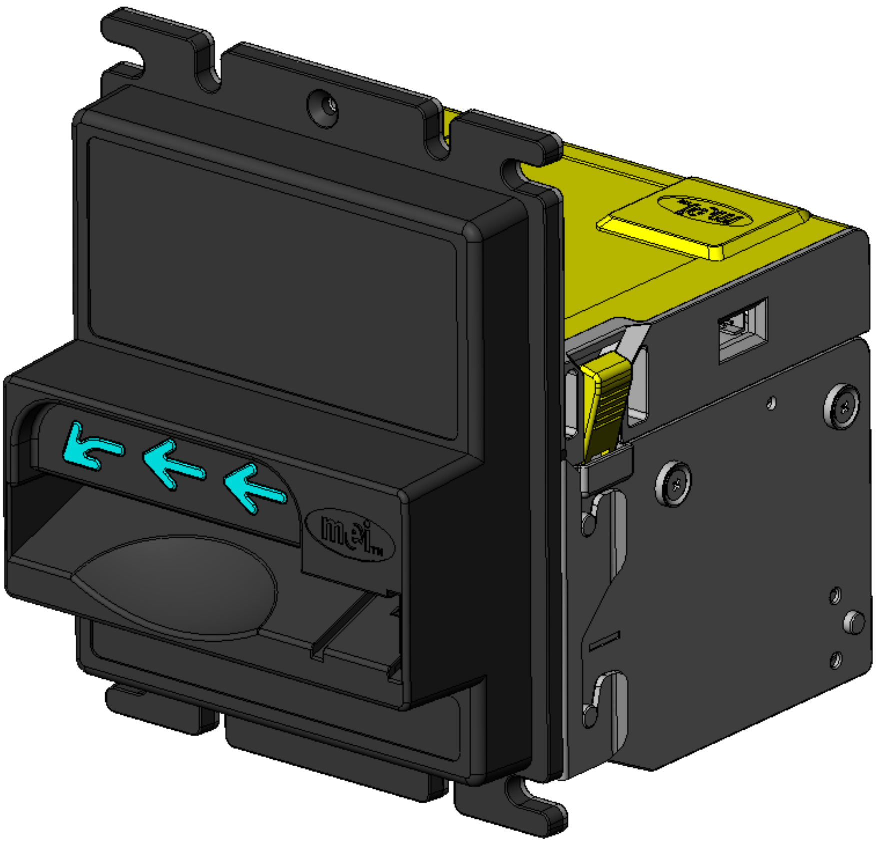
RS232 Interface Manual



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Introduction

The Geo® Gravity™ line of bill acceptors provide a "True" RS232 output from the 16 pin interface connector. No special interface cables are required. This is a three wire interface utilizing a Transmit Line (TXD), Receive Line (RXD) and Ground/Earth. In this polled system, the controller (Master) requests information from the validator (Slave) at a periodic rate (Polling Rate).

Technical Support

Support is available through our Help Desk and online at the MEI Website:

- www.meitechnical.com
- **Americas** 1 800 345 8172
- **Europe** +44 (0) 1189381100

General Data

Baud Rate:	**9600BPS**
Duplex:	**Half Duplex**
Character Format:	**1 Start Bit** **1 Stop Bit** **7 Data Bits** **1 Parity Bit (Bit 7, Even)** **NRZ Format**

Polling Rate

100mSec – 5 Sec: Longer poll rates (750mSec and above) will increase the overall transaction time. Poll rates below 100mS must not be used.

Inactive Timing

If the validator does not receive a poll within 5 seconds (30 seconds if a note is in the Escrow position) from the previous poll, the following conditions will apply.

1. Reject any note held in *Escrow*
2. Will not accept any note until the Master re-initiates the polling sequence. Diagnostic LED will be orange.

Configuration

Hardware: For "True" RS232 operation, an internal module (VA-PCBA09) must be installed in the validator. It may either be installed by customer or the factory. For installation instructions, contact local sales office or Authorized Service Center.

Software: The validator may be configured to operate in the RS232 mode via the GFlash program available for PC. The validator can also be factory set to operate in the RS232 mode.

Connection: Please see Electrical Connection section at the end of this manual.

Message Format

Each message follows a common format as outlined below:

STX, Length, MSG type and ACK number, Data fields, ETX, Checksum

Bytes are:

STX = 02H	One byte that indicates the start of a message
Length	One byte representation of the number of bytes in each message, including **STX, ETX** and **Checksum**
MSG type and ACK number	One byte of data

MSG type Bits 4, 5, and 6 of byte
=1 for *Master* to *Slave* (validator) messages
=2 for *Slave* (validator) to *Master* messages

ACK number Bits 0, 1, 2, and 3 of byte
=0 or 1

In messages sent by the *Master*, the **ACK number** is used to identify the message. As messages are sent to the validator, the number alternates between 0 and 1. If the validator receives two consecutive message with the same **ACK number**, it is treated as a re-send request. If no reply is received (i.e. The validator is busy), the Master **must** continue to send the same message and **ACK number** until a response is made.

In messages sent by the *Slave* (validator), the number is used to acknowledge specific messages sent by the *Master*. When the validator receives a *Master's* message correctly, the **ACK number** of *Slave's* message is set to the **ACK number** of the *Master's* message. If the *Slave* does not receive the *Master's* message correctly, *Slave* will not reply to that message.

Data	The data portion of the message consists of multiple data fields (see next section).
ETX = 03H	End of message byte
Checksum	One byte checksum. The checksum is calculated on all bytes except the **STX**, **ETX**, and **Checksum** itself. The calculation is done by Xoring the bytes.

States and Events

During the note validation process, the validator will pass through various “States” of operation and will report various “Events” to the Master. Multiple States can be reported by the validator in any one poll or they can also be reported on subsequent polls. Events are only reported once per occurrence and are cleared once acknowledged by the Master (by changing **ACK number**).

Validator States:

1. **Idle**: Not processing currency, waiting for note insertion
2. **Accepting:** A note has entered the sensor array and is being processed
3. **Escrowed:** A note has been validated. Note value will be reported to *Master*. The validator will continue to hold the note waiting for a message from the *Master* to **Stack** or **Return.**
4. **Note Jam:** The note cannot be stacked or returned.
5. **Stacker Full:** The note cannot be stacked because of a full cashbox.
6. **Failure:** A condition exists that prevents the validator from validating additional currency.
7. **Returning:** *Master* has instructed the validator to return the note.
8. **Rejecting:** Validator is rejecting a note that cannot be recognized.
9. **Stacking:** Validator is transporting a note to the cash box after being instructed by the *Master* to **Stack**.

Validator Events:

1. **Stacked**: A note has been successfully stacked into the cashbox. *Master* can report credit for note.
2. **Rejected:** A note has been returned because it was found to be invalid.
3. **Returned:** A note has been returned per request of *Master*.
4. **Power Up:** The validator power has been cycled since receipt of the last poll.
5. **Empty Stacked:** When validator executed an arbitrary stacking action to clear the note path.

Miscellaneous:

1. **Bill value Field**: Used in conjunction with Escrowed to indicate the channel of the current valid note.

Data Fields For Messages Sent By Master (Host Machine)

Byte 0

Bit 0: Set to 1 for 1st Note enable (e.g. USA $1)
Bit 1: Set to 1 for 2nd Note enable (e.g. USA $5)
Bit 2: Set to 1 for 3rd Note enable (e.g. USA $10)
Bit 3: Set to 1 for 4th Note enable (e.g. USA $20)
Bit 4: Set to 1 for 5th Note enable (e.g. USA $50)
Bit 5: Set to 1 for 6th Note enable (e.g. USA $100)
Bit 6: Set to 1 for 7th Note enable

Byte 1

Bit 0: Reserved for future (Set to 0)
Bit 1: Security. Reserved for future (Set to 0)
Bit 2: Reserved for future (Set to 0)
Bit 3: Reserved for future (Set to 0)
Bit 4: Reserved for future (Set to 0)
Bit 5: Stack (1=causes note to be stacked)
Bit 6: Return (1=causes note to be returned)

Byte 2

Bit 0: Reserved for future (Set to 0)
Bit 1: Set to 1 for 8th Note enable
Bit 2: Set to 1 for 9th Note enable
Bit 3: Set to 1 for 10th Note enable
Bit 4: Set to 1 for 11th Note enable
Bit 5: Set to 1 for 12th Note enable
Bit 6: Set to 1 for 13th Note enable

> Extended Version:
>
> Bits 1 to 6: To enable/disable extra channels

Note: To disable (inhibit) validator, set Byte 0 and Byte 2 to 0. The front LED's will stop flashing and no notes can be inserted. The Diagnostic LED on top of the validator will remain green.

Data Fields For Messages Sent By Slave (Validator)

Byte 0

Bit 0: Idling (1=validator in idle state)
Bit 1: Accepting (1=accepting note)
Bit 2: Escrowed (1=note in escrow)
Bit 3: Stacking (1=note being stacked)
Bit 4: Stacked (1=note stacked)
Bit 5: Returning (1=note being returned)
Bit 6: Returned (1=note returned)

> Extended Version:
>
> If all notes are disabled by Master, the validator will set Byte 0 to 0

Byte 1

Bit 0: Cheated (1=cheated)
Bit 1: Rejected (1=note rejected)
Bit 2: Jammed (1=note jammed)
Bit 3: Stacker Full (1=cashbox full)
Bit 4: Cashbox Present (1=cashbox present))
Bit 5: Empty Stacked (1=an arbitrary stack occurred)
Bit 6: Reserved

Byte 2

Bit 0: Power Up (1=initialization)
Bit 1: Invalid Command (1=invalid)
Bit 2: Failure (1=failure)
Bit 3 to 6: report note channel 1 to channel 15 in Binary format
Note Value Field (0000=none/unknown, 0001=1st note, …, 1111=15th note, etc…)

Byte 3

Reserved

Byte 4

Reserved

Byte 5

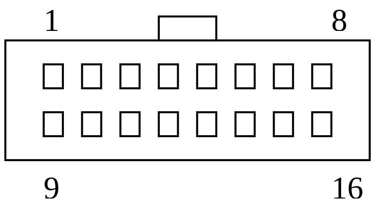
Firmware Revision (00-7FH)

Electrical Connection

IF Cable: VA-WIRA09
Input Voltage: 12 VDC ± 10%
Interface Module: VA-PCBA09

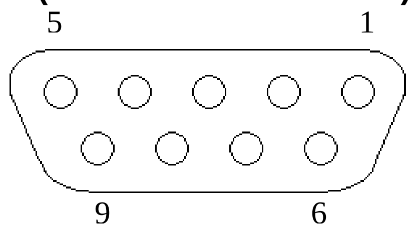
Test/Evaluation Software: RS-232 Serial Tester V2.4

Connector Viewed Facing Validator

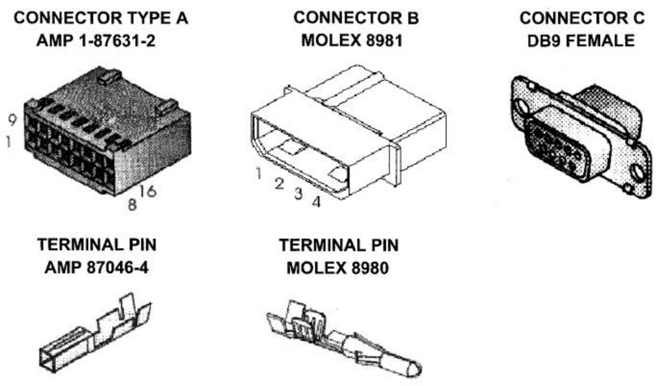


Pin 1: +12 VDC ± 10%
Pin 2: Ground/Earth (power)
Pin 14: RXD (receive data tovalidator)
Pin 15: Common (signal Gnd)
Pin 16: TXD (transmit data from validator)

Connector Viewed Facing Connector (DB9 Female Connector)



Pin 2: Host (PC) RXD (Receive)
Pin 3: Host (PC) TXD (Transmit)
Pin 5: Common (signal Gnd)



CONNECTION TABLE

A	WIRE TYPE	B
1	22AWG Stranded UL1061 300V 80C YLW	1
2	22AWG Stranded UL1061 300V 80C BLK	2
14	24AWG Stranded UL1061 300V 80C Any Color	
15	24AWG Stranded UL1061 300V 80C Any Color	
16	24AWG Stranded UL1061 300V 80C Any Color	

CONNECTOR A	: AMP 1-87631-2 or equivalent	1 PC
TERMINAL PIN	: AMP 87046-4 or equivalent	5 PC
CONNECTOR B	: MOLEX 8981 or equivalent DISK DRIVE POWER SOCKET	1 PC
TERMINAL PIN:	MOLEX 8980 or equivalent	2 PC
CONNECTOR C	: DB9 FEMALE WITH STRAIN RELIEF	1 PC