VTI
Validation Technologies International

matrix

Operation Manual

Table of Contents

Technical Specifications

Product Overview

The *Matrix* line of bill validators accepts bank notes and coupons thru 72 mm in width. The Matrix comes pre-programmed, per customer specification, from the factory or can be reconfigured by customers utilizing the *Matrix Tools* program for PDA or PC's. Software updates can also be uploaded into the *Matrix* via a PDA or PC enabled with the *Matrix Tools* program.

Operating Voltage*:* 12 VDC +/- 10%
34 VDC MDB I/F
117/220 VAC Optional

Operating Current*:* Idle: 140 mA
Stacking: 800 mA
Stalled: 1.1 A

Operating Temp*:* 0C – 60C (32F – 140F)
90% non-condensing

Notes Accepted*:* Standard Version: 11
Extended Version: 20

Note Orientation: Four (4) Ways

Interface Options: Pulse, Parallel, Serial, 'True' RS232, CC-Talk, USB. (*Custom interfaces available upon request*)

Sensor Suite*:* Optical, Magnetic, UV

I/O Ports*:* 16 Pos Mating Connector
RS232 Jack for PDA
(Diagnostic/Software Uploads)

Mounting*:* Can be mounted at any angle from center.

Cashbox Options*:* 250, 600, 1000
(locking option 600/1000)

Net Weight*:* 3.5 lbs, 1.6 Kg

Currency Range: Notes 62 mm thru 72 mm in width.

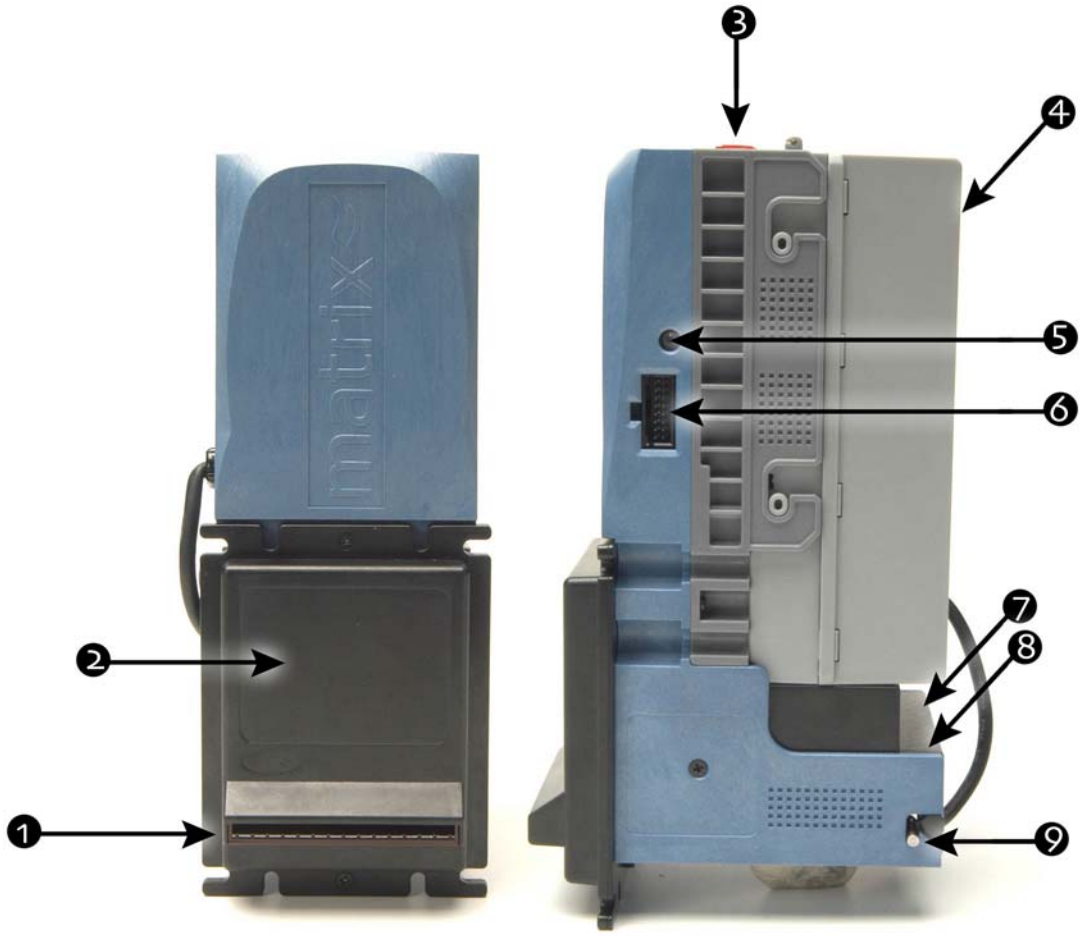
Validation Options: Coupons, Bar Code *(Refer to manual VTICBC-1 for additional detail)*

Warranty: 2 Years Parts and Labor *(Refer to page 15 for warranty detail)*

Acceptance Speed: Approx. 22 notes/min.

Stacking Orientation: Vertical Up or Down

Product Detail



1. Note Entry Area

2. Mounting Bracket/Bezel

3. Cashbox Removal Button

4. Currency Removal Door

5. Data Port

6. I/O Port

7. Reset/Diagnostic Button

8. Diagnostic LED

9. Lower Sensor Assembly Removal Bar (lift to remove)

ESD Precaution

The Matrix bill acceptor is used as an inside component of a vending machine. Proper grounding is conducted by connecting the Matrix metal mounting bracket to the metal surface of the vending machine chassis.

To minimize electrostatic discharge, observe the following precautions:

- When removing Matrix from an antistatic bag, or the vending machine cabinet, lay it on an antistatic surface such as an ESD mat or a disposable antistatic mat.
- Always wear an antistatic wrist strap connected to metal surface on the chassis of the vending machine (ground) when working on Matrix.
- Do not touch the I/O ports by hands.
- Do not disassemble the unit.

Cleaning & Maintenance

The *Matrix* currency validator was designed and manufactured for simple, trouble free operation. To enhance the long term reliability of your *Matrix* validator, please follow this simple, but important cleaning and maintenance guide.

Cleaning

We recommend a regular cleaning schedule for your Matrix bill validator. Depending on local environmental conditions and usage, the *Matrix* should be cleaned at least every 3 months, more regularly in areas of high dust and contamination. The *Matrix* utilizes a combination of IR, UV and/or Magnetic sensors along the note path to collect data off the bank note. During use, dust, contamination and foreign objects can collect along the note path and over the sensors, degrading their performance over time. Cleaning your *Matrix* on a regular basis will assure maximum performance and validation rates.

On-site cleaning

We realize that it may be impossible for you to remove your *Matrix* out of its application while in the field to perform a thorough cleaning. In these instances, we recommend that you obtain a can of *compressed air* and guide the output toward the note entry area. This will remove any excess dust or foreign objects that may have collected over the sensors located along the note path.

Thorough Cleaning

To perform a more thorough cleaning of the Matrix, remove the lower note guide module by pressing

up on the rear locking bar (for further detail, refer to page 3 of this manual). Slowly pull out the lower sensor module and remove from the main stacker body of the Matrix. We recommend that you use a mild soap/water combination and damp, dust free towel and wipe the note path area and sensors. Dry thoroughly and replace the lower note guide module. DO NOT USE ALCOHOL to clean your Matrix as this will degrade the sensor apertures and drive belts and will seriously affect the long term reliability.

Maintenance

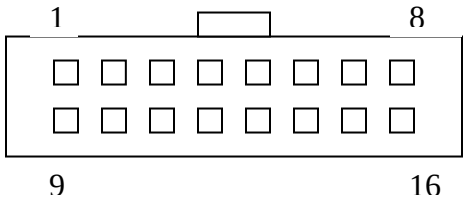
The Matrix was designed to provide you with simple, trouble free operation. By keeping your Matrix clean, you should enjoy many years of trouble free use. If on rare occasion an issue may arise, please refer to the *Matrix Tools* program for PDA/PC and run the diagnostic section of the program to troubleshoot your unit. Also, refer to the rear diagnostic LED on the Matrix. If the LED is flashing, refer to the diagnostic card on the cashbox to detail the possible problem. If you cannot rectify a problem on site, please contact your local service center or the factory.

Interface Descriptions

6a ***Pulse Interface:*** The *Pulse* Interface provides a corresponding signal on the output line that designates the particular note validated.

IF Cable: VA-WIRA05
Input Power: 12 VDC

Connector Viewed Facing Validator



Pin 1: +12 VDC
Pin 2: Ground/Earth (power)
Pin 4: Credit Pulse Output (open collector to Ground/Earth)
Pin 5: Alarm Output (open collector to Ground/Earth)
Pin 6: Enable Input (tied to Ground/Earth to enable validator)
Pin 12: Busy (open collector to Ground/Earth. Active LOW when busy)

Pulses/Denomination: Factory set per customer specification or via PDA utilizing *Matrix Tools*.

Pulse Output Rate: High: 50 msec ON/50 msec OFF
Low: 50 msec ON/300 msec OFF

Always Enabled: The M*atrix* can be configured to ignore the enable input status and operate *always enabled*.

6b Parallel Interface: The Parallel interface provides specific output lines for designating which note has been validated. This interface also provides for escrow and alarm functions.

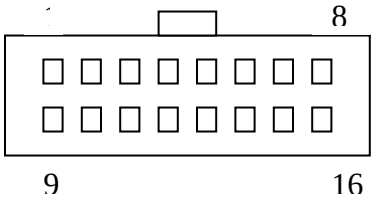
Pin 1: +12 VDC
Pin 2: Ground/Earth (power)
Pin 3: Vend Line 5 (open collector to Ground/Earth)
Pin 4: Vend Line 6(open collector to Ground/Earth)
Pin 5: Alarm Output (open collector to Ground/Earth. Prog. Logic)
Pin 6: Enable Input (tie to Ground/Earth to enable validator)
Pin 7: Vend Line 1 (open collector to Ground/Earth)
Pin 8: Vend Line 2 (open collector to Ground/Earth)
Pin 9: Vend Line 3 (open collector to Ground/Earth)
Pin 10: Vend Line 4 (open collector to Ground/Earth)
Pin 11: Escrow Line
Pin 12: Busy Line

Interface Descriptions

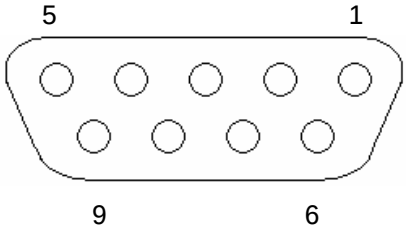
7a 'True' RS232: The 'True' RS232 interface provides for comms between a Host (PC) and Slave (validator). This interface operates at 'True' RS232 levels and allows direct connection between the validator and PC comm. port without the need for special interface harness/loom. 9600 bps, 1 start bit, 1 stop bit, 7 data bit format.

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

Viewing towards validator



Viewing towards connector (DB9 Female Connector)



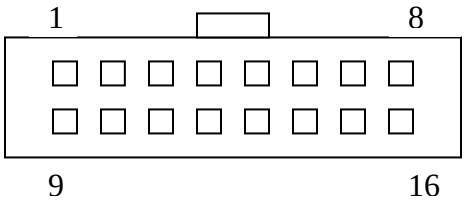
Pin 1: +12 VDC
Pin 2: Ground/Earth (power)
Pin 14: RXD (received data validator)
Pin 15: Common (signal)
Pin 16: TXD (transmit data validator)

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

7b TTL RS232: The TTL RS232 interface operates at TTL levels, 9600 bps, 1 start bit, 1 stop bit and 7 data bits.

IF Cable: VA-WIRA05
Input Voltage: +12 VDC

Viewing Towards Validator



Pin1: +12 VDC
Pin 2: Ground/Earth (power)
Pin14: TTL RXD (receive data to validator)
Pin 15: Common
Pin 16: TTL TXD (transmit data from validator)

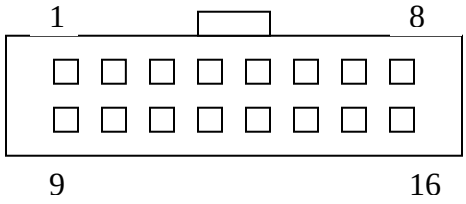
For complete technical detail on the RS232 interface, refer to manual VTIRS-6

Interface Descriptions

8a Serial Interface: The Serial interface is a MEI compatible, bi-directional interface. It operates at 600 bps, 1 start bit, 1 stop bit and 8 data bits.

I/F Cable: VA-WIRA05
Input Voltage: 12 VDC

Viewing Towards Acceptor



Pin 1: +12 VDC
Pin 2: Ground/Earth (power)
Pin 5: Alarm Output (open collector to Ground/Earth. Programmable Logic)
Pin 6: Enable Input (tie to Ground/Earth to enable validator)
Pin 7: Interrupt (request to send data to host)
Pin 12: Busy (open collector to Ground/Earth, active LOW when busy)
Pin 13: Send (host ready)
Pin 16: TXD (transmit data from validator)

For expanded technical information on the Serial Interface, please refer to manual VTISER-1

8b 'C-C Talk' Interface: Information to be added

Interface Descriptions

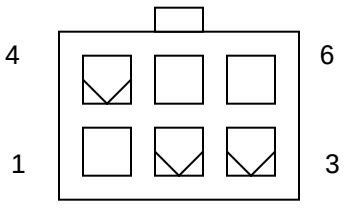
***9a USB Interface*:** Information to be added

Interface Module: VA-PCBA14

***9b MDB Interface*:** The Multi Drop Bus (MDB) meets all NAMA standards for functionality.

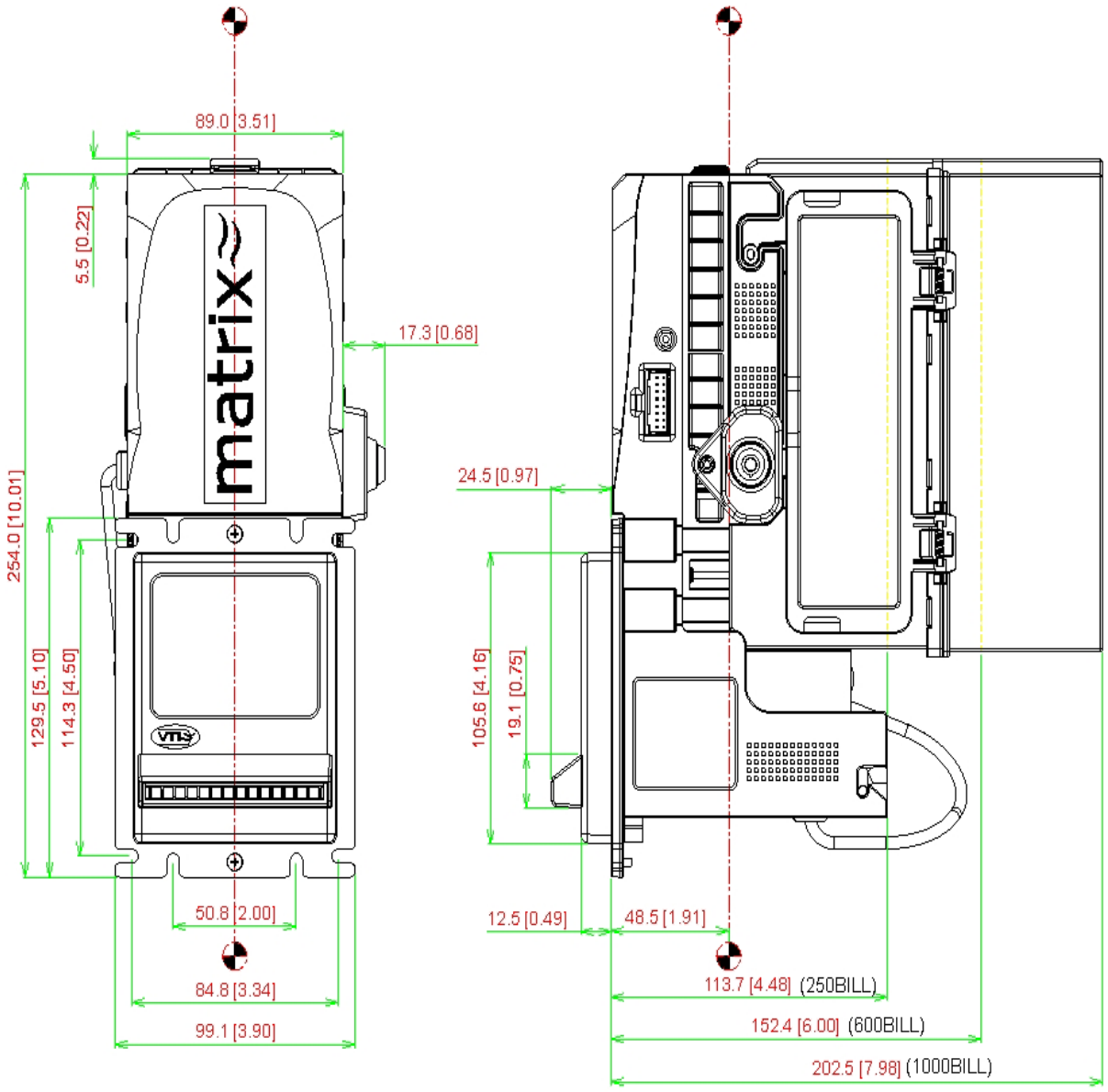
I/F Cable: VA-WIRA06
Input Voltage: 34 VDC (24 – 42 VDC)
Interface Module: VA-PCBA04

Viewing Toward Connector



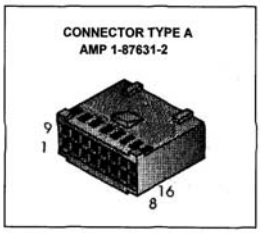
Pin 1: +34 VDC
Pin 2: Ground/Earth (power)
Pin 4: Master Receive
Pin 5: Master Transmit
Pin 6: Communications Common

Dimensional Detail



Harness Detail

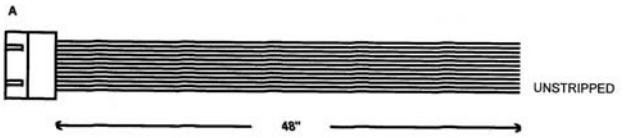
11a Standard Harness: VA-WIRA05



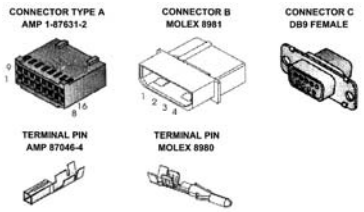
CONNECTION TABLE

	WIRE TYPE
1	24AWG Stranded UL1061 300V 80C RED
2	24AWG Stranded UL1061 300V 80C BLK
3	24AWG Stranded UL1061 300V 80C YLW
4	24AWG Stranded UL1061 300V 80C TAN
5	24AWG Stranded UL1061 300V 80C GRN
6	24AWG Stranded UL1061 300V 80C BLU
7	24AWG Stranded UL1061 300V 80C GRY
8	24AWG Stranded UL1061 300V 80C PNK
9	24AWG Stranded UL1061 300V 80C WHT
10	24AWG Stranded UL1061 300V 80C LT TAN
11	24AWG Stranded UL1061 300V 80C PUR
12	24AWG Stranded UL1061 300V 80C LT BLU
13	24AWG Stranded UL1061 300V 80C LT GRN
14	24AWG Stranded UL1061 300V 80C WHT/BLK
15	24AWG Stranded UL1061 300V 80C WHT/GRN
16	24AWG Stranded UL1061 300V 80C WHT/RED

TERMINAL PIN : AMP 1-87756-7 or Equivalent 16 PC
CONNECTOR : AMP 1-87631-2 or Equivalent 1 PC



11b 'True' RS232 Cable: VA-WIRA09



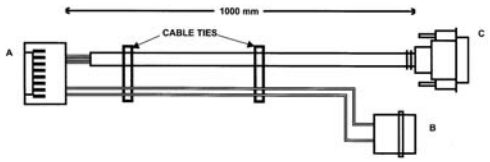
CONNECTION TABLE

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	

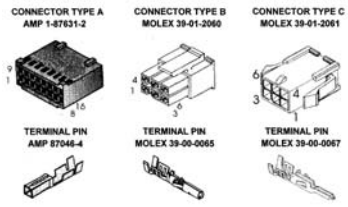
CONNECTOR A : AMP 1-87631-2 or equivalent 1 PC
TERMINAL PIN : AMP 87046-4 or equivalent 5 PC

CONNECTOR B : MOLEX 8981 or equivalent 1 PC
DISK DRIVE POWER SOCKET
TERMINAL PIN: MOLEX 8980 or equivalent 2 PC

CONNECTOR C : DB9 FEMALE 1 PC
WITH STRAIN RELIEF



11c MDB Harness: VA-WIR06



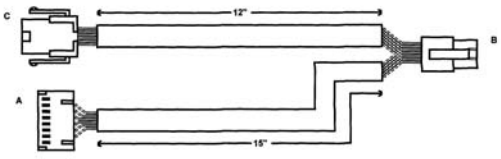
CONNECTION TABLE

A	WIRE TYPE	B	C
1	22AWG Stranded UL1061 300V 80C RED	1	1
2	22AWG Stranded UL1061 300V 80C YLW	2	2
14	22AWG Stranded UL1061 300V 80C GRN	5	5
15	22AWG Stranded UL1061 300V 80C ORG	6	6
16	22AWG Stranded UL1061 300V 80C BRN	4	4

CONNECTOR A : AMP 1-87631-2 or Equivalent 1 PC
TERMINAL PIN : AMP 87046-4 or Equivalent 5 PCS

CONNECTOR B : MOLEX 39-01-2060 or Equivalent 1 PC
TERMINAL PIN : MOLEX 39-00-0065 or Equivalent 5 PCS

CONNECTOR C : MOLEX 39-01-2061 or Equivalent 1 PC
TERMINAL PIN : MOLEX 39-00-0067 or Equivalent 5 PCS



MULTI-CONDUCTOR SHIELDED CABLE FOR EIA RS-232 APPLICATIONS
COLOR=BLACK 5 CONDUCTORS

Software Tools/Manuals

Software Tools

Matrix Tools: The *Matrix Tools* program enables your PDA or PC to become a powerful diagnostic tool for your *Matrix* validator. *Matrix Tools* allows the following functions…

Advanced Diagnostics
Unit Configuration
Software Uploads

Matrix RSTalk: *Matrix RSTalk* is a Windows Utility program that enables and runs the *Matrix* validator while in the RS232 Interface mode. The program can be used to test the *Matrix* outside of an application for diagnostic or test purposes.

Matrix USBTalk: *Matrix USBTalk* is a Windows utility program that enables and runs the *Matrix* validator while communicating to a Host via the USB port. This program can be used to test the *Matrix* outside an application for diagnostic or test purposes.

Matrix Remote: This powerful tool allows a qualified customer to scan bank notes for the purpose of software development.

Manuals

VTIRS-6: RS232 Interface Manual

VTISER-1: Serial Interface Manual

VTIUSB-1: USB Interface Manual

VTITRB-1: Troubleshooting Guide

VTIMR-1: *Matrix Remote* Manual

VTICON-1: *Matrix* Configuration Manual

VTICBC-1: Coupon Specification

Model Number Detail

MX-DMU-D 7-XXX

Series	*Model*	*Bezel/Faceplate type*	*Cashbox*	*Country ISO Code*
MX	S=Standard	A=Dn stacker, ¾"	2=250	USD=United States
	R=RS232	B=Dn stacker, ¾" 66mm	6=600 Non-Locking	EUR=Euro
	D=MDB	C=Up stacker, ¾"	7=600 Locking w/ Locking Assy	KWD=Kuwait
	M=Mag.	D=Up stacker, ¾" 66mm	8=600 Locking w/ Locking Assy Installed-R	
	U=UV	E=Up stacker, Flush	9=600 Locking w/ Locking Assy Installed-L	
	B=USB	F=Up stacker, Flush 66mm	A=1000 Non-Locking	
	G=Battery MDB	G=Dn metal bezel/FP, ¾" (w/ wake up switch) *	B=1000 Locking w/ Locking Assy	
			C=1000 Locking w/ Locking Assy Installed-R	
	C=CC Talk	H=Dn metal bezel/FP, ¾" (Standard)	D=1000 Locking w/ Locking Assy Installed-L	

Remark:

1): Any kind of Faceplate A-F, H with Model G are available as battery version 1.

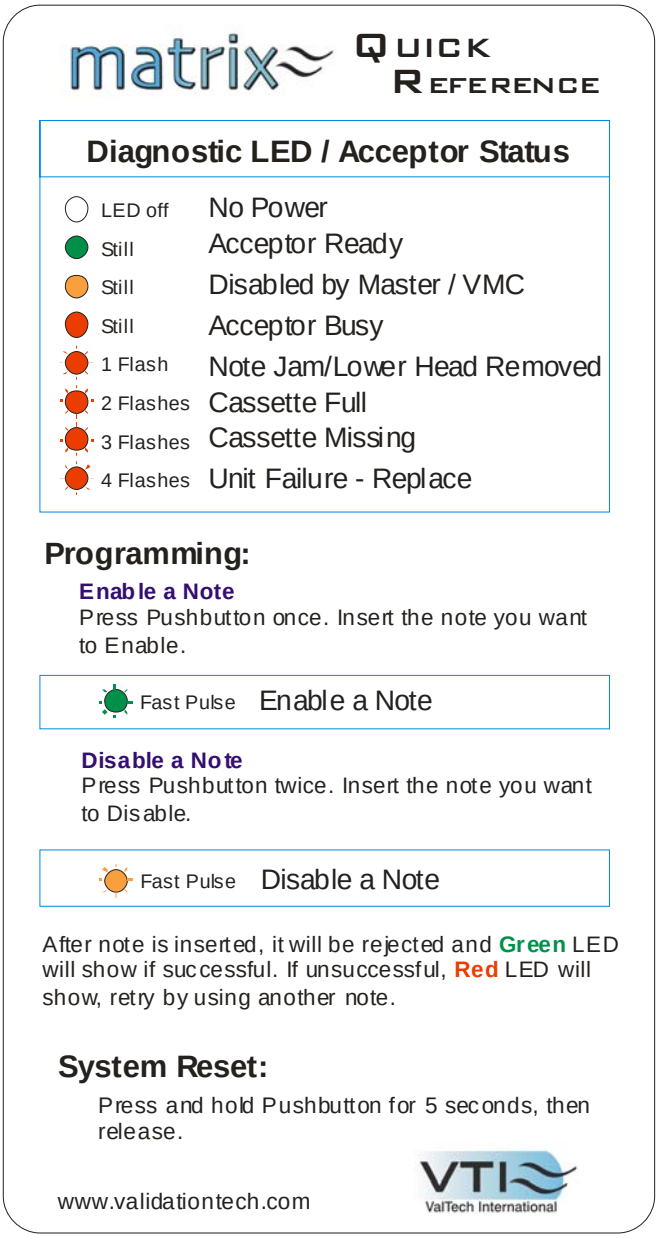
2): * This option only available as battery version 2

The Above Example Details the Following Configuration:

MX	=	Matrix
D	=	MDB I/F
M	=	Mag Sensor Used
U	=	UV Sensor Used
D	=	Up Stack ¾" Faceplate (66mm)
7	=	*600* Locking cashbox
USD	=	USA Software

Diagnostic Codes

The diagnostic codes for the *Matrix* are related to the diagnostic LED found on the rear of the *Matrix* bill validator. The codes are listed below.



System Reset: Hold Reset/Diagnostic Button Down for 5 Seconds.

Warranty Information

Limited Warranty

The *Matrix* bill validator is warranted for a period of two (2) years from date of manufacture. The warranty extends to the original owner and each transferee owner of the product during the two (2) year warranty period. During this two (2) year warranty period, manufacturer or authorized service center will repair or replace (at manufacturer's option) any parts, up to and including the complete validator, which may fail to function properly due to defects in material or workmanship.

The manufacturer is not responsible for any consequential damage or performance degradation that results from counterfeit currency or foreign objects inserted into the validator. The product to be repaired under warranty must be delivered, inbound freight prepaid to an authorized service center. Upon request, the owner must show proof of purchase when submitting validator for service during the warranty period. Repair and 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. Special handling or shipping charges will be assumed by the owner. Manufacturer will not be liable for any consequential damage as a result of defects in the material or workmanship. Any written or applied warranty of this product is strictly limited to the refund of the cost of goods purchased. Damage due to negligence, accidents, electrical overload, misuse, abuse, vandalism or act of God, are not covered by this warranty. Any alteration of the product after manufacture voids the warranty in entirety.

Shipping Damage: Manufacturer cannot be responsible for damage due to damage in the course of shipping. Please unpack and inspect your package and report any damage and file a claim within 72 hours of receipt.

Service: Contact authorized service center or manufacturer when returning product for repair. Please have the following information at hand; Customer Name, Serial Number of unit. You will be given a Return Authorization Number (RMA) that must be CLEARLY included on package and/or shipping documentation. We cannot accept any shipment nor begin repair without this RMA number. Manufacturer accepts no responsibility for any return without RMA.