

Instructions to Install Retrofit Kit 6/7000 Machine

****TURN POWER OFF OF MACHINE BEFORE INSTALLATION**
READ ALL INSTRUCTIONS BEFORE STARTING INSTALLATION**

Retrofit kit contents:

PART NAME	QUANTITY	PART NUMBER
PCBA, Snack Retrofit MEIH/Drop Controller with standoffs and nuts	1 4 4	10-0062-02 08-0615-00 08-0632-01
Cable Assembly, Retrofit Display	1	11-1700-01
Cable Assembly, Retrofit Keypad 1 (Pin2 = Key)	1	11-1700-02
Cable Assembly, Retrofit Keypad 2 (Pin12 = Key)	1	11-1700-03
Panel, Retrofit Display Assembly	1	05-0091-00
Cover, Display Retrofit 6/7000 VM	1	05-0090-01
Cable Assembly, MDB Extension	1	11-1700-05
Front Cover, 4/5/6/7000	1	05-0125-00
Cable Assembly, DEX Extension	1	DEX-27-EL
Washer for cable mounting	1	08-5075-00
Screws for front cover mounting	4	08-0632-00

Tools Needed:

Screwdriver, Philips
Pliers, needle nose

Additional Accessories Needed:

MDB Coin Changer
MDB Bill Validator

1. Fully open the vending machine door and set door stop to hold door open. Then slide the peripheral panel out to gain access to electronics and connections.

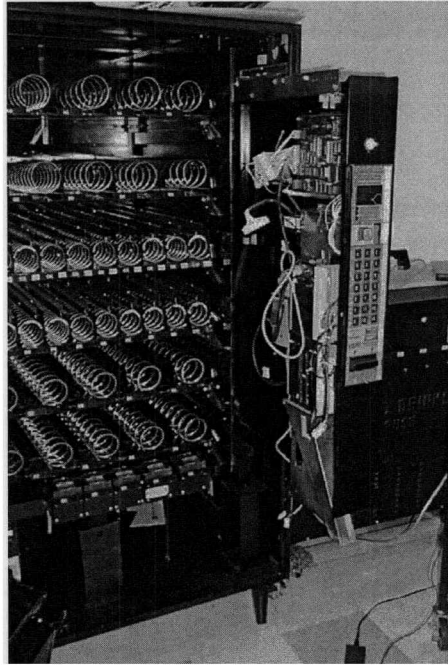


Figure 1

2. Remove cover, pictured in Figure 2, encasing the Vending Machine control board by removing the four retaining screws. You will no longer need this cover.

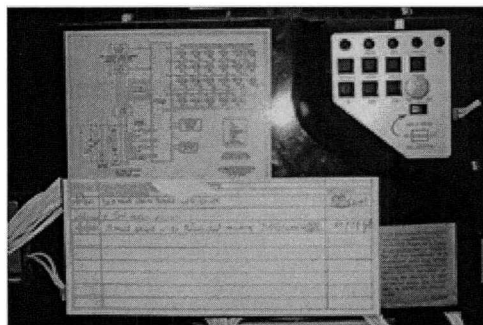


Figure 2

3. Remove display board by removing the three retaining screws. Refer to Figure 3. Save Screws.



Figure 3

4. Remove the coin return mechanism assembly as follows referring to figure 4:
Remove the E Snap Clip with needle nose pliers and lift pusher bar off axel and slip from push button shaft. Save E snap clip.
Remove four screws retaining the coin-return push button bracket and remove bracket. Save screws.
Remove the base sheet metal box/bell crank assembly by removing the three mounting screws. Save screws. Save all brackets and Return Push Button.

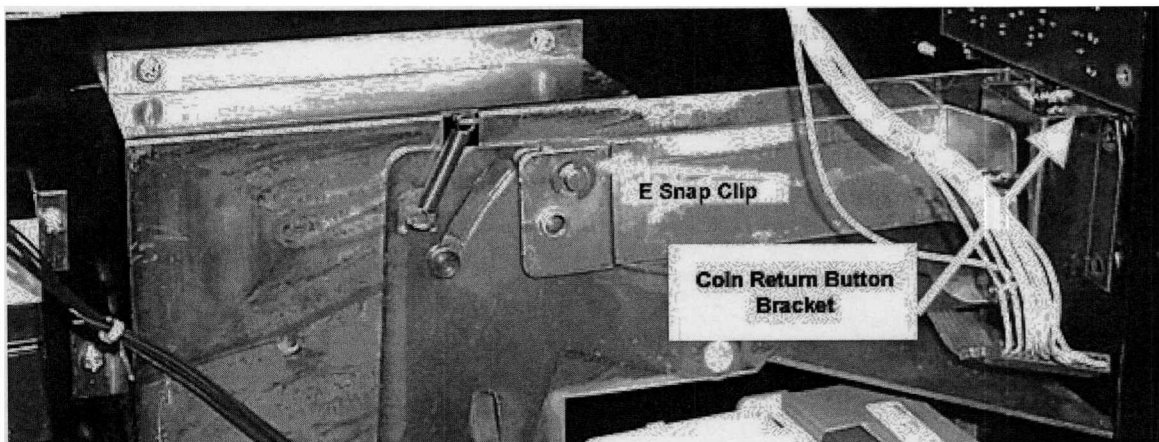


Figure 4

5. Remove Coin Changer by disconnecting the coin changer and then lifting it vertically and with horizontal motion towards technician, away from keyhole mounting studs. Set Coin Changer aside.
6. Remove the Bill Acceptor. Remove the cassette and set aside. Remove four screws, holding the bezel to the VM mounting bosses, two on the right and two on the left side of the validator respectively. Set bill acceptor and screws aside. Note: the screws for the bill validator are specific for this purpose.
7. Referring to figure 5, locate the two flat-ribbon flex cables exiting the rear of the selection keypad. Remove the extension cables that are connected to them.

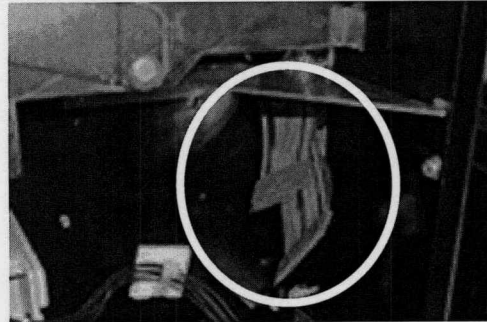


Figure 5

8. Referring to figure 6, remove the 10 capped screws on the rear side of the selection panel.

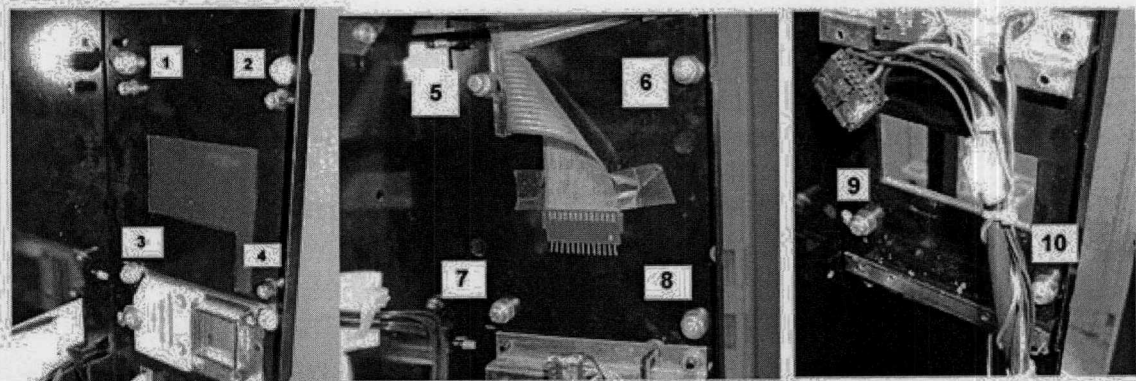


Figure 6

Slide the selection keypad bezel apart from the front of the drawer and carefully remove the Red/Silver plastic display cover.

Replace this with the Retrofit display cover, 05-0090-01 after its protective plastic cover is removed from both sides. Make sure the cover is oriented like the below figure 7 when looking at front of machine with the door shut.

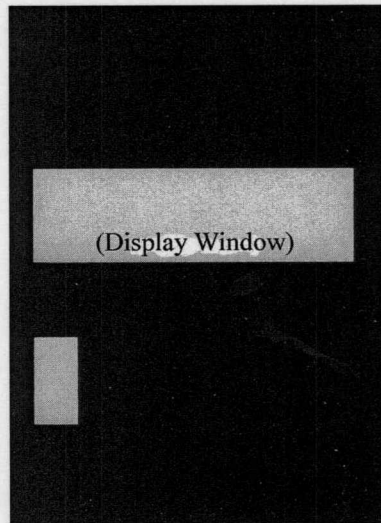


Figure 7

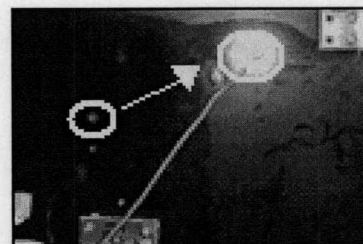
Slide the selection keypad bezel flush to drawer front and refasten at the rear with the screws 3-10. When replacing screws 1 and 2, remove the ferrules (caps) and save them.

9. Referring to figure 8, remove the cover of the High Voltage PCB. Disconnect P1 from the PCBA. Replace the cover.



Figure 8

10. Reposition the Green-Yellow ground wire as shown. This new hole is to the right and above the current one. Assure it is fastened securely.



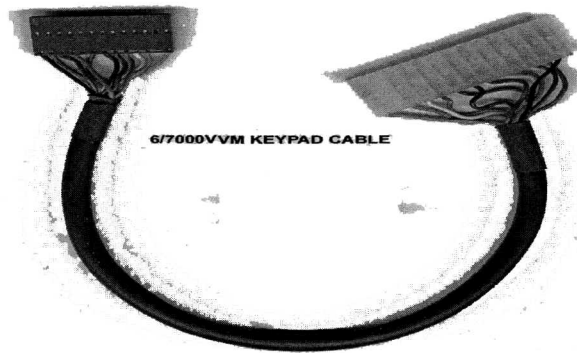
11. Install the MDB Bill Acceptor. Attach using the 4 screws saved from step 6 above. Install the MDB Coin Changer. Re-install the coin return button, brackets and bell crank assembly removed in step 4.

12. Connect the Retrofit Keypad 1 and 2 cable assemblies to the flex ribbon cables of the selection keypad panel.

There are two flat ribbon cable male connectors coming directly from the selection keypad. These connectors are attached to the new control board using two extension cable assemblies designated "Retrofit Keypad #1", 11-1700-02, and "Retrofit Keypad #2", 11-1700-03. Connect these cables as follows:

Connect 11-1700-02 to the bottom selection keypad ribbon connector.

Connect 11-1700-03 to the top selection keypad ribbon connector.

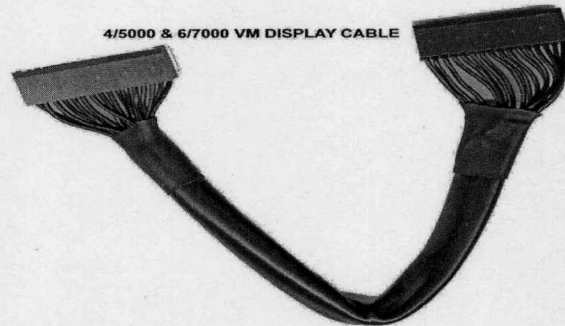


13. Mount the retrofit display assembly, 05-0091-00. Remove the protective cover on the one side of the panel before installing. Locate the top two studs used to mount the previous display board, attach the display assembly at its two upper holes using the ferrules that were saved from Step 8. Place the ferrules over the two studs and screw the assembly in. The display should match up with the window from the display cover already installed from Step 8.

14. The new control board can now be installed. Remove existing control board. Slide the new control board on to the four right pegs and secure.

15. Connections:

- Connect the display to **J1** of the retrofit control board using the Retrofit Display cable assembly.



- The power will be connected using the original connector. In order for this cable and the motor cable to reach and plug into the new control board, you will have to undo the cable harness that guides these cables. This harness is located near the back of the pull out door. It is a small white “hook”. Simply, lift the end facing the front of the machine and slide the cable sleeve out.



This will allow the power and motor connectors to plug into the board. The power connector will be a five (5) pin connector with pin 4 keyed. This will plug into **J17** of the new control board.

- The motor connector will be the 18 pin connector with pin 11 keyed. This will plug directly in **J12** of the new control board.
- The MDB coin mech and bill validator will be connected to each other. There will be a 2 x 3 connector coming off of their connecting cable. This will plug directly into the cable assembly included in the kit, 11-1700-05. The other end of this extension cable will plug directly into **J5** of the new control board. Make sure that the coin mech and validator are connected to each other.
- There is a switch located on the front of the pull out door. Its connector is a two pin 0.156” spacing connector. This will plug into the new control board at location **J16**.
- Headers, **J14 and J3**, have no connections.

- Connect the keypad extension cables to the control board. Connect 11-1700-02 to Control board connector J-6. Connect 11-1700-03 to Control board connector J-4.
- The DEX header, **J2**, will be connected to the panel mounted connector on the front cover. Be careful when plugging this in. This should be the last connection you make on the board.

After all these connections are made, you may carefully line up the front cover with the standoffs that are on the control board. Once this is done, you may screw the front cover on with the screws included in the kit, 08-0632-00.

VMC Retrofit Kits: Configuration and Usage Instructions

Revision 2.61, 17 October 2006

1 Introduction

The VMC Retrofit Kit adds a number of state-of-the-art features to your vending machine:

- Two line by sixteen character display
- User-friendly Service Mode for setup and maintenance tasks
- Support for both MDB and non-MDB coin mechs, bill validators, and card readers
- DEX port for accounting, configuration, and software upgrades
- Drop Sensor system (optional on some kits) ensures that customers receive the product they paid for.

This document explains how your vending machine will operate after it has been upgraded using the VMC Retrofit Kit. To get the most out of this document, it is suggested that you finish installing the Kit using the separate installation instructions. Then, proceed with Section 3, "Service Mode Basics", when you are at the machine.

2 Kit-Specific Information

This document is used with several kits covering different machine types. The essential differences between the kits are outlined in the table below:

Kit Type	Execute Key	Cancel Key	Up Key	Down Key	Other Differences
VMC-4000/5000-x	14	12	11	13	Jumper JP2: inserted across 1 and 2 Jumper JP3 removed
VMC-6000/7000-x	14	12	11	13	Jumper JP2: inserted across 1 and 2 Jumper JP3 removed
VMC-LCM VMC-LCM/M	H	D	↑	↓	Drop Sensor mandatory No home switches No door switch
VMC-LCM-1/M VMC-LCM-2/M	H	D	↑	↓	No door switch
VMC-110-x	H	G	↑	↓	Jumper JP2: inserted across 2 and 3 Jumper JP3: inserted
VMC-NATL145-x	E	D	F	G	Jumper JP2: inserted across 2 and 3 Jumper JP3: removed
VMC-NATL146-x	E	D	F	G	Jumper JP2: inserted across 2 and 3 Jumper JP3: inserted
VMC-NATL147-x VMC-NATL148-x	#	*	F	J	Jumper JP2: inserted across 2 and 3 Jumper JP3 removed Gum&Mint uses home switches <u>only</u>

3 Service Mode Basics

The VMC operates in one of three modes: Sales, Service, or Motor Status. Upon power-up, the VMC enters Sales Mode and remains there unless otherwise instructed. Personnel with access to the machine interior can enter Service Mode to configure the machine and obtain basic accounting information. Motor Status Mode allows route personnel to see and correct motor problems immediately after the door has been closed; see Section 6.4 for more details.

3.1 Entering Service Mode

With the machine turned on and the door open, press the round, yellow pushbutton on the VMC board. You will hear a beep, and the display will change to read either “Sys Errors” or “Main Menu.”

If the display reads “Sys Errors”, the VMC has found problems that require your attention. Before entering the main portion of Service Mode, the VMC gives you a chance to see and possibly correct these issues. See Sections 7.1 through 7.5 for more details on navigating this part of the menu.

3.2 Navigating Service Mode

Think of Service Mode as a series of lists that can be scrolled up and down. A flashing block called the *cursor* shows the current position at all times.

To move around and do things, you will use these five keys (see also Section 2 for definitions):

Up to move upward within a menu

Down to move downward within a menu

Cancel to cancel something and return to the previous menu

Execute to do whatever the cursor is showing right now

1 displays a “menu” of helpful reminders, in case you forget which key is which

The **Execute** key can “do” several things, depending on where you are in Service Mode:

- It can take you to a lower-level menu (*most common usage*)
- It can perform the listed action (*for example, “Clear All Links”*)
- It can toggle a particular option on or off (*Options, Clock, and Sales Blocking menus*)
- It can acknowledge an error condition (*Sys Errors and Motor Errors menus*)
- It can delete a motor link (*Link Motors menu*)

The **Cancel** key backs you out of menus. The VMC remembers where you were on the last menu, and returns you to that location. If you press **Cancel** at the Main Menu, the VMC exits Service Mode and returns to Sales Mode.

3.3 Leaving Service Mode

There are five different ways to exit Service Mode:

- Close the door
- Press **Cancel** at the Main Menu (as noted above)
- Press **and hold Cancel** for two seconds, anywhere in Service Mode
- Press the yellow button on the VMC
- Wait for two minutes

4 First-Time Machine Configuration

Before trying to vend products, go to Service Mode and follow these steps to ensure the VMC is configured properly:

4.1 Configure and Test Drop Sensor

(Skip this section if not using the Drop Sensor option.)

If you have not already done so, complete the sensor's mechanical installation using the separate "Sensor Kit Installation Instructions" document.

Go to the Options menu and scroll down to MOTOR STOP. The HOME setting (default setting on some models) causes the VMC to use a home switch to control motor movements, ignoring the Drop Sensor entirely. It is recommended that you press **Execute** to change the MOTOR STOP option to DROP or BOTH. In the DROP mode, the VMC uses only the Drop Sensor to control motor movements. In the BOTH mode, the VMC uses a home switch to stop a motor, but does not deduct credit unless the Drop Sensor detects a falling product.

When you are finished setting the Motor Stop option, press **Cancel** to return to the Main Menu.

Go to the Diagnostics menu, scroll down to TEST DROP SENSOR, and press **Execute**. Each time you interrupt the sensor beam with your hand – or with a falling product – the VMC beeps and increments a number on the display. If the VMC fails to detect a sensor beam interruption, or if it beeps continuously, see Section 7.4 for troubleshooting suggestions. Otherwise, press **Cancel** twice to return to the Main Menu.

4.2 Motor Configuration

Go to the Config Menu and select CONFIGURE MOTORS. This identifies the available motors and, if applicable, ensures they are homed. If you observe a motor rotate more than once, it is probable that its home switch is stuck or otherwise broken. See the Troubleshooting section for details on how to clear this error.

4.3 Set the Clock

On the Config Menu, select SET CLOCK, then select CHANGE TIME. Enter the digits of the current time, using "10" to represent zero if needed. Press **Execute** to proceed. Next, you are prompted to enter **Cancel** for AM or **Execute** for PM.

The date should be set correctly already. To check it, scroll down one entry and select CHANGE DATE. If the month and date is valid, simply press **Execute**. Otherwise, enter the correct date and press **Execute**. Next, repeat the same process with the two-digit year number.

While still on the Clock Menu, you may wish to modify how the clock is used: the SHOW CLOCK option determines whether the clock appears in Sales Mode or not; use **Execute** to toggle it on or off. There are also options to enable 24-hour time display and automatic Daylight Savings Time (for United States) correction.

4.4 Set the Asset Number

If you use a DEX accounting system and wish to assign a unique number to this machine, select ASSET NUMBER on the Config Menu.

4.5 Set Motor Links (Space-to-Sales)

A Motor Link (also called Space-to-Sales) allows the VMC to distribute an identical product from several adjacent columns on the same row. Products are vended successively from each linked column, regardless of which column the customer actually entered.

To establish a link, select LINK MOTORS on the Config Menu, then select ASSIGN NEW LINK. The VMC will prompt you for the tray, starting column number, and ending column number.

To clear a link, go to the Link Motors menu, move the cursor to the desired link, and press **Execute**.

4.6 Set Sales Blocking

Sales Blocking is used to disable vending based on the day of week and time of day. Typically, this feature is used for machines inside schools. Up to four periods can be defined. The periods can even overlap if required.

To enable blocking, select SALES BLOCKING on the Config Menu, then select one of the four available blocking periods. For each blocking period, you are able to set starting time, ending time, the days of the week for which blocking will be active, and the products which will be blocked. Press **Execute** to change a time, to toggle the status of a day, or to toggle the status of a product. When finished, exit with **Cancel**.

The blocking period menu also contains the selections BLOCK ALL ITEMS and EXEMPT ALL ITEMS. The former selection causes all products in the machine to become subject to the blocking period. The latter item causes all products to become exempted from the blocking period, effectively disabling the blocking period.

To deactivate a blocking period, go to the Sales Blocking menu, select the desired period, and toggle all days of the week to OFF. Alternately, the EXEMPT ALL ITEMS selection can be used.

Blocking periods are allowed to extend beyond midnight. In such cases, the VMC uses the day-of-week in effect at the start time to decide when the blocking period ends. For example, consider a blocking period enabled for Monday through Friday for 6:00 PM through 5:00 AM. On Saturday, vending will be disabled from midnight until 5:00 AM because the start time occurred on a Friday, and blocking was enabled on Fridays.

When you have completed all Sales Blocking changes, return to the Config Menu by pressing **Cancel**.

4.7 Set Prices

Exit the Config Menu by pressing **Cancel**. Scroll up to PRICE and select it.

The Price Menu allows you to set prices for the entire machine at once, on a tray-by-tray basis, or on an item-by-item basis. Make your selection, then enter the tray letter or selection number (if applicable). Now, you are able to key in the price directly. On machines with a "10" key, use that key to represent zero. You are not required to enter leading zeroes. Press **Execute** to save the price or **Cancel** to abandon it.

4.8 Check the Coin Mech

Exit the Price Menu by pressing **Cancel**. Scroll up to FILL / DISPENSE and select it.

This part of Service Mode temporarily enables the coin mech so you can add or remove a few coins using the front panel. If you haven't already done so, add a few coins to the mech. Then, press "1" to dispense the smallest-value tubed coin (such as the USA nickel), "2" to dispense the second smallest coin, and so on. If the coin mech responds to the dispense commands, and added coins are displayed at their proper value, then the connections to the coin mech are working properly.

4.9 Check DEX

If you use a DEX audit terminal, you can try it now. Note that the DEX connection is active at all times; you do not have to enter Service Mode to turn it on.

4.10 Set Options

These options are available under the Options Menu if needed for a particular installation. Use **Execute** to toggle the option where the cursor is located.

- **Force Vend:** disallows use of coin return button in most circumstances
- **Multi Vend:** does not return change automatically after a vend
- **Free Vend:** deliver all products in the machine for free
- **Change Bill:** allow patron to receive change for a bill without making a purchase
- **Motor Stop:** controls how the VMC knows when to stop a motor and deduct credit:

HOME	Motor stops after one revolution at the home position using a switch. Credit is deducted unconditionally.
DROP	Motor stops when a drop is seen, or after several revolutions. Credit is deducted only if a drop is seen. <i>(Drop Sensor option required.)</i>
BOTH	Motor stops after one revolution at the home position using a switch. Credit is deducted only if a drop is seen. <i>(Drop Sensor option required.)</i>

On Gum & Mint trays, the VMC automatically uses the home switch capability (if available) regardless of the Motor Stop setting. If the drop sensor is otherwise enabled, and machine conditions do not prohibit its use (see Section 2), then drop sensors will be used on Gum & Mint trays also.

- **Card Rdr:** controls how the Micromech connector is used:

MDB	Card reader uses MDB interface. The coin mech, if present, may be either Micromech or MDB. The coin mech type is detected automatically at power-up.
M-MECH	Card reader uses Micromech interface. The coin mech, if present, must be MDB.

- **Bill Val:** controls which type of bill validator is used:

MDB	Bill validator uses MDB interface.
PULSE	Bill validator uses low-level (DC voltage) credit pulse interface through a separate VMC connector. NOTE: Non-MDB bill validators may need to be adjusted to work with the VMC; see Section 8 for details.

- **Coin Lev Mem:** controls whether Micromech coin levels are remembered after power loss.

OFF <i>(default)</i>	Micromech coin tube levels are not remembered after power loss. Instead, the VMC uses the coin mech's low tube sensors to establish tube levels. This setting may cause the VMC to underestimate available change, restricting bill acceptance until change levels
--------------------------------	--

	increase. For example, in USA applications where items are priced at more than \$1, customers will not be able to insert two \$1 bills in succession.
ON	Micromech coin tube levels are remembered after power loss. If coin cassettes or the coin mech itself are ever replaced, the VMC's coin tube levels must be reset by one of these two methods: 1) Power up with the new cassette or mech empty, or 2) Toggle this setting OFF and then back ON.

- **DEX Support** determines how the VMC communicates over the DEX port:

V6 (default)	Use EVA-DTS 6.0 communication and reporting conventions.
V5	Use EVA-DTS 5.0 communication and reporting conventions. Select this option only if your auditing system has problems communicating with the VMC under the "V6" setting.

5 Sales Mode

This section describes the typical operation of Sales Mode as well as some optional behaviors and features.

5.1 Typical Operation

Under normal circumstances, when the machine is idle, the Sales Mode display consists of the message "INSERT MONEY" optionally followed by the current time. When credit is inserted, the display shows the word "CREDIT" followed by the credit amount. If a selection is attempted without sufficient credit, the display shows the full price of the item.

Several other idle messages may be displayed under special circumstances:

- "USE EXACT CHANGE" alternates with "INSERT MONEY" when a low change condition is detected. Low change is defined as all coin tubes empty (if no bill validator is present) or less change than the smallest-value bill (if bill validator is present). This message can also appear at time of selection if the coin mech does not have the proper coins to pay back either the inserted credit or the change for the selection.
- "NO SALES UNTIL *hh:mm*" appears when the Sales Blocking feature has disabled vending for a product based on the day of week and time of day. If all products are being blocked, this message replaces "INSERT MONEY" for the duration of the block.
- "FREE VEND" appears in place of "INSERT MONEY" if the machine-wide Free Vend option is enabled.

If a severe coin mech or Drop Sensor problem develops, the VMC will display "OUT OF SERVICE" and disable all payment devices. See Section 7 for tips on troubleshooting these conditions.

5.2 Drop Sensor

If the optional Drop Sensor is enabled, the VMC is able to verify whether a product actually dropped during a vend. Just prior to each vend, the VMC checks whether the sensor path is clear. If it is not clear, the VMC displays the message "SENSOR BLOCKED, UNABLE TO VEND" and returns the customer's credit. (This situation is often caused by debris buildup inside the machine.)

If the sensor path is clear throughout the entire vend, the VMC displays the message "PLEASE MAKE ANOTHER CHOICE." On cash vends, the customer can then try a different selection or press

coin return to get their money back. On some card (cashless) vends, the customer's card is returned automatically, but the customer is free to re-insert it immediately.

5.3 Bill Validators and Exact Change

The VMC evaluates change conditions in the coin mech when deciding whether to enable or disable the bill validator. Essentially, the VMC looks ahead and predicts what would happen if the customer inserted the smallest-value bill right now. If there would not be enough change to vend any product in the machine, or if there would not be enough change to pay back the inserted bill, the bill validator will be disabled and an "EXACT CHANGE" message will be displayed.

If you are testing a bill validator, be sure that the coin mech has enough coins to equal the smallest-value bill – but never less than 10 coins in a tube – to allow the VMC to enable the validator.

5.4 Card Revaluation

Certain MDB card (cashless) readers are able to increase the value stored on a customer's payment medium (card, key, or button) under VMC control. The VMC detects and supports such readers automatically. The VMC supports two slightly different forms of revaluation, depending on whether the customer inserts cash or card first:

1. "Cash First" revaluation: If the customer inserts a card when there is a cash balance, the VMC attempts to transfer the cash balance to the card, up to the card's revaluation limit. Any excess cash balance is paid out in change. If the revaluation is successful, the message "CREDIT ADDED TO CARD" will appear. Otherwise, the card session is ended, causing a physical eject on some readers.
2. "Card First" revaluation: In this scenario, the customer inserts cash after a card has already been inserted. When the customer presses coin return, presses the reader's cancel button, or makes a vend selection, the VMC tries to transfer the cash balance to the card, up to the revaluation limit. Any excess cash balance is paid out in change. If the revaluation is successful, the message "CREDIT ADDED TO CARD" will appear. Otherwise, the card session is ended, causing a physical eject on some readers.

6 Servicing the Machine

This section highlights some VMC features that can make routine machine servicing easier.

6.1 Checking Coin Tube Levels

In Service Mode, choose FILL/DISPENSE at the Main Menu. Either insert a coin of each type through the coin slot, or press '1', '2', '3', and '4' to dispense a coin of each type. In either case, the display will show the number of available coins of that type.

If you need to remove a large number of coins, it is usually faster to do so directly at the coin mech. Many coin mechs offer a repeating dispense feature that is faster than requesting the same dispenses from the VMC. Note that DEX accountability will not be maintained for dispenses initiated from Micromech coin mechs.

6.2 Accounting

The Accounting Menu provides audit counters that are accessible to service personnel, yet are completely separate from DEX activity. "HISTORICAL VENDS" and "HISTORICAL VALUE" show the number and amount of paid vends over the lifetime of the VMC. "RESETTABLE VENDS" and

“RESETTABLE VALUE” are resettable versions of the same counters. Select the “CLEAR ALL” item when you wish to clear the resettable counters.

6.3 Manual Motor Testing

To test a motor without changing any of the accounting data, go to the Diag Menu and select “TEST MOTORS.” You can test either a single motor or an entire tray at one time. Watch the display for any error messages that may appear.

If the Motor Stop mode is HOME or BOTH, each tested motor will turn one complete revolution to the home position. If the Motor Stop mode is DROP, each tested motor will run for about one-third of a second.

6.4 Automatic Motor Testing

Automatic scanning for motor problems takes place at two times: at door closure (for machines with door switches) and when leaving Service Mode. If no problems are seen, the VMC double-beeps and returns to Sales Mode. If problems are detected, the VMC enters Motor Status Mode.

In Motor Status Mode, the VMC progressively displays all failed motor designations in the machine. If all configured motors on a given tray have problems, only a tray designation is displayed. The only key entry permitted is **Execute**, which re-scans for motor problems. If the re-scan finds that all motor problems have been resolved, the VMC will double-beep and return to Sales Mode. If no door or keypad activity is detected within a short time, the VMC will emit five short beeps and return to Sales Mode.

Here is an example of a display sequence from Motor Status Mode:

```
*MOTOR ERROR(S) *      *MOTOR ERROR(S) *  
CHECK TRAY A           TO RE-TEST: H
```

In this example, all configured motors on Tray A have failures. It is likely that the mating connectors on the rear of Tray A are not fully engaged. Once Tray A has been re-seated, the route driver may either press **H** to scan again, or simply re-close the door.

7 Troubleshooting

This section highlights some Service Mode features that help detect and recover from machine failures.

7.1 Error Display

As mentioned earlier, the VMC automatically displays detected errors upon entry to Service Mode. Like other parts of Service Mode, “Sys Errors” is a scrolling menu: if several errors are outstanding, the menu will expand to hold the entire list.

All errors initially appear as two-line entries on the display. For example, consider the following display: “MOTOR ERROR(S) 0002 08/13 09:34”. This indicates that two motor errors have been recorded, and that the first one occurred on August 13th at 9:34 AM.

The following table lists all errors along with possible resolutions:

Error Name	Origin	Resolution
BV CHECK SUM	Bill Validator: internal problem has occurred in the firmware.	Repair or replace bill validator.
BV COMMUNICATION	Bill Validator, VMC, or cabling: communications between VMC and validator stopped unexpectedly.	Ensure cabling between VMC and validator is secure, with no broken wires. In unusual cases, bill validator or VMC may need to be replaced.
BV JAMMED BILL	Bill Validator: a bill has jammed in the acceptance path.	Remove the jammed bill.
BV MOTOR	Bill Validator: one of the motors has failed.	Repair or replace bill validator.
BV OPEN BOX	Bill Validator: cash box was removed while the machine door was closed.	Remove any foreign objects from the validator. Ensure that the cash box is firmly seated on the validator. Check that the machine’s door switch is connected properly to the VMC. Ensure that the machine door switch is not stuck closed.
BV SENSOR	Bill Validator: one of the sensors has failed.	Repair or replace bill validator.
BV STACKER FULL	Bill Validator: cash box is full.	Empty the cash box.
CC CHECK SUM	Coin Mech: internal problem has occurred in the firmware.	Repair or replace coin mech.
CC COMMUNICATION	Coin Mech, VMC, or cabling: communications between VMC and coin mech stopped unexpectedly.	Ensure cabling between VMC and coin mech is secure, with no broken wires. See also Section 7.2. In unusual cases, coin mech or VMC may need to be replaced.
CC JAMMED TUBE	Coin Mech: a payout tube has jammed.	Check for coin jams. On mechs with removable cassettes, ensure that the cassette is seated properly.
CC SENSOR	Coin Mech: one of the payout tube sensors is behaving abnormally.	Repair or replace coin mech.
CC UNPLUGGED	Coin Mech: the acceptor module	Repair or replace coin mech.

	seems to be missing.	
CR CARD ERROR	Card Reader: the payment media is defective.	This is an informational message; the problem may be limited to one particular payment medium.
CR COMM - MINOR CR COMM - MAJOR	Card Reader: an internal communications problem occurred within the reader. Problem is either recoverable ("MINOR") or non-recoverable ("MAJOR").	Repair or replace card reader.
CR INVALID CARD	Card Reader: payment media problem.	This is an informational message; the problem may be limited to one particular payment medium.
CR JAMMED CARD	Card Reader: payment media has jammed inside the reader.	Clear the jam.
CR READER FAIL	Card Reader: an unspecified problem developed within the reader; device is not presently functional.	Repair or replace card reader.
CR REFUND FAIL	Card Reader: funds could not be credited to the payment medium following a failed vend; funds were lost.	Determine if problem is limited to one particular payment medium. Repair or replace reader if problem affects more than one payment medium.
CR SERVICE SOON	Card Reader: reader device requires maintenance.	Perform maintenance as recommended by reader's manufacturer.
CR TAMPER	Card Reader: a security breach has been detected.	This is an informational message.
MOTOR ERROR(S)	VMC: a vend motor is missing, jammed, or has a defective home switch.	Press the Execute key to see a detailed list of motor problems. See Section 7.3 for more information.
STUCK KEY	VMC: a key has been depressed for an abnormally long time.	Repair or replace machine keypad.
SENSOR BLOCKED	VMC: Drop Sensor system was found to be blocked at machine power-up.	See Section 7.4 for more information.

7.2 Coin Mech Errors

As noted earlier, the VMC displays the "OUT OF SERVICE" message in Sales Mode when serious coin mech problems occur. To clear the error and bring the machine back in service, press the **Execute** key. If you do not address the original cause of the error, the coin mech may re-report the error, causing the machine to go out-of-service again.

On some machines, the MDB coin mech is connected to the VMC through an existing machine harness. In these situations, it is helpful to unmount the coin mech and plug it into the VMC board directly. By bypassing the machine harness, you can help determine whether the coin mech, the harness, or the VMC itself is at fault.

7.3 Motor Errors

It's important to know the details about motor problems, because the VMC prohibits vending on defective motors. When you press the **Execute** key at a "MOTOR ERROR(S)" display, you are taken into a special Motor Errors menu that displays the status of each problem motor. The following three letters are used on the error reports:

- "M" indicates that a motor was present when the machine was configured, but was missing when last checked.
- "J" indicates that the motor drew an excessive amount of current, and is probably jammed.
- "H" indicates that the motor failed to re-home itself within a reasonable amount of time.

Execute acts slightly differently in the Motor Error menu than in the main Sys Error menu: it immediately re-tests the motor to see if the error condition still exists. If the error has been resolved, it will be removed from the menu. On the other hand, if the error persists, the entry on the Motor Error menu will remain. Once again, any motor appearing on this menu cannot be used for vending until the problem is resolved.

7.4 Sensor Errors

If the Motor Stop option is set to DROP or BOTH, the VMC checks for sensor blockages at each power-up. If the sensor is blocked, a "SENSOR BLOCKED" error is generated. The best way to troubleshoot this error (and other sensor-related problems) is to use the TEST DROP SENSOR function under the Diagnostics menu.

During a Drop Sensor test, the VMC indicates the blockage status of the sensor through both audio and visual cues. You will hear one beep for each momentary blockage (such as a product drop) or one beep per second for a sustained blockage. The audio cues can be silenced by pressing the **Execute** key. If there is no obvious blockage in the sensor path, check the physical alignment of the sensor boards to verify that each is perpendicular to the sides of the delivery bin.

One of the two sensor boards provides a red diagnostic light which may be helpful during testing. If the light is fully illuminated, the sensor path is clear. If the light is pulsing, blockages are being detected. If the light is not illuminated, the sensor board is either defective or not receiving power; check the cable connection between the VMC and the sensor board.

7.5 Other Types of Errors

The remaining error types (bill validator, card reader, and stuck-key) are simple notifications; you press the **Execute** key to acknowledge that you read them. If you don't acknowledge these errors, they will keep appearing until you do. These errors do not cause the machine to go out-of-service.

7.6 Machine History Logs

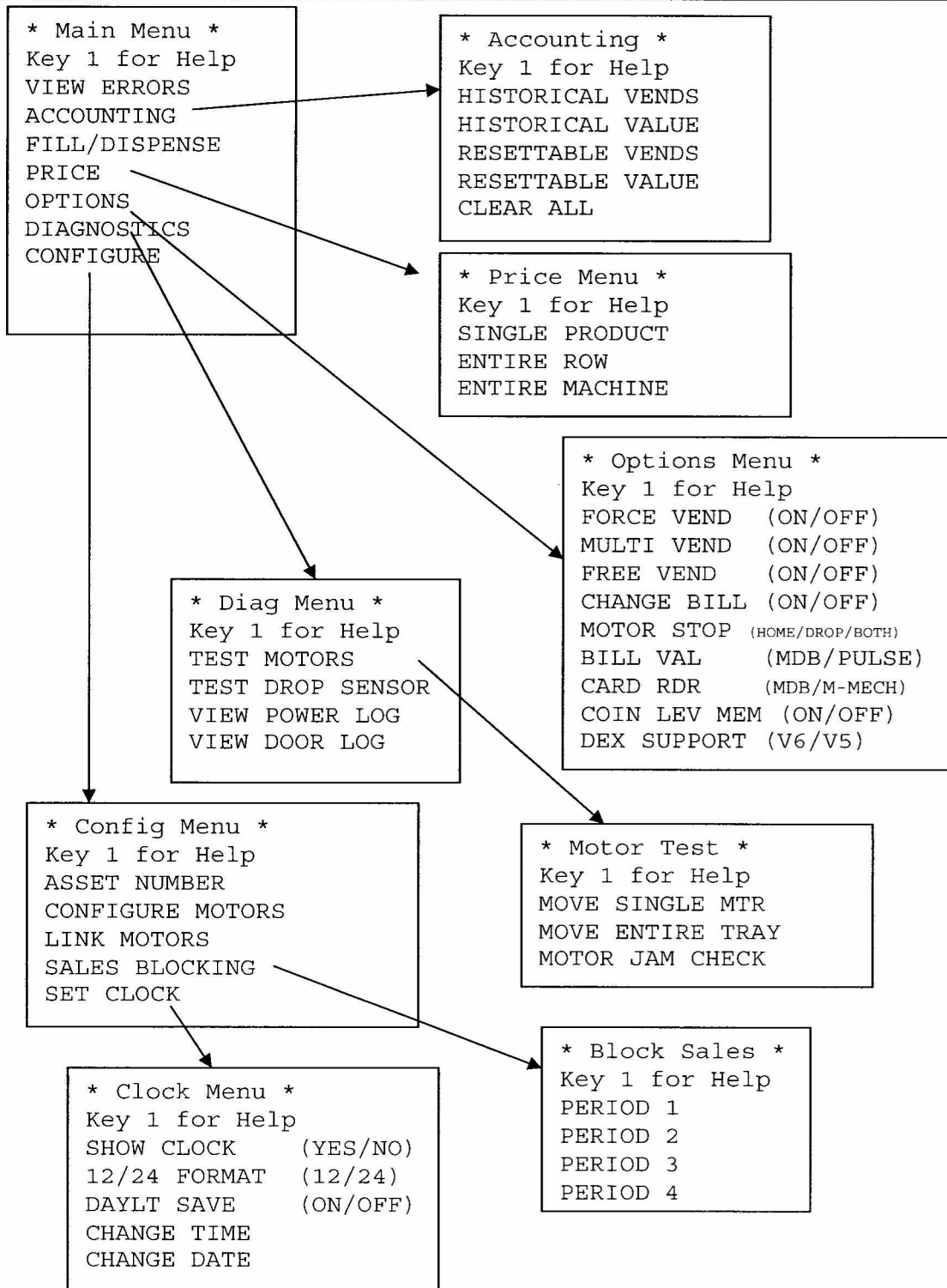
The VMC maintains a history of door and power events it has observed. To access these logs, go to the Diag Menu and select VIEW POWER LOG or VIEW DOOR LOG. In each case, the logs are shown starting from the most recent event and moving backwards in time, up to 10 events deep. Once the end of the log has been reached, scrolling down will cause the most recent event to be displayed again.

8 Pulse Bill Validator Settings

You may need to adjust DIP switch settings on pulse (non-MDB) bill validators, even if the validator was used with the vending machine's original control board. After adjusting DIP switches, you should cycle power on the machine. The following table lists switch settings for several popular types of bill validators. Settings marked in **bold** are required for proper operation.

Validator Model	DIP Switch Location	Settings
Mars/MEI VFM1	Underneath control box, which is screwed to the side of the validator.	#1: One direction (ON) or two direction (OFF) #2: Std. security (ON) or high security (OFF)
Mars/MEI VFM3	Underneath control box, which is screwed to the side of the validator.	#1: One direction (ON) or two direction (OFF) #2: ON (short pulse) #3: OFF (1 pulse per dollar) #4: OFF (1 pulse per dollar) #5: Std. security (ON) or high security (OFF) #6: ON (relay output) #7: ON (high- or low-level pulse) #8: \$1 only (ON) or \$1/\$2/\$5 (OFF)
Mars/MEI VN2300	Right side of validator.	#1/#2: Bill direction (1 OFF, 2 ON = 2-way) #3: High security (ON) or high accept. (OFF) #4: ON (accept \$1) #5: \$2 bill acceptance (ON=accept) #6-#8: Unused
Mars/MEI VN2500	Right side of validator.	#1/#2: Bill direction (1 ON, 2 ON = 4-way) #3: High security (ON) or high accept. (OFF) #4: ON (accept \$1) #5/#6: \$2/\$5 bill acceptance (ON=accept) #7: ON (short pulse) #8: OFF
Mars/MEI AE2600	Right side of validator.	#1/#2: Bill direction (1 ON, 2 ON = 4-way) #3: High accept. (ON) or high security (OFF) #4/#5: \$2/\$20 Bill acceptance (OFF=accept) #6: OFF (harness enabled) #7: OFF (short pulse) #8: ON (vending interfaces)
Mars/MEI AE2800	Right side of validator.	#1/#2: Bill direction (1 ON, 2 ON = 4-way) #3: High accept. (ON) or high security (OFF) #4/#5: \$50/\$100 Bill acceptance (OFF=accept) #6: OFF (harness enabled) #7: OFF (1 pulse per dollar) #8: ON (vending interfaces)
Coinco BA30S	On control board; remove retaining screw and slide board out from its plastic case.	#1: High security (ON) or std. accept (OFF) #2: One direction (ON) or two direction (OFF) #3: OFF (pulse interface) #4-#7: \$20/\$10/\$5/\$2 acceptance (ON=accept) #8: ON (accept \$1)

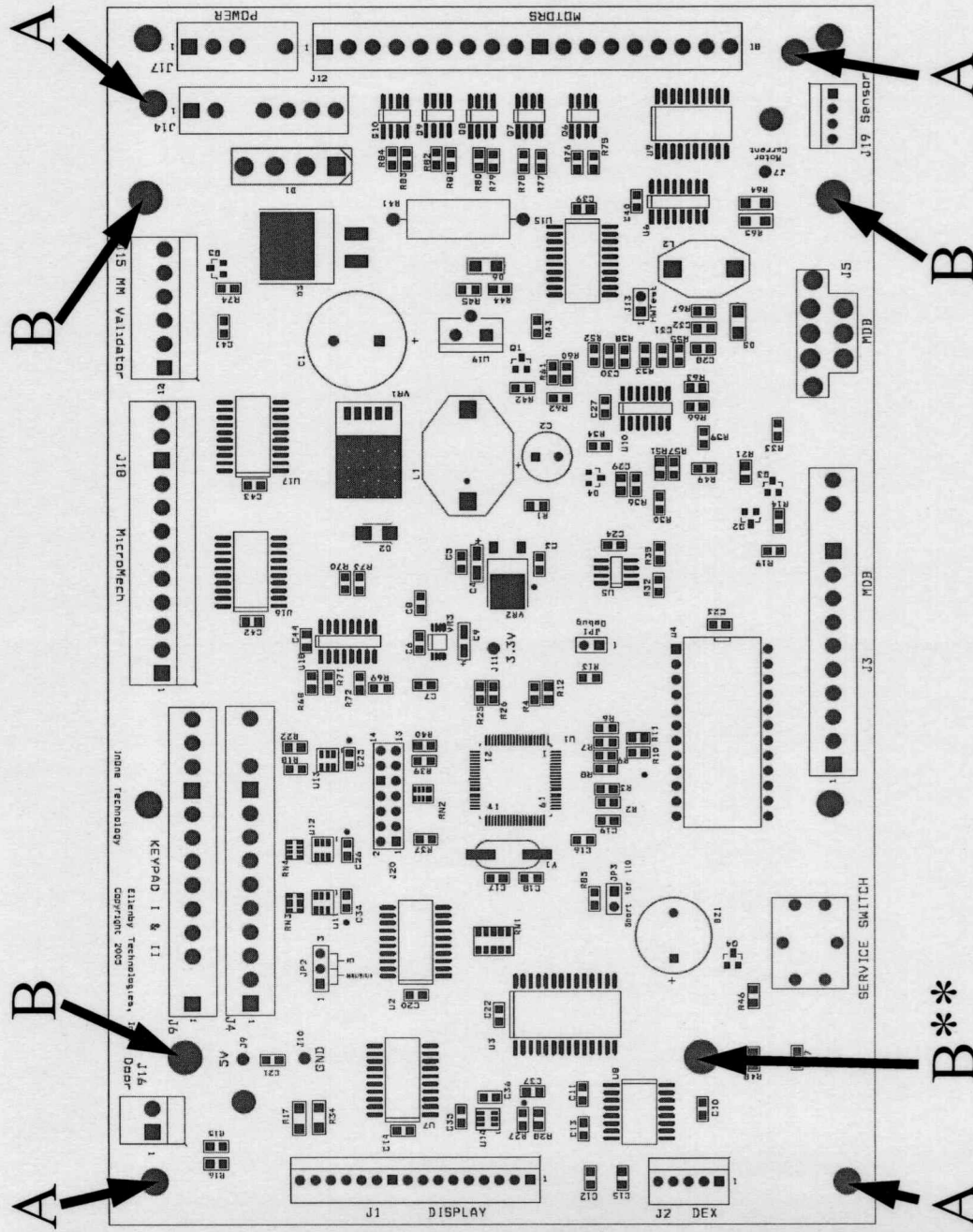
9 Service Mode Quick Reference



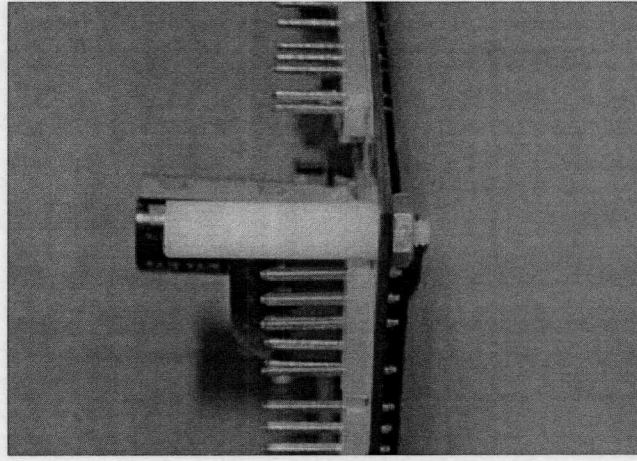
10 Revision History

- 17 October 2006: Firmware Revisions 2.60-2.61
Improved motor error detection and display for route personnel.
Added ability to block sales for selected products only (v2.61 firmware).
Added card revaluation feature.
Home switch usage now mandatory on all gum & mint trays.
VMC disables Bill Validator if no change could be made for any product.
Updated list of kits.
- 22 December 2005: Firmware Revisions 2.53-2.55
Added required switch settings for pulse bill validators.
Renamed items on Accounting menu to better reflect their function.
Updated list of kits.
- 1 September 2005: Firmware Revision 2.52
Updated list of kits.
- 12 July 2005: Firmware Revisions 2.50 & 2.51
Added Micromech, Pulse Bill, and DEX 6.0 capabilities.
- 9 May 2005: Firmware Revision 2.10
First generic manual covering several kits.
- 14 Feb 2005: Firmware Revision 2.01
Rearranged sensor setup instructions.
- 09 Feb 2005: Firmware Revision 2.00
Add Motor Stop option in place of Drop Sensor and Home Switch options.
Add Change Bill option.
Exact Change message now appears if all coin tubes are empty.
Prepare for non-MDB payment device support.

VMC STANDOFF LOCATIONS



STANDOFF
 CROSS SECTION
 DETAIL



FOR AP 4000/5000 & AP 110 KITS PLACE STANDOFFS IN "A" LOCATIONS
 FOR AP 6000/7000 & NATIONAL 147/148 KITS PLACE STANDOFFS IN "B" LOCATIONS
**** THIS LOCATION REQUIRES A NYLON WASHER ON BACKSIDE**

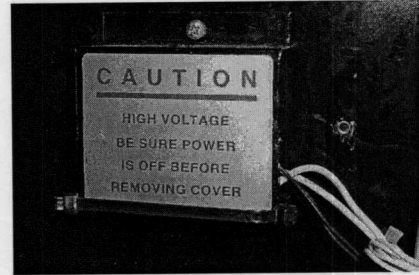
z:\prod process\standoff locations

MicroMech Option for VMC-6000/7000 Kits

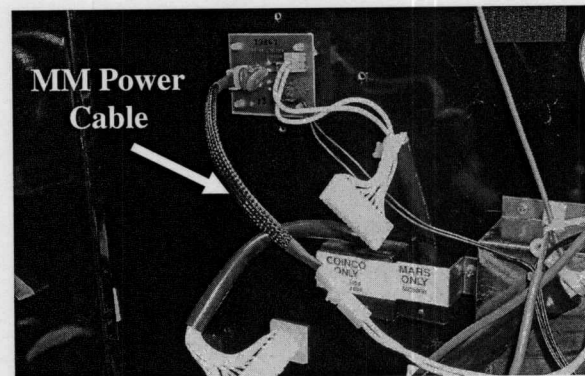
Items Needed:

- 11-0187-21 : Cable, 6/7000 Micromech
 - 11-0188-21 : Cable, 6/7000 MM Pwr Ext
-

1. Remove cover of the High Voltage PCB.



2. Locate P1 on PCB. Next, locate cable originally connected to P1 (extending from the Jones plug). This is a 3 pin connector with pin 2 keyed. Connect "MM Power Cable" to this cable with the male pins and the other end into P1 of the small PCB. You can now replace the cover to this PCB.

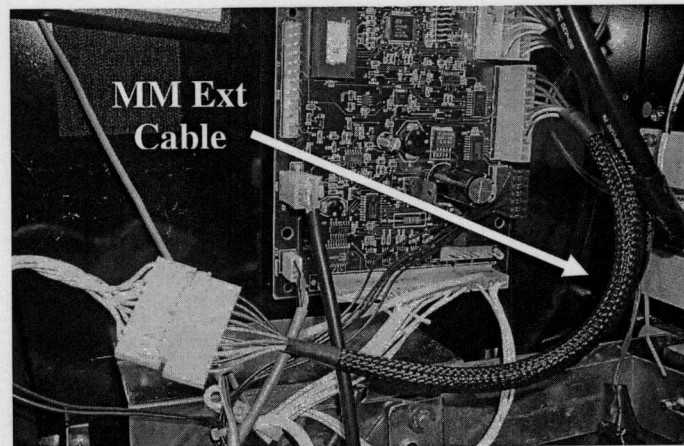


If installing MicroMech Coin acceptor:

1. The coin acceptor can connect directly to the Jones plug labeled "MARS ONLY".



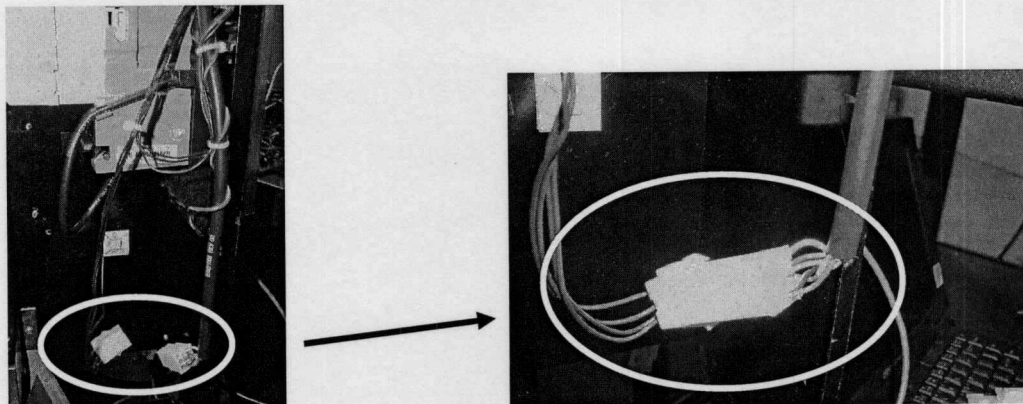
2. There is also an 11 pin connector with pin 11 keyed extending from the Jones plug. Connect "MM Ext Cable" to this 11 pin connector using the male pins. Remember pin 11 is keyed. The other end of this cable will plug directly into J18 of the Retrofit Control board. This is a 12 pin connector with pin 11 keyed.



*****After all connections are made, please replace the cover for the High Voltage PCB.*****

If installing a pulse bill validator:

1. Mount bill validator using the four existing screws and nuts.
2. The bill validator should connect directly to a 2x3 connector located in the machine. The other end of this cable has a 3 pin connector connected to the High Voltage PCB and a 6 pin connector with pin 4 keyed. The 6 pin connector can be connected to J15 of the Retrofit Control board.



*****After all connections are made, please replace the cover for the High Voltage PCB.*****

Sensor Kit Installation

10-0073-00

1. At this point, please locate the Sensor Kit included in your Retrofit kit. Without unplugging and cables, unravel the boards.
2. The Sensor Mounting Plate (part # 05-0098-01) will now have to be mounted onto the Emitter board bracket, which is the smaller of the two boards. The hardware that is needed is mounted on this bracket for convenience. See figure 1 for orientation.

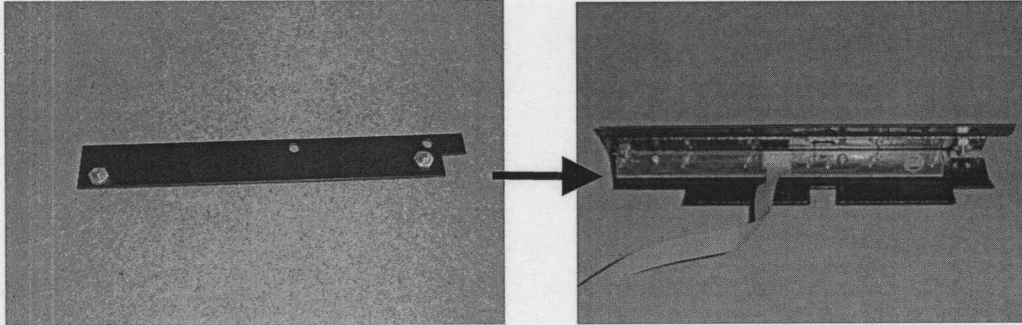


Figure 1.

3. Locate the two L-shaped brackets on both sides of the bin on the door. Unscrew the bottom screw completely with Philips screw driver. Next, loosen the top screw slightly to allow the bracket to move around freely. See Figure 2.

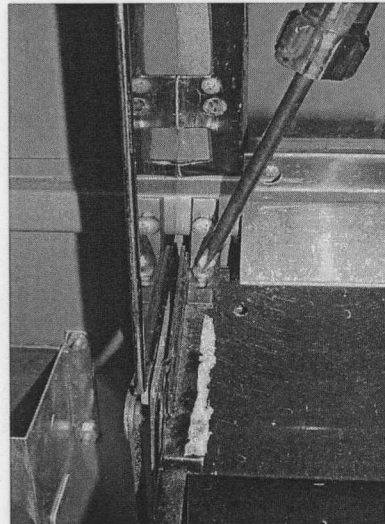


Figure 2.

4. You can now slide the Sensor mounting plate (installed on the Emitter board bracket) under the existing L-shaped bracket on the left side of the bin. This bracket should slide right underneath this L-shaped bracket and match up with the hole for the screw that has already been removed. The deflector may hit the bracket. If this happens, you may cut the corner of the deflector or bend it in so the bracket can be secured. Once you line this hole up, use a magnetic screwdriver to replace this screw. It may help to view this from the edge of the

bracket where you can see straight back. Next, tighten the top screw by coming in between the bracket and the edge of the “bin wall” with your screwdriver. Make sure this bracket is secure and straight. Install the 2nd screw that is halfway down the length of the Sensor mounting plate.

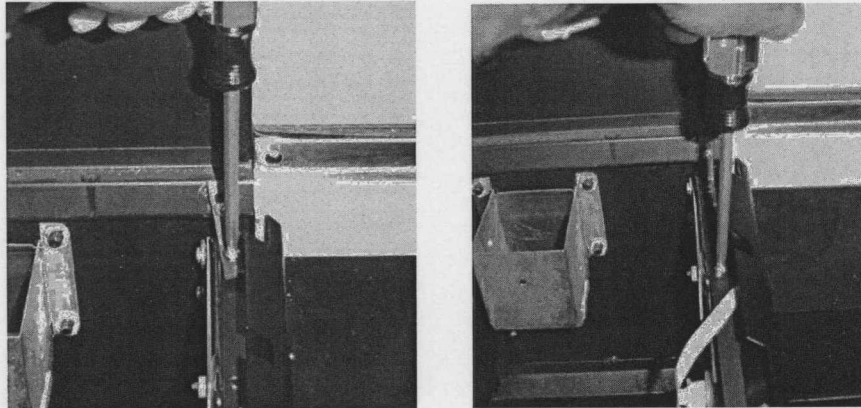


Figure 3.

5. This can be repeated for the Receiver board bracket (the larger board), however the Sensor mounting plate is not used. This bracket will get mounted on the right side of the bin (closest to the hinged part of the door). The two sensor boards should be “facing” each other.

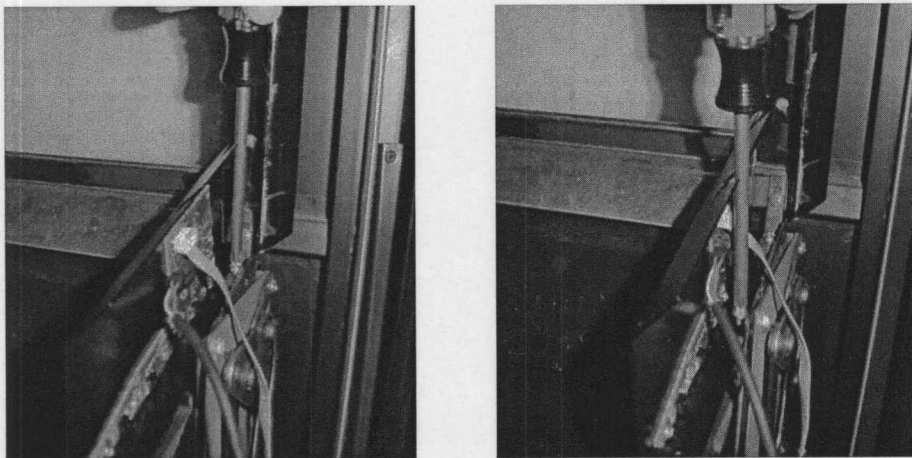


Figure 4

6. Confirm these two boards are connected with the Sensor Board Cable. The connectors are polarized so please take note to how they are plugged in. The cable should run along the sides and underneath the bin. Wire clasps are provided if needed. Make sure that this cable is OUTSIDE of the bin and not in the path of the boards. The two boards should be able to “see” each other with no obstructions. Refer to Figure 5.

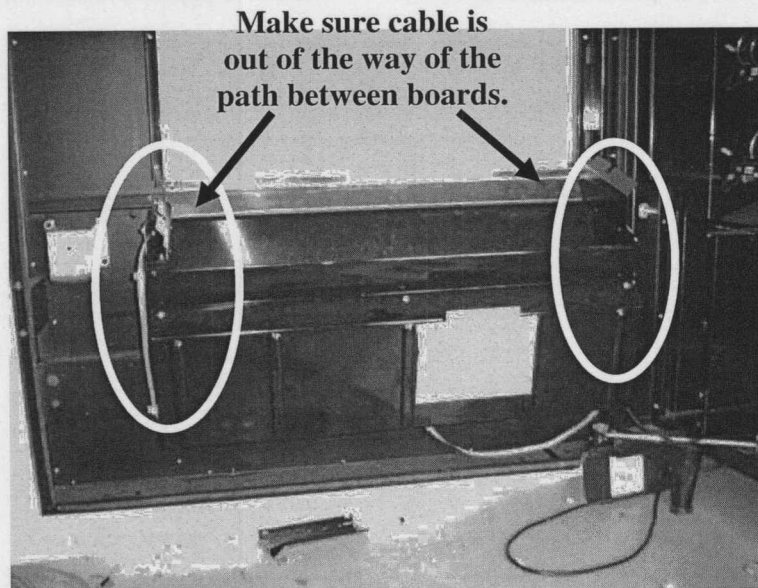
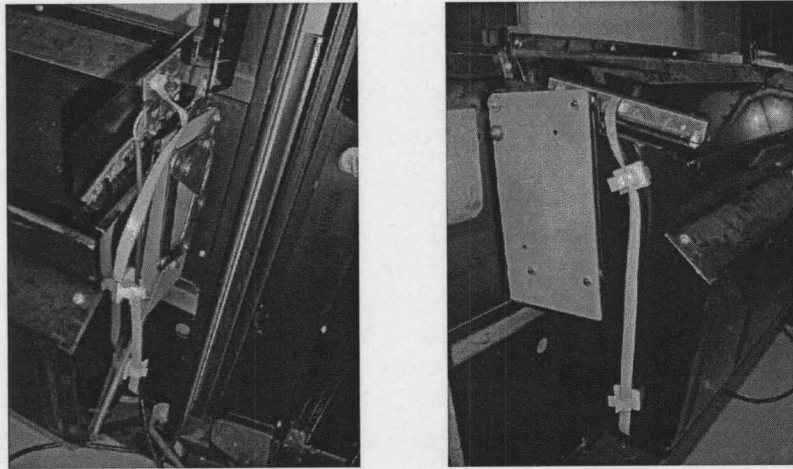


Figure 5.

7. Connect the receiver board to the control board. Use the Sensor to Control Cable that is already connected to the receiver board. The unconnected end will plug into the Drop Sensor header, J19, of the vending machine controller (VMC). See Figure 6.

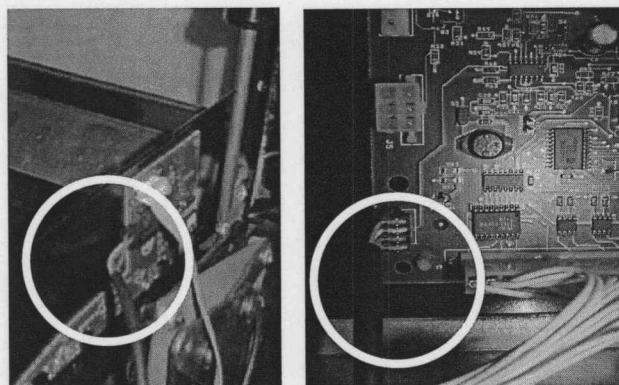


Figure 6.