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AP Vending Machine Retrofit

ARB-V17



DESCRIPTION

The AP 4000 – 7000 and 110 Series Vending Machines are presently using outdated controllers, severely limiting the potential of these machines.

To upgrade these vending machines and give them new life, Arbortronics has designed a state of the art controller with sophisticated firmware.

This controller provides a number of innovative and unique ultra modern features that places it in the category of the most up to date vending equipment.

The new controller PCB is identical in size and shape to the original board; therefore it mounts easily using the existing mounting studs. The same applies to the separate display board, which

is the second board in the AP6/7000 and AP 110 retrofit kits. The connectors on the new controller PCB are located in the same place as on the original so that it can be easily connected using the existing cables.

The retrofit kit consists of:

- New MDB Control Board
- 2 line Backlit LCD Display
- Display Lens
- Set of Interconnecting Cables

And on request:

- MDB Coin Changer
- MDB Bill Validator with cables and mounting hardware

Optional features include:

- “Proof of Delivery System”
- Audit Collection System

OPERATION

When the machine is switched “ON”, the message ‘Wait’ will appear on the display while the controller goes through the startup sequence. During the startup sequence the controller checks for and initiates communication with the attached devices. If an error occurs, either at startup or during operation, the controller will enter the error into the error log and disable the source of that error.

If the controller encounters an error with the coin changer, the machine will be disabled and the message ‘Out of Service’ will appear on the first line of the display, followed by ‘CC’ (Coin Changer) on the second line.

The machine will also go out of service if any of the keypad keys get stuck ‘ON’. When this happens, ‘Out of Service’ will appear on the first line followed by ‘KP’ (Keypad) on the second line.

If there is no bill validator, or if the bill validator is not connected, the controller will continue to function using only the coin changer.

Additionally, if a bill validator error is encountered or communication with it fails, the controller will inhibit bill acceptance and the vending machine will continue to function using only the coin changer.

When a product is selected and paid for, but the product dispense motor does not function properly, the controller will log this motor failure, retain the credit and request that another selection be made.

On an AP6/7000 vending machine, when the door is opened, if any of the motors have failed, the buzzer will sound and the machine will automatically display the “Motor Failure Log”.

PROGRAMMING GUIDE

Setup Menu

To enter the setup menu, press and hold the ‘PROG’ button inside the machine on the control board until the setup menu appears on the display. The setup menu will read: ‘Price – 1’, ‘Option – 2’ and ‘Audit – 3’.

To select any of the menu options press the associated number key. To return to this menu from any sub-menu or menu item, simply press the ‘14’ key on the keypad (on an AP110 series machine the ‘K’ key is used for this purpose).

While in programming mode, if no keys are pressed for approximately 20 seconds the controller will exit the setup menu and return the vending machine to idle mode.

Another way to finish programming and exit the setup menu, on a AP7/6000 vending machine, is to press the door switch button, or close the door, this will return the machine to idle mode.

On an AP4000 vending machine, pressing the ‘Prog’ button (located on the control board) will return the machine to idle mode.

Price Menu

The ‘Price’ is selected from the setup menu by pressing ‘1’ on the keypad. The following menu will then appear: ‘Individual – 1’ on the first line of the display and ‘Line – 2 All – 3’ on the second.

Individual Prices

The ‘Individual’ menu selection allows the setting of prices for individual products. To do this, enter the individual product’s location (eg. A1), followed by the price.

Note: The price is entered as follows:

- a) Enter up to two digits for the dollars (\$99 max) using ‘1’ through ‘9’ on the keypad and ‘10’ for ‘0’
- b) Press ‘D’ to place the decimal point
- c) Enter two digits for the amount of change.
- d) Press ‘E’ to accept the price that was entered

At any time while entering the price, ‘C’ may be pressed to clear the entry and begin again.

The price must be greater than \$0.00 and must be divisible by the scaling factor (5¢ in the US and Canada). When an invalid price is entered, 'Error' will be displayed on the screen for a few seconds followed by the cleared product location and price.

Line Prices

The 'Line' menu selection sets one price for an entire shelf (or row). To set one price for an entire row, enter the letter of that row (eg. A), followed by the price, as specified above.

All Prices

The 'All' menu selection sets a single price for the entire machine. When this selection is made, the display will only prompt for a price that is entered as above.

Option Menu

When 'Option' is selected from the setup menu, the following menu is displayed: 'TST: Motor – 1 DP – 2', and 'Escrow – 3 Erlog – 4'.

Motor Test

To test the motors, select 1 from the 'Options' menu. The display will then prompt for a motor number (eg. A1). Once a motor number is entered the controller will test that motor. If the motor experiences a problem, the controller will display 'Failure', followed by the appropriate error code (error codes are listed below), if it is functioning properly, it will display 'Ok'.

Delivery Proof Test

The 'DP' in the 'Option' menu stands for the delivery proof system. This is an optional feature available only with the Arbortronics AP retrofit.

To test the delivery proof system it must first be installed in the machine, otherwise when this menu item is selected the display will read "No DP System". If a delivery proof system is installed, the first line of the display will read "DP Connected".

If communication with the DP system fails or a problem develops, the second line of the display will read "Failure".

When there are no problems with the system the second line of the display will read "Start Test – 1". Press '1' on the keypad to begin the delivery proof test.

Once the test has begun the display will read, "Awaiting Product".

The system will wait approximately 20 seconds, or until one of the sensor beams is interrupted. For a successful test, interrupt one of the sensor beams within the 20 seconds.

If the test is successful, the display will read “Product Vended”. If the beams are not interrupted within the 20 seconds, the test is not successful and the display will read “No Vend”.

Escrow Modes

The ‘Escrow’ selection will display the following menu:
‘Nutral – 1’, ‘FVend – 2’ and ‘Change Machine – 3’.

Neutral Escrow

The ‘Nutral’ selection sets the escrow to enable where the changer will return the same denominations of coins as the customer deposited.

Forced Vend Escrow

The ‘Fvend’ selection disables escrow so that the customer must buy a product.

Change Machine Escrow

The ‘Change Machine’ selection enables the “Change Machine Mode” and enters the change machine setup menu. In Change Machine Mode, when the machine accepts certain bills it will change the bill and pay out change from the Coin Changer.

The change machine menu appears as follows: ‘\$5 – 1’ with a ‘Y’ or ‘N’ after the \$5, ‘\$10 – 2’ with a ‘Y’ or ‘N’ after the \$10 and ‘\$20 – 3’ with a ‘Y’ or ‘N’ after the \$20. To enable/disable allowing the changing of each bill, press the associated number. When the number is pressed, ‘Y’/‘N’ will change, ‘Y’ indicating that if enough change is available, change will be given for that bill. Please note, that the \$20 bill will not be changed unless the coin changer has a \$2 tube.

Error Log Menu

The ‘ERLOG’ selection allows a service person to examine a log of errors that have occurred since the log was last viewed.

When this menu item is selected the controller will display the following menu:
‘MOT – 1’, ‘CC – 2’ and ‘BA – 3’.

Selecting ‘MOT – 1’ will present the service person with ‘MOTOR XX CAUSE YY’ the first line of the display. The ‘XX’ indicates the motor number (eg. A1) which is faulty and the ‘YY’ is an error code representing the cause (see the table below). If there have not been any motor errors, all of the X’s and Y’s are blank. If more than one motor has caused an error, ‘Next – 1’ will be present on the second line. To view the next motor error simply press ‘1’, when you reach the last error the second line is blank. The Error Log will be cleared when the programming mode is quit.

Audit Menu

When 'Audit' is selected from the main menu the audit menu is entered. Please note that audit data collection is presently only visual.

The audit menu is as follows:

'Individual – 1', 'Total – 2', 'Other – 3' and 'Reset – 3'

Individual Product Audit

The auditing of individual products consists of four separate counters per product, two are resettable and two are non-resettable. There is one resettable and one non-resettable counter for both the amount money collected and the number of vends. The resettable counter for the amount of money collected has a \$999.95 maximum, while the counter for the number of vends has a 999 vend maximum. The non-resettable counter for the amount of money collected has a maximum of \$60,000.00 while the counter for the number of vends has a 60,000 vend maximum. Once a counter reaches its maximum value it will roll-over to zero and begin again.

Total Sales Audit

The Total Sales are tracked by two non resettable counters, one counts the total amount of money collected by the machine, while the other counts the total number of vends by the entire machine.

Other Audit Menu

The "Other" audit menu consists of less frequently desired audit items, some of which are tracked only by resettable counters while others are tracked by both types of counters.

The "Other" audit menu consists of:

"CBox – 1", "CC – 2", "MDisp – 3", "Bill – 4"

CBox (Coin Box) Audit

This selection will display the resettable counter that tracks the amount of money that has been routed to the coin box since the last reset.

CC (Coin Changer) Audit

This selection will display the resettable counter that keeps track of the amount of money that is currently in the Coin Changer tubes.

MDisp (Manually Dispensed) Audit

This selection will display the amount of money that has been manually dispensed since the last reset.

Bill Audit

The Bill Audit uses two counters for each bill denomination, one resettable and one non-resettable. Both counters track the number of bills of a specific denomination that have been accepted with a maximum of 60,000 bills per denomination. When this item is selected the display will show both counters for the \$5 bill, with “Next – 1” in the top right corner. Pressing ‘1’ on the keypad will proceed to the next bill denomination. Pressing ‘1’ from the \$20 bill will advance to the two counters (resettable and non-resettable) that track the total number of bills accepted regardless of denomination.

Reset Audit

This menu item sets all of the resettable counters to zero. To select the “Reset” item from the Audit menu, press the ‘4’ key until the controller emits a long beep. After resetting all of the resettable counters, the controller will exit the setup menu and return to idle mode.

Error Codes

Motor Errors

Cause Code	Cause Description
MD	Motor Disconnected (no current through motor)
MJ	Motor Jammed (high current draw)
HP	Missing home position signal
SW	Motor switch error

Coin Changer Errors

Cause Code	Cause Description
03	No Credit – Coin recognized but no credit given
04	Defective Tube Sensor
06	Acceptor Unplugged – Changer detected without acceptor
07	Coin Tube Jam – Coin tube payout jammed
08	ROM Checksum Error – Internal checksum does not match calculated
09	Coin Routing Error – Coin did not go where intended
12	Coin Jam – Coin(s) have jammed in the acceptance path

Bill Validator Errors

Cause Code	Cause Description
01	Defective Motor
02	Sensor Problem
04	ROM Checksum Error – internal checksum does not match calculated
05	Validator Jammed – Bill(s) jammed in the acceptance path
08	Cash box out of position – Bill Magazine not detected
09	Unit Disabled