



American Changer

1400 NW 65TH Place ♦ Ft. Lauderdale, FL 33309



CLASSIC SERIES – CHANGER

**OPERATIONS MANUAL
MODELS AC2002/2002.1**

ARL Listed STD: UL 756

Parts & Service: (888)741-9840

Service Fax: (954)917-5204

Sales: (800)741-9840

To order parts only, visit our website: www.americanchanger.com

Service Questions? E-mail: service@americanchanger.com

Model Number:

Serial Number:

Tested By:

Date:

Specifications

Operating voltage	120VAC +10% to -15%
Power consumption	Controller only: 10W
Operating temperature	32 - 130 degrees Fahrenheit
Interface to hoppers	24VDC & 12VDC, 1.5 amps max.
Interface to validators	120VAC, .5 amps max.
Hopper coin capacity	100/hopper minimum to 2,800/hopper maximum (5,600 total)

Warranty Information

A Return Material Authorization number (RMA #) must be obtained before returning a unit for repair. A copy of invoices must accompany any and all warranty work.

It is the end users' responsibility to follow cleaning and maintenance procedures as outlined in the validator manual. Any unit returned for repair requiring only a cleaning will be charged a flat rate plus shipping and handling.

Validators

Validators are warranted for two years from date of purchase.

Hopper(s) and/or Dispenser(s) and Logic Board

These items are warranted for one year from date of purchase.

COVERED

- Manufacturers' defects in workmanship or materials

NOT COVERED

- Damage caused by shipping or physical abuse
- Misapplication
- Vandalism
- End users' attempt, on their own, to repair components
- Cleaning and maintenance
- Power surges and lightning strikes

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SECTION A SETUP & INSTALLATION

Setup

Inspect for any connectors or components that may have been dislodged during shipping. The lock and keys for your changer will be inside the manila envelope along with this manual and other pertinent information. To install the lock, insert the cylinder into the hole in the middle of the T-handle and push until it stops. Turn the key until you hear it "snap." Turn the key counterclockwise ¼ turn and remove the keys.

NOTE: The only way to get a duplicate set of keys made is to save the tag that comes between the keys. This ID # starts with "AC or ACC ####."

CELLULAR WIRELESS CREDIT CARD SYSTEM (optional)

This feature is an optional add-on for most American Changer models. A separate maintenance manual is included in your packet. You **MUST** call American Changer technical support at (888) 741-9840 for setup and operating instructions. Prior to startup in the wireless mode, the machine will operate and validate cash transactions only.

Mounting the AC2002/2002.1 to a Wall

IF YOU ARE UNSURE IN ANY WAY IN PROCEEDING WITH THE FOLLOWING STEPS, PLEASE HIRE A LICENSED ELECTRICIAN TO MOUNT YOUR CHANGER FOR YOU!

1. Disconnect any and all AC power going to the changer. (Unplug AC line cord from the Power Module Board and from the wall.)
2. Slide the hoppers out of the cabinet.
3. Note: You will need to verify with the building code to see if it is allowable to plug the changer into a 3-prong grounded outlet. If it is not, there must be 120VAC run through conduit or other means to meet local codes to the changer. If it is not required, proceed to step #6.
4. Let the electrician run the conduit, install the new breaker, wire and help decide how the wiring will enter the changer (from the back or the bottom). This will affect the mounting location.
5. After the conduit has been installed, proceed with the mounting.
6. Locate the 4 punch-outs on the back or side wall of the changer. Using a screwdriver and hammer, remove the punch-outs by striking them from the inside of the changer.
7. Find an appropriate wall into which to bolt the changer. The wall should have studs or be constructed of concrete.
8. **NOTE: HANGING THE CHANGER FROM FEWER THAN THE HOLES PROVIDED MAY BE DANGEROUS. EACH HOLE NEEDS A BOLT THROUGH IT TO SECURELY MOUNT THE CHANGER TO THE WALL. MOUNTING THE CHANGER IN ANY OTHER WAY MAY RESULT IN THE CHANGER BEING TORN FROM OR FALLING FROM THE WALL, RESULTING IN PERSONAL OR CUSTOMER INJURY ALONG WITH ELECTRICAL SHOCK.**

9. Choose a height to mount the changer, keeping in mind that a handicapped person in a wheelchair should still be able to insert a bill into the bill validator. (We recommend no higher than 4 feet above the ground.)
10. Have someone hold the changer against the wall while someone else marks the holes. **CAUTION: THE CHANGER WEIGHS 98 POUNDS; DO NOT EXERT YOURSELF SO THAT YOU MAY CAUSE AN INJURY.**
11. **BEFORE DRILLING THE MARKED HOLES, ENSURE THAT THERE ARE NO ELECTRICAL WIRES, TELEPHONE LINES, GAS OR WATER LINES BEHIND THE WALL.**
12. Hold the changer's back against the wall. Thread and tighten bolts.
13. Verify that the machine is securely mounted.
14. If the changer is permanently connected through a conduit, proceed to step #16.
15. Feed the AC line cord out the bottom or the back of the changer by moving the "L" bracket if necessary, and then perform the following:
 - a. Plug the male end into the AC wall outlet. **Do not use an extension cord unless allowed by the building electrical code.**
 - b. **Important:** Attach the line cord clamp to the line cord. Verify it is at the right length and that the line cord is not rubbing against any sharp edges or is being strained in any way. Then mount the line cord clamp to the studs at the hole. Tighten securely. Installation is completed. Proceed to the "Filling the Hoppers" section.
16. In order to continue, you will need to purchase electrical cable conduit, a standard 3-prong AC wall outlet, and 12-gauge wire. We highly recommend hiring a licensed electrician to perform the following:
 - a. Install the conduit box on the conduit entering the cabinet in the lower right side of the cabinet.
 - b. Secure the 3 wires (hot, neutral and ground) to the AC wall outlet; the ground wire should also be directly attached to the cabinet ground terminal.
 - c. Plug the male end into the AC outlet just installed.
 - d. Properly fold the line cord to avoid sharp corners and any other damage.
17. Proceed to the "Filling the Hoppers" section.

Filling the Hoppers

When each hopper has fewer than 80-100 coins left, the red "Empty" LED will illuminate on the front of the changer. If you have disconnected your LED, make sure the orange wire is going to the terminal on the LED that has the red wired terminal. **Whenever the "Empty" LED is "ON," the validator is disabled; and it will no longer accept bills.**

1. Turn OFF the power on the Main Logic Board.
2. Slide the hoppers from the cabinet, and insert the coins through the opening on the top. *There must be at least enough coins to cover the two gold plates at the bottom of the hoppers (somewhere between 160 and 1,600 coins, minimum to maximum).*
3. Slide the hoppers back into the hopper plate. **Do not use excessive force!**
4. Turn the power switch to "ON." The "Empty" LED is now off, and the bill validator is ready to accept bills.

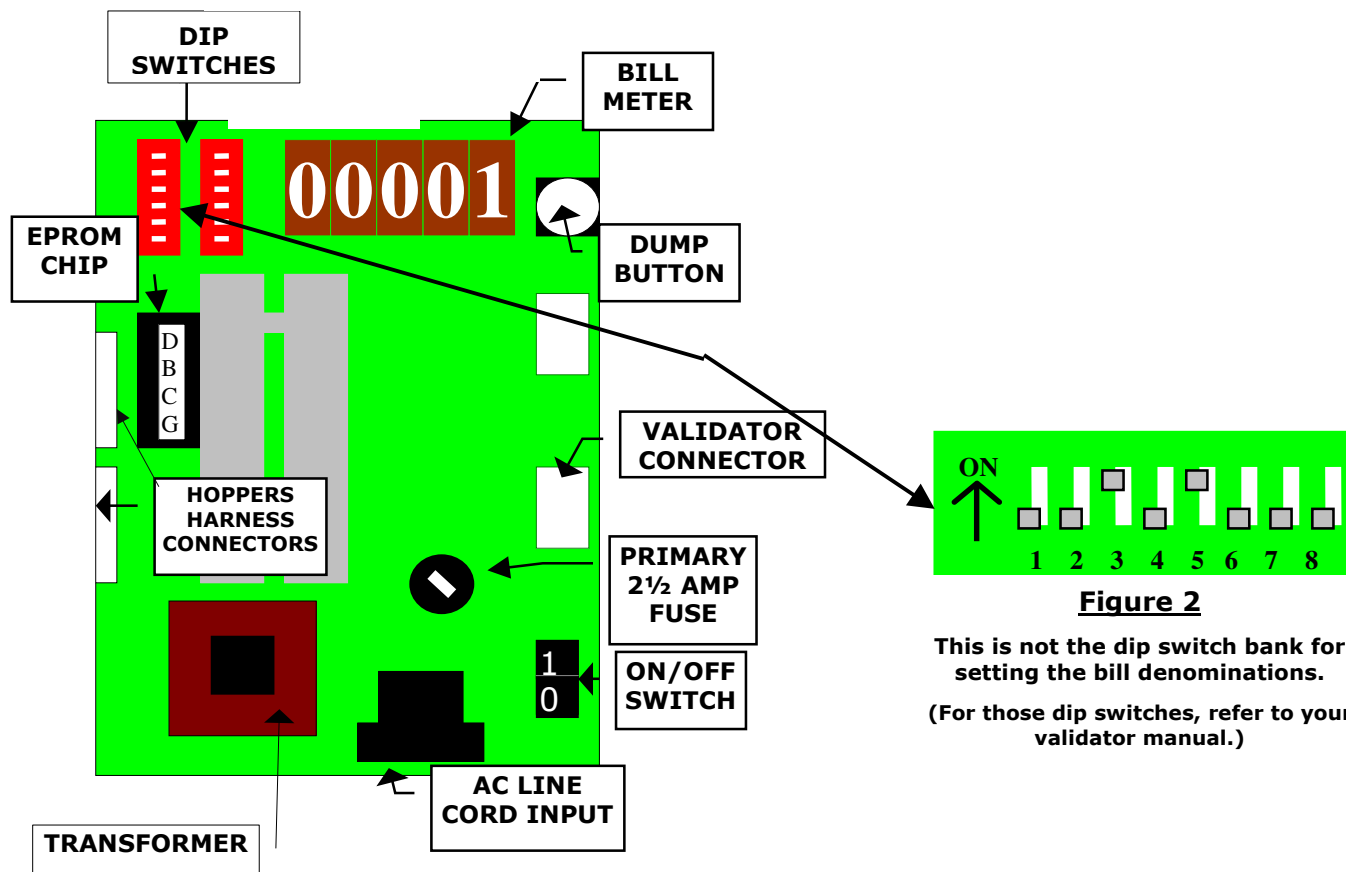


Figure 1 – Main Logic Board

Figure 2

This is not the dip switch bank for setting the bill denominations. (For those dip switches, refer to your validator manual.)

Using the Dump Mode to Empty the Hoppers

1. Open the cabinet door.
2. Turn OFF the POWER switch.
3. Place a suitable container in front of the hoppers to catch the coins.
4. Press and hold the "DUMP" button on the upper right corner of the Main Logic Board. Turn ON the Power switch. The red LED numbers on the main logic board will come on all "00000s." Once the red "00000s" lights up the SECOND time, release the "DUMP" button. If it is not released within one second, the "DUMP" mode is canceled as a security feature.
5. The hoppers will dispense coins until the POWER switch is turned OFF. If the red LED numbers are not counting up rapidly on the Main Logic Board's display, the dump mode was not accessed. Please try again.

The Dip Switches

The AC2002 changer is capable of dispensing coins in many different payout modes. Setting the coins out per dollar is controlled by which dip switches are turned "ON." (Refer to Figure 1 for their location.) For example, switch #2 is "ON" on both dip switches; therefore, the payout equals four coins per dollar (two coins per hopper for one dollar).

HOPPER PAYOUT TABLE

ALL CALCULATIONS ARE BASED ON THE TOTAL COINS YOU SET FOR THE \$1.00 BILL

For Mode #8, disregard the \$ sign. (I.e. \$2 = 2 tokens not \$2 in tokens.)

THE FOLLOWING BONUS OPTIONS ARE CONTROLLED BY THE RIGHT DIP SWITCH ONLY!!

"NO" MEANS "NO BONUS" FOR THIS BILL.

RIGHT				RIGHT				RIGHT				RIGHT			
SWT	Bonus Total			SWT	Bonus Total			SWT	Bonus Total			SWT	Bonus Total		
"ON"	\$5	\$10	\$20	"ON"	\$5	\$10	\$20	"ON"	\$5	\$10	\$20	"ON"	\$5	\$10	\$20
5	NO	NO	\$1	1-5	\$1	\$2	\$5	2-6	\$2	\$4	\$10	1-2-6	\$3	\$6	\$14
6	NO	NO	\$2	1-6	\$1	\$2	\$6	2-5-6	\$2	\$4	\$11	1-2-5-6	\$3	\$6	\$15
5-6	NO	NO	\$3	1-5-6	\$1	\$2	\$7	2-7	\$2	\$4	\$12	1-2-7	\$3	\$6	\$16
7	NO	NO	\$4	1-7	\$1	\$2	\$8	2-5-7	\$2	\$4	\$13	1-2-5-7	\$3	\$6	\$17
5-7	NO	NO	\$5	1-5-7	\$1	\$2	\$9	2-6-7	\$2	\$4	\$14	1-2-6-7	\$3	\$6	\$18
6-7	NO	NO	\$6	1-6-7	\$1	\$2	\$10	2-5-6-7	\$2	\$4	\$15	1-2-5-6-7	\$3	\$6	\$19
5-6-7	NO	NO	\$7	1-5-6-7	\$1	\$2	\$11	2-3	\$2	\$5	\$10	1-2-3	\$3	\$7	\$14
3	NO	\$1	\$2	1-3	\$1	\$3	\$6	2-3-5	\$2	\$5	\$11	1-2-3-5	\$3	\$7	\$15
3-5	NO	\$1	\$3	1-3-5	\$1	\$3	\$7	2-3-6	\$2	\$5	\$12	1-2-3-6	\$3	\$7	\$16
3-6	NO	\$1	\$4	1-3-6	\$1	\$3	\$8	2-3-5-6	\$2	\$5	\$13	1-2-3-5-6	\$3	\$7	\$17
3-5-6	NO	\$1	\$5	1-3-5-6	\$1	\$3	\$9	2-3-7	\$2	\$5	\$14	1-2-3-7	\$3	\$7	\$18
3-7	NO	\$1	\$6	1-3-7	\$1	\$3	\$10	2-3-5-7	\$2	\$5	\$15	1-2-3-5-7	\$3	\$7	\$19
3-5-7	NO	\$1	\$7	1-3-5-7	\$1	\$3	\$11	2-3-6-7	\$2	\$5	\$16	1-2-3-6-7	\$3	\$7	\$20
3-6-7	NO	\$1	\$8	1-3-5-6-7	\$1	\$3	\$12	2-3-5-6-7	\$2	\$5	\$17	1-2-3-5-6-7	\$3	\$7	\$21
3-5-6-7	NO	\$1	\$9	1-4	\$1	\$4	\$8	2-4	\$2	\$6	\$12	1-2-4	\$3	\$8	\$16
4	NO	\$2	\$4	1-4-5	\$1	\$4	\$9	2-4-5	\$2	\$6	\$13	1-2-4-5	\$3	\$8	\$17
4-5	NO	\$2	\$5	1-4-6	\$1	\$4	\$10	2-4-6	\$2	\$6	\$14	1-2-4-6	\$3	\$8	\$18
4-6	NO	\$2	\$6	1-4-5-6	\$1	\$4	\$11	2-4-5-6	\$2	\$6	\$15	1-2-4-5-6	\$3	\$8	\$19
4-5-6	NO	\$2	\$7	1-4-7	\$1	\$4	\$12	2-4-7	\$2	\$6	\$16	1-2-4-7	\$3	\$8	\$20
4-7	NO	\$2	\$8	1-4-5-7	\$1	\$4	\$13	2-4-5-7	\$2	\$6	\$17	1-2-4-5-7	\$3	\$8	\$21
4-5-7	NO	\$2	\$9	1-4-6-7	\$1	\$4	\$14	2-4-6-7	\$2	\$6	\$18	1-2-4-6-7	\$3	\$8	\$22
4-6-7	NO	\$2	\$10	1-4-5-6-7	\$1	\$4	\$15	2-4-5-6-7	\$2	\$6	\$19	1-2-4-5-6-7	\$3	\$8	\$23
4-5-6-7	NO	\$2	\$11	1-3-4	\$1	\$5	\$10	2-3-4	\$2	\$7	\$14	1-2-3-4	\$3	\$9	\$18
3-4	NO	\$3	\$6	1-3-4-5	\$1	\$5	\$11	2-3-4-5	\$2	\$7	\$15	1-2-3-4-5	\$3	\$9	\$19
3-4-5	NO	\$3	\$7	1-3-4-6	\$1	\$5	\$12	2-3-4-6	\$2	\$7	\$16	1-2-3-4-6	\$3	\$9	\$20
3-4-6	NO	\$3	\$8	1-3-4-5-6	\$1	\$5	\$13	2-3-4-5-6	\$2	\$7	\$17	1-2-3-4-5-6	\$3	\$9	\$21
3-4-5-6	NO	\$3	\$9	1-3-4-7	\$1	\$5	\$14	2-3-4-7	\$2	\$7	\$18	1-2-3-4-7	\$3	\$9	\$22
3-4-7	NO	\$3	\$10	1-3-4-5-7	\$1	\$5	\$15	2-3-4-5-7	\$2	\$7	\$19	1-2-3-4-5-7	\$3	\$9	\$23
3-4-5-7	NO	\$3	\$11	1-3-4-6-7	\$1	\$5	\$16	2-3-4-6-7	\$2	\$7	\$20	1-2-3-4-6-7	\$3	\$9	\$24
3-4-6-7	NO	\$3	\$12	1-3-4-5-6-7	\$1	\$5	\$17	2-3-4-5-6-7	\$2	\$7	\$21	1-2-3-4-5-6-7	\$3	\$9	\$25
3-4-5-6-7	NO	\$3	\$13	2	\$2	\$4	\$8	1-2	\$3	\$6	\$12				
1	\$1	\$2	\$4	2-5	\$2	\$4	\$9	1-2-5	\$3	\$6	\$13				

BONUS PAYOUT TABLE

DIPSWITCH OPTION SETTINGS

Mode	<i>I Want My Coin Hoppers to Dispense.....</i>	Left Dip Switch								Right Dip Switch							
		1	2	3	4	5	6	7	8	1	2	3	4	5	6	7	8
#0	4 Quarters per Dollar	○	○	C	○	C	○	○	○	○	○	○	○	○	○	○	○
#1	4 Tokens with a Bonus Payback in \$1 Increments (Bill Meter counts in \$1.00s)	○	○	C	○	C	○	○	○	See Bonus Table							
#2	\$1.00 SBAs, Lunis or Tokens and Quarters	○	○	○	○	○	C	○	○	C	C	○	○	○	○	○	○
#3	5 Nickels then Balance in Quarters	○	○	C	○	C	C	○	○	○	○	○	○	○	○	○	○
#4	Tokens Valued Between \$1.25 - \$15.75; the Balance Paid in Quarters	○	○	○	○	○	○	○	○	Set by \$.25 Increments							
#5	Tokens Valued in Even \$1.00 Increments; Alternating Hopper Payout	○	○	○	○	C	○	C	○	Set In \$1 Increments							
#6	4 Tokens with a Bonus Payback in \$1.00 Increments (Bill Meter counts in \$,.25)	○	○	○	○	○	C	C	○	See Bonus Table							
#7	Nickels ONLY Paid Out of Both Hoppers, with Quarter Acceptor	○	○	○	○	C	C	C	○	○	○	○	○	○	○	○	○
#8	4 Tokens with a Bonus Payback in \$1.00 Increments (Bill Meter counts in \$1.00s)	○	○	C	○	○	○	○	C	See Bonus Table							
#9	4 Quarters per Dollar with 5, 10 and 25 Cent Coin Acceptor + Bonus Option	○	○	C	○	○	○	○	C	See Bonus Table							
#10	4 Tokens with a Bonus Payback in \$.25 Increments (Bill Meter counts in \$,.25)	○	○	C	○	○	C	○	C	See Bonus Table							
#11	Golf Token Mode (Optional \$1 Coin Acceptor (Bill Meter counts in \$1.00s)	○	○	○	○	C	○	C	C	Set In \$1 Increments							
#12	Australian Mode \$1 Coins and Twenty-cent Pieces	○	○	○	○	○	○	C	C	○	○	○	○	○	○	○	○
#13	5 Dimes and the Balance in Quarters	○	○	○	○	C	○	C	C	○	○	○	○	○	○	○	○
#14	Canadian Luni - Tuni Payout Mode (See Next Page for Options on Right Dip Switches)	○	○	○	○	○	C	C	C	○	C	○	○	○	○	○	○

C IS DIPSWITCH "ON"

How to Use the Bonus Table

Think of the bonus table as the total amount of EXTRA tokens that you wish to receive after the regular payout:

EXAMPLE: PAYOUT – 4 tokens for \$1; 24 tokens for \$5; 52 tokens for \$10; 120 tokens for \$20

24 tokens = \$1 extra in tokens

52 tokens = \$3 extra in tokens

120 tokens = \$10 extra in tokens

Now go to the bonus table, find where the \$5 column = \$1

Look over to the \$10 column and go down until you see \$3.

Finally, go to the \$20 column and go down until you see \$10.

You should be at 1-3-7. Turn "ON" your right dip switches 1-3-7 to set this payout.

Dip Switch Settings

The following table shows how to set the dip switches to your desired payout.

<u>"ON"</u>	<u>COINS PER DOLLAR</u>
#1	1
#2	2
#3	4
#4	8

The left dip switch controls the left hopper's payout, and the right dip switch controls the right hopper's payout.

Refer to the next table to set up your changer for the settings you need.

Mode Descriptions

Some of the modes are self-explanatory, while others have sub-modes built into the chip. Here is a list of the modes and sub-modes when applicable.

MODE 2 - \$1 coins, the balance in quarters:

The quarters for each bill are controlled by the sub-mode settings of the right dip switches #1 and #2.

Neither "ON" – 16 quarters, balance in \$1 coins.

#1 "ON" only – 8 quarters, balance in \$1 coins.

#2 "ON" only – 12 quarters, balance in \$1 coins.

#1 and #2 "ON" – 4 quarters, balance in \$1 coins.

MODES #5 and #11 – Setting right dips in "\$1 increments":

Refer to the Dip Switch Option Settings chart – but instead of counting up in coins, think of it as dollars.

MODE #14 – Canadian \$1 and \$2 coin payout:

The right dip switches #1 and #2 can alter the amount of \$1 coins given to each denomination.

Lunis per \$	\$5	\$10	\$20
Neither "ON"	1L	0L	0L
#1 "ON"	3L	2L	2L
#2 "ON"	3L	4L	4L

The machine will always give 2 Lunis for a Tuni.

Fuse

High voltage fuse: This is the primary transformer AC fuse for the main logic board and the validator. Any direct short of the transformer or validator will cause this fuse to blow. Replace this fuse with a 2½ amp AS fuse only. ***REPLACING THIS FUSE WITH ANYTHING OTHER THAN A 2½ AMP "GDC" MAY RESULT IN A FIRE OR AN UNSAFE WORKING CONDITION!*** (See Figure 1 for location of this fuse.)

Indicator Lights

Main Logic Board:

1. Green LED on: AC power applied to the logic board. All fuses are good.
2. Decimal Point:
 - a. Heartbeat - 5 and 12VDC present. The changer is in standby, waiting for a bill pulse.
 - b. On Steady - Out of Service; Hopper error detected.

Validator Logic Board:

1. Red LED
 - a. On Steady - Standby Mode, waiting for bill insertion.
 - b. Flashing - Error mode, go to page for error code information.
 - c. Off - The changer "Empty" LED is lit.

Wire Harness Color and Definitions

Validator Harness:

Red - Switched Hot 120VAC
White - Neutral 120VAC
Black - 120VAC low current validator enable
Yellow - +5VDC credit pulse line
Blue - -5VDC credit pulse line
Orange - +12VDC Empty LED
Brown - -12VDC Empty LED

Hopper Harness:

Gray - Coin counting optic status line
White - Low coin sense (+5VDC)
Green - Coin counting optic pay out feedback line
Yellow - Raw sensor output line
Purple - Hopper payout line from main logic board (+)
Brown - Hopper payout line from main logic board (-)
Red - +12VDC logic board supply voltage
Black(s) - 12V, 24V low coin sense ground
Orange - +24VDC motor supply voltage

Hopper Coin/Token Sizes & General Information

The hopper will automatically adjust to dispense coins/tokens in size from 20-30 mm in diameter and 1.25-3.5 mm in thickness.

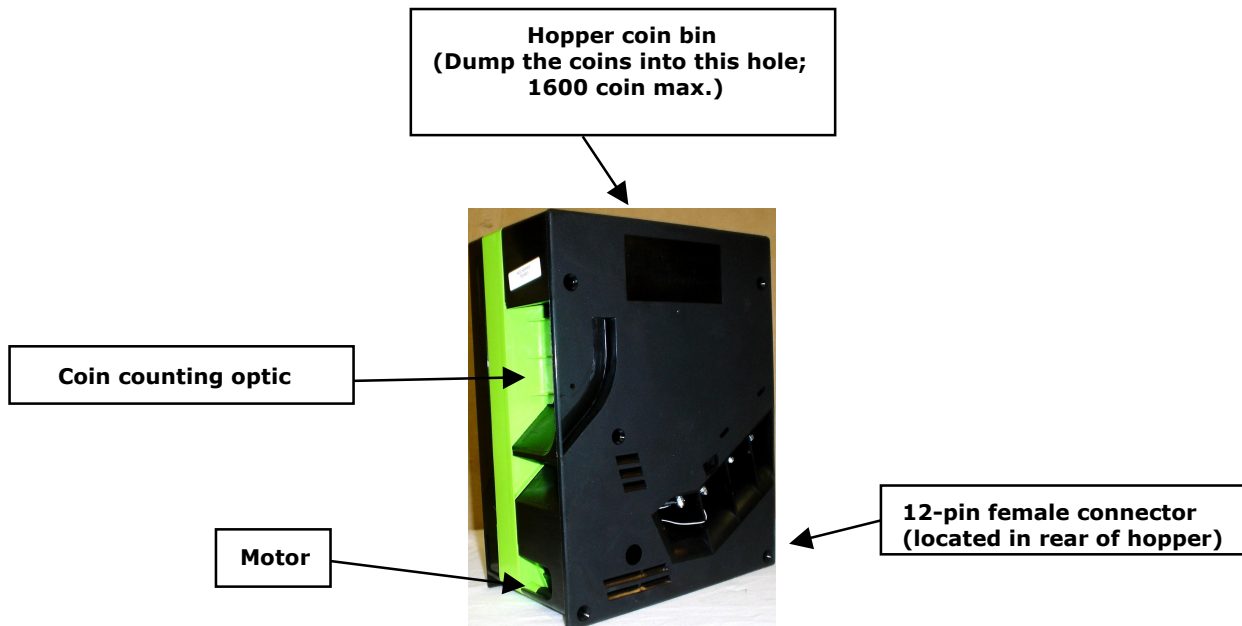


Figure 3 – Hopper

Validator Interface

6-PIN (MDB)

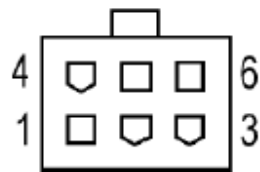


Figure 4 – 6-PIN (MDB)

Interfacing for all MDB Validators

No Dip Switches. Validator can be factory programmed, or it can be configured using the Configuration Card or a Palm. Refer to the validator's Installation/Operation manual for further information.

6-Pin (MDB) Connector Pinout:

- Pin #1 - +24VDC Power
- Pin #2 - DC Power return
- Pin #3 - Not Used
- Pin #4 - Master Receive
- Pin #5 - Master Transmit
- Pin #6 - Communications Common

Main Logic Board Connector Pin Definitions

MDB Validator Harness:

Connector J12

Pin #1 - +24 VDC
Pin #2 - Ground
Pin #3 - Data Pin, Master Transmit
Pin #4 - Data Pin, Master Receive

ccTalk Device Harnesses:

Left Side (Single Hopper) – J3

Right Side – J8

Pin #1 - Ground
Pin #2 - +24 VDC
Pin #3 - +5 VDC
Pin #4 - No Connection
Pin #5 - Data Line (Tx & Rx)
Pin #6 - Select (+24VDC) **Right Only**
Pin #7 - Ground

Pulse Device Harness:

Connector J11

Pin #1 - +24VDC
Pin #2 - Bill In
Pin #3 - Fail
Pin #4 - Enable
Pin #5 - Ground
Pin #6 - Ground

"Out-of-Service" Light Harness:

Connector J2

Pin #1 - +24 VDC
Pin #2 - Ground

Functional Description of the Series AC2002/2002.1 Changer

To follow along with this walk-through of your changer, fill the hoppers with coins and turn the changer on.

1. When power is applied, the validator will cycle twice; the out-of-service LED flashes, then goes out; the green LED on the main logic board comes on steady; and the decimal point on the main logic board number display will flicker on once per second in the standby mode.
2. During the power-up mode, the main logic board relay clicks twice, enabling power (120VAC) to the validator. When this relay is not enabled, it routes 12VDC ground to the out-of-service LED. With no power to the validator, the changer cannot accept bills. Since it is not in the error mode, the red LED on the validator logic board is on steady.
3. When a bill is inserted into the validator bill slot, the bill will be pulled inside. The validator then compares what the bill looks like to its memory. After the bill is validated, it grounds the 5VDC lines, causing a pulse along the yellow and blue validator harness wires to pins 5 and 15 of the main logic board. Each pulse stands for the amount of the denomination validated (i.e., 1 pulse for \$1, 5 pulses for \$5).
4. The 5VDC pulse then travels from pins 5 and 15 to the EEPROM chip (ver. DBCG-1") pin #25. The EPROM sends a 12VDC pulse to the meter chip (U5) out pins #21 and 22 (one pulse per denomination validated).
5. The EEPROM also multiplies the bill pulse by the dip switch settings. (The EEPROM reads the dip switch settings during the power-up mode and stores them into memory.)

6. The EEPROM then sends the hopper pulses out pin #23 to pins 6 and 7 of the red 12-pin hopper plugs. These pulses travel through the purple and brown wires of the hopper's wire harness to the hopper's pins 8 and 12.
7. The hopper turns itself on with the first hopper pulse. The hopper counts the hopper's pulses sent from the EEPROM chip on IN3 (pin 12), while dispensing the coins at the same time. When the amount of hopper pulses equals the coins dispensed through the coin-counting optical sensor, the hopper turns itself off.
8. The changer returns to the standby mode with the decimal point flashing once per second until another bill is inserted.

Functional Descriptions of Out-of-Service Conditions

Out-of-Service conditions occur for the Series AC2002/2002.1 changer for the following reasons: low coins, hopper error, validator error, or a blown fuse.

1. **Blown Fuse:** an AC power spike in line voltage or a bad transformer on the main logic board can cause a blown fuse on the main logic board. If either fuse blows, the indication is the green LED on the main logic board will not light.
 - a. Replace the fuse. If the green LED now lights, then there was a spike.
 - b. If it does not light and the fuse blows again, the power transformer is shorted. To test the transformer, use a voltmeter set for ohms and measure across the primary (40ohms) and the secondary (1.5ohms).
2. **Hopper Error:** A hopper error can either be a jammed hopper, a blocked coin-counting optic, or a bad hopper logic board.
 - a. Indications for a jammed hopper are that the changer accepts bills and the meter counts up, but nothing or not enough coins are paid out.
 1. After two minutes, the EPROM shuts off the validator if the coins are not paid out correctly. The "Empty" LED will flash once per second.
 2. At this point, the three options open are to attempt repair on your own, call your distributor, or return the defective hopper to American Changer.
 - b. Indications for a blocked coin optic or bad hopper logic board are that the out-of-service LED on the outside of the changer is lit and the red LED on the main logic board is lit and flickers off once per second.
 1. If two of the 3 green LEDs on the hopper logic board are lit, then the hopper logic board is bad.
 2. If there is a coin or foreign object caught in the coin exit window, LEDs #1 and #3 will be lit on the hopper logic board instead of LEDs #1 and #2.
 - a. Remove the side of the hopper with the five Philips screws. Pull up on the exit window logic board and look for the jammed item.
 - b. Ensure you have the pins aligned before reconnecting the logic board.
3. **Validator Error:** When a validator error occurs, the validator's EEPROM shuts down the validator and flashes an error code via the red LED on the validator logic board. When there is no error, this LED is on steady. The validator only gives bill pulses to the Main Logic Board, so the main board never knows if the validator is not functioning. Therefore, the out-of-service-LED will not light. See the Troubleshooting Guide in this manual for error codes.
4. **Low Coins:** The low-coin condition is probably the most common error. The EEPROM on the main logic board is constantly checking for low coins in the hoppers. This is done with a low current 5VDC signal on pin #3 of the hopper's output connector. The voltage then travels down the hopper's wire harness on the white wire to pin #7 of the hopper's plug. The signal is applied to one of the gold low-contact plates at the bottom of the hoppers. The 5V travels through the coins through the other contact brass plate to the hopper's pin #2. It then goes through the black wire in the hopper's harness to pin #10 on the main logic board. Any interruption of more than 1/2 a second will cause an out-of-service condition.
 - a. Clean the bottom brass plates of the hoppers with steel wool or fine sandpaper. Refill the hoppers and try again.

- b. Check continuity (0 ohms) and resistance from pins 3 (white) and 10 (black) of the red hopper harnesses. Make sure both hoppers are full and the changer is turned off.
 - 1. If the continuity is 0 ohms, replace the main logic board.
- c. Pull the hoppers out of the changer, then look at the 12-pin black male connector that sticks out of the hoppers. Place the continuity checker's leads on pins 2 & 7.
 - 1. If the continuity is 0 ohms, replace that hopper's plate or adjust the hopper's plate female socket's pins so that they are not so spread out.
 - 2. If the continuity is infinity, then replace that hopper.

QUICK CODE ERROR DEFINITIONS

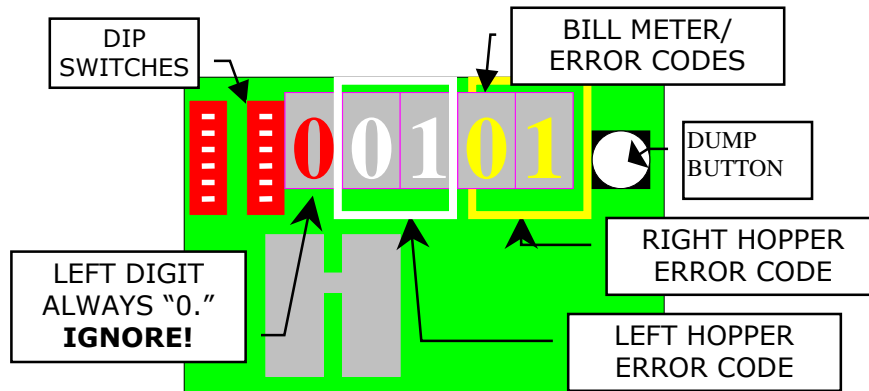


Figure 5 – MAIN LOGIC BOARD (on back wall of cabinet)

Press the "DUMP" Button before turning off changer. Match the code to samples below to find out why the hopper(s) were shut down.

LEFT HOPPER ERRORS

0	0	0	0	0	NO ERRORS
0	0	1	0	0	LOW COIN
0	0	2	0	0	EXIT WINDOW JAM
0	0	3	0	0	BAD HOPPER BOARD
0	0	4	0	0	JAMMED
0	1	0	0	0	JACKPOT PREVENTED

RIGHT HOPPER ERRORS

0	0	0	0	0	NO ERRORS
0	0	0	0	1	LOW COIN
0	0	0	0	2	EXIT WINDOW JAM
0	0	0	0	3	BAD HOPPER BOARD
0	0	0	0	4	JAMMED
0	0	0	1	0	JACKPOT PREVENTED

IF THE "EMPTY" LED IS LIT, LOOK FOR CODES FOR BOTH HOPPERS TO BE DISPLAYED.

NOTE: THE METER ON THE MAIN LOGIC BOARD CANNOT BE RESET TO ZERO!!!

Dual Hopper Schematics

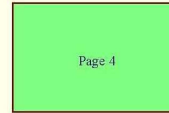
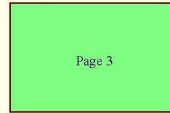
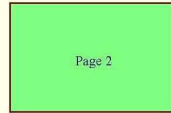
American Changer, Dual Hopper

PCB Revision 6, 23-Jan-2002

AC -DC

V-Reg.

Control

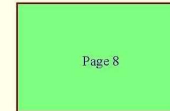
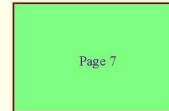
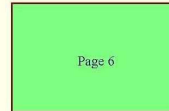
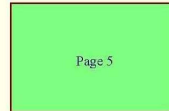


Display

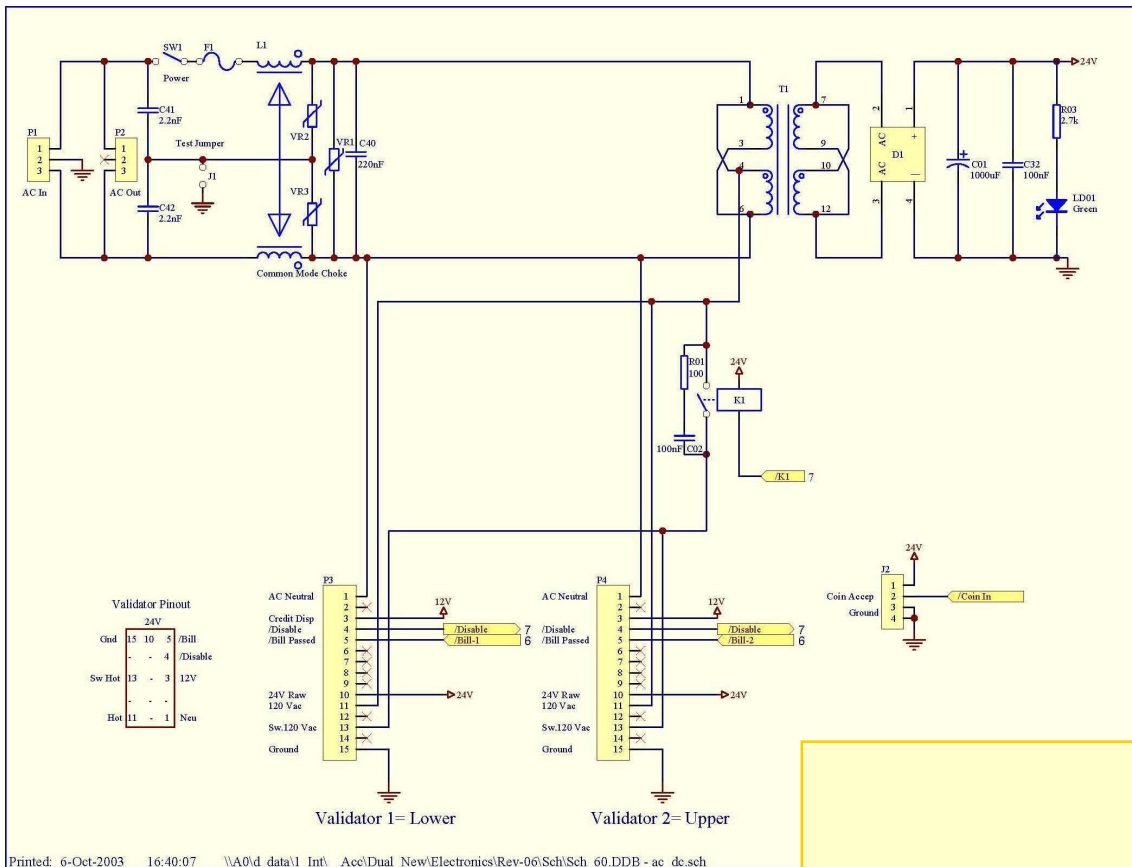
Input

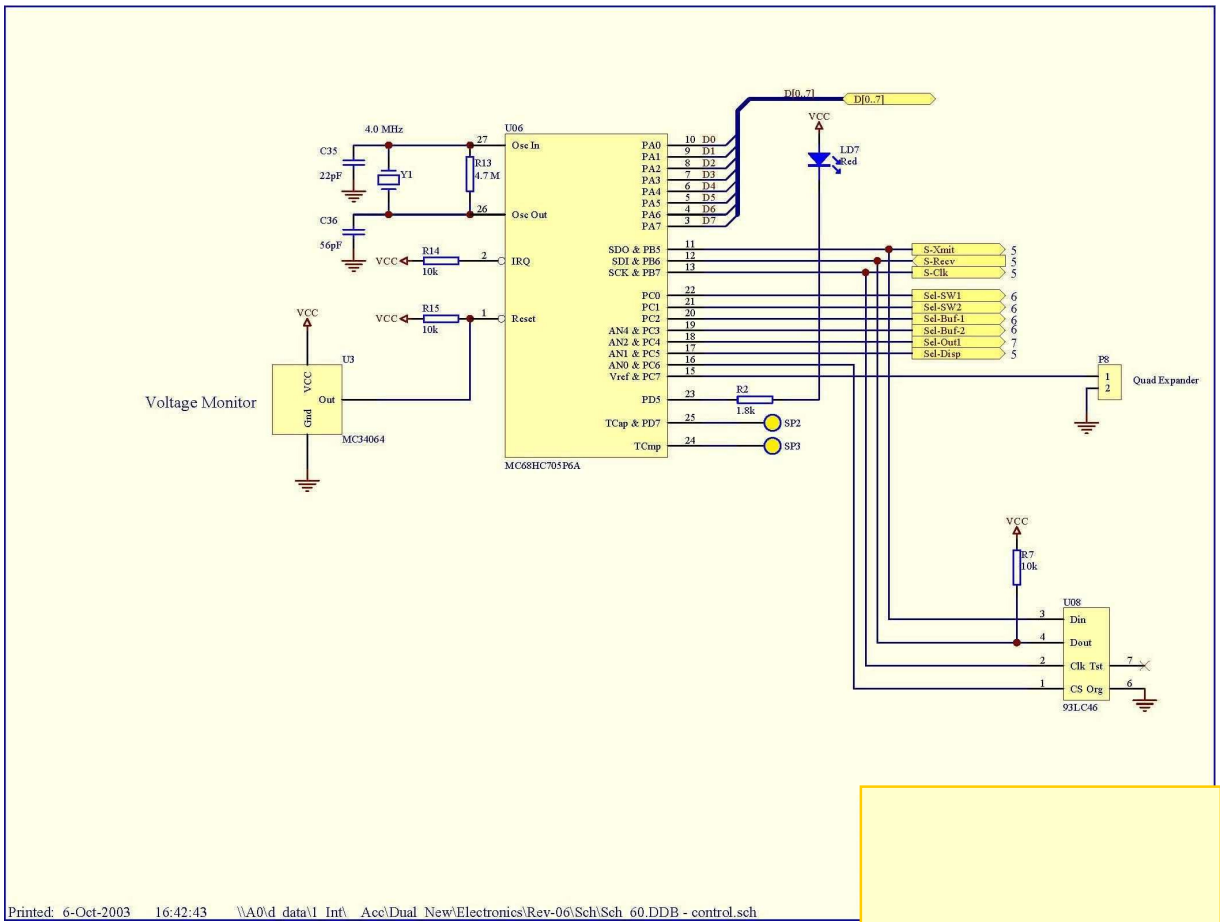
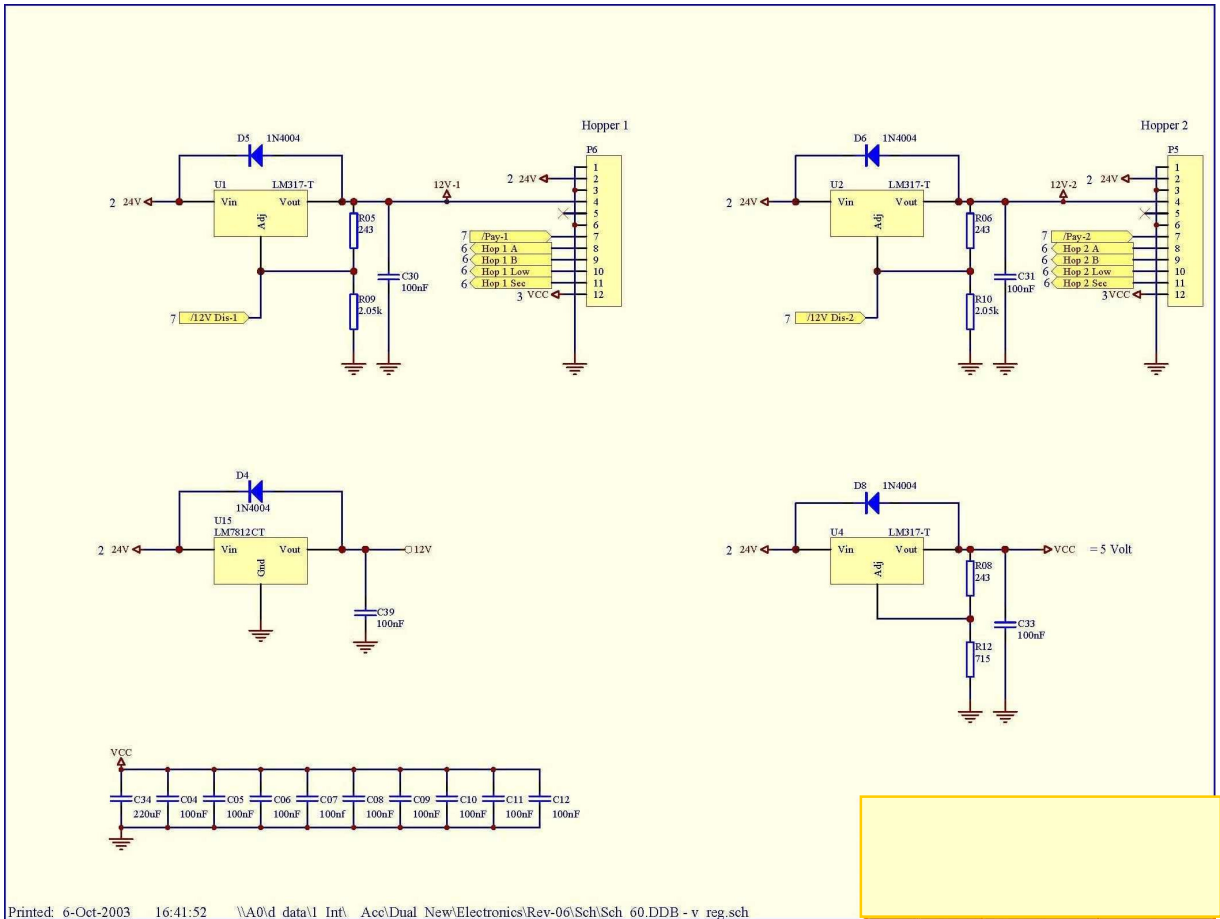
Output

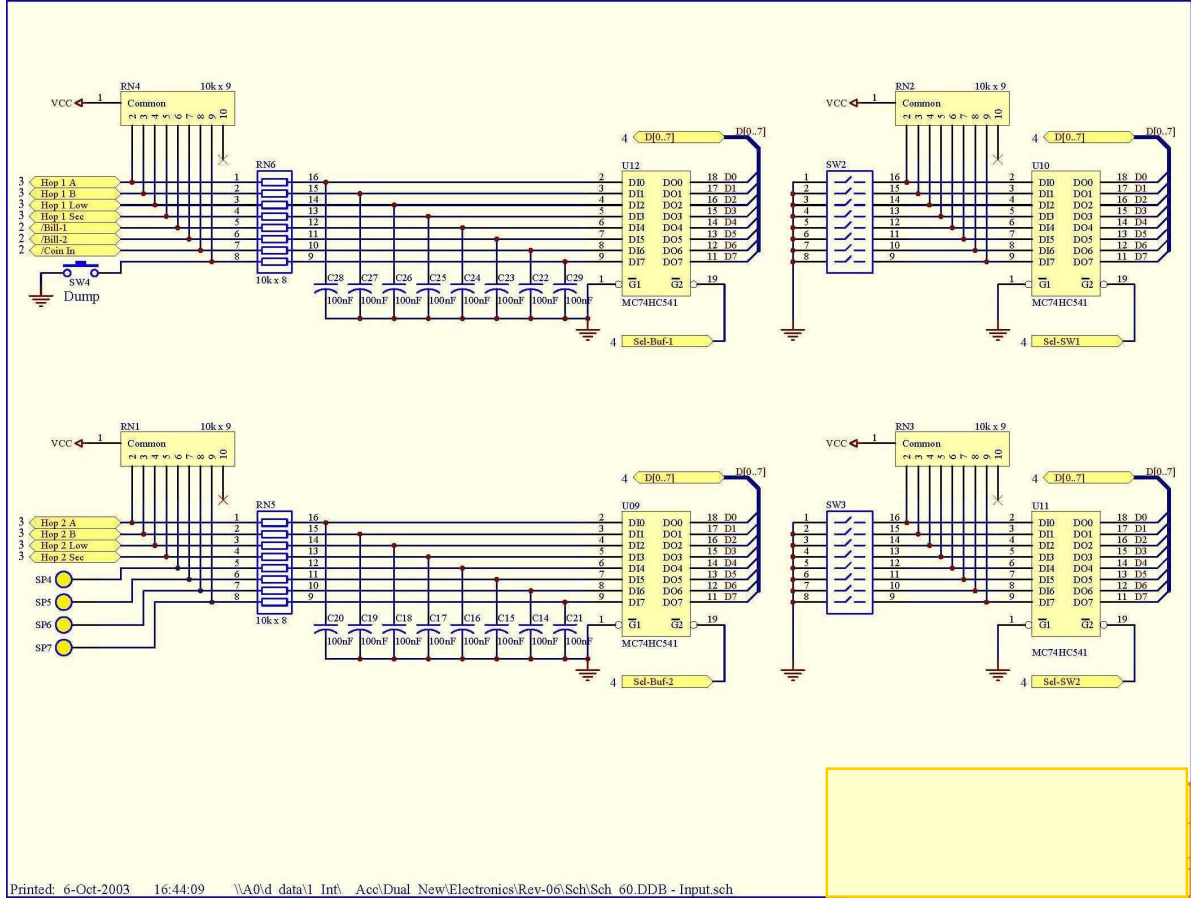
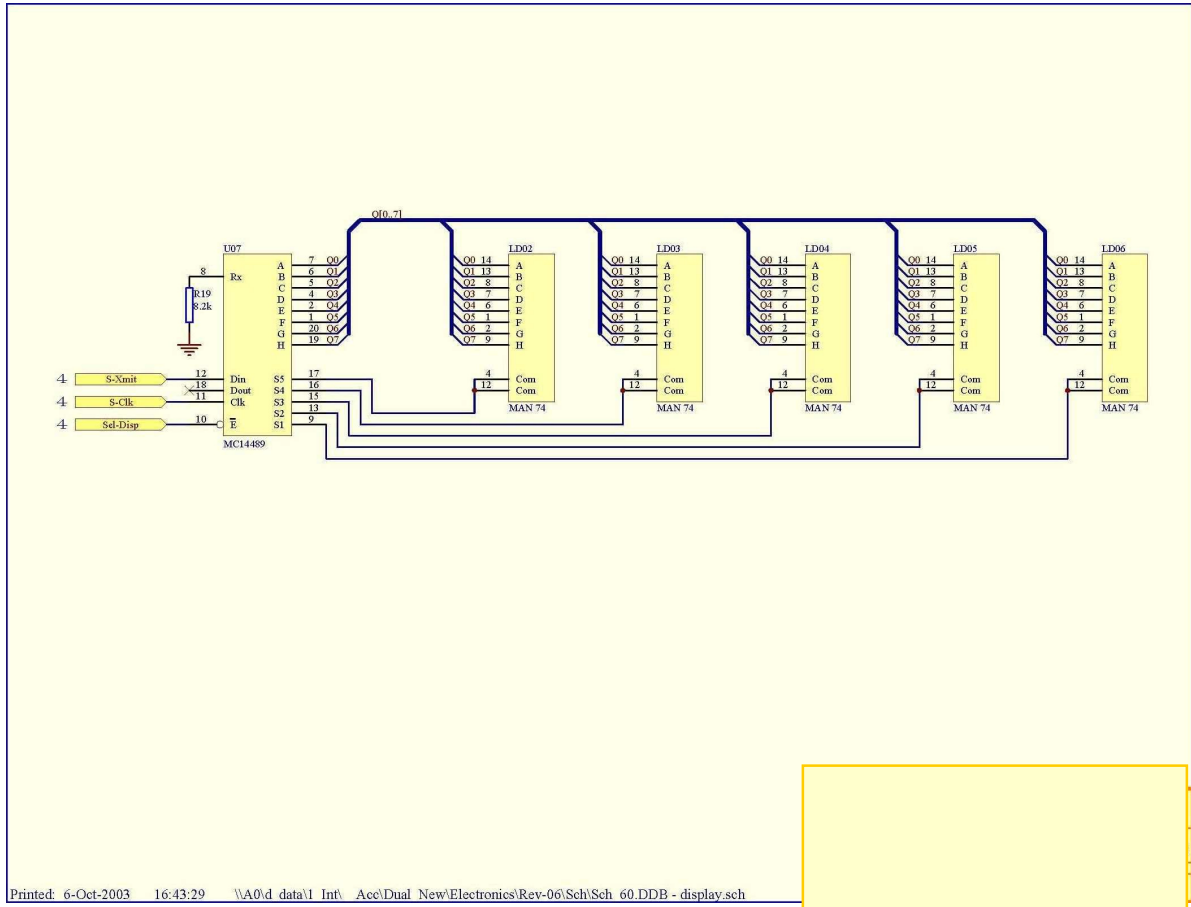
Revision Info

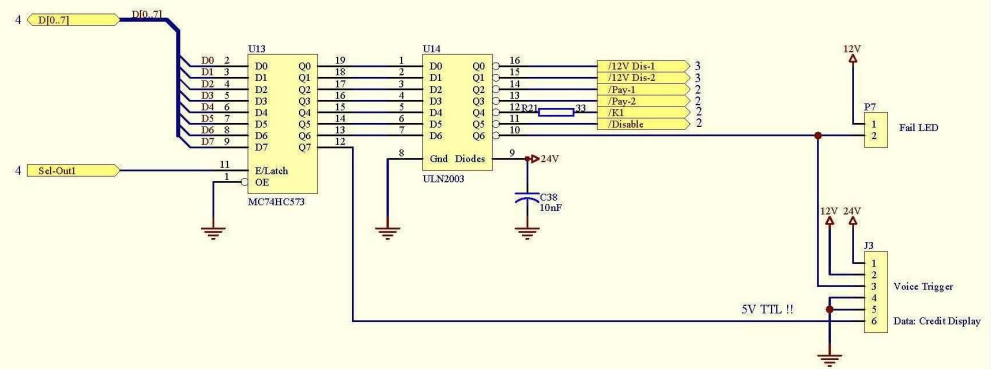


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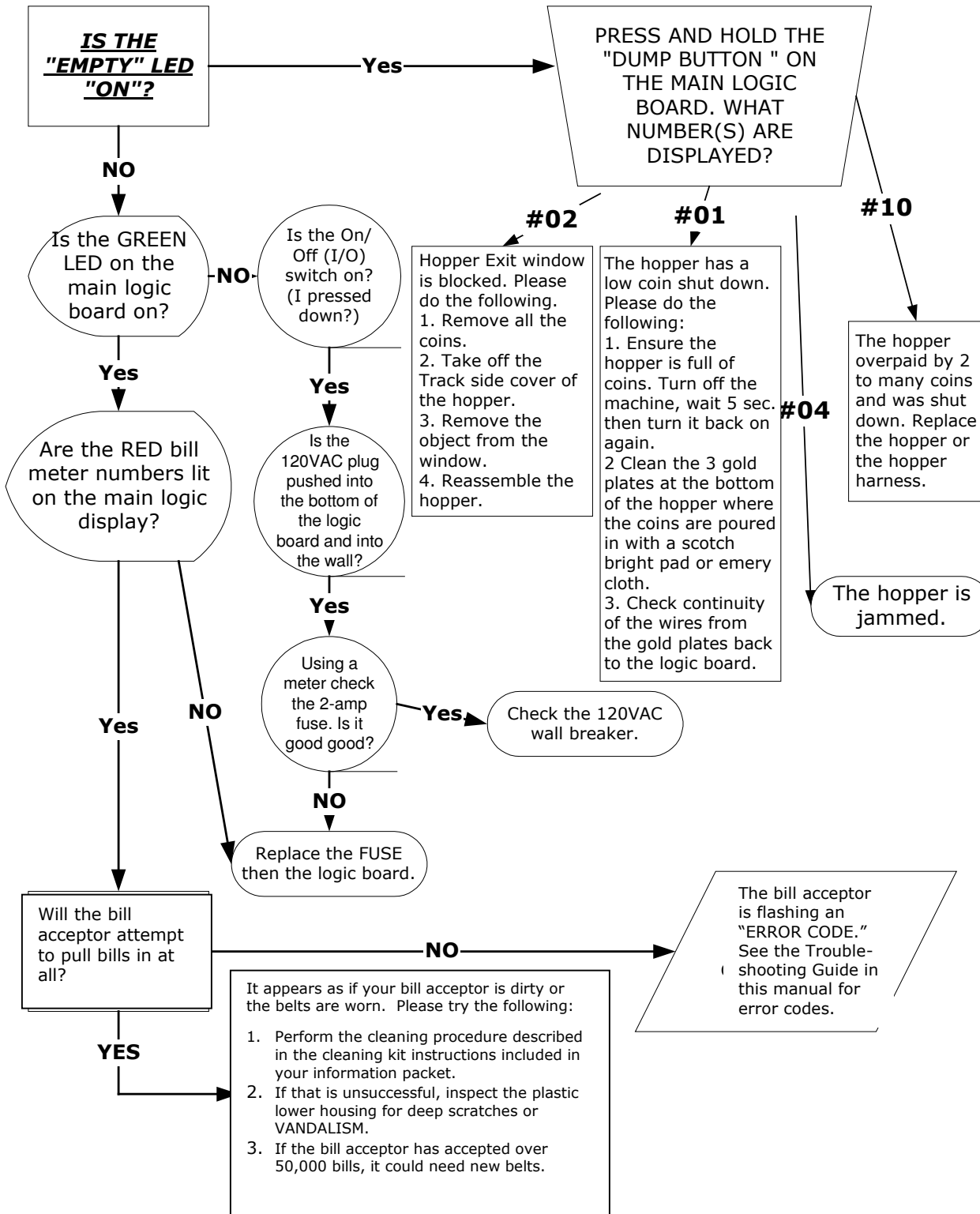




SECTION B TROUBLESHOOTING INFORMATION

TECHNICAL FLOW DIAGRAM

NOTE: Before starting this procedure ensure the changer is plugged in, the ON/OFF switch is on, the hoppers are full of coins, and all wire harnesses are connected securely and correctly. The wires exiting the red connectors should point away from the board!!



TROUBLESHOOTING GUIDE

To use the Troubleshooting Guide, match up the problem, then follow the solution suggestions. After every step, try operating the changer to see if the problem has been solved.

PROBLEM:	SOLUTION:
<p>A. The changer is completely dead. (The green LED on the Power Supply Board is not lit.)</p>	<ol style="list-style-type: none"> 1. Ensure the changer is plugged in. 2. Ensure the ON/OFF switch is rocked to the (1) position (down). 3. Unplug the female end of the line cord from the main logic board AC connector and plug it in again tightly. 4. Measure the AC voltage at the outlet or check the breaker/fuse box. You can also plug another item into the AC wall outlet to ensure there is power present at the outlet. 4. Inspect the AC line cord for cuts or abrasions. 5. Check both fuses on the Main Logic Board. 6. Replace the Main Logic Board. 7. Replace the line cord.
<p>B. The "Empty LED is lit. BOTH HOPPERS ARE OUT OF SERVICE.</p>	<ol style="list-style-type: none"> 1. Ensure the hoppers are not out of coins. (There should be enough coins in the hoppers to cover the gold low-level contact plates approximately \$30-\$40. These plates are located at the bottom of the hoppers where you pour the coins.) 2. Check the hoppers' wire harness that extends from the back of the plate that the hoppers slide in and out on for chipped pieces or other damage. (Pay close attention to pins # 2 and 7.) 3. Clean the gold contact plates with steel wool. 4. Perform the following steps: <ol style="list-style-type: none"> a. Turn the changer off. b. Ensure that the left hopper plate red connector on the left side of the main logic board (MLB) is plugged into the bottom connector and that the right is plugged into the top connector. c. On the MLB, slide all the dip switches left to the "OFF" position. d. On the left dip switch, slide #3 "ON," enabling a 4-coin-per-dollar payout. e. On the right dip switch, slide #8 "ON," disabling the top hopper connector and enabling the changer into "One Hopper Mode." f. Turn the changer on. g. If the "Empty" LED on the front of the changer is now off, remove the right hopper and service this hopper. The changer will function in this mode until the hopper is fixed. h. If the "Empty" LED is still "ON," turn the changer off and switch the hoppers; then turn the changer back on. i. If the "Empty" LED on the front of the changer is now off, remove the right hopper and service this hopper. The changer will function in this mode until the hopper is fixed. <i>Remember to remove the coin chute from the hopper, or the coins will fall into the changer instead of into the coin cup!</i> j. If the "Empty" LED is still "ON," turn off the changer. k. Reverse the hopper's plate connections (top to bottom, bottom to top), and repeat steps f thru i. Keep in mind that you are troubleshooting the hopper plates instead of the hoppers. 5. Replace the Main Logic Board. 6. Replace both hoppers. 7. Replace both hopper plates with the harnesses.

TROUBLESHOOTING GUIDE

*To use the Troubleshooting Guide, match up the problem, then follow the solution suggestions.
After every step, try operating the changer to see if the problem has been solved.*

PROBLEM:	SOLUTION:
C. The "Empty LED is lit. The decimal point on the light-up number display is "on" more than it is "off."	<ol style="list-style-type: none"> 1. Ensure the hoppers are pushed into the hopper's harness on the back of hopper plate tightly. 2. Replace the hopper. 3. Replace the hopper's plate and harness.
D. The green LED on the Main Logic Board is lit, but the light-up display is not.	<ol style="list-style-type: none"> 1. Bad 5 or 12VDC regulator on the Main Logic Board. 2. The hoppers are shorted. 3. Replace Main Logic Board. 4. Replace hoppers.
E. The bill validator accepts and stacks the bills, but the meter does not increase.	<ol style="list-style-type: none"> 1. Check continuity and for pin damage to the blue and yellow wires on the validator harness. 2. Replace the validator wire harness. 3. Replace the validator.
F. The bill validator accepts and stacks the bills, but the meter does increase.	<ol style="list-style-type: none"> 1. Ensure the dip switch settings are still correct. (#3 "ON" only) 2. Check the continuity of the brown and purple wires on the hopper's wire harness. 3. The hopper is jammed. 4. Replace the hopper's wire harness.
G. The bill validator will not pull in the bill, and the "Empty" LED is not lit.	<ol style="list-style-type: none"> 1. Ensure the orange wire going to the "Empty" LED is connected to the + or the terminal with the red mark by it. 2. Check for 12VDC going to the orange and brown wires. If there is, replace the LED. 3. Replace the Main Logic Board. 4. Replace the bill validator. 5. Replace the validator wire harness.
H. The bill validator pulls in the bill slightly, then rejects it.	<ol style="list-style-type: none"> 1. Clean the validator. See enclosed cleaning kit instructions. 2. Remove the lower housing (see validator manual) of the bill validator. Ensure the center wheel spins freely. Push straight down on it slightly to loosen. 3. Replace the bill validator.
I. The bill validator red status LED flashes a "5" error code.	<ol style="list-style-type: none"> 1. Clean the validator optic LEDs. See enclosed cleaning kit instructions. 2. Ensure that all the wire harness plugs are plugged firmly into their white female sockets. 3. Contact American Changer technical service (888-741-9840) to repair your bill validator.

TROUBLESHOOTING GUIDE

*To use the Troubleshooting Guide, match up the problem, then follow the solution suggestions.
After every step, try operating the changer to see if the problem has been solved.*

PROBLEM:	SOLUTION:
J. The bill validator red status LED flashes a "6 or 7" error code.	<ol style="list-style-type: none">1. Remove the bill stacker from the bill validator. Cycle the power on/off using the switch on the Main Logic Board and coast the silver push bar so that it stops in its fully extended position. Blow out the area behind the push bar with high pressure or canned air. Concentrate on the encoder wheel in the area top center behind the push bar.2. Contact American Changer technical service (888-741-9840) to repair your bill validator.
K. The bill validators red status LED is on steady, but it will not accept the bill.	<ol style="list-style-type: none">1. Pull out the lower housing (see validator manual) and look for something obstructing the bill path. (i.e., gum, papers, tickets, coins, etc.).2. Look inside the Plexiglas case on the side of the bill validator. Ensure that all the wire harness plugs are plugged firmly into their white female sockets.
FOR TECHNICAL SERVICE OR TO OBTAIN A RETURN AUTHORIZATION NUMBER, CALL (888) 741-9840.	

Maintenance Information

A full-size version of the cleaning kit instructions is included in your information packet.

AMERICAN CHANGER MAINTENANCE KIT

Cleaning the Validator(s).

Step 1.



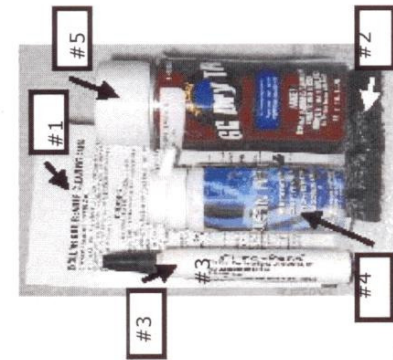
Do not separate the hopper to perform this step!
Using the dry Scotch-Bright pad clean Plates until they shine.

Step 2.



Do not separate the hopper to perform this step!
Place the changer in the dump mode:

1. Turn off power, remove the hopper extension.
 2. Hold in "Dump Button".
 3. Turn on power.
 4. Count 1-2-3
 5. Release "Dump Button"
- Hopper should now be running. If not Repeat. **Spray lubricant on the RED belt ONLY!** Spray for 4-5 seconds. **DO NOT SPRAY SILICON ON THE TWO HOPPER LOGIC BOARDS!**



This kit includes the following items:

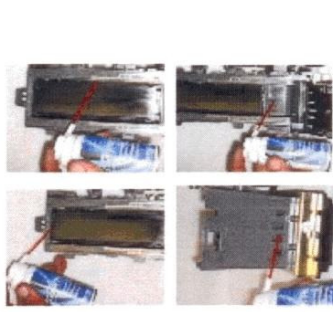
- #1 - 5 Validator Cleaning Cards
- #2 - 4 Scotch-Brite LOW-COIN Cleaning Pads
- #3 - Validator Optic Cleaning Pen
- #4 - 2.75oz Can Compressed Air
- #5 - 4oz Can of hopper Lubricant

Using the Maintenance Kit:

The following maintenance should be performed monthly to extend the life of your components:

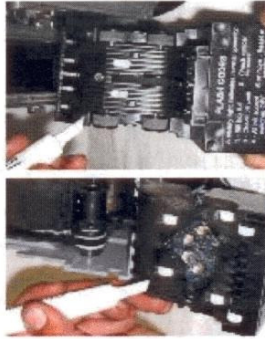
Cleaning & lubing the hopper.

NOTICE: THE HOPPER IN THE FOLLOWING STEPS IS SHOWN SEPARATED FOR EXPLANATION REASONS ONLY!!! It is not necessary to separate the hopper to perform these steps!



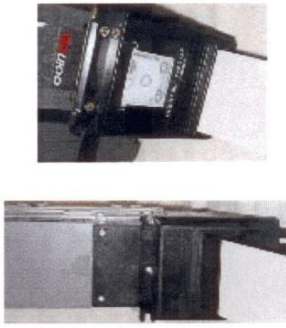
Cycle the power on and off quickly until the stacker for the bill acceptor coasts into the out position. Using the can of air, blow out all of the following places.

Step 5.



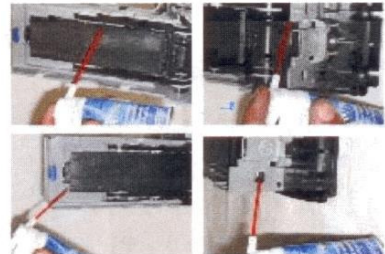
Remove the lower unit as shown. Use the Citrus-Pen to clean the optics on the lower housing of the validator.

This completes all maintenance procedures.



Insert the soap & water-cleaning card as shown. (Card can be used until dry.)

Step 4.



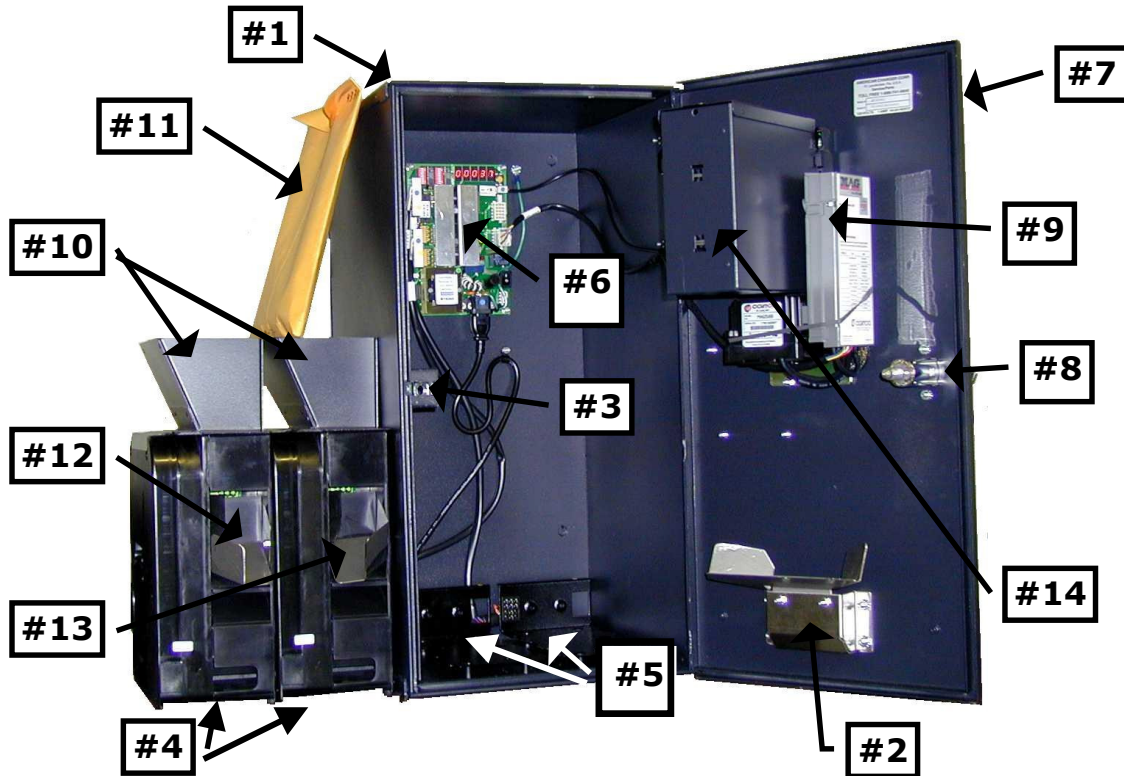
1400 NW 65th Place Fort Lauderdale, FL 33309

Tel: (954) 917-5963 Fax: (954) 917-5204

www.americanchanger.com

SECTION C PARTS LIST

(AC2002.1 SINGLE VALIDATOR SHOWN)



PARTS LIST FOR THE AC2002/2002.1 CHANGER

- | | |
|------------------------|--|
| 1. AC2012 | CABINET |
| 2. AC1013-M | COIN CUP |
| 3. 2012-30 | LOCK BRACKET ASSY. COMPLETE |
| 4. AC1047 | ACC HOPPER |
| 5. AC1047-H | MONEY CONTROLS HOPPER PLATES W/FEMALE PLUG & HARNESS |
| 6. AC2061 | MAIN LOGIC BOARD |
| 7. AC2083 | TWO VALIDATOR LEXAN FRONT |
| 8. AC5080 | SCREW-IN T-HANDLE |
| 9. AC9021 | PYRAMID 110V BILL VALIDATOR |
| 10. AC1042 | HOPPER EXTENSION, CAPACITY 1200 COINS EACH |
| 11. 2900 | MANUAL PACKET |
| 12. 2010-104 | LEFT STAINLESS COIN DIVERTER ONLY! |
| 13. 2010-114 | RIGHT STAINLESS COIN DIVERTER ONLY! |
| 14. AC9028-STKR | PYRAMID STACKER |
| -- AC1093 | LOCKS AND KEYS IN ENVELOPE |

AC2002/2002.1 OPTIONAL PARTS LIST (items not shown)

- | | |
|----------------|--------------------------------------|
| AC9003 | MARS AE2601-U5E BILL VALIDATOR |
| AC2076 | BASE (PEDESTAL) |
| AC1090 | DOOR/TILT ALARM |
| AC1095 | MEDECO LOCK AND KEY |
| AC1094 | MEDECO HARDEN STEEL T-HANDLES |
| 1093-01 | Extra Keys (Need the ACC Key Number) |