

ST-215 COIN WIZARD

ROUTE WIZARD

USER MANUAL



Full color manual can be downloaded at www.bellatrix.com

CONTENTS

ST-215 & MAGIC Features.....	2
Installation of ST-215.....	3-4
Tools.....	3
Installing the Door tongue	3
Mounting the backplate	4
Testing	4
Upgrading to MAGIC.....	5
The RouteWizard Wand.....	5
Setting Current Price	5
Changing Prices	2
Batteries	5
ST-215 Coin Wizard Maintenance.....	6
Cleaning	6
Batteries	6
Storage.....	6
Troubleshooting.....	7
LED	7
Reset Button.....	7
Testing Procedures	7
Technical Notes	11
Parts Diagram.....	13
Parts List.....	14

Updated versions of this manual may be found at the Bellatrix Web site
www.bellatrix.com

ST-215 MAGIC FEATURES

Coin Totalizing

The ST-215 Coin Wizard will accept any combination of coins inserted in any sequence.

Pennies and half dollars are not accepted.

Slug and Ferrous Coin Rejection

The ST-215 Coin Wizard can be ordered with ferrous coin/slug detection. This is indicated by a magnet snapped into the pocket on the center of the spreader lid.

Slug detect can be enabled or disabled.

Card-Trak Compatible

The **ST-215 Coin Wizard works with the Card-Trak System to accept Visa, MasterCard, Discover and American Express credit cards.**

Price Changes

Either an electronic keyswitch or a ComLink is used to make daily price changes. The ST-215 Coin Wizard comes equipped with either a three tier keyswitch or ComLink as standard equipment. Price changes are made by turning the key in the keyswitch or by docking a Route Wizard Wand to the ComLink. This manual is intended for use with an ST-215 with ComLink. For ST-215s with keyswitches, see the ST-215 Coin Wizard User Manual.

Automatic Coin Path Clearing

The ST-215 Coin Wizard coin path is designed to open each time the coin return button is pushed to assist in clearing coin jams or debris.

Electronic Price Increases/Additions

Four tier pricing is programmed into the Route Wizard Wand at the factory. To change the prices in the Route Wizard Wand it must either be returned to Bellatrix for reprogramming or reprogrammed on site with the Price Master Buffer.

Upgrading to Data Collection (Single-Trak)

The ST-215 COIN WIZARD can be upgraded to full data collection capability for use with the SINGLE-TRAK Data Acquisition and Management System. ST-215 Coin Wizards can be upgraded in the field by newspaper personnel.

For more information, call Bellatrix Technical Support at (800) 451-9753 or visit our Web site at <http://www.bellatrix.com>.

ST-215 INSTALLATION

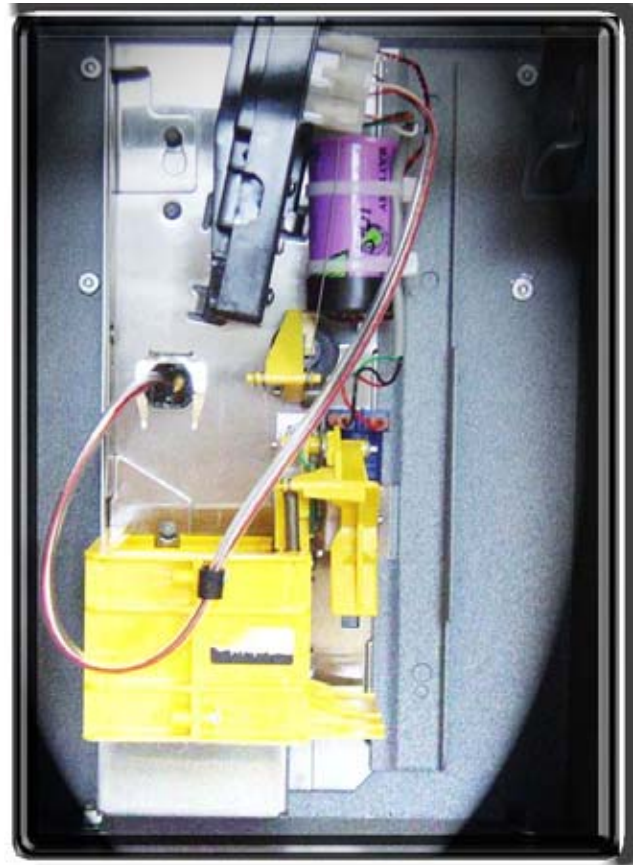
Recommended installation tools

Medium size pliers
Nut driver, size 3/8 inch

The ST-215 COIN WIZARD fits into newsracks on the same mounting system as older ST-210's and other mechanical totalizer units.

Removal of Existing Coin Mechanism

1. Open the rack head.
2. Remove the coin tray to prevent damage during installation.
3. Open the newsrack paper door and lock it open.
4. Unlatch the existing totalizer and remove it from the newsrack.



Changing the Door Tongue

The ST-215 Coin Wizard uses a spring-loaded tongue that is largely self-adjusting. The existing door tongue will not work with the new ST-215 Coin Wizard and may damage it if not removed.

1. Remove the old door tongue using a 3/8-inch nut driver, saving the nuts and bolts to install the new tongue.
2. Mount the new door tongue assembly onto the door.
3. Position the tongue at the middle position of adjustment (See figure at right). Tighten the three nuts.



Installing the ST-215

1. Install the new ST-215 Coin Wizard on the same mounts used by the old coin mechanism.
2. The locking latch is on the upper left corner of the backplate. Slowly close the newsrack door and check that the tongue slides under the metal trip lever housing and snaps up to lock the door. Raise or lower the tongue if needed.

3. Pull on the newsrack door a few times to make sure that it catches properly.

4. Check the solenoid and the reset control by pressing the blue reset button in the cutaway area on the coin reader assembly. The red LED will flash, the solenoid will fire, and the trip lever will fall and unlock the newsrack door.

5. Pull the front door to make sure that it unlocks each time the reset button is pushed. If the door will not open, the tongue may need to be raised or lowered.

6. Replace the coin tray inside the newsrack and close the rack head. Do not re-lock the head yet.



7. With the rack door and head closed, check the operation of the ST-215 Coin Wizard with coins.
8. Select a price on the Route Wizard Wand by turning the rotary switch with a small flat bladed screwdriver. Dock the Route Wizard Wand to the ST-215 Coin Wizard. Drop enough coins into the coin slot to **equal** the set price and verify that the rack opens. Open and shut the paper door.
9. Insert another coin (not a penny) that is **less** than the set price and pull on the door to verify that it does not unlock on less than the correct amount of money.
10. Press the coin return button to return the coin. Activating the coin return clears the current cash total.
11. Repeat steps 8 –10 for each price in the Route Wizard Wand.

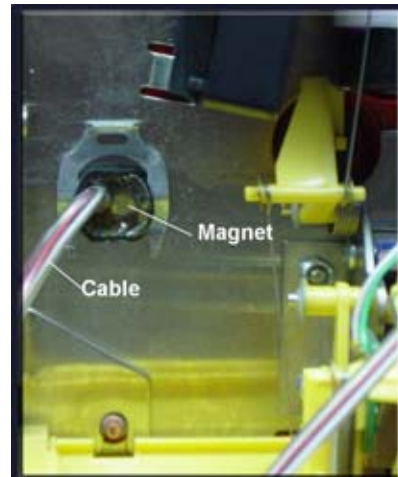
12. When installing Card-Trak, connect the 8 pin connector from the Card-Trak unit to the header on the reader body. The connector is keyed to avoid improper installation.



COIN RETURN BUTTONS:
Some racks may have a coin return button that is too long or an E-ring/C-clip that is too large. These can interfere with the coin return mechanics on the ST-215 Coin Wizard. Small E-rings/C-clips can be purchased from Bellatrix. For full color version of the ST-215 manual visit www.bellatrix.com.

UPGRADE INSTRUCTIONS

1. Remove the keyswitch cable and replace with a ComLink (part #100-0054). The ComLink cable should be positioned toward the outside and the magnet toward the inside of the Coin Wizard. If the ComLink is upside down, it will not communicate with the Route Wizard Wand as easily.

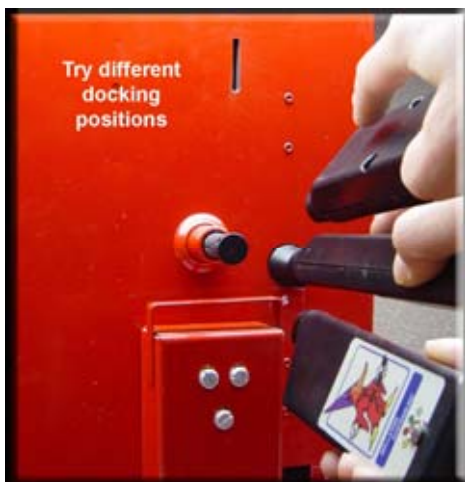


2. Reset the ST-215 Coin Wizard.
3. Dock the Route Wizard Wand to the ST-215 Coin Wizard. Docking sets the Group ID and the current sales price in the ST-215. The Red LED on the Route Wizard Wand will flash once for each attempt to set the price. The **Green** LED will flash and the Route Wizard Wand will beep when data transfer is complete.
4. Test the ST-215 Coin Wizard with coins to ensure that it opens on the set price.

The Route Wizard Wand

Setting Edition & Price

1. Using a small flat blade screwdriver turn the rotary pricing switch to the selected position to set the current sale price.
2. Dock the Route Wizard Wand to the ComLink nosecone. The **Red** LED will flash, followed by the **Green** LED. Hold the Route Wizard Wand to the ComLink until it beeps and the solenoid on the ST-215 fires. The current price will be set and the door will open for loading.



3. If the **Green** LED does not flash or the Route Wizard Wand does not beep, the price will not have been set. Dock the wand again. If unsuccessful, rotate the Route Wizard Wand in the hand to the left or right and dock to the ComLink in varying positions. The best position for communication may differ between Coin Wizards.
4. If the **Red** LED flashes repeatedly, check the coin return button. Verify that the rack door is closed. Shade the ComLink if bright light is shining directly on it.

5. If the **Red** LED is solidly lit and the Route Wizard Wand beeps every half second, reset the price on the rotary switch and re-dock. If either LED fails to flash during communication, return the wand to Bellatrix for repair.
6. Drivers must carry the Route Wizard Wand in the provided holster with the lanyard attached to prevent damage. The Route Wizard Wand is powered by two 3-volt, 2/3A lithium batteries. The batteries are warranted for 6 years. The Route Wizard Wand should be returned to Bellatrix for battery replacement. There is no signal emitted by the wand to indicate low battery power, the wand will simply stop working.

ST-215 MAINTENANCE

Any electromechanical device that has moving parts is subject to interference from the buildup of dirt, grime, etc. ST-215 Coin Wizards have very few moving parts, but still require maintenance. It is helpful to have a supply of spare parts on hand to make quick easy repairs.

Preventive Maintenance

Cleaning the coin path and door assemblies' occasionally will prevent most problems. In most cases, cleaning with compressed air once or twice a year should be adequate. In very dusty, salty or windy climates, cleaning will be required more often.

Dirt buildup can cause additional friction as the coin slides through the coin path. This can cause coins to move too slowly through the coin path and be misread. Dirt and dust can also cover the lenses in the coin detect/read circuits and prevent coins from being read properly. To clean the coin path, open the coin reader and wipe out dirt with a clean cloth, Q-tip or small brush. Wipe the steel roller on the underside of the spreader lid. Make sure that the roller moves freely and rolls smoothly

CLEANING NOTE:

Do NOT use oils, lubricants or solvents when cleaning the ST-215 Coin Wizard. These products can cause damage or may leave a film that attracts dust and dirt that will cause malfunctions. These types of cleaners should always be avoided. Use Windex™ or a similar type of cleaner and a cloth, Q-tip or brush to clean the coin path.

Check all springs on the ST-215 Coin Wizard. If springs are stretched or missing, the ST-215 Coin Wizard will not function properly.

The coin box assembly doors should open freely when you press the return button or move the accept arm. Do NOT test the coin return door by pushing down on it. This can cause the lower return spring to become stretched.

Lithium Battery

A 3.6 Volt Lithium D-Cell Battery powers the ST-215. This battery is rated non-hazardous. Bellatrix warrants the battery for 6 years. Actual life will depend on use. To

test the battery, press the reset button on the reader. If the LED flashes, the battery is still working and does not need to be replaced. However, if the LED does not flash, it does not necessarily mean that the battery is dead. Other circuit board problems could also cause the LED not to light. To replace, unplug the battery from the circuit board and cut the cable ties. Take care not to cut into the battery wires or battery case. Firmly strap the new battery into place with two new cable ties. Pay particular attention to the placement of the battery and solenoid wires. Plug in the battery and press the reset button to reinitialize the electronics.

ST-215 Coin Wizard Storage

The ST-215 Coin Wizard can be stored on a shelf with the battery unplugged. The ST-215 Coin Wizard will retain price information even when not powered. However, it is not necessary to unplug the battery.

TROUBLESHOOTING

LED

The red LED (Light Emitting Diode) is located inside the cutaway section on the black plastic coin reader assembly.

The LED will flash when a valid coin is read and when the reset button is pressed. The LED will not flash for invalid sized coins or ferrous slugs when slug detect is enabled. If the LED does not flash when the coins are dropped, try cleaning the coin path. If this doesn't help, press the reset button. If the LED does not flash when the reset button is pressed, check the battery connection and try again. If the LED still does not flash, try replacing the battery. If it still fails to flash return the ST-215 Coin Wizard to Bellatrix for repair.

Reset Button

The reset button is positioned just below the LED.

Pressing the reset button re-initializes the micro controller on the ST-215 circuit board. Reset the ST-215 Coin Wizard when the battery has been unplugged, or when the Coin Wizard is otherwise operating abnormally. Resetting the ST-215 Coin Wizard will not cause it to lose the group ID, Mech ID, or price settings.

Testing the ST-215 Coin Wizard Out of the Rack

If a rack or test head is not available for testing the ST-215, it can be held in the hand. When testing the ST-215 out of a rack, make sure that the accept arm is lifted UP in the approximate position it would be in were the rack door closed. The ST-215 will not read coins or perform other functions with the accept arm in the DOWN position, simulating an open door. When lifting the accept arm UP, do not overextend it or the extension spring may become stretched. The spring should not be stretched more than an inch.

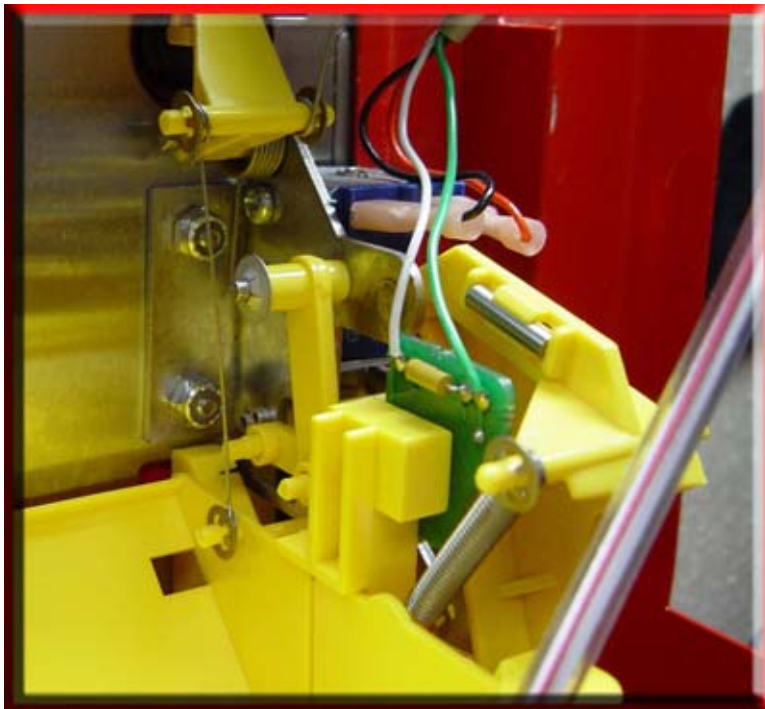


Problem: Rack Door Opens with Any Coin

Solution:

If an ST-215 is opening on every coin, it is probable that the microprocessor did not detect the door opening after the last sale. Each time a coin is dropped into the ST-215, the value of that coin is added to the current sales cash and compared to the current sale price. When a cash amount that is equal to or greater than the current sale price is reached, the solenoid is fired, releasing the trip lever, which allows the door to be opened. When the door is opened, the magnet on the accept arm activates the reed switch on the accept reed switch circuit board. This signals the micro controller that the door has been opened and resets the current sales cash to zero. If the magnet is missing in the accept arm or if the reed switch is broken or if the magnet is not close enough to the switch to close it, the ST-215 will not recognize the door opening and will not clear the cash. Now, each time a coin is dropped through, it is added to the current total and compared again. Since the cash was not cleared, it is still equal to or greater than the sale price and the solenoid will fire with each subsequent coin until it detects the door opening. This problem is fairly common with older light green rectangular reed switch boards but rare with the dark green triangular boards.

- Make sure that the magnet is in place on the accept arm. If the magnet needs to be replaced use standard magnet (P/N 317-0004).



- Verify that the accept arm swings all of the way down, making contact with the trip lever housing assembly, when the rack door is opened. If the coin accept door does not swing freely, check and clean the pivot pins and holes. Make sure that the spring does not catch on the coin box.
- Ensure that the reed switch board assembly wires are intact and that the cable is plugged into the reader assembly. Replace the accept reed switch board assembly if damaged.
- Check the cash door to make sure that it swings freely. If the cash door sticks, move the cash door spring away from the push-on nut until it moves freely.
- Check the reed switch with a Reed Switch Tester if available (Part # 100-0077). Otherwise replace with a new reed switch board (Part # 060-0057.) When replacing the rectangular board with the triangular board, a diagonal cutter may be needed to snip the plastic stop from the coin door in order to position the green board properly.
- If the problem persists, return the ST-215 Coin Wizard to Bellatrix for repair.

Problem: Rack Door Opens with Coins, but not with Route Wizard Wand

Solution:

- Check the ComLink nose and cable for damage.
- Check that the ComLink cable is securely attached to the connector on the reader assembly.
- If the ComLink is not visibly damaged and is properly connected, the fault may be internal to the ComLink. Replace with a new ComLink assembly and re-test.
- If the previous steps do not solve the problem, the circuit board is likely at fault. Change out the circuit board or return the ST-215 Coin Wizard to Bellatrix for repair.

Problem: Coins Do Not Fall Through the Coin Path

Solution:

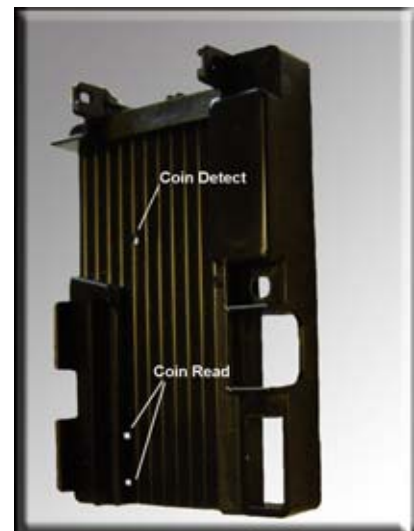
If coins don't fall through the coin path, the most likely cause is an obstruction. Clearing the obstruction will often solve the problem.

- Try to clear debris by pushing the coin return button a few times. If the coin path does not clear, open the rack head to check for debris inside the coin path while pressing the coin return button. Do not use sharp objects or abrasive materials to clean or clear the coin path. These types of materials can scratch the coin path causing coins to jam further. See cleaning note on page 5.
- Check the roller inside the reader lid. It should not have any dents or flat spots. If the roller does not roll smoothly, coins can hang up in the coin path.

Problem: ST-215 Coin Wizard Does Not Read Coins

Solution:

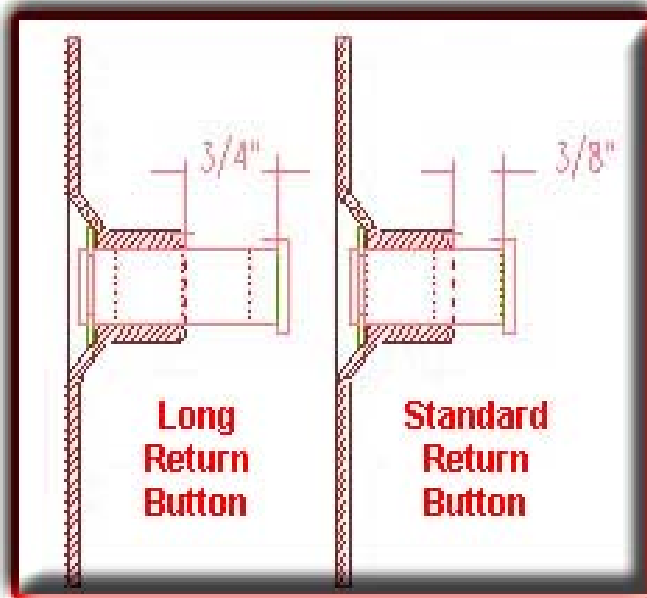
- The LED on the ST-215 will flash each time a **valid** coin is read. Drop coins into the ST-215 Coin Wizard and observe the LED on the reader. If the LED does not flash, the coin is not recognized as valid or the coin is not detected.
- ST-215s with "CrossDetect" sense coins by projecting the infrared light from the spreader lid to the circuit board. (Top Hole.) Dirt or other materials can build up in these holes, preventing the infrared light from reaching the detectors. Clear plastic lenses beneath the holes protect the circuit board from the dirt but the lenses may become scratched or dirty. Try cleaning the coin path with a small soft brush, compressed air or a Q-Tip and Windex. Thoroughly clean both sides of the coin path. If necessary, disassemble the reader assembly, remove the lenses and clean them. Reset and test the ST-215 Coin Wizard again.



Problem: Coin Return Button Does Not Return Coins or Jams

Solution:

- Make sure that the upper return spring has a small amount of play. If the spring is bent or jammed it will effect the operation of the coin reader.
- Check the coin return button E-ring. Large size E-rings can easily get caught on the return torsion spring or the bell crank, causing the coin return to be stuck open. Small E-rings are available from Bellatrix.



- Replace the lower return spring when it becomes stretched. A stretched lower return spring can cause the coin return door to sag, allowing coins to fall through into the coin return. A stretched lower return spring can also cause the return catch to hit on the post and prevent the trip lever from falling. This will keep the paper door from opening.
- Some TK newsracks are equipped with a long coin return button. In many cases, this button is too long for the ST-215 and should not extend more than 1/2" beyond the front of the rack. A button that is too long can jam the return bell crank if it is pushed in too

far. Use of standard length buttons is recommended. Conversely, it should not extend too far inside the rack. Typically, the E-ring that secures the button is about 3/16 inches from the tip that presses against the ST-215 Coin Wizard. The button should spin freely when turned.

- The coin return will not operate and the coin return door will not open unless the trip lever is in the UP position.

Problem: Solenoid Does Not Fire

Solution:

- Reset the ST-215 Coin Wizard while watching the solenoid and trip lever. The solenoid should fire and the trip lever fall.
- If the solenoid does not fire or fires weakly check for burrs, dirt, spider webs etc. on or around the solenoid plunger and trip lever area. Use compressed air and/or a Q-Tip with Windex or electronics cleaner to clean the solenoid plunger and surrounding area. **Never** use any type of lubricant or cleaner that leaves a residue on the solenoid plunger or any other part of the ST-215 Coin Wizard!
- A leaky capacitor, broken capacitor lead or dead battery will also prevent the solenoid from firing.

TECHNICAL NOTES

Coin Detect Circuit:

The coin detect circuit is comprised of a one-shot, a photo transistor, an LED (light emitting diode), and a comparator. The one-shot acts as a high speed switch and strobes the LED on and off at a rate of 50 times per second. The photo transistor is turned on just before the LED is strobed, and turned off just after the strobe. A NAND gate is used to detect whether or not any light passes through the coin path. If light passes through the coin path, no coin is present. If no light gets through, a coin is in the coin path. When a coin is detected this circuit will cause the coin read circuit to be switched on.

Coin Read Circuit:

The coin read circuit is actually two separate circuits like the coin detect circuit. When turned on, the circuits remain on until a coin passes, or a set amount of time passes with no interruption in the supply of light. The coin read circuits are exactly $\frac{1}{2}$ inch apart and as the LED of each circuit is blocked, counters record the duration of blockage. The values stored in the counters are then entered into a mathematical equation which renders a relative diameter. This diameter is then compared to a pre-programmed table and based on that table, enters the value into the temporary register.

Slug Detect Circuit:

The slug detect circuit is comprised of a magnet and a reed switch. (A reed switch is two pieces of wire, flattened on the ends, overlapped, and sealed in a glass case.) The reed switch is located on the main PCB and is marked S3. The magnet is located in a molded slot on the outside of the reader lid, about halfway down in the center. The reed switch is held closed by the magnetic force of the magnet. When a slug passes through the coin path the magnetic force is broken allowing the reed switch to open, which in turn causes the coin read circuit to be disabled and ignore the slug. Slug detect is an optional feature and is enabled at the factory. Coin Wizards without this feature will not have a magnet in the center of the reader lid. A slug is defined as a coin or token having ferrous content. If it can be picked up with a magnet, it is considered a slug.

Coin Accept Circuit:

The coin accept circuit operates on the same principle as the slug detect circuit. The reed switch is located on its own PCB and labeled S2. The PCB is mounted on the right coin door box and held in place with one Phillips head screw. The magnet is located on the accept arm in a molded slot. When activated, it moves the cash from the temporary register to the cash register and adds a sale to the sales register.

Coin Return Circuit:

The coin return circuit operates on the same principle as the slug detect circuit. The reed switch is located on the main PCB and labeled S1. The Magnet is located on the outside of the reader lid in the lower right corner. When activated, it clears the cash from the temporary register.

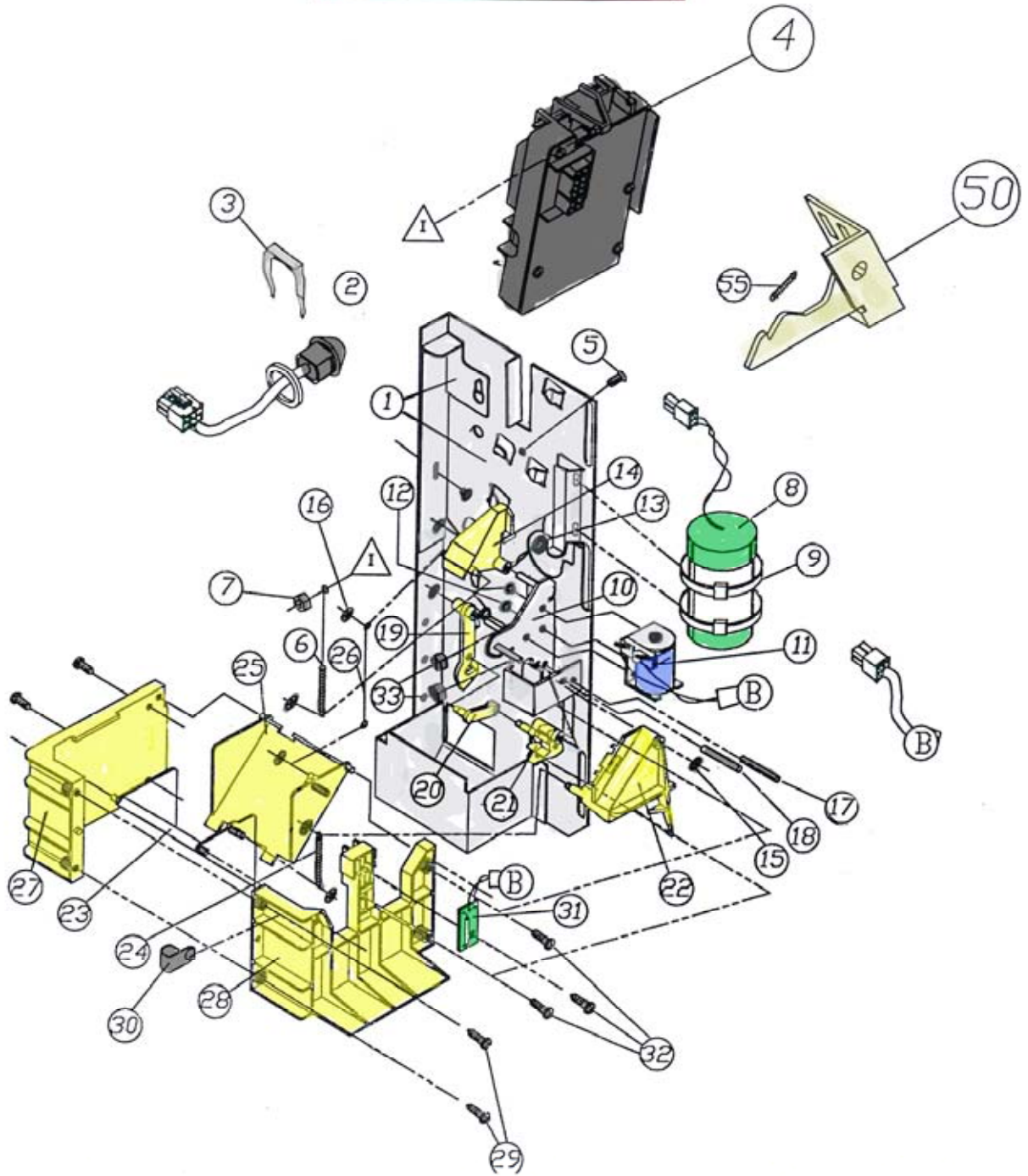
LED and Reset Switch:

The LED and reset switch are located on the left side of the reader body, halfway down in a cutaway. The reset button, when pressed, will cause the LED to flash and the solenoid will fire, allowing the newsrack door to be opened. In addition to flashing when the reset button is pressed, the LED will flash every time a valid coin is read. (A valid coin is one in which the diameter is within the parameters set in the coin table.)

Door Tongue Assembly:

The door tongue is a spring loaded two piece design. Rather than the locking mechanism on the Coin Wizard moving out of the way of the latch, the latch is now designed to move out of the way of the locking mechanism. This has virtually eliminated moving parts and drastically increased ease of installation.

Bellatrix Systems, Inc.
ST-211 COIN WIZARD®
Exploded Assembly



See <http://www.bellatrix.com/PartsAndRepair/ProductGrid/Default.aspx?id=38> for current parts price list.