ROWE BILL CHANGERS BCxx00
BUCKET POWER ON ERRORS!
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See Bruno's page

In this article I will pass along some of my FEK for some of the Bucket Power On Errors problems but before starting let me say just because I mention a given problem I may have only seen a given problem a few times. I write about them so you can save time in locating and fixing a given problem. At some point in time, you may want to check out my other BEAR NOTEBOOK articles for related information. They are posted on the following web site: http://www.eastcoastamusements.com/ On this site you will find Bruno's page and many other Bear notes.

You may have seen the Bucket Power On Errors on your Rowe BCxx00 bill changers or maybe you will see this error in the future.

When a problem occurs you have to gather has much information about the problem. I will try to break down Bucket Power ON errors by breaking it into five specific areas. There are plenty of basic bits and pieces in this article so you may want to read it even if you do not have bucket power on problems. Before the bucket material let's get computer's updates out of the way. I presume by now you already have the latest computer board and program updates but I still where the updates have not been done.

A SPECIAL NOTICE

FAST COIN PAYOUT: On January 31, 2003 Rowe introduced a new Fast Coin Payout dispense for $10.00 for the BC 100 and BC 200 and Fast Coin Payout for $20.00 for the BC1200, 1400, 2800 and 3500 bill changers. On the larger dispenses the bucket door opens and the coins drop then the bucket door is held open and as the hopper runs the rest of the coins drop. After the count is finished, the door closes and the escrow is loaded for the next dispense. The primary changes are a new power supply board, some minor power supply hardware changes [mount a large resistor & connect cable] and a program prom for the central control computer. The update should take less than an hour.

When it comes to the latest part number for Fast Pay update kits, power supply boards, Program EPROMs [version number], and computer boards call your local Rowe dealer or Rowe International. Keep in mind there are two basic types of bill changers, original non Fast Pay [double dump] and newer Fast Pay changers so you will have to tell them what you have.

Note for Fast Pay units: Once you do the update to the power supply and put the PROM into the computer they becomes a pair and they will not be interchangeable with the non Fast Pay type power supplies and computers. In the future you will have to pay attention to part numbers and prom numbers so you do not mix up NON Fast Pay computers and power supplies with Fast Pay computers and power

supplies. If you do update a power supply and computer for Fast Pay I suggest you clearly mark them both “Fast Pay.”

Bucket Power On Errors - General information: Homing in on a problem depends on your order of doing things. Getting good information up front is very important. How you get the information depends on how you are hard wired and you should be able to figure out how you are hard wired by reading the rest of this paragraph. You got a Bucket power on error on the display so you reset it. The bill changer may be back on line and everything is OK right? What next? Did you test vend all three buckets to see if one of them is empty? Did you hear a bucket door open? Did you see any coins drop? Was a bucket empty? Which bucket was empty, left, center or right [$1, $5, $10]? Did you ask someone if anyone had reported not getting coins after a Bucket power on error was reset? If they told you someone did not get the coins when they put in a $5 bill you now know you have a real bucket power on problem and it is related to $5 bucket. Was the changer just standing there or was it trying to dispense coins? Did someone put a bill into the changer? Did the bill get stacked? Did it end up in the upper or the lower bill box? Was anything going on that might have affected the Line voltage? Is there something else like a machine with a compressor on the same AC line? What else is on the same AC line? What was/is the AC line voltage? How often does the error show up; once a day, week, month? Do you have power supply voltage and ripple measurements for this changer and did you measure the voltages? Were any parts of the changer swapped before the problem showed up or what was changed in an attempt to resolve the problem? Are there any time and/or temperature factors which relate to the error? When the error reset was done, did another error message appear? Does the computer have the latest software update? Are any of the solenoids burned? Did you do an ohmmeter check on the solenoids and diodes? Do the route and/or the people who take care of the bill changer have a place to record all problems with the changer? When a problem occurs, are the people trained to test all 3 buckets and record the information including the errors reported on the display? Is the report in writing and are you able to see it? If you get, or pass along, equipment to be serviced, say a computer board, is the history information passed along with the computer board? With an intermittent problem, just pushing reset and walking away may not be the best procedure for resolving a problem. Your, and/or your company’s, order of doing things is the key to locating and fixing a problem without wasting unnecessary time and money. You can check the Bucket power on error operation by pulling the low end of a solenoid to ground thru a 7.5 ohm 5 watt resistor. Follow all safety rules because the solenoid’s inductive arc could reach thousands of volts. Do not get hurt! Electrical Safety always comes first. The chances of you being hurt or killed might be one in ten million

but remember; that one could kill you. Pull the AC plug from the outlet.

Number one: Bucket power on errors, or not, the replacement of the older –01 power supply boards is a must based on my observations. These -01 boards do have heat and related bucket power on problems. Early in the game, [I think it was in January 1997] Rowe made a major design change to the BC 100, 150, 200, 1200, and 1400 power supply board. The new part number is 650697-02. With this design change the heat sink mounted on the back of the power supply is eliminated. If the heat sink is still on the back of the power supply case and it is still connected, the changer still has the original -01 power supply. Get the update. When I make this update I remove the heat sink. A power supply board design change was also made for the BC3500 bill changer. The part number is Part # 650692-02. After making the power supply board update.

I always tag the outside of the unit "update -02 done." Now that FAST PAY updates are here I would clearly mark the power supply and computer “FAST PAY”. Making the update to the new power supply boards is categorically recommended and it has proven to be a worthwhile investment. It eliminates the heat problems including that nasty bucket power on error. The new supply boards have proven to be a very solid power supply with only a very few exceptions. A handful of failures have been caused by a bad or no connection of the wire leads of the round core coils. The coil problems are easily found and are fixed by cleaning the wire leads and then re-soldering them to the board.

I have noted failures which I think were caused by the failure to remove the AC plug from the outlet when removing or installing the power supply and/or failures were actually, caused by miss plugging of connectors.

Like all electronic devices connector and contact problems can and do exist but its no big thing if you are a Bear paper clip service tech and you got a long nose. If you are going to order a new power supply board and you do not like those double dumps of $10.00 with the BC 100 and BC 200 and/or the double $20.00 dump with the BC1200, 1400, 2800 and 3500 bill changers you might want to consider the FAST PAY update. Go back and read A SPECIAL NOTICE on page 1.

The only power supply update [December 2000] for the -02 power supplies I know about was made to improve the BA50 bill acceptor motor operation by increasing the 12 VDC to 14.8 VDC by changing R824 from 16K to 22.1K 1% metal film resistor [part # 799122212] and R825 from 1.8k to 2.0K 1% [part # 799122001]. Rowe recommends making this upgrade at a suitable time.

The second concern:

The false positive.

The Bucket power on errors starts with a sense resistor in the power supply and the two sense leads which end up at the computer. If the current sense

resistor does sense current in the bucket solenoid circuit when no current should be drawn, you will get a bucket power on error. Before getting into other bucket power on problems the error could be a failure related to the sense leads and the connections up to the computer board. Dirty or bad connections and/or connectors on the power supply board, power supply connectors or the computer board could produce a bucket power on error. In two cases, I have seen bad connections at the computer IC socket gave the bucket error. With these types of bucket errors there is no current actually being drawn in the solenoid circuit but it appears to the computer that current is being drawn so you get the Bucket Power On Error on the display. In this case, to think the solenoid circuit actually draw current is a false positive.

The third concern has to do with a real sense of current being drawn in the solenoid circuits. These include the computer, wiring, solenoid coils and/or the diodes across the solenoids. A bad solenoid may have leakage or even a full short to the metal frame and since the coils always have 40VDC applied to coils, you will get a current sense and the bucket power on error. More often than not, these problems may be intermittent. Here is another Bear Necessity history item relating to solenoids for you to think about. History of two solenoids which showed no leakage at all when checked with the ohmmeter but one solenoid coil would fail once in 1500 pulls and another would fail in 2501 pulls. After changing the solenoids the problem went away. Any solenoid wires that have leakage or a short will give you errors. You may find a pinched cable or something like a solenoid wire crimped under the solenoids. Another place for leakage or short is the diode across the solenoid coils. While an ohmmeter test may show the diode is ok but it may breakdown when the 40VDC is applied. Do not take the ohmmeter test as verification the diode is OK Sometimes it is best to simply replace the suspected diode/s. Any leakage which causes current to be drawn will give you a bucket power on error so the TIP102 transistors on the computer board can pull the low end of the solenoid to ground. If there is a short or leakage in a TIP102 current will be sensed and you will see a bucket power on error. Note that a simple transistor test of a TIP102 made with an ohmmeter may not show you the transistor is substandard. Two days ago, Mach 02, 2005 I removed many coins located on the bottom of the changer and on/next to the connectors on the power supply. I replaced a TIP104 because the left bucket was dumping coins while the changer was just on standby. So far the bucket power on error as not shown up. Did it fix the problem? I do not know, Only time will tell. I also left my Fluke min/max meter plugged into the same AC outlet the changer is plugged into. With an intermittent problem you may not be able to locate the bad component/s so a Bear shot gun approach of replacing of the TIP102/s and the diode/s and maybe even the solenoid/s is a valid course of action. If

you have located which bucket is the source of the problem you can home in on that bucket's components. This gets us back to my comments made in the earlier in my "General information" paragraph.

The forth factor is connected with reports that unexplained bucket power on errors may be linked to high perm counters. I do not think it is solely linked to high perm counter numbers but I think the computer got glitched or spiked in one way or another. I expect computers in the field will have high perm counter numbers and normally they do not give unexplained bucket power on errors. I have seen some computer counters with garbage, wrong values, and/or perm counters where the data errors are not visual which do give an unexplained bucket power on error. Garbage or obviously wrong values in the perm counter indicate the computer has been glitched. These are the computers which give the unexplained bucket power on errors. Rowe is, and has been, looking for a software relationship between high perm counters and bucket power on but as far as I know they have not found any. You may not like the fix for the unexplained bucket power on errors but here it is. The solution to this problem is to send your board to any authorized ROWE distributor to have the permanent counters reset to 0. After this is done the unexplained bucket power on errors will no longer appear provided the changer does not have other real bucket power on problems. Your distributor may not automatically do the clear and reset procedure so you should find out if your distributor can and will fulfill your request to do the clear and reset procedure. You should record the perm counter values for your record keeping before taking the computer out of the bill changer.

The fifth concern: In a general way there are various problems which can cause computers to glitch or crash. These are things like connectors, shorts or pinched wires or cables, AC line problems including spikes and noise, pulling or plugging connectors while equipment is still on, or as indicated above, a break down of a diode or a solenoid, cold solder joints, et cetera. I have seen computers crash with the turning on of a florescent light, and so forth, so I am sure there are many things which can cause a glitch or crash problem. Over the years I have collected notes about problems which can cause spikes and/or problems. I may, in the future, write an article about them but here is a few of them. A hopper or stacker motor with problems, a miss-adjusted stop micro switch or brake problem which causes a motor to stop and then quickly start again, or a hopper jam, a hopper cutting into the counter cable and creating a short, stacker jam, gear box jam which causes a large amount of current drawn, coin lockout relay coil and/or it' s diode breaking down, a wire short in the coin mech circuit, a loose coin in the coin mech, a breakdown of the stacker separate solenoid and/or its diode, bad relay contacts in a single stacker, bad relay contacts on the

power supply Out Of Service relay, Triacs breaking down and causing motors to get a low voltage or even high enough to make the motor run, arc suppressors [with defective diodes, caps, and resistors which break down and/or fail].

As I stated earlier I am monitoring the AC line with a Fluke with min/max metering on the changer I am working on. There all kinds of power tools, big oil burner, lots of florescent lights, three big commercial freezers, etc in the building and the street is loaded with various types of industrial buildings. In this case, since the changer location is only 10 minutes from me I have elected to leave the changer on site. There many times where you may elect to pull the changer and bring it into your shop.

May the
BUCKET POWER ON
error not be with you!

BCxx00 $5,$10,$20 bill updates - BC - 100,200,1200,1400,3500

BCxx00 with 65069006 control board - Eprom 270650-01 @ $32.00
BCxx00 with 65069001control board - A new control board 65069050 $194.00.

BC-150

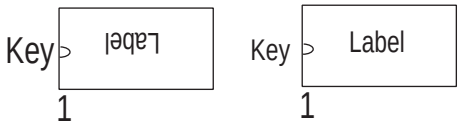
If you have 65069002 board order a new board 65069051 Board @ $194.00
If you have 65069011 board order Eprom 270650-02 @ 32.00

See Notes below ! Note: Prices may vary slighty

WHEN INSTALLING AN EPROM THE LABEL IS NOT THE KEY

FIRST: TURN OFF ALL POWER !

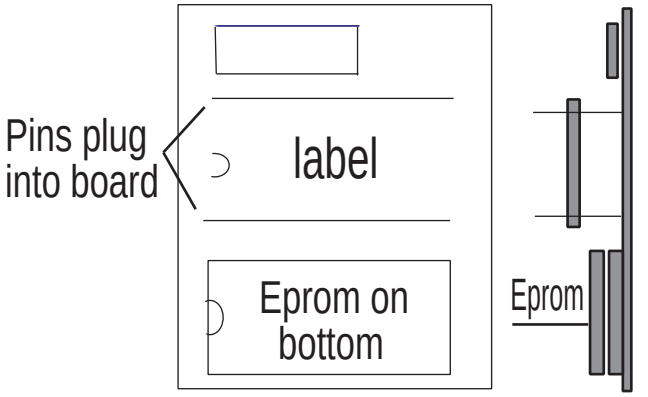
Never use the label as a guide to align the IC into the correct position.... Use the Key !!



Sometimes the IC pins are spread out to far. You can bend the pins by pushing IC againest an edge.

Make sure all pins have gone into the socket.

New version adapter board for converting 65069006 and 65069011 boards into new $5,$10,$20 boards



New BCxx00 Power supplies. In Jan 1997 Rowe introduced two new power supplies for BCxx00 series. They produce less heat and designed to reduce failures. If you need a power supply use the new part numbers listed below. If you have added wire jumpers and replaced a few resistors on older -01 boards you may be ok now but I strongly recommend getting a new -02 board.

Nov 24,2000 Rowe will not fix or replace -01 boards. You have to buy a new -02 board. !!!

	new board price
Part # 650692-02 BC3500	$ 238.61
Part # 650697-02 BC 100,150,200,1200,1400	$ 264.14

Remove heat sink and small cable when installing new -02 board.
New power supplies: 8v=7.5 12v=12

Note: Be prepaired to re-program the computer after an update is made. I can help you program the changer if you are at the changer with a telephone.. Borrow a cell phone if you have to.

Check all new pay out amounts by counting the second payout.

Perm counters maybe messed up when the new version is installed.
Reset the computer's perm counters to zero (0).

Bruno

At some point in time you may want to check out my other Bear notebook articles because they contain a great deal of related material. You will find them on Bruno's Page in http://www.eastcoastamusements.com/ then: left click on: **Visit his page for service notes and tips.** **OR:** http://www.eastcoastamusements.com/services.htm and then click on the BEAR with the flower!!

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You will want to check the East Coast Amusements site for revised or new articles. I do have more titles in the works. Here are some the posted articles.

ROWE 4900 ACCEPTOR ISSUES
ROWE BC-1 BILL CHANGER
THE MAGIC WAND (Dick's - my favorite)!
CONNECTORS - FIXING AND TESTING (another good one)
ROWE BILL CHANGER HOPPER REPAIR
MEASURING VOLTAGES
BUCKET POWER ON ERRORS
ROWE STACKERS
MAG HEAD LOOP SECRETS
DREMEL & ROWE STUFF
FEK MOTOR TEST UNIT
OBA ACCEPTORS
JACKPOTTING, FS, BUCKET POWER ON & CRASHES
BC-8 to BC-35 Bill Changers
CBA_UCBA
Basics_101
BCxx00_bill_changers

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To East Coast Amusements
> THANKS ! Bruno 1F