

# Q\*BERT Battery Backed RAM upgrade

All great fans of Q\*Bert know the game saves it's high score table, this is performed by two low power Static RAMs and a DataSentry battery backup. Owners of game will also know all about the nasty habit, seeing as they're now about 16 years old, of the aged battery either dying and/or LEAKING acid over the board !

So.. in an attempted to remedy this from ever happening, I removed the battery and simply modified a board to work with the Dallas SRAM I'm so fond of.

Overall very little needs to be done the battery must be removed, a jumper wire installed and two Dallas SRAM plugged into the board. This will give you 10 years of saved high-scores... should be enough to keep most folks happy. If anyone's really interested I could look at doing the modification using a Xicor X20C17: high speed AUTOSTORE NOVRAM, this unit allows 1,000,000 back up writes when the power is turned off, so if you turned the machine on and off every hour... it's still work for 114 years... .

As part of this project I also discovered another problem which was occurring to three other Q\*Bert boards. Even though the high-scores were being saved, they would get reset or corrupted without warning ! This turned out to be a reset error, the capacitor which gives a delay on the CPU reset was failing, causing the CPU reset to be too short a time period. This was fixed by replacement of capacitor C25 with a 470uF electrolytic.

## Game Enhancements

1. Battery backed RAM enhancement
2. Reset fix

## Known issues

1. None

## Upgrading

## Changing the RAM

To accomplish this you need to make only two board modifications, and to add some RAM.

1. Remove the battery !
2. Remove diode D2 and replace it with a wire, or just solder a wire over D2. This takes the power line for the two battery backed RAMs to directly 5v.

**Note:** Diode d2 is right next to the battery just above the socket for ROM4.

**Note:** In the picture on my site the jumper wire is soldered to a different point but it achieves the same goal.

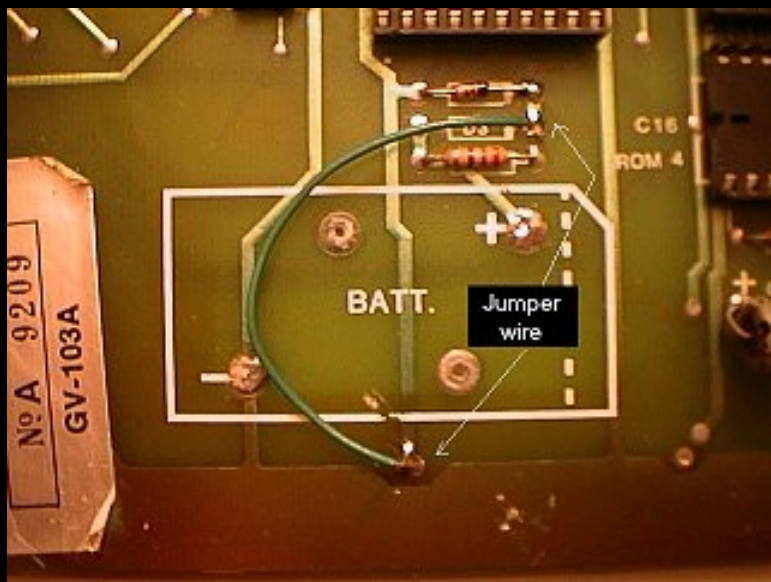
3. Replace RAM0 and RAM1 with Dallas DS1220 battery backed SRAM, now... depending on what your power supply is like you may need to use the DS1220AD ( 4.5 write protect voltage ) or DS1220AB ( 4.75 write protect ). See picture 2.

**Note:**At least one Q\*Bert I've come across has a really nasty PSU that just about gives out nearly 5.0v, so the voltage at the RAM comes in at UNDER 4.75, thus putting the AB part into it's write protect state.

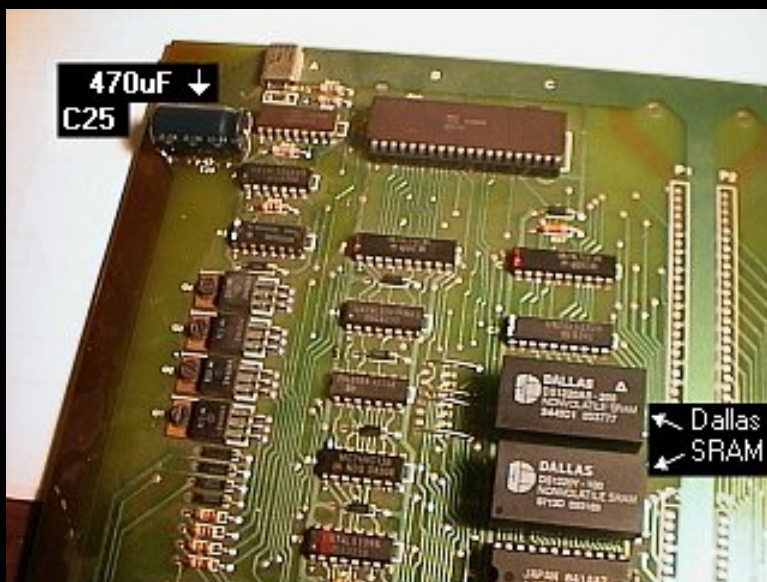
To be on the safe side I'd opt for the DS1220AD part.

4. That should be it, your Q\*Bert will be using battery backed RAM with at least a ten year lifespan, in a package which, unlike the original battery, won't leak acid all over your board.

Battery Removed and Jumper wire soldered in place  
Picture 1



Larger View of board with RAM in place and 470uF replacement capacitor  
Picture 2



## Corrupted Scores Fix

This was a condition that effected at least 3 boards and was driving at least one person mad.

What would happen is that everytime the game was powered down, the scores would become corrupted or lost. Now, I was sure there was nothing wrong with the battery back up ( in fact it would do this on an original Q\*Bert board WITHOUT the dallas hack ) so it had to be processor related.

Turned out to be the reset line ! The reset line on the 8088 was not being held active for long enough, so the CPU was starting in some kind of goofy state and corrupting everything.

Simple 20 second fix.

1. Replace capacitor c25 ! originally c25 was a 100uF, but I changed it for a 470uF cap ( mostly because that was what I had to hand at the time and a longer reset pulse doesn't hurt ).
2. Restart the machine

Hack by James Rowan  
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