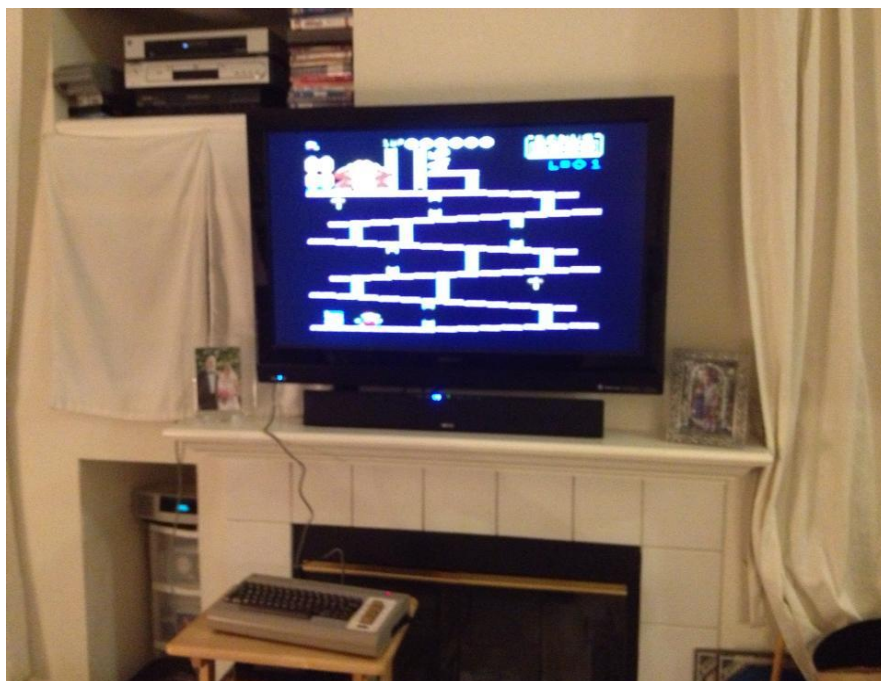


Commodore 64 revival



Memories from childhood

When I was just 7 years old, I had gotten my first computer for Christmas - a shining new Commodore 64. After playing games on our Atari 2600 for a year and even a bit of Pong on one of the original consoles, I was intrigued by the fact you could program the Commodore computer yourself and make it do so many interesting things. The documentation was wonderful and the included reference manual was quite useful in explaining so many ways to utilize the 3-voice SID sound chip, high resolution graphics, sprites, and game joysticks. It would be one of those gifts that would keep on giving!

The sound and graphics were far ahead of its time - although the IBM PC junior and the Apple Macintosh were also around, they paled in comparison. Even though I was still just a kid, I sensed the community around the Commodore. Many of my friends had them and we could trade programs, games and tricks with neighborhood friends and friends at school. When COMPUTE! magazine came out, it encouraged people to explore and take advantage of the creativity the BASIC computing language allowed. By printing listings of popular games right in BASIC, the magazine allowed me and my brother to take turns typing in the listing line by line. The code would even be commented to help us understand the functionality of what was going on.

You could change the line

```
LI = 3: REM 3 lives
```

to

```
LI = 99
```

and hack the game to give you 99 lives!

...

The computer probably ended up defining my life in more ways than expected. Through programming

experience at a young age, I ended up getting accepted to MIT where I studied computer science and started a career working in computer software. (I think I even mentioned the Commodore 64 in my college application essay when I applied to MIT!). Playing with the 3-voice sound, I was exposed to acoustics and physics of music in a unique way. I managed to program the entire piece of "The Entertainer" ragtime music, exploring different waveforms, tunings and temperaments. Perhaps studying "equal" versus "just" temperament planted a seed in my ear which would lead me to barbershop harmony years later.

My brother and I shared many memories and years of our lives with the old Commodore when we were kids living in Florida. It was a simpler time, before every day was taken with some sort of organized activity. My brother and I and some kids from our neighborhood street would play for hours. My brother and I built a fort from the cushions of our sofa and we took the computer inside, typing in games and playing Jumpman, Shamus, Winter Games (released shortly after the 1984 Sarajevo Winter Olympics - times had changed over there after 4 years of siege a decade later), and so many others.

After a couple years, the Commodore 64 was being replaced by the "better" and "more sophisticated" Commodore 128, which was supposed to have better graphics and sound. I missed the 64 when we sold it and got a 128 - it wasn't the same. Then, after my family moved to Pennsylvania, many of my friends there had Apple computers - the Apple //e was popular and that's what we had in the school. When we finally sold the old Commodore 128 at a garage sale and I started programming pinball games, playing Mario Bros (the original!), Lemonade Stand and Oregon Trail on the Apple, I soon forgot about the Commodore.

It wasn't until college that I ran across a Commodore 64 emulator, where you could download a program that ran in Windows 3.1 that would emulate a Commodore 64. The sound didn't really work and the graphics weren't quite right, but the familiar blue welcome screen came back. I realized how much I had missed the Commodore after 10 years. It was strange how history goes in cycles - I re-discovered the Commodore in college where I mentioned it in my application!

Fortunately, emulators improved over the years, and playing the Vice C64 emulator over the last few years was as close to playing the real thing as I could remember. The graphics and sound were about as authentic as could be (except my friends were all elsewhere, and the gamepad joystick and keyboard aren't anywhere near the same). Having my emulators throughout the years prevented me from becoming too rusty with some of the signature commands such as "POKE 53281,1" to change the color of the background, or "POKE 1024,83" to put a heart at the upper left corner of the screen.

The memories of the Commodore had remained in a corner of my mind, being revisited every several years when a wave of nostalgia would hit or I would spot a friend wearing an old retro Pac-Man or GI Joe shirt. I wondered for a long time if I would ever see a working one again. There is one in the Computer History museum in Mountain View (the old SGI building), but it is just a display piece and probably hadn't functioned for many years.

Fast forward to 2013. I got married to my wonderful wife Nisha, who had also attended MIT. After our honeymoon and moving in together, we started rooting through the boxes that her parents had left behind when they moved back to India. Amazingly, right near the front of the garage was an old HP computer box with a hand-typed label on it reading "Box contains Commodore 64 System: Keyboard, 1541 Disc Drive, Okidata Microline 320 - 9 pin printer, TV / Computer switch, ..." I excitedly opened the box, and rummaging through, I also discovered dozens of old floppy diskettes labeled with various finances, spreadsheets, recipes and other documents. This all looked like a gold mine! If the Commodore still worked, it could be a museum-quality piece! It was a time capsule in seemingly mint condition. It looked like the Commodore would be able to get a re-start in my life after all!

Unpacking the box from the garage, I found the familiar Commodore 64 keyboard, TV / video switch (which you plug into the antenna slot on the TV), disk drive, and many disks. I saw they had bought one of the original vintage units from 1983 (one of the old ones with the lighter colored keys). The Commodore was quite a find, even if it didn't power up anymore. At least, it would be interesting to see one again.

I knew Nisha's family used to own an Indian restaurant in Vermont where they had lived years ago. It turned out that they had bought the Commodore 64 back when it was new, and used it for several years to keep track of the finances, recipes, and assets of the restaurant. For them it was primarily used for business purposes, word processing and spreadsheets. Nisha's dad and her brother had written much of the accounting software themselves. Nisha explained that when her parents retired and moved to California in 1997 to be closer to her, her dad had boxed the Commodore 64 and transported it cross-country 3000 miles from North Ferrisburg, Vermont to Sunnyvale, California, in his old 1982 Mercedes 240D. Then, it had remained boxed up, as her dad bought a new computer after moving to California, and Nisha started using the modern computers at work.

I know that over the years, electronic parts break down and fail - they say we could be going through a set of dark ages right now, where instead of preserving material on printed medium that can survive for hundreds of years, much information is now stored on CD's, disks, and flash memory which may start to break down in the next 10-20 years, causing it to be lost if not backed up and kept up to date. Electronics manufactured these days are very cheap and mass produced and not built to last like things used to be.

Fortunately, the Commodore was manufactured before the "cheapening" of many electronics - the motherboard was sturdy with IC's, capacitors and resistors firmly in place. Often the first component to fail in the old days of transistor radios were the capacitors. Capacitors can leak over time or dry out, causing their capacitance to drop and putting the circuit out of specification, causing distortion in signals and wrong binary output for digital connections. I worried about this a bit, but kept my hopes up.

I soon ran into a problem, however. I couldn't find the power cord! I had this wonderful treasure from my childhood but for the time being it was just an expensive paperweight - bummer.

I had had some bad luck just a couple weeks ago with something that had also been quite promising at first. A group of us had been invited to a special cave in the Sierra foothills - we were all excited and highly anticipating the trip. However, what had been an intense excitement soon turned to intense frustration and grief - when we finally made it to the cave entrance and turned the key to open the gate, the key broke in the lock! We were all immediately saddened by this episode of "bad karma". I felt the bad karma has spilled over to the Commodore as well - what had been intense anticipation with the computer turned into frustration. My optimism had been squelched for a couple weeks. We had also been hit with a multitude of other struggles at the same time including a broken dishwasher, a dead power supply on my desktop computer...

I had vaguely remembered the power cord being attached to a heavy "brick" that I would stub my toe on when I was a kid since it sat under the desk in our house in Florida where I grew up. I googled the power supply and found out that indeed, it was a custom brick with specific settings. allpinouts.org indicated it as 5V DC and 9V AC from an external "power brick", attached to a 7-pin female DIN-connector on the computer. It was quite special. Also one search brought up an article on InfoWorld magazine from 1983 with a warning that "power supplies were notorious for failing over time, usually because of overheating." I remember as a kid when the power supply would overheat, strange lines would start appearing on the screen and the game would freeze. I took it as an indicator that we had played too long and we needed a time-out. I started to fear the worst about finding a power supply that was really 30 years old that would still work.

Talking with one of my friends at choir rehearsal the next evening who was a bit "tech-savvy" and geeky, he mentioned of an interesting place in Sunnyvale called "Weird Stuff". It sounded cool, and during our break, I pulled up a link on my phone - it sounded promising and maybe offered a possibility of finding a power cord for the Commodore after all! I realized I could probably order one on eBay - I'm sure there are many vintage computer collectors out there who are in to this sort of thing, but to find something locally would be great - I couldn't wait, but remained only cautiously optimistic.

The next morning I showed up at Weird Stuff - a giant warehouse of shelves of old computer parts from machines from the last several decades. You could find everything from old Tandy machines from the early 1980's to 286 desktops to old Apple //c monitors with missing knobs. It was another gold mine! It

was like out of an episode of American Pickers where guys travel cross country to find piles of old junk. Monitors were along one aisle, old disk drives were along another, spare S-video cables on another, and so on. Miscellaneous parts were in the back (what most of the place was). Unfortunately the guy at the desk seemed new and his guess would be as good as mine as to whether they had an old Commodore power supply.

Aisle Q (or was it W) way in the back had a bunch of power supplies. I recognized several from other similar old systems - Atari, Tandy, and Apple. But nothing from Commodore. I thought I was in the right place but seemed to be striking out. I wandered around a little more and when I came back, I saw there was another box behind the one I was looking at - I had missed it earlier. Less than 30 seconds into that box I came across a familiar logo - the Commodore "C" symbol with its blue and red lines next to the C. It looked like gold! I checked the connector, and yes indeed, it was a 7-pin "DIN". It indicated 5V DC, 9V AC - perfect!

At the check-out, my bill came to \$3 for the power supply! I was already late for work (I had been in the store for perhaps 2 hrs wandering). But I just had to try it out. I hastily plugged it in, connected the DIN to the Commodore keyboard and on came the red light - power! I thought I had the TV/Video switch plugged into the TV correctly, but checking every combination of channel 3 and 4, I couldn't get any display to come on. I had to get to work, so it would have to wait - bummer. My TV was too new and advanced for the antenna plug to connect - they had done away with analog TV back in June 2009 - you had to buy a converter box to keep your old TV working. They didn't build Commodore's with HDMI outputs back then...

I was on a mission at this point. I felt I had to re-claim this aspect of my childhood. Signs were all around me of people trying to re-claim their childhood as well. One of my friends had a retro Pac-Man shirt, a car in front of me on the freeway sported a Thundercats logo, and another car proudly showed an Autobots sign from Transformers. One of my co-workers had started "Star Wars T-shirt Thursdays" and a bunch of us (me included) happily displayed them at work! Mine was like an old Galaxian video game but the enemies were the Jedi spacecraft and you played the Dark Side! With so many adaptations of childhood memories not being the same (the new Transformers movie and GI Joe movies were nothing like the originals), I craved being able to re-live the memories of the past in an unspoiled form. The Commodore would be the perfect outlet for this.

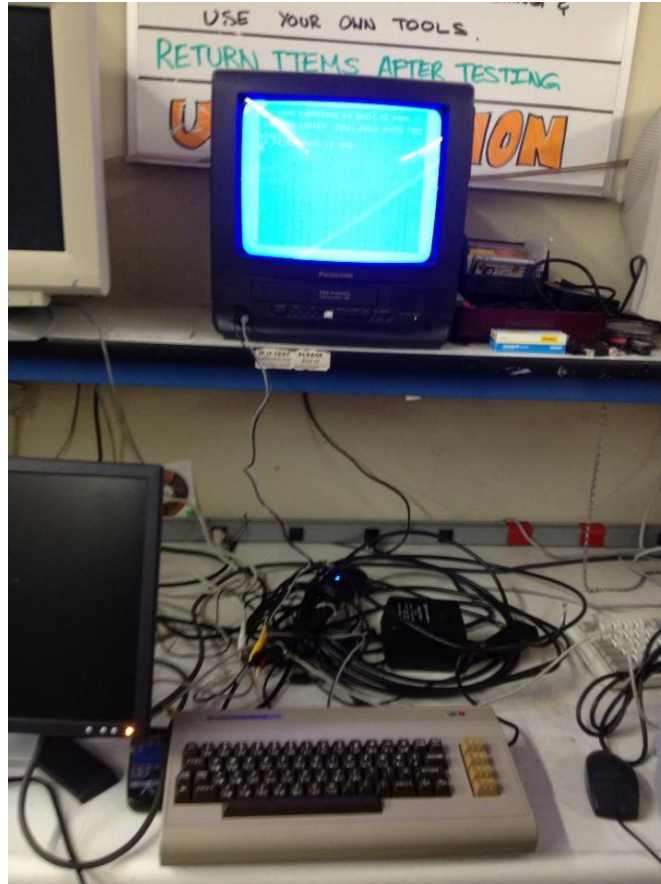
Back at the Weird Stuff store the following week, I started looking at cables - maybe there was a way to connect a 8-pin DIN video via an adaptor to S-video, or component, or HDMI - I really didn't care how I connected it. Even if it required 3 separate adaptors (DIN -> X -> Y -> S-video), I was satisfied. The DIN plug was very specific, however. A Commodore 64 site warned that "Beware that this is the 262° (horseshoe) version of the plug, not the 270° circular version" - I would have to be really careful. With so many things being USB plug & play these days, I had forgotten how many different types of plugs and adaptors used to exist.

Fortunately the Weird Stuff store had a "test bench" where you could bring in your machine and test it there on-site. I wouldn't be able to tell if the plug was 262 degrees or 270 degrees or 275 degrees - they all looked the same to me! After grabbing perhaps a half-dozen cables off various shelves, I started plugging things in and connecting our Commodore 64 to the TV they had in the store. I figured component cables would be the safest - pretty much all TV's still can use them. S-video could work too, but the S-video cables didn't have many other things they could connect to.

I thought I had a match, but yet the TV remained dark - no display came out. Another combination - again, no dice. I finally managed to touch a couple pins of the DIN connector to get a glimpse of video (I was just fooling around touching pins to see what signals might come out). But there was no sound. The Commodore was at least as famous for its sound (the SID chip technology was revolutionary), so with no sound, it was almost as good as useless. Onward went the search. I knew again, I could probably find something on eBay, but I thought I was very close. Plus, if I ordered something, waited a week for it to come and it didn't work, I would have to return it and try again...

I soon struck gold, however - in a bin of miscellaneous video cables, I stumbled across one that read "Commodore video cable" - it connected from an 8-pin DIN to component video / audio. Plugging it in at the test bench and turning on the Commodore, the red power light lit up and two seconds later, the glorious blue screen of life showed up! Success!

I probably had a dozen cables and random adaptors lying around. I quickly took them to the back of the store to figure out which bins they came from (I hoped they would probably eventually get sorted if I was wrong). Checking out at the desk - my bill was just \$1 this time for the cable - I showed him the photos I took with my phone (I had already posted one on facebook from the store). He was as excited as I was that I managed to get the old bucket of bolts working again!



Commodore coming back to life at Weird Stuff!

My bad karma from a while ago must have changed - I felt I was given a second chance with the Commodore after a series of setbacks and failures. Shortly afterward, I heard I would be given a second chance with the cave as well (the one with the broken key). This would prove to be true - we did indeed reschedule the cave trip, and returning several months later with a new key, the key worked on the first try and we had a blast!

Back at the house (I was late for work again, but oh well I would have a story to tell when I got in), I hurriedly plugged in the Commodore, flipped on the TV and NOTHING! I started to panic, wondering if my TV was somehow not compatible. We had owned an old TV with older types of inputs, but we had just donated it a couple months earlier. I futzed with the settings on the TV - maybe I had the wrong channel, the wrong mode, the wrong settings on the component inputs? I puzzled about it for a bit as I finished getting ready for work, but it soon came to me I may have just plugged the inputs in wrong. The plugs are not yellow/white/red color coded, but are just grey/black. I had just swapped the plugs by accident! I must

have plugged them correctly (by luck) in the store's test bench, but not at home. Swapping the plugs and power-cycling the Commodore, the familiar message "38911 bytes free" message came up in light blue letters - at long last, success! Yay!

To test the system and relive one of my childhood memories, I typed the familiar program:

```
10 FOR X = 1 TO 1000
20 PRINT "MATT IS COOL"
30 NEXT X
```

And it worked just like I remembered! Satisfied, I went to work with many stories to tell over lunch.

Back home in the evening, now that the machine was working, it was time to see what else could work with it. Nisha's dad also kept his old Okidata printer, 1541 disk drive and scores of ancient 5 1/4 inch diskettes. Amazingly, the printer powered up on the first try. Even the command "PRINT #9" worked just as it did in childhood. Right on cue, playing "Ragnarok Proofing" in spades, the printer spewed the line "Hello World". The ribbon was a bit dry and the print slightly faded, but the unmistakable 8-bit letters showed on the paper. It was as in "Wall-E" where the random gadgets and items the lonely robot stumbles upon on the long-abandoned earth still work as if they are new.

Next was to test the disk drive. Unplugging the printer and plugging in the disk drive (there was only one port, so only one device could be used at a time), the power indicator light of the drive glowed after decades of silence. Inserting a disk and typing the old familiar command

```
LOAD "$", 8, 1
```

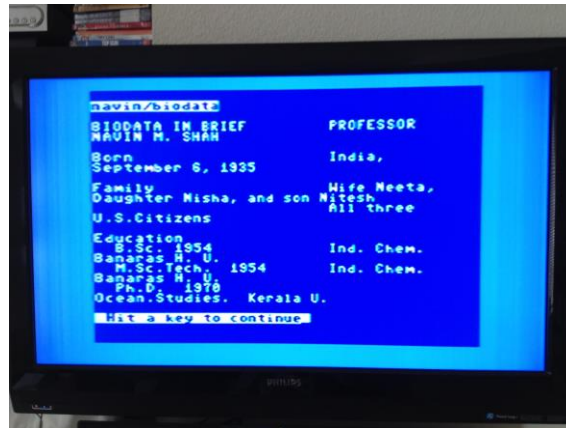
came back with a directory listing of a word processor and several documents! Loading the word processor and typing "RUN", the drive hummed, buzzed a bit but managed to retrieve the long lost bytes. From the word processor, you had the option to load a document - I had remembered a document called "casserole" on the directory listing (Nisha's dad also had a print-out of the directory listing stuck in the box). The letters appeared on the screen as if they were being read from a 1200-baud modem, line by line.

10 MINUTE CASSEROLE:

In a 2 qt covered casserole, mix 1 lb cut pieces of boneless poultry ...

It was a recipe - apparently something Nisha's parents used in the restaurant back in the 1980's. Another document was "resume88" - a copy of Nisha's resume from 1988 and when she still lived in N Ferrisburg, VT! There were dozens of old disks with digital files. I started taking screenshots of every page of the documents - an effort to preserve them, in case the Commodore was only going to last a short while before giving up the ghost for good. The feeble printer would probably die after printing a couple paragraphs and a spare ribbon would probably have to be special-ordered.

Browsing some of the other disks, I found that her dad even had saved versions of *his* resume, containing records of his university education and oceanography research in India, dating back to the 1950's!



Nisha's dad's resume

I felt we were in a struggle to preserve records of the past - again I felt we could easily be in a set of "dark ages" where so much information could be lost. Before the digital age, material was printed in books and on plates that would survive for centuries. Now, we are reliant on digital technology where both the media (the disks) and the readers (the drives) would both have to remain in working condition to recover the information. The Library of Congress is on an on-going mission to convert old media (from 100-year old custom wax cylinders to 8 inch giant floppy disks to Jaz disks) to a more persistent format that would survive. The mission is never completed and only gets more complicated each year as technology progresses at an ever increasing rate. Obsolescence is always a battle.

I went through maybe 1/2 dozen documents and articles - preserving everything might take a week or two! It would make a good rainy-day project, like how Nisha's dad had gotten their old 8mm films converted to DVD's - we still haven't watched those yet, but that's another rainy day project (and we haven't gotten enough rain!).

I was a bit saddened to realize Nisha's family rarely used the Commodore for "fun and games" - as a kid I only knew it as a fun and games machine. By the time I had to write papers for school, we had ditched the Commodore and were writing documents on the Apple. Nisha wasn't really into games as a kid (except for Pac-Man, which wasn't too violent), so games was never a priority. I still felt I had to get something back from my gaming memories, so I started looking on eBay for something.

One of my first searches came up with a Donkey Kong cartridge for about \$10. It was advertised to be in "working condition, recently tested", so I gave it a whirl. (Games that were indicated as not tested often only bid up to a dollar or two). The guy was from southern CA, and in the desert away from humidity for many years, I had faith the game would still play for a while. This game was the older (Nintendo / Atarisoft version) released in 1983 - the later (Ocean version) was released in 1986 - I was proud to have the original. I thought it ironic that the player was once named Jumpman (from one of my other favorite games on the Commodore), and it was renamed Mario (from one of my favorites on the Apple)!

About 4 days later, a padded envelope showed up in the mail - the game cartridge! Nisha didn't think there had ever been a cartridge inserted into the slot before - they had only run business software for the restaurant and worked with resumes and other important documents. I kept my fingers crossed on the cartridge slot. The pins still looked new so I gave it a shot. The cartridge was tight and didn't seem to fit properly, but I inserted it as much as I could. Flipping on the power switch was the "moment of truth" - just like turning the key in the gate of the cave... NOTHING! The power light didn't even come on - bummer...

I managed to loosen the screws to the case of the computer slightly and get the cartridge plugged in the rest of the way - maybe that was the problem. Still nothing. Unplugging the cartridge, the computer came on with the familiar blue screen, but with the cartridge, the computer didn't seem to have enough juice to power the game. Disenchanted, I packed away the computer and played with my emulator on my computer

for a while to try to re-gather the memories that had been long forgotten.

Being in a state of denial, however (I wasn't ready to grieve the loss of the Commodore quite yet), I went back over and decided to give it a go one more time. Blowing on the cartridge for good luck (as had often worked when I was a kid), plugging it back in and flipping the switch, the game came on! DONKEY KONG! Press F1 for 1 player. With a press of F1, the game came to life - the giant gorilla had kidnapped the girl, taken her to the top of the familiar set of beams, set her in her high perch, and then stomped a bunch of times, dropping the beams into their familiar arrangement.

Barrels flying and rolling down the beams, I was ready to run and climb the ladders and dodge the barrels to rescue the girl. But I was paralyzed! Frantically arrowing left and right on the keyboard, I felt my feet were in lead and couldn't move. Maybe instead of the arrow keys, it was I,J,K,M to move (I remembered a bunch of games using those keys) - nope that didn't work either. I started banging all around the keyboard - my feet were not responding and soon the first barrel landed on my head and the life was over. Two more lives ended the same way and the game was over.

A quick google search on the Donkey Kong game brought up the Wikipedia site which indicated "The game is controlled completely by joystick in port 1 of the C64". It was bittersweet - now I knew what the problem was - I just had to find a joystick. I couldn't get any further otherwise. The saga continued.

Browsing yet again on eBay, I found several sellers with restored Commodore joysticks, complete with Commodore-compatible joystick ports (similar to serial ports). I was happy with a rebuilt joystick - my experience as a kid had revealed a joystick wouldn't last more than about 6 months! At this point, I just wanted to be able to play Donkey Kong! I found a seller who had built many joysticks and tested them, so I bought one for about \$15.

The joystick appeared on our doorstep and I immediately plugged it in, with eager anticipation of getting the game to run. I knew the power supply was a bit fickle at this point - it was barely strong enough to support the cartridge. I wanted to test the joystick first though. Luckily the screen came on with the first try with the joystick plugged in. A quick search on the Commodore 64 wiki site (yes, there is an entire wiki for C64 enthusiasts - c64-wiki.com) brought some instructions to test the joystick. It was PEEK(56320) and PEEK(56321) for the two joystick ports. I tested both ports, and the bits changed when the joystick moved - yay!

I plugged in the game and powered on the computer once again, all ready for the adventure, and yet again NOTHING! Apparently at this point, the power supply was simply too tired to be able to support the computer, the game, and the joystick all at the same time. Unplugging the game and the joystick, the computer turned on after several tries, but even then, it was failing more often.

I had proven the game worked and the joystick worked (individually), but at this point, the computer seemed to have given up the ghost. Maybe it was a final RIP for the old machine. Sadly I hadn't loaded all the disks and reviewed all the recipes and financial records on those disks - at least I got a couple working. I feared the worst - maybe the motherboard had finally had enough after 30 years - maybe this was the final straw.

An idea came a few days later, however - maybe it was indeed the old power supply I had picked up at Weird Stuff - maybe that's what had given up the ghost. I couldn't tell what kind of condition it was in. I opened it up and looked inside - it's just a bunch of capacitors, inductors, resistors, and coils - the electronics are mostly analog and very simple. I was hoping to find something obvious - a cracked capacitor, broken resistor, or something, but nothing stood out.

I gave one last ditch effort. I went back onto eBay and found somebody who had built several C64 compatible power supplies (with the 7-pin DIN connectors, and 5V DC, 9V AC specifications). It cost a hefty \$30 with another \$10 shipping - I double-checked the return policy since I figured there'd be at least a 50% chance it would be coming back. But when it arrived, I plugged it in and immediately the familiar blue screen came on. Phew! Then I powered down, optimistically plugged in the game cartridge and

joystick, and powered it back on, and was greeted with some music from my childhood once again - dum, dum dum dum duuuum duuuummm... pow, pow, pow...

The beams were set, barrels were flying, and this time I was finally able to run with the joystick, climb the ladders, make flying leaps over rolling barrels, and rescue the girl!



Success!

Epilogue

Months later, I stumbled across another box in the garage when I was looking for a kitchen weigh scale. In searching for the lost scale, I ran across a soy milk box that wasn't obviously labeled. It turned out to be labeled, but the box was turned around, so the label was in the back, unseen for years. The label read "Commodore 64 Power Supply and Manuals" !! Nisha's dad had indeed kept the power supply after all! I wonder what further adventures await in the journey of rediscovering my childhood - I'm sure there are surprises we have still yet to discover.

It had been a wonderful journey getting back to my childhood once again. It turned out to not yet be finished, however. I found out they had released a DVD of all the back-issues of COMPUTE! magazine 11 recently for just \$10. I could load the DVD, retrieve all the listings of every game and program ever offered in the magazine and peruse the code. I could even cut & paste the program listings directly into my C64 emulator (no more hours of tedious buggy typing required). If only I could cut and paste from the DVD in my PC to the Commodore - I'd have to go back to eBay and see if anybody has built such an adaptor!

I had mentioned earlier about the legendary sound and harmony that the Commodore produced with its groundbreaking SID sound chip. I think the sound reinforced my love for music at a young age (which so many kids are lacking these days). I discovered barbershop harmony just a few years ago and immediately fell in love with it. I ended up joining a local chapter chorus, singing in several competitions with them (even winning a chorus bronze medal in Nashville a few years ago), and am hoping to compete in Las Vegas this summer.

The spirit of the Commodore lives on as well - just recently, somebody with a bit too much time on their hands managed to make a port of the sensationally popular "Flappy Bird" game (that people would play on their phones), to the Commodore 64! Written with the nostalgic pixelated graphics of the Commodore, it

played like the real thing! Now, we just need a port of the retro "Bruce Lee" and "Impossible Mission" to be released and made top hits on the App Store!