Command and Data Handling (C&DH) System

**Since we don’t have any experience in hardware or software, we have chosen to look at previous small satellites and base the C&DH system on some of those. The following was used on Citizen Explorer, a small satellite built by the Colorado Space Grant Consortium. We mainly used theirs as a starting point; we will change components if needed.

3 Sections
1. Computer
   - Runs the flight software and stores information for later retrieval.

2. Network
   - The system that interfaces the Computer to the rest of the hardware on the s/c.

3. Critical Decoder
   - Allows us to recover from radiation-induced errors.

Computer
At its core is an Intel 386 CPU (Central Processing Unit) running at 25 MHz. It has 8 MB of RAM (used for temporary data storage), 1 MB of ROM (used for permanent software storage), and an 8 MB SSD (Solid-State Disk, which "acts" like a hard disk, but has no moving parts. The SSD is used for temporary software and data storage).
The Critical Decoder
The last piece of the C&DH system helps out with a big problem in space: radiation. Computers store information in binary numbers, so every digit stored in the computer is either a "one" or a "zero". Radiation in space consists of particles zipping around which have very high energies; when these particles pass through living things, the energy in the particles can damage cells. And when the particles pass through computer chips, they can change the stored "ones" to "zeros" and vice-versa! This results in errors in the computer system.

Such errors aren't permanent, and we can fix the system by shutting it down and restarting it. The Critical Decoder gives us an "on/off" switch we can control from the ground; if the onboard computer is acting funny and won't respond to us, we can shut it down and restart it so that it will work normally again.