**~ 1970:**

* John Rex Warren had a knack for programming Litton tape drive based computers and slowly started to build up a small name for himself in writing software for these machines
* Bud was working as a detective and Bud’s sister was married to John Warren
* Litton Industries decided to drop support for their systems and John saw an opportunity

**1971:**

* Warrex Computers was created by Bud Smith and John Rex Warren using $4,400 (half Bud’s severance pay, half John’s money) in San Antonio, Texas
* Warrex Computers was incorporated with John, Bud and Bud’s sister as the co-founders
  + John was a notoriously sketchy person however, often using company funds to buy himself fancy toys, or spending time with one of his many girlfriends

**1972:**

* John meets with Terry Little, Henry Arnold and Bob Wohlander in San Antonio, who were ex-Litton employees
* Terry knew manufacturing, Henry and Bob knew engineering, John knew programming and Bud knew business and marketing
  + This combination of skills allowed Warrex to get off the ground
* At some point in the early 1970s, Warrex relocated to Dallas, Texas
* This team provided new software packages and tech. support to customers that had Litton computers

**The EE200:**

* One day Bud gets a call from a Bank who is a customer and they want a new computer
  + They’re sick of how difficult and unreliable the Litton is
  + They want Warrex’s programs and support on a new machine
  + Bud searches high and low and finally comes across [Eldorado Electrodata](http://www.bitsavers.org/pdf/eldoradoElectrodata/)
* The Eldorado Electrodata design featured three CPU cards on a passive backplane
  + This was called the [EE200](http://www.bitsavers.org/pdf/eldoradoElectrodata/ee200_Brochure_1972.pdf) and was the primary hardware used by Centurion for many years
  + The Warrex teams figures they can work with this hardware
* Warrex then became an official Eldorado Electrodata dealer
  + Warrex, [Fedder Data Centers](https://trademarks.justia.com/722/43/fedder-data-centers-72243234.html) and (we believe) Computer Development Inc. (CDI/IPC) all three became dealers for Eldorado
  + The three dealers had a contract that if Eldorado failed, they would receive perpetual rights to continue producing the technology (the EE200)
* Warrex sold EE200 systems with a Sykes drive and core memory
* Bud quits Warrex and then joins again after a month
  + John was continually stealing money from the company and Bud had had enough
  + John desperately need Bud, and Bud needed the money, so Bud rejoined
  + However, Bud made John sign a 5-page contract that forced him to be less shady
* After a few months of selling and maintaining EE200 based tape systems, Henry, Terry and Bob become partners
  + John = 30%, Bud = 30%, Henry = 13.3%, Terry = 13.3%, Bob = 13.3%
* John wrote powerful accounting and inventory software packages that ran on the EE200 tape based systems
* Eldorado goes bust and control of technology is handed over to Warrex, Fedder and CPI
  + Additionally, Eldorado had built a huge number of backplanes and CPU boards and this stock was redistributed among the dealers who gained control of the technology

**1973:**

* Bob Christensen (BC) and Steve Webking get hired sometime around early 1973 for engineering work
* At this point, the Control Data Corporation (CDC) 9427 Hawk drive is the wave of the future
  + The 9427 is the precursor to the 9427H used in our Centurion system
  + It features 10MB of storage, 5MB removable and 5MB fixed
  + The platters spin at near 3,000 RPM and seek times are lightning fast

**The First Warrex/Centurion Computer**

* John Warren started writing the random-access [Operating System](https://github.com/Nakazoto/CenturionComputer/wiki/Operating-System) (notably [JCL](https://github.com/Nakazoto/CenturionComputer/wiki/JCL-(Job-Control-Language)))
* Getting the EE200 based hardware to work with the Hawk drive proved difficult
  + The EE200 had some random-access issues and required redesigning a bit to work better with Hawk
  + DMA access was also necessary and so a fourth board was dedicated to that (unclear as to who was supplying the DMA boards at this time)
  + The CPU4 system was so named because it utilized four cards - three CPU cards and a DMA card
* Warrex built a fake case that looked fancy and got a beautiful model (Jan Gibson) to pose with it on the steps of the capital (this brochure specifically)
  + This photo and brochure was used as a bargaining tool to build a line of credit with CDC for Hawk Drives
* CDC gave Warrex a $200,000 line of credit
* Warrex started selling the first CPU4 systems
  + CPU: Modified EE200 CPU cards + DMA card
  + Memory: 4k core Fedder built 16k DRAM
  + Storage: 9427 Hawk and Sykes tape compatible
  + Communication: ???
  + Peripherals: ???

**1974:**

* In late 1973/early 1974 Warrex joined a trade show in El Paso, debuting the CPU4 system
  + Warrex was the only vendor using the Hawk
  + The lightning fast drive combined with John’s powerful applications meant that Warrex absolutely killed it at the show
  + They were taking orders for systems at the actual show
* Warrex was involved in some litigation [with IBM in 1974](https://github.com/Nakazoto/CenturionComputer/blob/main/Reference/Ads/Screen_Shot_2022-04-15_at_12.41.13_AM.png), unsure as to what
  + Bud was unfamiliar with this litigation
  + We believe it was potentially against John for non-payment of something
* Warrex starts selling Centurion computers all over the state of Texas
* Bud Smith is working very closely with CDC to continue receiving drives
  + At one point, Bud sold two systems, but only had one Hawk drive
  + They would install it for two weeks at one customer’s location, then say it had a problem, and carry it over to the other customer’s location for two weeks
  + They kept up this lie of Hawk “problems” to share the drive between two customers long enough to get a second drive
* As the company grew and demand for systems increased, they needed more space
  + They moved to their location on Arapaho

**1975:**

* Ken Romaine joins Centurion as 6th employee and first non-family employee
  + Ken worked with Centurion from August 1975 to March 1986
* Warrex was using the Hawk disk controller model “A” Disk Controller from Fedder Data Systems
  + The Fedder model “A” Hawk Disk Controller had design problems causing data to occasionally be written in the wrong disk sectors
  + This forced Warrex to design their first PCB’s the [DSK/AUT and DSK-II](https://github.com/Nakazoto/CenturionComputer/wiki/DSK-AUT-and-DSK-II-Boards) (p/n 1001 & pn 1002)
    - These would read the Sector Address “before” writing data into a sector, solving the problem
* Warrex designed its first memory PCB to replace the EE200 4KB core memory & Fetter’s 16KB memory cards.
  + The Warrex 32KB memory board (p/n 1003) was a 4-layer PCB using TI’s 22 pin 4K bit DRAM memory chip.
    - The 2nd engineering prototype 32K memory burned up damaging all DRAM chips because of a mod-wire error on the refresh timer circuit
* Warrex designed its first 4-Port MUX as well as Parallel Printer Interface

**1976:**

* Warrex built its own wood cabinet tops and CRT tables in their own dedicated woodworking shop
  + The shop caught fire and nearly bankrupted the company
    - The CPU3 PCB artwork was on the drafting table at the time of the fire and was subsequently lost in the fire
  + As a result of the fire and loss of CPU3 artwork, Warrex designed replacement 4-layer PCBs for the CPU1, 2, 3 and DMA cards
    - These had been purchased from David Fetter at Fetter Data Systems
  + Now Warrex had its own CPU1, 2, 3 and DMA cards now on 4-layer PCB’s not 2-layer PCBs
* John Rex Warren was driving through west Texas when a tire blew and he was killed in a car crash
  + John was driving a 1975 C3 Corvette at triple digits through west Texas towards Odessa
  + The Vette had Firestone tires and the Warren family got into legal battles with Firestone & GM
  + Ken Romaine was supposed to join John that night, but he had service calls in East TX that kept him to Midland / Odessa (whoa!)
* After John’s death, the company name changed from Warrex to Centurion
  + Centurion is the “Guardian of the People’s Data” (according to Bud)
  + Rumor is the employees liked the cop movie “The New Centurions”

**1977 ~ 1978:**

* Steve Jobs and Bill Gates approached Bud at the [West Coast Computer Faire](https://en.wikipedia.org/wiki/West_Coast_Computer_Faire) about implementing a GUI, however Bud declined
* The CPU5 was developed Steve Webking
  + The CPU5 featured a much more evolved ISA based on the AM2901 using microcode
  + It was constructed with two cards sandwiched together ([like the FFC](https://github.com/Nakazoto/CenturionComputer/wiki/FFC-Board))
* Jim McGee and Steve Pool were the OS Software engineers around this time

**1979:**

* The CPU6, developed by Steve WebKing, releases in the Centurion 6000
* Centurion Moves to JayEll Dr, from Sherman Dr. in Richardson.
* Centurion attends large minicomputer seminar in California
  + They did well with good software packages and strong hardware
  + EDS was in attendance and first heard of Centurion here
* Smart MUX cards development began
  + AM2901 based MUX cards that allowed up to 16(?) serial connections per card
  + The smart MUX cards unfortunately were too cost prohibitive and were never completed
* In response to the failed Smart MUX cards, David Williams developed an 8-port MUX card
  + Two [4 port MUX boards](https://github.com/Nakazoto/CenturionComputer/wiki/MUX-Board) were combined onto a single board
  + The programmable baud rate circuitry was stripped out to fit the 8 [UARTs](https://en.wikipedia.org/wiki/Universal_asynchronous_receiver-transmitter)
  + Port 3 and Port 7 had DIP switches to toggle the baud rate for printers
  + Ports 0, 1, 2, 4, 5, and 6 were all hardwired thru jumpers to 9600 baud
* 56 bit Fire-Code Checksum CMD Drive Controller Developed (7 or 8 board set) by Bobby Christenson and Tommy Atwood

**1980:**

* The chassis design changed to get UL certification
* Bud Smith met with an EDS representative who started the process of buying Centurion
  + This process was a bit long and convoluted because Bud wanted to protect his employees
  + Bud particularly wanted to protect Centurion dealers.
* Two board/Single Board [CMD drive controller](https://github.com/Nakazoto/CenturionComputer/wiki/CMD-Board) with simple CRC checksum developed by David Williams
* [Finch Floppy Controller card](https://github.com/Nakazoto/CenturionComputer/wiki/FFC-Board) designed by Tommy Atwood and David Williams
* Centurion Reel to Reel Tape Drive interface developed by David Williams
* Centurion gets a mention in the book “[The Soul of a New Machine](https://en.wikipedia.org/wiki/The_Soul_of_a_New_Machine)” by Tracy Kidder when they describe the big New York computer show
  + "*But I saw many other names, passing by. Among others, I saw Centronics, Nortronics, Key Tronic, Tektronix and also General Robotics. There were Northern Telecom and Infoton and Centurion, which had a fellow dressed as a Roman soldier standing by its booth.*" - Tracy Kidder
  + Centurion had hired an actor to dress like a Roman Centurion for the show booth
  + Eric L. recalls seeing the costume in someone's office at one time

**1981 ~ 1982:**

* Early January 1981, EDS purchases Centurion for enough money to make Bud agree
* During this time Centurion grew to be quite large, totaling 300? Employees
* The CPU6 was still going strong being further developed by Steve Webking
  + AM2901 based architecture with 56-bit microword
  + MORE SIMPLE SPECS HERE
* Centurion 8-inch Disk Drive Interface and Streamer tape interface developed by David Williams
* Centurion also started development of the MicroPlus
  + 4-Slot Backplane - David Williams
  + Membrane switch Front panel - David Williams
  + Dual Floppy or 8 inch Drive with Floppy or 8 Inch Drive with 8 Inch Streaming Tape Drive
  + 64k, 128K, or 256k Memory Board - Steve Webking
  + The MicroPlus was sold to CUDNA Credit Unions
* Centurion was also designing an Intel based PC for EDS that never made it to production
  + Engineering was told that EDS used it as leverage to get reduced pricing from IBM
* Somewhere in here Centurion did a port of [Unix](https://en.wikipedia.org/wiki/Unix) to the CPU6
  + However (as we recall) there wasn’t enough memory run any applications, all they could do was boot Unix
  + Steve once mentioned to Eric L. that EDS was able to get Unix to boot on a CPU6 but the performance was not good so they quietly dropped the project
* There was also an attempt to contract a [COBOL](https://en.wikipedia.org/wiki/COBOL) compiler to be written for the CPU6 that eventually was dropped
* [Diag Board](https://github.com/Nakazoto/CenturionComputer/wiki/Diagnostic-Board) for CPU5/6 designed and built (Hardware design by David Williams, software engineering by Terry Little, concept and specifications by Ken Romaine)

**1983 ~ 1984:**

* 8-Port Mux board developed by David Williams

**The Counterfeiting Scandal:**

* This was a period in which Centurion came to head with some nefarious entities who were selling knockoff Centurions that would ultimately lead to Centurion's bankruptcy
  + Bad blood starts to form between Bud and Ross Perot
    - Ross wanted to shift Centurion to pure GM work
    - That would screw all the Centurion dealers
  + Bud and Ross met on a weekly basis and the meetings got worse and worse
  + Finally, Bud quit in a fit of anger and that really pissed Ross Perot off
  + Bud starts his own company called ZTron
  + Around this time, Jim McGee quits Centurion/EDS, but carries a disk pack filled with OS and Application source code
  + Jim sells this pack to Bud at ZTron, who starts reverse engineering
    - The goal of reverse engineering was to fix problems that plagued the OS
    - For example, the OS was updated to use 512 byte sectors instead of 400 byte sectors
    - They also fixed buffering issues with the OS
  + The first counterfeit system is seen in the Tulsa, OK office and reported to EDS management around 1984
  + The first counterfeit circuit boards showed up in the EDS-Centurion repair depot
  + Counterfeit PCBs came from the Ft. Worth dealer for a Dallas area customer system
  + EDS starts looking into the counterfeiting problems
  + Some of the Centurion “PCB vendors” were selling blank PCB’s to people at a Centurion dealer to build systems.
  + The dealer would solder the PCBs up, put them into a generic case with a Hawk and sell
  + Once enough proof was found, Ross Perot rained down hellfire
  + Centurion had to remove all counterfeit cards and replace with genuine cards
  + All counterfeit cards were taken by EDS and presumed to have been destroyed
* At this point, Ross Perot is fed up with Centurion
  + Between the counterfeiting scandal and Ross Perot seeing Bud's departure as an insult, he's done with Centurion
* Centurion was sold by EDS to ZTron, the company Bud Smith started after leaving Centurion
* EDS sold hardware and software rights to ZTron just to be rid of it and the dealership base
* ZTron began development of the CPU7
  + CPU7 was a Multibus-1 based system
  + Multibus 1 allowed the use of third party developed cards including
    - SCSI-I disk controller from InterPhase
    - Buffered intelligent MUX card
  + Dual AMD 2903 based CPU
  + 4M of Memory
  + Of the shelf controllers and backplane
  + Switching Power supply

**1985:**

* Perot had it in for Bud Smith, and waged a war of attrition against Bud
  + War was waged with incessant legal battles over minor things
  + As Bud tells it, this was intended to bleed Bud dry of time and money until ZTron went bust
* Centurion found a group of Doctors out of Tulsa that put up 1M$ to get them past the EDS issue

**1986:**

* EDS went and somehow withdrew the 1M$ for missed payments forcing ZTron into bankruptcy.
* ZTron went bankrupt and Centurion was sold to Buddy Cruze of Cruze Computers
  + Centurion Dealers Computer Corporation (CDCC) was formed as a subsidiary of Cruze Computer Systems
* Cruze Computers still exists today and currently holds the Centurion IP
* Cruze developed the CPU9
  + The CPU8 was never used as a “label” for marketing reasons
  + The CPU9 was simple a cleaning up and streamlining the microcode of the CPU7, and represented a 30 to 40 percent increase in speed over the CPU7
  + The CPU7 was designed by an engineering firm in Houston using tools that optimize completing the project expeditiously and not for product performance
  + The only real difference in the CPU6 and CPU7 electrically was the bus interface and how memory was accessed
* The OS saw major changes due to a change from 400 byte sectors to 512 byte sectors
* A reverse compiler for the CPU7 microcode was developed by David Williams

**1987:**

* Centurion Dealers Computer Corporation (CDCC) was moved to Knoxville Tn.

**1988:**

* CDCC was moved from Knoxville to the Industrial Park near Maryville Tn.
* Somewhere in here Dr. Jim Lemmee joined CDCC from the Indianapolis Dealership.

**1991:**

* CPU 10 was developed.
  + The CPU10 was a 16 bit bit-slice CPU
  + Simple instruction prefetching
  + Simple data caching.
  + Upward Compatible with the CPU7 and CPU8
  + Some Instruction set enhancement

**1992:**

* Centurion ported to the X86 environment including 8X287 integer emulation
* All drivers for new PC and Multibus interfaces implemented Jim Lemmee
* All operating system modules ported to X86 Jim Lemmee
* Integer operations w/wo 80287 implemented by David Williams
* All CPL, JCL, Supported applications (GL, AP, AR, etc) converted to X86 Jim Lemmee and David Williams
  + Configurations were:
    - Single PC as Single user
    - PC as multiple users, using 4 port smart multiplexers
    - Multiple users using a network of PCs
    - Multi-bus 1 using the 80286 w/wo the 80287
* The Centurion CPU6 hardware side of things was completely retired
* Many enhancements to CPL to give it more C functionality
* A version of this port is still in use today with two customers of Cruze Computers