

Warrex / Centurion Minicomputer mfg. Richardson, TX 1974 to 1984 - info bits after 40 years?

Memory Map

Last Byte of
Program Mem.
FFFF (HEX)

First Byte of
Program Mem.
0100 (HEX)

FFFF
Memory Mapped I/O
F000
60KByte Program Memory
0100
00FF
256 Bytes CPU Registers
0000



DSK-1 & DSK-II Disk Controller for CDC 10MB 9427Hawk I/O Address F140 (HEX)
F140 Unit Select Reg. 00 = drive 0 platter 0 or 01 = drive 0 platter 1 or 10 = drive 1 platter 0
F141 & F142 Sector Address Reg. Cyl# Head# Sector# msb(CCCCCCCCCCHSSSS)lsb
F148 Command Reg. write 00=Read 01=Write 02=Seek 03=RTZ (ReturnTrackZero)
F143 Status Reg. (???) Disk Format = 16 (400 byte) Sectors per Track, 2 Tracks per Cylinder & 405 Cyl. [or 810 Tracks per platter = 5MB]

CMD Disk Controller for CDC 96MB 9448 Hawk I/O Address FC00"?" (HEX)

1st 4 Port Serial MUX I/O Address F200 (HEX) - System boots using CRT on Port-0 & baud = 9600,8,1,1,N

DMA Cont. card FD00 (I think?). If CPU5, 6 or 7 DMA is on CPU card. DMA-I/O are 1x400 or 16x400.

Interrupt Level [F]	Build by: Warrex, Centurion, EDS & ZTON
Interrupt Level [E]	CPU4 max RAM 60KB
Interrupt Level [D]	CPU5 max RAM 60KB
Interrupt Level [C]	CPU6 max RAM 2x60KB pages
Interrupt Level [B]	CPU7 max RAM 4x60KB pages
Interrupt Level [A]	Operating System @OSN & IBM like JCL
Interrupt Level [9]	Programming Lang. CPL or Assm. Code
Interrupt Level [8]	Max users 2 to 24 based on total memory.
Interrupt Level [7]	CPU4 type TTL (state mach.)
Interrupt Level [6]	CPU5, 6 or 7 AMD-2901 2x4-Bit Slice
Interrupt Level [5]	All CPU's 4. 5. 6 & 7 have same CopCode set.
Interrupt Level [4]	All CPU's have 5 MHz master clock.
Interrupt Level [3]	Sector & Record length 400(DEC) or 190(HEX).
Interrupt Level [2]	Systems have DMA function for 1 or 16 sector I/O.
Interrupt Level [1]	Power Supply +5 , (+/-) 12, (+24 VDC Floppy)
Interrupt Level [0]	

Each Interrupt Level [0-F] have
Eight 16 bit registers.
{all Mem. R/W are 8 bit}
CPU PC Program Counter 16 bits
The S-Register saves 4 bit Interrupt Vector.

- CPU4 (4 card CPU) Bootstrap on PROM / EEROM on DSK-1 card
 - CPU5 (2 card CPU) Bootstrap PROM on backplane in socket
 - CPU6 (1 card CPU) Bootstrap PROM on backplane in socket
 - All CPU models have 8bit R/W to memory and 16bit Prog.Cout.
 - Complete system boot starts with the Bootstrap PROM reading a master IPL track from track zero of selected disk drive into memory address 0100(HEX) then running the IPL program & outputting messages on CRT connected to MUX-0 Port-0.
- If the minicomputer will not boot a **Diag/PROM Test** card needs to installed into the backplane to trouble shoot the no boot problem.



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Common problems:

- Blown RS-232 or 20ma current loop XMIT/RECV chips on MUX ports or the CRT by external induced current spikes (lightning). LEDs on system front panel look normal but no text displayed on CRT0 or other CRTs do not display text.
- System with not boot or just crashes. Could be main system memory board or memory chip. Try diff. memory card to use 4 position dip switch on memory card to “roll” the 4 or 16K DRAM around the memory address selecting that memory bank. (Also try removing any cards in the card cage not needed to make the system run, extra MUX, Printer or Memory.
- Disk drive (boot-disk) keeps seeking over and over again Return Track Zero (RTZ). Not reading selected boot disk so try changing the position of the R/F switch on the system front panel to boot from other disk platter. (Removable / Fixed disk) Check disk 50 pin of 60 pin cables for damage between drive and controller. Use **Diag. ROM Board** to complete basic system card tests. Check over disk drive closely before just switching out to other removeable disk packs so not to crash heads / platter on new disk pack. Crashes are not very common but I have seen a field engineer or customer crash more than one disks before check of they did have a head crash. (FYI – Never move the drives even just around the room without installing the head-locking pin, if not the heads can slide out of retracted park position and cause damage.)
- Check system power supply +5, (+/-) 12 and +24 VDC [24 VDC is for Floppy disk drive systems]. Also check +5 VDC for 60 or 120 Hz ripple on the DC supplies. 60 Hz likely bad bridge diode, of 120 Hz ripple then likely bad main filter capacitor.
- Computer room temp. over 85 degrees of system fans not running? Plugged up air-filters? System over a floor heater vent?
- Ask about any changes to system hardware, new disk packs or software just installed before the problem started?
- System cards with dip switches set wrong can keep system from booting.
- 9427H & 9448 CMD drives do fail but be careful trouble shooting drives if not trained on them. Things can go bad very fast!

