HEWLETT-PACKARD CO.

NOTE: This page provides a running history of changes for a multi-page drawing which cannot conveniently be re-issued completely after each change. When making a change, list for each page all before-and-after numbers (within reason; use judgement, and use "extensive" revision note if loss of past history is tolerable, or retype complete page) and associate with each a symbol made up of the change letter and a serial subscript to appear here and on the page involved (there enclosed in a circle, triangle, or other attention-getting outline).

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HEWLETT PACKARD

BOBCAT MOTHERBOARD THEORY OF OPERATION

The Bobcat Motherboard serves three functions:

1. It busses power from the power supply to the fans, big boards, and backplane.

2. It busses DIO signals from the big board connectors, to the ribbon cable that connect to the backplane.

3. It drives the front panel LED.

I. POWER BUSSING

1. Starting with Rev. C motherboards, the sense wires for the +5V supply are tied into the +5V and ground planes near the ribbon cables to allow the power supply to compensate for drops across the motherboard.

2. All signals from the 96 pin motherboard connectors are routed to the Bobcat backplane through the JA and JB ribbon cables. Power is also provided to the Bobcat backplane through these ribbon cables. Backplane power allocation is:

VOLTAGE	MAX CURRENT	RIBBON CABLE WIRES ALLOCATED
+5 V	6.2 A	7
+12 V	1.6 A	2
-12 V	0.5 A	1
GROUND	7.8 A	16

Each ribbon cable contact is rated for 1A. The contact and wire resistance through each wire of the 28AWG ribbon cable is about .075 OHM. With 6.2 A runnint through +5V, then, we should see about 65mV drop through the ribbon cable on the +5V line between the motherboard and the backplane.

3. The JC and JD cables between the backplane and expander have 22 logic ground wires allocated to minimize any logic ground differential between the boxes.

4. DGND is connected directly to logic ground at the DIO connector. It is the responsibility of the I/O card designer to design the card such that large current glitches are not placed on this ground.

5. The small fan is an 18V fan that we run at 17V. The large fan is a 12V fan that we run at 11V. The two series diodes CR2 and CR3 drop the 12V supply from typically 12.4V - 2*(0.7V) to 11V. Diodes were

used instead of a resistor to provide a more "current insensitive" supply to the fan.

II. SIGNAL BUSSING

1. The ribbon cable signal placement was designed to minimize any crosstalk problems. Grounds or +5V lines are placed between all critical handshake wires.

2. PSPARE and SPARE on the DIO backplane have been renamed R. CLOCK and SAS* respectively for RODIO. They therefore do not show up on the signal list except under the new name.

3. Bobcat does not support vectored interrupts. IACK* will be tied directly to +5V at each DIO connector. VECTOR* and IMA* are no connects at each of the DIO connectors. (i.e., the VECTOR* pins are not connected together, even between DIO.)

4. The signals BG3, SPARE0, SPARE1, and SPARE2 are not on the motherboard. They are, however, bussed between all DIO connectors and bussed through to the expander. Two I/O cards could then talk through these spares if necessary in the future.

5. Pins 1 and 50 on the ribbon cables are logic ground. These lines are tied to a ground mesh inside the ribbon cable. Placing the grounds in this symmetric fashion allows up to plug in the ribbon cable in either direction.

6. The pinout on the ribbon cables has been chosen such that the JA and JB pinout is very close to the JC and JD pinout respectively. The only differences are that no power signals are run through the JC and JD cables, and that some signals not routed from the motherboard to the backplane (JA AND JB) are routed from the backplane to the expander (JC AND JD).

III. LED POWER SENSE

1. A 15V zener diode was added to the motherboard to provide a power supply sense for the front panel LED circuit. +12V and -12V can only come up if the +5V supply is up. The circuit is designed such that if either of the +12V or -12V supplies are at 0V, there will be inadequate current to turn the front panel LED on. This circuit provides sort of a poor man's power supply up detector.