Hitachi America, Ltd.

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Application Engineering TechNote

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H8/320 Series: Floating Pins

For any engineer creating a design with a microprocessor, it is always very important to make sure that all the pins are connected correctly. This mean that some pins must be tied high or low, or connected to the appropriate external signals or to other devices. What pins does one need to make sure are connected, and what pins may be left floating without causing any operational problems? This TechNote takes a look at H8/320 I/O pins from this angle, to see if everything is hooked up as it should be.

The major issue in deciding whether or not a pin may be left floating is simply whether or not it is being used. Obviously a pin that you are using is not going to be left floating, but is going to be wired in an appropriate fashion. For the general I/O lines as well as for the specific peripheral functions like the timers and serial ports, it is fine to leave the pins floating if they are unused. Of course, an output line can never really be "floating", so it is the input lines that one needs to be careful about. In the end, the pins that must be connected are the ones that might be called the 'system control pins' - pins that that affect the overall functioning of the CPU. An open pin always poses a danger of drawing in current from a system, and becoming high or low unexpectedly. While this won't always happen, it would be a poor design practice not to take the possibility into account and to take the appropriate measures in safeguarding the circuit against possible errors.

Important Pins	Comments
EXTAL	Clock or Crystal input.
XTAL	Connect to crystal circuit, inverse clock signal, or possibly floating in case of external clock.
RES	Reset pin. A stray transition would cause a reset, so hold this pin high during normal operation.
STBY	Standby pin. A stray transition would cause standby mode, so tie high most of the time.
WAIT	This could cause unwanted wait states, so tie it high in most cases.
NMI	Non-maskable interrupt. Tie high to avoid unwanted interrupts.
IRQ's	General interrupts. Tie high.
AVss	For parts w/ A/D Converter - tie to ground.
AVcc	For parts w/ A/D Converter - tie to Vcc.
MD_1 and MD_0	Operating mode control. A mode must be selected and the pins given an appropriate input.

All other unused I/O pins may be safely left floating without risk to the processor operation.