Layout Compatibility Guidelines For RC3233x 3.3V and 2.5 Devices

Application Note AN-432

Notes

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Background

IDT has introduced a 2.5 volt core supply voltage version for both the RC32332 and RC32333 processors. Previously, these processors were available only in 3.3 volt core voltage configuration. The new devices have a reference designator of "T" (e.g. RC32T333) which indicates the 2.5 volt core supply voltage requirement. Except for the modified core voltage, both these new devices are pin-compatible with their 3.3 volt counterparts.

The intent of this document is to illustrate one possible layout approach which will allow a single PCB design to accommodate both the 3.3 volt core parts and their respective 2.5 volt core counterparts through the use of jumpers on the PCB. If the user prefers not to use both the 3.3 volt core parts and the 2.5 volt core parts on the same design, this layout guideline is still valid, but the voltage jumpers should be removed and the core layout section should be hardwired to the appropriate voltage level.

> **Note:** This guide contains detailed layout information and is specific to the 208 PQFP package (which applies to the RC32332 and RC32333) and contains pin specific instructions that will not apply to any other package that may be released in the future.

Pin Considerations

Both the 3.3V and 2.5V versions of the processor use 3.3 volts for the I/Os. Therefore, the VCC_I/O pins are identical between any two members of the family (for example, between the RC32V332 and the RC32T333). However, as noted previously, the core supply voltage has changed. However, not all of the pins that were previously connected to VCC_Core now require 2.5 volts. Specifically, pins 181 and 184, which were connected to VCC_Core on the 3.3 volt part, still need to be connected to 3.3 volts on the 2.5 volt part. Accordingly, these two pins need to be moved off of the VCC_Core supply and over to the VCC_IO supply.

The VCC_Core pins were previously tied to a 3.3 volt supply plain. These pins now need a 2.5 volt supply. The board can either use a power supply that provides 2.5 volts or a regulator to regulate the 3.3 volt supply voltage down to 2.5 volts for the core.

The PLL pin can continue to use the same filter circuit the original part used. However, the PLL supply pin (77) now needs a 2.5 volt supply instead of its previous 3.3 volts supply. So, the input to the PLL filter needs to be disconnected from the 3.3 volt supply plain and connected to the new 2.5 volt VCC_Core plain.

In order for the PCB to accommodate both core supply voltages, the VCC_Core pins need to be jumpered. A jumper scheme, as well as a suggested VCC_Core & VCC_I/O power plain layout scheme, are depicted in Figure 1. Using this scheme, it should be possible to accommodate both the old 3.3 part as well as the new 2.5 volt part on the same board with no increase in layer count over the current design.

Notes

The following are VCC_I/O pins:

7, 17, 37, 47, 59, 69, 89, 99, 111, 121, 141, 151, 163, 173, 181, 184, 193, 203.

The following are VCC_Core pins:

27, 62, 82, 131, and 183.

The VCC_PLL pin is *77*.

The RC32T332 and RC32T333 (2.5V devices) need VCC_I/O to be 3.3V nominal, VCC_Core to be 2.5V nominal, and VCC_PLL to be 2.5V nominal. Pins 181 and 184 are moved from Core to I/O on both the RC32T332 and RC32T333 devices.

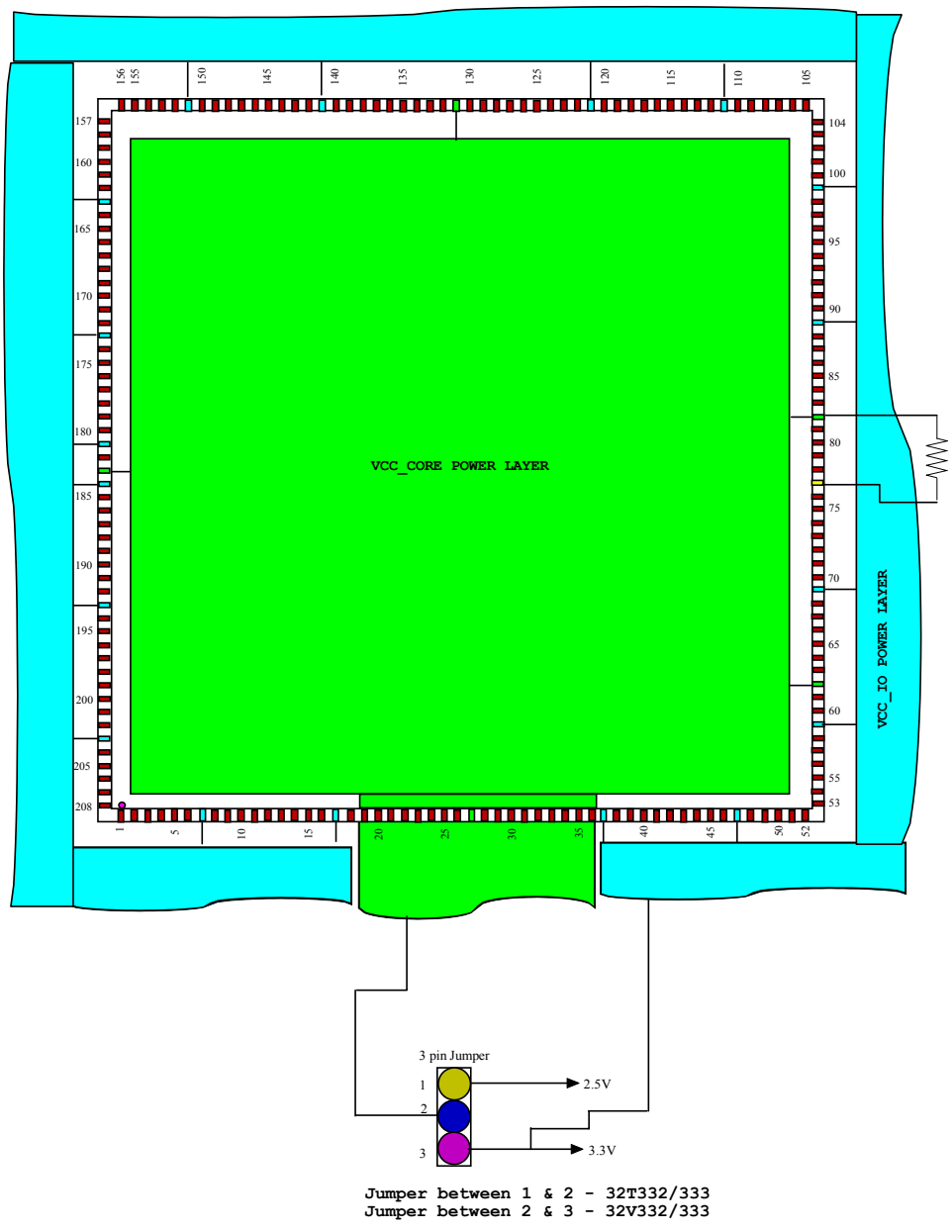

Figure 1 Recommended Core & IO Supply Layout with Optional Compatibility Jumper

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