

Flash Magic ISP → ICP Bridge Vdd Target Switch Control (Using MCB900)

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EXECUTIVE SUMMARY

The ICP Bridge Circuit (Figure 5) in NXP Application Note AN10258_2.pdf does not seem to work. I offer an alternative circuit in this document. Please also refer to AN10258_2.pdf when using this document. The main reference in AN10258_2.pdf is Section 4 (page 7). *** See disclaimer at the bottom ***

BACKGROUND

NXP P89LPC9xx parts (affectionately know as the LPC900 series of micro controllers) can be programmed 4 ways...

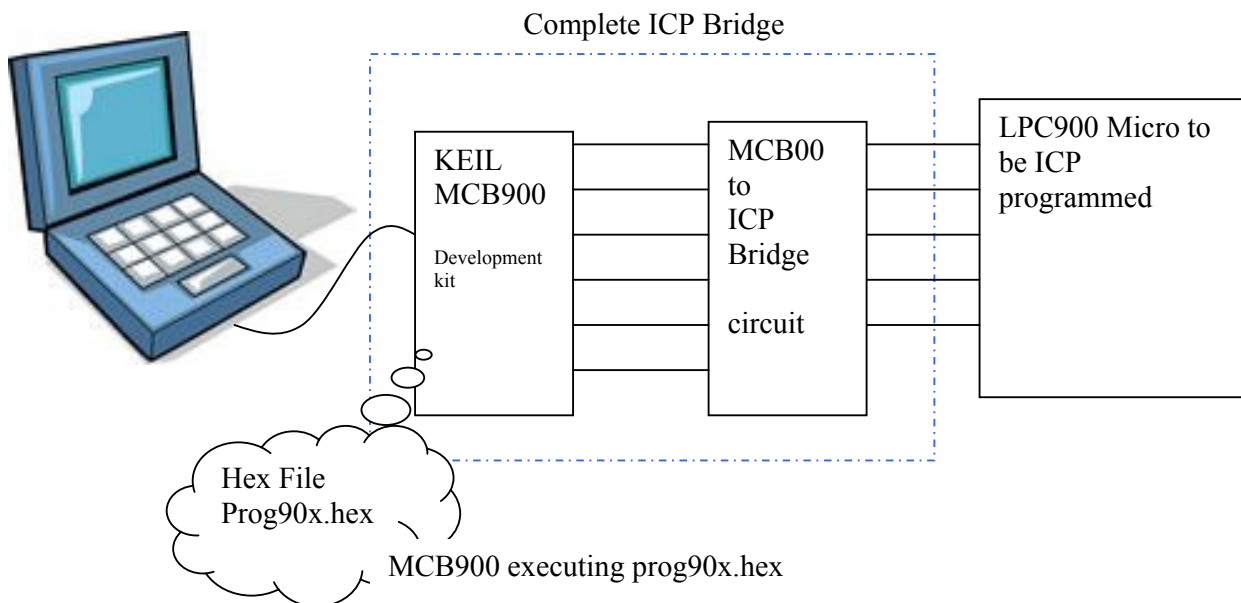
1. ISP (In-System-Programmed) using the UART of the LPC900
2. IAP (In-Application-Programmed) .. or “self programmed” by reprogramming the flash under code execution.
3. ICP (In-Chip-Programming)... using “Synchronous Serial”.... Similar to SPI signalling - each data bit is clocked in/out under clock signal control.
4. Parallel Programmer.

ISP Programming is only available for 20, 28 and 44pin parts.

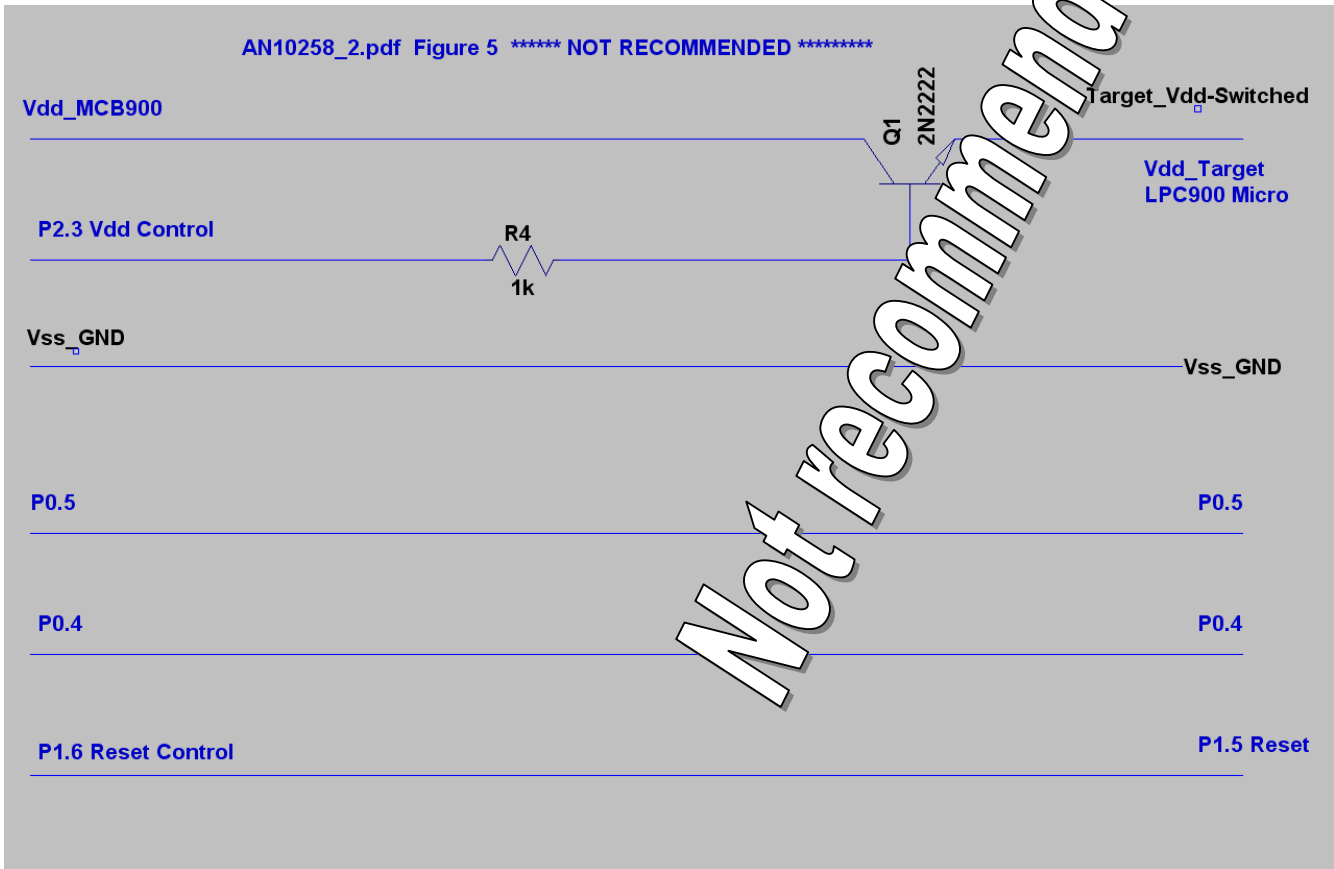
IAP is only available once your IAP program has been loaded in to the LPC900 part.

ICP -can be used to programme all the LPC900 parts. HOWEVER - ICP requires hardware control / signalling of the LPC900 to be programmed.

TO communicate between a PC (running Flash Magic) and the LPC900 Micro to be programmed an “ICP Bridge” circuit is required.



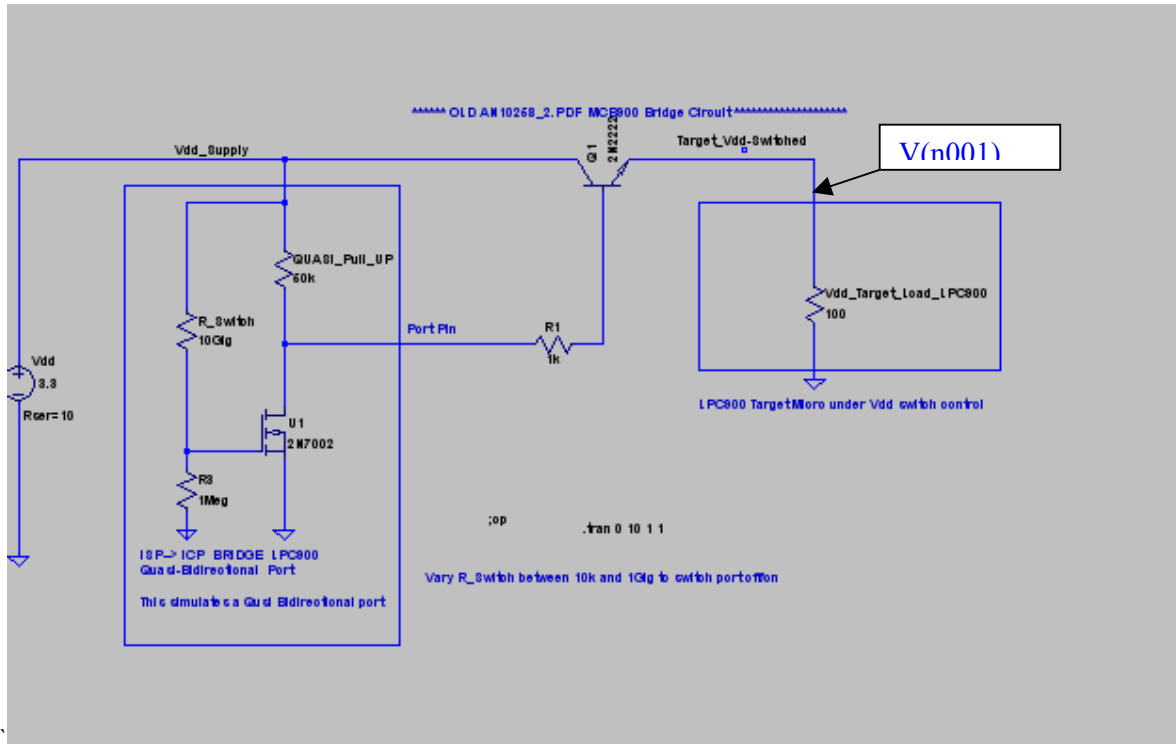
This is the hardware between the MCB900 and the LPC900 to be ICP Programmed



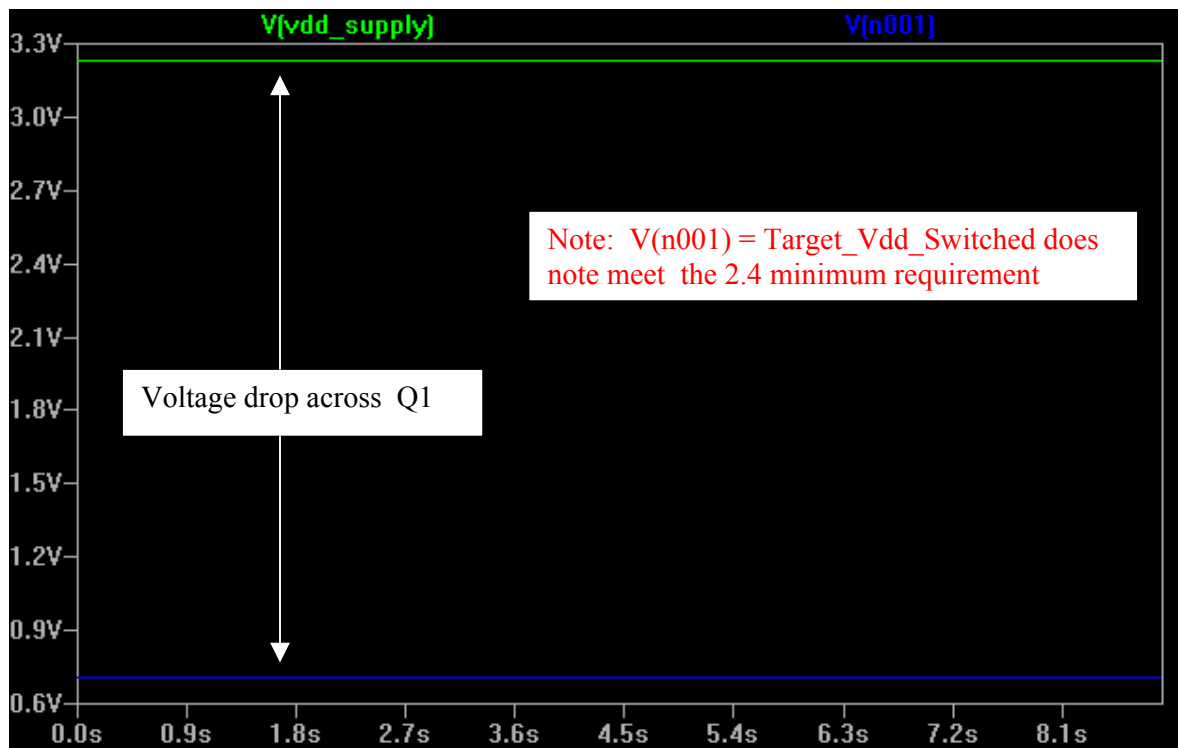
The main concern is the configuration of 2n2222 as a Vdd Switch.

A) Simulation of AN10258_2 ICP Bridge hardware circuit (above)

I have modelled Vdd Switch circuit above in a spice simulator and modelled it in the circuit below. Note MCB900 port pin P2.3 is modelled in as quasi-bi-directional output (label: "Port Pin" -this a s very very simple model but will serve the purpose for static conditions).

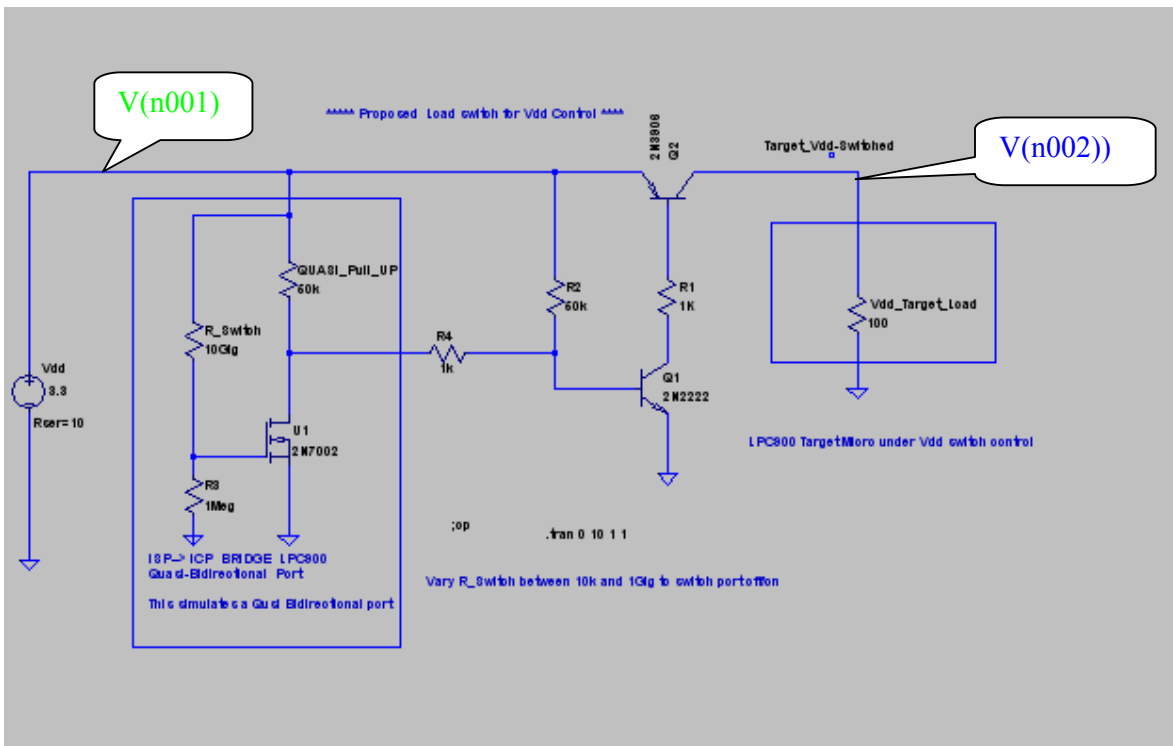


Spice Simulation of voltage points across 2n2222 transistor

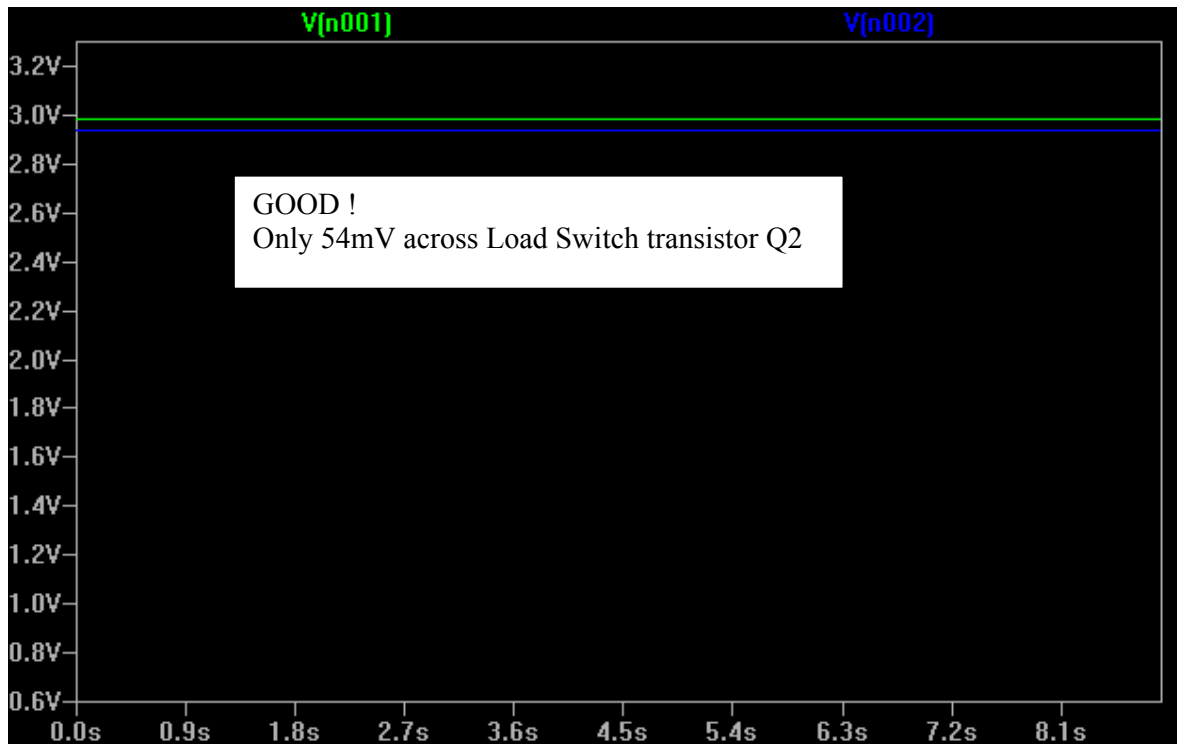


B) New Proposed Vdd Circuit for ICP Bridge Hardware

This is a modification on the classic NPN-PNP load switch circuit



Spice simulation of voltage points across 2n2222



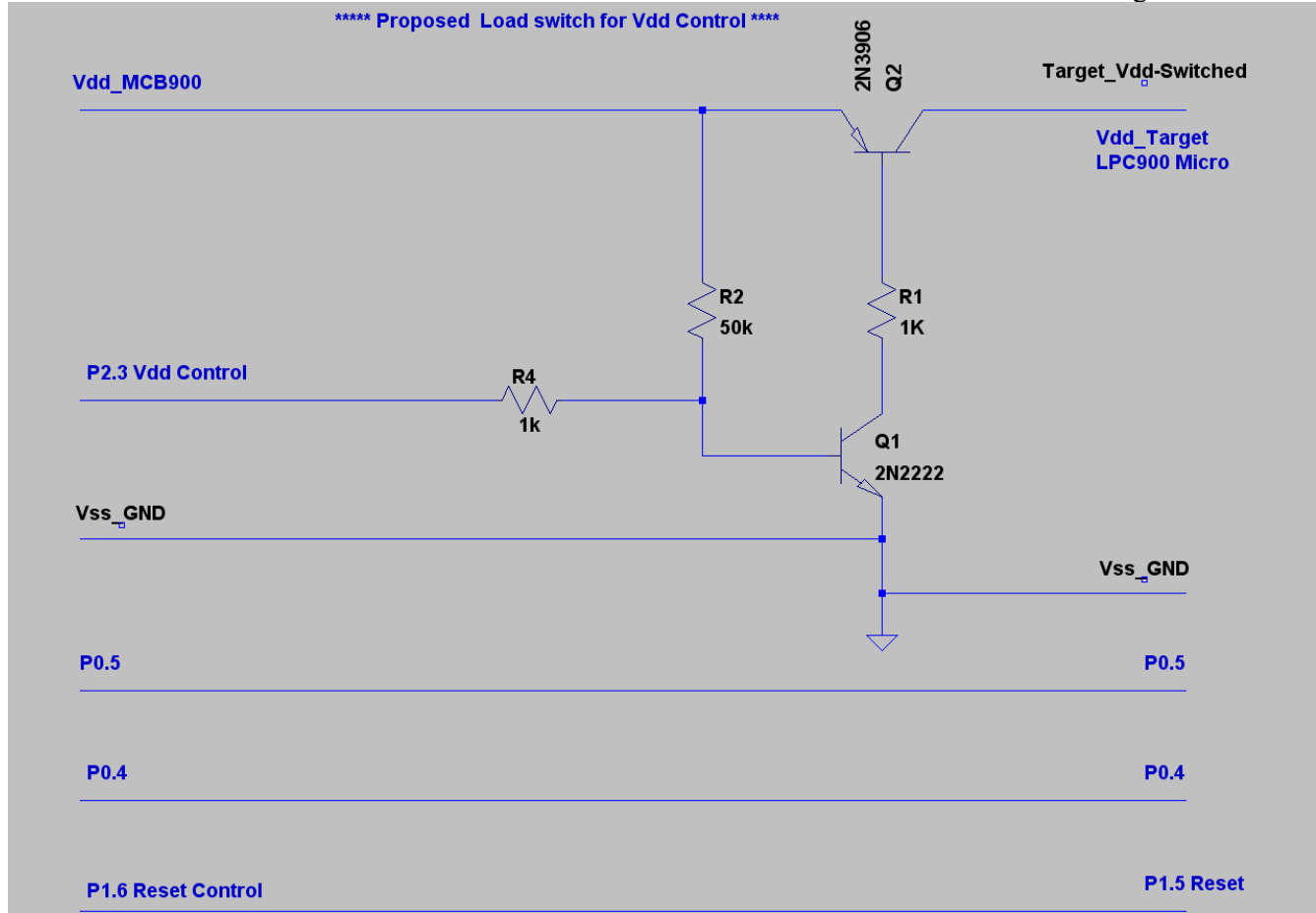
***** Here you can see Vdd Target LPC900 voltage loses ~ 60mV *****

***** AND.... Vdd Target LPC900 has enough operating voltage *****

Proposed MCB900 ISP → ICP Bridge Circuit

MCB900 Side

LPC900 Target Micro



R4 limits current if P2.3 is configured as Push_Pull and taken High.

Disclaimers and Assumption

- This document is for educational purposes only
- Use at own risk
- Errors and Omission Accepted
- MCB900 P2.3 Port Quasi-Bi-Directional Model is an educated guess....
- I assume MCB900 P2.3 is programmed as Quasi-Bi-Directional in prog90x.hex