

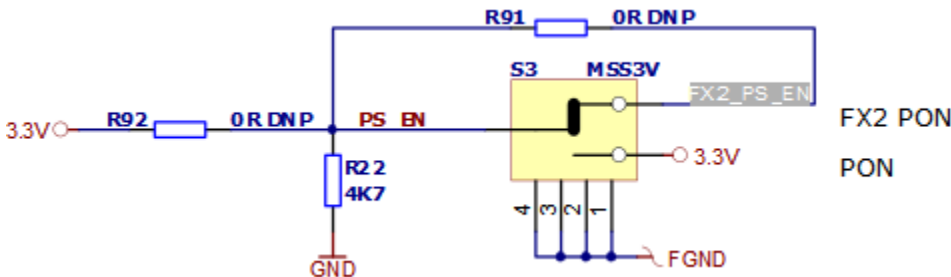
# TE0300 DIP Slide Switch S3 (Configuration)

TE0300 is provided with a slide switch S3.  
Slide switch S3 conditions the value of signal PS\_EN.  
In this way, S3 conditionally/unconditionally enables the power rails 1.2 V and 2.5 V.

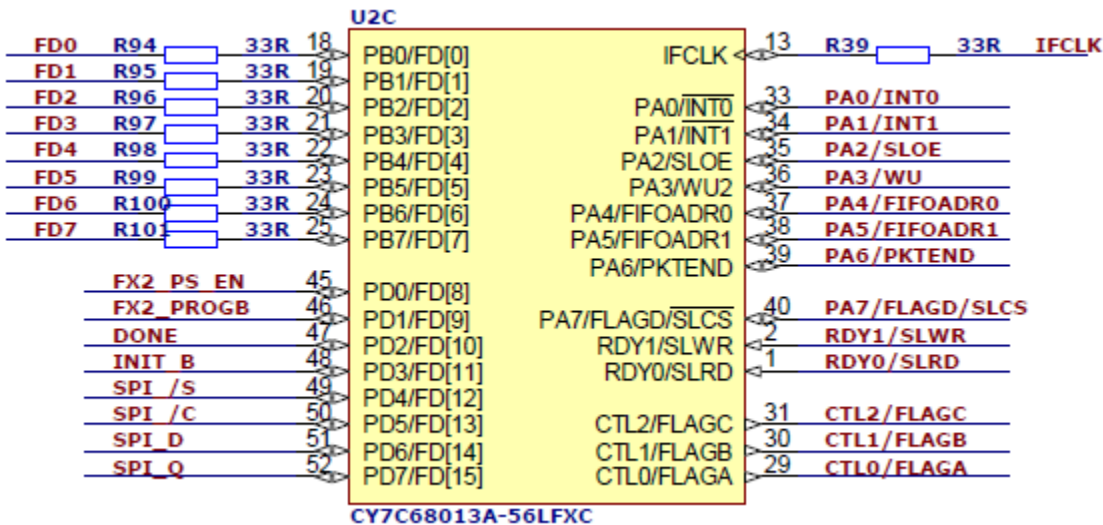
✔ Note. DNP: Do Not Populate aka Do Not Solder the Component associated to DNP label.



Slide switch S3 (angle view)




Slide switch S3 schematic





When slide switch S3 = FX2 PON, signal PS\_EN is set to signal FX2\_PS\_EN driven by the EZ-USB FX2LP USB FX2 microcontroller under user control.

When S3 is turned **on (closed, FX2 PON)**, the power rails 1.2 V and 2.5 V are controlled by the USB (EZ-USB FX2LP USB FX2) microcontroller. At start-up, the USB microcontroller switches off the power rails 1.2 V and 2.5 V and starts up the module in low-power mode. After enumeration, the USB microcontroller firmware enables (switches on) the power rails 1.2 V and 2.5 V, if enough current is available from the USB bus.

When S3 is turned **off (open, PON)**, the power rails 1.2 V and 2.5 V are always enabled (switched on).

 When S3 is turned on (*FX2 PON*), make sure that no signals are applied to the input pins when power-rails are disabled by the USB microcontroller (at start-up).

S3 position	Default position	Effect on 1.2 V and 2.5 V power rails
FX2 PON (on, closed)		1.2 V and 2.5 V rails controlled by USB FX2 microcontroller (signal <b>FX2_PS_EN</b> )  <b>PS_EN = FX2_PS_EN = 1 or 0</b>
PON (off, open)		1.2 V and 2.5 V rails always enabled ( <b>PS_EN = 1</b> )  <b>PS_EN FX_PS_EN = 1 or 0</b>

Slide switch S3 settings overview ( power rails 1.2 V and 2.5 V only)

## Signal FX2\_PS\_EN

To command signal **FX2\_PS\_EN**, read the [reference firmware code](#).

**IOD** = 0x03; // Enable PS\_EN and disable PROG\_B

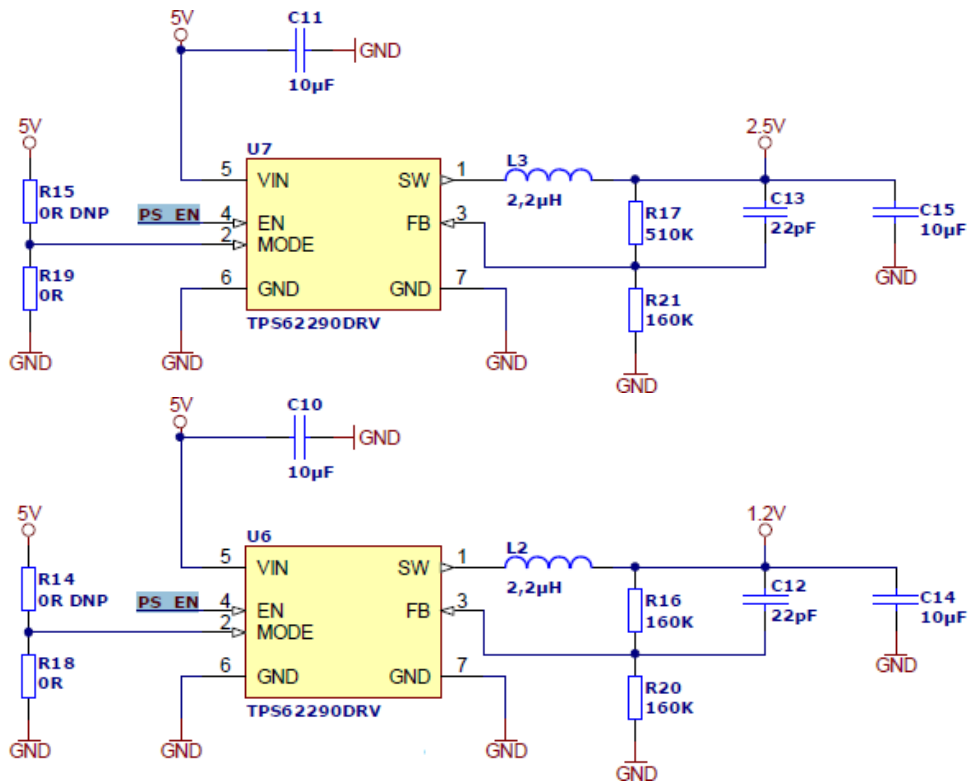
**OED** = 0x03; // Configure PS\_EN and PROG as outputs

Port D Pin	Alternate Function	Alternate Function is Selected By...	Alternate Function is Described in...
PD.7:0	FD[15:8]	IFCFG1 = 1 and any WORDWIIDE bit = 1	Slave FIFOs chapter 9 on page 99

Table from **EZ-USB(R) Technical Reference Manual** ([EZ-USB\\_TRM.pdf](#)).  
**USB FX2 microcontroller configuration table**

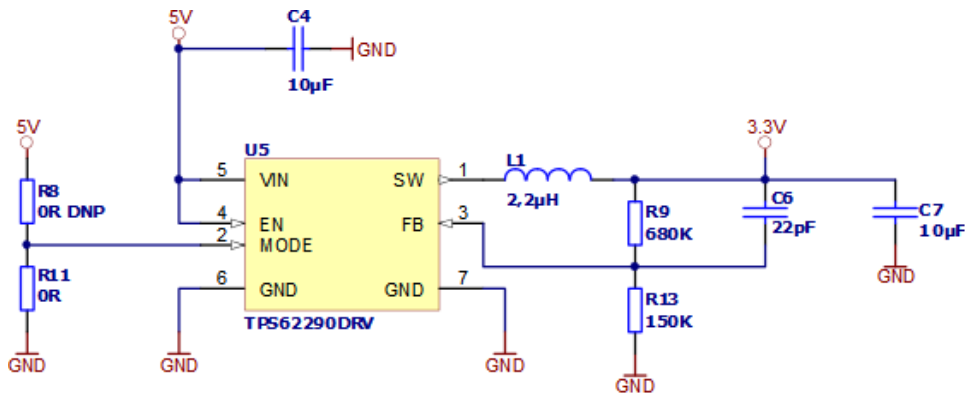
## Signal PS\_EN

- Signal PS\_EN enables (1) or disables (0) power rails 1.2 V and 2.5 V.



Power rails 1.2 V and 2.5 V could be enabled/disabled by signal PS\_EN

- Power-rail 3.3V is not controlled by signal PS\_EN and is unconditionally enabled. The power-rail 3.3 V though is out of the control of the USB-microcontroller and is supplied down-converting the power supply 5 V provided by either the USB-bus or the B2B receptacle connector. In this case, signals that are applied to the 3.3 V I/O banks do not need to be disconnected when power-rails are disabled by the USB microcontroller.



Power rail 3.3V could not be enabled/disabled by signal PS\_EN

## VCCIO0 assembly options

According to the corresponding assembly option, power rail VCCCI00 can depend or not on the power rail 2.5V.

Voltage VccIO for bank B0 shall span from 1.2 V to 3.3 V. VccIO can be supplied either externally or internally to the micromodule.

**Warning!** Spartan-3 I/Os are not 5 V tolerant. Applying more than the recommended operating voltages at any pin, results in a damaged FPGA (see [Xilinx Answer AR#19146](#)).

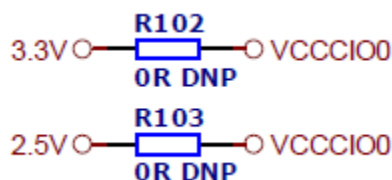
## Externally Supplied VCCIO

VccIO can be externally supplied over the B2B connector J4. If bank B0 is not used, then VccIO can be left open.

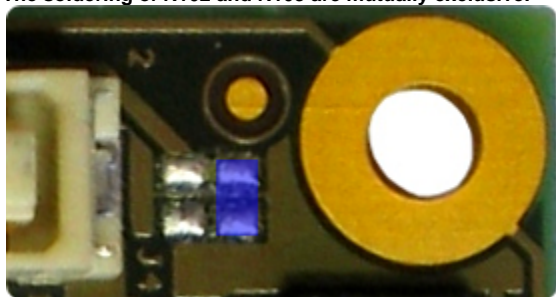
## Internally Supplied VCCIO

If VccIO is **not** externally supplied, it can be internally supplied by **one** of the internal power rails of 2.5 V and 3.3 V. This is possible by short-circuiting **one** of the two pad pairs placed on the right of connector J4 at the top right corner of the bottom side of the micromodule.

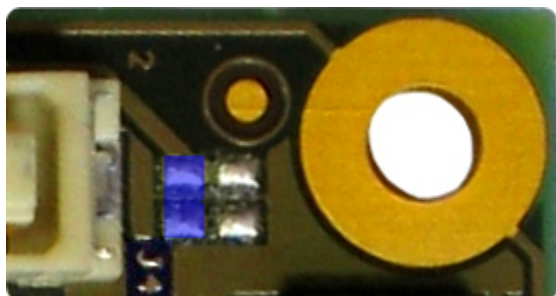
Two suitable ways of short-circuiting the pad pair are by means of a zero-ohm 0603 (1608 metric) chip resistor or a solder blob.



The soldering of R102 and R103 are mutually exclusive.



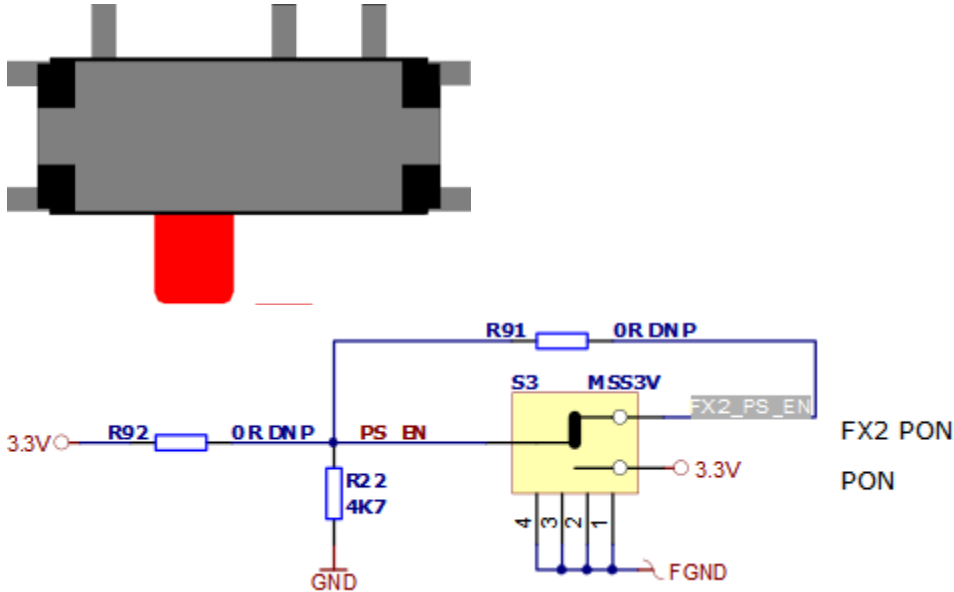
The figure shows how to short-circuit VccIO to internal power rail 3.3 V. FX2\_PS\_EN does not control VCCCI00 (3.3V) FPGA bank 0



The figure shows how to short-circuit VccIO to internal power rail 2.5 V. FX2\_PS\_EN does control VCCCI00 (2.5V) FPGA bank 0

## Slide Switch S3 = FX2 PON

When slide switch **S3** is in the **left position** (= **FX2 PON** : power rails conditionally on depending on signal FX2\_PS\_EN), signal **PS\_EN** is set to signal **FX2\_PS\_EN** (**PS\_EN = FX2\_PS\_EN**) driven by the EZ-USB FX2LP USB FX2 microcontroller under user control ([IOD](#) and [OED](#) of [fw.c](#)).

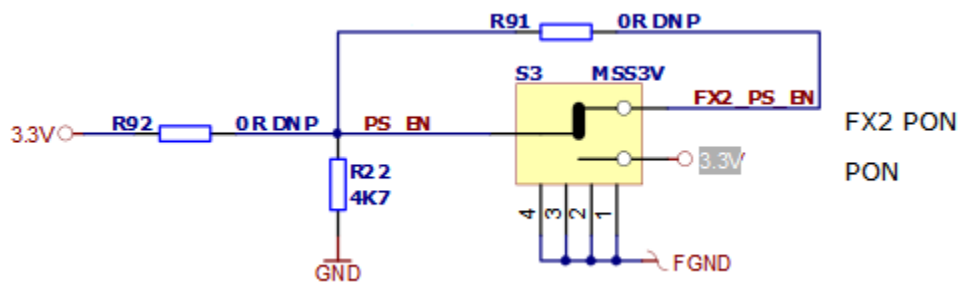
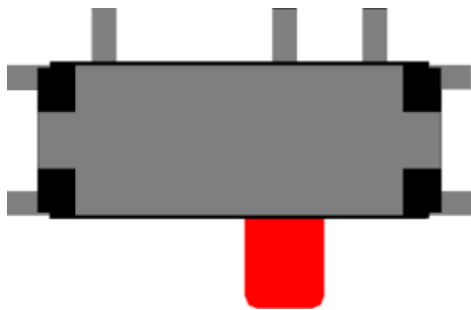


**S3 on position FX2 PON ( $PS\_EN = FX2\_PS\_EN = 1$  or  $0$ ).**

1. Dynamic **full power** operation ( **$PS\_EN = 1$** ): when the EZ-USB FX2LP USB FX2 microcontroller sets signal  **$PS\_EN = FX2\_PS\_EN = 1$** , power rails 1.2 V and 2.5 V are enabled.  
This setting can be useful for .
2. Dynamic **low power** operation ( **$PS\_EN = 0$** ): when the EZ-USB FX2LP USB FX2 microcontroller resets signal  **$PS\_EN = FX2\_PS\_EN = 0$** , the following components are switched off:
  - FPGA core logic (1.2V)
  - DDR SDRAM (2.5V)
  - FPGA bank 1 (2.5V)
  - VREF (2.5V)
  - VCCCIO0 (2.5V) FPGA bank 0 (if R102+R103- assembly)

## Slide Switch S3 = PON

Full power operation ( **$PS\_EN = 1$** ): when slide switch S3 is in the right position (PON = power rails unconditionally on), signal PS\_EN is set to power rail 3.3 V. Thus power rails 1.2 V and 2.5 V are unconditionally enabled.



S3 on position PON (PS\_EN FX2\_PS\_EN = x; PS\_EN = high ).

#### Summary table

The table below summarizes all switching options implied by slide switch S3 and firmware signal FX2\_PS\_EN (under the standard assembly option).

power rail	S3= PON (PS_EN = 1) (PS_EN FX2_PS_EN) (Full power)	S3 = FX2 PON and PS_EN = FX2_PS_EN = 1 (Dynamic full power)	S3 = FX2 PON and PS_EN = FX2_PS_EN = 0 (Dynamic low power)
1.2V	on	on	off
2.5V	on	on	off
VCCCIO0 (= 2.5V) R102+R103- assembly <sup>(1)</sup>	on	on	off
VCCCIO0 (= 3.3V) R102-R103+ assembly <sup>(2)</sup>	on	on	on

<sup>(1)</sup> R102 populated / R103 unpopulated

<sup>(2)</sup> R102 unpopulated / R103 populated  
Slide switch S3 settings overview ( 1.2V , 2.5V, VCCCIO0).