



# BitFire Walkthrough

## Functionality – Design – Expansion

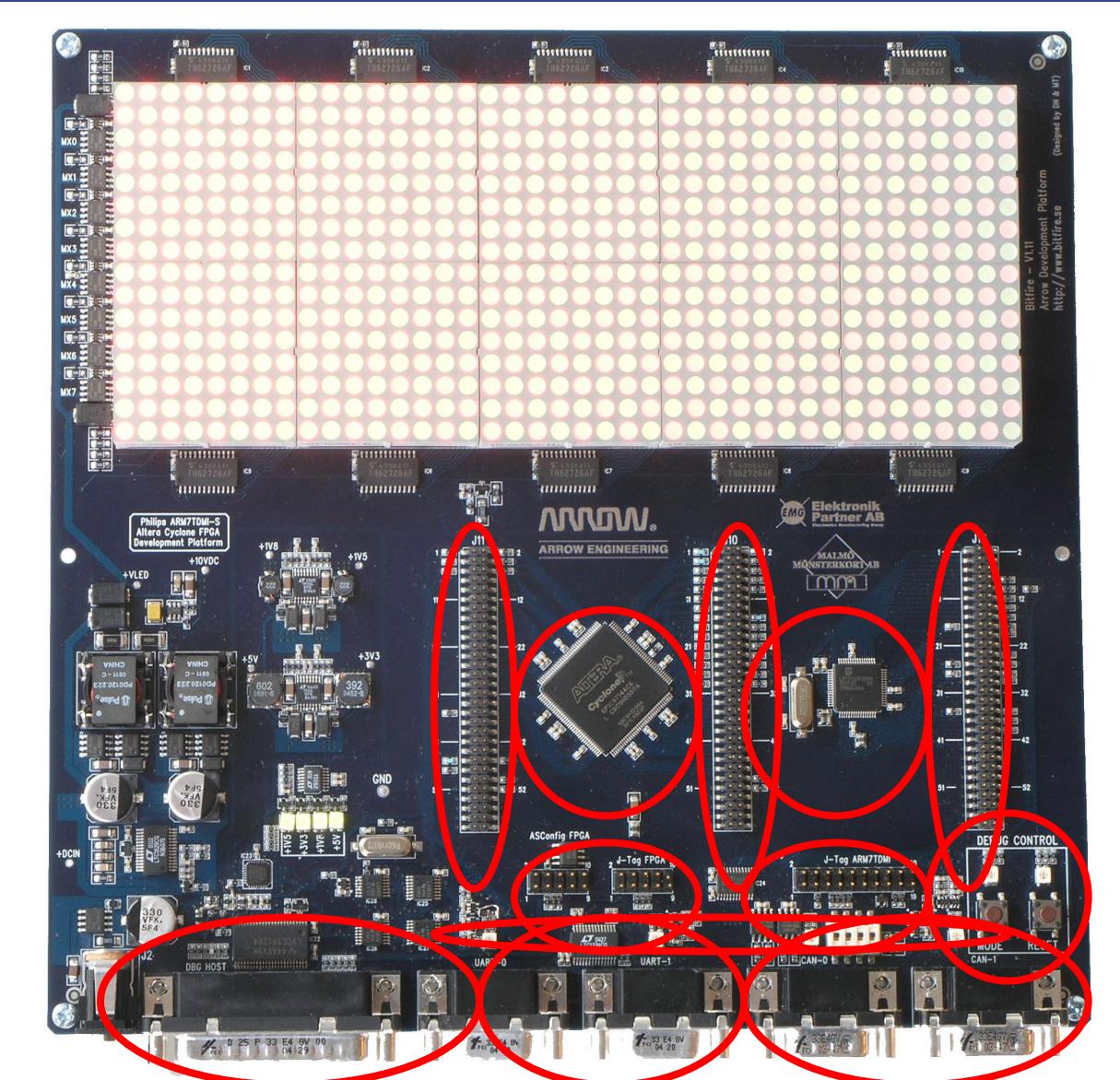


ARMSchool 2005 Bitfire Workshop, Göteborg

2005-10-25

Powering the Supply Chain.<sup>SM</sup>

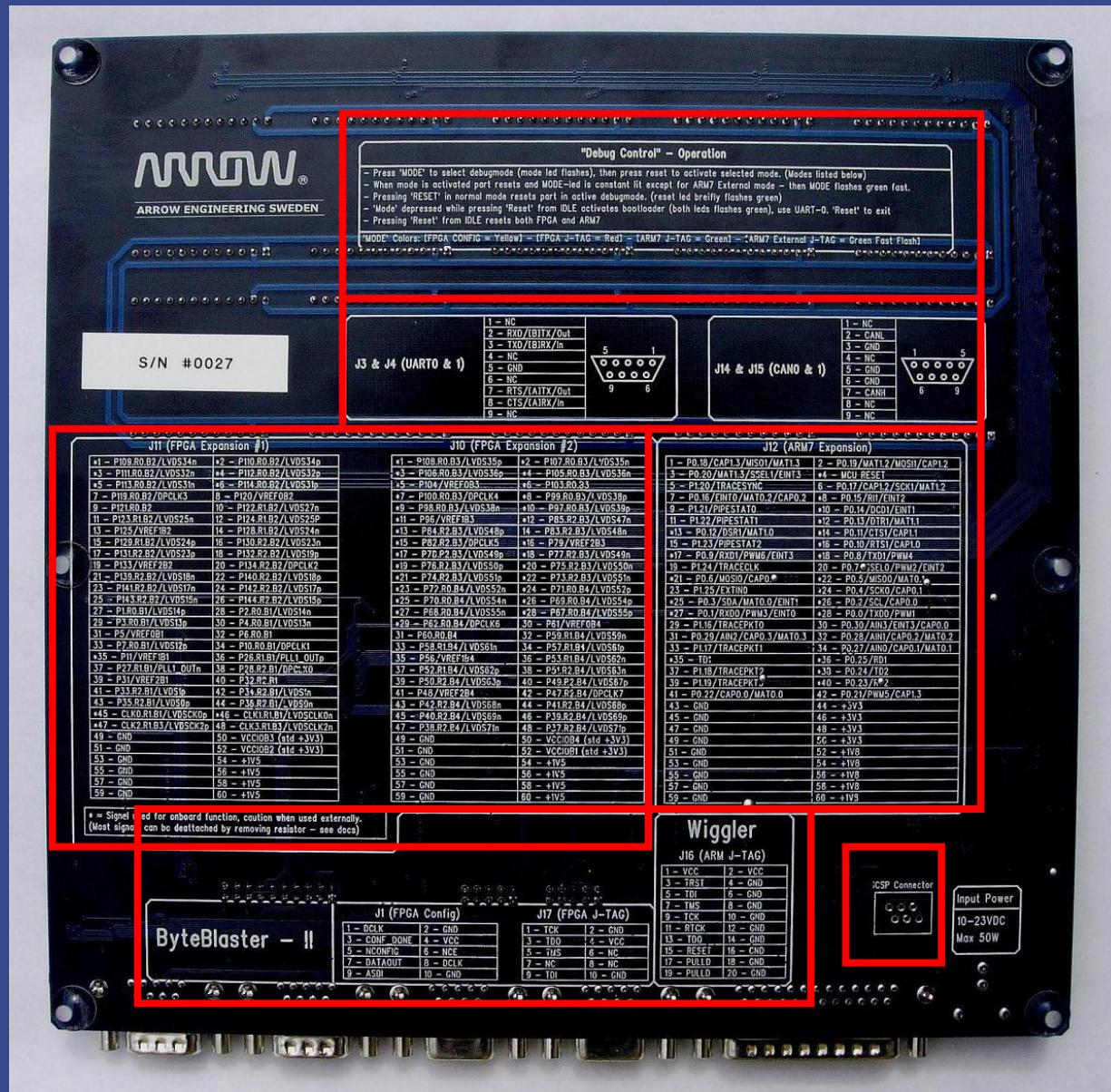
# Overview



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# Overview



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## **Onboard debug controller**

**Macraigor® Wiggler™ compatible debugger hardware for the ARM7 core using standard centronics interface.**

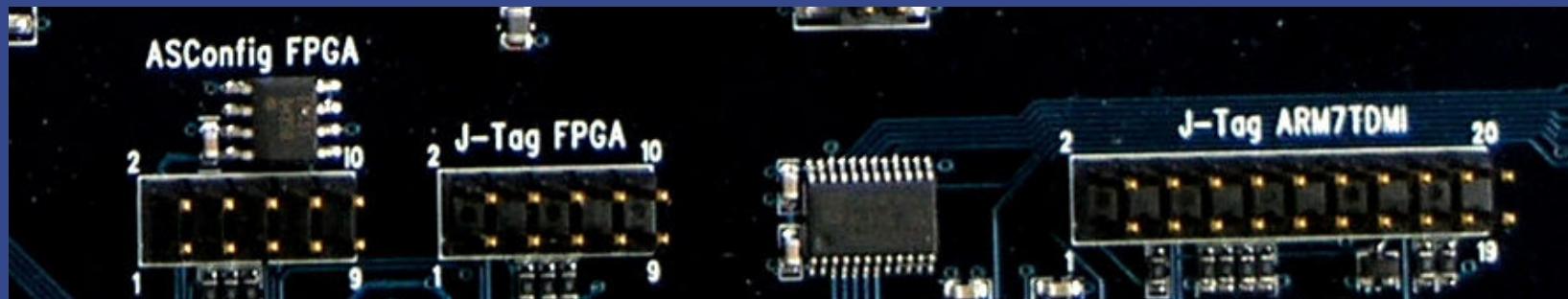
**ByteBlaster-II™ compatible tool against Cyclone FPGA, can be connected as both JTAG tool and configuration programmer.**

## **Boot-loader activation for ARM7**

## **Reset and configuration control**

## Onboard debug controller

External tools possible using connectors



## Onboard debug controller

‘Mode’ selects debug connection

‘Reset’ acts as reset or select

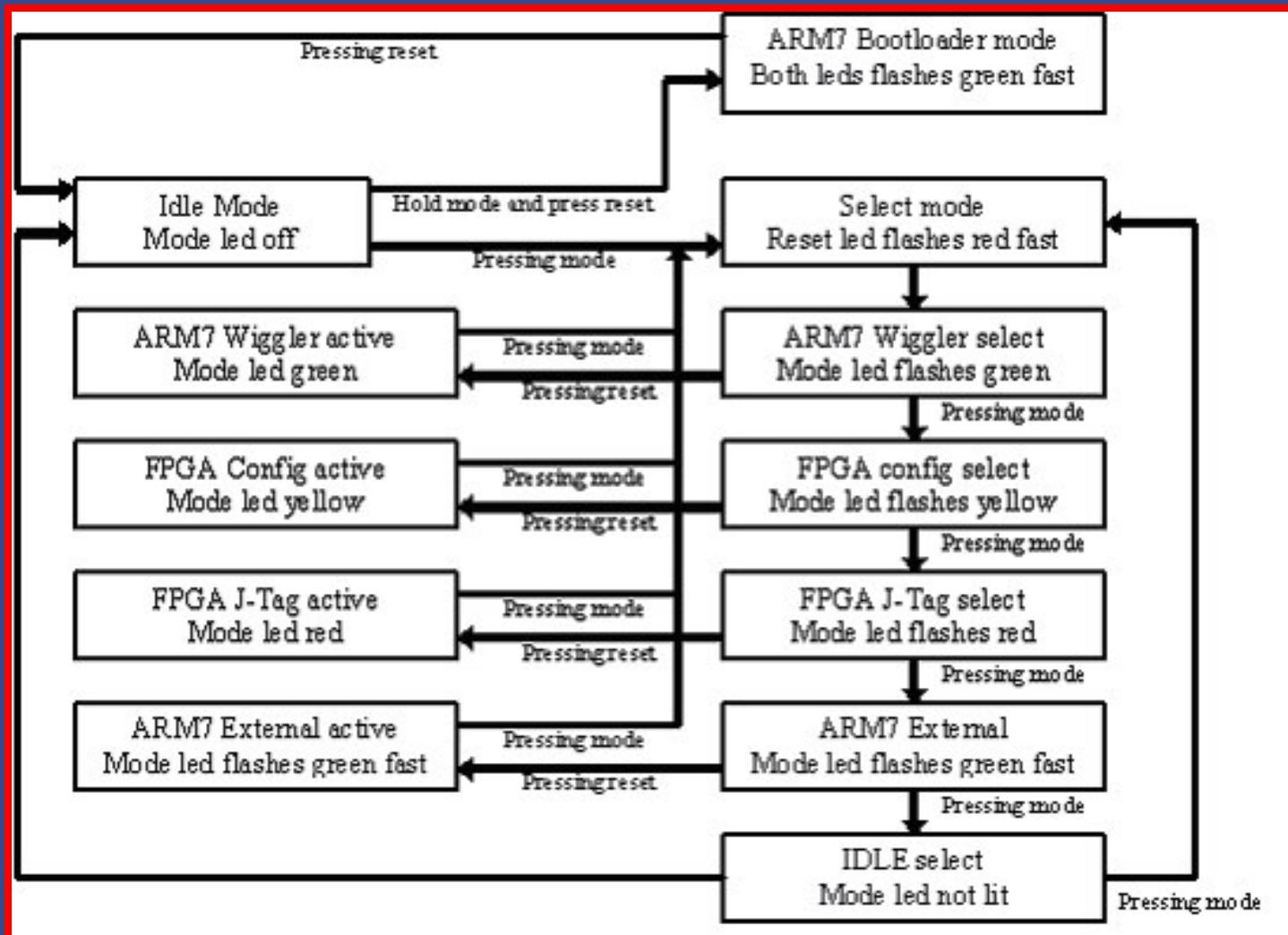
‘Mode’ and ‘Reset’ activates bootloader



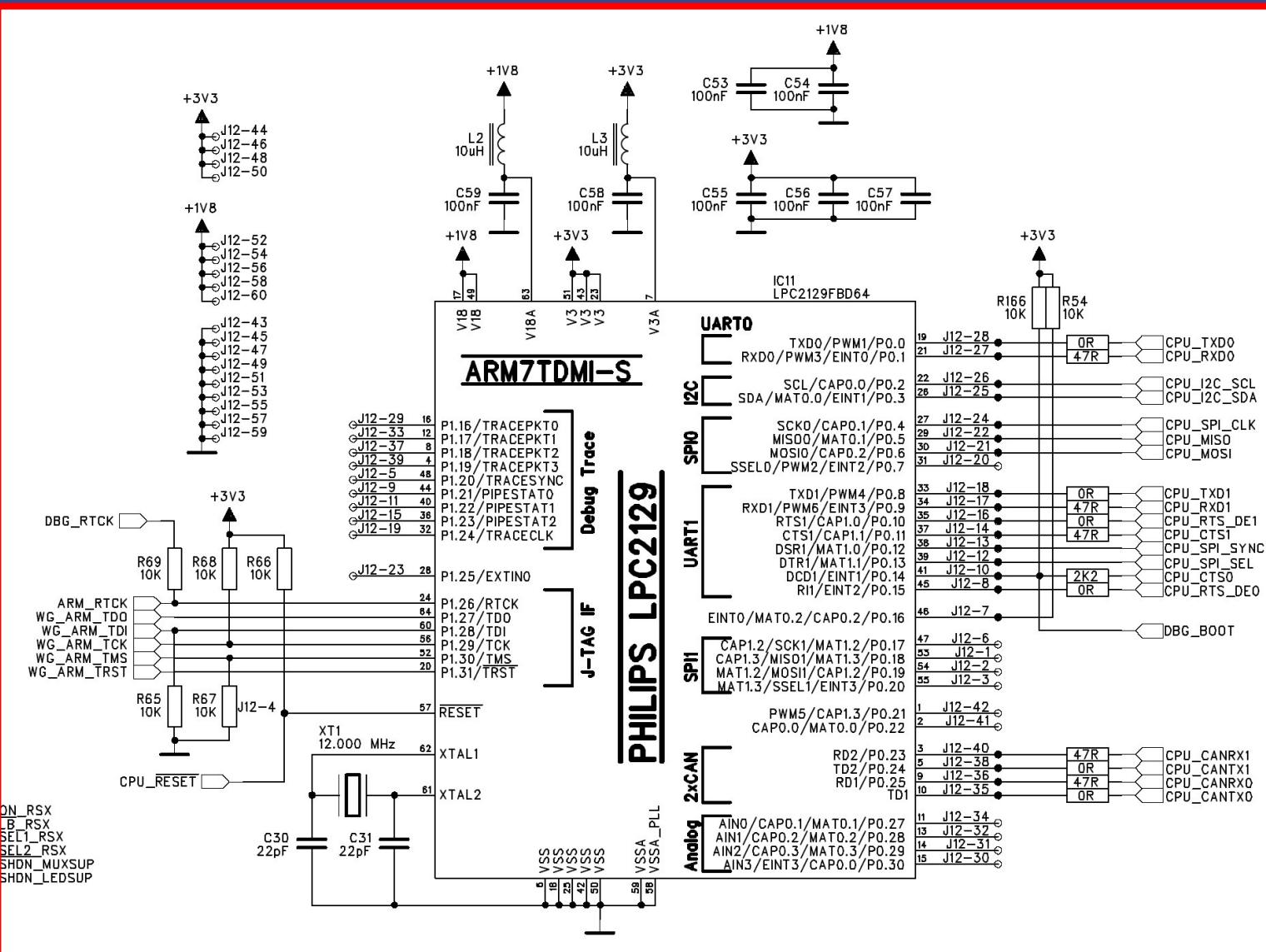
## Quick guide on backside of PCB

Mode	Color	Description	Pressing reset will
ARM7 J-Tag	green	ARM7 wiggler debugger engaged	Reset MCU
FPGA Config	yellow	FPGA byteblaster for configuration	Reset FPGA
FPGA J-Tag	red	FPGA byteblaster for debugging engaged	Reset FPGA
ARM7 External	green fast flash	ARM7 external tool	Reset MCU
IDLE	non lit	IDLE, onboard debugger disengaged	Reset MCU & FPGA

# Onboard debug controller



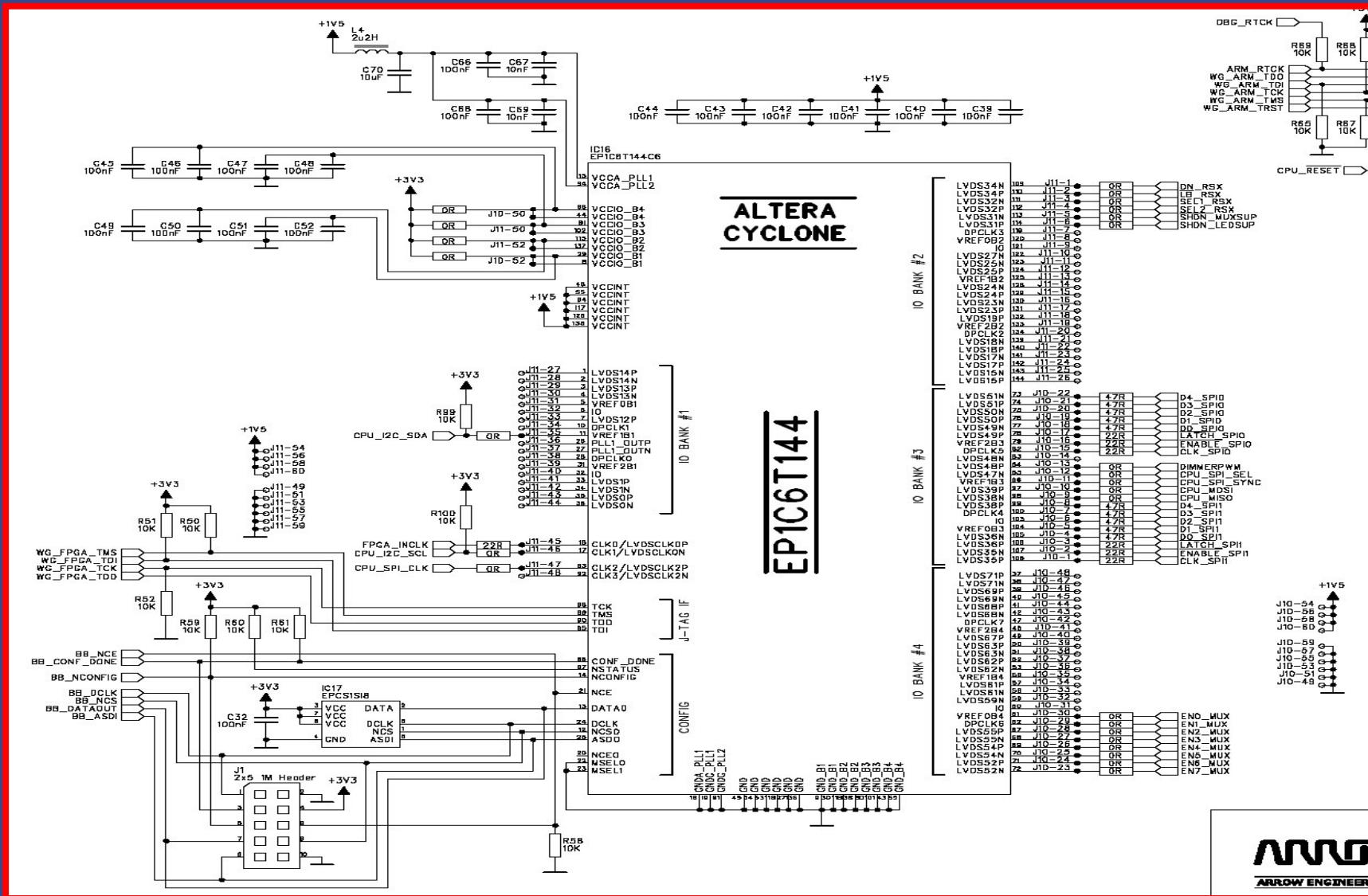
# ARM7 and FPGA design



# Powering the Supply Chain.<sup>SM</sup>



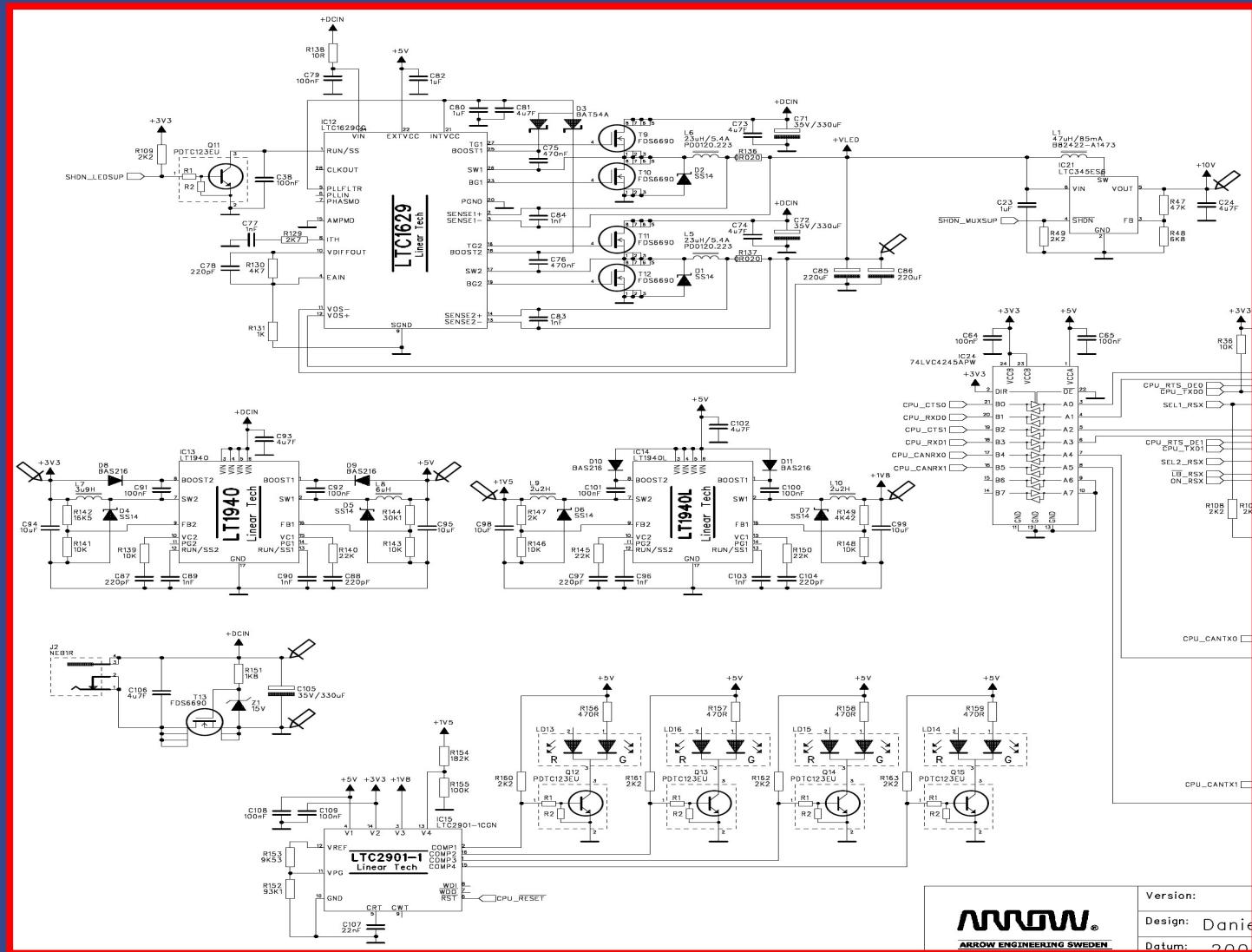
# ARM7 and FPGA design



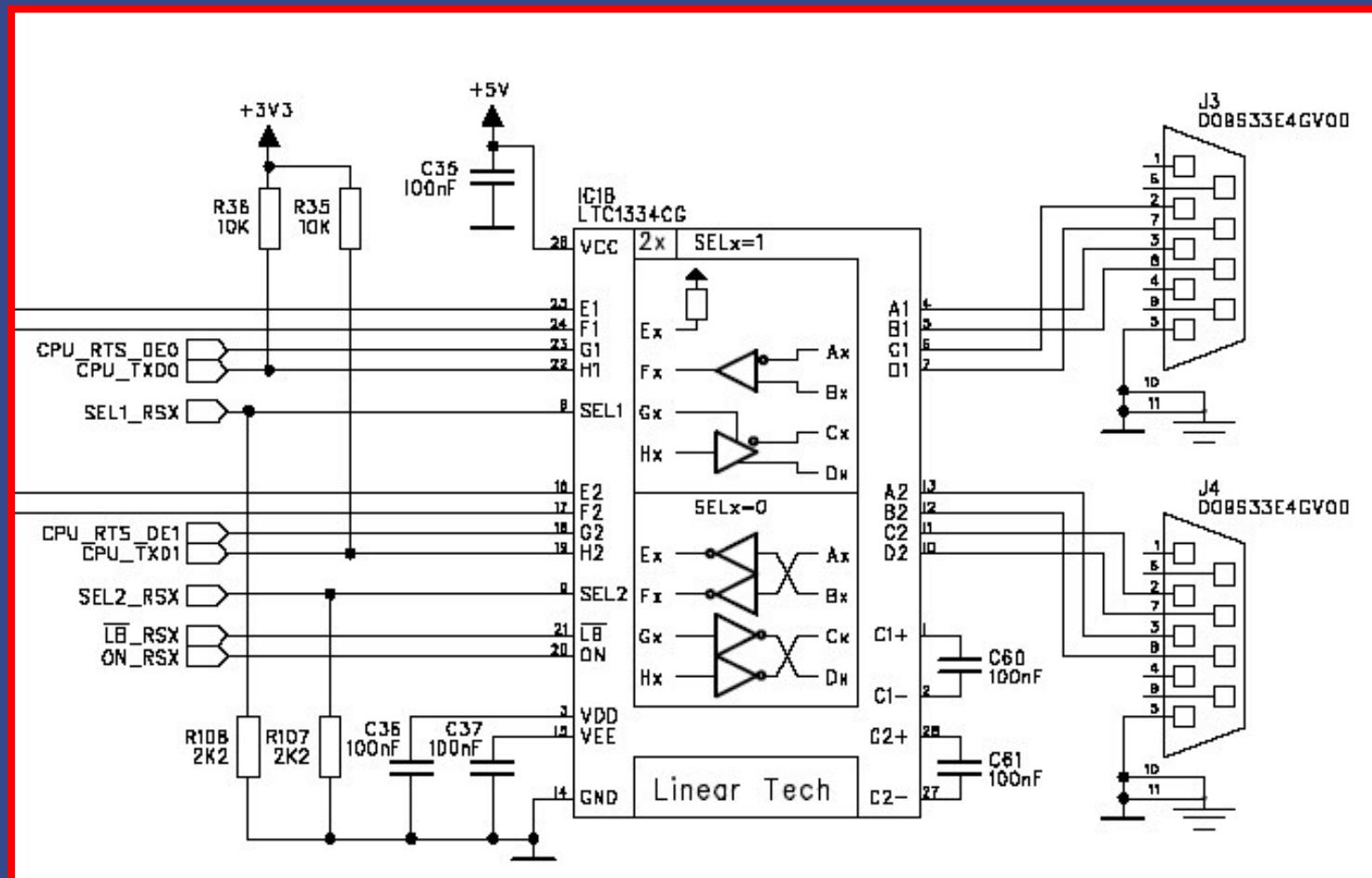
**Powering the Supply Chain.<sup>SM</sup>**



# Power Supply

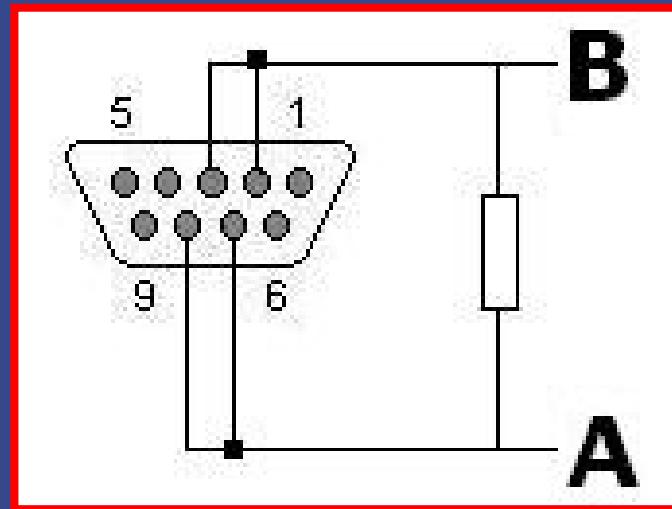


# UART Interfaces

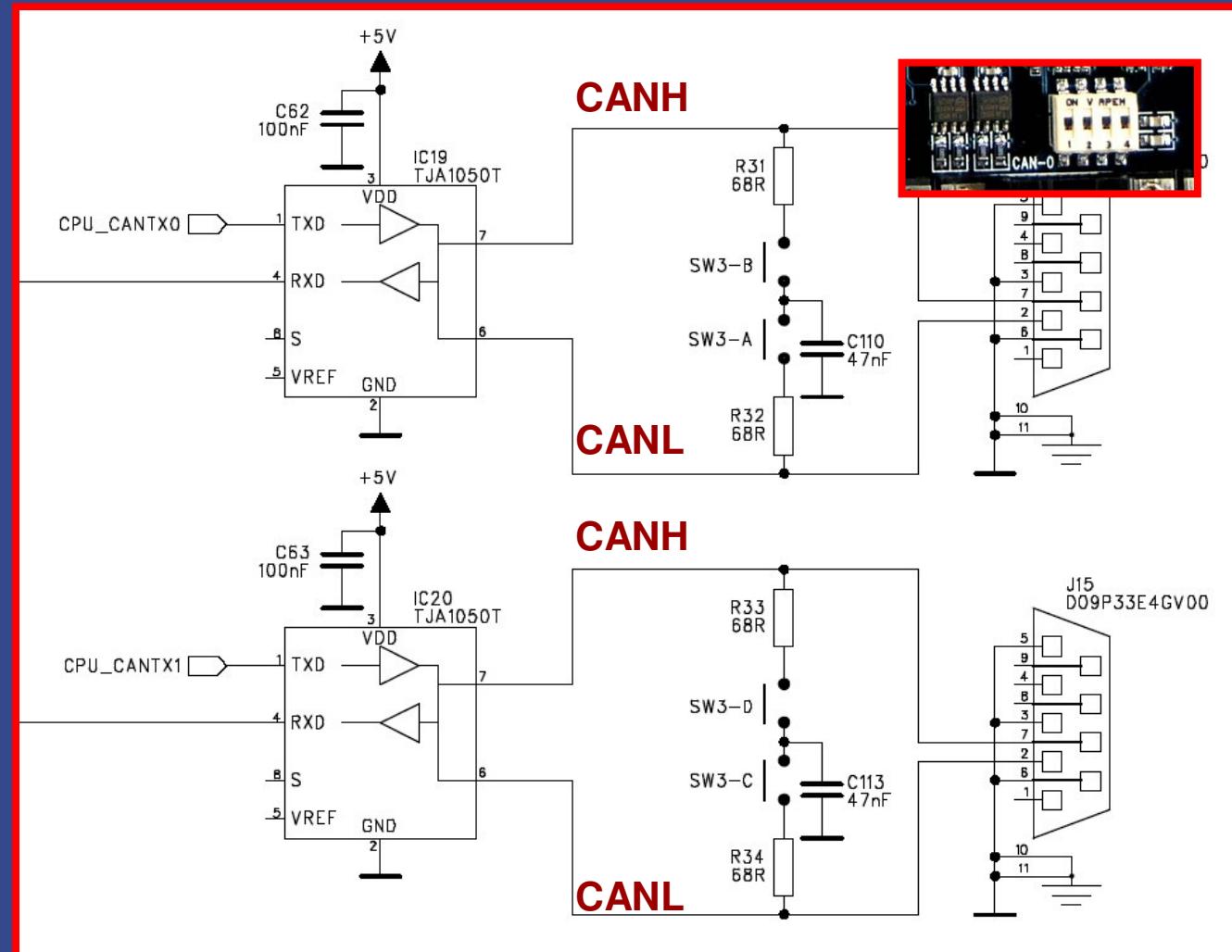


# UART Interfaces

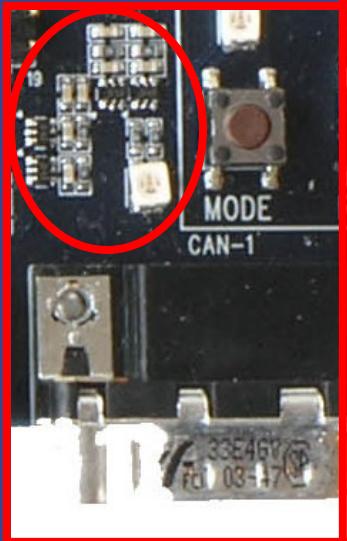
Note: External termination in RS485 mode



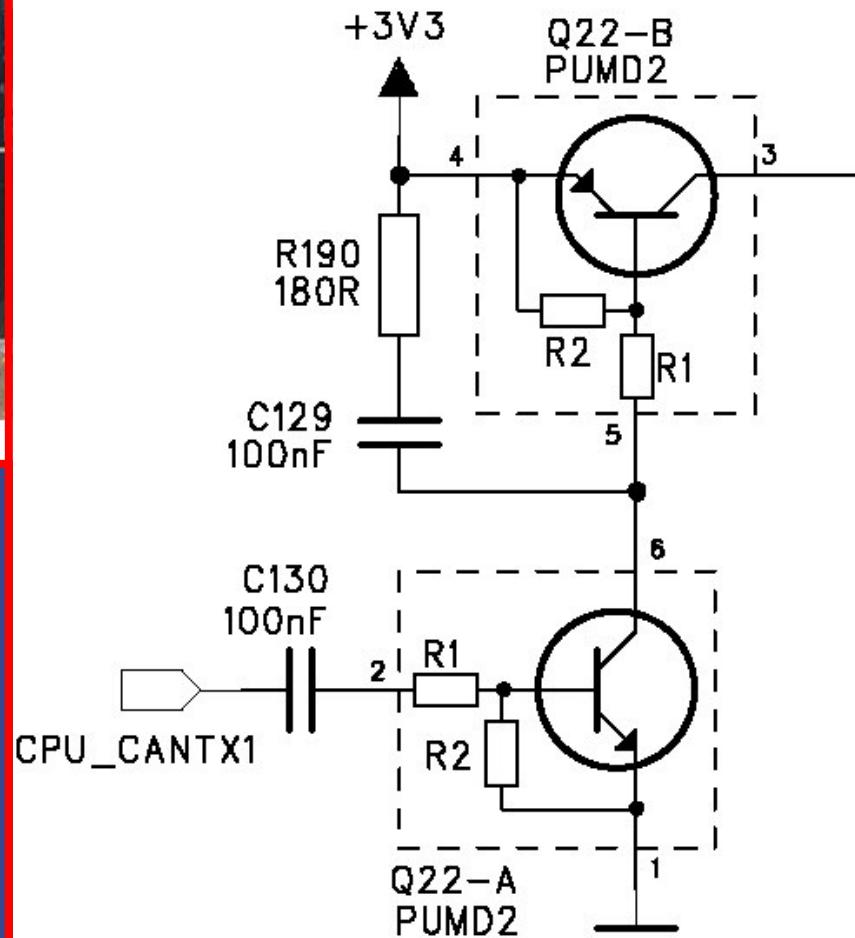
# CAN Interfaces



# Traffic Indicators



## CAN-1 Indicator

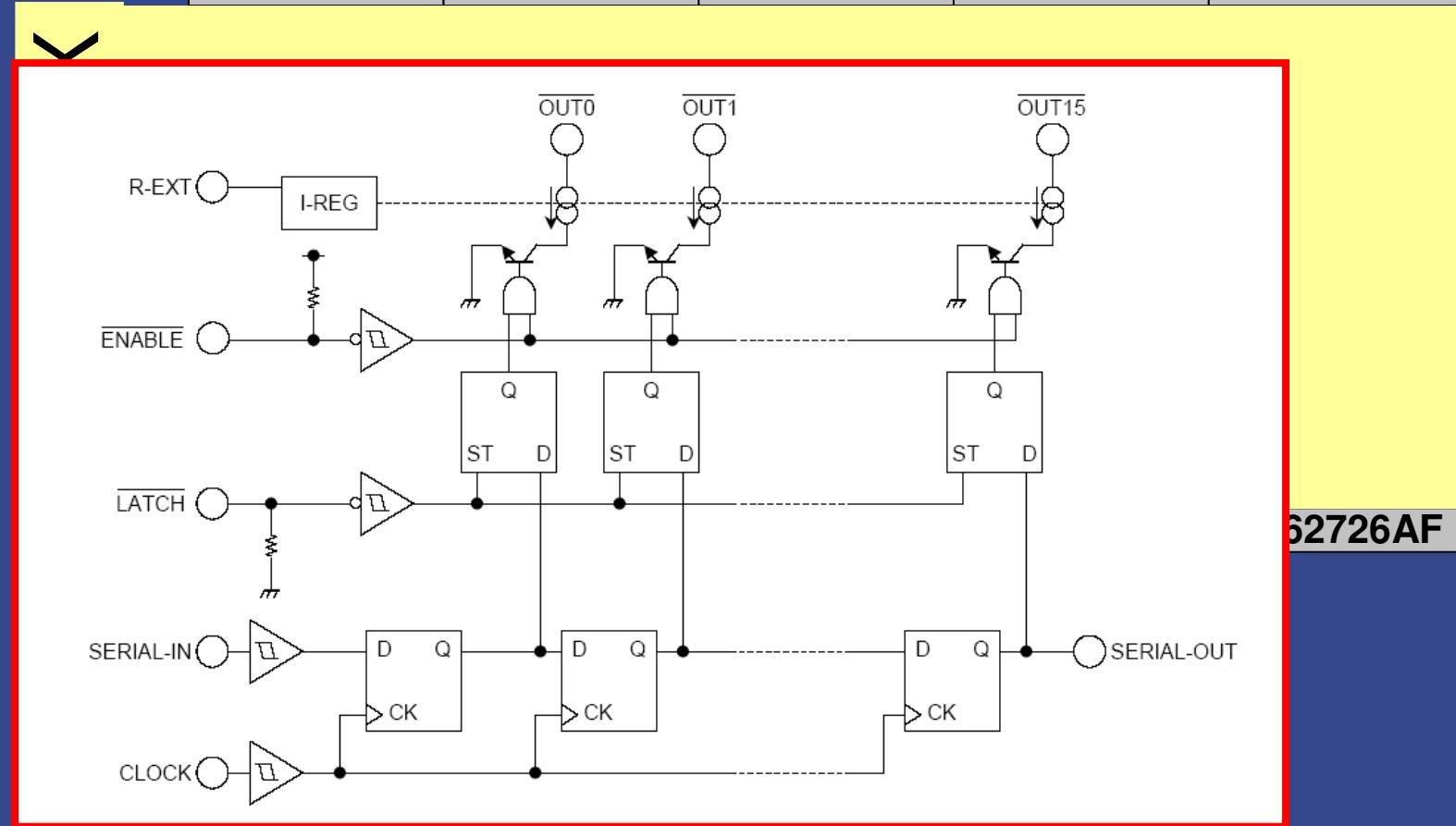


## **LED-matrix Driver**

- **40x16 pixels**
- **Each pixel consists of two LED's red and green.**
- **10 x 16bit serial constant current latches**
- **Latches driven by 10 x 16MHz SPI channels.**
- **Each LED has a programmable intensity of 8-bits**

# LED-matrix Driver

TB62726AF | TB62726AF | TB62726AF | TB62726AF | TB62726AF



62726AF

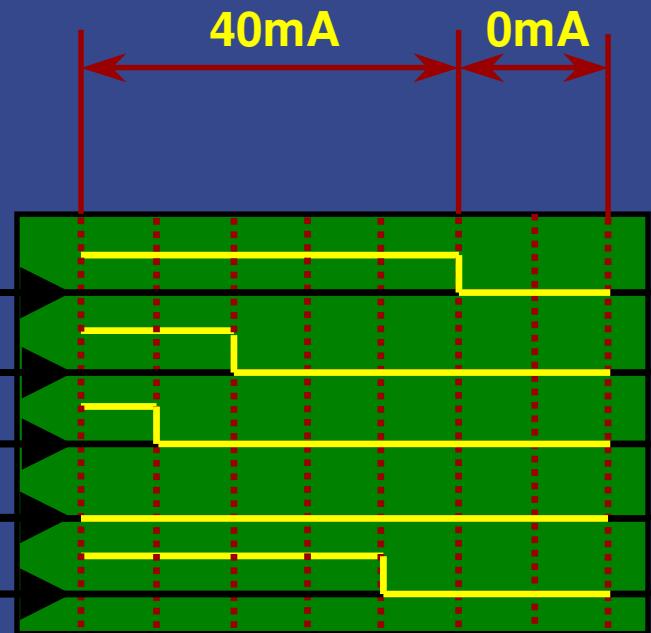
# LED-matrix Driver

Efter muxning:

$$28.5\text{mA} / 8 = \sim 3.56\text{mA}$$

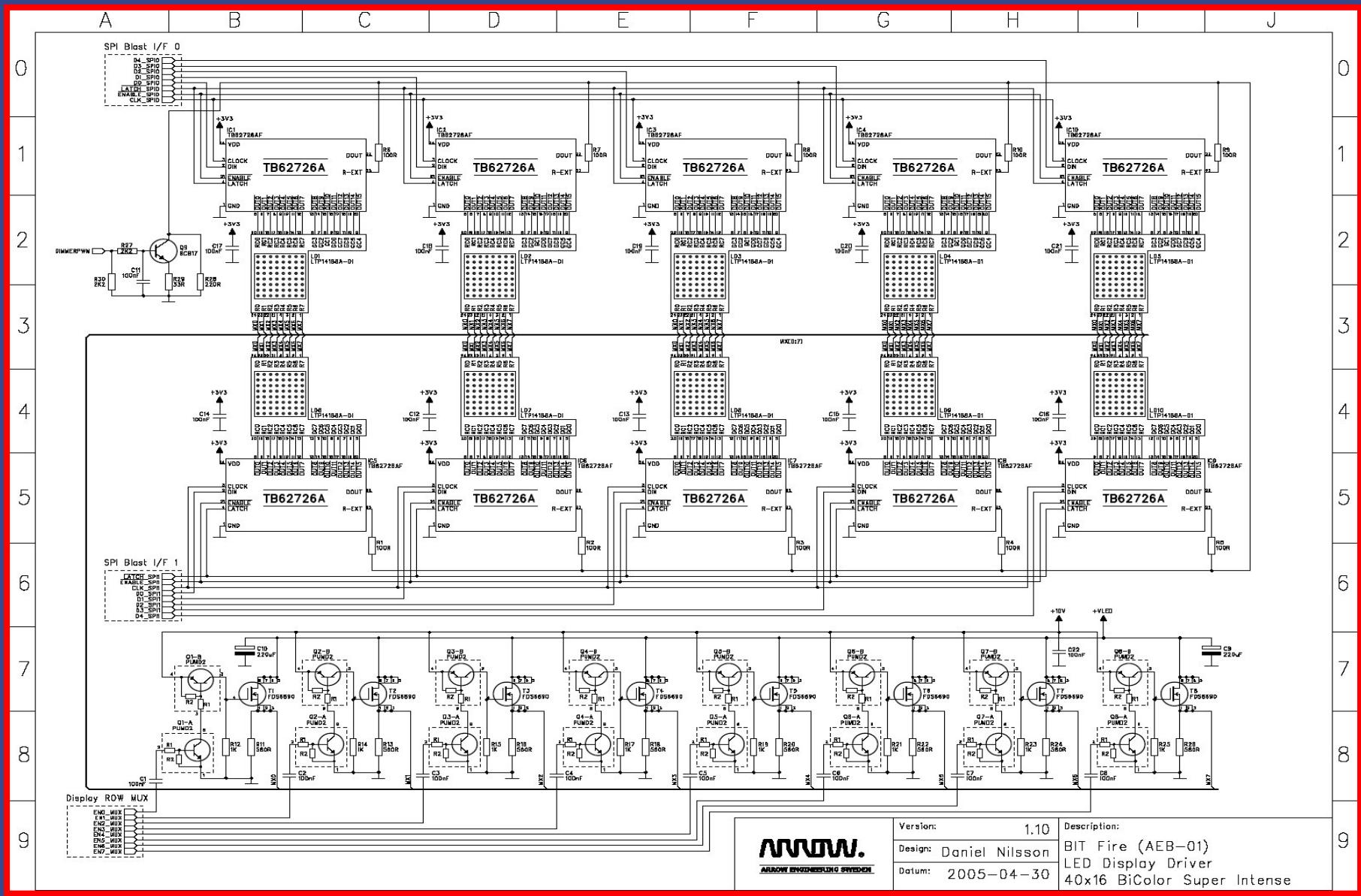
1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1
1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1
1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

$$5/7 * 40\text{mA} + 2/7 * 0\text{mA} = \sim 28.5\text{mA}$$



TB62726AF

# LED-matrix Driver

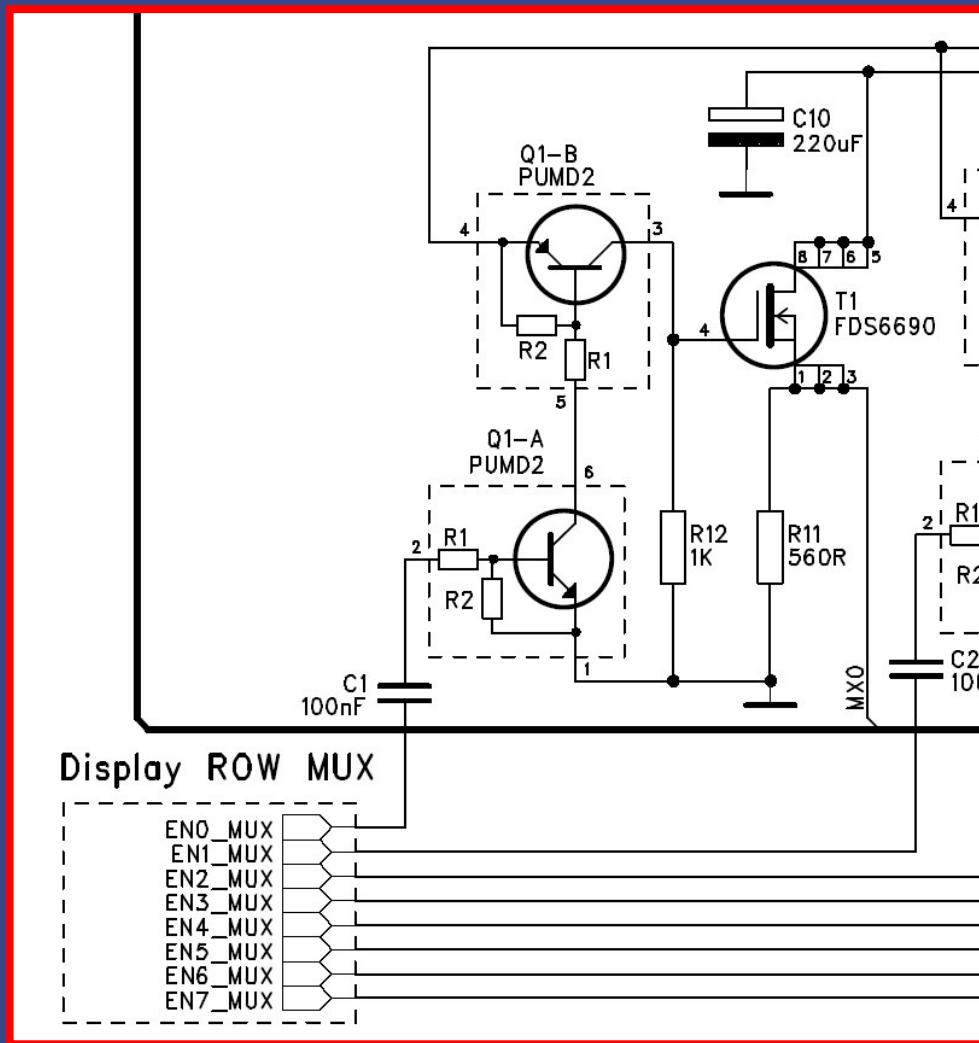


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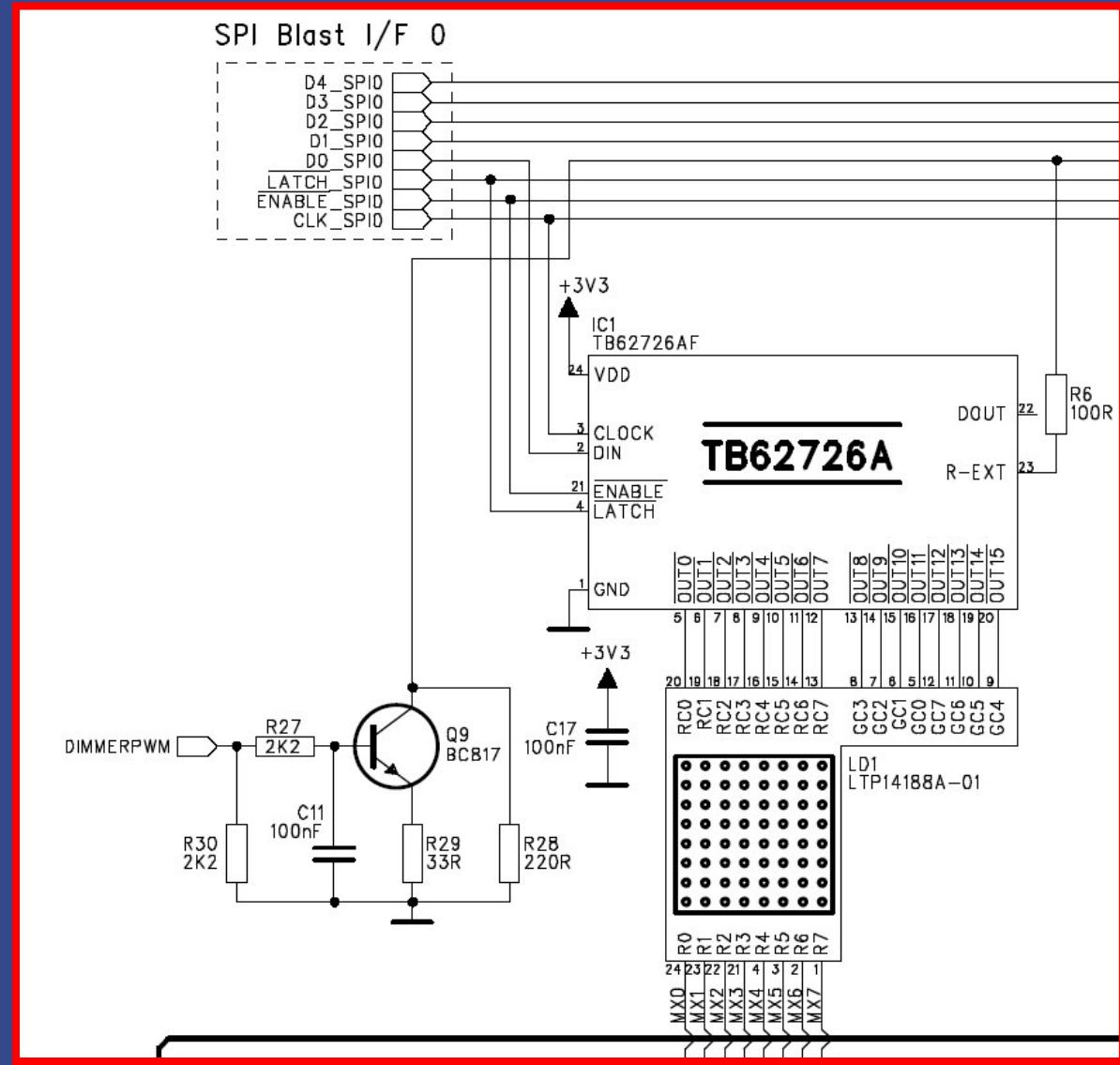
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# LED-matrix Driver



# LED-matrix Driver



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# TrAqK?



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