Raven demonstration board, block diagram

LED array

Header pin array (Raspberry Pi compatible)

jumpers

IRQ

XCLK

jmp

CMOS
crystal clock
(8MHz)

GPIO header

GPIO

SMA
connector
array

(optional)

1.8V
regulator

analog I/O

3.3V
regulator

power

XI

Crystal
(12.5MHz)

Raven chip

XO

power
jack

jmp

CLK, data

QSPI flash

jmp

CSB

TX

Serial display

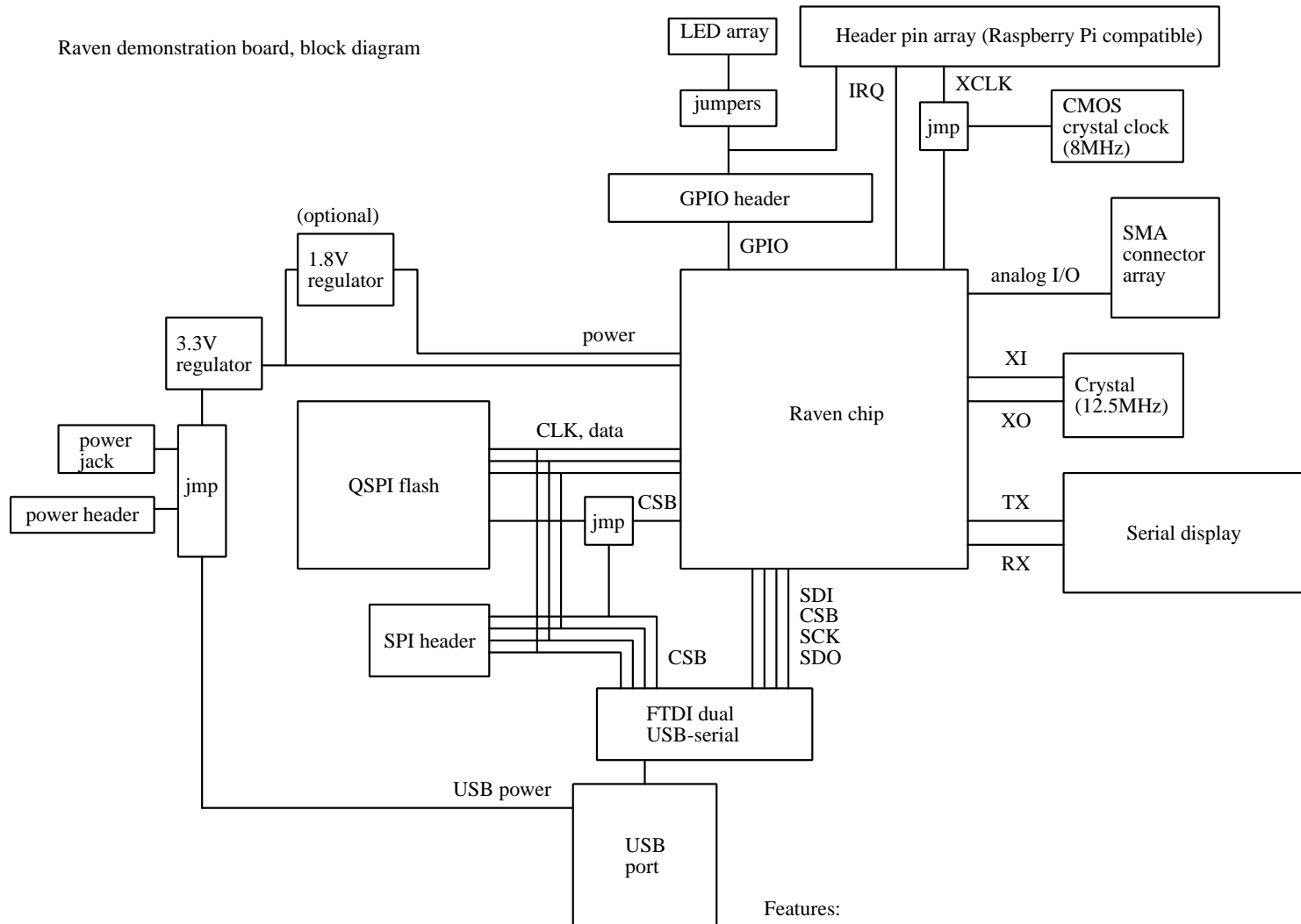SPI header

CSB

RX

SDI
CSB
SCK
SDO

power header

FTDI dual
USB-serial

CSB

USB power

USB
port

SPI flash: Cypress S25FL128 or similar ($2.42 each from Digi-Key).
Use the 8-pin SOIC (4 data + clock, select, power, and ground). 3.3V.

Serial display: Use a SparkFun serial-enabled 16x2 LCD ($25), 3.3V,
or the 20x4 SerLCD (also $25) (available from Digi-Key). Or the 20x2
SerLCD ($20).

FTDI: Use FT2232H (about $7 for the LQFP package from Digi-Key)

Features:
1. Can be powered from external supplies, power jack, or USB.
2. Split supplies if external 1.8V needed; otherwise chip is powered from 3.3V only.
3. Flash chip programmed through FTDI via USB
4. Raven SPI programmed through FTDI via USB
5. SMA inputs to analog functions.
6. Serial display for text I/O from Raven chip.
7. Clock from crystal (100MHz onboard), external (8MHz) or data line (slow)
8. Match Raspberry Pi header pins with GPIO header pins

Raspberry-Pi compatibility GPIO
header (3.3V)

NOTES:

Generally, the GPIO line up with
similar channels on the Raspberry
Pi board. The GCLK on the Pi
is connected to the Raven external
clock input. The I^2C lines are not
connected. The Raven SPI is
connected to the Pi SPI lines.

From USB or power jack

VDD3V3		5V
N/C (I2C)		5V
N/C (I2C)		Ground
EXTCLK		TX
Ground		RX
GPIO0		GPIO1
GPIO2		Ground
GPIO3		GPIO4
VDD3V3		GPIO5
SDI		Ground
SDO		GPIO6
SCK		CSB (Raven)
Ground		N/C (2nd SPI CSB)
N/C (I2C EEPROM)		N/C (I2C EEPROM)
GPIO7		Ground
GPIO8		GPIO12
GPIO9		Ground
GPIO10		GPIO13
GPIO11		GPIO14
Ground		GPIO15

Raven circuit board sketch (preliminary)

GPIO15 Ground
GPIO14 GPIO11
GPIO13 GPIO10
Ground GPIO9
GPIO12 GPIO8
Ground GPIO7

USB

3.3V regulator

5V Power Jack

Crystal

1.8V regulator

Ground

RX

Ground

3.3V

CSB (Raven) SCK
GPIO6 SDO
Ground SDI
GPIO5 VDD3V3
GPIO4 GPIO3
Ground GPIO2
GPIO1 GPIO0
RX Ground
TX EXTCLK
Ground
5V
5V VDD3V3

FT2232H
64 QFN

Reset
GND
SCK-F
Vcore
GND
AGND
USB-DM
USB-DP
GND
XO
XI
GND

SDI1
SDO1
CSB1
VCC
GND
VCC

Vcore
EECS
EECLK
EEDATA
PWREN
VCC
GND

VCC IO3 SCK IO0
S25FL128
8 SOIC
CS IO1 IO2 VSS

Raven
48 QFN

FLASH_IO3
FLASH_IO2
FLASH_IO1
FLASH_IO0
FLASH_CSB
FLASH_CLK
XCLK

GPIO15
SDI
CSB
SCK
SDO

GPIO2
GPIO1
GPIO0
XO
XI
VDD1V8
VDD3V3
ADC0_IN
ADC1_IN
VREF_L
VREF_H
ANALOG_OUT

8 MHz
CMOS clock
e.g., 535-12077-1-ND

Crystal

GPIO15
GPIO14
GPIO13
GPIO12
GPIO11
GPIO10
GPIO9
GPIO8
GPIO7
GPIO6
GPIO5
GPIO4
GPIO3
GPIO2
GPIO1
GPIO0

Power Header

LED array