ECE 2534
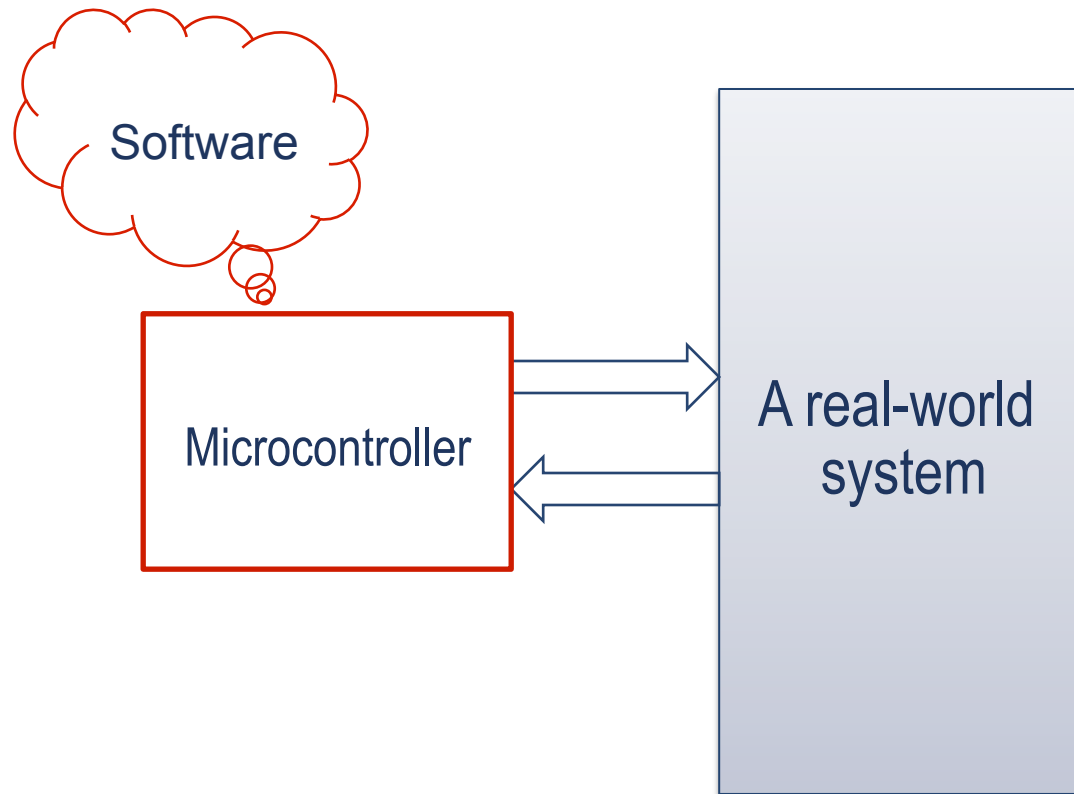
Overview of

PIC32, ~~Cerebot~~ Digilent, MPLAB,

and other things
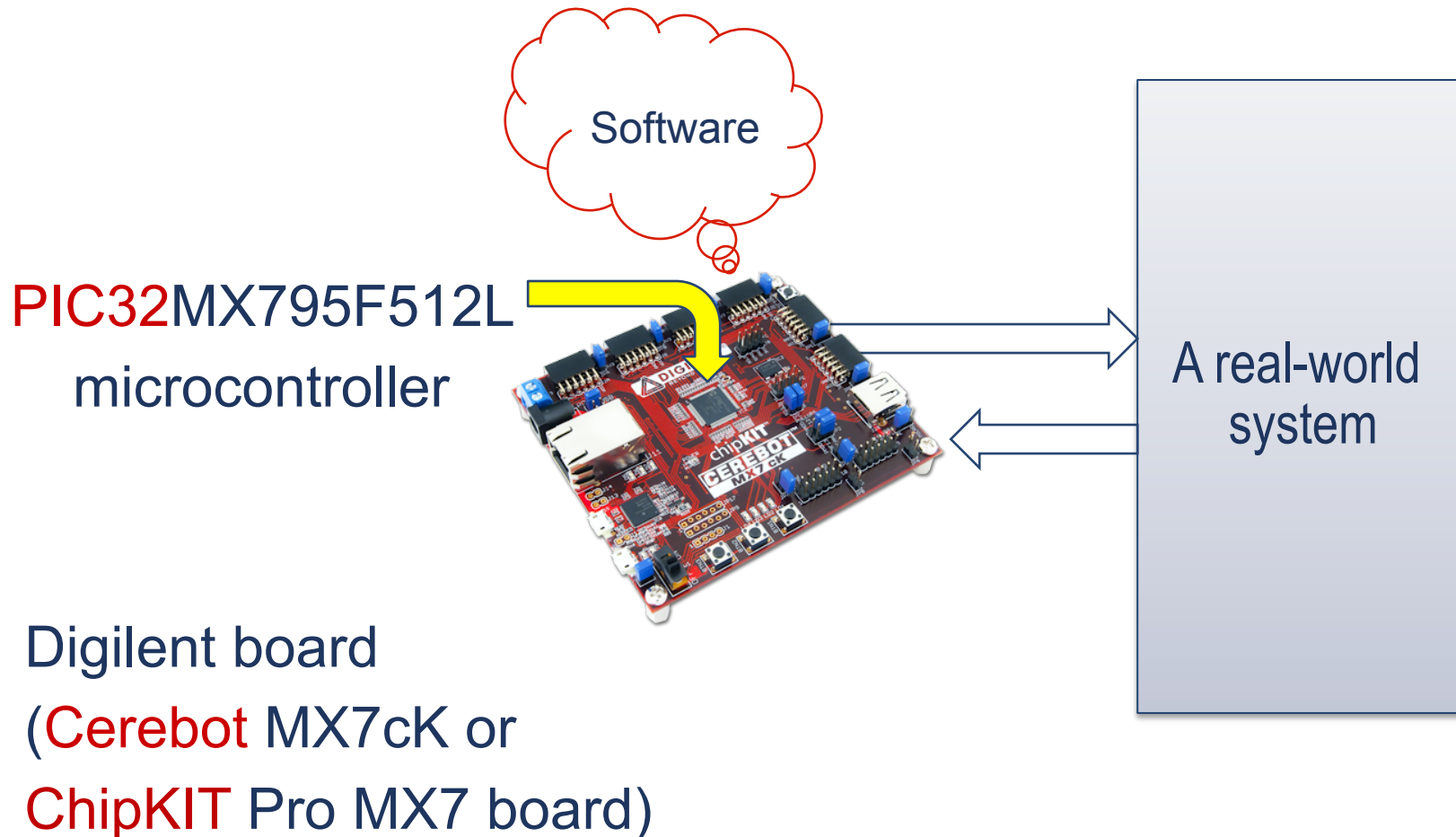
The BIG PICTURE
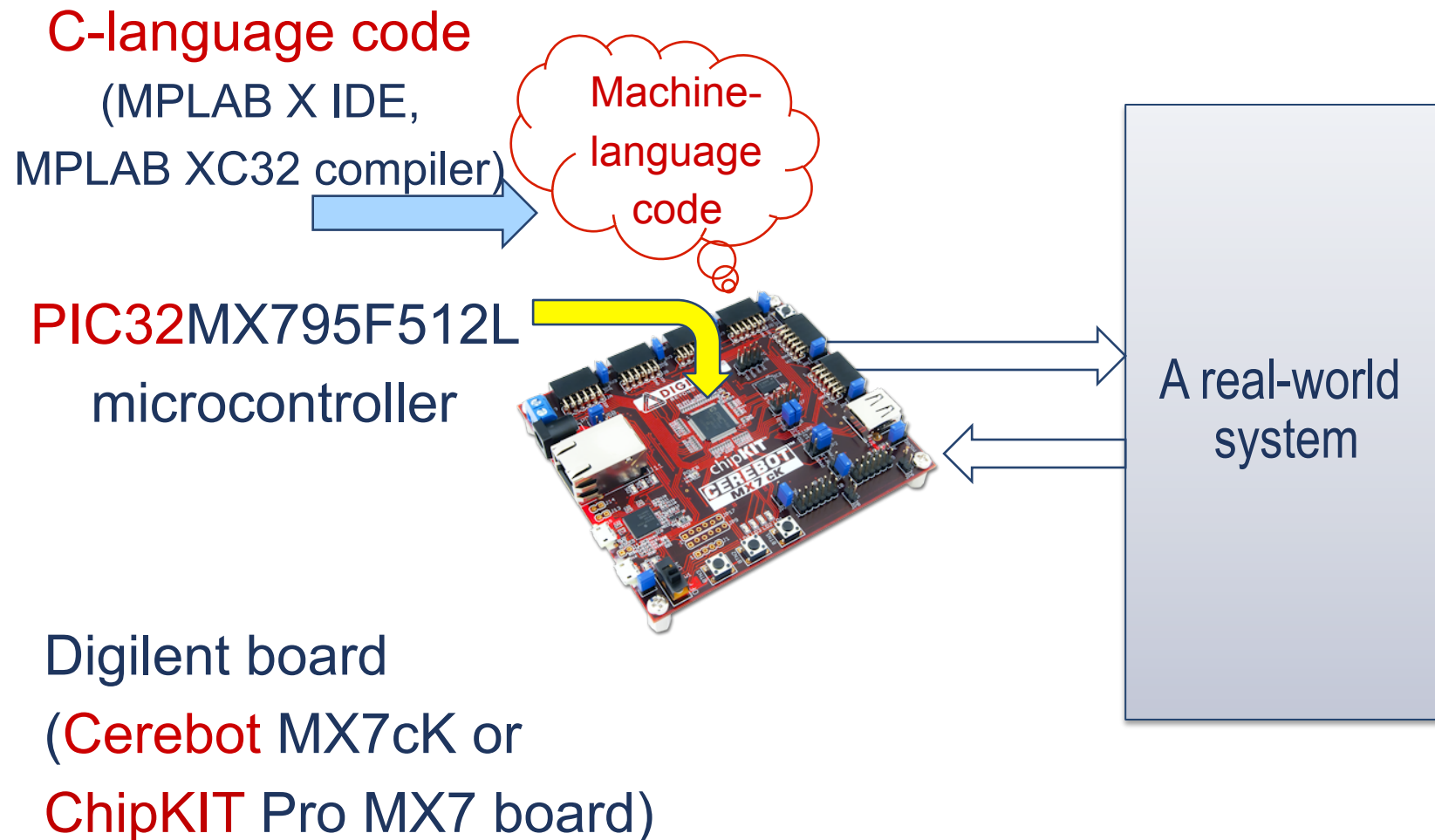
The BIG PICTURE

Software

PIC32MX795F512L
microcontroller

A real-world
system

Digilent board
(Cerebot MX7cK or
ChipKIT Pro MX7 board)

3

The BIG PICTURE

C-language code
(MPLAB X IDE,
MPLAB XC32 compiler)

Machine-language code

PIC32MX795F512L microcontroller

A real-world system

Digilent board
(Cerebot MX7cK or
ChipKIT Pro MX7 board)

Digilent board (high-level view)
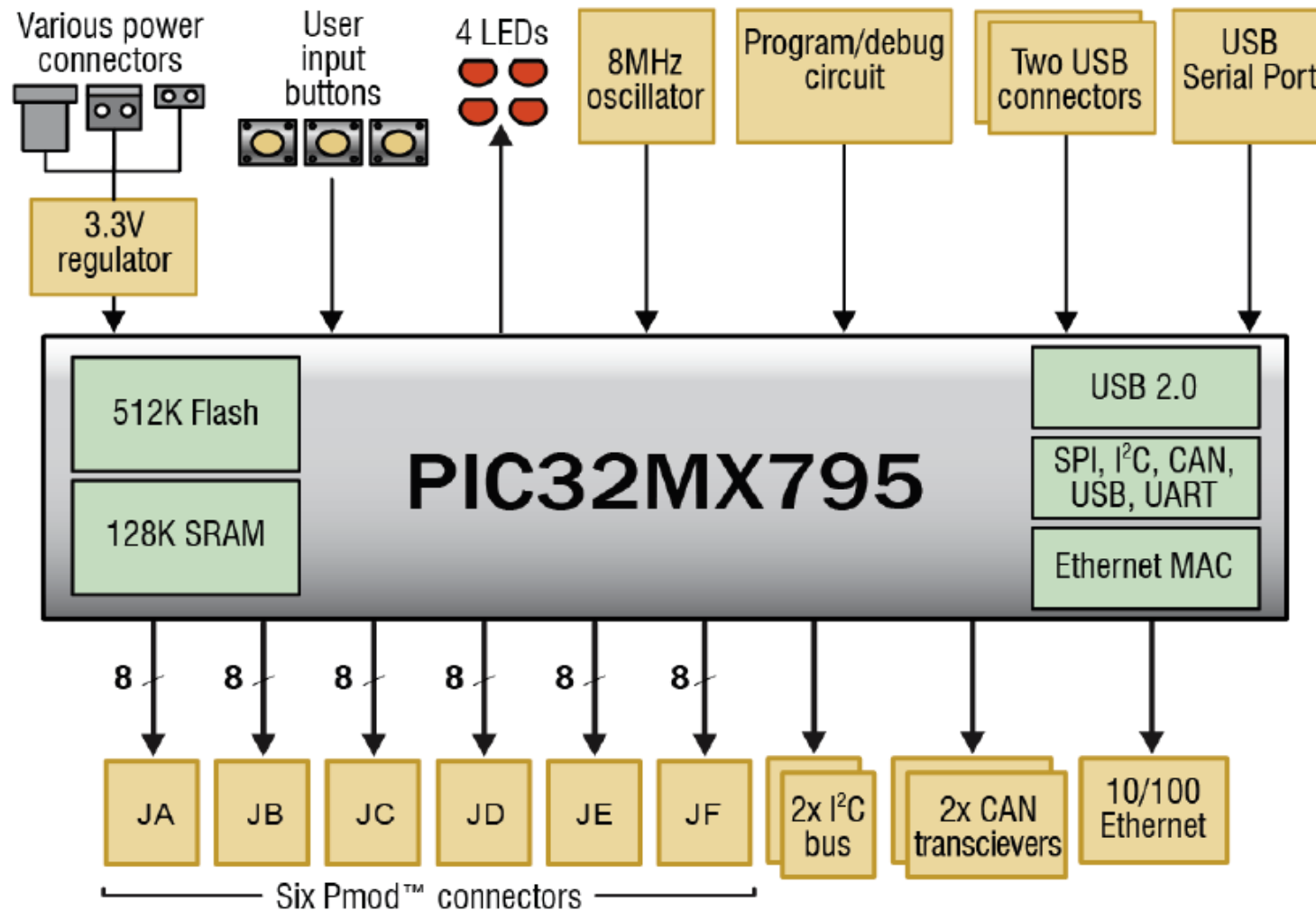
PIC32

(PIC32 datasheet, section 1)

FIGURE 1-1: **BLOCK DIAGRAM**[1,2]

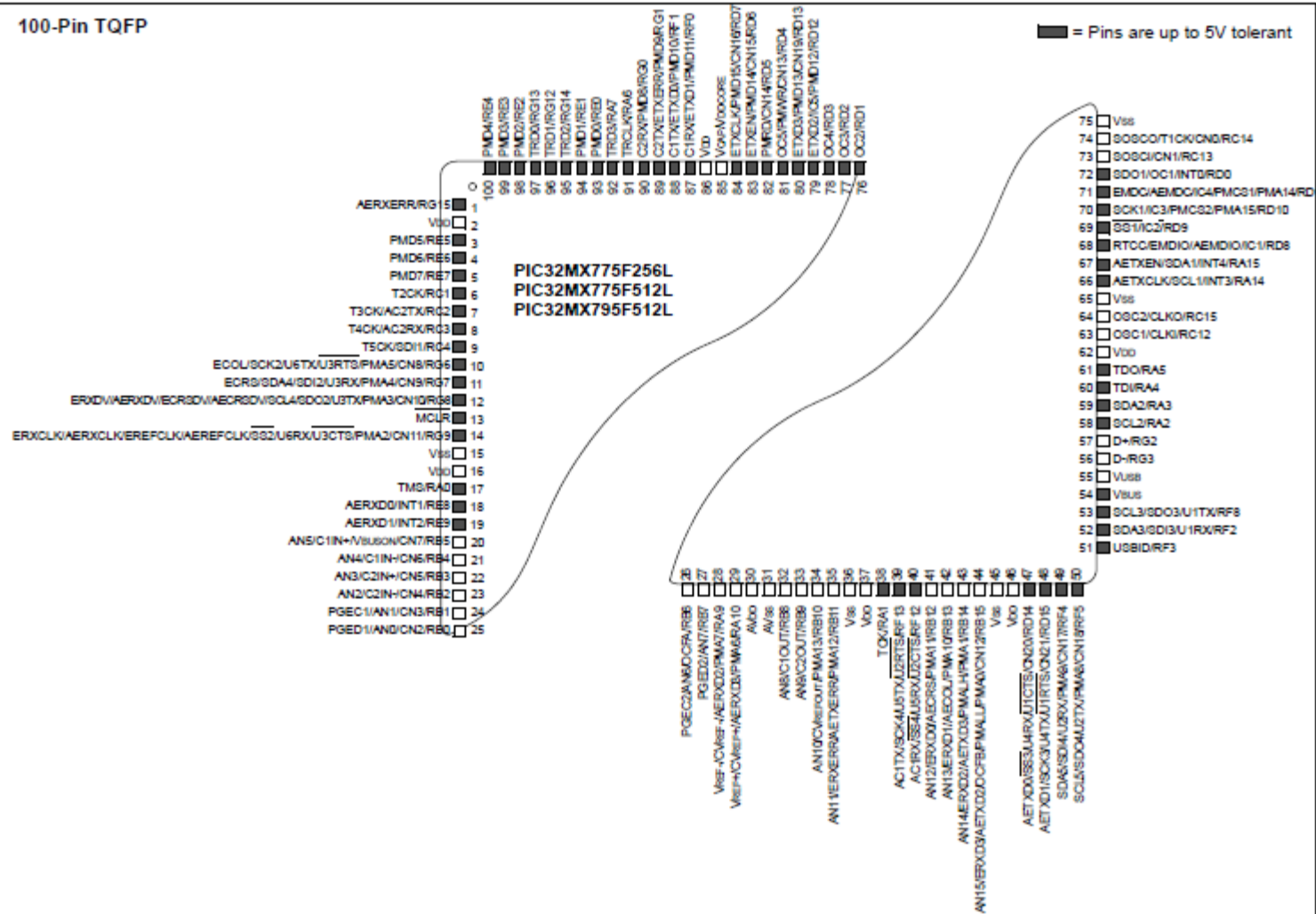**Note 1:** Some features are not available on all device variants.

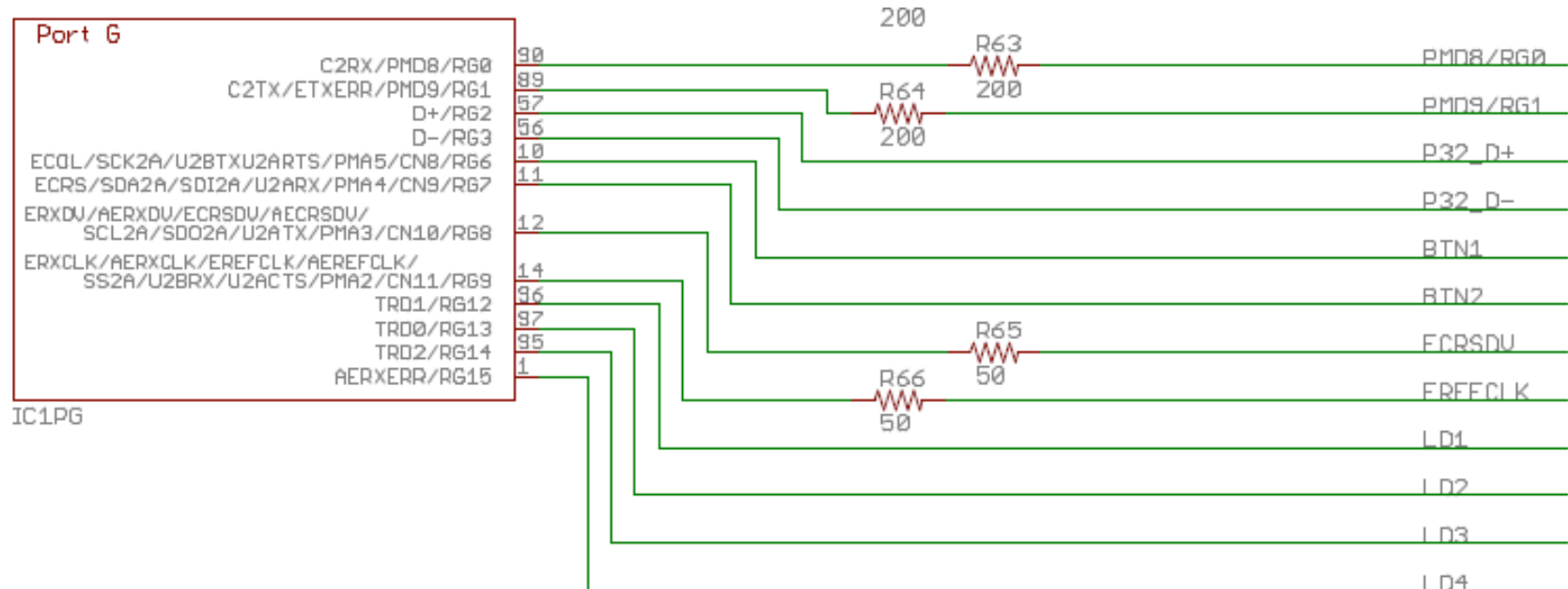**2:** BOR functionality is provided when the on-board voltage regulator is enabled.

PIC32 package

Pin Diagrams (Continued)

100-Pin TQFP

PIC32MX775F256L
PIC32MX775F512L
PIC32MX795F512L

= Pins are up to 5V tolerant

7

From Digilent schematics

Port G

IC1PG

Pin	Signal
90	C2RX/PMD8/RG0
89	C2TX/ETXERR/PMD9/RG1
57	D+/RG2
56	D-/RG3
10	ECOL/SCK2A/U2BTXU2ARTS/PMA5/CN8/RG6
11	ECRS/SDA2A/SDI2A/U2ARX/PMA4/CN9/RG7
12	ERXDV/AERXDV/ECRSDV/AECRSDV/SCL2A/SDO2A/U2ATX/PMA3/CN10/RG8
14	ERXCLK/AERXCLK/EREFCLK/AEREFCLK/SS2A/U2BRX/U2ACTS/PMA2/CN11/RG9
96	TRD1/RG12
97	TRD0/RG13
95	TRD2/RG14
1	AERXERR/RG15

200
R63
200
R64
200
R65   50
R66   50

PMD8/RG0
PMD9/RG1
P32_D+
P32_D-
BTN1
BTN2
ECRSDV
EREFCLK
LD1
LD2
LD3
LD4

Cerebot 32MX7	
Copyright 2010, Digilent Inc.	Engineer: NEA
SHEET: PIC32 Microcontroller	Author: GA
TITLE: Cerebot 32MX7	Rev: C
Doc#: 500-186 Date: 10/20/2010	Sheet: 5/9

From Digilent schematics

User Push Buttons

User LEDs

Cerebot 32MX7
Copyright 2010, Digilent Inc.

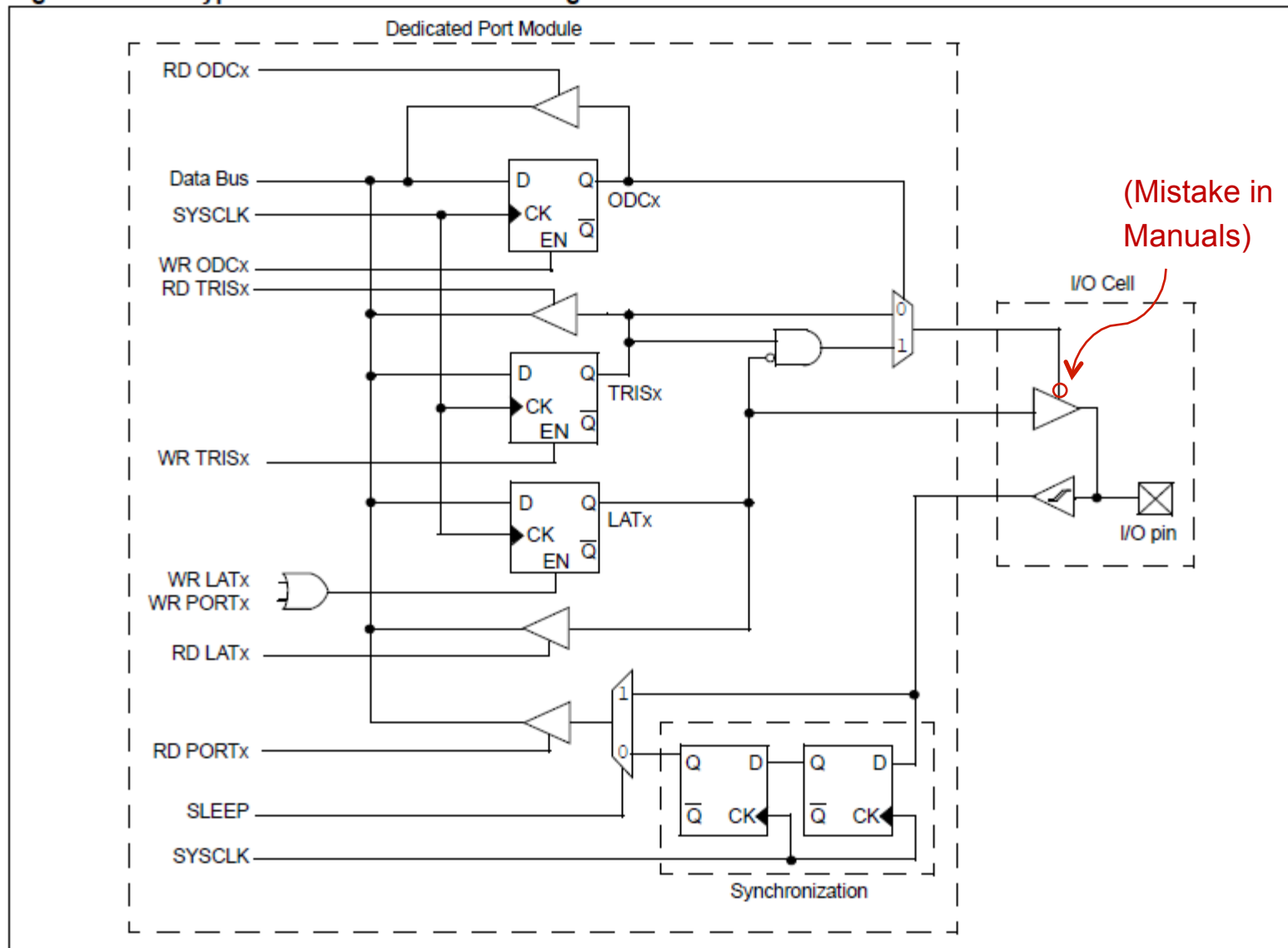|	
SHEET: Misc. I/O	Engineer: NEA
TITLE: Cerebot 32MX7	Author: GA
Doc#: 500-186	Date: 10/20/2010	Rev: C

Sheet: 6/9

One bit on a PIC32 I/O Port

Figure 12-1:   Typical Port Structure Block Diagram

(Mistake in Manuals)

Summary

❑ Need to think at several levels . . .

- Entire system

  The microcontroller is (ultimately) a component in a larger system

- Microcontroller board

  - The microcontroller has to sit somewhere, with power supply and electrical connections
  - The microcontroller has I/O ports that interface to external devices

- Microcontroller

  - The microcontroller has on-chip peripherals, such as timers, that need to be controlled through software
  - The microcontroller has a (rather complex) CPU that will try to fetch instructions and execute them
  - Instructions and data sit in memory (on-chip, possibly off-chip)

- Circuits & electronics

  - None of this works without good electrical design, proper signal conditioning, etc.