Digital Signals

Control systems and Computer Networks

Dr Alun Moon

Lecture 1.3

Digital Signals

What is a digital signal?

A Digital Signal is:

Digital Signals

What is a digital signal?

A Digital Signal is:

True

Digital Signals

What is a digital signal?

A Digital Signal is:

True False

Digital Signals

What is a digital signal?

A Digital Signal is:

True	False
1	

Digital Signals

What is a digital signal?

A Digital Signal is:

True	False
1	0

Digital Signals

What is a digital signal?

A Digital Signal is:

True	False
1	0
on	

Digital Signals

What is a digital signal?

A Digital Signal is:

True	False
1	0
on	off

Digital Signals

What is a digital signal?

A Digital Signal is:

True	False
1	0
on	off
Pressed	

Digital Signals

What is a digital signal?

A Digital Signal is:

True	False
1	0
on	off
Pressed	Not-pressed

Digital Signals

What is a digital signal?

A Digital Signal is:

True	False
1	0
on	off
Pressed	Not-pressed
High	

Digital Signals

What is a digital signal?

A Digital Signal is:

True	False
1	0
on	off
Pressed	Not-pressed
High	Low

Digital Signals

What is a digital signal?

A Digital Signal is:

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1	0
on	off
Pressed	Not-pressed
High	Low
5 V	

Digital Signals

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Digital Signals

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High	Low
5 V	0 V
3.3 V	

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- from a software perspective anything convenient for us to use

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- there are external limitations and constraints,

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- there are external limitations and constraints,
  - Physics

Digital Signals

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- from a software perspective anything convenient for us to use
- there are external limitations and constraints,
  - Physics
  - Standards

Electrical Characteristics

Generally :

positive voltage logical 1

negative voltage logical 0

Electrical Characteristics

Generally :

positive voltage logical 1

negative voltage logical 0

Specific technologies have specific voltages for *on*

TTL Transistor Transistor Logic 5 V

CMOS Complementary Metal Oxide Semiconductor 3.3 V

Sequences

Digital signals exist in sequences. . .

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- Traffic Lights

Sequences

Digital signals exist in sequences. . .

- Traffic Lights
  - Red $\rightarrow$ Red,Amber $\rightarrow$ Green $\rightarrow$ Amber $\rightarrow$ Red . . .

Sequences

Digital signals exist in sequences...

- Traffic Lights
  - Red $\rightarrow$ Red,Amber $\rightarrow$ Green $\rightarrow$ Amber $\rightarrow$ Red ...
- Flashing

Sequences

Digital signals exist in sequences...

- Traffic Lights
  - Red $\rightarrow$ Red,Amber $\rightarrow$ Green $\rightarrow$ Amber $\rightarrow$ Red ...
- Flashing
  - On $\rightarrow$ Off $\rightarrow$ On ...

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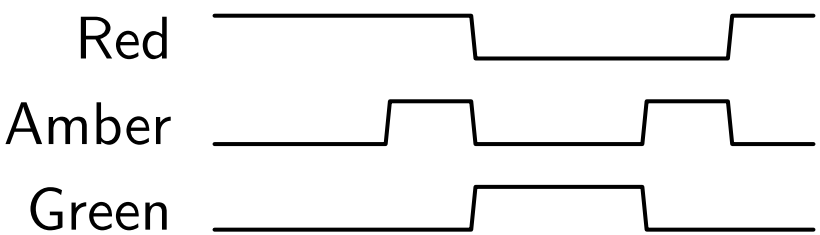
  - On $\rightarrow$ Off $\rightarrow$ On ...

Can be written as a Timing Diagram



Digital IO from the C

Microcontrollers (C) have dedicated hardware for digital IO. GPIO