CPE 323
Intro to Embedded Computer Systems
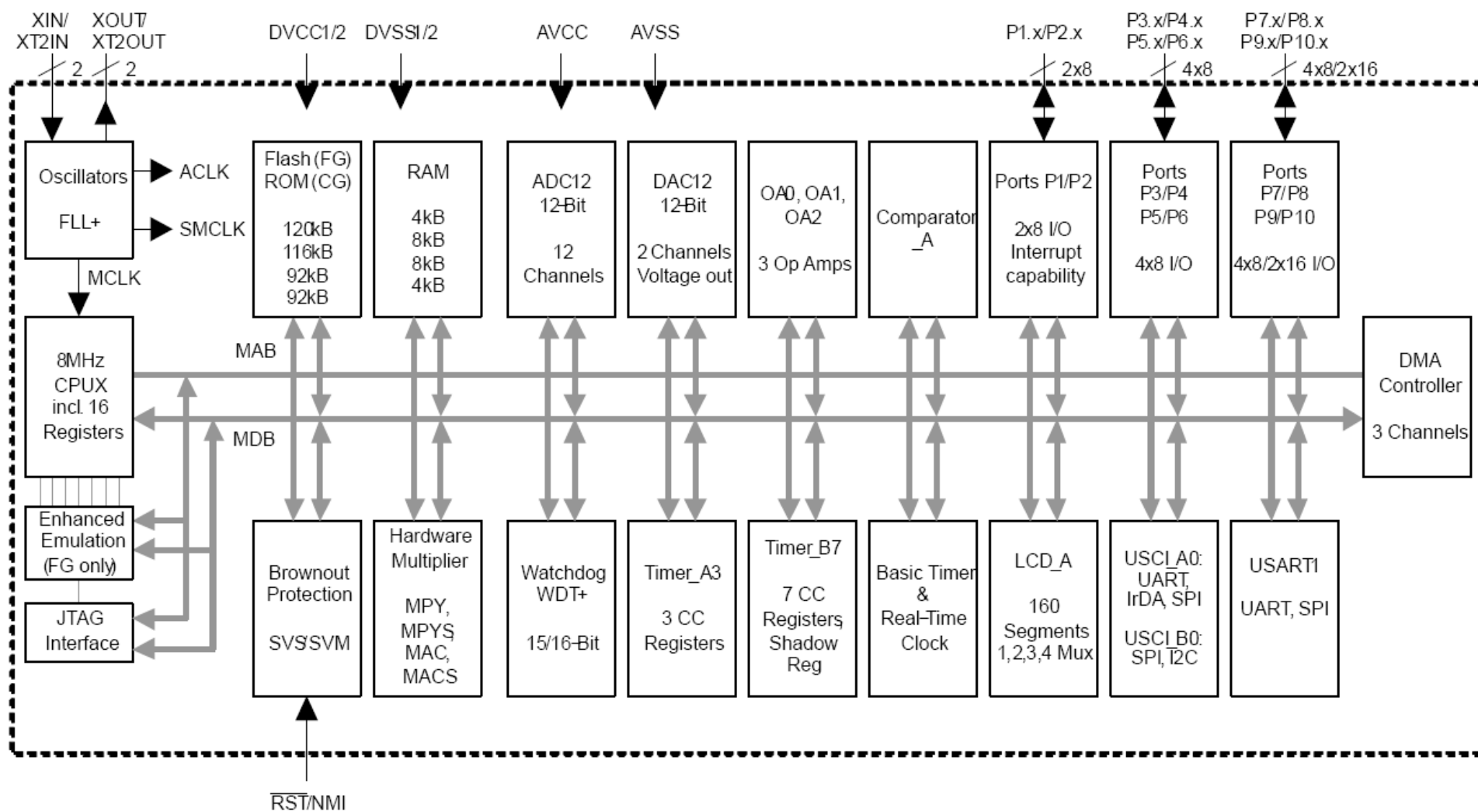# Serial Communication: I^{2}C

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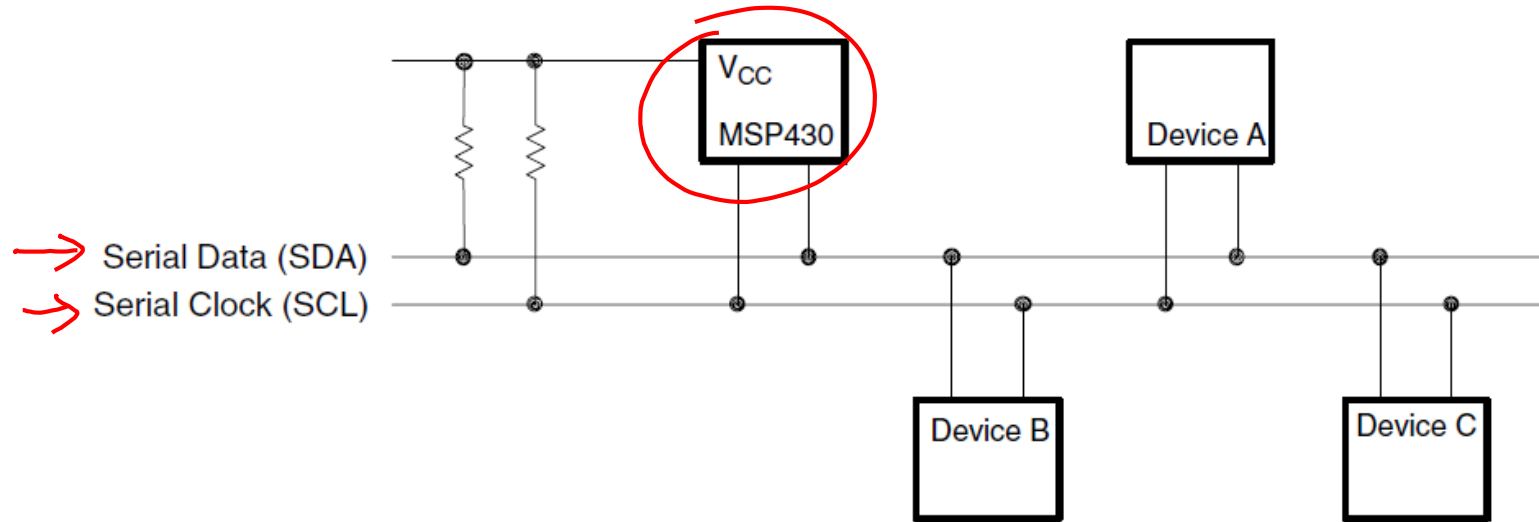# Admin

MSP430FG4618 Block Diagram
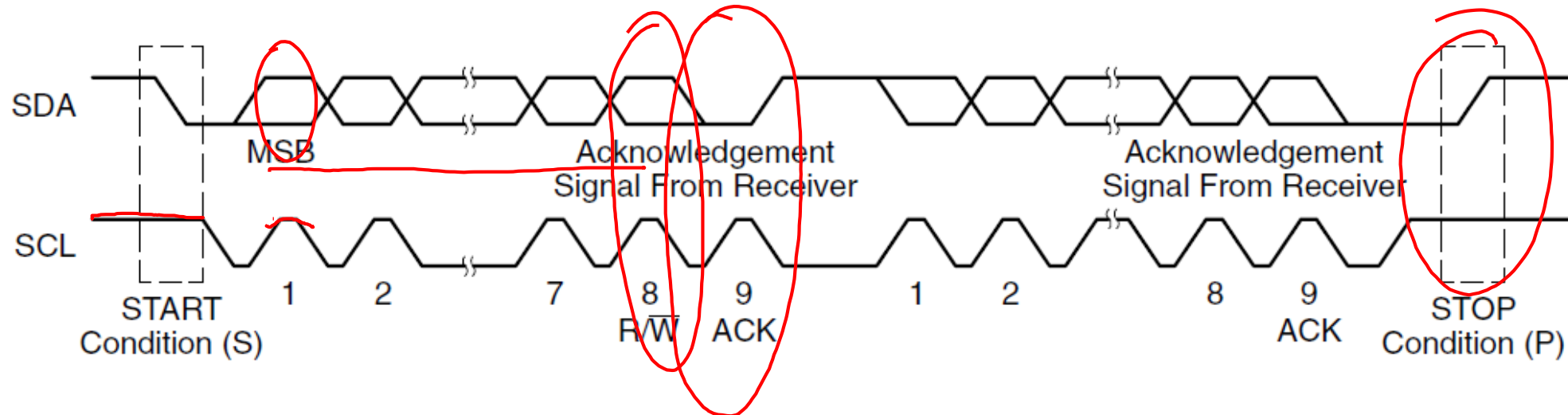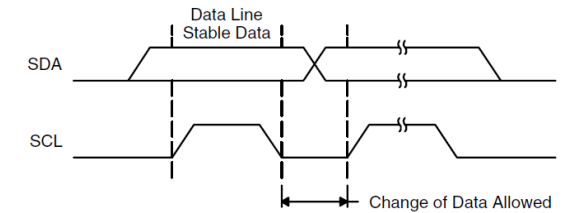
Characteristics

- 2-wired synchronous serial communication interface
  - Serial data: SDA
  - Serial clock: SCLK
- It's a bus
  - multiple devices can communicate
  - each device has its address
- Standardized

Big Picture

I^2C — (Inter) Integrated Circuits (IC)

V_{CC}

MSP430

Device A

Device B

Device C

→ Serial Data (SDA)

→ Serial Clock (SCL)

Transfer on the Bus

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Hardware View

(a) master   (b) slave   (c) simpler slave

Master Reads

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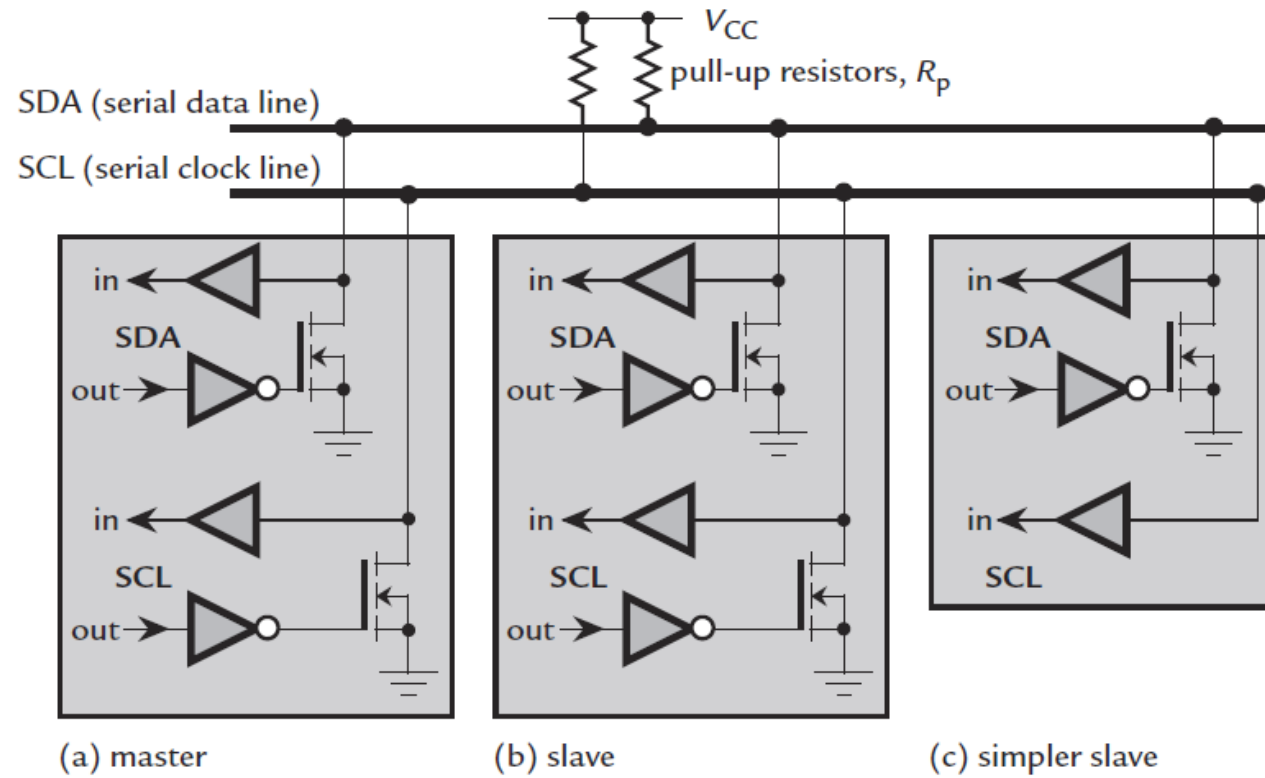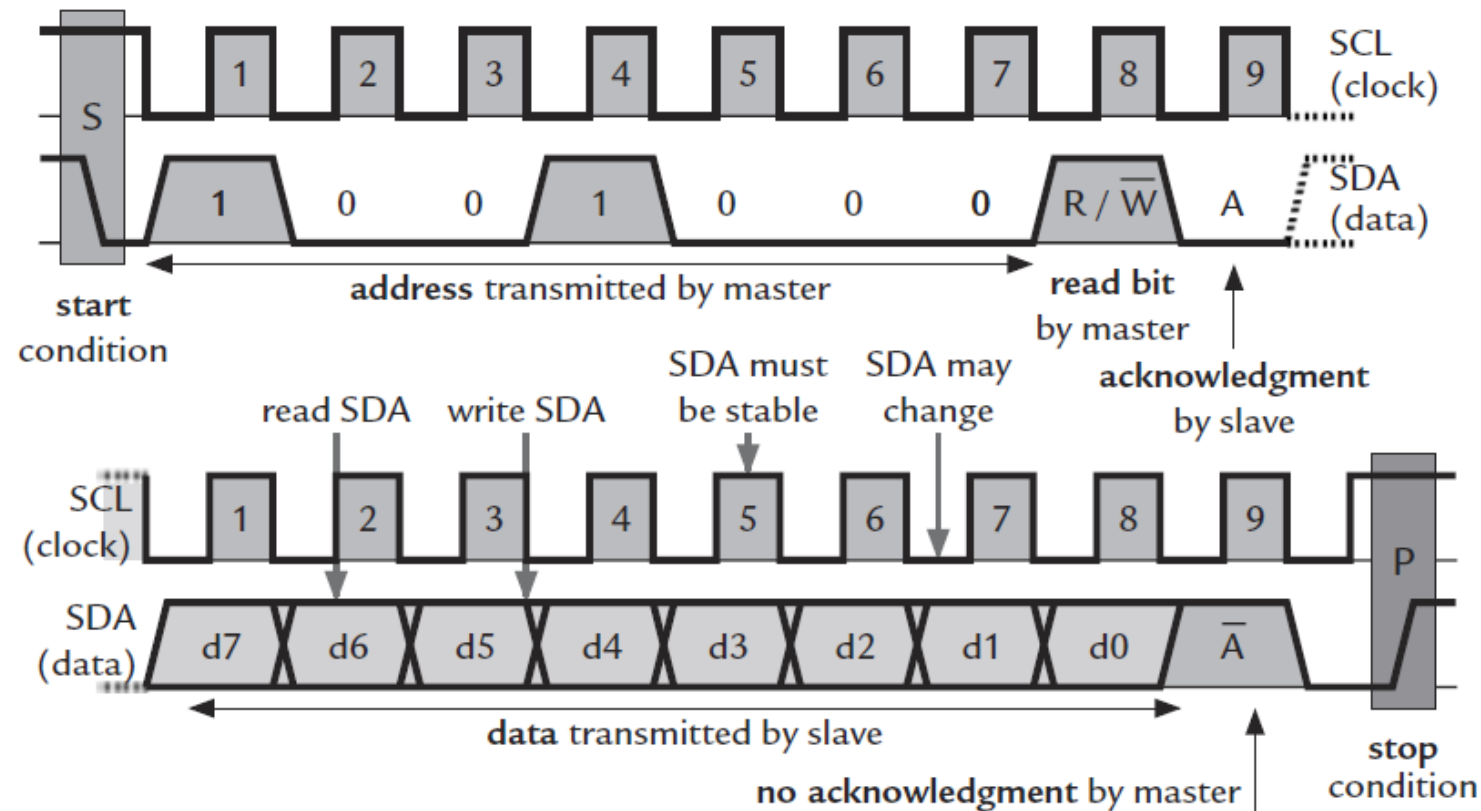
Figure 21–5. I²C Module 7-Bit Addressing Format

1	7	1	1	8	1	8	1	1
S	Slave Address	R/W̄	ACK	Data	ACK	Data	ACK	P
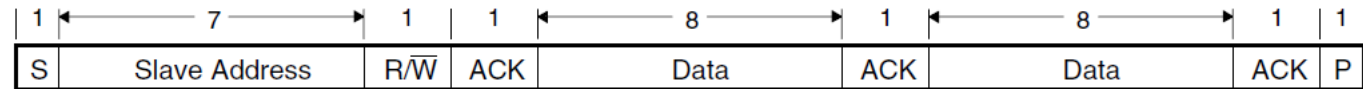
Figure 21–6. I²C Module 10-Bit Addressing Format

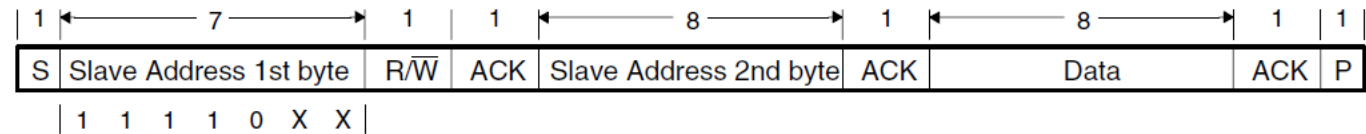| 1	7	1	1	8	1	8	1	1
S	Slave Address 1st byte	R/W̄	ACK	Slave Address 2nd byte	ACK	Data	ACK	P

| 1 1 1 1 0 X X |

Figure 21–7. I²C Module Addressing Format with Repeated START Condition

1	7	1	1	8	1	1	7	1	1	8	1	1
S	Slave Address	R/W̄	ACK	Data	ACK	S	Slave Address	R/W̄	ACK	Data	ACK	P

| 1 | Any Number | 1 | Any Number |