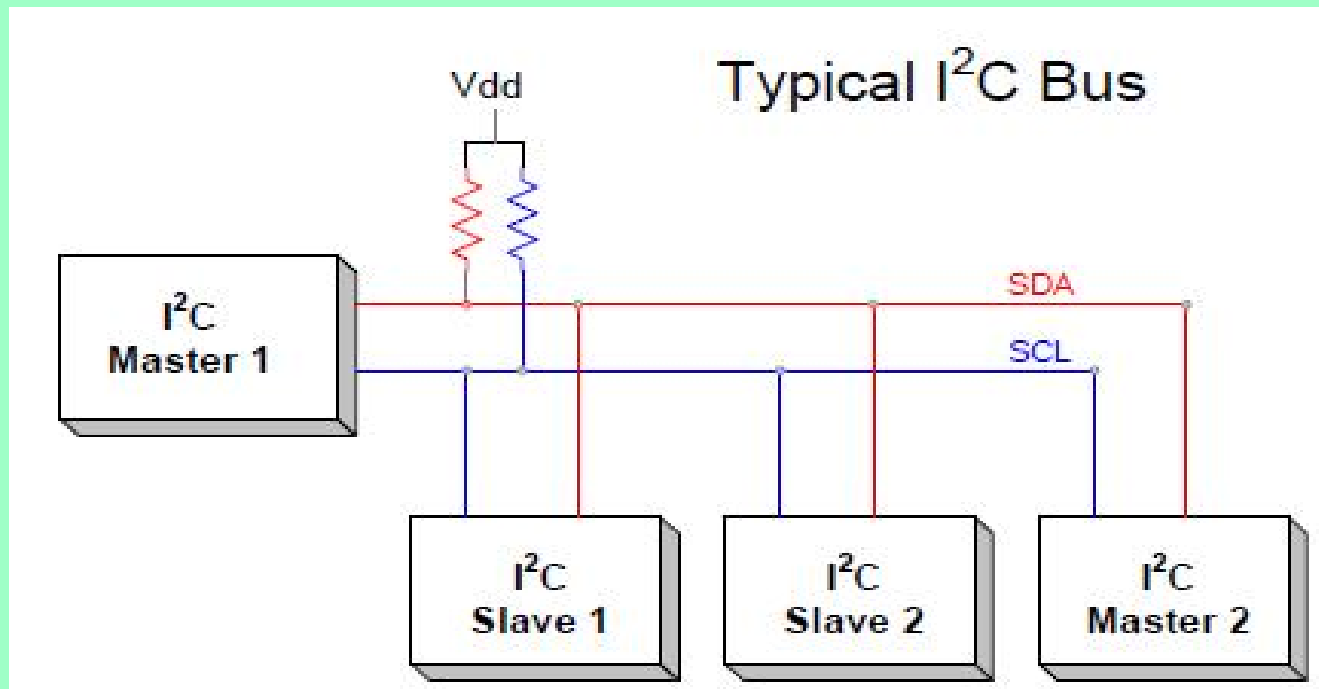


**MIKROKONTROLER ATMEGA
BERBASIS
CODEVISION AVR
(I2C DAN APLIKASI RTC)**

Teori I2C/I²C

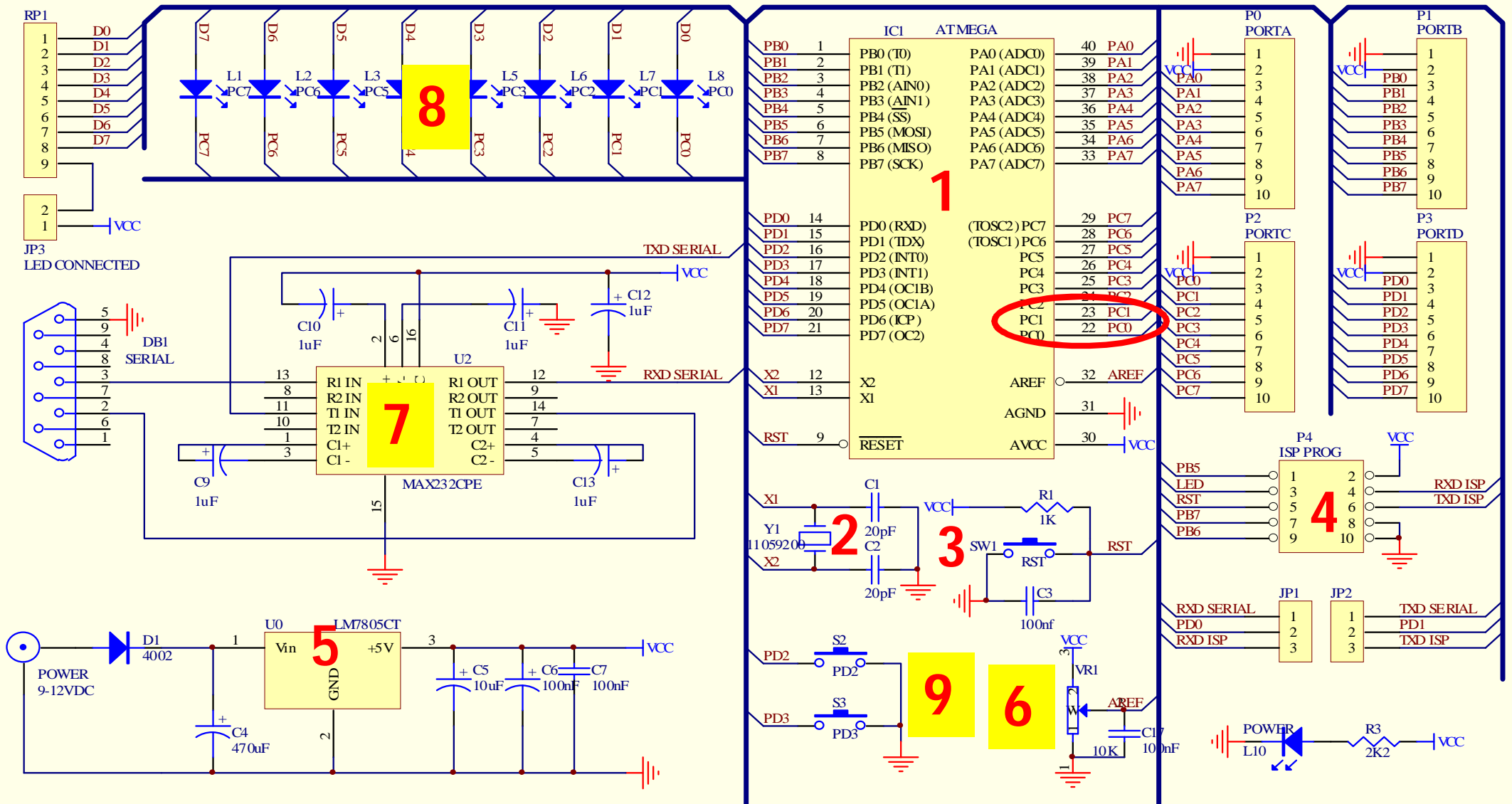
- I2C/I²C (Baca: I-Two-C atau I-Squared-C) = **Inter-Integrated Circuit**
- ▣ adalah salah satu teknik komunikasi serial dengan menggunakan dua jalur, yaitu SCL (Serial Clock), dan SDA (Serial Data).



Fitur I2C/I²C ATmega16A

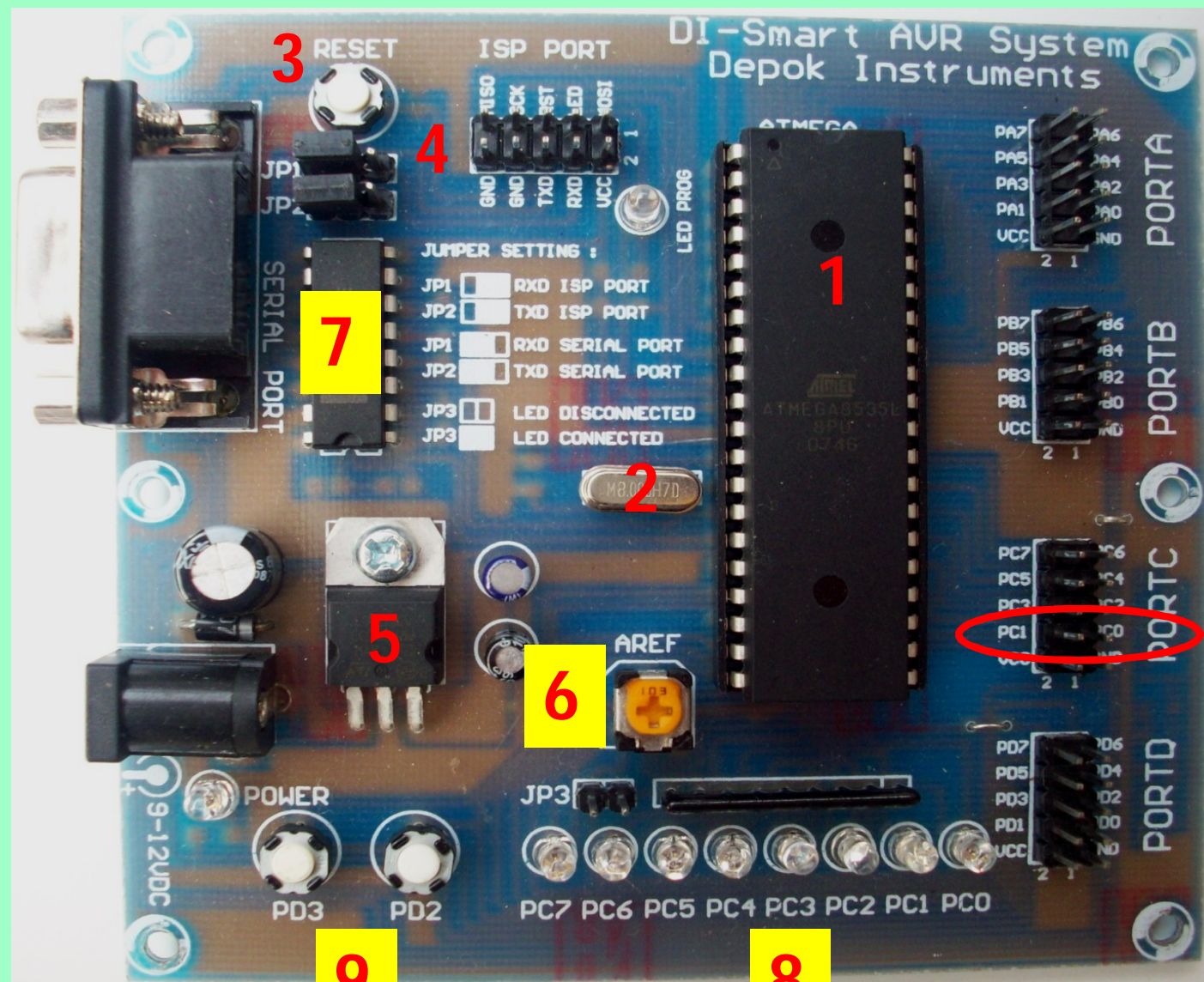
- PORTC.0 = SCL
- PORTC.1/PINC.1 = SDA
- I2C/I²C dapat dibangkitkan pula di PORT lain.
- Contoh perangkat yang menggunakan I2C/I²C:
 - ▣ IC RTC (Real Time Clock) DS1307

DI-Smart AVR.16 System (Sistem Plus μ C. ATmega16A)



DI-Smart AVR.16 System

1. ATmega16A
2. Crystal
3. Reset
4. ISP
5. Power
6. Vref ADC
7. RS232
8. LED Array
9. Push Button



Pemrograman I2C/I²C pada CVAVR

- Inisialisasi "*Wizard*"
 - ▣ Aktivasi I2C/I²C.
 - ▣ Pilih perangkat yang akan digunakan (RTC DS1307).
 - ▣ Pilih PIN untuk SDA dan SCL.
 - ▣ Aktivasi LCD Alphanumeric untuk menampilkan data dari RTC.

Pemrograman I2C/I²C (Setup "Wizard")

1

USART	Analog Comparator	ADC	SPI
I2C	1 Wire	TWI (I2C)	
Alphanumeric LCD			
Bit-Banged		Project Information	
Chip	Ports	External IRQ	Timers

Chip: ATmega16

Clock: 11.059200 MHz

Check Reset Source

Program Type: Application

2

USART	Analog Comparator	ADC	SPI
Alphanumeric LCD			
Bit-Banged		Project Information	
Chip	Ports	External IRQ	Timers

I2C Port: PORTC

SDA Bit: 1 SCL Bit: 0

PCF8583 DS1307

Enabled Square Wave Output Enabled

OUT: 0

3

USART	Analog Comparator	ADC	SPI
I2C	1 Wire	TWI (I2C)	
Alphanumeric LCD			
Bit-Banged		Project Information	
Chip	Ports	External IRQ	Timers

Enable Alphanumeric LCD Support

Characters/Line: 16

Connections

LCD Module AVR

RS	PORTB	Bit: 0
RD	PORTB	Bit: 1
EN	PORTB	Bit: 2
D4	PORTB	Bit: 4
D5	PORTB	Bit: 5
D6	PORTB	Bit: 6
D7	PORTB	Bit: 7

4

File Program Edit Help

Generate program, save and exit

Pemrograman I2C/I²C (i2c.h)

- `i2c_init(void); //Inisialisasi I2C.`
 - ▣ `i2c_init();`
- `i2c_start(void); //Mengaktifkan proses komunikasi.`
 - ▣ `i2c_start();`
- `i2c_stop(void); //Menghentikan proses komunikasi.`
 - ▣ `i2c_stop();`
- `i2c_read([char ack]); //Membaca data i2c.`
 - ▣ `unsigned char char_data;`
 - ▣ `void main(void) {char_data = i2c_read(0);}`
- `i2c_write([char data]); //Menulis data i2c.`
 - ▣ `unsigned char char_data;`
 - ▣ `void main(void) {char_data = i2c_write(255);}`

Pemrograman I2C/I²C (ds1307.h) [1/2]

- `rtc_init(void); //Inisialisasi rtc ds1307.`
 - `rtc_init();`
- `rtc_read([char address]); //Membaca data rtc.`
 - `unsigned char char_data;`
 - `void main(void)`
 - `{char_data = rtc_read(0);}`
- `rtc_write([char address, char data]); //Menulis data rtc.`
 - `unsigned char char_data;`
 - `void main(void)`
 - `{rtc_write(0,0);}`
- `rtc_get_time([char *hour, char *min, char *sec]); //Membaca- waktu (jam, menit, detik).`
 - `unsigned char cjm, cmn, cdt;`
 - `void main(void)`
 - `{rtc_get_time(&cjm, &cmn, &cdt);}`

Pemrograman I2C/I²C (ds1307.h) [2/2]

- `rtc_set_time([char hour, char min, char sec]);` //Mengeset waktu (jam, menit, detik).
 - `unsigned char cjm, cmn, cdt;`
 - `void main(void)`
 - `{rtc_set_time(cjm, cmn, cdt);}`
- `rtc_get_date([char *week_day, char *day, char *month, char *year]);` //Membaca tanggal
- `//(hari ke-, tanggal, bulan, tahun).`
 - `unsigned char chr, ctg, cbl, cth;`
 - `void main(void)`
 - `{rtc_get_date(&chr, &ctg, &cbl, &cth);}`
- `rtc_set_date([char *week_day, char *day, char *month, char *year]);` //Mengeset tanggal
- `//(hari ke-, tanggal, bulan, tahun).`
 - `unsigned char chr, ctg, cbl, cth;`
 - `void main(void)`
 - `{rtc_get_date(chr, ctg, cbl, cth);}`

Pemrograman I2C/I²C

"Jam Digital" [1/3]

- `#include <mega16.h>`
- `#include <delay.h>`
- `#include <stdio.h>`
- `#asm // I2C Bus functions`
 - `.equ __i2c_port=0x15 ;PORTC`
 - `.equ __sda_bit=1`
 - `.equ __scl_bit=0`
- `#endasm`
- `#include <i2c.h>`
- `#include <ds1307.h> // DS1307 Real Time Clock functions`
- `#include <alcd.h> // Alphanumeric LCD Module functions`
- `// Declare your global variables here`
- `unsigned char cstr[16];`
- `unsigned char jm=0, dt=0, mn=0, hr=0, tg=0, bl=0, th=0;`

Pemrograman I2C/I²C

"Jam Digital" [2/3]

```
□ void main(void)
  □ {
  □ // DS1307 Real Time Clock initialization
  □ // Square wave output on pin SQW/OUT: Off
  □ // SQW/OUT pin state: 0
  □ rtc_init(0,0,0);

  □ lcd_init(16);

  □ hr=1;tg=6;bl=9;th=15;
  □ rtc_set_date(hr,tg,bl,th);

  □ jm=13;mn=52;dt=59;
  □ rtc_set_time(jm,mn,dt);
```

Pemrograman I2C/I²C

"Jam Digital" [3/3]

```
□ while (1)
  ■ {
  ■ // Place your code here
  ■ rtc_get_date(&hr,&tg,&bl,&th);
  ■ sprintf(cstr,"%02d-%02d-%02d",tg,bl,th);
  ■ lcd_gotoxy(0,0);
  ■ lcd_puts(cstr);
  ■ rtc_get_time(&jm,&mn,&dt);
  ■ sprintf(cstr,"%02d:%02d:%02d",jm,mn,dt);
  ■ lcd_gotoxy(0,1);
  ■ lcd_puts(cstr);
  ■ delay_ms(100);
  ■ }
□ }
```

E-BOOK DINS

- <http://depokinstruments.com/category/3-e-book/>