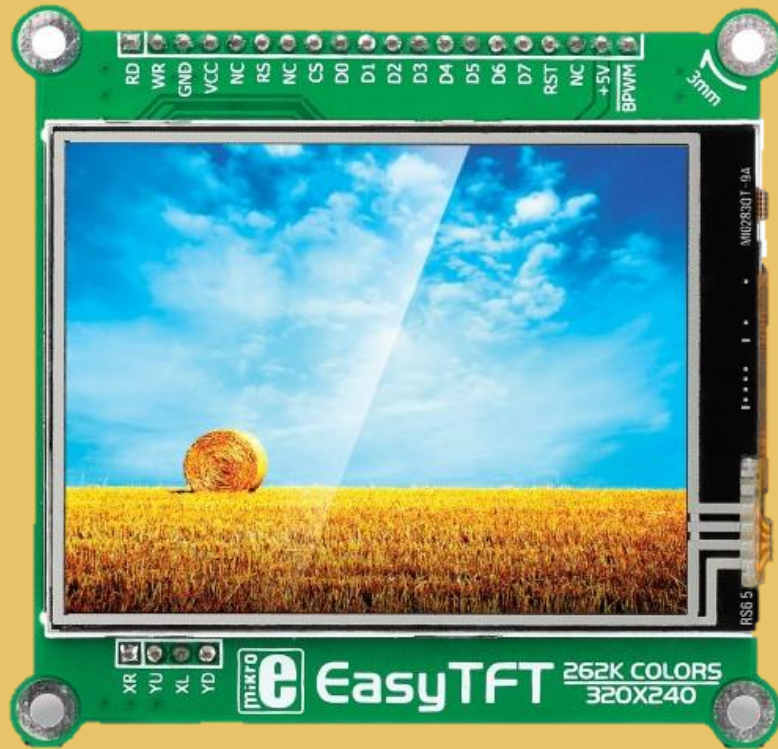


Mikroprocesorski merno- informacioni sistemi 2

Vežbe 5

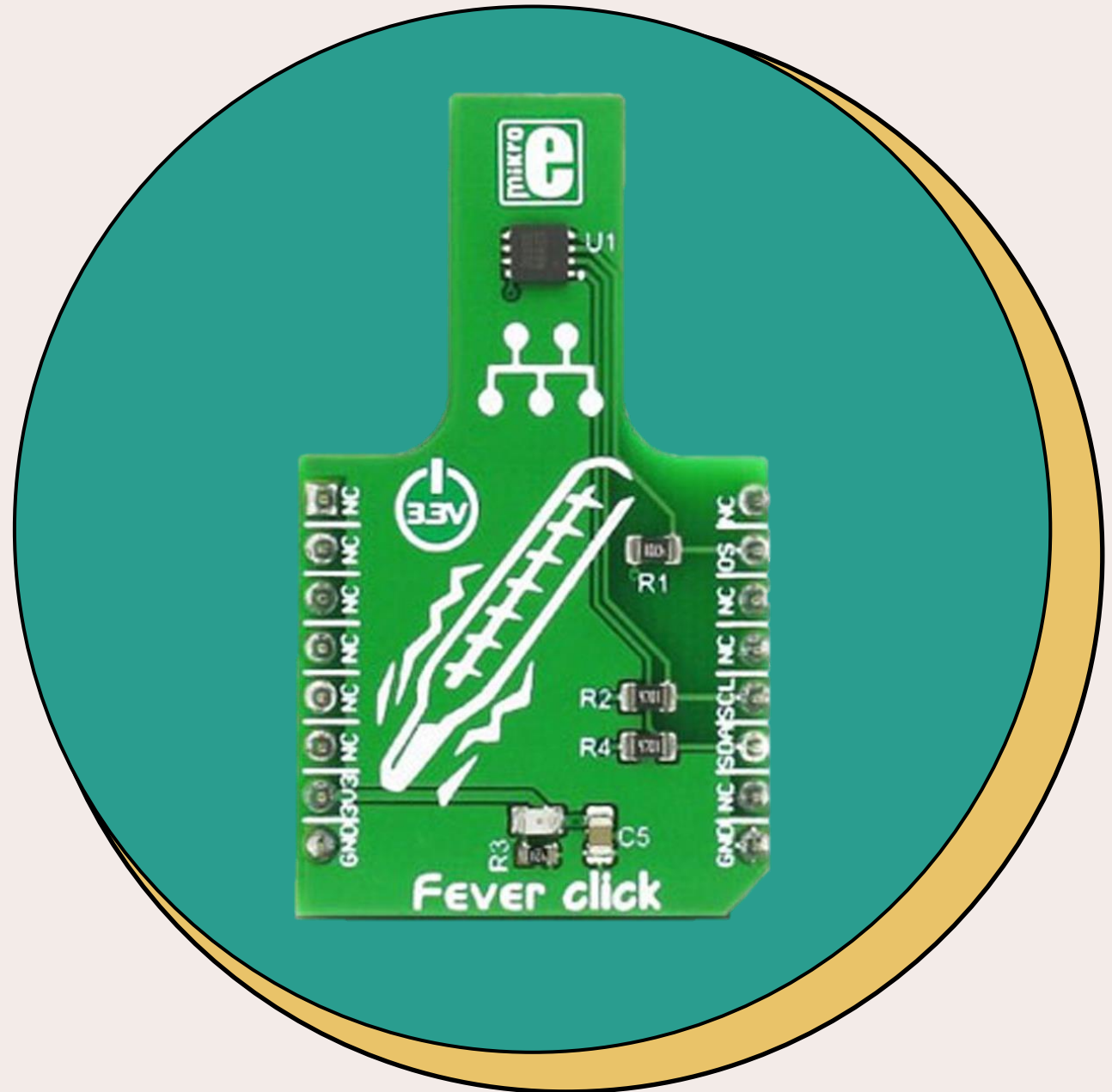
EasyTFT displej + touch panel



- ❑ 320x240
- ❑ ILI9341 displej kontroler

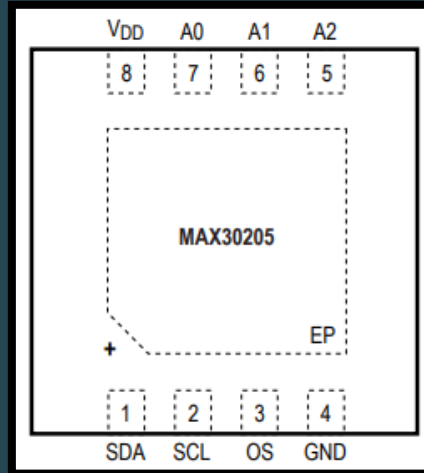
Pina	Opis	MCU pin
Vcc	Napajanje - 3,3 V	
GND	Masa	
CS	Chip select (active low)	RD10
RST	Reset (active low)	RD7
RD	Read signal (čitanje na uzlaznu ivicu)	RD5
WR	Write signal (upis na uzlaznu ivicu)	RD4
RS (D/C)	0 – komanda, 1 – podatak	RD9
D0-D7	Data bus	RE0-RE7

Fever click



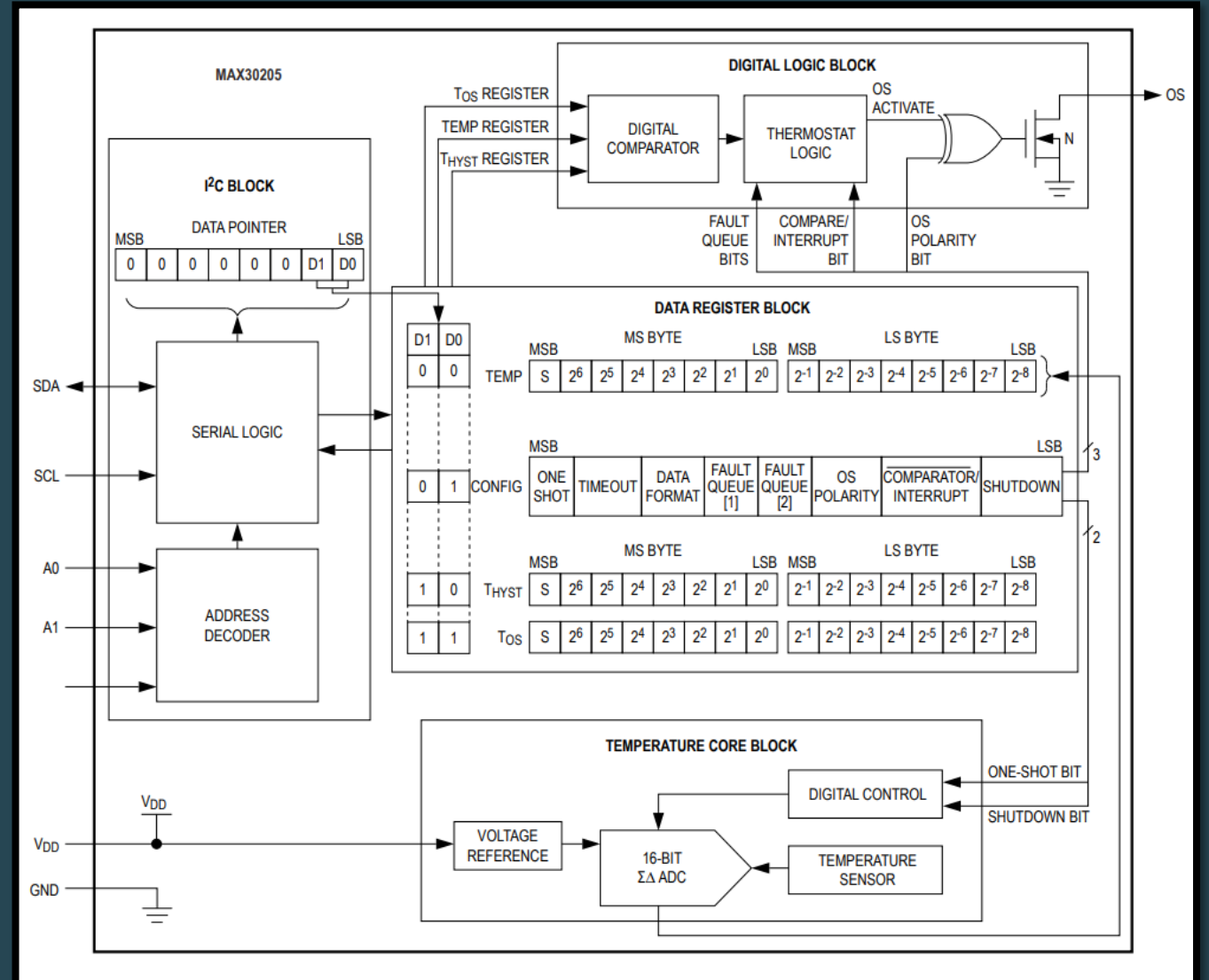
Fever click

MAX30205 senzor temperature



- I2C komunikacioni interfejs
- 16-bitni sigma-delta A/D konvertor
- Slave adresa je određena pinovima A2, A1 i A0

A2 CONNECTION	A1 CONNECTION	A0 CONNECTION	SLAVE ADDRESS BYTE (hex)
GND	GND	GND	90h



Fever click

□ Registri:

REGISTER NAME	ADDRESS (Hex)	POR STATE		POR STATE (°C)	READ/ WRITE
		Hex	BINARY		
Temperature	00	0000h	0000 0000 0000 0000	0	Read-only
Configuration	01	00h	0000 0000	—	R/W
T _{HYST}	02	4B00h	0100 1011 0000 0000	75	R/W
T _{OS}	03	5000h	0101 0000 0000 0000	80	R/W

▪ Configuration

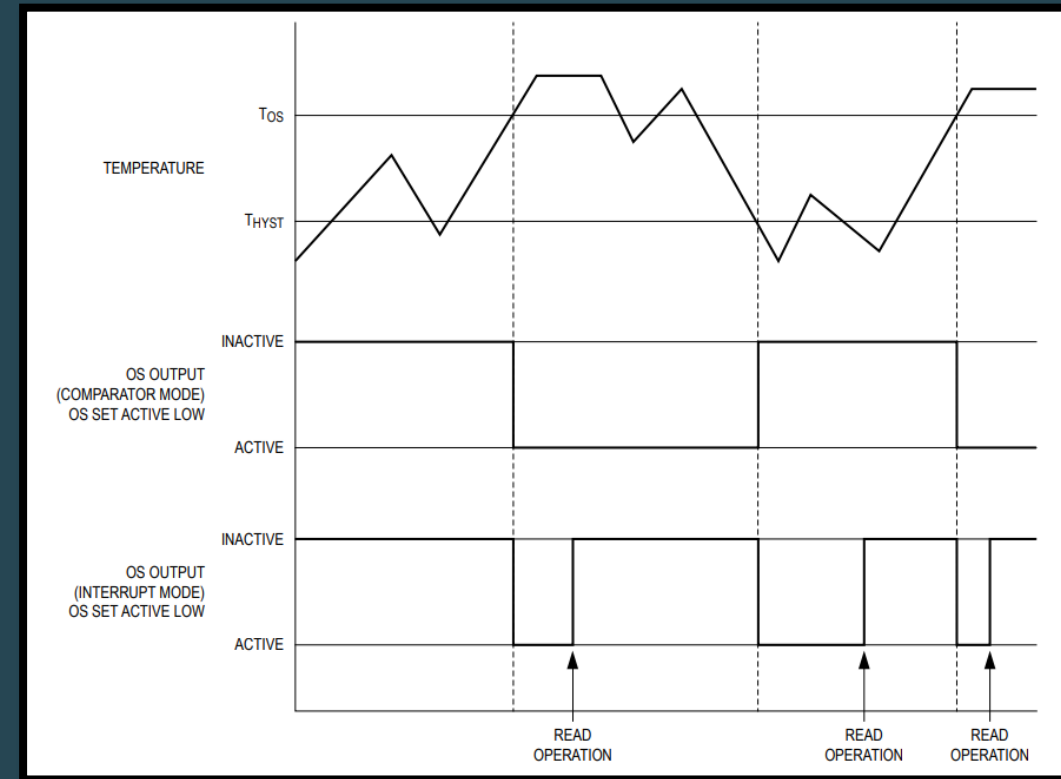
D7	D6	D5	D4	D3	D2	D1	D0
ONE-SHOT	TIMEOUT	DATA FORMAT	FAULT QUEUE [1]	FAULT QUEUE [0]	OS POLARITY	COMPARATOR/ INTERRUPT	SHUTDOWN

- ONE-SHOT = 1 – izvršava jednu konverziju temperature i vraća se u shutdown mod
- TIMEOUT = 0 – reset I2C interfejsa kada je SDA na 0 duže od 50 ms
- DATA FORMAT = 1 – proširenje opsega temperature
- FAULT QUEUE1:0 – određuje broj grešaka potreban za promenu stanja OS pina
- OS POLARITY = 0 – aktivno stanje OS pina je logička 0
- COMPARATOR/INTERRUPT = 0 – komparatorski mod / = 1 – interrupt mod OS pina
- SHUTDOWN = 1 – uređaj u shutdown modu

Fever click

□ OS pin:

- Komparatorski mod (termostat)
 - Pin je aktivan kada je temperatura veća od temperature T_{os}
 - Pin je neaktivan kada je temperatura manja od temperature T_{hyst}
- Interrupt mod
 - Pin je aktivan kada je temperatura veća od temperature T_{os} ili kada je temperatura manja od temperature T_{hyst}
 - Pin ostaje u aktivnom stanju dok se ne izvrši operacija čitanja stanja pina



Fever click

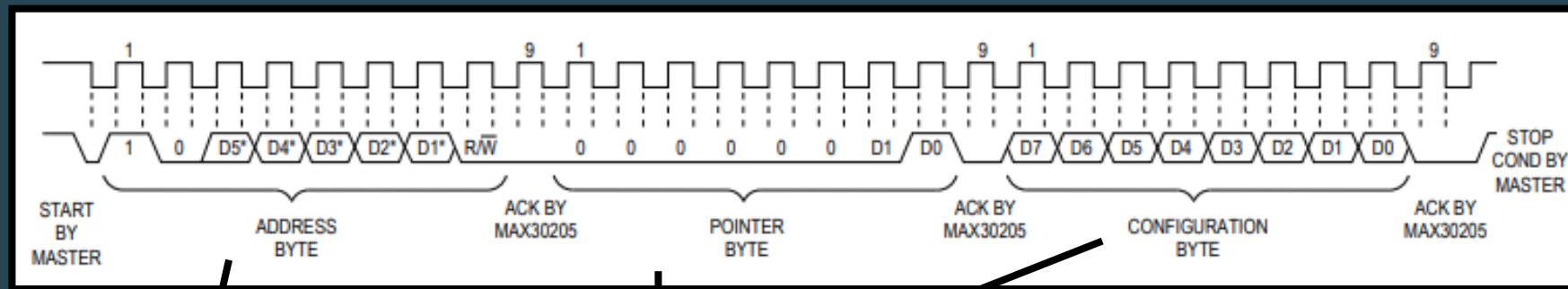
- Temperature – izmerena temperatura

UPPER BYTE								LOWER BYTE							
D15	D14	D13	D12	D11	D10	D9	D8	D7	D6	D5	D4	D3	D2	D1	D0
S	MSB 64°C	32°C	16°C	8°C	4°C	2°C	1°C	0.5°C	0.25°C	0.125°C	0.0625°C	0.03125°C	0.015625°C	0.0078125°C	0.00390625°C
	2 ⁶	2 ⁵	2 ⁴	2 ³	2 ²	2 ¹	2 ⁰	2 ⁻¹	2 ⁻²	2 ⁻³	2 ⁻⁴	2 ⁻⁵	2 ⁻⁶	2 ⁻⁷	2 ⁻⁸

- 16-bitni read only registar
- Podatak o temperaturi – komplement dvojke
- Tos – gornja granica temperature
 - 16-bitna vrednost, komplement dvojke
 - R/W registar
- Thyst – donja granica temperature
 - 16-bitna vrednost, komplement dvojke
 - R/W registar

Fever click

Upis podataka u 8-bitni registar:



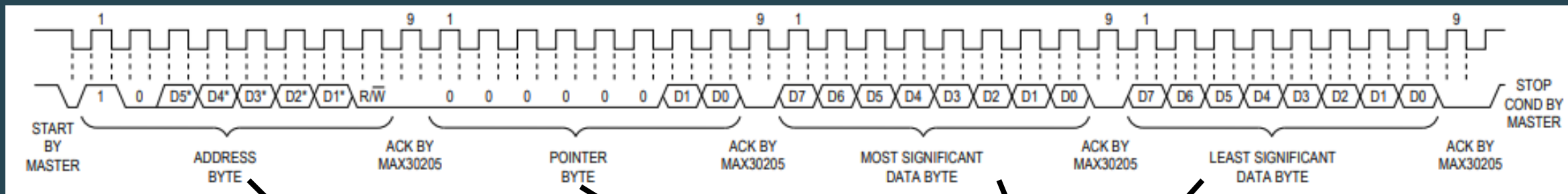
```
□ I2C2_Write(MAX30205_SLAVE_ADDR, wr_data, 2);
```

`wr_data[0]` = adresa registra

`wr_data[1]` = podaci koji se upisuju u registar

Fever click

Čitanje podataka iz 16-bitnog registra:



```
□ I2C2_WriteRead(MAX30205_SLAVE_ADDR, &wr_data, 1, rd_data, 2);
```

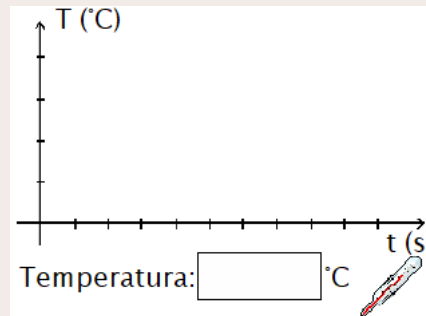
adresa registra

rd_data[0] = most significant data byte

rd_data[1] = least significant data byte

Zadatak 1 – Prikaz podataka o telesnoj temperaturi na EasyTFT displeju

- ❑ Implementirati Fever Click pločicu.
- ❑ Na EasyTFT displeju učitati i prikazati sliku koja sadrži koordinatne ose i polje za ispis podataka o temperaturi:



- ❑ U koordinatnom sistemu nacrtati temperaturne tačke na svaku 1 s, a u polju *Temperatura* izvršiti ispis vrednosti temperature.