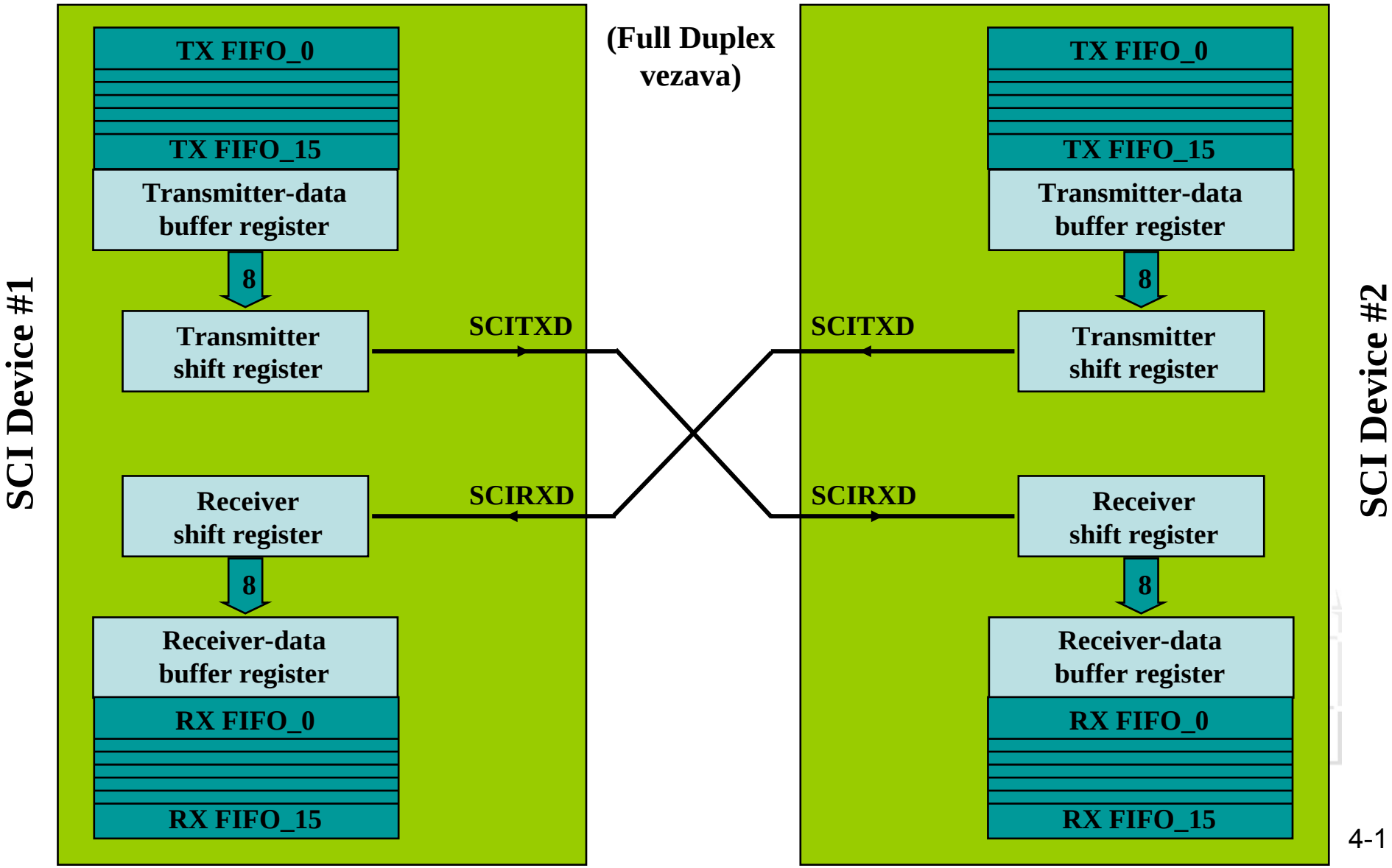
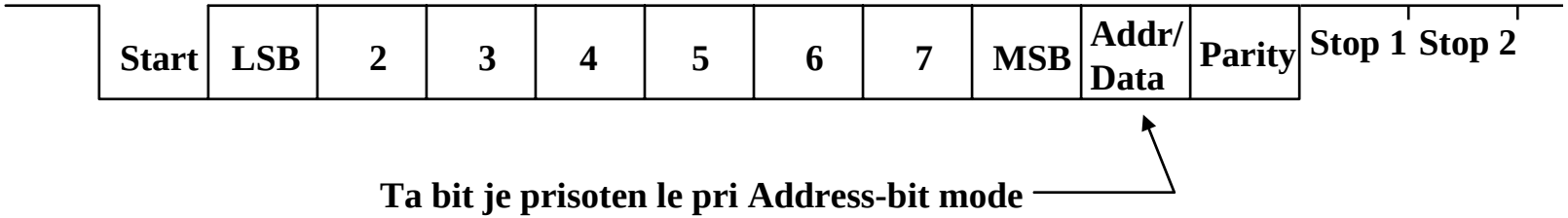
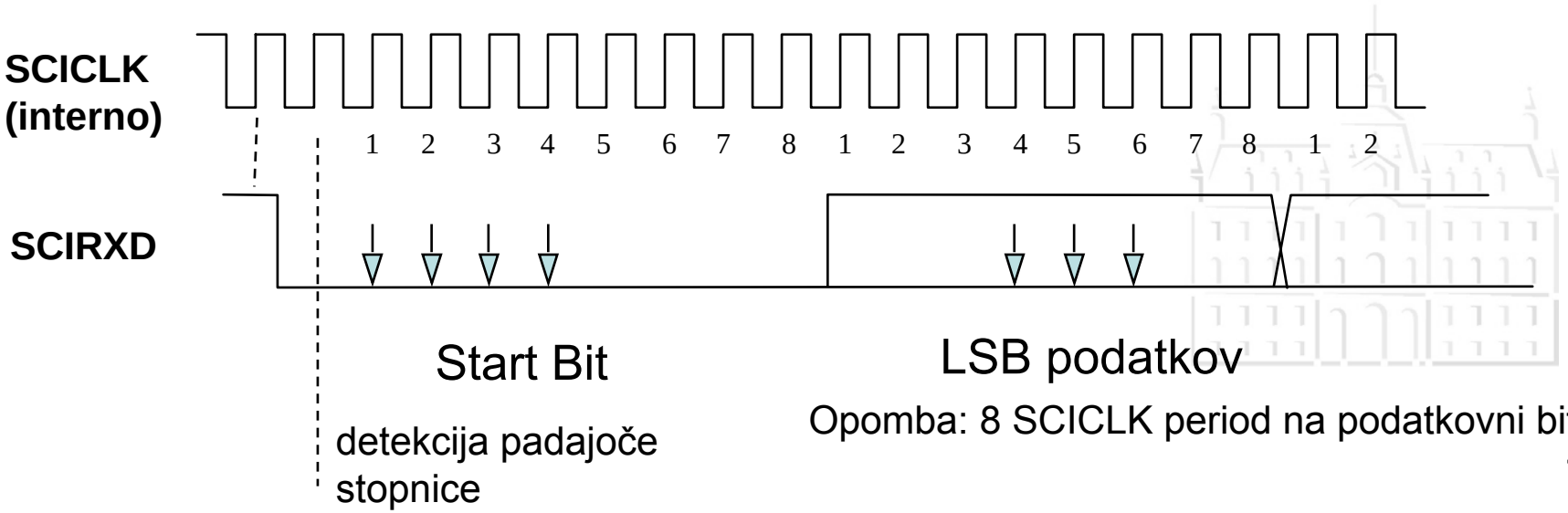
SCI (Serial Communication Interface) – enota za asinhr. serijsko komunikacijo



SCI - programirljivi podatkovni format

NRZ (nonreturn to zero) format





SCI povzetek

- asinhronski komunikacijski format
- 65,000+ različnih programirljivih hitrosti prenosa (angl. baud rates)

PAZI! Baud rate ni bps!!

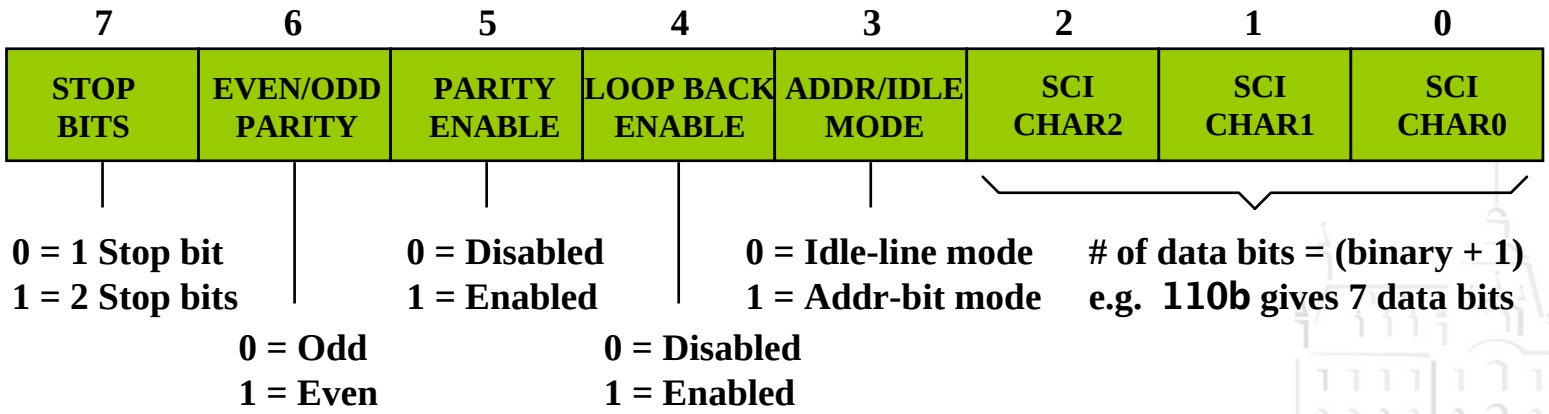
- dva mikroprocesorska režima za prebujanje (wake-up)
- programirljivi format podatkovne besede
  - dolžina podatkovne besede od 1 do 8 bit
  - 1 ali 2 stop bit
  - paritete: soda/liha/brez paritete (even/odd/no parity)
- Zastavice (flags) za detekcijo napake
  - napaka paritete, prekinitev linije, podatkovnega okvirja...
- FIFO-baferirano oddajanje in sprejem (buffered transmit and receive)
- individualne prekinitve za oddajo in sprejem

SCI-A registri

Address	Register	Name
0x007050	SCICCR	SCI-A commun. control register
0x007051	SCICTL1	SCI-A control register 1
0x007052	SCIHBAUD	SCI-A baud register, high byte
0x007053	SCILBAUD	SCI-A baud register, low byte
0x007054	SCICTL2	SCI-A control register 2 register
0x007055	SCIRXST	SCI-A receive status register
0x007056	SCIRXEMU	SCI-A receive emulation data buffer
0x007057	SCIRXBUF	SCI-A receive data buffer register
0x007059	SCITXBUF	SCI-A transmit data buffer register
0x00705A	SCIFFTX	SCI-A FIFO transmit register
0x00705B	SCIFFRX	SCI-A FIFO receive register
0x00705C	SCIFFCT	SCI-A FIFO control register
0x00705F	SCIPRI	SCI-A priority control register

SCI-A register za nastavitev komunikacije

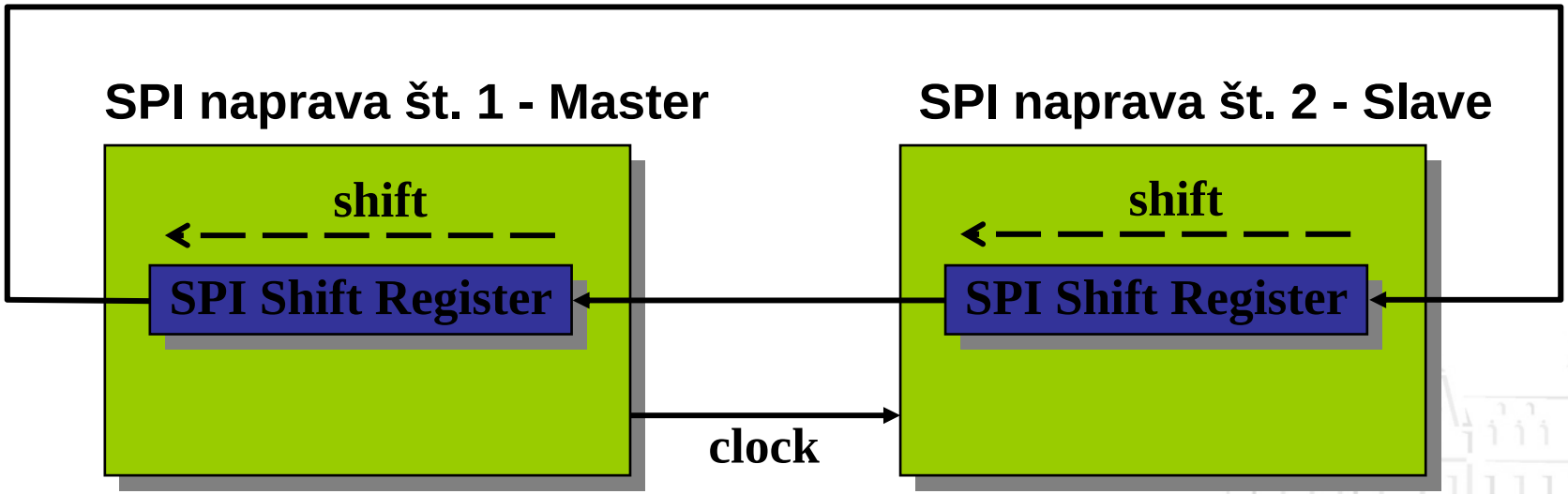
Communications Control Register (SCICCR) – 0x007050



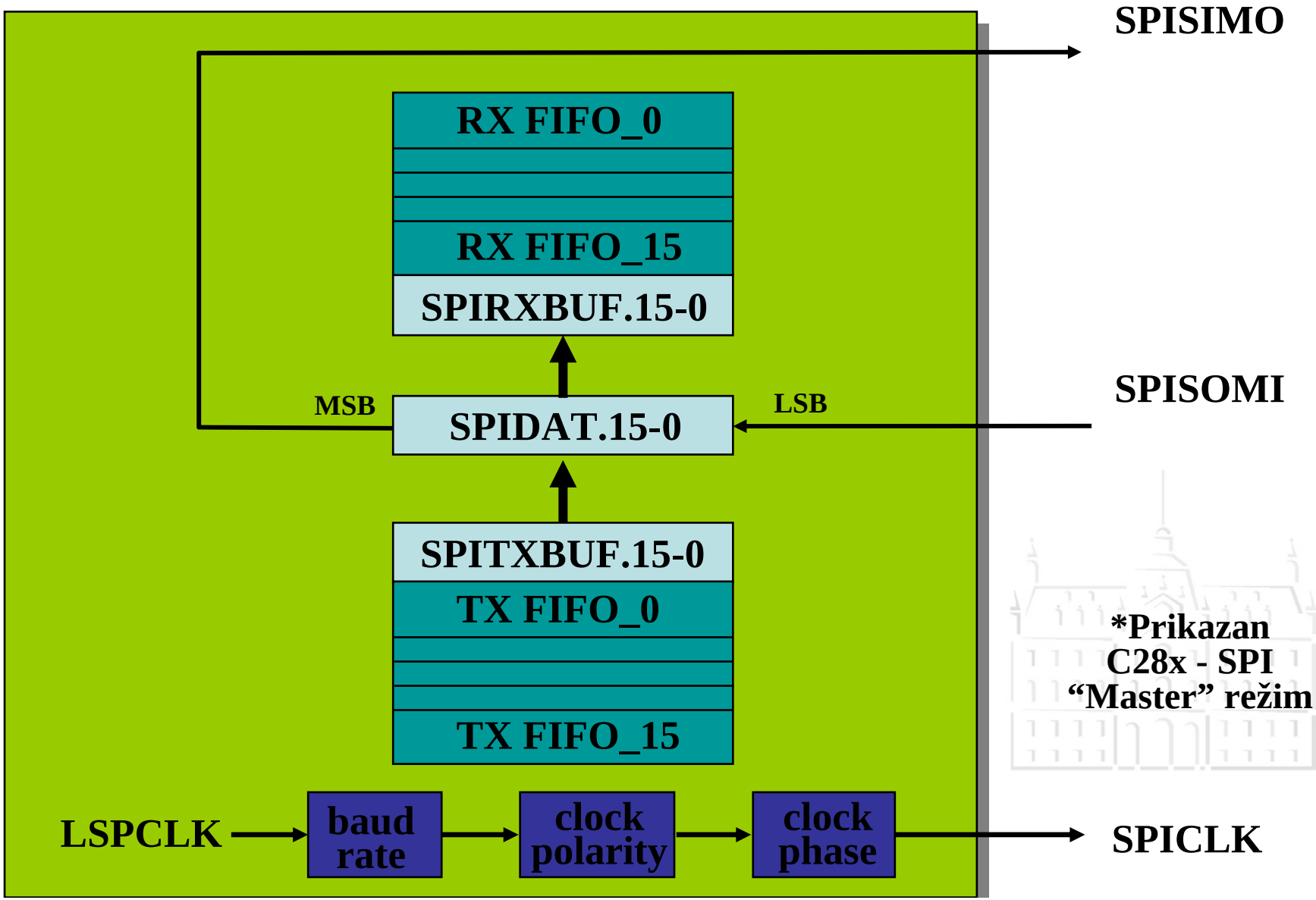
[SCI-B Communications Control Register (SCICCR) – 0x007750]

Potek komunikacije pri SPI

- Simultano oddajanje in sprejem
- za takt skrbi SPI Master



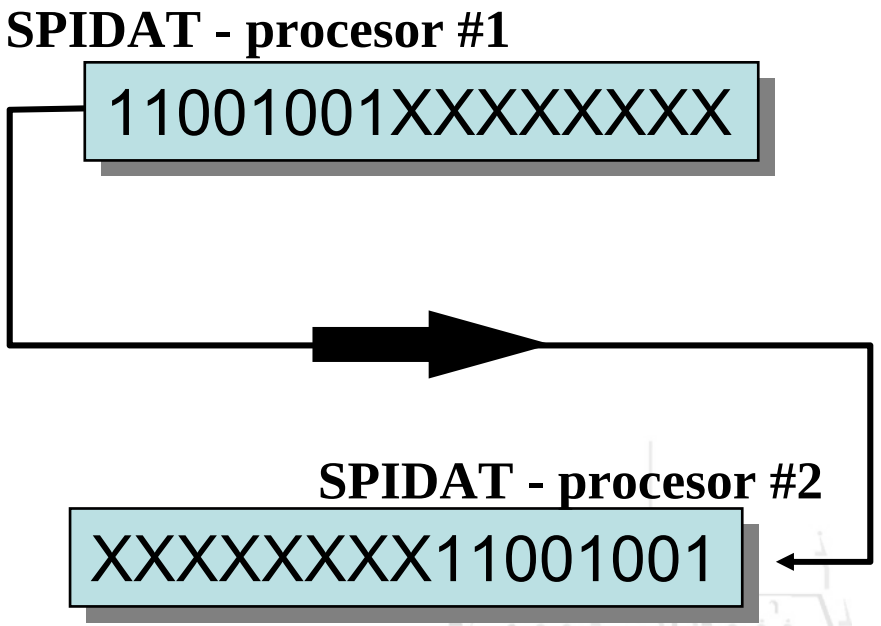
SPI Block Diagram*



*Prikazan C28x - SPI "Master" režim

SPI Data Character Justification

- programirljiva dolžina podatkovnega paketa od 1 do 16 bitov
- oddani podatkovni paketi krajši od 16 bitov morajo biti poravnani v levo (left justified)
  - najprej se prenaša MSB
- sprejeti podatkovni paketi krajši od 16 bitov so poravnani v desno (right justified)
- uporabniški program mora maskirati neuporabljene MSB bite



Registri SPI-A

Address	Register	Name
0x007040	SPICCR	SPI-A configuration control register
0x007041	SPICTL	SPI-A operation control register
0x007042	SPISTS	SPI-A status register
0x007044	SPIBRR	SPI-A baud rate register
0x007046	SPIEMU	SPI-A emulation buffer register
0x007047	SPIRXBUF	SPI-A serial receive buffer register
0x007048	SPITXBUF	SPI-A serial transmit buffer register
0x007049	SPIDAT	SPI-A serial data register
0x00704A	SPIFFTX	SPI-A FIFO transmit register
0x00704B	SPIFFRX	SPI-A FIFO receive register
0x00704C	SPIFFCT	SPI-A FIFO control register
0x00704F	SPIPRI	SPI-A priority control register

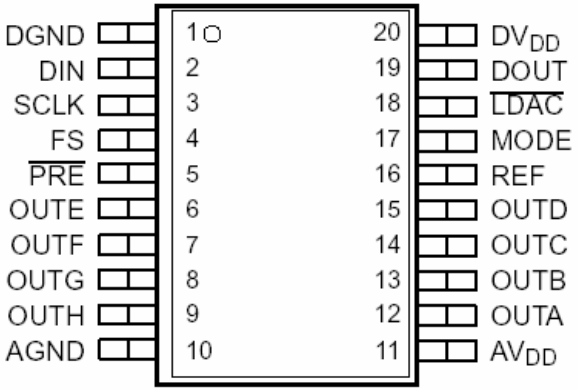
SPI, povzetek

- skrbi za sinhronsko serijsko komunikacijo
  - dvožična oddaja **ali** sprejem (half duplex)
  - trižična oddaja **in** sprejem (full duplex)
- programsko nastavljiv kot “master” ali “slave”
  - v režimu “master”, C28x akrbi za urin takt (clock signal)
- programirljiva dolžina podatkov 1-16 bits
- 125 različnih programirljivih hitrosti prenosa (baud rates)

Primer uporabe SPI: DAC TLV 5610

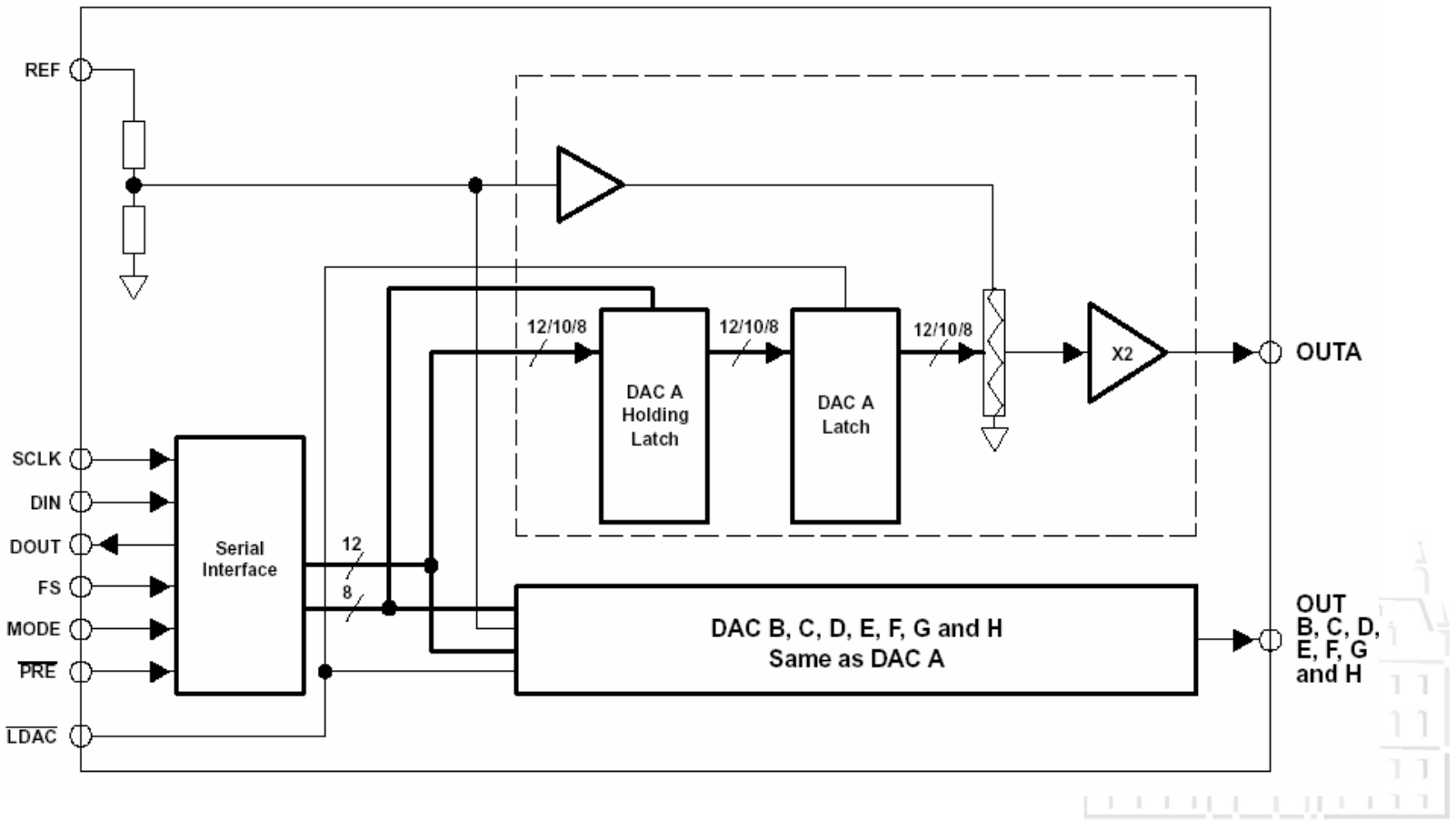
- Digitalno-analogni pretvornik (DAC) Texas Instruments TLV 5617A
  - 30 MBPS SPI komunikacija
  - max. frekvenca pretvorbe DAC: 1.95 MHz
  - osemkanalni analogni izhodi (OutA do OutH)
  - 12-bitna resolucija
  - 16-bitna podatovna beseda
  - napetostno območje: 0 – 3.3 V ali 0 – 5.3 V

Primer uporabe SPI: DAC TLV 5610



TERMINAL		I/O	DESCRIPTION
NAME	NO.		
AGND	10	I	Analog ground
AV_{DD}	11	I	Analog power supply
DGND	1	I	Digital ground
DIN	2	I	Digital serial data input
DOUT	19	O	Digital serial data output
DV_{DD}	20	I	Digital power supply
FS	4	I	Frame sync input
$\overline{LDAC}$	18	I	Load DAC. The DAC outputs are only updated, if this signal is low. It is an asynchronous input.
MODE	17	I	DSP/µC mode pin. High = µC mode, NC = DSP mode.
$\overline{PRE}$	5	I	Preset input
REF	16	I	Voltage reference input
SCLK	3	I	Serial clock input
OUTA-OUTH	6-9, 12-15	O	DAC outputs A, B, C, D, E, F, G and H

Primer uporabe SPI: DAC TLV 5610



Primer uporabe SPI: DAC TLV 5610

D15	D14	D13	D12	D11	D10	D9	D8	D7	D6	D5	D4	D3	D2	D1	D0
A3	A2	A1	A0	DATA											

Register Map

A3	A2	A1	A0	FUNCTION
0	0	0	0	DAC A
0	0	0	1	DAC B
0	0	1	0	DAC C
0	0	1	1	DAC D
0	1	0	0	DAC E
0	1	0	1	DAC F
0	1	1	0	DAC G
0	1	1	1	DAC H
1	0	0	0	CTRL0
1	0	0	1	CTRL1
1	0	1	0	Preset
1	0	1	1	Reserved
1	1	0	0	DAC A and $\overline{B}$
1	1	0	1	DAC C and $\overline{D}$
1	1	1	0	DAC E and $\overline{F}$
1	1	1	1	DAC G and $\overline{H}$