



Using the TR8100 in ISSS Mode

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Bob Nelson

The Following code snippet is from TR8100ISSS.asm which shows the code that is required to program the TR8100 Transceiver for ISSS mode which will operate under the FCC Part 15.247 rule.

The micro used is a SiLabs F330.

Development environment is the SiLabs IDE.

The TR8100 uses up to 3, 8 bit registers. These 8 bit registers have an additional 3 bits added to the 8 bit register, read/write control along with 2 bits for addressing totaling 11 bits. The SPI interface is an eight bit register, of which we need to send 11 bits. To accommodate this, we will send two 8 bit commands padding each with 5 zero bits for each 8 bit register.

Example:

R/W A1 A0 D7 D6 D5 D4 D3 D2 D1 D0 P P P P P

R/W = Read = 1, Write = 0

P = pad (0)

```

*****
;
;                               TR8100ISSS.ASM
;
;                               Range Test Enabled when Jumper is installed
;                               Unit with jumper installed is the Transmitter!
;                               Unit without jumper installed is the Receiver!
;
;                               This code sets the TR8100 up in ISSS mode for TX
;                               And High Sen. mode for RX..
;
;                               Control = R(read) = 1, W(write) = 0
;                               CFG = 1(high) to Write Configuration to TR8100
;
;*****
;Address Name Bit 7 Bit 6 Bit 5 Bit 4 Bit 3 Bit 2 Bit 1 Bit 0
;0 CFG0 Sleep TX/RX ASK/OOK 2.4 GHz Mode 1 Mode 0 RX HDR SV En
;1 CFG1 RX Blk VCO Lk ISSMod - BR3 BR2 BR1 BR0
;2 LoSyn Test LOSyn6 LOSyn5 LOSyn4 LOSyn3 LOSyn2 LOSyn1 LOSyn0
;*****
;Need to send an even 8 or 16 bits, control, address + data = 11, fill last 5 bits with zero
;R/W A1 A0 D7 D6 D5 D4 D3 D2 D1 D0 Fill Fill Fill Fill Fill
;0 0 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0 = 0080h High sen mode
;0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 = 2000h
;*****
; Added the following to set the TR8100 up RX mode
;Set_RX:
;
;                               setb P1.6 ; config high
;                               mov SPIODAT, #00h ; send write and address
;                               ACALL spio_wait ; wait for the 8 bits to send
;                               mov SPIODAT, #080h ; RX Hi Sen Mode
;                               ACALL spio_wait ; wait for the 8 bits to send
;                               clr P1.6 ; bring config low
;                               acall led ; delay
;                               setb P1.6 ; bring config high
;                               mov SPIODAT, #20h ; set high sen. mode
;                               ACALL spio_wait ; wait for spio
;                               mov SPIODAT, #00h ; next 8 bits
;                               ACALL spio_wait ; wait for spio
;                               clr P1.6 ; config low
;                               RET ; TR8100 in high rx mode
;*****
; Added the following to put the TR8100 in ISSS TX mode
;*****
;Address Name Bit 7 Bit 6 Bit 5 Bit 4 Bit 3 Bit 2 Bit 1 Bit 0
;0 CFG0 Sleep TX/RX ASK/OOK 2.4 GHz Mode 1 Mode 0 RX HDR SV En
;1 CFG1 RX Blk VCO Lk ISSMod - BR3 BR2 BR1 BR0
;2 LoSyn Test LOSyn6 LOSyn5 LOSyn4 LOSyn3 LOSyn2 LOSyn1 LOSyn0

```

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;*****
;Need to send an even 8 or 16 bits, control, address + data = 11, fill last 5 bits with zero
;R/W A1 A0 D7 D6 D5 D4 D3 D2 D1 D0 Fill Fill Fill Fill Fill
;0 0 0 0 1 0 0 1 0 0 0 0 0 0 0 0 = 0900h TX & DSSS mode
;0 0 1 0 0 1 0 0 0 0 0 0 0 0 0 0 = 2400h ISSS mode
;*****
;Set_TX:
;
;          setb P1.6          ; config high
;          mov SPIODAT,      #09h      ; ISSS mode
;          ACALL spio_wait      ; wait for the 8 bits to send
;          mov SPIODAT,      #00h
;          ACALL spio_wait      ; wait for the 8 bits to send
;          clr P1.6           ; config low
;          acall led           ; delay a bit
;          setb P1.6          ; config high
;          mov SPIODAT,      #24h
;          ACALL spio_wait      ; wait for the 8 bits to send
;          mov SPIODAT,      #00h
;          ACALL spio_wait      ; wait for the 8 bits to send
;          clr P1.6           ; config low
;          RET                 ; TR8100 in ISSS TX mode
;
;spio_wait:
;  mov A,SPIOCN          ; Get SPIO status bit
;  ANL A,#02h           ; Done sending the bits
;  cjne a,#02h,spio_wait ; wait till it is
;  RET                  ; Done
;
;*****

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The complete Range Test using the TR8100 in ISSS mode file name is TR1800ISSS.asm. This firmware will put the TR8100 in ISSS mode for transmit and High sensitivity mode is receive. Also the RF power out is set for max power of 10mw.

The following is the Range test PCB Schematic following by the PCB layout. Power to the range test demo board is 2 AAA batteries. Antenna is 3.06" ¼ wave, provisions have been made for a SMA connector.



