/\*

u8g\_com\_arduino\_st7920\_hw\_spi.c

Universal 8bit Graphics Library

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A special HW SPI interface for ST7920 controller

\*/

#include "u8g.h"

#if defined(ARDUINO)

#if ARDUINO < 100

#include <WProgram.h>

#include "wiring\_private.h"

#include "pins\_arduino.h"

#else

#include <Arduino.h>

#include "wiring\_private.h"

#endif

#if defined(\_\_AVR\_\_)

#define U8G\_ARDUINO\_ATMEGA\_HW\_SPI

/\* remove the definition for attiny \*/

#if \_\_AVR\_ARCH\_\_ == 2

#undef U8G\_ARDUINO\_ATMEGA\_HW\_SPI

#endif

#if \_\_AVR\_ARCH\_\_ == 25

#undef U8G\_ARDUINO\_ATMEGA\_HW\_SPI

#endif

#endif

#if defined(U8G\_ARDUINO\_ATMEGA\_HW\_SPI)

#include <avr/interrupt.h>

#include <avr/io.h>

#if ARDUINO < 100

/\* fixed pins \*/

#if defined(\_\_AVR\_ATmega644P\_\_) || defined(\_\_AVR\_ATmega1284P\_\_) // Sanguino.cc board

#define PIN\_SCK 7

#define PIN\_MISO 6

#define PIN\_MOSI 5

#define PIN\_CS 4

#else // Arduino Board

#define PIN\_SCK 13

#define PIN\_MISO 12

#define PIN\_MOSI 11

#define PIN\_CS 10

#endif // (\_\_AVR\_ATmega644P\_\_) || defined(\_\_AVR\_ATmega1284P\_\_)

#else

/\* use Arduino pin definitions \*/

#define PIN\_SCK SCK

#define PIN\_MISO MISO

#define PIN\_MOSI MOSI

#define PIN\_CS SS

#endif

static uint8\_t u8g\_arduino\_st7920\_hw\_spi\_shift\_out(u8g\_t \*u8g, uint8\_t val) U8G\_NOINLINE;

static uint8\_t u8g\_arduino\_st7920\_hw\_spi\_shift\_out(u8g\_t \*u8g, uint8\_t val)

{

/\* send data \*/

SPDR = val;

/\* wait for transmission \*/

while (!(SPSR & (1<<SPIF)))

;

/\* clear the SPIF flag by reading SPDR \*/

return SPDR;

}

static void u8g\_com\_arduino\_st7920\_write\_byte\_hw\_spi\_seq(u8g\_t \*u8g, uint8\_t rs, uint8\_t \*ptr, uint8\_t len)

{

uint8\_t i;

if ( rs == 0 )

{

/\* command \*/

u8g\_arduino\_st7920\_hw\_spi\_shift\_out(u8g, 0x0f8);

}

else if ( rs == 1 )

{

/\* data \*/

u8g\_arduino\_st7920\_hw\_spi\_shift\_out(u8g, 0x0fa);

}

while( len > 0 )

{

u8g\_arduino\_st7920\_hw\_spi\_shift\_out(u8g, \*ptr & 0x0f0);

u8g\_arduino\_st7920\_hw\_spi\_shift\_out(u8g, \*ptr << 4);

ptr++;

len--;

u8g\_10MicroDelay();

}

for( i = 0; i < 4; i++ )

u8g\_10MicroDelay();

}

static void u8g\_com\_arduino\_st7920\_write\_byte\_hw\_spi(u8g\_t \*u8g, uint8\_t rs, uint8\_t val) U8G\_NOINLINE;

static void u8g\_com\_arduino\_st7920\_write\_byte\_hw\_spi(u8g\_t \*u8g, uint8\_t rs, uint8\_t val)

{

uint8\_t i;

if ( rs == 0 )

{

/\* command \*/

u8g\_arduino\_st7920\_hw\_spi\_shift\_out(u8g, 0x0f8);

}

else if ( rs == 1 )

{

/\* data \*/

u8g\_arduino\_st7920\_hw\_spi\_shift\_out(u8g, 0x0fa);

}

else

{

/\* do nothing, keep same state \*/

}

u8g\_arduino\_st7920\_hw\_spi\_shift\_out(u8g, val & 0x0f0);

u8g\_arduino\_st7920\_hw\_spi\_shift\_out(u8g, val << 4);

for( i = 0; i < 4; i++ )

u8g\_10MicroDelay();

}

uint8\_t u8g\_com\_arduino\_st7920\_hw\_spi\_fn(u8g\_t \*u8g, uint8\_t msg, uint8\_t arg\_val, void \*arg\_ptr)

{

switch(msg)

{

case U8G\_COM\_MSG\_INIT:

u8g\_com\_arduino\_assign\_pin\_output\_high(u8g);

/\* code from u8g\_com-arduino\_hw\_spi.c \*/

pinMode(PIN\_SCK, OUTPUT);

digitalWrite(PIN\_SCK, LOW);

pinMode(PIN\_MOSI, OUTPUT);

digitalWrite(PIN\_MOSI, LOW);

/\* pinMode(PIN\_MISO, INPUT); \*/

pinMode(PIN\_CS, OUTPUT); /\* system chip select for the atmega board \*/

digitalWrite(PIN\_CS, HIGH);

//u8g\_com\_arduino\_digital\_write(u8g, U8G\_PI\_CS, LOW);

#ifdef OBSOLETE

DDRB |= \_BV(3); /\* D0, MOSI \*/

DDRB |= \_BV(5); /\* SCK \*/

DDRB |= \_BV(2); /\* slave select \*/

PORTB &= ~\_BV(3); /\* D0, MOSI = 0 \*/

PORTB &= ~\_BV(5); /\* SCK = 0 \*/

#endif

/\*

SPR1 SPR0

0 0 fclk/4

0 1 fclk/16

1 0 fclk/64

1 1 fclk/128

\*/

SPCR = 0;

/\* 20 Dez 2012: set CPOL and CPHA to 1 !!! \*/

SPCR = (1<<SPE) | (1<<MSTR)|(0<<SPR1)|(0<<SPR0)|(1<<CPOL)|(1<<CPHA);

#ifdef U8G\_HW\_SPI\_2X

SPSR = (1 << SPI2X); /\* double speed, issue 89 \*/

#endif

u8g->pin\_list[U8G\_PI\_A0\_STATE] = 0; /\* inital RS state: command mode \*/

break;

case U8G\_COM\_MSG\_STOP:

break;

case U8G\_COM\_MSG\_RESET:

if ( u8g->pin\_list[U8G\_PI\_RESET] != U8G\_PIN\_NONE )

u8g\_com\_arduino\_digital\_write(u8g, U8G\_PI\_RESET, arg\_val);

break;

case U8G\_COM\_MSG\_CHIP\_SELECT:

if ( arg\_val == 0 )

{

/\* disable, note: the st7920 has an active high chip select \*/

u8g\_com\_arduino\_digital\_write(u8g, U8G\_PI\_CS, LOW);

}

else

{

/\* enable \*/

//u8g\_com\_arduino\_digital\_write(u8g, U8G\_PI\_SCK, LOW);

u8g\_com\_arduino\_digital\_write(u8g, U8G\_PI\_CS, HIGH);

}

break;

case U8G\_COM\_MSG\_WRITE\_BYTE:

u8g\_com\_arduino\_st7920\_write\_byte\_hw\_spi(u8g, u8g->pin\_list[U8G\_PI\_A0\_STATE], arg\_val);

// u8g->pin\_list[U8G\_PI\_A0\_STATE] = 2;

//u8g\_arduino\_sw\_spi\_shift\_out(u8g->pin\_list[U8G\_PI\_MOSI], u8g->pin\_list[U8G\_PI\_SCK], arg\_val);

break;

case U8G\_COM\_MSG\_WRITE\_SEQ:

u8g\_com\_arduino\_st7920\_write\_byte\_hw\_spi\_seq(u8g, u8g->pin\_list[U8G\_PI\_A0\_STATE], (uint8\_t \*)arg\_ptr, arg\_val);

/\*

{

register uint8\_t \*ptr = arg\_ptr;

while( arg\_val > 0 )

{

u8g\_com\_arduino\_st7920\_write\_byte\_hw\_spi(u8g, u8g->pin\_list[U8G\_PI\_A0\_STATE], \*ptr++);

arg\_val--;

}

}

\*/

break;

case U8G\_COM\_MSG\_WRITE\_SEQ\_P:

{

register uint8\_t \*ptr = arg\_ptr;

while( arg\_val > 0 )

{

u8g\_com\_arduino\_st7920\_write\_byte\_hw\_spi(u8g, u8g->pin\_list[U8G\_PI\_A0\_STATE], u8g\_pgm\_read(ptr) );

// u8g->pin\_list[U8G\_PI\_A0\_STATE] = 2;

ptr++;

arg\_val--;

}

}

break;

case U8G\_COM\_MSG\_ADDRESS: /\* define cmd (arg\_val = 0) or data mode (arg\_val = 1) \*/

u8g->pin\_list[U8G\_PI\_A0\_STATE] = arg\_val;

break;

}

return 1;

}

#else

uint8\_t u8g\_com\_arduino\_st7920\_hw\_spi\_fn(u8g\_t \*u8g, uint8\_t msg, uint8\_t arg\_val, void \*arg\_ptr)

{

return 1;

}

#endif

#else /\* ARDUINO \*/

uint8\_t u8g\_com\_arduino\_st7920\_hw\_spi\_fn(u8g\_t \*u8g, uint8\_t msg, uint8\_t arg\_val, void \*arg\_ptr)

{

return 1;

}

#endif /\* ARDUINO \*/