



Nokia5110 graphical display interfacing with PIC18F4550

Overview of Nokia5110

Nokia5110 is a graphical display that can display text, images, and various patterns.

It has a resolution of 48x84 and comes with a backlight.

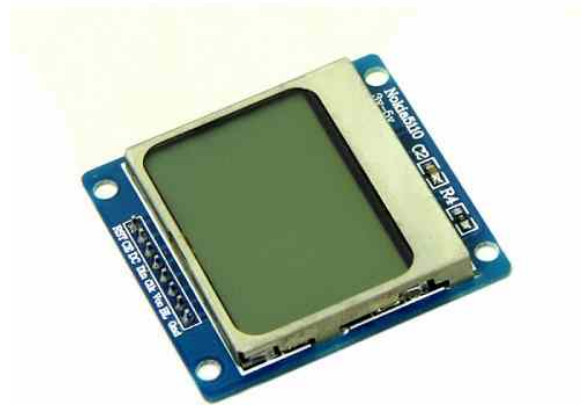
It uses SPI communication to communicate with a microcontroller.

Data and commands can be sent through a microcontroller to the display to control the display output.

It has 8 pins.

For more information about the Nokia5110 display and how to use it, refer to the topic Nokia5110 Graphical Display (<http://electronicwings.com/sensors-modules/nokia5110-graphical-display>) in the sensors and modules section.

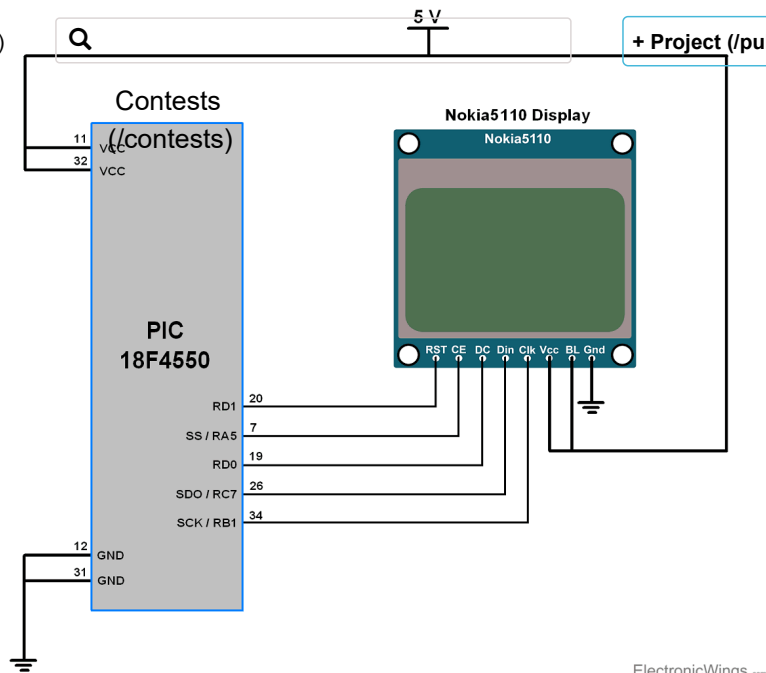
For information on SPI in PIC18F4550, refer to the topic on SPI in PIC18F4550 (<http://electronicwings.com/pic/pic18f4550-spi>) in the PIC inside section.



Nokia 5110 LCD Module

Connection Diagram for Nokia 5110 Display with PIC18F4550

- The following circuit diagram shows the complete interfacing of PIC18F4550 to the Nokia5110 display.



Nokia 5110 LCD Interfacing with PIC18F4550

Interconnection Detail

Nokia5110 Pins	PIC18F4550 Pins	PIC18F4550 Ports/Function
RST	20	RD1
CE	7	SS
DC	19	RD0
Din	26	SDO
CLK	34	SCK
BL and VCC	11/32	VCC
GND	12/31	GND

Programming of Nokia5110 Display

- In the coding first step is to include and initialize the SPI_Header_File.h header files.
- In the SPI_Header_File.h file contains all definitions of SPI.

Initialization of Nokia5110

- The first step is to reset the display by sending low to high pulse to the reset pin. The pulse width of a low signal should not be < 100 ms.
- Send command 0x21 to set the display in extended command mode (H=1).
- Set the voltage bias system using a 0x13 command, it is recommended for n=4 and 1:48 mux rate.
- Set the temp. coefficient. E.g. Set temperature coefficient 3 by sending 0x07H.
- Then set VOP = 5 V by sending command 0xC0H.
- Send the command 0x20 to configure the display for basic command mode (H=0).
- And then send 0x0C to operate the display in normal mode.



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```
{
    /*apply 100ms reset(low to high) pulse */
    RES = 0; /* enable reset */
    MSdelay(100);
    RES = 1; /* disable reset */
    Nokia_SendCommand(0x21); /* use extended instruction set */
    Nokia_SendCommand(0x13); /* select Bias voltage */
    Nokia_SendCommand(0x07); /* set temperature coefficient */
    Nokia_SendCommand(0xC0); /* set LCD Vop for contrast */
    Nokia_SendCommand(0x20); /* use basic instruction set */
    Nokia_SendCommand(0x0C); /* set normal mode */
}
```

Command write the function:

- Make DC pin low for command operation.
- Enable the slave select pin.
- Send/write the command to the SPI data(SSPBUF) register.
- Disable the slave select pin.

```
void Nokia_SendCommand(char cmd)
{
    DC = 0; /* Data/Command pin, D/C=1 - Data, D/C = 0 - Command*/
    CS = 0; /* enable chip */
    SPI_Write (cmd); /* write command to the Nokia 5110 */
    CS = 1; /* disable chip */
}
```

Data write the function:

- For data, the operation makes DC pin high for data operation.
- Enable the slave select pin.
- Send/write the data to the SPI data(SSPBUF) register.
- Disable the slave select pin after sending the data.

```
void Nokia_SendData(char dat)
{
    char i;
    DC = 1; /* Data/Command pin, D/C=1 - Data, D/C = 0 - Command*/
    CS = 0; /* enable chip */
    for(i=0;i<5;i++)
        SPI_Write(font[(dat) - (0x20)][i]); /* write data to the Nokia 511
    CS = 1; /* disable chip */
}
```



Nokia 5110 Display Code for PIC18F4550

Display "ElectronicWings" on Nokia5110 display using PIC18F4550

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* Nokia 5110 display interface with PIC18F4550
 * http://www.electronicwings.com
 */

```
#include <pic18f4550.h>
#include "Configuration_Header_File.h"
#include "SPI_Header_File.h"
#include "Nokia_Font.h"

void Nokia_Init();
void Nokia_SendCommand(char);
void Nokia_SendData(char);
void Nokia_SendString(char *);
void MSdelay(unsigned int);
void Nokia_Clear();
void Nokia_PositionXY(char, char);

#define DC LATD0
#define RES LATD1 /* connected to reset */
```


Image Display Function for Nokia5110

```
void Nokia_DisplayImage (const unsigned char *image)
{
    int i;
    CS = 0;
    DC = 1;
    for(i=0;i<504;i++)
    {
        SPI_Write(image[i]);
    }
    CS = 1;
}
```

Video of Nokia5110 Display using PIC18F4550



Components Used



(https://www.mouser.in?utm_source=electronicswing&utm_medium=display&utm_campaign=mouser-componentslisting&utm_content=0x0)


Powered By

Nokia5110 Graphical Display

Nokia5110 is 48x84 dot LCD display with Serial ...

X 1

 (https://www.mouser.in/ProductDetail/Olimex-Ltd/MOD-LCD3310?qs=%2Fha2pyFaduiM2FizGGE3eTLrshD%2FqHV%2F3UdKes06wINIfol%252BJ2g6%2Fw%3D%3D&utm_source=electronicswings&utm_medium=display&utm_campaign=mouser-componentslisting&utm_content=0x0)

 Datasheet (</components/nokia5110-graphical-display/1/datasheet>)

Components Used

Powered By

PIC18f4550
PIC18f4550

X 1

(https://www.mouser.in/ProductDetail/Microchip-Technology/PIC18F4550-I-P?qs=oKK8NaWdAJs8nLDXBGwMXw%3D%3D&utm_source=electronicswing&utm_medium=display&utm_campaign=mouser-componentslisting&utm_content=0x0)

Datasheet (/components/pic18f4550/1/datasheet)

PICKit 4 MPLAB
PICKit 4 MPLAB

X 1

(https://www.mouser.in/ProductDetail/Microchip-Technology/PG164140?qs=r5DSvlrkXmLKDuYNJlmlWw%3D%3D&utm_source=electronicswing&utm_medium=display&utm_campaign=mouser-componentslisting&utm_content=0x0)

Datasheet (/components/pickit-4-mplab/1/datasheet)

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PIC18F4550 Nokia5110 Text Project File

PIC18F4550 Nokia5110 Image Project File

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Dow (/api/download/platform-attachment/116)

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green3ggsandham (/users/green3ggsandham/profile) 2018-06-14 00:30:33

This is awesome! thanks so much. How would I go about interfacing this with push buttons?

Reply Like

lokeshc (/users/lokeshc/profile) 2018-06-14 20:58:47

Hi green3ggsandham what do you want to do iwth push buttons?

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green3ggsandham (/users/green3ggsandham/profile) 2018-06-15 17:19:36

I managed to get it all figured out! Thanks for the reply though

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green3ggsandham (/users/green3ggsandham/profile) 2018-06-16 16:55:22

Just a question about the send string function... how would I go about passing a variable to the string?

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fernandoliozzi (/users/fernandoliozzi/profile) 2018-09-30 22:54:29

```
sprintf(buffer,"Cont=%d",25);
Nokia_SendString(buffer);
```

https://www.electronicwings.com/pic/nokia5110-graphical-display-interfacing-with-pic18f4550

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you need:
#include <stdio.h>
char buffer[20];
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blarblublublar



(/users/blarblublublar/profile)
2019-05-21 23:25:04

SPI_Write(font[(data) - (0x20)][i]);

why u subtract 0x20?

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lokeshc



(/users/lokeshc/profile)
2019-06-03 17:06:21

This is to generate proper ASCII value for the requested character. You can see font.h file where array is given to generate particular font.

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pkarday123



(/users/pkarday123/profile)
2019-06-03 12:07:07

PIC4550

Getting error: section '.idata_spi.o' can not fit the section. Section '.idata_spi.o' length=0x000001e0

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ChristianYonpang



(/users/ChristianYonpang/profile)
2020-07-24 18:24:51

thanks for all its really awesome

but please how do i make the message on the screen to scroll??

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BinitaKar



(/users/BinitaKar/profile)
2021-10-11 10:35:51

What will be the coding of Nokia 5110 LCD Display using PIC12F675 microcontroller?

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