DEVELOPER'S MANUAL

Method Declarations of the Project

Pic Module:

sht15.c:

void comstart (void): This function alerts SHT15.

int1 comwrite (int8 iobyte): This function writes data to SHT15.

int16 comread (void): This function reads data from SHT15.

void comwait (void): This function waits for SHT15 reading.

void comreset (void): This function resets SHT15 communication.

void sht_soft_reset (void): This function resets SHT15(related software).

int16 measuretemp (void): This function measures SHT15 temperature.

int16 measurehumid (void): This function measures SHT15 humidity.

void calculate_data (int16 temp, int16 humid, float & tc, float & rhlin, float & rhtrue): This function calculates SHT15 temperature & humidity.

void sht_rd (float & temp, float & truehumid): This function measures(shift right measured data) & calculates SHT75 temperature & humidity.

void sht_init (void): This function initialises SHT15 on power-up.

void receiveData(): This function sends&receives data from RS232.

ds18b20.c:

void onewire_reset(): This function is OK if just using a single permanently connected device.

void onewire_write(int data): This function writes a byte to the sensor. Parameters are byte - byte to be written to the one-wire.

int onewire_read(): This function reads the 8 –bit(1 byte) data via the one-wire sensor and returns 1 byte data from sensor.

float ds1820_read(): This function reads data from DS18b20 and calculates the data. If resolution is 0.1 C degree then the result divides 16.0.

void receiveData(): This function sends&receives data from RS232.

GUI Module:

dbConnection.java:

public dbConnection(): Creates a connection with the database server.

public ResultSet returnQueryResult(String query): Executes the "Select" queries.

returnQueryExecute(String query): Executes the "Insert" and "Update" queries.

NodeMonitor.java:

public NodeMonitor(): Extracts sensor info from the database. Checks whether nodes are active.

private void nodeTreeMouseReleased(java.awt.event.MouseEvent evt): Shows the menu when right-clicked to Nodes.

private void checkActivity():Shows the active nodes as green and inactive ones as red.

private void pingMenuItemActionPerformed(java.awt.event.ActionEvent evt): When right-clicked to a node, it performs a ping action to this node and writes the result of the operation to the log panel.

private void rebootMenuItemActionPerformed(java.awt.event.ActionEvent evt): When right-clicked to a node, it sends a special string to the AP-Module of that node and make that node reboot.

private class MyRenderer: Renders the NodeTree in an iconized structure.

DataAnalyzer.java:

public DataAnalyzer(): Extraxts the sensors information from the database. Assigns a graph drawing function to each sensor. Gives a different color to each sensor graph. Adds the graph library and initiates it. Creates temperature and humidity tabs.

private void drawButtonActionPerformed(java.awt.event.ActionEvent evt): Creates a dataset according to the selected time interval and selected nodes.

private void initGraph(): Does the library specific initialization.

private void initFunctions(java.util.Date fromDate, java.util.Date toDate): Takes a time interval and extraxts the related information and creates a dataset accordingly.

private void initTimer(): Initiates the timer.

ReportGenerator.java:

public ReportGenerator(): Assigns dates to time spinners. Extracts sensor information from the database. Creates the Checkbox Tree

private void browseButtonActionPerformed(java.awt.event.ActionEvent evt): . Helps the user to select a location for file saving.

private void genButtonActionPerformed(java.awt.event.ActionEvent evt): Generates graphs according to criteria.

private void clearButtonActionPerformed(java.awt.event.ActionEvent evt): Clears the editor pane.

private void saveButtonActionPerformed(java.awt.event.ActionEvent evt): Helps the user save the generated information as eithera .txt or a .pdf file.

SensorSettings.java:

public void loginPage(): Initiates the login page.

public void setSensorTable(): Extraxts the sensor information from the database into the Sensor Table.

private void jButton5ActionPerformed(java.awt.event.ActionEvent evt): Logs in the user if the information provided by the user is correct.

private void jTable1MouseClicked(java.awt.event.MouseEvent evt): Shows the information in the selected row in the text fields.

private void jButton7ActionPerformed(java.awt.event.ActionEvent evt): Updates the Users table in the database.

public void clearForm(): Clears the update form.

private void jButton2ActionPerformed(java.awt.event.ActionEvent evt): Updates the Sensors Table in the database.

private void jButton3ActionPerformed(java.awt.event.ActionEvent evt): Deletes a sensor in the Sensors Table accordingly.

private void jButton4ActionPerformed(java.awt.event.ActionEvent evt): Inserts a new sensor to the Sensors Table in the database.

private void jButton6ActionPerformed(java.awt.event.ActionEvent evt): Sends the password of the user to the his/her e-mail extracted from the database.

MainFrame.java: This is the mainframe of the GUI Module. It adds sub-part objects GUI.

Server Module:

HSBSserverSMS.c:

void init_tty(char* device, int baudrate): Initializes the serial port to communicate with mobile phone.

void recordString(char* value, MYSQL *mysql): Records the data coming from the HSBS_Sentinels to the database. If an alert condition is violated, it sends an SMS to the user for acknowledgement.

void getIp(MYSQL *mysql): Extracts the IPs that are stored in the Sensors Table in the database.

int main(void): Creates a connection with MySQL Server. Calls getIP() method to extract the sensor IP information and for each sensor, it creates a process. Each process tries to establish a connection with its sensor. If a node is unreachable, its process tries to connect to that node

every 5 seconds. Once it is successful, it starts to get values from that node. If a node becomes unreachable while it was reachable, again its process tries to connect to that every 5 seconds. The user can quit the program via entering “q” to the console.

AP Module:

Capboard_bridge.c:

void parser(char* value): The PIC Module sends measured values to the AP Module in a specific format. This method parses these values accordingly.

void init_tty(char* device, int baudrate): Initializes the serial port in order to communicate with PIC Module.

void init_socket(int port): Allocates a TCP/IP socket and initalizes it and starts to listen to that port.

void server(int sig): Accepts a connection with the Server Module and once the Server Module is connected, this method starts to send the values coming from the PIC Module.

int main(int argc, char** argv): Calls the init_tty(), init_socket() and server() methods respectively.

Reboot_module.c:

void init_socket(int port): Allocates a TCP/IP socket and initalizes it and starts to listen to that port.

void server(int sig): Accepts a connection with the Server Module and waits a reboot request from the GUI Module. If it receives the special string from the GUI Module, then it reboots the device.

int main(int argc, char** argv): Calls init_tty() and server() methods respectively.

Tecnical List for SP07

PIC 16F877A

20 MHz Cristal

2 x 22 pF Capacitors

2 X 100nF Capacitors

1 mF Capacitor

Diyot

1 K Resistor

3 x 4.7 K Resistors

7805

Reset Button

1 LED

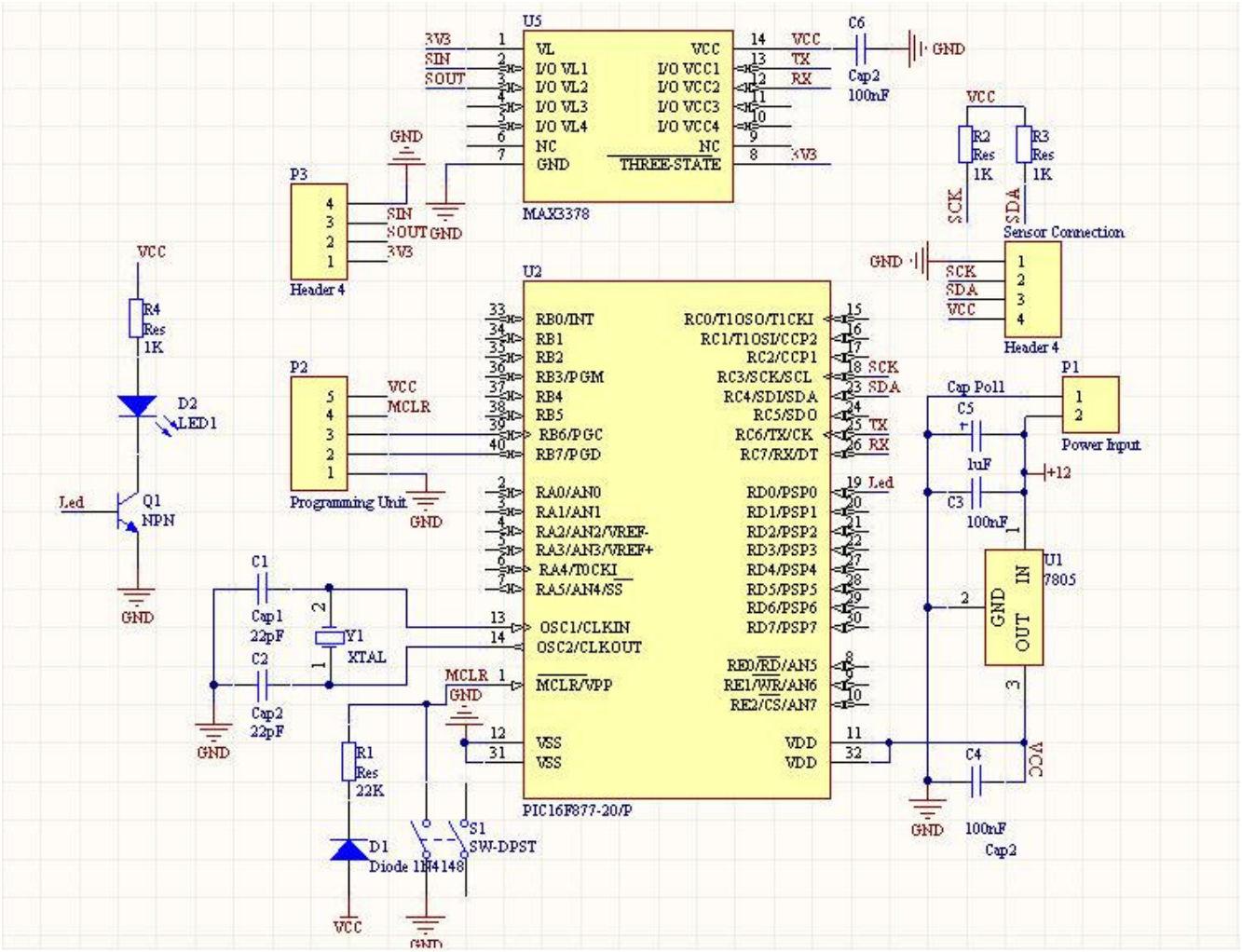
SHT15 Sensor (*SparkFun Electronics*)

DS18b20 Sensor (*SparkFun Electronics*)

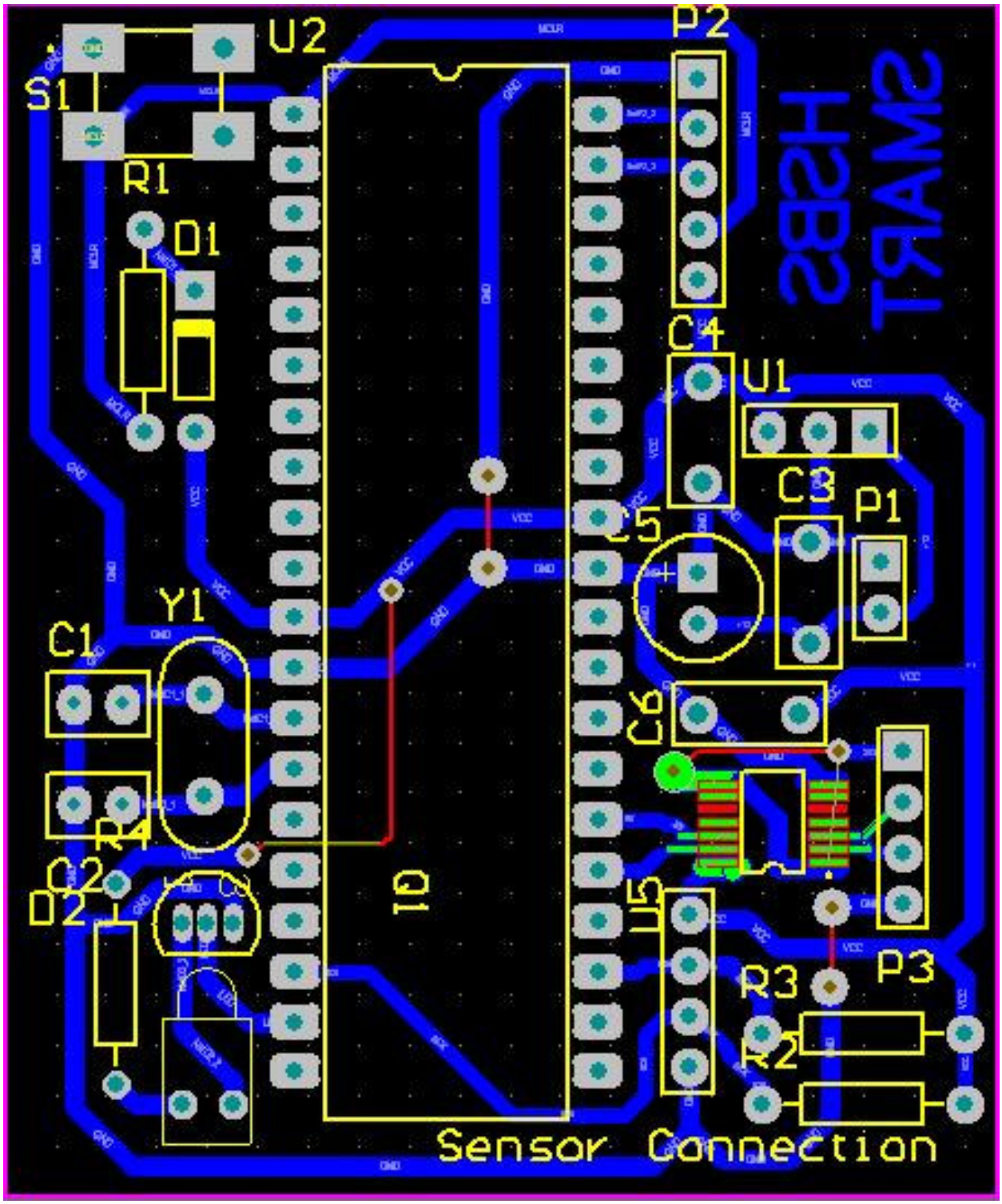
USB Programming Interface

Serial & Power Cable.

Schematic


U5
MAX3378
VL
I/O VL1
I/O VL2
I/O VL3
I/O VL4
NC
GND
VCC
I/O VCC1
I/O VCC2
I/O VCC3
I/O VCC4
NC
THREE-STATE
3V3
SIN
SOUT
TX
RX
C6
Cap2
100nF
P3
Header 4
SIN
SOUT
GND
3V3
R2
Res
1K
R3
Res
1K
SCK
SDA
Sensor Connection
Header 4
U2
PIC16F877-20/P
RB0/INT
RB1
RB2
RB3/PGM
RB4
RB5
RB6/PGC
RB7/PGD
RA0/AN0
RA1/AN1
RA2/AN2/VREF-
RA3/AN3/VREF+
RA4/T0CKI
RA5/AN4/SS
OSC1/CLKIN
OSC2/CLKOUT
MCLR/VPP
VSS
VSS
RC0/T1OSO/T1CKI
RC1/T1OSI/CCP2
RC2/CCP1
RC3/SCK/SCL
RC4/SDI/SDA
RC5/SDO
RC6/TX/CK
RC7/RX/DT
RD0/PSP0
RD1/PSP1
RD2/PSP2
RD3/PSP3
RD4/PSP4
RD5/PSP5
RD6/PSP6
RD7/PSP7
RE0/RD/AN5
RE1/WR/AN6
RE2/CS/AN7
VDD
VDD
P2
Programming Unit
MCLR
R4
Res
1K
D2
LED1
Led
Q1
NPN
C1
Cap1
22pF
C2
Cap2
22pF
Y1
XTAL
R1
Res
22K
D1
Diode 1N4148
S1
SW-DPST
P1
Cap Poll
Power Input
C5
1uF
C3
100nF
+12
U1
7805
GND
IN
OUT
C4
100nF
Cap2

PCB


U2
P2
S1
R1
D1
C4
U1
C3
P1
C5
Y1
C1
C6
R4
C2
D2
U5
R3
P3
R2
Sensor Connection