```
/*
Program to interface between N1MM Plus Logger and a transverter bandswitch.
*/

//include string handling library
#include <string.h>

//define variables
String commandInputString = "";         // input buffer string to hold incoming data
boolean commandStringComplete = false;  // true when the input string is complete
String command = "";  // incoming data string for parsing



//define constant pin aliases
const int Pin50 = 2; //number of 50 MHz pin
const int Pin144 = 3; //number of 144 MHz pin
const int Pin222 = 4; //number of 222 MHz pin
const int Pin432 = 5; //number of 432 MHz pin
const int Pin902 = 6; //number of 902 MHz pin
const int Pin1296 = 8; //number of 1296 MHz pin
const int Pin2304 = A5; //number of 2304 MHz pin
const int Pin3G = A4; //number of 3GHz pin
const int Pin5G = A3; //number of 5GHz pin
const int Pin10G = A2; //number of 10GHz pin
const int Pin24G = A1; //number of 24GHz pin
const int Pin47G = A0; //number of 47GHz pin
const int Pin76G = 7; //number of 76GHz pin

void setup() {

// define GPIO pins as output pins
pinMode(Pin50,OUTPUT);
pinMode(Pin144,OUTPUT);
pinMode(Pin222,OUTPUT);
pinMode(Pin432,OUTPUT);
pinMode(Pin902,OUTPUT);
pinMode(Pin1296,OUTPUT);
pinMode(Pin2304,OUTPUT);
pinMode(Pin3G,OUTPUT);
pinMode(Pin5G,OUTPUT);
pinMode(Pin10G,OUTPUT);
pinMode(Pin24G,OUTPUT);
pinMode(Pin47G,OUTPUT);
pinMode(Pin76G,OUTPUT);

//initialize all GPIO pin values to low
digitalWrite(Pin50,LOW);
digitalWrite(Pin144,LOW);
digitalWrite(Pin222,LOW);
digitalWrite(Pin432,LOW);
digitalWrite(Pin902,LOW);
digitalWrite(Pin1296,LOW);
digitalWrite(Pin2304,LOW);
digitalWrite(Pin3G,LOW);
digitalWrite(Pin5G,LOW);
digitalWrite(Pin10G,LOW);
digitalWrite(Pin24G,LOW);
digitalWrite(Pin47G,LOW);
digitalWrite(Pin76G,LOW);

 // define, start, flush serial port Serial 0
 // VHF log will send commands to this port
  Serial.begin(9600, SERIAL_8N1); // 9600/8/N/1
  Serial.println("N1MM Bandswitch");
  Serial.println("By W3SZ");
  Serial.println("Uses USB-Serial Port and OTRSP Protocol");
  Serial.println("50 MHz thru 76 GHz");
  delay(100);

  Serial.flush(); // clear buffers
}

void loop() { //MAIN

//////////////// Get the Command ////////////////////////////////////////////////
  // get VHFLOG command from serial0
  if (commandStringComplete) {
   command = commandInputString;
    // save this new command then clear the input buffer
    // clear the string:
    commandInputString = "";
    //set string complete flag to false in preparation for next VHFLOG command;
    commandStringComplete = false;
  }
//////////////// End Command ////////////////////////////////////////////////////
// now process the VHFLOG command
  if (command.length() > 0){
/////////////// Commands /////////////////////////////////////////////////////

    Serial.print("Command is:");
    Serial.print(command);

    if ((command.indexOf("AUX100")>=0) || (command.indexOf("AUX200")>=0) ) { // set band to 6m
          //set Pin50 high, all other pins low
digitalWrite(Pin50,HIGH);
digitalWrite(Pin144,LOW);
digitalWrite(Pin222,LOW);
digitalWrite(Pin432,LOW);
digitalWrite(Pin902,LOW);
digitalWrite(Pin1296,LOW);
digitalWrite(Pin2304,LOW);
digitalWrite(Pin3G,LOW);
digitalWrite(Pin5G,LOW);
digitalWrite(Pin10G,LOW);
digitalWrite(Pin24G,LOW);
digitalWrite(Pin47G,LOW);
digitalWrite(Pin76G,LOW);
Serial.print("Pin50 High");
    }

   else if ((command.indexOf("AUX101")>=0) || (command.indexOf("AUX201")>=0) ) { // set band to 2m
          //set Pin144 high, all other pins low
digitalWrite(Pin50,LOW);
digitalWrite(Pin144,HIGH);
digitalWrite(Pin222,LOW);
digitalWrite(Pin432,LOW);
digitalWrite(Pin902,LOW);
digitalWrite(Pin1296,LOW);
digitalWrite(Pin2304,LOW);
digitalWrite(Pin3G,LOW);
digitalWrite(Pin5G,LOW);
digitalWrite(Pin10G,LOW);
digitalWrite(Pin24G,LOW);
digitalWrite(Pin47G,LOW);
digitalWrite(Pin76G,LOW);
Serial.print("Pin144 High");
    }

    else if ((command.indexOf("AUX102")>=0) || (command.indexOf("AUX202")>=0) ) {    // set band to 222
          //set Pin222 high, all other pins low
digitalWrite(Pin50,LOW);
digitalWrite(Pin144,LOW);
digitalWrite(Pin222,HIGH);
digitalWrite(Pin432,LOW);
digitalWrite(Pin902,LOW);
digitalWrite(Pin1296,LOW);
digitalWrite(Pin2304,LOW);
digitalWrite(Pin3G,LOW);
digitalWrite(Pin5G,LOW);
digitalWrite(Pin10G,LOW);
digitalWrite(Pin24G,LOW);
digitalWrite(Pin47G,LOW);
digitalWrite(Pin76G,LOW);
    }

    else if ((command.indexOf("AUX103")>=0) || (command.indexOf("AUX203")>=0) ) {    // set band to 432
          //set Pin432 high, all other pins low
digitalWrite(Pin50,LOW);
digitalWrite(Pin144,LOW);
digitalWrite(Pin222,LOW);
digitalWrite(Pin432,HIGH);
digitalWrite(Pin902,LOW);
digitalWrite(Pin1296,LOW);
digitalWrite(Pin2304,LOW);
digitalWrite(Pin3G,LOW);
digitalWrite(Pin5G,LOW);
digitalWrite(Pin10G,LOW);
digitalWrite(Pin24G,LOW);
digitalWrite(Pin47G,LOW);
digitalWrite(Pin76G,LOW);
    }

    else if ((command.indexOf("AUX104")>=0) || (command.indexOf("AUX204")>=0) ) {    // set band to 903
          //set Pin902 high, all other pins low
digitalWrite(Pin50,LOW);
digitalWrite(Pin144,LOW);
digitalWrite(Pin222,LOW);
digitalWrite(Pin432,LOW);
digitalWrite(Pin902,HIGH);
digitalWrite(Pin1296,LOW);
digitalWrite(Pin2304,LOW);
digitalWrite(Pin3G,LOW);
digitalWrite(Pin5G,LOW);
digitalWrite(Pin10G,LOW);
digitalWrite(Pin24G,LOW);
digitalWrite(Pin47G,LOW);
digitalWrite(Pin76G,LOW);
    }

    else if ((command.indexOf("AUX105")>=0) || (command.indexOf("AUX205")>=0) ) {    // set band to 1296
          //set Pin1296 high, all other pins low
digitalWrite(Pin50,LOW);
digitalWrite(Pin144,LOW);
digitalWrite(Pin222,LOW);
digitalWrite(Pin432,LOW);
digitalWrite(Pin902,LOW);
digitalWrite(Pin1296,HIGH);
digitalWrite(Pin2304,LOW);
digitalWrite(Pin3G,LOW);
digitalWrite(Pin5G,LOW);
digitalWrite(Pin10G,LOW);
digitalWrite(Pin24G,LOW);
digitalWrite(Pin47G,LOW);
digitalWrite(Pin76G,LOW);
    }

    else if ((command.indexOf("AUX106")>=0) || (command.indexOf("AUX206")>=0) ) { // set band to 2304
          //set Pin2304 high, all other pins low
digitalWrite(Pin50,LOW);
digitalWrite(Pin144,LOW);
digitalWrite(Pin222,LOW);
digitalWrite(Pin432,LOW);
digitalWrite(Pin902,LOW);
digitalWrite(Pin1296,LOW);
digitalWrite(Pin2304,HIGH);
digitalWrite(Pin3G,LOW);
digitalWrite(Pin5G,LOW);
digitalWrite(Pin10G,LOW);
digitalWrite(Pin24G,LOW);
digitalWrite(Pin47G,LOW);
digitalWrite(Pin76G,LOW);
    }

    else if ((command.indexOf("AUX107")>=0) || (command.indexOf("AUX207")>=0) ) { // set band to 3456
          //set Pin3G high, all other pins low
digitalWrite(Pin50,LOW);
digitalWrite(Pin144,LOW);
digitalWrite(Pin222,LOW);
digitalWrite(Pin432,LOW);
digitalWrite(Pin902,LOW);
digitalWrite(Pin1296,LOW);
digitalWrite(Pin2304,LOW);
digitalWrite(Pin3G,HIGH);
digitalWrite(Pin5G,LOW);
digitalWrite(Pin10G,LOW);
digitalWrite(Pin24G,LOW);
digitalWrite(Pin47G,LOW);
digitalWrite(Pin76G,LOW);
    }

    else if ((command.indexOf("AUX108")>=0) || (command.indexOf("AUX208")>=0) ) { // set band to 5760
          //set Pin5G high, all other pins low
digitalWrite(Pin50,LOW);
digitalWrite(Pin144,LOW);
digitalWrite(Pin222,LOW);
digitalWrite(Pin432,LOW);
digitalWrite(Pin902,LOW);
digitalWrite(Pin1296,LOW);
digitalWrite(Pin2304,LOW);
digitalWrite(Pin3G,LOW);
digitalWrite(Pin5G,HIGH);
digitalWrite(Pin10G,LOW);
digitalWrite(Pin24G,LOW);
digitalWrite(Pin47G,LOW);
digitalWrite(Pin76G,LOW);
    }

    else if ((command.indexOf("AUX109")>=0) || (command.indexOf("AUX209")>=0) ) { // set band to 10368
          //set Pin10G high, all other pins low
digitalWrite(Pin50,LOW);
digitalWrite(Pin144,LOW);
digitalWrite(Pin222,LOW);
digitalWrite(Pin432,LOW);
digitalWrite(Pin902,LOW);
digitalWrite(Pin1296,LOW);
digitalWrite(Pin2304,LOW);
digitalWrite(Pin3G,LOW);
digitalWrite(Pin5G,LOW);
digitalWrite(Pin10G,HIGH);
digitalWrite(Pin24G,LOW);
digitalWrite(Pin47G,LOW);
digitalWrite(Pin76G,LOW);
    }

    else if ((command.indexOf("AUX110")>=0) || (command.indexOf("AUX210")>=0) ) {    // set band to 24 GHz
          //set Pin24G high, all other pins low
digitalWrite(Pin50,LOW);
digitalWrite(Pin144,LOW);
digitalWrite(Pin222,LOW);
digitalWrite(Pin432,LOW);
digitalWrite(Pin902,LOW);
digitalWrite(Pin1296,LOW);
digitalWrite(Pin2304,LOW);
digitalWrite(Pin3G,LOW);
digitalWrite(Pin5G,LOW);
digitalWrite(Pin10G,LOW);
digitalWrite(Pin24G,HIGH);
digitalWrite(Pin47G,LOW);
digitalWrite(Pin76G,LOW);
    }

    else if ((command.indexOf("AUX111")>=0) || (command.indexOf("AUX211")>=0) ) {    // set band 47 GHz
          //set Pin47G high, all other pins low
digitalWrite(Pin50,LOW);
digitalWrite(Pin144,LOW);
digitalWrite(Pin222,LOW);
digitalWrite(Pin432,LOW);
digitalWrite(Pin902,LOW);
digitalWrite(Pin1296,LOW);
digitalWrite(Pin2304,LOW);
digitalWrite(Pin3G,LOW);
digitalWrite(Pin5G,LOW);
digitalWrite(Pin10G,LOW);
digitalWrite(Pin24G,LOW);
digitalWrite(Pin47G,HIGH);
digitalWrite(Pin76G,LOW);
    }

    else if ((command.indexOf("AUX112")>=0) || (command.indexOf("AUX212")>=0) ) {    // set band to 76 GHz
          //set Pin76G high, all other pins low
digitalWrite(Pin50,LOW);
digitalWrite(Pin144,LOW);
digitalWrite(Pin222,LOW);
digitalWrite(Pin432,LOW);
digitalWrite(Pin902,LOW);
digitalWrite(Pin1296,LOW);
digitalWrite(Pin2304,LOW);
digitalWrite(Pin3G,LOW);
digitalWrite(Pin5G,LOW);
digitalWrite(Pin10G,LOW);
digitalWrite(Pin24G,LOW);
digitalWrite(Pin47G,LOW);
digitalWrite(Pin76G,HIGH);
    }
    // cleanup
    command = ""; // clear the VHFLOG command
  }
/////////////// END COMMANDS /////////////////////////////////////////////////////////


  delay(25); //  long enough for the radio to return its frequency

} //END MAIN


/*
  SerialEvent occurs whenever a new data comes in the
 hardware serial RX.  This routine is run between each
 time loop() runs, so using  inside loop can
 response.  Multiple bytes of data may be available.
 */
void serialEvent() {

  char commandInChar;

  while (Serial.available()) { // interrupt generated by hardware serial port
     // get the new byte:
     commandInChar = (char)Serial.read();

   // add it to the commandInputString:
   commandInputString += commandInChar;  // append
   // look for a carriage return
   // so the main loop can do something about it:
   if (commandInChar == '\r') { // the commands all end with a CR
       commandStringComplete = true;
   }
  }
 }



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```
/*
  ETHERNET SWITCH
    BY ROGER REHR w3sz

  Ethernet shield connected to pins 10, 11, 12, 13
  This initially required a MEGA as it used 3196 bytes of Dynamic Memory
  Changes in the code reduced SRAM requirement to 1598 bytes, so it should also work with an UNO.
*/

#include <Ethernet.h>  //for ethernet port
#include <string.h> // for string handling

String commandInputString = "";
String serIn;
String serOut1a;
String serOut2a;
String serOut3a;
String serOut4a;
String serOut1b;
String serOut2b;
String serOut3b;
String serOut4b;
String serOut5a;
String serOut6a;
String serOut7a;
String serOut8a;
String serOut9a;
String serOut5b;
String serOut6b;
String serOut7b;
String serOut8b;
String serOut9b;
String serOut10a;
String serOut11a;
String serOut12a;
String serOut13a;
String serOut14a;
String serOut15a;
String serOut16a;
String serOut10b;
String serOut11b;
String serOut12b;
String serOut13b;
String serOut14b;
String serOut15b;
String serOut16b;

const int ON = 1;
const int OFF = 0;

// Enter MAC address and IP address for Arduino.
// The IP address is dependent on your local network:
byte mac[] = { 0x90, 0xAA, 0xBB, 0xCC, 0xDA, 0x02 };
IPAddress ip(192, 168, 10, 176); //<< ENTER YOUR IP ADDRESS HERE <<

// Initialize the Ethernet server library
// We'll use port 80 for HTTP):
EthernetServer server(80);
EthernetClient client;

const int PinR1 = 2; //number of Relay 1 pin
const int PinR2 = 3; //number of Relay 2 pin
const int PinR3 = 4; //number of Relay 3 pin
const int PinR4 = 5; //number of Relay 4 pin
const int PinR5 = 6; //number of Relay 5 pin
const int PinR6 = 8; //number of Relay 6 pin
const int PinR7 = A5; //number of Relay 7 pin
const int PinR8 = A4; //number of Relay 8 pin
const int PinR9 = A3; //number of Relay 9 pin
const int PinR10 = A2; //number of Relay 10 pin
const int PinR11 = A1; //number of Relay 11 pin
const int PinR12 = A0; //number of Relay 12 pin
const int PinR13 = A8; //number of Relay 13 pin
const int PinR14 = A9; //number of Relay 14 pin
const int PinR15 = A10; //number of Relay 15 pin
const int PinR16 = A11; //number of Relay 16 pin

void setup()
{
  // initialize GPIO pins as output pins
  pinMode(PinR1, OUTPUT);
  pinMode(PinR2, OUTPUT);
  pinMode(PinR3, OUTPUT);
  pinMode(PinR4, OUTPUT);
  pinMode(PinR5, OUTPUT);
  pinMode(PinR6, OUTPUT);
  pinMode(PinR7, OUTPUT);
  pinMode(PinR8, OUTPUT);
  pinMode(PinR9, OUTPUT);
  pinMode(PinR10, OUTPUT);
  pinMode(PinR11, OUTPUT);
  pinMode(PinR12, OUTPUT);
  pinMode(PinR13, OUTPUT);
  pinMode(PinR14, OUTPUT);
  pinMode(PinR15, OUTPUT);
  pinMode(PinR16, OUTPUT);

  //initialize all GPIO pin values to OFF
  digitalWrite(PinR1, OFF);
  digitalWrite(PinR2, OFF);
  digitalWrite(PinR3, OFF);
  digitalWrite(PinR4, OFF);
  digitalWrite(PinR5, OFF);
  digitalWrite(PinR6, OFF);
  digitalWrite(PinR7, OFF);
  digitalWrite(PinR8, OFF);
  digitalWrite(PinR9, OFF);
  digitalWrite(PinR10, OFF);
  digitalWrite(PinR11, OFF);
  digitalWrite(PinR12, OFF);
  digitalWrite(PinR13, OFF);
  digitalWrite(PinR14, OFF);
  digitalWrite(PinR15, OFF);
  digitalWrite(PinR16, OFF);

  // start the Ethernet connection and the server and the serial port:
  Ethernet.begin(mac, ip);
  server.begin();
  Serial.begin(9600);
  Serial.println("Arduino Ethernet Device Switch");
  Serial.println("by W3SZ");
  Serial.println("Starting Server");
  Serial.println (Ethernet.localIP());


}

//this routine reads the output pin values and reports them both through the serial port and to the HTML client
//it also creates the HTML buttons on the web page and defines what is sent to the HTML server when each button is clicked
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```
void sendReply()
  {

    //read all output pin values
            bool val = digitalRead(PinR1);
            Serial.println(val);
            if(val == ON)
            {
            serOut1a = F("<input  type=button value = 'WATTMETER' onmousedown=
                location.href='/~1$' style = 'background-color:lime'>");
            serOut1b = F("<input  type=button value = 'SWR METER' onmousedown=
                location.href='/~100$' style = 'background-color:silver'>");
            }
            else if (val == OFF)
            {
            serOut1a = F("<input  type=button value = 'WATTMETER' onmousedown=
                location.href='/~1$' style = 'background-color:silver'>");
            serOut1b = F("<input  type=button value = 'SWR METER' onmousedown=
                location.href='/~100$' style = 'background-color:lime'>");
            }

            val = digitalRead(PinR2);
            Serial.println(val);
            if(val == ON)
            {
            serOut2a = F("<input  type=button value = 'SWR-CAM ON'  onmousedown=
                location.href='/~2$' style = 'background-color:lime'>");
            serOut2b = F("<input  type=button value = 'SWR-CAM OFF' onmousedown=
                location.href='/~200$' style = 'background-color:silver'>");
            }
            else if (val == OFF)
            {
            serOut2a = F("<input  type=button value = 'SWR-CAM ON' onmousedown=
                location.href='/~2$' style = 'background-color:silver'>");
            serOut2b = F("<input  type=button value = 'SWR-CAM OFF' onmousedown=
                location.href='/~200$' style = 'background-color:lime'>");
            }

            val = digitalRead(PinR3);
            Serial.println(val);
            if(val == ON)
            {
            serOut3a = F("<input  type=button value = 'WATT-CAM ON' style = '
                background-color:lime' onmousedown=location.href='/~3$'>");
            serOut3b = F("<input  type=button value = 'WATT-CAM OFF' style = '
                background-color:silver' onmousedown=location.href='/~300$'>");
            }
            else if (val == OFF)
            {
            serOut3a = F("<input  type=button value = 'WATT-CAM ON' onmousedown=
                location.href='/~3$' style = 'background-color:silver'>");
            serOut3b = F("<input  type=button value = 'WATT-CAM OFF' onmousedown=
                location.href='/~300$' style = 'background-color:lime'>");
            }

            val = digitalRead(PinR4);
            Serial.println(val);
            if(val == ON)
            {
            serOut4a = F("<input  type=button value = 'TX ANT ON' onmousedown=
                location.href='/~4$' style = 'background-color:lime'>");
            serOut4b = F("<input  type=button value = 'TX ANT OFF' onmousedown=
                location.href='/~400$' style = 'background-color:silver'>");
            }
            else if (val == OFF)
            {
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            serOut4a = F("<input  type=button value = 'TX ANT ON' onmousedown=location.href='/~4$' style = 'background-color:silver'>");
            serOut4b = F("<input  type=button value = 'TX ANT OFF' onmousedown=location.href='/~400$' style = 'background-color:lime'>");
            }

            val = digitalRead(PinR5);
            Serial.println(val);
            if(val == ON)
            {
            serOut5a = F("<input  type=button value = 'VNA ON' onmousedown=location.href='/~5$' style = 'background-color:lime'>");
            serOut5b = F("<input  type=button value = 'VNA OFF' onmousedown=location.href='/~500$' style = 'background-color:silver'>");
            }
            else if (val == OFF)
            {
            serOut5a = F("<input  type=button value = 'VNA ON' onmousedown=location.href='/~5$' style = 'background-color:silver'>");
            serOut5b = F("<input  type=button value = 'VNA OFF' onmousedown=location.href='/~500$' style = 'background-color:lime'>");
            }

            val = digitalRead(PinR6);
            Serial.println(val);
            if(val == ON)
            {
            serOut6a = F("<input  type=button value = 'Relay 6 ON' onmousedown=location.href='/~6$' style = 'background-color:lime'>");
            serOut6b = F("<input  type=button value = 'Relay 6 OFF' onmousedown=location.href='/~600$' style = 'background-color:silver'>");
            }
            else if (val == OFF)
            {
            serOut6a = F("<input  type=button value = 'Relay 6 ON' onmousedown=location.href='/~6$' style = 'background-color:silver'>");
            serOut6b = F("<input  type=button value = 'Relay 6 OFF' onmousedown=location.href='/~600$' style = 'background-color:lime'>");
            }

            val = digitalRead(PinR7);
            Serial.println(val);
            if(val == ON)
            {
            serOut7a = F("<input  type=button value = 'Relay 7 ON' onmousedown=location.href='/~7$' style = 'background-color:lime'>");
            serOut7b = F("<input  type=button value = 'Relay 7 OFF' onmousedown=location.href='/~700$' style = 'background-color:silver'>");
            }
            else if (val == OFF)
            {
            serOut7a = F("<input  type=button value = 'Relay 7 ON' onmousedown=location.href='/~7$' style = 'background-color:silver'>");
            serOut7b = F("<input  type=button value = 'Relay 7 OFF' onmousedown=location.href='/~700$' style = 'background-color:lime'>");
            }

            val = digitalRead(PinR8);
            Serial.println(val);
            if(val == ON)
            {
            serOut8a = F("<input  type=button value = 'Relay 8 ON' onmousedown=location.href='/~8$' style = 'background-color:lime'>");
            serOut8b = F("<input  type=button value = 'Relay 8 OFF' onmousedown=location.href='/~800$' style = 'background-color:silver'>");
            }
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                else if (val == OFF)
                {
                serOut8a = F("<input  type=button value = 'Relay 8 ON' onmousedown=location.href='/~8$' style = 'background-color:silver'>");
                serOut8b = F("<input  type=button value = 'Relay 8 OFF' onmousedown=location.href='/~800$' style = 'background-color:lime'>");
                }

                val = digitalRead(PinR9);
                Serial.println(val);
                if(val == ON)
                {
                serOut9a = F("<input  type=button value = 'Relay 9 ON' onmousedown=location.href='/~9$' style = 'background-color:lime'>");
                serOut9b = F("<input  type=button value = 'Relay 9 OFF' onmousedown=location.href='/~900$' style = 'background-color:silver'>");
                }
                else if (val == OFF)
                {
                serOut9a = F("<input  type=button value = 'Relay 9 ON' onmousedown=location.href='/~9$' style = 'background-color:silver'>");
                serOut9b = F("<input  type=button value = 'Relay 9 OFF' onmousedown=location.href='/~900$' style = 'background-color:lime'>");
                }

                val = digitalRead(PinR10);
                Serial.println(val);
                if(val == ON)
                {
                serOut10a = F("<input  type=button value = 'Relay 10 ON' onmousedown=location.href='/~10$' style = 'background-color:lime'>");
                serOut10b = F("<input  type=button value = 'Relay 10 OFF' onmousedown=location.href='/~1000$' style = 'background-color:silver'>");
                }
                else if (val == OFF)
                {
                serOut10a = F("<input  type=button value = 'Relay 10 ON' onmousedown=location.href='/~10$' style = 'background-color:silver'>");
                serOut10b = F("<input  type=button value = 'Relay 10 OFF' onmousedown=location.href='/~1000$' style = 'background-color:lime'>");
                }

                val = digitalRead(PinR11);
                Serial.println(val);
                if(val == ON)
                {
                serOut11a = F("<input  type=button value = 'Relay 11 ON' onmousedown=location.href='/~11$' style = 'background-color:lime'>");
                serOut11b = F("<input  type=button value = 'Relay 11 OFF' onmousedown=location.href='/~1100$' style = 'background-color:silver'>");
                }
                else if (val == OFF)
                {
                serOut11a = F("<input  type=button value = 'Relay 11 ON' onmousedown=location.href='/~11$' style = 'background-color:silver'>");
                serOut11b = F("<input  type=button value = 'Relay 11 OFF' onmousedown=location.href='/~1100$' style = 'background-color:lime'>");
                }

                val = digitalRead(PinR12);
                Serial.println(val);
                if(val == ON)
                {
                serOut12a = F("<input  type=button value = 'Relay 12 ON' onmousedown=location.href='/~12$' style = 'background-color:lime'>");
                serOut12b = F("<input  type=button value = 'Relay 12 OFF' onmousedown
                    =location.href='/~1200$' style = 'background-color:silver'>");
                }
                else if (val == OFF)
                {
                serOut12a = F("<input  type=button value = 'Relay 12 ON' onmousedown=
                    location.href='/~12$' style = 'background-color:silver'>");
                serOut12b = F("<input  type=button value = 'Relay 12 OFF' onmousedown
                    =location.href='/~1200$' style = 'background-color:lime'>");
                }

                val = digitalRead(PinR13);
                Serial.println(val);
                if(val == ON)
                {
                serOut13a = F("<input  type=button value = 'Relay 13 ON' onmousedown=
                    location.href='/~13$' style = 'background-color:lime'>");
                serOut13b = F("<input  type=button value = 'Relay 13 OFF' onmousedown
                    =location.href='/~1300$' style = 'background-color:silver'>");
                }
                else if (val == OFF)
                {
                serOut13a = F("<input  type=button value = 'Relay 13 ON' onmousedown=
                    location.href='/~13$' style = 'background-color:silver'>");
                serOut13b = F("<input  type=button value = 'Relay 13 OFF' onmousedown
                    =location.href='/~1300$' style = 'background-color:lime'>");
                }

                val = digitalRead(PinR14);
                Serial.println(val);
                if(val == ON)
                {
                serOut14a = F("<input  type=button value = 'Relay 14 ON' onmousedown=
                    location.href='/~14$' style = 'background-color:lime'>");
                serOut14b = F("<input  type=button value = 'Relay 14 OFF' onmousedown
                    =location.href='/~1400$' style = 'background-color:silver'>");
                }
                else if (val == OFF)
                {
                serOut14a = F("<input  type=button value = 'Relay 14 ON' onmousedown=
                    location.href='/~14$' style = 'background-color:silver'>");
                serOut14b = F("<input  type=button value = 'Relay 14 OFF' onmousedown
                    =location.href='/~1400$' style = 'background-color:lime'>");
                }

                val = digitalRead(PinR15);
                Serial.println(val);
                if(val == ON)
                {
                serOut15a = F("<input  type=button value = 'Relay 15 ON' onmousedown=
                    location.href='/~15$' style = 'background-color:lime'>");
                serOut15b = F("<input  type=button value = 'Relay 15 OFF' onmousedown
                    =location.href='/~1500$' style = 'background-color:silver'>");
                }
                else if (val == OFF)
                {
                serOut15a = F("<input  type=button value = 'Relay 15 ON' onmousedown=
                    location.href='/~15$' style = 'background-color:silver'>");
                serOut15b = F("<input  type=button value = 'Relay 15 OFF' onmousedown
                    =location.href='/~1500$' style = 'background-color:lime'>");
                }

                val = digitalRead(PinR16);
                Serial.println(val);
                if(val == ON)
                {
                serOut16a = F("<input  type=button value = 'Relay 16 ON' onmousedown=
                    location.href='/~16$' style = 'background-color:lime'>");
                serOut16b = F("<input  type=button value = 'Relay 16 OFF' onmousedown=location.href='/~1600$' style = 'background-color:silver'>");
                }
                else if (val == OFF)
                {
                serOut16a = F("<input  type=button value = 'Relay 16 ON' onmousedown=location.href='/~16$' style = 'background-color:silver'>");
                serOut16b = F("<input  type=button value = 'Relay 16 OFF' onmousedown=location.href='/~1600$' style = 'background-color:lime'>");
                }

              client.println("HTTP/1.1 200 OK");
              client.println("Content-Type: text/html");
              client.println();
              client.println("<!DOCTYPE HTML>");
              client.println("<html>");
              client.println("<HEAD>");
              client.println("<TITLE>W3SZ Ethernet Relay Switch</TITLE>");
              client.println("</HEAD>");
              client.println("<body>");
              client.println("<br />");
              client.println("<H1>W3SZ Ethernet Relay Control</H1>");
              client.println("<H2>Click On Relay Buttons To Change State</H2>");
              client.println("<br />");
              client.println("<input  type=button value = 'GET STATUS' onmousedown=location.href='/~STATUS$'>");
              client.println("<br />");
              client.println("<br />");
              client.println("<br />");
              client.println("<style>");

              client.println("table, th, td {border-collapse: collapse;");
              client.println("}");
              client.println("th, td {");
              client.println("padding: 5px;");
              client.println("}");

              client.println("table {");
              client.println("width: 100%;");
              client.println("}");
              client.println("</style>");
              client.println("<table>");
              client.println("<tr style='border-top:2px solid #f00; border-bottom:2px solid #f00; border-left:2px solid #f00; border-right:2px solid #f00;'>");
              client.println("<td>");
              client.println(serOut1a);
              client.println(serOut1b);
              client.println("</td>");
              client.println("<td>");
              client.println(serOut2a);
              client.println(serOut2b);
              client.println("</td>");
              client.println("<td>");
              client.println(serOut3a);
              client.println(serOut3b);
              client.println("</td>");
              client.println("<td>");
              client.println(serOut4a);
              client.println(serOut4b);
              client.println("</td>");
              client.println("</tr>");

              client.println("<tr style='border-bottom:2px solid #f00; border-left:2px solid #f00; border-right:2px solid #f00;'>");
```

```
          client.println("<td>");
          client.println(serOut5a);
          client.println(serOut5b);
          client.println("</td>");
          client.println("<td>");
          client.println(serOut6a);
          client.println(serOut6b);
          client.println("</td>");
          client.println("<td>");
          client.println(serOut7a);
          client.println(serOut7b);
          client.println("</td>");
          client.println("<td>");
          client.println(serOut8a);
          client.println(serOut8b);
          client.println("</td>");
          client.println("</tr>");


          client.println("<tr style='border-bottom:2px solid #f00; border-left:2px solid #f00; border-right:2px solid #f00;'>");
          client.println("<td>");
          client.println(serOut9a);
          client.println(serOut9b);
          client.println("</td>");
          client.println("<td>");
          client.println(serOut10a);
          client.println(serOut10b);
          client.println("</td>");
          client.println("<td>");
          client.println(serOut11a);
          client.println(serOut11b);
          client.println("</td>");
          client.println("<td>");
          client.println(serOut12a);
          client.println(serOut12b);
          client.println("</td>");
          client.println("</tr>");


          client.println("<tr style='border-bottom:2px solid #f00; border-left:2px solid #f00; border-right:2px solid #f00;'>");
          client.println("<td>");
          client.println(serOut13a);
          client.println(serOut13b);
          client.println("</td>");
          client.println("<td>");
          client.println(serOut14a);
          client.println(serOut14b);
          client.println("</td>");
          client.println("<td>");
          client.println(serOut15a);
          client.println(serOut15b);
          client.println("</td>");
          client.println("<td>");
          client.println(serOut16a);
          client.println(serOut16b);
          client.println("</td>");
          client.println("</tr>");

          client.println("</table>");


          client.println("</body>");
          client.println("</html>");
    // pause to give the browser time to receive the data
    delay(5);
    // close the connection:
    client.stop();


  }

//this is the main program loop.
//it listens for an HTML client and when it gets input from the client it builds a string from the client's input
//it then parses the input and if it finds a valid command in the input, it uses that command to set the status of
//the digital output pin referenced by that command
//it reports the command received to the serial monitor and
//it calls the function sendReply which reads the output pin values and reports them both via serial port and HTML
//and creates the webpage with the buttons and the relay status displays
void loop()
{
  // listen for incoming client
  client = server.available();
  if (client) {
    while (client.connected()) {
        char c = client.read();
        commandInputString += c;  //append latest character received to string
      if (c == '\n')
      {
        //Checks for the URL string beginning with '~' and ending with '$'
          int stringStart = commandInputString.indexOf('~');
          int stringEnd = commandInputString.indexOf('$');
          String commandOut = commandInputString.substring(1 + stringStart, stringEnd);
          Serial.print("Command is: ");
          Serial.println(commandOut);
          Serial.println(" ");

          if (commandOut  == "1") {
            digitalWrite(PinR1, ON);
            sendReply();
          }
          else if (commandOut  == "100") {
            digitalWrite(PinR1, OFF);
            sendReply();
          }

          else if (commandOut  == "2") {
            digitalWrite(PinR2, ON);
            sendReply();
          }
          else if (commandOut  == "200") {
            digitalWrite(PinR2, OFF);
            sendReply();
          }

          else if (commandOut  == "3") {
            digitalWrite(PinR3, ON);
            sendReply();
          }
          else if (commandOut  == "300") {
            digitalWrite(PinR3, OFF);
            sendReply();
          }

          else if (commandOut  == "4") {
            digitalWrite(PinR4, ON);
            sendReply();
          }
          else if (commandOut  == "400") {
            digitalWrite(PinR4, OFF);
            sendReply();
          }

          else if (commandOut  == "5") {
            digitalWrite(PinR5, ON);
            sendReply();
          }
          else if (commandOut  == "500") {
            digitalWrite(PinR5, OFF);
            sendReply();
          }

          else if (commandOut  == "6") {
            digitalWrite(PinR6, ON);
            sendReply();
          }
          else if (commandOut  == "600") {
            digitalWrite(PinR6, OFF);
            sendReply();
          }

          else if (commandOut  == "7") {
            digitalWrite(PinR7, ON);
            sendReply();
          }
          else if (commandOut  == "700") {
            digitalWrite(PinR7, OFF);
            sendReply();
          }

          else if (commandOut  == "8") {
            digitalWrite(PinR8, ON);
            sendReply();
          }
          else if (commandOut  == "800") {
            digitalWrite(PinR8, OFF);
            sendReply();
          }

          else if (commandOut  == "9") {
            digitalWrite(PinR9, ON);
            sendReply();
          }
          else if (commandOut  == "900") {
            digitalWrite(PinR9, OFF);
            sendReply();
          }

          else if (commandOut  == "10") {
            digitalWrite(PinR10, ON);
            sendReply();
          }
          else if (commandOut  == "1000") {
            digitalWrite(PinR10, OFF);
            sendReply();
          }

          else if (commandOut  == "11") {
            digitalWrite(PinR11, ON);
            sendReply();
          }
          else if (commandOut  == "1100") {
            digitalWrite(PinR11, OFF);
            sendReply();
          }

          else if (commandOut  == "12") {
            digitalWrite(PinR12, ON);
            sendReply();
          }
          else if (commandOut  == "1200") {
            digitalWrite(PinR12, OFF);
            sendReply();
          }


          else if (commandOut  == "13") {
            digitalWrite(PinR13, ON);
            sendReply();
          }
          else if (commandOut  == "1300") {
            digitalWrite(PinR13, OFF);
            sendReply();
          }

          else if (commandOut  == "14") {
            digitalWrite(PinR14, ON);
            sendReply();
          }
          else if (commandOut  == "1400") {
            digitalWrite(PinR14, OFF);
            sendReply();
          }

          else if (commandOut  == "15") {
            digitalWrite(PinR15, ON);
            sendReply();
          }
          else if (commandOut  == "1500") {
            digitalWrite(PinR15, OFF);
            sendReply();
          }

          else if (commandOut  == "16") {
            digitalWrite(PinR16, ON);
            sendReply();
          }
          else if (commandOut  == "1600") {
            digitalWrite(PinR16, OFF);
            sendReply();
          }

          else if (commandOut  == "STATUS") {
            sendReply();
          }
          else
          {
            String HTMString = "Command Not Recognized:  ";
            Serial.println(commandOut);
            Serial.println(HTMString);
            sendReply();
          }

          commandInputString = "";
          commandOut = "";
          c=' ';

      }
    }
```

```
  }
}

```

```

//    W3SZ 8-20-2017 Remote Ethernet Power Meter
//    To work in conjunction with C# client also
//    written by W3SZ 8-20-2017

#include <Ethernet.h>  //for ethernet port



//variables
String commandInputString = "";

// Enter MAC address and IP address for Arduino below.
byte mac[] = { 0x90, 0xAA, 0xBB, 0xCC, 0xDA, 0x02 };
IPAddress ip(192, 168, 10, 176); //<< ENTER YOUR IP ADDRESS HERE <<

IPAddress displayIP(192,168,10,78); //IP of computer running C# program

unsigned int dataPort = 8888;   // local port to send and receive data on

// buffers for receiving and sending data
char packetBuffer[UDP_TX_PACKET_MAX_SIZE]; //buffer to hold incoming packet,
char  ReplyBuffer[] = "acknowledged";       // a string to send back

// An EthernetUDP instance to let us send and receive packets over UDP

EthernetUDP Udp;

int VoltA0 = 0;
int VoltA1 = 0;
int VoltA2 = 0;
int VoltA3 = 0;
int VoltA4 = 0;
int VoltA5 = 0;
int VoltA6 = 0;
int VoltA7 = 0;
int VoltA8 = 0;
int VoltA9 = 0;
int VoltA10 = 0;
int VoltA11 = 0;
int VoltA12 = 0;
int VoltA13 = 0;
int VoltA14 = 0;
int VoltA15 = 0;

String MeterOn = "OFF";  //turns measurement UDP server on or off
String BANDA0 = "ON";     //turns sensor with this numeral on or off
String BANDA1 = "ON";     //turns sensor with this numeral on or off
String BANDA2 = "ON";     //turns sensor with this numeral on or off
String BANDA3 = "ON";     //turns sensor with this numeral on or off
String BANDA4 = "ON";     //turns sensor with this numeral on or off
String BANDA5 = "ON";     //turns sensor with this numeral on or off
String BANDA6 = "ON";     //turns sensor with this numeral on or off
String BANDA7 = "ON";     //turns sensor with this numeral on or off
String BANDA8 = "ON";     //turns sensor with this numeral on or off
String BANDA9 = "ON";     //turns sensor with this numeral on or off
String BANDA10 = "ON";     //turns sensor with this numeral on or off
String BANDA11 = "ON";     //turns sensor with this numeral on or off
String BANDA12 = "ON";     //turns sensor with this numeral on or off
String BANDA13 = "ON";     //turns sensor with this numeral on or off
String BANDA14 = "ON";     //turns sensor with this numeral on or off
String BANDA15 = "ON";     //turns sensor with this numeral on or off

// *************************************************************
// ********************  S  E  T  U  P  ************************
// *************************************************************
```

```

void setup() {

  //set pin modes to input
  pinMode(A0, INPUT);
  pinMode(A1, INPUT);
  pinMode(A2, INPUT);
  pinMode(A3, INPUT);
  pinMode(A4, INPUT);
  pinMode(A5, INPUT);
  pinMode(A6, INPUT);
  pinMode(A7, INPUT);
  pinMode(A8, INPUT);
  pinMode(A9, INPUT);
  pinMode(A10, INPUT);
  pinMode(A11, INPUT);
  pinMode(A12, INPUT);
  pinMode(A13, INPUT);
  pinMode(A14, INPUT);
  pinMode(A15, INPUT);

  // start the Ethernet connection and the server and the serial port:
  Ethernet.begin(mac, ip);
  Udp.begin(dataPort);
  Serial.begin(9600);
  Serial.println("Starting Server");
  Serial.println (Ethernet.localIP());

// Print a message to the serial port

  Serial.println("Pwr Meter");
  Serial.println("1 MHz - 9 GHz");
  Serial.println("W3SZ 08/2017");

  delay (4000);

} // end of setup

// *************************************************************
// ***********************  L  O  O  P  ************************
// *************************************************************
//this is the main program loop. it listens for an HTML client
//when it gets input from the client it builds a string from the client's input
//it parses the input and if it finds a valid command in the input, it uses
//that command to set each of 16 sensors (BANDS) ON or OFF or to START or
//STOP the measurement process altogether
//it reports the command received to the serial monitor and
//it calls the function sendReply which reads the Power/SDR values
//and reports them via UDP to C# client running on another computer

void loop() {

    //read sensors
 VoltA0 = analogRead(A0);        // Read A0 sensor voltage
 VoltA1 = analogRead(A1);        // Read A1 sensor voltage
 VoltA2 = analogRead(A2);        // Read A2 sensor voltage
 VoltA3 = analogRead(A3);        // Read A3 sensor voltage
 VoltA4 = analogRead(A4);        // Read A4 sensor voltage

 VoltA5 = analogRead(A5);        // Read A5 sensor voltage
 VoltA6 = analogRead(A6);        // Read A6 sensor voltage
 VoltA7 = analogRead(A7);        // Read A7 sensor voltage
 VoltA8 = analogRead(A8);        // Read A8 sensor voltage
 VoltA9 = analogRead(A9);        // Read A9 sensor voltage

 VoltA10 = analogRead(A10);        // Read A10 sensor voltage
```

```
  VoltA11 = analogRead(A11);        // Read A11 sensor voltage
  VoltA12 = analogRead(A12);        // Read A12 sensor voltage
  VoltA13 = analogRead(A13);        // Read A13 sensor voltage
  VoltA14 = analogRead(A14);        // Read A14 sensor voltage
  VoltA15 = analogRead(A15);        // Read A15 sensor voltage

   // listen for incoming UDP Packet
   // if there's data available, read a packet
   int packetSize = Udp.parsePacket();
   if (packetSize) {
     Serial.print("Received packet of size ");
     Serial.println(packetSize);
     Serial.print("From ");
     Serial.print(Udp.remoteIP());
     Serial.print(", port ");
     Serial.println(Udp.remotePort());

     // read the packet into packetBufffer
     Udp.read(packetBuffer, UDP_TX_PACKET_MAX_SIZE);
     Serial.println("Contents:");
     Serial.println(packetBuffer);

           commandInputString = (String)packetBuffer;
           int stringStart = commandInputString.indexOf('~');
           int stringEnd = commandInputString.indexOf('$');
           String commandOut = commandInputString.substring(1 + stringStart,stringEnd);
           if (commandOut  == "START") {
             String HTMString = "START MEASUREMENT";
             Serial.println(HTMString);
             MeterOn = "ON";
           }
           else if (commandOut  == "STOP") {
             String HTMString = "STOP MEASUREMENT";
             Serial.println(HTMString);
             MeterOn = "OFF";
           }

           else if (commandOut  == "BANDA0ON") {
             String HTMString = "BAND A0 is ON";
             Serial.println(HTMString);
             BANDA0 = "ON";
           }
           else if (commandOut  == "BANDA0OFF") {
             String HTMString = "BAND A0 is OFF";
             Serial.println(HTMString);
             BANDA0 = "OFF";
           }

           else if (commandOut  == "BANDA1ON") {
             String HTMString = "BAND A1 is ON";
             Serial.println(HTMString);
             BANDA1 = "ON";
           }
           else if (commandOut  == "BANDA1OFF") {
             String HTMString = "BAND A1 is OFF";
             Serial.println(HTMString);
             BANDA1 = "OFF";
           }

           else if (commandOut  == "BANDA2ON") {
             String HTMString = "BAND A2 is ON";
             Serial.println(HTMString);
             BANDA2 = "ON";
           }
           else if (commandOut  == "BANDA2OFF") {
             String HTMString = "BAND A2 is OFF";
```

```
            Serial.println(HTMString);
            BANDA2 = "OFF";
          }

          else if (commandOut  == "BANDA3ON") {
            String HTMString = "BAND A3 is ON";
            Serial.println(HTMString);
            BANDA3 = "ON";
          }
          else if (commandOut  == "BANDA3OFF") {
            String HTMString = "BAND A3 is OFF";
            Serial.println(HTMString);
            BANDA3 = "OFF";
          }

          else if (commandOut  == "BANDA4ON") {
            String HTMString = "BAND A4 is ON";
            Serial.println(HTMString);
            BANDA4 = "ON";
          }
          else if (commandOut  == "BANDA4OFF") {
            String HTMString = "BAND A4 is OFF";
            Serial.println(HTMString);
            BANDA4 = "OFF";
          }

          else if (commandOut  == "BANDA5ON") {
            String HTMString = "BAND A5 is ON";
            Serial.println(HTMString);
            BANDA5 = "ON";
          }
          else if (commandOut  == "BANDA5OFF") {
            String HTMString = "BAND A5 is OFF";
            Serial.println(HTMString);
            BANDA5 = "OFF";
          }

          else if (commandOut  == "BANDA6ON") {
            String HTMString = "BAND A6 is ON";
            Serial.println(HTMString);
            BANDA6 = "ON";
          }
          else if (commandOut  == "BANDA6OFF") {
            String HTMString = "BAND A6 is OFF";
            Serial.println(HTMString);
            BANDA6 = "OFF";
          }

          else if (commandOut  == "BANDA7ON") {
            String HTMString = "BAND A7 is ON";
            Serial.println(HTMString);
            BANDA7 = "ON";
          }
          else if (commandOut  == "BANDA7OFF") {
            String HTMString = "BAND A7 is OFF";
            Serial.println(HTMString);
            BANDA7 = "OFF";
          }

          else if (commandOut  == "BANDA8ON") {
            String HTMString = "BAND A8 is ON";
            Serial.println(HTMString);
            BANDA8 = "ON";
          }
          else if (commandOut  == "BANDA8OFF") {
            String HTMString = "BAND A8 is OFF";
            Serial.println(HTMString);
            BANDA8 = "OFF";
          }

          else if (commandOut  == "BANDA9ON") {
            String HTMString = "BAND A9 is ON";
            Serial.println(HTMString);
            BANDA9 = "ON";
          }
          else if (commandOut  == "BANDA9OFF") {
            String HTMString = "BAND A9 is OFF";
            Serial.println(HTMString);
            BANDA9 = "OFF";
          }

          else if (commandOut  == "BANDA10ON") {
            String HTMString = "BAND A10 is ON";
            Serial.println(HTMString);
            BANDA10 = "ON";
          }
          else if (commandOut  == "BANDA10OFF") {
            String HTMString = "BAND A10 is OFF";
            Serial.println(HTMString);
            BANDA10 = "OFF";
          }

          else if (commandOut  == "BANDA11ON") {
            String HTMString = "BAND A11 is ON";
            Serial.println(HTMString);
            BANDA11 = "ON";
          }
          else if (commandOut  == "BANDA11OFF") {
            String HTMString = "BAND A11 is OFF";
            Serial.println(HTMString);
            BANDA11 = "OFF";
          }

          else if (commandOut  == "BANDA12ON") {
            String HTMString = "BAND A12 is ON";
            Serial.println(HTMString);
            BANDA12 = "ON";
          }
          else if (commandOut  == "BANDA12OFF") {
            String HTMString = "BAND A12 is OFF";
            Serial.println(HTMString);
            BANDA12 = "OFF";
          }

          else if (commandOut  == "BANDA13ON") {
            String HTMString = "BAND A13 is ON";
            Serial.println(HTMString);
            BANDA13 = "ON";
          }
          else if (commandOut  == "BANDA13OFF") {
            String HTMString = "BAND A13 is OFF";
            Serial.println(HTMString);
            BANDA13 = "OFF";
          }

          else if (commandOut  == "BANDA14ON") {
            String HTMString = "BAND A14 is ON";
            Serial.println(HTMString);
            BANDA14 = "ON";
          }
          else if (commandOut  == "BANDA14OFF") {
            String HTMString = "BAND A14 is OFF";
            Serial.println(HTMString);
            BANDA14 = "OFF";
          }

          else if (commandOut  == "BANDA15ON") {
            String HTMString = "BAND A15 is ON";
            Serial.println(HTMString);
            BANDA15 = "ON";
          }
          else if (commandOut  == "BANDA15OFF") {
            String HTMString = "BAND A15 is OFF";
            Serial.println(HTMString);
            BANDA15 = "OFF";
          }
          commandInputString = "";
  } // end if UDP data received

  //send Sensor Data
   String data = "DATA";

    if(BANDA0 =="ON"){
      data = data + ",A00=" +String(VoltA0);
    }
    if(BANDA1 =="ON"){
      data = data + ",A01=" +String(VoltA1);
    }
    if(BANDA2 =="ON"){
      data = data + ",A02=" +String(VoltA2);
    }
    if(BANDA3 =="ON"){
      data = data + ",A03=" +String(VoltA3);
    }
    if(BANDA4 =="ON"){
      data = data + ",A04=" +String(VoltA4);
    }
    if(BANDA5 =="ON"){
      data = data + ",A05=" +String(VoltA5);
    }
    if(BANDA6 =="ON"){
      data = data + ",A06=" +String(VoltA6);
    }
    if(BANDA7 =="ON"){
      data = data + ",A07=" +String(VoltA7);
    }
    if(BANDA8 =="ON"){
      data = data + ",A08=" +String(VoltA8);
    }
    if(BANDA9 =="ON"){
      data = data + ",A09=" +String(VoltA9);
    }
    if(BANDA10 =="ON"){
      data = data + ",A10=" +String(VoltA10);
    }
    if(BANDA11 =="ON"){
      data = data + ",A11=" +String(VoltA11);
    }
    if(BANDA12 =="ON"){
      data = data + ",A12=" +String(VoltA12);
    }
    if(BANDA13 =="ON"){
      data = data + ",A13=" +String(VoltA13);
    }
    if(BANDA14 =="ON"){
      data = data + ",A14=" +String(VoltA14);
    }
    if(BANDA15 =="ON"){
      data = data + ",A15=" +String(VoltA15);
    }

   if(MeterOn == "ON")
   {
    int datalength = 1 + data.length();
    char databuf[datalength];
    data.toCharArray(databuf, datalength);
    // send a reply to the IP address and port that sent us the packet we received
    Udp.beginPacket(displayIP, dataPort);
    Udp.write(databuf);
    Udp.endPacket();
   }
  delay(50);
} //end loop


```