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/**********************************************************
 * Arduino analog-digital
 * Written by Laura Bordin and Valentina Venza
 * Based on a work by Hans-Christoph Steiner <hans@eds.org>
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#include <Firmata.h>

byte previousPIN[2];  // PIN means PORT for input
byte previousPORT[2];
byte analogPin;

void analogWriteCallback(byte pin, int value)
{
  pinMode(pin,OUTPUT);
  analogWrite(pin, value);
}

void outputPort(byte portNumber, byte portValue)
{
  // only send the data when it changes, otherwise you get too many messages!
  if(previousPIN[portNumber] != portValue) {
    Firmata.sendDigitalPort(portNumber, portValue);
    previousPIN[portNumber] = portValue;
    Firmata.sendDigitalPort(portNumber, portValue);
  }
}

void setPinModeCallback(byte pin, int mode) {
  if(pin > 1) { // don't touch RxTx pins (0,1)
    pinMode(pin, mode);
  }
}

void digitalWriteCallback(byte port, int value)
{
  byte i;
  byte currentPinValue, previousPinValue;

  if(value != previousPORT[port]) {
    for(i=0; i<8; i++) {
      currentPinValue = (byte) value & (1 << i);
      previousPinValue = previousPORT[port] & (1 << i);
      if(currentPinValue != previousPinValue) {
        digitalWrite(i + (port*8), currentPinValue);
      }
    }
    previousPORT[port] = value;
  }
}

void setup()
{
  Firmata.setFirmwareVersion(0, 1);
  Firmata.attach(ANALOG_MESSAGE, analogWriteCallback);
  Firmata.attach(DIGITAL_MESSAGE, digitalWriteCallback);
  Firmata.attach(SET_PIN_MODE, setPinModeCallback);
  Firmata.begin();
}

void loop()
{
  outputPort(0, PIND &~ B00000011); // pins 0-7, ignoring Rx/Tx pins (0/1)
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  outputPort(1, PINB); // pins 8-13
  while(Firmata.available()) {
    Firmata.processInput();
  }
  for(analogPin = 0; analogPin < TOTAL_ANALOG_PINS; analogPin++) {
    Firmata.sendAnalog(analogPin, analogRead(analogPin));
  }
}
```