Barometry 2 Web App

Release Notes

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Overview

The Baromery 2 (version 2.3.0) web app developed by Clinical Measurement in the Medical Physics Department at The James Cook University Hospital, replaces Barometry Version1. Barometry 2 includes the ability to read the pressure from a Druck Pace 1001 directly over ethernet.

The web app can be accessed via http://medphysics/Barometry

What's New

- A full re-design of the look and feel of the app, which utilise the NHS Digital Design Library.
- Complete re-write of the code in C# MVC .Net .
- Better webscraping of Barometer 1 (Medical Physics Department Barometer) using the htmlagilitypack.
- Ivi.Visa library interface with the new Druck Pace 1001 barometer for reading VX11.
- In-built change log.
- Display of calibration dates.

Technical Highlights

This section identifies some of the important technical information for Barometry 2.

Barometer 1 – Medical Physics Department

The app web scrapes the HTML from Barometer 1 (http://10.115.16.17) by using the HtmlAgilityPack nuget library. Specifically, it reads the HTML div tags 'pres_mbar' and 'pres_mmhg' and inserts the data into a HtmlNode. This data is then presented to the View as a string.

Barometer 2 – The Endeavour Unit

The web app utilises Ivi.Visa to connect to the Druck Pace 1001 via VX11, specifically by connecting the Visa session `TCPIP::10.115.46.84::inst0::INSTR`. It then sends the command `:SENSe:PRESsure?` to the Druck Pace 1001 and receives the mBar payload.

Currently, the mBar is converted into mmHg by using mBar * 0.750061561306.

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Main Source Code

This section includes the useful source code for reference. Please see the full source code if necessary.

Controller

```
using System;
using System.Collections.Generic;
using System.Linq;
using System.Web;
using System.Web.Mvc;
using System.Net.Http;
using System.Net.Http.Headers;
using System.Threading.Tasks;
using System.Net;
using System.Text;
using System.IO;
using HtmlAgilityPack;
using Ivi.Visa;


namespace Barometry.Controllers
{
    public class HomeController : Controller
    {
        public ActionResult Index()
        {
            try
            {
                //web scraper for main department barometer on IP 10.115.16.17
                HtmlWeb web = new HtmlWeb();
                //Load the html page as a document
                HtmlDocument document = web.Load("http://10.115.16.17");
                //Scrape the html that includes the div class with the ID pres_mbar
                HtmlNode mBar =
document.DocumentNode.SelectSingleNode("//div[@id='pres_mbar']");
                HtmlNode mmHg =
document.DocumentNode.SelectSingleNode("//div[@id='pres_mmhg']");
                //Pull the html into the string
                string divContentmBar = mBar.InnerHtml;
                string divContentmmHg = mmHg.InnerHtml;
                //View the Main Department Barometer
                ViewBag.b1mBar = divContentmBar;
                ViewBag.b1mmHg = divContentmmHg;
                //Set viewbags for the Endeavour Unit Barometer by calling the
B2EndeavourUnit method
                ViewBag.b2 = B2EndeavourUnitPressuremBar();
                ViewBag.b2mmHg =
B2EndeavourUnitPressuremmHg(B2EndeavourUnitPressuremBar());

                ViewBag.b2time = DateTime.Now;
            }
            catch (Exception ex)
            {
                ViewBag.b1mBar = "Offline";
                ViewBag.b1mmHg = "Offline";
            }
            //Return View
            return View();
        }
```

```csharp
        //Calculate the mmHg for the endeavour unit as not sure if the device sends
mmHg.
        public double B2EndeavourUnitPressuremmHg(string mBar)
        {
            double mBarToConvert;
            try
            {
                mBarToConvert = Double.Parse(mBar);
            }
            catch (FormatException)
            {
                throw new ArgumentException("Invalid number format - device may be
offline");
            }
            double mmHg = mBarToConvert * 0.750061561306;
            return Math.Round(mmHg, 2); // round the result to two decimal places

        }

        public string B2EndeavourUnitPressuremBar()
        {
            // Connect to the druck using an IVisaSession and globalresourcemanager
            using (IVisaSession res =
GlobalResourceManager.Open("TCPIP::10.115.46.84::inst0::INSTR",
AccessModes.ExclusiveLock, 2000))
            {
                //if the resource is a IMessageBasedSession (which it should be)
                if (res is IMessageBasedSession session)
                {
                    // Ensure termination character is enabled as here in example we
use a SOCKET connection.
                    session.TerminationCharacterEnabled = true;
                    // Request information about the druck.
                    session.FormattedIO.WriteLine(":SENSe:PRESsure?");
                    //Capture the information
                    string idn = session.FormattedIO.ReadLine();
                    //Set the index of the payload
                    int index = idn.IndexOf(' ');
                    //only get these specific characters, we're only interested in the
numbers.
                    string pressure = idn.Substring(index + 1, 7);
                    //Return the pressure
                    return pressure;
                }
                else
                {
                    return "Offline";
                }
            }
        }

    //Version Page
    public ActionResult ChangeLog()
        {
            return View();
        }

    }
}
```

Index View

```
@{
    ViewBag.Title = "Home Page";
}

<meta http-equiv="refresh" content="10; URL=http://medphysics/barometry">

<div class="nhsuk-width-container">
    <br />

    <div class="nhsuk-card nhsuk-card--feature">
        <div class="nhsuk-card__content nhsuk-card__content--feature">
            <h2 class="nhsuk-card__heading nhsuk-card__heading--feature nhsuk-heading-
m">
                Atmospheric Pressure Information
            </h2>

            <p class="nhsuk-card__description">

                <h3>@ViewBag.b2time</h3>


                <!-- Medical Physics Barometer Card-->
                <ul class="nhsuk-grid-row nhsuk-card-group">
                    <li class="nhsuk-grid-column-one-half nhsuk-card-group__item">

                        <div class="nhsuk-card">
                            <div class="nhsuk-card__content">
                                <h2 class="nhsuk-card__heading nhsuk-heading-m">
                                    Medical Physics Department
                                </h2>
                                <p class="nhsuk-card__description">
                                    @ViewBag.b1mBar
                                    <br/>
                                    @ViewBag.b1mmHg
                                <p>
                                    <br />Druck DPI 142
                                    <br />Serial No: 001986506
                                    <br />Barometer IP: 10.115.16.17
                                    <br /> Last Calibration: 01/11/2023
                                </p>
                            </p>
                        </div>
                    </div>

                </li>
                <!-- Endeavour Unit Barometer CArd -->
                <li class="nhsuk-grid-column-one-half nhsuk-card-group__item">
                    <div class="nhsuk-card bg-info">
                        <div class="nhsuk-card__content bg-info">
                            <h2 class="nhsuk-card__heading nhsuk-heading-m">
                                Endeavour Unit
                            </h2>
                            <p class="nhsuk-card__description">
                                @ViewBag.b2 mBar
                                <br />
                                @ViewBag.b2mmHg mmHg
<p>
                                <br />Druck Pace 1001
                                <br />Serial No: 12368670
                                <br /> Barometer IP: 10.115.46.84
                                <br /> Last Calibration: 08/08/2022
                            </p>
```

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```
                    </p>
                </div>
            </div>


        </li>
        </ul>


        </p>
</div>
        </div>

<!-- Inset Reminder to check date/time-->


<div class="nhsuk-inset-text">
    <span class="nhsuk-u-visually-hidden">Information: </span>
    <p>Ensure that you confirm date and time of readings</p>
</div>

</div>
```