Driver Board Dropwatcher

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Chapter 1

README

This project folder contains source code for the Driver Board Dropwatcher Software.

Item Naming in Source Code:

- txtb = Text Box
- cb = Combo Box,
- chbx = Check Box,
- lb = Label,
- btn = Button
- tc = Tab Control.

Chapter 2

Namespace Index

2.1 Namespace List

Here is a list of all documented namespaces with brief descriptions:

Chapter 3

Hierarchical Index

3.1 Class Hierarchy

This inheritance list is sorted roughly, but not completely, alphabetically:

Chapter 4

Class Index

4.1 Class List

Here are the classes, structs, unions and interfaces with brief descriptions:

Chapter 5

File Index

5.1 File List

Here is a list of all documented files with brief descriptions:

Chapter 6

Namespace Documentation

6.1 DriverBoardDropwatcher Namespace Reference

Classes

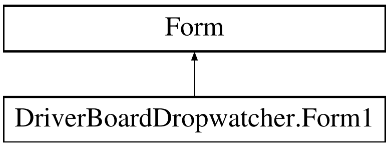
- class Form1
- class **Program**

Chapter 7

Class Documentation

7.1 DriverBoardDropwatcher.Form1 Class Reference

Inheritance diagram for DriverBoardDropwatcher.Form1:



Static Public Member Functions

- static Bitmap MakeGrayscale3 (Bitmap original)

  Grey Scale Image Function.

Protected Member Functions

- override void Dispose (bool disposing)

  Clean up any resources being used.

Private Member Functions

- void ThreadTask ()

  A Thread Task Function.
- void cbSerialPort_DropDown (object sender, EventArgs e)

  Detects Active Serial COM Ports from device.
- void cbSerialPort_SelectedIndexChanged (object sender, EventArgs e)

  Detects Changes in Serial Ports.
- void disconnect_board ()

  Disconnect Driver Board.
- void connect_board ()

  Connect Driver Board.

- void DataRecievedHandler (object sender, SerialDataReceivedEventArgs e)

  Processes data received from driver board.
- void determineStatus ()

  Determine the Status of Voltages and Temperatures.
- void parseJsonData (string input_string)

  Parse the JSON Data.
- void btnConnectDisconnect_Click (object sender, EventArgs e)

  Controls the Connect/Disconnect Toggle.
- void powerOnOff_Click (object sender, EventArgs e)

  Controls the Power On/Off Toggle.
- void powerOn ()

  Power On Function.
- void powerOff ()

  Power Off Function.
- void voltage_ValueChanged (object sender, EventArgs e)

  Fetches Voltage Data from GUI.
- void temperature_ValueChanged (object sender, EventArgs e)

  Fetches Temperature Data from GUI.
- void **frequencyValue_ValueChanged** (object sender, EventArgs e)
- void frequencyChange (object sender, EventArgs e)

  Fetches Frequency Data from GUI.
- void cbDropWatchMode_SelectedIndexChanged (object sender, EventArgs e)

  Fetches User Selected Drop Watch Mode Selection from GUI.
- void reset_Click (object sender, EventArgs e)

  Reset Board Button.
- void cbDropWatchHeadSelection_SelectedIndexChanged (object sender, EventArgs e)

  Fetches User Selected Head from GUI.
- void ImageBoxClicked (object sender, EventArgs e)

  Image Box Selection in Image Mode.
- void pictureBox1_Click (object sender, EventArgs e)

  Picture Box 1 is pressed.
- void pictureBox2_Click (object sender, EventArgs e)

  Picture Box 2 is pressed.
- void pictureBox3_Click (object sender, EventArgs e)

  Picture Box 3 is pressed.
- void pictureBox4_Click (object sender, EventArgs e)

  Picture Box 4 is pressed.
- void convertImageToData (string file_name)

  Convert Image to Data.
- void btnPrintImage_Click (object sender, EventArgs e)

  Print Image.
- void PrintingImage (int head)

  Printing Image Function.
- void VerifyImageData (int head, string existing_lines)

  Picture Box 2.
- void NozzleValue_ValueChanged (object sender, EventArgs e)

  Nozzle Value Modified in GUI.
- void SpanValue_ValueChanged (object sender, EventArgs e)

  Span Value Modified in GUI.
- void FillSingleNozzleButton_Click (object sender, EventArgs e)

  Fill Nozzle Push Button.

- void FillSpanNozzleButton_Click (object sender, EventArgs e)

    Fill Span Push Button.
- void ImageModeSelection_SelectedIndexChanged (object sender, EventArgs e)

    Runs if Image Mode Selection is Modified.
- void btnClearHead_Click (object sender, EventArgs e)

    Clear Heads Push Button.
- void FillCycleA_Click (object sender, EventArgs e)

    Fill Cycle A Button Press.
- void FillCycleB_Click (object sender, EventArgs e)

    Fill Cycle B Button Press.
- void FillCycleC_Click (object sender, EventArgs e)

    Fill Cycle C Button Press.
- void FillCycle (object sender, EventArgs e)

    Fill Cycle Function.
- void GapValue_ValueChanged (object sender, EventArgs e)

    Gap Value Modified.
- void FillGapButton_Click (object sender, EventArgs e)

    Fill Gap Button.
- void fillGap ()

    Fill Gap Function.
- void fillHead_Click (object sender, EventArgs e)

    Fill Head Button Press.
- void PD_Polarity_SelectedIndexChanged (object sender, EventArgs e)

    PD Polarity Mode Selection.
- void EncoderTrackedPositionSelection_SelectedIndexChanged (object sender, EventArgs e)

    Encoder Position Selection Change.
- void pdDirection_SelectedIndexChanged (object sender, EventArgs e)

    PD Direction Selection Change.
- void tcDropWatchingAndImageModes_SelectedIndexChanged (object sender, EventArgs e)

    Mode Selection.
- void DropWatchingTab_PreviewKeyDown (object sender, PreviewKeyDownEventArgs e)

    Arrow Keys Pushed.
- void DropWatchingTab_Click (object sender, EventArgs e)

    Drop Watching Tab pressed.
- void btnCancel_Click (object sender, EventArgs e)

    Cancel Button Pushed.
- void DeleteAllFilesInFolder (object sender, EventArgs e)

    Delete all Images and Data Files from Folder.
- void Form1_Load (object sender, EventArgs e)

    Loads all data when opening application.
- void Form1_FormClosing (object sender, FormClosingEventArgs e)

    Saves all data when closing application.
- void SetPosition (object sender, EventArgs e)

    Sets the Position of Print Head for Image Printing.
- void nudSetPosition_ValueChanged (object sender, EventArgs e)

    Sets the Position of Print Head for Image Printing.
- void **InitializeComponent** ()

    Required method for Designer support - do not modify the contents of this method with the code editor.

Private Attributes

- OpenFileDialog ofd
- bool **valid_port_selected** = false
- string **port_name**
- int **failCounter** = 0
- int **activeDropWatch**
- int **activeDropModeHead**
- int **activeNozzleValue**
- int **activeSpanValue**
- int **activeImageMode**
- int **activeGapValue**
- int **actFreq**
- int **timeBoardOn** = -1
- int **activePD_Polarity**
- int **activeEncoderPosition**
- int **activePDdirection**
- int **activeImageHeadIndex**
- bool **ImageHead1** = false
- bool **ImageHead2** = false
- bool **ImageHead3** = false
- bool **ImageHead4** = false
- bool **Head1ImageSend** = false
- bool **Head2ImageSend** = false
- bool **Head3ImageSend** = false
- bool **Head4ImageSend** = false
- bool **isRunning** = true
- String **CurrentFileName**
- String **datafolder** = System.IO.Path.Combine(Application.StartupPath, "Output Images\\File")
- String **outputFolderPath** = System.IO.Path.Combine(Application.StartupPath, "Output Images")
- int[ ] **HeadPrintCountersStoredAsInt** = new int[4]
- int[ ] **PreviousHeadPrintCounters** = new int[4]
- int[ ] **HeadStatus** = new int[4]
- byte[ ] **A_Bits** = { 0b10010010, 0b01001001, 0b00100100 }
- byte[ ] **B_Bits** = { 0b01001001, 0b00100100, 0b10010010 }
- byte[ ] **C_Bits** = { 0b00100100, 0b10010010, 0b01001001 }
- byte[ ] **BitsArray**
- byte[ ] **BytesToSend**
- System.ComponentModel.IContainer **components** = null

  Required designer variable.
- System.Windows.Forms.ComboBox **cbSerialPort**
- System.Windows.Forms.Button **btnConnectDisconnect**
- System.Windows.Forms.CheckBox **ChbxIsConnected**
- System.Windows.Forms.Button **btnPowerOnOff**
- System.Windows.Forms.CheckBox **ChbxPower**
- System.Windows.Forms.Label **lbStatus**
- System.Windows.Forms.TextBox **txtbStatusBox**
- System.Windows.Forms.Label **lbTimeOn**
- System.Windows.Forms.TextBox **txtbBoardUpTime**
- System.Windows.Forms.TextBox **txtbTemperatureOutput1**
- System.Windows.Forms.NumericUpDown **nudTemperatureHead1**
- System.Windows.Forms.NumericUpDown **nudVoltageHead1**
- System.Windows.Forms.TextBox **txtbTemperatureOutput2**
- System.Windows.Forms.NumericUpDown **nudTemperatureHead2**
- System.Windows.Forms.NumericUpDown **nudVoltageHead2**

- System.Windows.Forms.TextBox **txtbTemperatureOutput3**
- System.Windows.Forms.NumericUpDown **nudTemperatureHead3**
- System.Windows.Forms.NumericUpDown **nudVoltageHead3**
- System.Windows.Forms.TextBox **txtbTemperatureOutput4**
- System.Windows.Forms.NumericUpDown **nudTemperatureHead4**
- System.Windows.Forms.NumericUpDown **nudVoltageHead4**
- System.Windows.Forms.TextBox **txtbHeadStatus2**
- System.Windows.Forms.TextBox **txtbHeadStatus3**
- System.Windows.Forms.TextBox **txtbHeadStatus1**
- System.Windows.Forms.TabControl **tcDropWatchingAndImageModes**
- System.Windows.Forms.Button **btnReset**
- System.Windows.Forms.TabPage **DropWatchingTab**
- System.Windows.Forms.NumericUpDown **nudFrequency**
- System.Windows.Forms.NumericUpDown **nudNozzle**
- System.Windows.Forms.ComboBox **cbDropWatchHeadSelection**
- System.Windows.Forms.Label **label24**
- System.Windows.Forms.ComboBox **cbDropWatchMode**
- System.Windows.Forms.TabPage **ImageModeTab**
- System.Windows.Forms.NumericUpDown **nudSpan**
- System.Windows.Forms.Label **lbHeadIndex**
- System.Windows.Forms.Label **lbDropWatchingMode**
- System.Windows.Forms.Label **lbDropWatchingSpan**
- System.Windows.Forms.Label **lbDropWatchingNozzle**
- System.Windows.Forms.Button **btnFillCycleA**
- System.Windows.Forms.TableLayoutPanel **StatusTable**
- System.Windows.Forms.Label **lbCurrentTemperature**
- System.Windows.Forms.Label **lbSetTemperature**
- System.Windows.Forms.Label **lbHead**
- System.Windows.Forms.Label **lbSetVoltage**
- System.Windows.Forms.Label **label40**
- System.Windows.Forms.Label **label37**
- System.Windows.Forms.Label **label39**
- System.Windows.Forms.Label **label38**
- System.Windows.Forms.Label **lbHeadStatus**
- System.Windows.Forms.TextBox **txtbPrintCounter4**
- System.Windows.Forms.Label **lbPrintCount**
- System.Windows.Forms.TextBox **txtbPrintCounter1**
- System.Windows.Forms.TextBox **txtbPrintCounter2**
- System.Windows.Forms.TextBox **txtbPrintCounter3**
- System.Windows.Forms.Label **lbFrequency**
- System.Windows.Forms.PictureBox **pictureBox1**
- System.Windows.Forms.PictureBox **pictureBox4**
- System.Windows.Forms.PictureBox **pictureBox3**
- System.Windows.Forms.PictureBox **pictureBox2**
- System.Windows.Forms.Label **lbImageHead4**
- System.Windows.Forms.Label **lbImageHead3**
- System.Windows.Forms.Label **lbImageHead2**
- System.Windows.Forms.Label **lbImageHead1**
- System.Windows.Forms.OpenFileDialog **openFileDialog1**
- System.Windows.Forms.TextBox **txtbFileNameHead4**
- System.Windows.Forms.TextBox **txtbFileNameHead3**
- System.Windows.Forms.TextBox **txtbFileNameHead2**
- System.Windows.Forms.TextBox **txtbFileNameHead1**
- System.Windows.Forms.Label **lbFileNameHead4**
- System.Windows.Forms.Label **lbFileNameHead3**

- System.Windows.Forms.Label **lbFileNameHead2**
- System.Windows.Forms.Label **lbFileNameHead1**
- System.Windows.Forms.TextBox **txtbDimensionsHead4**
- System.Windows.Forms.Label **lbDimensionsHead4**
- System.Windows.Forms.TextBox **txtbDimensionsHead3**
- System.Windows.Forms.Label **lbDimensionsHead3**
- System.Windows.Forms.TextBox **txtbDimensionsHead2**
- System.Windows.Forms.Label **lbDimensionsHead2**
- System.Windows.Forms.TextBox **txtbDimensionsHead1**
- System.Windows.Forms.Label **lbDimensionsHead1**
- System.Windows.Forms.TextBox **txtbHeadStatus4**
- System.Windows.Forms.Label **lbDropWatchingFrequencyDuplicate**
- System.Windows.Forms.TextBox **txtbFrequencyDuplicate**
- System.Windows.Forms.Button **btnClearHead**
- System.Windows.Forms.Button **btnPrintImage**
- System.Windows.Forms.Button **btnCancel**
- System.Windows.Forms.Button **btnFillNozzle**
- System.Windows.Forms.Button **btnFillSpan**
- System.Windows.Forms.Label **lbImageMode**
- System.Windows.Forms.ComboBox **cbImageMode**
- System.Windows.Forms.TextBox **txtbHeadStatus**
- System.Windows.Forms.Label **lbDropWatchingFillCycle**
- System.Windows.Forms.Button **btnFillCycleC**
- System.Windows.Forms.Button **btnFillCycleB**
- System.Windows.Forms.GroupBox **FillCycleBox**
- System.Windows.Forms.Button **btnFillGap**
- System.Windows.Forms.NumericUpDown **nudGap**
- System.Windows.Forms.Label **lbDropWatchingGap**
- System.Windows.Forms.ToolTip **toolTip1**
- System.Windows.Forms.Button **btnFillHead**
- System.Windows.Forms.ComboBox **cbPDpolarity**
- System.Windows.Forms.Label **lbPDpolarity**
- System.Windows.Forms.ComboBox **cbEncoderTrackedPosition**
- System.Windows.Forms.Label **lbEncoderTrackedPosition**
- System.Windows.Forms.ComboBox **cdPDdirection**
- System.Windows.Forms.Label **lbPDdirection**
- System.Windows.Forms.CheckBox **chbxIsFillSpan**
- System.Windows.Forms.CheckBox **chbxIsFillGap**
- System.Windows.Forms.CheckBox **chbxIsFillHead**
- System.Windows.Forms.CheckBox **chbxIsFillNozzle**
- System.Windows.Forms.TextBox **txtbImageHeadStatus**
- System.Windows.Forms.TextBox **txtbCurrentEncoderPosition**
- System.Windows.Forms.Label **lbSetPosition**
- System.Windows.Forms.Label **lbCurrentEncoderPosition**
- System.Windows.Forms.NumericUpDown **nudSetPosition**
- System.Windows.Forms.TextBox **txtbCurrentStepperPosition**
- System.Windows.Forms.Label **lbCurrentStepperPosition**
- System.Windows.Forms.TextBox **txtbNozzleSpanStatusBox**

Static Private Attributes

- static SerialPort **driver_board**

7.1.1 Member Function Documentation

7.1.1.1 btnCancel_Click()

```
void DriverBoardDropwatcher.Form1.btnCancel_Click (
            object sender,
            EventArgs e )  [inline], [private]
```

Cancel Button Pushed.

This function is called when the "Cancel" button is pushed. This is to cancel all printing and clear all heads

Runs only if driver board is connected and powered on.

Parameters

sender	The object that contains the reference to the object that raised the event
e	The event data

7.1.1.2 btnClearHead_Click()

```
void DriverBoardDropwatcher.Form1.btnClearHead_Click (
            object sender,
            EventArgs e )  [inline], [private]
```

Clear Heads Push Button.

This function is called when "Clear Heads" button is pushed

It sends the relevent command to the driver board whilst unchecking all other relevent checkboxes to indicate that all heads are cleared.

Parameters

sender	The object that contains the reference to the object that raised the event
e	The event data

7.1.1.3 btnConnectDisconnect_Click()

```
void DriverBoardDropwatcher.Form1.btnConnectDisconnect_Click (
            object sender,
            EventArgs e )  [inline], [private]
```

Controls the Connect/Disconnect Toggle.

This function controls the connection state of the driver board and modifies the checkbox as checked if connected or unchecked if disconnected

Parameters

sender	The object that contains the reference to the object that raised the event
e	The event data

7.1.1.4 btnPrintImage_Click()

```
void DriverBoardDropwatcher.Form1.btnPrintImage_Click (
            object sender,
            EventArgs e )  [inline], [private]
```

Print Image.

This function is called when the Print Image Button is pressed.

Only runs if driver board is connected and powered on. Sends only the relevent images to print. For example, if images are uploaded to Head 1 and Head 3 and Head 2 and 4 are left blank, only Heads 1 and 3 will print.

Parameters

sender	The object that contains the reference to the object that raised the event
e	The event data

7.1.1.5 cbDropWatchHeadSelection_SelectedIndexChanged()

```
void DriverBoardDropwatcher.Form1.cbDropWatchHeadSelection_SelectedIndexChanged (
            object sender,
            EventArgs e )  [inline], [private]
```

Fetches User Selected Head from GUI.

This function is called when user modifies the head selection in the drop watching mode. Stores selected head in a variable called "activeDropModeHead".

Parameters

sender	The object that contains the reference to the object that raised the event
e	The event data

7.1.1.6 cbDropWatchMode_SelectedIndexChanged()

```
void DriverBoardDropwatcher.Form1.cbDropWatchMode_SelectedIndexChanged (
            object sender,
            EventArgs e )  [inline], [private]
```

Fetches User Selected Drop Watch Mode Selection from GUI.

This function is called when the Drop Watch Mode Seection is changed between Internal and External Modes. Stores user selected mode in a variable called "activeDropWatch" Only runs if driver board is connected

Parameters

sender	The object that contains the reference to the object that raised the event
e	The event data

7.1.1.7 cbSerialPort_DropDown()

```
void DriverBoardDropwatcher.Form1.cbSerialPort_DropDown (
            object sender,
            EventArgs e )  [inline], [private]
```

Detects Active Serial COM Ports from device.

This function searches and detects any available COM Ports available to open.

Parameters

sender	The object that contains the reference to the object that raised the event
e	The event data

7.1.1.8 cbSerialPort_SelectedIndexChanged()

```
void DriverBoardDropwatcher.Form1.cbSerialPort_SelectedIndexChanged (
            object sender,
            EventArgs e )  [inline], [private]
```

Detects Changes in Serial Ports.

This function runs when the Serial COM Port is changed.

Parameters

sender	The object that contains the reference to the object that raised the event
e	The event data

7.1.1.9 connect_board()

```
void DriverBoardDropwatcher.Form1.connect_board ( )  [inline], [private]
```

Connect Driver Board.

This function sends command to driver board to connect and checks the checkbox in the GUI. Only runs if a valid port is selected and is connected successfully to the driver board. If this fails to run, then an Error Dialog Box shows up.

7.1.1.10 convertImageToData()

```
void DriverBoardDropwatcher.Form1.convertImageToData (
            string file_name )  [inline], [private]
```

Convert Image to Data.

This function is called when the Image is ready to be converted into data in order to send it to the driver board.

Stores image as data in a file with an extension of ".printDat" in a Folder Called "Output Images" in Project Folder.

Parameters

file_name	This is the full path of where the file is stored in the system.

7.1.1.11 DataRecievedHandler()

```
void DriverBoardDropwatcher.Form1.DataRecievedHandler (
            object sender,
            SerialDataReceivedEventArgs e )  [inline], [private]
```

Processes data received from driver board.

This function reads the data received from the driver board. If the substring matches to the expected character, then the data is sent to parse. If this fails to run multipe times, then an Error Dialog Box shows up.

Parameters

sender	The object that contains the reference to the object that raised the event
e	The event data

7.1.1.12 DeleteAllFilesInFolder()

```
void DriverBoardDropwatcher.Form1.DeleteAllFilesInFolder (
            object sender,
            EventArgs e )  [inline], [private]
```

Delete all Images and Data Files from Folder.

This function is called when the user closes the application. THis is to delete all files stored in the "Output Images" folder created to save memory.

Parameters

sender	The object that contains the reference to the object that raised the event
e	The event data

7.1.1.13 determineStatus()

```
void DriverBoardDropwatcher.Form1.determineStatus ( )  [inline], [private]
```

Determine the Status of Voltages and Temperatures.

This function determines what state each Head is in and outputs the Voltage and Temperature Values to the GUI. Only runs if a valid port is selected and is connected and powered on successfully to the driver board.

7.1.1.14 disconnect_board()

```
void DriverBoardDropwatcher.Form1.disconnect_board ( )  [inline], [private]
```

Disconnect Driver Board.

This function sends command to driver board to disconnect and unchecks the checkbox in the GUI.

7.1.1.15 Dispose()

```
override void DriverBoardDropwatcher.Form1.Dispose (
            bool disposing )  [inline], [protected]
```

Clean up any resources being used.

Parameters

disposing	true if managed resources should be disposed; otherwise, false.

7.1.1.16 DropWatchingTab_Click()

```
void DriverBoardDropwatcher.Form1.DropWatchingTab_Click (
             object sender,
             EventArgs e )  [inline], [private]
```

Drop Watching Tab pressed.

This function is called when the user clicks anywhere withinthe drop watching tab

This will set focus onto the tab allowing for other functions to run such as right and left keys increasing and decreasing the nozzle value.

Parameters

sender	The object that contains the reference to the object that raised the event
e	The event data

7.1.1.17 DropWatchingTab_PreviewKeyDown()

```
void DriverBoardDropwatcher.Form1.DropWatchingTab_PreviewKeyDown (
             object sender,
             PreviewKeyDownEventArgs e )  [inline], [private]
```

Arrow Keys Pushed.

This function is called when the user presses down on an arrow key If right arrow key, then increase nozzle value by increments of 1 and send command to driver board. If left arrow key, then decrease nozzle value by increments of 1 and send command to driver board.

Parameters

sender	The object that contains the reference to the object that raised the event
e	The event data

7.1.1.18 EncoderTrackedPositionSelection_SelectedIndexChanged()

```
void DriverBoardDropwatcher.Form1.EncoderTrackedPositionSelection_SelectedIndexChanged (
             object sender,
             EventArgs e )  [inline], [private]
```

Encoder Position Selection Change.

This function is called when the user modifies the Encoer Position Mode

Sends relevent command to driver board if Encoder Position is changed between (Stepper Normal and Stepper Reverse)

Only runs if board is connected.

Parameters

sender	The object that contains the reference to the object that raised the event
e	The event data

7.1.1.19 FillCycle()

```
void DriverBoardDropwatcher.Form1.FillCycle (
            object sender,
            EventArgs e )  [inline], [private]
```

Fill Cycle Function.

This function is called by either Fill Cycle A,B or C.

Sends relevent commands in bytes to driver board in order to fill cycles.

Contains tags to identify which push button has been triggered.

Parameters

sender	The object that contains the reference to the object that raised the event
e	The event data

7.1.1.20 FillCycleA_Click()

```
void DriverBoardDropwatcher.Form1.FillCycleA_Click (
            object sender,
            EventArgs e )  [inline], [private]
```

Fill Cycle A Button Press.

This function is called Fill Cycle A Button is Pressed. Calls the Fill Cycle function.

Parameters

sender	The object that contains the reference to the object that raised the event
e	The event data

7.1.1.21 FillCycleB_Click()

```
void DriverBoardDropwatcher.Form1.FillCycleB_Click (
            object sender,
            EventArgs e )  [inline], [private]
```

Fill Cycle B Button Press.

This function is called Fill Cycle B Button is Pressed. Calls the Fill Cycle function.

Parameters

sender	The object that contains the reference to the object that raised the event
e	The event data

7.1.1.22 FillCycleC_Click()

```
void DriverBoardDropwatcher.Form1.FillCycleC_Click (
            object sender,
            EventArgs e )  [inline], [private]
```

Fill Cycle C Button Press.

This function is called Fill Cycle C Button is Pressed. Calls the Fill Cycle function.

Parameters

sender	The object that contains the reference to the object that raised the event
e	The event data

7.1.1.23 fillGap()

```
void DriverBoardDropwatcher.Form1.fillGap ( )  [inline], [private]
```

Fill Gap Function.

This function is called the Fill Gap Button is pressed

Prints in every nth nozzle gap.

Parameters

sender	The object that contains the reference to the object that raised the event
e	The event data

7.1.1.24 FillGapButton_Click()

```
void DriverBoardDropwatcher.Form1.FillGapButton_Click (
            object sender,
            EventArgs e )  [inline], [private]
```

Fill Gap Button.

This function is called the Fill Gap Button is pressed

Calls the FillGap() function

Parameters

sender	The object that contains the reference to the object that raised the event
e	The event data

7.1.1.25 fillHead_Click()

```
void DriverBoardDropwatcher.Form1.fillHead_Click (
            object sender,
            EventArgs e )  [inline], [private]
```

Fill Head Button Press.

This function is called when the "Fill Head" button is pushed.

Sends relevent command to driver board and sets other checkboxes to unchecked to indicate which mode is running.

Parameters

sender	The object that contains the reference to the object that raised the event
e	The event data

7.1.1.26 FillSingleNozzleButton_Click()

```
void DriverBoardDropwatcher.Form1.FillSingleNozzleButton_Click (
            object sender,
            EventArgs e )  [inline], [private]
```

Fill Nozzle Push Button.

This function is called when the "Fill Nozzle" button is pushed

It sends the relevent command to the driver board whilst checking the checkbox to show that it is running.

Parameters

sender	The object that contains the reference to the object that raised the event
e	The event data

7.1.1.27 FillSpanNozzleButton_Click()

```
void DriverBoardDropwatcher.Form1.FillSpanNozzleButton_Click (
             object sender,
             EventArgs e )  [inline], [private]
```

Fill Span Push Button.

This function is called when the "Fill Span" button is pushed

It sends the relevent command to the driver board whilst checking the checkbox to show that it is running.

Parameters

sender	The object that contains the reference to the object that raised the event
e	The event data

7.1.1.28 Form1_FormClosing()

```
void DriverBoardDropwatcher.Form1.Form1_FormClosing (
             object sender,
             FormClosingEventArgs e )  [inline], [private]
```

Saves all data when closing application.

This function is called when the User presses the close button

It stores all the user modified values/data and stores it ready to load up the next time the user opens it. This is to make everything more convenient for the user the next time they use this application instead of re-selecting all relevent options.

Parameters

sender	The object that contains the reference to the object that raised the event
e	The event data

7.1.1.29 Form1_Load()

```
void DriverBoardDropwatcher.Form1.Form1_Load (
             object sender,
             EventArgs e )  [inline], [private]
```

Loads all data when opening application.

This function is called when the user starts application

It loads all stored values/data from the last session. This is to make everything more convenient for the user saving repetitive actions.

Parameters

sender	The object that contains the reference to the object that raised the event
e	The event data

7.1.1.30 frequencyChange()

```
void DriverBoardDropwatcher.Form1.frequencyChange (
             object sender,
             EventArgs e )  [inline], [private]
```

Fetches Frequency Data from GUI.

This function runs when the Frequency Value is changed in the GUI so the new value is updated on the board. Only runs if driver board is connected and is powered on.

Uses tags to find relevent Numeric Up Downs and Labels in GUI.

Parameters

sender	The object that contains the reference to the object that raised the event
e	The event data

7.1.1.31 GapValue_ValueChanged()

```
void DriverBoardDropwatcher.Form1.GapValue_ValueChanged (
             object sender,
             EventArgs e )  [inline], [private]
```

Gap Value Modified.

This function is called the Gap Value Numeric Up Down Box is modified.

Stores new value in variable called "activeGapValue"

Parameters

sender	The object that contains the reference to the object that raised the event
e	The event data

7.1.1.32 ImageBoxClicked()

```
void DriverBoardDropwatcher.Form1.ImageBoxClicked (
            object sender,
            EventArgs e )  [inline], [private]
```

Image Box Selection in Image Mode.

This function is called when user presses the picture box in GUI to upload image

Opens up file dialog and filters it out to only allow upload of image files. Clones the image and saves it into a folder called "Output Images" in the .png format

Uses tags to find relevent Picture Boxes (1-4).

Parameters

sender	The object that contains the reference to the object that raised the event
e	The event data

7.1.1.33 ImageModeSelection_SelectedIndexChanged()

```
void DriverBoardDropwatcher.Form1.ImageModeSelection_SelectedIndexChanged (
            object sender,
            EventArgs e )  [inline], [private]
```

Runs if Image Mode Selection is Modified.

This function is user modified the image mode selection in GUI.

It stores the image mode into a variable called "activeImageMode" This function greys out other irrelevent combo box. For example, when Stepper Motor Mode is selected, the PD Polarity Settings are greyed out as they are irrelevent in this mode.

Parameters

sender	The object that contains the reference to the object that raised the event
e	The event data

7.1.1.34 MakeGrayscale3()

```
static Bitmap DriverBoardDropwatcher.Form1.MakeGrayscale3 (
            Bitmap original )  [inline], [static]
```

Grey Scale Image Function.

This function grey scales any image passed to it

Parameters

original	Original Image (Coloured)

Returns

Grey-Scaled Image in Bitmap format

7.1.1.35 NozzleValue_ValueChanged()

```
void DriverBoardDropwatcher.Form1.NozzleValue_ValueChanged (
            object sender,
            EventArgs e )  [inline], [private]
```

Nozzle Value Modified in GUI.

This function is called when user changed value of the Nozzle (Numeric Up Down)

If span value + nozzle value is greater than 128, then a warning message will pop up automatically rectifying the error in the numeric up down.

Parameters

sender	The object that contains the reference to the object that raised the event
e	The event data

7.1.1.36 nudSetPosition_ValueChanged()

```
void DriverBoardDropwatcher.Form1.nudSetPosition_ValueChanged (
            object sender,
            EventArgs e )  [inline], [private]
```

Sets the Position of Print Head for Image Printing.

Function is called when user modifies value in numeric up down

Calls the SetPosition function.

Parameters

sender	The object that contains the reference to the object that raised the event
e	The event data

7.1.1.37 parseJsonData()

```
void DriverBoardDropwatcher.Form1.parseJsonData (
            string input_string )  [inline], [private]
```

Parse the JSON Data.

This function parses the data received from the driver board. Stores data such as Voltage, Temperature and Print Count into variables that can be called later

Parameters

input_string	The Data Lines received from the driver board in JSON Format

7.1.1.38 PD_Polarity_SelectedIndexChanged()

```
void DriverBoardDropwatcher.Form1.PD_Polarity_SelectedIndexChanged (
            object sender,
            EventArgs e )  [inline], [private]
```

PD Polarity Mode Selection.

This function is called when the PD Polarity Mode is changed.

Stores active mode in variable called "activePD_Polarity" Sends relevent command to driver board. Only runs if driver baord is connected.

Parameters

sender	The object that contains the reference to the object that raised the event
e	The event data

7.1.1.39 pdDirection_SelectedIndexChanged()

```
void DriverBoardDropwatcher.Form1.pdDirection_SelectedIndexChanged (
            object sender,
            EventArgs e )  [inline], [private]
```

PD Direction Selection Change.

This function is called when the user modifes the PD Direction Setting Sends relevent command to driver board depending on which mode they have selected (continuous or single)

Parameters

sender	The object that contains the reference to the object that raised the event
e	The event data

7.1.1.40 pictureBox1_Click()

```
void DriverBoardDropwatcher.Form1.pictureBox1_Click (
            object sender,
            EventArgs e )  [inline], [private]
```

Picture Box 1 is pressed.

This function calls the ImageBoxClicked function when Head 1 Image is modified

Parameters

sender	The object that contains the reference to the object that raised the event
e	The event data

7.1.1.41 pictureBox2_Click()

```
void DriverBoardDropwatcher.Form1.pictureBox2_Click (
            object sender,
            EventArgs e )  [inline], [private]
```

Picture Box 2 is pressed.

This function calls the ImageBoxClicked function when Head 2 Image is modified

Parameters

sender	The object that contains the reference to the object that raised the event
e	The event data

7.1.1.42 pictureBox3_Click()

```
void DriverBoardDropwatcher.Form1.pictureBox3_Click (
            object sender,
            EventArgs e )  [inline], [private]
```

Picture Box 3 is pressed.

This function calls the ImageBoxClicked function when Head 3 Image is modified

Parameters

sender	The object that contains the reference to the object that raised the event
e	The event data

7.1.1.43 pictureBox4_Click()

```
void DriverBoardDropwatcher.Form1.pictureBox4_Click (
            object sender,
            EventArgs e )  [inline], [private]
```

Picture Box 4 is pressed.

This function calls the ImageBoxClicked function when Head 4 Image is modified

Parameters

sender	The object that contains the reference to the object that raised the event
e	The event data

7.1.1.44 powerOff()

```
void DriverBoardDropwatcher.Form1.powerOff ( )  [inline], [private]
```

Power Off Function.

This function is called when the toggle mode is set to Power Off

Sends command to driver board.

Parameters

sender	The object that contains the reference to the object that raised the event
e	The event data

7.1.1.45 powerOn()

```
void DriverBoardDropwatcher.Form1.powerOn ( )  [inline], [private]
```

Power On Function.

This function sends the command to turn on the driver board. Only runs if correct COM Port is selected.

7.1.1.46 powerOnOff_Click()

```
void DriverBoardDropwatcher.Form1.powerOnOff_Click (
            object sender,
            EventArgs e )  [inline], [private]
```

Controls the Power On/Off Toggle.

This function controls the power state of the driver board and modifies the checkbox as checked if powered on or unchecked if powered off.

Parameters

sender	The object that contains the reference to the object that raised the event
e	The event data

7.1.1.47 PrintingImage()

```
void DriverBoardDropwatcher.Form1.PrintingImage (
            int head )  [inline], [private]
```

Printing Image Function.

This function sends the relevent command with the relevent print head to the driver board.

Read the image data file and stores it in an array ready to send in bytes.

Parameters

head	The Active Head with the Image Loaded onto it.

7.1.1.48 reset_Click()

```
void DriverBoardDropwatcher.Form1.reset_Click (
            object sender,
            EventArgs e )  [inline], [private]
```

Reset Board Button.

This function is called when user presses Reset Board Button in GUI Only runs if driver board is connected Sends relevent command to the driver board to reset it.

Parameters

sender	The object that contains the reference to the object that raised the event
e	The event data

7.1.1.49 SetPosition()

```
void DriverBoardDropwatcher.Form1.SetPosition (
            object sender,
            EventArgs e )  [inline], [private]
```

Sets the Position of Print Head for Image Printing.

Function is called when user enters value into Set Position Numeric Up Down

Sends relevent command to the driver board.

Parameters

sender	The object that contains the reference to the object that raised the event
e	The event data

7.1.1.50 SpanValue_ValueChanged()

```
void DriverBoardDropwatcher.Form1.SpanValue_ValueChanged (
            object sender,
            EventArgs e )  [inline], [private]
```

Span Value Modified in GUI.

This function is called when user changed value of the Span (Numeric Up Down)

If span value + nozzle value is greater than 128, then a warning message will pop up automatically rectifying the error in the numeric up down.

Parameters

sender	The object that contains the reference to the object that raised the event
e	The event data

7.1.1.51 tcDropWatchingAndImageModes_SelectedIndexChanged()

```
void DriverBoardDropwatcher.Form1.tcDropWatchingAndImageModes_SelectedIndexChanged (
            object sender,
            EventArgs e )  [inline], [private]
```

Mode Selection.

This function is called when the user switches between Drop Watching Mode and Image Mode

Parameters

sender	The object that contains the reference to the object that raised the event
e	The event data

7.1.1.52 temperature_ValueChanged()

```
void DriverBoardDropwatcher.Form1.temperature_ValueChanged (
             object sender,
             EventArgs e )  [inline], [private]
```

Fetches Temperature Data from GUI.

This function reads data parsed from driverboard and outputs the required variables into the GUI. Only runs if driver board is connected

Uses tags to find relevent Numeric Up Downs and Labels in GUI.

Parameters

sender	The object that contains the reference to the object that raised the event
e	The event data

7.1.1.53 ThreadTask()

```
void DriverBoardDropwatcher.Form1.ThreadTask ( )  [inline], [private]
```

A Thread Task Function.

This function constantly runs in the background to ensure the board is connected at all times. It sends the command 'b' to receive relevent information such as voltage, temperature etc If this fails to run, then Error Message Box pops up signalling an error.

7.1.1.54 VerifyImageData()

```
void DriverBoardDropwatcher.Form1.VerifyImageData (
             int head,
             string existing_lines )  [inline], [private]
```

Picture Box 2.

This function calls the ImageBoxClicked function when Head 2 Image is modified

Parameters

sender	The object that contains the reference to the object that raised the event
e	The event data

7.1.1.55 voltage_ValueChanged()

```
void DriverBoardDropwatcher.Form1.voltage_ValueChanged (
             object sender,
             EventArgs e )  [inline], [private]
```

Fetches Voltage Data from GUI.

This function reads data parsed from driverboard and outputs the required variables into the GUI. Only runs if driver board is connected

Uses tags to find relevent Numeric Up Downs and Labels in GUI.

Parameters

sender	The object that contains the reference to the object that raised the event
e	The event data

7.1.2 Member Data Documentation

7.1.2.1 ofd

```
OpenFileDialog DriverBoardDropwatcher.Form1.ofd  [private]
```

Creates an OpenFileDialog variable called ofd

The documentation for this class was generated from the following files:

- Form1.cs
- Form1.Designer.cs

Chapter 8

File Documentation

8.1 Form1.cs File Reference

This C# Code contains the Source Code for the Driver Board Dropwatcher Application.

Classes

- class DriverBoardDropwatcher.Form1

Functions

- **[instance initializer]**

Variables

- $ **v**
- $ **T**
- $ **p**
- $ **n**
- $ **N**
- $ **l**

8.1.1 Detailed Description

This C# Code contains the Source Code for the Driver Board Dropwatcher Application.

Author

Added Scientific Limited (Kajeban Baskaran Internship Work)