

DIP Server Setup Instructions

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DIP Server Configuration

In the eventuality that the CMSTIFGAS PC needs to be restarted or re-configured, the following steps describe in detail how to set up FlowPlot, FlowView, FlowDEE2 and the DIP Server as they were originally, to continuously read data from the gas mixer and send it through the server.

Steps:

1. After restarting the CMSTIFGAS PC, login as `cmsgemhw` using the relevant password.
2. FlowPlot, FlowView and FlowDEE2 should automatically start, as they're part of the startup programs in MSCONFIG. In case they don't, they can be found by searching their names via the start menu, on the Desktop as shortcuts, or else by finding their application path at `C:\Program Files\Bronkhorst`, and starting them individually.

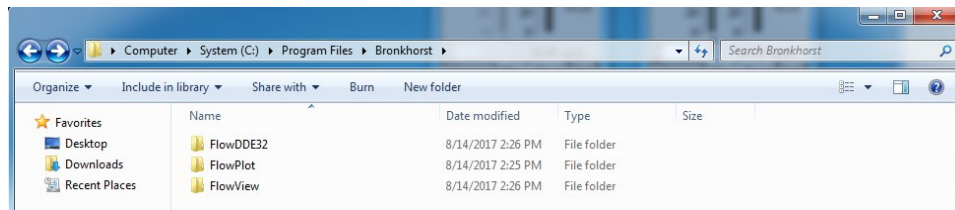


Figure 1: Path and view of the three programs

If necessary, then can be added to the startup programs by creating shortcuts of each of the three applications, and adding them to the startup folder:

- (a) Click on one of the three applications.
- (b) Right-click and select **Create Shortcut** from the drop down menu
- (c) Repeat for the other two programs

- (d) Start Menu → All Programs → Scroll down till you find **Startup** folder
- (e) Right-click on **Startup** folder → Explore
- (f) Drag and drop the program's shortcuts to this **Startup** folder
- (g) **Start Menu** → Type **msconfig** → **Startup** tab → Make sure the relevant programs are enabled as startup items.

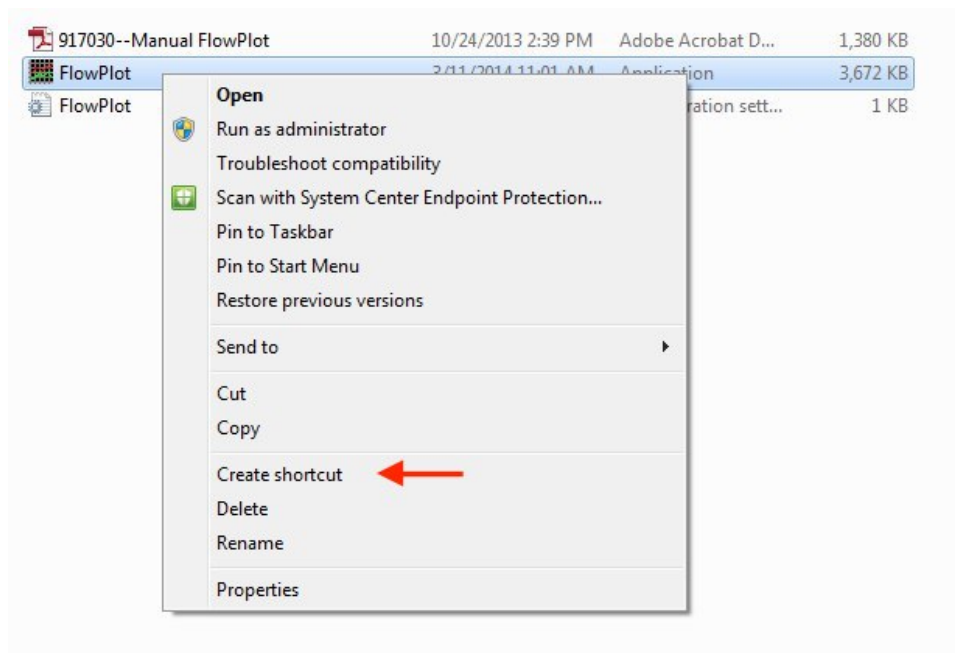


Figure 2: Creating shortcut

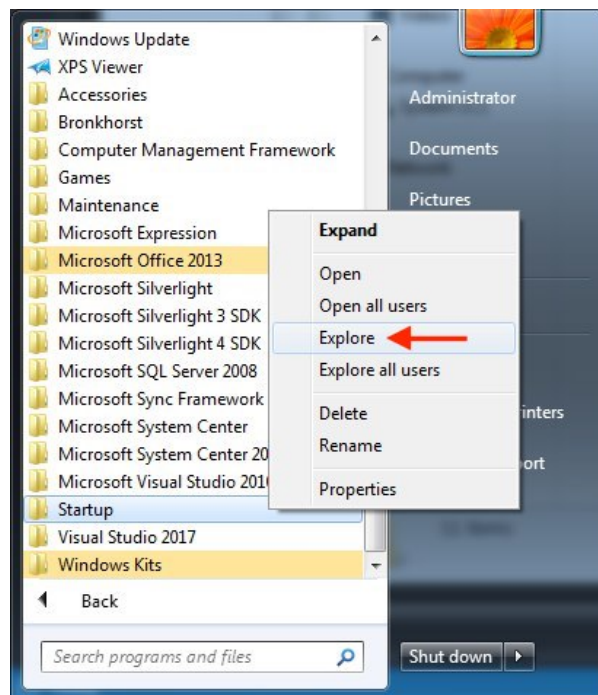


Figure 3: Opening Startup folder

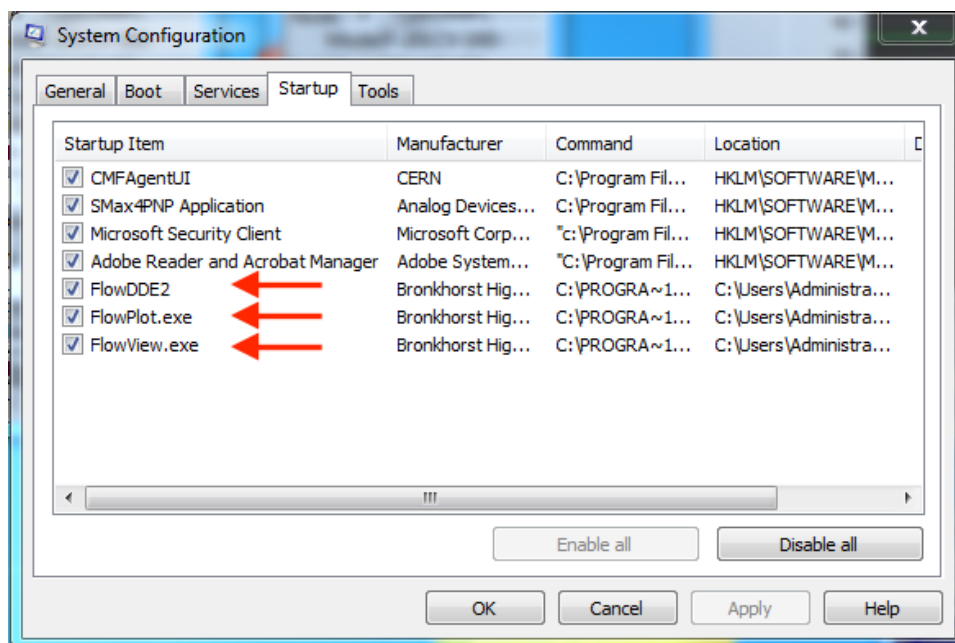


Figure 4: MSCONFIG

3. Use FlowDDE2 to open communication with the FlowDDE server:

(a) Menu → Communication → Open communication

This opens the communications and allows the other programs such as FlowView and FlowPlot to interact with the incoming data relating to the gas mixture.

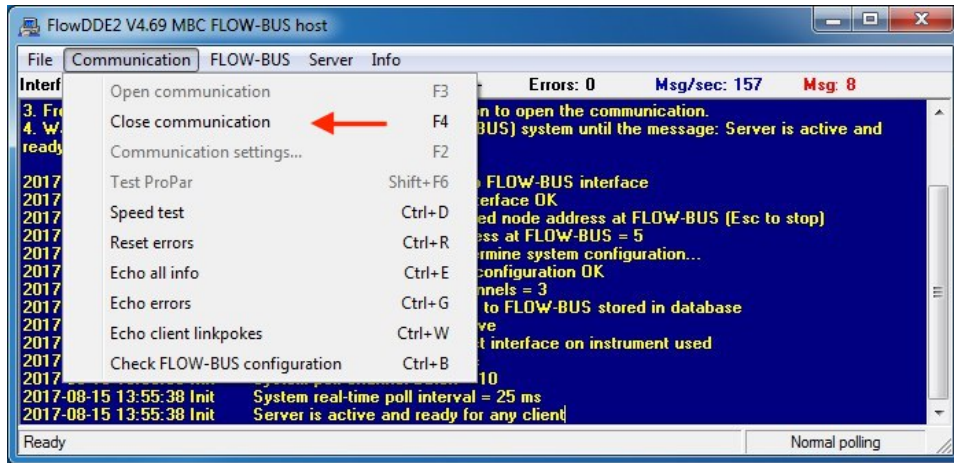


Figure 5: Communication → Open communication

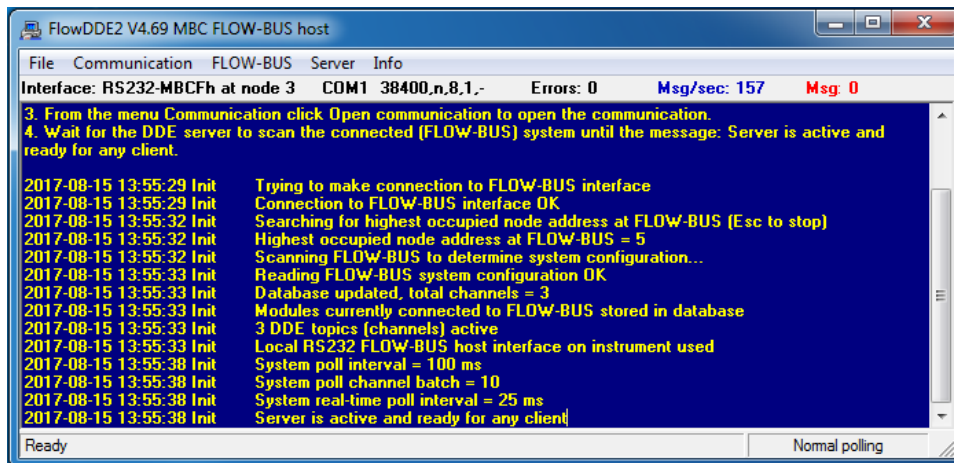


Figure 6: After opening communications

4. Use **FlowView** to view information about both channels. To do this, we need to open a new **FlowView** window to see the second gas channel:
 - (a) Press New on the open window to open another channel
 - i. Increment the channel by 1 to 2 by clicking on the > button
 - ii. Wait a few seconds till the second gas values are displayed
 - (b) Press the Advanced button on both windows to get a detailed view

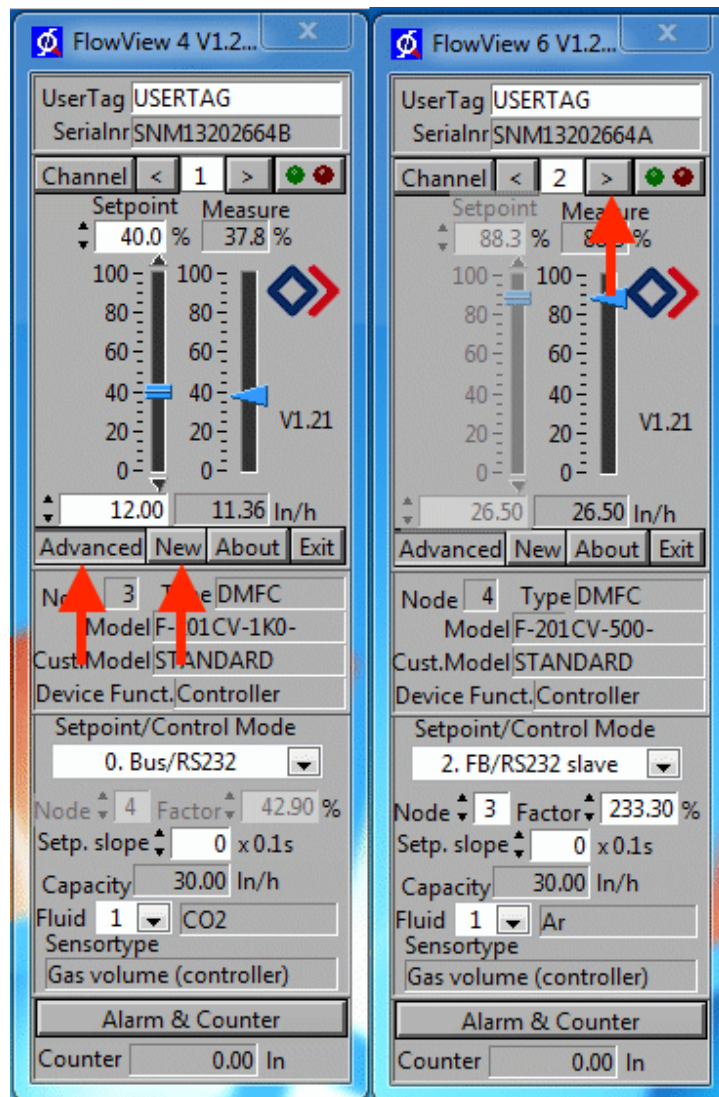


Figure 7: Configured Channels 1 and 2

5. Use FlowPlot to finally plot the graph according the gas mixture's values:
 - (a) Menu → Extra → Select Parameters:
 - i. Press Add to add a new channel
 - ii. Make sure the number selected in channel under Edit selected plot line corresponds to the channel number chosen in FlowView, in our case 2
 - iii. Remove any other plot lines, such as 2: Setpoint and 3: Valve out. Only the two gas percentage measures should be shown
 - iv. Change the color of one of the two plot lines to differentiate the two gases.
 - (b) Menu → Extra → Options → Plot settings, choose an adequate graph update value. 60000 ms should be appropriate
 - (c) Menu → Extra → Options → File locations
 - i. Check data is being saved to a .txt file and **note the path***
 - ii. Tick the Save plot data to spreadsheet file box
 - (d) Press Start on the main window to start plotting the data
 - (e) Check in Windows Explorer that the .txt file is indeed being written on the path shown in options. The number of lines will depend on the chosen graph update value. The 4 columns correspond to: Time; Channel 1 Gas % FSR; Time; Channel 2 Gas % FSR.

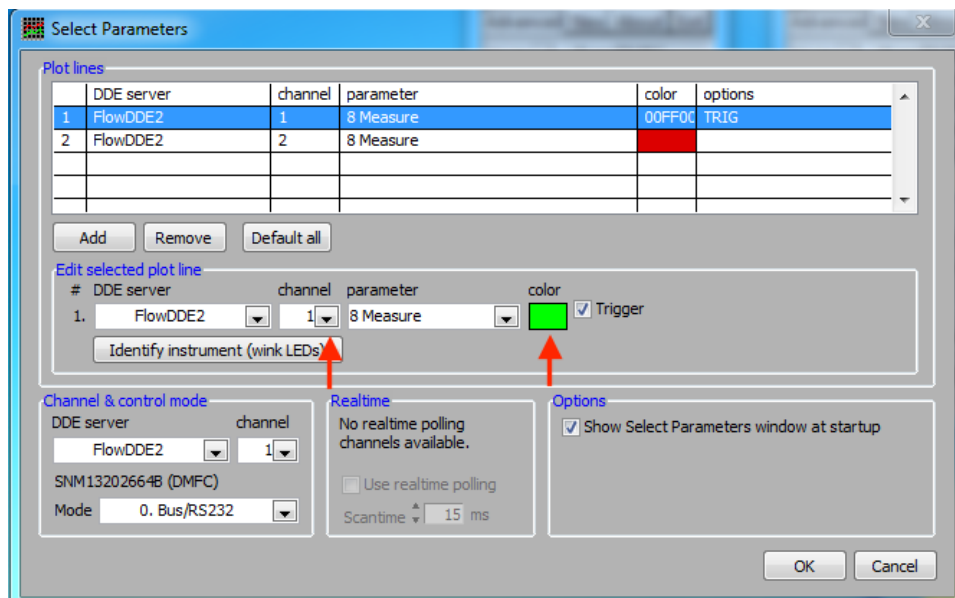


Figure 8: Configured Parameters

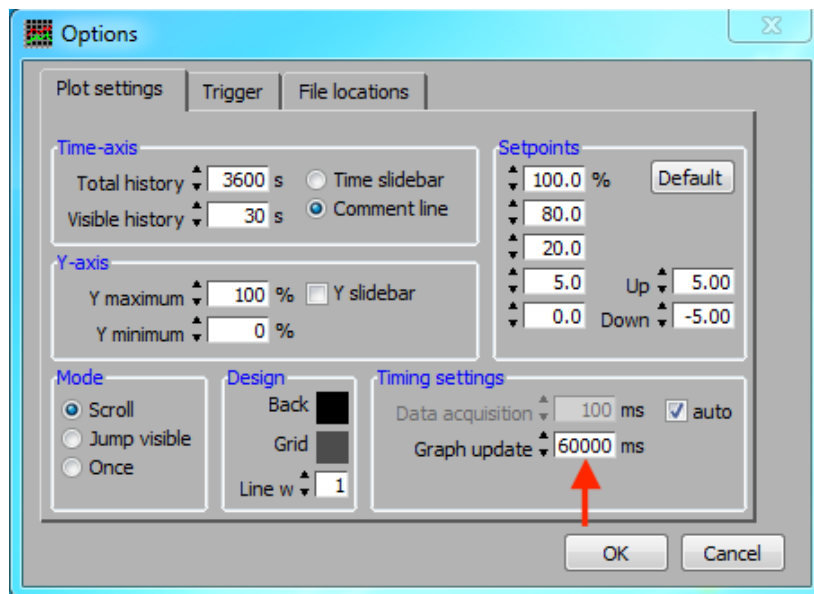


Figure 9: Plot Settings

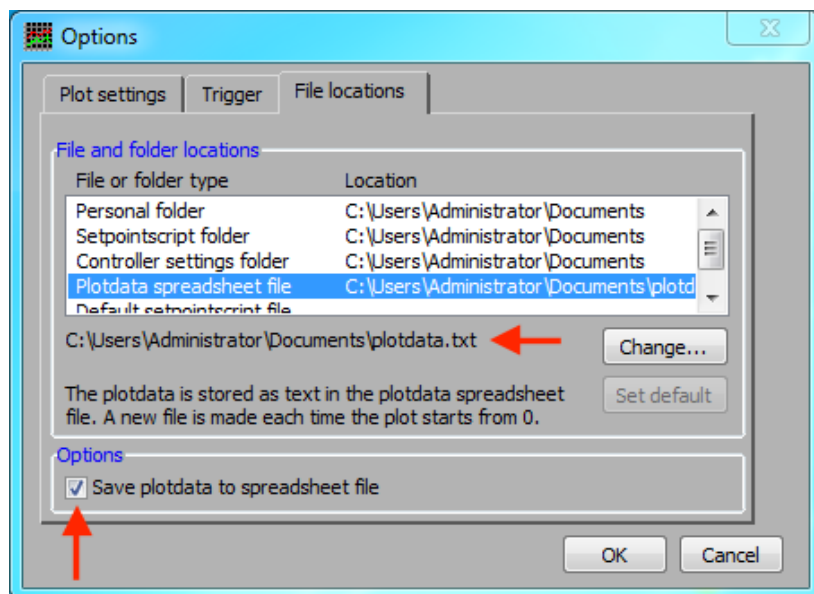


Figure 10: File locations

* Currently saved at `C:/Windows/DIPServer/PlotData`. This can be arbitrary, but is later required in the Microsoft Visual Studio project's properties as an argument. The sample path given above contains other previous .txt files, and it so would be best to continue to save them there.

6. Log all the various changes:

All activities on this PC need to be recorded. In the event of a failure or other occurrence, the steps taken prior are vital to understanding the cause of the incident. To do this, one needs a CMS Online account and proceed as following:

- Go to <https://cmsonline.cern.ch>
- Common → Elog → Subsystems → GEM → Quality Control → X-ray Station → Click on New above the previous e-logs
- Write the e-log describing in detail all the partaken activities on the PC.
- Press **Submit**

The screenshot shows the CMS Online interface. The top navigation bar includes the CMS logo, 'Accelerating science', and user information (Signed in as: Eklavya Sarkar). The sidebar on the left contains a 'Common' menu with links to DAQ, DCS, Event display, DSS, GAS, Elog (highlighted with a red arrow), Shiftlist, Storage manager, Firmware repository, ACT, and CMS visits. The main content area displays the 'Cosmic Stand' page, showing a list of e-logs. The 'New' button is highlighted with a red arrow. The table of e-logs has columns for Author, Subject, Shift Type, and Date.

Author	Subject	Shift Type	Date
BRIAN L DORNEY	Found PMT B51 in Trip	HV problem	MON 04.SEP.17 11:51:40
BRIAN L DORNEY	Taking Control of Stand for SW Development	System status	MON 04.SEP.17 10:54:28
BRIAN L DORNEY	Taking Stand for SW Development	System status	FRI 01.SEP.17 17:27:52
BRIAN L DORNEY	Investigating FW Reset Behavior of Scan Module	System status	FRI 01.SEP.17 15:40:04
BRIAN L DORNEY	Starting New Eff Curve w/RTbump=0	Run Summary	THU 31.AUG.17 21:45:34
BRIAN L DORNEY	Cannot Connect to CAEN Mainframe [SOLVED]	HV problem	WED 30.AUG.17 21:27:35
BRIAN L DORNEY	Taking Cosmic Stand for Measurements	System status	TUE 29.AUG.17 09:44:07
BRIAN L DORNEY	Re: Taking Cosmic Stand for Measurements	System status	TUE 29.AUG.17 18:26:19
BRIAN L DORNEY	Re: Taking Cosmic Stand for Measurements	System status	WED 30.AUG.17 08:19:32
BRIAN L DORNEY	Re: Taking Cosmic Stand for Measurements	System status	THU 31.AUG.17 08:22:27
BRIAN L DORNEY	Re: Taking Cosmic Stand for Measurements	System status	THU 31.AUG.17 15:43:20
BRIAN L DORNEY	Trimming on Cosmic Stand	Run Summary	MON 28.AUG.17 17:33:40
BRIAN L DORNEY	Taking Cosmic Stand for Eff Measurements	System status	MON 28.AUG.17 16:10:02
LOUIS JEAN MOURAUX	Testing trimChamber.py with built-in threshold scan	System status	FRI 25.AUG.17 11:39:19
LOUIS JEAN MOURAUX	Re: Testing trimChamber.py with built-in threshold scan	System status	MON 28.AUG.17 15:16:35
LOUIS JEAN MOURAUX	Testing trimChamber.py with built-in threshold scan	System status	THU 24.AUG.17 18:14:53
LOUIS JEAN MOURAUX	Proving that bur #24 is solved	Analysis report	THU 24.AUG.17 15:48:53
LOUIS JEAN MOURAUX	Testing trimChamber.py with built-in threshold scan	System status	WED 23.AUG.17 15:09:32
LOUIS JEAN MOURAUX	Taking over for sw development	System status	WED 23.AUG.17 12:40:37
LOUIS JEAN MOURAUX	Taking Stand for SW Development	System status	WED 23.AUG.17 11:05:12
BRIAN L DORNEY	Powering Off GE1/1-VI-L-CERN-0001	Hardware activity	TUE 22.AUG.17 18:09:54
BRIAN L DORNEY	Running Calibration Scans on Stand	Run Summary	MON 21.AUG.17 17:28:43
NELSON VANEGAS ARBELAEZ	Re: Running Calibration Scans on Stand	System status	WED 23.AUG.17 15:23:19
BRIAN L DORNEY	Re: Running Calibration Scans on Stand	System status	TUE 22.AUG.17 18:21:41
NELSON VANEGAS ARBELAEZ	Re: Running Calibration Scans on Stand	System status	THU 24.AUG.17 14:38:07

Figure 11: Sample E-log page

Starting the DIP server:

First, make sure the mixer is getting correct data. Then double click on the DIP Mixer Server shortcut on the Desktop (currently at the top right corner) to open the Microsoft Visual Studio 2015 project that contains the source code to run the DIP Server. Alternatively go to source path of the project:

```
\\cern.ch\dfs\Users\c\msgmh\documents\visual studio 2015\Projects\
DIPMixerServer
```

And there open DIPMixerServer.sln

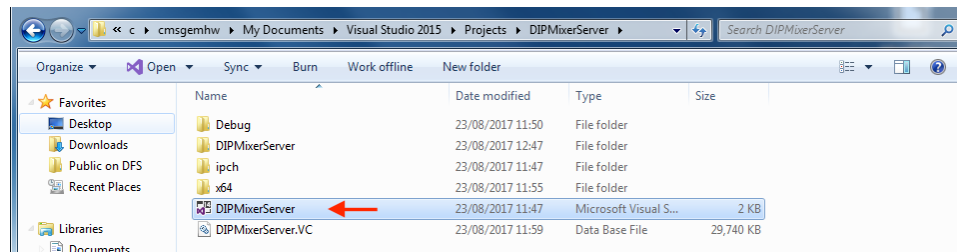


Figure 12: Project Source File Location

Before running the project, make sure the **source file argument provided** (eg: `C:/DIPServer/PlotData/plotdata20170823151118.txt`) in the project properties is **correct** and **the current one** to which data is being actively written by FlowPlot. The provided path in the properties is saved, and doesn't need to be re-configured every time, unless there source path is changed. If required:

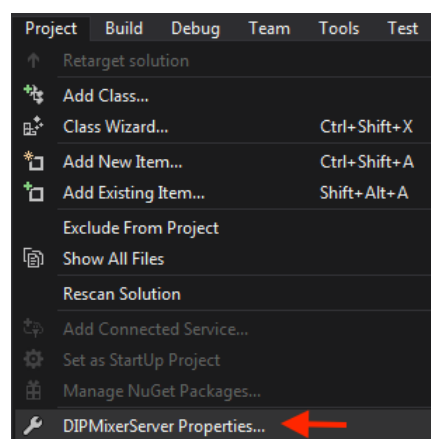


Figure 13: Project Properties Menu

Menu → Project → Project Properties → Debugging → Command Arguments → Add <source path>.

The following remaining steps need to be done only **once**, when first setting up the Microsoft Visual Studio project. If the settings have not been changed or else if the PC has simply been restarted, these steps can be **skipped**, as the project properties are saved. If setting up for the first time, ensure that all of these are properly set up:

Make sure to have downloaded the DIP API folder and unzipped in the a path which we will call **DIP_FOLDER** (currently it should be already present unzipped at **C:/Windows/DIPServer/dip-5.6.0**).

In order to run the project executable without runtime errors, you need to copy the following files from the **DIP_FOLDER** folder into the same path as the executable of the project, eg:

```
\\cern.ch\dfs\Users\c\cmsgemhw\documents\visual studio 2015\Projects\
DIPMixerServer\x64\Debug:
```

- log4cplus.dll
- dip-shared-5.6.0.dll

The **log4cplus.properties** also file needs to be copied from **DIP_FOLDER**, but to:

```
\\cern.ch\dfs\Users\c\cmsgemhw\documents\visual studio 2015\Projects\
DIPMixerServer\DIPMixerServer
```

Else the console outputs DIP API Logging not configured, cannot access 'log4cplus.properties'.

Furthermore, several other properties must be correctly configured, such as:

1. Menu → Project → Project Properties → Configuration Manager → x64
2. Configuration Properties → VC++ Directories → Include Directories → add **DIP_FOLDER\include**; at the start, eg:

```
DIP_FOLDER\include;$(IncludePath);$(VCInstallDir)include;$(VCInstallDir)
atlmfc\include;$(WindowsSdkDir)include;$(FrameworkSDKDir)\include;
```

3. Configuration Properties → C/C++ → Preprocessor → Preprocessor Definitions → Set to WIN32;%(PreprocessorDefinitions)

4. Configuration Properties → C/C++ → Code Generation → Runtime Library → Multi-threaded DLL (\MD)
5. Configuration Properties → Linker → General → Additional Library Directories → `DIP_FOLDER\lib64;%`(AdditionalLibraryDirectories)
6. Configuration Properties → Linker → Input → Additional Dependencies → add `dip-shared-5.6.0.lib;%`(AdditionalDependencies); at the start, eg:

```
dip-shared-5.6.0.lib;%(AdditionalDependencies);kernel32.lib;
user32.lib;gdi32.lib;winspool.lib;comdlg32.lib;advapi32.lib;
shell32.lib;ole32.lib;oleaut32.lib;uuid.lib;odbc32.lib;odbccp32.
lib;%(AdditionalDependencies)
```

Once the all these dependencies and libraries have been properly configured, compile and run the project by choosing so in the menu, pressing F5 or by pressing the green run arrow.

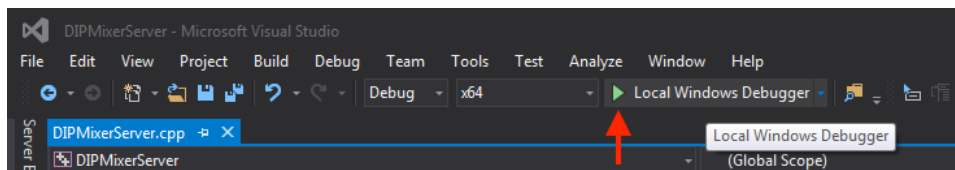


Figure 14: Build and Compile

The solution should build and the executable should run without any issues. As long as the executable is running, the data is visible on the receiving end.

Flow of Data:

Essentially, this whole project is an operation of several consecutive events. To summarise, first the **FlowDEE2** program gets data from the mixer via the RS-232 cable connected to the **CMS904DAQ** PC. These values are shown on the **FlowView** windows, and are used by **FlowPlot** to plot them on graphs and write the data values on the `plotdata.txt` file.

When compiling the project, the C++ source code reads the entire `plotdata.txt` file from start till end, removes the semi-colons separating the values and replaces them with a whitespace, and then pushes the **last** line's values to the DIP Server using the insert command, before going to 'sleep' for the hardcoded value of **60000 ms**. It then restarts the cycle, as the `.txt` file has been meanwhile updated, and gets the new last line, and again pushes the values to the DIP Server.

The insert command can only be run through the DIP API, which is why all these properties settings have to be set up. It's important to note that the latest DIP API only runs on a **64-bit** OS. Trying to compile from a **32-bit** machine with the current API will give messy errors. In case of other issues, advice can be solicited from Brice Copy, the person in charge of the DIP software at `brice.copy@cern.ch`.