



4D Systems

Application Note: 4D-AN-1003

Downloading a 4DGL Application Program to FLASH or RAM

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Description

This Application Note is dedicated to explaining the difference between downloading a user 4DGL program to the FLASH or RAM section on a 4D processor. In order to carry out this Application, the following items are required;

- Any 4D GFX Screen Module
 - 4D Programming Cable
 - 4DWorkshop3 IDE Software Tool
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Application Overview

When programming any one of the 4D screens with a 4DGL application program, the user has a choice between two destinations; RAM or FLASH. This application note is dedicated to explaining the differences between the two and why the user would choose one over the other.



Setup Procedure

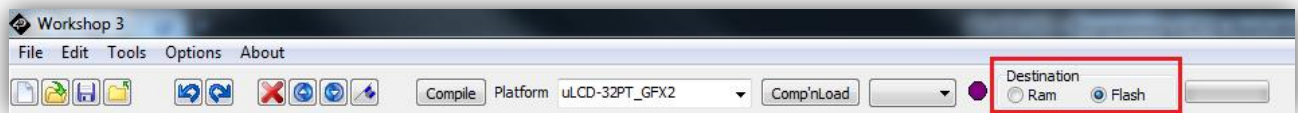
Firstly, you will need to download the 4DWorkshop3 IDE environment. This is where the end user application is developed and can be found from the 4D Systems website below:

<http://www.4dsystems.com.au/prod.php?id=111>

Simulation Procedure

4DWorkshop3 IDE Programming Panel

When it comes to programming a 4D screen module, the user is presented with one of two options in the upper right hand portion of the screen; RAM or FLASH.



Overview of FLASH and RAM

A critical feature to highlight is that programs run faster when stored in RAM. For this reason, even if the user downloads the application to FLASH, when the program executes, it will be copied to the RAM and executed from there. This is the default setting. If the user wishes for the program be run from FLASH, it will have to be specified explicitly in the application firmware using the following pragma directive:

```
#MODE RUNFLASH
```

Effects of Programming to FLASH or RAM

When developing an application, it is best to download the firmware straight to RAM. This will be much quicker and changes can be updated more promptly. However, it should be noted that if the device is unplugged after programming to RAM, then the application will be lost when the device is powered up again. If the application is to be retained, then the firmware must be downloaded to FLASH. It should be noted that this only applies for PICASO based modules. The only and default option for GOLDELOX is FLASH.

When to Program to RAM

When an application is finalised, it is then that the firmware should be placed on the FLASH.

FLASH Life Cycle Time

A minor note to mention is that a FLASH device typically has a life cycle time. What this means, is that the FLASH device can only be written to a finite number of times. This figure extends beyond tens of thousands of times and should not be considered a concern.

Allocation Size of FLASH and RAM

On the PICASO chips, there is 14KB of FLASH and 14KB of RAM. In essence, there are equal portions of memory space reserved for the user application in both destinations.

On the GOLDELOX chips, there is 10KB of FLASH and 510Bytes of RAM. However, when developing for a GOLDELOX platform, the only option is to download code to FLASH. There is no option for RAM.

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