



Intel[®] Modes Program

Users' Guide

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Revision 0.5



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Revision History

Revision Number	Description	Revision Date
0.1	• Initial release.	January 2011

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1 Introduction

This document is intended to assist any user familiar with the platform capabilities of the Oak Trail platform to operate the OEM Modes Program (OMP) to generate mode information for the given platform configuration.

The target audience for this paper is anyone interested in the expected modes for Oak Trail integrated graphics platform. The target audience is intended for, but not limited to:

- OEMs
- Software Engineers
- Marketing

1.1 Terminology

Term	Description
OMP	OEM Modes Program
HWVLD	Hardware Variable Length Decode
SWVLD	Software Variable Length Decode
GMCH	Graphics Memory Controller Hub
ISOCH	Isochronous Transfer
PRD	Product Requirements Document

1.2 Reference Documents

Document	Document No./Location
Modes Program Users Guide 0.71	

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2 OEM Modes Program

2.1 Overview

With the growing complexity of integrated graphics and display capabilities, it is no longer feasible to maintain a static table of modes supported in a given Graphics Software Product Requirements Document. Therefore the modes available for a platform are being defined by two criterions:

1. The software algorithm for enabling display modes which is outside the scope of this document. Contact your local Intel representative for more details.
2. Possible hardware and memory bandwidth limitations of the given platform.

The OEM Modes Program was created to evaluate possible modes based on the hardware and platform capabilities of a given configuration. By using this tool, the operator will be able to determine the level of support available for a specified set of modes using the input platform settings. These features will be outlined in the requirements below.

The OEM Modes Program has two methods of operation:

1. Single Mode allows for a single mode's capabilities to be evaluated. Specified platform and display information, outlined below, will need to be provided to successfully evaluate the mode's capabilities.
2. Multi Mode will generate a mode table in which an internal list of modes, and up to 16 custom modes, will be displayed with their corresponding capability. A Graphical User Interface (GUI) will allow input parameters to be selected. After the input parameters are selected, the program will calculate the modes capabilities. The results of the program shall be available in text or Excel format.

2.2 Installation

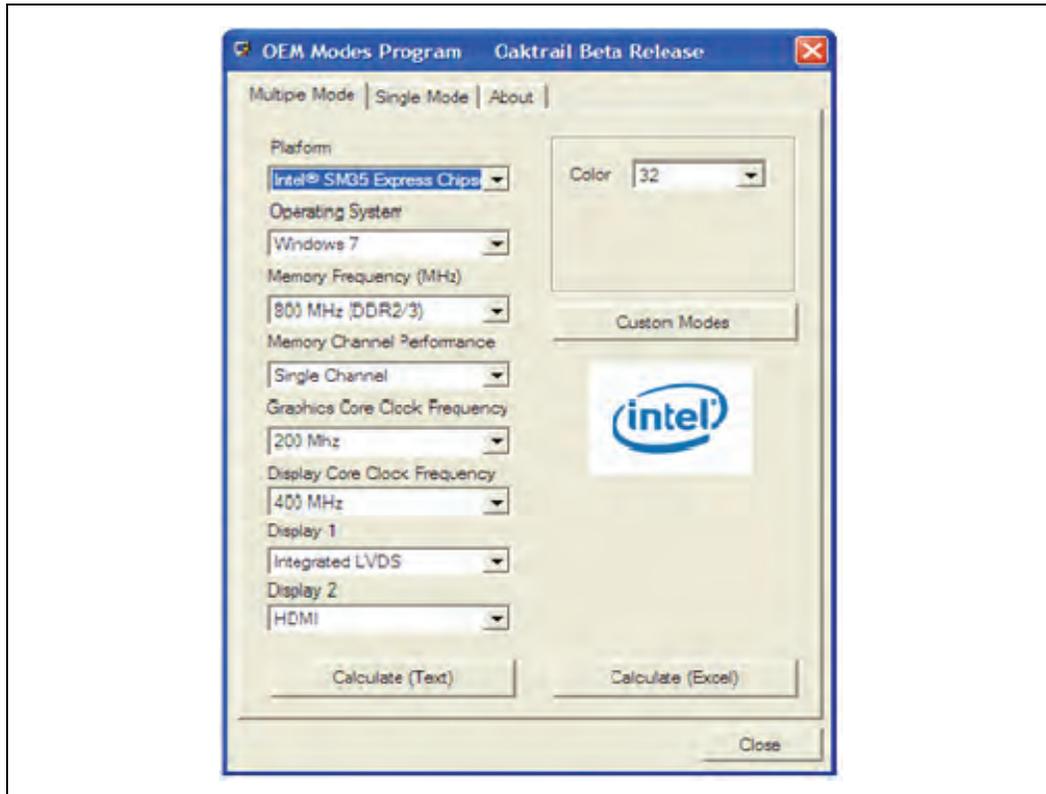
There is no installation required for the OMP.

2.3 Setting Platform Data

Both methods of calculating modes capabilities require the same base set of inputs. The required base inputs are as follow:

1. Platform – The platform under which the mode should be calculated. Each platform has its own specific set of internal attributes that cannot be changed.
2. Memory Frequency – Specified in MHz. For example, 400 would imply 400 MHz.
3. Memory Channels – The total number of memory channels.
4. Graphics Core Clock – Specified in MHz. For example, 200 would imply 200 MHz.

When a Platform is selected, a list of possible values for Memory Frequency and Core Clock will be made available in their relative fields.



Steps below must be taken to evaluate any modes data:

1. Select the desired Platform and the corresponding platform configuration (memory frequency, memory channels, core clock).
2. Add any additional custom modes to be included in the generated mode table. (optional)
3. Choose the desired output format. Excel will generate a color-coded Excel spreadsheet. Text will create a simple text file which can be opened in any text compatible program.
4. Calculate modes capabilities.

2.4 Single Mode Evaluation

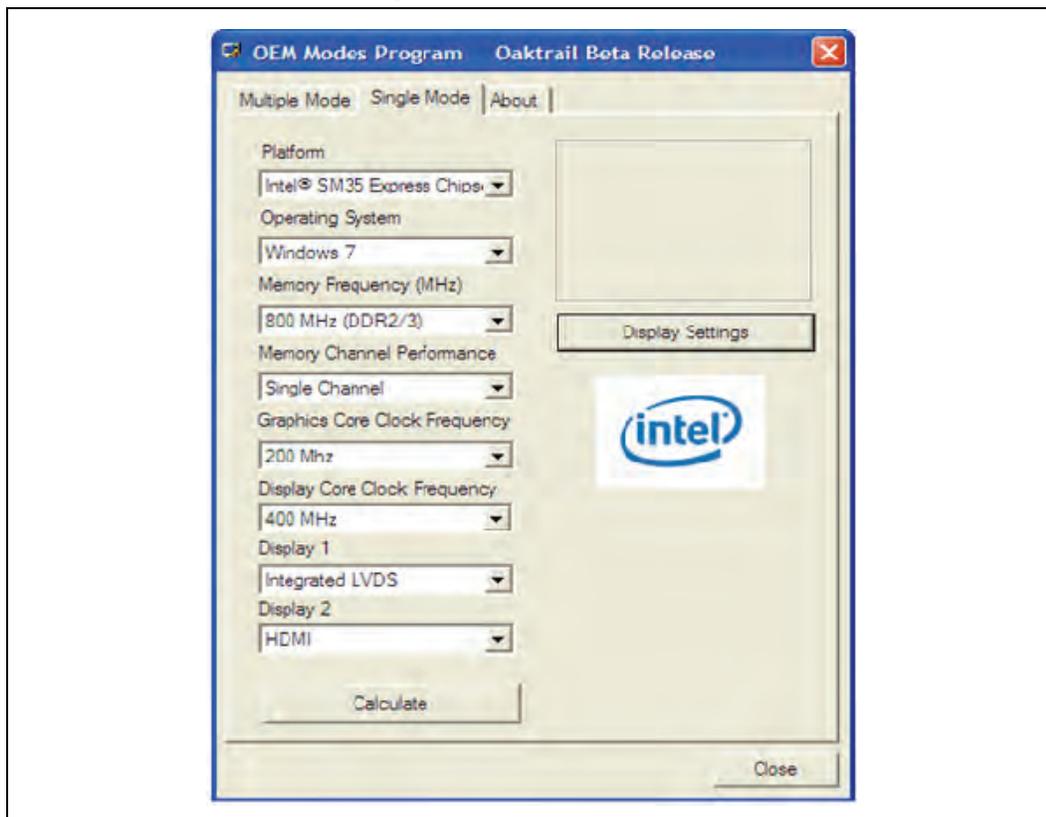
A single mode's capabilities can be calculated by providing some additional information about the mode. Along with the previously listed required inputs, the following inputs are also required:

1. Display Configuration
 - a. Single Mode – Single display. Only Display A is required.
 - b. Twin Mode – A single mode on 2 displays, using a single pipe. Display Type for both Display A and Display B are required.
 - c. Clone Mode – Same display on both displays. Display A and Display B may differ in active pixels and dot clock to accommodate centering and panning. Display A and Display B are required.



- d. Extended Desktop – Two independent displays. Display A and Display B are required.
2. hActive – The number of active horizontal pixels.
3. vActive – The number of active vertical pixels.
4. DotClock – The dot clock of the specified mode. Specified in MHz. For example, 60 would imply 60 MHz. If panning or centering is used, then the dot clock used by the display is required. This display “Dot Clock” field is described in the “Advanced” section below.
5. For example: If 1600x1200 is being evaluated, but is being panned on a 1280x1024 display, then the dot clock required is for the timings used on the 1280x1024 display.
6. Refresh – The refresh rate of the given mode.
7. Color – The color depth of the given mode.
8. Display – The display the given mode is to be displayed on. Note that certain display combinations may not be allowed when using 2 displays.

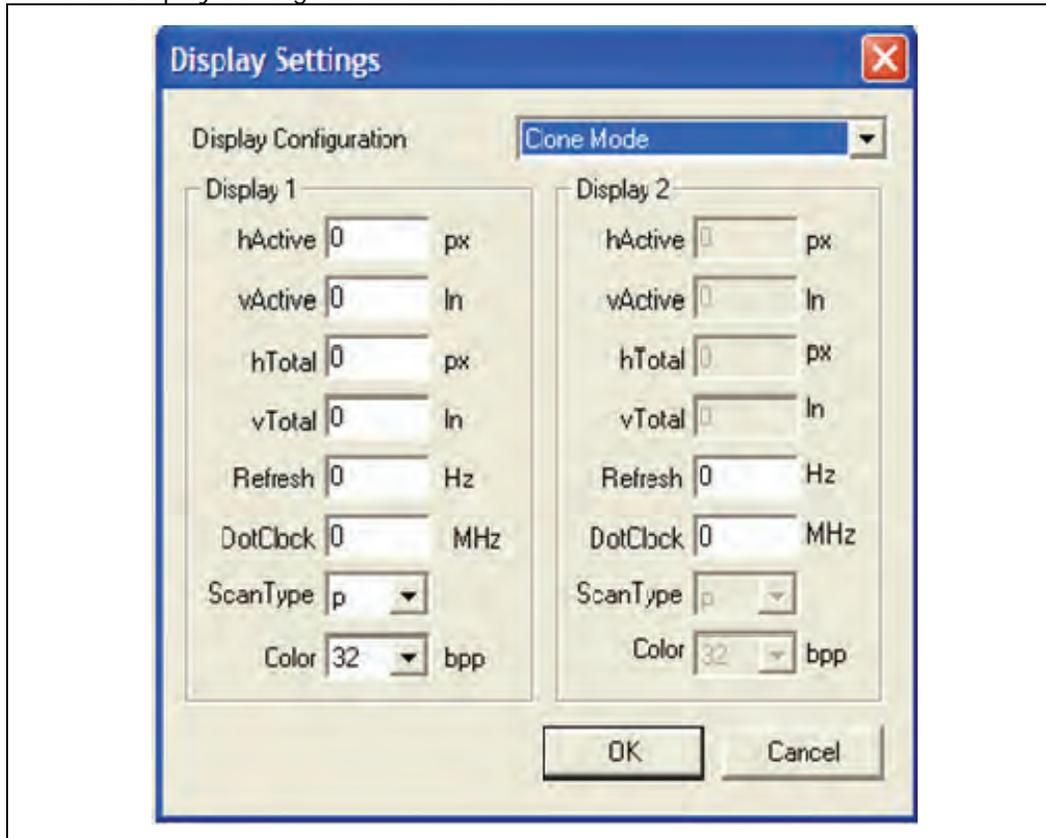
2.4.1 Instructions for a Single Mode Evaluation



1. Fill in the Platform, Memory Frequency, Memory Channels, and Core Clock as shown in the above diagram.
2. Click the Display Settings button (See next diagram) and fill in the settings.
3. Select Excel (If Excel is installed) as the desired Output format.
4. Click the Calculate button to calculate the mode's capabilities.



Fill in the Display Settings as shown below.



You will see that for Display A, the hActive and vActive fields are filled in with the mode to display, while the Display Horz and Display Vert fields contain the actual size of the LFP.

1. Select the desired Display Configuration.
2. Enter Display A's mode resolution, dot clock, refresh rate, and color depth. Display A's settings will be automatically copied into Display B for you.
3. Change Display B's settings accordingly to match the above diagram.
4. Select Display A's desired Display.
5. Select Display B's desired Display.

When finished, make sure the Platform configuration matches the specifications outlined above. Click the calculate button. The result should be "Support: Bandwidth sufficient for display + HWVLD based video".

2.5 Multi Mode Table Generation

A predefined list of modes is loaded by default for evaluation when the application starts. Up to 16 user-defined timings may be added to the default mode table.

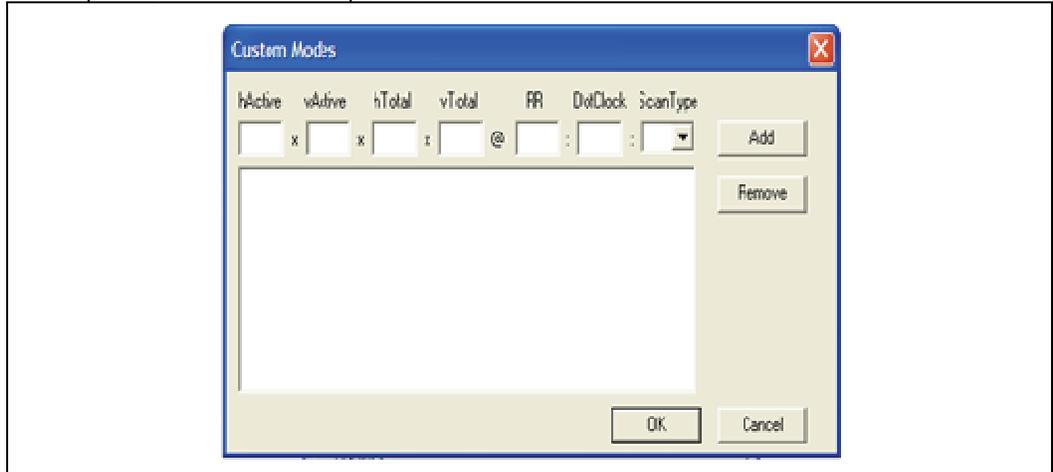
Please note that all results indicating video support assume that full-screen video is run at all times and all modes are evaluated at 32 bits per pixel color depths.



2.5.1 Instructions for Multi-mode Table Evaluation

2.5.1.1 Custom Modes Set Up

Custom modes can be added to the final generated output by providing the horizontal active pixels, vertical active pixels, refresh rate, and dot clock.



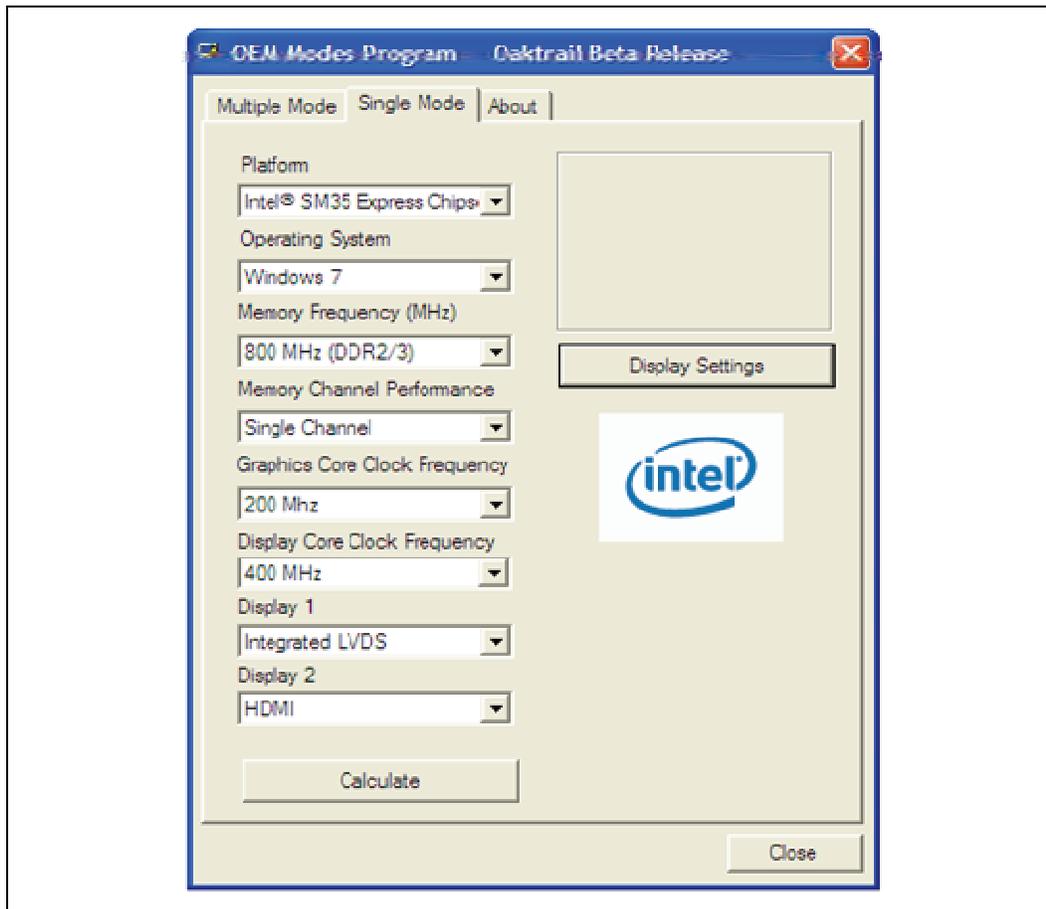
1. Fill in each field with the appropriate information.
2. Click Add to add the custom mode to the list.
3. Click OK to save the custom modes.

2.6 Reading the Output

The output format for Single mode and Multi mode is similar in functionality, but different in the way the results are displayed.

1. Single Mode – A popup box will appear giving details of the modes capabilities. Possible results for Single mode are:
 - a. Mode is supported with HWVLD based video.
 - b. Mode is not supported.
2. Multi mode - A matrix of modes containing all internal modes and custom modes is represented with Pipe A vertically and Pipe B horizontally. Each intersecting cell of the given modes contains a number. Each number is represented as follows:
 - a. 1 – Mode is supported with HWVLD based video. (Green)
 - b. 0 – Mode is not supported. (Red)

Below is a sample output table for the Multi mode calculation.



1. Fill in the Platform, Memory Frequency, Memory Channels, and Core Clock as shown in the above diagram.

Platform: SM35 Express Chipset

Memory Frequency: 800 MHz

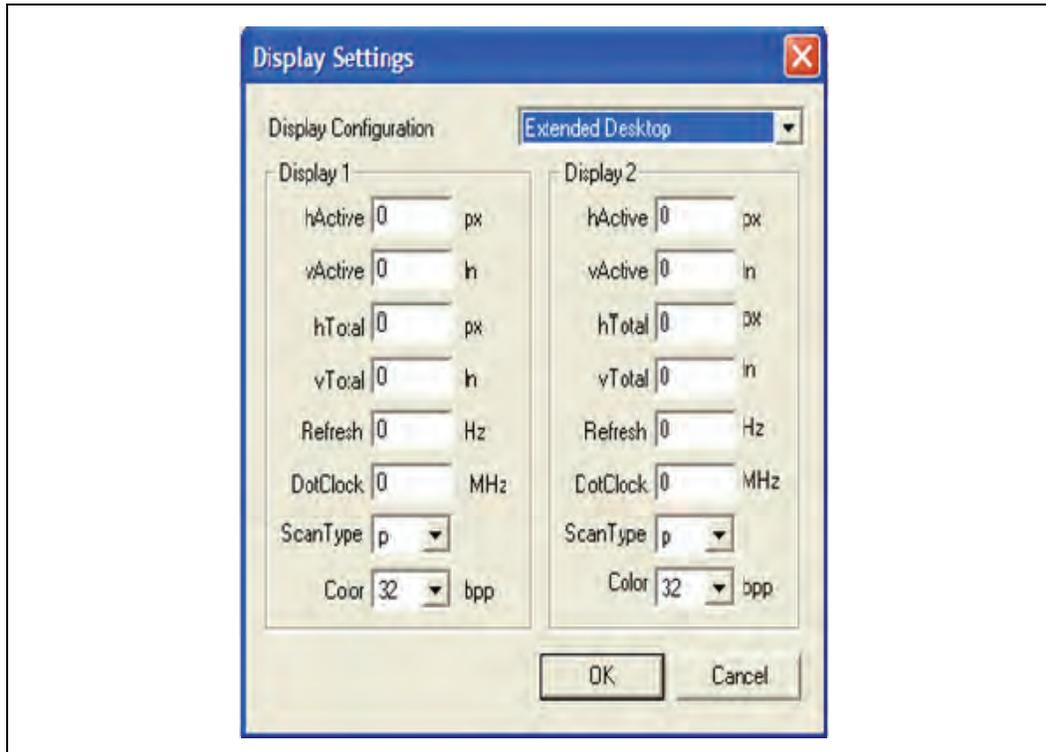
Memory Channels: Single Chanel

Core Clock: 400 MHz

Display Clock: 400Mhz

2. Click the Display Settings button (See next diagram) and fill in the settings.
3. Select the desired Output: Excel.
4. Click the Calculate button to calculate the mode's capabilities.

Fill in the Display Settings as shown below.



You will see that for Display A, the hActive and vActive fields are filled in with the mode to display, while the Display Horz and Display Vert fields contain the actual size of the LFP.

5. Select the desired Display Configuration.

Display Configuration: Extended Mode

6. Enter Display A's mode resolution, dot clock, refresh rate, and color depth. Display A's settings will be automatically copied into Display B for you.

hActive: 1400 pixels
vActive: 1050 pixels
DotClock: 75 MHz
Refresh: 60 Hz
Color: 32 bpp

7. Change Display B's settings accordingly to match the above diagram.

hActive: 1600 pixels
vActive: 1200 pixels
DotClock: 80 MHz
Refresh: 85 Hz
Color: 32bpp

8. Select Display A's desired Display.

Display: LVDS (Internal)

9. Select Display B's desired Display.

Display: HDMI



When finished, make sure the Platform configuration matches the specifications outlined above. Click the calculate button. The result should be "Support: Bandwidth sufficient for display + HWVLD based video".

2.7.2 Example 2 – Single Mode

In this example we will test another single mode combination.



1. Fill in the Platform, Memory Frequency, Memory Channels, and Core Clock as shown in the above diagram.

Platform: SM35 Express Chipset

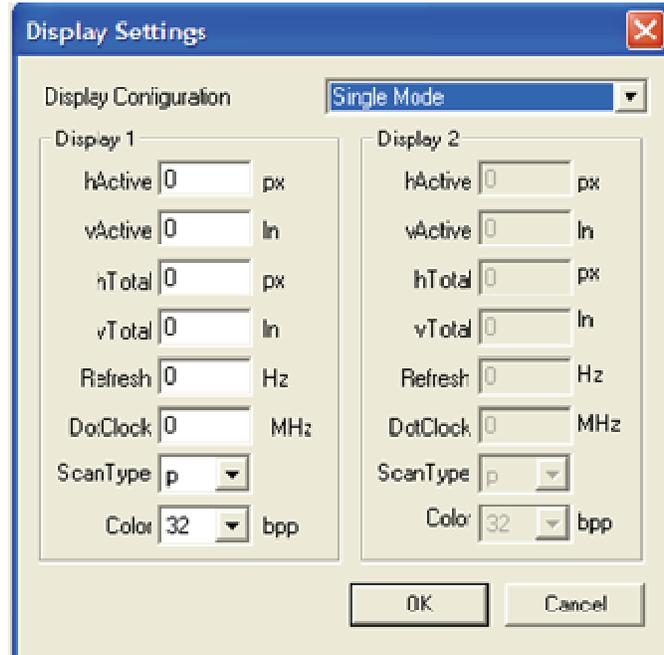
Memory Frequency: 800 MHz

Memory Channels: Single channel

Core Clock: 200 MHz

Display Clock: 400Mhz

2. Click the Display Settings button (See next diagram) and fill in the settings.
3. Select the desired Output: Excel.
4. Click the Calculate button to calculate the mode's capabilities.



Fill in the Display Settings as shown in the above diagram.

1. Select Single Mode as the Display Configuration.

Display Configuration: Single Mode

2. Enter Display A's settings as shown above.

hActive: 800 pixels

vActive: 600 pixels

DotClock: 60 MHz

Refresh: 60 Hz

Color: 32 bpp

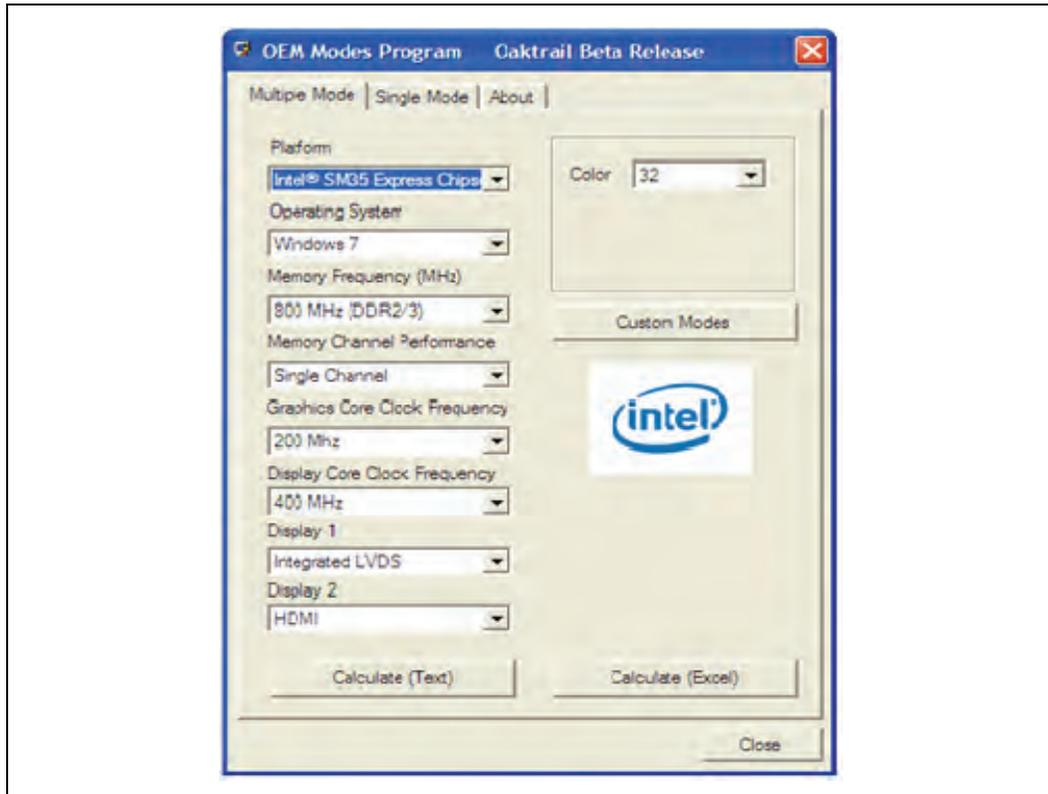
3. Select the Display type for Display A.

Display: LVDS (Internal)

Make sure the Platform configuration is correct and click Calculate. Again, the result should be "Support: Bandwidth sufficient for display + HWVLD based video".

2.7.3 Example 3 – Multi Mode

In this example we will generate a PRD-like table with 5 different custom timings included.

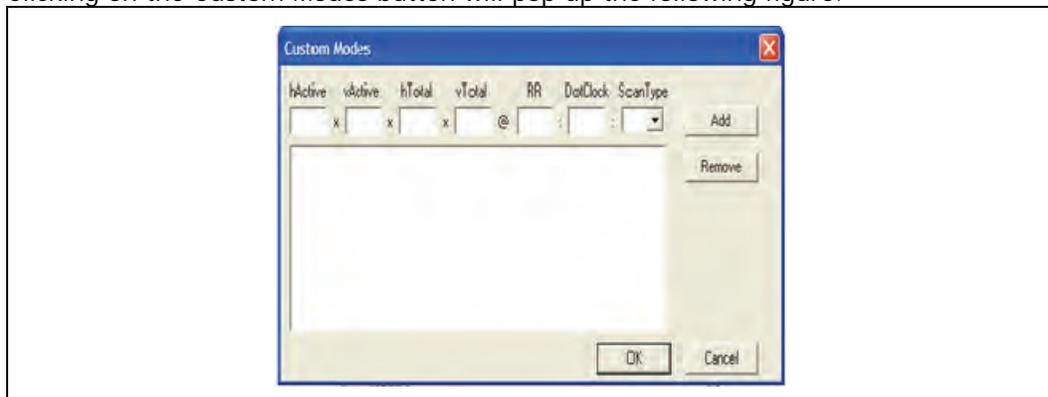


1. Fill in the Platform settings as shown above.

- Platform:** SM35 Express Chipset
- Memory Frequency:** 800 MHz
- Memory Channels:** Single channel
- Core Clock:** 200 MHz
- Display Clock:** 400MHz

2. Click Custom Modes and fill in the custom modes (See diagram below)
3. Select the desired Output: Excel.
4. Click Calculate to generate the mode table.

Clicking on the Custom Modes button will pop up the following figure.





5. Type in the custom modes as shown above.

1152x768@60:50
1152x768@75:70
1152x768@85:90
1152x768@100:90
1152x768@120:100

6. Click Add after entering each custom mode.
7. Click OK to return to the platform configuration to generate the mode table.

Again, make sure your Platform configuration is correct, and click Calculate. After that, open the results in Excel. You will see a PRD-like table with the custom modes in the correct order in the table. Please refer to Section 2.4.1 for details on the mode table results.

2.8 Frequently Asked Questions

TBD

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