



congatec Application Note #35

Affected Products	Products featuring AptioV UEFI Firmware
Subject	OEM Setup Modification
Confidential/Public	public
Author	CJR

Revision History

Revision	Date (yyyy-mm-dd)	Author	Changes
1.0	2016-10-07	CJR	Initial release of document

Preface

This Application Note is intended to explain how the congatec Embedded BIOS setup program can be customized and adapted to the requirements of a particular application. The customization of the BIOS Setup program can be done using the congatec System Utility tool (CGUTIL) in combination with the new congatec utility CgMlfEditor.exe.

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Symbols

The following are symbols used in this application note.



Notes call attention to important information that should be observed.



Cautions warn the user about how to prevent damage to hardware or loss of data.



Warnings indicate that personal injury can occur if the information is not observed.

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Terminology

Term	Description
UEFI	Unified Extensible Firmware Interface
AMI	American Megatrends, Inc - congatec’s BIOS partner
Aptio V	AMIs next generation UEFI BIOS
MLF	Menu Layout File

1 Introduction

Allowing full access to the BIOS Setup could lead to the risk that the end user can change BIOS settings that may negatively affect the systems functionality or even cause the system to no longer boot. One solution to avoid this is to secure the Setup with a BIOS password. With this solution the user access to the BIOS Setup can be completely blocked.

A more efficient solution is to customize the BIOS Setup program so that the user can only change settings that are not critical to the functionality of the complete system. That means that the end user will be allowed to have access to the BIOS Setup program but the settings that they are not allowed to change will be either not visible to them or grayed out. They will only have access to the settings that they can change that will not jeopardize the system's functionality. BIOS Setup program customization can be done using the congatec System Utility tool (CGUTIL). The following sections will describe how this can be done using the Windows GUI version of the CGUTIL tool. This function is not supported by the command line version of the CGUTIL tool (CGUTLCMD).

For detailed information about the congatec System Utility consult the CGUTIL User's Guide. This can be found on the congatec website (www.congatec.com).

With OEM setup modification support you are able to show, hide, gray-out a given setup node and change its title and help text. It is not possible to change the default settings or change the options of a particular setup node.

Refer to the congatec AN8_Create_OEM_Default_Map.pdf to learn how to change the default settings of a congatec embedded BIOS.

2 Requirements

OEM setup modification requires a congatec embedded BIOS based on AMIs Aptio V UEFI firmware implementation. Only BIOS releases after mid of 2016 may have the support built-in. One can check if the BIOS supports OEM setup modification by looking at the **Save & Exit** setup submenu. There must be an option for saving the current Setup Layout file by the item **Generate Menu Layout File**. See picture 1 below.

In addition to the BIOS support, two utilities are required:

- congatec system utility **CGUTIL** revision 1.5.6 or later
- congatec setup menu layout editor **CgMlfEditor.exe**

Both utilities can be downloaded from the congatec website at www.congatec.com and are available for Windows and Linux.



Note

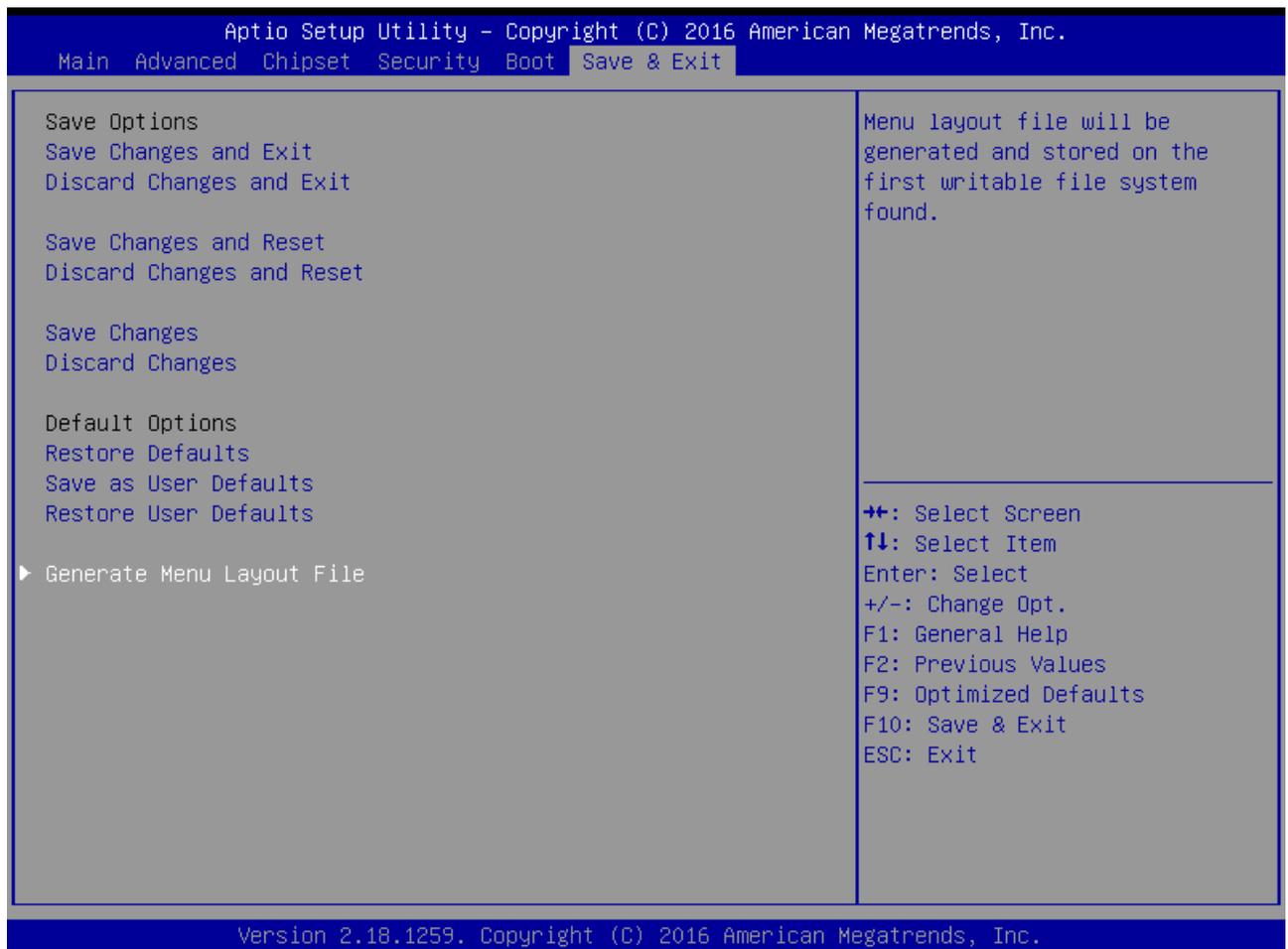
*The congatec setup menu layout editor **CgMlfEditor.exe** is also integrated in the **CGUTIL 1.5.6 GUI** version. See picture 3 below. Selecting the **BIOS Setup Configuration** button launches **CgMlfEditor.exe**.*

BIOS setup configuration is only supported in BIOS File operation target. It does not work with Board (CGOS) operation target.

3 OEM Setup Configuration – step by step

3.1 Generation of the MLF

The first step is to save the MLF (menu layout file) of the BIOS version you want to change. To do so, simply boot the congatec product using an attached boot device that has a writable file system (i.e. USB stick) and then enter BIOS setup. Go to the **Save & Exit** submenu and select the **Generate Menu Layout File** node. The MLF will be stored on the file system.



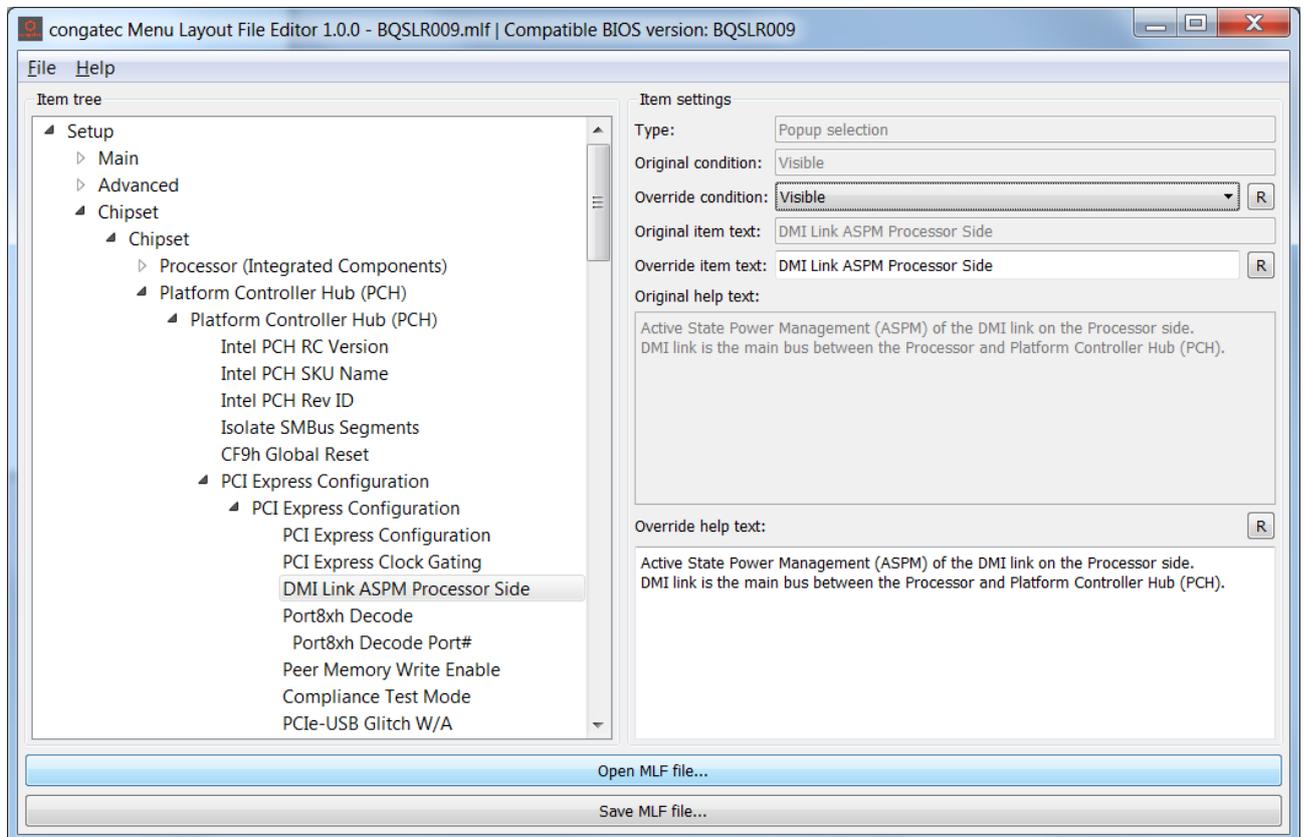
Picture 1: Save & Exit setup sub menu of a BIOS supporting OEM setup configuration

Note

The saved MLF can only be used for the BIOS version it was taken from. With future BIOS versions new MFL files have to be generated.

3.2 Modify the MLF

Use the congatec setup menu layout editor **CgMlfEditor.exe** on your development PC to modify the previously stored MLF to meet your needs. Open the previously created MLF file and make all your changes as explained below and then save the MLF under a new name, e.g. myBQSLR009.mlf.



Picture 2: cgMlfEditor Main Menu with a MLF file named BQSLR009.mlf opened

3.2.1 Item Tree

On the left side the cgMlfEditor shows the setup menu layout in a tree view. Use this tree to navigate to the setup item you want to modify. Note that in this tree view you can also see setup items that were not visible in the congatec embedded BIOS the MLF file was generated with. These setup items were hidden by either AMI or congatec already. Although the cgMlfEditor utility allows you to do so, you should not make such setup items visible. Also note that the setup submenus are listed twice in the item tree. This is only a cosmetic display issue and has no functional impact.

3.2.2 System Settings

On the right side the cgMIfEditor shows the settings of the selected setup item. The type field shows the type of setup node. The possible types are Popup selection and Numeric value for setup item and Text, Memo, SubMenu and Page for simple strings. The type field is just an information field that cannot be changed.

Underneath the type field are 3 pairs of settings that allow you to modify the setup item:

- **Condition** (Visible, Suppressed, Hidden, Grayed Out, Unknown) provides the ability to modify the visibility of a setup item.
- **Item text** provides the ability to modify the prompt text for the setup item.
- **Help text** provides the ability to modify the help text for the setup item.

The original setting, for all three changeable setup item properties, is also displayed and provides the ability to always return back to the original setting.

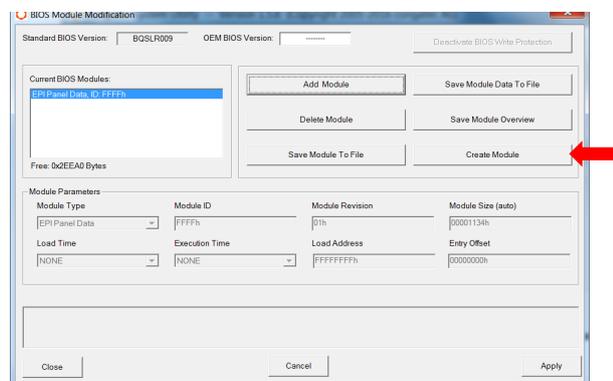
3.3 Generate an OEM BIOS module from the MLF

Run the CGUTIL GUI version **1.5.6 or later** on your development PC.



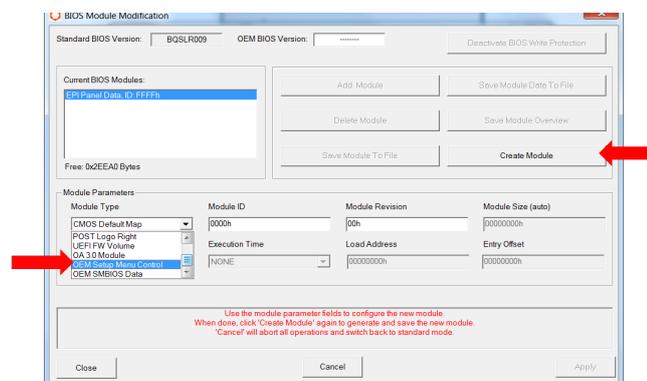
Picture 3: CGUTIL Main Menu

Select Operational Target **BIOS File** and the BIOS version you used to create the MLF as **Input BIOS File**. CGUTIL then prompts you for the file name of the new BIOS you are going to create. Let's name the BIOS OEM1R009.BIN for this example. In the next step select the **BIOS Module Modification** submenu.



Picture 4: Module Modification menu – Create Module

Continue with **Create Module**, select the previously saved myBQSLR009.mlf as input file for the new BIOS and select module type **OEM Setup Menu Control**.

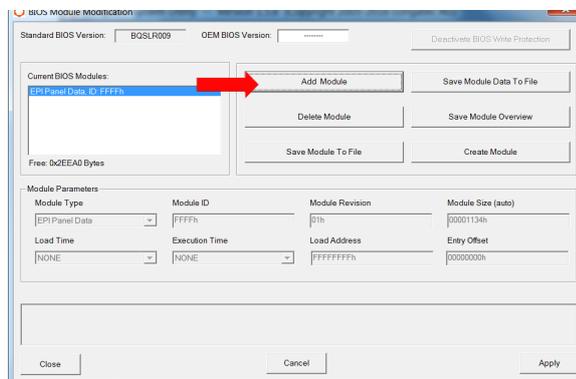


Picture 5: Create OEM Setup Menu Control BIOS module

Select **Create Module** again to save the new BIOS module. Name it, for example, myBQSLR009mlf.mod.

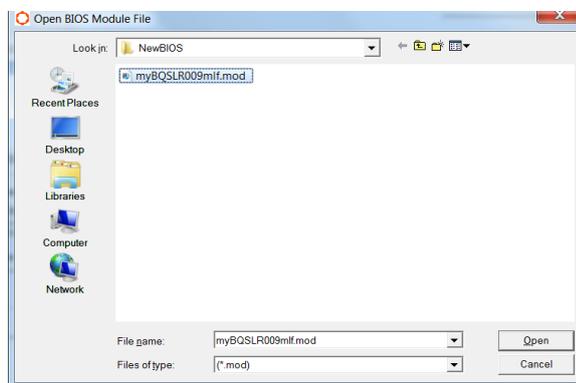
3.4 Add the OEM Setup Menu Control module to the BIOS

The last step is to add the previously created OEM Setup Menu Control module to the BIOS. Use the *Add Module* button



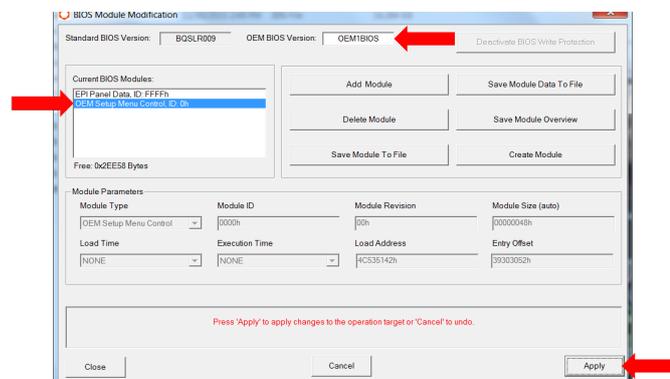
Picture 6: Module Modification menu – Add Module

and pick the BIOS module file.



Picture 7: Add the new Module

At the end double check that the OEM Setup Menu Control module is in the list of *Current BIOS modules*, assign an *OEM BIOS version* and *Apply* the changes. CGUTIL will save the OEM BIOS file.



Picture 8: Finalize the customized BIOS

Congratulations, you just created a BIOS with a customized BIOS setup program.