Application Note

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Applicable Products	COM Express modules based on Intel 3rd and 4th Gen. Core processor platforms
Application Note Subject	Enabling iRST (Intel Rapid Start Technology)
Document Name	AN30_iRST_Enabling_Guide
Usage Designation	External

Application Note #30

Revision 1.0

Revision History

Revision	Date (dd.mm.yy)	Author	Changes
1.0	30.01.14	CJR	Initial release

Preface

This application note describes how to enable iRST (Intel Rapid Start Technology) also known as iFFS (Intel Fast Flash Standby) on congatec COMs based on Intels 3rd and 4th Gen Core technology processor platforms (aka Ivy Bridge and Haswell).

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Intended Audience

This Application Note is intended for technically qualified personnel. It is not intended for general audiences.

Symbols

The following symbols may be used in this Application Note:

Warning

Warnings indicate conditions that, if not observed, can cause personal injury.

Caution

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

Note

Notes call attention to important information that should be observed.

Application Note

Terminology

Some of the following terms may be used throughout this document.

Term	Description
UEFI	Unified Extensible Firmware Interface is a specification that defines a software interface between an operating system and platform firmware. UEFI is meant as a replacement for the Basic Input/Output System (BIOS) firmware interface.
BIOS	BIOS: Basic Input/Output System. BIOS is actually firmware, the software that is programmed into a ROM (Read-Only Memory) chip built onto the motherboard of a computer
POST	Power On Self Test (typically the BIOS boot-up process)
ACPI	Advanced Configuration and Power Interface. Visit www.acpi.info for more information.
iRST	Intel Rapid Start Technology
iFFS	Intel Fast Flash Standby

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1 iRST Introduction

Intel Rapid Start Technology combines the advantages of Suspend to RAM (fast resume time) and Suspend to Disk (no power required while the suspend mode).

An iRST enabled system on entry to Windows sleep mode, transitions to Suspend to RAM (S3) and automatically resumes from S3 for a short time to copy the RAM image to a special disk partition. The system thereafter performs an S4 transition.

In this state, the power can be completely removed from the system without the risk of data loss because the system context unlike the S3, is stored on disk instead of RAM.

After a resume event (typically power button), the system context is copied from the special disk partition back to memory. The system then performs a normal S3 resume. This is faster in comparison to a resume from S4 (hibernate) which requires a full BIOS POST.

2 iRST System Requirements

For a system to support iRST, it must have the following:

- iRST capable chipset (QM77, HM76, QM87, HM86)

- iRST enabled System BIOS

- SATA controller in AHCI mode.

- Hibernate partition (ID=84) with minimum size of installed DRAM on an SSD

- Microsoft Windows 7 or 8

- Intel Rapid Start Technology Manager Software (optional)

Supported Disk Configurations

Disk Setup	Windows	Hibernate Partition
SSD	SSD	SSD
HDD + SSD	HDD	SSD
HDD + mSATA	HDD	mSATA
Hybrid Drive	SSHD	SSHD
2 Disk RAID	Volume 0	Volume 1

3 iRST Enabling and Testing

Create a hibernate partition on the disk (SSD)

Figure 1: Windows 7 Disk Management Console

If your Windows OS is already installed on SSD, first free-up space for the hibernate partition by shrinking the existing partition. Right click the partition in the Disk Management View (see above) and click "Shrink Volume".

Next run cmd.exe as administrator.

The command line utility will open. Now run diskpart.exe to launch the Windows disk partition tool.

At the diskpart prompt type the following commands to create the hibernate partition:

1. **list disk** to get a list of connected disks

2. **selelct disk X** to select the disk the hibernate partition should be installed on. (X is the disk number. Refer to the results from command 1 for the right disk number)

3. **create partition primary size=Y000** to create a new partition with the size of Y GB. The size=Y000 parameter is optional and can be used to create a partition smaller than the remaining disk space.

4. **detail disk** to get detailed information about the selected disk

5. **select volume X** so select the hibernate partition (X is the volume number of the new created partition)

6. **set id=84 override** to assign partition ID 84h (hibernate partition) to this volume.

7. **Exit**

Double check in the Windows Disk Management (see Figure 1 above) that there is a Hibernate Partition with adequate size.

Enable iRST in BIOS Setup

After the hibernate partition has been created, restart the system and enter the BIOS setup program.

Open the **Intel Rapid Start Technology** submenu in the Advanced menu.
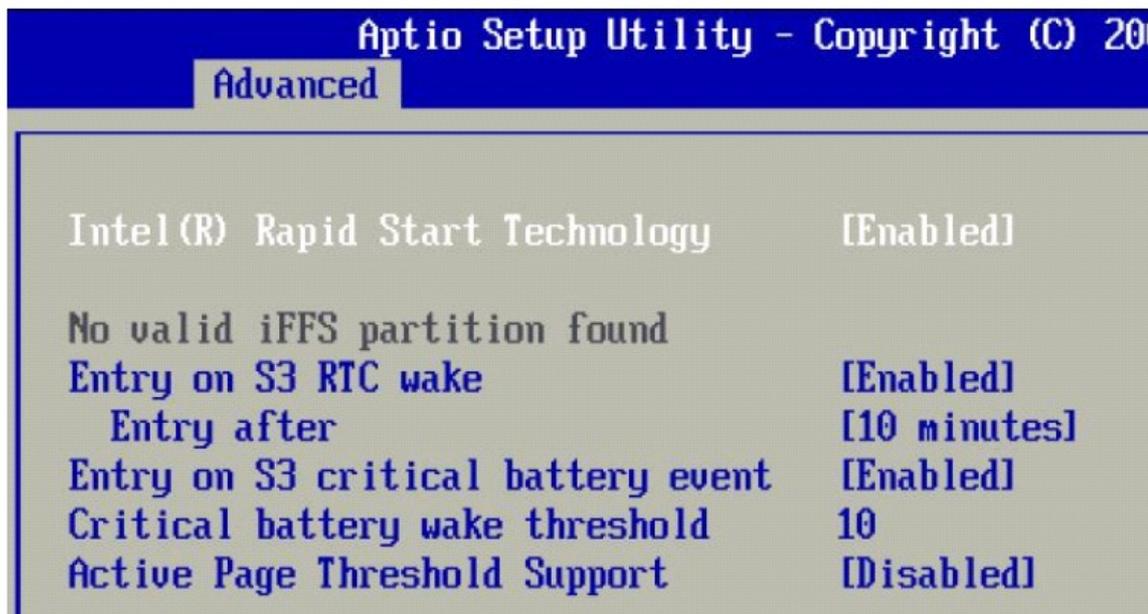
Figure 2: iRST BIOS setup submenu

After enabling the Intel Rapid Start Technology, you will see further setup options to configure iRST.

If there is no valid hibernate partition on the SSD, the BIOS setup screen will display the warning "No valid iFFs partition found" in the iRST submenu.

The option **Entry after** allows the user to set how long the system stays in S3 before it wakes up again to copy the image from memory to disk. Select 0 to resume immediately.

Enabling and configuring iRST with the Intel Rapid Start Technology Tool
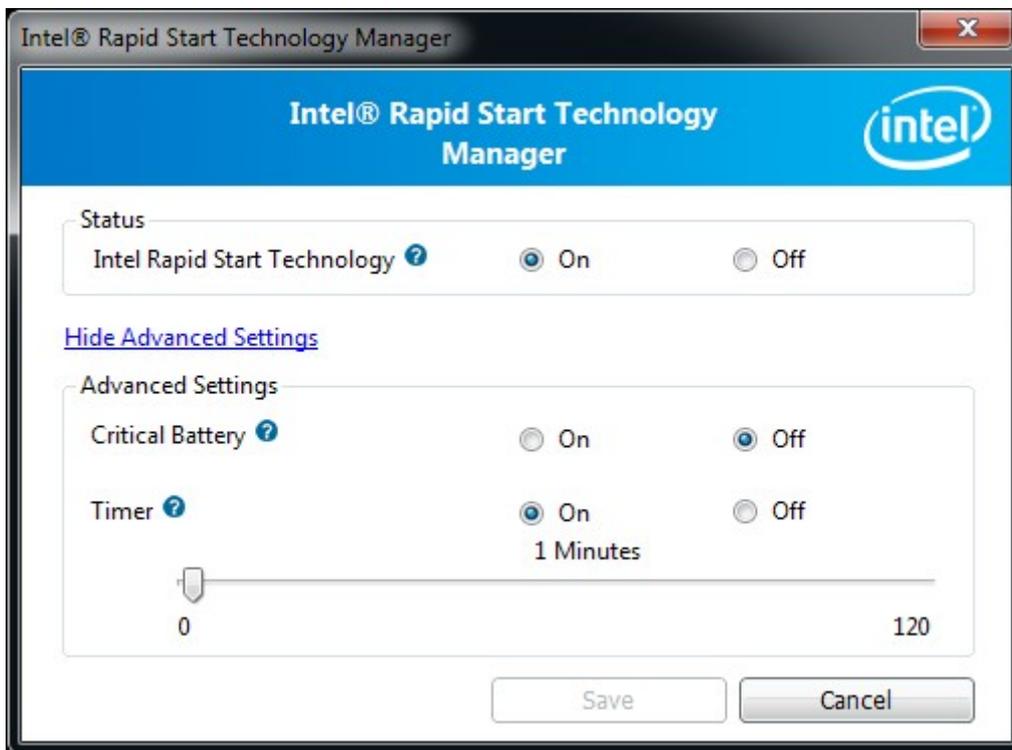
Figure 3: Intel Rapid Start Technology Manager

The Intel tool above can be used to configure the iRST feature within Windows. The use of this tool is optional. This is because the iRST features can be configured in the BIOS setup program as well.

Testing iRST

Boot up Windows and perform a normal sleep (S3) transition by clicking the Windows start button .
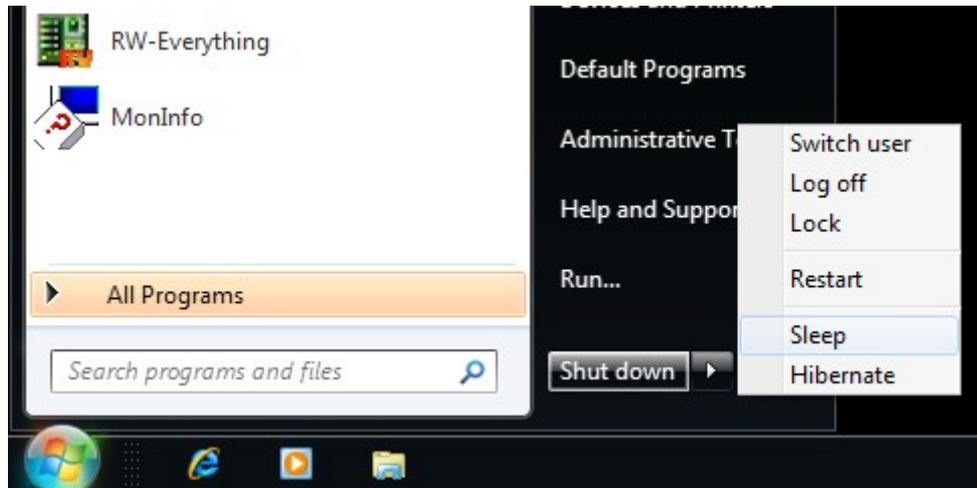
Figure 4: How to force Windows into Sleep

The OS will now perform a Suspend to RAM (S3) transition. The system then wakes up after the time you set as **Entry after** time in BIOS setup expires, copies the memory image to the hibernate partition on SSD and transitions to S4.

It is now safe to completely remove power from the system.

Re-apply power and resume the system by pressing the power button. Observe that the system resumes almost as fast as from S3.

The Windows sleep (S3 transistion) can of course also be triggered by other events like

- LID switch

- Sleep button

- Power button

- Power Management Timer