Video issues with S3 resume

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During S3 resume, hardware needs to be reinitialized. For most devices, this is easy, and kernel driver knows how to do it. Unfortunately there's one exception: video card. Those are usually initialized by BIOS, and kernel does not have enough information to boot video card. (Kernel usually does not even contain video card driver -- vesafb and vgacon are widely used).

This is not problem for swsusp, because during swsusp resume, BIOS is run normally so video card is normally initialized. It should not be problem for S1 standby, because hardware should retain its state over that.

We either have to run video BIOS during early resume, or interpret it using vbetool later, or maybe nothing is necessary on particular system because video state is preserved. Unfortunately different methods work on different systems, and no known method suits all of them.

Userland application called s2ram has been developed; it contains long whitelist of systems, and automatically selects working method for a given system. It can be downloaded from CVS at www.sf.net/projects/suspend . If you get a system that is not in the whitelist, please try to find a working solution, and submit whitelist entry so that work does not need to be repeated.

Currently, VBE_SAVE method (6 below) works on most systems. Unfortunately, vbetool only runs after userland is resumed, so it makes debugging of early resume problems hard/impossible. Methods that do not rely on userland are preferable.

Details

There are a few types of systems where video works after S3 resume:

1. systems where video state is preserved over S3.
2. systems where it is possible to call the video BIOS during S3 resume. Unfortunately, it is not correct to call the video BIOS at that point, but it happens to work on some machines. Use acpi_sleep=s3_bios.
3. systems that initialize video card into vga text mode and where the BIOS works well enough to be able to set video mode. Use acpi_sleep=s3_mode on these.
4. on some systems s3_bios kicks video into text mode, and acpi_sleep=s3_bios,s3_mode is needed.
5. radeon systems, where X can soft-boot your video card. You'll need a new enough X, and a plain text console (no vesafb or radeonfb). See http://www.doesi.gmxhome.de/linux/tm800s3/s3.html for more information. Alternatively, you should use vbetool (6) instead.
6. other radeon systems, where vbetool is enough to bring system back to life. It needs text console to be working. Do vbetool vbestate save > /tmp/delme; echo 3 > /proc/acpi/sleep; vbetool post; vbetool vbestate restore < /tmp/delme; setfont <whatever>, and your video should work.
7. on some systems, it is possible to boot most of kernel, and then POSTing bios works. Ole Rohne has patch to do just that at http://dev.gentoo.org/~marineam/patch-radeonfb-2.6.11-rc2-mm2.
8. on some systems, you can use the video_post utility and or do echo 3 > /sys/power/state && /usr/sbin/video_post - which will initialize the display in console mode. If you are in X, you can switch to a virtual terminal and back to X using CTRL+ALT+F1 - CTRL+ALT+F7 to get the display working in graphical mode again.

Now, if you pass acpi_sleep=something, and it does not work with your bios, you'll get a hard crash during resume. Be careful. Also it is safest to do your experiments with plain old VGA console. The vesafb and radeonfb (etc) drivers have a tendency to crash the machine during resume.

You may have a system where none of above works. At that point you either invent another ugly hack that works, or write proper driver for your video card (good luck getting docs :-(). Maybe suspending from X (proper X, knowing your hardware, not XF68_FBcon) might have better chance of working.

Table of known working notebooks:

Model	**hack (or "how to do it")**
Acer Aspire 1406LC	ole's late BIOS init (7), turn off DRI
Acer TM 230	s3_bios (2)
Acer TM 242FX	vbetool (6)
Acer TM C110	video_post (8)
Acer TM C300	vga=normal (only suspend on console, not in X), vbetool (6) or video_post (8)
Acer TM 4052LCi	s3_bios (2)
Acer TM 636Lci	s3_bios,s3_mode (4)
Acer TM 650 (Radeon M7)	vga=normal plus boot-radeon (5) gets text console back
Acer TM 660	??? [1]
Acer TM 800	vga=normal, X patches, see webpage (5) or vbetool (6)
Acer TM 803	vga=normal, X patches, see webpage (5) or vbetool (6)
Acer TM 803LCi	vga=normal, vbetool (6)

Model	hack (or "how to do it")
Arima W730a	vbetool needed (6)
Asus L2400D	s3_mode (3) [2] (S1 also works OK)
Asus L3350M (SiS 740)	6.
Asus L3800C (Radeon M7)	s3_bios (2) (S1 also works OK)
Asus M6887Ne	vga=normal, s3_bios (2), use radeon driver instead of fglrx in x.org
Athlon64 desktop prototype	s3_bios (2)
Compal CL-50	??? [1]
Compaq Armada E500 - P3-700	none (1) (S1 also works OK)
Compaq Evo N620c	vga=normal, s3_bios (2)
Dell 600m, ATI R250 Lf	none (1), but needs xorg-x11-6.8.1.902-1
Dell D600, ATI RV250	vga=normal and X, or try vbestate (6)
Dell D610	vga=normal and X (possibly vbestate (6) too, but not tested)
Dell Inspiron 4000	??? [1]
Dell Inspiron 500m	??? [1]
Dell Inspiron 510m	???
Dell Inspiron 5150	vbetool needed (6)
Dell Inspiron 600m	??? [1]
Dell Inspiron 8200	??? [1]
Dell Inspiron 8500	??? [1]
Dell Inspiron 8600	??? [1]
eMachines athlon64 machines	vbetool needed (6) (someone please get me model #s)
HP NC6000	s3_bios, may not use radeonfb (2); or vbetool (6)
HP NX7000	??? [1]
HP Pavilion ZD7000	vbetool post needed, need open-source nv driver for X
HP Omnibook XE3 athlon version	none (1)
HP Omnibook XE3GC	none (1), video is S3 Savage/IX-MV
HP Omnibook XE3L-GF	vbetool (6)
HP Omnibook 5150	none (1), (S1 also works OK)
IBM TP T20, model 2647-44G	none (1), video is S3 Inc. 86C270-294 Savage/IX-MV, vesafb gets "interesting" but X work.
IBM TP A31 / Type 2652-M5G	s3_mode (3) [works ok with BIOS 1.04 2002-08-23, but not at all with BIOS 1.11 2004-11-05 :-(]
IBM TP R32 / Type 2658-MMG	none (1)
IBM TP R40 2722B3G	??? [1]
IBM TP R50p / Type 1832-22U	s3_bios (2)
IBM TP R51	none (1)
IBM TP T30 236681A	??? [1]
IBM TP T40 / Type 2373-MU4	none (1)
IBM TP T40p	none (1)
IBM TP R40p	s3_bios (2)
IBM TP T41p	s3_bios (2), switch to X after resume
IBM TP T42	s3_bios (2)
IBM ThinkPad T42p (2373-GTG)	s3_bios (2)
IBM TP X20	??? [1]
IBM TP X30	s3_bios, s3_mode (4)
IBM TP X31 / Type 2672-XXH	none (1), use radeontool (http://fdd.com/software/radeon/) to turn off backlight.
IBM TP X32	none (1), but backlight is on and video is trashed after long suspend. s3_bios, s3_mode (4) works too. Perhaps that gets better results?
IBM Thinkpad X40 Type 2371-7JG	s3_bios,s3_mode (4)
IBM TP 600e	none(1), but a switch to console and back to X is needed
Medion MD4220	??? [1]
Samsung P35	vbetool needed (6)
Sharp PC-AR10 (ATI rage)	none (1), backlight does not switch off
Sony Vaio PCG-C1VRX/K	s3_bios (2)
Sony Vaio PCG-F403	??? [1]
Sony Vaio PCG-GRT995MP	none (1), works with 'nv' X driver
Sony Vaio PCG-GR7/K	none (1), but needs radeonfb, use radeontool (http://fdd.com/software/radeon/) to turn off backlight.
Sony Vaio PCG-N505SN	??? [1]

Model	hack (or "how to do it")
Sony Vaio vgn-s260	X or boot-radeon can init it (5)
Sony Vaio vgn-S580BH	vga=normal, but suspend from X. Console will be blank unless you return to X.
Sony Vaio vgn-FS115B	s3_bios (2),s3_mode (4)
Toshiba Libretto L5	none (1)
Toshiba Libretto 100CT/110CT	vbetool (6)
Toshiba Portege 3020CT	s3_mode (3)
Toshiba Satellite 4030CDT	s3_mode (3) (S1 also works OK)
Toshiba Satellite 4080XCDT	s3_mode (3) (S1 also works OK)
Toshiba Satellite 4090XCDT	??? [1]
Toshiba Satellite P10-554	s3_bios,s3_mode (4)[#f3]_
Toshiba M30	2. xor X with nvidia driver using internal AGP
Uniwill 244IIO	??? [1]

Known working desktop systems

Mainboard	Graphics card	hack (or "how to do it")
Asus A7V8X	nVidia RIVA TNT2 model 64	s3_bios,s3_mode (4)

[1] (*1*,*2*,*3*,*4*,*5*,*6*,*7*,*8*,*9*,*10*,*11*,*12*,*13*,*14*,*15*,*16*,*17*) from https://wiki.ubuntu.com/HoaryPMResults, not sure which options to use. If you know, please tell me.

[2] To be tested with a newer kernel.

[3] Not with SMP kernel, UP only.