

## APPLICATION NOTE

### SAS Expander FWLOAD Procedure

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#### INTRODUCTION

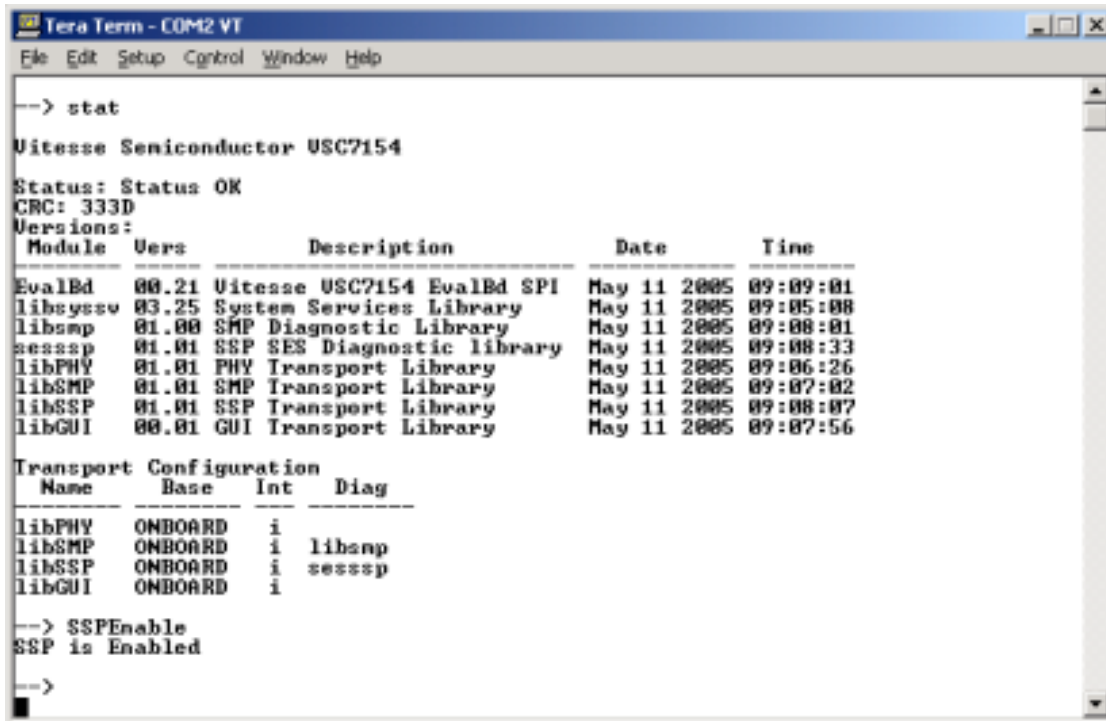
There may be some applications where customers need or desire to update the current firmware load of a Vitesse SAS Expander. One method of doing firmware updates is through the **SAS In-Band interface**, when a SAS host is connected properly to the SAS Expander. A Vitesse executable application, called "FWLOAD.EXE" is available, which allows this firmware update capability. This Application Note describes the procedure and required settings to initiate the firmware update through the "FWLOAD.EXE" Vitesse executable application.

#### CONFIGURING THE VITESSE SAS EXPANDER DEVICE

For the firmware update procedure, the SAS Expander device must be set to the desired memory configuration, using a Parallel flash or SPI flash device. In addition, the proper flash devices must be installed for proper SAS Expander operation, and for the proper operation of the FWLOAD command. The following steps are recommended for configuring the Vitesse SAS Expander device to operate properly with the "FWLOAD.EXE" Vitesse executable application, using the ROM monitor interface.

1. Apply power to the SAS Expander board through the desired power input interface.  
**WARNING:** *Ensure that the proper power supply sequence is implemented for the specific type of Vitesse SAS Expander device being used.*
2. Access to the SDK's ROM monitor is required to determine the state of the SSP virtual PHY in the Vitesse SAS Expander. Using a null modem cable, connect one end of the cable to the SAS Expander UART Connector and the other end of the cable to an open serial port on the PC.
3. Boot up the PC with the connected serial port, and ensure the associated COM port is configured within Windows 9x/NT/2000/XP as follows:
  - 9600 Baud
  - 8 Bit
  - No Parity
  - 1 Stop
  - No flow control
4. Open a HyperTerminal or Tera Terminal Pro session.
5. To access the ROM monitor, press <ENTER> at least one time to verify the ROM monitor session has been established (a "-->" prompt should appear if configured properly).

6. At the prompt, type “stat”, followed by <ENTER> to display the firmware revision status (see [Figure 1](#)).  
**NOTE:** Firmware with a release date of April 15, 2005 or later is required for proper functionality of the “FWLOAD.EXE” Vitesse executable application.
7. At the prompt, type “SSPEnable”, followed by <ENTER> to display the SSP status (see [Figure 1](#)).



```

Tera Term - COM2 VT
File Edit Setup Control Window Help

--> stat
Vitesse Semiconductor USC7154
Status: Status OK
CRC: 333D
Versions:
Module  Vers      Description          Date      Time
-----  -
EvalBd  00.21 Vitesse USC7154 EvalBd SPI    May 11 2005 09:09:01
libsysv 03.25 System Services Library    May 11 2005 09:05:08
libsmp  01.00 SMP Diagnostic Library    May 11 2005 09:08:01
sesssp  01.01 SSP SES Diagnostic library May 11 2005 09:08:33
libPHY  01.01 PHY Transport Library    May 11 2005 09:06:26
libSMP  01.01 SMP Transport Library    May 11 2005 09:07:02
libSSP  01.01 SSP Transport Library    May 11 2005 09:08:07
libGUI  00.01 GUI Transport Library    May 11 2005 09:07:56

Transport Configuration
Name      Base  Int  Diag
-----  -
libPHY  ONBOARD  i
libSMP  ONBOARD  i  libsmp
libSSP  ONBOARD  i  sesssp
libGUI  ONBOARD  i

--> SSPEnable
SSP is Enabled

-->

```

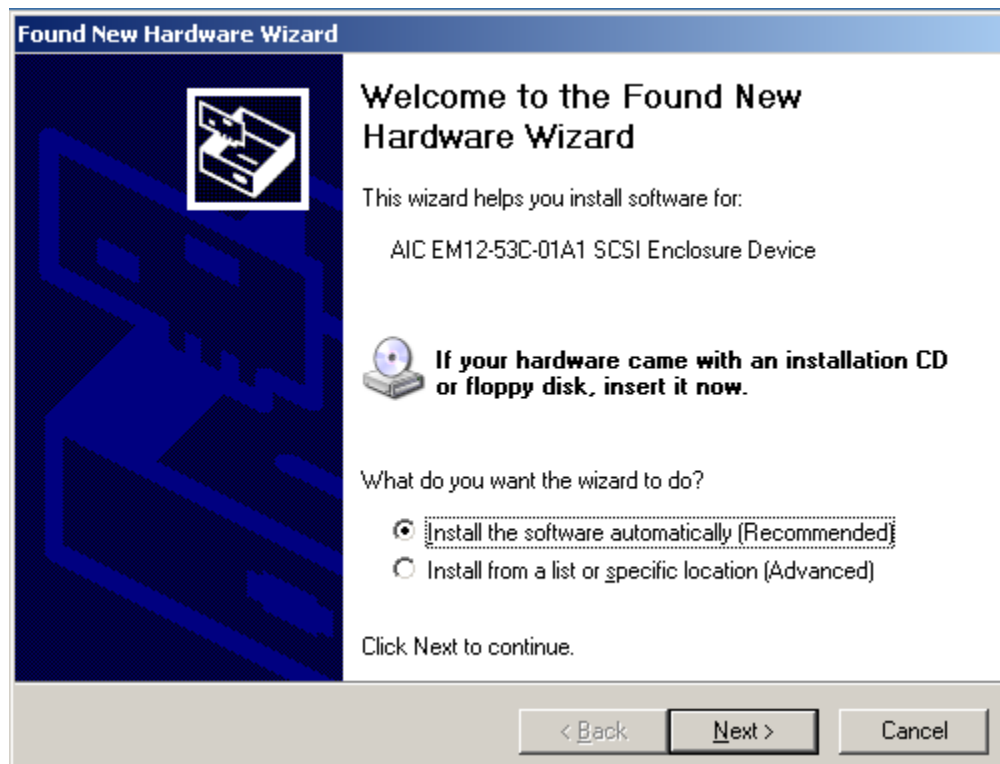
Figure 1. ROM Monitor status of “stat” and “SSPEnable”

8. If the status of the “SSPEnable” command is “SSP is Enabled”, then proceed to the *Firmware Update (FWLOAD) Procedure* section.
9. If the status of the “SSPEnable” command is “SSP is Disabled”, then type “SSPEnable 1”, followed by <ENTER> to enable the SSP.
10. RESET the SAS Expander device and then proceed to the *Firmware Update (FWLOAD) Procedure* section.

## FIRMWARE UPDATE (FWLOAD) PROCEDURE

For the firmware update procedure, the SAS Expander device must be set to the desired memory configuration, using a Parallel flash or SPI flash device. In addition, the proper flash devices must be installed for proper SAS Expander operation, and for the proper operation of the FWLOAD command. The following steps are recommended as a step-by-step method of providing power to the SAS Expander device and reaching a working state, with access to the ROM monitor interface, and the initiation of the “FWLOAD.EXE” Vitesse executable application.

1. Apply power to the SAS Expander board through the desired power input interface.  
**WARNING:** *Ensure that the proper power supply sequence is implemented for the specific type of Vitesse SAS Expander device being used.*
2. Using a PC with a SAS Host Adapter (updated with latest firmware and drivers), connect the SAS Mini SAS connector interface to the Vitesse SAS Expander device, using the appropriate SAS cable.
3. Boot up the PC with the SAS Host Adapter.
4. After logging into Windows, if the SSP virtual PHY is enabled with the proper firmware loaded into the Vitesse SAS Expander device, then Windows will detect the SAS Expander device.
5. When the *Found New Hardware Wizard* asks to install drivers for the Vitesse SAS Expander device, click on the “Cancel” button to bypass driver installation (see [Figure 2](#)).  
**NOTE:** *Driver development for the Vitesse SAS Expander device is a customization that AIC/Xtore can provide.*



**Figure 2.** *Found New Hardware Wizard* asks to install drivers for SAS Expander

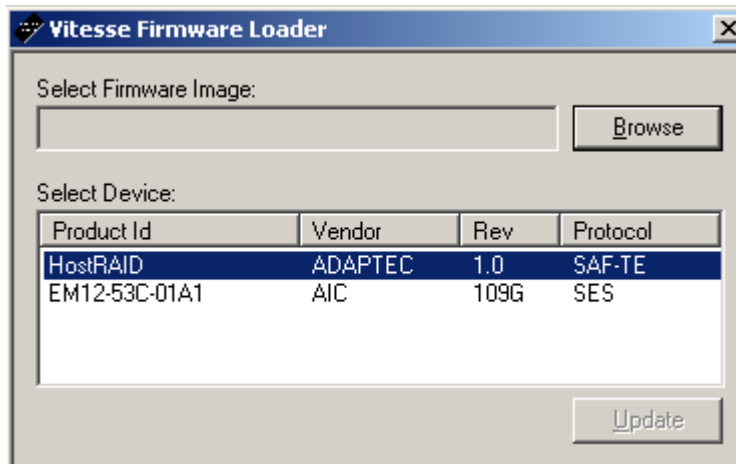
6. Once Windows has completed the logon process, save the new firmware image to a known location on the PC.
7. Copy the “FWLOAD.EXE” Vitesse executable application to a known location on the PC (see [Figure 3](#)).



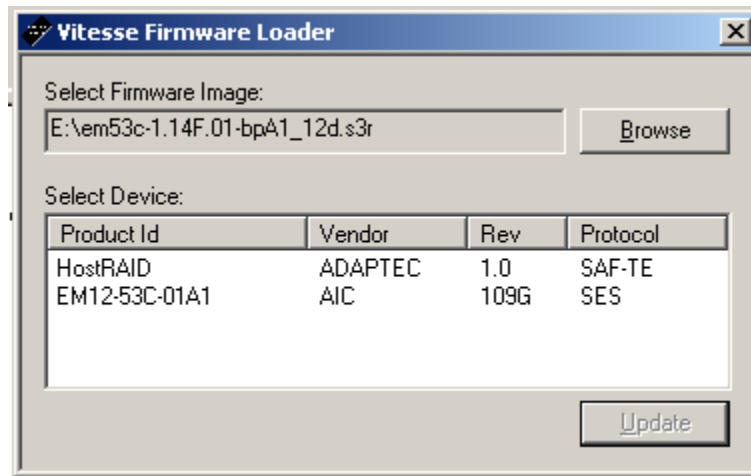
Fwload.exe

**Figure 3. “FWLOAD.EXE” Vitesse executable application**

8. Run the “FWLOAD.EXE” Vitesse executable application; the application will proceed with detecting the SAS devices connected to the Host PC.
9. After the application detects the SAS devices, the Vitesse Firmware Loader window will be displayed (see [Figure 4](#)).

**Figure 4. Vitesse Firmware Loader window**

- Click the “Browse” button and locate the new firmware image that was saved to the PC (see [Figure 5](#)).



**Figure 5. Vitesse Firmware Loader window with firmware selected**

- After the firmware image has been selected, click the “Update” button to start the SAS In-Band firmware update routine.
- A progress bar will be shown to indicate the status of the firmware update routine (See [Figure 6](#)). Monitor session displays as follow (see [Figure 7](#)):



**Figure 6. Vitesse Firmware Loader window during firmware update**

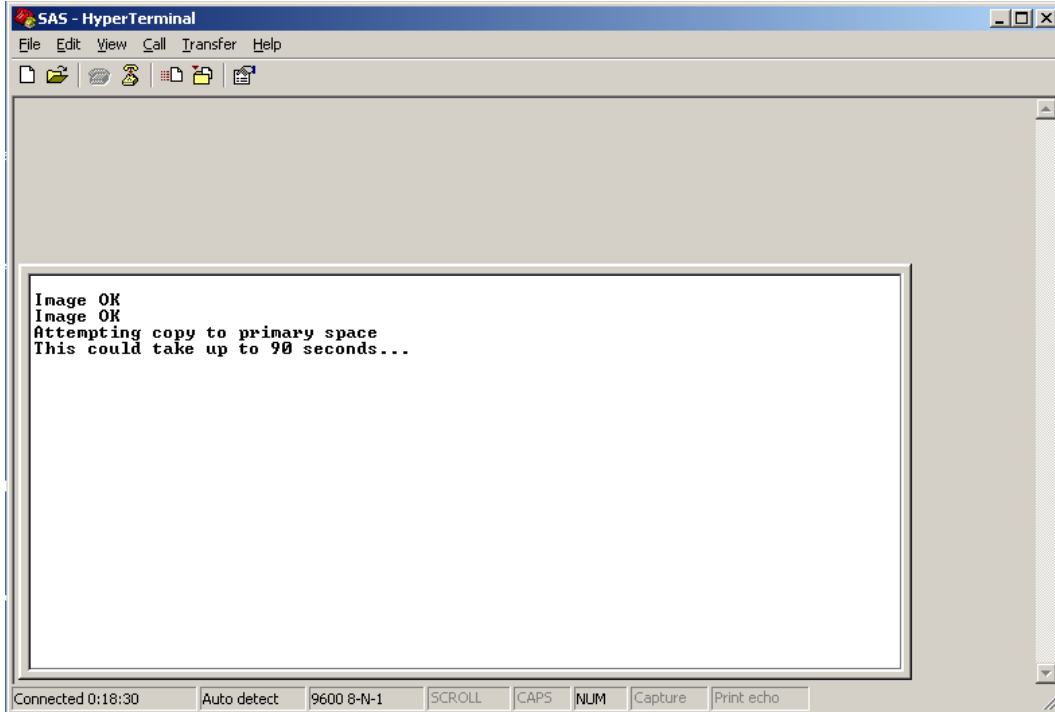


Figure 7. Monitoring window during firmware update

13. Wait for 2 to 5 minutes for the device **to reboot/beep**, the firmware update will be completed. After closing and re-opening the loader, the Vitesse Firmware Loader window will be displayed again showing the **new firmware revision** (see [Figure 8](#)).

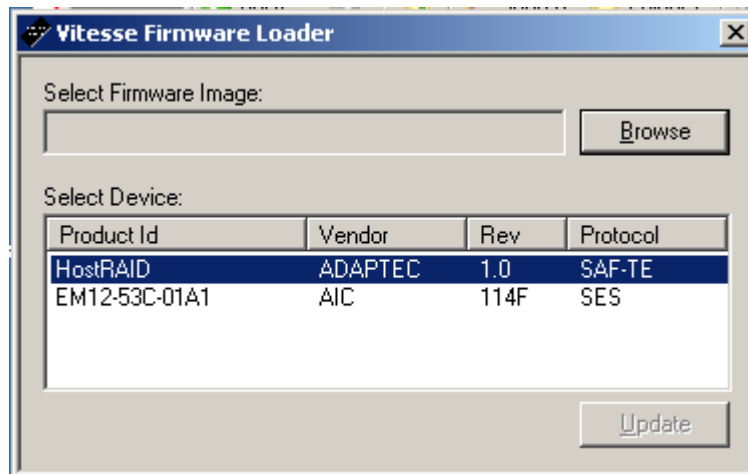
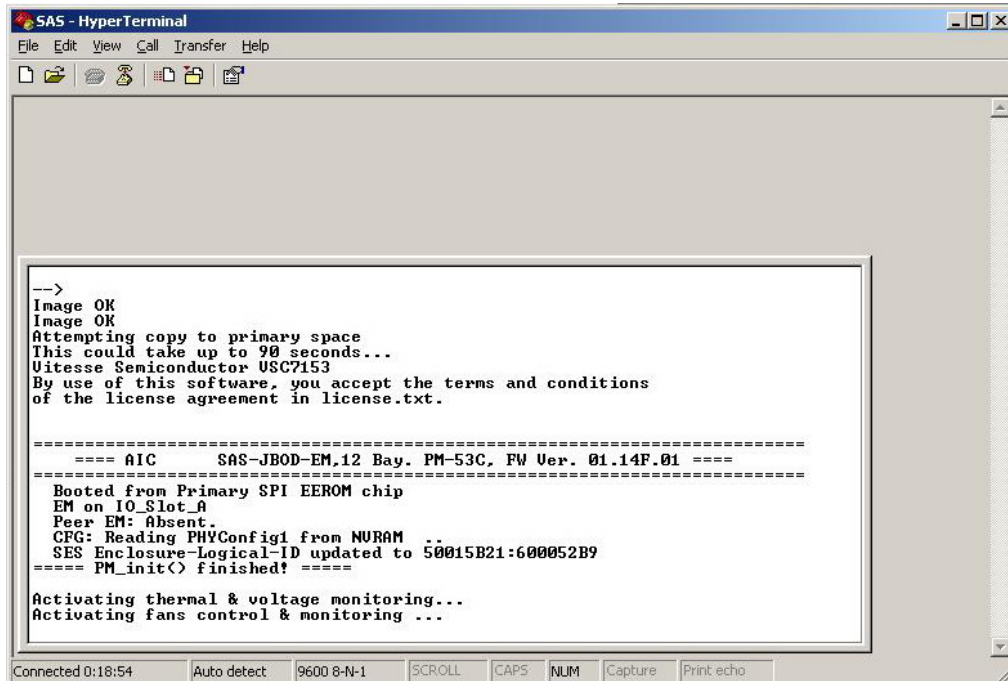


Figure 8. Vitesse Firmware Loader window with new firmware shown

**WARNING:** Please make sure to wait until SAS device to reboot before turning off the device. Fail to do so will cause the unit to brick and have to be returned to manufacture for reprogramming. To confirm that fwload process has finished check monitor session for upgrade status (see Figure 9).

The image shows a screenshot of a HyperTerminal window titled "SAS - HyperTerminal". The window contains a text-based interface for a firmware update. The text displayed is as follows:

```
-->
Image OK
Image OK
Attempting copy to primary space
This could take up to 90 seconds...
Vitesse Semiconductor USC7153
By use of this software, you accept the terms and conditions
of the license agreement in license.txt.

=====
==== AIC      SAS-JBOD-EM.12 Bay. PM-53C. FW Ver. 01.14F.01 =====
=====
Booted from Primary SPI EEROM chip
EM on IO_Slot_A
Peer EM: Absent.
CFG: Reading PHYConfig1 from NURAM ..
SES Enclosure-Logical-ID updated to 50015B21:600052B9
===== PM_init(<) finished! =====

Activating thermal & voltage monitoring...
Activating fans control & monitoring ...
```

The status bar at the bottom of the window shows "Connected 0:18:54", "Auto detect", "9600 8-N-1", "SCROLL", "CAPS", "NUM", "Capture", and "Print echo".

**Figure 9. Monitoring window with new firmware shown**

14. Close the Vitesse Firmware Loader application window.
15. For continued proper operation, RESET the Vitesse SAS Expander device, and restart the host PC.

The firmware update procedure should now be completed, using the “FWLOAD.EXE” Vitesse executable application. If there are any questions, or if further information is required, please contact a Vitesse Sales Representative or AIC/Xtore tech support.

This updated instruction is based on Vitesse SAS Expander FWLOAD Procedure Rev 0.1-Draft dated 5/31/05.

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