

TECHNICAL NOTE

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Updating the firmware on 32-bit SD-Rack DAC cards (P16336 variant)

Symptoms:

With certain card combinations in an SD-Rack it was found that the latest 32-bit DAC cards with Zynq firmware chip (P16336) don't always initialise correctly, and the slot is shown as empty in the Audio I/O window.

A new firmware is available which will correct this.

These instructions are provided to identify the different card versions and explain the necessary steps to successfully update the firmware.

Earlier 32-bit DAC cards (P16239 variant) do not require any firmware upgrade.

You will need:

- Windows PC running Windows 7 or later
- 1 x USB Cable with type A to type B connectors and a length of greater than 1m
- **P16336 ESS DAC32B.zip**
Once unzipped, this file contains two sub-folders:
 - TivaRackCardUpdater - Working folder for SD TIVA firmware programming
 - TIVA_USBSER_Drivers – Tiva Windows drivers
- The DAC32 firmware version 33 for P16336 variant DAC cards (included in the above zip file).

(Please note: The firmware version 18 for P16239 variant cards is also provided. This should not be used unless a card which was flashed with the incorrect firmware must be recovered.)

This Technical Note and the required software can be downloaded from here:

https://digico.biz/base_product/all-stage-racks/

Identifying the version of the 32-bit DAC cards (MOD-SDR-DAC32B)

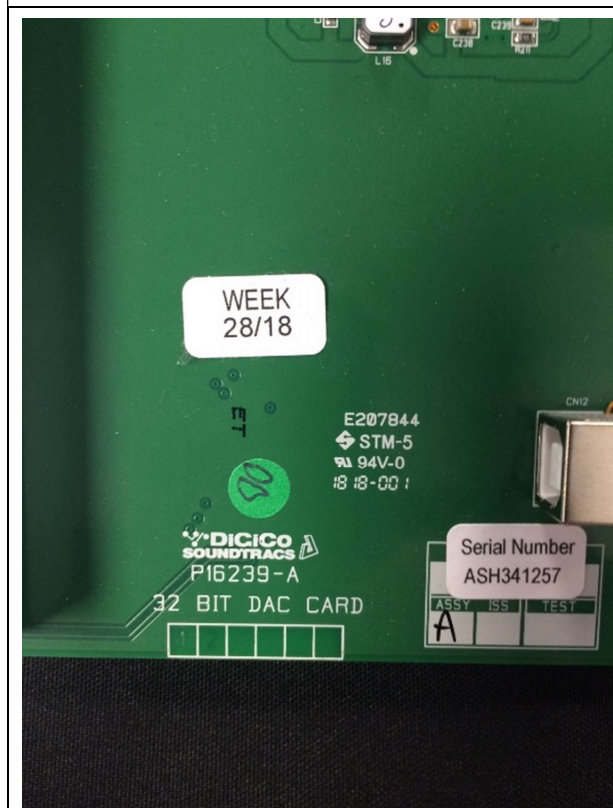
This section provides the information for correctly identifying the type of 32-bit DAC cards in use.

Earlier 32-bit DAC cards use a Spartan FPGA chip, and the PCB board is part number P16239. The description printed on the card is '32 BIT DAC CARD' (see pictures below).

These cards are unaffected and DO NOT require any firmware update.

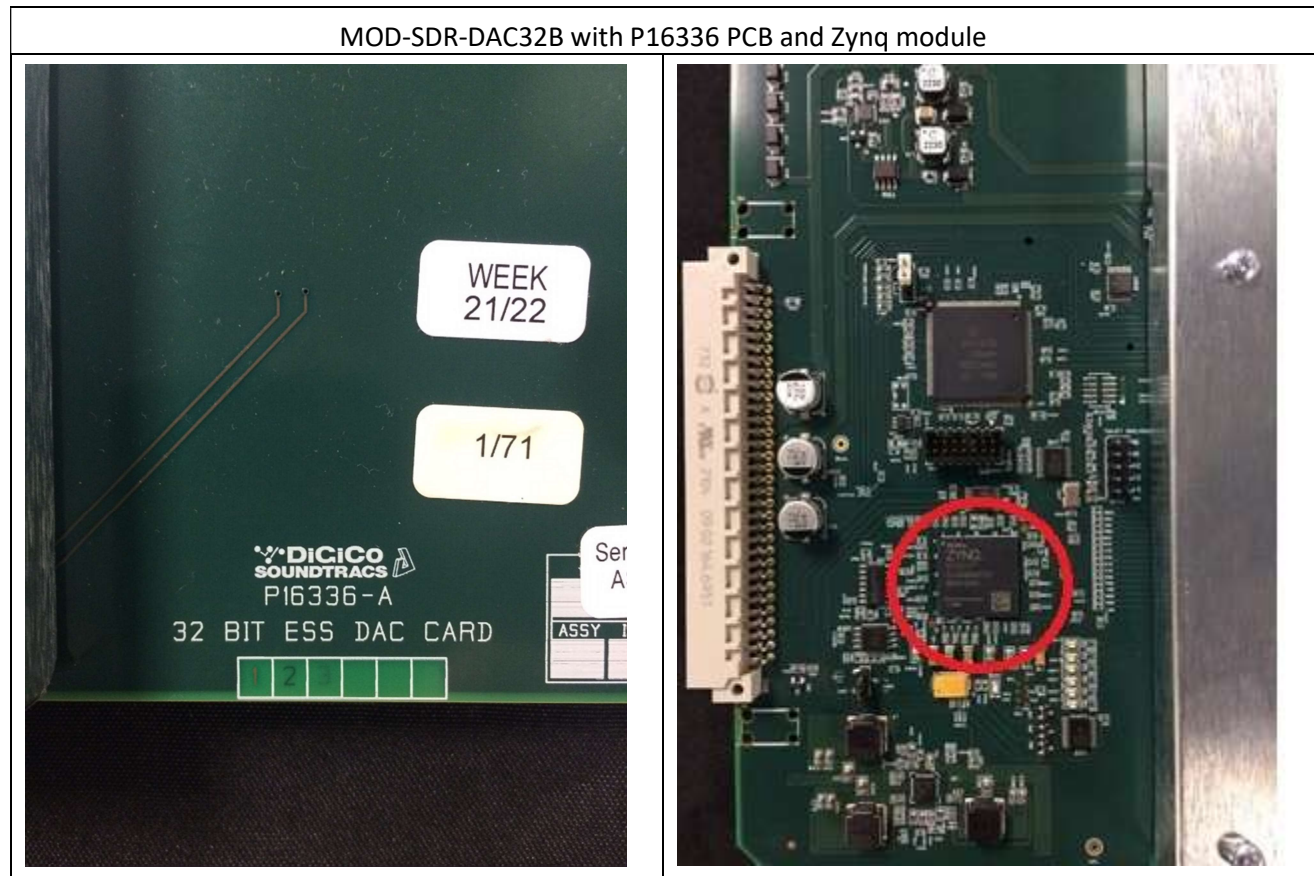
Flashing the card with the incorrect firmware will “break” the card and must be avoided. However, the card can be recovered by reprogramming it again with the correct firmware version. (see Appendix A)

MOD-SDR-DAC32B with P16239 PCB and Spartan FPGA chip

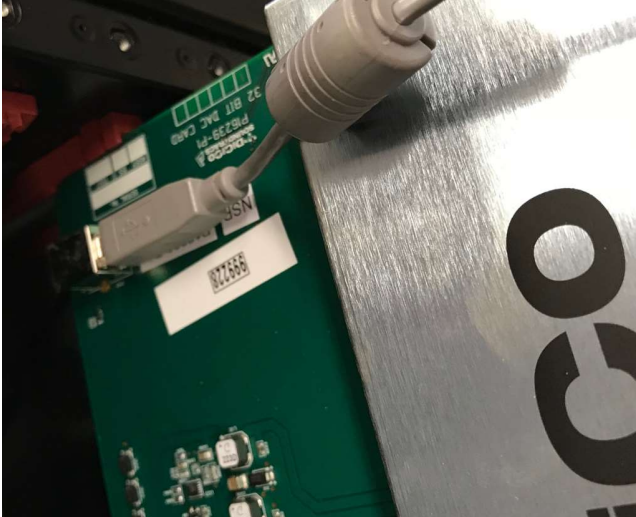
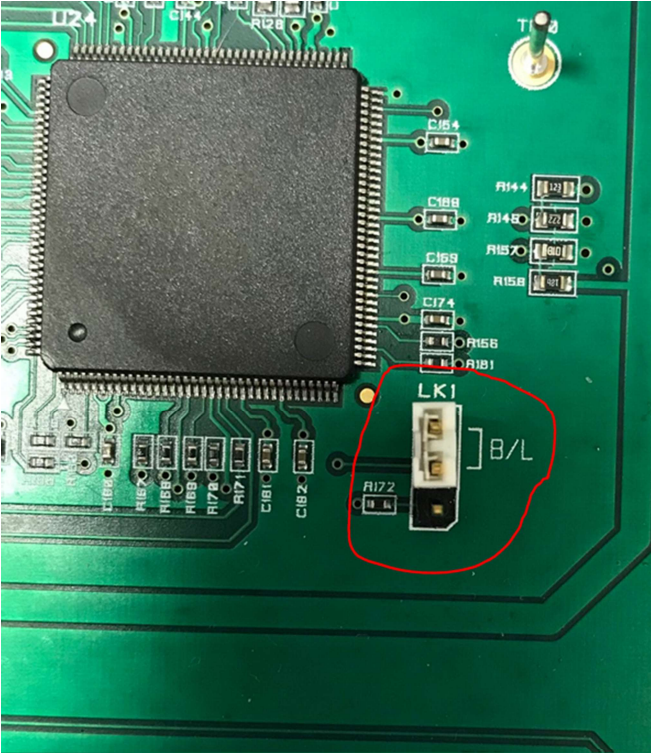


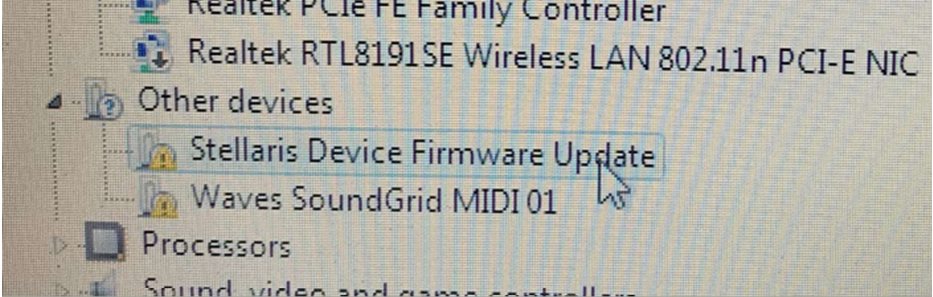
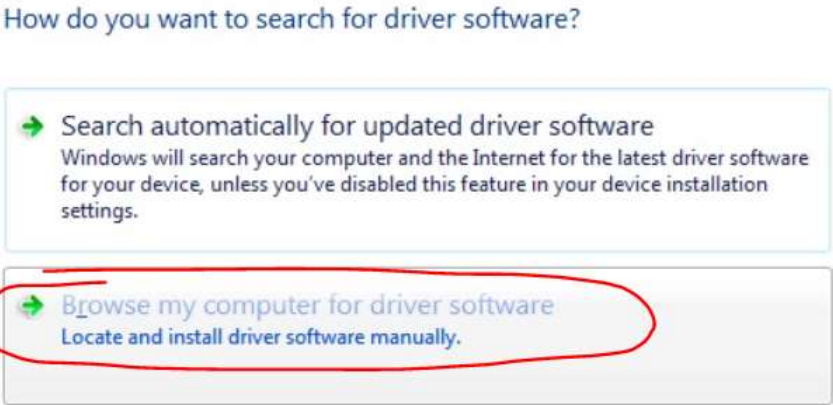
Later DAC cards (introduced from early 2022) use a Zynq chip, and the PCB board is part number P16336. The description printed on the card is '32 BIT ESS DAC CARD' (see pictures below).


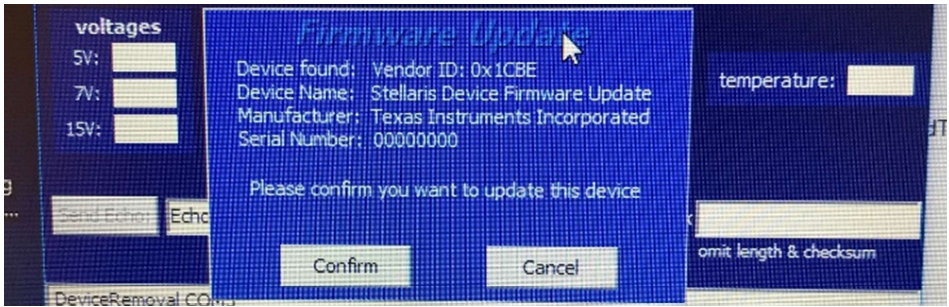
The firmware update process described below is only intended for these cards.



PROGRAMMING THE 32-bit DAC CARD (PA16336 ONLY)

	ITEM	INSTRUCTION
1	USB Connection	<ul style="list-style-type: none"> - Connect USB A-B from 32bit DAC USB B connector to PC USB A connector: 
2	LK1 Bootloader	<ul style="list-style-type: none"> - On the first card to be updated, set jumper LK1 to Bootloader (B/L): 
3	Power	<ul style="list-style-type: none"> - Plug 32bit DAC into any SD rack and turn power on

<p>4</p>	<p>USBSE Driver Installation</p>	<ul style="list-style-type: none"> - Unzip P16336 ESS DAC32B.zip - Navigate to Device Manager - Find Stellaris Device, under 'Other devices'  <ul style="list-style-type: none"> - Right click and select device properties - Select "Update Driver" - Select "Browse my computer for driver software"  <ul style="list-style-type: none"> - Browse to the TIVA_USBSE_Drivers folder inside the P16336 ESS DAC32B folder and click "Next" - Drivers will successfully install, and TIVA will display as a Stellaris Device Firmware Update (DFU) - You may need to restart your PC for the driver to finish installation correctly. This will differ from PC to PC.
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5	TIVA Programming	<ul style="list-style-type: none"> - Navigate to the TivaRackCardUpdater folder inside the P16336 ESS DAC32B folder - Open the folder and run 'SDRackCardTiva.exe' - From "COM Port:" drop down menu, select <none> and click "Update Firmware" 
6	TIVA Programming	<ul style="list-style-type: none"> - A pop-up menu will confirm that the 32bit DAC TIVA DFU has been found - Click "Confirm":  <ul style="list-style-type: none"> - Wait for the progress bar to complete, then click "Close" - The TIVA is now successfully programmed - Close 'SDRackCardTiva.exe'
7	RESTART	<ul style="list-style-type: none"> - Unplug 32bit DAC card from SD rack (Power off) - Remove USB cable from USB port on the card - Remove the LK1 jumper from the bootloader setting (marked B/L) and set to normal - Plug 32bit DAC back into SD rack - Front panel GT and SPLIT LED will flash once during boot up.
8	Programming subsequent cards	<p>If additional cards need programming, it is not necessary to set the LK1 jumper to bootloader mode because the correct USB drivers are now installed on the PC. Leave jumper LK1 as is.</p> <ul style="list-style-type: none"> - Plug the USB cable into the card and insert the card into a rack slot - Run 'SDRackCardTiva.exe' from the TivaRackCardUpdater folder - Select the card from the COM port drop down menu and hit 'Update Firmware' - Then complete the remaining steps as before.

Appendix A:

Recovery of an early MOD-SDR-DAC32B card (P16239 variant) which was flashed with the incorrect firmware version.

Open the '**TivaRackCardUpdater**' folder.

Open the '**RECOVERY v18 for P16239**' folder.

Run 'SDRackCardTiva.exe' from within this folder

Proceed with the firmware update as described in this document from Step 5 onwards.