Application Note DT-AN-351-1

DTU-351 HD-SDI Input for USB-3 – System Requirements

17 July 2015

1. Introduction

The DTU-351 is a compact USB-3 device for getting an HD-SDI signal into a laptop or PC, e.g. for analysis or monitoring with DekTec's SdEye software.

The high bitrate of HD-SDI makes the DTU-351 a demanding device on the USB-3 bus. Furthermo PC support for USB-3 is still relatively immature. Because of this the DTU-351 may not o properly under all circumstances.

This application note provides guidelines and restrictions for using the DTU-351 in a PC environm

General System Recommendation for the DTU-351
If you have the choice, DekTec recommends to use the DTU-351 with Windows 8/8.1, on a PC with an on-board USB-3 host controller (i.e. do not use a USB-3 PC add-on card).

2. Host System

As an obvious first step, please ensure that the PC system you want to use has one or more USB- ports. The DTU-351 will not work in a USB-2 port. Furthermore a proper USB-3 cable shall be used

Appendix A contains a list of PC types that DekTec trusts (but not guarantees!) will work with wel the DTU-351, if the OS requirements listed in the next section are observed.

Appendix B contains a list of PCs that have been tested to work, while Appendix C contains a list motherboards that have been tested.

3. Operating System

The DTU-351 is supported by the following operating systems:

Operating System	Remarks
Windows 8, Windows 8.1 (64 bits[1]	This OS has native support for USB 3. Do not install the driver supplied with the USB-3 host controller.
Windows 7 (64 bits[1]	No native OS support, the driver supplied with the USB-3 host controller has to be used.
Linux ≥ 2.6.31	This OS has native support for USB 3.

Older versions of Windows, server versions of Windows and Mac OS X are not supported.

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[1] 32-bit versions of Windows will probably work but have not been validated by DekTec. DekTec recommends using 64-bit OS to meet the performance requirements for processing HD-SDI.

4. USB-3 Host Controller

The USB-3 host controller is the device (chip) that manages the USB-3 transfers between host (PC) USB-3 device, in this case the DTU-351.

The following host controllers have been tested successfully for both Windows 7 and Windows 8:

USB-3 Host Controller	Remarks
Etron USB-3 Extensible Host Controller	Used on motherboards
Intel USB-3 eXtensible Host Controller	Used on motherboards
Renesas/NEC D720200	Used on motherboards
Renesas/NEC D720202	Used on PC add-on cards with 2 external USB-3 ports

Note: The Renesas/NEC host controller has been tested on Windows 7 with driver version v2.1.36 Older versions of this driver do not run stable.

The following USB-3 host controllers are not supported by the DTU-351:

USB-3 Host Controller	Remarks
Asmedia ASM1042 1144A/1144B	Used on PC add-on cards with 4/2 external USB-3 ports
Texas Instruments TUSB7340	Used on PC add-on cards with 4 external USB-3 ports
VIA/VLI VL810/VL811	Used on PC add-on cards with 4/5 external USB-3 ports

5. Troubleshooting

Two common issues that may prevent proper operation of the DTU-351 are:
1. The USB connection operates in USB-2 instead of USB-3 mode.
2. The USB-3 bandwidth required by the DTU-351 cannot be allocated.

5.1. DTU-351 starts in USB-2 instead of USB-3 Mode

You can use the utility DtInfo (downloadable from www.dektec.com/Downloads/Utilities.asp) to ch
whether the DTU-351 is connected in USB-2 or in USB-3 mode.

In USB-2 mode, the DTU-351 is visible in DtInfo and VPD data can be read, but the DTU-351 cann
transfer HD-SDI or other data at all.

If this condition occurs, please first try to fully disconnect the USB-3 connector on both ends of th
cable, and reconnect.

If the problem remains, a possible cause for this condition is the quality of the cable, which has to
a good-quality USB-3 cable, preferably a short one. If the DTU-351 still only starts in USB-2 mode,
there may be a compatibility problem, see the rest of this document.

5.2. Insufficient USB-3 Bandwidth

The DTU-351 uses so-called isochronous transfers for transporting HD-SDI frames from DTU-351 t
the host system. Isochronous transfers guarantee that sufficient bandwidth is available on the US
bus for maintaining a real-time stream. To enable isochronous transfers, the USB driver must first
request ("allocate") the maximum isochronous bandwidth the device will require. The USB subsys
will grant the allocation request, unless it cannot guarantee the bandwidth, e.g. because multiple
devices are connected to the USB-3 port through a USB-3 hub, and the total requested bandwidth
exceeds the available bandwidth.

The available isochronous bandwidth for USB-3 is 3144Mbps. The DTU-351 requires 1572M
when it is used in unscaled mode. One could think that this would allow the usage of two DTU-35
connected through a USB-3 hub to a single USB-3 port, but then the operational margin is 0%. De
is still investigating whether proper operation can be guaranteed this way. Connecting three DTU
in unscaled mode through a hub to a single USB-3 port will not be possible for sure.

The required USB-3 bandwidth is allocated by the DTU-351 driver when it starts up. If this bandwi
request fails, the DTU-351 cannot be used. You can check this condition by running DtInfo, and
looking at the "IO Conf." box. The error message is self-explanatory:

Appendix A. List of PC Types/Series with Supported Host Controller

The list below contains PCs that are likely to work with the DTU-351, based on the USB-3 host controller in these PCs (see also §4.). Please observe the following notes:
- DekTec has not validated these PCs with the DTU-351 and therefore cannot guarantee that the DTU-351 will actually work well. Inclusion in this list is based on the USB-3 host controller.
- A list of PCs that have actually been validated with the DTU-351 is contained in Appendix B.

Please help DekTec to extend these lists
If you have a PC that works well with the DTU-351 or that does not work or that's supposed to work but does not, report the PC and a comment to info@dektec.com. Thank you for your help.

PC	Type / Series
Dell Inspiron	14,14R,14Z,17R, N3110
Dell Latitude	E6320, E6330, E6420, E6430, E6520, E6530
Dell Optiplex	390, 790, 990, 7010
Dell Precision	M4600, M6600, T1600, T3600
Dell Vostro	3450, 3750
HP EliteBook	8540w, 8460p
HP ProBook	4530
Lenovo ThinkPad	T420, T520, W520, X1, X220
Microsoft Surface Pro	Surface Pro, Surface Pro 2
Toshiba Qosmio	X870

Appendix B. List of PCs Tested with the DTU-351

The list below contains PCs that have been tested to work well with the DTU-351.

PC	Operating System	Remark
Dell OptiPlex 7010MT	Windows 7	
Dell Precision T3600	Windows 8	
Microsoft Surface Pro	Windows 8	
Toshiba Qosmio X870	Windows 8	

Appendix C. List of Motherboards Tested with the DTU-351

The list below contains motherboards that have been tested to work well with the DTU-351.

Motherboard	Operating System	Remark
ASUS P6X58D-E	Windows 7	
ASUS P8P67-EVO	Windows 7	
ASUS P8B75-MLX	Windows 8	
ASUS Rampage III Gene	Windows 7	
ASUS Z68X-UD3H-B3	Windows 7	
EVGA SKT 1155 Z77 FTW	Windows 7	
MSI Z87 G45 Gaming	Windows 8	