PCI MPEG Capture Device

Model 616 AVStream DirectShow Programming Manual

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SENSORAY | embedded electronics

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Introduction

The 616 AVStream driver and SDK allows DirectShow graphs to be built to capture data using the 616 board. Is a supplement to the WDM 616 driver, not a replacement. Sensoray will continue to support the 616 WDM Windows driver in addition to the 616 AVStream driver.

DirectShow by nature is a complex API. Additionally, some DirectShow filters may be buggy or interpret the standard differently. Connecting DirectShow pins is highly filter dependent and not driver dependent. Because of these issues, Sensoray can make no guarantees that it's AVStream driver will be compatible with third-party applications. The reality is that many capture drivers will not work with all third-party applications. Sensoray provides a DirectShow demo application using standard DirectShow components, which displays RAW preview (on capable video cards) and captures MPEG.

The 616 AVStream driver requires a DirectX9 capable video card capable of rendering UYVY format.

Feature Summary

- MPEG1/2 capture at full frame rate and full resolution.
- Raw YUV preview.
- Composite or S-video inputs.
- Free Windows driver and demo application.

Software

Installation

The software may be distributed on a CD or downloaded from Sensoray's web site. If the file is downloaded, it will need to be unzipped into a folder on the local drive.

After windows first loads with the 616 plugged in, a Windows "Found new hardware…" dialog appears. Select an option that allows specifying the driver location ("Install from a list or specific location"), click on "Browse" button and select the \Drivers subfolder of the Sensoray 616 software disk or the folder where the downloaded file was unzipped to. If a "Windows Logo testing not

passed" warning is displayed, click the "Continue anyway" button. The driver files will be copied and installed on your computer.

If the 616 was already plugged in and "found new hardware" was cancelled or the WDM driver was installed, open the control manager and select the 616 device. From there, select update driver and follow the standard driver installation procedure above.

Run the setup program (setup.exe) from the distribution disk or folder. Software components, including a demo application with the source code, will be installed into the /Program Files/Sensoray/616av folder. The drivers will also be installed in the above folder.

SDK Reference

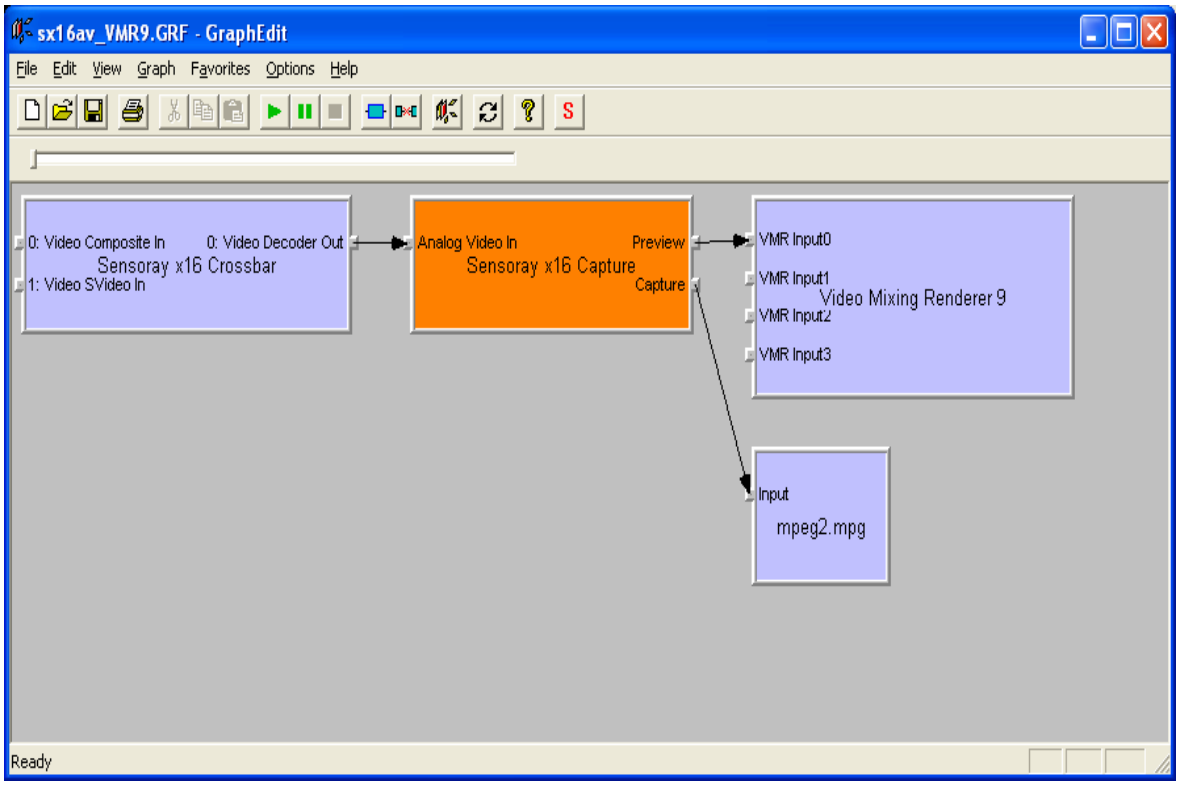
Release Notes

V.1.01:

- Initial release

Overview

The demo program builds the DirectShow graph below:



The crossbar allows selection of S-Video/Composite inputs on the 616.

The Capture device has 2 pins. The preview pin for the 616 is always the raw uncompressed stream.

The "Capture" pin is for the mpeg stream. The MPEG stream connects directly to the DirectShow "dump" filter. The dump filter source code is provided in the DirectX SDK under

%DXSDK_DIR%\dxsdk\samples\c++\directshow\filters\Dump

Pin Formats

The primary format for the pins is as follows.

Preview Pin ("Preview") Uncompressed

majortype : MEDIATYPE_Video

subtype: MEDIASUBTYPE_UYVY

formattype: FORMAT_VideoInfo2

NTSC: 640x480

PAL: 704x576

Capture Pin ("Capture") MPEG

majortype: MEDIATYPE_Stream

subtype: MEDIASUBTYPE_MPEG2_PROGRAM

formattype: KSDATAFORMAT_SPECIFIER_MPEG2_VIDEO

Interfaces supported

IAMAnalogVideoDecoder

- put_TVFormat (AnalogVideo_NTSC_M, AnalogVideo_PAL_B)

IAMVideoProcAmp

- Set (VideoProcAmp_Brightness, value, VideoProcAmp_Flags_Manual)
- Set (VideoProcAmp_Contrast, value, VideoProcAmp_Flags_Manual)
- Set (VideoProcAmp_Saturation, value, VideoProcAmp_Flags_Manual)

```
Default VideoProcAmp values

DEFAULT_BRIGHTNESS = 128;
DEFAULT_CONTRAST   = 64;
DEFAULT_SATURATION = 64;
```

IAMCrossbar

- Route(0, 0) // Composite Video

- Route(0, 1) // S-video

IX16Cfg

- GetAttr: Gets current attribute in driver
- SetAttr : Sets attribute(see below)
- GetGpio: Gets current Gpio byte
- SetGpio: Sets Gpio value byte

Attributes:

Video Bitrate

ATTR_video_bitrate = 10

Set the bitrate from 60000 to 9000000 (9Mbit/s)

GOP size

ATTR_video_m = 16

Set the GOP size. From2 to 30. Default 8

MPEG compression and size

ATTR_mpeg = 26

```
enum{
   COMP_MPEG2D1   = 0,
   COMP_MPEG1_SIF = 3,
   COMP_MPEG1_QSIF      = 4,
   COMP_MPEG2H720 = 5,
   COMP_MPEG2VGA  = 6,  // NOT supported for PAL
    } compression_values_t;
```

Stream Type

ATTR_stream_type = 27

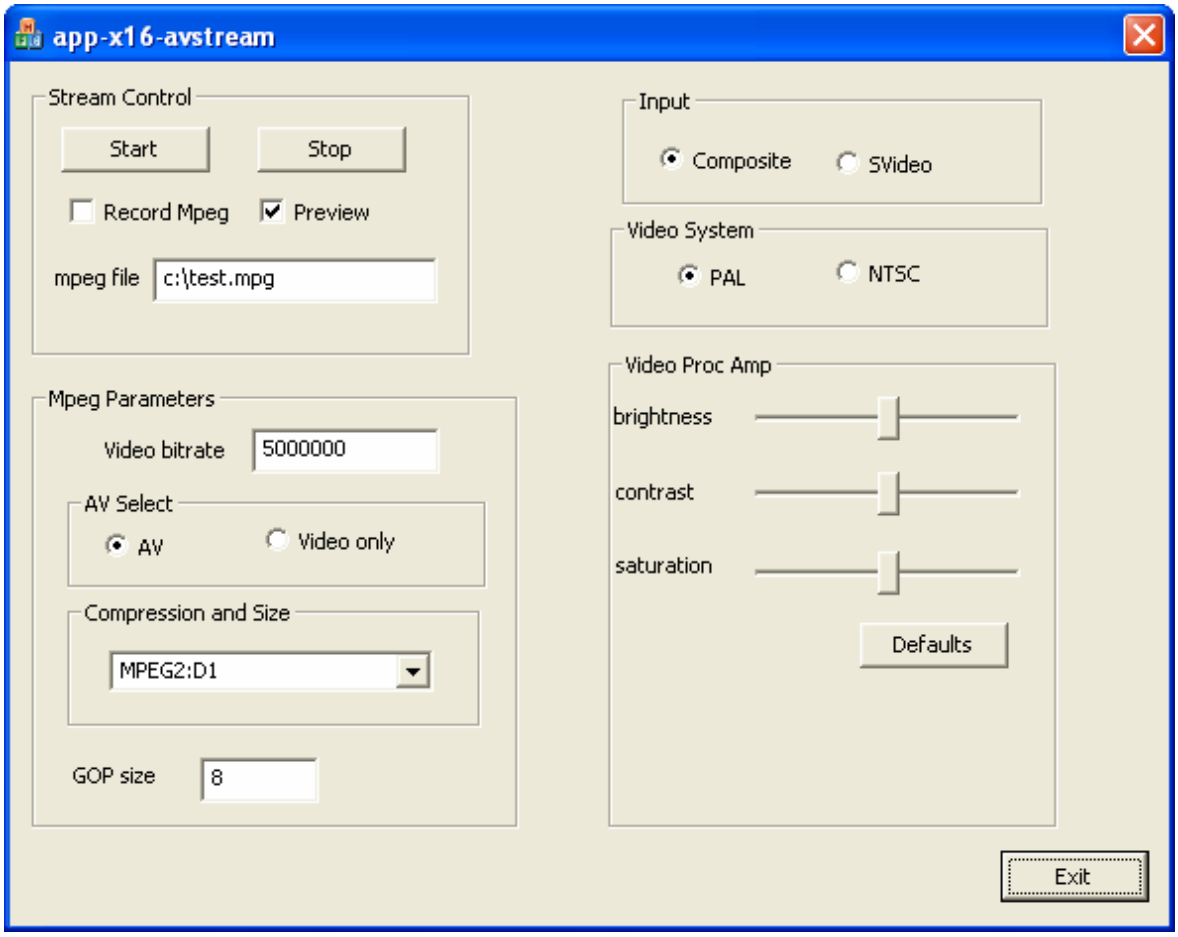
Value = 0 Multiplexed A/V

Value = 1 Video Only (MPEG compression)

Demo Application

The demo application was designed to show basic configuration and usage of the AVStream driver.

A screen shot of the demo application is shown below:



The stream is stopped and started with the Stream Control functions. Different filter graphs are built based on different settings. For example, Preview only will build a different graph than Record MPEG and Preview, which builds a different graph than Record MPEG only. The code for building the graphs is shown clearly in the file app-x16-avstreamDlg.cpp in the demo application directory.

The other functions are self-explanatory except that all settings except Video Proc Amp must be changed prior to starting the stream. Video Proc Amp values (brightness, contrast, saturation) are changed after the stream has started.

Modifications to the program can allow additional features. For instance, to change Video Proc Amp settings before starting the graph, the developer could create a so-called "setting graph" first where only the crossbar and avcapture graphs are added and the interfaces queried.

The demo application uses Smart Pointers to query interfaces. Smart Pointers are the recommended method for interface querying. This eliminates the possible of memory leaks, which can be difficult to track in DirectShow/COM programming.