

Gran Turismo 6/ Real-drive emulation using PS3 replay data/ FPDLinkIII & CAN

This is the introduction of the demonstration exhibited in the INTERNATIONAL TECHNICAL EXHIBITION ON IMAGE TECHNOLOGY AND EQUIPMENT 2017. We exhibited a demo that synchronizes and transfers CG driving video and driving data (CAN signals).

The main purpose of this demonstration is to run a simple driving simulation using Gran Turismo 6/PS3 without using expensive CG tools.

We think many customers are already using Vector company's CANape and our SVO-03 and SVM-03. With this environment, you can build a low-cost driving test environment. The CG video and driving data created in Gran Turismo 6 can transfer as FPD-Link III & CAN data using CANape and SVO-03. The receiving end of the data is the ECU, but this time it is received by CANape and SVM-03. See the text for details.

The outline of this demonstration is as follows.

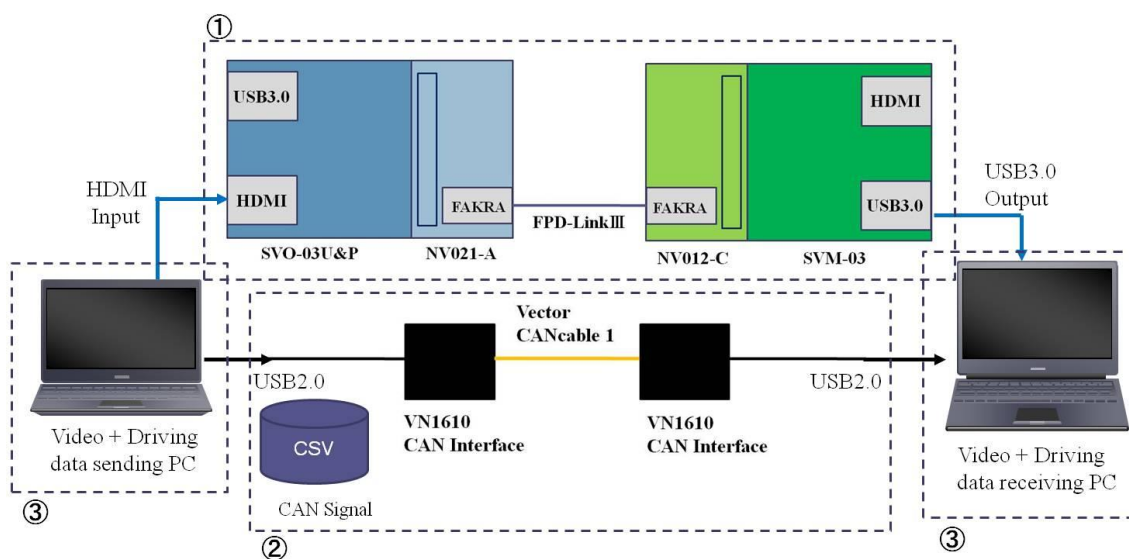


Figure 1: Overview of the entire demo structure

The outline of ① ~ ③ in the figure is as follows.

- ① Transfer of video data: Our SV board and Vector's app were used.
 - ② Transfer of driving data: Vector's app and CAN transfer devices were used.
 - ③ CG video and driving data creation: The replay data of PS3 game software was used.
- ※ Vector's app : CANape

We will explain the configuration of the above ① ~ ③ and the app "CANape" of the Vector company.

① Transfer configuration of video data

We use our SV board to transfer video data between PCs.

The device configuration used is as shown below.

- SVO-03U&P (Our Board)
- NV021-A (Our Board)
- NV012-C (Our Board)
- SVM-03 (Our Board)
- PC (2 pcs)

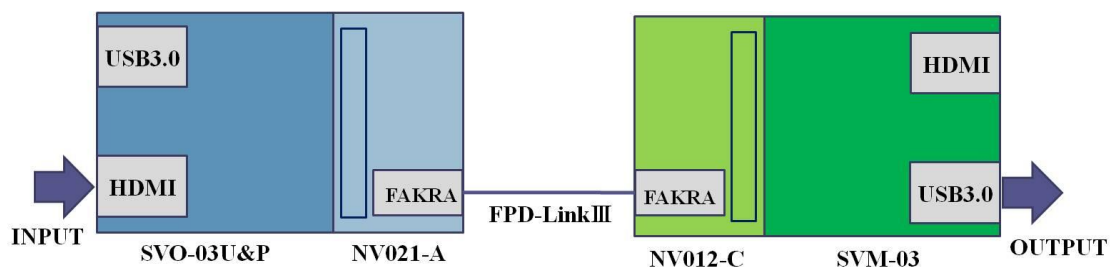


Figure 2: Transfer configuration of video data

SV board	Input	Output
SVO-03U&P	HDMI	Parallel
NV021-A	Parallel	FPD-Link III
NV012-C	FPD-Link III	Parallel
SVM-03	Parallel	USB3.0

Table 1: Input and output of each SV board used in the demo

- SVO-03U&P

This board is used to capture HDMI signals and output to the USB 3.0 port or parallel port.

Use in the mode to output to the parallel port, and transfer data to NV021-A.

- NV021-A

This board is used to capture parallel signals and convert them to FPD-Link III signals.

- NV012-C

This board is used to capture FPD-Link III signals and convert them to parallel signals.

- SVM-03

This board is used to capture parallel signals and output to the USB 3.0 port or HDMI port.

Use in the mode to output to the USB 3.0 port (UVC mode), and transfer data to the PC.

In this configuration, SerDes conversion (FPD-Link III) is performed and the SVM-03 side is made a virtual ECU.

②Transfer configuration of driving data

The transfer of driving data between PCs uses a Vector device.

The device configuration used is as shown below.

- VN1610 CAN Interface (Vector, 2 pcs)
- Vector CANcable 1 (Vector)
- PC (2 pcs)

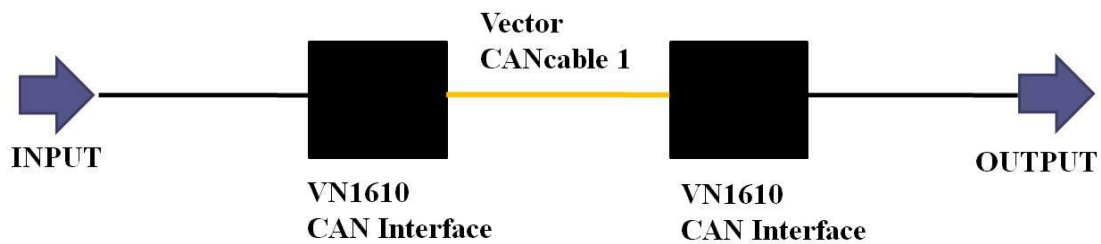


Figure 3: Transfer configuration of driving data

- VN1610 CAN Interface

CAN high-speed transceiver.

It has a USB 2.0 connector and a D-sub connector, and in this demonstration, the USB 2.0 side was connected to the PC and the D-sub connector side to Vector CANcable 1 and the transfer of the driving data was done.

- Vector CANcable 1

Used to connect two VN1610 CAN Interfaces.

③Creation of CG video and driving data

CG video and driving data use the PS3 Gran Turismo 6 replay data.

Video data and driving data are transferred from PS3 to PC in a separate way.

The video data used SVO-03U&P, and the driving data used the standard features of the PS3 and free software.

The format of the data transferred between the PC is the video is AVI, the driving data is CSV, so also explain how to convert.

The device and app configuration used to retrieve the data are as shown below.

- PS3
- Gran Turismo 6 (PS3 software)
- USB memory
- Motec's data analysis software "I2 Pro"

(Free software • URL : <http://www.motec.com/i2/i2downloads/>)

- SVO-03U&P (Our Board)
- PC
- NVCap (Our UVC capture software)

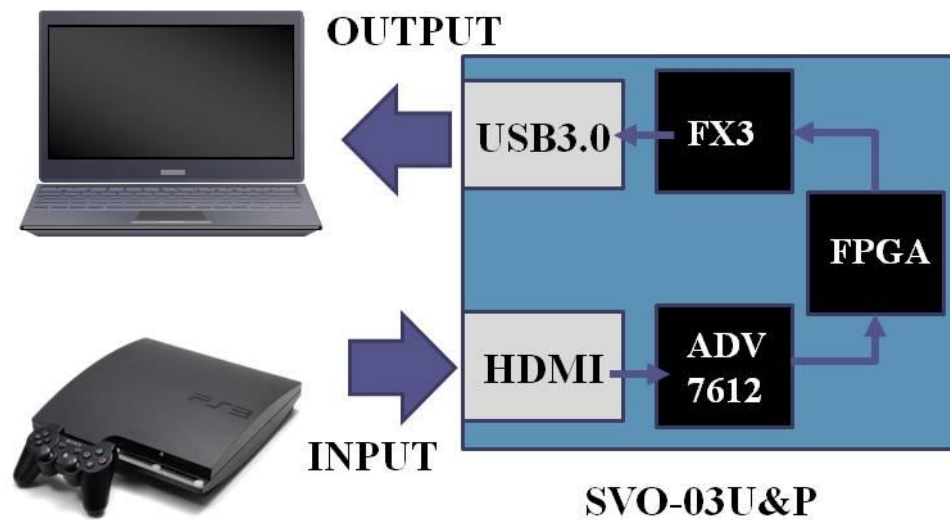


Figure 4: Transfer configuration of video data from PS3 to PC

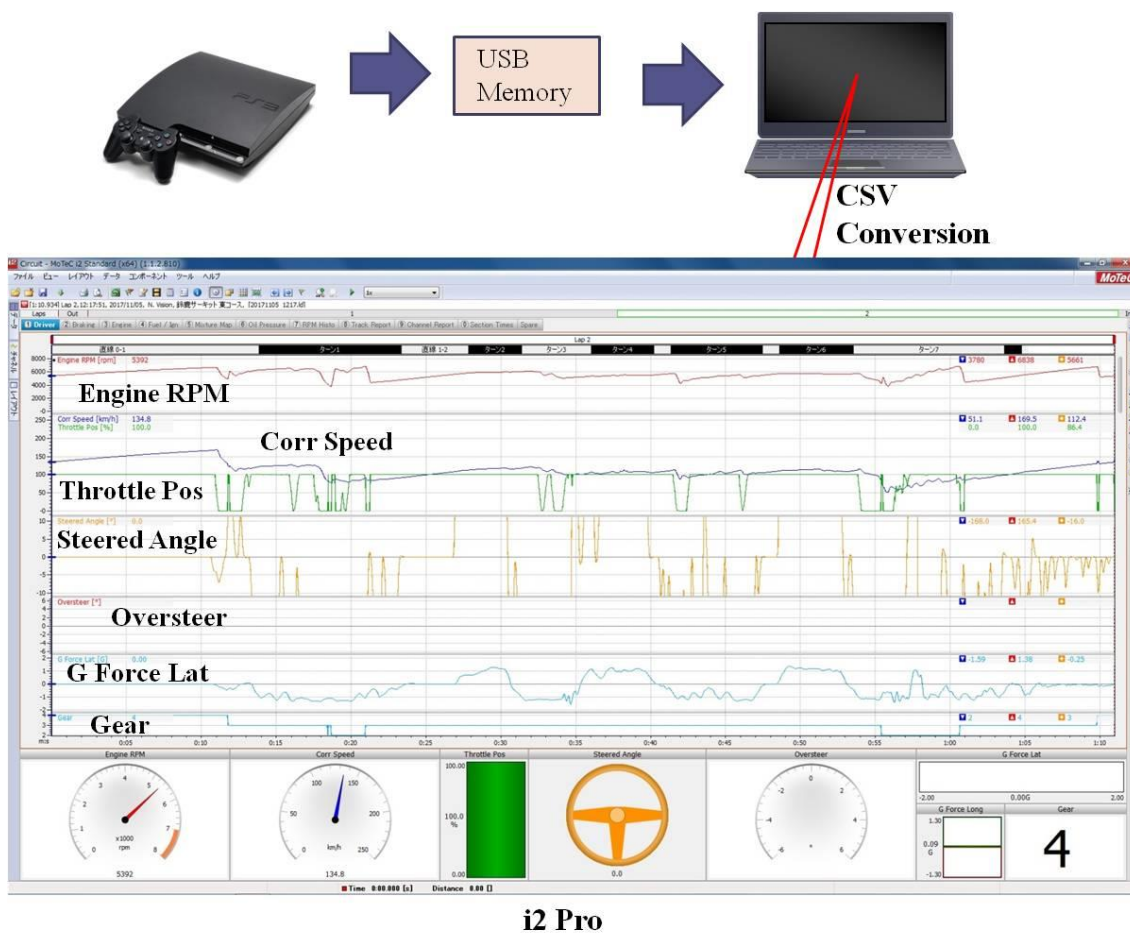


Figure 5: Transfer configuration of driving data from PS3 to PC, and I2 Pro screen.

○How to transfer video data from PS3 to PC.

- Create and save replay data in Gran Turismo 6 in advance.
- Use our SVO-03U&P to transfer video data to PC. ※1
- Start the NVCap on the PC side, and capture the screen image the PS3 that has been transfer from SVO-03U&P. ※2

This will complete the video data extraction.

※1 : SVO-03U&P is a board that captures the HDMI signal and outputs it to a USB 3.0 port or parallel port.

This time, the HDMI signal which comes out of the PS3 as shown in Figure 4 is captured, the processing is done by the FPGA, etc., and it transfers it to the PC (used in UVC mode).

※2 : NVCap can record video to PC in AVI format. For more information on our boards and apps, please refer to the product documentation.

The figure below shows the screen of the "I2 Pro" Application used in the driving data extraction.

"I2 Pro" is introduced as an application for analysis of driving data in the online manual of Gran Turismo 6 (<https://www.gran-turismo.com/jp/gt6/manual/>).

The items that can be analyzed are data such as speed, engine rpm, steering angle, etc. It is not displayed in the figure below, but it is also data such as GPS data.

Use this app to convert driving data to CSV format.



Figure 6: I2 Pro screen

○How to transfer driving data from PS3 to PC. ※3

- Save replay data in Gran Turismo 6, and insert the USB memory into the PS3.
- Choose the "Gallery" of the PS3 "my home".
- Choose "Library" in the "replay" that appears on the left of the PS3 screen.
- Select the replay you want to export data from the list of replays on the right side of the PS3 screen.
- When the replay detail screen appears, select "Export MoTeC i2 Pro data to USB memory" and decide.
- Insert the USB memory that contains the data into PC, start I2 Pro, and select "Circuit Workspace".
- Top left file > Open the log file and select the file you just saved.
- The driving data is displayed on the screen (the screen shown in the above figure 6 is displayed).

- Open the top left file > Export data and export the output file format to CSV file.
- The output CSV file has unnecessary data on the Top 14 lines, so remove that part.

This will complete the extraction of the driving data.

※3 Until the data is written to the USB memory, the same content is described in the "replay" > "MoTec i2 Pro Data Export" item in the online documentation of Gran Turismo 6.

■ About the "CANape" application for data transmission of Vector Company

Use the app called CANape on both the data sending PC and the data receiving PC.

The apps you use are the same, but the project files are separated by the sending side and the receiving side.

○ Sending side

CANape reads video data (AVI file) and driving data (CSV file) to transfer data to the receiving side.

The figure below shows the CANape screen of the sending side.

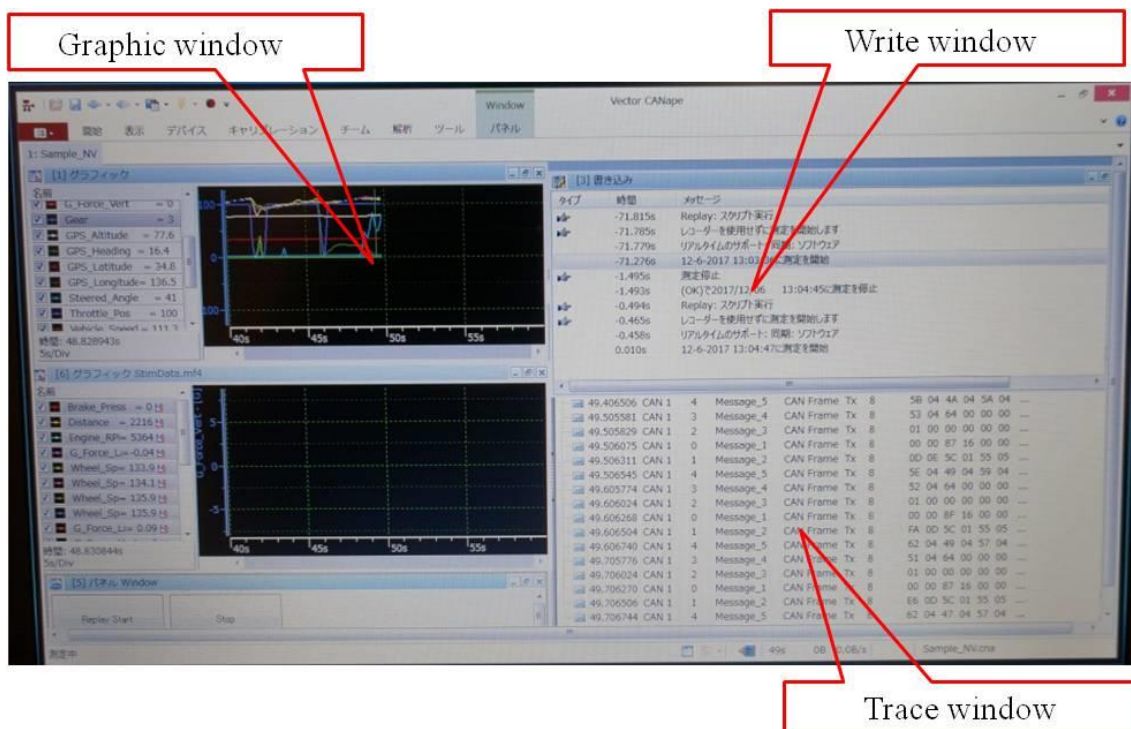


Figure 7: CANape sending side screen

Multimedia window



Figure 8: CANape sending side screen

Graphic window: Graphs data such as speed and gear status in CSV data.

Write window: Show CANape activity History

Trace window: Show the CAN data to send

Multimedia window: Show the video data to send

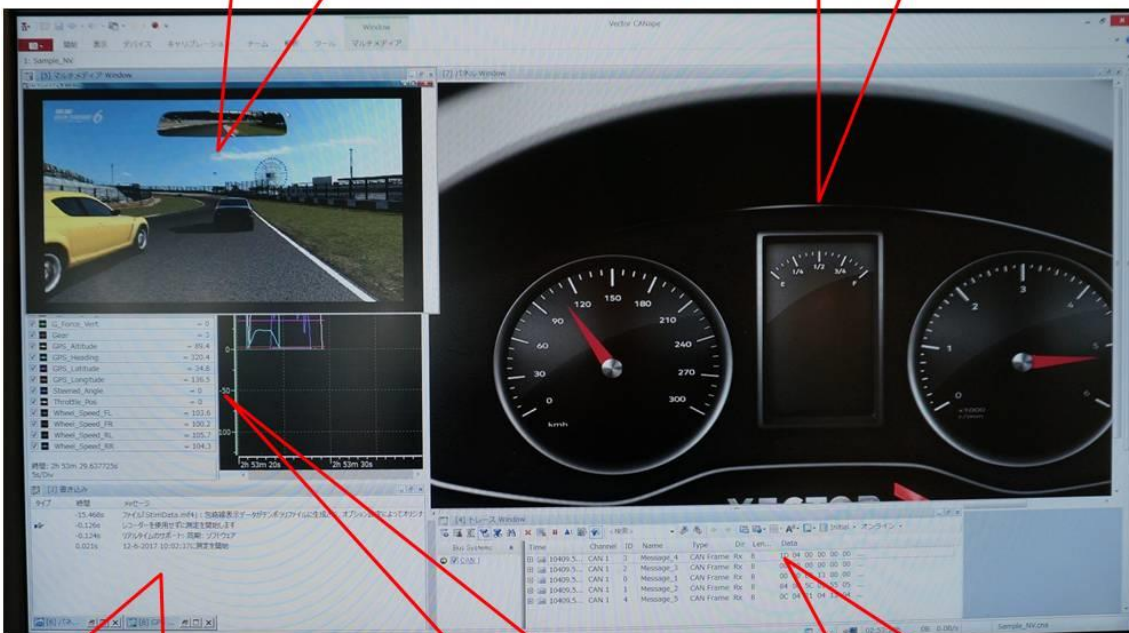
○Receiving side

Select SVM-03 as a video data import device.

The figure below shows the CANape screen of the receiving side.

Multimedia window

Panel window



Write window

Graphic window

Trace window

Figure 9: CANape receiving side screen

Multimedia window: Show the video data to receive.

Panel window: Visualize the speed and engine rpm from the received drive data.

Write window: Show CANape activity History.

Graphic window: Graphs data such as the received driving speed and gear status.

Trace window: Show the CAN data to receive.

○Synchronization of video data and driving data

It is synchronized by doing the cueing of AVI and CSV at the start of sending.

In this demonstration, we were able to confirm that the speed meter moves according to the video.

The overall structure, such as the board actually used in this demo, is shown below.

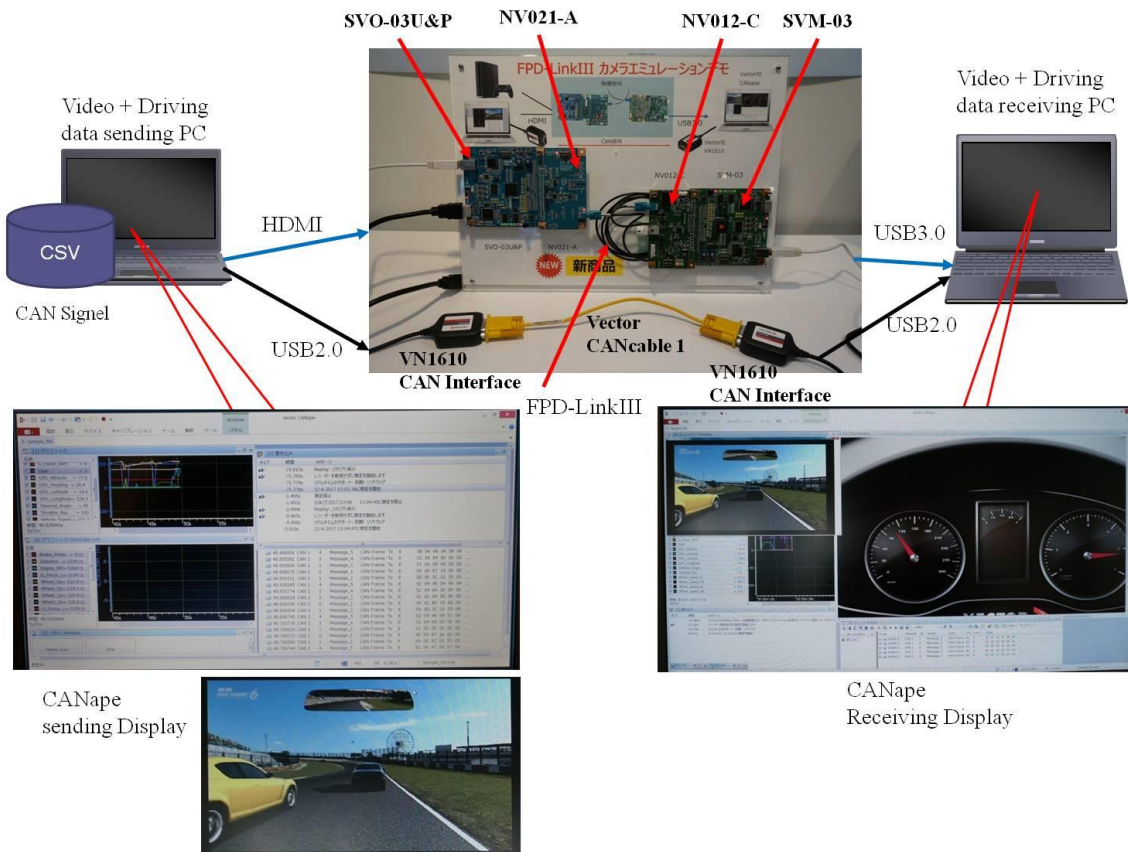


Figure 10: Overall composition

In this demonstration, we were able to take the driving video and driving data that we created on the PS3 to a PC and transfer it from PC to PC.

By changing the receiver to an ECU, we think it will be possible to put CG video and driving data into the ECU at a low cost.

If you are interested in the contents of the demo, please contact us below.

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Thank you.

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