Photron

FASTCAM Mini / Nova Series

YOKOGAWA DAQ Connection Quick Guide

2023/01 ver.01

This document describes how to synchronize a camera with Yokogawa Test & Measurement Corporation DAQ and to measure waveform.
For more details about camera, refer to each manual attached to the FASTCAM.

⚠ ▪ Read "FASTCAM First Step Guide" before using.
▪ To connect YOKOGAWA DAQ to a PC, a USB driver (YKMUSB) is required.
  Download and install it from the Yokogawa Measuring Corporation website.
▪ Mini CX is not supported.

DAQ Setup

1 Setup

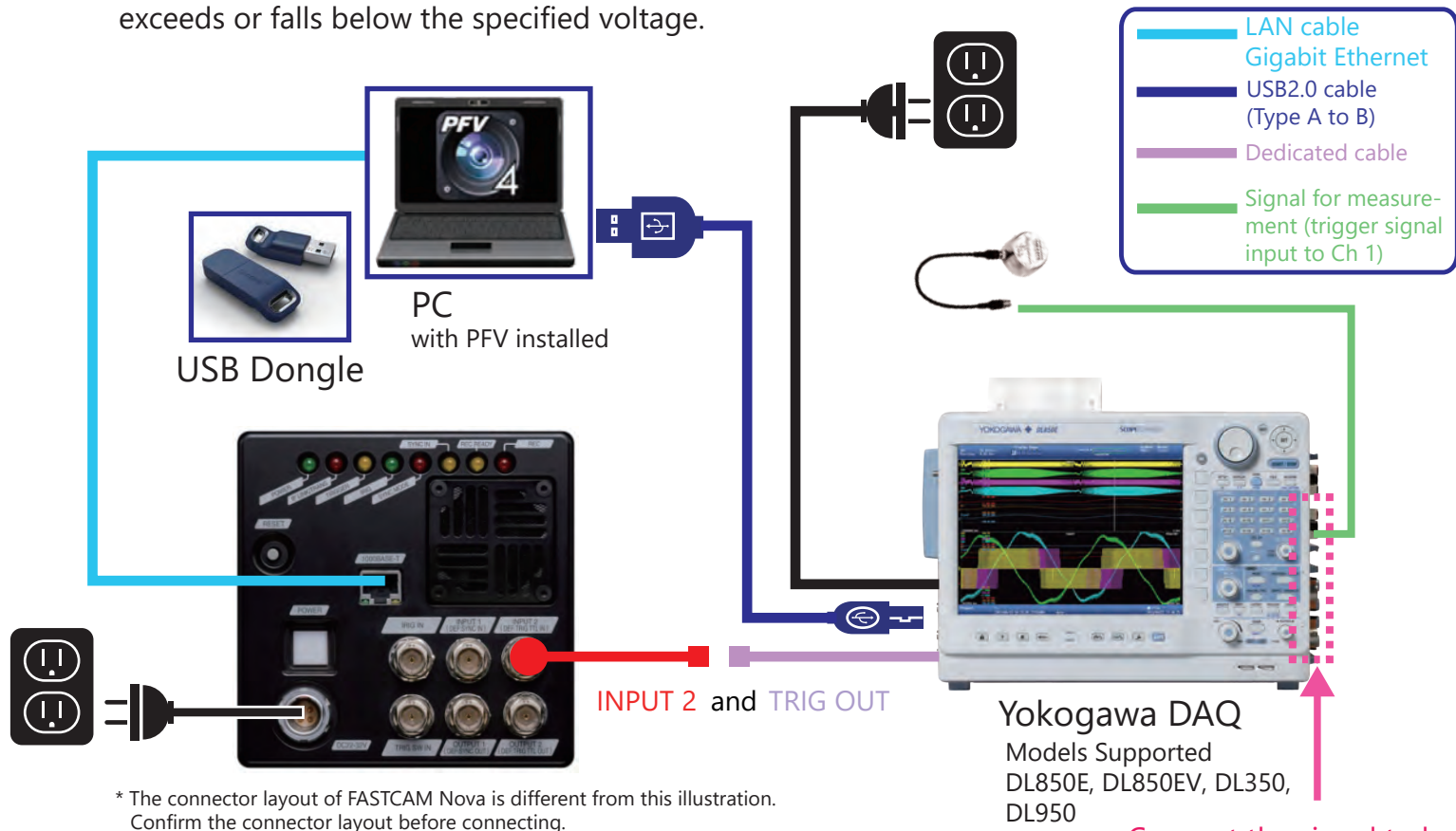Click the [Simple/Enhanced] button.
Make the settings as shown right.

Setting	Simple
Source	CH 2
Slope	Rising or falling edge depending on input signal
Level	Start/Stop Judgment Voltage
Hold Off	0.00 μsec

Device connection for using Level trigger [Case A]

What is "Level trigger" ?
  This is to start/stop measuring waveform data when the reference signal input to a DAQ exceeds or falls below the specified voltage.

USB Dongle

PC
with PFV installed

LAN cable
Gigabit Ethernet

USB2.0 cable
(Type A to B)

Dedicated cable

Signal for measurement (trigger signal input to Ch 1)

INPUT 2 and TRIG OUT

Yokogawa DAQ
Models Supported
DL850E, DL850EV, DL350, DL950

Connect the signal to be measured to Ch 2 ~

* The connector layout of FASTCAM Nova is different from this illustration.
  Confirm the connector layout before connecting.

Caution ▪ Note that the withstand voltage of DL DAQ varies depending on the module.
▪ For detailed settings of the DL DAQ unit, refer to the DL DAQ manual or contact Yokogawa Corporation.
▪ Center, End, and Manual triggers are available.

Note For SA-Z and others with composite IO cables, connect INPUT2 as TRIGGER TTL IN and OUTPUT1 as GENERAL OUT1.
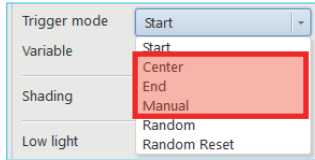
Configuration on PFV4

1 Trigger mode setting

Make the trigger mode setting before configuring DAQ settings.
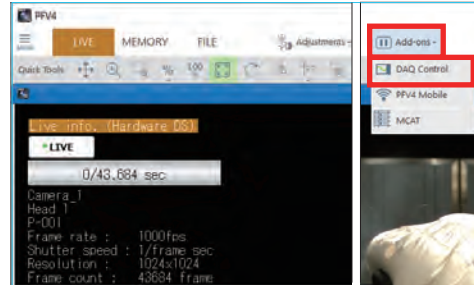The supported trigger modes are "Center", "End", and "Manual".
Caution
When using manual trigger mode, the number of frames before trigger should be set to 2 or more.

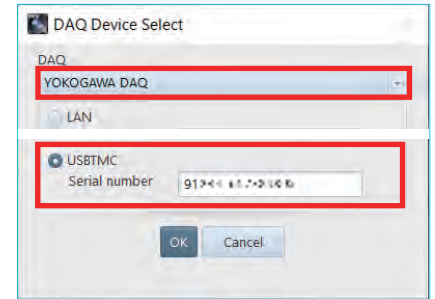| Trigger mode	Start
Variable	Start
	Center
Shading	End
	Manual
	Random
Low light	Random Reset

2 [DAQ Device Select] window

Click [Add-ons] - [DAQ Control].
If the connection is not made correctly, [Add-ons] - [DAQ Control] will not appear in the MENU.
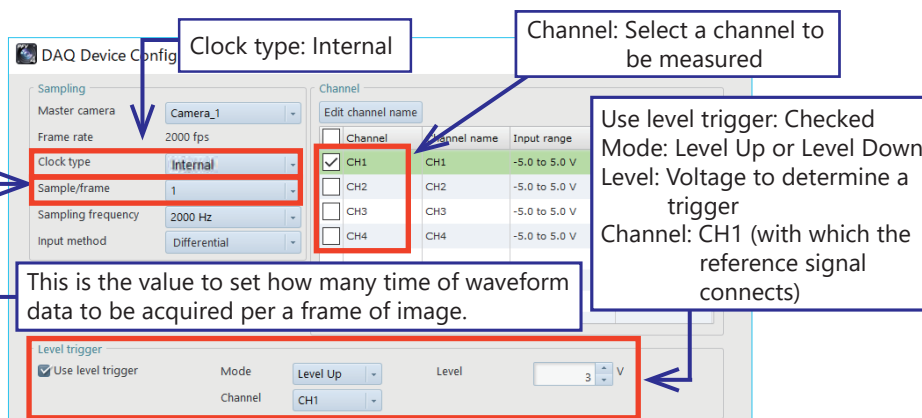Check if the dongle is connected and recognized correctly.

3 Device selection

Select "YOKOGAWA DAQ" and "USBTMC" on the [DAQ Device Select] window, enter the serial number beginning with "91", and click the [OK] button.
* This operation is required only for the first connection.

4 Make device settings

[DAQ Device Configuration] window appears.
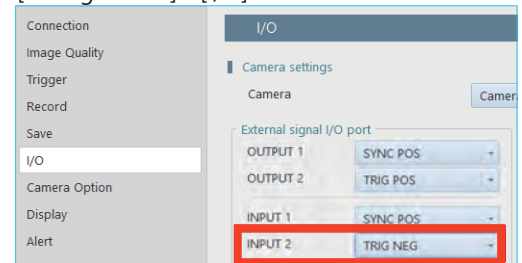Make the settings as shown below and click the [OK] button.

Clock type: Internal

Channel: Select a channel to be measured

Use level trigger: Checked
Mode: Level Up or Level Down
Level: Voltage to determine a trigger
Channel: CH1 (with which the reference signal connects)

This is the value to set how many time of waveform data to be acquired per a frame of image.

Sampling		Channel			
Master camera	Camera_1	Edit channel name			
Frame rate	2000 fps	Channel	Channel name	Input range	
Clock type	Internal	☑ CH1	CH1	-5.0 to 5.0 V	
Sample/frame	1	☐ CH2	CH2	-5.0 to 5.0 V	
Sampling frequency	2000 Hz	☐ CH3	CH3	-5.0 to 5.0 V	
Input method	Differential	☐ CH4	CH4	-5.0 to 5.0 V	

Level trigger					
☑ Use level trigger	Mode	Level Up	Level	3	V
	Channel	CH1			

5 DAQ State Monitoring

The [DAQ State Monitoring] window appears.
This window is for monitoring the DAQ status, not for starting recording.

6 I/O Setting

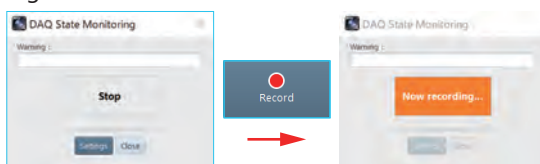Set [INPUT 2] as "TRIG NEG" from [MENU] - [Configuration] - [I/O].

Connection	I/O	
Image Quality		
Trigger	☐ Camera settings	
Record	Camera	Camer
Save	External signal I/O port	
I/O	OUTPUT 1	SYNC POS
Camera Option	OUTPUT 2	TRIG POS
Display	INPUT 1	SYNC POS
Alert	INPUT 2	TRIG NEG

Recording

1 Set recording conditions

Adjust focus of lens, aperture, and set recording conditions.
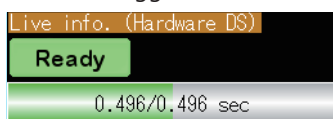Refer to PFV4 User's Manual for the detailed setting.

2 Click the [Record] button

Click the [Record] button on Recording/Playback panel.
The DAQ State Monitoring panel changes and the endless recording starts.

3 Input trigger

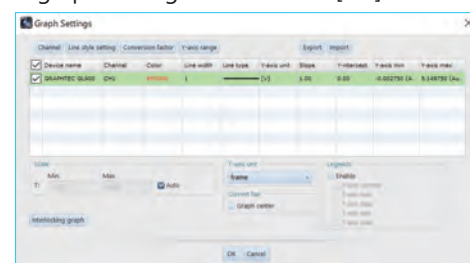Confirm the first half of recording has been done.
Input voltage to the data logger.

Caution

If the recording does not finish, check the points below:
1. Is the connection right?
2. Are the level and channel matched?
3. Was the recording interrupted by clicking the [Stop] button before recordable time expired?
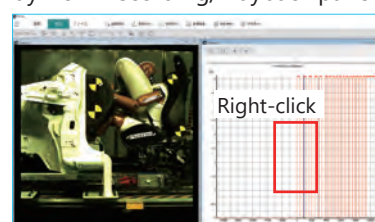
Playback/Saving

1 Make the graph settings

When the recording is finished, the screen moves from live to memory.
Click the [Graph] button, then [Graph Settings] window appears.
Configure the graph settings and click the [OK] button.

2 Click the [Play] button

After setting the graph, the recording result and the graph are shown.
Play from Recording/Playback panel and check the recorded result.

Right-click

To set the center position of the graph, follow the steps below.
1. Right-click on the graph window.
2. Click [Graph Settings].
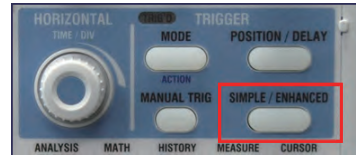3. Check the "Graph center" checkbox in the "Current bar" column.

3 Save data

Click the [Save] button, and specify Save location, File name and Save format. Click the [Save] button to save the data to PC.

DAQ Setup

1 Setup

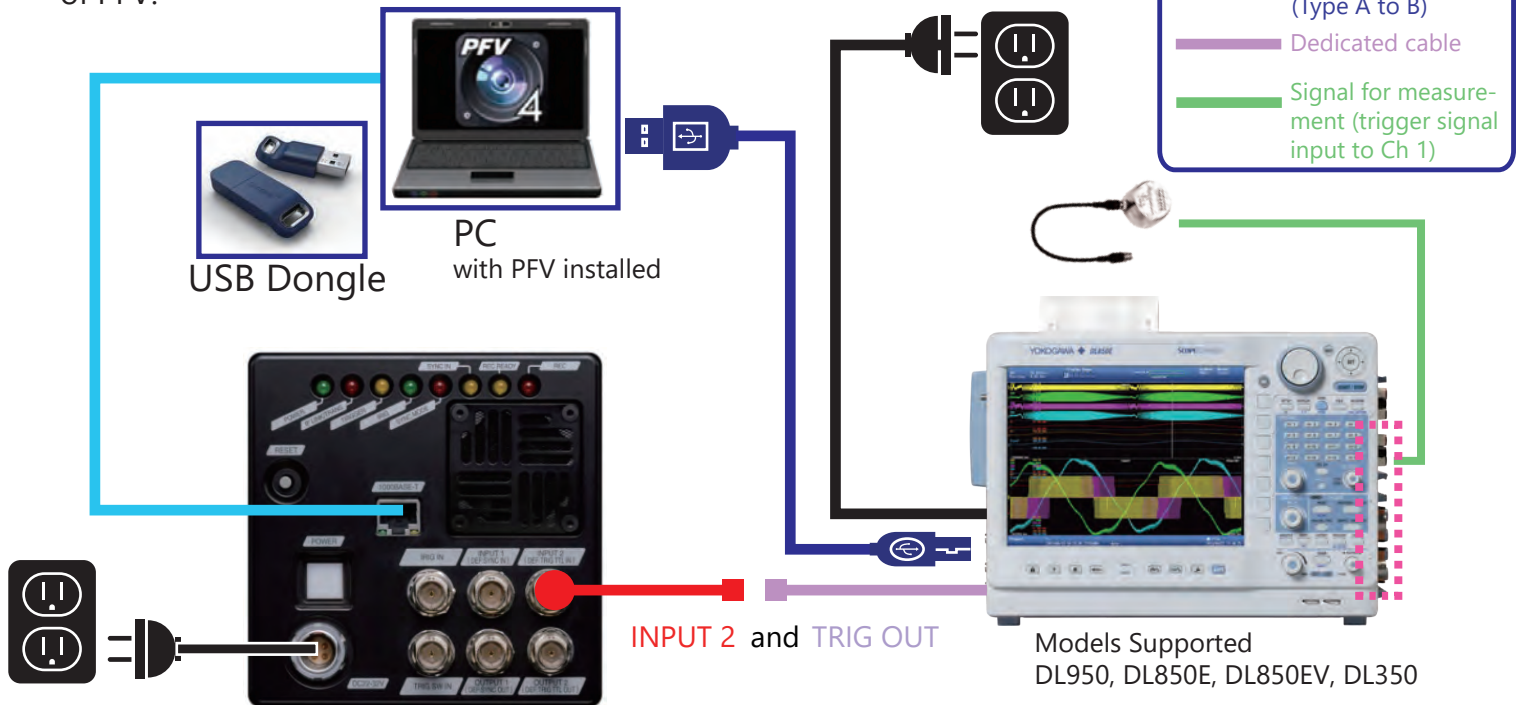Click the [Simple/Enhanced] button.
Make the settings as shown right.

Setting	Simple
Source	External
Slope	Rising edge
Hold Off	0.00 μsec

Device connection for using Manual trigger [Case B]

What is "Manual trigger" ?
This is to start measuring waveform data by clicking the [Record] button of PFV.

— LAN cable	Gigabit Ethernet
— USB2.0 cable	(Type A to B)
— Dedicated cable	
— Signal for measurement (trigger signal input to Ch 1)	

USB Dongle

PC
with PFV installed

INPUT 2 and TRIG OUT

Models Supported
DL950, DL850E, DL850EV, DL350

* The connector layout of FASTCAM Nova is different from this illustration.
Confirm the connector layout before connecting.

Caution

▪ In advance, install the DAQ driver bundled with DAQ.
▪ Disconnect a USB cable between PC and DAQ before changing the setting of DAQ.
▪ As the trigger mode, "Center", "End", and "Manual" can be used.
▪ Make sure to use a USB2.0 Type A to B cable for connecting PC and DAQ.
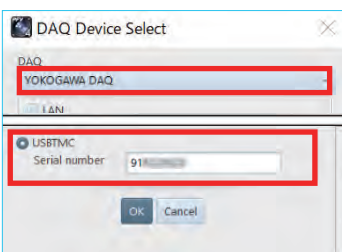
Configuration on PFV4

1 Trigger mode setting

Make the trigger mode setting before configuring DAQ settings.
The supported trigger modes are "Center", "End", and "Manual". When using manual trigger mode, the number of frames before trigger should be set to 2 or more.
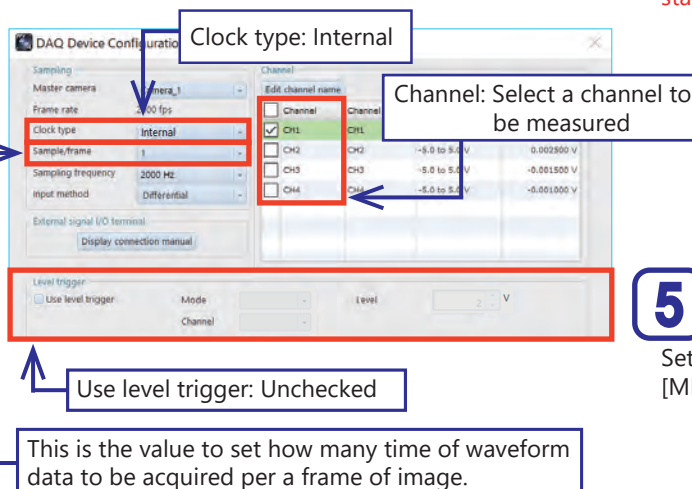
2 Device selection

Select "YOKOGAWA DAQ" and "USBTMC" on the [DAQ Device Select] window, enter the serial number beginning with "91", and click the [OK] button.

3 Make device settings

[DAQ Device Configuration] window appears.
Make the settings as shown below and click the [OK] button.

Clock type: Internal

Channel: Select a channel to be measured

Use level trigger: Unchecked

This is the value to set how many time of waveform data to be acquired per a frame of image.

4 DAQ State Monitoring

The [DAQ State Monitoring] window appears.
This window is for monitoring the DAQ status, not for starting recording.

5 I/O Setting

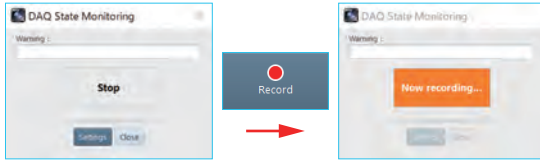Set [INPUT 2] as "TRIG NEG" from [MENU] - [Configuration] - [I/O].

Recording

1 Set recording conditions

Adjust focus of lens, aperture, and set recording conditions. Refer to PFV4 User's Manual for the detailed setting.

2 Click the [Record] button

Click the [Record] button on Recording/Playback panel. The DAQ State Monitoring panel changes and the endless recording starts.

3 Click the [Ready] button

Confirm the first half of recording has been done. Click the [Ready] button.

4 Press the [MANUAL TRIG] button on DAQ

When the display in the lower left corner of the DAQ changes from Pre-Trigger to Waiting for Trigger, press the MANUAL TRIG button.

Caution

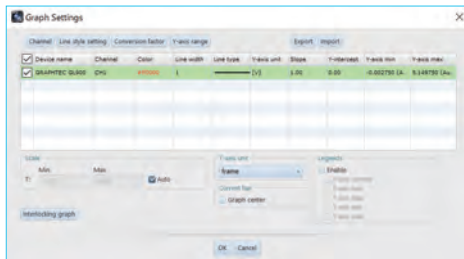If the recording does not finish, check the points below:
1. Is the connection right?
2. Are the level and channel matched?
3. Was the recording interrupted by clicking the [Stop] button before recordable time expired?

Playback/Saving
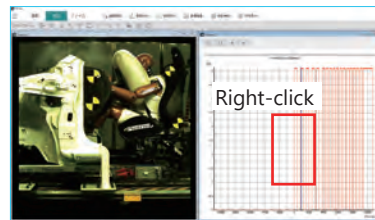
1 Make the graph settings

When the recording is finished, the screen moves from live to memory.
Click the [Graph] button, then Graph Settings window appears. Configure the graph settings and click the [OK] button.

2 Click the [Play] button

After setting the graph, the recording result and the graph are shown. Play from Recording/Playback panel and check the recorded result.

To set the center position of the graph, follow the steps below.
1. Right-click on the graph window.
2. Click [Graph Settings].
3. Check the "Graph center" checkbox in the "Current bar" column.

Right-click

3 Save data

Click the [Save] button, and specify Save location, File name and Save format. Click the [Save] button to save the data to PC.

FAQ and Trouble shooting (Refer to PFV4 User's Manual for more details.)

Q1 What are the frame rates that can be set?

◆ The item displayed under Sampling Rate on the DAQ is the supported sampling rate. The frame rate can be set as long as it is an integer multiple of the sampling rate. Follow the procedure below.

DL850E/DL950: Press [Acquire] button and check the "Record Length".
DL350: Check the "Sampling Rate" in the lower of the DAQ window.

Q2 How do I connect with a LAN cable?

◆ Install a HUB or two additional LAN terminals. Make sure that the IP addresses of DAQ and the high-speed camera and PC do not overlap.

Q3 How can I save the image and graphs side by side?

◆ Specify the layout save from the ▼ button next to the Save button.

Q4 An error appears and hinders the measurement process.

◆ Synchronization signal might not be detected as its width is short. Make signal settings following "I/O setting" in this guide. After making the settings, save the setting to the camera from [Camera controls...] - [Save/Load camera control settings] - [Save].

Q5 It is trouble to wait the completion of the long recording time. Any solution?

◆ Setting partition from [MENU] - [Configuration] - [Record] - [Partition] divides the total memory volume of the camera and shortens the recording time.

Q6 The message "The trigger mode is not supported" appears, and cannot record.

◆ Check if the trigger mode is set to any of "Center", "End", or "Manual".
◆ Make sure if "Use level trigger" is checked in the [DAQ device setting] window.

Q7 Has PFV4 User's Manual more information about operation with data logger?

◆ Refer to the [Add-on Functions] - [DAQ Control].