correlated
SOLUTIONS

DAQ Unit

1. General

Correlated Solutions DAQ devices are set up for operation with the VIC software for Digital Image Correlation (DIC) and function as integral part of our turn-key DIC systems. They mainly serve for triggering the cameras (hardware trigger) and simultaneously recording analog data as well as for delivering analog real-time output generated by the VIC-Gauge software. There are three DAQ types with different performance and features (and pricing). Only the DAQ-STD-8D Synchronization- / Trigger Device (right) can be used for synchronization of the cameras via a periodic signal (supported by the Fulcrum Module of VIC-Snap). It also is a 16bit device such as the DAQ-T8D-16 trigger device. Both also have two +/-10V outputs channels, whereas the DAQ-T4D-12 (left) is only a 12bit device with 5V analog output.

1.1 Camera Trigger & Power Supply

The information under this point (1.1) is valid for all DAQ devices by Correlated Solutions. Hardware trigger, as well as power supply for cameras is transmitted through the 12pin Hirose connectors on the DAQ unit. Two of these connectors are available for the connection of up to two cameras, which will be provided with power and trigger through one 12pin Hirose connector and cables per camera. Correlated Solutions also offers y-cables to run 4 cameras (two stereo systems) or more.

Alternatively the operation of more than two cameras with one DAQ is possible as well, using separate power supply for the cameras as well as a BNC cable for the transfer of the trigger signal from the "Trigger Out" / "Trigger IO" connector on the DAQ unit to the cameras. The trigger signal can be easily split up using one or more BNC T-connectors. The image here shows a 12 pin Hirose connector, which is transmitting power supply and trigger (left, connector in the image here) as well as a BNC connector for camera trigger only (right connector). 12V – 24V is recommended for operation of the DAQ device. Mind to use a power supply, that its the required voltage and power consumption of the camera(s) and the DAQ device, as they use the same power supply. Usually also most cameras are designed for 12-24V.

Contact our Sales Team for more details on the all new VIC-3D software and other exciting new developments from Correlated Solutions.

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1.2 Computer Connection / Driver

Connection to a computer is done by USB cable (type A <-> type B connector). Make sure that the corresponding driver (http://www.isi-sys.com/download/dic/NIDAQ1511f3.exe) is installed before connecting the DAQ device, in case the device was ordered separately. For more information on drivers / downloads, please contact isi-sys.

When the DAQ unit is connected to a computer for the first time, it may take a moment until it is ready for operation. For most Correlated Solutions DAQ units, a green LED will glow continuously when the device is ready. The status of the DAQ device can also be checked using the "Measurement & Automation Explorer" (MAX), which is installed along with the driver.

Note: Do not start VIC-Snap while the MAX is running and a DAQ device is connected to the computer and switched on. The device will appear unavailable / busy to VIC-Snap, as it is used by the MAX.

1.3 Analog Inputs

Correlated Solutions DAQ devices are available with either differential or non-differential analog inputs. For differential analog inputs, the parameter "Configure analog inputs as RSE" in the VIC-Snap "Advanced Options" on the "Data aquisition" tab must not be checked. For non-differential inputs is has to be checked.

The analog input connectors are BNC type, the range is +/-10V. The naming of these inputs on the DAQ devices is "AI" for Analog Input followed by a number starting with 0 and counting up, e. g."AI 0", "AI 1", "AI 2", ... Corresponding to this naming convention, the analog channels are similarly displayed in VIC-Snap.

1.4 Further IO Connectors

Besides analog inputs, all isi-sys DAQ devices can also be equipped with analog outputs (BNC type connector), which differ in voltage range depending on DAQ type. The naming is similar to the analog inputs: "AO 0", "AO 1", ...

Digital IO connectors (BNC type) are available as well. Here the naming is either "P0.0", "P0.1", ..."P0.7" or "P1.0", "P1.1", ... depending on the number of available digital ports. Some DAQ devices provide so-called programmable function interfaces (also digital ports), which are used for special features, like synchronized data acquisition with High-Speed cameras. The naming for these connectors (BNC type) is "PFI 0", "PFI 1", ...

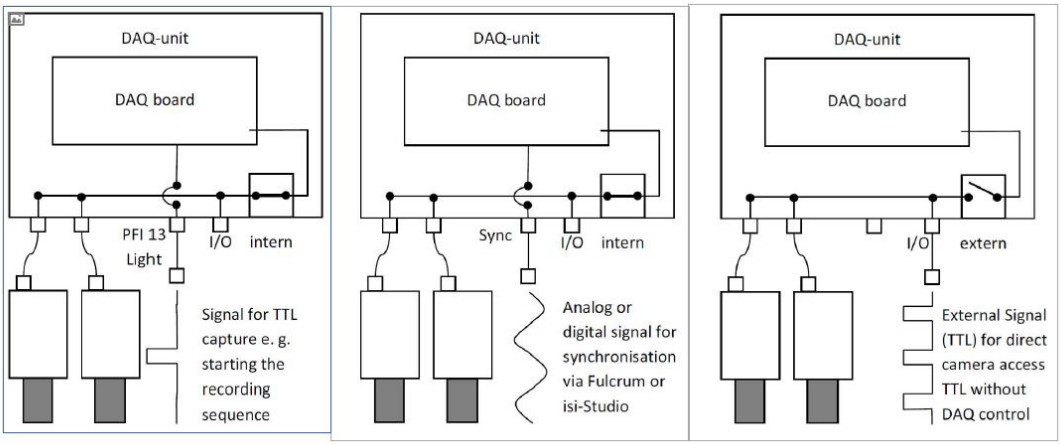
2. DAQ device DAQ-STD-8D

2.1 Overview

The Correlated Solutions DAQ-STD-8D Synchronization/Trigger Device (here DAQ unit) provides the operation of the High-Speed module and the Fulcrum module within Vic-Snap, as well as the control of tensile machines with VIC-Gauge. Please note not to use the power connector on the front of the DAQ

2.2 Schematic Overview for Triggering Scenarios

The special feature and option of this unit compared to the other two is the synchronisation options by analyzing a periodical signal (frequency) and triggering (synchronise) the cameras (Fulcrum module). There are different possible triggering scenarios, which are shown in the following schematics:



Standard Hardware trigger mode / TTL trigger mode (left): With this setup, the "TTL Capture" method in VIC-Snap can be used. This setup also provides the standard hardware triggering of the cameras, -for this case no TTL signal has to be connected to the PFI 13 / Light connector. In VIC-Snap the hardware trigger mode has to be selected.

Hardware trigger mode in combination with the Fulcrum module (middle): This setup is necessary for the operation of the Fulcrum module (if included) from within VIC-Snap. In VIC-Snap, the hardware trigger mode has to be selected and the Fulcrum modul has to be started.

Direct connection of external trigger signal to cameras (right): The last trigger setup is used to connect an external trigger signal (TTL) directly to the cameras without using the hardware trigger from the DAQ board.

2.3 Connectors/Control Elements on the Front

–2x 12 pin Hirose connector (upper left area) for connection of up to two cameras (camera power supply and camera trigger are transmitted).

–Connector for additional lighting equipment (connector labelled "Light" in "Camera / Sync" area) can also be used for "TTL Capture" method within VIC-Snap (Light BNC PFI 13 = Line 21 in VIC-Snap in Advanced Options).

–The connector "AI 0 / Sync" is a differential analog input, the range is +/-10V. This channel is used to analyze an analog trigger signal in order to synchronize the image capturing for the operation of the Fulcrum modul in VIC-Snap.

–The connector "I/O" in the „Trigger" area is either used as an input for an external trigger signal, or as an output for the camera trigger, depending on the position of the switch above, labelled "intern / extern", which is located above the "I/O" connector.

–If the switch is set to "intern", the "I/O" connector is connected to the two Hirose camera connectors and the internal trigger signal will be transmitted through these three connectors (2x Hirose, 1x BNC "I/O").

–If the switch is set to "extern", the "I/O" connector is only connected to the two Hirose connectors for the cameras and not connected to the internal trigger. If an external source, which provides a trigger signal, is now connected to the "I/O" connector, this signal is directly transmitted to the two Hirose connectors and thus to the cameras.

IMPORTANT:
If an external trigger source is connected to the "I/O" connector, the "intern / extern" switch must not be set to "intern", but only to "extern"

–The connectors "PFI 0" and "PFI 1" are used for the operation of the High-Speed modul in VIC-Snap. These channels provide the possibility to record analog signals synchronized to the image capturing of High-Speed cameras.

–The connectors "AO 0" and "AO 1" are analog outputs, the range is +/-10V. These channels are used to e.g. control tensile machines from within VIC-Gauge.

2.4 Connectors/Control Elements on the Back

–The connectors "AI 1" to "AI 7" are differential analog inputs, the range is +/-10V (In VIC-Snap, the parameter "Configure analog inputs as RSE" must not be clicked /selected)

–The connector for the enclosed power supply is located in the bottom left, area on the backside of the DAQ unit. It is a screw-in connector, ensuring a stable connection. The power supply, that is attached here, drives the DAQ unit as well as the connected cameras.

–On the right side of the power supply connector on the backside of the DAQ unit, the "On /Off" switch is located. This switch turns on / off the power supply for the DAQ unit and the connected cameras.

3. DAQ device DAQ-T8D-16

3.1 Overview

The Correlated Solutions DAQ-T8D-16 Trigger Device (here DAQ unit) does support the control of tensile machines with VIC-Gauge. The device does not support the Fulcrum module within VIC-Snap.

3.2 Notes

When the DAQ unit is connected to a computer for the first time, it may take a moment until it is ready for operation. A green LED will glow continuously when the device is ready.

3.3 Connectors/Control Elements on the Front

3.3.1 "Camera" (upper area)

2x Camera connector (12 pin Hirose):
These two connectors (upper left area) are for connection of up to two cameras (camera power supply and camera trigger are transmitted):

"Trigger Out" (BNC):
This connector (upper middle right area) transmits the camera trigger signal. This signal is also transmitted through the two camera connectors (12 pin Hirose)

"On/Off" Switch:
This switch turns the power supply for the cameras on and off.

3.3.2 "Trigger" (lower right area)

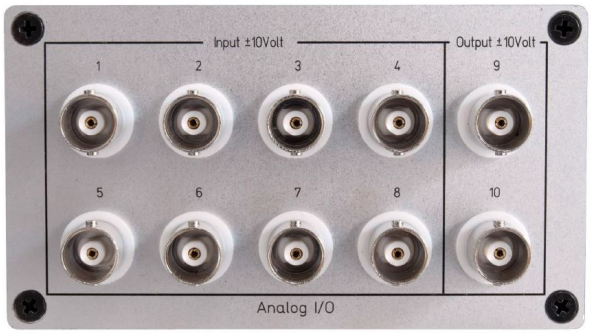
"Trigger In PFI 0" (BNC):
This connector is either used as an input for an external trigger signal, or as an input for a TTL signal for the "TTL Capture" method within VIC-Snap. Together with "PFI 1", these two connectors can be used for the operaô€€[]on of the High-Speed module in VIC-Snap. These channels provide the possibility to record analog signals synchronized to the image capturing of High-Speed cameras.

Switch "Intern/Extern" set to "Intern":
This setting will connect the internal trigger signal, generated by the DAQ unit, to the two 12 pin Hirose connectors for the cameras as well as to the "Trigger Out" BNC connector.

Switch "Intern/Extern" set to "Extern":
This setting will transmit the trigger signal from "Trigger In" BNC connector directly to the two 12 pin Hirose connectors for the cameras as well as to the "Trigger Out" BNC connector.

3.3.3 Internal Triggering

In order to use a hardware trigger signal generated by the DAQ unit for camera triggering, in VIC software (Snap and Gauge), the parameter "Trigger Output Line" has to be set to 4 (found in the "Advanced options" under "Data Aquisition"). Additionally the "Sync Mode" has to be set to "Hardware" (found in the main menu under "Images" \ "Sync Mode").



3.4 Connectors/Control Elements on the Back

3.4.1 "Input" (left area)

BNC connectors "AI 0" to "AI 7"(image differs):
These connectors are differential analog inputs, the range is +/-10V (The parameter "Configure analog inputs as RSE" must not be checked - found in VIC software in the "Advanced options" under "Data Aquisition").

3.4.2 "Output" (right area)

BNC connectors "AO 0" and "AO 1" (image differs):
These connectors are analog outputs, the range is +/-10V. These channels are used to e.g. control tensile machines from within VIC-Gauge.

3.5 Using TTL-Capture in VIC Software

In order to use the TTL-Capture method in VIC, a standard TTL signal has to be connected to the "Trigger In" BNC connector and the "Intern / Extern" switch has to be set to "Intern". This allows to start a measurement (as defined by the TTL-Capture method) and using the hardware trigger generated from the DAQ unit for camera triggering (In VIC software, the parameter "TTL Input Line" has to be set to 0).

4. DAQ device DAQ-T4D-12 (or DIC-C2-A8 older unit)

4.1 Overview

The Correlated Solutions DAQ-T4D-12 (or the DIC-C2-A8) Trigger Device does not support the Fulcrum module within VIC-Snap.

4.2 Connectors/Control Elements on the Front

4.2.1 "Camera/trigger" (upper area)

2x Camera connector (12 pin Hirose):
These two connectors (upper left) are for connection of up to two cameras (camera power supply and camera trigger are transmitted)

Camera Trigger (BNC):
This connector (upper right) transmits the camera trigger signal. This signal is also transmitted through the two camera connectors (12 pin Hirose)

4.2.2 "Trigger" (lower area)

"On/Off" Switch:
This switch (lower left) turns the power supply for the cameras on and off. The DAQ device itself is USB Bus powered.

Power supply connector:
The power supply connector (lower right) is a screw-in connector. It is recommended to use the suitable power supply, delivered by Correlated Solutions.

4.2.3 Triggering (lower area)

In order to use a hardware trigger signal generated by the DAQ unit for camera triggering, in VIC software (Snap and Gauge), the parameter "Trigger Output Line" has to be set to 0 (found in the "Advanced options" under "Data Aquisition"). Additionally the "Sync Mode" has to be set to "Hardware" (found in the main menu under "Images" \ "Sync Mode")

4.3 Connectors/Control Elements on the Back

In order to use a hardware trigger signal generated by the DAQ unit for camera triggering, in VIC software (Snap and Gauge), the parameter "Trigger Output Line" has to be set to 0 (found in the "Advanced options" under "Data Aquisition"). Additionally the "Sync Mode" has to be set to "Hardware" (found in the main menu under "Images" \ "Sync Mode")

4.3.1 Connectors

BNC connectors:
On the backside of the DIC-C2-A8, there are 8 BNC connectors available. These can be customized to fit different requirements. In the following, the possibilities are listed:

–8 non-differential analog inputs (Mind to check the parameter "Configure analog inputs as RSE" in the VIC-Snap options)

–4 differential analog inputs (Mind to uncheck the parameter "Configure analog inputs as RSE" in the VIC-Snap options)

–Depending on the number of analog inputs, that is selected, the remaining BNC connectors can be configured as either up to two analog outputs with the range of 0 to 5V, up to eight digital IO ports and / or up to two programmable function interface ports.

Further questions? Please do not hesitate to contact us by phone or e-mail. You can find our contact information below.