

Komputerowe wspomaganie eksperymentu

6

Dr Piotr Sitarek

Katedra Fizyki Doświadczalnej, Politechnika Wrocławska

Temat na dziś

Kontrola urządzeń – myDAQ
diody LED

Programowanie w środowisku (cd.)



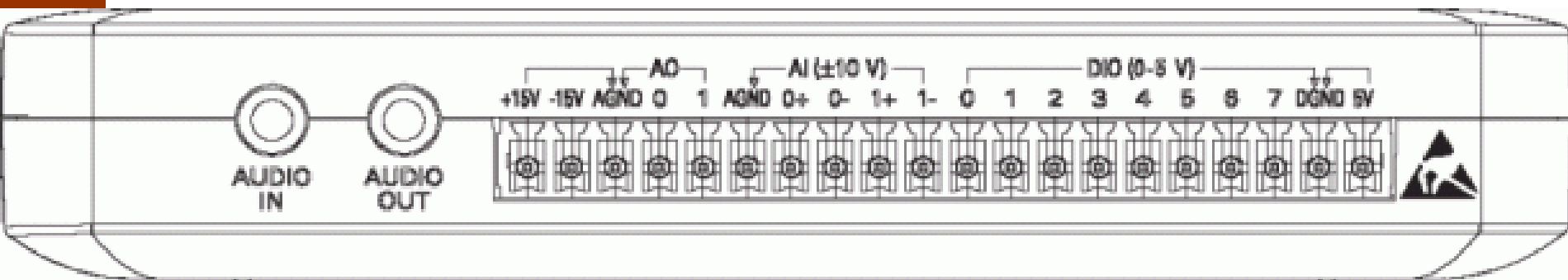
ni.com

(część materiałów zaczerpnięta ze
strony producenta)

myDAQ



myDAQ



MAX

The screenshot displays the NI Measurement & Automation Explorer (MAX) application window. The title bar reads "NI myDAQ 'myDAQ1' - Measurement & Automation Explorer". The interface includes a menu bar (File, Edit, View, Tools, Help) and a toolbar with buttons for Save, Refresh, Configure..., Reset, Self-Test, Test Panels..., and Create Task... A left-hand tree view shows the system hierarchy: My System > Data Neighborhood > Devices and Interfaces > NI myDAQ "myDAQ1". The main pane shows the "Settings" for the selected device, with the following details:

Settings	
Name	myDAQ1
Vendor	National Instruments
Model	NI myDAQ
Serial Number	030E9582
Status	Present

On the right side, a "Back" button is visible above a section titled "NI-DAQmx Device Basics". This section contains the text "What do you want to do?" and three actionable items: "▶Run the NI-DAQmx Test Panels", "▶Remove the device", and "▶View or change device configuration".

MAX

Test Panels : NI myDAQ: "myDAQ1" ✕

Analog Input | Analog Output | Digital I/O | Counter I/O

Channel Name
myDAQ1/ai0

Mode
On Demand

Input Configuration
Differential

Max Input Limit: 10 Min Input Limit: -10

Rate (Hz): 1000 Samples To Read: 1000

Amplitude vs. Samples Chart Auto-scale chart

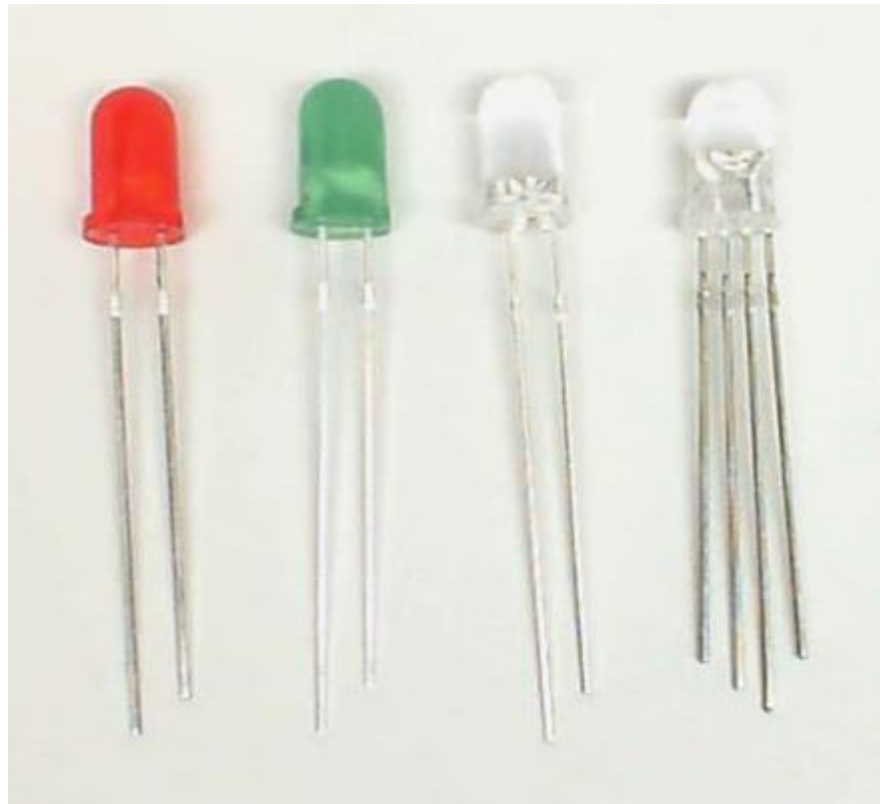
0 99

0

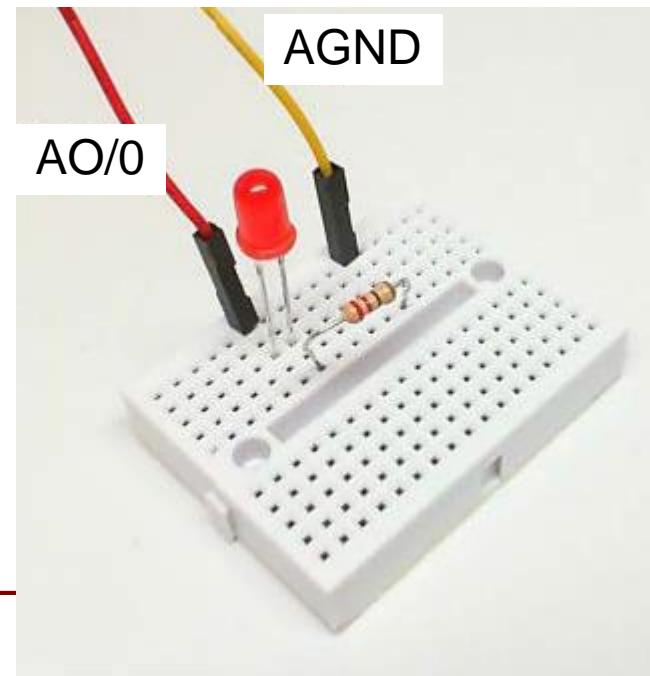
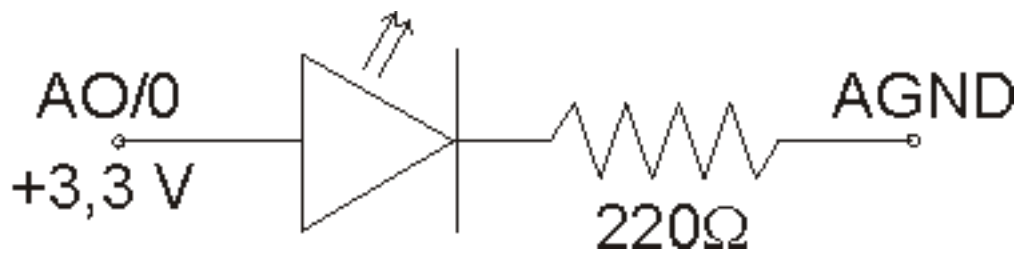
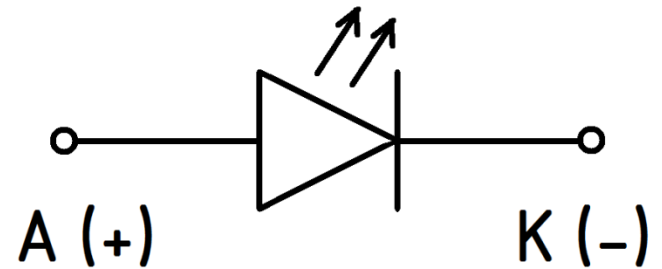
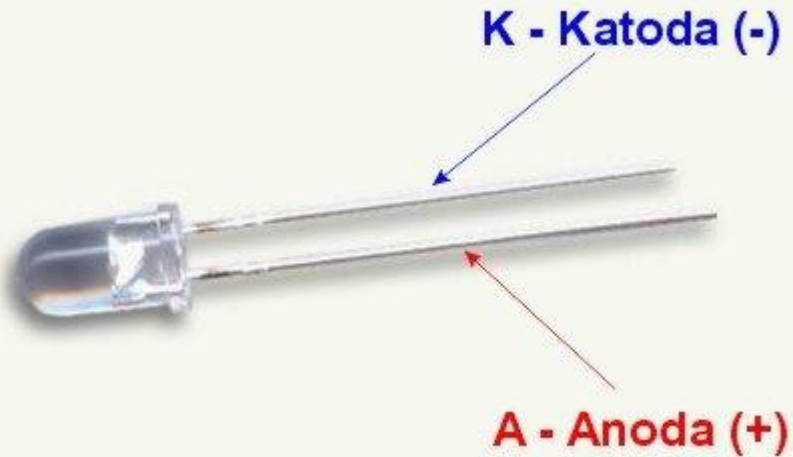
▶ Start ■ Stop

Close Help

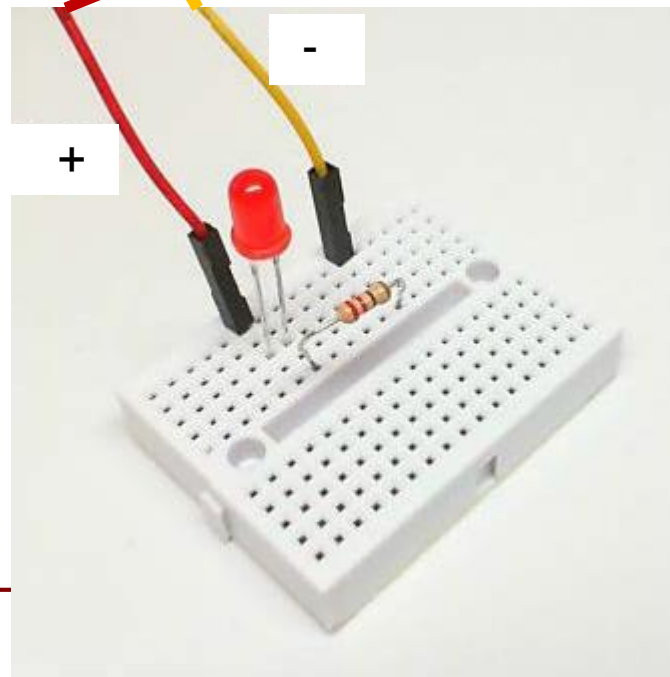
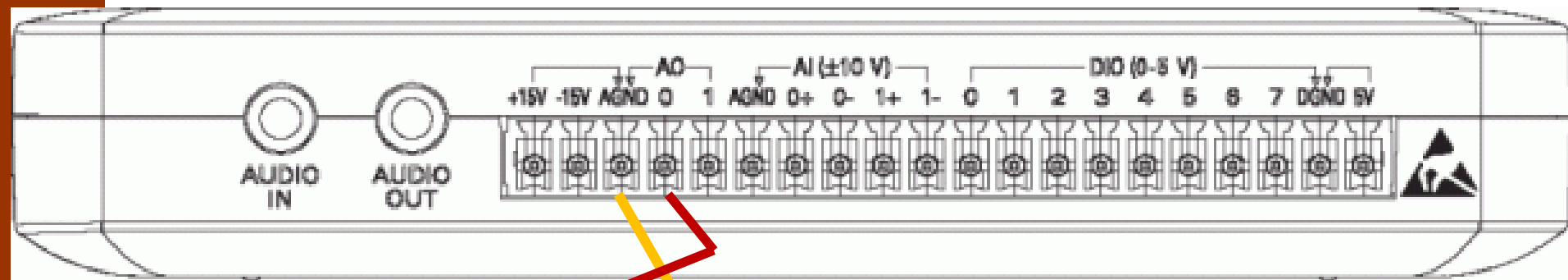
Diody LED



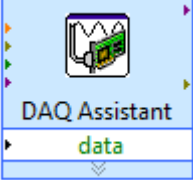
Diody LED



Dioda LED - analogowo




Dioda LED - analogowo



DAQ Assistant

data

DAQ Assistant



data

device name

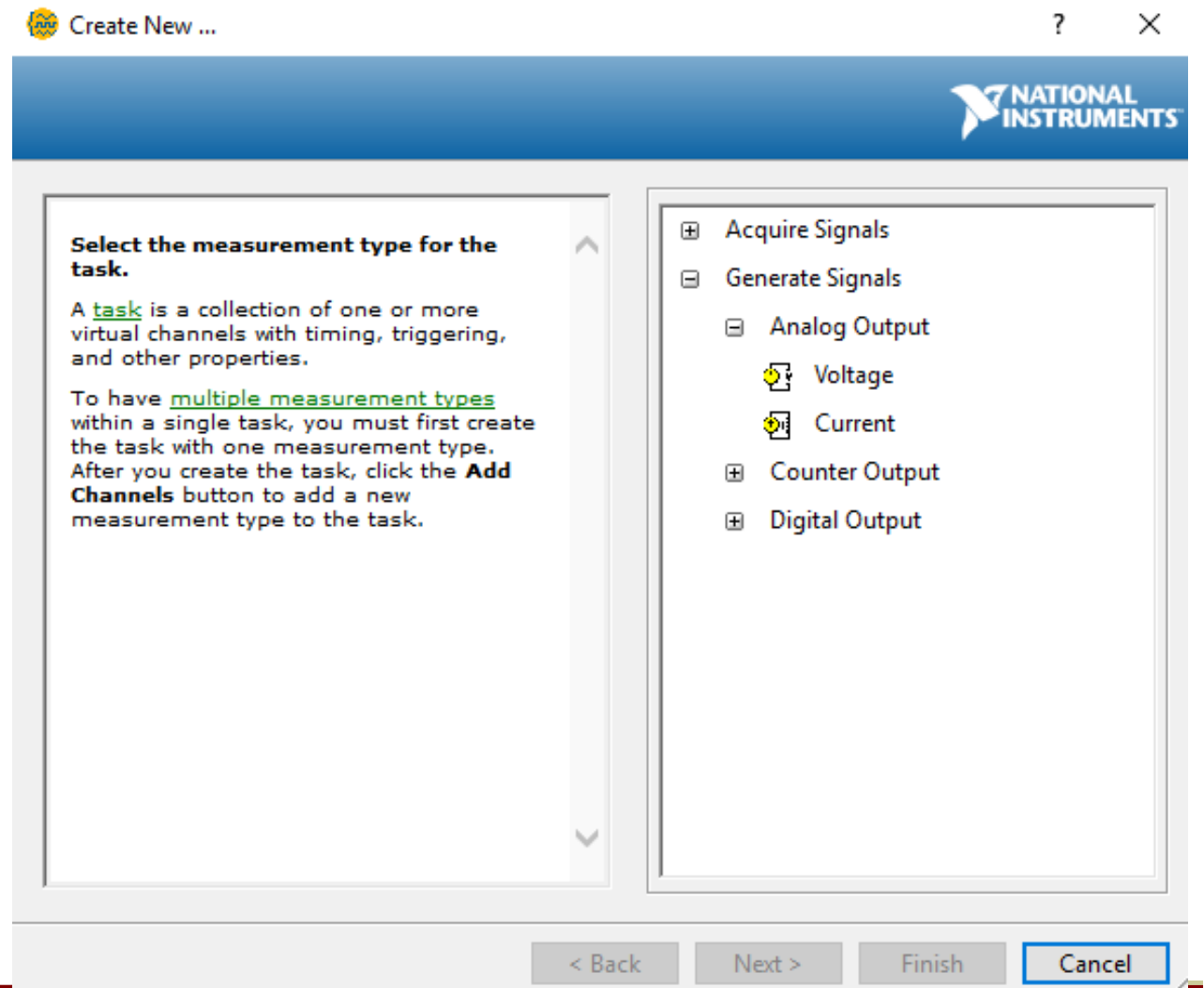
error in

stop (T)

timeout (s)

error out

task out



Create New ...

NATIONAL INSTRUMENTS

Select the measurement type for the task.

A [task](#) is a collection of one or more virtual channels with timing, triggering, and other properties.

To have [multiple measurement types](#) within a single task, you must first create the task with one measurement type. After you create the task, click the **Add Channels** button to add a new measurement type to the task.

- Acquire Signals
- Generate Signals
 - Analog Output
 - Voltage
 - Current
 - Counter Output
 - Digital Output

< Back Next > Finish Cancel

Dioda LED - analogowo

Create New ...

NATIONAL INSTRUMENTS

Select the physical channel(s) to add to the task.

If you have previously configured [global virtual channels](#) of the same measurement type as the task, click the **Virtual** tab to add or copy global virtual channels to the task. When you copy the global virtual channel to the task, it becomes a local virtual channel. When you add a global virtual channel to the task, the task uses the actual global virtual channel, and any changes to that global virtual channel are reflected in the task.

If you have TEDS configured, click the **TEDS** tab to add TEDS channels to the task.

For hardware that supports [multiple channels](#) in a task, you can select multiple channels to

Physical

Supported Physical Channels

- myDAQ1 (NI myDAQ)
 - ao0
 - ao1
 - audioOutputLeft
 - audioOutputRight

<Ctrl> or <Shift> click to select multiple channels.

< Back Next > Finish Cancel

Dioda LED - analogowo

Undo Redo Run Add Channels Remove Channels

0	Apply Value to All
VoltageOut	1,1

Configuration Triggering Advanced Timing

Channel Settings

+ X Details >>

VoltageOut

Click the Add Channels button (+) to add more channels to the task.

Voltage Output Setup

Settings

Signal Output Range

Max

Min

Scaled Units

Volts

Terminal Configuration

RSE

Custom Scaling

<No Scale>

Timing Settings

Generation Mode

1 Sample (On Demand)

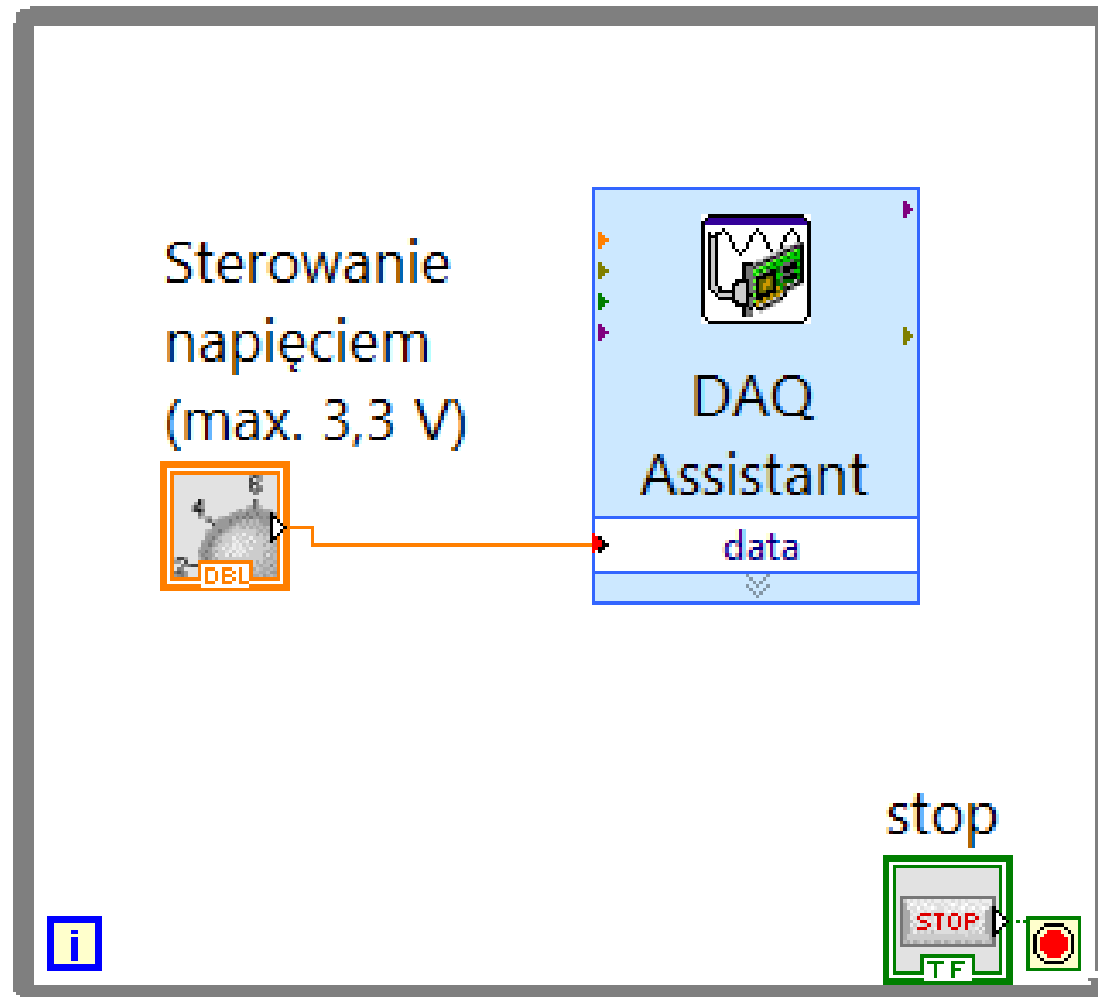
Samples to Write

100

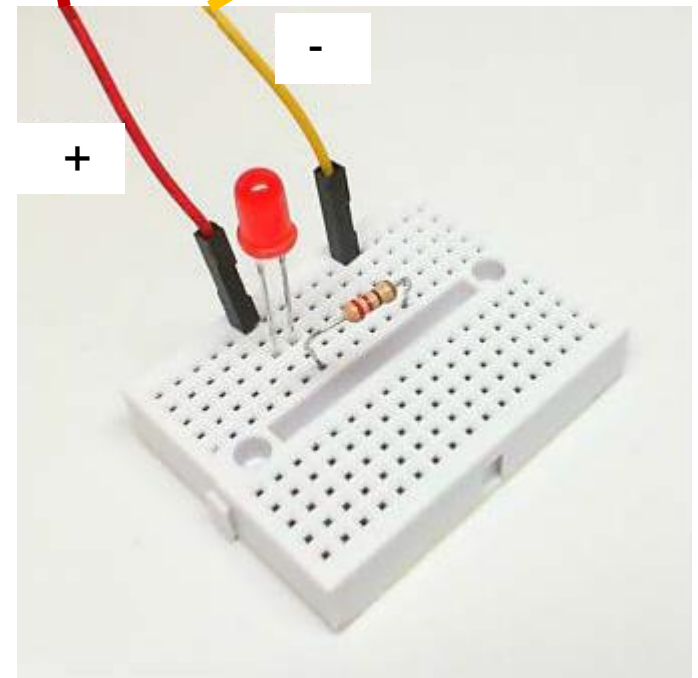
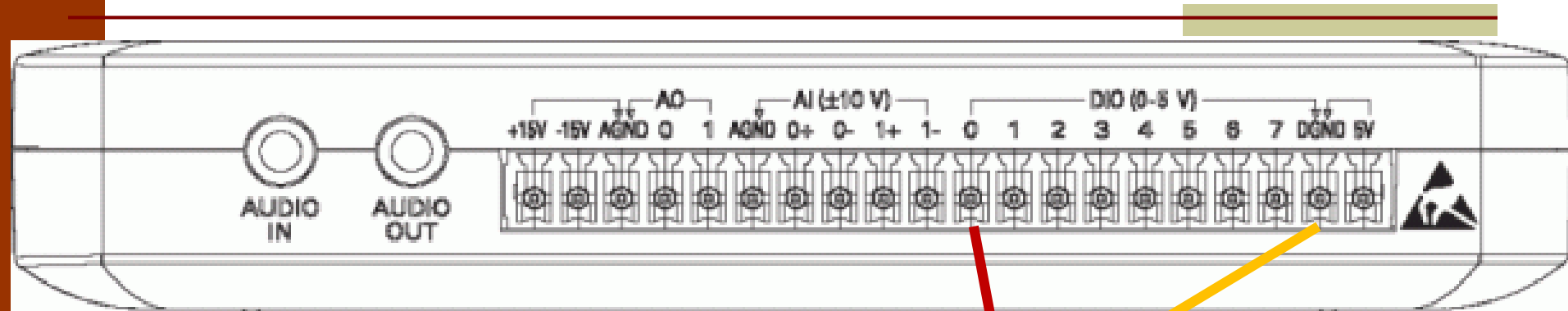
Rate (Hz)

1k

Dioda LED - analogowo



Dioda LED - cyfrowo



Dioda LED - cyfrowo

Create New ...

? X

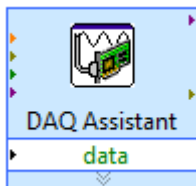
NATIONAL INSTRUMENTS

Select the measurement type for the task.

A **task** is a collection of one or more virtual channels with timing, triggering, and other properties.

To have **multiple measurement types** within a single task, you must first create the task with one measurement type. After you create the task, click the **Add Channels** button to add a new measurement type to the task.

- Acquire Signals
- Generate Signals
 - Analog Output
 - Counter Output
 - Digital Output
 - Line Output
 - Port Output



< Back

Next >

Finish

Cancel

Dioda LED - cyfrowo

Create New ...

NATIONAL INSTRUMENTS

Select the physical channel(s) to add to the task.

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If you have TEDS configured, click the **TEDS** tab to add TEDS channels to the task.

For hardware that supports [multiple channels](#) in a task, you can select multiple channels to

Physical

Supported Physical Channels

- myDAQ1 (NI myDAQ)
 - port0/line0
 - port0/line1
 - port0/line2
 - port0/line3
 - port0/line4
 - port0/line5
 - port0/line6
 - port0/line7

<Ctrl> or <Shift> click to select multiple channels.

< Back Next > Finish Cancel

Dioda LED - cyfrowo

The screenshot displays a software interface for configuring a digital signal generator. At the top, a toolbar includes buttons for Undo, Redo, Run, Add Channels (+), and Remove Channels (X). The main workspace shows a single channel named "DigitalOut" with a vertical scale indicator. Below this, a configuration panel is open, showing three tabs: Configuration, Triggering, and Advanced Timing. The Configuration tab is active, displaying "Channel Settings" with a list of channels containing "DigitalOut". A "Details" button is next to the channel name. Below the channel list, a note reads: "Click the Add Channels button (+) to add more channels to the task." To the right of the channel list is the "Digital Line Output Setup" section, which includes a "Settings" icon and an "Invert Line" checkbox. At the bottom, the "Timing Settings" section contains three input fields: "Generation Mode" set to "1 Sample (On Demand)", "Samples to Write" set to "100", and "Rate (Hz)" set to "1k".

Undo Redo Run Add Channels Remove Channels

DigitalOut

Configuration Triggering Advanced Timing

Channel Settings

+ X Details >>

DigitalOut

Click the Add Channels button (+) to add more channels to the task.

Digital Line Output Setup

Settings

Invert Line

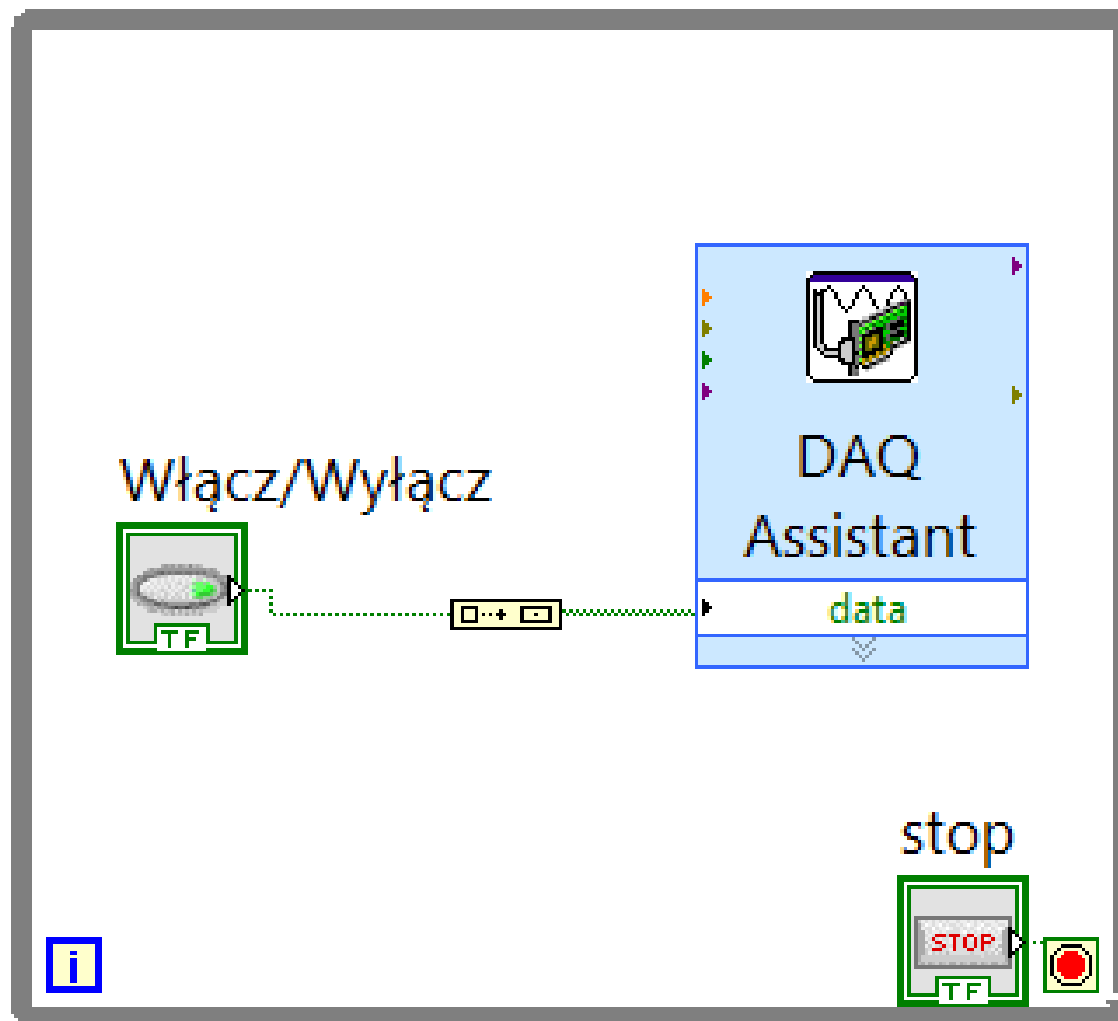
Timing Settings

Generation Mode 1 Sample (On Demand)

Samples to Write 100

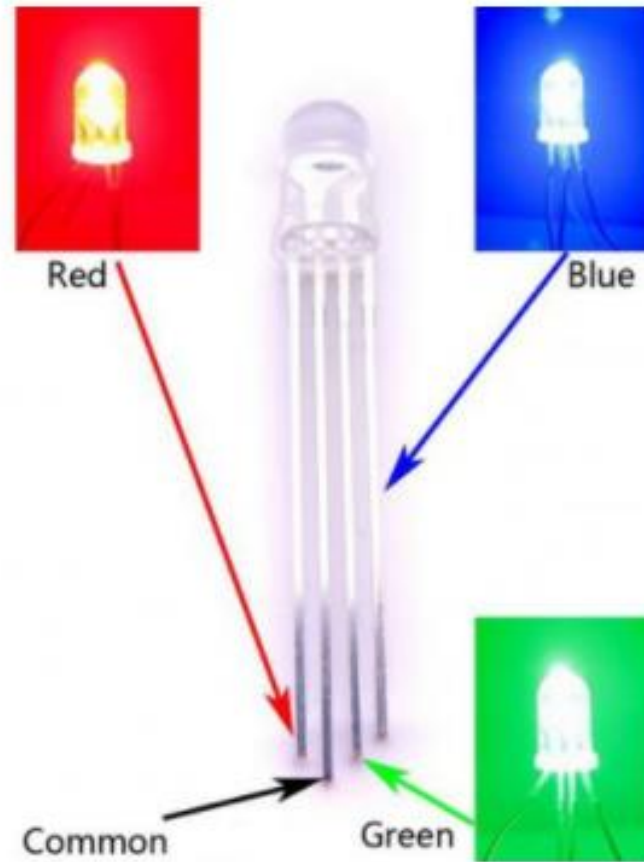
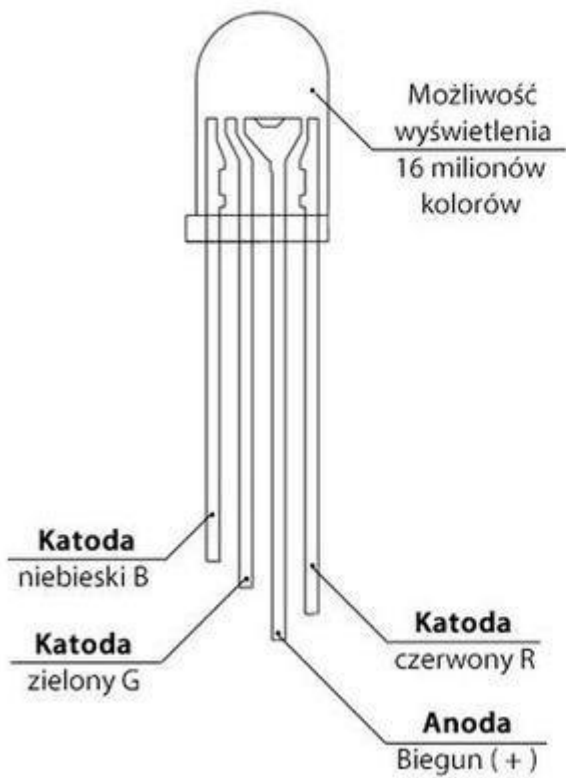
Rate (Hz) 1k

Dioda LED - cyfrowo

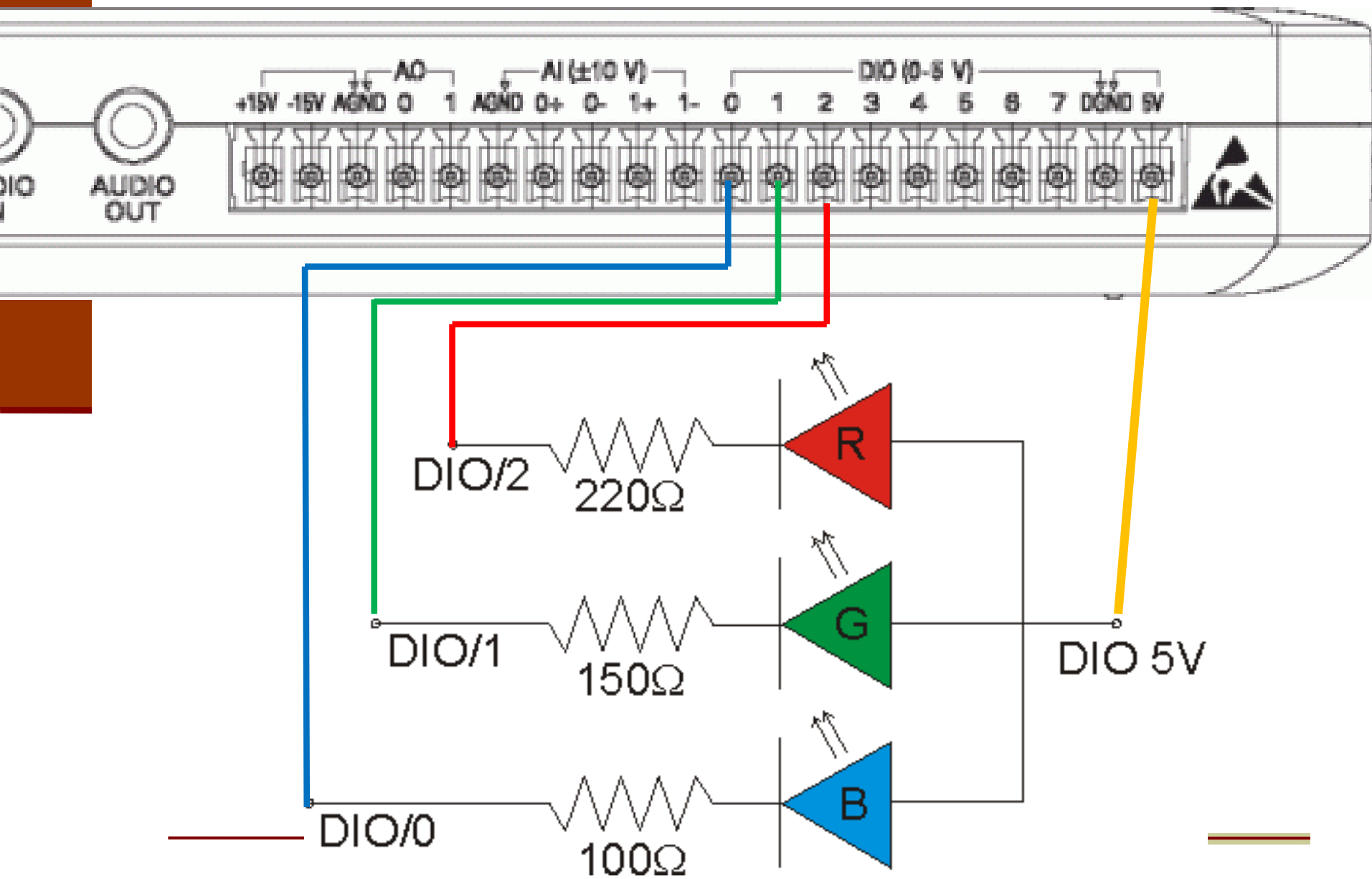


Dioda RGB

WSPÓLNA ANODA



Dioda RGB



Dioda RGB

Create New ...

?

X



Select the physical channel(s) to add to the task.

If you have previously configured [global virtual channels](#) of the same measurement type as the task, click the **Virtual** tab to add or copy global virtual channels to the task. When you copy the global virtual channel to the task, it becomes a local virtual channel. When you add a global virtual channel to the task, the task uses the actual global virtual channel, and any changes to that global virtual channel are reflected in the task.

If you have TEDS configured, click the **TEDS** tab to add TEDS channels to the task.

For hardware that supports [multiple channels](#) in a task, you can select multiple channels to

Physical

Supported Physical Channels

- myDAQ1 (NI myDAQ)
 - port0/line0
 - port0/line1
 - port0/line2
 - port0/line3
 - port0/line4
 - port0/line5
 - port0/line6
 - port0/line7

<Ctrl> or <Shift> click to select multiple channels.

< Back

Next >

Finish

Cancel

Dioda RGB

The screenshot shows a software interface with a top toolbar containing 'Undo', 'Redo', 'Stop', 'Add Channels', and 'Remove Channels'. On the right side, three digital output channels are listed: DigitalOut_2, DigitalOut_1, and DigitalOut_0. The main window has three tabs: 'Configuration', 'Triggering', and 'Advanced Timing'. The 'Configuration' tab is active and contains two sections: 'Channel Settings' and 'Timing Settings'. The 'Channel Settings' section has a list of channels: DigitalOut_0, DigitalOut_1, and DigitalOut_2. The 'Digital Line Output Setup' section has a 'Settings' sub-section with a checked 'Invert Line' checkbox. The 'Timing Settings' section includes 'Generation Mode' (set to '1 Sample (On Demand)'), 'Samples to Write' (set to '100'), and 'Rate (Hz)' (set to '1k').

Undo Redo Stop Add Channels Remove Channels

DigitalOut_2
DigitalOut_1
DigitalOut_0

Configuration Triggering Advanced Timing

Channel Settings

+ X Details >>

DigitalOut_0
DigitalOut_1
DigitalOut_2

Click the Add Channels button (+) to add more channels to the task.

Digital Line Output Setup

Settings

Invert Line

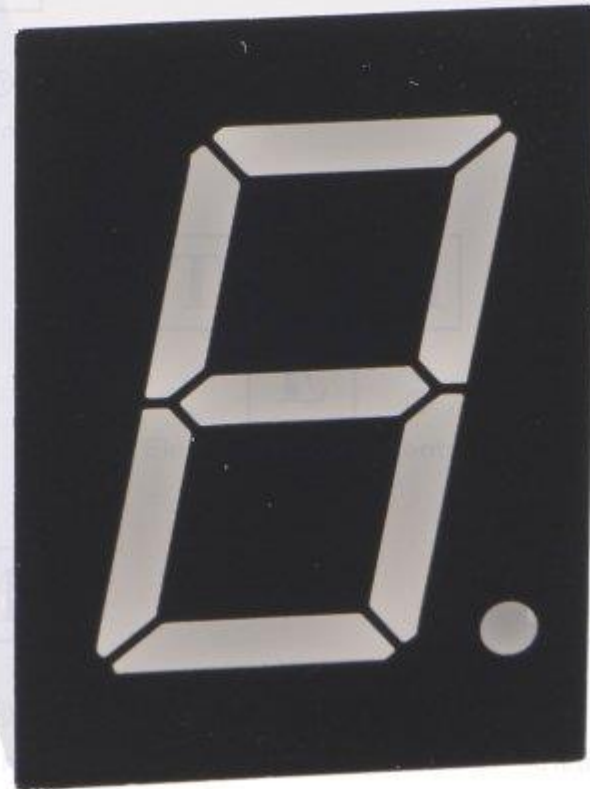
Timing Settings

Generation Mode Samples to Write Rate (Hz)

1 Sample (On Demand) 100 1k

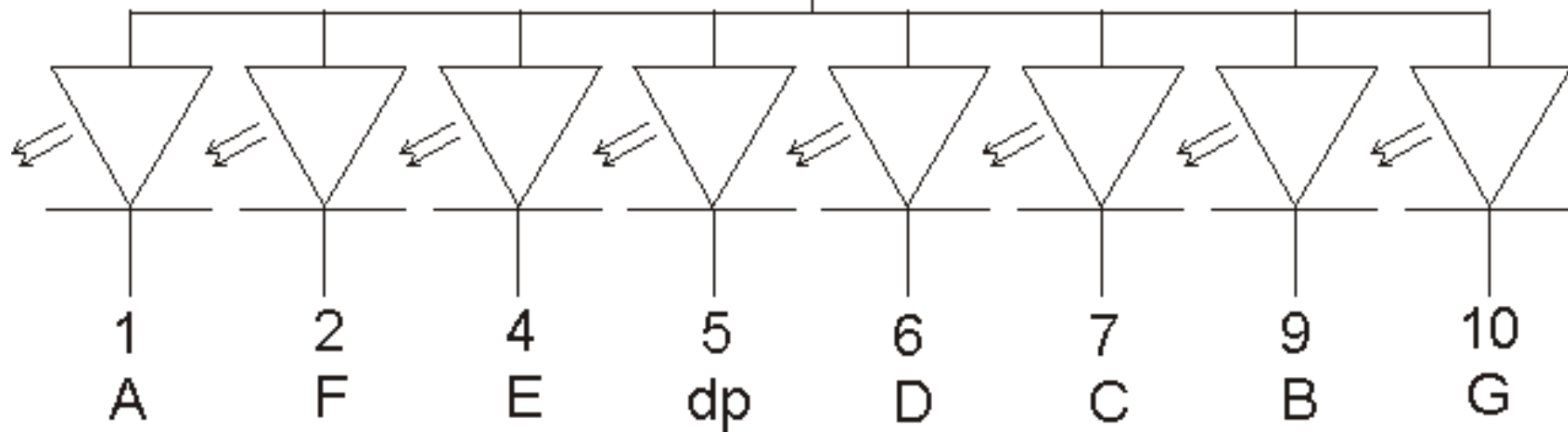
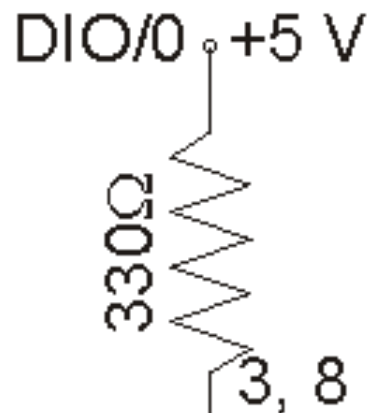
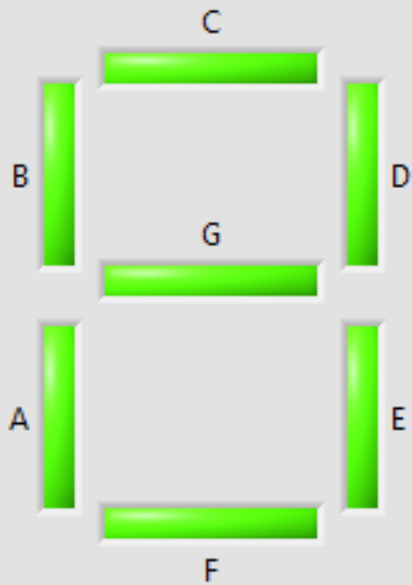
7 LED

10 - 6

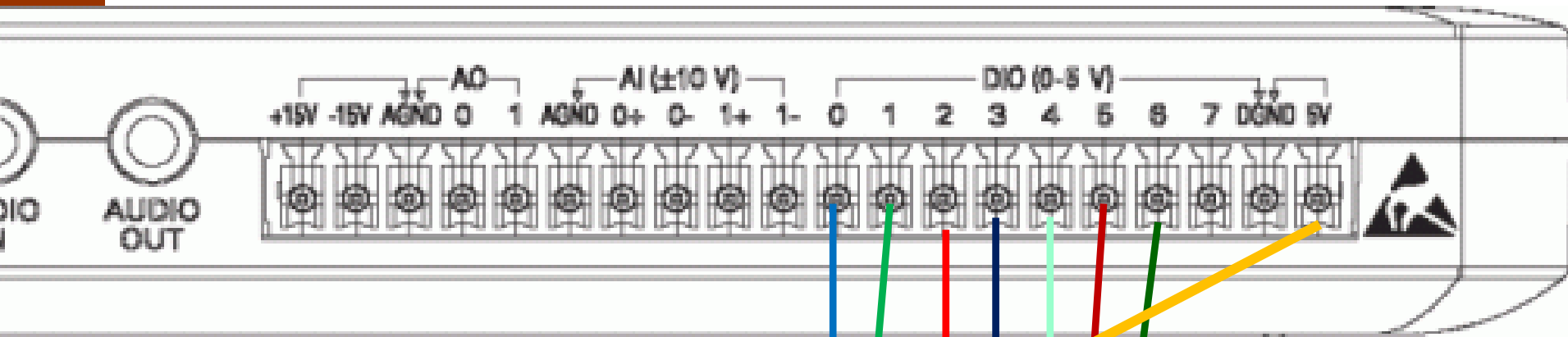


1 - 5

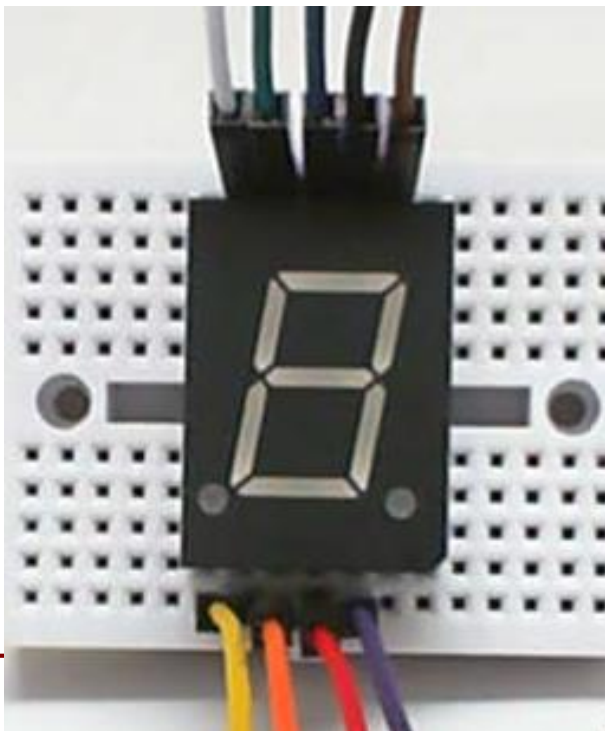
7 LED



Dioda RGB



np.



7 LED

Create New ...

?

×



Select the physical channel(s) to add to the task.

If you have previously configured [global virtual channels](#) of the same measurement type as the task, click the **Virtual** tab to add or copy global virtual channels to the task. When you copy the global virtual channel to the task, it becomes a local virtual channel. When you add a global virtual channel to the task, the task uses the actual global virtual channel, and any changes to that global virtual channel are reflected in the task.

If you have TEDS configured, click the **TEDS** tab to add TEDS channels to the task.

For hardware that supports [multiple channels](#) in a task, you can select multiple channels to

Physical

Supported Physical Channels

- myDAQ1 (NI myDAQ)
 - port0/line0
 - port0/line1
 - port0/line2
 - port0/line3
 - port0/line4
 - port0/line5
 - port0/line6
 - port0/line7

<Ctrl> or <Shift> click to select multiple channels.

< Back

Next >

Finish

Cancel

7 LED

The screenshot displays a software interface for configuring digital channels. At the top, a toolbar includes 'Undo', 'Redo', 'Run', 'Add Channels', and 'Remove Channels'. Below the toolbar, seven digital output channels are listed vertically: DigitalOut_6, DigitalOut_5, DigitalOut_4, DigitalOut_3, DigitalOut_2, DigitalOut_1, and DigitalOut_0. The main configuration area is divided into three tabs: 'Configuration', 'Triggering', and 'Advanced Timing'. The 'Configuration' tab is active and contains a 'Channel Settings' section with a list of channels from DigitalOut_0 to DigitalOut_6. The 'DigitalOut_0' channel is selected and highlighted in blue. To the right of the channel list is the 'Digital Line Output Setup' panel, which includes a 'Settings' sub-panel with a checked 'Invert Line' option. At the bottom, the 'Timing Settings' section shows 'Generation Mode' set to '1 Sample (On Demand)', 'Samples to Write' set to '100', and 'Rate (Hz)' set to '1k'.

Undo Redo Run Add Channels Remove Channels

DigitalOut_6
DigitalOut_5
DigitalOut_4
DigitalOut_3
DigitalOut_2
DigitalOut_1
DigitalOut_0

Configuration Triggering Advanced Timing

Channel Settings

+ X Details >>

DigitalOut_0
DigitalOut_1
DigitalOut_2
DigitalOut_3
DigitalOut_4
DigitalOut_5
DigitalOut_6

Digital Line Output Setup

Settings

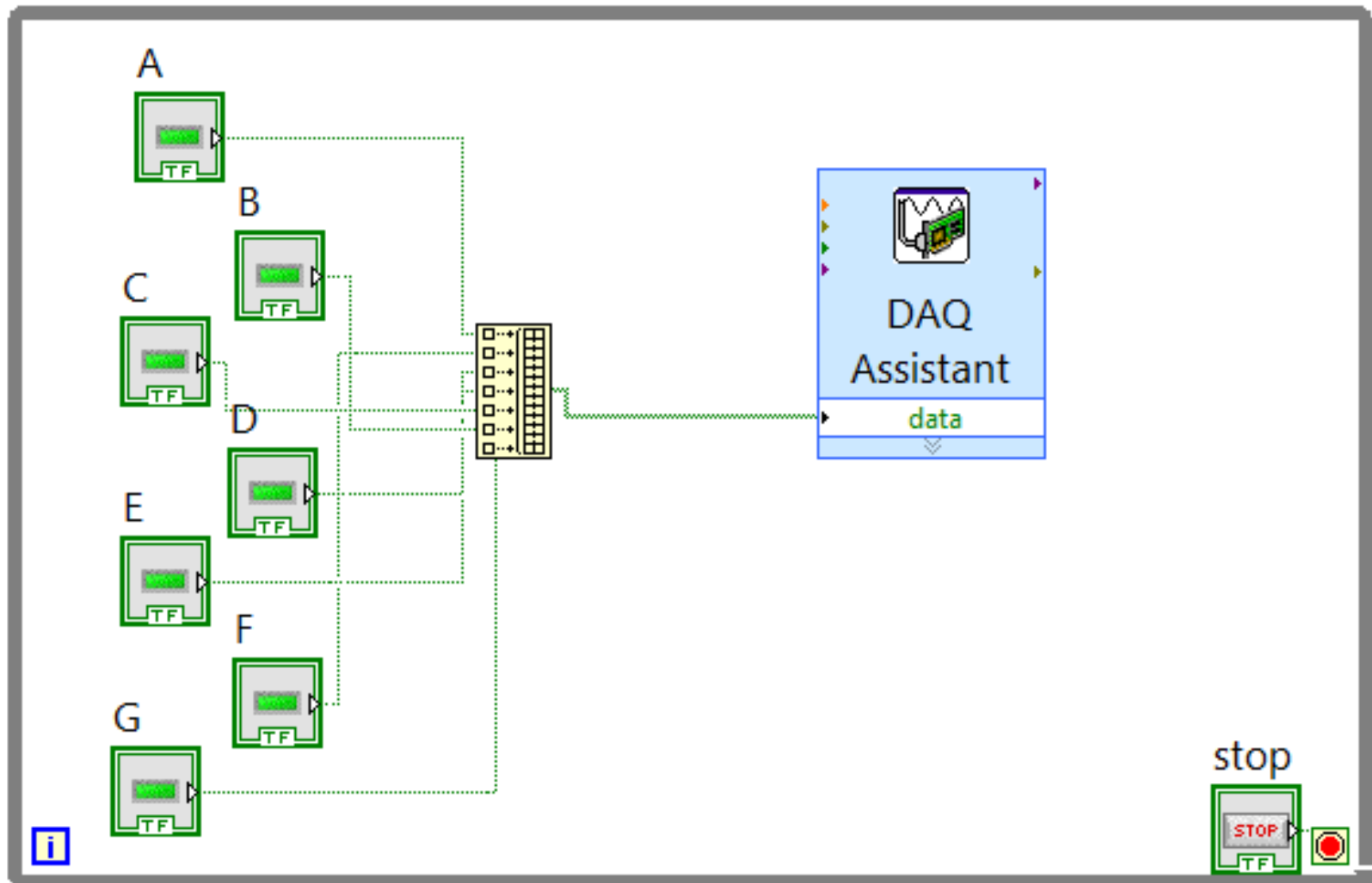
Invert Line

Timing Settings

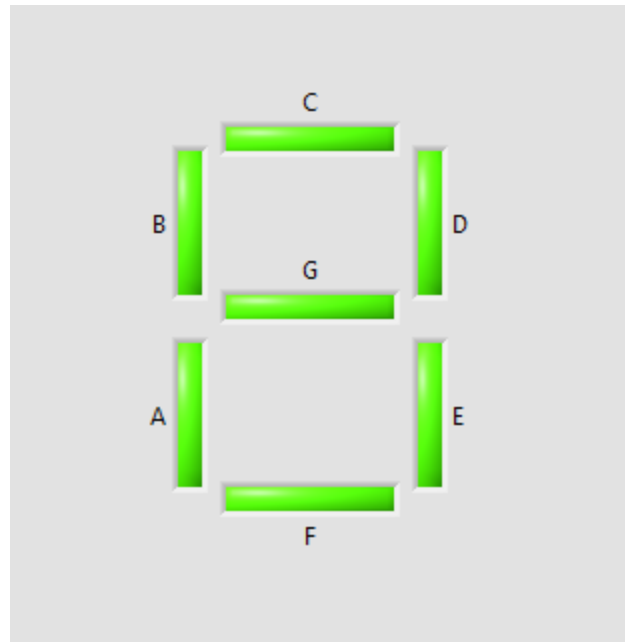
Generation Mode Samples to Write Rate (Hz)

1 Sample (On Demand) 100 1k

7 LED



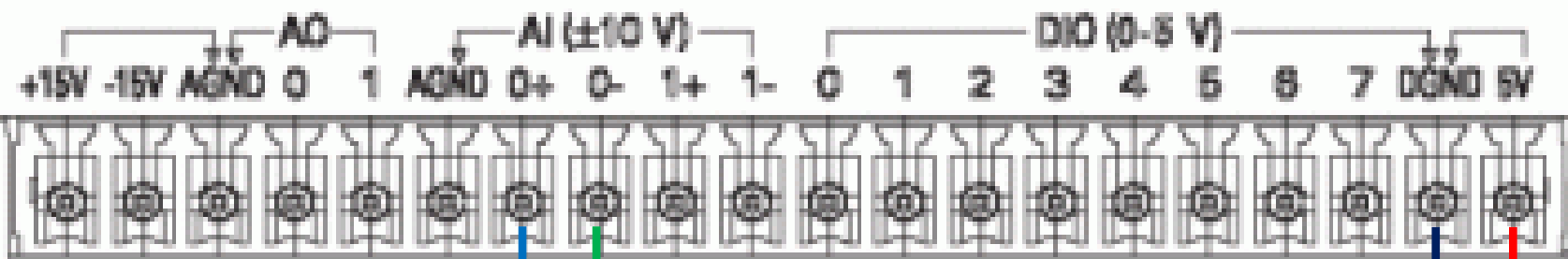
7 LED



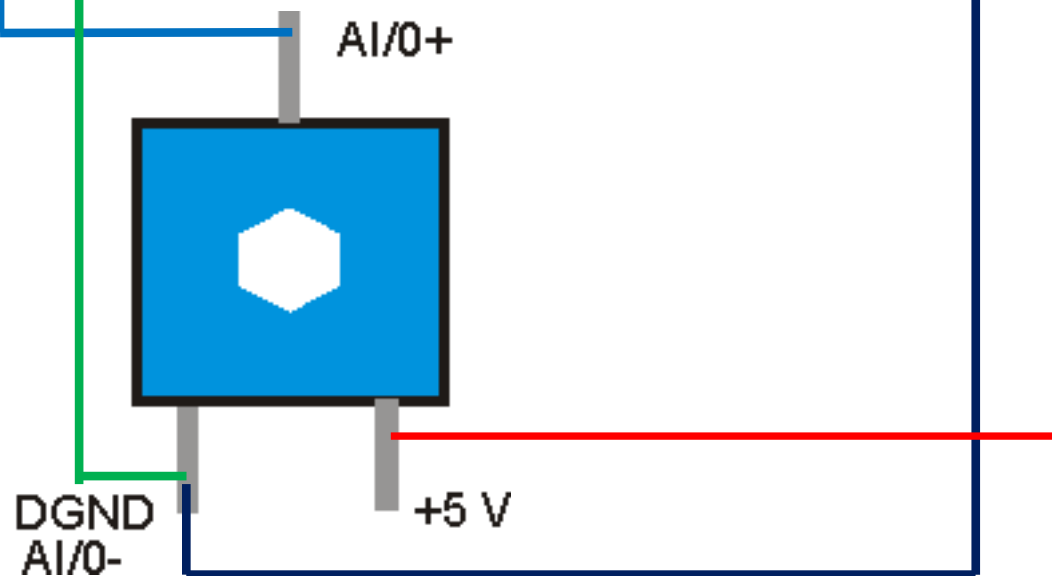
Potencjometr



Potencjometr




np.



Potencjometr

Create New ... ? X

 NATIONAL INSTRUMENTS

Select the measurement type for the task.

A [task](#) is a collection of one or more virtual channels with timing, triggering, and other properties.

To have [multiple measurement types](#) within a single task, you must first create the task with one measurement type. After you create the task, click the **Add Channels** button to add a new measurement type to the task.

- Acquire Signals
 - Analog Input
 - Voltage**
 - Temperature
 - Strain
 - Current
 - Resistance
 - Frequency
 - Position
 - Sound Pressure
 - Acceleration
 - Velocity (IEPE)
 - Force
 - Pressure

Potencjometr

Create New ...



Select the physical channel(s) to add to the task.

If you have previously configured [global virtual channels](#) of the same measurement type as the task, click the **Virtual** tab to add or copy global virtual channels to the task. When you copy the global virtual channel to the task, it becomes a local virtual channel. When you add a global virtual channel to the task, the task uses the actual global virtual channel, and any changes to that global virtual channel are reflected in the task.

If you have TEDS configured, click the **TEDS** tab to add TEDS channels to the task.

For hardware that supports [multiple channels](#) in a task, you can select multiple channels to

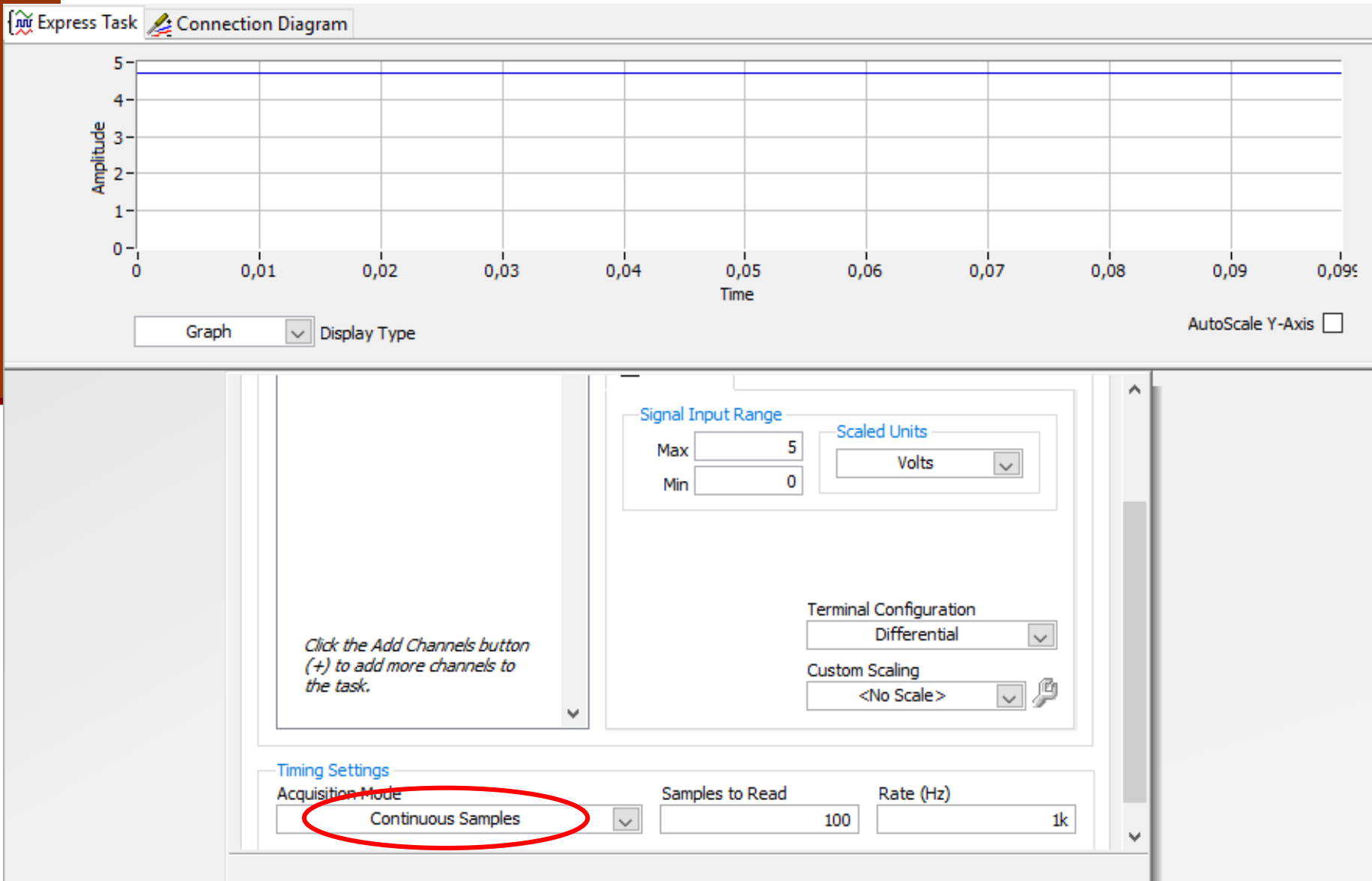
Physical

Supported Physical Channels

- myDAQ1 (NI myDAQ)
 - ai0
 - ai1
 - audioInputLeft
 - audioInputRight
 - dmm

<Ctrl> or <Shift> click to select multiple channels.

Potencjometr



Potencjometr

The screenshot shows the NI Express software interface. At the top, there is a toolbar with icons for Undo, Redo, Run, Add Channels, and Remove Channels. Below the toolbar, the 'Express Task' is named 'Connection Diagram'. A table at the top right shows the current channel configuration:

Channel	Value
Voltage	0

The main configuration window is open, showing the 'Configuration' tab. It is divided into 'Channel Settings' and 'Voltage Input Setup'.

Channel Settings: A list of channels is shown, with 'Voltage' selected. There are buttons for adding (+), removing (X), and refreshing (refresh icon) channels. A 'Details' button and a scroll bar are also present. A note at the bottom of this section reads: "Click the Add Channels button (+) to add more channels to the task."

Voltage Input Setup: This section contains several settings:

- Signal Input Range:** Max is set to 5, Min is set to 0.
- Scaled Units:** Set to 'Volts'.
- Terminal Configuration:** Set to 'Differential'.
- Custom Scaling:** Set to '<No Scale>'.

At the bottom of the configuration window, the 'Timing Settings' section is visible. The 'Acquisition Mode' is set to '1 Sample (On Demand)', which is circled in red. Other timing settings include 'Samples to Read' set to 100 and 'Rate (Hz)' set to 1k.

Potencjometr

Express Task **Connection Diagram**

Channels in Task

- Voltage

Connections List

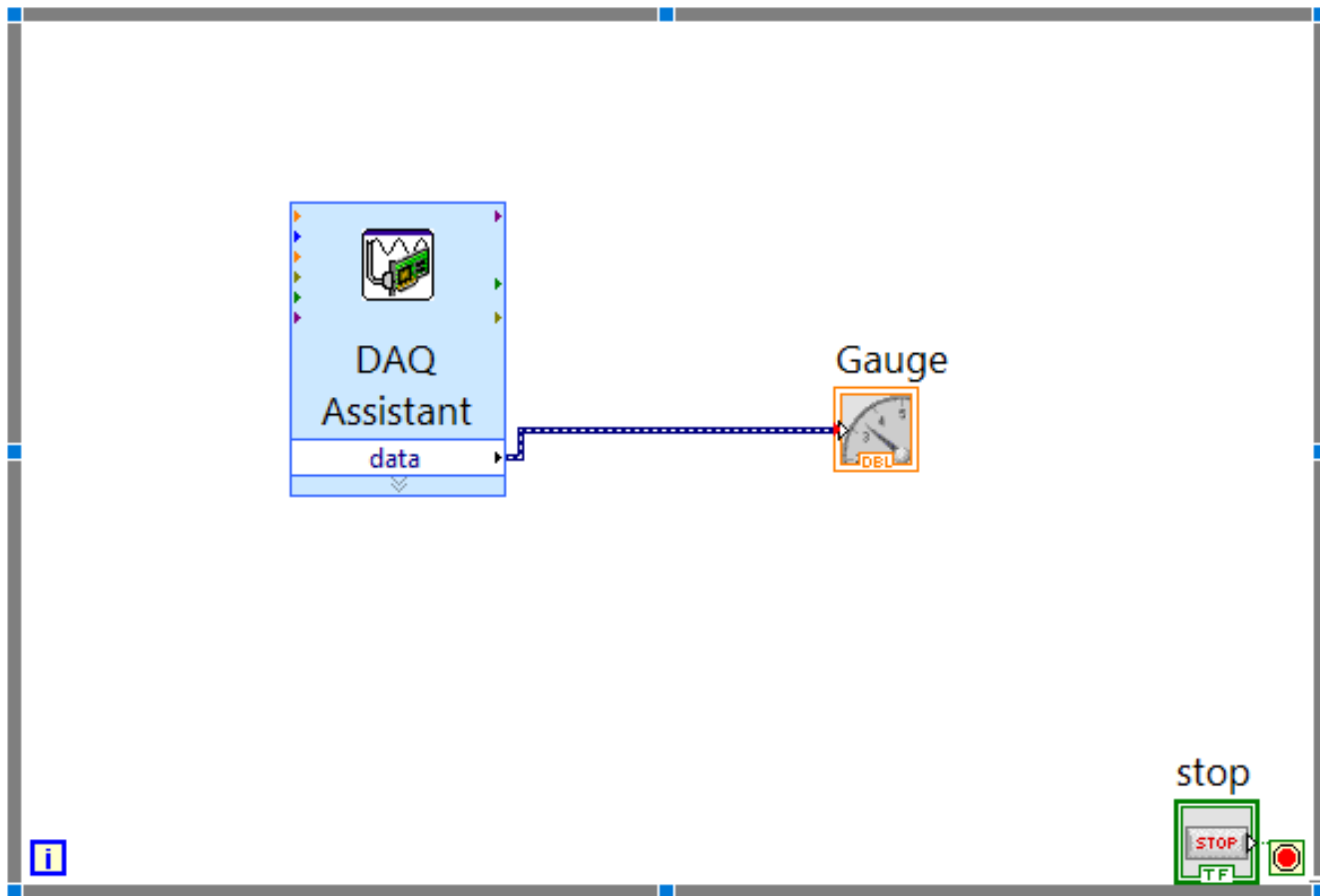
Point 1	Point 2
Voltage/CH+	myDAQ/AI0+
Voltage/CH-	myDAQ/AI0-

Save to HTML...

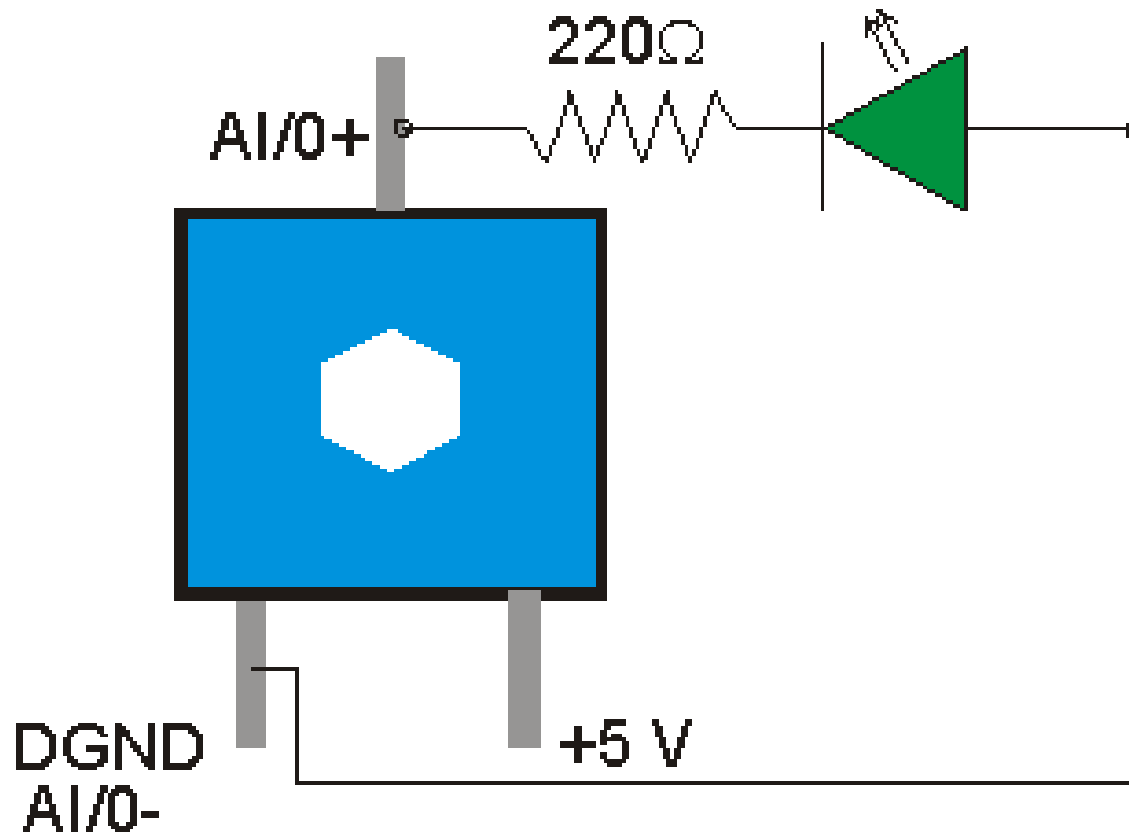
NATIONAL INSTRUMENTS

The diagram illustrates the hardware setup for measuring a potentiometer. On the left, the myDAQ terminal block is shown with labels for +18V, -18V, AGND, AO, AI ($\pm 10V$), and DIO ($\pm 6V$). The AI0+ and AI0- terminals are connected to the potentiometer's HI and COM terminals, respectively. The potentiometer's other HI terminal is connected to a voltage source V_s . The potentiometer's output terminals are labeled CH+ and CH-.

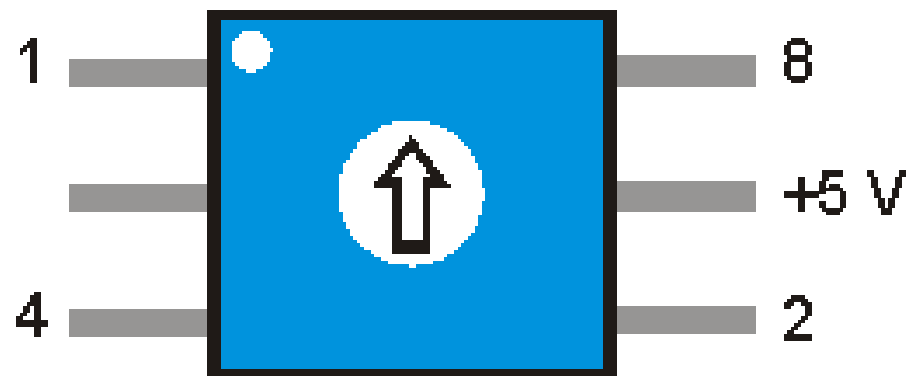
Potencjometr



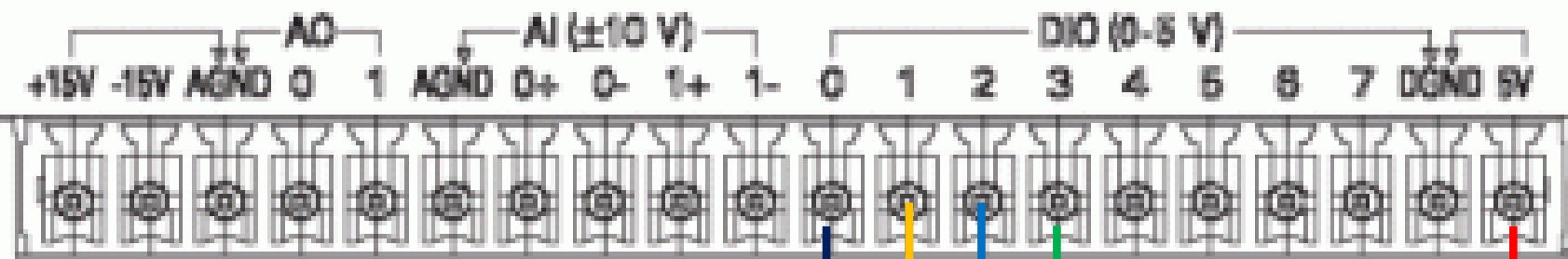
Potencjometr + dioda LED



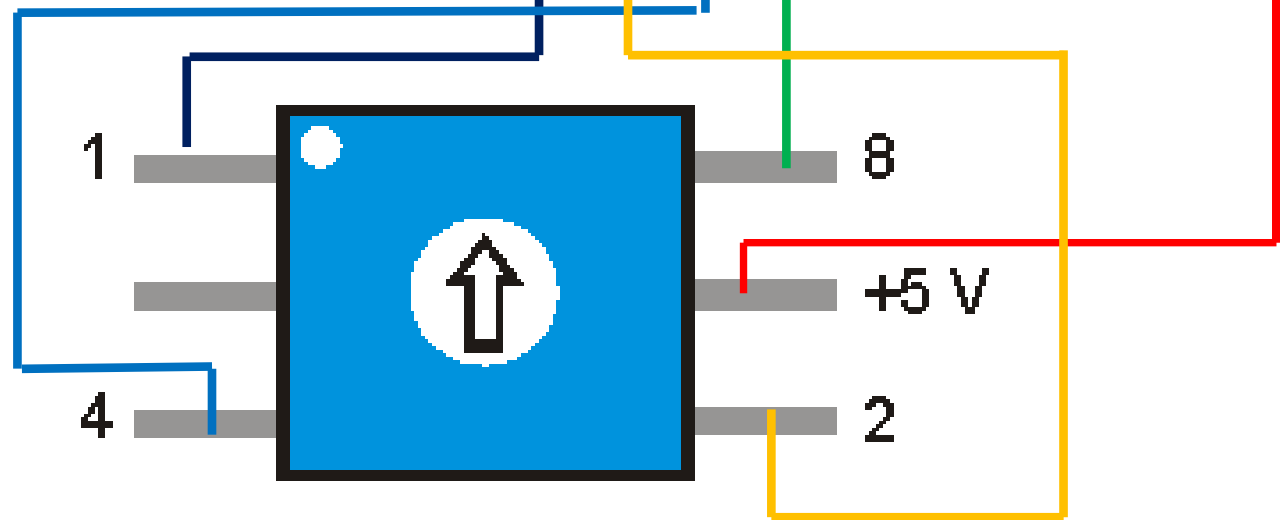
DIP - okrągły



DIP - okrągły



np.



DIP - okrągły

Create New ...

NATIONAL INSTRUMENTS

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- [-] Acquire Signals
 - [+] Analog Input
 - [+] Counter Input
 - [-] Digital Input
 - [-] Line Input**
 - [+] Port Input
 - [+] TEDS
- [+] Generate Signals

DIP - okrągły

Select the physical channel(s) to add to the task.

If you have previously configured [global virtual channels](#) of the same measurement type as the task, click the **Virtual** tab to add or copy global virtual channels to the task. When you copy the global virtual channel to the task, it becomes a local virtual channel. When you add a global virtual channel to the task, the task uses the actual global virtual channel, and any changes to that global virtual channel are reflected in the task.

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For hardware that supports [multiple channels](#) in a task, you can select multiple channels to

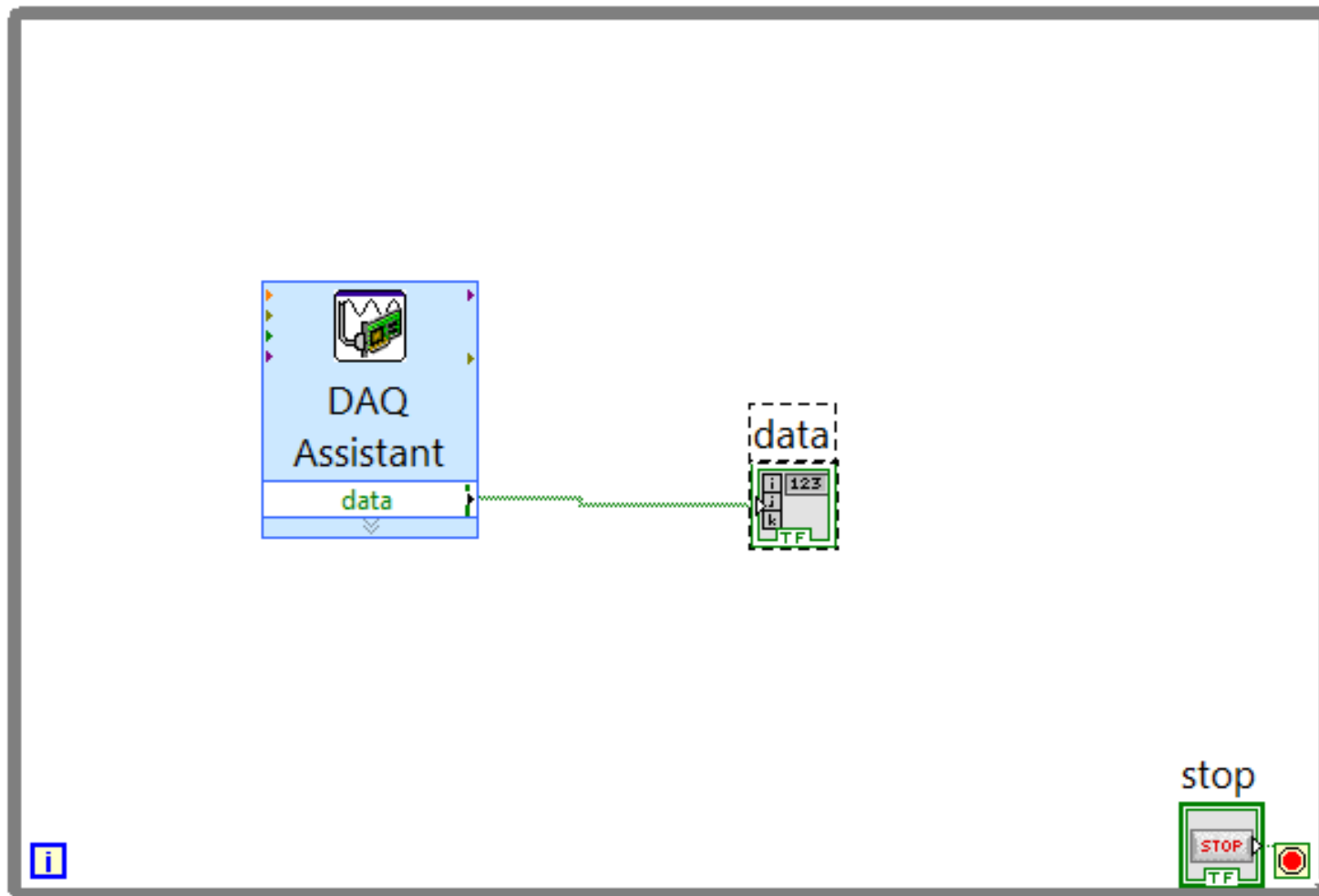
Physical

Supported Physical Channels

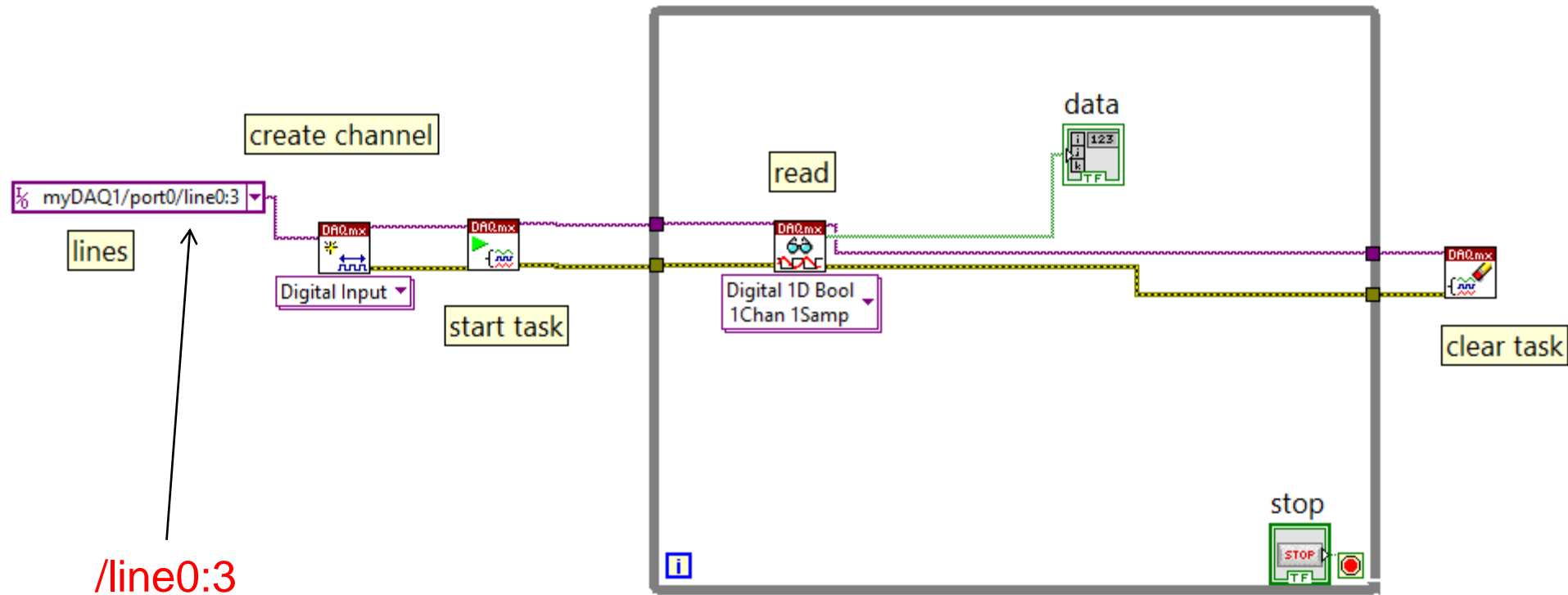
- [-] myDAQ1 (NI myDAQ)
 - port0/line0
 - port0/line1
 - port0/line2
 - port0/line3
 - port0/line4
 - port0/line5
 - port0/line6
 - port0/line7

<Ctrl> or <Shift> click to select multiple channels.

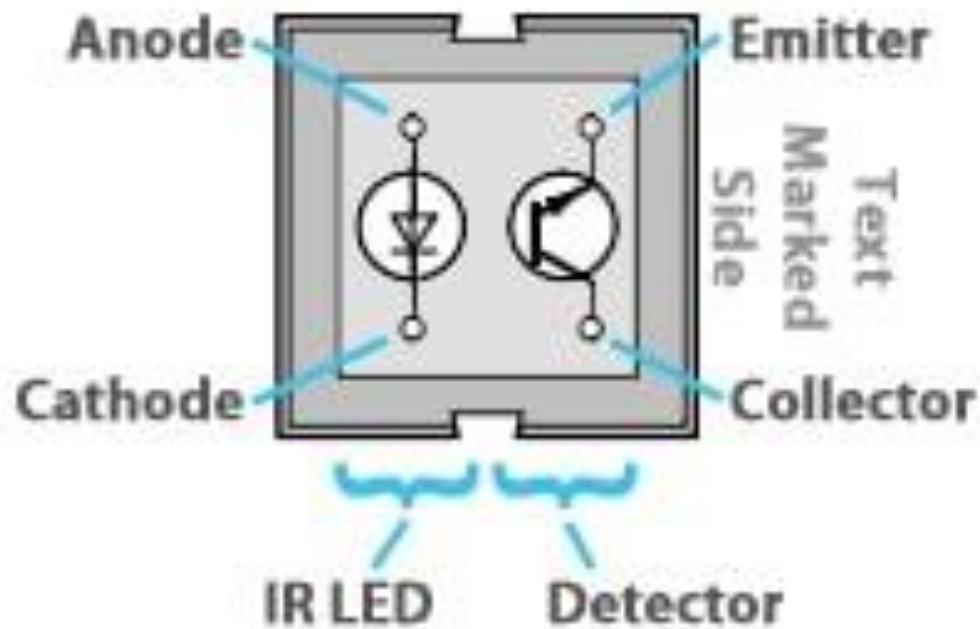
DIP - okrągły



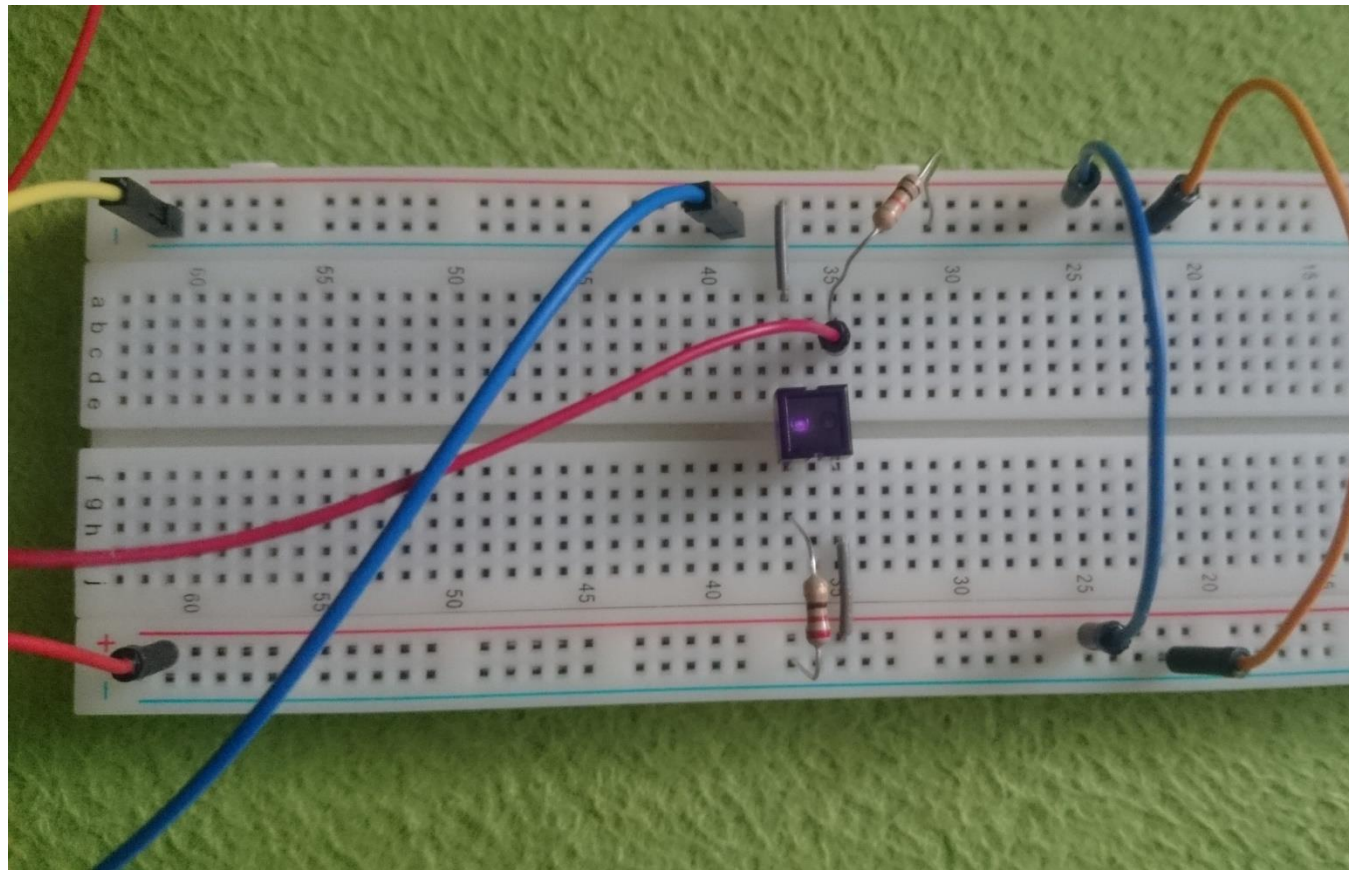
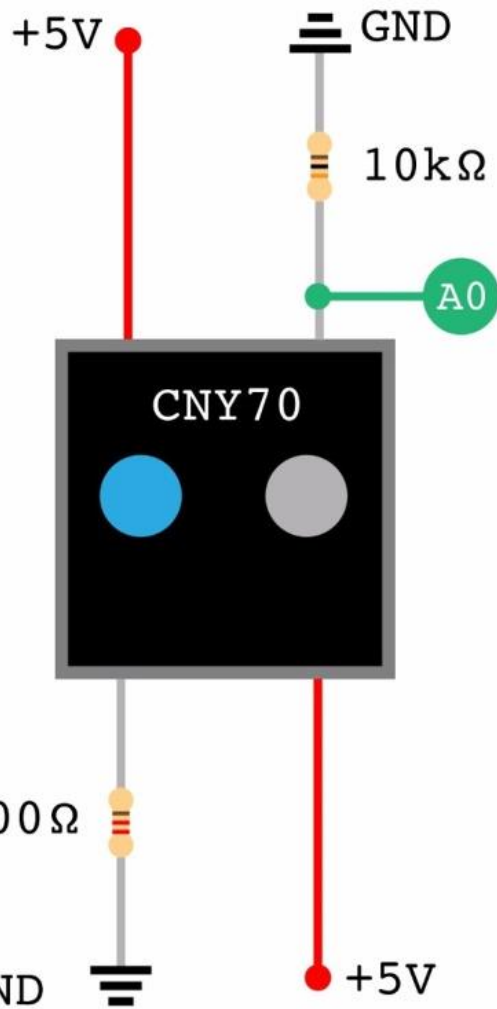
DIP – okrągły (inaczej)

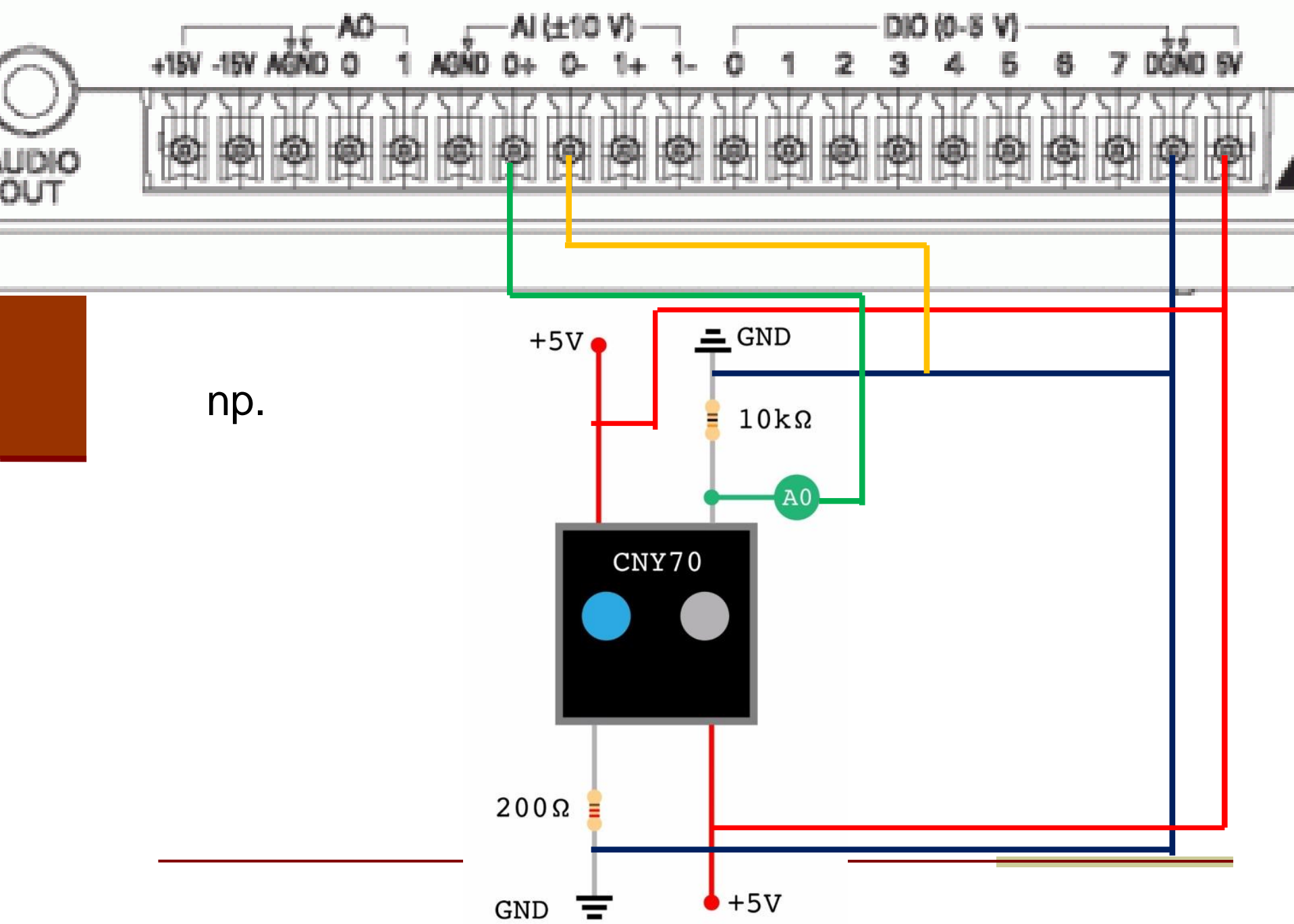


czujnik zblizeniowy



czujnik zblizeniowy





serwomotor

Serwomotor

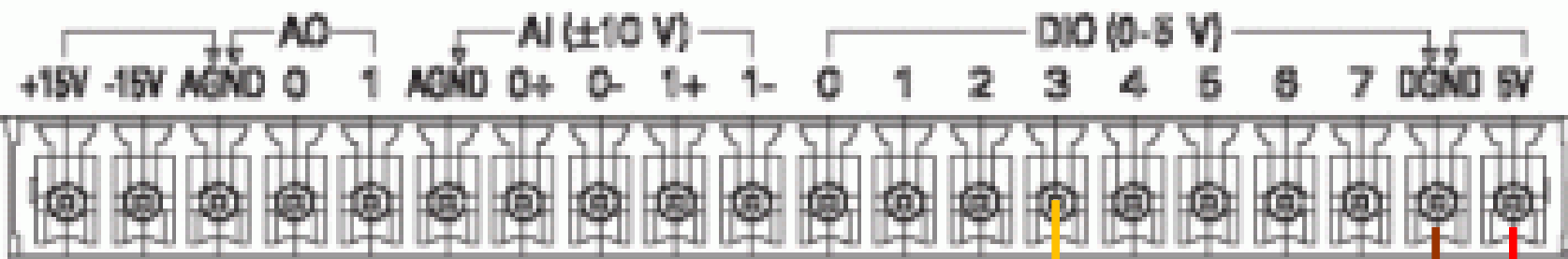
- zwykle nazywany serwomechanizmem łączy silnik prądu stałego, przekładnię, potencjometr i elektronikę kontrolera, aby zapewnić względnie precyzyjną regulację położenia kąтового wału obrotowego
 - zapewnia np. kontrolę ruchu ramion robota
 - używane w zdalnie sterowanych samolotach, samochodach i łodziach do manipulowania powierzchniami sterującymi (lotka, winda, ster) i sterowania.
-

serwomotor



Moment: 1,8 kg/cm
Waga: 9g
Prędkość: 0,12 s/60st
Napięcie pracy: 4,5V - 6V

serwomotor



np.

DIO3 (PWM)

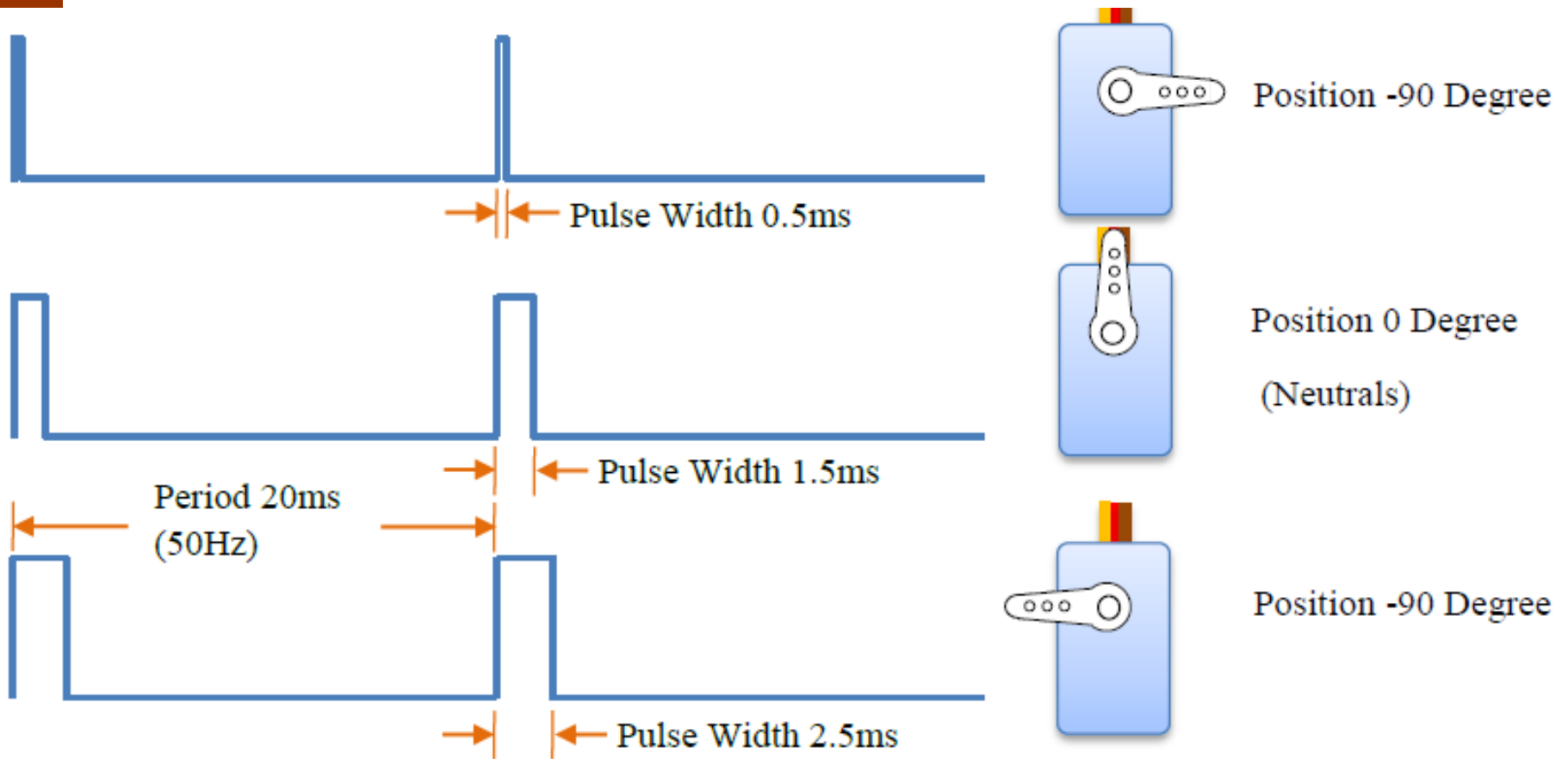
5 V

DGND



PWM

PWM – Pulse - Width Modulation

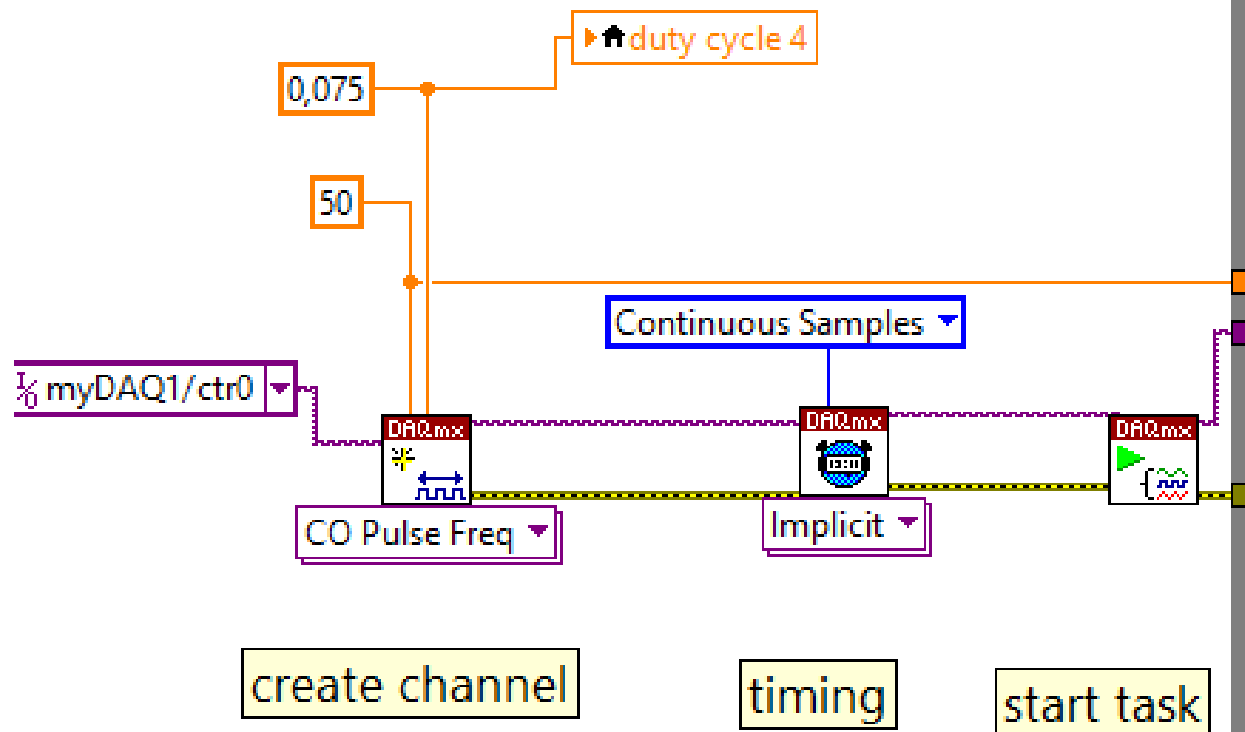


serwomotor

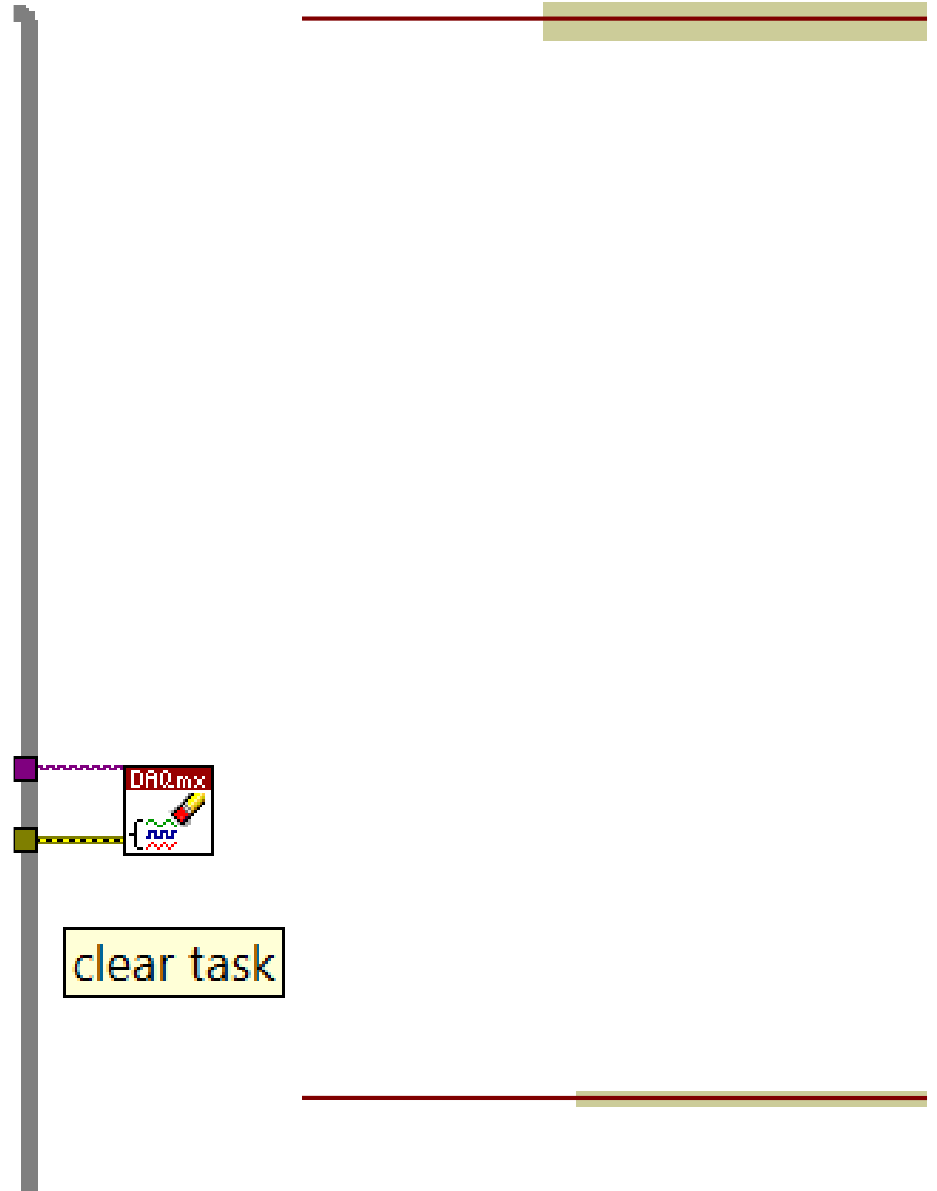
Parametry:

- napięcie pracy: 5 V
 - częstotliwość: 50 Hz (20 ms)
 - duty cycle: 0,5 ÷ 2,5 ms (0,025 ÷ 0,125)
-

serwomotor



serwomotor



serwomotor

