

# ARTEX

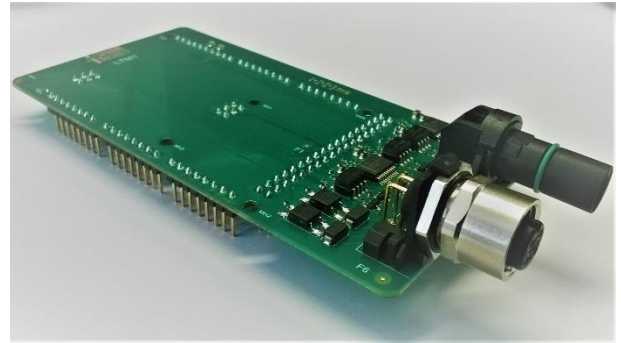
## 24V I/O Arduino DUE shield



### Industrial Real Time

### Main characteristics

- Arduino DUE shield
- Two Isolated 0-24V analog inputs
- Three isolated Encoder 24V inputs
- Three Isolated Digital 24V Inputs
- Two isolated 24V maximum relays (N.O.)
- PCB dimensions: 119mm x 60mm



DW0105-01

### Typical application

- Industrial process control
- Railways application
- Real time application

### Product Overview

The DWave.it DW0105-00 is an Arduino DUE compatible shield. It is used to provide to the Arduino DUE board external isolated analog or digital inputs. The three of the six digital inputs are connected to the Arduino DUE encoder inputs. All digital inputs are in negative logic.

The two analog inputs are isolated. The related on-board ADCs are connected to the Arduino DUE SPI bus with two separate Chip Select. For more information regarding this topic, please, refer to the Arduino DW0105-00 software library.

All digital/analog inputs are included in JP9 connector. The solution also includes two isolated output Relays (Normally Open) included in JS3.

All input and output are mutually isolated except all signal with the reference in common (see pin description).

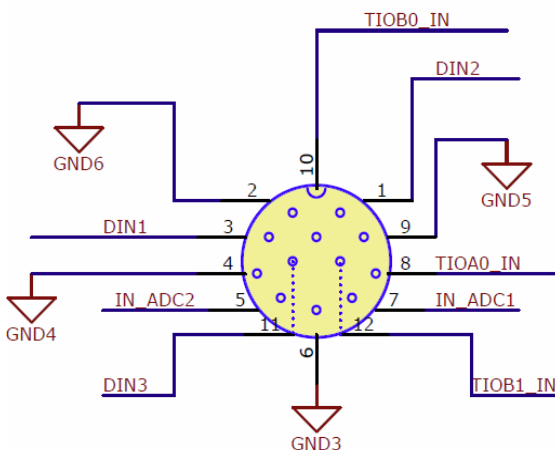


Figure 1: JP9 input connector.

JP9 Pin Description		
Pin #	Name/Description	Arduino DUE pin
1	DIN2: digital input 2	29
2	GND6: reference for DIN1, DIN2 and DIN3	
3	DIN1: Digital Input 1	A7
4	GND4: IN_ADC2 reference	
5	IN_ADC2: analog input 2	SPI + chip-select on pin 3
6	GND3: IN_ADC1 reference	
7	IN_ADC1: analog input 1	SPI + chip-select on pin 10

MORE INFORMATION AND DOCUMENTATION AT: [www.dwave.it](http://www.dwave.it)

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8	TIOA0_IN: digital/encode input 4	3
9	GND5: reference for TIOA0_IN, TIOB0_IN and TIOB1_IN	
10	TIOB0_IN: digital/encode input 5	13
11	DIN3: digital input 3	A4
12	TIOB1_IN: digital/encode input 6	A6

JS3 Pin Description		
Pin #	Name/Description	Arduino DUE pin
1	RL1_OUT: relay output 1	51
2	GND1: ON/OFF contact for RL1_OUT	
3	RL2_OUT: relay output 2	50
4	GND2: ON/OFF contact for RL2_OUT	
5	Unused	

The relays are “high level trigger” output that means that a high signal on Arduino interface enables the current to go through the relay (ON). In other words:

Arduino signal	Relay state
High	ON (RLX_OUT shorted to GNDX)
Low	OFF (RLX_OUT and GNDX are open)
Absent	OFF (RLX_OUT and GNDX are open)

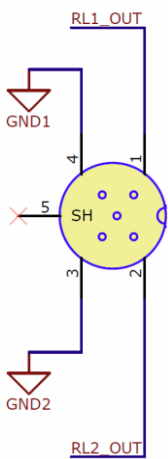


Figure 2: JS3 output connector.

Absolute Maximum Rating						
PARAMETER	MIN	TYP	MAX	UNIT	REMARKS	
<b>Digital Inputs</b>						
Continuous Digital Input voltage	-36		36	V		
Continuous Encoder Input voltage	-36		36	V		
<b>Analog Inputs</b>						
Continuous input voltage	-100		100	V		
<b>Relay output</b>						
Load Voltage	-60		+60	V		
Load Current	-0.5		0.5	A		
Peak load current	-1.5		1.5	A	100 ms (1 shot)	
<b>General</b>						
Operative temperature range	-40		+85	°C		
Storage temperature range	-40		+100	°C		

All information included in the following and previous table are related to  $T_{AMB} = 25^{\circ}\text{C}$ , unless otherwise specified.

Electrical characteristics						
PARAMETER	MIN	TYP	MAX	UNIT	REMARKS	
<b>Digital Inputs</b>						
Input voltage “High”	5.0	24		V		
Input voltage “Low”		0	2.0	V		
Rise/Fall time		4	7	$\mu\text{s}$		

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Electrical characteristics					
PARAMETER	MIN	TYP	MAX	UNIT	REMARKS
Input current			6.7	mA	Input voltage <24V
Input current			10	mA	Input voltage <36V
Latency			10	μs	Delay between input variation and internal output in comparator mode
Isolation: Maximum Withstand Isolation Voltage ( $V_{ISO}$ )	4.0			kV	IEC 60747-5-5 standard
Isolation: Maximum Repetitive Peak Isolation Voltage ( $V_{IORM}$ )	560			Vp	IEC 60747-5-5 standard
Isolation: Maximum transient isolation voltage ( $V_{IOTM}$ )	6.0			kVp	IEC 60747-5-5 standard
<b>Analog Inputs</b>					
Input voltage range	0	24.0	28.1	V	
Input current			56.8	μA	Input voltage <28.1V
Input current			211	μA	Input voltage <100V
Throughput	8		12	kSps	Single ADC tested
Input bandwidth		4.5		kHz	-3dB analog filtering
Latency			780	μs	No digital filtering, delay between input variation and internal output in comparator mode
Isolation: Maximum Withstand Isolation Voltage ( $V_{ISO}$ )	3.75			kV	IEC 60747-5-5 standard
Isolation: Maximum Repetitive Peak Isolation Voltage ( $V_{IORM}$ )	560			Vp	IEC 60747-5-5 standard
Isolation: Maximum transient isolation voltage ( $V_{IOTM}$ )	6.3			kVp	IEC 60747-5-5 standard
<b>Relay output</b>					
ON resistance	1		2.5	Ω	
OFF state leakage current			2	μA	
Latency ( $T_{ON}$ )	0.9		3.0	ms	Delay between internal variation and output effect. $I_{LOAD} = 0.5A$ .
Latency ( $T_{OFF}$ )	0.5		2.0	ms	Delay between internal variation and output effect. $I_{LOAD} = 0.5A$ .

## Outline Drawing

The DW0105-00 top outline drawing is shown in the following figure. All measurements are expressed in millimeters.

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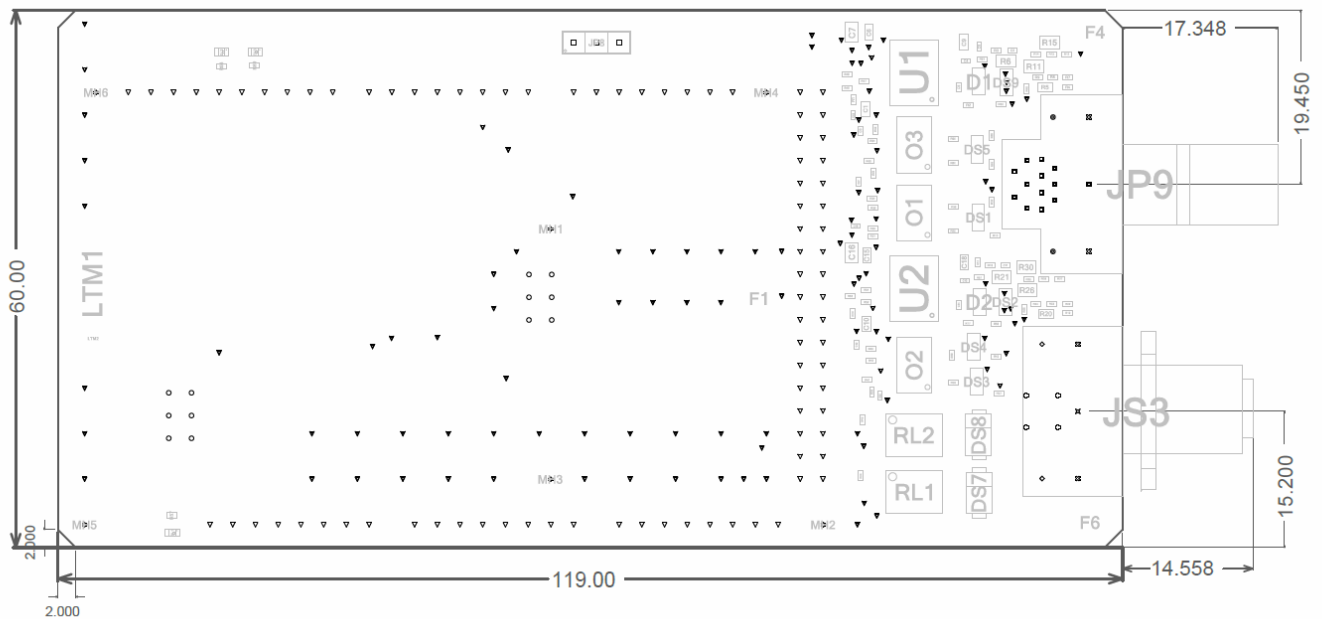


Figure 3. Top Side outline drawing.

## Connectors Information

REFERENCE	MANUFACTURER	MANUFACTURER PN	DESCRIPTION
JP9	PHOENIX CONTACT	1424198	Sensor/actuator flush-type plug, 12-pos. with shroud, A-coded, with angled solder connection, contact insert only
JS3	HARTING	21033214401	M12 PCB rectpt angl 4-pole A-coded female shielded

## Packaging information

The following part numbers are available

DW0105-01	24V I/O Arduino DUE shield
DW0105-00	Engineering sample

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