ULAD 10 - User Guide

PiKRON s.r.o. (http://www.pikron.com)

9th December 2004

Contents

1 ULAD 10 Converter Features

Technical Specifications of ULAD 10 :

Quantity	Value	Units
Supply voltage	11 to 30	VDC
Max. supply current	0.3	A
Max. analog input voltage	± 10	VDC
AD converter resolution	18 to 20	bit
Number of analog inputs	1 (2 optional)	
Sampling frequency	10	Hz
Basic input voltage range (selected by jumpers)	± 10 or ± 2.5	VDC
Software selectable gain and range reduction	$\times 1, \times 2, \times 4, \cdots, \times 64, \times 128$	
Width of input software filter	from 1 to 64 samples	
Number of digital inputs/outputs	2 / 4	
Auxiliary digital inputs/outputs (optional)	2 / 4	
Auxiliary DA converter (optional)	16	bit
Communication interface	RS-485	
Protocol	uLan	
Communication baud rate	19200	Baud

2 Control and Communication over uLan RS-485 Line

2.1 Accessible Variables Dictionary

2.1.1 Actual AD Converter Input Voltage Values

Name	R/W	Type	Function
CHA	R	f4	Actual value of A channel input
CHB	R	f4	Actual value of B channel input
CHAi	R	s2 (/.4)	Channel A as fixed value (unit 10^{-4})
CHBi	R	s2 (/.4)	Channel B as fixed value (unit 10^{-4})
ADCAl	R	s4	Raw A channel ADC value
ADCBl	R	s4	Raw B channel ADC value

Actual reported actual channel value is obtained as result of more scaling steps applicate to the raw ADC output value:

- converter proceeds conversion according to a selected mode CH*X*_MODE, result is raw value ADC*X*l
- value is filtered by moving averaging filter of width CH*X*_FILT samples
- values is scaled by such factor, that maximal software selectable range (± 10 or ± 2.5) is equivalent to ± 1.
- Factory preset constants (CH*X*_CM, CH*X*_CA) scales value resulting from previous steps such, that they correspond to voltage value connected to the **ULAD 10** input
- User can select user defined scaling by constants CH*X*_UM, CH*X*_UA. The default values of these constants are CH*X*_UM = 1 and CH*X*_UA = 0.

The steps are corresponding to the equation

$$CHX = CHX\_UA + CHX\_UM \cdot (CHX\_CA + CHX\_CM \cdot ADCX_{norm})$$

where $ADCX_{norm}$ is given as ratio of input voltage to the basic (jumper selected) input range

2.1.2 User Scaling and Offset for A and B Channels

Name	R/W	Type	Function
CHA_UM	R/W	f4	User selectable channel A multiplier
CHB_UM	R/W	f4	User selectable channel B multiplier
CHA_UA	R/W	f4	User selectable channel A additive offset
CHB_UA	R/W	f4	User selectable channel B additive offset

2.1.3 Channel A and B Voltage Calibration Scaling and Offset

Name	R/W	Type	Function
CHA_CM	R/W	f4	Channel A voltage calibration multiplier
CHB_CM	R/W	f4	Channel B voltage calibration multiplier
CHA_CA	R/W	f4	Channel A voltage calibration additive offset
CHB_CA	R/W	f4	Channel B voltage calibration additive offset

2.1.4 ADC input samples filter

Name	R/W	Type	Function
CHA_FILT	R/W	u2 <1,64>	Channel A averaging filter length in samples
CHB_FILT	R/W	u2 <1,64>	Channel B averaging filter length in samples

2.1.5 Conversion mode of AD converters

Name	R/W	Type	Function
CHA_MODE	R/W	u2	ADC channel A mode
CHB_MODE	R/W	u2	ADC channel B mode

The next table describes possible MODE setting for jumeperred base range ± 10 or ± 2.5 VDC

Gain	MODE value		Input voltage range	
	Unipolar	Bipolar	10 V	2.5 V
1×	144	128	10 V	2.5 V
2×	1168	1152	5 V	1.25 V
4×	2192	2176	2.5 V	625 mV
8×	3216	3200	1.25 V	300 mV
16×	4240	4224	625 mV	150 mV
32×	5264	5248	300 mV	75 mV
64×	6288	6272	150 mV	35 mV
128×	7312	7296	75 mV	17 mV

If above provided MODE value is increased by 8, acquired input voltage value is logarithmed. If the **ULAD 10** is used in UV detector **LCD 5254** the channel A MODE value should be 152 and channel B MODE value 128.

2.1.6 Digital Inputs Outputs

Name	R/W	Type	Function
AUXUAL	R/W	u2	Actual state on digital inputs and outputs
MARK_DADR	R/W	u2 <1,100>	The destination uLan address for MARK delivery
MARK_MASK	R/W	u2	Mask of changes producing MARK

ULAD 10 is populated with DIN-7 connector by default. The four digital outputs (1,2,3,4) and two digital inputs (5,6) are connected to the connector contacts. The signal 7 is activated by placing of magnet on PiKRON label. Actual state of inputs and last set value of of outputs can be read through AUXUAL dictionary variable. This variable is used for setting of value of output signals as well. Bits corresponding to the inputs are ignored in such case. Read and written value is equal to logical or arithmetic sum of weights corresponding to the signals.

Signal	I/O	Weight
1	O	1
2	O	2
3	O	4
4	O	8
5	I	16
6	I	32
7	I	64

The mask enables to select signals which are monitored for changes. If change is detected, MARK is sent to the address defined through MARK_DADR variable. Low byte of MARK_MASK variable masks responses to the rising edges of signals, hight byte (basic weights multiplied by 256) is used for monitoring of falling edges.

2.1.7 Configuration storage to non-volatile memory

Name	**R/W**	**Type**	**Function**
SAVECFG	E		Store actual selected configuration into EEPROM memory

Initial values of most of writable variables are setup according to the values stored EEPROM memory at **ULAD 10** power up. Different values can be written into dictionary and stored into EEPROM by SAVECFG command invocation. If some incorrect values are stored into EEPROM memory which prevents correct communication with **ULAD 10** converter, it is possible to skip EEPROM memory read at power on by placing magnet onto PiKRON label. The converter ignores EEPROM stored values in such case and new predefined values can be stored into memory EEPROM.

3 Producer

Company address:

PiKRON s.r.o.
Kankovskho 1235
18200 PRAHA 8

Tel. Fax: +420 2 84684676
Tel. : +420 2 409 76 71

http://www.pikron.com
e-mail: pikron@pikron.com