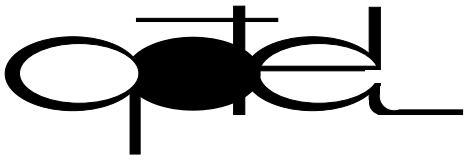
Research & Development
Ultrasonic Technology / Fingerprint recognition



DATA SHEETS

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OPKUD

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Ultrasonic Testing Card OPKUD-01/100

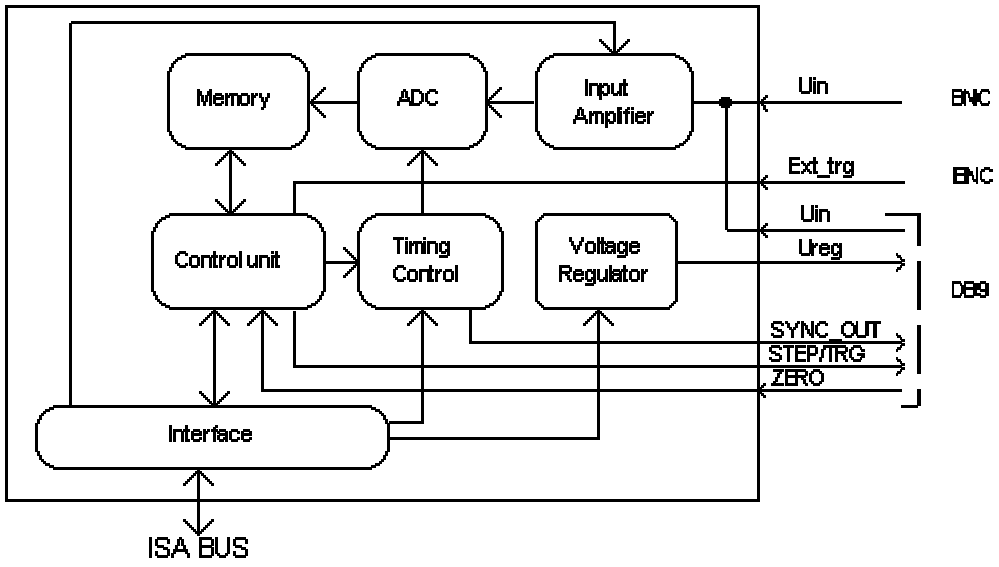
OPKUD-01/100 is particularly well suited for ultrasonic measurements as well as other kinds of measurements which employ mechanical scanning elements or multiplexed channels (the card is capable of controlling such devices). Together with the pulser&receiver unit OPGUD-01 and an ultrasonic probe it could be used as complete ultrasonic testing device. OPKUD-01/100 is a short (8-bit) ISA card and can be installed in a standard PC computer

1. Technical data

A/D converter:	
- Resolution:	8 bits
- Sampling frequency:	50 or 100MHz [1]
Analog parameters:	
- Input channels:	1
- Input amplifier gain:	x1, x2, x5, x10, x20, x50, x100 [1]
- Bandwidth:	0,1 - 25MHz
- Input voltage:	AC, max. 1Vp-p
- Input impedance:	50W, 10pF
Data buffer:	256, 512, 1K or 32K [1]
Triggering:	
- Source:	internal (software) or external (TTL Signal) [1]
- Post-trigger:	0-256ms [1]
- Ext. trigger frequency:	max. 2 kHz

1 - *software selected*

2. Block diagram of the card:



3. Signals on the external connectors:

DB9 **Uin** - measured input signal;
SYNC_OUT - pulse generator control;
STEP/TRG - step motor control or external trigger input (software selected);
ZERO (TTL-input signal) - position marker (e.g. generated by an optical or mechanical sensor).
Ureg (out) - software controlled voltage (2-10V, 8 steps) used for pulse amplitude control of the OPGUD pulser&receiver units;

BNC **Uin** - measured input signal
Ext_trg - external trigger

4. Characteristic of the card:

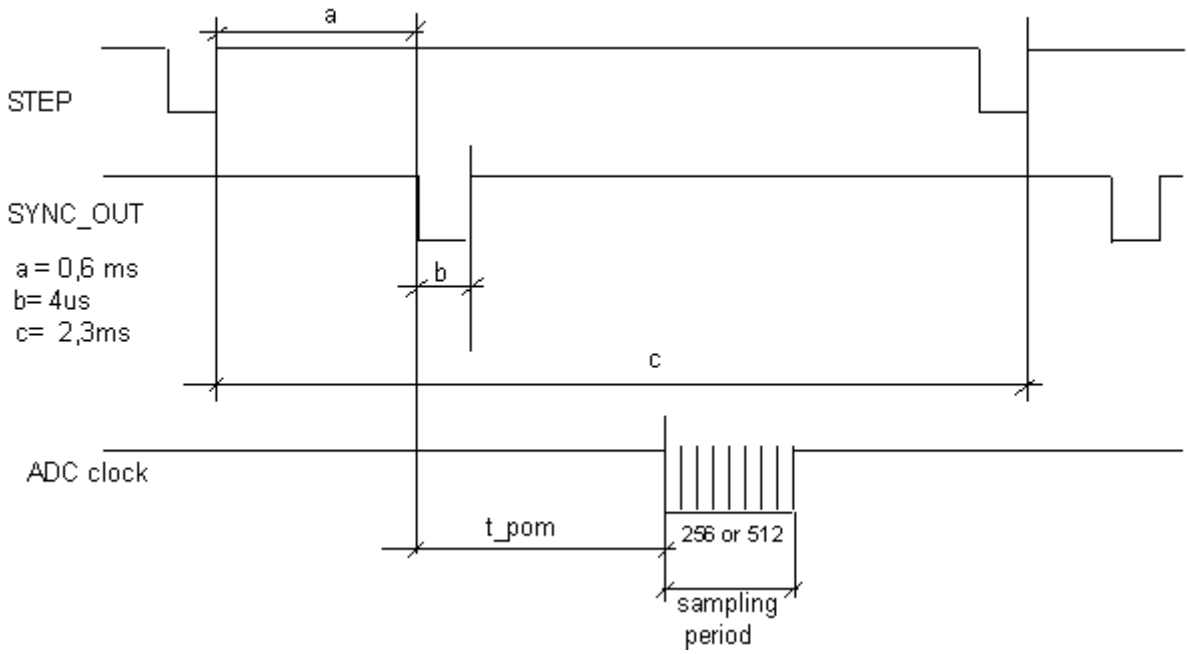
It can work in two modes:
Automatic: The measurement is controlled with the software and the sync_out signal triggers the measured unit (scan A and B)
Classical oscilloscope: measurement is controlled by the external trigger signal

One of the most important features of the card is a precise synchronization between the transmitter trigger signal T_NAD and the moment when the sampling of the input signal starts.

This time (t_pom) is software programmable in the range of 0 - 255ms with a resolution of 1ms and has stability within the range of 1ns. It is particularly important in the case of scanning devices, since it allows to achieve a very small time skew between different positions (channels).

1ns would correspond to a clock frequency of 1GHz which is much higher than the actual frequency used.

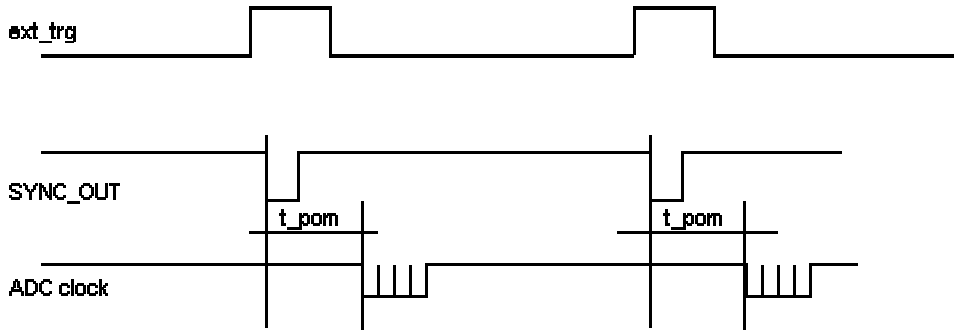
5. Automatic measurement mode



The card in its standard version can operate with a moving measurement head (rotating or moving linearly) as well as with a multiplexer circuit switching measurement channels. It can control a step motor (through a driver unit).

- ZERO is a marker of the reference position of the measurement head;
- STEP is a signal controlling the step motor driver unit or the multiplexer;
- T_NAD triggers the transmitter circuit, it is synchronized with the STEP signal in such a way that .
- a pulse on the STEP signal is followed by a delayed pulse on the T_NAD signal as shown in a figure below.
- The delay is introduced in order to eliminate potential interference from the step motor.

6. Oscilloscope mode



In this mode, for each EXT_TRG pulse, a single T_NAD pulse is generated (the STEP signal is not generated). This permits a precise synchronization with the clock signal generated on the card and therefore guarantees good repeatability of measurement results. In the case when the measurement circuit cannot be triggered, the repeatability of measurement results corresponds only to the clock resolution (12ns).

7. Additional notices:

In the current version of the card, there is no analogue trigger input and this function is implemented in software.

The card is programmed through the I/O operations. The STATUS and ZERO signals can be checked by reading the status register. The STATUS signal can also generate an interrupt.

Thanks to the feature which allows the I/O base address change, a number of our cards can work in a single computer.

All the control signals generated by the card can be modified according to specific customer requirements. For instance, a number of T_NAD pulses can be generated between consecutive STEP pulses, the frequency of the STEP pulses can be modified etc.

It is also possible to change following parameters: sampling frequency, bandwidth and amplification of the input circuit, the size of the input memory.

Included with the card is software which operates in both the automatic and oscilloscope mode. It also has a spectrum analysis function.

8. Future versions of the card will include

- 16-bit data bus and a programmable sampling frequency;
- Increased sampling frequency to at least 200 MHz;
- PCI interface.