

### Synchronization port

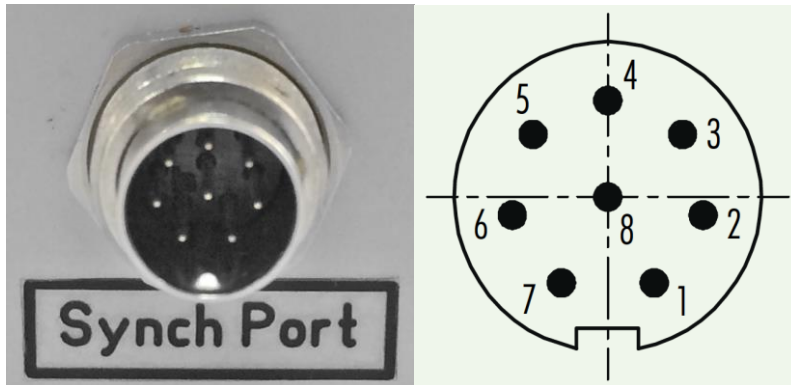
Synchronization port installed on the rear panel of system. Type of used connectors:

- System side: Binder 09-0481-00-08 (Web info: <https://www.binder-usa.com/products/partsdetail/89085>)
- Cable side: Binder 99-0480-100-08 (Web info: <https://www.binder-usa.com/products/partsdetail/89113>)

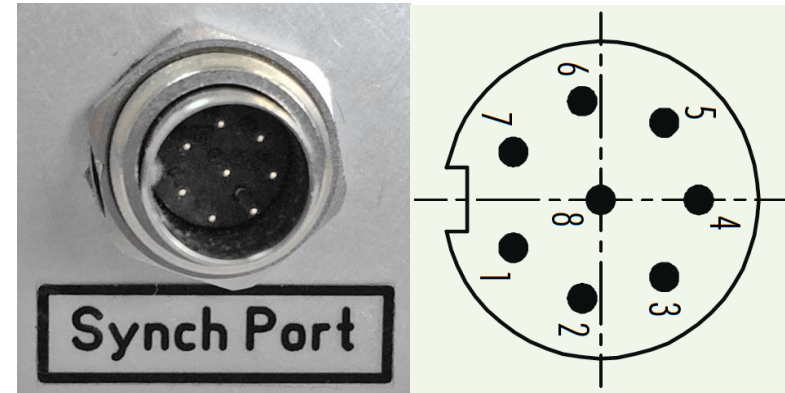
Buffer input/output chip inside of the system:

- SN74LVC2T45 (Web info: <http://www.ti.com/product/SN74LVC2T45>)

### Connector pin-out



MicrUs connector, rear panel view, full pin-out

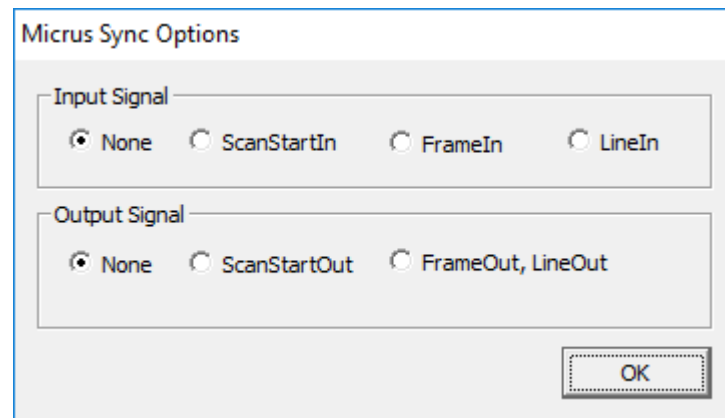


SmartUs connector, rear panel view, full pin-out

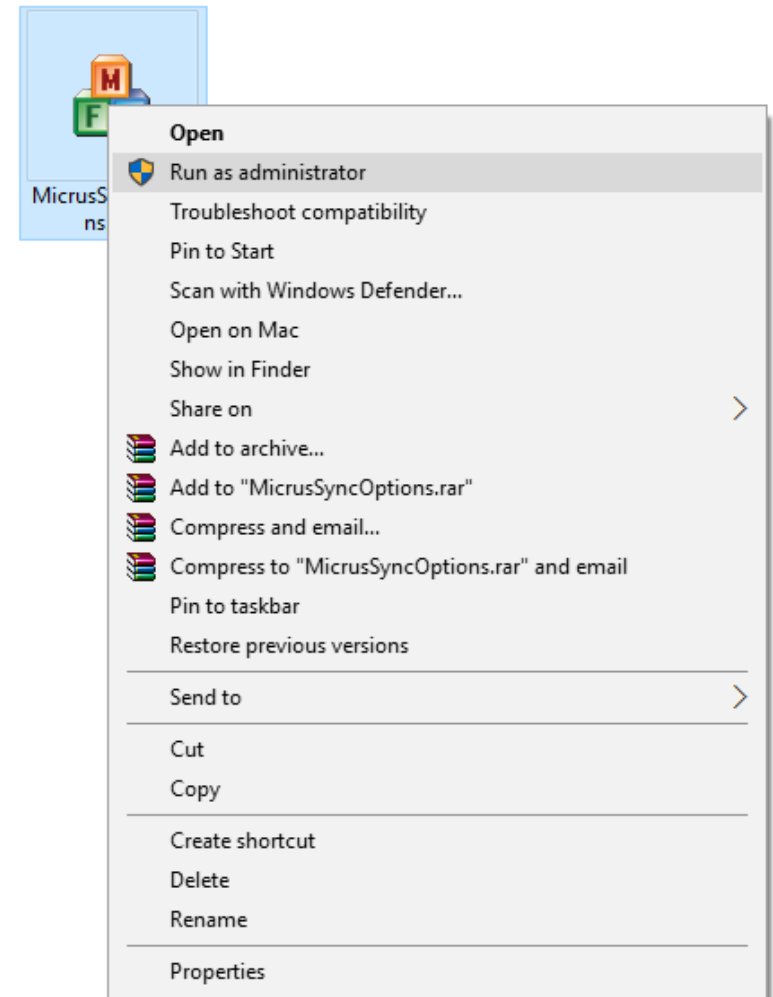
## Configuration utility

This utility allows to configure signals and their functionality. Using of this utility is very simple:

- Run utility as Administrator, see picture at the right side
- Choose Input / Output mode, see picture below
- Click OK
- **!!! Reconnect USB cable or reboot PC !!!**
- Run Echo Wave II software
- Signals will work in selected mode



Note. Utility for MicrUs and SmartUs looks same.



## Synchronization port pin-out

Connect or pin-out	Signal type (MicrUs)	Signal type (SmartUs)	Input / output modes							
			Input - none, Output - none.	Input - none, Output - ScanStartOut.	Input - none, Output - Frame, Line.	Input - ScanStartIn, Output - none.	Input - ScanStartIn, Output - ScanStartOut.	Input - ScanStartIn, Output - Frame, Line.	Input - FrameIn, Output - any.	Input - LineIn, Output - any.
1	Output	Output		<b>ScanStartOut</b>	<b>LineOut</b>		<b>ScanStartOut</b>	<b>LineOut</b>	<b>FrameAck</b>	<b>LineAck</b>
2	Ground	Ground	Gnd	Gnd	Gnd	Gnd	Gnd	Gnd	Gnd	Gnd
3	Output	Output			<b>FrameOut</b>			<b>FrameOut</b>		
4	Power output, Vdd=3.0V	Power output, Vdd=5.0V	Vdd	Vdd	Vdd	Vdd	Vdd	Vdd	Vdd	Vdd
5	Input	Input				<b>ScanStartIn</b>	<b>ScanStartIn</b>	<b>ScanStartIn</b>	<b>FrameIn</b>	<b>LineIn</b>
6	Ground	Ground	Gnd	Gnd	Gnd	Gnd	Gnd	Gnd	Gnd	Gnd
7	Input	Input	reserved	reserved	reserved	reserved	reserved	reserved	reserved	reserved
8	Power output, Vdd=3.0V	Power output, Vdd=5.0V	Vdd	Vdd	Vdd	Vdd	Vdd	Vdd	Vdd	Vdd

## Signals description

Logic levels:

- MicrUs logic levels: CMOS 3.0V
- SmartUs logic levels: CMOS 5.0V

ScanStartIn/ScanStartOut modes uses logic levels on appropriate signals. Logic level «1» - scanning is running, logic level «0» - scanning is stopped.

FrameOut/LineOut signals uses falling edges. Falling edge acts as a start point for frame/line scanning.

Signals FrameIn/LineIn uses rising edges with minimum pulse duration 200 ns. In FrameIn/LineIn modes FrameAck/LineAck signals acts as an acknowledge for end of frame/line scanning. Initial value for this signal is «0» and then this signal inverts its own value after every frame/line acquisition. Next rising edge of FrameIn/LineIn signal can be received by scanner only after FrameAck/LineAck flipping for previous scanning portion.

### Custom cable

We assume that customer will solder own cable because impossible to predict requirements (cable length, used signals and etc.). That's why in to kit included cable part connector.

Person, who doing cable soldering must be experienced in this job.

Important to know:

- Short connections between contacts or wires can damage beamformer. This is not warranty case.
- Turn off system before cable connected or disconnected. If not – beamformer can be damaged. This is not warranty case.
- Any hardware damage related to input/output buffer inside of beamformer – not warranty case.



