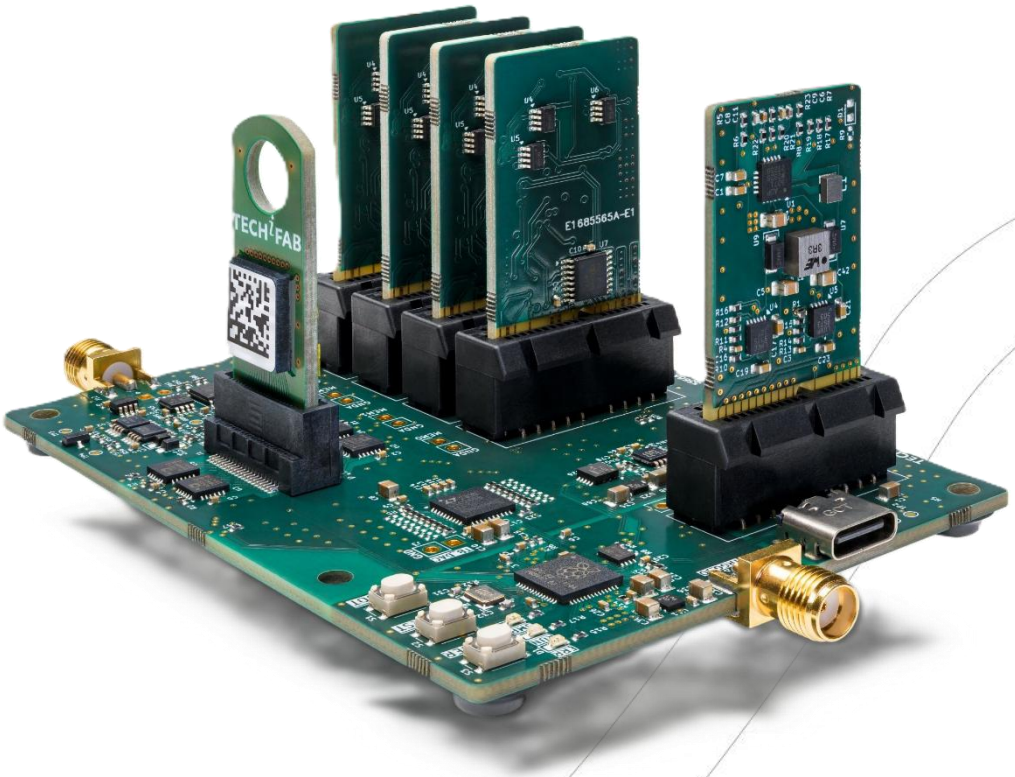
CLA-RiSTOR®-Demonstrator

With the CLA-RiSTOR® you can classify analog signals at the edge, e.g. acoustic signals, neuro signals, ECG signals. CLA-RiSTOR® allows for a high accuracy and a high recognition rate in particular for classifying electric signals with a comparatively high noise level.



Features

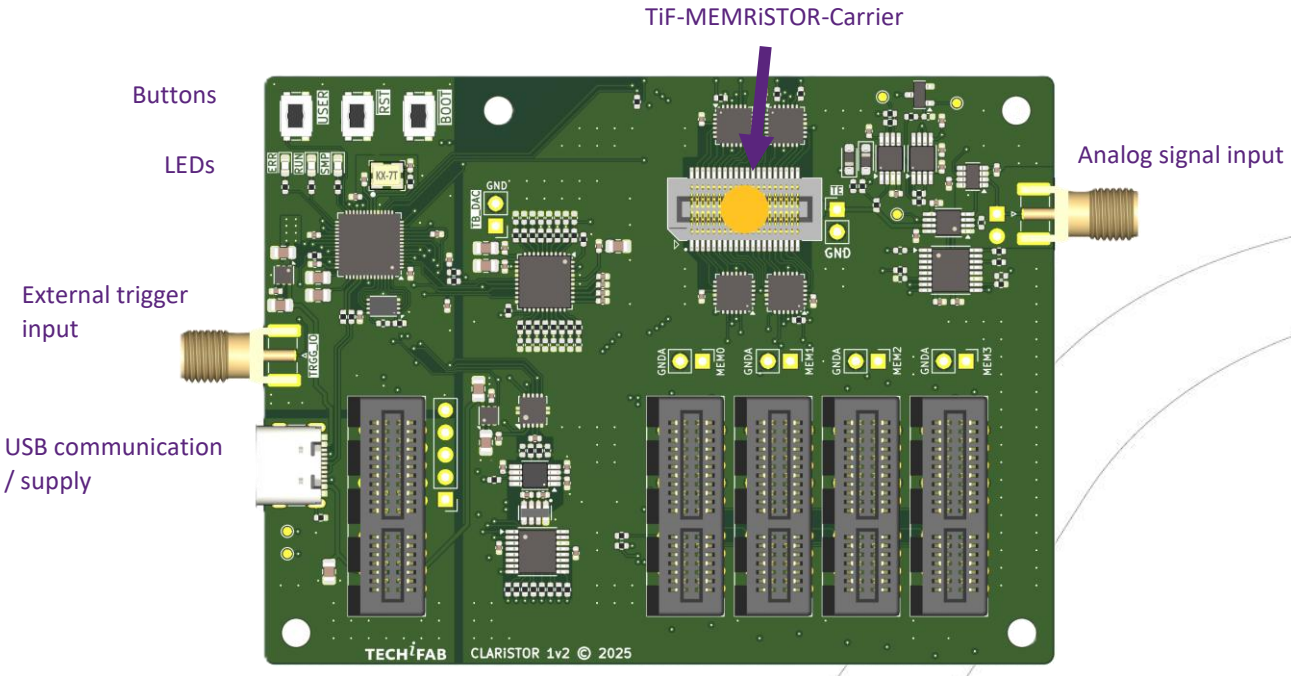
- Analog input conditioning for small input-signal amplitudes
- Input event detection
- Input signal routing to 1..4 out of 32 TiF-MEMRiSTOR devices
- Adjustable U-I delay / offset and analog integration time
- External trigger input
- On-board offset compensation and calibration

Table of Contents

Description

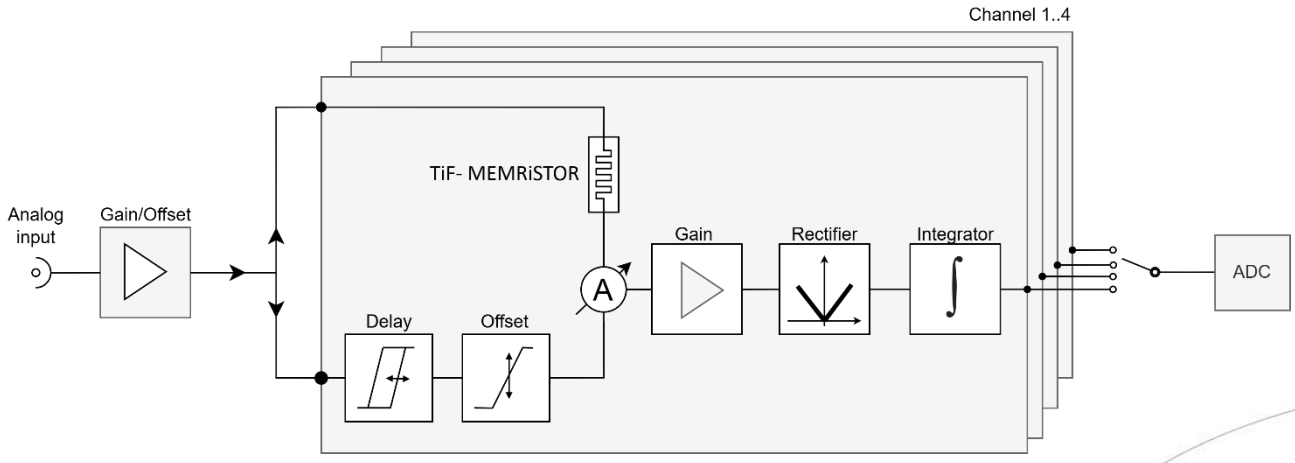
CLARiSTOR®-Demonstrator is a bench-top device consisting of all the control and measurement units necessary to execute TECHiFAB's classification algorithm. It is connected to PC via USB where further result processing and visualization can be performed.

Figure 1 User input



Signal handling

Figure 2 Analog signal flow

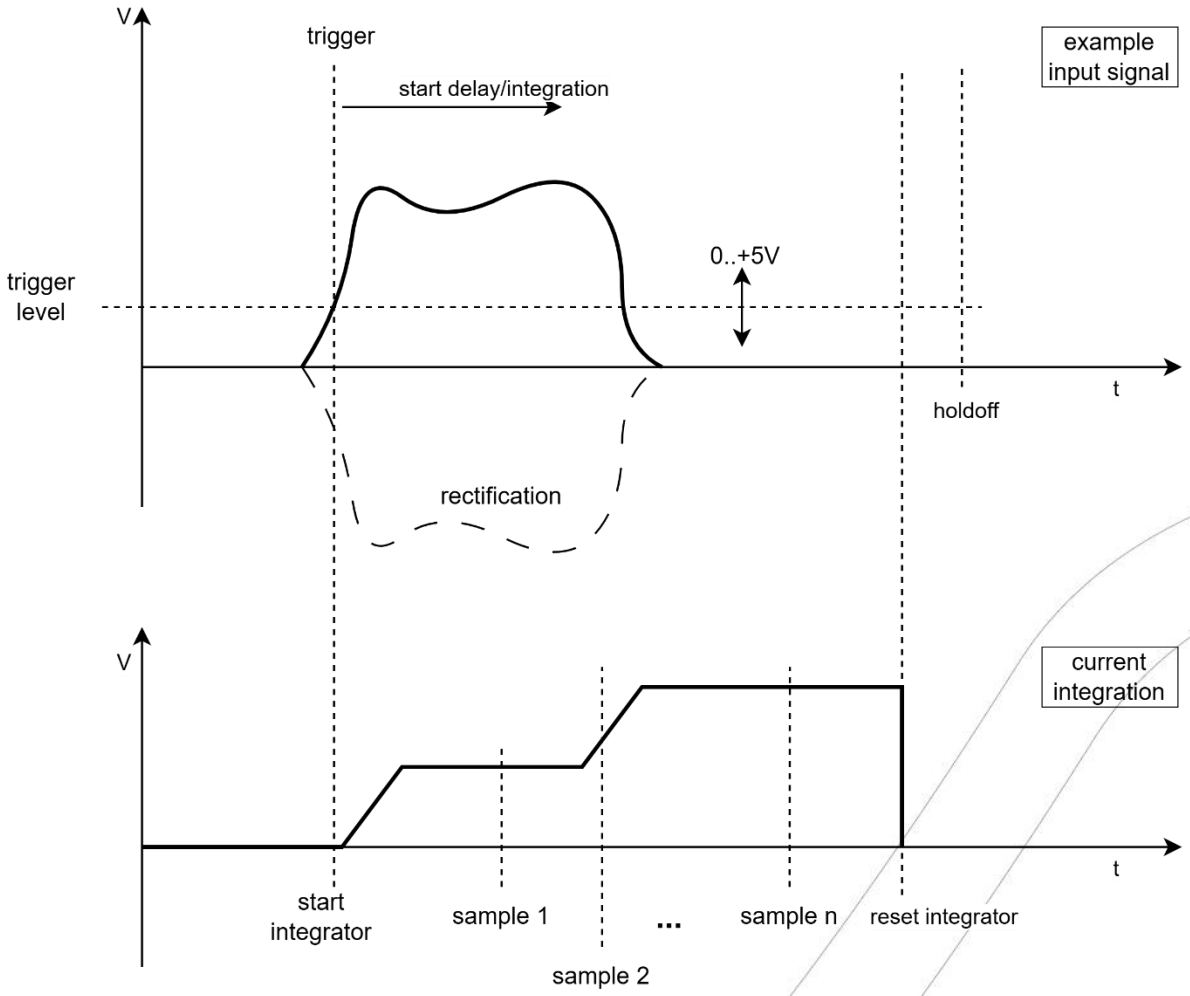


Analog input is pre-conditioned and applied:

- To one side of TiF-MEMRiSTOR – the “top contact”
- Passes a Delay / Offset stage and applied to the other side of TiF-MEMRiSTOR – the “bottom contact”

Resulting current is measured, amplified, rectified and integrated. The integrated voltage can then be fetched by a configurable list of sampling points. Since the input signal is applied to all of up to 4 Channels simultaneously, settings of Delay / Offset / Gain will affect the individual, per Channel, integrator result. And can therefore be used to classify signals. See Figure 3 for details.

Figure 3 Pulse integration scheme



Input trigger

Signal integration / sampling is started by trigger. Trigger options are:

- Level: Trigger is issued as soon as a certain level of rectified input signal is reached
- External: External input signal which is typically synchronized to input signal stimulus

Both triggers can be used simultaneously, after sampling phase the source of trigger can be determined.

Integrator sampling

Sampling of integrator can be set up for up to 14 individual sampling times and is handled in microcontroller. Combinations of the values of these integration samples are used to calculate features for signal classification. Parameters for these calculations are pre-processed and applied in PC.

Holdoff time

Adjustable holdoff time inhibits triggering new events after resetting integrator. It is set to match with setting up environmental conditions.

TiF-MEMRiSTOR-Carrier

TiF-MEMRiSTOR-Carrier provides 6 TiF-Memristors out of 32 TiF-Memristors, of which 4 can be selected in the following scheme

Channel	Memristor-Carrier device numbers
1	1..8
2	9..16
3	17..24
4	25..32

Production test ensures that at least a single device is usable per Channel. The list of TiF-Memristors in every channel is provided for the TiF-MEMRiTOR-Carrier.

For more information see:
https://techifab.com/product/tif-memristor-carrier-chip-8sh

Electrical Characteristics

Parameter	Value	Unit	Comment
Signal input voltage	-5 .. 5	V	
Input impedance	>1G	Ohm	
Input bandwidth	300k .. 1000	kHz	Depends on input gain
External trigger input voltage	0 .. +3.3	V	
Input adjustable gain	1, 2, 5, 8, 12.5, 22	V/V	6 steps
Adjustable trigger level	0 .. 5	V	
Signal delay	220 .. 2420	µs	256 steps
Signal offset	-5 .. +5	V	
Current gain	10 .. 200	V/mA	256 steps
Integration time	0 ..	sec	

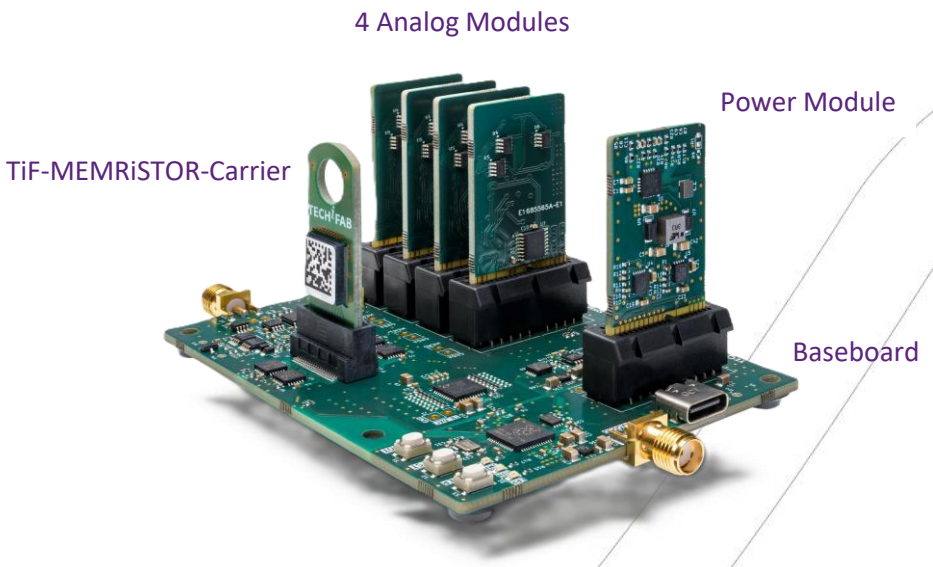
CLA-RiSTOR®-Demonstrator Kit assembly

The CLA-RiSTOR®-Demonstrator consists of separate modules which need to be connected like following:

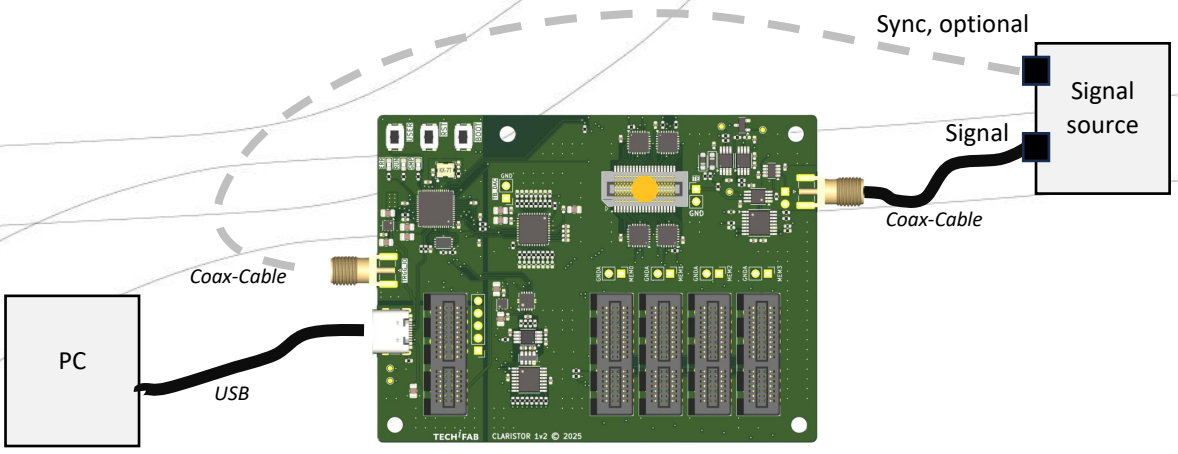
- 1 Baseboard
- 1 Plug-in card “Power Module”
- 4 Plug-in card “Analog Module”
- 1 TiF-MEMRiSTOR Chip-Carrier

Connect modules as shown in Figure 4.

Figure 4 Kit Assembly



Setup connections

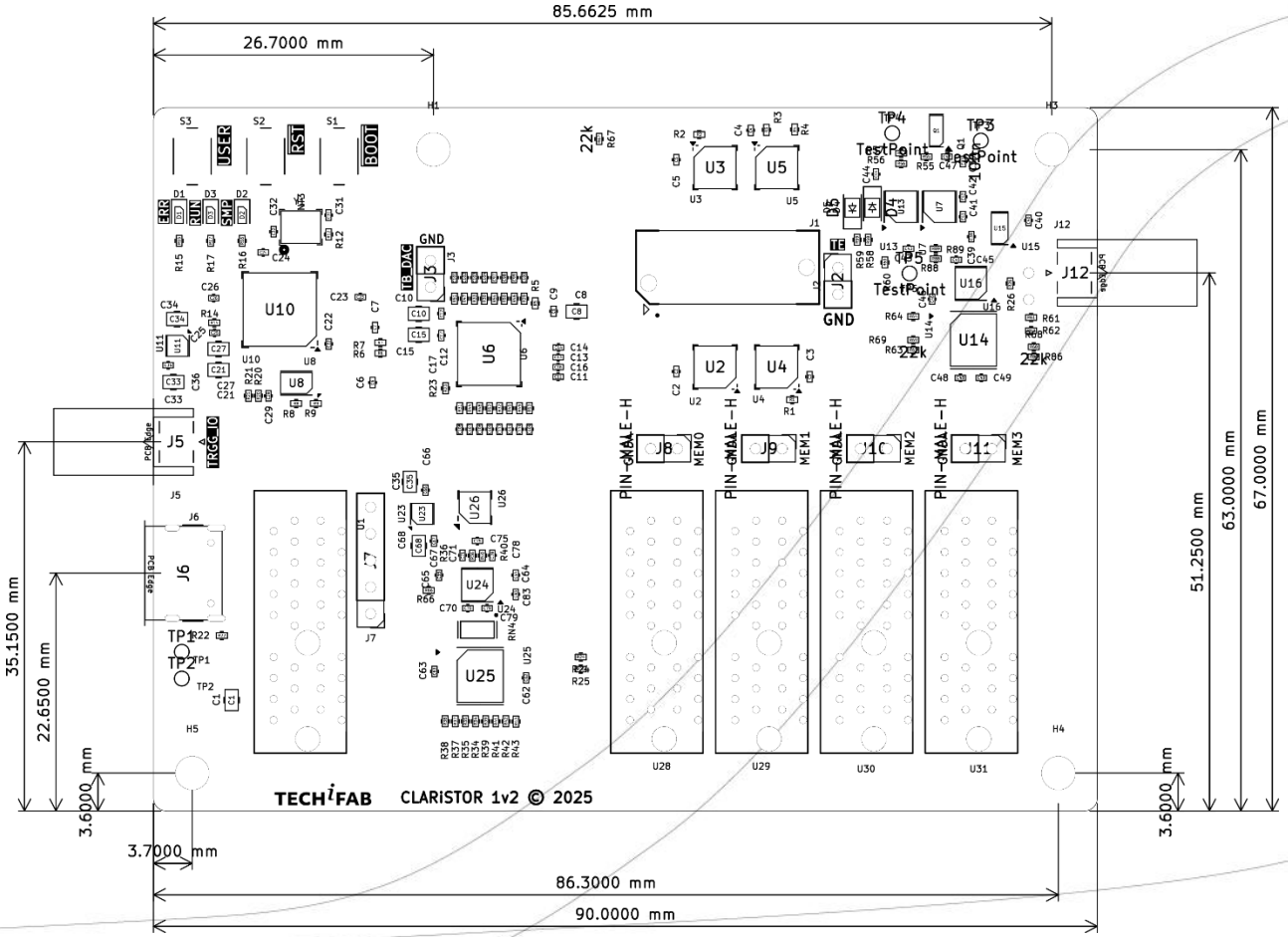


Handling precautions

Electronic devices are susceptible to electrostatic discharge. Handle with precautions.

Do not hot-plug individual Kit modules, like TiF-MEMRiSTOR Chip-Carrier or extension cards. Always power-off CLARiSTOR®-Demonstrator by disconnecting USB cable.

Dimensions



References

TECHiFAB GmbH. (2025). *COR-RiSTOR DD 3.2-0008SH*. Retrieved from https://techifab.com/product/hardware-3

TECHiFAB GmbH. (2025). *TiF-MEMRiSTOR-Carrier & Chip 8SH*. Retrieved from https://techifab.com/product/tif-memristor-carrier-chip-8sh

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