SATURN TRANSIENT RECORDER

for FAST MEASUREMENTS

SATURN Transient Recorders are modular measurement instruments, available from small portable systems up to 19” mainframes. Individually equipped with different numbers of channels, sampling rates and numerous special features they are ideally suited for a wide range of applications.

- Modular industrial system platform
- Isolated, single or diff. inputs
- Broad selection of sample rates
  200kS/s .. 1GS/s @ 16bit,
  20GS/s @ 12bit
- mV to kV input ranges
- 1 .. 240 channels, expandable
- Optional fiber-optic isolated inputs for high voltage protection and distributed systems
- GPS calibrated clock source
- Industrial PC for stand-alone operation or remote control via LAN
- Operating modes: Transient, Streaming, Segmentation
- Easy-to-use software
- Powerful analysis and reporting
- Remote control and scripting API

The FlatSaturn displayed above is the most compact housing option with up to 16 (BNC) or 48 (SMB) channels at different sampling rates. The small and rugged design makes it a popular portable instrument.

SATURN ADC MODULES

for HIGH PRECISION ANALOG TO DIGITAL

Depending on the application the SATURN systems are equipped with specialized input or output modules. Data acquisition (ADC) modules with different sample rates or digital inputs can be combined in one SATURN System to meet individual requirements. Analog and digital outputs can be installed in parallel for playback or arbitrary function generation (AFG) and digital pattern control (Sequence Timer) e.g. for synchronized test automation.
The following specification provides a brief ADC module overview, further types as well as customer-specific adaptations are available on request.

GENERAL SPECIFICATION

Ranges (full scale)
±100mV to ±1kV, 6 (8) ranges, free definable
Custom ranges available

Impedance
1 MOhm, capacity ~10pF
50 Ohm for ranges <10V (option)
Coupling: DC, GND, AC (option)

Acquisition memory

Standard	256 MB per module
Option	4 / 8 / 16 GB per module

Timebase

Accuracy	<0.05 ppm (0.000005%)

DATA TRIGGER - ANALOG/DIGITAL

Levels
Single or multiple individual analog triggers per channel plus digital trigger with accurate level detector per module. Trigger output (Option)

Range	0 - 100% of full scale
Accuracy	0.025% of full scale
Options	4x trigger per channel
	data trigger digital filter
	trigger & status output for external control

Modes
Multiple trigger configurations (trigger bus)
Level, pulse, slope, window, TTL, fiber (option)
4x global logically combined trigger signals

Trigger delay

Pre trigger range	0 - 100% of sample time
Post trigger range	up to hours / days

ADC 3 Channel ISO

ISOLATED 1000V INPUT

Inputs
3 channels, ISO BNC, ISO 4mm (Adapter)
±100mV to ±1kV, 8 ranges, free definable

Sample rate & bandwidth (e.g. 20 MS/s)

Maximum	50 ns/pt (20 MS/s @ 16 bit *1,2)
Bandwidth	typ. 10 MHz @ -3dB
	(auto adapting anti aliasing)

Acquisition time with 4..16 GB memory

3 channels	~12 .. 46 s @ 20 MS/s
1 channel	~46 .. 186 s @ 20 MS/s

ADC 8 Channel

COST EFFECTIVE

Inputs
8 channels, single ended, SMB or BNC
±100mV to ±100V, 6 (8) ranges, free definable

Sample rate & bandwidth (e.g. 3 MS/s)

Maximum	0.33 µs/pt (3 MS/s @ 16 bit *1,2)
Bandwidth	typ. 1.5 MHz @ -3dB
	(auto adapting anti aliasing)

Acquisition time with 4..16 GB memory

	~2.3 .. 9.3 s @ 100 MS/s
	~78 .. 311 s @ 3 MS/s

ADC 4 Channel

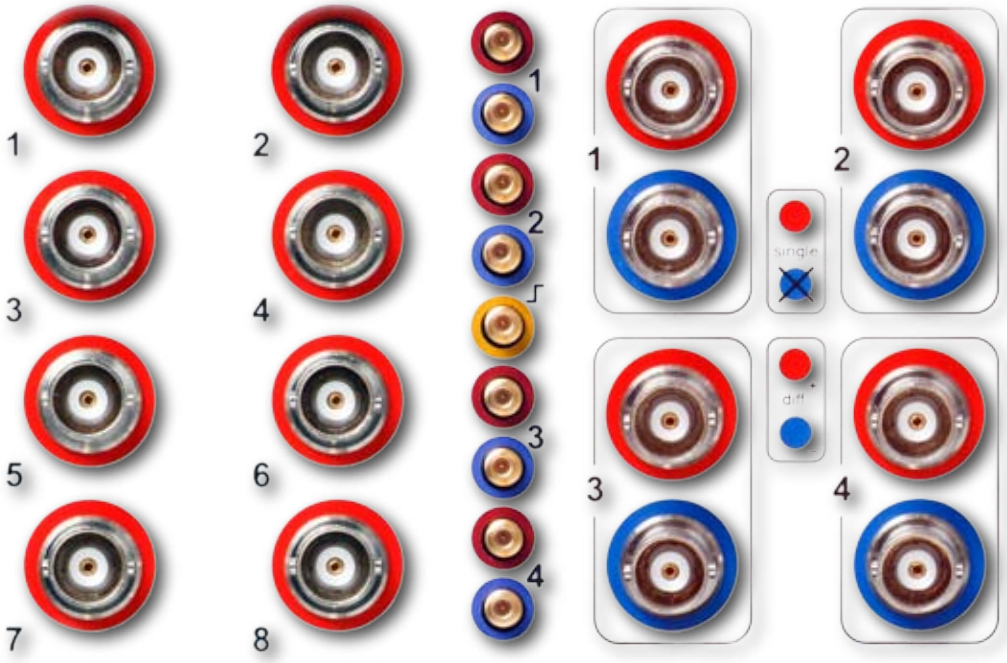
FLEXIBLE

Inputs
4 channels, diff. or single ended, SMB or BNC
±100mV to ±100V, 6 (8) ranges, free definable

Sample rate & bandwidth (e.g. 25 MS/s)

Maximum	40ns/pt (25 MS/s @ 16bit *1,2)
Bandwidth	12.5 MHz @ -3dB
	(auto adapting anti aliasing)

CONVERSION



Sample rate & bandwidth (100 MS/s)

Maximum	10ns/pt (100 MS/s @ 16bit *1,2)
Bandwidth	typ. 50 MHz @ -3dB (auto adapting anti aliasing)

Acquisition time with 4..16 GB memory

~4.7 .. 19 s @ 100 MS/s
~19 .. 75 s @ 25 MS/s

ADC 1G-16-4

HIGH SPEED

Inputs

4 channels, single ended, MCX
±1V & ±5V input range

Sample rate & bandwidth

Maximum	1 ns/pt (1 GS/s @ 16 bit *1,2)
Bandwidth	~500 MHz @ -3dB (auto adapting anti aliasing)

Acquisition time with 4..8 GB memory

~0.5 .. 0.9 s @ 1 GS/s

ADC 20G-12 *4

UP TO 20 GS/s 12BIT

Inputs

1..4 channel , single ended, SMA
1 ch: 20 GS/s @ 12 bit, ±1.2V input
2 ch: 10 GS/s @ 12 bit, ±0.6V input
4 ch: 5 GS/s @ 12 bit, ±0.6V input

Sample rate & bandwidth

Maximum	50ps/pt (20 GS/s @ 12 bit *1,2)
Bandwidth	~8 GHz @ -3dB (auto anti aliasing)

Acquisition time with 4..32 GB memory

~124 .. 994 ms @ 20 GS/s
~248 ms .. 2 s @ 10 GS/s

*1 **Dynamic Noise Reduction (DNR)**
Noise reduction by full automatic signal averaging (internal oversampling) at lower sampling rates.

*2 **Enhanced Bit Resolution (EBR)**
Enhanced signal resolution by automatic oversampling at lower sampling rates. Information gain up to 32 Bit.

ADC Module Overview

Type	No. of channels	Sample Rate	Resolution	Bandwidth	Input Type *3
200k-20-8	8	200 kS/s	20 bit	100 kHz	Single
1M-18-4	4	1 MS/s	18 bit	500 kHz	Diff.
3M-16-8	8	3 MS/s	16 bit	1.5 MHz	Single
10M-16-x	4 or 8	10 MS/s	16 bit	5 MHz	Diff. or Single
25M-16-x	4 or 8	25 MS/s	16 bit	12.5 MHz	Diff. or Single
100M-16-x	4 or 8	100 MS/s	16 bit	50 MHz	Diff. or Single
1M-16-3 ISO	3	1 MS/s	16 bit	500 kHz	1kV Isolated
5M-16-3 ISO	3	5 MS/s	16 bit	2.5 MHz	1kV Isolated
10M-16-3 ISO	3	10 MS/s	16 bit	5 MHz	1kV Isolated
20M-16-3 ISO	3	20 MS/s	16 bit	10 MHz	1kV Isolated
1G-16-4	4	1 GS/s	16 bit	500 MHz	Single
20G-12 *4	1/2/4	20/10/5 GS/s	12 bit	~8 GHz	Single

*3 Differential inputs can be used in single ended or differential mode *4 Preliminary

FIBER COUPLED PROBES

for ISOLATION AND LONG DISTANCE

SATURN Transient Recorders can be equipped with fiber-optic modules. These modules are connected to separated SATURN measurement probes (Satellites) by digital fiber-optic cables. The Satellites are battery powered (16 / 32 hours) or supplied by compressed air and remotely controlled from the SATURN main unit.
The optical communication and data transfer ensures perfect galvanic isolation between the device under test and the SATURN main unit. The fiber-optic transmission allow both, isolated measurements at any voltage level as well as bridging large distances between test object and data recording system. The following specification gives a brief Satellite overview, further types as well as customer-specific adaptations are available on request.

Satellite 100M-16-F

Inputs
1 channel, diff. or single ended, BNC
±100mV to ±100V, 6 (8) ranges, free definable

Sample rate & bandwidth
Maximum 10ns/pt (100 MS/s @ 14 bit *1,2)
Bandwidth 50 MHz @ -3dB
(auto adapting anti aliasing)

Acquisition time with 4..16 GB memory
~19 .. 75 s @ 100 MS/s

Satellite 20M-16-3-F-ISO

ISOLATED 1000V INPUT

Inputs
3 channels, ISO BNC, ISO 4mm (Adapter)
±100mV to ±1kV, 8 ranges, free definable

Sample rate & bandwidth
Maximum 50 ns/pt (20 MS/s @ 14 bit *1,2)
Bandwidth 10 MHz @ -3dB
(auto adapting anti aliasing)

Acquisition time with 4..16 GB memory
3 channels ~12 .. 46 s @ 20 MS/s
1 channel ~46 .. 186 s @ 20 MS/s

Satellite 25M-16-4-F

Inputs
4 channels 25 MS/s or 1 channel 100MS/s, diff. or single ended, BNC
±100mV to ±100V, 6 (8) ranges, free definable

Sample rate & bandwidth (e.g. 25 MS/s)
Maximum 40ns/pt (25 MS/s @ 14bit *1,2)
Bandwidth 12.5 MHz @ -3dB
(auto adapting anti aliasing)

Acquisition time with 4..16 GB memory
4 channels ~19 .. 75 s @ 25 MS/s
1 channel ~75 .. 258 s @ 25 MS/s

Satellite 3M-16-8-F

MULTI CHANNEL

Inputs
8 channels, single ended, BNC
±100mV to ±100V, 6 (8) ranges, free definable

Sample rate & bandwidth (e.g. 3 MS/s)
Maximum 0.33µs/pt (3 MS/s @ 14 bit *1,2)
Bandwidth 1.5 MHz @ -3dB
(auto adapting anti aliasing)

Acquisition time with 4..16 GB memory
8 channels ~5.1 .. 21 min. @ 3 MS/s
1 channel ~38 .. 155 s @ 3 MS/s

Satellite 1G-16-F *4

HIGH SPEED

Inputs
1 channel, single ended, MCX
±1V & ±5V input range

Sample rate & bandwidth
Maximum 1ns/pt (1 GS/s @ 14 bit *1,2)
Bandwidth 500 MHz @ -3dB
(auto adapting anti aliasing)

Acquisition time with 4..8 GB memory
~2 .. 4 s @ 1 GS/s
~10 .. 20 s @ 200 MS/s

digital optical transmission

AIRPOWER SUPPLY

Satellite with AirPower Supply

Unlimited isolation voltage
Continuous power supply for endless tests
UPS backup battery for 8h

Pulse Voltage Divider (for LPT)

1kV input reference voltage pulse divider
Satellite integrated (option)
N type input, BNC output
(integrated calibration pulse source, wide band linear step response)
Error <0.1% in <200ns

STEP RESPONSE CALIBRATED

Satellite Options & Accessories

Channel count
1, 3, 4 or 8 analog channels inside one Satellite
Expandable with digital channels

Fiber types
Multi-Mode (50/125µ) or Single-Mode (9/125µ)
Standard LC connectors
Industrial type IP67 sealed metal connectors
(Multi-Link cables, fiber patch boxes, 19" fiber patch panels and cable drums available)

Protection
Triple Shielding, optimized to protect against strong electric and magnetic fields

Accessories and Options
Wider housing for 2x battery and extension slot
1/2/3 ch "Rogowski Coil" integration, Pulse Voltage Divider (LPT), AirPower supply with backup battery

UP TO 32 HOURS OF BATTERY POWER

Satellite Overview

Type	No. of channels	Sample Rate	Resolution	Bandwidth	Input Type *3
1M-16-F	1	1 MS/s	14 bit	500 kHz	Differential
3M-16-8-F	8	3 MS/s	14 bit	1.5 MHz	Single
10M-16-F	1	10 MS/s	14 bit	5 MHz	Differential
20M-16-3-F ISO	3	20 MS/s	14 bit	10 MHz	1kV Isolated
25M-16-F	1	25 MS/s	14 bit	12.5 MHz	Differential
100M-16-F	1	100 MS/s	14 bit	50 MHz	Differential
25M-16-4-F	1 / 4	100 / 25 MS/s	14 bit	50 / 12.5 MHz	Differential
1G-16-F *4	1	1 GS/s	14 bit	500 MHz	Single

*3 Differential inputs can be used in single ended or differential mode *4 Preliminary

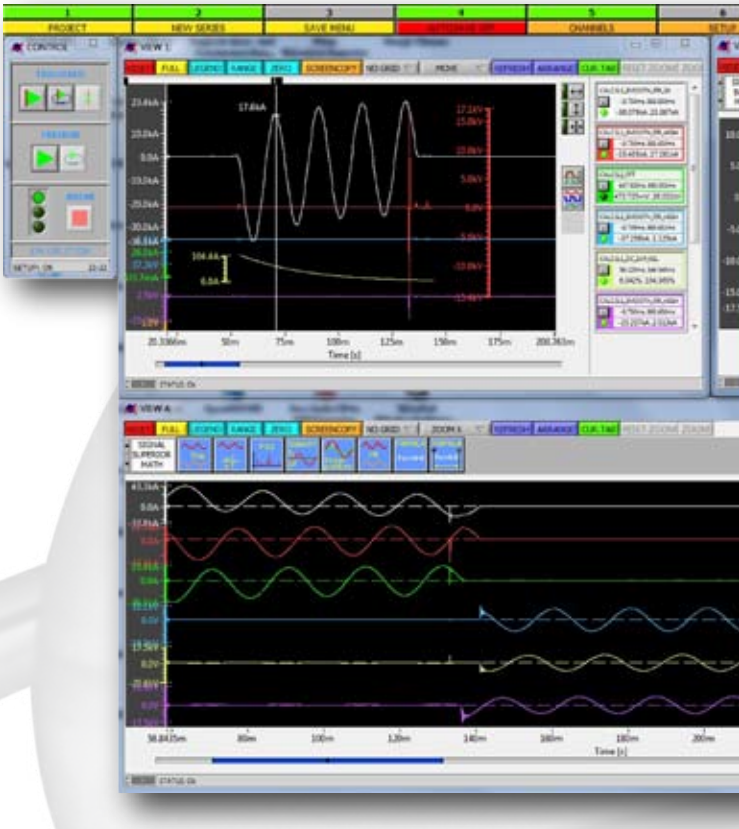
SATURN STUDIO II

WITH POWERFUL SCRIPTING INTERFACE

SYSTEM CONTROL & ANALYSIS SOFTWARE

SATURN Studio II is the versatile software solution for hardware configuration, measurement control and data display. It includes powerful analysis and flexible reporting for test labs in research and industry.

- Measurement modes: Transient, Loop, Streaming (option), Segmentation (option)
- Table style configuration grants perfect overview
- Project management with user specific archive and path generator
- Integrated sensor data base
- Live monitor display: analog, digital, gauge, bargraph etc.
- 20 view windows, up to 4 monitors, multiple cursors, graphs, scales etc.
- Unique ultra-fast data display
- Multiple analysis functions
- Integrated formular editor
- Powerful reporting module
- Extensive scripting language
- Powerful application programming interface (API, Python)



Transient mode

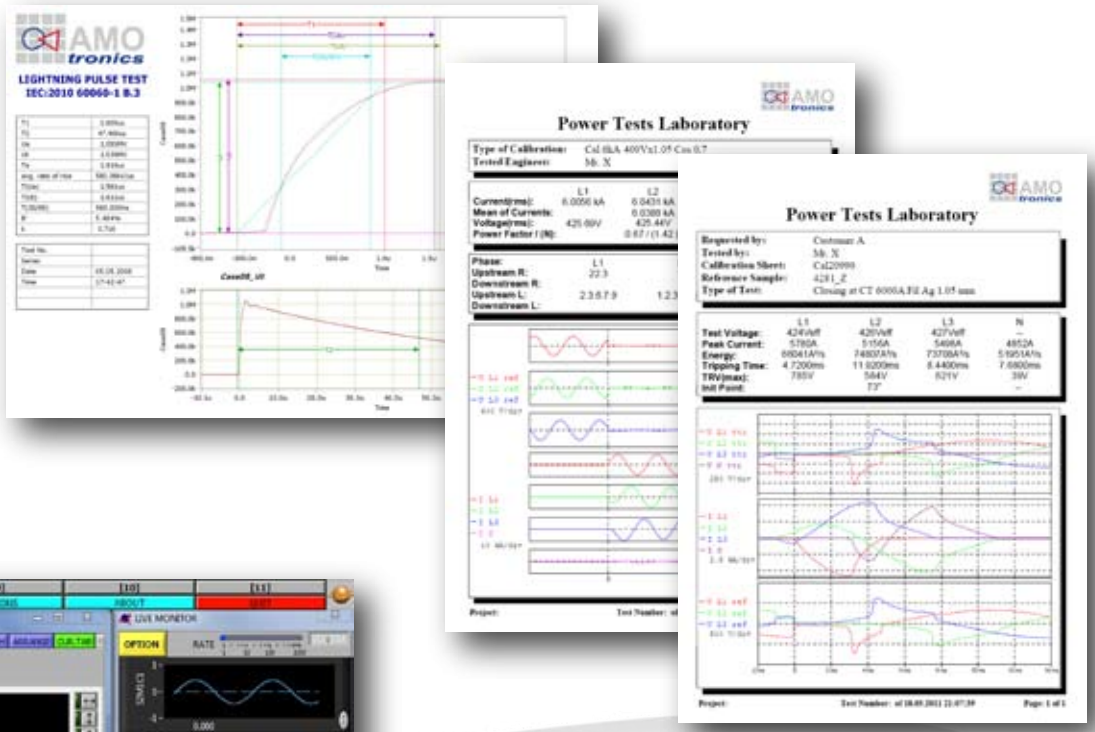
Input channels and trigger are configured by software. Data acquisition starts with a trigger condition (pre- or post trigger) or by software.

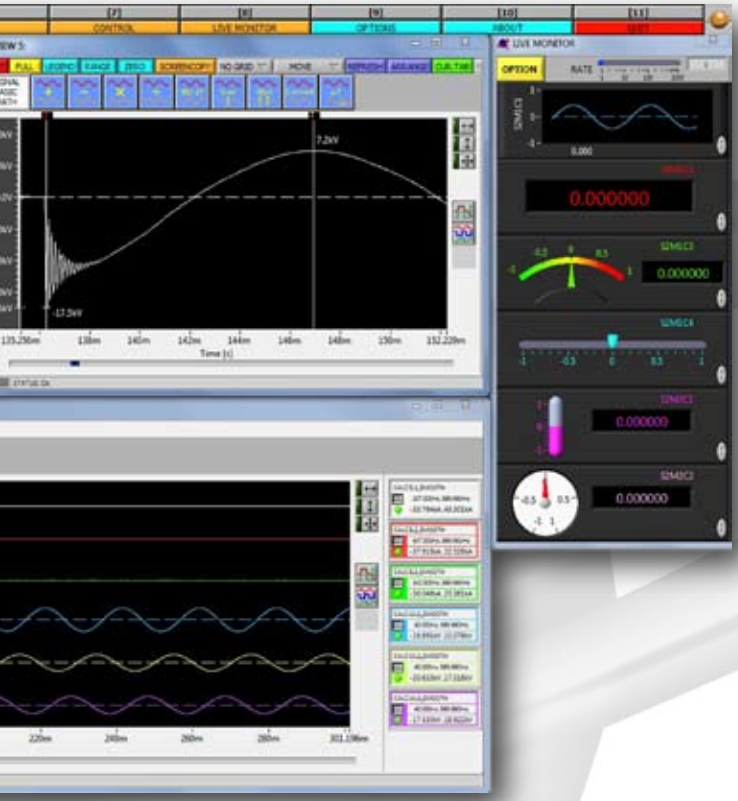
Streaming mode (option)

Extra long recordings are stored directly to the local SSD or network. Multi channel setups are supported with live data for selected signals.

Segmentation mode (option)

The system re-arm time reduces to only a few µs at very low jitter and thousands of repetitive measurements are collected in the transient memory for fast processing.





Remote Interface (e.g. Python)

Remote control via PYTHON is availalbe for easy task automation and full feature control.

Analysis & Reports

Accurate analysis and report functions process sets of test data. Multiple automatic filters can be applied to reduce signal noise. Reports can be prepared with easy drag-and-drop configuration or generated from adaptable templates to store results as a pdf-file in pre-defined folders. SATURN Studio II is especially optimized for fast display and analysis of large data sets. Complete ready-to-use report packages are available for several specific applications, e.g.:

Circuit Breaker Tests (acc. to STL)

Automated and interactive analysis routines according to guide lines of the Short-Circuit Testing Liaison (STL) and requirements of the IEC 60060-1 for tests of high current and high voltage switches for different test cases, as for instance No-Load Test, Short Circuit Test, Capacitive Load Test and Synthetic Test.

Lightning Pulse & Impulse Current Tests

Complete analysis package according to IEC 60060 and IEC 61083; automatically measuring parameters like U_p, T_1 and T_2 within seconds. Printed reports are instantly available after the measurement is completed.

Loop mode

The fully automatic analysis and reporting mode configures the system based on a configuration template and arms the channels. With each trigger a new test starts. Manual stop or the loop countdown finishes the test cycles.

Scripting language (option)

The powerful scripting interface enables users to automate complex analysis and control tasks. Multiple graphical windows, buttons and selection boxes, etc. allow programming of comfortable user interfaces with hundreds of standard and special commands in a professional programming environment with syntax highlighting.

AMOtronics offers programming service for individual requirements as well as professional training courses!

SATURN

FAMILY GALLERY

FlatSaturn

max. 48 channels

CubeSaturn

max. 96 channels

19" RackSaturn

max. 240 channels

SingleSatellite

1 channel

MultiSatellite

3 / 4 / 8 channels

Specials ... ?

Get in contact for tailor-made solutions!

AMO tronics

Roermonder Strasse 594
52072 Aachen
Germany

Web: www.amotronics.de
E-Mail: info@amotronics.de
Phone: +49 241 169 780 28
Fax: +49 241 169 780 55

Specifications are subject to change without prior notice.

Edition v1.07e