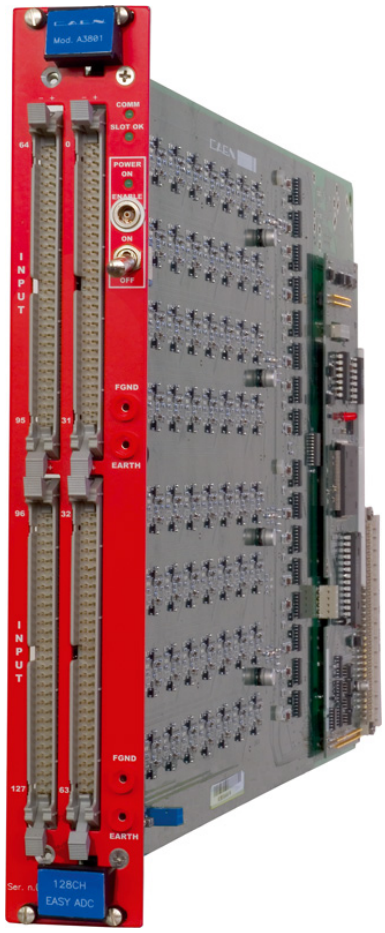
rev. 05 - 08/09/2010

A3801

128 Channel ADC Board



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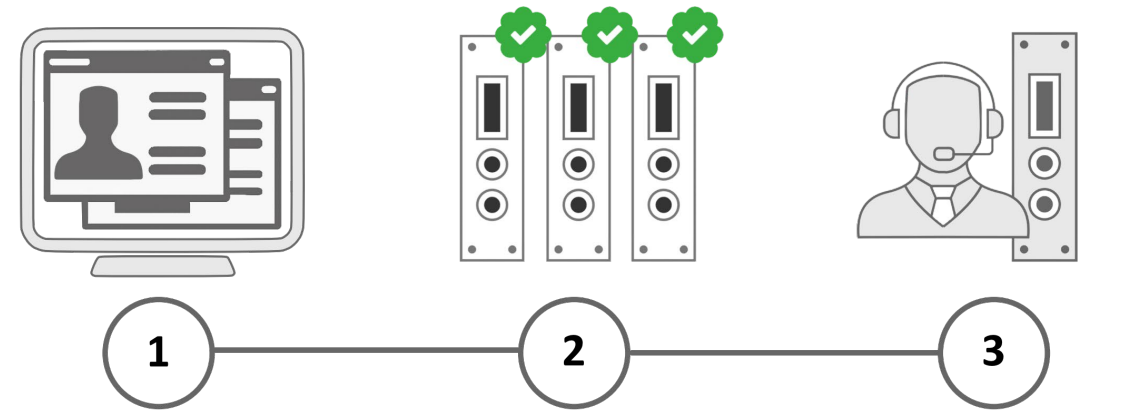

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Technical Information Manual

Revision n.5
8 September 2010

MOD. A3801
128 CHANNEL ADC
MANUAL REV. 5

NPO:
00114/03:A3801.MUTx/05

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MADE IN ITALY : We stress the fact that all the boards are made in Italy because in this globalized world, where getting the lowest possible price for products sometimes translates into poor pay and working conditions for the people who make them, at least you know that who made your board was reasonably paid and worked in a safe environment. (this obviously applies only to the boards marked "MADE IN ITALY", we can not attest to the manufacturing process of "third party" boards).

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1. EASY3000 Embedded Assembly System

1.1 Functional description

EASY3000 (Embedded Assembly SYstem) is the new CAEN power supply solution for operation in magnetic field and radioactive environment. CAEN has been involved for more than a decade in developing different solutions for the main LHC experiments, where the electronic equipment of the experiment is dealing with high dose radiation and intense magnetic field. In order to provide safe and reliable operations in such hostile areas, CAEN started tests with rad-tolerant components and magnetic field resistant solutions, patenting the new technology that is now used in this new line of products. Moreover, though designed for harsh environment, the EASY3000 modules can work also in normal condition with excellent performance. In the new architecture, the power supply can be located directly in the hostile area, where the EASY3000 modules provide a wide variety of output voltages to satisfy the requirements of most detectors and front-end electronics. The control of the EASY3000 power supply system is done remotely using a Branch Controller (Mod. A1676A) plugged in a SY1527 or SY2527 mainframe located in the control room. Each A1676A branch controller can handle up to 6 EASY3000 crates: in this way, one SY1527 power supply system, for example, housing up to 16 A1676A boards, can handle up to 96 EASY3000 systems. The EASY3000 crate can house up to 10 boards, depending on the boards' width. The branch controller is the interface between the mainframe (SY1527 or SY2527) and the remote boards in the EASY3000 crate: its role is to configure the EASY3000 channels as if they belong to the supply unit slot in which the branch controller is located. All the channels of the EASY3000 boards will be considered as channels of the branch control board, thus hugely increasing the number of channels the system can handle. Through the mainframe, the provided and fully reliable OPC server permits an immediate and "automatic" interfacing with the custom control software; moreover, a C-library for Windows and Linux is available as well. The EASY3000 crate can be used with an air and/or water intercooler and its standard width fit the rack mounting. An optional fan tray (A34FU -EASY3000 Fan Unit) can be used for the stand-alone operation of the EASY3000 crate when no magnetic field is present. EASY3000 is powered by external 48 V DC. The EASY architecture foresees two independent 48 V power supplies: the first (48 V Power) to power the channels regulators, the other (48 V Service) to power the control logic. The use of CAEN 48 V power sources (Mod. A3484 and A3485), allows to integrate into the channels control also the management of the 48 V power supplies. Fig. 1.1 shows the system's block diagram.

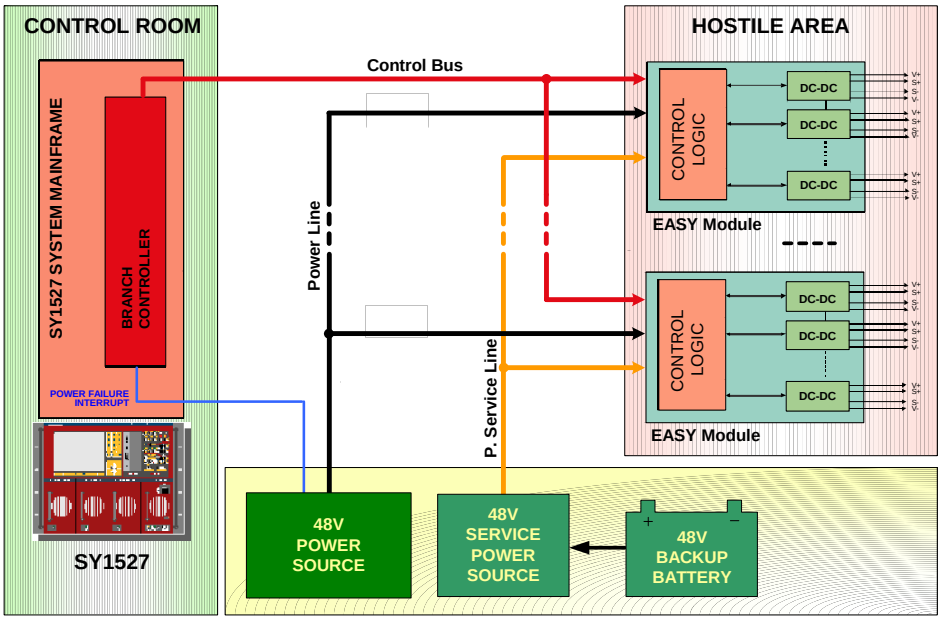

Fig. 1.1 – System's block diagram

1.2 The CAEN Multichannel Power Supply System Overview

The SY1527 system is the fully equipped experiment version of a new line of power supply systems which represent CAEN's latest proposal in the matter of High Voltage and Low Voltage Power Supplying. This system outlines a completely new approach to power generation and distribution by allowing the housing, in the same mainframe, of a wide range of boards with different functions, such as High/Low Voltage boards, generic I/O boards (temperature, pressure monitors, etc.) and branch controllers, where the latter are used to control other remote generators and distributors. Modularity, flexibility and reliability are the key-points of its design, enabling this module to meet the requirements needed in a wide range of experimental conditions, which range from those of LHC experiments, where the features of this model find prior application, to those of other less challenging, but still demanding, High Energy Physics experiments.
The mainframe is housed in a 19"-wide, 8U-high euro-mechanics rack and hosts four main sections:

- the Board Section, with 16 slots to house boards, distributors and branch controllers;
- the Fan Tray Section, housing 6 fans arranged on two rows;
- the Power Supply Section, which consists of the primary power supply and up to 3 power supply units;
- the CPU and Front Panel Section which includes all interface facilities.

The User Software Interface features the usual friendliness of the previous CAEN systems which now also includes a 7.7" colour LCD. A wide choice of interface facilities provides full communication compatibility with the previous systems and the feasibility of controlling heterogeneous external devices. Modularity has been one of the leading criteria in the design and development of the system: both the Power Supply Section and the Board Section are completely modular. The Power Supply Section allows different configurations with up to 3 power supply units per mainframe (up to 2250 W), while the Board Section can house up to 16 boards able to fulfil different functions. A complete line of power supply boards and distributors has been specially developed for this new

system. The minimum system configuration consists of the primary power supply, one Power Supply Unit and one board. The system allows also to deal with power supply solutions composed by “branch controllers” (housed in the system main frame) and on-detector “remote boards” (manufactured in order to be magnetic field and radiation tolerant). Channel trip control on other crates is performed via four external differential trip lines. A sophisticated trip handling via software allows to control and correlate trip conditions on the channels of the crate as well as of other crates connected to it. Live insertion and extraction of the boards, which reduces the down time of the global system, and easy access to the computing core and peripherals of the system complete the system flexibility. Easy interfacing is another key-point of the SY1527 system, which can be connected to SY127 and SY527 systems. The Ethernet interface (TCP/IP) allows both an easy Telnet access and the connection via OPC Server to a SCADA control system. Enhanced software programming features a unified command set independent from the interface used to communicate with the system. The Power Supply Section and Board Section can be externally synchronised via front panel connectors. Multi-layered access to the system via Intranet is foreseen through the management of several custom user profiles. In particular, three different access levels have been implemented: Guest, User and Administrator, each of which with password protection. Handy maintenance and upgrading, which constitute a major issue in the reliability of a system, are further guaranteed by the possibility of accessing and servicing the system via network facilities. Actually, the Telnet access facility allows remote debugging and technical support of the system, including future firmware upgrading. For a detailed description of the SY 1527 Universal Multichannel Power Supply System please refer to the *SY 1527 User's Manual*.

Table 1.1 – Technical specifications of the SY 1527 mainframe

Packaging	- 19"-wide, 8U-high Euro-mechanics rack; - Depth: 720 mm.
Weight	-Mainframe (*): 24 kg -Mod. A1532: 3.2 kg
Power requirements	*Voltage range*: 100/230 V *Frequency*: 50/60 Hz *Power*: 3400 W
Max. number of boards per crate	16
Max. number of power supply units per crate	3
Primary power supply output (Mod. A 1531)	± 12 V, 8 A +5 V, 20 A
Power supply unit output (Mod. A 1532)	+48 V, 15.6 A
Max. output power	2250 W
Operating temperature	From 0°C (dry atmosphere) to +40°C
Storage temperature	From -20°C (dry atmosphere) to +50°C

(*) One Primary Power Supply (Mod. A 1531) and one Power Supply Unit (Mod. A 1532) are included; boards are not included.

1.3 The Mod. A1676A Branch Controller overview

The Mod. A1676A EASY Branch Controller is implemented in a single width SY1527/SY2527 board. Once plugged in, the Branch Controller must be linked to the EASY3000 crates (placed in the “hostile area”), via front panel connectors (Control and Power Supply). The A1676A is the interface between the mainframe and the remote boards in the EASY3000 crate. It configures the EASY3000 channels as if they belong to the slot in which the branch controller is located: the channels of the EASY3000 boards operate as channels of the A1676A. Up to six EASY3000 crates can be controlled by one A1676A. The provided software tool allows the User to configure the A1676A to operate with any EASY crate layout.

2. A3801 128 Channel ADC

2.1 A3801 Overview

This document shows the features of the CAEN Mod. A3801 128 Channel ADC Board, developed for operation in magnetic field and moderate radioactive environment. One A3801 houses 128 differential ADC channels with a 0 ÷ 10 V input range; LSB is 0.2 mV.
The A3801 samples all channels at a 1 kHz rate and, normally, returns the mean value of the samples, averaged in a programmable number of samples.
The board has an internal 50Hz timer, that can be reset via the **ISEL** input on the SY1527/SY2527 system front panel.
If a programmable threshold is exceeded by the input voltage (i.e. a "voltage peak" occurs), then the module enters "peak detection mode", that can be programmed to be:

a. individual: the single channel exceeds the its programmable threshold
b. group: the mean value of a 16 channel group (ch. 1-16, ch. 17-32..) exceeds the threshold programmed for the 1st channel of the group (ch. 1, 17, 33…).

In both cases, the module acquires 250 samples, then returns:

- the peak value,
- the peak relative position (among the 250 samples)
- the number of over-threshold samples.
- a time reference, of the 50Hz internal clock, of the voltage peak

in "group" mode such values are reported for all the 16 channels in the group.

2.2 A3801 Channel Characteristic Table

Table 2.1 – Channel characteristics of the Mod. A3801 128 Channel ADC Board

Inputs	Differential, DC coupling
Full scale range	10 V
Common mode	±2 V
LSB	0.2 mV
Integral non linearity	0.1% of FSR
Conversion rate	2 s (for all channels)
Interchannel isolation	60 dB
Temperature stability	0.5 LSB/°C

2.3 A3801 Front panel components

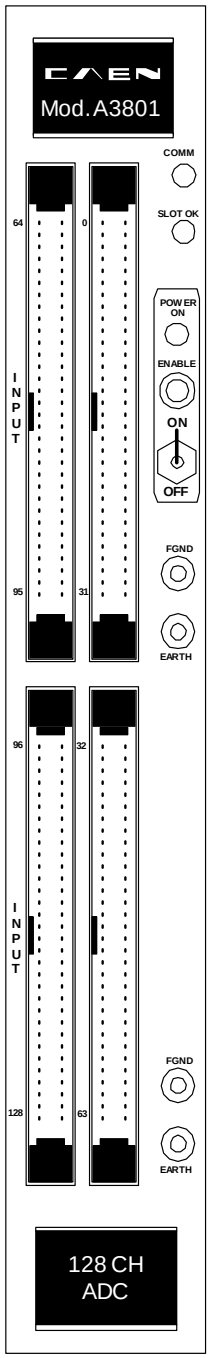

Fig. 2.1 – A3801 Front Panel

2.4 A3801 Technical Specifications

2.4.1 A3801 Packaging

The module is housed in a 8 TE wide, 6U-high mechanics.

2.4.2 A3801 Front panel connections

The board front panel houses the following components:

INPUT 0..127:	A3801: ADC Input; Type: Four 64 Pin Header Connectors
EARTH:	Function: earth auxiliary reference Type: 2mm plastic dial connector
FGND:	Function: floating return Type: 2mm plastic dial connector
48V ENABLE:	Function: to be shorted (or terminated on 50 Ohm) in order to enable the 48 V power supply (general ON/OFF of the module) Type: LEMO00 type connector

N.B.: Unused inputs require a 100 ohm termination.

2.4.3 A3801 Front panel switches

POWER ON:	Allows to enable/disable the the 48 V power supply (general ON/OFF of the module)

2.4.4 A3801 Front Panel Displays

PWGOOD LED:	*Function:* lights up as ± 12V supplies are present. *Type:* green LED
COMM LED:	*Function:* lights up as the communications take place. *Type:* green LED
SLOT OK LED:	*Function:* lights up as the board is correctly inserted into the assigned slot. *Type:* green LED

3. Safety information and installation requirements

3.1 General safety information

This section contains the fundamental safety rules for the installation and operation of the boards. Read thoroughly this section before starting any procedure of installation or operation of the product.

3.1.1 Injury Precautions

Review the following precautions to avoid injury and prevent damage to this product or any products connected to it. To avoid potential hazards, use the product only as specified. Only qualified personnel should perform service procedures.

Avoid Electric Overload.
To avoid electric shock or fire hazard, do not apply a voltage to a load that is outside the range specified for that load.

Avoid Electric Shock.
To avoid injury or loss of life, do not connect or disconnect cables while they are connected to a voltage source.

Do Not Operate Without Covers.
To avoid electric shock or fire hazard, do not operate this product with covers or panels removed.

Do Not Operate in Wet/Damp Conditions.
To avoid electric shock, do not operate this product in wet or damp conditions.

Do Not Operate in an Explosive Atmosphere.
To avoid injury or fire hazard, do not operate this product in an explosive atmosphere.

Do Not Operate With Suspected Failures.
If you suspect there is damage to this product, have it inspected by qualified service personnel.

3.2 Safety Terms and Symbols on the Product

These terms may appear on the product:

- **DANGER** indicates an injury hazard immediately accessible as you read the marking.
- **WARNING** indicates an injury hazard not immediately accessible as you read the marking.
- **CAUTION** indicates a hazard to property including the product.

The following symbols may appear on the product:

DANGER

High Voltage

ATTENTION

Refer to Manual

3.3 Installation

The Mod. A1676A is a single-width board for the SY1527/2527/3527 systems. At power ON the SY1527 system processor will scan all the slots in the crate to find out where the module is plugged and what kind of module it is. The A1676A must be connected to the EASY3000 remote crates through the control lines. The control connectors are placed on the A1676A front panel and on the EASY3000 panel.

3.4 Ventilation

It is necessary to provide the unit the proper ventilation by using for example the CAEN Mod. A3000F Fan Unit; (A34FU Fan Unit must be used when the board is operated with EASY 3000 crate first issue). Ventilation is necessary even when channels and 12VPwS are off (see § 4.1).

Fig. 3.1 – Ventilation-warning Label

4. Operating modes

The Mod. A1676A board can be controlled, either locally or remotely, through the SY 1527 software interface. For details on SY 1527 system operation, please refer to the User's Manual of this product.

ATTENTION

THE MOD. A1676A and A3801 BOARDS REQUIRE SY 1527 FIRMWARE VERSION 2.01.00 OR LATER

4.1 Output control and monitoring

The control software handles two types of channels: the **Channel 0**, which is a "virtual" internal channel and it is used to manage the board parameters, and the **Channnel 1÷128**, which are the actual input channels. A1676A Branch Controller parameters are listed in the relevant User's Manual.

Table 4.1 – CH0 Parameters (Board parameters)

Name	Dir	Sign	ValType	Min	Max	Res	UM	OnStr	OffStr
Name	SET	UNSIGNED	STRING						
NSamples	SET	UNSIGNED	NUMERIC	10	500	1	NONE		
SerNum	MON	UNSIGNED	NUMERIC	1	65535	1			
Status	MON	UNSIGNED	NUMERIC						
RemBdName	MON	UNSIGNED	ON_OFF					A3801	A3801
Rel	MON	UNSIGNED	NUMERIC	1.00	99.99	0.01	NONE		
12VPwS	MON	UNSIGNED	ON_OFF					Fail	Ok
Sync	MON	UNSIGNED	ON_OFF					Fail	Ok
HVSync	MON	UNSIGNED	ON_OFF					Fail	Ok
AcqRes	SET	UNSIGNED	ON_OFF						Done
AcqStat	MON	UNSIGNED	NUMERIC	0	1		NONE		
AcqTrCnt	MON	UNSIGNED	NUMERIC	0	4294967295	50	Sec		
AcqGroup	SET	UNSIGNED	ON_OFF					Yes	No

Name allows to assign a symbolic name to the board

NSamples allows to set the number of samples

SerNum allows to readout the module serial number.

Status allows to monitor the board status
Bit11: 0 = plugged
1 = unplugged
other bits: don't care

RemBdName allows to readout the module name.

Rel allows to readout the module firmware release.

12VPwS allows to readout the status of the +/-12V voltages generated inside the module.

Sync allows to readout the status of the 50Hz synchronisation signal (EASY BUS) provided by the A1676A Branch Controller.

HVSync allows to readout the status of the 625KHz EASY BUS clock signal provided by the A1676A

AcqRes allows to rearm **all** channels acquisition

AcqStat indicate that at least one channel of the 128 in the board has been triggered

AcqTrCnt indicate the running value of the 50Hz timer of the board (that can be reset via the **ISEL** input on the SY1527/SY2527 system front panel)

AcqGroup allows to enable group mode

Table 4.2 – CH 1..128 Parameters (input channel parameters)

Name	Dir	Sign	ValType	Min	Max	Res	UM	OnStr	OffStr
Name	SET	UNSIGNED	STRING						
VThr	SET	UNSIGNED	NUMERIC	0	10	0.001	Volt		
VMean	MON	UNSIGNED	NUMERIC	0	10	0.0002	Volt		
Peak	MON	UNSIGNED	HEX	0	0xFFFFFFFF		NONE		
AcqRes	SET	UNSIGNED	ON_OFF						Done
AcqTrStp	MON	UNSIGNED	NUMERIC	0	4294967295	50	Sec		

Name allows to assign a symbolic name to the channel

VThr allows to set the voltage threshold

VMean allows to monitor input voltage

Peak allows to readout Input peak values

AcqRes allows to rearm channel acquisition

AcqTrStp indicates value of the timer "AcqTrCnt" when that channel is triggered

N.B.: the A3801 Board parameters are actually referred to the first channel (CH0); the A3801 Channel parameters are referred to Channels [1..128], which correspond to Channels [0..127] on front panel.

4.1.1 A3801 VMean and Peak Readout

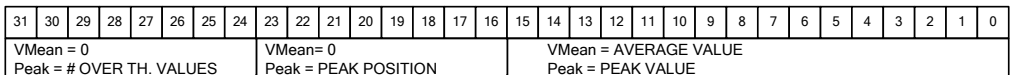

Fig. 4.1 – A3801 Vmean/Peak word

Vmean parameter returns the average value of the samples Bit[0..15].

If Input voltage > VThr a voltage peak occurs, therefore Peak parameter returns the current peak value, its relative position among the 250 samples and the number of over-threshold samples, as shown in Table 4.3. If Input voltage < VThr, Peak parameter returns the values of the latest voltage peak detected; such values are reset to 0 by an **AcqRes** command.
N.B.: If VThr parameter is set to 0, then the peak detection is disabled.

Table 4.3 – Peak word readout

Bit[0..15]	Peak Value
Bit[16..23]	Peak Relative Position
Bit[24..31]	No. Over Threshold Samples

4.1.2 A3801 Board OPC Items

This chapter describes the items which are available for the A3801 board control.
The **Name** item allows to assign to the board a symbolic name.
The **NSamples** item allows to set the number of samples.
A read access to the **NSamples#EU** item returns a string with the NSamples Engineering Units.
A read access to the **NSamples#HighEU** item returns the highest possible NSamples value.
A read access to the **NSamples#LowEU** item returns the lowest possible NSamples value.
A read access to the **SerNum** item returns the board serial number.
A read access to the **SerNum#EU** item returns a string with the serial number Engineering Units.
A read access to the **SerNum#HighEU** item returns the highest possible serial number value.
A read access to the **SerNum#LowEU** item returns the lowest possible serial number value.
A read access to the **Status** item returns back a 16 bit pattern indicating channel status
A read access to the **Rel** item returns a string with the board firmware release.
A read access to the **Rel#EU** item returns a string with the firmware release Engineering Units.
A read access to the **Rel#HighEU** item returns the highest possible firmware release value.
A read access to the **Rel#LowEU** item returns the lowest possible firmware release value.

A read access to the **12VPwS** item returns the internal ±12 V status.
A read access to the **12VPwS#CoOpen** item returns back the label “Off” associated to 12VPS=FAIL.
A read access to the **12VPwS#CoClose** item returns back the label “On” associated to 12VPS=OK.
A read access to the **Sync** item returns the external 50 Hz status.
A read access to the **Sync#CoOpen** item returns back the label “Off” associated to Sync=FAIL.
A read access to the **Sync#CoClose** item returns back the label “On” associated to Sync=OK.
A read access to the **HVSync** item returns the external 625 Hz status.
A read access to the **HVSync#CoOpen** item returns back the label “Off” associated to HVSync=FAIL.
A read access to the **HVSync#CoClose** item returns back the label “On” associated to HVSync=OK.
The **AcqRes** item allows to rearm channel acquisition.
A read access to the **AcqRes#CoOpen** item returns back the label “No” associated to **AcqRes** = FAIL
A read access to the **AcqRes#CoClose** item returns back the label “Yes” associated to **AcqRes** =OK
A read access to the **AcqStat** item returns the128 channel status
A read access to the **AcqStat#EU** item returns a string with the AcqStat Engineering Units
A read access to the **AcqStat#HighEU** item returns the highest possible AcqStat value.
A read access to the **AcqStat#LowEU** item returns the lowest possible AcqStat value.
A read access to the **AcqTrCnt** item returns the running value of the 50Hz timer
A read access to the **AcqTrCnt#EU** item returns a string with the AcqTrCnt Engineering Units
A read access to the **AcqTrCnt#HighEU** item returns the highest possible AcqTrCnt value.
A read access to the **AcqTrCnt#LowEU** item returns the lowest possible AcqTrCnt value.
The **AcqGroup** item allows to enable group mode.
A read access to the **AcqGroup#CoOpen** item returns back the label “Off” associated to AcqGroup =YES.
A read access to the **AcqGroup#CoClose** item returns back the label “On” associated to AcqGroup =NO.

Table 4.4 – A3801 board items

ItemID	Data Type	Access Rights	Description
PowerSupplyName.BoardXX.Chan0.Name	String	R/W	Channel name
PowerSupplyName.BoardXX.Chan0.SerNum	4-byte real	R	Board serial number
PowerSupplyName.BoardXX.Chan0.SerNum#EU	String	R	SerNum EU
PowerSupplyName.BoardXX.Chan0.SerNum #HighEU	8-byte real	R	SerNum upper limit
PowerSupplyName.BoardXX.Chan0.SerNum #LowEU	8-byte real	R	SerNum lower limit
PowerSupplyName.BoardXX.Chan0.Status	2-byte integer	R	Status
PowerSupplyName.BoardXX.Chan0.Rel	4-byte real	R	Board firmware release
PowerSupplyName.BoardXX.Chan0.Rel#EU	String	R	Rel EU
PowerSupplyName.BoardXX.Chan0.Rel#HighEU	8-byte real	R	Rel upper limit

ItemID	Data Type	Access Rights	Description
PowerSupplyName.BoardXX.Chan0.Rel#LowEU	8-byte real	R	Rel lower limit
PowerSupplyName.BoardXX.Chan0.NSamples	4-byte real	R/W	Set number of samples
PowerSupplyName.BoardXX.Chan0.NSamples#EU	String	R	NSamples EU
PowerSupplyName.BoardXX.Chan0.NSamples#HighEU	8-byte real	R	NSamples upper limit
PowerSupplyName.BoardXX.Chan0.NSamples#LowEU	8-byte real	R	NSamples lower limit
PowerSupplyName.BoardXX.Chan0.12VPwS	boolean	R	12V PwS status
PowerSupplyName.BoardXX.Chan0.12VPwS#CoOpen	string	R	12V PwS open label
PowerSupplyName.BoardXX.Chan0.12VPwS#CoClose	string	R	12V PwS close label
PowerSupplyName.BoardXX.Chan0.Sync	boolean	R	Sync status
PowerSupplyName.BoardXX.Chan0.Sync#CoOpen	string	R	Sync open label
PowerSupplyName.BoardXX.Chan0.Sync#CoClose	string	R	Sync close label
PowerSupplyName.BoardXX.Chan0.HVSync	boolean	R	HVSync status
PowerSupplyName.BoardXX.Chan0.HVSync#CoOpen	string	R	HVSync open label
PowerSupplyName.BoardXX.Chan0.HVSync#CoClose	string	R	HVSync close label
PowerSupplyName.BoardXX.Chan0.AcqRes	boolean	R/W	rearm acquisition
PowerSupplyName.BoardXX.Chan0.AcqRes#CoOpen	string	R	AcqRes open label
PowerSupplyName.BoardXX.Chan0.AcqRes#CoClose	string	R	AcqRes close label
PowerSupplyName.BoardXX.Chan0.AcqStat	2-byte integer	R/W	Acquisition status
PowerSupplyName.BoardXX.Chan0.AcqStat#EU	String	R	AcqStat EU
PowerSupplyName.BoardXX.Chan0.AcqStat#HighEU	2-byte integer	R	AcqStat upper limit
PowerSupplyName.BoardXX.Chan0.AcqStat#LowEU	2-byte integer	R	AcqStat lower limit
PowerSupplyName.BoardXX.Chan0.AcqTrCnt	4-byte real	R/W	Value of the 50Hz timer
PowerSupplyName.BoardXX.Chan0.AcqTrCnt#EU	String	R	AcqTrCnt EU
PowerSupplyName.BoardXX.Chan0.AcqTrCnt#HighEU	8-byte real	R	AcqTrCnt upper limit
PowerSupplyName.BoardXX.Chan0.AcqTrCnt#LowEU	8-byte real	R	AcqTrCnt lower limit
PowerSupplyName.BoardXX.Chan0.AcqGroup	boolean	R	Enable group mode
PowerSupplyName.BoardXX.Chan0.AcqGroup #CoOpen	string	R	AcqGroup open label
PowerSupplyName.BoardXX.Chan0.AcqGroup #CoClose	string	R	AcqGroup close label

4.1.3 A3801 Input Channel OPC Items

This chapter describes the items which are available for the control of the ADC channel.
The **Name** item allows to assign to the channel a symbolic name.
The **VThr** item allows to set the voltage threshold.
A read access to the **VThr#EU** item returns a string with the VThr Engineering Units.
A read access to the **VThr#HighEU** item returns the highest possible VThr value.

A read access to the **VThr#LowEU** item returns the lowest possible VThr value.
The **VMean** item returns back the VMean value.
A read access to the **VMean#EU** item returns a string with the VMean Engineering Units.
A read access to the **VMean#HighEU** item returns the highest possible VMean value.
A read access to the **VMean#LowEU** item returns the lowest possible VMean value.
The **Peak** item allows to readout peak values.
A read access to the **Peak#EU** item returns a string with the Peak Engineering Units.
A read access to the **Peak#HighEU** item returns the highest possible Peak value.
A read access to the **Peak#LowEU** item returns the lowest possible Peak value.
The **AcqRes** item allows to rearm the channel acquisition.
A read access to **AcqRes#CoOpen** returns back the label “Done” associated to AcqRes=0.
A read access to **AcqRes#CoClose** item back the label “” associated to AcqRes=1.
A read access to the **AcqTrStp** item returns the running value of the 50Hz timer when that channel is triggered
A read access to the **AcqTrStp#EU** item returns a string with the **AcqTrStp** Engineering Units
A read access to the **AcqTrStp#HighEU** item returns the highest possible **AcqTrStp** value.
A read access to the **AcqTrStp#LowEU** item returns the lowest possible **AcqTrStp** value.

Table 4.5 – A3801 Input Channel items

ItemID	Data Type	Access Rights	Description
PowerSupplyName.BoardXX.ChanYYY.Name	String	R/W	Channel name
PowerSupplyName.BoardXX.Chan0.VThr	4-byte real	R/W	Set VThr threshold
PowerSupplyName.BoardXX.Chan0.VThr#EU	String	R	VThr EU
PowerSupplyName.BoardXX.Chan0.VThr#HighEU	8-byte real	R	VThr upper limit
PowerSupplyName.BoardXX.Chan0.VThr#LowEU	8-byte real	R	VThr lower limit
PowerSupplyName.BoardXX.ChanYYY.VMean	4-byte real	R	VMean
PowerSupplyName.BoardXX.ChanYYY.VMean #EU	string	R	VMean EU
PowerSupplyName.BoardXX.ChanYYY.VMean#HighEU	8-byte real	R	VMean upper limit
PowerSupplyName.BoardXX.ChanYYY.VMean#LowEU	8-byte real	R	VMean lower limit
PowerSupplyName.BoardXX.ChanYYY.Peak	4-byte	R	Peak
PowerSupplyName.BoardXX.ChanYYY.Peak#EU	string	R	Peak EU
PowerSupplyName.BoardXX.ChanYYY.Peak#HighEU	8-byte real	R	Peak upper limit
PowerSupplyName.BoardXX.ChanYYY.Peak#LowEU	8-byte real	R	Peak lower limit
PowerSupplyName.BoardXX.ChanYYY.AcqRes	boolean	R/W	AcqRes ON/OFF
PowerSupplyName.BoardXX.ChanYYY.AcqRes#CoClose	string	R	AcqRes close label
PowerSupplyName.BoardXX.ChanYYY.AcqRes#CoOpen	string	R	AcqRes open label
PowerSupplyName.BoardXX.Chan0.AcqTrStp	4-byte real	R/W	Stop Value of 50Hz timer
PowerSupplyName.BoardXX.Chan0.AcqTrStp #EU	String	R	AcqTrStp EU
PowerSupplyName.BoardXX.Chan0.AcqTrStp#HighEU	8-byte real	R	AcqTrStp upper limit
PowerSupplyName.BoardXX.Chan0.AcqTrStp#LowEU	8-byte real	R	AcqTrStp lower limit

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