ADCA100

ADC Adapter with 24 BNC Connectors for Voltage Output or Current Supplied Sensors

FEATURES

- Multi channel analog interface SyMBus24 to AD Card
  Disturbance tolerant symmetrical transmission MDR68 front connector for reliable repetitive plugging
- 24 channel analog interface 24BNC to sensors
  24 widely accepted BNC front connectors
  - ± 10 V input-voltage range (current sources off)
  - 2 V to 22 V with current sources switched on 10 kΩ input resistance
  - 2 Hz to 80 kHz frequency response (with ADC100MLN card)

  4x switchable 6x 3 mA center contact current supply
- Nonvolatile calibration and configuration memory
- Onboard voltage monitoring
- Green activity LED
- Low power consumption (5 W typically)
- Aluminum box can be placed underneath the mcdRec721x and locks its feet

The ADCA100 is an aluminum adapter box that has been developed for connecting the symmetrical ADC1xxMLN Analog Measurement Cards to up to 24 single-ended voltage output or the common 2 – 20 mA current supplied sensors better known by their registered trademarks ICP®, DeltaTron®, Isotron® and Piezotron®.

It holds 24 (two rows of 12) BNC connectors and has four switches on the backside each switching 6 of the 24 AC inputs between ± 10 V and 2 V to 22 V input-voltage with 3 mA sensor supply.

Configuration and results of the factory-calibration can be stored in a nonvolatile memory and used for compensation while measuring.

Disturbance tolerant transmission from the MDR68 connector to the Analog Measurement Card is achieved when using the symmetrical mccabAR1xx cable.

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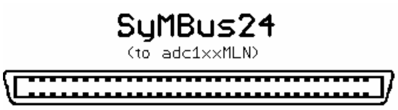
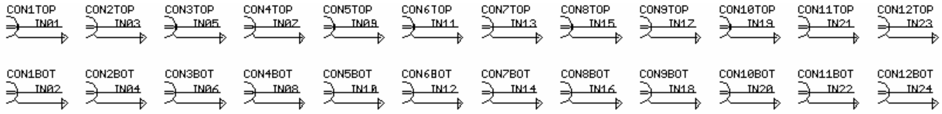
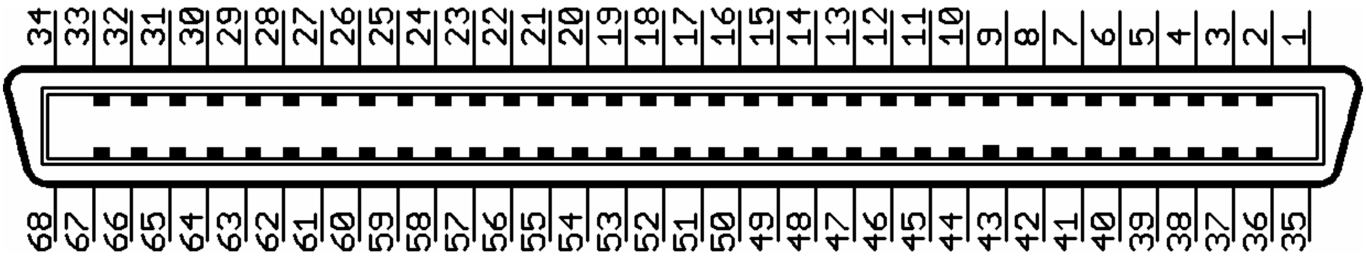
FRONT CONNECTOR SCHEME

MDR68	24BNC
	

MDR68 CONNECTOR SCHEME



1	/SHUTTER	**24**	OUT08–	**47**	OUT21–
2	5 V	**25**	SENSOR 6 V	**48**	OUT21+
3	IS SERIAL IN	**26**	OUT09+	**49**	SENSOR 0 V
4	12 V	**27**	OUT09–	**50**	OUT20–
5	SENSOR 6 V	**28**	OUT10+	**51**	OUT20+
6	OUT01+	**29**	OUT10–	**52**	OUT19–
7	OUT01–	**30**	SENSOR 6 V	**53**	OUT19+
8	OUT02+	**31**	OUT11+	**54**	SENSOR 0 V
9	OUT02–	**32**	OUT11–	**55**	OUT18–
10	SENSOR 6 V	**33**	OUT12+	**56**	OUT18+
11	OUT03+	**34**	OUT12–	**57**	OUT17–
12	OUT03–	**35**	/DETECT	**58**	OUT17+
13	OUT04+	**36**	0 V	**59**	SENSOR 0 V
14	OUT04–	**37**	IS SERIAL OUT	**60**	OUT16–
15	SENSOR 6 V	**38**	SWITCH 0 V	**61**	OUT16+
16	OUT05+	**39**	SENSOR 0 V	**62**	OUT15–
17	OUT05–	**40**	OUT24–	**63**	OUT15+
18	OUT06+	**41**	OUT24+	**64**	SENSOR 0 V
19	OUT06–	**42**	OUT23–	**65**	OUT14–
20	SENSOR 6 V	**43**	OUT23+	**66**	OUT14+
21	OUT07+	**44**	SENSOR 0 V	**67**	OUT13–
22	OUT07–	**45**	OUT22–	**68**	OUT13+
23	OUT08+	**46**	OUT22+		

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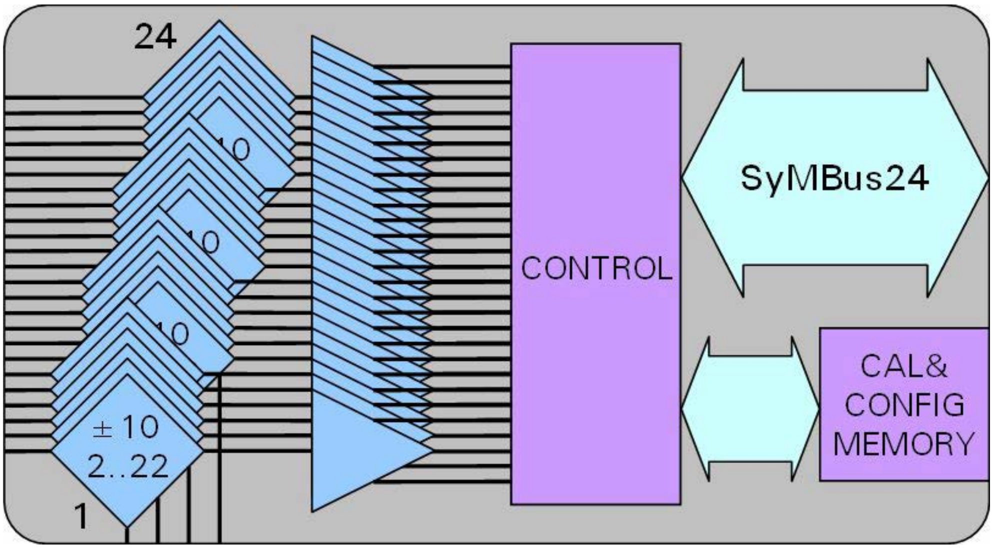
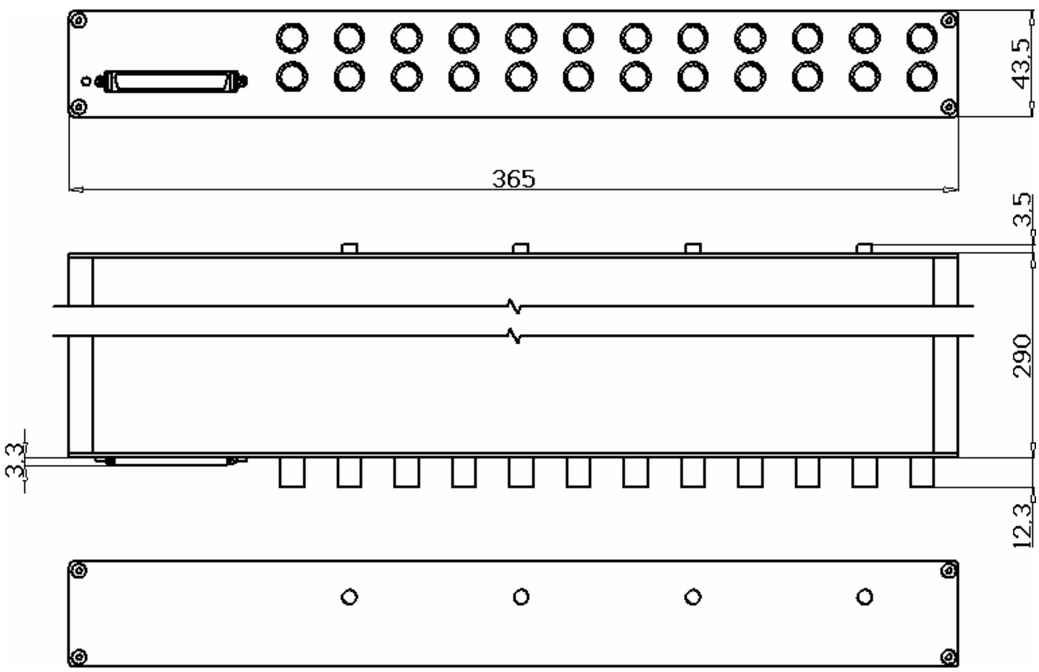
BLOCK DIAGRAM



MECHANICAL DATA



WEIGHT

2140 gr

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ABSOLUT MAXIMUM RATINGS

Parameter		Min	Max	Unit	Remarks
Power	12 V to SWITCH_0 V	- 0.3	14	V	Stresses above these may cause permanent damage. This is a stress rating only; functional operation at these or any other conditions above is not implied. Exposure to absolute maximum rating conditions for extended periods may affect reliability. Only one absolute maximum rating may be applied at any one time.
	SENSOR_6 V to SENSOR_0 V	- 0.3	8	V	
	5 V to 0 V	- 0.3	6	V	
BNC inputs to SENSOR_0 V*		- 23	23	V	
Digital inputs to 0 V		- 0.3	4	V	
Storage temperature		- 50	125	°C	

* when current sources are switched on for sensors like ICP®, min. input voltage reduces to - 0.3 V.

CONFORMITY

Electrical safety	complies with DIN EN 61010-1
Ingress protection code	IP30 according to DIN EN 60529
Electromagnetic compatibility (EMC)	complies with DIN EN 61326

OPERATING CONDITIONS

Parameter		Min	Typ	Max	Unit	Remarks
Power	12 V	5.0	12	12.6	V	voltages at the MDR68 connector must be guaranteed to be within these limits
	SWITCH_0 V	0.0		12.6	V	
	SENSOR_6 V	5.2	6	6.7	V	
	5 V	4.7	5	5.3	V	
Sensor supply (front)	3 mA	2.4	3	3.6	mA	at center contact of each BNC connector, short-circuit-proof
BNC inputs	IN to SENSOR_0 V	2		22	V	with current sources switched on
	IN to SENSOR_0 V	- 10		10	V	with current sources switched off
Analog outputs	OUT+ to OUT–	- 2		2	V	analog outputs are DC-biased at 2.5 V
	OUT+ to SENSOR_0 V	1.5	2.5	3.5	V	
	OUT– to SENSOR_0 V	1.5	2.5	3.5	V	
/DETECT		0		0.7	V	internally connected to 0 V
IS_SERIAL_IN	low	0		2.4	V	connects to IS_SERIAL_OUT at the ADC1xx_MLN
	high	3.6		5	V	
IS_SERIAL_OUT	low	0		0.4	V	connects to IS_SERIAL_IN at the ADC1xx_MLN
	high	2.2		5	V	
/SHUTTER	low	0		1	V	bidirectional (pulled up inside the mcdRec datarecorder)
	high	2		3.3	V	
Temperature		0		40	°C	the air surrounding the adapter box must be within these limits
Relative humidity		10		80	%	not to be operated until condensation is evaporated

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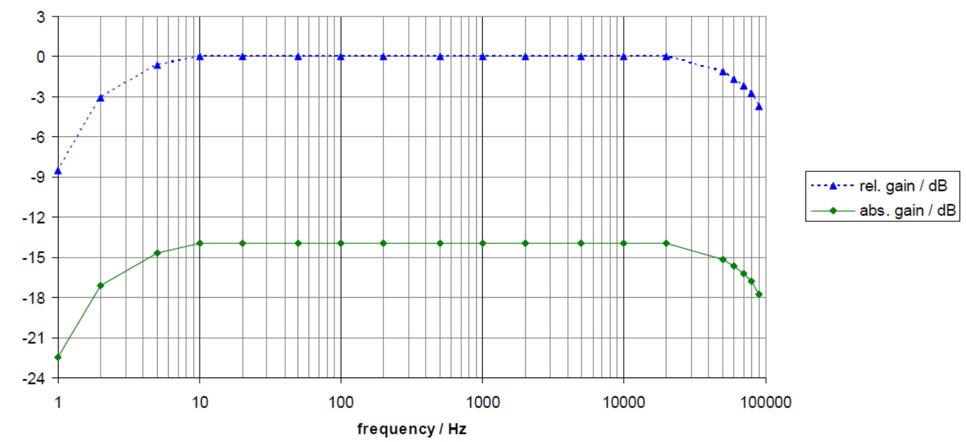
ELECTRICAL CHARACTERISTICS*

Parameter		Min	Typ	Max	Unit	Condition
Full-scale input-voltage		6.0	6.8	8.0	V_{eff}	@ current sources switched on/off
AC input-resistance		9.9	10	10.1	kΩ	between BNC inputs and SENSOR_0 V
Input referred noise	@ current sources switched off		17	25	µVeff	inputs connected to 50 Ω resistors,
	@ current sources switched on		17	28	µVeff	20 Hz – 20 kHz-weighted
Dynamic performance						full-scale input related to noise
	Signal to noise ratio (A-weighted)	111	115		dB(A)	@ current sources switched off
	(20 Hz – 20 kHz-weighted)	109	112		dB	
	(20 Hz – 40 kHz-weighted)	106	109		dB	
	(20 Hz – 80 kHz-weighted)	102	105		dB	
	Signal to noise ratio (A-weighted)	110	115		dB(A)	@ current sources switched on
	(20 Hz – 20 kHz-weighted)	108	112		dB	
	(20 Hz – 40 kHz-weighted)	105	109		dB	
	(20 Hz – 80 kHz-weighted)	102	105		dB	
Total harmonic distortion + noise						most distorted channel
	@ current sources switched off		- 72	- 66	dB	@ input 1 kHz,- 3 dB,
	@ current sources switched on		- 65	- 60	dB	20 Hz – 20 kHz-weighted
Accuracy	Output referred offset-error		1	15	µV	worst channel
	Input referred offset-error		6	73	µV	@ inputs connected to 50 Ω resistors
Channel separation						most disturbed channel
	Crosstalk @ 1 kHz (800 Hz – 1250 Hz-weighted)		- 84	- 80	dB	related to driven channel
	Crosstalk @ 10 kHz (8 kHz – 15 kHz-weighted)		- 84	- 70	dB	@ input- 3 dB
Power supply current	(12 V)		7	20	mA	
	(SENSOR_6 V)		713	1000	mA	@ inputs connected to 50 Ω resistors
	(5 V)		6	20	mA	
Power consumption	(12 V)		0.08	0.25	W	
	(SENSOR_6 V)		4.63	6.70	W	supply currents from above,
	(5 V)		0.03	0.11	W	voltages measured on the board
	(total)		4.74	7.06	W	

FREQUENCY RESPONSE*



* together with ADC100MLN card

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THEORY OF OPERATION

Signals entering the ADCA100 are passing ESD-protections and line inductors where high-frequency-components are removed that the following amplifiers cannot damp sufficiently.

Each of four switches can connect a group of six inputs to low noise 3 mA current regulators operating from a filtered 6 V to 24 V step up voltage converter.

Symmetrical-output-amplifiers are used to level from single-ended 7 Veff input- to differential 1.4 Veff output-voltagerange allowing for disturbance tolerant connection to ADC10xMLN or the low power ADC11xMLN Analog Measurement Cards by connecting the MDR68 connectors with a symmetrical mccabAR1xx cable.

Capacitors set the lower end of the frequency range to 1.6 Hz and the upper end to 150 kHz resulting in a 2 Hz to 80 kHz frequency range together with an ADC100MLN card at 192 kHz sampling frequency.

/DETECT connects to 0 V to inform the measurement card that a device is present.

A microcontroller communicates with the AD card via optically decoupled IS_SERIAL_IN and IS_SERIAL_OUT and provides for reading and writing of the nonvolatile configuration and calibration memory as well as for monitoring the three supply-voltages.

A green front-panel-LED is connected to a 12 mA current source and can be switched on and off from the ADC1xxMLN using SWITCH_0 V.

/SHUTTER is prepared for future use.

gfai tech GmbH
Volmerstraße 3,
12489 Berlin, Germany

www.gfaitech.com
E-Mail: info@gfaitech.de
Tel.: +49 (0)30 81 45 63-750