Amazing! CONTROLS

DCU System

Board information

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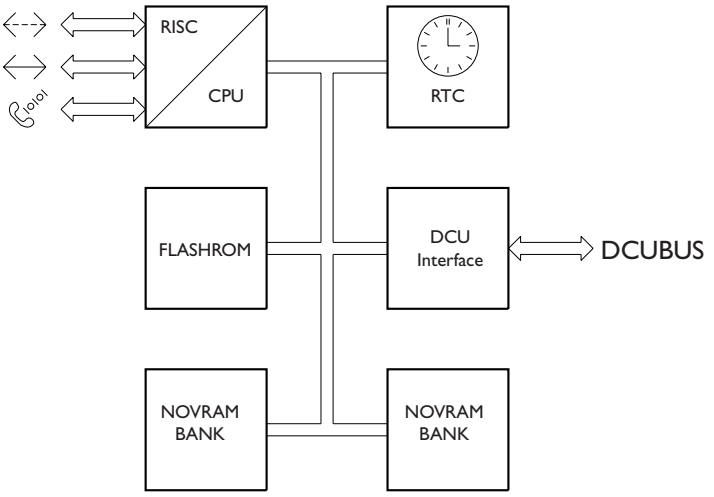
FDCU
Processor Board

FDCU

DCU systems can be configured by selecting function specific boards in combination with a controller board. This board, called a FDCU board (Fast Decentral Control Unit), is the only board that really is required for every possible FDCU configuration. It controls all the additional FDCU specific function boards and takes care of the network connection. Because of this network connection, more FDCU sytems and/or computers can be set up in one system. Software can run on it's on board high speed processor. Besides this it has an on board RealTime Clock. which provides the right time, date and day of the week information.
Self made applications are stored in memory and can be changed and serviced very quickly. Data is garanteed to stay valid even when the power is disconnected. Applications built with FDCUs range from building control systems and presentation systems to industrial controls and flight simulators.

Block diagram



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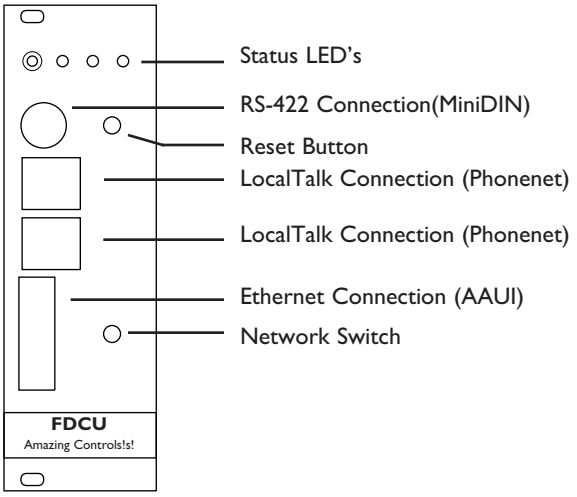
Board Description

The FDCU (Fast Decentral Control Unit) is ment to control real-time processes running on a DCUBUS system. It controls the I/O-boards placed on it's DCUBUS and is able to communicate to any Macintosh over an EtherNet (AAUI connector) or a LocalTalk network connection (PhoneNet wiring).
Since the FDCU runs enhanced 68030 compatible code and emulates a Macintosh application environment, DCU applications can be developed under MPW using C, C++, Pascal, Modula2 or Asm compilers and downloaded over the network. There is also an XCMD/XFCN kernel available allowing XCMDs and XFCNs on any Macintosh to master one or more DCUs.

Specifications

- 68360 Processor (combined CPU32+/RISC).
- 25 MHz model.
- 8/16/32-bit modes.
- 256 K EPROM (1 wait-state).
- 512 K - 4Mb Non Volatile RAM (no wait state).
- EtherNet interface (IEEE 802.2/802.3)
- AppleTalk (PhoneNet) interface.
- RS-422 Serial interface (Apple serial port pinout).
- DCUBUS controller.
- Standard software kernel installed for :
  - LLAP/ELAP/AARP/DDP/NBP/ZIP/RTMP AppleTalk layers.
  - LinkManager, SmartCheck, SmartLoader protocol support.
- Board dimensions: 160 x 100 mm.
- Front dimensions: 8 TE x 3 HE.

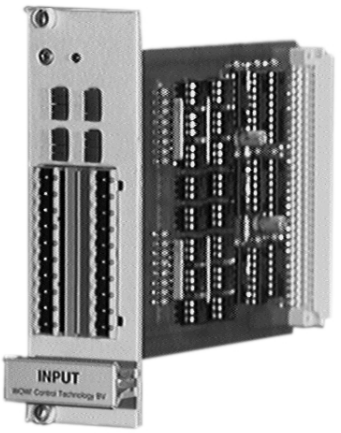
Front Layout



DCU-INPUT

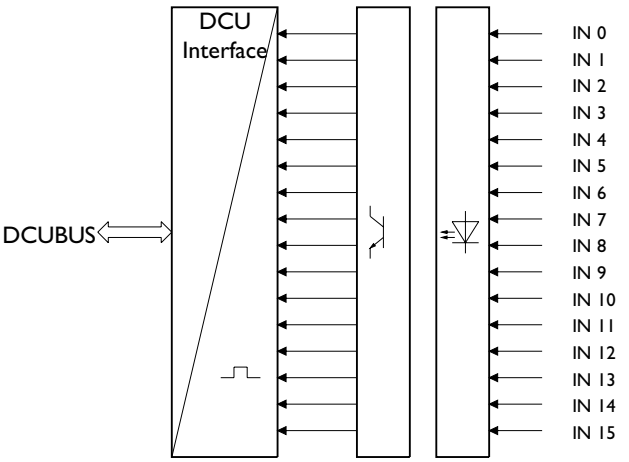
Input Board

DCU Input



The DCU Input board can be used to read two-state signals from connected devices. Up to 16 devices can be connected to one DCU Input board like switches, photocells and sensors. The DCU can read the 16 states in one move. 16 Visual indicators directly display their corresponding input channel status.

Block diagram



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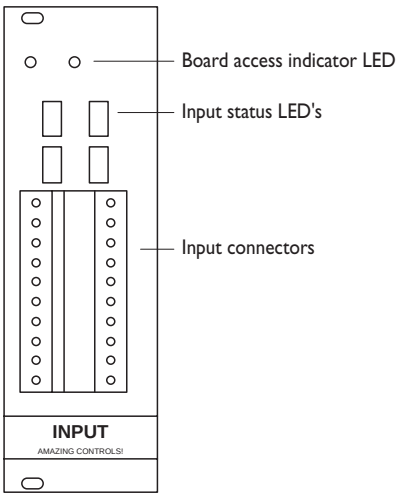
Board Description

This board interfaces inputs ranging from 15VDC to 24VDC to a DCUBUS system. A galvanic isolation provides protection for the DCUBUS against installation failures. The status of the inputs is displayed directly on the LEDs mounted on the board's front. For software the board looks like a 16-bit read-only bitset directly in processor memory. So an input can be tested by using only one Asm Read instruction. This together with a board access time of 70 nSec provides extremely fast I/O access.

Specifications

- 15VDC..24VDC inputs.
- 16 input channels.
- Max. load 6 mA / input.
- 4000V optical isolation.
- 16 input status LED's.
- Board access indicator LED.
- Solderless external connections.
- 70 nSec access time.
- Board dimensions: 160 x 100 mm.
- Front dimensions: 8 TE x 3 HE.

Front Layout

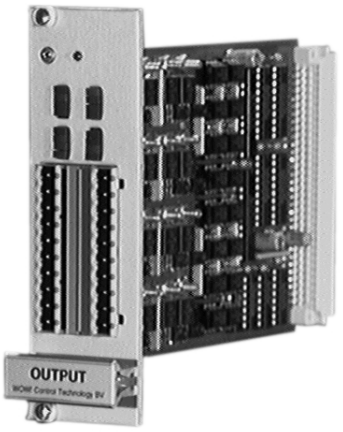


Input Connector Layout :

1	N.C.	11	N.C.
2	Input 00	12	Input 08
3	Input 01	13	Input 09
4	Input 02	14	Input 10
5	Input 03	15	Input 11
6	Input 04	16	Input 12
7	Input 05	17	Input 13
8	Input 06	18	Input 14
9	Input 07	19	Input 15
10	Ext. GND	20	Ext. GND

DCU-OUTPUT

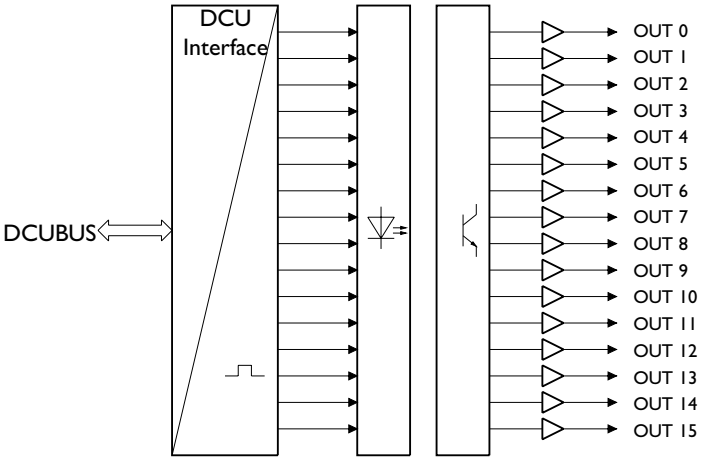
Output Board



DCU Output

The DCU Output board can drive an external provided voltage on a connected device. 16 Outputs can be switched and their status can be read in one move. 16 Visual indicators directly display the status of corresponding output channels. Devices to be connected consist of relays, signal lamps, valves etc.

Block diagram



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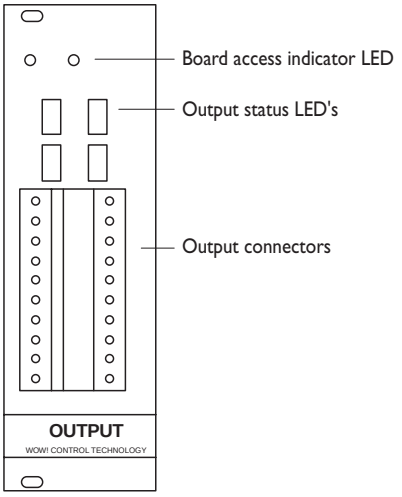
Board Description

This board provides an interface for 16 outputs ranging from 15VDC to 24VDC for the DCUBUS system. A galvanic isolation provides protection against installation failures. The status of the respective outputs is displayed directly on the board's front LEDs.
For software the board looks like a 16-bit readable and writeable bitset directly in processor memory. So an output can be set or cleared by using only one Asm Read-Modify-Write instruction. This together with a board access time of 70 nSec provides extremely fast I/O access.

Specifications

- 15VDC..24VDC outputs.
- 16 output channels.
- Max. output current 1A / output.
- 4000V optical isolation.
- 16 output status LED's.
- Board access indicator LED.
- Solderless external connections.
- 70 nSec access time.
- Board dimensions: 160 x 100 mm.
- Front dimensions: 8 TE x 3 HE.

Front Layout

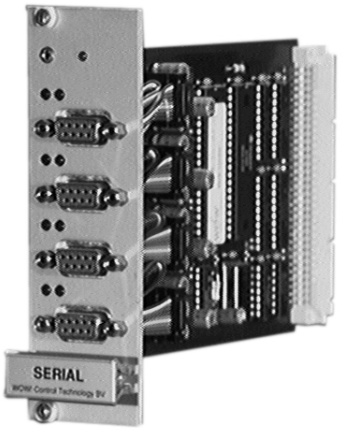


Output Connector Layout :

1	Ext +15...24 VDC	11	Ext +15...24 VDC
2	Output 00	12	Output 08
3	Output 01	13	Output 09
4	Output 02	14	Output 10
5	Output 03	15	Output 11
6	Output 04	16	Output 12
7	Output 05	17	Output 13
8	Output 06	18	Output 14
9	Output 07	19	Output 15
10	Ext. GND	20	Ext. GND

DCU-SERIAL

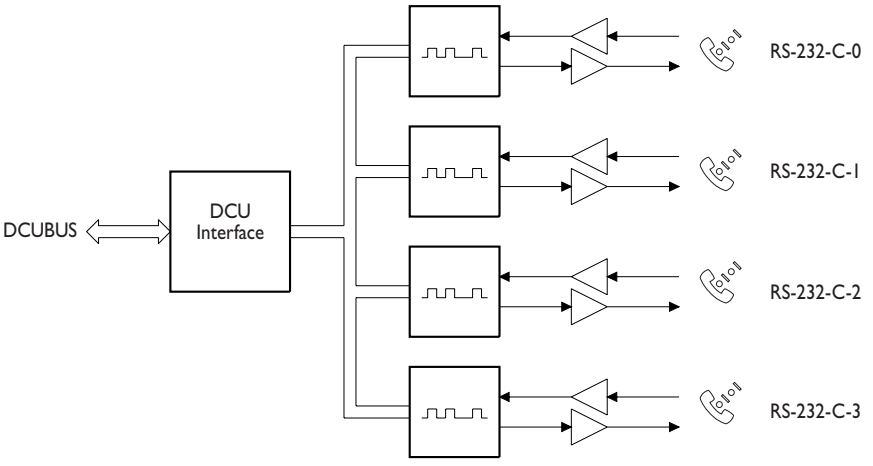
RS-232-C Board



DCU Serial

If serial digital data has to be sent or read the DCU Serial can be used. Devices that use serial communication are modems, printers, video recorders, slide projectors etc.The DCU Serial provides up to 4 different serial channels with a physical RS-232-C connection.

Block diagram



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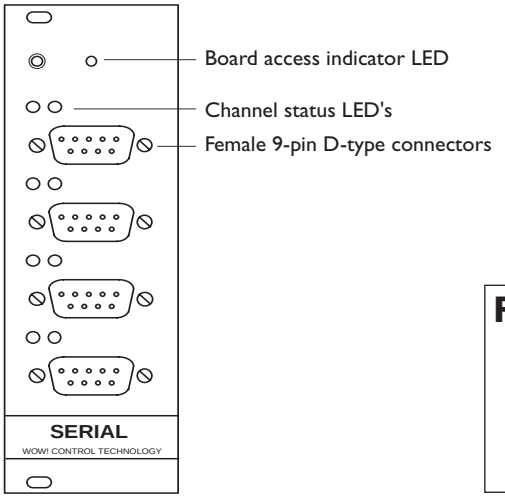
Board Description

This board interfaces 4 standard RS-232-C channels to a DCUBUS system. The standard control and status lines CTS/RTS/DTR are supported by both hardware and software drivers. The female connectors follow the AT 9 pin connector standard allowing for use of standard device cabling. All channel control- and status registers are directly accessible from the processor (no wait states). Standard libraries are available providing a fast, reliable and straightforward API for serial communication.

Specifications

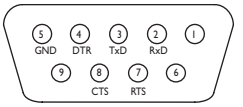
- Standard RS-232C interface (RxD, TxD, CTS, RTS, DTR).
- 4 serial channels.
- 9 pin female D connector with AT pinout.
- Status LEDs for every channel.
- Board access indicator LED.
- 110 nSec access time.
- OEM libraries for MPW available with serial drivers for this board.
- Board dimensions: 160 x 100 mm.
- Front dimensions: 8 TE x 3 HE.

Front Layout



RS-232C Connector Layout

Female 9-pin D-connector



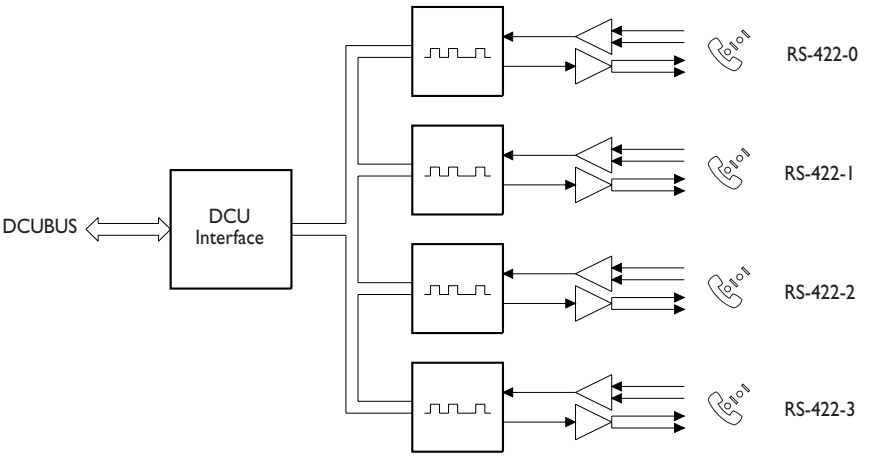
DCU-SERIAL2

RS-422 Board

DCU Serial2

If serial digital data has to be sent or read the DCU Serial can be used. Devices that use serial communication are modems, printers, video recorders, slide projectors etc. The DCU Serial2 provides up to 4 different serial channels with a physical RS-422 connection which extends the possible cable length.

Block diagram



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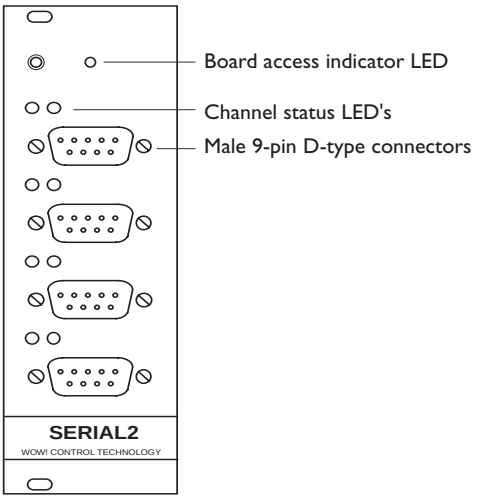
Board Description

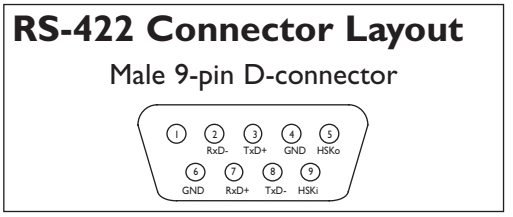
This board interfaces 4 RS-422 channels to a DCUBUS system. Hardware handshaking is possible by using the HskI, HskO and Gnd lines. The male connectors follow the Sony 9- pin connector layout for professional video equipment. All channel control and status registers are directly accessible from the processor (no wait states). Standard libraries are available providing a fast, reliable and straightforward API for serial communication.

Specifications

- RS-422 interface (RxD+, RxD-, TxD+, TxD-, HskI, HskO, Gnd).
- 4 serial channels.
- 9 pin male D connector with Sony video equipment pinout.
- Status LEDs for every channel.
- Board access indicator LED.
- 110 nSec access time.
- OEM libraries for MPW available with serial drivers for this board.
- Board dimensions: 160 x 100 mm.
- Front dimensions: 8 TE x 3 HE.

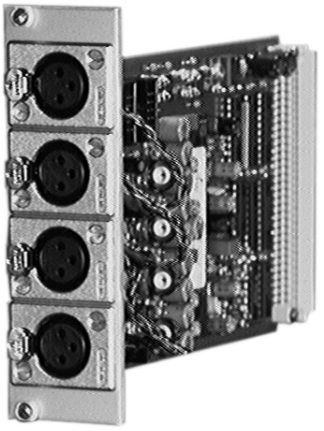
Front Layout





DCU-AIN

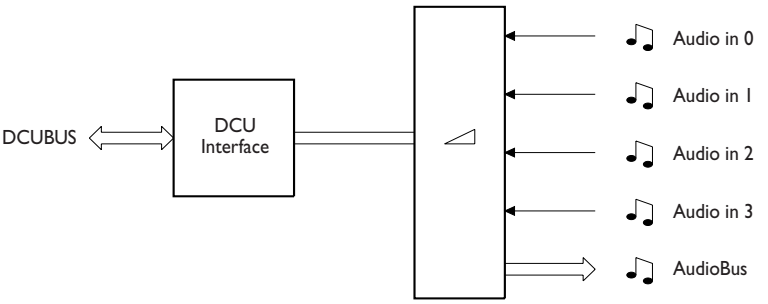
Audio Input Board



DCU AIN

The DCU Analog input board can be used to connect audio sources such as tape recorders, microphones, CD and video players, etc. DCU AIN boards have 4 input channels (2x stereo) and need an Audio Output board to make connections with amplifiers or recorders. Separate Audio input channels can be controlled in volume, bass, treble and some special sound effects. Examples of applications range from presentation room controls, exhibition show controls, multimedia applications to building control systems.

Block diagram



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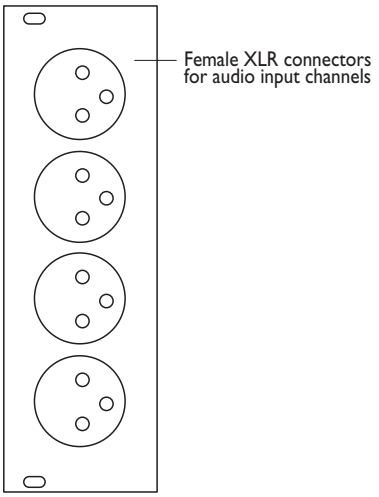
Board Description

This board is designed to control audio channels directly on a DCUBUS system. The channels are then mixed over a 4 channel local audio bus with other DCU-AIN boards. The mixed signals are output to an amplifier or other external device through a DCU-AOUT board. More DCU AIN boards can be used to mix up to 28 audio channels to the Audio Output board in a single DCU system.

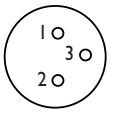
Specifications

- 4 (or 2 stereo) line inputs.
- Configurable symetrical- or asymetrical inputs per channel.
- Software controllable volume (-90dB..+0dB in 2 dB steps).
- Software controllable bass/treble(-12dB..+12dB in 3dB steps).
- Software controlled spatial/pseudo effects and mute (>90dB).
- Multiple boards of this type can be mixed over a 4 channel audiobus.
- 90 dB signal/noise ratio.
- Channel separation 75 dB.
- Total harmonic distortion 0.05%.
- OEM libraries for MPW available with audio control drivers for this board.
- Board dimensions: 132 x 100 mm.
- Front dimensions: 8 TE x 3 HE.

Front Layout



AIN Connector Layout:



1 GND (audio)
2 Signal +
3 Signal -

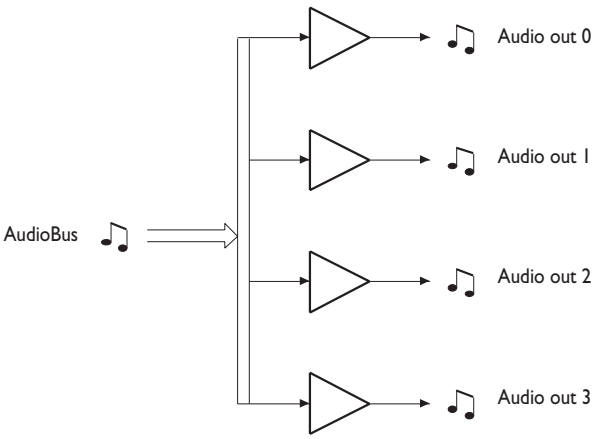
DCU-AOUT

Audio Output Board

DCU AOUT

The DCU Analog output board is always used in combination with one or more DCU AIN boards. The four mixed audio signals from the Audio Input boards are buffered and provided through the Audio Output board. More Audio Output boards can be used to expand the connectivity to more bufferd outputs, not more output channels. Examples of applications range from presentation room controls, exhibition show controls, multimedia applications to building control systems.

Block diagram



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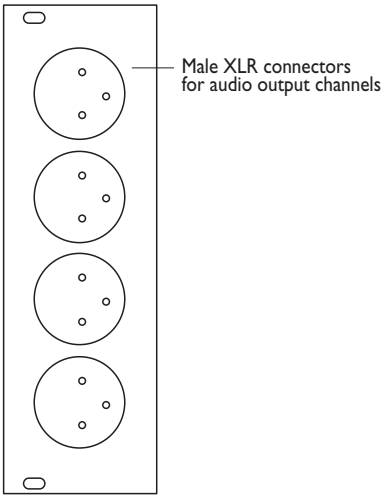
Board Description

This board is designed to buffer audio channels mixed down using DCU-AIN boards and output them to any external device like an amplifier. See DCU-AIN datasheet for information on how these channels are mixed. This board is only acting as a passive component and not controlled by the DCU processor. Because of this, there is no digital circuitry on the board.

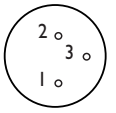
Specifications

- 4 (or 2 stereo) line outputs.
- Configurable symetrical- or asymetrical outputs per channel.
- Separately adjustable audiobus interfacing.
- 90 dB signal/noise ratio.
- Channel separation 75 dB.
- Total harmonic distortion 0.05%.
- To be used in conjunction with DCU-AIN boards.
- Board dimensions: 132 x 100 mm.
- Front dimensions: 8 TE x 3 HE.

Front Layout



AOUT Connector Layout:



1 GND (audio)
2 Signal +
3 Signal -

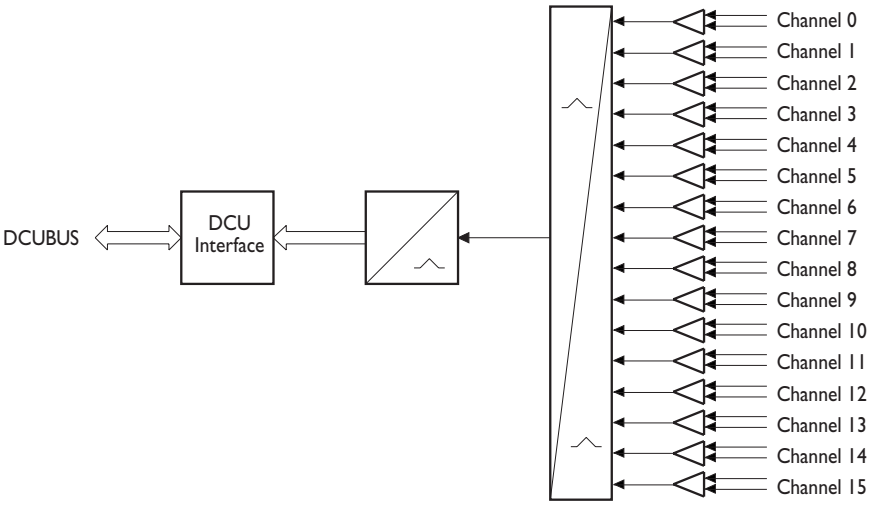
DCU-ADC

A/D Conversion Board

DCU ADC

The DCU ADC board can be used to read multi-state signals (analog signals) from connected devices. Up to 16 devices can be connected to one DCU ADC board like temperature sensors. It converts analog signals to digital values which can be read by the DCU board. Devices to be connected to this board consists of temperature sensors, light sensors etc. in mid-range resolution systems.

Block diagram



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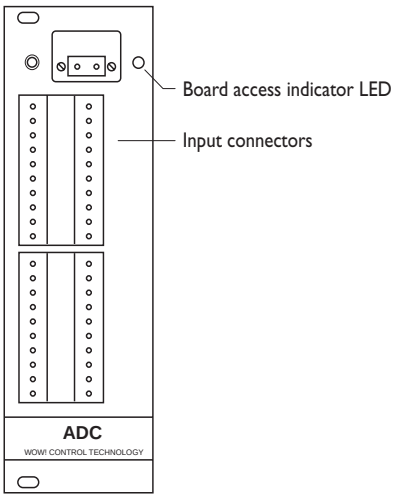
Board Description

This board interfaces analog signals ranging from -10..+10Vdc to the DCUBUS system. It contains 1 AD converter with a 16 channel multiplexer. Conversion is done one channel after another. Conversion of a single channel is done in 10 μS. Using all 16 channels will result in a sampling rate of about 160 μS. A single Asm Write to the board is enough to start the conversion of the channel depending on the address. A single read instruction always reads the converted value of the channel set at conversion start.

Specifications

- Input range - 10..+10V DC
- 16 very low common mode current differential inputs
- 12 bit resolution
- 10μS conversion/channel
- Integrated Linearity Error (INL): ± 0.5 LSB
- Differential Linearity Error (DNL): no missing codes
- Low power CMOS logic
- Fast FDCU interfacing
- Board access indicator LED
- High density 3.81 mm connectors
- Board dimensions 160 x 100 mm
- Front dimensions: 8 TE x 3 HE.

Front Layout



Input Connector Layout:

1	N.C.	21	N.C.
2,3	Channel 00	22,23	Channel 08
4,5	Channel 01	24,25	Channel 09
6,7	Channel 02	26,27	Channel 10
8,9	Channel 03	28,29	Channel 11
10	N.C.	30	N.C.
11	N.C.	31	N.C.
12,13	Channel 04	32,33	Channel 12
14,15	Channel 05	34,35	Channel 13
16,17	Channel 06	36,37	Channel 14
18,19	Channel 07	38,39	Channel 15
20	N.C.	40	N.C.

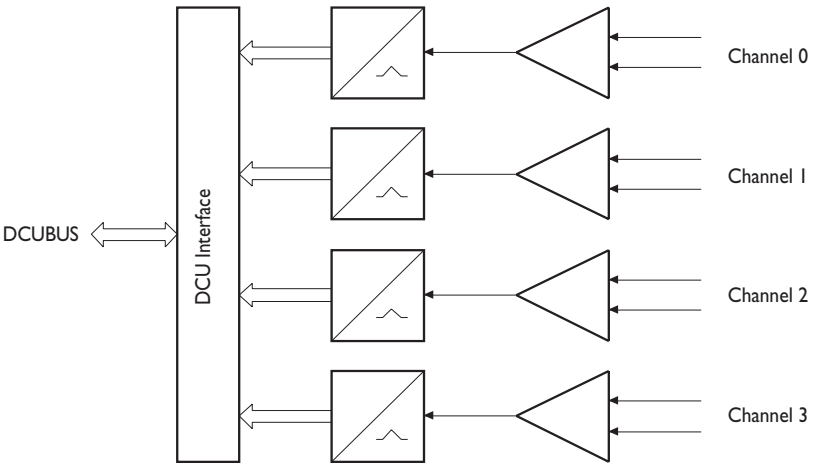
DCU-ADCQ

A/D Conversion Board

DCU ADCQ

The DCU ADCQ board can be used to read multi-state signals (analog signals) from connected devices. Up to 4 devices can be connected to one DCU ADCQ board like temperature sensors, transducers etc. It converts the analog signals to digital values wich can be read by the DCU board. Devices to be connected to this board consist of temperature sensors, pressure transducers, position transducers etc.

Block diagram



Amazing! CONTROLS

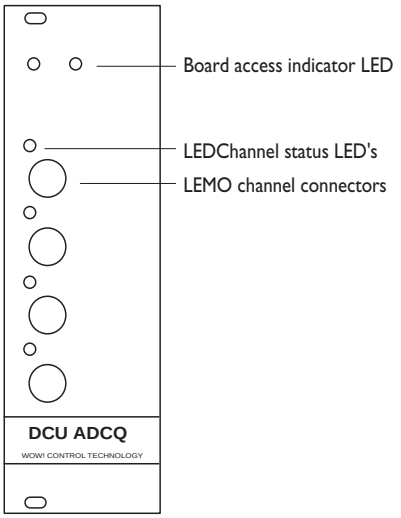
Board Description

This board interfaces analog signals ranging from -10..+10V= to the DCUBUS system. It contains 4 completely separated non-multiplexed channels with differential inputs. There is a 12-bit and 16-bit version available. A 100kHz sample rate together with a board access time of 70nSec allows for fast I/O access. To the processor the board appears to be an array of 4 16-bit signed integers and a 16-bit bitset. A single Asm Write to a specific channel is enough to start conversion. The status of conversion can be read from the status register. A single Read instruction can be used to read-in the converted value. The board design provides a very high accuracy. The Lemo connectors used to connect external devices further enhance accuracy and reliability.

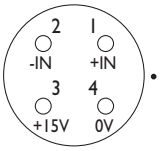
Specifications

- Input range -10..+10V=.
- Differential inputs.
- 16 or 12 bit resolution.
- Non-multiplexed fully separated channels.
- 100 kHz sample rate.
- Integrated Linearity Error (INL):
  for 16 bit version : ± 3 LSB (± 1.5 LSB opt)
  for 12 bit version : ± 0.5 LSB
- Differential Linearity Error (DNL): No missing codes.
- Board access indicator LED.
- Channel busy indicator LEDs.
- Optional gain and offset adjustment.
- Optional power supply + 15 Vdc 25 mA/channel
- Board dimensions: 160 x 100 mm.
- Front dimensions: 8 TE x 3 HE.

Front Layout



ADCQ ConnectorLayout:



1 +Analog input
2 –Analog input
3 +15VDC (20mA)
4 Gnd (15VDC)

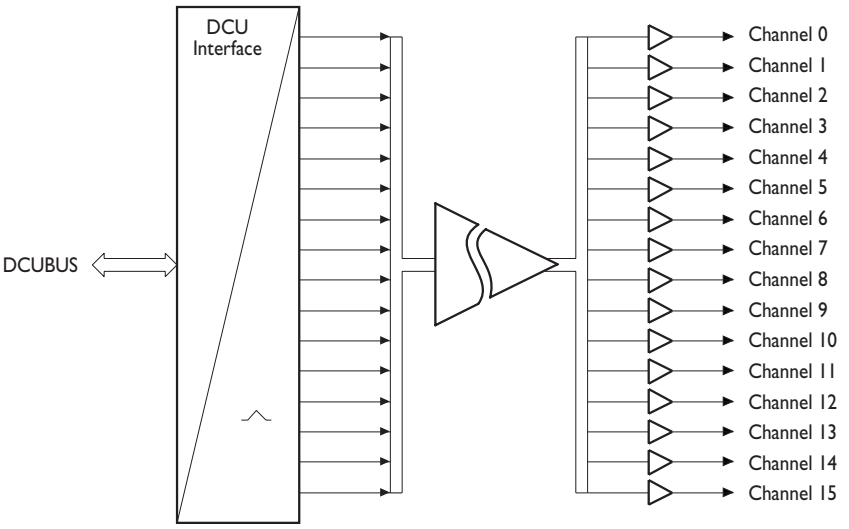
DCU-DAC

D/A Conversion Board

DCU DAC

The DCU DAC board converts the digital values from the DCU to analog voltages. These voltages can be used to control devices like dimmers, motor controllers etc. Up to 16 channels can be connected by the DCU DAC board.

Block diagram



Amazing! CONTROLS

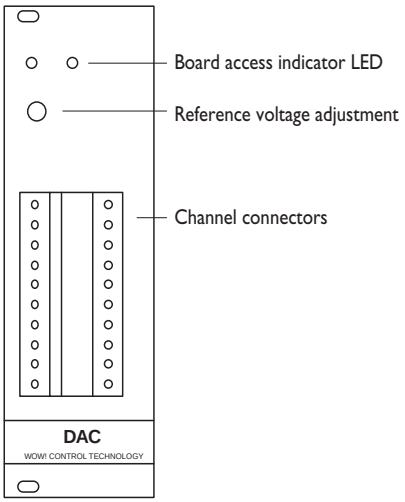
Board Description

This board provides an interface for 16 individual analog outputs ranging from 0..10V=. A galvanic isolation of approx. 2000V provides protection for the DCU system against installation failures.
For software the board looks like an array of 16 writeable unsigned 16 bit integers directly in processor memory. So an individual DAC can be set by using only one Asm Write instruction. This together with a board access time of 70 nSec provides extremely fast I/O access.

Specifications

- 0..10V= analog outputs.
- 16 Channels.
- Max. current 20mA / channel.
- 2000V galvanic isolation.
- 8 bit resolution.
- Board access indicator LED.
- Solderless external connections.
- 70 nSec access time.
- Board dimensions: 160 x 100 mm.
- Front dimensions: 8 TE x 3 HE.

Front Layout



Channel Connector Layout :

1	Ext. +12..15VDC	11	Ext.+12..15VDC
2	Channel 00	12	Channel 08
3	Channel 01	13	Channel 09
4	Channel 02	14	Channel 10
5	Channel 03	15	Channel 11
6	Channel 04	16	Channel 12
7	Channel 05	17	Channel 13
8	Channel 06	18	Channel 14
9	Channel 07	19	Channel 15
10	Ext. GND	20	Ext. GND

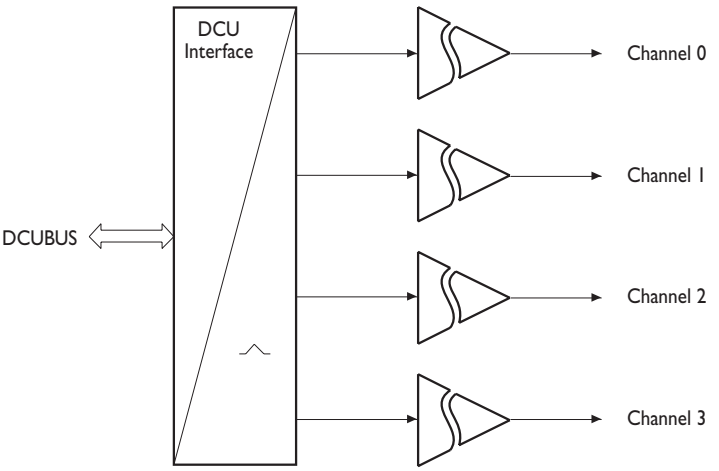
DCU-DACQ

D/A Conversion Board

DCU DACQ

The DCU DACQ board converts the digital values from the DCU to analog voltages. This board has a very high resolution so more precise voltages can be supplied on its 4 channels. With an extra security enable input for a fast system override, the board is very suitable to control servo valves, motor drives etc.

Block diagram



Amazing! CONTROLS

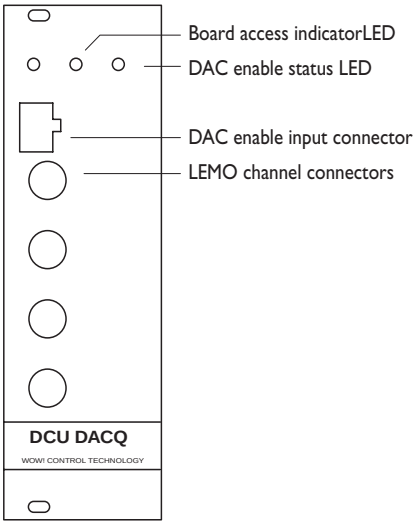
Board Description

This board provides an interface for 4 individual analog outputs ranging from -10..10V=. A galvanic isolation of 1500V RMS provides protection for the DCU system against installation failures.
For software the board looks like an array of 4 writeable 16-bit signed integers directly in processor memory. So an individual DAC can be set by using only one Asm Write instruction. This together with a board access time of 70 nSec provides extremely fast I/O access.

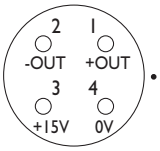
Specifications

- -10..+10V= analog outputs.
- 4 channels.
- 12 bit resolution.
- Galvanic isolated outputs, 1500V RMS, 2000V Peak.
- Integral Linearity Error (INL) ± 0.5 LSB.
- Differential Linearity Error (DNL): ± 1 LSB.
- Board access indicator LED.
- Board Enable Status LED.
- Opto isolated DAC enable input
  If this input is not high then the DACs will remain 0V.
- Board dimensions: 160 x 100 mm.
- Front dimensions: 8 TE x 3 HE.
- Optional power supply + 15 Vdc 5 mA/channel, galvanic isolated.

Front Layout



DACQ Connector Layout:



1 +Analog output
2 –Analog output
3 +15VDC (5mA)
4 Gnd (15VDC)

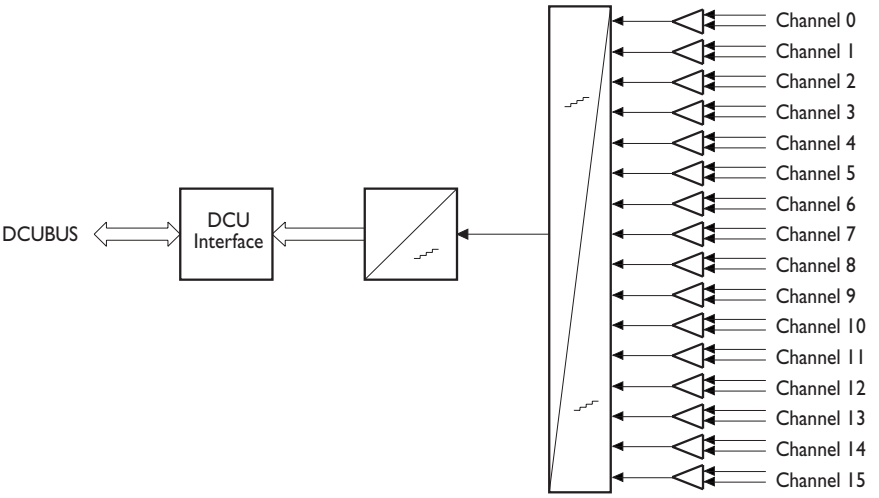
DCU-ALARM

Alarm Board

DCU Alarm

The DCU Alarm input board can read up to 16 detector devices or 16 groups of detector devices such as switches, movement & smoke detectors, fire detectors etc. The inputs are capable of detecting more than 2 different states over a 2 wire connection. Sabotage, tampering, malfunction & failures of the installation can be detected. Detectors connect their power supply lines directly to the DCU Alarm board. Power to detectors can be checked by the DCU system.

Block diagram



Amazing! CONTROLS

Board Description

The DCU Alarm board interfaces all kinds of detectors to a DCUBUS system. Normally detectors have two contacts, one alarm contact and one sabotage contact. To connect both contacts to a conventional alarm system a 6 wire cable is needed. Connecting the contacts as in fig. 1, only four wires are needed. Different states can be read like: normal functioning, alarm, tampering, sabotage open connection & sabotage shortcircuit. Each four input channels have a power supply connection which is short circuit protected. Whenever a short circuit appears, other power supply connections will not be disturbed. The DCU system detects power supply shortcuts. The DCU Alarm board needs an additional 12V dc supply for it's connected devices. Power supply from the DCUBUS is also possible but is not recommended.

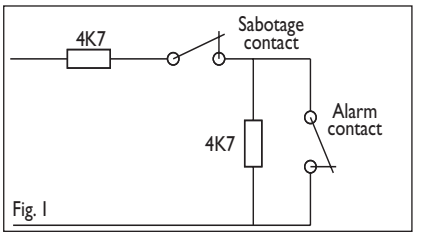
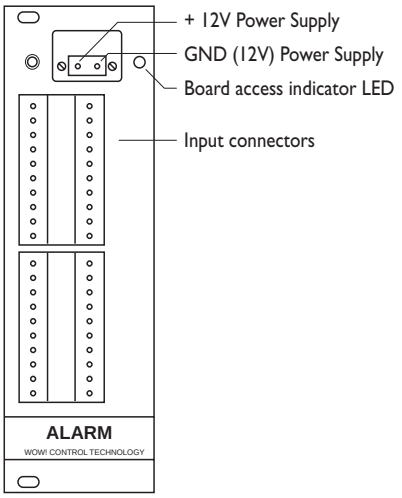


Fig. 1

Specifications

- 16 Input channels for resistance measurement
- Very low common mode current differential inputs
- Different terminating resistor values possible
- 12V - 250mA/4channels power supply
- 11 bit resolution
- Low power CMOS logic
- Fast FDCU interfacing
- Limited DCUBUS 12V power supply possibility (no external supply needed)
- Board access indicator LED
- High density 3.81mm connectors
- Board dimensions 160 x 100mm
- Front dimensions: 8 TE x 3 HE.

Front Layout



Input Connector Layout:

1	Ext. +12..15VDC	21	Ext. +12..15VDC
2,3	Channel 00	22,23	Channel 08
4,5	Channel 01	24,25	Channel 09
6,7	Channel 02	26,27	Channel 10
8,9	Channel 03	28,29	Channel 11
10	(Ext.) GND	30	(Ext.) GND
11	Ext. +12..15VDC	31	Ext. +12..15VDC
12,13	Channel 04	32,33	Channel 12
14,15	Channel 05	34,35	Channel 13
16,17	Channel 06	36,37	Channel 14
18,19	Channel 07	38,39	Channel 15
20	(Ext.) GND	40	(Ext.) GND