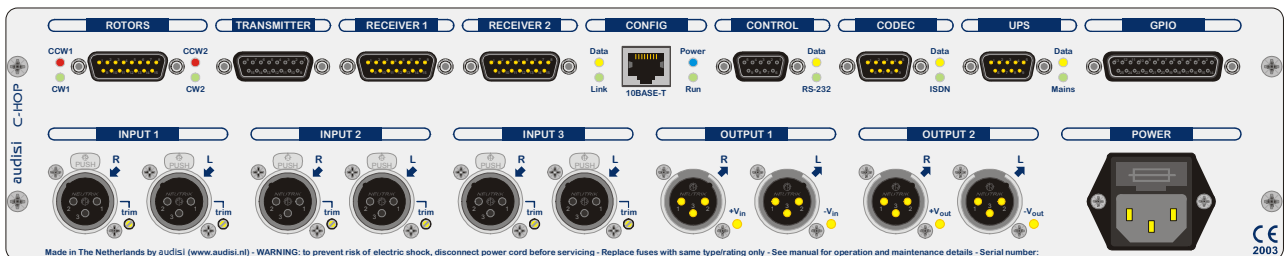
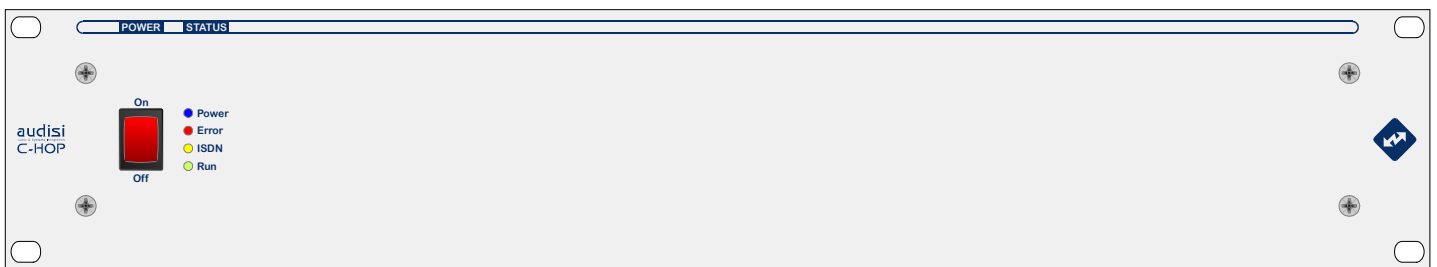


Custom hardware, Custom software and Consultancy for professional audio and systems integration

C-HOP MK-II (Controller voor HF Ontvangst Punt) Installation Manual



DOCUMENT HISTORY

Date	Version	Author	Changes
17-mar-2003	1.00	BCL	<ul style="list-style-type: none">• Initial re-design proposal
02-jun-2003	1.10	BCL	<ul style="list-style-type: none">• Connector layouts revised• Support for 2nd rotor• Support for 4..16 Rx frequencies (was: 2..4)• Support for RS-422• Improved documentation on serial ports• Software support for additional HF receivers so both contacts and RS-232 may be used at the same time (HF receivers which support addressing give the possibility of controlling a larger number of identical receivers)• Audio level trimmers moved to improve PCB layout

Specifications and design are subject to change without notice for the purpose of improvement.

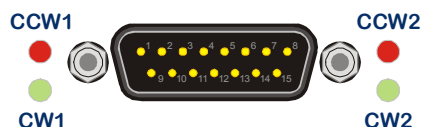
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DUAL ANTENNA ROTOR INTERFACE

ROTORS

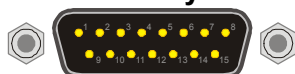


Description

Dedicated interface for controlling up to two external antenna rotors (CounterClockWise / ClockWise / brake) and measuring the antenna angle by means of a voltage which varies with the rotor's position. By default, the outputs supply a control voltage near to 9VDC (50mA maximum current). Optionally, the outputs can be fitted with opto-couplers so they can switch an external voltage (up to 30VDC, 200mW maximum dissipation).

During operation, 'CCW' and 'CW' LED indicators show in which direction the antenna is rotating.

Connector layout



Connector Pin	D-Sub 15 male (female connector on cable)		Type
1	Rotor 1 CCW +	(9VDC control voltage or opto-coupler collector)	Output
9	Rotor 1 CCW -	(DGND or opto-coupler emitter)	Output / DGND
2	Rotor 1 CW +	(9VDC control voltage or opto-coupler collector)	Output
10	Rotor 1 CW -	(DGND or opto-coupler emitter)	Output / DGND
3	Rotor 1 Brake +	(9VDC control voltage or opto-coupler collector)	Output
11	Rotor 1 Brake -	(DGND or opto-coupler emitter)	Output / DGND
4	Rotor 1 Vangle	(0..15VDC angle-linear voltage)	Input
12	Common ground	(0V minimum angle reference voltage for both rotors)	Input
5	Rotor 2 Vangle	(0..15VDC angle-linear voltage)	Input
13	Rotor 2 Brake -	(DGND or opto-coupler emitter)	Output / DGND
6	Rotor 2 Brake +	(9VDC control voltage or opto-coupler collector)	Output
14	Rotor 2 CW -	(DGND or opto-coupler emitter)	Output / DGND
7	Rotor 2 CW +	(9VDC control voltage or opto-coupler collector)	Output
15	Rotor 2 CCW -	(DGND or opto-coupler emitter)	Output / DGND
8	Rotor 2 CCW +	(9VDC control voltage or opto-coupler collector)	Output

HF TRANSMITTER INTERFACE

TRANSMITTER



Description

Dedicated interface for controlling an external HF transmitter for uplink or communications purposes. The interface supports 4 (1:1) or up to 16 channels (4-bit binary encoded), 2 (1:1) or up to 4 power levels (2-bit binary encoded) and a Push-To-Talk relay contact. Outputs are opto-couplers by default, please mind the polarity. Inputs are opto-couplers but can be switched to contact closure with internal pull-up resistor so they can be activated using an external relay or open-collector output.

Connector layout



Connector Pin	D-Sub 15 female (male connector on cable) Function	Type
1	Transmitter channel select bit 1 (opto-coupler collector, common emitter on pin 12)	Output
9	Transmitter detect (>+5VDC = connected, available)	Input
2	Transmitter channel select bit 2 (opto-coupler collector, common emitter on pin 12)	Output
10	Reserved (don't connect!)	n.c.
3	Transmitter channel select bit 3 (opto-coupler collector, common emitter on pin 12)	Output
11	Transmitter ground	GND
4	Transmitter channel select bit 4 (opto-coupler collector, common emitter on pin 12)	Output
12	Transmitter ground (connected to DGND when using contact closures)	GND / DGND
5	Transmitter power select bit 1 (opto-coupler collector, common emitter on pin 12)	Output
13	Reserved (don't connect!)	n.c.
6	Transmitter power select bit 2 (opto-coupler collector, common emitter on pin 12)	Output
14	Transmitter on (>+5VDC = transmitting)	Input
7	Transmitter Push-To-Talk (relay n.o.)	Output
15	Transmitter Push-To-Talk (relay common)	Output
8	Transmitter Push-To-Talk (relay n.c.)	Output

DUAL HF RECEIVER INTERFACE



Description

Dedicated identical interfaces for controlling a maximum of two external HF receivers and stereo decoders via dedicated contacts. Optional serial control for selected receiver types (e.g. Hecom WLR series) may add control of another pair of receivers! Outputs are opto-couplers by default, so please mind their polarity. Inputs are opto-couplers (external voltage $>+5\text{VDC}$ will activate them) but can be switched to contact closure mode with internal pull-up resistor so they can be activated using an external relay or open-collector output (please mind that using this mode may introduce earth-loops because no isolation barrier exists).

Connector layout



Connector	D-Sub 15 male (female connector on cable)		Type
Pin	Function		
1	Receiver channel select bit 1	(opto-coupler collector, common emitter on pin 12)	Output
9	Receiver detect	($>+5\text{VDC}$ = connected)	Input
2	Receiver channel select bit 2	(opto-coupler collector, common emitter on pin 12)	Output
10	Decoder detect	($>+5\text{VDC}$ = connected)	Input
3	Receiver channel select bit 3	(opto-coupler collector, common emitter on pin 12)	Output
11	Receiver RF level	(0..+15VDC, pin 12 is used as 0V reference)	ADC Input
4	Receiver channel select bit 4	(opto-coupler collector, common emitter on pin 12)	Output
12	Common ground	(for both Receiver and Decoder)	GND / DGND
5	Receiver squelch control	(opto-coupler collector, common emitter on pin 12)	Output
13	Decoder mono / stereo mode	(opto-coupler collector, common emitter on pin 12)	Output
6	Receiver remote enable	(opto-coupler collector, common emitter on pin 12)	Output
14	Decoder pilot detect	($>+5\text{VDC}$ = stereo)	Input
7	RS-232 TxD	(transmit serial data to connected receiver)	Output
15	RS-232 SG	(signal ground)	DGND
8	RS-232 RxD	(receive serial data from connected receiver)	Input

CONFIGURATION AND CONTROL

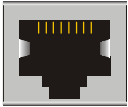


Description

System control software and configuration information is sent to the C-HOP using FTP and TCP/IP commands over a 10 Base-T Ethernet interface. It can also be used for remote control.

'Data' LED blinks as soon as data is received or transmitted using this port. 'Link' LED shows that the unit is connected to a network port. 'Power' LED shows that the power supply of the processor works ok. 'Run' LED blinks to show that the processor is up and running.

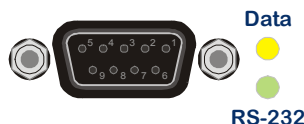
Connector layout (Standard 10 Base-T Ethernet port)



Connector	RJ-45 female (male connector on cable)	
Pin	Function	Type
1	Transmit +	Output
2	Transmit -	Output
3	Receive +	Input
6	Receive -	Input

REMOTE CONTROL

CONTROL

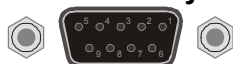


Description

Control commands and status information can be sent and received using a proprietary instruction set by means of the 10 Base-T Ethernet connector using TCP/IP or via this serial port. This serial port can be software-configured as an RS-232, RS-422 (full duplex) or RS-485 (half duplex) port. Don't forget to terminate the end of the cable with a 120 ohm resistor if the C-HOP is used in RS-422 mode or if it is the last unit on an RS-485 bus. Pins 1, 4 and 6 are interconnected on the PCB.

The 'Data' LED blinks as soon as data is received or transmitted using this port. 'RS-232' lights up if the port is configured to be used in RS-232 mode, otherwise the port is used in RS-422 / 485 mode.

Connector layout (full duplex RS-232 mode)



Connector	D-Sub 9 female (male connector on cable)		
Pin	Function		Type
2	TXD	(transmit serial data to connected device)	Output
7	CTS	(connect to pin 8 if connected device uses handshake)	Input
3	RXD	(receive serial data from connected device)	Input
8	RTS	(connect to pin 7 if connected device uses handshake)	Output
5	SG	(signal ground)	DGND

Avoid long cables (> 5 m), especially when used with higher baudrates (> 9600 baud)

Connector layout (full duplex RS-422 mode)



Connector	D-Sub 9 female (male connector on cable)		
Pin	Function		Type
2	Tx Data –	(TA)	Output
7	Rx Data –	(RB)	Input
3	Rx Data +	(RA)	Input
8	Tx Data +	(TB)	Output
5	SG	(signal ground)	DGND

May require 120 ohm termination resistor between pins 3 and 7

Connector layout (half duplex RS-485 mode)

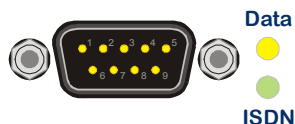


Connector	D-Sub 9 female (male connector on cable)		
Pin	Function		Type
2	Tx / Rx Data –	(interconnect to pin 8!)	Input / Output
3	Tx / Rx Data +	(interconnect to pin 7!)	Input / Output
5	SG	(signal ground)	DGND

May require 120 ohm termination resistor between pins 3 and 7 if this is the last device on the bus

ISDN CODEC CONTROL

CODEC

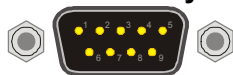


Description

Most common ISDN codecs that are used for transferring the audio and remote control data (through ancillary data) are connected to this RS-232 interface. The command set depends on the configured coded type. Please ask if your codec type can be supported by the firmware of C-HOP.

'Data' LED blinks as soon as data is received or transmitted using this port. 'ISDN' flashes if one or more B-channels of a connected codec are in use. It will light up constantly if the audio connection is framed.

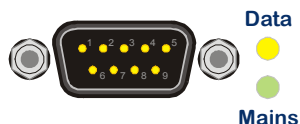
Connector layout



Connector	D-Sub 9 male (female connector on cable)	Type
Pin	Function	
1	CD (interconnected to pins 4 and 6, active)	Output
6	DSR (interconnected to pins 1 and 6, active)	Output
2	RXD (receive serial data from connected device)	Input
7	RTS (hardware handshake supported)	Output
3	TXD (transmit serial data to connected device)	Output
8	CTS (hardware handshake supported)	-
4	DTR (interconnected to pins 1 and 6, active)	Output
9	RI (not used)	n.c.
5	SG (signal ground)	DGND

If hardware handshaking is not used, interconnect pins 7 and 8 on this side of the cable only

UNINTERRUPTIBLE POWER SUPPLY

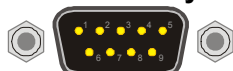


Description

The HF reception point can be supplied through a UPS. Optional, status and control information of the UPS can be requested by means of this RS-232 interface. The command set depends on the configured UPS type.

'Data' LED blinks as soon as data is received or transmitted using this port. 'Mains' LED lights up if the mains voltage is valid, otherwise the unit is running on battery power.

Connector layout



Connector Pin	D-Sub 9 male (female connector on cable) Function	Type
1	CD (interconnected to pins 4 and 6, active)	Output
6	DSR (interconnected to pins 1 and 6, active)	Output
2	RXD (receive serial data from connected device)	Input
7	RTS (hardware handshake supported)	Output
3	TXD (transmit serial data to connected device)	Output
8	CTS (hardware handshake supported)	-
4	DTR (interconnected to pins 1 and 6, active)	Output
9	RI (not used)	n.c.
5	SG (signal ground)	DGND

If hardware handshaking is not used, interconnect pins 7 and 8 on this side of the cable only

GPIO INTERFACE



Description

Fully isolated general purpose control inputs and outputs. All 4 GPI inputs have opto-couplers and will accept voltages in the range of +5VDC..+24VDC (please mind the polarity!). All 4 GPO outputs have SPDT relays able to switch various loads up to 1A @ 30VDC or 0,5A @ 48VAC.

CAUTION: Don't switch high-voltage (> 50V) signals with the relays because of limited isolation!

Connector layout



Connector Pin	D-Sub 25 female (male connector on cable) Function	Type
1	GPO output 1 (relay n.o.)	Relay
14	GPO output 1 (relay n.c.)	Relay
2	GPO output 1 (relay common)	Relay
15	GPO output (relay 2 n.o.)	Relay
3	GPO output 2 (relay n.c.)	Relay
16	GPO output 2 (relay common)	Relay
4	GPO output 3 (relay n.o.)	Relay
17	GPO output 3 (relay n.c.)	Relay
5	GPO output 3 (relay common)	Relay
18	GPO output 4 (relay n.o.)	Relay
6	GPO output 4 (relay n.c.)	Relay
19	GPO output 4 (relay common)	Relay
7	GPI input 1 (opto-coupler anode, +)	Opto-coupler
20	GPI input 1 (opto-coupler cathode, -)	Opto-coupler
8	GPI input 2 (opto-coupler anode, +)	Opto-coupler
21	GPI input 2 (opto-coupler cathode, -)	Opto-coupler
9	GPI input 3 (opto-coupler anode, +)	Opto-coupler
22	GPI input 3 (opto-coupler cathode, -)	Opto-coupler
10	GPI input 4 (opto-coupler anode, +)	Opto-coupler
23	GPI input 4 (opto-coupler cathode, -)	Opto-coupler
11, 24	Auxiliary power supply (+5VDC, 100mA maximum)	Supply
12, 25	Digital ground	DGND
13	Frame (shield)	FRAME