

Emness™ aHCN

EHS control module for household equipment

Emness Technology® designed this EHS module to provide white goods appliances with EHS capabilities and make them communicate over an EHS network. The device contains an *Emness™* implementation of version 1.3a of the EHS Specification.

In general, the electronic system of domestic appliances represents an internal network of functional modules. The modules exchange data with one another by using an internal protocol. In most cases the internal protocols are based on an existing physical serial interface, such as I2C, UART (RS-232), SPI, and so on.

In fact, the aHCN module includes two protocol stacks, one of them for internal data exchange and the second of them for the EHS communication with external Home Controllers (Feature Controllers), specially designed to control and monitor the performance of the appliance. A common application runs on top of the two protocols providing mapping between the EHS and the internal protocol according to a profile, specified by the appliance's manufacturer.

The aHCN module is directly supplied from the power line (the power line is a part of the physical layer of an EHS network).

The aHCN module is designed as Class 122 equipment, as defined into the EN 50065-1 standard.

The aHCN module can be placed in a plastic enclosure. The edge connector of the module fits into the opening of the enclosure and this is where the power line (EHS) and the appliance's internal network are connected, each of them using a different part of the connector.

Three connectors are mounted on the aHCN module's PCB. The J1 connector is to be connected to the power line (EHS Network). The J2 connector is used for the internal protocol communication. The J4 connector is intended for updating the firmware of the aHCN module. Updating the firmware requires a program named Home Control Device (HCD) Programmer (Windows application) and a programming cable. The new firmware is transferred via RS-232.

Connectors

Connector	Assignment
J1	Power line (230V AC)
J2	Internal protocol signaling SDA, SCL (I2C open-drain lines) or RXD, TXD (UART/RS-232)
J4	aHCN Firmware update (via RS-232)

J2 Pin assignment

Pin No.	Signal name
1	SDA (I2C) or RXD (UART/RS-232)
2	SCL (I2C) or TXD (UART/RS-232)
3	GND
4	+5V

LED Indications

LED	Assignment
LED1	RX (Reception of EHS packet)
LED2	TX (Transmission of EHS packet)
LED3	Firmware dependent
LED4	Power ON

Specifications

- **Construction of control**
Embedded control, electronic
- **Software Class and Structure**
Software Class A
- **Overvoltage Category II**
- **Mains transient voltage**
2.5 kV
- **Pollution Degree 2**
- **Temperature for the ball pressure test**
+125°C
- **Equipment Class according EN 50065-1**
Class 122
- **Equipment Type according EN 50065-7**
Type 2
- **AC Power supply input**

Mains voltage	220 – 240V AC
Mains frequency	50 - 60Hz
AC input connector	Designated as J1 on PCB
AC input currents, $V_{in} = 230V$ AC	
aHCN in Idle mode	$I_{in} = 0.013A_{(RMS)}$
aHCN in Receive mode	$I_{in} = 0.018A_{(RMS)}$
aHCN in Transmit mode	$I_{in} = 0.025A_{(RMS)}$, $I_{in} = 0.198A_{(P-P)}$
- **EHS Communication - Physical layer**

Physical layer chipset	ST7538, EN 50065 compatible Power-line FSK transceiver
Bit rate	2400 bps
Modulation	Frequency Shift Keying with 132.5KHz carrier frequency
Coupling to power line	Isolating signal transformer
Transmission output level	114.6dBuV (no load), measured with pick detector according to EN 50065-1



- **EHS Communication – Performance**

Message Error Rate (MER)	0 errors / 1000 messages (without additional load)
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- **EHS Communication – Protocol stack**

Home System Specification	EHS v1.3a, release 1
EHS Command blocking	none
EHS MAC Individual addresses list capacity	1
EHS link address size	1 byte
EHS buffer size	80 bytes
Maximum data length in a Command-language command	16 bytes
EHS Max LLC retries	3
EHS Max NAK retries	3
Application Title Directory (ATD)	ATD residing in EEPROM and RAM
Permanent links to EHS Stations	up to 10
Permanent links to EHS Groups	up to 10
Permanent links to Remote Subunits	up to 20
Duration of HA Acquisition	2 minutes
EHS/Power supply connector	Designated as J1 on PCB

- **Supported physical interfaces for appliance's internal protocol**

I2C, UART (TTL/CMOS signaling); RS-232

Other standard or custom interfaces are available upon request (contact Emness)

- **aHCN - Firmware update interface**

Interface type	RS-232
Equipment type	DCE
Protocol	Asynchronous (Emness™)
Bit rate	9600 bps
Data bits	8
Parity	none
Stop bits	1
Flow control	none
Connector	Designated as J4 on PCB

- **Ambient temperature**

Maximum temperature	+40°C
Minimum temperature	+5°C



- **Storage temperature**
 - Maximum temperature +85°C
 - Minimum temperature -30°C

- **Dimensions**
 - Width 54mm
 - Length 105mm
 - Height 20mm
 - Max component height on PCB's top side 16mm
 - Max component height on PCB's bottom side 2.5mm

- **Weight** 70g

Due to technical progress, all designs, specifications and components are subject to change without notice.
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