



CANLink® CL-446-100 Module

Master I/O Module w/ Software Configurable Inputs

20 Inputs and 8 Outputs including:

- (10) Inputs software configurable as switch to battery, switch to ground or 12-bit analog (0-5.5VDC).
- (4) Inputs software configurable as switch to battery, switch to ground or 12-bit analog (0-11.0VDC).
- (4) Inputs software configurable as switch to battery, switch to ground, 12-bit analog (0-5.5VDC) or RTD (1K ohm)
- (2) Inputs software configurable as switch to battery, switch to ground, 12-bit analog (0-5.5VDC), frequency, PWM or Quadrature Encoder
 - Frequency max is 10KHz at 50% duty cycle
- (8) 2A PWM outputs with estimated current feedback
 - or 2.5A digital outputs (software configurable as PWM or Digital)
- (1) 5VDC Regulated Sensor Supply (500mA)
- (2) J1939 CAN ports
- (1) USB port (for interfacing to HED® Orchestra™ software tools)

The CL-446 is a solid-state microprocessor based module and member of the HED® CANLink® multiplexed control family. Delivered in a Deutsch enclosure, this unit provides a high density and flexible I/O count in a compact and economical package.

The CL-446 is designed for use as a multi-purpose stand alone unit or as a master controller or I/O module in a distributed system.

The HED® CL-446 can be programmed using HED®'s do-it-yourself CANLink® Composer™ programming tool or directly by HED® engineering, and is designed for use with the CANLink® Conductor™ software tool for diagnostics and field troubleshooting.

Specifications

Enclosure:	Deutsch EEC-5X650 enclosure with 48-pin receptacle.
Mating Connectors: Deutsch	DT06-12SA DT06-12SB DT06-12SC DT06-12SD W12S (wedge) – one per connector required 0462-201-16141 16AWG sockets 114017 Sealing Plugs – Unused pins are required to be sealed to maintain module sealing
Operating Voltage Range:	8-32 VDC
Operating Temperature:	-40°C to 70°C
Storage Temperature:	-40°C to 85°C
IP Rating:	IP67
PC Boards:	The printed circuit boards are designed for high EMI/RFI protection. The boards are conformal coated with a silicone coating for further water/moisture protection. All inputs and outputs are protected against shorts to Battery(+) or Battery(-). 100% of the boards are functionally tested before shipment.



Hydro Electronic Devices, Inc.

Specifications

Connector A		Connector C		Connector D		Connector B	
Pin	Function	Pin	Function	Pin	Function	Pin	Function
1	Input #1 STB/STG/VTD/RTD ²	1	BAT(+) Outputs 1-4 / Input #22 Battery Voltage	1	CAN2-L	1	Input #9 STB/STG/VTD
2	Input #2 STB/STG/VTD/RTD ²	2	Output #1 DOUT+(2.5A) / PWM/ECC+(2A)	2	CAN2-H	2	Input #10 STB/STG/VTD
3	Input #3 STB/STG/VTD/RTD ²	3	Output #2 DOUT+(2.5A) / PWM/ECC+(2A)	3	No Connect	3	Input #11 STB/STG/VTD
4	Input #4 STB/STG/VTD/RTD ²	4	Output #3 DOUT+(2.5A) / PWM/ECC+(2A)	4	No Connect	4	Input #12 STB/STG/VTD
5	BAT(+) Module / Input #25 Battery Voltage	5	Output #4 DOUT+(2.5A) / PWM/ECC+(2A)	5	USB (Power) ³	5	Input #13 STB/STG/VTD ¹
6	BAT(-) Module	6	5VDC Sensor Supply (500mA) / Input #21 Sensor Supply	6	USB (Gnd)	6	Input #14 STB/STG/VTD ¹
7	CAN1-L	7	5VDC Sensor Supply Ground	7	USB (DP)	7	Input #15 STB/STG/VTD ¹
8	CAN1-H	8	Output #5 DOUT+(2.5A) / PWM/ECC+(2A)	8	USB (DM)	8	Input #16 STB/STG/VTD ¹
9	Input #5 STB/STG/VTD	9	Output #6 DOUT+(2.5A) / PWM/ECC+(2A)	9	No Connect	9	Input #17 STB/STG/VTD
10	Input #6 STB/STG/VTD	10	Output #7 DOUT+(2.5A) / PWM/ECC+(2A)	10	No Connect	10	Input #18 STB/STG/VTD
11	Input #7 STB/STG/VTD/FREQ/PWM/Encoder(1A) ⁵	11	Output #8 DOUT+(2.5A) / PWM/ECC+(2A)	11	No Connect	11	Input #19 STB/STG/VTD
12	Input #8 STB/STG/VTD/FREQ/PWM/Encoder(1B) ⁵	12	BAT(+) Outputs 5-8 / Input #23 Battery Voltage	12	Unswitched Battery(+) ⁴ / Input #24 Battery Voltage	12	Input #20 STB/STG/VTD

Note: Above pinout is for part number CL-446-100. Different I/O combinations are available. Additional part number data sheets available on HED® website.

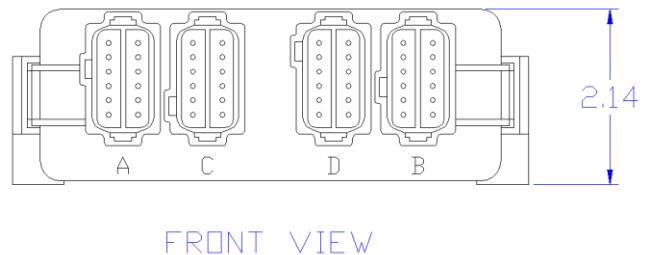
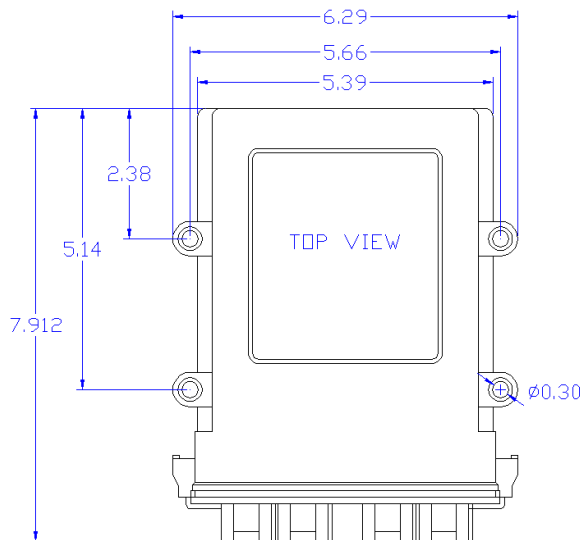
Note 1: VTD inputs on pins B5-B8 have range of 0-11.0VDC. All other VTD inputs on this module are 0-5.5VDC.

Note 2: RTD ranges are 0-1K ohm.

Note 3: USB cable utilized is required to have a wire between USB connector Pin 1 and this USB(Power) pin on the HED module.

Note 4: Unswitched vehicle battery must be connected to properly store data to EEPROM when module configured as master module. Module will draw max of 200 micro amps (12V) and 400 micro amps (24V) after turning itself off.

Note 5: Early versions of Composer™ require input to be configured as Pulse Counter when using Encoder input feature. If Composer does not show Encoder as available option to configure input, select one of Encoder pins to be Pulse Counter and this will configure two paired inputs as Encoder. Second pin does not need to be configured as anything, but can be configured as FREQ if application also requires the frequency of the Encoder. Both A & B signals from Encoder are required to be connected to pins 1A and 1B.



Information contained on this sheet is accurate at the time of printing. HED, Inc. reserves the right to change specifications without notice.

2120 Constitution Avenue, Hartford WI 53027 USA
 Tel: 800 398-2224 Fax: 262 673-9455
 e-mail: info@hedonline.com Web: www.hedonline.com

CANLink® CL-446-101 Module Client Module w/ Software Configurable Inputs



The CL-446 is a solid-state microprocessor based module and member of the HED® CANLink® multiplexed control family. Delivered in a Deutsch enclosure, this unit provides a high density and flexible I/O count in a compact and economical package.

The CL-446 is designed for use as a multi-purpose stand alone unit or as a master controller or I/O module in a distributed system.

The HED® CL-446 can be programmed using HED®'s do-it-yourself CANLink® Composer™ programming tool or directly by HED® engineering, and is designed for use with the CANLink® Conductor™ software tool for diagnostics and field troubleshooting.

16 Inputs and 8 Outputs including:

- (6) Inputs software configurable as switch to battery, switch to ground or 12-bit analog (0-5.5VDC).
- (4) Inputs software configurable as switch to battery, switch to ground or 12-bit analog (0-11.0VDC).
- (4) Inputs software configurable as switch to battery, switch to ground, 12-bit analog (0-5.5VDC) or RTD (1K ohm)
- (2) Inputs software configurable as switch to battery, switch to ground, 12-bit analog (0-5.5VDC) or frequency
 - Frequency max is 10KHz at 50% duty cycle
- (4) Harness code* inputs
- (8) 2A PWM outputs with estimated current feedback
 - or 2.5A digital outputs (software configurable as PWM or Digital)
- (1) 5VDC Regulated Sensor Supply (500mA)
- (2) J1939 CAN ports
- (1) USB port (for interfacing to HED® Orchestra™ software tools)

Specifications

Enclosure:	Deutsch EEC-5X650 enclosure with 48-pin receptacle.
Mating Connectors: Deutsch	DT06-12SA DT06-12SB DT06-12SC DT06-12SD W12S (wedge) – one per connector required 0462-201-16141 16AWG sockets 114017 Sealing Plugs – Unused pins are required to be sealed to maintain module sealing
Operating Voltage Range:	8-32 VDC
Operating Temperature:	-40°C to 70°C
Storage Temperature:	-40°C to 85°C
IP Rating:	IP67
PC Boards:	The printed circuit boards are designed for high EMI/RFI protection. The boards are conformal coated with a silicone coating for further water/moisture protection. All inputs and outputs are protected against shorts to Battery(+) or Battery(-). 100% of the boards are functionally tested before shipment. * Harness codes are switch to ground inputs used to identify I/O module location and function to the master controller

Connector A		Connector C		Connector D		Connector B	
Pin	Function	Pin	Function	Pin	Function	Pin	Function
1	Input #1 STB/STG/VTD/RTD ²	1	BAT(+) Outputs 1-4 / Input #18 Battery Voltage	1	CAN2-L	1	Input #9 STB/STG/VTD
2	Input #2 STB/STG/VTD/RTD ²	2	Output #1 DOUT+(+)(2.5A) / PWM/ECC(+)(2A)	2	CAN2-H	2	Input #10 STB/STG/VTD
3	Input #3 STB/STG/VTD/RTD ²	3	Output #2 DOUT+(+)(2.5A) / PWM/ECC(+)(2A)	3	No Connect	3	Input #11 STB/STG/VTD
4	Input #4 STB/STG/VTD/RTD ²	4	Output #3 DOUT+(+)(2.5A) / PWM/ECC(+)(2A)	4	No Connect	4	Input #12 STB/STG/VTD
5	BAT(+) Module / Input #21 Battery Voltage	5	Output #4 DOUT+(+)(2.5A) / PWM/ECC(+)(2A)	5	USB (Power) ³	5	Input #13 STB/STG/VTD ¹
6	BAT(-) Module	6	5VDC Sensor Supply (500mA) / Input #17 Sensor Supply	6	USB (Gnd)	6	Input #14 STB/STG/VTD ¹
7	CAN1-L	7	5VDC Sensor Supply Ground	7	USB (DP)	7	Input #15 STB/STG/VTD ¹
8	CAN1-H	8	Output #5 DOUT+(+)(2.5A) / PWM/ECC(+)(2A)	8	USB (DM)	8	Input #16 STB/STG/VTD ¹
9	Input #5 STB/STG/VTD	9	Output #6 DOUT+(+)(2.5A) / PWM/ECC(+)(2A)	9	No Connect	9	HID #1
10	Input #6 STB/STG/VTD	10	Output #7 DOUT+(+)(2.5A) / PWM/ECC(+)(2A)	10	No Connect	10	HID #2
11	Input #7 STB/STG/VTD/FREQ	11	Output #8 DOUT+(+)(2.5A) / PWM/ECC(+)(2A)	11	No Connect	11	HID #3
12	Input #8 STB/STG/VTD/FREQ	12	BAT(+) Outputs 5-8 / Input #19 Battery Voltage	12	Unswitched Battery(+) ⁴ / Input #20 Battery Voltage	12	HID #4

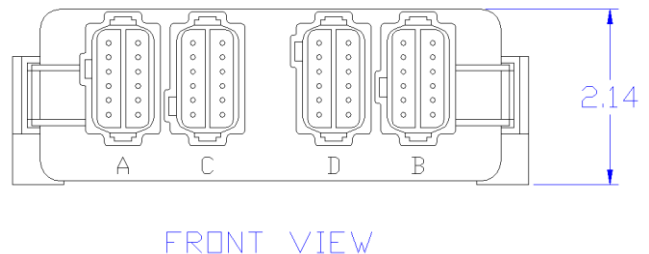
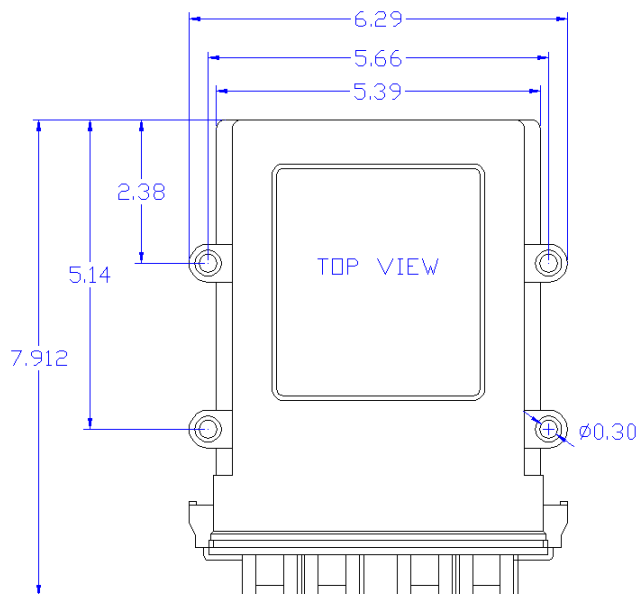
Note: Above pinout is for part number CL-446-101. Different I/O combinations are available. Additional part number data sheets available on HED® website.

Note 1: VTD inputs on pins B5-B8 have range of 0-11.0VDC. All other VTD inputs on this module are 0-5.5VDC.

Note 2: RTD ranges are 0-1K ohm.

Note 3: USB cable utilized is required to have a wire between USB connector Pin 1 and this USB(Power) pin on the HED module.

Note 4: Unswitched vehicle battery must be connected to properly store data to EEPROM when module configured as master module. Module will draw max of 200 micro amps (12V) and 400 micro amps (24V) after turning itself off.



CANLink[®] CL-451-100-XX Module

CL-451-100-10 : CANLink Master I/O

CL-451-100-20 : CANLink Client I/O

CL-451-100-30 : J1939 Client I/O



Up to 17 Inputs or 16 Outputs (17 total I/O):

- Powerful 32-bit processor
- Programmable using Presto™ tool. Ladder Logic not supported.
- (4) pins software configurable as PWM outputs with estimated current feedback (up to 3A)¹, or switch to battery or switch to ground input
- (3) pins software configurable as PWM outputs with estimated current feedback (up to 3A)¹, or switch to battery, switch to ground or 10-bit analog input
- (1) pin software configurable as PWM output with estimated current feedback (up to 3A)¹, or switch to battery, switch to ground, 10-bit analog or frequency input
 - Analog range is 0-5.5VDC. Other ranges are possible, but are set at HED. Contact HED for info.
- (8) pins software configurable as PWM outputs with estimated current feedback (up to 3A)¹ or switch to battery input or switch to ground input
 - All 8 pins must be configured to same I/O type. Either all as Outputs, all as STB Inputs, or all as STG Inputs
- (1) software configurable switch to battery or 10-bit analog input
- Client Harness Codes* are set in EEPROM. Default is 0x0F (15)
 - Harness Code can be changed with CAN message (see page 2)
- (1) J1939 CAN port

The CL-451 is a solid-state microprocessor based module and member of the HED[®] CANLink[®] multiplexed control family. Delivered in a Deutsch enclosure, this unit provides a high density I/O count in a compact and economical package.

Designed for use as a stand alone unit or as part of a distributed system.

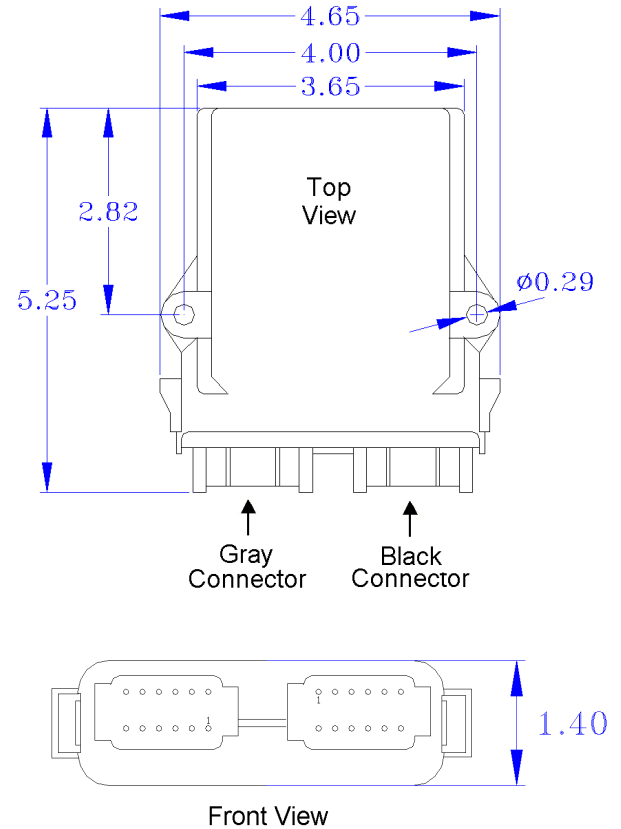
The HED[®] CL-451 can be programmed using HED[®]'s do-it-yourself CANLink[®] Composer™ programming tool or directly by HED[®] engineering, and is designed for use with the CANLink[®] Conductor™ software tool for diagnostics and field troubleshooting.

Specifications

Enclosure:	Deutsch standard EEC-325x4 PCB enclosure
Mating Connectors: Deutsch	DTM06-12SA DTM06-12SB WM-12S (wedge) – Two needed (one per connector) 0462-201-20141 20AWG sockets 0413-204-2005 Sealing Plugs – Unused pins are required to be sealed to maintain module sealing
Operating Voltage Range:	8-32 VDC
Operating Temperature:	-40°C to 70°C
Storage Temperature:	-40°C to 85°C
IP Rating:	IP67
PC Boards:	The printed circuit boards are designed for high EMI/RFI protection. The boards are conformal coated with a silicone coating for further water/moisture protection. All inputs and outputs are protected against shorts to Battery(+) or Battery(-). 100% of the boards are functionally tested before shipment. * Harness Codes are used to identify I/O module location and function to the master controller.

CL-451-100-XX Module

DTM13-12PA (Gray) or -12PC (Green)		DTM13-12PB (Black) or -12PD (Brown)	
Pin	Function	Pin	Function
1	Input #1 STB/STG/ Output #1 DOOUT(+)/PWM(+)/ECC ^{1,2}	1	Input #9 STB/STG/ Output #9 DOOUT(+)/PWM(+)/ECC ^{1,2}
2	Input #2 STB/STG/ Output #2 DOOUT(+)/PWM(+)/ECC ^{1,2}	2	Input #10 STB/STG/ Output #10 DOOUT(+)/PWM(+)/ECC ^{1,2}
3	Input #3 STB/STG/VTD/ Output #3 DOOUT(+)/PWM(+)/ECC ^{1,2}	3	Input #11 STB/STG/VTD/FREQ/ Output #11 DOOUT(+)/PWM(+)/ECC ^{1,2}
4	Input #4 STB/STG/VTD/ Output #4 DOOUT(+)/PWM(+)/ECC ^{1,2}	4	Input #12 STB/STG/VTD/ Output #12 DOOUT(+)/PWM(+)/ECC ^{1,2}
5	Input #5 STB/STG/ ³ Output #5 DOOUT(+)/PWM(+)/ECC ^{1,2}	5	Input #13 STB/STG/ ³ Output #13 DOOUT(+)/PWM(+)/ECC ^{1,2}
6	Input #6 STB/STG/ ³ Output #6 DOOUT(+)/PWM(+)/ECC ^{1,2}	6	Input #14 STB/STG/ ³ Output #14 DOOUT(+)/PWM(+)/ECC ^{1,2}
7	Input #7 STB/STG/ ³ Output #7 DOOUT(+)/PWM(+)/ECC ^{1,2}	7	Input #15 STB/STG/ ³ Output #15 DOOUT(+)/PWM(+)/ECC ^{1,2}
8	Input #8 STB/STG/ ³ Output #8 DOOUT(+)/PWM(+)/ECC ^{1,2}	8	Input #16 STB/STG/ ³ Output #16 DOOUT(+)/PWM(+)/ECC ^{1,2}
9	CAN1-L	9	Input #17 STB/VTD
10	CAN1-H	10	Switched BAT(+) Input #18 Battery Voltage
11	BAT(-) Module ⁵	11	BAT(-) Module ⁵
12	Unswitched BAT(+) Module ⁴ and Outputs 1-8	12	BAT(+) Outputs 9-16



Note: Different I/O combinations are available. Please refer to specific CL-451-1XX-XX data sheet for I/O number designations for use within Composer™. Data sheets available on HED® website.

1) Quad FET devices are used, so output current is limited in groups of 4 output pins. If only 1 of 4 outputs is active, max current is 3.0A in PWM and Digital mode. If all 4 outputs are active, max current per output is limited to 1.5A in PWM mode and 2.0A in Digital mode. PWM mode assumes 250Hz. Output current may be increased per channel up to individual max current of 3.0A if not all channels are active simultaneously or other channels are at a reduced current. Please contact HED if further information is needed. Output pin groups are A1-A4, A5-A8, B1-B4, B5-B8. It is strongly recommended to level the total output current across each of the groups as much as possible for best thermal performance.

2) Module output current capacity is limited to 10A total for each 8 outputs combined on each A and B connector. Output current total for outputs 1-8 is 10A and outputs 9-16 is 10A.

3) These 8 pins must have all I/O assigned in as same I/O type. Either all as Outputs, all as STB Inputs, or all as STG Inputs.

4) Unswitched vehicle battery must be connected to properly store data to EEPROM when module is configured as a master module. Module will draw less than 1mA after turning itself off. This feature is only available on versions of this module that are Master Module capable.

5) Battery (-) must be connected to both BAT(-) Module pins of module for outputs to function properly.

Setting Harness Code in EEPROM:

- Transmit the following message to change Harness Code.
 - KK = old Harness Code
 - HH = new Harness Code
 - MMMM = Module ID = 0x00FE (254)

00EF0002	MM	MM	KK	00	84	00	00	HH
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To verify new Harness Code has been set:

2. Cycle power to module.

- Below message is sent by module on power-up.
 - HH = new Harness Code

00EF0001	--	--	--	HH	--	--	--	--
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