CL-715/716 Product Family Specification

PFS-CL715_x716-A0

6/26/2026

CL-715
12 inch display

CL-716
15 inch display

USING THIS DOCUMENT

The specifications contained herein represent all possible configurations for this product family. The actual configurations available on each module may be a subset of this specification. Please refer to the module-specific datasheet for the connector pinout and configurations that are available.

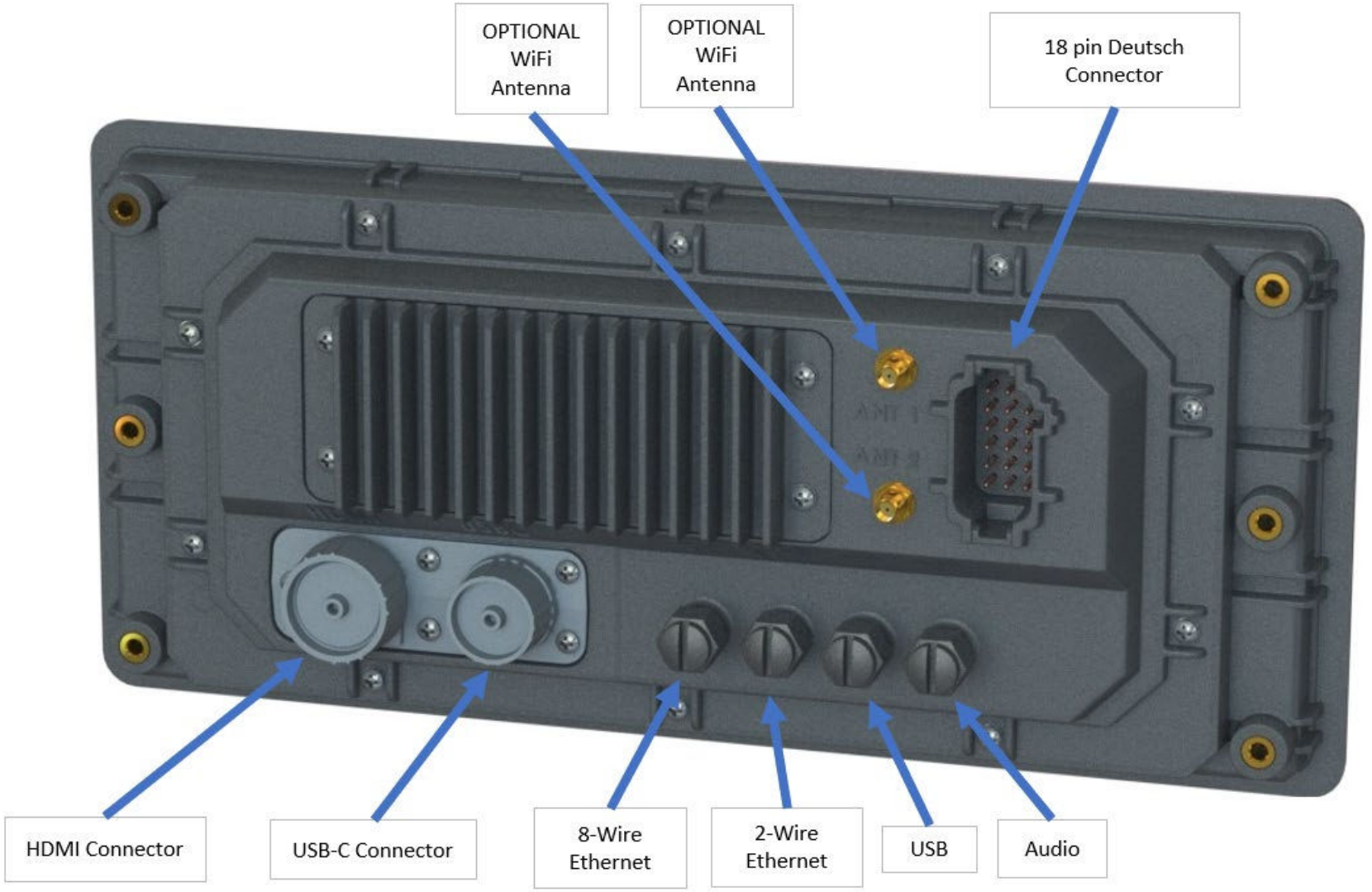
Telephone: (800) 398-2224

USER LIABILITY

The OEM of a machine or vehicle in which HED® electronic controls are installed is fully responsible for all consequences that might occur. HED®, and any authorized distributor, has no responsibility for any consequences, direct or indirect, caused by failures or malfunctions. Failure or improper selection or improper use of HED® products can cause death, personal injury and property damage.

The OEM must analyze all aspects of their application and review the information concerning product or system in the current product documentation. Due to the variety of operating conditions and applications for these products or systems, the user, through its own analysis and testing, is solely responsible for making the final selection of the products and systems and assuring that all performance, safety and warning requirements of the application are met.

The products described herein, including without limitation, product features, specifications, designs, availability and pricing, are subject to change by HED® at any time without notice.


OPTIONAL WiFi Antenna
OPTIONAL WiFi Antenna
18 pin Deutsch Connector
HDMI Connector
USB-C Connector
8-Wire Ethernet
2-Wire Ethernet
USB
Audio

Connector A - 18pin Deutsch	
Pin 1	CAN1-H
Pin 2	CAN1-L
Pin 3	CAN2-H
Pin 4	CAN2-L
Pin 5	Battery (-)
Pin 6	*Battery (+) AND Battery Voltage Measurement*
Pin 7	CAN3-H
Pin 8	CAN3-L
Pin 9	CAN4-H
Pin 10	CAN4-L
Pin 11	STB Wake-up (Key Switch ON/OFF)
Pin 12	Input STB/STG/VTD
Pin 13	Sourcing Output (Switch to Battery) 3A
Pin 14	Sourcing Output (Switch to Battery) 3A
Pin 15	Input STB/STG/VTD
Pin 16	Input STB/STG/VTD
Pin 17	Input STB/STG/VTD
Pin 18	Input STB/STG/VTD

2-Wire (4-Pin) - M12 - Ethernet; Key "D"	
Pin 1	ETH_TXP_PIN1
Pin 2	ETH_RXP_PIN2
Pin 3	No Connect
Pin 4	No Connect

8-Wire - M12 - Ethernet; Key "A"	
Pin 1	ETH_TXP_PIN1
Pin 2	ETH_RXP_PIN2
Pin 3	ETH_TXN_PIN3
Pin 4	ETH_RXN_PIN4
Pin 5	ETH_TXN_PIN5
Pin 6	ETH_RXN_PIN6
Pin 7	ETH_TXN_PIN7
Pin 8	ETH_RXN_PIN8

USB 2.0 w/o OTG Pin (M12, 4-Pin); Key "A"	
Pin 1	USB_VBUS
Pin 2	USB_DM
Pin 3	USB_DP
Pin 4	USB_GND

Audio (M12, 4-Pin); Key "B"	
Pin 1	Left
Pin 2	Right
Pin 3	Mic
Pin 4	Ground

INPUT STB/STG/VTD (18 PIN DEUTSCH PINS 12,15,16,17,18)

Switch-to-Battery (STB) Mode

Input Resistance
- 1.4KΩ (typical)

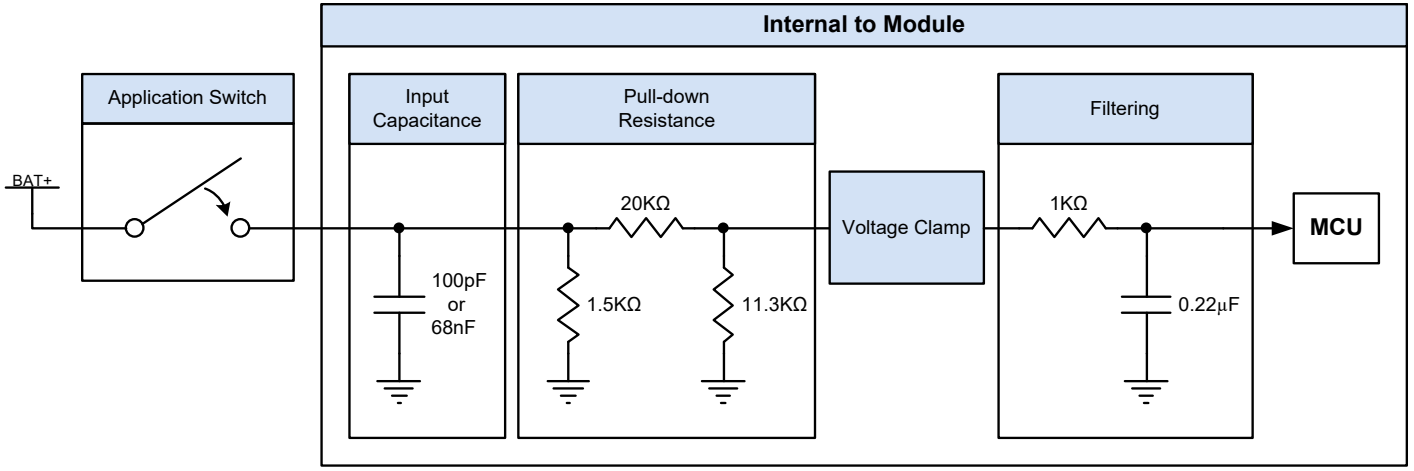
Input Current
- 5.7mA at 8V (typical)
- 22.9mA at 32V (typical)

Positive Going Threshold
- > 6.5V

Negative Going Threshold
- < 2.5V

Parallel Resistance
- 6.0KΩ at 8V (minimum)
- 28.1KΩ at 32V (minimum)

Series Resistance
- 220Ω (maximum)



Switch-to-Ground (STG) Mode

Pull-up Resistance
- 330Ω (typical)

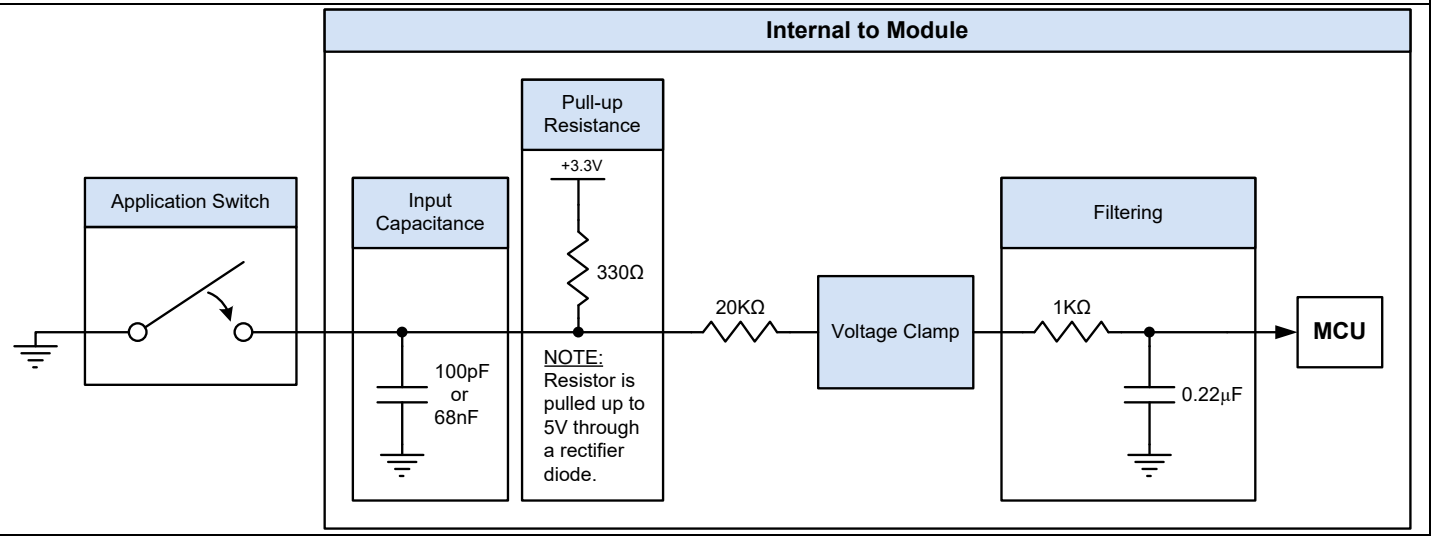
Input Current
- 9.3mA at 0V (typical)

Positive Going Threshold
- > 2.7V

Negative Going Threshold
- < 0.95V

Parallel Resistance
- 2KΩ at 0V (minimum)

Series Resistance
- 150Ω (maximum)



NOTE: If an input configured to STG is used in an abnormal condition where it is connected to battery voltage, the input will not read as designed and may require power cycle to resume function.

INPUT STB/STG/VTD (18 PIN DEUTSCH PINS 12,15,16,17,18)

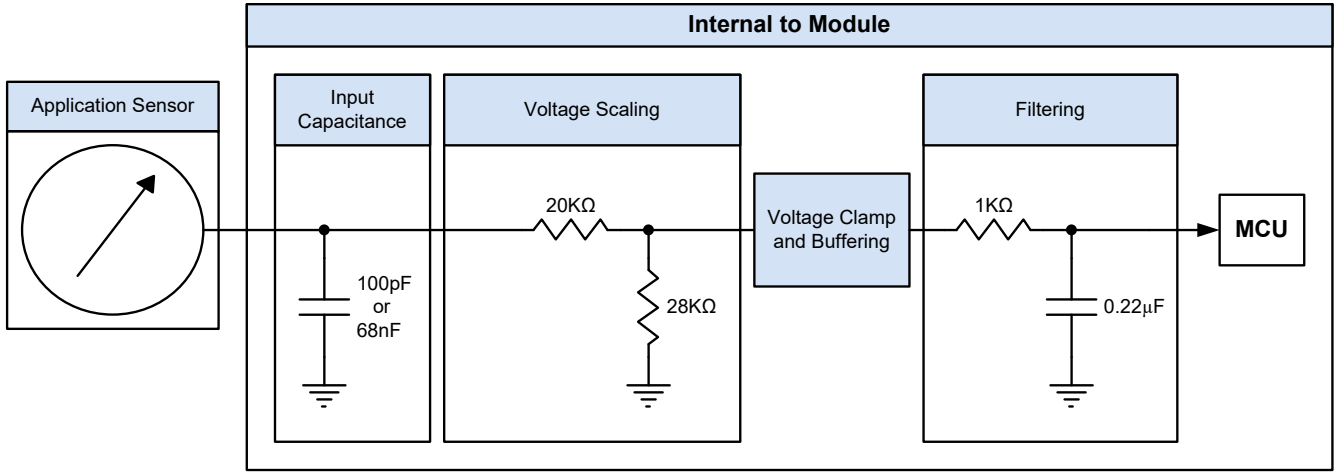
Voltage-to-Digital (VTD) Mode (0 – 5.5VDC)

Input Voltage Range
- 0V to 5.30V (minimum)
- 0V to 5.65V (typical)

Input Resistance
- 48KΩ (typical)

Resolution
- 12 Bits
- 1.22mV / count (typical)

Accuracy[1]
- ±1.0% and ±50mV (T_A = 25°C)
- ±3.0% and ±75mV (T_A = full)



STB WAKE-UP (18 PIN DEUTSCH PIN 11)

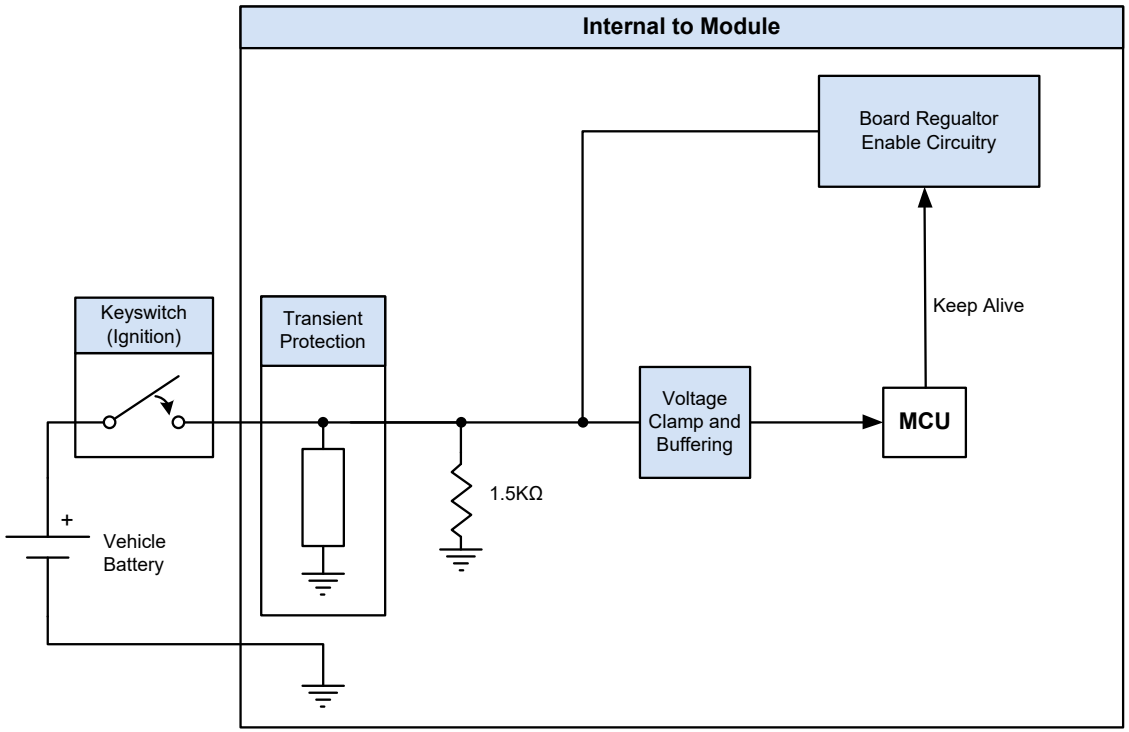
Wake-Up Mode

Operating Voltage Range
- 8.0VDC – 32VDC

Maximum Continuous Voltage(1)
- 36VDC

Wake-Up Source
- Software Configurable (RTC Wakeup)
- Use STB for wake-up

Wake-Up / Shutdown
- Input transition from inactive to active will wake module from low power / sleep mode
- Input transition from active to inactive will begin controlled shutdown sequence and place module in low power / sleep mode



(1) Exposure to maximum voltages for extended periods may affect device reliability.

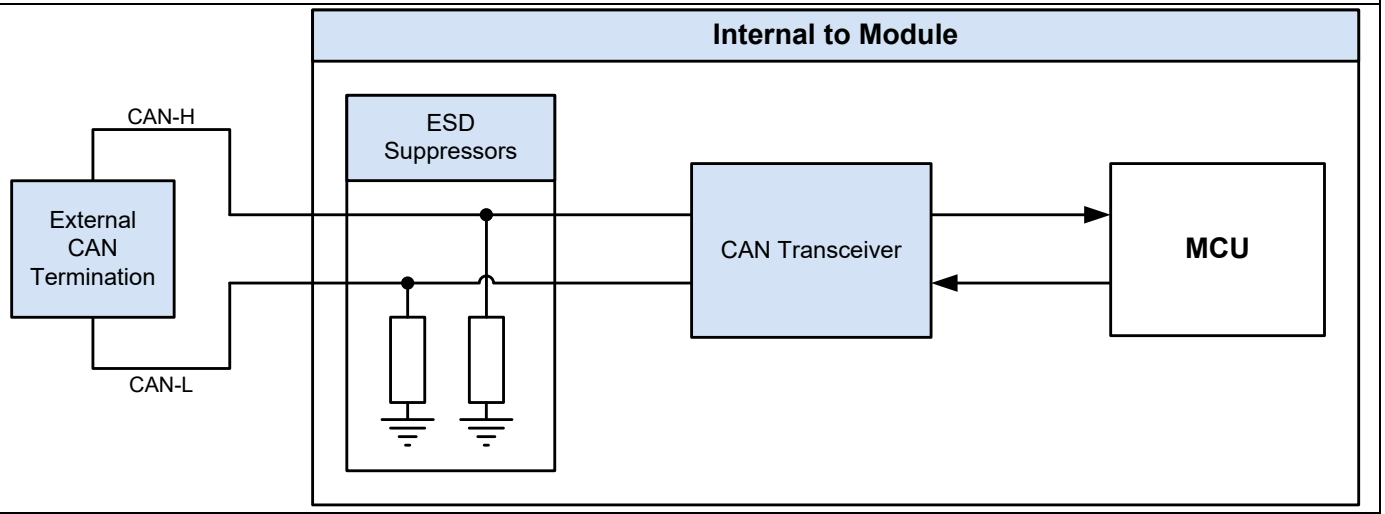
CAN COMMUNICATION (18 PIN DEUTSCH PINS 1/2, 3/4, 7/8, 9/10)

Baud Rate
- Up to 1Mbps

Maximum Allowable Voltage
- -58V to +58V

Input Capacitance (max)
- 26pF (f = 1MHz)

No Internal Termination



Maximum allowable voltage defines the voltage extremes that the transceiver can tolerate. Exposure to these voltages for extended periods may affect device reliability.

OUTPUT DOUT(+)/PWM(+)/ECC(+) (18 PIN DEUTSCH PINS 13,14)

Individual Output Current [1]
- Digital Mode = 2.5A (maximum)
- PWM Mode = 2.0A (maximum)

PWM Frequency[3]
- < 100 Hz (typical)
- < 300Hz (maximum)

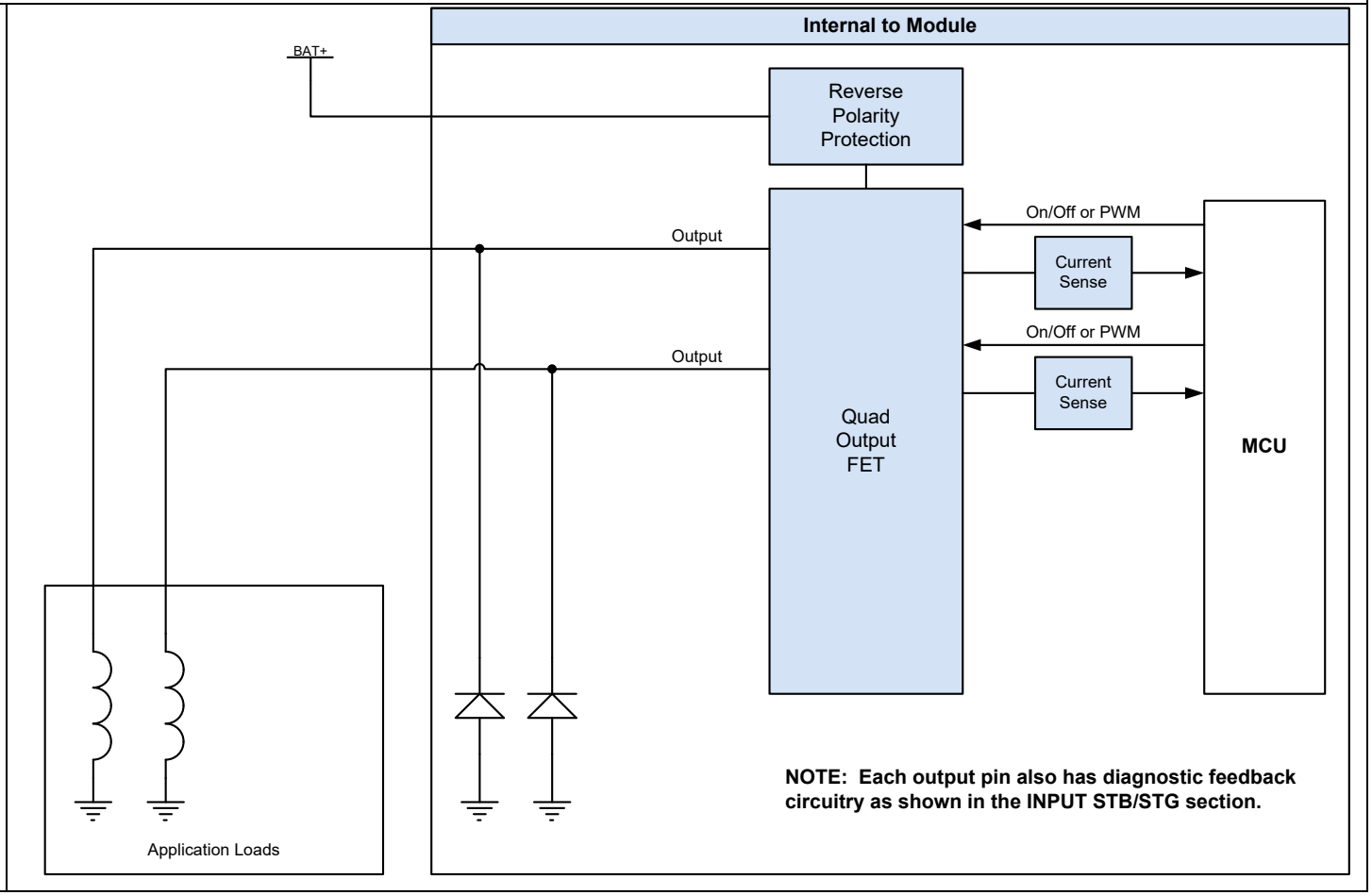
Output Diagnostics
- Short to Battery
- Short to Ground
- Overcurrent
- Open Circuit[4]

Current Sense Range
- Up to 3.6A max

Current Sense Resolution
- 12 bits
- 1.2mA / count (typical)

Current Sense Accuracy (typical)
- < 150mA at 2A, T_A = 25°C

Internal Flyback Diodes



(1) Individual Output Current specifies the maximum current for an individual output channel. Additional restrictions regarding total output current, number of active channels, etc. will apply and are specified in the Grouped Output Current parameter. PWM outputs assume 250Hz frequency.

(2) Output current maximums assume all four channels are active simultaneously and the module is at maximum ambient temperature. PWM outputs assume 250Hz frequency. Output current may be increased per channel (up to the individual output current maximum) if not all channels are active simultaneously or other channels are at a reduced load current. Please contact HED® for further information.

(3) The output driver is best suited for PWM frequencies of 300 Hz or less. PWM frequencies of up to 1 KHz are possible, but at reduced output current and duty cycle range.

(4) Open circuit can be detected when the output is active using current sense feedback for load currents of at least 250mA and duty cycles greater than 0%. Open circuit can be detected when the output is inactive using the pull-up resistor for loads that are not influenced by the associated pull-up current (see Input STG mode circuit diagram and parameters).

BATTERY (+) MODULE (18 PIN DEUTSCH PIN 6)

Battery (+) (Pins 6)

Operating Voltage Range

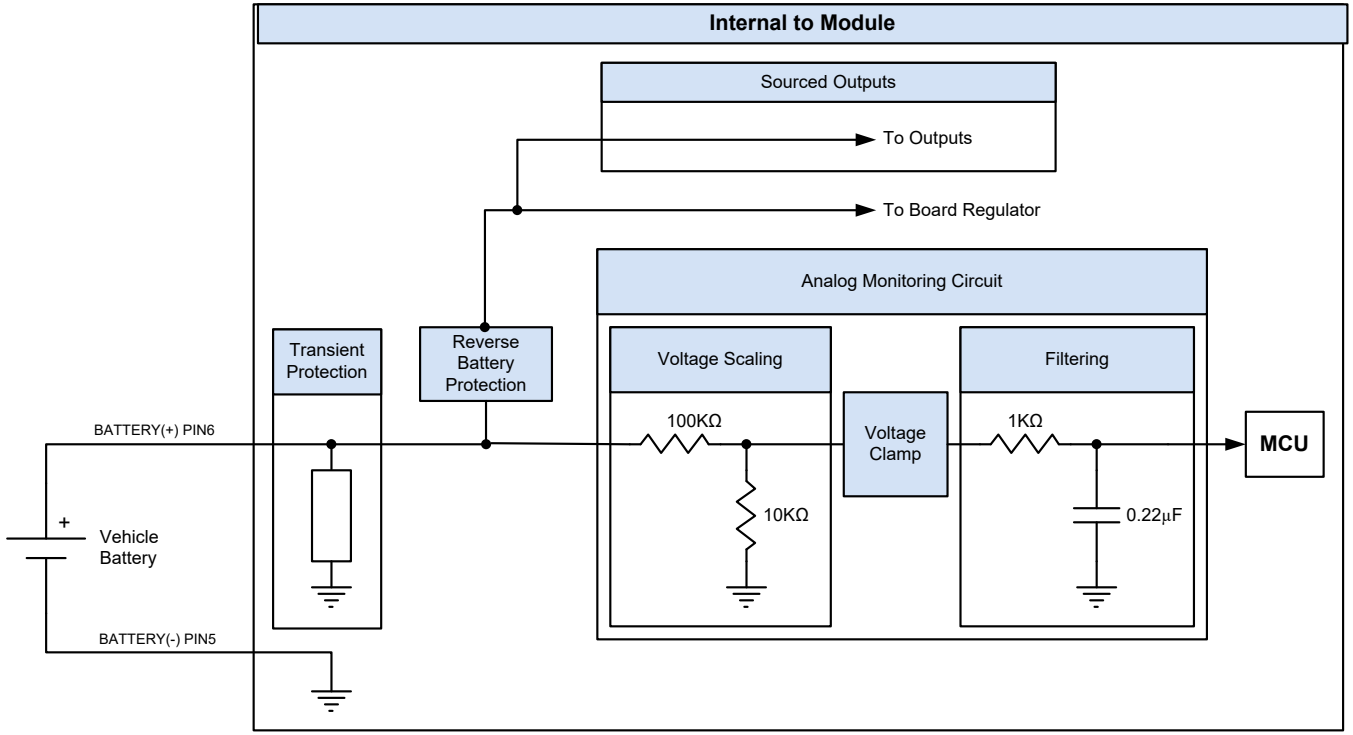
- 8.0VDC – 32VDC

Maximum Total Output Current

- See Output Section for output current constraints

Analog Monitoring Circuit

See Section Input – VTD Mode (0-36.34V Range)



	CL-715 (12in display)		CL-716 (15in display)	
Voltage	**Module Active no I/O or CAN**	**Module Inactive No I/O or CAN**	**Module Active no I/O or CAN**	**Module Inactive No I/O or CAN**
8V	3079mA (max)	650mA (max)	2633mA (max)	654mA (max)
13.8V	1689mA (max)	331mA (max)	1451mA (max)	331mA (max)
28V	1008mA (max)	190mA (max)	878mA (max)	190mA (max)
32V	798mA (max)	159mA (max)	707mA (max)	159mA (max)

Quiescent module current depends on the options selected and the application of inputs and outputs.
The maximum currents shown above include touch screen / WiFi&BLE / NVMe options populated.

(1) Exposure to maximum voltages for extended periods may affect device reliability.

(2) Module current draw is measured with inputs inactive and wake-up de-asserted. Actual values may vary based on specific setup.

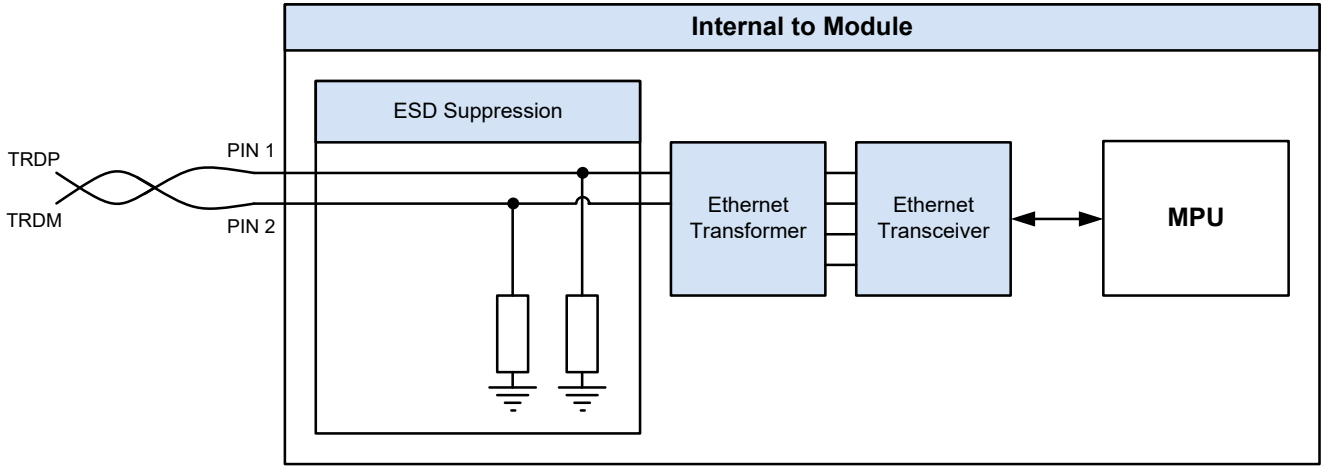
2 WIRE ETHERNET (4PIN M12)

Supported Modes

- 100Base-T1 IEEE 802.3bw
- 1000Base-T1 IEEE 802.3bp
- RGMII

ESD Suppression Capacitance (max)

- 2.0pF



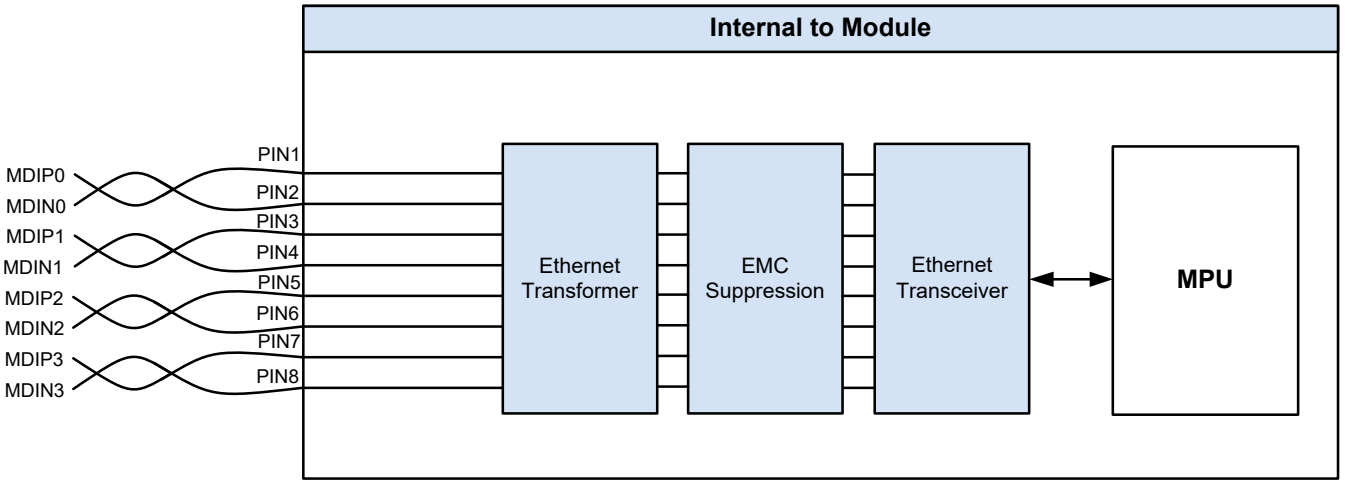
8 WIRE ETHERNET (8PIN M12)

Supported Modes

- 10Base-T IEEE 802.3
- 100Base-TX IEEE 802.3u
- 1000Base-T IEEE 802.3ab
- RGMII

ESD Suppression Capacitance (max)

- 2.3pF



USB-C (USB-C 24 pin Connector)

USB Standard

- USB 2.0/3.0

V_{BUS} Output Voltage Range

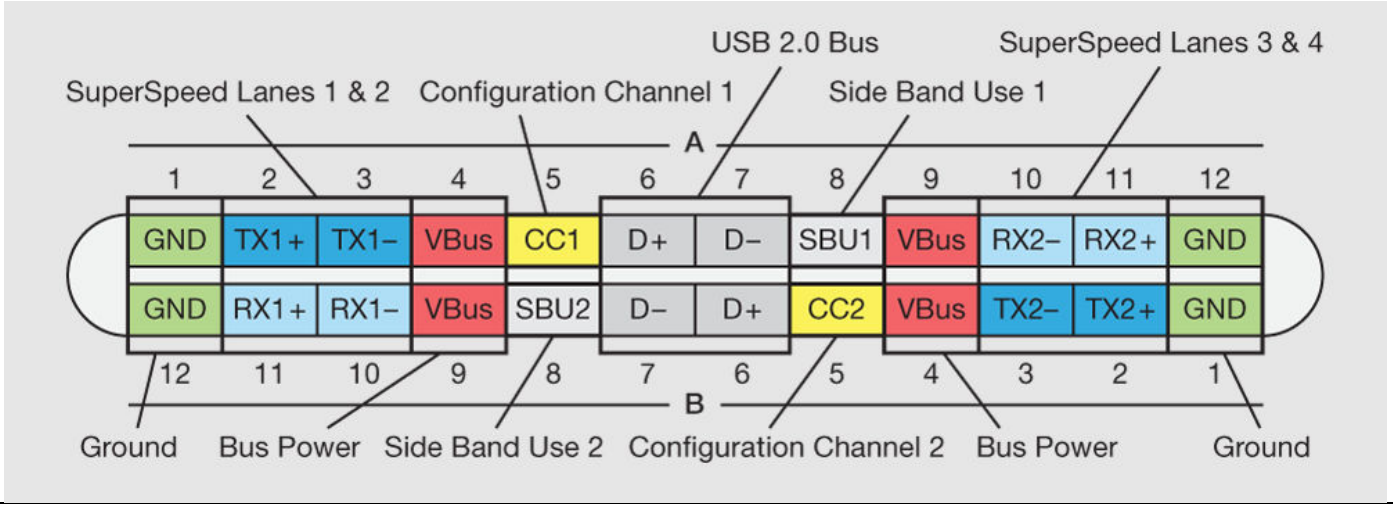
- 5V ± 5%

V_{BUS} Output Current Rating

- 1786mA

V_{BUS} Output Current Limit[(1)]

- 1626mA (minimum)
- 1786mA (typical)
- 1907mA (maximum)



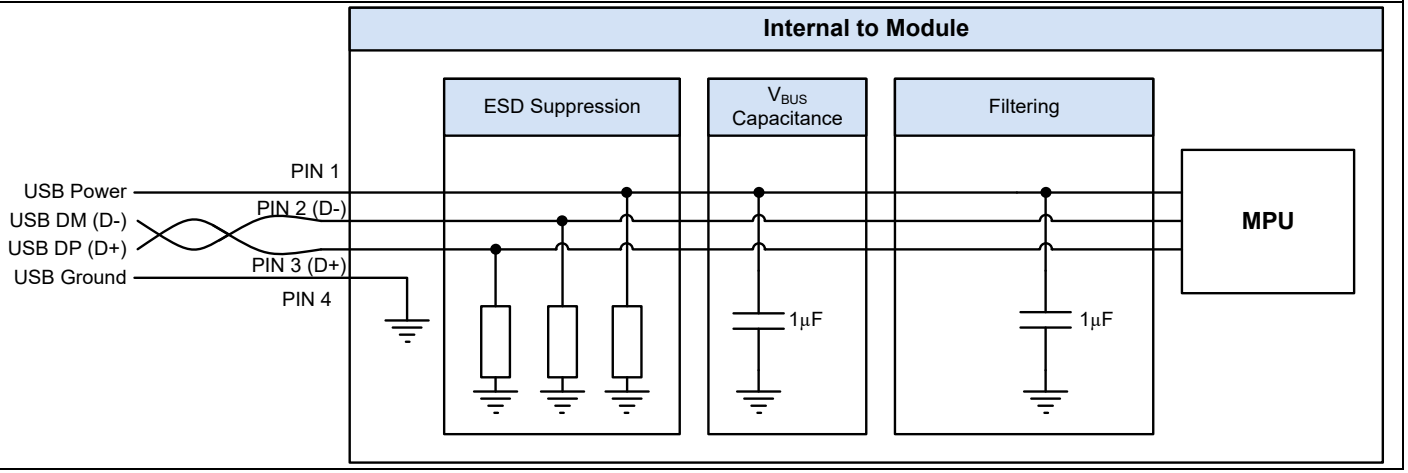
(1) In host mode, USB bus voltage (VBUS) is used to power an external device as well as the MPU. MPU current draw can be up to 50mA; therefore, output current limit for the external device could reduce by up to 50mA from the values listed.

Warning: When in USB host mode, USB ID must be connected only to the module USB Ground . Connecting to vehicle ground or other signals may result in damage to the module.

USB (4PIN M12 1,2,3,4)

USB Standard
- USB 2.0

V_{BUS} Input Voltage Range
- $4.75V < V_{BUS} < 5.25V$



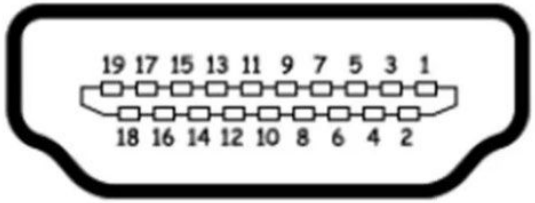
VIDEO (18PIN HDMI-Standard)

Video Out

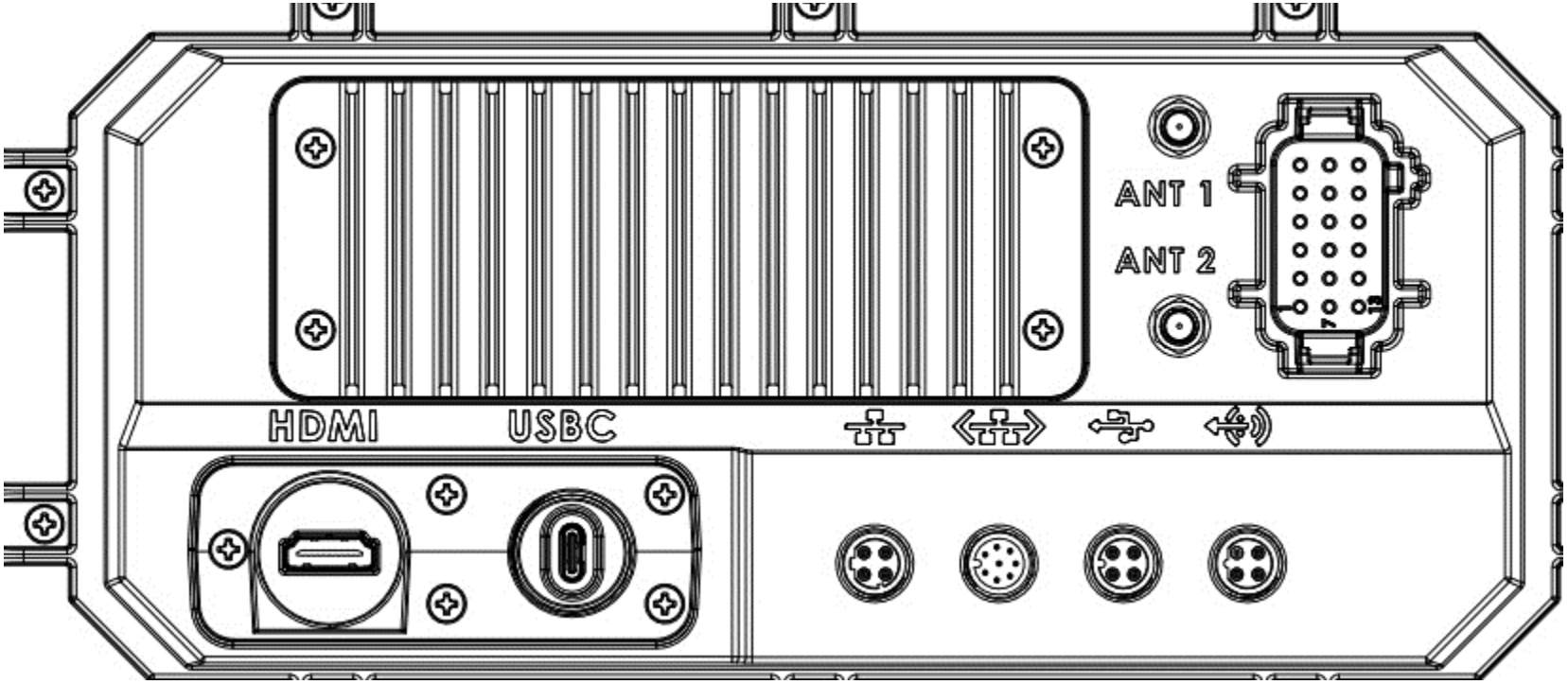
- HDMI 2.0a Tx one display
- Resolutions
  - 720x480p60
  - 1280x720p60
  - 1920x1080p60
  - 1920x1080p120
  - 3840x2160p30
- Pixel clock up to 297 MHz

Audio Support

- 32-channel Audio output
- 1 SPDIF audio eARC input



Pin#	Signal	Pin#	Signal
1	TMDS data 2+	11	TMDS clock shield
2	TMDS data 2 shield	12	TMDS clock-
3	TMDS data 2-	13	CEC
4	TMDS data 1+	14	No connected
5	TMDS data 1 shield	15	DDC clock
6	TMDS data 1-	16	DDC data
7	TMDS data 0+	17	Ground
8	TMDS data 0 shield	18	+5V power
9	TMDS data 0-	19	Hot plug detect
10	TMDS clock+		


ANT 1
ANT 2
HDMI
USBC

ADDITIONAL NOTES

IMPORTANT: Module configurations that contain sourcing outputs with internal flyback diodes may continue to operate in the event of a loss of module ground. This event can result in a ground shift to the internal board reference (ground). The ground shift is a result of a remaining current path from internal board reference (ground), through internal flyback diode(s), and terminating through an external load to ground (assuming the load is of relatively low resistance). Depending on system configuration and load resistances, analog input accuracy can be affected, especially if the analog sensor is not referenced to the module sensor ground. Be sure to include this condition when conducting a system-level FMEA.

Please refer to the module-specific technical datasheet for information regarding internal peripherals such as flash memory, RAM memory, accelerometer, real-time clock, LCD, and touchscreen.

REVISION HISTORY

Revision	Date	EC #	Changes
A00	5/20/24	324-147	Initial Release

APPENDIX

FCC / ISED COMPLIANCE

FCC “Code of Federal Regulations” Title 47 Part 15, Subpart B unintentional radiators.

Innovation, Science, and Economic Development Canada, ICES-003

The following EMC test was performed with conforming results.

Test Requirements	Test Methods
FCC 15B 15.109	ANSI C63.4-2014 Equipment Class A
ISED ICES-003, Section 6.2	ANSI C63.4-2014 Equipment Class A

EU/CE COMPLIANCE

2014/30/EU (Electromagnetic Compatibility)

The following sections describe the technical details that support conformity to the essential requirements of the 2014/30/EU Directive.

Electromagnetic Compatibility

The following harmonized standards were used as presumption of conformity.

Directives	Harmonized Standards
2014/30/EU (Electromagnetic Compatibility)	• EN 14982:2009 Agriculture and forestry machines – Electromagnetic compatibility – Test methods and acceptance criteria • EN 13309:2010 Construction machinery Electromagnetic compatibility of machines with internal electrical power supply •EN 50498:2010 Electromagnetic compatibility (EMC) — Product family standard for aftermarket electronic equipment in vehicles • ISO 13766:2006 Earth-moving machinery – Electromagnetic compatibility.
2011/65/EU (RoHS)	EN 50581:2012 Technical documentation for the assessment of electrical and electronic products with respect to the restriction of hazardous substance.

HED tests to the worst case as defined in each of the standards listed above.

All tests are performed and an accredited test lab.