



SEM840

PROGRAMMABLE DISPLAY FOR USE IN VEHICLES AND OFF-HIGHWAY MACHINERY



KEY FEATURES / SUMMARY

- Robust HMI/programmable display specifically designed for mobile applications
- Optically bonded 4.3" colour screen for harsh environments
- Powerful Cortex M4 + M processor with 200 MHz clock speed
- 32 MB of SDRAM and 16 MB of flash storage
- · 4 configurable inputs, digital and analogue capability
- 4 configurable digital outputs
- 2 independent CAN interfaces, J1939, CAN open and Raw CAN
- Ethernet interface for communication
- Flexible user programming via CODESYS 3.5 and C
- IP67 protection/NEMA 6

ADDITIONAL HARDWARE	DSE PART
Deutsch connector A, 18 way complete with pins	007-850
M840 connector harness	016-168
M840 panel gasket	020-602
Ethernet programming cable	016-160
M12 to USB cable	016-161

OVERVIEW

DC SUPPLY 8 V DC to 32 V DC

CURRENT CONSUMPTION

OPERATING CURRENT

< 1000 mA at 12 V and 24 V without external loads

DISPLAY

480 px x 272 px 24 bit colour Optically bonded

INPUTS/OUTPUTS (total)

4 inputs / 4 outputs

INPUTS

Configurable, Digital inputs (positive / negative) Analogue inputs (Voltage 0 V to 5 V, 0 V to 10 V, 0 V to 32 V, current 4 mA to 20 mA, Ratiometric, Resistive, Frequency)

OUTPUTS

Configurable
Digital Output High-Sided/Low-Sided

INTERFACES

CAN 1.2 CAN Interfaces 2.0 A/B, ISO11898 50 kbits/s... 1 Mbit/s CAN Open, SAE J1939 or Raw CAN

10 Mbit/s / 100 Mbit/s, Duplex

USB

USB Host 2.0 (12 Mbit/s)

DIMENSIONS

131 mm x 208 mm x 56 mm (H x W x D) 5.15" x 8.2" x 2.2" (H x W x D)

WEIGHT

< 1 ka

STORAGE TEMPERATURE RANGE

-40 ° C to +80 ° C -40 ° F to +176 ° F

OPERATING TEMPERATURE RANGE -30 ° C to +65 ° C

-22 ° F to +185 ° F

PROTECTION RATING

IP67/NEMA 6 (with mating connectors)

MOUNTING 4 x M5 bolts / RAM arm

RELATED MATERIALS

TITLE PART NO. M840 Installation Instructions 053-188 M840 Operators Manual 057-248

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Technical Data

DSE M840		
Supply	Connector A	
Operating voltage	8 V DC to 32 V DC	Pin 7
Unit power supply maximum current consumption, full backlight (no external loads)	< 1000 mA at 12 V and 24 V	
Unit power supply maximum current consumption, full backlight and heater (no external loads)	< 1500 mA at 12 V and 24 V	
Unit power supply current consumption after controlled shutdown has occurred due to the ignition being turned off	< 5 mA at 24 V	
Fusing		Connector A
Unit power supply external protection fuse rating	3 A	Pin 7
High current outputs supply input external fuse protection rating (i.e. sum of output currents from all outputs provided for by an individual supply to < external fuse rating in total)	10 A	Pin 7
Housing		I
PC PBT alloy plastic resin		
Dimensions		1
131 mm x 208 mm x 56 mm (H x W x D) / 5.15" x 8.2" x 2.2" (H x W x D)		
Weight		
< 1 kg		
Temperature		
Operating temperature	-30 ° C to +65 °C / -22 ° F to +176 ° F	
Storage temperature	-40 ° C to +80 ° C / -40 ° F to +176 ° F	
Protection Rating		
	IP67 (mating connectors)	
	NEMA 6 (mating connectors)	
Display		
Resolution, pixel	480 px x 272 px	
Colour	24 bit	
Format	4.3" diagonal	
Mounting	Optically bonded	
Illumination	LED (lifetime > 50,000 hrs)	
Connectors	_	
Connector A	18 pin TE connectivity DT16- 18SA-K004	
Ethernet	M12, D-coded 4 pole socket	
USB	M12, B-coded 5 pole socket	
Digital Inputs		Connector A
Digital inputs configured high or low		Pin 10, 11, 16, 17
High level voltage threshold	> 6 V	
Low level voltage threshold	< 2 V	
Analogue Voltage Inputs		Connector A
0 V to 5 V programmable voltage range	0 V to 5 V	Pin 10, 11, 16, 17
0 V to 10 V programmable voltage range	0 V to 10 V	
0 V to 32 V programmable voltage range	0 V to 32 V	
Voltage measurement resolution	10 bits	
Voltage measurement accuracy	± 1% FSD	
Voltage measurement input resistance	≥ 30 kΩ	
Voltage measurement sampling rate	500 Hz	
FSD = Full Scale Deflection		





DSEN	1840
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Analogue Current Inputs		Connector A
Current measurement direction	Current sink only	Pin 10, 11, 16, 17
Current measurement ranges	0 mA to 20 mA	
	4 mA to 20 mA	
Current measurement resolution	10 bits	
Current measurement accuracy	± 1% FSD	
Current measurement input sink resistance	100 Ω ± 1%	
Current measurement sampling rate	500 Hz	
SD = Full Scale Deflection		
Analogue Resistive Inputs	'	Connector A
Resistance measurement range	0 Ω to 3200 Ω	Pin 10, 11, 16, 17
Resistance measurement source voltage	12 V maximum	
Resistance measurement current	1 mA	
Resistance measurement resolution	10 bits	
Resistance measurement accuracy	± 1% FSD	
Resistance measurement sampling rate	500 Hz	
FSD = Full Scale Deflection		
Analogue Ratiometric Inputs		Connector A
/oltage ratiometric measurement voltage range		Pin 10, 11, 16, 17
Oltage ratiometric measurement Vref	Supply/Vref	
/oltage ratiometric measurement	Ratio of input pin to supply voltage	
/oltage ratiometric measurement accuracy	± 1% FSD	
SD = Full Scale Deflection		
requency Inputs		Connector A
requency range	5 Hz to 30 KHz	Pin 10, 11, 16, 17
Resolution	100 Hz at max. freq	
Accuracy	400 Hz at max. freq	
Maximum space voltage	< 1 V	
Minimum mark voltage	> 6 V	
Digital Outputs High Side		Connector A
Switching current	1 A Pin 2, 3, 4, 5	
Digital output active high 'ON' state internal voltage drop at rated current	< 100 mV	
Digital output active high 'OFF' state leakage current	< 10 µA at 24 V	
Digital Outputs Low Side		Connector A
Switching current	1 A	Pin 2, 3, 4, 5
Digital output active low 'ON' state maximum voltage at rated current	< 100 V	
Digital output active low 'OFF' state leakage current	< 5 μA at 24 V	
Reference Voltage	,	Connector A
Reference voltage output	Programmable 5 V or 10 V, 150 mA accuracy ±5%	6
		VRef GND Pin 18
Auxiliary Voltage		Connector A
12 V auxiliary voltage	Max 150 mA	Pin 13





Real time clock Standard RTC, backup time clock in your clock when the clock in your clock when in your clock in your clock when in your clock in your clock when in your clock		DSE M840			
Camera	RTC				
Analogue video input (supported video standards: PAL and NTSC)	Real time clock				
CAN Interfaces Connector A Number of CAN ports 2 Pin 8, 9, 14, 15 Supported protocols J1939 Pin 8, 9, 14, 15 Supported protocols RAW CAN CAN open Supported programmable baud rates S0 kbit/s, 500	Camera				Connector A
Number of CAN ports	Analogue video input (supported	l video standards: PAL and NTSC)	1		12,18
Supported protocols	CAN Interfaces				Connector A
CAN cpan	Number of CAN ports		2		Pin 8, 9, 14, 15
Raw CAN	Supported protocols		J193	9	
Supported programmable baud rates			CAN	open	
Number of Ethernet ports			Raw	CAN	
Number of Ethernet ports 1 D-coded 4 pole socket Supported data rates 10/100 Mbit/s Edition Modus TCP CODESYS 3.5 CODESYS 3.5 CODESYS 3.5 With port of USB host ports 1 B-coded, 5 pole socket Supported USB host ports 1 B-coded, 5 pole socket Supported USB post ported 1 B-coded, 5 pole socket Supported USB post ported 08 (Mass Storage) Image: Code (Iza Mbit/s) Supported Images supported Device class supported FAT32 Image: Code (Iza Mbit/s) Name of Usa Mass Storage Image: Code (Iza Mbit/s) Image:	Supported programmable baud	rates	kbit/s, 500 kbit/s, 800 Mbit/s,		
Supported data rates 10/100 Mbit/s Supported protocols Modbus TCP USB Interface M12, 5 pole Number of USB host ports 1 B-coded, 5 pole socket Supported USB version 2 Full speed (12 Mbit/s) Decoded, 5 pole socket Speeds supported 08 [Mass Storage)	Ethernet Interface				M12, 4 pole
Supported protocols Waterface Waterface Waterface Waterface Waterface Waterface Waterface Supported USB nost ports	Number of Ethernet ports		1		D-coded 4 pole socket
USB Interface USB Interface M12, 5 pole	Supported data rates		10/1	00 Mbit/s	
WBIs Interface Number of USB host ports 1 B-coded, 5 pole socket Supported USB version 2 2 Speeds supported 08 (Mass Storage)	Supported protocols		Mod	bus TCP	
Number of USB host ports			COD	ESYS 3.5	
Supported USB version 2 Full speed (12 Mbit/s) Speeds supported Full speed (12 Mbit/s) 6 Device class supported Filing system 68 (Mass Storage) 5 NZP LPC4357 Dual ARM M4 & M0 Cortex 200 MHz 6 NZP LPC4357 Dual ARM M4 & M0 Cortex 200 MHz 6 Memory Flash 32 MB 5 LED Status Colour Description State None Device not powered N/A Off Green Unit powered up, application program loaded but not running 5 Hz flash Application stopped Green Unit powered up, but no application program loaded and running 1 Hz flash No application Amber Bootloader functioning normally, firmware present Static Bootloader mode Firmware is at start-up Static Bootloader mode Unit stopped due to a serious fault Static Application exception Bootloader is reading an image from the USB 5 Hz flash Decrypting image Red Fatal system/hardware fault - LEd may be driven directly by microcontroller error pin or firmware is in a fault condition tunning running fault and fault condition for running running running fault and running running running fault and fault condition for running run					T
Speeds supported Device class supported Device class supported Supported filing system Processor NXP PC4357 Dual ARM M4 & M0 Cortex 2000 MHz Memory Flash Sa MB LED Status Colour Description Description Description Device not powered Unit powered up, application program loaded but not running Unit powered up, but no application program loaded and running Unit powered up, but no application program loaded Amber Bootloader functioning normally, firmware present Firmware is at start-up Unit stopped due to a serious fault Bootloader is decrypting the downloaded image Bootloader is reading an image from the USB Fatal system/hardware fault - LEd may be driven directly by microcontroller error pin or firmware is in a fault condition Unit running with a fault, see CODESYS error flags Faulty application running Fatulty application running Faulty application running Static Fatulty application Fatal system/hardware fault - LEd may be driven directly by microcontroller error pin or firmware is in a fault condition Unit running with a fault, see CODESYS error flags Fatal system/hardware fault - LEd may be driven directly by microcontroller error pin or firmware is in a fault condition Unit running with a fault, see CODESYS error flags					B-coded, 5 pole socket
Device class supported Supported filing system Processor NXP LPC4357 Dual ARM M4 & M0 Cortex 200 MHz Memory Flash Supported filing system Processor NXP LPC4357 Dual ARM M4 & M0 Cortex 200 MHz Device not powered NAP Colour Description Operation State NAP Coreen Unit powered up, application program loaded but not running Unit powered up, but no application program loaded and running Unit powered up, but no application program loaded Description Amber Bootloader functioning normally, firmware present Firmware is at start-up Unit stopped due to a serious fault Bootloader is decrypting the downloaded image Bootloader is reading an image from the USB Red Fatal system/hardware fault - LEd may be driven directly by microcontroller error pin or firmware is in a fault condition Unit running with a fault, see CODESYS error flags Dual ARM M4 & M0 Cortex Dual ARM M4 M0 Cortex Dual Arm Masser Date of Colour Masser Date of Colour			+		
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Processor NXP LPC4357 Dual ARM M4 & M0 Cortex 200 MHz Memory					
NXP LPC4357 Dual ARM M4 & M0 Cortex			FAT3	2	
Memory Flash 32 MB LED Status Colour Description Operation State None Device not powered N/A Off Green Unit powered up, application program loaded but not running Static Application stopped Unit powered up, application program loaded and running 1 Hz flash Application running Amber Bootloader functioning normally, firmware present Static Bootloader mode Firmware is at start-up Static Bootloader mode Unit stopped due to a serious fault Static Application exception Bootloader is decrypting the downloaded image 1 Hz flash Decrypting image Bootloader is reading an image from the USB 5 Hz flash Reading image from USB Red Fatal system/hardware fault - LEd may be driven directly by microcontroller error pin or firmware is in a fault condition Unit running with a fault, see CODESYS error flags Static Fatal error			T	ADM 144 0 140 0	
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Bootloader is decrypting the downloaded image Bootloader is reading an image from the USB The flash Bootloader is reading an image from the USB Bootloader is reading an image from the USB The flash Fatal system/hardware fault - LEd may be driven directly by microcontroller error pin or firmware is in a fault condition Unit running with a fault, see CODESYS error flags The flash Fatal error Fatal error The flash Faulty application running		Firmware is at start-up		Static	Firmware start-up
Bootloader is reading an image from the USB 5 Hz flash Reading image from USB Red Fatal system/hardware fault - LEd may be driven directly by microcontroller error pin or firmware is in a fault condition Unit running with a fault, see CODESYS error flags 5 Hz flash Reading image from USB Static Fatal error 1 Hz flash Faulty application running			Static	Application exception	
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microcontroller error pin or firmware is in a fault condition 1 Hz flash Faulty application running with a fault, see CODESYS error flags		Bootloader is reading an image from the USB		5 Hz flash	
Unit running with a fault, see CODESYS error flags running	Red				
	Unit running with a fault, see CODESYS error flags		1 Hz flash		





DSE**M840**

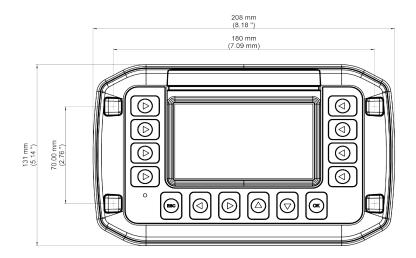
Environmental and Testing		
CE marking	Electromagnetic compatibility (EMC) noise immunity Electromagnetic compatibility (EMC) emission standard	EN 13309 EN 13766
E11 marking	Emission standard noise immunity with 100 V/m	UN/ECE-R10
Electrical tests	Pulse 1, severity level: IV; function state C Pulse 2a, severity level: IV; function state B Pulse 2b, severity level: IV; function state C Pulse 3a, severity level: IV; function state A Pulse 3b, severity level: IV; function state A Pulse 4, severity level: IV; function state B Pulse 5a, severity level: III; function state C	ISO 7637-2
Climatic tests	Damp heat, cyclic upper temperature 55°C, number Damp heat, steady state test temperature 40 °C / 93% RH Test duration: 21 days Salt spray test severity level 3 (vehicle)	EN 60068-2-30 EN 60068-2-78 EN 60068-2-53
Mechanical tests	Test VII; vibration, random mounting location: vehicle body Vibration, sinusoidal 2000 Hz: 0.73 mm / 10g: 10 cycles/axis Bumps 30 g / 6 ms; 24,000 shocks	ISO 16750-3 EN 60068-2-6 ISO 16750-3

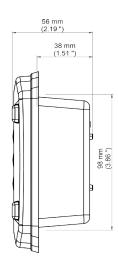


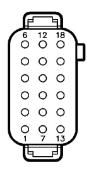


SEM840

PROGRAMMABLE DISPLAY FOR USE IN **VEHICLES AND OFF-HIGHWAY MACHINERY**







Connector A

Camera 1 GND

PIN	DESCRIPTION	REF
1	ECU Supply GND	
2	OUT H, L	QA002
3	OUT H, L	QA001
4	OUT H, L	QA004
5	OUT H, L	QA003
6	VREF OUT	
7	Battery	
8	CAN1 H	
9	CAN 2 H	
10	AIN	IA001
11	AIN	IA002
12	Camera 1	
13	Ignition	
14	CAN1 L	
15	CAN2 L	
16	AIN	IA003
17	AIN	IA004

Ethernet M12 "D" coded - 4 pin female



Pin - 01	TX+
Pin - 02	RC+
Pin - 03	TX-
Pin - 04	RC-

USB Host

M12 'B' coded - 5 pin female



Pin -01	5 V
Pin - 02	Data+
Pin - 03	Data-
Pin - 04	0 V
Pin - 05	Shield



