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M-Flex 4.3" Color Display 505400

The M-Flex 4.3" Color Display was designed specifically for severe duty, outdoor mobile applications to withstand the harsh temperatures, shock and vibration, moisture and electrical transients that are common to these environments. It has a very high brightness LCD to ensure easy viewing in bright sunlight, and the high resolution screen provides sophisticated graphics and animation. The silicone rubber pushbuttons provide simple screen navigation and function control. Two RGB multicolor LED's provide alarm and status indication. The standard CAN interface is SAE J1939, with autobaud detection for 250/500Kbps. Inputs and outputs are available for control of machine functions.

The M-Flex 4.3" Color Display is typically used for construction, agriculture, and turf care equipment, utility vehicles, power sports vehicles, marine, military, outdoor power equipment, and similar harsh environment applications.

FEATURES

- Designed for severe duty, outdoor mobile applications.
- High brightness LCD (800cd/m2) for true outdoor viewing in sunlight. Wide viewing angle from all directions.
- Wide operating voltage and temperature range for 12V and 24V applications.
- Low power sleep mode for applications requiring direct-to-battery connection.
- Eight pushbutton keypad with tactile feedback provides menu navigation and function selection.
- Silicon rubber pushbuttons have operating life exceeding 1 million cycles.
- Two RGB multi-color LED's for status and alarm indication.
- CAN port with auto baud detection of 250/500 Kbps. SAE J1939 CAN protocol (CANopen optional).
- High resolution color LCD provides incredible customized screen graphics and detailed images.
- Day and night screen inversion.
- Inputs and outputs available for custom control functions (See options list.)
- Compact, low profile housing with Deutsch DT style connectors.
- Mounting bracket provides quick, snap-in panel mounting. Alternatively, RAM-mount bolt pattern is built into housing.
- IP67 submersion and IP69K pressure wash rated for maximum water ingress protection.
- RoHS and CE compliant.

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- Programmed by Marlin to meet customers' specific application requirements. Saves you time and development cost.

INPUT/OUTPUT OPTIONS

(0) inputs, (0) outputs

(4) inputs, (2) outputs

(2) inputs, (4) outputs

(2) inputs, (2) outputs, (2) CAN ports

APPLICATION CAPABILITIES:

- User control of vehicle functions
- Vehicle status and alarm indication
- Vehicle and engine CAN diagnostics (DM1, DM2 messaging)
- Control of vehicle inputs and outputs
- Engine Regeneration
- Password protected maintenance mode and supervisor mode.
- English and metric selections.
- Language selection
- System configuration and software updates
- CAN fault detection
- CAN bridge between networks

PROGRAMMING

The M-Flex display has rich graphics and animation capability to provide the end user a vivid display that is easy to use and enjoyable to operate. To accomplish this, Marlin develops the software for our customer's to meet their unique application requirements. Marlin uses a powerful graphics development tool, the same used by major automotive manufacturers, to create the software faster than can be done with conventional tools. This saves our customers time, cost, and the frustration of having to develop the screen graphics and functions. Customers who wish to participate in the screen development can provide graphic images generated from common programs such as Adobe Photoshop™ and Adobe Illustrator™ that can then be imported by Marlin into our development tool.

SPECIFICATIONS:

Electrical

Supply Voltage:	8 - 36V operating range with reverse polarity protection
Max Output Current:	12 Amps (3A per output over full temperature range)
Communication:	SAE J1939 CAN 2.0A and 2.0B compliant
Baud Rate:	Auto Detection for 250/500 Kbps
CAN Port:	One CAN Port with option for 2nd CAN port.

Inputs:	2 or 4 configurable inputs that can be configured as analog, digital active-high or low,
	0-10KHz frequency, 0-100% PWM, 0-10Kohm resistive, 0-5KHz quadrature encoder. All inputs are current-limited and short-circuit protected.
Outputs:	2 half-bridge PWM outputs rated at 3.0A maximum continuous current, configurable as PWM proportional, digital current-sourcing, or digital current-sinking.
	Optional 2 high-side outputs rated 3.0A maximum continuous current for on/off control.
	All outputs are short-circuit and over-current protected.
Sensor Power:	Power supply rated 5VDC 0.5A max.
LCD:	Very high brightness of 800 cd/m2 for sunlight readability. High screen resolution of 480 X 272 pixels. Wide viewing angle in all directions. UV stable polarizer prevents yellowing of screen.
LED Indicators:	Two RGB multi-color LEDs for status and alarm indication.
Keypad:	4 pushbuttons for screen navigation and 4 pushbuttons for function selection and parameter setting. Pushbuttons have adjustable dimmable backlighting
Keypad Composition:	Pushbutton keypad is composed of silicone rubber

Mechanical

Enclosure:	GF nylon enclosure measuring 5.35" X 4.45" X 2.10".
Connector:	Deutsch DT15-12PA and DT15-6P molded in back shell of housing. The 6 pin connector is reserved for future use.
Mounting:	Panel-mount or optional RAM-mount.
	Panel-mounting cutout: 5.22"W X 4.29"H, 0.0787" panel thickness recommended.
	Panel –mount thickness range: 0.048" – 0.160"
Mounting Depth:	1.66" without mating connector

Environmental

Ingress Protection:	IP67 (1 meter submersion for 30 minutes) and IP69K pressure wash, 45° nozzle, with appropriate mating connector boot installed.
Operating temperature:	-20° to 70°C
Storage temperature:	-40° to 85°C

ENVIRONMENTAL TEST SPECIFICATIONS

ITEM	PROCEDURE or STANDARD	TEST DESCRIPTION	ACCEPTANCE CRITERIA	TARGET REQUIREMENTS
1		Hardware Validation	Unit functions properly during test	Refer to quoted operational spec

2		Software Validation	Unit functions properly during test	Refer to quoted operational spec
3	Marlin Standard	Potting Validation	Units exhibit limited/no potting voids.	Cut box/extrusion off of unit(s) and look for potting voids.
4	Marlin Standard Includes ISO 16750-2 4.2.2 Code A, E	Preliminary Load Test	Unit continues to function and shows no signs of excessive heating under full load conditions at maximum operating temperature.	Full load at maximum operating temperature for 30 minutes.
5	ANSI/ASAE EP455 JUL91 5.1.1 Level 2 ANSI/ASAE EP455 JUL91 5.10.1 Level 1 ISO 16750-2 4.2.2 Code A, E	Temperature - Operating & Voltage - Operating (4 Corners)	Unit functions properly during and after test	-40°C to 85°C, 8VDC and 16VDC (or other spec voltages), 4 corners, 24 Hr profile operating with load
6	ANSI/ASAE EP455 JUL91 5.2.10 Level 1	Over-Voltage	Unit functions properly after test	Operate at 26VDC (for 12VDC systems) for 5 min. (36VDC for 24VDC systems)
7	ANSI/ASAE EP455 JUL91 5.10.3	Reverse Polarity	Unit functions properly after test	Operate at -26VDC (for 12VDC systems) for 5 min. (-36V for 24VDC systems)
8	SAE J1455 4.1.3.2 Figure 2C	Temperature - Thermal Shock	Unit functions properly after test. No visible defects.	2 Hr soak @ -40°C & 85°C Ramp at >1.5°C/min Non-operating, 5 cycles
9	ANSI/ASAE EP455 JUL91 5.5 Level 2	Water Immersion	Unit functions properly after test. No visible water inside sealed areas.	55°C tap water, depth of 460mm, soak 5 min in each of 3 axis; remove and soak at -10°C for 30min, then 25°C for 60min
10	SAE J1455 4.5.3.2. Level 1	Wash	Unit functions properly after test.No visible water inside sealed areas.	1400kPa pressure & 9.5 L/min sprayed at dist. of 0.2 - 0.3m for 3 sec on each surface, 63 times per surface,15°C tap water, 45° nozzle
11	ANSI/ASAE EP455 JUL91 5.14.1	Mechanical Shock - Operational	Unit functions properly after test	Single 11ms half-sine pulse of 490m/s^2 in 3 perpendicular axes, with unit connected to harness and harness supported as typical during use.

12	ANSI/ASAE EP455 JUL91 5.15.1	Mechanical Vibration - Random	Unit functions properly after test. No loose parts or fatigue cracks.	See EP455 spec
13	ANSI/ASAE EP455 JUL91 5.1.2	Temperature - Storage	Unit functions properly after test	4 Hr soak @ -40°C & 85°C Ramp at <0.5°C/min Non-operating
14	ANSI/ASAE EP455 JUL91 5.13.2	Humidity - Soak	Unit functions properly after test	Soak in 96% RH at 38°C for 240Hrs.
15	ANSI/ASAE EP455 JUL91 5.4.2 Level 1 or 2	Ultraviolet Light	Unit functions properly after test. Acceptable degredation.	43-75W/m^2 of 280-400nm wavelength UV rad @ 0.75m dist for 300 Hr
16	ANSI/ASAE EP455 JUL91 5.2.2	Altitude - Shipping	Unit functions properly after test	Sea level to 12,192m (101.3kPa to 18.6kPA) 1 Hr soak @ 12,192m
17	ANSI/ASAE EP455 JUL91 5.2.1	Altitude - Operating	Unit functions properly after test	Sea level to 3,658m (101.3kPa to 62.1kPA) 1 Hr soak @ 3,658m
18	ANSI/ASAE EP455 JUL91 5.14.2.1	Mechanical Shock - Installation Handling	Unit functions properly after test. No visible stress to connectors.	With unit connected to harness and far end of harness supported, let unit free-fall without striking any objects. Repeat 10 times.
19	ANSI/ASAE EP455 JUL91 5.14.2.2 Level 1	Mechanical Shock - Bench Handling	Unit functions properly after test. No loose parts or fatigue cracks.	Drop unit from 400mm onto 40mm thick hardwood. Repeat on all edges and faces.
20	ANSI/ASAE EP455 JUL91 5.14.3	Mechanical Shock - Shipping Handling	Unit functions properly after test. No loose parts or fatigue cracks.	In its shipping container, drop unit 1200mm onto 50mm thick plywood backed by concrete.
21	Marlin Standard	1,000,000 Cycle Pushbutton Test	Unit continues to function up to 1,000,000 button presses. No signs of wear on keypad.	1,000,000 Pushbutton presses by automated test fixture.
22	ISO 10605	Electrostatic Discharge	Per customer requirement	See STD
23	ANSI/ASAE EP455 JUL91 5.9 Level 1	Salt Spray	Unit functions properly immediately after test and 100 hrs later.	Expose unit for 48hrs to atomized fog made from 5% aqueous solution of NaCl with 35°C temp and 6.5-7.2pH
24	ANSI/ASAE EP455 JUL915.8.2	Chemical-Brush Exposure(Types of chemicals TBD for the application.)	Unit functions properly during and after test and has no detrimental corrosion during test and 100 hrs later.	Brush apply specified chemical evenly over normally exposed surface. Repeat once/day for 3 days.

CONNECTIONS:

J1

Pin 1: Battery +

Pin 2: Ground

Pin 3: Input AIN/DIN (active high or low)/pulse/res

Pin 4: Input AIN/DIN (active high or low)/pulse/res

Pin 5: 5V Sensor Ground

Pin 6: 5V Sensor Output

Pin 7: CAN Low

Pin 8: CAN High

Pin 9: Input AIN/DIN (active high or low)/pulse/quad enc

Pin10: Input AIN/DIN (active high or low)/pulse/ quad enc

Pin11: Output PWMOUT/DOUT (active high or low~~)~~

Pin12: Output PWMOUT/DOUT (active high or low)

Dimensions: