



front view

DESCRIPTION

MConn is our new generation of Connected Displays with a powerful 32-bit multi-core ARM Cortex-A9 processor, with 2D, 3D, and Vector Graphics hardware acceleration. Featuring a multitouch PCAP touchscreen, operators can take advantage of features such as pinch-to-zoom, rotation, flick, and many more. It can be programmed to run on Embedded Linux, Android, or QNX, depending on the user requirements. The display comes packed with a rich set of wired and wireless interfaces, including CAN (2x), LIN, Ethernet, USB (2x), audio, camera inputs (4x), I/O (22), 4G LTE, GPS, WiFi, and Bluetooth.

TECHNICAL DATA

|                          |  |
|--------------------------|--|
| Housing                  | ABS Plastic  |
| Connector                | 1x TE 1-776231-1 35-position (Power, GND, CAN, LIN, I/O)<br>1x TE 776261-1, 14-position (4x camera, audio)<br>1x HDMI Type A (secondary display)<br>2x SMA connectors (optional, GPS, Radio)<br>2x USB connector with optional dust cap<br>1x Gigabit Ethernet connector |
| Dimensions               | 200.6mm x 139.1mm x 50mm (not including connector)   |
| Over-current Protection  | Yes  |
| Main Processor           | NXP i.MX6, 32-bit Cortex-A9 ARM processor  |
| Co-Processor             | Watchdog, analog inputs, and CAN functions.<br>CAN ready in < 0.5s from cold boot  |
| GPU                      | 2D, 3D, Vector Graphics Hardware Acceleration  |
| Storage                  | 4 GB eMMC for OS and user application  |
| Total Inputs and outputs | 22 (18 inputs 4 outputs)   |
| Inputs                   | 12 digital inputs<br>6 analog inputs<br>2 Thermistor inputs<br>2 frequency counter inputs  |
| Outputs                  | 4 Digital high side drivers (2A each)  |
| Operating voltage        | 9-32 V DC  |
| Interfaces               | 2x CAN<br>Ethernet<br>2x USB 2.0<br>4x Analog Video Inputs<br>GPS<br>WiFi<br>Bluetooth 4.0<br>AM/FM/WX Tuner   |

DISPLAY

|                         |  |
|-------------------------|--|
| Screen Size (Diag.)     | 7" WSVGA is Standard (10.1", 12.3" Extra-Wide Available)     |
| Video                   | 1080p, 30fps, encoding and decoding                          |
| Viewing Angle           | θL = 75°<br>θR = 75°<br>θT = 70°<br>θB = 75°                 |
| Viewing Direction       | All Direction  |
| TFT Resolution          | 1024 x 600   |
| Luminance               | 800 NITS   |
| Contrast Ratio          | 560:1 (7" & 10")<br>1000:1 (Extra-Wide)                      |
| Touch Mode              | PCAP, 5-point multi touch optional                           |
| Multi-Screen Capability | Dual Screen output available, can be mirrored or independent |

SOFTWARE/PROGRAMMING

|                    |  |
|--------------------|--|
| Programming System | Qt, C/C++  |
| Software Updates   | USB, CAN, Over the Air (OtA): Ethernet, WiFi, Cellular |

OPERATING SYSTEM

|                  |               |
|------------------|---------------|
| Operating System | Linux (Yocto) |
|------------------|---------------|

MOUNTING

|          |                                    |
|----------|------------------------------------|
| Mounting | VESA 50, optional mounting bracket |
|----------|------------------------------------|



SENSORS

|                 |   |
|-----------------|---|
| Accelerometer   | 3-axis, $\pm 2/\pm 4/\pm 8/\pm 16$ g acceleration range. Selectable full scales               |
| Gyroscope       | 3-axis, $\pm 125/\pm 245/\pm 500/\pm 1000/\pm 2000$ dps angular range. Selectable full scales |
| Compass         | 3-axis, used in conjunction with accelerometer to provide accurate heading information        |
| Buzzer          | 2.3kHz Tone, PWM Capable, 85 dB   |
| Real Time Clock | Onboard battery to keep track of time while unit is powered off                               |

TESTING

|                          |  |
|--------------------------|--|
| EMC/EMI                  | ISO 10605, CISPR 25                                    |
| Immunity                 | ISO 7637-2, ISO 16750-2                                |
| Shock                    | ISO 16750-3, 20G                                       |
| Vibration                | ISO 16750-3, Test VII                                  |
| Environmental Protection | IP54<br>IP65 (optional)                                |
| Temperature range        | Operating: -20 °C to 70 °C<br>Storage: -30 °C to 80 °C |

PIN ASSIGNMENT MATING CONNECTOR: AMPSEAL 776164-1

| Pin | Function    | Pin | Function    | Pin | Function  | Pin | Function  | Pin | Function   | Pin | Function   |
|-----|-------------|-----|-------------|-----|-----------|-----|-----------|-----|------------|-----|------------|
| 1   | Digital In  | 7   | Digital Out | 13  | VCC_LIN   | 19  | Analog In | 25  | Digital In | 31  | Digital In |
| 2   | Digital In  | 8   | Digital In  | 14  | LIN       | 20  | Analog In | 26  | CAN1_L     | 32  | CAN2_L     |
| 3   | Digital Out | 9   | Analog In   | 15  | GND       | 21  | GND       | 27  | CAN1_H     | 33  | CAN2_H     |
| 4   | Digital Out | 10  | Analog In   | 16  | VCC       | 22  | Analog In | 28  | Digital In | 34  | Digital In |
| 5   | Digital In  | 11  | Digital In  | 17  | Analog In | 23  | VCC       | 29  | Digital In | 35  | Digital In |
| 6   | Digital Out | 12  | Digital In  | 18  | GND       | 24  | GND       | 30  | Ignition   |     |            |

PIN ASSIGNMENT MATING CONNECTOR: AMPSEAL 776273-1

| Pin | Function | Pin | Function | Pin | Function | Pin | Function | Pin | Function  |
|-----|----------|-----|----------|-----|----------|-----|----------|-----|-----------|
| 1   | Video1+  | 4   | Audio L  | 7   | Video3-  | 10  | Video4+  | 13  | Audio Mic |
| 2   | Video1-  | 5   | Audio R  | 8   | Video2+  | 11  | Video4-  | 14  | GND       |
| 3   | Video3+  | 6   | GND      | 9   | GND      | 12  | Video2-  |     |           |

## INTERFACES

|              |   |
|--------------|---|
| CAN          | 2x CAN, 20 kbps – 1Mbps   |
| LIN          | 1x LIN, 1 kbps – 20 kbps  |
| Ethernet     | Gigabit Ethernet, 10/100/1000 Base-T  |
| USB          | 2x USB 2.0  |
| Camera       | 4x Analog video inputs<br>NTSC or PAL, Single-Ended or Differential                       |
| Audio        | Stereo out, Mic in  |
| Inputs       | 12 digital inputs<br>6 analog inputs<br>2 Thermistor inputs<br>2 frequency counter inputs |
| Cellular     | 3G fallback (UMTS/HSPA)<br>4G LTE   |
| GPS          | NMEA data, dedicated GPS antenna connection   |
| WiFi         | 802.11 bgn, +20 dBm TX, -97 dBm RX  |
| Bluetooth    | Bluetooth 4.0, +20 dBm TX, -94 dBm RX   |
| Radio Tuner  | AM/FM/WX Tuner with RDS decoder   |
| Power Supply | 9-32 VDC. CPU operational down to 7 VDC   |
| Ignition     | Ignition input for CPU  |



OFF THE SHELF OPTIONS

| FEATURE                           | STANDARD  | AUDIO VIDEO | ALL IN ONE |
|-----------------------------------|-----------|-------------|------------|
| <b>PART NUMBER</b>                | M112472   | M112464     | M112465    |
| <b>WI-FI</b>                      | -         | -           | ✓          |
| <b>BLUETOOTH</b>                  | -         | -           | ✓          |
| <b>GPS/GNSS</b>                   | -         | -           | ✓*         |
| <b>LTE</b>                        | -         | -           | ✓*         |
| <b>AM / FM TUNER<br/>OPTIONAL</b> | -         | -           | ✓*         |
| <b>AUDIO IN /<br/>OUT</b>         | -         | ✓           | ✓          |
| <b>VIDEO IN 4-CH</b>              | ✓         | ✓           | ✓          |
| <b>DUAL SCREEN</b>                | ✓         | -           | -          |
| <b>ETHERNET</b>                   | ✓         | ✓           | ✓          |
| <b>RAM</b>                        | 1 GB      |             |            |
| <b>CPU</b>                        | QUAD CORE |             |            |
| <b>IP RATING</b>                  | IP54      |             |            |
| <b>I/O</b>                        | ✓         |             |            |
| <b>USB 2.0</b>                    | ✓         |             |            |
| <b>LINUX OS</b>                   | ✓         |             |            |
| <b>TOUCH SCREEN</b>               | ✓         |             |            |
| <b>SD-STORAGE</b>                 | 16GB      | 32GB        |            |

\* Subject to consultation between customer and supplier.

- Indicates feature is not offered for this off the shelf option

FOR CUSTOM MCONN SOLUTIONS PLEASE SEE NEXT PAGE.

Please contact MRS Sales at (937) 522-0800 or [info@mrs-electronics.com](mailto:info@mrs-electronics.com) for inquiries.



PART NUMBER REFERENCE CHART FOR CUSTOM CONFIGURATIONS

EXAMPLE: MC7 4 1 P 0 R N 0 0 1 1 0 L B

**Series Code**

MC7 - 7" display  
 MC10 - 10.1" display  
 MC12W - 12.3" wide screen display

**Processor**

4 - Quad Core

**RAM**

1 - 1GB DDR3  
 4 - 4GB DDR3

**Touchscreen**

N - None  
 P - PCAP Touchscreen

**Multi-Screen**

0 - None  
 1 - Dual Screen via HDMI

**IP Rating**

R - IP54  
 S - IP65

**Video Input**

N - None  
 D - 4 Channel, Differential  
 E - 4 Channels, Single-Ended

**Audio**

0 - None  
 1 - Audio Input (Mono) / Output (Stereo)

**Telematics\***

0 - None  
 2 - 4G LTE (North America)  
 5 - 4G LTE (Global)

**GPS\***

0 - None  
 1 - GPS/GNSS

**Wireless Connectivity**

0 - None  
 1 - Wi-Fi (802.11 bgn) / BLE (4.0)

**Radio\***

0 - None  
 1 - AM/FM/WX Tuner with RDS decoder

**Operating System**

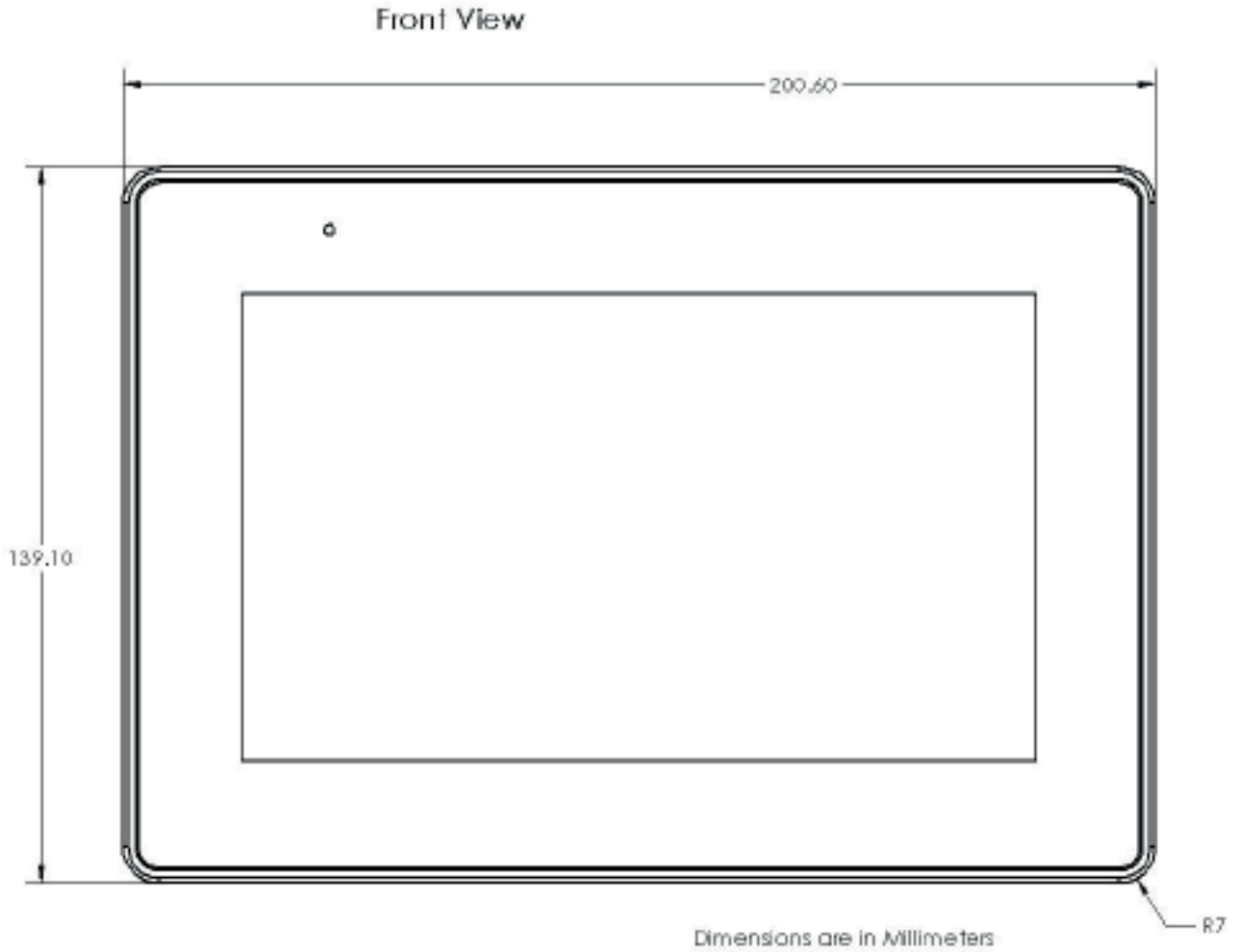
L - Linux

**SD Card Capacity**

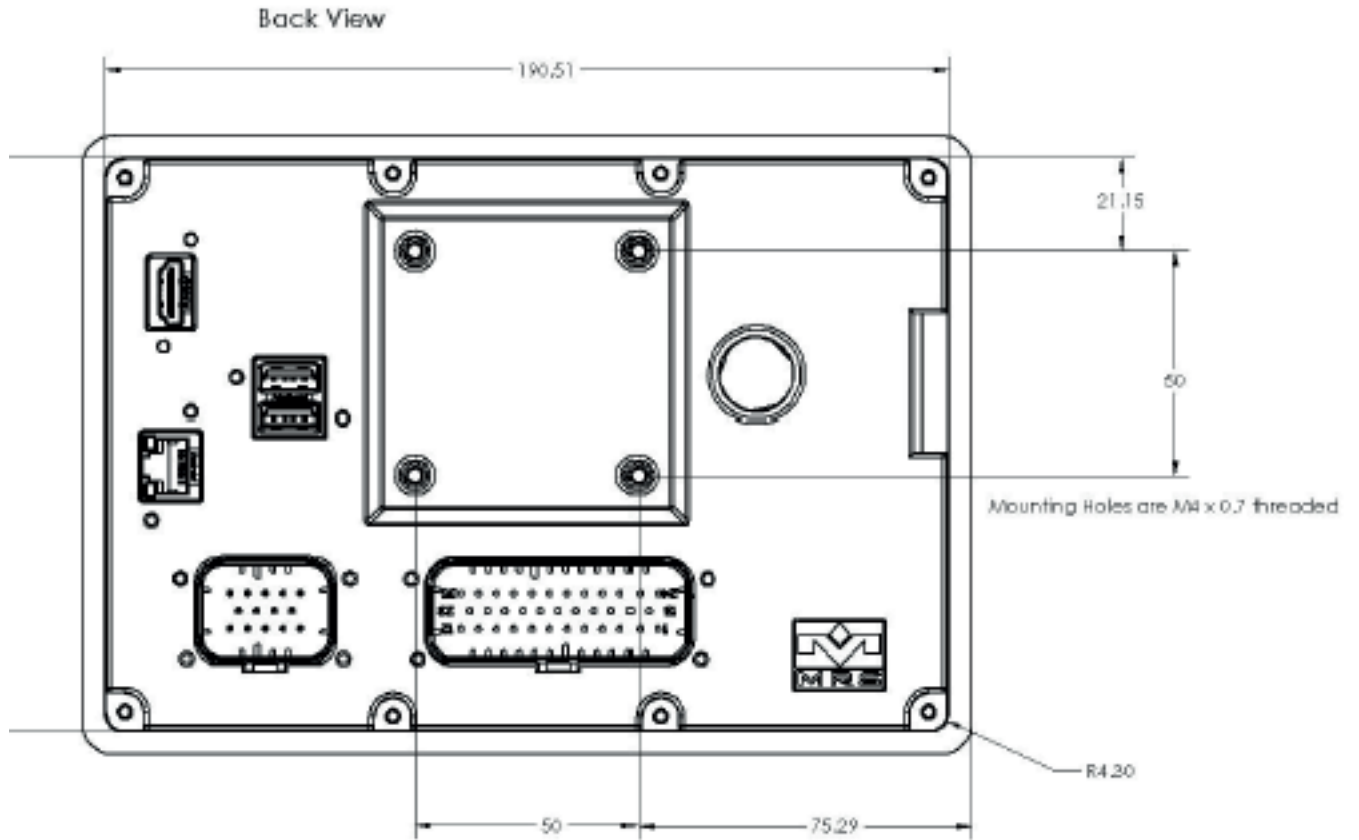
N - None  
 B - 16GB  
 C - 32GB  
 D - 64GB

\* - Choose 2 of the 3. All 3 options are not compatible with the hardware  
 Custom displays require an order of approximately 250 pieces minimum

TECHNICAL DRAWING (IN MM)



TECHNICAL DRAWING (IN MM)



## SAFETY AND INSTALLATION INFORMATION

It is essential to read the instructions in full thoroughly before working with the device.

Please note and comply with the instructions in the operating instructions and the information in the device data sheet, see [www.mrs-electronics.com](http://www.mrs-electronics.com)

**Staff qualification:** Only staff with the appropriate qualifications may work on this device or in its proximity.

### SAFETY



**WARNING! Danger as a result of a malfunction of the entire system.**

Unforeseen reactions or malfunctions of the entire system may jeopardise the safety of people or the machine.

- Ensure that the device is equipped with the correct software and that the wiring and settings on the hardware are appropriate.



**WARNING! Danger as a result of unprotected moving components.**

Unforeseen dangers may occur from the entire system when putting the device into operation and maintaining it.

- Switch the entire system off before carrying out any work and prevent it from unintentionally switching back on.
- Before putting the device into operation, ensure that the entire system and parts of the system are safe.
- The device should never be connected or separated under load or voltage.



**CAUTION! Risk of burns from the housing.**

The temperature of the device housing may be elevated.

- Do not touch the housing and let all system components cool before working on the system.

### PROPER USE

The device is used to control or switch one or more electrical systems or sub-systems in motor vehicles and machines and may only be used for this purpose. The device may only be used in an industrial setting.



**WARNING! Danger caused by incorrect use.**

The device is only intended for use in motor vehicles and machines.

- Use in safety-related system parts for personal protection is not permitted.
- Do not use the device in areas where there is a risk of explosion.

**Correct use:**

- operating the device within the operating areas specified and approved in the associated data sheet.
- strict compliance with these instructions and no other actions which may jeopardise the safety of individuals or the functionality of the device.

### Obligations of the manufacturer of entire systems

It is necessary to ensure that only functional devices are used. If devices fail or malfunction, they must be replaced immediately.

System developments, installation and the putting into operation of electrical systems may only be carried out by trained and experienced staff who are sufficiently familiar with the handling of the components used and the entire system.

It is necessary to ensure that the wiring and programming of the device does not lead to safety-related malfunctions of the entire system in the event of a failure or a malfunction. System behaviour of this type can lead to a danger to life or high levels of material damage.

The manufacturer of the entire system is responsible for the correct connection of the entire periphery (e.g. cable cross sections, correct selection/connection of sensors/actuators).

Opening the device, making changes to the device and carrying out repairs are all prohibited. Changes or repairs made to the cabling can lead to dangerous malfunctions. Repairs may only be carried out by MRS.

### Installation

The installation location must be selected so the device is exposed to as low a mechanical and thermal load as possible. The device may not be exposed to any chemical loads.

Install the device in such a manner that the plugs point downwards. This means condensation can flow off the device. Single seals on the cables/leads must be used to ensure that no water gets into the device.

### Putting into operation

The device may only be put into operation by qualified staff. This may only occur when the status of the entire system corresponds to the applicable guidelines and regulations.

## FAULT CORRECTION AND MAINTENANCE



**NOTE The device is maintenance-free and may not be opened.**

- If the device has damage to the housing, latches, seals or flat plugs, it must be taken out of operation.

Fault correction and cleaning work may only be carried out with the power turned off. Remove the device to correct faults and to clean it.

Check the integrity of the housing and all flat plugs, connections and pins for mechanical damage, damage caused by overheating, insulation damage and corrosion. In the event of faulty switching, check the software, switches and settings.

Do not clean the device with high pressure cleaners or steam jets. Do not use aggressive solvents or abrasive substances.