

**Installation Manual**  
MM102424V1 R1A



Data Brick DB800

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## 1. SAFETY

### 1.1 MAXIMUM PERMISSIBLE EXPOSURE (MPE) LIMITS

**Do not transmit** with this radio and antenna when persons are within the MPE Radius of the antenna, unless such persons (vehicle occupants or bystanders, for example) are shielded from the antenna field by a metallic barrier (such as the user's vehicle rooftop). The MPE Radius is the minimum distance from the antenna axis that ALL persons should maintain in order to avoid RF exposure higher than the allowable MPE level set by the FCC.



**Failure to observe these limits may allow those within the MPE radius to experience RF radiation absorption which exceeds the FCC maximum permissible exposure (MPE) limit. It is the responsibility of the installer to ensure that the maximum permissible exposure limits are observed at all times during radio transmission. The installer is to ensure that no bystanders come within the radius of the maximum permissible exposure limits shown below.**

### 1.1.1 Determining MPE Radius

The Maximum Permissible Exposure Radius has been estimated to be a radius of about 6.3 inches (or 16 cm) for a 5 dBi gain antenna, and 11.25 inches (or 28.5 cm) for a 10 dBi gain antenna per OET bulletin 65 of the FCC. This estimate is made using the maximum capable power of the radio and a maximum 50% transmit duty cycle.

## 1.2 SAFETY TRAINING INFORMATION



The DB800 generates RF electromagnetic energy during transmit mode. This radio is designed for and classified as “Occupational Use Only” meaning it must be used only during the course of employment by individuals aware of the hazards and the ways to minimize such hazards. This radio is NOT intended for use by the “General Population” in an uncontrolled environment. It is the responsibility of the installer to ensure that the maximum permissible exposure limits are observed at all times during radio transmission. The installer is to ensure that no bystanders come within the radius of the maximum permissible exposure limits.

This radio has been tested and complies with the FCC RF exposure limits for “Occupational Use Only.” In addition, this M/A-COM radio complies with the following Standards and Guidelines with regard to RF energy and electromagnetic energy levels and evaluation of such levels for exposure to humans:

- FCC OET Bulletin 65 Edition 97-01 Supplement C, Evaluating Compliance with FCC Guidelines for Human Exposure to Radio Frequency Electromagnetic Fields.
- American National Standards Institute (C95.1 – 1992), IEEE Standard for Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3 kHz to 300 GHz.
- American National Standards Institute (C95.3 – 1992), IEEE Recommended Practice for the Measurement of Potentially Hazardous Electromagnetic Fields – RF and Microwave.

### 1.3 TRANSMITTER HAZARDS



**The installer should be aware of certain hazards common to the operation of vehicular radio transmitters. A list of several possible hazards is given:**

1. **Explosive Atmospheres** – Just as it is dangerous to fuel a vehicle with the motor running, similar hazards exist when operating a vehicular radio. Be sure to turn the radio off while fueling a vehicle. Do not carry containers of fuel in the trunk of a vehicle if the radio is mounted in the trunk.

**Areas with potentially explosive atmospheres are often, but not always, clearly marked. Turn OFF your radio when in any area with a potentially explosive atmosphere. It is rare, but not impossible that the radio could generate sparks.**

2. **Interference to Vehicular Electronic Systems** – Electronic fuel injection systems, electronic anti-skid braking systems, electronic cruise control systems, etc., are typical electronic systems that can malfunction due to the lack of protection from radio frequency energy present when transmitting. If the vehicle contains such equipment, consult the dealer and enlist their aid in determining the expected performance of electronic circuits when the radio is transmitting.
3. **Dynamite Blasting Caps** – dynamite blasting caps may be caused to explode by operating a radio within 500 feet of the blasting caps. Always obey the “Turn Off Two-Way Radios” signs posted where dynamite is being used.

When transporting blasting caps in a vehicle:

- a) Carry the blasting caps in a closed metal box with a soft lining.
  - b) Leave the radio OFF whenever blasting caps are being put into or removed from the vehicle.
4. **Liquefied Petroleum (LP) Gas Powered Vehicles** – mobile radio installations in vehicles powered by liquefied petroleum gas with the LP gas container in the trunk or other sealed-off space within the interior of the vehicle must conform to the National Fire Protection Association standard (NFPA) 58 requiring:
- a) The space containing the radio equipment shall be isolated by a seal from the space containing the LP gas container and its fittings.
  - b) Outside filling connections shall be used for the LP gas container.
  - c) The LP gas container shall be vented to the outside of the vehicle.



**Under U.S. law, operation of an unlicensed radio transmitter within the jurisdiction of the United States may be punishable by a fine of up to \$10,000, imprisonment for up to two years, or both.**



## 1.4 OPERATING TIPS

The following conditions tend to reduce effective range and should be avoided whenever possible.

- Operating the radio in areas of low terrain, or while under power lines or bridges.
- Obstructions such as mountains and buildings.
- In areas where transmission or reception is poor, some improvement may be obtained by ensuring that the antenna is vertical. Moving a few yards in another direction or moving to a higher elevation may also improve communication.

## 1.5 OCCUPATIONAL SAFETY GUIDELINES AND SAFETY TRAINING INFORMATION



**To ensure that exposure to RF electromagnetic energy is within the FCC allowable limits for occupational use, always adhere to the guidelines below.**

The DB800 can transmit using a replaceable antenna. When the radio is ON, it receives and also transmits radio frequency (RF) signals. In order to maintain registration, the radio periodically transmits, even when the PTT switch has not been pressed.

In 1996, the Federal Communications Commission (FCC) adopted RF exposure guidelines with safety limits for portable devices, based on the recommended limits of the National Council on Radiation Protection and Measurements (NCRP) and the American National Safety Institute (ANSI).

The design of the DB800 complies with the FCC guidelines for Occupational / Controlled exposure to RF electromagnetic fields. To assure optimal performance and make sure human exposure to RF electromagnetic energy is within the FCC guidelines, always adhere to the following:

1. The DB800 should only be used for necessary work related communications.
2. The DB800 should only be used by authorized and trained personnel and should not be operated by children.
3. Do not attempt any unauthorized modification to the DB800. Changes or modifications CAN cause harmful interference. Service of the DB800 should only be performed by qualified personnel.
4. Always use M/A-COM authorized accessories (antennas, etc.). Use of unauthorized accessories can cause the FCC RF exposure compliance requirements to be exceeded.

## **2. PRODUCT DESCRIPTION**

The DB800 is a digital radio housed in a metal casting, whose function is to send data communication. The Data Brick can transmit information such as position, traffic flow, or atmospheric conditions. Three mounting holes are provided to attach the DB800 to an indoor wall or post or to mount inside an enclosure for outdoor use. The DB800 is also suitable for vehicle mounting.

The DB800 operates in OpenSky Trunked Protocol (OTP) mode and supports voice grouping, priority scanning, pre-emptive emergency calls, late call entry, and dynamic reconfiguration. It performs autonomous roaming for wide area applications.

Features and user profiles for DB800 are software-defined and can be reprogrammed over the air. This feature allows communications protocols to be changed and added at any time.

### 3. SPECIFICATIONS

#### 3.1 GENERAL

|   |  |
|---|--|
| Dimensions without Antenna (H x W x D): | 6.2 x 4.3 x 1.4 in.<br>(158 x 110 x 36 mm) |
| Weight:                                 | 22.5 oz (635g)                             |
| Input Voltage:                          | 8.5 VDC $\pm$ 20%                          |
| Operating Temperature Range:            | -22 to +140°F<br>(-30 to +60°C)            |
| Relative Humidity:                      | 95% (Non-Condensing)<br>@ 140°F (+60°C)    |
| Altitude (Operational):                 | 15000 ft (4572 m)                          |
| Color (Case):                           | Metallic                                   |

#### 3.2 TRANSMITTER

**800**

|   |                   |
|---|-------------------|
| Frequency Range (MHz):                    | 806-824           |
| Rated RF Power (W):                       | 5.5 Watts typ.    |
| Frequency Stability (-30 to +60°C) (ppm): | $\pm$ 1.5         |
| Modulation Deviation (kHz):               | 4.5 FM<br>4.5 OTP |

|                               |   |
|-------------------------------|---|
| Audio Response (dB):          | +1/-3   |
| Spurious and Harmonics (dBm): | Meets FCC Part 90, emission mask “G” and “H”  |
| Audio Distortion:             | <3% at rated audio @ 1000 Hz, 3 kHz deviation |

### 3.3 RECEIVER

#### 800

|  |                          |
|--|--------------------------|
| Frequency Range (MHz):   | 851-870                  |
| Channel Spacing (kHz):   | 12.5, 25, PLL Step       |
| FM Hum and Noise (dB):   | >35                      |
| Analog Sensitivity (12 dB SINAD, TIA/EIA-603) (dBm):                     | -118                     |
| Digital Sensitivity (5% block error rate, OpenSky protocol, AWGN) (dBm): | -110                     |
| Selectivity @ 25 kHz (dB):   | >63                      |
| Intermodulation (dB):  | >70                      |
| Spurious and Image Rejection (dB):                                       | >70                      |
| Frequency Stability (-30 to +60°C) (ppm):                                | ±1.5                     |
| Rated Audio Output (mW):   | 500 @ <3% max distortion |

### **3.4 DIGITAL OPERATION**

|                        |  |
|------------------------|--|
| <b>Vocoding Method</b> | <b>Advanced MultiBand<br/>Excitation (AMBE™)</b> |
| Data Rate              | 19.2 kbps  |
| Modulation             | 4-Level GMSK                                     |

### **3.5 REGULATORY DATA**

|                                      |                              |
|--------------------------------------|------------------------------|
| Frequency Range (MHz)                | 806-824 (TX)<br>851-870 (RX) |
| RF Output (W)                        | 6                            |
| Frequency Stability (ppm)            | 1.5                          |
| FCC Type Acceptance No:              | BV8DB800                     |
| Applicable FCC Rules                 | 15, 90                       |
| Industry Canada<br>Certification No: | 3636DB800                    |
| Applicable Industry<br>Canada Rules  | RSS-119                      |

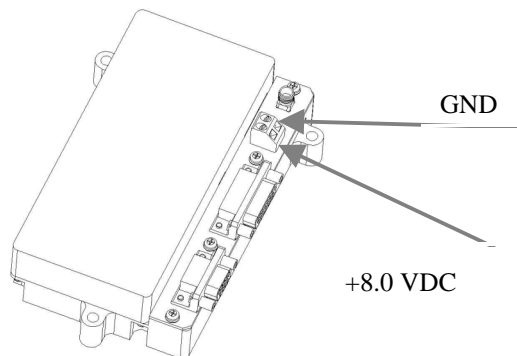
#### 4. OPTIONS AND ACCESSORIES

| MODEL/OPTION NUMBER      | DESCRIPTION   |
|--------------------------|---|
| <b>Transceiver*</b>      |   |
| MAHROS0047               | DB800, 800 MHz  |
| <b>Antennas*</b>         |   |
| MAHROS0024               | Antenna, 800MHz, Elevated Feed, Mobile                      |
| MAHROS0093               | Antenna, 800MHz, Tower Top, Fixed                           |
| <b>Optional Features</b> |   |
| OS-P25                   | P25 Common Air Interface                                    |
| OS-ENC                   | Voice Encryption  |
| MAHROS0039               | Over-the-Air Rekeying (requires encryption to be purchased) |

## 5. INSTALLATION

### 5.1 POWER INSTALLATION

Insert a stripped wire, (14-22 AWG) into the +8.0 VDC connector on the left side of the power connector. Insert a stripped wire, (14-22 AWG) into the GND connector on the right side of this connector. Secure the wires in the Data Brick connector by tightening the screws with a small Phillips screwdriver. The other end of power wire should be connected to an +8.0 VDC source. The other end of the ground wire should be connected to the negative terminal. The DB800's operating voltage is 7.0 to 8.5 VDC. Exceeding this voltage can permanently damage the device.



**Figure 5-1: Power Installation**



## 5.2 ANTENNA INSTALLATION

Screw the antenna into the connector on the top of the DB800 by turning it clockwise into the SMA connector.



**Figure 5-2: Antenna Wire Connector Installed**

## **6. CONFIGURATION**

Configuration of the DB800 is performed with an external computer attached to the DB9 port on the Data Brick. The Network Administrator will configure the DB800. Changes to the configuration, if required, can be made by the Network Administrator over the air if this option has been purchased.

## **7. MOUNTING REQUIREMENTS**

The DB800 can be mounted in a fixed or mobile setting indoors or outdoors. It should always be mounted in an environmentally controlled area. See 3. SPECIFICATIONS for environmental requirements.

Outdoors, the DB800 should be mounted in a customer-supplied enclosure that can supply the required voltage as well as the appropriate environmental conditions.

Indoors, the DB800 can be mounted using the mounting holes on the housing in areas of appropriate environmental conditions.

The DB800 should not be mounted less than 3 feet from human traffic.

In vehicles, the DB800 should be mounted in an enclosure in the trunk or inside the vehicle but more than 3 feet from where occupants may be riding.

## **8. TROUBLESHOOTING**

If troubleshooting assistance is required, contact a qualified service technician or call M/A-COM at 1-877-673-6759.

**WARRANTY**

DROP IN



**M/A-COM, Inc.**  
1011 Pawtucket Boulevard  
Lowell, MA 01853  
1-877-OpenSky/978-442-5000  
[www.macom.com](http://www.macom.com)

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