

# MOBILE ANTENNAS

At Larsen we want our customers to be confident they can find the right antenna for the right application. For this reason, we have provided some guidelines for mobile antenna selection.

When selecting a mobile antenna, there are a number of factors which significantly affect the ultimate performance of the antenna. Gain requirements, electrical type, ground plane availability, mounting style and placement, coaxial type and loss ratings, physical size, appearance and surrounding environment are issues to be addressed to ensure the maximum performance from a mobile antenna installation.

For over 40 years, Larsen engineers have been designing high-performance mobile antennas in a variety of electrical types and configurations to meet the most demanding performance criteria and operating conditions. The electrical type or design of the mobile antenna is commonly referred to in terms of its wavelength: 1/4 wave, 1/2 wave, 5/8 wave, etc. Each electrical type has a specific radiating pattern to be considered when selecting a mobile antenna. For example, the signal radiating from a 1/4 wave antenna is directed more vertically, thus making it ideal in urban environments where buildings might obstruct the signal. A 5 dB collinear mobile antenna is designed to direct the signal more towards the horizon. This type of antenna is ideal for geographically flat regions where signal coverage is sparse.

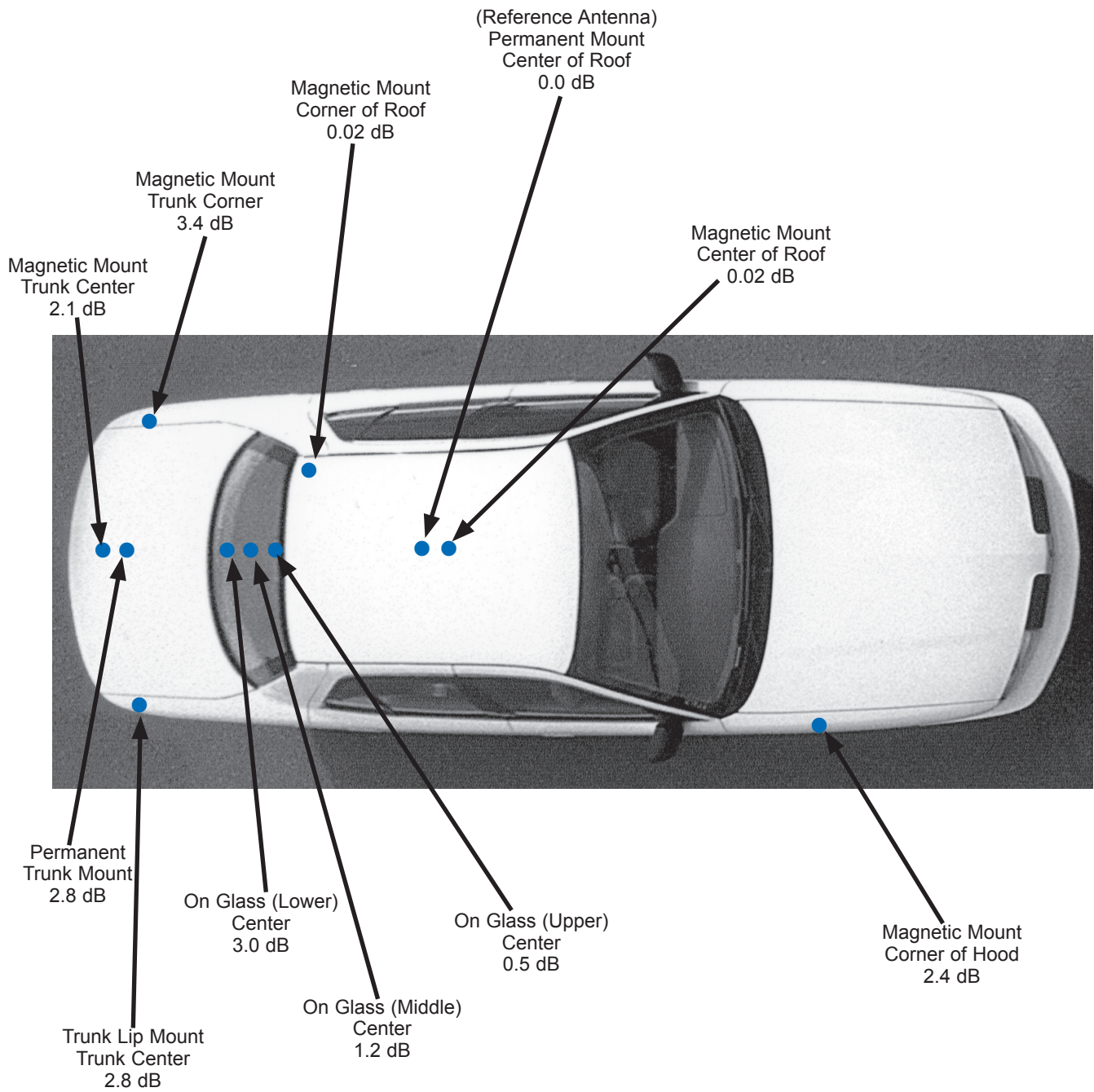
Ground plane availability is another critical factor in mobile antenna performance and must be considered when determining the location and type of the antenna. Ground plane requirements vary given the type of mobile antenna and the frequency of operation. A typical 5/8 wave antenna at 150 MHz requires a ground plane at least 42" in diameter. At 450 MHz 15" is required, and at 800 MHz a minimum of 8" is considered sufficient.

In terms of mounting mobile antennas on a vehicle, there are five general locations: roof, front fender, rear fender, trunk and rear window glass (although other glass mount locations may be used). Of these, the center of an automobile roof is considered the best for mobile antenna placement, followed by the center of the trunk lid, the fenders, then on-glass mounting. This ranking is determined by the amount of ground plane provided by the positioning and clearance from obstruction (i.e., the roof line). The center of the roof is considered the ideal mounting location, provided the roof is metal. The diagram below illustrates the effective loss (at 800 MHz) due to insufficient symmetrical ground plane.

Larsen provides a complete selection of permanent and temporary mounting alternatives, using only the highest quality materials to ensure superior electrical performance and mechanical durability. They include magnetic mounts (MM, MMR, MS), trunk lid mounts (TLM, TLP), trunk gutter brackets (TMB), mirror mount brackets (MB), window clip mounts (KGGK) and, of course, traditional permanent hole mounts for all antenna series.

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## ANTENNA PLACEMENT



NOTE: Antennas are not to scale

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# MOBILE SERIES DESIGNATIONS



## NMO

The most popular mount is the NMO or “new Motorola” mount. This product is styled after the industry standard TAD/TAE 3/4” hole mount. Larsen’s NMO version consists of a nickel plated brass bushing and silver plated center contact for maximum conductivity and corrosion resistance. The NMO is available in the following temporary mounting styles: MM, MMR, TLM, TLP, TMB and MMB. In addition, there is a 3/8” snap-in version.



## NMOHF

Antennas operating above 1700 MHz require a better match than the traditional NMO mount can provide. To meet this requirement, Larsen developed a totally redesigned standard NMO mount which boasts a variety of innovative features such as:

- Simply pull the center pin to convert from low frequency to high frequency applications.
- High quality components such as gold plated conductors and precision tooled body parts.
- Accommodates a variety of coax types.
- Fully sealed solder connections.
- Improves lower frequency performance as well!
- A THK (thick mount) version is also available.



## LPT

Larsen’s LPT or Shadow antenna line is designed for “transit” applications. At a maximum height of 4 1/2”, the unique coil design is housed in a UV- and chemical-resistant “radome” enclosure for a discrete, low silhouette antenna. The Shadow is available in UHF, 700, 800, 900 and 2400 MHz frequencies for NMO mounting.



## LM

The LM or “Larsen Mount” has the best performance of all mobile mounts. Based on a 5/16”-24 thread stud, this 3/4” hole mount provides durable installation with solid ground plane contact to maximize antenna gain potential. In addition, the thread connection prevents system static caused by intermittent contact between the coil and the mount. LM antennas are available in the MMR, TLM, TLP and TMB mounting options. Mounts are also available with 1/4” and 1/2” studs for thick-surface applications.

# MOBILE SERIES DESIGNATIONS



## LP

The Mirage LP mobile antenna is a unique high performance, low profile antenna design. The antenna incorporates PCB technology into a durable, resin polymer plastic housing just 4 1/2" in diameter and 1 1/2" high. The Mirage mounts like any other NMO antenna. Available in UHF and 800 / 900 MHz frequencies. The Mirage LP requires a ground plane.



## PO

The PO Series mount is an S0239/UHF type mount which fits in a 5/8" hole. The mount is made of brass for conductivity and stainless steel for durability. The PO is available in MM, MMR, TLM and TMB temporary mounting options, as well as standard permanent mounts.



## MHW

Similar to the PO series in that it mounts directly to an S0239/UHF connector, the MHW is a half-wave design requiring no ground plane for operation. The MHW can mount directly on a radio or any of the PO permanent or temporary mounts. The MHW is available in VHF and UHF frequencies.



## PHW

The PHW is a half-wave antenna with a flexible radiating element. Useful for quick set up, it is designed to be suspended from any non-metallic object by the radiating element. No ground plane is required. The antenna interfaces directly with a PL-259 connector.



# MOBILE SERIES DESIGNATIONS



## OM

The unique OM series is a self-mounting, half wave antenna. The coax is soldered directly to the antenna coil, requiring only a 3/8" hole. The half wave design makes it ideal for mounting on any surface, including wood and fiberglass, as no ground plane is required. The OM is self-mounting with three nuts and bolts or self-tapping screws. Mounting plate and trunk mount options are available in VHF, UHF, 800 and 900 MHz frequencies.



## KG

Larsen's patented KG (Kulglass) glass mount antennas feature low impedance power transfer and the industry's smallest footprint. Virtually no loss difference (.5 dB) through the glass and the no-holes mounting makes it an ideal option. The KG series is available in VHF, UHF, Dual Band (VHF / UHF, 800 / 1850), 800 and 900 MHz frequencies.



## TMB

The TMB is a trunk gutter bracket which mounts between the trunk gutter and the trunk lid. The TMB uses three screws to attach to the inside of the gutter, keeping them invisible from outside the vehicle. Offered for NMO, LM, PO and MHW antennas.



## TLP

The TLP is Larsen's low profile trunk lid mount. The sleek compact design is only 3/4" high and mounts with two set screws. It is constructed of a durable resin polymer plastic and has a protective foam-padded bottom surface. Standard in black, the TLP is available for LM and NMO antennas. Also available in TLM version.



# MOBILE SERIES DESIGNATIONS



## MM/MS

Complete antenna / mount units incorporating either a 2" or 3" extra-strength magnetic base with a whip antenna, "mini mag" antennas come with premium quality stranded coax for maximum durability. They are available in VHF, UHF, 800, 900, 1850 and Dual Band (VHF / UHF, Cellular / PCS) frequencies in unity, 3 dB and 5 dB configurations.



## MM

Larsen's traditional magnetic mount offers a rubber outer boot and Teflon tape for vehicle paint protection. MM mounts are available with standard RG-58A/U or premium dual shield coax. Offered for LM, PO and MHW antennas.



## MMR

Larsen's heavy duty round magnetic mount features the NMO HF mount and offers 90 lbs of pull strength. The MMR is available in standard RG-58A/U or premium dual shield coax versions. Offered for NMO (high and low frequencies), LM, PO and MHW antennas.



## MB

The MB is Larsen's mirror bracket mount. This chrome mount comes with the NMOHF mount (for both low and high frequency applications) and is available with standard RG-58A/U or RG-58A/U dual shield cable.

