ADVANCED

DATA SHEET

GTR Mushroom Antenna
DCD-LPR-G

General Description

The NavSync DCD-LPR-G GTR Mushroom Antenna is a front end primary reference source used within Symmetricom's DCD 523 timing platform for synchronizing digital communications networks and is fully compliant with CE mark requirements. The GTR Mushroom Antenna can provide the Primary Reference Source (PRS) required at any key network node, independent of landline timing distribution.

The mushroom antenna has proven reliability and provides optimum signal quality through a design focused on low noise within the unit, high gain from the receiver, and integration of the antenna element and GPS receiver. NavSync's Mushroom Antennas are compatible with Symmetricom's DCD 523 Digital Clock Distribution Network Synchronization System.

Features

- GPS Information Transmitted via Fiber Optic Cable
- Latest Digital Technology
- Easy to Install
- Compliant to ANSI, Telcordia, ETSI, ITU-T, NEBS, and CE/AS Standards
- CE Marked

DCD-LPR-G Receiver Antenna

GTR Antenna/Receiver — This system uses fiber optic connection to the GPS clock to provide nearly zero signal loss between the antenna and the GPS receiver; This allows virtually unlimited options in the antenna placement.

The GTR (GPS Timing Receiver) is a eight-channel parallel receiver that:

- Simultaneously tracks up to eight GPS satellites
- Determines the six best satellite signals in view
- Derives an average timing correction input for those six satellites
- Provides a multiplexed 4kHz synchronization signal incorporated into one pulse-per-second timing, and a data communications channel to the GTI (GPS Timing Interface). The fiber optic carrier is continuous between the GTR and GTI.

Bulletin	NS44
Revision	A00
Date	25 May 2011

NAVSYNC

Power and Cabling Considerations

Power requirement: 11VDC to 32VDC approximately. 8 watts

An important note is that the GTR has a switched mode power supply which means that as the supply voltage increases the supply current decreases. This places specific requirements on the installation of the GTR power supply which are mentioned below.

When installing the power supply for the GTR, it is important to ensure that the voltage applied to the GTR is between the specified 11VDC to 32VDC. The effective series resistance (ESR) of the power supply and wiring must be considered when planning the power supply installation. Although the GTR only requires about 7 watts when it is running, it may draw over an amp instantaneously during initial power up.

To highlight typical problems that can occur, consider the following examples.

Configuration: (1)	An installation is set up with an 18VDC 500mA power supply, with over-current protection.
Error:	Although theoretically the power supply can supply 9 Watts, the transient turn on current of the GTR may force the power supply into shutdown and so it will never start.
Configuration: (2)	Similar to configuration 1 but without protection. A long run of cable before the lightning arrestor and the arrestor itself causes the ESR of the power supply to be about 10Ω.
Error:	The surge current at start up can exceed an Amp so the voltage at the GTR can drop below 11VDC due to the ESR of the power supply and so start-up may be unreliable.
Configuration: (3)	An installation is set up with a 40VDC power supply because a very long run of cable is required before the lightning arrestor. The arrestor itself causes the ESR of the power supply to be about 40Ω, and it was considered that the nominal 200mA current of the GTR would drop the local voltage at the GTR to less than 32VDC.
Error:	As with configuration 2, the GTR may not start reliably. The GTR may draw less than the nominal current. In this case the voltage will rise, causing the current to drop further, raising the voltage further, etc., until the GTR is damaged

Mushroom Interface

Positioning the GTR

When mounting the bracket, ensure that the GTR has a clear view of the horizon and is at least two meters away from transmitting sources that may interfere with reception. Keep the GTR out of the direct path of any microwave links.

The most important consideration in selecting a position for the GTR is the presence of objects level or above the GTR which obscure the sky or horizon. Where possible, there should be no obstruction to a full view of the sky. Overhead wires and other very narrow obstructions can be considered invisible to the GTR provided they are more than a few meters away. Large flat surfaces can decrease performance of the receiver. In the case of facia or a flat roof, use a pole to raise the GTR approximately one meter above the flat surface.

NOTE: When handling the GTR, do not apply excess force to the connectors.

Lightning Considerations

As the GTR is roof mounted and positioned to have a clear view of the sky, it can to be exposed to lightning.

There is no way to provide 100% protection from direct strike damage for electronic equipment that, by necessity, must be exposed to electric fields. It is possible however to reduce the likelihood of damage from near strike induced fields by ensuring that the installation obeys some fundamental rules. These include:

- Ensure the mounting bracket is properly grounded. This must be by a certified lightning strap that can carry the thousands of amps that flow. Attach the bracket with the supplied “V” bolts to a pole that is grounded is acceptable.
- Ensure the power supply is fed through a certified and correctly installed lightning arrestor. The GTR requires less than 8W.
- Keep the length of the shielded power cable (the portion between the arrestor and the GTR) short. The length of the supplied power cable should be considered the maximum.
- Connect the shield of the power cable securely to the arrestor earth ground point.
- Minimize the exposure of the power cable to electrically induced fields. This is done by feeding the power cable down the center of the pole used to mount the bracket.
- Ensure all conduits exposed to induced fields are of heavy gauge, welded seam construction and properly grounded.
- NEVER, work on any part of the installation or cabling when there are weather conditions that may result in lightning strikes or corona discharge.

Warning: Do not simply extend the power cable down the conduit that contains the fiber optic and attach it to the same power supply that feeds the GTI. This form of installation is dangerous and potentially lethal in the event of a direct lightning strike to the GTR. It will result in irreparable damage to either the GTR, GTI or both in the event of a near strike.

Position Location

Introduction

When extracting data from the GPS system, there are four unknown variables the GPS receiver must determine – X position, Y position, Z position and time. Each of these has an effect on the other. Therefore, before the GTR can produce an accurate time output, it must obtain valid data for the other three variables.

Automatic Position Location

When the receiver is powered for the first time, unless it receives other instructions, it will proceed though the following steps:

- Search the sky until it finds satellites and can start downloading almanac data for all the other satellites.
- Calculate a position and perform checks to ensure the position is sensible.
- Calculate a position once a second for an hour and produce an average of these positions. This is called Survey Mode.
- Repeat this process and produce a second average position in dual mode. In this mode the system outputs timing signals.
- Compare these two positions and if they are within 25 meters of each other, use that position as its surveyed position. If the two positions are not within 25 meters, more hour long averaged points are collected until the positions are within 25 meters (typically taking four hours). This mode is called Timing Mode.

The position derived automatically will be sufficiently accurate to provide a timing solution within the specification of this system and is usually superior to the accuracy of position on maps.

GTR Mushroom Antenna
DCD-LPR-G

For inquiries regarding the sale or repair of GTR mushroom products, please contact us at +353 61 475666 or sales@navsync.com

Revision	Revision Date	Note
A00	05/25/11	Advanced Release

NavSync, Ltd. Europe
Bay 143
Shannon Industrial Estate
Shannon, Co. Clare, Ireland
Phone: +353 61 475 666
E-mail: sales@navsync.com

North America
2111 Comprehensive Drive
Aurora, IL 60505, USA
Phone: 630.236.3026
E-mail: northamerica@navsync.com

www.navsync.com