

Spirent Simulator Data Set GPS M-code Test Implementation

Options for M-code Testing

Comprehensive development and testing of GPS M-Code receiver technology in an essentially unclassified laboratory environment has been possible by employing AES encryption in accordance with ICD-GPS-700A.

However, user equipment ultimately needs to be tested and certified when it contains the real signal encryption algorithm rather than AES.

Simulator Data Sets (SDS) contain official, pre-encrypted data streams and have been devised by the U.S. Government as a means of testing such GPS Receivers in the laboratory using hardware simulators but without the need to employ the real algorithm in the simulator itself.

Spirent AES and SDS Test Implementations

Spirent has supplied AES M-code test capability since 2004 via its SimMCODE option for GSS7700 GPS simulators.

Spirent's SDS extension to SimMCODE, shown in Figure 1, uses a commercial data server to store the data sets.

Code streams are delivered in real time to the GSS7700 signal generator using buffered high-speed LVDS (Low Voltage Digital Signalling) links.

The SimGEN control and modelling software reads low-rate MNAV data and coherent supporting legacy data (almanac, ephemeris and other content) contained in the data sets via an Ethernet TCP/IP link, and ensures M-code signals at L1 and L2 are generated coherently with legacy C/A code and P(Y)-code GPS.

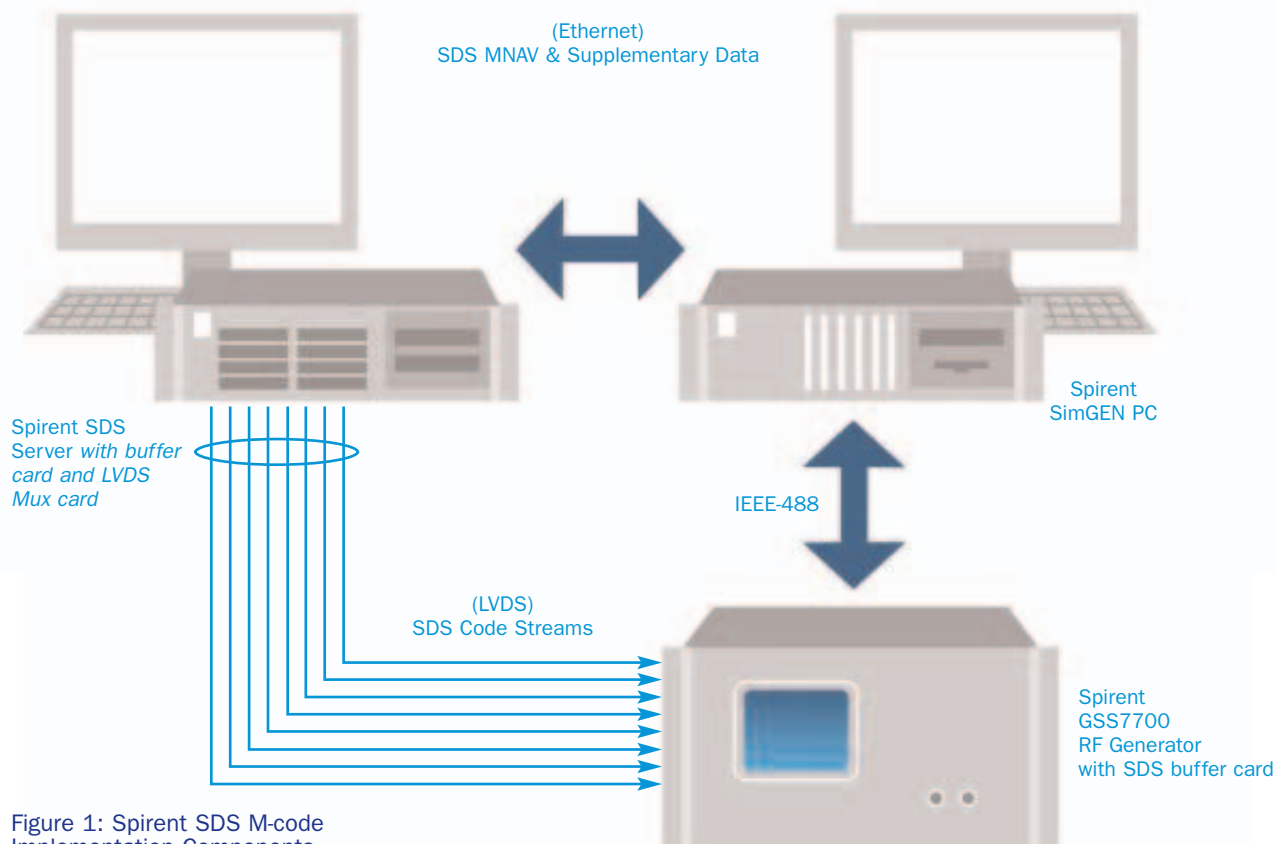


Figure 1: Spirent SDS M-code Implementation Components

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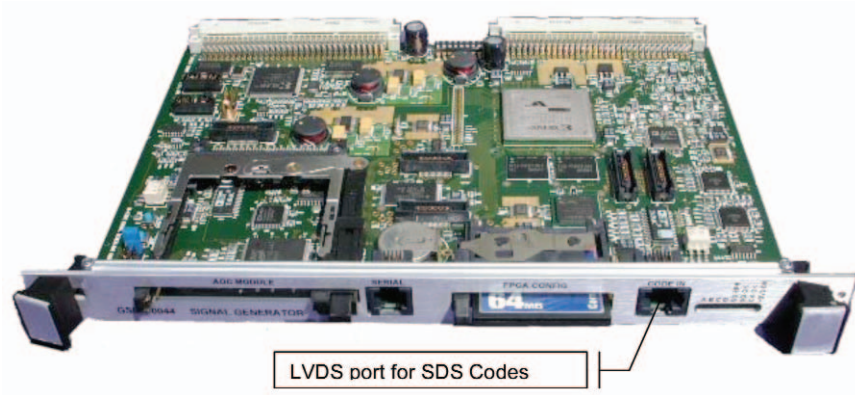


Figure 2: GSS7700 Signal Generator Card, showing LVDS Data Port

The LVDS port on each GSS7700 signal generator card, shown in Figure 2, accepts and de-multiplexes ranging codes in real time via internally fitted buffer cards. With each generator card supporting up to four satellite signals at a single frequency, a 16 channel L1 + L2 arrangement has 8 cards and hence 8 separate LVDS streams are delivered to the signal generator rear panel in a multi-way cable, as indicated in Figure 1. Spirent's SDS implementation retains the full range of simulated vehicle motion and other attributes that are familiar to users of the GSS7700 GPS simulation system and works in conjunction with Spirent's AES M-code simulation (SimMCODE).

Server PC Characteristics

- Server running Microsoft WindowsXP® Operating System with manufacturer-supplied Disk Array
- Sufficient space for up to 16 complete 1-hour Simulator Data Sets (each approx 56Gbyte)
- Gigabit Ethernet to allow data set upload of additional data sets as required from customer-supplied external storage
- Programmable data buffer and LVDS interface cards (PCI-format)

Security Approval

The Spirent SDS Upgrade Package for the GSS7700 GPS Simulator has been granted the Global Position Systems Wing security approval.

For further information, please contact us.

Cleared for release by the US Government



SALES AND INFORMATION
SALES AND INFORMATION
Spirent Communications
Aspen Way, Paignton
Devon, TQ4 7QR, England
T: +44 1803 546325
sales-uk@spirent.com
www.spirent.com/positioning

SALES AND INFORMATION
Spirent Federal Systems Inc.
22345 La Palma Avenue
Suite 105, Yorba Linda,
CA 92887
T: +1 714 692 6565
info@spirentfederal.com
www.spirentfederal.com

