

Application Note

AN2671/D
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FS Oncore™
Schematics Technology



OVERVIEW

Whether your product is in the design phase or is even an existing platform – the FS Oncore module can be added easily in an extremely small space and footprint.

FS Oncore is an extremely small, high-performance GPS receiver, capable of weak signal operation. Based on the Motorola Instant GPS MG4100 device, it contains the necessary functional blocks to perform autonomous, Mobile Station-based (MS-based) or MS Assisted-GPS (A-GPS). Motorola-provided software is boot-loaded into the FS Oncore from the host at power-up.

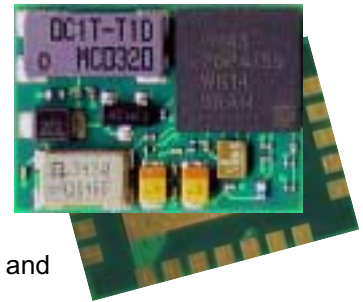
This complete, self-contained GPS receiver is designed to allow fast, cost-effective, and easy integration of GPS functionality into new and existing platforms. FS Oncore supports passive antenna input and either UART or SPI serial communications. Featuring advanced power management modes and signal detection to -152 dBm, FS Oncore is the optimal choice for your GPS requirements.

FS ONCORE MODULE FEATURES

The Instant GPS chip includes all the power management features you would expect from a low-power device. LNA, downconverter, baseband processing power, frequency synthesizer, and ARM-7 processor are all under control of the power-management features.

- High Performance
- Simple to use
- Reduces program risk
- Speeds customers' design and qualification cycle
- Supplied tested, simplifying EOL test requirements

- Built with high temperature solder for standard reflow process
- Eliminates unnecessary RF and Data connector costs
- Saves money in low to medium volume compared to sourcing the components and building you own GPS
- Small size (12mm x 16.6mm LGA) enables you to achieve a very small form factor without resorting to high cost / low yield esoteric packaging technologies.



LOW POWER

To conserve power, the on board TCXO is only on while position measurements are active. Once the measurement is complete, the TCXO is powered off, and the processor runs from a clock generated from the on board low power 32KHz oscillator. Total current consumption in standby mode between measurements is estimated to be 15uA, making battery powered asset and theft tracking a reality.

INTEGRATED SRAM

The integrated SRAM is used to store the firmware. After the Instant GPS chip is powered up, your application needs to download the firmware in a series of blocks. Either the SPI or UART port can be used for this process. Downloadable firmware means that field upgradeability is possible in your application.

ARM-7 CORE

An integrated ARM-7 core performs all of the processing functions you would expect from a GPS receiver. No firmware integration in your application is required to obtain a position solution, beyond a simple operating code bootload at power-up. FS Oncore from Motorola is truly an RF in – position solution out – GPS receiver.

Because all the processing required in a standard GPS receiver is built into the FS Oncore module, no further processing of the output is required.

FS ONCORE – BASED AROUND THE INSTANT GPS MG4100

Incorporating 256 Kb of program and data space, the MG4100 allows a full standalone system to be developed in your application.

Motorola Confidential Proprietary

**For More Information On This Product,
Go to: www.freescale.com**

FLASH CORRELATOR

Our new correlator technology enables your GPS application to work in weak signal environments. Increases in sensitivity of the GPS receiver mean that FS OnCore can provide a substantial increase in sensitivity over more traditional autonomous GPS receivers, which results in more position fix availability than ever before.

If your application has access to assistance data, even greater performance is possible with sensitivities as low as -152 dBm and market-leading TTFF performance. E911 compliance is assured in your application.

RF IN – SERIAL OUT!

In a traditional GPS chipset, there are numerous sensitive RF downconverters and IF filters circuits, which have to be carefully laid out for best performance. These circuits consume valuable space in your application and often can consume RF engineers' time, too!

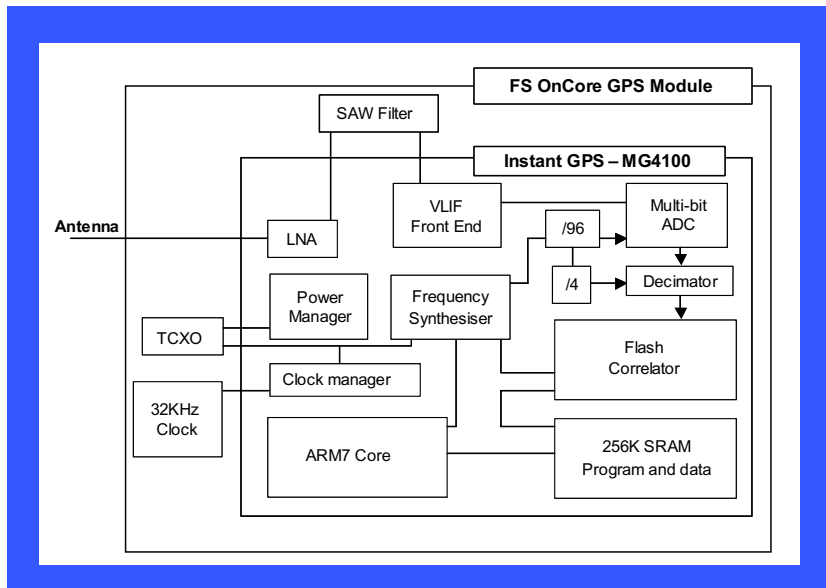
Our Low IF front end means that you no longer have to work hard on the RF downconverter in your design. The whole RF chain and IF Filter are integrated into our single-chip device. This includes a low noise amplifier (LNA), so that active or passive antennas can be accommodated in your design.

SCALABILITY

The FS OnCore allows the choice of device to be fitted into your application. If your application has GPS functionality as an option, thanks to the serial port 'discovery command,' your product can quickly determine if the GPS option or accessory is fitted.

EASE OF MANUFACTURE

With FS OnCore from Motorola, manufacturing with a GPS module has never been easier. Since all the necessary components, including center frequency SAW filter, reference oscillator, and 32 KHz clock, are integrated into the module, there are no critical components to place. Motorola is experienced at manufacturing GPS receivers in very high volumes to automotive-quality levels. This experience has been distilled into the FS OnCore module so that you do not need work so hard during manufacturing.



WHAT'S UNDER THE HOOD?

Almost everything you would expect to see in a traditional GPS module is fitted into a single 7 mm x 7 mm BGA package. We have also added features that translate to less work for you.

CHOOSE THE PORT

FS OnCore from Motorola offers a choice of I/O ports for your application. A dual UART or SPI port is available. At power-up, FS OnCore continuously checks each port for the host application's short message that directs the firmware download.

NEW POSSIBILITIES

With such high-performance, low-cost, and small-size GPS technology, FS OnCore from Motorola enables the creation of new location-sensitized to meet consumer demands.

GETTING STARTED

Using FS OnCore from Motorola could not be easier. We provide a simple module-usage reference design, including reference schematic, PCB layout, and recommended component list upon purchase of the FS OnCore low-cost evaluation kit.

All you need to do is add our module reference design to your product and then implement the simple I/O message-based firmware uploader in your application.

REFERENCE SCHEMATICS

Following are the FS OnCore reference schematics from Motorola:

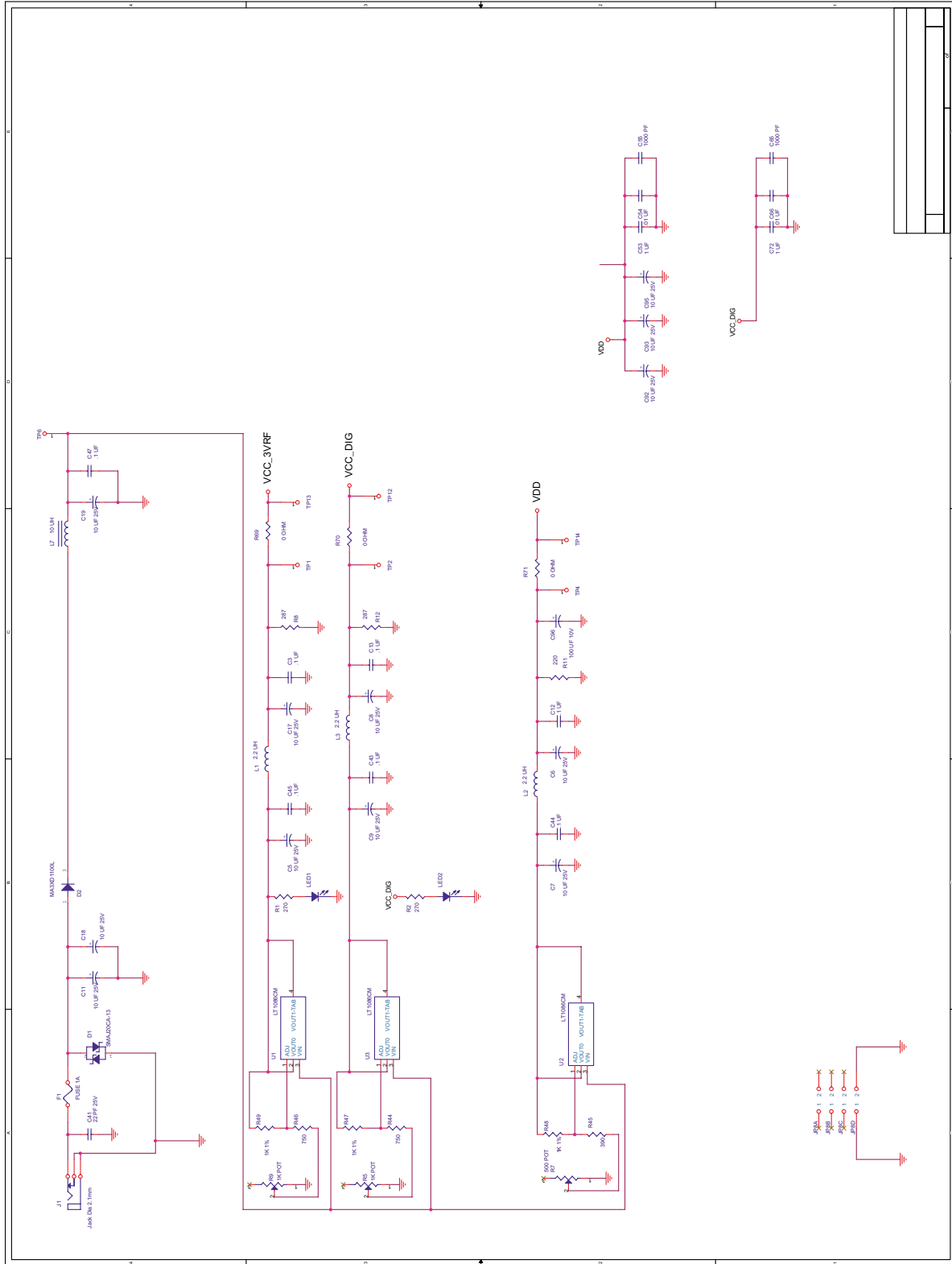


Figure 2.

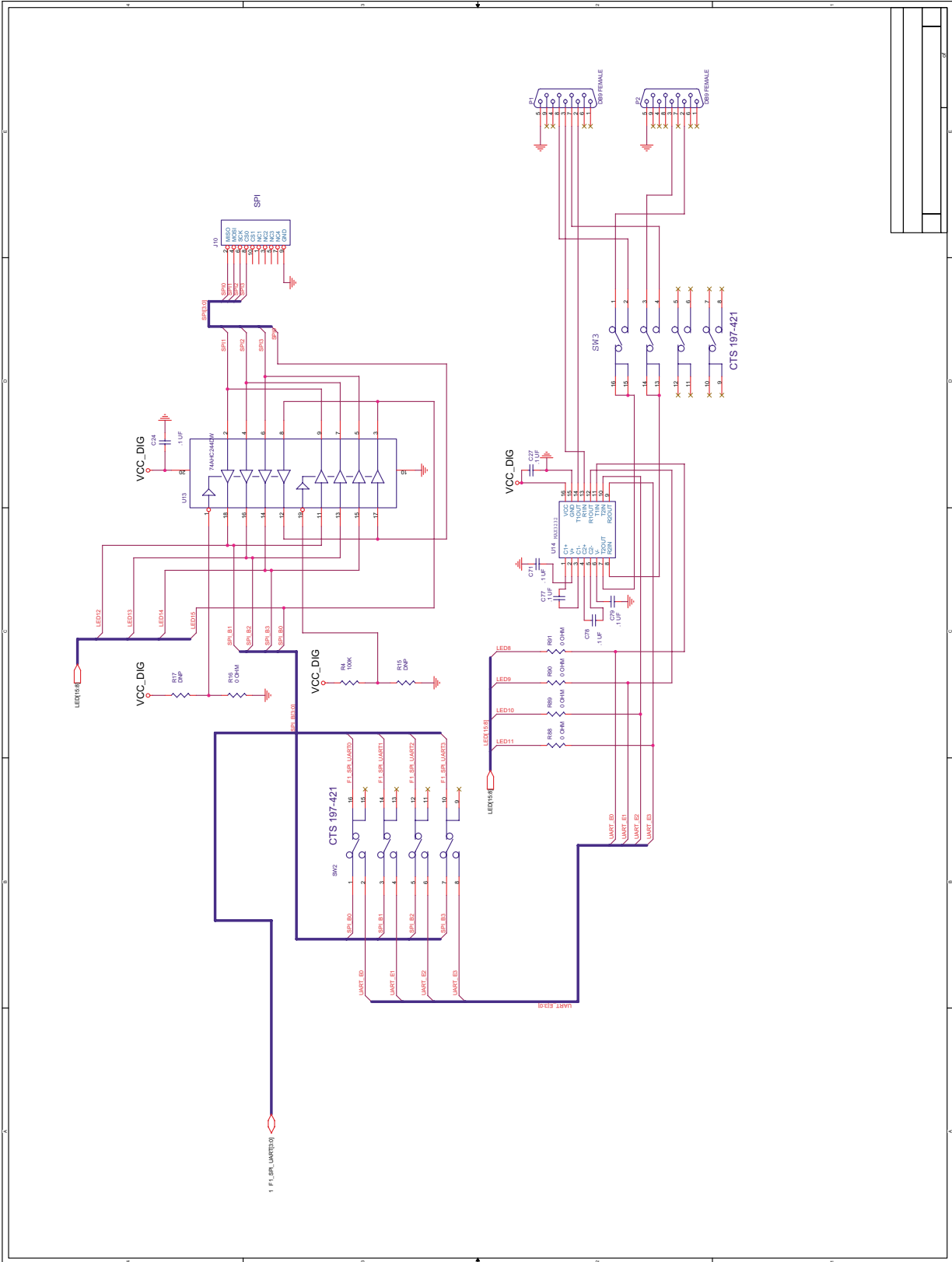


Figure 3.



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