

## Motorola ONCORE™ Product Summary

**ONCORE™ GPS Receivers:** Motorola produces several board level, OEM GPS receivers under the trade name ONCORE™. These low cost, high performance, 8 and 12 parallel channel GPS core receivers are available in configurations optimized for precision timing and tracking applications. Importantly, Motorola receivers operated correctly during the GPS 1024 week rollover in August of 1999, and they will handle the year 2000 changes properly.

**New M12 ONCORE™** With dimensions that measure 40 x 60 x 10 mm, the new M12 earns the distinction as the smallest ONCORE™ receiver ever. Available with right angle and straight connector configurations, its small size provides optimal application integration. The M12 was developed for a wide range of GPS positioning and tracking applications. A version optimized for precise timing will be available at a later date. The M12, 12-channel design ensures one of the fastest TTFF in the industry and provides split-second reacquisition time.



The M12 is also ideal for applications in which low power consumption is paramount -- it only requires a 2.75 to 3.2 supply voltage. And like its predecessors, the M12 features an RTCM differential GPS input, NMEA 0183 output, two COM ports, inverse differential GPS support, a user-controlled velocity filter and an antenna-sense circuit. Pseudorange output will be available in a future version.

**New RF ONCORE™ ChipSet:** This ChipSet is actually comprised of two separate components: The new Motorola M2003 processor chip, which includes the channel correlators and GPS code, and the miniature (40mm X 60mm X 10mm) PSRF1111A sub-assembly containing all of the sensitive RF components. To reduce parts count, Motorola designed the M2003 as a dual function processor capable of running Motorola GPS code simultaneous with customer designed functions.



**Table 1: Motorola ONCORE GPS Receiver Summary**

Model	Description	Features
M12 ONCORE™	New Miniature, 12 channel 3VDC platform	<ul style="list-style-type: none"> <li>• Full feature set announced in 3rd quarter 1999 (Request Preliminary Engineering Notes)</li> </ul>
RF ONCORE™ ChipSet	ChipSet for integration into OEM products	<ul style="list-style-type: none"> <li>• New two piece 12 channel GPS solution (Request Data Sheet)</li> </ul>
SL ONCORE™	Thin profile, 8 channel receiver for OEM products with space limitations	<ul style="list-style-type: none"> <li>• Uses Motorola's GT+ high performance ChipSet</li> </ul>
GT+ ONCORE™	8 channel receiver with increased EMI filtering and higher antenna current, optimized for tracking/positioning	<ul style="list-style-type: none"> <li>• Fast hot &amp; cold start TTFF</li> <li>• Low power (0.9 Watts)</li> <li>• Works down to -40 Degrees C</li> <li>• Excellent performance around foliage</li> <li>• Now with 500 ns 1PPS</li> </ul>
UT+ ONCORE™	8 channel receiver optimized for timing applications in high EMI environments	<ul style="list-style-type: none"> <li>• Field proven integrity monitor (T-RAIM)</li> <li>• Antenna sense circuit (short, open, ok)</li> <li>• &lt; 45 ns 1PPS (position hold mode)</li> <li>• Auto-Survey and 1PPS / 100PPS modes</li> <li>• 80 ma current for hi-gain antennas</li> </ul>

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**SL ONCORE™:** The DIN 1 size (40mm X 80MM) SL ONCORE™, based on Motorola's GT+ ChipSet, is a thin profile GPS receiver suitable for highly integrated products requiring small size. In addition to Mobile Data Terminals (MDT) the SL ONCORE™ is perfect for automobile tracking, positioning and location products based on DIN 1 Chassis standards. Featuring NMEA-0183 outputs and RTCM-104 DGPS inputs, the SL is available with a variety of Power/Data and RF connector combinations.



**GT+ ONCORE™:** This low cost GPS receiver now features a second, dedicated input port for RTCM-104 Differential GPS (DGPS) correction signals. It also includes Motorola binary and industry standard NMEA output messages and features one of the fastest



Time To First Fix (TTFF) in the industry. Starting with the new GT+ v2.2 firmware, the Issue Of Data Ephemeris (IODE) message was added. This enables the receiver to produce 2-5 meter typical accuracy when used in Inverse Differential GPS (IDGPS) tracking applications (requires a reference station at the monitoring location).

**UT+ ONCORE™:** This board level, GPS timing product continues to be the GPS receiver of choice for OEMs serving the telecommunications, broadcast synchronization, power transmission and wireless industries. The low cost UT+ includes a field proven Timing Receiver Autonomous Integrity Monitor (T-RAIM) and a triple filtered RF front end for operation in higher EMI



environments. In addition to its greatly enhanced reliability (significantly higher MTBF) UT+ firmware versions 2.0 and above include an Automatic Site Survey function (Self-Survey of position) for faster field installation and a user selectable 1PPS or 100PPS Precision output pulse.

**Motorola Antenna97:** This low cost, high performance, compact unit is designed to accommodate a wide variety of OEM, system integrator and end user applications. The 24 dB (including 6 Meter coax cable) active patch, Antenna97 operates from 5 VDC at just 20 mA supplied by the ONCORE GPS receiver or an external source depending on the specific application.



All Antenna97 configurations feature molded-in, side exit coaxial cable and offer optional coaxial connectors and cable lengths. The antenna design reflects Motorola's high standard for performance when operating in foliage/urban canyon environments and in the presence of electromagnetic interference.

The small footprint, low profile package and the shielded LNA (low noise amplifier) offer significantly enhanced performance while operating in a variety of GPS environments. Magnetic and direct mount options make the antenna suitable for a number of different installation configurations. The OEM or system integrator can count on signal gain and noise figure performance over an ambient operating temperature range which leads the industry (see Tech Note 498 for details). New antennas operating from 3VDC are being added now to accommodate the new M12 board and RF ONCORE™ ChipSet.

**Table 2: Popular 5V Motorola Antenna97 GPS Antenna Configurations, Other Versions on Request:**

Model Number	Gain	Mounting	Connector	Cable Length	Ant Housing
GCNAC1121A	24 dB	magnetic mount	BNC plug	6 meters (236 inch) coax	Gray Plastic
10001083	24 dB	direct mount	BNC plug	6 meters (236 inch) coax	Gray Plastic
GCNAC1111A	24 dB	magnetic mount	right angle OSX	6 meters (236 inch) coax	Gray Plastic
10001082	24 dB	direct mount	right angle OSX	6 meters (236 inch) coax	Gray Plastic
GCNSU1110A	24 dB	Substrate	right angle OSX	6 meters (236 inch) coax	None
GCNTM20A3A	25 dB	bracket mount	N connector	(To be specified)	Conical Radome

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**Timing Industry Successes:** From the beginning, ONCORE GPS receivers have excelled against numerous other GPS Receivers in tests conducted by the world's standards agencies, including the U.S. Naval Observatory, and third party developers. The original VP ONCORE™ and later UT ONCORE™ found application in a broad range of timing related products. The UT+ ONCORE™ features an enhanced Timing Receiver Autonomous Integrity Monitor (T-RAIM). This on-board, "timing quality indicator" - a first in the industry - detects and isolates bad satellite signals and removes them from the timing solution.

**Technical Support and Upgrades for Older Units:** After many successful years on the market, all versions of the Basic ONCORE™, the XT ONCORE™ and all 6 and 8 channel VP ONCORE™ receivers have been

phased out of production. Synergy Systems, LLC provides on-going technical support for all ONCORE™ GPS receivers and offers an upgrade path from the original Motorola XT ONCORE™ to the new, Synergy manufactured XTS/II GPS Sensor (see Tech-Note 704 for details).

**Summary:** Synergy Systems, LLC stocks quantities of all Motorola GPS receiver and antenna configurations and accessories, such as coaxial extension cables, interface boards and EMI shield modules, to assure shipment at the time of requirement. The company has established a proven history of providing on-time deliveries for projects requiring both high volume, immediate shipments and multiple deliveries made over longer periods. Visit [www.synergy-gps.com](http://www.synergy-gps.com) for additional information and technical support resources.

**Table 3: ONCORE™ Order Numbers for Specific Configurations\***

Model Number	DGPS Input	1 PPS	Bat B/U	Coax Connector	Power/Data Connector	Output Message	LNA *	Com Ports	Hi RF	Chan
<b>M12 ONCORE™ (Tracking)</b>										
P123T11N1X	BIN / RTCM	500 ns	X	ST MMCX	Right Angle	Bin / ASCII / NMEA		2		12
P123T12N1X	BIN / RTCM	500 ns	X	ST MMCX	Straight	Bin / ASCII / NMEA		2		12
P143T11N1X	BIN / RTCM	500 ns	X	ST MMCX	Right Angle	Bin / ASCII / NMEA		2		12
P143T12N1X	BIN / RTCM	500 ns	X	ST MMCX	Straight	Bin / ASCII / NMEA		2		12
P133T11N1X	BIN / RTCM	500 ns		ST MMCX	Right Angle	Bin / ASCII / NMEA		2		12
P133T12N1X	BIN / RTCM	500 ns		ST MMCX	Straight	Bin / ASCII / NMEA		2		12
<b>SL ONCORE™ (Tracking / Position)</b>										
R6111G111x	BIN / RTCM	500 ns		RA / OSX	Right Angle	Bin / ASCII / NMEA		2		8
R6111G114x	BIN / RTCM	500 ns		RA / SMB	Right Angle	Bin / ASCII / NMEA		2		8
R6111G117x	BIN / RTCM	500 ns		RA / SMB	Straight	Bin / ASCII / NMEA		2		8
R6211G111x	BIN / RTCM	500 ns	X	RA / OSX	Right Angle	Bin / ASCII / NMEA		2		8
R6211G118x	BIN / RTCM	500 ns	X	RA / OSX	Straight	Bin / ASCII / NMEA		2		8
<b>GT+ ONCORE™ (Tracking / Position)</b>										
R3111G111x	BIN / RTCM	500 ns		RA / OSX	Straight	Bin / ASCII / NMEA		2		8
R3211G111x	BIN / RTCM	500 ns	X	RA / OSX	Straight	Bin / ASCII / NMEA		2		8
R3111G114x	BIN / RTCM	500 ns		RA / SMB	Straight	Bin / ASCII / NMEA		2		8
R4112G111x	BIN / RTCM	500 ns		RA / OSX	Straight	Bin / ASCII / NMEA	X	2		8
R4212G111x	BIN / RTCM	500 ns	X	RA / OSX	Straight	Bin / ASCII / NMEA	X	2		8
R4112G117x	BIN / RTCM	500 ns		ST / OSX	Straight	Bin / ASCII / NMEA	X	2		8
<b>UT+ ONCORE™ (Precision Timing)</b>										
R5122U111x		< 45 ns		RA / OSX	Straight	Binary		1	X	8
R5222U111x		< 45 ns	X	RA / OSX	Straight	Binary		1	X	8
R5122U115x		< 45 ns		ST / OSX	Straight	Binary		1	X	8

\* VP Oncore™ discontinued effective Aug 1999 due to component shortages.

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