

**Motorola Oncore™ Product Summary**

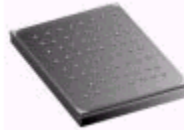
**Oncore™ GPS Receivers:** Motorola produces several board level, OEM GPS receivers under the trade name ONCORE™. These low cost, high performance, 8 and 12 parallel channel GPS core receivers are available in configurations optimized for precision timing and tracking applications. Importantly, Motorola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

**New M12 Oncore™** With dimensions of 40 x 60 x 10 mm, the new M12 earns the distinction as the smallest Oncore™ receiver ever. Available with right angle and straight data 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, provides split-second reacquisition time, and now features pseudorange output.



The M12 is also ideal for applications in which low power consumption is paramount -- it only requires 225mW at 3.0 volts. The M12 also 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.

**New Oncore™ GPS Chip:** The MG2000 Oncore GPS Chip integrated circuit was specifically designed for low power, cost effective host-based GPS applications. Measuring only 8x8 mm, the monolithic GPS sensor design includes a fully integrated main VCO and a multi-mode synthesizer that significantly reduce external component count and total system cost. The Oncore GPS Chip combines Motorola's proven dual down-conversion RF architecture and a 12-channel digital correlator using a 0.25µm BiCMOS Silicon Germanium process for superior on-chip interference mitigation and reduced power consumption.



**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>• Small size optimized for embedded applications</li> <li>• Low power requirement -- 225mW at 3.0 VDC</li> </ul>
MG2000 Oncore™ GPS Chip	ChipSet for integration into OEM products	<ul style="list-style-type: none"> <li>• Mixed mode GPS RF down-converter and 12-channel digital correlator</li> <li>• Host microprocessor independent architecture</li> <li>• Fully integrated main VCO</li> <li>• On-chip multi-mode synthesizer and LNA</li> <li>• 8x8 mm low profile 64-pin BGA package</li> <li>• 65 mW typical power consumption at 16.367 MHz reference frequency with power moding capabilities for further power reduction</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>

**For configuration assistance, order placement and technical support call:**

**SYNERGY SYSTEMS, LLC**  
*Time proven products and support*

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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 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

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.

**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 Synergy manufactured XTS/II GPS Sensor (see Tech-Note 704 for details). Information on the new lower cost SynPaQ series sensor is available on request.

**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 timely shipments. 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.

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Table 3: Oncore™ Order Numbers for Specific Configurations

Model Number	DGPS Input	1 PPS	Bat B/U	Coax Connector	Power/Data Connector	Output Message	Com Ports	Hi RF	Chan	Other
<b>M12 Oncore™ (Tracking)</b> 										
P123T11N1X**	BIN / RTCM	500 ns	X	ST MMCX	Right Angle	Bin / ASCII / NMEA	2		12	SRAM
P123T12N1X**	BIN / RTCM	500 ns	X	ST MMCX	Straight	Bin / ASCII / NMEA	2		12	SRAM
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> 										
R6111G114x	BIN / RTCM	500 ns		RA / SMB	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	
<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	

**Notes:**

- <sup>1</sup> "HI RF" is the enhanced capability to work within high EMI environments
- <sup>2</sup> The last digit in the part number, x, is reserved for the firmware version number.
- <sup>3</sup> Timing accuracy of <45 ns in position hold mode.
- <sup>4</sup> Synergy Systems, LLC now provides a plug-compatible replacement for the original XT ONCORE™. See Tech-Note 703 for details.
- <sup>5</sup> All versions of the VP ONCORE™ and Remote GPS phased out in August 1999.

\*\* These models contain a separate static RAM chip (SRAM) intended for future firmware features when released by Motorola. This SRAM chip is not to be confused with the microprocessor based SRAM holding receiver set-up information, Almanac information, Ephemeris data, etc.

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