10 June 2000

M12 Series Adaptor Boards

Updated 6 March 2019

**Replacing legacy Motorola 6 and 8 channel VP Oncore
and 6 and 8 channel GT, GT+ and UT, UT+ GPS receivers
with iLotus M12M Series 12 channel OEM GPS receivers**

Background:
Synergy Systems developed the first M12 Series Adaptor Board product in 2002. Adaptor Boards allowed Motorola's new (at the time) 12 channel M12+ to plug into Motorola's larger form factor VP, GT, GT+ and UT, UT+ Oncore receiver slots. If the application used NMEA messages, the Adaptor Board concept provided an inexpensive means for users to adopt the newer M12+, 12 channel GPS technology without making any physical changes to their motherboard.

The original M12+ Adaptor Board product allowed thousands of Motorola Eval Kit and XT Oncore owners to upgrade from their legacy 6 or 8 channel receivers. The Adaptor Board also allowed upgrading Synergy's XTS/II, SynPaQ/III and SynPaQ/E GPS Sensor products and evaluation kits to the newer 12 channel technology.

This new Adaptor Board assembly incorporates Motorola designed, iLotus M12M GPS receivers.
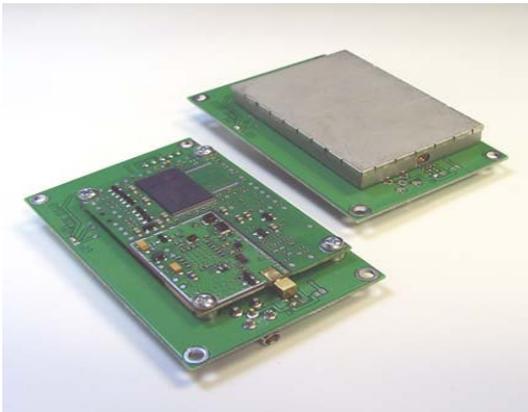
M12M Adaptor Board with and without EMI shield

Electrical Characteristics:
Since all power and signal pinouts of the Adaptor Board are the same as the legacy 5 Volt Motorola VP, GT+ or UT+ GPS receivers, the 3.3 Volt M12M receivers appear to the external electronics as a standard replacement unit. An optional on-board back-up battery runs the real-time-clock (RTC) when the receiver is powered off.

Note: Only specify an Adaptor Board Part Number with an on-board keep-alive battery option if the original VP, GT+ or UT+ being replaced contains a back-up battery.

5 Volt logic level inputs from the host hardware are translated into 3.3 Volt logic levels for use by the M12M Series receivers. The 3.3 Volt outputs from the M12M series receivers are converted to 5 Volts before being sent to the host.

Message Formats:
If the NMEA protocol is selected, code changes to interface with the 8 channel VP, GT and GT+ Oncore receivers, in positioning and navigation applications, may not be necessary.

If the host application is using the Motorola binary protocol for navigation, positioning or timing applications, some of the user's 6 and 8 channel Motorola binary operating code will need to be expanded to communicate with the 12 channel M12M Series receivers. See the 12 channel command\reply messages in the M12M User's Guide here: http://synergy-gps.com/support/. As an alternate, for 6 and 8 channel backward compatibility, specify Synergy's SSR-6Tf GPS receiver mounted on an Adaptor Board. Contact Synergy to discuss details.

The photo at left shows two typical examples of the M12M\Adapter assembly. In the foreground is an Adaptor Board providing a conversion from the M12M receiver's MMCX to an R/A MCX jack for the RF interface. This configuration allows the Adaptor Board to plug directly into VP, GT, GT+ and UT, UT+ Oncore receiver slots. An optional Adaptor Board configuration allows for connecting the RF input directly to the MMCX jack on the M12M receiver itself (see page 2).

● M12M series Positioning or Timing receiver
● Receiver with or without onboard back-up battery
● R/A MCX, straight MCX, or MMCX jack RF input
● With or without RF shield can
● Bare Adaptor Board without RF connectors
   (Uses RF connector on M12 Series receiver.)

A listing of the most popular M12M/Adaptor Board receiver configurations is shown on page 2 of this technote.

For configuration assistance, order placement and technical support call or Email:

Phone: (858) 566-0666 · Fax (858) 566-0768
Email: mailto:oeminfo@synergy-gps.com
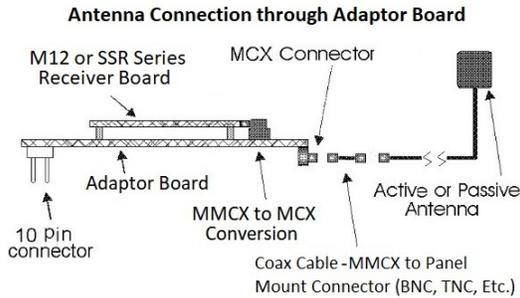**Web:** Http://www.synergy-gps.com

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Figure 1:

Antenna Connection through Adaptor Board

Figure 2:

Antenna Connection Directly to Receiver

This Adaptor Board configuration plugs into most VP, GT+ and UT+ slots in OEM GPS Navigation and timing products. It requires an RF Cable with an MCX connector mate to supply GPS signals to the Adaptor Board.
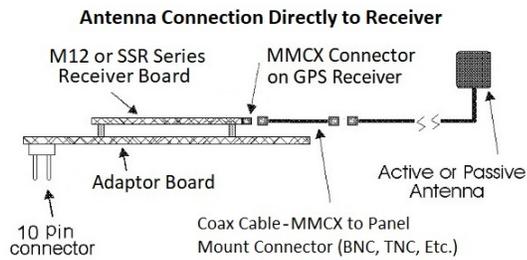
This adaptor Board configuration also plugs into most existing VP, GT+ and UT+ slots in OEM GPS Navigation and timing products. It requires a coax cable terminated with an MMCX plug, to supply GPS signals directly to the GPS receiver.

Ordering Information

PART NUMBER	INTERFACE DESCRIPTION
	Adaptor & M12M-N, Navigatoin with on-board battery
10001860	Straight 10 pin I/O header, R/A MCX Jack
	(Previously M12+ based P/N 10001460)
10001861	Straight 10 Pin I/O header, Straight MCX Jack
	(Previously M12+ Based P/N 10001461)
10001863	Straight 10 Pin I/O header, (Uses MMCX on M12M
	(Previously M12+ based P/N 10001463)
	Adaptor & M12M-N, Navigation without battery
10001873	Straight 10 pin I/O header, R/A MCX Jack
	(Previously M12+ based P/N 10001473)
10001881	Straight 10 pin I/O header, ST MCX Jack
	(Previously M12+ based P/N 10001481)
	Adaptor & M12M-T, Timing receiver with on-board battery
10001866	Straight 10 pin I/O header, R/A MCX Jack
	(Previously M12+ based P/N 10001466)
10001887	Straight 10 pin I/O header, (Uses MMCX on M12M)
	(Previously M12+ based P/N 10001487)
	Adaptor & M12M-T, Timing receiver without battery
10001872	Straight 10 pin I/O header, R/A MCX Jack
	(Previously M12+ based P/N 10001472)
10001874	Straight 10 pin I/O header, Straight MCX Jack
	(Previously M12+ based P/N 10001474)
10001879	Straight 10 pin I/O header, (Uses MMCX on M12M)
	(Previously M12+ based P/N 10001479)
	Adaptor Board Only (RoHS Compliant)
10001450G-2	Adaptor Board Only with hardware, (No M12M or RF Connectors)
10001450G-3	Adaptor Board Only (No M12M or RF Connectors)

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