

NMEA Multiplexer

Owner's Handbook

Document Number: 81250-1

Date: February 2005

Raymarine

Preface

Congratulations on having bought a Raymarine NMEA Multiplexer. This enables you to combine NMEA outputs from up to four devices, to provide a combined output to four other devices.

CAUTION: Electrical safety

Make sure you have switched off the power supply before you start installing this product.

Important information

To the best of our knowledge, the information in this handbook was correct when it went to press. However, Raymarine cannot accept liability for any inaccuracies or omissions it may contain.

In addition, our policy of continuous product improvement may change specifications without notice. Therefore, Raymarine cannot accept liability for any differences between the product and this guide.

EMC Installation Guidelines

All Raymarine equipment and accessories are designed to the best industry standards for use in the recreational marine environment.

Their design and manufacture conforms to the appropriate Electromagnetic Compatibility (EMC) standards, but correct installation is required to ensure that performance is not compromised. Although every effort has been taken to ensure that they will perform under all conditions, it is important to understand what factors could affect the operation of the product.

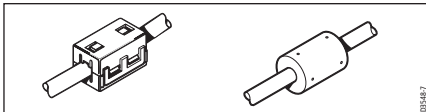
The guidelines given here describe the conditions for optimum EMC performance, but it is recognized that it may not be possible to meet all of these conditions in all situations. To ensure the best possible conditions for EMC performance within the constraints imposed by any location, always ensure the maximum separation possible between different items of electrical equipment.

For **optimum** EMC performance, it is recommended that **wherever possible**:

- Raymarine equipment and cables connected to it are:
 - At least 3 ft (1 m) from any equipment transmitting or cables carrying radio signals e.g. VHF radios, cables and antennas. In the case of SSB radios, the distance should be increased to 7 ft (2 m).
 - More than 7 ft (2 m) from the path of a radar beam. A radar beam can normally be assumed to spread 20 degrees above and below the radiating element.
- The equipment is supplied from a separate battery from that used for engine start. Voltage drops below 10 V in the power supply to our products, and starter motor transients, can cause the equipment to reset. This will not damage the equipment, but may cause the loss of some information and may change the operating mode.
- Raymarine specified cables are used. Cutting and rejoining these cables can compromise EMC performance and must be avoided unless doing so is detailed in the installation manual.
- If a suppression ferrite is attached to a cable, this ferrite should not be removed. If the ferrite needs to be removed during installation it must be reassembled in the same position.

Suppression Ferrites

The following illustration shows typical cable suppression ferrites used with Raymarine equipment. Always use the ferrites supplied by Raymarine.



Connections to Other Equipment

If your Raymarine equipment is to be connected to other equipment using a cable not supplied by Raymarine, a suppression ferrite **MUST** always be attached to the cable near the Raymarine unit.

Contents

Preface	i
CAUTION: Electrical safety	i
Important information	i
EMC Installation Guidelines	i
Suppression Ferrites	ii
Connections to Other Equipment	ii
Introduction	1
Inputs & outputs	1
NMEA inputs	2
Input priorities	2
NMEA outputs	2
Installation	3
Mounting	3
Connections	4
Real-time or buffered inputs	4
NMEA in	4
NMEA out	5
Power supply	6
CAUTION: Electrical Safety	7
Securing cables	7
Indicators	7
Data indicator lit	7
Overflow indicator lit	7
Both indicators lit	8
Maintenance	8
Disposal	8
Specifications	9

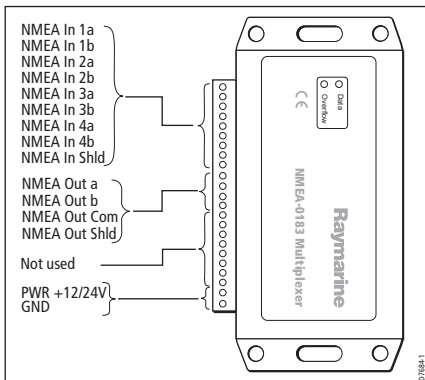
Introduction

The Raymarine NMEA Multiplexer combines data from up to four NMEA-0183 devices to provide a single, multiplexed NMEA output.

Inputs & outputs

The NMEA Multiplexer has:

- Four NMEA inputs (listener-ports), **NMEA In 1, 2, 3 & 4.**
- One NMEA output (talker-port), **NMEA Out**
- One common terminal **NMEA Out Com.**



NMEA inputs

Each **NMEA in** (listener) port is a differential pair across terminals **a** and **b**, and can receive NMEA data from one device. The speed of each listener port is fixed at 4800 baud.

NMEA data on listener ports **1** and **2** is multiplexed in real time (i.e. unbuffered).

NMEA data on listener ports **NMEA In 3** and **4** is fed via a discrete buffer for each port. Each buffer holds approximately 2 seconds of NMEA data.

Input priorities

Data at the listener ports is prioritized, so that each **NMEA in** port is read twice as often as the next one. Thus for example, data at input **1** is read in twice as often as data at input **2**, four times as often as input **3** and eight times more often than input **4**.

NMEA outputs

The **NMEA Out** (talker) port is a differential pair across terminals **a** and **b**, and feeds multiplexed NMEA data from all the NMEA inputs, to up to four products.

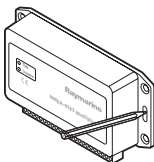
Installation

Mounting

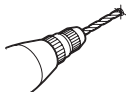
As the NMEA Multiplexer is not waterproof, it must be fitted in a location where it will not come into contact with water.

Secure the NMEA Multiplexer to a suitable surface, as shown in the following illustration.

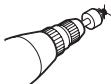
1. Place the NMEA Multiplexer at the intended location and mark holes for fixing screws.



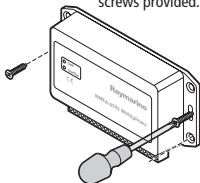
2. Drill two 1/8" (3.4 mm) pilot holes for NMEA Multiplexer screws.



3. Countersink pilot holes to prevent damage to the mounting surface.



4. Secure the NMEA Multiplexer with the screws provided.



Connections

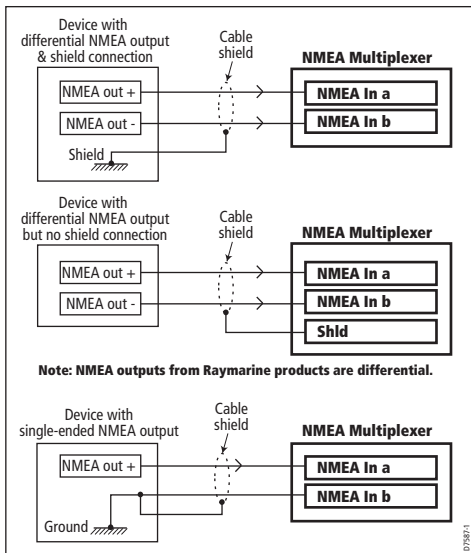
Real-time or buffered inputs

Before connecting NMEA inputs to your NMEA Multiplexer, consider whether they should be connected as real time or buffered inputs:

- Data running at a fast rate and consisting of single sentences, particularly time-critical data, should be connected to either **NMEA In 1** or **NMEA In2**, real time inputs. This includes data from devices such as Fast Heading Sensors, and Fluxgate Compasses. When data is processed in real time, some sentences may be lost, but the timing of the data is maintained and there is no time delay. These inputs will store only one NMEA sentence at a time, and thus prevent unwanted delays.
- Slower data that is input as a burst should be connected to either **NMEA In 3** or **NMEA In 4**, as buffered inputs. This includes data such as GPS, route and depth information, for which the timing is less critical. These inputs can store multiple sentences (12 to 70, depending on length). This is necessary for devices such as GPS, which can output 10 sentences at once, every 1 or 2 seconds.

NMEA in

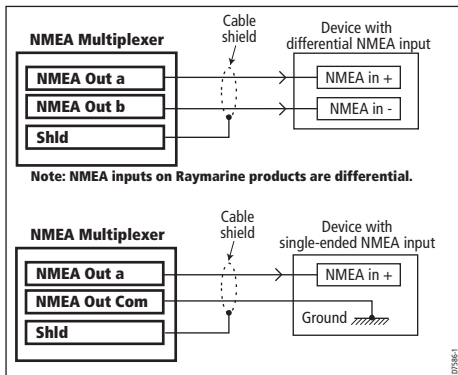
Connect an unused pair of **NMEA In a** and **b** terminals on the NMEA Multiplexer to the NMEA output port of each device from which you wish to receive NMEA data. The manner in which the connections are made depends on whether the device has a differential or single ended output, as follows:



NMEA out

Connect the **a** and **b** terminals of the **NMEA Out** connector to the listening ports of up to four devices to which you wish to transmit multiplexed data. The manner in which the connections

are made depends on whether the device has a differential or single ended output, as follows:



Power supply

The NMEA Multiplexer operates from a dc supply voltage in the range 8 V to 30 V and provides protection against reversed polarity. It is recommended to connect the NMEA Multiplexer to the same power source or circuit breaker as the ships instruments and/or computer.

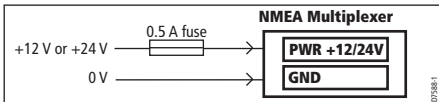
Protect the power supply with a 0.5 A fuse. The wires used to connect the power supply must be less than 50 m in length and have a total cross-sectional area of at least 0.2 mm^2 . The following examples represent the minimum requirement:

- 24 AWG single-strand wire.
- 7/0.2 multi-strand wire, i.e. 7 strands, each of 0.2 mm diameter

CAUTION: Electrical Safety

Before connecting power to the NMEA Multiplexer, turn off the power supply.

Connect either a 24 V or 12 V power supply, via a 0.5 A fuse, as follows:



Securing cables

When you have connected all cables, use appropriate cable ties and/or clamps to make sure the cables are physically secure and cannot be accidentally pulled from their connectors.

Indicators

Data indicator lit

A green **Data** LED blinks when valid NMEA data is received at the listener ports, to indicate satisfactory connection and polarity of the connected device. The **Data** LED will not blink if the input polarity is reversed.

Overflow indicator lit

A red **Overflow** LED indicates a buffer overflow, i.e. that more data is coming in than can be transmitted. When a buffer is full,

partially received sentences will be discarded, to ensure that the NMEA Multiplexer only passes complete and valid sentences.

You may be able to resolve this overflow situation if you:

- Set up the devices on the listener ports to send less data or data at greater intervals. If possible, disable non-relevant sentences.
- Swap the input devices to different listener ports.

Both indicators lit

Both LED s will blink once when power is applied to the NMEA Multiplexer. If the red LED stays lit, this indicates that a hardware error was found during self-test.

Maintenance

There are no user-serviceable parts inside the Raymarine NMEA Multiplexer. However periodically check to ensure that the connections to it are secure, and that the condition of the connecting cables is satisfactory.

Disposal

When you want to dispose of this product, do so in accordance with local regulations.

Specifications

Supply voltage:	8 V to 30 V dc, protected against reversed polarity.
Supply protection:	0.5 A fuse
Supply connection:	Minimum requirement either: 24 AWG single-strand wire. or 7/0.2 multi-strand wire.
Current consumption:	70 mA maximum, with fully loaded talker ports.
Inputs:	4 x NMEA-183, galvanically isolated.
Input resistance:	>800 Ohm.
Outputs:	1 x NMEA-183.
Buffers:	2 buffers of 1000 characters (NMEA In 3 and NMEA In 4 only).
NMEA Out:	Combined data from NMEA inputs.
Speed NMEA in:	4800 baud.
Speed NMEA out:	4800 baud.
Indicators:	Overflow and Data LEDs.
Dimensions:	138 x 72 x 33 mm.
Housing:	Flame retardant ABS.

Raymarine UK Ltd,

Quay Point,
Northarbour Road
Portsmouth,
Hampshire PO6 3TD,
United Kingdom.

Tel: +44 (0) 23 9269 3611
Fax: +44 (0) 23 9269 4642

www.raymarine.com

Raymarine Inc,

22 Cotton Road,
Unit D, Nashua,
New Hampshire 03063-4219,
USA.

Tel: +1 603.881.5200

Fax: +1 603.864.4756

www.raymarine.com

Raymarine