G-Series Systems

Installation and Commissioning Instructions

Raymarine®

Raymarine

G-Series System

Installation & Commissioning Instructions

Document Number:87070_1
Date: June 2007

Trademarks and registered trademarks

Autohelm, HSB, Raymarine, RayTech, Sail Pilot, SeaTalk and Sportpilot are registered trademarks of Raymarine Limited. Apelco is a registered trademark of Raymarine Holdings Limited (Registered in all major marketing territories).

AST, Autoadapt, Auto GST, Autoseastate, Autotrim, Bidata, Marine Intelligence, Maxiview, On Board, Raychart, Raynav, Raypilot, Raystar, ST40, ST60, Seaclutter, Smart Route, Tridata and Waypoint Navigation are trademarks of Raymarine Limited.

Maptech is a registered trademark of Maptech.

All other product names mentioned are trademarks or registered trademarks (if applicable) of their respective companies

Contents

Warnings and cautions

Product installation

This equipment must be installed and operated in accordance with the Raymarine instructions provided. Failure to do so could result in poor product performance, personal injury, and/or damage to your boat.

Potential ignition sources

The equipment in these instructions is NOT approved for use in hazardous/flammable atmospheres such as an engine room.

Switch off power supply

Make sure you have set the boat's power supply to OFF before you start installing this product. Unless otherwise stated connect and disconnect equipment only with the power supply switched OFF.

High voltage

Equipment contains high voltages.
Unless otherwise instructed within these instructions do not remove the covers or attempt to access the internal components.

Grounding requirements

This display is not intended for use on "positive" ground boats. The power input cable earth screen connections must be connected directly to the boats ground.

Radar

The radar scanner transmits electromagnetic energy. Ensure all personnel are clear of the scanner before switching to Tx (transmit mode)

Navigation aid

Raymarine equipment is intended for use only as an aid to navigation. You must still ensure that a properly qualified person is acting as navigator at all times and that all applicable maritime regulations are adhered to. You must also ensure that all proper judgements and actions are taken to ensure a safe passage. Always maintain a permanent watch

Service and Maintenance

This product contains no user serviceable components. Please refer all maintenance and repair to authorized Raymarine dealers. Unauthorized repair may affect your warranty.

Sun covers

To provide protection against the damaging effects of ultra violet (UV) light, use the sun covers when equipment is not in use.

Cleaning

DO NOT use acid, ammonia based or abrasive products.
DO NOT use commercial high pressure washing (jet wash) equipment.

EMC installation guidelines

Raymarine equipment and accessories conform to the appropriate Electromagnetic Compatibility (EMC) regulations. This minimizes electromagnetic interference between equipment, which could otherwise affect the performance of your system.

Correct installation is required to ensure that EMC performance is not compromised.

For optimum EMC performance, we recommend that:

- Raymarine equipment and the cables connected to it are:

i. 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).
ii. 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 product is supplied from a separate battery from that used for engine start. This is important to prevent erratic behavior and data loss which can occur if the engine start does not have a separate battery.
- Raymarine specified cables are used.
- Cables are not cut or extended unless doing so is detailed in the installation manual.

Remember

Where constraints on the installation prevent any of the above recommendations:

- Always allow the maximum separation possible between different items of electrical equipment. This will provide the best conditions for EMC performance for the installation.

Suppression ferrites

Raymarine cables may be fitted with suppression ferrites. These are important for correct EMC performance. Any ferrite removed to facilitate installation must be replaced in the original position immediately installation is complete.

- Use only ferrites of the correct type, supplied by Raymarine authorized dealers.

Connections to other equipment

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

Waste Electrical and Electronic Equipment Directive

The Waste Electrical and Electronic Equipment (WEEE) Directive requires the recycling of waste electrical and electronic equipment. Whilst the WEEE Directive does not apply to some of Raymarine's products, we support its policy and ask you to be aware of how to dispose of this product.

The crossed out wheeled bin symbol, illustrated above, and found on our products signifies that this product should not be disposed of in general waste or landfill.

Please contact your local dealer, national distributor or Raymarine Technical Services for information on product disposal.

Water ingress

As it exceeds the water proof rating capacity outlined by standards CFR46 / IPX7, subjecting any Raymarine equipment to commercial high pressure washing equipment may cause subsequent water intrusion and failure of the equipment. Raymarine will not warranty equipment subjected to high pressure washing

Warranty

To register your new Raymarine product, please take a few minutes to fill out the warranty card included in the box or go to:

www.raymarine.com

It is important that you complete the owner information and return the card to receive full warranty benefits, including notification of software updates if they are required.

Disclaimer

The technical and graphical information contained in this handbook, to the best of our knowledge, was correct as it went to press. However, our policy of continuous improvement and updating may change product specifications without prior notice. As a result, unavoidable differences between the product and handbook may occur from time to time. Raymarine cannot accept responsibility for any inaccuracies or omissions it may contain. For the latest product information visit our website - www.raymarine.com

Chapter 1: Introduction

This guide provides information to help you plan, install and commission your G-Series system.

Chapter contents

See also

You may require additional information when planning or installing your system.

- **Spares and accessories.**
  Lists of spares, accessories and cables can be found in Appendix C - Spares and accessories.
- **Raymarine handbooks and manuals.**
  All additional documents referred to in this manual can be downloaded from the Raymarine website. wwww.raymarine.com/handbooks.

1

1.1 Handbook information

This document is part of a series of books associated with the G-Series system

All documents can be downloaded from:
www.raymarine.com/handbooks.

G-Series handbooks

Title	Part number
Installation and commissioning instructions	87070
Operating guide	86126
User reference guide	81276

Additional handbooks

You may also refer to separate instructions provided with the associated ancillary equipment.

1.2 Plan your installation

Prior to installing your G-Series system you will need to plan carefully. Use the information in this guide to assist you.

Tick	Planning for	Installation instructions
	Overall system	Chapter 2: Typical systems Chapter 3: Packs and contents
	Equipment location	Chapter 5: Installation and mounting
	Power, supply and distribution	Chapter 4: Cables and connections
	Connections and cables	Chapter 4: Cables and connections
	Nav Station details	Appendix B - Nav Station schematic
We strongly recommend that you produce a complete schematic diagram for your G-Series installation. See Appendix B - Nav Station schematic.		

1.3 Install your system

Once you have completed the planning stage, proceed with the installation:

Tick	Installation task	Installation instructions
	Ensure you have all required equipment, accessories and cables.	Chapter 3: Packs and contents Chapter 4: Cables and connections Appendix C - Spares and accessories
	Site all equipment.	Chapter 5: Installation and mounting
	Route all cables.	Chapter 4: Cables and connections
	Drill cable and mounting holes.	Chapter 5: Installation and mounting
	Make all connections into equipment.	Chapter 4: Cables and connections
	Power on test the system.	Chapter 6: Initial test
	Secure all equipment in place.	Chapter 5: Installation and mounting

1.4 Commissioning

Once you have completed the installation, proceed with the commissioning of the system:

Tick	Commissioning task	Installation instructions
	Assign master GPM	Chapter 7: Initial Setup
	Set up Nav Stations	Chapter 7: Initial Setup
	Assign keyboards	Chapter 7: Initial Setup
	Commission ancillary equipment	Chapter 8: Commissioning
	Complete warranty cards for equipment installed	Refer to separate warranty booklets supplied with equipment.

Chapter 2: Typical systems

This section provides an overview of typical G-Series systems and ancillary equipment.

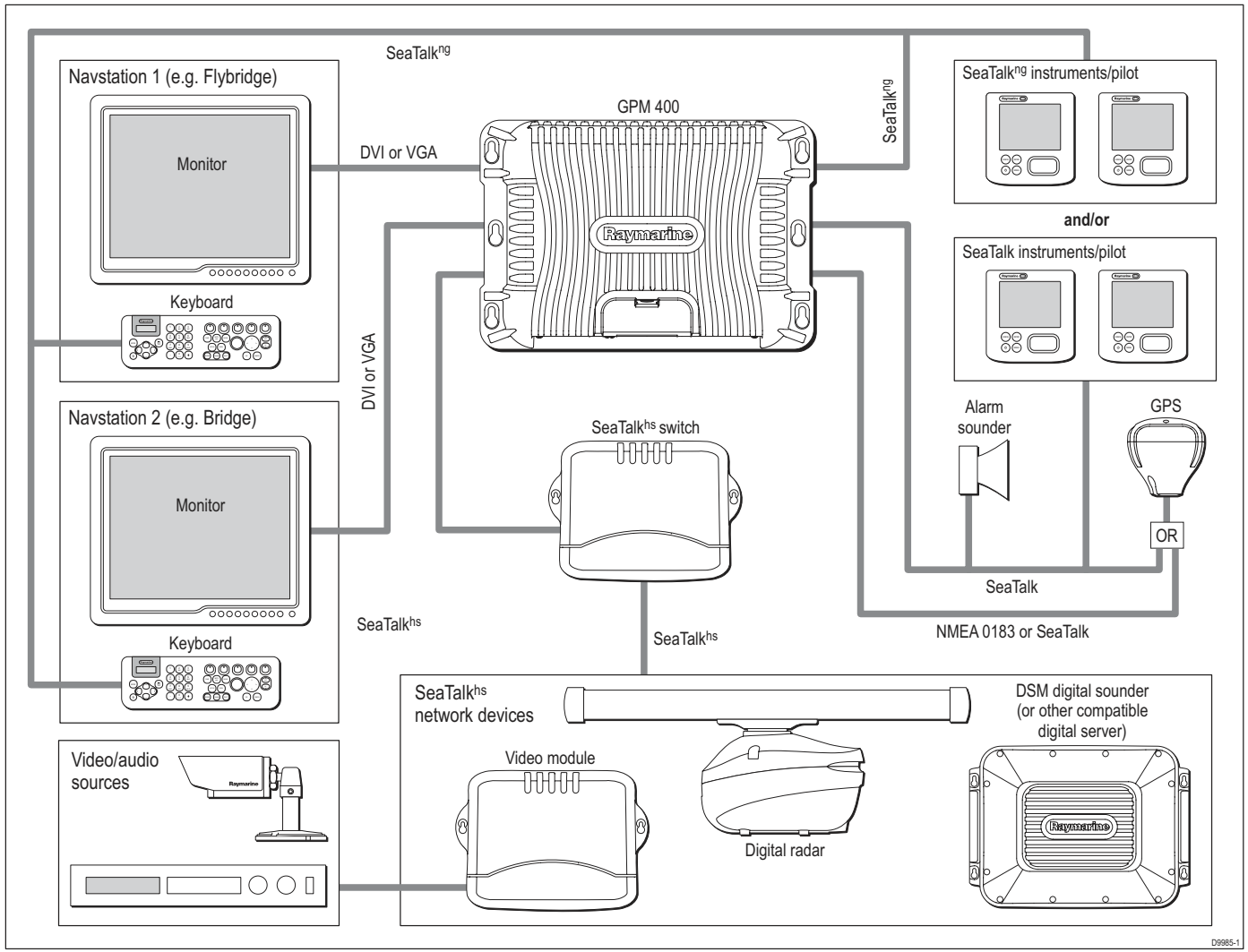
Chapter contents

See also

- Cables and connections on page 31

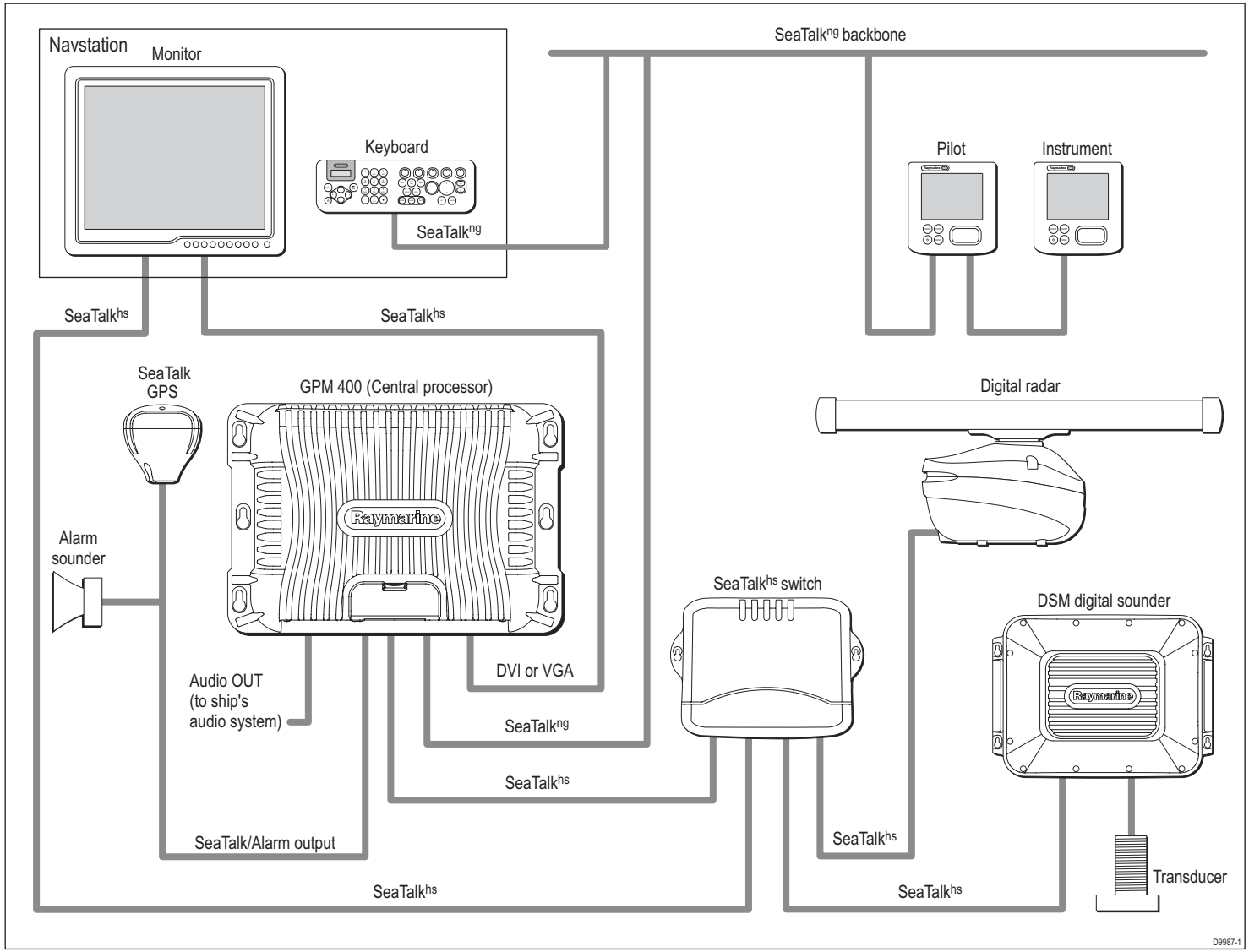
2

System overview

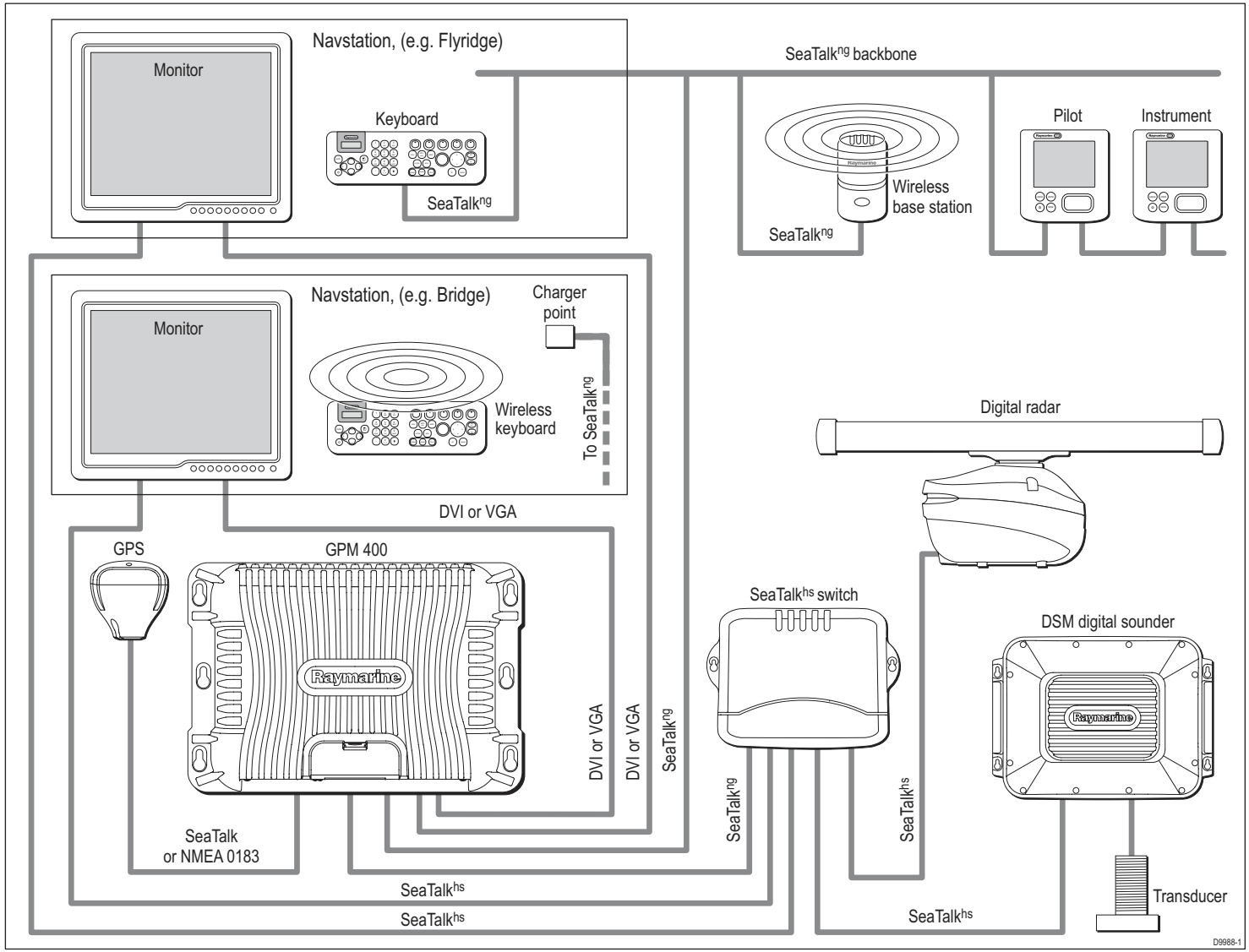


Note: Where 2 displays are connected to a single processor, both will display the same information.

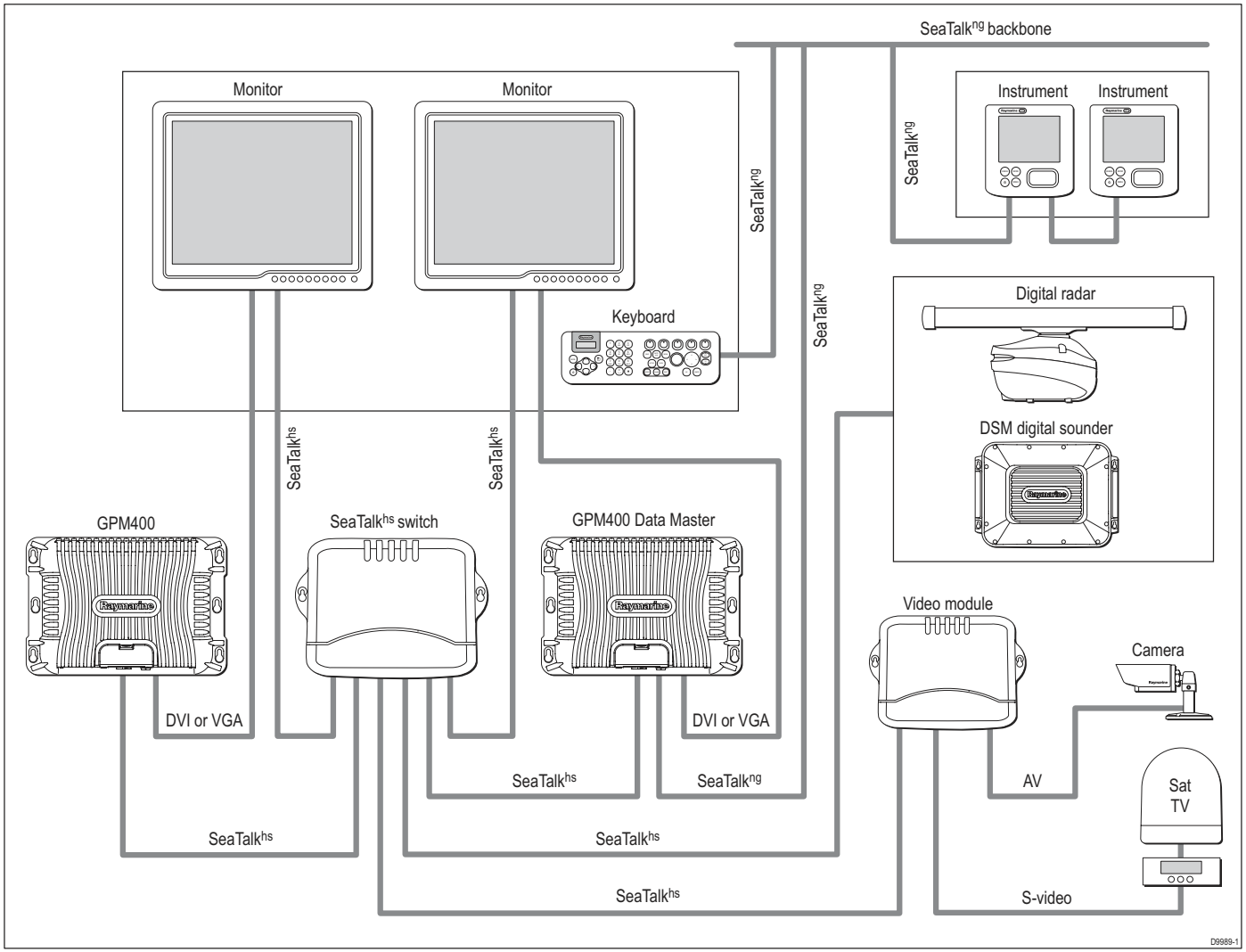
Single processor system



Dual Nav station (single processor)

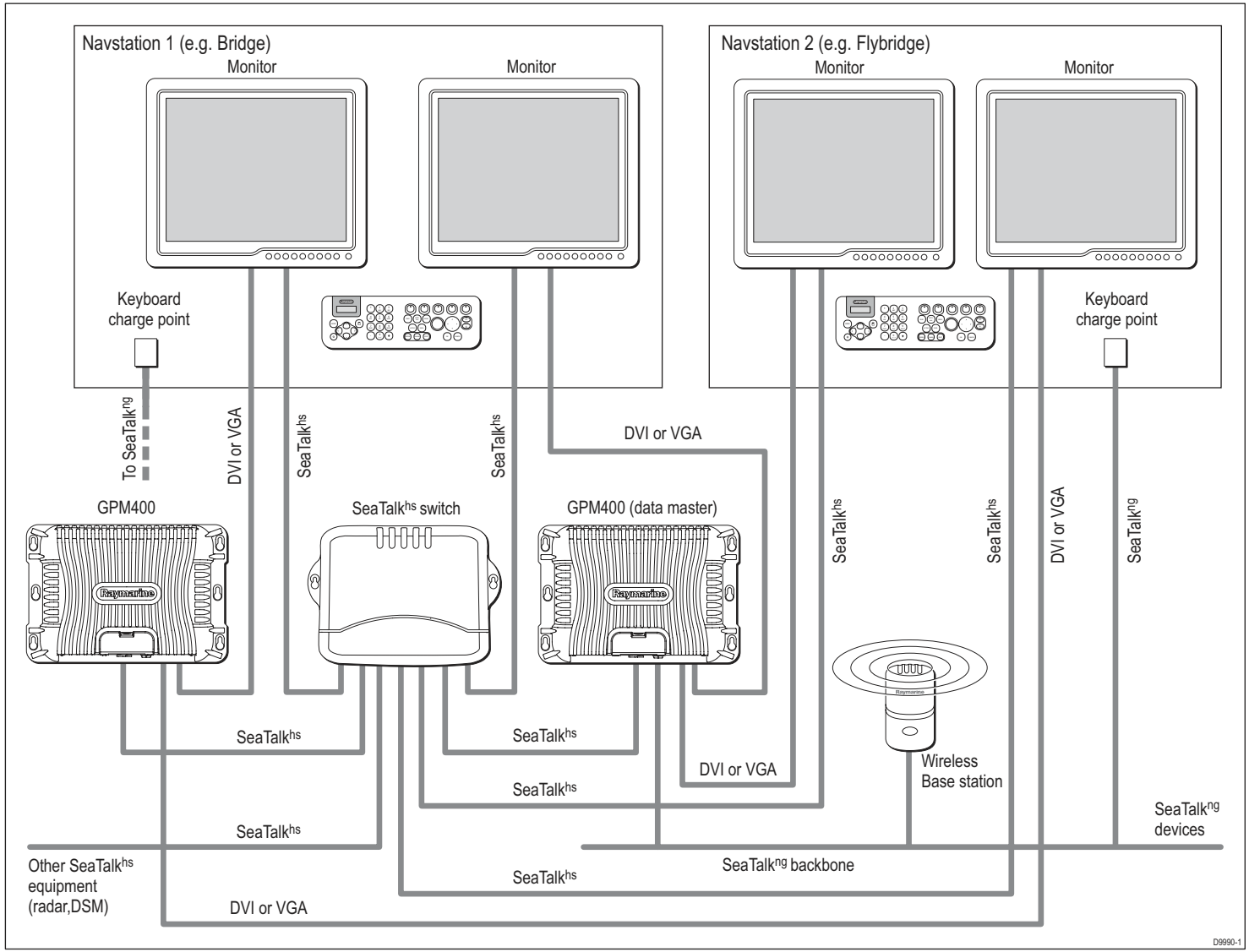


Network system, Single Nav station (Dual processor)

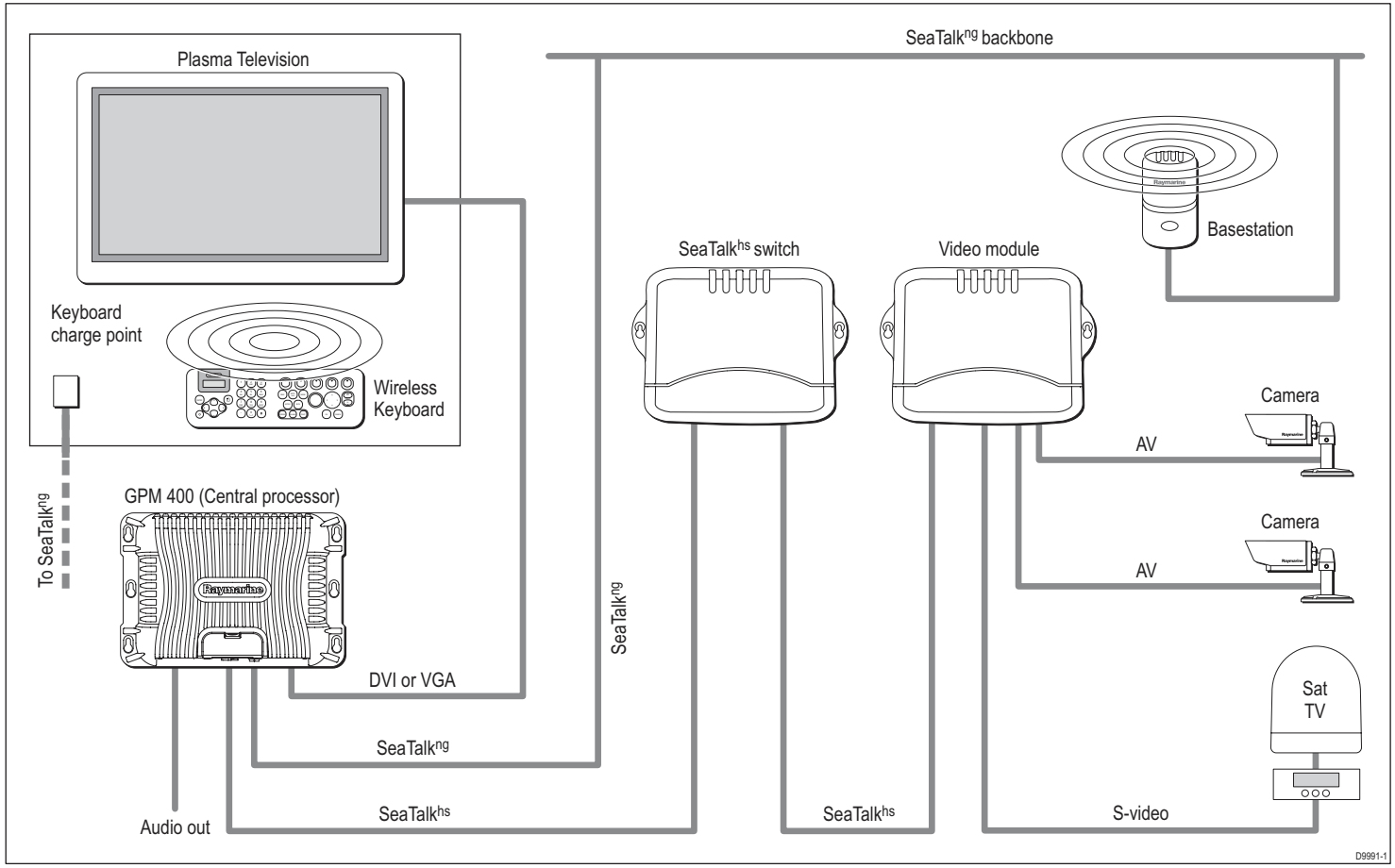


Note: Each display at a Nav station must be connected to a different GPM400. DIsplays sharing a GPM will both display identical information.

Dual Nav station (Dual processor 2)



Entertainment system



Note: The system may include up to 2 Video modules to provide additional video capacity.

System limits

The following quantities of G-Series components may be connected within a single system:

G-Series component	Max. number on system
GPM400 processor module	4 (of which 1 must be set as master GPM)
Monitors	8 (2 per GPM400 processor)
Keyboards	8
GVM400 video module	2
DSM digital sounder	1
Digital radar scanner	2

See also

For limitations associated with ancilliary components and systems, refer to the separate manufacturer's documentation.

Chapter 3: Packs and contents

This section contains details of pack contents for the G-Series system components.

3

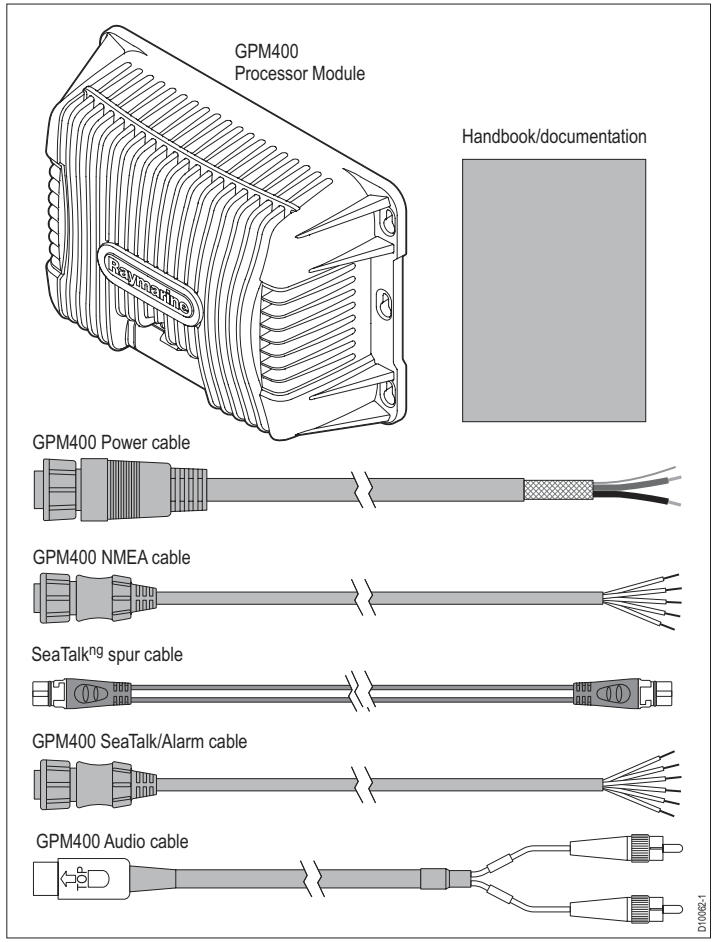
Chapter contents

See also

- For peripheral components (e.g. GPS antenna) refer to the separate instructions supplied with the equipment.

3.1 GPM400 processor

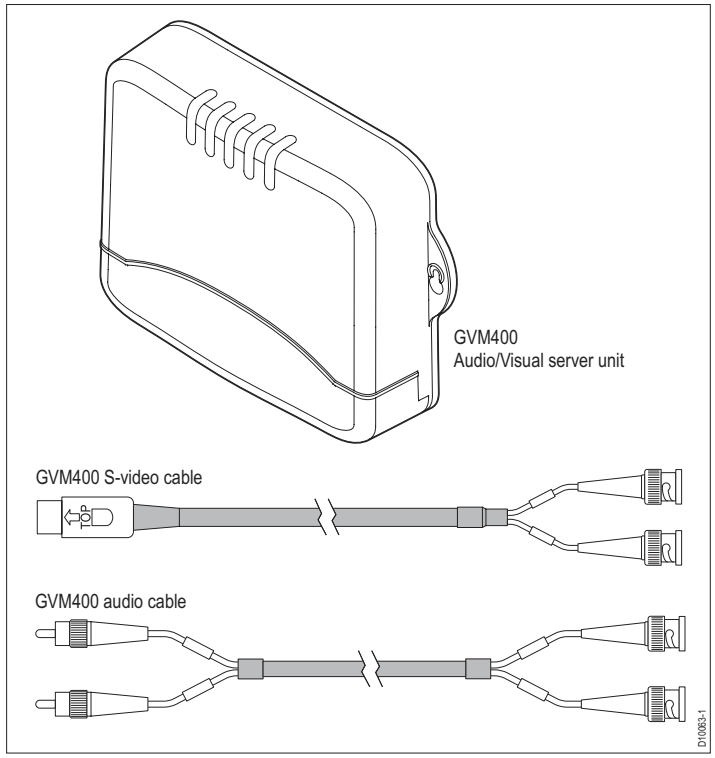
Pack items



Description	Part No.
GPM400 Processor module - US version GPM400 Processor module - EU version GPM400 Processor module - ROW version	E02042 E02047 E02048
1.5 m (4.9 ft) Power cable	R08003
1.5 m (4.9 ft) NMEA 0183 cable	R08004
1 m (3.3 ft) SeaTalkng spur cable	A06039
1.5 m (4.9 ft) SeaTalk/Alarm Out cable	E55054
3 m (9.8 ft) G-Series Audio out cable	R08266
Install pack	R08295
User documentation CD	47018
Commissioning and installation guide	87070
Quick reference guide	86126
Warranty booklet	80017

3.2 GVM400 video module

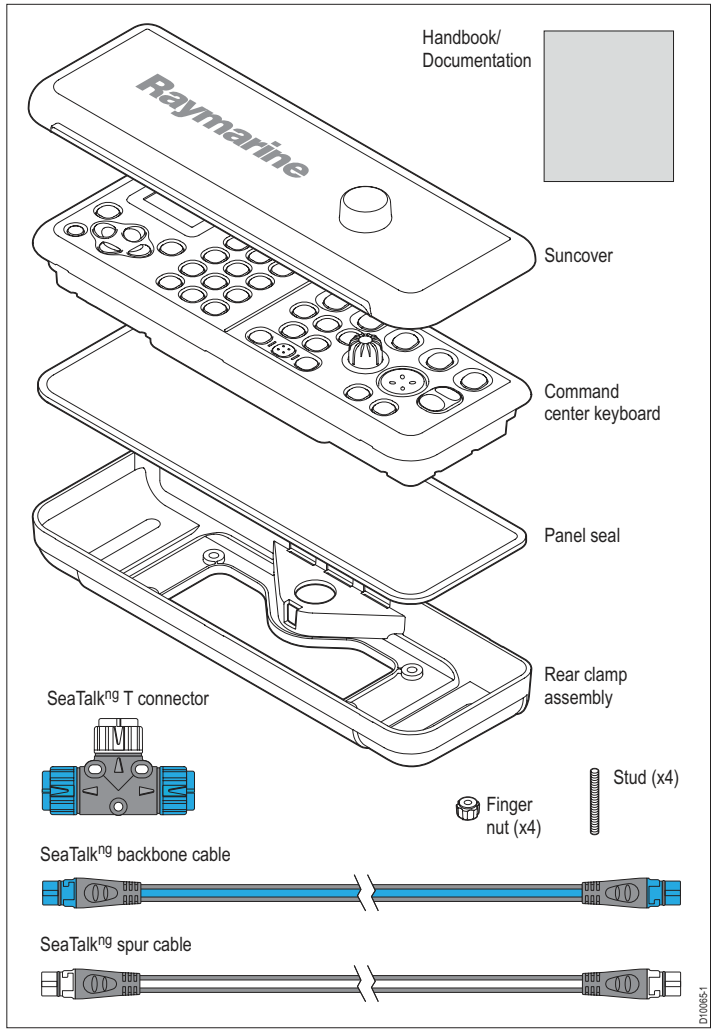
Pack items



Description	Part No.
GVM400 Video Module	E02043
1.5 m (4.9 ft) S-Video cable	R08274
1.5 m (4.9 ft) Audio cable	R08275
Install pack	R08318
Installation sheet	87068
Warranty booklet	80017

3.3 G-Series Keyboard

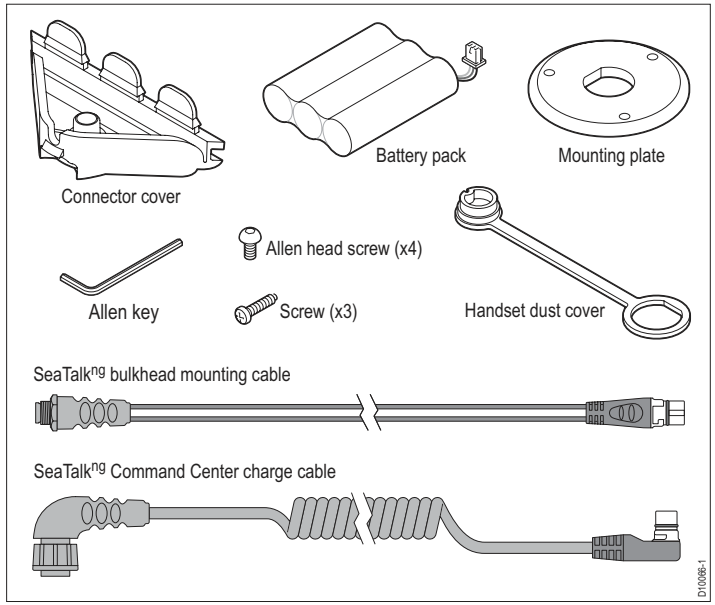
Pack items



Description	Part No.
G-Series command center keyboard	E02044
Sun cover	R08307
1 m (3.3 ft) SeaTalk^{ng}/NMEA2000 cable	A06039
400 mm (15.75 in) SeaTalk^{ng} backbone cable	A06033
SeaTalk^{ng} T-piece connector	A06028
Rear cover / mounting bracket	R08308
Screw pack	R08309
Installation sheet	87084
Warranty booklet	80017

3.4 Keyboard wireless upgrade kit

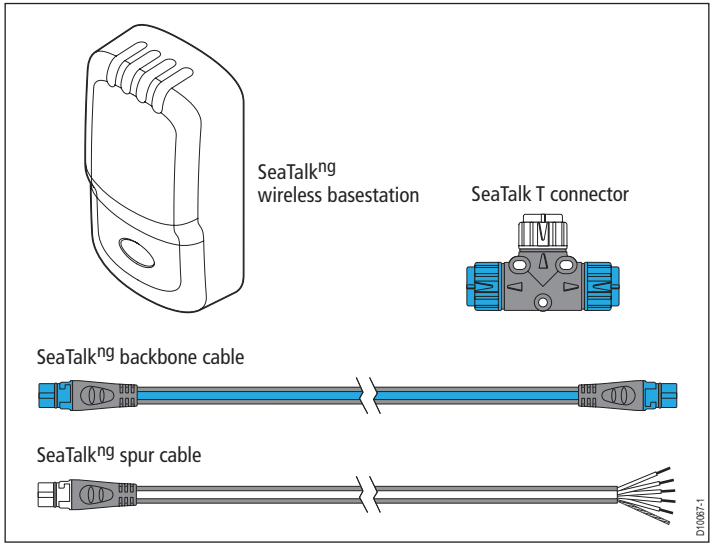
Pack items



Description	Part No.
SeaTalk^{ng} bulkhead mounting cable	R08311
2.5 m (8.2 ft) keyboard charge cable	R08310
Battery pack	R08312
4 x allen head M3 screws	R08313
Mounting plate	R08314
Connector cover	R08315
Mounting screws (self tapping) x 3	R08316
Dust cap (covers dash mount cnx)	R08317
Allen key	R08338
Installation Sheet	87085

3.5 SeaTalk^{ng} wireless basestation

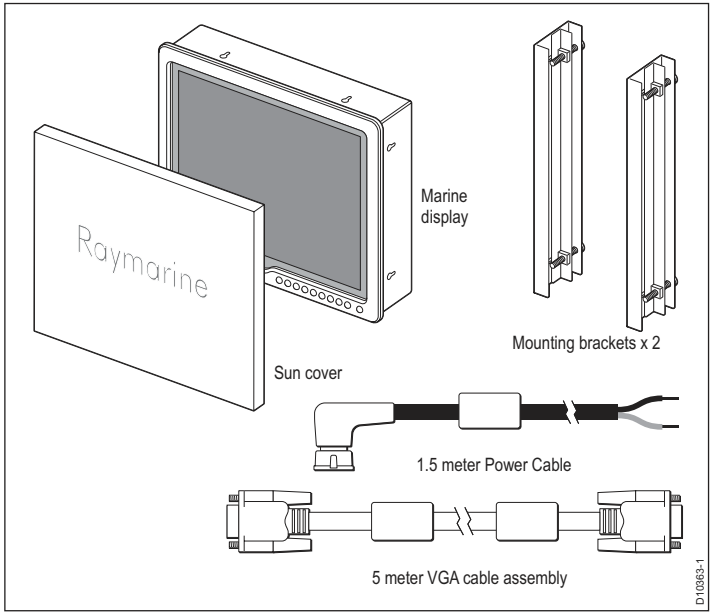
Pack items



Description	Part No.
Wireless basestation	E02045
1 m (3.3 ft) SeaTalk NG spur cable - stripped ends	A06043
400 mm (15.75 in) SeaTalk^{ng} backbone cable	A06033
SeaTalk NG T-connector	A06028
Installation instructions	87086

3.6 Marine monitors

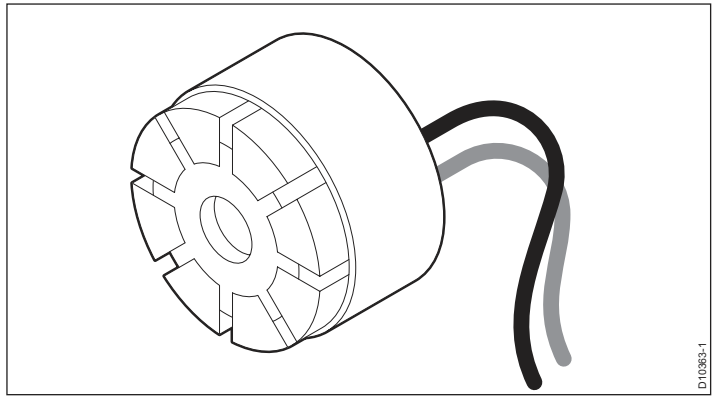
Pack items



Description	Part No.
17” Marine Display 19” Marine Display	E02036 E02037
Sun cover	Part numbers depend on the display model. Refer to your display handbook for details
2 x mounting brackets	
5 m (16.4 ft) VGA cable	
1.5 m (4.9 ft) Power cable	

3.7 Alarm buzzer

Pack items



Description	Part No.
Alarm buzzer	E26033

Chapter 4: Cables and connections

4

This section contains details of cables and connections. Use it to plan your system wiring and ensure that you have the necessary cables available.

Chapter contents

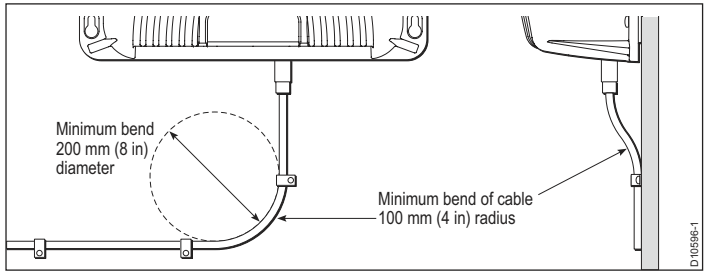
4.1 General instructions

Cable types and length

- Follow the guidelines given in this section to determine appropriate cable types and length.
- Unless otherwise stated use only standard cables of the correct type, supplied by Raymarine.
- Ensure that any non-Raymarine cables are of the correct quality and gauge. For example, longer power cable runs may require larger wire gauges to minimize any voltage drop in a cable.

Routing cables

- No acute bends. Minimum bend radius of 100mm.



- Protect all cables from physical damage and exposure to heat. Use trunking or conduit where possible. Avoid running cables through bilges or doorways, or close to moving or hot objects.
- Secure cables in place using tie-wraps or lacing twine. Coil any extra cable and tie it out of the way.
- Where a cable passes through an exposed bulkhead or deckhead, a watertight feed-through should be used.

You should always route data cables:

- as far apart from other equipment and cables as possible,
- as far away from high current carrying AC and DC power lines as possible,
- as far away from antennas as possible.

Strain relief

- Ensure adequate strain relief is provided. Protect connectors from strain and ensure they will not pull out under extreme sea conditions.

Circuit isolation

For installations using both AC and DC current:

- Always use isolating transformers or a separate power-inverter to run PC's, processors, displays and other sensitive electronic instruments or devices.
- Always use an isolating transformer with Weather FAX audio cables.
- Always use and RS232/NMEA converter with optical isolation on the signal lines.
- Always make sure that PC's or other sensitive electronic devices have a dedicated power circuit.

Cable shielding

Ensure that all data cables are properly shielded that the cable shielding is intact (e.g. hasn't been scraped off by being squeezed through a tight area).

Schematic diagram

When planning your connections and cabling, produce a schematic diagram to assist you.

EMC installation guidelines

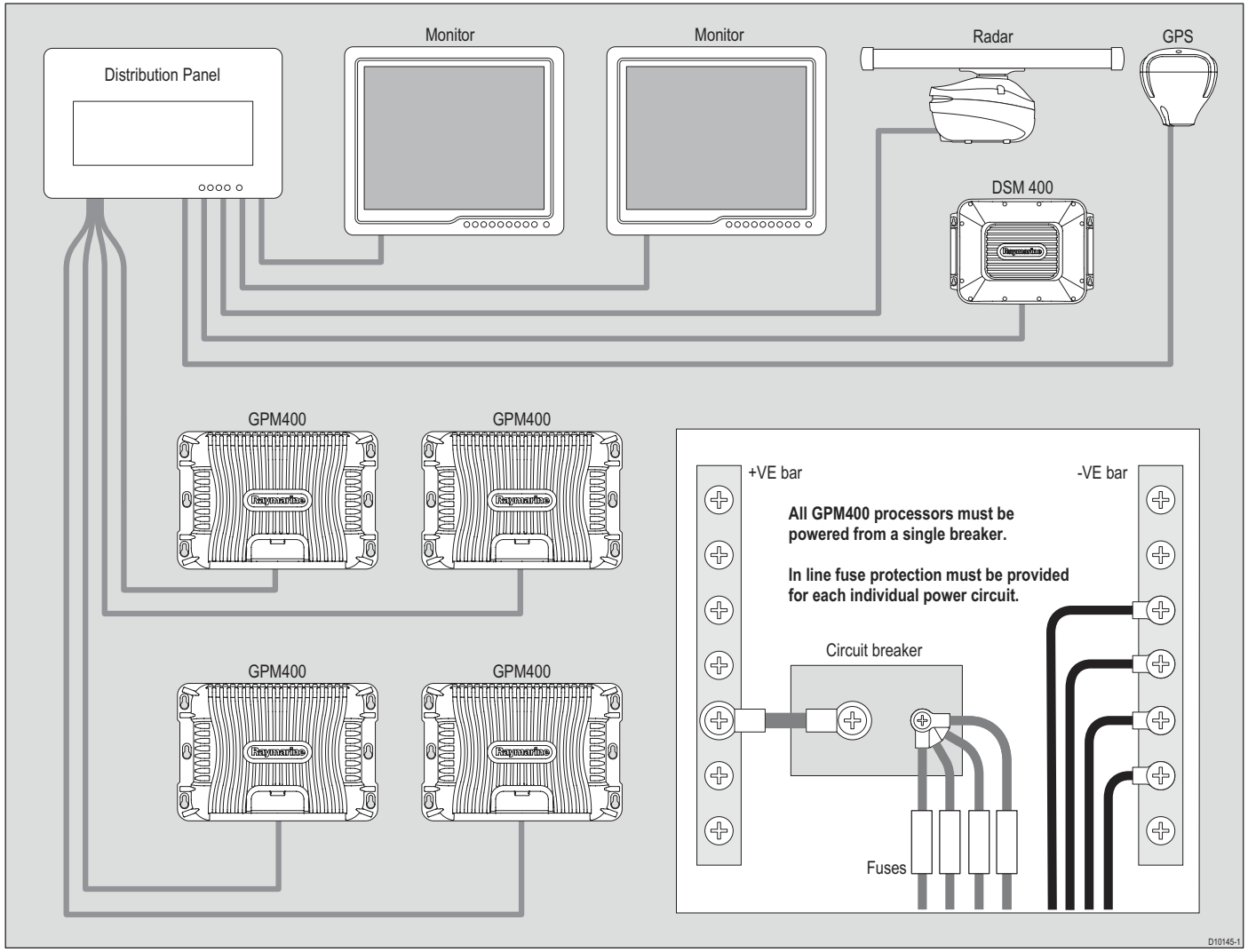
Raymarine equipment and accessories conform to the appropriate Electromagnetic Compatibility (EMC) regulations. This minimizes electromagnetic interference between equipment, which could otherwise affect the performance of your system.

Correct installation is required to ensure that EMC performance is not compromised.

Ensure you comply with the EMC guidelines detailed on *page 58*

4.2 Power distribution

Typical distribution

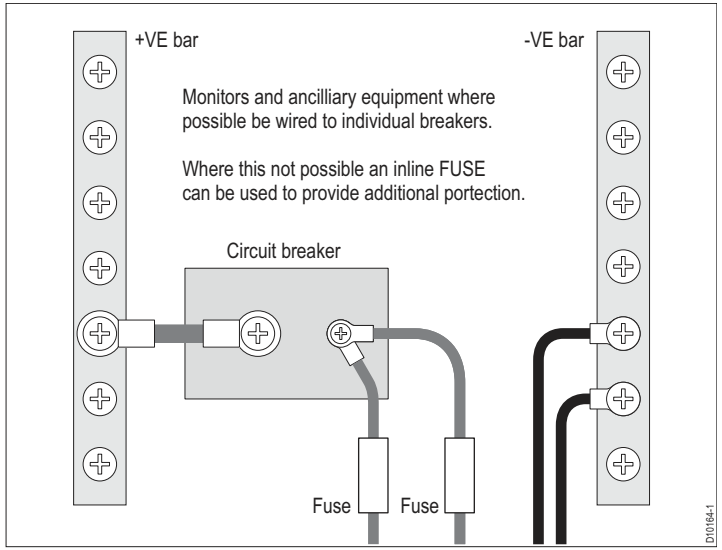


Power distribution notes:

- Raymarine recommend that you have a dedicated distribution panel for your G-Series system.
- All GPM400 processor units must be powered from a single breaker or switch, with appropriate circuit protection.
- All monitors and ancillary equipment should where possible be wired to individual breakers.

Sharing a breaker

Where more than 1 piece of equipment shares a breaker you must provide protection for the individual circuits. E.g. an in-line fuse for each power circuit



The fuse must be of an appropriate type and rating for the load to be protected.

Circuit grounding

Grounding

The power cable screen and all Ground terminals MUST be connected to ship's ground. Failure to connect to ship's ground may cause it, or other on-board electronics to function incorrectly.

No positive ground

The G-Series system is NOT intended for use on "positive" ground boats. The power input cable earth screen connections must be connected directly to the boats ground.

No ground loops

Ground loops may cause galvanic corrosion. Avoid using the ships structure (metal) as an earth point, as this could result in ground loops.

Grounding notes

- Use a dedicated earthing plate (e.g. dynaplate) in contact with the water.
- Ground cables may be routed to a common point (e.g. within the switch panel. With a single (appropriately rated) copper braid connecting to the earthing plate.
- Use flat tinned copper braid, 30 A rating (1/4 inch) or greater. Equivalent stranded wire diameter 4mm or greater.
- Keep the length of the earth braid as short as possible.
- Installations using both AC and DC current should have a separate ground circuit for each. See Circuit isolation on page 32.

Circuit protection

GPM400 processor

All GPM400 processors must be switched via a single breaker.

Number of GPM400 units	Supply voltage	Thermal breaker (Overall)	Fuse (Individual)
1	12 V	10 A	10 A
	24 V	5 A	5 A
2	12 V	20 A	10 A
	24 V	10 A	5 A
3	12 V	25 A	10 A
	24 V	15 A	5 A
4	12 V	35 A	10 A
	24 V	20 A	5 A

General circuit protection

The following loads and protection ratings apply to G-Series displays and ancillary equipment:

Equipment	Supply voltage	Thermal breaker	Fuse
G190 marine display	12 V	8 A	12 A
	24 V	4 A	6 A
G170 marine display	12 V	8 A	12 A
	24 V	4 A	6 A
GVM400 Video Module	12 V	1.2 A	2 A
	24 V	1 A	1 A

For other ancillary equipment, refer to the separate installation instructions for circuit loading and protection information.

Power cables

- Cable must be of a suitable gauge for the circuit load.
- Each unit should have its own dedicated power cable wired back to the distribution panel.
- All GPM400 processors should be connected to the same breaker.
- Power cable must include a separate screen wire.

GPM400 power cables

Length (max)	Supply voltage	Cable gauge (AWG)
0-5 m (0-16.4 ft)	12 V	18
	24 V	20
5-10 m (16.4-32.8 ft)	12 V	14
	24 V	18
10-15 m (32.8-49.2 ft)	12 V	12
	24 V	16
15-20 m (49.2-65.6 ft)	12 V	12
	24 V	14

Each unit should have its own dedicated power cable wired back to the distribution panel.
All GPM400 processors should be connected to the same breaker.
Power cable must include a separate screen.

GVM400 Video Module power cables

Length (max)	Supply voltage	Cable gauge (AWG)
0-5 m (0-16.4 ft)	12 V	20
	24 V	20
5-10 m (16.4-32.8 ft)	12 V	20
	24 V	20
10-15 m (32.8-49.2 ft)	12 V	20
	24 V	20
15-20 m (49.2-65.6 ft)	12 V	18
	24 V	20

The GVM400 should have its own dedicated power cable wired back to the distribution panel.
Power cable must include a separate screen.

G170/G190 Marine monitor power cables:

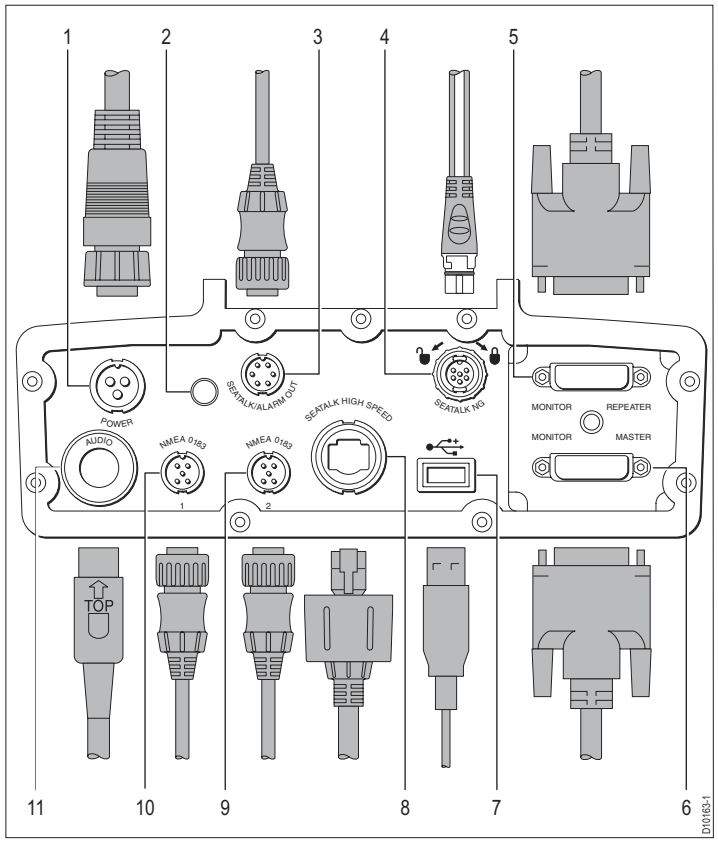
Length (max)	Supply voltage	Cable gauge (AWG)
0-5 m (0-16.4 ft)	12 V	12
	24 V	12
5-10 m (16.4-32.8 ft)	12 V	9
	24 V	9
10-15 m (32.8-49.2 ft)	12 V	7
	24 V	7
15-20 m (49.2-65.6 ft)	12 V	6
	24 V	6

Monitor connection notes:

- Each monitor should have its own dedicated power cable.
- Equipment which is susceptible to noise (such as VHF radios) should not be wired to the same distribution panel as the monitors. If in doubt the monitors (or affected equipment) can be wired directly back to the battery/power source via a dedicated breaker.
  Refer to the separate monitor documentation for more details.

4.3 GPM400 processor

The GPM400 has the following connections:



1. 12/24V Power in (see *page 33*)
2. Status LED (see *page 99*)
3. SeaTalk / Alarm output (see *page 50*)
4. SeaTalk^{ng} connection (see *page 54*)
5. DVI display connection - repeater (see *page 38*)
6. DVI display connection - master (see *page 38*)
7. USB connection (for chart and software upgrade only)
8. SeaTalk^{hs} network connection (see *page 47*).
9. NMEA 0183 connection (see *page 51*)
10. NMEA 0183 connection (see *page 51*)
11. Audio output (see *page 46*)

Maximum quantity of GPM400 units

The G-Series system will support up to 4 GPM400 processors, of which 1 must be set as the Master GPM.

Master GPM

On a system with more than one GPM400 you must designate one them as a Master GPM. The SeaTalk and SeaTalk^{ng} bus must be connected to the Master GPM.

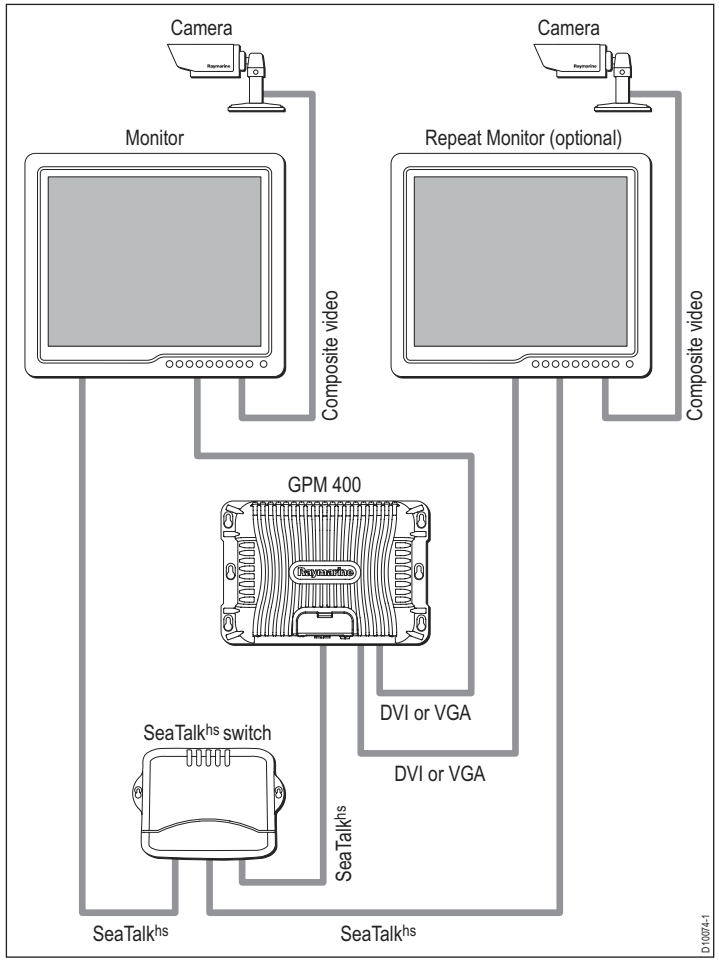
Note: The data is passed between multiple GPMs using the SeaTalk^{hs} network.

See also

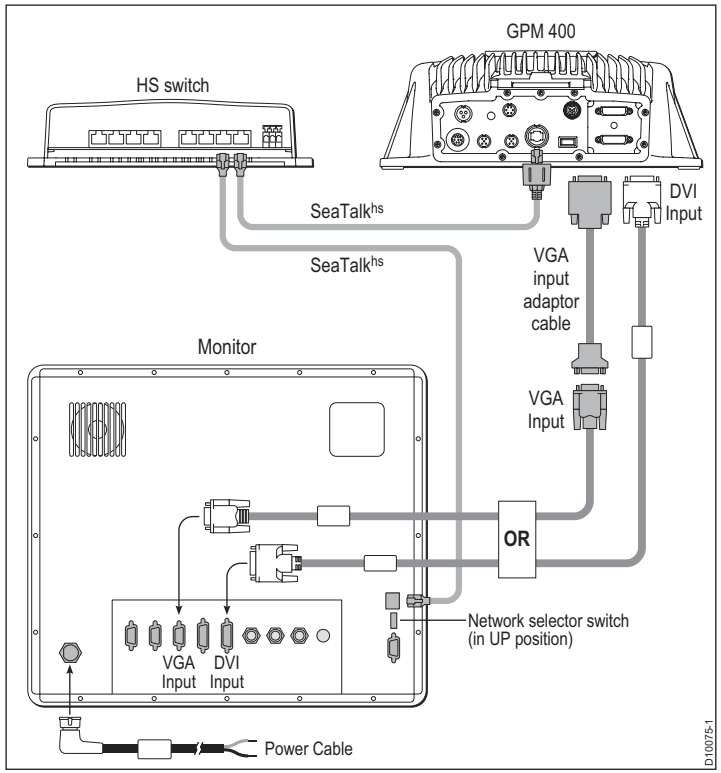
- Ensure you record connections to the GPM400 on the schematic diagram. See Appendix B - Nav Station schematic .
- For a typical SeaTalk^{hs} system see *page 19*.
- For information on SeaTalk^{hs} cables and connections see *page 47*.

4.4 Monitor connections

Connect the G-Series marine displays to both the GPM400 processor and SeaTalk^{hs} switch.



Monitors may be connected to the GPM400 using either VGA or DVI cable.



Repeat displays

Repeat displays (if used) show the same information / page as the master display. For this reason each display within a Nav Station must be connected to a different GPM400.

Note: During start-up only the master display will show the boot sequence and start-up information.

Maximum quantity of monitors

The G-Series system will support up to 8 monitors (2 per GPM400).

Screen resolution and aspect ratio

Each GPM will output the same screen resolution to all connected displays.

Therefore where multiple displays are connected to a single GPM they should have the same aspect ratio and screen resolution. For example we recommend that wide screen televisions and standard displays are connected to separate GPMs.

IP Address

When connecting a display to the processor, note its IP address on your system diagram. You will need to refer to this during the commissioning process. (See *Appendix B* for sample diagrams.)

Selector Switch

Raymarine G-Series displays have a selector switch located by the SeaTalk^{hs} connector. This must be in the UP position for connection to the SeaTalk^{hs} network.

3rd party displays

Ensure that any 3rd party (non-Raymarine) displays have electrical isolation between the video connections and power supply (and any other 0 V referenced connection). This is to avoid 0 V loops which can cause interference issues.

Marine display cables

The following cables can be used with marine displays:

Cable	Part No	Notes
DVI Connection		To ensure optimum signal quality use only Raymarine cables.
5 m (16.4 ft) DVI to DVI (digital) cable	E06021	
10 m (32.8 ft) DVI to DVI (digital) cable	E06022	
VGA		To ensure optimum signal quality use only Raymarine cables.
500 mm (19.69 in) DVI-VGA converter	E06053	Required for any VGA connection to the GPM400.
1.5 m (4.9 ft) VGA cable	R08130	
5 m (16.4 ft) VGA cable	R08174	Supplied with Raymarine G-Series Marine Displays.
10 m (32.8 ft) VGA cable	R08296	
20 m (65.6 ft) VGA cable	R08297	
Display to SeaTalk^{hs}		Required for keyboard control of display functions.
1.5 m (4.9 ft) SeaTalk^{hs} cable	E55049	
5 m (16.4 ft) SeaTalk^{hs} cable	E55050	
10 m (32.8 ft) SeaTalk^{hs} cable	E55051	
20 m (65.6 ft) SeaTalk^{hs} cable	E55052	
Power		
1.5 m (4.9 ft) Power cable	R08173	Supplied with product

Cable	Part No	Notes
Power cable extension	Not supplied	You may extend the power cable if required. See *page 35*.

See *Appendix C* for other cables and accessories.

See also

- For more detailed installation information refer to the separate users guide supplied with the display.
- Ensure you record connections to the GPM400 on the schematic diagram. See Appendix B - Nav Station schematic .

4.5 Keyboard connections

The G-Series Keyboard communicates using the SeaTalk^{ng} system. It may be connected directly to the backbone (wired) or use a remote basestation (wireless).

Note: You should have at least one permanently wired keyboard. In the event that any wireless keyboards are lost, the wired keyboard can be used to control the system.

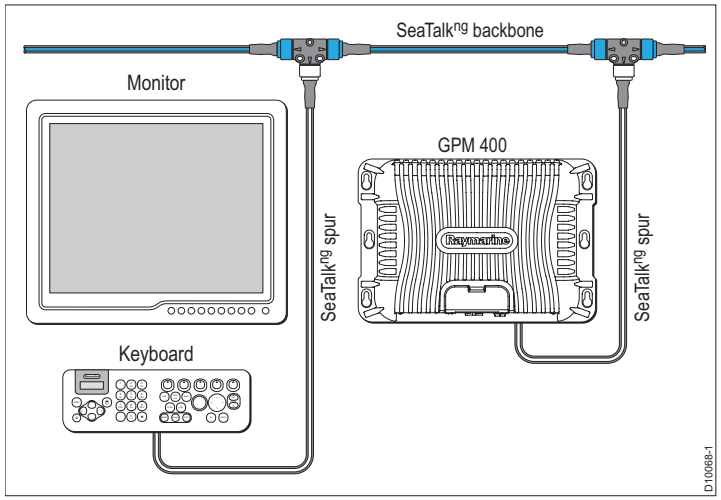
Maximum quantity of Keyboards

The G-Series system will support up to 8 keyboards.

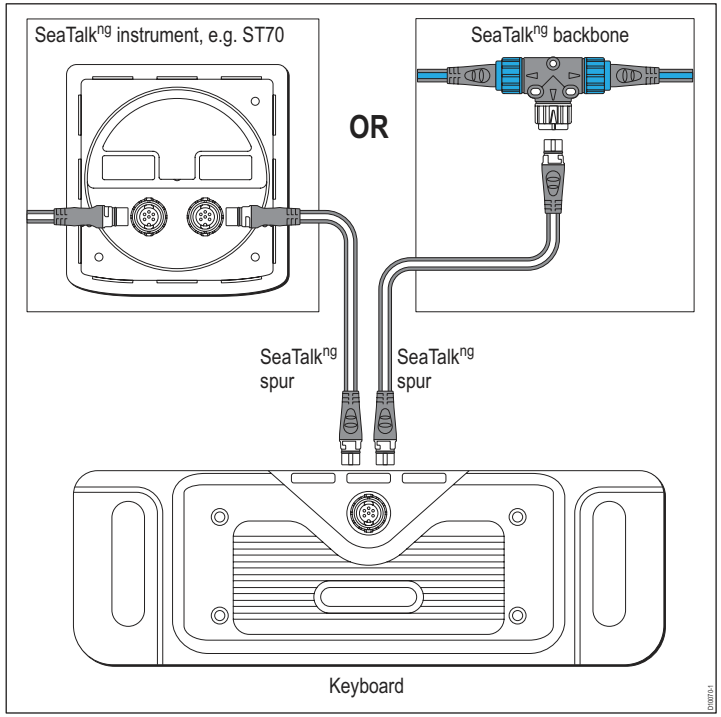
Schematic diagram

When connecting a keyboard to the system, record its details on your system/schematic diagram. You will need this information during commissioning. (See *Appendix B* for sample diagrams.)

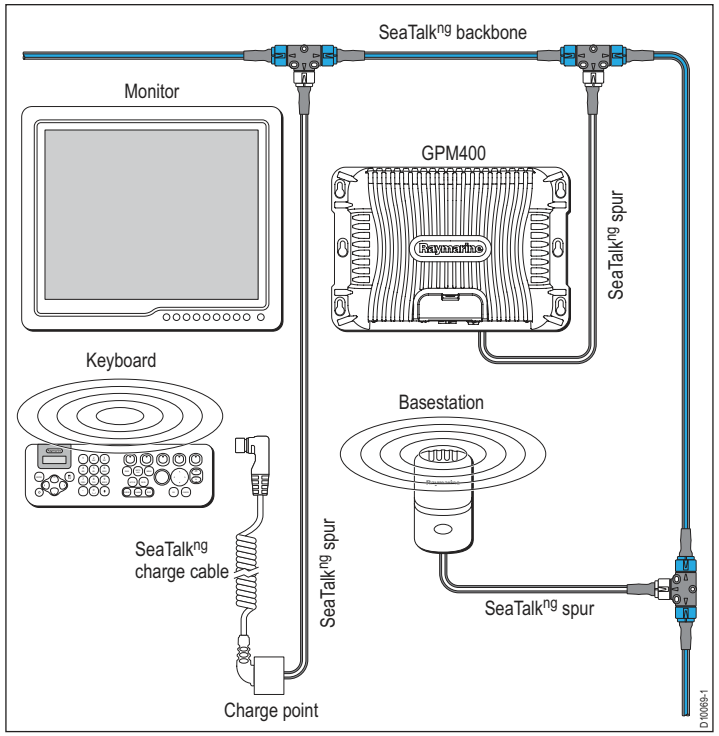
Wired keyboard system



Wired keyboard connection details

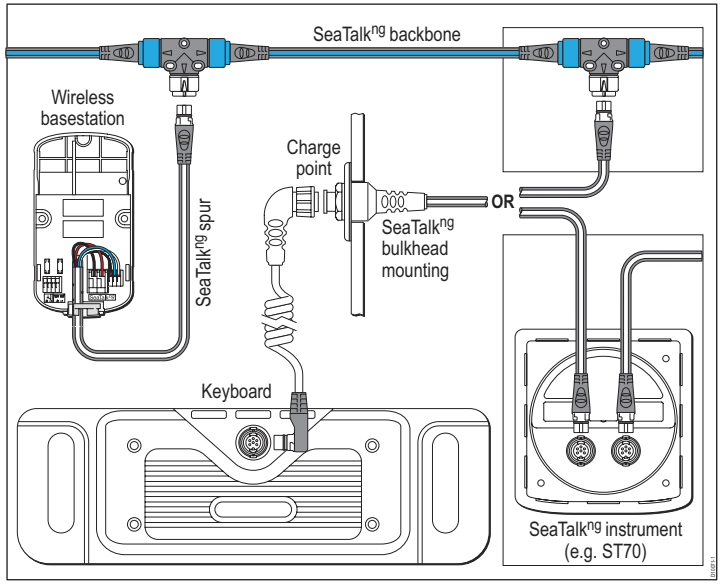


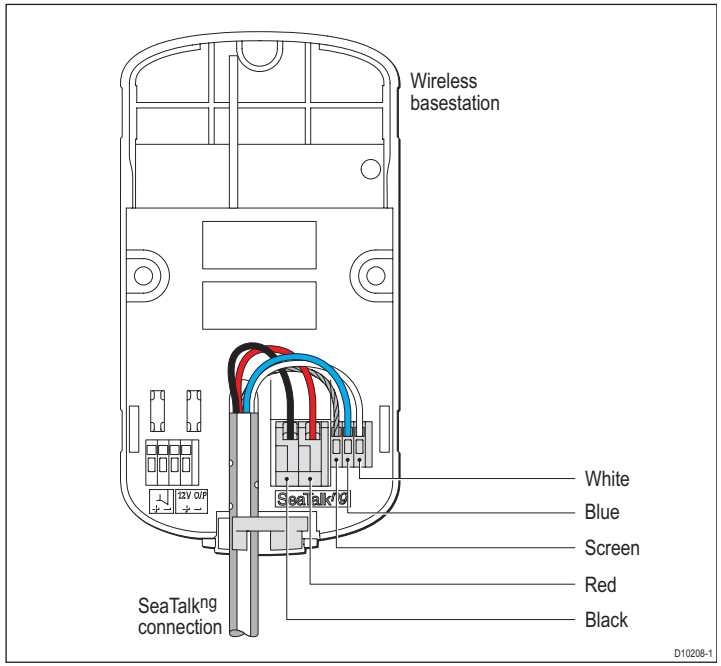
Wireless keyboard system



For cable part numbers see *page 42*.

Wireless keyboard connection details





Keyboard cables

The following cables can be used with the Keyboard:

Cable	Part No	Notes
Keyboard to SeaTalkng		
400 mm (15.75 in) SeaTalkng spur cable	A06038	
1 m (3.3 ft) SeaTalkng spur cable*	A06039*	Suppled with the keyboard
3 m (9.8 ft) SeaTalkng spur cable	A06040	

Cable	Part No	Notes
5 m (16.4 ft) SeaTalk^{ng} spur cable	A06041	
Wireless basestation to SeaTalk^{ng}		
1 m (3.3 ft) SeaTalk^{ng} spur cable (bare ends)	A06043	Included with wireless basestation.
3 m (9.8 ft) SeaTalk^{ng} spur cable (bare ends)	A06044	
Dashboard / Charging		
2.5 m (8.2 ft) charging cable	R08311	Included with the wireless upgrade kit.
3 m (9.8 ft) SeaTalk^{ng} bulkhead mounting cable	R08310	
See *Appendix C* for other cables and accessories.		

See also

Ensure you record connections to the GPM400 on the schematic diagram. See Appendix B - Nav Station schematic .

4.6 Video and Entertainment

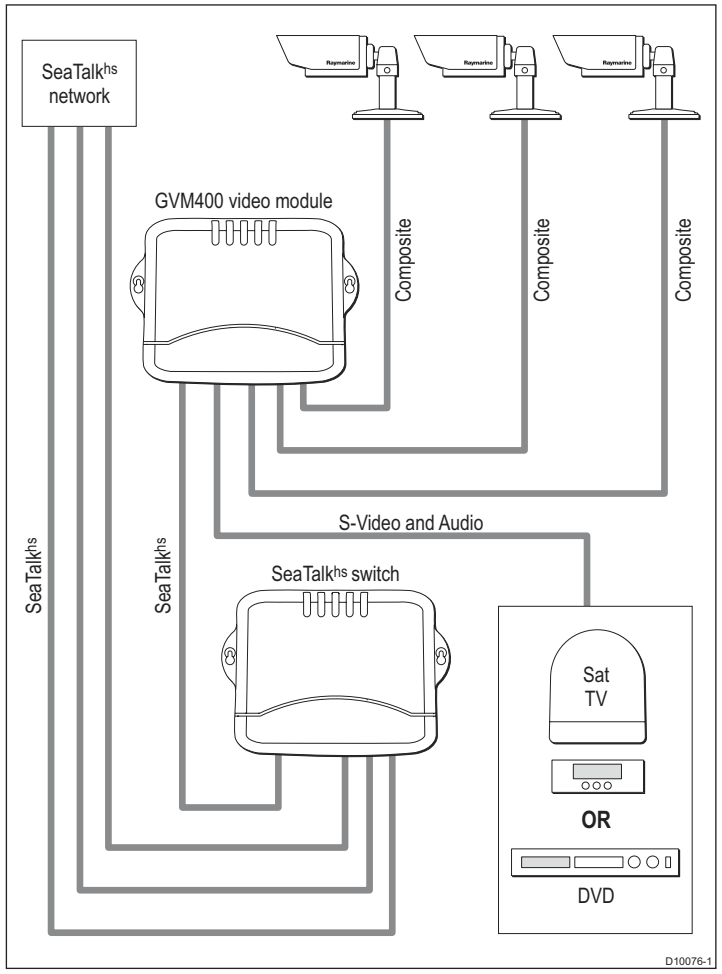
Video and entertainment is connected and distributed to the

G-Series system using 2 system components:

- GVM400 Video Module
- SeaTalk^{hs} switch.

Note: Video equipment may also be connected directly into the displays, although this will not be distributed around the system.

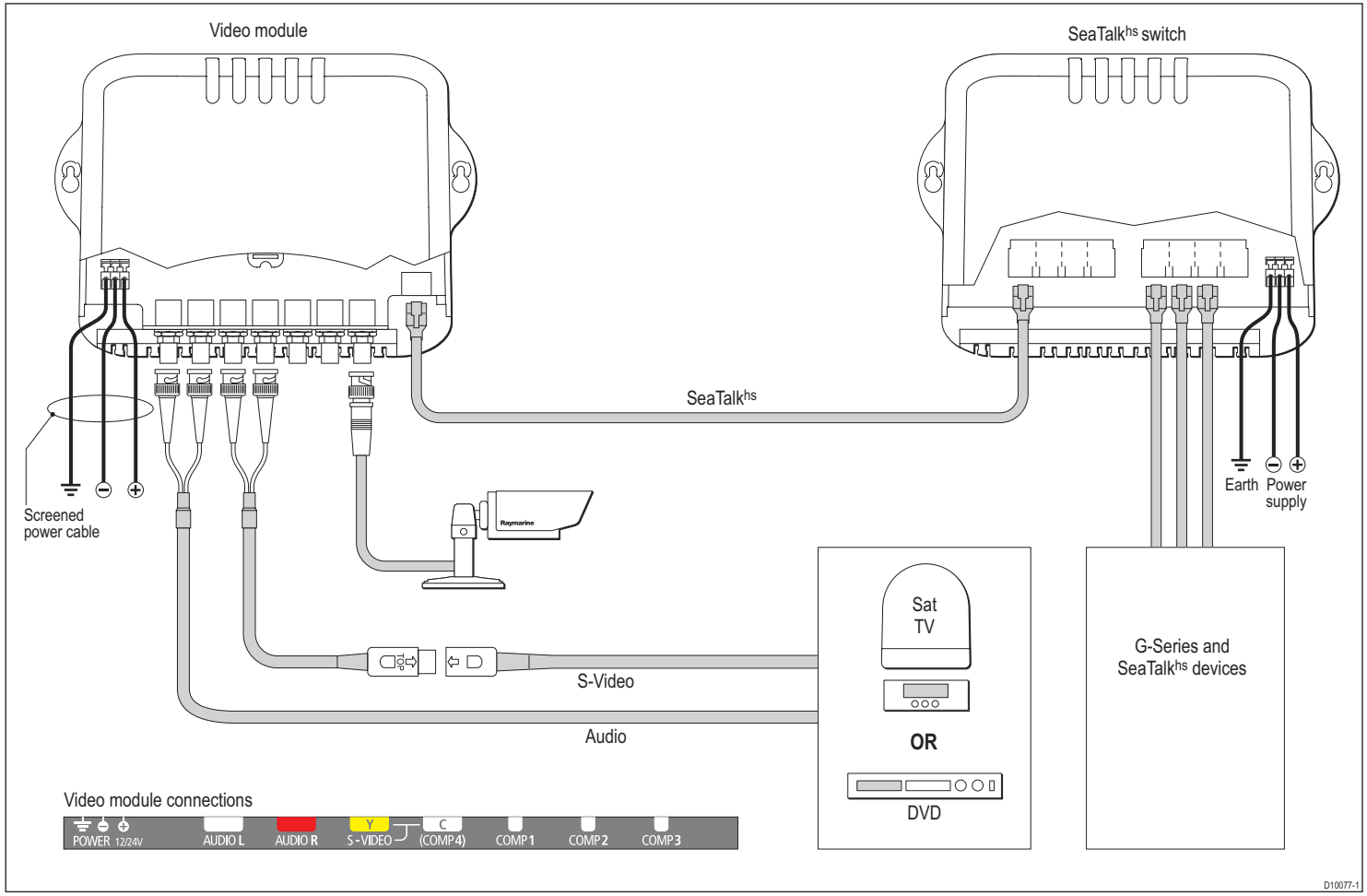
Typical video system



Maximum quantity of GVM400 video modules

The G-Series system will support up to 2 GVM400 video modules.

Video / Entertainment connection details



Video/Entertainment system cables

The following cables are used to connect the GVM400 video module:

Cable	Part No	Notes
S-Video		
1.5 m (4.9 ft) adapter cable	R08274	Included with GVM400.
Audio		
1.5 m (4.9 ft) audio cable	R08275	Included with the GVM400
AV cables	N/A	Installer to supply suitable cables.
Video and audio equipment should be supplied with appropriate cables to connect to the G-Series system.		
SeaTalk^{hs}	Use SeaTalk^{hs} Patch cables. See *page 47*	
Power	Power cables are not included with GVM400. You must supply appropriate power cables to suit your system requirements (see *page 35*).	
See *Appendix C* for other cables and accessories.		

Video output connection

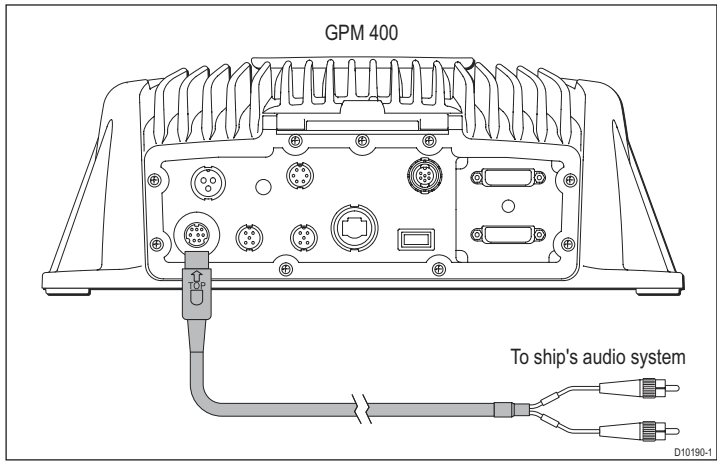
The video output is obtained from the GPM400 processor using DVI or VGA cables. See *Monitor connections* on *page 38* for details.

Audio output connection

G-Series audio output is obtained from the GPM400. The following audio signals are obtained through this output.:

- Entertainment / Audio from the Video processor. (Associated with the Comp4 or S-Video connection)
- Alarms and other system alerts.

Note: The audio output is line level only and must be connected to a suitable 3rd party amplifier in order to be heard.



Audio cables

The following cables are available to connect to the audio output:

Cable	Part No	Notes
Audio		
3 m (9.8 ft) Audio out cable	R08266	Supplied with GPM400.
15 m (49.2 ft) G-Series Audio out cable	R08298	

4.7 SeaTalk^{hs} network

The SeaTalk^{hs} network has 2 main purposes:

- Connection of digital devices.
- Networking of G-Series equipment.

For a typical SeaTalk^{hs} system see *page 19*.

SeaTalk^{hs} devices

The following digital devices communicate via the SeaTalk^{hs} network:

- **SeaTalk^{hs} Switch**
  The hub of the network, this routes all network traffic.
- **GPM400 processors**
  For sharing data over the network.
- **GVM400 Video Module**
  For video distribution over the G-Series network. See *page 43*
- **Digital radar**
- **Digital sounder (e.g. DSM400)**
  For fishfinding applications. Refer to the separate instructions supplied with the sounder.
- **G-Series marine displays** (G190, G170 etc.)
  To allow control of display functions at the G-Series keyboard. See *page 38*
- **SR100 Sirius weather/audio receiver** (North America only.)
  To receive sirius satellite weather and audio services.

See also

For a typical SeaTalk^{hs} system see *page 19*.

For more details on the connections refer to the separate instructions supplied with the digital devices and the SeaTalk^{hs} switch.

SeaTalk^{hs} Network cables

All devices are wired individually back to the SeaTalk^{hs} switch using the following cables:

Cable		Notes
SeaTalk^{hs} network		
1.5 m (4.9 ft) SeaTalk^{hs} network cable	E55049	Network cables are used to connect the GPM400 to the SeaTalk^{hs} switch.
5 m (16.4 ft) SeaTalk^{hs} network cable	E55050	
10 m (32.8 ft) SeaTalk^{hs} network cable	E55051	
15 m (49.2 ft) SeaTalk^{hs} network cable	A62135	
20 m (65.6 ft) SeaTalk^{hs} network cable	E55052	
SeaTalk^{hs} patch		

Cable		Notes
1.5 m (4.9 ft) SeaTalk^{hs} patch cable	E06054	Patch cables are used to connect the following devices to the SeaTalk^{hs} switch: • GVM400 video module • SeaTalk^{hs} Switch (connecting to other SeaTalk^{hs} switches). • G-Series marine displays.
5 m (16.4 ft) SeaTalk^{hs} patch cable	E06055	
10 m (32.8 ft) SeaTalk^{hs} patch cable	E06056	
15 m (49.2 ft) SeaTalk^{hs} patch cable	A62136	
20 m (65.6 ft) SeaTalk^{hs} patch cable	E06057	
Power	Power cables are not included with the SeaTalk^{hs} switch. You must supply appropriate power cables to suit your system requirements (see *page 35*).	
See *Appendix C* for other cables and accessories.		

Increasing network capacity

For increased capacity the network may contain multiple SeaTalk^{hs} switches, connected together using SeaTalk^{hs} network patch cables.

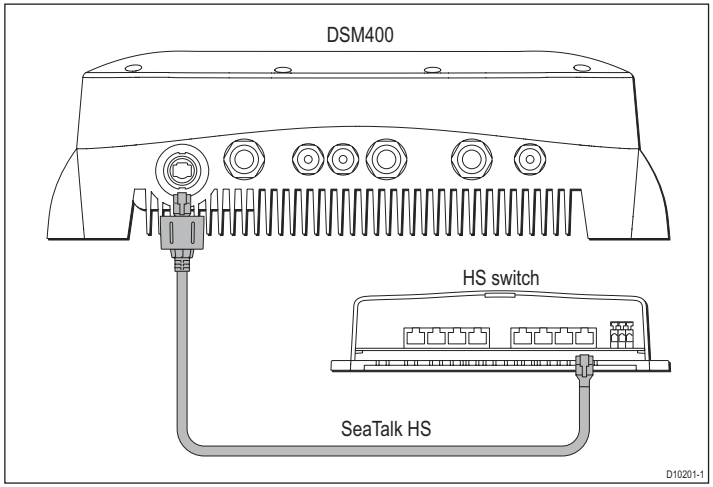
DSM digital sounder connection

The G-Series system can be used with the following DSM units:

- DSM300
- DSM400

The DSM connects to G-Series system via the SeaTalk^{hs} switch.

Example: DSM400 connection



Maximum quantity of DSM sounders

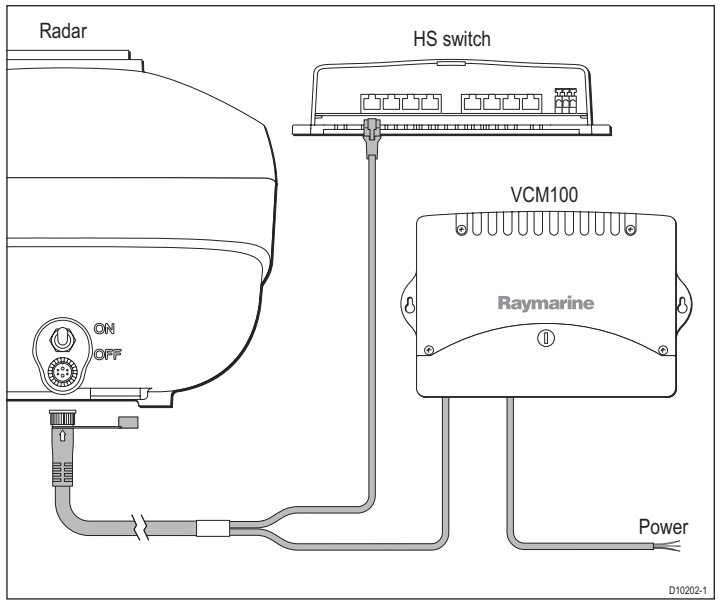
The G-Series system will support 1 DSM sounder.

See also

For more information refer to the installation guide supplied with the DSM unit.

Digital radar connection

The digital radar scanner connects to the SeaTalk^{hs} switch using dedicated digital radar cables



Maximum quantity of Radar scanners

The G-Series system will support up to 2 digital rader scanners.

Digital radar cables

The following cables are used to connect the digital radar scanner:

Cable	Part No	Notes
Digital cable		
5 m (16.4 ft) Digital cable	A55076	
10 m (32.8 ft) Digital cable	A55077	
15 m (49.2 ft) Digital cable	A55078	
25 m (82.0 ft) Digital cable	A55079	
Digital extension cable		Required if you wish to extend the cable distance.
5 m(16.4 ft) extension cable	A5080	
10 m (32.8 ft) extension cable	A55081	
The maximum cable length including all extensions is 55 m (180 ft)		

See also

For more information refer to the installation guide supplied with the radar scanner.

4.8 GPS Connection

Depending upon your GPS type it may be either connected via SeaTalk or NMEA 0183.

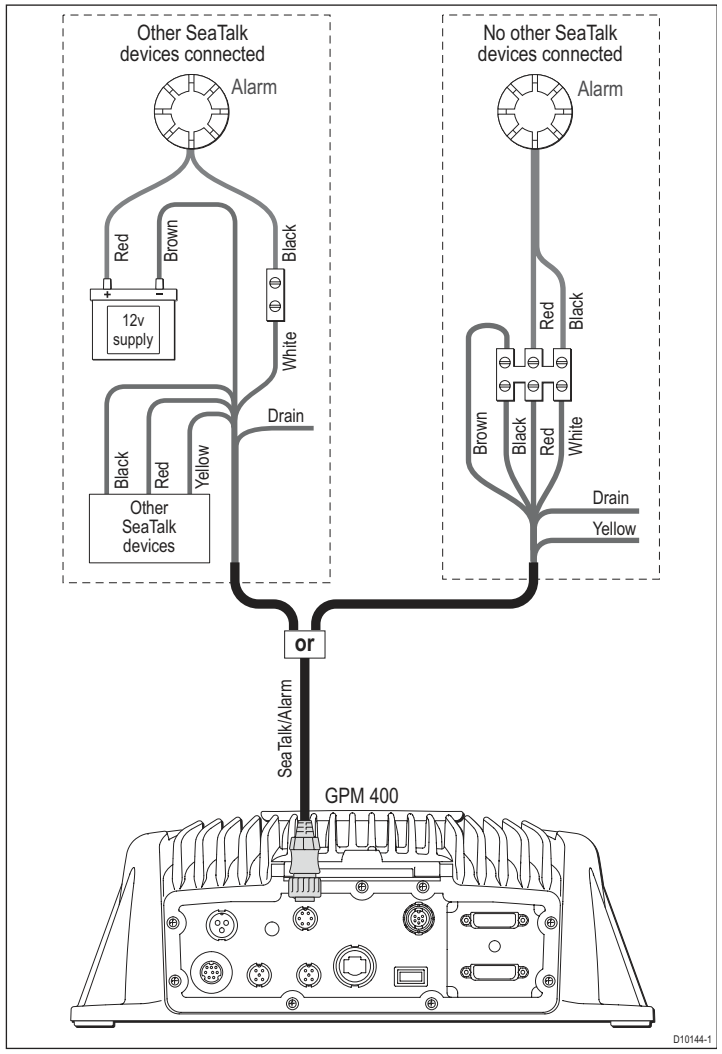
For SeaTalk connection refer to:

- SeaTalk & Alarm connection on page 50.
- Separate instructions supplied with your GPS unit.

For NMEA 0183 connection refer to:

- NMEA 0183 connections on page 51
- Separate instructions supplied with your GPS unit.

4.9 SeaTalk & Alarm connection



The alarm output and SeaTalk are combined into a single connector. This includes a 12 V fused power supply.

Alarm output

The alarm output is used to alert the operator to alarms and other audible warnings.

Note: Alarms are global and as such will be sounded across all audio and alarm outputs across the system.

SeaTalk connection

The SeaTalk connection allows the G-Series system to receive data from Raymarine SeaTalk compatible devices such as:

- **Autopilot**
  The G-Series can receive and display autopilot information and act as a repeat controller. Refer to the separate reference guide for operation details.
- **Instruments**
  The G-Series can receive and display data received from instruments, such as wind, speed and depth.
- **GPS**
  Required for chart applications.

Master GPM

The SeaTalk bus must be connected to the Master GPM (see *page 37*).

Note: SeaTalk connection to other GPMs for the purposes of redundancy is allowed.

12 V power supply

The SeaTalk connection provides a 12 V supply rated at 125 mA. This is suitable to supply 1 sounder module.

Note: SeaTalk instruments will usually be powered from a separate power supply, e.g from a Raymarine autopilot course computer. You should not power a SeaTalk bus from more than one supply.

SeaTalk / Alarm output cables

The following cable is used to connect the SeaTalk / Alarm output:

Connection / Cable	Part No	Notes
Alarm / SeaTalk		
1.5 m (4.9 ft) SeaTalk/Alarm Out cable	E55054	Supplied with GPM400 processor.
See *Appendix C* for other cables and accessories.		

4.10 NMEA 0183 connections

The GPM400 processor has 2 NMEA 0183 connectors.

Dual speed: 38.4 or 4.8 Kbps as required.

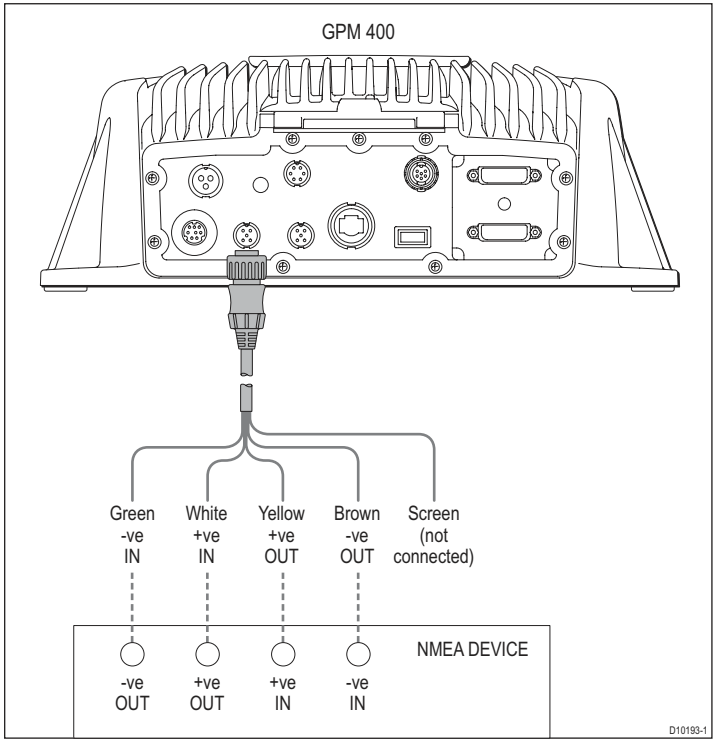
These may be used for connection of NMEA compliant devices for data such as:

- **Fastheading**, from an autopilot or fastheading sensor.
  This is required for Radar target acquisition (MARPA). See *page 52* and your separate autopilot instructions.
- **AIS information** (for radar target identification).
  See *page 53* and your separate AIS receiver instructions.
- **Other NMEA data** (such as 3rd party GPS or autopilot systems).
  For other NMEA device connections refer to the separate manufacturers instructions.

Multiple NMEA devices

You may connect NMEA devices to any GPM400 including the master GPM. You should only connect 1 device of any particular type to the G-Series system (including any connected databus or networked electronics).

For example: Your system should have GPS connected to one place only. Duplicated GPS data will produce erratic behavior within the system.



NMEA 0183 connection cables

The following cables are used to connect to NMEA 0183 devices.

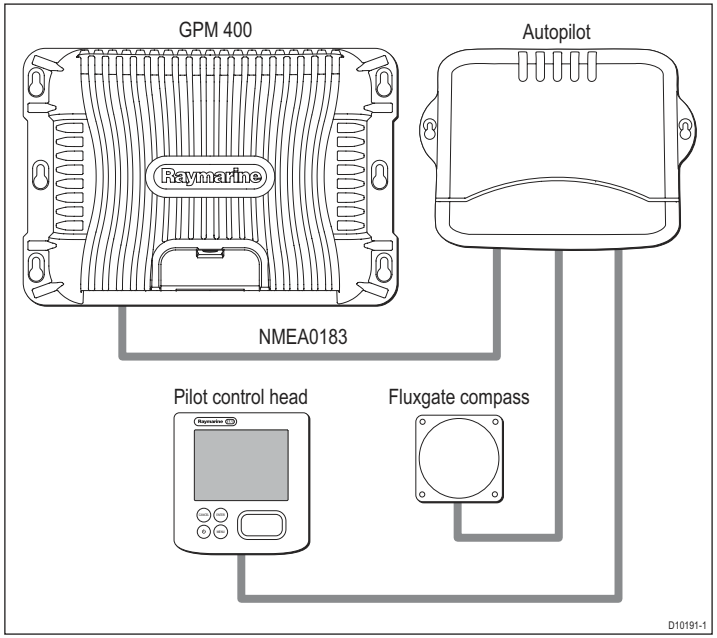
Connection / Cable	Part No	Notes
1.5 m (4.9 ft) NMEA 0183 cable	R08004	Supplied with GPM400 processor unit.
Other NMEA connections	N/A	Installer to supply suitable data cable.
	Use a shielded twisted pair cable to minimise interference.	
See *Appendix C* for other cables and accessories.		

NMEA 0183 Raymarine cable cores:

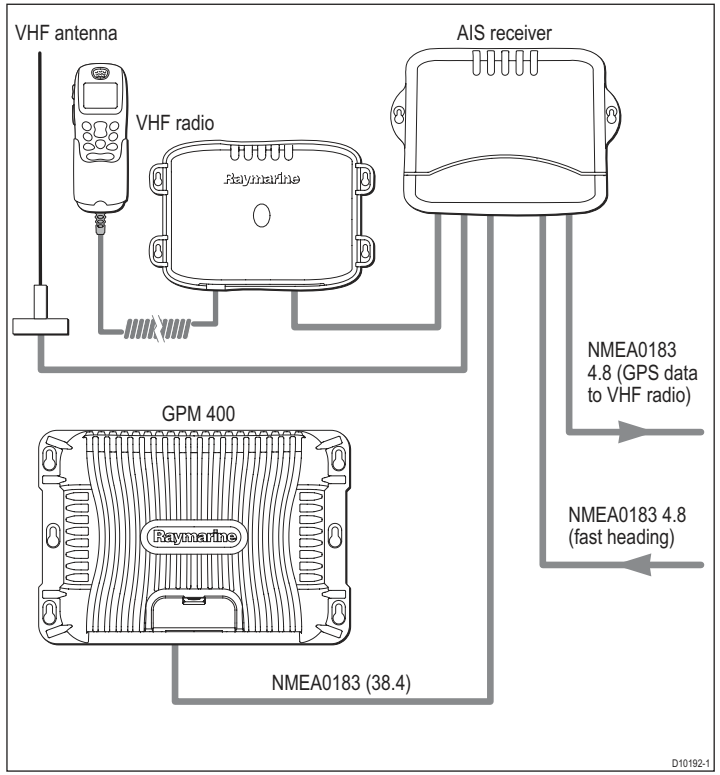
Function (at GPM400 processor)	Color	Pin no.
NMEA Input (-ve) common	Green	1
NMEA Input (+ve)	White	2
NMEA Output (+ve)	Yellow	3
NMEA Output (-ve) common	Brown	4
Not connected	Screen	5
Note: Input and outputs are crossed. Input GPM400 is connected to output at NMEA device and vice versa.		

Fastheading connection

Fastheading data required for radar target acquisition (MARPA) may come from either the autopilot or a separate Raymarine Fastheading sensor.



AIS connection



For more information refer to separate AIS instruction documents.

4.11 SeaTalk^{ng} connections

The G-Series system will use SeaTalk^{ng} to communicate with:

- SeaTalk^{ng} instruments (e.g. ST70),
- SeaTalk^{ng} autopilots (e.g. ST70 with SPX course computer),
- G-Series keyboard.

SeaTalk^{ng} cables

The SeaTalk^{ng} system uses the following cables and connections.

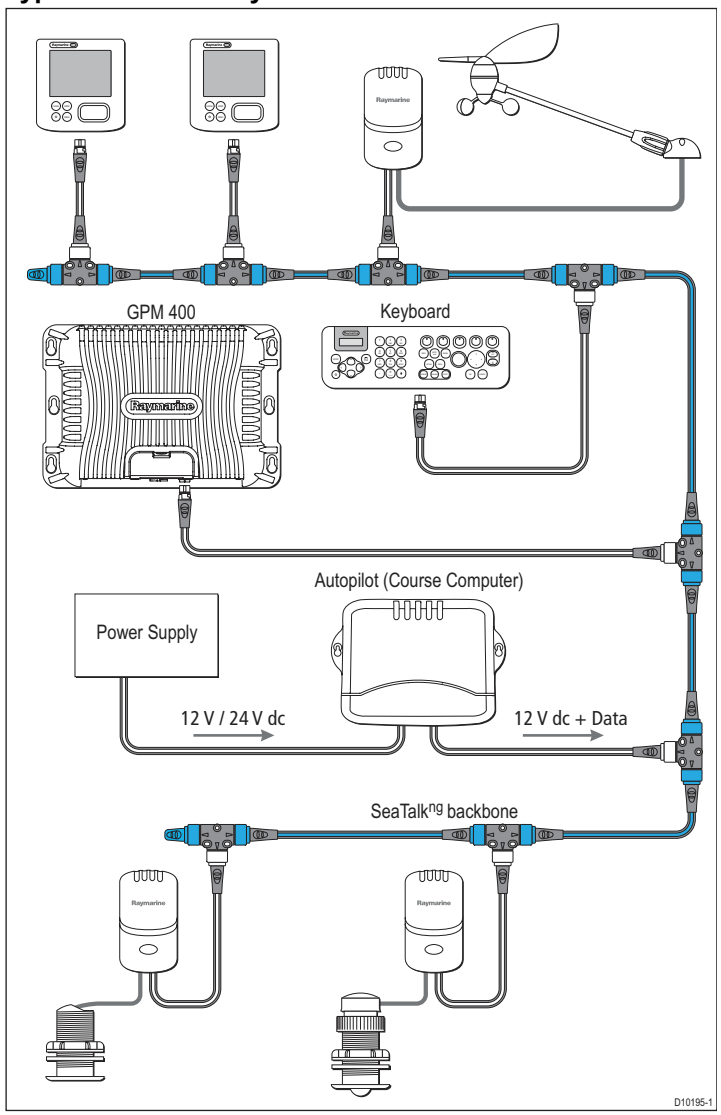
Connection / Cable	Notes
Backbone cables (various lengths)	The main cable carrying data. Spurs from the backbone are used to connect SeaTalk^{ng} devices.
T-piece connectors	Used to make junctions in the backbone to which devices can then be connected.
Terminators	Required at either end of the backbone.
Spur cables	Used to connect devices. Devices may be daisy chained or connected directly to the T-pieces.
For more information refer to the separate SeaTalk^{ng} reference manual.	

SeaTalk^{ng} power

The SeaTalk^{ng} bus requires a 12 V power supply. This may be provided from:

- Raymarine equipment witha regulated 12 V supply. (e.g. a SmartPilot course computer)
- Other suitable 12 V supply. (Note the grounding requirements for the G-Series system, see page *page 34*.

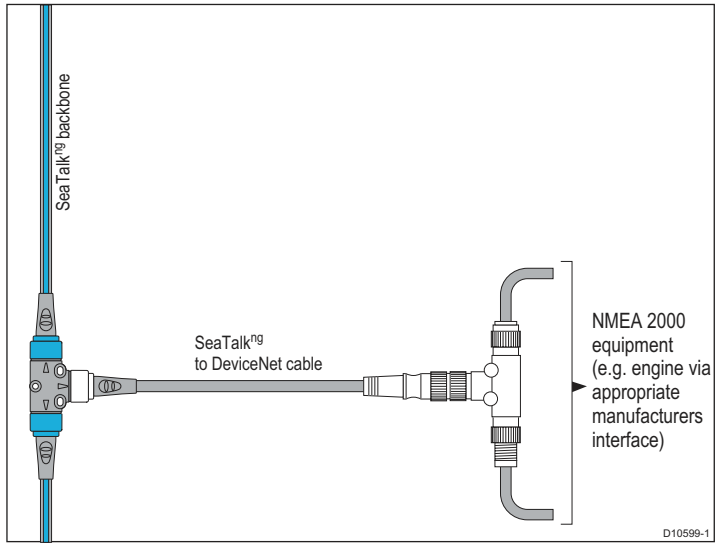
Typical SeaTalk^{ng} system



4.12 NMEA 2000 connections

NMEA 2000 devices are connected using the SeaTalk^{ng} bus. The G-Series system can display data received from NMEA 2000 devices (e.g. for displaying data from compatible engines).

You may connect NMEA 2000 compatible devices using appropriate adaptor cables.



NMEA 2000 cable

The following cable is used to connect the NMEA 2000 devices to the SeaTalk^{ng} bus:

Connection / Cable	Part No	Notes
1.5 m (4.9 ft) SeaTalk^{ng} to DeviceNet male	A06046	

See also

For more information refer to the separate SeaTalk^{ng} reference manual.

Chapter 5: Installation and mounting

5

This section gives details for installation and mounting of the core components of the G-Series system. Use this information when planning and installing your system.

Chapter contents

See also

- Monitor installation. Refer to the separate instructions supplied with the monitor.
- Peripheral equipment. Refer to the instructions supplied with the individual packs.
- Cabling and connections - Chapter 4: Cables and connections. Page 31.

5.1 General instructions

Equipment location

When deciding on the location of system components, consider the following:

- Ignition hazards
- Ventilation
- Mounting surface
- Cable entry
- EMC installation guidelines

Ignition hazards

Potential ignition sources

The equipment in these instructions is NOT approved for use in hazardous/flammable atmospheres such as an engine room.

Ventilation

To ensure adequate airflow:

- Ensure that equipment is mounted in a compartment of suitable size.
- Ensure that ventilation holes are not obstructed.
- Allow adequate separation of equipment.

Any specific requirements for each system component are provided later in this chapter.

Mounting surface

Ensure equipment is adequately supported on a secure surface.

Do not mount units or cut holes in places which may damage the structure of the vessel.

Any specific requirements for each system component are provided later in this chapter.

Cable entry

Ensure the unit is mounted in a location which allows proper routing and connection of cables:

- Minimum bend radius of 100 mm (3.94 in).
- Use cable supports to prevent stress on connectors.

EMC installation guidelines

Raymarine equipment and accessories conform to the appropriate Electromagnetic Compatibility (EMC) regulations. This minimizes electromagnetic interference between equipment, which could otherwise affect the performance of your system.

Correct installation is required to ensure that EMC performance is not compromised.

For optimum EMC performance, we recommend that:

- Raymarine equipment and the cables connected to it are:
  i. 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).
  ii. 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 product is supplied from a separate battery from that used for engine start. This is important to prevent erratic behavior and data loss which can occur if the engine start does not have a separate battery.
- Raymarine specified cables are used.
- Cables are not cut or extended unless doing so is detailed in the installation manual.

Remember

Where constraints on the installation prevent any of the above recommendations:

- Always allow the maximum separation possible between different items of electrical equipment.
- This will provide the best conditions for EMC performance for the installation.

Suppression ferrites

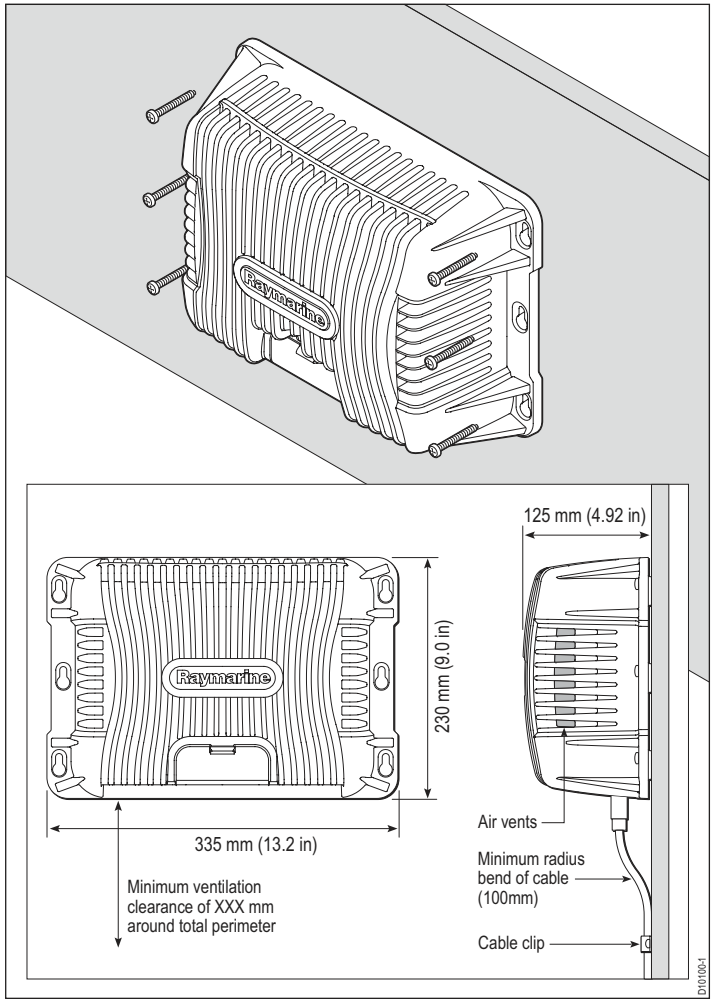
Raymarine cables may be fitted with suppression ferrites. These are important for correct EMC performance. Any ferrite removed to facilitate installation must be replaced in the original position immediately after the installation is complete.

- Use only ferrites of the correct type, supplied by Raymarine authorized dealers.

Connections to other equipment

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

5.2 GPM400 Processor module



Mounting and environment

The following conditions apply:

- Do NOT install near sources of heat or vibration (e.g. engine).
- The unit is NOT designed for use in a sealed enclosure. Access to the unit is required, e.g. for chart updates.
- Must be mounted on a vertical surface. Sides and top must be level.
- Mounting surface must be firm, secure and capable of supporting the weight of the unit.
- Install below decks in a dry area.
- Install the unit well away from potential sources of ignition.

Mounting clearances

Allow the following clearances from other equipment and surfaces.

Side	Distance
Top	100 mm (3.94 in)
Left	100 mm (3.94 in)
Right	100 mm (3.94 in)
Bottom	To allow cable entry
Front	150 mm (5.91 in)

Cables

- Minimum bend radius of 100 mm (3.94 in)
- All cables must be secured within 150 mm (5.91 in) of the unit. This will prevent undue strain on the connectors.

See also

Ensure you record connections to the GPM400 on the schematic diagram. See Appendix B - Nav Station schematic.

For connection details, see *page 31*.

5.3 G-Series Keyboard

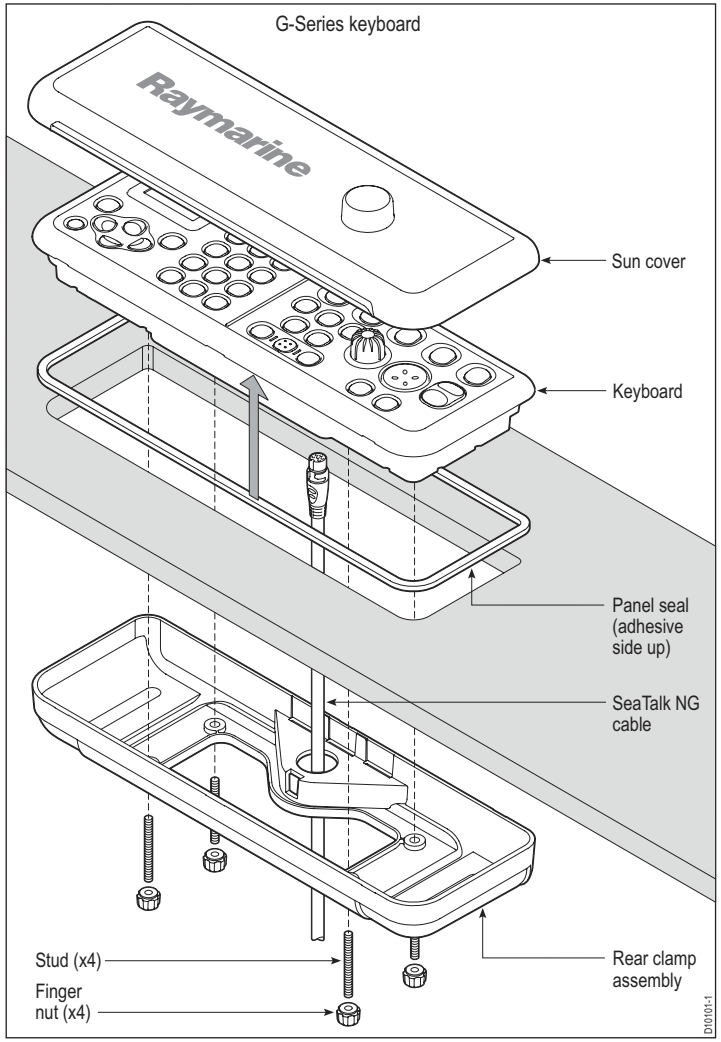
The Keyboard can be installed for 2 different types of use:

- Wired operation (flush mounted).
- Wireless operation, using the wireless upgrade kit and SeaTalk^{ng} basestation.

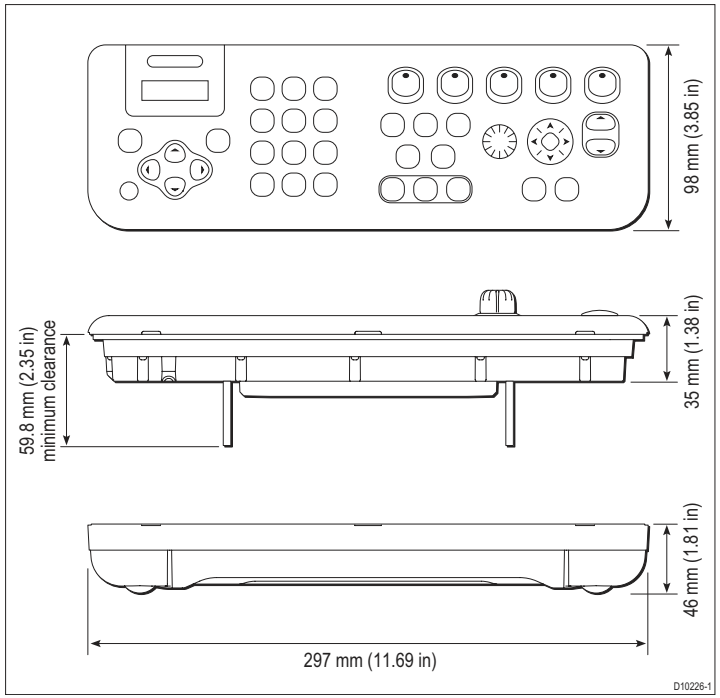
Note: You should have at least one permanently wired keyboard. In the event that any wireless keyboards are lost, the wired keyboard can be used to control the system.

Wired operation - flush mounted

Mounting arrangement



Dimensions



Mounting and environment

- The keyboard is suitable for mounting both above and below decks. It is waterproof to CFR-46 standard.
- Use the cutting template provided with the keyboard.
- Connect cable into keyboard before clamping in place.

The following conditions apply:

- Do NOT install near sources of heat. (e.g. engine).
- Install the unit well away from potential sources of ignition.

Cables

- Minimum bend radius of 100 mm (3.94 in).

See also

Ensure you record your keyboard details on the schematic diagram. See Appendix B - Nav Station schematic.

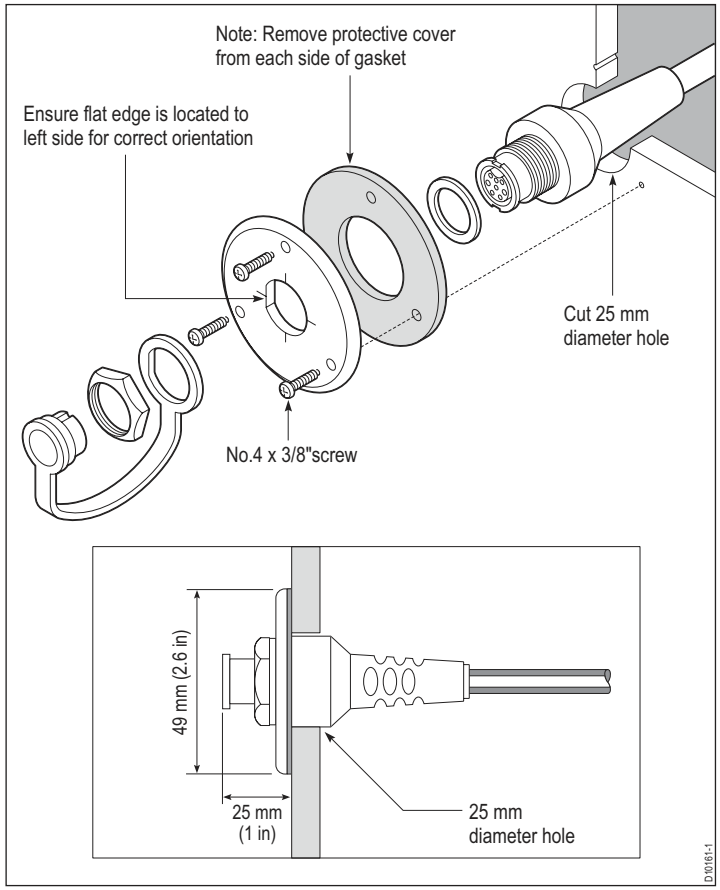
Wireless upgrade kit

Allows wireless operation of the keyboard.

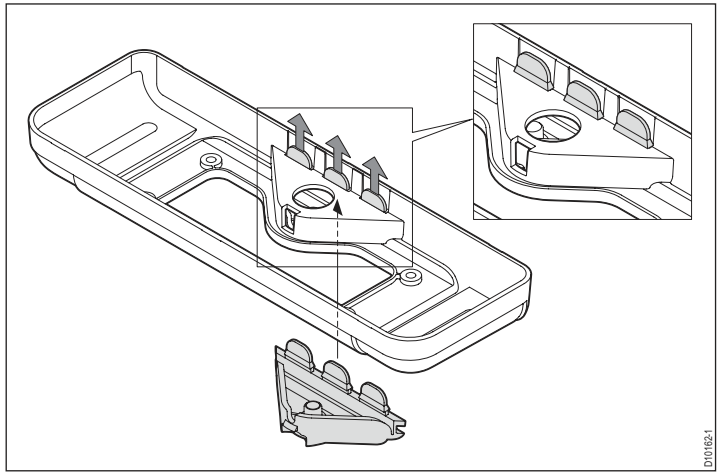
Mounting and environment

- The should be within sight of G-series monitors. This will allow a keyboard to operate the system whilst on charge.

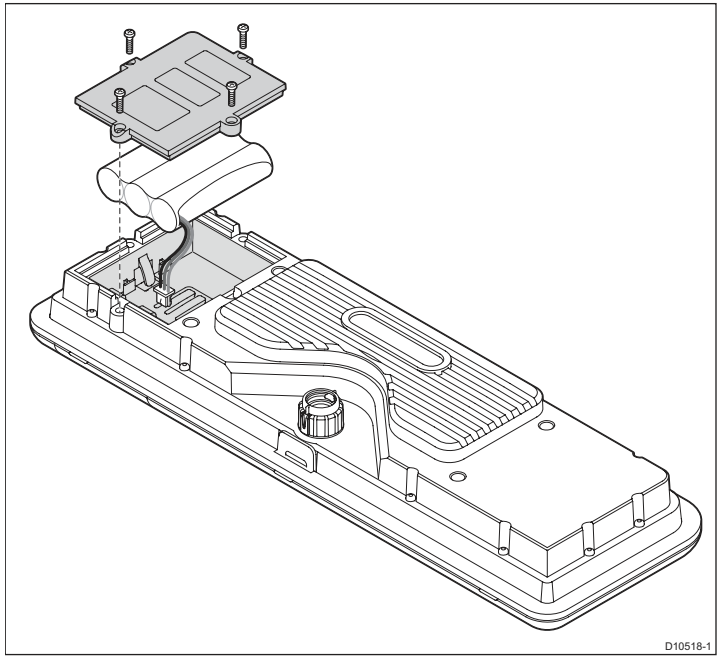
1. Install charge point.



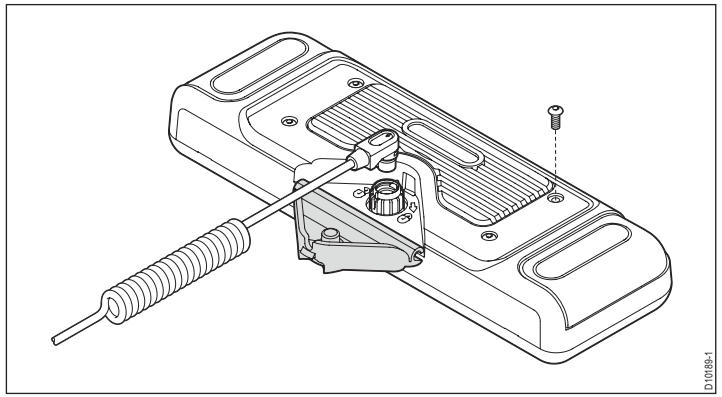
2. Fit splash cover.



3. Fit the battery, taking care to avoid contamination of the cover seal.



4. Fit the rear cover.



5. For charging and wired operation use the cable provided

Note: The keyboard should be charged for 6 hours before use.

Wireless basestation

Required for wireless operation of the keyboard.