



# **Addendum 1.4\_2**

**(Addendum to MX420 Operator's Manual)**

**September, 2007**



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## NOTES

## **About this document**

This document details the new features included in the MX420 Version 2.0(849) software or higher (*except for LORAN-C capability*). To obtain *LORAN-C* features, please ensure that the MX420's software is Version 2.0(862) or higher.

The following features and changes are highlighted in the rest of this document:

- MX575 Heading & Rate of Turn (to work with MX575 D/GPS Satellite Compass)
- New Navigation Compass Screens (NAV5 and NAV6)
- Lighting - Display/Keyboard Light, Contrast Control & Default Display Setting
- MX535A (Nauticast) UAIS Class A Transponder Interface
  - Security Log Screen (AIS11 & AIS12)
  - Ability to set sensor input port baud rates
- External DGPS input port can now be configured to work with four different baud rates
- HDT & ROT sentences have been added to the NMEA OUT list
- Option to set the timeout age for AIS target data (AIS license only)
- Configurable Alarm Log that can provide the option to view only active AIS alarms (*For AIS enabled MX420 only*)
- LORAN-C capability added (*when LORAN-C (Raytheon) license is activated*)

Addendum on page 103 of the MX420 Operator Manual

## ***MX575 Heading and Rate of Turn (ROT)***

The MX575 D/GPS Satellite Compass is designed to work interactively with the MX420 Control and Display Unit. The MX575 is IMO Certified as both compass and positioning device for navigation.

When connected to an MX420 CDU, the MX575 can be controlled to function in the following modes:

- MX575 as a D/GPS Satellite Compass only
- MX575 as a D/GPS Satellite Compass with Navigation Functionality
- MX575 as a Secondary Navigation Device for AIS

### ***MX575 as a D/GPS Satellite Compass only***

MX575 can be used as a Heading and ROT device by connecting it to any available data input port other than port 3 of the MX420 CDU. The MX575 will output the NMEA data at the default data rate of 4800 baud. The HDT and ROT sentences are transmitted once per second.

*(For installation instructions, please refer to Data Interface on Page 29 of the MX575 Installation and Operation Manual)*

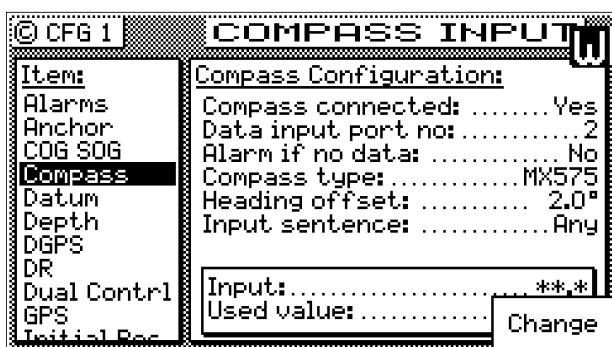
To setup the Heading (Compass) and ROT from MX420, use the following steps:

Compass Configuration:

1. Press the *CFG* key.
2. Scroll to *Compass* menu.
3. Press *E* key.
4. Use the *Change* Soft key to change the *Compass connected* to *Yes*.
5. Scroll to *Data input port no.*

6. Press the *Change* Soft key to change *Data input port no.* to 2 (or any available *Data input port* for MX420).
7. Scroll to *Compass type* and press the *Change* soft key, change to MX575.
8. Scroll to *Heading offset* and use the *Change* soft key to change the *Heading Offset* (if any).
9. Press the *E* key to exit.

Note: You should be able to see the heading value under *Input* and *Used value* as shown in Fig 1.01.

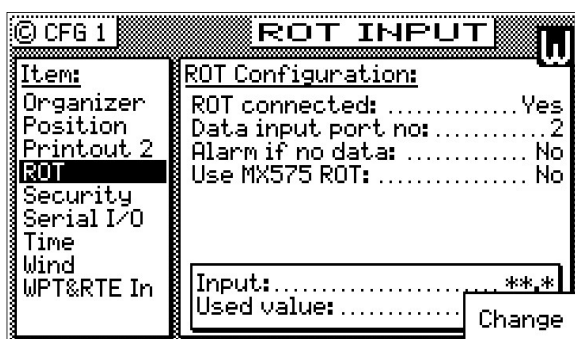


**Fig 1.01 Compass Configuration Screen  
(MX575 as a heading device)**

Rate of Turn (ROT) Setup:

1. Press the *CFG* key.
2. Scroll to *ROT* menu.
3. Press *E* key.
4. Use the *Change* soft key to change the *ROT connected* to *Yes*.
5. Scroll to *Data input port no.*
6. Press the *Change* soft key to change *Data input port no.* to 2 (or any available *Data input port* for MX420).
7. Scroll to *Use MX575 ROT* and make sure that *Use MX575 ROT* to set to *No*.
8. Press the *E* key to exit.

Note: You should be able to see the Rate of Turn value under *Input* and *Used value* as shown in Fig 1.02.



**Fig 1.02 ROT Configuration Screen  
(MX575 as a heading device)**

### ***MX575 as a D/GPS Satellite Compass with Navigation Functionality***

MX575 can be also used as a primary navigation antenna that supplies the positioning, heading and ROT data by connecting it on port 3 of the MX420 CDU. The MX420 will automatically configure the MX575 NMEA data output at 19,200 baud rate and the HDT output rate is set at 10 Hz as soon as power is applied.

*(For installation instructions, please refer to Data Interface on Page 28 of the MX575 Installation and Operation Manual)*

To setup the MX575 as a positioning device using the MX420, use the following steps:

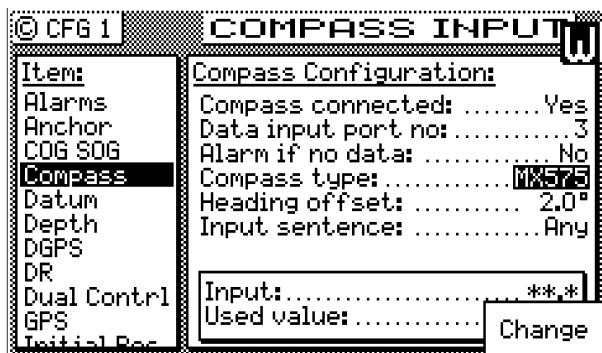
#### **Heading/Compass Setup:**

1. Press the *CFG* key.
2. Scroll to *Compass* menu.
3. Press *E* key.



4. Use the *Change* soft key to change the *Compass connected* to Yes.
5. Scroll to *Data input port no.*
6. Press the *Change* soft key to change *Data input port no.* to 3.
7. Scroll to *Compass type* and press the *Change* soft key to change the *Compass type* to MX575.
8. Scroll to *Heading offset* and use the *Change* soft key to change the *Heading Offset* (if any) to an offset/bias value corresponding the HDG difference between the gyro and then MX575.
9. Press the *E* key to exit.

Note: You should be able to see the heading value under *Input* and *Used value* as shown in Fig 1.03.



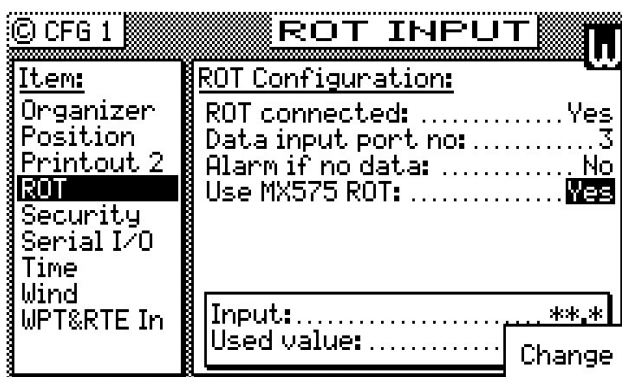
**Fig 1.03 Compass Configuration Screen  
(MX575 as a positioning device)**

Rate of Turn (ROT) Setup:

1. Press the *CFG* key.
2. Scroll to *ROT* menu.
3. Press *E* key.
4. Use the *Change* soft key to change the *ROT connected* to Yes.
5. Scroll to *Data input port no.*
6. Press the *Change* soft key to change *Data input port no.* to 3.
7. Scroll down to *Use MX575 ROT* and press the *Change* soft key to change *Use MX575 ROT* to Yes.

8. Press the *E* key to exit.

Note: You should be able to see the Rate of Turn value under *Input* and *Used value* as shown in Fig 1.04.



**Fig 1.04 ROT Configuration Screen  
(MX575 as a positioning & heading device)**

### ***MX575 as a Secondary Navigation Device for AIS***

MX575 can also be used as a Secondary Positioning Device to an AIS transponder unit. It is required that an AIS transponder is configured and operational.

To implement this feature, use the following steps:

1. Press the *CFG* key.
2. Scroll to *AIS Static* menu.
3. Press *E*.
4. Scroll to *Ext GPS Connected*.
5. Use the *Change* soft key to change *Ext GPS Connected* to *Yes*.
6. Scroll to *Ext. GPS Port*.
7. Use the *Change* soft key to set the port number to where the MX575 is connected.
8. Press the *E* key to exit.

### NAV5 & NAV6 Compass Display Screens

These screens are used to display the Heading and Rate of Turn information given by the MX575 GPS compass. These screens can be accessed by pressing the NAV key repeatedly until you reach the desired NAV screen.

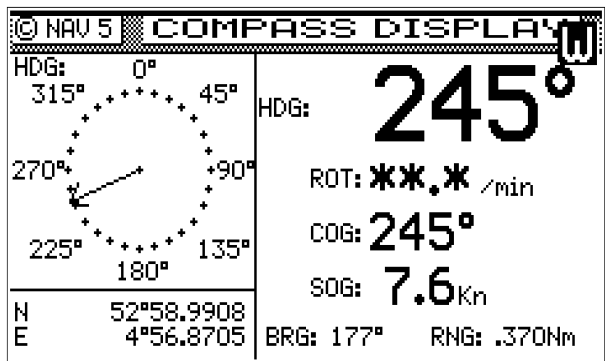


Fig 1.05 NAV5 Compass Display Screen

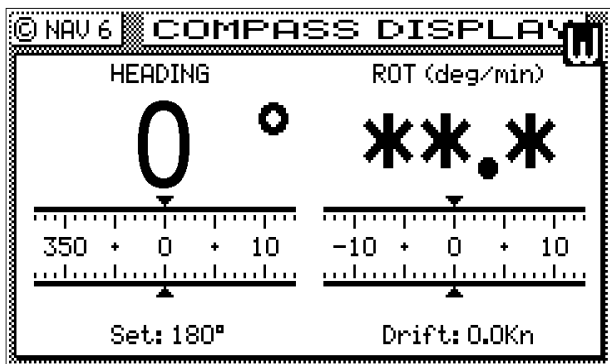
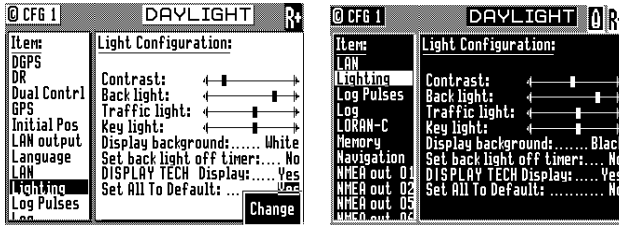


Fig 1.06 NAV6 Compass Display Screen

Addendum on page 111...

## **Lighting - Display/Keyboard Light, Contrast Control & Default Display Setting**

There are two basic display setups. The light function key allows you to instantly switch between two predefined screens (*Daylight & Nightlight*).



*Contrast*- Controls the viewing angle of the display

*Backlight*- Controls the display backlight intensity

*Traffic light* - Controls the brilliance of the three traffic LEDs

*Display background* - selects black or white display background

*Set back light off timer* - turns the backlight to minimum brilliance when no keypad activity is detected within 30 seconds (time is configurable)

*DISPLAY TECH Display* - controls the LCD parameters to match the LCD made by Display Tech Company

*Set All to Default* - When set to Yes, all display settings will be set to factory settings.

Addendum to page 151.....

## ***UAIS Ship Borne Class “A” Transponder (For AIS enabled MX420 only)***

### **AIS Function Key**

Several AIS display pages are available under the AIS key. Pressing the AIS key repeatedly will scroll through the following AIS screens (paging can also be done by using the left or right arrow keys after pressing the AIS key), namely:

- AIS1 - OWN SHIP DATA
- AIS2 - REMOTE SHIP LIST
- AIS3 - RX SAFETY MSGS
- AIS4 - TX SAFETY MSG
- AIS5 - TX SAFETY LIST
- AIS6 - REGIONAL AREAS
- AIS7 - LONG RANGE LIST
- AIS9 - AIS STATUS
- AIS11 - SECURITY LOG
- AIS12 - REMOTE SHIP EPFS
- AIS13 - REMOTE SHIP DATA

#### ***AIS 1 – OWN SHIP DATA***

This display shows the ship's information transmitted by the AIS transponder. Information such as ships' name, MMSI #, call sign, IMO #, ship type/cargo, Navigation status is all configured under the AIS Static setup, while the destination and ETA are taken from the AIS Voyage setup. It also gives you an idea which GPS is being used under the GPS Source field and its antenna offset data.

© AIS 1		OWN SHIP DATA	
Name: MUMARINE	AGE: 0 s		
MMSI: 111223333	Nav Stat: Fishing		
CallSign: GDA	Ship/Cargo Type: 46		
IMO: 321	GPS Source: PRIMARY		
LAT: 33°48.5077N	GPS Ant Pos	A: 111 m	
LOn: 118°21.0146W		B: 111 m	
COG: 149 °	SOG: 00.0 km	C: 11 m	
HDG: 100 °	ROT: 000 °/min	D: 11 m	
Destination:	ETA Time: 12:00		
CARSON	Date: 05/16		

*Display Field Descriptions:*

**Name:** Vessel's name

**MMSI:** Maritime Mobile Service Identity number used for identification of ship and message

**Ship/Cargo Type:** Ship & Cargo Type (see table A-1 for values)

**AGE:** Age of the information in the display, in seconds

**Nav Stat:** Navigation status as entered in AIS Voyage setup

**CALL SIGN:** Assigned radio call sign

**IMO:** International Marine Organization number (when available)

**GPS Source:** Source of the GPS information in use. The choices are:

Primary (MX421, MX521 or MX525 smart GPS sensors),

Secondary (external GPS attached to the MX420 CDU), and

Backup (Transponder GPS)

**Lat/Lon:** Position fix of the GPS in use.

**GPS Ant Pos:** In-use GPS Antenna location (A, B, C & D values see below) with reference to aft of bow and port or starboard of centerline.

**HDG:** Gyro reading, in degrees.

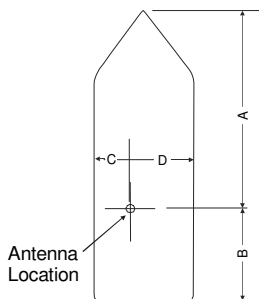
**COG:** Course Over Ground (degrees)

**ETA:** Estimated time of arrival (date & time).

**ROT:** Ship's Rate-Of-Turn, in degrees per minute.

**SOG:** Speed Over Ground (knots)

**Destination:** Operator entered destination under the CFG => AIS Voyage setup screen.



**GPS Antenna Offset Diagram**

The MX525A is an AIS Transponder Unit, which receives data from other vessels by means of VHF radio and sends this data to the MX420 Control and Display Unit (CDU) or the ECDIS.

The MX525A AIS transponder can be used with the following systems:

- MX420 CDU with program version 2.0(849) or higher with AIS license enabled
- IMO compliant ECDIS systems

It is also possible to use the MX525A within systems from other manufacturers, which support the IEC-defined interfaces.

*(For Cable connections and Wiring diagram, please refer to Pages 29 and 34 of the MX525A Technical & Installation Manual).*

The MX525A (Nauticast) transponder can be setup using the AIS Configuration Screens of the MX420 CDU.

Following are the instructions to setup the MX535A transponder using the MX420 CDU:

1. Press the *CFG* key.
2. Scroll to the *AIS Config* menu.
3. Press *E* key.
4. Use the *Change* soft key to change the *Transponder Type* to *Nauticast*.
5. Scroll to *Static Config Update* and make sure it is set to *MKD*.
6. Press *E* to exit the *AIS Config* screen. Your screen should look like Fig 1.07.
7. Scroll to *AIS Static* screen and press *E*.
8. Use the *Change* soft key to change *AIS Connected (Port 5)* to *Yes*.
9. Press the *E* key to exit. Your screen should look like Fig 1.08.

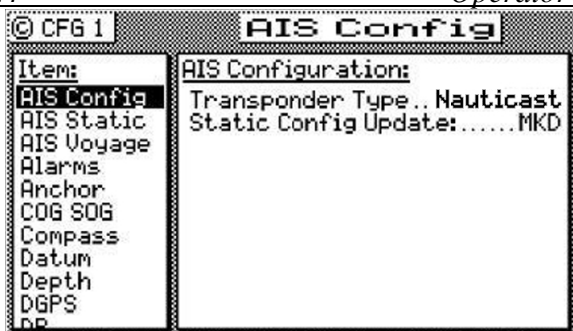


Fig 1.07 AIS Configuration Screen

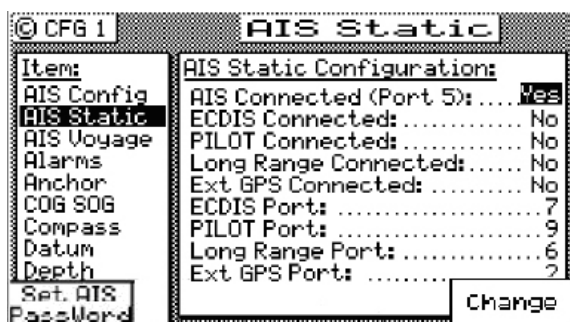


Fig 1.08 AIS Static Configuration Screen

To learn more about AIS and the instructions to setup other AIS configuration, please refer to 'AIS System Setup' on Page 142 of the MX420 Operator's Manual.

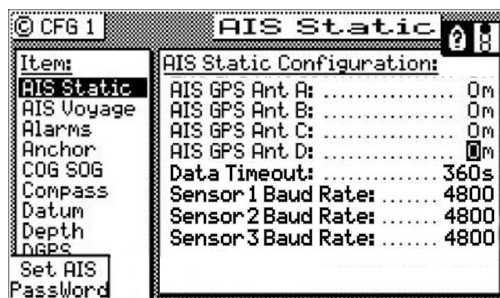


**MX535A Sensor Input Baud Rates**

The MX420 CDU (with Version 2.0(849) or higher) allows the user to control the baud rate settings of the three sensor input ports of the MX535A (Nauticast) AIS Transponder.

To implement this feature, use the following steps:

1. Press the *CFG* key.
2. Scroll to *AIS Static* menu.
3. Press *E* key to edit the *AIS Static* menu.
4. Press the *Set AIS Password* softkey and enter the administrator password (*admin*).
5. Press the *Done* softkey.
6. Scroll down to *Sensor 1 Baud Rate*.
7. Use the *Change* soft key to change the *Sensor 1 Baud Rate* to the baud rate.
8. Similarly, using the down arrow key, you can also change the baud rates for sensor ports 2 and 3.
9. Press *E* key to exit. See Fig 1.09 below.



**Fig 1.09 AIS Static Configuration Screen  
(Nauticast Sensor port Baud Rate Setup)**

**Note:** These options are available only under NAUTICAST transponder selection. Not shown under ATLAS or SAAB.

### MX535A Security Log Screen (AIS 11)

The MX535A provides a Security Log screen (AIS 11) which displays the transponder status in the event when the unit is either powered off or in silent mode for more than 15 minutes.

The following information is included in the AIS11 screen:

**Start Time:** The time when the transponder was either turned off, or began operating in silent mode.

**End Time:** The time when the transponder regained its power or stopped operating in silent mode.

**Cause:** This displays POW (power off) or TX (silent mode).

This screen can be accessed by pressing the AIS key repeatedly until you reach AIS11.



	StartTime	EndTime	Cause
1)	02/02/05 23:30	02/03/05 00:30	Pow.
2)	---	---	---
3)	---	---	---
4)	---	---	---
5)	---	---	---

REFRESH

Fig 1.10 AIS 11 – MX535A Security Log Screen

#### Softkey description:

Press the **E** key to show the softkey below.

REFRESH

Pressing this softkey will refresh the Security Log data from the MX535A/NAUTICAST transponder.

**Note:** This display is available only under NAUTICAST transponder selection. Not shown under ATLAS or SAAB.

**AIS12 - Remote Ship EPFS**

This AIS screen indicates the MMSI, SRC (transmitted message type 1, 3 or 18), RNG (Range), EPFS (Electronic Positon Fixing System) or source of position used by the target ships (i.e. GPS, GLONASS, etc.). Use the DOWN (or UP) arrow key to scroll through the list.

@ AIS 12		REMOTE SHIP EPFS			
TGT	MMSI	SRC	RNG	EPFS	
40	▲ 240825000	03	010NM		
05	▲ 367008510	01	011NM		
27	▲ 240646000	03	011NM	GPS	
09	⊗ 970123456	01	999NM		
00	⚡ 211000999	09	999NM		
26	▲ 1193046	--	---		

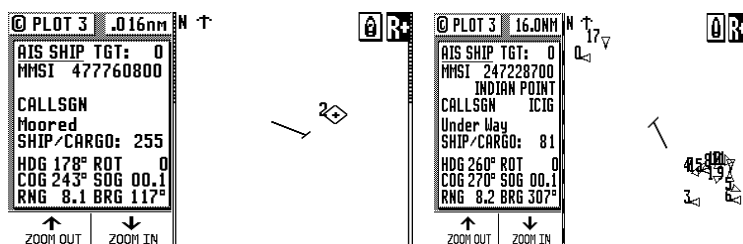
**AIS13 - Remote Ship Data**

This AIS screen indicates the MMSI, RNG, Ship Dimensions (meters) and name of transponder manufacturer. Use the DOWN (or UP) arrow key to scroll through the list.

@ AIS 13		REMOTE SHIP DATA						
TGT	MMSI	RNG	AAA	BBB	CC	DD	Vendor	ID
17	357444620	3.2NM						
19	538002961	4.6NM						
11	352484000	5.7NM						
12	354315000	6.2NM	256	076	16	27m		
09	367348930	6.3NM						
01	353846000	6.5NM	185	094	10	30m		
10	211424430	6.7NM	013	265	20	20m		

## PLOT 3 – AIS Plot Screen






The PLOT3 screen is accessed by pressing the PLOT key two times or until the PLOT3 screen is shown. This display shows a graphical representation of the area surrounding your vessel. All boats equipped with AIS that are within the display resolution will be shown. Each boat icon has an index number next to it corresponding to the target number shown in the AIS2, AIS12 and AIS13 displays. The boat icons are oriented according to their heading. The icon in the center of the screen is your ship. To zoom-in press the DOWN arrow key. To zoom-out press the UP arrow key.



### Softkey Description:

- This softkey enables the user to quickly view information for the next target. In addition to the ship identification data, the range and bearing from your ship to the target is also calculated.
- This softkey enables the user to quickly view information for the previous target.
- This softkey enables the user to quickly access information for a specific target by entering its index number. It gives access to information from all vessels in the database. The displayed vessels are the same ones listed in the AIS2 Remote Ship List display. The MKD will display both Class A and B AIS targets.
- Down Arrow - Zoom In.
- Up Arrow - Zoom Out.

### Plot 3 Icons:

-  AIS equipped vessel with index number
-  Own Ship icon
-  Base Station
-  Search and Rescue (SAR)
-  Aids to Navigation

**AIS Target Data Timeout (AIS Only)**

This feature allows the user to select the time the AIS targets will stay on the MX420 display after the target has stopped transmitting or has moved out of VHF range before it is removed from the AIS2 or PLOT3 screens. The default setting is 360 seconds. This value can be changed to match the timeout period of an AIS enabled ECDIS system.

*(To learn more about PLOT3 and AIS2 screens, please refer to Pages 77 and 153 respectively in the MX420 Operator's Manual)*

This feature can be used with any of the three transponder selections (SAAB, ATLAS & NAUTICAST).

To implement this feature, use the following steps:

1. Press the *CFG* key.
2. Scroll to *AIS Static* menu.
3. Press *E* key.
4. Scroll down to *Data Timeout*.
5. Use the *Numeric* keypad to change *Data Timeout* value that matches the ECDIS time out value.
6. Press the *E* key to exit. Please refer to Fig 1.09 to see this particular screen option.

## **External DGPS**

This feature controls the operation of the GPS engine in the MX521 (or MX525) smart antenna to accept RTCM data corrections from its internal beacon receiver or an external differential receiver.

This feature is available in the MX420 with program version V2.0(849) or higher. The following RTCM baud rates can be used - 2400, 4800, 9600, 19200.

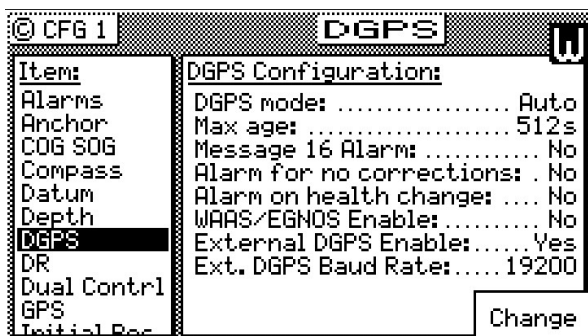
This special feature is only available for the MX521 or MX525 smart antennas.

The feature can be found under the CFG1→DGPS Configuration menu.

To implement this feature:

1. Press the *CFG* key.
2. Scroll down to *DGPS* menu.
3. Press *E* key.
4. Scroll to *External DGPS Enable: No*.
5. Press the *Change* soft key to change *External DGPS Enable* to *Yes*.
6. Scroll to *Ext. DGPS Baud Rate* and use the *Change* soft key to change *Ext. DGPS Baud Rate* to the required value.
7. Press the *E* key to exit. Your screen should appear like Fig 1.11.

**Note:** This feature is not available if the LORAN-C (Raytheon) license is activated. The EUROFIX DGPS option will be available instead. Please refer to the LORAN-C (Raytheon) portion of this document for more information.



**Fig 1.11 DGPS Configuration Screen  
(External DGPS Enabled)**

You can check the DGPS status and the corrections on GPS6 screen. (Refer 'GPS6-DGPS Status' on Page 98 of the MX420 Operator's Manual).

(To learn more about DGPS Configuration Screen, please refer to 'DGPS Configuration' on Page 106 of the MX420 Operator's Manual)

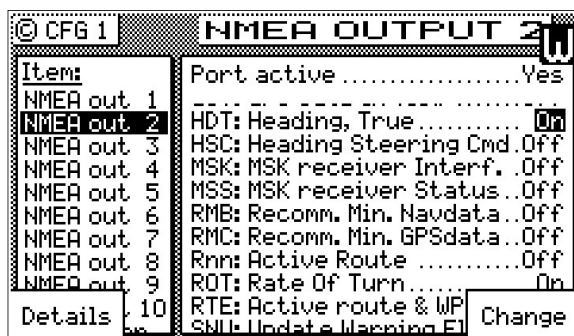
## ***HDT & ROT Output***

The MX420 CDU (with program Version 2.0(849) or higher) can now pass through the HDT (True heading) and ROT (rate of turn) data supplied by the MX575 (or other heading sensors) to any NMEA data output port.

To activate the Pass Through feature:

1. Press the *CFG* key.
2. Scroll to *NMEA out 1* menu.
3. Press *E* key.
4. Scroll down to *HDT: Heading True*.
5. Press the *Change* soft key to change *HDT: Heading, True* to *On*.
6. Press the *PASSTHRU* softkey to pass through the input data to the output port selected.
7. Scroll down to *ROT: Rate Of Turn*.
8. Press the *Change* soft key to change *ROT:Rate Of Turn* to *On*.
9. Press the *E* key to exit *NMEA out 1* screen. Your setup should look like Fig 1.12.
10. Similarly, you can scroll down to other available *NMEA Out* ports and configure them to output HDT and ROT sentences by following the above procedure.





**Fig 1.12 NMEA Out Configuration Screen  
(HDT & ROT output enabled)**

*(To learn more about NMEA Out and the instructions as to how to output the sentences, please refer to 'NMEA Out Data Control' on Page 117 of the MX420 Operator's Manual).*

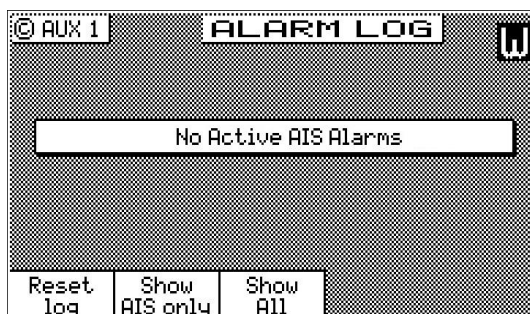
## **'Show AIS Only' Alarms (AIS Only)**

The AUX1 (Alarm Log) screen now gives the user an additional option to display the AIS alarms using the "Show AIS Only" soft key.

**Note:** This feature is only available on MX420 CDU with AIS license enabled.

To implement this feature:

1. Press the *AUX* key to bring up the *AUX1* Screen.
2. Press *E* to see the softkeys.
3. Use *Show AIS Only* soft key to display only the AIS alarms. If you currently have no AIS Alarms, the screen should display- '*No Active AIS Alarms*'.
4. Use *Show All* soft key to display all recorded alarms.
5. Press *E* to exit the soft key options.



**Fig 1.13 Alarm Log Screen  
(Show AIS only feature enabled)**

*(To learn more about Alarm Log and instructions on how to use it, please refer to 'Alarm Log' on Page 86 of the MX420 Operator's Manual).*

## LORAN-C (Raytheon)

The MX420 now has Loran-C capability. This feature will be available when the **Loran-C (Raytheon)** license is activated. Please copy the PCB & part numbers and call MX Marine to obtain the license.

After the license is activated, the *LORAN-C* feature will appear in the *CFG 1* screen and be available for use.

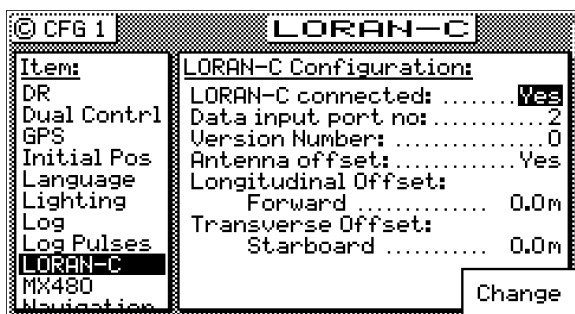


Fig 1.15 LORAN-C Screen

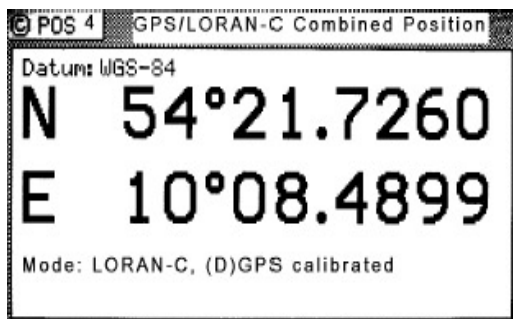
To implement this feature, change *LORAN-C connected* to *Yes*.

Identify the appropriate input port that the LORAN-C device connects to the receiver by using the *Change* softkey.

Select the appropriate *Version Number* with the range from 0 to 9.

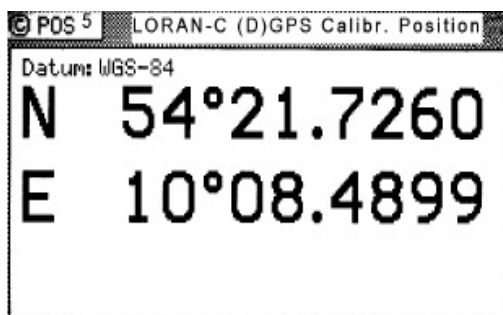
The *Antenna offset* option of the LORAN-C feature is similar to the *Antenna offset* from the GPS feature. The *Antenna offset* allows you to virtually offset your LORAN-C antenna. That is, if you are forced to place the antenna in a location other than where you want your position fix calculated (due to superstructure or other high power antennas), you can place the antenna in a practical location. Then enter the appropriate *Antenna offset*, and the receiver will calculate your position in the place where you would have preferred to place the antenna.

After the LORAN-C feature is enabled, you will have 3 new screens (**POS 4**, **POS 5**, **POS 6**), which display your LORAN-C information.



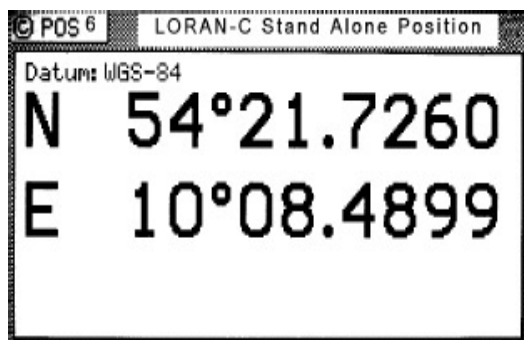
**Fig 1.16 POS 4 Screen  
GPS/LORAN-C Combined Position**

The POS 4 screen displays the *GPS/LORAN-C combined position* and navigation modes received from the *\$PMVX1* message (which is based on (D)GPS if GPS is available, and based on (D)GPS calibrated LORAN-C position if GPS is not available) from the LORAN-C receiver. The *\$PMVX1* message is formatted just like the NMEA GGA message, except that its GPS quality indicator ranges from 0-5. The GPS quality indicator is displayed as a navigation mode on the POS 4 screen.



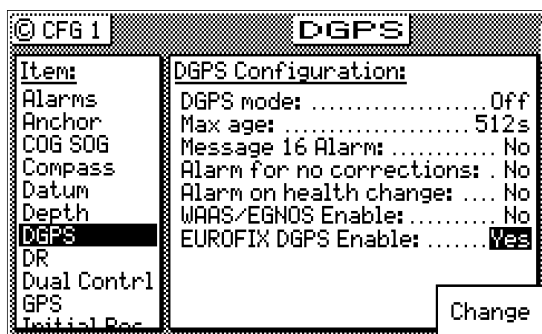
**Fig 1.17 POS 5 Screen  
LORAN-C (D)GPS Calibrated Position**

The POS 5 screen displays the *(D)GPS calibrated LORAN-C position* received from the GLL message from the LORAN-C receiver.



**Fig 1.18 POS 6 Screen  
LORAN-C Stand Alone Position**

The POS 6 screen displays the *stand-alone (uncorrected) LORAN-C position* received from the RMA message from the LORAN-C receiver.



**Fig 1.19 EUROFIX DGPS**

When Loran-C (Raytheon) is enabled, the MX420 gives the option to accept *EUROFIX DGPS* corrections instead of the External DGPS corrections under the CFG1→DGPS Configuration screen.