MX MARINE

MX420 Navigation System

Installation & Service Manual

MX420 Navigation System

Installation and Service Manual

Models Covered:

MX420/2
MX420/8
MX420/BR
MX420/BRIM
MX420/AIS BASIC (MKD)
MX420/AIS DGPS

Prepared by
MX Marine
A Division of NAVICO, Inc.
23868 Hawthorne Boulevard, Suite 201
Torrance, California 90505-5908
USA

P/N 3508 102 70060
July, 2007

MX Marine

MX Marine reserves the right to make changes to its products and specifications without notice.

About This Manual

We at MX Marine have attempted to take care and develop manuals which provide in-depth information. Obviously, we can't anticipate every configuration in which you might install the MX420, but we can help make your work more thorough and enjoyable.

This manual is organized by first describing the list of included items for the particular model you purchased. The sections that follows detail the technical specifications of the MX420 navigation unit and the MX421 antenna unit. This is followed with the mechanical and electrical wiring diagrams and installation notes to guide you in the installation of your MX420 system.

Should you require additional technical support, please first contact the dealer where you purchased your MX420. Since your dealer sells and installs the MX420 and many other types of equipment, they are often your best resource for technical questions. You can also contact MX Marine for technical assistance:

International:

MX Marine (US)
A Division of NAVICO, Inc.
23868 Hawthorne Blvd., Suite 201
Torrance, California 90505
USA

+01-310-791-8213 Telephone (International)
+01-310-791-6108 Fax

info@mx-marine.com
www.mx-marine.com

We hope you find the manual enjoyable and informative. As always, we welcome your comments on improving our products or manuals. Thank you.

Product Information

The model and serial number of your instrument are given on the back of the unit. Please enter the serial number in the space provided below. Always refer to this information when you contact your dealer.

Model: MX420 Navigation System S/N _____

Notes:

Table of Contents

SECTION 1
LIST OF COMPONENTS

List of Components

Table 1.0 MX Marine Antenna Units

Item	Component	Qty.	Part Number	Remarks
1	MX421B-10 Smart DGPS Antenna	1	9525 200 80110	Option
2	MX521 Smart DGPS Antenna	1	727010	Option
3	MX521G Smart GPS Antenna	1	727027	Option
4	MX525 Smart DGPS Antenna	1	9525 200 80290	Option
5	MX525G Smart GPS Antenna	1	9525 200 80291	Option
6	MX575 D/GPS Satellite Compass	1	3508 102 70720	Option

Table 1.1 Standard Parts for MX420/2 Model

Item	Component	Qty.	Part Number	Wt (lbs.)	Remarks
1.0	MX420/2 Control and Display System Consisting of:	1	9525 200 78000		
1.1	MX420, 2 Port Control and Display Unit	1	3508 102 70200	2.6	
1.2	Mounting Bracket	1	3508 101 38472		
1.3	Mounting Kit	1	3508 102 03140		
1.4	Power /NMEA Cable (Cable A)	1	3508 102 70010		
1.5	MX420 Operator's Manual	1	3508 102 70040		
1.6	MX420 Operator's Quick Guide	1	3508 102 70050		
1.7	MX420 Installation/Service Manual	1	3508 102 70060		
1.8	Tide Table Manual	1	3508 101 89490		
2.0*	MX421 Smart GPS antenna System* Consisting of:	1			Not Included with Item 1.0
2.1	MX421-10 Smart GPS Antenna*	1	9525 200 80100	1.1	
2.2	Antenna Cable Options: 15 meters 20 meters 40 meters 90 meters		 725637 3508 102 70170 3508 102 70180 3508 102 70190		 Option Option Option Option
2.3	MX421 Installation Manual	1	723594		
***GPS only model. For MX420/2B model substitute with MX421B-10 DGPS Antenna (see table below)**					

Table 1.2 Standard Parts for MX420/8 Model

Item	Component	Qty.	Part Number	Wt. (lbs.)	Remarks
1.0	MX420/8 Control and Display System Consisting of:	1	9525 200 78010		
1.1	MX420, 8 Port Control and Display Unit	1	3508 102 70210	2.6	
1.2	Mounting Bracket	1	3508 101 38472		
1.3	Mounting Kit	1	3508 102 03140		
1.4	Power/NMEA Cable (Cable A)	1	3508 102 70010		
1.5	Cable B NMEA Cable	1	3508 102 70020		
1.6	Cable C NMEA Cable	1	3508 102 70030		
1.7	MX420 Operator's Manual	1	3508 102 70040		
1.8	MX420 Operator's Quick Guide	1	3508 102 70050		
1.9	MX420 Installation/Service Manual	1	3508 102 70060		
1.10	Tide Table Manual	1	3508 101 89490		
2.0*	MX421 Smart GPS antenna System* Consisting of:	1			Not Included with Item 1.0
2.1	MX421-10 Smart GPS Antenna*	1	9525 200 80100	1.1	
2.2	Antenna Cable Options: 15 meters 20 meters 40 meters 90 meters		 725637 3508 102 70170 3508 102 70180 3508 102 70190		 Option Option Option Option
2.3	MX421 Installation Manual	1	723594		
GPS only antenna model. For MX420/8B model substitute with MX421B-10 DGPS antenna (See table below).					

Table 1.3 Standard Parts for MX420/BR Dual Control Display System

	Component	Qty.		Wt. (lbs.)	Remarks
1.0	MX420/8 Control and Display System Consisting of:	1	9525 200 78010		
1.1	MX420, 8 Port Control and Display Unit	1	3508 102 70210	2.6	
1.2	Mounting Bracket	2	3508 101 38472		
1.3	Mounting Kit	2	3508 102 03140		
1.4	Power/NMEA Cable (Cable A)	2	3508 102 70010		
1.5	Cable B NMEA Cable	1	3508 102 70020		
1.6	Cable C NMEA Cable	1	3508 102 70030		
1.7	MX420 Operator's Manual	2	3508 102 70040		
1.8	MX420 Operator's Quick Guide	2	3508 102 70050		
1.9	MX420 Installation/Service Manual	2	3508 102 70060		
1.10	Tide Table Manual	2	3508 101 89490		
2.0	MX420/2 Control and Display Unit	1	9525 200 78000		
3.0*	Smart GPS Antenna System Consisting of:	1			Not Included with Item 1.0
3.1*	MX421-10 Smart GPS Antenna Or, MX421B-10 Smart DGPS Antenna	1 1	9525 200 80100 9525 200 80110	1.1 1.9	
3.2	Antenna Cable Options: 15 meters 20 meters 40 meters 90 meters	1	 725637 3508 102 70170 3508 102 70180 3508 102 70190		 Option Option Option Option
3.3	MX421 Installation Manual	1	723594		

*GPS antenna for MX420/8 GPS only installation use P/N 9525 200 80100. For MX420/8B DGPS installation use P/N 9525 200 80110.

Table 1.4 MX420/BRIM (Integrity Monitor) Model

Item	Component	Qty.	Part Number	Wt. (lbs.)	Remarks
1.0	MX420/8 Control and Display System consisting of:	2	9525 200 78010		
1.1	MX420, 8 Port Control and Display Unit	2	3508 102 70210	2.6	
1.2	Mounting Bracket	2	3508 101 38472		
1.3	Mounting Kit	2	3508 102 03140		
1.4	Power/NMEA Cable (Cable A)	2	3508 102 70010		
1.5	Cable B NMEA Cable	2	3508 102 70020		
1.6	Cable C NMEA Cable	2	3508 102 70030		
1.7	MX420 Operator's Manual	2	3508 102 70040		
1.8	MX420 Operator's Quick Guide	2	3508 102 70050		
1.9	MX420 Installation/Service Manual	2	3508 102 70060		
1.10	Tide Table Manual	2	3508 101 89490		
2.0	MX421 Smart DGPS Antenna System Consisting of:	2			Not Included with Item 1.0
2.1	MX421B Smart GPS Antenna	2	9525 200 80110	1.9	
2.2	Antenna Cable Options: 15 meters 20 meters 40 meters 90 meters	2	 725637 3508 102 70170 3508 102 70180 3508 102 70190		 Option Option Option Option
2.3	MX421 Installation Manual	2	723594		

Table 1.5 MX420/AIS Model

Item #	Description	P/N	Remarks
1.0	MK420/AIS Control and Display System Consisting of:	9525 200 80000	Standard
1.1	MK420/AIS 8-port Control and Display Unit	3508 102 70240	
1.2	Mounting Bracket	3508 101 38472	
1.3	Mounting Kit	3508 102 03140	
1.4	Power/NMEA Cable (Cable A)	3508 102 70010	
1.5	Cable B NMEA Cable	3508 102 70020	
1.6	Cable C NMEA Cable	3508 102 70030	
1.7	MX420 Operator's Manual	3508 102 70410	
1.8	MX420 Installation Manual	3508 102 70420	
1.9	MX420 Quick Reference Guide	3508 102 70060	
1.10	Tide Table Manual	3508 101 89490	
1.11	AIS Reference Card		
2.0	MX421B-10 Smart DGPS Antenna System Consisting of:		Option
2.1	MX421B Smart DGPS Antenna	9525 200 80110	Option
2.2	15 Meter Interface Cable, or 20 meters 40 meters 90 meters	725637 3508 102 70170 3508 102 70180 3508 102 70190	Option Option Option Option
2.3	MX421 Installation Manual	723594	

SECTION 2
TECHNICAL SPECIFICATIONS

MX421 Smart GPS Antenna

Receiver GPS:

Type:	L1, C/ A Code, 12 channel continues tracking
Update rate:	Once per second
Accuracy:	1 m 2DRMS Position with DGPS 3 m 2DRMS without correction
Dynamics:	Velocity: 460 m/ s Acceleration: 2.5g
Time to first fix:	Less than 1 minute with almanac 15 minutes from coldstart.
Reacquisition:	15 seconds typical
DGPS Input:	RTCM SC- 104 format, from internal beacon receiver.

Beacon: (MX421B Model)

Type:	2 channels, Automatic or Manual tuning,
Frequency:	283.5 - 325 KHz, in 500 Hz steps
Dynamic Range:	100dB
Adjacent Channel Rejection:	40dB (500 Hz)
Bit rate:	25, 50,100, or 200 (auto- sync)
RTCM Messages Supported:	Type 1, 2, 3, 5, 7, 9,16

MX420 Control and Display Unit (CDU)

Display:

Part name:	LMG7410PLFC (Hitachi)
Dots:	240 by 128
Duty:	1/ 128
LCD:	Film type black and white (negative type). Bottom polarizer is trans missive type. Matches polarized sunglasses. Viewing dir.: 6 O'clock.
Back light:	Cold cathode fluorescent lamp
Protection:	Acryl 7N PMMA window

Keyboard:

Type:	Tactile silicone rubber
Contact:	Carbon
Back light:	Yellow LEDs

Front enclosure:

Plastic:	ABS/ PC- blend Cycoloy C1200

Back enclosure:

Metal:	Cast aluminum

Connectors:

Connector A:	
Panel plug:	18-Pin Male (Conxall)
Connector B (MX 420/8 only):	
Panel socket:	18-Pin Female (Conxall)
Connector C (MX 420/8 only):	
Panel socket:	18-Pin Female (Conxall)

Cables:

Cable A:	
Type:	9-Pair Shielded - Wire 24x 0.20 mm
Connector:	18-Pin (Female - Conxall)
Cable B:	
Type:	9-Pair Shielded- Wire 24 x 0.02 mm
Connector:	18-Pin (Male - Conxall)
Cable C:	
Type:	9-Pair Shielded- Wire 24 x 0.20 mm
Connector:	18-Pins (Male - Conxall)
Antenna:	
Type:	8 wire (24 AWG) shielded
Connectors:	
Antenna end:	8-Pin Female Conxall
Navigator end:	None

Antennas:

MX421 GPS Smart Antenna Unit

Freq.:	GPS L1 , 1575 MHz

MX421B DGPS Smart Antenna Unit

Freq.:	GPS L1 , 1575 MHz
Beacon:	283.5 - 325 KHz

Physical

MX420 CDU:

Height:	145 mm (5.71in)
Width:	271 mm (10.67in)
Depth overall:	53 mm (2.52in)
Depth flush mounted:	24.5 mm (0.98in) to wall
Depth for cables:	100 mm (3 in.)
Weight:	1238 g (2.75 lbs.)
Weight gimbal mount:	214 g (0.47lbs)

Cables	
Cable A:	2 m (6 ft)
Cable B:	2 m (6 ft)
Canle C:	2 m (6 ft)

MX421 Antenna:

Height:	89 mm (3.27 in)
Diameter:	182 mm (7.28in)
Cable Length:	
Supplied:	15 m. (Standard length)
Options:	20 or 40 meters

Environmental

MX420 CDU:

Operating Temperature:	-15 to +55 °C. IEC 60, clause 4.5.2 and 4.5.4 (draft 3 rd edition)
Storage Temperature:	-30 to +70 °C. IEC 945, clause 4.5.2 and 4.5.4 (draft 3 rd edition)
Humidity:	IEC 945, clause 4.5.3 (draft 3 rd edition)
Vibration:	IEC 945, clause 4.5.7 (draft 3 rd edition)
Solar Radiation:	MIL- STD- 810E, Method 505.3, Procedure I
Corrosion:	945, clause 4.5.10 (draft 3 rd edition)
Water Resistance:	MIL- STD- 108E, Procedure 4.10. EMC: EN 50081- 1/ 1992, EN 50082- 1/ 1992 and 55022/ 1994 class B, IEC 801- 2/ 1991, IEC 801-3/ Draft Second Edition, IEC 801- 4/ 1998, IEC 945/ 1994, IEC 80/ 106/ CDV/ 1995 (Draft IEC945), FTZ 171 R 32/ Aug. 1985, FTZ 171 R 45/ Jan. 1989, FTZ 171 R 46/ Dec 1988
Compass Safe Distance:	1.5 m. (Recommended)

MX421 Antenna:

Operating Temperature:	-25 to +70 °C.
Humidity:	MIL- STD- 810E, Method 507.3, Procedure I. 100% R. H. for 30 days at 24 °C

Power:

MX420 CDU :

Type:	DC/ DC switch mode with galvanic separation
Consumption:	Less than 11W (display back light on). Typical 8W at 24 volt external supply voltage. Typical 8.7W at 12 volt external supply voltage
Supply voltage:	12 or 24 volt battery: 9.6 volt dc to 32 VDC
Reverse protection:	-100 volt: internal diode
Over voltage protection:	+40 volt: fuse and transient voltage suppression
Fuse:	Internal over current / over temperature fuse. Automatic resetting
Insulation:	Supply voltage to data pins or shield: Maximum 50 VDC
Antenna supply:	12 VDC, maximum 500mA

***Antenna**:*

MK 421:	12 VDC, 200 mA
MK 421B:	12 VDC, 280 mA

MX420 CDU Inputs and Outputs:

The input and output circuits of the serial interfaces meet the requirements of:

- **IEC 61162-1** including the requirements of **ITU-T V.11**.
- **NMEA 0183** version 1.5, 2.0, 2.1, 2.2 & 2.3

NMEA talker (all outputs):

Levels:	Maximum ±6 volt, minimum ±2 volt, A out relative to B out
Current:	Minimum 15mA
Protection:	-1 volt to +6 volt, output relative to shield, ±50 volt, output relative to external power lines

NMEA listeners (all inputs):

Insulation:	Opto coupler. Maximum ±50 volt, input relative to shield or power supply lines
Impedance:	Minimum 500 Ohms, A- in relative to B- in
Threshold:	Maximum 2 volt and 2 mA
Protection:	±15 volt, A- in relative to B- in, ±50 volt, input relative to shield or power

MOB/ Event input

Insulation:	Maximum ±50 volt, input relative to power supply lines
Impedance:	3.5 kOhm input relative to Reference GND
Pull-up:	15 kOhm to internal 12 volt
Threshold:	Positive going maximum 2.3 volt, input relative to Reference GND Negative going minimum 0.6 volt, input relative to Reference GND Hysteresis minimum 0.6 volt
Protection:	±25 volt, input relative to shield ±50 volt, input relative to external power lines
Frequency:	Triggered with 50 mS bounce control
Pulse width:	Minimum 100 mS
Cable B Pins:	Pin 6 (normally open) to Pin 1 (GND)

Alarm output

Signal levels:	When not in Alarm state, or after acknowledged alarm: Normally Open When in Alarm On state: Closed to Ref. GND
Cable A Pins:	Pin 18 (N.O. contact to GND)

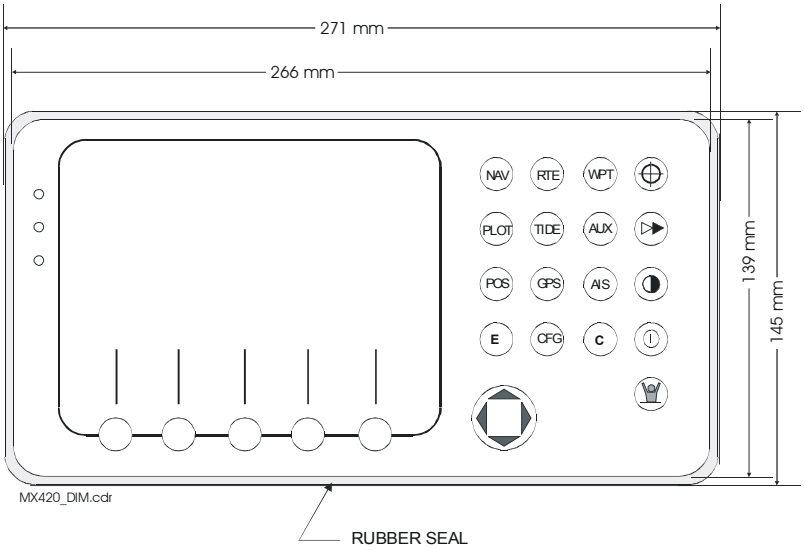
Antenna voltage output (Cable A)

DC voltage:	12 VDC, +1.0 VDC loaded; (11.5 VDC nominal unloaded)
DC current:	Maximum 500 mA at 12.0 volt DC

1 PPS Output (optional)

Output :	1 PPS + 50 ns RMS
Signal levels:	0-12 Volt
Pulse width:	250 mS.
Rise Time:	25 nS.

SECTION 3
MECHANICAL AND INSTALLATION DRAWINGS



ALL DIMENSIONS IN MM.

Figure 3.1 MX420 Display Console Dimensions (Front View)

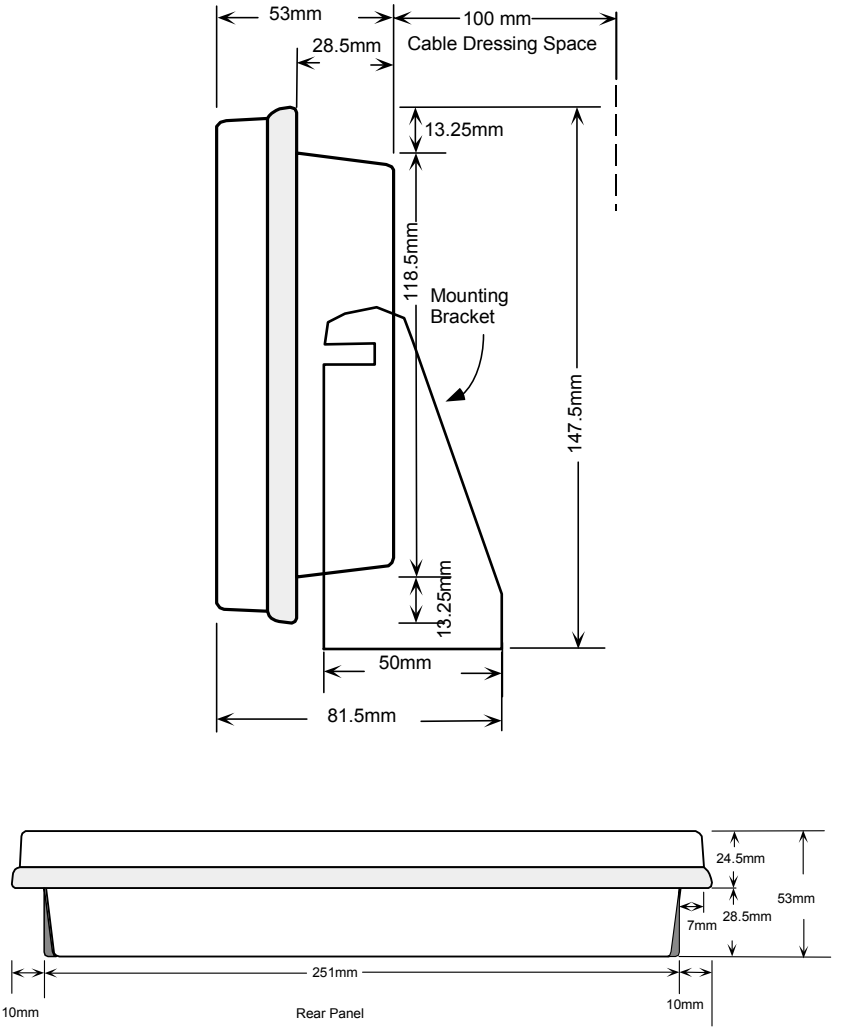


Figure 3.2 MX420 Display Console Dimensions (Top and Side View)

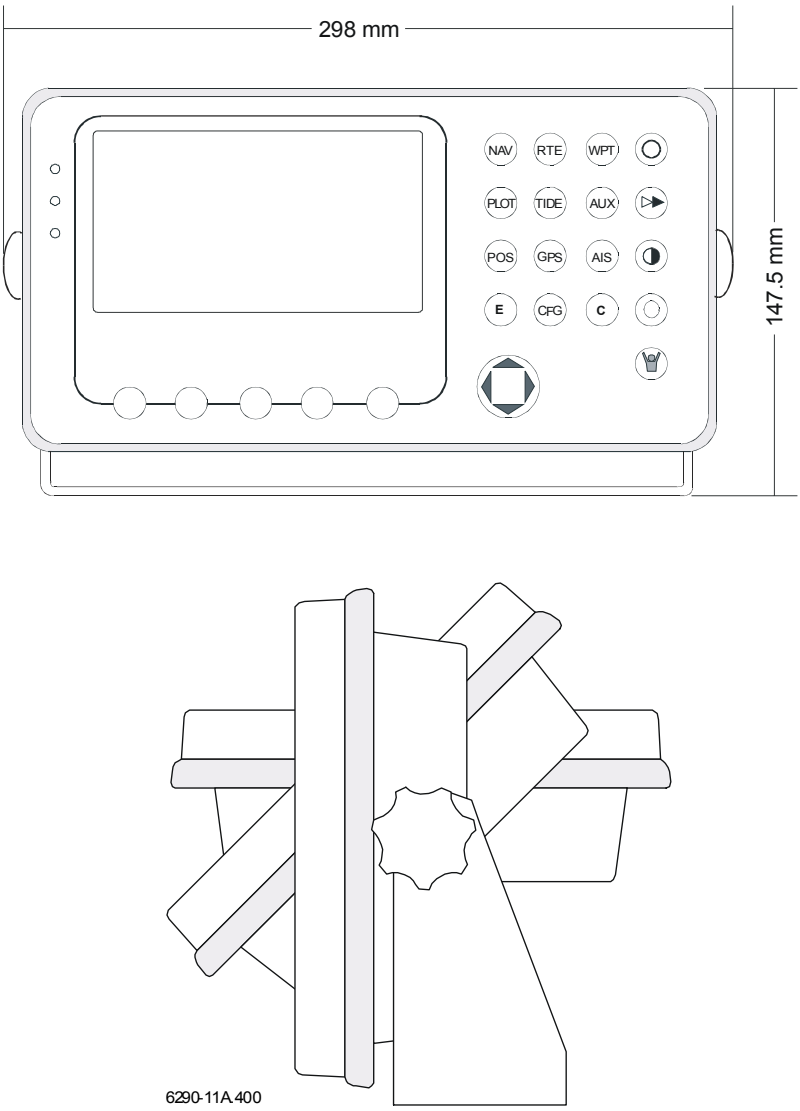


Figure 3.3 Gimbal Mount

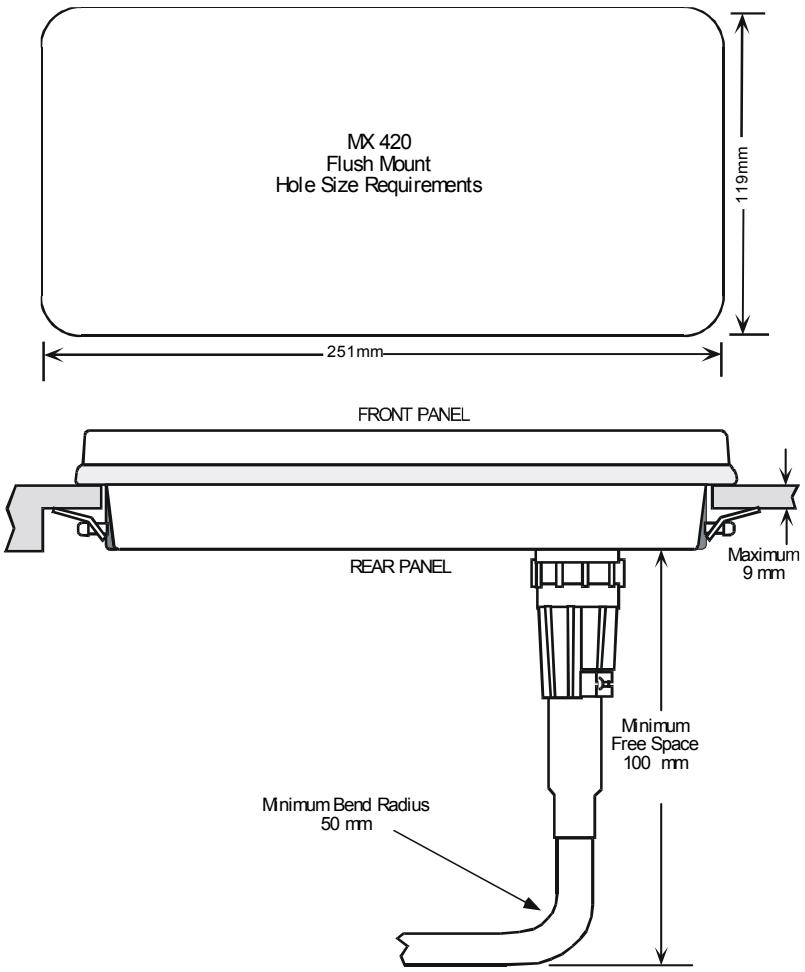


Figure 3.4 Standard Flush Mount and Cable Clearance

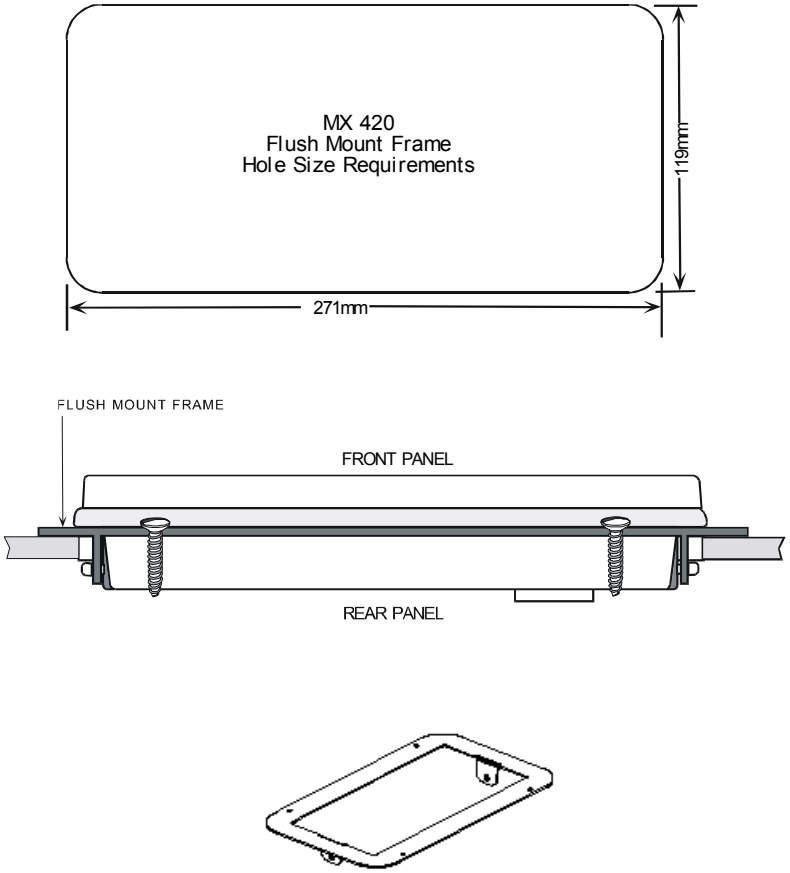


Figure 3.5 Optional Flush Mount Frame Installation

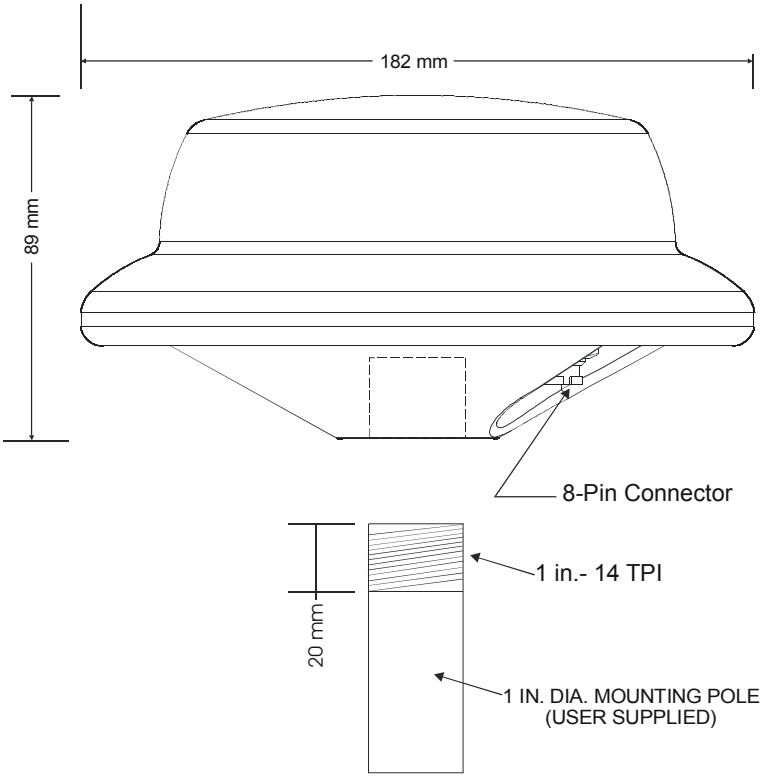


Figure 3.6 MX421/B Antenna Dimensions and Mount Specifications

SECTION 4
ELECTRICAL INSTALLATION DRAWINGS

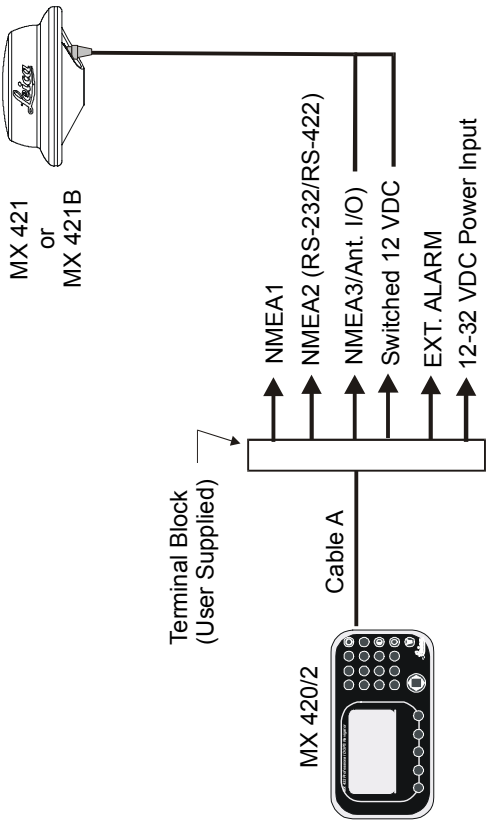


Figure 4.1 MX420/2 Basic System Configuration

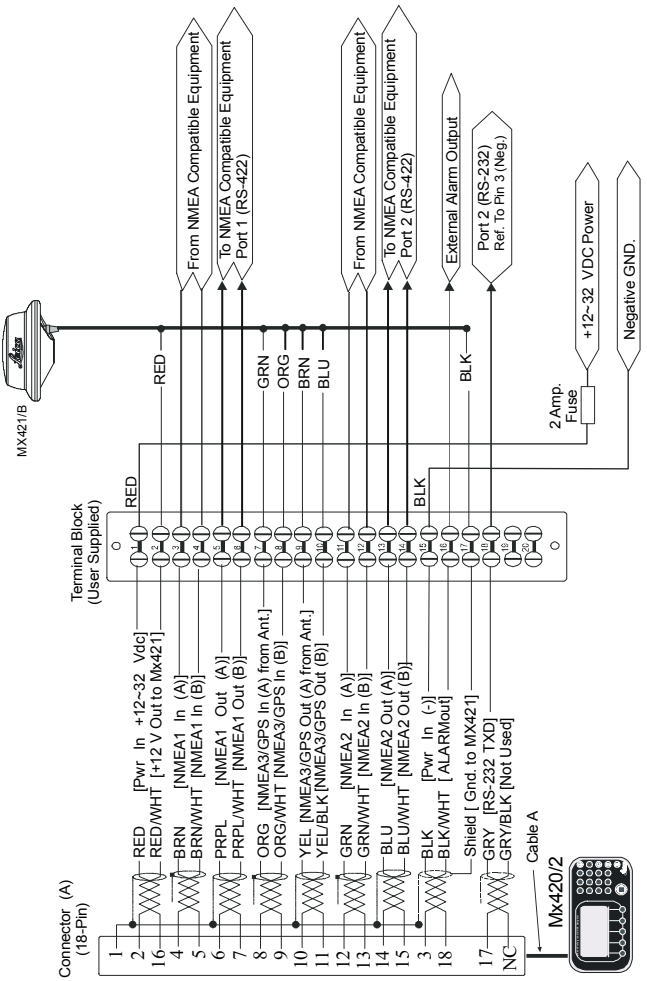


Figure 4.2 MX420/2 Basic Wiring Diagram

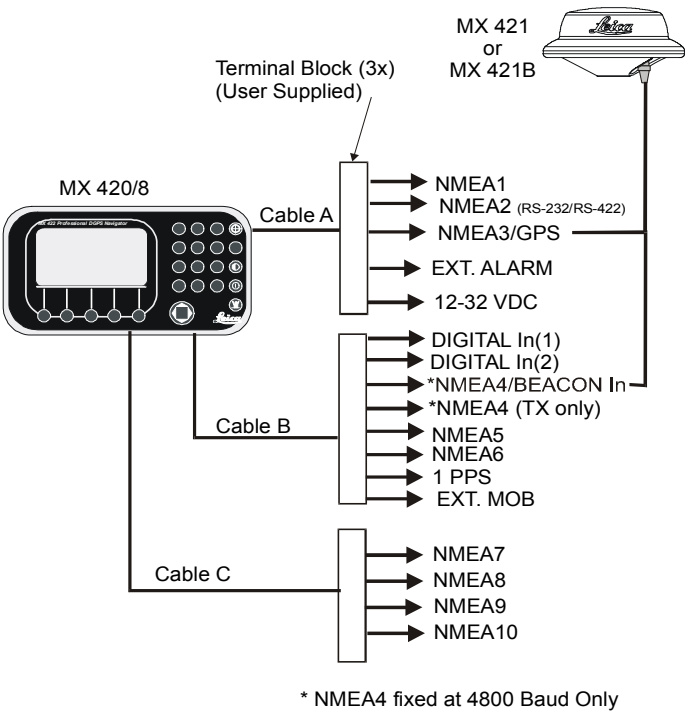


Figure 4.3 MX420/8 System Configuration

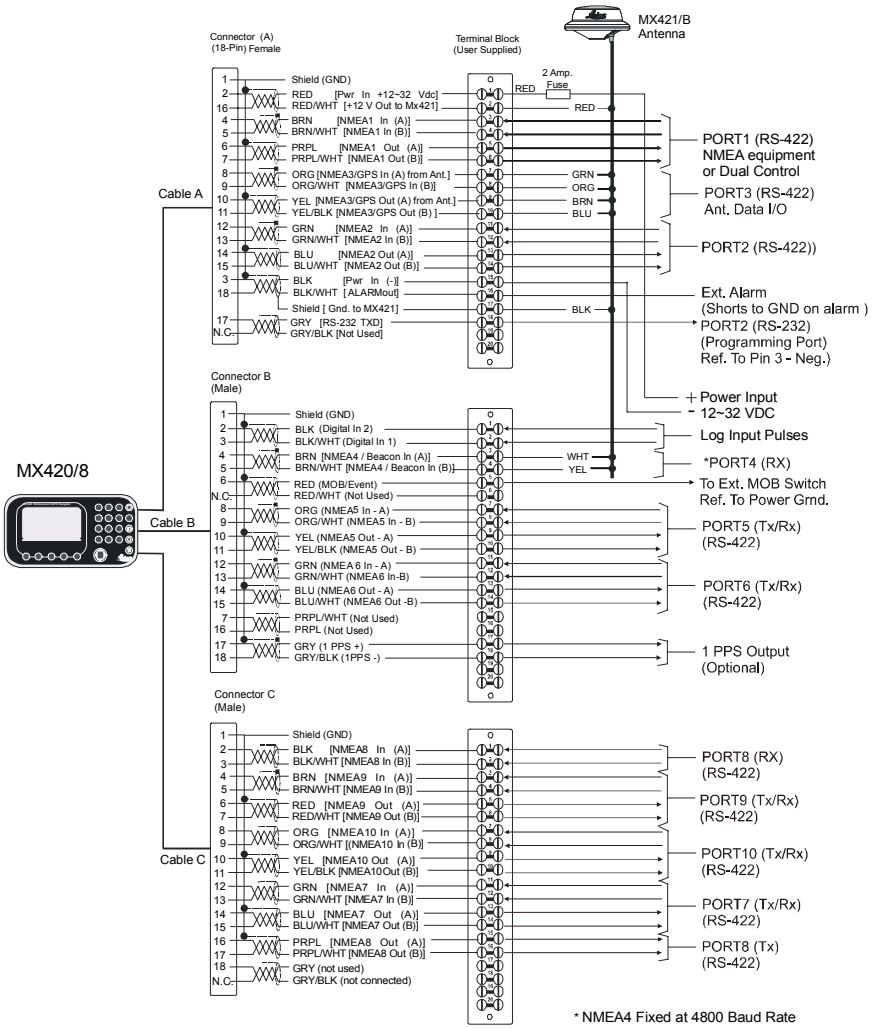


Figure 4.4 MX420/8 Wiring Diagram

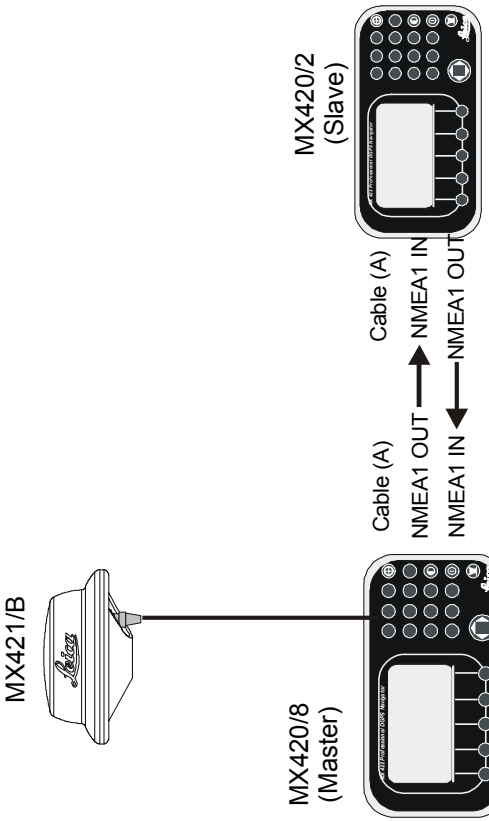


Figure 4.5 MX420/BR Dual Control System

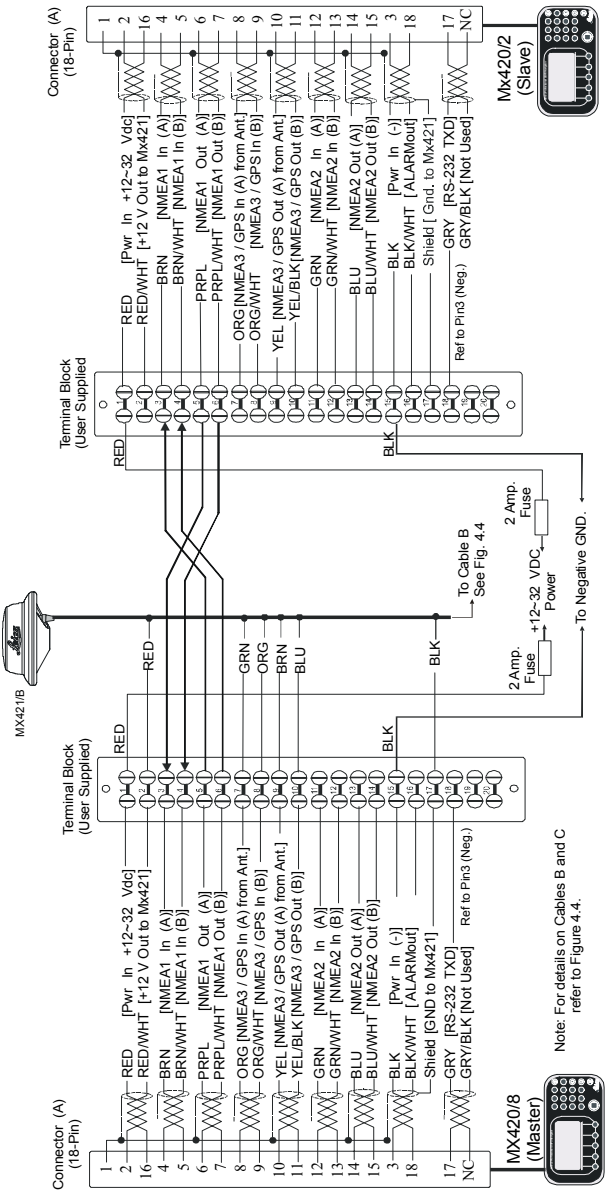


Figure 4.6 MX420/BR Dual Control Wiring Diagram

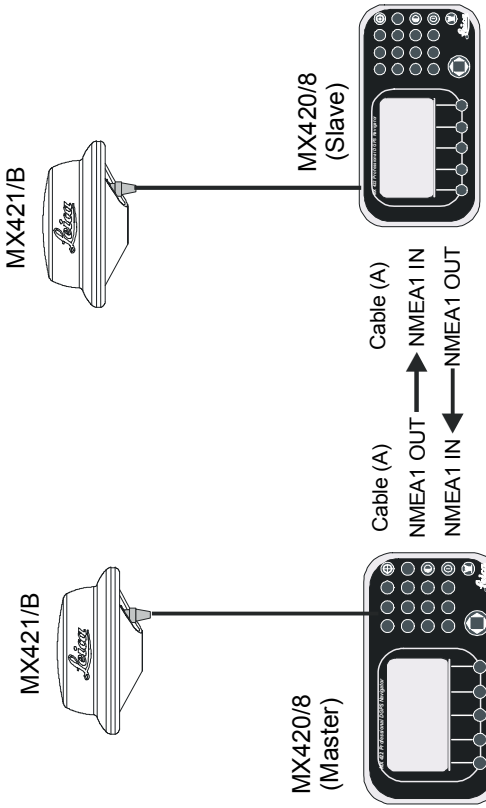


Figure 4.7 MX420/BRIM Dual Station Integrity Monitor System

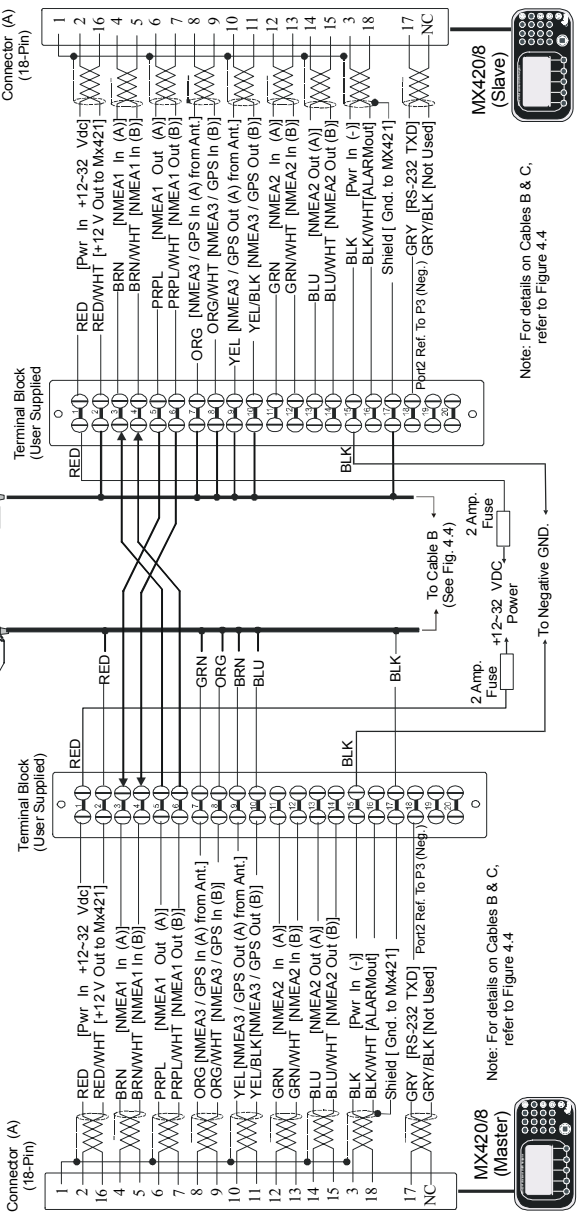


Figure 4.8 MX420/BRIM Dual Station Integrity Monitor Interface Diagram

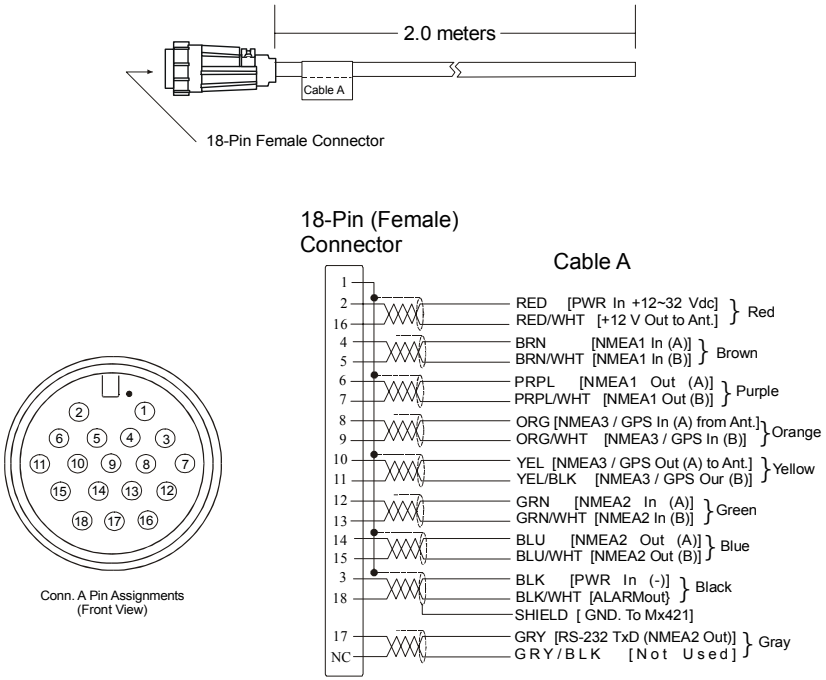
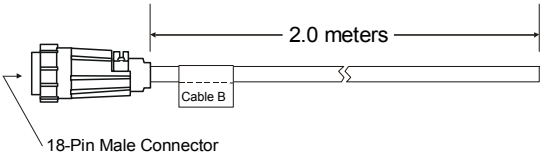
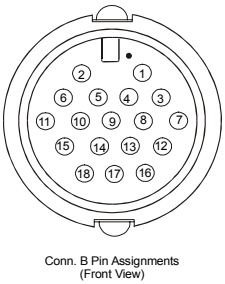


Figure 4.9 Cable (A) Wiring Configuration





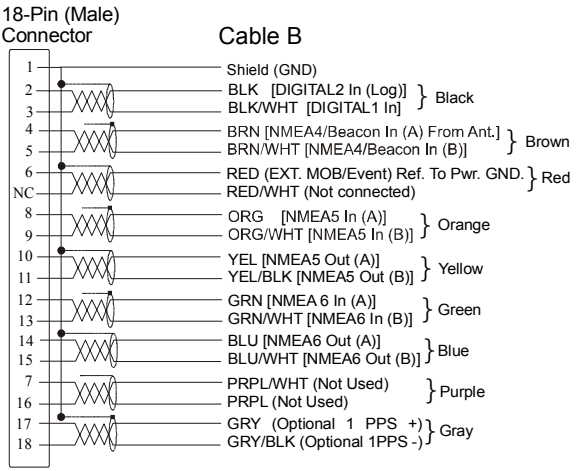


Figure 4.10 Cable (B) Wiring Configuration (Only on MX420/8)

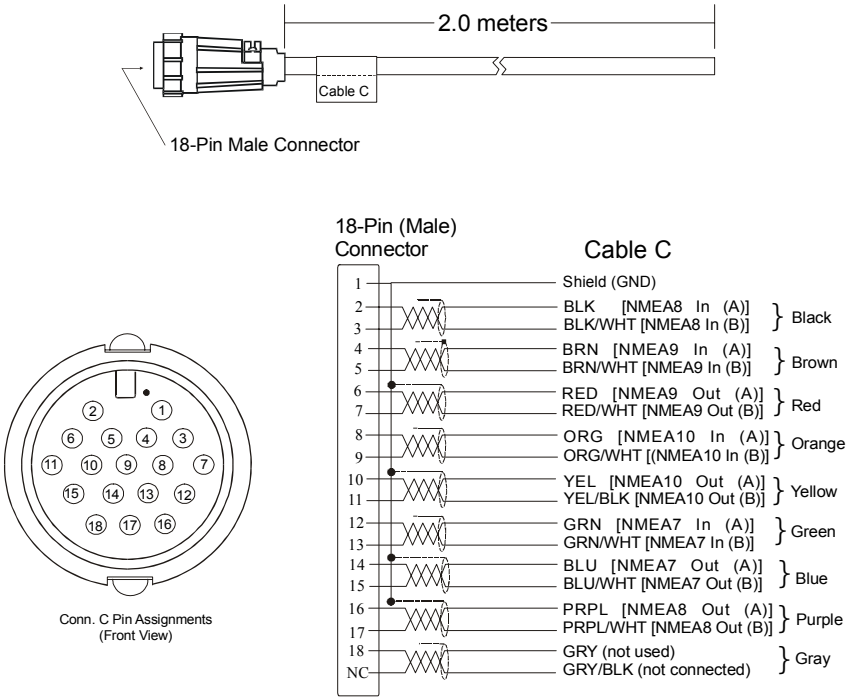


Figure 4.11 Cable (C) Wiring Configuration (Only on MX420/8)

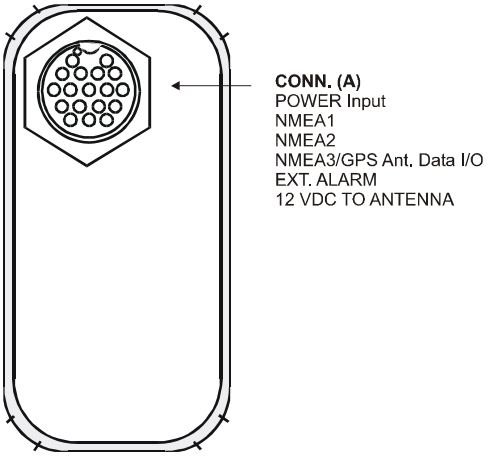


Figure 4.12 MX420/2 Rear Panel Connector

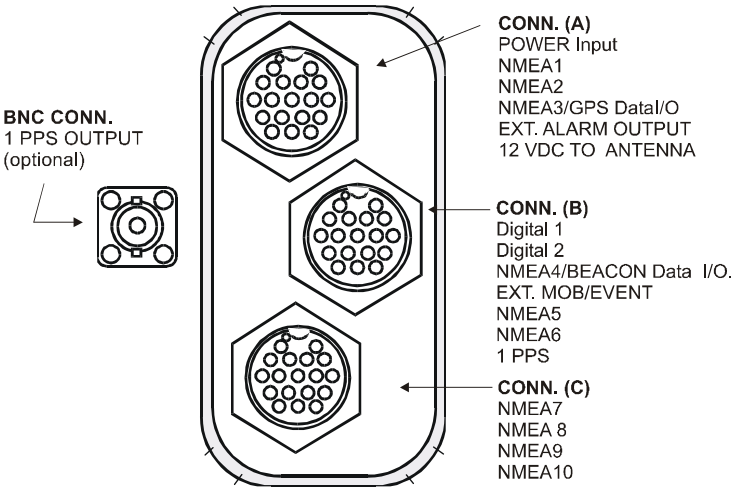


Figure 4.13 MX420/8 Rear Panel Connectors

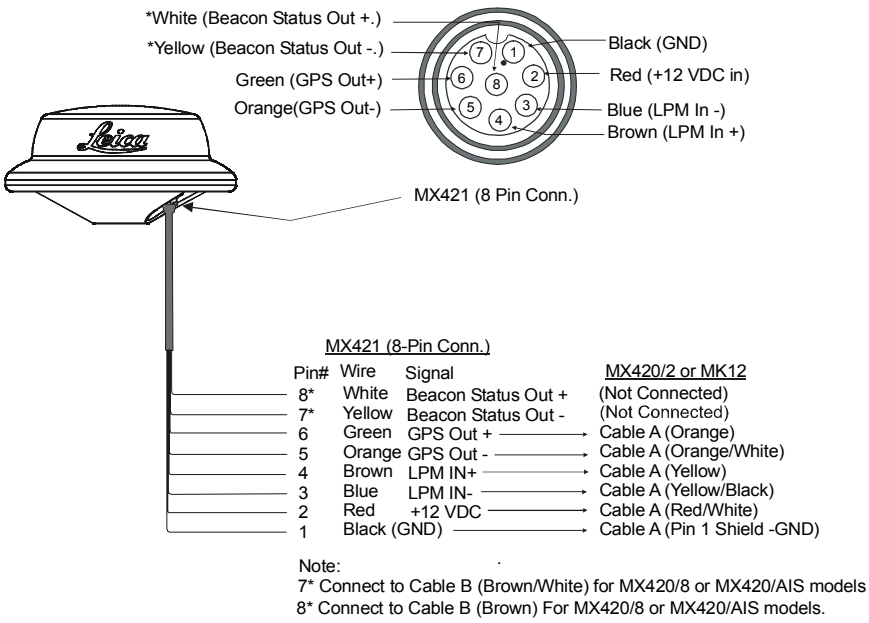


Figure 4.14 MX421(8-Pin) GPS Antenna Wiring Diagram

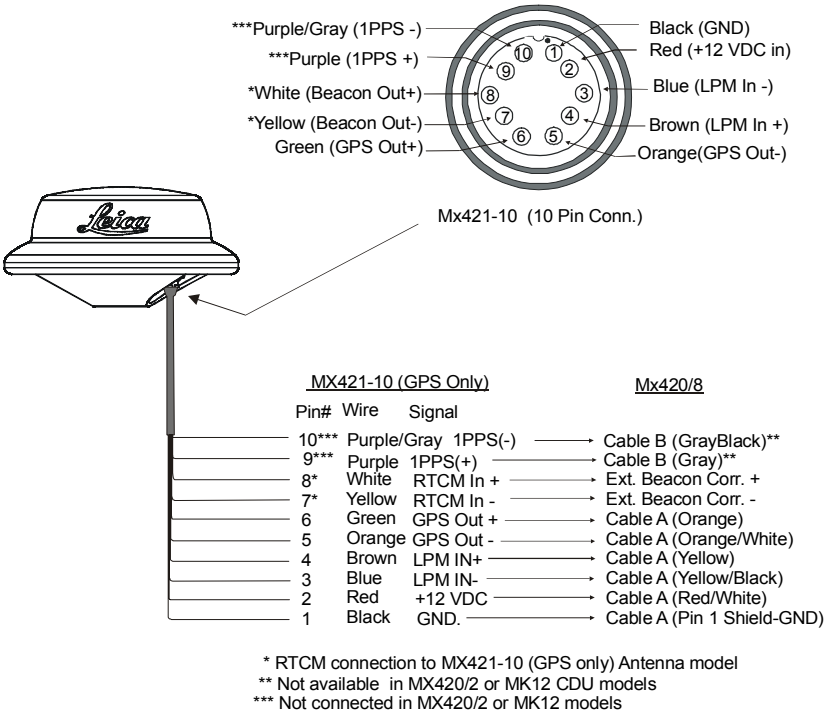


Figure 4.15 MX421-10 (10-Pin) GPS Only Antenna Wiring Diagram

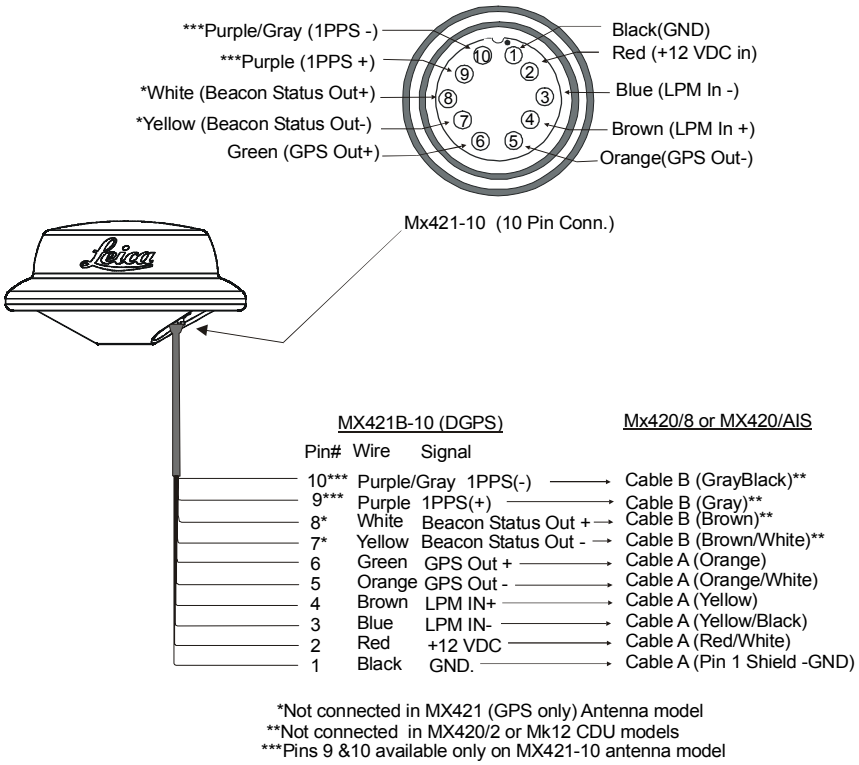


Figure 4.16 MX421B-10 (10-Pin) DGPS Antenna Wiring Diagram

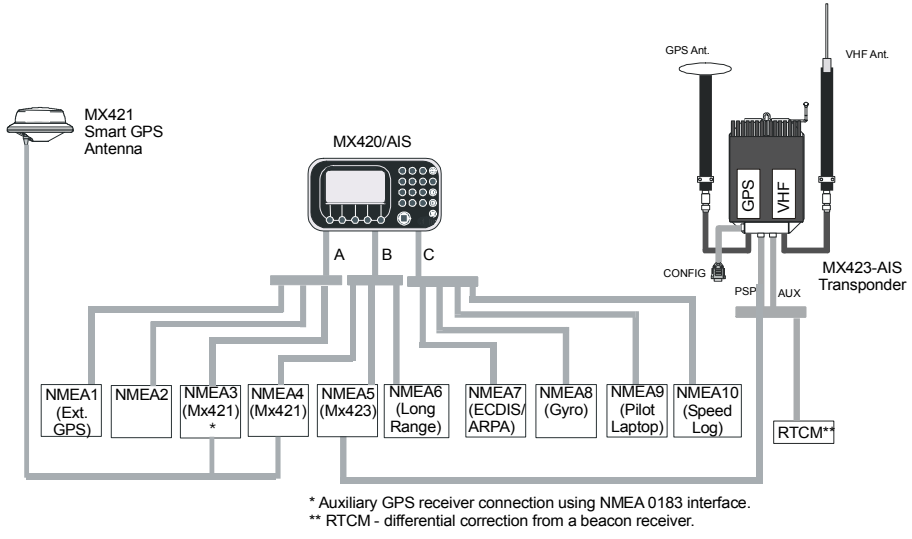


Figure 4.17 MX420/AIS CDU & MX423 (SAAB) Transponder System Block Diagram

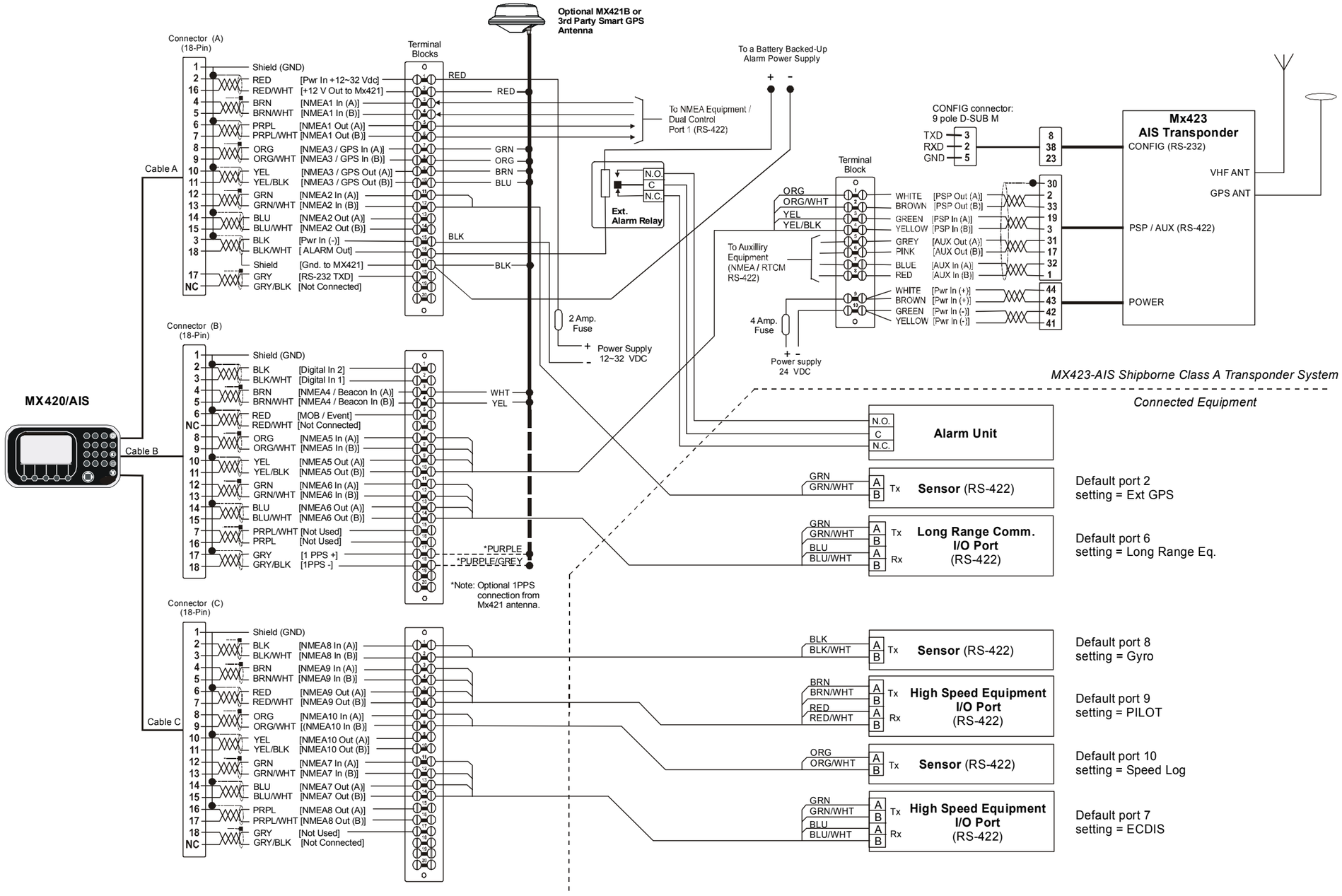


Figure 4.18 MX420/AIS CDU & MX423 (SAAB) Transponder System Wiring Diagram

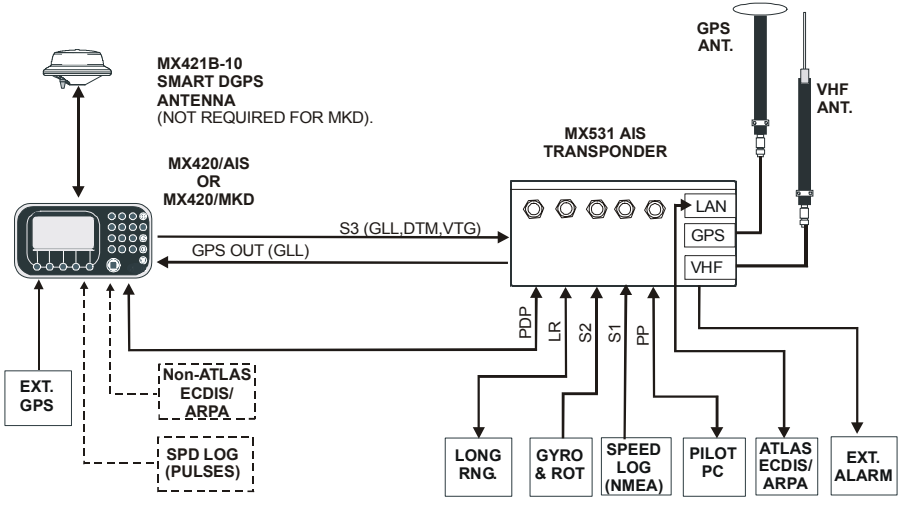


Figure 4.19 MX420/AIS/MKD CDU & MX531 (ATLAS) Transponder Block Diagram

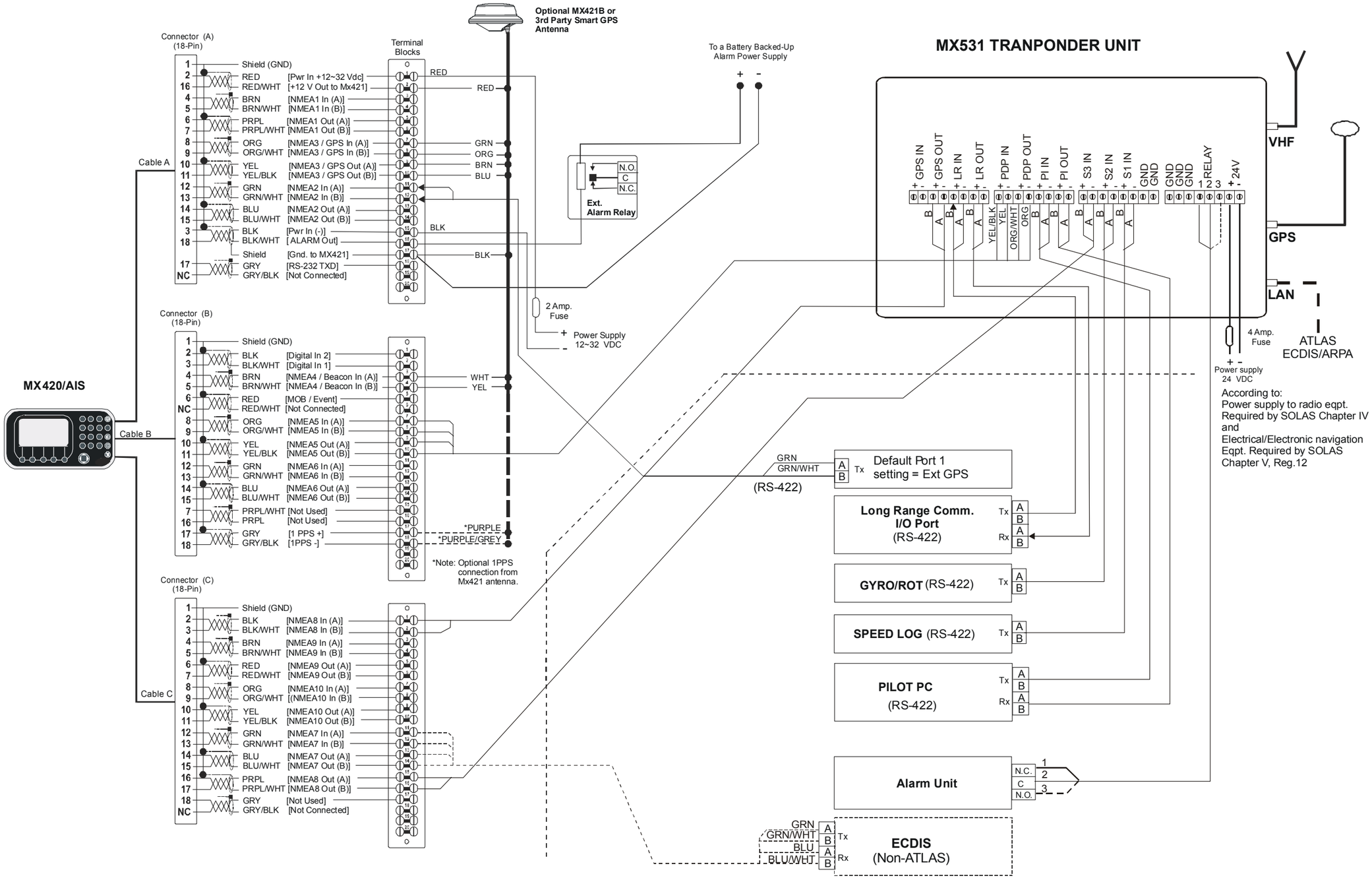


Figure 4.20 - MX420/AIS/MKD CDU & MX531 (ATLAS) Transponder System Wiring Diagram

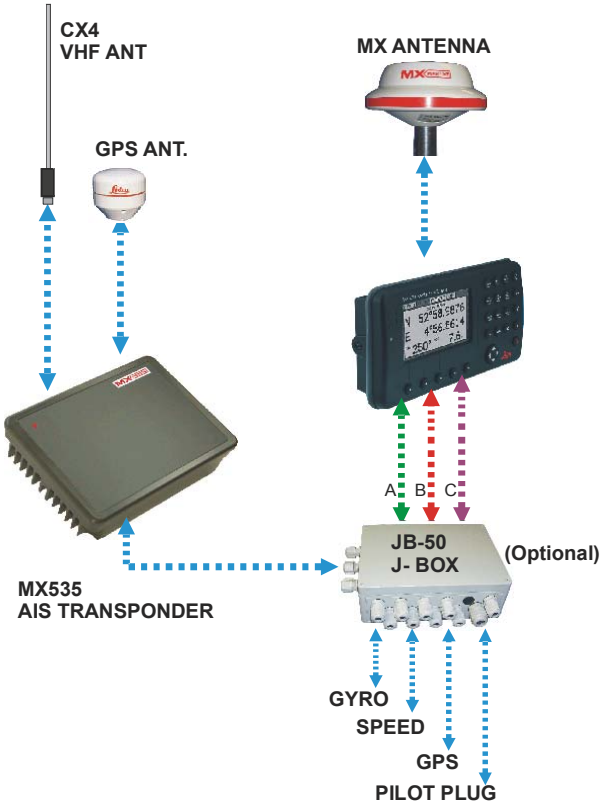


Figure 4.21 MX420/AIS/MKD CDU & MX535 (NAUTICAST) Transponder Block Diagram

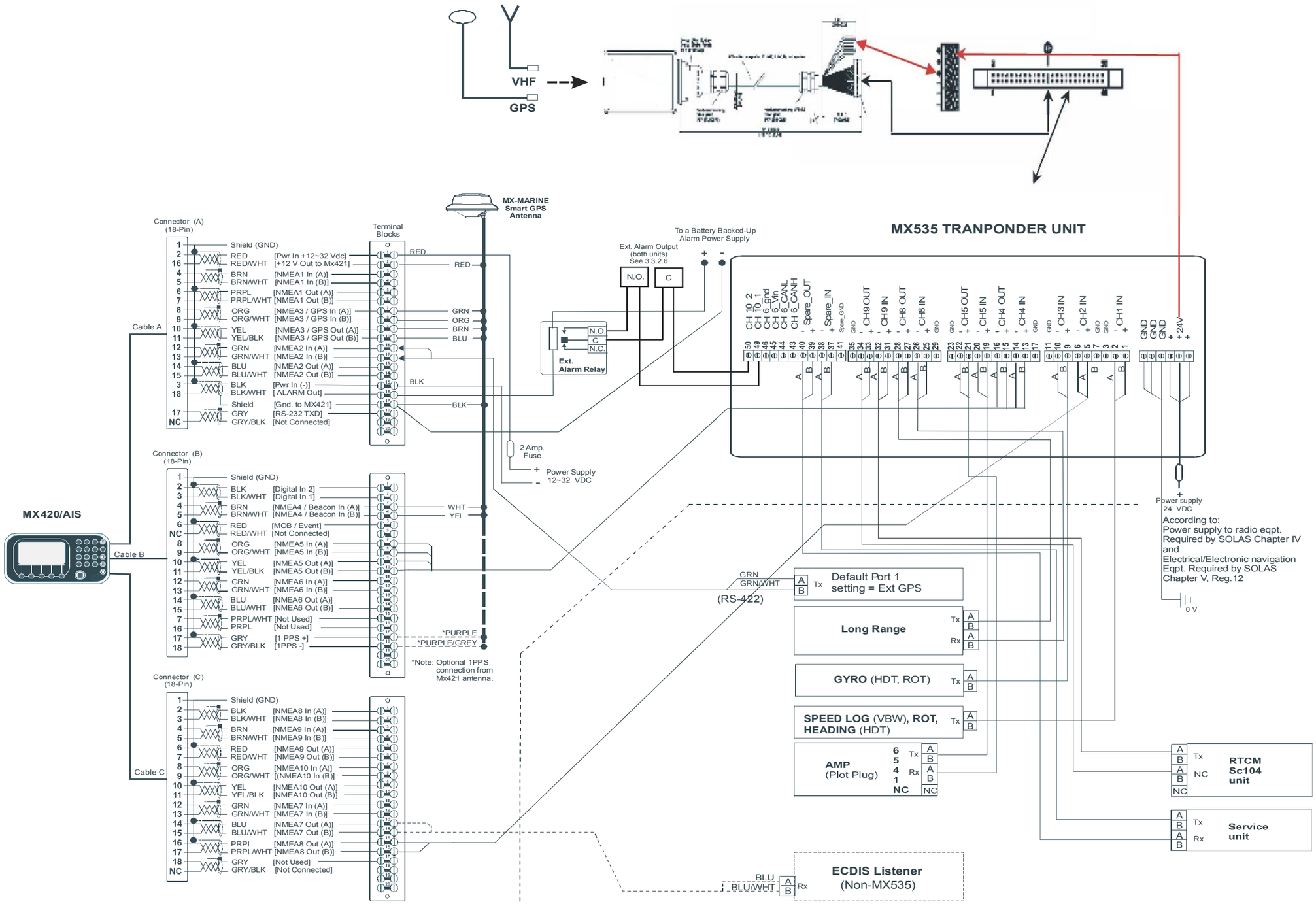
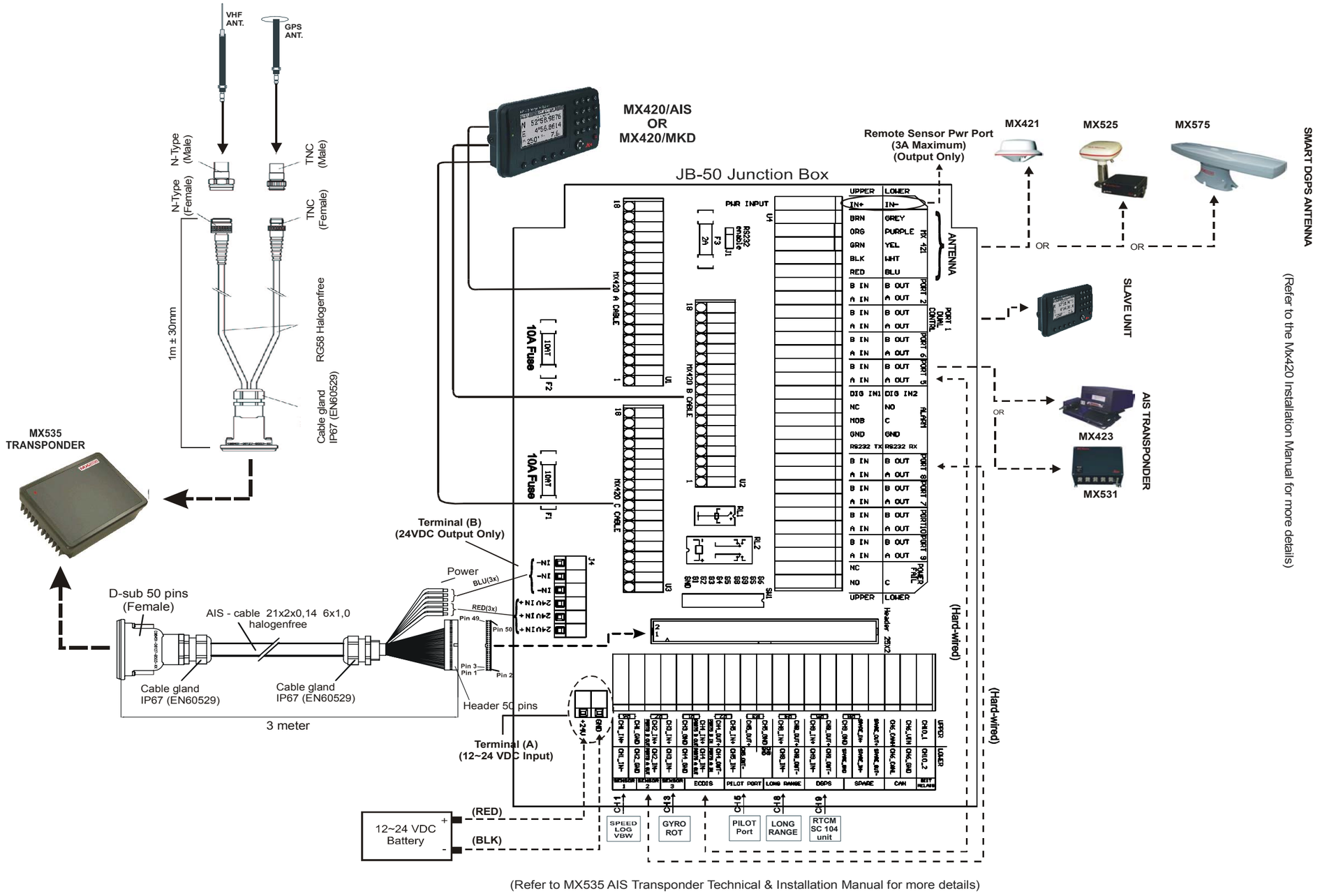


Figure 4.22 - MX420/AIS/MKD CDU & MX535 (NAUTICAST) Transponder System Wiring Diagram



Note: Port 5 (In/Out) is hard-wired to Ch4 (ECDIS) and Port 8 (Out) is hard-wired to Ch2 (Sensor 2).
External wiring for these ports is not necessary when using the JB-50 with the MX420 and the MX535 AIS Transponder.

Figure 4.23 - MX420/AIS/MKD CDU & MX535 (NAUTICAST) Transponder System Wiring Diagram with JB-50 Junction Box

SECTION 5
INSTALLATION NOTES

GENERAL

All configurations of the MX420 Control and Display Unit (CDU) are splashproof and can be installed both above and below deck. To ensure that the back of the display unit remains splashproof, protection covers must be used around the connectors. The installation should meet the requirements of the helmsman, the crew or other users. When flush mounted, locate a smooth and flat surface to insure that the gasket makes full contact with the mounting surface. Ensure that the navigator is mounted in a place where water flows off easily. Avoid places where water may accumulate for any period of time.

Electronic Connections

Refer to figures in Section 3 for the drawing of the display console and Section 4 for interface cables. The MX420/2 has one interface connector at the back, while the MX420/8 and MX420/AIS models have three. The power and data I/O cable (Cable A) and antenna cable are standard in the MX420/2 and MX420/8/AIS models. Cables B and C are only supplied with the MX420/8 and MX420/AIS. All 18-wire I/O cables are 2 meters long and are clearly tagged with the letter designation near the connector end. Cable A is pre-wired with a female 18-pin connector while cables B and C are pre-wired with male 18-pin connectors. These data cables are not interchangeable. When ordering these cables, please specify the part number and description as described in the list of components in Section 1 of this manual.

Wire Preparation Procedure

Cables A, B & C are all 9-pair shielded cables. We recommend that the main cable insulation (black plastic) be stripped about 5 inches back to expose the 9 color-coded leads. Stripping each of these leads will expose the two wires in each pair, as follows:

RED ---------- Red & Red/White
BROWN ----- Brown & Brown/White
PURPLE ---- Purple & Purple/White
ORANGE --- Orange & Orange/White
YELLOW --- Yellow & Yellow/Black
GREEN ------ Green & Green/White
BLUE -------- Blue & Blue/White
BLACK ------ Black & Black/White
GRAY -------- Gray & Gray/Black

Strip the individual wire insulation about 1/2 inch to make it more convenient to connect the wires to the terminal strip posts and cut the shield wires short if not used. Use electrical tape or shrink tubing to protect exposed shield wires. Use a 20-position terminal strips to terminate each cable. This item is not supplied with the product, we suggest getting it from a local electronic store. For more wiring details, please refer to pages 33, 34 and 35 of this installation manual.

External Power

The MX420 was designed to operate on 12 ~ 32 VDC supply. It can tolerate voltages no lower than 10 volts and no higher than 35 volts. It draws about 1 Ampere at 12 VDC (with a MX421/B antenna connected). Power input connection is done through Cable

A. Power wire colors are red (+) and black (-). Refer to Figure 4.1 for wiring hookup. Even though the navigator has a reverse polarity protection device, we recommend that the installer observe proper polarity before hooking up the power leads. MX Marine also recommends using a 2 amp. fuse in line with the red wire as close to the battery as possible. This not only protects the navigator but also the cabling.

Navigator Grounding.

The electronics of the navigator are isolated from the external power supply. Connect the navigator unit to ground to avoid static charge build up. This can be done in either one of two ways:

1. Connect the Cable A shield to the boat's *Seawater ground*.
2. Connect the grounding stud of the navigator to the boat's *Seawater ground*.

Note : 'Seawater ground' is any electrically conductive material that is directly in contact with sea water.

MX421 GPS ANTENNA INSTALLATION

Antenna Location

The GPS smart antenna (MX421) should be mounted with a relative clear view of the horizon. Do not, mount the antenna on top of a very tall sailboat mast, as this may degrade the COG and SOG calculations, particularly when in DGPS mode. Ensure the antenna is placed outside the beam path of transmitting radar (typically +15 °horizontally from the array's center point) and INMARSAT satcom (A, B, C, or M; typically +10° from the array's center point in any of the possible transmitting directions and at least 5 meters from any side lobe or back lobe direction). The GPS antenna should be mounted below and at least 5 meters away from these types of antennas. Do not place it within 3 meters of a SSB or VHF radios or their antennas.

Antenna Options

Two antenna options are available for the MX420, namely:

- GPS only smart antenna (MX421 or MX421-10)
- Combined GPS and differential beacon smart antenna (MX421B or MX421B-10)

These antenna models look identical and they are wired the same way (refer to the chart shown below). The antenna model is indicated on the serial number tag on the underside of the antenna. The drive voltage to the antenna is 12 VDC +10%, and normally provided by the MX420. However, power to the MX421 antenna may be taken from the main battery supply.

Antenna Connector

The multi-pin connector at the bottom of the antenna housing provides the necessary interfacing between the MX421 smart antenna and the MX420 CDU. Older production MX421 antennas use 8-pin connectors while new build units (MX421-10) use 10-pin connectors. The interface connections from pins 1 through 6 are common for all MX421 configurations. Pins 7 & 8 are used for monitoring the beacon receiver status (for the built-in beacon receiver) or for external RTCM correction. The additional two pins on the newer production MX421 are used to output the 1 PPS signal as shown in

the chart below. Refer to figures 4.14, 4.15 and 4.16 for the MX421 antenna wiring diagrams.

MX421 Smart Antenna Configurations					
Pin #	Wire Color	8-Pin Conn.		10-Pin Conn. (MX421-10)	
		MX421 GPS	MX421B DGPS	MX421-10 GPS	MX421-10B DGPS
1	BLK/ SHIELD	Negative Ground			
2	RED	+10.5 ~ 32 VDC			
3	BLU	MX Marine Proprietary Message (LPM) In (-)			
4	BRN	MX Marine Proprietary Message (LPM) In (+)			
5	ORG	GPS Out (-)			
6	GRN	GPS Out (+)			
7	YEL	N/C	Beacon Status Out (-)	RTCM In (-)	Beacon Status Out (-)
8	WHT	N/C	Beacon Status Out (+)	RTCM In (+)	Beacon Status Out (+)
9	PRPL	N/A	N/A	1 PPS (+)	
10	PRPL/ GRY	N/A	N/A	1 PPS (-)	

Antenna Cable Options

The antenna cable is not provided with the MX421 antenna. The installer has to determine the length needed and specify the length when ordering the cable. The following cable lengths are available:

- 15 meter, twisted pair, 10-lead cable -- P/N 725637
- 20 meter, twisted pair, 10-lead cable -- P/N 3508 102 70170
- 40 meter, twisted pair, 10-lead cable -- P/N 3508 102 70180
- 90 meter, twisted pair, 10-lead cable -- P/N 3508 102 70190

External Differential Connection

Differential corrections from an external beacon receiver can only be connected to the MX421-10 GPS model. Connections are done directly through Pins 7 (yellow) and 8 (white) of the MX421-10 antenna cable. It will accept the RTCM SC-104 signal at 4800 baud.

MX420 NAVIGATOR INSTALLATION

The *Navigator* or CDU is the primary unit with the integrated display and keypad. The navigator can be mounted using one of three techniques:

- Gimbal mount (supplied)
- Flush mount (supplied)
- Frame mount (optional)

Each of these techniques are described below. All the hardware necessary to complete the Flush and Gimbal mount is provided with the MX420. You will need rear panel access to complete these types of mounts. The Frame mount is an option for applications where front panel removal is not desired or rear panel access is not available. The hardware necessary for the Frame mount is sold separately (P/ N 715707). It is important to consider the space behind the unit to prevent sharp cable bends before commencing with the installation. A minimum of 100 mm. free space is needed behind the unit for cable dressing.

Gimbal Mounting

A pivot Mounting Bracket including finger screws and rubber friction washers are delivered with the MX420. Place the self-adhesive rubber washers around the two threaded holes at each side of the navigator. Use the two machine screws with the large palm grips to secure the MX420 to the mounting bracket. Adjust the viewing angle to meet your needs.

Flush Mounting

Drilling and cutting instructions for flush mounting are given in Figure 3.3. The maximum bulkhead thickness which can be used in this configuration is 9 mm (7/ 16 in). Cut a notch deep enough to accommodate the flush mount bracket, Allen head bolt, and Allen key for thicker bulkheads

Flush Mount Frame

If access to tighten the screws from the backside is impossible, an optional Flush Mounting Frame is available (P/ N 715707). First, mount the frame to the navigator. Next, attach all of the hardware interfaces to the appropriate port (i. e. Cable A, B & C). Finally, mount the entire assembly to the panel from the display side. The frame is oversized (300 mm x 175 mm; 11.81 in x 6.89 in). The frame mount hole cut dimensions are given in Figure 3.5.

Turning Power On and Off

The navigator is turned on by briefly pressing the ⏻ key. Please do not keep the key pressed for more than one second, as this will turn the navigator off again when the key is released. This key is also used to turn the power off by either of two methods:

a) Software Control:

A normal short key press displays the softkey option boxes *Yes* or *No* to turn the power off. Respond by pressing the *Yes* softkey under the box turns the navigator off. Selecting *No* cancels the operation, and returns the unit to normal operation.

b) Hardware Control:

Pressing the power key for more than 3 seconds, turns the power off under hardware control (the softkey option will also be displayed under normal operating conditions). The MX420 can not be turned on again for 10 seconds when this method is used. Attempting to turn the unit on during this 10 second period, will only activate the navigator for as long as the key is not released. This option is not normally used, and is provided as an emergency alternative to the software power control.

If the external power to the unit fails for any reason, the navigator will remember if it was on or off for about 20 minutes. That is if the navigator was on when the power failed and the power comes back within 20 minutes, the navigator will turn itself on again. Otherwise, it will stay turned off until the key is pressed.

EQUIPMENT INTERFACING

Introduction

The MX420 series is composed of 3 main models, namely:

- MX420/2
- MX420/8
- MX420/AIS

The MX420/2 has two user NMEA ports while the MX420/8 and MX420/AIS have eight (8) user NMEA ports. All ports are NMEA 0183 protocol capable. Anyone of these ports can be used to communicate with other external equipment which utilize the NMEA 0183 standard. All NMEA interface ports are configured for RS-422 standard. This configuration complies with NMEA 0183 version 2.0 and later. The NMEA2 port can be either as RS-422 or as RS-232. Only one of these two electrical interfaces may be implemented at any given time on port 2. The RS-232 port standard is used to connect to a personal computer or any other RS-232 or *single ended interfac*e. The RS-422 electrical interface will almost always work with the older NMEA 0183 version 1.5 electrical interface; both of which are *balanced line interface*s. If for some reason you can't get this interface to work, try the Port 2 RS-232 interface.

Other features available only from, the MX420/8 are:

- External Man-Over-Board (MOB) switch input (also used for external Event input)
- Pulse Counter inputs for the speed log,
- Additional NMEA ports (NMEA 5 through 10)
- Optional 1 PPS output

Refer to Section 4 of this manual for wiring information.

Note: The MX420/AIS (MKD) is used primarily as a display and control unit for the MX423 AIS transponder but can also perform all the navigation features of the MX420/8 when a MX421 antenna is connected to it.

External Man Over Board & Event (MX420/8 Only)

A momentary closed switch can be connected between the pin 6 (MOB/Event) input and REF GND on cable B. Connect the appropriate MOB/Event pins to a *normally ope*n switch.

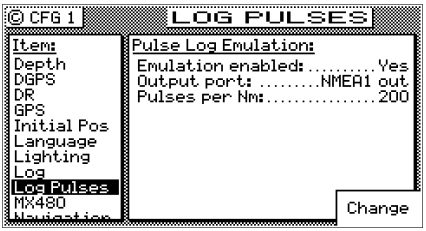
The Man-Over-Board (MOB) function is activated when the switch is pressed for at least 2 seconds, causing the two contacts to short. Once activated, the MOB condition must be canceled from the MX420 front panel display. Refer to the Operator's manual for this operation and more details on the Man Over Board function. When this switch is closed for less than 2 seconds, this causes your present position and time to be stored as a waypoint in the waypoint bank. A message indicating which waypoint number is used will be displayed on the MX420 screen for up to 5 seconds in this scenario.

Speed Over Ground Pulse Output

The MX420 outputs the GPS calculated speed over ground in a pulse format. Refer to the Specifications section of this manual for signal characteristics.

The pulse output is derived from either NMEA 1 or 2 ports (shared with the NMEA 0183 protocol) on the MX420. Therefore, these ports are available for either pulse output or NMEA 0183 output. Don't forget that only NMEA2 Out (Port2) can be either RS-232 or RS-422 port. Pulse output NMEA1 is connected to the cable (A) connector pins 6 (signal) and 7 (return; not ground). Pulse output Port 2 is connected to the cable (A) connector pins 14 (signal) and 15 (return; not ground). These are RS-422 level signals, and may not be compatible with every installation.

To setup the MX420 software, select the *CFG1/Log Pulses* screen. This screen controls the output port (Pulse) of the speed over ground log output from the MX420 at a user determined pulse rate of 100 to 500 pulses per nautical mile (200 is the pre-selected value). The default condition of the Speed-Over-Ground output is not active.

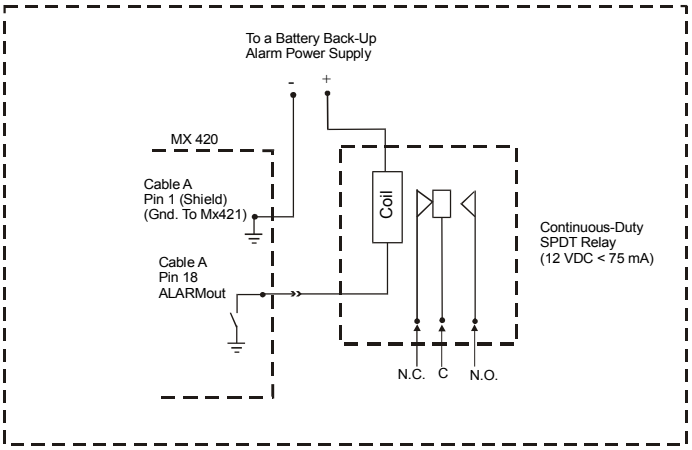


External Alarm Output

The MX420 is held open (floating) during normal operations. In an alarm condition, the external alarm pin is switched to ground potential. When an alarm condition is cleared or acknowledged, the Ext. alarm signal will return to open condition automatically (refer to table below for relay conditions). However, it is possible to retain the external alarm condition by setting the "Retain external alarm:" to ON. At this setting, the external alarm signal can only be cleared by correcting the problem.

Ext. Alarm Relay Conditions	
MX420 turned OFF	Energized
MX420 Turned ON (No Alarm)	Not Energized
MX420 Turned On (With Alarm)	Energized
12 VDC Input Power Failure	Energized

The external alarm is derived from the “ALARMout” port on cable (A) pin 18 (Black/ White - ALARMout). The software is setup in each of the appropriate *CFG1* (Alarms) menu. The relay coil supply voltage must be connected to an independent battery backed-up alarm supply. Make sure the relay coil voltage is compatible with the voltage rating of the alarm power supply (i.e. NTE Electronics Relay - P/N R14-11D10-12 for use in a 12 VDC supply). The negative ground of the alarm power supply must be connected to the “GND. to MX421” shield wire in Cable A (refer to the relay diagram below).



Port 2: RS- 422 / RS- 232 Serial Interface

The CDU has a standard RS- 232 interface (similar to a PC COM). The RS-232 use the same internal UART logic as the NMEA port 2. The TxD RS- 232 output and the NMEA2 out RS- 422 output carries the same serial data, but with the electrical levels of each standard. The input is shared, and can only be set up to either receive RS- 232 input or NMEA RS- 422 input.

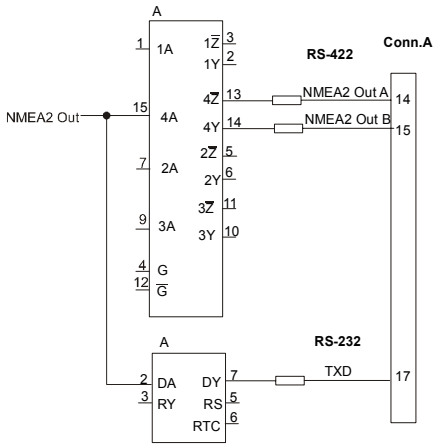
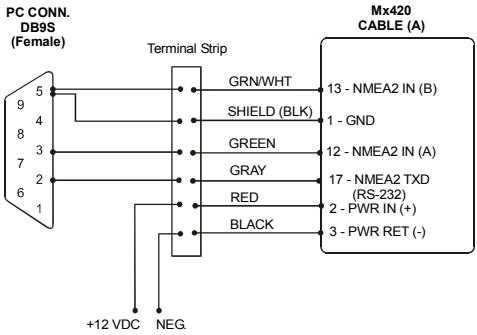


Figure 5.1 Port 2: RS- 422 / RS- 232 Port Schematic

MX420 PC Interface

The diagram below shows the bi-directional (RS-232) interface between the MX420 (NMEA2 port in Cable A) and a PC serial port.



NMEA Interface

The MX420 meets the NMEA 0183 version 2.1 electrical standard for marine interface communications with other marine equipment, such as:

Radars, Plotters, Autopilots, Fish Finders, etc.

There are differences in the electrical interface specification between NMEA 0183 version 1.5 (introduced in 1987) and NMEA 0183 version 2.0 and later (introduced in 1994). Some older model equipment utilize RS-232, others use RS-422, and others meet the older version 1.5 specification. In an effort to simplify your interface capabilities, you should take the time to determine which electrical interface specification all of the interfaced equipment meets.

NMEA Interface to other Equipment

The MX420 meets NMEA 0183 version 2.1 electrically, and in protocol. As version 2.1 is not necessarily compatible with the older version 1.5, the differences in hardware are mentioned here to avoid possible conflicts:

Listener:

The listener input works with a threshold of 2 volts compared to the former 4 volt. It is still an insulated input and, in general, there should not be any interface problems receiving data from the older
standard.

Talker:
The talker output is a RS-422 output:
NMEA talker output B is active compared to GND or shield of the navigator. *In the old version, output B was normally tied to GND or shield.*

The maximum drive voltage between the talker A and B outputs is ±6 volt.

Compared to the former 0 to 15 volt output, the negative voltage between the talker A and B output may be a problem on older listeners which do not meet the new standard.

The minimum output voltage may be as low as ±2 volt. *This is **not compatible** with the former 4 volt input threshold and may be the cause of interface problem*s. If this is the case, try using the MX420's RS-232 interface. This may more likely solve the problem. Otherwise third party conversion boxes may be necessary.

Cables provided for the NMEA signals are shielded pairs. If extension cables are needed, be sure to use similar shielded pair cables in order to avoid spurious signal radiation. More than one NMEA listener can be connected in parallel to the same NMEA talker. The maximum number of listeners connected to a single talker is dependent on the combined listener input impedance's, and the capacity available for data throughput.

MX420 NMEA 0183 Sentences

The NMEA Standard provides for asynchronous transmission, with a single *Talker* and multiple *Listeners* per line. Typical use includes information transfer from electronic positioning and navigational devices to autopilots, plotters, terminals, printers, etc.

The NMEA 0183 Standard uses an 8 bit ASCII block oriented protocol, that is not compatible with the NMEA 0180 simple format or the NMEA 0182 complex format due to differences in data format, baud rate and parity bits.

Data Format

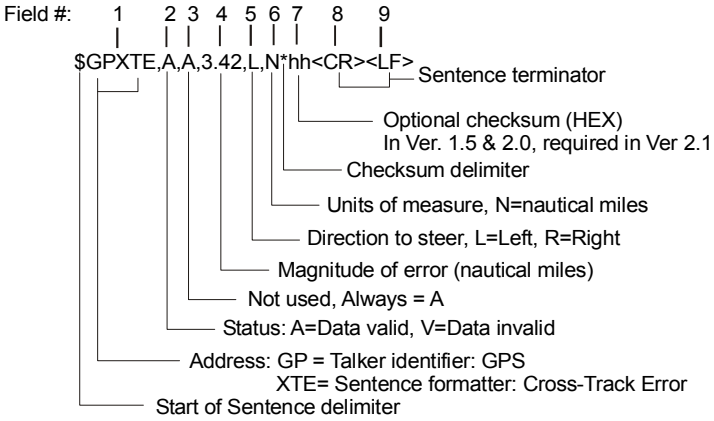
Data are transmitted in different sentences, each containing one or more data fields. A field consists of a string of characters immediately preceded by a "," (comma) character, except for the first (address) field which is preceded by "$", indicating the beginning of a new record. Hex 0D 0A <CR>< LF> - end of sentence - must follow the last field in each sentence.

The data fields are identified only by their position within the sentence as determined by the field delimiters (comma). Numerical data fields within a sentence may vary in length from one sentence to another, depending on the precision available.

Data field position is therefore determined only by counting "," (commas) rather than counting the total number of characters from the beginning of the sentence.

The last data field is not followed by a comma delimiter. When a checksum is used, the last data field is followed by an asterisk "*", indicating that the checksum follows. The checksum is the absolute value calculated by exclusive -OR'ing the 8 data bits (no start bits or stop bits) of each character in the sentence between, but excluding "$" and "*". The hexadecimal value of the most significant and least significant 4 bits of the result are converted to two ASCII characters (0- 9, A- F) for transmission. The most significant character is transmitted first.

Example:



NMEA Output Sentences

All sentences have the identifier “GP” for Global Positioning Systems. All position data are in the user selected (displayed) datum except for GGA where the datum can be manually set to WGS84, independent of the selected (displayed) datum.

RMB is transmitted only if an active route is present. Please refer to the *Route* section of the *Operator’s Manual* for details on setting up an active route.

APA , **APB** , and **XTE** , are transmitted only if an active route is present and the *Autopilot Alarm* in each of these NMEA sentence setup screens is *Enabled* and this feature is not in an alarm condition.

ID	DESCRIPTION	ID	DESCRIPTION
* **APA**	Autopilot Sentence A	**RMB**	Recommended Minimum Navigation Information
APB	Autopilot Sentence B	**RMC**	Recommended Minimum Specific GPS/ Transit Data
BOD	Bearing Origin to Destination	***Rnn**	Routes
BWC	Bearing & Distance to Waypoint - Great Circle	**ROT**	Rate of Turn
BWR	Bearing & Distance to Waypoint - Rhumb Line	**RTE**	Routes
DTM	Datum Reference	***SNU**	Loran- C SNR Status
GGA	GPS Fix Data	**VDR**	Set & Drift
GLL	Geographic Position - Latitude/ Longitude	**VHW**	Water Speed and Heading
GRS	GPS Range Residuals	**VPW**	Speed Measured Parallel to Wind
GSA	GPS DOP & Active Satellites	**VTG**	Course & Speed Over Ground
GST	GPS Pseudorange Noise Statistics	**WCV**	Waypoint Closure Velocity
GSV	GPS Satellites In View	**WPL**	Waypoint Location
HDT	Heading, True	**XTE**	Cross- Track Error, Measured
HSC	Heading Steering Command	**ZDA**	Time & Date
MSK	MSK Receiver Interface	**ZTG**	UTC & Time to Destination Waypoint
MSS	MSK Receiver Signal Status		
* **APA** , **Rnn** and **SNU** are older sentence formats (version 1.5) not recommended for new designs.			

Table 5.1 NMEA 0183 Output Sentences

Input NMEA 0183 Sentences

The MX420 recognizes version 1.5, 2.0,2.1 and 2.3 NMEA input records. The MX420 can utilize the following input sentence formats:

***Depth**:* DBK, DBS, DBT, and/ or DPT

***Gyro**:* HCC, HDM, HDT, RMA (only when GPS is not available), RMC (only when GPS is not available), VHW, and VTG (only when GPS is not available)

Position: GLL, RMA, RMC (only when GPS is not available)

***Speed**:* RMA , RMC , VHW, VTG (only when GPS is not available) or pulses-per-second

***Transducer**:* MMB, XDR

***Waypoints**:* The received WPL data will overwrite the memory content of the waypoint location which is contained in the received WPL sentence

The MX420 does not process the TALKER identifier (first two characters following the $ of NMEA 0183 sentences) for any NMEA sentences received. Any pair of characters within the NMEA specification are recognized.

The MX420 does process floating numerical formats in the received sentences.

Although the current version of the NMEA 0183 standard requires that a checksum be present, the checksum is not required by the MX420. However, if the checksum is included in the NMEA sentence, the MX420 will reject any sentence where the checksum and data do not correlate.

Viewing Input Data

You can view data being sent to the MX420 by other equipment or loop a MX420 output port back to an unused input port to verify if it is outputting data to other equipment. This is a great tool to use when you are first interfacing equipment.

To activate the *Input Data* screen:

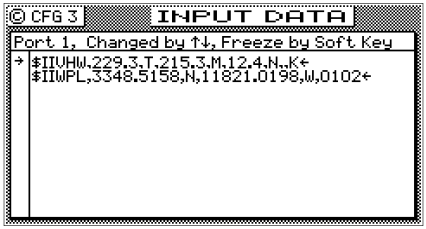
Press **CFG**.

Scroll through the menu and select *Operation*.

Press **E** and change *Engineering Display* from *No* to *Yes*.

Press **E** again to exit the edit mode.

Press the left cursor key until the **CFG3** *Input Data* screen is displayed.



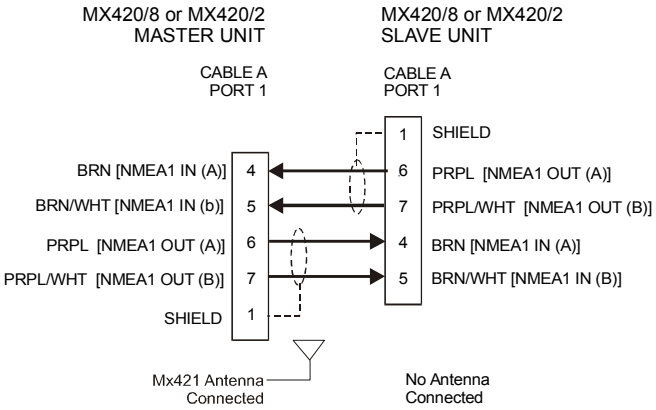
Press the up or down cursor key until the proper input port number is selected.

The data that you will see on the screen is unprocessed. Therefore, if there are errors in the data, you can compare the data against the NMEA 0183 standard. You can also use this screen to verify that data is being received from external RTCM sources or other equipment communicating with the MX420.

Dual Control (Remote) Interface

The Dual Control mode, which is enabled in the **CFG** *Dual Contr.* screen, allows you to connect two MX420s in a *Master / Slave* configuration where a common database is shared between two MX420 control heads. This configuration also allows you to use one antenna connected to the Master unit, for both MX420s. The remaining data ports, the MOB /Event input port, and the alarm output ports are still available on each unit for individual use on each MX420.

The hardware interface is accomplished by connecting NMEA Output 1 to NMEA Input 1 between the two units.



MX420 Dual-Control Data Interface

The interface between the two units takes place over a high speed data link. The master unit must be connected to the smart GPS antenna unit (MX421). The master unit receives the position data then transfer it to the slave unit at a one second rate (the same as the position calculation). Due to the high speed data link, there is virtually no visible position delay between the two units.

When the two units are first configured as master and slave, the master listens for a configuration polling message from the slave. Once the master recognizes the slave's polling message, the *Common Data Base* (see Table below) is downloaded from the master to the slave. This function also takes place each time the units are powered up.

Data Base	Comments
Present Position	Update once per second
Time	Update once per second. Displayed in the same mode on both units.
Date	
Routes	Only one unit can make changes at any given time.
Waypoints	Leave the screen and reenter it or press the E key to refresh the screen if viewing the screen at the same time in both units. Only one unit can make changes at any given time.
Reset XTE	Only one unit can make changes at any given time.
DGPS Setup	Only one unit can make changes at any given time.
Dual Control Alarms	
Man Over Board	Only one unit can make changes at any given time.

Table 5. Master / Slave Common Data Base

The items detailed in Table 6 are independently controlled at the individual MX420 control heads.

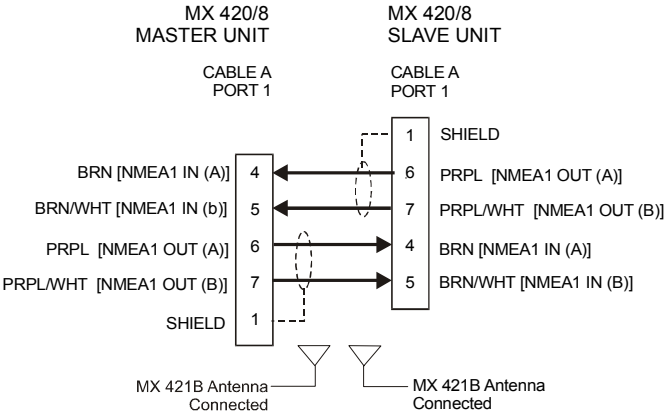
Plotter Setup	Navigate Displays
GPS Engineering Display	Position Displays
Dual Control Setup	Auxiliary Displays
Lighting Setup	Tide Displays
DGPS Displays (slave reflects the conditions in master)	GPS Displays (slave reflects the conditions in master)
NMEA Out	Printer Out 2
Waypoint Sorting	

Table 6. Independently Controlled Functions

MX420 Dual Control with Integrity Monitor

The Integrity Monitor (IM) feature (once the license is enabled) allows the two dual-control MX420/8 units to constantly compare each of the two GPS solutions and, if configured to do so, give an alarm and/or switch to the use of the “best” GPS solution.

Both Master and Slave units are functional GPS receivers and both continuously calculate GPS solutions. The IM continuously compares the two position solutions. If the GPS Source is set to Automatic, it begins by using the Master calculated position. However, it continuously compares the “used” solution to the “other” solution. If the “other” solution is better, it will switch to use that position solution. Essentially, the Master mode will transfer automatically to the unit whose position solution is being used for navigation.



MX420 Dual Control with Integrity Monitor Data Interface

Once the Dual Control IM is enabled, CFG1/Dual Control screen looks like this:

DUAL CONTROL		
Mode:	Master	(options: Master, Slave)
Dual Control:	Yes	(options: Yes, No)
GPS Source:	Automatic	(options: Automatic, Master, Slave)
Integrity Alarm:	Yes	(options: Yes, No)
GPS Source:	Master	(options: Master, Slave)
Dual Status:	OK	(options: OK, No Comm, Mirroring)

To enable the functionality of the Dual Control Integrity Monitor, you must set the following to:

Dual Control:	Yes
GPS Source:	Automatic

If you want the alarm to sound when the GPS source is switched:
Set the Integrity Alarm to Yes

MX420/AIS Installation

There are two variation of the MX420/AIS models, namely:

- MX420/AIS Basic System (MKD)
- MX420/AIS DGPS Navigation System

The MX420/AIS Basic or MKD system is primarily a control and display unit (CDU) for the MX423 AIS transponder. GPS Position data is supplied by the GPS engine in the transponder. The MX420/AIS Basic does not perform navigation calculations. Displays functions like the NAV, TIDE and GPS are inactive. In addition, some display pages like POS3, AUX3, and AUX5 are also inactive when no MX421 (smart GPS antenna) is connected to the CDU. A third party external GPS source may be used to provide position data to the transponder.

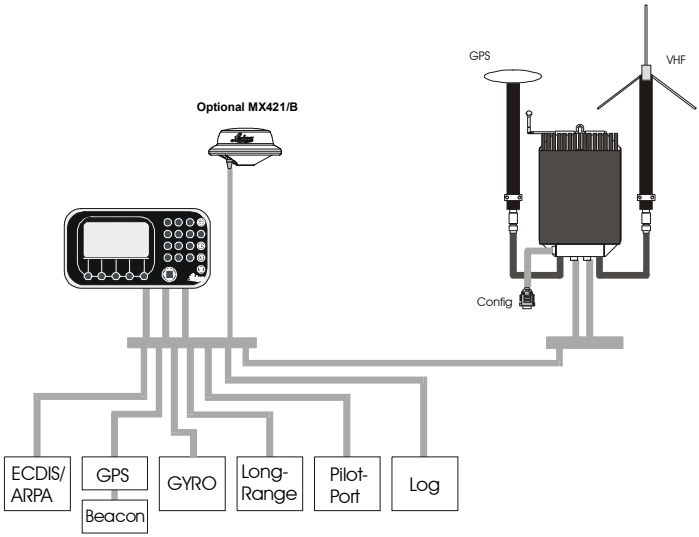
The MX420/AIS Navigation system performs both the CDU functions to the AIS transponder and navigation functions just like any regular GPS navigator. The MX420/AIS Basic and the MX420/AIS Navigation Systems are essentially identical control and display unit. The main difference is the addition of the MX421 smart antenna and the activation of the AIS option (AIS license is required). The MX420/AIS detects the presence of the MX421 antenna and makes the full navigation function available to the user. Refer to pages 39 and 41 for AIS wiring diagram.

Other MX420/AIS Interface

In addition to Speed and Gyro (ROT) interface, it is suggested to connect the MX420/AIS CDU to the following equipment:

- MX423 AIS Transponder - NMEA 5 (required)
- Long-Range Communication (INMARSAT-C) - NMEA 6 (optional)
- ECDIS Chart - NMEA 7 (optional)

These equipment requires high-speed connection to the MX420. NMEA 5 through 10 are high-speed ports capable of handling baud rate speeds up to 115.2 Kbps. We recommend interfacing these equipment to the NMEA ports listed above for better results.



MX420 AIS Basic configuration

MX423 AIS Transponder Interface

The NMEA 5 port of the MX420/AIS (or MKD) connects to the bidirectional PSP port of the MX423 AIS transponder (see the schematic diagram on figure 4.18 on page 41). Communication speed between the MX420 and the transponder is preset at 57.6 Kbps.

Refer to the MX423 AIS Shipborne Class A Transponder installation manual for more details.

Troubleshooting Guide

The MX420 is virtually maintenance free. There are, however, a few important points to note.

Please check your installation carefully before returning the MX420 to the dealer or factory for service. A few troubleshooting tips follow.

The MX420 performs a variety of self tests during normal operation. If a function fails the self test, the navigator displays an *Internal Error* message every one minute.

Problem	Diagnosis
No response: (Black LCD display and no traffic light)	No external power supply Check supply voltage Check for reverse polarity Check wire installation Check if external fuse is blown
No keyboard response or partial keyboard response	Corrupted memory faulty keyboard faulty processor Return the unit for repair
Battery low alarm	External battery low Check power supply voltage and installation
No position update; won't track satellites (Red traffic light blinking for more than 10 minutes)	Jamming by other on- board or adjacent transmitters Faulty antenna or antenna cable Relocate GPS antenna Connect the MX421 power directly to the external 12 VDC supply. Replace antenna Return the unit for repair
No position update; tracking satellites (Red traffic light solid all the time)	DGPS mode set to *DGPS Only* and no corrections are being received GPS satellite signals weak (satellites dropping in and out) Check maximum cable length restrictions and cable condition (for weak satellite signal condition) Return the unit for repair
All data lost at power up	Backup battery is dead Replace the internal backup battery
No DGPS update; not tracking beacon station	DGPS mode set to *Off,* so no corrections are being received. *Station Select* is set to *Manual.* Faulty antenna
No data output to peripheral equipment	NMEA output data not configured Wrong NMEA version Wrong output rate, or format Wrong electrical standard Too many data sentences turned on (throughput overflow) More than one NMEA *talker* on the circuit Faulty port The MX420 requires the user to enable NMEA Return the unit for repair

Memory Backup Battery

The internal real time clock and memory which stores the waypoints, alarm limits, etc., is backed up by a lithium cell battery. The expected life time is 2 years at 21° C, but this is based on the temperature the navigator is stored at when not in use. The higher the temperature, the shorter the life and vice versa.

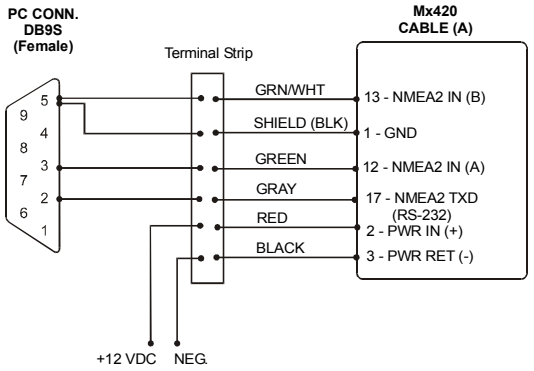
Backup Battery Replacement

Marine electronics dealers or radio supply stores will typically stock the replacement battery, Type CR2032, 3V Lithium battery.

The battery is mounted in a socket located on the MX420 processor board. MX Marine recommends this service to be done by a qualified service technician.

MX420 PC Interface

The diagram below shows the RS-232 interface between the MX420 (NMEA2 port only) and a PC serial port.



PC Interface Cable Diagram

Software Download Procedure

Tools, cables and software needed:

- Power/Download cable (or refer *PC Interface Cable Diagram* above)
- DC power supply 12-24 VDC
- PC with DOS or DOS prompt under Windows xx
- Download program **dlmx400.exe** and **Dos4gw.exe**
- *.hex file – the program itself

Procedure:

1. Install the download program dlmx400.exe, dos4gw and the *.hex file in the same directory (i.e. MX Marine).
2. Using a pre-made Power/Download cable, connect the power cable to the power supply. Black wire to ground and blue wire to +12-24V.
3. Connect the DB9 connector to COMM1 (RS232) serial port of the PC.
4. Connect the 18-pin connector (or Cable A) to the MX420/MK12.
5. Turn the MX420/MK12 on to verify if power connection is correct. Turn it off again.
6. The download program runs much faster under DOS than under Windows. However, if a DOS-PC is not available, you can also use the DOS prompt under Windows 95, 98, NT, etc.
7. At the command prompt type dlmx400 *.hex. (where *.hex is the program file name)
8. The program will ask you to turn the navigator on. When this has been done the file will be loaded into the download program and after a short while a short line starts to turn in the right hand side of the computer screen.
9. The traffic lights will turn from red to yellow and then to green.
10. When the download is finished the computer will return to the DOS prompt. Turn the main power supply switch OFF and ON and verify the program version in the AUX 7 display. Under the AUX7 screen, press the left-most softkey 3 times to show the complete program build number (i.e. V1.5(751).

Hint:
It is highly recommended that the MX420 navigator be cold started after downloading the program. Please note that all settings including waypoints and routes will be lost.

This is important to flush out the residual memory, which may cause problems with the operation of the unit.

Memory Clear Procedure:

1. After downloading the software, turn the power off to the MX420 by turning off the 12 VDC circuit breaker (this may also be accomplished by removing the “Cable A” from the back of the unit).
2. Press and hold down the right-most softkey.
3. Apply 12-volt power to the unit and wait for about 5 seconds. The MX420 will come on and display the MX Marine logo.
4. Release the softkey.
5. The memory is now cleared.

MX Marine
A division of NAVICO, Inc.
23868 Hawthorne Blvd., Suite 201
Torrance, CA 90505
USA

+1 310 791 8213 Telephone
+1 310 791 6108 Fax

Internet: www.mx-marine.com