

# Operation & Installation

for **MODEL**

## **NT-2000/DEBEG 2902**

### Dual Channel

## NAVTEX Receiver

(Receiver Unit: PROTECTED EQUIPMENT UNDER IEC 60945-2002)  
(Antenna Unit: EXPOSED EQUIPMENT UNDER IEC 60945-2002)

Valid for Software Version 1.2



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**In this manual the NAVTEX Receiver DEBEG 2902  
is referred to as NT-2000.**

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Alterations resulting from technical progress are reserved.

< WARRANTY >

The warranty terms and conditions for the **DEBEG 2902** are given in a separate sheet attached to the delivery of each unit.

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## WARRANTY

Japan Marina Co. Ltd. (JMC) warrants the **NT-2000** NAVTEX Receiver and its active antenna **ANT-2000** against defects in materials and workmanship for a period of one year from the date of shipping from the factory, during which time JMC will, at its option, either repair or replace products that prove to be defective.

Users shall ship defective products, freight prepaid, back to JMC, address given below, for warranty service.

The warranty shall not apply to defects caused by:

- Misuse or incorrect usage
- Static discharges/lightning strikes to the antenna or to the receiver or other types of natural disaster
- RF power from radio transmitters in excess of 30V rms at the antenna input
- Improper or inadequate maintenance by the user
- Unauthorized service including modification, realignment of the receiver/antenna
- User-supplied software or interfacing
- Operation outside the environmental specifications listed in the manual, or
- Improper installation

The above warranty applies to the original user who purchased the products direct from JMC. If your unit was supplied by a JMC-authorized dealer, different warranty terms and conditions may apply. Please contact your dealer for details.

Before returning the units to JMC for warranty service, please obtain JMC's return authorization.

When shipping the units to JMC or its dealers for service, please be sure to include the following types of information:

- Serial number
- Software release date and revision (REV.) number
- Power supply voltage
- Installation details, including antenna height and surrounding environment
- Detailed description of trouble
- Valid proof of purchase from JMC
- Invoice marking "**MADE IN JAPAN, being returned for repairs.**"

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## **< WARNINGS >**

### **1. HIGH VOLTAGES**

**HIGH VOLTAGES EXIST INSIDE THE EQUIPMENT CABINET. BE SURE TO SWITCH THE EQUIPMENT OFF AND UNPLUG THE POWER CORD BEFORE OPENING THE CABINET FOR INSPECTION OR REPAIRS.**

### **2. INSTALLATION & OPERATING ENVIRONMENT**

**THE DISPLAY CABINET IS IN THE “PROTECTED” EQUIPMENT CATEGORY AS DEFINED UNDER IEC 60945(2002), AND IS NOT WEATHERIZED FOR OUTDOOR INSTALLATION/OPERATION. ANY DAMAGE CAUSED DIRECTLY OR INDIRECTLY THROUGH WATER INTRUSION IS NOT COVERED BY THE MANUFACTURER’S OR DEALER’S WARRANTY.**

### **3. INSTALLATION & OPERATING PROCEDURES**

**ANY DAMAGE CAUSED BY INSTALLING OR OPERATING THE EQUIPMENT OUTSIDE THE SPECIFICATIONS DESCRIBED IN THIS MANUAL IS NOT COVERED BY THE MANUFACTURER’S OR DEALER’S WARRANTY.**

**CONTACT YOUR DEALER FOR WARRANTY CONDITIONS.**

### **4. LIABILITY**

#### **OPERATION**

**NEITHER THE MANUFACTURER NOR ITS DEALER IS RESPONSIBLE FOR ANY LOSS OF LIFE, PERSONAL INJURY OR DAMAGE TO THE PROPERTY RESULTING FROM THE USE OF THIS EQUIPMENT OR FROM BEING UNABLE TO OPERATE THE EQUIPMENT FOR ANY REASON.**

#### **MANUAL**

**REASONABLE PRECAUTIONS HAVE BEEN TAKEN TO PREPARE THIS MANUAL. HOWEVER, NEITHER THE MANUFACTURER NOR ITS DEALER ASSUMES ANY RESPONSIBILITY FOR ERRORS OR OMISSIONS.**

## < CAUTIONS >

### 1: Operational – Memory Retention Period

Do not leave the equipment switched off for more than 10 days continuously, or all stored messages will be erased, whether they are protected or not. Important messages you wish to preserve should be output to an optional printer or to a PC via the appropriate rear panel interface connector if the equipment is to be kept turned off for extended periods of time.

### 2: Operational – Memory–Full Indications

As soon as the equipment has stored a total of 199 messages, the following caution will show up in the bottom command/prompts line along with 3 beeps:

**MEMORY FULL ! [CLR] TO ACKNLG.**

The oldest message will then be erased from memory automatically after reception of a next new message. As soon as you notice the above warning, be sure to acknowledge each unread message by pressing **CLR**, and if necessary, press **STO MSG** to protect important messages you wish to retain for permanent storage.

### 3: Environmental Safety – Equipment Disposal

Neither the display cabinet nor the active antenna unit contains any materials considered hazardous to the environment. However, if either unit is to be discarded for any reason, be sure to follow all relevant local ordinances/regulations, and contact your dealer or the manufacturer (contact information given below) for assistance or instructions before disposing of it.

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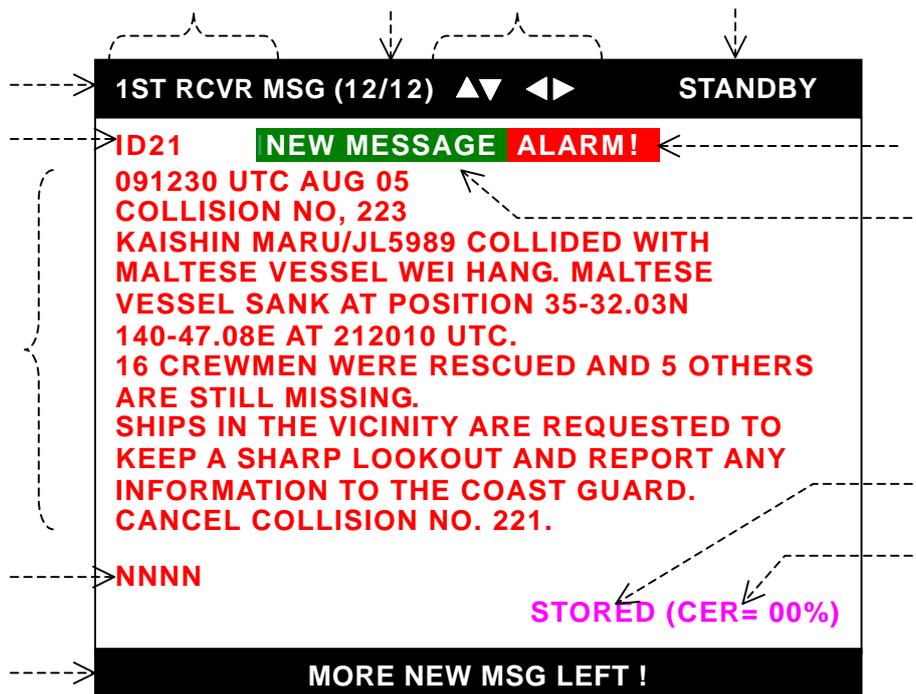
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## 1. Typical NAVTEX Message Screen

### 1.1. Introduction

The illustration below represents a typical NAVTEX message screen, showing a new message received on the first (518 kHz) receiver. A similar screen will show up when the equipment is switched to receive a second receiver (490 kHz or 4209.5 kHz) message. A brief description of on-screen indications is given below and in the following pages.

Figure 1-1 Typical NAVTEX Message Screen (First Receiver Page)



Indication of Receiver in Use to Display Current Messages

- **1ST RCVR**: First receiver, 518 kHz
- **2ND RCVR1**: Second receiver, 490 kHz or **2ND RCVR2**: 4209.5 kHz

The two receivers can be switched by pressing **PAGE**.

Message No. and Total No. of Messages Stored

The message number of the currently displayed message along with the total number of stored messages is indicated in the following format:

Examples:

- **12/12**: Message #12 (newest message) of 12 messages stored
- **1/12**: Message #1 (oldest message) of 12 messages stored

Message Scrolling Keys

The keys that can be used to scroll messages on the current screen are indicated.

- **▲▼**: Line-by-line scrolling by pressing  / 
- **◀▶**: Message-by-message scrolling by pressing  / 

(continued on next page)

## 1. Typical NAVTEX Message Screen (continued – 2/5)

### 1.1. Introduction (continued – 2/4)

#### Receiver Operating Status Indication

The current status of receiver operation is indicated here.

- **STANDBY:** Receiver is waiting for a NAVTEX message transmission.
- **ACQUIRING:** Receiver is currently in the process of locking onto the start of the current message transmission.
- **LOCKED:** Receiver has locked onto the current NAVTEX transmission, allowing a message to be received. As soon as the equipment starts receiving the message, this indication will be replaced by its message ID.
- **ABORTED:** Receiver has failed to lock onto the current transmission, or has already received the same message. No message will be received.

#### Operating Status Line

The current status of receiver operation, text scroll keys, etc. are indicated here.

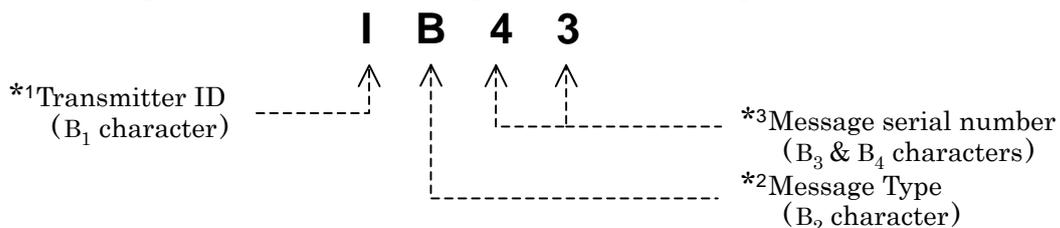
Examples:

- **1ST RCVR MSG:** Message received on the first receiver is currently displayed.
- **2ND RCVR MSG:** Message received on the second (490 or 4209.5 kHz) is currently displayed.
- **▲▼:** Message can be scrolled line by line by pressing ▲ / ▼.
- **STANDBY:** Receiver is idling, waiting for a NAVTEX message transmission. See above for details.

#### Message Identification (Message ID)

The ID of the currently displayed message is shown here. A red-colored ID represents a warning message. A message ID consists of the following elements: station ID, message type, and message serial number, as in the following example:

Figure 1-2 NAVTEX Message ID Format – Example



\*1: *ID of the transmitter from which the message was received.*

*Examples:*    **I** in NAVAREA    : Yokohama, Japan  
                   **L** in NAVAREA    : Limnos, Greece  
                   **P** in NAVAREA    : Ijmuiden, Netherlands

\*2: *Type (category) of this message (subject indicator)*

*Examples:*    **A:** Navigational warnings  
                   **B:** Weather warnings  
                   **D:** Search and rescue (SAR), piracy or armed robbery warnings

\*3: *Serial number of this message*

*Each message within the same category group is allocated a serial number between 00 and 99 by each transmitter. A message with number 00 is always received on each transmission regardless of rejection settings, and will be stored in memory.*

(continued on next page)

## 1. Typical NAVTEX Message Screen (continued – 3/5)

### 1.1. Introduction (continued – 3/4)

Alarm Tag **ALARM!**

This tag represents a visual alarm and is turned on when a NAVTEX message of one of the following types has been received.

- Type–A Message: Navigational warning (initially disabled).
- Type–B Message: Weather warning (initially disabled).
- Type–D Message: Search and rescue (SAR) information, piracy and armed robbery warnings. All text characters will be displayed in red to distinguish it from other alarm messages.
- Type–L Message: Additional navigational warning (initially disabled)

*NOTE: When a type–D message has been received, an audible alarm will also be turned on, beeping at approx. 1 second intervals. To silence the alarm sound, press **STOP ALM**.*

< **CAUTION** >

**Silencing the audible alarm constitutes your acknowledgement of the current alarm message.**

The alarm for the message types A, B and L is initially disabled. It can be enabled via **SYSTEM MENU – 9:TURN ON/OFF MESSAGE ALARM**. See paragraph 4.13 for details.

New Message Tag **NEW MESSAGE**

This indication (tag) shows that the currently displayed NAVTEX text is a new message that you have not yet read or acknowledged.

To acknowledge it, simply press **NEW MSG** or **CLR**, turning the tag off.

If two or more new messages have been left unread, the following caution message will be displayed at the screen bottom, prompting you to read them. Press **NEW MSG** again to display, or scroll the text up to, the next one by pressing **▲** / **▼**.

**MORE NEW MSG LEFT !**

The **NEW MESSAGE** tag for the current message will be automatically turned off 24 hours after its reception, if it is left unacknowledged (i.e. if **CLR** is not pressed).

NAVTEX Message

If the message text exceeds the screen display area, you can scroll it line–by–line by pressing **▲** / **▼**. Holding down either key accelerates the scroll.

To read other messages, press **◀** / **▶** (for message–by–message scrolling). Holding down either key accelerates the scroll.

Type D messages (search–and–rescue, piracy or armed robbery information) will be displayed in red.

*NOTE: Forced carriage return: ↓*  
*When the number of characters in a line exceeds 40, an internally generated carriage return symbol, shown above, will be automatically inserted in the 40th character position to divide the last word, forcing the rest of the characters in the word to shift to the top of the next line. This symbol will be replaced by an underscore ( \_ ) when it is printed or output to an INS device via the RS–422 port.*

*(continued on next page)*

## 1. Typical NAVTEX Message Screen (*continued – 4/5*)

### 1.1. Introduction (*continued – 4/4*)

#### End-of-Message Indication **NNNN**

The appearance of these four successive N characters indicates the end of the currently displayed NAVTEX message.

*NOTE: Some messages including those from Chinese stations, end with NN (2 Ns) instead of NNNN (4 Ns).*

#### Indication of Message Storage Status

This indication shows whether or not the displayed NAVTEX message has been stored in the internal non-volatile memory.

- **STORED:** The message has been stored.
- **STORAGE ABORTED:** The message has not been stored.

When message reception has been completed with a character error rate (CER) of 33% or less, the received NAVTEX message together with its ID will be stored in memory, making it possible to recall it onto the screen at a later time.

If the same message is received with a lower CER on the next transmission, the previously stored message will be replaced with the new one.

When the CER exceeds 33%, the message and its ID will not be stored in memory, allowing a retransmission of the same message to be received.

#### Character Error Rate (CER) Indication

CER is the percentage ratio of the total number of asterisks (\*) to the total number of characters received, including control codes (sync. signal, carriage returns, line feeds, letter/numeral shift, etc.), in a message. If a message is received with a CER equal to or greater than 33%, the message will not be stored in memory.

#### Message Prompt Line

This line indicates the receiver's response for the user's keypress or displays prompts related to reception of new or alarm NAVTEX messages on the first or second receiver, or related to message storage, like the examples below.

- **ALARM MESSAGE RECEIVED ON 2ND RCVR**
- **MORE UNREAD ALARM \*1MSG LEFT**
- **2ND \*2RCVR RECEIVED NEW MSG**
- **MORE NEW MSG LEFT**
- **STORAGE LIMIT IS REACHED**
- **MEMORY FULL ! \*3 [CLR] TO \*4 ACKNLG.**

\*1 MSG = MESSAGE, \*2 RCVR = RECEIVER

\*3 [CLR] =  \*4 ACKNLG = ACKNOWLEDGE

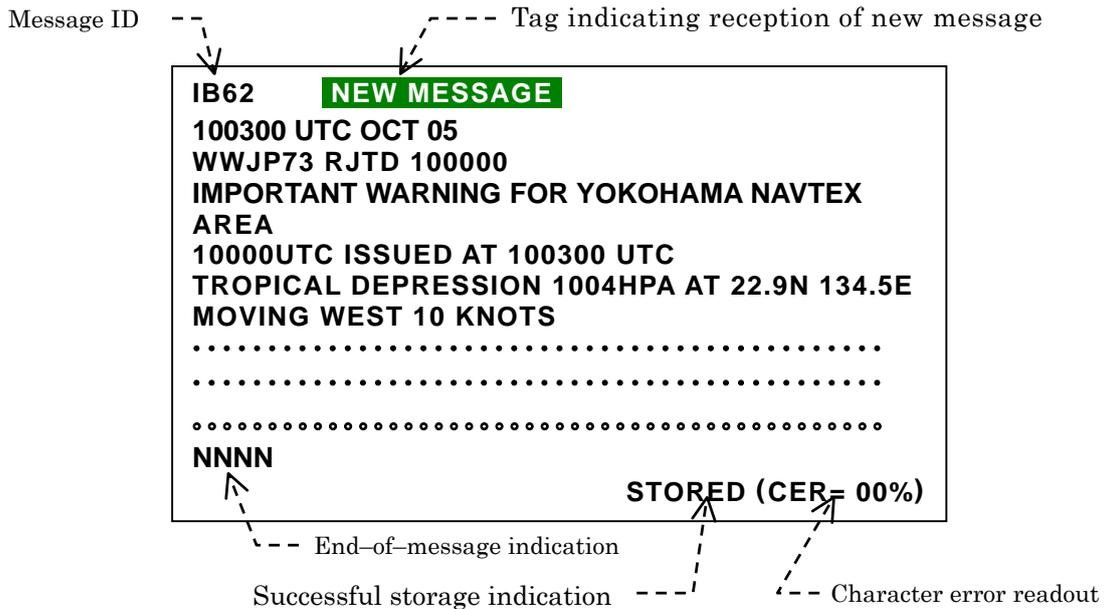
1. Typical NAVTEX Message Screen (continued – 5/5)

1.2. Indication of Reception and Storage of New NAVTEX Message

Indicating Reception of New Message – First Receiver

The equipment visually indicates the reception of a new NAVTEX message by attaching a tag (**NEW MESSAGE**) to the message ID, as in the example below. The tag will be turned off 24 hours after reception or when you press **CLR**.

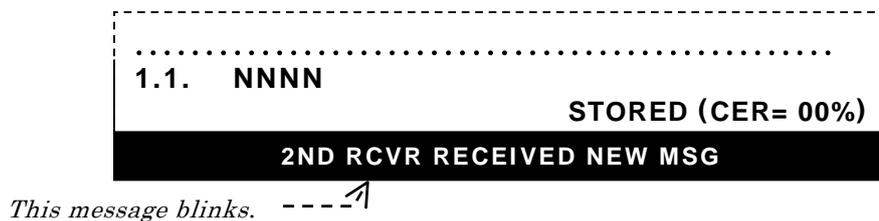
Figure 1-3 First Receiver Receiving New NAVTEX Message – Example



Indicating Reception of New Message – Second Receiver

When the first receiver message screen is currently showing, the reception of a new message on the second receiver is indicated with message “**2ND RCVR RECEIVED NEW MSG**” blinking in the prompt line at the screen bottom, as in the example below. To read it, switch to the second receiver page by pressing **PAGE**.

Figure 1-4 Indication of New Message Reception on Second Receiver – Example



Indicating Successful Storage of New Message

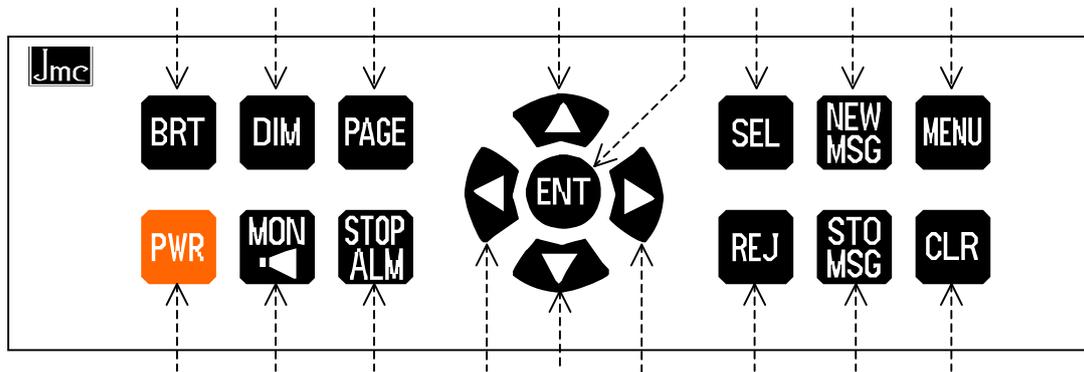
When a new NAVTEX message has been received with a character error rate (CER) of 33% or less, the message will be stored in non-volatile memory together with its ID; this condition is displayed with indication “**STORED**” at the end of the message together with its CER reading, as in the example above.

If the CER exceeds 33%, the current message will not be stored, and indication “**STORAGE ABORTED**” is displayed at the end of the message.

## 2. Control Panel Functions

The figure below shows the control panel of the equipment. A summary description of the functions the keys provides is given below and in the following pages.

Figure 2-1 Control Panel



### Screen Brightness Key **BRT**

Repeated pressing of this key adjusts the screen brightness in a total of 8 steps including a completely dark level. The last used level is stored in memory. The brightness level returns to its maximum on next power-up when the equipment is switched off with the level set to its minimum. See paragraph 4.5 for related information.

### Power Key **PWR** – 1/2

This key turns the unit on/off. A first keypress turns it on, displaying an opening message like the example at right for approximately five seconds.

To turn the unit off, press and hold down **PWR** for 2-3 seconds until a power-off countdown window shows up as illustrated at right, indicating that a power-off sequence has started.

Keep on pressing the key until all five bars have disappeared, and then release the key to completely switch it off. This delayed action helps prevent an accidental shutoff and loss of data.

Releasing the key with at least one countdown bar showing cancels the power-off sequence.

Figure 2-2 Opening Message – Example

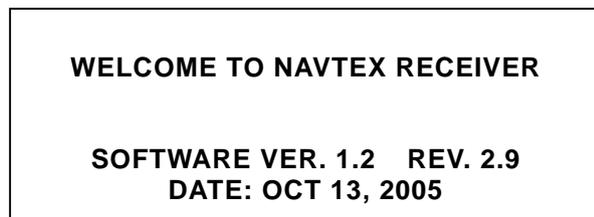


Figure 2-3 Power-Off Countdown Window



Countdown bars

(continued on next page)



## 2. Control Panel Functions *(continued – 3/10)*

### Screen Page Key

Pressing this key switches the message screen between the first receiver screen page and the second receiver screen page.

For example, if the current screen is currently showing the first receiver page (i.e. 518 kHz NAVTEX message display), a first keypress changes the display to show the second receiver page (i.e. 490 kHz/4209.5 kHz message display). A second press changes it back to the first receiver page. See paragraph 3.5 for more details.

### Alarm Stop Key

The equipment will alarm you audibly through a built-in buzzer and visually by turning an alarm indication ( **ALARM!** ) in reverse video on the message screen upon reception of an important NAVTEX warning (type-D message, for example). A type-D message text will be displayed in red. See paragraph 3.7 for more details.

Pressing this key silences the audible alarm. The alarm tag is also removed. Observe the **CAUTION** at right.

< **CAUTION** >

**Silencing the audible alarm constitutes your acknowledgement of the current alarm message/condition.**

If more alarm messages are left unread in memory, a next alarm message will be displayed after the above keypress.

### Up Key

- When a NAVTEX message is currently being displayed, pressing this key scrolls the message screen downward one line at a time, allowing you to view message lines hidden beyond the screen's upper limit. When the newest message (e.g. **200/200**) is reached, a further keypress displays the oldest one (e.g. **1/200**). Holding down the key accelerates the scrolling.
- When a menu is currently being displayed, pressing this key selects (highlights) vertically listed options upward. Press  after highlighting the desired option.

### Left Key

- When a NAVTEX message is currently being displayed, a single press of this key scrolls the message text by one message forward chronologically, displaying a newer message. Holding down the key accelerates the scroll. When the newest message (e.g. **200/200**) is currently shown, a further keypress returns you to the oldest message (e.g. **1/200**).
- When a currently displayed menu has horizontally listed options, pressing this key selects (i.e. highlights) those options in a leftward direction. Be sure to press  after highlighting the desired option.

*(continued on next page)*

## 2. Control Panel Functions (continued - 4/10)

Enter Key **ENT**

- When a NAVTEX message is currently being displayed, pressing this key displays the newest message (e.g. **200/200**).
- When a menu is currently being displayed, pressing this key:
  - completes the selection of a desired option,
  - executes the function selected or,
  - finalizes the current setting.

Down Key 

- When a NAVTEX message is currently being displayed, pressing this key scrolls the message screen upward one line at a time, allowing you to view message lines hidden beyond the lower limit of the screen. When the oldest message (e.g. **1/200**) is displayed, further keypress returns you to the newest message (e.g. **200/200**).

Holding down the key accelerates the scrolling.

- When a menu is currently being displayed, pressing this key selects (highlights) vertically listed options downward. Be sure to press **ENT** after highlighting the desired option.

Message/Station Selection Key **SEL** - 1/2

- When a NAVTEX message is currently being displayed, pressing this key displays a summary list of the transmitter IDs and message types selected for reception on both the first and second receivers, as in the example below.

Figure 2-5 List of Currently Selected Stations and Message Types - Example

All transmitters and most of major message types are initially selected so that the equipment will receive those selected types of messages from all stations in the coverage area.

A particular station or a particular message type can be rejected via the menu system.

**MENU** SYSTEM MENU  
5:MAKE SEL/REJ SETTING  
1/2/3 1/2 **REJ**

Detailed instructions are given in paragraph 4.8.

To turn off the above lists, press **CLR**.

```

< FIRST RECEIVER >
SELECTED STATIONS:
A B C D E F G H I J K L M
N O P Q R S T U V W X Y Z

SELECTED MESSAGES:
A B C D E F H J K L
V Z
  
```

```

< SECOND RECEIVER 1 >
SELECTED STATIONS:
A B C D E F G H I J K L M
N O P Q R S T U V W X Y Z

SELECTED MESSAGES:
A B C D E F H J K L
V Z
  
```

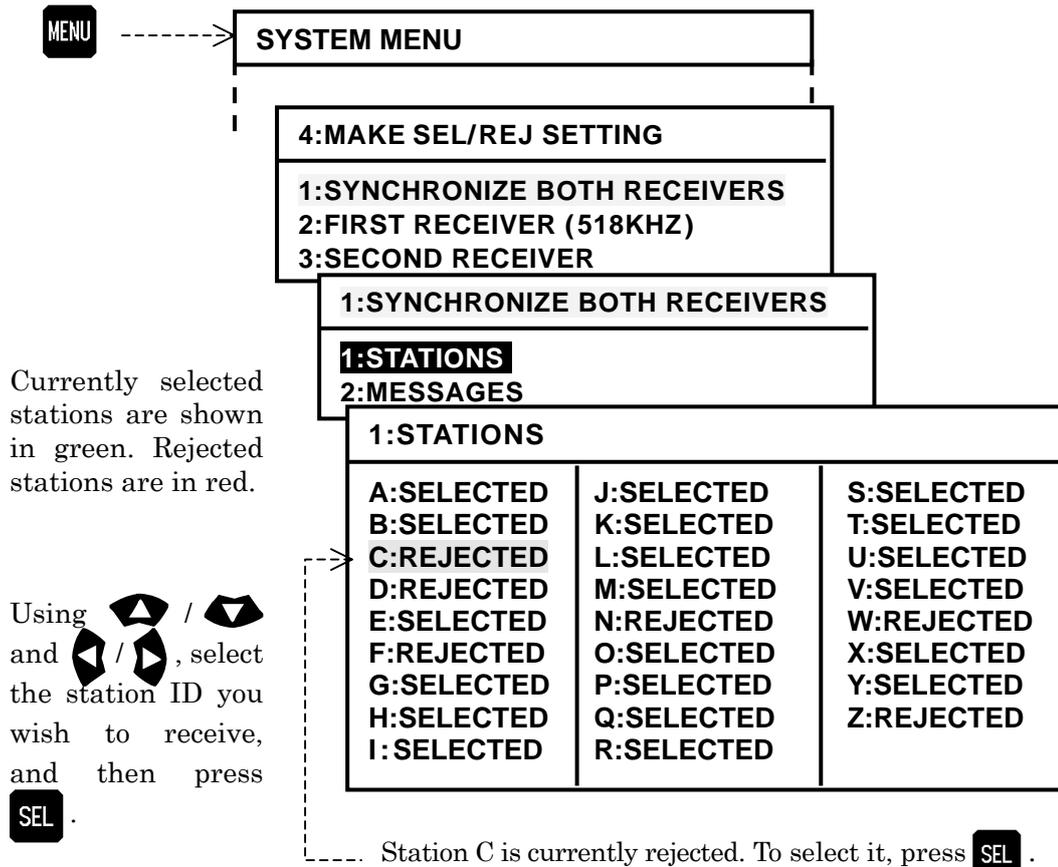
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## 2. Control Panel Functions (continued – 5/10)

Selection/Station Key **SEL** – 2/2

- When option “**5:MAKE SEL/REJ SETTING**” on the **SYSTEM MENU** is currently accessed for selection/rejection settings, this key selects the station or message type you specify for reception. An example of station selecting procedure is illustrated below.

Figure 2-6 Selecting Stations – Example



Right Key 

- When a NAVTEX message is currently being displayed, a single press of this key scrolls the message text by one message backward chronologically, displaying a older message.

When the oldest message (e.g. **1/200**) is currently displayed, further keypress returns you to the newest message (e.g. **200/200**).

Holding down the key accelerates the scroll.

- When a currently displayed menu has horizontally listed options, pressing this key selects (highlights) those options in a rightward direction. Be sure to press **ENT** after highlighting the desired option.

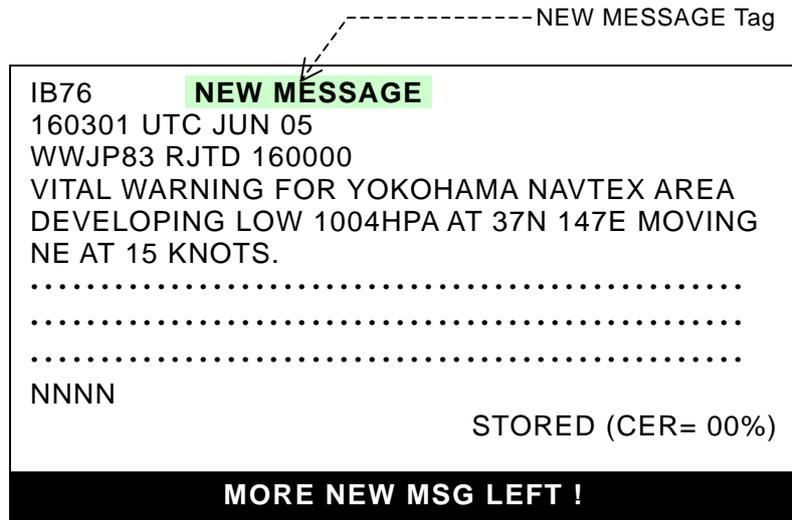
(continued on next page)

2. Control Panel Functions (continued – 6/10)

New Message Key 

When a new NAVTEX message has been received, a **NEW MESSAGE** tag is attached to the message ID as in the example below to indicate that the message is new.

Figure 2-7 Indication of Reception of New Message



Pressing  removes the tag from the message ID, meaning that you have acknowledged its reception.

More new messages are left unread. Scroll to next one by further pressing  or  /  and  / .

The new message tag will be automatically removed 24 hours after reception of that message, even if you forget to acknowledge it.

< CAUTION >

**Removal of the **NEW MESSAGE** tag constitutes your acknowledgement of the currently displayed new message.**

The above example shows that a number of new messages have been received, as indicated by the bottom line prompt. Pressing  will recall the next new message on to the screen. It may also be displayed by pressing  /  (for line-by-line viewing) or  /  (for message-by-message viewing).

If no additional new message is left in memory, further keypress will cause the following message to show blinking for a few seconds at the bottom, indicating an operational error.

Figure 2-8 Indication of All New Messages Being Acknowledged



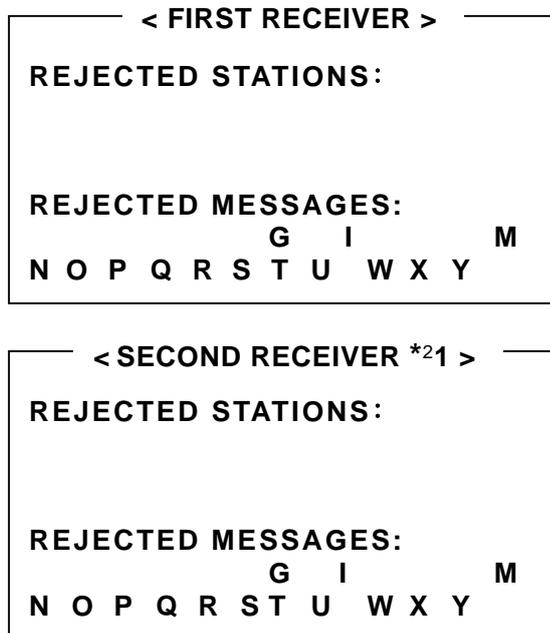
(continued on next page)

2. Control Panel Functions (*continued – 7/10*)

Message/Station Rejection Key **REJ** – 1/2

- When a NAVTEX message text is currently being displayed, pressing this key displays a summary list of the transmitter IDs and message types rejected (deselected) via the \*1 menu system on both the first and second receivers, as in the example below.

Figure 2-9 List of Currently Rejected Stations and Message Types – Example



\*1: **MENU** SYSTEM MENU 4:MAKE SEL/REJ SETTING

*Detailed instructions are given in paragraph 4.8.*

\*2\* **SECOND RECEIVER 1 = 490 kHz, SECOND RECEIVER 2 = 4209.5 kHz**

- The following message types cannot be rejected due to the relevant IMO resolutions and IEC regulations related to navigational safety:
  - Type A: Navigational Warning
  - Type B: Meteorological Warning
  - Type D: SAR (search and rescue) Information, Piracy or Armed Robbery Warning
  - Type L: Additional Navigational Warning
- To turn off the above lists, press either **CLR** .  
Pressing **MENU** turns the lists off and displays the **SYSTEM MENU**.

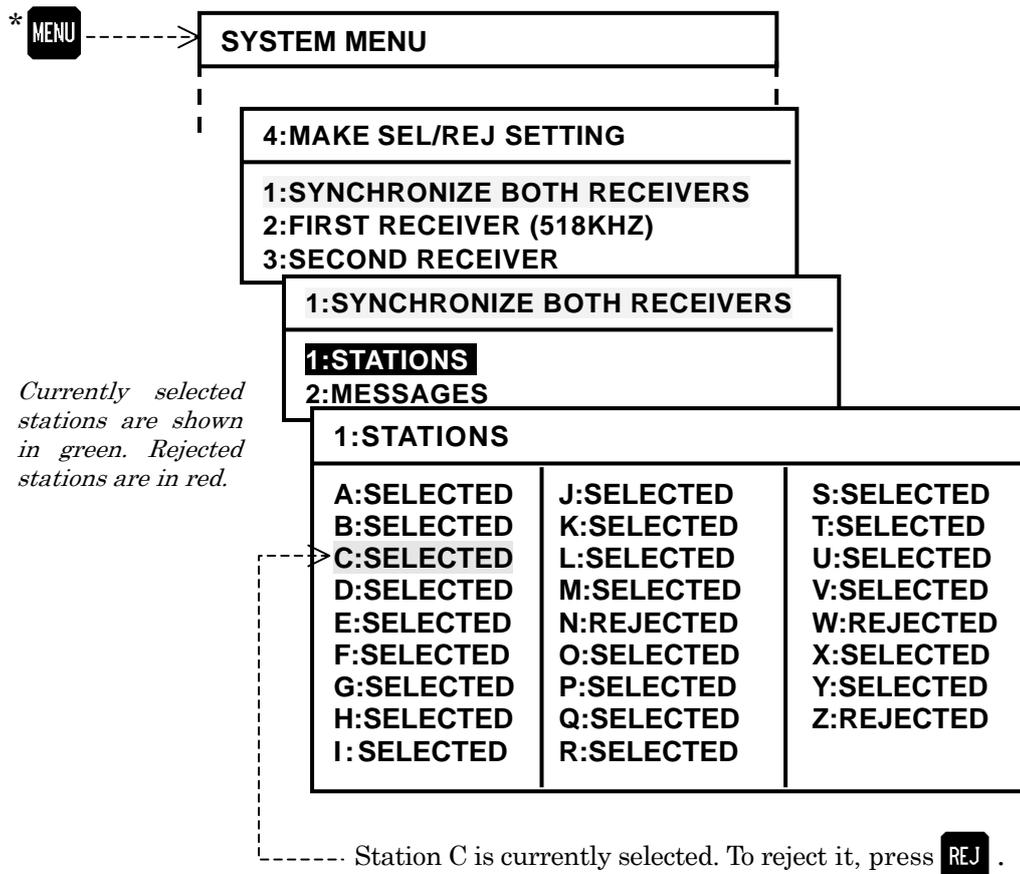
(*continued on next page*)

2. Control Panel Functions (continued – 8/10)

Message/Station Rejection Key **REJ** – 2/2

- When option “5:MAKE SEL/REJ SETTING” on the **SYSTEM MENU** is currently accessed for selection/rejection settings, this key rejects the station or message type you specify. An example of station rejecting procedure is illustrated below.

Figure 2-10 Rejecting Stations – Example



Using / and / , select the station ID in the list you wish to reject, and then press **REJ**.

While other menu is being displayed, pressing this key produces three quick beeps to indicate an operational error.

\* The functions of **MENU** are summarized in paragraph on the next page and described in details in various paragraphs under section 4.

(continued on next page)

## 2. Control Panel Functions (continued – 9/10)

Menu Key 

- Pressing this key opens a menu termed “**SYSTEM MENU**,” as shown below, to customize the operation to suit your specific needs by making various settings, to test the receiver performance off-line, or reset the entire system to the initial settings. See paragraphs in section 4 for greater details.

Figure 2-11 SYSTEM MENU

- To turn the menu off, press  again or  <sup>\*1</sup>.
- A desired menu option can be selected by highlighting it with  / , followed by .

SYSTEM MENU	
<b>1: MAKE DISPLAY SETTINGS</b>	
2: SELECT 2ND RECEIVER FREQUENCIES	
3: TURN ON/OFF KEYPRESS BEEP	
4: MAKE SEL/REJ SETTINGS	
5: SEARCH STORED MESSAGES	
6: SELECT OUTPUT MESSAGES	
7: SET OUTPUT PORTS	
8: START SELF-DIAGNOSTIC TESTS	
9: TURN ON/OFF MESSAGE ALARM	
0: RESET TO FACTORY DEFAULTS	

- The functions of each option are summarized below.

- |  |   |
|--|---|
| <b>1: MAKE DISPLAY SETTINGS:</b>           | Selects display background colors, turns on/off screen sleep mode, or selects message font types. |
| <b>2: SELECT 2ND RECEIVER FREQUENCIES:</b> | Selects 490 or 4209.5 kHz.  |
| <b>3: TURN ON/OFF KEYPRESS BEEP:</b>       | Turns on/off keypress beep.   |
| <b>*2 4: MAKE SEL/REJ SETTINGS:</b>        | Selects or rejects stations or message types.   |
| <b>5: SEARCH STORED MESSAGES:</b>          | Search stored messages by station and/or message type.  |
| <b>6: SELECT OUTPUT MESSAGES:</b>          | Selects messages to be output externally.   |
| <b>7: SET OUTPUT PORTS:</b>                | Sets output ports on/off, selects protocols, formats, etc.  |
| <b>8: START SELF-DIAGNOSTIC TESTS:</b>     | Executes self-diagnostic tests.   |
| <b>*3 9: TURN ON/OFF MESSAGE ALARM:</b>    | Turns on/off message alarms.  |
| <b>*4 0: RESET TO FACTORY DEFAULTS:</b>    | Initializes user-made settings.   |

*\*1: Pressing this key returns you to the first receiver screen as well as turns the menu off.*

*\*2: Types A, B, D and L messages cannot be rejected due to relevant IMO resolutions.*

*\*3: Alarm for type-D messages cannot be turned off due to relevant IMO resolutions.*

*\*4: Stored messages will not be erased from memory by executing this function.*

Detailed information on each menu option is given in section 4.

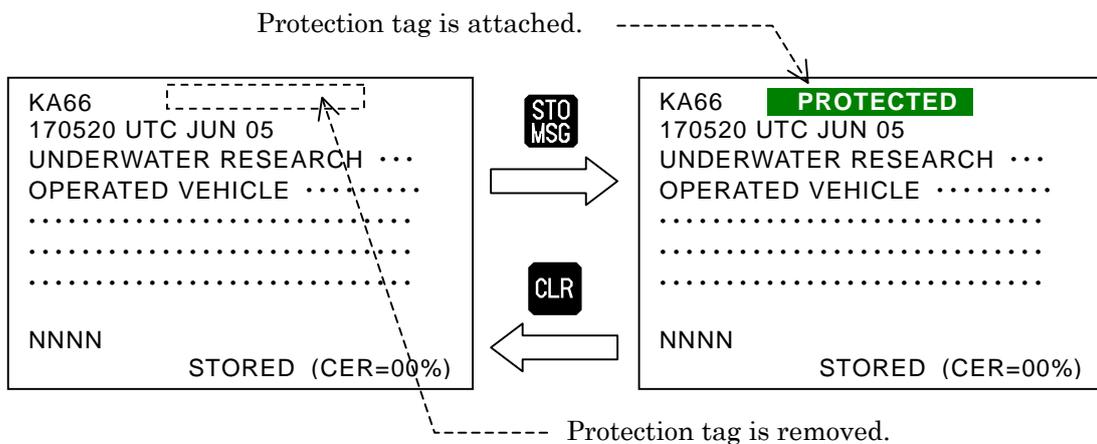
(continued on next page)

## 2. Control Panel Functions (continued – 10/10)

### Store Message Key **STO MSG**

- This key is used to place a specific NAVTEX message in permanent storage, thereby protecting it from being erased from memory automatically after the maximum message storage limit (200 messages) is reached.
- Pressing this key attaches a “**PROTECTED**” tag to the ID of the message you wish to protect, and pressing **CLR** \*removes the tag from the message, as in the example below. \*User confirmation is required. See below.

Figure 2-12 Attaching/Removing Message Protection Tag – Example



- Up to 50 messages can be protected. An attempt to protect messages beyond this limit causes an operational error, turning on the following caution message in the message prompt line (screen’s bottom line):

**STORAGE LIMIT IS REACHED !**

- The message storage capacity will increase by 50 to 250 messages when 50 received messages are protected.

### Clear Key **CLR**

The major functions this key provides are:

- \*1removing the message protection tag ( **PROTECTED** ) from the currently displayed protected NAVTEX message.
- removing the new message tag ( **NEW MESSAGE** ) from a new message, and
- turning off all menus at a time, returning to the first receiver message page when making settings via the \*2 menu system.

\*1: Removing the message protection tag requires your confirmation, as shown at right.

Use **▲** / **▼** to select the desired option and then press **ENT**.

\*2: See section 4 for more information.

<b>ARE YOU SURE ?</b>
<b>1: NO (CANCEL)</b>
<b>2: YES (EXECUTE)</b>
[ ] [ ] [ENT]

### 3. Basic Operating Procedure

#### 3.1. Introduction

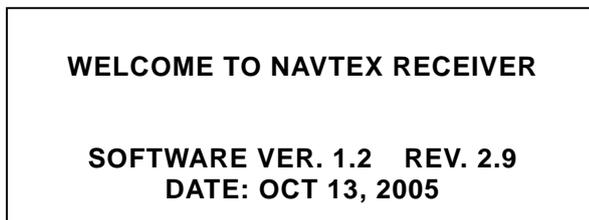
This section describes the basic operating procedure, allowing you to operate your NAVTEX receiver from the front keypad without prior knowledge of the NAVTEX system. The functions that are available from the keypad are summarized in section 2 (Control Panel Functions). It is assumed that a specified antenna and appropriate power supply are connected to the equipment.

#### 3.2. Turning the Equipment On/Off

To turn the equipment on, gently press **PWR** once.

An opening message like the example at right will show up and stay for approximately five seconds, indicating the model name, software version number and release date. The numbers shown are examples.

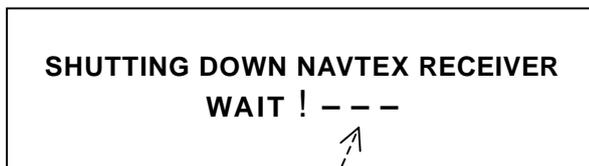
Figure 3-1 Opening Message – Example



#### Turning Equipment Off

To turn the unit off, press and hold down **PWR** for two to three seconds until a power-off countdown window shows up as illustrated at right, indicating that a power-off sequence has just started.

Figure 3-2 Power-Off Countdown Window



Countdown bars

- Keep on pressing the key until all countdown bars have disappeared, and then release the key to completely switch the unit off. This delayed action avoids an accidental shutoff and loss of message data.
- Releasing the key with at least one countdown bar still showing cancels the power-off sequence.

#### Turning Opening Message Off

- After the unit is switched on, the opening message window will be replaced with another window listing the current settings of receiver control parameters, as in the example shown in Figure 2-4.
- The above list will stay on for approximately 20 seconds before the NAVTEX message screen shows up, replacing it automatically.
- To turn the list off immediately, press **CLR** or **ENT**.

*(continued on next page)*

### 3. Basic Operating Procedure – 2/7

#### 3.3. Adjusting Screen Brightness

- The screen brightness level can be changed in a total of eight steps to suit the ambient lighting condition by repeatedly pressing **BRT**.
- To extend the service life of the backlighting lamp, the level can be changed in two steps automatically after a user-preset time period. See paragraph 4.5 for detailed information on the screen sleep mode.
- The screen background is initially white. You can change it to black or blue via the instructions given in paragraph 4.3.

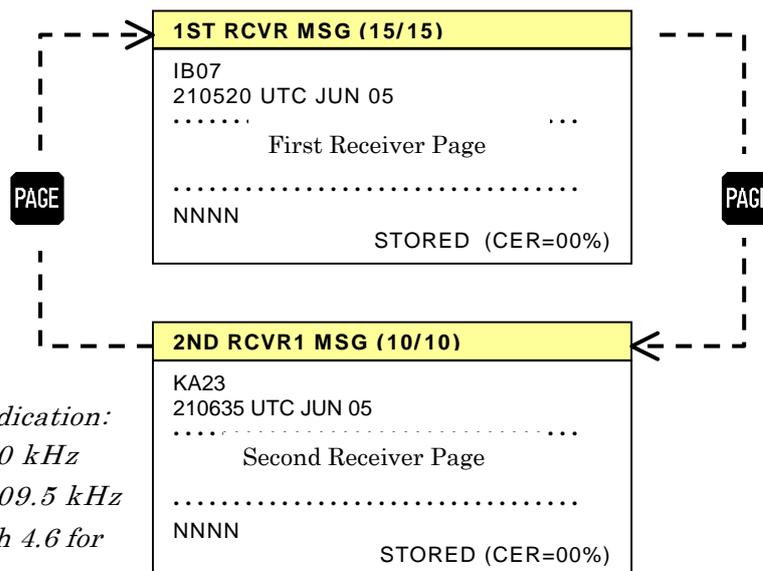
#### 3.4. Adjusting Keypad Backlighting Level

- The keypad backlighting level can be changed in a total of eight steps to suit the ambient lighting condition by repeatedly pressing **DIM**.
- The last used level will be stored in memory. However, if the minimum level was used last time, it will return to the maximum level on next power-up.

#### 3.5. Switching First and Second Receivers

- The message display initially shows first receiver page, showing the NAVTEX message received on the first (518 kHz) receiver.
- To display the second receiver page to show messages received on the second receiver (\* 490 kHz or \* 4209.5 kHz), press **PAGE**. A second keypress will switch the display back to the first receiver page.
- Pressing **CLR** will also return you to the first receiver page when you are making settings via the menu system.

Figure 3-3 Switching First and Second Receivers



\* *Frequency Indication:*

- **RCVR1** = 490 kHz
- **RCVR2** = 4209.5 kHz

See paragraph 4.6 for instructions.

(continued on next page)

### 3. Basic Operating Procedure – 3/7

#### 3.6. Scrolling NAVTEX Messages

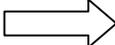
The displayed NAVTEX text can be scrolled line by line or down or message by message with the use of the following pairs of keys:

-  / : Line-by-line scrolling.
  - Pressing  scrolls the text downward, allowing more message lines hidden beyond the lower screen limit to show up. Holding down the key accelerates scrolling.

When the top line of the newest message (e.g. **13/13**) is reached, further keypress displays the last line of the oldest message (e.g. **1/13**).
  - Pressing  acts in the opposite way, allowing more lines hidden beyond the upper screen limit to show up. Holding down the key accelerates scrolling.

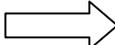
When the bottom line of the oldest message (e.g. **1/13**) is reached, further keypress displays the top line of the newest message (e.g. **13/13**).
-  / : Message-by-message scrolling.
  - Pressing  once scrolls the text by one message chronologically forward to show a next newer message, as in the example below.

Figure 3-4 Forward Message Scrolling – Example 1

1ST RCVR MSG **129/130**  1ST RCVR MSG **130/130**

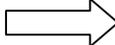
Holding down the key accelerates the scroll speed. After the newest message is reached, further keypress displays the oldest one.

Figure 3-5 Forward Message Scrolling – Example 2

1ST RCVR MSG **130/130**  1ST RCVR MSG **1/130**

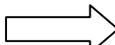
- Pressing  once scrolls the text by one message chronologically backward to show a next older message, as in the example below.

Figure 3-6 Backward Message Scrolling – Example – 1

1ST RCVR MSG **110/130**  1ST RCVR MSG **109/130**

Holding down the key accelerates the scroll speed. After the oldest message is reached, further keypress displays the newest one.

Figure 3-7 Backward Message Scrolling – Example – 2

1ST RCVR MSG **1/130**  1ST RCVR MSG **130/130**

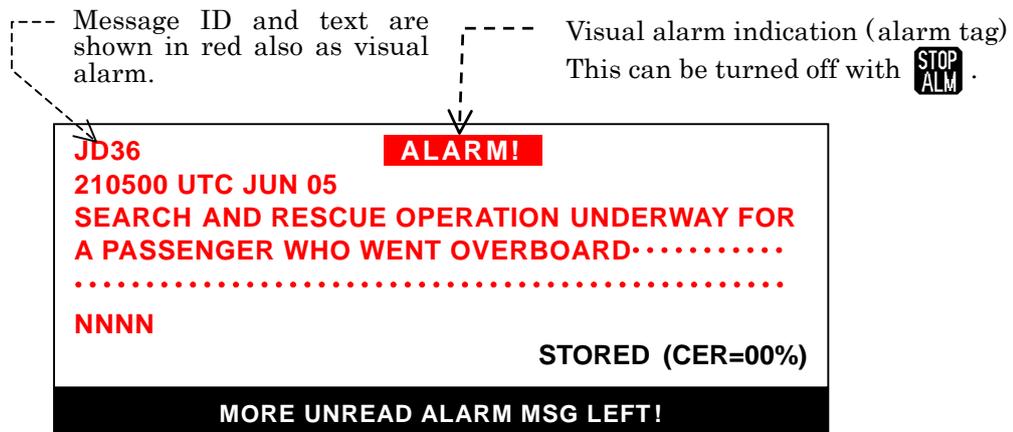
*(continued on next page)*

### 3. Basic Operating Procedure – 4/7

#### 3.7. Stopping Audible and Visual Alarm

Your equipment will warn you audibly and visually against reception of a vital NAVTEX message (type-D message), such as SAR information, piracy, or armed robbery warning. An example type-D alarm message is given below, showing the visual alarm called the alarm tag attached to the message ID. The ID and text are also displayed in red to indicate that the message below is a type-D alarm message, distinguished from other alarm message (type-A: navigational, type-B: weather, or type-L: other alarm).

Figure 3-8 Visual Alarm Indication for Type-D Message – Example



To silence the audible alarm, simply press **STOP ALM**. The visual alarm indication (**ALARM!**, alarm tag) will also be removed.

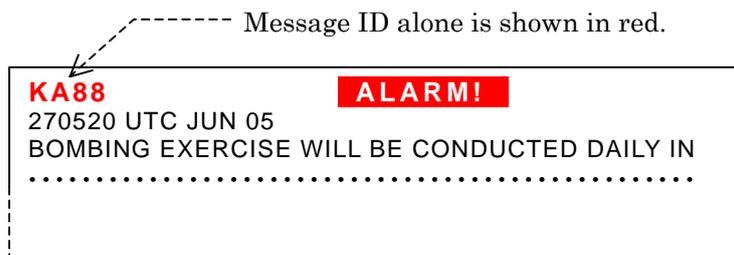
This message indicates more alarm messages are left unread in memory

**< CAUTION >**  
**Silencing the audible alarm constitutes your acknowledgement of the current alarm message.**

If additional alarm messages are left unread in memory, that condition will be indicated as in the example above. Pressing **STOP ALM** again will recall the next unread alarm message onto the screen.

Figure 3-9 Visual Alarm Indication for Type-A Message – Example

The equipment can also be set to alert you to a navigational warning (type-A message), a weather warning (type-B message) or other warning (type-L message) via the menu system described in paragraph 4.13.



(continued on next page)

### 3. Basic Operating Procedure – 5/7

#### 3.8. Protecting Messages for Permanent Storage

##### 3.8.1. Introduction

Initially, all stored NAVTEX messages will be automatically erased one by one from memory on a first-in-first-out basis as the equipment continues receiving new messages after the message storage capacity limit (200 messages) is reached. If you wish to protect a specific message for permanent retention in memory, proceed via the steps given below. Up to 50 messages can be protected, and are saved in a separate area of the non-volatile memory, allowing an additional 50 new messages to be stored.

##### 3.8.2. Protecting Procedure

Figure 3-10 Protecting a Specific Message from Automatic Erasure – Step 1

(1) Using  /  and/or  / , display the message you wish to save. If two or more messages are currently shown, the ID of that message should be brought to the top message line, as in the example at right.

----- ID of message to be saved  
To protect this message, press .

**KB67**  
**211740 UTC JUN 05**  
**DENSE FOG EXPECTED IN AREAS BOUNDED BY ...**  
.....  
.....  
**NNNN**

**STORED (CER= 00%)**

**MORE UNREAD NEW MSG LEFT!**

Figure 3-11 Protecting a Specific Message from Automatic Erasure – Step 2

(2) Press . This will attach a message protection tag (**PROTECTED** tag) to the message ID as illustrated at right, indicating that the message is now protected against automatic erasure.

----- Message protection tag

**KB67** **PROTECTED**  
**211740 UTC JUN 05**  
**DENSE FOG EXPECTED IN AREAS BOUNDED BY ...**  
.....  
.....  
**NNNN**

**STORED (CER= 00%)**

**MORE UNREAD NEW MSG LEFT!**

*NOTE: If the message you wish to protect is a new message, the **NEW MESSAGE** tag will be replaced with the **PROTECTED** tag.*

##### Storage Limit Indication

Attempting to protect messages in excess 50 will cause the following error message to be turned on blinking in the message prompt line for a few seconds.

**STORAGE LIMIT IS REACHED !**

### 3. Basic Operating Procedure – 7/7

#### 3.8.3. Removing Protection Tag

The protection tag on a specific message can be removed via the following steps:

- (1) Using  /  and/or  / , display the message from which you wish to remove the tag.
- (2) Press . This will cause the following caution window to pop up, asking you to confirm your action.

ARE YOU SURE ?
<b>1: NO (CANCEL)</b>
2: YES (EXECUTE)
[ ] [ ] [ENT]

- (3) Press  or  to highlight option “**2: YES (EXECUTE)**” and then press .
- (4) If there are more messages you wish to remove the protection tag from, repeat the above steps.

## 4. Customizing Operation via Menu System

### 4.1. Introduction

The equipment should work normally with the initial factory settings. Some of the settings, such as keypress beep on/off, screen background color, rejection of certain transmitters or message types and alarm on/off, however, may be changed to suit your specific operating needs via the menu system.

### 4.2. Accessing the Menu System

The menu system can be accessed by simply pressing **MENU**. The menu shown at right should then be turned on, indicating that you have activated the menu system.

To turn the menu off, press **MENU** again or \*1 **CLR**.

\*1: Pressing **CLR** returns you to the first receiver page, if you are operating on the second receiver.

Figure 4-1 System Menu

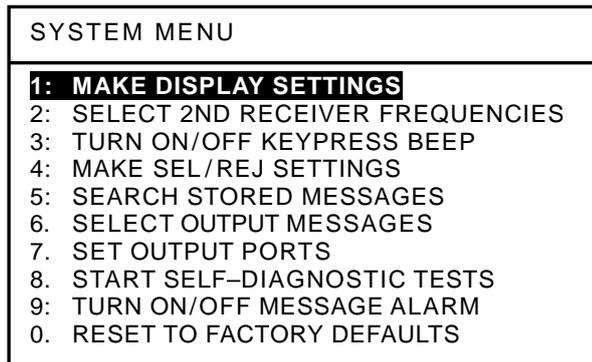
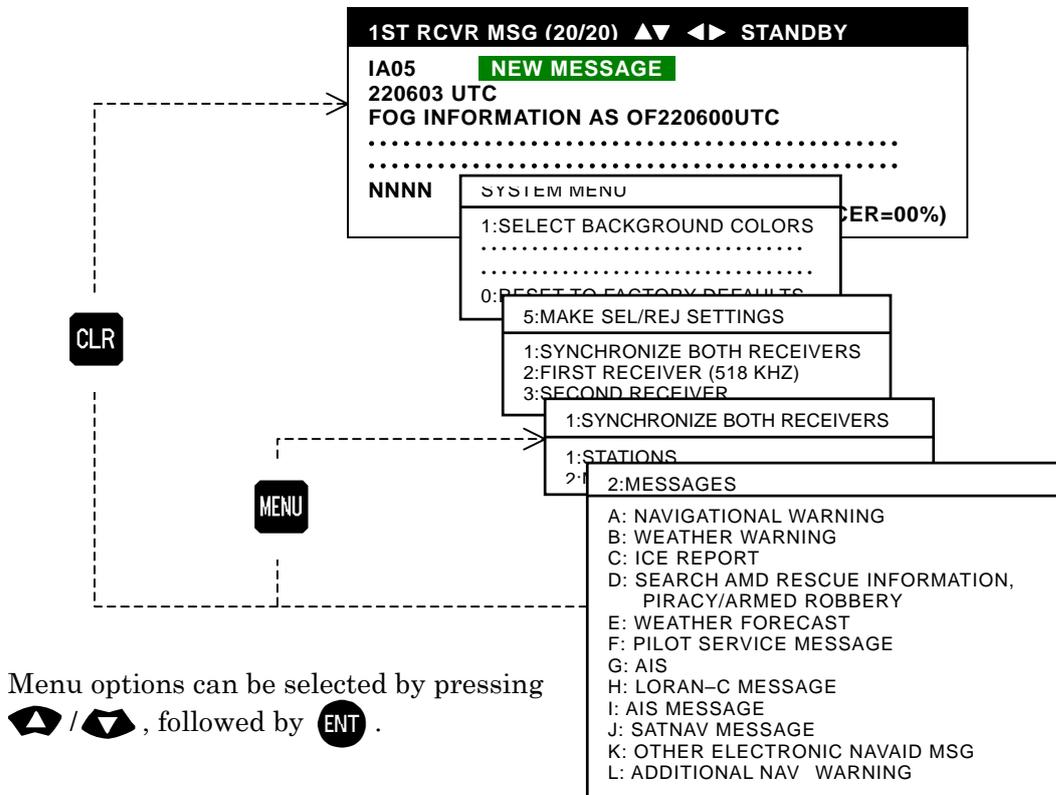


Figure 4-2 Returning to Previous Menu or Directly to Message Screen



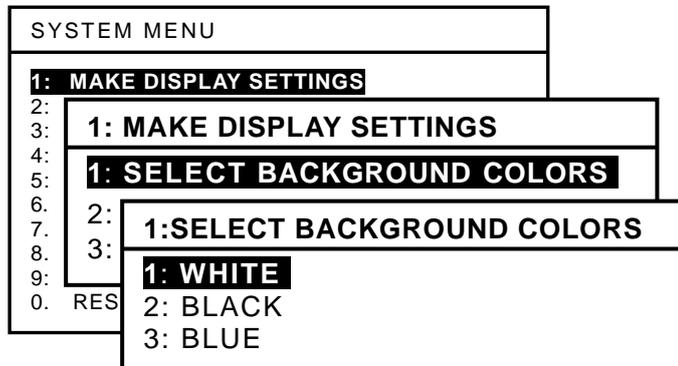
(continued on next page)

### 4.3. Selecting Screen Background Colors

Figure 4-3 Selecting Screen Background Colors

Three different colors (white, black and blue) are selectable for the text screen background. Initially the background is set to white.

The two others can be selected via the following steps:



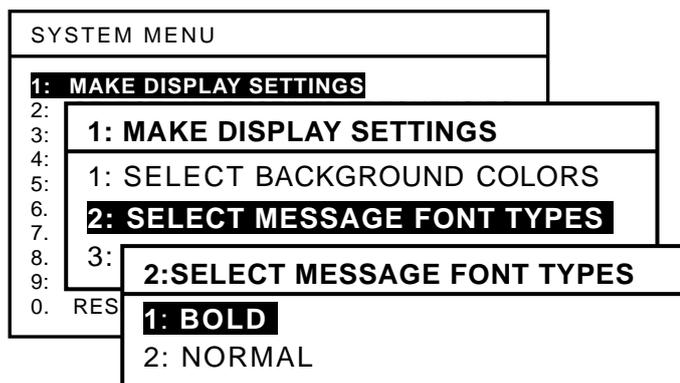
- (1) Highlight option “1:MAKE DISPLAY SETTINGS” by pressing / , followed by .
- (2) Select option “1:SELECT BACKGROUND COLORS” in the same manner.
- (3) Highlight the desired color option by pressing / again, and then press .
- (4) Press or to return to the text screen.

### 4.4. Selecting Message Font Types

Figure 4-4 Selecting Message Font Types

NAVTEX messages are initially displayed in a bold font for ease of reading from a distance (2–3 meters away).

A thinner type font can be selected via the following steps.



- (1) Highlight option “1:MAKE DISPLAY SETTINGS” by pressing / and then .
- (2) Select option “2:SELECT MESSAGE FONT TYPES” in the same manner.
- (3) Highlight “2:NORMAL” by pressing / again, and then press .
- (4) Press or to return to the text screen.

## 4.5. Turning on/off Screen Sleep Mode

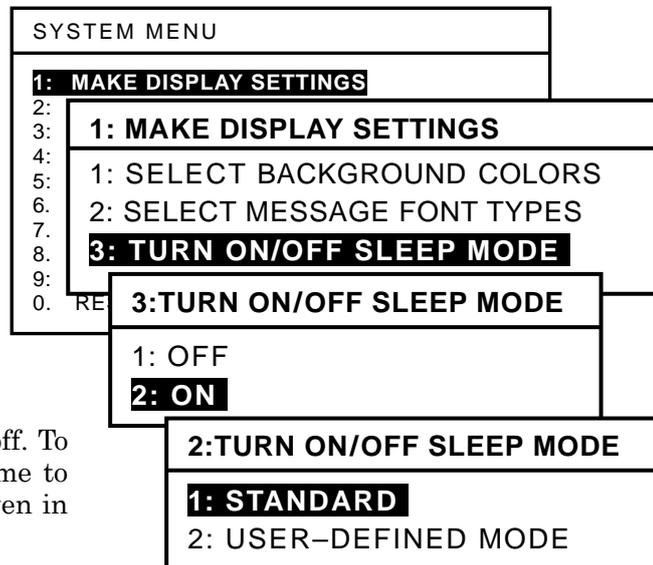
### 4.5.1. Introduction

The screen brightness initially remains at the level set by pressing **BRT**.

To extend the service life of the backlighting lamp (fluorescent lamp), a screen sleep mode can be activated, which automatically reduces the brightness level in two steps when no key is pressed for a time period defined by the user.

The sleep mode is initially turned off. To activate its function and set the time to the sleep mode, follow the steps given in the following paragraphs.

Figure 4-5 Turning Screen Sleep Mode on



### 4.5.2. Turning Sleep Mode on

- (1) Highlight option “**1:MAKE DISPLAY SETTINGS**” by pressing **▲** / **▼**, followed by **ENT**.
- (2) Select option “**2:TURN ON/OFF SLEEP MODE**” in the same manner.
- (3) Select option “**2: ON**” in the same manner.

The following options are now selectable:

**1:STANDARD:** 1 minute to reduced level 1, 15 minutes to reduced level 2

**2:USER-DEFINED MODE:** times to reduced levels 1 and 2 are selectable in 1-minute steps

*NOTE:*

*Reduced level 1 = approx. half maximum brightness level*

*Reduced level 2 = backlighting switched off*

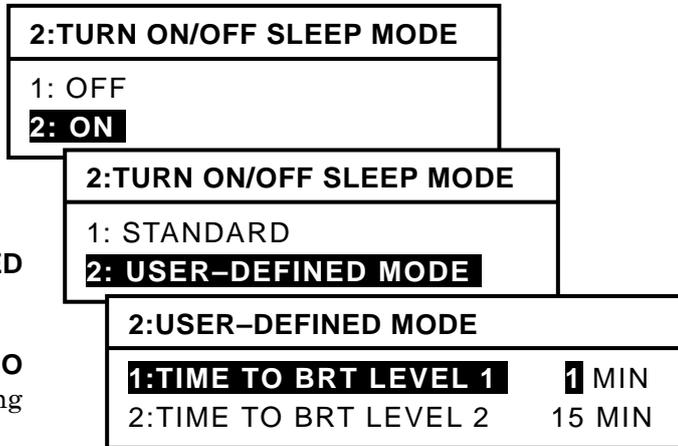
- (4) Select the desired option, and press **ENT**.
- (5) If you selected “**USER-DEFINED MODE**” at the above step, proceed to the next paragraph (4.5.3) for the instructions.
- (6) Press **CLR** or **MENU** to return to the text screen.

### 4.5.3. Setting Times to Reduced Brightness Levels

Figure 4-6 Setting Times to Reduced Brightness Levels

If you wish to set the times to the reduced brightness levels, follow the steps given below.

- (1) Select option “**2:ON.**”
- (2) Select option “**USER-DEFINED MODE.**”
- (3) Highlight option “**1:TIME TO BRT LEVEL 1**” by pressing / .



- (4) Select the desired time period in one-minute steps by pressing / .
- (5) Highlight option “**2:TIME TO BRT LEVEL 2**” by pressing / .
- (6) Select the desired time period in one-minute in the same manner.

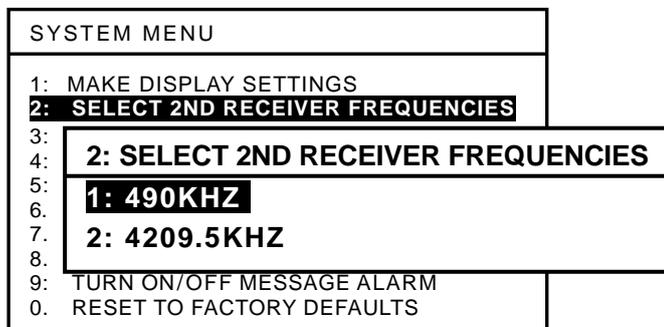
### 4.6. Selecting Frequencies for Second Receiver

Figure 4-7 Selecting Second Receiver Frequencies

The following two frequencies are selectable for the second receiver operation:

- 490 kHz
- 4209.5 kHz

Initially the second receiver is set to 490 kHz. Several countries, including Canada, France, Portugal and U.K., are currently broadcasting national language messages on this channel, catering mainly for local users. The NAVTEX service on 4209.5 kHz is primarily intended for users in tropical regions, and is currently available on an experimental basis. This shortwave frequency can be chosen via the following steps:



- (1) Highlight option “**2:SELECT 2ND RECEIVER FREQUENCIES**” by pressing / , followed by .
- (2) Highlight option “**2: 4209.5KHZ**,” and then press .
- (3) Press or to return to the text screen.

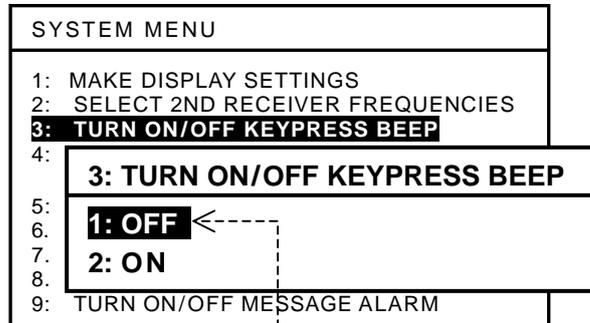
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#### 4.7. Turning on/off Keypress Beep

Figure 4-8 Turning on/off Keypress Beep

Pressing a front panel key causes the equipment to beep, indicating proper actuation of that key; this is the initial setting.

If you wish to turn off the keypress beep, follow the steps given below.



To silence keypress beep, select this option and press **ENT**.

- (1) Highlight option “**2: OFF**” by pressing **▲** / **▼**, followed by **ENT**.
- (2) Press **CLR** or **MENU** to return to the text screen.

*(continued on next page)*

## 4.8. Selecting and Rejecting Transmitters and Message Types

### 4.8.1. Selecting and Rejecting Transmitters

Initially all NAVTEX transmitters are selected so that the equipment will automatically receive NAVTEX messages from every station on the air within the coverage area. The following procedure allows you to reject transmissions from stations that are not of concern to your navigational needs or that you do not wish to receive for some reason. The rejected stations can be checked by simply pressing **REJ** while on the message screen.

To reject a specific station, execute the following step-by-step instructions:

- (1) Highlight option “**4: MAKE SEL/REJ SETTINGS**” by pressing **▲** / **▼**, followed by **ENT**. This opens a submenu as shown below with the following options:

- 1: SYNCHRONIZE BOTH RECEIVERS:** Applies same settings to both receivers.
- 2: FIRST RECEIVER (518KHZ):** Makes settings for first receiver alone.
- 3: SECOND RECEIVER:** Makes settings for second receiver alone.

Figure 4-9 Making Settings for Both Receivers Simultaneously or Separately

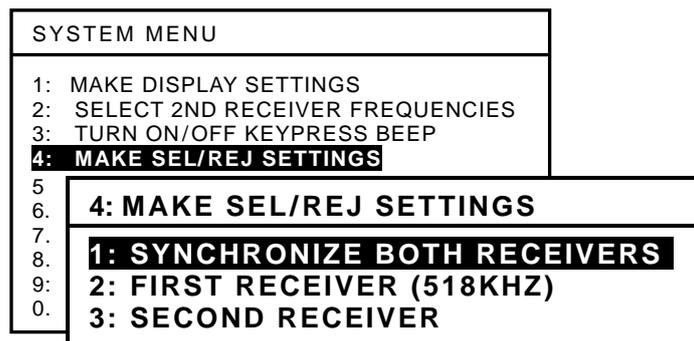
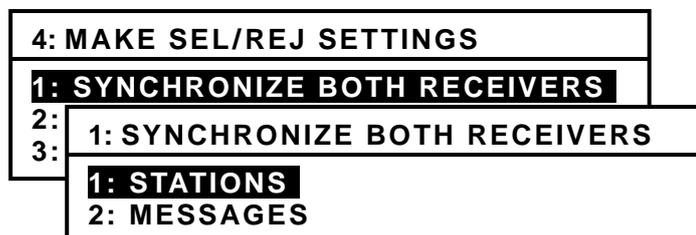


Figure 4-10 Rejecting Transmitters – Step 1

- (2) Highlight the desired option, and then press **ENT**. The example at right shows that you selected option “**1: SYNCHRONIZE BOTH RECEIVERS**” to apply the same settings to both the first and second receivers.



The following options then become available:

- 1: STATIONS:** Selects or rejects transmitters.
- 2: MESSAGES:** Selects or rejects message types.

*(continued on next page)*

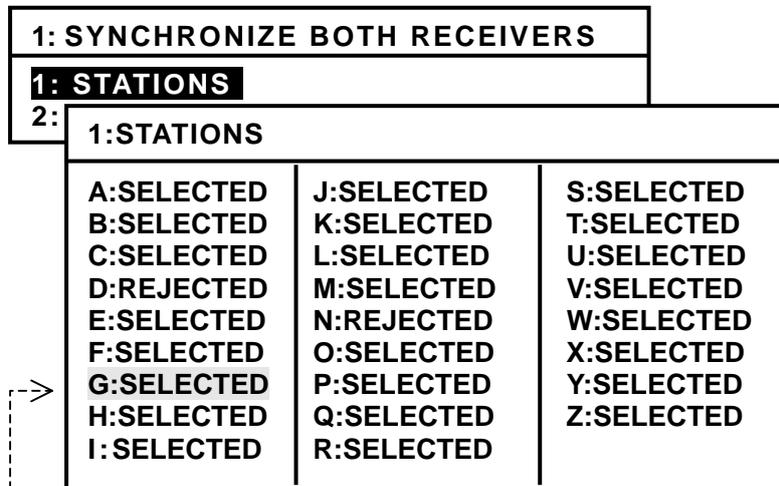
### 4.8.1. Selecting and Rejecting Transmitters – 2/2

Figure 4-11 Rejecting Transmitters – Step 2

- (3) Highlight option “1:STATIONS,” and press **ENT**.

A list of all stations and their current settings will then be displayed as in the example at right.

Using **▲** / **▼** / **◀** / **▶**, select the station you wish to reject, and then press **REJ**.



To reject station G, press **REJ**.

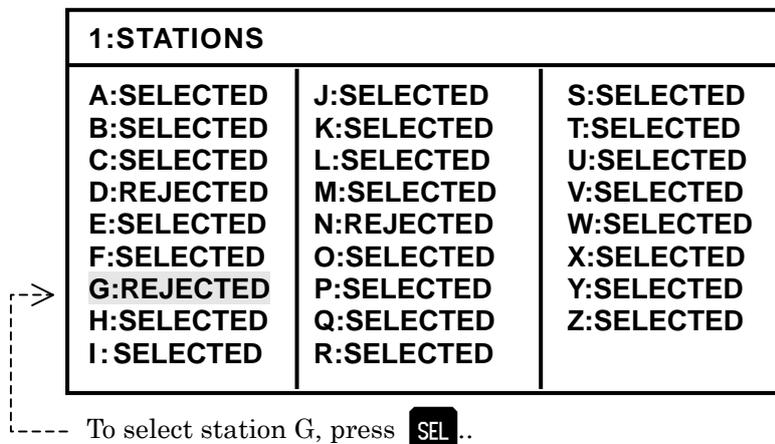
There is no need to press **ENT** after each setting.

- (4) Repeat step (3) to select other transmitters you wish to reject.  
 (5) Press **MENU** to return to the previous menu (for selection/rejection settings of transmitters) or **CLR** to return to the first receiver message page.

#### To Select Rejected Stations Again

To select a station you rejected previously, press **SEL** instead of **REJ** after selecting that station at step (3).

Figure 4-12 Selecting Transmitters – Example



To select station G, press **SEL**.

### 4.8.2. Selecting and Rejecting Message Types

Initially the following NAVTEX message types are rejected, making it impossible for the equipment to receive any messages of those types under the initial factory settings:

Figure 4-13 Initially Rejected Message Types

**G I M N O P Q R S T U W X Y**

The following procedure allows you to reject certain message types that are not of concern to your navigational or operational needs or that you do not wish to receive for any reason. The rejected message types can be checked by simply pressing **REJ** while on the message screen. To reject a specific message type, execute the following step-by-step procedure:

- (1) Highlight option **“4: MAKE SEL/REJ SETTINGS”** by pressing **▲ / ▼**, followed by **ENT**. This opens a submenu (Figure 4-9) with the following options:

- 1: SYNCHRONIZE BOTH RECEIVERS:** Applies same settings to both receivers.
- 2: FIRST RECEIVER (518KHZ):** Makes settings for first receiver alone.
- 3: SECOND RECEIVER:** Makes settings for second receiver alone.

Figure 4-14 Rejecting Message Types – Step 1

- (2) Highlight the desired option, and then press **ENT**. The example at right shows that you selected option **“1: SYNCHRONIZE BOTH RECEIVERS”** to apply the same settings to both the first and second receivers.

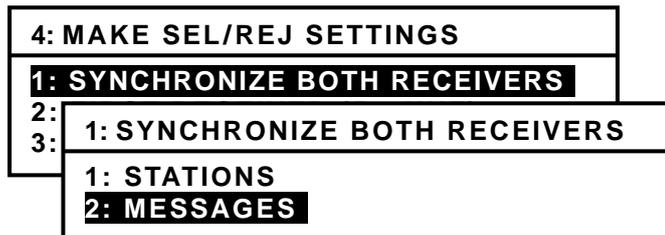


Figure 4-15 Partial List of NAVTEX Message Types

- (3) Highlight **“2:MESSAGES”** and then press **ENT**. This displays a partial list of the NAVTEX message types and their current settings, as shown at right.

The status of a message type that is currently selected is shown in green.

The rest of the message types (M through Z) can be checked by repeatedly pressing **▲ / ▼**.

<b>2: MESSAGES</b>	
<b>A: NAVIGATIONAL WARNING</b>	<b>SELECTED</b>
<b>B: METEOROLOGICAL WARNING</b>	<b>SELECTED</b>
<b>C: ICE REPORT</b>	<b>SELECTED</b>
<b>D: SEARCH AND RESCUE INFORMATION/PIRACY &amp; ARMED ROBBERY</b>	<b>SELECTED</b>
<b>E: METEOROLOGICAL FORECAST</b>	<b>SELECTED</b>
<b>F: PILOT SERVICE MESSAGE</b>	<b>SELECTED</b>
<b>G: AIS</b>	<b>REJECTED</b>
<b>H: LORAN-C MESSAGE</b>	<b>SELECTED</b>
<b>I: PRESENTLY NOT USED</b>	<b>REJECTED</b>
<b>J: SATNAV MESSAGE</b>	<b>SELECTED</b>
<b>K: OTHER ELECTRONIC NAVAID MSG.</b>	<b>SELECTED</b>
<b>L: ADDITIONAL NAV. WARNING</b>	<b>SELECTED</b>
<b>M: MESSAGE TYPE M</b>	<b>REJECTED</b>
.....	
<b>Z: NO MESSAGE ON HAND</b>	<b>SELECTED</b>

*(continued on next page)*

### 4.8.2. Selecting and Rejecting Message Types – 2/2

(3) – 2/2

The status of a rejected message type is indicated in red.

Types A, B, D and L, however, cannot be rejected due to the relevant IMO resolutions and IEC specifications.

Using  /  /  / , select the message type you wish to reject, and then press . There is no need to press  after making each setting.

Figure 4-16 Rejecting Message Types – Step 2

2: MESSAGES	
A: NAVIGATIONAL WARNING	SELECTED
B: METEOROLOGICAL WARNING	SELECTED
C: ICE REPORT	SELECTED
D: SEARCH AND RESCUE INFORMATION/PIRACY & ARMED ROBBERY	SELECTED
E: METEOROLOGICAL FORECAST	SELECTED
F: PILOT SERVICE MESSAGE	REJECTED
G: AIS	REJECTED
H: LORAN-C MESSAGE	SELECTED
I: PRESENTLY NOT USED	REJECTED
J: SATNAV MESSAGE	SELECTED
K: OTHER ELECTRONIC NAV AID MSG.	SELECTED
L: ADDITIONAL NAV. WARNING	SELECTED

-----> To reject message type F, press .

(4) Repeat step (3) to select other message types you wish to reject.

(5) Press  to return to the previous menu (for selection/rejection settings of transmitters) or  to return to the first receiver message page.

#### To Select Rejected Message Type Again

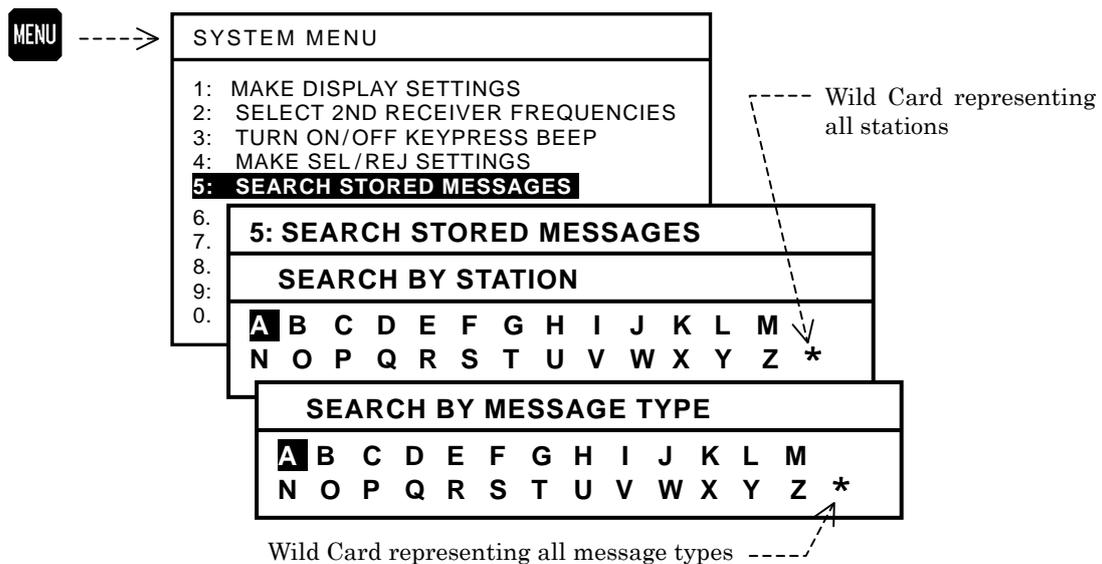
To select a message type you rejected previously, press  instead of  after selecting that station at step (3).

#### 4.9. Searching Memory for Stored Messages

NAVTEX messages stored in non-volatile memory are searchable by station and/or message type via the following steps.

- (1) Highlight option “**5: SEARCH STORED MESSAGES**” by pressing / , followed by . This opens a submenu with a list of all station IDs, as shown below. The wild card character (\*) represents all station IDs.

Figure 4-17 Searching for Stored Messages



- (2) Using / / / , select the station of which messages you wish to search for.

For example, if you wish to search for all stored messages sent from station A, highlight **A**. If you wish to search for messages of a specific type from all stations, highlight the wild card character (\*) which represents all transmitter IDs.

- (3) Press . This opens a menu listing all the message types. The wild card (\*) represents all message types.
- (4) Using / / / , select the desired message type. If you wish to specify all message types from the station selected at step (2), highlight **\***.
- (5) Press . This allows all messages to be displayed that meet the conditions you set at above steps (2) and (4).

The displayed messages can be scrolled line-by-line by pressing / or message-by-message by pressing / .

To return to the menu, press . To return to the text screen, press it once again.

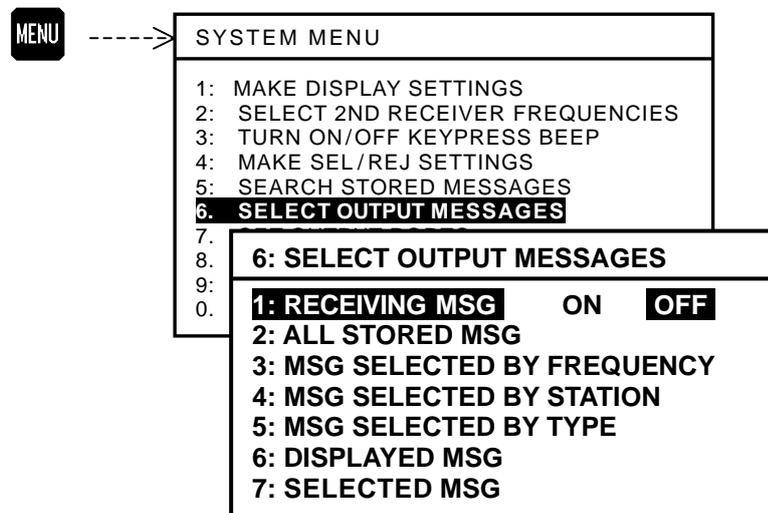
## 4.10. Selecting Output Messages

### 4.10.1. Introduction

The NAVTEX message that is currently being received or previously received messages stored in memory can be output to external devices (e.g., a printer, an INS/IBS device) via the rear panel interface connectors (I/O ports, i.e. **RS-232C**, **RS-422**, **I/O DATA**). The execution of the following instructions allows you to selectively output the desired messages by specifying various parameters, such as live (on-line) or recall-from-storage mode, receiver type, transmitter ID and message type.

- (1) Press **MENU**, opening the **SYSTEM MENU**.

Figure 4-18 Accessing Output Selection Menu



- (2) Highlight “**6: SELECT OUTPUT MESSAGES**” by pressing **▲** / **▼**, followed by **ENT**. This opens a submenu as illustrated above, with the following output mode options:

<b>1: RECEIVING MSG:</b>	Message currently being received
<b>2: ALL STORED MSG:</b>	All stored messages
<b>3: MSG SELECTED BY FREQUENCY:</b>	Messages selected by specifying receiver
<b>4: MSG SELECTED BY STATION:</b>	Messages selected by specifying transmitter
<b>5: MSG SELECTED BY TYPE:</b>	Messages selected by specifying message type
<b>6: DISPLAYED MSG:</b>	All messages currently displayed
<b>7: SELECTED MSG:</b>	Individual messages selected from those appearing on display

Before the desired output can be obtained, the target output connector (output port) must be enabled (set to **ON**) via the instructions in paragraph 4.11. Note that all ports are initially enabled unless set otherwise previously by your dealer.

*NOTE: A forced carriage return (↓) will be replaced by an underscore ( ) (hex 5F) when it is output to a PC terminal or a printer.*

#### 4.10.2. Outputting Live NAVTEX Messages

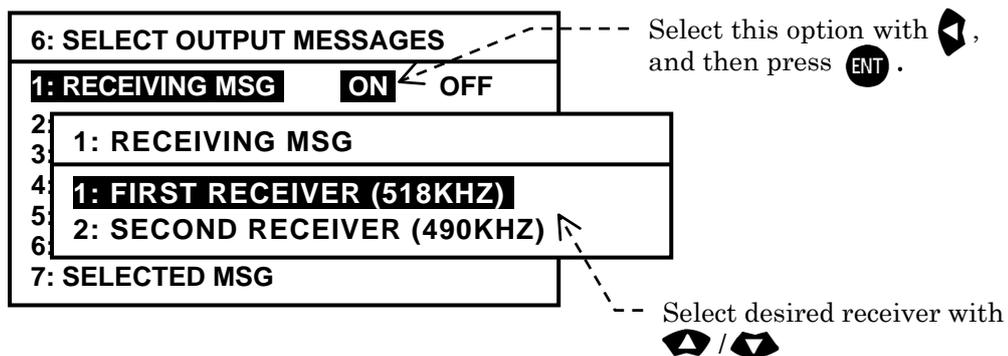
This output mode is to be activated when an optional printer is plugged in for realtime, on-line message printing or when a live NAVTEX output is required for other onboard applications.

To output live messages as they are received, follow the steps given below. Be sure to set the printer (e.g. \*1PR-900) or other receiving device properly.

*NOTE: A forced carriage return (↓) will be replaced by an underscore (\_) (hex 5F) when it is output to a PC terminal or a printer.*

- (1) Highlight option “1:RECEIVING MSG” on the **SELECT OUTPUT MESSAGES** submenu, and then press **ENT**.
- (2) Press **▲** to highlight “\*2ON,” and then press **ENT**. Another submenu will then show up, allowing you to select the first or second receiver, as illustrated below.

Figure 4-19 Outputting Live NAVTEX Message



- (3) Using **▲** / **▼**, select the desired receiver, and then press **ENT**. The equipment will then start outputting live messages from the receiver selected.

The settings you made via the above steps will be stored in memory.

- (4) Press **MENU** to return to the previous menu or **CLR** to return to the first receiver message screen.

\*1: Before the printer can be used, the data transfer speed via the RS-232C port must be set to 110 baud (**BIT RATE: 0.11**) via the instructions given in 4.11.4.2.

\*2: This setting is remembered in memory. It will return to “OFF” owhen you execute the system reset via the instructions in paragraph 4.14.

### 4.10.3. Outputting All Stored Messages

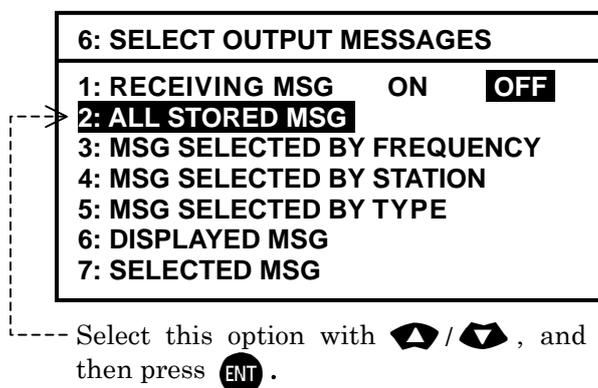
To output all the messages stored in memory, follow the steps given below.

*NOTE: A forced carriage return (↓) will be replaced by an underscore (\_) (hex 5F) when it is output to a PC terminal or a printer.*

- (1) Highlight “**2:ALL STORED MSG**” on the **SELECT OUTPUT MESSAGES** submenu, and then press **ENT**.

The stored messages will then be output one by one.

Figure 4-20 Outputting All Stored Messages



The following window will pop up to indicate the outputting action in progress.

**OUTPUTTING ALL STORED MESSAGES.  
TO CANCEL, PRESS [CLR].**

The window will be turned off automatically upon completion of outputting.

To cancel the action, press **CLR**.

- (2) Press **MENU** to return to the previous menu or **CLR** to return to the first receiver message screen.

#### 4.10.4. Outputting NAVTEX Messages of Specific Receiver

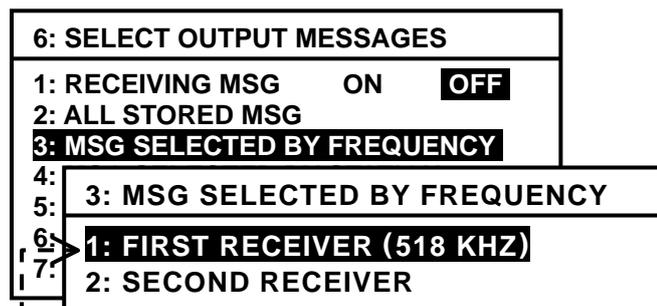
If you wish to output all NAVTEX messages received from either receiver (first or second receiver) alone, carry out the following step-by-step procedure:

*NOTE: A forced carriage return (↓) will be replaced by an underscore (\_) (hex 5F) when it is output to a PC terminal or a printer.*

- (1) Highlight option “**3:MSG SELECTED BY FREQUENCY**” on the **SELECT OUTPUT MESSAGES** submenu, and then press **ENT**. This turns on another submenu with the following options, enabling you to select the desired receiver, as in the example illustrated below:

- 1: FIRST RECEIVER (518 KHZ):** Outputs first receiver messages.
- 2: SECOND RECEIVER:** Outputs second receiver messages.

Figure 4-21 Outputting Stored Messages of First Receiver – Example



-- To derive first receiver messages from memory, select this option with **▲** / **▼**, and then press **ENT**.

- (2) Highlight the desired option, and then press **ENT**. The following window will pop up to indicate the outputting action in progress.

OUTPUTTING ALL STORED MESSAGES.  
 TO CANCEL, PRESS [CLR].

The window will be turned off automatically upon completion of outputting.

To cancel the action, press **CLR**.

- (3) Press **MENU** to return to the previous menu or **CLR** to return to the first receiver message screen.

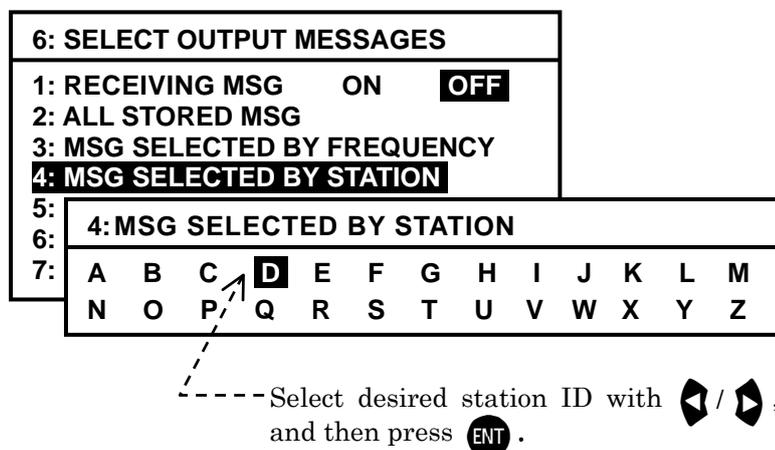
#### 4.10.5. Outputting NAVTEX Messages of Specific Station

If you wish to output all messages received from a specific NAVTEX transmitting station, carry out the following step-by-step procedure:

*NOTE: A forced carriage return (↓) will be replaced by an underscore ( ) (hex 5F) when it is output to a PC terminal or a printer.*

- (1) Highlight option “**4:MSG SELECTED BY STATION**” on the **SELECT OUTPUT MESSAGES** submenu, and then press **ENT**. This turns on another submenu with a list of station IDs, enabling you to select the desired transmitter, as in the example illustrated below:

Figure 4-22 Outputting Stored Messages Received from Station D – Example



- (2) Using ◀ / ▶, highlight the desired ID, and then press **ENT**. The following window will pop up to indicate the outputting action in progress.

OUTPUTTING ALL STORED MESSAGES.  
 TO CANCEL, PRESS [CLR].

The window will be turned off automatically upon completion of outputting.

To cancel the action, press **CLR**.

- (3) Press **MENU** to return to the previous menu or **CLR** to return to the first receiver message screen.

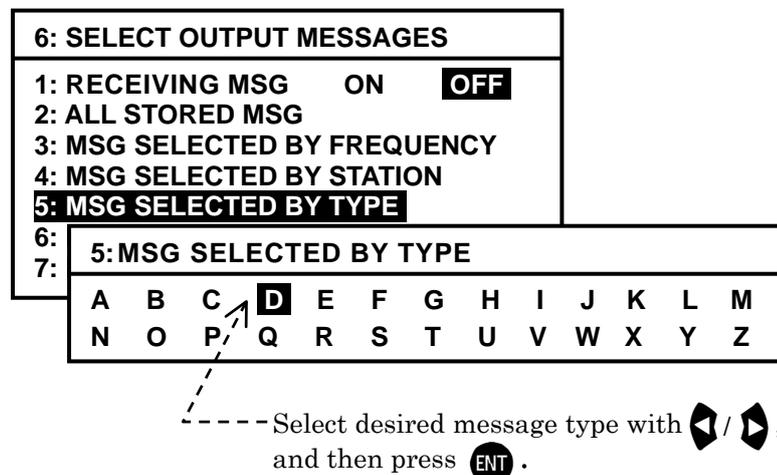
#### 4.10.6. Outputting NAVTEX Messages of Specific Message Type

If you wish to output all messages of a specific message type, carry out the following step-by-step instructions:

*NOTE: A forced carriage return (↓) will be replaced by an underscore ( ) (hex 5F) when it is output to a PC terminal or a printer.*

- (1) Highlight option “**5:MSG SELECTED BY TYPE**” on the **SELECT OUTPUT MESSAGES** submenu, and then press **ENT**. This turns on another submenu with a list of message types, enabling you to select the desired message type, as in the example illustrated below:

Figure 4-23 Outputting Stored Messages of Message Type D – Example



- (2) Using **←** / **→**, highlight the desired message type, and then press **ENT**. The following window will pop up to indicate the outputting action in progress.

OUTPUTTING ALL STORED MESSAGES.  
 TO CANCEL, PRESS [CLR].

The window will be turned off automatically upon completion of outputting.

To cancel the action, press **CLR**.

- (3) Press **MENU** to return to the previous menu or **CLR** to return to the first receiver message screen.

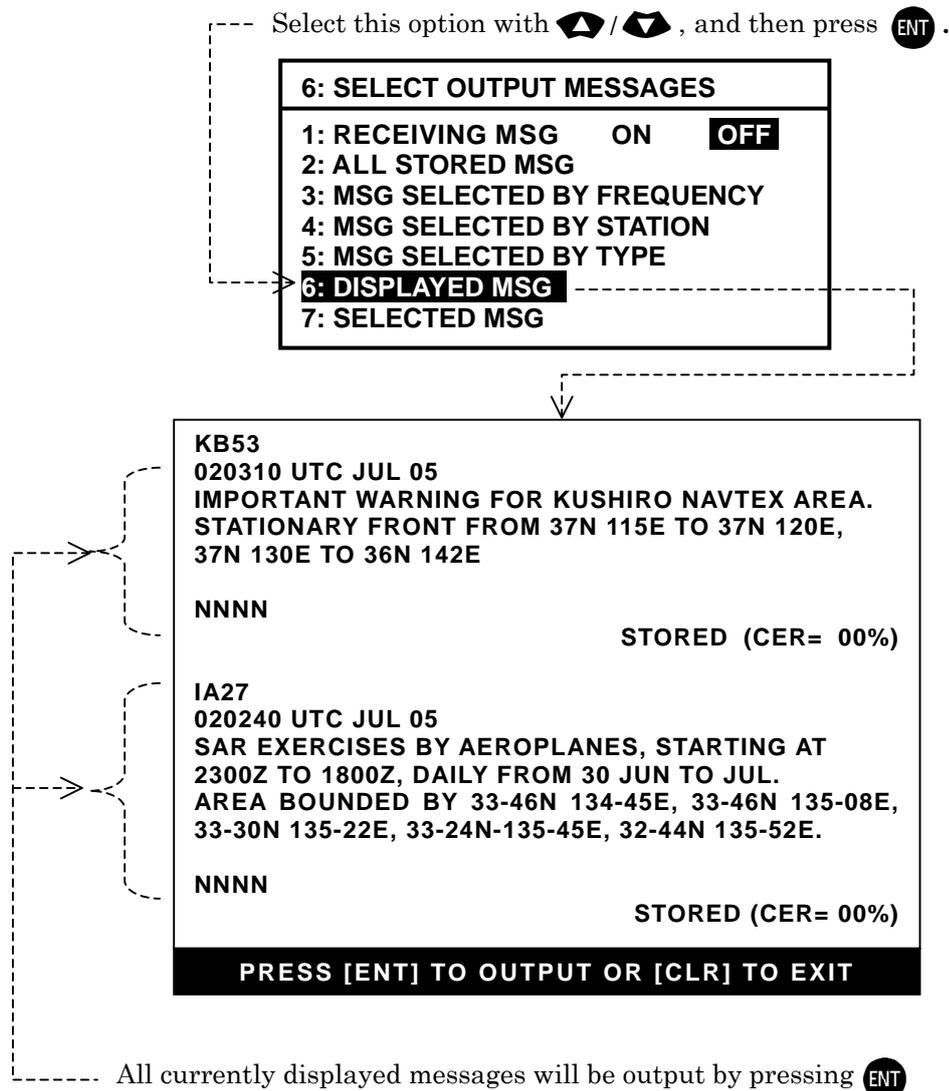
#### 4.10.7. Outputting All Displayed NAVTEX Messages

If you wish to output all messages currently displayed, follow the steps given below.

*NOTE: A forced carriage return (↓) will be replaced by an underscore (\_) (hex 5F) when it is output to a PC terminal or a printer.*

- (1) Highlight “**6: DISPLAYED MSG**” on the **SELECT OUTPUT MESSAGES** submenu, and then press **ENT**. This turns all menus off, showing the current message screen, as in the example illustrated below.

Figure 4-24 Outputting All Currently Displayed Messages – Example



- (2) Press **ENT** to output all the displayed messages, or **CLR** to cancel the function.

The previous message screen will return automatically upon completion of the output.

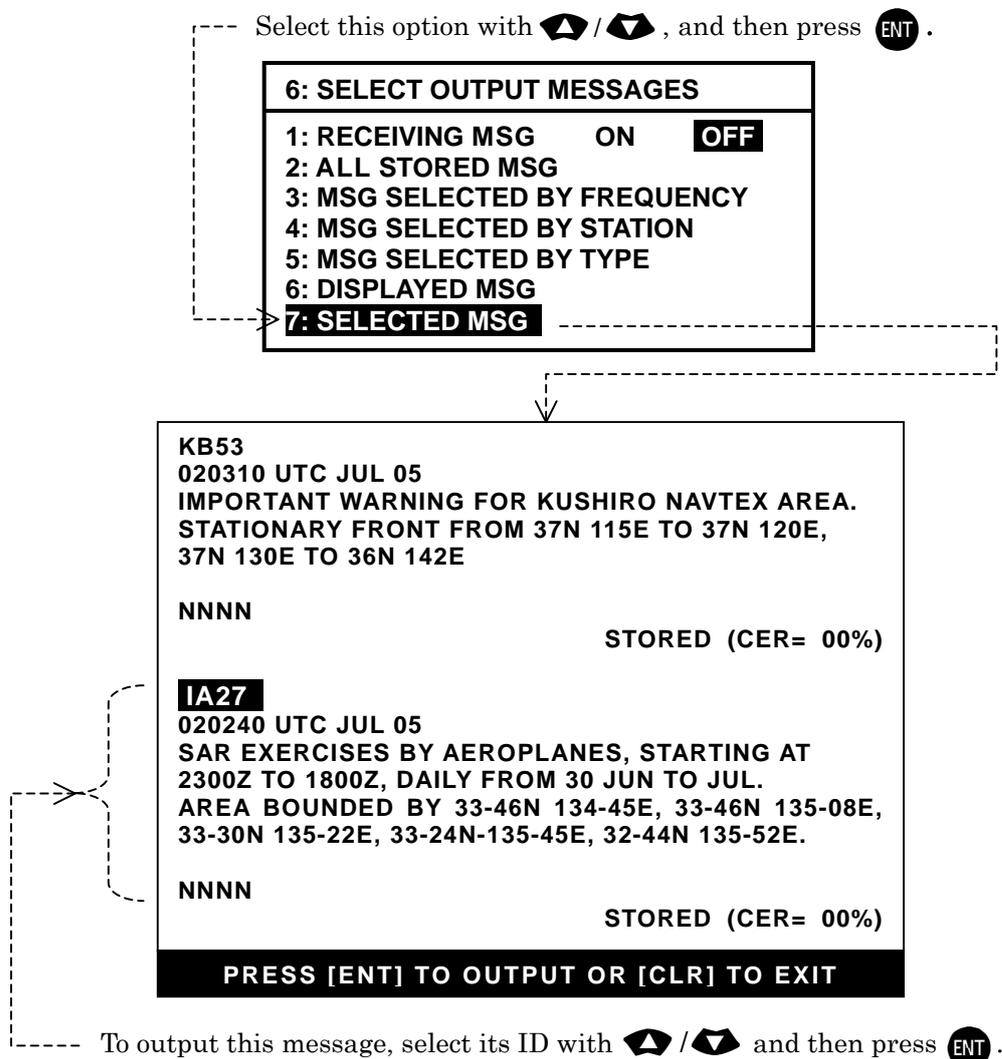
#### 4.10.8. Outputting Specific NAVTEX Message

If you wish to output a specific message out of all currently displayed messages, carry out the following procedure:

*NOTE: A forced carriage return (↓) will be replaced by an underscore ( ) (hex 5F) when it is output to a PC terminal or a printer.*

- (1) Highlight “**7:SELECTED MSG**” on the **SELECT OUTPUT MESSAGES** submenu, and then press **ENT**. This turns all menus off, showing the current message screen, as in the example illustrated below.

Figure 4-25 Outputting Specific Message – Example



- (2) Using **▲** / **▼**, highlight the ID of the desired message as in the example above, and then press **ENT**.

To cancel the function, press **CLR** instead of **ENT**.

## 4.11. Setting Output Ports

### 4.11.1. Introduction

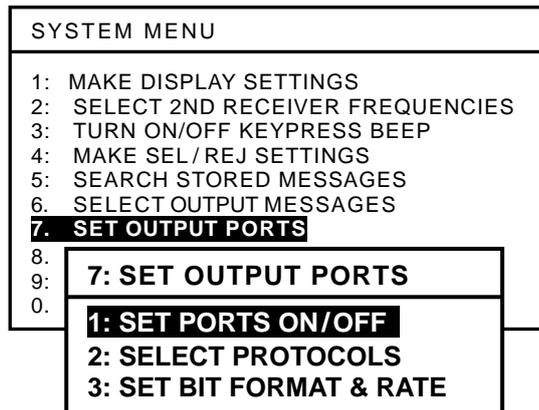
In order for external devices (e.g. printer, IBS/INS component) to receive live or stored NAVTEX messages properly through the desired rear panel I/O connectors (**RS-232C**, **RS-422** or **I/O DATA** port), it is necessary to set the following parameters to the port selected.

Figure 4-26 Opening Submenu for Setting Output Ports

#### Output Port Parameters:

- Status (enabled or disabled)
- Communications Protocol
- Bit Format and Output Rate

The following instructions allow you to set these parameters as required by the data-receiving device plugged into the desired connector.



- (1) Press **MENU**, opening the **SYSTEM MENU**.
- (2) Highlight “**7: SET OUTPUT PORTS**” by pressing **▲** / **▼**, followed by **ENT**. This opens a submenu as illustrated above, with the following output options:

- |                                      |  |
|--------------------------------------|--|
| <b>1: SET PORTS ON/OFF:</b>          | Enables or disables desired port.      |
| <b>2: SELECT PROTOCOLS:</b>          | Selects protocols for desired port.    |
| <b>3: SET BIT FORMAT &amp; RATE:</b> | Sets correct bit format and data rate. |

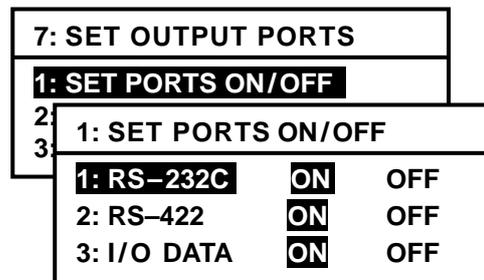
### 4.11.2. Enabling/Disabling I/O Ports

#### 4.11.2.1. RS-232C Port

The **RS-232C** port is mainly designed as a printer interface, and is initially enabled so that the messages selected in paragraphs 4.10.2 through 4.10.8 will be output via this port. If, for any reason, you wish to disable it, follow the steps given below.

Figure 4-27 Selecting Output Ports for Enable/Disable Settings – 1

- (1) Highlight “**1:RS-232C**” and press **ENT**.
- (2) Using **◀** / **▶**, highlight “**OFF.**”
- (3) Press **ENT** to complete or **CLR** to cancel.
- (4) Press **MENU** to return to the previous submenu or **CLR** to return to the first receiver text page.



#### 4.11.2.2. RS-422 Port

The **RS-432** port, designed as an interface with an IBS/INS system, is also initially enabled so that the NAVTEX messages selected in paragraphs 4.10.2 through 4.10.7 will be output via this port. If, for any reason, you wish to disable it, follow the steps given below.

Figure 4-28 Selecting Output Ports for Enable/Disable Settings – 2

- (1) Highlight “**2:RS-422**” and press **ENT**.
- (2) Using **◀ / ▶**, highlight “**OFF.**”
- (3) Press **ENT** to complete, or **CLR** to cancel.
- (4) Press **MENU** to return to the previous submenu or **CLR** to return to the first receiver text page.

<b>7: SET OUTPUT PORTS</b>		
<b>1: SET PORTS ON/OFF</b>		
2		
3	<b>1: SET PORTS ON/OFF</b>	
	<b>1: RS-232C</b>	<b>ON</b> <b>OFF</b>
	<b>2: RS-422</b>	<b>ON</b> <b>OFF</b>
	<b>3: I/O DATA</b>	<b>ON</b> <b>OFF</b>

*NOTE: The input lines to the RS-422 connector are insulated from the ship’s ground by opto-isolators.*

#### 4.11.2.3. I/O DATA Port

The **I/O DATA** port is also initially enabled so that the messages selected in paragraphs 4.10.2 through 4.10.8 will be output via this port. If, for any reason, you wish to disable it, carry out the following step-by-step instructions:

Figure 4-29 Selecting Output Ports for Enable/Disable Settings – 3

- (1) Highlight “**3:I/O DATA**” and press **ENT**.
- (2) Using **◀ / ▶**, highlight “**OFF.**”
- (3) Press **ENT** to complete or **CLR** to cancel.
- (4) Press **MENU** to return to the previous submenu or **CLR** to return to the first receiver text page.

<b>7: SET OUTPUT PORTS</b>		
<b>1: SET PORTS ON/OFF</b>		
2		
3	<b>1: SET PORTS ON/OFF</b>	
	<b>1: RS-232C</b>	<b>ON</b> <b>OFF</b>
	<b>2: RS-422</b>	<b>ON</b> <b>OFF</b>
	<b>3: I/O DATA</b>	<b>ON</b> <b>OFF</b>

### 4.11.3. Selecting Communications Protocols

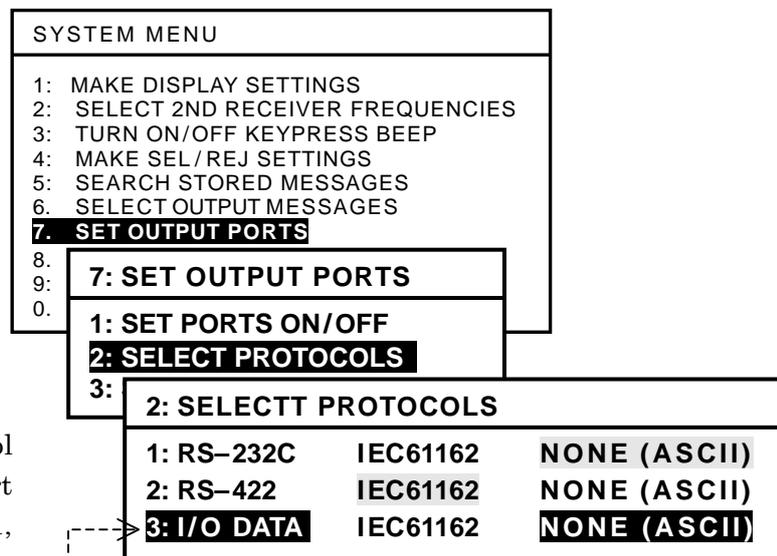
The following communications protocols are initially assigned to the three output ports described in paragraph 4.10.1.

- IEC 61162-1 (NMEA-0183 Ver. 2.0 & greater): **RS-422** Port
- Asynchronous non-handshaking: **RS-232** Port and **I/O DATA** Port

Of the three ports, only the **I/O DATA** port can select either the IEC 61162-1 or the asynchronous non-handshaking transfer mode. If your application using that port requires the IEC 61162-1 as its protocol, follow the steps given below.

- (1) Highlight option “**2:SELECT PROTOCOLS**” on the **SET OUTPUT PORTS** submenu, and press **ENT**. This turns on another submenu for selection of the protocols, as illustrated below.

Figure 4-30 Accessing Submenu for Selection of Protocols for **I/O DATA** Port



- (2) To change the protocol for the **I/O DATA** port to the IEC 61162-1, press **←**, highlighting option **IEC 61162**, as shown below.

----- Protocols are selectable only for this port.

Figure 4-31 Selecting Protocol for **I/O DATA** Port

<b>2: SELECTT PROTOCOLS</b>		
1:	RS-232C	IEC61162 NONE (ASCII)
2:	RS-422	IEC61162 NONE (ASCII)
3:	<b>I/O DATA</b>	<b>IEC61162</b> NONE (ASCII)

- (3) Press **ENT** to complete the selection.

- (4) Press **MENU** to return to the previous submenu or **CLR** to return to the first receiver text page.

#### 4.11.4. Selecting Bit Formats and Data Transfer Rates

##### 4.11.4.1. Introduction

The following instructions allow you to select the correct bit format (number of data bits, stop bits, parity bit status) and bit rate (baud rate: 110, 4800, 9600 etc.) that are required by the application using each I/O port for correct data transfer.

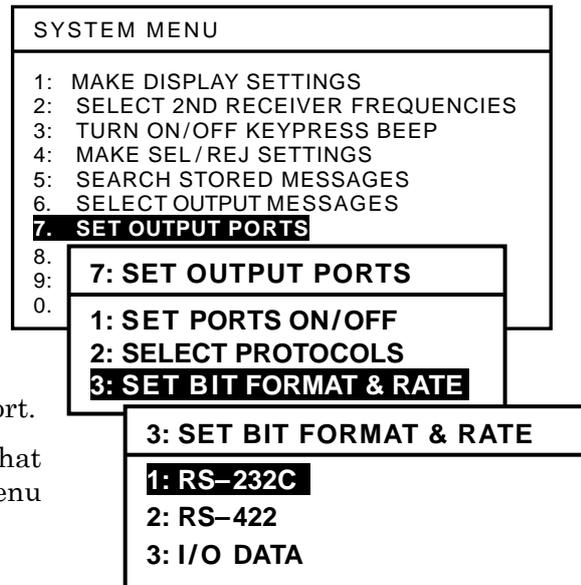
Figure 4-32 Accessing Submenu for Selection of Bit Formats and Rates

- (1) Highlight option “**3:SET BIT FORMAT & RATE**” on the **SET OUTPUT PORTS** submenu, and then press **ENT**.

Another submenu (**SET BIT FORMAT & RATE**) will then be turned on as shown at right to specify the port for which you wish to select those parameters.

- (2) Using **▲** / **▼**, select the desired port.

The procedure given below assumes that the **SET BIT FORMAT & RATE** submenu is currently displayed.



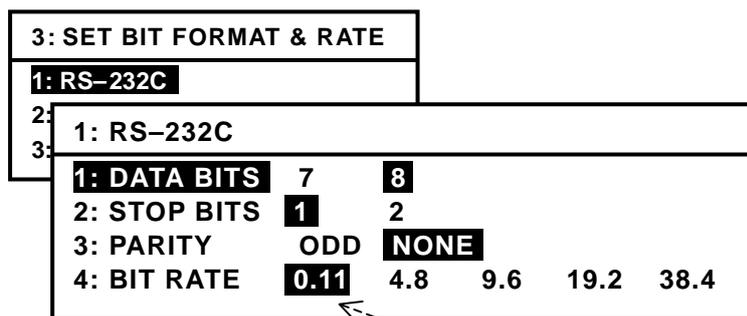
##### 4.11.4.2. Selecting Parameters for RS-232C Port

The parameters for the **RS-232C** port are initially set as follows:

- Data Bits: 8 bits
- Stop Bits: 1 bit
- Parity: None
- Bit Rate: 110 baud

Figure 4-33 Checking Current Parameters for RS-232C

The current parameter values can be checked by selecting “**1:RS-232C**” as shown at right.



0.11=110 baud

If your RS-232C application requires a different set of parameters, select the appropriate values by following the steps given below:

*NOTE: If an optional PR-900 printer is plugged into the RS-232C connector, be sure to select the following parameters:*

**DATA BITS = 8, STOP BITS = 1, PARITY = NONE, BIT RATE = 0.11 (110 baud)**

(continued on next page)

#### 4.11.4.2. Selecting Parameters for RS-232C Port (continued – 2/2)

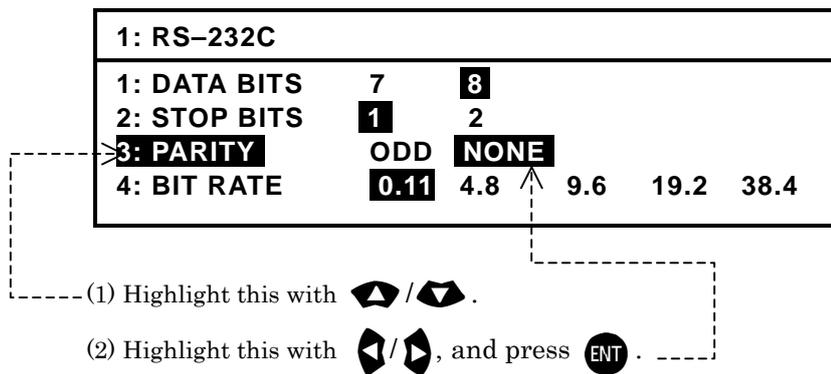
(1) Press / to highlight the desired parameter.

For example, to change the parity bit status to non-parity, highlight “3:PARITY.”

(2) Press / to highlight the desired value, and then press .

For example, highlight “NONE” and press .

Figure 4-34 Changing Parity Bit Status Parameter – Example



(3) Press to return to the previous submenu or to return to the first receiver text page.

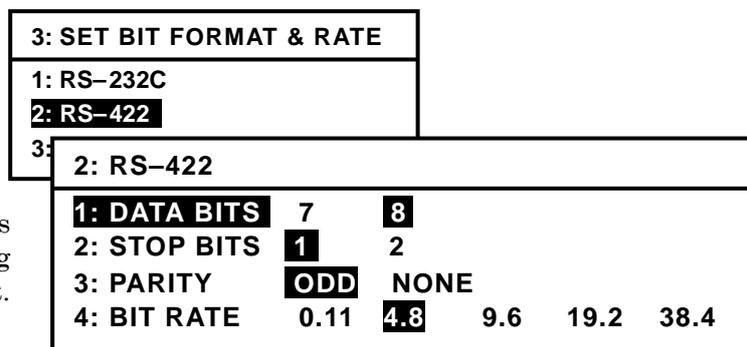
#### 4.11.4.3. Selecting Parameters for RS-422 Port

The parameters for the **RS-422** port are initially set as follows:

Figure 4-35 Checking Current Parameters for RS-422

- Data Bits: 8 bits
- Stop Bits: 1 bit
- Parity: Odd parity
- Bit Rate: 4800 baud

The current parameter values can be checked by selecting “2:RS-422” as shown at right.



Each parameter can be changed in the same manner as in the example given above (paragraph 4.11.4.2). Be sure to press after selecting the desired value.

(continued on next page)

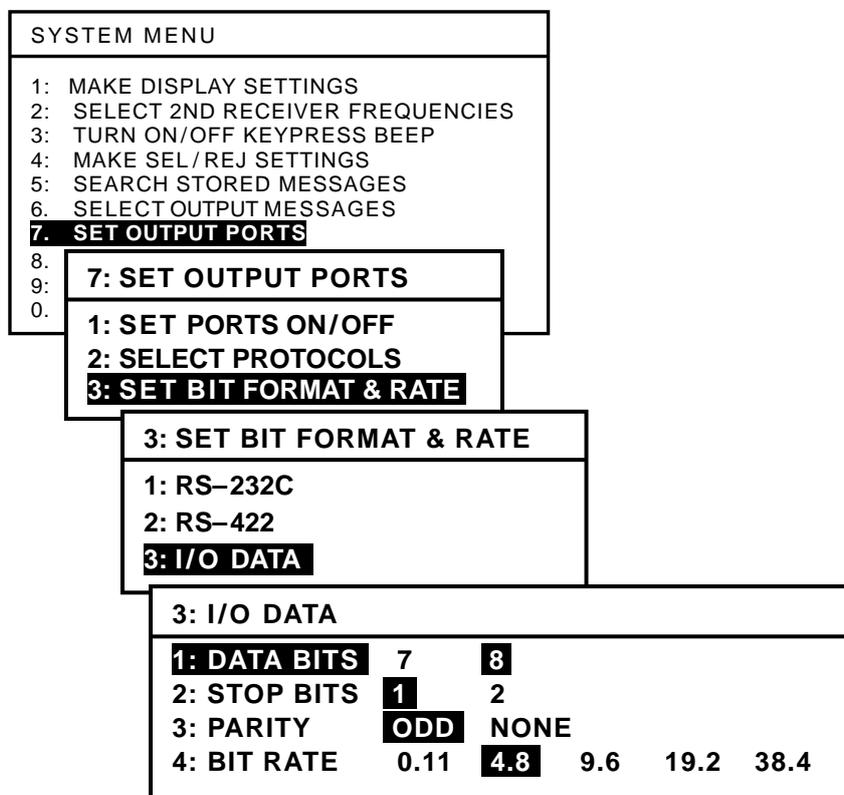
#### 4.11.4.4. Selecting Parameters for I/O DATA Port

The parameters for the **I/O DATA** port are initially set as follows:

- Data Bits: 8 bits
- Stop Bits: 1 bit
- Parity: Odd parity
- Bit Rate: 4800 baud

The current parameter values can be checked by selecting “**3:I/O DATA**” on the **SET BIT FORMAT & RATE** submenu, as shown below.

Figure 4-36 Checking Current Parameters for I/O DATA Port



Each parameter value can be changed using / and / in the same manner as in the example given in paragraph 4.11.4.2.

Be sure to press after selecting the desired value.

## 4.12. Performing Self-Diagnostic Tests

Figure 4-37 Starting Self-Diagnostic Test

### 4.12.1. Introduction

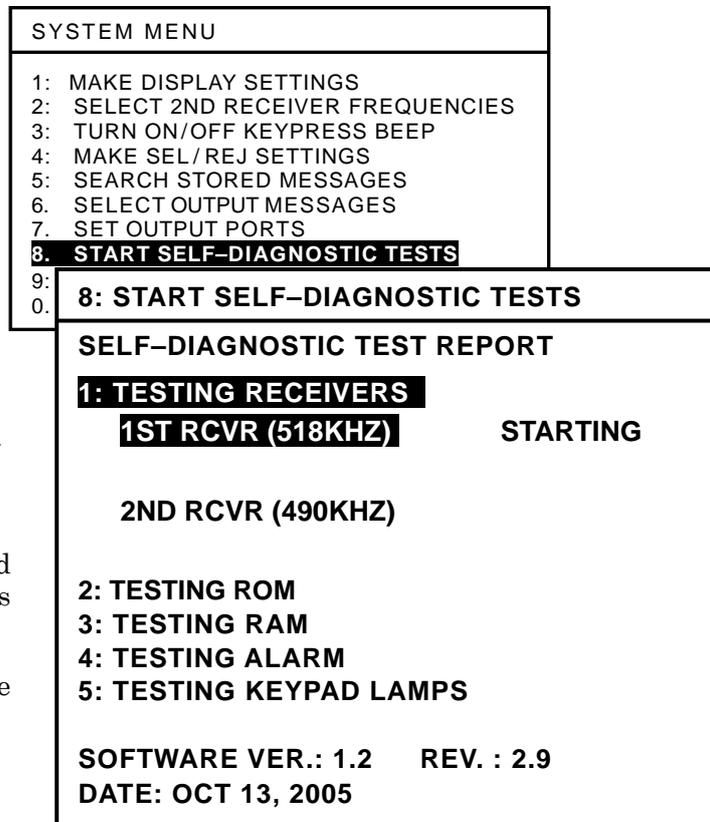
Selecting option “**8: START SELF-DIAGNOSTIC TESTS**” opens a test report window as shown at right and at the same time initiates automatically the built-in function of self-diagnostic tests to check the integrity of important hardware components of the equipment.

*Note that the test functions cannot be executed during message reception.*

The self-diagnostic tests should be conducted every six months as a part of regular maintenance.

The following components will be checked:

- First Receiver (518 kHz)
- Second Receiver (490 kHz or 4209.5 kHz, currently selected)
- ROM (flash memory embedded in CPU chip, for software storage)
- RAM (DRAM embedded in CPU chip, for software execution) and (SRAM mounted on CPU PCB, capacitor-backed, for message/ID storage)
- Alarm (audible)
- Keypad dimmer lamps



### 4.12.2. Activating Self-Diagnostic Test Function

- (1) Allow the equipment to warm up for **at least 30 minutes** before activating the test function.
- (2) Press **MENU** to open the system menu, highlight “**8: START SELF-DIAGNOSTIC TESTS**” and press **ENT**. A test report window will show up as in the example above, and the tests will start automatically. To cancel the execution, press **CLR**. If reception of a NAVTEX message is already in progress, the function cannot be activated, and the following caution will be turned on, blinking in reverse video.

**WAIT FOR MESSAGE RECEPTION TO END!**

Press **CLR** to turn it off, returning to the text screen.

*(continued on next page)*

### 4.12.3. Checking Test Results

Figure 4-38 Results of Self-Diagnostic Test – Example

The function will be terminated automatically just after completion of the keypad dimmer lamp test (**TESTING KEYPAD LAMPS** on the test report). The test report window will remain to allow the user to check the tests results. The figure at right shows an example of the test report showing the results of the self-diagnostic tests.

<b>8: START SELF-DIAGNOSTIC TESTS</b>	
<b>SELF-DIAGNOSTIC TEST REPORT</b>	
<b>1: TESTING RECEIVERS</b>	
<b>1ST RCVR (518KHZ)</b>	<b>OK</b>
<b>0 1 2 3 4 5 6 7 8 9 ( ) . , = ?</b>	
<b>ABCDEFGHIJKLMN OPQRSTUVWXYZ</b>	
<b>2ND RCVR (490KHZ)</b>	<b>OK</b>
<b>0 1 2 3 4 5 6 7 8 9 ( ) . , = ?</b>	
<b>ABCDEFGHIJKLMN OPQRSTUVWXYZ</b>	
<b>2: TESTING ROM</b>	<b>OK</b>
<b>3: TESTING RAM</b>	<b>OK</b>
<b>4: TESTING ALARM</b>	<b>COMPLETE</b>
<b>5: TESTING KEYPAD LAMPS</b>	<b>COMPLETE</b>
<b>SOFTWARE VER.: 1.2 REV.: 2.9</b>	
<b>DATE: OCT 13, 2005</b>	

The result of each check will be available in one of the following indications:

- **OK:** Tested hardware is functioning normally (for test items 1, 2 and 3).
- **FAILED:** Malfunction of tested hardware is detected (for test items 1, 2 and 3). If this indication shows up, see section 5 (User-Level Troubleshooting) for actions to be taken, or contact your dealer for assistance.  
*NOTE: If the receiver test result is “FAILED,” check to be sure that the unit has been turned on for at least 30 minutes before starting the test. This warm-up period is necessary for the internal test oscillators to become stable. The “FAILED” indication should not be interpreted as a sign of receiver malfunction if the unit was tested shortly after power-up.*
- **Completed:** Tested is completed (for test items 4 and 5). The user should check whether the tested hardware component functioned correctly.

(1) Result of Audible Alarm Test

Execution of the test “**4:TESTING ALARM**” checks the buzzer function of the audible alarm circuit. On successful completion of the test, the buzzer should sound three slow beeps. If no sound is heard, see section 5 (User-Level Troubleshooting) for actions to be taken, or contact your dealer for assistance.

(2) Result of Keypad Backlighting Lamp Test

Execution of the test “**5:TESTING KEYPAD LAMPS**” checks the light-emitting diodes (LEDs) that illuminate the keys and their control circuit. All keys should be lit blinking at the maximum level during the test. If no key is lit or if some of the keys remain extinguished, see section 5 (User-Level Troubleshooting) for actions to be taken, or contact your dealer for assistance.

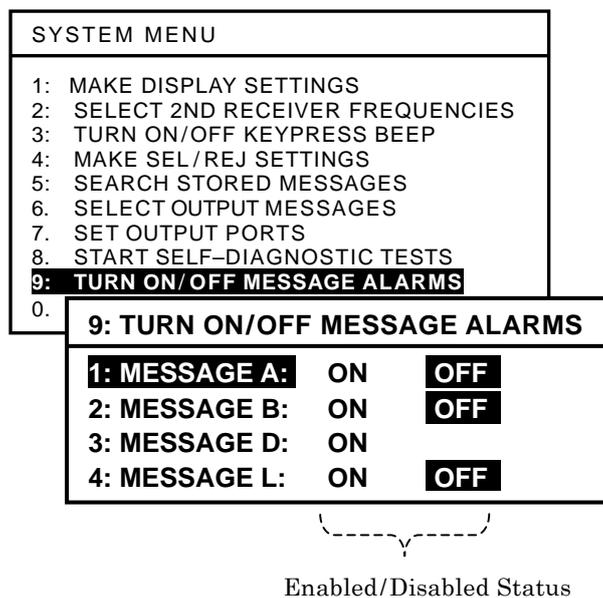
This test result should be checked in a dark environment for ease of checking.

### 4.13. Turning on/off Message Alarms

The alarm function for types A, B and L messages is initially disabled unless it was set otherwise by your dealer. If you wish to enable some or all of the message alarms, follow the steps given below. The alarm for type-D messages cannot be disabled due to the relevant IMO resolutions.

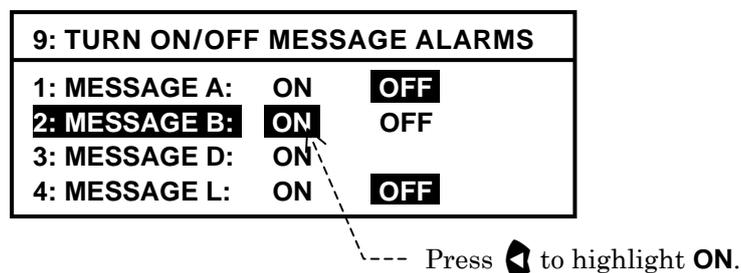
- (1) Press **MENU**, opening the system menu.
- (2) Using **▲** / **▼**, highlight “**9: TURN ON/OFF MESSAGE ALARMS**” and then press **ENT**. The current alarm on/off status will then be displayed on a submenu as in the example below.

Figure 4-39 Initial Alarm Status



- (3) Highlight the desired message type with **▲** / **▼**, and then highlight status indication “**ON**” by pressing **◀**, as in the example below.

Figure 4-40 Enabling Alarm for Type-B Messages



Be sure to press **ENT** after selecting the desired setting.

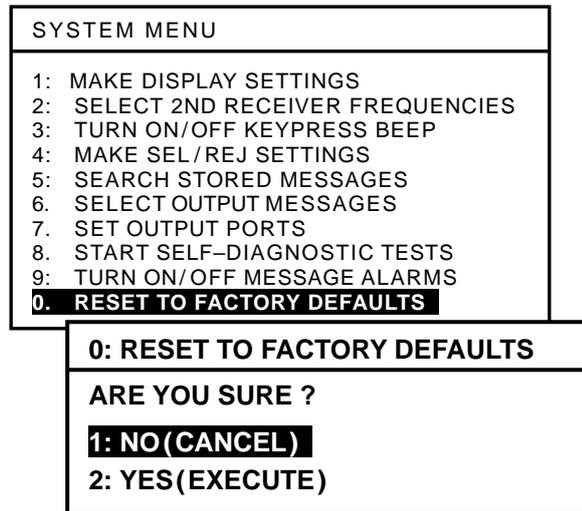
- (4) Press **MENU** to return to the previous submenu or **CLR** to return to the first receiver text page.

#### 4.14. Resetting the System

If, for any reason, you wish to reset the system to return all current operational settings to the initial factory settings, follow the steps given below. Initialization of the settings does not affect the message storage; all stored messages will be retained.

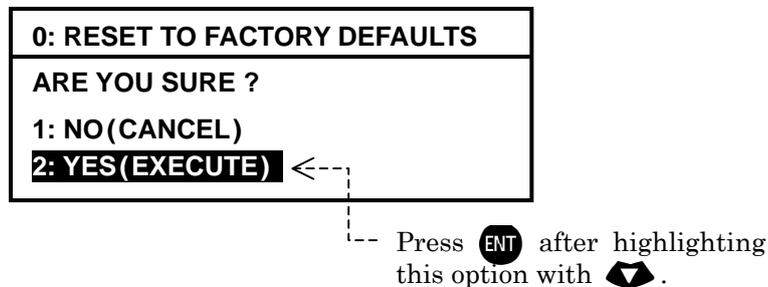
- (1) Press **MENU**, opening the system menu.
- (2) By pressing **▲** / **▼**, highlight **“0:RESET TO FACTORY DEFAULTS”** and then press **ENT**. This opens a submenu, asking you to confirm whether to reset the system, as illustrated at right.

Figure 4-41 Resetting the System – Step 1



- (2) Press **▼** to highlight **“2: YES (EXECUTE)”** as shown below.

Figure 4-42 Resetting the System – Step 2



- (3) Press **ENT**. This will reset initialize all the settings you have made, and then return you automatically to the first receiver text page.

#### Attention to Printer Users

If you are using an optional **PR-900** printer or other serial printer plugged into the **RS-232C** connector to print live NAVTEX messages on-line, be sure to set the menu option **RECEIVING MSG** on the **SELECT OUTPUT MESSAGES** submenu to **“ON”** again via the instructions in paragraph 4.10.2.

## 5. User-Level Troubleshooting

A list of common troubles the user may experience while operating the equipment is given below along with recommended remedies for such troubles. If a problem persists, contact your dealer for assistance, giving as much information as possible about the symptom, self-diagnostic tests results (paragraph 4.12), power supply voltage, antenna configuration, operating frequency, control and menu settings used, serial number of, and \*<sup>1</sup>software version (**VER.**) and revision (**REV.**) numbers of, your equipment.

\*<sup>1</sup> *The software version and revision numbers are displayed in the opening message window that appears briefly at power-up. Those data will also be displayed when the self-diagnostic tests are conducted (paragraph 4.12).*

### < WARNING >

**HIGH VOLTAGES EXIST INSIDE THE EQUIPMENT CABINET. BE SURE TO SWITCH THE EQUIPMENT OFF AND UNPLUG THE POWER CORD BEFORE OPENING THE CABINET FOR INSPECTION OR REPAIRS.**

#### 5.1. Power-Up Problems

The following description of the symptoms assumes that the equipment was working correctly for some time after its initial installation.

Symptom	Suggested Solution
<b>The equipment cannot be turned on.</b>	<ol style="list-style-type: none"> <li>1. Check if the power cord is plugged into the three-pin rear panel connector (<b>POWER</b>).</li> <li>2. Check if the power cord is connected to the ship's DC power source with the correct polarity. <i>NOTE: Reversing the power cord polarity causes the fuse (3A) to blow.</i></li> <li>3. Check the voltage of the power source. <i>NOTE: The nominal power supply voltage is 24 VDC. The equipment works safely over the voltage range from 11 to 36 VDC.</i></li> <li>4. Check the fuse inside the rear panel fuse holder. If it is found blown, replace it with a correct replacement (3A, 5.2X20mm).</li> <li>5. If it blows again, unplug the active antenna cable from the rear panel connector, and then check if the problem persists. If it does not, suspect that the antenna amplifier or the cable developed a short. Replace the antenna and cable.</li> <li>6. If replacing the antenna still does not correct the problem, suspect that either the power supply PCB or the DC/AC inverter PCB has become defective. Ask your dealer/qualified engineer to check each board by replacement.</li> <li>7. If all attempts above fail to solve the problem, ask your dealer/qualified service engineer to replace the CPU PCB.</li> </ol>

## 5.2. No Message Reception

The following description of the symptoms assumes that NAVTEX messages were properly received for some time after initial installation.

Symptom	Suggested Solution
<p><b>No messages can be received except for warning messages.</b></p> <p><i>No NAVTEX messages can be received, except for navigational warnings, weather warnings, SAR/piracy/armed robbery warnings or other warnings.</i></p>	<ol style="list-style-type: none"> <li>1. Check the message rejection settings by pressing <b>REJ</b>.</li> <li>2. Select all message types you wish to receive, via the steps given in paragraph 4.8.2.</li> </ol>
<p><b>No messages can be received from desired transmitters.</b></p> <p><i>No NAVTEX messages can be received from some transmitters at any time even if you are within the coverage areas.</i></p>	<ol style="list-style-type: none"> <li>1. Check the current station rejection settings by pressing <b>REJ</b>.</li> <li>2. Select all IDs of transmitters from which you wish to receive, via the steps given in paragraph 4.8.1.</li> </ol>
<p><b>No messages can be received despite correct selection settings.</b></p> <p><i>No NAVTEX messages can be received regardless of the correct selection settings for all desired messages or transmitters.</i></p>	<ol style="list-style-type: none"> <li>1. Check if the appropriate antenna is correctly plugged into the appropriate rear apron antenna (BNC) connector.</li> <li>2. Run the self-diagnostic tests via the steps given in paragraph 4.12, and check if the receiver test result is “OK.”  If the test result indication shows “<b>FAILED</b>,” suspect that the corresponding receiver PCB has become defective. Ask your dealer or qualified engineer to check all wiring harnesses to/from the PCB and to replace the PCB if necessary.</li> <li>3. Check if you are located within the service area covered by the ground wave of the desired station. The ground wave coverage normally extends to 200 – 400 nautical miles from each station during daytime hours.</li> <li>4. Check the broadcast schedule of the desired station. Each station usually transmits for 5 to 10 minutes at intervals of 4 hours.</li> <li>5. Check the active antenna unit and/or cabling by replacement.</li> </ol>

(continued on next page)

## 5.2. No Message Reception – 2/3

Symptom	Suggested Solution
<p><b>No messages can be received in the daytime.</b></p> <p><i>No NAVTEX messages can be received on 518 kHz or 490 kHz during daytime hours despite appropriate station/message type selection settings.</i></p>	<ol style="list-style-type: none"> <li>1. Check if you are located within the service area covered by the ground wave of the desired station. The area is normally 200 to 400 nautical miles from each station during daytime hours. At night, NAVTEX signals (518/490 kHz) can travel distances in excess of 1000 nautical miles depending on the season and ionospheric conditions. Nighttime signal propagation changes greatly with the season.</li> <li>2. Check the broadcast schedule of the desired station. Each station usually transmits for 5 to 10 minutes at intervals of 4 hours. Currently transmitting stations may be outside the coverage area.</li> </ol>
<p><b>No messages can be received even during a broadcasting time and while in the service area.</b></p> <p><i>No NAVTEX messages can be received regardless of being in the service area of a currently transmitting station and of appropriate message/station selection settings.</i></p>	<ol style="list-style-type: none"> <li>1. Check if the antenna cable is correctly plugged into the appropriate rear apron BNC connector receptacle.</li> <li>2. Check if the connector (BNC) plug is properly installed onto the cable. Check also the coupling connectors, if used for cable extension.</li> <li>3. Check by replacing the active antenna. The antenna preamplifier unit may have been destroyed by static discharges. If a correct replacement is not available, run approx. 5 meters of insulated wire from the BNC connector's center conductor as a temporary long wire antenna, and place it as high as possible from the ground level. <b>&lt; WARNING &gt;</b> <b>DO NOT SHORT THE OTHER END OF THE WIRE ANTENNA TO GROUND, OR DAMAGE TO THE UNIT'S POWER SUPPLY WILL RESULT.</b></li> <li>4. If replacing the antenna still does not solve the problem, check the voltage at the center conductor of each antenna connector. It should be 8V+ on the 490 and 518 kHz connectors, and 12V+ on the 4209.5 kHz connector. If no voltage is present or it is extremely low, ask your dealer/qualified engineer to check the wiring to/from the power supply PCB first and to replace the PCB, if necessary.</li> <li>5. If all attempts above fail to correct the problem, ask your dealer/qualified engineer to check the related connections to/from the CPU PCB first and to replace the PCB, if necessary.</li> </ol>

(continued on next page)

### 5.2. No Message Reception – 3/3

Symptom	Suggested Solution
<p><b>No messages can be received at any time on the first or the second receiver with a good replacement antenna plugged in, but the results of the self-diagnostic tests are “OK” for both receivers.</b></p> <p><i>No NAVTEX messages can be received at any time and anywhere on either the first or the second receiver after the antenna is replaced with one known to be good. The self-diagnostic tests (paragraph 4.12) show that both receivers are working properly.</i></p>	<p>The symptom is an indication that the antenna circuit has become defective.</p> <ol style="list-style-type: none"> <li>1. If the active antenna is used, replace it with one known to be good.</li> <li>2. If a correct replacement antenna is not available, run approx. 5 meters of insulated wire from the center conductor of the appropriate connector as a temporary long wire antenna, and place it as high as possible from the ground level.</li> </ol> <p style="text-align: center;"><b>&lt; WARNING &gt;</b> <b>DO NOT SHORT THE OTHER END OF THE WIRE ANTENNA TO GROUND, OR DAMAGE TO THE UNIT’S POWER SUPPLY WILL RESULT.</b></p> <ol style="list-style-type: none"> <li>3. If replacing the antenna still does not solve the problem, ask your dealer/qualified engineer to check the antenna coupler/selector circuit inside the rear apron for faulty or broken connections.</li> </ol>
<p><b>No messages can be received at any time on the first or the second receiver with a good replacement antenna plugged in, and the results of the *self-diagnostic tests are “FAILED” for both receivers.</b></p> <p><i>* 30 minute warm-up period required before test.</i></p>	<ol style="list-style-type: none"> <li>1. The symptom suggests that both receivers have got out of alignment. Ask your dealer/qualified engineer to check the connections to/from the receiver PCBs and/or replace the PCBs.</li> <li>2: The CPU PCB has also become defective and/or some of the internal connections to the PCB have become faulty or broken. Ask your dealer/qualified engineer to check the related wiring harnesses to/from the CPU PCB first and to replace the PCB, if necessary.</li> </ol>

### 5.3. Message Storage Problems

Symptom	Suggested Solution
<p><b>Some stored messages disappear from memory after some time.</b></p>	<p>Messages will be erased from memory after 60 hours, unless they are protected from automatic erasure.</p> <p>Put the “<b>PROTECTED</b>” tag to each desired message via the steps in paragraph 3.8.</p>
<p><b>None of the received messages is stored after power-off.</b></p>	<p>The symptom indicates that the memory backup circuit on the CPU PCB is failing. Ask your dealer or qualified engineer to replace the CPU PCB.</p>
<p><b>All messages disappear from memory after continued power-off for some time.</b></p>	<p>The memory retains stored messages for at least 10 days after power-off. Print out desired messages using an optional printer before switching the unit off for extended periods of time continuously.</p>

#### 5.4. Poor Reception

The following description of the symptoms assumes that NAVTEX messages were properly received for some time after initial installation time, and all message types and transmitter IDs you wish to receive are selected (via the steps given in paragraph 4.8).

Symptom	Suggested Solution
<p><b>Messages can be received in the daytime, but with many error characters (*) at all times.</b></p> <p><i>NAVTEX messages can be received but with many error characters (asterisks) and often cannot be stored.</i></p>	<ol style="list-style-type: none"> <li>1. Check if you are located within the service area covered by the ground wave of the desired station. The area is normally 200 to 400 nautical miles from each station during daytime hours. At night, NAVTEX signals can travel distances in excess of 1000 nautical miles depending on the season and ionospheric conditions.</li> <li>2. Run the self-diagnostic tests as per paragraph 4.12, and check the receiver test results. If the result for the receiver in question is “<b>FAILED</b>,” ask your dealer/qualified service engineer to check the related wiring harnesses to/from the receiver PCB or replace the PCB.</li> <li>3. Check if you have recently installed an electronic device near the receiver cabinet receiver or near the antenna. Turn off or relocate such equipment away from the NAVTEX receiver, and see if any improvement can be obtained.</li> <li>4. Unplug the antenna cable from the BNC connector on the rear apron, and check the voltage at the center conductor. It should be 8V+ on the <b>ACTIVE ANT</b> and <b>518 kHz</b> connectors, and 12V+ on the <b>490/4209.5 kHz</b> connector. If no voltage is present or the voltage is extremely low, ask your dealer/qualified service engineer to check the related connections to/from the power supply PCB first and to replace the PCB, if necessary.</li> <li>5. Suspect that the preamplifier in the active antenna unit is failing or water intruded into the cable via the junction. Check by replacing the amplifier unit and/or the cable.  If a correct replacement antenna is not available, run approx. 5 meters of insulated wire from the center conductor of the appropriate connector as a temporary long wire antenna, and place it as high as possible from the ground level.</li> </ol> <p style="text-align: center;"><b>&lt; WARNING &gt;</b></p> <p><b>DO NOT SHORT THE OTHER END OF THE WIRE ANTENNA TO GROUND, OR DAMAGE TO THE UNIT’S POWER SUPPLY WILL RESULT.</b></p>

### 5.5. Blank Message Screen

The following description of the symptom assumes that your NAVTEX receiver was properly working for some time after initial installation time.

Symptom	Suggested Solution
<p><b>The NAVTEX receiver can be turned on but the message screen remains blank.</b></p>	<ol style="list-style-type: none"> <li>1. Check to be sure that the power source voltage is within the 11–36V range.</li> <li>2. Repeatedly press <b>BRT</b> to check if the normal brightness returns.</li> <li>3. Suspect that the LCD module or the inverter PCB has become defective. Ask your dealer/qualified service engineer to check the related connections to/from the module and the DC/AC inverter PCB, and replace the module and/or the PCB.</li> <li>4. Suspect that the CPU PCB has become defective. Ask your dealer/qualified engineer first to check the related connections to/from the PCB, and to replace the PCB, if necessary.</li> </ol>

### 5.6. Uncontrollable Screen Brightness

The following description of the symptom assumes that your NAVTEX receiver was properly working for some time after initial installation time.

Symptom	Suggested Solution
<p><b>The NAVTEX receiver can be turned on but the message screen brightness cannot be controlled.</b></p> <p><i>The brightness level does not change by pressing <b>BRT</b>.</i></p>	<ol style="list-style-type: none"> <li>1. Check to be sure that the power source voltage is within the 11–36V range.</li> <li>2. Suspect that the CPU PCB has become defective. Ask your dealer/qualified engineer to check the wiring harnesses to/from the PCB first and to replace the PCB, if necessary.</li> </ol>

### 5.7. No Beep from Keypress

The following description of the symptom assumes that your NAVTEX receiver was properly working for some time after initial installation time.

Symptom	Suggested Solution
<p><b>No keypress beep is heard.</b></p>	<ol style="list-style-type: none"> <li>1. Check if the keypress beep function is disabled. Refer to paragraph 4.7 for instructions.</li> <li>2. Ask your dealer/qualified engineer to check the related wiring to/from the keypress buzzer.</li> </ol>

### 5.8. No Response from Keypress

The following description of the symptom assumes that your NAVTEX receiver was properly working for some time after initial installation time.

Symptom	Suggested Solution
<b>The NAVTEX receiver can be turned on but does not respond to any keypress.</b>	<ol style="list-style-type: none"> <li>1. Check to be sure that the power source voltage is within the 11–36V range.</li> <li>2. Reset the system, returning all settings to the factory's initial settings via the procedure given in paragraph 4.14.</li> <li>3. Suspect that the CPU PCB or the Key PCB has become defective. Run the self-diagnostic tests (as per paragraph 4.12), and check the result of the RAM and ROM tests. If the either test result is <b>FAILED</b>, ask your dealer/qualified service engineer to check the related connections to/from these PCBs first, and to replace the CPU PCB and/or the Key PCB, if necessary.</li> </ol>

### 5.9. No Message Alarm Indication

The following description of the symptom assumes that your NAVTEX receiver was properly working for some time after initial installation time.

Symptom	Suggested Solution
<b>No audible or visual alarm indication is available when navigational warnings (type-A messages) or meteorological warnings (type-B messages) are received.</b>	The alarm function for type-A and type-B messages are initially disabled. To turn it on, refer to paragraph 4.13 for instructions.
<b>No audible alarm indication is available when a Search &amp; Rescue (SAR) or distress message is received.</b>	<ol style="list-style-type: none"> <li>1. Run the self-diagnostic tests as per the steps given in paragraph 4.12, and check the result of the alarm test. If no beep is heard on completion of the test, suspect that a fault has developed in the wiring harness to/from the message buzzer or the buzzer has become defective. Ask your dealer/qualified engineer to check the related wiring harnesses and the buzzer.</li> <li>2. Suspect that the CPU PCB has become faulty. Run the self-diagnostic tests and check the result of the RAM and ROM tests. If the result is <b>FAILED</b>, ask your dealer/qualified engineer to check the PCB by replacing.</li> </ol>

### 5.10. No Message Alarm Output

The following description of the symptom assumes that your NAVTEX receiver was properly working for some time after initial installation time.

Symptom	Suggested Solution
<p><b>No alarm output is available from the rear panel ALARM connector.</b></p>	<ol style="list-style-type: none"> <li>1. The alarm function for type-A and type-B messages are initially disabled. To turn it on, refer to paragraph 4.13.</li> <li>2. Run the self-diagnostic tests via the steps in paragraph 4.12, and check the results of the RAM and ROM tests. If the test result is “<b>FAILED</b>,” suspect that the CPU PCB has become faulty. Ask your dealer/qualified engineer to check the PCB by replacing.</li> <li>3. Suspect that some of the connections to/from the connector have loosened or the CPU PCB has become faulty. Ask your dealer/qualified engineer to check the related wiring harness terminations.</li> </ol>

### 5.11. No External Outputs

The following description of the symptom assumes that your NAVTEX receiver was properly working for some time after initial installation time.

Symptom	Suggested Solution
<p><b>No messages can be output from the memory to the printer, to an INS/IBS system despite correct connections to the appropriate rear panel connector.</b></p>	<ol style="list-style-type: none"> <li>1. Check to be sure that all ports are enabled (set to <b>ON</b>). See paragraphs 4.11.1 through 4.11.4 for details.</li> <li>2. Check to be sure that the communications protocol of your application matches that of the port (rear panel connector) in use. See paragraph 4.11.</li> <li>3. Check the bit format and baud rate of your application match those of the port in use. See paragraph 4.11.</li> <li>4. Suspect that some of the connections to/from the connectors have become loosened or broken. Ask your dealer/qualified engineer to check for faulty wiring harness terminations.</li> <li>5. Suspect that the CPU PCB has become defective. Ask your dealer/qualified engineer to check the PCB first and replace it if necessary.</li> </ol>

## 5.12. External Control Problem

The following description of the symptom assumes that your NAVTEX receiver was properly working for some time after initial installation time.

Symptom	Suggested Solution
<p><b>Alarm indications cannot be controlled remotely from IBS/INS terminals despite correct connections to the rear panel RS-422 connector.</b></p>	<ol style="list-style-type: none"> <li>1. Check to be sure that the RS-422 port is enabled (set to <b>ON</b>). See paragraphs 4.11.1 through 4.11.4 for details.</li> <li>2. Check to be sure that the communications protocol of your application matches that of the RS-422 port. See paragraph 4.11.2.2 for details.</li> <li>3. Check the bit format and baud rate of your application match those of the RS-422 port parameters. See paragraph 4.11.4 for details.</li> <li>4. Suspect that some of the internal connections to/from the connectors have become loosened or broken. Ask your dealer/qualified engineer to check for faulty wiring harness terminations.</li> <li>5. Run the self-diagnostic tests as per paragraph 4.12, and check the results of the RAM and ROM tests.  If the indication of either result is <b>"FAILED,"</b> suspect that the CPU PCB has become defective. Ask your dealer/qualified engineer to check the PCB and related wiring harnesses first and to replace it if necessary.</li> </ol>

## **6. User-Level Maintenance Instructions**

To ensure long-term trouble-free operation, the user should regularly follow the maintenance instructions described in this section.

### **6.1. Maintenance on the Equipment Cabinet**

Keep the equipment, away from sea splashes, direct sunlight and other heat-generating sources, and make sure that air around the cabinet is circulating freely. If the equipment is not going to be used for extended periods of time, dismount the cabinet from the vessel and place them in dry storage. Be sure to switch the equipment off before removing electrical connections from the rear panel.

#### **< WARNINGS >**

- 1. HIGH VOLTAGES EXIST INSIDE THE EQUIPMENT CABINET WHEN IT IS ENERGIZED. BE SURE TO TURN IT OFF AND UNPLUG THE POWER CABLE BEFORE OPENING THE CABINET FOR INSPECTION.**
- 2. CHEMICAL SOLVENTS, SUCH AS PAINT THINNERS AND BENZENES, MUST NOT BE USED TO CLEAN THE CABINET OR SCREEN FILTER, OR PERMANENT DAMAGE TO THOSE PARTS WILL RESULT.**
- 3. ALL MESSAGES STORED IN MEMORY, INCLUDING PROTECTED ONES, WILL BE ERASED IF THE UNIT IS TO BE TURNED OFF CONTINUOUSLY IN EXCESS OF 10 DAYS. IMPORTANT MESSAGES SHOULD BE PRINTED OUT OR SAVED INTO AN APPROPRIATE STORAGE MEDIA VIA A PC CONNECTED TO THE RS-422 PORT.**

To clean the cabinet surface, a neutral type household detergent intended for office equipment is recommended. Cleaning the acrylic filter on the LCD screen should be a maintenance routine to avoid using a high brightness level. To clean the screen filter, use a piece of slightly wet cloth. If stains persist, the cloth may be moistened with a neutral type household detergent.

#### **To prolong LCD Screen's Service Life**

To increase the service life of the LCD screen (life of the fluorescent lamp for backlighting), it is recommended that the screen sleep mode be activated as per the instructions in paragraph 4.5.

### **6.2. Maintenance on Electrical Connections**

The high humidity marine environment can cause electrical contacts in the rear panel connectors to corrode over time. Vibrations and shocks normally encountered on the vessel in motion can cause the electrical contacts to become loosened. Corroded or loose contacts will become responsible for erratic, intermittent operation or performance degradation. To avoid such possible problems, conduct the following maintenance operations at least once a year:

Unplug all the cables from the rear panel, and check to be sure that contact surfaces, including the pins in the rear-panel mounted receptacles are free from corrosion.

Check the connections at the ship's DC power source for freedom from any sort of corrosion.

Correct any problem using a high quality contact-cleaning agent (contact rejuvenator).

#### **< WARNINGS >**

- 1. BE SURE TO TURN THE EQUIPMENT OFF BEFORE REMOVING / INSTALLING THE CONNECTIONS FROM / TO THE REAR PANEL CONNECTORS.**
- 2. SANDPAPER WILL DAMAGE THE CONTACT SURFACE AND MUST NOT BE USED.**

### 6.3. Maintenance on The Active Antenna Unit

The **ANT-2000** active antenna or an optional active antenna unit (e.g. **ANT-900**, all consisting of a 1.2m fiberglass whip, a preamplifier housing and coaxial cabling), requires maintenance at least once every six months:

#### 1. Whip Section

- Clean the surface with a piece of soft cloth moistened with neutral household detergent, while checking for any sign of damage.
- Check to be sure that the whip is tightly screwed into the socket on the preamplifier case, and that the set screw (hex socket head type) is tightened.
- Check to be sure that the knurled metallic base is free from damage or corrosion. Corrosion may be removed with a piece of wood, and then coated with water-proofing paint. A metallic tool can damage the surface and should not be used

#### 2. Preamplifier Housing

- Clean the surface with a piece of soft cloth moistened with neutral household detergent, while checking for any sign of damage.
- Check to be sure that the housing is securely screwed onto the pole (if installed on a marine mount) or the mounting hardware is properly secured to the mast (if user- or dockyard-supplied hardware is used)..

#### 3. Cabling

- Clean the exposed section with a soft cloth moistened with neutral household detergent, while checking to be sure that the surface is free from any sign of damage.
- If the installation uses a double-ended female coaxial coupler for cable extension, check to be sure that the jointed section is properly protected with self-bonding taping and there is no sign of damage.

#### < WARNING >

**THE CENTER CONDUCTOR OF THE COAXIAL CABLE IS AT +8VDC WHEN THE EQUIPMENT IS SWITCHED ON. DO NOT SHORT THE CENTER CONDUCTOR TO GROUND, OR DAMAGE TO THE INTERNAL POWER SUPPLY CIRCUIT CAN RESULT.**

### 6.4. Self-Diagnostic Tests

At least once every six months, conduct the self-diagnostic tests as per the procedure described in paragraph 4.12, and consult your dealer/qualified service engineer for advice if the result indication of any tested item shows “**FAILED**.”

## 6.5. Recommended Spare Parts

A list of the spare parts recommended for the maintenance and servicing for three to five years is given below. Replacing parts, except for the active antenna unit, should be done by your dealer or a qualified service engineer. The user should not open the receiver cabinet for inspection or replacing suspected parts.

Table 6-1 Recommended Spare Parts

Part Name	Part Number	Quantity
Fuse	3A/5.2X20mm	10
Plugs:		
Coaxial Cable Plug (Antenna Plug)	BNC-58/U	2
Power Cable Plug	14P-3F	1
*1 I/O DATA Plug	FM14-8P	1
*2 RS-422/232C Plug	HDEB-9S	1
*3 Coaxial Cable Plug (Extension)	PL-259	1
Active Antenna Unit:		
*4 Preamplifier Unit	ANT-2000-3F	2
*4 Whip Element (1.2m)	410298B	1
Printed Circuit Boards (PCBs):		
First Receiver PCB	NT-2000-A	1
*5 Second Receiver PCB	NT-2000-B	1
*6 Frequency Converter PCB	N501-F/C-A	1
Power Supply PCB	N501-PWR-A	1
FL Inverter PCB	CXA-L0621A	1
Key PCB	SF-KB02	1
-----		
*1 Not needed unless the I/O DATA port is used for your applications.		
*2 Not needed unless RS-232C/RS-422 port is used for your applications.		
*3 Dealer-supplied. Not needed unless the cable is extended with a PL-258 connector.		
*4 Not needed if your installation uses a long wire antenna.		
*5 Not needed unless second receiver 490 kHz is used in regular operation.		
*6 Not needed unless second receiver 4209.5 kHz is used in regular operation.		

Table 6-2 Other Parts Available As Replacements

Part Name	Part Number
CPU PCB	N501-CPU-A
TFT LCD Module (LCD display panel)	LQ080V3DG01

## 7. Installation

### 7.1. Receiver Cabinet Installation

#### 7.1.1. General Precautions

The receiver cabinet is constructed to withstand the humid and corrosive marine environment, but is designed to be installed or operated inside the wheelhouse or chartroom. The cabinet is a “protected” category product under IEC 60945–2002, and is not waterproof. Serious damage will result to the electronics inside the cabinet when it is exposed to salt water spray or splash.

#### Additional Requirements:

- (1) For long term trouble-free service, the proposed site for installation should be:
  - dry, well-ventilated and free as much as possible from shocks and engine vibrations.
  - away as much as possible from high temperature outlets (such as exhaust fans and heaters), and as much as possible from areas where the unit is likely to be constantly exposed to direct sunlight.
- (2) To prevent reception of weak NAVTEX signals from being interfered with, the unit should also be located away as much as possible from other onboard electronics, especially those emitting pulsed signals, such as echo sounders and radars.

#### 7.1.2. Mounting the Receiver Cabinet

The receiver cabinet is primarily designed to be mounted on a tabletop with the mounting bracket supplied and weights approximately 3.7 kg in total. The dimensions necessary for installation are given in Figure 7–2. Provide sufficient clearance behind the cabinet for cabling termination and maintenance checks.

Using a total of four appropriate wood screws or bolt/nut combinations through its four mounting holes (9 mm in diameter each), secure the bracket to the selected site.

Make sure that the mounting surface is strong enough to support the unit against shocks or vibrations that are likely to be encountered with the ship in motion.

#### Compass Safe Distances (in energized condition):

- |                           |                   |                  |
|---------------------------|-------------------|------------------|
| • Receiver Cabinet alone: | 0.60m (standard), | 0.40m (steering) |
| • Cabinet with Bracket:   | 0.80m (standard), | 0.45m (steering) |

#### < WARNINGS >

1. **DO NOT PLACE THE UNIT IN AN UNVENTILATED, SEALED ENCLOSURE, SUCH AS A THEFT-DETERRENT CABINET, OR OVERHEATING AND MALFUNCTION WILL RESULT.**
2. **DAMAGE CAUSED BY EXPOSURE TO WATER SPRAY OR TO DIRECT SUNLIGHT WILL NOT BE COVERED BY THE MANUFACTURER’S WARRANTY.**

*(continued on next page)*

**7.1.2. Mounting the Display Cabinet** (*continued – 2/2*)

Be sure to attach a serrated plastic washer to the inside of each arm before placing the cabinet in the bracket. This pair of washers is supplied separately in the plastic bag that contains the power cable, fuses, plugs, etc., and prevents the cabinet from leaning forward or backward with the clamping knobs tightened.

After tilting the cabinet to a desired viewing angle, tighten the clamping knob firmly.

Figure 7-1 Table-Top Mounting – Example

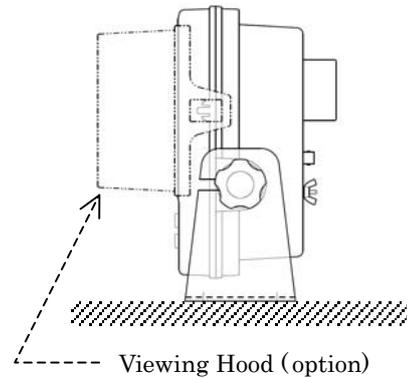
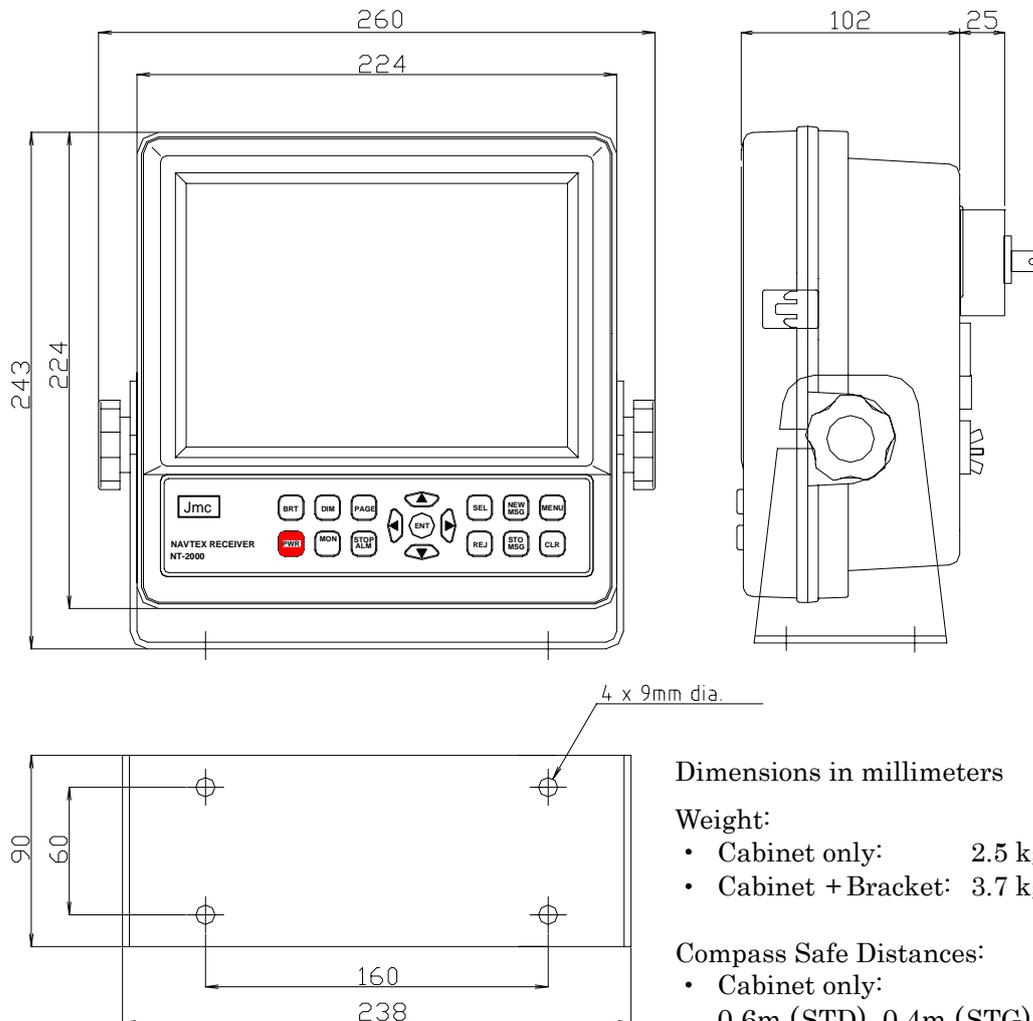


Figure 7-2 Installation Dimensions



Dimensions in millimeters

Weight:

- Cabinet only: 2.5 kg
- Cabinet + Bracket: 3.7 kg

Compass Safe Distances:

- Cabinet only:  
0.6m (STD), 0.4m (STG)
- Cabinet + Bracket:  
0.8m (STD), 0.45m (STG)

## 7.2. Antenna Installation

The dimensions of the active antenna (**ANT-2000**) is given in Figure 7-3. The same dimensions apply to the optional active antennas (**ANT-900** and **ANT-2002**). If a long wire is to be used permanently, it should be insulated and at least five meters long.

### 7.2.1. Installation Site Requirements

#### Active Antenna

For best results and a prolonged service life, the active antenna unit should be installed:

- at a site free from continuous, heavy shocks and vibrations,
- away as much as possible from the feedpoint or radiating elements of HF/MF communications antennas, radar scanners and INMARSAT antennas, and
- away as much as possible from, and above, any metallic obstructions.

#### **< WARNING >**

**LOCATING THE ACTIVE ANTENNA CLOSE TO THE FEED POINT OR RADIATING ELEMENTS OF AN HF/MF TRANSMITTING ANTENNA CAN DESTROY THE PREAMPLIFIER IN THE CYLINDRICAL HOUSING.**

#### Long Wire Antenna

- A long wire antenna should be of insulated type and at least 5 meters long. Bare wire can short-circuit the antenna to ground and must not be used.

Before connecting the wire to the appropriate rear apron antenna connector, ask your dealer/qualified service engineer to change the internal wiring (two jumpers) on each receiver PCB in the cabinet and on the frequency converter board in the rear apron so that an input impedance match is achieved and that no DC voltage is present on the connector's center conductor.

- For best results, the wire should be raised as high as possible from the ground, and as much away as possible from nearby walls or surrounding structures as well as from the onboard devices listed above, or very poor, noisy reception will result.

### 7.2.2. Precautions for Cabling

- To minimize the effect of interference from other onboard electronics, the coaxial cable from the antenna unit should not be run close to, and in parallel with, transmit antenna feed lines, radar waveguides, echo sounder transducer cables, control cables, power cables, etc. from such equipment. The same requirements apply to the routing of the long wire antenna.
- If the cable is extended with coaxial connectors (e.g. PL-258/PL-259 pairs), be sure to make the junctions waterproof using self-bonding tape or other appropriate sealant.

#### **< WARNING >**

**THE CENTER CONDUCTOR OF THE COAXIAL CABLE IS AT +8 VDC (OR AT +12V WHEN WORKING ON 4209.5 KHZ) WITH THE EQUIPMENT SWITCHED ON. DO NOT SHORT THE CENTER CONDUCTOR TO GROUND OR DAMAGE TO THE POWER SUPPLY PCB CAN RESULT.**

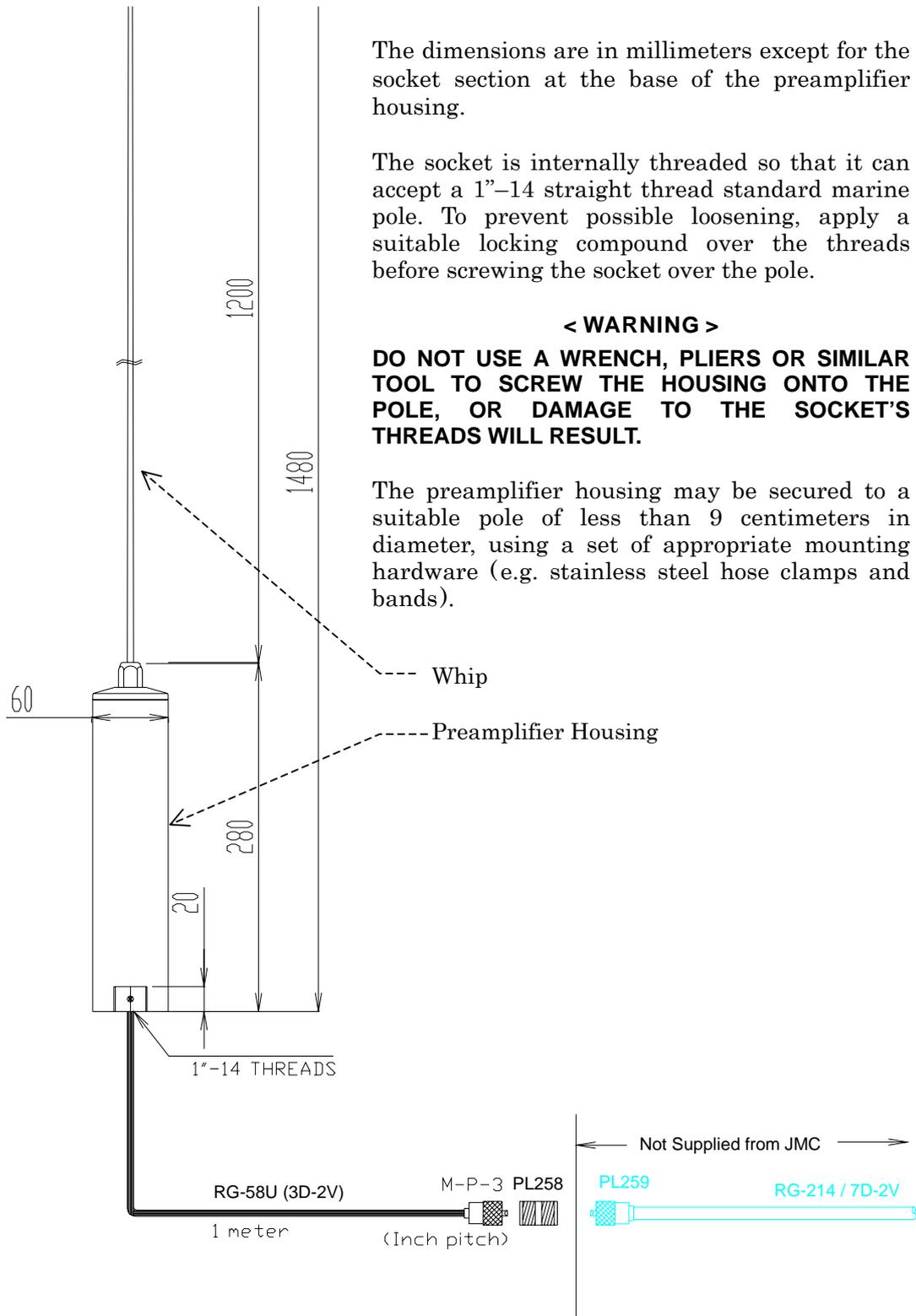
#### **< CAUTION >**

**Water intrusion into the coax cable will seriously degrade the reception performance.**

*(continued on next page)*

7.2.2. Precautions for Cabling (*continued -2/2*)

Figure 7-3 ANT-2000 Active Antenna Unit Dimensions



## 7.3. Electrical Connections

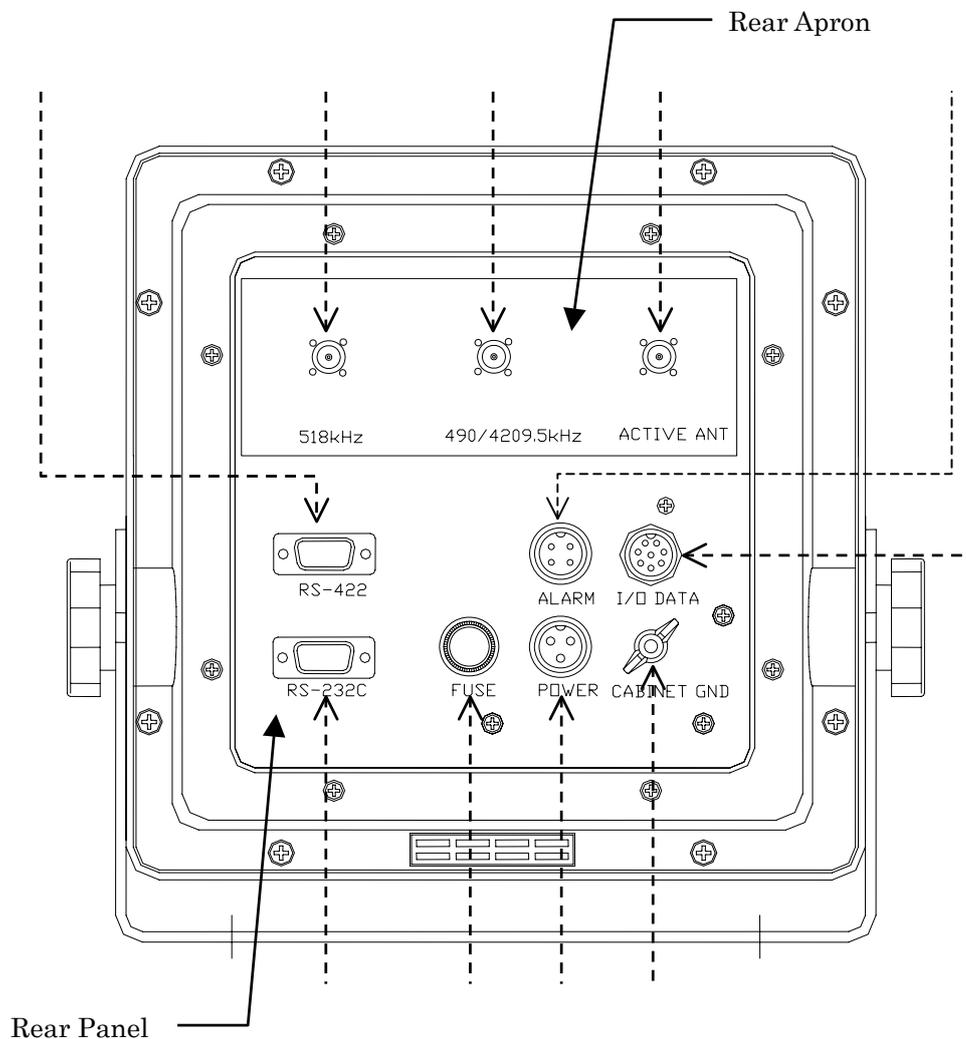
### 7.3.1. Introduction

All electrical connections to the equipment are to be made via the connector receptacles and terminal installed on the rear panel and the rear apron. The figure below shows the rear view of the equipment. Overall connections are illustrated in Figure 7-5. A summary description of the necessary connections to each component is given in the next paragraphs.

#### < CAUTIONS >

1. All cables should be plugged in with the equipment switched off.
2. Cables specified for use with the F-2000/F-3000 or DEBEG 4620/DEBEG 4630 Navigation Sounders cannot be used as alternative cables.

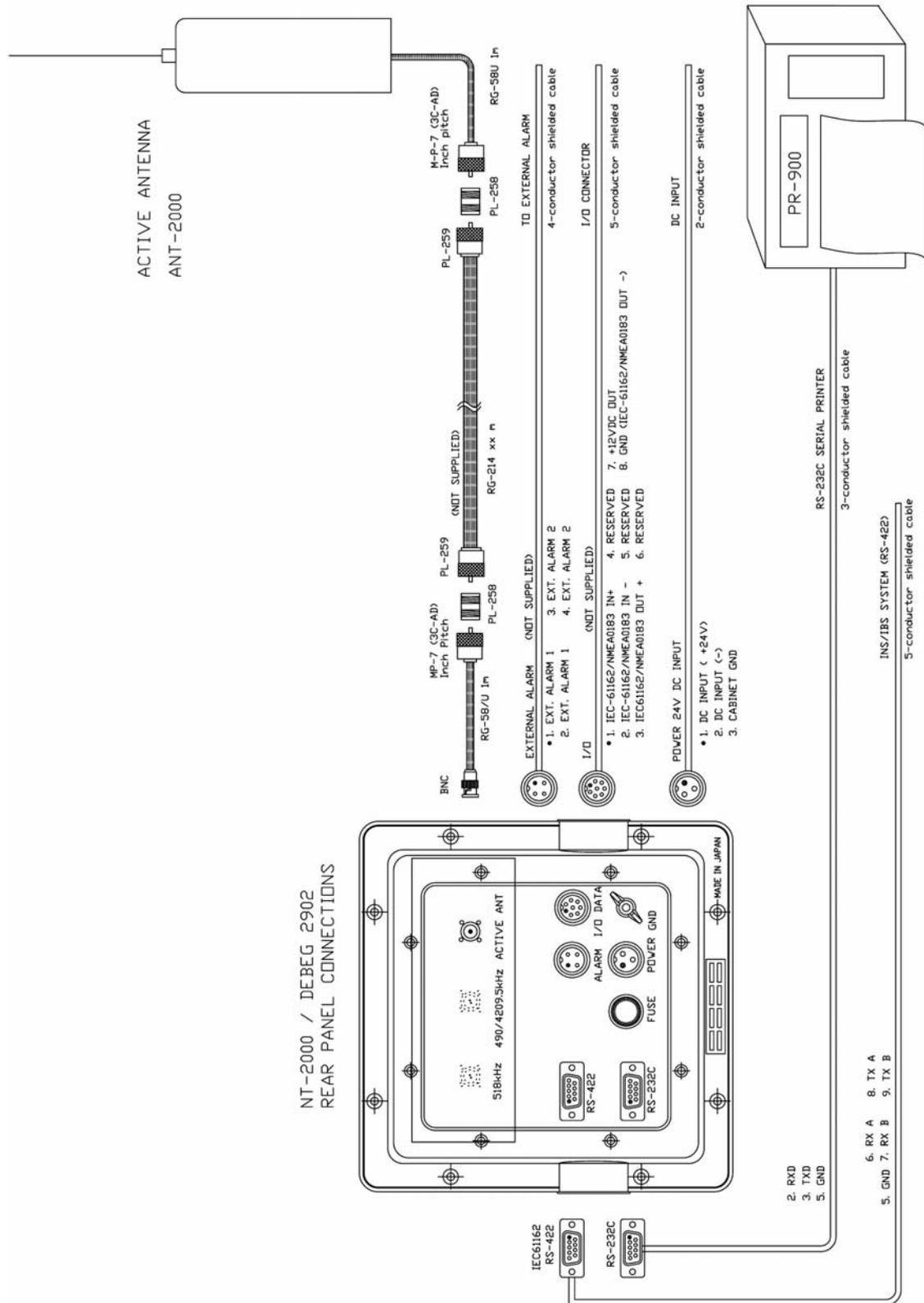
Figure 7-4 Rear View



(continued on next page)

7.3.1. Introduction (continued -2/2)

Figure 7-5 Overall Connections

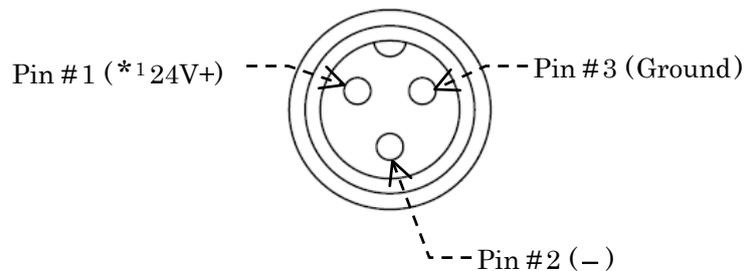


### 7.3.2. Connector Pin Assignments and Connections

The pin assignments of the connectors and connections to the pins are illustrated below.

#### Power Supply Receptacle

Figure 7-6 Power Supply Receptacle (Front View)



- Mating Female Type Plug: 14P-3F

The power cable supplied is approx. 3 meters long and is of two-wire shielded type, normally terminated in a 3-hole female type plug at one end, with 3 conductors open-ended at the other end. See **CAUTIONS 1** below.

After pushing the plug into the above receptacle and tightening its coupling ring, connect the three conductors as follows:

- Black conductor: to negative ( - ) terminal of ship's power source
- White conductor: to positive ( + ) terminal of ship's power source (\*24 VDC)
- Shield (braid): to ship's earth ground

\*1 *Nominal input voltage. The equipment operates safely over the 11-to-36V range.*

#### < CAUTIONS >

1. **The DC power cable specified for the F-2000/F-3000W or DEBEG 4620/ DEBEG 4630 cannot be plugged into the above receptacle.**
2. **Reversing the power cable polarity (black and white connections) causes the fuse to blow.**

#### Cabinet Ground Terminal

Figure 7-7 Cabinet Ground Terminal

The receiver cabinet, which is electrostatically coated inside, can be grounded to the vessel's earth ground without grounding the negative line of the ship's power source. In situations where it is required, or desirable, to ground the cabinet for safety reasons or \*2EMC compliance, connect from this terminal to an appropriate earth ground in the vessel using a thick wire. The ground wire should be as short as possible to reduce the chance of picking up interference from other onboard electronics.



\*2 *EMC = electromagnetic compatibility*

(continued on next page)

### 7.3.2. Connector Pin Assignments and Connections *(continued – 2/8)*

#### Fuse Holder

Figure 7-8 Fuse Holder

A 3-ampere (3A) cartridge fuse (5.2X20 mm, slow-blow type) is inserted in the holder.

*Reversing the power cable polarity causes the fuse to blow.*



**< WARNING >**

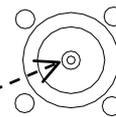
**AN INCORRECTLY RATED FUSE OR INCORRECT TYPE FUSE WILL BLOW AT POWER-UP OR WILL NOT PROTECT THE EQUIPMENT IN THE REMOTE EVENT OF A TROUBLE OVERLOADING ITS POWER SUPPLY.**

#### Antenna Receptacle (BNC) for Active Antenna **ANT-2000**

Figure 7-9 Antenna Connector for **ANT-2000**

Plug the **ANT-2000** three-frequency active antenna into this connector receptacle.

+8V at center conductor



- Mating Plug: BNC-58/U or equivalent

**ACTIVE ANT**

**< WARNING >**

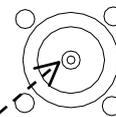
**THE CENTER CONDUCTOR OF THE BNC RECEPTACLE IS AT 8V+ WHEN THE EQUIPMENT IS TURNED ON. DO NOT SHORT THE CENTER CONDUCTOR TO GROUND OR DAMAGE TO INTERNAL PARTS MAY RESULT.**

#### Antenna Receptacle (BNC) for Active Antenna **ANT-900**

Figure 7-10 Antenna Connector for **ANT-900**

The equipment's antenna input circuit is initially configured to use the **ANT-2000**. If a separate antenna is desired for reception of the first receiver frequency (518 kHz), ask the dealer to change the input wiring first, and the plug the **ANT-900** active antenna into this connector receptacle.

+8V at center conductor



**518 kHz**

- Mating Plug: BNC-58/U or equivalent

**< WARNING >**

**THE CENTER CONDUCTOR OF THE BNC RECEPTACLE IS AT 8V+ WHEN THE EQUIPMENT IS TURNED ON. DO NOT SHORT THE CENTER CONDUCTOR TO GROUND OR DAMAGE TO INTERNAL PARTS MAY RESULT.**

*(continued on next page)*

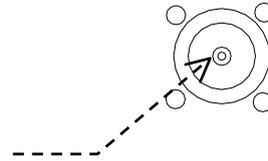
### 7.3.2. Connector Pin Assignments and Connections (continued – 3/8)

#### Antenna Receptacle (BNC) for Second Receiver Antenna

Figure 7-11 Antenna Connector for 2nd Receiver Antenna

If a separate antenna is desired for reception of the second receiver frequency (490 kHz or 4209.5 kHz), ask the dealer to change the input wiring first, and then plug the appropriate antenna into this connector receptacle.

+12V at center conductor



- Mating Plug: BNC-58/U or equivalent

**490/4209.5 kHz**

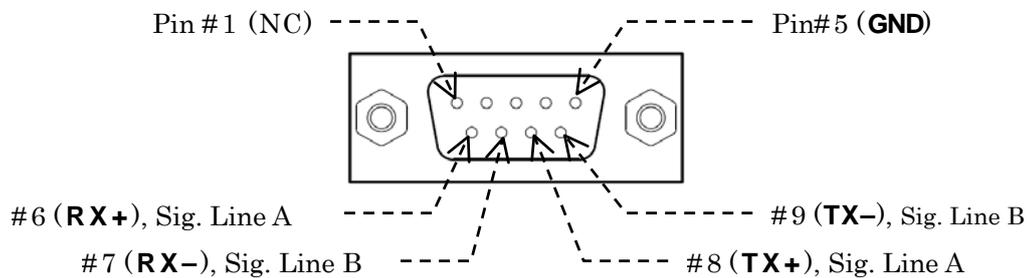
**< WARNING >**

**THE CENTER CONDUCTOR OF THE BNC RECEPTACLE IS AT 12V+ WHEN THE EQUIPMENT IS TURNED ON. DO NOT SHORT THE CENTER CONDUCTOR TO GROUND OR DAMAGE TO INTERNAL PARTS MAY RESULT.**

#### RS-422 Connector

Connections from an IBS/INS device are to be plugged into this receptacle. A D-Sub 9 female type plug mates with this connector. The pin assignments are illustrated below.

Figure 7-12 RS-422 Connector Pin Assignments (Front View)



**NOTES:**

(1) This interface consists of a MAX3490 RS-422 transceiver. Brief specs. are given below. For details, see the parts manufacturer's (MAXIM) data sheets.

Input High Voltage: 2V (min.), Input Low Voltage: 0.8V (max.)

Input Current (signal lines A & B): 1.0 mA @12V, -0.8 mA @-7V

Receiver Input Impedance: 12 k

(2) Pins #1, #2, #3 and #4: No internal connections (NC)

(3) Input lines (pins #6 and #7) are insulated from ship's ground by opto-isolators.

- Mating Plug: HDEB-9S (supplied) or equivalent

After making connections, check to be sure that the RS-422 port is enabled (as per paragraph 4.11.2) and that a correct set of parameters is selected (as per paragraphs 4.11.3 and 4.11.4) for your applications.

The command formats used to control communications with an INS/IBS device are given in paragraph 7.4.

(continued on next page)

**7.3.2. Connector Pin Assignments and Connections** (*continued – 4/8*)

RS-422 Transceiver Data Sheet – 1/3

## **3.3V-Powered, 10Mbps and Slew-Rate-Limited True RS-485/RS-422 Transceivers**

### **General Description**

The MAX3483, MAX3485, MAX3486, MAX3488, MAX3490, and MAX3491 are 3.3V, low-power transceivers for RS-485 and RS-422 communication. Each part contains one driver and one receiver. The MAX3483 and MAX3488 feature slew-rate-limited drivers that minimize EMI and reduce reflections caused by improperly terminated cables, allowing error-free data transmission at data rates up to 250kbps. The partially slew-rate-limited MAX3486 transmits up to 2.5Mbps. The MAX3485, MAX3490, and MAX3491 transmit at up to 10Mbps.

Drivers are short-circuit current limited and are protected against excessive power dissipation by thermal shutdown circuitry that places the driver outputs into a high-impedance state. The receiver input has a fail-safe feature that guarantees a logic-high output if both inputs are open circuit.

The MAX3488, MAX3490, and MAX3491 feature full-duplex communication, while the MAX3483, MAX3485, and MAX3486 are designed for half-duplex communication.

### **Applications**

- Low-Power RS-485/RS-422 Transceivers
- Telecommunications
- Transceivers for EMI-Sensitive Applications
- Industrial-Control Local Area Networks

### **Features**

- ♦ Operate from a Single 3.3V Supply—  
No Charge Pump!
- ♦ Interoperable with +5V Logic
- ♦ 8ns Max Skew (MAX3485/MAX3490/MAX3491)
- ♦ Slew-Rate Limited for Errorless Data Transmission (MAX3483/MAX3488)
- ♦ 2nA Low-Current Shutdown Mode (MAX3483/MAX3485/MAX3486/MAX3491)
- ♦ -7V to +12V Common-Mode Input Voltage Range
- ♦ Allows up to 32 Transceivers on the Bus
- ♦ Full-Duplex and Half-Duplex Versions Available
- ♦ Industry Standard 75176 Pinout (MAX3483/MAX3485/MAX3486)
- ♦ Current-Limiting and Thermal Shutdown for Driver Overload Protection

### **Ordering Information**

PART	TEMP. RANGE	PIN-PACKAGE
MAX3483CPA	0°C to +70°C	8 Plastic DIP
MAX3483CSA	0°C to +70°C	8 SO
MAX3483C/D	0°C to +70°C	Dice*
MAX3483EPA	-40°C to +85°C	8 Plastic DIP
MAX3483ESA	-40°C to +85°C	8 SO
MAX3485CPA	0°C to +70°C	8 Plastic DIP
MAX3485CSA	0°C to +70°C	8 SO
MAX3485C/D	0°C to +70°C	Dice*
MAX3485EPA	-40°C to +85°C	8 Plastic DIP
MAX3485ESA	-40°C to +85°C	8 SO

*Ordering Information continued at end of data sheet.  
\* Contact factory for dice specifications.*

### **Selection Table**

PART NUMBER	GUARANTEED DATA RATE (Mbps)	SUPPLY VOLTAGE (V)	HALF/FULL DUPLEX	SLEW-RATE LIMITED	DRIVER/RECEIVER ENABLE	SHUTDOWN CURRENT (nA)	PIN COUNT
MAX3483	0.25	3.0 to 3.6	Half	Yes	Yes	2	8
MAX3485	10		Half	No	Yes	2	8
MAX3486	2.5		Half	Yes	Yes	2	8
MAX3488	0.25		Full	Yes	No	—	8
MAX3490	10		Full	No	No	—	8
MAX3491	10		Full	No	Yes	2	14

### 7.3.2. Connector Pin Assignments and Connections (continued – 5/8)

RS-422 Transceiver Data Sheet – 2/3

#### ABSOLUTE MAXIMUM RATINGS

Supply Voltage (V <sub>CC</sub> ) .....	7V	14-Pin Plastic DIP (derate 10mW/°C above +70°C) .....	800mW
Control Input Voltage ( $\overline{RE}$ , DE) .....	-0.3V to 7V	14-Pin SO (derate 8.33mW/°C above +70°C) .....	667mW
Driver Input Voltage (DI) .....	-0.3V to 7V	Operating Temperature Ranges	
Driver Output Voltage (A, B, Y, Z) .....	-7.5V to 12.5V	MAX34__C__ .....	0°C to +70°C
Receiver Input Voltage (A, B) .....	-7.5V to 12.5V	MAX34__E__ .....	-40°C to +85°C
Receiver Output Voltage (RO) .....	-0.3V to (V <sub>CC</sub> + 0.3V)	Storage Temperature Range .....	-65°C to +160°C
Continuous Power Dissipation (T <sub>A</sub> = +70°C)		Lead Temperature (soldering, 10sec) .....	+300°C
8-Pin Plastic DIP (derate 9.09mW/°C above +70°C) .....	727mW		
8-Pin SO (derate 5.88mW/°C above +70°C) .....	471mW		

Stresses beyond those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated in the operational sections of the specifications is not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.

#### DC ELECTRICAL CHARACTERISTICS

(V<sub>CC</sub> = 3.3V ±0.3V, T<sub>A</sub> = T<sub>MIN</sub> to T<sub>MAX</sub>, unless otherwise noted. Typical values are at T<sub>A</sub> = +25°C)

PARAMETER	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNITS
Differential Driver Output	V <sub>OD</sub>	R <sub>L</sub> = 100Ω (RS-422), Figure 4	2.0			V
		R <sub>L</sub> = 54Ω (RS-485), Figure 4	1.5			
		R <sub>L</sub> = 60Ω (RS-485), V <sub>CC</sub> = 3.3V, Figure 5	1.5			
Change in Magnitude of Driver Differential Output Voltage for Complementary Output States (Note 1)	ΔV <sub>OD</sub>	R <sub>L</sub> = 54Ω or 100Ω, Figure 4			0.2	V
Driver Common-Mode Output Voltage	V <sub>OC</sub>	R <sub>L</sub> = 54Ω or 100Ω, Figure 4			3	V
Change in Magnitude of Common-Mode Output Voltage (Note 1)	ΔV <sub>OC</sub>	R <sub>L</sub> = 54Ω or 100Ω, Figure 4			0.2	V
Input High Voltage	V <sub>IH</sub>	DE, DI, $\overline{RE}$	2.0			V
Input Low Voltage	V <sub>IL</sub>	DE, DI, $\overline{RE}$			0.8	V
Logic Input Current	I <sub>IN1</sub>	DE, DI, $\overline{RE}$			±2	μA
Input Current (A, B)	I <sub>IN2</sub>	DE = 0V, V <sub>CC</sub> = 0V or 3.6V	V <sub>IN</sub> = 12V		1.0	mA
			V <sub>IN</sub> = -7V		-0.8	
Output Leakage (Y, Z)	I <sub>O</sub>	DE = 0V, $\overline{RE}$ = 0V, V <sub>CC</sub> = 0V or 3.6V, MAX3491	V <sub>OUT</sub> = 12V		20	μA
			V <sub>OUT</sub> = -7V		-20	
Output Leakage (Y, Z) in Shutdown Mode	I <sub>O</sub>	DE = 0V, $\overline{RE}$ = V <sub>CC</sub> , V <sub>CC</sub> = 0V or 3.6V, MAX3491	V <sub>OUT</sub> = 12V		1	μA
			V <sub>OUT</sub> = -7V		-1	
Receiver Differential Threshold Voltage	V <sub>TH</sub>	-7V ≤ V <sub>CM</sub> ≤ 12V	-0.2		0.2	V
Receiver Input Hysteresis	ΔV <sub>TH</sub>	V <sub>CM</sub> = 0V		50		mV
Receiver Output High Voltage	V <sub>OH</sub>	I <sub>OUT</sub> = -1.5mA, V <sub>ID</sub> = 200mV, Figure 6	V <sub>CC</sub> - 0.4			V
Receiver Output Low Voltage	V <sub>OL</sub>	I <sub>OUT</sub> = 2.5mA, V <sub>ID</sub> = 200mV, Figure 6			0.4	V
Three-State (High Impedance) Output Current at Receiver	I <sub>OZR</sub>	V <sub>CC</sub> = 3.6V, 0V ≤ V <sub>OUT</sub> ≤ V <sub>CC</sub>			±1	μA
Receiver Input Resistance	R <sub>IN</sub>	-7V ≤ V <sub>CM</sub> ≤ 12V	12			kΩ

### 7.3.2. Connector Pin Assignments and Connections (continued – 6/8)

#### RS-422 Transceiver Data Sheet – 3/3

#### DC ELECTRICAL CHARACTERISTICS (continued)

( $V_{CC} = 3.3V \pm 0.3V$ ,  $T_A = T_{MIN}$  to  $T_{MAX}$ , unless otherwise noted. Typical values are at  $T_A = +25^\circ C$ )

PARAMETER	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNITS	
Supply Current	$I_{CC}$	No load, $DI = 0V$ or $V_{CC}$	DE = $V_{CC}$ , RE = $0V$ or $V_{CC}$		1.1	2.2	mA
			DE = $0V$ , RE = $0V$		0.95	1.9	
Supply Current in Shutdown Mode	$I_{SHDN}$	DE = $0V$ , RE = $V_{CC}$ , DI = $V_{CC}$ or $0V$		0.002	1	$\mu A$	
Driver Short-Circuit Output Current	$I_{OSD}$	$V_{OUT} = -7V$			-250	mA	
		$V_{OUT} = 12V$			250		
Receiver Short-Circuit Output Current	$I_{OSR}$	$0V \leq V_{RO} \leq V_{CC}$	$\pm 8$		$\pm 60$	mA	

#### DRIVER SWITCHING CHARACTERISTICS—MAX3485, MAX3490, and MAX3491

( $V_{CC} = 3.3V$ ,  $T_A = +25^\circ C$ )

PARAMETER	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNITS
Driver Differential Output Delay	$t_{DD}$	$R_L = 60\Omega$ , Figure 7	1	22	35	ns
Driver Differential Output Transition Time	$t_{TD}$	$R_L = 60\Omega$ , Figure 7	3	8	25	ns
Driver Propagation Delay, Low-to-High Level	$t_{PLH}$	$R_L = 27\Omega$ , Figure 8	7	22	35	ns
Driver Propagation Delay, High-to-Low Level	$t_{PHL}$	$R_L = 27\Omega$ , Figure 8	7	22	35	ns
$ t_{PLH} - t_{PHL} $ Driver Propagation Delay Skew (Note 2)	$t_{PDS}$	$R_L = 27\Omega$ , Figure 8			8	ns
<b>DRIVER OUTPUT ENABLE/DISABLE TIMES (MAX3485/MAX3491 only)</b>						
Driver Output Enable Time to Low Level	$t_{PZL}$	$R_L = 110\Omega$ , Figure 10		45	90	ns
Driver Output Enable Time to High Level	$t_{PZH}$	$R_L = 110\Omega$ , Figure 9		45	90	ns
Driver Output Disable Time from High Level	$t_{PHZ}$	$R_L = 110\Omega$ , Figure 9		40	80	ns
Driver Output Disable Time from Low Level	$t_{PLZ}$	$R_L = 110\Omega$ , Figure 10		40	80	ns
Driver Output Enable Time from Shutdown to Low Level	$t_{PSL}$	$R_L = 110\Omega$ , Figure 10		650	900	ns
Driver Output Enable Time from Shutdown to High Level	$t_{PSH}$	$R_L = 110\Omega$ , Figure 9		650	900	ns

#### DRIVER SWITCHING CHARACTERISTICS—MAX3486

( $V_{CC} = 3.3V$ ,  $T_A = +25^\circ C$ )

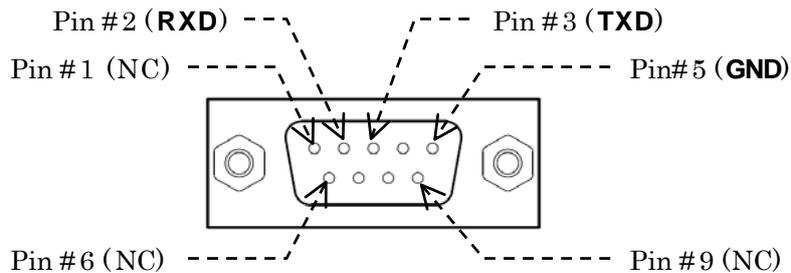
PARAMETER	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNITS
Driver Differential Output Delay	$t_{DD}$	$R_L = 60\Omega$ , Figure 7	24	48	70	ns
Driver Differential Output Transition Time	$t_{TD}$	$R_L = 60\Omega$ , Figure 7	15	35	60	ns
Driver Propagation Delay, Low-to-High Level	$t_{PLH}$	$R_L = 27\Omega$ , Figure 8	20	48	70	ns
Driver Propagation Delay, High-to-Low Level	$t_{PHL}$	$R_L = 27\Omega$ , Figure 8	20	48	70	ns
$ t_{PLH} - t_{PHL} $ Driver Propagation Delay Skew (Note 2)	$t_{PDS}$	$R_L = 27\Omega$ , Figure 8			11	ns
Driver Output Enable Time to Low Level	$t_{PZL}$	$R_L = 110\Omega$ , Figure 10		55	100	ns
Driver Output Enable Time to High Level	$t_{PZH}$	$R_L = 110\Omega$ , Figure 9		55	100	ns
Driver Output Disable Time from High Level	$t_{PHZ}$	$R_L = 110\Omega$ , Figure 9		45	80	ns
Driver Output Disable Time from Low Level	$t_{PLZ}$	$R_L = 110\Omega$ , Figure 10		45	80	ns
Driver Output Enable Time from Shutdown to Low Level	$t_{PSL}$	$R_L = 110\Omega$ , Figure 10		700	1000	ns
Driver Output Enable Time from Shutdown to High Level	$t_{PSH}$	$R_L = 110\Omega$ , Figure 9		700	1000	ns

### 7.3.2. Connector Pin Assignments and Connections *(continued – 7/8)*

#### RS-232C Connector

An optional serial printer (**PR-900**) is to be plugged into this receptacle. A D-Sub 9 female type plug mates with this connector. The pin assignments are illustrated below.

Figure 7-13 **RS-232C** Connector Pin Assignments (Front View)



*NOTE: Pins #1, #4, #5, #6, #7, #8 and #9: No internal connections (NC)*

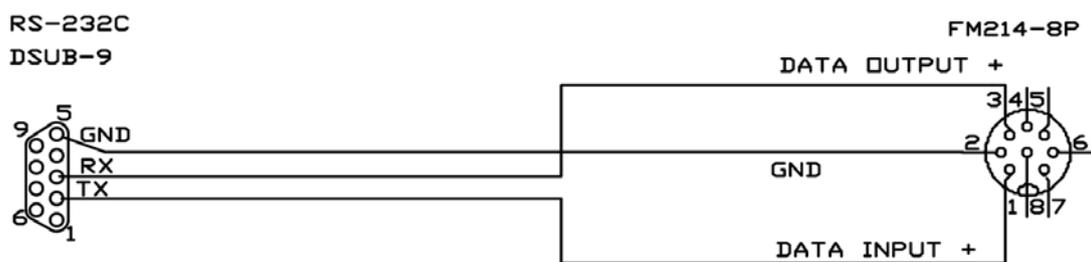
- Mating Plug: HDEB-9S (supplied) or equivalent

After making connections, check to be sure that the RS-232C port is enabled (as per paragraph 4.11.2) and that a correct set of parameters is selected (as per paragraphs 4.11.3 and 4.11.4) for your applications.

#### Connections to PR-900

The connections from the RS-232C port to the **PR-900** serial printer are illustrated below. A 2-meter cable, terminated in appropriate mating plugs at both ends is normally supplied with each printer.

Figure 7-14 Connections between RS-232C Port and PR-900



#### Port Parameter Settings for PR-900

The **PR-900** requires the following parameter settings for the RS-232C port:

**DATA BITS: 8**  
**STOP BITS: 1**  
**PARITY: NONE**  
**BIT RATE: 0.11 (=110 baud)**

See paragraph 4.11 for instructions.

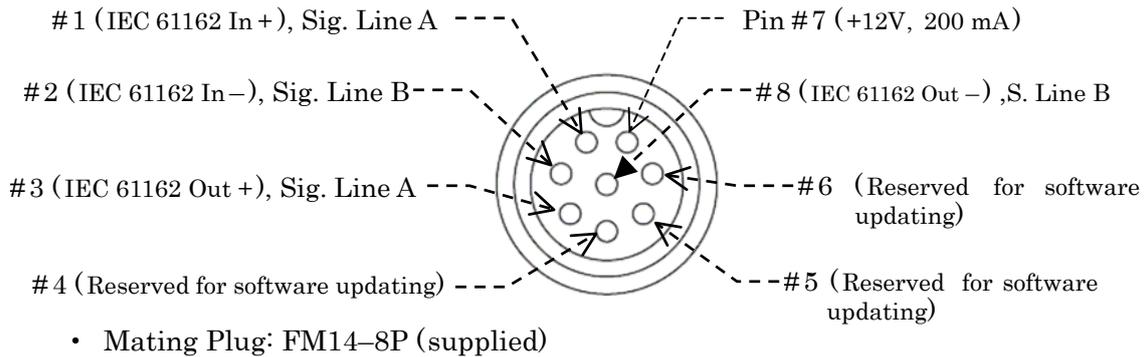
*(continued on next page)*

### 7.3.2. Connector Pin Assignments and Connections *(continued – 8/8)*

#### I/O DATA Connector

The **I/O DATA** port is primarily for data communications with other onboard devices using IEC 61162-1 (NMEA-0183) as the interface. It also provides a port (comprising pins #4, #5 and #6) for software updating, and a regulated 12V DC 200mA output for powering light-duty applications.

Figure 7-15 **I/O DATA** Connector Pin Assignments (Front View)



#### < WARNINGS >

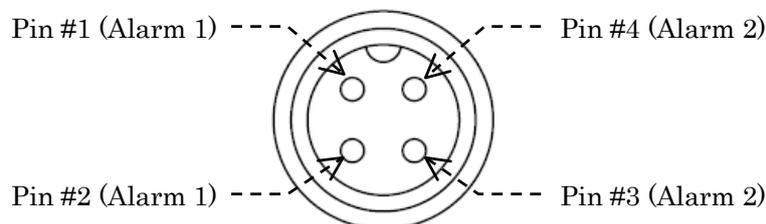
1. **PINS #4, #5 AND #6 ARE TO BE USED EXCLUSIVELY FOR THE SPECIFIED PROGRAMMING TOOL. CONNECTING ANY OTHER DEVICE TO THESE PINS CAUSES THE EQUIPMENT TO BE LOCKED UP.**
2. **CURRENT DRAIN FROM PIN # 7 MUST NOT EXCEED 200 MILLIAMPS.**

#### ALARM Output Connector

The **ALARM** output connector provides an on/off (make/break) alarm output simultaneously via two pairs of replay contacts, electrically isolated from each other and from the equipment circuitry. This connector is to be used to activate an alarm device mounted at a remote location. The pin assignments are given below.

To connect an external alarm device, use pins #1-#2 pair or pins #3-#4 pair.

Figure 7-16 **ALARM** Output Connector Pin Assignments (Front View)



- Mating Plug: FM14-4P (supplied)

*NOTE: Alarm messages compliant with IEC 61162-1 \$CRARL sentence format are available from the RS-422 port, and not from this connector.*



### 7.4.2. NAVTEX Receiver Masks

The following command is used to manipulate the configuration masks that control which messages of which stations are to be received/stored and sent to the RS-422 port or to the RS-232C port. User settings made via the keypad will be changed accordingly.

`$CRNRM,X,X,hhhhhhh,hhhhhhh*hh <CR> <LF>`

Function code: 0 – 9

0 = request messages, 1 = set/report storage mask, 2 = set/report printer mask  
3 = set/report INS mask, 4 to 9 = reserved

Frequency index: 1 – 9

1 = 490 kHz, 2 = 518 kHz, 3 = 4209.5 kHz, 4 to 9 = reserved

Transmitter ID mask (32 bits in total)

LSB = station A, bit 1 = station B, bit 25 = station Z, bits 26 to 32 = reserved

To select a station, its corresponding bit should be set to “1.” To reject a station, its corresponding bit should be set to “0.”

For example, to select stations E, J, M and T only, set the bit masks as follows:

								00081210 hex	
0	0	0	8	1	2	1	0	(hex)	
0000	0000	0000	1000	0001	0010	0001	0000	(binary)	
	ZY	XWVU	TSRQ	PONM	LKJI	HGFE	DCBA	(station)	

Message type mask (32 bits in total):

LSB = type A, bit 1 = type B, bit 25 = type Z, bits 26 to 32 = reserved

To select message types A, B, D, F and L only, set their bit masks as follows:

								0000082B hex	
0	0	0	0	0	8	2	B	(hex)	
0000	0000	0000	0000	0000	1000	0010	1011	(binary)	
	ZY	XWVU	TSRQ	PONM	LKJI	HGFE	DCBA	(type)	

*NOTE: Message types A, B, D and L must always be selected due to the relevant IMO resolution, and their corresponding bits cannot be set to “0.”*

The equipment accepts the following query command sentence to report the current bit masks:

`$ - - CRQ,NRM*hh<CR><LF>`

Example: Device identifier = IN (INS), checksum=3A hex

`$ INCRQ,NRM*3A<CR><LF>`

### 7.4.3. Alarm Output Sentence Format

The following format sentence is output to the RS-422 port to report the reception of a warning NAVTEX message or the current alarm condition or to indicate an equipment failure or malfunction.

`$CRALR,,003,A,V,NAVTEX:Search and Rescue information*72<CR><LF>`

Local alarm number:

001 = Navigational warning (type A message)  
 002 = Meteorological warning (type B message)  
 003 = Search and rescue information (type D message)  
 004 = Receiver malfunction  
 005 = Self-diagnostic test failure  
 006 = General failure

Alarm conditions:

A= threshold exceeded (i.e. alarm condition exists)  
 V= threshold not exceeded (i.e. alarm condition is non-existent)

Alarm acknowledgement status

A= acknowledged  
 V= unacknowledged

Alarm description text

Checksum:

03 = Navigational warning  
 0F = Meteorological warning  
 72 = Search and rescue information  
 72 = General failure-

*NOTE: The equipment does not use UTC as the time source, and therefore sends a null field in place of the time-of-alarm-condition-change field.*

### 7.4.4. Alarm Acknowledgement

The following command is supported to externally acknowledge/stop the current message alarm:

`$--ACK,003*hh<CR><LF>`

Local alarm number

001 = Navigational warning  
 002 = Meteorological warning  
 003 = Search and rescue information

Checksum:

If the device identifier is IN (INS), the above command is as follows:

`$INACK,003*51<CR><LF>`

#### 7.4.5. Proprietary Sentences

The following commands (IEC 61162-1 proprietary format sentence) are supported to externally switch the second receiver frequency:

`$PJMCR, 0, 1 *hh <CR> <LF>`

Receiver index:

0 = Second receiver

1 to 9 = Reserved

Receive frequency index:

1 = 490 kHz

2 = 4209.5 kHz

Checksum

See the examples below.

Examples:

- Switching to 490 kHz: `$PJMCR,0,1*47<CR><LF>`
- Switching to 4209.5 kHz: `$PJMCR,0,3*45<CR><LF>`

## **8. Summarized Theory of Operation**

### **8.1. What is NAVTEX?**

NAVTEX, a system of broadcast and automatic reception of global maritime safety information by means of direct display/printing telegraphy, is part of the \*<sup>1</sup>GMDSS infrastructure, defined by \*<sup>2</sup>IMO Assembly resolution A.706 (17). Broadcasting is accomplished by a worldwide network of dedicated coastal stations regularly sending weather information, navigational warnings, search-and-rescue (SAR) information and other related messages, all in an easy-to-read text format, to mariners free of charges.

### **8.2. Operating Frequencies**

At present three frequencies are officially allocated by the \*<sup>3</sup>ITU for NAVTEX broadcasting service: 518 kHz, 490 kHz and 4209.5 kHz. All \*<sup>4</sup>SOLAS convention vessels are required to carry a receiver dedicated to receiving NAVTEX transmissions automatically on all the above frequencies.

Transmissions on 518 kHz are in English and of general interest to vessels navigating international waters, while the 490 kHz service is primarily targeted at those working most of the time in areas close to transmitting stations, providing more localized information in national languages. Some stations also broadcast information to local users on 4209.5 kHz. Stations on each frequency transmit NAVTEX messages usually for a period of 10 minutes on a time-sharing basis to avoid cross-station interference.

### **8.3. Service Area**

The coverage area of a 518 kHz station is normally 200 to 400 nautical miles in daytime hours, depending on the transmitting power level, and a signal travels along the surface. At night some of the signal often travels more than double the daytime coverage by being reflected a number of times between the surface and the ionosphere, a band of ionized atmospheric layers 50 to 400 km above the surface. The 490 kHz service area is less than the 518 kHz coverage due to lower power levels, but the nighttime coverage often extends greatly because of ionospheric reflections. The 4209.5 kHz broadcast, though catering mainly for inshore users and covering much less areas in the daytime, can be received from more than 1000 miles away during hours of darkness.

### **8.4. Error Correction**

Signal propagation conditions constantly vary with time of the day and also with the season. The signal arriving at the receiver can be corrupted or distorted at any time by static discharges, natural noise, abnormal solar activity, unstable ionospheric conditions, interference between the signal coming directly from the transmitter and the one reflected from the ionosphere, etc. It is therefore likely that a vital NAVTEX message can be missed due to signal corruption or distortion at the receiving end.

In order to ensure that each message is properly received within its area of coverage, a station sends out the same message twice, some hours apart, each with the station's identification code, message type indication and a serial number. In addition, the system employs a mode of transmission called forward error correction (FEC), transmitting each alphanumeric character in the message twice at very short intervals, thus enabling the receiver to have a chance to receive either the first character or the next one even if it fails to receive either one correctly. In this way, a NAVTEX message transmission is designed to be received without fail and with minimum number of erroneous characters.

*(continued on next page)*

## **8. Summarized Theory of Operation** (*continued – 2/6*)

### **8.5. NAVTEX Receiver – General**

A NAVTEX receiver that complies with the relevant IMO resolutions and regulations for wheel mark certification is programmed to automatically receive and display/print a message, and avoids a repeated reception of the same message by checking the ID and numbering of each message. Using the ID and message type data attached to each message, the user can also program the receiver to reject certain transmissions and message types that are not of importance while in the current area, except for SAR and other urgent warning messages classified as type D messages. An audible and visual alarms are automatically triggered upon reception of such a message. To silence the alarm, the user must manually acknowledge the message arrival. Received messages are either printed on paper (for a receiver with a built-in printer) or displayed on a screen with memory for storage and retrieval (for a receiver with an LCD screen).

### **8.6. The NT-2000/DEBEG 2902 NAVTEX Receiver**

The NT-2000/DEBEG 2902 receiver has two built-in receiver, with the first receiver devoted to receiving 518 kHz broadcast and the second receiver receiving either 490 kHz or 4209.5 kHz signal as selected by the user. Received messages are displayed across an 8-inch liquid crystal display (LCD) and stored permanently or temporarily as specified by the user. Up to 200 messages, each with an average of 500 characters, received on the first and second receivers are separately stored and then automatically erased from memory 60 hours after the time of reception on a first-in-first-out basis. However, up to 25 messages can be protected against automatic erasure, and are stored in a separate area of the non-volatile message memory, in which case an additional 50 new messages can be stored in memory.

When a transmission occurs on the first and second receiver frequencies at the same time, the equipment receives both signals, displaying the first receiver message while storing the second receiver message in memory for later retrieval. An appropriate caution message shows up in the screen bottom prompt line to indicate the reception of a new NAVTEX message on the second receiver.

Reception of a type-D message activates the audible and visual alarms. The received message text is shown in red, making it easy to discriminate it from navigational and weather warnings. The audible alarm also sounds differently to indicate that a type-D message has been received. The alarm can be acknowledged remotely by an INS device connected to the RS-422 port on the rear panel.

The stored messages can be output via three interface ports mounted on the rear panel for IBS/INS or other onboard applications. The user can specify the ID, frequency and type of the messages you wish to output. An optional printer can also be plugged in to print the current message in real time or those recalled from the non-volatile memory.

- \*1: Global Maritime Distress and Safety System
- \*2: International Maritime Organization
- \*3: International Telecommunications Union
- \*4: Safety of Life at Sea

(*continued on next page*)

## 8. Summarized Theory of Operation (*continued – 3/6*)

### 8.7. Operating Principle of NT-2000/DEBEG 2902

Figure 9-1 shows interconnections between the printed circuit boards (PCBs) comprising the NT-2000/DEBEG 2902 system and interface connections from the PCBs to data input/output ports and peripheral devices. Figure 9-2 is the schematic of the antenna selector which allows selection of the desired antenna from a single keystroke on the keypad.

To follow the circuit description below, see also the schematics of the receivers, CPU PCB and power PCB attached.

#### Receiver Circuit

To receive the three NAVTEX frequencies (518 kHz, 490 kHz and 4209.5 kHz), the system incorporates two independent receivers (first and second receivers) plus a frequency converter. The 518 kHz international broadcast is picked up by the first receiver (NT-2000A), and the 490 kHz national broadcast, by the second receiver (NT-2000B). The second national broadcast frequency of 4209.5 kHz is first converted down to 490 kHz by the frequency converter (N501-F/C-A) and then fed to the second receiver.

Each receiver is of straight amplifier type, consisting of two stages (field-effect transistors V6 and V7) of amplification, followed by an IC amplifier (U1) and an amplitude limiter (diode pair V8 and V9). Located at the end of the amplification chain is an FM detector that consists of crystal-controlled oscillator B1, its associated parts and part of the IC circuitry), which demodulates a frequency-shifted ( $\pm 85$  Hz) RF NAVTEX signal into a stream of baseband DC pulses at 100 baud using a quadrature detection technique. The detected output is then fed to the CPU via opto-isolator K2.

To test whether each receiver is functioning properly, a NAVTEX signal generator is provided on the PCB, consisting of quartz crystal B2, IC (N1) and their associated parts. When the self-diagnostic test function is activated via the menu, the CPU PCB supplies a test signal (modulating signal) to the generator via opto-isolator K4 and transistor switch V13, allowing the generator to produce a simulated frequency-shifted signal at the receiver frequency, and feeds it to the receiver input through relay K1.

#### CPU Circuit

The CPU PCB (N501-CPU-C) is built around a 16-bit single-chip microcomputer (U10) that has a CPU clocked at 24 MHz by crystal-controlled oscillator X1, and on-chip flash ROM for program software and on-chip RAM providing memory space for data processing of the demodulated signal. An external static RAM (SRAM) chip (U5, 512 kB) is mounted for message and ID storage, and is backed up by large capacity capacitor C6 (1.0 farad) for approx. 10 days in the event of continuous power-off.

Another external SRAM (U1, 256 kB) is used to hold text for display on the LCD screen. U3 and U4 are factory-programmed to jointly act as a display controller to perform various display control functions and text scrolling. The input/output interface between the CPU and externally connected devices consists of three external ports: U7 for the RS-232C port, U12 for the \*RS-422 port and an opto-isolator for the I/O DATA port.

*\*Input lines to the RS-422 port are insulated from ground by opto-isolators (ISO2, ISO3).*

*(continued on next page)*

## **8. Summarized Theory of Operation** (*continued – 4/6*)

### **8.7. Operating Principle of NT-2000/DEBEG 2902** (*continued –2/2*)

#### Power Supply Circuit

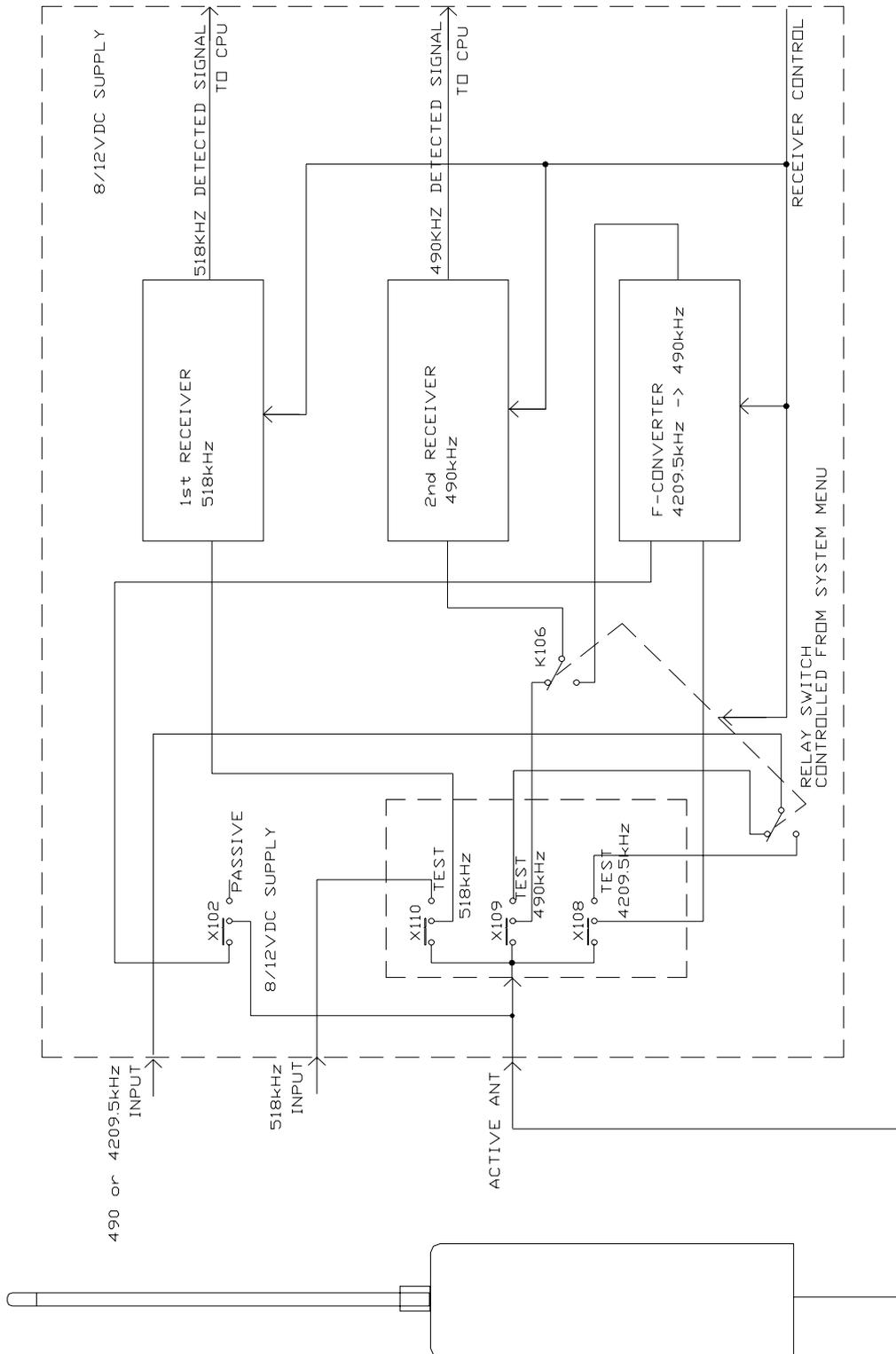
The power supply PCB (N501-PWR-A/B) consists mainly of a switch-mode voltage regulator (U2) and a three-terminal voltage regulator (U1), supplying regulated DC outputs (3.3V, 5V, 12V) from an input voltage ranging 11 to 36 volts, though the nominal voltage is 24 volts at which the performance specifications are fully met. Should the power line polarity be reversed accidentally, diode D1 will cause the fuse F1 (3A) to blow, thereby protecting the input circuit from possible damage. The regulated outputs from the power supply PCB are fed to the CPU PCB, through which the 12V output is also derived to operate the receivers and frequency converter.

Another power supply board, termed the FL Inverter PCB (CXA-L0612A-VJL), is also installed. This PCB is a DC-to-AC inverter unit, generating an AC voltage of approx. 1600V at approx. 60 Hz out of 12V supplied via the CPU PCB to power the fluorescent lamp used to backlight the LCD screen.



8. Summarized Theory of Operation (continued - 6/6)

Figure 8-2 Antenna Switching Circuit



## 9. Specifications

- (1) IEC 60945–2002 Equipment Category:
- Receiver Cabinet: Protected
  - Active Antenna Unit: Exposed
- (2) Receive Frequencies:
- First Receiver: 518 kHz
  - Second Receiver: 490 kHz and 4209.5 kHz, front panel–selectable
- (3) Type of Receiver:
- First Receiver: 518 kHz straight amplifier
  - Second Receiver:
    - 490 kHz: 490 kHz straight amplifier
    - 4209.5 kHz: Down–conversion to 490 kHz
- (4) Antenna Inputs (518, 490 and 4209.5 kHz):
- Coaxial: 50 (nominal), matched with ANT–2000 active antenna
  - Unbalanced: 10 + 150 pF for long–wire antenna
- (5) Input Protection: 30 V<sub>RMS</sub> for 15 minutes over 100 kHz–28 MHz range
- (6) Active Antennas:
- Standard: Preamplified 1.2m glass–fiber whip (**ANT–2000**) for reception of 518 kHz, 490 kHz and 4209.5 kHz, with 1–meter RG–58/U coaxial cable attached, terminated in BNC and PL–259 plugs for cable extension.
  - Option: Preamplified 1.2m glass–fiber whip (**ANT–900**) for reception of 518 kHz, with 30 meter RG–58/U cable
  - Option: Preamplified 1.2m glass–fiber whip (**ANT–2002**) for reception of 490 kHz and 4209.5 kHz with 30 meter RG–58/U cable
- (7). Receiver Sensitivity: Better than the following values for message reception with character error rate of less than 4%:
- 1 μV to coaxial 50 input
  - 5 μV to unbalanced (10 +150 pF) input
- (8) Demodulator: Quadrature detector, crystal–controlled
- (9) Mode of Reception: F1B with forward error correction (ITU–R REC. 476–3, 540–1 and 625 B–mode)
- Single Frequency: Automatic reception and display of message transmitted on 518 kHz or on user–selected second receiver frequency (490 kHz or 4209.5 kHz)
  - Dual Frequency: Automatic, simultaneous reception of 518 kHz and user–selected second receiver frequency (490 kHz or 4209.5 kHz), with automatic display of first receiver’s live messages while storing second receiver messages in memory when NAVTEX broadcasts occur at both frequencies simultaneously.

*(continued on next page)*

## 9. Specifications (continued – 2/4)

- (10) Second Receiver Selection: 490 kHz or 4209.5 kHz selectable via menu system
- (11) Source of Time: Derived from CPU clock 24.00 MHz for calculation of time passage to handle message aging. No real time clock (RTC) is used.
- (12) Display Screen: 8-inch color VGA TFT LCD, daylight-viewing, backlit  
Text display resolution: QVGA
- (13) User Interface Language: English (menus, status, prompts, cautions)
- (14) Text Display:
- NAVTEX Messages: 40 characters per line, 18 lines per screen. A forced carriage return symbol \*(↓) divides the last word at 40th character position if the number of character in a line exceeds 40.  
\* Hex 5F ( \_ ) is output to printer or INS.
  - Statuses & Prompts: 1 line (40 characters maximum) at screen's upper and lower edges
- (15) Indication of Message Reception and Storage
- Message Reception: Tag **NEW MESSAGE** is attached to message ID.
  - Storage: Indication "**STORED**" is turned on at the end of each satisfactorily received message together with a character error rate (**CER** = XX%) readout
- (16) Message Scrolling:
- Live Messages: Automatic, line-by-line scrolling
  - Stored Messages: Manual, line-by-line or page-by-page scrolling
- (17) Message Storage:
- Capacity: 200 messages (average 500 characters per message) for each of 518 kHz, 490 kHz and 4209.5 kHz receivers. Up to an additional 50 messages can be stored on each frequency if stored messages are protected.  
  
If the equipment receives a message with a character error rate (CER) of > 4% and 33%, it will store the message but receive the same message to be transmitted subsequently. If the subsequent message has a lower CER, it will automatically replace the previously stored message. If a message is received with a CER > 33%, it will not be stored.
  - Duration: 60 hours from successful reception of each message, after which old messages will be automatically erased from memory on a first-in-first-out basis except for user-protected messages that cannot be erased from memory until their protection tags are removed manually. Time source is derived from CPU clock (24.00 MHz) to compute message aging.
  - Storage 4 without Power: Protected messages are stored for at least 10 days after power is removed continuously.

(continued on next page)

## 9. Specifications (continued – 3/4)

- (18) Message Protection: Up to 50 messages can be protected against automatic erasure, and are saved in a separate area of the non-volatile message memory. Protection of a user-selected message can be \*cancelled to allow automatic erasure after a 60-hour time passage.
- Protected messages are indicated with tag **PROTECTED** attached to the message ID.
- \*Removing the tag requires user confirmation.*
- (19) Message ID Storage:
- Capacity: 200 IDs of successfully received messages on each of 518 kHz, 490 kHz and 4209.5 kHz
  - Duration: 60 hours
- (20) Stored Message Outputs: The following messages can be selectively output via rear panel **RS-422**, **RS-232C** and **I/O DATA** ports:
- All currently displayed messages or currently displayed messages of user's choice
  - All stored messages
  - Stored messages of user's choice by specifying frequency, transmitter or message type
- (21) External I/O Interfaces:
- Printer Interface: **RS-232C** port (**MAX3232** transceiver)
  - IBS/INS: **RS-422** port (**MAX3490** transceiver) with input lines optically isolated
  - NMEA-0183/IEC 61162-1: 8-pin connector (**I/O DATA** port)
  - Alarm Activation Output: 2 isolated pairs of relay contacts (**ALARM** port)
- (22) Message Alarm Specifications:
- Audible Indication: Beeping from front-facing piezoelectric buzzer
    - 1-second intervals: Type D messages
    - 3-second intervals: Types, A, B and L messages
  - Visual Indication: Red tag **ALARM!** attached to ID  
ID and message text displayed in red color for type D messages (SAR).
  - Acknowledgement/Muting: Manually with front panel button or by means of IEC61162-format command (IEC 61162-1 compliant \$-ACK command) via **RS-422** input port.
  - Alarm Conditions Output: IEC 61162-1 compliant \$CRALR sentences containing local alarm numbers and alarm text via **RS-422** output port. See paragraph 7.4.3 for details.

*NOTE: See section 10 (List of Alarms) for additional information on alarms.*

*(continued on next page)*

**9. Specifications** (*continued – 4/4*)

- (23) Power Requirements: 24 VDC (nominal), approx. 15W. Floating ground.  
The unit operates safely over a 11-to-36V range.
- (24) Cabinet Size & Weight: 225/245 (W) X 225/271 (H) X 135 (D) mm  
Approx. 3.7/2.5 kg with/without mounting bracket
- (25) Compass Safe Distances (in Energized Condition):
- Cabinet with Bracket: 80 cm (standard), 45 cm (steering)
  - Cabinet only: 60 cm (standard), 40 cm (steering)
- (26) Ambient Temperatures: -15 to 55°C (cabinet, operating)  
-25 to 70°C (cabinet, storage)  
-25 to 55°C (active antenna, operating)  
-25 to 70°C (active antenna, storage)
- (27) Compliances: IMO Resolutions MSC. 148(77) and A.694(17)  
IEC 61097-6 Ed.2 FDIS,  
IEC 60945-2002, IEC 61162-1, IEC 61162-2

*NOTE: Specifications, other than those specified under the relevant IMO recommendations and IEC specifications, are subject to change without notice or obligation.*

## 10. List of Alarms

### 10.1. Message Alarms

#### Alarm for D-Type Message

- Enabled/Disabled Status: Enabled at all times.
- Triggering Condition: To be triggered upon reception of a D-type message.
- User Interface:
  - Audible: Beeping at approx. 1-sec. intervals by alarm buzzer.
  - Visual: Attaching **ALARM!** tag to message ID and displaying both message ID and text in red.

#### Alarm for A-, B-, and L-Type Messages

- Enabled/Disabled Status: Initially disabled, and can be individually enabled by the user. See paragraph 4.13 for instructions.
- Triggering Condition: To be triggered upon reception of an A-, B- or L-type message.
- User Interface:
  - Audible: Beeping at approx. 3-sec. intervals by alarm buzzer.
  - Visual: Attaching **ALARM!** tag to message ID and displaying message ID in red.

### 10.2. Operational Alarms

#### Storage Limit Alarm:

- Enabled/Disabled Status: Enabled at all times.
- Triggering Condition: To be triggered when protecting NAVTEX messages for permanent storage in excess of 50.
- User Interface:
  - Audible: Beeping 3 times in quick succession by small buzzer.
  - Visual: Displaying warning “**STORAGE LIMIT IS REACHED!**” in prompt line at screen’s bottom.

#### Memory-Full Alarm:

- Enabled/Disabled Status: Enabled at all times.
- Triggering Condition: To be triggered when receiving new NAVTEX message with 199 messages stored.
- User Interface:
  - Audible: Beeping 3 times in quick succession by small buzzer.
  - Visual: Displaying warning “**MEMORY FULL! [ CLR ] TO ACKNLG.**” in prompt line at screen’s bottom.

#### Invalid Keypress Alarm:

- Enabled/Disabled Status: Enabled at all times.
- Triggering Condition: To be triggered when any key not valid for current operation is pressed.
- User Interface:
  - Audible: Beeping 3 times in quick succession by small buzzer.
  - Visual: Displaying warning “**INVALID KEYPRESS,**” blinking.

## 11. List of Abbreviations

The abbreviations used in this manual and menus, on screen, control panel and rear panel are listed below.

A:	amperes
ACKNLG:	Acknowledge
ALM:	Alarm
ANT:	Antenna
BNC:	Type of coaxial connector
BRT:	Brightness control key
BSH:	Bundesamt für Seeschifffahrt und Hydrographie (Federal Maritime and Hydrographic Agency, Germany)
BV:	Bureau Veritas (France), EU notified body
CER:	Character Error Rate (ratio of asterisks to total number of characters)
CH:	Operating channel (receiver currently in use)
CLR:	Clear key
CPU:	Central Processing Unit (core of single-chip microcomputer on CPU PCB)
D:	Depth (part of cabinet dimensions)
dB:	decibels (unit of relative power strength)
DC/AC:	DC-to-AC (DC-to-AC voltage inverter for screen backlighting lamp)
DIM:	Dimmer key (for keypad backlighting)
DOS/V:	Disk Operating System/V (PC operating system for IBM-compatibles)
DRAM:	Dynamic Random Access Memory
EMC:	Electromagnetic compatibility
EN:	Europäische Norm (European Standard)
ENT:	Entry key
F:	Frequency
FEC:	Forward error correction (error-correcting protocol in NAVTEX system)
FL:	Fluorescent lamp (screen backlighting lamp)
FM:	frequency modulation
FREQ:	Frequency
FSK:	Frequency shift keying (modulation technique for NAVTEX transmission)
FWE:	Flash-memory write enable (CPU-embedded flash memory programming)
F/C:	Frequency converter (used to receive 4209.5 kHz on second receiver)
GMDSS:	Global Maritime Distress and Safety System
GND:	Ground
GPS:	Global Positioning System, GPS receiver/sensor
H:	Height (part of cabinet dimensions)
ID:	Identification code (identification of transmitter)
IEC:	International Electrotechnical Commission
IMO:	International Maritime Organization
ISO:	International Standardization Organization
I/O:	Input/Output
kB:	kilobytes
kg:	kilograms
LSB:	Least significant bit
LST:	Local standard time
LAT/LON:	Latitude/Longitude coordinates
LCD:	Liquid crystal display

*(continued on next page)*

## 11. List of Abbreviations – 2/2

m:	meters
mA:	milliamperes
min:	minutes
mm:	millimeters
MON:	Monitor (audible monitor)
MSG:	Message (NAVTEX message)
MPU:	Microprocessing Unit
NC:	No connection (no internal connection)
NMEA:	U.S. National Marine Electronics Association
NNNN:	End-of-message indication (specified under IMO/IEC regulations)
para.:	paragraph
PC:	Personal Computer
PCB:	Printed Circuit Board
PWR:	Power
QVGA:	Quarter VGA (screen resolution, 320X240 pixels)
RAM:	Random Access Memory (embedded in CPU chip)
RCVR:	Receiver
REC:	Recommendation (ITU Recommendation)
REF:	Reference
REJ:	Reject
REV:	Revision (software revision number)
RH:	Relative humidity
ROM:	Read-Only Memory (embedded in CPU chip)
RTC:	Real time clock
RX:	Receive
RMRS:	Russian Maritime Register of Shipping
S:	Signal
SAR:	Search and Rescue
SEL:	Select
SIG:	Signal
SOLAS:	Safety of Life at Sea
SRAM:	Static RAM (for message storage)
STD:	Standard compass
STG:	Steering compass
STO:	Store
TFT:	Thin-film transistor (technology of color LCD)
TX:	Transmit
TXD:	Transmit data (Send data)
UTC:	Universal time coordinated (=GMT in common usage)
V:	volts
VCC:	Operating voltage of IC chips used
VDC:	Volts DC
VER:	Version (software version)
VGA:	Video graphics array (screen resolution, 640 × 480 pixels)
W:	Width (part of cabinet dimensions)
W:	watts
XTAL:	Crystal (quartz crystal oscillator)

## 12. User Settings To Be Stored in Non-Volatile Memory

The following user-made settings will be stored in the non-volatile memory.

Screen Brightness Level: Last used level

Keypad Dimmer Level: Last used level

### \*1Settings via Menu System

- Background Color: **WHITE, BLACK, BLUE**
- Message Font Type: **NORMAL, BOLD**
- Screen Sleep Mode
  - On/Off Status: **ON, OFF**
  - On/Off Time Period: **STANDARD, USER-DEFINED MODE**
- \*2Second Receiver Frequency: **490 KHZ, 4209.5 KHZ**
- Keypress Beep: **ON, OFF**
- \*3Station Selection/Rejection
  - First Receiver:
    - Selected Stations: **A to Z (all stations)**
    - Rejected Stations: **None**
  - Second Receiver:
    - Selected Stations: **A to Z (all stations)**
    - Rejected Stations: **None**
- \*3Message Type Selection/Rejection
  - First Receiver:
    - Selected Types: **A, B, C, D, E, F, H, J, K, L, V, Z**
    - Rejected Types: **G, I, M, N, O, P, Q, R, S, T, U, W, X, Y**
  - Second Receiver:
    - Selected Types: **A, B, C, D, E, F, H, J, K, L, V, Z**
    - Rejected Types: **G, I, M, N, O, P, Q, R, S, T, U, W, X, Y**
- Output Port Settings (On/Off, Protocol, Bit Format, Baud Rate):
  - RS-232C: **ON, NONE, 8 DATA BITS, 1 STOP BIT, ODD, 0.11**
  - RS-422: **ON, IEC61162, 8 DATA BITS, 1 STOP BIT, ODD, 4.8**
  - I/O DATA: **ON, NONE, 8 DATA BITS, 1 STOP BIT, ODD, 4.8**
- Message Output (for printing live messages on-line)
  - **RECEIVING MSG:** **ON, OFF**
- \*4Message Alarms On/Off
  - Type A Message: **ON, OFF**
  - Type B Message: **ON, OFF**
  - Type L Message: **ON, OFF**

\*1: *Settings indicated in Italic type fonts are factory defaults.*

\*2: *Can be controlled via RS-422 port with IEC 61162-1 proprietary command. Last setting is stored in memory.*

\*3: *Can be controlled via RS-422 port with IEC 61162-1 \$CRNRM command. Last settings are stored in memory. Message types A, B, D and L cannot be rejected.*

\*4: *Type D message alarm is always set to ON; the user cannot change the status.*

### 13. List of Components To Be Shipped

The following set of components is usually shipped by the manufacturer, either as standard or optionally. The same information is usually given in the shipping documents (INVOICE, PACKING LIST, etc. as requested by the user) to be attached to the shipment. If your equipment is purchased from a JMC-authorized dealer, or if it is an OEM model, a different set of components may be delivered. Contact your dealer for details.

Receiver Console (Cabinet), <b>NT-2000</b> :	Standard	1 set
Active Antenna Assembly, <b>ANT-2000</b> :	Standard	1 set
• Pre-amplifier with * <sup>1</sup> 10m coax cable terminated in BNC plug		
• Whip, 1.2m		
Receiver Mounting Bracket:	Standard	1 pc
Panel Mounting Frame, 3050901:	Optional	1 pc
Cabinet Clamping Knob, M8X15:	Standard	2 pcs
Power Supply Cable:	Standard	1 set
3m, 2-conductor shielded, terminated in type FM14-3P plug		
Plugs:		
• FM14-4P (external alarm port):	Standard	1 pc
• FM14-8P (I/O DATA port):	Standard	1 pc
• HDEB-9S (RS-232C, RS-422 ports):	Standard	2 pcs
Fuse (3A, 125V, 5.2X20 mm):	Standard	2 pcs
Reference Manual, UM-NT2000-6:	Standard	1 copy

\*<sup>1</sup> OEM models are supplied with 1m RG58/U coax cable terminated in a PL-259.