



**SAILOR** C4900/C4901  
Installation Manual

# Introduction

## S. P. Radio A/S

For more than half a century S. P. Radio A/S has been the market leader within maritime radio communication.

## SAILOR

The communication products and systems of S. P. Radio are recognized under the brand name SAILOR. The Saylor name has become a guarantee of reliable and technologically superior radio equipment, ranging from basic VHF units to satellite systems and complete compact GMDSS solutions.

## Products

The SAILOR COMPACT 2000 GMDSS is based on the well proven range of Saylor products specifically developed to meet the GMDSS requirements and supported by a world-wide Certified GMDSS service concept, giving several hundred reasons for shipping companies to choose equipment manufactured by S. P. Radio A/S. Today S. P. Radio A/S is recognized as the world's leading supplier of GMDSS solutions.

The SAILOR COMPACT 2000 GMDSS has already been and still is constantly supplied to a large number of the world's leading shipping companies and national naval fleets. It is a complete GMDSS solution which matches communication and safety needs exactly - regardless of whether you operate with A1, A2, A3 or A4.

The System 4000 GMDSS sets new standards. It is constructed on the basis of our comprehensive experience developing GMDSS equipment. It satisfies all the relevant requirements regarding safety and efficiency. The System 4000 presents a large number of attractive convenience and safety facilities, either as a complete solution or as a series of stand-alone products.

Saylor has a long history as a satellite communications supplier offering a full programme of satellite systems which includes Mini M, SAT-C and a number of stationary satellite systems. Our SAT-B is a breakthrough in maritime aerial technology and reliability. The SAT-B is the best possible choice when high quality speech transmission, top level security and the capacity to deal with large volumes of telex, fax, data and high-speed data (HSD) transmissions are required.

## Training certification

Training of deck officers to meet the requirements within the concept of GMDSS, as to operation of equipment and basic understanding of the systems, is an extremely important factor for the overall success-

ful implementation of GMDSS. As a unique initiative for GMDSS solutions, we can supply a complete software training programme for on-board training, to be used as preparation in order to fulfil the GMDSS requirements for obtaining the General Operation Certificate.

## Service

A world-wide Saylor GMDSS certified service concept has been established in order to provide the shipping industry with a highly professional and uniform level of service. The Saylor GMDSS Certified Service Centre concept, which is constantly monitored, ensures that replacement units and spare parts are available at all the Saylor Certified Service Centres around the world. Service centres which are in position along all the major shipping routes. Furthermore the Certified Service Centres ensure that technicians with an annually updated training are ready to provide service 24 hours a day, 365 days a year.

## Maintenance

Because of the fact that GMDSS equipment has been installed on board ships in order to meet the SOLAS (Safety of Life At Sea) convention, manufacturers and suppliers of GMDSS equipment have a certain responsibility to secure reliable supplies of equipment and spares in the years to come.

Therefore shipowners operating ships both locally and internationally should be fully aware of the importance of fitting GMDSS solutions which will be fully supported by the manufacturer.

It is a firm policy of S. P. Radio A/S, as the world's major manufacturer and supplier of GMDSS solutions, that for both the present GMDSS solutions and for future, alternative product solutions, all Saylor GMDSS systems will be entering the next century, in fully parallel production.

## Please note

Any responsibility or liability for loss or damage in connection with the use of this product and the accompanying documentation is disclaimed.

The information in this manual is furnished for informational use only, is subject to change without notice, may contain errors or inaccuracies, and represents no commitment whatsoever.

This agreement is governed by the laws of Denmark.

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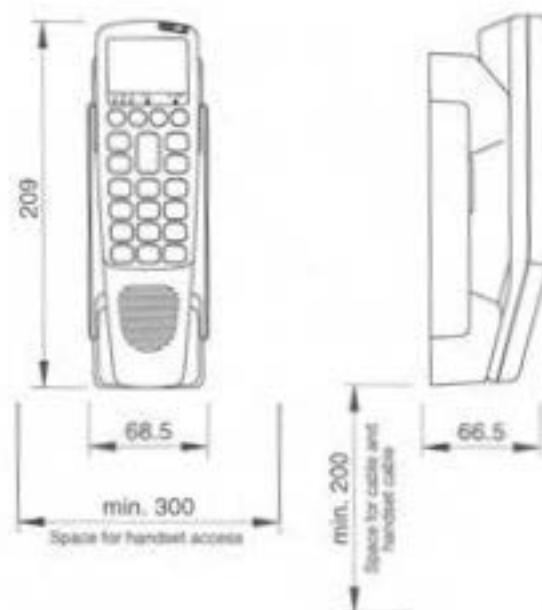
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## 2 Installation

### 2.1 Mounting Possibilities

#### Handset

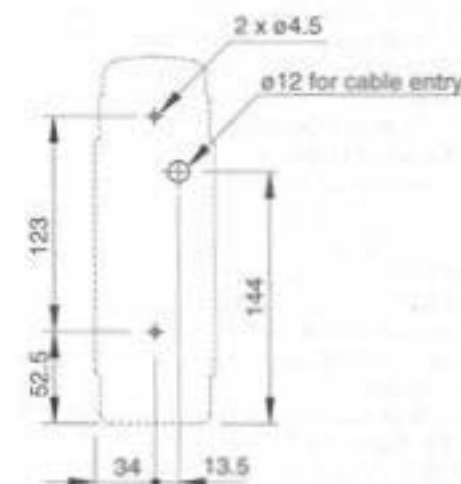


4.0.1041

**Weight:**  
Handset

0.5 kg

#### Drilling Plan



4.0.1042

### 2.2 Power Supply

The handset unit is supplied from the SPARC-bus interface with +12V-DC. The +12V-DC supply is fused in the handset by a 630 mA fuse.

## 2.3 Handset Connection - A1 VHF-DSC/Basic VHF

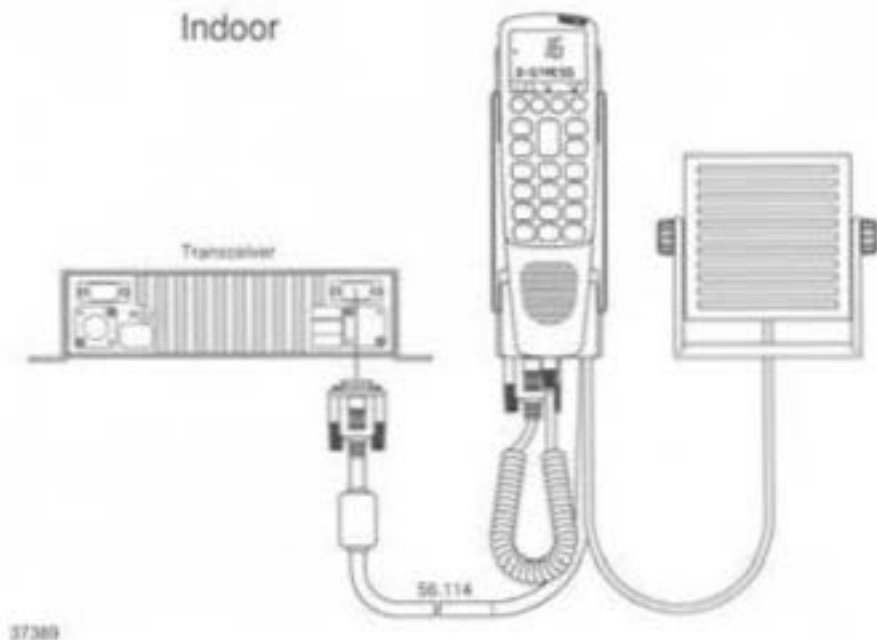
Remote control units can be connected in two ways:

1. Directly between the transceiver and the control unit hooks.
  2. By means of a SPARC-bus connection box H4991 or WP SPARC-bus connection box.
- Both control units with or without DSC can be connected.

Remote speaker may be connected to remote hooks, or to be connection box H4991 or WP SPARC-bus connection box.

The max. number of handsets allowed to be connected simultaneously to the transceiver without DSC are 4 handsets and to the transceiver with DSC are 7 handsets.

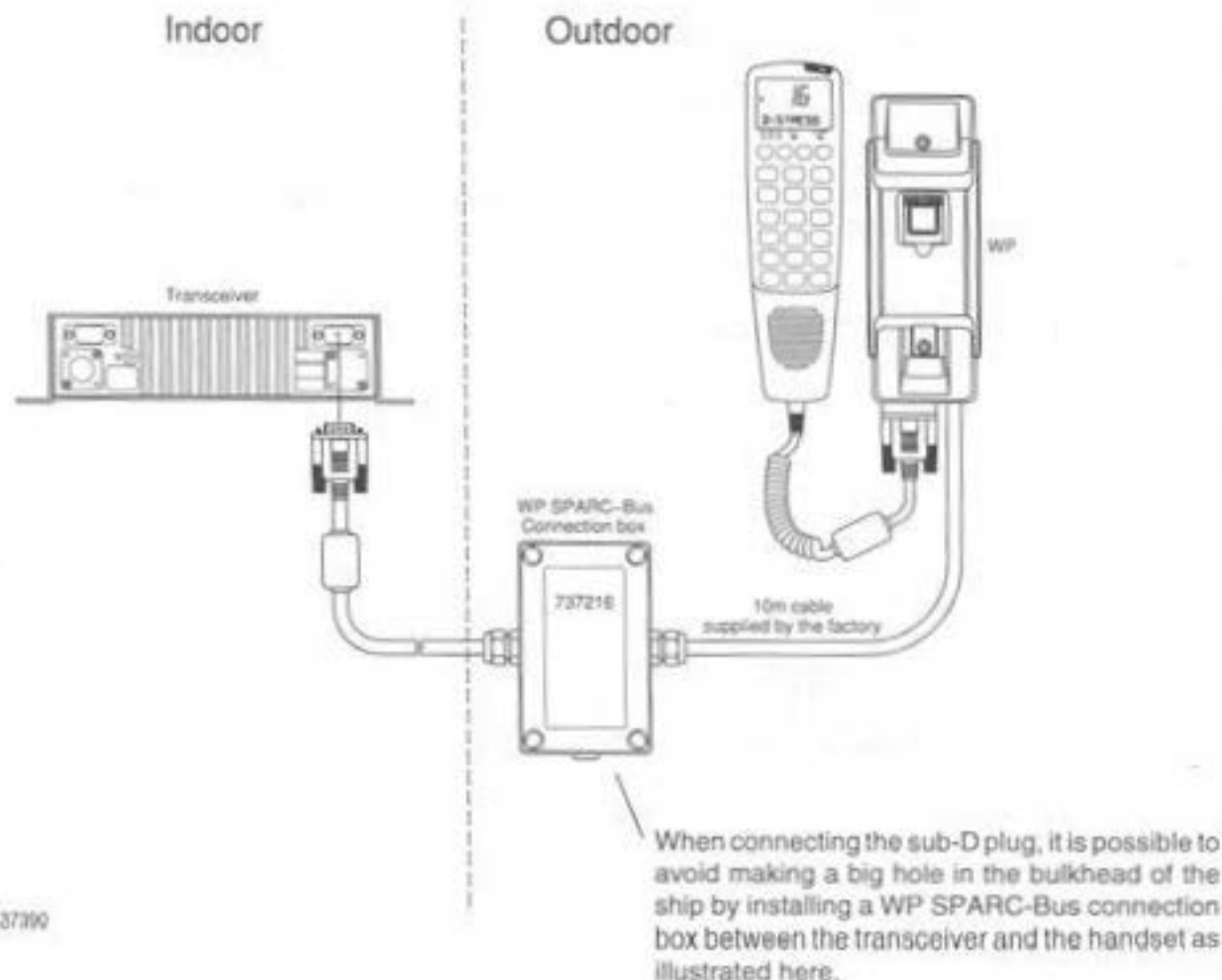
### 2.3.1 Connection of Transceiver / Indoor Handset



#### WARNING:

Do not connect the spiral cable for the intelligent handset directly to the transceiver. The spiral cable for the intelligent handset must be connected to the handset hook; otherwise the transceiver may activate distress.

### 2.3.2 Connection of Transceiver / WP SPARC-Bus Connection Box / Weatherproof Handset



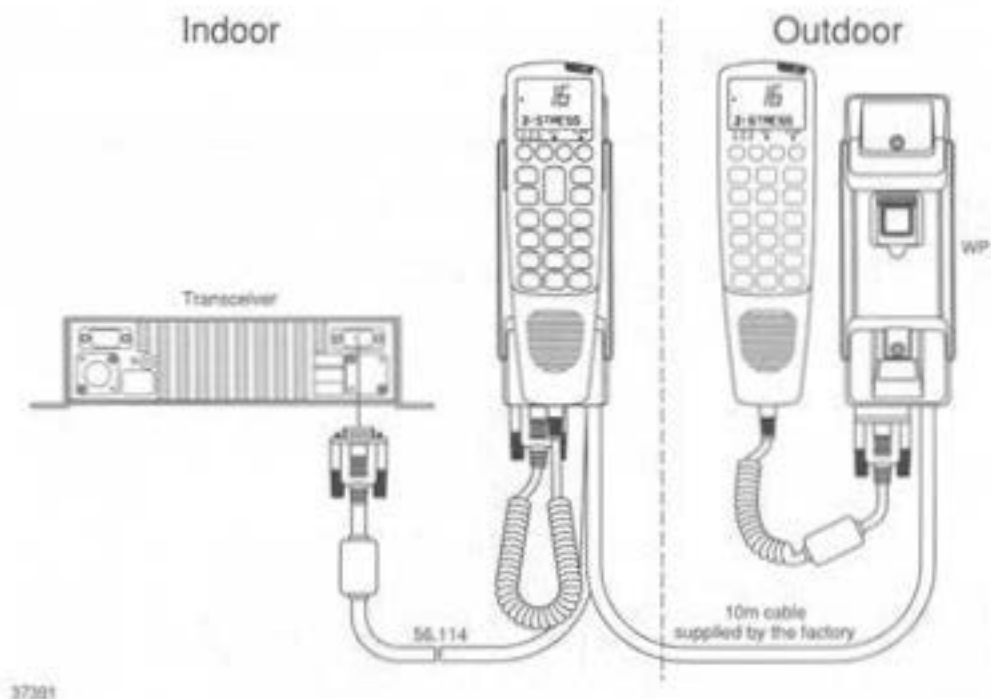
37390

**WARNING:**

Do not connect the spiral cable for the intelligent handset directly to the transceiver. The spiral cable for the intelligent handset must be connected to the handset hook; otherwise the transceiver may activate distress.

### 2.3.3 Connection of Transceiver / Indoor and Weatherproof Handset

If the existing handset hook is the one shown in the drawing below, your weatherproof handset is to be connected as follows.



**WARNING:**

Do not connect the spiral cable for the intelligent handset directly to the transceiver. The spiral cable for the intelligent handset must be connected to the handset hook; otherwise the transceiver may activate distress.

## 2.4 Handset Connection - VHF-DSC

Remote control units can be connected in two ways:

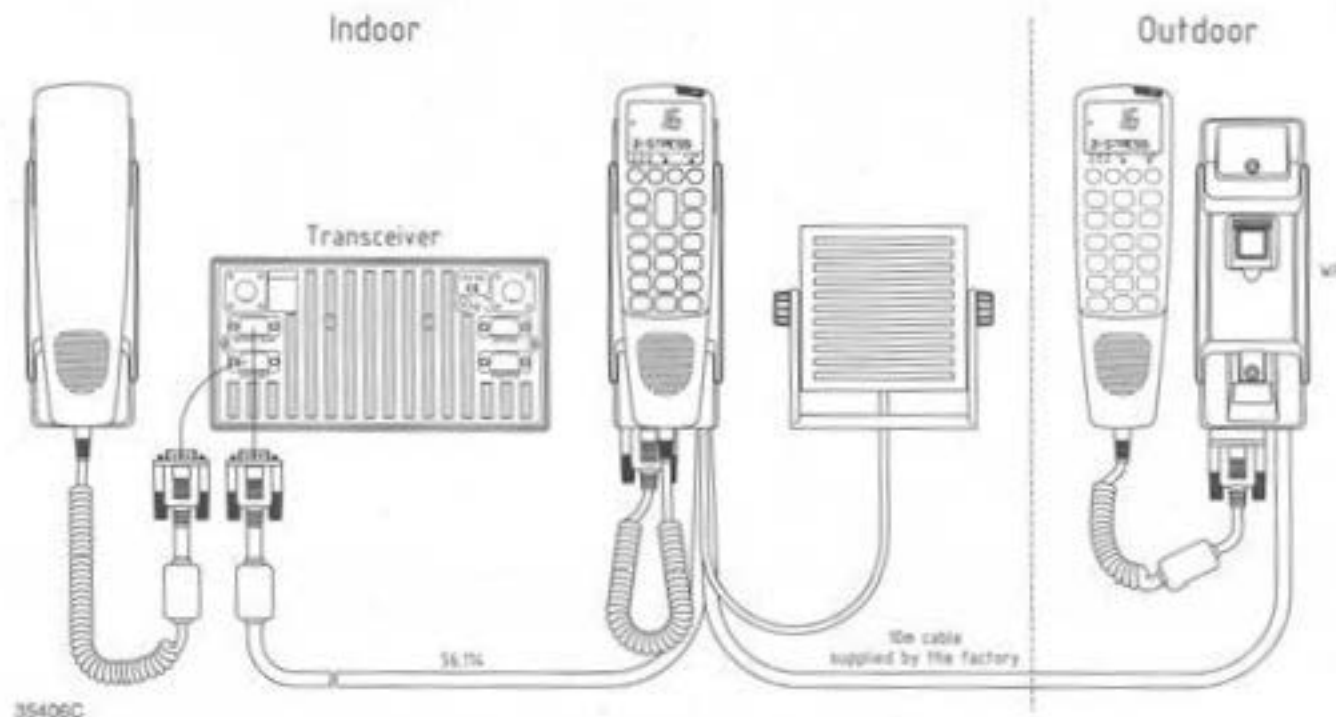
1. Directly between the transceiver and the control unit hooks.
  2. By means of a SPARC-bus connection box H4991 or WP SPARC-bus connection box.
- Both control units with or without DSC can be connected.

Remote speaker may be connected to remote hooks, or to be connection box H4991 or WP SPARC-bus connection box.

The max. number of handsets allowed to be connected simultaneously to the transceiver with DSC are 6 handsets.

Always connect local handset to the transceiver. DSC Class of intelligent handset is "D" even if the radio is Class A.

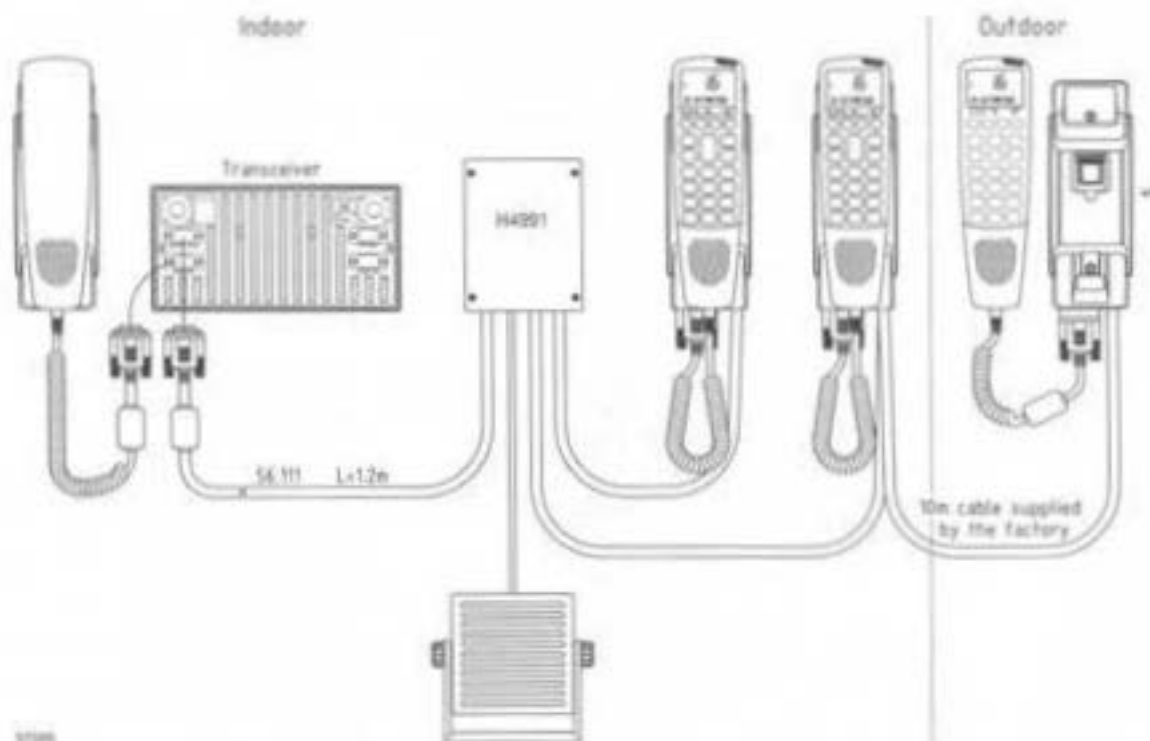
### 2.4.1 Connection of Transceiver / Indoor and Weatherproof Handset



**WARNING:**

Do not connect the spiral cable for the intelligent handset directly to the transceiver. The spiral cable for the intelligent handset must be connected to the handset hook; otherwise the transceiver may activate distress.

## 2.4.2 Connection of Transceiver / Connectionbox H4991 / Indoor and Weatherproof Handset



### WARNING:

Do not connect the spiral cable for the intelligent handset directly to the transceiver. The spiral cable for the intelligent handset must be connected to the handset hook; otherwise the transceiver may activate distress.

## 2.5 Loudspeaker Connection

When one or more control units are connected to the VHF system, two of them can be set up to use the transceiver's two loudspeaker outputs to drive external speakers.

To link a loudspeaker to a control unit, enter the function menu and select external speaker:

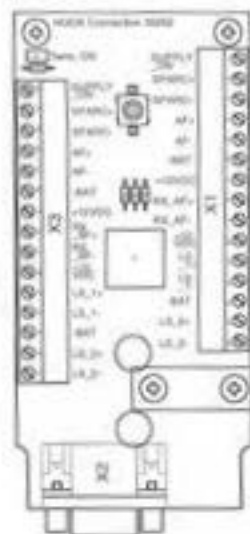
Path: Func/general/sound/loudspeak/norm/almarm/extspk, and set external speaker to be 1 or 2 as desired.

The loudspeaker signals are available in the SPARC-bus cabling, and a loudspeaker can be connected to the system in the handset hook parts or in the connection box.

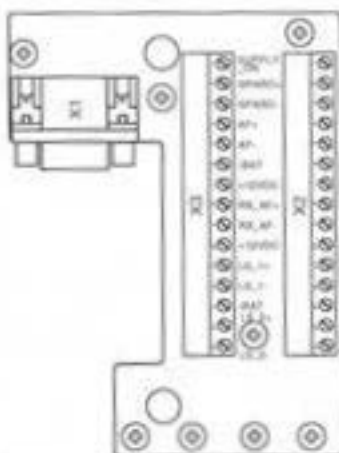
Connect the loudspeaker cables to SPARC-bus signals (LS\_1+ and LS\_1-) or (LS\_2+ and LS\_2-) depending on which speaker selection is made by the control unit(s).

## 2.6 Connectors

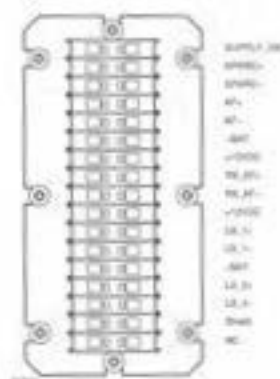
Handset Hook



SPARC-Bus Connection Box H4991



WP SPARC-Bus Connection box



In the handset hook the shield of the SPARC-bus cable is connected to the cable relief.

### WARNING:

Be carefull not to cover the distress switch with installation wires.

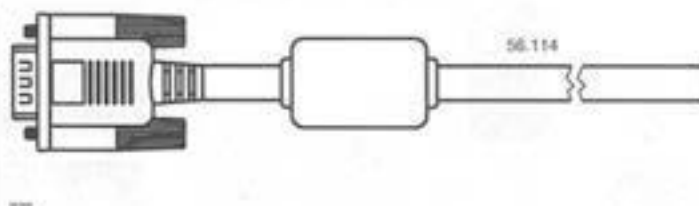
## 2.6.1 SPARC-Bus Cable

The table below describes the max. length of the SPARC-bus cable for the power supply for **one** handset unit. The length of the cable depends on the number of supply wires and the wire thickness. The table shows the cable lengths for systems with a supply voltage of +12V. If the system supply voltage is 24V, i.e. the supply voltage is provided through N420, the max. cable length listed in the table may be doubled.

| Number | System supply | Number of wires in cable | From        | To   | Wire mm2 | Number of wires - BATT OVDC | Number of wires +12VDC | Max. length |
|--------|---------------|--------------------------|-------------|------|----------|-----------------------------|------------------------|-------------|
| 56.114 | +12 Volt      | 2x8                      | BOX         | HOOK | 0.25     | 2                           | 2                      | 30 metres   |
|        | +12 Volt      | 2x8                      | BOX         | HOOK | 0.50     | 2                           | 2                      | 60 metres   |
|        | +12 Volt      | 2x8                      | BOX         | HOOK | 0.75     | 2                           | 2                      | 100 metres  |
|        | +12 Volt      | 2x8                      | Transceiver | HOOK | 0.14     | 3                           | 2                      | 5 metres    |

The SPARC-bus cable length is limited by the level of output power delivered to a connected external speaker on the LS\_2 terminals. The speaker output power depends on cable length and cable thickness as described in the table below.

| Wire [mm2] | Length [m] | Max. Power [W] |
|------------|------------|----------------|
| 0.14       | 5          | 3.4            |
| 0.25       | 10         | 3.2            |
| 0.25       | 20         | 2.0            |
| 0.50       | 20         | 3.2            |
| 0.50       | 40         | 2.0            |
| 0.75       | 30         | 3.2            |
| 0.75       | 60         | 2.0            |



SPARC-bus/Option cable 5 metres 56.114

| Pin no. | Name      | Colour         | Twisted pair |
|---------|-----------|----------------|--------------|
| pin 1   | SUPPLY_ON | Red/White      | 7            |
| pin 2   | SPARC+    | Yellow         | 1            |
| pin 3   | SPARC-    | Yellow/Black   | 1            |
| pin 4   | AF+       | Blue/White     | 2            |
| pin 5   | AF-       | Blue           | 2            |
| pin 6   | -BAT_OVDC | Red and Orange | 7/8          |
| pin 7   | +12VDC    | Orange/White   | 8            |
| pin 8   | RX_AF+    | Green/White    | 3            |
| pin 9   | RX_AF-    | Green          | 3            |
| pin 10  | +12VDC    | Black/White    | 6            |
| pin 11  | LS_1+     | Brown          | 4            |
| pin 12  | LS_1-     | Brown/White    | 4            |
| pin 13  | -BAT_OVDC | Black          | 6            |
| pin 14  | LS_2+     | Purple         | 5            |
| pin 15  | LS_2-     | Purple/White   | 5            |
| Shield  |           | Shield         |              |

SPARC-bus connections

| Transceiver unit X1 | Name      | Twisted pair | Handset HOOK X1,X3 | SPARC-bus connection box X1,X2,X3 |
|---------------------|-----------|--------------|--------------------|-----------------------------------|
| pin 1               | SUPPLY_ON |              | 1                  | 1                                 |
| pin 2               | SPARC+    | 1            | 2                  | 2                                 |
| pin 3               | SPARC-    | 1            | 3                  | 3                                 |
| pin 4               | AF+       | 2            | 4                  | 4                                 |
| pin 5               | AF-       | 2            | 5                  | 5                                 |
| pin 6               | -BAT_OVDC |              | 6                  | 6                                 |
| pin 7               | +12VDC    |              | 7                  | 7                                 |
| pin 8               | RX_AF+    | 3            | 8                  | 8                                 |
| pin 9               | RX_AF-    | 3            | 9                  | 9                                 |
| pin 10              | +12VDC    |              | 10                 | 10                                |
| pin 11              | LS_1+     | 4            | 11                 | 11                                |
| pin 12              | LS_1-     | 4            | 12                 | 12                                |
| pin 13              | -BAT_OVDC |              | 13                 | 13                                |
| pin 14              | LS_2+     | 5            | 14                 | 14                                |
| pin 15              | LS_2-     | 5            | 15                 | 15                                |

## 2.7 Installation of Handset

0. VHF system turned off, connect hook and handset to the system according to the above description.
1. When transceiver, SPARC-bus cable and handset hook unit are assembled, connect the handset to the hook by the 15-pole D-sub connector and place the handset on hook.
2. Turn the VHF system on by pressing the ON/OFF button at the top of the handset.
3. Set up the handset SPARC-bus location number and SPARC-bus handset name by entering the service menu in the handset:

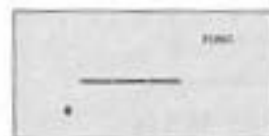
Press  



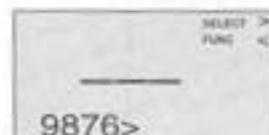
Press arrow down



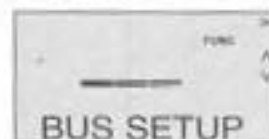
Press



Key in the acces code  
(Alter the key until the digit appears)



Press

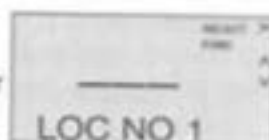


Press



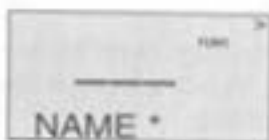
Press 

Use  to change SPARC-bus location number



Press 

Use keys  to  to enter/change name of handset.



Press  to step one character to the right or select the entered name.

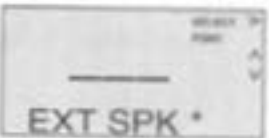
After setup enter VHF mode by pushing:

  or 



4. If an external speaker has to be linked to the handset:
- Enter the function menu and select external speaker as desired.
  - Path Func/general/sound/loudspeaker/normal/alarml/extspk
  - Display:

- Use  to change type of EXT. speaker



- 0: No external speaker selected
- 1: External speaker 1 selected
- 2: External speaker 2 selected
- 3: Both external speakers selected

- Use  to select the setting

5. **ATTENTION:**

When more control units are connected to the VHF system, they all have to be assigned different location numbers for the system to function correctly.

The control unit placed at a ship's main place of control should be assigned location number 1.

In the VHF system the control unit which has location number 1 also has the highest priority in the system and is thus able to control the system at any time.

## 2.8 System Function Test

When a handset has been connected to the VHF system, go through the following test procedures to ensure correct system function. If the test items are performed successfully the VHF system functions correctly.

- Purpose:** To test correct assembly of the system, ensuring SPARC-bus command communication between all system units, including system control priorities for the control units. Check the telephony TX LF and RX LF routing.
- Test setup:** Turn on all control units, all handsets placed on hook, each unit showing VHF display.

### 2.8.1 Test Procedure System Priorities: (System Control and SPARC-Bus Data Interface Circuits)

If only one control unit is connected, just hook off the handset and change the channel or push PTT once to ensure that the handset is able to control the system.

If more control units are connected, do the following:

| Test stimuli                  | Expected result                   |                                                                                                                                                                   |
|-------------------------------|-----------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1a Handset (loc_1): Hook off, | Handset loc_1: VHF display.       |  <div data-bbox="1222 1123 1485 1257"> <div>16</div> <div>0 08 01</div> </div> |
|                               | Other control units: OCC display. | <div data-bbox="1222 1283 1485 1414"> <div>oCC</div> <div>1 "NAME"</div> </div>                                                                                   |

- 1b Other control units in sequence:  
Hook off.



Handset loc\_1: VHF display.

16  
0 08 01

Other control units: OCC display.

oCC  
1 "NAME"

- 2 All control units:  
Hook on.



All control units: VHF display (system idle).

16  
0 08 01

- 3a Handset (loc\_2):  
Hook off.



Handset loc\_2: VHF display.

16  
0 08 01

Other control units: OCC display.

oCC  
2 "NAME"

- 3b Handset (loc\_1):  
Hook off.



Handset loc\_1 or loc\_2: VHF display.

16  
0 08 01

Other control units: OCC display.

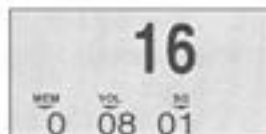
oCC  
1 "NAME"

- 3c Handset (loc\_1):  
Hook on.



Handset loc\_2: VHF display.

Other control units: OCC display.

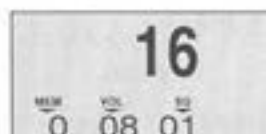


- 3d Handset (loc\_3):  
Hook off.



Handset loc\_2: VHF display.

Other control units: OCC display.

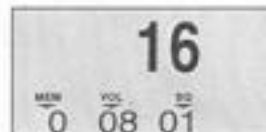


- 3e Handset (loc\_3):  
Hook on.

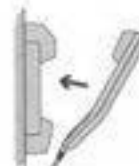


Handset loc\_2: VHF display.

Other control units: OCC display.



- 3f Handset (loc\_2):  
Hook on.  
All on hook.



All control units: VHF display (system idle).

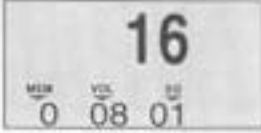


If the different control units do not act as described, it is possible that some of the units are assigned the same location number; if so, check the location number setup in each unit.

## 2.8.2 Test Procedure Intercom: (Handset TX AF Circuits and Handset Audio Amplifier Circuits)

If only one control unit is connected, this test is not to be carried out.

If more control units are connected, do the following:

| Test stimuli                                                                        | Expected result                                                       |                                                                                       |
|-------------------------------------------------------------------------------------|-----------------------------------------------------------------------|---------------------------------------------------------------------------------------|
| 1 Handset (loc_1):                                                                  | Handset (loc_1): INT-C dial display and dialling tone in the handset. |    |
|    | Handset (loc_2): INT-C dial display and dialling tone in the handset. |    |
|                                                                                     | Other control units: VHF display.                                     |    |
| 2 Handset (loc_1):<br>Hook off.                                                     | Handset (loc_1): INT-C dial display and dialling tone in the handset. |   |
|  | Handset (loc_2): INT-C dial display and dialling tone in the handset. |  |
|                                                                                     | Other control units: VHF display.                                     |  |

- 3 Handset (loc\_1):  
Press PTT and talk.



Handset (loc\_1): INT-C dial display  
and dialling tone in the handset.

Handset (loc\_2): Voice output in speaker  
and dialling tone in the handset.

Other control units: VHF display.

**IC2**  
CALLING

**IC1**  
CALLING

**16**  
MEM 0 VOL 08 RD 01

- 4 Handset (loc\_2):  
Hook off.



Handset (loc\_1): INT-C display.

Handset (loc\_1): INT-C display.  
Intercom in progress, talk both ways.  
Voice in both handset  
earpieces/speakers.



Other control units: VHF display.

**IC2**  
"NAME 2"

**IC1**  
"NAME 1"

**16**  
MEM 0 VOL 08 RD 01

- 5 Handset (loc\_1):  
Hook on.



Handset (loc\_2): VHF display.

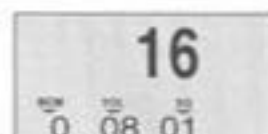
Other control units: OCC display.

**16**  
MEM 0 VOL 08 RD 01

**oCC**  
2 "NAME"

- 6 Handset (loc\_2):  
Hook on (all on hook)

All control units: VHF display (sys idle).



### 2.8.3 Test Procedure TX Transmitter: (Handset TX AF Circuits and VHF Transmitter)

When this test is carried out, the transmitter power level has to be 25W indicated by no light in the 1W indicator lamp. If the VHF transmitter fails, the 1W indicator lamp will go on during PTT push and/or the display will show the error message ANTEN FAIL. This is not the expected result. If ANTEN FAIL is displayed, check that the aerial and aerial cable are connected correctly.

#### Test stimuli

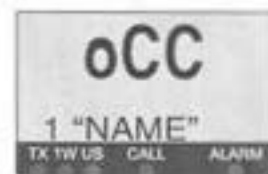
#### Expected result

- 1 Handset (loc\_1):  
Hook off.

Handset (loc\_1): VHF display.



Other control units: OCC display.



- 2 Handset (loc\_1):  
Press PTT.



Handset (loc\_1): VHF display.  
TX indicator lamp is lit.



Other control units: OCC display.



- 3 Handset (loc\_1):  
Release PTT.



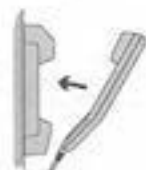
Handset (loc\_1): VHF display  
TX indicator lamp turns off.



Other control units: OCC display.



- 4 Handset loc\_(1):  
Hook on.



All control units: VHF display (system idle).



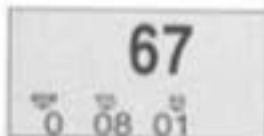
## 2.8.4 Test Procedure VHF Signal Reception: (VHF Receiver and Handset RX AF Circuits)

For each control unit, do the following:

### Test stimuli

### Expected result

- 1 All handsets placed on hook.  
(VHF display)  
Set squelch threshold  
level to 0.



All control units:  
Receiver opens, static noise in all control  
unit speakers.  
If no sound, activate the speaker and turn  
up the volume level.



## 2.8.5 Test Procedure TX/RX DSC Call

To test the system's DSC functionality, enter the function menu and perform two test calls: (INTERNAL test) and (EXTERNAL test).

**Internal test call:** (The call is looped back internally, no activation of transmitter or receiver)

This test controls the DSC modem in the transceiver RX and TX internally.

1. Hook off handset.
2. Enter function menu: Func/dsc/testcalls/int path. Select call by "arrow right" key.
3. "Transmit" the call by keying "Send call".
4. The display will show in sequence: TX-CALL, TX-OK.
5. The call is announced by the DSC modem. Read the call info in RX-LOG.

**External test call:** (The call is transmitted and received using the aerials).

This test also controls the hardware of transmitter and receiver boards.

1. Hook off handset.
2. Enter function menu: Func/dsc/testcalls/ext path. Select call by "arrow right" key.
3. "Transmit" the call by keying "Send call".
4. The display will show in sequence: TX-CALL, TX-OK.
5. The call is announced by the DSC modem. Read the call info in RX-LOG.