MP7600

Maintenance Manual

Kongsberg Maritime Part no.	
MP7600 Base model:	704293
MP7600 NAV model:	704364
MP7600 with 4-screen model:	302088
MP7600 with LAN/CAN model:	302089
MP7600 with 8 channel Blue Heat model:	302090
MP7600 with LAN/CAN + 2 COM ports model:	304324
MP7600 HS/DP-Recorder 500 model:	312199

302399/E
May 2007

Document history

Document number: 302399		
Rev. A	April 2006	First version.
Rev. B	August 2006	Added part number 304324 MP7600 with LAN/CAN + 2 COM ports model, added COM2 to Base model, changed Damper kit, and changed name for List ident 9 in Table 3.
Rev. C	December 2006	Corrected PN names on front page, and updated section 1.4.2 to reflect that PN: 704364 does not include RIC2 card.
Rev. D	January 2007	Changed MP7600 with 4 channel Blue Heat card with 8 channel Blue Heat card, and added section 4.1.15.
Rev. E	May 2007	Added part number 312199 MP7600 HS/DP-Recorder 500 mode. Added section 4.1.5 and section 4.1.11

Note

Comments

To assist us in making improvements to the product and to this manual, we welcome comments and constructive criticism.
e-mail: km.documentation@kongsberg.com

Kongsberg Maritime AS
P.O.Box 483
N-3601 Kongsberg,
Norway

Telephone: +47 32 28 50 00
Telefax: +47 32 28 50 10
Service: +47 815 35 355
www.kongsberg.com

KONGSBERG

Table of contents

1 HARDWARE DESCRIPTION

This section describes the MP7600 hardware configuration.

1.1 General description

The MP7600 maritime computer is used in a wide range of Operator Stations (OSs) produced by Kongsberg Maritime.

The computer can be installed inside OS consoles by using specific mounting brackets (see actual operator station maintenance manual for details on mounting).

The OS and process station application software is stored on the MP7600 hard-disk.

The MP7600 is built around a high−performance CPU (central processing unit) running the Microsoft® Windows XP™.

The computer can be easily dismantled for replacing module purposes.

The MP7600 accepts both 115 and 230 VAC mains input voltage.

Part numbers for the different models are shown on the front page of this document. The models differ mainly on the combination of interface cards installed.

1.2 MP7600 computer cabinet

1.2.1 Cabinet front panel

See figure below for layout of the cabinet front. DVD-RW drive is located to the left, and underneath the DVD is microphone input, headphones output, two USB ports, LEDs for power and internal hard-disk drive, and On/Off switch.

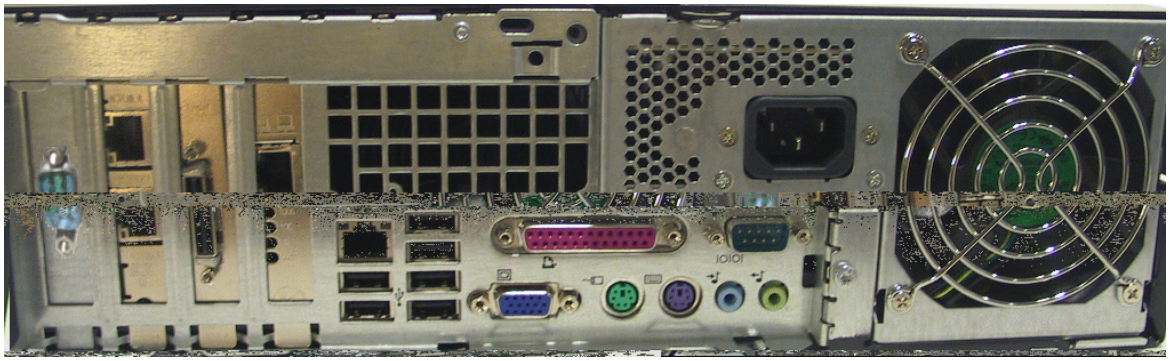
Figure 1 Cabinet front panel

1.2.2 Cabinet rear panel

Connectors for power, user interfaces and external equipment are located on the rear panel. See *MP7600 external connections* on page 10.

Six different types of MP7600 computers are available using different interface cards. See *Interface cards and connections* on page 12.

Figure 2 Cabinet rear panel (example)



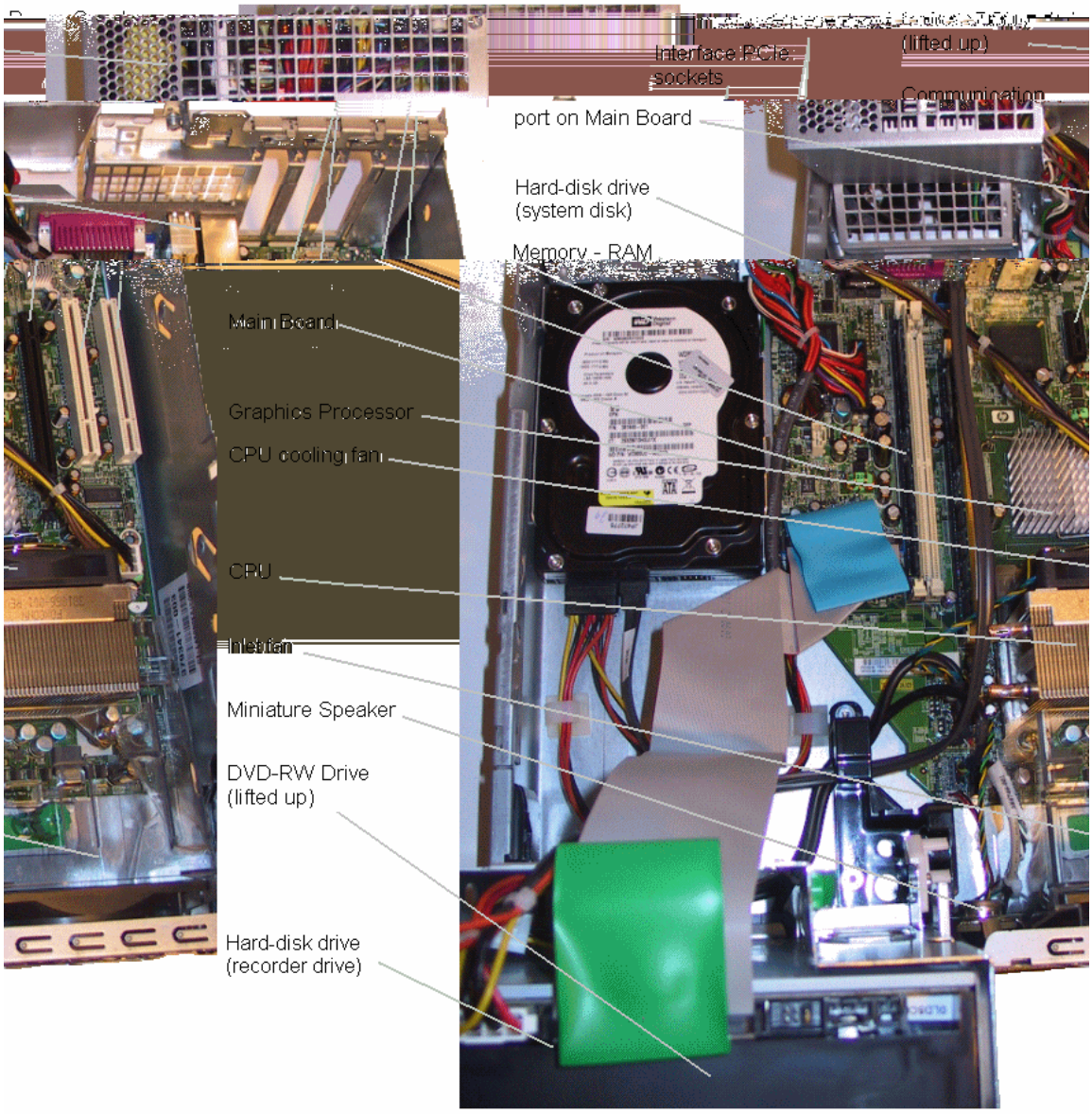
1.2.3 Cabinet interior

Location of the main components inside the cabinet is shown in figure below. The computer is shown from above with the front wall pointing towards you.

The power supply with its cooling fan is lifted up and located in the back to the left.

The DVD-RW/HDD-Recorder assembly is also lifted up and located in the front to the left.

Figure 3 Cabinet interior



The interface card assembly modules (removed in figure above) are located in the upper right hand corner. They can easily be pulled out for changing of interface cards. No screws are to be unscrewed, only lifting the lever at the green coloured handle, which secures the interface cards to the main board.

1.3 MP7600 configuration

The following cards and components are available for the different models of the MP7600:

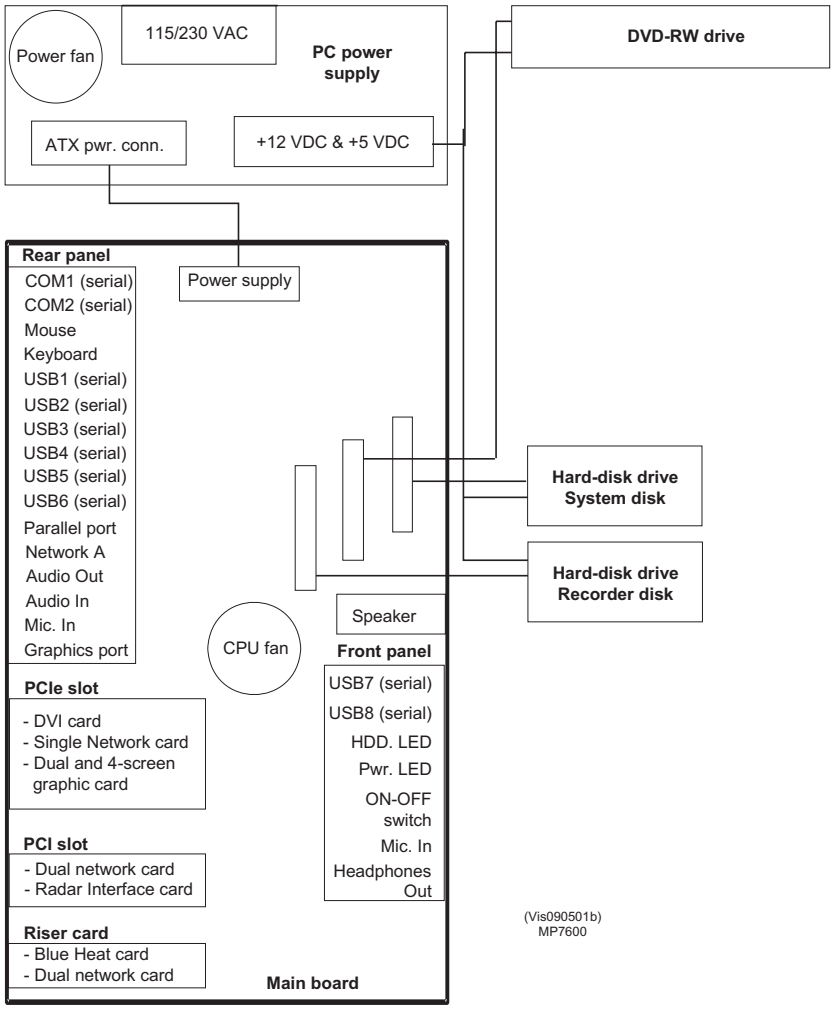
- Main board (Motherboard)
- CPU
- RAM, 2 x 512 MB
- Power supply 115/230 VAC
- Network card (Net B and Net C)
- DVI card
- Graphics card (2–screen / 4–screen)
- Serial line card (COM2)
- Blue Heat cards (8 channel / 4 channel; obsolete)
- CAN card (Can Net)
- Radar Interface card
- Hard-disk drive (system disk)
- Hard-disk drive (recorder disk)
- DVD-RW drive
- Miniature speaker
- Reset button (On/Off)

Each of the computer and interface cards, drives and power supplies listed above are shortly described in sections below. The replaceable modules are described more detailed in separate documents (*Hardware Module Descriptions*).

The following figure shows a block diagram of the MP7600.

Note

The figure does not show an actual MP7600 configuration, but the available interface cards, drives and power supplies.



1.3.1 Main board

The main board is equipped with a 3 GHz CPU and 2 x 512 MB RAM.

The main board is not considered a replaceable module because the computer has to be rebuilt from scratch and thoroughly tested if the board is changed.

1.3.2 Power Supply

One power module is used. It has 115 VAC or 230 VAC as input voltage, and is of type Autosense.

Note

See Replaceable Parts and Consumables on page 51 for module names and part numbers, and see the corresponding Hardware Module Description for more technical information.

1.3.3 Interface cards

The following interface cards are available with MP7600 computer:

Dual network card, Single network card, DVI card, 2-screen graphic card, 4-screen graphic card, Radar interface card 2 (RIC2), Blue Heat card, and COM2 card.

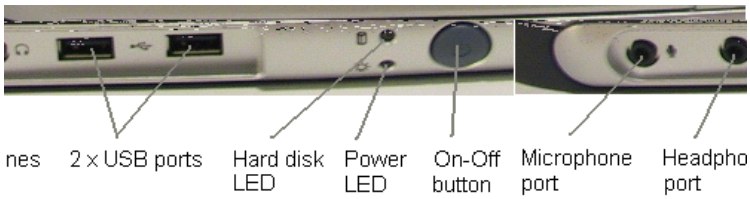
For details about the interface cards see the appropriate *Hardware Module Descriptions*, and refer to

1.4.1 Main board connections

This section lists the connectors available from the main board. For more details refer to the *Hardware Module Description* for the main board.

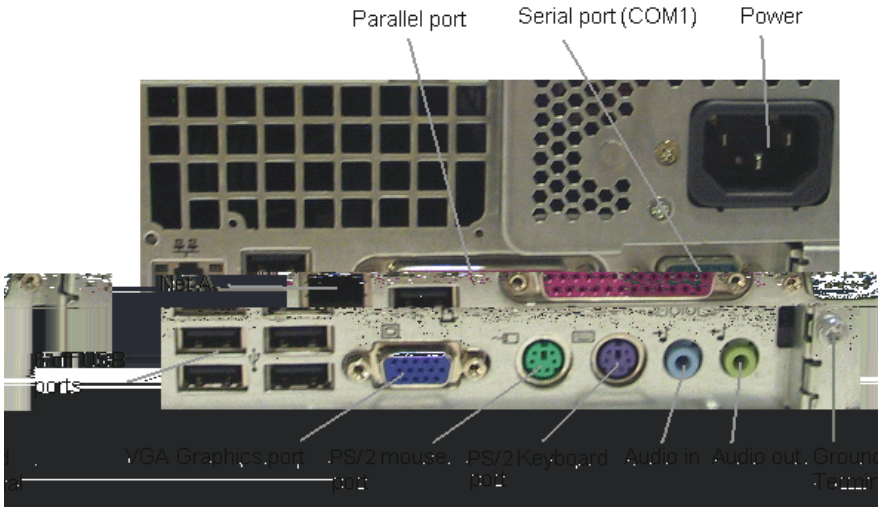
The following figure shows front connectors for external connections:

Figure 4 Front – external connections



The following figure shows rear wall connectors for external connections:

Figure 5 Rear – external connections



1.4.1.1 Mouse

This is a standard PS/2 serial mouse connector.

1.4.1.2 Keyboard

This is a standard PS/2 keyboard connector.

1.4.1.3 Parallel port

The Parallel port complies with the standard for PC parallel ports.

With appropriate driver software and configuration a local printer can be connected to this port.

1.4.1.4 COM1 and COM2

These are standard PC serial line COM ports.

1.4.1.5 Network

This is a standard ethernet network connection based on the RJ45 connector. It is assigned to the network A in the redundant process network.

1.4.1.6 Audio In

This is a audio line input connection based on the mini jack connector.

1.4.1.7 Audio Out

This is a audio line output connection based on the mini jack connector.

1.4.1.8 Microphone

This is a microphone connection based on the mini jack connector. A contact is located on the front and on the rear wall.

1.4.1.9 Headphones

This is a headphones connection based on the mini jack connector and is located on the front.

1.4.1.10 USB

The main board provides eight USB (Universal Serial Bus) roots (ports) for attaching USB devices. Two ports are available on the front and six on the rear panel.

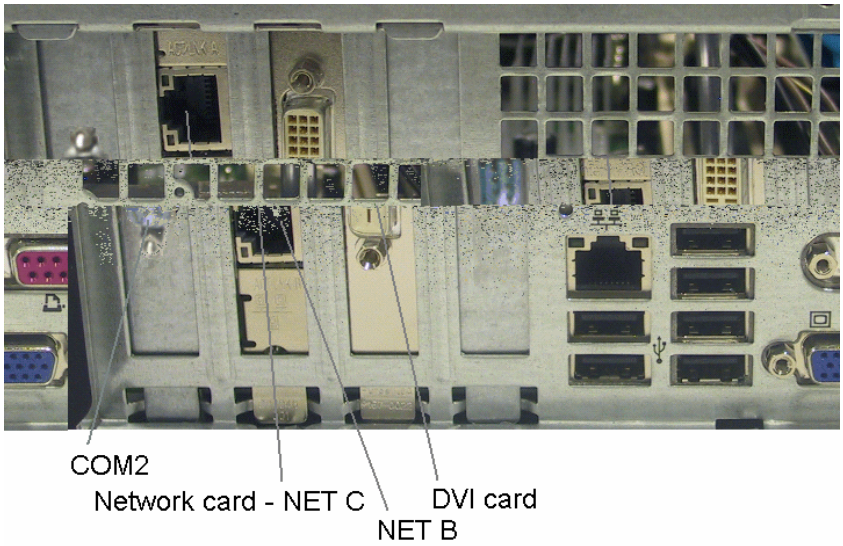
1.4.2 Interface cards and connections

The illustrations below shows the different types of MP7600 computers.

Six different types of MP7600 computers are available: (see front page for part numbers). Common for all rear panels are: Net A, 6 off USB ports, VGA graphics port, PS/2 mouse port, Keyboard port, Audio -in and -out, and Main power plug as shown in *Rear – external connections* on page 11.

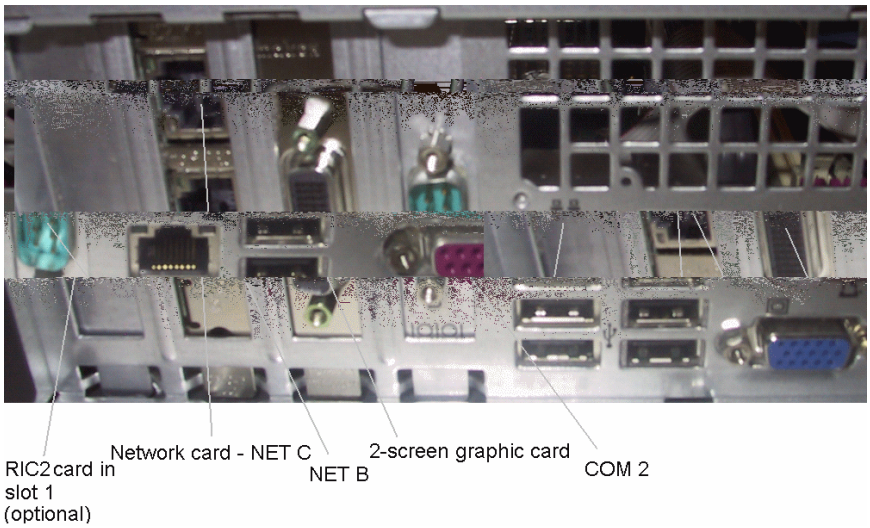
The rear panel layout for each type is shown in figures below. It is focused on slot 1 through 4 where the differences are.

1.4.2.1 MP7600 Base model



The different card slots are as follows (seen from left to right – slot 1 through 4): COM2 card, Dual network card (Net B and C), DVI card, empty slot.

1.4.2.2 MP7600 NAV model

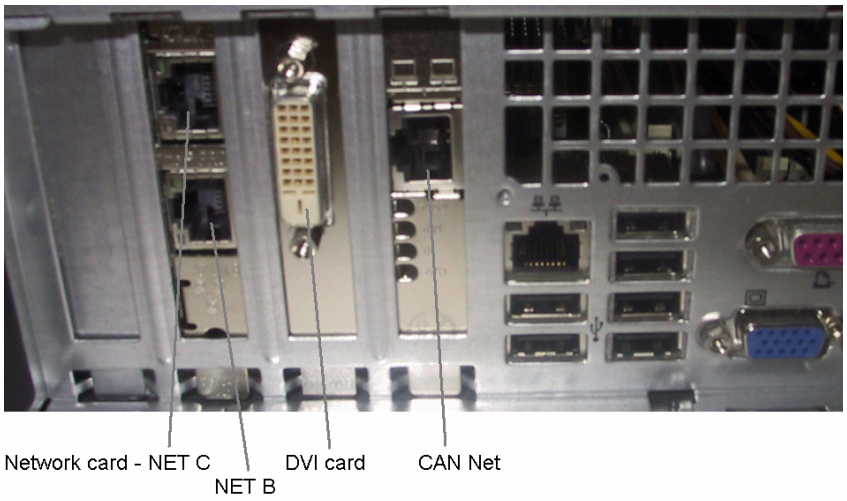


The different card slots are as follows (seen from left to right – slot 1 through 4): RIC2 (optional; empty in this picture), Dual network card (Net B and C), 2-screen graphic card, COM2 card.

1.4.2.3 MP7600 with 4-screen model

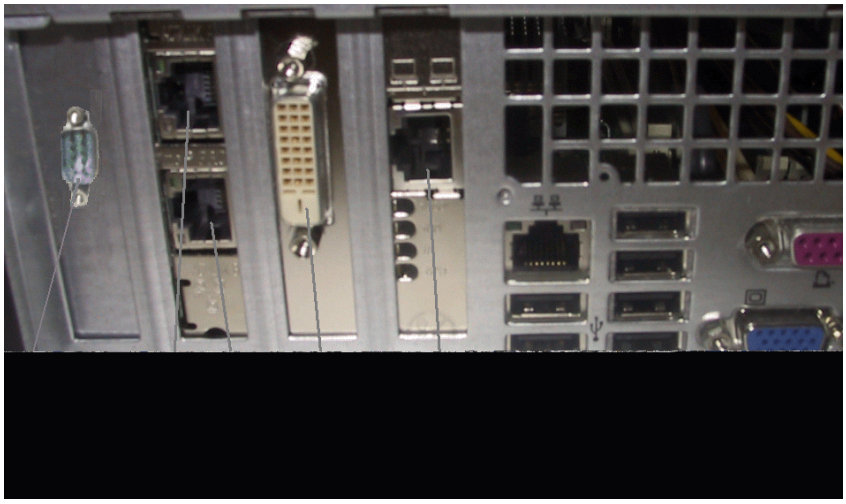
The different card slots are as follows (seen from left to right – slot 1 through 4): Empty slot, Dual network card (Net B and C), 4-screen graphic card, empty slot.

1.4.2.4 MP7600 with LAN/CAN model



The different card slots are as follows (seen from left to right – slot 1 through 4): Empty slot, Dual network card (Net B and C), DVI card, Single network card (CAN net).

1.4.2.5 MP7600 with LAN/CAN + 2 COM ports model

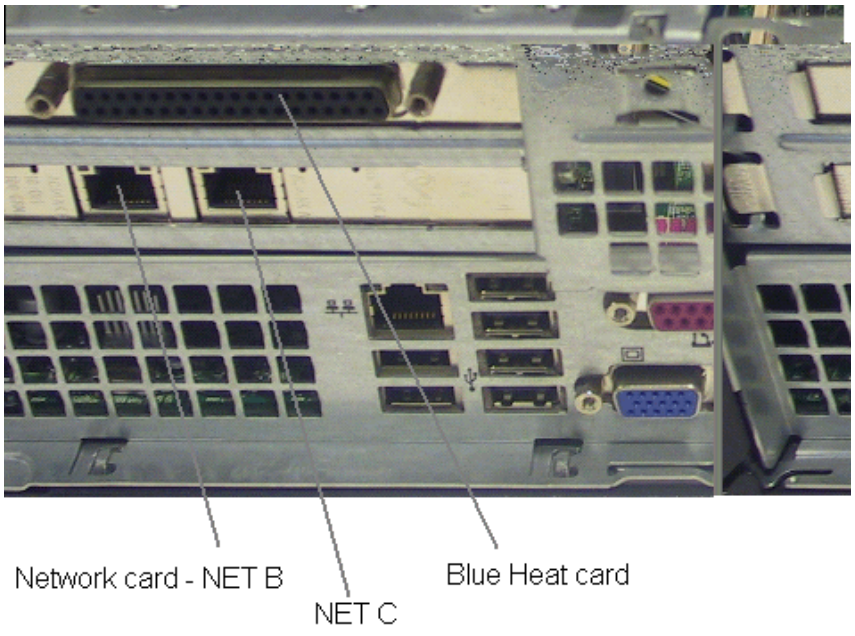


The different card slots are as follows (seen from left to right – slot 1 through 4): COM2 card, Dual network card (Net B and C), DVI card, Single network card (CAN net).

1.4.2.6 MP7600 with Blue Heat model (8 channel / 4 channel; obsolete)

Note

The Blue Heat card is inserted in an extra chassis (Riser card) for fitting to the MP7600 computer, see picture below.



The different card slots are as follows (seen from top to bottom – slot 1 and 2): Blue Heat card, Dual network card (Net B and C).

1.4.2.7 Interface cards

Dual network card (standard)

The dual network card is a PCI type card and provides two network ports. The lower port is normally connected to Network B, and the upper port, if required by the system, is connected to Network C (for MP7600 with Blue Heat the left connector is for Network B and the right connector is for Network C), see figures in *Interface cards and connections* on page 12. The connectors are of the RJ45 type. For details refer to the *Hardware Module Description* for the network card.

Single network card (optional)

The single network card is used as interface to the external LAN/CAN converter. The connector on the single LAN interface card is a RJ45 type.

For details refer to the *Hardware Module Description* for the single LAN network card.

DVI card (standard)

The card is a PCIe type card. The connector is a keyed standard DVI female connector.

RIC2 (optional)

The Radar Interface Card2 (RIC2) is a PCI type card, is normally located in slot 1 and is used for connection to radar scanners. For details refer to the *Hardware Module Description* for the appropriate card.

Blue Heat

The Blue Heat card is available in two versions (8 channel to be used):

- 8 channel version: This card is a PCI type card and provides two RS232 and two RS422/485 serial channels by the use of a special interface split cable. The connector types used on the cable are eight 9–pin male D-sub.
- 4 channel version; obsolete: This card is a PCI type card and provides four RS232 and four RS422/485 serial channels by the use of a special interface split cable. The connector types used on the cable are four 9–pin male D-sub.

Note

Read the numbering on the cable connectors for which is which serial line.

For details refer to the *Hardware Module Description* for the Blue Heat interface card.

Graphics cards

The 2-screen graphics card is a PCIe slot card. Split cables that come with the graphics card are used for connecting to the colour monitors.

The 4-screen graphics card is a PCIe slot card. Split cables that come with the graphics card are used for connecting to the colour monitors.

Note

Read the numbering on the cable connectors for which monitor they connect.

1.4.3 Power connection

The computer is provided with a standard three-pin apparatus socket and fits a standard female three-hole apparatus plug, as shown in *Rear – external connections* on page 11.

Note

The power supply is of the Autosense type, and thereby automatically senses correct input voltage (either 115 VAC or 230 VAC).

1.4.4 Chassis ground connection

The computer is provided with a ground terminal screw located at the right lower corner when the computer is seen from the rear side, as shown in *Rear – external connections* on page 11. This terminal must be bonded to PE (Protection Earth) with a short ground wire having large cross section.

1.5 MP7600 Technical specifications

POWER SUPPLY REQUIREMENTS

Voltage:	115/230 VAC (autosense)
Power consumption from power supply:	240 W

CONFIGURATION, PERFORMANCE AND CAPACITY

CPU type and speed:	Intel Pentium 4, 3GHz
Hard-disk drive:	Hard Disc Drive 80GB SATA-3G, (see item no. 3 in Spare Parts list)
DVD-RW drive:	16X DVD-RW drive, (see item no. 4in Spare Parts list)
Memory:	Memory DIMM, 2 x 512MB, PC2-4200 CL4, (see item no. 5 in Spare Parts list)
Power Supply 115/230 VAC:	Power Supply, (see item no. 1 in Spare Parts list)
VGA:	On main board — Intel processor
DVI:	DY674A Intel DVI ADD2 SDVO (PCIe) adapter for DC7600, (see item no. 12 in Spare Parts list)
Dual network interface card: (Network interface, one port on main board)	Intel Pro/1000 MT Dual Port Server Bulk, PWLA8492MTBLK5 (see item no. 8 in Spare Parts list)
Single network interface card:	Broadcom NetXtreme Gigabit PCIe NIC, (optional) - (see item no. 13 in Spare Parts list)
Graphics card (2-screen):	Millenium G550 32MB Dual Head PCI-Express 1x, Low Profile, (optional) - (see item no. 11 in Spare Parts list)
Graphics card (4-screen):	MATROX QID 128MB QUAD DVI/RGB PCIE LP (optional) - (see item no. 10 in Spare Parts list)
RIC:	RIC card (optional) - (see item no. 14 in Spare Parts list)
Serial interface:	- Blue Heat PSI RS422/485; 4 off RS232 + 4 off RS422/485 - (see item no. 16 in Spare Parts list) - Blue Heat PCI/4; 2 off RS232 + 2 off RS422/485 - (see item no. 15 in Spare Parts list); obsolete

MECHANICAL SPECIFICATION

Size: width x depth x height:	337 x 379 x 100 mm
Weight:	8.8 kg (Base model)
IP degree:	IP22

ENVIRONMENTAL REQUIREMENTS

Refer to KM Environmental Specification, document number 161011.

LIFE CYCLE SPECIFICATION

MTBF calculated:	108 206 hours

2 FAULT FINDING

This section presents the fault finding principles for the MP7600 computer.

2.1 Fault location/identification

If a fault situation has occurred, the fault is normally identified from the symptoms observed. It is therefore important to record all these observations to help the maintenance person or service engineer. All error messages shown on the screen should be logged for this purpose.

Note

If you are not able to correct the error situation yourself, you should contact your nearest Kongsberg Maritime service office for advice or to request service.

The fault-finding table below assumes that the problem is caused by the MP7600 computer itself and no external factors are involved.

Table 1 Fault-finding tips

ID	Symptoms	Probable Error Source	Corrective Action
1	No visible or audible sign of power present at MP7600. Fans are not blowing.	External supply voltage is turned off or circuit-breaker fuse has tripped.	Check the 115/230 VAC power supply.
		Internal power supply defect.	Replace power supply. See procedure *How to replace the Power Supply model* on page 38.
2	Applications are not loading when booting the MP7600. Only blue screen displayed.	Defective file system.	Reinstall the software by using the system backup CD.
3	Applications are not loading when booting after the entire operating system software has been installed on MP7600. Only blue screen displayed.	Defective hard-disk drive.	Replace hard-disk. See procedure *How to replace the System Hard-disk drive* on page 28.

Table 1 Fault-finding tips (cont'd.)

ID	Symptoms	Probable Error Source	Corrective Action
4	MP7600 does not respond over network on either channel.	Network task not running.	Reboot MP7600.
5	MP7600 responds over network on only one of three channels.	Defective network card or network part of main board.	Replace network card. See procedure *How to replace a socket-mounted PCI and PCIe card* on page 33.
6	MP7600 crashes or hangs unexpectedly.	Possible defective RAM memory card.	Replace RAM memory card. See procedure *How to replace a RAM memory card* on page 37.

3 PREVENTIVE MAINTENANCE

This section presents the preventive maintenance procedures for the MP7600.

Replacement procedures relating to preventive maintenance, are described only in the Corrective maintenance section.

3.1 How to clean the MP7600 cabinet surface

Use a lint-free, non-abrasive cloth and a neutral or mild soap solution for best result. Do not use a dripping wet cloth when cleaning. Use only a moistened cloth.

3.2 Preventive maintenance intervals

Note

These procedures should be performed on each MP7600 in the system. Local evaluations should be made to determine site-specific maintenance intervals.

Table 2 Recommended preventive maintenance intervals

ACTION	INTERVAL RECOMMENDED
Clean all operator panels. Run the on-line lamp and unit function tests. Clean all filters for units equipped with fans.	Each week.
Clean cabinet surface.	Each month.
Check for loose connectors and wires.	Each six month.

4 CORRECTIVE MAINTENANCE

This section presents the corrective maintenance procedures for the MP7600.

Corrective maintenance procedures not described in this section are to be found in the appropriate *Hardware Module Description* for the part numbers referred to in the replaceable parts and recommended spare parts list. Corrective maintenance of parts not provided by any of the above should be performed by Kongsberg Maritime service personnel only.

4.1 Replacement procedures

Caution

Electrostatic charges can damage components on the cards. Notice the following precautions: Always wear a properly connected earthing strap when handling unpacked cards. Place unpacked cards only on a properly connected earthing mat or a shielding bag. Keep cards in their shielding bags when not installed. Never store cards near electromagnetic or electrostatic devices.

Note

Replacement procedures that require power to be turned off must be preceded by shutting down the MP7600 in a controlled manner. Refer to the system operator manual for the appropriate procedure.

WARNING

To avoid the risks accompanying high voltages, always turn off the power circuit supplying the computer before you open the cabinet lid.

4.1.1 How to remove MP7600 computer from Damper kit

Two Damper kits are available: One for horizontal mounting (MS2030) and one for vertical e.g. door mounting (MS2040+), see figures below.

1 Disconnect all cables connected to the computer.

2 Standing in front of the computer locate the damper kit.

3 Unscrew 4 off screws (horizontal mounting, see Figure 6) or 6 off screws (vertical mounted, see Figure 7 and Figure 8) on the damper kit securing the computer.

Figure 6 Horizontal mounted Damper kit

Figure 7 Vertical mounted Damper kit– top

Figure 8 Vertical mounted Damper kit – bottom

4 Carefully remove the computer and place aside.

4.1.2 How to remove cabinet lid

1 Disconnect all cables connected to the computer.

2 Place the computer on a firm surface.

3 Standing with the front of the computer towards you, push the two release levers in, one on each side of computer lid, slide the lid forward and lift the lid (see figure below for location of the lid release lever). This also removes the top cover and front cover.

Figure 9 Release lever of the cabinet lid

4.1.3 How to replace the DVD-RW drive

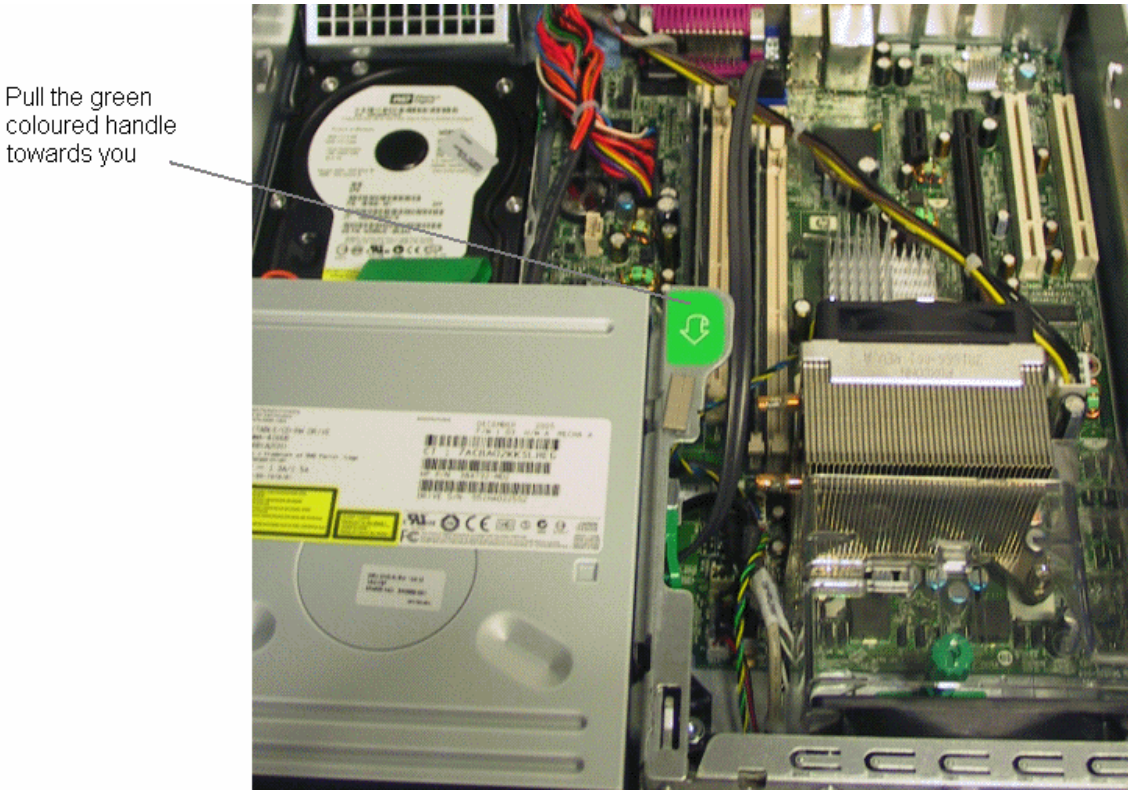
The following steps must be done before performing this procedure:

- The power to the MP7600 computer must have been turned off.
- Ensure that the new drive is equal to the one listed in recommended consumable spare part list.
- The kit must have been removed from the computer, as described in *How to remove MP7600 computer from Damper kit* on page 22.
- The cabinet lid must have been removed from the computer, as described in *How to remove cabinet lid* on page 25.

4.1.3.1 Disassembly

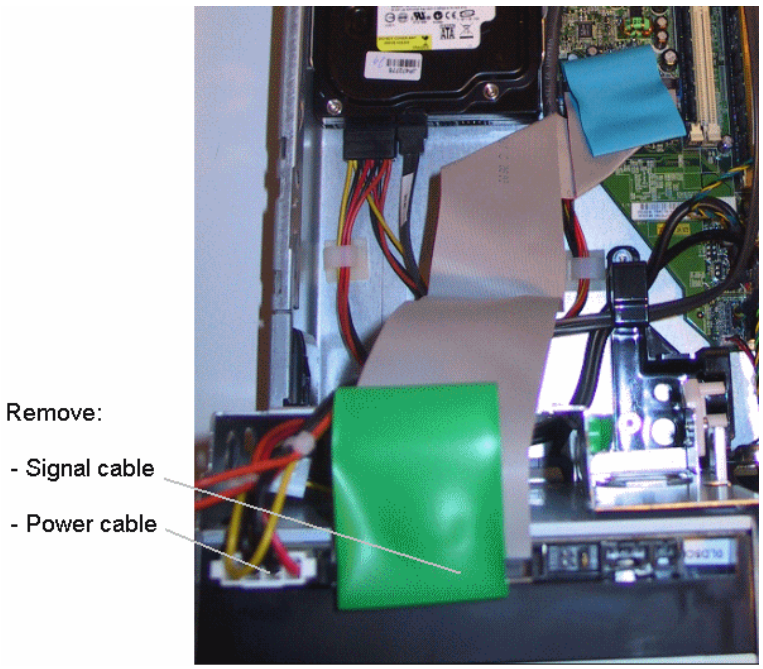
1 By lifting, pivot the DVD-RW drive assembly upwards, by pulling the green coloured handle towards you.

Figure 10 Lifting the DVD chassis



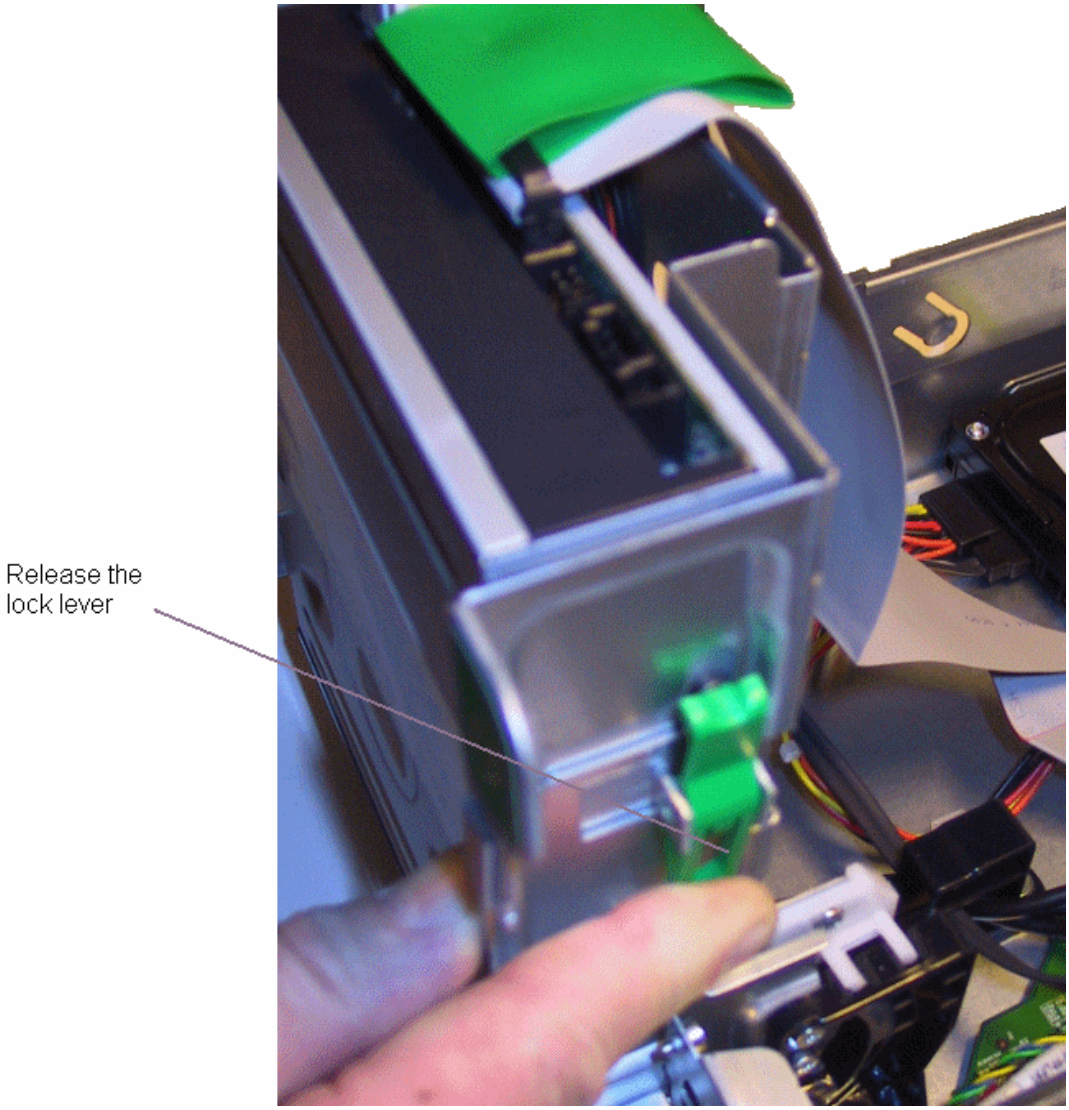
2 Disconnect and remove the flat signal cable and power cable from the DVD drive, as identified in figure below:

Figure 11 Disconnecting cables



3 Release the lock for DVD-RW drive by pushing the lever in, identified in figure below.

Figure 12 Releasing the lock lever



4 Carefully lift the drive out from its slide.

5 Mark the DVD-RW with a label describing the symptoms observed, carefully pack in a shielding bag and place on a secure place.

4.1.3.2 Reassembly

1 Set any mode jumpers of the new drive to the same positions as for the replaced drive.

2 Reassemble by performing steps 1 to 4 of the *Disassembly* procedure above, in reverse order.

3 Verify proper drive operation.

4.1.4 How to replace the System Hard-disk drive

The following steps must have been done before performing this procedure:

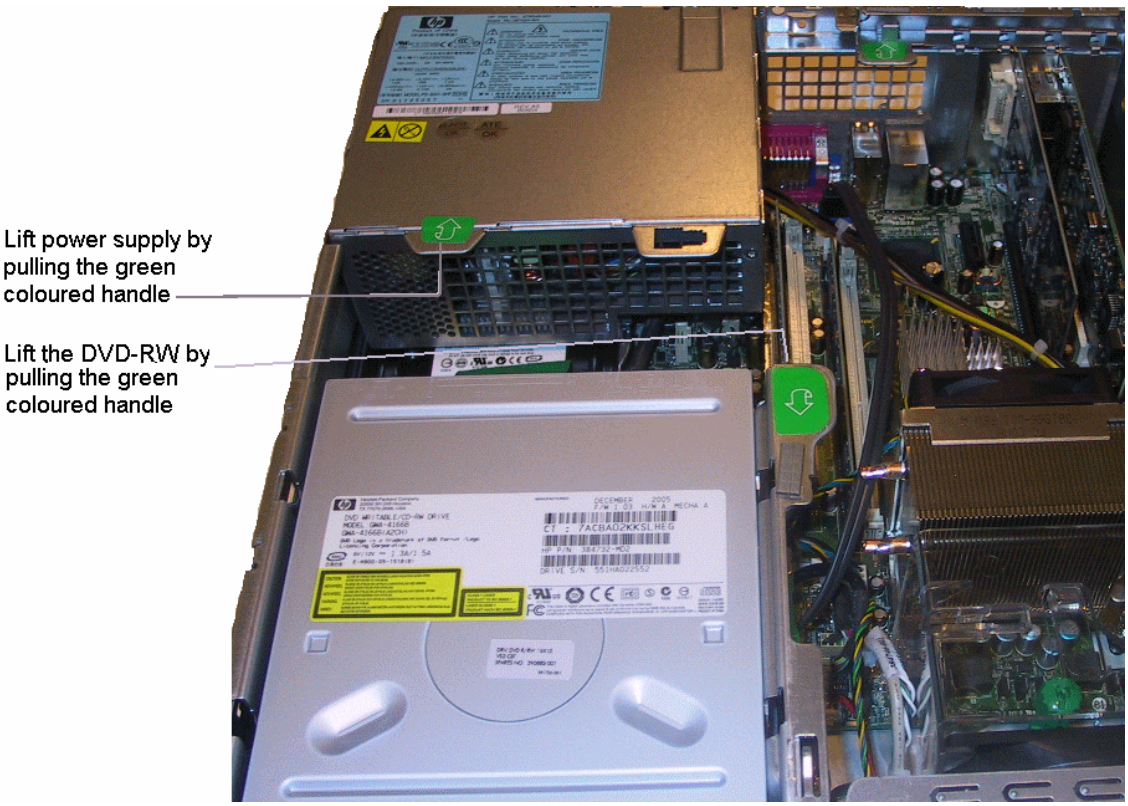
- The power to the MP7600 computer must have been turned off.
- Ensure that the new system hard-disk drive is equal to the one listed in recommended consumable spare part list.
- The damper kit must have been removed from the computer, as described in *How to remove MP7600 computer from Damper kit* on page 22.
- The cabinet lid must have been removed from the computer, as described in *How to remove cabinet lid* on page 25.

4.1.4.1 Disassembly

1 Place the computer on a flat surface with the interface cards towards you.

2 By lifting, pivot the power supply assembly upwards, by pulling the green coloured handle and lifting and pushing away from you.

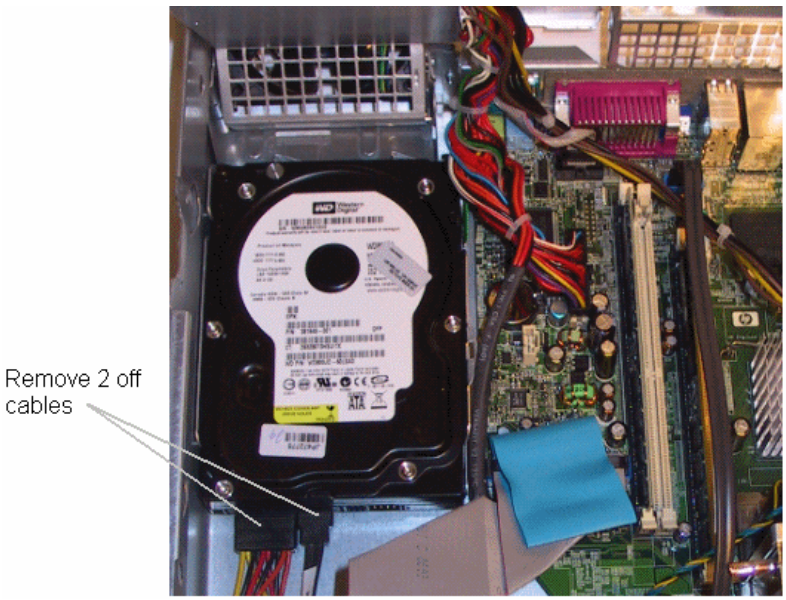
Figure 13 Lifting the power supply



3 Also lift the chassis for the DVD-RW drive, as described in *Disassembly* on page 25.

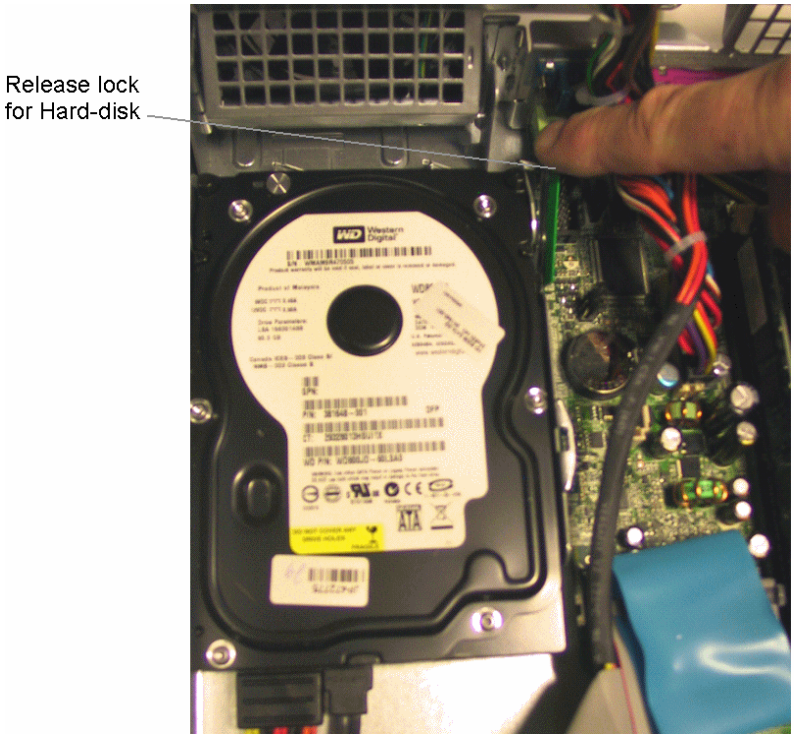
4 Disconnect and remove the 2 off flat cables from the disk, as identified in figure below:

Figure 14 Disconnecting cables



5 Release the lock for the hard-disk by pulling out, as identified in figure below:

Figure 15 Releasing the lock



6 Carefully lift out the disk from its frame.

7 Mark the old disk with a label describing the symptoms observed, carefully pack in a shielding bag and place on a secure place.

4.1.4.2 Reassembly

1 Set any mode jumpers of the new disk to the same positions as for the replaced disk.

2 Reassemble by performing steps 1 to 5, of the *Disassembly* procedure, in reverse order.

3 Verify proper operation. The hard-disk must then be reloaded with backup data (see separate procedure).

4.1.5 How to replace the Recorder Hard-disk drive

The following steps must have been done before performing this procedure:

- The power to the MP7600 computer must have been turned off.
- Ensure that the new recorder hard-disk drive is equal to the one listed in recommended consumable spare part list.

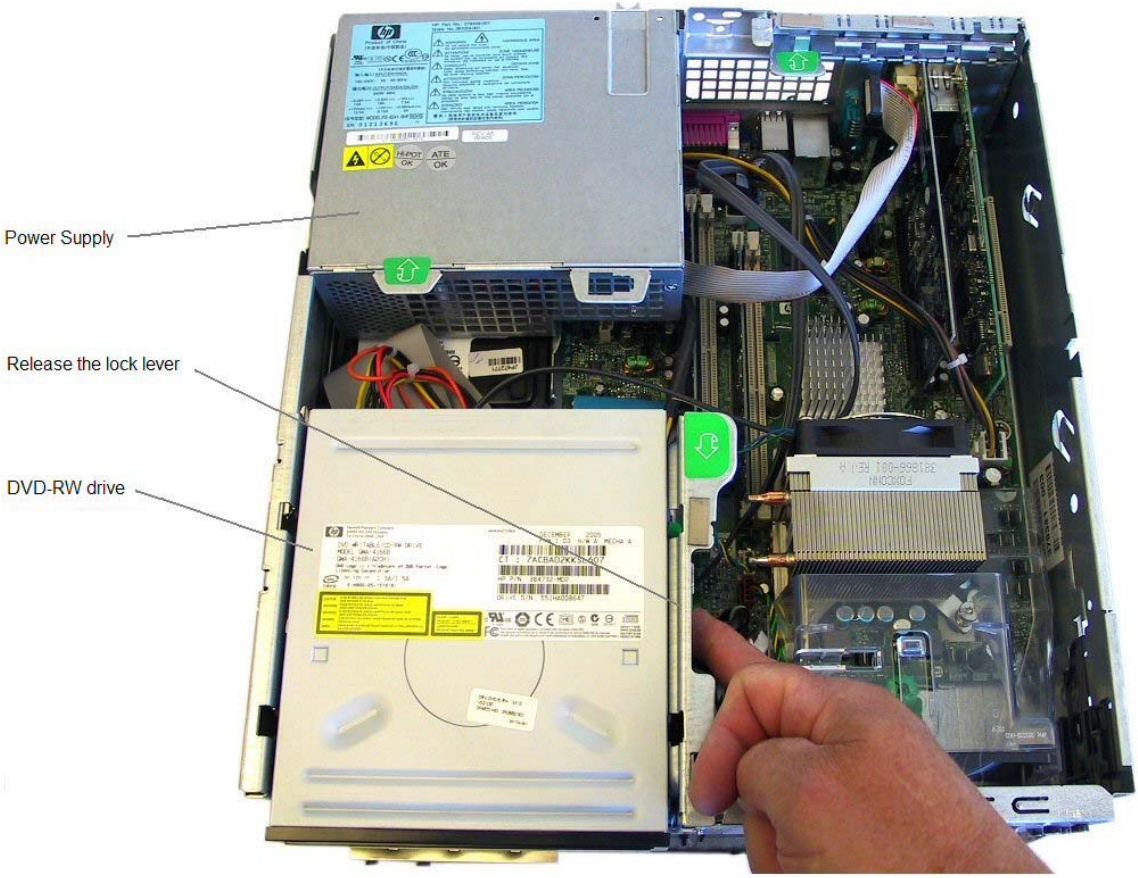
- The damper kit must have been removed from the computer, as described in *How to remove MP7600 computer from Damper kit* on page 22.
- The cabinet lid must have been removed from the computer, as described in *How to remove cabinet lid* on page 25.

4.1.5.1 Disassembly

1 Place the computer on a flat surface with the interface cards towards you.

2 Push the green coloured lock lever on the right side of the DVD-RW drive to release the drive, as shown in figure below:

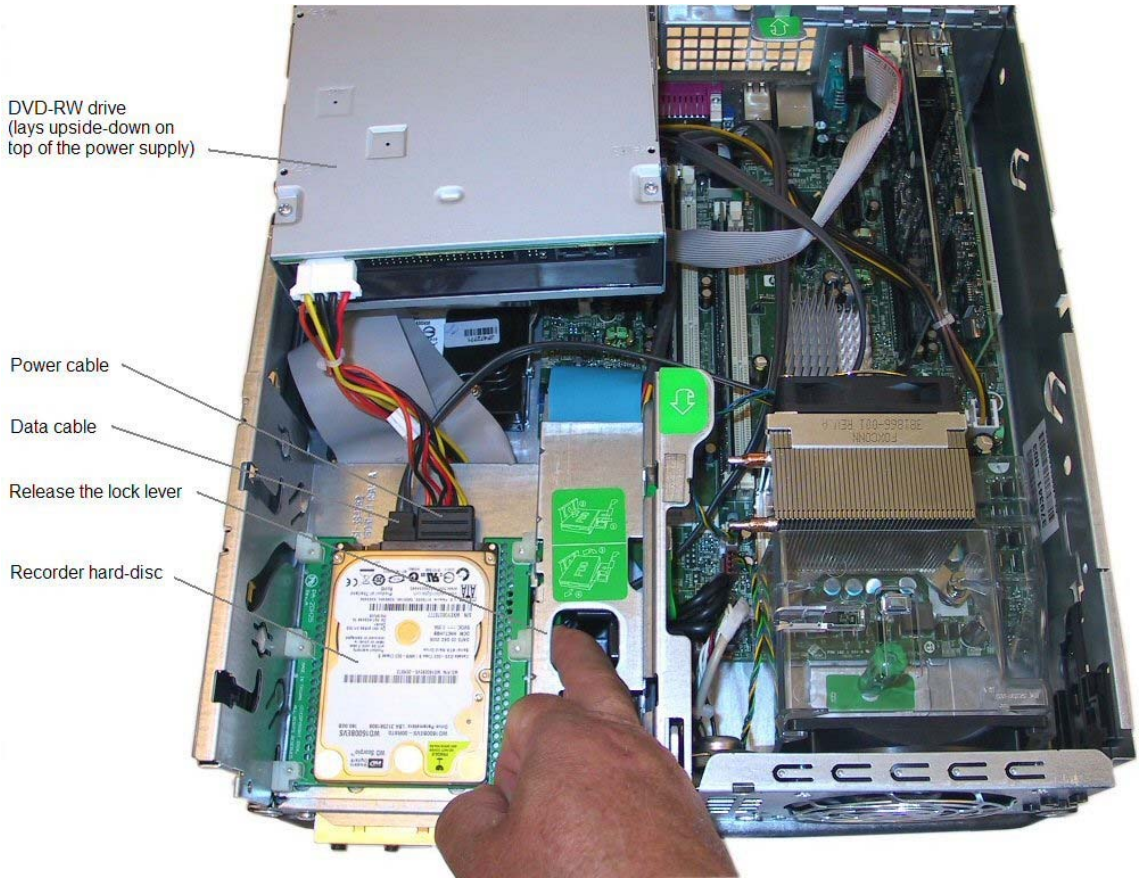
Figure 16 Releasing the DVD-RW drive



3 Slide the DVD-RW drive forward and lift upwards to release the drive from the frame.

4 Lay the DVD-RW drive upside-down on top of the power supply in front of the DVD-RW drive, as shown in figure below:

Figure 17 Releasing the recorder hard-disk



5 Push the green coloured lock lever on the right side of the recorder hard-disk accessed through a hole in the frame, to release the hard-disk, as shown in figure above.

6 Slide the recorder hard-disk forward and lift upwards in the back, and slide the hard-disk forward to release the hard-disk from the frame.

7 Disconnect and remove the 2 off flat power- and data- cables from the back of the hard-disk, as shown in figure above.

8 Carefully lift the hard-disc out of the frame.

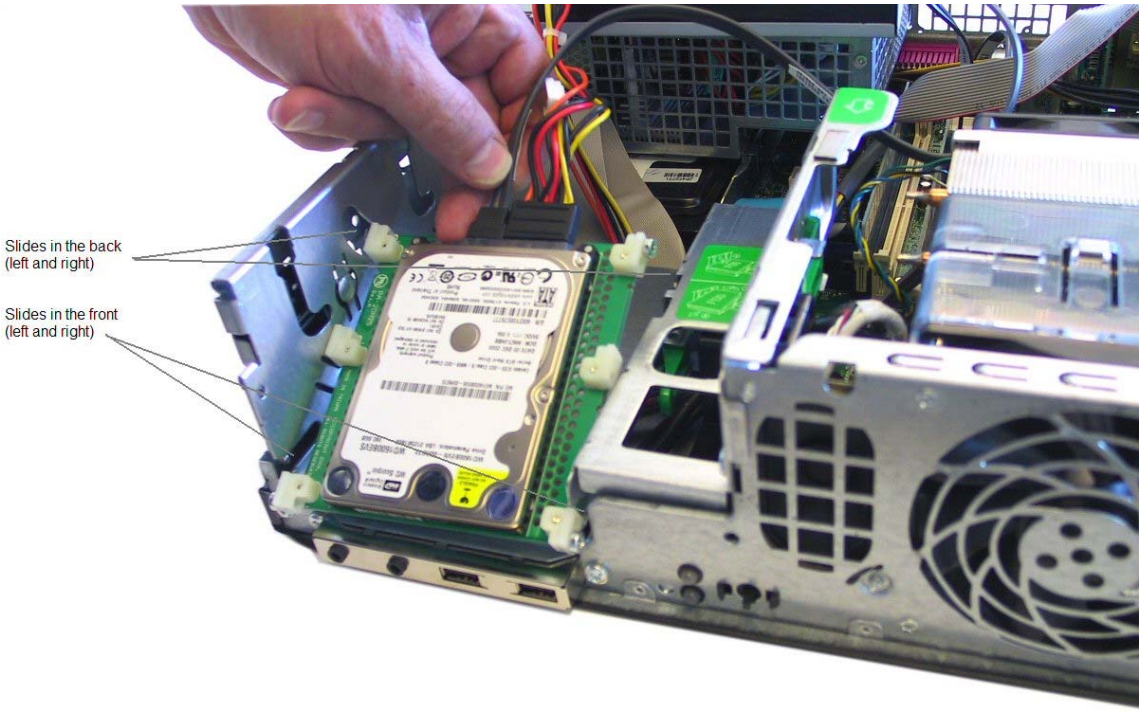
9 Mark the hard-disk with a label describing the symptoms observed, carefully pack in a shielding bag and place on a secure place.

4.1.5.2 Reassembly

1 Connect the 2 off flat power- and data- cables to the back of the new hard-disk, as identified in figure above.

2 Slide the hard-disk into position in the disk frame, starting to enter the slides (left and right) in the back, then enter the slides (left and right) in the front, as shown in figure below:

Figure 18 Sliding the recorder drive in position



3 Slide the hard-disk assembly forward until it clicks in position.

4 Install the DVD-RW drive, which is located upside-down on top of the power supply, into its dedicated slides in the disk-frame.

5 Slide the DVD-RW drive forward until it clicks in position.

6 Verify proper operation. The hard-disk must then be reloaded with backup data (see separate procedure).

4.1.6 How to replace a socket-mounted PCI and PCIe card

Note

The PCI sockets are the two white sockets, and the PCIe socket is the black socket, refer to Cabinet interior on page 7.

Note

No screws are to be unscrewed to replace an interface card, only lifting the lever at the green coloured handle, which secures the interface card to the main board.

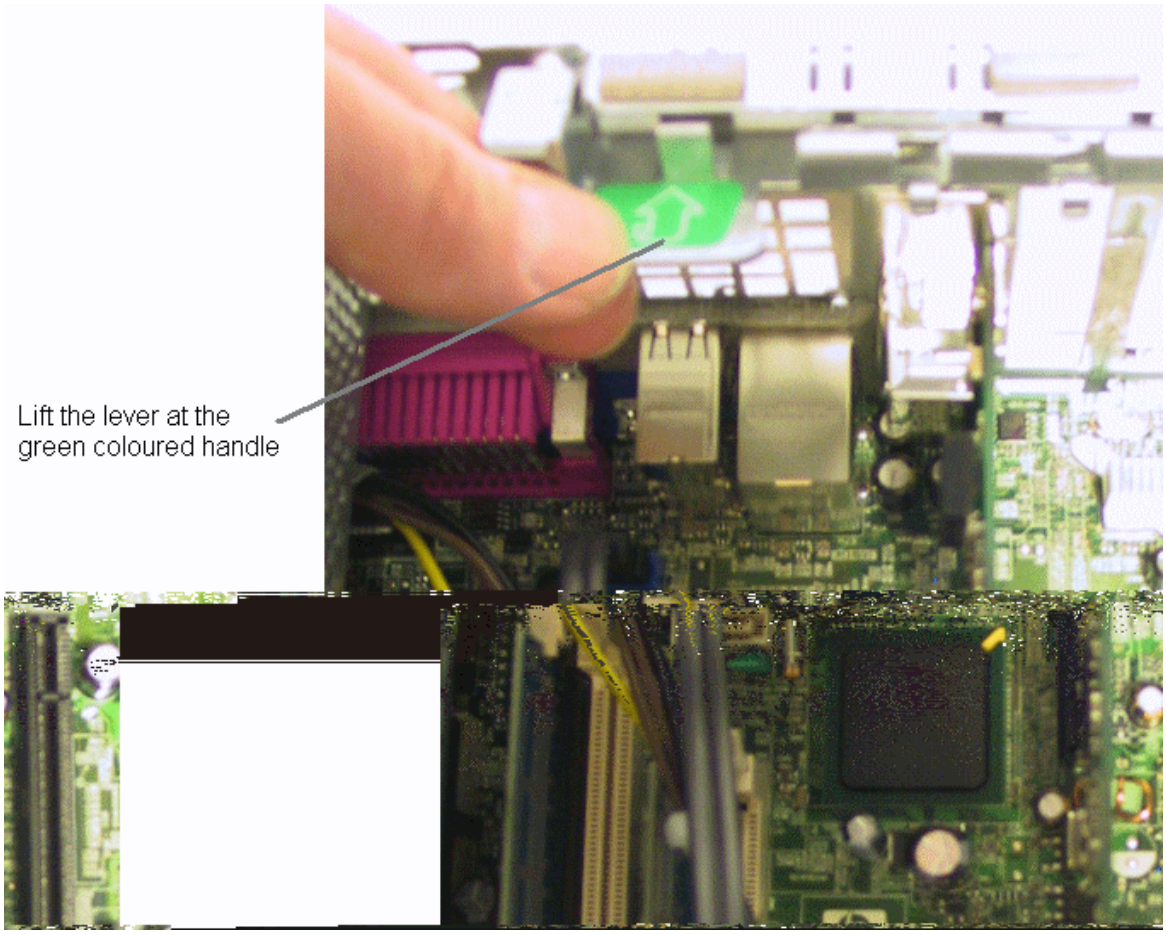
The following steps must have been done before performing this procedure:

- The power to the MP7600 computer must have been turned off.
- The cable must be removed from the interface card to be replaced.
- Ensure that the new card is equal to the one listed in recommended consumable spare part list.
- The kit must have been removed from the computer, as described in *How to remove MP7600 computer from Damper kit* on page 22.
- The cabinet lid must have been removed from the computer, as described in *How to remove cabinet lid* on page 25.

4.1.6.1 Disassembly

1 Seen from the front of the computer, at the back loosen the locking lever for the PCI cards by lifting the lever at the green coloured handle, as identified by figure below:

Figure 19 Removing a PCI card



2 Carefully pull the PCI (PCIe) card assembly to be replaced upwards from the socket card and remove the card assembly.

3 Mark the card with a label describing the symptoms observed, carefully pack in a shielding bag and place on a secure place.

4.1.6.2 Reassembly

1 Check that all jumper and DIP settings of the new card are set correctly before starting to reassemble.

2 Reassemble by performing steps 1 to 2, of the *Disassembly* procedure, in reverse order.

3 If the card is a network card, you should perform the Checking Network Cards procedure, else verify proper operation of MP7600.

4.1.7 How to replace a socket-mounted PCI in Blue Heat model

Note

The Blue Heat- and Network- cards are inserted in an extra chassis for fitting to the MP7600 computer.

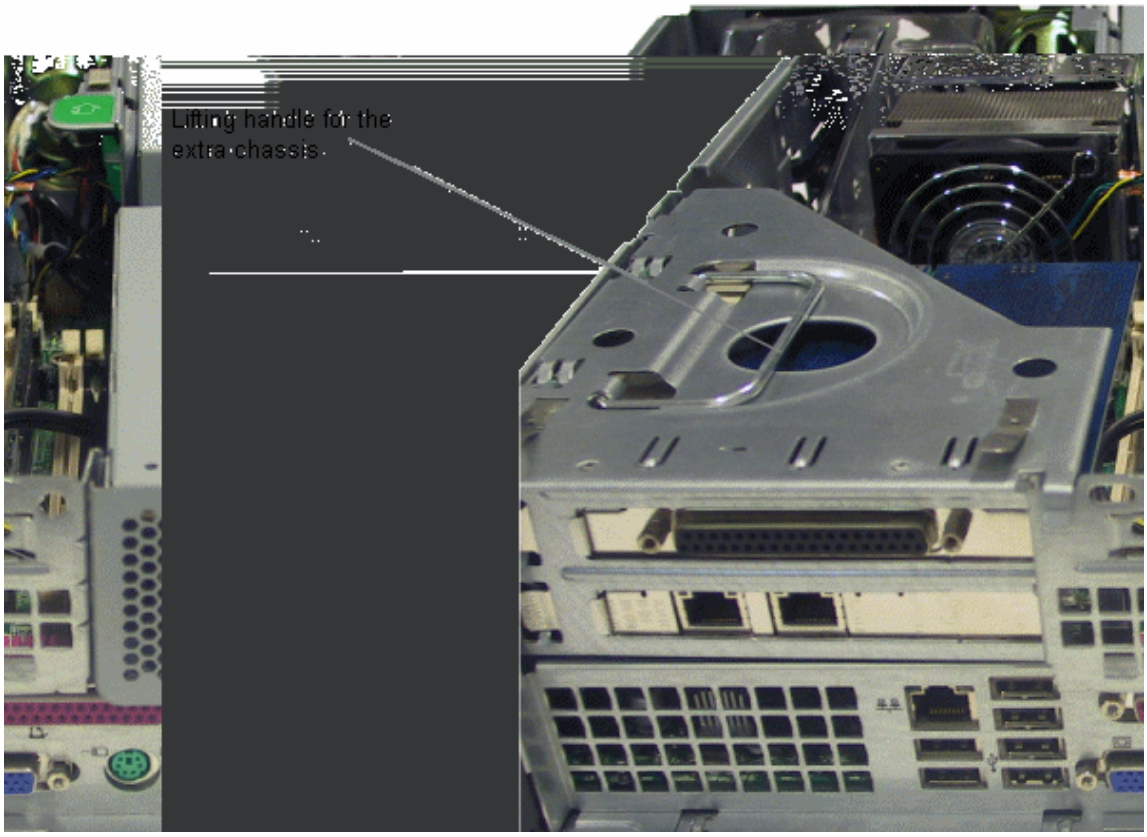
The following steps must have been performed before performing this procedure:

- The power to the MP7600 computer must have been turned off.
- The cable must be removed from the interface card to be replaced.
- Ensure that the new card is equal to the one listed in recommended consumable spare part list.
- The kit must have been removed from the computer, as described in *How to remove MP7600 computer from Damper kit* on page 22.
- The cabinet lid must have been removed from the computer, as described in *How to remove cabinet lid* on page 25.

4.1.7.1 Disassembly

1 Seen from the back of the computer, locate the handle for lifting the extra chassis with interface cards, as identified by figure below:

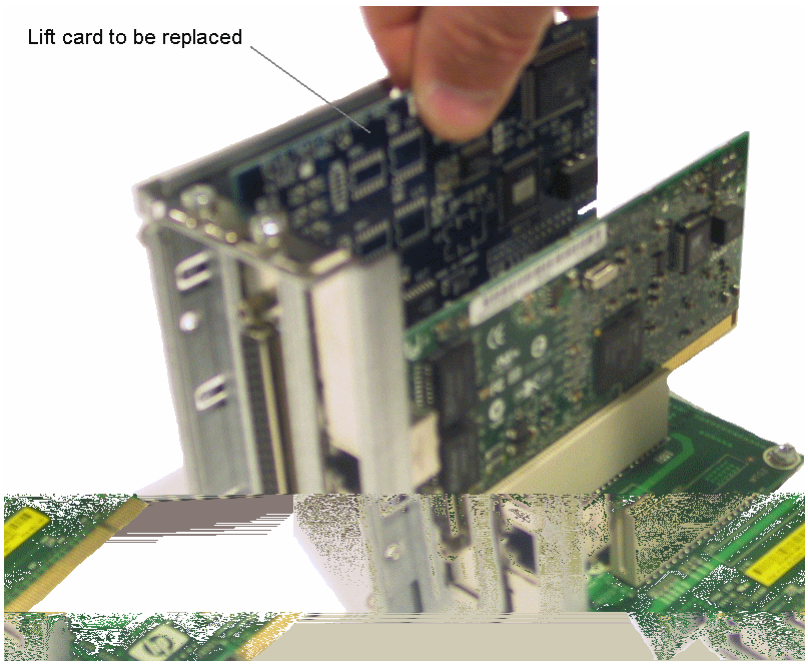
Figure 20 Locating the lifting handle



2 Carefully lift the extra chassis out of the computer chassis, and place on a table.

3 Locate the PCI card to be replaced.

4 Carefully pull the PCI card assembly to be replaced upwards from the socket card and remove the card assembly, see figure below:



5 Mark the card with a label describing the symptoms observed, carefully pack in a shielding bag and place on a secure place.

4.1.7.2 Reassembly

1 Check that all jumper and DIP settings of the new card are set correctly before starting to reassemble.

2 Reassemble by performing steps 1 to 4, of the *Disassembly* procedure, in reverse order.

3 If the card is a network card, you should perform the Checking Network Cards procedure, else verify proper operation of MP7600.

4.1.8 How to replace a RAM memory card

The following steps must have been performed before performing this procedure:

- The power to the MP7600 computer must have been turned off.
- Ensure that the RAM memory card is equal to the one listed in recommended consumable spare part list.
- The kit must have been removed from the computer, as described in *How to remove MP7600 computer from Damper kit* on page 22.
- The cabinet lid must have been removed from the computer, as described in *How to remove cabinet lid* on page 25.

4.1.8.1 Disassembly

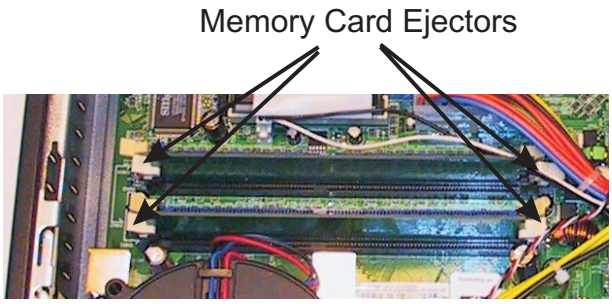
1 Lift the power supply assembly and the DVD-RW assembly, as described in *Disassembly* on page 31.

2 Locate the RAM memory card inside the computer.

3 Lift assemblies according to *Disassembly* on page 31.

4 Remove the RAM memory card by pressing the ejectors at both ends of the memory card to release it from the socket, see figure below:

Figure 21 Memory card sockets with ejectors



(Cd3134)

5 Mark the memory module with a label describing the symptoms observed, carefully pack in a shielding bag and place on a secure place.

4.1.8.2 Reassembly

1 Reassemble by performing step 1 to 3 of the *Disassembly* procedure, in reverse order.

2 Verify proper operation of MP7600.

4.1.9 How to replace the Power Supply model

The following steps must have been performed before performing this procedure:

- The power to the MP7600 computer must have been turned off.
- Ensure that the new power supply module is equal to the one listed in recommended consumable spare part list.
- The kit must have been removed from the computer, as described in *How to remove MP7600 computer from Damper kit* on page 22.
- The cabinet lid must have been removed from the computer, as described in *How to remove cabinet lid* on page 25.

Note

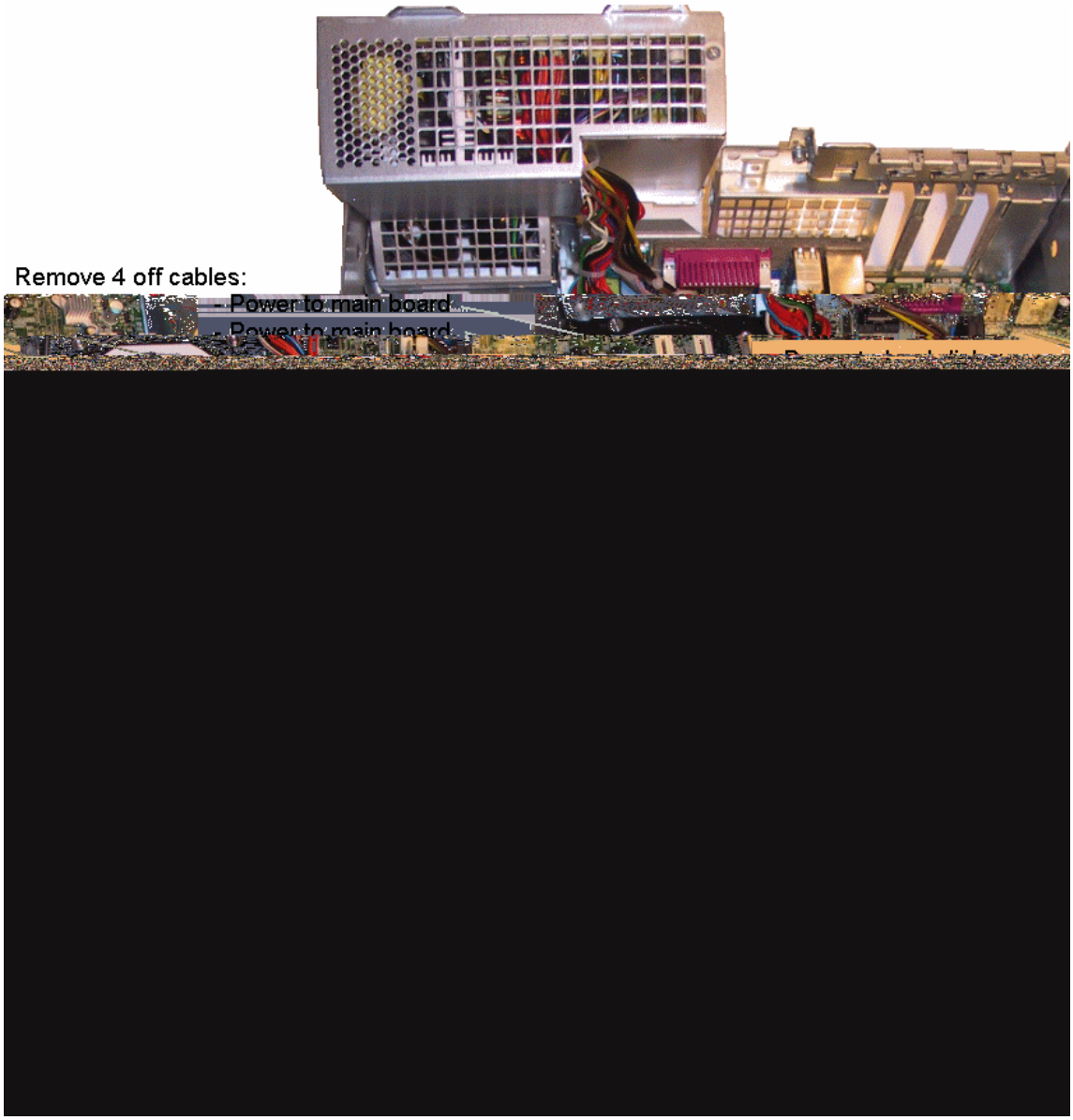
An error with the power supply module should be handled by Kongsberg Maritime Service Department only.

4.1.9.1 Disassembly

1 Lift the power supply assembly and the DVD-RW assembly, as described in *Disassembly* on page 31.

2 Disconnect 4 off power cables, refer to figure below:

Figure 22 Power cables



3 When cables are removed, slide the power supply module out of the computer chassis by lifting upwards.

4 If necessary, use a cutter to remove the strips that keep the cable bundles together.

5 Mark the power supply module with a label describing the symptoms observed, carefully pack in a shielding bag and place on a secure place.

4.1.9.2 Reassembly

1 Reassemble by performing step 1 to 4 of the *Disassembly* procedure, in reverse order.

2 Verify proper operation of MP7600.

4.1.10 How to replace the Filter

Note

This procedure applies only to the MP7600 with LAN/CAN models.

The following steps must have been performed before performing this procedure:

- The power to the MP7600 computer must have been turned off.
- Check that the new filter is equal to the one listed in recommended consumable spare part list.
- The kit must have been removed from the computer, as described in *How to remove MP7600 computer from Damper kit* on page 22.
- The cabinet lid must have been removed from the computer, as described in *How to remove cabinet lid* on page 25.

4.1.10.1 Disassembly

1 The cabinet lid removed from the computer must be placed upside down on a workbench.

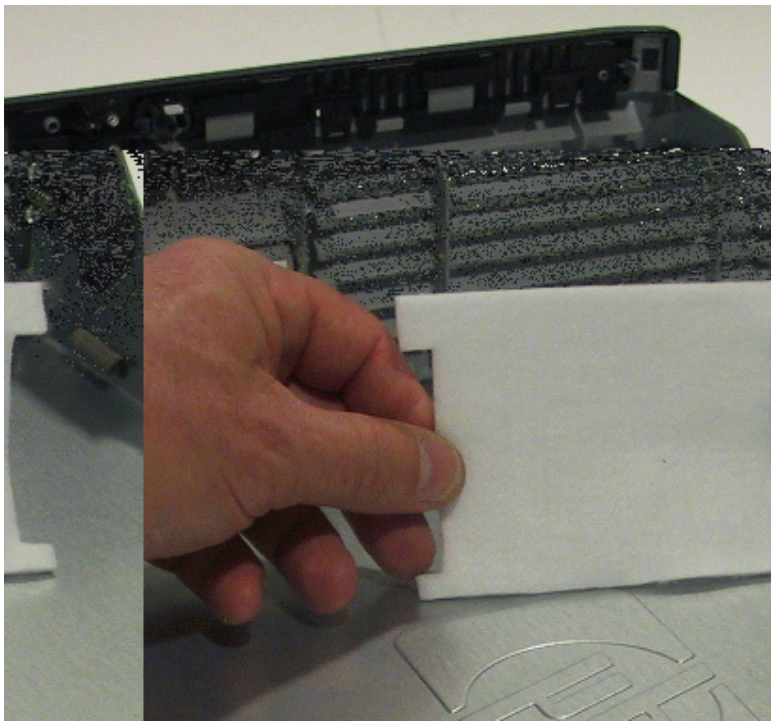
2 Locate the filter inside the lid, refer to figure below:

Figure 23 Filter location

3 Carefully remove the filter inside the lid by snapping it off the lid.

4.1.10.2 Reassembly

Figure 24 New filter



1 Reassemble by inserting a new filter onto the lid.

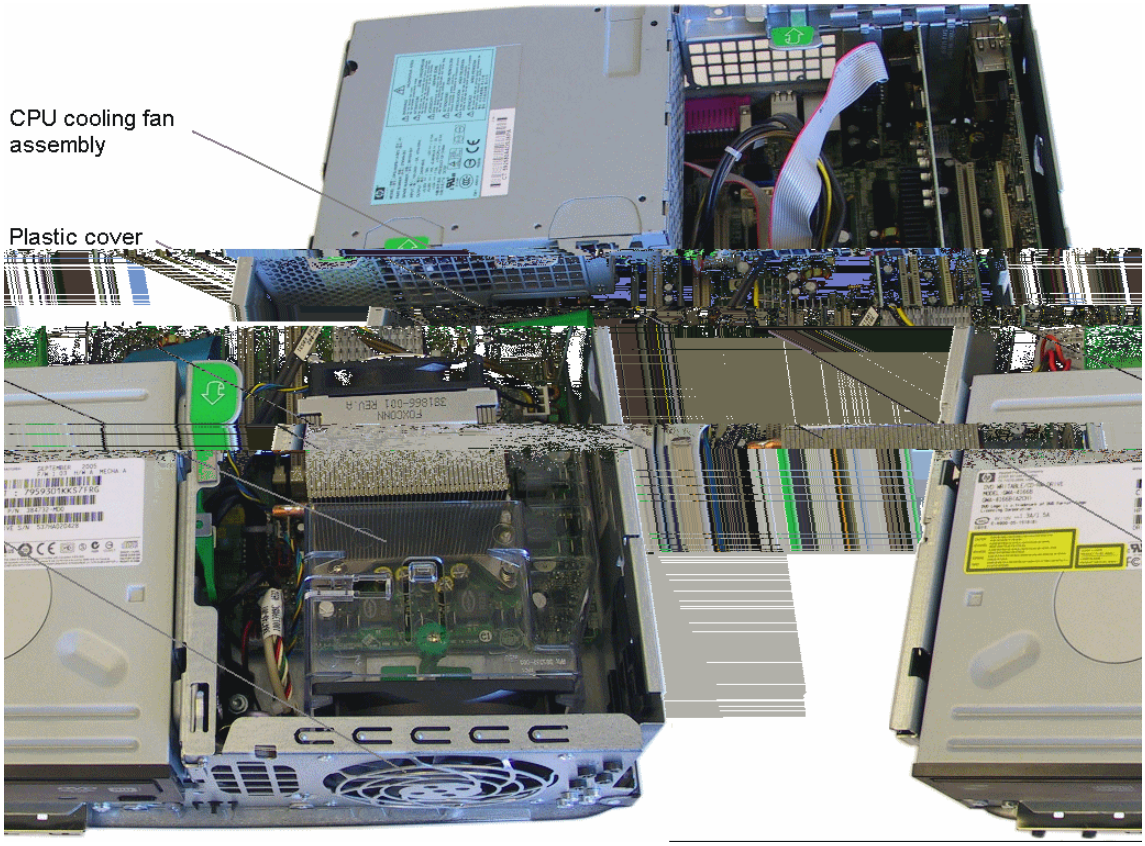
2 Verify proper installation and fastening of the filter.

4.1.11 How to replace CPU cooling fan and Inlet fan

The following steps must have been performed before performing this procedure:

- The power to the MP7600 computer must have been turned off.
- Check that the new fan is equal to the one listed in recommended consumable spare part list.
- The kit must have been removed from the computer, as described in *How to remove MP7600 computer from Damper kit* on page 22.
- The cabinet lid must have been removed from the computer, as described in *How to remove cabinet lid* on page 25.
- The Plastic cover, covering the inlet fan must have been removed from inside the computer, see Figure 25.

Figure 25 Inside view of the computer



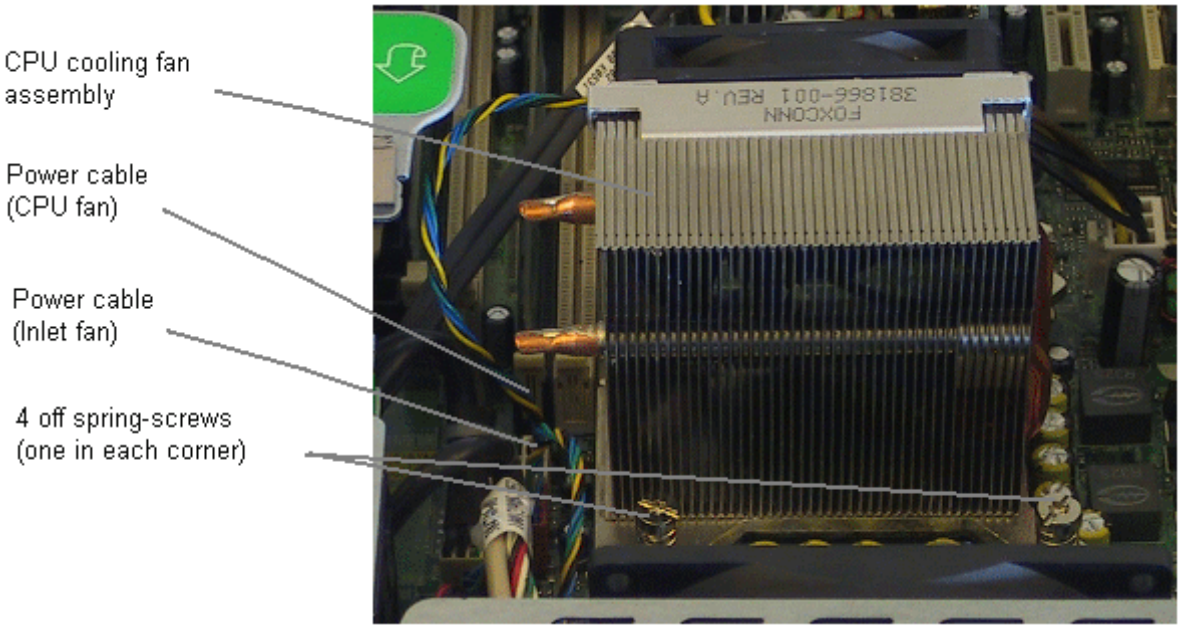
4.1.11.1 CPU cooling fan

Disassembly

1 Locate the CPU cooling fan assembly inside the computer, see Figure 25 and Figure 26.

2 Unscrew 4 off spring-screws, one in each corner of the fan assembly, see Figure 26 and Figure 27.

Figure 26 CPU cooling fan assembly

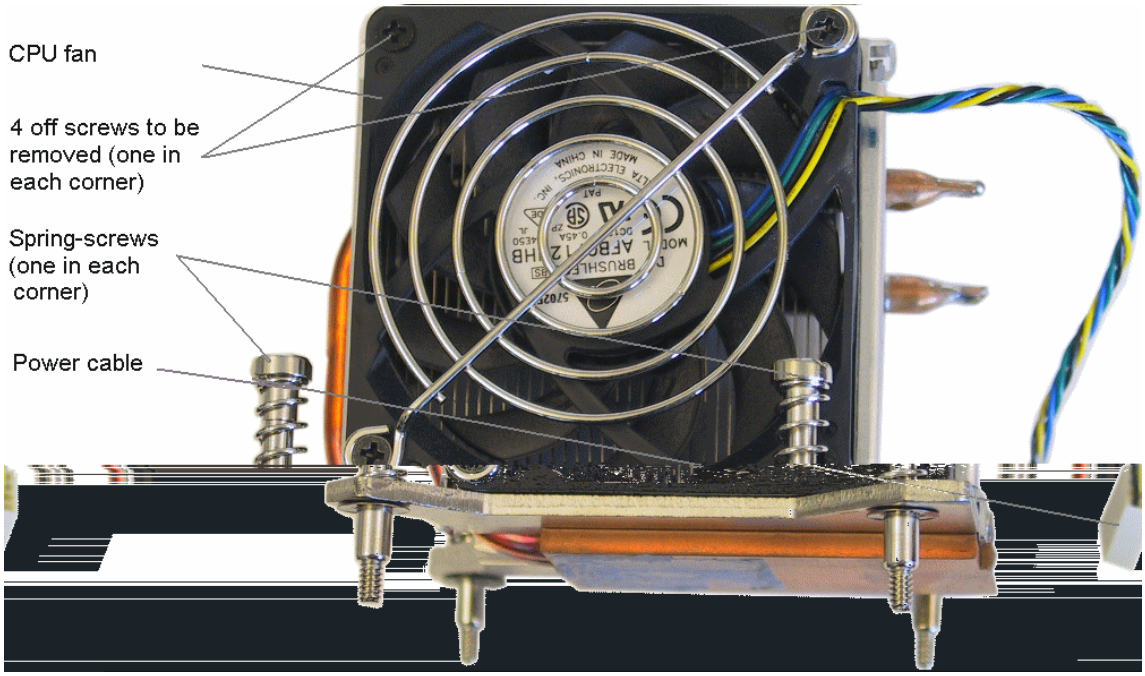


3 Lift the fan assembly carefully out of the computer.

4 Disconnect the power cable for the CPU fan from the connector located on the motherboard of the computer, see Figure 26.

5 Lay the CPU cooling fan assembly on a flat surface and disconnect the fan from the fan assembly by unscrewing 4 off screws, one in each corner of the fan assembly, see Figure 27.

Figure 27 CPU cooling fan



6 Mark the CPU cooling fan with a label describing the symptoms observed, carefully pack in a shielding bag and place on a secure place.

Reassembly

1 Screw the new CPU cooling fan to the fan assembly using the 4 off screws, one in each corner on the fan, see Figure 27.

2 Connect the power cable to the connector located on the motherboard of the computer, see Figure 26.

3 Screw the CPU cooling fan assembly to the computer by using the 4 off spring-screws, one in each corner of the fan, see Figure 27.

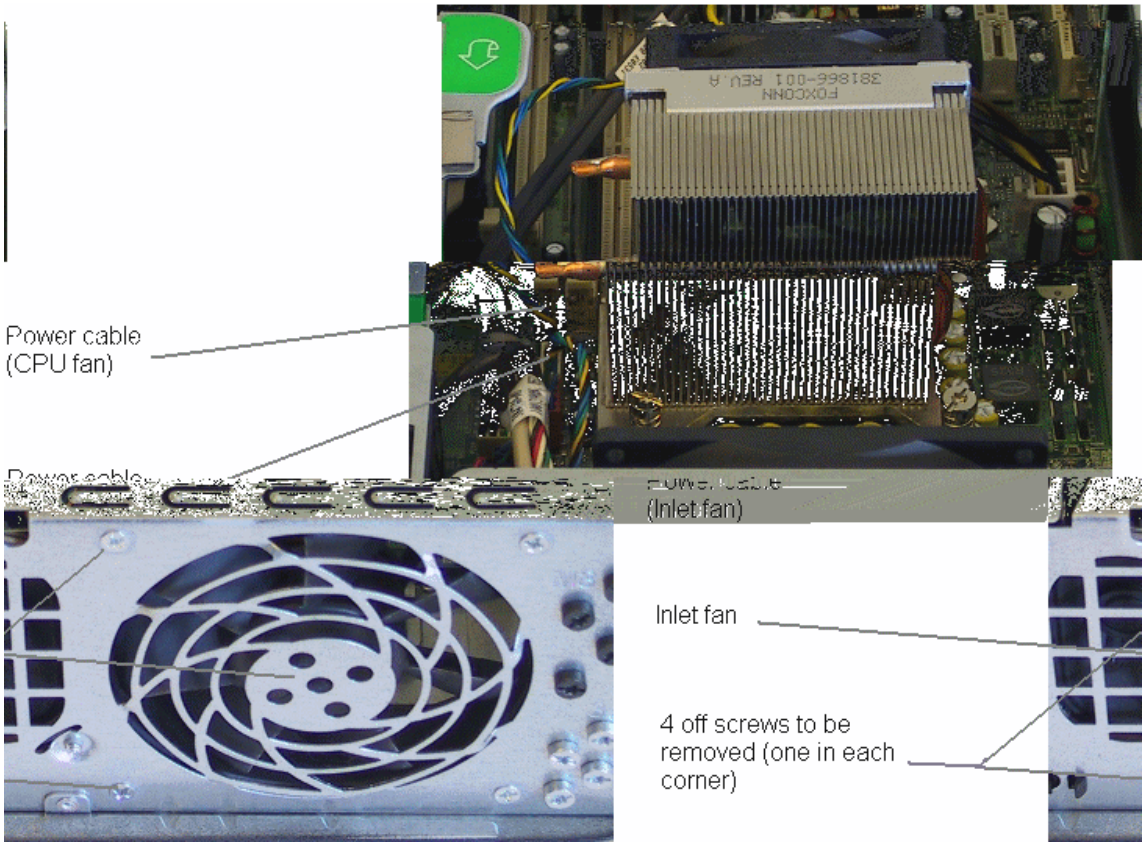
4 Insert the plastic cover inside the computer, covering the inlet fan.

4.1.11.2 Inlet fan

Disassembly

1 Locate the Inlet fan inside the computer, see Figure 25 and Figure 28.

Figure 28 Inlet fan



2 From outside of the computer, unscrew 4 off screws, one in each corner of the fan assembly. see Figure 28.

3 Lift the fan assembly carefully out of the computer.

4 Disconnect the power cable for the inlet fan from the connector located on the motherboard of the computer, see Figure 28.

5 Mark the inlet fan with a label describing the symptoms observed, carefully pack in a shielding bag and place on a secure place.

Reassembly

1 Connect the power cable to the connector located on the motherboard of the computer, see Figure 28.

2 From the outside of the computer, screw the inlet fan to the computer by using the 4 off screws, one in each corner of the fan, see Figure 28.

3 Insert the plastic cover inside the computer, covering the inlet fan.

4.1.12 How to replace the CPU

Note

An fault with the CPU should be handled by Kongsberg Maritime Service Department.

4.1.13 How to replace the Main Board

Note

An fault with the main board should be handled by Kongsberg Maritime Service Department.

4.1.14 How to replace the Built-in Speaker

Note

An fault with the built-in speaker should be handled by Kongsberg Maritime Service Department.

4.1.15 How to replace a MP7600 computer w/4 channel Blue Heat card with a new MP7600 computer w/8 channel Blue Heat card

The two computer types with Blue Heat cards are as follows:

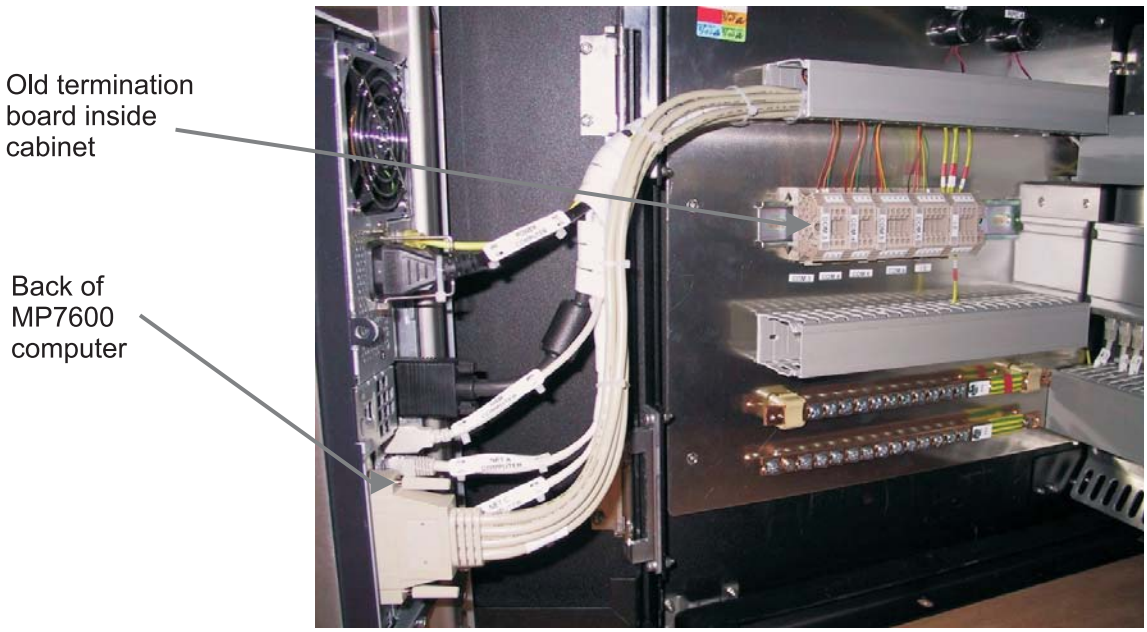
- MP7600 computer with 4 channel Blue Heat card (MP7600 w/4 ch.)
- MP7600 computer with 8 channel Blue Heat card (MP7600 w/8 ch.)

The following steps must have been done before performing this procedure:

- Ensure that the new MP7600 computer has the correct 8 channel Blue Heat interface card.
- Ensure that the new termination board (green) is the correct type, and the correct number termination boards are available.
- The power to the MP7600 computer must have been turned off.

This is how a typical MP7600 w/4 ch. looks like inside the cabinet, where channel 1 and 2 are for RS232 and channel 3 and 4 are for RS422/485 on the old grey termination board:

Figure 29 Typical MP7600 w/4 channel system (old termination board)



1 Unscrew and disconnect all the cables from the back of the MP7600 computer.

2 Perform the procedure *How to remove MP7600 computer from Damper kit* on page 22.

3 Then attach the new MP7600 computer with 8 channel Blue Heat card, by reversing the steps in procedure referred in step above.

4 Attach the cables to the back of the new computer.

5 Unscrew and disconnect the leads including the ground leads from the 4 channels on the computer side of the termination board.

Note

Channel 1 and 2 (RS232) uses 3 leads, and channel 3 and 4 (RS422/485) uses 5 leads.

6 Remove the disconnected cables from the cable tray.

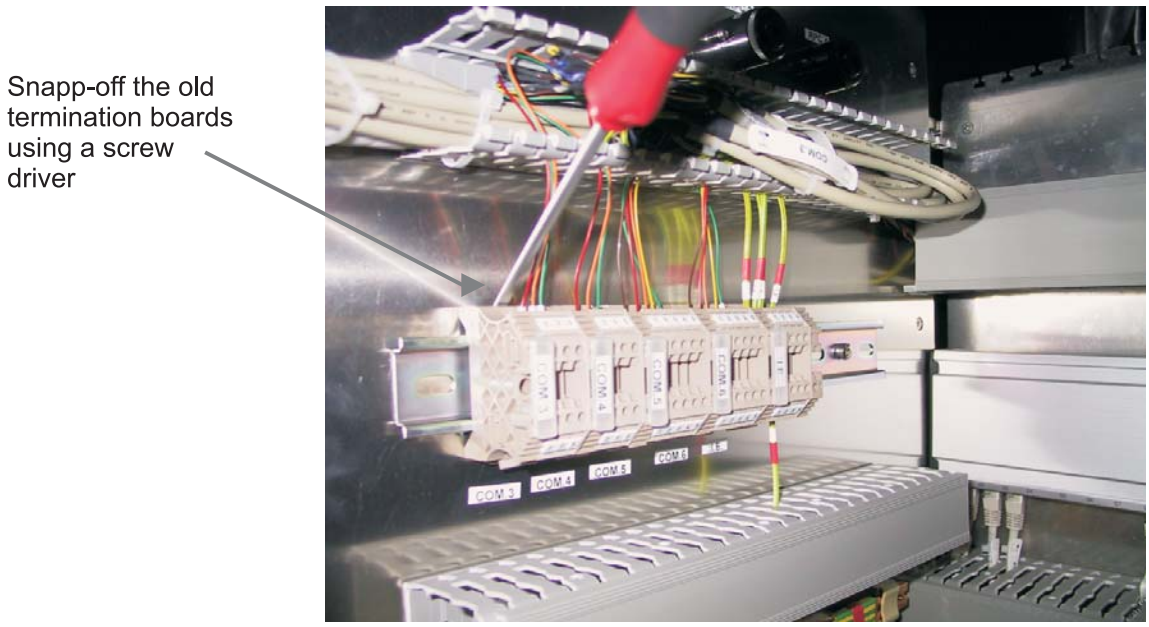
7 Unscrew and disconnect leads including the ground leads from the 4 channels on the field side of the termination board.

Note

It is advisable to screw the leads including the ground leads from the field side directly onto the new loose termination boards (green termination boards) before removing the old termination boards from the metal bar.

8 Remove the 4 off old termination boards by snapping them off the metal bar, using a screwdriver at top of the termination board, see figure below:

Figure 30 Disconnecting old termination board



9 Connect the Blue Heat cable to the Blue Heat connector (78–pin) on back of the MP7600 computer, see 1.4.2.6.

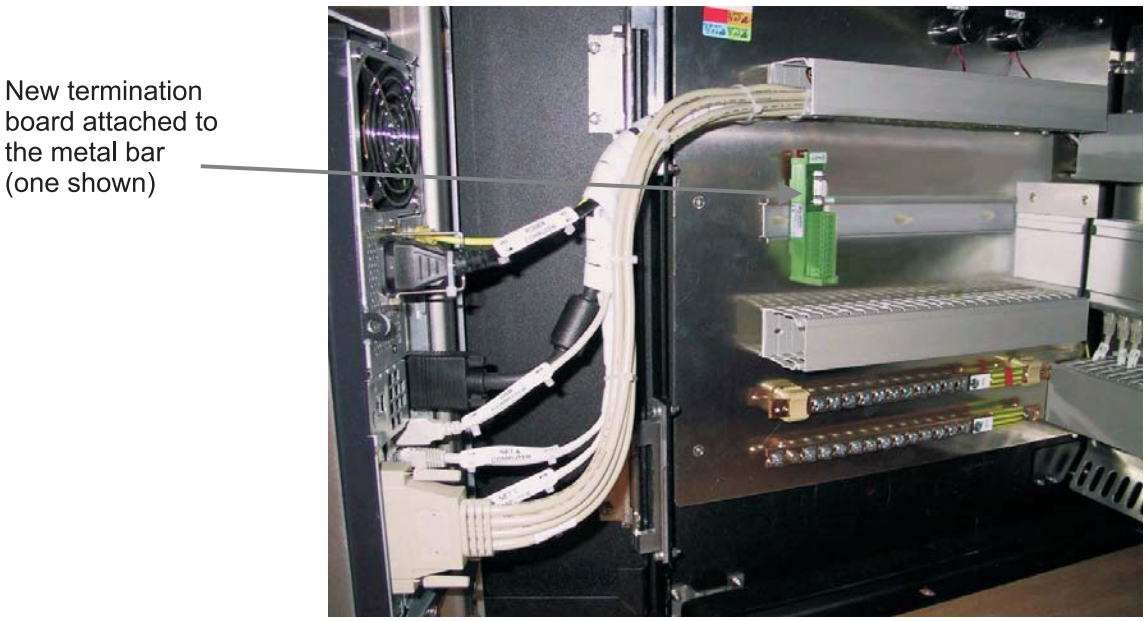
10 Snap-on the new termination boards, onto the metal bar.

Note

The new termination boards are to be connected to reflect the channels on the new 8 channel Blue Heat card, where channel 1 through 4 are for RS232 and channel 5 through 8 are for RS422/485 (P1 to channel 1, P2 to channel 2, P5 to channel 5 and P6 to channel 6).

Channel P3, P4 (RS232) and channel P7 and P8 (RS422/RS485) are for future use.

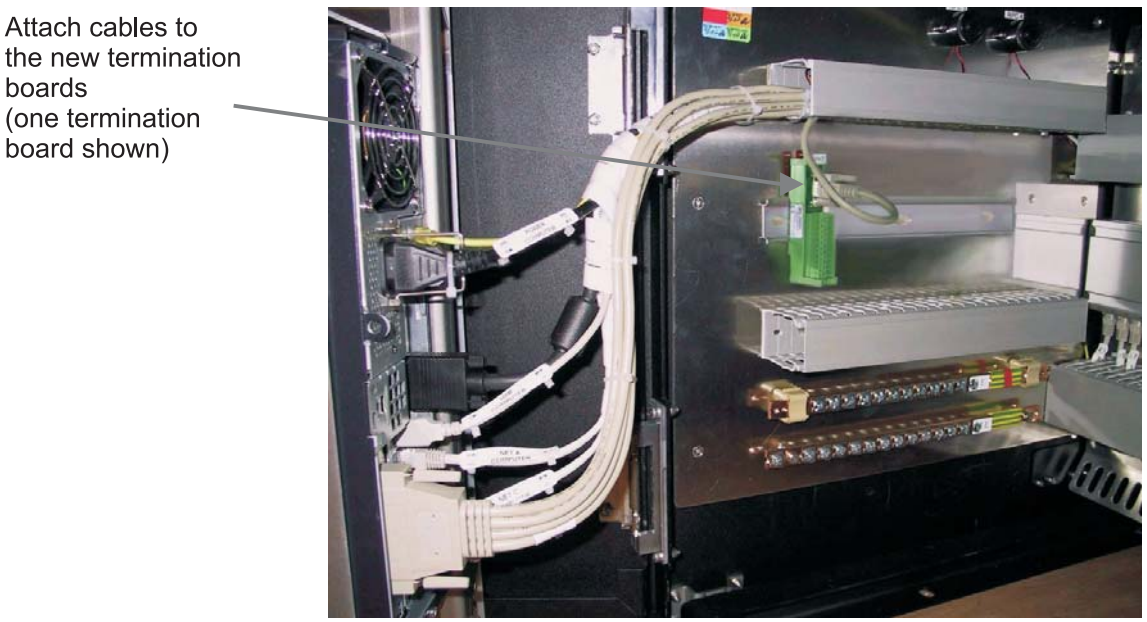
Figure 31 Terminal board – new type



11 On the other side of the Blue Heat cable, screw the split cables (P1 to P8) onto each connector (9–pin) on the respective new termination boards.

The figure below is how a typical MP7600 w/8 ch. looks like inside the cabinet (only channel 1 shown and connected).

Figure 32 Typical MP7600 w/8 channel system (new terminal board)



12 If more termination boards are to be connected, perform steps 10 and forward.

13 Lay the split cables inside the cable tray and snap-on the cover.

14 If applicable, turn on power to the MP7600 computer and close the cabinet door.

5 REPLACEABLE PARTS AND CONSUMABLES

This section contains lists of replaceable parts, recommended spare parts and consumables used in MP7600. Replacement procedures for the listed parts are mainly described in the Corrective maintenance chapter. No replacement procedures are normally supplied for the consumables.

5.1 Replaceable basic parts and recommended spare parts

The table shows replaceable basic parts and recommended spare parts.

Table 3 Replaceable parts and recommended spare parts for the computer

List Ident	Part Name	Recommended as Spare Part	Part Number
1	Power Supply, 381024-001	X	302263
2	Motherboard, 381028-001		302264
3	System Hard-disc drive 80GB SATA-3G, 391945-001	X	302265
4	Recorder Hard-disc drive 160GB SATA WD1600BEVS (for HS/DP-Recorder model)		312200
5	16X DVD-RW drive, 390882-001		302266
6	Memory DIMM, 512MB, PC2-4200 CL4, 393393-001	X	302267
7	Heat sink with cooling fan, 382024-001		302268
8	Intel Pentium 4 630 processor - 3.0GHz 800MHz front side bus, 2MB Level-2 casocket 775, 392273-001		302269
9	Dual LAN; Intel Pro/1000 MT Dual Port Server Bulk, PWLA8492MTBLK5		302270
10	Serial Port 2ND DC7600 / DC7100 PA716A		302271
11	4-screen graphic card; MATROX QID 128MB QUAD DVI/RGB PCIe LP, QID-E128LPA (for 4-screen model)		302273
12	2-screen graphic card; Matrox Millenium G550 32MB Dual Head PCI-Express 1x, Low Profile, G55-MDDE32LPD (for NAV model)		302274

Table 3 Replaceable parts and recommended spare parts for the computer (cont'd.)

List Ident	Part Name	Recommended as Spare Part	Part Number
13	DY674A Intel DVI ADD2 SDVO (PCIe) adapter for DC7600, 361264-001		302275
14	Single LAN; Broadcom NetXtreme Gigabit PCIe NIC, EA833AA (for LAN/CAN models)		302322
15	RIC2 card, low profile (optional for MP7600 NAV)		6200455
16	Serial interface; Blue Heat PCI/4; 2 ports RS232, 2 ports RS422/485 (for Blue Heat models)	(obsolete)	701058
17	Serial interface; Blue Heat PSI RS422/485; 4 ports RS232, 4 ports RS422/485 (for Blue Heat models)		308845
18	Termination Board; 9–pins D-sub for screw terminals (for 8 channel Blue Heat card)		309044
19	Inlet fan, Type: 392185-001		312278
20	CPU cooling fan, Type: 381866-001		312281

5.2 Consumables

Table 4 Consumables

List Ident.	Part Name	Recommended as Spare Part	Part Number
1	System Backup DVD	X	301862
2	Filter for MP7600 computer, for LAN/CAN models	X	303078

Kongsberg Maritime AS

P.O.Box 483
N-3601 Kongsberg,
Norway

Telephone: +47 32 28 50 00
Telefax: +47 32 28 50 10
Service: +47 815 35 355
www.kongsberg.com

KONGSBERG