

**Series DCX 870
Dual PSU Upgrade
Installation Guide**

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STATUTORY NOTICES

APPROVED for connection to telecommunication systems specified in the instructions for use subject to the conditions set out in them.

NS/1282/I/J/453041

WARNINGS

This product has a removable dress panel fitted to the front of the unit. It may only be removed by suitably qualified personnel for installation or maintenance purposes, and must be replaced afterwards. Removal under any other circumstance would invalidate the EMC (Electro-Magnetic Compatibility) type approvals.

In order to avoid creating a safety hazard, both PSUs, or a PSU and blanking plate, must be installed at all times.

Please refer to the Series DCX Installation Guide (X840-305351) for connection of Kilostream ports to the DCX 870.

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Preface

This document details the procedures for upgrading an existing installed DCX 870 card frame from single-PSU to full dual-PSU operation, using the integral Dual PSU solution. It is intended for use by appropriately trained Cray installation engineers, or any engineers authorised by Cray's agents or distributors to perform the upgrade.

The manual should be read in conjunction with the Series DCX Installation Guide (X840-305351), where the section relating to 'DCX Dual Power Supply Unit' is superseded by this document.

An existing knowledge of the DCX system and appropriate terminology is assumed throughout. It is also assumed that the equipment originates from the Cray Communications UK factory.

It is recommended that this and other relevant documents are read completely *before* the installation is attempted.

Those customers who currently have digital PTT interfaces (for example, British **Telecom's Kilostream** service) are reminded of their obligations and should refer to the appropriate appendix in the DCX Installation Guide.

STATUTORY NOTICES (continued)

WARNINGS

This equipment uses and generates hazardous voltages when powered-up and for a period of up to five minutes after all power has been removed. Do not apply power to the equipment until all installation operations are complete. Correct power-up procedures are given and must be observed for proper network operation.

This equipment is considered to be a hazardous energy source, due to its ability to supply in excess of 240 VA from its DC outputs.

The upgrade must be performed by a suitably trained and qualified engineer.

A PROTECTIVE EARTH must be provided for safety, in accordance with BS6701 : Part 1 : 1990 : Clause 6.10 (which also refers to the current IEE wiring regulations).

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The DCX 870 Dual PSU Upgrade kit is designed to provide an 'add-on' dual-redundant PSU capability to any existing single-PSU DCX 870 card frame. Typical features are:

- PSU fall-back redundancy.
- Load-sharing operation.
- Provision of management warning on PSU failure (via System Module 2 software).
- Visual indication of failed and working PSUS.
- Total enclosure within the DCX 870 card frame, with no additional external rack space required.
- Use of existing IEC 320 mains input supply, with no additional or special external mains wiring required.
- High reliability.

The functionality and performance of the Dual PSU exceeds that of the alternative 3U unit. Since it uses up no space outside the card frame (unlike the alternative unit), any space previously reserved for this can now be utilised for additional equipment instead. Another advantage is that each and every DCX 870 card frame within the rack can have its own Dual PSU option.

Each PSU is capable of being removed from, and inserted into, a live system (provided that the PSU has had its power cord unplugged).

Note that, due to space requirements, it is not possible to install a DCX 870 Dual PSU system in an **STC-based** DCX 860/870 node. If you wish to perform the Dual PSU upgrade for such a unit, you must first replace the STC with a System Module.

Note also that it is not possible, under any circumstances, to perform the upgrade on a desktop unit.

1.1 Requirements

You will need the following items for the upgrade:

- An upgrade kit.
- A small **flat-bladed** screwdriver.
- A medium-sized **flat-bladed** screwdriver.
- A large **flat-bladed** screwdriver.
- A small/medium-sized cross-head screwdriver (preferably a 'Pozidriv').
- A small pair of side cutters.
- A medium-sized pair of standard pliers.
- A 5.5 mm nut-spinner.
- A 1.5 mm Allen key.
- A pair of scissors for cutting paper.
- A box or tray for temporary storage of nuts, bolts and so on.

1.2 Checking the Upgrade Kit

The upgrade kit comes supplied as a kit of parts. Familiarise yourself with the parts, which will be more-or-less as given in the following list, and check that they are all present (some part numbers may vary for different voltage specifications):

X840-21401101	2 off	Dual PSU assemblies 230V (single units)
X840-41001101	1 off	Dual PSU fan-tray assembly 230V.
X840-41011101	1 off	Dual PSU mains-distribution and deflector-plate assembly 230V.
X840-610311	1 off	Dual PSU transition PCB assembly.
X840-917703	1 off	Dual PSU isolating plate.
X840-917803	1 off	Dual PSU front panel.
X840-214411	1 off	Dual PSU blanking plate ('dummy' PSU).
X1 00-405411	1 off	Safety earth wire.
X840-315551	1 off	This Installation Guide.
X84 0-410311	1 off	Dual PSU Upgrade PSU-fail cable.
X15 0-1 00086	4 off	DCX card-frame card guides.

Now is a good time to check that the voltage-rating labels on each of the powered items indicate the same operating voltage, and that this is correct for your installation.

The upgrade procedure, as given in this chapter, makes a number of assumptions about the location of the DCX unit to be upgraded:

- The unit is sited in a standard 19" (482 mm) rack.
- The lid (top) of the unit is not accessible.
- Access to the front **and** back at the same time is not possible.
- The unit has a full complement of cards and interconnect cables.
- The EMC screening panel is fitted.
- A 1U (44.45 mm) air-deflector **plate** (or ventilation **panel**) is correctly fitted, directly above the unit.

The entire process will take approximately one hour from power-off to power-on.

There is no need to remove the unit from the rack.

2.1 Preparation

Locate the unit on which the upgrade is to be performed, and prepare for the task as follows:

1. Isolate the power by switching off at the mains connection point and then removing the mains lead from the rear of the unit. This lead will later be plugged into the new Dual PSU mains-distribution and deflector-plate assembly (replacing the existing 1U air-deflector plate), so make sure that there is sufficient length available to reach it.
2. Be prepared to label all data cables attached to the unit, so that you will be able to reconnect them correctly at a later stage, should you find, during the disassembly process, that they need to be removed.
3. Make available facilities to guard against the effects of static electricity (wrist straps, and so on).

You are now ready to proceed with the upgrade.

2.2 Disassembly of Existing Unit

To disassemble the existing unit, carry out the following procedure:

Working from the Front:

1. Using a small **flat-bladed** screwdriver, release the fixings of the EMC screening panel, and remove it. It will no longer be required.
2. Clearly identify and label the six cards fitted closest to the PSU, and note their relative positions in the card frame. Remove them and store them carefully for **re-use** later. This will facilitate access to the PSU area.
3. Using a small **flat-bladed** screwdriver, release the fixings of the PSU, and remove it. It will no longer be required.
4. Using a small **flat-bladed** screwdriver, release the fixings of the fan tray, and then carefully begin to remove it, until the mains connector is accessible. Disconnect the fan tray at this connector. Fully remove the fan tray. It will no longer be required.
5. Locate the **'Ty-rap'** fixings for the fan-tray cable and then, using a small pair of **side cutters**, cut the **'Ty-raps'** and release the cable. It will no longer be required.

Working from the Rear:

6. Using a small cross-head screwdriver, loosen and remove the **hinged**-rear-panel fixings, and save them for **re-use** later. Examine the data cables, and if you find that they are too short to allow the panel to be fully lowered, then label them and remove them. Leave the panel hinged open.
7. Locate and, using a 5.5 mm nut-spinner, remove the (green and yellow) earth wire connection between the chassis and the mains filter unit. You may discard the fixings, as they are no longer required.
8. Locate and, using a small cross-head screwdriver, loosen and remove the two fixings that secure the filter to the lower portion of the rear panel. You may discard the fixings, as they are no longer required.
9. Locate and remove the two wires from the mains filter, and remove the filter. It will no longer be required.

10. Locate and, using a 5.5 mm nut-spinner, remove the two (green and yellow) earth wire connections from the left-hand side of the chassis side-wall. You may discard the fixings, as they are no longer required.
11. Using a small **flat-bladed** screwdriver, loosen and remove the cover from the multi-way wiring block.
12. Using a small **flat-bladed** screwdriver, loosen the fixing screws and remove the four wires from the right-hand side of the block. Loosely replace the cover.
13. Locate and, using a small cross-head screwdriver, loosen and remove the four fixings that secure the internal **IEC-lead** assembly to the chassis. You may discard the fixings, as they are no longer required.
14. Using the side cutters, cut and remove the wires from the fuse-holder, and remove the remainder of the wiring loom and **IEC** assembly from the chassis. It will no longer be required.
15. Using the medium-sized pair of pliers, remove the plastic nut used to secure the fuse-holder to the chassis. Remove the fuse-holder, which you may now discard, as it is no longer required.

Working from the Front:

16. Locate the air-deflector plate (or ventilation panel, as appropriate), which should be directly above the chassis and, using a large **flat-bladed** screwdriver, loosen and remove the two rack fixings, and then remove the plate/panel itself. Store the fixings carefully for **re-use** later. The plate/panel, however, will no longer be required.

This completes the disassembly process.

2.3 Preparation of New Parts

Before you can assemble the new unit, you must first undertake some preparation, as follows:

1. Turn to Appendix C of this manual and remove one of the two template pages (the other is a spare). Using a pair of scissors, carefully cut out each of the three templates along the dotted lines. Keep them handy for use during the re-assembly process.
2. Look for the following items from the upgrade kit:

X840-610311 Dual PSU transition PCB assembly.

X840-917703 Dual PSU isolating plate.

The second of these is easily recognizable as being the large, grey coloured, awkwardly shaped item of metalwork. It has no markings to otherwise identify it.

3. Place this large piece of metal flat in front of you, with the large opening to your left. Notice the three (black) captive fixings on the left, and the three loosely tightened fixings on the right. Using a **medium-sized** cross-head screwdriver, remove the three fixings on the right. Align the transition PCB with the fixing holes, ensuring that it sits on the right-hand side of the bracket, with the four large capacitors facing to the right. Insert the fixings and securely tighten them.
4. Remove the nuts and washers fitted to the two protruding M3 studs on the metal support bracket fastened to the transition PCB. Keep them handy for use later.
5. Check whether a safety earth wire, connecting the M4 stud on the hinged rear panel of the DCX 870 bay to a permanent earth (in accordance with BS6701: Part 1:1990: Clause 6.10, which also refers to the current IEE wiring regulations), already exists. If not, you must make the connection using the earth wire (Xl 00-40541 1) supplied in the kit.
6. Ensure that all the items required for the assembly process are to hand.

2.4 Re-assembly of Unit

Now you can begin the process of putting everything back together again, using the new parts. The procedure is as follows:

Working from the Front:

1. Locate and remove the two right-most pairs of card guides fitted to the base of the chassis. These were used to hold the old PSU and need to be re-positioned for the new system. You will also need the four additional guides supplied in the kit.

Note that a guide is easily removed by holding it in the middle of its length and gently pulling it (perpendicularly) away from the chassis until one end 'pops' out of its location. The other end then just easily pulls out.

2. Template **1** defines the new positions of the bottom card guides. Take the template and place it, using the 'Slot 20' and 'RHS of Chassis' markings as alignment points, along the front edge of the lower chassis member. Now you can either keep hold of the template, or transfer the new guide markings to the chassis using a soft pencil (removing the pencil marks **later!**). Fit four of the guides in their new positions at the front, using the appropriate template markings to align them. Once you are satisfied that these are correctly positioned, fit the four **rear-most** ones, lining them up with the front ones just fitted.

Note that a guide is easily fitted by firstly positioning one end of it at the required point, and then gently bending it (perpendicularly to the chassis) until the other end can be pressed in. Once fitted, check that it is parallel to the other card guides.

3. Repeat step **1** for the two pairs of guides at the top of the chassis. (No additional ones will be needed this time.)
4. Template **2** defines the new positions of the top card guides. Repeat step 2, using Template 2, for these four guides at the top of the chassis. (There are eight at the bottom and only four at the **top!**)
5. Check that the guides are correctly fitted by temporarily fitting one of the DCX cards previously removed. Also recheck the location with the appropriate template.
6. Locate and, using a **1.5 mm** Allen key, loosen the two old PSU fixing retainers in the upper front extrusion, and the right-hand fixing

retainer in the lower front extrusion (which was used by the old fan tray). These need to be repositioned for the new system.

7. Using Template 3, with its right-hand edge touching the right-hand side of the chassis, reposition the top two retainers and the single bottom retainer, and loosely retighten them. (You cannot be absolutely sure that the positioning is spot-on until you reach step 12: – a certain amount of trial and error may well be involved.)
8. Offer the previously assembled isolating-plate and **transition-PCB** assembly (see Section 2.3) into the chassis as follows. The PCB should beat the rear, with the four large capacitors at the bottom. Check that the two sets of M3 nuts and washers have been removed from the support-bracket studs. Insert the leading edge of the isolating plate into the fourth row of card guides (counting from the right) and carefully slide the assembly into the chassis until resistance is felt. At this point, the assembly is not quite home, and there should be approximately 1 cm between the upper carrier fixings and the upper front extrusion of the chassis.
9. Check that the PSU fixing retainers are still correctly positioned. The screw holes, in the retainers, which are identified on the template as Critical Alignment Items should line up exactly with the respective upper and lower black captive fixings on the isolating plate. If they do not, remove the isolating-plate and **transition-PCB** assembly and re-adjust the position(s) of the retainer(s) as per step 7. Once the assembly is in place (but not quite home) and the relevant items are lined up, securely tighten the retainers.

Working from the Rear:

10. Carefully pull the isolating-plate and **transition-PCB** assembly until the two M3 stud fixings coincide with and protrude through the corresponding holes in the motherboard. When they both protrude some 1 cm, then you can be sure that the old DIN-style PSU connectors are correctly mated.
11. Place the previously removed plain washer, spring washer and nut (in that order) over each of the stud fixings. Then loosely tighten the nuts, just with your fingers, until all the slack has been taken up.

Working from the Front:

12. Locate and, using a small **flat-bladed** screwdriver, tighten the two upper and single lower black captive isolating-plate fixings. *Do not use excessive force.* If they do not screw home with the minimum of force, then the PSU fixing retainers are incorrectly positioned and will have to be re-adjusted.

Working from the Rear:

13. Using the nut-spinner, fully tighten the two nuts on the back of the motherboard.
14. If you have a System Module 2, fit the Dual PSU Upgrade **PSU-fail** cable (X84 O-4103 11) between PL13 on the transition PCB and PL3 on the System Module 2 manager PAM(s). In a dual System Module 2 situation, the cable must be fitted to both PAMs, using both connectors.

Working from the Front:

15. Carefully insert each of the separate power supplies into the chassis, ensuring that the edges of the metalwork are located in the card guides, and that the assembly can slide in smoothly. There should be little resistance felt until the PSU is **1 cm** from being fully home. (If you do feel any resistance before this point is reached, then check the location of the card guides.) At the 1 cm point, carefully push the PSU fully home: the only resistance you should encounter is the insertion resistance of the connectors, which is very low. Using a medium-sized **flat-bladed** screwdriver, secure the single fixing. *Do not over-tighten.*
16. Take hold of the new fan-tray assembly and install it into the bottom of the chassis. Using a small **flat-bladed** screwdriver, tighten the two fixings.
17. Take hold of the mains-distribution and deflector-plate assembly and install it above the chassis, in the place vacated by the old air-deflector plate. Using a large **flat-bladed** screwdriver, tighten the two rack fixings.
18. Grasp the longest of the three IEC mains leads and carefully push it into the cable-retaining channel on the right-hand side of the front of the new isolating plate. Insert its connector into the **IEC** socket on the fan tray.

19. Insert each of the other two IEC mains connectors into the IEC socket at the front of each PSU.
20. Refit the DCX cards you previously removed to perform the upgrade.

Working from the Rear:

21. Using a medium-sized cross-head screwdriver, refit and secure the hinged rear panel, using the original fixings.
22. Refit any data cables you may have removed. This is where you are glad that you **labelled** all the cables, as previously advised!
23. Again, you should check that the safety earth wire fitted to the stud on the rear panel of the chassis is connected to an appropriate earthing point.

This completes the **re-assembly**. You are now ready for power-up and commissioning.

2.5 Power-up

WARNING

This equipment uses and generates hazardous voltages when powered-up and for a period of up to five minutes after all power has been removed. Do not apply power to the equipment until all installation operations are complete. Correct power-up procedures are given and must be observed for proper network operation.

In addition, this equipment is considered to be a hazardous energy source, due to its ability to supply high currents from its DC outputs. You must be careful not to cause any short circuits, and not to touch any hot parts.

With all the installation work completed, you can proceed with power-up as follows:

1. Take hold of the original mains lead and plug it into the IEC inlet in the rear of the mains-distribution unit.
2. Apply power.
3. Successful operation is indicated by the illumination of the green LED on each of the PSUS and the network springing into life!
4. If a System Module 2 is installed, the PSU status should be reported as good.

2.6 Commissioning

The output voltages of the Dual PSU system have been accurately set at the factory, and no adjustment is possible in the field. When the correct mains input power is applied, the PSU monitors its own output and internal working voltages and, if a fault is detected, the PSU will illuminate its red LED and extinguish its green LED. Also, if there is a System Module 2 card in the rack, the fault will be reported by the software.

If anything appears to be amiss with the PSU after power-up, refer to Section 2.7 in the first instance.

For a full description of fault reporting by the LEDs and the System Module 2 manager, see Appendix A.

Check that each fan in the fan tray is operational.

Finally, fit the new screening panel (X840-917803) over the front of the cards.

2.7 Basic Troubleshooting

In the unlikely event of a problem occurring during the installation, first check whether the symptoms are those described in either of the following two subsections and, if so, perform the suggested actions. If necessary, refer to Appendix A for detailed information on fault reporting.

2.7.1 No Apparent DC Output from PSU System

Symptom: The DCX cards in the chassis are not powered up.

- Actions:
1. Check that the mains cord into the mains-distribution unit is correctly connected to a live power source.
 2. Check that the power leads into each of the PSU units themselves are connected.
 3. Check the fuse, where fitted, in the connector on the mains cord.
 4. Check the fuses in the mains inlet connector on the mains-distribution unit.

Note that fuses must only be replaced by those of the same type and rating.

2.7.2 One PSU Fails to Power Up Properly

Symptom: The red LED is illuminated on one PSU, and the green LED on the other.

- Actions:
1. Check that the power lead into the suspect PSU is connected properly.
 2. Completely remove the PSU, and visually check the condition of the DC-output connector and its mating half on the motherboard. **Do not insert your hand into the frame until power has been removed.** If the connection is suspect, then power must be removed from the system and the cause investigated.
Replace the PSU with a known working unit and return the suspect unit to Cray for investigation and/or repair.

2.8 Clearing Up

Carefully dispose of all the old parts; you do not have to return these to the factory.

Store the blanking plate and this Installation Guide in a safe place for future use. The blanking plate will be needed, if one PSU is ever removed from the system for any reason, to maintain the user safety approval and for maintaining proper airflow around the remaining PSU.

3 Live PSU Removal and Replacement

WARNING

This equipment uses and generates hazardous voltages when powered-up and for a period of up to five minutes after all power has been removed. Do not apply power to the equipment until all installation operations are complete. Correct power-up procedures are given and must be observed for proper network operation.

In addition, this equipment is considered to be a hazardous energy source, due to its ability to supply high currents from its DC outputs. You must be careful not to cause any short circuits, and not to touch any hot parts.

3.1 To Remove a PSU from a Live System

You must adopt the following procedure whenever you remove a PSU (perhaps a failed one) from a live system, and intend to leave the system working with the remaining PSU. Failure to observe this procedure may result in damage to the DCX node or the PSU system, or in disruption to user **traffic**.

1. Locate the PSU to be removed.
2. Unplug its power cord. The red LED on this PSU should come on, if it is not already on.
3. Using a small **flat-bladed** screwdriver, release the fixing at the top of the PSU.
4. Using the pull-handle, carefully withdraw the PSU from the system.
5. If the system is to be left for any length of time with only one PSU installed, then you must install the PSU blanking plate (X840-21441 1), as detailed in the following steps. This is required to prevent access to a 'hazardous energy source' (the PSU bus bars) and to maintain adequate airflow around the single remaining PSU.

- a) Carefully insert the top and bottom edges of the blanking plate into the appropriate card guides. Gently push the plate into the chassis.
- b) Using a small **flat-bladed** screwdriver, secure the fixing at the top of the plate.
- c) For tidy stowage of the power-cord, insert its connector into the 'dummy' IEC mains socket at the front of the blanking plate.

3.2 To Install a PSU into a Live System

You must adopt the following procedure whenever you install a PSU into a live system. Failure to observe this procedure may result in damage to the DCX node or the PSU system, or in disruption to user traffic.

1. Locate the blanking plate in whose position the new PSU is to be installed.
2. Remove the power-cord connector from the 'dummy' IEC socket at the front of the plate.
3. Using a small **flat-bladed** screwdriver, release the fixing at the top of the blanking plate.
4. Using the pull-handle, carefully withdraw the plate from the system.
5. Take hold of the PSU to be installed.
6. Carefully insert the top and bottom edges of the PSU metalwork into the appropriate card guides. Gently push the PSU into the chassis. There should be little resistance felt until the PSU is 1 cm from being fully home. At this point, carefully push the PSU fully home: the only resistance you should encounter is the insertion resistance of the connectors, which is very low.

The red LED on this PSU should now be illuminated.

7. Using a small **flat-bladed** screwdriver, secure the fixing at the top of the **PSU**.
8. Insert the power-cord connector into the IEC mains socket at the front of the PSU.

The green LED on this PSU should illuminate, whilst the red LED should go out.

In the event of a PSU fault situation occurring, you can obtain status information in two ways:

- From the status LEDs found on the front panel of each PSU. Refer to Section A1.
- From fault reports generated by System Module 2 manager software (if such a card is installed). Refer to Section A.2. Details of the actual format of these reports can be found in the System Module 2 Reference Manual. Basically, the Event Log Station will report that one of the PSUS has failed in a specific master or slave bay.

A.1 Status LEDs

There are two LEDs fitted to each PSU: a red one and a green one. They are designed to give a clear indication of a fault condition. *Only one LED can possibly illuminate at any one time on a given PSU.*

Both LEDs are powered from the +5 V rail on the DCX motherboard. There must be in excess of 4 V available on this rail for the LEDs to illuminate satisfactorily. Thus, for any kind of LED readout to exist at all, at least one of the PSUS must have at least a semi-operational + 5 V rail. This, together with the inherent interactivity between the two PSUS, can lead to misinterpretation of the LED readout. Therefore, for clarity, the **dual-PSU** situation is treated separately, in the explanations given below, to the **single-PSU** situation (which **arises** when one of the pair of PSUS is removed for any reason).

Note that there is no self-test feature for the LEDs.

Both PSUS Installed

Both green LEDs illuminated:

This indicates, under normal conditions, that all output voltages and all internal working voltages are at acceptable levels on each supply (although they may not necessarily **be within their** specification limits).

In this state, both PSUS will supply the current demand of the system on a roughly 50/50 basis.

Both red LEDs illuminated:

This indicates, under normal conditions, that both PSUS have detected that one or more of their output voltages or internal working voltages have failed to reach a minimum level (and will definitely be below specification).

One red LED and one green LED illuminated:

This indicates, under normal conditions, that one PSU (with the green LED lit) is working properly, while the other PSU (with the red LED lit) has detected that one or more of its output voltages or internal working voltages have failed to reach a minimum level.

In this state, only the PSU with the green LED lit will supply the current demanded by the system. Although this PSU will supply the demand for power indefinitely, you are advised, in the interests of further resilience, to replace the faulty supply as soon as possible.

Note that this LED status can indicate not only an actual PSU fault, but also a situation where one PSU has had its mains supply disconnected.

No LEDs illuminated (or both red LEDs dimly illuminated):

This indication can be given, under normal conditions, when the common + 5V rail has decreased to a level too low to sustain the LEDs. A typical situation may be:

- An overload condition, where both PSUS have gone into a current-limiting mode and reduced their output voltage accordingly.
- An over-temperature condition, where the PSUS have shut down as a result of getting too hot.

Single PSU Installed

Green LED illuminated:

This indicates, under normal conditions, that all output voltages and all internal working voltages are at acceptable levels (although they may not necessarily be within their specification limits).

Red LED illuminated:

This indicates, under normal conditions, that the PSU has detected that one or more of its output voltages or internal working voltages have failed to reach a minimum level.

No LEDs illuminated (or red LED dimly illuminated):

This indication can be given, under normal conditions, when the +5 V rail has decreased to a level too low to sustain the LEDs. A typical situation may be:

- An overload condition, where the PSU has gone into a current-limiting mode and reduced its output voltage accordingly.
- An over-temperature condition, where the PSU has shut down as a result of getting too hot.

A.2 System Module 2 Manager Reporting

A fault situation is reported on the Event Log by the manager software. The exact interpretation of such a fault report will depend on whether both PSUS, or just one PSU, is installed,

Both PSUS Installed

Should a fault occur, one or both of the PSUS will detect that one or more of the output voltages or internal working voltages have failed to reach a minimum level. Although the System Module 2 is made aware of this and generates a fault report, it is not possible for the software to detect precisely *which* PSU has failed. Exact indication of the faulty unit can only be observed from the status LEDs on the **PSUs**: the red LED on the faulty **PSU(s)** should be illuminated (see Section A. I).

If the faulty PSU is then removed, its removal will not be reported, unless the remaining PSU is also faulty.

Single PSU Installed

It may seem surprising that a single PSU can be reported, via a card dependent on that **PSU's** rail voltage, as being faulty. However, this *is* possible if the PSU is not completely down. Suppose the PSU has detected — that one or more of its output voltages or internal working voltages have failed to reach a minimum level. If the System Module 2 is able to obtain this information and generate a suitable report, the +5 V rail must be holding up **sufficiently** well for the card to be still receiving its power. Therefore, it would then be logical to conclude that either the ± 15 V rails or the internal supplies of the PSU are at fault. You would confirm this by observing the red LED on the PSU, which should be illuminated.

In the event of the +5 V rail being down, it is unlikely that the manager software **will** have had time to report that the PSU was going faulty prior to the actual loss of power. Therefore, the only indication of a fault in such a case would be on the status LEDs of the PSU. Either both LEDs would be extinguished, or just the red LED would be dimly lit (see Section AI).

All nominal specifications given in this appendix are for a correctly installed DCX 870 Dual PSU system, operating (unless indicated otherwise) at maximum load, with both PSUS fitted, at a nominal 25°C ambient temperature, at sea-level. Many of the specified ratings will vary, depending on the exact input voltage, frequency, temperature and altitude of the installation.

Function

The Dual PSU Upgrade provides a load-sharing and redundant fall-back DC power supply for a DCX 870 rack-mount unit.

Mains Power

Nominal Input Voltage (AC):	230V \pm 10% 115V \pm 10%
Frequency:	47-63 Hz single-phase
Input Current:	At 230 V: 2.5 A At 115 V: 4.9A
Leakage Current:	At 230 V: 0.5 mA At 115 V: 1.0 mA
Power Factor:	At 230 V: 0.79 At 115 V: 0.85
VA Rating:	At 230 V: 580 VA At 115 V: 565VA
Heat Output:	At 230 V: 460 W At 115 V: 480W

Mains Connection

The main power input, for all mains variants, is via a standard IEC 320 (dual-fused) inlet connector. This can be found at the rear of the **mains**-distribution unit, which should be located immediately above the chassis.

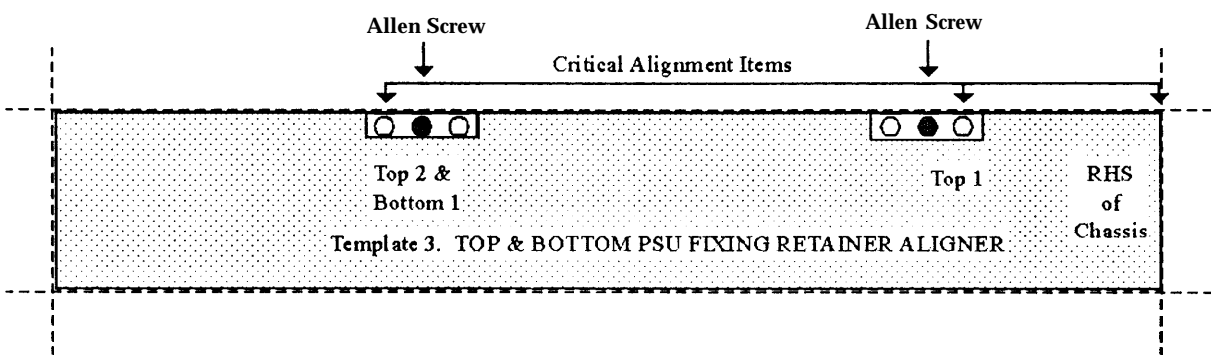
The mains-distribution and deflector-plate assembly **must also** be correctly installed above the chassis.

In the event of one of the PSUS being removed for any length of time (greater than one hour), its vacated space must be filled by a blanking plate in order to maintain the cooling (and also to prevent a safety hazard).

Weight

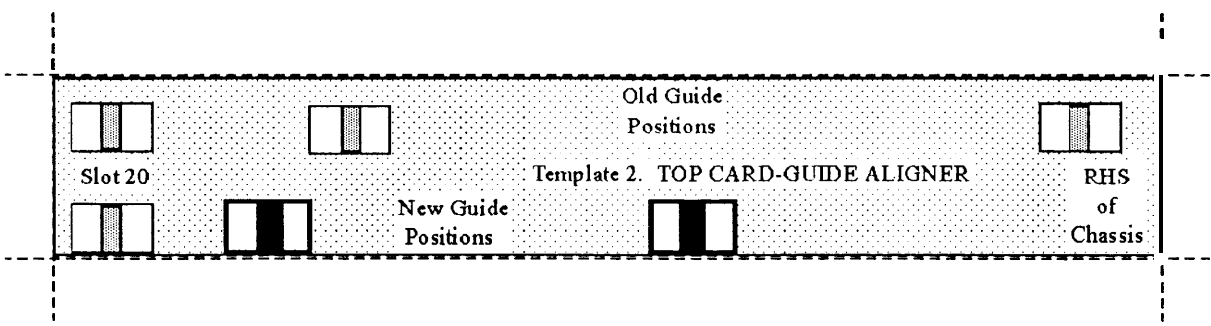
Mass of (upgrade) components:	15.5 kg
Mass difference between new and existing installation:	3.0 kg
Mass of an individual PSU:	3.6 kg

This appendix contains the set of three templates that you must use in the upgrade, together with a spare set.



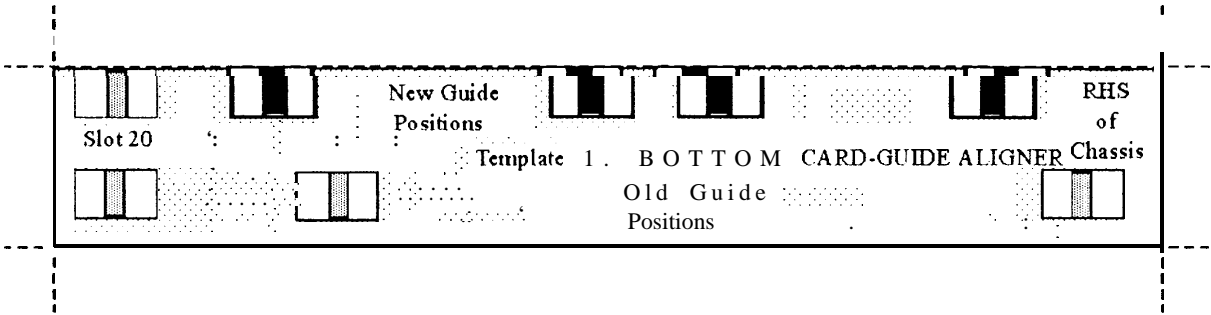
Template 3

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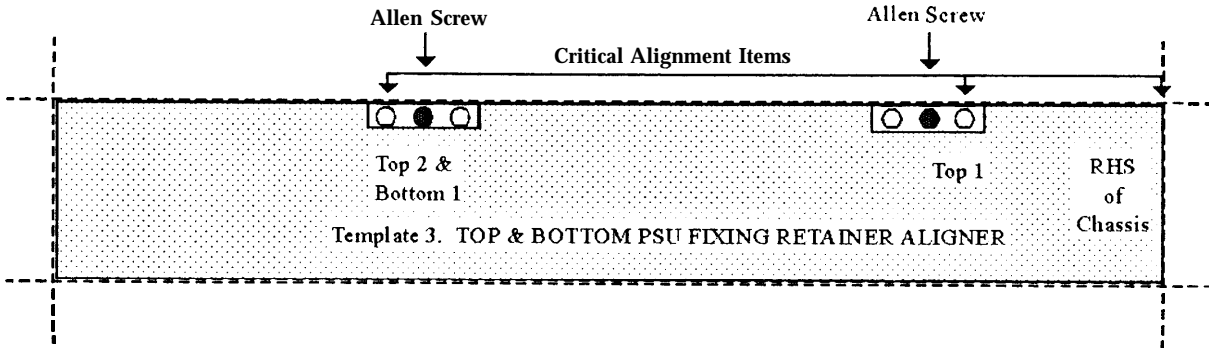
Template 2

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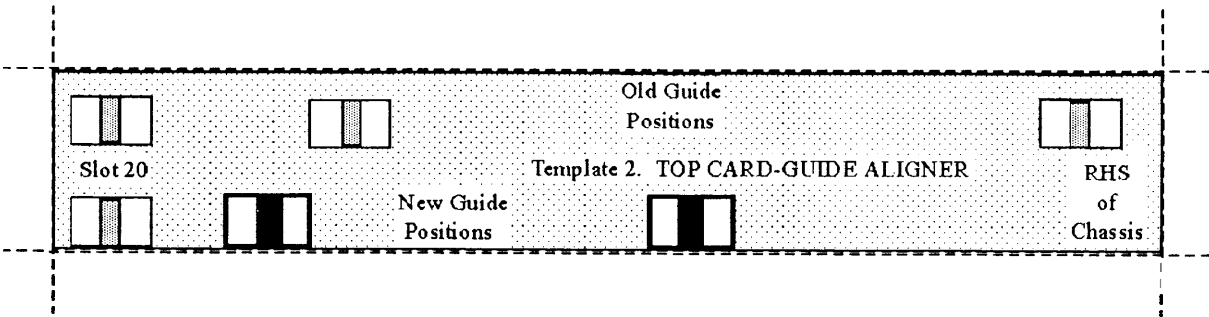
Template 1

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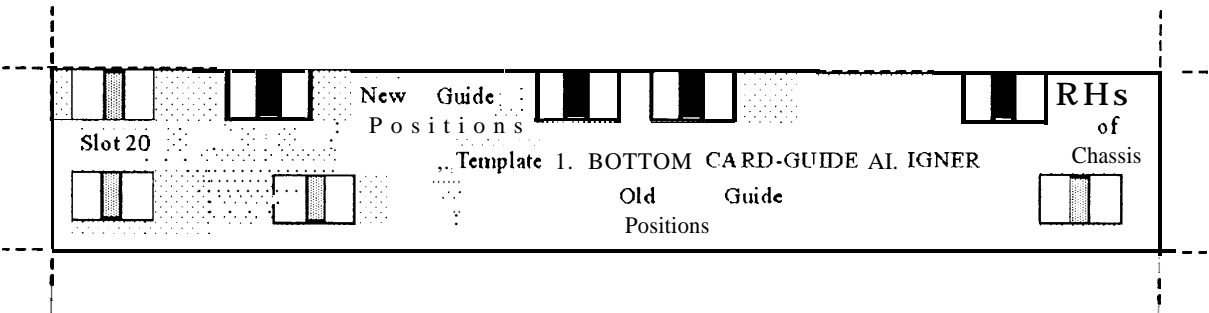
Template 3

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Template 2

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Template 1

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