APPLICABILITY: All Systems containing KN02-AA CPU’s manufactured before 27-AUG-1990 including but not limited to the following:
PM361-BD PM361-BE PM361-BG PM361-BH PM361-BK PM361-BL PM361-MD PM369-PZ
PM361-ME PM361-MG PM361-MH PM361-MK PM361-ML PM362-BK PM362-BL PM371-BY

PROBLEM & SYMPTOM:
1. Firmware Spec too Complex for the Open Systems Environment
2. TURBOChannel Modules Lift Out of System I/O Connectors
3. Excessive Resistance Build up in the 5V Power Connector

SOLUTION: 1. Replace (4) socketed ROM’s on system module and (1) socketed
   ROM on each TURBOchannel option present.
2. Add six standoffs to system module which the options bolt to.
3. Clean 5V and GND connectors with a "Gold-Wipe" towelette containing PPE.

QUICK CHECK: If the firmware revision displayed during power-up is below 5.3c
install the FCO.

PRE/CO-REQUISITE FCO: None | MTTI 1.5 hr

TOOL/TEST EQUIPMENT:
ROM Extraction Tool: 29-28497-01 (included in EQ Kit)
ESD Kit: 29-26246-00 or equivalent

FCO PARTS INFORMATION

<table>
<thead>
<tr>
<th>FCO KIT NO.</th>
<th>DESCRIPTION OF CONTENTS</th>
<th>EQ KIT VARIATION APPLICABILITY</th>
</tr>
</thead>
<tbody>
<tr>
<td>EQ-01589-01</td>
<td>Quantity Part Number Description (See Page 6 for Contents of EQ Kit)</td>
<td>None</td>
</tr>
<tr>
<td>FA-04919-01</td>
<td>1 FA Document</td>
<td></td>
</tr>
</tbody>
</table>

FCO CHARGING INFORMATION

<table>
<thead>
<tr>
<th>WARRANTY/CONTRACT</th>
<th>NONWARRANTY/NONCONTRACT</th>
</tr>
</thead>
<tbody>
<tr>
<td>ON-SITE</td>
<td>OFF-SITE</td>
</tr>
<tr>
<td>TRAVEL/INSTALL</td>
<td>EQ INSTALL</td>
</tr>
<tr>
<td>DEC</td>
<td>DEC</td>
</tr>
<tr>
<td>CUS</td>
<td>CUS</td>
</tr>
</tbody>
</table>

APPROVALS

CSSE ENG
Dave Oliver

FSHQ LOGISTICS
Carol Sarasin

FS PRODUCT SAFETY
Robert Brister
KNO2-AA-0001 FCO INSTALLATION PROCEDURE

*****************************************************************
** IMPORTANT **
The purpose of this document is to provide the engineer with an overview of the procedure used to install the FCO.
The installation is described in detail in the DECstation 5000 FCO Upgrade Manual (EK-FSFCO-RO) included in the EQ Kit.

*****************************************************************

TABLE OF CONTENTS
Overview...............................Page 3
FCO Procedure..........................Page 4
Firmware Changes.......................Page 5
Materials..............................Page 6
OVERVIEW

The primary reason for the FCO is to implement a new firmware architecture into the DECstation 5000/Model 200 workstation and DECsystem 5000/Model 200 server. The firmware fix involves replacing four socketed ROMs on the system module and one socketed ROM on each TURBOChannel option present in the system. While on site, service personnel will perform two additional tasks:

- Add six standoffs to the system enclosure which the TURBOChannel modules will bolt to. This will prevent modules from lifting out the system I/O connectors.

- Clean the 5V power connectors with a "Gold-Wipe". A Gold-Wipe is a towelette treated with PPE (Polyphenyl Ether), an anti-oxidant/lubricant. This will extend the life of the power connector.
The purpose of this section is to provide the engineer with an overview of the procedure used to install the FCO. The installation is described in detail in the DECstation 5000 FCO Upgrade Manual (EK-FSFCO-RO) included in the EQ Kit.

1. Determine if a system is a candidate for the FCO. If the firmware revision displayed during power-up is below 5.3c install the FCO.

2. From the console, display and record all System Environmental Variables contained in the current firmware. This information will be needed later (see step 9) to reset the Environmental Variables.

3. Remove cover and clean 5V Power connectors with a Gold-Wipe. Place the used Gold-Wipe in the zip lock bag provided, for disposal.

4. Add standoffs if needed. Bolt the six standoffs into pre-drilled and tapped holes in the system module. Use the machine screws to secure each TURBOChannel option.

5. Remove ALL 4 ROMs from the base system module plus ALL ROMs in the TURBOChannel option modules. (For ease of installation you may need to remove the power supply)

6. Install the 2 base system ROMs (High, Low) and verify with power-up selftest. The diagnostic LED’s on the back of the system will blink on and off as self test runs. If the LEDs stay lit for more than 30 seconds self test has failed.

7. Replace the two remaining base system ROMs (NI, SCSI) and any ROMs in the TURBOChannel options modules. Use power-up self test to verify the total system is operational.

8. Apply new revision labels to all updated modules.

9. Reset the environmental variables including the boot path. (use the information recorded in step 2)

10. Verify that the system boots Ultrix.

11. Leave customer documentation packet on site.
FIRMWARE CHANGES

This new Firmware incorporates major changes to the console and diagnostic commands. If you have experience working with the DECstation 5000/Model 200 workstation or DECsystem 5000/Model 200 server you will find the new console and diagnostics radically different. The console has adopted the industry standard UNIX - C language look and feel.

*****************************************************************
*                        ** IMPORTANT **                        *
*                                                               *
*  It is important for the service engineer to understand how  *
*  the console has changed. For example a new command string is *
*  used to define the boot path.                                *
*                                                               *
*****************************************************************

As an educational aid we have included a copy of the revised DECstation 5000/Model 200 Maintenance Guide in the EQ kit. This manual is for service engineers. Please take it with you when you leave the site and use it to familiarize yourselves with the new interface. This document describes in detail the usage of the new console and diagnostic commands.

MATERIALS

This section contains a description of the material contained in the EQ kit.

FCO KIT CONTENTS

Table #1
(70-28331-01, Pre-packaged FCO Parts as listed below)

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Description</th>
<th>QTY</th>
</tr>
</thead>
<tbody>
<tr>
<td>70-28330-01</td>
<td>ROM Assembly</td>
<td>2*</td>
</tr>
<tr>
<td>70-28332-01</td>
<td>Gold-Wipe Assembly</td>
<td>1</td>
</tr>
<tr>
<td>70-28329-01</td>
<td>Screw/Standoffs</td>
<td>1</td>
</tr>
<tr>
<td>36-34442-01</td>
<td>REV Labels</td>
<td>1</td>
</tr>
<tr>
<td>29-28497-01</td>
<td>ROM Extraction Tool</td>
<td>1</td>
</tr>
<tr>
<td>EK-FSFCO-DK</td>
<td>Service Doc Kit</td>
<td>1</td>
</tr>
<tr>
<td>EK-CUFCO-DK</td>
<td>Customer Doc Kit</td>
<td>1</td>
</tr>
</tbody>
</table>

Note #1: (* Two sets of ROMs)

Each kit contains two complete sets of ROMs. Customers may have system configurations with duplicate options. There are also spare ROMs in the event of a problem during installation.

********************************************************************
*                        ** CAUTION **                             *
*                                                                  *
*  The ROMs contained in the EQ Kit are sensitive to electrostatic *
*  discharge. Use ESD kit (29-26246-00) or equivalent during the *
*  ROM installation. Following standard ESD procedures will        *
*  minimize the possibility of damaging system components.         *
*                                                                  *
********************************************************************
Example #1

Install the ROM labeled with part number "23-096E6-00" in location E17 on the KN02-AA system module. (See the FCO Installation Guide for diagrams)

Example #2

Install the ROM labeled with part number "23-241E7-00" in location E30 on the 54-19815-01 board. (See the FCO Installation Guide for diagrams)

Note #2: (Duplicate Part Number)

* The same NI diagnostic ROM is used on both the base KN02-AA and the PMAD-A module.

** The same SCSI diagnostic ROM is used on both the base KN02-AA and the PMAZ-A module.
ROM REVISION TABLE

Table #3

<table>
<thead>
<tr>
<th>Module Part Number</th>
<th>Option Part Number</th>
<th>Description</th>
<th>Current REV</th>
<th>FCO Rev</th>
</tr>
</thead>
<tbody>
<tr>
<td>54-19811-01</td>
<td>KN02-AA</td>
<td>System Module</td>
<td>B09,C09</td>
<td>D09,D09*</td>
</tr>
<tr>
<td>54-19815-01</td>
<td>PMAG-B</td>
<td>CFB</td>
<td>A06,B06,B07</td>
<td>C06,D06,D07</td>
</tr>
<tr>
<td>54-20314-01</td>
<td>PMAG-C</td>
<td>2DA</td>
<td>D03,E03</td>
<td>F03,H03</td>
</tr>
<tr>
<td>54-19874-01</td>
<td>PMAD-A</td>
<td>NI</td>
<td>A06,A07,B07</td>
<td>C06,C07,D07</td>
</tr>
<tr>
<td>54-19876-01</td>
<td>PMAZ-A</td>
<td>SCSI</td>
<td>A05,A06</td>
<td>B05,B06</td>
</tr>
</tbody>
</table>

Example #3

If you upgrade a Rev "B06" CFB Module place a new Rev "D06" sticker over the old revision label of the 54-19815-01

Note #3: (* Duplicate Revision)

* Yes this is correct; the only difference between the KNO2-AA Rev "B09" and Rev "C09" was the firmware. When the new code is added to either revision of the system module, the new revision becomes "D09".

---

DOCUMENTATION

EQ KIT DOCUMENTATION

Table #4

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Description</th>
<th>Qty of Manuals</th>
<th>Intended Audience</th>
</tr>
</thead>
<tbody>
<tr>
<td>EK-FSFCO-DK</td>
<td>Service Documentation</td>
<td>3</td>
<td>Services Engineer</td>
</tr>
<tr>
<td>EK-CUFCO-DK</td>
<td>Customer Documentation</td>
<td>5</td>
<td>Customer</td>
</tr>
</tbody>
</table>

---

EK-FSFCO-DK SERVICE DOCUMENTATION KIT CONTENTS
<table>
<thead>
<tr>
<th>Part Number</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>EK-FSFCO-RO</td>
<td>DECstation 5000 FCO Upgrade Manual</td>
</tr>
<tr>
<td>EK-370AA-MG</td>
<td>Maintenance Guide</td>
</tr>
<tr>
<td>EK-FSFCO-RC</td>
<td>Console Command Reference Card</td>
</tr>
</tbody>
</table>

**CUFCO-DK CUSTOMER DOCUMENTATION KIT CONTENTS**

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>EK-CUFCO-CC</td>
<td>Console Commands</td>
</tr>
<tr>
<td>EK-CUFCO-CL</td>
<td>Read Me First</td>
</tr>
<tr>
<td>EK-367AA-IC</td>
<td>Installation Card</td>
</tr>
<tr>
<td>EK-FCOIN-UG</td>
<td>Hardware Installation Guide Update</td>
</tr>
<tr>
<td>EK-FSFCO-WS</td>
<td>Ultrix Boot Commands</td>
</tr>
</tbody>
</table>

*****************************************************
* Leave the Customer Documentation Kit with the customer *
*****************************************************

**LARS INFORMATION**

<table>
<thead>
<tr>
<th>CATEGORY 0</th>
<th>USA</th>
<th>GIA</th>
<th>EUROPE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Activity</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(a)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Contract and Warranty</td>
<td>W</td>
<td>U</td>
<td>W</td>
</tr>
<tr>
<td>In-DEC Contract</td>
<td>W</td>
<td>Country Specific</td>
<td>W</td>
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<table>
<thead>
<tr>
<th>Hardware Segment Code</th>
<th>111</th>
<th>111</th>
<th>111</th>
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<table>
<thead>
<tr>
<th>RTD/Off-site Agreement</th>
<th>Servicenter</th>
</tr>
</thead>
<tbody>
<tr>
<td>(a)</td>
<td>(b)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>FCO</th>
<th>KN02-AA-0001</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>PAGE 10 OF 13</td>
</tr>
</tbody>
</table>
(a) First revenue ship of the DECstation 5000/Model 200 and the DECSys-
tem 5000/Model 200 occurred in April 1990. Systems shipped after Septem-
ber 1, 1990, have been built with the new firmware. All systems shipped
within this time frame, whether sold with List Warranty or Standard War-
ranty are covered by the FCO.

(b) Due to the nature of this FCO, CSSE does not recommend it be per-
formed in the Servicenter. To verify that the firmware has been pro-
perly installed the customer must bring the entire system including the
monitor and external mass storage into the servicenter.

Transportation and storage of bulky systems can be burdensome to both
the customer and the Servicenter and can cause significant customer satis-
faction problems. This is only a recommendation, the final decision is a local one.

SCRAP MATERIAL

Upon successful completion of the FCO please remove the old ROMs from
the customer site and destroy them. This will prevent the old ROMs from
being accidentally installed in a system. Make sure the system has
booted ULTRIX and is fully operational before destroying the ROMs.
Please follow local policies and procedures for the disposal of scrap
material.

The EQ kit contains two sets of new ROMs. After successful installation
of the FCO, Customer Service Engineers may find themselves with unused
ROMs. The disposition of this material is left up to the engineer. EQ
kits are an expensed item there is no logistics credit for returned
ROMs.
TECHNICAL BACKGROUND

PROBLEM 1

"Firmware Spec too Complex for the Open Systems Environment"

A review of the DECstation 5000/Model 200 firmware has revealed that the current firmware implementation is unnecessarily complex and cumbersome to implement.

SOLUTION:

The firmware has been redesigned. It is now substantially easier for both Digital and Third Party TURBOChannel hardware developers to understand and implement.

FCO IMPLEMENTATION:

Replace four socketed ROMs on the system module and one socketed ROM on each of the TURBOChannel options present in the system.

PROBLEM 2

"TURBOChannel Modules Lift Out of System I/O Connectors"

DECStandard 102 ESS testing, of the DECstation 5000/Model 200 with the 2DA graphics accelerator and 3D graphics modules, revealed that these TURBOChannel modules will lift out of the system I/O connectors. 2DA External Field Test also identified this as a problem.

SOLUTION:

Add Standoffs to the system enclosure.

FCO IMPLEMENTATION:

Bolt six standoffs to the system enclosure. Then use a machine screw to attach all the TURBOChannel Module to the standoff. The CPU, enclosure and TURBOChannel modules are all pre-drilled and tapped to accept standoffs and machine screws.
PROBLEM 3

"Excessive Resistance Build up in the 5V Power Connector"

Power supply life testing revealed that over time excessive contact resistance will build up on the 5V connectors. This resistance causes excessive heat build up and can result in a voltage drop across the power connector, sufficient to impact reliable system operation.

Corporate safety has reviewed this problem and has determined that there are no safety issues.

SOLUTION:

Apply PPE An anti-oxidant/lubricant to the 5V connectors of the power supply.

FCO IMPLEMENTATION:

Clean the power connectors with a "Gold-Wipe". A Gold-Wipe is a towelette treated with PPE. They are used widely in both Manufacturing and Customer Service. Place the used Gold-Wipe in the zip lock bag provided, for disposal.