Hardware Requirements for Catalyst 6000/Catalyst 6500 Redundancy

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Contents

Introduction

Cisco Catalyst 6000 series switches can be installed with dual Supervisor Engines to provide Layer−2 redundancy. When the Supervisor Engines are equipped with an Multilayer Switch Feature Card (MSFC), the dual MSFCs provide Layer−3 redundancy as well.

This document provides some simple checks you can carry out to determine if a pair of Supervisors would meet the hardware requirements for redundancy configuration if installed in a Cisco Catalyst 6000 or 6500 switch. This document provides a brief explanation of the different hardware available, part numbers, and a table with graphical representations of the hardware. A sample **show module** command output is also provided by clicking on the pictures in the table.

These procedures apply to Catalyst 6000 series switches running Cisco CatOS® as well as Cisco IOS® System Software. To find out more about the differences between CatOS and Cisco IOS System Software, refer to System Software Conversion from CatOS to Cisco IOS for Catalyst 6500/6000 Switches for more information.

Prerequisites

Requirements

Readers of this document should have knowledge of these topics:

- Understanding How Supervisor Engine Redundancy Works
- MSFC Redundancy

The Supervisor engine, the routing engine, and the forwarding engine models *must* be the same on both modules for redundancy to be supported.

Note: For redundancy, there is no need for firmware to match.

To find out what kind of Supervisor module is installed in your chassis, you need the following information:

- **The Supervisor engine model:** there are multiple models of Supervisor engines that can be used in Catalyst 6000 and 6500 switches. Currently, the following models can be used:
    - ♦ Supervisor Engine I (WS−X6K−SUP1−2GE)
    - ♦ Supervisor Engine IA (WS−X6K−SUP1A−2GE)
    - ♦ Supervisor Engine II (WS−X6K−SUP2−2GE)
    - ♦ Supervisor Engine 720 (WS−SUP720−BASE)
- **The forwarding engine used:** depending on the module, the Supervisor can be equipped with different types of forwarding engines. Currently, the following models can be used:
    - ♦ Policy Feature Card (PFC) (WS−F6K−PFC)
    - ♦ PFC 2 (WS−F6K−PFC2)
    - ♦ Layer 2 (L2) Switching Feature Card (WS−F6020)
    - ♦ L2 Switching Feature Card II (WS−F6020A)
    - ♦ PFC3 (WS−F6K−PFC3A)
- **The routing engine used:** the Supervisor module can also be equipped with a routing engine so that your Catalyst 6000 or 6500 switch can be used as a Layer 3 (L3) switch. Currently, the following models can be used:
    - ♦ Multilayer Switch Feature Card (MSFC) (WS−F6K−MSFC)
    - ♦ Multilayer Switch Feature Card 2 (MSFC2) (WS−F6K−MSFC2)
    - ♦ Multilayer Switch Feature Card 3 (MSFC3)(WS−SUP720)

For more information on Part Numbers, refer to "Background Information" and "How to Determine the Part Number" sections in the document How to Determine the Type of Supervisor Module That Is Installed in Catalyst 6500/6000 Series Switches.

Components Used

The outputs shown in this document are based on these Catalyst 6000 series hardware and software versions:

- Supervisor I with CatOS 8.2(1)
- Supervisor II with Cisco IOS Software Release 12.1(20)E2
- Supervisor 720 with CatOS 8.1(1)
- Supervisor 720 with Cisco IOS Software 12.2(17b)SX

The information in this document was created from the devices in a specific lab environment. All of the devices used in this document started with a cleared (default) configuration. If your network is live, make sure that you understand the potential impact of any command.

Conventions

For more information on document conventions, refer to the Cisco Technical Tips Conventions.

Determining Hardware when Powered and Working

To find out what hardware is being used when the switch is powered and working, login to the Catalyst switch and issue the **show module** command. Depending on what type of software you are running (CatOS or Cisco IOS Software), the output displayed will be either similar to the output shown in Output One, or similar to that shown in Output Two.

When you install two Supervisor Engines, the first Supervisor Engine to come online becomes the active module; the second Supervisor Engine goes into standby mode. All administrative and network management functions, such as SNMP, command−line interface (CLI) console, Telnet, Spanning Tree Protocol (STP), Cisco Discovery Protocol (CDP), and VLAN Trunking Protocol (VTP) are processed on the active Supervisor Engine. On the standby Supervisor Engine, the console port is inactive, the module status shows as "standby" and the status for the uplink ports is shown normally.

Output One − Switches Running CatOS

This is the first example of output.

```
6513−47a(enable)  show module
Mod  Slot Ports Module−Type                Model               Sub Status
--- ---- ----- ------------------------  ------------------- --- --------
1   1    2     1000BaseX Supervisor       WS−X6K−SUP2−2GE     yes ok
15  1    1     Multilayer Switch Feature  WS−F6K−MSFC2        no  OK
2   2    2     1000BaseX Supervisor       WS−X6K−SUP2−2GE     yes standby
16  2    1     Multilayer Switch Feature  WS−F6K−MSFC2        no  OK


Mod Module−Name         Serial−Num
--- ------------------- -----------
1                       SAD051307ER
15                      SAD050814J3
2                       SAD0421058D
16                      SAD042106PB

Mod MAC−Address(es)                         Hw     Fw          Sw
--- --------------------------------------- ------ ---------- -----------------
1   00−01−64−75−eb−ce to 00−01−64−75−eb−cf 2.2    6.1(3)     6.2(2)
00−01−64−75−eb−cc to 00−01−64−75−eb−cd
00−05−5f−0f−ec−80 to 00−05−5f−0f−ec−bf
15  00−05−5e−da−ee−00 to 00−05−5e−da−ee−3f 1.2    12.1(8a)E5 12.1(8a)E5
2   00−01−64−f8−38−ac to 00−01−64−f8−38−ad 0.310  6.1(2)     6.3(3)
00−01−64−f8−38−ae to 00−01−64−f8−38−af
16  00−02−fd−b1−0f−00 to 00−02−fd−b1−0f−3f 1.1    12.1(8a)E5 12.1(8a)E5

Mod Sub−Type                Sub−Model           Sub−Serial  Sub−Hw
--- ----------------------- ------------------- ----------- ------
1   L3 Switching Engine II  WS−F6K−PFC2         SAD051405TV 1.3
2   L3 Switching Engine II  WS−F6K−PFC2         SAD04110B5E 0.305
```

Review the output highlighted in bold. You can see this information:

- **WS−X6K−SUP2−2GE:** Supervisor Engine II
- **WS−F6K−PFC2:** Module is equipped with a PFC 2
- **WS−F6K−MSFC2:** Module is equipped with an MSFC 2

Output Two − Switches Running Supervisor IOS

Alternatively, the output might resemble this output:

```
Telix> show module
Mod   Ports Card Type                                Model             Serial No.
---   ----- ----------------------------------       ----------------  -----------
1      2  Cat 6k Supervisor 1 Enhanced QoS (Active) WS−X6K−SUP1A−2GE SAD03460665
4     48  48 port 10/100 mb RJ−45 ethernet          WS−X6248−RJ−45   SAD040201BS

Mod MAC addresses                        Hw     Fw             SW     Status
--- ---------------------------------- ------ ---------     --------- -------
2  00d0.bcf0.2064 to 00d0.bcf0.2065   1.0    5.1(1)       7.1(0.9)  OK
```

```
4  0030.962d.afdc to 0030.962d.b00b   1.1    4.2(0.24)    7.1(0.9)  OK

Mod Sub-Module                  Model         Serial             Hw     Status
--- --------------------------  ------------  ---------------   ------ ------
1 Policy Feature Card           WS-F6K-PFC    SAD03477104       1.0    OK
1 MSFC Cat6k daughterboard      WS-F6K-MSFC   SAD03470065       1.2    OK
```

Review the output highlighted in bold. You can see this information:

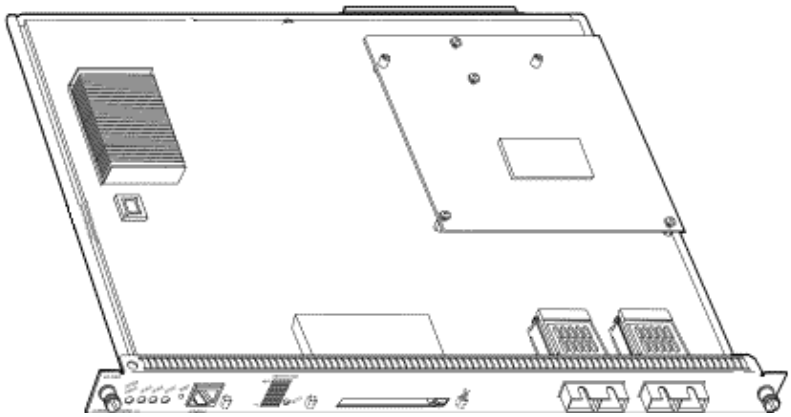
- **WS−X6K−SUP1A−2GE:** Supervisor Engine IA
- **WS−F6K−PFC:** Module is equipped with a PFC
- **WS−F6K−MSFC:** Module is equipped with an MSFC

Determining Hardware when Removed from Chassis

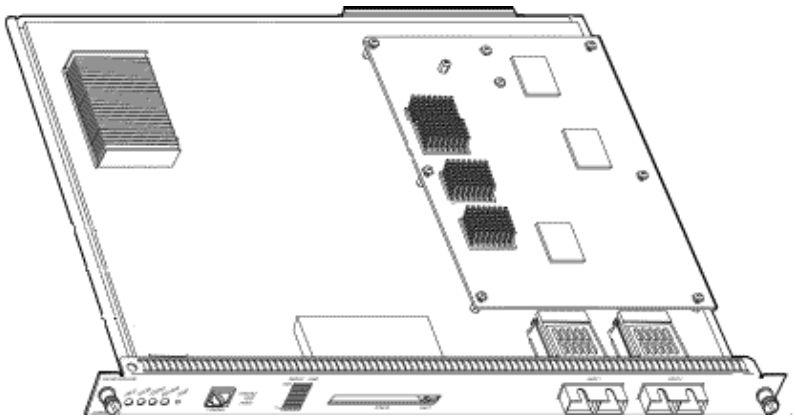
If you remove the modules from the chassis, it is still possible to determine what type of hardware you have, and find out which part number is being used. The table below graphically represents different combinations that meet the hardware requirements for redundancy in the Cisco Catalyst 6000/6500 switch. If you click on the link above the image, a corresponding **show module** output is displayed.

Supervisor Engine Physical Configuration

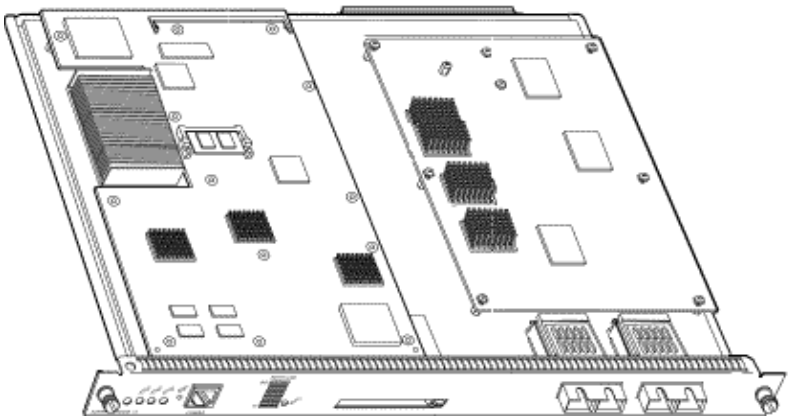
- Sup IA with F−6020



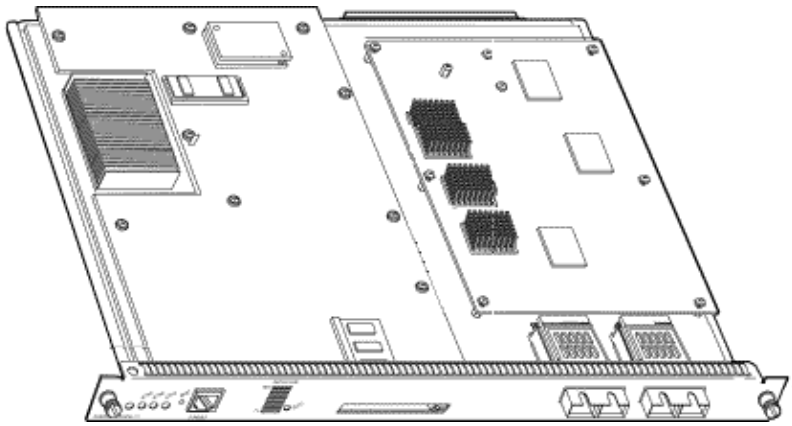
- Sup IA with PFC



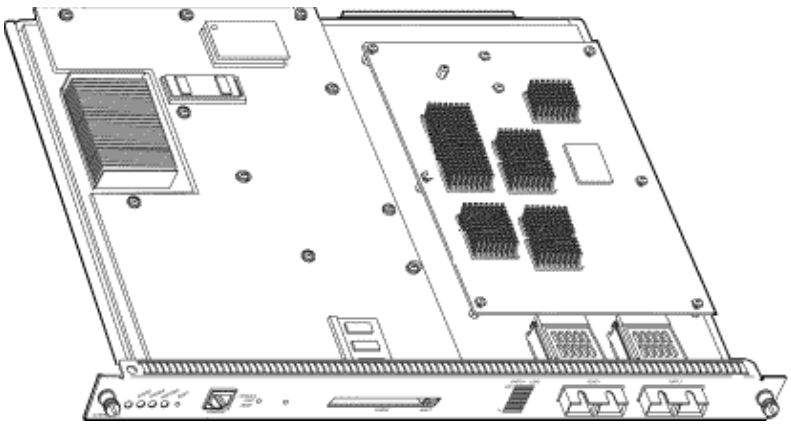
- Sup IA with PFC and MSFC



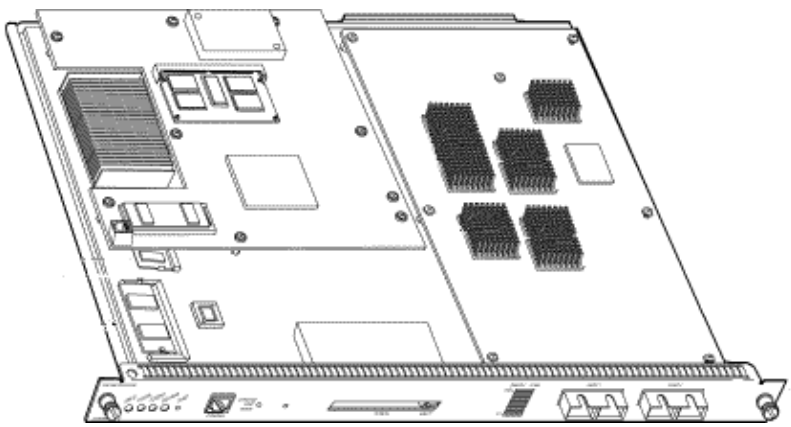
- Sup IA with PFC and MSFC2



- Sup II with PFC2 and MSFC2 shipped before November 2001



- Sup II with PFC2 and MSFC2 shipped after November 2001



show module Outputs

Sup IA with F−6020A

```
Console>(enable) show module

Mod Slot Ports Module−Type               Model               Sub Status
−−− −−−− −−−−− −−−−−−−−−−−−−−−−−−−−−−−− −−−−−−−−−−−−−−−−−−− −−− −−−−−−−−
1   1    2     1000BaseX Supervisor      WS−X6K−SUP1A−2GE    yes ok
2   2    2     1000BaseX Supervisor      WS−X6K−SUP1A−2GE    yes standby


Mod Module−Name         Serial−Num
−−− −−−−−−−−−−−−−−−−−−− −−−−−−−−−−−
1                       SAD050404KM
2                       SAD05040EC2

Mod MAC−Address(es)                         Hw     Fw          Sw
−−− −−−−−−−−−−−−−−−−−−−−−−−−−−−−−−−−−−−−−− −−−−−− −−−−−−−−−− −−−−−−−−−−−−−−−−−
1   00−02−7e−27−17−f6 to 00−02−7e−27−17−f7 7.0    5.3(1)     5.5(9)
00−02−7e−27−17−f4 to 00−02−7e−27−17−f5
00−d0−03−8c−9c−00 to 00−d0−03−8c−9f−ff
2   00−01−64−75−80−16 to 00−01−64−75−80−17 7.0    5.3(1)     5.5(9)
00−01−64−75−80−14 to 00−01−64−75−80−15


Mod Sub−Type                Sub−Model           Sub−Serial  Sub−Hw
−−− −−−−−−−−−−−−−−−−−−−−−− −−−−−−−−−−−−−−−−−− −−−−−−−−−−− −−−−−−
1   L2 Switching Engine II  WS−F6020A           SAD05030WR5 2.0
2   L2 Switching Engine II  WS−F6020A           SAD05030VZH 2.0
```

Sup IA with PFC

```
Console> show module
Mod Slot Ports Module−Type               Model               Sub Status
−−− −−−− −−−−− −−−−−−−−−−−−−−−−−−−−−−−− −−−−−−−−−−−−−−−−−−− −−− −−−−−−−−
1   1    2     1000BaseX Supervisor      WS−X6K−SUP1A−2GE    yes OK
2   2    2     1000BaseX Supervisor      WS−X6K−SUP1A−2GE    yes standby


Mod Module−Name         Serial−Num
−−− −−−−−−−−−−−−−−−−−−− −−−−−−−−−−−
1                       SAD041203B9
2                       SAD040803Z5


Mod MAC−Address(Es)                         Hw     Fw          SW
−−− −−−−−−−−−−−−−−−−−−−−−−−−−−−−−−−−−−−−−− −−−−−− −−−−−−−−−− −−−−−−−−−−−−−−−−−
1   00−30−7b−90−f5−ba to 00−30−7b−90−f5−bb 3.1    5.3(1)     5.5(9)
00−30−7b−90−f5−b8 to 00−30−7b−90−f5−b9
00−d0−06−24−f0−00 to 00−d0−06−24−f3−ff


2   00−d0−d3−36−b1−a6 to 00−d0−d3−36−b1−a7 3.1    5.3(1)     5.5(9)
00−d0−d3−36−b1−a4 to 00−d0−d3−36−b1−a5


Mod Subtype                Sub−Model           Sub−Serial  Sub−Hw
−−− −−−−−−−−−−−−−−−−−−−−−− −−−−−−−−−−−−−−−−−− −−−−−−−−−−− −−−−−−
1   L3 Switching Engine     WS−F6K−PFC          SAD04120059 1.1
2   L3 Switching Engine     WS−F6K−PFC          SAD04080DR8 1.0
```

Sup IA with PFC and MSFC

```
Console> show module

Mod Slot Ports Module-Type               Model               Sub Status
--- ---- ----- ------------------------ ------------------- --- --------
1   1    2     1000BaseX Supervisor     WS-X6K-SUP1A-2GE    yes OK
15  1    1     Multilayer Switch Feature WS-F6K-MSFC         no  OK
2   2    2     1000BaseX Supervisor     WS-X6K-SUP1A-2GE    yes standby
16  2    1     Multilayer Switch Feature WS-F6K-MSFC         no  OK

Mod Module-Name         Serial-Num
--- ------------------- -----------
1                       SAD041203B2
15                      SAD041009DF
2                       SAD040803Z1
16                      SAD0406045K

Mod MAC-Address(Es)                         Hw     Fw          SW
--- --------------------------------------- ------ ----------- ------------------
1   00-30-7b-90-f5-ba to 00-30-7b-90-f5-bb 3.1    5.3(1)      5.5(9)
00-30-7b-90-f5-b8 to 00-30-7b-90-f5-b9
00-d0-06-24-f0-00 to 00-d0-06-24-f3-ff
15  00-30-7b-90-f5-bc to 00-30-7b-90-f5-fb 1.3    12.1(8a)E5 12.1(8a)E5
2   00-d0-d3-36-b1-a6 to 00-d0-d3-36-b1-a7 3.1    5.3(1)      5.5(9)
00-d0-d3-36-b1-a4 to 00-d0-d3-36-b1-a5
16  00-d0-d3-36-b1-a8 to 00-d0-d3-36-b1-e7 1.3    12.1(8a)E5 12.1(8a)E5

Mod Subtype                Sub-Model           Sub-Serial  Sub-Hw
--- ---------------------- ------------------- ----------- ------
1   L3 Switching Engine    WS-F6K-PFC           SAD041200V9 1.1
2   L3 Switching Engine    WS-F6K-PFC           SAD04080DR7 1.0
```

Sup IA with PFC and MSFC2

```
Console> (enable) show module

Mod Slot Ports Module-Type               Model               Sub Status
--- ---- ----- ------------------------ ------------------- --- --------
1   1    2     1000BaseX Supervisor     WS-X6K-SUP1A-2GE    yes OK
15  1    1     Multilayer Switch Feature WS-F6K-MSFC2        no  OK
2   2    2     1000BaseX Supervisor     WS-X6K-SUP1A-2GE    yes standby
16  2    1     Multilayer Switch Feature WS-F6K-MSFC2        no  OK

Mod Module-Name          Serial-Num
--- -------------------- -----------
1                        SAD0433088P
15                       SAD04360AJ8
2                        SAD05030UEW
16                       SAD05030Z4W

Mod MAC-Address(Es)                         Hw     Fw          SW
--- --------------------------------------- ------ ----------- ------------------
1   00-d0-d3-3d-d2-3a to 00-d0-d3-3d-d2-3b 3.2    5.3(1)      6.3(3)
00-d0-d3-3d-d2-38 to 00-d0-d3-3d-d2-39
00-30-7b-4e-64-00 to 00-30-7b-4e-67-ff
15  00-03-6b-f1-2a-40 to 00-03-6b-f1-2a-7f 1.1    12.1(8a)E5  12.1(8a)E5
2   00-02-7e-f5-c8-7e to 00-02-7e-f5-c8-7f 7.1    5.3(1)      6.2(2)
00-02-7e-f5-c8-7c to 00-02-7e-f5-c8-7d
16  00-04-dd-f1-f0-80 to 00-04-dd-f1-f0-bf 1.2    12.1(8a)E5  12.1(8a)E5

Mod Subtype                Sub-Model           Sub-Serial  Sub-Hw
--- ---------------------- ------------------- ----------- ------
1   L3 Switching Engine    WS-F6K-PFC           SAD04330KWZ 1.1
2   L3 Switching Engine    WS-F6K-PFC           SAD050315AR 1.1
```

Sup II with PFC2 and MSFC2 shipped before November 2001

```
Console> show module

Mod Slot Ports Module-Type               Model               Sub Status
--- ---- ----- ------------------------ ------------------- --- --------
1   1    2     1000BaseX Supervisor     WS-X6K-SUP2-2GE     yes OK
15  1    1     Multilayer Switch Feature WS-F6K-MSFC2        no  OK
2   2    2     1000BaseX Supervisor     WS-X6K-SUP2-2GE     yes standby
16  2    1     Multilayer Switch Feature WS-F6K-MSFC2        no  OK

Mod Module-Name         Serial-Num
--- ------------------- -----------
1                       SAD051307ER
15                      SAD050814J3
2                       SAD0421058D
16                      SAD042106PB

Mod MAC-Address(Es)                         Hw     Fw          SW
--- --------------------------------------- ------ ----------- ------------------
1   00-01-64-75-eb-ce to 00-01-64-75-eb-cf 2.2    6.1(3)     6.2(2)
00-01-64-75-eb-cc to 00-01-64-75-eb-cd
00-05-5f-0f-ec-80 to 00-05-5f-0f-ec-bf
15  00-05-5e-da-ee-00 to 00-05-5e-da-ee-3f 1.2    12.1(8a)E5 12.1(8a)E5
2   00-01-64-f8-38-ac to 00-01-64-f8-38-ad 0.310  6.1(2)     6.3(3)
00-01-64-f8-38-ae to 00-01-64-f8-38-af
16  00-02-fd-b1-0f-00 to 00-02-fd-b1-0f-3f 1.1    12.1(8a)E5 12.1(8a)E5

Mod Subtype                Sub-Model           Sub-Serial  Sub-Hw
--- ---------------------- ------------------- ----------- ------
1   L3 Switching Engine II  WS-F6K-PFC2         SAD051405TV 1.3
2   L3 Switching Engine II  WS-F6K-PFC2         SAD04110B5E 0.305
```

Sup II with PFC2 and MSFC2 shipped after November 2001

```
Console> (enable) show module

Mod Slot Ports Module-Type               Model               Sub Status
--- ---- ----- ------------------------ ------------------- --- --------
1   1    2     1000BaseX Supervisor     WS-X6K-SUP2-2GE     yes ok
15  1    1     Multilayer Switch Feature WS-F6K-MSFC2        no  ok
2   2    2     1000BaseX Supervisor     WS-X6K-SUP2-2GE     yes standby
16  2    1     Multilayer Switch Feature WS-F6K-MSFC2        no  ok

Mod Module-Name         Serial-Num
--- ------------------- -----------
1                       SAD051307ER
15                      SAD050814J3
2                       SAD0421058D
16                      SAD042106PB


Mod MAC-Address(es)                         Hw     Fw          Sw
--- --------------------------------------- ------ ----------- ------------------
1   00-01-64-75-eb-ce to 00-01-64-75-eb-cf 2.2    6.1(3)     6.2(2)
00-01-64-75-eb-cc to 00-01-64-75-eb-cd
00-05-5f-0f-ec-80 to 00-05-5f-0f-ec-bf
15  00-05-5e-da-ee-00 to 00-05-5e-da-ee-3f 1.2    12.1(8a)E5 12.1(8a)E5
2   00-01-64-f8-38-ac to 00-01-64-f8-38-ad 0.310  6.1(2)     6.3(3)
00-01-64-f8-38-ae to 00-01-64-f8-38-af
16  00-02-fd-b1-0f-00 to 00-02-fd-b1-0f-3f 1.1    12.1(8a)E5 12.1(8a)E5

Mod Sub-Type               Sub-Model           Sub-Serial  Sub-Hw
--- ---------------------- ------------------- ----------- ------
1   L3 Switching Engine II  WS-F6K-PFC2         SAD051405TV 1.3
```

```
2   L3 Switching Engine II  WS-F6K-PFC2         SAD04110B5E 0.305
```

Sup 720 with PFC3 running Cisco CatOS

```
Console> (enable) show module
Mod Slot Ports Module-Type                Model               Sub Status
--- ---- ----- ------------------------- ------------------- --- --------
3   3    48    10/100BaseTX Ethernet     WS-X6348-RJ-45      yes ok
5   5    2     1000BaseX Supervisor      WS-SUP720-BASE      yes ok

Mod      Module-Name               Serial-Num
---   --------------------         -----------
3                                   SAD04350CUY
5                                   SAD072704PE
Mod    MAC-Address(es)                          Hw     Fw     Sw
---     -------------------------------------- ------ -------- ------------
3       00-01-97-55-0e-70 to 00-01-97-55-0e-9f  1.1   5.4(2) 8.1(1)
5       00-0c-ce-64-1c-4e to 00-0c-ce-64-1c-4f  2.1   7.7(1) 8.1(1)
        00-0c-ce-64-1c-4c to 00-0c-ce-64-1c-4f
        00-0a-42-d1-75-80 to 00-0a-42-d1-79-7f
Mod  Sub-Type                 Sub-Model    Sub-Serial  Sub-Hw    Sub-Sw
--- ---------------------- ------------------- ----------- ------ ------
3  Inline Power Module      WS-F6K-VPWR                  1.0      0.0(0)
5  L3 Switching Engine III  WS-F6K-PFC3A   SAD072704UN   1.1
```

Sup 720 with PFC3 and MSFC3 running Cisco IOS Software

```
Router# show module
   Mod     Ports      Card Type                                        Model
   ---       -----    ---------------------------------------        ------------------
   1          16       SFM-capable 16 port 1000mb GBIC               WS-X6516-GBIC
   3          48       48 port 10/100 mb RJ45                        WS-X6348-RJ-45
   5           2       Supervisor Engine 720 (Active)                WS-SUP720-BASE
   Mod     MAC addresses                          Hw           Fw            Sw
   ---    ------------------------------        ------       ------------  ------------
   1      00d0.c0d4.7a7c to 00d0.c0d4.7a8b          2.0          6.1(3)         8.3(0.63)
   3      0001.9755.0e70 to 0001.9755.0e9f          1.1          5.4(2)         8.3(0.63)
   5      000c.ce64.2590 to 000c.ce64.2593          2.3          7.7(1)         12.2(17b)
   Mod     Sub-Module                Model                 Serial       Hw       Stat
   ---   ----------------------    ---------------          ----------     -------  -----
   3      Inline Power Module       WS-F6K-PWR                              1.0       O
   5      Policy Feature Card 3     WS-F6K-PFC3A            SAD0727054R     1.2       O
   5      MSFC3 Daughterboard       WS-SUP720               SAD0722004E     1.5       O
   Mod Online Diag Status
   --- -------------------
   1 Pass
   3 Pass
   5 Pass
```

Determining the Part Number

Once you have the information described in the previous sections, you can determine which part number matches the Catalyst switch.

Note: The amount of memory installed on the Supervisor and the MSFC should always be checked separately, as this is not always reflected in a different part number.

On Supervisor Engine I:

- WS-X6K-SUP1-2GE: Supervisor Engine I, L2 Feature Card
- WS-X6K-SUP1A-2GE: Supervisor Engine I, L2 Feature Card

- WS−X6K−SUP1A−PFC: Supervisor Engine I, PFC
- WS−X6K−SUP1A−MSFC: Supervisor Engine I, PFC, MSFC
- WS−X6K−S1A−MSFC2: Supervisor Engine I, PFC, MSFC2

On Supervisor Engine II:

- WS−X6K−S2−PFC2: Supervisor Engine II, PFC2
- WS−X6K−S2−MSFC2: Supervisor Engine II, PFC2, MSFC2
- WS−X6K−S2U−MSFC2: Supervisor Engine II with 256 MB of DRAM on the Supervisor, PFC2, 256 MB of DRAM on MSFC2

On Supervisor 720:

- WS− SUP720: Supervisor Engine 720, Integrated Fabric, PFC3A, MSFC3

Note: In certain circumstances, the MSFC, MSFC2, or MSFC3 may not be displayed when you use the commands shown in this document. If you do not see the MSFC, MSFC2, or MSFC3 in the output from these commands, but you are sure that there is a routing engine on the Supervisor module, refer to Recover an MSFC Missing from the Supervisor Engine show module Command for more information.

Related Information

- **Understanding Internal MSFC Redundancy on Hybrid Mode Catalyst 6000 Switches**
- **How to Determine the Type of Supervisor Module That Is Installed in Catalyst 6500/6000 Series Switches**
- **Cisco Catalyst 6000 Series Switches Configuring Redundancy**
- **Configuring RPR or RPR+ Supervisor Engine Redundancy**
- **Cisco Catalyst 6000 Series Switches Configuration Guides**
- **Cisco Catalyst 6000 Series Switches Command References**
- **Cisco Catalyst 6000 Series Switches Overview**
- **Cisco Catalyst 6000 Series Switches Installation Guides**
- **Technical Support − Cisco Systems**

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