Troubleshooting MICA Modem Hardware Issues

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Introduction

In many situations, modem call failures on AS5200 and AS5300 Series Access Servers can be traced to problems with the Modem ISDN channel aggregation (MICA) hardware. This document helps you identify and troubleshoot common problems associated with the MICA hardware. It also shows how to identify a specific faulty modem component for replacement, rather than replacing all the modem hardware.

Note: It is strongly recommended that you run MICA portware or firmware version 2.7.3.0. If you are not running version 2.7.3.0, please upgrade the modem firmware using the procedure described in the document Upgrading the Modem Firmware/Portware in Cisco Routers with Internal Digital Modems. If your issue persists, then continue with the procedures described in this document.

Note: For non−hardware specific modem troubleshooting, refer to the document Troubleshooting Modems.

Before You Begin

Conventions

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

Prerequisites

Readers of this document should be knowledgeable of the following:

- General AS5200 and AS5300 hardware troubleshooting procedures
- Using and interpreting Cisco IOS® **show** commands

Components Used

The information in this document is based on the software and hardware versions below.

- MICA modems (Hex Modem Module [HMM] or Double Density Modems [DMM])
- Cisco AS5200 and AS5300 Series Access Servers

- Recommended MICA firmware version 2.7.3.0

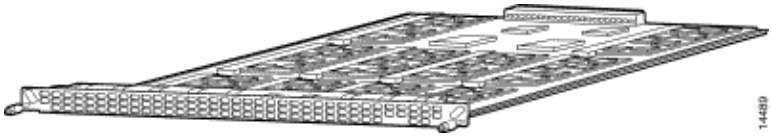
Hardware Overview

MICA Carrier Card

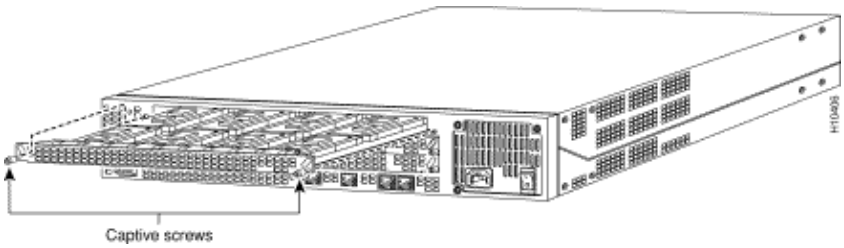
The MICA carrier card includes ten slots in which you can install six− or 12−port modem modules. Hence, in a fully populated carrier card you can have either 60 modems (if using the six−port modules) or 120 modems (if using the 12−port modules).

Note: Since there are two carrier card slots, a fully populated chassis can have 120 (if using the six−port modules) or 240 (if using the 12−port modules) modems per chassis.

The diagram below shows a MICA Carrier card fully populated with 12−port modems:



This carrier card fits into one of the two slots on the chassis as shown in the diagram below:



Individual modem modules are plugged into single in−line memory module (SIMM) slots on the carrier card. Refer to the document MICA Modem Cards for information on identifying a specific module on the carrier card. A failure of one or more of the modules will not affect the operation of the rest of modem modules on the carrier card.

The following table describes the LEDs on the MICA carrier card:

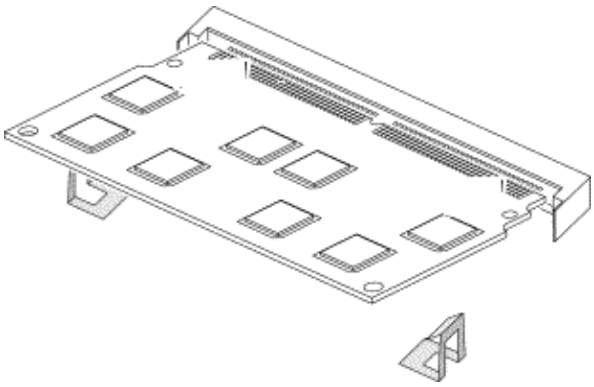
LED	State	Description
Activity (ACT)	Flickering	There is transmit activity on one or more modems on this module.
	Off	There is no modem call activity on the MICA module cards.
Board OK (OK)	One flash	The carrier card is powering up.
	On	The card has passed the initial power−on diagnostic tests and is operating normally. This state is entered after the firmware is downloaded to the modems.
	Off	A fault condition is present on the card.

These LEDs are used in the troubleshooting procedure later in this section.

Note: There are 2 types of MICA Carrier Cards: CC and CC2. CCs accept only HMMs (6−port modem modules) while CC2s can accept both HMMs and DMMs (12−port modem modules). You must not insert DMMs in a CC. Refer to the section Troubleshooting Procedure for information on identifying the type of Carrier Card that is installed in the chassis.

MICA Modem Modules

As discussed previously, each carrier card can contain up to ten MICA modem modules. Each modem module can be either a six−port or 12−port module. The six−port modem module is also referred to as Hex Modem Module (HMM) while the 12−port module is referred to as Double Density Modem Module(DMMs). A diagram of a DMM partially inserted into the carrier card SIMM slot is shown below:



MICA modems are implemented with one digital signal processor (DSP) for each two ports, and one control processor (CP) per six ports. The set of six MICA modems controlled by one CP is known as a "hex"; a HMM consists of one hex and a DMM contains two hexes (hence the name "Double" Density). From time to time, a DSP or a CP can fail. This causes all subsequent modem calls into that DSP or CP to fail to trainup.

Since DSPs or CPs on a modem module cannot be separated from the other modems on the module, a DSP or CP hardware failure may require the replacement of the entire HMM or DMM.

Troubleshooting Procedure

MICA hardware problem need to be isolated to one or more of the following: Modem module (DMM or HMM), MICA carrier card, or router chassis.

Perform the following steps to determine if the MICA modems come up correctly:

1. Reload the Access Server.

   You should see console message similar to the following, indicating that the carrier card is recognized:

   ```
   *Dec 31 19:02:27.073: %MICA−5−BOARDWARE_RUNNING: Slot 1 is running boardware
   version 2.0.2.0*Dec 31 19:02:27.077: %MICA−5−BOARDWARE_RUNNING:
   Slot 2 is running boardware version 2.0.2.0
   ```

   Once the boot process is complete, the router downloads the firmware to the individual modems.
2. Once the Access Server completes booting up, verify that the OK LED on the carrier card is ON (solid).
3. Perform a **show running−config**. Towards the end of the output you should see all the async lines.

For example, if you have two carrier cards with 48 modems per slot then you should see 96 lines (2 x 48)

```
line 1 96
```

Note whether the line number range matches the number of modems installed on the carrier card. For example, in the above case, if you notice that the router recognizes only line 1 90 , then we can conclude that six modems are not recognized.

4. Perform a **show version** command.

   Verify that the output includes the line `96 terminal line(s)`. The number of terminal lines should match the number of modems installed on the chassis.
5. Perform a **show modem** and **show modem version** command.

   The **show modem** output should display every individual port (for a total of 96). In the **show modem version** output , verify that the modem firmware version is as expected. You should also check to see that every modem module has either six (for HMM) or 12 (for DMM) modems.

Once you have gathered the information as specified above, proceed to one of the hardware symptoms below.

Unrecognized Modems

When dealing with unrecognized modem issues, we must first determine whether:

- None of the Modems (on the entire chassis) are recognized. This means that the Access Server does not recognize the presence of the MICA carrier card.
- None of the Modems (on a single MICA carrier card) are recognized. The Access Server recognizes the presence of the carrier card, but none of the modems within the carrier card are recognized.
- All Modems (on a DMM or HMM within the carrier card) are not being recognized. The Access Server recognizes only some modems on the carrier card. The unrecognized modems will all be in one particular DMM or HMM modem module.

None of the Modems (on the Entire Chassis) are Recognized

If the previous steps do not show any lines available on the chassis, then proceed with the instructions below:

1. Power down the router.
2. Remove and reseat the MICA carrier card. Tighten the two captive screws.
3. Power up the router. If both carrier cards are not recognized (OK LED is off), then the problem could be caused by the chassis, carrier card or collectively all the modem modules. Try inserting the carrier card in another chassis.
4. Troubleshoot the AS5200 or AS5300 chassis.

   Refer to the document Hardware Troubleshooting for AS5200/AS5300 Series Routers for more information

None of the Modems (on a Single MICA Carrier Card) are Recognized

Use the **show modem mapping** command to verify that both carrier cards are recognized. For example,

```
maui-nas-02#show modem mapping
Slot 1 has Mica Carrier card.
......
Slot 2 has Mica Carrier card.
......
```

Verify that both carrier cards are correctly identified. If either card is not identified then proceed below:

1. Power down the router.
2. Remove the two carrier cards and swap them between slots on the chassis. Hence, the carrier card in slot 1 is now in slot 2 and vice versa. Power up the router.

   For more information on removing and inserting the cards refer to the document MICA Modem Cards.
3. If the symptom continues, then the problem could be due to the carrier card or all the modem modules in it. If the problem remains with the particular slot, then the issue is a chassis or slot failure. Replace the chassis.

All Modems (on a DMM/HMM within the Carrier Card) are Not Being Recognized

If the steps above show only a few missing lines, then we can conclude that the HMM or DMM for those modems is not functioning:

Swap the particular HMM or DMM within the same carrier card. If the problem follows the HMM or DMM, then replace the HMM or DMM. However, if the problem does not follow the module, rather it remains with the the slot, we can conclude that the particular slot on the carrier card is faulty. Replace the carrier card.

Tip: The show modem version command specifies the modem module each modem port belongs to. Hence, if a certain range of modems are not being recognized, you can use the show modem version command to determine the particular modem module that is affected and swap out that module. In the sample shown below, we can conclude that modem module number 5 is not recognized, hence we reseat or replace that module.

```
          Modem module      Firmware   Boot          DSP
Mdm     Number            Rev        Rev           Rev
...
...
1/57         4            2.7.3.0
1/58         4            2.7.3.0
1/59         4            2.7.3.0
1/60         6            2.7.3.0
1/61         6            2.7.3.0
1/62         6            2.7.3.0
1/63         6            2.7.3.0
...
...
```

Note: If the MICA Carrier Card is type CC, then ensure that only HMMs are installed on that Carrier Card. DMMs cannot be installed on CC Carrier Cards. However, this restriction is not applicable to CC2s. To identify whether the Carrier Card is type CC or CC2, use the **show modem version** command. If the output indicates that the Board ID is **0x47**, then the Carrier Card is CC. If the Board ID is **0x4C**, then it is a CC2. Here are some examples:

show modem version output for a CC2:

```
...
...
Slot 1:
Carrier card:
     number_of_ports= 60, max_modules= 10
Manufacture Cookie Info:
 EEPROM Type 0x0001, EEPROM Version 0x01, Board ID 0x4C,

! -- Board ID 0x4C indicates the Carrier Card is CC2
```

```
! -- This Carrier Card can accept both HMMs and DMMs

 Board Hardware Version 1.0, Item Number 800-3680-1,
 Board Revision A0, Serial Number 20234639,
 PLD/ISP Version 2.2, Manufacture Date 10-May-2000.
...
...
```

show modem version output for a CC:

```
......
Carrier card:
     number_of_ports= 48, max_modules= 10
Manufacture Cookie Info:
 EEPROM Type 0x0001, EEPROM Version 0x01, Board ID 0x47,
! -- Board ID 0x47 indicates the Carrier Card is CC
! -- This Carrier Card can accept ONLY HMMs
 Board Hardware Version 1.0, Item Number 73-2393-3,
 Board Revision A0, Serial Number 06466432,
 PLD/ISP Version 5.9, Manufacture Date 3-Nov-1997.
...
...
```

Hardware is Recognized but Modems do Not Take Calls

Follow the steps below to troubleshoot modems.

1. Check whether the **show modem** command output obtained earlier contains any modems in the b (busy), B (Bad) or p (pending download) states.

   The example below shows some modems in the B state:

```
maui-nas-02#show modem
    ...
    ...
           AvgHold Inc calls Out calls Busied Failed  No   Succ
    Mdm    Time   Succ Fail Succ Fail   Out   Dial Answer  Pct
   * 1/0  01:35:55 82   5     0    0     1      0     0     94%
   * 1/1  01:06:10 100  8     0    0     1      0     0     93%
   * 1/2  01:05:39 103  11    0    0     1      0     0     90%
     1/3  01:03:16 111  6     0    0     1      0     0     95%
   * 1/4  01:07:21 100  7     0    0     1      0     0     93%
     1/5  00:50:12 121  8     0    0     1      0     0     94%
     1/6  01:00:56 117  6     0    0     0      0     0     95%
     1/7  00:56:55 108  10    0    0     0      0     0     92%
   B 1/8  01:10:17 93   15    0    0     0      0     0     86%
   B 1/9  01:06:25 96   15    0    0     0      0     0     86%
     1/10 01:07:02 103  2     0    0     0      0     0     98%
     1/11 01:10:02 101  6     0    0     0      0     0     94%
   * 1/12 01:04:02 109  8     0    0     1      0     0     93%
   * 1/13 01:09:50 101  7     0    0     1      0     0     94%
     ...
     ...
```

2. Reflash the modem portware. This involves manually reloading the modem firmware to the modem just as if you were upgrading firmware.

   - For Cisco IOS Software Releases 12.0(5) and earlier, use the **copy flash modem** command. This transfers the modem firmware in flash to the modems. Refer to the Command Reference for more information on the **copy modem** command.

For Cisco IOS Software Releases 12.0(5) and later, use the **spe** and **firmware location** commands. For example:

```
router# configure terminal
router(config)# spe 1/1 2/7

! --- This is used to access the SPE configuration mode and specify
! --- a range of modems to download firmware into.

router(config-spe)# firmware location flash:mica-modem-pw.2.7.3.0.bin
```

Command Syntax Description:

firmware location {**system** | **flash**}: *filename*

- **System** − The router loads the firmware from a built−in file within the Cisco IOS software image.
- **flash** − The router loads the firmware from the Flash NVRAM located within the router.
- *filename* − The name of the desired firmware file (for example, **mica−modem−pw.2.7.3.0.bin**,). If system is specified, enter the path to the filename you want to download.

For more information, refer to the example in Upgrading the Modem Firmware/Portware in Cisco Routers with Internal Digital Modems

If you often encounter modems in bad or pending download state, consider configuring modem recovery. Refer to the document Configuring MICA Modem Recovery for more information. .

3. Execute the **show modem version** command. Check whether there are modems with "unknown" under the Firmware Rev column.

   Let's look at an example:

```
...
...

          Modem module    Firmware Boot         DSP
Mdm       Number          Rev      Rev          Rev
2/0            0          Unknown
2/1            0          Unknown
2/2            0          Unknown
2/3            0          Unknown
2/4            0          Unknown
2/5            0          Unknown
2/6            1          Unknown
2/7            1          Unknown
...
...
```

4. Reflash the modem portware. Use the procedure explained in Step 2 above.
5. Use the show modem version command to verify that the modems firmware was downloaded and that they are using the correct firmware version.
6. Sometimes you may see the following message indicating that modem firmware download was not successful.

```
%MODEM-1-DL_FAIL Modem (1/1) failed firmware download (0)
Download timed out%MODEM-1-BADMODEM Modem (1/0) failed Download Failed
```

7. In such cases the problem is most likely a hardware issue. Replace the affected module

Modem Errors Scroll After Power Cycling

In very rare circumstances, modem errors constantly scroll on the console, causing the router to reboot.

This usually happens when a HMM or DMM is bad. Note that the messages scroll very quickly, making it difficult to determine the bad modem module generating the error message. To determine the offending modem module perform the following steps:

1. Remove all the modem modules (HMMs or DMMs) from the carrier card, insert the carrier card back into the chassis and power on. Check whether the errors still appear. Power off the router.
2. Add a single Modem Module to the carrier card and power on. Check whether the errors still appear. Repeat this step until the messages reappear. We can now conclude that the last inserted MM is generating the errors. Replace that particular modem module.

Related Information

- **Maintaining the Universal Access Server**
- **Technical Support − Cisco Systems**

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