

**Q & A**

## HIGH-DENSITY ANALOG (NM-HDA) NETWORK MODULE ON THE CISCO 2600/2800/3600/3700/3800 SERIES MULTISERVICE PLATFORMS

### OVERVIEW

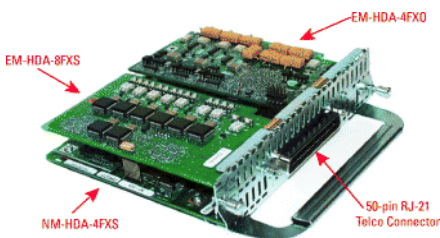
The Cisco 2600/2800/3600/3700/3800 family of multiservice platforms seek to provide enterprise and service provider solutions that offer greater flexibility when integrating voice and data applications. The High-Density Analog Network Module (NM-HDA) offers analog voice port density of up to 8 FXO + 4 FXS, or up to 12 FXS + 4 FXO ports. Various combinations of FXS and FXO ports are supported by using different components. Specific supported configurations are detailed below in the “Configuration Information” section—not all possible combinations are supported.

The NM-HDA itself contains 4 FXS ports and two 5421 DSPs. In addition, the NM-HDA offers two expansion module (EM) slots that can be filled with combinations of a 4-port FXO module or an 8-port FXS module. A DSP expansion module is also available.

**Q.** What is the NM-HDA-4FXS?

**A.** It is a Network Module (NM) for the Cisco 2600, 2800, 3600, 3700 and 3800 series platforms that supports up to 8 FXO + 4 FXS, or up to 12 FXS + 4 FXO ports voice connections. The NM itself contains a 50-pin RJ-21 connector, 4 FXS ports and two 5421 DSPs. The NM has two expansion slots where the 4-port FXO and 8-port FXS modules can be added. A DSP expansion module can also be added. The illustration below shows the different components.

**Figure 1.**



**Q.** Which platforms support the NM-HDA?

**A.** All platforms within the Cisco 2600, 2800 (except 2801), 3600 (except 3620), 3700 and 3800 series.

**Q.** What are the goals of the NM-HDA?

**A.** To provide a high density analog voice gateway for:

- enterprise and managed services applications
- branch office fax machines and phones
- analog PBXs and Key Systems, thereby not requiring upgrades to existing telephony equipment when more than 4 analog ports is required
- low-cost analog phone connectivity for branch offices to participate in voice transport or Call Manager controlled networks
- analog PSTN connectivity for branch offices with IP Phones and SRST functionality
- ITSP Analog FXO Gateway

**Q.** What are the components that can be used on the NM-HDA?

**A.** The following components can be used:

- The base NM supports 4 FXS ports and two 5421 DSPs
- There are two expansion module slots in the NM that can be used for combinations of:
  - 8-port FXS expansion module
  - 4-port FXO expansion module
- There is also a DSP expansion module with an additional two DSPs.

**Q.** When should the NM-HD-1V/2V be used vs. the NM-HDA?

**A.** 1) If current and anticipated needs are as follows, use the NM-HD-1V/2V:

- Up to 8 FXS or FXO, or a mix of these up to 8 ports.
- If any number of Analog-DID, E&M or BRI connectivity is required
- If the FXO loop length (the length of wire between the FXO module and the central office) exceeds 8,000 ft

2) If the total number of FXS and/or FXO ports will exceed 8, then use the NM-HDA.

## VOICE FEATURES

**Q.** What voice features are supported by the NM-HDA?

**A.** The following features are supported:

- High and Medium complexity codecs—the same codec set as supported on the NM-HDV.
  - High complexity codecs include: G.711 a-law, G.711 u-law, G.726 32K, G.726 24K, G.726 16K, G.728, G.729, G.729A, G.729B, G.729AB, G.723.1 5.3K, G.723.1 6.3K, G.723.1A 5.3K, G.723.1A 6.3K, clear-channel codec and fax-relay.
  - Medium complexity codecs include: G.711 a-law, G.711 u-law, G.726 32K, G.726 24K, G.726 16K, G.729A, G.729AB, clear-channel codec and fax-relay.
- Up to 8 FXO ports, by using both expansion slots for 2 4-port FXO modules
- Up to 12 FXS ports, by using the 4 FXS ports on the base NM and one expansion slot for an 8-port FXS module
- VoIP H.323, SIP and MGCP with Call Agent
- VoIP MGCP and H.323 with CM
- VoFR
- VoATM: VoAAL5 and Trunked VoAAL2
- Caller ID Support
- FXO Answer and Disconnect Supervision and battery reversal disconnect
- FXO Power Failover
- Voice feature parity with the NM-HDV and NM-1V/2V (such as VAD, echo cancellation, DTMF relay etc.)

**Q.** How many calls are supported by the DSPs on the base NM?

**A.** A maximum of 8 high complexity calls, or 16 medium complexity calls (12 FXS and 4 FXO). For more than 8 high complexity calls, the DSP EM is needed.

**Q.** What battery reversal capabilities do the FXO ports support?

**A.** The FXO EM supports all the capabilities of the VIC-2FXO-M1, VIC-2FXO-M2 and VIC-2FXO-M3 and can therefore be used in any country. (Please check the homologation status for specific countries.)

**Q.** What is FXO Power Failover?

**A.** The FXO Power Failure feature is a hardware feature built into the FXO cards that allows connectivity to an analog phone patched into the right pair of wires to be activated by a relay if power to the Cisco router containing the NM-HDA fails. This allows PSTN calls to be made via the FXO line normally connected to the router from a designated “red” phone in the office while power is out. For an FXO EM in slot 0 of the NM-HDA, the analog phone must be connected to wire-pair 14 (counting from 1 on the RJ-21 connector) to take advantage of the FXO Power Failover feature. For an FXO EM in slot 1 of the NM-HDA, the analog phone must be connected to wire-pair 24 (counting from 1 on the RJ-21 connector) to take advantage of the FXO Power Failover feature. If both EMs are populated with FXO modules, two “red” phones can be used.

## CONFIGURATION INFORMATION

**Q.** What are the supported combinations of port expansion modules?

**A.** The following combinations are supported:

- 4 FXS: base NM only
- 12 FXS: 4 FXS on the base NM, one 8-port FXS EM
- 4 FXS + 4 FXO: 4 FXS on the base NM, one 4-port FXO EM
- 4 FXS + 8 FXO: 4 FXS on the base NM, two 4-port FXO EMs
- 12 FXS + 4 FXO: 4 FXS on the base NM, one 8-port FXS EM; one 4-port FXO EM

**Q.** How are the ports on the base and EMs numbered?

**A.** Port numbers are statically allocated to each slot in the NM-HDA—these do not change based on what module is plugged into that slot. The x below is the slot within the Cisco 26/28/36/37/3800 chassis where the NM-HDA is located.

- Base - 4 ports: x/0/0 - x/0/3
- EM in Slot 0 (left-hand side) - 8 ports: x/0/4 - x/0/11
- EM in Slot 1 (right-hand side) - 8 ports: x/0/14 - x/0/21

EM slots have 10 port numbers allocated to them, but only the bottom 4 (FXO) or 8 (FXS) can be used. Note that the middle digit of the port number for the NM-HDA is always 0.

**Q.** What is the port number for the FXO Power Failover port where the emergency telephone is connected?

**A.** Counting from 0, ports 13 (EM in slot 0) and/or port 23 (EM in slot 1). If counting from 1, it would be wire-pairs 14 and 24.

## LIMITATIONS AND RESTRICTIONS

**Q.** Are E&M ports supported on the NM-HDA?

**A.** No.

**Q.** Are BRI ports supported on the NM-HDA?

**A.** No.

**Q.** Are Analog-DID ports supported on the NM-HDA?

**A.** No.

**Q.** The NM-HDA can be physically populated with up to 20 FXS ports? Why is this not listed as a supported configuration?

**A.** There is not enough power to drive 20 ports if they're all active at once and this is therefore an unsupported configuration. The maximum supported configuration is 16 ports (12 FXS + 4 FXO).

**Q.** What other limitations apply to the NM-HDA?

**A.** The following limitations apply:

- The loop length (the length of wire between the FXO module and the central office) should not exceed 8,000 ft.
- The middle digit of the port number for the NM-HDA is always 0
- Port numbers of the EM slots are not contiguous. There are 10 port numbers assigned to each EM, but only the bottom 8 are used
- The NM-HDA can only use DSPs (base or EM) on the NM itself. The AIM-VOICE-30 or AIM-ATM-VOICE-30 cards cannot be used for DSP expansion
- Analog to Digital cross-connect (D&I) is not supported. However, POTS to POTS dial-peers can be used to route calls from analog to digital ports

**Q.** Is analog to digital drop & insert (cross-connect) supported?

**A.** No.

**Q.** How many NM-HDAs can be supported in each platform?

**A.** Please see the table below.

Platform	Maximum Number of NM-HDAs Allowed
2600/2600XM/2691	1
2811/2821/2851	1
3640/A	3
3660	6
3725	2
3745	4
3825	2
3845	4

**Q.** Can all ports be simultaneously off-hook in all supported configurations?

**A.** Yes.

**Q.** Is Answer and Disconnect Tone Supervision supported on the NM-HDA FXO ports?

**A.** Yes.

## CISCO IOS® RELEASE SUPPORT AND MEMORY REQUIREMENTS

**Q.** What is the minimum Cisco IOS® software release required to support the NM-HDA?

**A.** Please see the table below.

Product	Cisco 2600/3600	Cisco 2691/2600XM/3700	Cisco 2800	Cisco 3800
NM-HDA-4FXS	12.2(2)XT or 12.2(8)T	12.2(8)T	12.3(8)T4	12.3(11)T
EM-HDA-8FXS	12.2(2)XT or 12.2(8)T	12.2(8)T	12.3(8)T4	12.3(11)T
EM-HDA-4FXO	12.2(2)XT or 12.2(8)T	12.2(8)T	12.3(8)T4	12.3(11)T
DSP-HDA-16	12.2(2)XT or 12.2(8)T	12.2(8)T	12.3(8)T4	12.3(11)T

**Q.** Which Cisco IOS® feature sets support the NM-HDA?

**A.** All Plus IOS® feature sets for Cisco 26/36/3700 Series. Use IP Voice image for Cisco 2800 and 3800 Series platforms.

**Q.** What are the memory requirements for NM-HDA?

**A.** Memory recommendations are as follows:

- 64M DRAM and 16M flash for Cisco 2600 series
- 64-96M DRAM and 32M Flash for Cisco 2600XM series
- 96-128M DRAM and 32M flash for the Cisco 3640 and 3660 platform
- 128M DRAM and 32M Flash for 2691, 3725 & 3745:
- 256M DRAM and 64M flash for Cisco 2800 and 3800 series

## ORDERING INFORMATION

**Q.** What are the various components for populating the NM-HDA?

**A.** There are multiple components that can be used with the NM-HDA:

Part Number	Description
NM-HDA-4FXS	High density analog network module with 4 FXS
EM-HDA-8FXS	8-port FXS expansion module
EM-HDA-4FXO	4-port FXO expansion module
DSP-HDA-16	16-channel DSP module for NM-HDA

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