



Technology Primer

Mitel 3300 ICP Analog Solutions

Technology Primer

July 2007

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The purpose of this technology primer is to provide details of the various analog solution options available to the Mitel® 3300 IP Communications Platform (ICP).

Product Note Overview

With the ongoing migration to the 3300 ICP portfolio, this document is designed to clarify the traditional analog solution options that the 3300 ICP portfolio delivers.

3300 ICP Controllers

The 3300 ICP Controller is delivered in several different formats:

- Mitel 3300 CX Controller
- Mitel 3300 CXi Controller
- Mitel 3300 Mx Controller
- Mitel 3300 Mx Server
- Mitel 3300 AX Controller

From an analog connectivity perspective, the CX Controller and CXi Controller are exactly the same and will be treated as a single controller within this document. The Mx Server does not support any analog connectivity, and as such, will not be discussed any further.

CX Controller and CXi Controller



The CX Controller and CXi Controller are typically used for small business solutions, or in a branch office, and can support a maximum of 150 connected devices. Of those 150 devices, they can support a maximum of 104 analog telephone devices and / or a maximum of 36 analog trunks(1). As standard, the CX Controller and CXi Controller do not support any Analog Services Unit (ASU) cabinets – please see the Mitel Quad Copper Interface Module (CIM) section below – but they can be optionally added.

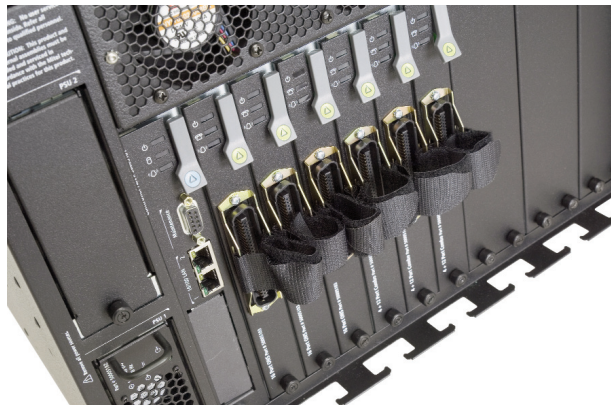
MXe Controller



The MXe Controller can be used in two different configurations. The standard configuration supports a maximum of 350 devices, of which 128 can be analog devices, and / or a maximum of 38 analog trunks(1), while the expanded configuration can support a maximum of 1,500 devices, of which 390 can be analog devices and / or a maximum of 102 analog trunks(1). As standard, the MXe Controller can support up to four ASU cabinets, and further ASU's can be added to the expanded MXe Controller with the introduction of the Quad CIM - please see the Quad CIM section below.

- 1) The controllers cannot support the maximum number of analog extensions and analog trunks at the same time.

AX Controller



The AX Controller was designed to be an analog cabinet and can support a maximum of 250 devices, of which 192 can be analog devices. The AX Controller has capacity for 12 analog cards, as can be seen above.

Analog Hardware

Embedded Analog Boards

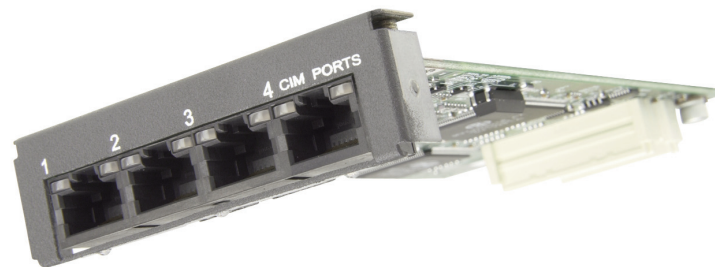
All CX Controllers, CXi Controllers, and MXe Controllers include an embedded Analog Main Board (AMB) as standard. The embedded analog boards are installed into the back of the controllers and therefore cannot be seen in the above pictures. The AMB supports four analog extension (ONS) ports, six loop start (LS) trunk ports, one music on hold port, and a paging port. The AMB allows the first two ONS ports to connect directly to the first two LS trunk ports in the event of a power failure.

Custom local area signaling services (CLASS) is supported on the embedded LS trunk ports and ONS extension ports. CLASS allows the 3300 ICP system to pass calling line ID digits and CLASS name information to display sets that support caller ID functionality.

Message waiting indication is supported on the embedded ONS ports via the Class 2 protocol and not by high voltage. High voltage message waiting is supported on the analog interface cards.

The CX Controller and CXi Controller also support a second embedded Analog Option Board which supports a further four ONS ports and six LS trunk ports.

Quad Copper Interface Module (CIM)



The Quad CIM is used in the CX Controllers, CXi Controllers, and MXe Controllers when further ASU's need to be connected to the controller. A single Quad CIM can be installed into a CX Controller and CXi Controller, but when the Quad CIM is installed into the CX Controller and CXi Controller, only the first three ports can connect to ASU's. The fourth port will be inactive.

When the MXe Controller has been expanded to support up to 1,500 devices, a further two Quad CIM's can be installed. This would expand the ASU capacity on the MXe Controller from four to 12.

Analog Services Unit

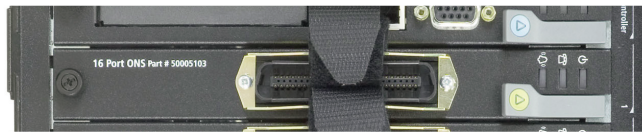


The ASU connects to the CX Controllers, CXi Controllers, and MXe Controllers via a CAT5 cable. The ASU houses up to two analog interface cards and the cards can be installed in any mix.

Analog Interface Cards

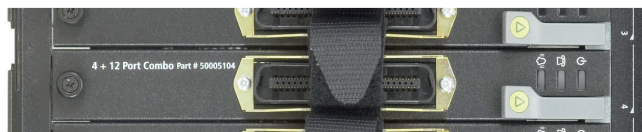
The AX Controller and ASU support the same analog interface cards. Currently, there are two distinct cards.

16-port extension (ONS) card



The ONS card can connect up to 16 standard (POTS) telephones. A protected version of the card is available in Brazil that allows the telephones to be cabled externally.

12-port ONS and 4-port LS trunk (combo) card



The combo card has 12 protected ONS ports and four LS trunk ports. This means analog connections to the public network can be used on the same card as a lower density of analog extensions. In the event of a power failure, the four LS trunks switch across to the first four ONS ports, creating external telephony access for any emergency situation.

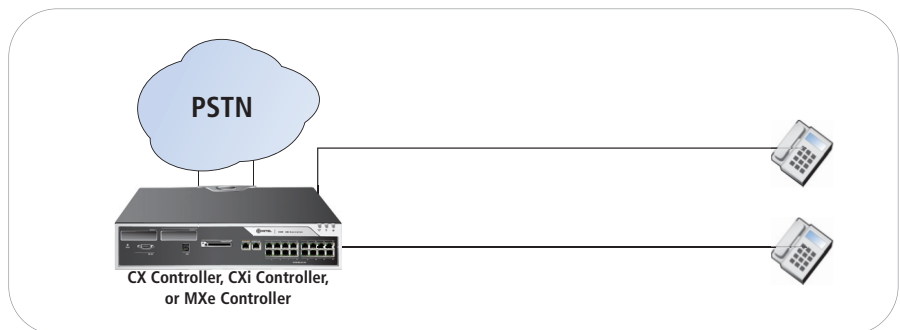
The ASU supports two of the analog interface cards and the AX Controller supports up to 12.

3300 ICP Analog Deployment Options

For most 3300 ICP analog requirements, the deployment options are relatively straightforward. The following sections will detail how progressively larger analog solutions can be deployed.

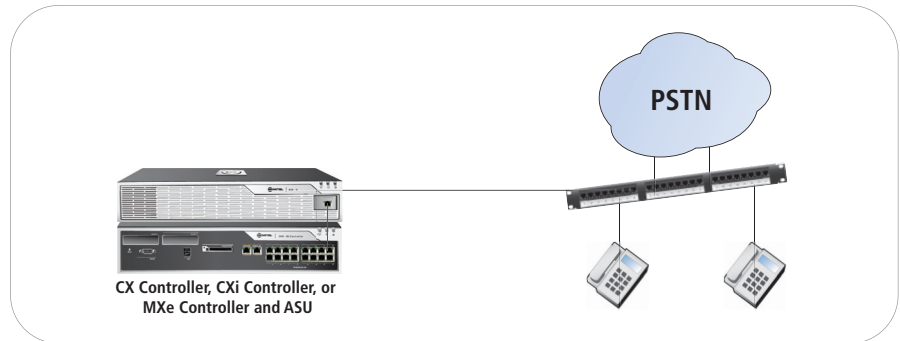
Very Small Requirement

When the analog requirement is very small, for instance a couple of fax machines or modems, the embedded analog options will be sufficient.



Small Analog Requirement

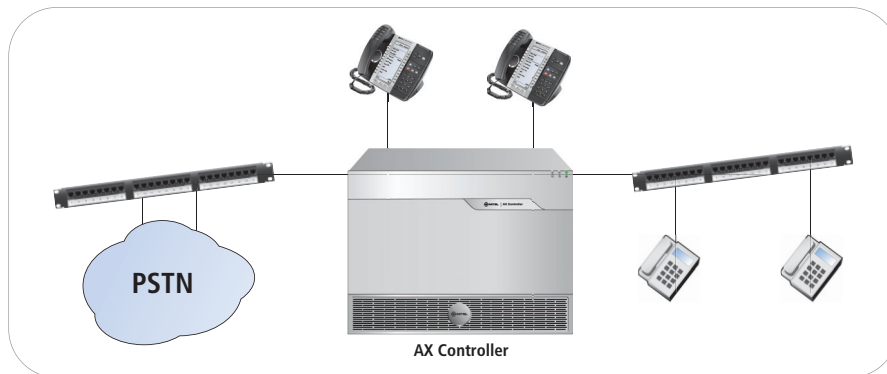
When the analog requirement is larger than the embedded analog boards can satisfy, or high voltage message waiting is required, the CX Controllers, CXi Controllers, and MXe Controllers can have ASU's added to them.



The ASU connects to the CX Controller, CXi Controller, or MXe Controller via a CAT5 cable. The ASU houses up to two analog interface cards which both have an Amphenol cable to connect to the building wiring. The above diagram shows the ASU connecting to a patch panel. The telephones or public network lines are then connected into the patch panel.

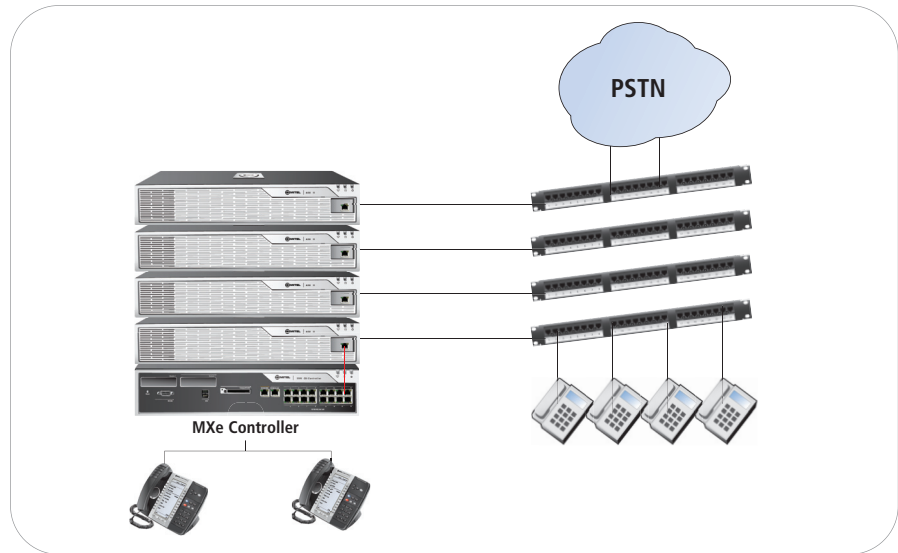
Medium analog requirements

For systems requiring a medium or large density of analog devices, there are two different options. Option one would be for solutions that are predominantly analog that also require a smaller number of IP devices.



The AX Controller can support up to 192 analog devices and also up to 100 IP devices in a small single contained cabinet. For medium analog-sized solutions that are below a total of 250 devices, the AX Controller would be the preferred solution.

Option two would be ideal for solutions that have a similar or slightly larger analog requirement as option one, but also have a large number of IP devices running on the same 3300 Controller.



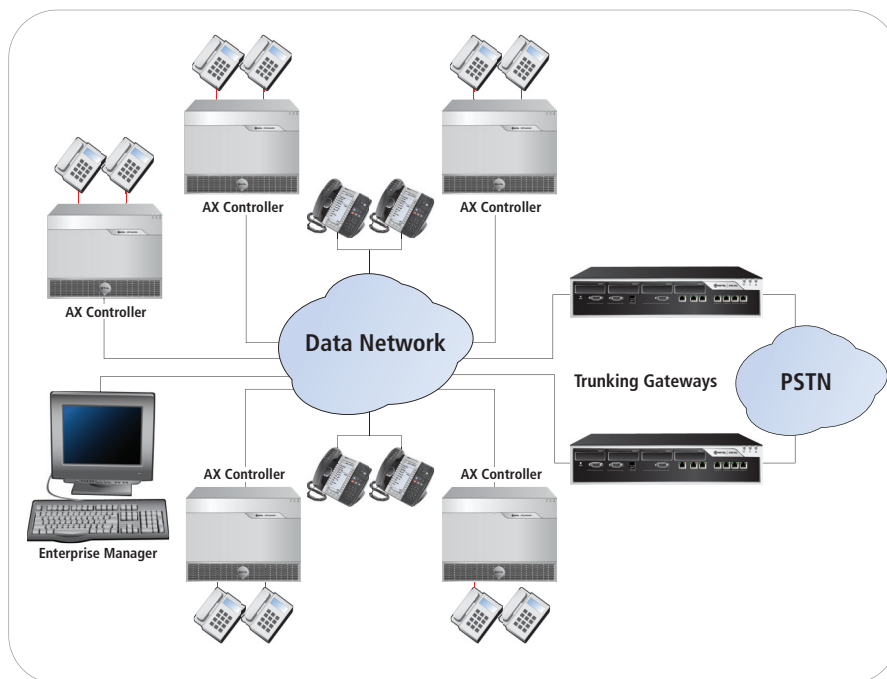
In option two, the analog interface cards are connected via ASU's instead of directly into the AX Controller, and although this is not as neat as option one, it does allow more IP devices to be connected into the same system. The MXe Controller can support up to 12 ASU connected cabinets each with two analog interface cards installed.

Very Large Analog Requirements

For systems requiring a very large density of analog devices, the 3300 ICP solution would be delivered as a multiplatform AX Controller solution.

By moving to a multiplatform solution, inherent 3300 ICP software capabilities would be utilized, for instance, System Data Synchronization (SDS) and Mitel Enterprise Manager, to minimize the complexity of solution administration. By distributing the analog devices across multiple AX Controllers, the solution can be made inherently redundant by not having any large single points of failure. This includes locating the controllers in different places to minimize the impact of any environmental disaster. The AX Controllers can be located close to the actual devices they serve, reducing large core cabling runs, and inter-system traffic is distributed across the core data network.

By distributing the analog processing around an enterprise IP network, the solution is inherently more robust than a traditional PBX system, as there is no catastrophic single point of failure. Any single point of failure would be limited to the surrounding area and locally registered IP phones could reconnect to secondary controllers for continued voice services.



System Data Synchronization

By replacing a single 3300 ICP with multiple controllers, it is important that the administration of the solution does not become exponentially more difficult or time consuming. With that in mind, the 3300 ICP supports automatic data sharing. This capability is called System Data Synchronization (SDS) and is available on all 3300 Controllers with Release 6.0 and above.

SDS reduces the time required to set up and manage multiplatform solutions by allowing the customer to compare the data in a programming form of one system against the data in the same form on another system, start sharing system and user data among other 3300 ICP systems, and automatically synchronize the data from one system to the other 3300 ICP systems.

After a network or cluster has been set up with SDS, all adds, changes, and deletions to the data that the customer has designated as shared are automatically distributed to the other elements in the network or cluster.

For distributed solutions like the above very large analog deployment, it is important to ensure that call logging or call management records for all the different systems are collected. Enterprise Manager will collect the relevant call record files from the 3300 Controllers and well-designed call management systems can utilize the files to deliver consolidated call record statistics.

Enterprise Manager

By utilizing Enterprise Manager as the single point of administration, customers do not need to worry about managing multiple controllers. All users can be added, edited, or deleted from Enterprise Manager and all solution alarm management and voice quality information is presented to the Enterprise Manager application. For system wide changes, like feature access codes or class of restriction updates, the administrator simply programs a single 3300 ICP (from Enterprise Manager) and SDS replicates the change around the network.

Analog Capacities

The below table clarifies the exact analog capacities of the 3300 ICP solution.

	CX Controller and CXi Controller	MXe Controller - Base Configuration	MXe Controller - Expanded Configuration	AX Controller	MXe Server
Embedded AMB - ONS ports	4	4	4	NO	NO
Embedded analog option board – ONS ports	4	NO	NO	NO	NO
Embedded AMB – LS trunks	6	6	6	NO	NO
Embedded analog option board – LS trunks	6	NO	NO	NO	NO
Standard ASU's	NO	4	4	NO	NO
Quad CIM	1 (1)	NO	2	1 (2)	NO
Expanded ASU's	3	4	12	4	NO
Maximum analog interface cards	6	8	24	16	NO
Maximum ONS ports supported per system	104	128	390	192	0
Maximum LS trunks supported per system	36	38	102	48	0

1 – Only the first three ports are available on the Quad CIM for the CX Controllers and CXi Controllers.

2 – Although it is possible to install a Quad CIM onto an AX Controller, the practicalities of it mean it should not happen.

Technology Primer

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