

# Remote PIM Over IP

Remote PIM via IP was first introduced with R6.2 (3200 Series) on the NEAX IPS. The initial release supported only 7 remote sites all configured in DM (Distributed Model) PIMs.

**R8** software (3300 Series) saw the additional support for up to 15 remote sites with the ability to utilize regular PIMs, including IVS PIMs, along with CP24 and CP26 processors in the remote sites. The system port capacity was also increased to where the 256 trunks and 256 IPLA PAD ports no longer subtracted from the 512 station ports. As a result R8 supports 1020 LT ports + 256 AP ports.

The release of **R9** (3400 Series) software allows the support of up to 980 station ports + 256 trunks + 256 Pad Channels + 256 AP ports.

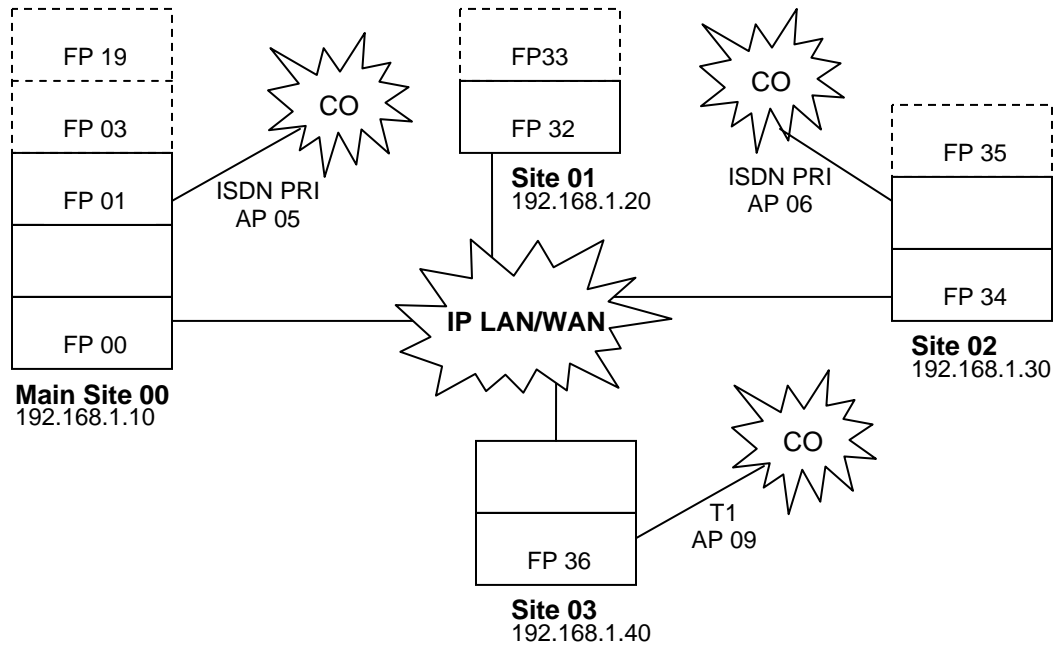
**R11** software (3600 Series) allows the Remote Sites to increase from 15 to 23 and **R12** software (3700 Series) extends the number of Remote Sites to 30.

**Please Read** the following recommendations/conditions.

1. Confirm you have licensing for Remote PIM via IP (F88>16>XXX). **NEVER** exceed in programming assignments the number of remote sites that you have licenses for. If you exceed the license number none of the remote sites will download.
2. It is recommended before each remote PIM deployment a full network diagram be drawn up. FP/IP/CCIS assignments can then be penciled in to assist with a better overall understanding and to help alleviate possible assignment errors. An example diagram is supplied in this document.
3. As with all systems, where possible, it is recommended to bench test the configuration. Even if the network is a multi-site, only 2 PIMs are required to bench test the basic remote PIM operation. The first PIM is set up as the main site while the 2<sup>nd</sup> can be tested as each remote shelf individually by simply changing the site ID and IP addressing in the remote MP. If adding a remote site to an existing remote network connect the new remote shelf locally first and confirm database download. This will confirm PBX FP assignments and isolate the problem to the network if it does not work once installed at the remote location.
4. Initially program **ONLY** the CM 05 assignments and IP addressing. Then assign 1 Dterm only in the main and each remote site and confirm correct and complete download to each remote shelf. Only then should the rest of the assignments be completed in CM14. If you complete CM 14 before testing the download and an error is found with the FP assignments, there will be a good chance that all CM 14 assignments will have to be removed to correct the CM 05 issue.
5. Always assign the first remote shelf as site 01, the second as site 02, the third as site 03 and so on. Failure to do so can result in intermittent failure on some basic Dterm features and operation.
6. FP's utilized in remote sites should only use FP numbers 32 and above.
7. If port allocation allows, always assign the additional ports to sites where the most growth is predicted. This will save time and MP resets when the actual hardware must be added.
8. On page 3 of this document commands 0B31, 0B32, 0B33, etc are **NOT** referencing FP's 31, 32, and 33 but remote sites 01, 02, and 03.
9. Confirm there is NO Spanning Tree Protocol enabled for the port the remote or main MP is connected to. Spanning Tree should be removed or the port set to "Port Fast" to bypass this option. See "**An Additional Requirement**" on page 4 of this document.

## Programming the Database.

Below is a programming example of a remote PIM via IP network consisting of a main site with 3 remote sites, each of different configurations. The IP network is configured within the same subnet for ease with bench testing.



### PBX Assignments

With a direct MAT connection to the Main site MP and all LT assignments removed from CM 10/14, assign the following to CM 05 (If new install B load the MP and delete default F300 from LEN 000).

<p><b>CM 050</b></p> <p>050&gt;00&gt;00                      050&gt;01&gt;00                      050&gt;02&gt;00                      050&gt;03&gt;00                      050&gt;05&gt;12                      050&gt;06&gt;12                      050&gt;09&gt;09                      050&gt;19&gt;00                      050&gt;32&gt;00                      050&gt;33&gt;00                      050&gt;34&gt;00                      050&gt;35&gt;00                      050&gt;36&gt;00</p>	<p><b>CM 053</b></p> <p>053&gt;00&gt;128                      053&gt;01&gt;064                      053&gt;02&gt;000                      053&gt;03&gt;000                        053&gt;32&gt;064                      053&gt;34&gt;128                      053&gt;36&gt;128</p>	<p><b>CM 056</b></p> <p>056&gt;00&gt;2                      056&gt;01&gt;3                      056&gt;02&gt;3                      056&gt;03&gt;0                      056&gt;05&gt;3                      056&gt;06&gt;1                      056&gt;09&gt;1                      056&gt;19&gt;0                      056&gt;32&gt;1                      056&gt;33&gt;1                      056&gt;34&gt;1                      056&gt;35&gt;1                      056&gt;36&gt;1</p>	<p><b>CM 057</b></p> <p>                      057&gt;06&gt;3                      057&gt;09&gt;3                        057&gt;32&gt;2                      057&gt;33&gt;0                      057&gt;34&gt;2                      057&gt;35&gt;0                      057&gt;36&gt;2</p>	<p><b>CM 058</b></p> <p>058&gt;00&gt;000001                      058&gt;01&gt;000203                      058&gt;02&gt;000405                      058&gt;03&gt;0006                      058&gt;05&gt;0099                      058&gt;06&gt;0299                      058&gt;09&gt;0399                      058&gt;19&gt;0007                      058&gt;32&gt;0100                      058&gt;33&gt;0101                      058&gt;34&gt;020001                      058&gt;35&gt;0202                      058&gt;36&gt;030001</p>
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## Command 05 Defined

**CM 050:-** This defines the FP numbers. Note that virtual FP's at the main site start with the last PIM (PIM 7 FP 19) and work backwards. FP's not utilized should be removed. FP's in remote sites start with 32 and can be assigned in any order for hardware or Virtual PIMs.

**CM053:-** This CM is *ONLY* assigned to hardware FP's and must be a multiple of 8. Default NONE also = 128 ports for FP's 00-03. Total ports assigned in CM 053 must not exceed the number in CM F88>10.

**CM 056:-** Designates the FP/AP to be built in (2), Virtual (0), Regular (3) or utilized at a remote location (1). All FP/AP's assigned as a 1 must then be addressed in CM 057.

**CM 057:-** This CM stipulates the function of the FP/AP in the remote site to be either a built-in FP (2), a Virtual FP (0), or a regular AP (3).

**CM 058:-** Defines the site the FP/AP is located at and the equipment it controls. The setting data for an FP first shows the site ID followed by the PIM/PIMs it controls for that site. For an AP card the setting data shows the site ID followed by 99. Any assignments in CM 14 for the FP to be assigned **MUST** be removed to allow this CM to execute. A hardware FP can control up to 2 PIMS. A virtual FP can only control

**With CM 05 complete the following additional programming is required for basic testing.**

1. CM 0B00>00>192168001010 Assigns the IP address for the Main site.
2. CM 0B00>01>255255255000 Assigns the subnet mask for the Main site.
3. CM 0B31>00>192168001020 Assigns the IP address for Site 01.
4. CM 0B31>01>255255255000 Assigns the subnet mask for Site 01.
5. CM 0B32>00>192168001030 Assigns the IP address for Site 02.
6. CM 0B32>01>255255255000 Assigns the subnet mask for Site 02.
7. CM 0B33>00>192168001040 Assigns the IP address for Site 03.
8. CM 0B33>01>255255255000 Assigns the subnet mask for Site 03.
9. CM 14>00000>F1000 Assigns a Dterm station to the first LEN at the Main site.
10. CM 14>03000>F1500 Assigns an IP Dterm to the Virtual PIM at the Main site.
11. CM 14>32000>F2000 Assigns a Dterm to the first LEN Site 01.
12. CM 14>33000>F2500 Assigns an IP Dterm to the Virtual PIM at Site 01.
13. CM 14>34000>F3000 Assigns a Dterm to the first LEN Site 02.
14. CM 14>35000>F3500 Assigns an IP Dterm to the Virtual PIM at Site 02.
15. CM 14>36000>F4000 Assigns a Dterm to the first LEN Site 03.
16. A prime line in CM 90 and 93 should then be assigned for all the stations above.
17. CM EC6>0>0 and once complete reset the MP.

This completes the basic assignments for the main site MP.

**The following assignments would now be assigned via direct connection to the remote CP31/CP24/CP26.**

1. In Off Line mode (MP sense wheel 2 and reset) CM 0B00>90>01 Where 01 is the site you wish to test first.
2. Back in On Line mode (sense wheel back to 0. Do not reset)  
CM 0B00>00>192168001010 Assigns the IP address of the main site.
3. CM 0B31>00>192168001020 Assigns the IP address for site 01 in this example.
4. CM 0B31>01>255255255000 Assigns the subnet mask for site 01 in this example.
5. CM EC6>0>0 and when complete reset the remote MP. Ensure that both MP's are connected via a test hub/switch. Once the remote MP comes back on line it should then immediately commence a download of data from the Main Site.
6. Once completed test the assigned Dterm station for dial tone. Also try logging in the IP Dterm if one is assigned for that site and check for dial tone. Be sure to use the remote MP IP address for the DRS assignment in the IP station. You will not be able to call between these 2 devices or the main site as no IPLA PAD is assigned. The important part of the test is to receive dial tone on the correct station. This will confirm you have the important CM 05 settings correct.

## Testing calls and Voice Path

Of course the test is far more effective if you can confirm voice traffic across the IP link. To do this the IPLA-PAD cards must be assigned.

The following assignments are for the programming example with a 32IPLA-PAD in the main, Site 02, and Site 03. In Site 01 an 8IPLA-PAD card will be shown with the 24-IPLA piggy-back card installed for an additional 16 VCT channels (total 24). The channel assignment and CM 0A73 assignment may vary based upon the IPLA-PAD equipment you have to test with.

1. CM 0A00>00>001 Assigns the 32IPLA-PAD card to Main site LT05 and LT04.
2. CM 0A00>01>321 Assigns the 8IPLA-PAD card to LT04 in Site 01.
3. CM 0A00>02>341 Assigns the 32IPLA-PAD card to LT04 in Site 02.
4. CM 0A00>03>363 Assigns the 32IPLA-PAD card to LT04, second PIM, in Site 03.
5. CM 0A01>00>192168001011 IP address of IPLA in Main Site.
6. CM 0A01>01>192168001021 IP address of IPLA in Site 01.
7. CM 0A01>02>192168001031 IP address of IPLA in Site 02.
8. CM 0A01>03>192168001041 IP address of IPLA in Site 03.
9. CM 0A02>00~03>255255255000 Assigns the Subnet mask for all IPLA cards.
10. CM 14>00032>DD000~DD031 Assigns the 32 PAD channels in the Main Site.
11. CM 14>32032>DD032~DD055 Assigns the 24 PAD channels in Site 01.
12. CM 14>34032>DD056~DD087 Assigns the 32 PAD channels in Site 02.
13. CM 14>36096>DD088~DD119 Assigns the 32 PAD channels in Site 03.
14. CM 0A09>00>00 Assigns location 00 to the Main Site Pad card.
15. CM 0A09>01>01 Assigns location 01 to the Site 01 Pad card.
16. CM 0A09>02>02 Assigns location 02 to the Site 02 Pad card.
17. CM 0A09>03>03 Assigns location 03 to the Site 03 Pad card.
18. CM 0A73>01>02 Allocates the 24 PAD channels for Site 01. Default setting 07 is 32 channels for all other sites.
19. CM 6719>00~03>01 Advises all location groups to Give Priority to IP-PAD with 16VCT. This will allow the PAD cards to be installed with or without 16VCTs in your test set up.
20. Perform and EC8>00>0 to confirm the upload to your remote site and then reset the IPLA-PAD card in both the remote and the main site. You should then be able to test voice traffic between all sites and stations.

### **An Additional Requirement**

After the MP performs its first down load it does a data save and reset which effectively disconnects the Ethernet port. To the switch/router it is connected to this looks like the cable was unplugged. When the MP comes back on line after this reset the first thing it does is try to contact the main site for a verify download. The trouble is that the coming back on line is like plugging the cable back into the switch/router and many devices can take quite some time to initialize the Ethernet port and get it back on line. Most Cisco devices take 4 to 5 seconds. As a result the remote MP's signal to the Main site is lost and the remote site goes into survival mode. Also Cisco devices, by default, have the **Spanning Tree** protocol enabled. Spanning Tree has the switch scan the Ethernet port for possible loops in the IP network via other connected switches. As this is not relevant for the PBX port ( the PBX is a single host off the port) the "**Port Fast**" command should be set for each switch port a NEAX MP is connected to. See <http://www.cisco.com/warp/public/473/12.html> for details on Cisco assignments for the different revisions of Cisco devices.

To counter act the issue with slow 3<sup>rd</sup> party Ethernet devices (This is not an issue for some devices such as NEC Bluefire) the **CM 410>108>** should be set for the amount of seconds delay needed after the reset before attempting to contact the main site. A setting of up to 05 (5 seconds) may be assigned. Setting this timer above 05 can cause issues with the application.