AJA-017

OC12 Expansion Upgrade (Linear Configuration)

PURPOSE

This procedure upgrades a network of 1603 SM Network Elements (NEs) in a linear configuration within an expansion node (see Figure 1). The expansion node is co-located within an existing node. In this case, the expansion node is part of Node 1. The expansion node contains overflow circuits for Node 1.
The expansion node has been provisioned and is ready for network operations. This includes the interface units, the VSCC cross-connect units, drop units, etc. After completing this procedure, the expansion node only requires fiber connections to be fully operational.

PREREQUISITES

The following conditions must be met before starting the upgrade process:

- Expansion node is provisioned and is ready for network operations (i.e., using the 1603 SM start-up wizard).
- Cross-connections are provisioned at expansion node.
- Exspansion node is provisined for bidirectional switching and nonrevertive switching mode.
- NEs are running appropriate software.
- Automatic Download Feature is enabled (Provision> Network Element>Allow/Inhibit)
- If NE is equipped with an expanded memory COA (COAxx5, COAxx6, or COA603 - 610), it has the correct software loaded for any new processor plug-in units
- Network topology is linear with APS line protection enabled (line groups equipped with both Side-A and Side-B HIF units).
- NEs are operating normally - no upgrade-blocking failures.
- NEs in network are alarm-free.

Figure 1. Linear Configuration

EQUIPMENT LIST

The following equipment is required:

- Two IBM-compatible PCs equipped with 1301 NMX
- RS-232 cables to connect PCs to Craft 1 port (USI) on COA
- ATM12 R08.00.00 or later Software Program Kit

NOTE: *Software Program Kit is not required if NE has system software stored on COA with expanded memory (COAxx5, COAxx6, or COA603 - 610).*

- Appropriate HIF units (per Table A)

Table A. HIF Units

TYPE	OC12 UNITS
Short Reach	HIF701/702/703/704/705
Intermediate Reach	HIF601/602/603/604/605/606
Long Reach	HIF901/902 HIFA01/02/03/04
Very Long Reach	HIF903/904/905/906/907 HIFA05/06/07/08

Procedure

1. **CAUTION: Possibility of service interruption. There must be no equipment or facility alarms at the NE.**

2. ***WARNING: Possibility of equipment damage. Plug-in units contain static-sensitive devices. These devices are susceptible to static discharge damage in unconnected circuit conditions. The following procedure should always be followed when installing or removing the plug-in units.***

3. Review procedures for handling static-sensitive devices.

    a. Wear grounded wrist strap.

    b. Handle the units at front and side edges only. DO NOT touch circuit traces or components.

    c. Connect static ground wrist straps to the grounding jacks. The jacks are located below the PWR A and PWR C positions.

4. Connect PC to Craft 1 port (USI) on COA.

5. Log on to NE (AJA-101).

6. In the scope pane of the Application browser, right-click NE name to display a context menu.

   NOTE: *When directed to select menu items in this procedure, selections are made from this menu.*

7. Verify NE is free of alarms:

   a. Select the following menu item: **Alarm Surveillance**

   b. Click on Current Alarms tab.

   c. Click on Retrieve.

   d. Resolve any unexpected alarms that may block upgrade before continuing.

   e. Click on Close.

8. Retrieve facility protection switching parameters:

   a. Select the following menu items:
   Provision>Facilities>OC12>OC12 Facility

   b. On OC12 Facility Provisioning screen, select Switch tab.

   c. Click on Retrieve.

   d. Is bidirectional and nonrevertive switching reported for all facilities?

      If yes, go to step 8 i.
      If no, go to step 8 e.

   e. To change parameters, select either side (A or B) of facility.

   f. Click on Modify.

g. Under Modify Switch select:

- Switching Direction = Bidirectional
- Switching Mode = Nonrevertive.

h. Click on OK.

i. Click on Send, then Close.

NOTE: *Switching parameters must be provisioned the same at both ends of fiber span. If not, an APSCONF alarm occurs on the facility.*

9. **CAUTION: Possibility of service interruption. The following step switches traffic at both ends of span and may cause a 50-ms or less traffic hit.**

10. If Side-B (LG2-OC12B) is active (ACT LED lighted on Side-B HIF), switch (and release) to Side-A:

    a. Select the following menu items:
    Manual Controls>Switching> Facilities

    b. On Facilities Switching screen, select Facility tab.

    c. Click on Retrieve.

    d. Select Switch Mode = Manual.

    e. Select LG2-OC12B, if active.

    f. Click on Send.

    g. After transaction is completed, select Switch Mode = Release.

h. Click on Send, then Close.

NOTE: *Both NEs should have ACT LED lighted on Side-A HIF.*

11. ***NOTE:*** *Perform the following steps to upgrade the line groups (HIFs) associated with facility between the two existing NEs when an expansion node is added to an existing node pair (Node 1 and Node 2). This expansion node is co-located and is an expansion of an existing node (Node 1 in this case). Since the expansion node is co-located to Node 1,the user may require a different set of HIFs (for example, replacing an IR, LR, or VLR with an SR). After adding and provisioning the expansion node, it must be connected between the existing Node 1 and Node 2.*

    NOTE: *In the following steps, while the facilities are in a hybrid configuration (HIF/facility on Side-A and HIF/facility on Side-B where the HIFs have different compatibility codes), alarms and conditions for the standby side cannot be retrieved (responses will not be meaningful).*
    Assign the new HIF:

    a. Select the following menu items:
    Provision>Equipment>HIF

    b. Select Parameters tab.

    c. Click on Retrieve.

    d. Select HIF-B unit of LG2 being upgraded.

    e. Click on Modify.

    f. Select Service State = Memory Admin.

    g. For Equipment Type, type the code of the unit equipped.

    h. Select Compatibility Code:

    - HIF601 is the compatibility code for the following HIF units:
      HIF601, 602, 606, 701, 702, 901, 902, 905, 906, A01, A02, A05, A06, A07)

- HIF603 is the compatibility code for the following HIF units: HIF603, 604, 605, 703, 704, 705, 903, 904, 907, A03, A04, A08.

i. Select Auto In-Service on Insertion = No.

j. Click on OK.

k. Click on Send, then Close.

12. See Figure 2. Replace the Side-B HIF with an IR/SR HIF per table A, if required.

13. At Node 1 LG2B, connect B fiber from expansion node LG1B.

14. At expansion node LG2B, connect B fiber from Node 2 LG1B.

Figure 2. HIFxxx Locations

1. Is NE equipped with expanded memory COA (COAxx5, COAxx6, or COA603 - 610)?

   If yes, go to step 16.
   If no, go to step 17.

2. If COA has expanded memory, perform the following:

   a. Wait until software is automatically downloaded to the HIF unit (HIF-B).

      NOTE: *While the download is in progress, the green ACT LED flashes on the destination unit and the NEP.*

   b. To verify the download process, select the following menu items: **Download**

   c. Click on Status tab.

   d. Click on Retrieve.

   e. After download is complete, verify that ALM LED on HIF-B is off. If ALM LED stays on, replace the unit.

      NOTE: *The NEP automatically configures the HIF unit to match the STS1 1-3 or 1-12 connections of the unit it replaced.*

f. After automatic download is complete, click on Close, then go to step 18.

3. Manually download software to HIF-B unit:

   a. Select the following menu item: **Download**

   b. On Download screen, select Download Processor tab.

   c. In Download Release box, select the desired Release version from the drop-down list.

   d. Click on Retrieve.

   e. Select HIF-B for LG2 being upgraded from the list of units.

   f. Click on Download.

   g. Wait until the ALM (red) LED is out on HIF-B. Then click on Retrieve to update the download status screen.

      NOTE: *The NEP automatically configures the HIF unit to match the STS1 1-3 or 1-12 connections of the unit it replaced.*

   h. Click on Close.

4. Retrieve system alarms:

   a. Select the following menu item: **Alarm Surveillance**

   b. Select Current Alarms tab.

   c. Click on Retrieve.

   d. Verify that the only alarms are:

- COM:EQPTMA (because HIF-B is OOS-MA-AS)
- COM:CONFIG (because of the HIF configuration).

e. If any unexpected alarms exist, resolve before continuing.

f. Click on Close.

5. Place the new HIF in maintenance state:

   a. Select the following menu items:
   Provision>Equipment>HIF

   b. On HIF Provisioning screen, select Parameters tab.

   c. Click on Retrieve.

   d. Select HIF-B of LG2 being upgraded only.

   e. Click on Modify.

   f. Select Service State = Maintenance.

   g. Click on OK.

   h. Click on Send, then Close.

6. Run full diagnostics on HIF-B:

   a. Select the following menu items:
   Manual Controls>Diagnostics> Equipment

b. On Equipment Diagnostics screen, select HIF tab.

c. Select Group = Side B of LG2 being upgraded.

d. Select Termination Method = Normal.

e. Select Iterations = 1.

f. Click on Phase at top of Phase column (all available phase rows become selected).

g. Click on Send.

h. After transaction is complete, verify Pass is reported for all available phases. If any phase fails, replace HIF-B unit and repeat procedure from step 15.

i. Click on Close.

7. Initialize and retrieve PM registers for new facility:

   a. Select the following menu items:
   Performance Monitoring>Facilities> OC12

   b. On Performance Monitoring screen, select Line tab.

   c. Select Group = Side B of LG2 being upgraded.

   d. Click on Condition at top of Condition column (all conditions become selected).

   e. Verify Offset Hours = 0.

   f. Click on Set to Zero.

g. Wait a few minutes and then retrieve PM registers by clicking on Retrieve.

h. If Current PM counters show performance problems, resolve before continuing.

i. Click on Close.

8. Place the Side-B HIF unit in service:

   a. Select the following menu items:
   Provision>Equipment>HIF

   b. On HIF Provisioning screen, select Parameters tab.

   c. Click on Retrieve.

   d. Select HIF-B of LG2 being upgraded.

   e. Click on Modify.

   f. Select Service State = In Service.

   g. Click on OK.

   h. Click on Send, then Close.

9. **CAUTION: Possibility of service interruption. The following step switches traffic to the new facility. All steps up to this point must be completed at both NEs that terminate the span being upgraded.**

10. At one NE only, perform the following to switch (and release) to Side-B facility:

    a. Select the following menu items:
    Manual Controls>Switching> Facilities

b. On Facilities Switching screen, select Facility tab.

c. Click on Retrieve.

d. Select Switch Mode = Manual.

e. Select OC12A for LG2 being upgraded.

f. Click on Send.

g. After transaction is complete, select Switch Mode = Release.

NOTE: *The 1301 NMX status bar indicates when the switch is complete. It is not necessary to wait for the MAN condition to be raised before releasing the switch.*

h. Click on Send, then Close.

11. Verify switch took place at both Node 1 and the expansion node by observing the ACT (active) LED on the HIFs.

12. Retrieve system alarms:

a. Select the following menu item: **Alarm Surveillance**

b. Select Current Alarms tab.

c. Click on Retrieve.

d. Resolve any alarms before continuing.

e. Click on Close.

13. Assign the new HIF (HIF-A):

a. Select the following menu items:
Provision>Equipment>HIF

b. Select Parameters tab.

c. Click on Retrieve.

d. Select HIF-A unit of LG2 being upgraded.

e. Click on Modify.

f. Select Service State = Memory Admin.

g. For Equipment Type, type the code of the unit equipped.

h. Select Compatibility Code:

- HIF601 is the compatibility code for the following HIF units:
HIF601, 602, 606, 701, 702, 901, 902, 905, 906, A01, A02, A05, A06, A07)

- HIF603 is the compatibility code for the following HIF units:
HIF603, 604, 605, 703, 704, 705, 903, 904, 907, A03, A04, A08.

i. Select Auto In-Service on Insertion = No.

j. Click on OK.

k. Click on Send, then Close.

14. See Figure 2. Replace the Side-A HIF with an IR/SR HIF per Table A.

15. At Node 1 LG2A, connect A fiber from expansion node LG1A.

16. At expansion node LG2A, connect A fiber from Node 2 LG1A.

17. Wait while software is automatically copied to HIF-A (approximately two minutes).

18. ***NOTE:*** *The ACT LED flashes on the HIF while software is being copied to it.*

    After copy process is complete, verify that ALM LED on HIF-A goes off. If ALM LED stays on, replace the unit and repeat the download.

19. Retrieve system alarms:

    a. Select the following menu item: **Alarm Surveillance**

    b. Select Current Alarms tab.

    c. Click on Retrieve.

    d. Verify that the CONFIG alarm clears and the only alarm is COM:EQPTMA. If any unexpected alarms exist, resolve them before continuing.

    e. Click on Close.

20. Place HIF-A in maintenance state:

    a. Select the following menu items:
    Provision>Equipment>HIF

    b. On HIF Provisioning screen, select Parameters tab.

    c. Click on Retrieve.

    d. Select HIF-A of LG2 being upgraded.

    e. Click on Modify.

f. Select Service State = Maintenance.

g. Click on OK.

h. Click on Send, then Close.

21. Run full diagnostics on HIF-A:

a. Select the following menu items:
Manual Controls>Diagnostics> Equipment

b. On Equipment Diagnostics screen, select HIF tab.

c. Select Group = Side A of LG2 being upgraded.

d. Select Termination Method = Normal.

e. Select Iterations = 1.

f. Click on Phase at top of Phase column (all available phase rows become selected).

g. Click on Send.

h. Wait for the transaction to complete.

i. Is Pass reported for all available phases?

If no, replace HIF-A unit, repeat steps 31 through 33, and return to step 35.
If yes, go to step 35 j.

j. Click on Close.

22. Initialize and retrieve PM registers for Side-A facility:

a. Select the following menu items:
Performance Monitoring>Facilities> OC12

b. On Performance Monitoring screen, select Line tab.

c. Select Group = Side A of LG2 being upgraded.

d. Click on Condition at top of Condition column (all conditions become selected).

e. Click on Set to Zero.

f. Wait a few minutes and then retrieve PM registers by clicking on Retrieve.

g. If PM counters show performance problems, resolve before continuing.

h. Click on Close.

23. Place the Side-A HIF unit in service:

a. Select the following menu items:
Provision>Equipment>HIF

b. On HIF Provisioning screen, select Parameters tab.

c. Click on Retrieve.

d. Select HIF-A of LG2 being upgraded.

e. Click on Modify.

f. Select Service State = In Service.

g. Click on OK.

h. Click on Send, then Close.

24. **CAUTION: Possibility of service interruption. The following step is optional and switches traffic to Side-A facility. All steps up to this point must be completed at both NEs that terminate the span being upgraded.**

25. At one NE only, perform the following to switch (and release) to Side-A facility:

    a. Select the following menu items:
    Manual Controls>Switching> Facilities

    b. On Facilities Switching screen, select Facility tab.

    c. Click on Retrieve.

    d. Select Switch Mode = Manual.

    e. Select OC12B for LG2 being upgraded.

    f. Click on Send.

    g. After transaction is complete, select Switch Mode = Release.

    h. Click on Send, then Close.

26. Verify switch took place at both NEs by observing the ACT (active) LED on the HIFs.

27. If you want to change APS parameters for the span from bidirectional and nonrevertive switching, enter the following commands:

    a. Select the following menu items:

Provision>Facilities>OC12>OC12 Facility

b. On Facility Provisioning screen, select Switch tab.

c. Click on Retrieve.

d. To change parameters, select either side (A or B) of facility.

e. Click on Modify.

f. Under Protection Switching select:

- Switching Direction = Bidirectional or Unidirectional
- Switching Mode = Revertive or Nonrevertive.

g. Click on OK.

h. Click on Send, then Close.

NOTE: *Switching parameters must be provisioned the same at both ends of fiber span. If not, an APSMM alarm occurs on the facility.*

28. STOP. This procedure is complete.