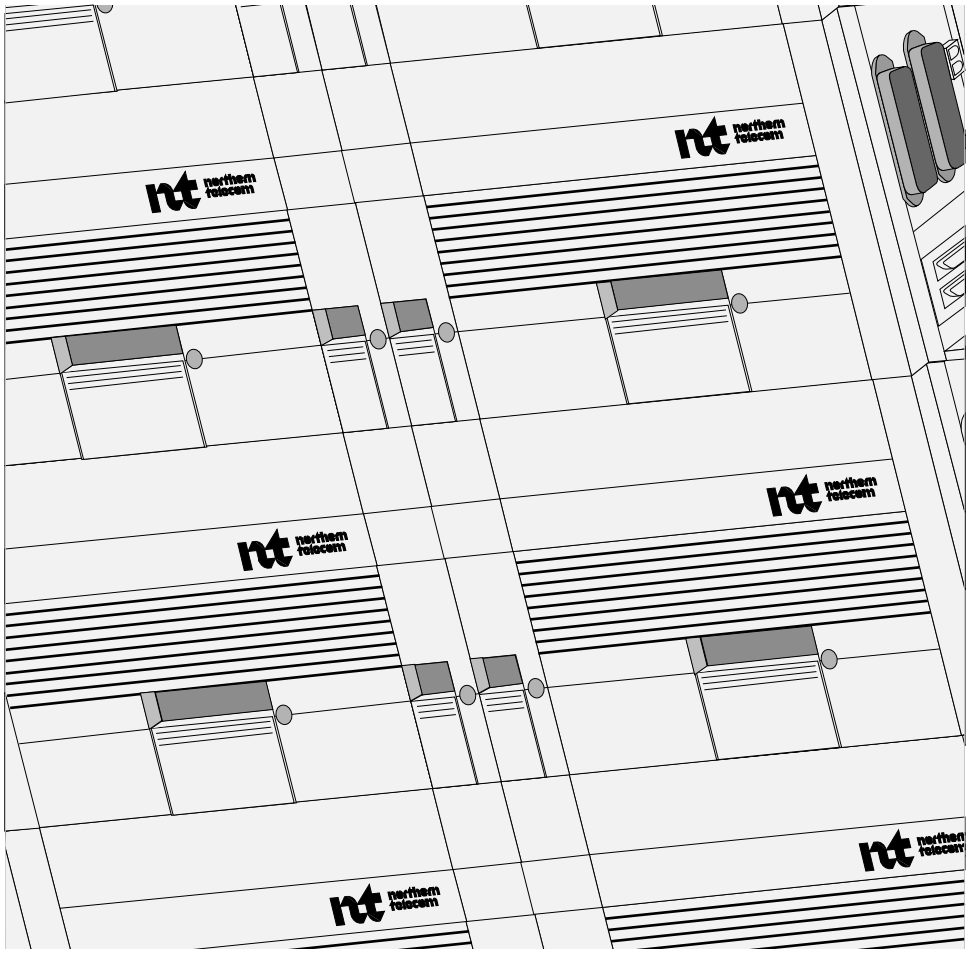
**NT4K00LA** **323-3001-032**

SONET Products

# AccessNode

## Engineering and Ordering Information

Issue 3.0 October 1999



NORTEL NETWORKS™

SONET Products

# AccessNode

## Engineering and Ordering Information

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# Publication history

**October 1999**

AN17 Standard release of the document, Issue 3.0. The updated information was copied from the following Engineering Change Memorandums (ECMs):

- *ABM Bay and Circuit Pack Hardware ECM, Issue 19/12 Release*
- *TBM Bay and Circuit Pack Hardware ECM, Issue 19/11 Release*

**June 1999**

AN17 Standard release of the document, Issue 2.0. To ensure up-to-date technical, information, the material in the book was extracted from three Engineering Change Memorandums (ECMs):

- *ABM Bay and Circuit Pack Hardware ECM*
- *TBM Bay and Circuit Pack Hardware ECM*
- *AccessNode AN17.00 Software Release ECM*

**February 1999**

Standard AN16 release of the document, Issue 1.0.

**June 1998**

AN15 Standard 01.01 release of the document. For this release, the following material was added to this document:

- information about the DMS direct connect feature
- changes to power cable colors
- changes to connections to TBF and CDS power
- new TBM bay configurations
- new parts for BIP: internal modem, circuit breaker

**September 1997**

AN14 Standard 01.01 release of the document. For this release, references were added to *AccessNode Express Ordering Guide*, 323-3051-032.

### July 1996

AN12 Standard 01.01 release of the document. For this release, the following material was added to this document:

- configuration information about VTBM ring systems in Chapters 2, 3, and 4.
- ordering information for VTBM ring systems in Chapters 5 through 14.

### November 1995

AN11 Standard 02.01 release of the document. For this release, the following material was added to this document:

- configuration information about full service terminals (FST) in Chapters 2 and 3.
- ordering instructions for FST configurations in Chapters 4 through 11.
- ordering information for OC-3 tributaries in Chapters 4 through 11.
- ordering information for Modular Business Package (MBP) enclosures to Chapters 12 and 13 from *Addendum 1 (MBP) Engineering and Ordering Information*, 323-3001-032, and the addendum has been deleted for AN11.
- ordering information for Series 800A Outside Plant enclosures to Chapter 14 from *Addendum 2 (S800A) Engineering and Ordering Information*, 323-3001-032, and the addendum has been deleted for AN11.

### May 1995

AN10 Standard 01.02 version of the document released in print form and compact disc. The following information was updated:

- instructions regarding ordering the ESI card and carrier on page 7-4
- the note about “faceplate 1 assembly, passive” on page 11-18
- the note about the ESI card on page 11-19
- the note about the test bypass pair card on page 11-19
- the note about the PGTC/MTA card on page 11-20

### April 1995

AN10 Standard 01.01 release of the document. For this release, the following material was added to this document:

- information to help you decide on which type of system you need to order, in the new Chapter 2
- ordering instructions for DS1-fed systems, in the new Chapter 8
- ordering instructions for single-ended systems, in the new Chapter 9
- ordering codes for
  - — the timing and cross-connect card

— new and updated software items

— new and updated documentation items

**December 1994**

AN08 Standard release of the document. For this release, the following material was added to this document:

- a description of TR-08 traffic
- ordering codes for
  - — the transport interface card that supports TR-08 traffic
  - — the DS1/VT synchronous mapper that supports TR-08 traffic
  - — new and updated software items
  - — new and updated documentation items
  - — newly available predefined bay configurations

**November 1994**

Reissue of the AN07 Standard release of the document.

**April 1994**

AN07 Standard release of the document.

**May 1993**

FWP06 Standard release of the document.

# Contents

# Introduction

## Product/system overview (ABM)

The AccessNode is a full-featured Next Generation Digital Loop Carrier, designed and manufactured by Nortel. It is an evolution of the DMS-1 Urban product. The AccessNode is characterized by its evolution towards the "fiber in the loop" design that supports a much wider pallet of services off the DLC. The AccessNode supports a full suite of switched, non-switched and non-locally switched services in a single Access vehicle. The enhanced fiber technology and application specific integrated circuitry allows for more reliable performance monitoring and testing capabilities. The AccessNode also introduces "service-adaptive" linecards that support on-demand service delivery, fewer craft dispatches, larger inventory savings and simplified service forecasting.

The AccessNode system consists of Access Bandwidth Manager (ABM) or Transport Bandwidth Manager (TBM) shelf or shelves connected in a fiber-fed or copper-fed system and supported by AccessNode software furnished by an Operations Controller (OPC). The AccessNode supports many of the transport features of the TransportNode system and architecture. The main difference between the AccessNode and TransportNode is that the AccessNode supports digital telephony down to the DS0 level.

Support at the DS0 level requires the use of linecards and special shelves to physically hold these packs. These shelves are not found in TransportNode systems. Three type of shelves can hold AccessNode linecards including the Copper Distribution Shelf (CDS), Universal Edge 9000 (UE9K) and the AccessNode Express (ANX) remote linecard shelves. Ordering information for the UE 9000 shelf is discussed in *UE9000 Customer Ordering Guide*, P0907599. The AccessNode Express shelf is discussed in *AccessNode Express Customer Ordering Guide*, 323-3051-032, in the AccessNode Express NTPs.

AccessNode hardware conforms to industry standard EIA, ANSI and Bellcore specifications for standard 23-inch equipment mounting. AccessNode can be supported in open bay frames (racks), a secure indoor enclosure called the Modular Business Package (MBP) and a wide assortment of Outside Plant (OSP) cabinets.

In order to support the many types of system architectures, residential subscriber services and bandwidth intensive business subscriber services requires a lot of system flexibility. With the AccessNode this is primarily accomplished through equipping the ABM or TBM shelves with varying mixes of common equipment packs. A distributed single software load supports all AccessNode services and architectures.

The AccessNode supports the following kinds of ABM and TBM configurations:

- DS1-fed AccessNode (DFA)
- OC-3 Fiber-fed SONET Point-to-Point
- OC-12 Fiber-fed SONET Point-to-Point
- OC-12 Fiber-fed SONET VTBM Ring
- OC-3 and 12 Fiber-fed SONET Single Ended AccessNode (SEAN)
- Fiber MUX
- OPC Shelf or C-Server Shelf
- AccessNode Express (ANX) Host Digital Terminal (HDT)

The AccessNode supports the following kinds of services:

- DS0 services including: POTS, Single Party, coin, ISDN, CLASS, UVG, PBX trunk, Centrex, MBS, DDS, 2-wire, 4-wire, and 6/8-wire
- DS1 transport
- DS3 transport
- Optical tributaries
- STS and VT tributaries

These services can be mixed within the same AccessNode to provide a wide selection of services at each Network Element (NE) site. By using fiber optic rings, a complete AccessNode network comprised of up to 16 NEs can be used to provide an entire area with varied wide and narrow band services tailored to each site.

The host NE, that is the AccessNode that interfaces back to the switch, can be connected using TR-57 Universal for DS0 interface, TR-08 Mode 1 (non-concentrated) and 3 (DS1 tandem) SLC-96 specification interface or TR-303 NGDLC interface. The TR-303 comes in two types DMS and MVI. DMS is used when interfacing to a Nortel DMS switch and allows the use of an advanced messaging channel. MVI (Multi-Vendor Interface) is used when interfacing the AccessNode to AT&T 5ESS, AGCS GTD5 or Siemens EWSD switches.

Most AccessNode features, hardware and documentation are dependent upon minimum AccessNode software releases. It is the responsibility of the system engineer to insure that the system software is at or above the minimum software level to provide the services requested.

### Features and services supported

The following is a list of key features that shall be supported on releases of the AccessNode:

- DS1 or Fiber-fed single ended systems
- SONET Point-to-Point Fiber-fed systems
- SONET Bi-directional Line Switched Ring Fiber-fed systems
- Ability to support DS0 in any
- SONET NE clock holdover on optics
- Synchronization status messaging (S1 byte)
- Automatic/Manual Ring Protection Switching
- VT1.5/STS-1 Path Performance Monitoring

## Product/system overview (TBM)

The AccessNode is a full-featured Next Generation Digital Loop Carrier, designed and manufactured by Nortel. It is an evolution of the DMS-1 Urban product. The AccessNode is characterized by its evolution towards the "fiber in the loop" design that supports a much wider pallet of services off the DLC. The AccessNode supports a full suite of switched, non-switched and non-locally switched services in a single Access vehicle. The enhanced fiber technology and application specific integrated circuitry allows for more reliable performance monitoring and testing capabilities. The AccessNode also introduces "service-adaptive" linecards that support on-demand service delivery, fewer craft dispatches, larger inventory savings and simplified service forecasting.

The AccessNode system consists of Access Bandwidth Manager (ABM) or Transport Bandwidth Manager (TBM) shelf or shelves connected in a fiber-fed or copper-fed system and supported by AccessNode software furnished by an Operations Controller (OPC). The AccessNode supports many of the transport features of the TransportNode system and architecture. The main difference between the AccessNode and TransportNode is that the AccessNode supports digital telephony down to the DS0 level.

The TBM is a Transport product that can be adapted for use in an AccessNode system. Its primary use is as an FCOT (Fiber Central Office Terminal) in a Point-to-Point or Bi-directional Line Switched Ring (BLSR). There are several reasons the TBM would be chosen over the ABM for the same site. Primarily the TBM has a greater capacity for DS1 traffic (up to 168 vs. 98 for

the ABM). This is because the TBM backplane is optimized for transport rather than DS0 traffic. Secondly, the TBM bay has the capacity to accept up to three (3) TBM shelves in a single 7 ft. frame, versus a maximum of two ABM shelves. These two items work together to provide a very high density which is an asset to our customers. This is an especially useful feature in BLSR architectures where up to 16 ABMs can be adding DS1 traffic to the fiber ring.

The TBM cannot be used at the remote locations in an AccessNode system because it cannot accept signaling from CDS shelves. The TBM does not support signaling at the DS0 level. For this reason TBMs are used only in bay frames, the normal packaging for the central office. TBMs are not placed in Outside Plant (OSP) cabinets or other typical remote location packaging common to the ABM.

### Features and service supported

The following is a list of key features that shall be supported with the AN12 feature release of the AccessNode:

- ABM and TBM 2 fiber BLSR (16 nodes)
- VT1.5 Time Slot Assignment (TSA)
- OPC Connection Manager support for VTBM
- Line timing with VTBM (no ESI required)
- SONET NE clock holdover on optics
- Synchronization status messaging (S1 byte)
- Automatic/Manual Ring Protection Switching
- VT1.5/STS-1 Path Performance Monitoring

## About this manual

This document covers every sellable code available for use on the products covered in this manual, including required options and provisionable options. Every effort has been made to accurately include every coded part required to fully implement the products covered. This includes specialized cables, software, User Guides, CAPs, and Engineering Change Notices. For this reason these documents are updated on a continual basis. Therefore, the user should insure that they are referencing the latest document issue.

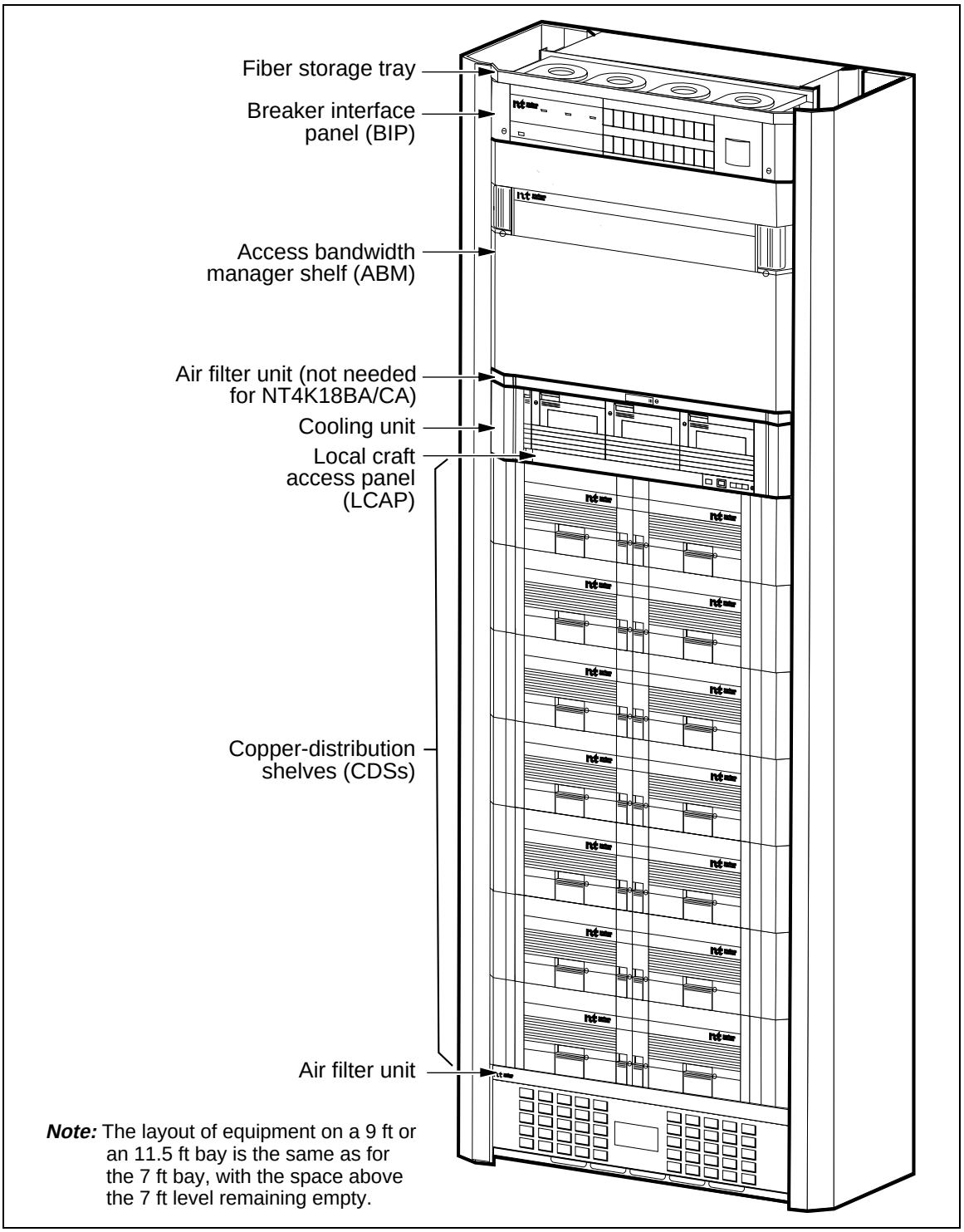
Generally, the provisioning statements for required products will clearly state the need for such items, and the quantity required will be plainly stated. The provisioning statement for optional products generally includes the word *option*, and the quantity required will be placed in parentheses.

# Hardware provisioning (ABM)

AccessNode is available is several different packaging schemes to meet customer deployment needs. Bay mounted products are available for secured areas such as the Central Office (CO), Huts, and vaults. A secure version is available for use on customer premises, called the Modular Business Package (MBP). Outside Plant versions are available in several different OSP cabinets, including the Series 800A and the ModCab modular cabinet. Only the bay mounted product is covered in this chapter. All other packaging schemes are similar except for packaging details.

**Figure 2-1**
**AccessNode bay**

PC-10238




***Note:*** The layout of equipment on a 9 ft or an 11.5 ft bay is the same as for the 7 ft bay, with the space above the 7 ft level remaining empty.

A typical ABM AccessNode product in a seven-foot bay equipped with seven (7) CDS for a total of 672 VF lines is shown in Figure 2-1 on page 2-2. The bay is also available with less than seven (7) CDS, and no (0) CDS.

AccessNode equipped bays are available in three (3) different configurations, and each configuration is available in three (3) different bay heights. Except as marked, all AccessNode ABM based equipment is alike in that it contains an ABM, a BIP, an LCAP and a Cooling Unit.

## ABM bay models

Provide one of the following AccessNode systems for orders that require an ABM shelf in a bay. Bays are available as "standard" bare bay assemblies or as Framepacks. Special heights are available only through the standard part coding. Framepacks are factory sponsored kits that include an ABM bay assembly and the most commonly ordered accessories.

### Standard ABM bays

Provide one of the following AccessNode systems for orders that require an ABM shelf in 7-ft. bay. Contact the factory for orders in 9 or 11.5-ft. bays. Generally: order the NT4K01 for systems equipped from the factory with 7 CDS (672 lines), order the NT4K02 for systems to be equipped with from one (1) to six (6) CDS, and the NT4K03 for systems which will never be equipped with a CDS (i.e. Mux, HDT, or C-servers).

#### Standard order

Provide one of the following ABM bays per customer request:

1 NT4K01BB 7-ft. AccessNode Bay with Shelves

AccessNode VTBM ready bay equipped with ABM shelf, 7 CDS shelves and all cable harnesses.

1 NT4K02BB 7-ft. AccessNode Bay wired for Shelves

AccessNode VTBM ready bay equipped with ABM shelf and some cable harnesses.

1 NT4K03BB 7-ft. AccessNode Bay not wired for Shelves

AccessNode VTBM ready bay equipped with ABM shelf. This configuration has the internal harnesses for CU power, but no CDS power or D-link harnesses.

### Special order heights

These bays match the configuration content of the BB-series and differ only in the bay frame height.

Provide one of the following ABM bays per customer request:

| | | |
|---|---|---|
| 1 | NT4K01FA | 9-ft. AccessNode Bay with Shelves |
| 1 | NT4K02FA | 9-ft. AccessNode Bay wired for Shelves |
| 1 | NT4K03FA | 9-ft. AccessNode Bay not wired for Shelves |
| 1 | NT4K01GA | 11.5-ft. AccessNode Bay with Shelves |
| 1 | NT4K02GA | 11.5-ft. AccessNode Bay wired for Shelves |
| 1 | NT4K03GA | 11.5 ft. AccessNode Bay not wired for Shelves |

Each ABM Bay includes all the following items:

| | | |
|---|---|---|
| 1 | NT4K10AB | ABM Shelf |
| 1 | NT4K14BA | BIP |
| 1 | NT4K16AA | LCAP |
| 1 | NT4K18CA | Cooling Unit Shelf |
| 1 | NT4K85JA | Cooling Unit Interface Cable |
| 1 | NT4K85KA | BIP Control Cable |
| 1 | NT7E70AA<br>NT7E70FA<br>NT7E70GA | 7-ft. Bay Frame, or<br>9-ft. Bay Frame, or<br>11.5-ft. Bay Frame |

***Note 1:*** As of 98W38 the NT4K13BA Fiber Storage Tray and the NT4K13CA Fiber Storage Tray for Mini-VOA will be sold only as options to the ABM bay.

***Note 2:*** As of 98W42 a single piece cooling unit, NT4K18CA, will replace all the following: (1) NT4K18BA cooling shelf and (3) NT4K17BA cooling modules.

Each NT4K01 ABM Bay includes all the following additional items:

| | | |
|---|---|---|
| 7 | NT4K12AB | Copper Distribution Shelf (CDS) |
| 1 | NT4K15BA | Air Filter Assy |
| 1 | NT4K82BA | Access Link Cable, 1 - 3 |
| 1 | NT4K82CA | Access Link Cable, 4 - 7 |

| | | |
|---|---|---|
| 7 | NT4K12AB | Copper Distribution Shelf (CDS) |
| 1 | NT4K84JA | Power Distribution Cable |
| 1 | NT4K84JB | Power Distribution Cable |
| 1 | NT4K86FA | Metallic Access Cable, ABM-to-CDS#1 |
| 6 | NT4K86FB | Metallic Access Cable, CDS-to-CDS |

Each NT4K02 ABM Bay includes all the following additional items:

| | | |
|---|---|---|
| 1 | NT4K13AA | Bottom Plate |
| 1 | NT4K15CA | Air Filter Assy (NT4K15BA substituted if CDS are added) |
| 1 | NT4K82BA | Access Link Cable, CDS 1 - 3 |
| 1 | NT4K82CA | Access Link Cable, CDS 4 - 7 |
| 1 | NT4K84JA | Power Distribution Cable |
| 1 | NT4K84JB | Power Distribution Cable |

Each NT4K03 ABM Bay includes all the following additional items:

| | | |
|---|---|---|
| 1 | NT4K13AA | Bottom Plate |
| 1 | NT4K15CA | Air Filter Assy |
| 2 | NT4K84BA | Common Equipment Power Cable |
| 2 | NT4K84CB | Cooling Unit Power Cable |

### Triple ABM bay

Starting in 99W10 a special bay configuration will be offered that allows three (3) standard ABM shelves to be mounted in a single 7-ft. bay frame. The base product will be offered with two (2) ABM shelves. This configuration does not allow the use of CDSs and is limited to C-servers and HDTs. There will be upgrade kits offered that upgrade a standard bay to the two ABM shelves, upgrades the bay to its full compliment of three ABM shelves, add an HDSL shelf or add an OC-3 MX. These can be factory or field installed.

Provide the following to upgrade a standard ABM bay to the NT4K03CA Dual ABM bay:

| | | |
|---|---|---|
| 1 | NT4K10DA | Upgrade Kit, Single ABM Bay-to-Dual ABM Bay |
| 1 | NTR464JA | Upgrade CAP "Installing Two or Three ABMs in a Bay" |
| 1 | P0891391 | Dual ABM Bay QRC |

Provide the following per customer request for dual ABMs in a bay:

| | | |
|---|---|---|
| 1 | NT4K03CA | 7-ft. AccessNode Bay with Dual ABM Shelves |
| 1 | P0891391 | Dual ABM Bay QRC |

Provide one (1) of the following options groups to upgrade the NT4K03CA bay:

| | | |
|---|---|---|
| (1) | NT4K10CA | ABM#3 Upgrade Shelf Kit |
| (1) | P0891392 | ABM#3 Installation Guide |
| | - OR - | |
| (1) | NT4K48LA | HDSL Shelf Kit with Wiring |
| (1) | P0891393 | HDSL Shelf Kit Installation Guide |
| | - OR - | |
| (1) | NTN450AA | OC-3 Express MX Kit with Wiring |
| (1) | P0891394 | OC-3 Express Installation Guide |

***Note:*** The NT4K10CA includes the ABM, Cooling Unit and LCAP and can be field installed.

## Framepack codes

Framepack Codes are rapid ordering codes for bay frame packaging which include the bay, any CDS shelves, installation kit, covers, and power cables. The only additional items which must be ordered with Framepack Codes are the line cards, common equipment packs, C-net cable and wrist strap. The factory prefers use of Framepack Codes to the use of standard individual codes.

Provide one (1) of the following Framepack codes as required to fill customer orders:

| | | |
|---|---|---|
| 1 | NTFF20BA | 7-ft. Pre-wired ABM Bay with 0 CDS (NT4K02BB) |
| 1 | NTFF20BB | 7-ft. Pre-wired ABM Bay with 1 CDS |
| 1 | NTFF20BG | 7-ft. Pre-wired ABM Bay with 2 CDS |
| 1 | NTFF20BH | 7-ft. Pre-wired ABM Bay with 3 CDS |
| 1 | NTFF20BC | 7-ft. Pre-wired ABM Bay with 4 CDS |
| 1 | NTFF20BJ | 7-ft. Pre-wired ABM Bay with 5 CDS |
| 1 | NTFF20BK | 7-ft. Pre-wired ABM Bay with 6 CDS |

| | | |
|---|---|---|
| 1 | NTFF20BA | 7-ft. Pre-wired ABM Bay with 0 CDS (NT4K02BB) |
| 1 | NTFF20BD | 7-ft. Pre-wired ABM Bay with 7 CDS |
| 1 | NTFF20BL | 7-ft. Pre-wired Dual ABM Bay with 0 CDS for HDT (NT4K03BB) |
| 1 | NTFF20BM | 7-ft. Pre-wired Triple ABM Bay with 0 CDS for HDT (NT4K03BB) |

Each NTFF20BA, BB, BC, BD, BG, BH, BJ, BK, BL and BM Framepack includes all the following items:

| | | |
|---|---|---|
| 1 | NT4K01BB<br>NT4K02BB<br>NT4K03BB | Bay Assembly, or<br>Bay Assembly, or<br>Bay Assembly |
| 1 | NT4K0124 | Bay Installation Kit |
| 1 | NT4K1024 | ABM Label |
| (AR) | NT4K12AB | Copper Distribution Shelf |
| (AR) | NT4K1222 | CDS Label Kit |
| 1 | NT4K86FA | MTA Cable, ABM-to-CDS#1 |
| (AR) | NT4K86FB | MTA Cable, CDS-to-CDS |
| 1 | NT4K1422 | BIP Label |
| 4 | NT4K84UE | Main Power Cable (Red and White), 35' |
| 2 | NT7E5072 | Termination Plug |

## Bay hardware

The ABM is not a stand-alone item. It is usually ordered with installation kits, bay options and cables that support services or installation requirements. Items in this section will be ordered with each bay assembly.

Provide all of the following required items with each ABM bay:

| | | |
|---|---|---|
| 1 | NT4K0124 | Bay Installation Kit (For use with NT4K14BA BIPs only) |
| 2 | NT7E5072 | C-Net Terminators (ABM SIL J09 and J10) |
| 1 | A0336175 | Wrist Strap |

The NT4K0124 ABM Bay Installation Kit includes all the following items:

| | | |
|---|---|---|
| 1 | NT4K0133 | ABM Front Cover |
| 1 | NT4K1494 | BIP Front Cover |
| 1 | NT7E6020 | Frame Insulation kit |
| 1 | NT7E73AA | Frame Junction kit |
| 1 | A0368415 | Lamp Incandescent |
| 1 | R0116394 | Plastic Spiral Wrap |

Provide one of the following required OPC cables depending upon location:

| | | |
|---|---|---|
| 1 | NT7E44FA | 25/25 User Interface Cable (At all remote sites) |
| | - OR - | |
| 1 | NT7E44RA/B | 9/25 User Interface Cable, 5 or 20 meter (At all CO terminals) |

## Universal bay hardware

The following bay hardware can be added to any bay to add additional features. Fiber Storage spools, Filler Panels, End Guards, and Frame Extensions can be added at any time in the field by the installer. Filler panels can also be included in the Custom Pick List to be factory installed. Typically, the AC Outlet is only added to the bay at the factory.

Provide bay fiber storage devices on fiber-fed AccessNode bays:

| | | |
|---|---|---|
| (1) | NT4K13BA | Fiber Storage Tray (Optional after 98W42) |
| (1) | NT4K13CA | Fiber Storage Tray for Mini-VOA (Optional after 98W42) |

***Note:*** As of 98W42 the NT4K13BA Fiber Storage Tray and the NT4K13CA Fiber Storage Tray for Mini-VOA will be sold only as options to the ABM bay.

Provide empty and custom height front access Bay Frames per customer request:

| | | |
|---|---|---|
| (1) | NT7E70AA | 7-ft. Standard Bay Frame |
| (1) | NT7E70BA | 7-ft. 6-in. Extended Bay Frame |
| (1) | NT7E70CA | 8-ft. Extended Bay Frame |

| | | |
|---|---|---|
| (1) | NT7E70AA | 7-ft. Standard Bay Frame |
| (1) | NT7E70DA | 9-ft. Extended Bay Frame |
| (1) | NT7E70EA | 11-ft. 6-in. Extended Bay Frame |
| (1) | NT7E70FA | 8-ft. 8-in. Extended Bay Frame |

Provide optional bay frame Extensions per customer request:

| | | |
|---|---|---|
| (1) | NT7E71BA | Frame Extension, 6 inches |
| (1) | NT7E71CA | Frame Extension, 1 foot |
| (1) | NT7E71DA | Frame Extension, 2 feet |
| (1) | NT7E71EA | Frame Extension, 4.feet 6 inches |
| (1) | NT7E71FA | Frame Extension, 1 foot 8 inches |

Provide optional bay frame End Guards per customer request:

| | | |
|---|---|---|
| (1) | NT7E72AA | End Guard, 7 feet |
| (1) | NT7E72BA | End Guard, 7 feet 6 inches |
| (1) | NT7E72CA | End Guard, 8 feet |
| (1) | NT7E72DA | End Guard, 9 feet |
| (1) | NT7E72EA | End Guard, 11 feet 6 inches |
| (1) | NT7E72FA | End Guard, 8 feet 8 inches |
| (1) | NT7E75BA | End Guard, 6 inch |
| (1) | NT7E75CA | End Guard, 1 foot |
| (1) | NT7E75DA | End Guard, 2 feet |
| (1) | NT7E75EA | End Guard, 4 feet 6 inches |
| (1) | NT7E75FA | End Guard, 1 foot 8 inches |

***Note:*** Do not use the 9-ft. End Guard on a 7-ft. bay equipped with 2-ft. extension. Use the separate 7-ft. and 2-ft. sectional End Guards.

Provide optional bay frame Filler Panels and mounting screws per customer request:

| | | |
|---|---|---|
| (AR) | NT7E52AA | 21-in. Filler Panel |
| (AR) | NT7E52CA | 1-3/4 in. Filler Panel |
| (AR) | P097D121 | Filler Panel Mounting Screws (Four screws required per panel) |

Provide optional bay frame AC Outlet per customer request:

| | | |
|---|---|---|
| (1) | NT7E76AA | A. C. Outlet Assembly |

***Note:*** Preferred NTI method for A/C wiring is to locate the A/C outlets outside the IGZ.

## NT4K02 Options

The NT4K02 series of ABM bays is specified when customers request from one (1) to six (6) Copper Distribution Shelves. The NT4K02 can be equipped with up to seven (7) CDSs, but it is easier to order the NT4K01 if seven (7) CDS are required initially. This bay comes equipped with CDS power cables, but the CDSs and MTA cabling must be added to the bay. If these items are added to the Custom Pick List they will be added at the factory.

Provide one (1) CDS shelf for every 96 lines of VF required by the customer:

| | | |
|---|---|---|
| 1 to 6 | NT4K12AB | Copper Distribution Shelf |

Provide one (1) required MTA cable when equipping an NT4K02 bay with CDS#1:

| | | |
|---|---|---|
| 1 | NT4K86FA | CDS Metallic Test Link Cable (ABM-to-CDS#1) |

Provide one (1) required MTA cable with each CDS, #2 through #7, when equipping an NT4K02 bay:

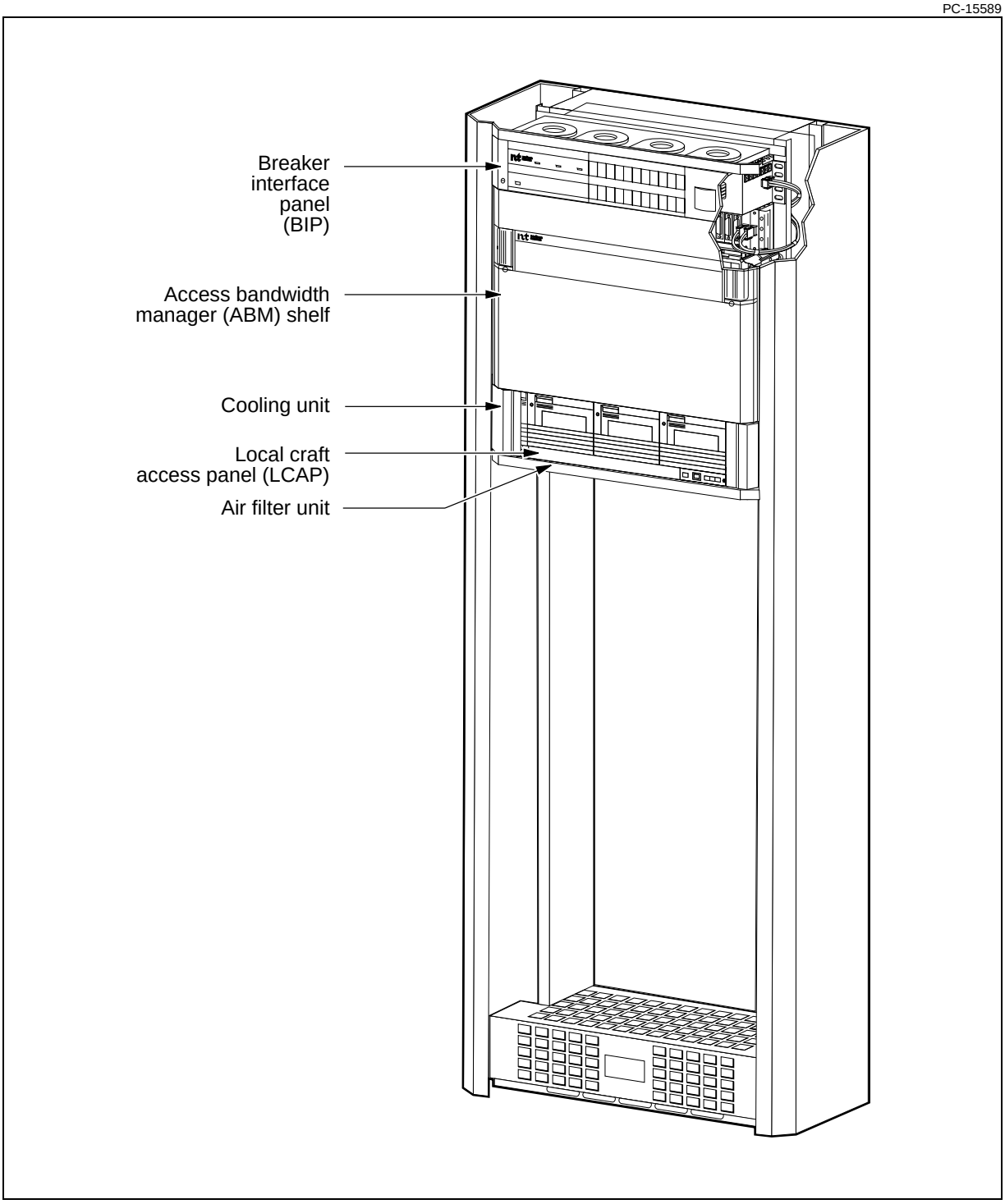
| | | |
|---|---|---|
| 1 - 6 | NT4K86FB | CDS Metallic Test Link Cable (CDS-to-CDS) |

***Note 1:*** UE Shelves can also be added to the NT4K02 bay. See *UE9000 Customer Ordering Guide*, P0907599.

***Note 2:*** Any of the items on this page can also be provided as ship loose items at the request of the customer.

**Figure 2-2**
**Typical NT4K2 bay**

PC-15589



A typical NT4K02 is shown in Figure 2-2 on page 2-11 ready to accept from 1 to 6 CDS in the empty space below the cooling unit, or this could be a picture of the NT4K03 in its finished state, ready to ship.

### NT4K03 options

The NT4K03 series of ABM bays is specified when a customer requests zero (none) Copper Distribution Shelves. This bay is usually specified for use as C-Server, HDT or Mux configurations in which CDSs will never be needed. In these cases the NT4K03 only needs the addition of common equipment packs. However, an existing unit can be upgraded to support CDSs with the addition of the missing cables.

Provide all the following to upgrade an existing NT4K03 bay for use with CDS shelves:

| | | |
|---|---|---|
| 1 | NT4K84JA | Power Distribution Cable Harness (Left Side) |
| 1 | NT4K84JB | Power Distribution Cable Harness (Right Side) |
| 1 | NT4K82BA | Access Link Cable Harness, for CDS 1 - 3 |
| 1 | NT4K82CA | Access Link Cable Harness, for CDS 4 - 7 |

Provide all the following to upgrade an existing NT4K03 bay for dual power feed HDT:

| | | |
|---|---|---|
| 1 | NT4K84CE | Cooling Unit and Triple ABM Power Cable |
| 1 | P0902557 | BIP Label for NT4K14AA or NT4K14AB BIPs |
| 1 | P0902558 | Connector Label for BIP Right-Side |
| 1 | P0902684 | Circuit Breaker Label for BIP |

## Breaker interface panel (BIP)

Each AccessNode bay assembly comes with a power distribution shelf called the Breaker Interface Panel (BIP). The BIP houses the DC breakers, bay alarm lights and external alarm pin field. The BIP also houses the Alarm and TBF packs, which come already installed. BIPs can be field replaced with an out-of-service upgrade. At the shelf level, only the latest model is available as a repair part.

| | | |
|---|---|---|
| (1) | NT4K14BA | Breaker Interface Panel (BIP2) |
| NA | NT4K14AB | Breaker Interface Panel (Discontinued 99W02) |
| NA | NT4K14AA | Breaker Interface Panel (initial offering with incandescent alarm lamps) |

### BIP packs

| | | |
|---|---|---|
| (2) | NT4K61AA | Talk Battery Filter Circuit Pack (TBF)<br>(BIP slot 3 and 4 of NT4K14AA or AB ONLY) |
| (1) | NT4K61BA | Talk Battery Filter Circuit Pack (TBF)<br>(BIP slot 2 of NT4K14BA ONLY) |
| (1) | NT4K64AA | Alarm Relay Circuit Pack<br>(BIP slot 2 of NT4K14AA or AB ONLY) |
| (1) | NT4K64BA | Alarm Relay Circuit Pack<br>(BIP slot 1 of NT4K14BA ONLY) |

***Note 1:*** The NT4K61AA is not required for systems fitted with the NT4K14BA BIP starting 99W02.

***Note 2:*** The NT4K64AA is not required for systems fitted with the NT4K14BA BIP starting 99W02.

## Cooling unit

Each AccessNode bay assembly comes with a fan shelf called the Cooling Unit (CU). The CU houses the fans and blowers required to cool the ABM and CDS. CU Shelves can be field replaced with an in-service upgrade. At the shelf level, only the latest model is available as a repair part.

| | | |
|---|---|---|
| (1) | NT4K18CA | Cooling Unit Shelf (Non-replaceable Cooling Modules) |
| NA | NT4K18BA | Cooling Unit Shelf (Minimum required for VTBM) |
| NA | NT4K18AA | Cooling Unit Shelf (initial offering) |

### Cooling modules

| | | |
|---|---|---|
| AR | NT4K17AA | Cooling Module (Only for use in the NT4K18AA Shelf) |
| AR | NT4K17BA | Cooling Module (Only for use in the NT4K18BA Shelf) |

## Labels

Labels are not part of any NT4K01/02/03 assembly and must be specified separately as required by the system configuration. Labels are usually included with Framepacks.

Provide the following required labels for each ABM and BIP based on market location:

| | | |
|---|---|---|
| 1 | NT4K1022 | ABM Label Kit, English (For NT4K10AA only) |
| (1) | NT4K1023 | ABM Label Kit, English / French (For NT4K10AA only) |
| 1 | NT4K1024 | ABM Label Kit, English (For NT4K10AB only) |
| (1) | NT4K1025 | ABM Label Kit, English / French (For NT4K10AB only) |
| 1 | NT4K1422 | BIP Label Kit, English |
| (1) | NT4K1423 | BIP Label Kit, English / French |

Provide a required label for each CDS based on market location:

| | | |
|---|---|---|
| 1 - 7 | NT4K1222 | CDS Label Kit, English |
| (1 - 7) | NT4K1223 | CDS Label Kit, English / French |

## ABM common circuit packs

The ABM and CDS shelves must be filled with circuit packs in order for the AccessNode system to work. The system configuration defines the pack selection. Regardless of the system packaging used, the packs will be the same for similar configurations (i.e. a DFA in a bay will require the same number and types of packs as a DFA in an outside plant cabinet). When packs are purchased with bays, packs are shipped installed.

### APC

Provide one (1) of the following required CPU packs with each ABM AccessNode system:

| | | |
|---|---|---|
| 1 or 2 | NT4K52FA | Shelf Processor Card, 32Mb (AN14 and lower)<br>(ABM slot 17 working; slot 18 protection) |
| 1 or 2 | NT4K52GA | Shelf Processor Card, 32Mb (AN14 DMS Access)<br>(ABM slot 17 working; slot 18 protection) |
| 1 or 2 | NT4K52FB | Shelf Processor Card, 64Mb (AN15 and higher)<br>(ABM slot 17 working; slot 18 protection) |
| 1 or 2 | NT4K52GB | Shelf Processor Card, 64Mb (AN15 DMS Access)<br>(ABM slot 17 working; slot 18 protection) |

***Note 1:*** All the processor cards within an ABM shelf must bear the same PEC code.

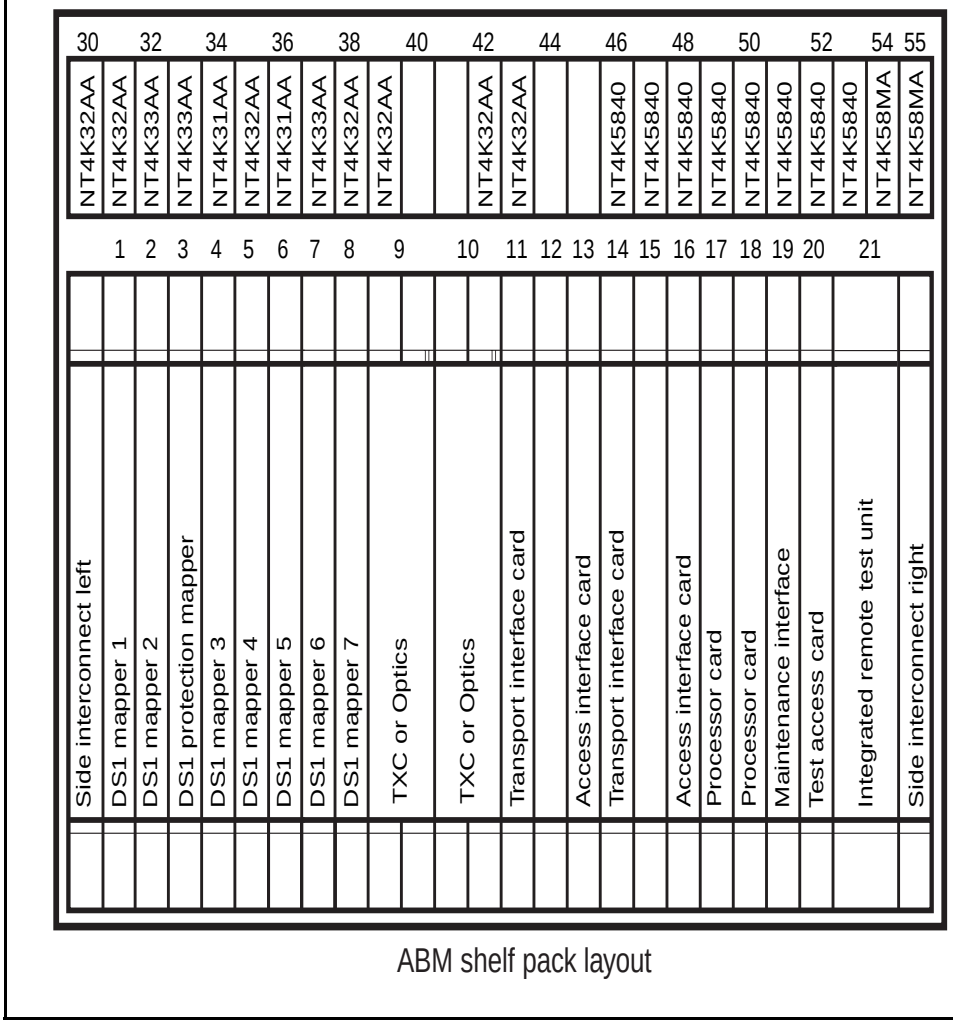
***Note 2:*** AN16 will allow in-service upgrade of the older 32Mb processors to the newer 64 Mb packs.

***Note 3:*** A or B-series processors will work on AN15, however B-series are preferred. B-series processors are required on AN16 only for AN16 features. B-series processors are required on AN17 and higher.

***Note 4:*** The second NT4K52 is not required, but Nortel recommends the second processor at the RFT, when the system is integrated, due to the effect on call processing if the processor is lost.

**Figure 2-3**
**Common circuit packs**

AN-1074



### MIC

Provide one (1) of the following required packs with each ABM AccessNode system:

| | | |
|---|---|---|
| 1 | NT4K53AC | Maintenance Interface Circuit Pack (MIC)<br>(ABM slot 19) |
| 1 | NT4K53AD | Universal Maintenance Interface Circuit Pack (UMIC) (2Q99)<br>(ABM slot 19) |

***Note:*** The NT4K53AB cannot be used in AccessNode applications. It is TransportNode only.

### TAC

Provide all the following packs if the bay is equipped with any CDS:

| | | |
|---|---|---|
| 1 | NT4K54AA | Test Access Circuit Pack (TAC)<br>(ABM slot 20) |

### AIC

Provide one (1) of the following required packs with each ABM AccessNode system:

| | | |
|---|---|---|
| 1 or 2 | NT4K55AA | Access Interface Circuit Pack (AIC)<br>(ABM slot 13 working; slot 16 protection) |
| 1 or 2 | NT4K55CA | Loopback Access Interface Circuit Pack (LAIC)<br>(ABM slot 13 working; slot 16 protection) |

***Note:*** The NT4K55CA Loopback AIC is used only on the AccessNode Express (ANX) HDT. It cannot be used with any system equipped with CDSs. See *AccessNode Express Customer Ordering Guide*, 323-3051-032, in the AccessNode Express NTPs.

### TIC

Provide the following required packs with each ABM AccessNode system:

| | | |
|---|---|---|
| 1 or 2 | NT4K56AC | Transport Interface Circuit Pack (TIC)<br>(ABM slot 11 working; slot 14 protection) |
| 1 or 2 | NT4K56BA | Enhanced Transport Interface Circuit Pack (ETIC)<br>(ABM slot 11 working; slot 14 protection) (Requires AN16) |
| 1 or 2 | NT4K56CA | Asynchronous Transport Interface Circuit Pack (ATIC)<br>(ABM slot 11 working; slot 14 protection) (Requires AN17) |
| 1 or 2 | NT4K56CB | Asynchronous Enhanced Transport Interface Circuit Pack (AETIC)<br>(ABM slot 11 working; slot 14 protection) (Requires AN18) |

***Note 1:*** Asynchronous TICS are required when the customers want to use "Brand-X" SONET equipment within an AccessNode system. ATICs can work in both asynchronous and byte-synchronous modes.

***Note 2:*** The NT4K56AC is required for all TR08 interface applications and supplies 3 STS-1s.

***Note 3:*** The NT4K56BA is a cost reduced (enhanced) version of the 56AC.

***Note 4:*** The NT4K56CA/CB are required for all TR08 interface applications and supply 6 STS-1s.

### IRTU

Provide one (1) of the optional IRTU packs at the RFT per customer request for line testing:

| | | |
|---|---|---|
| (1) | NT4K57AB | Integrated Remote Test Unit Card (Dual Head)<br>(ABM slot 21) |
| (1) | NT4K57BA | Integrated Remote Test Unit Card (Single Head) (Available 99W01)<br>(ABM slot 21) |

***Note 1:*** Use of the IRTU requires a Test Access Card (TAC) and four (4) assigned DS0 channels. This limits the maximum line size of an AccessNode system to 668 lines. The designated line card slots may not house line cards of any description.

***Note 2:*** See NTPs for line test configuration. Some configurations require a TAP card/cable at the RFT and TBP card/cable at the FCOT. To have fully integrated S/DMS SuperNode MAP testing, the AccessNode must

have AN08 or higher software and the SuperNode must have NA002 (BCS37) software loaded. The IRTU does not support 4-TEL testing. If the IRTU is being installed in a release 7 or older NT4K10AA ABM, then the shelf must be modified to accommodate the IRTU.

***Note 3:*** The Single Head IRTU offers a significant price reduction over the Dual Head IRTU. However, the Dual Head IRTU can test twice as many lines during the same time span.

### ABM I/O filler

Provide the following required blanking faceplates for the unfilled card slots in the top row of the ABM:

| | | |
|---|---|---|
| 1 -16 | NT4K5830 | Passive I/O Faceplate #1<br>(ABM slots 30 - 45) |
| 1 - 8 | NT4K5840 | Passive I/O Faceplate #2<br>(ABM slots 46 - 53) |

### TXC

Provide the required TXC packs in place of optical packs on DS1-fed AccessNodes only:

| | | |
|---|---|---|
| 1- 2 | NT4K75AA | Timing and Cross-Connect Circuit Pack (TXC)<br>(ABM slot 9 working; slot 10 protection) |

***Note:*** The TXC can only address 3 DS1 mappers. Therefore, DFA configurations with dual TXCs are limited to 5 working and 1 protection mappers, or 70 DS1s. In AN17 this will be expanded to 98 DS1s.

## CDS circuit packs

The ABM and CDS shelves must be filled with circuit packs in order for the AccessNode system to work. Each CDS has common equipment and linecards that must be equipped if VF services are required.

### CDS commons

Provide each CDS with all of the following required circuit packs:

| | | |
|---|---|---|
| 2 | NT4K62AB | Power Converter Circuit Pack |
| 4 | NT4K70AA | Narrowband Interface Card (NLIC) |
| 2 | NT4K73CA | Metallic Test Access Card (MTA) (For use with AN14 and higher) |

***Note 1:*** The NT4K62AB replaces the 62AA as of 99W18 and introduces increased reliability with lower power consumption. The 62AB is backward compatible and can be mixed with the 62AA in the same CDS as long as the NT4K62AAs are Rel 09 or later.

***Note 2:*** The NT4K73CA introduces a feature to help locate faulty Talk Battery Filter packs. This feature requires AN14 or higher software. Earlier software does not recognize the CA as a valid pack.

***Note 3:*** The NT4K73BA is only used on the FST product. Do not order this pack.

## Linecards

The provisioning of line cards defines the services that the AccessNode can deliver to the customer. All line cards are provided based on customer request. All line cards are shipped loose, and installed on-site.

Provide line cards per customer request:

AR NT4K65AB Epsilon Station Card (POTS)

***Note:*** This card is not service adaptive. It supports 2-wire POTS, CLASS, and CENTREX service not requiring P-Phone. The NT4K65AB is TR303 compliant. It is used only in the RFT. If analog appearance is required at FCOT, a NT4K68 line card is required.

AR NT4K67AC 2-Wire Station Line-Interface

***Note:*** This is the Omega 1.4 SAA service adaptive linecard. Primarily used in the RFT. Can be used in both the FCOT and RFT. Use in FCOT to support DID and OPS. If Release 20 is used with AN12 or earlier it requires a special linecard software load.

AR NT4K68AA 2-Wire Office Line-Interface Card

***Note:*** Primarily used in the FCOT in Universal configurations with NT4K65 in the remotes. Can be used in both the FCOT and RFT. Used in RFT to support DID and OPS.

AR NT4K69AA 4-Wire Line-Interface Card

***Note:*** Can be used in both the FCOT and RFT. Supports all 4-wire services except T1 and DS1 type services.

AR NT4K77AA 6/8 Wire Line-Interface Card

***Note:*** Can be used in both the FCOT and RFT. Supports all special services employing E&M, tandem, or Pulse Link Repeater. DC signaling on circuits having six or eight leads.

AR NT4K78AA 2-Wire Manual Ringdown Line-Interface Card

***Note:*** Manual Ringdown is a non-switched special service. A customer who has this service is able to press a button at his or her telephone and thus generate ringing current to the line. This service is provided in a Point-to-Point configuration only. Multi-Point configurations are accomplished with external bridging units, not supplied by NTI.

AR NT4K79AB Universal Voice Grade (UVG) Station Linecard

***Note:*** This is the Omega 1.2 UVG Power Saver version. This card is not service adaptive. It supports 2-wire POTS and UVG functionality, including PBX trunks and lines, WATS trunks, and lines, 800 trunks and lines, secretarial lines, and loop/ground start. It is used only in the RFT. If analog appearance is required at the FCOT, a NT4K68 line card is required.

AR NT4K65CA Hong Kong Linecard

***Note:*** This card is for sale in Hong Kong only. It is not service adaptive. It supports 2-wire POTS, CLASS, and CENTREX service not requiring P-Phone. The NT4K65CA is TR303 compliant. It is used only in the RFT. If analog appearance is required at the FCOT, a NT4K68 line card is required.

## DS1 equipping

Equipping an ABM for DS1 service consists of adding DS1 Input, DS1 Output, DS1 Protection Bridge and DS1 Mapper packs. Protection Bridge packs protect the I/O packs, and an extra DS1 Mapper card is used to protect the other working mappers. RFT applications require a DS1 Protection Software Certificate if transport DS1s are provisioned.

Provide one (1) DS1 Mapper for every pair of DS1 I/O cards:

1 - 8 NT7E04EA DS1/VT Synchronous Mapper

(ABM slots 1, 2, 4, 5, 6, 7, and 8)

Provide one (1) DS1 Mapper if optional mapper protection is required:

| | | |
|---|---|---|
| (1) | NT7E04EA | DS1/VT Synchronous Mapper<br>(ABM slot 3) |

***Note:*** The EA is fully backwards/forwards compatible with the CA. The EA and CA are fully backward compatible to the BA. However, the BA cannot provide protection for a CA pack. The CA can provide protection for either the BA or CA packs. (CA is required for TR08 applications)

Provide two (2) DS1 Protection Bridge Packs if optional I/O protection is required:

| | | |
|---|---|---|
| (2) | NT4K31AA | DS1 Protection Bridge Circuit Card<br>(ABM slots 34 and 36) |

Provide one (1) DS1 Input Card for every 14 DS1 lines required:

| | | |
|---|---|---|
| 1 - 7 | NT4K32AA | DS1 Input Circuit Card<br>(ABM slots 30, 31, 35, 38, 39, 42 and 43) |

Provide one (1) DS1 Output Card for every DS1 Input Card:

| | | |
|---|---|---|
| 1 - 7 | NT4K33AA | DS1 Output Circuit Card<br>(ABM slots 32, 33, 37, 40, 41, 44, and 45) |

***Note 1:*** Each DS1 I/O pack carries 14 DS1s, and each Mapper is capable of 14 input and 14 output DS1s.

***Note 2:*** Each DFA configuration requires only two or three DS1s for full operation, but two (2) Input and two (2) Output DS1 packs must be equipped to enable an alternate timing source.

Provide one (1) cable for every two (2) DS1 Input and one (1) cable for every two (2) DS1 Output cards:

| | | |
|---|---|---|
| AR | NT4K85HH | DS1 Cable, 50 feet |
| AR | NT4K85HA | DS1 Cable, 100 feet |
| AR | NT4K85HB | DS1 Cable, 150 feet |
| AR | NT4K85HJ | DS1 Cable, 200 feet |
| AR | NT4K85HC | DS1 Cable, 250 feet |

| | | |
|---|---|---|
| AR | NT4K85HH | DS1 Cable, 50 feet |
| AR | NT4K85HK | DS1 Cable, 300 feet |
| AR | NT4K85HD | DS1 Cable, 350 feet |
| AR | NT4K85HE | DS1 Cable, 450 feet |
| AR | NT4K85HF | DS1 Cable, 550 feet |
| AR | NT4K85HG | DS1 Cable, 650 feet |

***Note:*** DS1 input and output signals cannot be mixed within the same DS1 cable. A minimum of 2 cables is always required for DS1 I/O. Each cable is capable of supporting up to two (2) I/O cards.

Provide one (1) grounding assembly per DS1 transmit cable if the ground shield for the transmit DS1 cables are to be grounded at the DSX panel:

| | | |
|---|---|---|
| (1) | P049Q122 | Grounding Assembly |

## DS3 equipping

Equipping an ABM for DS3 service consists of adding DS3 Input / Output Cards, DS3 Protection Cards, and DS3 Mapper packs. Protection Switching pack protects the I/O packs, and an extra DS3 Mapper card is used to protect the other working mappers. All ABM applications using DS3s require a DS3 Protection Software Certificate and a DS3 Performance Monitoring Software Certificate.

Provide one (1) DS3 Mapper for every three (3) DS3 I/O cards:

| | | |
|---|---|---|
| 1 - 3 | NT7E08AA | DS3/STS Mapper Circuit Card<br>(ABM slots 3, 5 and 7) |

Provide all the following if optional DS3 protection switching is required:

| | | |
|---|---|---|
| (1) | NT7E08AA | DS3/STS Mapper Circuit Card<br>(ABM slot 1) |
| (1) | NT4K60CA | DS3 Protection Switch Controller Circuit Card<br>(ABM slot 2) |

Provide one (1) I/O Card for each DS3 line required:

| | | |
|---|---|---|
| 1 - 9 | NT4K30AA | DS3 Input / Output Circuit Card<br>(ABM slots 34-36, 38-40 and 42-44) |

Provide two (2) DS3 cables for every DS3 Input / Output card:

| | | |
|---|---|---|
| 2 | NT7E43AA | 734 COAX With One BNC, 5 meters |
| 2 | NT7E43AB | 734 COAX With One BNC, 10 meters |
| 2 | NT7E43AC | 734 COAX With One BNC, 20 meters |
| 2 | NT7E43AD | 734 COAX With One BNC, 30 meters |
| 2 | NT7E43AE | 734 COAX With One BNC, 40 meters |
| 2 | NT7E43AF | 734 COAX With One BNC, 50 meters |
| 2 | NT7E43AG | 734 COAX With One BNC, 60 meters |
| 2 | NT7E43AH | 734 COAX With One BNC, 75 meters |
| 2 | NT7E43AJ | 734 COAX With One BNC, 80 meters |
| 2 | NT7E43AK | 734 COAX With One BNC, 140 meters |
| 2 | NT7E43AL | 734 COAX With One BNC, 100 meters |

***Note:*** Other cables can be provided (RG-59, 735A) but they are not part of the A/N product structure.

Provide one (1) BNC connector for terminating every DS3 cable:

| | | |
|---|---|---|
| AR | A0721853 | 734 Coaxial BNC Connector |
| AR | A0721854 | RG59/U Coaxial BNC Connector |
| AR | A0721855 | 735A Coaxial BNC Connector |

## Optical equipping

Optical packs are available to feed the ABM in Point-to-Point or Ring configurations. These packs are provisioned into ABM slots 9 and 10, with slot 9 being the normal working and slot 10 being the normal protection slot. Additional OC-3 optical packs can also be added to support tributaries. These packs are provisioned into ABM slots 3 and 4, with slot 3 being the normal working and slot 5 being the normal protection slot. Protection is optional with all optical packs and is *1 + 1 Non-revertive*.

Provide OC-12 VTBM optical interfaces per customer requirements for ring applications:

| | | |
|---|---|---|
| 2 | NT7E05JC | OC-12 Long Reach Interface (Adapterless) |
| 2 | NT7E05JB | OC-12 Intermediate Reach Interface (Adapterless) |

Provide one (1) required Universal Connector Adapter for each Adapterless multi-connector optical pack:

| | | |
|---|---|---|
| 1 | NTN459FC | FC Universal Connector Adapter |
| 1 | NTN459ST | ST Universal Connector Adapter |
| 1 | NTN459SC | SC Universal Connector Adapter |

***Note:*** Each Adapterless connector kit contains two (2) optical connectors.

Provide OC-12 Point-to-Point optical interfaces per customer requirements:

| | | |
|---|---|---|
| 2 | NT7E02KA | OC-12 Long Reach 1310 Interface (BI) |
| 2 | NT7E02PC | OC-12 Long Reach 1310 Interface (Adapterless) |
| 2 | NT7E02LA | OC-12 Intermediate Reach 1310 Interface (BI) |
| 2 | NT7E02PB | OC-12 Intermediate Reach 1310 Interface (Adapterless) |

Provide OC-3 Point-to-Point optical interfaces per customer requirements:

| | | |
|---|---|---|
| 2 | NT7E01CA | OC-3 Long Reach 1310 Interface (BI) |
| 2 | NT7E01GB | OC-3 Long Reach 1310 Interface (Adapterless) |
| 2 | NT7E01DA | OC-3 Intermediate Reach 1310 Interface (BI) |
| 2 | NT7E01GA | OC-3 Intermediate Reach 1310 Interface (Adapterless) |

Provide two (2) of the following patch cords per optical pack when Mini-VOA is **not** required:

| | | |
|---|---|---|
| 2 | NT7E46AA | Optical Patchcord, BIC-BIC, 5 meters |
| 2 | NT7E46AB | Optical Patchcord, BIC-BIC, 10 meters |
| 2 | NT7E46AC | Optical Patchcord, BIC-BIC, 15 meters |
| 2 | NT7E46AD | Optical Patchcord, BIC-BIC, 20 meters |
| 2 | NT7E46AE | Optical Patchcord, BIC-BIC, 30 meters |

| | | |
|---|---|---|
| 2 | NT7E46AA | Optical Patchcord, BIC-BIC, 5 meters |
| 2 | NT7E46BA | Optical Patchcord, FC-FC, 5 meters |
| 2 | NT7E46BB | Optical Patchcord, FC-FC, 10 meters |
| 2 | NT7E46BC | Optical Patchcord, FC-FC, 15 meters |
| 2 | NT7E46BD | Optical Patchcord, FC-FC, 20 meters |
| 2 | NT7E46BE | Optical Patchcord, FC-FC, 30 meters |
| 2 | NT7E46CA | Optical Patchcord, ST-ST, 5 meters |
| 2 | NT7E46CB | Optical Patchcord, ST-ST, 10 meters |
| 2 | NT7E46CC | Optical Patchcord, ST-ST, 15 meters |
| 2 | NT7E46CD | Optical Patchcord, ST-ST, 20 meters |
| 2 | NT7E46CE | Optical Patchcord, ST-ST, 30 meters |
| 2 | NT7E46FA | Optical Patchcord, SC-SC, 5 meters |
| 2 | NT7E46FB | Optical Patchcord, SC-SC, 10 meters |
| 2 | NT7E46FC | Optical Patchcord, SC-SC, 15 meters |
| 2 | NT7E46FD | Optical Patchcord, SC-SC, 20 meters |
| | NT7E46FE | Optical Patchcord, SC-SC, 30 meters |

Provide two (2) of the following patch cords per optical pack when Mini-VOA is required:

| | | |
|---|---|---|
| 2 | NT7E47AA | Optical Patchcord with MVOA, BI-BI, 5 meters |
| 2 | NT7E47AB | Optical Patchcord with MVOA, BI-BI, 10 meters |
| 2 | NT7E47AC | Optical Patchcord with MVOA, BI-BI, 15 meters |
| 2 | NT7E47AD | Optical Patchcord with MVOA, BI-BI, 20 meters |
| 2 | NT7E47AE | Optical Patchcord with MVOA, BI-BI, 30 meters |
| 2 | NT7E47BA | Optical Patchcord with MVOA, FC-FC, 5 meters |
| 2 | NT7E47BB | Optical Patchcord with MVOA, FC-FC, 10 meters |
| 2 | NT7E47BC | Optical Patchcord with MVOA, FC-FC, 15 meters |
| 2 | NT7E47BD | Optical Patchcord with MVOA, FC-FC, 20 meters |
| 2 | NT7E47BE | Optical Patchcord with MVOA, FC-FC, 30 meters |
| 2 | NT7E47CA | Optical Patchcord with MVOA, ST-ST, 5 meters |
| 2 | NT7E47CB | Optical Patchcord with MVOA, ST-ST, 10 meters |

| | | |
|---|---|---|
| 2 | NT7E47AA | Optical Patchcord with MVOA, BI-BI, 5 meters |
| 2 | NT7E47CC | Optical Patchcord with MVOA, ST-ST, 15 meters |
| 2 | NT7E47CD | Optical Patchcord with MVOA, ST-ST, 20 meters |
| 2 | NT7E47CE | Optical Patchcord with MVOA, ST-ST, 30 meters |
| 2 | NT7E47FA | Optical Patchcord with MVOA, SC-SC, 5 meters |
| 2 | NT7E47FB | Optical Patchcord with MVOA, SC-SC, 10 meters |
| 2 | NT7E47FC | Optical Patchcord with MVOA, SC-SC, 15 meters |
| 2 | NT7E47FD | Optical Patchcord with MVOA, SC-SC, 20 meters |
| 2 | NT7E47FE | Optical Patchcord with MVOA, SC-SC, 30 meters |

Provide two (2) of the following pig tails per optical pack when Mini-VOA is **not** required:

| | | |
|---|---|---|
| 2 | NT7E48AA | Optical Pigtail, BIC, 20 meters |
| 2 | NT7E48BA | Optical Pigtail, FC, 20 meters |
| 2 | NT7E48CA | Optical Pigtail, ST, 20 meters |
| 2 | NT7E48FA | Optical Pigtail, SC, 20 meters |

Provide two (2) of the following pigtails per optical pack when Mini-VOA is required:

| | | |
|---|---|---|
| 2 | NT7E49AA | Optical Pigtail with MVOA, BIC, 20 meters |
| 2 | NT7E49BA | Optical Pigtail with MVOA, FC, 20 meters |
| 2 | NT7E49CA | Optical Pigtail with MVOA, ST, 20 meters |
| 2 | NT7E49FA | Optical Pigtail with MVOA, SC, 20 meters |

## STS-1 equipping

The AN14 release adds a feature to support a subset of the STS-1 Tributary functionality which is working on the TransportNode BLSR node only.

## Miscellaneous I/O equipping

The following is a list of packs and cables that provide optional or additional interfaces to the equipment.

## Control network (C-Net)

C-Net allows nearby ABM and TBM shelves to come under the span of control of a single OPC. This interconnection is done with C-Net cables through ABM SIL J09 and J10 using a daisy chain arrangement. All unfilled connectors **must** be filled with C-Net Terminators. When in doubt always provide 2 terminators with every bay and ModCab system. Two terminators are supplied as part of the MBP and S800A.

Provide C-Net cables as requested:

| | | |
|---|---|---|
| AR | NT7E44JB | Control Network Shelf-To-Shelf Cable, 1 meter |
| AR | NT7E44JC | Control Network Bay-To-Bay Cable, 5 meter |
| AR | NT7E44JK | Control Network Bay-To-Bay Cable, 10 meter |
| AR | NT7E44JX | Control Network Bay-To-Bay Cable, 20 meter |
| AR | NT7E44JY | Control Network Bay-To-Bay Cable, 30 meter |
| AR | NT7E44JW | Control Network Bay-To-Bay Cable, 45 meter |
| AR | NT7E44JZ | Control Network Bay-To-Bay Cable, 100 meter |

Provide the required C-Net Terminators to fill all empty connectors:

| | | |
|---|---|---|
| 0 - 2 | NT7E5072 | C-Net Terminators (ABM SIL J09 and J10) |

## External synchronization interface (ESI)

This option requires a carrier, at least one (1) card, and a cable. These cables are connectorized on one end only for connection to ABM SIL J12. The cable is cut to length after installation. Another connector may be field installed, but is not supplied.

The ESI card is used only in FCOTs. It is required in basic fiber-fed system that serves a GR-303 application, a TR-08 application or Digital Data Service (DDS). Use of the ESI precludes the use of the IRTU card.

Provide one (1) per customer request for ESI:

| | | |
|---|---|---|
| (1) | NT7E19AA | External Synch Interface Carrier<br>(ABM slot 21) |

Provide one (1) or two (2) ESI cards if ESI Carrier is equipped in the ABM:

| | | |
|---|---|---|
| 1 or 2 | NT7E27DA | External Synch Interface Card<br>(1 working; 1 optional protection) |

Provide one (1) cable if ESI is equipped in the ABM:

| | | |
|---|---|---|
| 1 | NT4K86EB | ESI Cable, 50 feet |
| | NT4K86EA | ESI Cable, 100 feet |
| | NT4K86EC | ESI Cable, 200 feet |
| | NT4K86ED | ESI Cable, 300 feet |
| | NT4K86EE | ESI Cable, 650 feet |

***Note:*** ESI is required in the FCOT for IDLC applications and in universal applications using DDS. Cables are connected to ABM SIL J12.

### Null modem adapter cables

Use these cables in conjunction with either a NT7E44EA/EB and/or NT7E44FA/FB to adapt different equipment to the base port on the LCAP or ABM. See “User interface cables” on page 2-31 for more details.

Provide one (1) cable per requirement:

| | | |
|---|---|---|
| 1 | NT7E44MA | Null Modem Adapter Cable (DCE-to-DCE; Screw Lock) |
| | | (For use with NT4K44EA /EB) |
| 1 | NT7E44MB | Null Modem Adapter Cable (DTE-to-DTE; Nut Lock) |
| | | (For use with NT4K44FA /FB) |

### Orderwire extension cables

These cables are connectorized on one end only for connection to ABM SIL J04. The cable is cut to length after installation. Another connector may be field installed, but is not supplied.

Provide as required:

| | | |
|---|---|---|
| (1) | NT4K85CE | Orderwire Extension Cable, 50 feet |
| (1) | NT4K85CA | Orderwire Extension Cable, 100 feet |
| (1) | NT4K85CB | Orderwire Extension Cable, 200 feet |
| (1) | NT4K85CC | Orderwire Extension Cable, 300 feet |
| (1) | NT4K85CF | Orderwire Extension Cable, 400 feet |

### Pair gain test controller (PGTP)

PGTP is required at the central office only, requires TBP cabled at CO, and TAP cabled at the RFT.

Provide one (1) PGTC/MTA I/O card if PGTC/MTA testing is required:

| | | |
|---|---|---|
| (1) | NT4K58DA | PGTC/MTA I/O Card (PMA)<br>(ABM slot 52) |

Provide one (1) cable if the PGTC card is equipped in the ABM:

| | | |
|---|---|---|
| 1 | NT4K85BA | PGTC/MTA Cable, 4 feet |

## Parallel telemetry cables

These cables are connectorized on one end only for connection to ABM SIL J11. The cable is cut to length after installation. Another connector may be field installed, but is not supplied.

Provide one (1) per customer request:

| | | |
|---|---|---|
| (1) | NT4K85GE | Parallel Telemetry Cable, 50 feet |
| (1) | NT4K85GA | Parallel Telemetry Cable, 100 feet |
| (1) | NT4K85GB | Parallel Telemetry Cable, 200 feet |
| (1) | NT4K85GC | Parallel Telemetry Cable, 300 feet |
| (1) | NT4K85GF | Parallel Telemetry Cable, 400 feet |

***Note:*** Provide one required NT4K85GE with each HUT, CEV or walk-in type OSP cabinet.

## Serial I/O

These cables are connectorized only at one end, and are used to add optional additional OPC serial ports (3 and 4) only in the ABM. One DS1 Mapper slot is forfeited with this feature. Must provide the Enhanced Administration Software Certificate and the NT7E24BC OPC.

Provide per customer request for additional OPC ports:

| | | |
|---|---|---|
| (1 or 2) | NT4K58LA | Serial I/O Cards<br>(ABM slots 38, 40) |

Provide one (1) serial cable per Serial I/O Card:

| | | |
|---|---|---|
| 1 | NT7E44TA | Serial I/O Cable, 5 meter (ABM slots 38) |
| 1 | NT7E44TB | Serial I/O Cable, 20 meter (ABM slots 38) |
| 1 | NT7E44VA | Serial I/O Cable, 5 meter (ABM slots 40) |
| 1 | NT7E44VB | Serial I/O Cable, 20 meter (ABM slots 40) |

***Note:*** Use the NT7E44TA and TB for EIA 530 synchronous interface for use with a graphics terminal or remote operating system; use the NT7E44VA and VB for a VT100 terminal or printer access.

### Serial telemetry cables

These cables are connectorized on one end only for connection to ABM SIL J06. The cable is cut to length after installation. Another connector may be field installed, but is not supplied.

Provide per customer request:

| | | |
|---|---|---|
| 1 | NT4K86CB | Serial Telemetry Cable, 50 feet |
| 1 | NT4K86CA | Serial Telemetry Cable, 100 feet |
| 1 | NT4K86CC | Serial Telemetry Cable, 200 feet |

### Test bypass (TBP) and test access path (TAP)

The Test Access Path (TAP) is a passive card and should be cabled to provide access to customer lines by bypassing the line cards via the MTAC. Required at RFT for PGTC and most other loop testing scenarios.

Provide per customer request:

| | | |
|---|---|---|
| (1) | NT4K58KA | Test Access Path I/O Card (TAP)<br>(ABM slot 53) |

If CDSs are equipped at a remote site and require test bypass pairs, provide 1 test bypass I/O card at the CO only. This is a passive card and should be cabled to provide copper access to customer lines by bypassing the line cards via the MTAC. Required at the CO for PGTC.

Provide per customer request:

| | | |
|---|---|---|
| (1) | NT4K58CA | Test Bypass Pair I/O Card (TBP)<br>(ABM slot 51) |

Provide one (1) cable per if TAP or TBP cards are equipped in the ABM:

| | | |
|---|---|---|
| 1 | NT4K85ED | Test Access or Bypass Cable, 50 feet |
| 1 | NT4K85EA | Test Access or Bypass Cable, 100 feet |
| 1 | NT4K85EB | Test Access or Bypass Cable, 200 feet |
| 1 | NT4K85EC | Test Access or Bypass Cable, 300 feet |

### User interface cables

The following cables link the ABM SIL J07 for OPC user interface, or J08 for a modem. They can also link the user to a printer or computer terminal if a NT4K44MA Null Modem Adapter is added.

Provide as required:

| | | |
|---|---|---|
| (1) | NT7E44EA | 9/25 User Interface Cable, 5 meter |
| (1) | NT7E44EB | 9/25 User Interface Cable, 20 meter |

The following cables link the user interface connector on the LCAP (Port 2) to either a printer or computer terminal. They can also link the user to an external modem if a NT4K44MB Null Modem Adapter is added.

Provide as required:

| | | |
|---|---|---|
| (1) | NT7E44FA | 25/25 User Interface Cable, 5 meter |
| (1) | NT7E44FB | 25/25 User Interface Cable, 20 meter |

## Cables

All cables not supplied with the bay are shipped loose and installed after the bay is mounted on site. Some cables are required, some are optional depending upon site requirements and customer requests.

### VF cables

VF cables are required to wire the CDS VF output to the customer’s VF cross connect blocks. These cables are connectorized on one end only, and are cut to length at installation.

Provide two 50-pair VF cables per CDS shelf according to site length requirements. (Each 50-pair VF cable ends in a “Y” with two 25-pair connectors attached.)

| | | |
|---|---|---|
| AR | NT4K85PA | VF Cable (50 FT) |
| AR | NT4K85PB | VF Cable (100 FT) |
| AR | NT4K85PC | VF Cable (150 FT) |
| AR | NT5K85PD | VF Cable (200 FT) |
| AR | NT4K85PE | VF Cable (250 FT) |
| AR | NT4K85PF | VF Cable (300 FT) |

***Note 1:*** These cables are for use with the NT4K12AB deployed in a bay package only. Customers with the NT4K12AA CDS cannot use the VF cables listed in this section. The cables listed above are 50-pair. The 25-pair cables are available, but only as a special order.

## Power cables

Each ABM requires power cables to feed 48VDC to the AccessNode BIP. The older NT4K14A series BIP requires four (4) cables for every system. The newer NT4K14B series BIP requires two (2) cables, and can handle up to four (4) if redundant feeds are requested. Power cables come in two (2) lengths and two (2) color schemes. All power cables are connectorized on one end only, and are cut to length at installation. If the distance from the BIP to the power source is greater than 35 feet, the Power Application Engineer will be required to size additional wire and taps for the power cable extensions. All power cables are rated at 50A maximum for use with any AccessNode BIP.

Provide the required power cables for the DC power feed to each ABM:

| | | |
|---|---|---|
| 2 or 4 | NT4K84UG | Main Power Cable (Red and Black), 35' |
| | - OR - | |
| 2 or 4 | NT4K84UH | Main Power Cable (Red and Black), 15' |

Most customers prefer the conductors with red and black insulation. However, the older cables with red and white are available under the following numbers. Do not use them unless by specific customer request.

Provide the required DC power cables by special request only:

| | | |
|---|---|---|
| 2 or 4 | NT4K84UE | Main Power Cable (Red and White), 35' |
| | - OR - | |
| 2 or 4 | NT4K84UF | Main Power Cable (Red and White), 15' |

Provide all the following optional connector parts if the customer wishes to build a set of ABM power cables:

| | | |
|---|---|---|
| (8) | A0377840 | Anderson Power Pole Crimp Contact for #6 AWG Wire |
| (8) | A0377260 | Anderson Power Pole Insulated Housing, Black |
| (4) | A0381017 | Anderson Power Pole Roll Pin |

***Note:*** Use of Anderson Power Pole crimps in the field requires the use of special Anderson crimping tools and is not suggested unless special wiring or cable lengths is absolutely mandated by the customer.

### Miscellaneous cables

The following cables are supplied with higher assemblies, such as bay frames. They can also be ordered individually for spares or replacement requirements.

Provide as requested for spares or replacement:

| | | |
|---|---|---|
| 1 | NT4K82BA | Access Link Cable Harness, For CDS 1 - 3 |
| 1 | NT4K82CA | Access Link Cable Harness, For CDS 4 - 7 |
| 1 | NT4K84BA | ABM Power Cables (For use on NT4K03 Only) |
| 1 | NT4K84CB | Cooling Unit Power Cable |
| 1 | NT4K84JA | Power Distribution Cable Harness (Left Side) |
| 1 | NT4K84JB | Power Distribution Cable Harness (Right Side) |
| 1 | NT4K85JA | Cooling Unit Power Cable |
| 1 | NT4K85KA | BIP Control Cable |
| 1 | NT4K86FA | CDS Metallic Test Link Cable (ABM-to-CDS#1) |
| 1 - 6 | NT4K86FB | CDS Metallic Test Link Cable (CDS-to-CDS) |

## Operational controller (OPC)

Each AccessNode ABM and TBM must come under the span of control of an OPC. The OPC is always located in the CO. The OPC from one co-located AN system can be used to control another if a C-Net cable is used to connect the

two ABM or TBM shelves together. One OPC can control up to a total of 16 network elements. Be aware that addition of the OPC may block certain mapper slots within the ABM or TBM.

Provide an OPC per customer request or system requirements:

| | | |
|---|---|---|
| 1 | NT7E24BC | OPC With DAT Tape Drive<br>(ABM slots 1 - 4 or 5 - 8) |

***Note:*** One (1) OPC per ABM only. Slot assignment depends upon tributary slot assignment. Slots 5 to 8 are considered standard placement.

### Larger OPC hard drive

When ordering AN16 software or higher, you must make customers aware that due to the growing software load, there is a hard drive size limitation. Starting with AN16, the OPC will need a hard drive with a minimum size of 800 Mbytes.

All systems upgrading to AN16 or higher should have the following minimum release OPCs:

| | |
|---|---|
| NT7E24AC | OPC, Release 14 or higher |
| | - OR - |
| NT7E24BC | OPC, Release 17 or higher |

If the customer has either of the OPCs, at the listed release or higher, they already have the larger hard drive. If they have an OPC with a lower release, they will not have enough room on the drive to load the new software.

### Cables to OPC front panel ethernet connector

Provide OPC front panel connector to an Ethernet hub/LAN per customer request:

| | | |
|---|---|---|
| (1) | NT4K86LA | OPC-to-Ethernet Hub Cable, 20 meter (908 connector) |
| (1) | NT4K86LB | OPC-to-Ethernet Hub Cable, 40 meter (908 connector) |
| (1) | NT4K86LC | OPC-to-Ethernet Hub Cable, 100 meter (908 connector) |

Provide OPC front panel connector to an X-terminal or MAU per customer request:

| | | |
|---|---|---|
| (1) | NT4K86SA | OPC-to-Xterm or MAU Cable, 5 meter (Straight connector) |
| (1) | NT4K86SB | OPC-to-Xterm or MAU Cable, 20 meter (Straight connector) |
| (1) | NT4K86SC | OPC-to-Xterm or MAU Cable, 40 meter (908 connector) |
| (1) | NT4K86SD | OPC-to-Xterm or MAU Cable, 100 meter (908 connector) |

### Cables to OPC sil connector

These cables link the ABM SIL J07 OPC user interface to other optional interfaces.

Provide as required:

| | | |
|---|---|---|
| (1) | NT7E44EA | 9/25 User Interface Cable, 5 meter (OPC-to-Modem) |
| (1) | NT7E44EB | 9/25 User Interface Cable, 20 meter (OPC-to-Modem) |
| (1) | NT7E44RA | 9/25 User Interface Cable, 5 meter (OPC-to-VT100 or Printer) |
| (1) | NT7E44RB | 9/25 User Interface Cable, 20 meter (OPC-to-VT100 or Printer) |
| (1) | NT7E44QA | 9/25 User Interface Cable, 5 meter (OPC-to-Graphics Terminal) |
| (1) | NT7E44QB | 9/25 User Interface Cable, 20 meter (OPC-to-Graphics Terminal) |

***Note:*** For offices without an OPC order NT7E44FA or FB and connect through the LCAP. See “User interface cables” on page 2-31.

Provide asynchronous RS232 interface for a Toshiba lap-top computer per customer request:

| | | |
|---|---|---|
| (1) | NT7E44SA | OPC-to-Laptop Cable, 5 meter |
| (1) | NT7E44SB | OPC-to-Laptop Cable, 20 meter |

## VTBM upgrades

A cooling system upgrade is mandatory when adding VTBM optics to older systems. The upgrade consists of a new cooling shelf. Older cooling modules and shelves are not interchangeable with the newer units. No upgrade is required if the system is already equipped with an NT4K18BA shelf.

Provide all the following when upgrading an ABM bay for VTBM cooling:

| | | |
|---|---|---|
| 1 | NT4K18CA | VTBM Cooling Shelf |
| 1 | A0657084 | CAP 95-24, ABM Cooling Unit Upgrade to VTBM |
| 2 | A0381920 | 15A Circuit Breakers |
| 1 | P0844580 | BIP Breaker Label |

***Note 1:*** Per EC 11-21919, all upgrades to VTBM cooling units require the CU-A and CU-B breakers in the NT4K14AB BIP to be upgraded from 10A to 15A. A new label is installed to indicate the breaker amperage.

***Note 2:*** As of 98W42 a single piece cooling unit, NT4K18CA, will replace the NT4K18BA shelf that uses 3 loose NT4K17BA fans. The NT4K18CA is fully VTBM compatible.

## Miscellaneous spares

The following is a list of spares that can be ordered with the initial purchase or as replacement items during the life of the product.

Order as spares, replaceable items, or additional material per customer request:

| | | |
|---|---|---|
| 1 | NT4K0120 | Bay Installation Kit (For use with NT4K14AA or NT4K14AB BIP before 99W02) |
| AR | NT4K1033 | ABM Front Cover with AccessNode Labe |
| AR | NT4K13BA | Fiber Storage Panel (FSP) |
| AR | NT4K13CA | MINI VOA Storage Assembly |
| AR | NT4K1472 | BIP Replacement LED Alarm Module (Used on NT4K14AB BIP) |
| AR | NT4K1490 | BIP Shelf Cover (For use with NT4K14AA and AB BIP pre-99W02) |
| AR | NT4K1494 | BIP Shelf Cover (For use with NT4K14BA BIP after 99W02) |
| AR | NT4K17BA | Cooling Module (Only for use in the NT4K18BA Shelf) |
| AR | NT4K1740 | Replacement fan unit inside the NT4K17CA (3 ABMs in a bay) |
| AR | NT4K1743 | Replacement printed circuit board for cooling unit alarm |
| AR | NT4K58MA | ABM Power Termination Card (2 come with each ABM) |
| 1 | NT4K61BA | Talk Battery Filter Circuit Pack (TBF)<br>(BIP slot 2 of NT4K14BA **ONLY)** |

| | | |
|---|---|---|
| 1 | NT4K64BA | Alarm Relay Circuit Pack<br>(BIP slot 1 of NT4K14BA ONLY) |
| 2 | NT4K84BA | ABM Power Cable |
| 2 | NT4K84CB | Cooling Unit Power Cable |
| 1 | NT4K85JA | Cooling Unit Interface Cable |
| 1 | NT4K85KA | BIP Control Cable |
| 1 | NT4K85YA | DS1 Daisy Chaining Test Cable |
| 1 | NT7E70AA | 7-ft. SONET Bay Framework |
| AR | P0712994 | CDS Cable Cover (Left or Right) |
| AR | A0379322 | Air Filter Element (Fits all bay mounted filter drawers) |
| AR | A0368415 | BIP Replacement Incandescent Alarm Lamp (Used on NT4K14AA BIP) |

***Note:*** The DS1 daisy chaining test cable is used for testing OC-12 receive sensitivity in sub networks serving universal and integrated applications.

## X11 terminals

X11 terminals are graphics capable, UNIX computer terminals that can be connected to the OPC. Nortel Networks uses NCD terminals and software package. However, for each customer inquiry a call must be placed to NCD to get the latest terminal number and software package.

***Note:*** Call Nortel Networks for the latest information.

## Battery backup (Hong Kong)

The following unit is the battery backup for Hong Kong customers only.

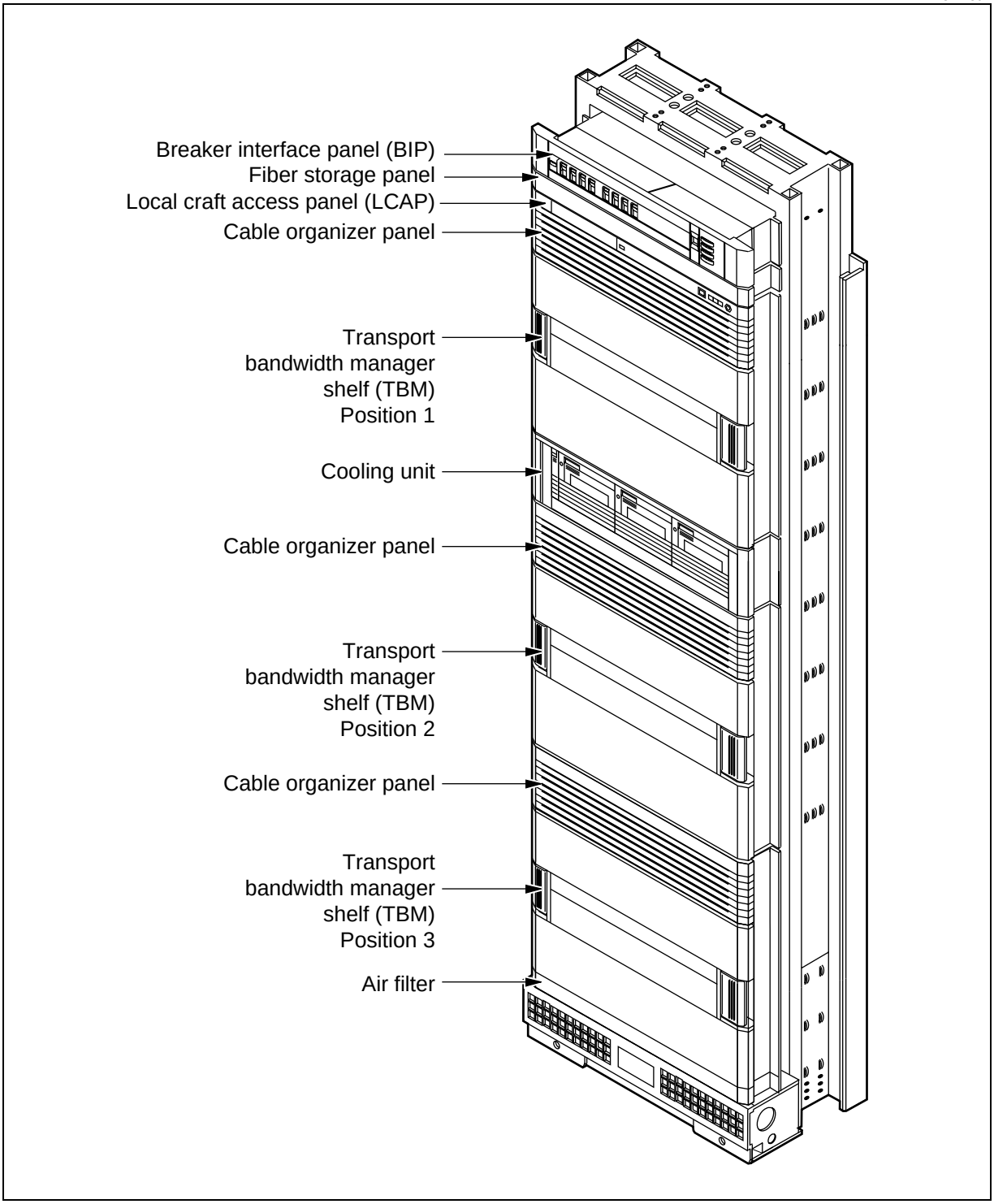
| | | |
|---|---|---|
| 1 | NT4K04AA | 192L Integrated power, battery backup, 7’ bay |

# Hardware provisioning (TBM)

Although the TBM as a transport product is available in several different packaging schemes, AccessNode TBM is only used at the Central Office (CO) in an FCOT (Fiber-Fed CO Terminal) configuration. The AccessNode TBM is therefore only available in bay mounted configurations. Thus, only the bay mounted products are covered in this chapter. The TBM does not support the use of any subscriber lines (DS0 level), and is used to maximize the number of DS1 lines into the switch.

**Figure 3-1**
**TBM bay**

PC-11504



AccessNode TBM equipped bays are available in four (4) different configurations containing one (1) to three (3) TBM shelves, and each configuration is available in three (3) different bay heights. Existing bays with one (1) or two (2) TBM shelves can be upgraded by adding another TBM shelf. Except as marked, all AccessNode TBM based equipment is alike in that it contains a TBM, a BIP, and LCAP.

## AccessNode TBM bay models

Provide one of the following AccessNode systems for orders that require a TBM shelf in a bay. Bays are available as "standard" bare bay assemblies or as Framepacks. Special heights are available only through the standard part coding. Framepacks are factory sponsored kits that include a TBM bay assembly and the most commonly ordered accessories.

### Standard TBM bays

Provide one of the following TBM systems for orders that require a TBM FCOT in 7-ft. bays. Generally speaking, 7-ft. bays with bay extensions are preferable to 9 and 11.5 foot extended height bays. These TBM bays contain the new NT7E51AA units that feature integral cooling units.

Provide VTBM-ready TBMs bay mounted in 7-ft. frames per customer request:

| | | |
|---|---|---|
| 1 | NT7E78GA | One (1) TBM shelf located in Position 1 for raised floor cabling |
| 1 | NT7E78GB | Two (2) TBM shelves located in Positions 1 and 2 |
| 1 | NT7E78GC | Three (3) TBM shelves |
| 1 | NT7E78GD | One (1) TBM shelf located in Position 2 for overhead cabling |
| 1 | NT7E78GE | Two (2) TBM shelves located in Positions 2 and 3 |

***Note 1:*** Positions are numbered starting at the top of the bay frame. The maximum number of TBM positions in a single bay is three (3).

***Note 2:*** Bays with frame heights of 9 and 11.5 feet are still available on a special order basis. Use a Custom Pick List to include all the equipment included on the standard height frame along with the extended frame.

### Framepack codes

Framepack Codes are rapid ordering codes for bay frame packaging which include the bay and any peripheral shelves. The factory prefers use of Framepack Codes to the use of standard individual codes.

Provide one (1) of the following Framepack codes as required to fill customer orders:

| | | |
|---|---|---|
| 1 | NTFF10AB | 7-ft. OC-12 Bay e/w one (1) VTBM ready TBM in Position 1 |
| 1 | NTFF10BB | 7-ft. OC-12 Bay e/w one (1) VTBM ready TBM in Position 2 |
| 1 | NTFF10CB | 7-ft. OC-12 Bay e/w two (2) VTBM ready TBMs |
| 1 | NTFF10DB | 7-ft. OC-12 Bay e/w three (3) VTBM ready TBMs |

## TBM bay hardware

Items in this section will be ordered as part of a bay assembly.

Provide one (1) required installation kit for each TBM bay:

| | | |
|---|---|---|
| 1 | NT7E6020 | TBM Bay Installation Kit (Isolation Material) |

Provide one (1) optional TBM bay fiber storage tray per customer request:

| | | |
|---|---|---|
| (1) | NT7E58AB | Fiber Storage Panel (FSP) |

Provide the following COP Cooling Unit kits per customer request:

| | | |
|---|---|---|
| (1) | NT4K19AT | COP/CU Maintenance Kit<br>(Order 1 as spare per site e/w one or more 3 TBM shelf bays) |

***Note:*** The NT4K19AT COP Cooling Unit is not used on the newer NT7E51 TBM shelf, only the NT4K19A series TBM shelf has need of this kit.

The following bay hardware can be added to any bay to add additional features. Filler Panels, End Guards, and Frame Extensions can be added at any time in the field by the installer. Filler panels can also be included in the Custom Pick List to be factory installed. Typically, the AC Outlet is only added to the bay at the factory.

Provide empty and custom height front access Bay Frames per customer request:

| | | |
|---|---|---|
| (1) | NT7E70AA | 7-ft. Standard Bay Frame |
| (1) | NT7E70BA | 7-ft. 6-in. Extended Bay Frame |
| (1) | NT7E70CA | 8-ft. Extended Bay Frame |
| (1) | NT7E70DA | 9-ft. Extended Bay Frame |
| (1) | NT7E70EA | 11-ft. 6-in. Extended Bay Frame |
| (1) | NT7E70FA | 8-ft. 8-in. Extended Bay Frame |

Provide optional bay frame Extensions per customer request:

| | | |
|---|---|---|
| (1) | NT7E71BA | Frame Extension, 6 inches |
| (1) | NT7E71CA | Frame Extension, 1 foot |
| (1) | NT7E71DA | Frame Extension, 2 feet |
| (1) | NT7E71EA | Frame Extension, 4 feet 6 inches |
| (1) | NT7E71FA | Frame Extension, 1 foot 8 inches |

Provide optional bay frame End Guards per customer request:

| | | |
|---|---|---|
| (1) | NT7E72AA | End Guard, 7 feet |
| (1) | NT7E72BA | End Guard, 7 feet 6 inches |
| (1) | NT7E72CA | End Guard, 8 feet |
| (1) | NT7E72DA | End Guard, 9 feet |
| (1) | NT7E72EA | End Guard, 11 feet 6 inches |
| (1) | NT7E72FA | End Guard, 8 feet 8 inches |
| (1) | NT7E75BA | End Guard, 6 inch |
| (1) | NT7E75CA | End Guard, 1 foot |
| (1) | NT7E75DA | End Guard, 2 feet |
| (1) | NT7E75EA | End Guard, 4 feet 6 inch |
| (1) | NT7E75FA | End Guard, 1 foot 8 inches |

***Note:*** Do not use the 9-ft. End Guard on a 7-ft. bay equipped with 2-ft. extension. Use the separate 7-ft. and 2-ft. sectional End Guards.

Provide optional bay frame Filler Panels and mounting screws per customer request:

| | | |
|---|---|---|
| (AR) | NT7E52AA | 21-in. Filler Panel |
| (AR) | NT7E52CA | 1-3/4 in.Filler Panel |
| (AR) | P097D121 | Filler Panel Mounting Screws (Four screws required per panel) |

Provide optional bay frame AC Outlet per customer request:

| | | |
|---|---|---|
| (1) | NT7E76AA | A. C. Outlet Assembly |

***Note:*** Preferred NTI method for A/C wiring is to locate the A/C outlets outside the IGZ.

## Labels

Labels are not part of any kit and must be specified separately as required by the system configuration.

Provide one (1) required AccessNode TBM Shelf ID label per TBM shelf:

| | | |
|---|---|---|
| 1 - 3 | P0732671 | AccessNode TBM Shelf Identification Label |

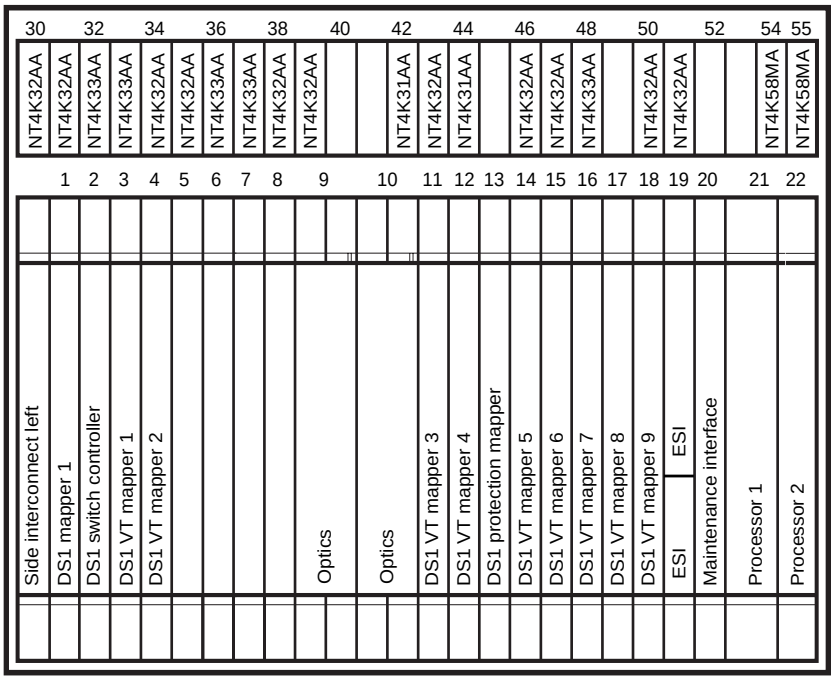
***Note:*** Reference CAP # AN94-19 for re-labeling the TransportNode TBM shelf to AccessNode TBM.

## Common circuit packs

The TBM shelf must be filled with circuit packs in order for the AccessNode system to work. The system configuration defines the pack selection. When packs are purchased with bays, packs are shipped installed.

**Figure 3-2**
**TBM shelf pack layout**

AN-1075




TBM shelf pack layout

## Shelf Processor

Provide all the following required circuit packs with each AccessNode TBM:

| | | |
|---|---|---|
| 1 | NT4K52BC | Shelf Processor Card (Only with TN_BLSR; AN12.10 and higher) |
| | | (TBM slot 21 working) |
| 1 or 2 | NT4K52FA | Shelf Processor Card, 32MB (Only with AN10 to AN15.10) |
| | | (TBM slot 21 working; slot 22 protection) |
| 1 or 2 | NT4K52B | Shelf Processor Card, 64 MB (Only with AN16.10 and higher) |
| | | (TBM slot 21 working; slot 22 protection) |

***Note 1:*** For TN_BLSR, only one processor is supported and it must be installed in TBM slot 21.

***Note 2:*** Use a minimum software load of AN16.10 when using the NT4K52FB processor.

**MIC**

| | | |
|---|---|---|
| 1 | NT4K53AD | Universal Maintenance Interface Circuit Pack (UMIC)<br>(TBM slot 20) |

***Note 1:*** N4K53AC was replaced in all cases by NT4K53AD Universal MIC on 99W09. The 53AD can also be used on TransportNode.

***Note 2:*** TransportNode TBM uses the NT4K53AB MIC. This pack cannot be used on any AccessNode systems, ABM or TBM. The 53AB will not recognize AccessNode software.

## DS1 equipping

The TBM is capable of supplying a maximum of 168 DS1s in the TN_BLSR configuration. There is a mapper and I/O card for each set of 14 DS1s.

Provide one (1) DS1 Mapper Card if DS1 mapper protection is required:

| | | |
|---|---|---|
| 1 | NT7E04EA | DS1/VT Synchronous Mapper<br>(TBM slot 13 for FCOT or FCOT_BLSR)<br>(TBM slot 19 for TN_BLSR) |

Provide one (1) DS1 Mapper for every 14 DS1s requested:

| | | |
|---|---|---|
| 1 - 12 | NT7E04EA | DS1/VT Synchronous Mapper<br>(TBM slots 3, 4, 11, 12, 14, 15, 16, 17, and 18 for FCOT)<br>(TBM slots 1, 2, 3, 4, 11, 12, 14, 15, 16, 17, and 18 for FCOT_BLSR)<br>(TBM slots 1, 2, 3, 4, 11, 12, 13 14, 15, 16, 17, and 18 for TN_BLSR) |

***Note 1:*** The DS1 Protection Mapper is installed in slot 13 for all TN systems except TN_BLSR.

***Note 2:*** The first NT7E04EA in an office must be in the protection slot. The EA and CA are fully backward compatible to the BA, however the BA cannot provide protection for a CA pack. The EA and CA can provide protection for either the BA or CA packs. (CA required for TR08 applications)

Provide two (2) Protection Bridge cards if DS1 I/O protection is required:

| | | |
|---|---|---|
| (2) | NT4K31AA | DS1 Protection Bridge Card<br>(TBM slots 42 and 44 for FCOT or FCOT_BLSR) |

***Note:*** On TN_BLSR systems with the DS1 Mapper in slot 19 the DS1 Protection Bridge cards are not required. DS1 Protection Bridge cards are only used when the protection DS1 Mapper is in slot 13.

Provide one (1) DS1 Input Card for every DS1 line required:

| | | |
|---|---|---|
| 1 - 12 | NT4K32AA | DS1 Input Card<br>(TBM slots 34, 35, 38, 39, 43, 46, 47, 50 and 51 for FCOT)<br>(TBM slots 30, 31, 34, 35, 38, 39, 43, 46, 47, 50 and 51 for FCOT_BLSR)<br>(TBM slots 30, 31, 34, 35, 38, 39, 42, 43, 46, 47, 50 and 51 for TN_BLSR) |

Provide one (1) DS1 Output Card for every DS1 Input Card:

| | | |
|---|---|---|
| 1 - 12 | NT4K33AA | DS1 Output Card<br>(TBM slots 36, 37, 40, 41, 45, 48, 49, 52, and 53 for FCOT)<br>(TBM slots 32, 33, 36, 37, 40, 41, 45, 48, 49, 52 and 53 for FCOT_BLSR)<br>(TBM slots 32, 33, 36, 37, 40, 41, 44, 45, 48, 49, 52 and 53 for TN_BLSR) |

Provide one (1) DS1 cable for every DS1 input card, and one (1) DS1 cable for every DS1 output card:

***Note:*** The type 608 cable is standard for the TBM. For TN_BLSR applications that require up to 168 DS1s, provide type 1249C cable, which has a smaller outside diameter.

Provide one (1) cable for every DS1 Input, and one (1) DS1 cable for every DS1 output card:

### Type 608 cables

| | | |
|---|---|---|
| AR | NT7E40BL | 608 DS1 Cable, 7 meters |
| AR | NT7E40BA | 608 DS1 Cable, 15 meters |
| AR | NT7E40BM | 608 DS1 Cable, 30 meters |
| AR | NT7E40BB | 608 DS1 Cable, 45 meters |
| AR | NT7E40BN | 608 DS1 Cable, 60 meters |
| AR | NT7E40BC | 608 DS1 Cable, 75 meters |
| AR | NT7E40BP | 608 DS1 Cable, 90 meters |
| AR | NT7E40BD | 608 DS1 Cable, 106 meters |
| AR | NT7E40BQ | 608 DS1 Cable, 120 meters |
| AR | NT7E40BE | 608 DS1 Cable, 137 meters |
| AR | NT7E40BR | 608 DS1 Cable, 153 meters |
| AR | NT7E40BF | 608 DS1 Cable, 168 meters |
| AR | NT7E40BS | 608 DS1 Cable, 183 meters |
| AR | NT7E40BG | 608 DS1 Cable, 198 meters |

### Type 1249C cables

| | | |
|---|---|---|
| AR | NT7E40CG | 1249C DS1 Cable, 7 meters |
| AR | NT7E40CA | 1249C DS1 Cable, 15 meters |
| AR | NT7E40CH | 1249C DS1 Cable, 30 meters |
| AR | NT7E40CB | 1249C DS1 Cable, 45 meters |
| AR | NT7E40CJ | 1249C DS1 Cable, 60 meters |
| AR | NT7E40CC | 1249C DS1 Cable, 75 meters |
| AR | NT7E40CK | 1249C DS1 Cable, 90 meters |
| AR | NT7E40CD | 1249C DS1 Cable, 106 meters |
| AR | NT7E40CL | 1249C DS1 Cable, 120 meters |
| AR | NT7E40CE | 1249C DS1 Cable, 137 meters |

Provide one (1) grounding assembly per DS1 transmit cable if the ground shield for the transmit DS1 cables are to be grounded at the DSX panel:

| | | |
|---|---|---|
| (1) | P049Q122 | Grounding Assembly |

## DS3 equipping

Equipping a TBM for DS3 service consists of adding DS3 Input / Output Cards, DS3 Protection Switching Cards, and DS3 Mapper packs. A Protection Switching pack protects the I/O packs, and an extra DS3 Mapper card is used to protect the other working mappers. Remote Terminals applications require a DS3 Protection Software Certificate if transport DS3s are provisioned.

Provide one (1) DS3 Mapper for every three (3) DS3 I/O cards:

| | | |
|---|---|---|
| 1 - 3 | NT7E08AA | DS3/STS Mapper Circuit Card |
| | | (TBM slots 11, 15, and 17 for FCOT) |
| | | (TBM slots 11, 13*, 15, and 17 for FCOT_BLSR) |
| | | (TBM slots 11, 13, 15, and 17 for TN_BLSR) |

***Note:*** Slot 13 on FCOT_BLSR is only available with no DS1 Mappers in the shelf.

Provide all the following if optional DS3 protection switching is required:

| | | |
|---|---|---|
| (1) | NT7E08AA | DS3/STS Mapper Circuit Card |
| | | (TBM slot 1) |
| (1) | NT4K60CA | DS3 Protection Switch Controller Circuit Card |
| | | (TBM slot 2) |

Provide one (1) Input/Output Card for each DS3 line required:

| | | |
|---|---|---|
| 1 - 9 | NT4K30AA | DS3 Input / Output Circuit Card |
| | | (TBM slots 38-40, 46-48, and 50-52) |

Provide two (2) DS3 cables for every DS3 Input / Output card:

| | | |
|---|---|---|
| 2 | NT7E43AA | 734 COAX With One BNC, 5 meters |
| 2 | NT7E43AB | 734 COAX With One BNC, 10 meters |
| 2 | NT7E43AC | 734 COAX With One BNC, 20 meters |
| 2 | NT7E43AD | 734 COAX With One BNC, 30 meters |
| 2 | NT7E43AE | 734 COAX With One BNC, 40 meters |
| 2 | NT7E43AF | 734 COAX With One BNC, 50 meters |
| 2 | NT7E43AG | 734 COAX With One BNC, 60 meters |

| | | |
|---|---|---|
| 2 | NT7E43AA | 734 COAX With One BNC, 5 meters |
| 2 | NT7E43AH | 734 COAX With One BNC, 75 meters |
| 2 | NT7E43AJ | 734 COAX With One BNC, 80 meters |
| 2 | NT7E43AK | 734 COAX With One BNC, 140 meters |
| 2 | NT7E43AL | 734 COAX With One BNC, 100 meters |

***Note:*** Other cables can be provided (RG-59, 735A) but they are not part of the AccessNode product structure.

Provide one (1) BNC connector for terminating every DS3 cable:

| | | |
|---|---|---|
| AR | A0721853 | 734 Coaxial BNC Connector |
| AR | A0721854 | RG59/U Coaxial BNC Connector |
| AR | A0721855 | 735A Coaxial BNC Connector |

## Optical equipping

Optical packs are available to feed the TBM in Point-to-Point or Ring configurations. These packs are provisioned into TBM slots 9 and 10, with slot 9 being the normal working and slot 10 being the normal protection slot. Additional OC-3 optical packs cannot be added to support tributaries in a AccessNode TBM.

Provide OC-12 VTBM optical interfaces per customer requirements for ring applications:

| | | |
|---|---|---|
| 2 | NT7E05JC | OC-12 Long Reach Interface (Adapterless) |
| 2 | NT7E05JB | OC-12 Intermediate Reach Interface (Adapterless) |

Provide one (1) required Universal Connector Adapter for each Adapterless multi-connector optical pack:

| | | |
|---|---|---|
| 1 | NTN459FC | FC Universal Connector Adapter |
| 1 | NTN459ST | ST Universal Connector Adapter |
| 1 | NTN459SC | SC Universal Connector Adapter |

***Note:*** Each Adapterless connector kit contains two (2) optical connectors.

Provide OC-12 Point-to-Point optical interfaces per customer requirements:

| | | |
|---|---|---|
| 2 | NT7E02KA | OC-12 Long Reach 1310 Interface (BI) |
| 2 | NT7E02PC | OC-12 Long Reach 1310 Interface (Adapterless) |
| 2 | NT7E02LA | OC-12 Intermediate Reach 1310 Interface (BI) |
| 2 | NT7E02PB | OC-12 Intermediate Reach 1310 Interface (Adapterless) |

Provide OC-3 Point-to-Point optical interfaces per customer requirements:

| | | |
|---|---|---|
| 2 | NT7E01CA | OC-3 Long Reach 1310 Interface (BI) |
| 2 | NT7E01GB | OC-3 Long Reach 1310 Interface (Adapterless) |
| 2 | NT7E01DA | OC-3 Intermediate Reach 1310 Interface (BI) |
| 2 | NT7E01GA | OC-3 Intermediate Reach 1310 Interface (Adapterless) |

Provide two (2) of the following patch cords per optical pack when Mini-VOA is **not** required:

| | | |
|---|---|---|
| 2 | NT7E46AA | Optical Patchcord, BIC-BIC, 5 meters |
| 2 | NT7E46AB | Optical Patchcord, BIC-BIC, 10 meters |
| 2 | NT7E46AC | Optical Patchcord, BIC-BIC, 15 meters |
| 2 | NT7E46AD | Optical Patchcord, BIC-BIC, 20 meters |
| 2 | NT7E46AE | Optical Patchcord, BIC-BIC, 30 meters |
| 2 | NT7E46BA | Optical Patchcord, FC-FC, 5 meters |
| 2 | NT7E46BB | Optical Patchcord, FC-FC, 10 meters |
| 2 | NT7E46BC | Optical Patchcord, FC-FC, 15 meters |
| 2 | NT7E46BD | Optical Patchcord, FC-FC, 20 meters |
| 2 | NT7E46BE | Optical Patchcord, FC-FC, 30 meters |
| 2 | NT7E46CA | Optical Patchcord, ST-ST, 5 meters |
| 2 | NT7E46CB | Optical Patchcord, ST-ST, 10 meters |
| 2 | NT7E46CC | Optical Patchcord, ST-ST, 15 meters |
| 2 | NT7E46CD | Optical Patchcord, ST-ST, 20 meters |
| 2 | NT7E46CE | Optical Patchcord, ST-ST, 30 meters |
| 2 | NT7E46FA | Optical Patchcord, SC-SC, 5 meters |
| 2 | NT7E46FB | Optical Patchcord, SC-SC, 10 meters |

| | | |
|---|---|---|
| 2 | NT7E46AA | Optical Patchcord, BIC-BIC, 5 meters |
| 2 | NT7E46FC | Optical Patchcord, SC-SC, 15 meters |
| 2 | NT7E46FD | Optical Patchcord, SC-SC, 20 meters |
| 2 | NT7E46FE | Optical Patchcord, SC-SC, 30 meters |

Provide two (2) of the following patch cords per optical pack when Mini-VOA is required:

| | | |
|---|---|---|
| 2 | NT7E47AA | Optical Patchcord with MVOA, BI-BI, 5 meters |
| 2 | NT7E47AB | Optical Patchcord with MVOA, BI-BI, 10 meters |
| 2 | NT7E47AC | Optical Patchcord with MVOA, BI-BI, 15 meters |
| 2 | NT7E47AD | Optical Patchcord with MVOA, BI-BI, 20 meters |
| 2 | NT7E47AE | Optical Patchcord with MVOA, BI-BI, 30 meters |
| 2 | NT7E47BA | Optical Patchcord with MVOA, FC-FC, 5 meters |
| 2 | NT7E47BB | Optical Patchcord with MVOA, FC-FC, 10 meters |
| 2 | NT7E47BC | Optical Patchcord with MVOA, FC-FC, 15 meters |
| 2 | NT7E47BD | Optical Patchcord with MVOA, FC-FC, 20 meters |
| 2 | NT7E47BE | Optical Patchcord with MVOA, FC-FC, 30 meters |
| 2 | NT7E47CA | Optical Patchcord with MVOA, ST-ST, 5 meters |
| 2 | NT7E47CB | Optical Patchcord with MVOA, ST-ST, 10 meters |
| 2 | NT7E47CC | Optical Patchcord with MVOA, ST-ST, 15 meters |
| 2 | NT7E47CD | Optical Patchcord with MVOA, ST-ST, 20 meters |
| 2 | NT7E47CE | Optical Patchcord with MVOA, ST-ST, 30 meters |
| 2 | NT7E47FA | Optical Patchcord with MVOA, SC-SC, 5 meters |
| 2 | NT7E47FB | Optical Patchcord with MVOA, SC-SC, 10 meters |
| 2 | NT7E47FC | Optical Patchcord with MVOA, SC-SC, 15 meters |
| 2 | NT7E47FD | Optical Patchcord with MVOA, SC-SC, 20 meters |
| 2 | NT7E47FE | Optical Patchcord with MVOA, SC-SC, 30 meters |

Provide two (2) of the following pigtails per optical pack when Mini-VOA is **not** required:

| | | |
|---|---|---|
| 2 | NT7E48AA | Optical Pigtail, BIC, 20 meters |
| 2 | NT7E48BA | Optical Pigtail, FC, 20 meters |
| 2 | NT7E48CA | Optical Pigtail, ST, 20 meters |
| 2 | NT7E48FA | Optical Pigtail, SC, 20 meters |

Provide two (2) of the following pigtails per optical pack when Mini-VOA is required:

| | | |
|---|---|---|
| 2 | NT7E49AA | Optical Pigtail with MVOA, BIC, 20 meters |
| 2 | NT7E49BA | Optical Pigtail with MVOA, FC, 20 meters |
| 2 | NT7E49CA | Optical Pigtail with MVOA, ST, 20 meters |
| 2 | NT7E49FA | Optical Pigtail with MVOA, SC, 20 meters |

## STS-1 equipping

The AN15 release will add a feature to support a subset of the STS-1 Tributary functionality which is working on the TN_BLSR node only. This configuration involves the STS-1 Tributary.

Provide STS-1 packs as requested:

| | | |
|---|---|---|
| 1 | NT7E09AA | STS-1 Pack |
| 1 | NT4K60BA | DS3/STS-1 Protection Switcher |
| 1 | NT4K30AA | DS3 Input / Output Circuit Card |

## Miscellaneous equipping

The following is a list of packs and external cables that provide optional or additional interfaces to the equipment.

### Control network (C-Net)

C-Net allows nearby ABM and TBM shelves to come under the span of control of a single OPC. This interconnection is done with C-Net cables through TBM SIL J09 and J10 using a daisy chain arrangement. All unfilled connectors must be filled with C-Net Terminators.

Provide C-Net cables as requested:

| | | |
|---|---|---|
| AR | NT7E44JB | Control Network Shelf-To-Shelf Cable, 1 meter |
| AR | NT7E44JC | Control Network Bay-To-Bay Cable, 5 meter |
| AR | NT7E44JK | Control Network Bay-To-Bay Cable, 10 meter |
| AR | NT7E44JX | Control Network Bay-To-Bay Cable, 20 meter |
| AR | NT7E44JY | Control Network Bay-To-Bay Cable, 30 meter |
| AR | NT7E44JW | Control Network Bay-To-Bay Cable, 45 meter |
| AR | NT7E44JZ | Control Network Bay-To-Bay Cable, 100 meter |

***Note:*** Two (2) NT7E5072 C-Net Terminators are provided with every TBM shelf.

### DS1 daisy chaining test cable

The DS1 Daisy Chaining test cable is used for testing OC-12 receive sensitivity in sub networks serving universal and integrated applications.

Provide per customer request:

| | | |
|---|---|---|
| 1 | NT4K85YA | DS1 Daisy Chaining Test Cable |

### External synchronization interface (ESI)

This option requires a carrier, at least one (1) card, and a cable. These cables are connectorized on one end only for connection to TBM SIL J12. The cable is cut to length after installation. Another connector may be field installed, but is not supplied.

Provide one (1) per customer request for ESI:

| | | |
|---|---|---|
| 1 | NT7E19AA | External Synch Interface Carrier<br>(TBM slot 19 for TN FCOT)<br>(TBM slot 23 for TN_BLSR) |

Provide one (1) or two (2) ESI cards if ESI Carrier is equipped in the TBM:

| | | |
|---|---|---|
| 1 or 2 | NT7E27DA | External Synch Interface Card<br>(1 working; 1 optional protection) |

Provide one (1) cable if ESI is equipped in the TBM:

| | | |
|---|---|---|
| 1 | NT4K86EB | ESI Cable, 50 feet |
| 1 | NT4K86EA | ESI Cable, 100 feet |
| 1 | NT4K86EC | ESI Cable, 200 feet |
| 1 | NT4K86ED | ESI Cable, 300 feet |
| 1 | NT4K86EE | ESI Cable, 650 feet |

***Note:*** ESI is required in the FCOT for IDLC applications and in universal applications using DDS. Cables are connected to TBM SIL J12.

## Modem cable

Modems are used for dial-in remote system access.

Provide as required:

| | | |
|---|---|---|
| 1 | NT7E90AA | 2400-BAUD BIP MODEM |

Provide Integral Modem Cable as required:

| | | |
|---|---|---|
| AR | NT7E44DD | Integral Modem Cable for TBM Pos 1 |
| AR | NT7E44DE | Integral Modem Cable for TBM Pos 2 |
| AR | NT7E44DF | Integral Modem Cable for TBM Pos 3 |

## Orderwire extension cables

These cables are connectorized on one end only for connection to TBM SIL J04. The cable is cut to length after installation. Another connector may be field installed, but is not supplied.

Provide as required:

| | | |
|---|---|---|
| (1) | NT4K85CE | Orderwire Extension Cable, 50 feet |
| (1) | NT4K85CA | Orderwire Extension Cable, 100 feet |
| (1) | NT4K85CB | Orderwire Extension Cable, 200 feet |
| (1) | NT4K85CC | Orderwire Extension Cable, 300 feet |

| | | |
|---|---|---|
| (1) | NT4K85CE | Orderwire Extension Cable, 50 feet |
| (1) | NT4K85CF | Orderwire Extension Cable, 400 feet |
| (1) | NT7E44UA | PSTN Interface Cable, 20 meters<br>(Links Public Switching Network to Orderwire) |

### Parallel telemetry cables

These cables are connectorized on one end only for connection to TBM SIL J11. The cable is cut to length after installation. Another connector may be field installed, but is not supplied.

Provide one (1) per customer request:

| | | |
|---|---|---|
| (1) | NT4K85GE | Parallel Telemetry Cable, 50 feet |
| (1) | NT4K85GA | Parallel Telemetry Cable, 100 feet |
| (1) | NT4K85GB | Parallel Telemetry Cable, 200 feet |
| (1) | NT4K85GC | Parallel Telemetry Cable, 300 feet |
| (1) | NT4K85GF | Parallel Telemetry Cable, 400 feet |

### Serial I/O provisioning

Additional serial I/O ports are available on the Side Interconnect Left (SIL) of the TBM shelf. The NT4K58LA cards are not available for use with the TBM shelf. The enhanced administration software certificate must be provided for this feature.

### Serial telemetry cables

These cables are connectorized on one end only for connection to TBM SIL J06. The cable is cut to length after installation. Another connector may be field installed, but is not supplied.

Provide per customer request:

| | | |
|---|---|---|
| 1 | NT4K86CB | Serial Telemetry Cable, 50 feet |
| 1 | NT4K86CA | Serial Telemetry Cable, 100 feet |
| 1 | NT4K86CC | Serial Telemetry Cable, 200 feet |

### User interface cables

These cables link the user interface connector on the front of the LCAP (Port 2) to either a printer or computer terminal. They can also link the user to an external modem if a NT4K44MB Null Modem Adapter is added.

Provide as required:

| | | |
|---|---|---|
| (1) | NT7E44FA | 25/25 User Interface Cable, 5 meter |
| (1) | NT7E44FB | 25/25 User Interface Cable, 20 meter |

## Cables

All cables not supplied with the bay are shipped loose and installed after the bay is mounted on site. Some cables are required, some are optional depending upon site requirements and customer requests.

### Power cables

The TBM uses raw wire to provide power into the NT7E56AB, BA or CA BIP. The TBM BIP accepts up to a #6 AWG wire, and uses four (4) single hole 1/4" terminal lugs. Requires two 30A breakers/fuses at the customer's power supply panel.

### Miscellaneous cables

The following cables are supplied with higher assemblies, such as bay frames. They can also be ordered individually for spares or replacement requirements.

Provide as requested for spares or replacement:

| | | |
|---|---|---|
| 1 | NT4K1950 | TBM Power Cable |
| 1 | NT4K85JA | Cooling Unit Interface Cable, 1 Position |
| 1 | NT4K85JB | Cooling Unit Termination Plug |
| 1 | NT4K85JC | Cooling Unit Interface Cable, 2 Position |
| 1 | NT4K85RA | TBM COP/LCAP Cable |
| 1 | NT7E5650 | Shelf Alarm Cable (Position 1) |
| 1 | NT7E5651 | Shelf Alarm Cable (Position 2) |
| 1 | NT7E5652 | Shelf Alarm Cable (Position 3) |
| 1 | NT7E5654 | Cooling Unit Power Cable |
| 1 | NT7E5681 | Shelf Alarm Cable (AN12 and later) |
| 1 | NT7E7802 | COP Cooling Unit Alarm Cable, TBM3 |
| 1 | NT7E7804 | COP Cooling Unit Power Cable |

## Operational controller (OPC)

Each AccessNode must come under the span of control of an OPC. The OPC is always located in the CO. The OPC from one co-located AN system can be used to control another ABM or TBM if a C-Net cable is used to connect the

two shelves together. One OPC can control up to a total of 16 network elements. Be aware that addition of the OPC may block certain mapper slots within the ABM or TBM.

Provide an OPC per customer request or system requirements:

| | | |
|---|---|---|
| 1 | NT7E24BC | OPC with DAT Tape Drive<br>(TBM slots 5 - 8) |

***Note:*** One (1) OPC per TBM only. Slot assignment depends upon tributary slot assignment. Slots 5 to 8 are considered standard placement.

### Cables to OPC front panel ethernet connector

Provide OPC front panel connector to an Ethernet hub/LAN per customer request:

| | | |
|---|---|---|
| (1) | NT4K86LA | OPC-to-Ethernet Hub Cable, 20 meter (908 connector) |
| (1) | NT4K86LB | OPC-to-Ethernet Hub Cable, 40 meter (908 connector) |
| (1) | NT4K86LC | OPC-to-Ethernet Hub Cable, 100 meter (908 connector) |

Provide OPC front panel connector to an X-terminal or MAU per customer request:

| | | |
|---|---|---|
| (1) | NT4K86SA | OPC-to-Xterm or MAU Cable, 5 meter (Straight connector) |
| (1) | NT4K86SB | OPC-to-Xterm or MAU Cable, 20 meter (Straight connector) |
| (1) | NT4K86SC | OPC-to-Xterm or MAU Cable, 40 meter (908 connector) |
| (1) | NT4K86SD | OPC-to-Xterm or MAU Cable, 100 meter (908 connector) |

### Cables to OPC sil connector

These cables link the TBM SIL J07 OPC user interface to other optional interfaces.

Provide as required:

| | | |
|---|---|---|
| (1) | NT7E44RA | 9/25 User Interface Cable, 5 meter (OPC-to-VT100 or Printer) |
| (1) | NT7E44RB | 9/25 User Interface Cable, 20 meter (OPC-to-VT100 or Printer) |
| (1) | NT7E44QA | 9/25 User Interface Cable, 5 meter (OPC-to-Graphics Terminal) |
| (1) | NT7E44QB | 9/25 User Interface Cable, 20 meter (OPC-to-Graphics Terminal) |

## TBM expansion

All TBM bays with less than three (3) TBM Shelves can be expanded with the addition of another TBM shelf. The exact shelf used in the expansion is dependent upon the type TBM already present. The NT7E51 shelves cannot be mixed with the NT4K19s within the same bay.

### NT7E51AA upgrade

With the 98W16 release, the TBM the cooling unit is integral with the TBM framework. Using this system there is only one upgrade kit for any position (1, 2 or 3) within the bay.

Provide TBM Shelves as requested to upgrade an existing TBM bay:

| | | |
|---|---|---|
| (1 or 2) | NT7E51AA | TBM Shelf with Integral Cooling Unit |

Provide one (1) Installation Kit for each expansion TBM Shelf:

| | | |
|---|---|---|
| 1 | NT7E6010 | TBM Shelf Installation Kit |

Provide one (1) label for each expansion TBM Shelf:

| | | |
|---|---|---|
| 1 - 3 | P0732671 | AccessNode TBM Shelf Identification Label |

### NT4K19AA/AB upgrade

TBM bays produced up until 98W16 can be expanded using the VTBM-ready expansion kits. However, some knowledge is required to know which shelf positions are already occupied within the TBM bay. To insure that the cooling air stream is conserved, the expansion shelf must be adjacent to the existing shelf.

Provide as required to add a VTBM-ready TBM shelf to an existing TBM bay in the field:

| | | |
|---|---|---|
| (1 or 2) | NT4K19AB | TBM Shelf (Positions 1 or 2 ONLY) |
| (1) | NT4K19AC | TBM Shelf with COP Cooling Unit (Position 3 ONLY) |

Provide one (1) Installation Kit for each expansion TBM Shelf:

| | | |
|---|---|---|
| 1 | NT7E6010 | TBM Shelf Installation Kit |

Provide one (1) label for each expansion TBM Shelf:

| | | |
|---|---|---|
| 1 - 3 | P0732671 | AccessNode TBM Shelf Identification Label |

***Note:*** Issue CAP NTR465BA for re-labeling the TransportNode TBM shelf to AccessNode TBM.

### Shelf alarm cables

All TBM shelf alarms must be routed into the BIP. On newer systems that use the NT7E56CA BIP, a three (3) connector cable (NT7E5681) is already supplied with each bay and no additional alarm cables are required to add a TBM shelf. On older systems that used either the NT7E56AB or BA BIP, individual alarm cables must be supplied to add an additional TBM shelf.

Provide one (1) required Shelf Alarm Cable on systems equipped with NT7E56AB or BA Bips:

| | | |
|---|---|---|
| 1 | NT7E5650 | Shelf Alarm Cable (Position 1) |
| | - OR - | |
| 1 | NT7E5651 | Shelf Alarm Cable (Position 2) |
| | - OR - | |
| 1 | NT7E5652 | Shelf Alarm Cable (Position 3) |

## VTBM upgrades

A cooling system upgrade is mandatory when adding VTBM optics to at least one (1) TBM shelf in a pre-AN12 system. The upgrade consists of a new cooling shelf and new cooling modules. Older cooling modules and shelves are not interchangeable with the newer units. No upgrade is required if the system is already equipped with an NT4K18BA shelf.

### For bays with 1, 2 or 3 TBM shelves

Provide when upgrading an TBM bay for VTBM cooling:

| | | |
|---|---|---|
| 1 | NT4K11AB | TBM Bay Cooling Upgrade Kit |
| 1 | NTR462FA | CAP 95-29, TBM Cooling Shelf Upgrade to VTBM |

The NT4K11AB consists of:

| | | |
|---|---|---|
| 1 | NT4K18BA | Flow Through Cooling Shelf (REQUIRED FOR VTBM) |
| 3 | NT4K17BA | Flow Through Cooling Module |
| 1 | NT4K15CA | Air Filter Unit |
| 1 | NT4K85JC | TBM Cooling Unit Cable |
| 1 | P0733554 | LCAP Filler |

***Note 1:*** The NT4K11BA can be ordered in place of the NT4K11AB if the NT4K15CA Air Filter is not required.

***Note 2:*** Unlike the ABM BIP, no circuit breaker change is required to upgrade the TBM BIP to VTBM cooling. This is because the TBM BIP already comes equipped with 15A breakers.

### For bays with 3 TBM shelves

TBM bays with triple NT4K19 TBM shelves (the older type) also have an additional cooling unit behind the Cable Organizer Panel (COP). An upgrade to include this unit is required whenever a third TBM shelf is added to an existing bay, or any one of the three TBM shelves is to be equipped with VTBM optical packs.

Provide all of the following required equipment:

| | | |
|---|---|---|
| 1 | NT4K19AS | COP/CU Upgrade Kit |
| 1 | NT4K19AR | COP/CU Installers Kit |
| 1 | NT4K19AT | COP/CU Maintenance Kit |
| 1 | NTR461FA | CAP 95-28, TBM COP Cooling Unit Upgrade to VTBM |

## Miscellaneous spares

Replacement parts can be ordered for any part of this product. This section is provided as a convenient place to list part numbers of items that are normally sold as constituent parts of higher level assemblies, and which do not have a logical place to appear elsewhere in this document. Some of these items may be required for product servicing during the product's life. However, any particular item's inclusion in, or exclusion from, this list should in no way be construed as recommending it for any type of officially sanctioned “Spares Kit.” For more information on AccessNode replacement parts see the *AccessNode NTPs*.

Provide spares as requested by the customer:

| | | |
|---|---|---|
| (1 - 3) | NT4K17BA | Cooling Module |
| (1) | NT4K18BA | Cooling Shelf |
| (1) | A0379322 | Replacement Air Filter Element (For NT4K19 TBM shelf) |
| AR | NT4K5830 | Passive I/O Face Plate (TBM slots 30-53) |
| (1) | NT4K58MA | Power Termination Card |
| (1) | NT4K1933 | Common Equipment Shelf Cover / Label Assy |
| (1) | P0732671 | TBM Shelf Identification Label |
| (1) | NT4K19AT | COP/CU Maintenance Kit |
| (4) | NT7E55AA | Fan Module (For NT7E51 TBM shelf) |
| (1) | A0368944 | Replacement Air Filter Element (For NT7E51 TBM shelf) |

# Software provisioning

The Superset software is loaded onto the hard drive of the Operations Controller (OPC). The OPC distributes the software over the system to the ABM processor cards within each NE under its control. Therefore, each AccessNode system must come within the span of control of an OPC. The OPC is almost always placed at the (ABM or TBM) CO terminal. The OPC can control a maximum of 16 network elements.

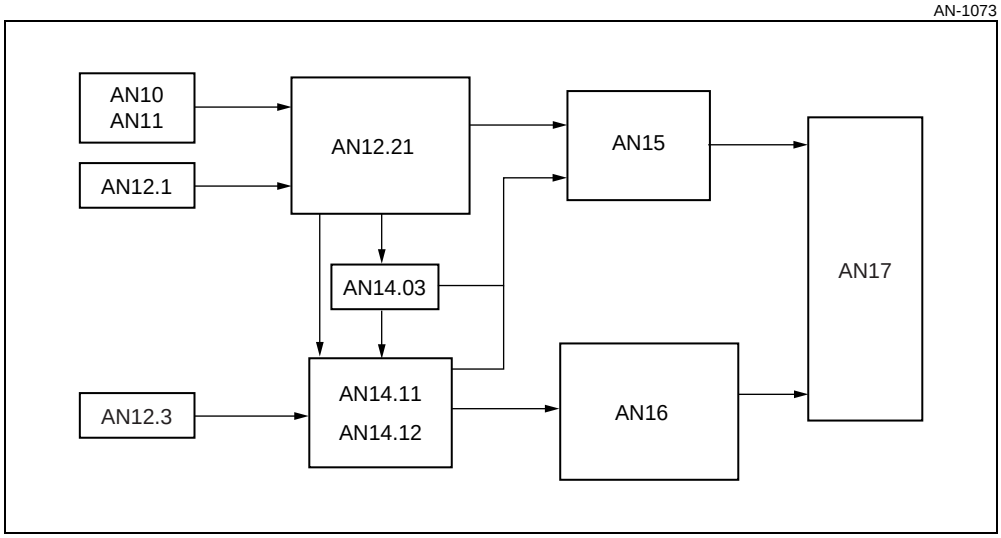
For new installations, an OPC must be ordered for the CO terminal. The Superset software is ordered and delivered from the factory on the OPC's hard drive. When there is an existing OPC, as with upgrades, the software is ordered and delivered on a DAT tape. Installers must field install the Superset software onto the OPC as part of installation. See this document and the NTPs for more information on the OPC.

## Software upgrade path

AN17 will allow the following upgrade paths:

**Figure 4-1**
**Software upgrade path**

AN-1073



## Superset software

Each job that specifies the requirement for Superset software shall be provisioned at a minimum with Superset software provided on a DAT cartridge. If an OPC was specified, a second copy shall be loaded onto the hard drive within the OPC. Additionally, when an OPC is provisioned a blank DAT cartridge shall be supplied with each order so that initial system setup data can be archived by the installer. The Superset software is only supplied to the terminal with an OPC, which is usually the CO terminal.

Provide one of the following AccessNode Software releases:

| | | |
|---|---|---|
| 1 | NT4K90NA | AccessNode AN17.00 Release Superset (Due 3Q99) |

Provide all the following at the CO terminal for new installations:

| | | |
|---|---|---|
| 1 | NT4K90NA | AccessNode AN17 Release Superset |
| 1 | NT7E24BC | OPC with DAT Tape Drive |
| 2 | NT7E24TA | Blank DAT Cartridge (1 Loaded; 1 Blank) |

Provide all the following at the CO terminal for software upgrade applications:

| | | |
|---|---|---|
| 1 | NT4K90NA | AccessNode AN17 Release Superset |
| 1 | NT7E24TA | Blank DAT Cartridge (Loaded) |

Provide optional blank DAT tapes per customer request:

| | | |
|---|---|---|
| (AR) | NT7E24TA | Blank DAT Cartridge (Blank) |

***Note 1:*** In upgrade applications it is assumed that system backups have already occurred, that system backup tapes already exist, and therefore that no blank DAT tape need be supplied.

***Note 2:*** Reference GENESIS S0000100, S0000200 and S0000900 custom pick lists for software.

## Core software certificates

Every network element must purchase a *right to use* license called the Core Software Certificate. This licenses the customer to execute (run) the basic operations portion (or core) of AccessNode software, which the controlling OPC loads into the processor cards at each network element. Each node running the system software is required to have the correct Core Software Certificate for the level of system software loaded on the OPC. New Core Certificates must be provisioned at each NE for a software upgrade.

Provide one (1) required Core Software Certificate at each network element:

| | | |
|---|---|---|
| 1 | NTG370AN | AN17 Core Software Certificate |

## Software certificates

Software certificates are a license that must be purchased in order to use any of the special features of the superset software. Unlike the Core Certificate, these Right-To-Use certificates are sold on an individual NE basis. That is, each network element within the system will have a selection of RTU certificates sold with it. The exact number and type of certificates provisioned at each node will vary with the configuration and functionality of that node.

Supply the software certificates at each node based on the configuration and level of system software used at the controlling OPC. One (1) of each certificate that apply should be provisioned at each node. Some RTU certificates have prerequisite certificates.

| | | |
|---|---|---|
| NTG350AA | X.25 interface | Note 2 |
| NTG351AC | ISNMS TL1 surveillance OS interface | Note 2, 4 |
| NTG352AC | TL1 Generic surveillance OS interface | Note 2, 4 |
| NTG353AA | DS1 protection switching | Note 2 |
| | (Provide at RFT only when DS1 protection is required) | |
| NTG354AD | NEC TL1 provisioning OS interface | Note 2 |
| NTG355AB | TA-201 Special Service testing (SARTS testing) | Note 2, 4 |
| NTG356AA | DARTS Testing | Note 2, 4 |
| NTG357AB | Multihosting | Note 2, 5 |
| NTG358AA | DS-3 interfaces | Note 3 |
| NTG359AA | DS-3 performance monitoring | Note 3 |
| NTG371AC | NMA / TL1 surveillance OS interface | Note 2,4 |
| NTG372AA | Standby OPC | Note 7 |
| NTG373AB | High-speed performance monitoring | Note 3 |
| | (Optical Protection Switch) | |
| NTG374AD | OPS/INE TL1 provisioning OS interface | Note 2, 4 |
| NTG375AD | DMS SuperNode integration | Note 2 |
| NTG376AB | Meridian Business Set | Note 2 |

| | | |
|---|---|---|
| | (Integrated application only. P-phone, MBS,EBS) | |
| NTG377AB | ISDN-U integration | Note 2 |
| | (Integrated application only w/ ISDN) | |
| NTG378AD | Enhanced administration | Note 2 |
| | (Multi-user NE and OPC) | |
| NTG379AB | Enhanced maintenance (ALT and ALIT Feature) | Note 2 |
| NTG620AA | DS-1 performance monitoring | Note 3 |
| NTG621AA | FCOT-Less | Note 2 |
| NTG622AB | OPC special-service testing | Note 2 |
| | (IRTU special services testing, NLS and NS) | |
| NTG623AA | CALRS testing | Note 2, 4 |
| NTG624AA | Inventory, Network View | Note 6 |
| NTG625AA | TR08 | Note 2 |
| NTG626AC | TL-1 generic provisioning OS I/F | Note 2, 3 |
| NTG629AA | OC-3/3c Tributary | Note 8 |
| NTG631AA | OC12 VTBM Ring Feature Package | Note 3 |
| NTG632AA | Multi-Vendor Interface (MVI) | |
| NTG633AA | Data Direct (TR-303 TMC) | Note 9 |
| NTG634AA | Data Direct (TR-303 CSC/DMS-100) | Note 10 |
| NTG636AA | DMS Access Right To Use | Note 11 |
| NTGN10AA | 3DS0 ISDN Right To Use | Note 12 |
| NTGN12AA | Fractional T1 on ANX Right To Use | Note 13 |
| NTGN13AA | IDSL Right To Use | Note 14 |
| NTGN14AA | Mix and Match Right To Use | Note 15 |

***Note 1:*** Core software is required for every AccessNode network element (FCOT and RFT).

***Note 2:*** If you order this item, order one instance for each RFT.

***Note 3:*** If you order this item, order one instance for each network element.

***Note 4:*** This software package works with X.25 software package.

***Note 5:*** This software package works with DMS SuperNode integration software package.

***Note 6:*** If you order this item, order one instance for the FCOT containing the primary OPC.

***Note 7:*** If you order this item, order one instance for the FCOT containing the standby OPC.

***Note 8:*** If you order this item, order one instance for each network element containing OC-3/3c Tribs.

***Note 9:*** At every NE with line cards if Data Direct is requested, **AND** TR-303 interface is used to connect to a generic switch.

***Note 10:*** At every NE with line cards if Data Direct is requested, **AND** TR-303 interface is used to connect to a DMS switch.

***Note 11:*** Required at every CO terminal using the DMS Access feature to make a direct connection from an AccessNode to a DMS switch.

***Note 12:*** Required at each AccessNode using 3DS0 ISDN services.

***Note 13:*** Required at each AccessNode Express HDT using fractional T1 (FT1) service.

***Note 14:*** Required at each AccessNode or HDT using IDSL services.

***Note 15:*** Required at each ANX HDT that also controls CDS or UE shelves.

# Documentation

System level documentation is always supplied based upon the level of system software supplied with the network. One (1) set of paper NTPs are supplied at the CO, and each additional remote network element is supplied with NTPs on CD-ROM. QRGs are supplied at every node. There are other special installation and site planning guides.

## Nortel Networks Technical Publications (NTPs)

Provide one (1) full set of paper NTPs at the CO network element only:

| | | |
|---|---|---|
| 1 | NT4K00LA | AN17 Complete Set Of Volumes And Guides - Paper |

Provide one (1) of all of the following at each remote network element:

| | | |
|---|---|---|
| 1 | NT4K00LR | AN17 / ANX Complete Set Of Volumes - CD ROM (Helmsman) |
| 1 | NT4K00LP | AN17 / ANX Complete Set Of Volumes - CD ROM (Non-Helmsman) |
| 1 | NTR410LA | AN17 Planning Guide |

The Complete Set of AN17 NTPs (Paper or CD-Rom) consists of:

| | | |
|---|---|---|
| P0904223 | | *Engineering, Configuration and Ordering Guide*, Volume 1 |
| P0904231 | | *Description*, Volume 2 |
| P0904232 | | *Commissioning and Testing*, Volume 3 |
| P0904233 | | *Operations, Administration and Provisioning*, Volume 4 |
| P0904236 | | *Maintenance*, Volume 5 |
| | 323-3001-030 | *About the AccessNode Library* |
| | 323-3001-032 | *Engineering and Ordering Information* |
| | 323-3001-154 | *Mapper Layouts Planning Guide* |

| | | |
|---|---|---|
| | 323-3001-155 | *Line Card Application and Special Services Engineering* |
| | 323-3001-200 | *Site Installation Planning and Engineering* |
| | 323-3001-100 | *Configuration and Equipment Description* |
| | 323-3001-102 | *Signal Flow and Circuit Pack Description* |
| | 323-3001-103 | *Protection Switching Description* |
| | 323-3001-104 | *Alarms and Surveillance Description* |
| | 323-3001-105 | *Performance Monitoring Description* |
| | 323-3001-115 | *Line and Loop Testing Overview* |
| | 323-3001-180 | *System Specifications* |
| | 323-3001-181 | *Line Card Specifications* |
| P0906796 | 323-3001-230 | *Setting Up Your System: VTBM* |
| P0906797 | 323-3001-235 | *Setting Up Your System: DFA* |
| P0906798 | 323-3001-240 | *Setting Up Your System: Point-to-Point* |
| P0906799 | 323-3001-245 | *Setting Up Your System: Single-Ended* |
| | 323-3001-220 | *Optional Commissioning Procedures* |
| | 323-3001-221 | *Site Testing Procedures* |
| | 323-3001-222 | *System Testing Procedures* |
| | 323-3001-223 | *Line Test Interface Commissioning Procedures* |
| | 323-3001-225 | *DS1 Feeder Testing Procedures* |
| | 323-3001-300 | *Network Element User Interface Description* |
| | 323-3001-301 | *OPC User Interface Description* |
| | 323-3001-302 | *System Administration Procedures* |
| | 323-3001-304 | *Data Administration Procedures* |
| | 323-3001-310 | *Provisioning and Operations Procedures* |
| | 323-3001-311 | *Protection Switching Procedures* |
| | 323-3001-315 | *Line Card Provisioning Procedures* |
| | 323-3001-316 | *Line Card Testing Procedures* |
| P0904347 | 323-3001-324 | *System Expansion Procedures* |
| P0887941 | – | *Span of Control Consolidation* |
| P0887942 | – | *Addition of AN Nodes in a VTBM Ring* |

| | | |
|---|---|---|
| P0887943 | – | *Removal of AN Nodes in a VTBM Ring* |
| | 323-3001-543 | *Alarm and Trouble Clearing Procedures* |
| | 323-3001-840 | *Log Report Manual* |
| | 323-3001-510 | *Network Surveillance Procedures* |
| | 323-3001-520 | *Performance Monitoring Procedures* |
| | 323-3001-545 | *Recovery Procedures* |
| | 323-3001-546 | *Routine Maintenance Procedures* |
| | 323-3001-547 | *Module Replacement Procedures* |
| | 323-3001-548 | *Circuit Testing from the OPC User Interface* |

Provide the following volumes in addition to the above set based on the equipment being ordered:

| | | | |
|---|---|---|---|
| 1 | P0887756 | 323-3001-110 | *Modular Business Package Description* |
| 1 | P0887931 | Addendum 1 to 323-3001-200 | *MBP Site Installation Planning and Engineering* |
| 1 | P0887757 | 323-3001-206 | *Modular Business Package Cabinet Installation Manual* |
| 1 | P0887758 | – | *MBP VTBM Ring Installation Guide* |
| 1 | P0904244 | – | *MBP VTBM Ring User Guide* |
| 1 | P0887760 | 323-3001-118 | *Series 800A Outside Plant Cabinet Description* |
| 1 | P0887761 | 323-3001-210 | *Series 800A Outside Plant Cabinet Installation Manual* |
| 1 | P0887762 | 323-3001-119 | *Modular Cabinet Description* |
| 1 | P0887763 | 323-3001-211 | *Modular Cabinet Installation Guide* |
| 1 | P0891391 | – | *AccessNode Multiple ABMs in a Bay (NT4K03CA) QRC* |
| 1 | NT4K00KG/ A0746248 | – | *Quick Reference Guide* |
| 1 | P0903573 | – | *MCOT to ABM Commissioning QRG* |
| 1 | P0905277 | – | *AN2016 User Guide* |
| 1 | P0905278 | – | *AN Step-In Cabinet Guide* |

Provide the following volumes for ANX at each HDT site:

| | | |
|---|---|---|
| 1 | NT4K00LH | AN17 ANX Volume And Guides - Paper |

The NT4K00LH ANX NTP Volume consists of:

| | | |
|---|---|---|
| | 323-3001-030 | *About the AccessNode Library* |
| P0904254 | 323-3051-032 | *AccessNode Express Customer Ordering Guide* |
| | 323-3051-100 | *AccessNode Express Configuration and Equipment Description* |
| | 323-3051-220 | *AccessNode Express Commissioning and OAM&P* |
| P0904251 | 323-3001-850 | *List of Terms* |

Provide the following volumes in addition to the above set based on the equipment being ordered:

| | | |
|---|---|---|
| P0887771 | – | *AccessNode Express Modular Cabinet Installation Guide* |
| P0887772 | 323-3051-118 | *AccessNode Express Modular Cabinet Description* |
| P0904259 | – | *AccessNode Express HDSL Installation and Reference Guide* |
| P0887769 | – | *AccessNode Express 24-Line Cabinet Installation Guide* |
| P0889658 | – | *AccessNode Express (ANX-24L for CPE/CPL) Grounding Quick Reference Card* |
| P0905280 | – | *AccessNode Express 1-Meg Modem Reference and Troubleshooting Guide* |
| P0905282 | – | *AccessNode Express Installing 1-Meg Modem Service Using PC Access Assist QRC* |
| P0905281 | – | *AccessNode Express Commissioning 1-Meg Modem Service Quick Reference Card* |
| P0905283 | – | *AccessNode Express Installing the 1-Meg-Modem Loop Extender Quick Reference Card* |
| P0887584 | – | *AccessNode Express 24-line Enclosure Installation Quick Reference Card* |
| P0887944 | – | *Reconfiguration from CServer to HDT* |

| | | |
|---|---|---|
| P0888972 | – | *Reconfiguration from DS1 to HDSL Feeder* |
| NT4A67AA | 323-3051-240 | *AccessNode Express 100 Cabinet User Guide* |
| NTN565BA | – | *AccessNode Express Point-to-Multipoint Reunion User Guide* |
| NTN565AA | – | *AccessNode Express Mini-Cabinet User Guide* |
| P0887777 | | *2/4 Party User Guide* |

## Change application procedures

Provide all applicable CAPs for AN17 upgrade applications as required:

| | | |
|---|---|---|
| AN 99-01 | NTR427HA | Upgrading to 64M processor cards (AN15 or AN16) |
| AN 99-02 | NTR464JA | Installing 2 or 3 ABMs in a bay |
| AN 99-04 | NTR421KA | Upgrading the software from AN14/15/16 to AN17 |
| AN 99-05 | NTR465JA | Upgrading the Cooling Unit to the NT4K18CA |
| AN 99-06 | NTR465JA | In-Service NE ID Renumbering |

# Product/system specifications

## Limitations and restrictions

Equipment location affected by cable length limits:

**For an ABM**

| | |
|---|---|
| DS1 | Allowable maximum cable length is 200 m (655 ft.) to interface the DSX-1 cross-connect. |
| DS3 | Allowable maximum cable length is 137 m (450 ft.) to interface the DSX-3 cross-connect. |

**For a TBM**

| | |
|---|---|
| DS3 | Allowable maximum cable length is 137 m (450 ft.) to interface the DSX-3 cross connect. |
| DS1 | Allowable maximum cable length is 200 m (655 ft.) to interface the DSX-1 cross connect. |

Control Network Allowable maximum length is 122 m (400 ft.) for end to end cabling including shelf backplane tracking, when interconnecting two equipment shelves that coexist in the same location and are intended to operate on one OPC.

## ABM line capacity

| | |
|---|---|
| VF | 672 lines (Requires ABM and 7 copper distribution shelves) |
| | 2688 lines (Requires ABM and 7 Universal Edge shelves) |
| DS1 | ABM shelf = 98 DS1s |
| | TN_BLSR shelf = 168 DS1s |
| DS3 | ABM shelf = 9 max. |
| | TN_BLSR = 12 max. |
| OC-12 | VTBM BLSR only supported at the OC-12 Rate |

## TBM line capacity

| | |
|---|---|
| VF | 0 lines (VF not supported by TBM shelves) |
| DS1 | TBM shelf = 154 DS1s |
| | TN_BLSR shelf = 168 DS1s |
| DS3 | TBM shelf = 12 max. |
| | TN_BLSR = 12 max. |
| OC-12 | VTBM BLSR only supported at the OC-12 Rate |

## Cooling limitations

AccessNode Packages equipped with VTBM require additional cooling capacity due the higher thermal dissipation of the NT7E05 circuit packs. Cooling for the ABM/TBM bays, the standard MBPs, the S800A cabinets and the STS-1 Ring MBPs can be upgraded in the field as needed. The VTBM ring MBPs have been designed and manufactured with the VTBM cooling equipment in place and will not required field upgrades. The cooling method is dependent on the type of AccessNode package.

- ABM bay - NT4K18CA cooling shelf

- TBM (1 or 2 shelves) - NT4K18BA cooling shelf and (3) NT4K17BA cooling modules
- TBM (3 shelves) - NT4K18BA cooling shelf, (3) NT4K17BA cooling modules and a COP (Cable Organizer Panel) cooling unit above TBM shelf 3. The COP cooling unit is part of the NT4K19AC TBM shelf. The NT4K19AC is deployed only in bays e/w (3) TBM shelves. The NT4K19AS COP/CU Upgrade Kit is used to upgrade TBM shelf 3 in existing three-shelf TBM bays in the field.

### Span of control

With AN12 release software single OPC can support up to 16 network elements, including the OPC shelf.

### Line timing

A minimum of one BITS is required per BLSR using line timing

- Up to 15 nodes can be synchronized from the same BITS in the C.O.
- ESI cards are required as timing interfaces to the C.O. terminal
- Up to 15 nodes can be "line timed" from the C.O. terminal

ESI cards required at all nodes where Stratum 3 Holdover is required:

- $\pm$ 0.37 ppm (Part per Million) for 24 hours

No ESI required at Nodes if SONET NE holdover is acceptable:

- $\pm$ 4.6 ppm for 24 hours and $\pm$ 0.37 ppm for 5 minutes
- SONET clock holdover provided by the new VTBM card

## Office layout information

Not applicable. No change to existing requirements.

## Physical characteristics

### ABM

No change to existing requirements for RFT. Any OPC Shelf provided will be limited to within 33 ft. (10 m) of the TBM/ABM terminal bay due to the available length of the C-Net cable.

### TBM

No change to existing requirements for CO terminals. Any OPC Shelf provided will be limited to within 33 ft. (10 m) of the TBM terminal bay due to the available length of the C-Net cable.

## Power requirements

Not applicable. No change to existing power requirements.

## EMI/ESD information

Not applicable. No change to existing requirements for EMI/ESD.

# Glossary

**ABM**
Access Bandwidth Manager

**AN**
AccessNode

**APC**
Access Processor Card

**BCS**
Batch Change Supplement

**BLSR**
Bi-directional Line Switch Ring

**BIP**
Breaker Interface Panel

**BITS**
Building Integrated Timing Source

**BOC**
Bell Operating Company

**CLE**
Customer Located Equipment

**CNET**
Control Network Cable

**CO**
Central Office

**CSC**
Common Signaling Channel

**DCC**

Digital Communication Channel

**DFA**

DS1 Fed AccessNode

**DS0**

Digital Signal Level 0 (64 kbps)

**DS1**

Digital Signal Level 1 (1.544 Mbps)

**DS3**

Digital Signal Level 3 (44.7Mbps)

**ESI**

External Synchronization Interface

**FCOT**

Fiber Central Office Terminal

**FST**

Full Services Terminal

**HDT**

Host Digital Terminal

**IDLC**

Integrated Digital Loop Carrier

**IDT**

Integrated Digital Terminal

**IOC**

Independent Operating Company

**Kbps**

Kilo-bits per second

**LCAP**

Local Craft Access Panel

**Mbps**

Mega-bits per second

**MIC**

Maintenance Interface Card

**MTA**
Metallic Test Access Card

**NE**
Network Element

**NT**
Northern Telecom

**NTP**
Northern Telecom Publication

**OAM&P**
Operations, Administration, Maintenance and Provisioning

**OC-3**
Optical Carrier Signal Level 3

**OC-12**
Optical Carrier Signal Level 12

**OC-48**
Optical Carrier Signal Level 48

**OMC**
Operations and Maintenance Channel

**OPC**
Operations Controller

**OSS**
Operations Support System

**RFT**
Remote Fiber Terminal

**SDCC**
SONET Data Communications Channel

**SMA**
Subscriber Carrier Module - 100 Access

**SONET**
Synchronous Optical NETwork

**STS-1**
Synchronous Transport Signal Level 1 (SONET signal format 51.84 Mb/s)

**TBM**

Transport Bandwidth Manager

**TELCO**

TELephone COmpany

**TIC**

Transport Interface Card

**TL1**

Transaction Language 1

**TN**

TransportNode

**TXC**

Timing and Cross-Connect

**UI**

User Interface

**VT**

Virtual Tributary

**VTBM**

Virtual Tributary Bandwidth Management

SONET Products

# AccessNode

## Engineering and Ordering Information



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NORTEL NETWORKS™