EXHIBIT 4: Installation Manual

The Installation manual is provided.

Lucent Technologies
Bell Labs Innovations

Flexent® Modular Cell 4.0B

Outdoor Cabinet Installation Manual

401-703-454
FOA Draft Issue 1
February, 2006

Notice

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For technical support, see “To obtain documentation, training, and technical support, or submit feedback” on the 401-010-001 *Flexent®AUTOPLEX®Wireless Networks System Documentation* CD-ROM or the documentation web site at https://wireless.support.lucent.com/amps/rls_info/rls_doc/cd_docs/customer.support/customer.support_toc.pdf.wen

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Alternate: 1-800-CAL-4NSC (1-800-225-4672)

Developed by Lucent Technologies

Contents

2 Modular Cell 4.0B and WNG24-BC cabinet handling, placement, anchoring and grounding

3 Cable connections in the Modular Cell 4.0B cabinets

4 Power and alarm connections in Modular Cell 4.0B cabinets with integrated power

5 Component installation in the Modular Cell 4.0B and the WNG24-BC battery cabinest

6 RF cable connections between existing Modular Cell cabinets and a 4.0B dual band cabinet

7 Finishing the installation

About this information product

Purpose

This information product (IP) provides instructions for the physical installation of the following:.

- Flexent® Modular Cell 4.0B outdoor primary cabinets with integrated power, and the associated WNG24-BC battery cabinets or EZBFo battery frames
- Modular Cell 4.0B outdoor dual band cabinets with integrated power, with various Legacy cabinets.
- Modular Cell 4.0B outdoor cabinets *without* integrated power, that utilize customer power

For 4.0B Dual Band cabinet installation, a PCS 4.0B dual band cabinet may be installed with an 850 Cellular 4.0B primary cabinet. A PCS 4.0B dual band cabinet may be installed with an 850 Cellular 4.0B primary cabinet. Also, a 4.0B PCS dual band cabinet with integrated power may be installed with 850 Cellular 1.0/2.0/3.0/4.0 primary and/ or first growth cabinets in certain line-up configurations. Variations in the RF cabling are specified in the text.

When connecting 60ECv2 and WNG24-BC battery cabinets to PowerHouse 24 and WNG24-K power cabinets, respectively, the instructions are provided in *Outdoor Flexent CDMA Modular Cell 1.0/ 2.0 Cabinet Installation Manua*l, 401-710-123.

The tasks mentioned on the previous page are to be performed after completion of all site preparation tasks, which are covered in *Flexent Modular Cell 4.0/4.0B Outdoor Site Preparation Guidelines*, 401-703-413.

Important! The procedures contained in this IP are based on Lucent Technologies standard practices. Prior to beginning a Modular Cell 4.0B cabinet, or battery cabinet installation, installers should be familiar with these practices. If there is a conflict, standard practices take precedence. However, this IP takes precedence for identification of parts and materials specific to a Modular Cell 4.0B cabinet, or battery cabinet installation.

Important! Following installation of the Modular Cell 4.0B cabinet, the next step is to test and integrate it into the network. Procedures for testing and integration may be found in *Installation Engineering Handbook 238.*

Reason for reissue

This is FOA Draft Issue 1 of the *Flexent Modular Cell 4.0B Outdoor Cabinet Installation Manual*, document number 401-703-454. This issue incorporates information that was formerly included in the *Flexent Modular Cell 4.0/4.0B Outdoor Cabinet Installation Manual*, document number 401-703-414. This issue also incorporates the following new information available as of January, 2006:

- New 4.0B cabinet configurations:
  - 4.0B PCS Dual Band G-2 cabinet installation with existing primary and G1 Legacy cabinets
  - 4.0B PCS Dual Band G-3 cabinet installation with existing primary, G1 and G2 Legacy cabinets
  - 4.0B PCS cabinet, four to six sectors added
- Increase in PCS carriers available in a 4.0B dual band cabinet to eleven total.
- Addition of installation instructions for the dual band integrated power alarm cable
- 4.0B Heat exchanger and solar shield table revised
- RF cable routing and connection added between a 4.0B PCS Dual Band G-2 or G-3 cabinet and existing Legacy cabinets
- Revisions to Appendix B to add an additional DC cable for cabinets with an A6 shelf

The following significant changes have been made since the release of Issue 8.0 of document 401-703-414:

Significant changes from last issue

- In Chapter 1:
  - Miscellaneous line-up and carrier changes and clarifications
  - New 4.0B line-up configurations added (see above list). Refer to Modular Cell 4.0B cabinets on Page 1 - 8 and Outdoor Flexent Modular Cell 4.0B site descriptions (typical) on Page 1 - 15

- In Chapter 2:
  - 4.0B heat exchanger and solar shield table revised. Refer to Heat exchanger and solar shield configurations for Modular Cell 4.0B cabinets on Page 2 - 69.

- In Chapter 3:
  - Addition of installation instructions for the dual band integrated power alarm cable. Refer to Route and punch down the dual band cabinet integrated power alarms on the EFIM in the Modular Cell 4.0B primary cabinet, if applicable on Page 3 - 49

- In Chapter 4:
  - AC junction box and conduit paragraph and figure added. Refer to AC conduits on Page 4 - 3

- In Chapter 6:
  - RF cable routing and connection added between a 4.0B PCS Dual Band G-2 or G-3 cabinets and existing Legacy cabinets. Refer to Routing and connection of RF inter-frame cables to a 4.0B Modular Cell dual band cabinet on Page 6 - 8

- In Appendix A:
  - EZBFo footprint figure with Modular Cell 4.0B cabinets added. Refer to EZBFo battery frame footprint with Modular Cell 4.0B primary and dual band cabinets on Page A - 5

- In Appendix B:
  - Revisions to Appendix B to add an additional DC cable for cabinets with an A6 shelf. Refer to How to route and connect DC power cables to the Modular Cell 4.0B primary cabinet on Page B - 18, and How to route and connect DC power cables to a Modular Cell 4.0B dual band cabinet on Page B - 54

- In "Installation Process":
  - Revised installation process checklist references as a result of changes made in the applicable chapters and appendices

Safety labels

The safety alert symbol is used on product labels and in this IP to alert the user to important safety instructions. The definitions of the three types of safety labels are listed below, in order of severity.

DANGER

DANGER indicates the presence of a hazard that will cause death or severe personal injury if the hazard is not avoided.

WARNING

WARNING indicates the presence of a hazard that can cause death or severe personal injury if the hazard is not avoided.

CAUTION

CAUTION indicates the presence of a hazard that will cause minor personal injury or property damage (to include loss of software or interruption of service) if the hazard is not avoided.

Within this IP, the safety label typically includes additional information such as the hazard type, a description of the damage that can be caused, and the steps that should be taken to avoid the hazard.

Intended audience

This IP is intended for use by Lucent Technologies' installation technicians.

How to use this information product

Since this IP contains instructions for the installation of *all* Modular Cell 4.0B outdoor site cabinets (in all applications and configurations), only certain pages are required for specific installations.

In order to isolate the pages required for your current installation, the installer may use the *"Installation Procedure Checklist"*, which lists all installation procedures, by chapter, along with corresponding chapter and page references where the actual instructions can be found. The procedures required for a certain installation are separated by headings which identify the installation activity.

This checklist may also be used by installers to record completion of individual installation activities. The checklist contains a "completed" column, and is printed on one side of the page only, in order to facilitate copying.

For experienced installers, chapter and page references can be used in the event a particular activity requires review.
The Installation Procedure Checklist is included in the *"Installation process"* chapter, which immediately follows this chapter.

The following is a general overview of chapter and appendix usage.

Installation process Provides an explanation of the installation process, and includes the "Installation Procedure Checklist".

After reading Chapter 1, the installer should use the following chapters and appendices, as applicable. Note that a battery cabinet/frame(s) can be installed simultaneously using the same chapter order. For the installation of primary cabinets, use the following chapters and appendices, as applicable

Primary 4.0B cabinet *with* integrated power: Initial installation

- Installation Process as a guide to installation steps
- Chapters 2 through 5, as applicable, and Chapter 7 to finish the installation

Primary 4.0B cabinet without integrated power: Initial installation

- Installation Process as a guide to installation steps
- Chapters 2 and 3, Appendix B, and Chapter 7 to finish the installation

4.0B dual band cabinet with integrated power: Initial installation

- Installation Process as a guide to installation steps
- Chapters 2 through 6, as applicable, and Chapter 7 to finish the installation

4.0B dual band cabinet *without* integrated power: Installation

- Installation Process as a guide to installation steps
- Chapters 2, 3, and 6, Appendix B, and Chapter 7 to finish the installation

For the installation of power cabinets or frames, use the following chapters and appendices, as applicable.

If a 4.0B dual band cabinet is installed with existing 1.0, 2.0, 3.0, or 4.0 cabinets that utilize a PowerHouse24 or WNG power cabinet, the total load for all cabinets is limited to 17kW. The total number of carriers possible in the 4.0B dual band cabinet will be limited. Use of a dual band cabinet with Integrated Power is recommended to overcome this limitation

For the installation of additional cabinets, use the following chapters and appendices, as applicable.

EZBFo battery frame installation (first and/or second) with a Modular Cell 4.0B primary or dual band cabinet, which has integrated power:

- Installation Process as a guide to installation steps
- Chapter 2 for handling, placement, anchoring and grounding
- Appendix A for installation instructions

Subjects covered in this manual are listed below.

Installation process Provides an explanation of the installation process, and includes the "Installation Procedure Checklist".

Chapter 1 "Overview of the Flexent® Modular Cell 4.0B cabinet installation" provides the following information.

- An overview of the Flexent Modular Cell 4.0B cabinets
- A description of typical installation sites, as well as cabinets.

Chapter 2 "Modular Cell 4.0B and WNG24-BC cabinet handling, placement, anchoring and grounding" provides the following information.

- Procedures for anchor installation
- Instructions for installation of optional mounting bases
- Instructions for cabinet handling

- Procedures for placement, anchoring and grounding of the Modular Cell 4.0B primary cabinet, as well as the first and second WNG battery cabinet
- Procedures for placement, anchoring and grounding of Modular Cell 4.0B dual band cabinet.

Chapter 3 "Cable connections in the Modular Cell 4.0B cabinets" provides procedures for connecting the following cables at the primary, or dual band 4.0B Modular Cell cabinets, as applicable.

- GPS antenna (primary cabinet only)
- T1/E1.
- External user alarms (primary cabinet only)

Chapter 4 "Power and power alarm connections in Modular Cell 4.0B cabinets with integrated power" provides the following procedures for power and power alarm connections.

- Customer power references to other chapters and appendices, as well as other documents
- AC Utility connection to the primary or dual band cabinet
- AC, DC, alarm and fan power cable connections between the first battery cabinet and the primary Modular Cell 4.0B cabinet, as well as between the second battery cabinet and the first battery cabinet
- Battery installation procedure revisions (for 66ECv2 battery cabinet with 4.0B with integrated power)

Chapter 5 "Component installation in the Modular Cell 4.0B and WNG24-BC battery cabinets" provides the following procedures for the installation of power components.

- Rectifier and battery installation in the primary and dual band cabinets (for reference only)
- Battery installation in the first and second WNG battery cabinets
- Final DC connections after installation of the first or second WNG battery cabinet.

Chapter 6 "RF cable connections between existing Modular Cell cabinets and a Modular Cell 4.0B dual band cabinet" provides the following procedures for RF connections between cabinets.

- Procedures for the use of the chapter
- Routing and connection of RF cables between existing Modular Cell cabinets and a Modular Cell 4.0B dual band cabinet

Chapter 7 "Finishing the installation" provides the following procedures for finishing the installation of individual cabinets.

- RF antenna connections (Primary or dual band cabinets)
- Final connection of primary cabinet batteries
- Replacement of panels and closure of cabinet doors (all cabinets).

Appendix A "**EZBFo Battery Frame Installation with Modular Cell 4.0B cabinets (with integrated power)" provides installation procedures for the installation of the EZBFo battery frame as an alternate to the WNG24-BC procedures presented in Chapters 4 and 5.**

Appendix B "Non-Lucent power ancillary hardware installation, cable routing and connection" provides instructions for the connection of non-Lucent customer power at the 4.0B Modular Cell cabinets

Appendix C "**Post-installation checklist by cabinet" provides checklists to verify completion of required items.**

Appendix D "Post-installation checklist by cabinet" provides checklists to verify completion of required items.

Glossary

Conventions used

The following conventions are used in this IP:

Illustrations

The illustrations shown in this IP are schematics. They do not contain all details and exceptions, but are rather intended to highlight main points. Dimensions are usually shown in millimeters, with inches in parenthesis. As an example, 680.0 (26.77) equals 680 millimeters or 26.77 inches.

Naming conventions

The Flexent Modular Cell 4.0B cabinet will be referred to as the Modular Cell 4.0B cabinet, or merely the 4.0B cabinet.

Standard cross-sections and wire diameters of round copper conductors

The following table is from IEC standard 60947-1 (c) IEC:1996 +A1:1997+A2:1998.

ISO CROSS SECTION (mm^2)	AWG
120	0000
95	000
70	00
50	0
35	2
25	4
16	6
10	8
6	10
4	12
2.5	14
1.5	16
1	16
0.75	18
0.5	20
0.5	22
0.2	24
DIAMETER (mm)	**AWG**
0.81	20
0.65	22
0.51	24
0.4	26
0.32	28

Related documentation

The following product-related documentation is available for the Flexent Modular Cell 4.0B cabinet:

Lucent Technologies documents

- *Flexent® Modular Cell 4.0/4.0B Outdoor Site Preparation Guidelines,* 401-703-413*
- *Outdoor Flexent® Modular Cell 1.0/2.0 Cabinet Installation Manual,* 401-710-123*
- *Grounding and Lightning Protection Guidelines for Lucent Technologies Network Wireless System Cell Sites,* 401-200-115**
- *Base Station CDMA Reference Frequency Timing Generator and GPS Antenna System Description, Operation, Installation and Maintenance,* 401-660-128*
- *Lucent Technologies Installation Engineering Handbook 238***
- *12IR125 Series II Batteries KS-23997 Product Manual,* Select Code 157-622-025*
- *Corner Mounted Rotating Derrick Equipped with Hydraulic Digger - Description and Maintenance,* 649-300-021*
- *Slings,* 649-310-115*
- *B Connecting Links,* 081-410-105*

* May be ordered by contacting Lucent's Customer Information Center (CIC) at the telephone numbers on the following pages.

Related training

The following product-related training is available for the Flexent Modular Cell cabinet:

Lucent Technologies training

Flexent® Modular Cell 4.0 Installation Video Course, CL 5494*

* May be ordered by contacting Lucent's Customer Information Center (CIC) at the telephone numbers listed below.

Site preparation checklists

All site preparation activities, as well as adherence to the guidelines, should be verified prior to the installation of the cell site equipment. Various checklists and punchlist sheets have been provided in Appendix A of the site preparation document (see Related documentation) to aid customers and Lucent personnel during a base station site Method of Procedure (MOP) walk-through prior to the equipment installation. A general list is provided in Chapter 1.

Utilization of the checklists helps ensure a quality installation and provides a base station site history file for later reference. The punchlist is used to track completion of any outstanding site preparation items, and to aid in the project management of installation resources.

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Attention: Order Entry Section
2855 N. Franklin Road
P.O. Box 19901
Indianapolis, IN 46219 USA

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  Facsimile: 1-800-566-9568
- From Canada:
  Telephone: 1-317-322-6615
  Facsimile: 1-317-322-6699
- From all other countries:
  Telephone: 1-317-322-6416
  Facsimile: 1-317-322-6699

Installation process

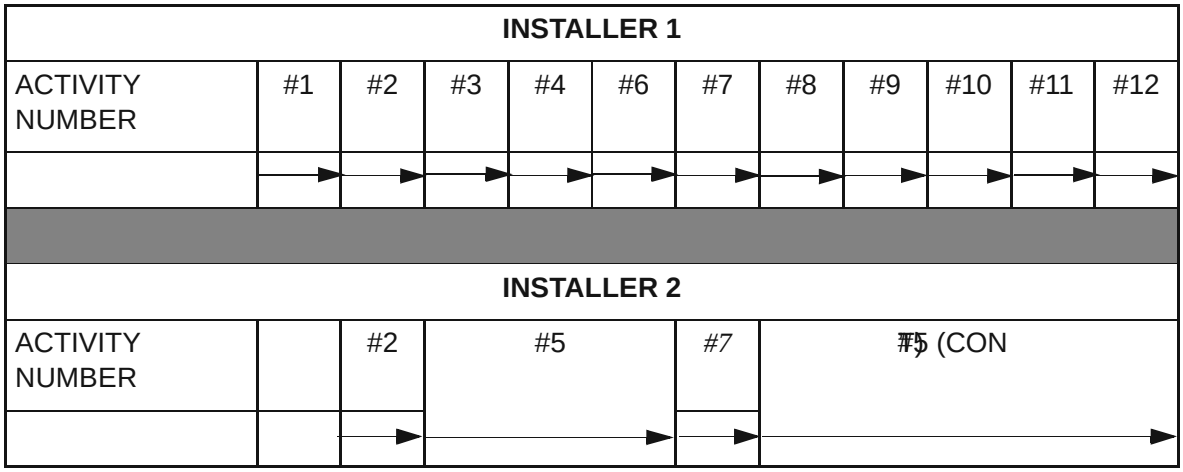
Overview

Purpose

This section provides an outline for the physical installation process, as well as installation procedure checklists to guide the installer through specific installation procedures.

Physical installation process chart

The chart shown below assigns the concurrent installation activities for each of two installers. The specific activities are listed in the table that follows.



Physical installation process table

This table represents the activities required to install a Modular Cell 4.0B primary cabinet with integrated power.

ACTIVITIES	INSTALLER ACTIVITY ASSIGNMENT	
	INSTALLER 1	INSTALLER 2
1. Check parts inventory	X	
2. Line up cabinet on the cabinet anchor holes	X	X
3. Anchor the cabinet to the surface	X	
4. Ground the cabinet	X	
5. Install six RF antenna cable jumpers and one GPS antenna cable		X
6. Install the conduit interface for the T1/E1 and user alarm cables	X	
7. Route the T1/E1 and user alarm cables into the cabinet	X	X
8. Punch down the T1/E1 lines at the EFIM	X	
9. Install the conduit interface for the AC utility cable	X	
10. Route and connect the AC feed to the terminal block in the power module	X	
11. Turn on and check power	X	
12. Clean up	X	

Installation Procedure checklists

Overview

Purpose

The following checklists may be used by all installers to record completion of individual installation activities. The checklists are particularly useful when used to determine the specific activity to be performed. To use the checklists, make a copy of the pages. Since only certain pages are required for specific installations, use only the pages that apply to the specific equipment you are installing.

Page references are given for each activity. The checklists are therefore useful to experienced installers, to use in place of the installation manual itself. The page references can be used in the event that a particular activity requires review.

This section contains installation checklists for the following chapters.

Chapter 2: Modular Cell 4.0B and WNG24-BC cabinet handling, placement, anchoring and grounding

Overview

Table 1 lists the procedures covered in Chapter 2 for handling, placement, anchoring and grounding of the 4.0B Modular Cell primary and dual band cabinets, as well as the WNG24-BC battery cabinets.

Modular Cell 4.0B Primary Cabinet Serial Number:

_____

Modular Cell 4.0B Dual Band Cabinet Serial Number:

_____

WNG24-BC Battery Cabinet Serial Number:

_____

Table 1 Chapter 2

COMPLETED	INSTALLATION STEP	PAGE
	Mark and drill the anchor holes	2 - 5
	Set the 1/2-inch drop-in anchor (if applicable)	2 - 7
PERFORM THE NEXT FIVE STEPS ONLY IF INSTALLING CABINETS ON MOUNTING BASES		
	Set the 12-mm expansion stud anchors for mounting bases	2 - 9
	Install the optional bases for the primary cabinet, and battery cabinets if applicable, using zone 0, 1, and 2 type anchors	2 - 11
	Install the optional mounting bases for the primary cabinet, and battery cabinets if applicable, using zone 3 and 4 type anchors	2 - 13
	Install the optional mounting bases for a dual band cabinet, using zone 0, 1, and 2 type anchors	2 - 17
	Install the optional mounting bases for a dual band cabinet using zone 3 and 4 type anchors	2 - 19
PERFORM THE NEXT FIVE STEPS IF APPLICABLE		
	Unpack the cabinet	2 - 24
	Install the lifting eye bolts	2 - 24
	Lift cabinet using boom tip winch	2 - 25
	Transport cabinet	2 - 27
	Remove cabinet from pallet	2 - 27

Chapter 3: Cable connections in the Modular Cell 4.0B cabinets

Overview Table 2 lists the procedures covered in Chapter 3 for cable connections in the 4.0B Modular Cell primary and dual band cabinets.

Modular Cell 4.0B Primary Cabinet Serial Number:

_____

Modular Cell 4.0B Dual Band Cabinet Serial Number:

_____

Table 2 Chapter 3

COMPLETED	INSTALLATION STEP	PAGE
PERFORM THE NEXT THREE STEPS IF INSTALLING A 4.0B PRIMARY CABINET, IF APPLICABLE		
	Connect the unterminated end of the GPS jumper cables to the Modular Cell 4.0B primary cabinet, if applicable	3 - 4
	Connect a terminated end of the GPS antenna jumper cables to the Modular Cell 4.0B primary cabinet, if applicable	3 - 8
	Connect the GPS antenna jumper cable to the GPS surge protector at the GPS antenna cable	3 - 11
PERFORM THE NEXT STEP TO INSTALL THE CONDUITS FOR TI/E! LINES AND EXTERNAL USER ALARMS		
	Connect the conduit between the metal conduits and the antenna cable cover of the 4.0B primary cabinet	3 - 13
PERFORM THE NEXT STEP IF INSTALLING A DUAL BAND CABINET IN AN INTEGRATED POWER LINE-UP		
	Route T1/E1 cables to the Modular Cell 4.0B dual band cabinet	3 - 16
PERFORM THE NEXT STEP IF INSTALLING A DUAL BAND CABINET IN A LINE-UP WITH A POWERHOUSE 24 CABINET		
	Route the T1/E1 cable(s) to the Modular Cell 4.0B dual band cabinet (in line-ups that utilize existing PowerHouse24 or customer supplied power)	3 - 19
PERFORM THE NEXT STEP IF INSTALLING A DUAL BAND CABINET IN A LINE-UP WITH A WNG POWER CABINET		
	Route the T1/E1 cable(s) to the Modular Cell 4.0B dual band cabinet (in installations that utilize an existing WNG power cabinet)	3 - 24
PERFORM THE NEXT TWO STEPS IF INSTALLING T1/E1 AND/OR USER ALARM CABLES		
	Install the EMI / RFI cord grip seals with T1/E1 and user alarm cables	3 - 29
	Prepare the T1/E1 and user alarm cables for punchdown and ground connection at the facilities interface module	3 - 33

Chapter 4: Power and power alarm connections in Modular Cell 4.0B cabinets with integrated power

Overview

Table 3 lists the procedures covered in Chapter 4 for AC power connections in the Modular Cell 4.0B integrated power primary and dual band cabinets, as well as installation of the WNG24-BC battery cabinets.

Modular Cell 4.0B Primary Cabinet Serial Number:

_____

Modular Cell 4.0B Dual Band Cabinet Serial Number:

_____

WNG24-BC Battery Cabinet Serial Number:

_____

Table 3 Chapter 4

COMPLETED	INSTALLATION STEP	PAGE
PERFORM THE NEXT FOUR STEPS IF INSTALLING A PRIMARY 4.0B CABINET WITH INTEGRATED POWER		
	Prepare the AC power module (ACPDA) for connection of the AC utility wires	4 - 7
	Install a 2-inch flexible conduit fitting on the primary or dual band cabinet	4 - 9
	Connect the flexible conduit between the existing metal conduit and the fitting at the primary or dual band cabinet	4 - 10
	Route and connect the AC utility wires in the primary or dual band cabinet	4 - 12
PERFORM THE NEXT THIRTEEN STEPS IF INSTALLING A FIRST BATTERY CABINET		
	Install the cable interface panel	4 - 15
	Determine the battery shelf type	4 - 19
	Connect the DC cables in the first WNG24-BC battery cabinet	4 - 20
	Identify the individual interface panel cables on the battery cabinet side	4 - 24
	Route and connect the fan power/alarm cable in the WNG24-BC battery cabinet	4 - 26
	Route and connect the fuse alarm cable in the WNG24-BC battery cabinet	4 - 28
	Route and connect the intrusion alarm cables in the WNG24-BC battery cabinet	4 - 30
	Identify the individual interface panel cables on the primary cabinet side	4 - 33

Chapter 5: Component installation in the Modular Cell 4.0B and WNG24-BC cabinets

Overview

Table 4 lists the procedures covered in Chapter 5 for installation of the rectifiers and batteries in the 4.0B Modular Cell primary and dual band cabinets with integrated power, as well as installation of batteries in the WNG24-BC battery cabinets. Also listed are the procedures for final connection of DC power after the installation of batteries in a WNG24-BC battery cabinet.

Modular Cell 4.0B Primary Cabinet Serial Number:

_____

Modular Cell 4.0B Dual Band Cabinet Serial Number:

_____

WNG24-BC Battery Cabinet Serial Number:

_____

Table 4 Chapter 5

COMPLETED	INSTALLATION STEP	PAGE
PERFORM THE NEXT TWO STEPS IF MOVING OR INSTALLING A RECTIFIER OR BATTERIES IN A MODULAR CELL 4.0B CABINET		
	Install rectifiers in a Modular Cell 4.0B primary cabinet	5 - 3
	Install batteries in a Modular Cell 4.0B cabinet	5 - 5
PERFORM THE NEXT SEVEN STEPS IF INSTALLING L1, L2, OR 12IR125 BATTERIES IN A BATTERY CABINET THAT HAS TYPE 1 SHELVES (SPACING RODS)		
	Prepare the batteries for installation	5 - 16
	Place the batteries on a shelf	5 - 18
	Install the battery retaining bracket	5 - 21
	Attach the two battery cable assemblies to the retaining bracket (L1,L2, and 12IR125 batteries only)	5 - 23
	Connect positive battery cables to all battery strings	5 - 26
	Attach interconnecting bus bars to all battery strings	5 - 28
	Connect the negative battery cables to all battery strings	5 - 30

Chapter 6: RF cable connections between existing Modular Cell cabinets and a Modular Cell 4.0B dual band cabinet

Overview Table 5 lists the procedures covered in Chapter 6 for connection of cables between Modular Cell 4.0B dual band cabinets and the existing cabinet(s) in a line-up.

Modular Cell 4.0B Dual Band Cabinet Serial Number:

_____

Table 5 Chapter 6

COMPLETED	INSTALLATION PROCEDURE	PAGE
PERFORM THE NEXT THREE PROCEDURES BEFORE STARTING THE INSTALLATION OF CABLES BETWEEN MODULAR CELL CABINETS		
	Read cabinet definitions	6 - 3
	Identify your line-up configuration	6 - 4
	Determine the prerequisite changes needed in the existing cabinet(s) in your line-up configuration	6 - 5
PERFORM THE A NEXT TWO PROCEDURES TO ROUTE AND CONNECT RF CABLES BETWEEN MODULAR CELL CABINETS		
	Route and connect the 15-MHz cable(s)	6 - 9
	Route and connect the GPS cable	6 - 18

Chapter 7: Finishing the installation

Overview Table 6 lists the procedures covered in Chapter 7 for finishing the installation of the Modular Cell 4.0B primary cabinet and dual band cabinets, as well as the WNG24-BC battery cabinets.

Modular Cell 4.0B Primary Cabinet Serial Number:

_____

Modular Cell 4.0B Dual Band Cabinet Serial Number:

_____

WNG24-BC Battery Cabinet Serial Number:

_____

Table 6 Chapter 7

COMPLETED	INSTALLATION STEP	PAGE
PERFORM THE NEXT THREE STEPS TO VERIFY ANTENNA STATUS AND REFERENCE POWER UP AND SYSTEM TESTS		
	Verify GPS antenna connection	7 - 3
	Verify RF antennas not connected	7 - 3
	Perform power-up and system test	7 - 4
PERFORM THE NEXT FIVE STEPS IF INSTALLING A 4.0B PRIMARY OR DUAL BAND CABINET		
	Test and connect the internal battery cables (if applicable)	7 - 5
	Connect the unterminated end of the RF antenna jumper cables to the Modular Cell 4.0B primary or 4.0B dual band cabinet	7 - 8
	Connect a terminated end of the outdoor RF antenna jumper cables to the Modular Cell 4.0B primary or 4.0B dual band cabinet	7 - 12
	Connect RF antenna jumper cables to the antenna cables	7 - 15
	Replace / close all access panels and doors	7 - 18
PERFORM THE NEXT STEP IF INSTALLING A FIRST OR SECOND BATTERY CABINET		
	Finish the installation of the first or second WNG24-BC battery cabinet	7 - 19

Appendix A: EZBFo battery frame installation with Modular Cell 4.0B cabinets (with integrated power)

Overview

Table 7 lists the procedures covered in Appendix A for installation of EZBFo battery modules with Modular Cell 4.0B primary or dual band cabinets (with integrated power).

Modular Cell 4.0B Primary Cabinet Serial Number:

_____

Modular Cell 4.0B Dual Band Cabinet Serial Number:

_____

EZBFo Battery Frame serial number:

_____

Table 7 Appendix A

COMPLETED	INSTALLATION STEP	PAGE
PERFORM THE NEXT FOUR STEPS TO PLACE AND ATTACH THE FIRST BATTERY BASE MODULE OUTER FRAME AND MARK, DRILL, AND SET ANCHORS		
	Place and attach a battery base module to the Modular Cell cabinet or the first battery base module using the applicable conduit	A - 10
	Remove the top and filter panels from the battery base module	A - 14
	Mark and drill the anchor holes	A - 16
	Set the 1/2-inch diameter drop-in anchor	A - 18
PERFORM THE NEXT FOUR STEPS TO INSTALL HEATER PADS IN THE BATTERY MODULE INNER FRAMES		
	Remove the top and filter panels from the battery base module (Reference)	A - 20
	Remove the two piece battery retaining brackets, separating the two parts if applicable	A - 20
	Install the internal AC wiring for the heater pads	A - 21
	Install the heater pads on each of the two battery shelves	A - 24
PERFORM THE NEXT FOUR STEPS TO INSTALL THE INNER BATTERY FRAME AND LEVEL, ANCHOR, AND GROUND THE FIRST OR SECOND BATTERY BASE MODULE		
	Remove the two piece battery retaining brackets, separating the two parts if applicable (Reference)	A - 27

COMPLETED	INSTALLATION STEP	PAGE
	Complete the installation of batteries	A - 153
	Replace the battery module panels and close/secure the front door(s) (if applicable)	A - 153
PERFORM THE NEXT TWO STEPS TO COMPLETE INSTALLATION OF 12IR125 BATTERIES IN A BATTERY MODULE		
	Test and connect the 12IR125 battery cables to the bus bars in the battery modules	A - 157
	Complete the installation of 12IR125 batteries	A - 160
PERFORM THE TWO STEP TO COMPLETE THE INSTALLATION OF BATTERY MODULES		
	Replace the battery module panels and close/secure the front door(s), if applicable (Reference)	A - 162

Appendix B: Non-Lucent power ancillary hardware installation, cable routing and connection

Overview Table 8 lists the procedures covered in Appendix B for Non-Lucent power ancillary hardware installation, cable routing and connection to Modular Cell 4.0B primary and dual band cabinets.

Modular Cell 4.0B Primary Cabinet Serial Number:

_____

Modular Cell 4.0B Dual Band Cabinet Serial Number:

_____

Table 8 Appendix B

COMPLETED	INSTALLATION STEP	PAGE
PERFORM THE NEXT FOUR STEPS TO INSTALL THE ANCILLIARY HARDWARE AND PHYSICALLY ATTACH THE NON LUCENT POWER SOURCE		
	Install the cable duct assembly	B - 4
	Install the AC conduit	B - 6
	Attach the non-Lucent power source directly to the cable duct (zero spacing), if applicable	B - 11
	Attach the non-Lucent power source to the cable duct assembly using conduits.	B - 14
PERFORM THE NEXT TWO STEPS TO ROUTE AND CONNECT THE DC CABLES BETWEEN THE NON-LUCENT POWER SOURCE AND THE MODULAR CELL 4.0B PRIMARY CABINET		
	Route the DC cables from the Modular Cell 4.0B primary cabinet to the non-Lucent power source	B - 22
	Connect the DC cables at the Modular Cell 4.0B primary cabinet	B - 24
PERFORM THE NEXT FOUR STEPS TO ROUTE AND CONNECT THE POWER ALARM CABLE BETWEEN THE NON-LUCENT POWER SOURCE AND THE MODULAR CELL 4.0B PRIMARY CABINET		
	Route the power source alarm cable to the Modular Cell 4.0B primary cabinet	B - 27
	Install the EMI / RFI cord grip seal with the alarm cable	B - 32
	Prepare the alarm cable for punchdown and ground connection at the facilities interface panel	B - 35
	Connect alarm cable to the EFIM punchdowns in Modular Cell 4.0B cabinet	B - 37
PERFORM THE NEXT THREE STEPS TO ROUTE AND CONNECT THE AC CABLE(S) BETWEEN THE NON-LUCENT POWER SOURCE AND THE MODULAR CELL 4.0B PRIMARY CABINET		
	Route the AC power cables to the Modular Cell 4.0B primary cabinet	B - 42

1 Overview of the Flexent® Modular Cell 4.0B cabinet installation

Overview

Purpose This chapter contains the following sections.

Modular Cell 4.0B cabinets

Overview

Purpose This chapter provides an overview of Flexent ® Modular Cell site cabinet installation. Descriptions of cabinets, system configurations, and typical installation sites are provided. Tools, supplies and required parts are listed and safety issues are addressed.

General information

Modular Cell 4.0B description

The Flexent Modular Cell 4.0B is a CDMA application product that utilizes the OneBTS digital module with UCRs and LAMS. The primary cabinet can support up to six carriers per cabinet. The Modular Cell 4.0B cabinet may be used as a stand-alone primary cell, or be configured as a growth, dual band, or mixed dual band cabinet at an existing Modular Cell site.

Note that the dual band and mixed dual band cabinets are available in specific line-ups only. Refer to Outdoor Flexent Modular Cell 4.0B site descriptions (typical) on Page 1 - 15

The Flexent Modular Cell 4.0B is a CDMA application product that utilizes the OneBTS digital module with MCRs and 2PAMs. The Modular Cell 4.0B primary cabinet is available in a PCS three carrier, three sector version, which is “six sector ready”, as well as three sector offerings that can support up to eleven PCS carriers and eight 850 carriers.

Site preparation

Before installation of the Modular Cell 4.0B cabinet can begin, site preparation should have been completed.

Refer to *Flexent Modular Cell 4.0/4.0B Outdoor Site Preparation Guidelines, 401-703-413*.

The following requirements must be met at the installation site, prior to installation of the Modular Cell 4.0B cabinet:

- Adequate clearance must be provided for service access.
- The environment must comply with the specifications set forth in the site preparation guidelines.
- AC electric service must be installed as described in Chapter 5 of the site preparation guidelines.
- T1/E1 facilities must be installed at demarcation point as described in Chapter 8 of the site preparation guidelines.
- Balun Protector Box must be installed, if required.
- User alarm must be installed at demarcation point.
- Grounding system must be installed.
- RF and GPS antenna runs must be installed.
- Surge protection for antennas must be installed.
- Cable support must be installed.
- Tower light power must be installed (if required).
- Tower light alarm must be installed (if required).
- Cabinet support structure must be in place.
- Ice shield must be installed, if required.
- Cabinet anchor holes must be drilled.
- Mounting base must be installed, if required.

Product specification - outdoor installation details

Outdoor cabinets may be installed in either controlled or uncontrolled environments. This equipment has been evaluated for use in an ambient temperature range from -40 to 52° Celsius.

The cabinet must only be mounted on a concrete pad or other noncombustible surface.

Definitions

The following terms are used when describing an installation site.

Uncontrolled Environment: All outdoor locations, and any indoor location in which temperature, humidity, ventilation, and dust *are not* maintained at specific levels.

Outdoor Site: Installation site in an uncontrolled environment which requires outdoor cabinets: Modular Cell cabinets, WNG24 battery cabinets, and weatherproofing hardware. Outdoor cabinets may also require heat exchangers.

> **Important!** For more detailed information on indoor and outdoor site environmental requirements, refer to:

- *Flexent® Modular Cell 4.0/4.0B Outdoor Site Preparation Guidelines, 401-703-413.*

Primary cabinet: A Modular Cell 4.0B primary cabinet is the cabinet that houses the CDMA radio communication electronics, amplifiers, and filters. This cabinet contains all of the cell site control electronics, alarms, and T1/E1 facilities interface, as well as the user alarm interface. If the cabinet has integrated power it also contains a power supply, rectifiers and up to four backup batteries (two strings).

Dual Band: A Modular Cell 4.0B dual band cabinet can add PCS carriers to 850 carriers in a primary cabinet, or vice versa.

Cabinet dimensions and weights

For detailed specifications for all of the Modular Cell 4.0B Cabinet dimensions and approximate weights, refer to:

- *Flexent® Modular Cell 4.0/4.0B Outdoor Site Preparation Guidelines,* 401-703-413.

Outdoor mounting brackets and rooftop platforms

If desired, steel mounting brackets may be used to provide a raised, level, and stable cabinet mounting surface for outdoor installations. The design and installation of the brackets or rooftop platforms are the responsibility of the customer.

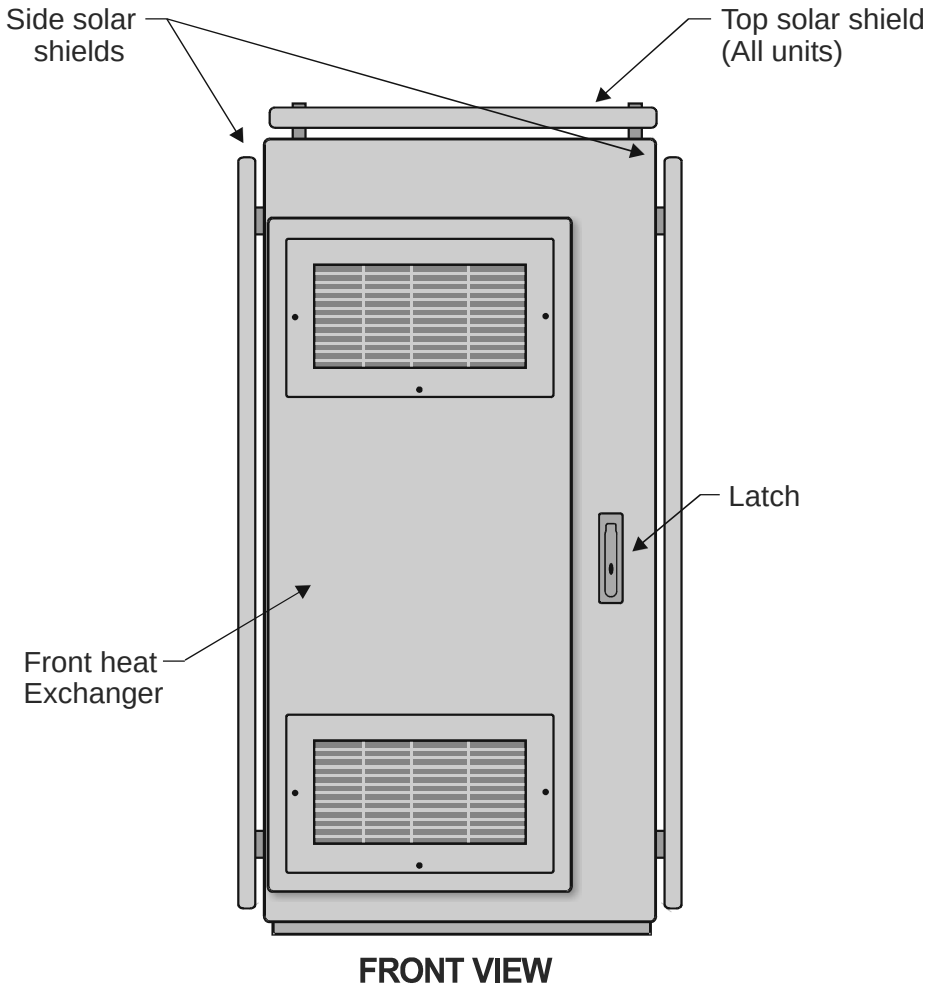
Components of the Flexent Modular Cell 4.0B site

Overview

This section provides a brief description of the cabinets which make up an outdoor Flexent ,Modular Cell 4.0B. Additional information about each component is provided at the beginning of the associated installation chapters.

Modular Cell cabinet: front view

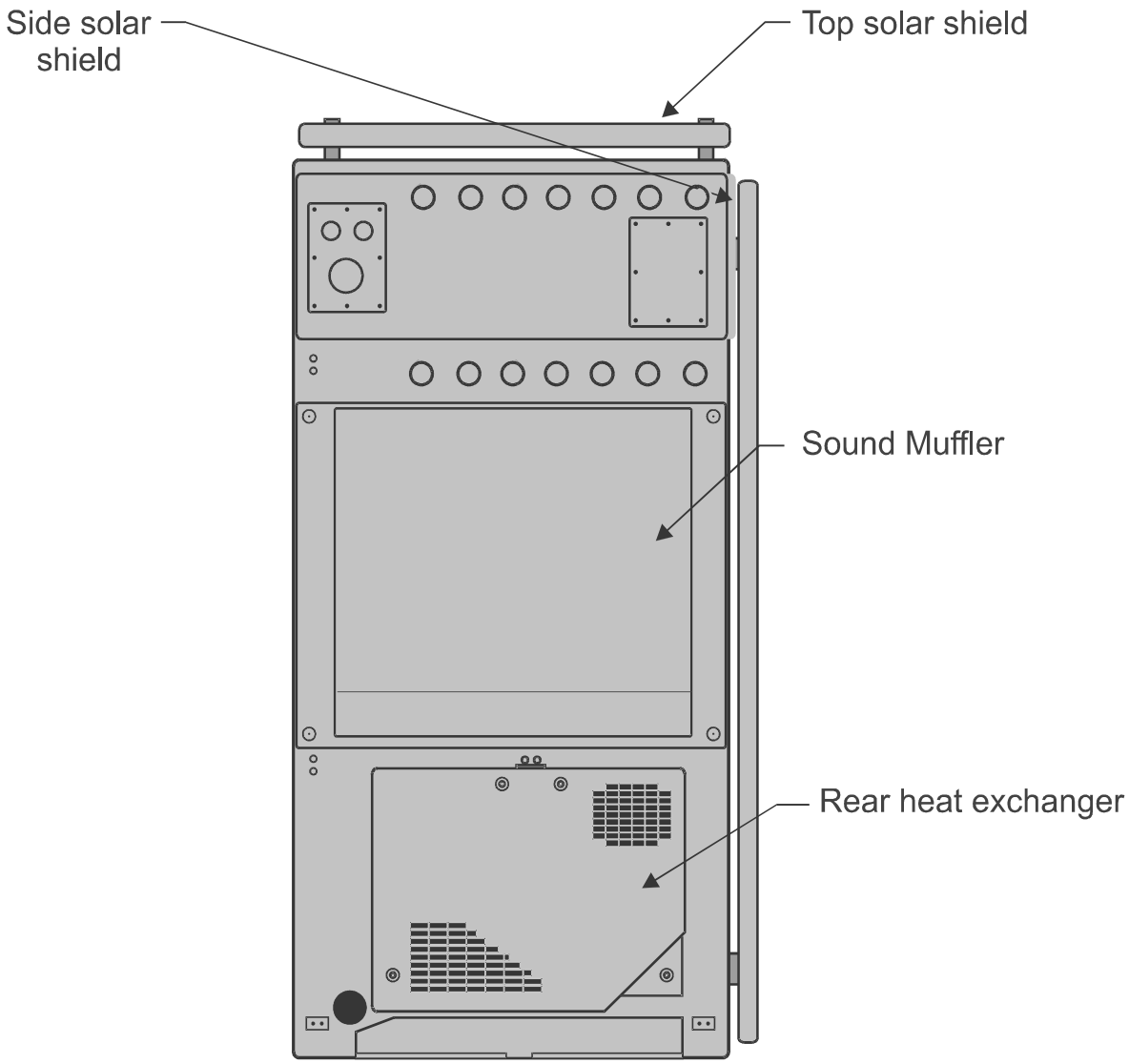
The figure below shows the front of the Modular Cell 4.0B cabinet. Note that the key must remain in the latch to open the door. Solar shield and heat exchanger applications may differ. Refer to Heat exchanger and solar shield configurations for Modular Cell 4.0B cabinets ON PAGE 2 - 69, as applicable.



FRONT VIEW

The figure below shows the rear of the Modular Cell 4.0B cabinet with a sound muffler and rear heat exchanger. Refer to the figure on Page 1-26 for a side view of the cabinet showing the rear heat exchanger and muffler profiles.

FOR SOLAR SHIELD APPLICATION BY CABINET CONFIGURATION, REFER TO THE SOLAR SHIELD TABLE IN CHAPTER 2: Heat exchanger and solar shield configurations for Modular Cell 4.0B cabinets on Page 2 - 69. SOLAR SHIELD INSTALLATION INSTRUCTIONS (IF APPLICABLE) FOLLOW THE TABLES.

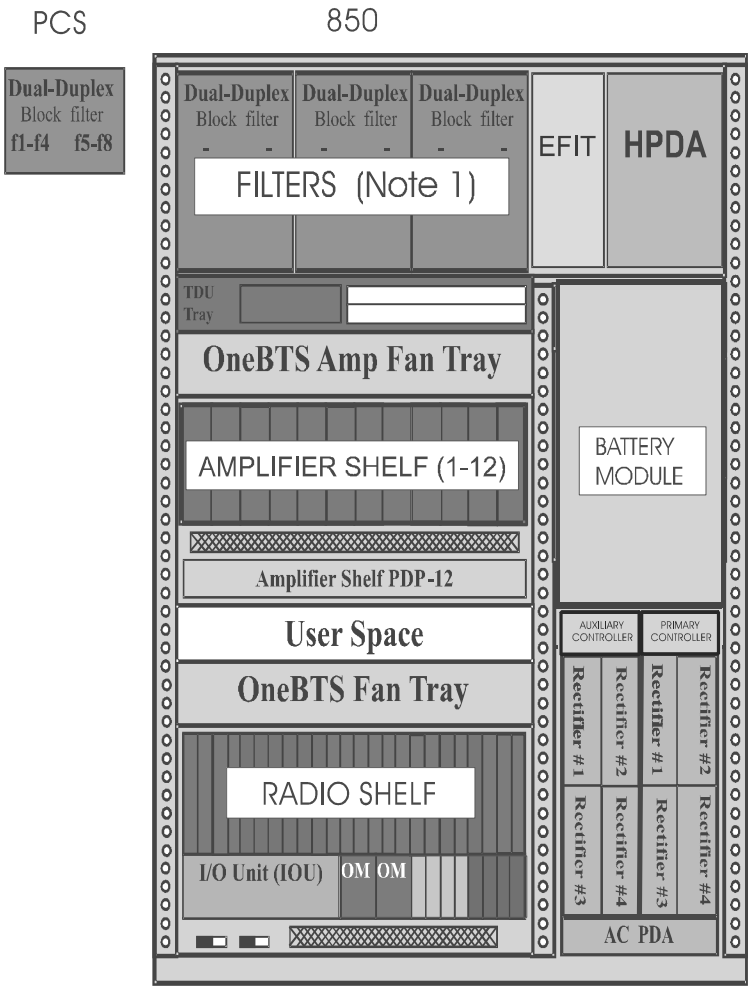


REAR VIEW

Modular Cell 4.0B cabinets

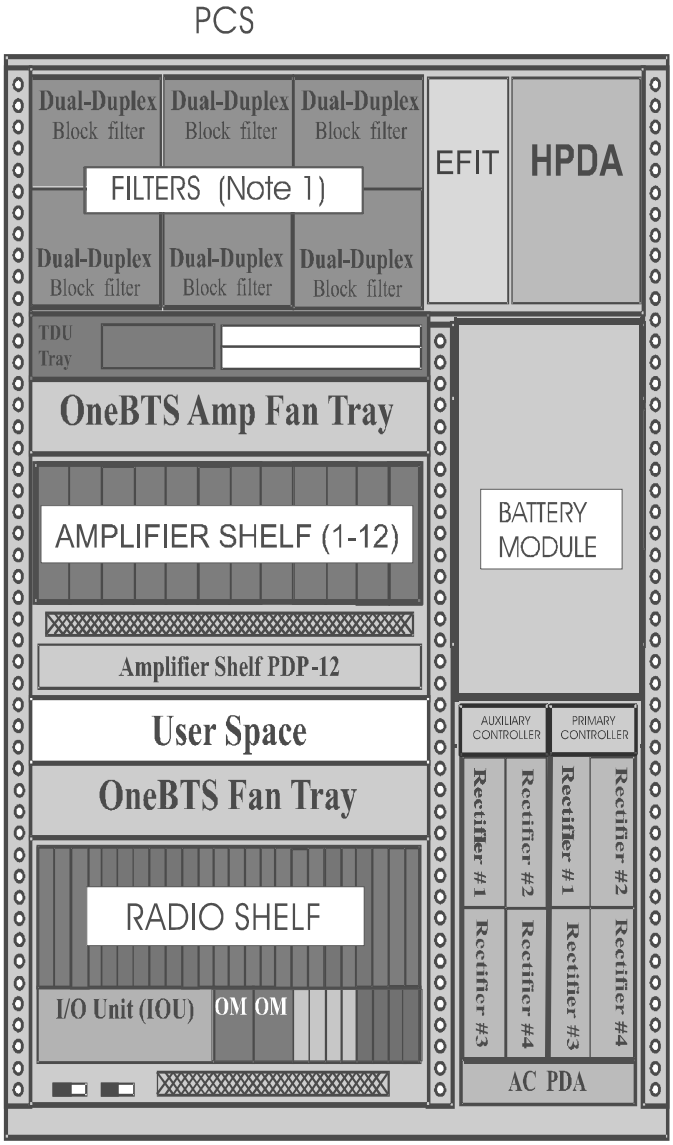
The following cabinets make up an outdoor Flexent Modular Cell 4.0B site. These cabinets all house the CDMA radio communication electronics, amplifiers, alarms, T1/E1 facilities interface, and filters (except in growth cabinets), as well as the user alarm interface. Integrated power cabinets also house a power supply, rectifiers and up to four backup batteries (two strings).The Modular Cell 4.0B cabinet can be shipped with components which provide from 1 to 8 cellular or 1 to 11 PCS carriers maximum, and 1 to 3 sectors, maximum. Upgrade kits are available to add additional carriers and sectors up to the maximums.

MODULAR CELL 4.0B ONE TO TWELVE AMPLIFIER CABINET WITH INTEGRATED POWER



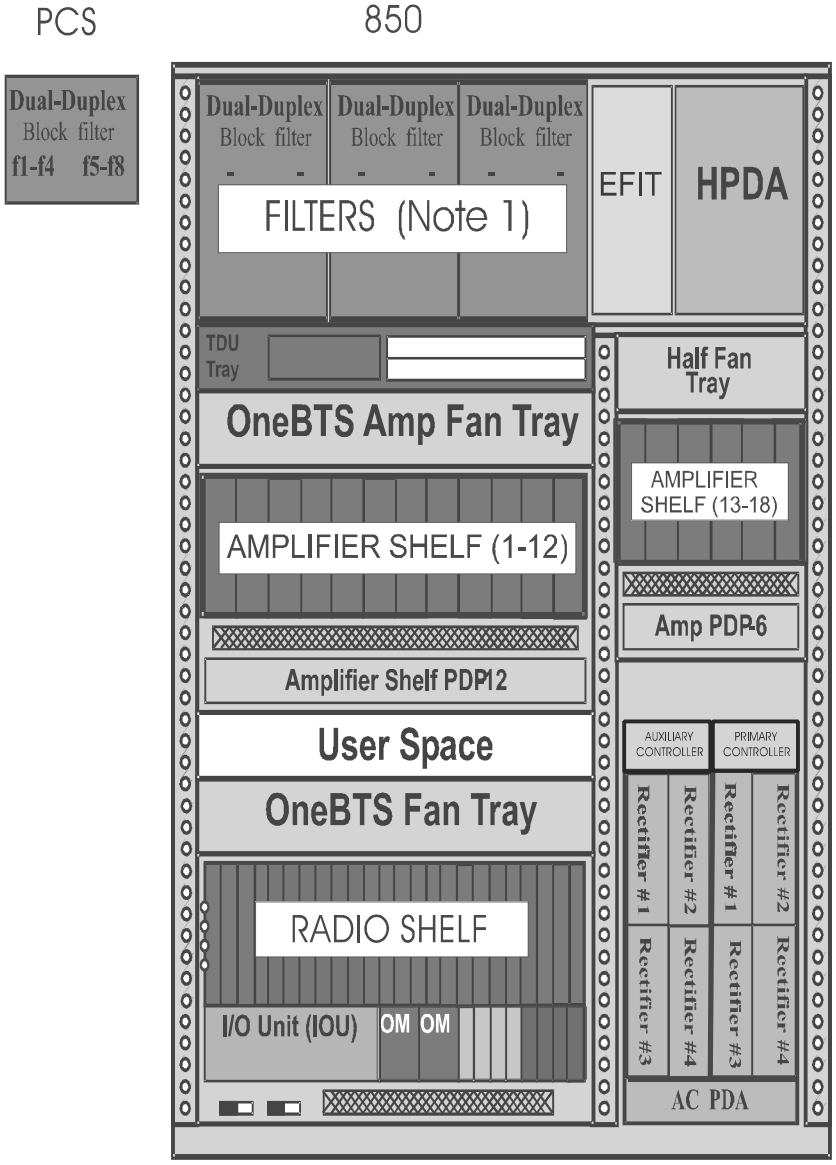
Note 1: Both 850 and PCS filters are illustrated

MODULAR CELL 4.0B ONE TO TWELVE AMPLIFIER CABINET WITH INTEGRATED POWER (3-CARRIER, 4 to 6-SECTOR)



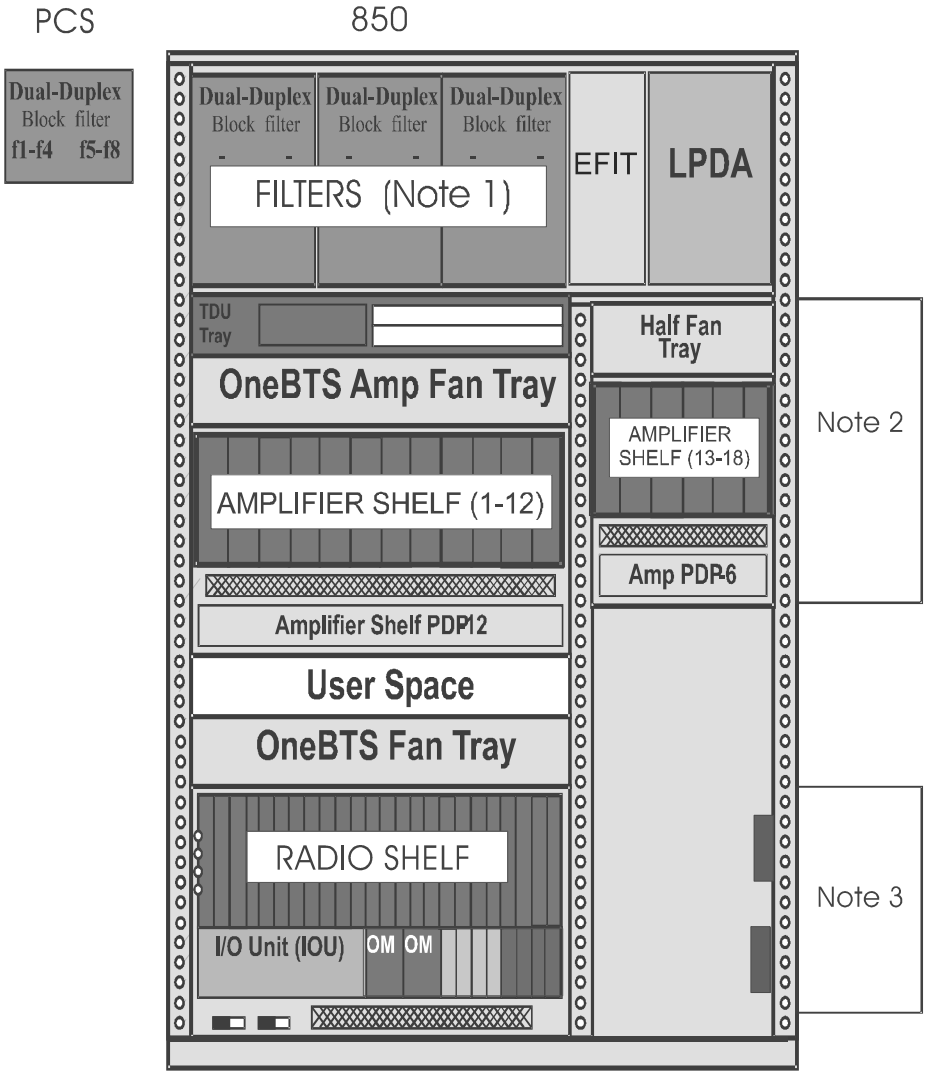
Note 1: Six PCS filters are illustrated

MODULAR CELL 4.0B THIRTEEN TO EIGHTEEN AMPLIFIER CABINET WITH INTEGRATED POWER



Note 1: Both 850 and PCS filters are illustrated

MODULAR CELL 4.0B CABINET WITHOUT INTEGRATED POWER



Note 1: Both 850 and PCS filters are illustrated

Note 2: Illustrated with A6 shelf for amplifiers 13 through 18.

Note 3: AC junction box and convenience outlet.

Lucent Technologies backup power cabinets

The following backup power systems supported by Lucent are compatible with the outdoor Flexent Modular Cell 4.0B cabinets.

First WNG24-BC battery cabinet (for use with the WNG24-K power cabinet)

The first optional WNG24-BC battery cabinet provides additional backup batteries (up to 10 strings - 20 batteries of type 12IR125 [or L1, with type 1 battery shelves], or 5 strings - 30 batteries of type C-11) to supplement the batteries in the primary cabinet or the WNG24-K power cabinet, as applicable. The batteries are charged by the primary cabinet or the power cabinet, as applicable. Shelf heaters are provided to keep the batteries warm in cold weather. Temperature sensors control the shelf heaters.

Second WNG24-BC battery cabinet (for use with the first WNG24-BC battery cabinet only)

The second optional WNG24-BC battery cabinet is identical to the first, but is shipped with the differing connecting hardware that is required to attach it to the first cabinet. It also provides additional backup batteries (up to 10 strings - 20 batteries of type 12IR125 [or L1, with type 1 battery shelves], or 5 strings - 30 batteries of type C-11) to supplement the batteries in the primary cabinet or the WNG24-K power cabinet, as applicable.

First outdoor 60ECv2 battery cabinet (for use with the PowerHouse 24 cabinet only)

The first optional 60ECv2 battery cabinet provides additional backup batteries (up to 10 strings - 20 12IR125 batteries) to supplement the batteries in the PowerHouse 24 cabinet. The batteries are charged by the power cabinet. Shelf heaters are provided to keep the batteries warm in cold weather. Temperature sensors control the shelf heaters. A "G" (Global) version of the 60ECv2 battery cabinet (60ECv2G) is also available. This version of the battery cabinet is used for connection to the "G" version of the PowerHouse 24 cabinet (PowerHouse 24G).

Second outdoor 60ECv2 battery cabinet (for use with the first outdoor 60ECv2 battery cabinet only)

The second optional 60ECv2 battery cabinet is identical to the first, but is shipped with the different connecting hardware that is required to attach it to the first cabinet. It also provides additional backup batteries (up to 10 strings - 20 12IR125 batteries) to supplement the batteries in the PowerHouse 24 cabinet.

EZBFo battery frames (first and second)

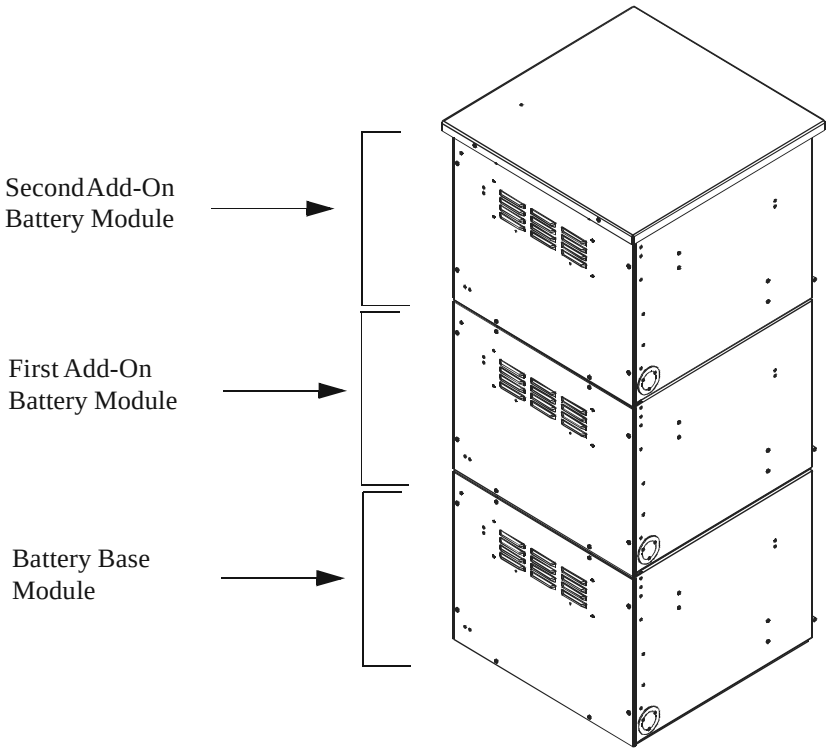
This section provides a brief description of the EZBFo battery frame, which is a backup power configuration for an outdoor Flexent Modular Cell 4.0B primary cabinet with integrated power.

The optional EZBFo battery frame provides additional backup batteries to supplement the batteries in an integrated power one to eight carrier 4.0B primary or dual band cabinet. The optional EZBFo battery frame provides the *initial* backup batteries for an integrated power 4.0B primary or dual band cabinet having more than 8 carriers. The batteries are charged by the primary or dual band cabinet, as applicable.

The optional EZBFo battery frame may also be used to provide additional backup batteries to supplement the batteries a 3GP24i power cabinet used with non-integrated 4.0B primary or dual band cabinets.

The figure below illustrates one of two possible battery frames. Each frame is comprised of a battery base module and two add-on modules. The battery base module is installed first. Subsequently, add-on modules may be separately installed. The modules below are shown with front panels. They may also be equipped with a front door.

Note: When installing a second add-on module in zone 4, a zone 4 mounting kit is required.



Lucent Technologies power systems

Lucent Technologies power systems are not supported with outdoor Flexent Modular Cell 4.0B primary and dual band two cabinet line-ups without integrated power.

> **Important!** If a 4.0B dual band cabinet is installed with existing 1.0, 2.0, 3.0, or 4.0 cabinets that utilize a PowerHouse24 or WNG power cabinet, the total load for all cabinets is limited to 21 kW for WNG-DJ, and to 17Kw for PowerHouse24, as well as WNG-M and WNG-K power cabinets. The total number of carriers possible in the 4.0B dual band cabinet will not be limited by the use of the WHD-DJ (21 kW) power cabinet, but will be limited by the 17 kW power cabinets (PowerHouse24, WNG-M, and WNG-K power cabinets). The total number of DC terminals available in the 17 kW power cabinets is also a limitation in some cases. In all cases where the number of carriers is limited, use of a dual band cabinet with Integrated Power is recommended.

Outdoor Flexent Modular Cell 4.0B site descriptions (typical)

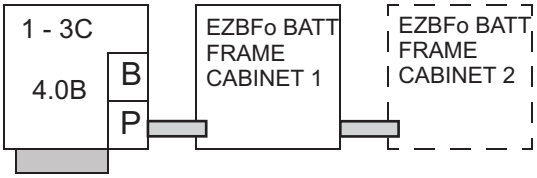
Overview

The following diagrams shows configuration options for a Modular Cell 4.0B site utilizing cabinets with and without integrated power. The illustrations that follow the diagrams are of typical installation sites, which may be positioned on a concrete pad on a rooftop.

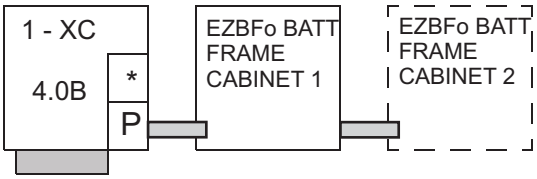
Refer to Chapter 2, Heat exchanger and solar shield configurations for Modular Cell 4.0B cabinets on Page 2 - 69 for heat exchanger and solar shield applications for the following configuration

4.0B primary cabinet configuration with integrated power

1 - 3 PCS CARRIERS (4 TO 6 SECTOR)



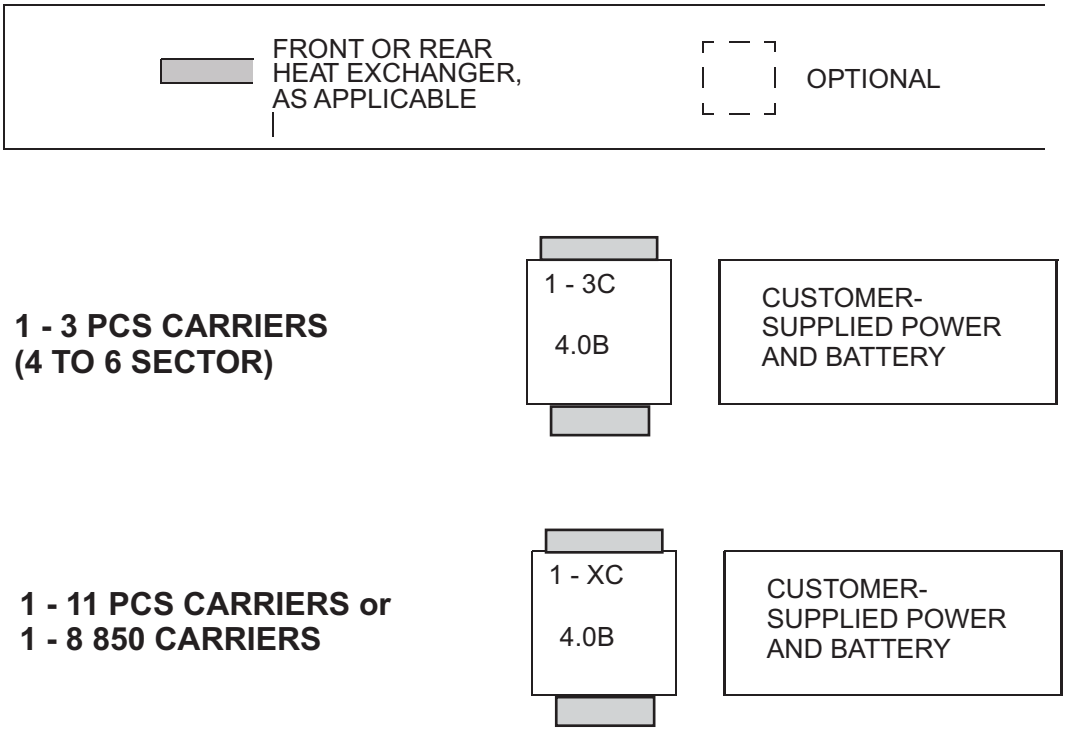
1 - 11 PCS CARRIERS or 1 - 8 850 CARRIERS



*** 850 cabinets have batteries.**
PCS cabinets above 8 carriers will not have batteries because of the presence of the A6 Amplifier Shelf.

Refer to Chapter 2, Heat exchanger and solar shield configurations for Modular Cell 4.0B cabinets on Page 2 - 69 for heat exchanger and solar shield applications for the following configuration

4.0B primary cabinet configuration without integrated power, using customer-supplied power and battery

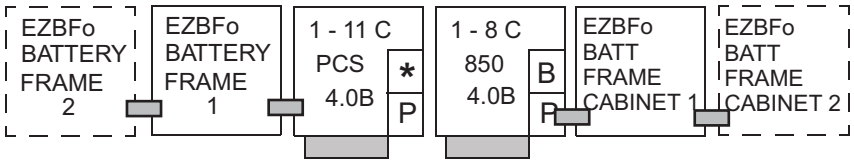


Refer to Chapter 2, Heat exchanger and solar shield configurations for Modular Cell 4.0B cabinets on Page 2 - 69 for heat exchanger and solar shield applications for the following configurations

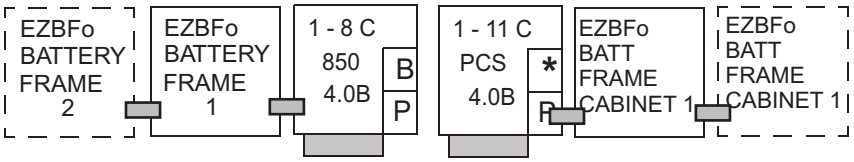
4.0B primary and dual band cabinet configurations with integrated power

The following diagram shows configuration options for 4.0B primary and dual band cabinet configurations with integrated power.

1-8 CELLULAR 850 CARRIERS and 1-11 PCS CARRIERS (Dual Band)



1-11 PCS CARRIERS and 1-8 CELLULAR CARRIERS (Dual Band) **

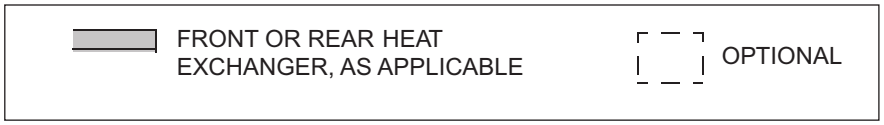


* 850 cabinets have batteries.
PCS cabinets above 8 carriers will not have batteries because of the presence of the A6 amplifier shelf.

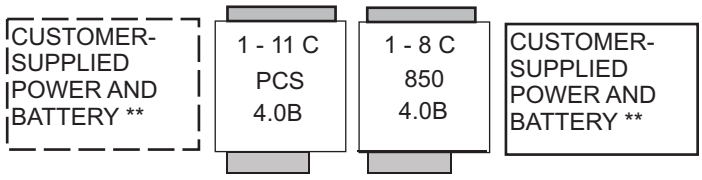
Refer to Chapter 2, Heat exchanger and solar shield configurations for Modular Cell 4.0B cabinets on Page 2 - 69 for heat exchanger and solar shield applications for the following configurations

4.0B primary and dual band cabinet configurations without integrated power, using customer-supplied power and battery

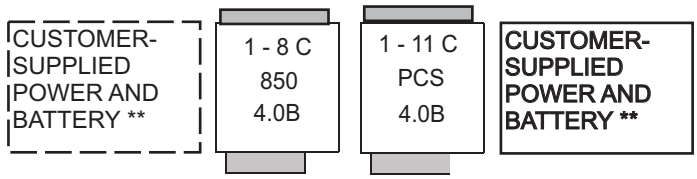
The following diagram shows configuration options for 4.0B primary and dual band cabinet configurations without integrated power, using customer-supplied power and battery.



1-8 CELLULAR 850 CARRIERS and 1-11 PCS CARRIERS (Dual Band)



1-11 PCS CARRIERS and 1-8 CELLULAR CARRIERS (Dual Band) *



* Future offering
** Customer-supplied power and battery may be Supplied from either side, or both sides, of the line-up.

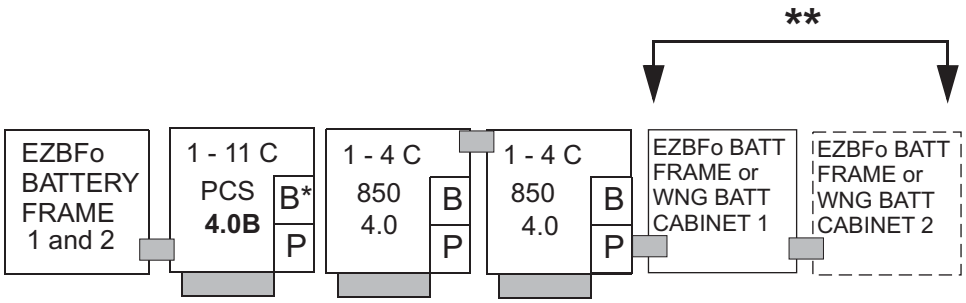
Refer to Chapter 2, Heat exchanger and solar shield configurations for Modular Cell 4.0B cabinets on Page 2 - 69 for heat exchanger and solar shield applications for the following configurations

4.0B dual band cabinets in legacy line-ups with integrated power

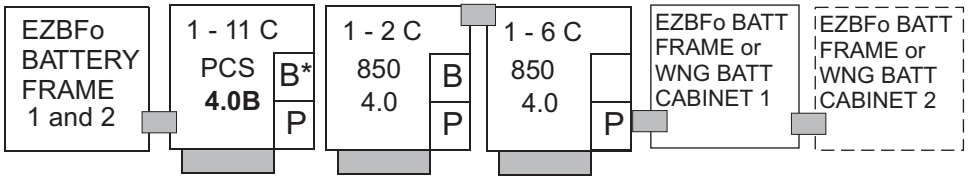
The following diagram shows configuration options for 4.0B dual band cabinets in legacy line-ups with integrated power.

FRONT HEAT EXCHANGER

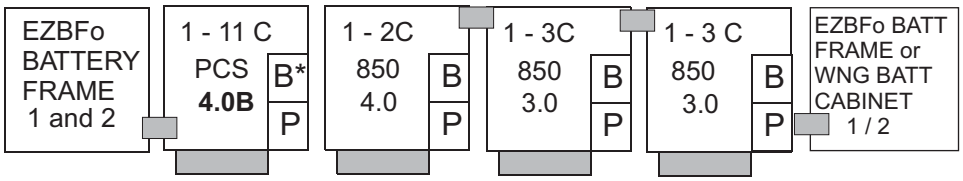
5-8 850 CARRIERS (in G-1 with 4C Primary) 1-11 PCS CARRIERS (4.0B Dual Band)*



7-8 850 CARRIERS (in G-1 with 6C Primary) 1-11 PCS CARRIERS (4.0B Dual Band)*



8 850 CARRIERS (3.0 Primary, G-1 AND 4.0 G-2) 1-11 PCS CARRIERS (4.0B Dual Band)*



*** 850 cabinets have batteries; PCS cabinets above 8 carriers will not have batteries because of the presence of the A6 amplifier shelf.**

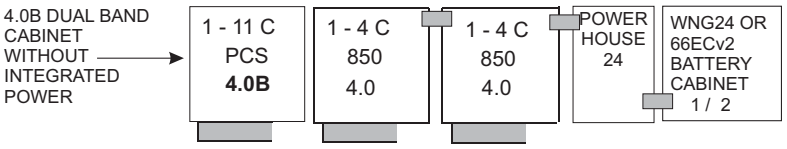
**** 66ECv2 battery cabinets may also have been used to support the existing legacy cabinets in these configurations**

Refer to Chapter 2, Heat exchanger and solar shield configurations for Modular Cell 4.0B cabinets on Page 2 - 69 for heat exchanger and solar shield applications for the following configurations

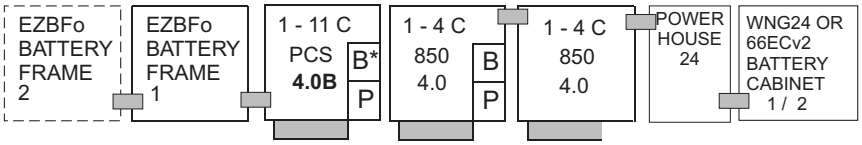
4.0B dual band cabinet in legacy line-ups with Powerhouse 24 power cabinet

The following diagram shows configuration options for 4.0B dual band cabinets in legacy line-ups with Powerhouse 24 power cabinet.

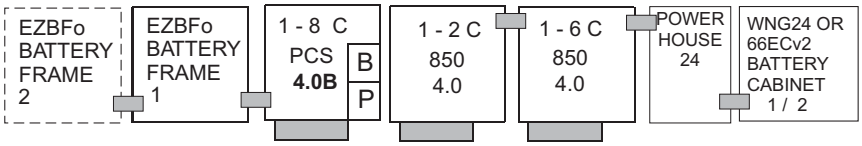
5-8 850 CARRIERS (4.0 Primary and G-1) 1-11 PCS CARRIERS ** (4.0B Dual Band)



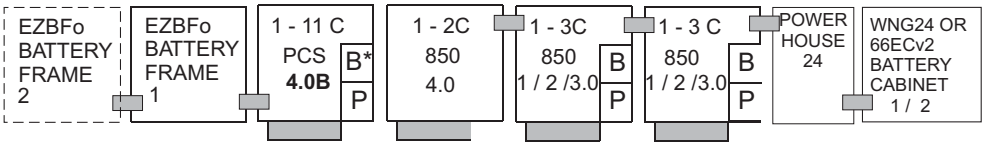
5-8 850 CARRIERS (4.0 Primary and G-1) 1-11 PCS CARRIERS (4.0B Dual Band)



5-8 850 CARRIERS (4.0 Primary and G-1) 1-8 PCS CARRIERS * (4.0B Dual Band)**



8 850 CARRIERS (1 / 2 / 3.0 Primary and G-1, 4.0 G-2) 1 - 11 PCS CARRIERS (4.0B Dual Band)



* 850 cabinets have batteries; PCS cabinets above 8 carriers will not have batteries because of the presence of the A6 amplifier shelf.

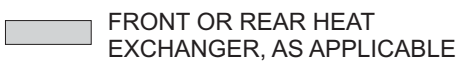
** The total output of the WNG-M and WNG-K power cabinets is 17 kW, which limits the total number of carriers in the dual band cabinet. Use of an integrated power cabinet is recommended for the line-ups shown.

*** The number of PCS carriers limited to 8 by the number of available PH 24 DC terminals. (See ** above for another possible limitation and recommendation.)

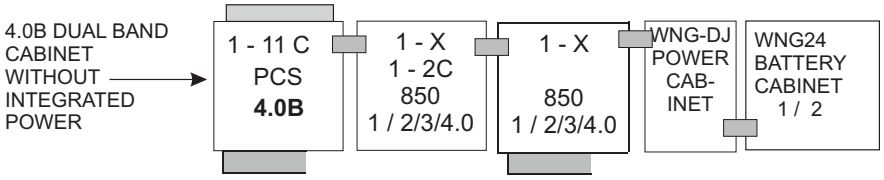
Refer to Chapter 2, Heat exchanger and solar shield configurations for Modular Cell 4.0B cabinets **on Page** 2 - 69 **for heat exchanger and solar shield applications for the following configurations**

4.0B dual band cabinet in legacy line-ups with WNG 24 power cabinets

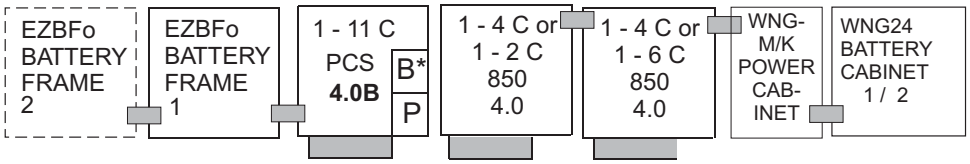
The following diagram shows configuration options for 4.0B dual band cabinet in legacy line-ups with WNG 24 power cabinets.



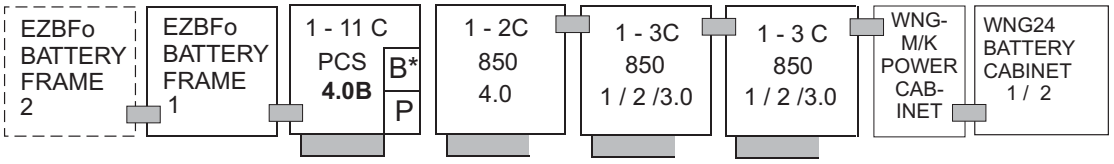
1-8 850 CARRIERS (4.0 Primary and G-1) 1-11 PCS CARRIERS * (4.0B Dual Band)**



X-8 850 CARRIERS (4.0 Primary and G-1) 1-11 PCS CARRIERS ** (4.0B Dual Band)



7-8 850 CARRIERS (1 / 2 / 3.0 Primary and G-1, 4.0 G-2) 1 - 11 PCS CARRIERS ** (4.0B Dual Band)



* 850 cabinets have batteries; PCS cabinets above 8 carriers will not have batteries because of the presence of the A6 amplifier shelf.

** The total output of the WNG-M and WNG-K power cabinets is 17 kW, which limits the total number of carriers in the dual band cabinet. Use of an integrated power cabinet is recommended for the line-ups shown.

*** The total output of the WNG-DJ cabinet is 21 kW, which does not limit the total number of carriers in the dual band cabinet. Therefore, the dual band cabinet would not need integrated power in the line-up illustrated.