

**NX-CBDS™**  
User's Manual

November 1985

**p-cad™**  
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## ABOUT THIS MANUAL

This manual introduces you to NX-CBDS, a program that converts P-CAD schematic database files to files in the format of the IBM CBDS Design File. This manual also introduces you to NX-MAP, a cross-reference utility program that facilitates transfer of schematic data from PC-CAPS through NX-CBDS into the IBM CBDS system.

**Chapter 1, INTRODUCTION**, provides an overview of NX-CBDS and installation instructions.

**Chapter 2, PREPARING THE SCHEMATIC DATABASE**, gives instructions for using PC-CAPS to create a schematic database to be used with NX-CBDS.

**Chapter 3, PREPARING THE INPUT FILES**, gives instructions for creating the files to be input into NX-CBDS.

**Chapter 4, USING NX-CBDS**, gives instructions for configuring and running NX-CBDS.

**Chapter 5, VIEWING THE OUTPUT FILES**, gives instructions for viewing, printing, and interpreting the NX-CBDS output files.

The appendixes explain error messages and provide a summary of PC-CAPS attributes used with NX-CBDS, complete instructions for using the NX-MAP program, and sample output files.



## NOTATION

This manual gives step-by-step procedures and examples. To make it easy for you to follow these procedures, we use the following notation.

---

**<xxxx>** Angle brackets around lowercase letters indicate a variable name that may be entered by the system or by you. For example:

`<filename>.SCH`

**[ ]** Square brackets indicate the name of a key. For example:

`[Return]`

**[ ]-[ ]** Square brackets connected with a hyphen indicate keys that must be pressed simultaneously. For example:

Press `[Ctrl]-[Alt]-[Del]`.

**UPPER** Uppercase letters indicate a command or an element that must be typed as shown. For example:

Type `PCPLOTS` and press `[Return]`.

**/** A forward slash separates PC-CAPS main menu and submenu command combinations. For example:

**DRAW/ARC**

**.XXX** A period followed by up to three uppercase letters indicates a preferred or default filename extension. For example:

**PC-FORM** outputs the **.NDE** file.

**\*** An asterisk in a filename or in a filename extension indicates that any character(s) can occupy that position and all the remaining positions in the filename or extension. For example, the DOS command

**DIR \*.SYM**

displays a list of all the filenames with the extension **.SYM** in the current directory.

**TESTFILE** **TESTFILE** is a sample filename, which you must replace with the filename you intend to use. For example:

**Database Filename** :TESTFILE.SCH  
**Netlist Filename** :TESTFILE.NLT

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## CHAPTER 1. INTRODUCTION

The NX-CBDS interface program translates P-CAD circuit schematics to a format that is compatible with IBM CBDS Design File syntax. The NX-MAP program, which is described in Appendix C, "NX-MAP," accompanies NX-CBDS and cross-references P-CAD schematic symbols with the corresponding CBDS components.

NX-CBDS translates circuit connectivity information to CBDS format. It does not support transfer of graphical data.

This chapter gives an overview of NX-CBDS and installation instructions.

### OVERVIEW

NX-CBDS, together with PC-NODES and (if needed) PC-LINK and NX-MAP, enables you to produce a CBDS-formatted netlist file from a schematic created using PC-CAPS.

There are five stages in this process:

1. Using PC-CAPS, you prepare the schematic design. This design consists of one or more schematic files (.SCH), which are created by interconnecting basic schematic symbols (.SYM).

NOTE: NX-CBDS does not support hierarchical structure. For further explanation, refer to Chapter 2, "Preparing the Schematic Database."

2. Using PC-NODES, you extract a netlist (.NLT) from each schematic file. Netlist files contain component and interconnection information for each schematic drawing. If a design consists of a single schematic, the corresponding netlist file can be input directly to NX-CBDS. In this case, you do not need to perform step 3.
3. If your design consists of multiple sheets, after you extract the netlist for each separate sheet, you must use PC-LINK to link all the netlists into a single expanded netlist (.XNL).
4. If necessary, you create or modify the map file and/or the CDB file. These files are described in Chapter 3, "Preparing the Input Files," and in Appendix C, "NX-MAP."
5. You then input the netlist or expanded netlist file to NX-CBDS. NX-CBDS uses this netlist, with the map file and/or the CDB file, if present, to produce two output files:
  - **The CBDS Design File (.CBD)** is an output file compatible with the IBM CBDS design file format. It contains sections corresponding to the following sections of the IBM CBDS design file:

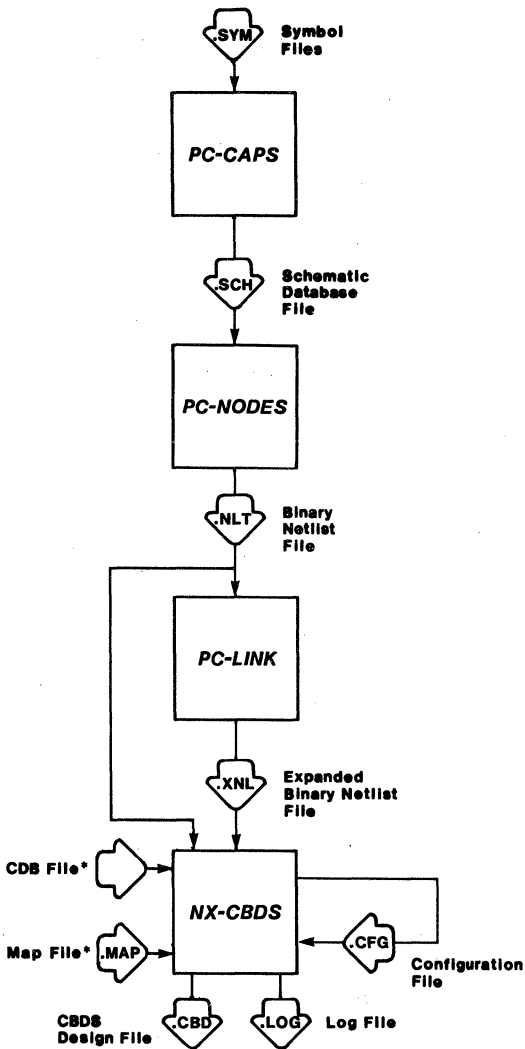
DFHEAD  
CONNECT  
ASSIGN  
INTERFAC  
TESTPAD

These sections contain information regarding the electrical connectivity of the design. NX-CBDS does not generate other sections of the CBDS design file that contain information regarding schematic or PCB graphics.

The .CBD file is described in detail in Chapter 5, "Viewing the Output Files."

- **The NX-CBDS Log File (.LOG)** contains all messages displayed during the execution of NX-CBDS. The log file has the same filename as the CBDS output file, but has the extension .LOG. This file is especially useful for examining any error messages that are reported by NX-CBDS.

Figure 1-1 illustrates the process described above.



\*Optional Files

Figure 1-1. NX-CBDS Input and Output

## SYSTEM REQUIREMENTS

Before you install NX-CBDS, your computer system must have the following minimum configuration:

- IBM PC/XT, PC/AT; TI Professional; Tandy TRS 2000; or equivalent
- 640K of RAM
- Color or monochrome monitor
- DOS 2.0, or higher, operating system
- CONFIG.SYS in the root directory, containing the following text:

```
BUFFERS=12  
FILES=15
```

## INSTALLATION

Your NX-CBDS diskette contains the following files:

Program files:

```
NXCBDS.EXE  
NXMAP.EXE
```

Sample data files:

DEMO1 sample:	DEMO2 sample:
DEMOLIB.SCH	7400.SYM
DEMO1.SCH	7404.SYM
DEMO1.NLT	7474.SYM
DEMO1.MLF	CONN1.SYN
DEMO1.MAP	CONN3.SYM
DEMO1.CFG	CONN5.SYM
DEMO1.CBD	CONN10.SYM
DEMO1.LOG	SHEET1.SCH
	SHEET2.SCH
	SHEET1.NLT
	SHEET2.NLT
	DEMO2.XNL
	DEMO2.CFG
	DEMO2.DB
	DEMO2.CBD
	DEMO2.LOG

The sample data files are not required for running NX-CBDS. You can use the sample data to see how the program works.

To install NX-CBDS on your hard disk, insert the diskette in Drive A and use the following procedures. These procedures assume that you are using the P-CAD directory structure.

Install the program files in your \PCAD\EXE directory. To do this, first change to the \PCAD\EXE directory by typing:

CD \PCAD\EXE [Return]

Copy the files by typing:

COPY A:\*.EXE [Return]



Copy the sample data files to your working project directory. For example, if you are using the PROJ0 directory, change to that directory by typing:

```
CD \PCAD\PROJ0 [Return]
```

Then copy the files by typing:

```
COPY A:DEMOLIB.SCH [Return]  
COPY A:DEMO1.* [Return]  
COPY A:*.SYM [Return]  
COPY A:SHEET1.* [Return]  
COPY A:SHEET2.* [Return]  
COPY A:DEMO2.* [Return]
```



## CHAPTER 2. PREPARING THE SCHEMATIC DATABASE

Before using NX-CBDS, you must use PC-CAPS to create a schematic database. This chapter describes PC-CAPS schematic structure and the features you must use to construct a CBDS-compatible schematic. You should read this chapter before creating your schematic.

### SCHEMATIC DATABASE STRUCTURE

A PC-CAPS schematic consists of an interconnected group of pre-defined symbols. These symbols can be user-defined or can be part of a P-CAD supplied library. Each symbol is a logical and pictorial representation of a component. For example, a 7400 symbol might be a single two-input NAND gate.

Symbols are created in PC-CAPS SYMB mode as .SYM files. You assemble symbols into a schematic in DETL mode, producing a .SCH file.

NX-CBDS does not support hierarchical structure. It requires "flat" structure, which consists of symbols placed directly on the final schematic. Because of this, you should not use hierarchical design in a schematic if you intend to input it to NX-CBDS.

NX-CBDS does support multisheet structure, which you can use for a schematic that requires more than one drawing.

A multisheet schematic is created by producing a number of single sheet schematics. Connections between sheets are indicated by giving connected wires the same net name on each sheet. When you use PC-LINK, it merges together wires that have the same name and are on different sheets.

To indicate that a given schematic is a single sheet of a multisheet schematic, assign the SHEET attribute to the sheet. In PC-CAPS SYMB mode, use the ACOM/ATTR command and enter, anywhere in the design, the following attribute:

SHEET=<sheet id>

where:

<sheet id> is typically a number, with the first sheet being sheet one and so on. Sheet ID's in a multisheet schematic can have up to three characters and each sheet's ID must be unique.

## **SPECIAL PC-CAPS INPUT FOR NX-CBDS**

As you assemble your schematic database, you must input certain information to make your files compatible with CBDS. This information and the PC-CAPS commands used to enter it are described in the following sections.

### **Symbols**

You can use any PC-CAPS symbol in a schematic to be processed by NX-CBDS as long as you follow the conventions outlined in the next three sections, "Pin Order," "Symbol Attributes," and "Power and Ground Symbols."

NX-CBDS creates an entry in the CONNECT block of the output file for each occurrence of a symbol in the schematic.

Connector symbols are treated specially by NX-CBDS. See the section below, "Connectors," for more information.

### *Pin Order*

Each symbol in your PC-CAPS schematic must have the same pin order as the corresponding CBDS library part in order to produce a CBDS netlist that accurately reflects the connections in the schematic.

Many P-CAD library symbols have different pin order than the corresponding CBDS parts. So that you do not have to edit each symbol, the NX-CBDS program package includes the NX-MAP program, which enables you to produce a map file that specifies the CBDS pin order for each symbol. Refer to Chapter 3, "Preparing the Input Files," and Appendix C, "NX-MAP," for instructions for using NX-MAP.

If you create your own schematic symbols, you can enter symbol pins in the order used for the corresponding CBDS symbol. In this case, you do not need to use NX-MAP to define pin order for the symbol.

### *Symbol Attributes*

CBDS requires each symbol to have names for the schematic symbol and for the physical component it represents. CBDS also allows a component to have an optional version name. PC-CAPS library symbols have only one name, the symbol filename.

NX-CBDS requires that you specify a symbol name for each symbol. It recognizes the symbol filename as the physical component name, but allows you to specify another name if you want to replace the filename. It also allows you to specify the version name.

NX-CBDS provides two ways for you to enter this information: entering it in the map file or assigning it as symbol attributes. If you need to create a map file to assign CBDS pin orders, you may prefer to enter the symbol, component, and version names in the map file so that you do not need to edit each symbol file to add the appropriate names. Refer to Chapter 3, "Preparing the Input Files", and Appendix C, "NX-MAP," for instructions for creating the map file.

Connector symbols are treated specially by NX-CBDS and cannot have this information entered using NX-MAP. See the section below, "Connectors," for more information.

NX-CBDS recognizes three PC-CAPS attributes that specify symbol name, part name, and version name for a symbol. These attributes are described below. To assign these attributes, use the ATTR/ACOM command.

Normally, these attributes are assigned to the symbol in SYMB mode so that the symbol will have the attribute whenever you use it on a schematic. You can also assign the attribute to one instance of a symbol in DETL mode after placing the symbol on the schematic.

**SNAME** - Specifies the symbol name for the SDSYMB field of the CONNECT section of the .CBD file. This field is required, so if you do not enter the name for a symbol in a map file, you must assign this attribute to

the symbol. If it is not found, NX-CBDS reports an error. If this attribute is assigned and there is also an entry in the map file, NX-CBDS uses the name specified by the attribute.

**PNAME** - Can be used to specify the name of the physical component for the LOGCOMP field of the ASSIGN section of the .CBD file. If this attribute is assigned and there is also an entry in the map file, NX-CBDS uses the name specified by the attribute. If this attribute is not assigned and there is no entry in the map file, NX-CBDS uses the filename of the symbol (without the extension).

The PNAME attribute (or the corresponding map file entry) is useful in two cases:

- When the desired name fails to meet DOS filename conventions. For example, a resistor part might be RESISTOR1.K. This name is too long and contains an embedded period.
- When filename duplication would occur. For example, you might want to have two graphical representations of a 2-input NAND gate, the first using a NAND symbol and defined in the 7400.SYM file and the second using the DeMorgan equivalent and defined in the 7400E.SYM file.

In the examples described above, the respective attribute assignments would be PNAME=RESISTOR1.K and, for the 7400E.SYM symbol, PNAME=7400.

**REV** - Specifies the version number of the symbol for the LOGVER field of the ASSIGN record of the .CBD file. If this attribute is assigned and there is also an entry in the map file, NX-CBDS uses the name specified by the attribute. If this attribute is not assigned and there is no entry in the map file, the field is left empty.

If you create your own symbols, you should enter the SNAME, PNAME, and REV attributes for each symbol when you create it. In this case, you do not need to use NX-MAP to define symbol attributes.

### *Power and Ground Symbols*

If you want to use special symbols to represent power and ground, when you create the symbol, use the PC-CAPS SCMD/SCAT command in SYMB mode to assign a Component Type ID number of 0 (zero). This Type ID will cause PC-NODES to delete the symbol from the netlist. If you do not assign the correct value, the symbol will appear as a logical component in the design file.

Once you create power and ground symbols, you can enter them into a schematic in the same way as logical symbols using the ENTR/COMP command.

Note that the net to which the signal is attached must be correctly named (e.g., VCC, GND, +5, etc.) using the NAME/NET command in PC-CAPS DETL mode.

### **Packaging Preassignment**

Before PCB placement and routing can occur, the logical symbols used in the schematic must be assigned to physical locations in the component package that is to be placed on the PCB. CBDS performs this packaging, so the PC-CAPS schematic has to show only the interconnection of logical symbols. You can leave the physical implementation considerations to CBDS.

For cases in which you want to preassign several logical symbols to the same physical package and/or to assign a symbol to a specific gate in the package, you must use



the two PC-CAPS commands described below. See the *PC-CAPS User's Manual* for more information.

**SCMD/PNLC** (system command/pin number location) is used when defining basic symbols in SYMB mode. It lets you set the number of gates that are to be assigned to each physical package and the pin numbers which correspond to each gate location. It also allows you to specify locations for the reference designator and pin numbers.

**SCMD/PNUM** (system command/pin number) is used in DETL mode to preassign a reference designator to a symbol in a schematic. You can use SCMD/PNUM only if SCMD/PNLC was used for the symbol in SYMB mode.

**NX-CBDS** lists preassignments of logical symbols in the ASSIGN section of the CBDS design file.

**NX-CBDS** treats connectors differently from logical symbols, as explained in the next section.

### **Connectors**

In order to provide flexibility in the way connectors are used, NX-CBDS treats them differently than logical components. The major differences are:

- You can represent a single connector by one schematic symbol or by many symbols.
- You must assign each connector a reference designator and pin numbers. These are not required for other symbols.

- You can add an alphabetic prefix or suffix to connector pin numbers.
- You must assign the symbol attributes SNAME, PNAME, and REV directly to the symbol; NX-MAP is not supported for connectors.

The following sections explain how to create connector symbols and assign the appropriate information.

### *Creating Connector Symbols*

If you want to represent a connector with a single schematic symbol, create the symbol in the same way you create a logical symbol.

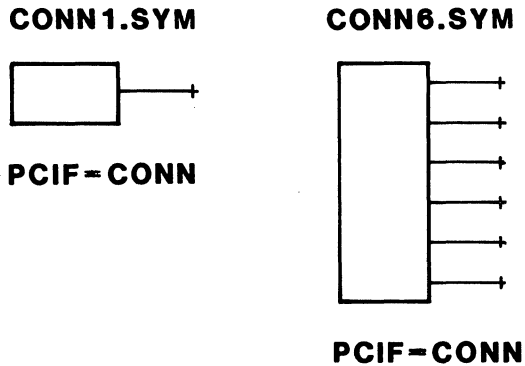
If you want to represent a connector with several symbols, create a separate symbol file for each unique symbol. You can represent a connector with as many or as few symbols as your application requires.

The best approach is to create generic symbols for 1-pin, 2-pin, . . . , n-pin connectors and then to use whatever combination of symbols is appropriate to represent each connector.

When creating a connector symbol, always use the SCMD/PNLC command and define the number of gates per package as 1. Define the number of pins per gate as the number of pins on the symbol. When assigning pin numbers, always start with 1 and number the pins sequentially.

Assign the PCIF attribute with the CONN value to all connector symbols to identify them as special connector symbols. Assign the attribute in SYMB mode after you draw the symbol.

Figure 2-1 shows 1-pin and 6-pin connector symbols with filenames, pin numbers, and the PCIF attribute. (Note that pin numbers, the filename, and the attribute name are not visible on the actual symbol.)



85201

**Figure 2-1. Connector Symbols**

### *Assigning Reference Designators and Pin Numbers*

When you use connector symbols in a schematic, you must assign a reference designator and pin numbers to each symbol, using the SCMD/PNUM command in PC-CAPS DETL mode.

If a connector is represented by a single symbol, enter the reference designator and use A as the section; for example:

P3/A

In this example, P3 will appear as the reference designator and the pins will be numbered as defined

using the SCMD/PNLC command when the symbol was created. If you want to number the pins differently, use the following format, which explicitly lists pin numbers to be assigned:

P3(2 4 6 8 10)

If a connector is represented by many symbols, you must enter each reference designator and all pin numbers in the second format above. For example, use the following steps to represent a 9-pin connector with three 3-pin symbols.

1. Use the ENTR/COMP command in PC-CAPS DETL mode to enter the three connector symbols.
2. Select the SCMD/PNUM command and select each symbol. Assign the following reference designators and pin numbers, one set to each symbol:

P3(1 2 3)

P3(4 5 6)

P3(7 8 9)

NX-CBDS will make entries only for pins that are actually entered on the schematic. For example, if the second symbol, P3(4 5 6), was not present, NX-CBDS would not make any entries for pins 4, 5, and 6 of connector P3.

**NOTE:** If any connector on the schematic has no reference designator or pin numbers or has duplicate pin numbers for the same reference designator, NX-CBDS generates an error message. Pins numbered as 0 are considered unnumbered.

### *Pin Number Prefixes and Suffixes*

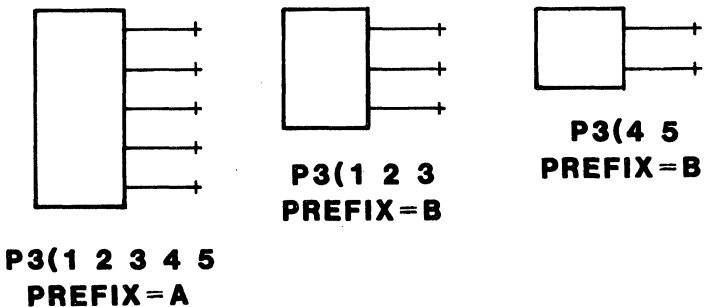
For some connectors, it is necessary to use prefixes and suffixes for the pin numbers. For example, a two-sided connector may have pins numbered A1-A5 and B1-B5. NX-CBDS recognizes two PC-CAPS attributes, which are described below, to support these cases. Assign these attributes to the symbol in PC-CAPS DETL mode after you place the symbol on the schematic.

**PREFIX** - Specifies a prefix for all pin numbers of the symbol.

**SUFFIX** - Specifies a suffix for all pin numbers of the symbol.

You must assign these attributes to each symbol to which they apply.

Figure 2-2 shows three symbols that constitute a 10-pin connector that has two sides and pins numbered A1-A5 and B1-B5.



85202

**Figure 2-2. Example of the PREFIX Attribute**

### *Symbol and Component Names*

Indicate symbol names, component names, and versions of connectors with the SNAME, PNAME, and REV attributes, respectively. You cannot use the map file to assign these names for connectors.

Assign these attributes in the same way you assign them to logical components. For a multiple-symbol connector, assign these attributes to only one symbol. If you assign different values for any of these attributes to different symbols in one connector, NX-CBDS produces an error message.

### **Test Pads**

You can represent a test pad with a single pin symbol identified with the PCIF=TSTPT attribute, as shown in Figure 2-3.



**PCIF=TSTPT**

---

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**Figure 2-3. Test Pad Symbol**

NX-CBDS enters a record for each test pad in the TESTPAD section of the CBDS design file. If the design does not contain test pads, the TESTPAD section is not created.

To conform to CBDS requirements, you must assign a special name to each test pad on the schematic. In DETL mode, use the NAME/COMP command to name each test pad TSTnn, where nn is a number from 01-99 and must be unique for each test pad. NX-CBDS uses this name for the TSTDES field of the TESTPAD record in the .CBD file.

To specify the LAYER and/or SHAPE fields of the TESTPAD record, assign the PCTP attribute to a test pad symbol in one of the following ways:

```
PCTP=<layer>,<shape>
PCTP=<layer>
PCTP=,<shape>
```

where:

<layer> and <shape> are strings to be inserted literally into the design file. The comma is required when there is a shape.

If you do not need either field, do not use the attribute.

NOTE: For PC-CAPS attributes, if embedded blanks are required, you must enclose the attribute string in quotation marks:

```
PCTP="<layer>,<shape>"
```

NOTE: Neither PC-CAPS nor NX-CBDS checks the validity of the PCTP attribute; you must ensure that it is compatible with CBDS.





Sample data files:

DEMO1 sample:	DEMO2 sample:
DEMOLIB.SCH	7400.SYM
DEMO1.SCH	7404.SYM
DEMO1.NLT	7474.SYM
DEMO1.MLF	CONN1.SYN
DEMO1.MAP	CONN3.SYM
DEMO1.CFG	CONN5.SYM
DEMO1.CBD	CONN10.SYM
DEMO1.LOG	SHEET1.SCH
	SHEET2.SCH
	SHEET1.NLT
	SHEET2.NLT
	DEMO2.XNL
	DEMO2.CFG
	DEMO2.DB
	DEMO2.CBD
	DEMO2.LOG

The sample data files are not required for running NX-CBDS. You can use the sample data to see how the program works.

To install NX-CBDS on your hard disk, insert the diskette in Drive A and use the following procedures. These procedures assume that you are using the P-CAD directory structure.

Install the program files in your \PCAD\EXE directory. To do this, first change to the \PCAD\EXE directory by typing:

```
CD \PCAD\EXE [Return]
```

Copy the files by typing:

```
COPY A:* .EXE [Return]
```

## SYSTEM REQUIREMENTS

Before you install NX-CBDS, your computer system must have the following minimum configuration:

- IBM PC/XT, PC/AT; TI Professional; Tandy TRS 2000; or equivalent
- 640K of RAM
- Color or monochrome monitor
- DOS 2.0, or higher, operating system
- CONFIG.SYS in the root directory, containing the following text:

```
BUFFERS=12  
FILES=15
```

## INSTALLATION

Your NX-CBDS diskette contains the following files:

Program files:

```
NXCBDS.EXE  
NXMAP.EXE
```

The CDB file is made up of one or more lines, each containing two fields in the format:

```
<cdblnm> <cdbdir>
```

where:

**<cdblnm>** is the name of the CDB partition. It can be up to 4 characters long.

**<cdbdir>** is the name of the disk containing the partition. It can be up to 40 characters long.

If you enter a name that is too long, NX-CBDS will truncate it. If you enter more than two names on a line, NX-CBDS will ignore the extra name(s). If you enter only one name on a line, NX-CBDS will generate an error message and ignore the line.

You can give a CDB file any filename and extension. You can create any number of CDB files; when you run NX-CBDS, it will use the CDB file specified in the current configuration.

Figure 3-1 shows a sample CDB file.

---

```
CORP LIB1  
PROJ LIB2  
USER LIB3  
LOKI LIB4
```

---

Figure 3-1. Sample CDB File

This CDB file produces the following entry in the last part of the DFHEAD record in the CBDS Design File:

```
(<CORP,LIB1>,<PROJ,LIB2>,<USER,LIB3>,  
<LOKI, LIB4>);
```

## CREATING THE MAP FILE

You must create a map file if any symbols in your schematic have different pin orders than the corresponding CBDS parts. In addition, you can use the map file to specify the symbol, part, and version names for each symbol. Refer to Appendix C, "NX-MAP," for instructions for creating the map file.

You can create several map files or use one map file for all schematics. You can re-use a map file whenever necessary. If you need to add symbols to a map file, you can add the necessary information to the NX-MAP input file and rerun NX-MAP to produce an updated map file.

## CHAPTER 4. USING NX-CBDS

This chapter describes the required conditions and procedures for configuring and running NX-CBDS.

Before you run NX-CBDS, be sure that:

- The system is correctly configured and NX-CBDS is installed. (See the "System Requirements" and "Installation" sections in Chapter 1.
- You have assembled the schematic circuit.
- You have extracted and, if necessary, linked the netlist files and the netlist is present in the current directory.
- You have created the map and/or CDB files, if necessary, and they are present in the current directory.

NX-CBDS has three operating modes: interactive, command line, and batch. In interactive mode, NX-CBDS displays a series of screens and you select options and specify filenames. In command line mode, you specify filenames when you start the program and NX-CBDS processes the input file automatically. In batch mode, when you start the program you specify the name of a batch file that instructs NX-CBDS to process several circuits automatically.

The following sections describe how to start, configure, and run NX-CBDS in interactive mode and how to use command line and batch modes.

## **INTERACTIVE MODE**

In interactive mode, you must first start NX-CBDS to display the opening menu. You can then either configure or run the program.

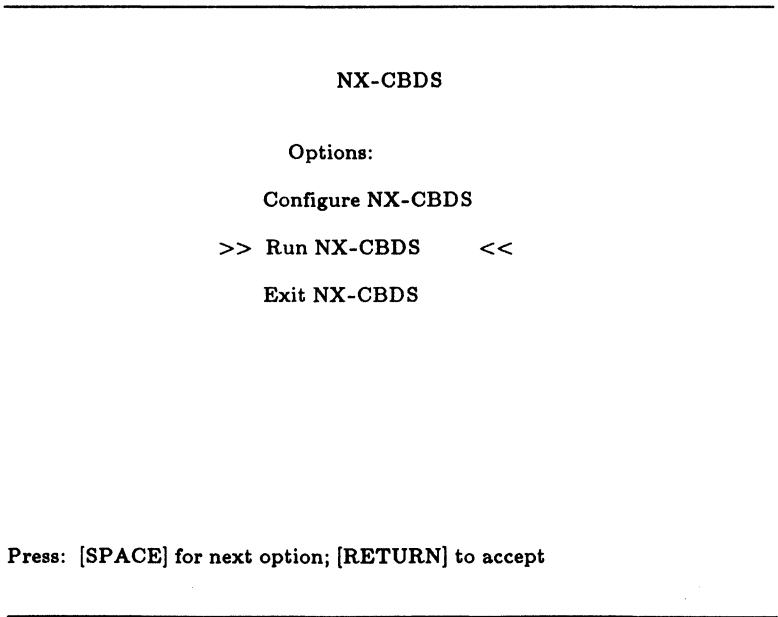
### **Starting NX-CBDS**

To start NX-CBDS, use the following steps.

1. From the appropriate project directory, type:

**NXCBDS [Return]**

The system displays the NX-CBDS Title Screen. Press any key to display the NX-CBDS Opening Menu, shown in Figure 4-1.



**Figure 4-1. NX-CBDS Opening Menu**

This menu provides the following options.

**Configure NX-CBDS** - Allows you to set or change NX-CBDS configuration options.

**Run NX-CBDS** - Lets you begin file processing.

**Exit NX-CBDS** - Returns you to DOS.

The default option, "Run NX-CBDS," is highlighted.

**NOTE:** You can load a previously created NX-CBDS configuration file directly from DOS by typing NXCBDSD followed by a left parenthesis and then the filename (without extension) of the configuration file. For example, typing NXCBDSD ( TESTFILE causes NX-CBDS to read the configuration file called TESTFILE.CFG.

2. If you want to set or change the configuration, use the procedure in the next section, "Configuring NX-CBDS." If you do not want to set or change the configuration, continue to "Running NX-CBDS."

**NOTE:** A default configuration file named NXCBDSD.CFG is created the first time you start NX-CBDS and is used each time you run NX-CBDS if you do not specify another configuration file.

## **Configuring NX-CBDS**

"Configure NX-CBDS" allows you to specify values for several standard operating parameters. Default values are provided.

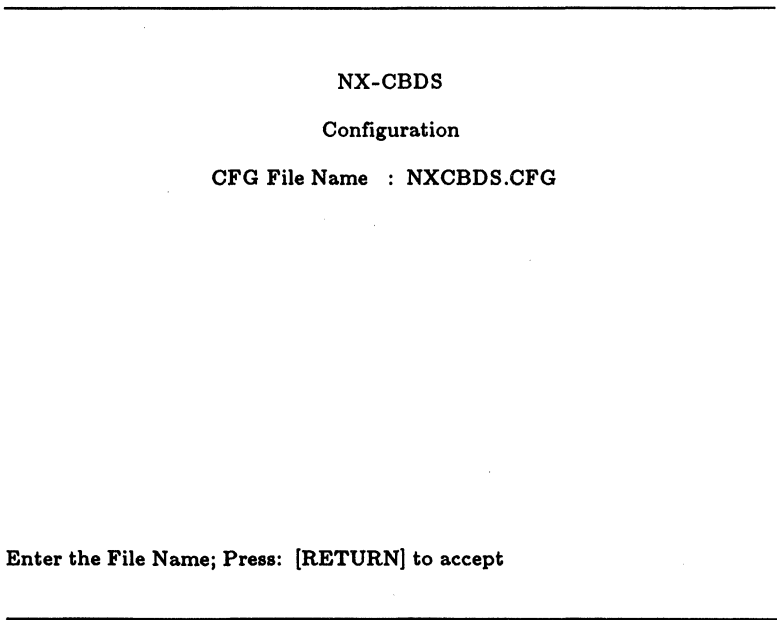
You can use a configuration for just one operating session or you can save it to a configuration file, which you can later reuse. You may want to create a configuration file for each design you process. You can add or modify a current configuration or a configuration file whenever necessary.

Select "Configure NX-CBDS" at the main menu to select, modify, or create the configuration for a program session. The configuration option also allows you to perform multiple runs of NX-CBDS using different configurations without leaving the program.



To configure NX-CBDS, use the following steps.

1. At the NX-CBDS opening menu, press the space bar or use the cursor key to select "Configure NX-CBDS," then press [Return]. The system displays the current configuration filename (the one you specified when starting NX-CBDS or at an earlier session at the configuration screen, or the default NXCBD.S.CFG) and prompts you to accept the current configuration or specify another configuration filename, as shown in Figure 4-2.



**Figure 4-2. NX-CBDS Configuration Screen**

2. Press [Return] to accept the default file, or enter the name of the configuration file you want to create or edit and press [Return]. If you enter only blanks for a filename, the configuration will be used but will not be saved to a file.

The system displays the configuration. If the file you named already exists in the current directory, its current values are displayed as defaults. Otherwise, NX-CBDS supplies default values as shown in Figure 4-3. You can now enter the appropriate values.

---

**NX-CBDS**  
Configuration

CFG File Name : TESTFILE.CFG  
Design Name : TESTFILE  
Project Name : PROJECT  
Designer : DESIGNER  
CDB File : <filename>  
NX-MAP File : <filename>  
Special Symbol : \$

Enter Design Name; Press [Return] to accept, [Esc] to quit

---

**Figure 4-3. Default Configuration Values**

3. The first prompt asks for the design name. Enter the name of the design and press [Return]. You can use up to eight characters. IBM CBDS allows letters and numbers only and requires that the first character is a letter; NX-CBDS does not check for validity.

You can accept the default value by pressing [Return]. If you specified a new filename, the default design name is the same as the filename. If you did not give a filename, the default is "DESIGN."

NOTE: At any step on this screen, you can terminate the configuration process by pressing [Esc]. The program displays the update prompt and you can go to step 9. (If you did not specify a configuration filename, the information from this screen is used for this program session, but not saved.)

4. Enter a project name of up to 12 characters and press [Return], or just press [Return] to accept the default. You can use any characters. The supplied default is "PROJECT. "
5. Enter the name of the designer and press [Return], or press [Return] to accept the default. The default is "DESIGNER." Although CBDS supports up to 40 characters, NX-CBDS allows only up to 30.
6. If you are using a CDB file to specify Component Data Base disk names and partitions, enter the name of the file and press [Return]. If you are not using a CDB file, just press [Return].

7. If you are using a map file to specify pin order and/or component and version names, enter the name of the map file and press [Return]. If you are not using a map file, just press [Return].
8. The special symbol is used as the prefix when producing the design file header and format records. The choices are "\$" and "\". Unless P-CAD has instructed you otherwise, use the \$ default. To accept the default of "\$," press [Return]. To select the \ value, press the space bar to display the "\" and press [Return].

When you have set all the parameters, the system displays the update prompt at the bottom of the screen.

#### **Configuration File : Update**

**NOTE:** This prompt is not displayed if you did not specify a configuration filename. In this case, configuration is complete, and the program returns to the opening menu.

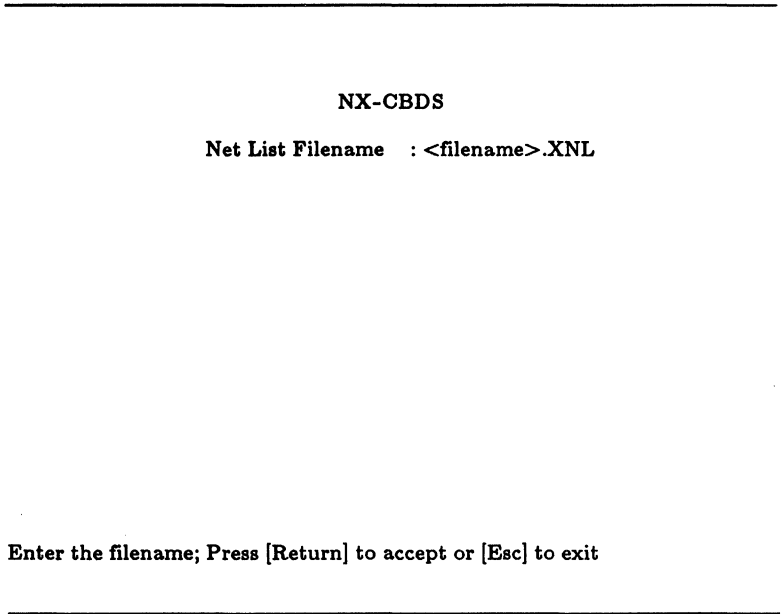
9. Press [Return] to accept the default of "Update," or press the space bar to display the "No Update" option and press [Return] to accept it.

The "Update" option saves the configuration file. The "No Update" option causes the onscreen configuration to be used for the current session only.

When configuration is complete, the program returns to the opening menu.

## Running NX-CBDS

1. Select "Run NX-CBDS" at the opening menu. The system prompts you for the name of the netlist file, as shown in Figure 4-4.



**Figure 4-4. NX-CBDS Program Screen**

2. Enter the name of the P-CAD netlist file to be read by NX-CBDS and press [Return]. If you do not enter the filename extension, NX-CBDS assumes .XNL.

The system prompts for the CBDS output filename, as shown in Figure 4-5.

---

NX-CBDS

Net List Filename : TESTFILE.XNL  
CBDS Filename : TESTFILE.CBD

Enter the filename; Press [Return] to accept or [Esc] to exit

---

**Figure 4-5. Sample Program Screen**

3. Enter the name of the CBDS-compatible output file to be created and press [Return], or press [Return] to accept the default, which is the netlist filename with a .CBD extension.

**NOTE:** At either of these two fields or during file processing, if you decide not to proceed with the program, you can press [Esc] to quit and return to the opening menu.

When you enter the output filename, NX-CBDS begins file processing. It displays progress reports and error messages, if any, at the bottom of the screen.

When processing is complete, the system displays the opening menu. You can select "Exit NX-CBDS" to exit to DOS or one of the other options to process another file.

## COMMAND LINE MODE

Command line mode allows you to specify the input netlist file and, if you want, the output and/or configuration files when you start NX-CBDS.

To use command line mode, at the DOS prompt, type NXCBDSD followed by the filenames, then press [Return].

The name of the input file is entered first and is required. If you do not include the filename extension, NX-CBDS assumes .XNL.

The name of the output file is entered next and is optional. If you specify a name with no extension, NX-CBDS uses the .CBD extension. If you do not specify a name, NX-CBDS gives the output file the same name as the input file with a .CBD extension.

The name of the configuration file is entered last, is optional, and must be preceded by a left parenthesis. You do not have to enter the .CFG extension; the program inserts it. If no configuration file is specified, NX-CBDS uses the NXCBDSD.CFG file.

Examples of command lines are shown below.

```
NXCBDSD TESTFILE  
NXCBDSD TESTFILE ( TEST  
NXCBDSD TESTFILE.NLT TEST2
```

After you enter the command line, the program runs automatically with no further input from you. First, the NX-CBDS Title Screen appears, followed by the Command Line Mode Screen. Figure 4-6 shows a sample Command Line Mode Screen.

---

NX-CBDS  
BATCH MODE

Net List File : TESTFILE.XNL  
Output File : TESTFILE.CBD  
Config. File : NXCBD.SCFG  
Log File : TESTFILE.LOG

Press [Esc] to abort

---

**Figure 4-6. Command Line Mode Screen**

When processing is complete, the program returns you to DOS.



Command line mode produces two log files: `<filename>.LOG` (where `<filename>` is the name of the input netlist file), which contains error messages produced while processing the netlist file, and `NXCBDS.LOG`, which contains error messages produced by NX-CBDS outside of netlist file processing.

## BATCH MODE

Batch mode is a variation of command line mode where the input file is a batch control file (.BCF) containing several command lines to be run consecutively without user intervention.

Use a text editor to create the batch control file. Each line of the batch control file has the same format as a command line without the NXCBDS command. Each line contains the name of an input netlist file and can include an output filename and/or a configuration filename. You must use a .BCF filename extension when naming the batch control file.

Figure 4-7 shows an example of a batch control file.

---

```
DESIGN1
DESIGN2.NLT ( CONFIG2
DESIGN3 OUTPUT ( CONFIG3
```

---

**Figure 4-7. Sample Batch Control File**

To run the batch control file, at the DOS prompt, type

**NXCBDS @ <filename> [Return]**

You do not need to enter the .BCF extension; NX-CBDS assumes it.

NX-CBDS displays the title screen, then the same screen displayed during command line mode. NX-CBDS processes the files sequentially, displaying each netlist filename in turn. When processing is complete, the program returns you to DOS.

Batch mode produces .CBD design files and log files for all netlist files listed in the batch control file. Like command line mode, it also produces the NXCBDS.LOG file, which lists messages generated during batch mode outside of netlist processing.

## CHAPTER 5. VIEWING THE OUTPUT FILES

NX-CBDS has two output files, the CBDS-compatible design file (.CBD) and the log file (.LOG), which contains error and information messages displayed during the generation of the .CBD file.

This section describes how to view and print the output files and how to interpret the .CBD file. Error messages that might be in the .LOG file are listed and explained in Appendix A, "Error Messages."

### VIEWING AND PRINTING FILES

To display or print an output file, use the DOS TYPE and [Ctrl]-[P] commands. For example, to display a file, type:

```
TYPE TESTFILE.LOG [Return]
```

Or, to print a file, type:

```
TYPE TESTFILE.LOG [Ctrl]-[P] [Return]
```

When the file is printed, press [Ctrl]-[P] again to turn off the print function.

You can also use the DOS PRINT command to print a file.

### THE .CBD FILE

The .CBD design file is made up of five sections. The first section, DFHEAD, contains the CBDS header information. The remaining four sections, CONNECT,

ASSIGN, INTERFAC, and TESTPAD, are all part of the Design Information division of the CBDS design file. (NX-CBDS generates no information for the other divisions.)

Each section of the .CBD file begins with a two-line header. The first line gives the name of the section and the second line gives the record format and the field names for the data records in the section.

The remaining lines of each section are the data records. Each record has several fields, separated by commas, which correspond to the fields in the second line of the section header. Some fields may be empty or omitted. Each record ends with a semicolon. If a record is longer than one line, it carries over to additional lines.

The fields of each section of the file, their contents, and their P-CAD origin are listed below. Field names enclosed in angle brackets (< >) can have more than one value per record. These values are separated by commas.

## **DFHEAD**

This section contains information that identifies the file.

**DESIGN** - Entered during NX-CBDS configuration.

**PROJECT** - Entered during NX-CBDS configuration.

**DESIGNER** - Entered during NX-CBDS configuration.

**DATE** - Taken from the system clock.

**TIME** - Taken from the system clock.

**LOKIVER** - Left blank.

**SPRIGVER** - Left blank.

**<CDBLNM>** - Taken from the CDB file specified during configuration.

**<CDBDIR>** - Taken from the CDB file specified during configuration.

## **CONNECT**

This section gives information about symbols and their interconnections. It contains one record for each symbol on the design.

**SYMDES** - (Required.) The name of the symbol instance, assigned using DETL:NAME/COMP or assigned by PC-NODES as UCsssnnn. For connectors, it is the reference designator, assigned using DETL:SCMD/PNUM.

**SDSYMB** - (Required.) The symbol type, assigned using the SNAME attribute; if the attribute is not assigned, taken from map file (except for connectors).

**<SIGNAL>** - (Required, but not used for connectors.) The names of nets attached to symbol pins, assigned using DETL:NAME/NET or assigned by PC-NODES as UNsssnnn. Pins are listed according to pin order, which is taken from the map file, if present, or defined with the symbol.

## ASSIGN

This section contains one record for each symbol on the design.

**SYMDES** - (Required.) The name of the symbol instance, assigned using DETL:NAME/COMP or assigned by PC-NODES as UCsssnnn. For connectors, the reference designator, assigned using DETL:SCMD/PNUM.

**LOGCOMP** - (Required.) The component type, assigned using the PNAME attribute. For nonconnectors, if the attribute is not assigned, this value is taken from map file if assigned there; otherwise, the .SYM filename is used.

**LOGVER** - The version, assigned using the REV attribute; if the attribute is not assigned, taken from map file (except for connectors).

**COMPDES** - The reference designator, assigned using DETL:SCMD/PNUM. Required for connectors.

**GRRDES** - Left blank.

**<PINNUM>** - The pin numbers corresponding to the **<SIGNAL>** names in the CONNECT section, assigned using DETL:SCMD/PNUM. Not used for connectors.

## INTERFAC

This section shows assignment of signals to connector pins. It contains one record for each connector pin.

**SYMDES** - The reference designator for the connector, assigned using DETL:SCMD/PNUM.

**SIGNAL** - The name of the net attached to the connector pin, assigned using DETL:NAME/NET or assigned by PC-NODES as UNsssnnn.

**PINNUM** - The pin number for SIGNAL above, assigned using DETL:SCMD/PNUM.

**PINNAME** - Present only for connector symbols having a single pin. The name of the pin, assigned using DETL:NAME/COMP. Left blank if the pin is unnamed.

### **TESTPAD**

This section contains one record for each test pad. If the design has no test pads, this section is omitted.

**TSTDES** - The test pad designator, assigned using DETL:NAME/COMP. It must have a format of TSTnn, where nn is 01-99.

**SIGNAL** - The name of the net attached to the test pad, assigned using DETL:NAME/NET.

**X** - Left blank.

**Y** - Left blank.

**LAYER** - Layer, assigned using the PCTP attribute.

**SHAPE** - Shape assigned using the PCTP attribute.

Appendix D contains sample .CBD files. For more information on the contents of the fields and records, refer to the IBM CBDS manuals.





## APPENDIX A. ERROR MESSAGES

NX-CBDS displays error messages on the screen and stores them in the .LOG log file, which you can view or print.

This appendix lists and explains NX-CBDS error messages.

### FILE ERRORS

Errors in this group are due to file access problems. You cannot run the program until the error is corrected.

**Message: \*\*\*\* <filename> not found**

**Cause:** The named file could not be located.

**Action:** Make sure that you enter the correct filename and that the file is present on the current or specified directory.

**Message: \*\*\*\* File extension must be <extension>**

**Cause:** A file name with an improper extension was specified.

**Action:** Use the correct extension.

**Message: \*\*\*\* Incompatible Database Format**

**Cause:** The netlist file was produced by old version of PC-NODES.

**Action:** Extract the netlist again using the newer version of PC-NODES.

**Message: \*\*\*\* Cannot open <filename>**

**\*\*\*\* Cannot read <filename>**

**\*\*\*\* Cannot close <filename>**

**\*\*\*\* Cannot delete <filename>**

**Cause:** Various causes.

**Action:** Make sure the file exists on the current directory. If the problem persists, turn the computer off and reboot.

## **CONNECTOR PREASSIGNMENT OR ATTRIBUTE ERRORS**

Errors in this group arise from mistakes in connector preassignment or attributes.

**Message: \*\*\*\* Connector has no reference designator  
Component : <compname>**

**Cause:** The program encountered a connector that has no reference designator.

**Action:** Go back to PC-CAPS and enter a reference designator for the connector.

**Message: \*\*\*\* No symbol name for connector <refdes>**

**Cause:** No SNAME attribute was assigned to the connector with the specified reference designator.

**Action:** Assign the appropriate attribute to the connector either using PC-CAPS or in the map file.

**Message: \*\*\*\* No part name for connector <refdes>**

**Cause:** No PNAME attribute was assigned to the connector with the specified reference designator.

**Action:** Assign the attribute to the connector either using PC-CAPS or in the map file.

**Message: \*\*\*\* Connector Pin Without Pin Number  
See .CBD File : <refdes>**

**Cause:** The connector with the specified reference designator has a pin that was not preassigned using SCMD/PNUM.

**Action:** Go back to PC-CAPS and enter a pin number.

**Message: \*\*\*\* Duplicate Connector Pin Numbers  
<refdes> <pnum>**

**Cause:** An attempt was made to assign the pin number <pnum> to two pins on connector <refdes>.

**Action:** Go back to PC-CAPS and assign the correct pin number.

**Message: \*\*\*\* Conflicting Connector Attributes  
for <refdes>  
<attr> => <value1> or <value2> ?**

**Cause:** Two symbols in the connector <refdes> have been assigned conflicting values <value1> and <value2> for the attribute <attr>.

**Action:** Go back to PC-CAPS and correct the attribute value.

## **CDB FILE ERRORS**

These errors are found when processing the CDB file.

**Message: \*\*\*\* CDB File (<filename>) not found**

**Cause:** NX-CBDS was unable to find the CDB file <filename> entered in the configuration mode.

**Action:** Check to make sure the filename is entered correctly and the file is present in the current or specified directory.

**Message: \*\*\*\* CDBDIR missing for CDBLNM <name>  
Line Ignored**

**Cause:** A line in the CDB file had only one name entered.

**Action:** Correct the CDB file if necessary.

**Message: \*\*\*\* CDBLNM (<name>) Too Long  
First four characters used**

**Cause:** The disk name entered in the CDB file was over four characters long.

**Action:** Check to see if the name used is acceptable.

**Message: \*\*\*\* CDBDIR (<label>) Too Long  
First forty characters used**

**Cause:** The disk name entered in the CDB file was over forty characters long.

**Action:** Check to see if the name used is acceptable.

## COMMAND LINE/BATCH CONTROL FILE ERRORS

**Message: \*\*\*\* Invalid batch control record ignored**

**Cause:** A line of the batch control file was in incorrect format so no file was processed for the line.

**Action:** Check your batch control file; process the file if necessary.

**Message: \*\*\*\* Errors occurred in command line or  
batch mode  
See NXCBDS.LOG**

**Cause:** Errors occurred outside of netlist processing.

**Action:** Check the NXCBDS.LOG file for the error message(s); correct the errors, if necessary.

## OTHER ERRORS

Remaining error messages are shown below.

**Message: \*\*\*\* No symbol name for <compname>**

**Cause:** The symbol named <compname> has no symbol name.

**Action:** Go back to PC-CAPS and assign the appropriate symbol name using the SNAME attribute.

**Message: \*\*\*\* Hierarchical component detected**  
**Component name : <compname>**

**Cause:** The component named <compname> is hierarchical.

**Action:** The .CBD file is not generated. Correct your schematic.

**Message: \*\*\*\* Database Error**

**Cause:** The database is unusable.

**Action:** Regenerate your database and try again.

**Message: \*\*\*\* Memory Allocation Error**

**\*\*\*\* Cannot create or write Work File**

**Cause:** The system may have insufficient memory. NX-CBDS requires 640K.

**Action:** Be sure you have 640K. If so, reboot your system.





## APPENDIX B. ATTRIBUTE SUMMARY

This appendix lists the PC-CAPS attributes that are used with NX-CBDS. Assign all attributes by using the ATTR/ACOM command and entering the attribute in the format:

<keyword>=<value>

where:

<keyword> is the name of the attribute.

<value> is the value you specify for it (for example, SHEET=01).

If the value contains embedded blanks, you must enclose it in quotation marks.

Table B-1 lists each attribute and its use in NX-CBDS. With the exception of the SHEET attribute, which is assigned to each sheet of a multisheet design, all these attributes are assigned to symbols. Most of the attributes, as noted in the table, can be assigned either in SYMB mode when the symbol is created or in DETL mode when the symbol is used.

**Table B-1. Attribute Summary**

Attribute	NX-CBDS Use	Mode
SHEET	Identifies multiple sheets	SYMB
PCIF	Identifies connectors (CONN) and test pads (TSTPT)	SYMB or DETL
SNAME	Gate type; SDSYMB field of CONNECT section of .CBD file	SYMB or DETL
PNAME	Component type; LOGCOMP field of ASSIGN section of .CBD file	SYMB or DETL
REV	Component version; LOGVER field of ASSIGN section of .CBD file	SYMB or DETL
PREFIX	Prefix for connector pin numbers	DETL
SUFFIX	Suffix for connector pin numbers	DETL
PCTP	Test pad layer and/or shape; LAYER and/or SHAPE fields of TESTPAD section of .CBD file	SYMB or DETL

## **APPENDIX C. NX-MAP**

### **NX-MAP OVERVIEW**

The NX-MAP program is a utility that allows you to cross-reference PC-CAPS schematic symbols and the corresponding components in the library of another "target" system. NX-MAP is used together with the P-CAD interface program to the target system.

NX-MAP allows you to specify changes in pin order and component identification when the target system conventions are different from those used in the PC-CAPS library symbols. Using NX-MAP enables you to cross-reference the components without editing each P-CAD library symbol.

There are four stages in this process:

1. Create the map library file(s) (.MLF) using PC-CAPS and PC-NODES. To create each map library file, use PC-CAPS to produce the schematic database file that contains all the symbols you want to map. Then use PC-NODES to extract the netlist from the schematic database.
2. Use a text editor and (optionally) NX-MAP batch file preparation mode to create the map batch file (.MBF), which contains information about the target library components.
3. Input the map library file and the map batch file into NX-MAP, using update mode. NX-MAP generates two output files:

- The map file (.MAP) contains the cross-reference information in binary format and can be input directly into the appropriate P-CAD interface program.
  - The log file (NXMAP.LOG) contains all messages displayed and all error messages generated during program operation.
4. To examine the contents of the map file, use NX-MAP dump mode to translate the map file into the ASCII-format map dump file (.MDF). If corrections are necessary, you can edit the dump file, then input it into NX-MAP to generate a corrected map file.

Once the map file is created, you can use it whenever you run the interface program. If you need to add components, you can edit your NX-MAP input files, then rerun NX-MAP to produce an updated map file.

Figure C-1 illustrates the process described above.

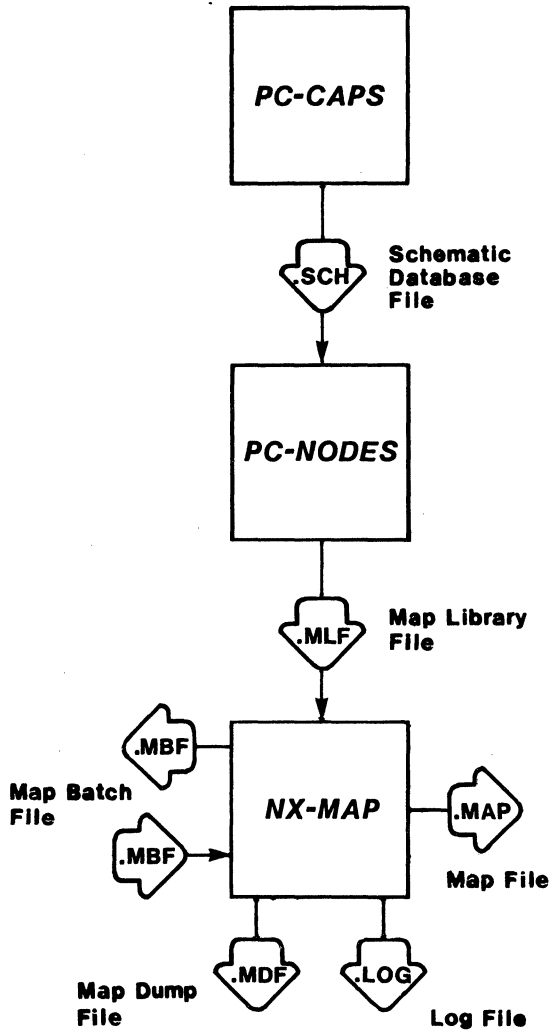


Figure C-1. NX-MAP Input and Output

## **PREPARING THE NX-MAP INPUT FILES**

Before you can run NX-MAP, you must prepare the map library file and the map batch file. This chapter explains how to create these files and describes in detail the format of the map batch file.

### **Creating the Map Library File**

The map library file (.MLF) provides NX-MAP with the pin order of each P-CAD symbol. It is in standard P-CAD binary netlist format.

You can input several map library files into NX-MAP to create one map file.

To create the map library file, first determine which components you need to reference. Then use PC-CAPS to create a schematic database file containing all the components. Use the ENTR/COMP command in detail mode to enter each symbol on the schematic. You can place the symbols anywhere on the schematic, and you do not need to connect them. However, you must use the ENTR/WIRE command to draw at least one wire to meet PC-NODES requirements.

Next, run PC-NODES to extract the binary netlist from the schematic. To identify the netlist as a map library file, use a .MLF filename extension.

### **Creating the Map Batch File**

The map batch file is an ASCII file that contains the information you want to add to each P-CAD symbol in the map library file. The map batch file can redefine pin order, part name, revision level, and symbol name for each symbol.

You can create a map batch file using a text editor such as DOS EDLIN or you can use NX-MAP preparation mode. To use preparation mode, you input the map library file into NX-MAP. NX-MAP creates a new file, which contains an entry for each symbol in the map library file and is in map batch file format. You can then use a text editor to add the necessary information to the new file. The section on "Using NX-MAP" contains instructions for using preparation mode.

Each entry in the map batch file must have a corresponding entry in a map library file. When you run NX-MAP, you can specify any number of map batch files and any number of map library files to create a single .MAP file. If a symbol listed in a map batch file is not present in any of the map library files, NX-MAP ignores that symbol.

The map dump file created in NX-MAP dump mode is in standard map batch file format. You can edit it and input it into NX-MAP the same way you do a map batch file.

The next sections describe map batch file format and how to handle the batch file created in preparation mode.

#### *Map Batch File Format*

The map batch file contains a record for each schematic symbol to be included in the map file. Each record begins with the DEFINE keyword and can take up several lines. A line can be up to 80 characters long. All characters to the right of and including a percent sign (%) are considered a comment and are ignored by NX-MAP.

Each record has several fields which contain symbol name and pin order information in the following format:

**DEFINE**

**<fname> <pname> <rev> <sname> <order>**

where:

**DEFINE** is the keyword that indicates the beginning of a new record. It must be on a line by itself.

**<fname>** is the filename of the P-CAD symbol; for example, 7400. The extension is not included. This field is required.

**<pname>** is the name of the physical component associated with the symbol; for example, SN7400. With some interface programs, this corresponds to the PC-CAPS PNAME attribute. If you do not want to specify a value, enter an asterisk (\*) in this field.

**<rev>** is the revision level of the physical component. With some interface programs, this corresponds to the PC-CAPS REV attribute. If you do not want to specify a value, enter an asterisk (\*) in this field.

**<sname>** is the name of the schematic symbol; for example, NAND2. With some interface programs, this corresponds to the PC-CAPS SNAME attribute. If you do not want to specify a value, enter an asterisk (\*) in this field.

**<order>** is a list of the schematic symbol pins in the order required by the target system. You must make an entry for each pin defined on the symbol. You must reference each pin by its P-CAD name (not by its name in the target system).



The example in Figure C-2 defines the symbol in the P-CAD 7474.SYM file to have a part name of J415, a revision level of 2.3, and a symbol name of DFF, and the pins ordered in the sequence shown.

---

```
DEFINE
7474 J415 2.3 DFF
Q Q' D CP SD RP
```

---

**Figure C-2. Sample Map Batch File Entry**

### *The Preparation Mode Batch File*

NX-MAP preparation mode produces a file in the usual map batch file format. Each entry includes only the P-CAD information for the symbol; you must use a text editor to add the target system information.

Each entry in the file includes a comment line that lists the P-CAD pin order. You can use this line as a reference when entering the target system pin order.

If a P-CAD symbol has the PNAME, REV, or SNAME attribute, preparation mode inserts the attribute value into the corresponding <pname>, <rev>, or <sname> field. If the symbol does not have an attribute, an asterisk is used for the field. If you want to add a value for one of these fields, replace the asterisk with the corresponding value.

The following example shows an entry created in preparation mode from a symbol in the map library file. The symbol has the SNAME attribute assigned with a value of DFF.

---

```
DEFINE
7474 * * DFF
% D CP Q Q' SD RD
```

---

**Figure C-3. Sample Preparation Mode Map  
Batch File Entry**

## USING NX-MAP

This section describes the required conditions and procedures for configuring and running NX-MAP.

Before you run NX-MAP, be sure that:

- The system is correctly configured and NX-MAP is installed.
- You have prepared the map library file and it is present in the current directory.
- Any other necessary input files are present in the current directory.

To start NX-MAP, use the following steps.

1. From the appropriate project directory, type:

```
NXMAP [Return].
```

The system displays the NX-MAP Title Screen. Press any key to display the NX-MAP Opening Menu, shown in Figure C-4.

---

NX-MAP

Options:

Prepare Batch File  
>> Update Map File <<  
Dump Map File  
Exit

Press: [SPACE] for next option; [RETURN] to accept

---

### Figure C-4. NX-MAP Opening Menu

This menu provides the following options.

**Prepare Batch File** - Allows you to use the map library file to prepare a preliminary map batch file.

**Update Map File** - Allows you to create the map file.

**Dump Map File** - Allows you to produce an ASCII version of the map file.

**Exit** - Returns you to DOS.

The default option, "Update Map File", is highlighted. You can select it by pressing [Return]. To select another option, press the space bar as many times as necessary to highlight the option, then press [Return].

### **Prepare Batch File Mode**

"Prepare Batch File" allows you to input the map library file into NX-MAP to produce a preliminary map batch file (.MBF), which you can then edit as necessary to produce the final map batch file.

To prepare a map batch file, use the following steps.

1. Select "Prepare Batch File" at the opening menu. The system prompts you for the name of the netlist file, as shown in Figure C-5.

---

NX-MAP

Current Mode : Prepare Batch File  
Library Filename : <filename>.MLF

Enter the filename; Press [Return] to accept or [Esc] to exit

---

**Figure C-5. NX-MAP Prepare Batch File Screen**

2. Enter the name of the map library file to be read by NX-MAP and press [Return]. If you do not enter the filename extension, NX-MAP assumes .MLF. The system prompts for the output map batch filename.

It displays a default filename consisting of the library filename with a .MBF extension, as shown in Figure C-6.

---

NX-MAP

Current Mode : Prepare Batch File  
Library Filename : TESTFILE.MLF  
Map Batch Filename : TESTFILE.MBF

Enter the filename; Press [Return] to accept or [Esc] to exit

---

**Figure C-6. Sample Prepare Batch File Screen**

3. Press [Return] to accept the default filename or enter another name for the output map batch file to be created and press [Return].

**NOTE:** At either of these two fields, if you decide not to proceed with the program, you can press [Esc] to quit and return to the opening menu.

When you enter the output filename, NX-MAP begins file processing. It displays status reports at the bottom of the screen.

When processing is complete, the system displays the opening menu. You can select one of the other NX-MAP options or "Exit NX-MAP" to exit to DOS.

### **Update Mode**

"Update Map File" allows you to create or update a map file. Use the following steps.

1. Select "Update Map File" at the opening menu. The system prompts you for the name of the map file, as shown in Figure C-7.

---

**NX-MAP**

**Current Mode** : Update Map File  
**Map Filename** : <filename>.MAP

Enter the filename; Press [Return] to accept or [Esc] to exit

---

**Figure C-7. NX-MAP Update Map File Screen**

**NOTE:** At any of the following steps, if you decide not to proceed with the program, you can press [Esc] to quit and return to the opening menu.

2. Enter the name of the map file to be output by NX-MAP and press [Return]. If you do not enter the filename extension, NX-MAP assumes .MAP.



If the filename you entered is the name of a map file that is in the current directory, NX-MAP prompts:

**Map file already exists**

Press [Return] to update the existing map file with the information in the map batch file or enter another filename and press [Return].

When the program updates the map file, it adds any records found in the map batch file that are not already present in the map file. If records for a symbol are present in both the existing map file and the map batch file, the program replaces the existing records with the ones in the map batch file. No records are deleted from the map file; instructions for deleting a record are given in the section "The NX-MAP Output Files."

The system prompts for the input map library filename.

3. Enter the name of the library file to be read by NX-MAP and press [Return].

The next prompt asks for the name of the map batch file, as shown in Figure C-8.

---

NX-MAP

Current Mode : Prepare Batch File  
Map Filename : TESTFILE.MAP  
Library Filename : TESTFILE.MLF  
Map Batch Filename : <filename>.MBF

Enter the filename; Press [Return] to accept or [Esc] to exit

---

**Figure C-8. Sample Update Map File Screen**

4. Enter the name of the map batch file to be input into NX-MAP.

NX-MAP starts processing the files to create the map file. It displays status reports at the bottom of the screen. When the library file and the batch file that you specified are processed, the cursor returns to the library filename prompt. You can now process as many library and batch files as necessary for one map file.

5. Enter the name of the next library file to process and press [Return]. Then enter the name of the next batch file and press [Return].

NX-MAP processes the files and adds the results to the map file, then prompts again for additional library and batch file names.

Repeat this step until you have processed all the library and batch files for this map file. You can process as many files as necessary. You can use the same library file with several batch file and the same batch file with several library files.

6. When you have finished creating the map file, press [Esc] to exit update mode. The system displays the opening menu. You can select one of the other NX-MAP options or "Exit NX-MAP" to exit to DOS.

When the map file is created, you may want to check its contents. The next section, "Dump Mode," tells how to produce an ASCII version of the map file which you can print out and edit if necessary.

### **Dump Mode**

"Dump Map File" allows you to produce the map dump file (.MDF), which is in batch file format and which reflects the contents of the map file.

To create a map dump file, first be sure that all the map library files used to create the map file are present in the current directory. Then, use the following steps.

1. Select "Dump Map File" at the opening menu. The system prompts you for the name of the map file, as shown in Figure C-9.

---

NX-MAP

Current Mode : Dump Map File  
Map Filename : <filename>.MAP

Enter the filename; Press [Return] to accept or [Esc] to exit

---

**Figure C-9. NX-MAP Dump Map File Screen**

2. Enter the name of the map file to be dumped and press [Return]. If you do not enter the filename extension, NX-MAP assumes .MAP.

The system prompts for the output map dump filename. It displays a default filename consisting of the map filename with a .MDF extension, as shown in Figure C-10.

---

NX-MAP

Current Mode : Dump Map File  
Map Filename : TESTFILE.MAP  
Dump Filename : TESTFILE.MDF

Enter the filename; Press [Return] to accept or [Esc] to exit

---

**Figure C-10. Sample Dump Map File Screen**

3. Press [Return] to accept the default filename or enter another name for the output dump file to be created and press [Return].

**NOTE:** At either of these two fields, if you decide not to proceed with the program, you can press [Esc] to quit and return to the opening menu.

When you enter the output filename, NX-MAP begins file processing. It displays progress reports at the bottom of the screen.

When processing is complete, the system displays the opening menu. You can select one of the other NX-MAP options or "Exit NX-MAP" to exit to DOS.

## THE NX-MAP OUTPUT FILES

NX-MAP has four output files, the map file (.MAP), which is output in update mode; the preparation mode batch file (.MBF); the dump file (.MDF), which is output in dump mode; and the log file (.LOG), which is output in all modes.

The map file is in binary format and cannot be read by the user. The log file contains status and error messages displayed during an NX-MAP program session. Possible error messages are listed and explained in the "NX-MAP Error Messages" section.

This section describes the preparation mode batch file and the dump file and explains how to view and print the ASCII output files.

### The Preparation Mode Batch File

The batch file output in NX-MAP preparation mode lists the P-CAD information for all the symbols in the input library file. The section "Preparing the NX-MAP Input Files" explains how to edit the preparation mode batch file to produce the final map batch file.

Figure C-11 shows a sample batch file created in preparation mode. Note that the P-CAD pin order is shown as a comment.

---

```
DEFINE
7400 * * *
% A B Y

DEFINE
7474 * * *
% D CP SD RD Q Q'

DEFINE
7404 * * *
% Y A
```

---

**Figure C-11. Sample Preparation Mode Batch File**

### **The Map Dump File**

The map dump file is an ASCII translation of the map file. It is in the same format as the map batch file. You can examine the map dump file to be sure that the information in the map file is complete and accurate.

If you need to make corrections, you can correct the dump file and input it into NX-MAP as a map batch file to produce a corrected map file.

To delete the record for a symbol, use the following procedure.

1. Create and print the dump file.
2. Rename or delete the existing map file.
3. Edit the dump file to remove the record.

4. Run NX-MAP in update mode to create a new map file.

A sample dump file is shown below.

---

```
DEFINE
7400 * * *
% A B Y
Y A B
DEFINE
7474 PARTNAME REV SYBNAME
% D CP SD RD Q Q'
Q Q' D CP SD RD
DEFINE
7404 * REV *
% Y A
A Y
```

---

**Figure C-12. Sample Map Dump File**

### **Viewing and Printing Files**

To display or print an output file, use the DOS TYPE and [Ctrl]-[P] commands. For example, to display a file, type:

```
TYPE TESTFILE.LOG [Return]
```

Or, to print a file, type:

```
TYPE TESTFILE.LOG [Ctrl]-[P] [Return]
```



When the file is printed, press [Ctrl]-[P] again to turn off the print function.

You can also use the DOS PRINT command to print a file.

## **NX-MAP ERROR MESSAGES**

This section lists and explains NX-MAP error messages.

### **Batch File Errors**

Errors in this group are produced when processing a batch file in update mode.

#### **Message: No record for DEFINE**

**Cause:** The batch file contains a DEFINE keyword which does not precede a symbol definition record.

**Action:** Check the batch file and correct it if necessary.

#### **Message: Incorrect number of fields for <name>**

**Cause:** The record for the symbol <name> does not have the correct number of fields.

**Action:** Correct the batch file entry so that it has the correct number of pins and it contains a value or an asterisk in each of the other fields.

**Message:** <name> has a duplicated pin

**Cause:** The batch file lists two pins with the same name for symbol <name>.

**Action:** Correct the batch file entry.

**Message:** <name> has misspelled pin name <pinname>

**Cause:** The batch file entry for the symbol <name> has a pin name (<pinname>) that is not present for the same symbol in the map library file.

**Action:** Correct the batch file entry.

**Message:** <name> is not found in library

**Cause:** The batch file entry for symbol <name> does not have a corresponding entry in the map library file being accessed.

**Action:** Be sure you specified the correct filenames; check both files and make any necessary corrections.

### **Library File Errors**

**Message:** Duplicated symbol <name> found in <libname>

**Cause:** The map library <libname> contains two or more instances of the symbol <name>.

**Action:** Remove the extra symbol(s) from the schematic and regenerate the map library file.

## **System and Database Errors**

**Message: Memory Allocation error**

**Insufficient memory**

**Write error : <filename>**

**Cannot open <filename>**

**Cause:** These errors are all system errors.

**Action:** Exit from NX-MAP and turn the computer off and then back on. Make sure 640K of memory is available. Make sure the specified file exists.

**Message: Database error**

**Cause:** The netlist is unusable.

**Action:** Generate a new netlist file.



## APPENDIX D. SAMPLE .CBD FILES

This appendix contains sample .CBD files produced using the sample data supplied on your NX-CBDS diskette.

### DEMO1

The DEMO1 design is a schematic that requires the use of NX-MAP. The output CBDS design file, DEMO1.CBD, is shown below.

```

$D DFHEAD
$F DESIGN,PROJECT,DESIGNER,DATE,TIME,LOKIVER,SPRIGVER,<(CDBLNM,CBDDIR)>;
DESIGN,PROJECT,DESIGNER,01/NOV/85,13:56,,,<(,)>;
$D CONNECT
$F SYMDES, SDSYMB, <SIGNAL>;
S1,NOR2,<N8,N1,N2>;
S2,NAND2,<N9,N3,N4>;
S3,INV,<N5,N10>;
S4,XOR,<N11,N6,N7>;
S5,DIFF,<N12,N13,N9,N10,N8,N11>;
S7,DECODER,<N19,N20,N21,N22,N23,N24,N25,N26,N13,N14,N15,N16,N17,N18>;
$D ASSIGN
$F SYMDES, LOGCOMP, LOGVER, COMPDES, GRDDDES, <PINNUM>;
S1,PN12,,U1,,<1,3,2>;
S2,7400,,U2,,<3,1,2>;
S3,7404,REV1,U3,,<1,2>;
S4,7486,,U4,,<3,1,2>;
S5,7474,REV88,U5,,<5,6,2,3,4,1>;
S7,74LS138,,U6,,<15,14,13,12,11,10,9,7,1,2,3,4,5,6>;
$D INTERFAC
$F SYMDES,SIGNAL,PINNUM,PINNAME;

```

## DEMO2

The DEMO2 design is a two-sheet schematic. The output CBDS design file, DEMO2.CBD, is shown below.

```

$D DFHEAD
$F DESIGN,PROJECT,DESIGNER,DATE,TIME,LOKIVER,SPRIGVER,<(CDBLNH,CBDDIR)>;
TEST1,TEST2,TEST3,01/NOV/85,14:02,,,<(CORP,CDB),(PROJ,CDB),(USER,CBDSWK),
(LOKI,CDB),(,)>;
$D CONNECT
$F SYMDES, SDSYMB, <SIGNAL>;
S6,NAND2,<UN001006,UN001007,N5>;
S7,NAND2,<UN001008,UN001009,N6>;
S8,NAND2,<UN001015,UN001014,RESET>;
S9,NAND2,<UN001013,UN001012,SET>;
S10,NAND2,<UN001011,UN001010,CLOCK>;
S5,NAND2,<UN001001,UN001005,N4>;
S4,NAND2,<UN001001,UN001004,N3>;
S3,NAND2,<UN001001,UN001003,N2>;
S2,NAND2,<UN001001,UN001002,N1>;
S1,INV,<UN001001,UN001000>;
S13,DFF,<CLOCK,RESET,**NC**,UN002002,N3,SET>;
S12,DFF,<CLOCK,RESET,**NC**,UN002001,N2,SET>;
S11,DFF,<CLOCK,RESET,**NC**,UN002000,N1,SET>;
S14,DFF,<CLOCK,RESET,UN002003,**NC**,N4,SET>;
S15,DFF,<CLOCK,RESET,**NC**,UN002004,N5,SET>;
S16,DFF,<CLOCK,RESET,**NC**,UN002005,N6,SET>;
P2,CONN20,<>;
P1,CONN5,<>;
$D ASSIGN
$F SYMDES, LOGCOMP, LOGVER, COMPDES, GRDDDES, <PINNUM>;
S6,7400,,,,<,,>;
S7,7400,,,,<,,>;
S8,7400,,,,<,,>;
S9,7400,,,,<,,>;
S10,7400,,,,<,,>;
S5,7400,,U1,,<12,13,11>;
S4,7400,,U1,,<10,9,8>;
S3,7400,,U1,,<4,5,6>;
S2,7400,,U1,,<1,2,3>;
S1,7404,,,,<,,>;
S13,7474,,U3,,<3,1,6,5,2,4>;
S12,7474,,U2,,<11,13,8,9,12,10>;
S11,7474,,U2,,<3,1,6,5,2,4>;

```

```
S14,7474,,U4,,<3,1,6,5,2,4>;
S15,7474,,U4,,<11,13,8,9,12,10>;
S16,7474,,U3,,<11,13,8,9,12,10>;
P2,CJ45,,P2,,<>;
P1,CJ234,V14,P1,,<>;
$D INTERFAC
$F SYMDES,SIGNAL,PINNUM,PINNAME;
P2,UN001006,A1;
P2,UN001007,A2;
P2,UN001008,A3;
P2,UN001009,A4;
P2,UN001015,A5;
P2,UN001014,A6;
P2,UN001013,A7;
P2,UN001012,A8;
P2,UN001011,A9;
P2,UN001010,A10;
P2,UN002002,B1;
P2,UN002001,B2;
P2,UN002000,B3;
P2,UN002005,B4;
P2,**NC**,B5;
P2,**NC**,B6;
P2,UN002004,B7;
P2,UN002003,B8;
P2,SET,B9,P2PIN9B;
P2,CLOCK,B10;
P1,UN001000,1;
P1,UN001002,2;
P1,UN001003,3;
P1,UN001004,4;
P1,UN001005,5;
```

**NX-CBDS D-4**

