System Interconnect Board (SIB)

(CRAY T90™ Series)

HTM-027-B

Cray Research Proprietary

Cray Research, Inc.

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SYSTEM INTERCONNECT BOARD (SIB)

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Module Description

The system interconnect board (SIB) is a printed circuit board that passes data and control signals in CRAY T916 and CRAY T932 computer systems; each system contains eight SIBs. The SIB replaces the wire mat that was used in previous Cray Research computer systems.

The SIB module description varies according to system type. For CRAY T932 systems, each SIB module measures approximately 15 in. $\times$ 16 in. and consists of two 18-layer printed circuit boards bonded with a nonconductive adhesive. For CRAY T916 systems, the SIB is half this size because modules exist in only half of the system. The SIB does not have logic components, and no interconnections exist between the two printed circuit boards.

The SIB connects to the other module chassis components with two types of electronic zero insertion force (EZIF) connectors: orthogonal interconnect module (OIM) connectors and straight interconnect module (SIM) connectors. The OIM connects modules that are on an orthogonal plane; the SIM connects modules that are on a horizontal plane. The SIB is not a field-replaceable unit (FRU).

NOTE: Throughout this document, there are frequent references to the CP module; CP refers to a module type. The CP module in a CRAY T90 series system is commonly referred to as a *CPU* in other Cray Research systems.

Module Types

The CRAY T916 and CRAY T932 systems use two different SIB module types: SJ and SI modules.

The CRAY T916 systems use only the SJ module type, which is approximately one half the size of an SI module. The SJ module is designed to maintain the full memory bandwidth of a CRAY T916 system. This is accomplished by doubling the number of addressable sections per memory module stack.

The SI module is used only with CRAY T932 systems. CRAY T932 systems that contain less than the full complement of 32 CP modules can be upgraded by adding more CP modules.

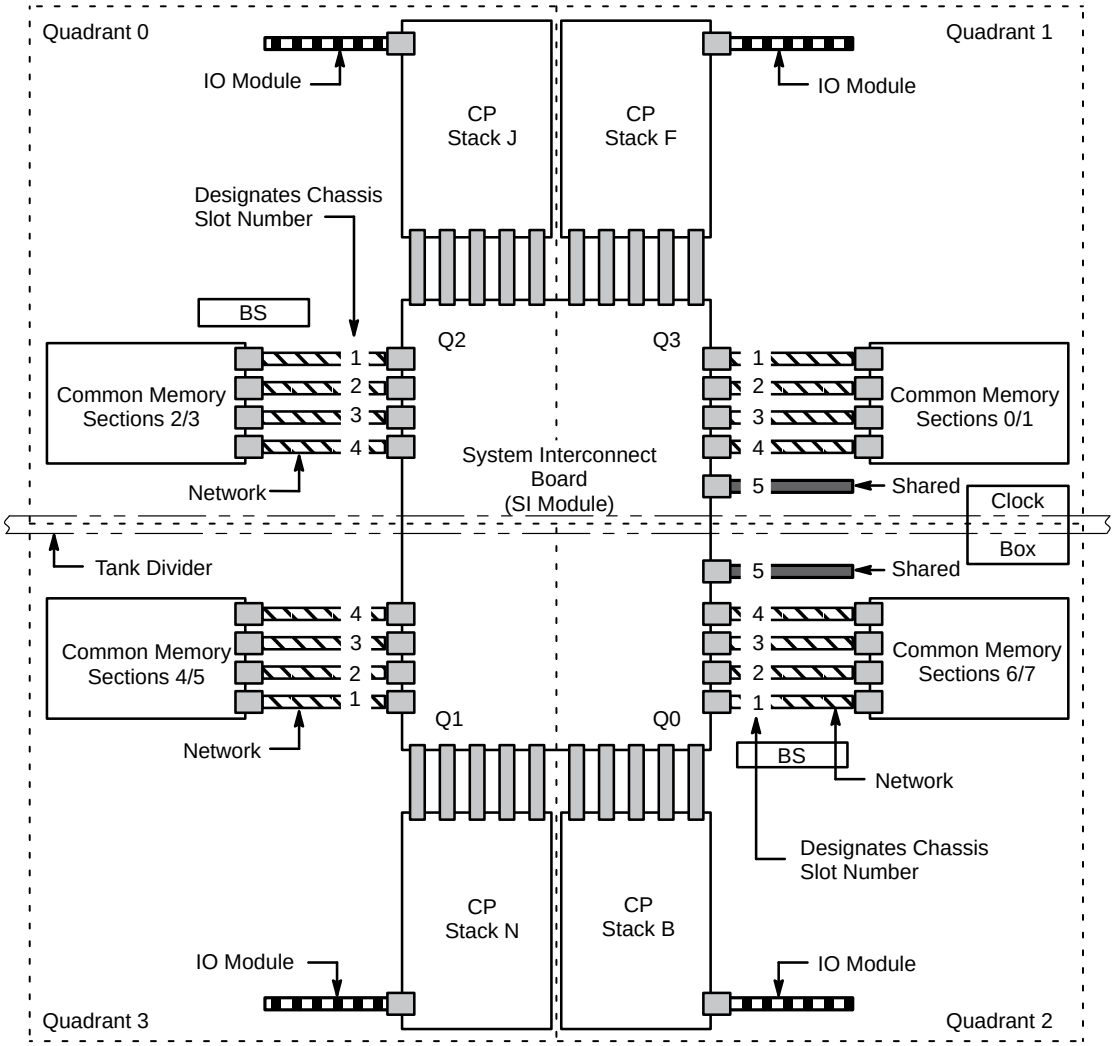
Module Chassis Components

The following subsections provide information about the CRAY T932 and CRAY T916 module chassis components.

CRAY T932 Module Chassis Components

Refer to Figure 1 for a top view of the CRAY T932 module chassis components. The CRAY T932 module chassis is divided into four quadrants: Q0, Q1, Q2, and Q3, with the SIB located in the center of the module chassis. A tank divider separates quadrants 0 and 1 from quadrants 2 and 3. CRAY T932 systems have from 1 to 32 CP modules, and the CP modules can reside on both sides of the tank divider.

Figure 1. Top View of a CRAY T932 Module Chassis

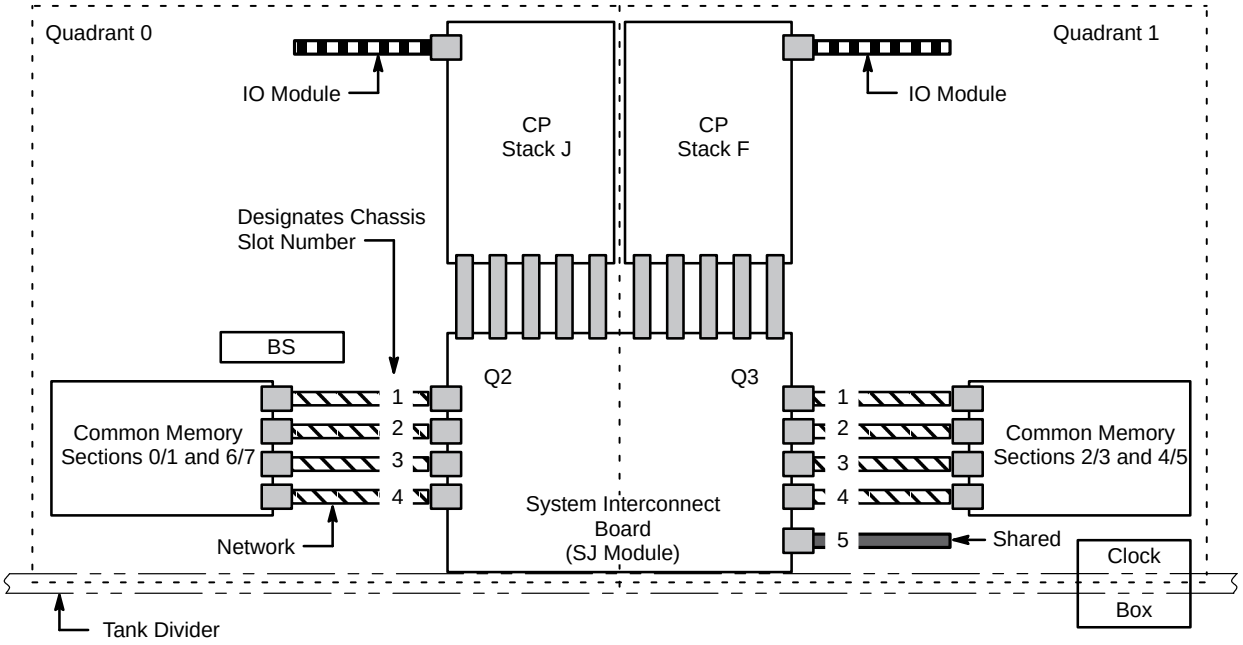


CRAY T916 Module Chassis Components

Refer to Figure 2 for a top view of the CRAY T916 module chassis components. Like the CRAY T932 module chassis, the CRAY T916 module chassis is divided into four quadrants; however, only quadrants 0 and 1 are used.

The SIB is located in the center of the module chassis, and a tank divider separates quadrants 0 and 1 from quadrants 2 and 3. CRAY T916 systems have from 1 to 16 CP modules, and the CP modules reside on only one side of the tank divider (in quadrants 0 and 1). A CRAY T916 module chassis cannot be upgraded beyond 16 CP modules.

Figure 2. Top View of a CRAY T916 Module Chassis



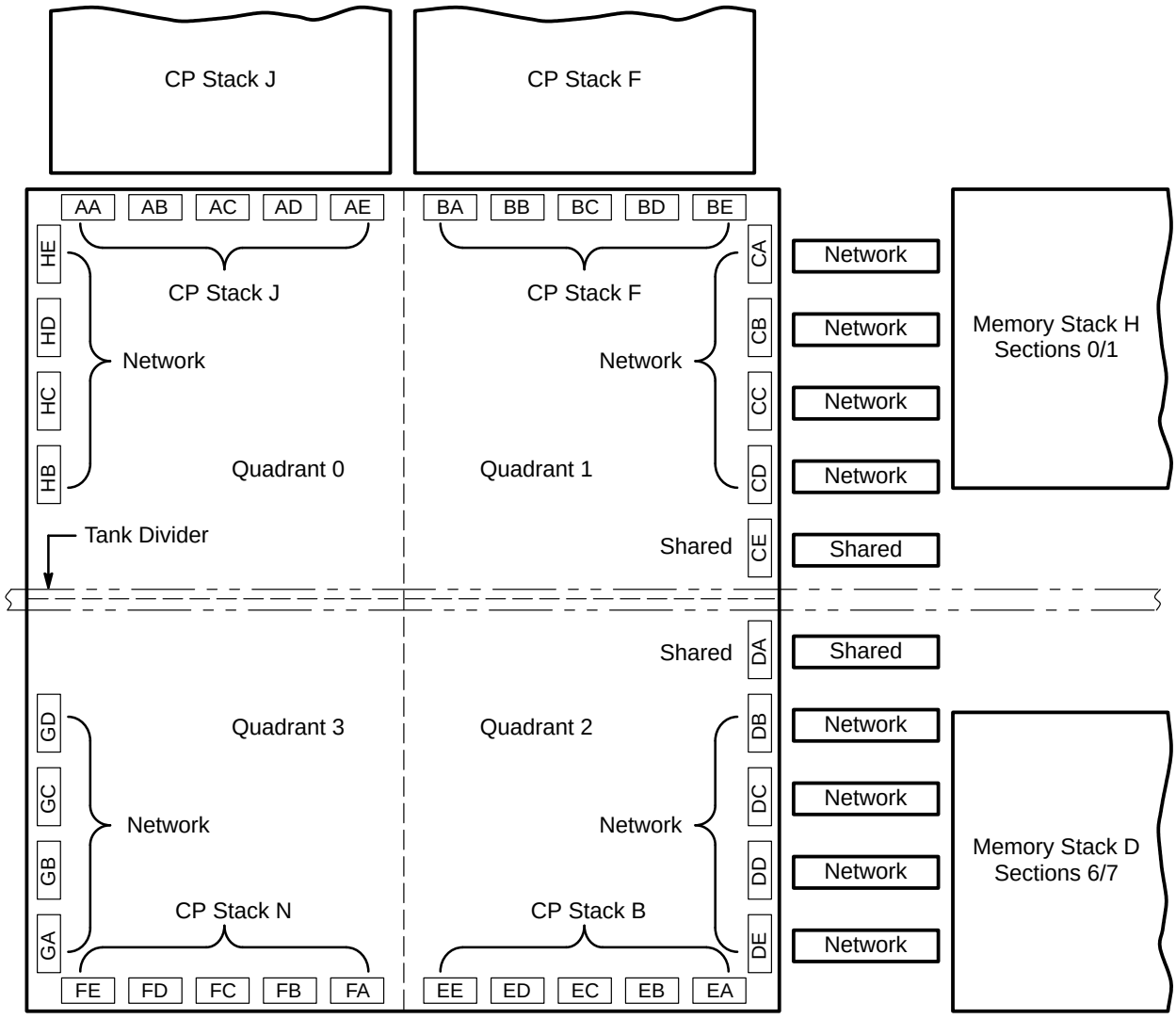
As shown in Figure 1, the SIB modules connect to the CP modules, network modules, and shared modules. The common memory modules are connected on the other side of the network modules. All data passes between modules through foil runs; these foil runs are more commonly referred to as *nets*.

Figure 10 shows a stack of SIB modules; some of the CP module stacks, network modules, memory module stacks, and IO modules have been omitted for ease of viewing. The location of the SIB within the SIB stack determines which data and control signals it passes. For example, data on CP module number 4 can pass data only to SIB module number 4.

Board Layout

Figure 3 illustrates the layout of the SIB. Each one of the eight SIBs contains five EZIF connector pads per CP module. The EZIF connector pads are (horizontally) labeled AA through AE, BA through BE, EA through EE, and FA through FE. The network modules attach (vertically) to the side connector pads of each SIB and are labeled CA through CD, DB through DE, GA through GD, and HB through HE. Pads CE and DA connect to the shared modules.

Figure 3. System Interconnect Board Layout



Connector Numbering Sequence

Figure 4 shows the relationship of all the connector pads to the SIB. Connector pad assignments for each pad layout are explained in detail diagrams B, C, D, and E, Figure 5 through Figure 8. Each connector pad area is composed of an EZIF connector and a module revision notice (MRN) connector. The EZIF connector contains 260 pin pad positions. The MRN connector is composed of 6 pad pairs that include signal and ground. The MRN connector is available in Systems Test and Checkout for any possible Engineering Change Order (ECO) work.

Each EZIF connector and MRN connector is labeled. Table 1 lists each EZIF connector along with its corresponding MRN connector.

Table 1. EZIF to MRN Connector Labeling

EZIF	MRN	EZIF	MRN	EZIF	MRN	EZIF	MRN
AA	AF	BA	BF	CA	CF	DA	DF
AB	AG	BB	BG	CB	CG	DB	DG
AC	AH	BC	BH	CC	CH	DC	DH
AD	AI	BD	BI	CD	CI	DD	DI
AE	AJ	BE	BJ	CE	CJ	DE	DJ
EA	EF	FA	FF	GA	GF		
EB	EG	FB	FG	GB	GG	HB	HG
EC	EH	FC	FH	GC	GH	HC	HH
ED	EI	FD	FI	GD	GI	HD	HI
EE	EJ	FE	FJ			HE	HJ

Figure 4. SIB Connector Pin Layout (Quadrants 0 – 3)

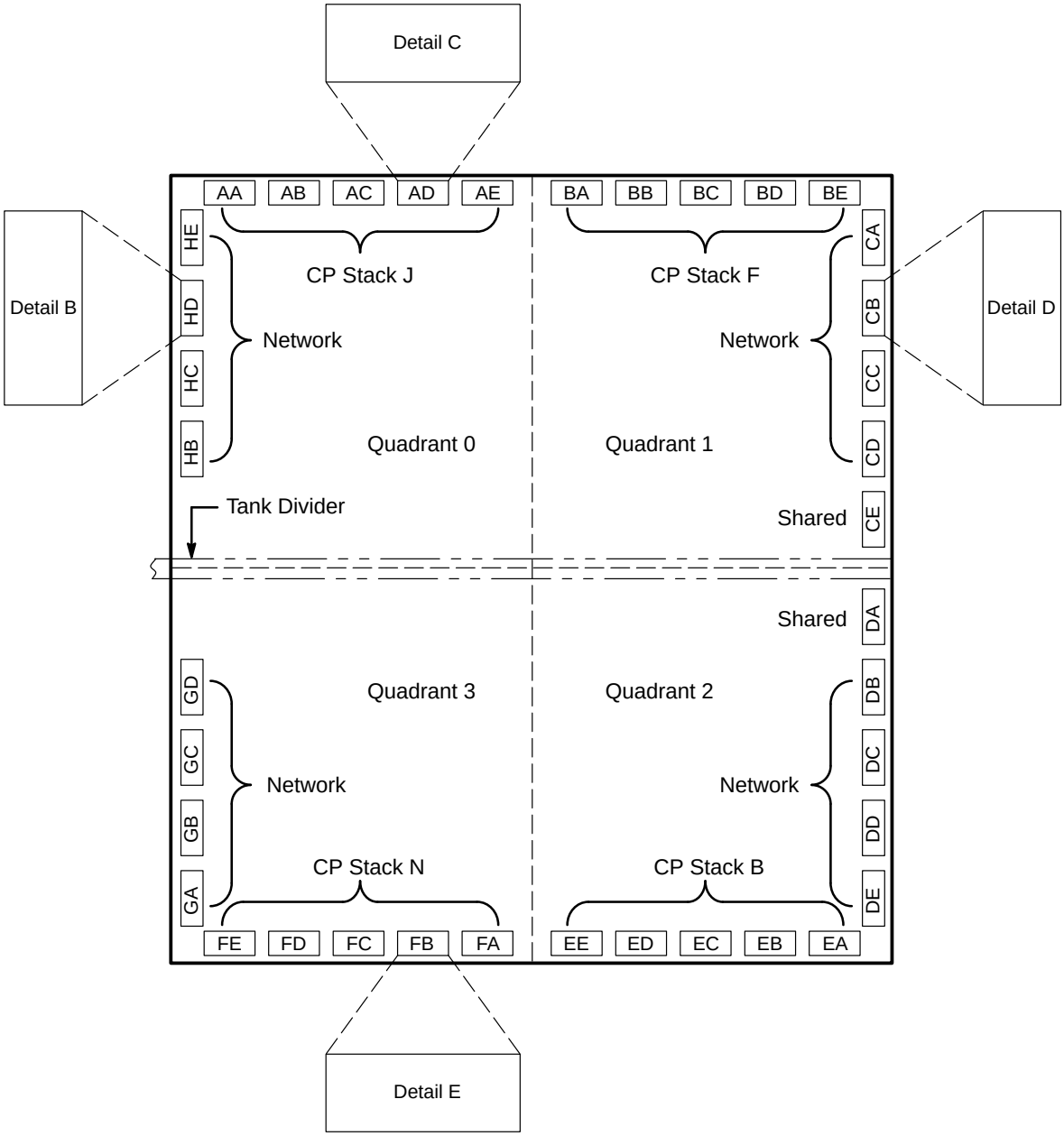


Figure 5 through Figure 8 show the detail pad positioning of each EZIF and module revision notice (MRN) connector in each quadrant of the SIB. Each EZIF pad contains 260 connection points. The MRN pad is composed of 6 pad pairs.

Figure 5. SIB Connector Pin Layout (Detail B)

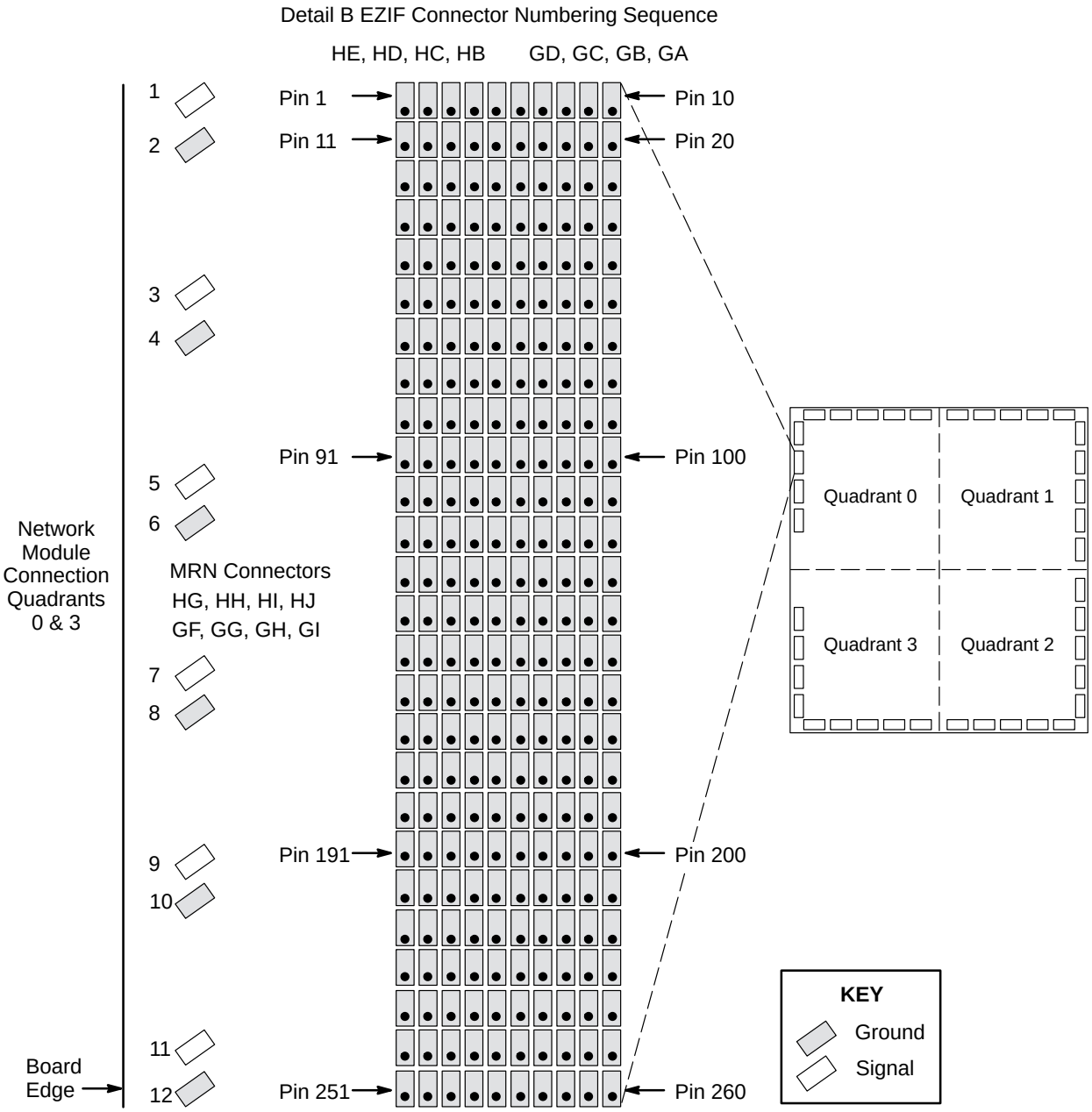


Figure 6. SIB Connector Pin Layout (Detail C)

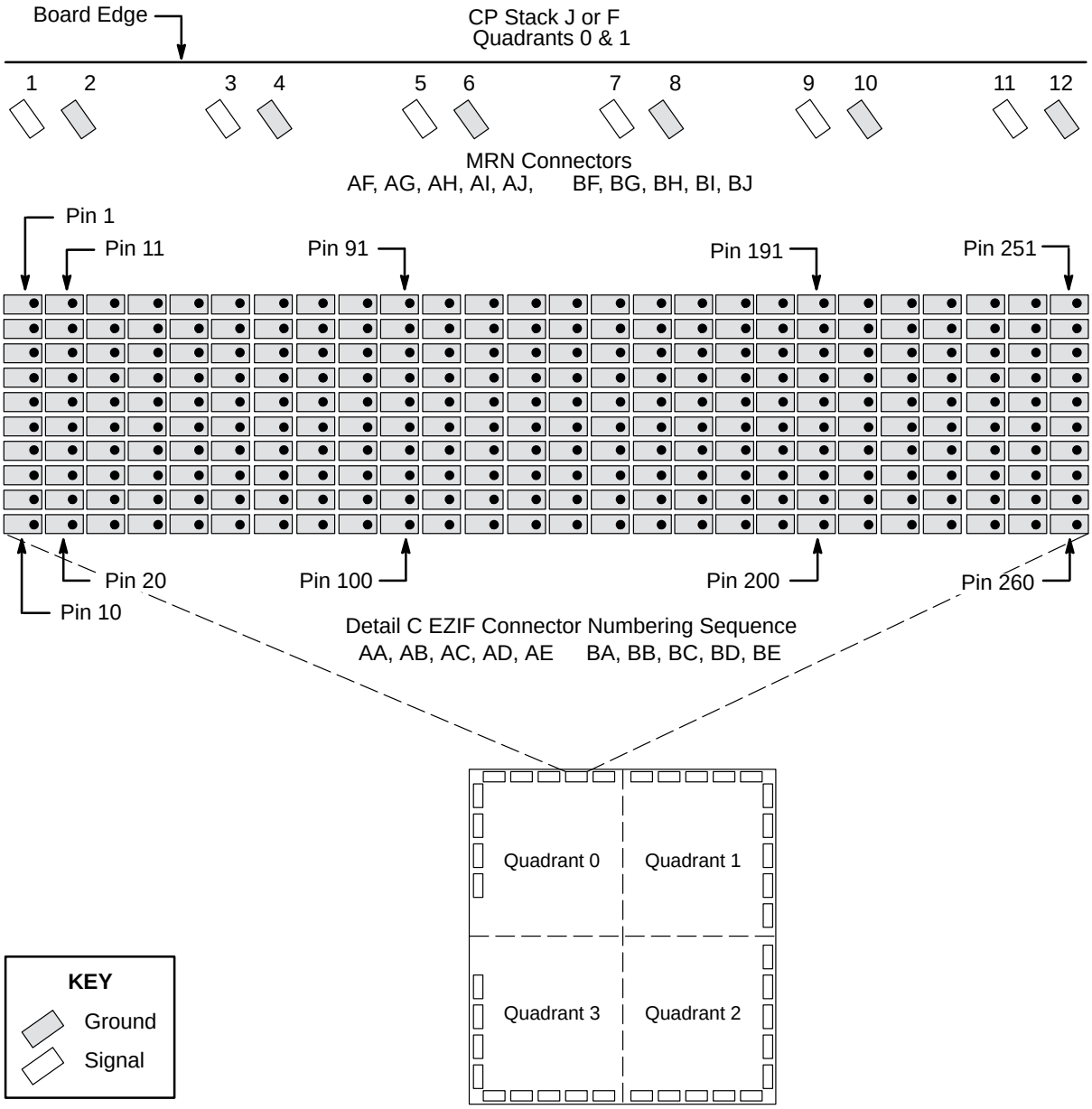


Figure 7. SIB Connector Pin Layout (Detail D)

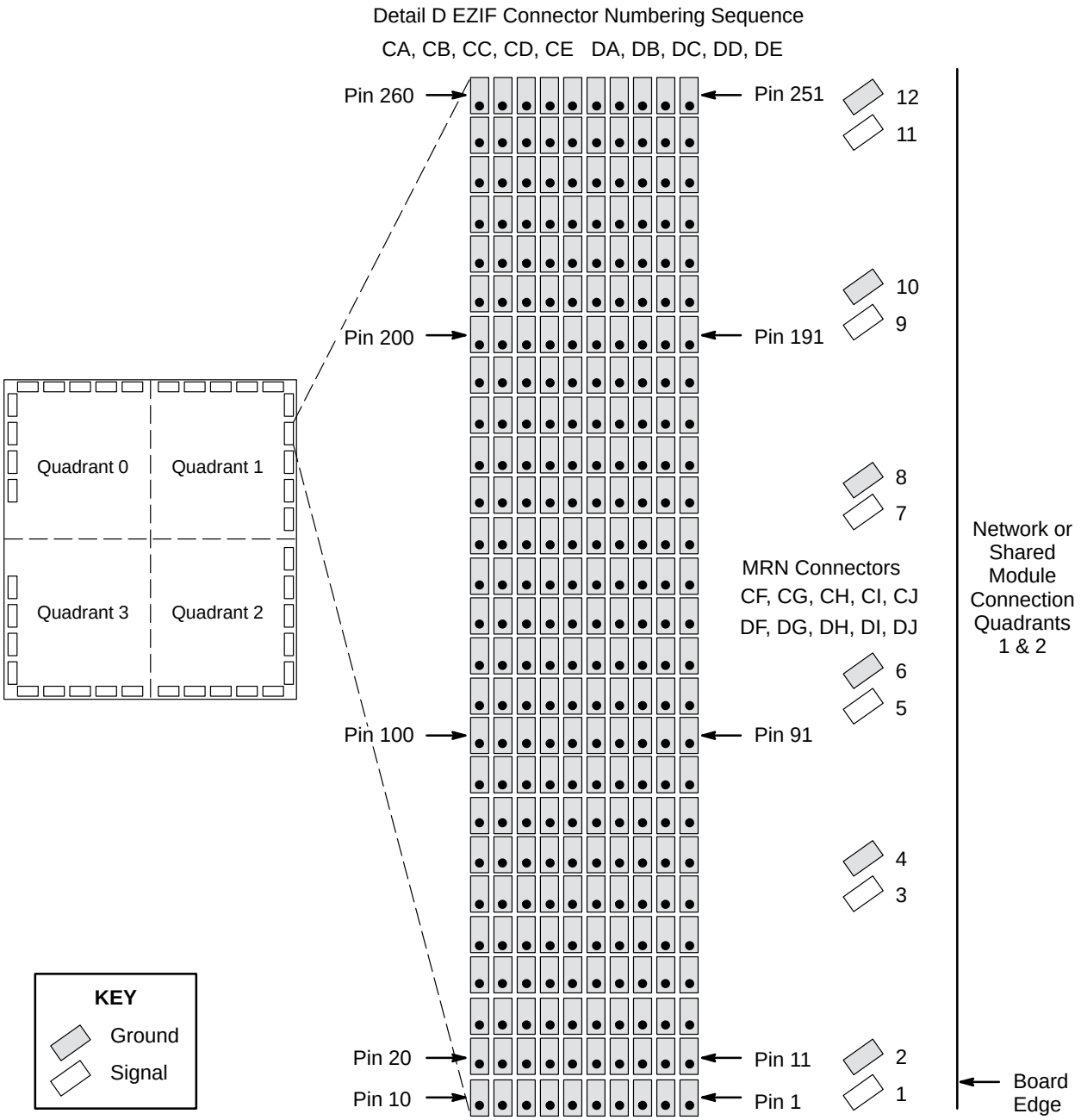


Figure 8. SIB Connector Pin Layout (Detail E)

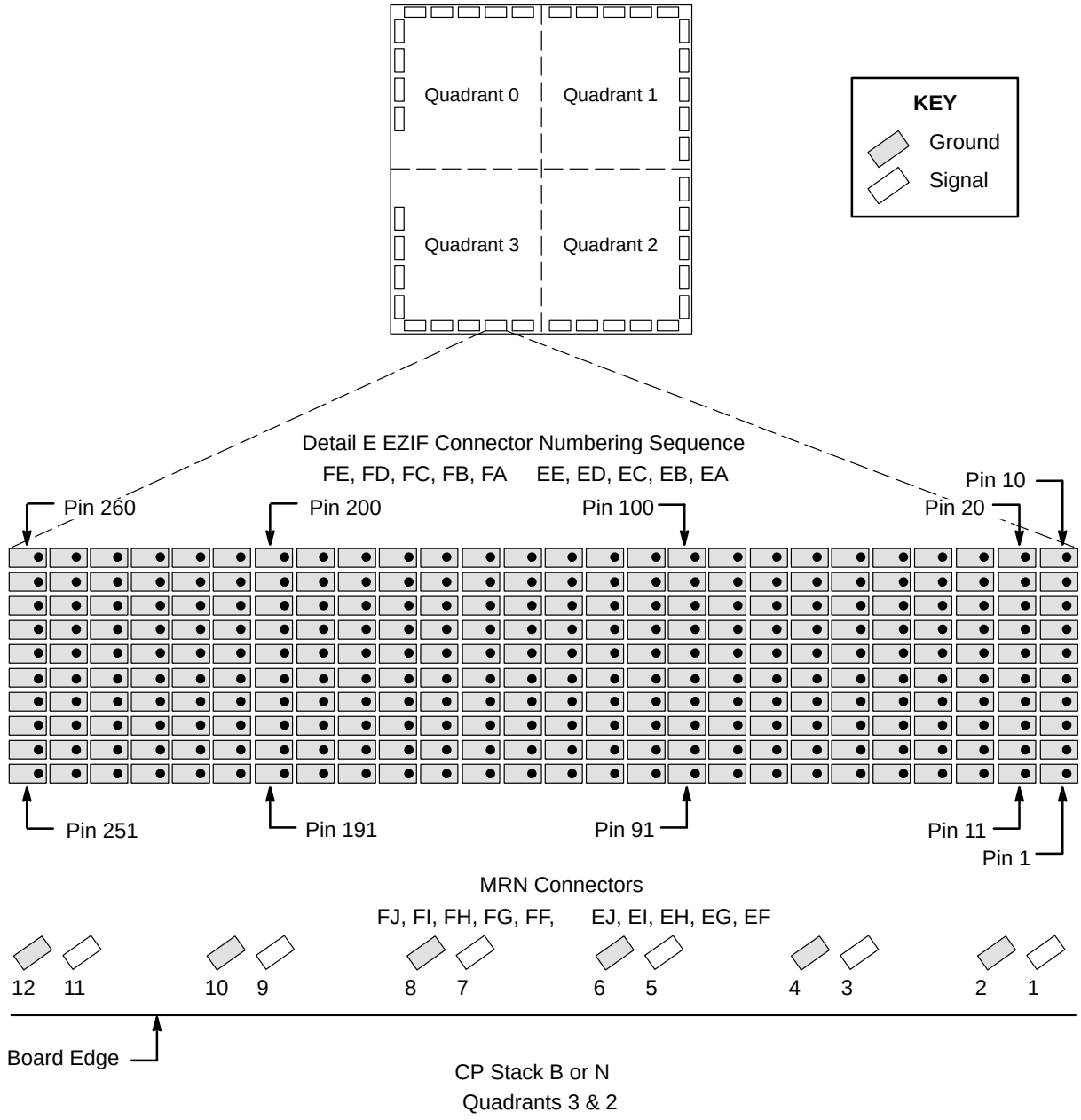


Figure 9 shows the pad layout of the SIB as it connects vertically to the network, shared, and memory modules and horizontally to the CP modules. Because each SIB is identical, the connection between the SIB and either the network modules or the CP modules is location dependent. For example, connector pad DE is in the same physical position for all SIBs but connects to pads YH, YG, YF, etc., on the network module. In comparison, connector pad YA of each network module connects to pads DE, DD, DC, and DB along the top portion of the SIB (quadrant 0).

Summary

This document provided an introduction to and description of the SIB. Information about the module chassis components, the module types, the board layout, and the connector numbering sequence was also provided.

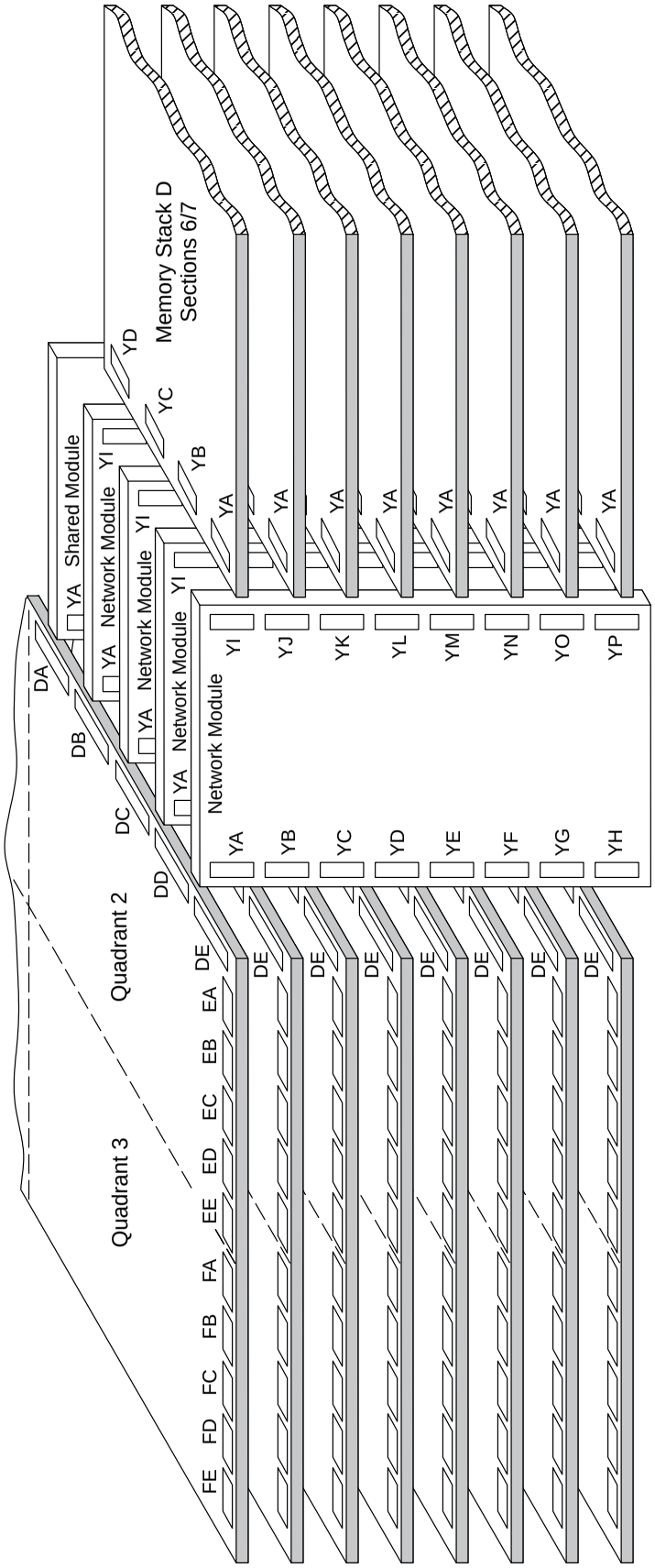
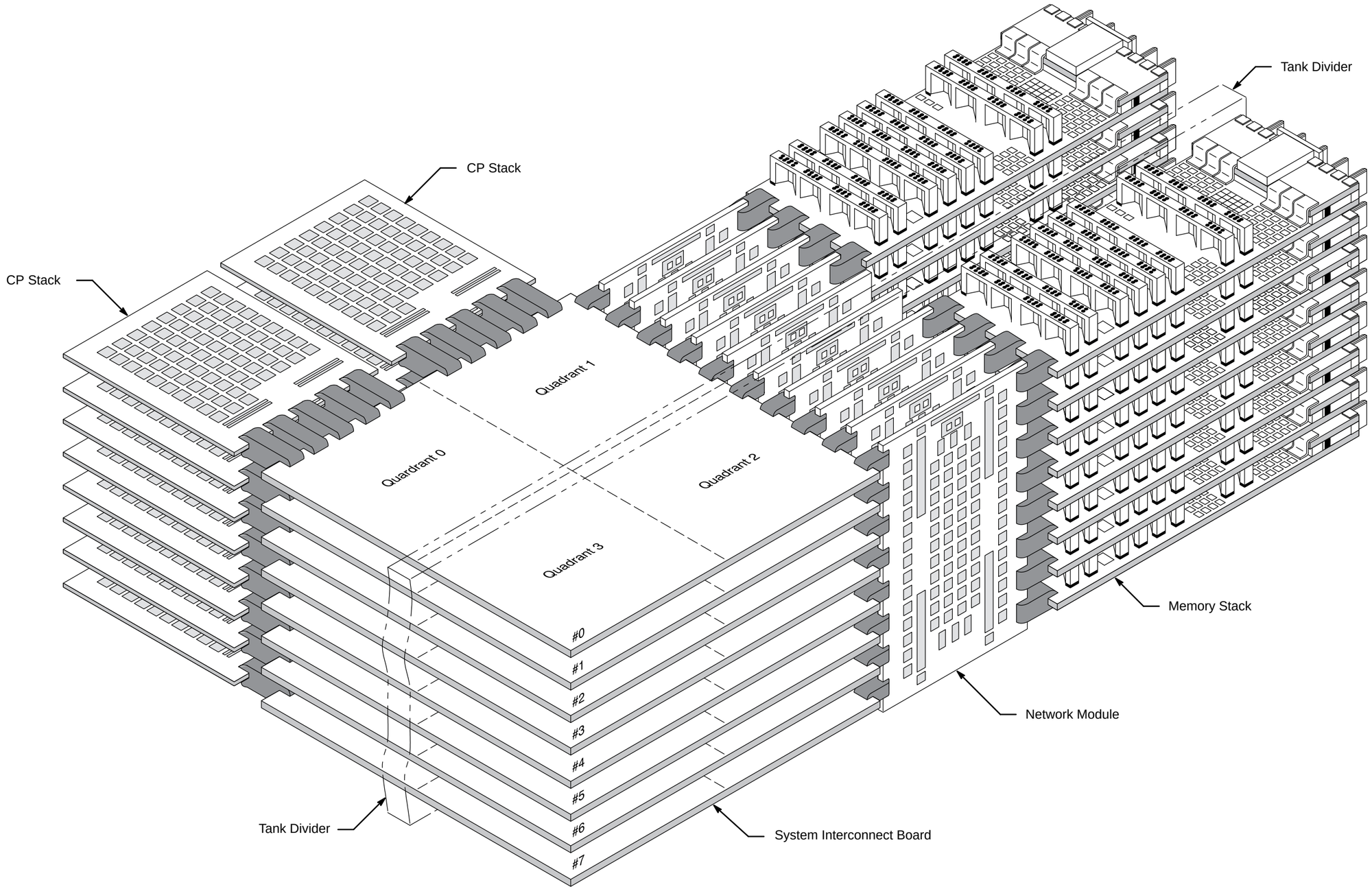


Figure 9. SIB Connector Layout

Figure 10. Stack of System Interconnect Boards



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