CEI Control Expansion Interface

PESA Switching Systems
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Rev.	Date	Description	By
A	02-01-94	Initial release.	Unknown
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C	03-13-01	Deleted bills of material, drawings, and schematics per ECO CE00130.	GLT

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Customer Notification of Change

The Control Expansion Interface Unit has gone through extensive modifications to insure proper reliability. These changes were necessary to correct problems associated with the functionality and interface requirements with the 6600E System Controller. Included within this Manual are detailed instructions to the changes made. Your CEI has already undergone these changes and no other maintenance or modifications are necessary. The included documentation is for your reference only.

November 10, 1994

PC Board Modifications to Card and Backplane
Notification of Change No. 2329 P/N 81906202840 REV A

Modification Drawing	SP57-0344	REV A
Component Assembly	CA25-1147	REV C
Schematic	SC33-1147	REV B
Component Assembly	CA25-1110	REV B
Schematic	SC33-1110	REV B
Bill of Materials	81906514088	REV D
Bill of Materials	81906512942	REV B

Feb. 17, 1994

PC Board Modifications to Card
Notification of Change No. 2408 P/N 81906202950 REV A

Modification Drawing	SP57-0344	REV B
Schematic	SC33-1147	REV C
Bill of Materials	81906514088	REV E

Feb. 17, 1994

Software Version Change
Notification of Change No. 2409 P/N 81906202960 REV A

Bill of Materials	81906514088	REV F
Bill of Materials	81906514112	REV D

1.1 Manual Overview

This manual provides instructions for installing and operating the PESA Control Expansion Interface Unit (CEI). This manual is divided into four sections as shown.

Section 1, **INTRODUCTION**, summarizes the manual, describes the CEI product and provides the panel specifications.

Section 2, **INSTALLATION**, provides installation and setup instructions.

Section 3, **OPERATION**, describes system operation procedures

Section 4, **MAINTENANCE**, explains procedures for maintenance

1.2 General Description

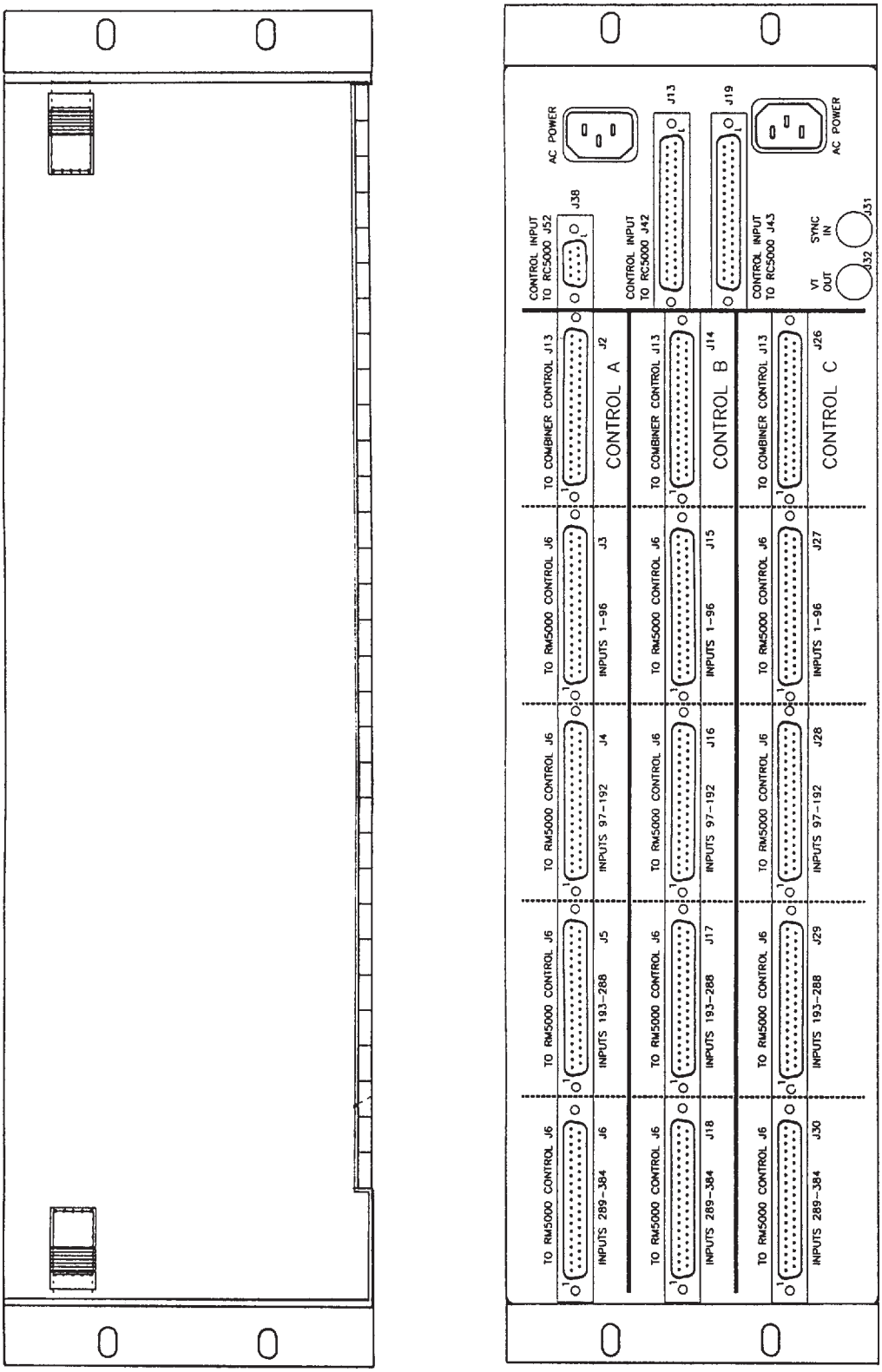
PESA's System V Control Expansion Interface Unit, referred to as the CEI, is used to expand the System V Matrix size capabilities to 384 inputs by 512 outputs. The RC5000 controller requires a control expansion interface to communicate with output combiners, which are used anytime a system requires more than 48 video inputs, or more than 96 audio inputs (48 audio inputs for stereo audio frames). The CEI also translates control signals to the audio and video switcher frames, and thus the frames must be configured properly to work with a CEI in the system. The frames will be configured at the factory and will not have to be changed after delivery.

The CEI contains up to three groups of control: Control A, B and C. Each control group can address up to five levels of control, and can be single or dual. A dual configuration is used for redundancy any time a dual controller is used in the system. Thus, a CEI frame may contain up to six logic cards, and address up to 15 levels of control.

The CEI is powered by a linear, unregulated power supply that is contained within the CEI chassis. In a dual controller configuration, a second power supply is also contained inside the chassis for redundancy. One power supply unit supplies the primary logic cards, and the other power supply unit supplies the backup cards. The power supplies are electrically isolated to prevent a failure in one supply from affecting the other, thus preventing a single point failure condition.

The CEI functions as a control translation unit, and is placed between the system controller (RC5000, 6600E, or other controller) and the switching frames/combiners. The CEI translates and distributes the controller output to the switching frames and combiners. The translation is required because the controller does not have the capability to talk to the combiners directly. The CEI performs the necessary translation and distribution so that the controller can address a large system with switching combiners.

The CEI also provides the switching combiners with a vertical trigger pulse for vertical interval switching. The SYNC signal is translated into a vertical trigger pulse, which can then be distributed to all switching combiners in the system. The CEI should be connected to the same SYNC signal as the switcher frames for proper system switching.



FRONT AND REAR VIEW OF CEI UNIT FIG. 1-1

1.3 Specifications

GENERAL	
Mounting	Standard 19" Rack
CONTROL INPUT TO RC5000	
Input Number	2 (Loop-Through)
Input Type	37 Pin "D" Connector
CONTROL INPUT TO RC5000 (Strobes 11-16)	
Input Number	1
Input Type	9 Pin "D" Connector
CONTROL OUTPUT TO RM5000	
Output Number	3 SETS OF 4 (Control A, B, and C)
Output Levels	6 (3 with Redundancy)
Output Type	37 Pin "D" Connector
CONTROL OUTPUT TO COMBINER	
Output Number	3 (provides for 6 levels) (Control A, B, and C)
Output Type	37 Pin "D" Connector
VERTICAL TRIGGER OUT	
Output Type	1 75 ohm BNC
SYNC IN	
Input Type	1 75 ohm BNC
POWER	
Voltage Requirements	+ 5Vdc @ 750mA
AC Power	115VAC ±10% 50-60Hz 230VAC ±10% 50-60Hz
MECHANICAL	
Height	5.25 in (133.3mm)
Width	19.00 in (482.6mm)
Depth	15.90 in (403.9mm)
ENVIRONMENTAL	
Temperature	0℃ to 40℃
Humidity	20% to 90% Non-Condensing

2.1 Introduction

This section details the CEI installation procedures. The following topics are discussed:

- Receipt Inspection
- Location
- Chassis Mounting
- Power Connections
- Cabling

Receipt Inspection

The CEI was inspected and tested prior to leaving PESA's Factory. In most cases the CEI is installed in large systems with the unit mounted in the equipment rack and normal shipping instructions would not be applicable. However, if the unit is shipped as a single item, inspect the unit for shipping damage. If damage is detected, notify the carrier immediately and hold all packing material for inspection. After unpacking, compare all parts received against the packing document. If the unit is undamaged and all components have been received, proceed with the installation of the CEI.

All MI/D panels should have the following items included in the shipping container:

• Control Expansion Unit	81906513718
• Power Supply	
115V Version	81906511388
220V Version	81906511396
• Service Manual (this book)	81905901238

Before installing the CEI into the rack it is suggested that the serial number be recorded and written down on the Ordering Assistance, Service, and Inquiries Page located in the front of this manual. The serial number can be found on the rear of the CEI. Recording this number and referring to it when dealing with Customer Service provides PESA the ability to better service you in the future.

Location

The CEI should be positioned as close as possible to the RC5000 Controller. An area should be selected where temperatures do not exceed 40°C inside the equipment rack. Panel depth is 16 inches and will require approximately 4 inches of free space behind the panel to allow for cabling when installed into an equipment rack.

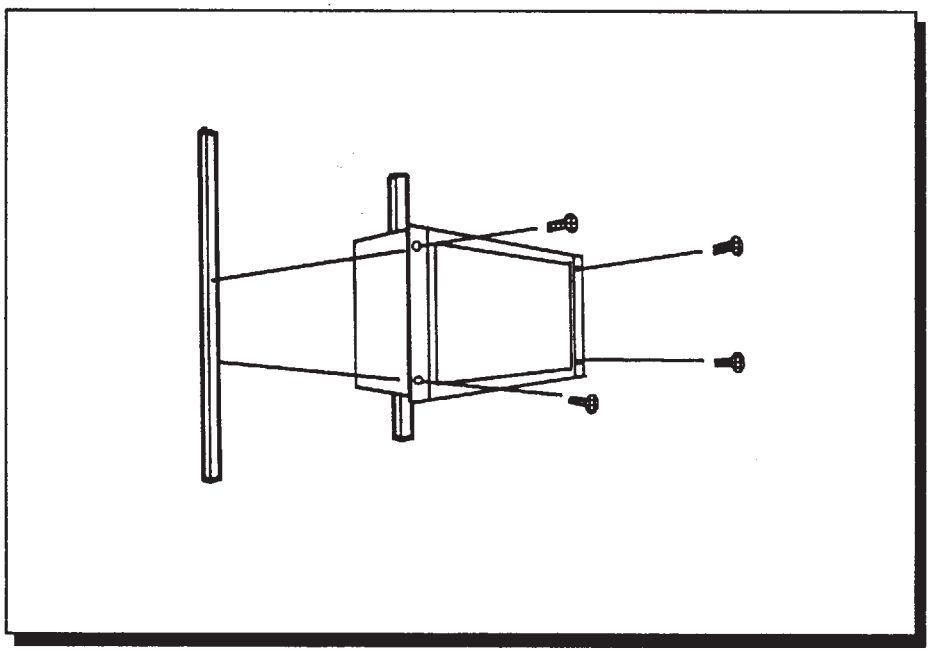
Chassis Installation

Rack Mounted: The CEI will fit any standard 19" equipment rack. Sufficient space should be provided behind the chassis to allow for coax and power cable installation. Use the following steps when installing the CEI into a rack mounted unit.

1. Align the CEI panel with the threaded or slotted openings in the rack
2. For ease of installation, and to support the unit, install the two bottom screws first.

(Because of the variety of equipment rack specifications, Rack Screws are not provided with the CEI.)

3. Install the two top screws
4. Tighten all four screws securely



RACK INSTALLATION FIG. 2-1

Power Connections

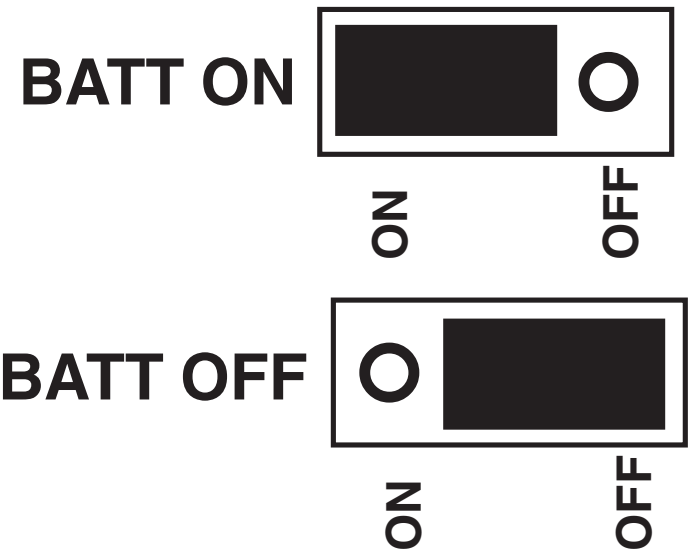
Before initial power up and intallation , the Interface Card should be checked to insure the "BATT ON" shunt is in the proper location. This is done by placing the 3 pin Shunt (JP85) on the Interface Card in the "BATT ON" position. See Note 3 on page 6.3

Power for the CEI is supplied by an AC power cord for either 115VAC or 230VAC .

NOTICE: DO NOT INSTALL THE CEI CARDS WITH POWER ON AS DAMAGE WILL OCCUR TO COMPONENTS. SEE POWER UP PROCEDURES IN THE OPERATIONS SECTION OF THIS MANUAL FOR PROPER POWER UP SEQUENCE.

• 115V: The Power Supply is configured for any standard 110VAC-120VAC power outlet . Connecting the AC power cord to the unit will immediately power the unit to AC Voltage.

• 240V: The Power Supply is configured for voltages from 200VAC to 250VAC. The AC power cord has been modified to remove the standard 115VAC plug. Final outlet connections are dependant on the location and country to be installed. Contact your PESA Service Representative if outlet type and voltage cannot be determined.



Cabling

Cabling for the CEI consist of ribbon cable connectors to the Matrix Switcher, the Combiner Switcher, and the Controller. Two BNC connections are also required for VT Out and SYNC In. Cabling for systems built and tested at the PESA factory will have lengths and connections predefined prior to facilities installation. The installer should refer to the system diagram supplied for proper cable installation.

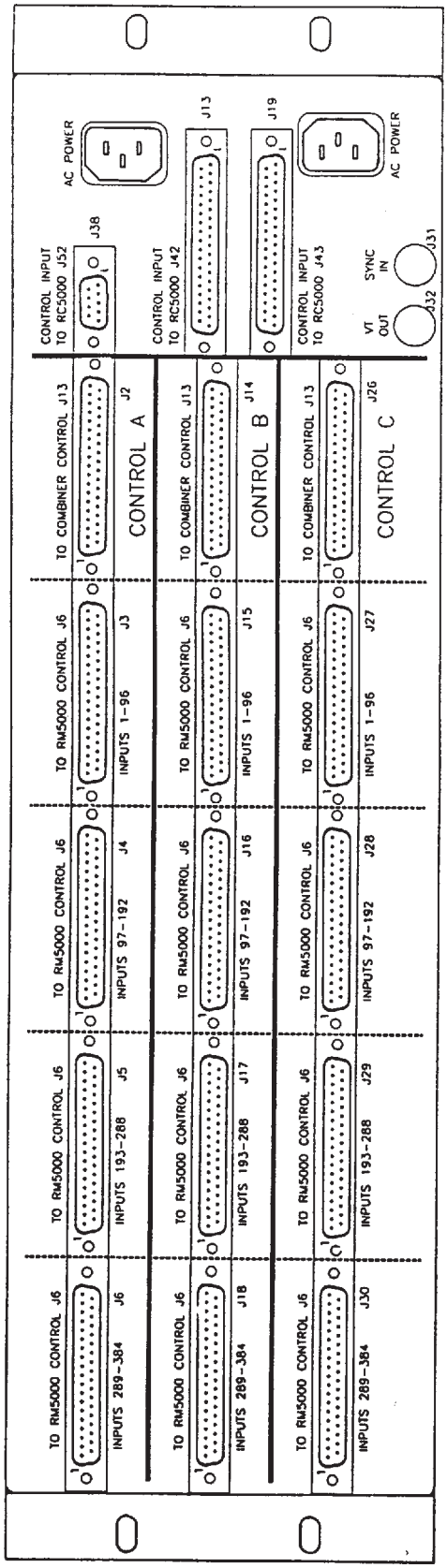


FIGURE 2-2 REAR VIEW OF CEI

PINOUT FOR INTERFACE CARD CONNECTOR J1

1	IA1
2	IA2
3	IA4
4	IA8
5	IA16
6	IA32
7	IA64
8	IA128
9	IA256
10	OA1
11	OA2
12	OA4
13	OA8
14	OA16
15	OA32
16	OA64
17	OA128
18	OA256
19	CONF
20	STB6
21	J1-RB1
22	J1-RB2
23	J1-RB4
24	J1-RB8
25	J1-RB16
26	J1-RB32
27	J1-RB64
28	J1-RB128
29	J1-RB256
30	STB1
31	STB2
32	STB3
33	STB4
34	STB5
35	R/W
36	P/S
37	VTI
38	GROUND
39	STB15
40	STB16

PINOUT FOR INTERFACE CARD CONNECTOR J2

1	CIA1
2	CIA2
3	CIA4
4	CIA8
5	CIA16
6	STB9
7	STB10
8	STB11
9	STB12
10	COA1
11	COA2
12	COA4
13	COA8
14	COA16
15	COA32
16	COA64
17	COA128
18	COA256
19	COMBINERS
20	STB13
21	RB1
22	RB2
23	RB4
24	RB8
25	RB16
26	RB32
27	RB64
28	RB128
29	STB14
30	CSTROBE1
31	CSTROBE2
32	CSTROBE3
33	CSTROBE4
34	CSTROBE5
35	CR/W
36	CP/S
37	CVTI
38	GROUND
39	STB15
40	STB16

PINOUT FOR INTERFACE CARD CONNECTOR J3

1	DIA1
2	DIA2
3	DIA4
4	DIA8
5	DIA16
6	DIA32
7	DIA64
8	DIA128
9	SYNC IN
10	DOA1
11	DOA2
12	DOA4
13	DOA8
14	DOA16
15	DOA32
16	DOA64
17	DOA128
18	DOA256
19	CONF. 1-96
20	+V IN
21	2-RB1
22	2-RB2
23	2-RB4
24	2-RB8
25	RB16
26	RB32
27	RB64
28	RB128
29	VTOUT
30	DSTROBE1
31	DSTROBE2
32	DSTROBE3
33	DSTROBE4
34	DSTROBE5
35	DR/W
36	DP/S
37	DVTI
38	GROUND
39	NC
40	+V IN

PINOUT FOR INTERFACE CARD CONNECTOR J4

1	EIA1
2	EIA2
3	EIA4
4	EIA8
5	EIA16
6	EIA32
7	EIA64
8	EIA128
9	SYNC IN
10	EOA1
11	EOA2
12	EOA4
13	EOA8
14	EOA16
15	EOA32
16	EOA64
17	EOA128
18	EOA256
19	CONF. 97-192
20	+ V IN
21	2-RB1
22	2-RB2
23	2-RB4
24	2-RB8
25	RB16
26	RB32
27	RB64
28	RB128
29	VTOUT
30	ESTROBE1
31	ESTROBE2
32	ESTROBE3
33	ESTROBE4
34	ESTROBE5
35	ER/W
36	EP/S
37	EVTI
38	GROUND
39	NC
40	+ V IN

PINOUT FOR INTERFACE CARD CONNECTOR J5

1	FIA1
2	FIA2
3	FIA4
4	FIA8
5	FIA16
6	FIA32
7	FIA64
8	FIA128
9	SYNC IN
10	FOA1
11	FOA2
12	FOA4
13	FOA8
14	FOA16
15	FOA32
16	FOA64
17	FOA128
18	FOA256
19	CONF. 193-288
20	+ V IN
21	2-RB1
22	2-RB2
23	2-RB4
24	2-RB8
25	RB16
26	RB32
27	RB64
28	RB128
29	VTOUT
30	FSTROBE1
31	FSTROBE2
32	FSTROBE3
33	FSTROBE4
34	FSTROBE5
35	FR/W
36	FP/S
37	FVTI
38	GROUND
39	NC
40	+V IN

PINOUT FOR INTERFACE CARD CONNECTOR J6

1	GIA1
2	GIA2
3	GIA4
4	GIA8
5	GIA16
6	GIA32
7	GIA64
8	GIA128
9	SYNC IN
10	GOA1
11	GOA2
12	GOA4
13	GOA8
14	GOA16
15	GOA32
16	GOA64
17	GOA128
18	GOA256
19	CONF. 289-384
20	+ V IN
21	2-RB1
22	2-RB2
23	2-RB4
24	2-RB8
25	RB16
26	RB32
27	RB64
28	RB128
29	VTOUT
30	GSTROBE1
31	GSTROBE2
32	GSTROBE3
33	GSTROBE4
34	GSTROBE5
35	GR/W
36	GP/S
37	GVTI
38	GROUND
39	NC
40	+V IN

PINOUT FOR POWER SUPPLY A

CONNECTOR P37 ON MOTHERBOARD

1	+5V
2	+5V
3	+5V
4	GND
5	GND
6	GND

PINOUT FOR POWER SUPPLY B

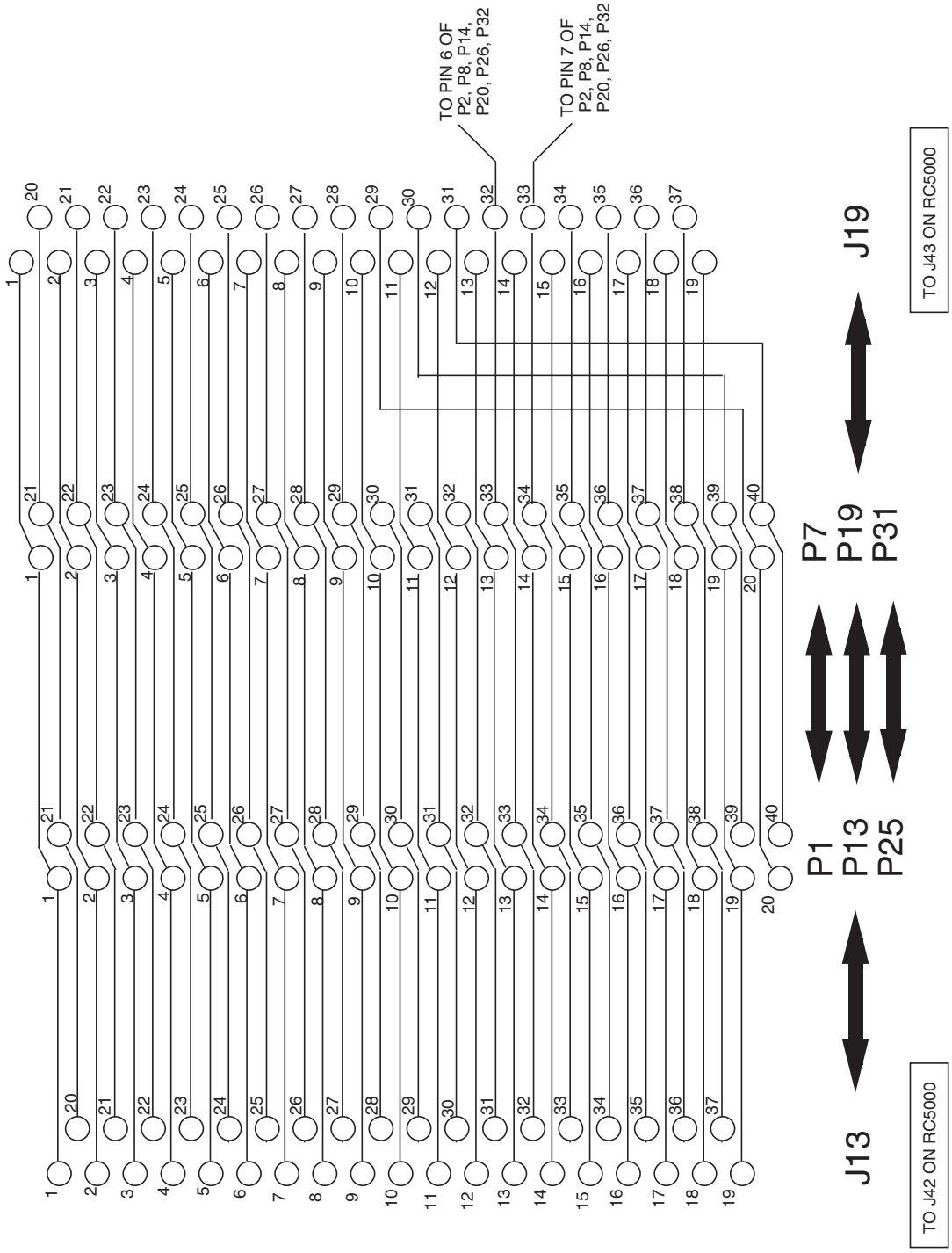
CONNECTOR P38 ON MOTHERBOARD

1	+5V
2	+5V
3	+5V
4	GND
5	GND
6	GND

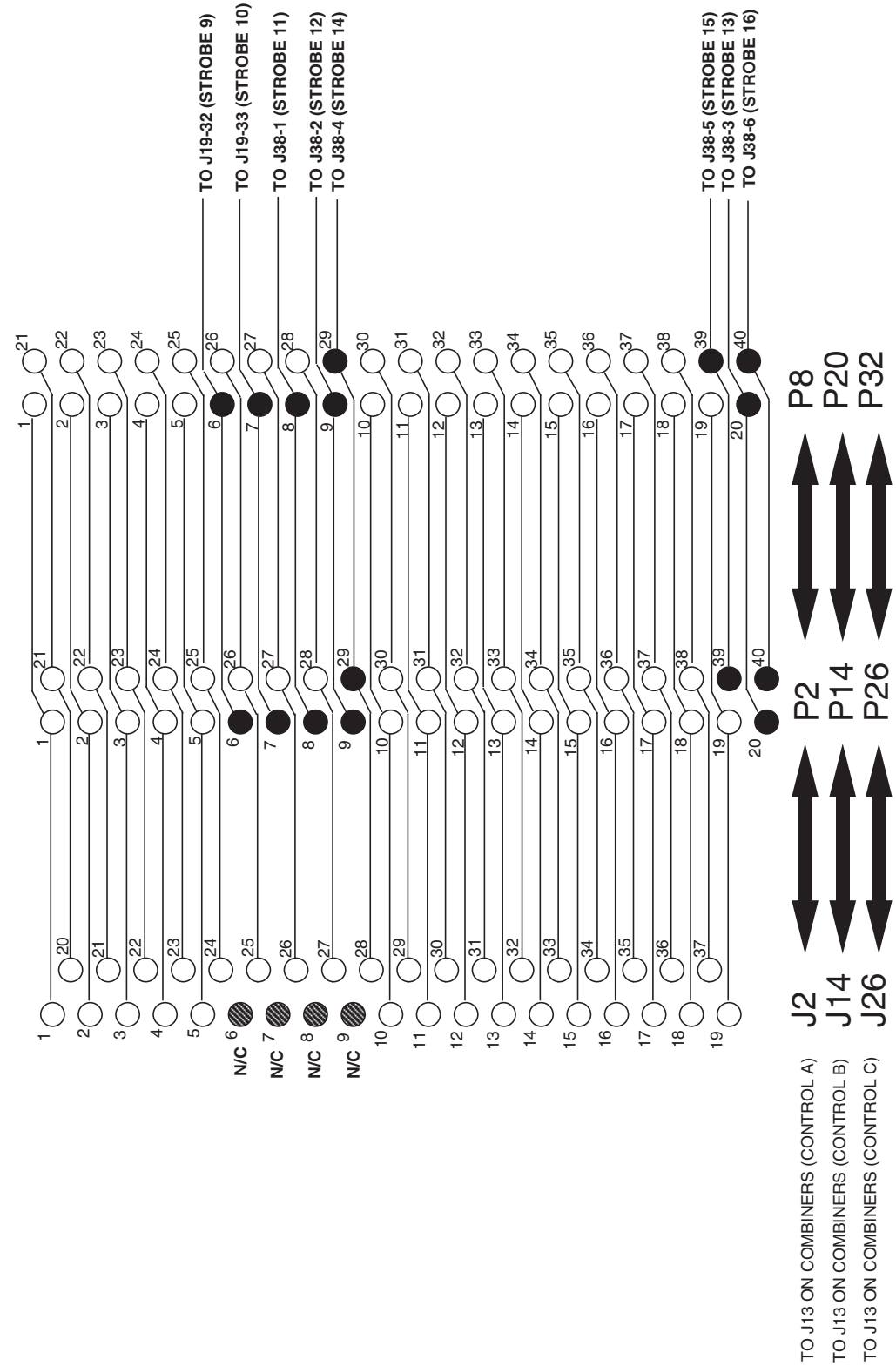
PINOUT FOR CONTROL (STROBE 11-16)

CONNECTOR J38 TO P2, P8, P14, P20, P26, P32

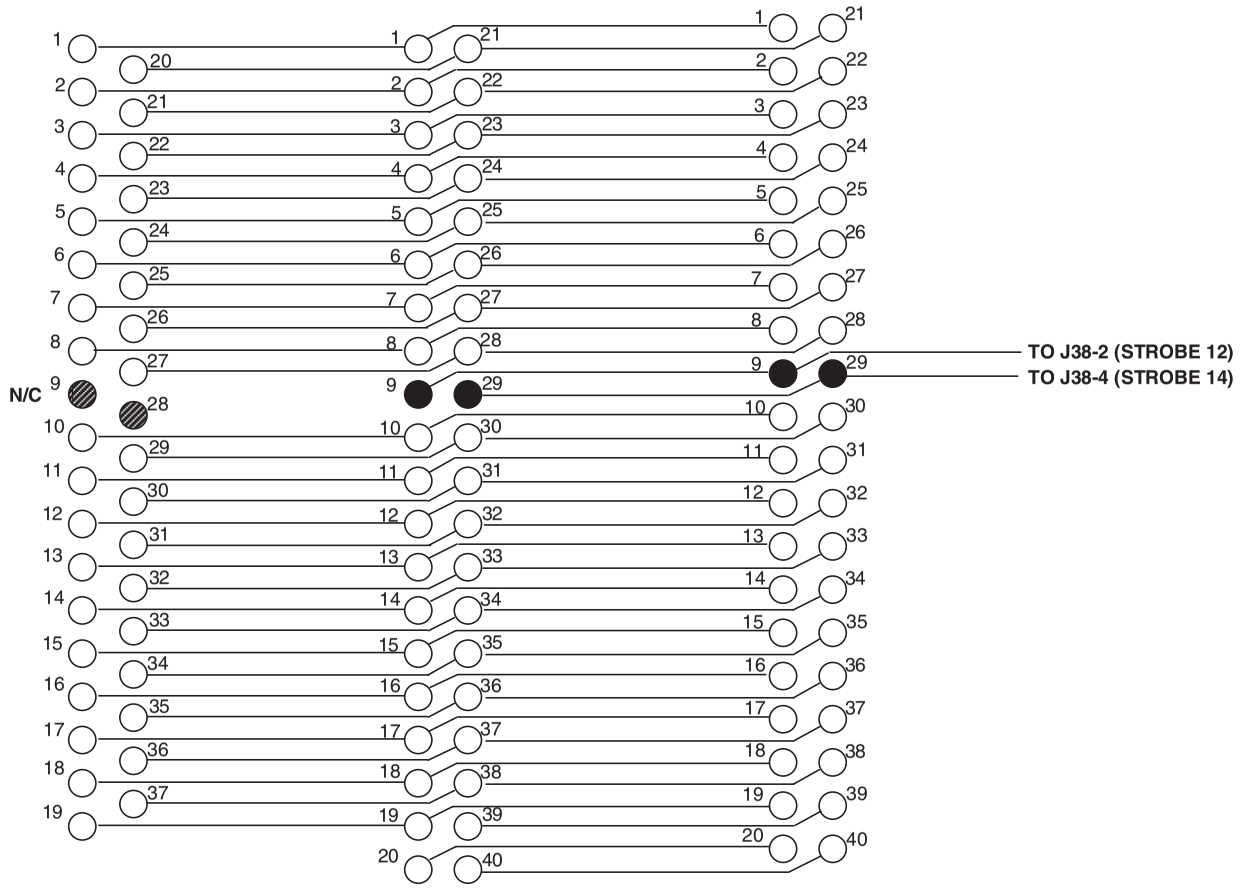
1	STROBE 11	PIN 8
2	STROBE 12	PIN 9
3	STROBE 13	PIN 20
4	STROBE 14	PIN 29
5	STROBE 15	PIN 39
6	STROBE 16	PIN 40
7	NC	
8	CONTROL A	P3,P15,P27, - PIN 39
9	CONTROL B	P9,P21,P33, - PIN 39



MOTHERBOARD PIN TO PIN CONNECTIONS FOR THE CONTROLLER SECTION
FIG 2-3

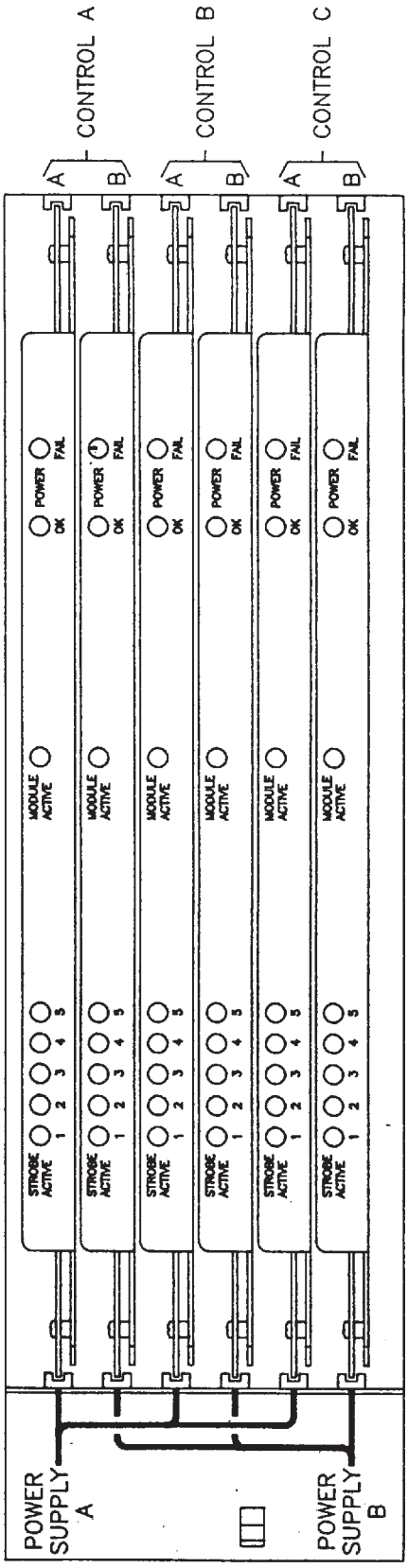


MOTHERBOARD PIN TO PIN CONNECTIONS FOR THE COMBINER SECTION
FIG 2-4



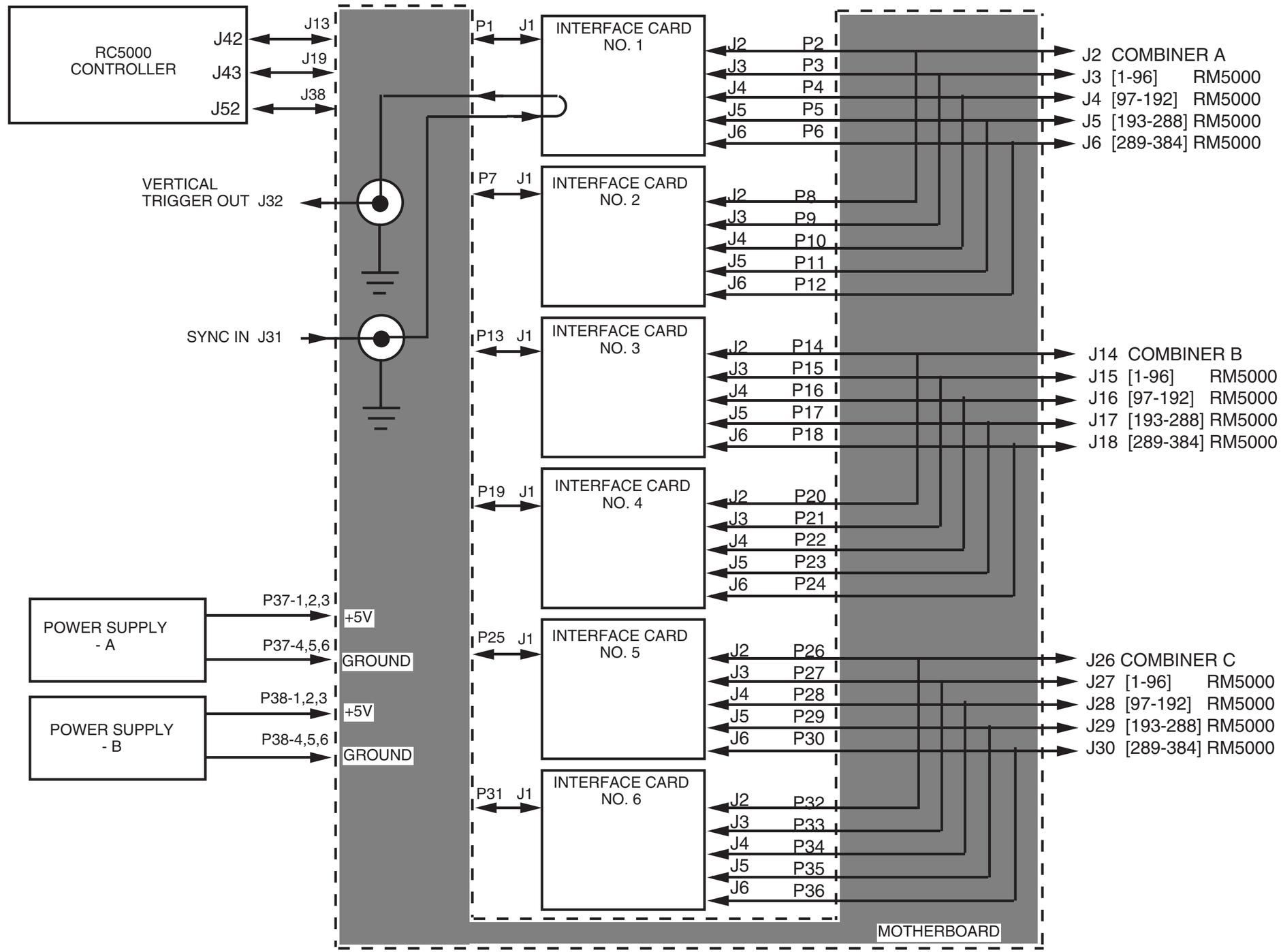
		INT. 1	INT. 2
1-96 INT. 1 AND 2	J3	P3	P9
97-192 INT. 1 AND 2	J4	P4	P10
193-288 INT. 1 AND 2	J5	P5	P11
289-384 INT. 1 AND 2	J6	P6	P12
		INT. 3	INT. 4
1-96 INT. 3 AND 4	J15	P15	P21
97-192 INT. 3 AND 4	J16	P16	P22
193-288 INT. 3 AND 4	J17	P17	P23
289-384 INT. 3 AND 4	J18	P18	P24
		INT. 5	INT. 6
1-96 INT. 5 AND 6	J27	P27	P33
97-192 INT. 5 AND 6	J28	P28	P34
193-288 INT. 5 AND 6	J29	P29	P35
289-384 INT. 5 AND 6	J30	P30	P36

MOTHERBOARD PIN TO PIN CONNECTIONS FOR THE SWITCHER SECTION
FIG 2-5



NOTE: JP85 SHOULD BE IN THE "BATT ON" POSITION BEFORE POWER-UP.

FIG 2-6 FRONT VIEW OF INTERFACE CARDS INSTALLED


RC5000
CONTROLLER
J42
J43
J52
J13
J19
J38
VERTICAL
TRIGGER OUT J32
SYNC IN J31
POWER SUPPLY
- A
POWER SUPPLY
- B
P37-1,2,3
P37-4,5,6
P38-1,2,3
P38-4,5,6
+5V
GROUND
+5V
GROUND
P1 J1
INTERFACE CARD
NO. 1
P7 J1
INTERFACE CARD
NO. 2
P13 J1
INTERFACE CARD
NO. 3
P19 J1
INTERFACE CARD
NO. 4
P25 J1
INTERFACE CARD
NO. 5
P31 J1
INTERFACE CARD
NO. 6
J2 P2
J3 P3
J4 P4
J5 P5
J6 P6
J2 P8
J3 P9
J4 P10
J5 P11
J6 P12
J2 P14
J3 P15
J4 P16
J5 P17
J6 P18
J2 P20
J3 P21
J4 P22
J5 P23
J6 P24
J2 P26
J3 P27
J4 P28
J5 P29
J6 P30
J2 P32
J3 P33
J4 P34
J5 P35
J6 P36
J2 COMBINER A
J3 [1-96] RM5000
J4 [97-192] RM5000
J5 [193-288] RM5000
J6 [289-384] RM5000
J14 COMBINER B
J15 [1-96] RM5000
J16 [97-192] RM5000
J17 [193-288] RM5000
J18 [289-384] RM5000
J26 COMBINER C
J27 [1-96] RM5000
J28 [97-192] RM5000
J29 [193-288] RM5000
J30 [289-384] RM5000
MOTHERBOARD

3.1 Operations

Basic Operations

The CEI Unit has been designed to interface with the Controller,Combiners, and Switchers without any adjustments or control operations by the user. This unit is normally setup at the factory to customer specifications. Operations of the unit can be monitored by LEDS provided on the front of each Interface Card.

Manual Control Module Switchover Selection

A manual selection switch can be found on the front of each CEI Control module. This push-on type switch can be used to select the preferred control module to be active when your CEI is configured as redundant or back-up control. This allows you to manually configure your system to have either A or B control module active In systems where each control module is independantly configured, this switch has no fuction.

Power up procedure

NOTICE: DO NOT INSTALL THE CEI CARD(S) WITH POWER ON, AS DAMAGE WILL OCCUR TO COMPONENTS. THE FOLLOWING POWER-UP PROCEDURES MUST BE FOLLOWED TO INSURE YOUR SYSTEMS OPERATES PROPERLY.

Systems with single power supplies

Systems with a single power supply and primary CEI control modules only (non-redundant system) will use the following power up procedure.

1. Insure that AC power is not applied to the CEI power supply.

2. Insert all CEI control modules into the chassis (if not already present), insuring that they are fully seated. CEI control modules should only be placed in the A positions of the CEI frame (refer to figure 2-6 on page 2.15 of this manual, or to the inside of the front door on the CEI frame to locate A and B positions within the CEI frame)

3. Insert the power supply into the chassis (if not already present). The power supply should only be inserted into the Power Supply A position of the CEI frame (refer to figure 2-6, page 2-16, inside front door).

4. After the power supply and all CEI control modules are installed, apply AC power to the CEI chassis. The green LED should come on.

5. If the red LED remains illuminated on any of the CEI control modules after AC power is applied to the frame, AC power should be removed from the chassis. After removing AC power, remove each CEI control module and insure that the battery jumper is in the "ON" position. Refer to page 2.3 of this manual for information on setting the batter jumper to the "ON" position.

6. Re-install the CEI control modules, and then, with all cards seated properly, re-apply AC power to the chassis. If red LED remains illuminated, service is required. Remove AC power from the system and refer to the maintenance section of this manual for information on obtaining factory service and repair.

Systems with dual power supplies

Systems with dual power supplies and redundant CEI control modules will use the following power up procedure.

1. Insure that AC power is not applied to the CEI power supply.

2. Insert all CEI control modules into the chassis (if not already present), insuring that they are fully seated.

3. Insert the power supplies into the chassis (if not already present).

4. After the power supplies and all CEI control modules are installed, apply AC power to both power supplies simultaneously. This may me accomplished by plugging

both AC cords into receptacles that are both controlled by a common switch (such as a switchable power strip) and then turning the switch on. It is important that AC power is supplied to both power supplies at all times, or damage to the CEI control modules may result. The green LED should be illuminated on all CEI control modules when AC power is present.

5. If the red LED remains illuminated on any of the CEI control modules after AC power is applied to the frame, AC power should be removed from the chassis (simultaneously). After removing AC power, remove each CEI control module and insure that the battery jumper is in the "ON" position. Refer to page 2.3 of this manual for information on setting the batter jumper to the "ON" position.

6. Re-install the CEI control modules, and then, with all cards seated properly, re-apply AC power (simultaneously) to both power supplies in the chassis. If red LED remains illuminated, service is required. Remove AC power from the system and refer to the maintenance section of this manual for information on obtaining factory service and repair.

Removing a CEI control Module from an active system

In all systems, any CEI control module may be removed from the chassis when AC power is applied and the system is operating. Control cards can be removed from the system (i.e. for repair) without powering down the system. However, prior to re-installing a CEI control module, the entire CEI chassis must be powered down by removing the AC power from the system. Systems with dual power supplies must be powered down simultaneously. After AC power is removed from the chassis, the CEI control modules may be installed, and then the system may be power up. Dual supply systems must have AC power applied to both power supplies simultaneously. Damage to the CEI control modules may occur if they are plugged into a system that is powered up. In dual power supply systems, damage to the CEI control modules may occur if power is present on only one of the two power supplies.

Removing a CEI power supply from an active system

In a single power supply system, simply remove AC power before removing the power supply. Follow the power up procedure for single supply systems when re-installing the power supply.

In dual power supply systems, a power supply may be removed from an active system, provided that all CEI control modules powered by that supply are removed from the system first. If power supply A is to be removed, all of the CEI control modules in the A positions must first be removed from the chassis. If power supply B is to be removed, all of the CEI control modules in the B positions must first be removed from the chassis. Refer to figure 2-6 on page 2.16 of this manual, or to the inside front cover of the CEI chassis for A and B positions in the chassis.

When a control module is removed from an active system, the redundant card will automatically become active and system operation will not be affected. This allows for repair of control modules or power supplies without affecting system operation. However, when any cards or power supplies are to be re-installed in the system, the entire chassis must be powered down, and the procedure for powering up the system (above) must be followed.

Below are the list of active LEDS's on the front of the Interface Card.

STROBE 1 - STROBE 5 (YELLOW LED)
Up to 5 Active strobes can be monitored . The levels that are active will be lit.

MODULE ACTIVE (YELLOW LED)
This LED will be lit to indicate that the module is on-line and being monitored by the Controller

POWER OK (GREEN LED)
+5V is active on the Interface Card

POWER FAIL (RED LED)
A fault in the +5V monitor circuit has occured. The battery jumper (JP85) is not in the "BATT ON" position, or AC power is not connected to the power supply(s). The RED LED will also illuminate if the +5V regulator circuit is not working properly.

4.0 Maintenance

General

The CEI is designed to provide extended, troublefree service with minimum maintenance requirements. No other maintenance other than the normal care which should be given to any advanced solid-state electronic device is required.
If additional technical assistance is required, please refer to the Ordering Assistance, Service, and Inquiries Sheet in the front of this manual.

NOTE:
Do not repair equipment under warranty without first contacting PESA. Remember, PESA warrants the CEI equipment against defective workmanship or materials for a period of one year from the date of delivery. Refer to the Equipment Warranty Sheet in the front of this manual for further information.

Equipment may be returned to the Factory freight pre-paid for repair. Contact PESA's customer service Dept. for an RMA number before shipment. Use the original packing material if at all possible, othewise securly pack and carefully label the carton to prevent damage, delay or even loss during transit.