Appendix B
Jumpers

OVERVIEW

This appendix outlines jumper location and switch settings for all boards located in the Master and Slave Card Cages for product codes 43, 63, 65 and 66.

Check all boards for correct jumpering configuration before installing them into the analyzer.

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MASTER CARD CAGE

Slot	3.3 Bubble	3.7 Semiconductor	4.8 Series II™	4.8 Grounded
1	Dual Port RAM	Dual Port RAM	Dual Port RAM	Dual Port RAM
2				
3	Master CPU	Master CPU	Master CPU	Master CPU
4	Dynamic RAM #1*	Dynamic RAM		
5	Dynamic RAM #2*			
6	Bubble Controller	SRAM	SRAM	SRAM
7	Bubble Expansion	ROM Decode	ROM Decode	ROM Decode
8	Bubble Expansion	ROM Memory	ROM Memory	ROM Memory
9	Quad UART	Quad UART		
10	Bar Code Reader	Bar Code Reader	Bar Code Reader	Bar Code Reader
11	Lamp Servo	Lamp Servo	Lamp Servo	Lamp Servo
12	Incubator Servo	Incubator Servo	Incubator Servo	Incubator Servo
13	Power Monitor			
14	CRT Controller	CRT Controller	CRT Controller	CRT Controller
15				
16	Bus I/O	Bus I/O	Bus I/O	Bus I/O

* May be configured with one 512K Dynamic RAM Board or two 256K Dynamic RAM Boards.

DUAL PORT RAM BOARD
Slot 1 - Master Card Cage

3.3 Bubble	3.7 Semiconductor	4.8 Series II™	4.8 Grounded
2-18165-01	2-18165-01	Not used	Not used
JUMPERS: E-1 to E-2 E-9 to E-10 E-3 to E-4 E-11 to E-12 E-5 to E-6 E-13 to E-14* *Only if J-994 is mounted on the bd EPROM: U-3 2-06603-01 (101)	JUMPERS: E-1 to E-2 E-9 to E-10 E-3 to E-4 E-11 to E-12 E-5 to E-6 E-13 to E-14* *Only if J-994 is mounted on the bd EPROM: U-3 2-06603-02 (501)		
2-18165-02	2-18165-02	2-18165-02	2-18165-02
JUMPERS: JU1 Pins 2 & 3 JU2 Pins 2 & 3 EPROM: U-2 2-18573-01 (101)	JUMPERS: JU1 Pins 2 & 3 JU2 Pins 2 & 3 EPROM: U-2 18179-101	JUMPERS: JU1 Pins 2 & 3 JU2 Pins 2 & 3 EPROM: U-2 18179-101	JUMPERS: JU1 Pins 2 & 3 JU2 Pins 2 & 3 EPROM: U-2 18179-101

Interpreting LEDs on the 2-18165-02 Dual Port RAM

LED #	Function	LED #	Function
1	Slave has possession of Dual Port.	4	Master is sending interrupt through Dual Port.
2	Master has possession of Dual Port.	5	Slave is attempting to access Dual Port without having possession.
3	Slave is sending interrupt to Master through Dual Port.	6	Master is attempting to access Dual Port without having possession.

Dual Port RAM Board Layout (all systems)
2-18165-02

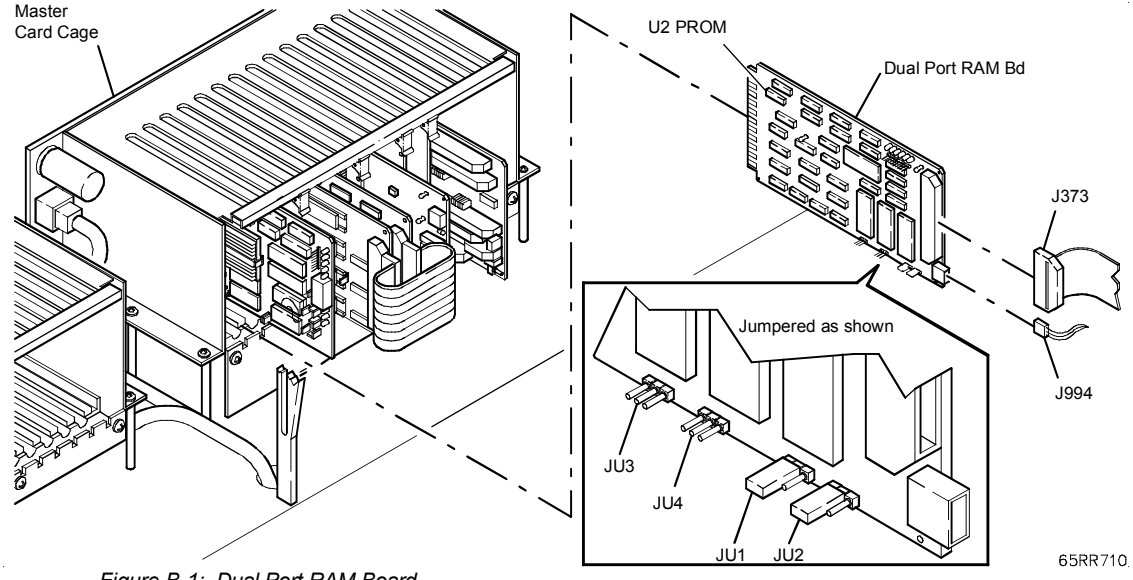


Figure B-1: Dual Port RAM Board

MASTER CPU BOARD

Slot 3 - Master Card Cage

Software Version	HZ	Counters	Non-Linear Math	Board	EPROM	ID PROM U-34
3.3 Spectrum	60 Hz	No	No	2-06654-01 *	2-07213-01 (105)	
3.7 Spectrum	60 Hz	No	No	2-06654-01 *	2-07213-02 (504)	
3.7 Spectrum	50 Hz	Yes	No	2-06654-01 *	18131-101	
3.7 Spectrum	60 Hz	Yes	No	2-06654-01 *	18133-101	
3.7 CCx	60 Hz	No	No	2-06654-01 *	18142-401	
3.7 CCx	50 Hz	Yes	No	2-06654-01 *	18132-401	
4.8 Spectrum	60 Hz	Yes	No	2-18155-01		18630-101
4.8 Spectrum	60 Hz	Yes	Yes	2-18155-01		18629-101
4.8 Spectrum	50 Hz	Yes	Yes	2-18155-01		18631-101
4.8 Spectrum	50 Hz	Yes	No	2-18155-01		18632-101
4.8 CCx	60 Hz	Yes	No	18155-407		18626-101
4.8 CCx	60 Hz	Yes	Yes	18155-407		18625-101
4.8 CCx	50 Hz	Yes	Yes	18155-407		18627-101
4.8 CCx	50 Hz	Yes	No	18155-407		18628-101

** NOTE: 2-06654-01 / -02 boards are not available. Upgrade to 4.8 software is required.*

3.3 Bubble and 3.7 Semiconductor□	**4.8 Series II™ and 4.8 Grounded**
2-06654-01 Revs D, E, and F (except as noted): W-1 (not F)□ W-14 W-20 W-31 W-40 W-4□ W-17 W-21 W-33 W-41 W-5□ W-18 W-23 W-34 W-42 W-7□ W-24 W-36 W-43 W-9□ W-27 □ W-45 W-29□ W-46 (F only) W-48 (F only) W-49 (F only)	2-18155-01 JUMPERS: JU-1□ JU-12□ JU-8□ (PINS 1-2) JU-2□ JU-13□ JU-15□ (PINS 2-3 & 4-5) JU-9□ JU-14□ JU-16□ (PINS 1-2 & 3-4) JU-10 JU-20□ JU-17□ (PINS 1-2 & 3-4) On 18155 boards versions -106 and higher, include jumpers JU-18 and JU-19. 4.8 Grounded: Same as 4.8 Series II™ except remove JU-20.

NOTE: For 3.3 and 3.7 illustrations, refer to ISA-14G.

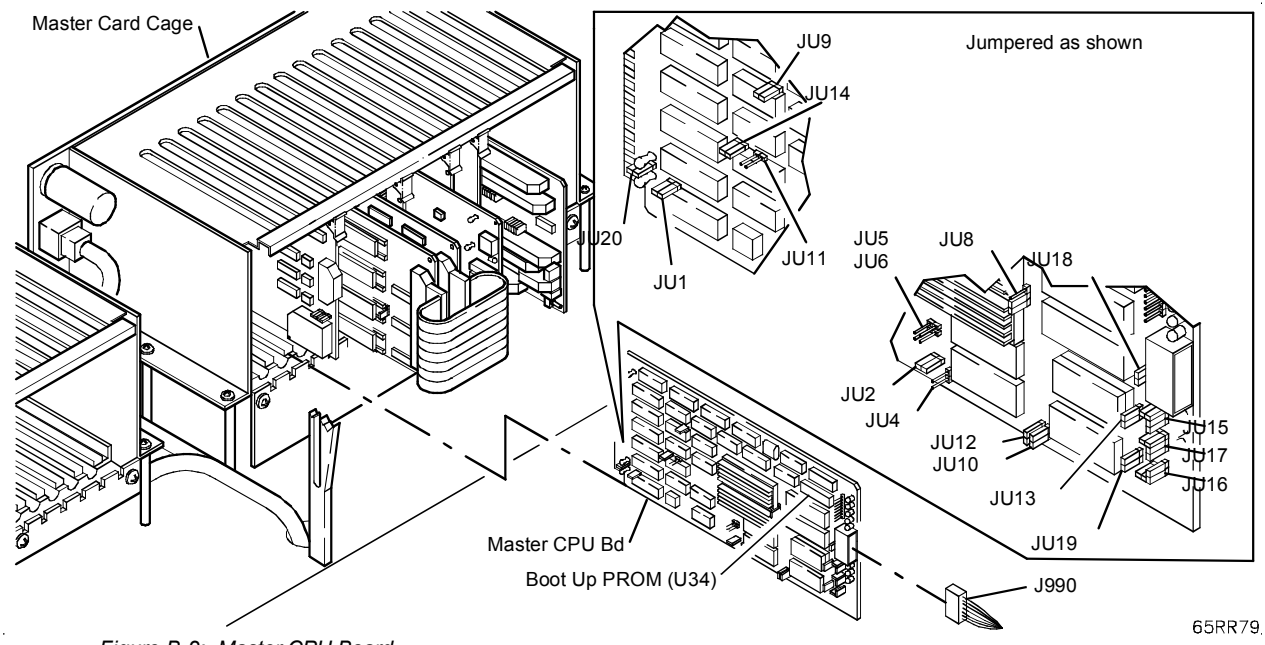


Figure B-2: Master CPU Board

DRAM (512K DYNAMIC RAM) BOARD (3.3, 3.7 ONLY)
Slot 4 - Master Card Cage

3.3 Bubble and 3.7 Semiconductor 2-06655-01	**3.3 Bubble and 3.7 Semiconductor□**	**DRAM Micro Memory**
512K DRAM ZT8824 2 banks 256K chips JUMPERS (3.3 and 3.7 except as noted): W-12 (3.3 only) □ W-23□ W-32 W-13□ W-24□ W-35 W-21 (3.7 only)□ W-25□ W-36 W-22 (3.7 only)□ W-29	DRAM ZT8821 lower 256K 1 bank 256K chips JUMPERS: W-13□ W-24□ W-32 W-21□ W-25□ W-35 W-22□ W-29□ W-36 W-23	JUMPERS: E-1 to E-2□ E-14 to E-15 E-4 to E-5□ E-18 to E-19 E-8 to E-9□ E-22 to E-23 E-10 to E-11
DRAM ZT8821 lower 256K 4 banks 64K chips JUMPERS: W-1 (hard wire)□ W-13□ W-19 W-3□ W-14□ W-22 W-4□ W-15□ W-25 W-12□ W-16□ W-26	DRAM ZT8821 upper 256K 1 bank 256K chips (3.3 Bubble only) JUMPERS: W-13□ W-24□ W-32 W-21□ W-25□ W-35 W-22□ W-29□ W-36 W-23	
DRAM ZT8821 upper 256K 4 banks 64K chips (3.3 Bubble only) JUMPERS: W-1(hardwire)□ W-14□ W-22 W-3□ W-15□ W-25 W-4□ W-16□ W-26 W-12□ W-19		

NOTE: For illustrations, refer to ISA-14G.

BUBBLE MEMORY SET (3.3 ONLY)
Slots 6, 7, 8 - Master Card Cage

2-06894-01

NOTE: No Bubble Memory Sets available. Upgrade to 4.8 software is required.
NOTE: For additional information on Bubble Memory Set, refer to ISA 14G.

WARNING !

Do not change the jumpering of these boards after they have been programmed. This will cause a failure of the software.

Slot 6: Bubble Controller (3.3 only)	**Slots 7 & 8: Bubble Expansion (3.3 only)**
JUMPERS: E-2 E-3 E-6 E-12 (Only if J-992 is mounted on the board.)	Jumpers for Lower Expansion Bd: E-1 E-4 Jumpers for Upper Expansion Bd: E-2 E-5

SRAM BOARD (3.7, 4.8)
Slot 6 - Master Card Cage

CAUTION !

Use caution when removing boards during troubleshooting. Power will still be applied to the RAM chips if the board is placed trace side down on a conductive surface. User files can be lost

3.3 Bubble	3.7 Semiconductor	4.8 Series II™ and 4.8 Grounded
Not used	2-19400-01	2-19400-01
	SRAM JUMPERS: JU-3 JU-4	SRAM JUMPERS: JU-3 JU-4 *NOTE: The error **DUAL PORT RAM TIME OUT ERROR** will occur if JU2 is jumpered on 4.8 software.*

Smart Battery
The battery on the SRAM is called a Smart Battery. The Smart Battery is OFF when the board leaves Abbott Laboratories.

To turn on the Smart Battery:
1. Insert the new board into Master Card Cage slot #6.
2. Turn power on.
3. Power up for 5 - 10 seconds.
4. Power off for 35 - 40 seconds.
5. Power on.
6. Re-initialize the system:
   - D (Diagnostics) when prompted.
   - 3 (Reinitialize the system)
   - Y (Yes) to proceed.

Preparing the SRAM for Shipping/Storing
To turn off the Smart Battery:
1. Remove JU-3 while board is in the analyzer and power is on.
2. Power down the analyzer.
3. Remove board.
4. Re-install JU-3.

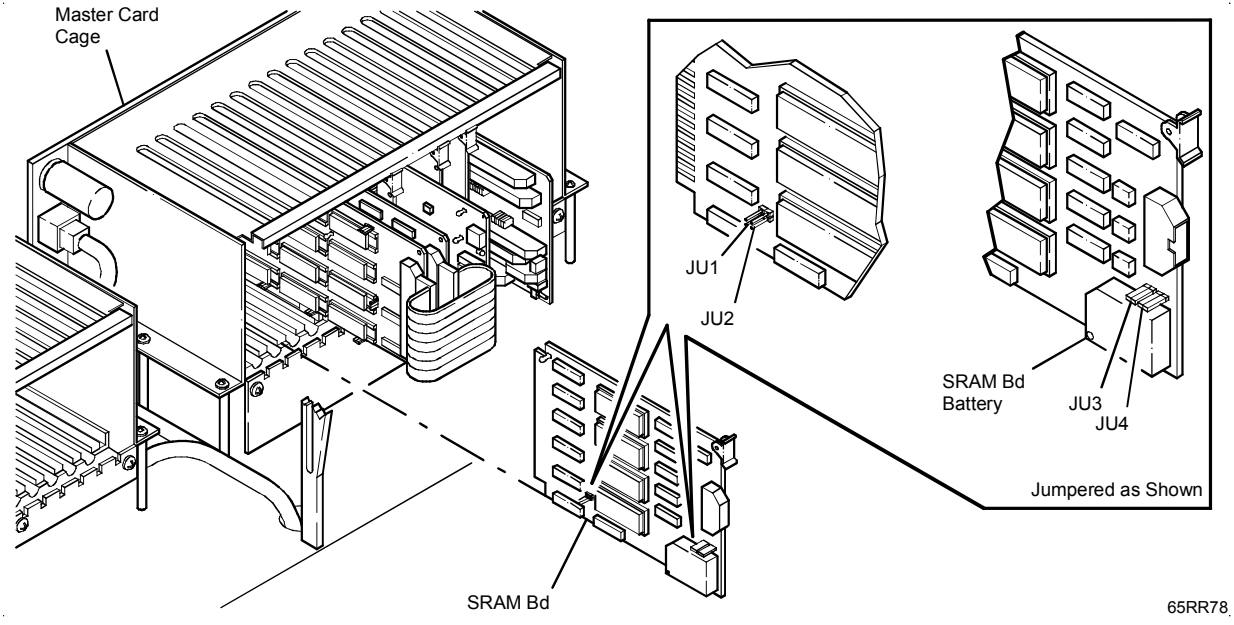


Figure B-3: SRAM Board with Battery

ROM SET (4.8 SERIES II™ AND GROUNDED)
Slots 7, 8 - Master Card Cage
(ROM Memory, ROM Decode and connecting cable)

3.3 Bubble	3.7 Semiconductor	4.8 Series II™ and 4.8 Grounded
Not used	2-19992-01	2-54787-01
	ROM DECODE (2-19465-01) JUMPERS: E-1 E-4 E-2 E-5 E-3 *NOTE: These may be installed, but are not required for normal operation.* SWITCH SETTINGS: ON 4, 7 OFF 1, 2, 3, 5, 6, 8	ROM DECODE (2-19465-01) JUMPERS: E-1 E-4 E-2 E-5 E-3 *NOTE: These may be installed, but are not required for normal operation.* SWITCH SETTINGS: ON 4, 7 OFF 1, 2, 3, 5, 6, 8
	ROM MEMORY (2-19912-01) JUMPERS: JU1 1 to 3 JU4 1 to 3 JU7 1 to 2 JU2 1 to 2* JU5 1 to 2* JU8 2 to 3 JU3 1 to 3 JU6 1 to 2* JU9 2 to 3 JU10 1 to 2 *JU2, JU5, JU6 are not required for normal operation.	ROM MEMORY (2-19912-02) JUMPERS: JU1 1 to 3 JU4 1 to 3 JU7 1 to 2 JU2 1 to 2* JU5 1 to 2* JU8 2 to 3 JU3 1 to 3 JU6 1 to 2* JU9 2 to 3 JU10 1 to 2 *JU2, JU5, JU6 are not required for normal operation. *NOTE: U6 is not used.*

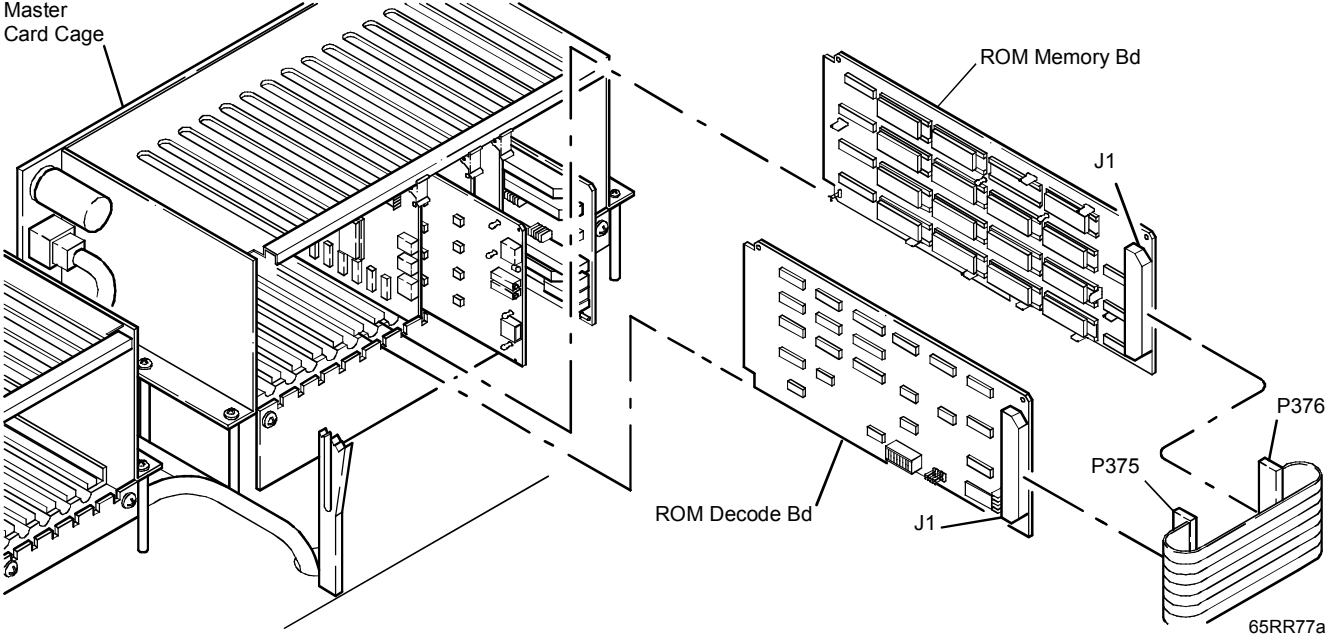


Figure B-4: ROM SET (ROM Memory and ROM Decode Boards)

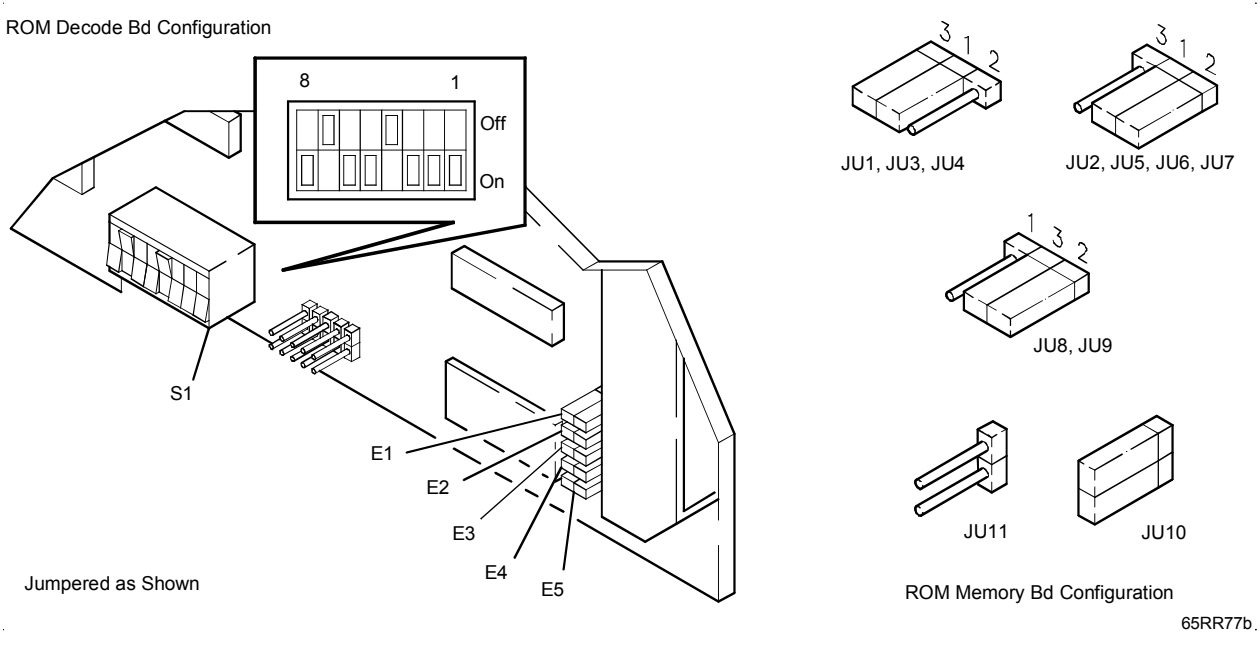


Figure B-5: ROM Memory and ROM Decode Boards Jumpers

QUAD UART BOARD
Slot 9 - Master Card Cage

3.3 Bubble and 3.7 Semiconductor	4.8 Series II™ and 4.8 Grounded
2-06837-01	Not used
QUAD UART: 2-06837-01 JUMPERS: W-1 W12-16 W-3 W18-22 W-36 W-4 W24-28 W-40 W-8 W30-34 W-10	*NOTE: The function of the Quad UART is on the Bus I/O Bd for 4.8 Series™ systems.*

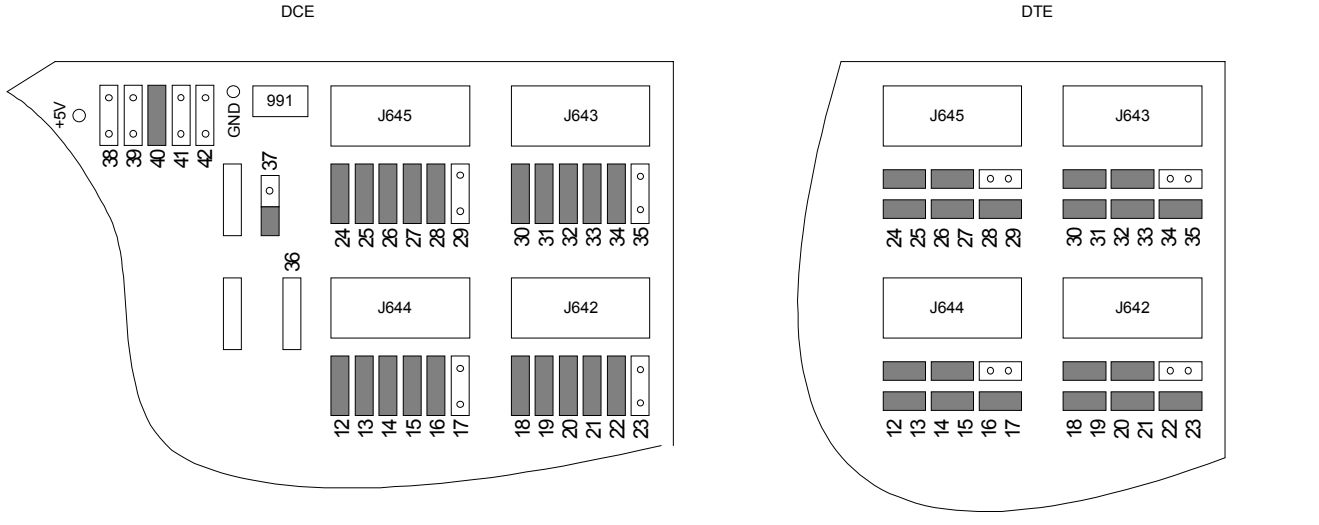
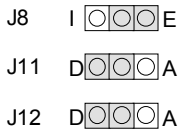


Figure B-6: DCE and DTE

REAGENT BAR CODE READER BOARD
Slot 10 - Master Card Cage

NOTE: Not used in CCx™ analyzers.
NOTE: Intermec® Bar Code Reader Boards are no longer available.

3.3 Bubble and 3.7 Semiconductor	4.8 Series II™ and 4.8 Grounded
2-06660-01 Intermec® Bar Code Reader (All configurations) JUMPERS: J-6 to J-5 PINS 1, 2, 3, 5, 6, & 7 J-8 PINS 1 to 2 (Only if J-995 is mounted on board)	Same
2-18835-01 Welch Allyn® Bar Code Reader (All configurations) JUMPERS: A2, A3, A5, A6, A7 J8, J11, J12 	Same

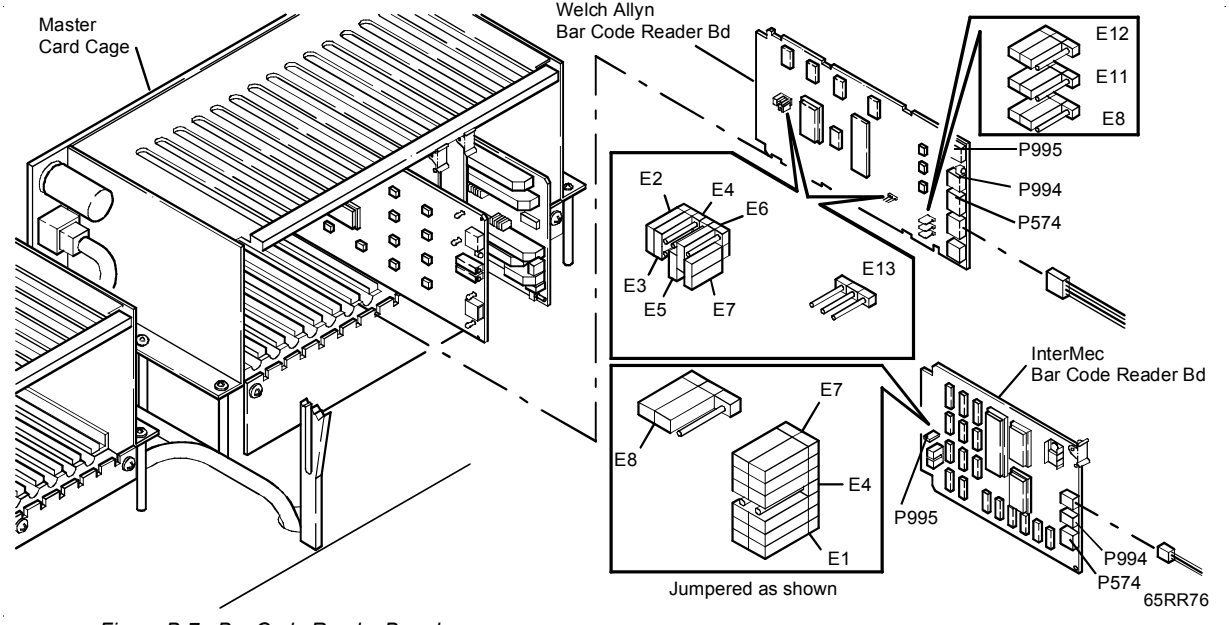


Figure B-7: Bar Code Reader Boards

LAMP SERVO BOARD
Slot 11 - Master Card Cage

3.3 Bubble	3.7 Semiconductor	4.8 Series II™	4.8 Grounded
2-06665-01			2-18885-01
Lamp Servo Board JUMPERS: E-1 to E-2 * *NOTE: There is not an EPROM in the U6 socket. The U6 slot is empty.*	Same as 3.3	Same as 3.3	

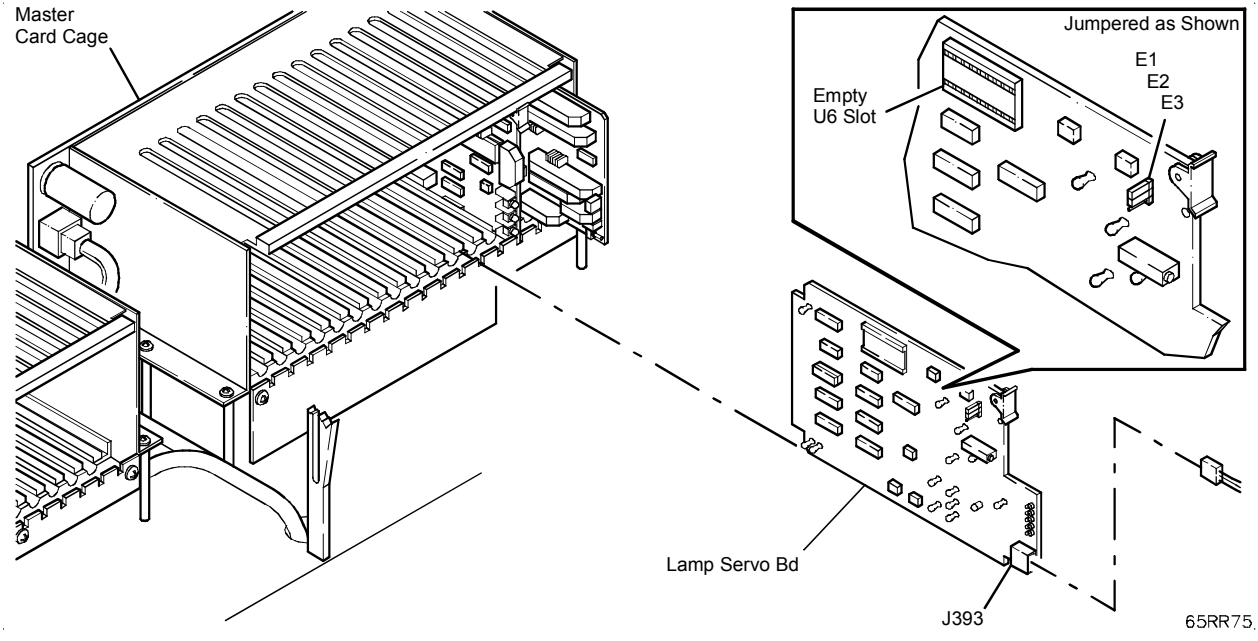


Figure B-8: Lamp Servo Board

INCUBATOR SERVO BOARD
Slot 12 - Master Card Cage

3.3 Bubble and 3.7 Semiconductor	**4.8 Series II™**	**4.8 Grounded**
2-06675-01 JUMPERS: No Jumpers needed	Same as 3.3/3.7	2-18880-01 JUMPERS: No Jumpers needed

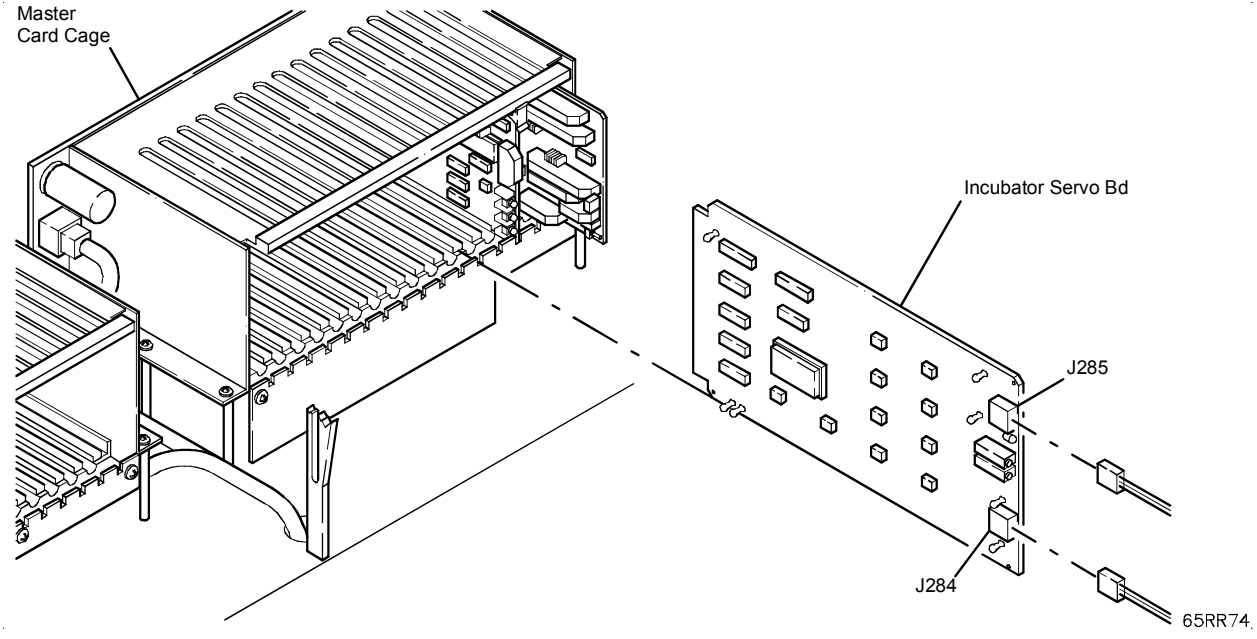


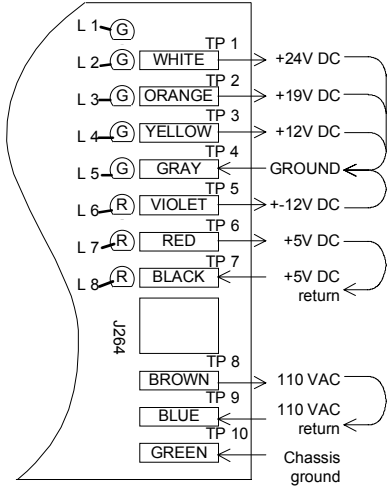
Figure B-9: Incubator Servo Board

POWER MONITOR BOARD
Slot 13 - Master Card Cage

3.3 Bubble	**3.7 Semiconductor**	**4.8 Series II™ and 4.8 Grounded**
Power Monitor 2-06830-01 JUMPERS: Depends upon S/N. Refer to chart below.	Not used	Not used

Multi-Output Power Supply S/N	Jumpers
S/N 19516 and higher	E-2 to E-3
S/N ends in -1	E-2 to E-3
S/N below 19516	no jumpers
S/N does not end with -1	no jumpers

LED #		Illuminated indicates:
L1	+24 VDC	+24 VDC
L2	+19 VDC	+19 VDC
L3	+12 VDC	+12 VDC
L4	-12 VDC	-12 VDC
L5	+5 VDC	DC voltage present
L6	OVERVOLTAGE	DC overvoltage conditions
L7	POWER CHECK	DC voltage not current
L8	UNDERVOLTAGE	DC overvoltage condition



POWERMON. DS4

Figure B-10: Power Monitor Board

CRT CONTROLLER BOARD
Slot 14 - Master Card Cage

NOTE: 2-18095-01 no longer available.

3.3 Bubble / 3.7 Semi	4.8 Series II™	4.8 Grounded
2-18095-01 JUMPERS: 2 to 4 5 to 6 to 7 to 8 to 9 to 10 (for 3.3) 6 to 7 to 8 to 10 (for 3.7) 18 to 20 28 to 30 19 to 26 32 to 33 22 to 23 34 to 35 (for 3.3) 27 to 29 38 to 39 (for 3.7)	2-18095-01 JUMPERS: 2 to 4 22 to 23 6 to 7 to 8 to 10 27 to 29 18 to 20 28 to 30 19 to 26 32 to 33 38 to 39	**Can not use**
2-18095-02 JUMPERS: J-2 pins 1 & 2 (for 3.3) J-2 pins 1 & 3 (for 3.7) J-3 J-4 J-5 J-6 J-7 J-8 pins 1 & 2 (U16, 28 pin pkg) pins 1 & 3 (U16, 24 pin pkg)	2-18095-02 JUMPERS: Same as 3.7	2-18095-03 JUMPERS: Same as 3.7

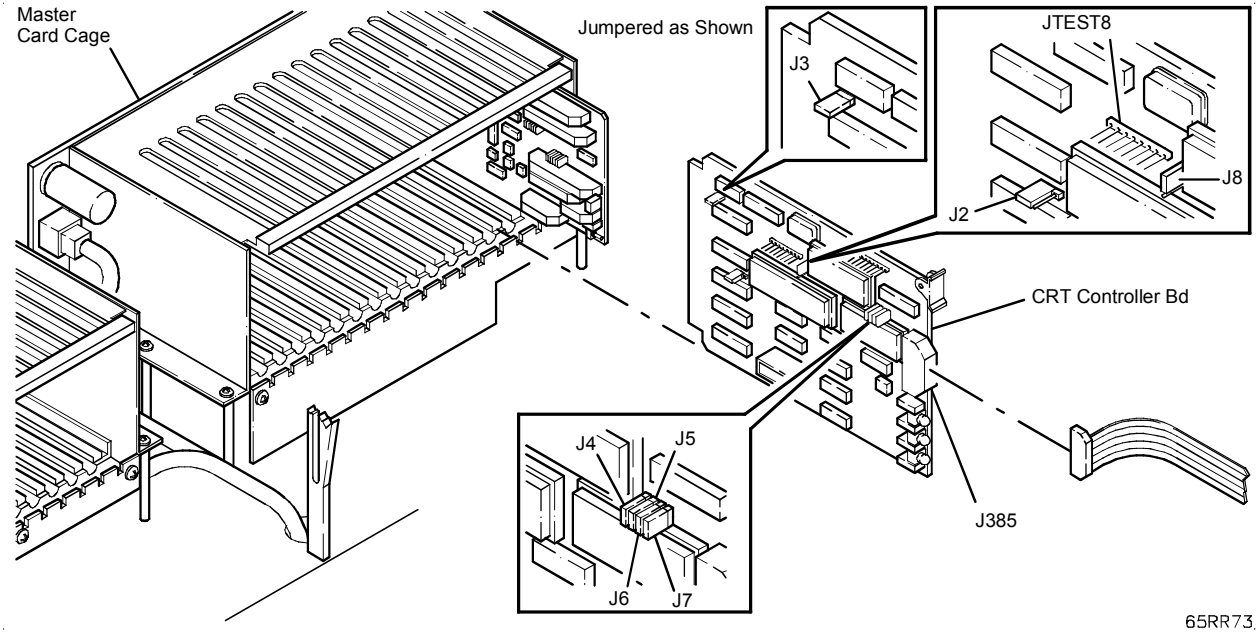


Figure B-11: CRT Controller (3.7 Semiconductor and 4.8 Series II™)

BUS I/O BOARD
Slot 16 - Master Card Cage

3.3 Bubble and 3.7 Semiconductor	**4.8 Series II™**	**4.8 Grounded**
2-06680-01	2-19845-01	2-18895-01
JUMPERS: W-3	JUMPERS for DCE: JU1 through JU12 (vertical) JU13 JU17 through JU22 (vertical) JU16 JU23 JUMPERS for DTE: JU1 through JU12 (horizontal) JU13 JU17 through JU22 (horizontal) JU16 JU23	Same as 4.8 Series II™

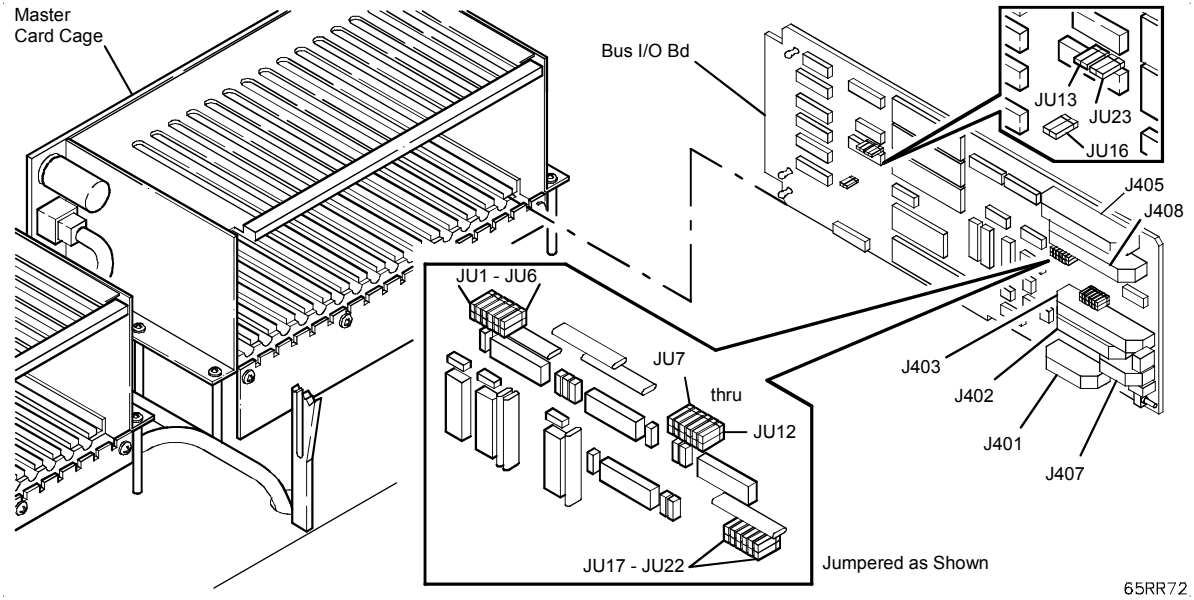


Figure B-12: Bus I/O Board

NOTE: For DTE configuration and for Bus I/O Board (3.3 and 3.7), refer to ISA 14-G.

SLAVE CARD CAGE

Slot	3.3 Bubble and 3.7 Semiconductor	4.8 Series II™ and 4.8 Grounded
1		
2	Motor Controller #1	Motor Controller #1
3		
4	Motor Controller #2	Motor Controller #2
5		
6	Motor Controller #3	Motor Controller #3
7		
8	Motor Controller #4	Motor Controller #4
9		
10	Motor Controller #5	Motor Controller #5
11		
12		Motor Controller #6
13	Real Time Processor (Slave CPU)	
14		Real Time Processor (Slave CPU)
15		
16	AD Converter	AD Converter

MOTOR CONTROLLER BOARD
Slave Card Cage

NOTE: 2-06765-01 is no longer available.

3.3 Bubble and 3.7 Semi-conductor	**4.8 Series II™ and 4.8 Grounded**
Motor Controller 2-06765-01 JUMPERS: E-5 E-14 to E-15 E-6 to E-7 E-18 E-10 to E-11 E-19 NOTE: Some jumpers may be hard-wired in the board. MC #1: E-4 E-3 E-2 MC #2: E-4 E-3 MC #3: E-4 E-2 MC #4: E-4 MC #5: E-3 E-1	Same DO NOT use this style board as Motor Controller #6 for the Shutter in any 4.8 Series II™ analyzers.
2-19645-02 Motor Controller Board This board can be used in any analyzer in the ABBOTT SPECTRUM® family. JUMPERS: See jumper configuration chart on page B-34.	Same

LED	MC #1		MC #2		MC #3		MC #4		MC #5		MC #6
1	Left Limit	Reagent Inner Arm Motor #1	Station	Sample Carousel Motor #5	Upper	Reagent Syringe Motor #7	Station	Cuvette Carrier Motor #6	Station	Calibration Wheel Motor #9	Not used
2	Right Limit				Home		Inc. Lev. Sense				
3	Home Limit		Home		Home		Home		Home		
4	Left Limit	Reagent Outer Arm Motor #2	Left Limit	Sample Arm Horizontal Motor #4	Upper	Sample Syringe Motor #8	Right Limit	Mix Arm Horizontal Motor #11	Valves & Sensors * Motor #18		Not used
5	Right Limit		Right Limit		Home		Left Limit				
6	Home Limit		Home Limit		Home		Home Limit				
7	Fluid Sense	Reagent Arm Vertical Motor #0	Fluid Sense	Sample Arm Vertical Motor #3	Not used	Not used	Home Limit	Mix Arm Vertical Motor #10	Pumps ** Motor #19		Shutter
8	Home Limit		Home Limit				Lower Limit				
Jumpers	E2, E3, E4, E5, E6		E3, E4, E5, E6		E2, E4, E5, E6		E4, E5, E6		E1, E3, E5, E6		E2, E5, E6

* Motor #18:
Incubator Fill Valve
Mix Wash Valve
Reagent Wash Valve
Sample Diluent Valve
Sample Diluent Level Sensor
Sample Diluent Pressure Sensor
Wash Water Pressure Sensor

** Motor #19:
Mix Arm Coil
Reagent Bar Code Reader
Sample Diluent Pump
Waste Pump
Zero Crossing Detector

JUMPCHRT.DS4

Figure B-13: Jumper Configuration Chart

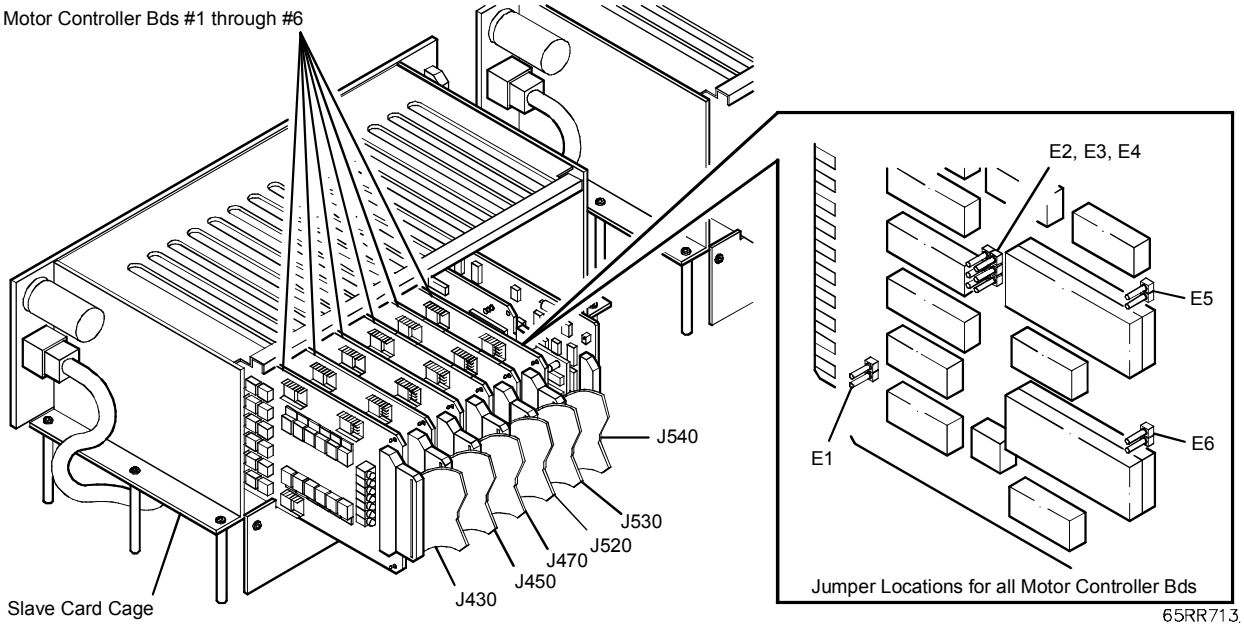


Figure B-14: Motor Controller 2-19645-02 (Slave Card Cage)

REAL TIME PROCESSOR BOARD (SLAVE CPU)
Slot 13 - Slave Card Cage

3.3 Bubble	**3.7 Semiconductor**	**4.8 Series II™ and 4.8 Grounded**
Board: 2-06690-01 U-25 PROM: 2-07216-01 (103) NOTE: Verify U-25 for proper configuration. JUMPERS: E-1 to E-2 E-5 to E-6 E-3 to E-4 E-8 to E-9	Board: 2-06690-01 U-25 PROM: 2-07216-01 (103) NOTE: Verify U-25 for proper configuration. JUMPERS: E-1 to E-2 E-5 to E-6 E-3 to E-4 E-8 to E-9	Board: 2-06690-01 U-25 PROM: 2-07216-01 (103) NOTE: Verify U-25 for proper configuration. JUMPERS: E-1 to E-2 E-4 to E-6 E-3 to E-5 E-8 to E-9

NOTE: Ensure that there are no black and white wires attached to J993 (the "pig tail").
If there are black and white wires attached, perform ISA 43-093.

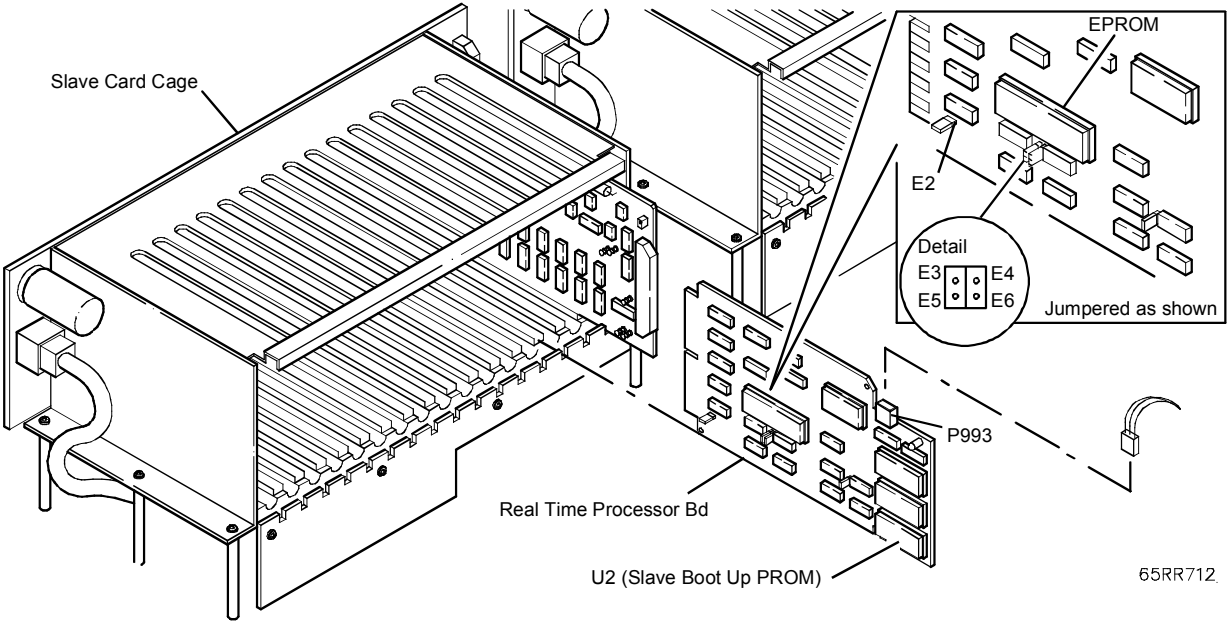


Figure B-15: Real Time Processor Board (4.8 Series II™ and 4.8 Grounded)

AD CONVERTER BOARD
Slot 16 - Slave Card Cage

3.3 Bubble and 3.7 Semiconductor	4.8 Series II™ and 4.8 Grounded
2-06700-02	Same
JUMPERS: See Figure below.	Same

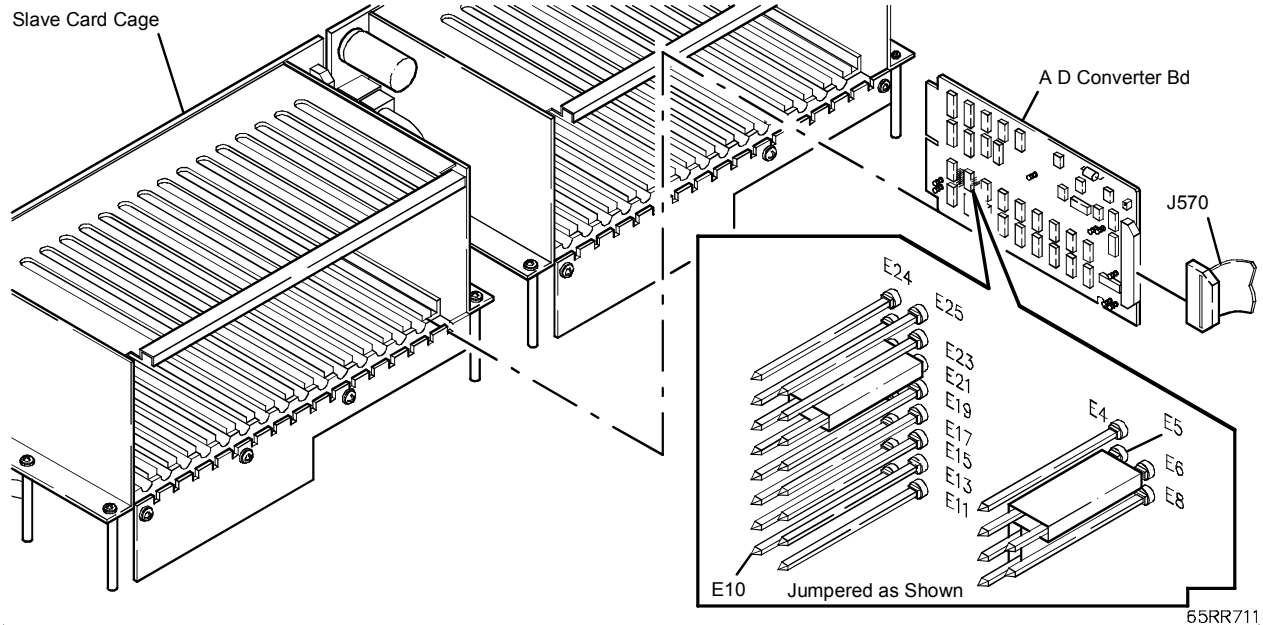
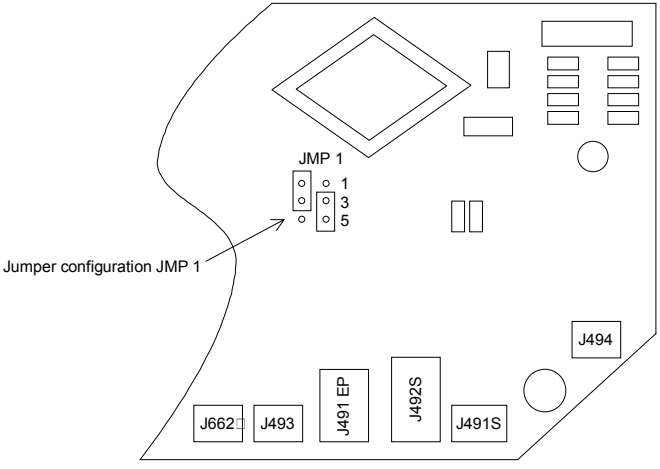


Figure B-16: AD Converter Board Jumpers

PUMP & VALVE/HOME STATION INTERFACE BOARD (NEW STYLE)



PUMPVALV.DS4

Figure B-17: Pump & Valve / Home Station Interface Board (New Style)

NOTE: For additional information, refer to the Pump & Valve/Home Station Interface Board TSB.