# HP 3000 SERIES 68

# AUXILIARY I/O BAYS

# Familiarization Guide

**Series 68A Auxiliary I/O Bay, Part Number 30164A**

**Series 68B Auxiliary I/O Bay, Part Number 30164B**

HEWLETT PACKARD
19447 PRUNERIDGE AVENUE, CUPERTINO, CA 95014

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FEDERAL COMMUNICATION COMMISSION RADIO
FREQUENCY INTERFERENCE STATEMENT

The United States Federal Communications Commission (in Subpart J, of Part 15, Docket 20780) has specified that the following notice be brought to the attention of the users of this product:

*"Warning: This equipment generates, uses, and can radiate radio frequency energy and if not installed and used in accordance with the instructions manual, may cause interference to radio communications. As temporarily permitted by regulation it has not been tested for compliance with the limits for Class A computing devices pursuant to Subpart J of Part 15 of FCC Rules, which are designed to provide reasonable protection against such interference. Operation of this equipment in a residential area is likely to cause interference in which case the user at his own expense will be required to take whatever measures may be required to correct the interference."*

*"This product has been tested and licensed by the Fernmeldetechnisches Zentralamt (FTZ) for use in West Germany. Included with the system is a registration postcard to be completed and mailed for all German installations."*

# PREFACE

This guide is the CE/TSE training and reference document for the HP 3000 Series 68A and 68B Auxiliary I/O Bays. It is expected that the reader has already been 200-level or 400-level trained on the HP3000 Series 64.

# Table Of Contents

# I. INTRODUCTION

The HP 3000 Series 68 Computer System consists of an HP 3000 Series 64 SPU and a MPE V disc-caching software package which significantly increases system performance. As there are two versions of the Series 64, the Series 64A and the Series 64B, there are correspondingly two versions of the Series 68, namely the Series 68A and Series 68B. In conjunction with the release of the Series 68A and B, two new Auxiliary I/O Bays are being released as optional add-ons for the Series 68. These Auxiliary I/O Bays provide both a third Inter-Module Bus (IMB) and a second junction panel which allow for the connection of more terminals and peripheral devices than was previously possible with the Series 64. The two versions of the Series 68 Auxiliary I/O Bays are: (1) the Auxiliary I/O Bay for the Series 68A, which utilizes the HP New Jersey Division power supplies as originally released with the Series 64, and (2), the Auxiliary I/O Bay for the Series 68B, which utilizes the ITT power supplies as shipped with the Series 64B. The emphasis of this document will be on these two Auxiliary I/O Bays.

Note that other documentation which discusses the Series 64/68 may use the term "Auxiliary I/O Bay" synonymously with "Expansion I/O Bay." In this document the bays of a three-bay system will be referred to as the CPU Bay, the First I/O Bay, and the Auxiliary I/O Bay.

# II. SERIES 68A AUXILIARY I/O BAY

## A. Description

The Series 68A Auxiliary I/O Bay is of the same physical dimensions as the First I/O Bay on the Series 64A/68A. As shown in Figure 1, the Auxiliary I/O Bay will be physically connected to the left of the CPU Bay as seen from the front. The Series 68A Auxiliary I/O Bay utilizes many of the same parts currently used in the First I/O Bay of the Series 64A/68A. Materials used in both the Series 68A Auxiliary I/O Bay and the Series 64A/68A First I/O Bay include two HP New Jersey Division power supplies, an I/O card cage, and an I/O Backplane. The CPU communicates with the third IMB via an I/O Adapter Module (IOA) which is identical to the IOAs used for the first two IMBs. The I/O Adapter Module assemblies are shipped separately from the Auxiliary I/O Bay, and include IMBI, CBI, and IOB PCAs, and the necessary cabling. A block diagram of the three-IMB Series 68 is shown in Figure 2. Note that the First IMB is referred to as IMB0, the Second as IMB1, and the Third IMB as IMB2. With the exception of some new cabling and a new breaker assembly, there are essentially no new hardware products used in the Series 68A Auxiliary I/O Bay and I/O Adapter Module that are not already used in the Series 64A.

**FIG 1**
**THREE-BAY SERIES 68A**
**FRONT VIEW**

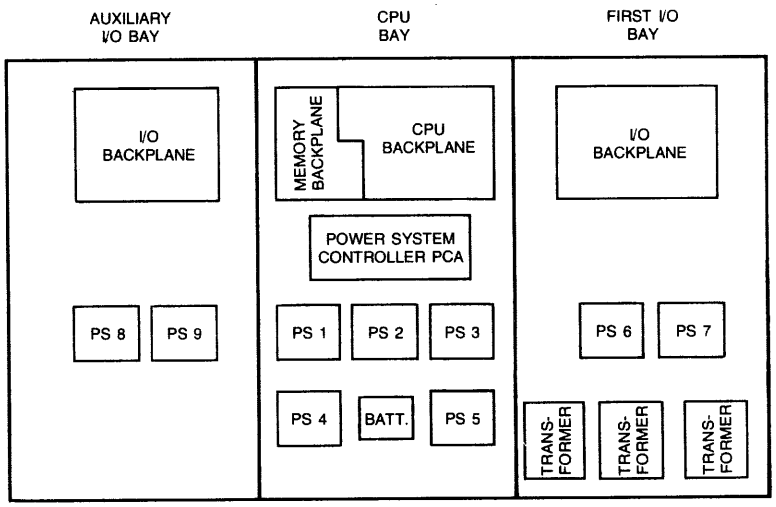
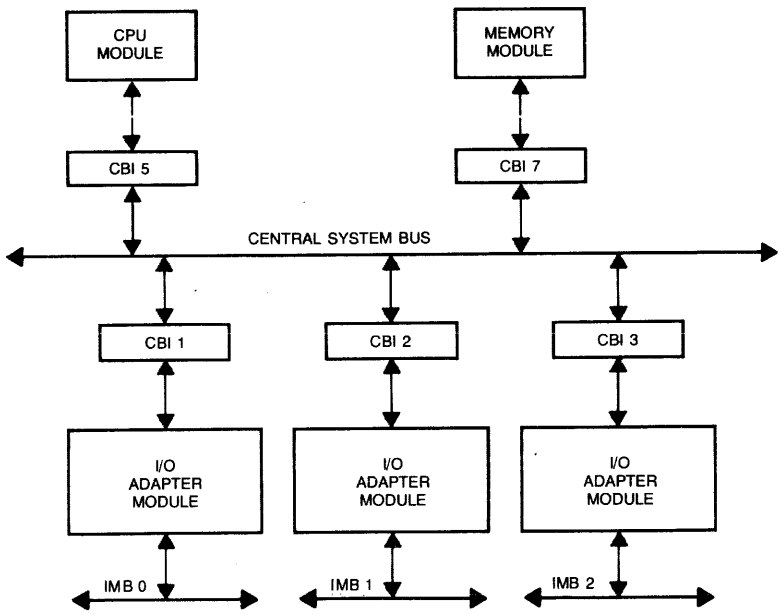



**FIG 2**
**SERIES 68**
**SYSTEM BLOCK DIAGRAM**



***Product Configuration*** The Series 68A Auxiliary I/O Bay and I/O Module, product number 30464A, consists of two separate products:

| | |
|---|---|
| Product Number 30164A | Auxiliary I/O Bay with HP New Jersey Power Supplies |
| Product Number 30143A | I/O Module (IMBI, IOB, CBI PCAs, cabling) |

The Series 68A Auxiliary I/O Bay is associated with the following upgrade and add-on products:

***Field Upgrade***

| | |
|---|---|
| Product Number 30468A: | Series 64A to 68A Field Upgrade<br>(This includes installation of disc-caching software and 1 Megabyte of memory) |
| option 190: | Delete 1 Mb memory |
| option 250: | Add Expansion Bay and I/O Adapter |

***Add-On Product***

| | |
|---|---|
| Product Number 30464A: | Series 68A Expansion Bay and I/O Adapter |

As indicated above, the Auxiliary I/O Bay can be ordered as part of a field upgrade from a Series 64A to Series 68A, or as an add-on to an existing Series 68A. Note that a Series 64A must first be upgraded to a Series 68A before the Auxiliary I/O Bay can be added to the system; the Auxiliary I/O Bay is ***NOT*** supported on the Series 64A!

## B. Electrical Specifications

There are no new system-external power connections introduced with the connection of the Auxiliary I/O Bay. The bay itself draws its AC power from the secondary of the large isolation transformers in the bottom of the First I/O Bay. Below are given the ratings for maximimum AC input current draw and surge current for the Series 68A with the Auxiliary I/O Bay; note that these are unchanged from the corresponding specifications as orginally released with the Series 64A. Thus, there is no effect on the customer in regards to providing another power panel, another power outlet, or a larger line conditioner if the Auxiliary I/O Bay is added to an existing system.

Maximum AC input current draw:

| | |
|---|---|
| For 208 Volts @ 60 Hz | 24 Amps per phase |
| For 380 Volts @ 50 Hz | 13 Amps per phase |
| For 415 Volts @ 50 Hz | 12 Amps per phase |

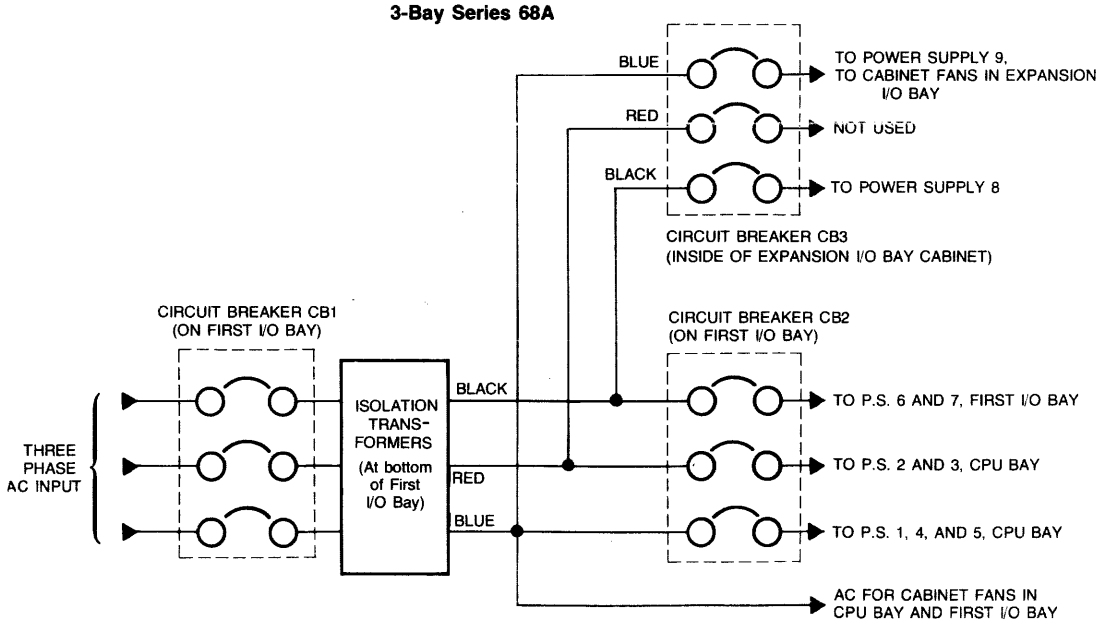
Surge current
For 208 Volts @ 60 Hz 200 Amps per phase, 1 cycle max

# C. Power System

## AC Distribution

As shown in Figure 3, three circuit breakers control the distribution of AC power in the three-bay Series 68A. Circuit breaker CB1 is physically located on the Power Control Module (PCM) at the rear of the First I/O Bay, and is electrically at the primary of the three large isolation transformers in the First I/O Bay. Switching CB1 ON allows AC power to be switched to the isolation transformers, and also sends power to the cabinet fans in the CPU Bay and the First I/O Bay. Circuit Breaker CB2 is physically located on the PCM beside of CB1, and is electrically at the secondary of the isolation transformers. Switching CB2 ON sends AC power to DC power supplies 1 through 7 in the CPU Bay and the First I/O Bay. Circuit breaker CB3 is physically on the inside frame of the Auxiliary I/O Bay, and electrically, like CB2, it is at the secondary of the isolation transformers. Switching CB3 ON switches AC power to power supplies 8 and 9 in the Auxiliary I/O Bay, and also switches power to the cabinet fans in the Auxiliary I/O Bay. Note that CB3 is a 20 Amp breaker which can only be accessed by first removing the right front cabinet door of the Auxiliary I/O Bay. Figure 4 shows the location of CB3 in the Auxiliary I/O Bay. *It is imperative that this breaker be switched ON at system installation!*

**FIGURE 3.**
**AC POWER DISTRIBUTION**
**3-Bay Series 68A**



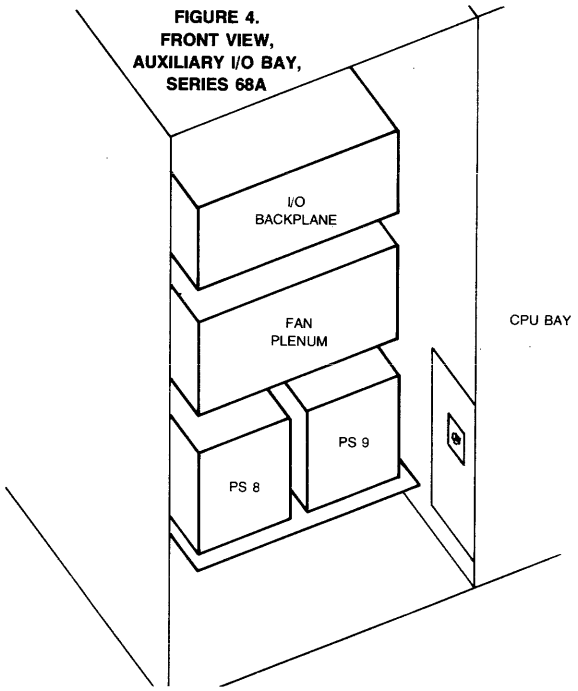



**FIGURE 4.
FRONT VIEW,
AUXILIARY I/O BAY,
SERIES 68A**

## DC Distribution

The DC power system in the Auxiliary I/O Bay is essentially identical to the DC power system in the First I/O Bay of the Series 64A/68A. The power supplies themselves, the parallel power supply configuration, and the bus bars used to distribute power to the backplane are all identical in the First I/O Bay and the Auxiliary I/O Bay. The two power supplies in the Auxiliary I/O Bay are referenced as supplies 8 and 9; see Figure 1 for the location and labelling of the DC supplies in the three-bay Series 68A. Both of the supplies are the same five volt supplies, part number 62971M, as supplies 2,3,6, and 7 in the CPU Bay and the First I/O Bay.

## Adjusting Power Supplies 8 and 9

Power Supplies 8 and 9 are adjusted in exactly the same manner and to the same specifications as power supplies 6 and 7. See the Series 64 CE Handbook for the adjustment procedure for power supplies 6 and 7. Below are listed the specifications which should be used for adjustment purposes. Voltage is as measured at the sense lines at connector J21 on the I/O Backplane, and current limit adjust is made by monitoring and adjusting a voltage on the IREF terminals at the rear of the power supplies. See the Series 64 CE Handbook for further details.

| Supply | Nominal Output Voltage | Current Limit Setting | Voltage Adjustment Limits |
|---|---|---|---|
| 8 | 5.05 V | ABOVE 65.00 | 4.995 V - 5.005 V |
| 9 | 5.05 V | 42.30 A - 47.70 A | 5.045 V - 5.055 V |

Below are listed the operating limits for the supplies; if a supply output is within this range as measured at the sense lines on the I/O Backplane, then no adjustment is necessary.

| Supply | Nominal | Upper Operating Limit | Lower Operating Limit |
|---|---|---|---|
| 8 | 5.05 V | 5.10 V | 4.80 V |
| 9 | 5.05 V | 5.10 V | 4.80 V |

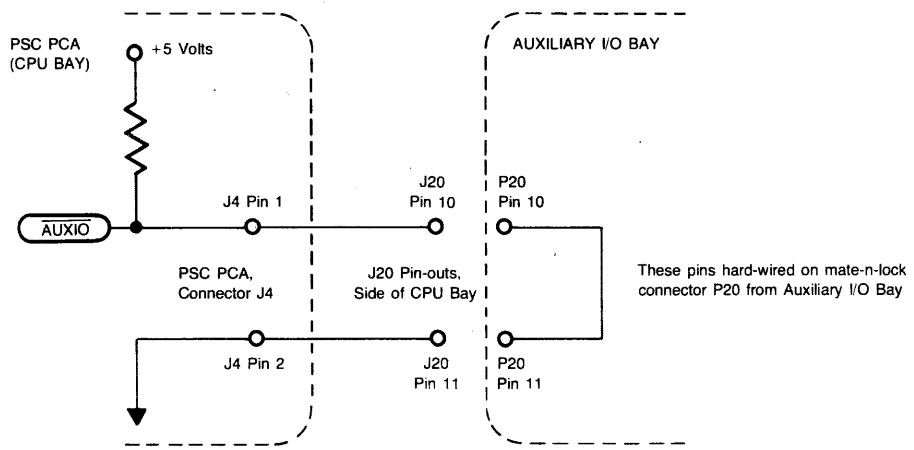
## Power Supply Monitoring

The Power System Controller (PSC) PCA monitors the voltage and current outputs and controls the power supply remote shutdown lines for all DC power supplies, including supplies 8 and 9, if present. See the Series 64 Reference Training Manual for details of the power system and PSC operation.

## Detection of Auxiliary I/O Bay

As the Series 68A can be either a two-bay or three-bay system, a mechanism must exist for the PSC to detect whether the Auxiliary I/O Bay is present so that the PSC/DCU can determine if the voltage and current readings for power supplies 8 and 9 are valid. The mechanism used by the PSC for detection of the Auxiliary I/O Bay is a loopback check, depicted in Figure 5. The PSC/DCU monitor the logic state of pin 1 of PSC connector J4; if HI, then the Auxiliary I/O Bay is assumed not present, if LO, then the Auxiliary I/O Bay is assumed present. As Figure 5 shows, both pins 1 and 2 of PSC connector J4 are cabled to connector J20 at the side of the CPU Bay. If the Auxiliary I/O Bay is present, the cable from the Auxiliary I/O Bay that connects to J20 is hardwired to short these pins, putting a LO on pin 1, PSC connector J4, and the PSC/DCU then assumes that the Auxiliary I/O Bay is present. If the Auxiliary I/O Bay is not present, pin 1 of PSC connector J4 floats HI, and the PSC/DCU assumes that the Auxiliary I/O Bay is absent. See the page 26 of the PSC IMS for further details.

**FIGURE 5. SERIES 68A, AUXILIARY I/O BAY LOOPBACK CHECK**



## D. Inter-Bay Cabling

There are a total of six cables that carry logic signals and power between the CPU Bay and the Auxiliary I/O Bay. Four of these cables are wrapped at the side of the Auxiliary I/O Bay before shipping, and are connected by the CE at installation before the Bay is bolted to the CPU Bay. These include:

1. *Temperature Sense cable.* This cable terminates in a three-pin mate'n'lock connector, and runs along the top of all three bays. These lines include temperature sensors that will sense overtemp conditions in the Auxiliary I/O Bay.

2. *Power Supply Sense Lines and Shutdown Lines.* These lines, from power supplies 8 and 9 in the Auxiliary I/O Bay, terminate in a 15-pin Mate-n-lock connector that connects to J20 on the side of the CPU Bay. This cable carries the remote shutdown, voltage sense, and current sense lines for power supplies 8 and 9 in the Auxiliary I/O Bay. The Power System Controller (PSC) PCA in the CPU Bay monitors and controls these lines.

3. *Plus/Minus 12 Volt, +5B cable.* This cable runs from connector P19 on the auxiliary I/O Backplane and is connected upon installation to connector J21 on the side of the CPU Bay. This cable carries +\- 12 Volts to the I/O Backplane in the Auxiliary I/O Bay to supply power for terminal I/O, and carries 5B Battery Backup voltage to the I/O Backplane for INPs.

4. *AC Power cable.* This cable carries AC power from the CPU Bay to the Auxiliary I/O Bay. The cable in the Auxiliary I/O Bay terminates in a large blue 5-pin connector which is mated to connector J21 on the side of the CPU Bay. The five wires include ground, neutral, and three phases of AC power, but note that the RED phase is not used in the Auxiliary I/O Bay. In the Auxiliary I/O Bay, this cabling is routed to breaker CB3 and then AC power is distributed to the cabinet fans and DC power supplies.

After the Auxiliary I/O Bay is bolted to the CPU Bay, there are two remaining inter-bay cables that are to be connected. These cables are the long flat-ribbon cables which connect at the IMBI and IOB PCAs, and provide the communications link for the third IMB in the Auxiliary I/O Bay to interface to the Central System Bus. Note that the two IMBI-IOB cables are identical to each other, and are also identical to the IOB-IMBI cables used for IMBs Zero and One. See Section IV of this document for further details on the I/O Adpater Module.

## E. Installation

Installation of the Auxiliary I/O Bay and I/O Adapter Module is straightforward. The left side panel of the CPU Bay is first removed. The Auxiliary I/O Bay is then positioned beside of the CPU Bay, and the four inter-bay cable

connections discussed above are made. The bays are bolted together and the Auxiliary I/O Bay circuit breaker is turned ON. The left side panel that was removed from the CPU Bay is installed on the left side of the Auxiliary I/O Bay. The I/O Adapter PCAs are installed, the IMBI/IOB cables are connected, and the IMBI-CBI cable is connected to complete the installation.

For further installation information, see the 30464A Auxiliary I/O Bay Installation Manual, part number 30164-90007. This manual will be available by first customer shipment of the Auxiliary I/O Bay.

## F. Parts

The assembly drawings for the 30164A are included in this document, and provide part numbers for all assemblies in the Series 68A Auxiliary I/O Bay.

The only exchange assemblies associated with the Auxiliary I/O Bay itself are the five volt power supplies. Its exchange part number is given below.

*Exchange Assemblies; system-common with Series 64A and Series 68A*

| Part Number | Exchange Part Number | Description |
|---|---|---|
| 62971M | 62971-69001 | +5 Volt Pwr Supply |

*The I/O Adapter Module includes three PCAs, each of which are exchange assemblies.*

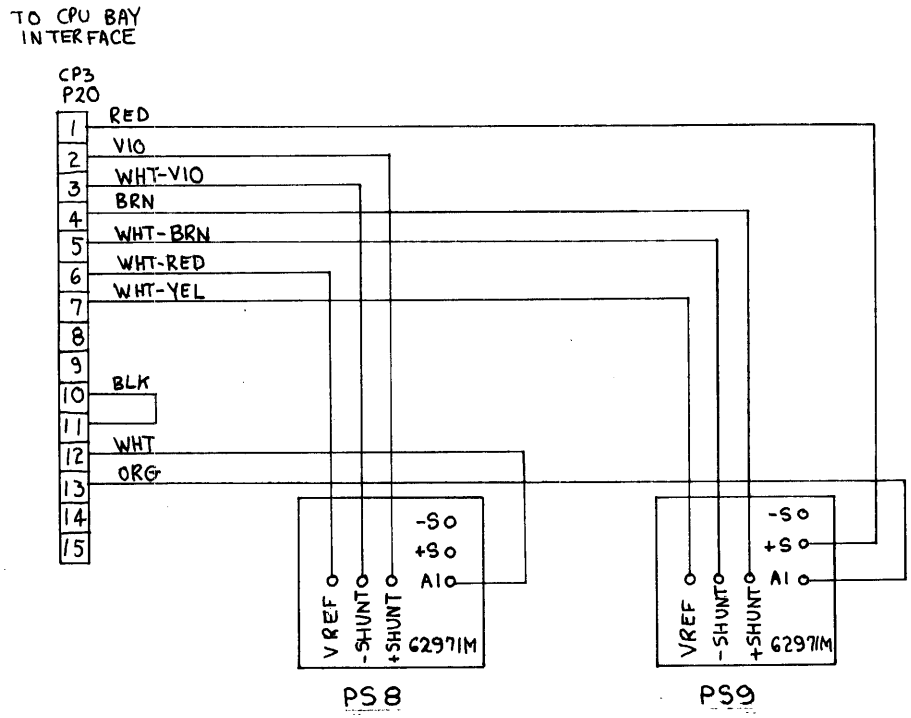
| Part Number | Exchange Part Number | PCA Name |
|---|---|---|
| 30140-60011 | 30140-69011 | CBI PCA |
| 30140-60015 | 30140-69015 | IOB PCA |
| 30140-60016 | 30140-69016 | IMBI PCA |

## G. Wiring Diagrams, 30164A

The Wiring Diagrams for the 30164A (the Series 68A Auxiliary I/O Bay) are included on the following pages. Note that the part numbers for these Wiring Diagrams are 30164-90005-1,2, and 3.

## H. Assembly Drawings, 30164A

The Assembly Drawings for the 30164A (Series 68A Auxiliary I/O Bay) are included on the following pages. Note that the part numbers for these Assembly Drawings are 30164-90001-1,2, and 3

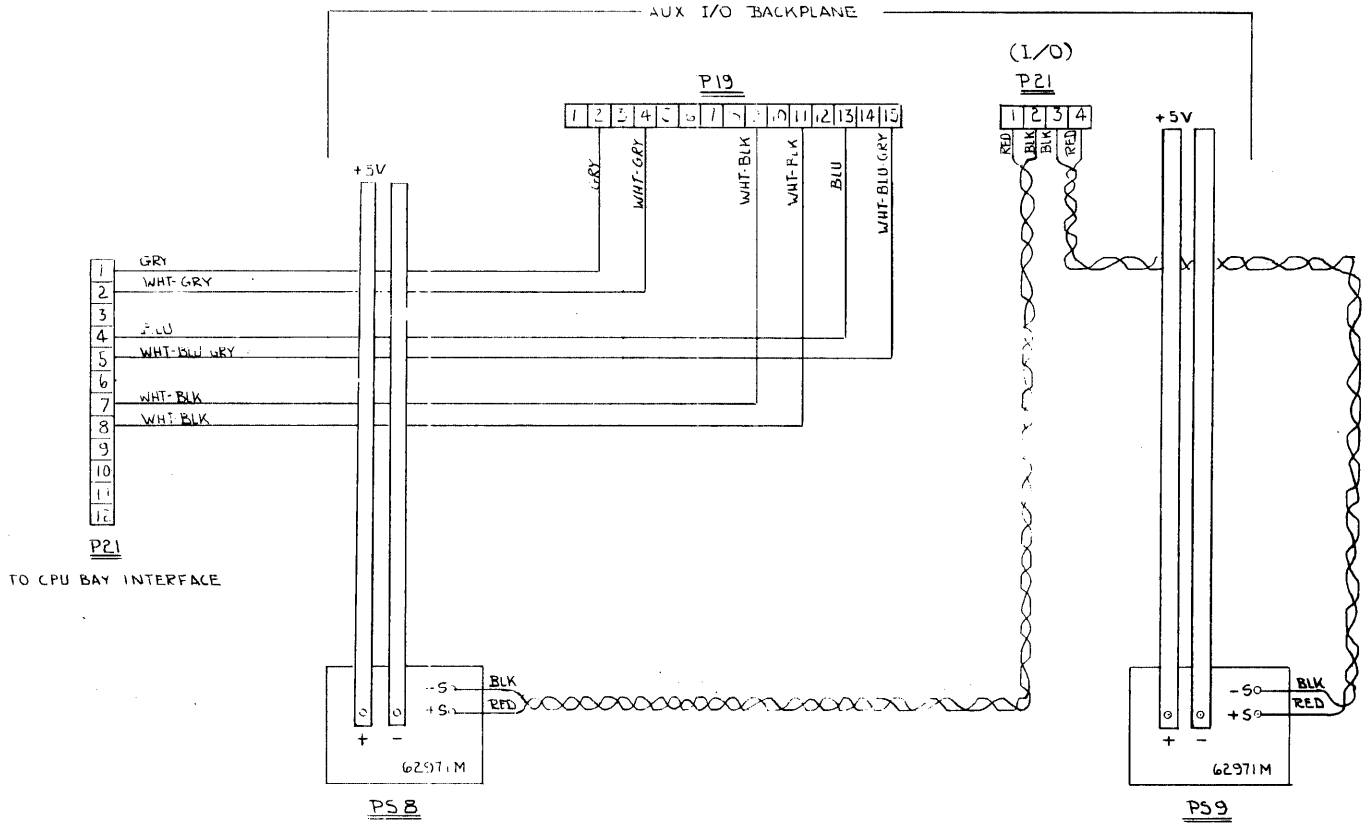



PRELIMINARY DWG.

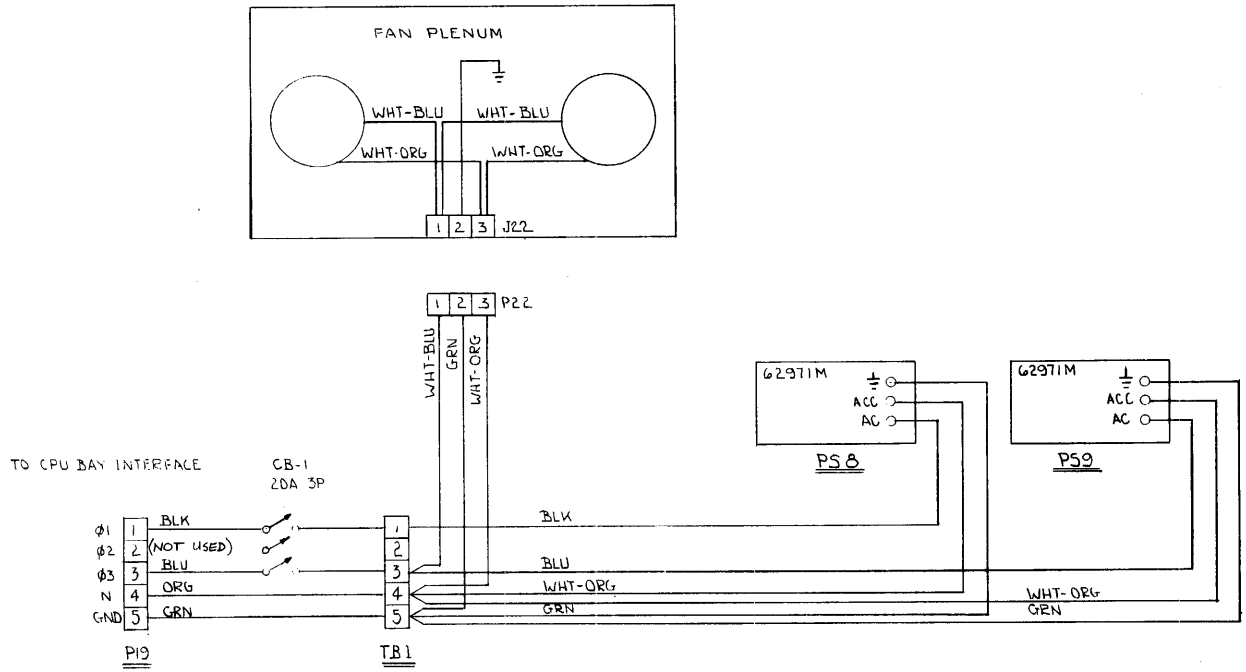
MAY 16 1983
DATE ISSUED

NOT TO BE USED FOR PRODUCTION

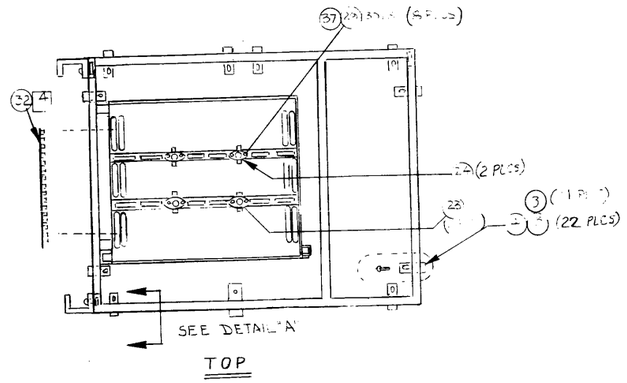
TITLE: AUX. I/O - CONTROL WIRING DIAG.
NEXT ASSEMBLY: 30164A
PART NUMBER: B-30164-90005-1

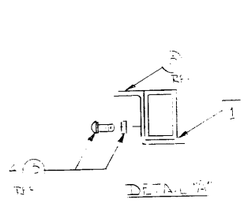


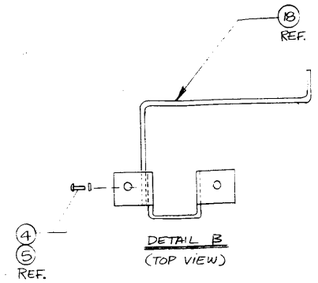

TITLE: AUX. I/O- DC VOLTAGE DISTR.
NEXT ASSEMBLY: 30164A
PART NUMBER: C-30164-90005-2

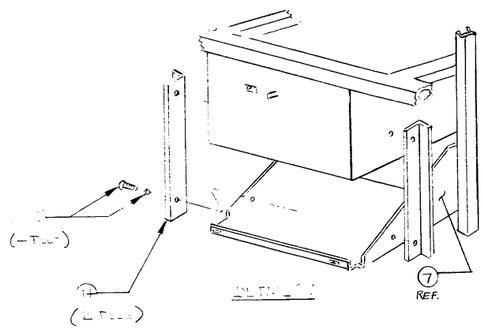


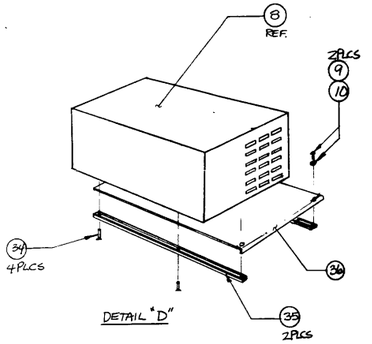

TITLE: AUX. I/O - AC WIRING DIAGRAM
NEXT ASSEMBLY: 30164A
PART NUMBER: C-30164-90005-3

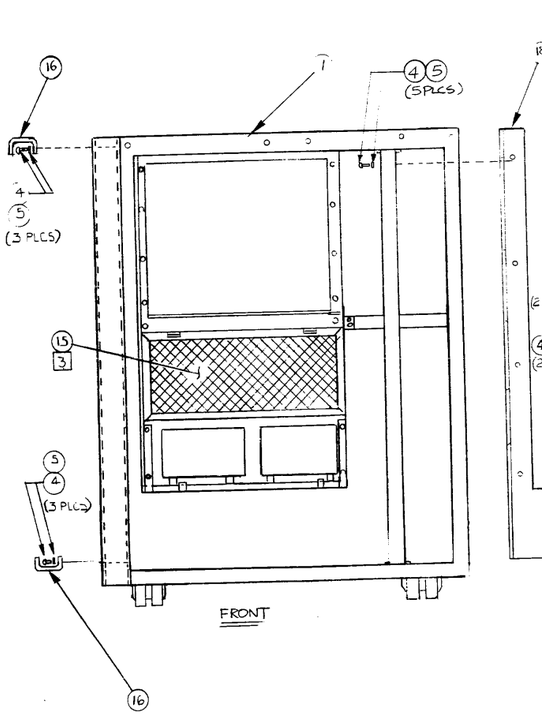


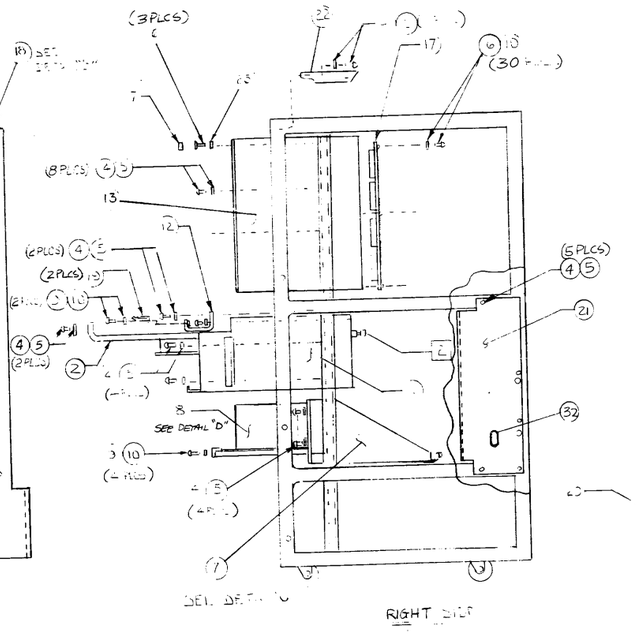



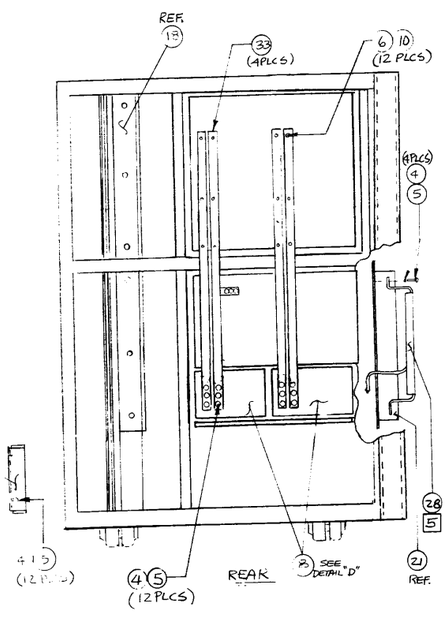



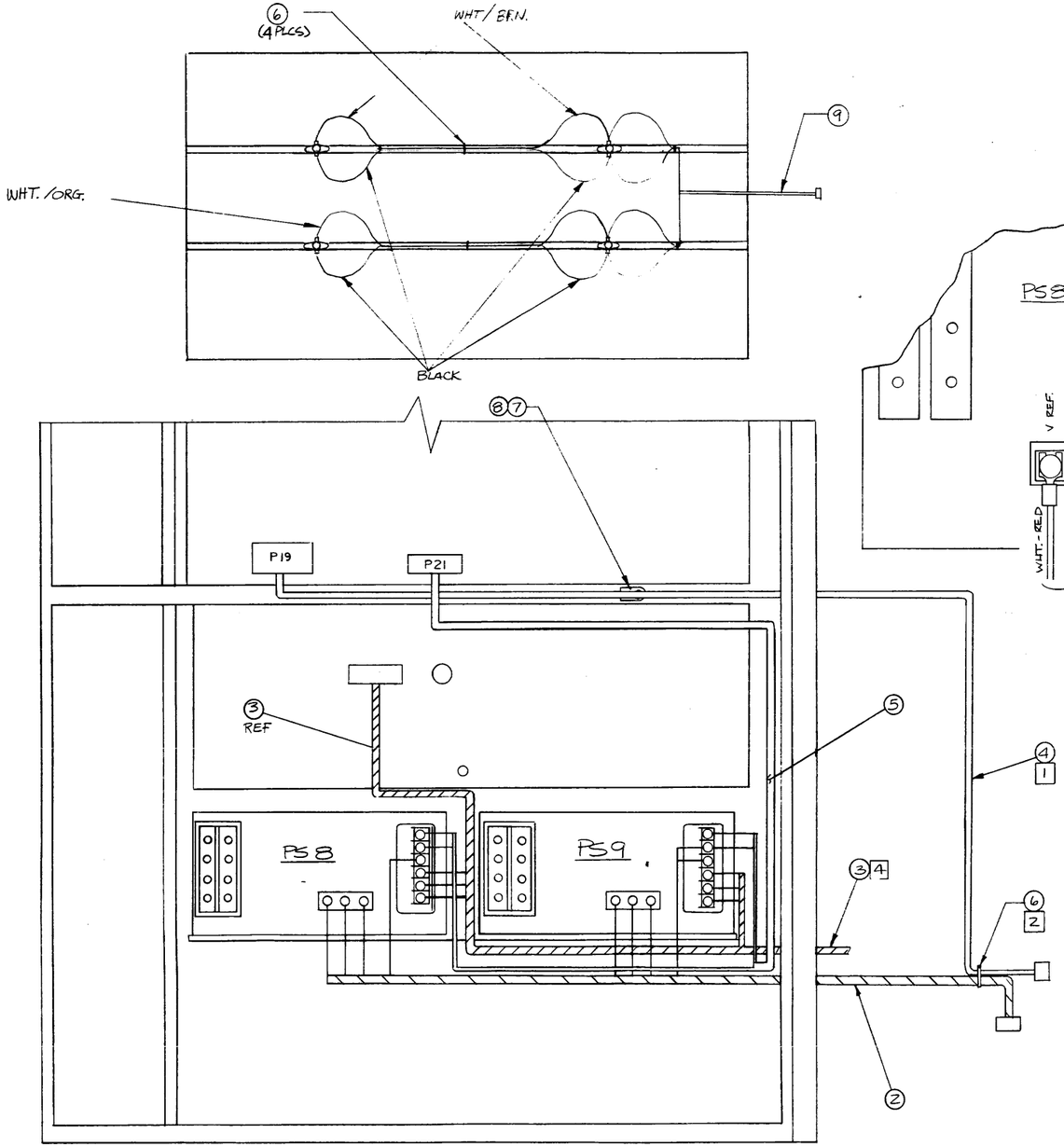



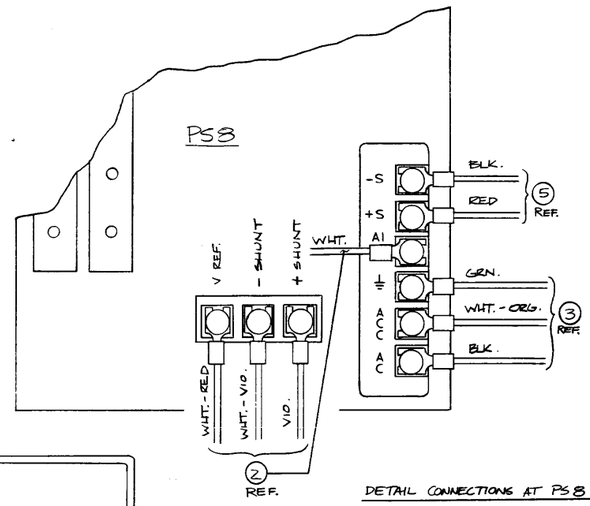



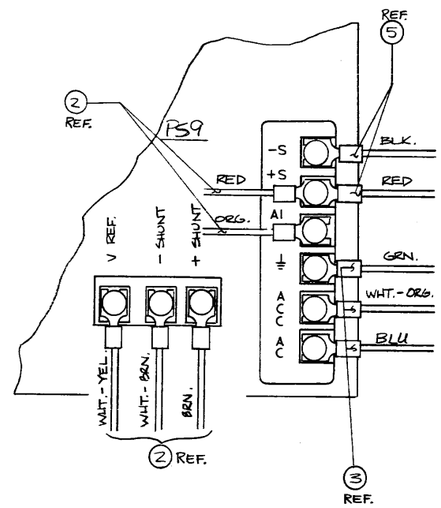

| ITEM | QTY. | MATERIAL DESCRIPTION | MAT'L PART NO. |
|---|---|---|---|
| 37 | 8 | NUT- #4 W/L | 2260-0009 |
| 36 | 2 | HANDLE- POWER SUPPLY | 30140-00093 |
| 35 | 4 | GUIDE - POWER SUPPLY | 30135-40001 |
| 34 | 8 | SCR- #10-32 X.5 FH, POZI | 2680-0106 |
| 33 | 4 | SUS BAC. I/O BP | 30140-00077 |
| 32 | A/R | GROMET-CHANNEL | 0400-0082 |
| 31 | 8 | WASHER-FLAT #4 | 3050-0279 |
| 30 | 8 | WASHER LOCK #4 HELICAL | 2190-0108 |
| 29 | 8 | SCR 4-40 X.312 P.H., POZI | 2200-0141 |
| 28 | 1 | ASSY-HIGH VOLTAGE | 30164-60004 |
| 27 | 1 | LABEL-IDENT I/O | 7121-7340 |
| 26 | 3 | SCR 4-40 X-312 FH | 2200-0166 |
| 25 | 1 | PLATE MTG LABEL I/O | 30140-00181 |
| 24 | 2 | SWITCH-THERM.122 F CL | 3103-0103 |
| 23 | 2 | SWITCH-THERM.104 F CL | 3103-0104 |
| 22 | 1 | PAN-DRIP I/O BAY | 4040-1874 |
| 21 | 1 | PLATE-HIGH VOLTAGE | 30164-00009 |
| 20 | 1 | JUNCTION PANEL-I/O BANK | 30140-00023 |
| 19 | 2 | CLIP SPRING | 1600-1037 |
| 18 | 1 | SUPPORT-JUCTION PANEL | 30164-00007 |
| 17 | 1 | PCA-DUAL I/O BACKPLANE | 30140-60081 |
| 16 | 2 | CHANNEL-RFI TOP/BOT | 30140-00005 |
| 15 | 1 | AIR FILTER-I/O PLENUM | 3150-0390 |
| 14 | 2 | SUPPORT-P.S. TRAY | 30140-00021 |
| 13 | 1 | CARD CAGE-24 SLOT | 7101-0583 |
| 12 | 1 | DUCT CABLE - I/O | 30140-00019 |
| 11 | 1 | ASSY-PLENUM I/O | 30140-60130 |
| 10 | 56 | WASHER-#6 FLAT | 3050-0228 |
| 9 | 14 | SCR. 6-32 X.375 W/L | 2360-0359 |
| 8 | 2 | ASSY-POWER SUP UNITS | 62971M |
| 7 | 1 | ASSY-POWER SUP SHELF | 30140-60069 |
| 6 | 42 | SCR. 6-32 X.44 PH W/L | 2360-0300 |
| 5 | 88 | WASHER-#10 FLAT | 3050-0216 |
| 4 | 88 | SCR 8-32 X.50 FH W/L | 2680-0274 |
| 3 | 11 | BRACKET-MTG. TOP | 30140-00001 |
| 2 | 1 | ASSY-FAN TRAY, I/O | 30140-60106 |
| 1 | 1 | ASSY-I/O FRAME | 30164-60011 |

TITLE: AUX. I/O - NJD P.S.
NEXT ASSEMBLY: 30164A
PART NUMBER: D-30164-90001-1



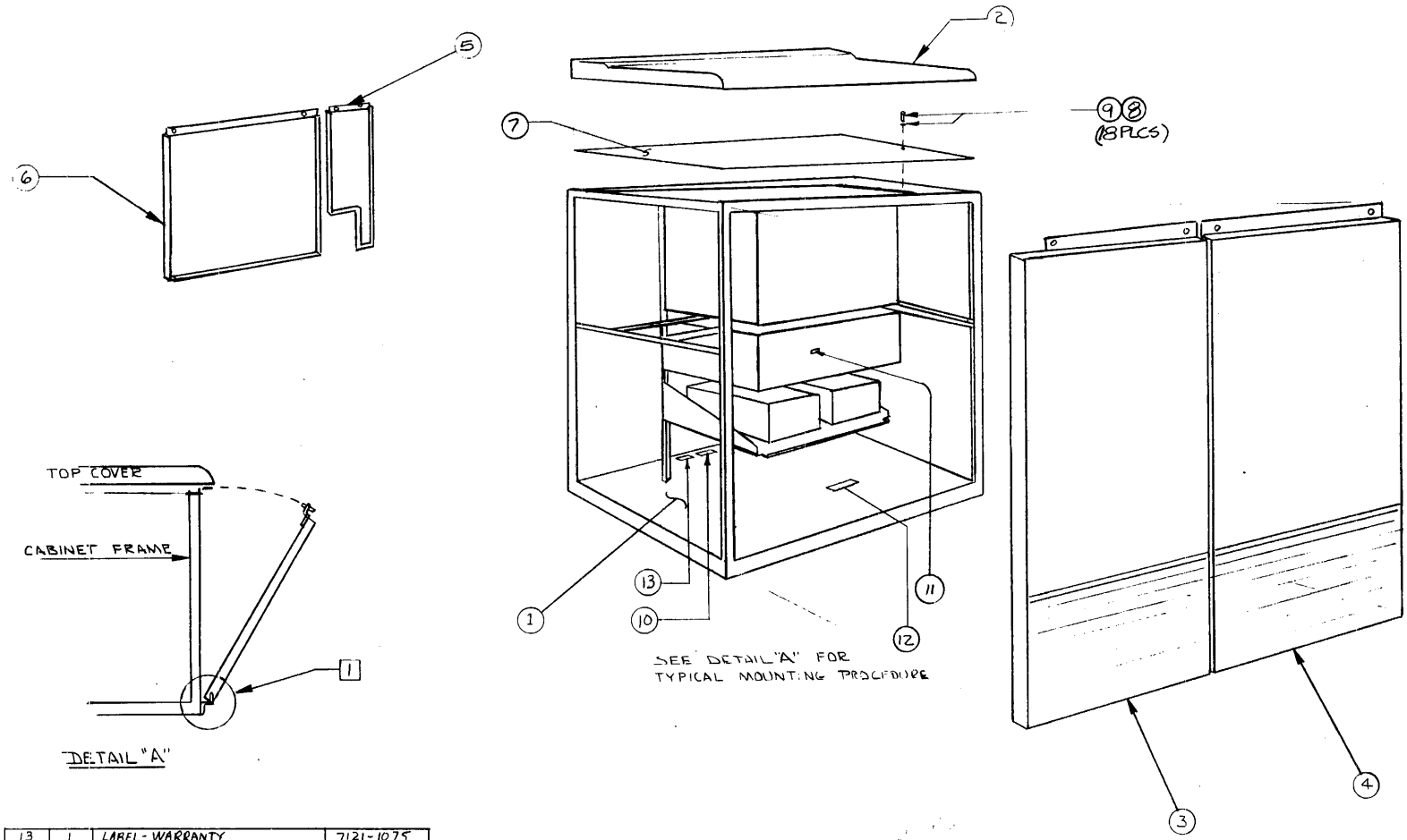




DETAIL CONNECTIONS AT PS8 AND PS9




| ITEM | QTY. | MATERIAL-DESCRIPTION | MAT'L-PART NO. |
|---|---|---|---|
| 9 | 1 | CA - I/O HEAT SENSE | 30140-60056 |
| 8 | 1 | SCR. #10-32 x 5 PH | 2680-0274 |
| 7 | 1 | CABLE TIE MTG | 1400-0786 |
| 6 | 17 | CABLE TIE | 1400-0249 |
| 5 | 1 | CA - CONTROL, I/O BP / PS. | 30164-60003 |
| 4 | 1 | CA - AUX I/O, BACK PLANE | 30164-60002 |
| 3 | - | ASS'Y - HIGH VOLTAGE | REF. |
| 2 | 1 | CA - CONTROL, P.S. | 30164-60001 |
| 1 | - | ASS'Y - FRAME | REF. |

TITLE: AUX. I/O - CABLES
NEXT ASSEMBLY: 30164A
PART NUMBER: D-30164-90001-2




| ITEM | QTY. | MATERIAL DESCRIPTION | MAT'L PART NO. |
|---|---|---|---|
| 13 | 1 | LABEL - WARRANTY | 7121-1075 |
| 12 | 1 | LABEL - P58, P59 | 30164-80200 |
| 11 | 1 | LABEL - J17 | 7121-2573 |
| 10 | 1 | LABEL - SERIAL TAG | 7120-5524 |
| 9 | 18 | WASHER - FLAT, #10 | 3050-0226 |
| 8 | 18 | SCR #10-32 x.50 PH W/L | 2690-0274 |
| 7 | 1 | SCREEN - ESD | 1600-1291 |
| 6 | 1 | PANEL - AUX I/O, REAR | 30164-00006 |
| 5 | 1 | PANEL - CABLE EXT. AUX I/O | 30164-00004 |
| 4 | 1 | PANEL - EXT., CENTER | 30140-00042 |
| 3 | 1 | PANEL - FAR LEFT, FRONT | 30164-00003 |
| 2 | 1 | COVER - TOP, I/O BAY | 4040-1792 |
| 1 | - | ASS'Y - FRAME | REF. |

TITLE: AUX. I/O - COVERS AND LABELS
NEXT ASSEMBLY: 30164A
PART NUMBER: D-30164-90001-3

# III. SERIES 68B AUXILIARY I/O BAY

## A. Description

The Series 68B Auxiliary I/O Bay and I/O Adapter utilizes the same I/O card cage, I/O Backplane, and I/O Adapter module as used in the Series 64A/B and the Series 68A Auxiliary I/O Bay. The only difference between the Series 64A/68A and the Series 64B/68B is the type of power system used. The Series 68B utilizes two ITT 5 Volt power modules which are identical to modules currently used in the Series 64B/68B. See Figure 2 for a block diagram of the three-IMB Series 68. With the exception of some new cabling, there are essentially no new hardware products used in the Series 68B Auxiliary I/O Bay and I/O Adapter that are not already used in the Series 64B/68B systems.

## B. Electrical Specifications

There are no new system-external power connections introduced with the addition of the Auxiliary I/O Bay on the Series 68B. The bay draws its AC and DC power from the AC distribution unit in the First I/O Bay of the Series 68B. The ratings for maximum AC input current draw and surge current are given below; note that these specifications are identical to the corresponding specs originally given with the release of the Series 64B. Thus, there is no effect on the customer in regards to providing another power panel, another power outlet, or a larger line conditioner.

| | |
|---|---|
| Maximum Input AC Current Draw | |
| 208 Volts @ 60 Hz: | 24 Amps per phase |
| 380 Volts @ 50 Hz: | 13 Amps per phase |
| 415 Volts @ 50 Hz: | 12 Amps per phase |
| | |
| Inrush Current | |
| 208 Volt Line | 500 Amps peak, 1 cycle duration |
| 380 Volt Line | 325 Amps peak, 1 cycle duration |
| 415 Volt Line | 300 Amps peak, 1 cycle duration |

## C. Power System

Power Distribution in the three-bay Series 68B revolves around a 300 Volt DC Bus, which powers all of the DC power modules, and a 230 Volt AC bus, which powers the cabinet fans and the fans which are internal to the power modules themselves. As shown in Figure 6, the AC Unit in the First I/O Bay derives the 300 Volts DC and the 230 Volts AC from the input three-phase power. These voltages are routed to the Auxiliary I/O Bay to power the DC power modules, the fans internal to the modules, and the cabinet fans in the Auxiliary I/O Bay. The two DC power modules are referenced as modules 1 and E2, and are the same 5 Volt ITT modules as modules D1 and D2 as used in the 64B/68B. See Figure 7 for the physical location of modules E1 and E2. Like the ITT modules used in the 64B/68B, modules E1 and E2 require no field adjustment.

**FIGURE 6.**
**THREE BAY SERIES 68B**
**POWER DISTRIBUTION**

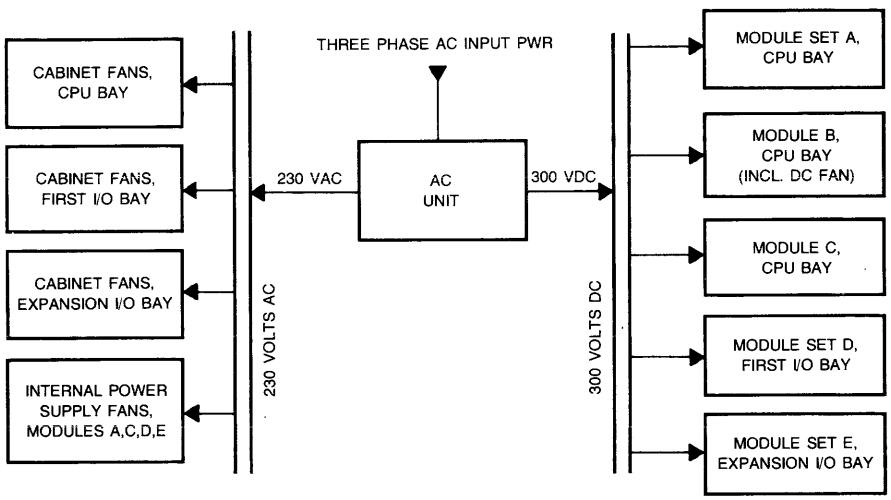
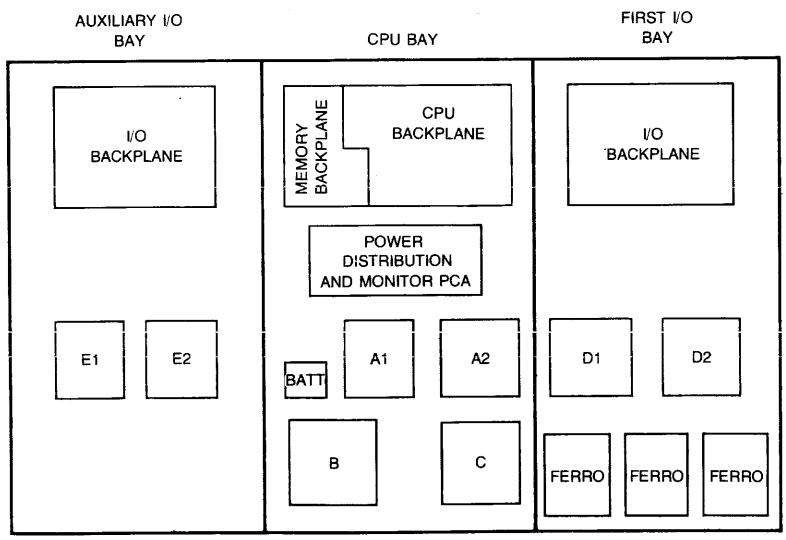



**FIGURE 7.**
**THREE-BAY SERIES 68B**
**FRONT VIEW**



### Power Module Monitoring

All power modules, including modules E1 and E2 in the Auxiliary I/O Bay, have DC Overvoltage, DC Undervoltage, and Overtemp alarms which are generated internally in the module. The status of these alarms is continuously monitored by the Power Distribution and Monitor (PDM) PCA, which reports this information to the DCU.

### Detection of the Auxiliary I/O Bay

Unlike the PSC in the Series 68A, the PDM in the Series 68B cannot automatically detect the presence of the Auxiliary I/O Bay. Instead, a manual switch S2 is provided on the PDM which is put in the CLOSED position if the Auxiliary I/O Bay is present. If the Auxiliary I/O Bay is not installed, S2 should be left open. This switch S2 is one of four switches in a DIP package on the PDM, and is labeled "NO AUX I/O". With this switch closed, the PDM enables the E LED on the SSDP to be illuminated if a module alarm in Module Set E is activated.

## D. Interbay Cabling

There are a total of seven cables that carry logic signals and power between the CPU Bay and the Auxiliary I/O Bay. Five of these cables are wrapped at the side of the Auxiliary I/O Bay prior to shipping, and are connected by the CE at installation before the Auxiliary I/O Bay is bolted to the CPU Bay. These include:

1. *Temperature Sense Cable* This cable terminates in a three-pin mate'n'lock connector, and runs along the top of the card cages in all three bays. Its purpose is to carry logic signals which provide information regarding overtemperature conditions in the Auxiliary I/O Bay.

2. *High Voltage Cable* This cable terminates in a five-pin mate'n'lock connector, and connects from the Auxiliary I/O Bay to connector J1 on the side of the CPU Bay. This cable carries 300 Volts DC to the J1 connectors on power modules E1 and E2, carries 230 Volts AC to the J17 connector on the fan plenum for cabinet fan power, and 230 Volts AC to power modules E1 and E2 for their internal fan power.

3. *Plus/Minus 12 Volt, +5B Cable* This cable terminates in a nine-pin mate'n'lock connector, and connects from J19 on the I/O Backplane in the Auxiliary I/O Bay to connector J18 on the PDM PCA in the CPU Bay. This cable carries +/- 12 Volts from the PDM to the I/O Backplane for terminal I/O power; +5B Battery Backup power from the PDM to the I/O Backplane for INPs, and the monitor voltage of module set E from the I/O Backplane which is carried to a test point on the PDM.

4. ***Module Set E Utility Connector*** This cable terminates in a 20-pin mate'n'lock connector, and connects from J3 on both Modules E1 and E2, to J21 on the I/O Backplane in the Auxiliary I/O Bay and to connector J6 on the PDM in the CPU Bay. This cable carries Module Alarm signals to the PDM for monitoring purposes, carries Converter Shutdown signals from the PDM to module set E, and carries Output Current signals from the modules to test points on the PDM. This cable also carries +5 volt sense lines from the I/O Backplane to the power modules themselves.

5. ***Zero Volt Cable*** This cable runs from the "RTN" Bus Bar in the Auxiliary I/O Bay to the terminal labeled "A" on the Zero Volt Bus Bar in the CPU Bay. This represents the logic common for the system.

After these cables are connected and the Auxiliary I/O bay is bolted to the CPU Bay, there are two remaining inter-bay cable connections that are to be made. These cables are the long flat-ribbon cables which connect the IOB and IMBI PCAs, and provide the communications link for the third IMB in the Auxiliary I/O Bay to interface to the Central System Bus. Note that the two IMBI-IOB cables are identical to each other, and are also identical to the IOB-IMBI cables used for IMBs Zero and One. See Section IV for details on the I/O Adapter Module.

## E. Installation

Installation of the Series 68B Auxiliary I/O Bay and I/O Adapter Module is straight-forward. The left side panel of the CPU Bay is first removed. The Auxiliary I/O Bay is then positioned beside of the CPU Bay, and the five inter-bay cable connections are made. The bays are bolted together and the left side panel which was removed from the CPU Bay is installed on the left side of the Auxiliary I/O Bay. Switch S2 on the PDM PCA is switched to the ON position, the I/O Adapter PCAs are installed, the IMBI-IOB cables are connected, and the IOB-CBI cable is connected to complete the installation.

For further information on Auxiliary I/O Bay installation, see the Series 68B Auxiliary I/O Bay Installation Manual, part number 30164-90008. This manual will be available by first customer shipments of the Auxiliary I/O Bay.

## F. Parts

The 30164B Assembly Drawings give the part numbers for all assemblies in the Series 68B Auxiliary I/O Bay. Although these drawings are stamped PRELIMINARY, these part numbers are correct.

The Series 68B Auxiliary I/O Bay includes only one exchange assembly, this being the five volt power module. Its exchange part number is given below.

*Exchange Assembly, system common with Series 64B/68B.*

| Part Number | Exchange Part Number | Description |
|---|---|---|
| 0950-1654 | 0957-0006 | +5 Volt Power Supply |

*The I/O Adapter Module includes three PCAs which are on the exchange program.*

| Part Number | Exchange Part Number | PCA Name |
|---|---|---|
| 30140-60011 | 30140-69011 | CBI PCA |
| 30140-60015 | 30140-69015 | IOB PCA |
| 30140-60016 | 30140-69016 | IMBI PCA |

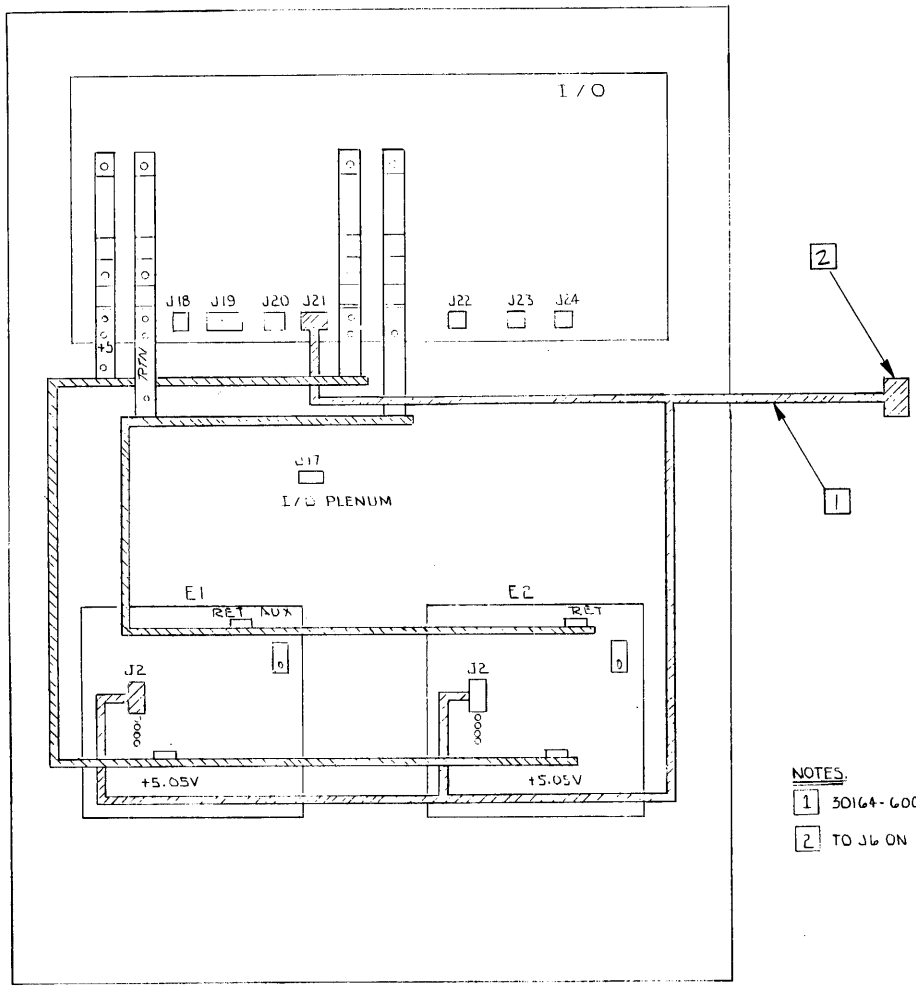
Note that all of these assemblies are already used on the Series 64B/68B.

## G. Wiring Diagrams, 30164B

The Wiring Diagrams for the 30164B (Series 68B Auxiliary I/O Bay) are included on the following pages. Note that the part number of the Wiring Diagrams themselves is 30164-90006-1,2, and 3.

## H. Assembly Drawings, 30164B

The Assembly Drawings for the 30164B (Series 68B Auxiliary I/O Bay) are included on the following pages. Note that the part number of the Assembly Drawings themselves is 30164-90002-1,2,3, and 4.

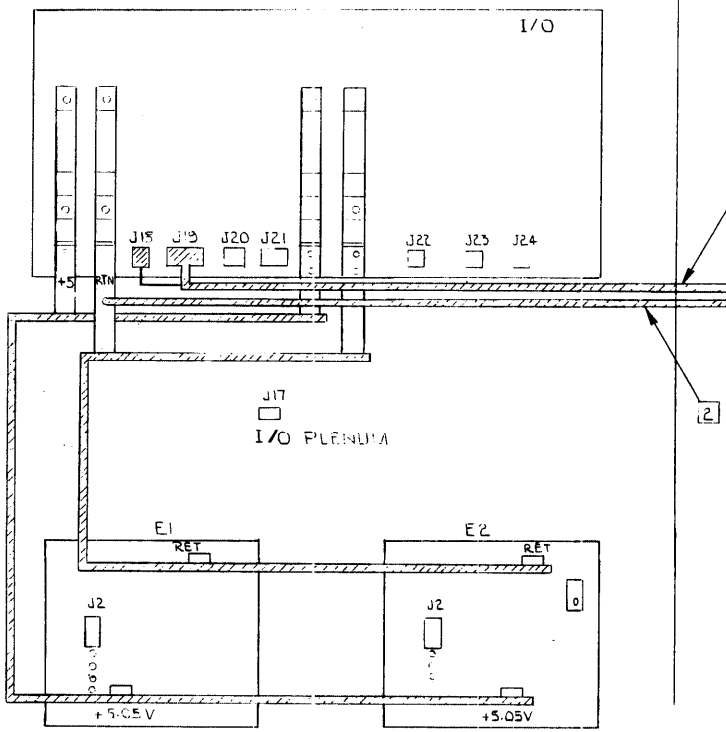



| MODULE SET E INTERFACE | | | | | |
|---|---|---|---|---|---|
| E1 | | E2 | PDM | I/O | SIGNAL |
| P2-11 | | P2-1 | | | 5V SENSE RTN |
| P2-1 | | | | P21-2 | 5V SENSE RTN |
| P2-18 | | P2-8 | | | 5V SENSE |
| P2-8 | | | | P21-1 | 5V SENSE |
| P2-6 | | P2-16 | | | 5V LO MARGIN |
| P2-16 | | | P6-14 | | 5V LO MARGIN |
| P2-7 | | P2-17 | | | 5V HI MARGIN |
| P2-17 | | | P6-13 | | 5V HI MARGIN |
| P2-20 | | P2-10 | | | CURR SHARE |
| P2-12 | | | P6-2 | | E1 MOD ALARM |
| P2-2 | | | P6-3 | | E1 MOD ALARM COM |
| P2-13 | | | P6-1 | | E1 MOD SHUTDOWN |
| P2-3 | | | P6-19 | | E1 MOD SHUTDOWN COM. |
| P2-14 | | | P6-11 | | E1 OUTPUT CURR. |
| P2-15-19 | | | | | E1 INTERLOCK |
| | | P2-15-19 | | | E2 INTERLOCK |
| | | P2-12 | P6-5 | | E2 MOD ALARM |
| | | P2-2 | P6-15 | | E2 MOD ALARM COM. |
| | | P2-13 | P6-4 | | E2 MOD SHUTDOWN |
| | | P2-3 | P6-16 | | E2 MOD SHUTDOWN COM |
| | | P2-14 | P6-10 | | E2 OUTPUT CURR. |

NOTES:

1. 30164-60009
2. TO J6 ON 30140-60091

TITLE: AUX. I/O - CONTROL & MONITOR SIGNAL DISTRIBUTION
NEXT ASSEMBLY: 30164B
PART NUMBER: C-30164-90006-1

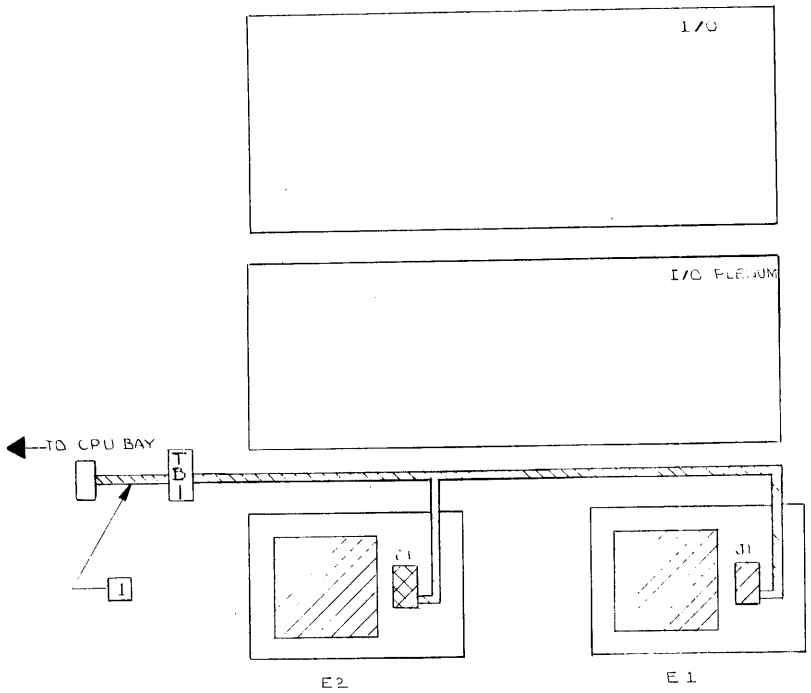



| INTERFACE CONNECTION | | | |
|---|---|---|---|
| PDM | I/O BP | ØVOLT BUS | SIGNAL |
| | RTN BUS | BOLT'A' | |
| P18-1 | P19-2 | | +5B |
| P18-2 | P19-3 | | +5B |
| P18-3 | P19-6 | | +5B |
| P18-4 | P19-10 | | +12V |
| P18-7 | P19-13 | | +12V |
| P18-6 | P19-14 | | -12V |
| P18-9 | P19-15 | | -12V |
| P18-8 | P18-1 | | +5V |

NOTES:

1. 30164-60007
2. 30164-60005
3. TO "A" ON 30140-60001
4. TO "A" ON ZERO VOLT BUS BAR 1550-0388.

TITLE: AUX. I/O - DC DISTRIBUTION
NEXT ASSEMBLY: 30164B
PART NUMBER: C-30164-90006-2

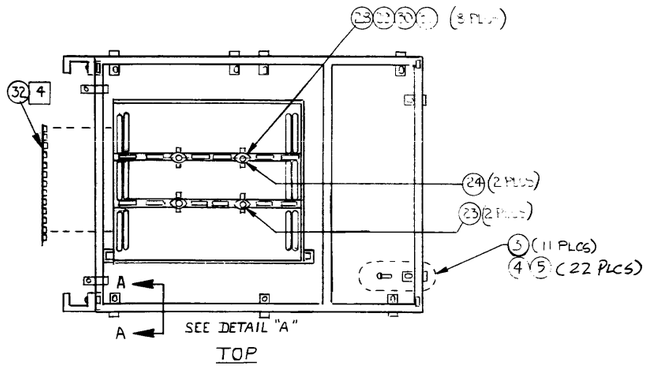


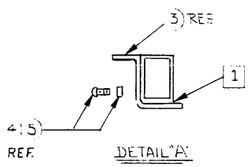

| TB1 1/2 | E1/J1 | E2/J1 | I/O PLENUM | SIGNAL |
|---|---|---|---|---|
| TB-1,2 | P1-1 | P1-1 | | +300 VDC |
| TB4,5 | P1-2 | P1-2 | | 300 VDC RETURN |
| TB10,11 | P1-4 | P1-4 | J17-3 | 230 VAC |
| TB-7,8 | P1-5 | P1-5 | J17-1 | 230 VAC RETURN |
| | | | J17-2 | CHASSIS GND |

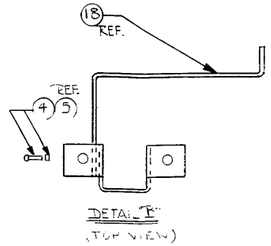
NOTES:

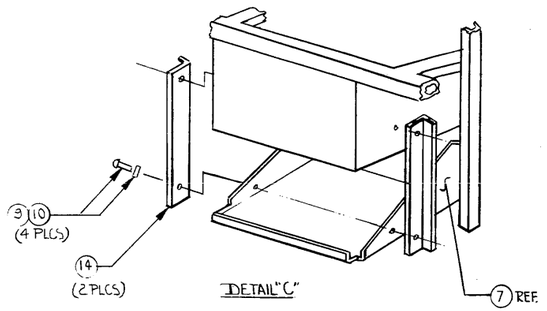
[1] HIGH VOLTAGE CABLE - 30164-60010.

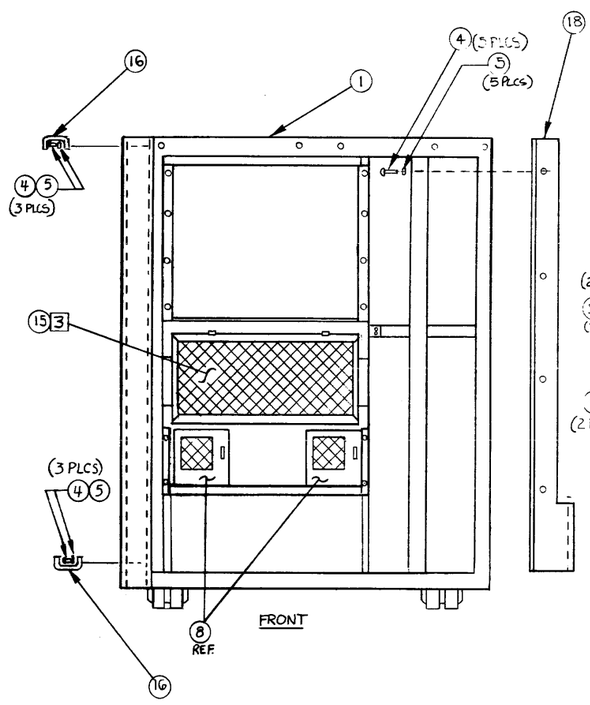
TITLE: AUX. I/O - AC DISTRIBUTION
NEXT ASSEMBLY: 30164B
PART NUMBER: C-30164-90006-3

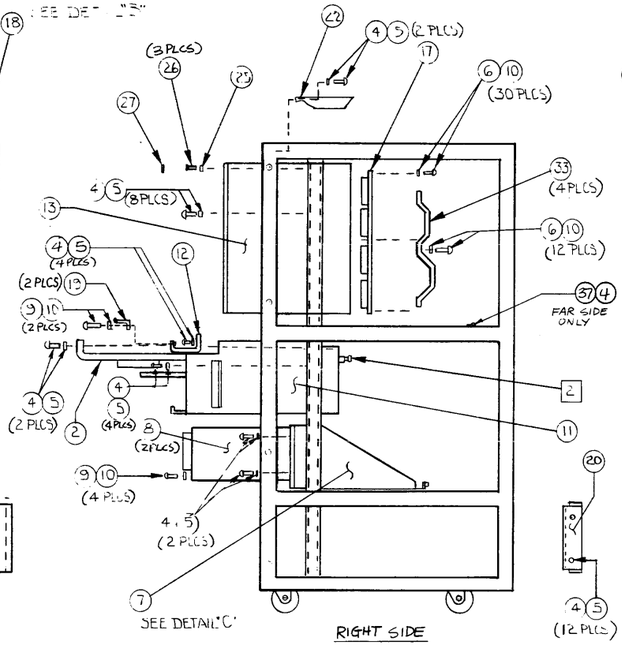


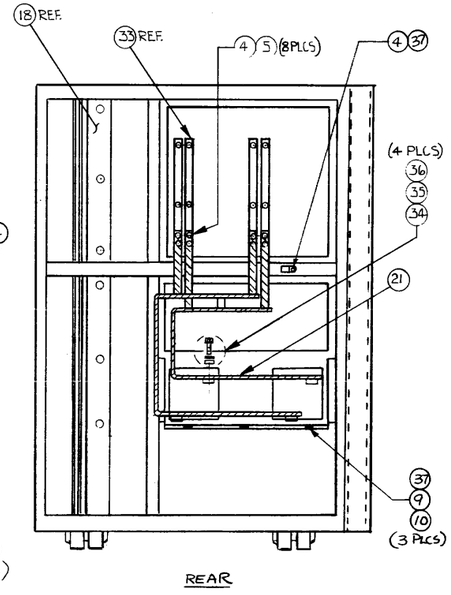



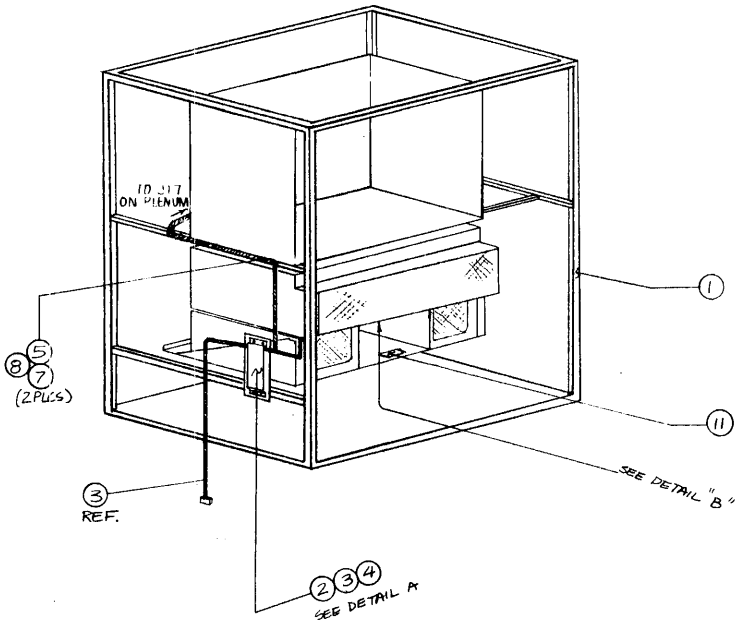



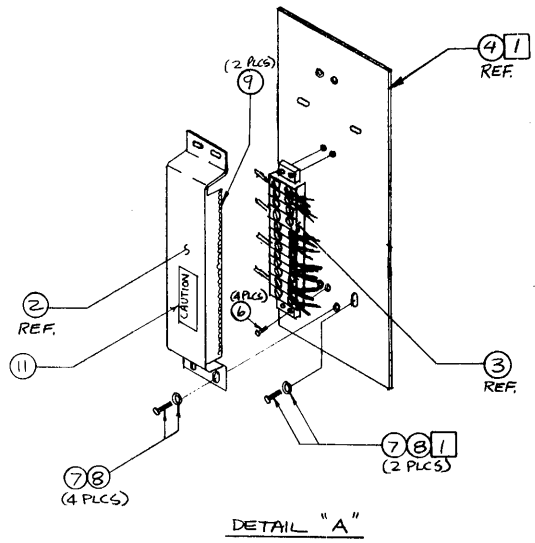



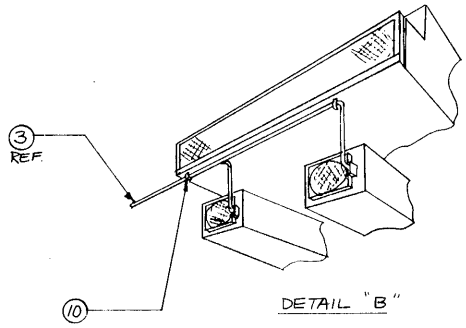

| ITEM | QTY. | MATERIAL-DESCRIPTION | MAT'L-PART NO. |
|---|---|---|---|
| 37 | 5 | MOUNT - CABLE TIE | 1400-0786 |
| 36 | 4 | WASHER — FLAT, 1/4 IN. | 3050-0225 |
| 35 | 4 | WASHER—LOCK 1/4 IN. | 2190-0032 |
| 34 | 4 | BOLT-1/4-20 X.5L, HEX | 2940-0103 |
| 33 | 4 | BUS BAR—I/O B.P. | 1530-0394 |
| 32 | A/R | GROMET - CHANNEL | 0400-0082 |
| 31 | 8 | WASHER-FLAT #4 | 3050-0224 |
| 30 | 8 | WASHER-LOCK #4 HELICAL | 2190-0108 |
| 29 | 8 | SCR 4-40X.312 L PH, POZ 1 | 2200-0141 |
| 28 | 8 | NUT #4-40 W/L | 2260-0009 |
| 27 | 1 | LABEL - ID, I/O CARD CAGE | 7127-1940 |
| 26 | 3 | SCR 4-40 X.312, FH | 2200-0166 |
| 25 | 1 | PLATE-MTG. LABEL I/O | 30140-00081 |
| 24 | 2 | SWITCH - THERM. 122°F | 3103-0103 |
| 23 | 2 | SWITCH - THERM. 104°F | 3103-0104 |
| 22 | 1 | PAN-DRIP, I/O BAY | 4040-1874 |
| 21 | 1 | BUS BAR—I/O BAY | 1530-0393 |
| 20 | 1 | JUNCTION PANEL BLANK | 30140-00023 |
| 19 | 2 | CLIP—SPRING | 1600-1027 |
| 18 | 1 | SUPPORT—JUNCTION PANEL | 30164-00007 |
| 17 | 1 | PCA DUAL—I/O BACKPLANE | 30140-60021 |
| 16 | 2 | CHANNEL—R.F.I TOP/BOT. | 30140-00005 |
| 15 | 1 | AIR FILTER—I/O PLENUM | 3150-0390 |
| 14 | 2 | SUPPORT—P.S. TRAY | 30140-00021 |
| 13 | 1 | CARD CAGE-24 SLOT | 7101-0583 |
| 12 | 1 | DUCT CABLE — I/O | 30140-00116 |
| 11 | 1 | ASS'Y—PLENUM, I/O CC | 30140-60102 |
| 10 | 55 | WASHER-#6, FLAT | 3050-0228 |
| 9 | 13 | SCR #6-32 X.375 W/L | 2360-0359 |
| 8 | 2 | ASS'Y- POWER SUPPLY | 0950-1654 |
| 7 | 1 | ASS'Y - POWER SUPPLY SHELF | 30140-60098 |
| 6 | 42 | SCR #6-32 X.44 PH, W/L | 2360-0300 |
| 5 | 75 | WASHER #10, FLAT | 3050-0226 |
| 4 | 77 | SCR #10-32 X.50 PH W/L | 2680-0274 |
| 3 | 11 | BRACKET— MTG. TOP | 30140-00001 |
| 2 | 1 | ASS'Y-FAN TRAY I/O | 30140-60106 |
| 1 | 1 | ASS'Y,— FRAME, I/O | 30164-60011 |

TITLE: AUX. I/O BAY - ITT P.S.
NEXT ASSEMBLY: 30164B
PART NUMBER: D-30164-90002-1



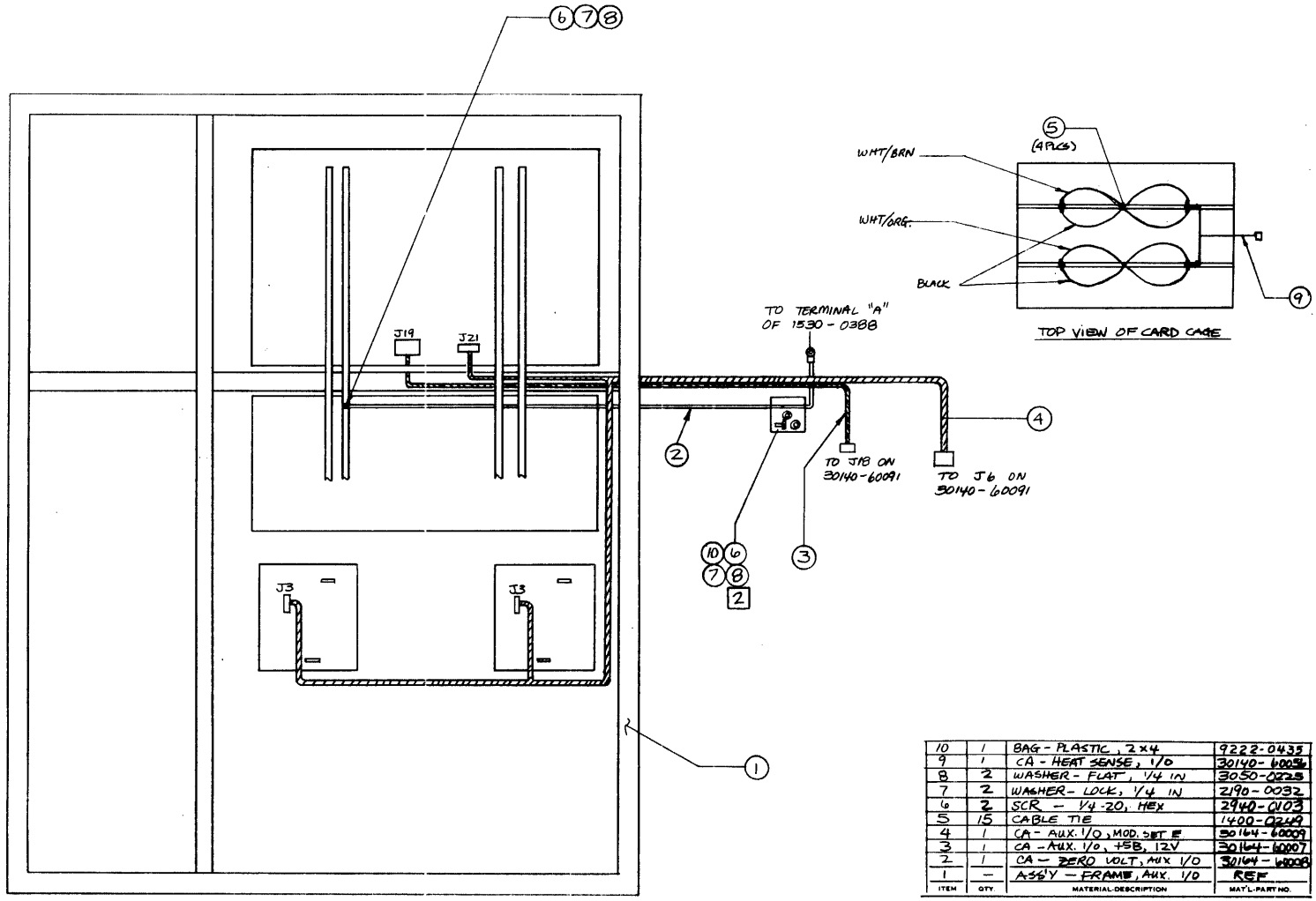

DETAIL "A"




DETAIL "B"

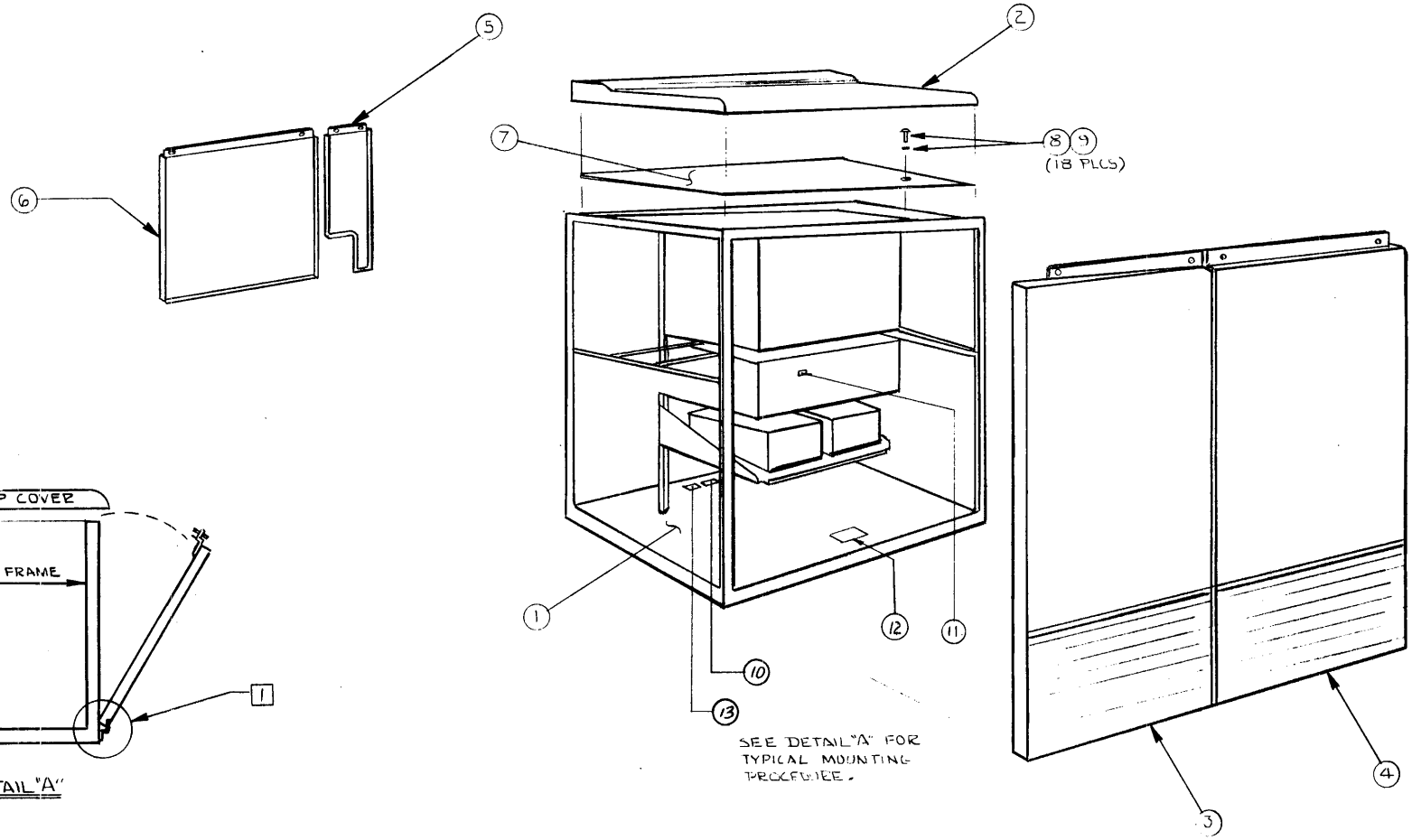
| ITEM | QTY. | MATERIAL DESCRIPTION | MAT'L-PART NO. |
|---|---|---|---|
| 11 | 2 | LABEL - CAPACITOR DISCHARGE | 30140-80201 |
| 10 | 5 | CABLE TIE | 1400-0249 |
| 9 | A/R | GROMMET CHANNEL | 0480-0082 |
| 8 | 8 | WASHER - FLAT, #8 | 3050-0139 |
| 7 | 8 | SCREW - #8-32 x .375 PH WL | 2510-0301 |
| 6 | 4 | SCREW - #6-32 x .5 PH | 2360-0121 |
| 5 | 2 | MOUNT - CABLE TIE | 1400-0786 |
| 4 | 1 | PLATE - TERMINAL BLOCK | 30140-00111 |
| 3 | 1 | CA - AUX I/O, HIGH VOLTAGE | 30164-60010 |
| 2 | 1 | COVER - TERMINAL BLOCK | 30140-00112 |
| 1 | — | ASSY - AUX I/O | REF. |

TITLE: AUX. I/O - HIGH VOLTAGE CABLES
NEXT ASSEMBLY: 30164B
PART NUMBER: C-30164-90002-2




| ITEM | QTY | MATERIAL-DESCRIPTION | MAT'L-PART NO. |
|---|---|---|---|
| 10 | 1 | BAG - PLASTIC, 2 X 4 | 9222-0435 |
| 9 | 1 | CA - HEAT SENSE, I/O | 30140-60056 |
| 8 | 2 | WASHER - FLAT, 1/4 IN | 3050-0225 |
| 7 | 2 | WASHER - LOCK, 1/4 IN | 2190-0032 |
| 6 | 2 | SCR - 1/4-20, HEX | 2940-0103 |
| 5 | 15 | CABLE TIE | 1400-0249 |
| 4 | 1 | CA - AUX. I/O, MOD. SET E | 30164-60009 |
| 3 | 1 | CA - AUX. I/O, +5B, 12V | 30164-60007 |
| 2 | 1 | CA - ZERO VOLT, AUX I/O | 30164-60008 |
| 1 | - | ASS'Y - FRAME, AUX. I/O | REF |

TITLE: AUX. I/O - CABLES
NEXT ASSEMBLY: 30164B
PART NUMBER: C-30164-90002-3




| ITEM | QTY. | MATERIAL DESCRIPTION | MAT'L PART NO. |
|---|---|---|---|
| 13 | 1 | LABEL - WARRANTY | 7121-1075 |
| 12 | 1 | LABEL - P.S. IDENT, I/O | 30164-80201 |
| 11 | 1 | LABEL - J17 | 7121-2573 |
| 10 | 1 | LABEL - SERIAL TAG | 7120-5524 |
| 9 | 18 | WASHER FLAT, #10 | 3050-0226 |
| 8 | 18 | SCR #10-32 X .50 PH W/L | 2680-0274 |
| 7 | 1 | SCREEN - ESD | 1600-1291 |
| 6 | 1 | PANEL - AUX I/O REAR | 30164-00006 |
| 5 | 1 | PANEL - CABLE EXT AUX I/O | 30164-00004 |
| 4 | 1 | PANEL EXT. CENTER | 30140-00042 |
| 3 | 1 | PANEL - FAR LEFT FRONT | 30164-00002 |
| 2 | 1 | COVER - TOP, I/O BAY | 4040-1792 |
| 1 | - | ASS'Y - FRAME, AUX I/O | REF. |

TITLE: AUX. I/O - FINAL ASS'Y
NEXT ASSEMBLY: 30164B
PART NUMBER: D-30164-90002-4

# IV. THE I/O ADAPTER MODULE

The I/O Adapter Module, product number 30143A, consists of the PCAs necessary to provide a communications link between the Central System Bus of the SPU and the IMB in the Auxiliary I/O Bay. The PCAs and cabling provided are all identical to the corresponding I/O Adapter Module parts provided for IMBs Zero and One. For further details, see the IOA Add-On Manual, part number 30143-90001. The IOA assemblies include the following:

*Printed Circuit Assemblies*

| Acronym | Full Name of PCA | Installation to: |
|---|---|---|
| IOB PCA | Input/Output Buffer PCA | CPU Bay slot 25, labelled "IOB3" |
| CBI PCA | Common Bus Interface PCA | CPU Bay slot 24, labelled "CBI3" |
| IMBI PCA | Inter-Module Bus Interface PCA | Auxiliary I/O Bay slot 24, "IMBI" |

*Cable Assemblies*

| Cable | Description |
|---|---|
| IOB-IMBI cables (Part # 30140-60082) | Two long, identical 50-pin flat ribbon cables. One of these cables connects the middle port (J4) of the IOB to the middle port (J2) of the IMBI, the other connects the upper port (J3) of the IOB to the upper port (J1) of the IMBI. |
| IOB-CBI cable (Part # 30140-60028) | A short flat ribbon cable which connects the J5 connectors of the IOB and CBI PCAs. |

# V. DIAGNOSTIC SUPPORT

***FAULT LOCATING DIAGNOSTICS*** Test Section 5 of the FLDs, I/O and IOMAP, recognizes and identifies channels and devices configured on the third IMB.

***DCU SELFTEST*** Note that the I/O Adapter PCAs for IMB1 and IMB2 are not required for DCU Selftest to pass, but their presence is recognized by the DCU. Thus, when DCU Selftest is run and either the second IMB (IMB1) or the third IMB (IMB2) is present, the message "DCU Selftest Complete" is followed by the message "OPTION PCAs RESPONDING", and a list of these PCAs is given. For IMB1, assemblies listed are IOB2 and CBI2, and for the second IMB, assemblies listed are IOB3 and CBI3.

***DIAGNOSTIC UTILITY SYSTEM*** The software diagnostics on DUS are fully functional on the third IMB (IMB2). This includes DMAEXR, GICDIAG, CS80DIAG, IOMAP, etc.

# VI. DOCUMENTATION

The following are the service manuals which have been updated for the Series 68 and will be available by product release. Note that the System Installation Manual and the Diagnostic Set are included with customer shipments. The Site Prep Set manual is mailed before the system is shipped.

| Manual Title | |
|---|---|
| Series 68 System Support Log | 03000-90117 |
| Series 68A Expansion Bay Installation | 30164-90007 |
| Series 68B Expansion Bay Installation | 30164-90008 |
| Series 64/68 Installation Manual | 30140-90007 |
| Series 64/68 Diagnostic Set | 32342-60001 |
| Series 64/68 Site Prep Set | 30140-60085 |

Below are listed other service manuals which will be updated for the Series 68 at a later date:

| | |
|---|---|
| Series 64/68 Reference Training | 30140-90005 |
| Series 64/68 CE Handbook | 30140-90006 |
| Seires 64/68 Block Diagrams & Assembly Drawings | 30140-90004 |

# VII. CONFIGURATION NOTES

There are several notes regarding the configuration of PCAs on the IMB that apply to the Auxiliary I/O Bay just as they did to the First I/O Bay on the Series 64/68.

1. Channels may never be installed more than 10 slots away from each other on an IMB on the Series 64/68.

2. Two INPs should never be configured in consecutive slots 1 and 2 or 9 and 10. Damage will result if INPs are installed in both slots.

3. Slot assignment on the third IMB is as follows:

- Slot 24 is reserved for IMBI3.
- Slots 9-23 can be used for either channels or device interfaces.
- Slots 1-8 can be used only for device interfaces, i.e., AIB PCAs, etc.

Note that it is possible to use slot 8 for the IMBI PCA and then use slots 1-7 for channels and devices on the third IMB if necessary for troubleshooting purposes.

4. A maximum of five GICs are supported per IMB on the 64/68.

5. A maximum of two High-speed GICs are supported per IMB on the 64/68.

6. A maximum of six High-speed device controllers are supported per GIC.

7. Calculate the DRT according to the formula

   DRT # = (IMB# x 128) + (Channel# x 8) + Dev#