60458390

CONTROL DATA

CDC® CYBER 170 COMPUTER SYSTEMS MODELS 835, 845, AND 855

CDC® CYBER 180 COMPUTER SYSTEMS MODELS 835, 845, AND 855

HARDWARE OPERATOR'S GUIDE

REVISION RECORD

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C (01-15-83)	Manual revised to include power-on initialization procedure. Changes have been made to power control box figures and tables. Other miscellaneous changes and corrections were also made. This edition obsoletes all previous editions.
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or use Comment Sheet in the back of this manual.

LIST OF EFFECTIVE PAGES

New features, as well as changes, deletions, and additions to information in this manual, are indicated by bars in the margins or by a dot near the page number if the entire page is affected. A bar by the page number indicates pagination rather than content has changed.

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PREFACE

This manual provides operating instructions for the CONTROL DATA® CYBER 170/180 Models 835, 845, and 855 Computer Systems. The content of this manual concentrates on familiarizing the operator with the computer system controls, indicators, and panels used in system start-up, power-down, and recovery procedures as opposed to operating system procedures. For detailed information about the operation of Control Data's standard operating systems, refer to the applicable operator's guide.

This manual also contains basic maintenance procedures, including use of the utility programs provided with the Common Test and Initialization Module (CTI) and the tests and diagnostics on the maintenance software libraries (MSLs) 152 and 153.

Depending upon preservice maintenance agreements, job requirements of the computer system operator may vary from one installation to another. Therefore, this manual should be used in conjunction with established policies and procedures provided by the installation.

RELATED PUBLICATIONS

The following manuals contain additional information that may prove useful:

Control Data Publication	Publication Number
Concurrent Maintenance Library (CML) Customer's Guide	60455980
CYBER 170/180 Models 835, 845, and 855 Computer System (170 State) Hardware Reference Manual	60469290
CYBER Initialization Package (CIP) User's Handbook	60457180
MSL 15X Reference Manual	60456530
CYBER 170/180 Model 835 Computer System (Virtual State) Hardware Reference Manual Volume I	60469690
CYBER 170/180 Models 845 and 855 Computer System (Virtual State) Hardware Reference Manual Volume I	60461320
CYBER 170/180 Models 810, 815, 825, 830, 835, 845, 855, and 990 Computer System (Virtual State) Hardware Reference Manual Volume II	60458890
NOS/BE Operator's Guide	60493900
NOS 2 Operation's Handbook	60459310

Additional copies of this manual are available through Literature Distribution Services, 308 North Dale, St. Paul, Minnesota 55103.

RADIATION WARNING

The following warning applies to this subsystem.

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. The equipment has been tested for compliance with the limits for Class A computing devices pursuant to Subpart J of Part 15 of the 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.

DISCLAIMER

This product is intended for use only as described in this document. Control Data cannot be responsible for the proper functioning of undescribed features or parameters.

CONTENTS

FIGURES

TABLES

PROCEDURES

SAM LISTS

This section briefly introduces the components of the models 835, 845, and 855, the operating system, and maintenance software library (MSL).

COMPUTER SYSTEM

The models 835, 845, and 855 are medium-scale, high-speed computer systems for both business and scientific applications. All models include the following units:

- Central processor (CP)
- Central memory (CM)
- Input/output unit (IOU)
- Display station

The hardware configurations (figures 1-1 and 1-2) include a display station and a three-bay cabinet for the processor, memory, and IOU. Each bay contains a logic chassis with plug-in circuit boards. The logic chassis in the IOU contains a deadstart panel with initialization and maintenance controls and displays. Each bay also contains a cooling system to cool the logic chassis, an ac/dc control section with voltage margin testing facilities, and dc power supplies. There are two types of cooling systems for removing the heat generated by the electrical components. One uses refrigerant and forced air. The second uses water cooling.

The power distribution controls and indicators, cooling system controls and indicators, and the deadstart panel are described in section 2 of this guide. If further information about the hardware is required, refer to a hardware reference manual listed in the preface.

DISPLAY STATION

The display station (figure 1-3) provides a visual, alphanumeric readout for the computer and a keyboard for data entry. Information from the computer is displayed on a 533.4 millimetre (21-inch) cathode-ray tube (CRT).

The computer system software uses the display screen to bring information to your attention. You can respond to or instruct the computer system software by entering information via the console keyboard.

The format of the information displayed and of commands entered varies according to the software currently being executed. Refer to the operating system operator's guide for applicable operator/system communication. Later sections of this guide provide basic instructions for operating the display station when the common maintenance software executive (CMSE) program is controlling the display.

All console and keyboard controls are described in section 2 of this guide.

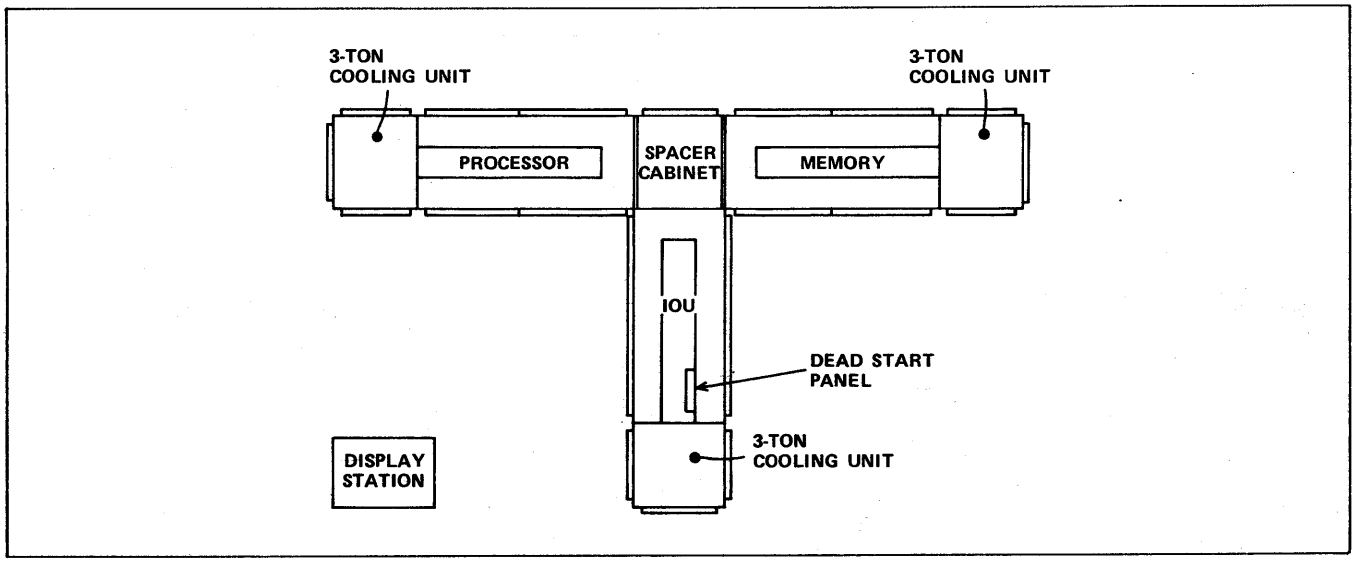


Figure 1-1. Model 835 Hardware Configuration

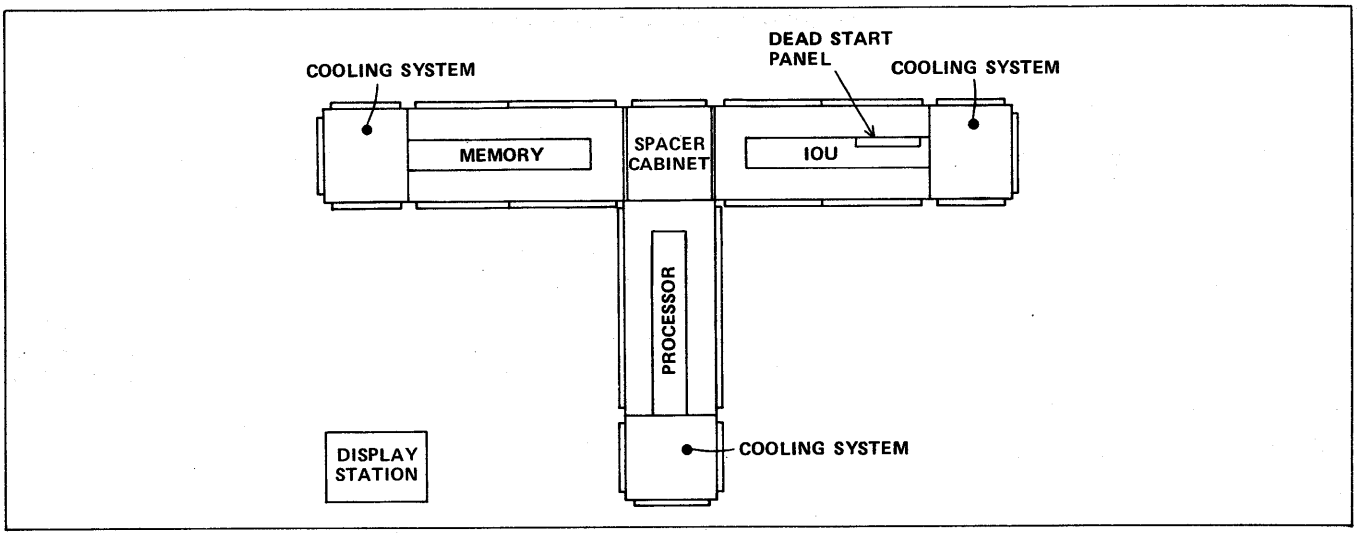


Figure 1-2. Models 845 and 855 Hardware Configuration

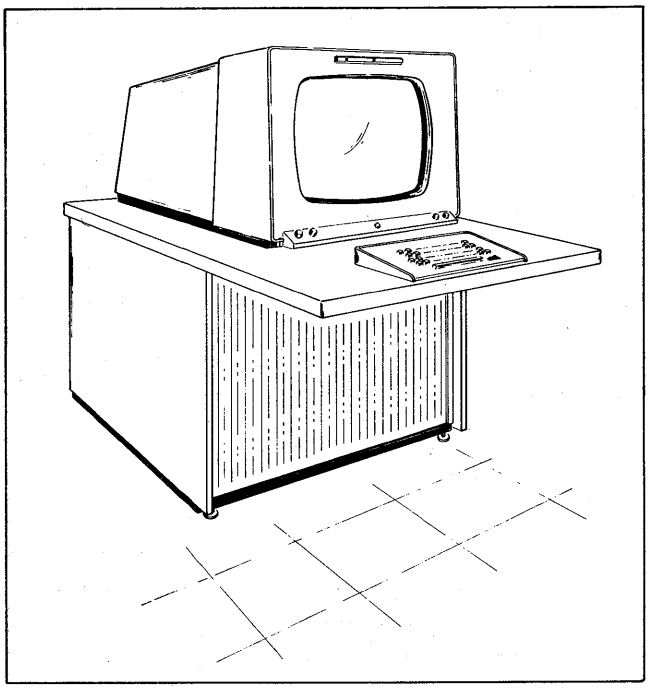


Figure 1-3. Display Station

OPERATING SYSTEM

This guide assumes that a standard Control Data-supported operating system will be used that functions with the common test and initialization (CTI) module and the hardware initialization and verification software (HIVS).

Although this guide reiterates some of the basic operating system deadstart and recovery procedures, for comprehensive operating instructions, refer to the applicable operating system operator's guide.

If the site has purchased a Control Data maintenance agreement that provides use of the Concurrent Maintenance Library (CML) with the operating system, refer also to the CML Customer's Guide for a description of CML features and capabilities.

The operating system is loaded into the computer system by CTI. Some procedures for using CTI are provided in section 4 of this guide.

CYBER INITIALIZATION PACKAGE (CIP)

A unique release tape, called the CYBER Initialization Package (CIP), is created for each model of computer system. Microcode, EI, CTI, CMSE, and selected MSL programs, command buffers, and utility routines are distributed on the CIP tape to sites with a maintenance contract. Sites without a maintenance contract receive a CIP tape that contains microcode, EI, CTI, CMSE, and a subset of MSL tests and utilities, called HIVS.

MAINTENANCE SOFTWARE LIBRARY

MSL consists of a set of tests and diagnostics that aid in the identification and isolation of defective components of the computer system. A unique MSL file is provided on the CIP tape for each computer system model. MSL 152 is provided for use on model 835 only and MSL 153 for models 845 and 855 only. Each MSL file is divided into the following parts:

- Common Maintenance Software Executive (CMSE)
- Tests and diagnostics
- Command buffers

The operating system does not concurrently share the computer system with MSL as it does with CML. Thus, MSL operation is completely independent of the operating system (off-line).

The CIP User's Handbook provides procedures for loading MSL into the computer system using CTI.

CMSE

The CMSE program controls all MSL activity. CMSE commands provide off-line monitor capability. Monitoring can be done from either a local or remote console. CMSE also provides display facilities, a keyboard command structure, a loading capability, and diagnostic sequencing. CMSE can be initialized following a short or long deadstart and extended deadstart using CTI.

TESTS AND DIAGNOSTICS

MSL contains a set of tests and diagnostics that test the many components of the computer system for correct operation, monitor system status, and, in some cases, isolate system faults.

COMMAND BUFFERS

Command buffers are useful tools enabling a user to load and execute a series of tests and to set parameters. Procedures for using command buffers to run tests and diagnostics are given in section 5.

COMMON TEST AND INITIALIZATION MODULE (CTI)

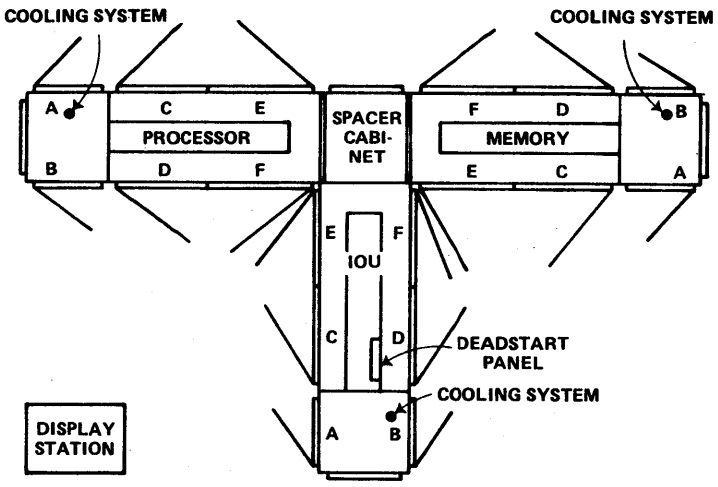
CTI performs hardware initialization and represents a standardized human interface for loading either the operating system or CMSE (deadstart). CTI provides a set of displays from which you select the desired method for deadstarting. The CTI process usually includes some input/output unit (IOU) testing and hardware initialization.

HARDWARE INITIALIZATION AND VERIFICATION SOFTWARE (HIVS)

HIVS is a basic subset of MSL tests that performs confidence testing on the system. The HIVS module exists on the CIP tape for sites that do not have a maintenance agreement for MSL.

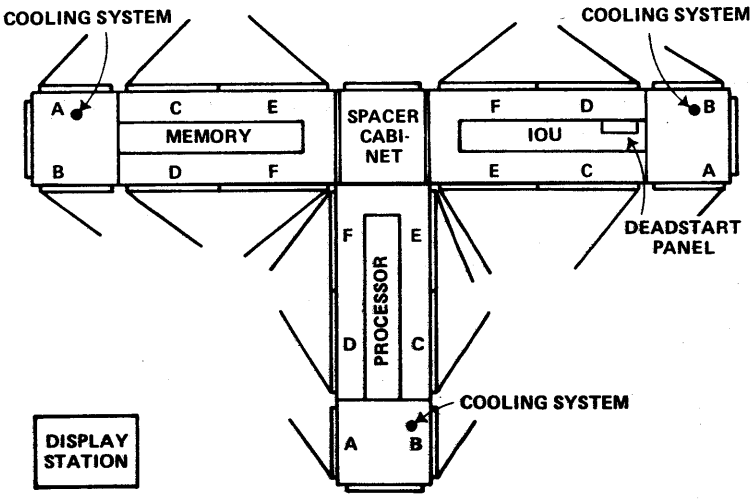
The hardware verification sequencer (HVS) is initiated by CTI and runs tests under control of CMSE.

This section illustrates all system controls and indicators that may require attention and defines their functions. Figures 2-1 and 2-2 show the general location of switches and indicators located on the mainframes of the models 835, 845, and 855.



Deadstart Panel	–	D (IOU only)
Channel Cables	–	F (IOU only)
2-Port Mux Cables	–	F (IOU only)
Fault Indicators	–	A
Power On/Off Switch	–	A
Circuit Breakers		
50/60 Hz	–	A
400 Hz	–	B
Fuses		
50/60 Hz	–	A
400 Hz	–	B
Voltage Meter	–	B
Cooling System Gauges	–	B
Remote/Local Switch	–	A
Back Panel Wires	–	C and E
Logic Packs	–	D and F
CM Configuration Switches	–	F (Memory only)

Figure 2-1. Model 835 Mainframe Switch and Indicator Locations



Deadstart Panel	–	D (IOU only)
Channel Cables	–	F (IOU only)
2-Port Mux Cables	–	F (IOU only)
Fault Indicators	–	A (IOU & Memory), B (CP)
Power On/Off Switch	–	A (IOU & Memory), B (CP)
Circuit Breakers		
50/60 Hz	–	A (IOU & Memory), B (CP)
400 Hz	–	B (IOU & Memory), A (CP)
Fuses		
50/60 Hz	–	A (IOU & Memory), B (CP)
400 Hz	–	B (IOU & Memory), A (CP)
Voltage Meter	–	B (IOU & Memory), A (CP)
Cooling System Gauges	–	B (IOU & Memory), A (CP)
Cooling System Indicators	–	B (CP only)
Remote/Local Switch	–	A (IOU & Memory), B (CP)
Back Panel Wires	–	C and E
Logic Packs	–	D and F
CM Configuration Switches	–	F (Memory only)

Figure 2-2. Models 845 and 855 Mainframe Switch and Indicator Locations

SYSTEM POWER CONTROLS AND INDICATORS

Figures 2-3 through 2-10 and tables 2-1 through 2-8 illustrate and define the controls and indicators of the wall-mounted System Power Control Panel (SPCP) and the bay-mounted 50/60-Hz Power Control Box (50/60 PCB), 400-Hz Power Control Box (400 PCB), and Cooling System Power Control Box.

In addition to the controls and indicators described in the following tables and figures, each bay, except the models 845 and 855 processor bays, contains smoke detectors. If any of the four smoke detectors in a bay activates, the logic power supply circuit breakers and the 400-Hz DISCONNECT circuit breaker on the 400-Hz power control box open. (Refer to figure 2-6.)

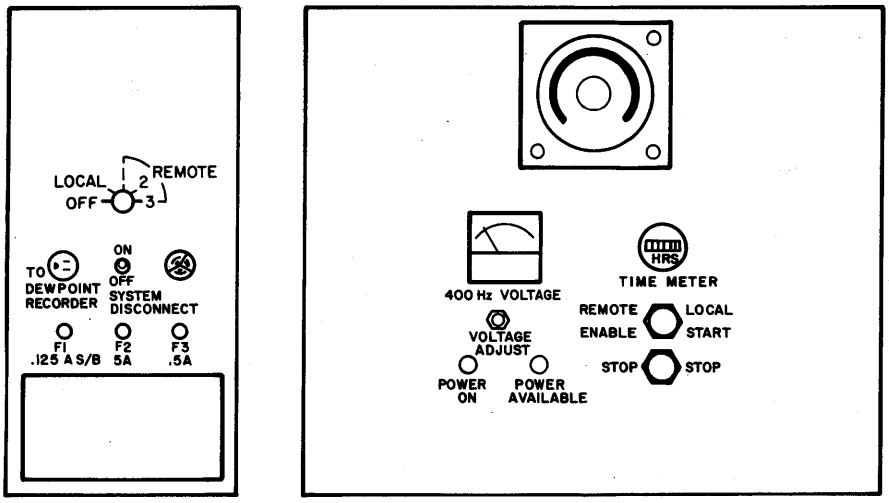


Figure 2-3. System Power Control Panel (SPCP) - Wall Mounted

Table 2-1. System Power Control Panel Controls and Indicators (Sheet 1 of 2)

Panel Nomenclature	Description	Function
REMOTE ENABLE/ LOCAL START	Pushbutton switch (momentary)	Unlatches STOP switch with mode switch (refer to figure 2-3) in LOCAL position, and applies 50/60-Hz power to system motor generator (MG), SPCP fault warning and shutdown circuits, bay cooling and compressor units that are cycled on and off with the system, and peripheral equipment. Applies 400-Hz power from MG to bays.
STOP	Pushbutton switch (latching)	Removes 50/60-Hz power from MG, SPCP fault warning and shutdown circuits, bay cooling and compressor units, and peripheral equipment. Removes 400-Hz power (from MG) from bays. This action occurs regardless of mode switch position.
POWER AVAILABLE	Indicator light	Indicates that 50/60-Hz power is present at SPCP and that SYSTEM DISCONNECT switch is in ON position.
POWER ON	Indicator light	Indicates that POWER AVAILABLE indicator light conditions are present, that REMOTE ENABLE/LOCAL START switch has been pressed, and that 50/60-Hz power has been applied throughout the system, either locally or via remote control.
400 Hz VOLTAGE	Meter	Indicates percentage deviation of MG output from nominal level (120 volts line-to-neutral, 208 volts line-to-line). Indication is average of the three 400-Hz lines.
VOLTAGE ADJUST	Rheostat	Adjusts MG output voltage plus or minus 5 percent from nominal level (refer to 400 Hz VOLTAGE preceding).
TIME METER	Digital meter	Indicates total MG running time.

Table 2-1. System Power Control Panel Control and Indicators (Sheet 2 of 2)

Panel Nomenclature	Description	Function
OFF/LOCAL/ REMOTE	Rotary switch (keylock)	Selects control point for application of 50/60-Hz and 400-Hz power to system: OFF — System power cannot be applied. LOCAL — Local SPCP control. REMOTE 1 — Model 835, 845, or 855 controlled by master Model 17X or 700 series, or SPCP for peripherals shared by master Model 17X or 700 series and slave Model 835, 845, or 855. REMOTE 2 — Model 835, 845, or 855 controlled by master Model 835, 845, or 855. REMOTE 3 — Reserved for future use.
ON OFF SYSTEM DISCONNECT†	Toggle switch	Applies single-phase 50/60-Hz power from power source, via wall-mounted EMERGENCY OFF switch, to SPCP.
	Dewpoint	Indicates room dewpoint from -15 °C to 35 °C (5 °F - 95 °F). If indicator dewpoint reaches 11.1 °C (52 °F), horn (next paragraph) sounds. If dewpoint reaches 13.3 °C (56 °F) processor receives Short Warning and system powers down.
	Horn	Sounds if room dewpoint reaches 11.1 °C (52 °F) or room temperature reaches 35 °C (95 °F).

†This switch should be left in the ON (up) position under normal conditions (refer to caution under Power Application and Removal procedures).

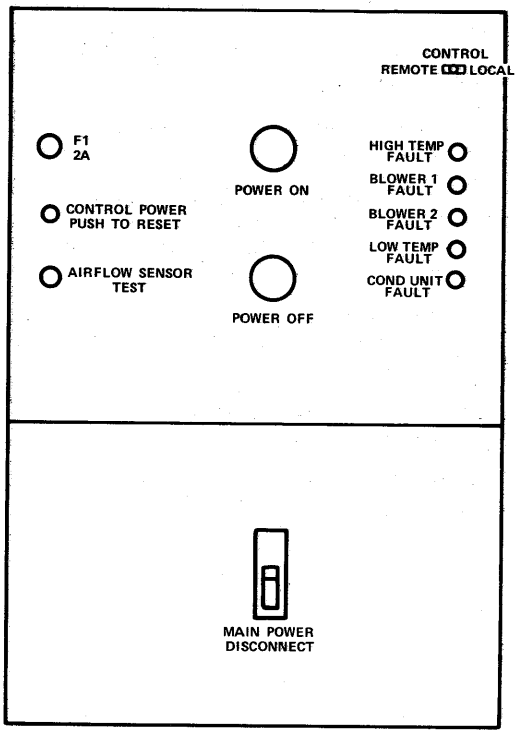


Figure 2-4. 50/60-Hz Power Control Box, Except Models 845 and 855 Processor Bays

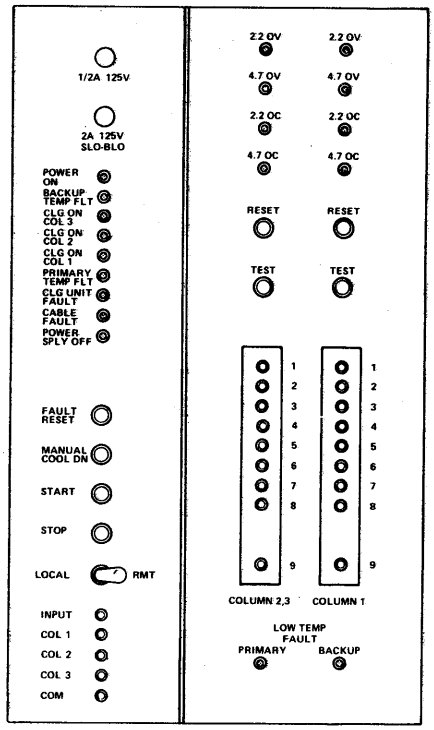


Figure 2-5. 50/60-Hz Power Control Box, Models 845 and 855 Processor Bays

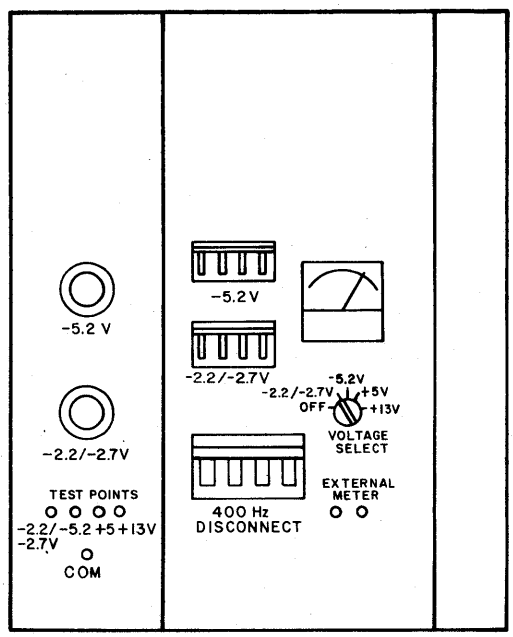


Figure 2-6. 400-Hz Power Control Box, Model 835 Processor Bay

Table 2-2. 50/60-Hz Power Control Box Controls and Indicators, Except Models 845 and 855 Processor Bays (Sheet 1 of 2)

Panel Nomenclature	Description	Function
MAIN POWER DISCONNECT	Circuit breaker	Applies 50/60-Hz power to 50/60-Hz power control box and bay condensing unit.
POWER ON	Pushbutton	Applies 50/60-Hz power to blowers and solenoids in condensing unit if all circuit breakers are closed and CONTROL switch is in LOCAL position. Resets any fault light emitting devices (LEDs) that are lit. Applies 50/60-Hz power to blowers and 400-Hz power to logic power supplies. If CONTROL switch is in REMOTE position, these functions are controlled by REMOTE ENABLE/LOCAL START on the SPCP (table 2-1) or other remote system.
POWER OFF†	Pushbutton switch (3-second delayed release)	Removes 50/60-Hz power from bay and condensing unit blowers and from condensing unit solenoids. Removes 400-Hz MG power from logic power supplies.
CONTROL POWER PUSH TO RESET	Circuit breaker	Applies 24-volt 50/60-Hz power to 50/60-Hz power control box fault detection logic and local start/run sensing logic if overcurrent occurs. Can be reset manually.
AIRFLOW SENSOR TEST	Toggle switch (spring loaded return)	Interrupts 50/60-Hz power to bay blowers to test BLOWER 1 and BLOWER 2 FAULT sensing circuits and LEDs when switch is in down position.
†All fault LEDs remain lit after fault corrected until POWER ON is pressed.		

Table 2-2. 50/60-Hz Power Control Box Controls and Indicators, Except Models 845 and 855 Processor Bays (Sheet 2 of 2)

Panel Nomenclature	Description	Function
CONTROL REMOTE LOCAL	Toggle switch	In REMOTE position, enables remote control of POWER ON switch functions; enables processor to receive Short Warning status signal for bay high temperature fault, condensing unit fault, or bay blower fault (refer to HIGH TEMP FAULT, COND UNIT FAULT and BLOWER FAULT, following). In REMOTE position, enables Long Warning status signal to bay logic for bay high temperature warning 35 °C (95 °F) or for bay low temperature, (refer to LOW TEMP FAULT, following). In REMOTE position, enables Long Warning status signal to IOU bay logic for room environmental warning from SPCP. In LOCAL position, enables local control of POWER ON switch functions (refer to POWER ON, preceding); prevents selected bay from issuing status signal for any bay fault.
HIGH TEMP FAULT†	Indicator	Indicates that bay temperature has reached 48.9 °C (120 °F).
BLOWER 1 FAULT†	Indicator	Indicates that bay blower 1 is no longer running or has failed to keep bay temperature below 54.4 °C (130 °F).
BLOWER 2 FAULT†	Indicator	Indicates that bay blower 2 is no longer running or has failed to keep bay temperature below 54.4 °C (130 °F).
LOW TEMP FAULT†	Indicator	Indicates that bay temperature has reached 13.9 °C (57 °F).
COND UNIT FAULT†	Indicator	Indicates that an internal fault has occurred in the condensing unit compressor.

†All fault LEDs remain lit after fault corrected until POWER ON is pressed.

Table 2-3. 50/60-Hz Power Control Box Controls and Indicators, Models 845 and 855 Processor Bays (Sheet 1 of 2)

Panel Nomenclature	Description	Function
START	Pushbutton	If all circuit breakers are closed and control switch is in LOCAL position, applies 50/60-Hz power to cooling system power control box. Resets any fault LEDS that are lit. Applies 400-Hz MG power to logic power supplies. If control switch is in RMT position, these functions are controlled by REMOTE ENABLE/LOCAL START on the SPCP (table 2-1) or other remote system.
STOP	Pushbutton Switch	Removes 50/60-Hz power from cooling system power control box. Removes 400-Hz MG power from logic power supplies.
LOCAL RMT	Toggle switch	In RMT position, enables remote control of START switch functions; enables processor bay to receive Short Warning status signal for bay high temperature fault, cooling unit fault, or all backup faults. In LOCAL position, enables local control of START switch functions (refer to START, preceding); prevents processor bay from issuing status signal for any processor bay fault.

Table 2-3. 50/60-Hz Power Control Box Controls and Indicators, Models 845 and 855 Processor Bays (Sheet 2 of 2)

Panel Nomenclature	Description	Function
POWER ON	Indicator light	Indicates logic power supply output to logic chassis.
BACKUP TEMP FLT †	Indicator light	Indicates that bay temperature has reached 40 °C (104 °F) or dropped to 13.3 °C (56 °F).
CLG ON COL 1,COL 2,Col 3	Indicator lights	Indicate cooling is present at the respective columns.
PRIMARY TEMP FLT †	Indicator light	Indicates that bay temperature has reached 35 °C (95 °F) or dropped to 14.1 °C (57.5 °F).
CLG UNIT FAULT †	Indicator light	Indicates high/low coolant pressure, high/low coolant temperature, or high pump motor current draw. Cooling system power control box provides specific indicator lights for above conditions, except low water pressure and high pump motor current draw.
CABLE FAULT †	Indicator light	Indicates loose, broken, or disconnected cables or plug-jack connections.
POWER SPLY OFF	Indicator light	Indicates loss of logic power supply output due to tripped circuit breakers, in response to overcurrent/overvoltage/undercurrent conditions.
FAULT RESET	Pushbutton switch	Clears LED fault indicators on 50/60-Hz power control box front panel and temperature protect board front panels.
MANUAL COOL DN	Pushbutton switch	Applies cooling on a column basis; switch is enabled if any column temperature reaches 23 °C (73.4 °F) after bay shutdown.
INPUT, COL 1, COL 2, COL 3, COM	Test jacks	Allow voltmeter measurement of coolant (column) temperature at the common column input and the columns 1, 2, and 3 outputs.
2.2 OV, 4.7 OV, 2.2 OC, 4.7 OC	Indicator light	Indicates overvoltage and overcurrent fault conditions with the -2.2 V and -4.7 V logic voltages for COLUMN 1 and COLUMN 2, 3.
RESET	Pushbutton switches	Clear transient fault LED indicators on 50/60-Hz power control board front panel.
TEST	Pushbutton switches	Activate transient circuit (OV/OC LEDs light, transient contactors open, power supply circuit breakers trip) to test transient protection.
1-9, COLUMN 2,3 1-9, COLUMN 1	Test jacks	Allow fault isolation to determine transient protect board failure or actual transient condition.
LOW TEMP FAULT PRIMARY †	Indicator light	Indicates that bay temperature has reached 14.1 °C (57.5 °F).
LOW TEMP FAULT BACKUP †	Indicator light	Indicates that bay temperature has reached 13.3 °C (56 °F).

†All fault LEDs remain lit after fault is corrected until FAULT RESET is pressed.

Table 2-4. 400-Hz Power Control Box Controls and Indicators, Model 835 Processor Bay

Panel Nomenclature	Description	Function
400 Hz DIS-CONNECT	Circuit breaker	Applies 400-Hz power from MG to 400-Hz power control box.†
-2.2/-2.7 V, -5.2 V	Circuit breakers	Apply 400-Hz power to corresponding bay logic power supply.†
VOLTAGE SELECT	Rotary switch	Selects low-voltage power supply output for display on percentage meter.
	Percentage meter	Indicates percent deviation of selected low-voltage power supply output from nominal value.
EXTERNAL METER	Test jacks	Allow connection of external test equipment to output of low voltage power supply selected by VOLTAGE SELECT.
-2.2/-2.7 V -5.2 V	Variable auto transformer	Adjusts output of corresponding power supply, as shown on percentage meter.
-2.2/-2.7 V, -5.2 V, +5 V, +13 V, COM	Test jacks	Allow connection of external test equipment to output of corresponding logic power supply.††

†Opens if any of the four smoke detectors in a bay activates.
††+5-volt and +13-volt jacks are not used in processor.

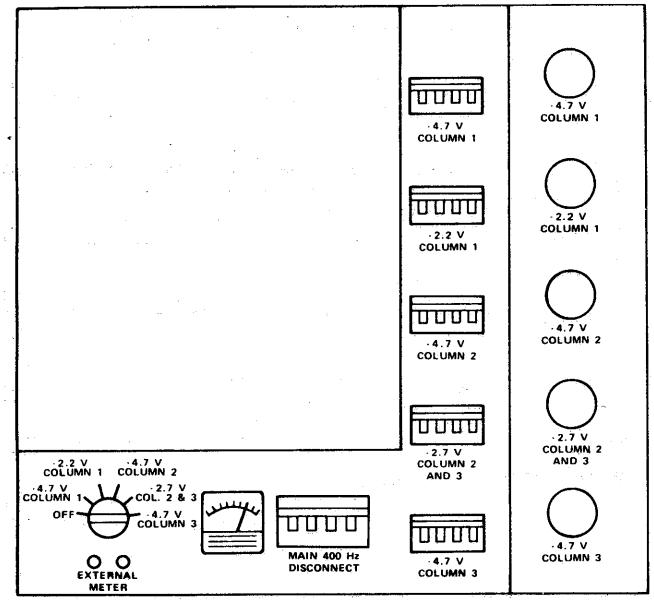


Figure 2-7. 400-Hz Power Control Box, Models 845 and 855 Processor Bays

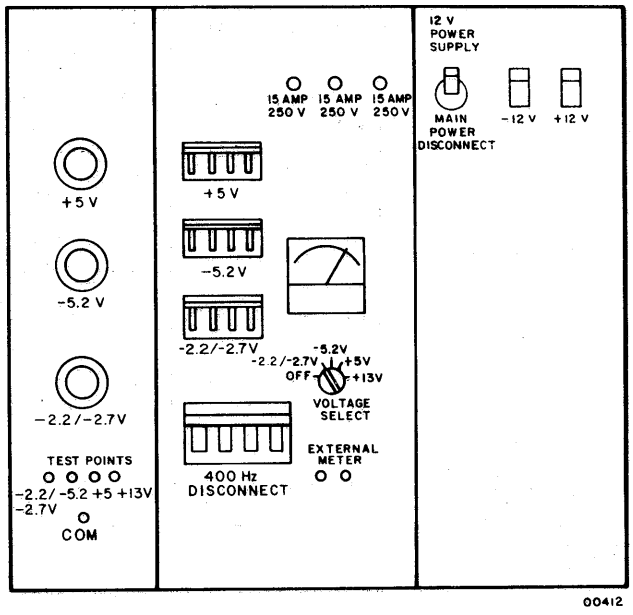


Figure 2-8. 400-Hz Power Control Box, IOU Bay

Table 2-5. 400-Hz Power Control Box Controls and Indicators, Models 845 and 855 Processor Bays

Panel Nomenclature	Description	Function
MAIN 400 Hz DISCONNECT	Circuit breaker	Applies 400-Hz power from system MG to 400-Hz power control box.
-4.7 V COLUMN 1, -2.2 V COLUMN 1, -4.7 V COLUMN 2, -2.7 V COLUMN 2 AND 3 -4.7 V COLUMN 3	Circuit breakers	Apply 400-Hz power to corresponding bay logic power supply.
	Rotary switch	Selects low-voltage power supply output for display on percentage meter.
	Percentage meter	Indicates percentage deviation of selected low-voltage power supply output from nominal value.
EXTERNAL METER	Test jacks	Allow connection of external test equipment to output of low-voltage power supply selected by rotary switch.
-4.7 V COLUMN 1, -2.2 V COLUMN 1, -4.7 V COLUMN 2 AND 3 -4.7 V COLUMN 3	Variable auto transformers	Adjust outputs of corresponding power supplies as shown on percentage meter.
F1, F2, F3 15 AMP	Fuses	Provide input overcurrent protection for three-phase 400-Hz at the -2.2 V, -2.7 V, and -4.7 V power supplies.

Table 2-6. 400-Hz Power Control Box Controls and Indicators, IOU Bay

Panel Nomenclature	Description	Function
400 Hz DIS-CONNECT	Circuit breaker	Applies 400-Hz power from MG to 400-Hz power control box.†
-2.2/-2.7 V, -5.2 V, +5 V	Circuit breakers	Apply 400-Hz power to corresponding bay logic power supply.†
VOLTAGE SELECT	Rotary switch	Selects low-voltage power supply output for display on percentage meter.
	Percentage meter	Indicates percent deviation of selected low-voltage power supply output from nominal value.
EXTERNAL METER	Test jacks	Allow connection of external test equipment to output of low voltage power supply selected by VOLTAGE SELECT.
-2.2/-2.7 V, -5.2 V, +5 V	Variable auto transformers	Adjust output of corresponding power supply, as shown on percentage meter.
-2.2/-2.7 V, -5.2 V, +5 V, +13 V, COM	Test jacks	Allow connection of external test equipment to output of corresponding logic power supply.
12 V POWER SUPPLY MAIN POWER	Circuit breaker	Applies 120 V, 400-Hz power to +12 V power supply and regulator.
-12 V, +12 V	Circuit breaker	Trip in response to overvoltage/overcurrent conditions detected by (or failure of) +12 V power supply regulator.
15 AMP, 250 V	Fuses	Provide overcurrent protection for +5 V transformer in 400-Hz power control box.

†Opens if any of the four smoke detectors in a bay activates.

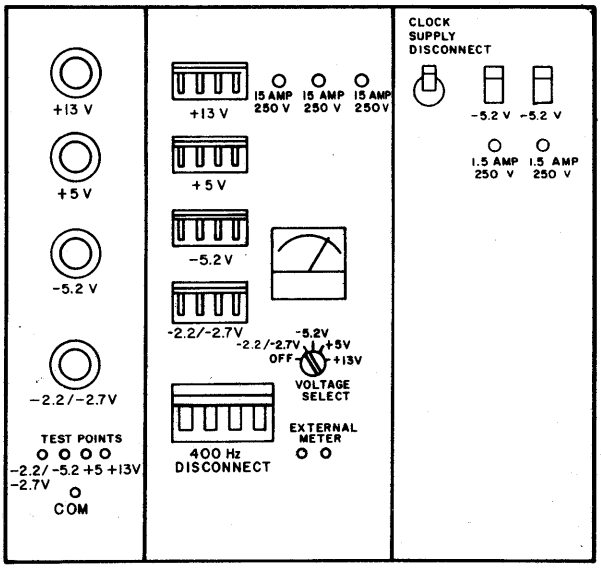


Figure 2-9. 400-Hz Power Control Box, Memory Bay

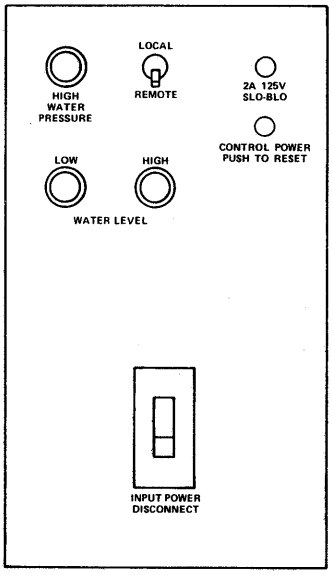


Figure 2-10. Cooling System Power Control Box, Models 845 and 855 Processor Bays

Table 2-7. 400-Hz Power Control Box Controls and Indicators, Memory Bay

Panel Nomenclature	Description	Function
400 Hz DISCONNECT	Circuit breaker	Applies 400-Hz power from MG to 400-Hz power control box.†
-2.2/-2.7 V, -5.2 V, +5 V, +13 V	Circuit breakers	Apply 400-Hz power to corresponding bay logic power supply.†
VOLTAGE SELECT	Rotary switch	Selects low-voltage power supply output for display on percentage meter.
	Percentage meter	Indicates percent deviation of selected low-voltage power supply output from nominal value.
EXTERNAL METER	Test jacks	Allow connection of external test equipment to output of low voltage power supply selected by VOLTAGE SELECT.
-2.2/-2.7 V, -5.2 V, +5 V, +13 V	Variable auto transformer	Adjust output of corresponding power supply, as shown on percentage meter.
-2.2/-2.7 V, -5.2 V, +5 V, +13 V, COM	Test jacks	Allow connection of external test equipment to output of corresponding power supply.
CLOCK SUPPLY DISCONNECT	Toggle switch	Applies 208 V, 400-Hz power to clock power supply and regulator.
-2.2 V, -5.2 V	Circuit breakers	Trip in response to overvoltage/overcurrent conditions detected by (or failure of) clock power supply regulator.
1.5 AMP, 250 V	Fuses	Provides overcurrent protection for transformer in clock power supply.
15 AMP, 250 V††	Fuses	Provide overcurrent protection for +5 V and +13 V transformers in 400-Hz power control box.

†Opens if any of the four smoke detectors in a bay activates.
††Model 835 only.

Table 2-8. Cooling System Power Control Box Controls and Indicators, Models 845 and 855 Processor Bays

Panel Nomenclature	Description	Function
INPUT POWER DISCONNECT	Circuit breaker	Applies 50/60-Hz power to cooling system power control box and 50/60-Hz power control box.
LOCAL REMOTE	Switch	In REMOTE position, enables remote control of cooling system startup. In LOCAL position, enables local control of cooling system in a service mode.
HIGH WATER PRESSURE	Indicator light	Indicates water pressure in the cooling system lines has reached 344 kPa (50 psi).
LOW WATER LEVEL	Indicator light	Indicates low water level in cooling system lines.
HIGH WATER LEVEL	Indicator light	Indicates high water level in cooling system lines.
2A, 125 V SLO-BLO	Fuse	Provides input overcurrent protection for the 400-Hz and 50/60-Hz transformers in the 50-60-Hz power control box.
CONTROL POWER PUSH TO RESET	Circuit breaker	Provides input overcurrent protection for transformer and relays in the cooling system power control box.

COOLING SYSTEM CONTROLS AND INDICATORS

Figures 2-11 and 2-12 and table 2-9 illustrate and define the controls and indicators of the cooling system used in the IOU, memory and model 835 processor bays. Figure 2-13 and table 2-10 illustrate and define the controls and indicators of the water cooling unit used in the models 845 and 855 processor bays. Refer to figures 2-5 and 2-10 and tables 2-3 and 2-8 for additional models 845 and 855 cooling system controls and indicators.

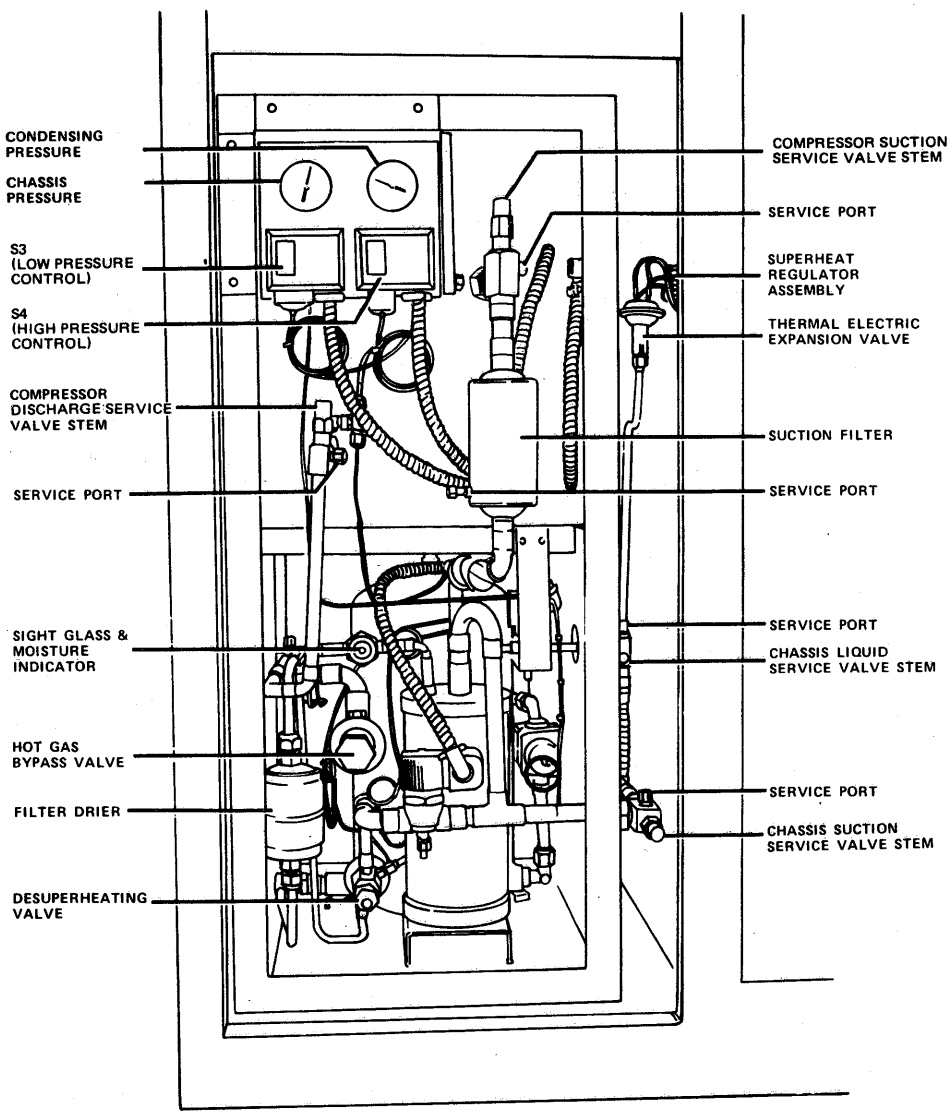


Figure 2-11. Condensing Unit, Front View

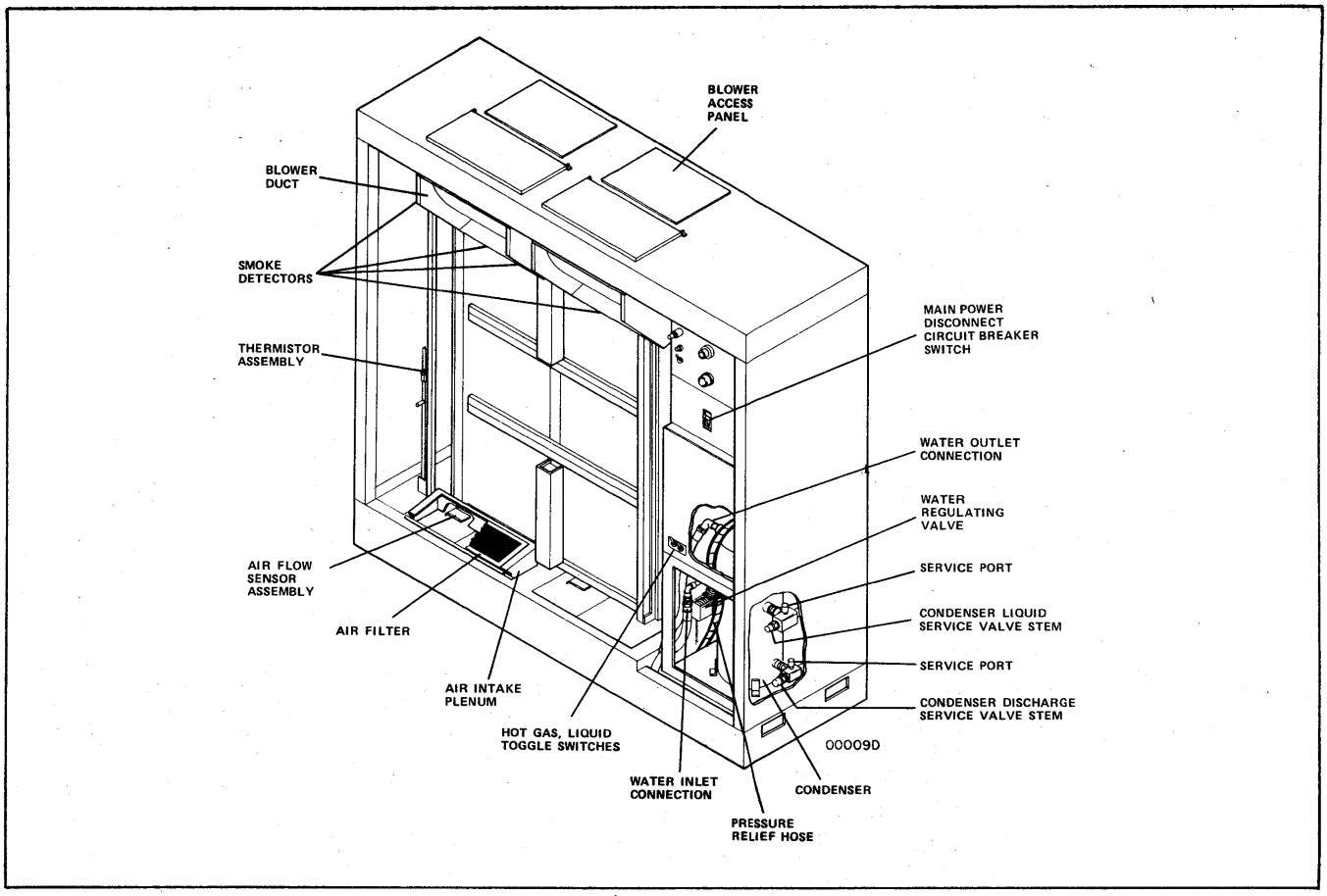


Figure 2-12. Models 835, 845, and 855 IOU and Memory Bays, Rear View

Table 2-9. Cooling System Controls and Indicators, Except Models 845 and 855 Processor Bays

Figure Number	Panel Nomenclature	Description	Function
2-11	CHASSIS PRESSURE	Temperature gauge	Indicates pressure in pounds per square inch of gaseous refrigerant at the suction side of the compressor. In addition to the pressure/vacuum scale, it indicates temperature of the refrigerant.
2-11	CONDENSING PRESSURE	Temperature gauge	Indicates pressure in pounds per square inch of liquid refrigerant at the output of the condenser. In addition to the pressure/vacuum scale, it indicates temperature of the refrigerant.
2-11	S4	High pressure control	Shuts down compressor automatically in response to high head pressure with electric switch and pressure responsive device. Control has a manual reset switch which restarts compressor after a head pressure fault.
2-11	S3	Low pressure control	Shuts down the compressor automatically in response to low suction control pressure with electric switch and pressure responsive device.
2-12	HG	Hot gas bypass toggle switch	Closes hot gas bypass solenoid valve when set to the down position. This switch is used when the refrigeration system is pumped down manually, otherwise it is always in the up position.
2-12	LIQ	Liquid toggle switch	Closes liquid line solenoid valve when set to the down position. This switch is used when the refrigeration system is pumped down manually, otherwise it is always in the up position.

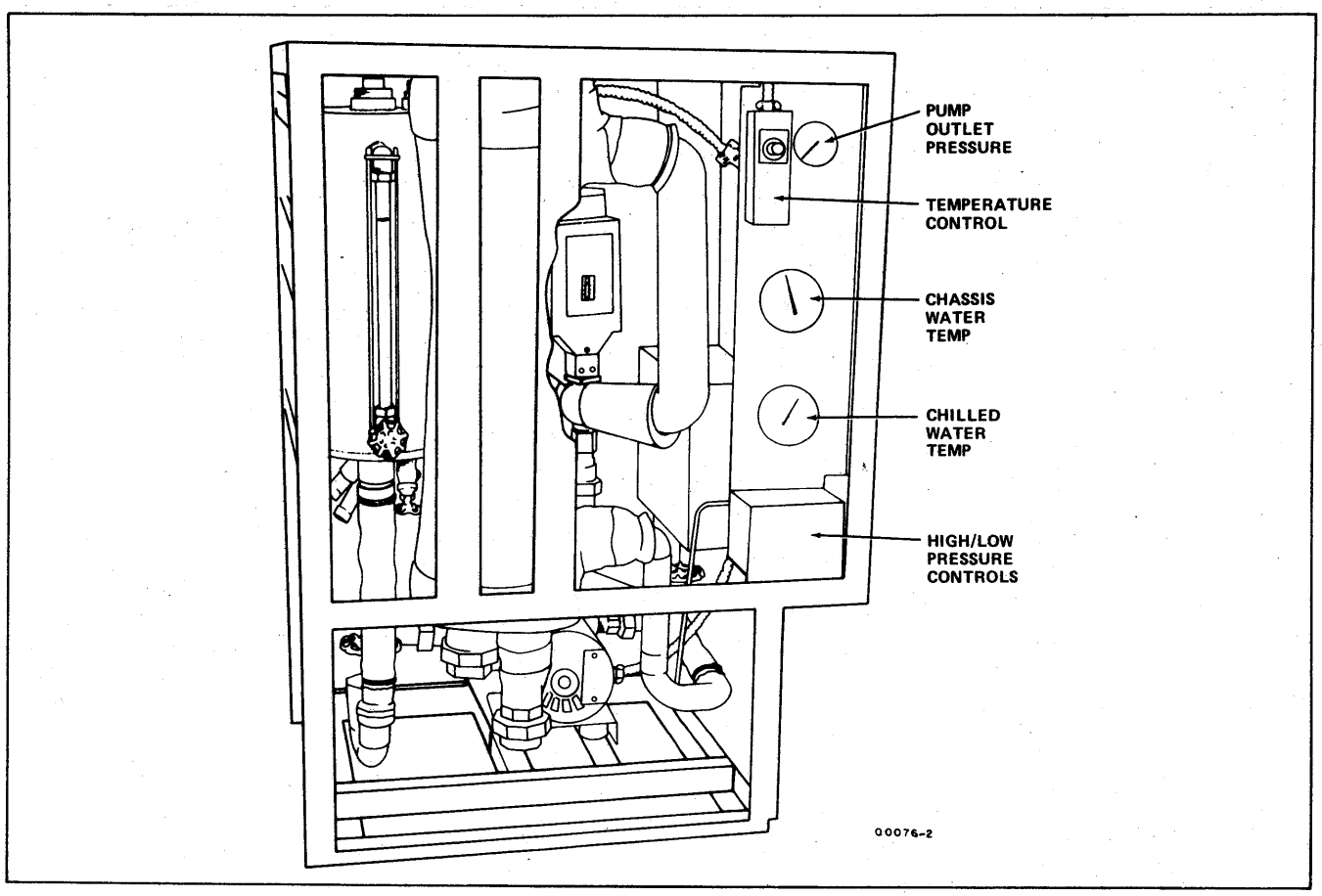


Figure 2-13. Cooling System, Front View, Models 845 and 855 Processor Bays

Table 2-10. Cooling System Controls and Indicators, Models 845 and 855 Processor Bays

Panel Nomenclature	Description	Function
	Potentiometer	Provides modulating control of the water temperature required for cooling the chassis.
CHASSIS WATER TEMP	Gauge	Indicates the temperature of the water entering the chassis.
PUMP OUTLET PRESSURE	Gauge	Indicates water pressure at the output of the pump.
CHILLED WATER TEMP	Gauge	Indicates site water temperature entering the heat exchanger.
	Pressure control	An electric switch and pressure responsive device that automatically shuts down the machine if the pump outlet pressure gets too low.
	Pressure control	An electric switch and pressure responsive device that automatically shuts down the machine if the pump outlet pressure gets too high.

DEADSTART PANEL CONTROLS AND INDICATORS

Figure 2-14 and table 2-11 illustrate and define the controls and indicators on the deadstart panel. The deadstart panel is located behind door D of the IOU bay (see figures 2-1 and 2-2).

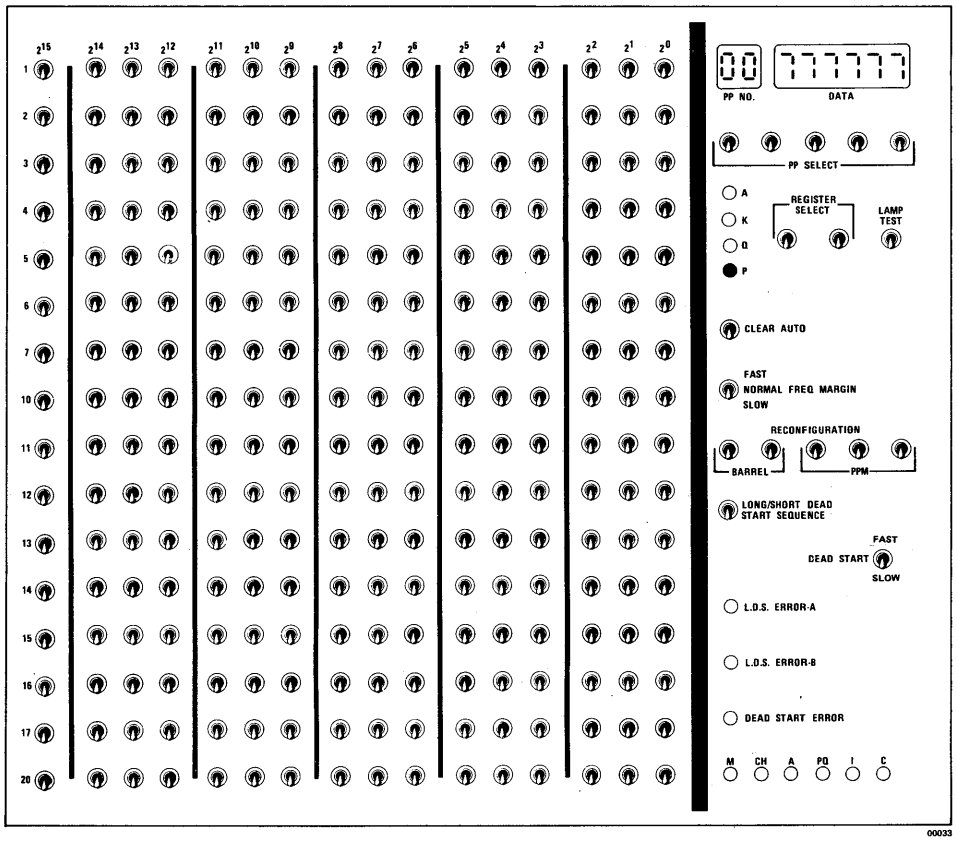


Figure 2-14. Deadstart Panel

Table 2-11. Deadstart Panel Controls and Indicators

Panel Nomenclature	Description	Function
PP NO	Octal display	Shows peripheral processor (PP) selected by PP select switches.
2^0 through 2^{15} by 1 through 20	Toggle switch matrix (two-position switches)	Provides a 16-word deadstart program for PP0. Switches 2^0 through 2^{11} set 12 bits for each of the program words, labeled 1 through 20 (octal). Switches 2^{12} through 2^{15} are normally set to zero. Up position sets bit. Down position clears bit.
DATA	Octal display	Shows content of register selected by REGISTER SELECT switches.
PP SELECT	Toggle switches (two-position)	Select PP whose register is to be displayed.
REGISTER SELECT	Toggle switches (two-position)	Select register displayed (A, K, Q, or P). Up position sets bit. Down position clears bit. (0 = P, 1 = Q, 2 = K, 3 = A.)
A, K, Q, P	Indicators	Indicates which of the four registers is selected by REGISTER SELECT switches.
LAMP TEST	Toggle switch (two-position)	Lights all indicators and display segments.
CLEAR AUTO	Toggle switch (two-position)	Generates pulse clearing bit 34 (auto mode) of environment control register. This allows display of PP registers on deadstart panel after a failure occurred with this bit set.
FREQ MARGIN	Toggle switch (three-position)	Determines frequency margin selected (FAST/NORMAL/SLOW) during deadstart only. This switch must be set to NORMAL position.
RECONFIGURATION, BARREL	Toggle switches (two-position)	Select physical barrel which is logical barrel 0. All the other logical barrels are numbered from the selected physical barrel circularly, for example, if physical barrel 1 is selected, by the switches, physical barrel 2 is logical barrel 1, and so on.
RECONFIGURATION, PPM	Toggle switches (two-position)	Select physical PP memory which is logical PP0. All other PP memories in all barrels are numbered from selected physical PP memory circularly. If switches are set to a value greater than four, no reconfiguration takes place.
LONG/SHORT DEAD START SEQUENCE	Toggle switch (two-position)	Selects the LONG/SHORT DEAD START SEQUENCE during deadstart only. UP selects the long deadstart sequence; DOWN selects the short deadstart sequence. (Refer to deadstart procedures in section 3).
DEAD START	Toggle switch (three-position, center off)	Selects FAST/SLOW repetitive deadstart, which generates master clear pulse every 250/4000 microseconds respectively. (The single deadstart control pushbutton is on display console.)
LDS ERROR-A	Indicator	Remains lit when long deadstart branch tests are not completed within 10.25 microseconds.
LDS ERROR-B	Indicator	Remains lit when a long deadstart sequence does not go to completion.
DEAD START ERROR	Indicator	Lights in case of long deadstart ROM address/data parity error.
M, CH, A, PQ, I, C	Indicators	Light in case of hardware failures as follows: M - PP memory failure CH - I/O channel failure A - A barrel failure PQ - P or Q barrel failure I - Firmware or control failure C - 12/16 conversion failure

CENTRAL MEMORY (CM) CONTROLS

The central memory (CM) contains four three-position configuration switches (figure 2-15). These switches (SW3 through SW6) are located along the edge of a printed-circuit board in the right center section (model 835) or right lower section (models 845 and 855) of the CM. The switches are used to eliminate CM sections with malfunctions. When a switch is centered, normal addressing takes place. When it is in the up position, the upper half of memory remains operational, while the lower half becomes unavailable. Similarly, when a switch is in the down position, the lower half remains operational, while the upper half becomes unavailable. Refer to table 2-12.

In case of CM malfunctions, the remaining good memory can be reconfigured so it is accessible by contiguous addresses from zero to the maximum remaining address. This is accomplished by setting the configuration switches. Refer to Central Memory Reconfiguration in section 3.

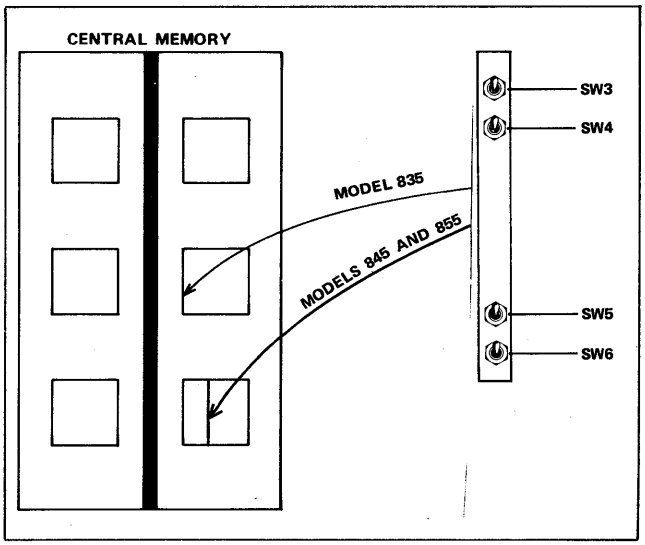


Figure 2-15. CM Configuration Switches

Table 2-12. CM Configuration Switches

Switch	Centered	Up	Down
SW3	Normal Addressing	Use upper 1049K of 2097K	Use lower 1048K of 2097K
SW4	Normal Addressing	Use upper 524K of 1049K	Use lower 524K of 1048K
SW5	Normal Addressing	Use upper 262K of 524K	Use lower 262K of 524K
SW6	Normal Addressing	Use upper 131K of 262K	Use lower 131K of 262K

DISPLAY STATION CONTROLS

The display station consists of a display screen, console panel, and console keyboard.

DISPLAY SCREEN

The display screen enables the viewing of messages directed to it by the operating system or maintenance software and permits monitoring messages composed on its associated keyboard.

Both the operating system and MSL use the display screen to bring information to the operator's attention. The operator can respond to or instruct the operating system or maintenance software by entering information via the console keyboard.

CONSOLE PANEL

The console panel (figure 2-16) contains the DEAD START switch and controls affecting the appearance of displayed information. Table 2-13 defines the function of these controls.

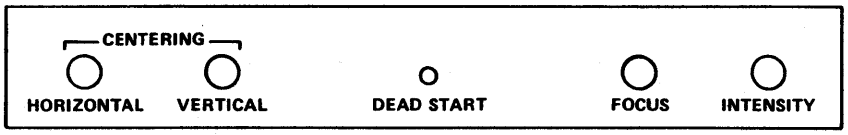


Figure 2-16. Console Panel

Table 2-13. Display Console Controls

Panel Nomenclature	Description	Function
CENTERING HORIZONTAL VERTICAL	Position controls	Vary horizontal and vertical position of display.
FOCUS	Focus control	Changes clarity in center areas of display.
INTENSITY	Intensity control	Varies brightness of display.
DEAD START	Deadstart switch	Initiates single deadstart sequence.

KEYBOARD

Figure 2-17 shows the keyboard. The PRESENTATION CONTROL switch, located to the right of the spacebar, allows selection of a left screen display only, a right screen display only, or both left and right screen displays of reduced size on a split screen. When the switch is in the LEFT position, only those displays referred to in the following sections as left screen displays appear. Only those referred to as right screen displays appear when the switch is in the RIGHT position. A split screen showing both the left and right displays appears when the switch is in the middle or MAINTENANCE position.

When the operating system has been loaded, the keyboard keys function as described in the applicable operating system operator's guide. When MSL has been loaded and the CMSE is in control, the keyboard keys function as shown in table 2-14.

The following statements apply to keyboard entries during deadstart.

- Entries typed from the console keyboard are displayed on the bottom of the left console screen as they are entered.
- The BKSP key deletes the previous character typed.
- The left blank key deletes the current line being typed (left blank is third key from right on top row of keyboard).
- The following message may appear above the console entry if the entry is unrecognizable:

  INVALID ENTRY.

Table 2-14. CMSE Keyboard Usage

Key	Function
(blank, left of =) Erase	Clear keyboard line.
(=) Equal	Switch B (right screen) display from test display to memory display or vice versa.
Backspace (BKSP)	Delete last character entered.
Comma, period, or space	Accepted as a command separator.
(+) Plus	Increment base address, index, or ordinal associated with current A (left screen) display.
(() Left parenthesis	Same as (+), for B (right screen) display.
(-) Minus	Decrement base address, index, or ordinal associated with current A (left screen) display.
()) Right parenthesis	Same as (-), for B (right screen) display.
(blank, right of =) Forward	Execute command, increment address parameter, and clear data parameter. If data entry is repeated without entering data, no data is stored.
(CR) Carriage return	Execute command entered. Initial entry of (CR) causes a single byte of zeros for a test command.
Consecutive commas	Enter zeros for parameters not entered in a command.

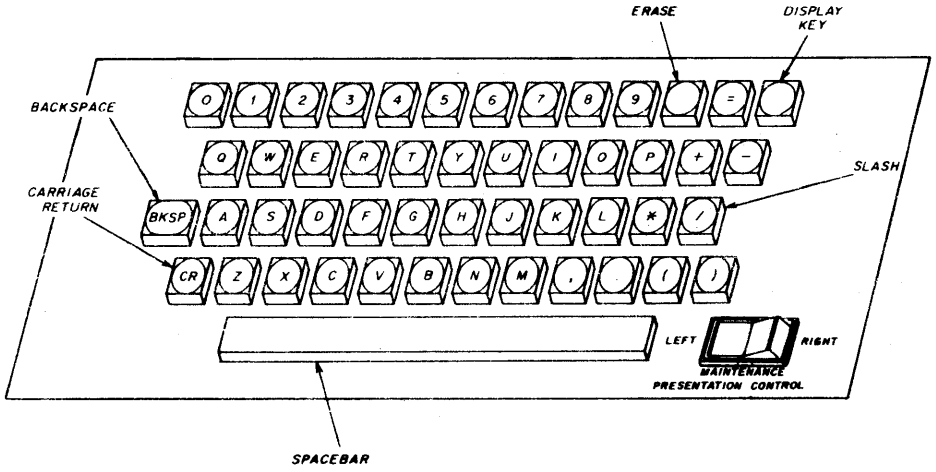


Figure 2-17. Console Keyboard

This section contains adjustments that are performed prior to initiating a deadstart sequence. Initial adjustments include deadstart panel settings for coldstarts, warmstarts, and mainframe reconfiguration.

DEADSTART PANEL SETTINGS

The deadstart panel (refer to figure 2-14) contains a 16-by-16 matrix of toggle switches.

NOTE

The leftmost four switches for each row must be in the down position (set to 0) and are not shown in the following tables.

Use the rightmost 12 switches to set the 12-bit PP instruction words that are used in the deadstart program. This program is subsequently loaded into PP0 memory and executed whenever the DEADSTART switch is pressed.

In general, two types of deadstart programs are entered on the panel: coldstart and warmstart.

A system coldstart is used to write controlware into the memory of a programmable controller so that a warmstart may be accomplished.

The coldstart panel settings shown in table 3-1 are used for loading controlware into a 7021/7152 tape controller or into an 844 or 885 disk controller from a card reader. The card reader must be on a different channel than the disk or tape unit on which the deadstart device is mounted, and the card reader must be on a channel without a PP (for example, channel 12 or 13). A 66X or 67X tape subsystem or 844 or 885 disk subsystem or equivalent controlware deck must be available. For detailed information about the controlware deck, refer to the appropriate installation handbook for the operating system being used. Refer to section 4 for the associated coldstart procedures.

The warmstart panel settings shown in table 3-2 are used when controlware is assumed to be loaded and functioning. Refer to section 4 for the associated warmstart procedures.

Table 3-1. Deadstart Panel Settings for a Coldstart (Sheet 1 of 2)

Disk Controller From Card Reader			7021/7152 Tape Controller From Card Reader		
Word	Octal Setting	PP Mnemonic	Word	Octal Setting	PP Mnemonic
01	75cc	DCN	01	75cc	DCN
02	77cc	FNC	02	77cc	FNC
03	f000	(fcn)	03	f000	(fcn)
04	0000	(zeros)	04	0000	(zeros)
05	77cc	FNC	05	77cc	FNC
06	1400	(fcn)	06	1400	(fcn)
07	74cc	ACN	07	74cc	ACN
10	71cc	IAM	10	71cc	IAM
11	7664	(fwa)	11	7664	(fwa)

Table 3-1. Deadstart Panel Settings for a Coldstart (Sheet 2 of 2)

Disk Controller From Card Reader			7021/7152 Tape Controller From Card Reader		
Word	Octal Setting	PP Mnemonic	Word	Octal Setting	PP Mnemonic
12	00tt	(parms)	12	00tt	(parms)
13	rpxx	(parms)	13	rpxx	(parms)
14	e3uu	(parms)	14	e2uu	(parms)

cc Channel number used to access the card reader from which controlware is to be read.

f Controller number to which card reader is connected.

tt Channel number used to access deadstart tape or disk equipment.

fwa First word address.

fcn Function.

parms Parameters.

e Controller number to which deadstart unit is connected (0 through 7).

u Unit number on which deadstart tape or disk pack is mounted.

0 through 7 = (66x)

0 through 17 = (67x)

0 through 7 = (844)

40 through 57 = (885)

rpxx This parameter is used as follows:

r Indicates an initialization or recovery level used by the operating system and CTI/HIVS. Refer to CIP User's Handbook.

p Contains a PP0 Save Switch (bit 2^7 of word 13). If set, PP0 memory is written to central memory before loading the full express deadstart dump (EDD) package allowing dumping of PP0 memory contents. The remainder of the p field may be used by the operating system to hold other deadstart parameters which may not be modified by the operator.

xx Indicates the central memory resident (CMRDECK) number. Refer to operating system operator's guide.

Table 3-2. Deadstart Panel Settings for a Warmstart (Sheet 1 of 2)

Active PP (Channel 1 through 7, or 11_8)			Inactive PP (Channel 0, 12_8 or 13_8)		
Word	Octal Setting	PP Mnemonic	Word	Octal Setting	PP Mnemonic
01	1402	LDN	01	0000	PSN
02	73tt	OAM	02	0000[1]	PSN
03	0017	(fwa)	03	0000[1]	PSN
04	75tt	DCN	04	75tt[2]	DCN
05	77tt	FNC	05	77tt	FNC
06	eddd	(fcn)	06	eddd	(fcn)
07	74tt	ACN	07	74tt	ACN
10	71tt	IAM	10	71tt	IAM
11	7301	(fwa)	11	7301	(fwa)
12	wxyf	(parms)	12	wxyf	(parms)
13	rpxx	(parms)	13	rpxx	(parms)
14	0000	(parms)	14	0000	(parms)
15	0000	(zeros)	15	0000	(zeros)
16	0000	(zeros)	16	0000	(zeros)
17	0000	(zeros)	17	0000	(zeros)
20	7112	IAM	20	0000	(zeros)

tt Channel number used to access deadstart equipment.

fwa First word address.

fcn Function.

parms Parameters.

eddd Set to one of the following depending on the deadstart device:

66x = e26u.

67x = e12u

844 = e3uu

885 = e3uu

e Controller number to which deadstart unit is connected (0 through 7).

u Unit number on which deadstart tape or disk pack is mounted.

= 0 through 7 (66x)

= 0 through 17 (67x)

= 0 through 7 (844)

= 40 through 57 (885)

Table 3-2. Deadstart Panel Settings for a Warmstart (Sheet 2 of 2)

wxyf This parameter is defined for MSL/HVS as follows:

w Defines the size of unified extended memory (UEM):

0 = none 4 = 1M

1 = 1xxK 5 = 1.5M

2 = 2xxK 6 = 2M

3 = 5xxK 7 = 2.5M

x Defines the central memory (CM) size as follows:

0 = 16K 4 = 98K

1 = 32K 5 = 131K

2 = 49K 6 = 198K

3 = 65K 7 = 262K

y Defines the CPU type:

2 = 835

3 = 845 or 855

f The rightmost bit of f selects Extended Deadstart (EDS), if set when long deadstart is selected by the LONG/SHORT DEAD START SEQUENCE switch.

rpxx This parameter is used as follows:

r Indicates an initialization or recovery level used by the operating system and CTI/HIVS. Refer to CIP User's Handbook.

p Contains a PP0 Save Switch (bit 2^7 of word 13). If set, PP0 memory is written to central memory before loading the full express deadstart dump (EDD) package allowing dumping of PP0 memory contents. The remainder of the p field may be used by the operating system to hold other deadstart parameters which may not be modified by the operator.

xx Indicates the central memory resident (CMRDECK) number. Refer to operating system operator's guide.

1 If a 6681 Data Channel Converter or equivalent is the first equipment on the deadstart channel, set words 2 through 4 as follows:

02 75tt DCN

03 77tt FNC

04 2100 (fcn)

2 The disconnect channel number (DCN) is 75tt where tt has the following bit pattern:

lxxxxx

xxxxx represents the channel number in binary (0 through 31 decimal).

MAINFRAME RECONFIGURATION

When a hardware problem occurs, the mainframe hardware may be reconfigured so that running may continue. Two types of reconfiguration are possible: mainframe hardware reconfiguration using the deadstart panel reconfiguration switches and the CM configuration switches; and reconfiguration of the operating system hardware using CTI options. Refer to section 5 for hardware reconfiguration procedures using CTI. The following paragraphs provide instructions for reconfiguring the PPs and for decreasing the amount of CM available using switches.

PP RECONFIGURATION

The system associates a number with each PP. For a given hardware configuration, the system always associates the same number with each PP. This number is called the logical PP number. Logical PP numbers appear at the top of the MSL left screen (A display).

Reconfiguring the hardware causes the logical PPs to be associated with different physical PPs. Ordinarily, logical PP0 is associated with physical PP0. You can reconfigure the PPs by assigning a different physical PP as logical PP0 using the reconfiguration switches on the deadstart panel.

Within the hardware, PPs are assembled into groups of five. Each group is called a barrel. Depending on the number of PPs in the system, it is possible to have up to four barrels, numbered 0 through 3, containing up to 20 PPs, numbered 0 through 4, 5 through 11_8, 20_8 through 24_8, and 25_8 through 31_8.

The most common way to reconfigure PPs is to use the deadstart panel reconfiguration switches labeled BARREL (refer to figures 2-14 and 3-1) to specify (in binary) which barrel will be logical barrel 0 and, therefore, will contain logical PP0. All other logical barrels (and their PPs) are numbered circularly from the barrel specified as logical barrel 0. That is, if physical barrel 2 is selected by the switches it becomes logical barrel 0, physical barrel 3 becomes logical barrel 1 and physical barrel 0 becomes logical barrel 2, and so on. Normally, physical barrel 0 is specified as logical barrel 0. Figure 3-1A shows the hardware before being reconfigured (BARREL switches are set to 00) and figure 3-1B shows the configuration when the BARREL switches specify barrel 2 (10_2) as logical barrel 0. Numbers on the left are logical PP numbers; numbers on the right are physical PP numbers.

PPs can also be reconfigured within each barrel by using the PPM switches on the deadstart panel to specify (in binary) which PP is to be logical PP0 (figure 3-1). Note that setting the PPM switches on the deadstart panel not only designates which PP in logical barrel 0 is to be PP0, but which PP in the other barrels is 5, 20_8, or 25_8, respectively, with the remaining PPs being renumbered circularly within each barrel. The computer ignores values higher than four.

Figure 3-1C shows the PP configuration when the BARREL switches are set to 2, and the PPM switches are set to 3.

PROCEDURE 3-1. RECONFIGURE PPs

1. Locate reconfiguration switches on deadstart panel.

2. Determine switch settings of reconfiguration switches. If any switch is up, the PPs have probably already been reconfigured; additional reconfiguration is not recommended. If all switches are down (set to 0); proceed to step 3.

3. Set two BARREL switches to the binary number of the barrel that is to contain logical PP0.

4. Set three PPM switches to the binary number of PP within the barrel that is to be designated as logical PP0.

	A. Standard Configuration BARREL switches = 00 PPM switches = 000		B. Reconfiguration Example BARREL switches = 10† PPM switches = 000		C. Reconfiguration Example BARREL switches = 10† PPM switches = 011†	
	Logical PP	Physical PP	Logical PP	Physical PP	Logical PP	Physical PP
Barrel 0	0	0	20	0	22	0
	1	1	21	1	23	1
	2	2	22	2	24	2
	3	3	23	3	20	3
	4	4	24	4	21	4
Barrel 1	5	5	25	5	27	5
	6	6	26	6	30	6
	7	7	27	7	31	7
	10	10	30	10	25	10
	11	11	31	11	26	11
Barrel 2	20	20	0	20	2	20
	21	21	1	21	3	21
	22	22	2	22	4	22
	23	23	3	23	0	23
	24	24	4	24	1	24
Barrel 3	25	25	5	25	7	25
	26	26	6	26	10	26
	27	27	7	27	11	27
	30	30	10	30	5	30
	31	31	11	31	6	31

†1 indicates the switch is set (up).

Figure 3-1. PP Reconfiguration

CENTRAL MEMORY (CM) RECONFIGURATION

Central memory reconfiguration is a manually performed function that permits you to restructure the CM addresses so that a failing part of CM can be quickly locked out to provide a continuous block of usable CM. Central memory may be reconfigured under the control of four configuration switches mounted on the outside edge of a circuit board. In the model 835, the circuit board is located just to the right of the center post in the middle section of the memory bay. In models 845 and 855, the circuit board is located by the center post in the lower section of the memory bay. (Refer to figure 2-15.) Each switch has three positions up, centered, or down. The normal position is centered. When all the switches are centered, the entire installed physical central memory is available for use. Switches set to either the up or down position degrade real memory as shown in table 3-3. In this table, the D, U and - indicate switch positions down, up, and centered, respectively.

The memory reconfiguration should be viewed as a stop-gap measure only, which will keep the system operational until a customer engineer (CE) arrives to correct the problem. For this reason, degrading memory more than twice is not considered to be practical. To reconfigure central memory, use the following procedure.

PROCEDURE 3-2. RECONFIGURE CENTRAL MEMORY

1. Locate CM configuration switches on mainframe. (Refer to figure 2-15.)
2. Locate normal size of central memory from the CM Before Reconfiguration Words column. (Refer to table 3-3.)
3. Locate correct line within the grouping by selecting range of addresses which includes defective portion of memory.
4. Determine switch settings of configuration switches. Normally, all switches will be in centered position. If the CM has already been reconfigured or degraded once, one switch will be set to up or down position. If the CM has already been reconfigured or degraded twice, two or more switches will be set to up or down position.
5. Reset the CM configuration switches to setting shown in the Configuration Switch Setting column for a first degradation if they are all centered.

NOTE

If only one switch is in up or down position, the CM has already been degraded once.

6. Reset switches to settings shown in Configuration Setting column for a second degradation if necessary.

NOTE

If more than one configuration switch is already set, do not attempt to reconfigure; additional reconfiguration is not recommended.

Table 3-3. CM Reconfiguration

CM Before Reconfiguration Words	Failing Address Octal	Configuration Switch Setting	CM After Reconfiguration Words	Degradation
		SW3 SW4 SW5 SW6		
2097K	4 000 000-7 777 777	D - - -	1049K	First
	2 000 000-3 777 777	D D - -	524K	Second
	0-1 777 777	D U - -	524K	Second
	0-3 777 777	U - - -	1049K	First
	6 000 000-7 777 777	U D - -	524K	Second
	4 000 000-5 777 777	U U - -	524K	Second
1572K	4 000 000-5 777 777	D - - -	1049K	First
	2 000 000-3 777 777	D D - -	524K	Second
	0-1 777 777	D U - -		Second
1048K	2 000 000-3 777 777	- D - -	524K	First
	1 000 000-1 777 777	- D D -	262K	Second
	0- 777 777	- D U -	262K	Second
	0-1 777 777	- U - -	524K	First
	3 000 000-3 777 777	- U D -	262K	Second
	2 000 000-2 777 777	- U U -	262K	Second
524K	1 000 000-1 777 777	- - D -	262K	First
	400 000- 777 777	- - D D	131K	Second
	0- 377 777	- - D U	131K	Second
	0- 777 777	- - U -	262K	First
	1 400 000-1 777 777	- - U D	131K	Second
	1 300 000-1 377 777	- - U U	131K	Second

This section provides procedures for applying power to the computer mainframe and for performing deadstart operations. Deadstart is the process that makes the operating system or maintenance software operational and ready to process jobs or run tests.

POWER APPLICATION PROCEDURES

Power application procedures depend upon how long the computer system has been shut down and upon whether power application is under local or remote control.

PROCEDURE 4-1. POWER APPLICATION, INITIAL START-UP OR RECOVERY

All Bays Except Models 845 and 855 Processor Bays

If system power was removed by pressing one of the Control Data supplied EMERGENCY OFF switches, mounting box cover for that switch must be removed and switch must be reset by technician.

CAUTION

If system power has been off for 30 minutes or longer, dewpoint sensor bobbin should be replaced. Contact customer engineer (CE) to perform this procedure. After dewpoint sensor bobbin replacement or on initial power up, leave SYSTEM DISCONNECT switch on SPCP in ON (up) position for 30 minutes before applying system or bay power to allow bobbin to warm up.

If bay power was removed by fault logic response to high compressor head pressure (COND UNIT FAULT LED lit at 50/60-Hz power control box), high pressure control in the bay condensing unit must be reset. Refer to figure 2-11 for switch location.

Whenever any of the bay condensing units has been off for two hours or more, whether due to power outage, initial installation, or fault condition, start the compressor first and allow it to run until coolant gas is pumped back into compressor from the lines. This is done as follows:

1. Set hot gas (HG) and liquid (LIQ) switches on condensing unit (refer to figure 2-12) to up position. Set MAIN POWER DISCONNECT circuit breaker on bay 50/60-Hz power control box to ON position. Compressor motor starts.

2. Allow compressor to run until coolant is pumped down and head pressure has dropped.

CAUTION

If slugging (liquid refrigerant in the compressor causing loud, rattling sounds) occurs, immediately set MAIN POWER DISCONNECT circuit breaker to OFF position to prevent damage to compressor. Wait 20 to 30 seconds and reapply power with condensing unit circuit breaker for not more than 2 or 3 seconds. Wait another 20 to 30 seconds and repeat. Continue in this manner until slugging stops.

3. Apply power as described for normal conditions.

Models 845 and 855 Processor Bays

1. Set all circuit breakers on 50/60-Hz power control box and 400-Hz power control box to ON.

2. Rotate all variable auto transformer adjustment knobs on 400-Hz power control boxes fully counterclockwise.

3. Apply power to processor bay using normal procedures.

4. Slowly rotate each variable auto transformer clockwise until output has stabilized at 0 percent (using external meter).

PROCEDURE 4-2. POWER APPLICATION, NORMAL CONDITION

Normal power application procedures depend on whether the model 835, 845, or 855 system power is to be under SPCP, local, or remote control. For any model 835 bay power application, and for model 845 or 855 IOU and memory bay power application, ensure that the hot gas (HG) and liquid (LIQ) switches on the cooling unit are set to the up position.

SPCP CONTROL

1. Set mode switch on side of SPCP (refer to figure 2-3) to LOCAL.

2. Set all circuit breakers on each 50/60-Hz power control box and 400-Hz power control box to ON position at processor, IOU, and memory bays. Set CONTROL switch on 50/60-Hz power control box to REMOTE position.

CAUTION

SYSTEM DISCONNECT switch should always be in ON position under normal conditions. If switch is OFF for 30 minutes or longer, contact CE to replace dewpoint sensor bobbin.

On initial power application or after dewpoint sensor bobbin replacement, leave SYSTEM DISCONNECT switch in ON position for 30 minutes before proceeding, to allow bobbin to warm up.

3. Set SYSTEM DISCONNECT switch on side of SPCP is set to ON (up) position. POWER AVAILABLE indicator on front of SPCP lights.

4. Press and hold REMOTE ENABLE/LOCAL START switch on SPCP for 2 seconds. POWER ON indicator lights, MG starts, bay cooling systems start. System power is now on.

5. Observe 400-Hz VOLTAGE meter on SPCP; MG output has stabilized when meter reads 0 percent.

LOCAL (BAY) CONTROL

1. Set mode switch on side of SPCP (refer to figure 2-3) to LOCAL position.

2. Set all circuit breakers on each 50/60-Hz power control box and 400-Hz power control box to ON position at processor, IOU, and memory bays. Set CONTROL switch on 50/60-Hz power control box to LOCAL position.

CAUTION

SYSTEM DISCONNECT switch should always be in ON position under normal conditions. If switch is off for 30 minutes or longer, contact CE to replace the dewpoint sensor bobbin.

On initial power application or after dewpoint sensor bobbin replacement, leave SYSTEM DISCONNECT switch in ON position for 30 minutes before proceeding, to allow bobbin to warm up.

3. Set SYSTEM DISCONNECT switch on side of SPCP to ON (up) position. POWER AVAILABLE indicator on front of SPCP lights.

4. Press REMOTE ENABLE/LOCAL START on SPCP. POWER ON indicator lights (this step starts MG).

5. Observe 400-Hz VOLTAGE meter on SPCP; MG output has stabilized when meter reads 0 percent.

6. Press and release POWER ON switch on the IOU, memory, and model 835 processor bay 50/60-Hz power control boxes. Press START switch on models 845 or 855 bay 50/60-Hz power control box.

REMOTE CONTROL

1. Set mode switch on side of SPCP to REMOTE 1, REMOTE 2, or REMOTE 3, according to type of remote control:

   REMOTE 1

   a. Model 835, 845, or 855 controlled by master Model 171, 172, 173, 174, 175, or 176 or Model 720, 730, 740, 750, or 760.

   b. SPCP for peripherals shared by master Model 171, 172, 173, 174, 175, or 176 or Model 720, 730, 740, 750, or 760.

   REMOTE 2 Model 835, 845, or 855 controlled by master Model 835, 845, or 855.

   REMOTE 3 Not currently used.

2. Set all circuit breakers on each 50/60-Hz power control box and 400-Hz power control box to ON position at processor, IOU, and memory bays (refer to figures 2-4 through 2-10). Set CONTROL switch on all bay 50/60-Hz power control boxes to REMOTE position.

CAUTION

SYSTEM DISCONNECT switch should always be in ON position under normal conditions. If switch is OFF for 30 minutes or longer, contact a CE to replace the dewpoint sensor bobbin.

On initial power application or after dewpoint sensor bobbin replacement, leave SYSTEM DISCONNECT switch in ON position for 30 minutes before proceeding, to allow bobbin to warm up.

3. Set SYSTEM DISCONNECT switch on side of SPCP to ON (up) position. POWER AVAILABLE indicator on front of SPCP lights.

4. Apply power to remote system according to type of remote control (refer to step 1):

   REMOTE 1

   a. Contact CE to apply power to master Model 171, 172, 173, 174, 175, or 176 or Model 720, 730, 740, 750, or 760.

   b. Same as REMOTE 1a, preceding, or place mode switch at SPCP for slave Model 835, 845, or 855 to LOCAL and apply power as described under SPCP CONTROL, preceding.

   REMOTE 2 Apply power to master Model 835, 845, or 855 as described under SPCP CONTROL, preceding.

   REMOTE 3 Not currently used.

DEADSTART PROCEDURES

Use the following deadstart procedures for the model 835, 845, or 855. There are two basic types of deadstart procedures, warmstart and coldstart. The warmstart procedure assumes that the necessary controlware has already been loaded into the tape or disk controllers that are to be used for the deadstart operation. The coldstart procedure loads the controlware into the tape or disk controllers before performing the deadstart sequence. The power-on initialization procedure includes additional steps to ensure the mainframe memories are initialized properly after power has been applied to the system.

PROCEDURE 4-3. DEADSTART PROCEDURE, COLDSTART

This procedure summarizes the steps necessary to coldstart a tape or disk controller from a card reader. Use this as a checklist during coldstart. Ensure that the card reader is on a different channel than the tape or disk unit on which the deadstart device is mounted. The card reader must be on a channel without a PP (for example, channel 12 or 13). For detailed information on the controlware deck for the controller, refer to the operating system installation handbook.

1. Ensure that required mass storage devices have packs mounted and/or are available.

2. Mount deadstart tape (CIP) or disk (refer to operating system operator's guide for instructions).

3. Set deadstart panel for coldstart from card reader (refer to table 3-1).

4. Set LONG/SHORT DEAD START SEQUENCE switch to short (down) position.

5. Press DEADSTART switch on the console panel (figure 2-16).

6. Insert card deck in card reader and activate card reader as follows:

   a. Press MOTOR POWER.

   b. Select AUTO MODE.

   c. Press RELOAD MEMORY.

   d. Press READY.

7. Continue with deadstart process by selecting CTI or MSL options as described in the CIP User's Handbook.

Once system has been coldstarted, warmstart procedure (procedure 4-4) should be used.

PROCEDURE 4-4. DEADSTART PROCEDURE, WARMSTART

The following steps are performed when deadstarting from a 66x or 67x tape unit, or an 844 or 885 disk unit or equivalent. The required controlware is assumed to be loaded and functioning properly.

The LONG/SHORT DEADSTART SEQUENCE switch on the deadstart panel selects the level of hardware testing that is to occur during the deadstart sequence. For normal operator deadstarts, do not have the system do any testing (switch in down position). This testing is usually done after maintenance has been performed on the system. Confidence level testing checks only part of PP0. Extended deadstart testing verifies that all of PP0 is working.

1. Mount CIP tape or disk pack (refer to operating system operator's guide for instructions).

2. Set program switches on deadstart panel for current deadstart condition (refer to deadstart panel settings for a warmstart in section 3 of this manual). Use active PP deadstart panel settings if deadstart device is on channel associated with PP doing block input at deadstart time (for example, PP 5/channel 5). Use inactive PP deadstart panel settings if the deadstart device is on channel not associated with a PP at deadstart time (channels 12_8 or 13_8).

3. Enter one of the following to set the level of testing at the deadstart panel:

Option	Action
No testing	Set LONG/SHORT DEADSTART SEQUENCE switch to short (down) position.
Confidence level testing	Set LONG/SHORT DEADSTART SEQUENCE switch to long (up) position.
Extended deadstart testing	Set LONG/SHORT DEADSTART SEQUENCE switch to long position (up) and set rightmost switch of word 12 to up position.

4. Press DEADSTART switch on display console. The CTI Initial Options display appears.

Refer to the CIP User's Handbook for further instructions on initializing the operating system and for instructions on using the CTI options and MSL.

PROCEDURE 4-5. POWER-ON INITIALIZATION PROCEDURE

Perform a power-on initialization when deadstarting the computer system after applying power to the mainframe.

1. Perform coldstart procedure 4-3, if necessary, to ensure controlware is installed.

2. Perform steps 1 and 2 of warmstart procedure 4-4.

3. Set the LONG/SHORT DEADSTART SEQUENCE switch to the long (up) position.

4. Press the DEADSTART switch to initiate a long deadstart and bring up the Initial Options display.

5. Enter a U to bring up the Utilities display.

6. Enter the letter I while displaying the Utilities display. The Initial Options display reappears with the following message at the bottom of the display:

```
ALL MAINFRAME MEMORIES WILL
BE INITIALIZED FOR MSL/OS LOADS.
```

7. Enter one of the following:

   CR To initialize the system (deadstart recovery levels 0, 1, 2 only) and load the operating system. If the deadstart recovery level is 3, the following message will be displayed:

```
OS LOAD IMPOSSIBLE
POWER ON INITIALIZATION AND
RECOVERY DEADSTART SELECTED
DEADSTART AND SELECT ONLY
ONE OPTION.
```

   Refer to the operating system operator's guide for information relative to recovery levels.

   M To initialize the system and bring up the MSL Deadstart display.

8. If communication is lost with a PP during initialization, the following message is displayed:

```
PP xx NOT RESPONDING
DEADSTART ABORTED
```

   Press the DEADSTART switch, logically turn off the PP, and repeat the procedure.

This section contains instructions for performing certain maintenance procedures prior to contacting the on-call CE.

It is expected that maintenance assistance will be required in three situations:

1. The operating system has displayed a fatal error message and the system cannot be recovered or restarted.
2. The system will not deadstart.
3. A power or cooling failure has occurred.

The troubleshooting guide in this section has been developed to assist in these situations. Its intent is, first of all, to attempt system recovery so that operation can continue until the on-call CE is contacted, and, secondly, to provide a clear picture of the failing situation to the on-call CE through use of the preservice request form.

STRUCTURED ANALYSIS METHOD (SAM)

The following troubleshooting lists, SAM 5-1 through 5-3, use the structured analysis method to guide the troubleshooting process. To interpret a troubleshooting list, read the advisory information (if any) following the SAM title, and then go to the first question. If the answer is yes, follow the line below the Y to the next question or action. If the answer is no, follow the line below the N. Actions are numbered sequentially, and the number of the last action in a sequence is underlined.

It may not be necessary to perform all the actions listed under a specific question. Proceed only until desired result is accomplished. For example, in SAM 5-1, there is no need to do step 4 if step 3 resulted in a successful recovery.

Procedures referenced in these lists are located in the CIP User's Handbook and in sections 3, 4, 5, and 6 of this manual.

SAM 5-1. OPERATING SYSTEM ERROR MESSAGES

Steps to take when the operating system halts and displays a fatal mainframe error message at the system control point of the B display are stated in the following SAM:

```
010 Y   N    CM FATAL ERROR message?
020 |   Y    N   CPU FATAL ERROR message?
030 |   |    Y   N   IOU FATAL ERROR message?
040 |   |    |   Y   N   MCH FATAL ERROR message?
050                                          1  No fatal errors. Attempt
                                                level 3 recovery deadstart
                                                as described in the
                                                operating system operator's
                                                guide. If errors occur, go
                                                to SAM 5-2.
060 1   1    1   1                           Record error message on
    |   |    |   |                           preservice request form.
070 2   2    2   2                           Perform express deadstart
    |   |    |   |                           dump according to procedure
    |   |    |   |                           in CIP User's Handbook.
080 3   3    3   3                           Attempt level 3 recovery
    |   |    |   |                           deadstart as described in
    |   |    |   |                           operating system operator's
    |   |    |   |                           guide.
090 4   4    4   4                           Run hardware verification
    |   |    |   |                           sequence (HIVS) according to
    |   |    |   |                           procedure 5-1. Record
    |   |    |   |                           errors on preservice request
    |   |    |   |                           form.
100 5   5    5   5                           Attempt level 0 recovery
    |   |    |   |                           deadstart as described in
    |   |    |   |                           operating system operator's
    |   |    |   |                           guide.
110 6   6    6   6                           Dump maintenance registers
    |   |    |   |                           according to printer dump
    |   |    |   |                           procedure in CIP User's
    |   |    |   |                           Handbook. Select print
    |   |    |   |                           options K, L, and M. Attach
    |   |    |   |                           printout to preservice
    |   |    |   |                           request form.
120 7   7    7   7                           Load off-line maintenance
    |   |    |   |                           software according to pro-
    |   |    |   |                           cedure 5-2.
130 8   9    9                               Run memory tests command
    |   |    |                               buffer according to
    |   |    |                               procedure 5-3. Record
    |   |    |                               messages on preservice
    |   |    |                               request form.
140 9   10   8   8                           Run IOU tests command buffer
    |   |    |   |                           according to procedure
    |   |    |   |                           5-3. Record messages on
    |   |    |   |                           preservice request form.
150 10  8                                    Run processor tests command
    |   |                                    buffer according to
    |   |                                    procedure 5-3. Record
    |   |                                    messages on preservice
    |   |                                    request form.
160 11                                       Degrade central memory
    |                                        according to procedure 3-2.
170             10                           Reconfigure PPs according to
                |                            procedure 3-1.
180 12          11                           Attempt level 0 recovery
    |           |                            deadstart as described in
    |           |                            the operating system
    |           |                            operator's guide.
190 13  11  12  9                            Contact service center.
200 14  12  13  10                           Establish remote maintenance
                                             terminal communication as
                                             described in procedure 5-5.
```

SAM 5-2. DEADSTART ERROR MESSAGES

Steps to take when an error occurs during a system deadstart sequence are stated in the following SAM:

010	Y	N					PROCESSOR NOT RESPONDING, FATAL ERROR - DEADSTART ABORTED message?
020		Y	N				DEADSTART ABORTED - FATAL ERROR message?
030			Y	N			ERROR PP xx message?
040				Y	N		ERROR CM message?
050					Y	N	ERROR CPUxx message?
060						1	No messages but sequence halted. Record deadstart status.
070	1	1	1	1	1		Record error message on preservice request form.
080	2						Deadstart. Turn off failing PP according to procedure. Press CR to load the operating system.
090	3	2					Dump maintenance registers according to printer dump procedure in CIP User's Handbook. Select print options K, L, and M. Attach printout to preservice request form.
100		3					Run hardware verification sequence (HIVS) according to procedure 5-1. Record errors on preservice request form.
110		4					Attempt level 0 recovery deadstart as described in the operating system operator's guide.
120	4	5	2	2	2		Load off-line maintenance software according to procedure 5-2.
130	5	6	3	4			Run IOU tests command buffer according to procedure 5-3. Record messages on preservice request form.
140		7	4	3	4		Run memory tests command buffer according to procedure 5-3. Record messages on preservice request form.
150		8		5	3		Run processor tests command buffer according to procedure 5-3. Record messages on preservice request form.
160				6			Degrade central memory according to procedure 3-2.
170				7			Attempt level 0 recovery deadstart as described in the operating system operator's guide.
180	6	9	5	8	5	2	Contact service center.
190	7	10	6	9	6		Establish remote maintenance terminal communication as described in procedure 5-5.

SAM 5-3. POWER/COOLING WARNING MESSAGE OR FAILURE CONDITIONS

Steps to take when power or cooling system failures occur or a shutdown is imminent are stated in the following SAM:

010	Y	N			CPU POWER FAILURE message?
020		Y	N		SHUTDOWN IMMINENT message?
030			Y	N	CPU, IOU, or memory powered down?
040				Y	N Audible warning sounded?
050				1	No warning message or failure occurred.
060	1	1			No action will prevent automatic power down. To lessen impact, perform the procedures in section 6.
070				1	Contact building maintenance personnel.
080			1		Look at the voltage meters inside each bay to determine which unit has powered down. Meters should indicate 0 percent when unit is on.
					NOTE Be sure meter select switch is positioned to other than OFF position.
090	2	2	2		After cooling system or unit has powered down, record power and cooling status on preservice request form.
100	3	3			Press POWER ON switch on system power control panel to bring power back up on system.
110			3		Attempt to bring power back up on unit according to procedure 4-2.
120			4		Perform an initial deadstart to reload the operating system as described in the operating system operator's guide.
130	4	4	5		Contact service center.

MAINTENANCE PROCEDURES

PROCEDURE 5-1. RUN HARDWARE INITIALIZATION AND VERIFICATION SOFTWARE (HIVS)

The hardware verification sequencer controls the execution of a set of go/no go tests of the peripheral processor subsystem (PPS), central memory (CM), extended memory (EM), and the central processor unit (CPU). The tests are taken from MSL and run under control of the sequencer using the capabilities of CMSE. The tests executed are CMC, MY1, EJP, and CT8.

The HIVS is initiated using the following procedure. This procedure assumes that you have deadstarted the system and have selected the CIP Operator Intervention display.

NOTE

If you are going to do a level 3 recovery deadstart after verifying the hardware, you must set the deadstart panel for a level 3 recovery prior to deadstart. Refer to the operating system operator's guide.

1. Enter a V to select HIVS. The display shown in figure 5-1 appears. Asterisks (*) on this display indicate the hardware to be tested.

2. Add or delete hardware tests using one or more of the following entries:

Entry	Description
A,CM or D,CM	Add (A) or delete (D) central memory tests.
A,C0 or D,C0	Add or delete CPU0 tests.
A,C1 or D,C1	Add or delete CPU1 tests.
A,PS or D,PS	Add or delete PP tests.
A,EM or D,EM	Add or delete extended memory tests. Extended memory testing is not available on systems using the NOS/BE Operating System.

When an attempt is made to select a testing sequence in which the hardware has been turned off via CTI or is physically not present on the system, one of the following messages will be presented:

```
NO PP AVAILABLE
NO CM AVAILABLE
NO CP AVAILABLE
NO EM AVAILABLE
```

3. Press CR to start testing.

   Hardware testing sequences may be selected individually and are not dependent on the successful completion of previously selected sequences. For example, CPU testing may be selected and executed without testing the PPs or central memory, or PP testing may be deselected and all other testing may still be executed.

   Upon completion of the test sequence, if no errors are detected, HIVS displays:

```
HARDWARE VERIFICATION COMPLETE
     DEADSTART IS REQUIRED
```

   If an error is detected, HIVS displays one of the following error messages:

```
ERROR PP xx
ERROR CM
ERROR CPU xx
ERROR EM
ERROR REG
```

   Where xx indicates the PP or CPU in error.

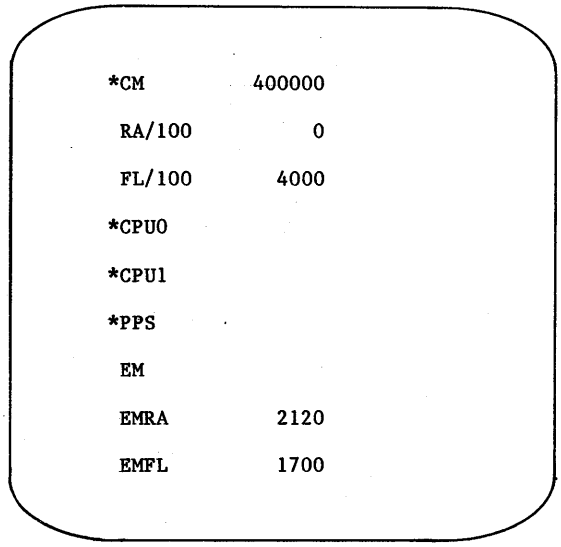


Figure 5-1. HIVS Display

PROCEDURE 5-2. LOAD OFF-LINE MAINTENANCE SOFTWARE

The off-line maintenance software libraries (MSL 152 and MSL 153) consist of a set of tests and diagnostics which aid in checkout and isolation of defective components in the computer system. MSL contains the CMSE, tests, diagnostics, and utility programs.

Selecting option M of the CTI Initial Options display causes system to load CMSE deadstart loader program. CMSE then allows operation to be performed on individual tests, diagnostics or utilities, by providing test displays, a keyboard command structure, a loading capability, and diagnostic sequencing.

The following steps are performed when deadstarting the maintenance software from a 66x or 67x tape unit, or an 844 or 885 disk unit or equivalent. The procedure assumes that the necessary controlware has been loaded and is functioning.

1. Mount maintenance software tape or disk. Refer to operating system operator's guide for instructions.

2. Set switch settings on deadstart panel as shown in table 3-2 for a warmstart.

3. Press DEADSTART switch. The Initial Options display appears on the screen.

4. Enter an M. The off-line maintenance deadstart display shown in figure 5-2 appears for a tape deadstart. Refer to notes at the bottom of this page for a description of disk deadstart display.

5. Enter the following to change an entry:

   nn.entry

   where:

   nn — number of entry to be changed.

   entry — desired value as described on display.

   Press CR.

6. When all entries are correct press CR . The CMSE A display header appears on the left screen and the B display header appears on the right screen as shown in figures 5-3 and 5-4.

   CMSE is now operational and ready to execute tests and diagnostics as directed by operator commands.

```
                SX MAINT. SYS
  COPYRIGHT CONTROL DATA CORP., 1979
     DSRT STAND-ALONE TST LDR
     OPER ENTRIES (FOLLOWED BY CR)
     (CR) TO LOAD SYS
     MNE - LD STAND-ALONE TST


     KP - CLR PP MEM
     KC - CLR CM
     * - CA+KP+KC
     NN.ENTRY - CHG SYS CONFIG

     SYS CONFIG

 1. MACHINE TYPE                        =   SX
 2. CM SIZE                             =   0X
    3=65K  4=98K  5=131K
    6=198K  7=262K
 3. EM SIZE
    1=1XXK  2=2XXK  3=5XXK  4=10XXK     =   0X
    5=15XXK 6=20XXK 12=40XXK
 4. NO. OF CPUS †                       =   01
 5. NO. OF PP S †                       =   24

 6. MON PP/IO COMM CH                   =   01
 7. PP COMM CH                          =   03
 8. DIS PP/COMM CH                      =   02

 9. SCAN CH(CY176 ONLY)                 =   00
10. 1ST AND LAST PPU(CY 176 ONLY)       = 0000

11. LD DEV TYPE ††                      =   00
    0= TAPE,1= 844-21,2= 3330-1,3= 3330-11.
    4= 3350,5= 844-4X,6= 885, 7=834

12. 405 (CCEE)                          = 1204
13. CM FLAG/CR MAC/DCC                  = 4401

14. TAPE UN/DCC NO.S(UUOD) ††           = 0101

15. DISK CH AND EQ ††                   = 0100
16. DISK UN/MAC/DCC NO.S(UUMD)          = 0100

17. DISK CYL NO.                        = 0000
```

† Entry not applicable on some machines.
†† Entry not displayed if disk deadstart (entries are renumbered).

Figure 5-2. MSL Deadstart Display

```
CR OFF CP0 PP03  04  05  06  07  10  11
F S S F*E  D*E   P   *   D*   *   F   *
LE         PP20 21  22  23  24  25  26  27  30  31
A=0000      *   *   *   *   *   *   *   *   *   *
```

Figure 5-3. CMSE A Display Header

The following status characters may appear in the A display header.

Character	Description
*	Displayed when PP or CP is in contact with CMSE.
D	Displayed when PP or CP is requesting test display.
E	Displayed when PP or CP had identified an error condition.
F	Displayed when CMSE unable to contact PP in 4096 attempts.
P	Displayed when PP has parity error status.
LE	Displayed when error logging is turned on.
F S S F	Indicates clock margins: fast (F) and slow (S), maximum of four.
A=0000	Indicates contents of pseudo A register.
CPx	Identifies CPU.
CR OFF(ON)	Indicates the status of the card reader.

The PPs that do not exist or are not available for maintenance do not appear in the header display.

The keyboard area consists of the bottom five lines of the A display.

```
CH00   01   02   03   04   05   06   07   10   11   12
13  15  17
  E00 -00  -    F00  -    -10  -    -    F00  -    -
-   -   -
CH20  21   22   23   24   25   26   27   30   31   32   33
  -   -    -    -   F07  -    -    -    -    P    -    -
BP
ST  SS  SB  SC *SE  LE  RT  RS  RB  RC  SM  QL
DR  DE
```

Figure 5-4. CMSE B Display Header

The B display contains system error and I/O channel status information as follows:

Character	Description
-	Displayed when channel inactive when interrogated by CMSE.
F	Displayed when channel full when interrogated by CMSE.
E	Displayed when channel empty when interrogated by CMSE.
P	Displayed when channel contains parity error status.
BP	Specifies the type of display.
*	Indicates which of the parameter conditions shown are selected.

The number following the hyphen, E, or F channel activity indicators is the number of the PP for which the channel is reserved. If the number is 00, the channel is reserved for CMSE use.

PROCEDURE 5-3. RUN COMMAND BUFFER

Command buffers are a means of saving strings of CMSE and/or program commands which are necessary to execute a particular diagnostic sequence. A specific command buffer can be easily accessed by entering one command.

Use the following procedure to load and run a command buffer. This procedure assumes that the maintenance software library has been loaded and is operational.

1. Enter GO,name. Press CR.

   name is the name of the command buffer (one to seven alphanumeric characters) as it appears in the command buffer name table.

2. Enter GO if the command buffer halts. Press CR. The next command in the halted command buffer is executed.

The test and diagnostic display shown in figure 5-5 appears while tests are running.

```
name op PCxxxx Sxxxx SBxxxx Cxxxx - (message)
```

Figure 5-5. Test and Diagnostic Message Display

The message display has the following meaning:

name	Name of test (four-character mnemonic).
op	Type of operation performed:
	RU Running
	SM SCOPE mode
	SP Set parameters/stopped for parameters
	SC Stop at end of condition
	SL Stop at loop
	SB Stop at end of subsection
	SS Stop at end of section
	ST Stop at end of test
	SE Stopped on error
	RC Repeating condition
	RL Repeating loop
	RB Repeating subsection
	RS Repeating section
	RT Repeating test
PCxxxx	Pass count
Sxxxx	Current section number
SBxxxx	Current subsection number
Cxxxx	Current condition number

PROCEDURE 5-4. DISPLAY COMMAND BUFFER NAME TABLE

MSL contains a number of command buffers for the convenience of operators and CEs who wish to use the tests, diagnostics and utilities on MSL.

Use the following procedure to display a list of available command buffers. This procedure assumes that MSL has been loaded and is operational.

1. Enter an AG or BG command. Press CR.

   The A or B screen displays up to 200 command buffer names.

2. Enter AG,indx or BG,indx to advance table. Press CR. The table will advance by the number of entries indicated by indx (1 to 4 octal digits). Entries of +, -, (, and) increment or decrement the name table display.

This section provides procedures to be performed in emergency or abnormal operating conditions.

PROCEDURE 6-1. EMERGENCY POWER REMOVAL

Pull handle of any of the wall-mounted EMERGENCY OFF switches.

NOTE

This switch can be reset only by removing mounting box cover.

PROCEDURE 6-2. EMERGENCY COOLING SYSTEM PROCEDURES, EXCEPT MODELS 845 AND 855 PROCESSOR BAYS

A condensing unit fault, a facility power failure, or activation of the site emergency off switch prevents condensing unit from pumping down. The system has refrigerant dispersing throughout and will have to be pumped down manually as follows:

1. Wait 20 to 30 seconds and reapply power with condensing unit circuit breaker for not more than 2 or 3 seconds.

2. Wait another 20 to 30 seconds and repeat. Continue in this manner until slugging stops.

PROCEDURE 6-3. AUDIBLE ALARM

If the audible alarm sounds, it indicates that room temperature has reached 35 °C (95 °F) or room dewpoint has reached 11 °C (52 °F). Contact building maintenance personnel.

This section provides normal power down procedures. Before performing these procedures refer to applicable operating system operator's guide for procedures on preparing operating system for a normal shut down.

PROCEDURE 7-1. POWER REMOVAL, NORMAL CONDITION

Normal power removal procedures depend on whether system power is under SPCP, remote, or local control.

NOTE

If system power will be down for more than 12 hours, notify a customer engineer (CE) who will close liquid and discharge service valves.

SPCP LOCAL CONTROL

Press and release STOP on SPCP; or, at IOU bay, memory bay, and model 835 processor bay, press and release POWER OFF on each 50/60-Hz power control box. At the model 845 or 855 processor bay press STOP on the 50/60-Hz power control box.

REMOTE CONTROL

Remove power from system according to type of remote control:

REMOTE 1

a. Contact CE to remove power from master Model 17X or 700 series (this powers down both master and slave systems); or remove power from slave system only as described under SPCP LOCAL CONTROL, preceding.

b. Contact CE to remove power from master Model 17X or 700 series. Ensure that slave Model 835, 845, or 855 is powered down. If mode switch on slave system SPCP is in LOCAL position, remove power from slave system as described under SPCP LOCAL CONTROL, preceding.

REMOTE 2 Remove power from master Model 835, 845, or 855 as described under SPCP LOCAL CONTROL, preceding (this powers down both master and slave systems); or, remove power from slave system only as described under SPCP LOCAL CONTROL, preceding.

REMOTE 3 Not currently used.

PRESERVICE REQUEST FORM

The preservice request form (figure 8-1) documents the visible indications of a hardware failure. It provides the CE with a written record of the problems you encountered and the procedures you performed in attempting to identify and correct the problems.

With this information, the on-call CE can determine which tools, test equipment, and spare parts should be brought on the service call.

TEMPERATURE/HUMIDITY RECORDER CHARTS AND PENS (OPTIONAL)

Control Data supplies temperature/humidity recorder charts and pens for systems covered by a Control Data maintenance agreement. For other systems, these items can be obtained from a local Honeywell sales or service center.

PRESERVICE REQUEST FORM

CUSTOMER NAME _____ DATE _____

SITE ADDRESS _____ TIME _____

COMPUTER SYSTEM _____ MODEL _____

OPERATING SYSTEM _____ LEVEL _____

OPERATING SYSTEM STATUS

OPERATING SYSTEM ERROR MESSAGE: _____

TEST OR DIAGNOSTIC STATUS

COMMAND BUFFERS RUN (List all command buffers ran):

Command Buffer	Ran OK? (Y/N)	Test	Section(S)	Failing Subsection(SB)	Condition(C)	EC1	EC2

ERROR MESSAGES: _____

DEADSTART STATUS

DEADSTART PANEL STATUS:

	PP 0 Register Contents	Indicator	ON	OFF	Indicator	ON	OFF
A		LDS ERROR A			CH		
K		LDS ERROR B			A		
Q		DEADSTART ERR			PQ		
A		M			I		
					C		

DEADSTART ERROR MESSAGE: _____

POWER AND COOLING STATUS

Circuit Breaker or Gauge	845/855 CP	835 CP	IOU	CM	Indicator	845/855 CP ON	845/855 CP OFF	835 CP ON	835 CP OFF	IOU ON	IOU OFF	CM ON	CM OFF
400 Hz (Tripped, Y/N)					COND. FAULT								
50/60 Hz (Tripped, Y/N)					HIGH TEMP. FAULT								
Chassis Pressure					LOW TEMP. FAULT								
Condenser Pressure					BLOWER 1 FAULT								
Dew Point					BLOWER 2 FAULT								
Chassis Water Temp.					BACKUP TEMP FAULT								
Pump Outlet Pressure					PRIMARY TEMP FAULT								
Chilled Water Temp.					CLG UNIT FAULT								
					CABLE FAULT								
					POWER SPLY OFF								
					PRIMARY LOW TEMP FAULT								
					BACKUP LOW TEMP FAULT								
					HIGH WATER PRESSURE								
					LOW WATER LEVEL								
					HIGH WATER LEVEL								

OTHER: _____

PRINTOUTS ATTACHED: Printer Dump _____ Error Logs _____

EXPRESS DUMP AVAILABLE (Yes/No) Tape _____ Location _____

Printout _____ Location _____

OPERATOR _____

PHONE NO. _____

Figure 8-1. Preservice Request Form

Proper care of the computer system includes regular monitoring of sensors and gauges to ensure that the required environmental conditions are being maintained and that the power and cooling systems are operating properly. Perform the following procedures at the time intervals specified.

WEEKLY CARE

Perform procedures 9-1, 9-2, and 9-3 weekly.

PROCEDURE 9-1. MONITOR DEWPOINT

A dewpoint sensor is located on the system power control panel. (Refer to figure 2-3.) It consists of a dial with two scales, the gray scale is degrees Centigrade, and the black scale is degrees Fahrenheit.

A red needle indicator gives the dewpoint reading.

Record the dewpoint reading weekly, either on temperature/humidity recorder chart when it is replaced or on a dewpoint record chart. Refer to figure 9-1 for a sample chart.

PROCEDURE 9-2. MONITOR COOLING SYSTEM GAUGES, MODEL 835

The cooling system gauges are located behind door B of the processor, IOU, and memory bays. (Refer to figure 2-1, mainframe switch and indicator location diagram.)

There are two gauges in each bay, one is labeled CONDENSING PRESSURE, the other CHASSIS PRESSURE.

Record chassis pressure and condenser pressure readings on a cooling system gauge record chart weekly. Refer to figure 9-2 for a sample chart. Use outer black scale of both gauges.

If the chassis pressure is below 56 psi or above 59 psi, or if the condenser pressure is below 132 psi or above 144 psi, contact the Control Data Service Center.

PROCEDURE 9-3. MONITOR COOLING SYSTEM GAUGES, MODELS 845 AND 855

The cooling system gauges are located behind door B of the IOU and memory bays and behind door A of the processor bay. Refer to figure 2-2 Models 845 and 855 Mainframe Switch and Indicator Locations.

There are two gauges in the IOU and memory bays, one is labeled CONDENSING PRESSURE, and the other CHASSIS PRESSURE.

Record chassis pressure and condenser pressure readings on a cooling system gauge record chart weekly (refer to figure 9-3 for a sample chart). Use outer black scale of both gauges.

If the chassis pressure is below 56 psi or above 59 psi, or if the condenser pressure is below 132 psi or above 144 psi, contact the Control Data Service Center.

DEWPOINT RECORD

Record the dewpoint reading on this chart weekly. Record the black numbers only.

Date	Dewpoint	Initials	Date	Dewpoint	Initials

Figure 9-1. Dewpoint Record Chart

There are three gauges in the processor bay. One is labeled PUMP OUTLET PRESSURE and the other two are labeled CHASSIS WATER TEMP and CHILLED WATER TEMP. Record the pump outlet pressure and the two water temperatures on the cooling system gauge record chart weekly.

If the pump pressure is below 69 kPa (10 psi) or above 344 kPa (50 psi), or if the chassis water temperature is below 16.5 °C (60 °F) or above 18.3 °C (65 °F), or if the chilled water temperature is below 4 °C (40 °F) or above 10 °C (50 °F) contact the Control Data Service Center.

PROCEDURE 9-4. TEMPERATURE/HUMIDITY RECORDER PROCEDURES (OPTIONAL)

The temperature/humidity recorder provides a record of computer room temperature and humidity. This information can be valuable in resolving certain types of problems (such as paper handling, magnetic tape).

The chart, CDC part no. 22066270, is a seven-day chart and needs only weekly replacement. When installing the new chart, make sure the proper day and approximate time are under the pens.

GENERAL RECOMMENDATIONS

Satisfactory recording is based on the assumption that normal maintenance procedures for pens are followed and that chart paper is handled with care.

The user is strongly urged to follow the recommendations given below for all recording systems:

1. Keep chart clean and packed in its box until it is to be used. Store charts away from humid or very dry atmospheres.
2. Handle chart as little as possible.
3. Handle pen mechanism with care. Replace pen cartridges as needed. Take care not to touch exposed pen tip.

REPLACING PEN CARTRIDGES AND CHART PAPER

1. Pull pen arrestor arm out so pen(s) rests away from chart face.
2. Install pen cartridge(s) parallel to pen arm, with plastic pen nub against V-notch at end of arm.
3. Close plastic flap of cartridge around pen arm and snap into place on cartridge body.
4. Insert chart on hub, slipping edge under hold-down lugs.
5. Remove protective pen tip caps.
6. Line up desired chart time line with humidity pen. (On two pen instruments, the inner arm is humidity and uses a red fiber-tip pen cartridge.)

MODEL 835
COOLING SYSTEM GAUGE RECORD

Record the chassis pressure and condenser pressure of the processor, IOU and memory on this chart weekly. Record the black numbers from the outside scale only.

	PROCESSOR		IOU		MEMORY		
Date	Chassis	Condenser	Chassis	Condenser	Chassis	Condenser	Initials

Figure 9-2. Cooling System Record Chart, Model 835

MODEL 845 OR 855
COOLING SYSTEM GAUGE RECORD

Record the pump outlet pressure and chassis and chilled water temperatures for the processor bay and record the chassis and condenser pressure for the IOU and memory bays on this chart weekly.

	PROCESSOR			IOU		MEMORY		
Date	Pump Outlet Pressure	Chassis Water Temp.	Chassis Water Temp.	Chassis Pressure	Condenser Pressure	Chassis Pressure	Condenser Pressure	Initials

Figure 9-3. Cooling System Record Chart, Model 845 or 855

COMMENT SHEET

MANUAL TITLE: CDC CYBER 170/180 Computer Systems Models 835, 845, and 855 Hardware Operator's Guide

PUBLICATION NO.: 60458390 **REVISION:** F

NAME: _____

COMPANY: _____

STREET ADDRESS: _____

CITY: _____ **STATE:** _____ **ZIP CODE:** _____

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