984-380 and -381 Controllers
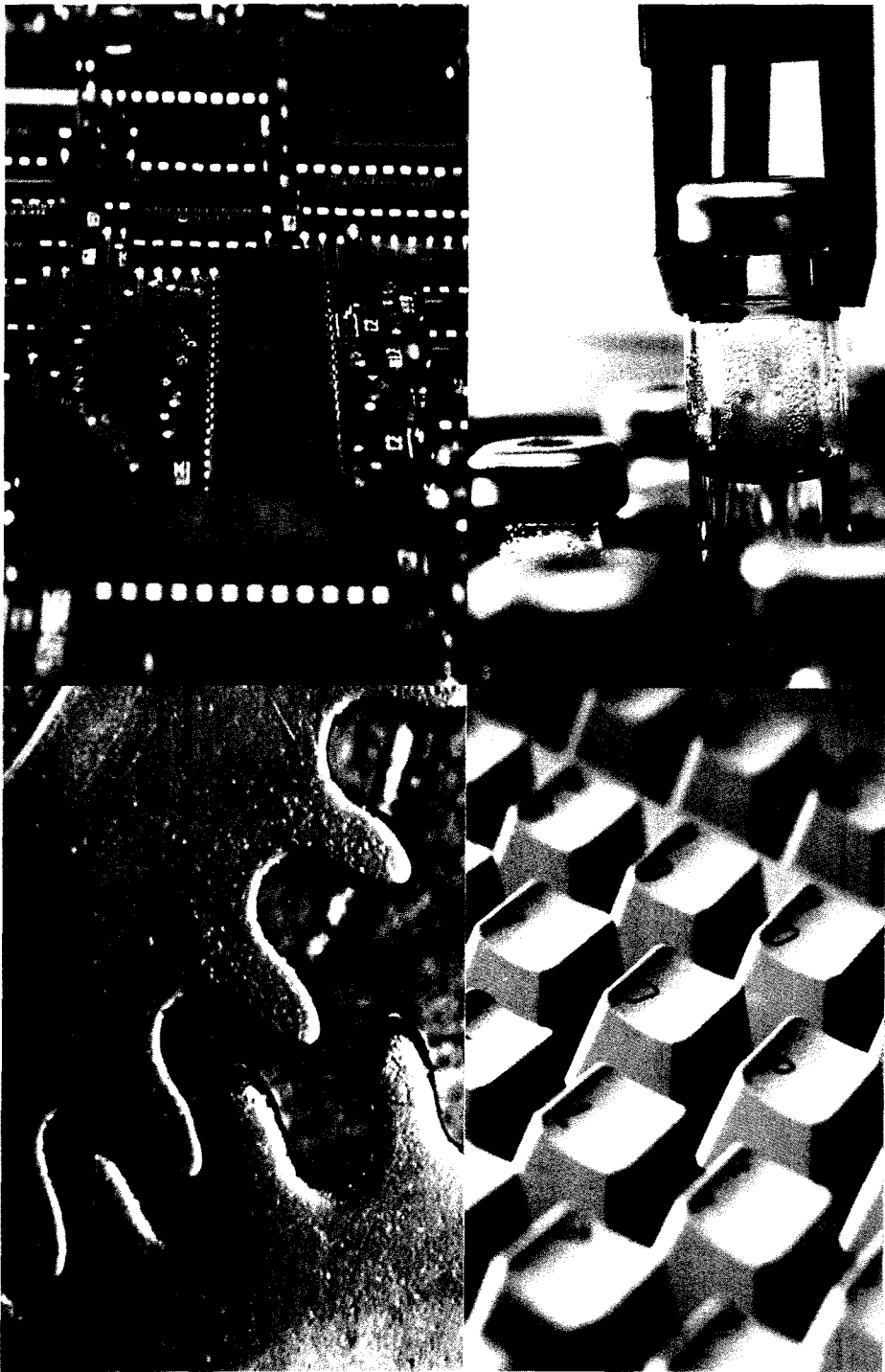## System Planning and Installation Guide

GROUPE SCHNEIDER

■ Modicon ■ Square D ■ Telemecanique

MODICON
PC-0984-380/381
Programmable Logic Controller
System Planning and Installation Guide

December, 1987

Preface

This guide describes the PC-0984-380 [and PC-0984-381] Programmable Logic Controller systems together with system planning information and installation procedures.

For brevity and your convenience, the PC-0984-380 controller is referred to in context as the 984-380 or simply Model 380. Since the Model 381 is an enhanced Model 380, the Model 380 documentation applies to the 381 except when dealing with the enhancements; i.e., discrete I/O support, real time clock, and second MODBUS port. When these exceptions occur, the Model 381 information appears in [brackets].

In the context of this manual, the terms "Programmable Controller" and "Programmable Logic Controller" have been abbreviated to "PC" for brevity. References to IBM's personal computer are written out or in context with IBM's initials.

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Modicon Doc FN's: 0240Q thru 0245Q

Objectives

This manual has been written to help you plan, configure, mount, wire, connect, check out and, if necessary, troubleshoot your 984-380 PC system including 984/800 Series Remote I/O. After reading this publication:

- A Control Engineer will be able to identify and physically plan the location and mounting of system components.

- A Plant Electrician/Installer will be able to install, power-up and check out the system.

- A Maintenance Technician will be able to recognize, locate, identify and resolve or report system failures.

How To Use This Manual

Chapter 1 describes the 984-380 PC system's functions.

Chapter 2 offers information for planning your installation with Local I/O.

Chapter 3 is an installation procedure for your controller with local I/O along with installation verification procedures.

Appendix A gives system specifications including a summary table of I/O module specifications.

Appendix B gives Stopped Error Codes, MODBUS cable connector pinouts, a table of Modicon 984-380 system end-user part numbers, Customer Service/Technical Support telephone numbers, and Installation Verification troubleshooting charts.

Related Documents

GM-0984-001 Rev B   P190 Programming Guide
GM-0984-IBM Rev B   IBM Programming Guide
ML-P190-USE Rev C   984-380/P190 PC System User Manual
GM-T984-001 REV A   984-380/P190 PC System Tape Loader
GM-HIBM-002 REV A   IBM Load/Record Verify User's Guide

Incoming Inspection Guidelines

Procedure   *Guidelines for Inspection*

Step 1   Before you do anything, verify your shipment is complete and undamaged. If the shipment is incomplete or damaged, notify the carrier and your distributor.

Step 2   Remove everything from its packing and check for physical defects or damage. If the equipment is physically defective or damaged, notify your Modicon representative.

▶ **NOTE**   Save shipping materials until installation is complete.

Sending Something Back?

- To the extent possible, use the original packing materials supplied by Modicon.

- All equipment should be firmly packed so that it cannot move around in its shipping container.

- All equipment should be protected against impact during shipment.

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Chapter 1
Introducing Your Controller

This chapter describes your 984, Model 380 Programmable Controller (PC) system.

984-380 Programmable Controller System Description

Overview

The Modicon 984 Model 380 (984-380) PC is a mid-range Programmable Logic Controller (PC) in a modular, expandable, architecture. It employs Modicon 800 series housings, interfaces and I/O modules. The Model 380 is supported by the same instruction set as the other 984 PC models and is programmed by the same tapes and P190/IBM accessories.

Figure 1-1 is a perspective view of the 984-380/[381] system's controller module with built-in power supply. Certain physical features are noted.

Figure 1-1

984, Model 380/[381]
Controller Module
(PC-0984-380)
[PC-094-381]
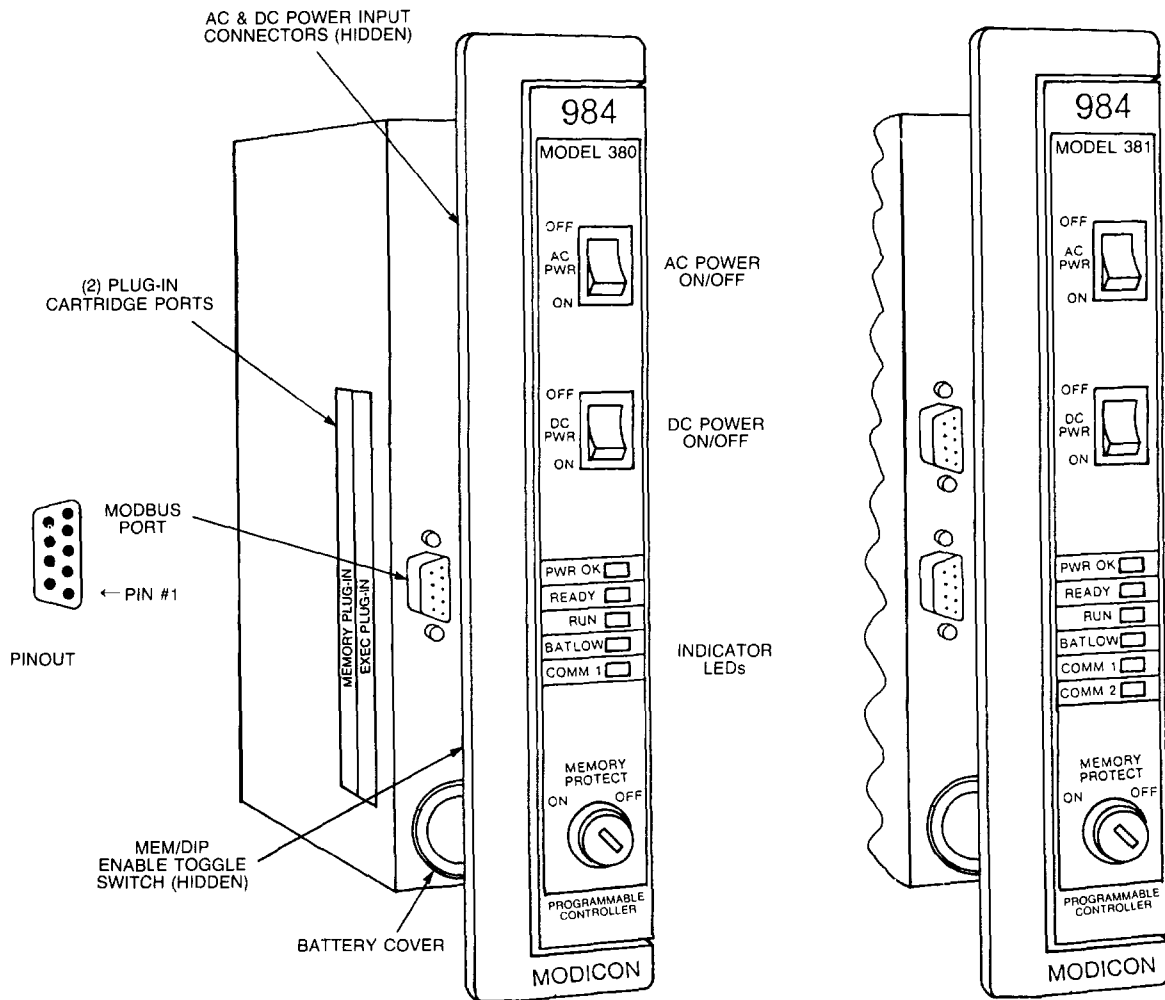
System Features

The Model 380 system's features are described below followed by somewhat more detailed functional descriptions.

System Capacity   The Model 380 controller features up to 6K words of User Logic and 1920 Registers of state RAM for a total user memory of 8K words.

The 380's user logic and state RAM support one local drop in the form of two Modicon 800 series module housings. This local drop has a maximum I/O module capacity of 21 I/O Modules (19 modules if an auxiliary power supply is required) and up to 256 discrete points [512 for Model 381] of local I/O (any mix). The Model 380 will not support remote I/O.

Changeable Executive PROMs and Memory   The 380 system features user-changeable executive operating firmware and two levels of user memory (user logic) which are referred to in this manual as executive and memory cartridges, or simply Exec and RAM packs, respectively.

Module Housings   The 984-380 system uses Modicon 800 series housings for its controller and I/O modules; specifically, a 19" primary housing with a seven module capacity or a 27" primary housing with an eleven module capacity.

Primary Enclosure — With the single-width Model 380 controller in your primary enclosure, the 19" and 27" primary enclosures will accomodate up to 6 or 10 I/O modules, respectively.

Secondary Enclosure — The secondary housing will accommodate a one and one-half wide P810, P800 or P884 auxiliary power supply if a power supply extender is required and as many I/O modules as there is room remaining.

Specifically, the standard 19" or 27" secondary housings will accommodate five or nine I/O modules along with a one and one-half wide (two slot) auxiliary power supply and a full seven or eleven I/O modules without the power supply.

The 19-inch primary housing with controller is shown in Figure 1-2. For simplicity's sake, the 27" housing is not shown in this manual except as required in the illustration on panel mounting dimensions.
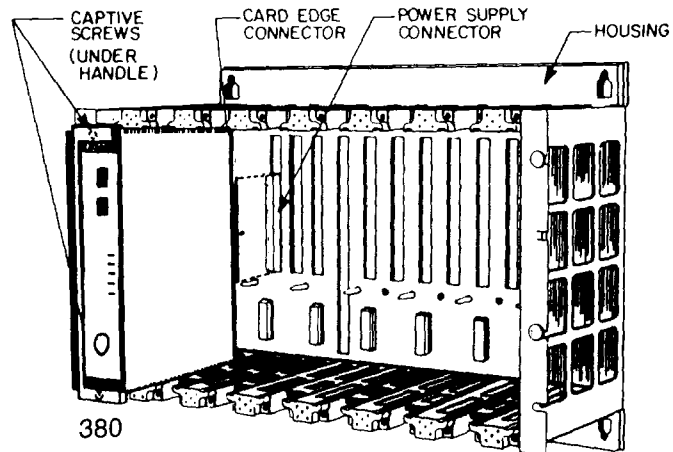
Construction   The Model 380 controller is housed in a rugged metal chassis designed to withstand specified temperature and humidity extremes as well as vibration, shock, and ambient atmospheric conditions consistent with the "factory floor."

The 380's primary housing employs a shielded backplane which provides for internal communications within the housing. The backplane protects the internal system communications from both electromagnetic (EMI) and radio frequency interference (RFI).

Captive screws secure all modules in the housings and they should be used to insure good electrical contact between the connector at the rear of the module and backplane in the housing. Key pin protection is also available.

User memory is backed up by a lithium battery which has a one year service life. It will hold-up for 14 days after the BAT LOW indicator comes on. The battery's installed but unused service life is rated at one year, with a five year shelf life.

A manually operated memory-protect key switch prevents accidental access to the user's program. The operating key may be removed to limit access to designated personnel.

Power Supply Function (AC and DC)

The Model 380 system's controller module comes with a built-in power supply which provides 16.25 Watts to the I/O (worst case).

The 984-380 will run on 115 or 230Vac (47 to 63 Hertz) and 24Vdc. As shown on Figure 1-3, the power supply's step down transformer is matched to the appropriate AC input voltage by means of a slide switch located above the AC primary power input connector (seen from the module's left side). Once connected, AC power is then switched ON/OFF with a front panel rocker switch.

The PC will also operate continuously on 24Vdc as an alternate or its exclusive power source. Figure 1-3 shows a primary power input connector for a customer supplied 24Vdc source. Once connected, DC power is then switched ON/OFF with a front panel rocker switch.

Figure 1-3

984-380 Module (Left Side)

115/230Vac Select Slide Switch and Input Power Connectors
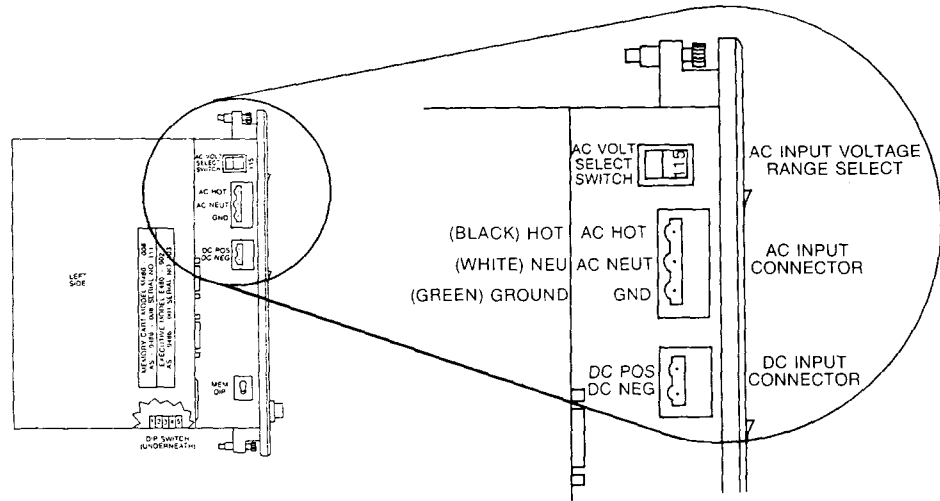
► **NOTE** The primary power DC input feature was not designed, nor is it suitable as an automatic battery backup provision in the event of an AC outage. This is because the controller's externally sourced DC input joins with the AC sourced, internally produced DC. At any given time, the PC is taking from the higher of the two DC voltage sources if there is as little as a 1V differential. The consequence of this would be to draw down the DC battery if there were an extended period(s) of reduced AC voltage supply.

If you want a backup alternative, one could be configured from a user-supplied DC power supply with its own backup battery and charger combination along with appropriate monitoring provisions.

Communications Processing Function

The Model 380 has one built-in MODBUS port for data transfer and remote programming. Through this port, communication processing on the CPU board can be linked from the controller to supervisory and programming devices such as a host computer or Modicon's P190 CRT programmer. The MODBUS port allows you to schedule one MODBUS service per scan. [The Model 381 offers a second MODBUS port which allows you to incorporate your controller into the MODBUS network and still have a free port for connecting you local programming panel.]

Figure 1-4 shows the 984-380 controller from the left side. The MEM/DIP toggle switch enables your preset DIP switch configuration for MODBUS port 1. (For software configuration, refer to software configurator in software documentation.)

Figure 1-4

984-380 Controller(Side View)
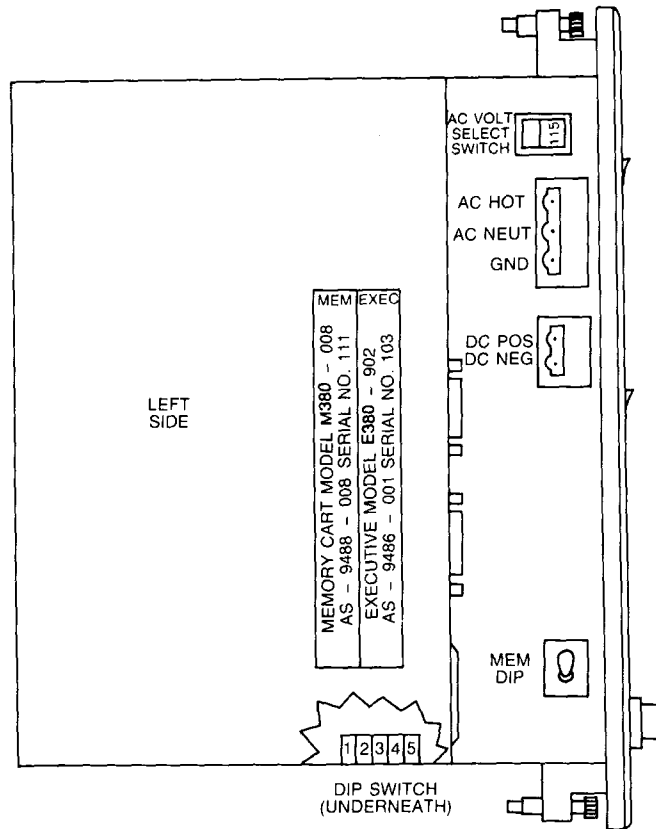
The DIP switch for configuring MODBUS port 1 parameters is shown at the bottom of the illustration but access to the DIP switch is actually through the bottom of the module's case.

Although the executive and memory cartridge plug-ins are shown installed in the chassis, they are shipped separately and user-installed as part of system installation.

Central Processing Unit (CPU) Function

The 984-380's 16-bit CPU, which is fully compatible with the Modicon 984 PC instruction set, solves user logic at a nominal rate of 5 ms per thousand nodes of user logic. [A time-of-day clock is provided on the Model 381 for special applications.]

Mainframe Controls

Figure 1-5 shows front panel user controls.

Figure 1-5

984-380/[381] (Front Panel)
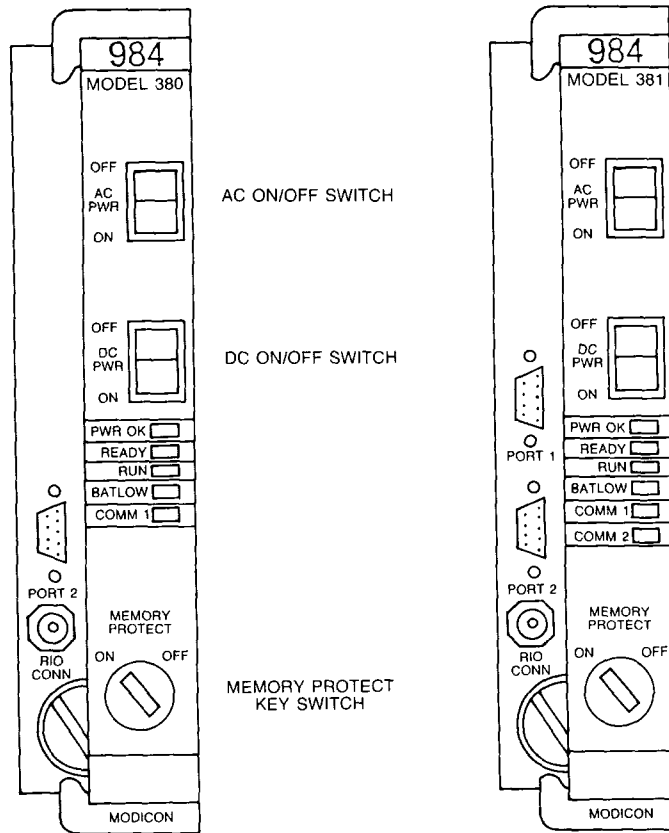
Status indicators on the CPU module are:

- POWER OK   Green LED: When ON, indicates input power OK and voltage outputs OK. Your I/O power OK is indicated by the READY LED.

- READY   Amber LED: When ON, indicates Controller passed power-up diagnostics. Remains ON in Stopped and Run modes as long as health status is OK. Indicator is OFF when an error condition is detected by diagnostics.

- RUN   Green LED: When ON, indicates Controller is in the RUN mode and solving logic.

- BATTERY LOW   Red LED: When ON, indicates battery needs to be replaced (14 day holdup from initial indication).

- COMM 1   Green LED: When ON, indicates communication processor has unit address and communications are in progress.

[Model 381 only]:

- COMM 2   Green LED: When ON, indicates communication processor has unit address and communications are in progress.

Chapter 2
Planning For Your Controller and I/O Installation

This chapter describes planning considerations for installing your 984-380 PC with local I/O.

Overview

The 984-380 PC is designed to work with your Modicon P190 Programmer or IBM Personal Computer; Modicon 800 series housings, interfaces and I/O modules.

The site planner must also consider the peripheral equipment (such as a P190 Programmer, CRT monitor, or printer) when preparing an installation plan for the site. Refer to the appropriate Modicon publications for site preparation procedures for related equipment.

Space Requirements

For the primary module housing, allow 12 inch clearance to the left so installer can see power supply connectors. Allow 6 inches on the top and side of the housing for convection cooling in vertical mounting situations. Allow 12 inch clearance at the bottom of the PC for cable access.

For all other housings, allow 6 inches on the top and sides of each housing for unobstructed cooling airflow in vertical mounting situations.

Also consider installation and physical access for removal of the modules as well as subsequent service including the connection and detachment of signal and power cables when required.

The Model 380 primary housing may be separated up to 12 feet from the secondary housing depending only on the cable length employed.

Primary Power Lines

In addition to service access, distance to power sources has to be considered in planning your controller installation. In addition to cable routing considerations, good practices dictate that the power lines be dedicated to the PC installation to minimize problems that sometimes arise when sharing AC power with electrically noisy equipment.

Finally, plan to install a service loop and a cable restraint as the primary power cable connector is not locked in place.

Environmental Requirements

In planning for the 984-380 PC installation, consideration should be given to the environment around the controller. Although designed for a harsh industrial environment and able to withstand factors that would harm other types of electronic equipment, problems can be avoided by not placing the controller and its related equipment in an operating area where there is high ambient temperature, acidic atmosphere, vibration, dust, and dirt if it can be avoided.

Mounting Hardware Requirements

After deciding on the final location of the 984-380 PC, its associated equipment and cables, you should plan for related mounting hardware. This would include such items as: nut and bolt combinations, flat and star washers, housings, mounting surface, ground straps and system ground connections.

Mounting bolts are NOT provided. The recommended mounting bolts are 0.312-24 UNF-2B (insert or tapped) stainless steel (#8-13-SS).

Housing Installation Options

The 984-380 system housing can be panel/bulkhead mounted or rack mounted as described in the following text.

Panel or Bulkhead Mounting

As shown in Figure 2-1 below, the housing has keyholes at the top and bottom of the housing for bulkhead mounting purposes. The keyholes are sized for 5/16-inch bolts. The recommended ground point is also shown.

Figure 2-1

H819/H827 Housing's Panel
or Bulkhead Mounting
Dimensions

H819

GROUND POINT

H827

GROUND POINT
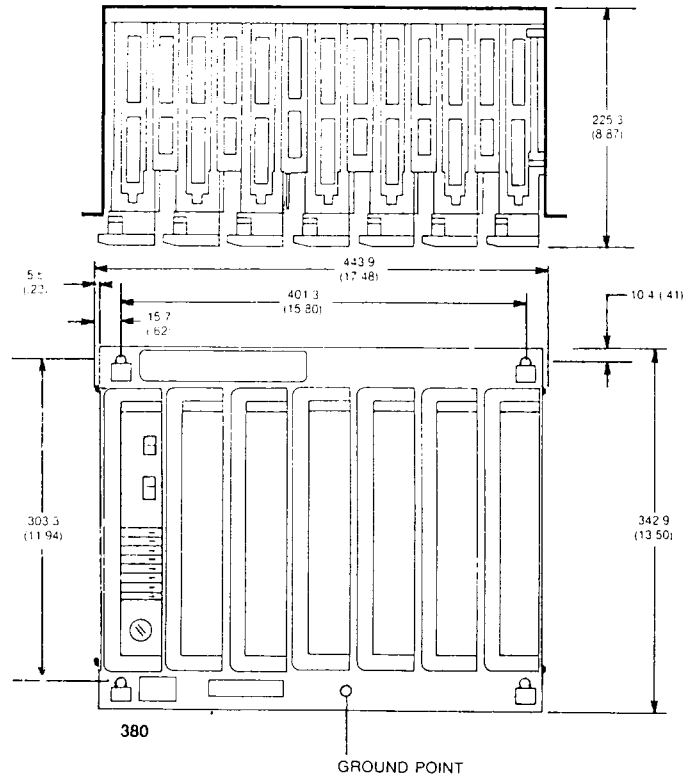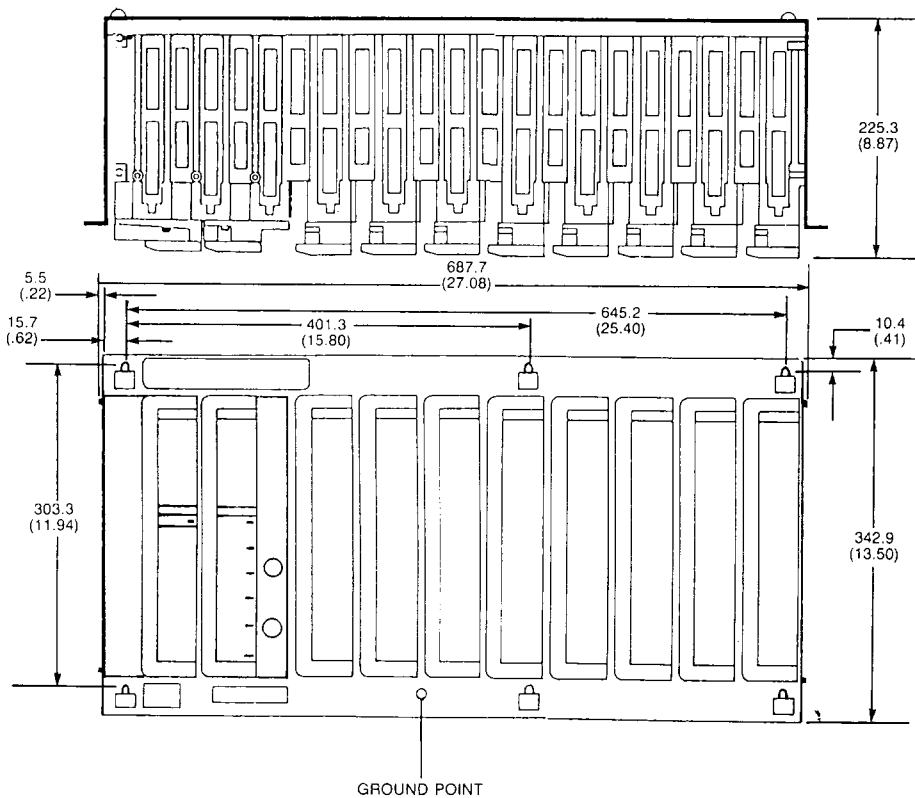
Rack Mounting

The H819 Module Housings can be mounted in a 19-inch standard
(EIA) rack. Hardware is supplied for installing the "rack adaptor –
mounting flange kit" on the housing but not for installing the adapted
housing in the rack.

Figure 2-2 shows dimensions for rack mounting an RI/O housing. The following hardware is required for rack mounting each housing:

- (1) 19-inch Standard (EIA) rack

- (1) pair of rack mounting flanges

- (8) #10-32, Pan Head Machine Screws to mount the housing to the NEMA rack

- (8) #10-32 Flat Lock Nuts if mounting holes in rack's side rails are not threaded.

- (8) #8-32 Pan Head Machine Screws (supplied) to attach rack mount flanges to ends of housing

- (8) 1/4 bolts (supplied) to attach back of rack mount flanges to back of housing

Figure 2-2

H819 Housing Rack Mount Dimensions

GROUND POINT
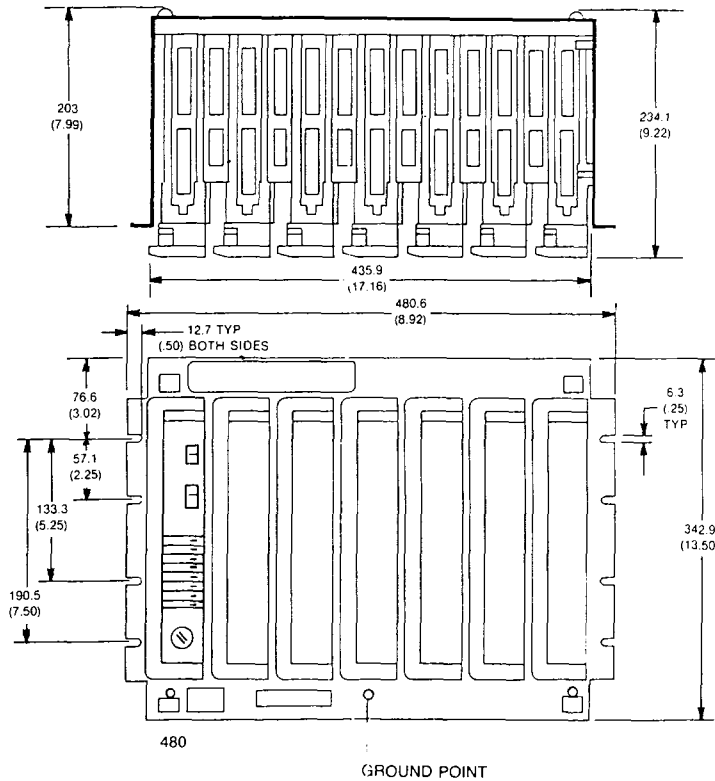
Some planning considerations common to rack mounting for 800 series I/O housings are:

1. Between housings, allow 12 inches below the primary housing for cable breakout, physical inspection and ventilation.

2. The cable length connecting the primary housing and secondary housing must not exceed 12 feet.

The modular chassis will fit in a 12-inch deep standard NEMA enclosure should this be required (e.g., an acidic atmosphere in the factory).

Since the only cooling available to the 984-380 PC is derived from natural convection, some provision for added cooling may be required if the PC is placed within a NEMA enclosure.

Grounding Your Installation

For grounding purposes, Modicon recommends that your 984-380 PC housing(s) be mounted on a suitably finished metal mounting plate capable of supporting its weight along with the other modules in the installation. An aluminum mounting plate with a chromate finish such as IRIDITE, ALODINE or OAKITE No. 36 would meet the requirement. This type of installation provides both a low frequency (AC) safety ground path and a low impedance shield path for EMI/RFI.

If a metal mounting plate (preferred) is not feasible, Modicon recommends that all PC housings within a drop be interconnected by a flat braided copper ground strap with a minimum width of 1 inch. The ground strap should be kept short and installed without loops and bends. Use stainless steel hardware including a flat washer to secure the braid strap to the housing.

Regardless of the housing-to-housing method of ground interconnection, Modicon recommends the entire installation be grounded by a one inch wide (min) flat, braided copper strap installed between the primary housing ground connection point and a suitable factory ground. The bulkhead and rack mounting illustrations show the housing's recommended ground connection point.

Primary Power Cable (AC/DC)

Ideally, the power lines should be dedicated to the PC installation to minimize problems that arise when sharing AC power with electrically "noisy" equipment.

Provide for strain relief by installing a service loop and cable restraint on the primary power cable as its connector is not locked in place.

AC Power Cable   The recommended AC power cable should consist of three insulated leads of Number 14 AWG stranded copper. The cable leads insert in the plug-in power cable connector shipped "installed" in the AC input connector jack from the factory.

The color code (standard) for the AC cable is white for AC neutral, black for AC hot, and green for factory or earth ground. The European color code is light blue instead of white for neutral, brown instead of black for the hot wire, and green/yellow instead of green for ground.

Your AC source cable must be suitable for supplying 115/230 Vac at 5A peak for the turn-on surge and 0.4A continuous at worst-case, low voltage conditions.

► **NOTE**   Factory and earth grounds often have different potentials; e.g., building steel versus grounding rods.

DC Power Cable   For DC power input, use at least AWG 18.

If you are planning DC backup, note the discussion under "Power Supply Function," Section 1. Note also, that your external DC input should go directly to the controller from the power source and not involve your I/O.

Your DC source cable must be suitable for supplying 24Vdc at 24A peak (turn-on surge) and 1.7A continuous at worst-case, low voltage.

Figure 2-3 below shows your primary power (AC/DC) cable connectors.

Figure 2-3

Model 380 Wiring AC/DC
Primary Power Connectors
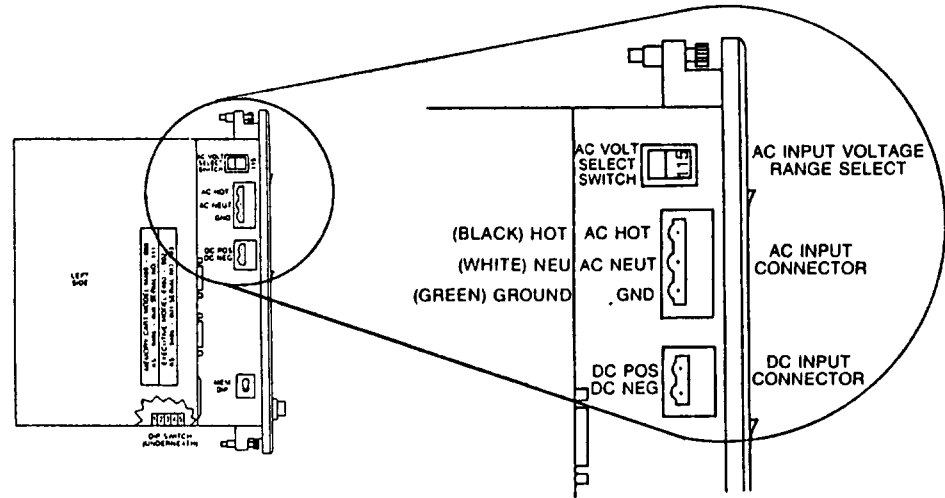
DIP Switch Configuration for MODBUS, Port 1

MODBUS Port 1 is both manually and software configurable. For manual configuration, there is a through-the-chassis, user accessible DIP switch on the underside of the 984-380 controller. For software configuration, use the P190/IBM configurator software.

The DIP switch presettings are enabled (even while operational) through the use of a DIP/MEM toggle switch located on the controller module behind the module handle.

DIP switch settings for MODBUS Port 1 are shown in Figure 2-4 below.

Baud rate settings for DIP switches 1 and 2 are given in Table 2-1 below.

Figure 2-4

Model 380 DIP Switch
Settings for MODBUS
Port 1

LOCATION   REAR →

```
┌─────────────────────────────────────┬──────┐
│        CONTROLLER                    │      │
│         MODULE                       │      │      ← FRONT
│       BOTTOM VIEW                    │      │
│                          │1 2 3 4 5││      │
└─────────────────────────────────────┴──────┘
```
                                                 DIP SWITCH

LEGEND   DIP SWITCH CONDITIONS | UP (OFF) / DOWN (ON)

```
□   □   □   □   □
─────────────────
□   □   □   □   □
1   2   3   4   5
```
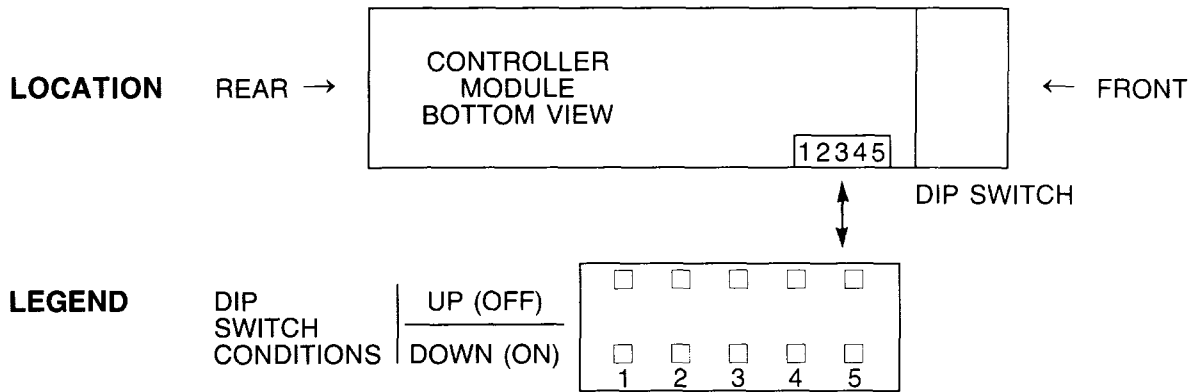
SWITCH FUNCTION

Sw #	Down		Up	
1	□	baud select	□	baud select
2	□	" "	□	" "
3	□	no parity	□	parity
4	□	odd parity	□	even parity
5	□	ASCII (7 data bits)	□	RTU (8 data bits)

DEFAULT SETTINGS:

9600 baud, even/parity, RTU

```
┌─────────────────────────┐
│      □   □   □   □       │
│  □                      │
│  1   2   3   4   5      │
└─────────────────────────┘
```
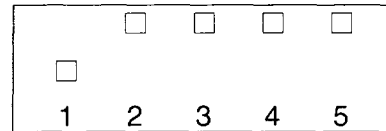
► **NOTES:**
1. Two stop bits are transmitted in all frames except RTU with parity.

2. When the MEM/DIP enable toggle is returned to MEM position, port 1 comm parameters and link address return to original memory configured values.

3. Although certain production units may contain an 8 position DIP switch, only the first five are used.

Table 2-1

DIP Switch Baud Rate
Settings (Left to Right)

Baud	Sw#1	Sw#2
19200	up	up
9600	down	up
2400	up	down
1200	down	down

Chapter 3
Installing Your Controller and Local I/O

This chapter is an installation procedure for your
984-380 PC with local I/O.

► **WARNING** ENSURE THAT YOUR ELECTRICAL SERVICE IS PROPERLY GROUNDED AND IN ACCORDANCE WITH THE ELECTRICAL CODE FOR YOUR AREA. INSTALLATION AND MAINTENANCE SHOULD BE PERFORMED BY A QUALIFIED PERSON IN CONFORMANCE WITH LOCAL CODE AND THE NATIONAL ELECTRICAL CODE, ANSI/NFPA PUBLICATION NO. 70.

Procedure

Step 1   Install cable troughs in your primary and secondary housings in accordance with the I/O module assignments planned.

Step 2   Mount housings for local drop on desired surface taking care to observe system ground requirements.

Step 3   Connect power and signal cable between primary and secondary housings as required by your configuration. See example shown in Figure 3-1.

Figure 3-1

Typical Local Drop
Configuration

| 984-380 | I/O | I/O | I/O | I/O | I/O | I/O | RACK #1 |

—RACK INTERCONNECT CABLE (W801)

—AUXILIARY POWER CABLE (W804)

| PS P810 | I/O | I/O | I/O | I/O | I/O | RACK #2 |
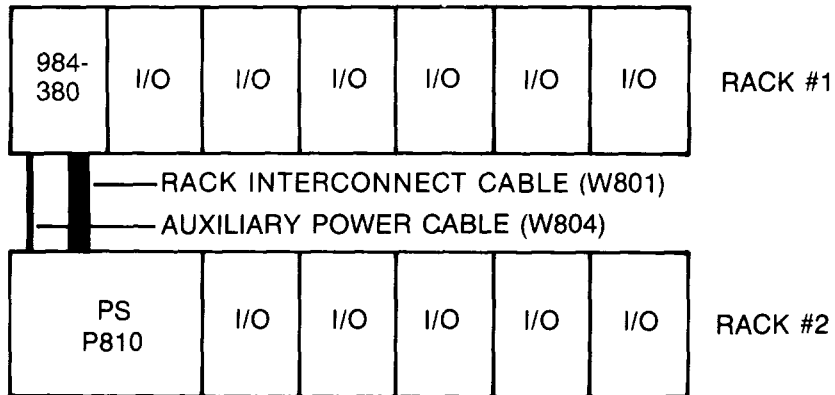
Step 4   Ground power cable's ground strap to system ground on housing (shown in Figures 2-1 or 2-2).

CAUTION   In Step 5 below, the mounting holes for the Exec and RAM pack plug-ins are so aligned that you cannot secure them if the plug-ins have been interchanged. Powering up with interchanged cartridges will have unpredictable results.

Step 5   Install your Exec and RAM packs in controller. Observe plug-in orientation shown in Figure 1-4.

►   **NOTE**   Record Exec and PROM pack revision levels as well as release dates for future reference.

Step 6   Set DIP Switch for MODBUS 1, Port 1 as desired (see DIP Switch settings in Figure 2-4 previous).

Step 7   Set toggle switch to MEM or DIP position (as desired).

Step 8   Verify presence of memory backup battery.

If lithium battery has been supplied separately, install in battery compartment observing polarity marked inside battery compartment cover.

►   **NOTE**   When removing battery, push to compress loading spring which will partially eject battery as you let go.

Step 9   Install 984-380 controller module in Slot 1 of primary housing, securing with captive screws.

Step 10   Set memory protect key-switch to OFF.

Step 11   If using an auxiliary power supply, partially insert it in Slot 1 of expansion housing.

WARNING   IN STEPS 12 THRU 22 BELOW, THE AC AND DC PRIMARY SOURCES SHOULD NOT BE CONNECTED (ENERGIZED) ON THE SOURCE SIDE.

Step 12   Wire auxiliary power supply input power, install 115Vac jumper (if appropriate) and then secure module in housing.

Step 13   Wire AC primary power cable to controller's AC input power connector shown in Figure 2-3.

Step 14   Select appropriate 115/230Vac slide switch position.

Step 15   Form service loop in AC input power cable and install mechanical restraint on housing.

Step 16   Plug AC input power cable connector into controller's AC input power jack at left side of module. DO NOT CONNECT TO PRIMARY POWER SOURCE AT THIS TIME!

Step 17   If using DC input, wire to controller's DC input connector shown in Figure 2-3.

Step 18   Form service loop in DC input power cord and install mechanical restraint on housing.

Step 19   Plug DC input power cable connector into controller's DC input power jack on left side of controller. DO NOT CONNECT TO PRIMARY POWER SOURCE AT THIS TIME!

Step 20   Do field wiring for local drop and attach to I/O connectors.

Step 21   Install key pins in I/O housing slots (as required in your installation plan).

Step 22   Verify ground and cable connections are secure and according to plan.

► **NOTE**   Other than local I/O, the physical installation of your 984-380 PC is now complete. You are ready for initial power-up and installation check-out.

Procedure   *Installation Checkout – Unconfigured PC*

Step 1   If using DC input power, energize DC power source and switch controller's DC power switch to ON.

If not using DC input, go to Step 4 below.

Step 2   Visually inspect installation and verify operation. After a few seconds of delay for internal diagnostics, your Model 380, POWER OK indicator should come up Green and the READY indicator, Amber. The BATTERY LOW indicator should be OFF.

▶ **NOTE**   If you have an obvious mechanical or electrical problem, take the appropriate corrective action.

If your LED status seems incorrect, try to eliminate the possibility of a false indication resulting from parallax error (one LED lighting more than one indicator window). If your LED status is incorrect, refer to the Installation Troubleshooting Chart, Figure B-2, Sheet 1.

If all else fails, call us at the number listed under technical assistance, Appendix B.

Step 3   Switch controller's DC input power switch to OFF.

Step 4   Connect primary power input to AC source and set controller's AC power switch to ON.

Step 5   Visually inspect installation and verify operation. After a few seconds of delay for internal diagnostics, your Model 380, POWER OK indicator should come up Green and the READY indicator, Amber. The BATTERY LOW indicator should be OFF.

▶ **NOTE**   If you have an obvious mechanical or electrical problem of any nature, take the appropriate corrective action.

If your LED status seems incorrect, try to eliminate the possibility of a false indication resulting from parallax error (one LED lighting more than one indicator window). If your LED status is incorrect, refer to Installation Troubleshooting Chart, Figure B-2, Sheet 1.

If all else fails, call us at the number listed under technical assistance, Appendix B.

Procedure   *Installation Checkout - Configured PC w/Local I/O*

Finish your installation verification by configuring and Traffic Copping your PC and then communicating with local I/O.

Step 1   Set your controller's input power to OFF. Shutoff auxiliary power.

Step 2   Install a simple I/O module in Slot 2 of primary housing (a B805 for example) and secure with captive screws.

Step 3   Repower

PC to P190 Setup

Step 4   Connect PC MODBUS, Port 1 to P190 Port 1 using W953 cable and power-up P190.

Step 5   Load CONFIG tape in P190 (label up).

Step 6   At P190 keyboard, simultaneously press and then release the red keys:

   [INIT] & [INIT LOCK]

Following tape load (about 2 min), a row of soft-keys will appear at the bottom of the P190 screen. The soft-keys are actuated by a row of non-labeled function keys at the top of the P190 keyboard. At any given time, their assigned functions are those indicated at the bottom of the P190 display screen. The key names displayed with inverse lettering correspond to the white function keys and vice versa.

Lastly, in the following procedures, keys on the P190 keyboard are referenced by their labeled name in brackets [NAME]. The soft-keys are referenced by the labeled name that appears on the P190 screen, both in brackets and underscored [NAME].

Getting PC into RUN Mode

Step 7   While monitoring COMM 1 indicator at PC, perform following at P190:

Press:

   [1], [984-CONFIG]

Step 8   After COMM 1 indicator flashes (at PC), press following soft key on P190 screen:

   [WRITE CONFIG]

Step 9   On next screen, press:

   [PROCEED]

Step 10   On keyboard, enter:

[1]

On screen, press:

[ATTACH UNIT #]

Step 11   On keyboard, press:

[EXIT]

On new screen, press:

[CONTROL OPERATIONS]

Step 12   On new screen, press:

[START 984]

Step 13   Observe following indications at PC as a result of pressing [PROCEED] on the P190:

- COMM 1 indicator flashes briefly

- RUN indicator goes Green (takes about 4 seconds)

Configure PC

Step 14   At P190, press:

[STOP 984]

On new screen, press:

[PROCEED]

Step 15   Cycle P190 memory protect key to LOCKED position, then back to UNLOCKED again.

Step 16   On P190 keyboard, enter:

[1]

Step 17   On new screen, press

[984-CONFIG]

Step 18   On next screen, press:

[SET SIZE]

Step 19   On keyboard, enter

[2]

On screen, press:

[TOTAL # OF I/O MODS]

Step 20   On new screen, press:

[PREV MENU]

Step 21   On new screen, press:

[WRITE CONFIG]

Step 22   On new screen, press:

[PROCEED]

Traffic Cop PC

Step 23   Load TRAFFIC COP tape in P190 (label up).

Step 24   At P190, simultaneously press and then release:

[INIT] & [INIT LOCK]

Following tape load (about 2 min), soft-keys will come up on P190 screen.

Step 25   At P190, enter:

[1]

On screen, press:

[ATTACH UNIT #]

Step 26   On keyboard, press:

[EXIT]

On screen, press:

[I/O CONFIG OPERATIONS]

Step 27   On next screen, press:

[800-TRAF COP]

Step 28   On keyboard, enter last 2 digits from model number of your I/O module:

[n] [n]

and press:

[ENTER]

Step 29   On keyboard, enter:

[1] [0] [0] [0] [1]

and press:

[ENTER]

Step 30   On screen, press:

[WRITE DROP]

Step 31   On next screen, press:

[PROCEED]

Step 32   On keyboard, press:

[SHIFT] & [RESET]

followed by:

[EXIT]

Step 33   On new screen, press:

[CONTROL OPERATIONS]

Step 34   On new screen, press:

[START 984]

Step 35   Observe following indications at PC as a result of pressing [PROCEED] on the P190:

- COMM 1 indicator flashes briefly

- RUN indicator goes Green (takes about 4 sec)

Step 36   On I/O module, observe ACTIVE indicator is green

Step 37   Visually inspect installation and verify operation. In sum, your Green POWER OK indicator and Amber READY indicator status should remain ON. The RUN indicator should be Green. Your I/O module ACTIVE indicator should be Green.

► **NOTE**   Your PC installation is now complete and verified. If you have an obvious problem, take the appropriate corrective action. If your LED status is incorrect, refer to the Installation Troubleshooting Chart, Figure B-2, Sheet 2.

If all else fails, call us at the number listed under technical assistance, Appendix B.

Appendix A
984-380 System Specifications

This appendix covers the following specifications:

- **PHYSICAL CHARACTERISTICS**
    Dimensions
    Weight

- **ELECTRICAL CHARACTERISTICS**
    Static Discharge
    Magnetic
    Agency Approval
    Indicators

- **CIRCUIT CHARACTERISTICS**
    Scan Rate
    Throughput
    I/O
    Memory
    Holdup
    Power Consumption
    Surge Withstand
    Time-of-Day Clock [381]

- **ENVIRONMENTAL CHARACTERISTICS**
    Temperature
    Humidity
    Max Wet Bulb
    Altitude
    Shock
    Vibration

- **BUILT-IN POWER SUPPLY**
  - Input Power
  - Fusing
  - Holdup
  - Indicators
  - Output Power
  - Output Voltage

- **EXTERNAL POWER ISSUES**
  - AC Isolation Transformer
  - External 24Vdc Power Supply
  - 800 Series I/O Module Loading

Mainframe Specifications

Physical Characteristics

Dimensions

W x H x D inch	2.54 x 10.5 x 8
W x H x D (mm)	(39.4 x 266 x 203)

Weight	5 lbs, 6 oz

Electrical Characteristics

Static Discharge	15kV to all surfaces
Magnetic	20 Gauss field inside Helmholtz Coil, 0.25 to 8 pps
Agency Approval	Designed to meet applicable agency safety requirements

Indicators

• **POWER OK**	Green LED: When ON, indicates input power OK and voltage outputs OK. (Your I/O power OK is indicated by READY LED.)
• **READY**	Amber LED: When ON, indicates Controller passed power-up diagnostics. Remains ON in Stopped and Run mode as long as health status is OK. Indicator is OFF when an error condition is detected by diagnostics.

Indicators (continued)

- **RUN**   Green LED: When ON, indicates Controller is in the RUN mode and solving logic.

- **BATTERY LOW**   Red LED: When ON, indicates battery needs to be replaced (14 day holdup from initial indication).

- **COMM 1**   Green LED: When ON, indicates communication processor has unit address and communications are in progress.

[Model 381 only]:

- **COMM 2**   Green LED: When ON, indicates communication processor has unit address and communications are in progress.

Circuit Characteristics

Scan Rate   5 ms per thousand nodes of user logic

Throughput   <15ms for 64 I/O points

I/O   512 bits in/ 512 bits out
1 Analog point = 16 bits
Max I/O Mods in drop = 21
Max discrete I/O = 256 (any mix)
[512 max discrete, any mix, 381]

Memory Capacity

User Logic	Registers	Option
1.5 K Wds	1920	(resident)
4.0 K Wds	1920	(AS-M380-004)
6.0 K Wds	1920	(AS-M380-006)

Holdup   60ms for CPU from "POWER OK" going inactive

Power Consumption   5 W

Surge Withstand   Per IEEE 472-1974, ANSI C37.90a

(continued)

Circuit Characteristics (continued)

[Model 381 only]:

Time-of-Day Clock	±1 sec/day @ 25°C
	±3 sec/day, 0-40°C
	±8 sec/day, 0-60°C

Environmental Characteristics

Temperature	Operating: 0° → 60°C
	Storage: −40° → +80°C
Humidity	0-95% Non-condensing
Max Wet Bulb	Non-operating: Non-condensing
	Operating: 85°F
Altitude	10,000 feet max
Shock	± 10g's, 11ms, 3 pulses per axis
Vibration (Operating)	5Hz to 50Hz @ .005 in D.A.,
	30 min/axis
	50Hz to 500Hz @ 0.625 g's,
	30 min/axis
Vibration (Non-operating)	10Hz to 50Hz @ .029 g's/Hz
	50Hz to 300Hz @ .029 g's/Hz,
	−8dB/octave

Built-in Power Supply

Input Power*	115 Vac ± 15%
	230 Vac ± 15%
	24 Vdc ± 15%

*See current requirements under "External Power Issue Specifications" (below).

(continued)

Mainframe Specifications (continued)

Built-in Power Supply (continued)

Fuses	0.750A, 3A SB Buss, (Not customer replaceable)
Holdup	64ms for CPU from Power OK going inactive
Indicators	Green LED: POWER OK
Output to I/O	16.25 Watts to I/O service

Output*
V1 5Vdc I/O	3.0A max
V2 4.3Vdc I/O	3.0A max
V3 −5Vdc I/O	0.250A max

*When added, any combination of V1, and V2, must not exceed 3.0Adc continuous

External Power Issue Specifications

Isolation Transformer	100W (recommended) based on 40.8W (meas) and assuming 0.4A continuous w/97Vac (115V − 15%), 5A peak
Ext 24Vdc P.S.	31W nom, 1.3Adc continuous @ 24Vdc (24A peak); or 1.7Adc cont @ 20.4Vdc (24V − 15%)
I/O Mod Loads	See Table A-1

800 SERIES I/O FACT SHEET

DISCRETE INPUT MODULES

MODEL	VOLTAGE RANGE	NUMBER OF INPUTS	NUMBER PER COMMON	I/O POWER REQUIRED (mA) +5.0V	+4.3V	−5.0V	REQUIRED ADDRESSING DISC. I/O	REG. I/O	REQUIRED CONNECTOR
B805-016	115 VAC	16	8	40	1	14	16 / 0	0 / 0	AS-8534-000
B817-116	115 VAC	16	1	25	25	8	16 / 0	0 / 0	AS-8535-000
B803-008	115 VAC	8	1	27	1	2	8 / 0	0 / 0	AS-8534-000
B809-016	230 VAC	16	8	42	1	15	16 / 0	0 / 0	AS-8534-000
B817-216	230 VAC	16	1	25	25	8	16 / 0	0 / 0	AS-8535-000
B827-032	24 VDC (TH)	32	32	30	1	0	32 / 0	0 / 0	AS-8535-000
B825-016	24 VDC (TH)	16	8	27	2	0	16 / 0	0 / 0	AS-8534-000
B833-016	24 VDC (TL)	16	8	27	2	0	16 / 0	0 / 0	AS-8534-000
B881-001	24 VDC (LATCH)	16	16	30	1	0	0 / 0	1 / 1	AS-8534-000
B821-008	10-60 VDC (TH)	8	2	27	1	0	8 / 0	0 / 0	AS-8534-000
B837-016	24 VAC/DC	16	8	40	1	15	16 / 0	0 / 0	AS-8534-000
B849-016	48 VAC/DC	16	8	40	1	15	16 / 0	0 / 0	AS-8534-000
B853-016	125 VDC	16	8	40	1	15	16 / 0	0 / 0	AS-8534-000
B829-116	5 V TTL	16	16	27	1	0	16 / 0	0 / 0	AS-8534-000
B865-001	TTL REGISTER	8 CH	8	400	600	0	0 / 0	8 / 0	AS-8535-000

DISCRETE OUTPUT MODULES

MODEL	VOLTAGE RANGE	NUMBER OF OUTPUTS	NUMBER PER COMMON	I/O POWER REQUIRED (mA) +5.0V	+4.3V	−5.0V	REQUIRED ADDRESSING DISC. I/O	REG. I/O	REQUIRED CONNECTOR
B804-016	115 VAC	16	8	76	480	0	0 / 16	0 / 0	AS-8534-000
B810-008	115 VAC	8	1	50	240	0	0 / 8	0 / 0	AS-8534-000
B802-008	115 VAC	8	2	76	240	0	0 / 8	0 / 0	AS-8534-000
B808-016	230 VAC	16	8	76	480	0	0 / 16	0 / 0	AS-8534-000
B838-032	24 VDC (TH)	32	8	160	1	0	0 / 32	0 / 0	AS-8535-000
B826-032	24 VDC (TH)	32	32	90	1	0	0 / 32	0 / 0	AS-8535-000
B824-016	24 VDC (TH)	16	8	32	260	0	0 / 16	0 / 0	AS-8534-000
B832-016	24 VDC (TL)	16	8	32	235	0	0 / 16	0 / 0	AS-8534-000
B820-008	10-60 VDC (TH)	8	2	90	80	0	0 / 8	0 / 0	AS-8534-000
B836-016	12-250 VDC	16	1	50	603	0	0 / 16	0 / 0	AS-8535-000
B814-108	RELAY (NO/NC)	8	1	107	800	0	0 / 8	0 / 0	AS-8534-000
B840-108	REED RELAY (NO/NC)	8	1	67	400	0	0 / 8	0 / 0	AS-8534-000
B828-016	5 V TTL	16	16	32	220	0	0 / 16	0 / 0	AS-8534-000
B864-001	TTL REGISTER	8 CH.	8	220	180	0	0 / 0	0 / 8	AS-8535-000

ANALOG INPUT MODULES

MODEL	DESCRIPTION AND APPLICATION RANGE	NUMBER CHANNELS	I/O POWER REQUIRED (mA) +5.0V	+4.3V	−5.0V	REQUIRED ADDRESSING DISC. I/O	REG. I/O	REQUIRED CONNECTOR
B875-101	FAST A/D: 4-20mA; ±10V; ±5V;0-10V;0-5V;1-5V	8	650	975	0	0 / 0	8 / 0	INCLUDED
B875-001	A/D: 4-20mA; 1-5V	8	300	300	0	0 / 0	8 / 0	INCLUDED
B873-001	A/D: 4-20mA; 1-5V	4	300	300	0	0 / 0	4 / 0	INCLUDED
B875-011	A/D: −10V TO +10V	8	300	300	0	0 / 0	8 / 0	INCLUDED
B873-011	A/D: −10V TO +10V	4	300	300	0	0 / 0	4 / 0	INCLUDED
B883-200	THERMOCOUPLE: TYPE B,E,J,K,R,S,T,N OR LINEAR mV	10	300	0	0	0 / 0	3 / 3	INCLUDED
B883-201	RTD: AMERICAN OR EUROPEAN 100 OHM PLATINUM	8	400	5	0	0 / 0	3 / 3	INCLUDED
B846-001	ANALOG MULTIPLEXER: 16 VOLTAGE INPUTS, 1 OUTPUT	16	65	1	0	0 / 0	0 / 1	AS-8535-000
B846-002	ANALOG MULTIPLEXER: 16 CURRENT INPUTS, 1 OUTPUT	16	65	1	0	0 / 0	0 / 1	AS-8535-000

ANALOG OUTPUT MODULES

MODEL	DESCRIPTION AND APPLICATION RANGE	NUMBER CHANNELS	I/O POWER REQUIRED (mA)			REQUIRED ADDRESSING		REQUIRED CONNECTOR
			+5.0V	+4.3V	−5.0V	DISC. I/O	REG. I/O	
B872-002	D/A: 4-20mA, 1-5V	4	475	11	0	0 / 0	0 / 4	INCLUDED
B872-011	D/A: ±10V, ±5V, 0-10V, 0-5V	4	240	750	0	0 / 0	0 / 4	INCLUDED

INTELLIGENT MODULES

MODEL	DESCRIPTION	I/O POWER REQUIRED (mA)			REQUIRED ADDRESSING		REQUIRED CONNECTOR
		+5.0V	+4.3V	−5.0V	DISC. I/O	REG. I/O	
B882-239	HIGH SPEED COUNTER, 2 UP-COUNTERS, 0-30kHz	188	0	0	0 / 0	2 / 2	INCLUDED
B883-001	HIGH SPEED COUNTER, 2 UP/DOWN, 0-50kHz, INTERNAL CLOCK	680	0	0	0 / 0	3 / 3	INCLUDED
B883-101	CAM EMULATOR, ABSOLUTE ENCODER INPUT, 8 DISCRETE OUT	1000	0	0	0 / 0	3 / 3	INCLUDED
B883-111	CAM EMULATOR WITH VELOCITY COMPENSATION	1000	0	0	0 / 0	3 / 3	INCLUDED
B884-002	PID: 2 LOOPS, CASCADABLE, STANDALONE, 11 TOTAL I/O	50	0	0	0 / 0	4 / 4	INCLUDED
B885-001	ASCII/BASIC, 64K RAM, 2 RS232/422 PORTS	500	1760	0	0 / 0	6 / 6	INCLUDED

800 I/O POWER SUPPLIES

MODEL	DESCRIPTION	VOLTAGE	REQUIRED HOUSING	REQUIRE SLOTS	I/O POWER AVAILABLE (mA)		
					+5.0V	+4.3V	−5.0V
P884-001	REMOTE PRIMARY AND SECONDARY	120/220 VAC	H8XX-100/103/107	1.5	5000	10100	500
P802-001	REMOTE PRIMARY AND SECONDARY	24 VDC	H8XX-100/103/107	1.5	2500	10100	500
P810-000	REMOTE PRIMARY AND SECONDARY	120/220 VAC	H8XX-100/103/107	1.5	12500	5000	300 (2)
984-680	INTERNAL SUPPLY FOR LOCAL I/O	120/220 VAC, 24 VDC	H8XX-209	1.5	8000	6000	500 (3)
984-480/380	INTERNAL SUPPLY FOR LOCAL I/O	120/220 VAC, 24 VDC	H8XX-209	1.5	3000	3000	250 (4)

(2) MAXIMUM +5V AND +4.3V = 13500 mA   (3) TOTAL MAXIMUM = 8000 mA   (4) TOTAL MAXIMUM = 3000 mA

800 I/O REMOTE INTERFACES

MODEL	DESCRIPTION	REQUIRED HOUSINGS	REQUIRED SLOTS	
S908-110	REMOTE I/O DRIVER FOR 984-680 CONTROLLER, SINGLE CABLE	H8XX-209	1	(1)
J890-001	REMOTE I/O RECEIVER FOR S908, SINGLE CABLE	H8XX-103/107	1.5	
J890-002	REMOTE I/O RECEIVER FOR S908, DUAL CABLE	H8XX-103/107	1.5	
J892-001	REMOTE I/O RECEIVER FOR S908, SINGLE CABLE, 2 ASCII PORTS	H8XX-103/107	1.5	
J892-002	REMOTE I/O RECEIVER FOR S908, DUAL CABLE, 2 ASCII PORTS	H8XX-103/107	1.5	
J810-000	REMOTE I/O RECEIVER FOR S901	H8XX-103/107	1.5	
J812-000	REMOTE I/O RECEIVER FOR S901, 2 ASCII PORTS	H8XX-103/107	1.5	

(1) REQUIRES 1500 mA FROM +5.0V OF 984-680

800 I/O HOUSINGS

MODEL	DESCRIPTION	LENGTH	AVAILABLE I/O SLOTS
H819-209	PRIMARY FOR 984-380, 480, 680; S908-110 & I/O	19 INCHES	6 (380, 480), 5 (680), 4 (680 W/ S908)
H827-209	PRIMARY FOR 984-380, 480, 680; S908-110 & I/O	27 INCHES	10 (380, 480), 9 (680), 8 (680 W/ S908)
H819-103	PRIMARY FOR REMOTE RECEIVER, POWER SUPPLY AND I/O	19 INCHES	4 (W/ RECEIVER & P.S.)
H827-103	PRIMARY FOR REMOTE RECEIVER, POWER SUPPLY AND I/O	27 INCHES	8 (W/ RECEIVER & P.S.)
H819-100	SECONDARY RACK, POWER SUPPLY AND I/O ONLY	19 INCHES	5 (W/ P.S.), 7 (NO P.S.)
H827-100	SECONDARY RACK, POWER SUPPLY AND I/O ONLY	27 INCHES	9 (W/ P.S.), 11 (NO P.S.)

800 I/O CABLES

MODEL	DESCRIPTION	AVAILABLE LENGTHS			
		1.5 FT	6.0 FT	12.0 FT	20 FT
W801-XXX	I/O SIGNAL CABLE BETWEEN RACKS AT A LOCAL OR REMOTE DROP	-002	-006	-012	N/A
W808-XXX	I/O POWER EXTENDER CABLE TO ADDITIONAL RACK WITHOUT POWER SUPPLY	-002	-006	N/A	N/A
W802-XXX	I/O POWER EXTENDER CABLE TO ADDITIONAL RACK WITHOUT POWER SUPPLY	N/A	N/A	-012	N/A
W804-XXX	I/O POWER EXTENDER CABLE TO ADDITIONAL RACK WITH POWER SUPPLY	-002	-006	-012	N/A
W929-XXX	LOCAL I/O CABLE FOR THE 984X	N/A	-006	-012	-020

Appendix B
What to Do If Things Go Wrong

This appendix contains troubleshooting help and Modicon telephone numbers for Customer Service and Technical Support. Figure B-1 shows MODBUS cable pinouts for troubleshooting purposes. Figure B-2 offers an installation verification troubleshooting chart on two sheets. Figure B-3 offers P190 to MODBUS hookup information.

Stopped Error Codes

Table B-1 following lists all stopped error codes applicable to 984 family controllers.

Machine Stop Bits		Description
PCSICK	0x7FFF	Controller unhealthy
PCSTOPPED	0x8000	Controller stopped
BADTCOP	0x4000	Bad I/O traffic cop
DIMAWAR	0x2000	PC in dim awareness
PORTIVENT	0x1000	Bad port intervention
BADSEGSCH	0x0800	Bad segment scheduler
SONNOTIST	0x0400	Son did not start segment
PDCHEKSUM	0x0200	Bad power-down checksum
NOEOLDOIO	0x0080	Watchdog expired
RTCFAILED	0x0040	Real time clock failed
BADOXUSED	0x0020	Bad coil used table
RIOFAILED	0x0010	Remote IO option failed
NODETYPE	0x0008	Illegal node type user
ULCSUMERR	0x0004	User logic checksum error
DSCRDISAB	0x0002	Discretes disable error
BADCONFIG	0x0001	Bad configuration

Modicon 984-380/[381] End-User Part Numbers

Table B-2 shows Modicon 984-380/[381] system end-user part numbers.

Part Number	Description
Hardware	
PC-0984-380	Model 380 Controller w/o cartridges
PC-0984-381	[Model 381 Controller w/o cartridges]
AS-E380-902	Standard 380 Exec Cartridge
AS-E381-902	[Standard 381 Exec Cartridge]
AS-E380-904	Enhanced 380 Exec Cartridge
AS-E381-904	[Enhanced 381 Exec Cartridge]
AS-M380-004	4K Memory Cartridge
AS-M380-006	6K Memory Cartridge
Housings	
AS-H819-209	Primary 19″ Housing
AS-H827-209	Primary 27″ Housing
AS-H819-100	Secondary 19″ Housing
AS-H827-100	Secondary 27″ Housing
Cables	
AS-W954-006	Modem to 984-x80
AS-W955-012	IBM PC/XT to 984-x80
AS-W955-025	IBM PC/XT to 984-x80
AS-W956-012	IBM PC/AT to 984-x80
AS-W956-025	IBM PC/AT to 984-x80
AS-W953-006	P190 to 984-x80
AS-W953-012	P190 to 984-x80
AS-W953-025	P190 to 984-x80
AS-W801-0xx	Housing interconnect signal cable
AS-W802-0xx	Housing interconnect power cable
AS-W804-0xx	Housing interconnect aux power cable
AS-W808-0xx	Housing interconnect power cable
Software Tapes and Disc Support for P190	
SW-PR9T-0TB	Programming Support Module – P190
SW-DO9T-0TB	Documentor Support Module – P190
SW-CS9T-0TB	Controller Support Module – P190
SW-PR9D-1DB	Programming Support Module – IBM
SW-DO9D-1DB	Documentor Support Module – IBM
SW-CS9D-1DB	Controller Support module – IBM

Modicon telephone numbers are as follows:

- To call us from anywhere in North America except from within the state of Massachusetts:

    1-(800)-468-5342

- To call us from within Massachusetts or from outside North America:

    1-(508)-975-5001

Customer Service – When calling the Modicon 5001 telephone number, ask for service from the list below.

When calling the 800 number, you will get a recording asking you to enter a one digit code for the type of service you want (listed below). However, this only works with a "touch tone" phone. If using a dial phone, hang on and the operator will intercept after a short pause.

The service categories – and *extra digit* code responses for push-button phones – are:

"1" – Hardware or software technical support

"2" – Order entry, buying hardware or software

"3" – Return/exchange status inquiries

"4" – Training/course registration inquiries

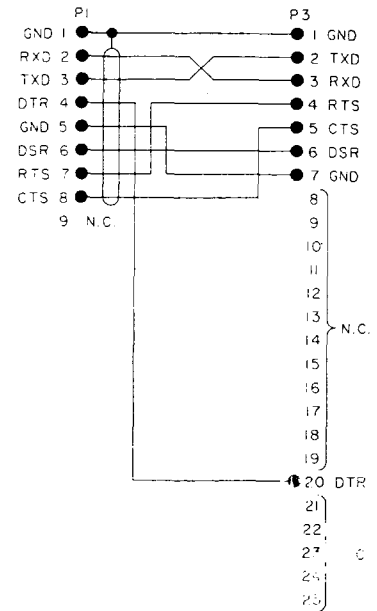"5" – General information other than above.
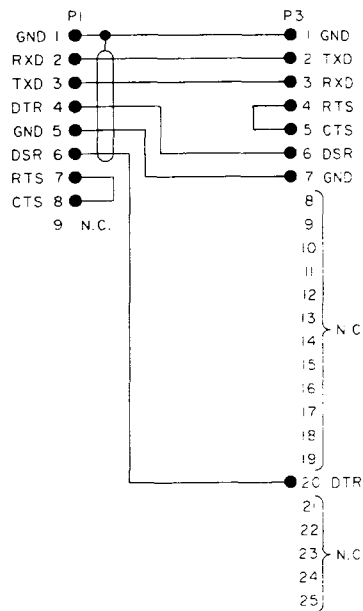
MODBUS Cable Pinouts

Figure B-1

MODBUS Cable Pinouts
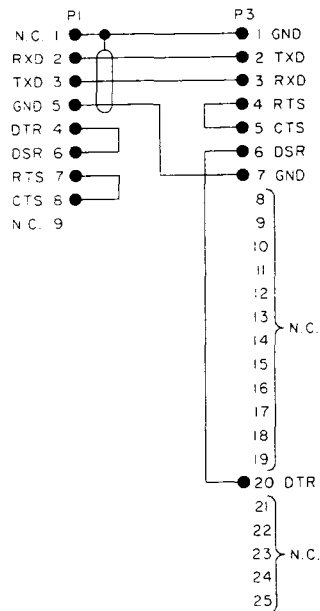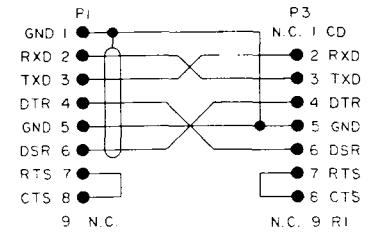

A. MODBUS to P190 (W953)

B. MODBUS to Modem (W954)

C. MODBUS to Null Modem
[IBM PC/XT] (W955)

D. MODBUS to IBM AT (W956)

Figure B-2 (Sheets 1 & 2) offer you a modular approach to troubleshooting your PC System installation.

Figure B-2

PC Installation
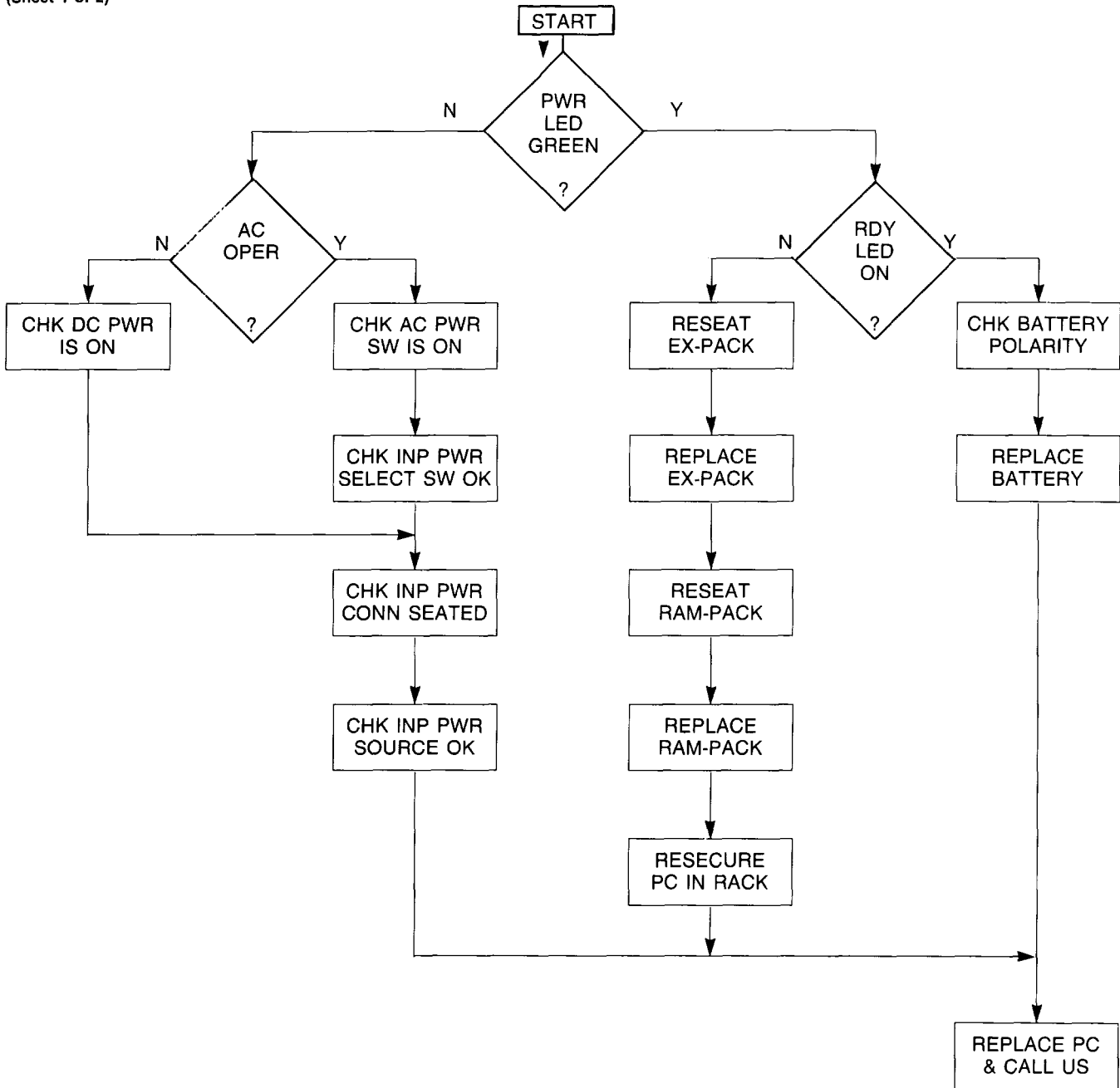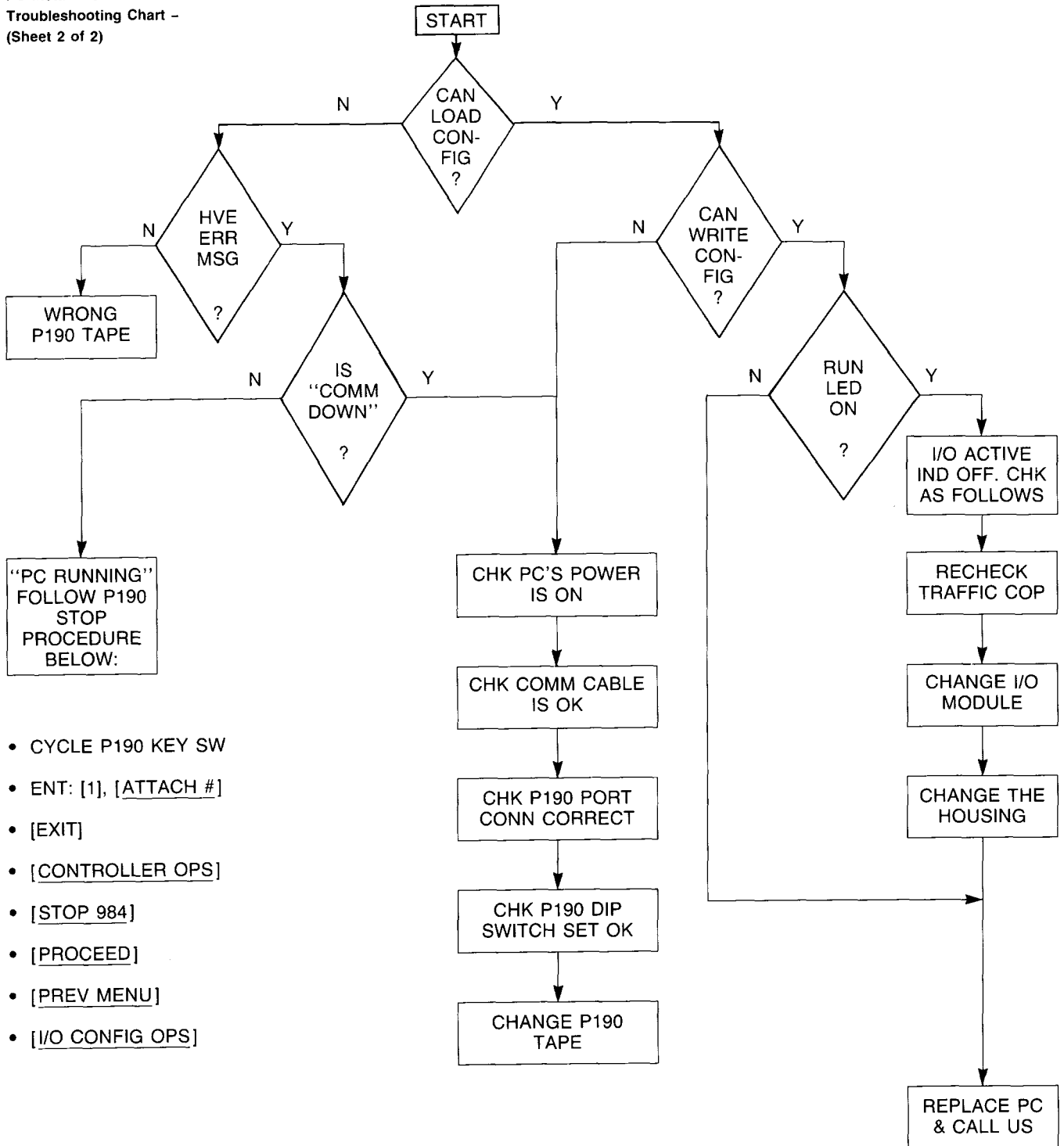Troubleshooting Chart –
(Sheet 1 of 2)

```
                                    ┌─────────┐
                                    │  START  │
                                    └─────────┘
                                         │
                      N                  ◇                  Y
         ┌───────────────────────────  CAN  ───────────────────────────┐
         │                            LOAD                              │
         │                            CON-                              │
         │                            FIG                               │
         │                             ?                                │
         ◇                                                              ◇
    N   HVE   Y                                               N        CAN        Y
  ┌──── ERR ────┐                                        ┌─────────  WRITE  ──────────┐
  │     MSG     │                                        │           CON-             │
  │      ?      │                                        │           FIG              │
  │             │                                        │            ?               │
  ▼             ▼                                        │                            ◇
┌───────┐       ◇                                        │                 N   RUN   Y
│WRONG  │  N   IS   Y                                     │             ┌──── LED ────┐
│P190   │ ┌── "COMM ──┐                                   │             │    ON       │
│TAPE   │ │  DOWN"    │                                   │             │     ?       │
└───────┘ │    ?      │                                   │             │             │
          │           │                                   │             │             ▼
          ▼           ▼                                   ▼             │       ┌──────────┐
┌────────────┐   ┌──────────────┐                 ┌──────────────┐      │       │I/O ACTIVE│
│"PC RUNNING"│   │CHK PC'S POWER│                 │CHK PC'S POWER│      │       │IND OFF.CHK│
│FOLLOW P190 │   │   IS ON      │                 │   IS ON      │      │       │AS FOLLOWS│
│STOP        │   └──────────────┘                 └──────────────┘      │       └──────────┘
│PROCEDURE   │          │                                 │             │             │
│BELOW:      │          ▼                                 ▼             │             ▼
└────────────┘   ┌──────────────┐                 ┌──────────────┐      │       ┌──────────┐
                 │CHK COMM CABLE│                 │CHK COMM CABLE│      │       │RECHECK   │
                 │   IS OK      │                 │   IS OK      │      │       │TRAFFIC COP│
                 └──────────────┘                 └──────────────┘      │       └──────────┘
```

START

CAN LOAD CONFIG ? — N / Y

HVE ERR MSG ? — N / Y

WRONG P190 TAPE

IS "COMM DOWN" ? — N / Y

CAN WRITE CONFIG ? — N / Y

RUN LED ON ? — N / Y

"PC RUNNING" FOLLOW P190 STOP PROCEDURE BELOW:

- CYCLE P190 KEY SW
- ENT: [1], [ATTACH #]
- [EXIT]
- [CONTROLLER OPS]
- [STOP 984]
- [PROCEED]
- [PREV MENU]
- [I/O CONFIG OPS]

CHK PC'S POWER IS ON

CHK COMM CABLE IS OK

CHK P190 PORT CONN CORRECT

CHK P190 DIP SWITCH SET OK

CHANGE P190 TAPE

I/O ACTIVE IND OFF. CHK AS FOLLOWS

RECHECK TRAFFIC COP

CHANGE I/O MODULE

CHANGE THE HOUSING

REPLACE PC & CALL US

TROUBLESHOOTING   B-7

Figures B-3 through B-5 below show setup and certain other physical information regarding the use of your P190 programmer.
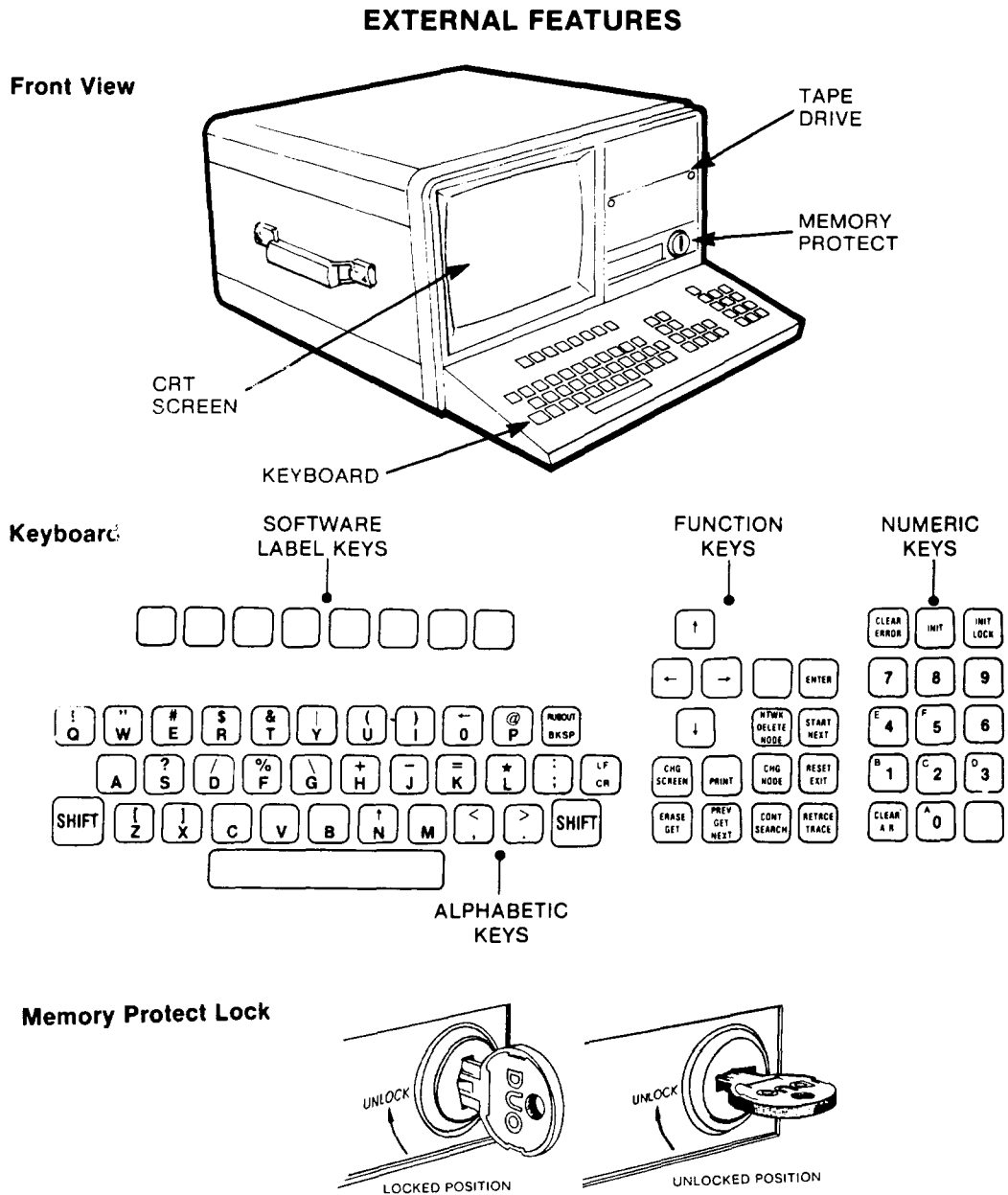
Figure B-3

P190 Programmer External Features

EXTERNAL FEATURES

Front View

TAPE DRIVE

MEMORY PROTECT

CRT SCREEN

KEYBOARD

Keyboard

SOFTWARE LABEL KEYS

FUNCTION KEYS

NUMERIC KEYS

ALPHABETIC KEYS

Memory Protect Lock

UNLOCK

LOCKED POSITION   UNLOCKED POSITION

P190 PORT SETTINGS

BACK OF P190

FUSE

IDENTIFICATION
PLATE

P190 PORT 1 (TO 984 PORT 1) →

P190 PORT 2 (TO YOUR PRINTER) →

DIP SWITCH COVER

PARAMETER SELECTION
LABEL

PORT 1 DIP SWITCH

PORT 2 DIP SWITCH

1
0 | S1 S2 S3 S4 S5 S6 S7 S8

1 = UP   0 = DOWN

NOTE THAT THE P190 ONLY READS
THESE DIP SWITCHES AT TURN-ON

FACTORY SET AT
9600 BAUD,
EVEN PARITY
1 STOP BIT,
8 DATA BITS.

YOU SET
FOR YOUR
PRINTER

Baud Rate	S1	S2	S3	S4
19,200	1	1	1	1
9,600	1	1	1	0
7,200	1	1	0	1
4,800	1	1	0	0
3,600	1	0	1	1
2,400	1	0	1	0
2,000	1	0	0	1
1,800	1	0	0	0
1,200	0	1	1	1
600	0	1	1	0
300	0	1	0	1
150	0	1	0	0
134.5	0	0	1	1
110	0	0	1	0
75	0	0	0	1
50	0	0	0	0

S5	1	Parity Enable
	0	Parity Disable
S6	1	Even Parity
	0	Odd Parity
S7	1	1 Stop Bit
	0	2 Stop Bit
S8	1	8 Data Bit
	0	7 Data Bit

P190 Programmer Port 1 to
MODBUS Port 1 Hookup

25 PIN MALE CONNECTOR
TO PORT 1

B-10 TROUBLESHOOTING

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an AEG company
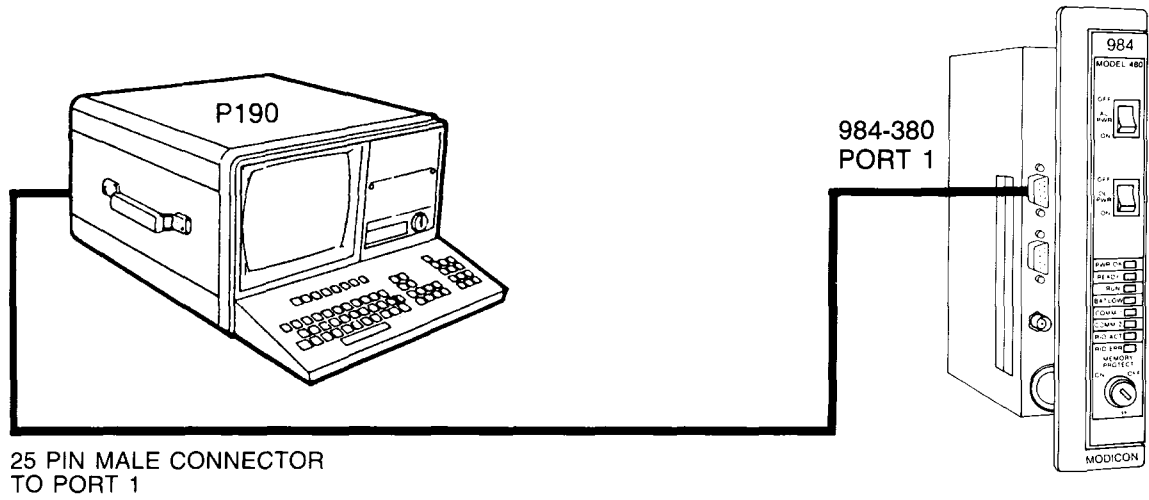
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_____

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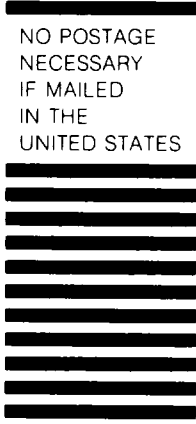
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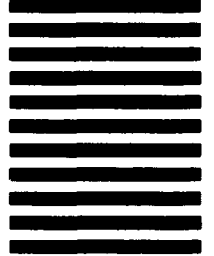
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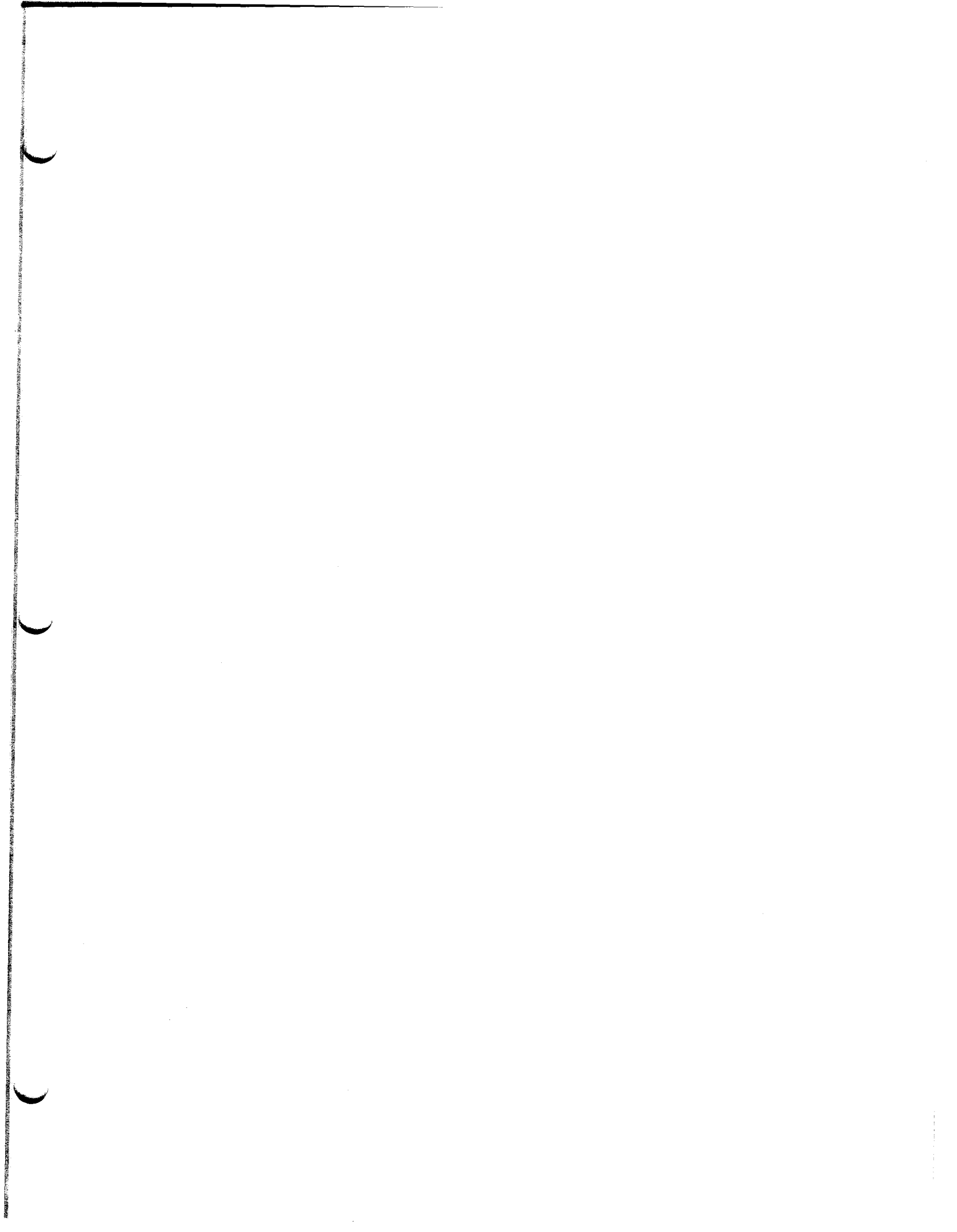NO POSTAGE
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