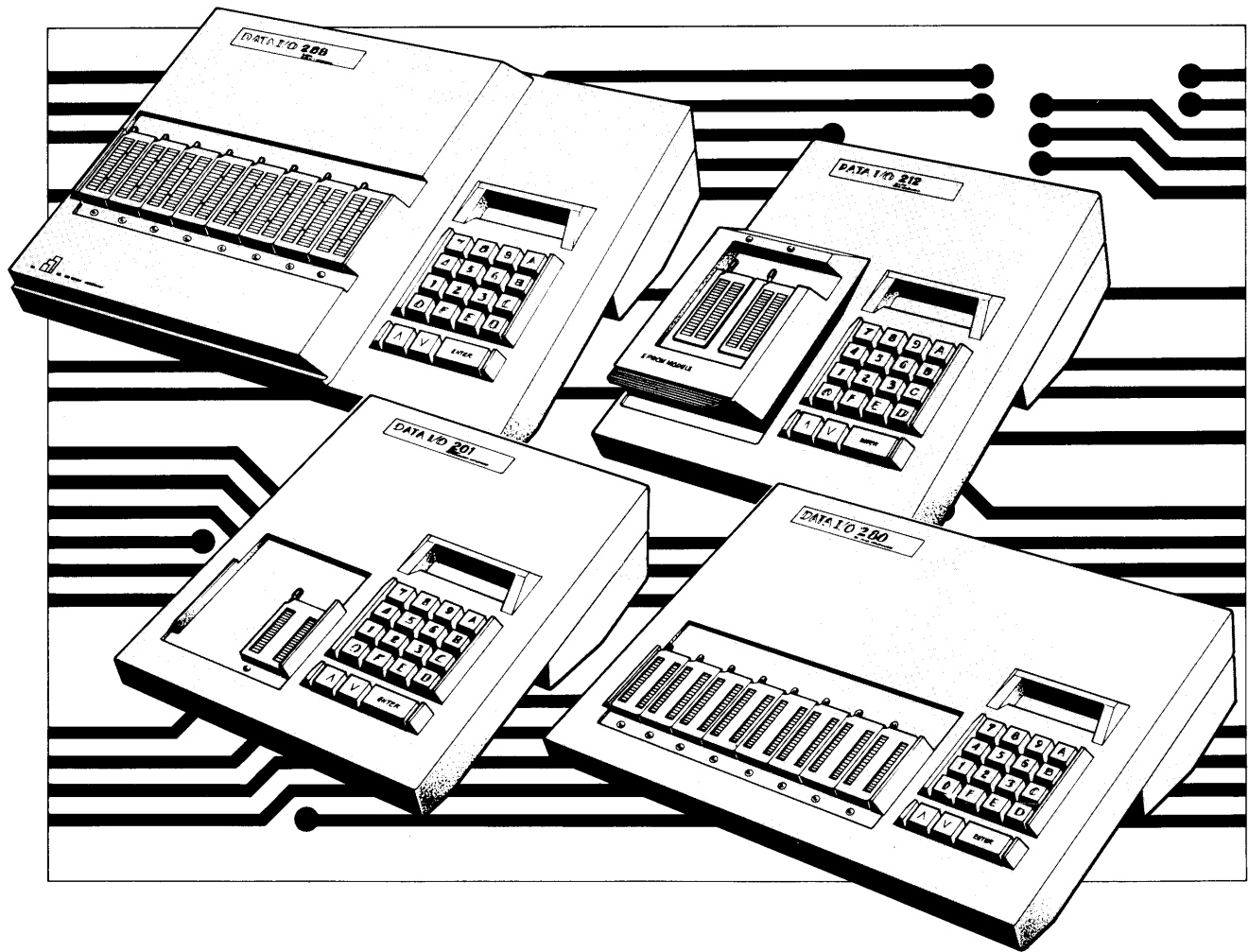


**DATA I/O**

200 Series



**DATA I/O**  
Corporation

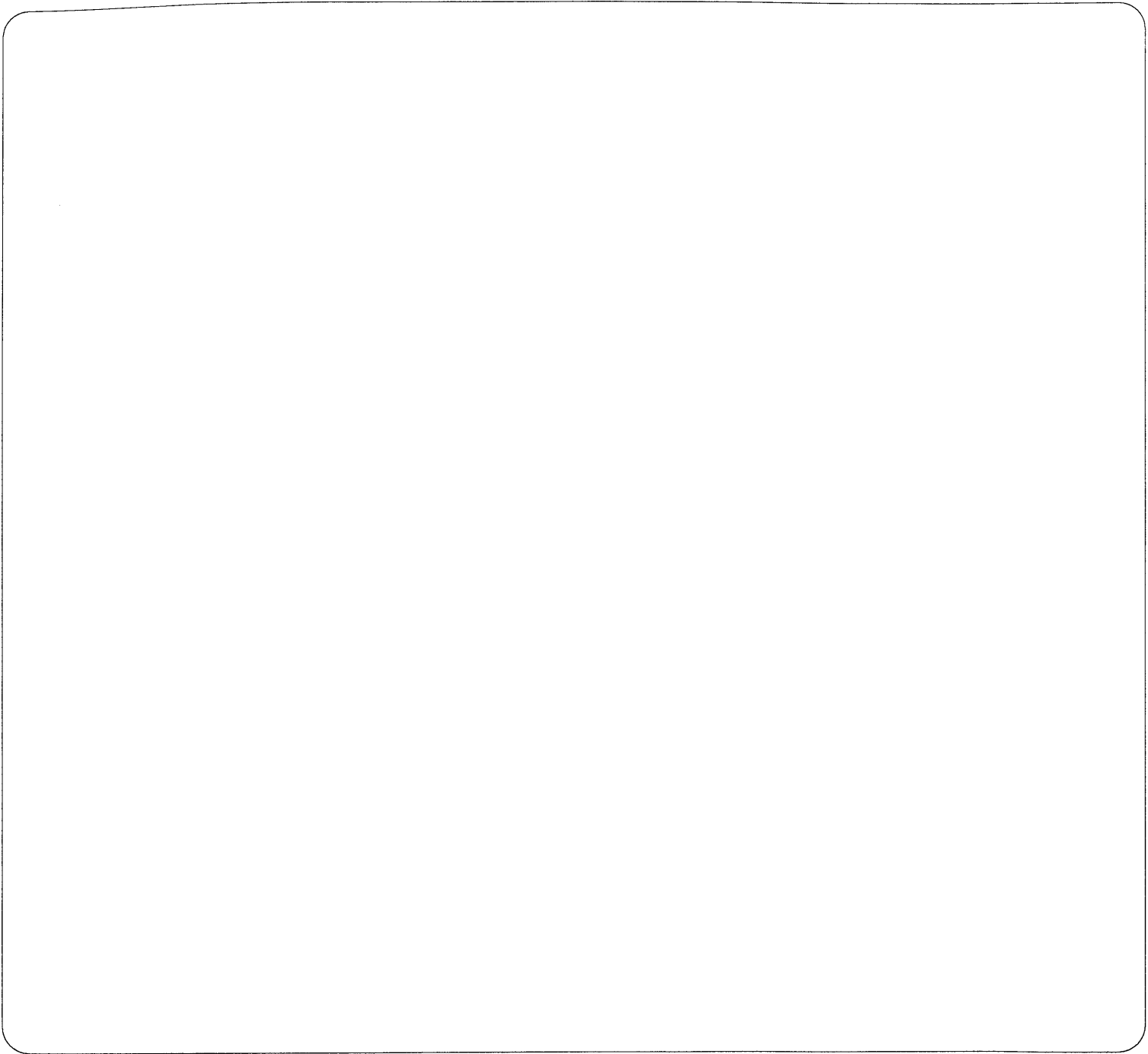
**212 MULTI PROGRAMMER**

---

***Operator's Manual***

981-0054-001

OCTOBER 1988



*Data I/O has made every attempt to ensure that the information in this document is accurate and complete. However, Data I/O assumes no liability for errors, or for any damages that result from use of this document or the equipment which it accompanies.*

*Data I/O reserves the right to make changes to this document without notice at any time.*

#### ORDERING INFORMATION

When ordering this manual, use Part Number 980-0016-001.

Data I/O® is a registered trademark of Data I/O Corporation.  
PROMlink™ is a trademark of Data I/O Corporation.

Copyright 1989, Data I/O Corporation. All rights reserved.

# Safety Summary

General safety information for operating personnel is contained in this summary. In addition, specific WARNINGS and CAUTIONS appear throughout this manual where they apply and are not included in this summary.

## Definitions

WARNING statements identify conditions or practices that could result in personal injury or loss of life. CAUTION statements identify conditions or practices that could result in damage to equipment or other property.

## Symbols



This symbol appears on the equipment and it indicates that the user should consult the manual for further detail.



This symbol stands for Vac. For example,  $120 V^{\sim} = 120 \text{ Vac}$ .

## Power Source

Check the voltage selector indicator (located inside the rear panel) to verify that the product is configured for the appropriate line voltage.

## Grounding the Product

The product is grounded through the grounding conductor of the power cord. To avoid electric shock, plug the power cord into a properly wired and grounded receptacle only. Grounding this equipment is essential for its safe operation.

## Power Cord

Use only the power cord specified for your equipment.

## Fuse Replacement

For continued protection against the possibility of fire, replace the fuse only with a fuse of the specified voltage, current and type ratings.

## Servicing

To reduce the risk of electric shock, do not perform any servicing other than that described in this manual.

# TABLE OF CONTENTS

## INTRODUCTION

Specifications .....	Intro-2
Functional Specifications .....	Intro-2
Power Requirements .....	Intro-3
Physical and Environmental .....	Intro-3
Ordering Options .....	Intro-4
System and Hardware Options .....	Intro-5
Programming Capability Updates .....	Intro-6
Warranty and Service .....	Intro-6
Manual Contents .....	Intro-7

## GETTING STARTED

Introduction .....	1-1
Connecting Power .....	1-1
Setting/Verifying the Operating Voltage .....	1-1
Verifying/Replacing the Line Fuse .....	1-4
Grounding the Programmer .....	1-6
I/O Port Connections .....	1-6
RS-232C Port Cable Connections .....	1-8
Parallel Port Cable Connections .....	1-9
Installing and Removing Socket Modules .....	1-10
Installing a Socket Module .....	1-10
Removing the Socket Module .....	1-12
Powering Up the Programmer .....	1-13
Displaying the Firmware Version Number .....	1-14
The Main Menu Functions .....	1-15
Sample Programming Session .....	1-16

**FRONT PANEL OPERATION**

Introduction .....	2-1
General Operating Notes .....	2-3
Family/Pinout Codes and Device Part Numbers .....	2-3
The Action Display .....	2-5
Aborting an Operation .....	2-5
Error Indicators .....	2-5
Devices with Electronic Identifiers .....	2-6
Checking for Non-blank Devices .....	2-7
Programming from a Master .....	2-9
Loading the Data from a Master Device .....	2-10
Programming a Device .....	2-12
Verifying Programmed Parts .....	2-14
Setting Communications Protocol .....	2-18
Downloading Data Using RS-232 Port .....	2-20
Uploading Data Using RS-232 Port .....	2-24
Downloading Data Using Parallel Port .....	2-28
Uploading Data Using Parallel Port .....	2-32
Editing RAM Data .....	2-36
Complementing Data .....	2-38
Inserting Single Data Bytes .....	2-39
Inserting a Single Value into a Block of RAM .....	2-41
Deleting Single Data Bytes .....	2-43
Deleting a Block of Data .....	2-45
Filling a Block of Memory .....	2-46
Searching for Data .....	2-47
Copying Data from One RAM Location to Another .....	2-49
Editing Single Data Bytes .....	2-51
Changing Special Programming Options .....	2-53
Enabling/Disabling Electronic ID Checking .....	2-54
Enabling/Disabling Device Testing .....	2-55
Enabling/Disabling Synchronous Programming .....	2-56
Setting the Initial Byte .....	2-57

**FRONT PANEL OPERATION (Cont.)**

Encryption Edit .....	2-58
Signature Edit .....	2-60
Byte Swap Data .....	2-62
Shuffling Data from 8-bit-wide to 16-bit-wide Format .....	2-64
Splitting 16-bit-wide Data .....	2-66

**TERMINAL REMOTE CONTROL**

Introduction .....	3-1
Symbols and Conventions .....	3-3
Terminal Remote Control Command Summary .....	3-4
General Operating Notes .....	3-5
Entering Commands .....	3-5
Controlling Command Execution .....	3-6
Action Display .....	3-6
Error Indicators .....	3-7
Default Parameter Values .....	3-8
Entering and Exiting Terminal Remote Control Mode .....	3-9
Entering Terminal Remote Control Mode .....	3-9
Exiting Terminal Remote Control Mode .....	3-11
On-Line Help - EPROMs Only .....	3-12
On-Line Help - Microprocessors Only .....	3-13
Selecting a Device Type .....	3-14
Selecting the Device Type from the TRC Menus .....	3-15
Selecting the Family/Pinout Code .....	3-17
Enabling/Disabling Electronic ID Checking .....	3-18
Programming Operations .....	3-19
Checking for Non-blank Devices .....	3-20
Setting Security Options (Microprocessors Only) .....	3-21
Loading a Single Master .....	3-23
Programming Single Devices .....	3-25
Loading a Set of Masters .....	3-28
Programming Sets of Devices .....	3-31
Loading Word-Wide Masters .....	3-35
Programming Devices Using a Word-Wide Format .....	3-38
Loading Long Word-Wide Masters .....	3-41
Programming Devices Using a Long-Word-Wide Format .....	3-44



**TERMINAL REMOTE CONTROL (Cont.)**

Verifying Programmed Devices .....	3-48
Verifying Single Devices .....	3-49
Verifying Sets of Devices .....	3-52
Verifying Word-Wide Devices .....	3-55
Verifying Long-Word-Wide Devices .....	3-58
Editing Memory .....	3-61
Displaying Memory .....	3-62
Modifying Single Memory Locations .....	3-64
Filling a Segment of Memory .....	3-66
Inserting New Data .....	3-68
Deleting Data .....	3-70
Transferring (Copying) Memory .....	3-72
Byte Swapping Memory .....	3-74
Searching Memory .....	3-76
Displaying Memory Reserved for Encryption (Microprocessors Only) .....	3-78
Modifying Single Encryption Locations (Microprocessors Only) .....	3-80
Filling a Segment of Memory Reserved for Encryption (Microprocessors Only) .....	3-82
Sumchecking Data .....	3-84
Performing a Sumcheck (Total) .....	3-84
Performing an Exclusive-OR Checksum .....	3-86

**COMPUTER REMOTE CONTROL**

Introduction .....	4-1
Symbols and Conventions .....	4-3
Computer Remote Control Command Summary .....	4-4
Response Characters .....	4-5
Specifying Block Parameters .....	4-6
Using PROMlink to Operate the 212 .....	4-9
Aborting an Operation .....	4-9
Entering and Exiting Computer Remote Control .....	4-10
Entering Computer Remote Control .....	4-10
Exiting Computer Remote Control .....	4-11

**COMPUTER REMOTE CONTROL (Cont.)**

Verifying Proper Communication .....	4-12
Programming Operations .....	4-13
Transferring Data .....	4-17
Inquiring About Operating and Error Status .....	4-19
Editing RAM .....	4-21
Data Translation Formats .....	4-23
Introduction .....	4-23
Software Handshaking .....	4-25
Hardware Handshaking .....	4-27
Leader/trailer and Null Output .....	4-27
Data Verification .....	4-28
Formats with Limited Address Fields .....	4-28
ASCII Space Hex, Code 50 .....	4-29
Binary Transfer, Code 10 .....	4-30
Intel Intellec 8/MDS Format, Code 83 .....	4-31
Intel MCS-86 Hexadecimal Object, Code 88 .....	4-32
Motorola Exorciser (S1) Format, Code 82 .....	4-35
Motorola Exormax Format (S1 and S2), Code 87 .....	4-36
Motorola 32-Bit (S3) Format, Code 95 .....	4-37
Tektronix Hexadecimal Format, Code 86 .....	4-38
<b>ERROR MESSAGES .....</b>	<b>5-1</b>
<b>INDEX .....</b>	<b>6-1</b>

TABLE OF CONTENTS

[Empty table area]

# INTRODUCTION

The 212 Multi Programmer is a modular single device programmer that allows you to program 24, 28, 32 and 40-pin NMOS and CMOS EPROMs and EEPROMs as well as 40-pin single-chip microcontrollers. You can operate the 212 "locally" using the front panel keys and 32-character display, or "remotely" using a terminal or computer and the RS-232 serial/bi-directional parallel "two-in-one" port.

In addition to the basic programming features, the 212 includes features which allow you to edit data loaded into the programmer's RAM, make use of electronic IDs, blank check devices, and work with data in 8-bit wide, 16-bit wide or 32-bit wide words.

The 212 Multi Programmer offers eight data translation formats (such as ASCII Space Hex, Binary, and formats supplied by Intel, Motorola and Tektronix) which enable you to transfer files to and accept files from software development systems.

This manual contains the instructions necessary for operating the 212 Multi Programmer both locally (from the front panel) and remotely (via computer or terminal). Instructions for setting up the programmer for either remote or local operation are provided in the Getting Started section and operating instructions for each of the modes are provided in separate, tabbed sections.

## NOTE

*Additional documentation may have been included with your module. This supplementary documentation contains instructions specific to the module and should be read before performing any operations with the module. The supplementary documentation can then be stored in the pocket on the inside of the operator's manual binder.*

## SPECIFICATIONS

Specifications for the 212 Multi Programmer are listed below.

### Functional Specifications

Functional specifications for the 212 are as follows:

- Data RAM: 256K or 1M (Bytes)
- Translation Formats: ASCII Space Hex
  - Binary
  - Intel Intellec 8/MDS
  - Intel MCS-86 Hexadecimal Object
  - Motorola Exorciser (S1)
  - Motorola Exormax (S1 and S2)
  - Motorola 32-bit (S1, S2, and S3)
  - Tektronix Hexadecimal
- Input/Output: Serial RS-232C compatible (110 through 19.2K baud)  
Bi-Directional Parallel Interface
- Remote Control: Computer Remote Control (CRC)  
Terminal Remote Control (TRC)
- Keyboard: 16-key hexadecimal, 3-key control
- Display: 16 x 2 character alphanumeric LCD display

## **Certificate of RFI/EMI Compliance with VDE 0871 Level B**

Data I/O certifies that the 212 Multi Programmer complies with the Radio Frequency Interference (RFI) requirements of VDE 0871 level B as required in West German postal regulation number vfg 1046/1987, page 1943.

Data I/O further certifies that the German Postal Service (DBP) has been notified of Data I/O's intention to market this equipment in West Germany. Data I/O acknowledges that the DBP reserves the right to retest this equipment to verify compliance with the regulation.

## Power Requirements

Power requirements for the 212 are as follows:

- Operating Voltages: 90 V — 130 V or 180 V — 260 V
- Frequency Range: 48 — 62 Hz
- Power Consumption: 60 W nominal

## Physical and Environmental

Physical and environmental requirements for the 212 are as follows:

- Dimensions: 32.5 cm x 11.0 cm x 23.7 cm (12.8" x 4.3" x 9.3")
- Weight: Base — 2.9 kg (6.4 lbs); Module — 0.9 kg (2.0 lbs)
- Operating Temperature Range: 5° to 45° C (41° to 113° F)
- Storage Temperature Range: -20° to 60° C (-4° to 140° F)
- Humidity: Up to 90%, noncondensing
- Operational Altitude: To 10,000 ft

## ORDERING OPTIONS

The following paragraphs describe the available 212 Multi Programmer systems, options and feature updates. If you are interested in purchasing another complete system, one or more of the options, or an update, contact your nearest Data I/O sales representative. An order for shipment must include the following information:

- Description of the equipment
- Quantity of each item ordered
- Shipping and billing address of firm, including ZIP code
- Name of person ordering equipment
- Purchase order number
- Desired method of shipment



## System and Hardware Options

Additional socket modules are available and can be installed on your 212 Multi Programmer to enable you to program different types of devices. The available socket modules, listed below, are available in low voltage (90V - 130V) and high voltage (180V - 260V). Use the model numbers listed below, specifying low or high voltage when ordering. The available socket modules including other options are listed below.

<u>Model Number</u>	<u>Description</u>
212MP256	212 Multi Programmer base unit with 256K bytes of data RAM. Does not include a socket module.
2121MEG	212 Multi Programmer base unit with 1Megabyte of data RAM. Does not include a socket module.
MODEPROM	EPROM/EEPROM Module, programs 24-, 28-, 32-, and 40-Pin EPROMS and EEPROMS.
MODMICRO	Microcontroller Module - programs 40-pin single-chip microcontrollers.

Other socket modules or options may become available in future. Contact your local Data I/O sales representative for updated information on available 212 options.

### OPTIONS

212CABLE	A "Y-style" cable that allows you to utilize either serial or parallel capability from a single cable.
212UPGRADE	A one megabyte user installable RAM upgrade kit used to upgrade from 256K bytes of RAM to 1 Mega byte of RAM.

## Programming Capability Updates

As new device programming capabilities become available, Data I/O will offer user-installable memory card updates for the 212 Multi Programmer. Contact your local Data I/O sales representative for information on available updates. Data I/O also offers Full Service Agreements which provide automatic shipment of updates, plus calibration and repair of your equipment. Contact your local Data I/O representative for information on service contracts.

## WARRANTY AND SERVICE

Data I/O equipment is warranted against defects in materials and workmanship. The warranty period of one year, unless specified otherwise, begins when you receive the equipment. Refer to the warranty card inside the back cover of this manual for information on the length and conditions of the warranty. For warranty service, contact your nearest Data I/O Service Center.

Data I/O maintains Service Centers throughout the world, each staffed with factory-trained technicians to provide prompt, quality service. This includes not only repairs, but also calibration of all Data I/O products. For the number of your local service representative, please call one of the following numbers:

<b>UNITED STATES:</b>	<b>1-800-247-5700</b> <b>(In Wash. State, call 206-881-6444)</b>
<b>DATA I/O CANADA:</b>	<b>416-678-0761</b>
<b>DATA I/O EUROPE:</b>	<b>+31 (0)20 622866</b>
<b>DATA I/O JAPAN:</b>	<b>03 432 6991</b>
<b>ALL OTHER LOCATIONS:</b>	<b>206-881-6444</b>

Sockets are warranted for 25,000 cycles. Socket replacements are available through your Data I/O Service Center or local area representative.

## MANUAL CONTENTS

A brief outline of the contents of this manual is provided below:

- INTRODUCTION—This section provides a general description of the programmer, its specifications, available options and ordering information, and warranty and service information.
- GETTING STARTED—This section provides instructions on how to set up the 212 Multi Programmer for operation and a sample programming session to give you a general idea of how to operate the programmer.
- FRONT PANEL OPERATION—This section provides detailed instructions on how to blank check, program and verify devices using the front panel keys. How to perform operations on devices, using the front panel keys as well as how to upload data, prepare the programmer to accept and store downloaded data, and how to edit data stored in the programmer's RAM using the front panel keys.
- TERMINAL REMOTE CONTROL—This section provides instructions on how to operate the 212 Multi Programmer from a remote terminal connected to the programmer through the RS-232C port.
- COMPUTER REMOTE CONTROL—This section provides a description of the computer remote control command language. This command language can be used to write a software driver that allows you to operate the programmer using a host computer. This section also contains detailed descriptions of the data translation formats available for the 212 Multi Programmer.
- ERROR MESSAGES—This section provides a list of the error messages displayed on the programmer. The meanings of the error messages are described as well as corrective action that should be taken. The device list, provided separately, should be placed in the section as well.
- INDEX—This is an alphabetical guide to all major topics covered in this manual.

# 1

**Getting Started**

# 1. GETTING STARTED

This section explains how to set up your 212 Multi Programmer for operation. Included in this section are instructions on setting and verifying operating voltage, verifying and replacing the line fuse, I/O port connections, installing and removing socket modules, and powering up the unit. Also given in this section is a brief description of the 212 menus and a sample EPROM programming session.

## CONNECTING POWER

Before connecting power to the programmer, perform the following checks:

- Make sure the operating voltage is properly selected on the back panel of the unit.
- Make sure the correct line fuse is installed.
- Make sure the unit is properly grounded.
- Make sure the memory card is fully inserted in the slot on the right-hand side of the unit.

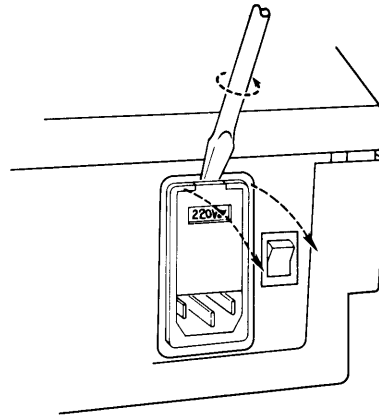
## Setting/Verifying the Operating Voltage

The voltage setting is visible through a window in the door that covers the voltage selector wheel, located on the back panel. The voltage appearing in the window should be the same as the line voltage at which the programmer will operate. If the voltage that appears in the window is incorrect, change the operating voltage according to the following procedure.

**CAUTION**

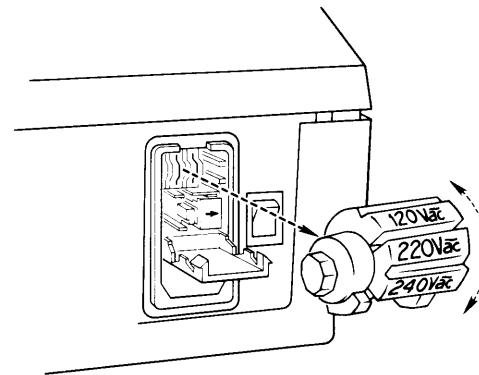
**This instrument may be damaged if operated with the wrong operating voltage.**

1. Disconnect the power cord if plugged into the unit.
2. Gently pry open the door that covers the voltage wheel selector with a flat-blade screwdriver.
3. Pull the voltage wheel selector out of its slot.

**CAUTION**

**The voltage wheel selector may be damaged if the operating voltage is changed while the wheel is still inserted in its slot.**

4. Rotate the voltage selector so that the correct operating voltage is facing out from the back panel of the programmer.

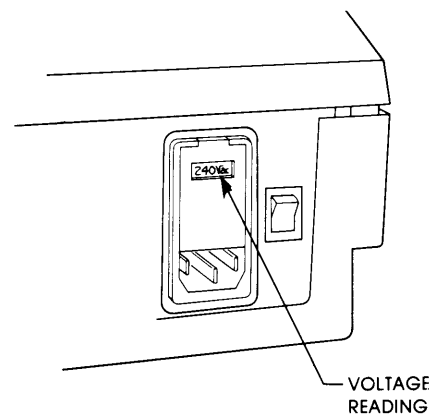


5. Insert the voltage selector into its slot.

**NOTE**

*If you wish to access the line fuse at this time, proceed to step 2 of the next procedure.*

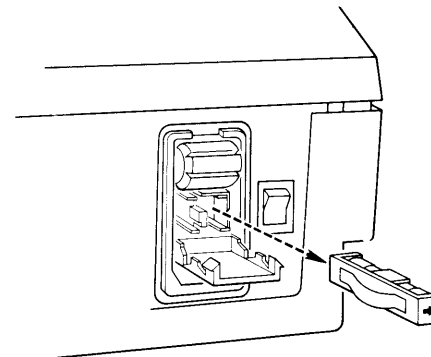
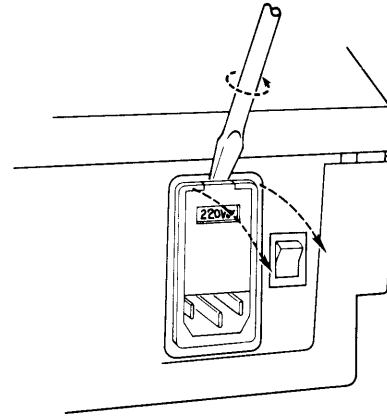
6. Snap the door closed.
7. The correct voltage reading should now appear in the window.



## Verifying/Replacing the Line Fuse

The line fuse is located behind the same door that covers the voltage wheel selector. Perform the following procedure to verify that the line fuse is correct and intact. In the event that the fuse is blown, replace it with one of the correct size and rating.

1. Gently pry open the door that covers the fuse holder using a flat-blade screwdriver.
2. Pull the right fuse holder out of its slot (the left fuse holder is for a spare fuse).
3. Verify that the fuse is the correct type and value per the following table; if necessary, install the correct fuse into the fuse holder.





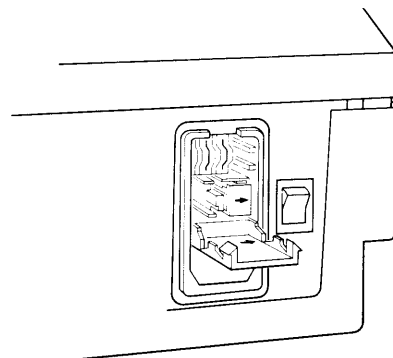
Line Voltage	Line Fuse Rating			Data I/O Part Number
	Current	Voltage	Type	
90 - 130	1.0A	250V	T (Slow-blow)*	416-3010
220 - 260	0.5A	250V	T (Slow-blow)	----

\* Littlefuse type 313, Bussman type MDA

### CAUTION

**For continued protection against the possibility of fire, replace only with a fuse of specified voltage, current, and type ratings.**

4. Insert the fuse holder into its slot so that the arrow on the fuse holder points in the same direction as the arrows on the door.
5. Snap the door closed.



## Grounding the Programmer

The 212 Multi Programmer is shipped with a three-wire power cable. This cable connects the chassis of the programmer to earth ground when connected to a properly grounded three-wire ac receptacle.

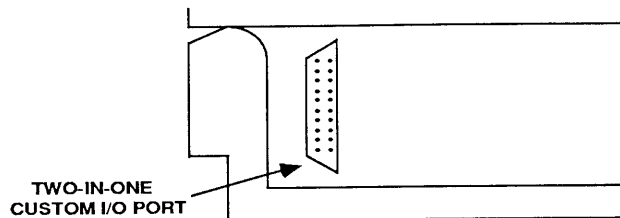
### WARNING

---

**Continuity of the grounding circuit is vital for the safe operation of the unit. Never operate this equipment with the grounding conductor disconnected.**

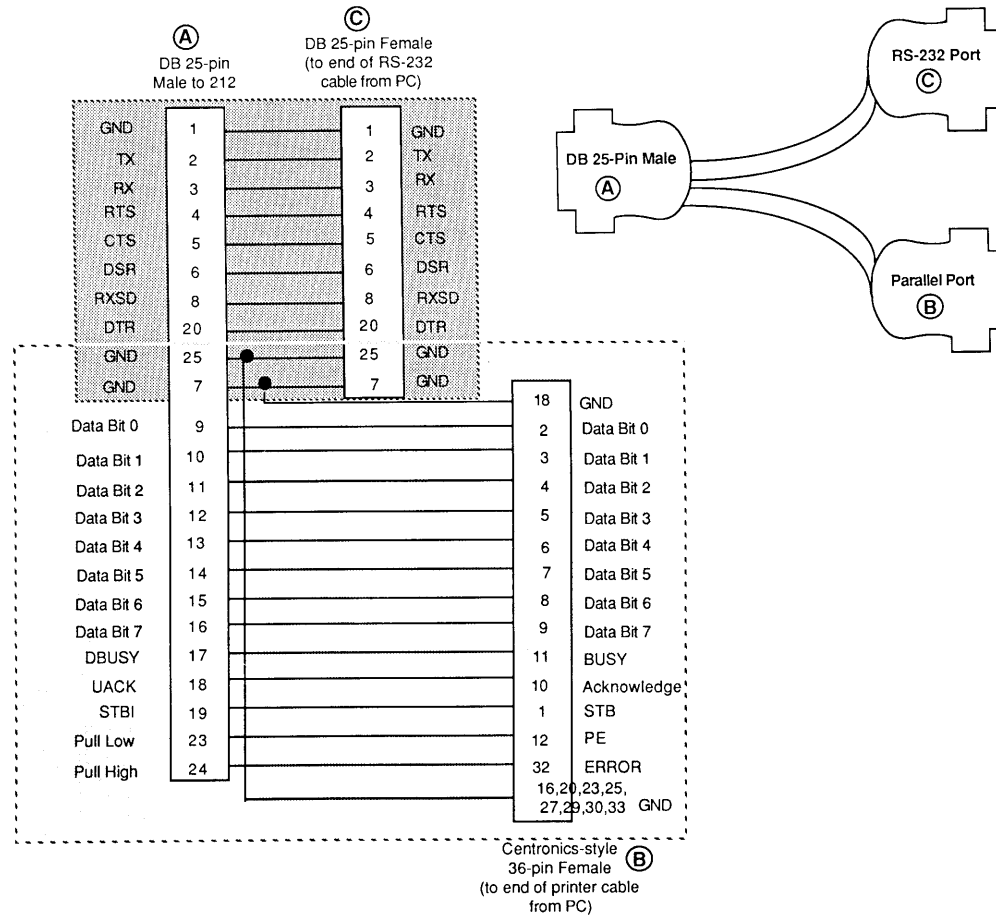
## I/O PORT CONNECTIONS

The 212 Multi Programmer is equipped with a two-in-one custom I/O port which is located on the back panel of the programmer (see illustration). The port is a combination RS-232C and parallel port selectable from the front panel menu. The cable connections required for the RS-232 or parallel connector for each mode are shown in the illustration below.



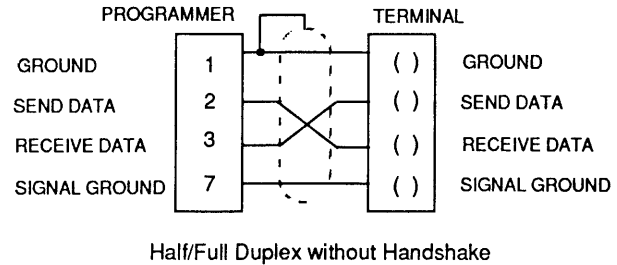
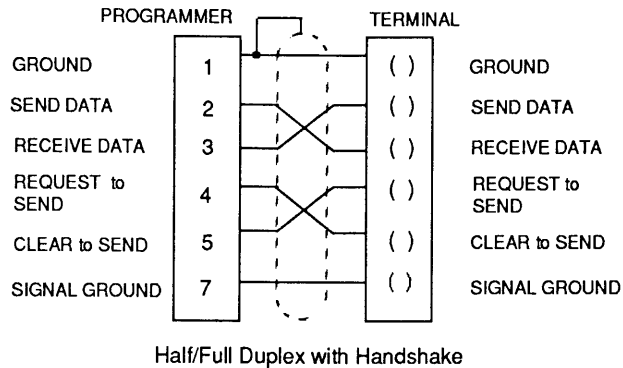
## NOTE

An optional "y-style" adapter cable is available from Data I/O for use with a Centronix parallel cable which will allow the user to connect the 212 using a standard parallel cable. Additionally, the "y-style" cable allows the customer the convenience of having the RS-232 and parallel cables connected simultaneously. The pinouts of the adapter cable are shown below:



## RS-232 Port Cable Connections

The RS-232 compatible I/O port can be linked to a terminal, computer, or other development systems in either a handshake or non-handshake mode. The cable connections required for the RS-232 for each mode are shown in the following illustrations:

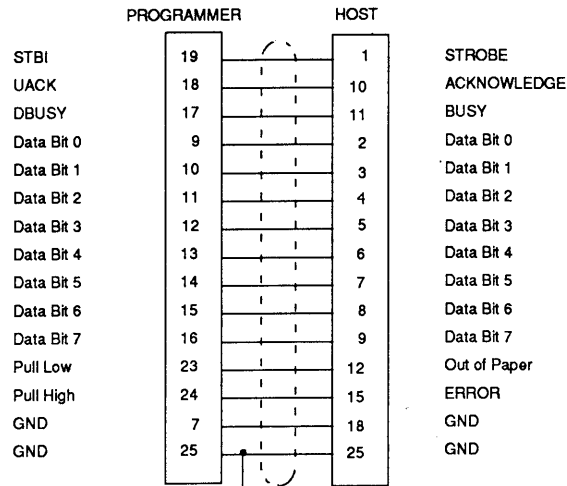


### NOTES

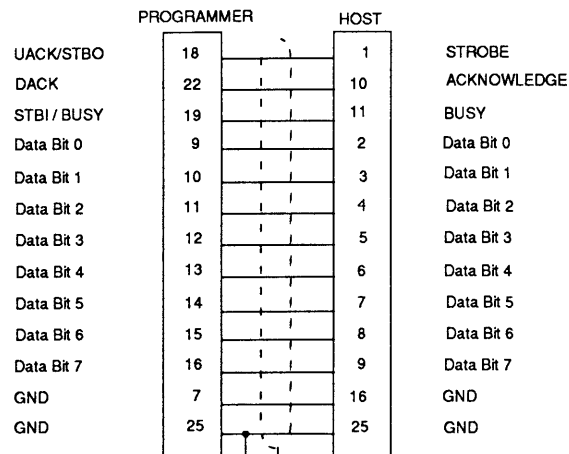
1. All signals are named with respect to the originating unit.
2. All undesignated pins are to be left open.
3. For applications that do not require handshaking, the programmer's "clear to send" line is pulled up internally.
4. Host system's pin numbers may differ.

## Parallel Port Cable Connections

The parallel port can be linked to a system capable of transmitting only or transmitting and receiving data through a parallel port. The cable connections required for each mode are shown in the following illustrations:



Connections for Parallel Port  
for Downloading to 212 from Host



Connections for Parallel Port  
for Uploading from 212 to Host

### Notes

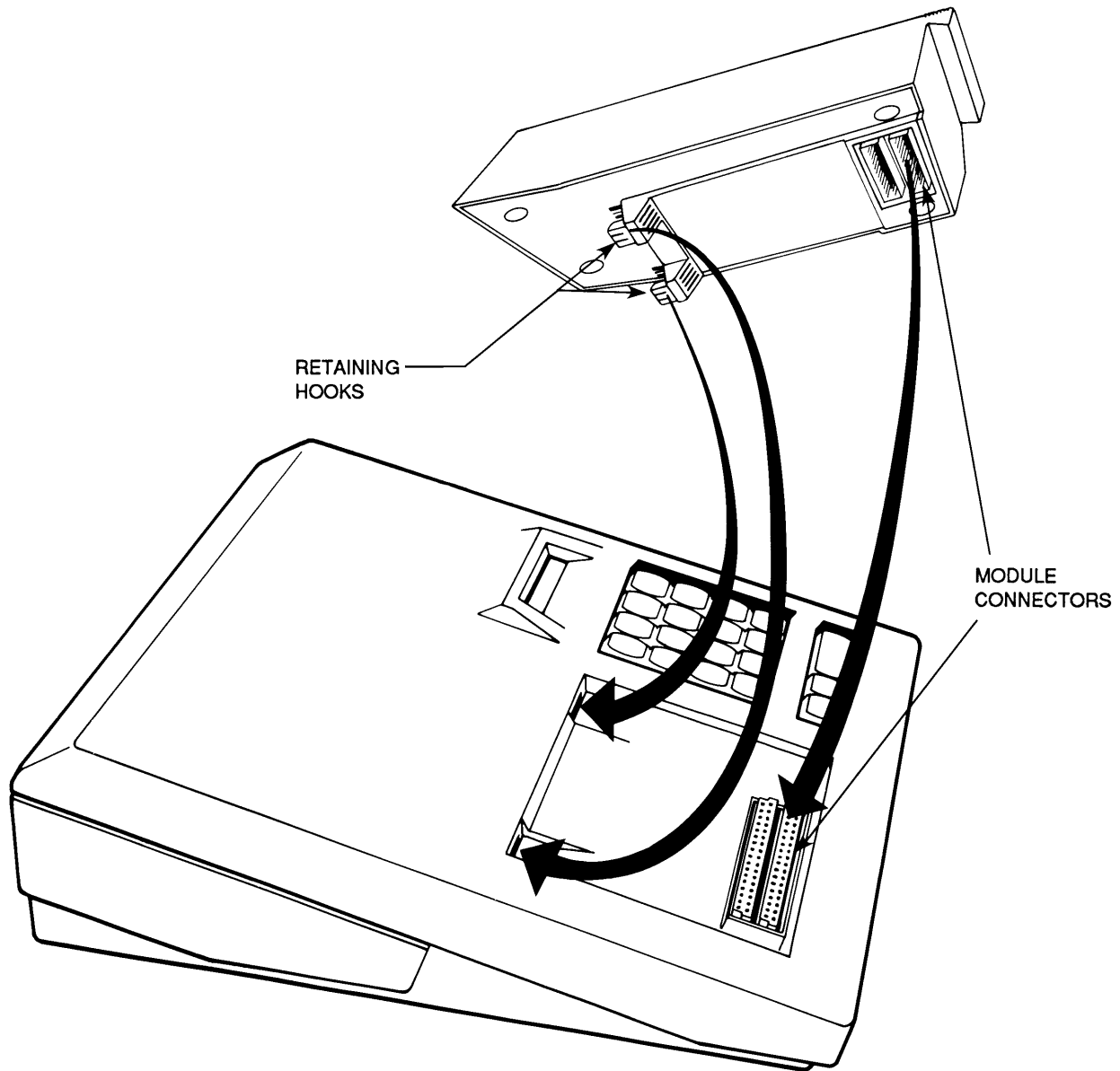
1. All undesignated pins are to be left open.
2. Host system pin numbers may differ.
3. Some host systems may not be capable of receiving parallel data.
4. Separate cables are required for uploading and downloading parallel data.

## INSTALLING and REMOVING SOCKET MODULES

The socket modules contain the sockets in which the devices to be programmed are installed. Different socket modules allow you to program different kinds of devices. The programmer cannot be operated without a socket module installed. The socket module can be removed and another module installed while power is on, but it is recommended that you install and remove your socket modules with the power off. To install and remove the socket module, perform the following procedures.

### Installing a Socket Module

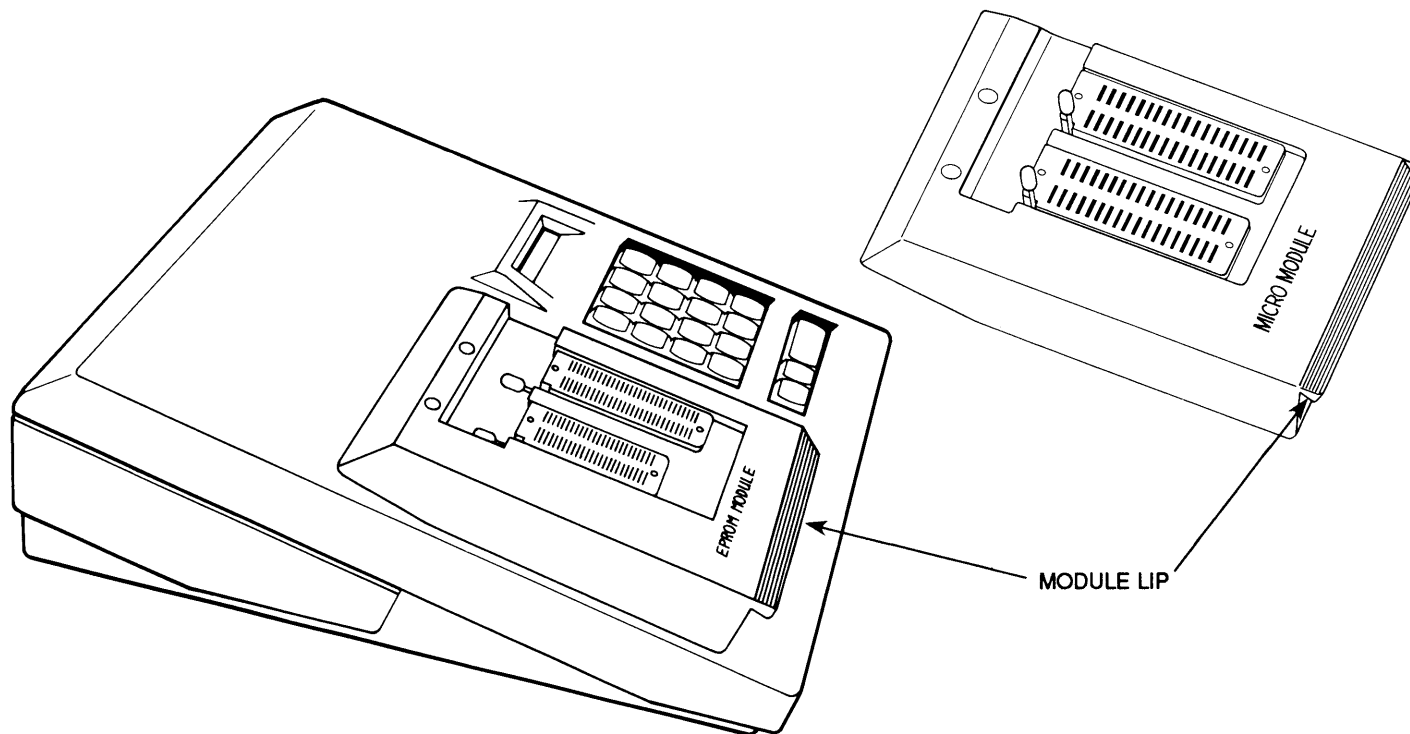
1. Insert the retaining hooks on the underside of the socket module into the slots on the front of the 212 front panel (see illustration).
2. Lower the front of the module slightly, slide the module towards the back of the base unit as far as the retaining hook will allow and then continue lowering the front of the module until the module drops into place. The module should lower down until the bottom of the module is resting almost fully against the top of the 212 base unit.
3. Press firmly on the lower front portion of the module to seat the connectors on the bottom of the module into the 212 connectors (see illustration). If the connectors are not fully engaged, the programmer will not operate and a "MODULE DISCONNECTED" message will appear on the front panel display.



## Removing the Socket Module

Different socket modules allow you to program different kinds of devices. Shown in the illustration below are the EPROM module for programming EPROM devices and the MICRO module for programming microprocessor devices. To remove an installed socket module, perform the following steps:

1. Lift up on the lip at the front edge of the module until the connector disengages (see illustration).
2. Lift the front of the module up until the module is at a 45° angle to the base unit and then lift the module straight up until the retaining hooks on the bottom of the module clear the base unit.
3. Store the module on an antistatic surface or in an antistatic container.

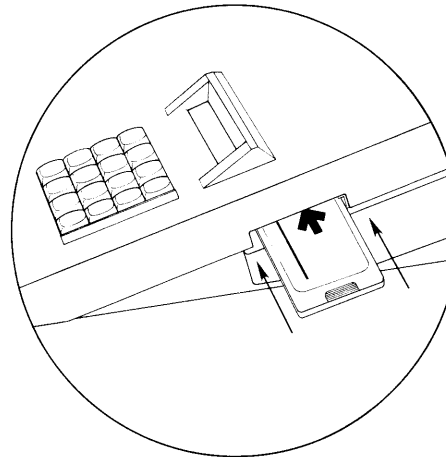




## POWERING UP the PROGRAMMER

To power up the programmer, proceed as follows:

1. Make sure the device sockets are empty.
2. Make sure the memory card is fully inserted in the programmer. See the illustration.



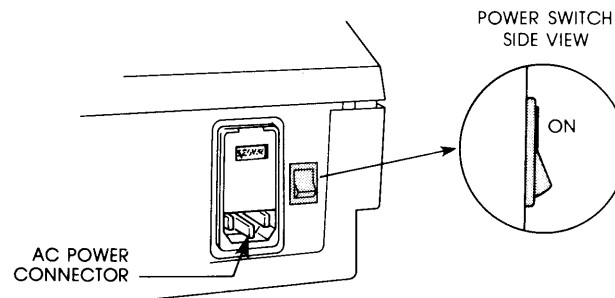
### NOTE

*Applying power without the memory card inserted will either cause no response from the programmer or will cause the programmer to beep and display the message: INSERT MEMORY CARD →*

### CAUTION

**Removing or installing the memory card with power applied may result in damage to the memory card.**

3. Plug the power cable into the back panel connector and an AC power receptacle.
4. Press the power switch to the ON position (see the illustration).



When the programmer is turned on, it automatically performs a self test that verifies correct operation of the unit. During execution of the self test, the front panel display shows

```
SELF TESTING
```

```
.....
```

with advancing decimal points on the lower portion of the display. Upon completion of the self test, the programmer briefly displays

```
SELF TEST OK  
DATA I/O 212 N
```

where "N" is the version number of the programmer's software.

The programmer then displays the first main menu item.

```
LOAD FROM MASTER
```

If a device is present in the programmer's socket when the power is switched on, the display reads

```
DEVICE IN SOCKET  
REMOVE DEVICE
```

To correct this condition, remove the device and press ENTER. The self test will then proceed.

## THE MAIN MENU FUNCTIONS

The 212 Multi programmer can perform seven basic functions, each of which is presented on the main menu. To display each of these functions, scroll through the main menu by means of the scroll keys shown in the illustration. (Scroll forward with the right-hand key and backward with the left-hand key.) The seven main menu functions are:

**LOAD FROM MASTER** — load data from a master device into internal memory.

**PROGRAM** — program a device with the contents of internal memory.

**VERIFY**—verify the contents of one or more devices against the contents of internal memory.

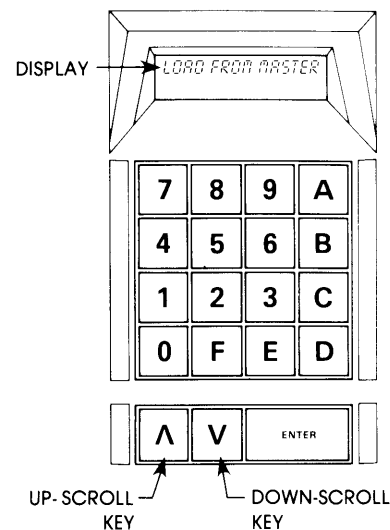
**BLANK CHECK** — perform a blank check on the installed device.

**RS232 PORT** — perform RS-232C port operations, such as change the port settings, download a file, upload a file, or transfer control of the programmer to a remote computer or terminal.

**EDIT** — edit the contents of the programmer's data RAM.

**PARALLEL PORT** - uploading and downloading files.

Each of the seven functions is fully described in the Front Panel Operation section; however, to familiarize you with the basic programming operation, a sample programming session is described in the following pages.



## SAMPLE PROGRAMMING SESSION

The following steps describe how to program a blank device from a master device. (A master device is a device that has been previously programmed and is used as a "master" to program blank devices). To perform this programming session, you will need a master device and a blank device. The master device used in the following procedure is an Intel 2764, but could be any device shown on the Device List.

In the following procedure, the blank device is assumed to be of the same type as the master device, although it is possible for the master device to differ from the blank device. For more details on device programming, refer to the Front Panel Operation section of this manual.

1. If the programmer is not on, make sure all the sockets of the programmer are empty and that the memory card is inserted in the programmer, then turn on the power switch. Wait until the self test is complete and the display reads

```
LOAD FROM MASTER
```

2. Press ENTER to select the LOAD FROM MASTER function. The display reads

```
LOAD FROM MASTER  
F/P CODE FF/FF
```

"FF/FF" is the current family/pinout code. (A family/pinout code of FF/FF causes the programmer to read the electronic ID of the installed device and select the correct family/pinout code automatically.) For this sample session, select the device type from the 212 menus.

### NOTE

*A family/pinout code is a unique number assigned to individual manufacturer's devices by Data I/O.*

3. Press the down-scroll key once. The display reads

```
LOAD FROM MASTER  
ELECTRONIC ID
```

4. Press the down-scroll key until the display shows the name of the manufacturer of the master device you are loading.

*NOTE*

*If you scroll past the desired selection, use the up-scroll key to move backwards through the menu.*

5. When the correct manufacturer is displayed, press ENTER to select that manufacturer. If you selected Intel as the manufacturer, the display would read

```
LOAD FROM MASTER  
INTEL 2716
```

*NOTE*

*If you are using a device of a manufacturer other than Intel, the name of that manufacturer and a device part number appear on the display.*

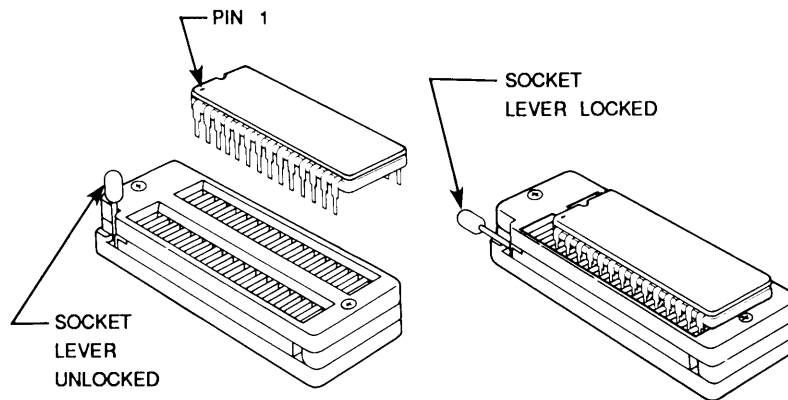
6. Press the up-scroll or down-scroll key until the display shows the correct part number of your master device. For example, if you are using an Intel 2764, the display should read

```
LOAD FROM MASTER  
INTEL 2764
```

7. Press ENTER to select the device type. The display reads

```
INSERT DEVICE  
INTEL 2764
```

8. Insert the master device in the socket with the illuminated LED by lifting the lever and placing the device in the socket so that the bottom pins of the device are bottom-justified and pin 1 is toward the top of the socket (see illustration) and press ENTER to initiate the load operation. Push the lever down to lock the device in place.



9. Press ENTER to begin the load operation. The display reads

```
LOAD FROM MASTER
.....
```

(Advancing decimal points on the lower portion of the display indicate that the load operation is taking place.)

When the load operation is complete the display reads

```
LOAD FROM MASTER
SUMCHECK = HHHHHH
```

where "HHHHHH" is the sumcheck of the device (the sum of all the data bytes in the device expressed as a hexadecimal number). Make a note of the sumcheck for future reference.

10. Lift the socket lever and remove the master device.
11. Press the down-scroll key two times. The display reads

PROGRAM

12. Press the ENTER key to select the program function. The display reads

PROGRAM  
F/P CODE 79/33

(79/33 is the family/pinout code for the Intel 2764, and is now the default family/pinout code. If you used a master device other than an Intel 2764, the family/pinout code of the device you selected is now the default.)

13. Press the ENTER key to select the displayed family/pinout code. The display reads

INSERT DEVICE  
F/P CODE 79/33

14. Install a blank device and press the ENTER key to initiate the programming operation. During the programming operation the display reads

PROGRAM

.....

(Advancing decimal points on the lower portion of the display indicate that the program operation is taking place.)

When the program operation is complete the display reads

PROGRAM

SUMCHECK = HHHHHH

where "HHHHHH" is the sumcheck of the device. This hexadecimal number should match that displayed in step 9.

15. Lift up the socket lever and remove the programmed device.
16. To program an additional device, press ENTER twice and return to step 13.

This completes the sample programming session.

*NOTE*

*An automatic Verify Operation is included in the programming operation.*