



**iMDX 511  
IOC FIRMWARE ENHANCEMENT  
KIT  
INSTALLATION INSTRUCTIONS**

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REV.	REVISION HISTORY	DATE
-001	Original issue.	9/82
-002	Manual updated to support IOC-III board.	5/83





This manual is written for the design engineer, programmer, or technician who will install and check out the iMDX 511 IOC Firmware Enhancement Kit. It provides general information, installation procedures, and instructions for using diagnostics.

Supporting documentation is available in the following manuals:

- *Intellec Series II Installation Manual*, order number 9800559
- *Intellec Series II Microcomputer Development System Hardware Interface Manual*, order number 9800555
- *Intellec Series II Microcomputer Development System Hardware Reference Manual*, order number 9800556

## **Notational Conventions**

**UPPERCASE** Characters shown in uppercase must be entered in the order shown. You may enter the characters in uppercase or lowercase.

*italic* Italic indicates a meta symbol that may be replaced with an item that fulfills the rules for that symbol. The actual symbol may be any of the following:

**Vx.y** Is a generic label placed on sample listings where the version number of the product that produced the listing would actually be printed.

**punctuation** Punctuation other than ellipses, braces, and brackets must be entered as shown. For example, the punctuation shown in the following command must be entered:

```
SUBMIT PLM86(PROGA, SRC, '9 SEPT 81')
```

**input lines** In interactive examples, user input lines are printed in white on black to differentiate them from system output.





<b>INSTALLATION</b>	<b>PAGE</b>
Introduction .....	1
Installation .....	1
IOC Board Upgrade .....	2
Keyboard Upgrade .....	5
IOC Firmware Diagnostic .....	5
Keyboard Test .....	6

**FIGURES**

<b>FIGURE</b>	<b>TITLE</b>	<b>PAGE</b>
1	Intellec Series II Mainframe Rear Panel .....	2
2	Rear Panel/IOC Board Attaching Screws .....	3
3	IOC Board Component Location Diagram .....	4







## Introduction

The iMDX 511 upgrade enhances a Series II or Series III Development System by providing a more user friendly human interface. Features added by this enhancement include:

- Automatic keystroke repeat function
- Solid (non-blinking) cursor
- Programmed keystroke sequences
- Direct cursor addressing
- Block movement of data to the CRT
- Command line recall/edit
- Flexible file display facility
- Increased batch job capability

This iMDX 511 IOC Firmware Enhancement Kit includes:

- One single-density diskette
- One double-density diskette
- One 8741A microcontroller (keyboard firmware)
- Four preprogrammed 2716 PROM chips (IOC firmware)
- Two key caps (labeled FUNC)

## Installation

Before you start to install this system enhancement, ensure that your system is operating properly. You can do this by running an existing working program, or by executing the diagnostics described in the *Intellec Series II Installation Manual*.

### NOTE

If your system has an IOC-III board installed, you will not have to remove the IOC board and install the four 2716 PROMs; your system already has the enhanced firmware. You will, however, have to install the keyboard upgrade.

To determine the level of the IOC board in your system, place the DIAGNOSTIC/LINE/LOCAL switch on the rear panel in the DIAGNOSTIC (up) position. Press the RESET button on the front panel. The system will run a test (you will hear five beeps as the test executes) and then display a sign-on message.

When an IOC-III board is installed, the first line of the message reads:

```
SERIES II IOC-III DIAGNOSTICS Vx.y
```

When an older version of the IOC board is installed, the first line of the message reads:

```
SERIES II IOC DIAGNOSTIC Vx.y
```

If your system does not have the IOC-III board installed, use the following procedure to install the 511 upgrade kit. If your system has an IOC-III board installed, turn off system power and skip to the keyboard upgrade installation procedure.

### IOC Board Upgrade

1. Turn off system power, disconnect power cord(s), and disconnect all cables connected to mainframe rear panel. Record where the cables were removed to aid in their replacement.
2. If low-profile diskette drive(s) are installed on top of the mainframe chassis, remove the two aluminum ground strips between the mainframe and the first drive chassis. Remove the drive(s) from the top of the mainframe.
3. Remove the two screws from the top of the mainframe. Remove the two screws that fasten the top cover to the backpanel, and remove the mainframe top cover.
4. Refer to figure 1 and disconnect the cables from connectors J14, J15, and J16 on the top edge of the IOC board. If the mainframe includes an integral diskette drive, also disconnect the cables from connectors J17 and J18.

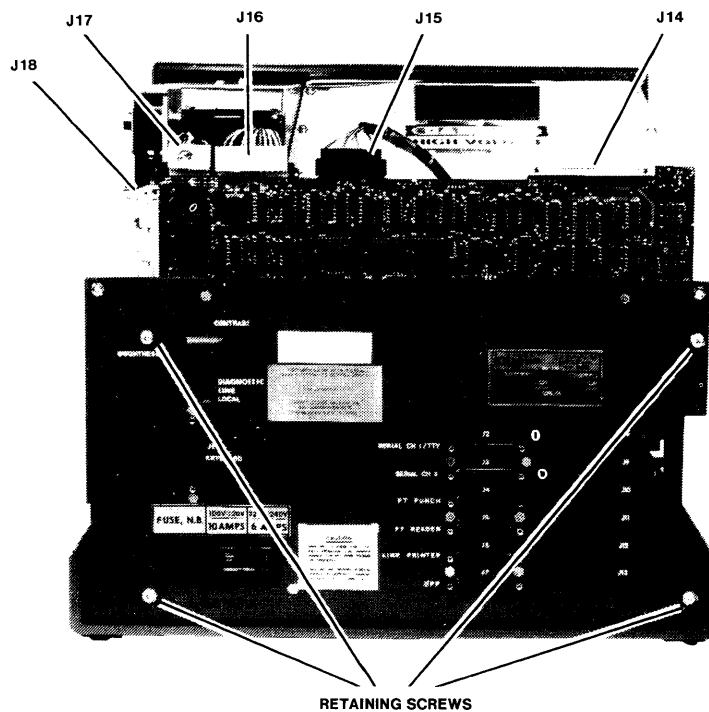


Figure 1. Intellec® Series II Mainframe Rear Panel

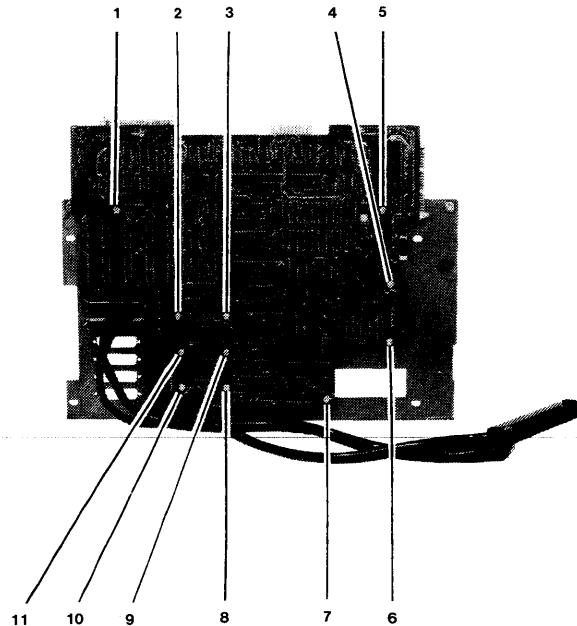
122014-1

5. If your system includes a hard disk or (a) dual double-density diskette drive(s), and the controller boards are installed in the mainframe cardcage, remove the mainframe front panel and disconnect the hooded connector from the controller interface board.
6. Remove the screws that hold the rear panel to the mainframe. Pull the rear panel assembly away from the mainframe, and carefully withdraw the drive controller cable (if present) through the opening in the side of the chassis.
7. Place the rear panel assembly face down on a padded flat surface. Refer to figure 2 and remove the 11 screws that attach the IOC board to the rear panel. Lift the IOC board free of the rear panel.
8. Refer to figure 3 and remove the four PROM chips from locations A50, A51, A52, and A53.

**CAUTION**

When handling the PROM chips, be extremely careful to avoid bending the dual in-line pins.

9. Install the four replacement 2716 PROMs in locations A50, A51, A52, and A53 as labeled on the chips.
10. Align the mode switch and the brightness thumbwheel on the IOC board with the cutouts on the rear panel. Attach the IOC board to the rear panel using the 11 screws removed in step 7. Insert all of the screws before you tighten any of them.



**Figure 2. Rear Panel/IOC Board Attaching Screws**

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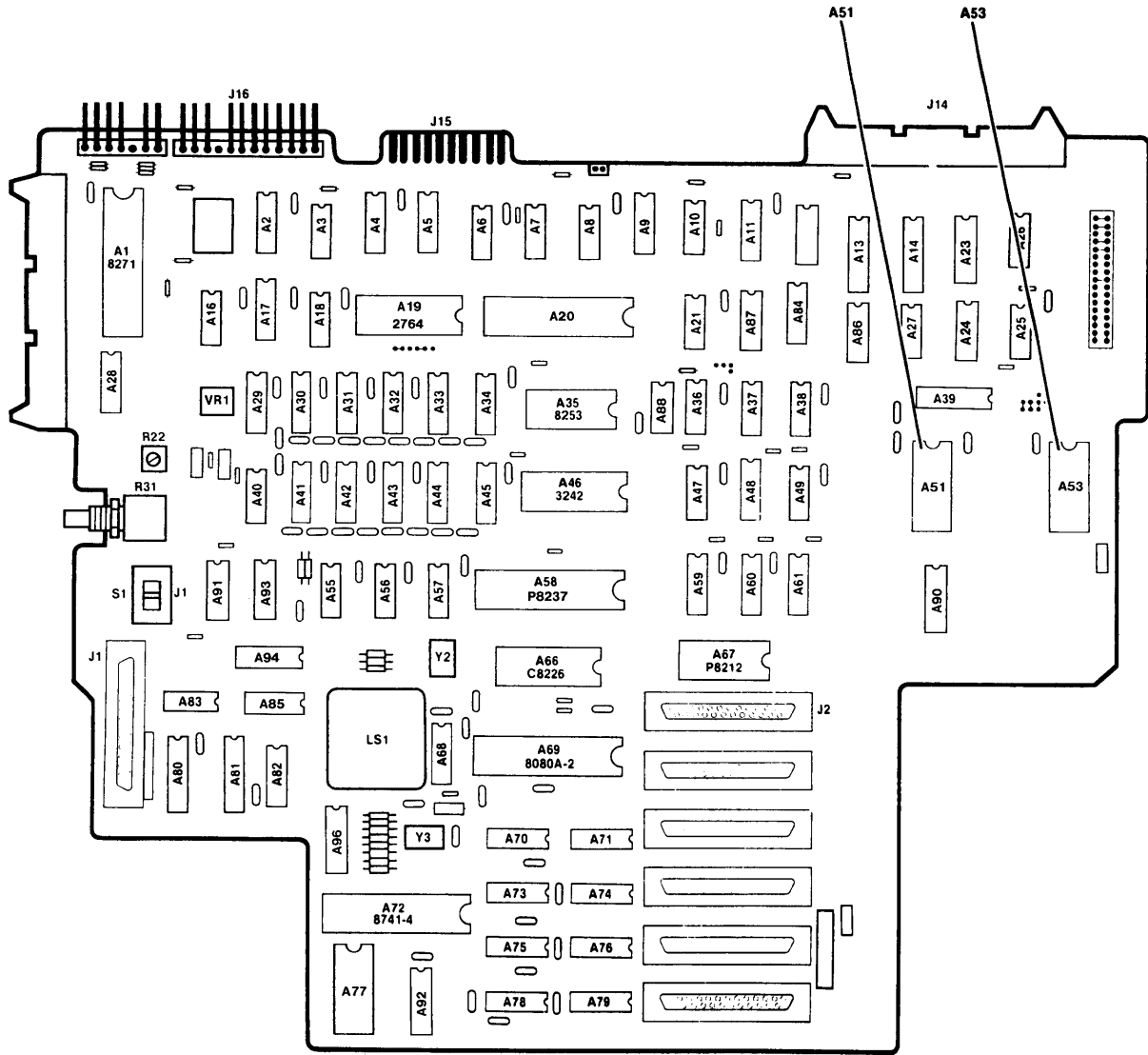


Figure 3. IOC Board Component Location Diagram

122014-3

11. Position the rear panel against the mainframe, while guiding the drive controller cables (if present) through the opening in the side of the chassis; make sure that no cables are pinched between the IOC board and the mainframe. Secure the rear panel assembly to the mainframe using the screws removed in step 6.
12. Reattach the hooded connector on the drive controller cable (if present) to the controller interface board. Reinstall the mainframe front panel.
13. Reconnect the cables to connectors J14 through J18 on the top edge of the IOC board.
14. Replace the mainframe top cover.
15. Reinstall the low-profile diskette drive (if present) on top of the mainframe and reconnect all cables removed in steps 1 and 2.
16. Fill in the upgrade label and attach it to the front panel.

## Keyboard Upgrade

To upgrade your keyboard with the new firmware and keycap, perform the following procedures:

1. Set the keyboard face down on a protective surface.
2. Remove the screws from the bottom of the keyboard. Return the keyboard to its normal position and remove the top cover-plate from the keyboard. (For some keyboard versions, these two screws permit removal of the entire keyswitch assembly, including the top cover plate).
3. Remove the screws that hold the keyswitch assembly in place and carefully remove the keyswitch assembly.
4. Remove the edge connector from the keyboard PC board.
5. Remove the large 40-pin chip from its socket. Note the direction of the notched end of the removed device. Replace the device with the 8741A included in the upgrade kit. Note that the new chip must be installed with its notched end facing the same direction as the one removed.
6. Reinstall the edge connector removed in step 4.
7. Reinstall the keyswitch assembly using the screws removed in step 3. Make certain that the ground wire from the keyboard cable (if present) is reconnected with the screw on the left.
8. Remove the RPT keycap from the keyboard (by pulling straight up) and replace it with the FUNC key provided in the kit.
9. Reinstall the keyboard cover plate using the screws removed in step 2.
10. Execute IOC firmware diagnostic as described in the following procedure. Refer also to the *Intellec Series II Installation Manual*.
11. Fill out and mail the Software Registration Certificate included in your kit.

## IOC Firmware Diagnostic

1. On the rear panel, set the DIAGNOSTIC/LINE/LOCAL switch to the DIAGNOSTIC (up) position. Press the RESET button on the front panel.
2. The system runs a five-beep test automatically when the RESET button is pressed. If the test executes correctly, you will hear the five beeps spaced as follows: two beeps, slight pause, then three beeps.

After the fifth beep, the system displays an IOC diagnostic sign-on message similar to the following:

```
SERIES II IOC-III DIAGNOSTIC Vx.y
TYPE CNTL-@, U, *
          REQUESTED      RECEIVED
```

The diagnostic messages displayed by different levels of IOC board firmware are slightly different; the diagnostics are essentially the same. If a discrepancy exists between a message in this procedure and a message displayed on the screen, follow the instructions on the screen. The explanations in this procedure are valid in all cases.

3. To run the diagnostic, enter:

CNTL-@	(CNTL and @ key simultaneously)
U	(upper case U)
*	(SHIFT and * keys simultaneously)

- The system checks and displays each input and then displays the test menu as follows:

```

      REQUESTED      RECEIVED
      ↑@ 00000000    ↑@ 00000000
      U 01010101    U 01010101
      * 00101010    * 00101010
    
```

Is there a FUNC-key ? Y or N

- You have just installed the FUNC key, so enter:

**Y**

The following message is displayed:

Type FUNC-\*, Func-RUBOUT

- To continue the diagnostic, enter:

```

FUNC - *          (FUNC, SHIFT and * keys simultaneously)
FUNC - RUBOUT    (FUNC and RUBOUT keys simultaneously)
    
```

- The system checks and displays each input and then displays the test menu as follows:

```

      * 10101010    * 10101010
      RD 11111111    RD 11111111
    
```

D - Disk G - General K - Keyboard/CRT

- If REQUESTED and RECEIVED data do not match, the system will display ERROR and indicate the faulty bits. For example, if a lowercase u is entered instead of an uppercase U, the following would be displayed:

```

      REQUESTED      RECEIVED
      ↑@ 00000000    ↑@ 00000000
      U 01010101    u 01110101 ERROR 00100000
      * 00101010    * 00101010
    
```

- If an error is indicated while the IOC firmware diagnostic is running, first check that you have entered each character correctly. If the error persists, go back through the installation procedure and check that all devices and connectors are seated firmly. If an error is displayed when the diagnostic is rerun, contact an authorized Intel product service representative for assistance.

## Keyboard Test

The keyboard enhancement eliminates the need for a special key to repeat characters (holding a particular key down will cause that character to be repeated automatically) and adds a programmed character (function) capability; the RPT key is replaced by the FUNC key. To select and execute the keyboard test from the IOC diagnostic menu, enter:

**K**

The system displays a full screen (25 lines, 80 characters per line) of characters.

Type each keyboard character. The system displays a full screen of each typed character. Typed letters are displayed as capitals when the TPWR key is released (up). Typed letters follow the SHIFT key when the TPWR key is pressed and latched. Pressing FUNC and any other key displays FUNC *x* and fills the screen with *x*'s, where *x* is the other key. Pressing CNTL and any letter key displays ↑ *x*, where *x* is the letter key pressed (displayed in uppercase).

To restore your system to normal operation, set the DIAGNOSTIC/LINE/LOCAL switch on the rear panel to the LINE (middle) position. Press the RESET button on the front panel, and the system displays:

```
SERIES II MONITOR, Vx.y
```

The system is now ready for you to insert a system diskette into drive 0, press the RESET button, and begin using your enhanced system.







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