

DIO-200X
MULTI-I/O CARD
USER'S MANUAL
REV. A

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SECTION I

- HARDWARE -

INTRODUCTION

The DIO-200 is a flexible and powerful Multi-I/O enhancement product for the IBM Personal Computer (PC) family. It provides powerful data I/O expansion capabilities for the IBM PC, PC-XT, PC portable and compatibles. The DIO-200 is space efficient using only one short slot in your PC. Standard features include a real-time clock-calendar with battery backup, one RS-232C asynchronous serial communication port, a parallel printer port, and a game adapter port. An optional secondary RS-232C serial port is also available.

Note: Your DIO-200 can be used in the IBM PC, PC-XT, PC portable or compatibles.

Standard Features

- One RS-232C serial interface to be used with Modems, serial printers, Remote display terminals, or other serial devices, or for asynchronous communications software control.
- A parallel printer port to be used for connecting a parallel printer to the PC.
- A Real-Time clock-calendar with battery backup so that you don't have to reenter the time and date every time you start your system. The battery power is only used when your system is turned off.

- A game adapter port which can be used with an IBM compatible joystick.

- The MFPLUS utility diskette containing clock software which supports the clock-calendar. RAMDISK and PSPOOL software is also provided.

Options

A secondary RS-232C serial port with a flat cables.

Board Layout and Description

Following figures are board layout, brief description of relevant locations and switch configurations on your DIO-200.

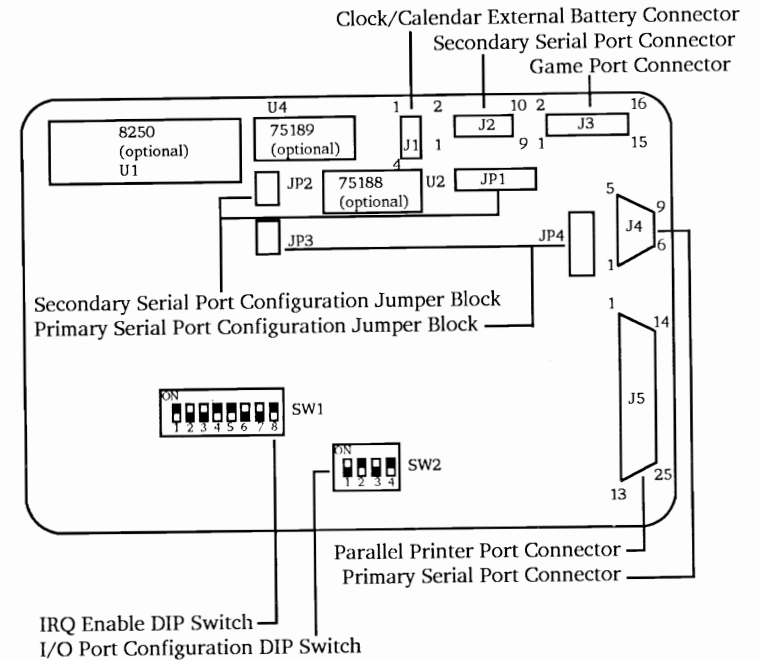


Figure 1-1. Connection and Default Setting of DIO-200

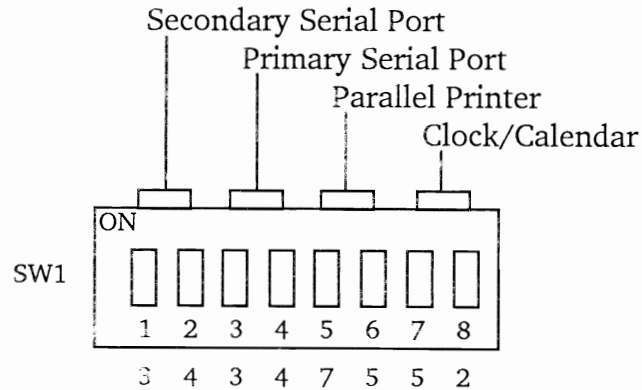


Figure 1-2. Interrupt Selection Switch

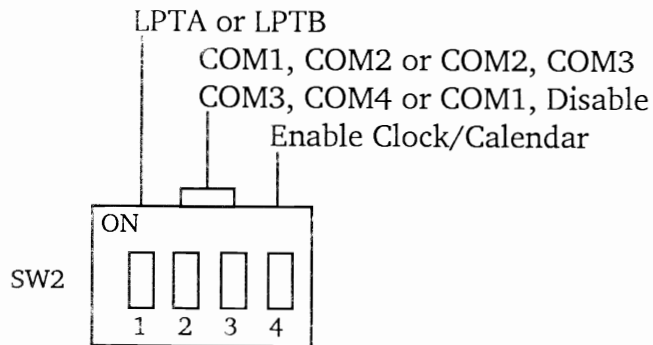


Figure 1-3. I/O Port Configuration Switch

THE CLOCK-CALENDAR

The clock-calendar includes the following features:

- 24-hour clock, maintained in a Microprocessor Real Time Clock chip (MM58167A) on the DIO-200 board.
- Four-year calendar (no leap year).
- Battery backup power supply (battery life approximately five years).
- User-replacable lithium battery.
- Full PC-DOS compatibility.

Two clock utility programs, GETCLOCK.COM and SETCLOCK.COM, are supplied on your MFPLUS diskette. GETCLOCK is used for answering the TIME and DATE prompts which the DOS operating system issues each time you boot the system. SETCLOCK updates the real-time clock.

Configuration of the Clock-Calendar

The clock-calendar I/O port address is defined as follows:

PORT CONFIGURATION	I/O PORTS
CLOCK	2C0-2DF HEX

Clock-Calendar Enable/Disable

DIP Switch Bank 2 (SW2) is utilized to enable and disable your DIO-200 clock-calendar. Switch 4 on SW2 is toggled as follows:

Status	S4
Enable	ON (default)
Disable	OFF

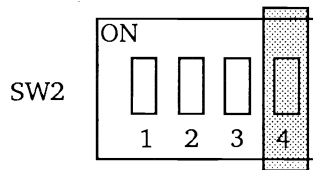


Figure 2-1. Enable Clock Calendar

Clock-Calendar Interrupt Generation

The clock-calendar feature of your DIO-200 normally does not need or support interrupts. By writing your own

software, however, it is possible to program the DIO-200 to generate timed interrupts on either the IRQ2 or the IRQ5 interrupt lines. To implement this feature, you will need to do the following:

Setting Clock Interrupts

DIP Switch Bank 1 (SW1) is utilized to Enable clock interrupts. To select either interrupt lines (IRQ2 or IRQ5) toggle switches 7 and 8 on SW1 as follows:

LINE	S7	S8
IRQ2	OFF	ON (Default)
IRQ5	ON	OFF

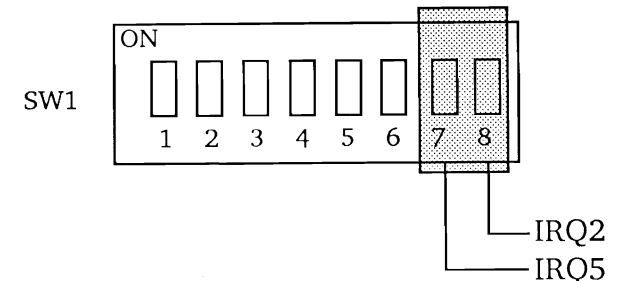


Figure 2-2. Clock-Calendar Interrupt

Note: If you wish to write your own software to handle clock interrupts you should obtain further information about the National Semiconductor

MM58167AN clock chip from your dealer or from National Semiconductor directly. Your IBM PC manual can also provide useful information for this purpose.

Technical Information

I/O Address	Function
2C0	counter-1/10000 of seconds
2C1	counter-1/100 and 1/10 seconds
2C2	counter-seconds
2C3	counter-minutes
2C4	counter-hours
2C5	counter-days of the week
2C6	counter-days of the month
2C7	counter-month
2C8	RAM-upper nibble only
2C9	RAM-last month storage
2CA	RAM-year storage (-80)
2CB	RAM-reserved
2CC	RAM-not used
2CD	RAM-not used
2CE	RAM-not used
2CF	RAM-not used
2D0	interrupt status register

I/O Address	Function
2D1	interrupt control register
2D2	counter reset
2D3	RAM reset
2D4	status bit
2D5	GO command
2D6	standby interrupt
2DF	test mode

Counter and RAM reset format

Data	Function
01	1/10000 of seconds
02	1/100 and 1/10 of seconds
04	seconds
08	minutes
10	hours
20	days of the week
40	days of the month
80	months

Using an External Battery with your DIO-200

You can attach your DIO-200 clock-calendar to an external battery by connecting the 4 pin connector (J1), to the external battery on your system. The external battery must be DC 3V.

Note: Some systems may not have an external battery available. Please check your system manual or call your dealer to determine if your system includes this provision.

PARALLEL PRINTER PORT

The DIO-200 has a standard feature for interfacing your PC to a parallel printer such as the IBM/Epson MX-80. This port is completely compatible with the IBM PC and uses the same female DB25 connector as an IBM port.

I/O Port Assignment and Pinouts

The parallel port on the DIO-200 uses the following system I/O ports:

Port Configuration	I/O Ports
LPTA	378-37A Hex
LPTB	278-27A Hex

DIP Switch Bank 2 (SW2) is utilized to select either LPTA or LPTB. Toggle switch 1 on SW2 as follows:

Port Configuration	S1
LPTA	OFF (default)
LPTB	ON

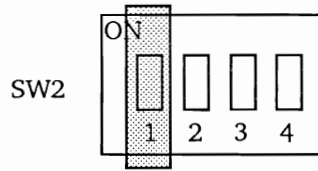


Figure 3-1. Printer Port Select

Parallel Port-System Consideration

The IBM PC allows installation of up to three parallel ports. These ports are called; LPT1, LPT2, and LPT3. The printer port on the Monochrome/Printer Adaptor which is addressed at 3BC (HEX) will be LPT1 when it is installed, LPTA on your DIO-200 will be LPT2, and LPTB on your DIO-200 will be LPT3. If your system uses a Color/Graphic Adaptor, and a Monochrome/Printer Adaptor is not installed, then LPTA on your DIO-200 will be LPT1, and LPTB on your DIO-200 will be LPT2.

Parallel Port-Interrupt Enable

DIP Switch Bank 1 (SW1) is utilized to enable either IRQ5 or IRQ7 as an interrupt. Toggle switches 5 and 6 on SW1 as follows:

Line	Status	S5	S6
IRQ5	Enable	OFF	ON
IRQ7	Enable	ON	OFF (default)

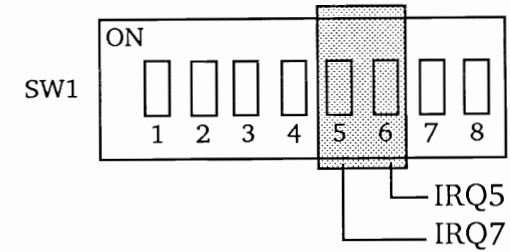


Figure 3-2. Parallel Printer Port Interrupt

Parallel Printer Port Pinout

PIN	SIGNAL NAME
1	-STORBE
2	DATA 0
3	DATA 1
4	DATA 2
5	DATA 3
6	DATA 4
7	DATA 5
8	DATA 6
9	DATA 7
10	-ACK
11	BUSY
12	PAPER EMPTY
13	+SELECT
14	-AUTO FDXT
15	-ERROR

PIN	SIGNAL NAME
16	-INIT
17	-SLCTIN
18	GROUND
19	GROUND
20	GROUND
21	GROUND
22	GROUND
23	GROUND
24	GROUND
25	GROUND

SERIAL PORT

Your DIO-200 has one serial port for asynchronous communications. (A second RS-232C serial port is optional.) This port can be used to connect your PC to a serial printer, modem, or other device which uses a RS-232C interface. The RS-232C interface can be configured as a DTE or DCE device. The primary serial port has a male DB9P connector on J4. The secondary serial port has a male DB25P connector linking to J2 via extension cable.

Configuring your Serial Port

Selecting the Serial I/O Port

The serial port on your DIO-200 uses the following system I/O ports:

Port Configuration	I/O Ports
COM 1	3F8-3FF HEX
COM 2	2F8-2FF HEX
COM 3	3E8-3EF HEX
COM 4	2E8-2EF HEX

DIP Switch Bank 2 (SW2) is utilized to disable or select the primary and secondary serial I/O port address. Toggle switches 2 and 3 on SW2 as follows:

Primary Serial Port	Secondary Serial Port	S2	S3
COM 1	COM 2	OFF	OFF
COM 1	disable	ON	OFF (default)
COM 2	COM 3	OFF	ON
COM 3	COM 4	ON	ON

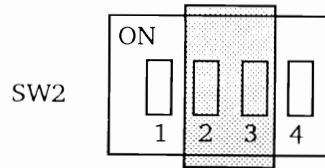


Figure 4-1. Serial Port Select

Setting the Interrupt Request Line

DIP Switch Bank 1 (SW1) is utilized to select IRQ3 and IRQ4 as an interrupt. Toggle switch 1, 2, 3 and 4 on SW1 as follows:

Primary Serial Port	Secondary Serial Port	S1	S2	S3	S4
IRQ3	--	--	--	ON	OFF
IRQ4 (default)	--	--	--	OFF	ON
-- (default)	IRQ3	ON	OFF	--	--
--	IRQ4	OFF	ON	--	--

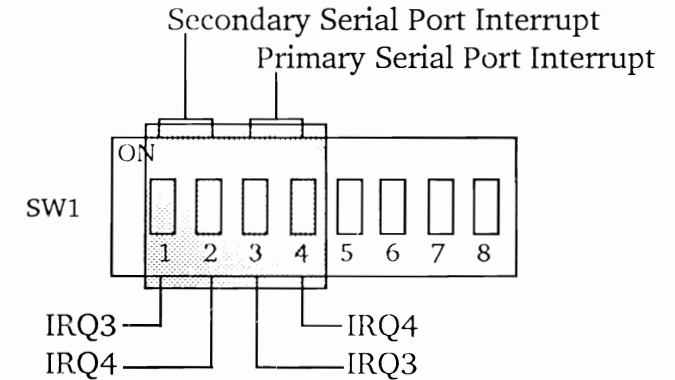


Figure 4-2. Serial Port Interrupt Line Select

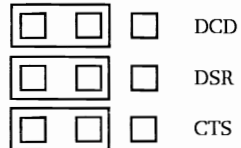
Configuring the RS-232C Interface Line

Your DIO-200 multi-I/O card adheres to RS-232C engineering standards. All inputs to the serial port with the exception of Ring Indicator, pin 9, must be connected to a signal, even if the device the port is connected to is not using one or more of the interface lines at connector J4 or J2. You can configure the serial ports as DTE (Data Terminal Equipment) (default) or as DCE (Data Communication Equipment) using jumper blocks JP4 and JP1.

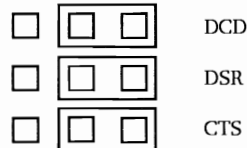
By adjusting jumper blocks JP3 and JP2, you can also configure the CTS, DSR, and DCD signals to be either "normal" (default) or "forced true". The three signals can be set independently of each other, i.e., one or two of the signals can be set as "normal", and the other signal(s) can be set as "forced true". You may want to set DSR to "forced true", for example, to suppress a "device timeout" error message that would occur if your printer were off line. Please note, however, that you may lose some data if you are not aware your device is off line.

Primary serial port

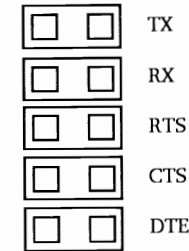
JP3 Normal Setting



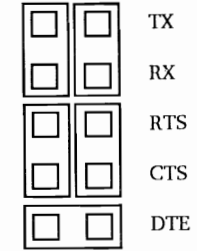
JP3 Forced True Setting



JP4 DTE Setting

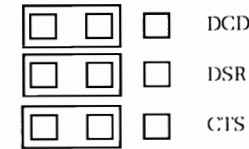


JP4 DCE Setting

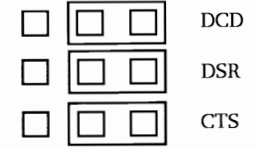


Secondary Serial Port

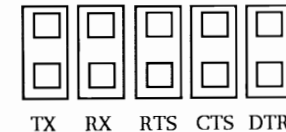
JP2 Normal Setting



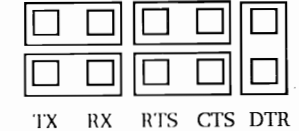
JP2 Forced True Setting



JP1 DTE Setting



JP1 DCE Setting



Serial I/O Port Pinouts

Primary serial port J4/Secondary serial port J2

RS-232C Name	J2,J4 Pin No.	Signal Name
CF	1	DCD (Data Carrier Detect)
BB	2	RX (Receive Data)
BA	3	TX (Transmit Data)
CD	4	DTR (Data Terminal Ready)
AB	5	GND (Signal Ground)
CC	6	DSR (Data Set Ready)
CA	7	RTS (Request To Send)
CB	8	CTS (Clear To Send)
CE	9	RI (Ring Indicator)

Connecting Your Serial Port to a Device With DB25S Connector

Your DIO-200 primary serial port has a DB9P connector at J4. Also provided in DIO-200 carton is a interface cable which has a DB9S connector at the bracket end and a DB25P connector at the remote RS-232C interface end. This interface cable let your primary serial port connect to a device with DB25S connector.

The secondary serial port connector on your DIO-200 is a 10 pin connector (J2), 9 pins are used. The interface cable for secondary serial port has a DB25P connector at the bracket end and a 10-pin rectangular connector at the PC

board end. Plug the 10-pin connector to the PC board at J2. The connector must be attached to the PC board with the red or blue cable orientation line set next to pin 1 of J2. Proper cable installation is critical; your serial device and/or DIO-200 may be damaged by improper cable orientation.

The following is the wiring diagram for the DB9S to DB25P adapter cable.

Signal Name	DB9S Connector	DB25P Connector
DCD (Data Carrier Detect)	1	8
RX (Receive Data)	2	3
TX (Transmit Data)	3	2
DTR (Data Terminal Ready)	4	20
GND (Signal Ground)	5	7
DSR (Data Set Ready)	6	6
RTS (Request To Send)	7	4
CTS (Clear To Send)	8	5
RI (Ring Indicator)	9	22

Installing the Secondary Serial Port

To install the Secondary Serial Port, insert IC 8250 into U1, SN75189 into U4 and SN75188 into U2 to activate the secondary serial port.

Note: Contact your dealer for the optional secondary serial port kit.

GAME ADAPTER PORT

One Game Adapter Port is included on the DIO-200. The I/O port address is defined as 200-20F. A game adapter cable is required. Any IBM compatible joy stick can be used.

Game Port Pinout

Line Name	J3 Pin	DIO-200 Adapter Cable Output DB-15S
+5VDC	1	1
Button 4	2	2
Position 0	3	3
Ground	4	4
Position 1	6	6
Button 5	7	7
+5VDC	8	8
+5VDC	9	9
Button 6	10	10
Position 2	11	11
Ground	12	12
Position 3	13	13
Button 7	14	14
+5VDC	15	15

SECTION II

- SOFTWARE -

INTRODUCTION

About This Section

This section describes the use and operation of the MFPLUS Utility programs. These programs will work satisfactorily on most expansion cards that are available for the IBM PC, PC-XT, PC portable and compatibles. And should be executed under all current releases of PC-DOS.

The MFPLUS utility includes clock-calendar, printer spooler, and disk cache; all but disk cache are used to support the DIO-200 board. We also provide you the additional RAMDISK program as a disk cache.

The followings are a general description for each program in MFPLUS:

SETCLOCK.COM

SETCLOCK utility writes the date and time to the DIO-200 board's Real Time Clock Chip.

GETCLOCK.COM

GETCLOCK utility program reads the current date and time from the Real Time Clock Chip on the DIO-200 board.

RAMDISK.COM

A program which simulates floppy disk drives with your PC system RAM. It helps you access data or execute programs much faster than a floppy disk.

RAMHELP.COM

This utility lists the RAMDISK operations menu. It also gives you a brief listing of all options, types, and their meanings.

DISKCONF.COM

A program which displays the current RAMDISK status message.

PSPOOL.COM

A program which enables printing a list of data files on the printer while you are performing other tasks on your PC system. Your print output data is queued in a predefined area of memory and will be printed using PC system interrupt.

PSPLHELP.COM

This utility list the PSPOOL operations menu. It also gives you a brief listing of all options, types, and their meanings.

PSPLCONF.COM

A program which displays the current PSPOOL status message.

Backing Up Your MFPLUS Utility Programs

The following steps are used to back up the MFPLUS utility programs.

STEP 1

Write-Protect your original MFPLUS utility diskette. Put a tab on the original diskette. This will prevent accidental erasure during the copying process.

STEP 2

Boot your PC system

STEP 3

Copy the utility program to your new diskette.

- If you have only one floppy drive, type:

COPY B:.* A: <enter>*

The system will prompt you to change source and destination diskettes.

- If you have two or more floppy drives, place the MFPLUS diskette in drive B: and type

COPY B:.* A: <enter>*

The system will copy all of the programs in B: into A:

STEP 4

The MFPLUS utility programs will be copied to your diskette.

Note: The MFPLUS utility diskette should be kept in a safe place and should not be used during system operation.

CLOCK-CALENDAR UTILITY

Getting Started

To start your clock-calendar utility, you need to copy these programs onto your system diskette:

GETCLOCK.COM
SETCLOCK.COM

The GETCLOCK Command

Setting your PC TIME and DATE:

GETCLOCK is a utility program which reads and displays the current date and time from your DIO-200 real time clock chip.

For your convenience, you may include the GETCLOCK command in AUTOEXEC.BAT file. Therefore, it eliminates the need to manually enter the correct date and time through your keyboard whenever your PC is powered on or rebooted.

The SETCLOCK Command

Setting your DIO-200 TIME and DATE:

You need to execute the SETCLOCK utility whenever you want to correct the date or time of your DIO-200 board's internal clock. The DOS DATE and TIME commands only update the system's time and date parameters; they will not update the time and date values stored in the DIO-200 clock chip unless you go through following procedures:

STEP 1

Boot the system with the system diskette that leaves the screen at the A> prompt.

STEP 2

From the DOS prompt A>, enter the following instruction:

SETCLOCK<enter>

A current date and time message will be displayed.

Note: If your clock-calendar has not been used before or you have just replaced your Lithium battery, then the current date and time will be the system's date and time, and this information will be recorded in the real time clock chip on DIO-200 board.

If the current date and time are displayed incorrectly, please do the following steps to update your clock-calendar:

STEP 3

Enter the DOS command DATE. The current date will be printed on the screen, and you will be given a chance to enter a new date. Press <enter> if no change is necessary or type a new date in the form mm/dd/yy <enter> or mm-dd-yy <enter>. Your DOS will determine, from the information you provided, the proper date and display it when you execute the GETCLOCK command.

STEP 4

Enter the DOS command TIME. The current date will be indicated on your screen, and you will be given a chance to enter a new time. Press <enter> if no change is necessary or type a new time in the form hh:mm:ss <enter>. For maximum accuracy, type in a time that is 10 to 15 seconds ahead of the actual time but do not press the <enter> key; observe a digital clock or watch, and press <enter> when the seconds reading on the clock synchronizes with the value that you typed in.

Preparing your Working DOS Diskettes

After installing your DIO-200 you must prepare your working DOS diskettes to automatically initialize the time and date each time you boot the system. This sub-section lists the process used to invoke your clock-calendar.

STEP 1

Copy the two clock programs, GETCLOCK.COM and SETCLOCK.COM to your working DOS diskette. These programs are on the diskette supplied with your DIO-200.

STEP 2

If your working DOS diskette already has an AUTOEXEC.BAT file, then you need to alter this file to include the GETCLOCK command. To see the current contents of your AUTOEXEC file, insert the working DOS diskette in drive A: and from the A> prompt, type the following command line:

TYPE AUTOEXEC.BAT<enter>

The contents of your AUTOEXEC file will be listed on your CRT screen. You now need to create a new AUTOEXEC file in which the command GETCLOCK proceeds these other command(s).

If your working DOS diskette has no AUTOEXEC file, then you should use the following sequence to create one. The only command in the file is GETCLOCK.

COPY CON:AUTOEXEC.BAT <enter>

GETCLOCK <enter>

Function Key *F6* <enter>

STEP 3

If necessary, use the SETCLOCK utility to give the TIME and DATE variables their initial values.

RAMDISK

Introduction

The RAMDISK utility program allows you to assign RAM space for use as one or more electronics floppy disks. These RAMDISKs will enhance the processing speed of your PC. A RAMDISK performs the same I/O functions as a floppy disk drive, yet saves tremendous time as it is much faster than an ordinary disk. You can run any DOS command on it and save data into it. Because that RAMDISKs store files only temporarily until you turn off the power or restart your computer. So, remember to back up files before you power off the system.

Your RAMDISK includes the following features:

- Simulation of up to four disk drives using your PC's memory. (below 640K)
- User definition of memory space and RAMDISK size.
- Supports single and double sided drives, eight or nine sectors per track, up to 360K in size.

Preparing RAMDISK on Your Personal Computer

Before you install the RAMDISK on your system, set the PC for RAMDISK operation.

Normally, you will do this only once after you have set up the PC as described below. Proceed the following procedures prior to using your RAMDISK capabilities:

- Set DIP switch 1 on your PC motherboard to conform with each floppy drive and each RAMDISK being utilized. Remember that each RAMDISK will be counted as a physical drive by your system board. Thus if you are using two floppy drives and two RAMDISKs DIP switch 1 must be set for 4 drives.

Note: Consult your PC user's manual for proper DIP switch settings for your system.

Refer to Figure 8-1 for setting DIP switch 1 on your main board. You may set the DIP switch for more disk drives than are actually installed. It's perfectly acceptable for you to leave the switches set for a total of three or four drives, so that you can assign any of four drive names (A:, B:, C:, and D:) to your RAMDISKs at any time.

- Memory Setting

Refer to your PC technical reference manual for memory settings. Set the switch to the maximum memory size currently available in your system. This allows you to fully use all available memory space.

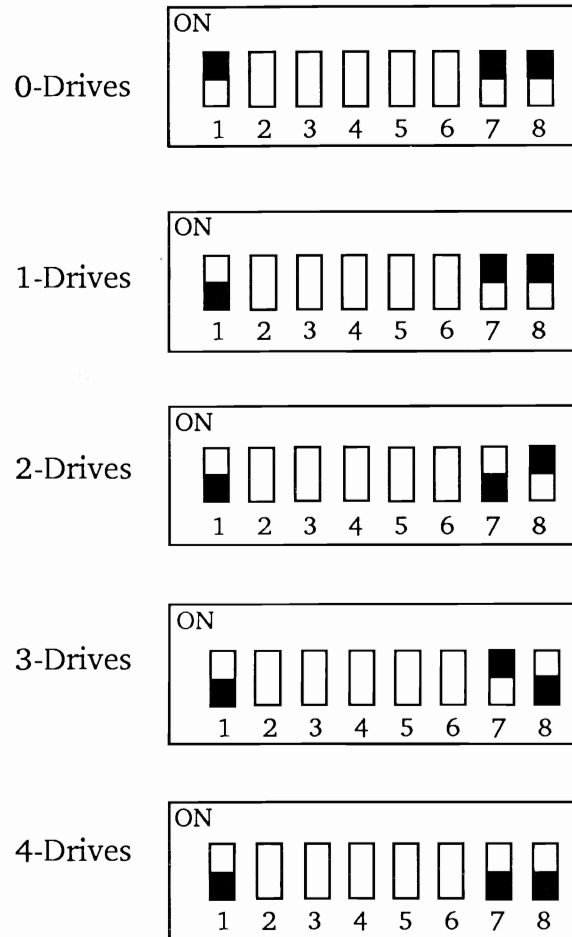


Figure 8-1. DIP Switch 1

Getting Started

To start the RAMDISK, you must copy three utility programs into your DOS diskette, the utilities are:

RAMDISK.COM
 RAMHELP.COM
 DISKCONF.COM

Insert your DOS diskette in drive A. Next, type the command you wish to execute.

The RAMDISK Help Command

The RAMDISK Help Command is one of the RAMDISK utility programs. It provides an operations menu to be used with your RAMDISK. To execute the RAMHELP command type:

RAMHELP<enter>

Your screen will display:

****RAMDISK HELP INFORMATION****

Command Format:

RAMDISK X: [/1][/2][/M=xxx][/U=xxx][/8][/9]
 <enter>

- /1 -- Side specification. Creates a single sided RAMDISK.
- /2 -- Side specification. Creates a double sided RAMDISK.
- /M=xxx -- RAMDISK size specification.
- /U=xxx -- Reserves memory space size for user applications programs.
- /8 -- Creates an 8 sector per track formatted RAMDISK.
- /9 -- Creates an 9 sector per track formatted RAMDISK.
- X: -- Drive specification.
- [] -- Indicates an optional term. The [] is not part of the input.

The RAMDISK Parameters Specification

RAMDISK, just like a DOS command, it must be initialized each time you turn on your PC. This section describes in detail the various commands and options you can use and the format in which they must be entered.

To install the RAMDISK, type the command using the following format:

```
RAMDISK X: [/M=xxx][/U=xxx][/1][/2][/8][/9]
           <enter>
```

RAMDISK uses the PC memory (below 640K) and invokes the RAMDISK program's command handler routines. The remainder of the command syntax specifies the various options. They are described below:

- X: It creates a RAMDISK in memory. X may be A, B, C, and D.
- /1 or /2 Single sided or double sided drive specification creating a single sided drive with /1 option, the default drive size is 160K for DOS 1.1, 180K for DOS version 2.0 or later. Creating a double sided drive with /2 option, the default drive size is 320K for DOS 1.1, 360K for DOS version 2.0 or later. The default side specification is /2.
- /8 or /9 Specifies eight sectors per track or nine sectors per track.
- /M=xxx This option reserves xxxK bytes of memory for RAMDISK use. If this option is omitted, as much memory as possible will be allocated to RAMDISK based on the option /1 or /2 chosen.

/U=xxx This option reserves a minimum of xxxK bytes of memory for user application programs and its working space. If this option is omitted, the RAMDISK will reserve a minimum default 64K application memory space.

Examples Using RAMDISK

The following examples are provided to help clarify the use of the RAMDISK command.

Example 1

RAMDISK B: <enter>

Allocates a minimum 64K bytes of application memory space in your PC system memory. It also creates a double sided drive as B:

Example 2:

RAMDISK C: /2/U=128/M=128 <enter>

Allocates a minimum 128K bytes of application memory space, and creates a double sided drive with memory space of 128K.

Now, we will take you step by step through the process of creating and using a RAMDISK.

STEP 1

Create a RAMDISK by entering a command as follows:

RAMDISK D: <enter>

Your screen will display the following message.

```
RAMDISK Version 2.00
RAMDISK D: total space xxxxxxbytes
A>
```

STEP 2

To copy all of the files from drive A: to drive D:, type:

COPY A:.* D: <enter>*

STEP 3

To set drive to D:, type:

D: <enter>

STEP 4

Execute the program at drive D:

Program - Name <enter>

Executing DISKCONF

DISKCONF command is one of the RAMDISK utility programs. It allows you to check the current RAMDISK configuration. After you type in the command DISKCONF, the screen will display the configuration of current RAMDISKs.

TYPE:

DISKCONF<enter>

Your screen will display:

RAMDISK CONFIGURATION INFORMATION

RAMDISK X: 1 side 8 sectors, total xxxxxx bytes.
RAMDISK X: 2 sides 9 sectors, total xxxxxx bytes.

. .
. .
. .

RAMDISK Error Messages

RAMDISK may give you an error message under certain conditions. These messages are described below:

- INVALID RAMDISK SPECIFIED!

(This indicates that either the system board switches have not been set for the correct number of drives or you have used an invalid drive letter in your RAMDISK command.

- NO AVAILABLE MEMORY SPACE!

This indicates that there is no available memory space to allocate a RAMDISK.

- xxxxxx Bytes Short

This is a message indicating the number of insufficient memory space that you specified for memory allocation.

- RAMDISK CAN NOT BE REPLACED!

(It attempts to specify an installed RAMDISK name.

- INVALID PARAMETERS SPECIFIED!

It indicates an invalid parameter specified.

PSPOOL

Introduction

The PSPOOL utility program is a print spooler which provides queued print-out data to a parallel or serial printer during concurrent processing of other programs. Files to be printed will be output to the PSPOOL queue, the PSPOOL program will handle output to the printer at printer speed.

PSPOOL has the following features:

- Provides queued output of print data to either a parallel or serial printer.
- Allows you to define the size of the spooler queue.
- Allows stop, restart, and number of lines per page controls.

Preparing PSPOOL on Your Personal Computer

Refer to your PC technical reference manual for memory setting to set the switch to the maximum memory size of your system. This allows you to fully use memory space. Prior to entering your PSPOOL command, you must enter the DOS MODE command to disable the redirection of printer LPT#: This can be done by typing in:

MODE LPT1: <enter>

If you assign the print data to your serial printer, you must do the following:

- Refer to the DOS MODE command which initializes the Asynchronous Communications Adapter by using option 3.
- Use the PSPOOL command to redirect LPT1: to a serial printer.

Getting Started

To start PSPOOL, you must copy three utility programs into your DOS diskette, the utilities are:

PSPOOL.COM
PSPLHELP.COM
PSPLCONF.COM

Insert the DOS diskette into drive A, and type the command you wish to execute.

The PSPLHELP Command

The PSPLHELP Command is one of the PSPOOL utility programs. It provides you an operations menu, after you type the following command:

PSPLHELP <enter>

Your screen will display:

PSPOOL HELP INFORMATION

Command Format:

PSPOOL LPTn: [=COMn:][/U=xxx][/M=xxx]
[/L=xx][/S][/C][/R][/I][/ON=]
[/OFF=] <enter>

LPTn: -- Selects a parallel printer such as LPT1:.

=COMn: -- Redirects parallel printer output to a serial port.

/U=xxx -- Reserves memory space for user application programs.

/M=xxx -- PSPOOL queue size specification.

/L=xx -- Sets number of lines per page.

/S -- Stops output of print data.

/C -- Continues output of print data.

/R -- Continues output of print data at the beginning of the current page.

/I -- Initializes the PSPOOL queue, all print data will be purged.

/ON= -- Turns on serial printer port handshake line protocol options.

/OFF= -- Turns off serial printer port handshake line protocol options.

[] -- Indicates an optional term. The [] is not part of the input.

PSPOOL Parameters Specification

PSPOOL, just like a DOS command, it must be initialized each time you turn on your PC. This section describes in detail the various commands and options you can use and the format in which they have to be entered. The PC normally sends all printer output to LPT1 unless the user takes steps to redirect the output to a different port. When either a serial or parallel port is assigned for printer output with PSPOOL, the port cannot be used by any other program for any purpose until the port is redirected by the PSPOOL command once again.

To install PSPOOL, use the following command format.

PSPOOL LPTn: [=COMn:][/U=xxx][/M=xxx][/L]
[/S][/C][/R][/I][/ON=OPTION]
[/OFF=OPTION] <enter>

The word PSPOOL invokes the PSPOOL program's command handler routines. The remainder of the command syntax specifies the various options. They are described below.

LPTn: selects one of the three possible parallel ports.

=COMn: Redirects parallel printer output to a serial port. LPTn now responds as LPTn+1. Note that you must initialize the Asynchronous Communication Adapter by using DOS command MODE before you select this option.

/U=xxx This option reserves a minimum of xxxK bytes of memory for the user application programs, and its working space. If this option is omitted, PSPOOL will reserve a minimum default program space of 64K memory space.

/M=xxx This option reserves a minimum of xxxK bytes of memory for PSPOOL queue. If this option is omitted, The default queue size is 64K. If =xxx is omitted as much memory as possible will be allocated to PSPOOL queue.

/L Sets the number of lines per page. Default is 66.

/S Stops output of print data. No data will be lost, and data output can be restarted by using /C option.

/C Continue output of print data.

/R Continue output of print data at the beginning of the current page.

/I Immediately purge all data from PSPOOL queue, the queue is empty.

/ON= Turn on serial printer port handshake line protocol options. (Default ON = CTS, DSR)

/OFF= Turns off serial printer port handshake line protocol options. (Default OFF = XON, DCD)

The handshake line protocol options are XON, DCD, DSR, and CTS.

Examples Using PSPOOL

The following examples are provided to help clarify the use of the PSPOOL command.

Example 1

PSPOOL LPT1: <enter>

Spooler printer output is directed to LPT1.

Example 2

PSPOOL LPT1:/U=192/M <enter>

Spooler printer output is directed to LPT1, and reserved a minimum of 192K for the application program. Use as much memory space as possible for spooler queue.

Example 3

```
PSPOOL LPT1:=COM1:/ON=CTS <enter>
```

Redirects to serial printer 1, with CTS handshake line protocol control.

Now, we will take you step by step through the process of creating and using PSPOOL.

STEP 1

Prepare DOS for PSPOOL by using MODE command

```
A> MODE LPT1: <enter>
```

STEP 2

Create PSPOOL by entering a command as follows:

```
A> PSPOOL LPT1: <enter>
```

```
PSPOOL Version 2.00
```

```
PSPOOL total queue space xxxxxx bytes
```

```
A>
```

STEP 3

To use the spooler, you can give a print screen command (shift-prtsc) or give a print out file XYZ.LST to LPT1: by entering following command :

```
A> COPY A:XYZ.LST LPT1:(enter)
```

At this point, you can proceed with running whatever program you want while PSPOOL is printing out your specified data files.

Executing PSPLCONF

Once PSPOOL has been activated, the status can be checked at any time by entering the PSPLCONF command. The current printer configuration and spooler queue will be displayed.

The PSPOOL directed printer port configuration can be changed when the spool queue is empty.

PSPOOL Error Messages

PSPOOL may give you error messages under certain conditions. The messages are described below:

- PRINTER NOT AVAILABLE

No such printer port in the system or printer not on line.

- INVALID PARAMETER SPECIFIED

This indicates an invalid parameter specified.

- CANNOT BE REDIRECTED

Redirect parameter specified error.

- NO AVAILABLE MEMORY SPACE

This indicate that there is no available memory space for printer queue.