Setting up MPU-401 and Compatible Cards on your PC

In this guide we will cover IBM computer setup for use with Roland MPU-401 Compatible MIDI cards. This includes the Roland SCC-1, LAPC-1, MPU-IPC-T, MPU-401 and MPU-401AT.

I.   We will first look at the hardware changes that may be necessary to make use of a MIDI card in your computer.
II. Then we will go through the steps of installing the appropriate 'driver' software to make use of the MIDI card.
III. Then we will run your MIDI card through a test to make sure it is setup properly.
IV. Finally, we will discuss the steps necessary to setup your sequencing, notation and multimedia software with Roland MIDI cards.

I. Hardware Setup

IBM computers can be expanded to accept many different devices such as a mouse, modem, fax, printer or MIDI card. Your computer uses a few key ID numbers to distinguish between which device to send the appropriate information to. Most Roland cards primarily use two numbers for this task : IRQ's (sometimes referred to Int or Interrupt) and Port Address's (sometimes referred to as I/O Address's). Since this guide is not intended to explain the concepts of IBM computers in detail, we will not jump into the particular definitions of IRQ's or Address's. The most important thing to remember is that IRQ and Port Address numbers must be unique for EVERY device in your computer.

When two devices in your computer are set to the same IRQ or Address setting, this is referred to as a 'conflict'. A 'conflict' is the most common problem encountered when installing a new device. This may result in your computer crashing, reporting an error message or playing MIDI or Audio sounds in an unusual manner. In order to avoid conflicts, it is important to be familiar with the IRQ and Port Address settings of the various devices in your computer. Here are some typical IRQ and Port Address settings:

Device	IRQ	Port Address
Video Card	2/9	3D0-3DF
MIDI / Sound Card	2/9	330
Com 2	3	02F8
Com 1	4	03F8
LPT2 (Secondary)	5	278-27F
Floppy Drive	6	3F0-3F7
LPT1 (Primary)	7	378-37F
SCSI Card	15	330

Note: All Port Address's are written using Hexadecimal notation.

As you can see, there are many devices and settings in your computer to examine before installation. All Roland MIDI cards are shipped with IRQ 2/9 and Port Address 330H. The notation of IRQ 2/9 means that IRQ 2 and 9 are what are called 'redirected' IRQ's. This means anything set on IRQ 2 is also on 9 thus making it impossible to have a device on IRQ 2 and another device on IRQ 9. Notice that Video cards and MIDI/Sound Cards typically have the same IRQ setting of 2/9. This is a good place to start if you have problems.

A few of the above devices that require further explanation are LPT1 and LPT2. These refer to the parallel ports of your computer which are typically used for printers. LPT2 (IRQ 5) is usually available since it is commonly used for a secondary printer. COM 1 and COM 2 refer to the COM Port connectors on the back of your computer. A Mouse is typically used with COM 1. An example of a conflict would be a MIDI card set at IRQ 4. With the COM 1 port at standard settings according to this chart, this would create a conflict. This may cause the mouse to freeze and become inoperable. Modem and Fax devices typically use COM ports for operation.

The MPU-401AT is an unusual MIDI card. It can be used as a MIDI card with no sounds, or you can attach a Roland SCD-10 or SCD-15 daughter board. These daughter boards use the IRQ and Port Address of the card they are mounted on.

Note: *Due to the fact that IBM computers and devices are manufactured by many different companies, default settings may vary. Contact your computer or device manufacturer for more information*

To change an IRQ or Port Address setting of a Roland MIDI card, you must change jumpers or switch positions located on the card.

Possible IRQ and Port Address Settings
The following is a list of Roland MIDI cards with possible settings for each:

SCC-1 and LAPC-1
IRQ: 2/9, 3, 4, 5, 6, 7
Port Address: 330, 332, 334, 336

MPU-IPC-T
IRQ: 2/9, 3, 4, 5, 6, 7
Port Address: 300, 320, 330

MPU-401
IRQ: 2/9
Port Address: 330

MPU-401AT
IRQ: 2/9, 3, 4, 5, 6, 7
Port Address: 300, 320, 330, 332, 334, 336

Jumper or Switch settings for IRQ and Port Address
Here are the jumper/switch settings to change the IRQ and Port Address for Roland MIDI cards:

Note: *Some DOS programs will require that you use the stock Roland MIDI card settings of IRQ 2/9 and Port Address 330H. If you have a conflict, adjust the IRQ and Port Address settings of other devices in your computer if possible.*

SCC-1
IRQ: With the connectors of the card facing down and to the right, the jumpers used to change IRQ's are located near the bottom center. IRQ's are labeled on the card IRQ 2/9, 3, 4, 5, 6, 7. Move the jumper to the appropriate position.

Port Address: There are two jumpers labeled 1 and 2 on the SCC-1 used to change Port Address. With the connectors of the card facing down and to the right, these jumpers should be located near the top center of the SCC-1 on the right. You will find an OFF and ON position for each of the jumpers. Move the connector to the desired location using this chart:

	Port 330		Port 332		Port 334		Port 336	
ON			xx			xx	xx	xx
OFF	xx	xx		xx	xx			
Jumper	1	2	1	2	1	2	1	2

LAPC-1
IRQ: There is a set of jumpers labeled J01 though J06 on the LAPC-1. With the connectors of the card facing down and to the right, these jumpers should be located near the bottom center of the LAPC-1 on the right. Move the connector to the desired location using this chart:

IRQ	3	4	5	6	7	2/9
Jumper Name	J02	J03	J04	J05	J06	J01

Port Address: There are two jumpers labeled J07 though J08 on the LAPC-1 used to change Port Address. With the connectors of the card facing down and to the right, these jumpers should be located near the bottom center of the LAPC-1 on the left. Move the connector to the desired location using this chart:

	Port 330		Port 332	Port 334		Port 336	
1	xx	xx	xx	xx			
0			xx		xx	xx	xx
Jumper	J07	J08	J07 J08	J07	J08	J07	J08

MPU-IPC-T

IRQ: With the connectors of the card facing down and to the right, the jumpers used to change IRQ's are located near the bottom center. IRQ's are labeled on the card IRQ 2/9, 3, 4, 5, 6, 7. Move the jumper to the appropriate position.

Port Address: There are several jumpers labeled A04 though A09 on the MPU-IPC-T used to change Port Address. With the connectors of the card facing down and to the right, these jumpers should be located near the top center of the MPU-IPC-T. You will find a 0 and 1 position for each of the jumpers. Move the jumper to the desired locations for A04 through A09 using this chart:

Port Address				Jumper	Name	
	A04	A05	A06	A07	A08	A09
300	0	0	0	0	1	1
320	0	1	0	0	1	1
330	1	1	0	0	1	1

MPU-401

The original MPU-401 card was hard wired from the factory on IRQ 2/9 and Port Address 330H. If you wish to change these settings, contact a Registered Roland Service Center.

MPU-401AT

IRQ: There is a set of jumpers labeled SW1 on the MPU-401AT card. With the connectors of the card facing down and to the right, the SW1 jumpers should be located near the bottom left of the MPU-401AT. Move the connector to the desired location using this chart:

	*	*	*	*	*	*
	*	*	*	*	*	*
IRQ	7	6	5	4	3	2

Port Address: There is a set of switches labeled SW2 to the right of the SW1 jumpers on the MPU-401AT. You will find an OFF and ON position for each of the jumpers. Move the switches to the desired locations using this chart:

Port Address	300					320					330			
Switch	1	2	3	4		1	2	3	4		1	2	3	4
ON/OFF	OFF	OFF	OFF	OFF		OFF	OFF	OFF	ON		OFF	OFF	ON	ON

Port Address	332					334					336			
Switch	1	2	3	4		1	2	3	4		1	2	3	4
ON/OFF	ON	OFF	ON	ON		ON	ON	ON	OFF		ON	ON	ON	ON

MIDI Card Installation
Note: *Since computers vary dramatically by manufacturer and type, it is a good idea to consult your computer manufacturer before installation. If you are not comfortable installing the card, please consult a local computer technician.*

If you using a MPU-401AT with a daughter board, we will need to attach the daughter board to the card. The MPU-401AT has a connector labeled CN1. This connector will attach to the equivilent connector on the daughter board. Two of the four plastic pins on the daughter board will connect to the MPU-401AT.

Now that the card is set to appropriate IRQ and Port Address settings, we must physically install it in the computer. Remove the cover of your computer - this will typically require a screwdriver and/or key. Insert the card in an available slot on your PC. Be careful not to drop anything like a screwdriver or other tool in your computer. Use a screw to fasten the card firmly to your computer. Replace the cover of your computer.

II. Driver Installation

Microsoft Windows is currently the most popular operating system for IBM computers. A 'Driver' is a tool used by Windows applications to find and make use of a device in your computer. Once a Windows driver is installed, every appropriate application within Windows should be able to make use of that device. Many drivers for Roland MIDI cards are included with Microsoft Windows. All others come on disks and are included with the Roland MIDI cards.

In order to install a Windows driver you must be familiar with Windows operations. This guide assumes that you have not re-arranged your Windows icons or files. You may need to search for missing files or icons mentioned in this guide that have been re-arranged in your system.

First, boot Windows using your typical procedure.

1) Use your mouse to select MAIN under the Windows heading at the top of your screen. You should now have a highlighted window labeled 'MAIN'.
2) Click on the arrows of the MAIN window until an icon labeled 'Control Panels' is available.
3) Double click on the Control Panels icon with your mouse.
4) A window labeled 'Control Panels' should now appear on the screen.
5) Click on the arrows of the Control Panel window until an icon labeled 'Drivers' is available.
6) Double click on the Drivers icon with your mouse.

You should now have a list of the currently installed Windows drivers. Common default installed drivers are typically Timer and MIDI Mapper.

1) Click Add.
2) A list of drivers will now appear on your screen.
3) Click on 'Unlisted or Updated Driver'.
4) Click on OK.

Insert the Roland Windows Drivers disk in your computer.

5) Click Browse.
6) Choose the appropriate disk drive by clicking on the arrow to the right of the drive selection, using the up and down arrows to find your drive and clicking on the correct disk drive.
7) Click on the appropriate folder for your driver.
8) Click on OK. A screen will appear that will list the drivers contained in the folder you selected.
9) Click on the driver followed by OK.

A screen will appear that will request the current settings of the IRQ and Port Address that were set on your card earlier in this guide. Choose the appropriate settings with your mouse. ex. IRQ 2/9 and Port Address 330H.

10) Click on OK.

Typically, you will get one of two responses when we click on OK. If your computer crashes, refer to message #2 below.

1) The Roland xxx driver has been added. For the new driver to take effect you must quit and restart Windows.' In this case, choose Restart Now. If you get an error message upon restart of Windows refer to #2.

2) 'Your Port (or Interrupt) selection does not match the settings on the card, or you have a conflict with another card. Check your hardware jumper settings, or make a different selection.'

    If you get this message, check the IRQ and Port Address settings to make sure they match the card. If you still get this message then you probably have an IRQ or Port Address conflict with another device in your system. Check your hardware setup, refer to 'hardware settings' earlier in this guide to make the appropriate settings, and try the installation procedure again. You may also get message #2 upon restarting of Windows.

Now that the appropriate Windows driver has been installed for your card, lets setup the MIDI Mapper and run the card through a test.

III. MIDI Mapper Setup and Sound Card Test

MIDI Mapper Setup
Some applications will require a program called MIDI Mapper which is included with Windows. MIDI Mapper is a setup program that controls MIDI routing between applications and sound cards. It also allows remapping of program changes, drum note mapping and use of multiple sound cards in Windows applications. While setup of the MIDI Mapper driver is optional, it is required for the sound card test we will be doing next in this guide.

This setup assumes you have the MIDI Mapper driver installed in Windows. Refer to the section on 'Driver Installation' if you do not have the MIDI Mapper driver installed. The MIDI Mapper driver is included with Windows on disk #4.

Use the following procedure to setup MIDI Mapper in Windows:

First, boot Windows using your typical procedure.
1) Use your mouse to select MAIN under the Windows heading at the top of your screen. You should now have a highlighted window labeled 'MAIN'.
2) Click on the arrows of the MAIN window until an icon labeled 'Control Panels' is available.
3) Double click on the Control Panels icon with your mouse.
4) A window labeled 'Control Panels' should now appear on the screen.
5) Click on the arrows of the Control Panel window until an icon labeled 'MIDI Mapper' is available.

    Note: *If this icon is not available then you do not have an installed MIDI device or the MIDI Mapper driver has not been installed. Refer back to Driver Installation' earlier in this guide to install the appropriate driver.*

6) Double click on the MIDI Mapper icon with your mouse.
7) Click on Setups under Show.
8) Click New.
9) Type in the desired name and description. ex. Name: Roland MPU-401, Description: Roland
10) Click OK.
11) You should now have a MIDI Setup screen. Port Name should indicate None for all 16 MIDI channels.
12) Click on each Port Name selection until a list appears with the installed MIDI drivers.
13) Click on the MPU-401 MIDI driver.
14) Repeat steps 12 and 13 for all 16 MIDI channels.
15) Click on OK.
16) Choose Yes to save your new MIDI Map.
17) Click on CLOSE.

Now that we have set up MIDI Mapper, we are ready to test out the MIDI card.

Testing the Sound Card

We will be using a file included with Windows called CANYON.MID. This file is set up for General MIDI. It may sound unusual with a LAPC-1 which uses the MT-32 sound arrangement. If you are using a MIDI card without sounds such as the MPU-IPC-T or MPU-401AT you will have to setup an external MIDI device to hear the demo song play back.

For our testing purposes we will be using Media Player which is included with Windows. Use the following procedure to test the MIDI play back of your card:

1) From Program Manager use your mouse to select Accessories under the Windows heading at the top of your screen. You should now have a window labeled 'Accessories'.
2) Click on the arrows of the Accessories window until an icon labeled 'Media Player' is available.
3) Double click on the Media Player icon with your mouse.
4) A window labeled 'Media Player' should now appear on the screen.
5) Under the Device heading at the top of the window select MIDI Sequencer.
6) You should now have a file called CANYON.MID available on the left side of the screen.
7) Double click on the CANYON.MID file name.
8) Click on the play icon which resembles an arrow pointing to the right.
9) If you hear sound then the MIDI portion of your card is properly installed.

If you are not able to hear playback or you are given an error message, review the Hardware Setup, Driver Installation and MIDI Mapper setup steps earlier in this guide. MIDI Mapper setup is required for this test.

If you are using a MPU-IPC-T or MPU-401AT (without a daughter board) interface make sure you have the MIDI Out of the connector box attached to the MIDI In of your sound module or keyboard. Don't forget to hook up audio cables to your sound card, sound module or keyboard.

IV. Software Setup

Software setup will vary depending on whether you are using DOS (Disk Operating System) or Windows for your MIDI applications. We will look at the setup required by each.

DOS Program Setup

Each DOS MIDI sequencing or Game program should contain its own setup for MIDI use. Since there is no such thing as a global 'DOS driver', the support for each card will vary depending on the software program. Setup for each program will vary, contact your software manufacturer for exact instructions. Some programs in DOS will require that you use the stock Roland MIDI card settings of IRQ 2/9 and Port Address 330H. More commonly you will be asked for IRQ and Port Address settings upon installation of the software. You may also be asked for the model of your MIDI card. Since all interfaces discussed in this guide emulate the Roland MPU-401 interface, you should select it if available. If your software does not request this information on installation, then you should have some way of selecting MIDI setup within the program. Choose MPU-401 for interface type and the appropriate IRQ and Port Address settings. Make sure to select MIDI THRU (sometimes called MIDI echo or Auto channelize) on your program to be able to hear the sounds of the sound card or other MIDI equipment as you play on your MIDI keyboard.

In addition to the IRQ and Port Address settings, you may be asked to choose the arrangement of sounds on your card. ex. Sound 1=Piano, Sound 35=Picked Bass. Here is a chart to show you the different sound map settings available for Roland sound cards:

MIDI Card	Sound Map	Audio Playback
LAPC-1	MT-32	n/a
SCC-1	General MIDI, GS, MT-32*	n/a
SCD-10	General MIDI	n/a
SCD-15	General MIDI, GS, MT-32*	n/a

* This requires you run a special MT-32 emulation program called 'MT32EMUL.MID'. This file is included on the Roland Windows Drivers Disk in the GSMT32 folder and can be played with the Media Player program discussed in this guide.

Note: *If you are running a DOS MIDI program from Windows and you have the Windows driver installed, you may need to exit Windows before running your DOS program. If not you may receive an error such as Cant find MPU' in your software program. This is due to the fact that upon the boot up of Windows, the driver takes control of the MIDI port and therefore the card is not available for DOS applications.*

<u>**Windows Program Setup**</u>
We have already done most of the work for Windows installation by installing the appropriate Windows driver. Now all we need to do is setup each program to use the appropriate driver. Typically in each program you will have a MIDI input and output choice under MIDI setup. You may also have a choice of the desired driver or MIDI port per track of a sequencing program. After the appropriate device is selected, save the preferences for your program if required. If you have choices for sound map or device name in your software use the chart from the DOS software section as your guide. Make sure to select MIDI THRU (sometimes called MIDI echo or Auto channelize) on your program to be able to hear the sounds of the sound card or other MIDI equipment as you play on your MIDI keyboard.

If you wish to reset the Roland SCC-1 or SCD-15 to its factory settings without turning off and on the computer, play the file entitled 'GS_RESET.MID' contained in the GSMT32 folder with Media Player program discussed in this guide.

Note: *For further information about the setup of your Windows application, please contact your software manufacturer.*