M-AUDIO

Oxygen 88 User Guide

1: Introduction

Congratulations on your purchase of the Oxygen 88, a premium 88-note, graded hammer-action, velocity-sensitive performance keyboard for studio and stage. Oxygen 88 features DirectLink, which provides support for qualified Digital Audio Workstations (DAW)[1] such as Pro Tools. DirectLink automatically maps the track and master volume sliders, slider buttons, pan knobs, and transport controls to their corresponding functions in the application.

A single USB connection not only sends MIDI data to the computer, but also provides power to the keyboard. Oxygen 88 functions as a class-compliant device and will be recognized by your computer without the need to install additional drivers. Simply use the included USB cable to connect the keyboard to an available USB port on your computer and set the power switch to the On position.

Please refer to Section 5 of this Guide for more information on keyboard setup (including optional driver installation), and configuration of your recording application.

2: Oxygen 88 Features

- 88 velocity-sensitive, fully-weighted, hammer-action keys
- 4 programmable Keyboard Zones
- Automatic mapping of top panel controls to qualified DAWs
- Advanced programming functions via the keyboard
- Octave/Transpose buttons
- 2 Track Select buttons
- 9 sliders; MIDI re-assignable
- 9 buttons; MIDI re-assignable
- 6 Transport Buttons; MIDI re-assignable
- 8 knobs; MIDI re-assignable
- Pitch Bend and Modulation wheels; MIDI re-assignable
- 2 Sustain pedal inputs; MIDI re-assignable
- 1 Expression pedal input; MIDI re-assignable
- MIDI Out Port
- 10 user editable memory locations
- 3-digit LED screen
- USB 2.0 port (backward compatible with USB 1.1)
- 10 user presets for using DirectLink

[1] Please check www.avid.com for a current list of qualified recording applications, the most recent DirectLink installers, and configuration instructions.

3: Minimum System Requirements

Minimum system requirements can be found at our website, www.avid.com.

4: Setup

Oxygen 88 recognized by your computer without the need to install additional drivers. Simply use the included USB cable to connect the keyboard to an available USB port on your computer and set the power switch to the On position.

Windows users who are planning to:

- *use the keyboard to control more than one application at the same time*

or

- *simultaneously use other class-compliant USB audio devices connected to their computer*

...must install the latest Oxygen 88 drivers found at our website, www.avid.com.

Windows Installation Instructions

NOTE: This installation process must be performed before installing DirectLink.
Make sure Oxygen 88 is not connected to the computer when beginning the installation. The following instructions will indicate when you should connect it to your computer.

1. Install the Oxygen 88 drivers by doing one of the following:

   - If you have Internet access, download the latest Oxygen 88 drivers from the Support > Drivers page at www.avid.com. This is highly recommended, as it provides you with the newest drivers available. Once the download is complete, double-click the file to start the installation process.

     Or

   - If you do not have Internet access and are installing drivers from the Oxygen Series disk, the computer will automatically display the interactive install screen when the CD-ROM is inserted. If your computer fails to launch this application, you can manually start it by clicking on Start > My Computer > Oxygen Series (*Windows XP*) or Start > Computer > Oxygen Series (*Windows Vista* and *Windows 7)*.

2. Select Oxygen 88 from the menu and click Install.

3. Follow the on-screen instructions. At various points in the process, you may be notified that the driver being installed has not passed Windows Logo Testing, or asked whether the program you wish to run is a trusted application. Click "Continue Anyway" (*Windows XP*), or "Install" (*Windows Vista* and *Windows 7*) to proceed with the installation.

4. Once the installer has completed, click "Finish."

5. Connect Oxygen 88 to an available USB port on your computer. *If you are using Windows Vista or Windows 7, your Oxygen 88 is now ready to use.* If you are using Windows XP, proceed with the following steps.

6. For Windows XP *only*, do the following:

   - After Windows XP identifies the keyboard and asks if you want to search for a driver. Select "No, not this time" and press "Next."
   - When the Found New Hardware Wizard appears, select "Install the software automatically" and click "Next."
   - Once the Wizard has completed, click "Finish." If you are presented with another Found New Hardware Wizard dialog, repeat step 6.

7. When the installation is complete, you will see a message stating "Your new hardware is installed and ready to use."

Mac OS X Installation Instructions

The class-compliant drivers built into Mac OS X provide full support for all features of Oxygen 88. This means that no additional software drivers are necessary (or available) when using Oxygen 88 on Mac OS X. Simply connect the controller keyboard to the computer using the supplied USB cable, configure your recording software, and start making music.

Host Software Configuration

When using Oxygen 88 with your computer, you may need to configure your music software to receive MIDI data. This process varies from one application to another, but is usually done through a "Preferences," "Setup," or "Options" menu. Please refer to the documentation for your DAW software to learn how to do this.

Because Oxygen 88 does not contain built-in sounds, pressing a key will only send MIDI data to the computer, giving instructions on when and how a note should play. A virtual instrument loaded onto a track of your DAW software then creates the sound, based on the instructions received from Oxygen 88. Please refer to the documentation for your DAW software for more details on using virtual instruments.

5: DirectLink DAW Support

DirectLink automatically maps the track volume and master sliders, slider buttons (mute/solo), pan knobs, and transport controls to their corresponding functions in qualified recording applications such as Pro Tools. Please check www.avid.com for a list of compatible DAW applications, and the latest DirectLink installers.

Installation

1. Close the DAW application if it is currently running.
2. Download and save the DirectLink installation program for your DAW.
3. Locate the downloaded file, and double-click on its icon to launch the installer.
4. Save or print the configuration instructions contained in the installation program.
5. Follow all on-screen instructions and prompts.

DAW Configuration

Once the DirectLink files have been installed, you must configure your DAW software for use with DirectLink. The configuration procedure varies between different applications. Please print and follow the configuration steps contained within the DirectLink installer. Pro Tools 8.0 users can use the configuration instructions listed below.

DirectLink Configuration for Pro Tools 8.0:

(For DAW applications other than Pro Tools, please check the configuration instructions contained in the DirectLink installer, available for download from www.avid.com).

1. Launch Pro Tools
2. Select "Peripherals" from the Setup menu
3. Select the "MIDI Controllers" tab from the window that appears
4. Click the first "Type" pop-up menu and select "Keyboard"
5. Click the first "Receive From" pop-up menu and select the "Oxygen 88 In" port
   In Windows XP, the Oxygen 88 MIDI ports are listed as "USB Audio Device." Install the Oxygen 88 drivers (available from www.avid.com) for the ports to appear as Oxygen 88.
6. Click the first "Send To" pop-up menu and select the "Oxygen 88 Out" port
7. Make sure that "8" is selected in the "# Chs" pop-up menu and click "OK" to close the window

Load Preset 10 (DirectLink Preset) on Oxygen 88:

1. On the front panel of Oxygen 88, press the Select button until the lower edge of the LED screen shows a red dot above "PRESETS"
2. Scroll through the Preset numbers using the "-" or "+" buttons until the LED screen shows "P10."

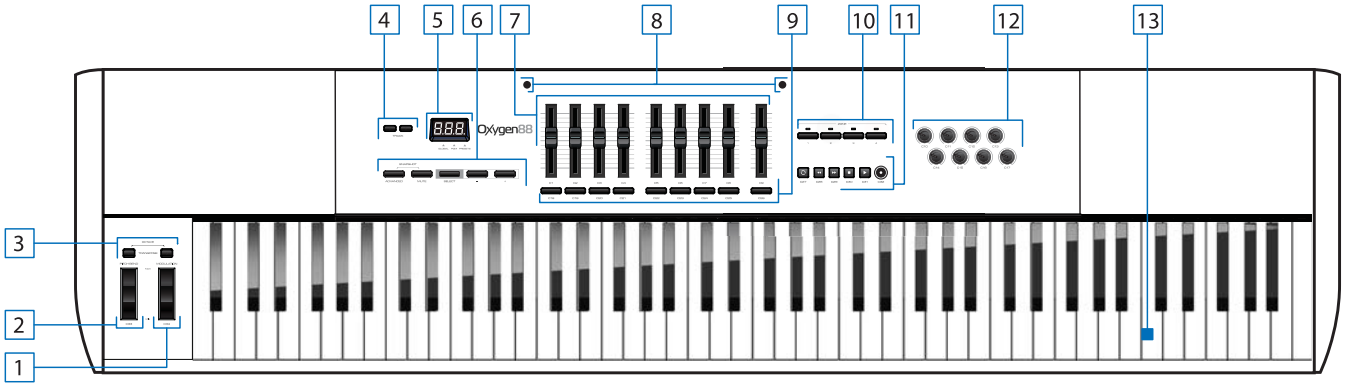
Applications not currently supported by DirectLink:

Applications not directly supported via DirectLink can be controlled by using the MIDI learn feature of your DAW, or by mapping the Oxygen 88 controls manually. See sections 8 and 10 of this guide for more information.

If your software does not support DirectLink or MIDI learn, it may be possible to control it manually by assigning the buttons, knobs and sliders of Oxygen 88 to the MIDI CC numbers for various software parameters.

For further information, please refer to *Section 8 - Advanced Keyboard Functions*, and *Section 10 - Advanced Programming Functions.*

6: Controls and Connectors



About DirectLink:

Once installed and configured, DirectLink automatically maps many of the top panel controls of Oxygen 88 to their corresponding functions in qualified recording applications.

Where applicable, the following section will explain both the operation of these controls when using DirectLink, as well as their default MIDI assignments.

Top Panel

1. Modulation Wheel:
This wheel is used to add expression to performances by changing the intensity of certain effects. By default, most synthesizers assign this wheel to control vibrato (change in intonation) or tremolo (change in volume). However it is usually possible to reassign the function of this wheel using the on-screen controls on a virtual instrument, or the front panel of a hardware synth or sound module.

Rolling the Modulation Wheel upward increases the modulation effect, while rolling downward reduces the effect.

The Modulation Wheel is an assignable controller capable of sending a variety of MIDI messages other than Modulation data. For a list of parameters the Modulation wheel can be assigned to, see "Chapter Standard MIDI Control Numbers (MIDI CCs)" on page 40.

2. Pitch Bend Wheel:
This wheel creates expressive changes in performances by raising and lowering pitch. Rolling the Pitch Bend wheel upward will raise the pitch of an instrument. Rolling it downward will lower the pitch. The upper and lower pitch bend limit is determined by settings on your hardware or software synthesizer, not by the Pitch Bend wheel on Oxygen 88 itself. Typically, this can be either a half note or an octave up/down. This wheel is spring-mounted and will return to the center position when released.

The Pitch Bend wheel is an assignable controller capable of sending a variety of MIDI messages other than pitch bend data. For a list of parameters the Pitch Bend wheel can be assigned to, "Chapter Standard MIDI Control Numbers (MIDI CCs)" on page 40.

3. Octave/Transpose Buttons:

Pressing the Right Octave/Transpose button (**>**) shifts the keyboard upwards in one octave increments (for example, note F3 becomes F4), and pressing the Left Octave/Transpose button (**<**) shifts the keyboard downwards in one octave increments (for example, note F3 becomes F2).Pressing both buttons simultaneously, then pressing the Right Octave/Transpose button shifts the keyboard upward by one half-step (semi-tone). For example, note F3 becomes F#3. Pressing the Left Octave/Transpose button shifts the keyboard downward by one half-step (F3 becomes E3). Oxygen 88 will automatically return to performance mode after the pitch has been transposed.

> ***Global and Zone Shift Functions:***
>
> *The Global Octave and Global Transpose functions work in combination with the Zone Octave and Zone Transpose functions (see Section 9 - Zone Octave and Zone Transpose keys). The Global Octave and Global Transpose settings shift the pitch of the entire keyboard while preserving relative pitch offsets between Zones. The Zone Octave and Transpose functions are useful when different Octave or Transpose shift settings are needed across multiple Zones.*
>
> *For example, if a Zone is configured for a Transpose shift of +5 semi-tones, and a Global Octave shift setting of +1 is applied to the keyboard, the effective pitch shift for that Zone is one Octave and five semi-tones (or a total of 17 semi-tones).*

4. Track Buttons:

DirectLink Operation:

The left Track button (**<**) selects the previous Track in qualified DAW applications. For example, if Track 2 is currently selected, pressing this button will select Track 1 in the application.

The right Track button (**>**) selects the next Track in qualified DAW applications. For example, if Track 2 is currently selected, pressing this button will select Track 3 in the application.

These buttons can also be used to select tracks outside the currently active bank of 8 sequencer tracks. For example, if track 8 is currently selected and the **>** track button is pressed, track 9 will be selected. The track sliders and their corresponding buttons will now control Tracks 9 - 16.

Default Operation:

The left Track button sends MIDI CC 110, while the right Track button sends MIDI CC 111. These buttons are not re-assignable to other MIDI parameters. On your DAW, use the "MIDI Learn" function (if available) to assign these buttons to software functions as desired. Refer to the manual provided with your DAW software for more information about its MIDI Learn capabilities.

5. LED Screen:

Oxygen 88 features a 3-digit LED screen providing visual information regarding current operation, programing, and status.

6. **Function Buttons:**
   Oxygen 88 features 5 function buttons for programming various settings and advanced features as outlined below.

   Advanced
   The Advanced button allows access to the extended parameters listed along the top edge of the keyboard. When the Advanced button is pressed, the LED screen will display three dots, indicating the keyboard is in Advanced mode. For more information on Advanced Mode, see "Chapter 7: Advanced Keyboard Functions" on page 12.

   Mute
   Pressing the Mute button prevents the Knobs and Sliders from transmitting MIDI data, and the LED screen will display "OFF", signifying their disabled state. This allows changes to Slider and Knob positions without affecting the settings of connected MIDI devices or applications.

   As shown in the following example, the Mute function can be used to prevent "jumps" caused by differences between the physical positions of sliders and knobs on Oxygen 88, and the expected values of the corresponding software parameters:

   When loading a new sound patch for a virtual instrument, it is likely that the current positions of the Knobs on Oxygen 88 will be "out-of-sync" with what the virtual instrument is expecting. For example, an Oxygen 88 Knob may be set to 64 (center position) while the sound patch expects this value to be zero (all the way to the left). This may cause this synthesizer setting to jump or "snap" from zero to 64 when the Oxygen 88 Knob is adjusted. The rapid change can be a jarring experience if the knob is controlling a parameter like Master Volume or Filter.

   To prevent these value jumps, press the Mute button, and set the Knobs and Sliders to their expected positions before using them with a new sound patch. Pressing the Mute button a second time will exit Mute mode.

NOTE: The Mute function does not affect the buttons, keys or the sustain pedal. Pressing any of them automatically cancels Mute mode.

   Snapshot (Advanced & Mute)
   Simultaneously pressing the Advanced and Mute buttons will activate the Snapshot function. The LED screen momentarily shows "S-S", and Oxygen 88 will immediately send the current values of all knobs and sliders. This feature can be used to simultaneously change multiple parameters within the software you are controlling, to match the settings on your Oxygen 88.

Select

The Select button assigns the Plus (+) and Minus (-) buttons to one of three parameters as indicated by a dot along the lower edge of the LED screen:

- GLOBAL: The Plus (+) and Minus (-) buttons set the global MIDI channel.
- PGM (program): The Plus (+) and Minus (-) buttons transmit program change messages.
- PRESETS: The Plus (+) and Minus (-) buttons step through and load Oxygen 88 presets from its 10 memory locations. Oxygen 88 comes with 10 pre-loaded presets for use with select DAWs and virtual synthesizers, as shown in the following table:

User Preset	Preset Setting
1	GM Patch/Pro Tools Instruments
2	Xpand2
3	Hybrid Pt. A
4	Hybrid Pt. B
5	Velvet
6	Strike
7	Oddity
8	ImpOSCar
9	MiniMonsta
10	Direct Link

7. Sliders:

Oxygen 88 features nine Sliders.

DirectLink Operation:

The first eight sliders automatically map to control the track volume for the currently selected bank of eight tracks in a qualified DAW application. The right-most Slider (C9) maps to the master volume fader.

Default Operation:

These sliders send different types of standard MIDI CC messages, or advanced MIDI messages (see Appendix B), based on the parameter they are assigned to, or the active preset. Each slider can be mapped to various parameters in your DAW, by using its MIDI Learn function (if available check the user documentation for your DAW), or by manual assignment as described in "Chapter 9: Advanced Programming Functions" on page 23.

8. Slider Buttons:

Oxygen 88 features nine Slider Buttons.

DirectLink Operation:

The first eight buttons map to the currently active bank of eight tracks within qualified DAW applications. Pressing a Slider button will mute the corresponding track. Pressing and holding the right-most Button (C26) places all other Slider buttons in Solo mode. While the right-most Button is held down, pressing another Slider button will solo the corresponding DAW track.

When using Pro Tools, the right-most Slider button (C26) also allows using the eight Oxygen 88 control knobs to adjust either the left, or the right pan knobs of stereo tracks. By default, the Oxygen 88 knobs control the left pan knobs of stereo tracks. However, when the right-most Slider button is held down, the Oxygen 88 knobs control the right pan knobs.

Default Operation:
These buttons send different types of standard MIDI CC, MIDI note, or other advanced MIDI messages (see Appendix B), based on the parameter they are assigned to, or the active preset. Each button can be mapped to various parameters in your DAW, by using its MIDI Learn function (if available check the user documentation for your DAW), or by manual assignment as described in "Chapter 9: Advanced Programming Functions" on page 23.

9. **Zone Buttons:**
The Zone feature splits the keyboard into a maximum of four programmable non-overlapping, or overlapping sections. Pressing any of the 4 Zone buttons will activate the corresponding keyboard Zone. To activate multiple Zones, simultaneously press their respective Zone buttons.

Parameters such as Zone Range, Zone Channel, Zone Octave and Zone Transpose can be edited for every individual Zone. These settings are saved as part of a User Patch when stored to a Memory Location.

For further information on Zone parameters, see "Chapter 8: Zone Keys" on page 18.

10. **Transport Buttons:**
Oxygen 88 features 6 Transport Buttons.

DirectLink Operation:
These buttons map to the Transport Buttons in qualified DAW applications, to control playback, record, start/stop, fast forward and rewind, as well as enabling (or disabling) of the loop function.

Pro Tools 8 users can access additional functions via the Loop button:

Holding the Loop button while pressing one of the other Transport Control buttons gives access to additional Pro Tools transport functions. See Appendix D for more details.

Quickly pressing the Loop button toggles the control knobs on your Oxygen 88 between Instrument Mode and Mixer mode.

Mixer mode (default): The 8 knobs control the corresponding pan or balance settings of the selected track.

Instrument Mode: The control knobs automatically map to 8 parameters on the active instrument or effect plug-in. The instrument mode parameter mapping can be customized by clicking the "learn" button in the upper right corner of the plug-in. Please check the Pro Tools 8 documentation for more details.

Default Operation:
These buttons send standard MIDI CC, MIDI note, MMC (MIDI Machine Control), or other advanced MIDI messages (see Appendix B), based on the parameter they are assigned to, or the active preset. Each button can be reassigned to control various parameters, including the transport controls, by using the MIDI Learn function (if available check the user documentation for your DAW) in your DAW, or by manual assignment, as described in "Chapter 7: Advanced Keyboard Functions" on page 12.

11. **Knobs:**
    Oxygen 88 features 8 MIDI Control Knobs.

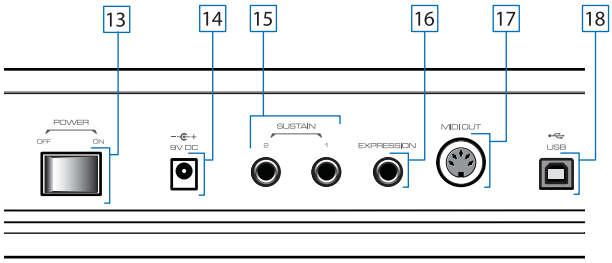
    DirectLink Operation:
    These knobs map to control the panorama or balance setting for the currently active bank of eight tracks in a qualified DAW application. When working with stereo tracks in Pro Tools 8, the knobs default to control the left pan controls. Pressing and holding the right-most Slider button (C26), will map the knobs to the right pan controls.

    Pro Tools 8 users can place the 8 control knobs into Instrument mode by quickly pressing the Loop button. In this mode, these knobs automatically map to 8 parameters on the active instrument or effect plug-in. The instrument mode parameter mapping can be customized by clicking the "learn" button in the upper right corner of the Plug-In. Please check the Pro Tools 8 documentation for more details.

    Default Operation:
    These knobs send different types of standard MIDI CC messages or advanced MIDI messages (see Appendix B), based on the parameter they are assigned to, or the active preset. Each knob can be mapped to various parameters in your DAW, by using its MIDI Learn function (if available ñ check the user documentation for your DAW), or by manual assignment as described on page 23.

12. **Velocity-sensitive Keyboard:**
    The velocity-sensitive keyboard is not only the primary method of sending Note On/ Off and Velocity data when performing, it is also used to access extended programing functions listed along its upper edge. For more information on the extended programming functions, refer to "Chapter 7: Advanced Keyboard Functions" on page 12.

Back Panel



13. **On/Off Switch:**
    Use this switch to power the device on or off.

14. **Power Socket:**
    This socket accepts an optional 9V DC, 500mA power supply. A power supply must be connected when using Oxygen 88 in stand-alone mode (without a host computer).

NOTE: Do not use a power supply while Oxygen 88 is connected to a computer via USB.

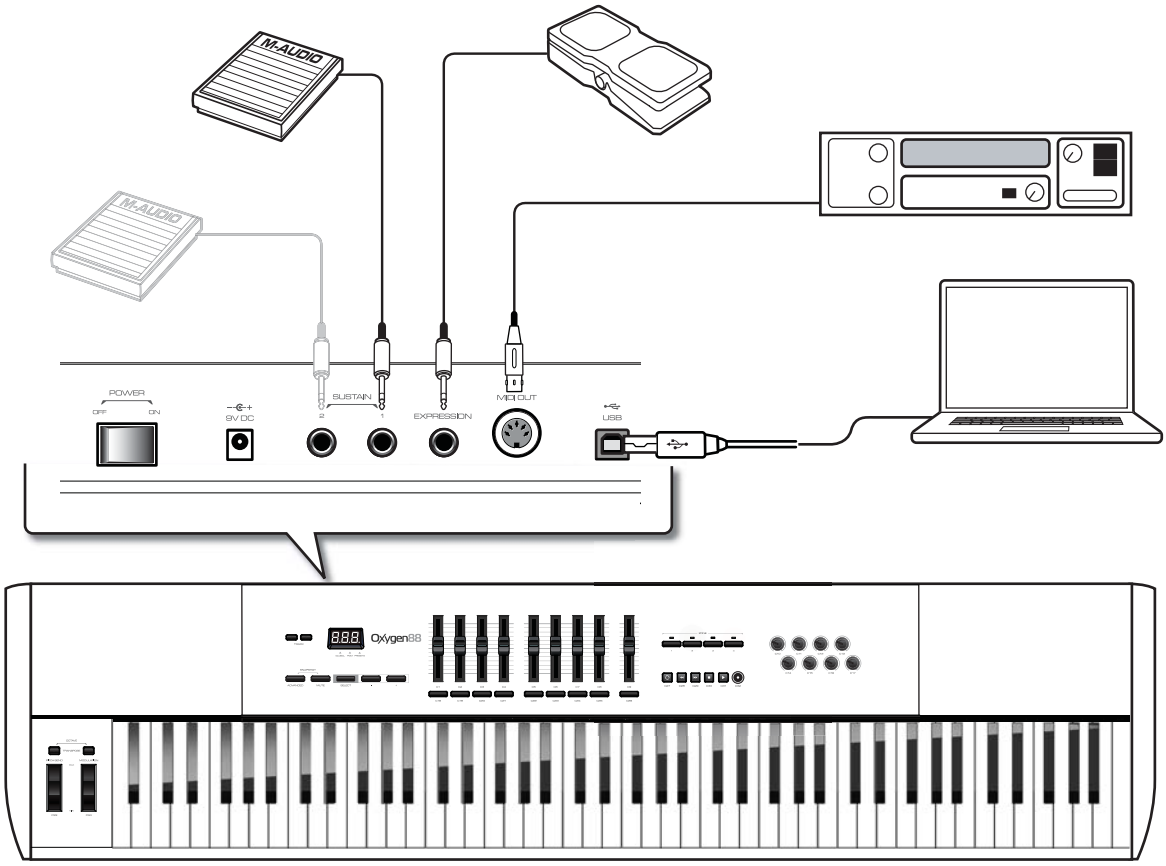
15. **Sustain Pedal Inputs:**
    This socket accepts a momentary-contact foot pedal (not included). When pressed, this pedal will sustain the notes you are playing without having to keep your fingers pressing down the keys.

NOTE: The polarity of the sustain and expression pedals is determined by the keyboard upon startup. When Oxygen 88 is powering up, the sustain pedal is assumed to be in the "up" (Off) position. It is important that the sustain pedal is not pressed during startup, otherwise the pedal will reverse its operation, and notes will sustain when the pedal is not pressed.

16. **Expression Pedal Input:**
    This socket accepts a standard expression pedal such as EX-P for adding expressive changes during performances.

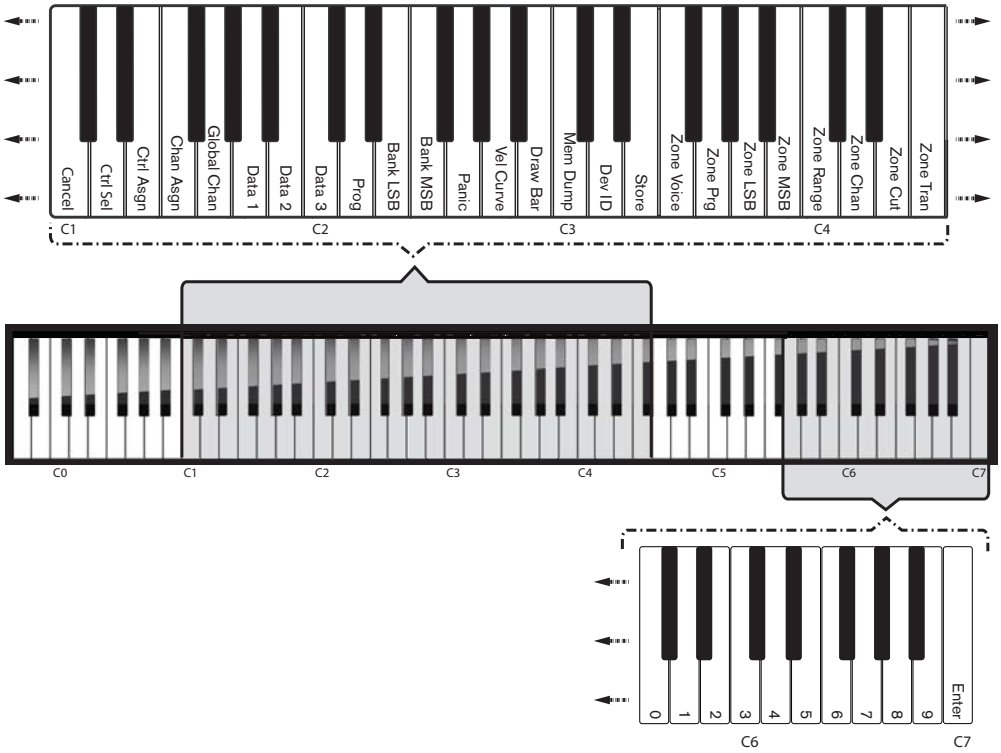
17. **MIDI Out Port:**
    This standard 5-pin MIDI connector transmits MIDI data to any compatible device such as a synthesizer, sound module, or drum machine.

18. **USB Port:**
    The USB 2.0 port (backward compatible with USB 1.1) delivers power to the keyboard and transmits MIDI data when connected to a computer.



7: Advanced Keyboard Functions

Oxygen 88 includes extended programming capabilities through secondary functions of the keys. The available parameters are listed along the top edge of the keyboard, and accessed by pressing the Advanced button. The LED screen shows the numerical value of the parameter being edited.



Cancel

Pressing the Cancel key will exit advanced mode, discarding all changes. Alternatively, pressing the Advanced button a second time will yield the same result.

NOTE: The Panic, Drawbar and Memory Dump functions take immediate effect and cannot be cancelled once the corresponding key has been pressed.

Control Select

The Control Select function (CTRL SEL) is used to select a MIDI control (a Knob, Button, Slider or the Sustain or Expression Pedal jack) for editing.

NOTE: Every control is labeled with a unique number, such as C1, C2, etc. It is not necessary (or possible) to enter the letter C when following the editing examples below.

1. Press the Advanced button.
2. Press the Control Select key.
3. Enter the control's ID number using the number keys.
4. Press the Enter key to confirm.

Or:

Move or press the control to be programmed, before or after pressing the Advanced button.

Control Assign, Data 1, Data 2, Data 3

The Control Assign function (CTRL ASGN) assigns a MIDI continuous control number (MIDI CC), or other MIDI parameter from the table in Appendix B to the selected Knob, Button, Slider, or the Sustain Pedal jack. The Data 1, Data 2, and Data 3 keys define various related aspects of the parameter or function assigned to a control.

For example, it is possible to configure a Button to send MIDI note On/Off Data by assigning it to controller number 147. The Data 1 key is used to specify the pitch (note number) of the note played by the button (see Appendix C). The Data 2 key is used to set the Note Off velocity (Velocity Off). The Data 3 key is used to set the Note On velocity (Velocity On), determining how loud the note will sound.

For more details and step-by-step control assignment examples, refer to "Chapter 9: Advanced Programming Functions" on page 23.

Channel Assign

The Channel Assign function (CHAN ASGN) assigns a Knob, Slider, Button or the Pedal jack to a specific MIDI channel.

1. Select the control as described earlier.
2. Press the Advanced button.
3. Press the Channel Assign key - The LED screen will display the current MIDI channel (for example "c.0.2.").
4. Enter the new MIDI channel number using the number keys.
5. Press the Enter key.

When assigned to channel "0", the control (Knob, Slider, Button or Sustain Pedal jack) will transmit on the Global MIDI Channel. For more information, refer to the next section, "Global Channel."

Assigning a Knob, Slider, Button, or Pedal Jack to a Zone channel (Z1 - Z4), will link the control to the same MIDI channel number as used by the associated keyboard Zone. For further instructions on assigning a MIDI channel to a Zone, please refer to "Chapter 8: Zone Keys" on page 18.

** Enter numbers 17 - 20 to associate a control with the same MIDI Channel as used by one of the four keyboard Zones, Z1 - Z4. Alternatively, use the -/+ buttons to step through all available channel selections (1 - 16; Z1 - Z4)*

Keyboard Entry	LED Screen	Keyboard Zone
17	z1	Zone 1
18	z2	Zone 2
19	z3	Zone 3
20	z4	Zone 4

NOTE: When a control is assigned to send SysEx messages, the displayed number represents the SysEx Device ID instead of the MIDI transmit channel number. For more information about SysEx messages, please refer to "Chapter 10: MIDI Messages Defined" on page 34.

Global Channel

The Global Channel function (GLOBAL CHAN) sets the default MIDI channel for the keyboard and all MIDI controls, except those that already have a specific MIDI channel assignment.

1. Press the Advanced button.
2. Press the Global Channel key - The LED screen will display the current Global channel (for example, "c.0.1.").
3. Enter the new channel number using the number keys.
4. Press the Enter key.

The Global Channel can also be changed by using the following method:

1. Press the Select button until a red dot appears above "GLOBAL" on the lower edge of the LED screen.
2. Scroll through the MIDI channels using the "**-**" or "**+**" buttons to select the new channel number.

Program

This function sends Program Change MIDI messages on the Global Channel. These messages can be used to select different sound patches within your virtual instrument or sound module.

1 Press the Advanced Function button.
2. Press the Program key - the LED screen will display the last sent program number (for example, ".0.1.").
3. Enter the Program number.
4. Press the Enter key to send the program change message.

Program change messages can also be sent using the following method:

1. Press the Select button until the a red dot appears above "PGM" on the lower edge of the LED screen.
2. Scroll through the Program numbers using the "**-**" or "**+**" buttons.

Bank LSB

The Bank LSB function sends bank change messages on the Global MIDI channel. These messages are used to access additional banks of sound patches, if available, on virtual instruments or sound modules.

Refer to the documentation for the virtual instrument or synthesizer to confirm it will respond to these messages.

1. Press the Advanced button.
2. Press the Bank LSB key - the LED screen will display the last sent Bank LSB number (for example, ".0.1.").
3. Enter the new Bank LSB number using the number keys.
4. Press the Enter key.

NOTE: Bank LSB messages will not have any effect until they are followed by a Program Change message. For more information on Bank LSB messages, please refer to "Chapter 10: MIDI Messages Defined" on page 34.

Bank MSB

The Bank MSB function sends bank change messages on the Global MIDI channel. These messages are used to access additional banks of sound patches, if available, on virtual instruments or sound modules.

Refer to the documentation for the virtual instrument or synthesizer to confirm it will respond to these messages.

1. Press the Advanced button.
2. Press the Bank MSB key - the LED screen will display the last sent Bank MSB number (for example, ".0.1.").
3. Enter the new Bank MSB number using the number keys.
4. Press the Enter key.

NOTE: Bank MSB messages will not have any effect until they are followed by a Program Change message. For more information on Bank MSB messages, please refer to "Chapter 10: MIDI Messages Defined" on page 34.

Panic

Press the Advanced button followed by the Panic key to send an "All Notes Off" message on all 16 MIDI channels. This stops any stuck notes that continue to play even after their keys have been released.

Velocity Curve

The Velocity Curve Select key (VEL CURVE) is used for changing the touch sensitivity of the keyboard. This setting lets you decide how the force with which you hit a key affects the volume at which a note plays. Oxygen 88 provides 7 different sensitivity options:

1 = **C1** is a sensitivity setting that generates lower velocity values for the same force. This setting is useful for playing more quietly, even if you tend to strike the keys harder.

2 = **C2** is the default setting, and is designed to be useful for most players with an "average" touch (people who play with an average amount of force).

3 = **C3** is a sensitivity setting that generates higher velocity values for the same force. This setting is useful for playing more loudly, even if you tend to strike the keys with less force.

4 = **C4** is a sensitivity setting that generates an equal velocity value for a given amount of force, resulting in a linear (or neutral) keyboard response.

5 = **F1** is a setting that effectively disables sensitivity, meaning the keyboard will generate a fixed velocity value of 64 (on a scale of 0-127) regardless of how hard or soft the keys are struck.

6 = **F2** is a setting that effectively disables sensitivity, meaning the keyboard will generate a fixed velocity value of 100 (on a scale of 0-127) regardless of how hard or soft the keys are struck.

7 = **F3** is a setting that effectively disables sensitivity, meaning the keyboard will generate a fixed velocity value of 127 (on a scale of 0-127) regardless of how hard or soft the keys are struck.

When a new Velocity Curve is selected using either method described below, the LED screen will display the first 4 Velocity curves as C1 - C4, and the three fixed velocity settings as F1 - F3.

1. Press the Advanced button.
2. Press the Velocity Curve key - the LED screen will display the current velocity curve (for example, ".C.2").
3. Type the Velocity Curve number (1 through 7) using the number keys.
4. Press the Enter key.

Or:

1. Press the Advanced button.
2. Press the Velocity Curve key - the LED screen will display the current velocity curve (for example, ".C.2").
3. Use the "**-**" and "**+**" buttons to scroll through the Velocity Curves (C1 through F3).
4. Press the Enter key.

Drawbar Mode

This parameter switches all 9 Sliders to Drawbar Mode.This reverses the operation of the sliders, so that the maximum value (127) is at the bottom and the minimum value (0) is at the top.

This feature is intended for use with Organ presets that utilize drawbars.

1. Press the Advanced button.
2. Press the Drawbar key - the LED screen will momentarily display "On".
   Drawbar mode becomes active immediately, and Advanced mode exits automatically.

To disable Drawbar mode, repeat steps 1 and 2. The LED screen will momentarily display "OFF".

Memory Dump

The SysEx Memory Dump function (MEM DUMP) will send the contents of all 10 Preset memory locations for storage in a DAW application. For information on how to record SysEx MIDI data, please refer to the documentation provided with your DAW software.

1. Prepare a MIDI track within your DAW software to record from your Oxygen 88.
2. Press the Advanced button on your Oxygen 88.
3. Start the MIDI recording in your DAW software.
4. Press the Memory Dump key on your Oxygen 88. The SysEx memory dump will begin immediately, and the LED screen will display "SYS" to indicate that data is being sent.

The SysEx file will appear as a new MIDI recording in your DAW software.

Restoring a Memory Dump:

IMPORTANT: Restoring a saved Memory Dump will permanently overwrite all current presets on your Oxygen 88.

Play back a MIDI track that contains a previously recorded Oxygen 88 SysEx Memory Dump. The SysEx data is sent back to Oxygen 88, and the LED screen will display "SYS" while receiving the SysEx data.

NOTE: Restored settings will not become active until a new preset is loaded on your Oxygen 88, or the device has been powered off and on.

Device ID

The Device ID function (DEV ID) allows the assignment of a unique SysEx Device ID to differentiate between multiple MIDI devices of the same model, when sending or receiving SysEx data.

The default setting of 127 lets the keyboard respond to all incoming SysEx messages compatible with the same type of controllers. However, if the Device ID is changed to any other value, the keyboard will only respond to SysEx messages that contain the same Device ID number. This is useful in situations where multiple Oxygen 88 controller keyboards are connected to the same DAW software and SysEx information needs to be sent to a specific keyboard controller with a unique Device ID number.

1. Press Advanced.
2. Press the Device ID key - the LED screen will display the current Device ID (for example "1.2.7.").
3. Enter the new Device ID number using the number keys.
4. Press the Enter key.

NOTE: If the Device ID number of an Oxygen 88 keyboard is changed after a Memory Dump was recorded into a DAW application, any attempts to restore it will be ignored because the numbers do not match. If you do not remember the Device ID number used when the Memory Dump was recorded, set your Oxygen 88 to Device ID 127 to ensure all Memory Dumps will be recognized.

For more information on SysEx messages and Device ID numbers, please refer to "Chapter 10: MIDI Messages Defined" on page 34.

Store

The Store function saves control assignment settings to one of 10 memory locations.

IMPORTANT: Storing new assignment settings will overwrite the contents of the selected memory location

1. Press the Advanced button.
2. Press the Store key - The LED screen displays the number of the current memory location (for example, P. 0.1.).
3. Enter the number of the memory location you want to store the new settings to by using the number keys or the -/+ buttons.
4. Press the Enter key to save the changes and overwrite the previous settings of the memory location.

NOTE: The Oxygen 88 factory presets can be restored by holding down the "-" and "+" buttons during power up. IMPORTANT: This will permanently erase all customized user settings.

Number Keys

This section of the keyboard is used to type in numerical parameter values while in Advanced mode.

Enter Key

The Enter key confirms changes made and exits Advanced mode.

NOTE: The Panic, Drawbar and Memory Dump functions take immediate effect when the corresponding key is pressed. Advanced mode will exit automatically.

8: Zone Keys

The Zone feature allows splitting the Oxygen 88 keyboard into a maximum of four programmable non-overlapping or overlapping sections, while transmitting MIDI notes of each on separate MIDI channels. This makes it possible to play up to 4 different instrument sounds of a connected multi-timbral synthesizer, by playing notes in different sections (zones) of the keyboard. If Zones are configured to overlap partially or completely, multiple instrument sounds will play simultaneously (layered) if a key in such an area of the keyboard is pressed.

Pressing any of the four Zone buttons will activate the corresponding keyboard Zone. To activate multiple Zones, simultaneously press their respective Zone buttons. An LED above each button indicates if the Zone is active.

When in Advanced mode and editing a parameter for an active Zone by pressing one of the Zone keys, the LED screen will display the current value of the associated function for that key. The LED above each active Zone will flash.

The LED above each active Zone will flash while editing Zone parameters. When more than one Zone is active, any changes made will be applied to all active Zones.

Parameters such as Zone Range, MIDI Channel, Program/Bank number (selects Instrument Sound Patch), Octave and Transpose shift can be edited for each Zone. These settings are saved as part of a User Patch when stored to a Memory Location.

Zone Voice

The Zone Voice (ZONE VOICE) function is a global parameter that is applied to all zones of the same number (for example, Zone one) across all memory locations of Oxygen 88, regardless of the currently active Preset Patch. Zone Voice can be enabled or disabled for each of the four zones. When the Zone Voice function is set to "On" (default), recalling an Oxygen 88 Preset Patch will cause the Zone to transmit Bank and Program Change messages on the MIDI channel of the Zone, causing a connected synthesizer to load the corresponding instrument sound patch. When Zone Voice is set to "Off" for a Zone, no Bank or Program change message is transmitted when an Oxygen 88 Preset Patch is recalled, and you need to select the desired instrument sound patch manually on your synthesizer.

Disabling Zone Voice (Bank/Program Change transmission) for a Zone:

1. Select a Zone by pressing its Zone button.
2. Press the Advanced button.
3. Press the ZONE VOICE key - the LED screen will indicate that Zone Voice is now set to "OFF".
4. Repeat steps 1 - 3 for any Zone that should not transmit Bank/Program change messages.

Repeat the above steps to re-enable the Zone Voice function for any combination of Zones.

After configuring the Zone Voice function and exiting Advanced mode, activate all desired Zones by simultaneously pressing their respective Zone buttons.

Zone Program

The Zone Program (ZONE PRG) key is used to specify the Program Change number that will be sent for a keyboard Zone, when a Preset Patch is recalled.

Note: Program Change messages are only sent for a Zone upon recalling a Preset Patch, if the Zone Voice function is set to "ON" for that Zone.

1. Select a Zone by pressing its Zone button.
2. Press the Advanced button.
3. Press the ZONE PRG key - the LED screen will display the currently assigned Program Number.
4. Enter the new Program number using the number keys.
5. Press the Enter key - The assigned Program Change number will be transmitted immediately.
6. Repeat steps 1 - 5 to assign new Program Numbers for the remaining Zones.

After configuring the Program Numbers and exiting Advanced mode, activate all desired Zones by simultaneously pressing their respective Zone buttons.

Zone LSB:

The Zone LSB (ZONE LSB) key is used to specify the Bank LSB value that will be sent for a keyboard Zone, when a Preset Patch is recalled.

Note: Bank LSB messages are only sent for a Zone upon recalling a Preset Patch, if the Zone Voice function is set to "ON" for that Zone.

1. Select a Zone by pressing its Zone button.
2. Press the Advanced button.
3. Press the ZONE LSB key -the LED screen will display the currently assigned Bank LSB value.
4. Enter the new Bank LSB value using the number keys.
5. Press the Enter key -The assigned Bank LSB value will be transmitted immediately.
6. Repeat steps 1 - 5 to assign new Bank LSB value for the remaining Zones.

After setting the Bank LSB values and exiting Advanced mode, activate all desired Zones by simultaneously pressing their respective Zone buttons.

Zone MSB:

The Zone MSB (ZONE MSB) key is used to specify the Bank MSB value that will be sent for a keyboard Zone, when a Preset Patch is recalled.

Note: Bank MSB messages are only sent for a Zone upon recalling a Preset Patch, if the Zone Voice function is set to "ON" for that Zone.

1. Select a Zone by pressing its Zone button.
2. Press the Advanced button.
3. Press the ZONE MSB key -the LED screen will display the currently assigned Bank MSB value.
4. Enter the new Bank MSB value using the number keys.
5. Press the Enter key -The assigned Bank MSB value will be transmitted immediately.
6. Repeat steps 1 - 5 to assign new Bank MSB value for the remaining Zones.

After setting the Bank MSB values and exiting Advanced mode, activate all desired Zones by simultaneously pressing their respective Zone buttons.

Zone Range

This function sets the range of notes used by a Zone. By default, all Zones span across the entire length of the keyboard, from note A-1 on the far left to C7 on the far right.

If two or more active Zones are configured to overlap partially or completely, multiple instrument sounds will play simultaneously (layered) if a key in an overlapping area of the keyboard is pressed.

1. Select a Zone by pressing its Zone button.
2. Press the Advanced button.
3. Press the Zone Range key - the LED screen will display "Z.n.-".
4. Press the lowest note to be included in the zone - the LED screen will display the note value.
5. Press the highest note to be included in the zone - the LED screen will display the note value.
6. Repeat steps 1 - 5 to set the range of notes for all remaining Zones.

Or:

1. Press and hold one or multiple Zone Buttons - After approximately two seconds the LED screen will read "Z.n.-".
2. Press the lowest note to be included in the zone - the LED screen will display the note value.
3. Press the highest note to be included in the zone - the LED screen will display the note value.
4. Repeat steps 1 - 3 to set the range of notes for the remaining Zones.

Simultaneously holding down multiple Zone buttons and then setting the range as described above, will set the same Zone Range for all active Zones. This will result in the layering of all sound patches that are played. After setting the Range, activate all desired Zones by simultaneously pressing their respective Zone buttons.

When assigning the lower or upper zone range limit to a black key, the LED will place a dot between the note name and the octave number to indicate a sharp note.

Note Name	LED Screen
A-1	A-1
Bb-1	A.-1
G#2	G.2

Zone Channel:

The Zone Channel (ZONE CHAN) function specifies which MIDI Channel a Zone will use when transmitting MIDI data. Assigning each Zone to its own channel will allow you to play up to 4 different sound patches on a connected synthesizer. This settings is saved as part of a User Patch when stored to a Memory Location.

1. Select a Zone by pressing its Zone button.
2. Press the Advanced button.
3. Press the Zone CHAN key - the LED screen will display the current Zone Channel number.
4. Enter the new MIDI Channel number for the Zone using the number keys.
5. Press the Enter key.
6. Repeat steps 1 - 5 to assign set the MIDI channel for the remaining Zones.

After setting the Zone channel and exiting Advanced mode, activate all desired Zones by simultaneously pressing their respective Zone buttons. The following table shows the default Zone Channels.

Zone	MIDI Channel
1	0 (Global Channel)
2	2
3	3
4	4

Assigning a Knob, Slider, Button, or Pedal jack to a Zone MIDI Channel (Z1 and Z4),causes that control to transmit MIDI data on the same MIDI Channel as the corresponding Zone.

Zone Octave

The Zone Octave (ZONE OCT) function allows the pitch of a Zone to be shifted up or down, in one octave increments, to a maximum of 10 Octaves.

1. Select a Zone by pressing its Zone button.
2. Press the Advanced button.
3. Press the Zone OCT key - the LED screen will display the current Octave shift value.
4. Repeatedly press the "-" or "+" button to lower or raise the Octave shift value.
5. Press the Enter key.
6. Repeat steps 1 - 5 to set the octave shift for the remaining Zones.

After setting the Octave shift value and exiting Advanced mode, activate all desired Zones by simultaneously pressing their respective Zone buttons.

Note: Zone Octave shift settings work in combination with the Global Octave shift setting (see Section 7, Octave / Transpose Buttons). This can be useful when working with different Octave or Transpose shift settings across multiple Zones. The Global Octave function shifts the entire keyboard up or down, while preserving relative pitch settings between Zones. For example, if a Zone is configured for an Octave shift of +1, and a Global Octave shift setting of +2 is applied to the keyboard, the effective octave shift for that Zone is +3.

Zone Transpose

The Zone Transpose function (ZONE TRAN) allows the pitch of a Zone to be shifted up or down in one semi-tone (half-step) increments, to a maximum of 12 semi-tones.

1. Select a Zone by pressing its Zone button.
2. Press the Advanced button.
3. Press the Zone TRAN key - the LED screen will display the current Transpose value.
4. Repeatedly press the "-" or "+" button to lower or raise the pitch.
5. Press the Enter key.
6. Repeat steps 1 - 5 to set the Transpose value for the remaining Zones.

After setting the Transpose value and exiting Advanced mode, activate all desired Zones by simultaneously pressing their respective Zone buttons.

Note: Zone Transpose shift settings work in combination with the Global Transpose shift setting. This can be useful when working with different Transpose or Octave shift settings across multiple Zones. The Global Transpose function shifts the entire keyboard up or down, while preserving relative pitch settings between Zones. For example, if a Zone is configured for a Transpose shift of +5, and a Global Transpose shift setting of +2 is applied to the keyboard, the effective octave shift for that Zone is +7.

9: Advanced Programming Functions

The MIDI CC (continuous controller) numbers from 0 to 127 are part of the General MIDI specification, and are typically used for real-time control of parameters in MIDI compatible music equipment. For example, an Oxygen knob may be assigned to MIDI CC number 10, which controls the Pan setting of a connected synthesizer or DAW software track.

Many of the controls on Oxygen 88 are fully programmable, and can be assigned to any of these standard MIDI CCs. However, to simplify assignment of other, more complex MIDI message types (for example SysEx or RPN/NRPN), M-Audio has appended such additional MIDI message types to the end of the MIDI CC number list, extending the range of available numbers beyond 127. These additional messages can be assigned to Oxygen controls, just as if they were standard MIDI CCs, but using numbers in the range from 128 to 255, as listed in the tables in "Assignable MIDI CCs" on page 41.

Generally, this is achieved by selecting the control for editing and assigning a 3-digit number.

This chapter provides examples of the typical control assignment procedure for knobs, sliders, buttons and the sustain pedal jacks. Assigning MIDI messages that are not explicitly mentioned in this section is done by using the same basic principle as given in the examples.

NOTE: Oxygen 88 never transmits values outside the range specified by the MIDI protocol (0-127). The controller numbers from 128 - 255 are only used internally by Oxygen 88. This simplifies configuration of the knobs, buttons and sliders when assigning advanced MIDI messages, and allows additional configuration options for the controls (for example, setting Trigger or Toggle operation of a button).

Setting Toggle Values (Min./Max) for Buttons or the Sustain Pedal

When standard MIDI CC numbers are assigned to buttons or a Sustain pedal, they toggle between two values. This means that one value is sent the first time it is pressed, and another value is sent the next time it is pressed.

By default, the buttons on Oxygen 88 are already configured to operate as toggle switches. When configuring a button or a sustain pedal to operate in toggle mode, the following three values need to be specified:

Key	Parameter	Value
Control Assign (example)	MIDI CC number	10 (Pan)
Data 2 (example)	Second press	0 (minimum)
Data 3 (example)	First press	127 (maximum)

The following example will configure a button to "hard pan" the sound to the left speaker when it is pressed the first time, and "hard pan" to the right speaker when it is pressed a second time:

1. Select a button as described earlier in this guide.
2. Press the Advanced button.
3. Press the Control Assign key.
4. Type 10 using the number keys. This assigns MIDI CC number 10 (Pan) to the button.
5. Press the Enter key.
6. Press the Advanced button.
7. Press the Data 2 key.
8. Type 0 using the number keys to assign the "second button press" (minimum) value.
9. Press the Enter key.
10. Press the Advanced button.
11. Press the Data 3 key.
12. Type 127 using the number keys to assign the "first button press" (maximum) value.
13. Press the Enter key.

TIP: *It can be useful to transmit two other specific values instead of sending minimum (zero) and maximum (127) values as in the above example. When assigning a button to control Pan (MIDI CC 10), you can, for example, configure Data 2 to send value 38, and Data 3 to send value 93, effectively causing pan to switch between the approximate "ten o'clock" and "two o'clock" positions when pressing the button repeatedly.*

NOTE: If you want the button to send the same value every time it is pressed, enter the same value for both the Data 2 and Data 3 parameters.

Setting Trigger Values for the Buttons or the Sustain Pedal

It is possible to set a Trigger Value for a button or the sustain pedal, causing it to send one value when pressed and held down, and another value when released.

The sustain pedal is already configured to send trigger values by default, ensuring it activates the sustain effect when pressed and deactivates it when the pedal is released. Buttons can also be configured to operate this way, which requires four values to be specified. At the example of the sustain pedal, these four values are:

Key	Parameter	Value
Control Assign	Trigger On/Off operation	146
Data 1 (example)	MIDI CC number	64 (Sustain)
Data 2 (example)	Button/Pedal Released	0 (minimum)
Data 3 (example)	Button/Pedal Pressed	127 (maximum)

NOTE: When working with proprietary parameters from the 128-255 range, the "Control Assign" setting is used to configure a button or the sustain pedal for this special mode of operation. This means that certain values that are usually specified through the "Control Assign" setting must instead be specified via the "Data 1" parameter (such as the standard MIDI CC parameter in the example below).

The following example will configure a button to "hard pan" the sound to the right speaker when it is held down, and "hard pan" to the left speaker when it is released. This involves configuring the button to operate as a trigger, while controlling the Pan parameter (MIDI CC 10):

1. Select a button as described earlier in this guide.
2. Press the Advanced button.
3. Press the Control Assign key.
4. Type 146 using the number keys. This configures the button to operate as a trigger (press/release). See Appendix B.
5. Press the Enter key.
6. Press the Advanced button.
7. Press the Data 1 key.
8. Type 10 using the number keys. This specifies which parameter the button will trigger and release. In this example, MIDI CC 10 (Pan). See "Standard MIDI Control Numbers (MIDI CCs)" on page 40.
9. Press the Enter key.
10. Press the Advanced button.
11. Press the Data 2 key.
12. Type 0 using the number keys. This sets the "release" value to zero. In other words, sound will be panned "hard left" when the button is released.
13. Press the Enter key.
14. Press the Advanced button.
15. Press the Data 3 key.
16. Type 127 using the number keys. This sets the "press" value to the maximum value, so that the sound is panned hard right when the button is pressed.
17. Press the Enter key.

TIP: *It can be useful to transmit two other specific values instead of sending minimum (zero) and maximum (127) values as in the above example. When assigning a button to control Pan (MIDI CC 10), you can, for example, configure Data 2 to send value 38, and Data 3 to send value 93, effectively causing pan to switch between the approximate "ten o'clock" and "two o'clock" positions when pressing and releasing the button.*

Assigning MMC Control to Buttons

The transport functions of some hardware recording devices and DAW applications can be remotely operated via MMC (MIDI Machine Control) commands. MMC is a specialized transport control protocol and requires a somewhat different configuration method.

The following values need to be specified:

Key	Parameter	Value
Control Assign	MMC Control	149
Channel Assign (example)	Device ID	127
Data 2 (example)	MMC Function	2 (Play)

The following example will configure a button to send the MMC command "Play":

1. Select an assignable button as described earlier in this guide.
2. Press the Advanced button.
3. Press the Control Assign key.
4. Type 149 using the number keys. This sets the button to send MMC (MIDI Machine Control).
5. Press the Enter key.
6. Press the Advanced button.
7. Press the Channel Assign key.
8. Enter 127 (Poly On) using the number keys. This ensures all receiving devices will respond to the MMC messages.
9. Press the Enter key.
10. Press the Advanced button.
11. Press the Data 2 key.
12. Enter a number from the chart below to select the MMC command for the button. This determines which transport function will be controlled by this button. For example, enter "2" for the Play command.
13. Press the Enter key.

Number	MMC Command
01	STOP
02	PLAY
03	DEFERRED PLAY
04	FAST FORWARD
05	REWIND
06	RECORD STROBE
07	RECORD EXIT
08	RECORD PAUSE
09	PAUSE
09	EJECT
10	CHASE
11	COMMAND ERROR RESET
12	MMC RESET

Assigning a Note to a Button

It is possible to configure a Button to send a Note On message when it is held down, and a Note Off message when it is released.

This requires four values to be specified (values given are examples):

Key	Parameter	Value
Control Assign	Trigger Note On/Off	147
Data 1 (example)	Note pitch	64 (E4 - see Appendix C)
Data 2 (example)	Note off velocity	0
Data 3 (example)	Note on velocity	100

The following example configures a button to play MIDI note E4 while it is being held down and stop the note when the button is released.

1. Select a button as described earlier in this guide.
2. Press the Advanced button.
3. Press the Control Assign key.
4. Enter 147 using the number keys. This sets the button to trigger MIDI Notes (see Appendix B).
5. Press the Enter key.
6. Press the Advanced button.
7. Press the Data 1 key (Pitch/Note parameter).
8. Enter "64" using the number keys. This sets the button to play MIDI note 64 (E4 - see Appendix C).
9. Press the Enter key.
10. Press the Advanced button.
11. Press the Data 2 key (Velocity Off).
12. Enter 0 using the number keys. This sets the button to transmit a Note Off message with a release velocity value of zero.
13. Press the Enter key.
14. Press the Advanced button.
15. Press the Data 3 key (Velocity On).
16. Enter 100 using the number keys. This sets the button to transmit a Note On message with a velocity of 100 when pressed.
17. Press the Enter key.

NOTE: It is also possible to configure a button to send a note on message when it is pressed and a note off message when it is pressed a second time. To do this, follow the above configuration steps, but enter 148 for the "Control Assign" parameter (see "Hexadecimal Conversion Chart" on page 45).

Setting Buttons to send combined Program Change, Bank LSB and Bank MSB messages

The assignable buttons and the sustain pedals can be configured to send a multi-part message, consisting of a Program Change, Bank LSB and Bank MSB message when pressed. This is useful for specific patch/sound selection from a specific bank of a connected synthesizer or virtual instrument.

This requires four values to be specified (values given are examples):

Key	Parameter	Value
Control Assign	Program/Bank Preset select	145
Data 1 (example)	Program Change Number	42 (GM Instrument Cello - see Appendix C)
Data 2 (example)	Bank LSB number	8
Data 3 (example)	Bank MSB number	32

The following example configures a button to send a total of 3 MIDI messages each time the button is pressed (Bank LSB, Bank MSB and Program Change), allowing you to recall any sound in any bank of a connected software or hardware synthesizer that supports this:

1. Select the Control as described earlier in this guide (Button or Pedal).
2. Press the Advanced button.
3. Press the Control Assign key.
4. Enter 145 using the number keys. This sets the button or the pedal to send a combined Bank Select/Program Change message.
5. Press the Enter key.
6. Press the Advanced button.
7. Press the Data 1 key.
8. Enter the Program Change number, for example 42.
9. Press the Enter key.
10. Press the Advanced button.
11. Press the Data 2 key.
12. Enter the Bank LSB number, for example 8.
13. Press the Enter key.
14. Press the Advanced button.
15. Press the Data 3 key.
16. Enter the Bank MSB number, for example 32.
17. Press the Enter key.

See "10: MIDI Messages Defined" on page 34 for an in-depth explanation of how Bank LSB / Bank MSB and Program Change messages work together to access all programs on a connected synthesizer or other MIDI device.

Programming a Button to Increment/Decrement a MIDI CC value

It is possible to configure a button to increase or decrease a value each time it is pressed. This is useful if you want to step through values one by one each time a button is pressed.

To configure a button to increment a MIDI CC between a minimum and maximum value, assign the button to number 154 (see "Assignable MIDI CCs" on page 41). The minimum and maximum values are set using the Data 2 and Data 3 parameters respectively.

This requires four values to be specified (values given are examples):

Key	Parameter	Value
Control Assign	Increment MIDI CC	154
Data 1 (example)	MIDI CC number	72 (Release Time)
Data 2 (example)	Low Limit	0
Data 3 (example)	High Limit	127

The following example configures a button to increment the release time of the currently active MIDI instrument sound patch every time the button is pressed (you may have to push the button several times while playing notes to hear a difference).

1. Select the Control as described earlier in this guide (Button or Pedal).
2. Press the Advanced button.
3. Press the Control Assign key.
4. Enter 154 using the number keys. This sets the button or the pedal to increment the MIDI CC value.
5. Press the Enter key.
6. Press the Advanced button.
7. Press the Data 1 key.
8. Enter "72" using the number keys. This specifies the MIDI CC for which values will be incremented.
9. Press the Enter key.
10. Press the Advanced button.
11. Press the Data 2 key.
12. Enter 0 using the number keys. This specifies the minimum value.
13. Press the Enter key.
14. Press the Advanced button.
15. Press the Data 3 key.
16. Enter 127 using the number keys. This specifies the maximum value.
17. Press the Enter key.

To configure a button to decrement (decrease) a MIDI CC value, assign the button to number 153 (see Appendix B). The minimum and maximum value (range) for each button is set using the Data 2 and Data 3 parameters respectively.

NOTE: Each button will only increment or decrement its own parameter value and this value is independent of any other button. In other words, assigning one button to increment a parameter and another button to decrement the same parameter will cause the first button to send values such as 1, 2, 3, etc., each time the button is pressed. Pressing the second button will send values such as 127, 126, 125 (as opposed to starting to decrement where the first button left of; for example 2, 1, 0).

Programming a Button to Increment/Decrement a Program Change

It is possible to configure a button to send an Increment (increase) or Decrement (decrease) Program Change message each time it is pressed.

To configure a button to increment a Program Change between a minimum and maximum value, assign the button to number 156 (see "Assignable MIDI CCs" on page 41). The minimum and maximum values are set using the Data 2 and Data 3 parameters respectively.

The requires three values to be specified (values given are examples):

Key	Parameter	Value
Control Assign	Program Increment	156
Data 2 (example)	Program Number (minimum)	0
Data 3 (example)	Program Number (maximum)	127

The following example configures a button to increment through the sound patches on a connected software or hardware synthesizer:

1. Select the Control as described earlier in this guide (Button or Pedal).
2. Press the Advanced button.
3. Press the Control Assign key.
4. Enter 156 using the number keys. This configures the button to increment the Program number.
5. Press the Enter key.
6. Press the Advanced button.
7. Press the Data 2 key.
8. Enter 0 using the number keys. This specifies the lowest Program number.
9. Press the Enter key.
10. Press the Advanced button.
11. Press the Data 3 key.
12. Enter 127 using the number keys. This specifies the highest Program number.
13. Press the Enter key.

To configure a button to decrement a Program Change between a maximum and minimum value, assign the button to number 155 (see "Assignable MIDI CCs" on page 41). The minimum and maximum values are set using the Data 2 and Data 3 parameters respectively.

NOTE: Each button will only increment or decrement its own parameter value and this value is independent of any other button. In other words, assigning one button to increment through sound patches and another button to decrement through sound patches will cause the first button to recall programs 1, 2, 3, etc., each time the button is pressed. Pressing the second button will recall programs such as 127, 126, 125 (as opposed to starting to decrement where the first button left of; for example 2, 1, 0).

Reversing the operation of Knobs or Sliders

Most MIDI parameters assignable to knobs or sliders can be configured so that the operation of the controls are reversed. Once a control is assigned to a MIDI parameter, by default the Data 2 parameter defines the minimum value (for example zero) while the Data 3 parameter defines the maximum value to be transmitted (for example 127). Reversing the operation of Knobs or Sliders is achieved by entering a higher value for the Data 2 parameter (usually minimum) and a lower value for the Data 3 parameter (usually maximum).

This is useful when a single Slider needs to be configured to work as a drawbar, or if a knob needs to be configured in reverse when controlling a particular parameter.

This requires two values to be specified (values given are examples):

Key	Parameter	Value
Data 2 (example)	Minimum Value	127
Data 3 (example)	Maximum Value	0

The following example configures a button or slider to reverse its operation:

1. Select a Knob or Slider as detailed earlier in this guide.
2. Press the Advanced button.
3. Press the Data 2 key.
4. Enter 127 using the number keys. This configures the control to reach its maximum value when it is all the way down.
5. Press the Enter key.
6. Press the Advanced button.
7. Press the Data 3 key.
8. Enter 0 using the number keys. This configures the control to reach its minimum value when it is all the way up.
9. Press the Enter Key.

The Knob or Slider now operates reversed. What was originally the maximum position, is now the minimum position, and vice versa.

Limiting the Range of a Knob or Slider

The MIDI protocol allows for a maximum range of transmitted values between 0 and 127. The effective range of values transmitted by Knobs and Sliders can be limited by entering values other than 0 and 127 (default) for the Data 2 and Data 3 parameters.

For example with the Data 2 parameter set to 38 and Data 3 set to 93, if a knob is set fully counter-clockwise, the lowest value it transmits is 38. If the knob is turned fully clockwise, the highest value it transmits is 93. This can be useful in a variety of scenarios, for example to keep a knob within the "sweet spot" of a synthesizer parameter (for example, filter cutoff), or to quickly recall a specific minimum or maximum volume setting for a track.

Key	Parameter	Value
Control Assign (example)	MIDI CC number	07 (Volume)
Data 2 (example)	Minimum Value	38
Data 3 (example)	Maximum Value	93

The following example configures a knob or slider to operate within a limited range (38 to 93):

1. Select a a Knob or Slider as described earlier in this guide.
2. Press the Advanced button.
3. Press the Control Assign key.
4. Type 7 using the number keys. This assigns MIDI CC number 7 (Volume) to the knob or slider. See Appendix A.
5. Press the Enter key.
6. Press the Advanced button.
7. Press the Data 2 key.
8. Type 38 using the number keys.
9. Press the Enter key.
10. Press the Advanced button.
11. Press the Data 3 key.
12. Type 93 using the number keys.
13. Press the Enter key.

NOTE: The operation of knobs and sliders can be reversed, even if the range of operation is limited. This is achieved by entering a higher value for the Data 2 parameter and a lower value for the Data 3 parameter.

Assigning RPN/NRPN messages to a Knob, Slider, Button, or Pedal

Oxygen 88 allows transmission of all three necessary MIDI CC messages for RPNs and NRPN's by simply moving a knob or slider or by pressing a button or sustain pedal.

The "Control Assign" setting allows assignment for control of the RPN Coarse (132) and RPN Fine (133), as well as NRPN Coarse (134) and NRPN Fine (135) parameters (see "10: MIDI Messages Defined" on page 34 for more information).

The Data 1 setting lets you specify which MIDI CC number is sent to alter values (usually: Coarse = CC 6; Fine = CC 38). The Data 2 setting defines what value is sent for LSB (RPN: CC 100, NRPN: CC 98) while the Data 3 setting defines which value is sent for MSB (RPN: CC 101, NRPN: CC 99). Together, the LSB and MSB values specify the RPN/NRPN parameter to be edited.

Assigning a knob to control an RPN/NRPN on a connected hardware or software device requires four values to be specified.

Key	Parameter	Value
Control Assign	NRPN Coarse	134
Data 1 (example)	CC for Value Change	6
Data 2 (example)	CC 98 / LSB	51
Data 3 (example)	CC 99 / MSB	3

The following example assigns a manufacturer specific NRPN coarse (134) message to a control on Oxygen 88:

1. Select a Knob or Slider as described earlier in this guide.
2. Press the Advanced button.
3. Press the Control Assign key.
4. Enter 134 (NRPN Coarse) using the number keys (see Appendices B and F).
5. Press the Enter key.
6. Press the Advanced button.
7. Press the Data 1 key.
8. Enter 6 using the number keys (or the MIDI CC number for value changes as required by your device).
9. Press the Advanced button.
10. Press the Data 2 key.
11. Enter the value to be transmitted via MIDI CC 98 (LSB) using the number keys.
12. Press the Enter key.
13. Press the Advanced button.
14. Press the Data 3 key.
15. Enter the value to be transmitted via MIDI CC 99 (MSB) using the number keys.
16. Press the Enter key.

See "10: MIDI Messages Defined" on page 34 for an in-depth explanation of RPN/NRPN MIDI messages and their usage.

SysEx Messages and Device ID

When transmitting SysEx messages, the individual control channel number does not define a transmit channel, but a Device ID. When the CHAN ASGN key is pressed, the "c" is not displayed on the LED screen.

Device IDs range between 0-127. In most cases, the Device ID should be set to 127 so that all devices will receive the SysEx message.

The Device ID for a SysEx message assigned to a controller cannot be changed using the Device ID key. This key is used for varying the global Device ID of Oxygen 88.

Non-Volatile Memory

All Oxygen keyboards feature non-volatile memory, which allows for automatic saving of preset patches when the device is powering down. The current controller and channel assignments are stored even if the Save function has not been used. The Program, Bank LSB and Bank MSB data, Global Channel setting, and last used memory preset patch are also stored.

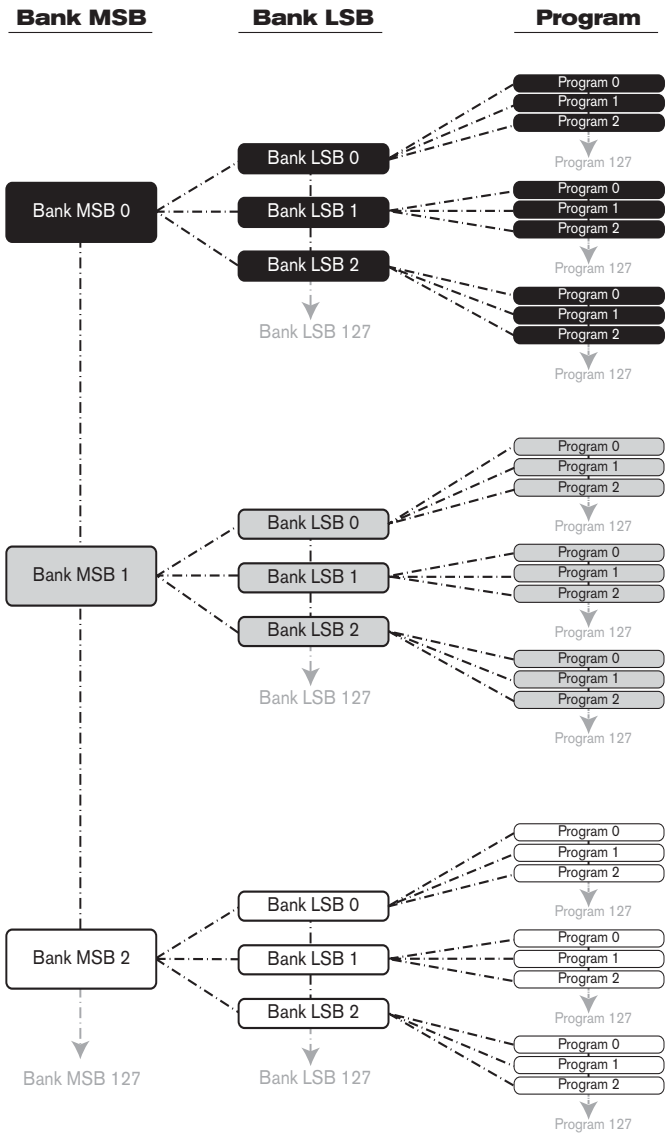
Restoring the Factory Settings

Factory default settings can be restored by holding down the **-** and **+** buttons during power-up. At this point all previously saved data will be erased.

10: MIDI Messages Defined

Program and Bank Changes

When the MIDI standard was first established, it enabled the user to access only 128 different sounds using program change messages (0-127). As MIDI devices became more sophisticated and contained more sounds, bank change messages were included in an updated MIDI specification allowing access to more than 128 sounds. The language MIDI uses to communicate between musical instruments only allows for program change commands 0-127, for a total of 128 possible programs (127 programs + program ì0î = 128 programs total). Due to inherent limitations of the MIDI communication protocol, the number of directly accessible programs (using program change messages) cannot easily be expanded beyond 128. Thus, a system of banks, with 128 sounds in each, has been created that enables manufacturers to overcome the 128-sound MIDI limit.



128 banks with 128 sounds in each bank is the basic principle used to expand the number of accessible sounds. However, to avoid reaching the new limit of the resulting 16,384 possible sounds (128 banks x 128 programs) accessible using a bank change combined with a program change, another layer of banks was added. The result is a system of 128 banks that can contain 128 sub-banks in each of them, which, in turn, can contain 128 sounds (programs).

Bank change messages are useful when calling up sounds from a large library that may exist in a particular sound module or software synthesizer. For example, devices that are built according to the GS specification from Roland or the XG specification (*Appendix E*) from Yamaha require you to specify a bank change in order to access the extra voices that these devices provide. MIDI CC 0 is the bank select MSB (Most Significant Byte) message. This MIDI message is 7-bit in size and can be used to select any of 128 banks.

This message can be used in conjunction with MIDI CC 32 which is bank select LSB (Least Significant Byte): a separate 7-bit message allowing additional selection of any of another 128 sub-banks. The combination of Bank MSB and LSB messages gives a 14-bit message that can select any of a possible 16,384 banks. Each bank can in turn contain 128 possible sounds selected via a separate program change MIDI message. This enables a user to theoretically recall over two million programs directly, using only MIDI commands. However, most devices only use a few different banks, and you can often ignore the LSB message.

You will find many MIDI devices respond to program change commands and many are organized according to the GM listing. In General MIDI devices, different sounds are organized in the same way from device to device. Piano sounds are in their particular place, string sounds are in their place, drum sounds are in their place, and so on. All GM devices (both hardware and software sound modules) are clearly labeled as such, so you know that their sounds are organized in the General MIDI structure. When a GM device receives a MIDI program change, it calls up a type of sound that you expect from the GM sound set. All non-GM MIDI sound modules call up unique sounds from their memory upon receiving MIDI program changes. Since the sounds in a non-GM device are not arranged in a particular order, you need to take a look at the device itself to see which sound you want and at which location in the memory it resides. Many VST instruments such as Native Instruments FM7 or the synth modules in Propellerheads Reason are non-GM devices.

You can send Program Change, Bank LSB and Bank MSB messages directly from Oxygen 88.

Please consult the documentation for your sound module, DAW or software instrument for further information.

RPN/NRPN

Overview

RPN stands for "Registered Parameter Number" and NRPN stands for "Non-Registered Parameter Number". Non-registered parameter numbers (NRPN) are device-specific messages that enable you to control specific synthesizer or sound module parameters via MIDI, that are not accessible via standard MIDI CCs. The MIDI specification defines open parameter numbers to allow manufacturers to specify their own NRPN controllers.

The more common of these are registered by the MIDI Manufacturer Association and are now part of the MIDI specification, hence the term RPN (See Appendix A). Each NRPN/RPN has an associated 2-byte number.The two bytes allow for 128 values each. An RPN or NRPN message is made up of two parts: The MSB and the LSB message. Both of these messages together constitute an RPN or NRPN command. This allows for 16,384 values in total. MIDI controllers 98 and 99 represent the NRPN LSB and MSB respectively, while 100 and 101 represent the RPN LSB and MSB messages.

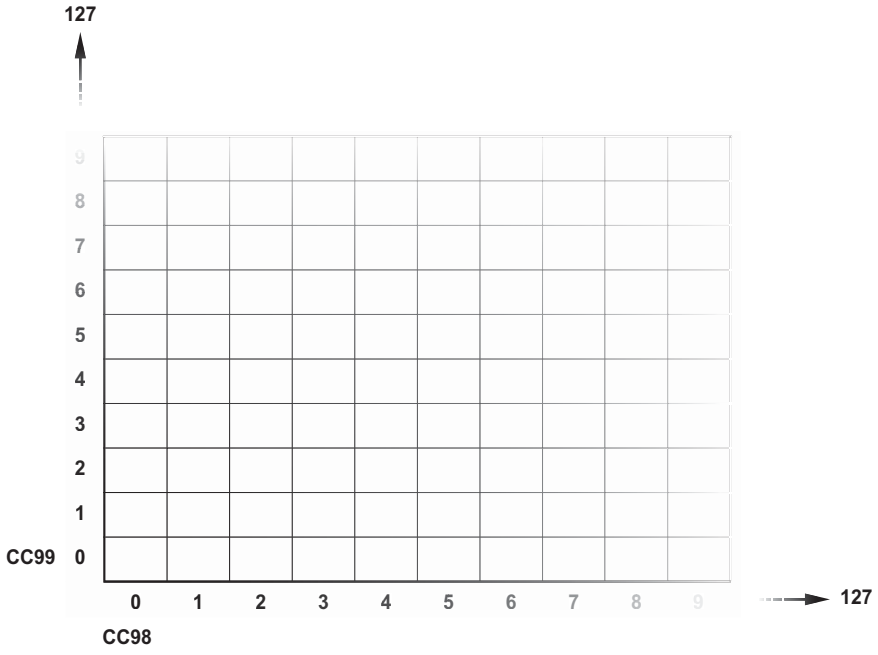
To transmit an NRPN/RPN message, these LSB and MSB controller messages are sent along with their user-specified values. A further controller message and value needs to be sent to specify the (coarse or fine) value adjustment. This is specified by controller number 6 (data entry) for coarse adjustments or number 38 for fine adjustments.

A list of NRPNs is usually given in the user manual of any device that receives NRPN messages. It is always necessary that the NRPN MSB and LSB be sent together. Both will be specified in the device manual, but typically only in Hexadecimal format. If this is the case, you may refer to Appendix C for help translating the value to decimal.

Combining Two MIDI CC Numbers for 16,384 possible RPNs/NRPNs

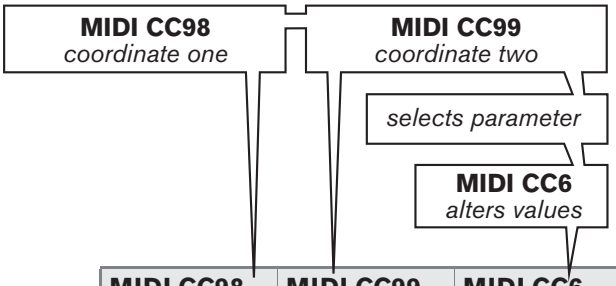
A single MIDI CC provides 128 values or possible selections - not enough to provide a sufficient number of unique RPN/NRPNs for all manufacturers of MIDI equipment. In order to make a large enough number of RPN and NRPN messages available for use by the many manufacturers of MIDI devices, two specific MIDI CC numbers (NRPN=98+99; RPN=100+101) are combined for RPN/NRPN selection. When combining two MIDI CC numbers this way, the 128 possibilities of the first MIDI CC multiply with the 128 possibilities of the second MIDI CC, resulting in 16384 unique possibilities - plenty of options for all manufacturers of MIDI equipment.

You can think of this as a matrix of 128x128 options, each representing a unique identifier a manufacturer of MIDI equipment may choose to use for selection of a specific parameter in their device. See the illustration below.



Check your 3rd Party Documentation for a RPN/NRPN List

Begin by checking the documentation for your MIDI device for a list of supported RPN or NRPN numbers. As mentioned, the supported parameters are unique to the device in use but the list should look similar to this:



	MIDI CC98	MIDI CC99	MIDI CC6
Filter Cutoff	41	3	0-127
Resonance	41	4	0-127
Attack	41	5	0-127
Decay	41	6	0-127
Sustain	2	1	0-127
Release	41	8	0-127
LPF	41	9	0-127
HPF	41	10	0-127

Find the parameter you wish to control from the list in the 3rd party manufacturers documentation and make note of the values listed for CC 98 (LSB) and for CC 99 (MSB) when working with NRPNs, or CC 100 (LSB) and CC 101 (MSB) when working with Runs. You will need these values once you are ready to assign an Oxygen control to an RPN or NRPN.

A Third MIDI CC Number (CC 6 or CC 38) for Altering the RPN or NRPN Value

A third MIDI CC is needed to change the value of the selected RPN or NRPN. For most devices, MIDI CC 6 is used when working with NRPN or RPN "coarse" messages, while MIDI CC 38 is used when working with "fine" messages. In other words, the combined MIDI CC numbers (NRPN=98+99; RPN=100+101) only specify the parameter to be edited. They have to be followed with yet another specific MIDI CC number/value (CC 6 or CC 38) in order to alter the associated parameter value.

This means that 3 MIDI messages have to be sent in sequence, in order to select, and then change a RPN or NRPN value. For example:

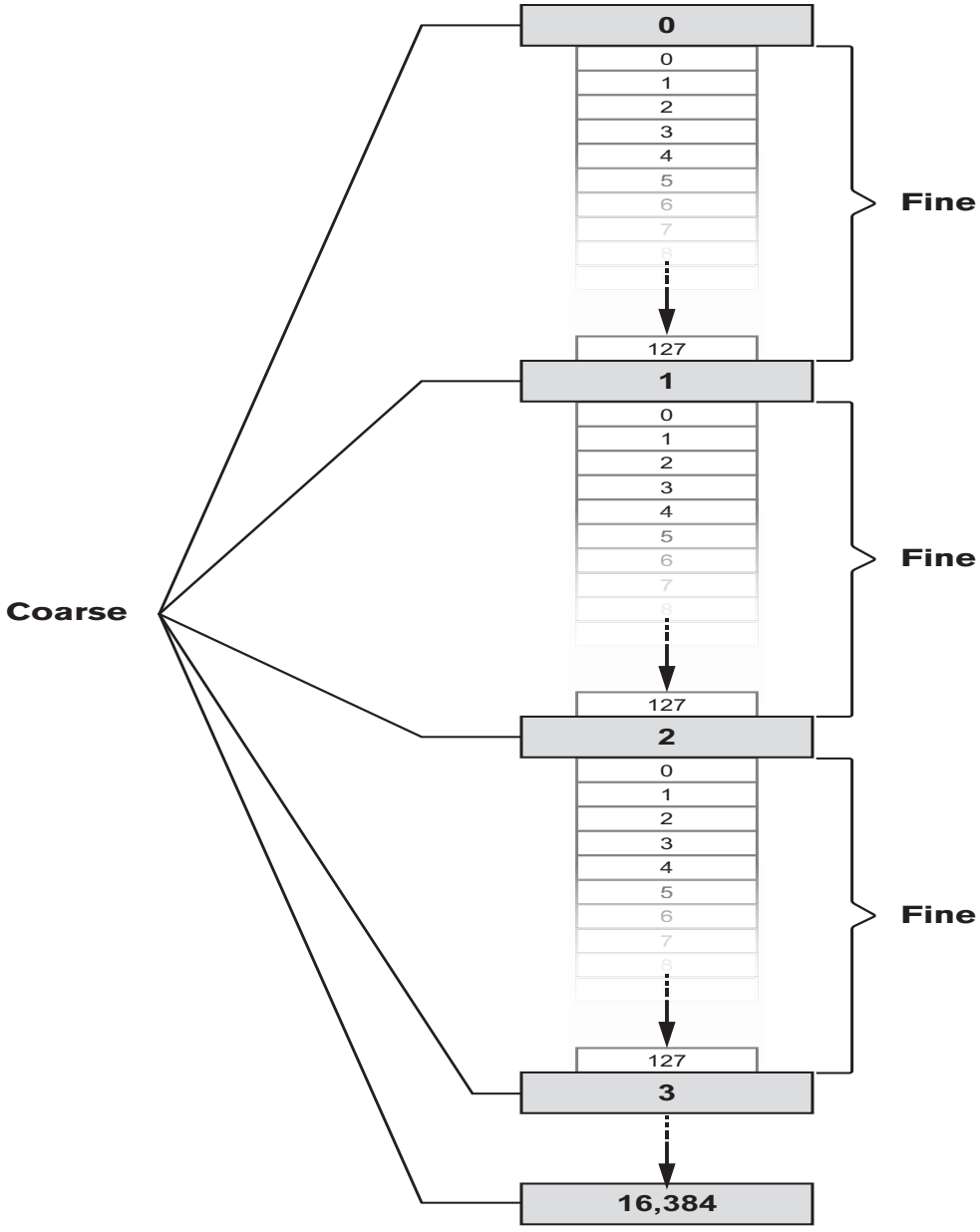
MIDI CC 98: value 51
MIDI CC 99: value 3
} Selects a specific NRPN

MIDI CC 6: value 10 → Sets the parameter to a value of 10.

16,384 step resolution through combined Coarse and Fine messages

Most assignable MIDI controls, including those on Oxygen 88, operate with a resolution of 128 steps. Standard MIDI CC messages that can be used universally between different MIDI devices are also limited to a resolution of 128 steps. However, the RPN/NRPN concept allows for a resolution of 16,384 steps by combining two 7-bit MIDI messages into a 14-bit message (coarse + fine).

Hardware controller knobs or sliders that take advantage of the full 14-bit RPN/NRPN resolution are very uncommon. To illustrate the concept and make the purpose of RPN/NRPN Coarse and Fine messages easier to understand, we included a graphic describing how such a 14-bit RPN/NRPN control would operate (not supported by Oxygen Series keyboards):



The RPN/NRPN coarse message divides the range of 16384 steps into 128 segments and activates them by sending each segment's first value, while the RPN/NRPN fine message provides the 128 steps of resolution contained in each of these segments.

The controls on Oxygen 88 allow assignment of either a RPN/NRPN coarse message, or a RPN/NRPN fine message, but not both simultaneously. In practical use, this means:

- Assigning an RPN/NRPN coarse message to an Oxygen control allows to access values throughout the entire range of 16384 steps while skipping 128 steps with every value transmitted (0; 129; 258; 387; 516; 645;...;16384).

- Assigning an RPN/NRPN fine message to an Oxygen control allows access to the first 128 values of the entire range (0-127 of 16384).

In most cases, it is preferable to assign the RNP/NRPN coarse message, unless two Oxygen controls are dedicated to be operated together for simultaneous control of the RPN/NRPN coarse and fine parameters.

Many data sheets for synthesizers make use of NRPN messages and will give the LSB and MSB values that should be entered for Data 2 and Data 3. Some manuals may only give the hex values, but Oxygen requires the decimal value to be entered. See Appendix E for a hex to decimal conversion chart.

SysEx

System Exclusive (SysEx) messages were defined in the MIDI specification to allow control of individual devices via MIDI. The format of SysEx messages allows virtually any function to be performed via MIDI if the receiving device can read and translate the message. This allows devices to send audio sample memory data, memory dumps, controller settings, and much more. It also allows the controllers of one device to be controlled by another.

It is not possible to program your own specific SysEx message into the Oxygen controller. However, several useful SysEx messages are pre-programmed into the keyboard. They can be accessed by assigning the appropriate MIDI controller number to a control.

A SysEx message is not transmitted on any specific channel. All SysEx messages contain a Device ID, which is used to single out devices to respond to the SysEx message. All other devices are ignored. If you are using a SysEx message with your Oxygen keyboard, the Global Channel is ignored. When you press the Channel Assign key, you will enter a Device ID instead. This is indicated by the fact that the LED screen displays a 3-digit number, not a 2-digit number proceeded by a "c."

Device IDs run from 00 to 127. 127 is the default device number setting for Oxygen 88. This setting transmits the SysEx message to all devices.

It is not possible to program the controls on Oxygen 88 with your own SysEx messages, there are software applications that can receive a MIDI input signal and translate it into a different, user-specified message. You can program your custom SysEx messages into the translator software, and then translate the incoming data from the keyboard to your custom SysEx message.

11: Troubleshooting

- **Oxygen 88 suddenly stopped working.**

  Turn off the unit for 10 seconds, then restart your computer and power up the keyboard. If the problem persists, check the website for the latest drivers and re-install them.

- **The keyboard is connected to my computer with the USB cable, but I cannot locate Oxygen 88 in MIDI devices dialog box for my DAW or other computer-based application.**

  Oxygen 88 may not be receiving enough USB bus power to function correctly. Try plugging it into a different USB port or a powered USB hub connected to your computer.

  In Windows XP, the Oxygen MIDI ports will appear as "USB Audio Device" if the optional drivers *have not* been installed. Select "USB Audio Device" as your MIDI input and output device.

  Please refer to Chapter 5 of this guide for instructions on how to install the Oxygen 88 Drivers.

- **The Oxygen keyboard does not trigger sounds in my music software.**

  Most programs have a MIDI activity indicator that can be used to confirm whether MIDI data from the keyboard is reaching the software. If the software is not receiving any MIDI data, be sure the controller is properly installed and is selected as a MIDI input device within your software. Refer to the documentation for your DAW software, to learn how to configure and select MIDI input devices.

  If the MIDI activity indicator shows that MIDI data is reaching your software, then you may not be hearing sounds because the MIDI data is not being routed correctly through the software itself. Refer to the documentation for your DAW software, to learn how to route MIDI data properly.

- **When playing a virtual instrument loaded in my music software, there is a noticeable delay before I hear any sound.**

  This delay is known as latency, and it may be possible to reduce it through the Control Panel of your audio interface. Please refer to the User Guide your audio interface to see if this is possible.

- **I have connected a sustain pedal to my Oxygen keyboard, but its operation is reversed (i.e., the notes sustain when the pedal is not pressed, but the notes stop sustaining once the pedal is pressed).**

  The polarity of the sustain pedal is determined by the keyboard upon startup. When the keyboard is powering up, the sustain pedal is assumed to be in the "up" (off) position. It is important that the sustain pedal is not pressed down during startup, otherwise its operation will be reversed.

- **My virtual instrument software (or hardware MIDI module) always recalls the sound next to the program change number that I have sent to it from Oxygen 88. For example, if I send a program change number 40 (Violin), my MIDI module or software loads sound number 41 (Viola).**

  This behavior is normal. Some MIDI devices count their sound presets from 1-128 instead of 0-127. As a result, there may be an offset of +/-1 between the program change number sent from the keyboard and the recalled sound preset on your module.

- **I have changed many parameters and would like to go back to the default settings of the keyboard.**

  Oxygen 88 can be reset to its "factory" settings by simultaneously pressing the "**+**" and "**-**" buttons as the unit is switched on.

NOTE: All assignments and modified patches will be lost once you perform this action—use this function with caution!

12: MIDI Data

Standard MIDI Control Numbers (MIDI CCs)

00 Bank Select	46 Controller 46	92 Tremolo Depth
01 Modulation	47 Controller 47	93 Chorus Depth
02 Breath Control	48 Gen Purpose 1 LSB	94 Celeste (De-tune)
03 Controller 3	49 Gen Purpose 2 LSB	95 Phaser Depth
04 Foot Control	50 Gen Purpose 3 LSB	96 Data Increment
05 Porta Time	51 Gen Purpose 4 LSB	97 Data Decrement
06 Data Entry	52 Controller 52	98 Non-Reg Param LSB
07 Channel Volume	53 Controller 53	99 Non-Reg Param MSB
08 Balance	54 Controller 54	100 Reg Param LSB
09 Controller 9	55 Controller 55	101 Reg Param MSB
10 Pan	56 Controller 56	102 Controller 102
11 Expression	57 Controller 57	103 Controller 103
12 Effects Controller 1	58 Controller 58	104 Controller 104
13 Effects Controller 2	59 Controller 59	105 Controller 105
14 Controller 14	60 Controller 60	106 Controller 106
15 Controller 15	61 Controller 61	107 Controller 107
16 Gen Purpose 1	62 Controller 62	108 Controller 108
17 Gen Purpose 2	63 Controller 63	109 Controller 109
18 Gen Purpose 3	64 Sustain Pedal	110 Controller 110
19 Gen Purpose 4	65 Portamento	111 Controller 111
20 Controller 20	66 Sostenuto	112 Controller 112
21 Controller 21	67 Soft Pedal	113 Controller 113
22 Controller 22	68 Legato Pedal	114 Controller 114
23 Controller 23	69 Hold 2	115 Controller 115
24 Controller 24	70 Sound Variation	116 Controller 116
25 Controller 25	71 Resonance	117 Controller 117
26 Controller 26	72 Release Time	118 Controller 118
27 Controller 27	73 Attack Time	119 Controller 119
28 Controller 28	74 Cut-off Frequency	Channel Mode Messages
29 Controller 29	75 Controller 75	120 All Sound off
30 Controller 30	76 Controller 76	121 Reset all Controllers
31 Controller 31	77 Controller 77	122 Local Control
32 Bank Select LSB	78 Controller 78	123 All Notes Off
33 Modulation LSB	79 Controller 79	124 Omni Off
34 Breath Control LSB	80 Gen Purpose 5	125 Omni On
35 Controller 35	81 Gen Purpose 6	126 Mono On (Poly Off)
36 Foot Control LSB	82 Gen Purpose 7	127 Poly On (Mono Off)
37 Porta Time LSB	83 Gen Purpose 8	Extra RPN Messages
38 Data Entry LSB	84 Portamento Control	128 Pitch Bend Sensitivity
39 Channel Volume LSB	85 Controller 85	129 Fine Tune
40 Balance LSB	86 Controller 86	130 Coarse Tune
41 Controller 41	87 Controller 87	131 Channel Pressure
42 Pan LSB	88 Controller 88	
43 Expression LSB	89 Controller 89	
44 Controller 44	90 Controller 90	
45 Controller 45	91 Reverb Depth	

Assignable MIDI CCs

Sliders and Knobs:

MIDI CC	Description	Data 2	Data 3
0-119	Standard MIDI CCs (*Appendix A*)	Min	Max
120-127	Channel Mode Messages	Min	Max
128	Pitch Bend Sensitivity	Min	Max
129	Channel Fine Tune	Min	Max
130	Channel Coarse Tune	Min	Max
131	Channel Pressure	Min	Max
132	RPN coarse	RPN LSB	RPN LSB
133	RPN Fine	RPN LSB	RPN LSB
134	NRPN Coarse	NRPN LSB	NRPN LSB
135	NRPN Fine	NRPN LSB	NRPN LSB
136	Master Volume GM*	Min	Max
137	Master Pan GM*	Min	Max
138	Master Coarse Tune GM*	Min	Max
139	Master Fine Tune GM*	Min	Max
140	Chorus Mod rate GM2*	Min	Max
141	Chorus Mod Depth GM2*	Min	Max
142	Feedback GM2*	Min	Max
143	Send to Reverb GM2*	Min	Max
144	Pitch Bend	-	-
255	Controller Off**	-	-

*General MIDI SysEx messages
**Press O and then press the Enter key. Next press the Data - button

Buttons and Pedals:

MIDI CC	Description	Data 1	Data 2	Data 3
0-119	Standard MIDI CCs (*Appendix A*)	-	Toggle Value 2	Toggle Value 1
120-127	Channel Mode Messages	-	Toggle Value 2	Toggle Value 1
128	Pitch Bend Range	-	Sensitivity Value	-
129	Channel Fine Tune	-	Tuning Amount	-
130	Channel Coarse Tune	-	Tuning Amount	-
131	Channel Pressure	-	Pressure Amount	-
132	RPN coarse	Value	RPN LSB	RPN MSB
133	RPN Fine	Value	RPN LSB	RPN MSB
134	NRPN Coarse	Value	NRPN LSB	NRPN MSB
135	NRPN Fine	Value	NRPN LSB	NRPN MSB
136	Master Volume GM*	-	Volume LSB	Volume MSB
137	Master Pan GM*	-	Pan LSB	Pan MSB
138	Master Coarse Tune GM*	-	Tuning LSB	Tuning MSB
139	Master Fine Tune GM*	-	Tuning LSB	Tuning MSB
140	Chorus Mod rate GM2*	-	Mod Rate	-
141	Chorus Mod Depth GM2*	-	Mod Depth	-
142	Feedback GM2*	-	Feedback Level	-
143	Send to Reverb GM2*	-	Reverb Send Level	-
144	Pitch Bend	-	Pitch Shift LSB	Pitch Shift MSB
145	Program/Bank Preset	Program	Bank LSB	Bank MSB
146	MIDI CC (On/Off)	MIDI CC	Button Press Value	Button Release
147	Note (On/Off)	Note	Velocity Off	Velocity On
148	Note (On/Off Toggle)	Note	Velocity Off	Velocity On
149	MMC Command**	-	Command Select	-
150	Reverb Type GM2*	-	Type	-
151	Reverb Time GM2*	-	Time	-
152	Chorus Type GM2*	-	Type	-
153	MIDI CC decrement	MIDI CC	Min	Max
154	MIDI CC increment	MIDI CC	Min	Max
155	Program decrement	-	Min	Max
156	Program increment	-	Min	Max
255	Controller Off**	-	-	-

*General MIDI SysEx messages
**Press 0 and then press the Enter key. Next press the Data - button

Useful MIDI Data

Piano	Bass	Reed	Synth Effects
0 Acoustic Grand Piano	32 Acoustic Bass	64 Soprano Sax	96 SFX Rain
1 Bright Acoustic Piano	33 Fingered Bass	65 Alto Sax	97 SFX Soundtrack
2 Electric grand Piano	34 Electric Picked Bass	66 Tenor Sax	98 SFX Crystal
3 Honky Tonk Piano	35 Fretless Bass	67 Baritone Sax	99 SFX Atmosphere
4 Electric Piano 1	36 Slap Bass 1	68 Oboe	100 SFX Brightness
5 Electric Piano 2	37 Slap Bass 2	69 English Horn	101 SFX Goblins
6 Harpsichord	38 Syn Bass 1	70 Bassoon	102 SFX Echoes
7 Clavinet	39 Syn Bass 2	71 Clarinet	103 SFX Sci-Fi
Chromatic Percussion	**Strings/Orchestra**	**Pipe**	**Ethnic**
8 Celesta	**40 Violin**	**72 Piccolo**	**104 Sitar**
9 Glockenspiel	**41 Viola**	**73 Flute**	**105 Banjo**
10 Music Box	**42 Cello**	**74 Recorder**	**106 Shamisen**
11 Vibraphone	**43 Contrabass**	**75 Pan Flute**	**107 Koto**
12 Marimba	**44 Tremolo Strings**	**76 Bottle Blow**	**108 Kalimba**
13 Xylophone	**45 Pizzicato Strings**	**77 Shakuhachi**	**109 Bag Pipe**
14 Tubular bells	**46 Orchestral Harp**	**78 Whistle**	**110 Fiddle**
15 Dulcimer	**47 Timpani**	**79 Ocarina**	**111 Shanai**
Organ	**Ensemble**	**Synth Lead**	**Percussive**
16 Drawbar Organ	48 String Ensemble 1	80 Syn Square Wave	112 Tinkle Bell
17 Percussive Organ	49 String Ensemble 2	81 Syn Sawtooth Wave	113 Agogo
18 Rock Organ	50 Syn Strings 1	82 Syn Calliope	114 Steel Drums
19 Church Organ	51 Syn Strings 2	83 Syn Chiff	115 Woodblock
20 Reed Organ	52 Choir Aahs	84 Syn Charang	116 Taiko Drum
21 Accordion	53 Voice Oohs	85 Syn Voice	117 Melodic Tom
22 Harmonica	54 Syn Choir	86 Syn Sawtooth Wave	118 Syn Drum
23 Tango Accordion	55 Orchestral Hit	87 Syn Brass & Lead	119 Reverse Cymbal
Guitar	**Brass**	**Synth Pad**	**Sound Effects**
24 Nylon Acoustic	56 Trumpet	88 New Age Syn Pad	120 Guitar Fret Noise
25 Steel Acoustic	57 Trombone	89 Warm Syn Pad	121 Breath Noise
26 Jazz Electric	58 Tuba	90 Polysynth Syn Pad	122 Seashore
27 Clean Electric	59 Muted Trumpet	91 Choir Syn Pad	123 Bird Tweet
28 Muted Electric	60 French Horn	92 Bowed Syn Pad	124 Telephone Ring
29 Overdrive	61 Brass Section	93 Metal Syn Pad	125 Helicopter
30 Distorted	61 Syn Brass 1	94 Halo Syn Pad	126 Applause
31 Harmonics	62 Syn Brass 2	95 Sweep Syn Pad	127 Gun Shot

NOTE: Some MIDI devices count preset sounds from 1-128 instead of 0-127. As a result, there may be an offset of +/-1 between the program change number sent from the keyboard and the recalled sound preset on your module.

MIDI Note Numbers

Octave (n)	Note Numbers											
	Cn	C#	Dn	D#	En	Fn	F#	Gn	G#	A	A#	Bn
-1	0	1	2	3	4	5	6	7	8	9	10	11
0	12	13	14	15	16	17	18	19	20	21	22	23
1	24	25	26	27	28	29	30	31	32	33	34	35
2	36	37	38	39	40	41	42	43	44	45	46	47
3	48	49	50	51	52	53	54	55	56	57	58	59
4	60	61	62	63	64	65	66	67	68	69	70	71
5	72	73	74	75	76	77	78	79	80	81	82	83
6	84	85	86	87	88	89	90	91	92	93	94	95
7	96	97	98	99	100	101	10	10	10	10	10	10
8	108	109	11	11	112	113	11	11	11	11	11	11
9	120	121	12	12	124	125	12	12				

DirectLink Transport Control Assignments

Pro Tools 8 users can access additional functions via the Loop button:

1. Holding the Loop button while pressing one of the other Transport Control buttons gives you access to additional Pro Tools transport functions.

Button	Pro Tools Control	Modified Button	Pro Tools Control
LOOP*	-	-	-
REW	REW	LOOP + REW	Go to Start
FWD	FWD	LOOP + FWD	Go to End
STOP	STOP	LOOP + STOP	Undo
PLAY	PLAY	LOOP + PLAY	Loop Play Mode
REC	REC	LOOP + REC	Loop Record Mode

2. Quickly pressing the Loop button toggles the control knobs on your Oxygen keyboard between Instrument Mode and Mixer mode.

Mixer mode (default): The 8 knobs control pan or balance settings for the corresponding tracks.

Instrument Mode: The 8 control knobs automatically map to 8 parameters on the active Instrument or Effect Plug-In. The Instrument mode parameter mapping can be customized by clicking the "learn" button in the upper right corner of the Plug-In. Please check the Pro Tools 8 documentation for more details.

Hexadecimal Conversion Chart

Hexadecimal Value	Decimal Value	Hexadecimal Value	Decimal Value	Hexadecimal Value	Decimal Value
0	0	2B	43	56	86
1	1	2C	44	57	87
2	2	2D	45	58	88
3	3	2E	46	59	89
4	4	2F	47	5A	90
5	5	30	48	5B	91
6	6	31	49	5C	92
7	7	32	50	5D	93
8	8	33	51	5E	94
9	9	34	52	5F	95
0A	10	35	53	60	96
0B	11	36	54	61	97
0C	12	37	55	62	98
0D	13	38	56	63	99
0E	14	39	57	64	100
0F	15	3A	58	65	101
10	16	3B	59	66	102
11	17	3C	60	67	103
12	18	3D	61	68	104
13	19	3E	62	69	105
14	20	3F	63	6A	106
15	21	40	64	6B	107
16	22	41	65	6C	108
17	23	42	66	6D	109
18	24	43	67	6E	110
19	25	44	68	6F	111
1A	26	45	69	70	112
1B	27	46	70	71	113
1C	28	47	71	72	114
1D	29	48	72	73	115
1E	30	49	73	74	116
1F	31	4A	74	75	117
20	32	4B	75	76	118
21	33	4C	76	77	119
22	34	4D	77	78	120
23	35	4E	78	79	121
24	36	4F	79	7A	122
25	37	50	80	7B	123
26	38	51	81	7C	124
27	39	52	82	7D	125
28	40	53	83	7E	126
29	41	54	84	7F	127
2A	42	55	85		

Roland GS & Yamaha XG NRPN Messages

NRPN MSB CC99	NRPN LSB CC98	Data MSB CC06	Data LSB CC38	
01	08	00-7F	n/a	(-64 - 0 - +63) Vibrato Rate (relative change)
01	09	00-7F	n/a	(-64 - 0 - +63) Vibrato Depth (relative change)
01	0A	00-7F	n/a	(-64 - 0 - +63) Vibrato Delay (relative change)
01	20	00-7F	n/a	(-64 - 0 - +63) Filter Cutoff Freq. (relative change)
01	21	00-7F	n/a	(-64 - 0 - +63) Filter Resonance (relative change)
01	63	00-7F	n/a	(-64 - 0 - +63) EG (TVF&TVA) Attack Time (relative change)
01	64	00-7F	n/a	(-64 - 0 - +63) EG (TVF&TVA) Decay Time (relative change)
01	66	00-7F	n/a	(-64 - 0 - +63) EG (TVF&TVA) Release Time (relative change)
14	00-7F	00-7F	n/a	(-64 - 0 - +63) Drum Filter Cutoff Freq. (relative change)*
15	00-7F	00-7F	n/a	(-64 - 0 - +63) Drum Filter Resonance (relative change)*
16	00-7F	00-7F	n/a	(-64 - 0 - +63) Drum EG Attack Rate (relative change)*
17	00-7F	00-7F	n/a	(-64 - 0 - +63) Drum EG Decay Rate (relative change)*
18	00-7F	00-7F	n/a	(-64 - 0 - +63) Drum Instrument Pitch Coarse (relative change)
19	00-7F	00-7F	n/a	(-64 - 0 - +63) Drum Instrument Pitch Fine (relative change)*
1A	00-7F	00-7F	n/a	(0 to Max) Drum Instrument Level (absolute change)
1C	00-7F	00-7F	n/a	(Random, L>C>R) Drum Instrument Pan pot (absolute change)
1D	00-7F	00-7F	n/a	(0 to Max) Drum Instrument Reverb Send Level (absolute change)
1E	00-7F	00-7F	n/a	(0 to Max) Drum Instrument Chorus Send Level (absolute change)
1F	00-7F	00-7F	n/a	(0 to Max) Drum Instrument Variation Send Level (absolute change)**

**added by Yamaha XG;*
***changed from Delay to Variation by Yamaha XG*

General MIDI Reverb and Chorus Types

Reverb Types

0: Small Room
1: Medium Room
2: Large Room
3: Medium Hall
4: Large Hall
5: Plate

Chorus Types

0: Chorus 1
1: Chorus 2
2: Chorus 3
3: Chorus 4
4: FB Chorus
5: Flanger

13: Technical Info

Guide Part Number 9329-65030-00 REV A 07/10

Documentation Feedback

We are always looking for ways to improve our documentation. If you have comments, corrections, or suggestions regarding our documentation, email us at ***techpubs@avid.com***.

Communications and Safety Regulation Information

Compliance Statement
This model Oxygen 88 complies with the following standards regulating interference and EMC:

- FCC Part 15 Class B
- EN 55103-1 E3
- EN 55103-2 E3
- AS/NZS 3548 Class B
- CISPR 22 Class B

Radio and Television Interference

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules.

DECLARATION OF CONFORMITY

We Avid,
2001 Junipero Serra Boulevard, Suite 200
Daly City, CA 94014 USA
tel: 650-731-6300
declare under our sole responsibility that the product
Oxygen 88
complies with Part 15 of FCC Rules.
Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Communication Statement

NOTE: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try and correct the interference by one or more of the following measures:

- Reorient or locate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

Canadian Compliance Statement:

This Class B digital apparatus complies with Canadian ICES-003.

Cet appareil numérique de la classe B est conforme à la norme NMB-003 du Canada.

Disposal of Waste Equipment by Users in the European Union

This symbol on the product or its packaging indicates that this product must not be disposed of with other waste. Instead, it is your responsibility to dispose of your waste equipment by handing it over to a designated collection point for the recycling of waste electrical and electronic equipment. The separate collection and recycling of your waste equipment at the time of disposal will help conserve natural resources and ensure that it is recycled in a manner that protects human health and the environment. For more information about where you can drop off your waste equipment for recycling, please contact your local city recycling office or the dealer from whom you purchased the product.

Precautions On Use

Please read the following precautions on use before operating the system.
Use the correct power cable for your local power supply.

For 240 V AC

For 220 V AC to 240 V AC

When disconnecting the power cable, turn off the power and allow at least 30 seconds for any electrostaticity to be discharged.
To avoid electric shocks always plug all cables in to properly grounded power sources. Do not use adaptor plugs.
Use an uninterruptible power supply, surge processor or line conditioner in order to protect your system from sudden changes in electrical power.
Location
When running a PAL video monitor with the system there should be a distance of at least one foot between this and the system monitors, thus avoiding picture distortion and flickering.
Always place the system on a steady, flat surface and ensure that it is not liable to fall over.
Do not place the system where it is exposed to direct sunlight, direct heat, high temperatures or any area where it is in danger of overheating.
Do not place the system near any equipment which generates magnetism.
Do not cover any cooling vents in the system.
Avoid installing the system in a location where humidity, dust and fumes occur.
Handle With Care
Never use the system during abnormal conditions. Do not operate if no picture appears on the monitor, if smoke is emitted, sound is frequently deformed, or if there are any conditions of malfunction.
Do not place any liquids on or near the system.
Ensure that nothing rests on the system's cables, that they do not come in to contact with water or excessive heat. Damage to a cable can cause fire or electric shock. They should be located where they cannot be stepped on or tripped over.
When not using the system for extended periods make sure that all power cables are disconnected from the power source.
Disconnect all external leads before shipping. Do not subject the system to damage shocks during shipment.
Never remove any covers unless in accordance with the manufacturers' instructions. Do not place any foreign objects through ventilation holes. If a foreign object falls inside the system disconnect all power cables and contact customer support.

Warning

This product contains chemicals, including lead, known to the State of California to cause cancer and birth defects or other reproductive harm. Wash hands after handling.

Important Safety Instructions

When using electric or electronic equipment, basic precautions should always be followed, including the following:

- Read all instructions before using this equipment.
- To avoid the risk of shock, keep this equipment away from rainwater and other moisture. Do not use this equipment if it is wet.
- The equipment should only be connected to the correct rating power supply as indicated on the product.
- Do not attempt to service the equipment. There are no user-serviceable parts inside. Please refer all servicing to authorized Avid personnel.
- Any attempt to service the equipment will expose you to a risk of electric shock, and will void the manufacturer's warranty.

Cleaning

Keep your system clean and dust free at all times. To clean use a soft cloth lightly moistened with a mild detergent. Never use an abrasive pad or solvent such as benzine or alchol.
Do not allow dust and moisture to accumulate in the surrounding environment.

Avid
2001 Junipero Serra Boulevard
Daly City, CA 94014-3886 USA

Technical Support (USA)
Visit the Online Support Center at
www.avid.com/support

Product Information
For company and product information,
visit us on the web at www.avid.com