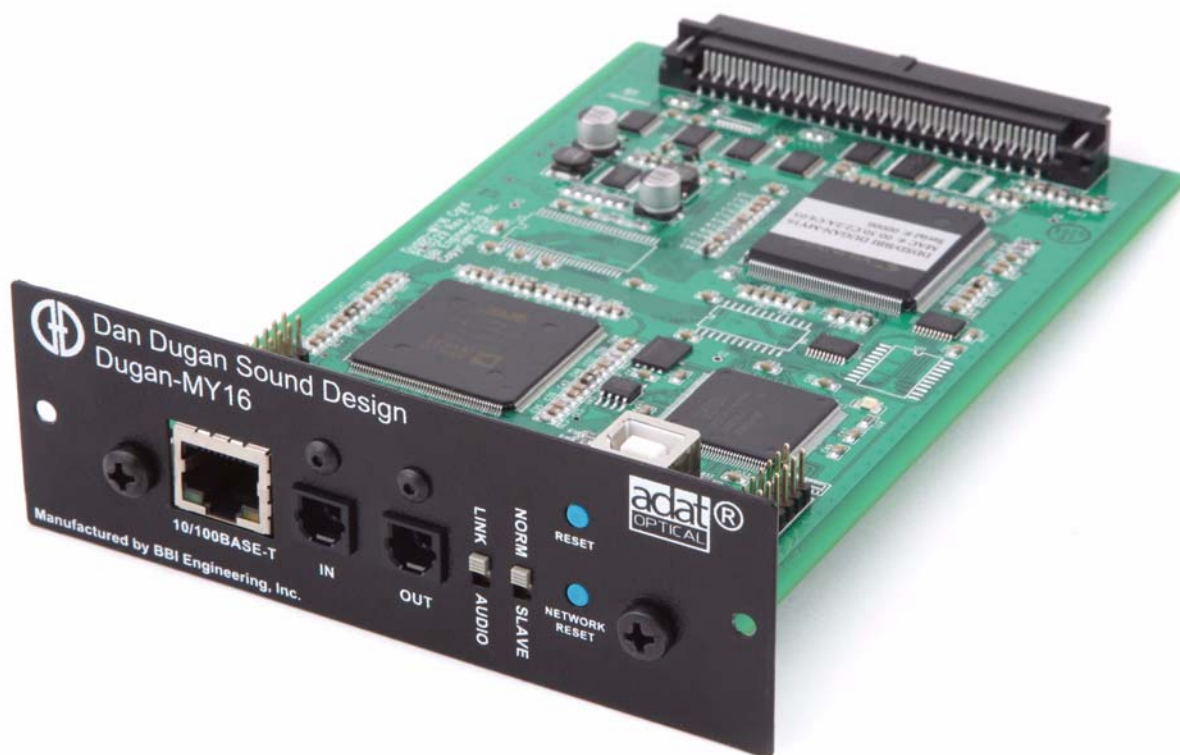


Dugan-MY16 User Guide

Automatic Mixing Controller Card

for Yamaha Digital Mixers



Release Date	August 2011
Version	1.0
Author	Rob Wenig

Dan Dugan Sound Design



290 Napoleon St., San Francisco, CA 94124
Phone: (415) 821-9776 Fax: (415) 826-7699

Important Safety Instructions and Warnings

The Dugan-MY16's circuitry is made in the USA and meets applicable national safety standards.

Safety Instructions

1. Read these instructions.
 2. Keep these instructions.
 3. Heed all warnings.
 4. Follow all instructions.
 5. Do not use this apparatus near water.
 6. **WARNING!** To reduce the risk of fire or electric shock, do not expose this apparatus to rain or moisture.
 7. Clean only with dry cloth.
 8. Do not block any ventilation openings. Install in accordance with the manufacturer's instructions.
 9. Do not install near any heat sources such as radiators, heat registers, stoves, or other apparatus (including amplifiers) that produce heat.
 10. Only use attachments/accessories specified by the manufacturer.
 11. Unplug this apparatus during lightning storms or when unused for long periods of time.
 12. **WARNING!** Refer all servicing to qualified service personnel. Servicing is required when the apparatus has been damaged in any way, such as liquid has been spilled or objects have fallen into the apparatus, the apparatus has been exposed to rain or moisture, does not operate normally, or has been dropped.
 13. **WARNING!** No user serviceable parts inside.
-

FCC

1. **IMPORTANT NOTICE: DO NOT MODIFY THIS UNIT!** This product, when installed as indicated in the instructions contained in this manual, meets FCC requirements. Modifications not expressly approved by Dan Dugan Sound Design may void your authority, granted by the FCC, to use the product.
2. **IMPORTANT:** When connecting this product to accessories and/or another product use only high quality shielded cables. Failure to follow instructions could void your FCC authorization to use this product in the USA.
3. **NOTE:** This product has been tested and found to comply with the requirements listed in FCC Regulations, Part 15 for Class "B" digital devices. Compliance with these requirements provides a reasonable level of assurance that your use of this product in a residential environment will not result in harmful interference with other electronic devices. This equipment generates/uses radio frequencies and, if not installed and used according to the instructions found in the users manual, may cause interference harmful to the operation of other electronic devices. Compliance with FCC regulations does not guarantee that interference will not occur in all installations.

If this product is found to be the source of interference, which can be determined by turning the host unit OFF and ON, please try to eliminate the problem by using one of the following measures: Relocate either this product or the device that is being affected by the interference. Utilize power outlets that are on different branch (circuit breaker or fuse) circuits or install AC line filter/ s. In the case of radio or TV interference, relocate/ reorient the antenna. If the antenna lead-in is 300 ohm ribbon lead, change the lead-in to co-axial type cable. If these corrective measures do not produce satisfactory results, please contact the local retailer authorized to distribute this type of product. If you can not locate the appropriate retailer, please contact Dan Dugan Sound Design.

The above statements apply ONLY to those products manufactured by Dan Dugan Sound Design.

This device complies with Part 15 of the 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.

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

Precautions

Failure to observe the following warnings may lead to fatality or serious injury from fire or electric shock.

1. Before installing the card, you must refer to the owner's manual of the host device or to the Yamaha website ("Guidance on the use of Mini-YGDAI cards" page) to verify that your host device supports this card, and to verify the number of cards that can be installed in combination with other Yamaha or third-party cards. Yamaha website: <http://www.yamahaproaudio.com/>
2. If one or more cards in a combination not endorsed by Yamaha are installed in a Yamaha device, electrical shock, fire, or malfunction may occur. Please note that the Dugan-MY16 can be used with the following models of Yamaha product that accept option I/O cards (Yamaha MY series and third-party products): PM5D/PM5D-RH, DSP5D, M7CL-48ES, M7CL-48, M7CL-32, LS9-32, LS9-16, DM2000, DM1000, 02R96, 01V96, DME64N, DME24N
3. To use the Dugan-MY16 card in a DM2000 or 02R96, the following system software is required: DM2000 Version 1.14 or later. 02R96 Version 1.06 or later. See the Yamaha Web site for upgrade information.
4. Do not attempt to disassemble or modify the card. Do not apply excessive force to board connectors or other board components. Mishandling the board may lead to shock, fire hazard, or equipment failure.
5. To eliminate shock hazard, disconnect the power cable from the main unit before installing this card.

CAUTION: Failure to observe the following precautions may lead to personal injury, or may result in damage to equipment or other property.

6. Do not touch the board's metallic leads (pins) when handling the card. Pins are sharp and may cause hand cuts.
7. The card is electrostatic-sensitive. Before handling the card, you should briefly touch the main unit's metal casing with your bare hand to drain any static charge from your body.

CAUTION: Dan Dugan Sound Design assumes no responsibility for data loss, equipment damage, or injury caused by inappropriate handling or usage.

Warranty Statement

Dan Dugan Sound Design warrants that Dugan-MY16 hardware will be free from defects in components and workmanship for a period of 12 months from the date of invoice.

During the warranty period, Dan Dugan Sound Design will cover the cost of all parts and labor to remedy the defect, or replace products which prove to be defective.

Dan Dugan Sound Design is not obliged to honor this warranty if the hardware has failed to be maintained and operated as specified by Dan Dugan Sound Design, in the accompanying documentation, or other than in accordance with industry standards. Defects caused by unauthorized modifications, misuse, negligence, act of God or accident are not covered by this warranty.

Software is provided as a convenience, but due to the wide variety of computer systems, cannot be guaranteed to work. This Limited Warranty is exclusive and no other warranty is expressed or implied. Dan Dugan Sound Design does not warrant that Dan Dugan Sound Design software, or any third-party software, is error free.

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Chapter 1: Introduction

The Dugan-MY16 is a 16-channel automatic mixing controller that plugs into a slot on Yamaha consoles. Sound engineers can now manage multiple live mics without continually riding individual faders. The Dugan-MY16 automatically detects the active mics and makes fast, transparent cross-fades without the distracting sonic artifacts common to noise gates. It tracks unscripted dialogue perfectly and maintains consistent system gain for up to 16 open mics.

The Dugan-MY16 supports a broad spectrum of live mixing applications:

- Conference reinforcement, video trucks
- Houses of worship
- Television news and sports panels, reality shows, game shows
- Multiple wireless mics for theater
- Boardrooms, civic meeting rooms, community TV
- Teleconferencing and distance learning

The Dugan-MY16 dramatically improves live mixing with multiple mics by

- eliminating missed cues and late upcuts;
- reducing PA feedback and studio noise;
- linking up to eight Dugan automatic mixing controllers.

The Dugan-MY16 is operated from the Dugan Control Panel for Java, provided on the CD. The Dugan Control Panel for iPad (sold separately) performs the same function on an iPad.

Theory of Operation

The Dugan-MY16 Automatic Mixing Controller uses the Dugan Speech System™, a patented and trademarked automatic mixing function. The Dugan Speech System distributes the gain of one open microphone over the entire system, maintaining a natural one-mic ambience.

It is essential to distinguish this behavior from the distracting fluctuation of levels and uneven ambience in a conventional noise-gating system. The system automatically manages any number of live mics in situations of unpredictable dialogue.

When one person talks at a time:

- The system rapidly fades that mic's gain up and the others down.
- When the speaker pauses, that mic fades down and the others up, so all mics sum to equal one mic at full gain.
- When the next person talks, the system fades that mic's gain up and the others down.

The result sounds like handing one mic around among the speakers.

When several people talk at once, the gain is shared among active mics. All mics sound normal when used but there is no noise buildup or feedback.

It is important to note that the Dugan Speech System does not perform limiting or automatic level control. While people are talking, mix the individual mic levels on the Yamaha mixer's faders in the normal way. You can leave the faders up when people are not talking because the Dugan takes care of cueing the mics.

Figure 1-1 shows four snapshots of the Speech System in action with three mics. The first frame shows no one speaking; the sound levels at all mics are low. The system fades all channels to a medium gain that sums to the equivalent of one mic at full gain.

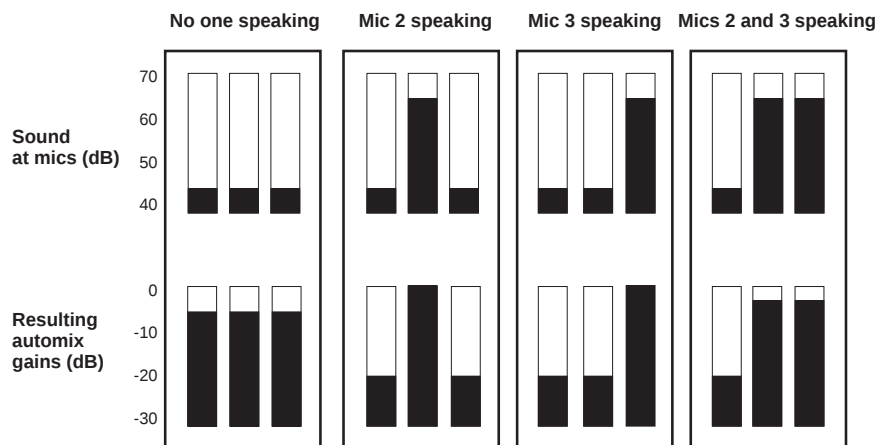


Figure 1-1 Dugan Speech System

The second frame shows one person speaking. The system automatically fades this gain to full, while the other two inputs are turned down.

The third frame shows a different person speaking. The system automatically fades this gain to full, while the other two inputs are turned down.

The fourth frame shows two people speaking simultaneously. The system automatically shares the gain between them, while the other input is turned down.

Conventions

In this guide,

- *activate* means *click a button **on** (lit)*.
- *de-activate* means *click a button **off** (not lit)*.
- *select* means *click a button repeatedly until the desired setting is shown*.

Subscribe to the *duganusers* Yahoo group (groups.yahoo.com/group/duganusers) to be notified when updates are available. See Chapter 4: *Firmware Updates* to install updates.

Chapter 2: Installation and Linking

This chapter explains how to:

- Install Dugan-MY16 card(s);
- Install the Dugan Control Panel for Dugan-MY16 cards and external Dugans;
- Link Dugan-MY16 cards and external Dugans into a single unified automatic mixing controller.

Installing the Dugan-MY16 Card

The Dugan MY-16 is compatible with a wide range of Yamaha mixers (see table below). Most Yamaha mixers have multiple slots, each of which has 16 channels. The Dugan-MY16 can be installed in any available slot.

To begin installing your Dugan-MY16, first find your mixer model in the table below, and set the Native-Legacy switch accordingly. The Native-Legacy switch allows Yamaha to maintain compatibility with its older mixers. Some older Yamaha mixers that require the Legacy setting do not display the correct names for plug-in cards in their insert patching screen.

Yamaha Mixer Model	Native-Legacy Switch
PM5D/PM5D-RH	Native
DSP5D	Native
M7CL-48ES	Legacy
M7CL-48	Legacy
M7CL-32	Legacy
LS9-32*	Legacy
LS9-16*	Legacy
DM2000	Legacy
DM1000	Legacy
02R96	Legacy
01V96	Legacy
DME64N	Native
DME24N	Native

* With LS9 firmware V1.21 or earlier, the LS9 insert patch points are pre-fader only. To properly mute mixer channels, you must use the Dugan Control Panel for Java (included) or the Dugan Control Panel for iPad (sold separately).

Choose an Operating Mode

The operating mode determines sample rate, linking, and channel count. Set the Yamaha mixer's sample rate before setting the operating mode. See your Yamaha mixer user guide to learn how to do this.

Choose one of the three operating modes:

Standard

Sixteen Dugan mixing channels at 44.1 or 48 kHz

ADAT I/O connectors can link multiple Dugan units

High-rate

Eight Dugan mixing channels at 88.2 or 96 kHz

ADAT I/O connectors can link multiple Dugan units

Shared

Eight Dugan mixing channels at 44.1 or 48 kHz

The ADAT I/O connectors serve as a general-purpose interface that is available for patching on channels 9–16 of the Dugan-MY16's slot. These channels are unrelated to Dugan mixing and can be used as additional Yamaha mixer I/O.

To use channels 9–16 (as with any digital input), an appropriate synchronization source must be selected. See your Yamaha mixer's user guide for details.

To configure and install the Dugan-MY16 card:

1. Set the **48 kHz-96 kHz** switch according the table below.

Mode	Mixer Sample Rate	Sample Rate Switch	LINK-AUDIO Switch
Standard	44.1 kHz	48 kHz	LINK
	48 kHz	48 kHz	LINK
High Rate	88.2 kHz	96 kHz	LINK
	96 kHz	96 kHz	LINK
Shared	44.1 kHz	48 kHz	AUDIO
	48 kHz	48 kHz	AUDIO

The sample rate switch represents *low* (44.1 or 48 kHz) and *high* (88.2 or 96 kHz) settings, respectively, that must correspond to your mixer's current sample rate.

For example,

If your mixer is set to 44.1 kHz, use the **48 kHz** position.

If your mixer is set to 88.2 kHz, use the **96 kHz** position.



Figure 2-1 Circuit board and rear panel switches

2. Install the Dugan-MY16 card according to the instructions in your mixer's user guide.
3. Turn on the mixer.
If you are using Shared mode, an appropriate synchronization source must be selected for channels 9–16. See your Yamaha mixer's user guide for details.
4. Press and hold the **RESET** button for 3 seconds.
This sets all channel modes and presets to **auto**, all **override** buttons to inactive, all **weights** to 0 dB, all groups to a, all **bypass** buttons to inactive, all channel names to defaults, and **METERS** mode to **gain**.
5. Press and hold the **NETWORK RESET** button for 3 seconds.
This sets the network parameters to default values.
6. Set the rear panel **LINK-AUDIO** switch to the position corresponding to the selected operating mode (see table above).
7. Set the **NORM-SLAVE** switch to **NORM** (up) for unlinked operation.
8. Use your mixer's channel select button to select the first mixer channel in which to insert the Dugan-MY16.
Refer to your Yamaha mixer user guide to display the insert patching screen.
Legacy mixers will identify the card on the insert patching screen as either **MY16AT** or **MY8AE96**.
9. Insert the Dugan-MY16 as a post-fader insert on this mic channel.
If you have an LS9 mixer that does not allow post-fader inserts, you must use the Dugan Control Panel for Java (included) or Dugan Control Panel for Java for iPad (sold separately) to operate with the Dugan-MY16 (see *Muting Mics on an LS9* on page 30).

10. Repeat steps 8 and 9 for each additional mixer mic channel in which you wish to insert the Dugan-MY16.

No further configuration is required for basic operation of the Dugan-MY16. We designed nominal settings that work fine out of the box, which comes in handy if you are pressed for time before an event.

However, to take full advantage of the Dugan-MY16's advanced features, we recommend installing the Dugan Control Panel software.

Installing the Dugan Control Panel for Java

The Dugan Control Panel requires Java Runtime Environment version 5 or higher. You can download the latest version from:

<http://java.sun.com/javase/downloads/index.jsp>

Two applications are on the CD supplied with the Dugan-MY16: *Dugan-Control-Panel-version#.jar* and *Dugan-Firmware-Updater-version#.jar*. Since these may not be the most current versions, we recommend downloading them from:

<http://www.dandugan.com/downloads>

- or -

<http://tech.groups.yahoo.com/group/duganusers/files>

Connecting Automatically Using DHCP

We recommend using the following method to connect the Dugan-MY16 to your computer. For those needing to set an explicit IP address, see below.

1. Set your computer so that it can communicate with the Dugan-MY16 card. To do this, you must turn DHCP on.

On the Macintosh, see instructions at:

http://support.apple.com/kb/HT1383?viewlocale=en_US

On Windows 7, see instructions at:

<http://windows.microsoft.com/en-US/windows7/Change-TCP-IP-settings>

2. Connect your computer or LAN to the Dugan-MY16 card with a Cat-5 cable.

Wait about a minute for the devices to establish communication.

3. Double-click *Dugan-Control-Panel-version#.jar*.

After a few seconds, an icon of your Dugan-MY16 appears in the top pane of the window.

NOTE: If you see just a black window with three blank panes, quit the Dugan Control Panel and relaunch it.

Setting an IP Address

We recommend this method for experts only.

To change the IP address:

1. Launch *Dugan-Firmware-Updater-version#.jar*.
2. Click on the Dugan card in the top pane's list.

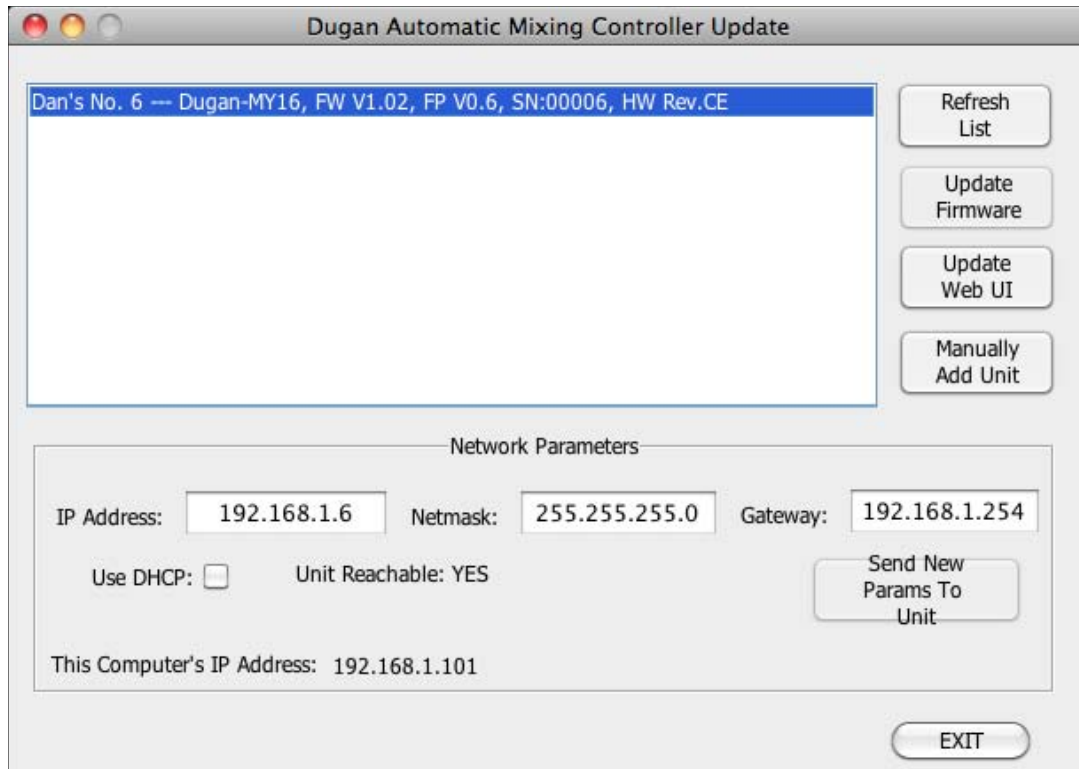


Figure 2-2 Dugan Mixing Controller Updater

3. Change to the desired IP address.
4. Click **Send New Params to Unit**.
5. Wait 3 seconds, then click **Refresh List**.
6. Click the Dugan in the list to check that its address was changed.

If the Dugan does not appear in the list, press and hold **NETWORK RESET** for 3 seconds to reset network parameters to their default values.

If the Dugan Mixing Controller Updater reports **Unit Reachable: No**, inspect the **IP Address** and take corrective action by repeating the steps above.

Linking

To link multiple Dugan-MY16 units to operate as one system, configure them in an optical ring network. Two standard optical audio cables (i.e., ADAT lightpipe or Toslink) are required to link two mixers.

To link multiple Dugan-MY16s and external Dugan automatic mixing controllers (Models D-2, D-3, E, E-1):

1. Designate one Dugan-MY16 as master by setting its rear panel **NORM-SLAVE** switch to the **NORM** (up) position.
2. Link other units in a ring configuration.
Each unit's **LINK IN** and **OUT** connectors are used to create the ring.
3. Set all other linked units to be slaves by setting their rear panel **NORM-SLAVE** switches to the **SLAVE** (down) position.

If external Dugan automatic mixing controllers are linked with one or more Dugan-MY16s, one of the Dugan-MY16s must be set to **master**.

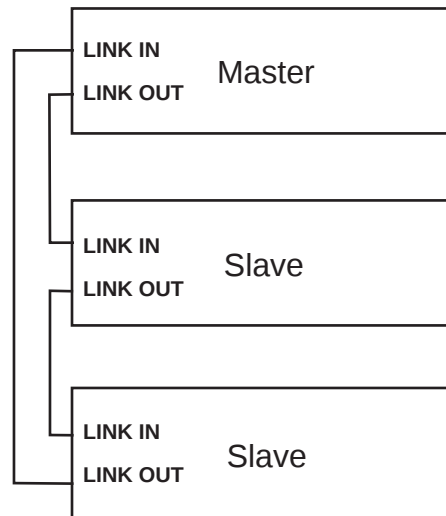


Figure 2-3 Linking Dugan-MY16s in a ring

NOTE: A single Dugan-MY16 must be set to **master**.

Chapter 3: The Dugan Control Panel

The Dugan Control Panel has three panes. The controls displayed in these panes depend on which Dugan device is selected in the top pane. This chapter assumes the Dugan-MY16 is selected.

The Dugan Control Panel displays the following items:

- Overview Pane: Icons for all connected Dugan units
- Channel Controls Pane: **man**, **auto**, **mute**, **preset**, **override**, **group**, **channel name**, **weight**, and **bypass** controls
- Master Controls Pane: **OVERRIDE**, **PRESET**, **MUTE**, **meters**, and **reset** controls

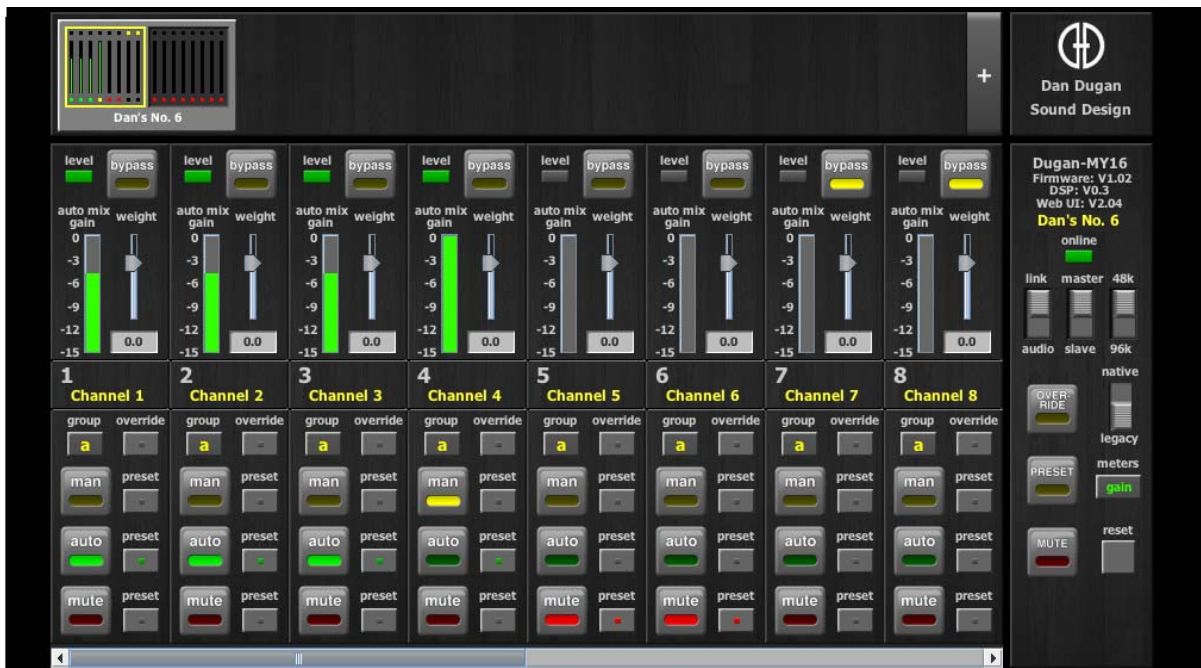


Figure 3-1 Control Panel

Overview Pane

The Overview Pane displays all connected Dugan units. Click on a unit to display it for editing in the Channel Controls Pane. The yellow rectangle in the figure below shows channels 1–8 of *Dan's No. 6* selected. Clicking on the other half of the icon selects channels 9–16 for editing.



Figure 3-2 Overview Pane

Some Yamaha mixers have multiple card slots that can be used for additional Dugan-MY16s. Also, Dugan Models E or E-1 can be interfaced via the insert points of the mixer. All connected Dugan units appear in the Overview Pane.

Channel Controls and Indicators

Each channel is always in one of three channel modes: **man**, **auto**, and **mute**. The active channel mode illuminates. All transitions are made with a smooth, rapid fade. They can be selected by pressing the individual mode buttons or the master **PRESET** button.



Figure 3-3 Channel controls

Man

This sends the audio through without any gain alteration. Use this mode when someone sings into this mic.

Auto

This engages the Dugan Speech System. Use this mode for dialogue.

Mute

This mode mutes the channel.

Preset

These buttons select the channel mode (**man**, **auto**, **mute**) when the master **PRESET** button is pressed. The preset programmed for each channel is indicated by a lit **preset** button.

Override

This button programs the channel to change modes to either **man** or **mute** when the master **OVERRIDE** button is active.

- If the channel **override** is active, activating the master **OVERRIDE** button changes the channel mode to **man**.
- If the channel **override** is not active, activating the master **OVERRIDE** button changes the channel mode to **mute**.
- When the master **OVERRIDE** button is deactivated, the channel returns to its previous mode.

Multiple channels can have their **override** buttons active at the same time.

Override can be used to help the leader of a panel discussion take control of the system.

To program this:

1. Activate the leader's channel **override** button.
2. Deactivate all other channels' **override** buttons.
3. Activate the Master **OVERRIDE** button when needed.

Channel Name

The channels can be named by entering text in the field under the channel number. Channel names are remembered on the card. They are erased by pressing the **Reset** button on either the rear panel or Dugan Control Panel.

Group

Each channel can be assigned to one of three groups. Each group acts as a separate automatic mixer that can span multiple linked Dugans.

Applications where groups are helpful include:

- **Separate Rooms:** Assign the mics in each room to different groups so they function as separate automatic mixers.
- **Stereo Panning:** Assign the mics panned left, right, and center to groups a, b, and c, respectively, to maintain a stable stereo ambience.

The master controls continue to act on all groups.

Meter Indicator

The meters (see Figure 3-4) have three display modes. Press the master **meters** button to cycle between them.

gain	Action of the Dugan Speech System	green
input	Input level	yellow
output	Output level	blue

NOTE: *Keep the meters in gain mode for normal operation. The other modes are for troubleshooting.*

Weight

The **weight** setting adjusts the relative sensitivity of the automatic mix for live mic channels. Set the **weight** so all **auto mix gain** meters show approximately the same gain with no one talking. Now each mic has an equal opportunity to obtain full system gain.

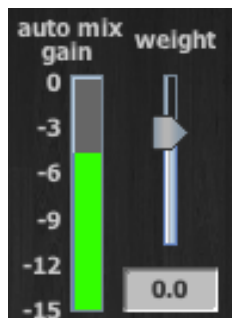


Figure 3-4 Meter and weight control

The mixer's input gains and the Dugan's **weight** controls balance the **auto mix gain** meters when no one is talking. If a mixer input gain is decreased, increase that channel's **weight** to compensate, and vice-versa.

To change a channel's **weight**, drag the slider or enter a value in the field below the slider.

It is important to understand that the Dugan Speech System computes the *ratio* of a given channel's input level to the level of the sum of all live mic inputs. The **weight** control is not a gate threshold!

The following example explains how **weight** works (see Figure 3-5).

Raising the **weight** control for one channel

- increases that mic's **auto mix gain** display during ambience, and decreases it for the others;
- makes it easier for the mic with the higher **weight** setting to acquire system gain than the other mics.

The **weight** control does not set that mic's *level* in the mix when operated alone, but only its relative *sensitivity* with respect to other mics during automatic mixing.

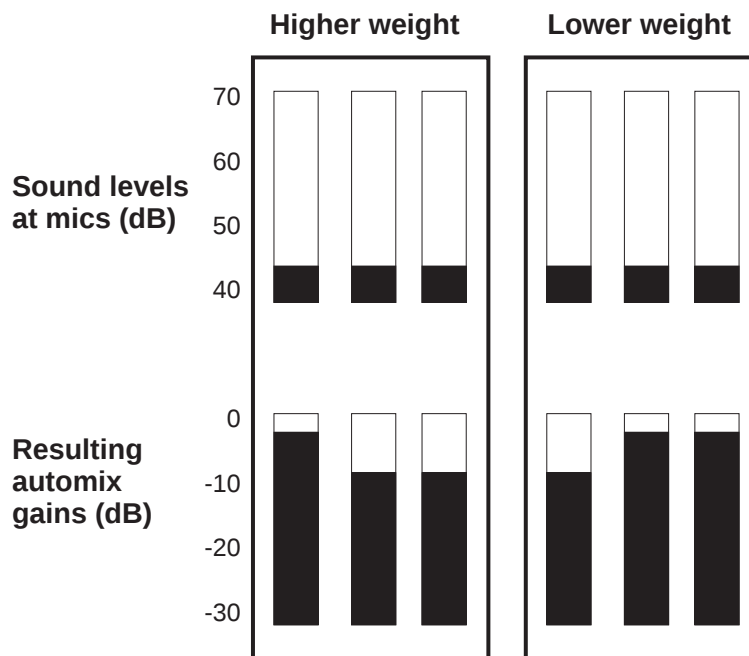


Figure 3-5 Changing one channel's weight control

Lowering the **weight** control for one channel

- decreases the **auto mix gain** display during ambience for that mic and increases it for the others;
- makes it more difficult for that mic to be heard over the others.

For optimal performance, balance the **weight** controls so the channel gains display approximately equally when no one is talking.

If there is ongoing noise near one mic (e.g., computer fan or air vent), suppress it by reducing that channel's **weight**. Adjustments up to 10 dB usually result in an acceptable compromise between noise reduction and channel sensitivity.

The figure below shows a system with appropriate **auto mix gain** displays.

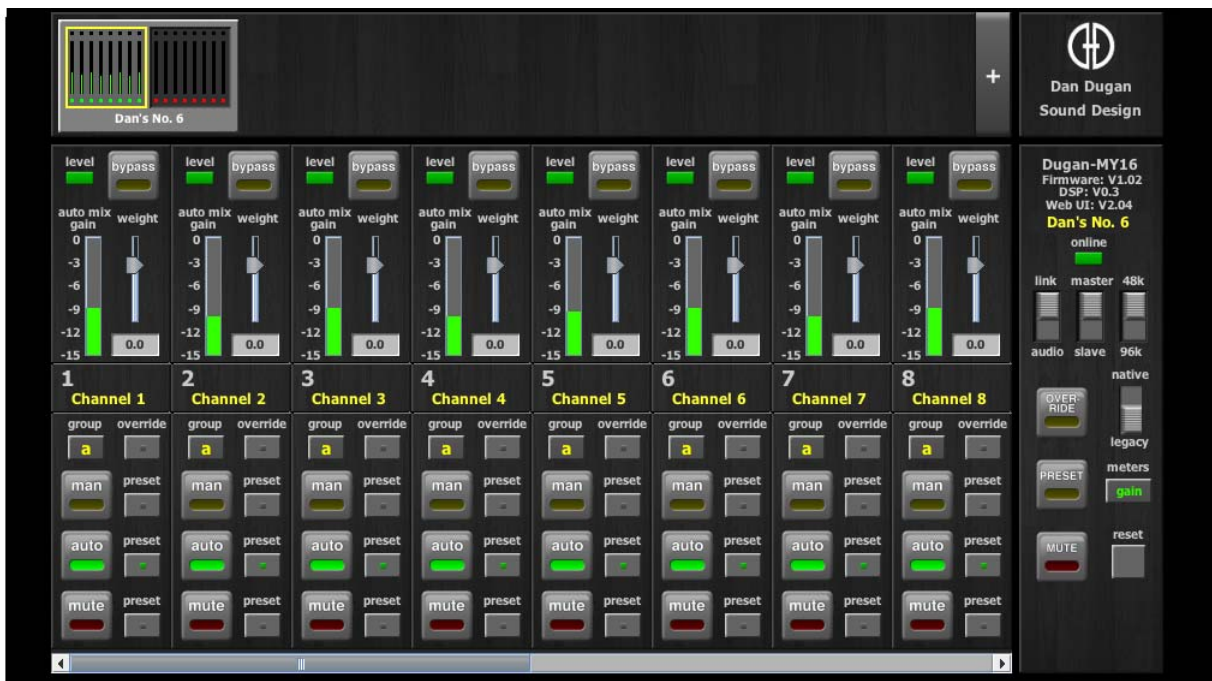


Figure 3-6 Ambience with 8 mics: **auto mix gain** displays hover around -9 dB

Level Indicator

Each channel has a **level** LED that lights green when the audio level is adequate for automatic mixing. It should remain green when no one is talking.

- If the **level** indicator blinks, raise the Yamaha mixer's input gain.
- If the **level** LED lights red, lower the Yamaha mixer's input gain until it stays green at all times.

Bypass

Each channel has a bypass mode. A channel may be patched directly through the Dugan with the **bypass** switch. That channel's lights extinguish and the **bypass** LED illuminates.

The Difference Between Man and Bypass

When controlling a Dugan-MY16, **man** and **bypass** act the same. Both pass the signal through without gain control. The **bypass** button has a unique function when controlling a Dugan with analog I/O, such as a Model E-1. It activates a relay that physically connects the input to the output.

Master Controls and Indicators

The contents of the master section change to reflect the Dugan device selected. This section documents the Dugan-MY16's controls and indicators.

The selected unit's firmware and Control Panel (Java or iPad) versions are shown below the Dugan logo.



Figure 3-7 Master section

Card Name

The Dugan-MY16 card can be named by entering text in the field above the **online** indicator.

Override

The master **OVERRIDE** button fades all the channels up to unity gain or down to mute, depending on each channel's **override** button status.

Select the channel(s) to include in the override group by activating their **override** button(s). These channels will come up to unity gain when the master **OVERRIDE** button is activated. All other channels will be muted.

Preset

Pressing the master **PRESET** button sets the channel modes (**man**, **auto**, **mute**) to those shown on the illuminated **preset** LEDs. Use these settings to program your most common channel mode setup. Channels are set to their preset modes when the unit is powered up.



Figure 3-8 Channel (left) and Master (right) **preset** buttons

Mute

The master **MUTE** button rapidly fades out (0.5 s) all channels when activated.

Meters

The meters have three display modes. Press the master **meters** button to cycle between them.

gain	Action of the Dugan Speech System	green
input	Input level	yellow
output	Output level	blue

NOTE: *Keep the meters in gain mode for normal operation. The other modes are for troubleshooting.*

Reset

Holding down the **Ctrl** key and pressing the **reset** button restores the Dugan-MY16 to factory default settings.

Indicators

The master section includes several indicators that do not change any function. See *Choose an Operating Mode* on page 14 to learn how the switches are set on the card.



Figure 3-9 Master section indicators

Online

This indicator lights to show the unit is online.

Master-slave

This indicates whether this unit is set to **NORM** (**master**) or **SLAVE** mode on the rear panel switch.

- A single Dugan-MY16 must be set to **master**.
- If multiple Dugans are linked, set only one to **master** and the others to **slave**.
- If external Dugan automatic mixing controllers are linked with one or more Dugan-MY16s, one of the Dugan-MY16s must be set to **master**.

48k-96k

This indicates whether this unit is set to low (44.1 or 48 kHz) or high (88.2 or 96 kHz) sample rate on the circuit board switch.

Link-audio

This indicates the operating mode selected on the rear panel switch.

Native-legacy

This indicates whether this device is set to native or legacy mode on the circuit board switch. This allows Yamaha to maintain compatibility with its older mixers.

NOTE: *After all controls have been set, the Dugan Control Panel can be disconnected. The Dugan-MY16 remembers all settings, even after the power is turned off.*

Typical Operation

This section creates a setup that will work for most applications.

1. Activate the **auto** mode buttons for all live mic channels.
2. Activate the **mute** buttons for all unused channels.

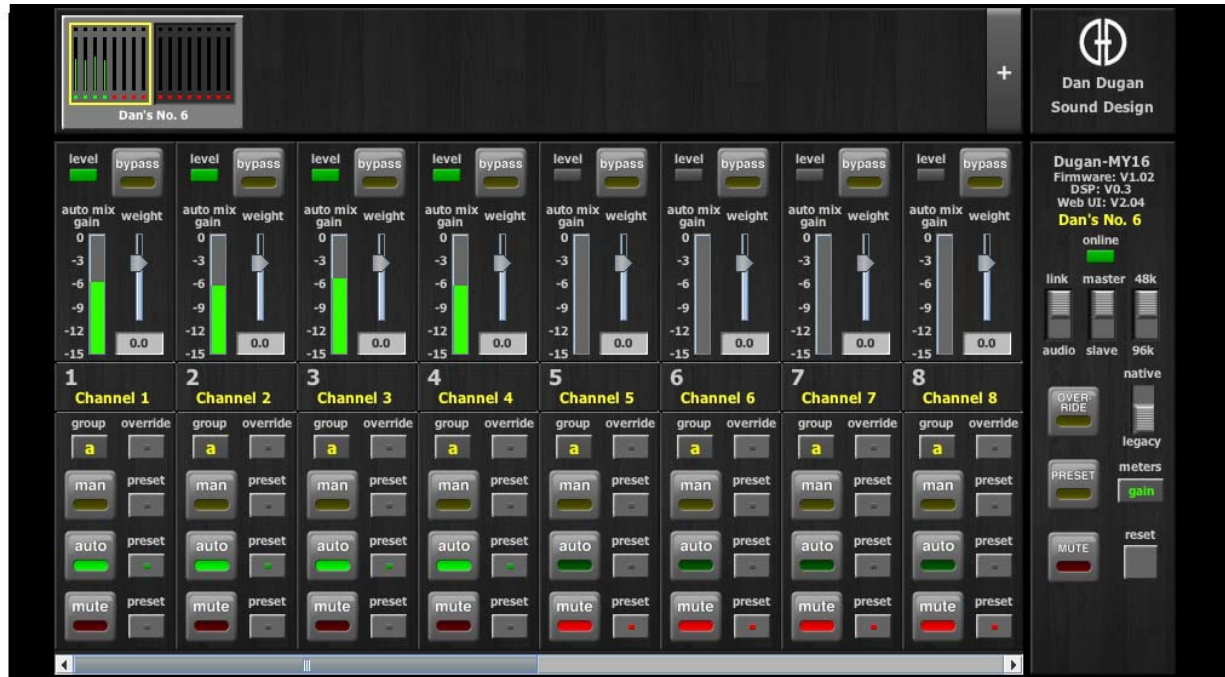


Figure 3-10 Typical operation

3. Activate the **preset** button next to the active mode button on each channel.
This causes that mode to be selected when the system restarts.
4. Initially, set the mixer's faders to unity gain.
5. Speak into each mic normally at the desired distance from the mic. Increase the mixer's input gain to just below clipping for best automatic mixing performance.

The input gain to the Dugan-MY16 should be high enough keep the **level** LED lit green during silences.

If the input gain controls are set too low, the inputs drop below the minimum operating level, and the smooth ambience is disrupted.

6. Adjust each live mic channel's **weight** setting until the fluctuating ambient noise registers approximately equally on all **auto mix gain** meters.

Note that raising one channel's **weight** setting causes its **auto mix gain** to rise and the others to fall. With balanced **weight** settings, all mics have equal access to the system gain.

7. During the event, adjust the faders to refine your mix.

There is usually no need to adjust the Dugan-MY16's controls during the event.

Since the Dugan Speech System manages gain, there is no need to mute live mic channels (on the mixer or Dugan-MY16) unless there is disturbing noise.

NOTE: *If clipping occurs on a channel, turn down that channel's input gain, and increase the channel's weight setting to re-establish the ambient noise balance.*

Muting Mics on an LS9

If you have an LS9 mixer with firmware V1.21, or earlier, it does not allow post-fader inserts. You must use the Dugan Control Panel to operate with the Dugan-MY16.

Mics must be muted by using the Dugan's **mute** buttons. Pulling a fader down on the console will not properly mute a channel. Although that mic is no longer audible in the mix, it still contributes to the automatic mixing gain computations, and causes ambient noise fluctuation. At worst, a noise at this mic could cut off another speaker.

To properly mute a channel:

- Leave the console faders up, adjust levels while people are talking, and mute a mic by pressing the Dugan's **mute** mode button. Enable the mic when needed by activating the **auto** button. You can use the Master **PRESET** button as a panic button to unmute all mics.

Muting mics does not alter the overall ambient sound mix: the Speech System compensates by slightly raising the ambient gains of the other mics to compensate for the gain subtracted by muting a mic.

- OR -

- Use the **bypass** button with the console fader pulled down. This keeps the mic instantly available on the fader but removes that mic from automatic mixing.

Chapter 4: Firmware Updates

Program updates and other improvements, installed while the Dugan-MY16 is connected to a host computer, can be found at:

<http://www.dandugan.com/downloads>

- or -

<http://tech.groups.yahoo.com/group/duganusers/files>

To update the firmware:

1. Download and launch *Dugan-Firmware-Updater-version#.jar*.

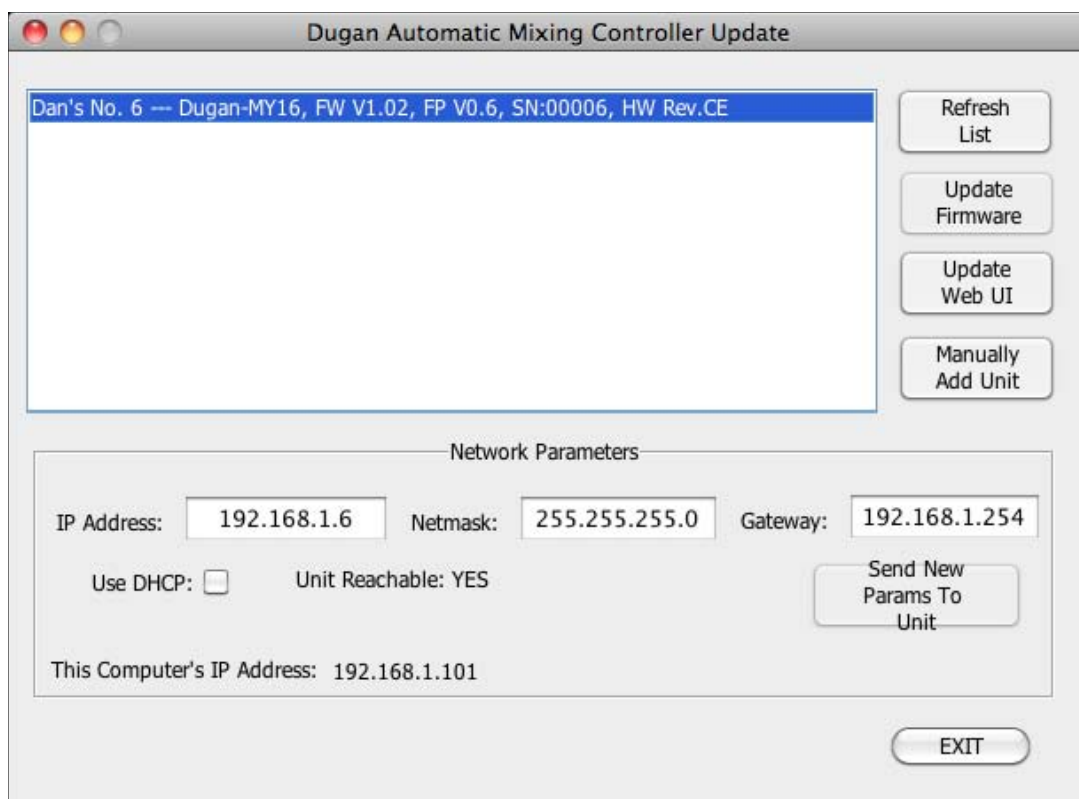


Figure 4-1 Dugan Mixing Controller Updater

2. Click on the Dugan card in the top pane's list.
3. Click **Update Firmware**.

Chapter 5: Specifications

Operating Modes	Standard 16 channels of Dugan mixing at 44.1 or 48 kHz, ADAT connectors link multiple Dugan units High-rate 8 channels of Dugan mixing at 88.2 or 96 kHz sample rate, ADAT connectors link multiple Dugan units Shared 8 channels of Dugan mixing and 8 channels of general purpose ADAT I/O
Digital I/O	ADAT optical, 24 bit, 44.1/48 kHz (Shared mode only)
Gain	Unity
Audio Latency	0.2 ms
Optical Linking	Up to 8 units may be linked in a ring; links with Models D-2, D-3, E, E-1, and Dugan-MY16
Connectors	10/100 BASE T: RJ-45 Linking and Digital I/O: ADAT optical
Recommended Yamaha Mixers	PM5D/PM5D-RH, DSP5D, M7CL, LS9, DM2000, DM1000, 02R96, 01V96, DME64N, DME24N
Dimensions	H = 4.0 cm (1.57 in) W = 12.0 cm (4.72 in) D = 17.6 cm (6.91 in)
Weight	160 g (5.6 oz) 0.6 kg (1 lb 5 oz) in shipping box

