



AW2816

PROFESSIONAL AUDIO WORKSTATION



Tutorial

E

Introduction

Welcome to the world of the AW2816!

If you have an interest in music production, you probably know that the songs of the artists you see on television and in magazines are produced in sophisticated recording and mixing studios using lots of expensive equipment, and pass through numerous processes under the care of professional sound engineers who have a wealth of specialized knowledge.

Into the AW2816 is packed the functionality used for every process that happens in these large and sophisticated studios. If the optional CD-RW drive is installed, the entire process from recording to CD production can be carried out completely within the AW2816, and all at professional quality.

Starting with a powerful digital mixer of equivalent quality with the Yamaha 02R mixing console (the de-facto standard for digital recording), the AW2816 includes an automix function that records and reproduces the operations of the mixer section, two digital multi-effect units with a rich array of functions, a completely uncompressed 16-track recorder that supports not only 16 bit CD-quality but also 24 bit recording/playback that captures even the most subtle nuances, and many other functions.

If you already have experience using a digital mixing console or digital recorder, operating the AW2816 will soon feel completely natural to you, and you will quickly be amazed at the astounding amount of functionality that is packed into such a small unit. On the other hand if you are new to this type of equipment, be reassured that the AW2816 is designed to make it easy for you to fully use every bit of its powerful functionality.

Although this tutorial will guide you through a full range of actual operations, this is just the first step in understanding the full potential of the AW2816. We hope that by working through this tutorial, you will acquire your very own know-how that will help you take full advantage of the AW2816.

About this tutorial

This tutorial is intended for people who have an interest in recording and mixdown but have never before used equipment like the AW2816, and explains the process from recording to mixdown on the AW2816 while leading you through the actual steps of operation.

Once you have worked through this tutorial, you will have learned how to operate the basic functionality of the AW2816. For a more detailed explanation of each function, refer to the AW2816's "Owner's Manual." At the end of this tutorial there is a glossary of specialized terms related to the AW2816, digital mixing consoles, and digital recorders. Please refer to it when you encounter an unfamiliar term.

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Recording on the AW2816

Amazingly for its size, the AW2816 conceals potential that rivals the mixing consoles found in large recording studios.

Although you can of course record a live performance in a single pass, you can also use multi-track recording to take full advantage of the AW2816's 16 x 8 = 128 tracks.

This tutorial will guide you through the actual recording process, so that you can learn how to utilize the full power of the AW2816.

Creating a new song

In the WORK NAVIGATE section, press the [SONG] key. When the Song List screen appears, move the cursor downward, and press [ENTER] at the NEW SONG button. You will be asked "Save current song?," so answer either YES or NO. Then specify the sampling rate (Fs) and number of recording bits (Recbit) that the newly created song will use, and press [ENTER]. Next you will be asked whether you want to import mixer data (for details refer to the AW2816's "Owner's Manual," Reference section), but in this case you need not select anything.

Now you can input a name for the song that will be created. Press [ENTER] at OK, and the comment input screen will appear. Unless you want to assign a comment, simply select OK. A new song has now been created on the AW2816's hard disk.

Recording the rhythm section

When recording a new song, it is usual to start by recording the rhythm section first, in order to set down the tempo and groove (rhythmic feel) of the song. After you have created the structure and rhythm of the entire song, you can add vocals, guitar, and other backing parts to complete the song.

At this stage, you just need the drums, bass, and percussion parts. In particular, recording the bass at an early point in the process will clarify the chord progression of the song, and will make it easier for you to perform overdubbing later. Parts that contribute to the rhythmic feel of the song such as backing keyboard and guitar chording should also be recorded early.

In the pages that follow, we will give several examples of how the rhythm can be recorded. Refer to the explanation for the method that you will actually use.

Using two mics to record the rhythm

Since the AW2816 provides two channels of XLR mic input, you can put up two mics in a recording booth and record in stereo. In this section we are going to assume that you will record using two mics.

■ Connect the mics to the AW2816

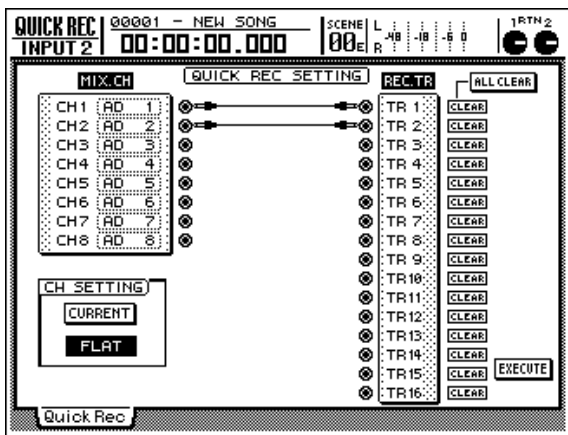
Obtain two mics with the same characteristics (as far as possible, two mics of the same manufacturer and model), and connect the mic cables to the AW2816's INPUT 1 and 2 XLR jacks. If you are using condenser mics, turn on the PHANTOM +48V switch located on the back panel. (If you are using dynamic mics, leave this switch turned off. Otherwise, the mic may be damaged.)

Now let's check that the sound from the mic is actually being input to the AW2816. First turn the gain controls of the input to make adjustments. Recording at as high a level as possible will take the best advantage of the AW2816's potential, and give you the best sound. However if the level is too high, the sound may be distorted or a hissing noise may be recorded along with the sound, so use caution. Adjust the gain so that the PEAK indicator located at the upper right of the gain control just barely flickers when you play most loudly. If the PEAK indicator does not light even when the gain control is turned all the way to the right, check the connections once again, and if they are OK, use the following procedure to check whether the meters move.

■ Recording sound from the mics onto the hard disk

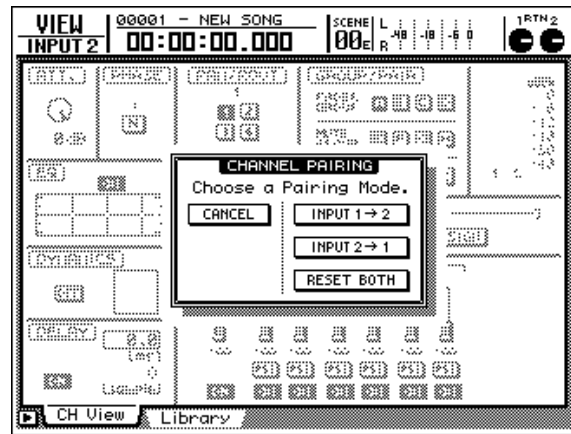
When you have finished adjusting the input level, connect the input to the track on which it will be recorded. In the WORK NAVIGATE section, press the [QUICK REC] key. On the left side are the sounds being input to the AW2816, and on the right side are tracks 1–16 (a total of sixteen tracks) on which you can record. Try pressing [ENTER] on the circle for CH1 in the left. In the screen, a connection will be made between CH1 and TR1. In the same way, connect CH2 and TR2. In the CH SETTING area, select [FLAT] to select the default settings when recording for the first time.

When you have completed these preparations, press [ENTER] on EXECUTE, located at the far right. You will be asked whether you are sure, so select OK. If the REC TRACK SELECT 1 and 2 indicators in the upper right of the AW2816 are blinking, you are ready.



Although you could record immediately, let's pair the two inputs so that we can record in stereo.

In the MIXING LAYER section, press INPUT [1-8], and then press the channel 1 [SEL] key to make it light. Now in the MIXER section, press [VIEW], and then press [F1] to access the CH View screen. Use the [CURSOR] keys to move to the MONOX2 area beside PAIR, and press [ENTER]. You will be asked how you want to pair adjacent channels, so for this example, press [ENTER] on INPUT 1→2. This lets you simultaneously control the settings for the two inputs channel 1 and 2. To try this out, move the fader of input channel 1 up and down. The fader of the adjacent channel should move with it.



Press the [ON] key located immediately above the input channel 1 fader, making it light. (At this time, the channel 2 [ON] key will also light if pairing has been enabled.) A volume meter will be displayed at the upper right of the CH View screen, so adjust the fader, and check whether sound is being input from each mic into the AW2816. You will be able to record with the best-quality sound if the level is adjusted as high as possible without allowing the OVER indicator in the meter to light when the loudest sounds are played. If you were able to adjust the gain control successfully in the beginning of this process, a fader position of approximately 0 dB should be just right.

Now we can just record. When you are ready to begin playing, hold down the [REC] key and press the [PLAY] key. When you are finished playing, press the [STOP] key.

■ Play back the recorded sound

Let's listen to the sound that was recorded. If you used the two mics in stereo, press the MIXER section [PAN] key, and then press [F2] to open the Pan MONI screen. If you have just created the song (and not modified the settings), all sixteen tracks should be heard from the middle (CENTER). In the screen, move the cursor to the Pan control for track 1, and turn the [DATA/JOG] dial all the way to the left (L16). In the same way, set track 2 all the way to the right (R16). What if you recorded the right mic on track 1? If so, simply invert the left/right settings of the two tracks. However since the input channels and tracks are paired as 1-2, 3-4, ... etc., you should use the odd-numbered channel to input the left sound.

After you have made Pan settings, press the 0 [RTZ] key of the keypad to return to the beginning of the song, and press the [PLAY] key to play back. If you do not hear sound, press the MIXING LAYER section RECORDER [1-8] key, make the [ON] key light for tracks 1 and 2 of the recorder, and make sure that the faders are raised. Also make sure that the red STEREO fader is raised and the PHONES control (if using headphones) or MONITOR OUT control (if using connected monitor speakers) are not lowered all the way. If you still do not hear sound, it is possible that some mistake was made when recording, so try the procedure described above once again, checking each step you perform it.

Was the sound recorded correctly? If the sound is distorted or cracked, adjust the gain control and try the recording once again. If the sound was recorded on the hard disk in a distorted condition, it will be impossible to fix it later.

You should also pay close attention to the position of the mics. Changing the direction of the mics and their distance from the instrument makes an amazing amount of difference in the recorded sound. Since the AW2816 lets you re-record as many times as you like, try various mic settings until you are happy with the recorded sound you get. It is also useful to read magazines and watch what other people do, but unless you are an experienced professional recording engineer, it is difficult to put up mics in the "perfect" location without some trial and error. We recommend that you refer to professional publications, and try various experiments with the AW2816.

Recording the sound of a rhythm machine

As an alternative to the preceding example, here's how a rhythm section created on a rhythm machine with built-in sequencer functionality can be recorded on the AW2816. Although you could simply press the PLAY button of the rhythm machine at the same time you begin recording, nearly all rhythm machines these days support MTC or MIDI Clock, so let's try synchronizing the AW2816 with your rhythm machine. In this example, we will use the AW2816 as the MTC or MIDI Clock master, and make the rhythm machine follow it.

First press [MIDI], and then [F1] to access the MIDI Setup 1 screen. Make sure that MTC SYNC is set to MASTER. Next, make sure that your rhythm machine is able to receive MTC or MIDI Clock messages and operate in synchronization. (On your rhythm machine, this may be a setting named SYNC, or something similar.) The settings and connections will differ depending on which type of message is used for synchronization.

If you are using MTC, use a MIDI cable to connect the AW2816's MTC OUT connector to your rhythm machine's MIDI IN connector (or its MTC IN connector, if there is one).

If you are using MIDI Clock, press [F2] to access the MIDI Setup 2 screen. Turn the MIDI CLK setting ON, set MIDI/HOST to MIDI, and set OUT/THRU to OUT. For each of these, move the cursor to the setting, and press [ENTER] to change the setting. Then use a MIDI cable to connect the AW2816's MIDI OUT connector to the MIDI IN connector of your rhythm machine. If you are using MIDI Clock, you will also need to make tempo settings as explained below.

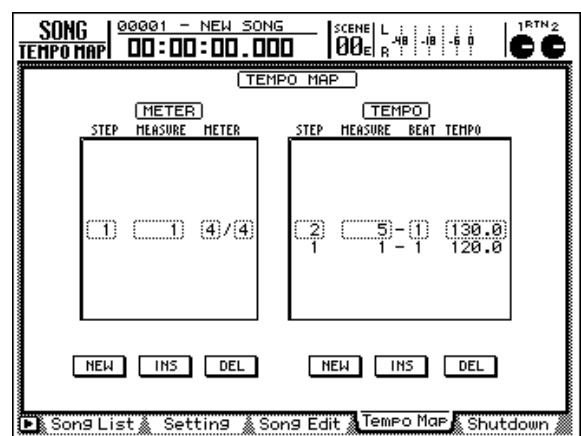
Next, change the settings on your rhythm machine so that it will operate in synchronization to MTC or MIDI Clock, and put the rhythm machine in a mode in which it will wait for synchronization messages to arrive. Now when you press the AW2816's PLAY button, the rhythm machine should begin operating in

synchronization. Did it work? In the case of MTC, a parameter called "Frame Rate" must also be set to the same setting on both devices, so refer to the AW2816's "Owner's Manual" and the manual of your rhythm machine, and check this setting as well.

■ What is tempo data on the AW2816

On the AW2816, tempo data is maintained independently for each song. When a new song is created, it will be set to a time signature of 4/4 and a tempo of 120. If you want to change this, or if you want the time signature or tempo to change during the song, press [SONG] and then press [F4] to access the Tempo Map screen. Of the two frames, the left one is the time signature (METER), and the right is the tempo (TEMPO). To try this out, move the cursor to NEW in the TEMPO area, and press [ENTER]. A second tempo data will be created. Now try changing the STEP 2 settings MEASURE to 5, and TEMPO to 130.0. With these settings, the tempo will be at the STEP 1 value (120) for the first four measures, and will change to 130 at measure 5.

If your rhythm machine has only a connector that transmits MTC, or if you have already input detailed tempo data into your rhythm machine and it's too much work to re-specify it for the AW2816, refer to the AW2816's "Owner's Manual" and set it to operate as a MTC slave.



Now that we have made the two devices operate in synchronization, we are ready to record. Connect the audio outputs of the rhythm to the inputs of the AW2816, make sure that the sound is being input correctly, and then record. You can preserve a wider range of mixdown options if you record separate sounds from your rhythm machine on separate tracks of the AW2816, so being mindful of the eventual structure of your song, do this if you will have enough recording tracks on the AW2816.

Recording sounds that you step-recorded into your sequencer

The basic idea in this case is the same as when using a rhythm machine, discussed above. However, the AW2816 does not have tone generator functionality, so you will have to provide a separate MIDI sound module, use your sequencer software to play it, and then record the audio onto the AW2816.

Recording vocals and acoustic instruments

When you are finished recording the rhythm section, let's record the vocals, lead guitar, and acoustic instruments. Our explanation will assume that you have connected a mic to the AW2816's INPUT 1 (or 2), and will be recording a vocal.

When recording a vocal, the singer will obviously need to sing while listening to the previously-recorded tracks. Nobody is going to make the mistake of having the vocalist listen to the existing tracks over the monitor speakers while singing into the mic, but it's worth noting that if the vocalist uses open-type headphones for monitoring, sound that leaks from the headphones can get into the mic and be recorded. We strongly recommend that you use sealed-type headphones for monitoring when recording into a mic.

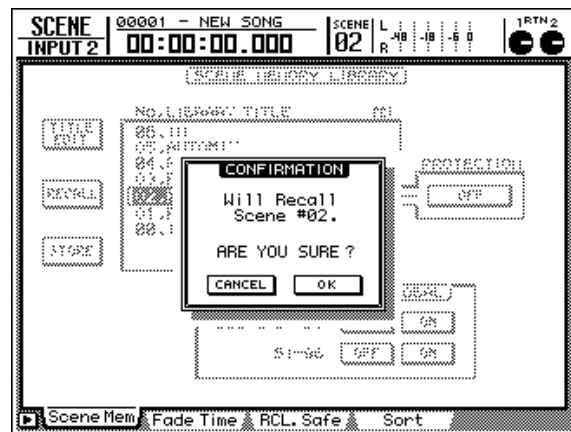
When recording a vocal, it is effective to use a monitor mix that is different from the real mix. For example you may want to boost the volume of specific rhythm parts, or to have a pre-recorded "scratch vocal" that the vocalist can sing along with as a guide. The AW2816 has a function called "scene memory," so first store the current settings of the MIXER section, and then create a separate mix for monitoring by the vocalist and store it in a different scene memory. This way, you will always be able to return to the same condition whenever you need to re-record the vocal at some later point.

■ Switching scene memories

Let's try actually switching the scene. First use the SCENE MEMORY section [▼]/[▲] keys to change the scene number to other than 00. (Scene number 00 contains default settings that cannot be edited.) The scene number is displayed in the upper part of the screen, slightly toward the right side. For this example we will assume that you have selected 01. Press the [STORE] key of the SCENE MEMORY section. You will be asked to input a name for the scene, so assign an appropriate name and select OK. Next, play back the previously-recorded tracks, boost the volume of the drums and other rhythm instruments so that the vocalist will have a clear sense of the song's rhythm (while reducing the volume of the other parts). Change the setting to Scene Memory 02 and press STORE, assign an appropriate name, and select OK to save the scene.

Now let's recall the scenes you saved. Change the scene number to 01 and press [RECALL]. A message will ask "Will Recall – ARE YOU SURE?", asking you whether you are sure you want to recall. Press [ENTER] on OK, and you will be back to the settings that were in effect before you modified the volume of each track for monitoring by the vocalist. In the same way, select scene 02 and press [RECALL]. Now the mixer has the settings that you previously saved for vocal monitoring.

Scene memories are convenient, but if you recall a different scene without remembering to save the previous settings, they cannot be recovered, so please use caution.



■ Tips – vocal recording

For the music of today, recording the vocal is the most important element in the recording. The volume adjustment at the input of the AW2816 is of course important, but you must also pay careful attention to the height and direction of the mic, remember to use a pop shield, and be aware of the volume and tonal character of the vocal. Your selection of a recording location is also important. The sound will differ dramatically depending on whether it was recorded in the living room or in the shower.

The best settings are the settings that give you a recording that maximizes the strengths of that vocalist. Try everything you can think of that will help the vocalist perform at peak ability. You will probably not get a good recording if the vocalist is very tense or nervous. If you create an appropriately relaxed atmosphere for your vocalist, you will get a good recording that takes full advantage of the broad dynamic range offered by the AW2816 (very broad, since you can even use 24 bit recording!).

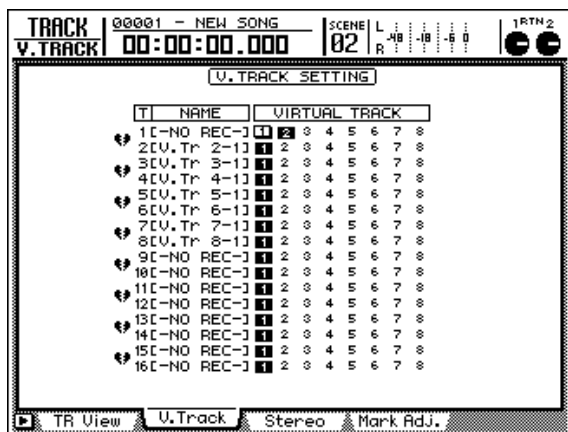
Overdubbing

The overdubbing procedure is basically the same as when you recorded the rhythm section and vocal. Record each of the backing tracks while you listen to the previously-recorded tracks.

We recommend that during the recording stage, you record all the parts you think you will ever want for the song. You can always delete unneeded parts during the mixdown, and you can (for example) record several different guitar solos and switch between them to see which one you like best. The AW2816 has 128 virtual tracks, so if you record and keep several takes of the vocal, you will have more flexibility during mixdown.

■ Switching virtual tracks

When you want to switch virtual tracks, press the RECORDER section [TRACK] key, and then press [F2] to access the V.Track screen. To try this out, go to the virtual track area for track 1 (the top line), and press [ENTER] on 2. The "2" will be highlighted. Now press [F1] to return to the TR View screen. There is a column labeled "V" at the right of the NAME column for each track, and for track 1 this should indicate "2". This shows the virtual track that is currently selected for each track.



■ Tips – is it good or bad to record with effects?

The AW2816 provides a very wide range of effects, but you should be aware that if you apply an effect during recording so that the processed sound is recorded, it will be impossible to make any changes in that effect afterward. In particular, applying equalizer (EQ) or spatial-type effects during recording may limit your freedom during mixdown.

In some cases, a limiter is used while recording drums or bass to keep the sound from distortion, but this requires a certain amount of technique, so until you have some experience, we recommend that you actually watch the meter, and use the gain control or volume fader to adjust the level so that distortion is avoided.

■ To apply effects only to the sound being monitored

When recording a vocal, the vocalist often finds it easier to sing if a spatial-type effect such as reverb is applied. In this case, it is useful to apply the effect by using AUX SEND from the input, so that the unprocessed sound is recorded and the effect applied only to the monitored sound.

Referring to the methods that we have discussed so far, input the sound from the mic into input channel 1, and use [QUICK REQ] to prepare to record on track 1. Next, press [AUX 5] in the FADER MODE section. The faders should all move down, and the Eff.Edit screen should appear. Here, raise the input channel 1 fader, and listen to the sound from the mic on the AW2816. If a reverb-type effect is selected, reverberation should be applied to the sound. At this point, the effect sound is being output to the stereo out (which is the final output of the AW2816), but is not being recorded on track 1. Actually record the input, and verify that the effect is not applied to the recorded sound.

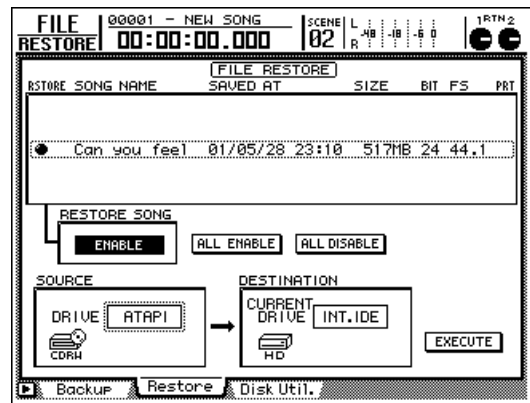
Restoring the demo song

The following chapter explains the mixdown procedure using the demo song included with the AW2816. Thus, we will begin by explaining how to load the demo song from the included CD-ROM into the AW2816's hard disk.

In this tutorial, we will assume that an ATAPI-connected CD-RW drive has already been installed in the AW2816. However, it is also possible to use an external SCSI CD-RW drive. For details on how to install a CD-RW drive, refer to the AW2816's "Owner's Manual."

Restoring to the hard disk

- 1 Press the [FILE] key.
- 2 Press the [F2] key to access the Restore page.
- 3 Make sure that in the SOURCE area, the DRIVE parameter is set to ATAPI.
(If you want to use an external SCSI CD-RW drive, move the cursor to the SOURCE area, and turn the [DATA/JOG] dial to select the appropriate SCSI ID number, and then press the [ENTER] key.)
- 4 Hold down the [SHIFT] key and press the [F2] key (CD UNLOAD) to open the CD tray.
Place the included demo CD-ROM with the label facing upward on the tray. Then hold down the [SHIFT] key and press the [F1] key (CD LOAD) to close the tray and load the CD.
- 5 The demo song "Can you feel it?" will appear in the on-screen list.
Move the cursor to the RESTORE SONG area and press the [ENTER] key. The RESTORE SONG button will change from DISABLE to ENABLE.
- 6 Move the cursor to the EXECUTE button in the screen, and press the [ENTER] key. A message of "ARE YOU SURE" will ask you to confirm, so move the cursor to "OK" and press the [ENTER] key to begin the Restore operation.



- 7 When the display indicates "COMPLETE," the Restore operation has been completed.
The Restore operation will take approximately ten minutes. Once you have executed Restore, it is not possible to cancel the operation.

Loading the demo song from hard disk

- 1 Press the [SONG] key. (If the Song List page does not appear, press the [F1] key.)
- 2 Use the [DATA/JOG] dial to select "Can you feel it?"
- 3 Move the cursor to the LOAD button in the screen, and press the [ENTER] key. A message of "Will Save Current Song. ARE YOU SURE?" will appear, so move the cursor to "YES" or "NO," and press the [ENTER] key to begin loading the data.
- 4 When the progress indicator disappears, the demo song has finished loading.
If you want to hear the pre-mixed version of the demo song before you mix it yourself: Press the [PLAY] key. The demo song will be loaded with automix turned on, and will be played back according to this mix.

Mixdown

“Mixdown” sounds like it refers to a single operation, but in reality, it is a sequence that consists of numerous processes. As you become more experienced, the various steps will blend together into one big process. It is important to keep this in mind, because you must be aware of the effect that even the smallest operation will have on the overall sound. For example if you use the equalizer to slightly modify the tonal character of one instrument, it will affect the way in which other instruments are heard. Through experience, you will gain the ability to predict the result of such changes. As you create more mixes, you will become better at it.

Step 1. Listen to the recorded tracks and make your plans

The most important step in mixing is to make plans in your mind before you actually begin mixing. Consider the following points.

- Think about the music you intend to produce. What is the lyric content? What is the atmosphere you want to convey? How can you create a mix that enhances the music itself?
- What is the defining characteristic of the song? The lyrics? The voice of the singer? The rhythm? A specific instrument or sound? You should emphasize the element that is most important. For example if the lyrics are important, you should avoid letting the vocal be buried in the background, or obscured by excessive reverb.
- How are the instruments placed in the stereo field? Are you going to recreate the sound field of a live performance? Or are you trying to create a more abstract impression?
- In what type of space do you want to place the music? An open and dry space? A spacious and reverberant space? Narrow and tight? Distant? Nearby?
- Are there any instruments that share a similar frequency range and might conflict with each other? Distorted electric guitar and organ are good examples of this. Such instruments might be separated by being panned to left and right, or you might use the equalizer to give each instrument its own distinct identity, skillfully bringing out the unique character of each instrument.
- Will you need to change moods or scenes to create significant shifts in level, equalizer, or effects during the mix? By using automation, even such complex mixes can be easily performed.

These are just a few examples, but as you gain experience, you will learn how to make a good mixing plan for each song.

■ Let's begin

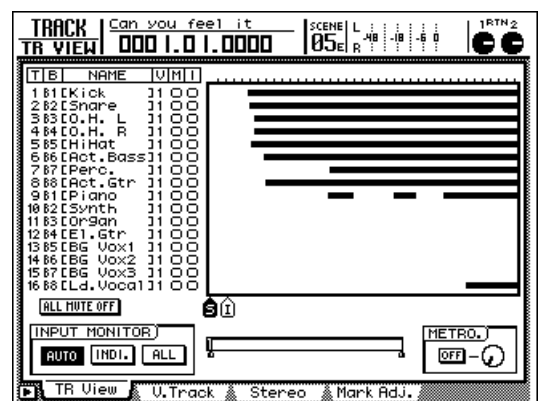
Now that the song has been restored to the hard disk, let's listen to the “unmixed” song.

Before you proceed, you must be sure to turn AUTOMIX off. In the AUTOMATION section, press the [AUTOMIX] key. In the AUTOMIX area, move the cursor to the ENABLE button and press the [ENTER] key to set AUTOMIX to DISABLE (off).

- 1 Make sure that in the MIXING LAYER section, “1-8” or “9-16” is selected.
- 2 Recall scene number 01 “FADERS NOMINAL” to set faders 1–16 to the nominal level. (Press the [SCENE] key, and use the [DATA/JOG] dial to select scene number 01 “FADER NOMINAL,” move the cursor to the RECALL button, and press the [ENTER] key. Then select “OK” and press the [ENTER] key to confirm.)
- 3 Press the MIXER section [VIEW] key to access the parameters for the selected monitor channel. Press [F1] to access the CH View page.
- 4 Press the [PLAY] key, and listen to the tracks.

The following table shows the track contents of the included demo song.

1	2	3	4
Kick	Snare	Overhead (L)	Overhead (R)
5	6	7	8
Hi-hat	Acoustic bass	Percussion	Acoustic guitar
9	10	11	12
Piano	Synth	Organ	Electric guitar
13	14	15	16
(Chorus)			16 Vocal



Step 2. Setting up a rough mix

The rough mix is just a starting point for the final mix, and does not need to be perfect. The purpose of creating a rough mix by adjusting only level and pan is to have a reference point from which you can make more detailed adjustments, and apply effects and automation, so don't spend too much time on this. Of course if the fader or pan settings bother you in a way that would affect your judgment during the remainder of the mixing process, go ahead and make the necessary adjustments. Mixing is a process of trial and error, so you will keep making adjustments as many times as necessary until you are satisfied.

• The preset rough mix

If you do not want to set up your own rough mix, or if you would like to listen to the existing rough mix, recall scene number 02 "STEP2 MIX." Press the [SCENE] key, and use the [DATA/JOG] dial to select scene number 02 "STEP2 MIX." Next, move the cursor to "RECALL" and press the [ENTER] key. When the confirmation message appears, select "OK" and press the [ENTER] key. To return to the VIEW screen, press the MIXER section [VIEW] key.

If you want to leave the VIEW screen displayed while doing this, use the SCENE MEMORY section [▼]/[▲] keys to select the scene that you want to recall. (The scene number and title will be displayed in the upper right of the screen.) Next press the [RECALL] key, and when the confirmation message appears, select "OK" and press the [ENTER] key.

You can make settings so that the entire song or a portion of it continues looping while you set up the rough mix. This will make it easier to adjust level and pan.

Use MARK A and B to specify the beginning and end of the loop, and press the [REPEAT] key make the playback repeat. (For details refer to the AW2816 "Owner's Manual.")

■ Start with the kick and snare

Use the channel [ON] keys to turn off all tracks except for the kick and snare (tracks 1 and 2). Leave the STEREO channel on. The kick and snare are recorded on tracks 1 and 2 respectively.

■ Adding the drum overhead tracks

Use the following procedure to pair the monitor channels.

1 Hold down the channel 3 [SEL] key and press the channel 4 [SEL] key.

2 When the CHANNEL PAIRING window appears, select "MONITOR 3→4" and press the [ENTER] key.

This will pair the two channels so that operating the fader of one channel will cause the other fader to move in the same way. The MIXER VIEW screen will display the pan and routing controls for both channels.

Next we will pan the stereo drum tracks to left and right to create a stereo image. Use the following procedure to adjust the pan settings of channels 3 and 4.

1 Use the [SEL] key to select the channel whose pan you want to adjust. (Since the channels are paired, selecting a channel will cause the [SEL] key of the other channel to blink.)

2 While you watch the pan control in the screen, use the [PAN] control in the upper right of the screen to make adjustments.

■ Adding the hi-hat

Turn channel 5 "ON," and listen. This will sound better with the pan adjusted toward the right. If the hi-hat is a bit obtrusive when the kick and snare track faders and the overhead track faders are all at nominal level, you can use fader 5 to lower the hi-hat level about 5 dB (the fader screen will indicate -5.0).

■ Adding the acoustic bass

Turn channel 6 "ON" and listen. There's no need to adjust the pan, since the bass is normally placed in the center, but if the bass is too loud relative to the drums when the drum track faders are at nominal level, use fader 6 to lower the bass level about 5 dB (the fader screen will indicate -5.0).

■ Adding the percussion

Turn channel 7 "ON" and listen. If the percussion (handclaps) is too loud for the drum set and acoustic bass, use fader 7 to lower the percussion level about 5 dB (the fader screen will indicate -5.0).

■ Adding the acoustic guitar

Turn channel 8 "ON". If the guitar is too loud for the other tracks, use fader 8 to lower the level about 10 dB.

■ Adding the piano

Turn channel 9 "ON". If the piano is too loud for the other tracks, use fader 9 to lower the level about 5 dB.

■ Adding the synthesizer

Turn channel 10 “ON”. If the synthesizer is too loud for the other tracks, use fader 10 to lower the level about 5 dB.

■ Adding the organ

Turn channel 11 “ON”. Make fine adjustments to the fader so that the sound does not stand out in comparison with the other tracks.

■ Adding the electric guitar

Turn channel 11 “ON”. Compared to the other tracks, the electric guitar track will have a more intense sense of volume, so you might use fader 12 to lower the level about 10 dB.

■ Adding the lead vocal

Some of you probably expected to add the chorus (tracks 13/14/15) before adding the lead vocal, but in order to set appropriate levels for the chorus, it is important to hear it in relation to the lead vocal level.

Turn channel 16 on, and with the pan left in the center (the usual position for the lead vocal), set the fader at approximately nominal level (0 dB).

■ Adding the chorus

In the intro, the chorus enters before the lead vocal, and in the final mix a certain amount of automation will be necessary. But for now, listen to a section of the song where the lead vocal is heard together with the chorus, and adjust the level of the chorus section. Turn on channels 13/14/15, and raise the fader levels to a point where they will not interfere with the lead vocal on track 16.

■ Listening to the rough mix

Although you have already listened to the song numerous times while creating the rough mix, now you will listen to the entire song, rather than to an individual part. Make adjustments as desired.

■ Saving the song

To save the song, press the WORK NAVIGATE section [SONG] key to access the SONG screen. As necessary, press the [F1] key to display the Song List page. Move the cursor in the screen to “SAVE,” and press the [ENTER] key. When the confirmation window appears, move the cursor to “OK” and press the [ENTER] key. The song has now been saved.

■ Saving the scene

Let’s save the completed rough mix. Press the SCENE key, and use the [DATA/JOG] dial to select a vacant scene that is displayed as “No Data!” Then move the cursor to “STORE” and press the [ENTER] key. The TITLE EDIT popup window will appear, so assign a name (or leave it unassigned), select “OK” and press the [ENTER] key.

You can alternately select this scene and another scene to compare the pre-made rough mix with your own.

Step 3. Assembling the mix for each part

In order to create a balanced mix, we now need to pay a bit more attention to the details of each track.

• **Preset scene**

You can recall a preset scene that contains all settings up through step 3, below. Press the [SCENE] key (press the [F1] key to select the Scene Mem page if necessary), and use the [DATA/JOG] dial to select scene number 03 “STEP3 MIX.” Move the cursor to “RECALL” and press the [ENTER] key. When the confirmation message appears, select “OK” and press the [ENTER] key. To return to the VIEW screen, press the MIXER section [VIEW] key.

If you want to leave the VIEW screen displayed while doing this, use the SCENE MEMORY section [▼]/[▲] keys to select the scene that you want to recall. (The scene number and title will be displayed in the upper right of the screen.) Next, press the [RECALL] key, and when the confirmation message appears, select “OK” and press the [ENTER] key.

During the mix process, you will frequently be turning channels on/off so that you can hear just a certain part by itself, or together with specific other tracks. You might think of using the Solo function to do this, but in this case, this would require you to change the settings of the Solo function by accessing the SET UP screen/Solo Setup page, and setting STATUS to MIX-DOWN SOLO, and LISTEN to AFTER PAN. At this stage of the mixdown, you need to hear the tracks with the EQ, dynamics, and other effects applied. Normally when you use the Solo function to monitor, you will hear only the “dry sound” of a track. At this stage, listening to the dry sound would not be very helpful.

■ Channels 1/2: Bass drum and snare drum

By applying a 3.5 dB boost to the LOW region below 70 Hz, we will fatten the resonance of the kick drum shell. Next, we raise the HI-MID 4.23 kHz region by 4.5 dB to emphasize the character of the kick drum skin. After that, we lower the L-MID 223 Hz region by 4.5 dB to cut the sympathetic vibration of the kick (bass drum), minimizing the unwanted resonance. Next is the snare drum. By adding a 5.5 dB boost to the HIGH 10.0 kHz region we can increase the sense of sensation of air. We will lower the 187 Hz region by 4.0 dB to create a sense of separation in the mix. All of this produces a snare sound with a light touch.

- 1 Press the channel 1 [SEL] key. (Perform the same operations for channel 2.)
- 2 Press the MIXER section [EQ] key. (This displays the details of the EQ parameter adjustments.)

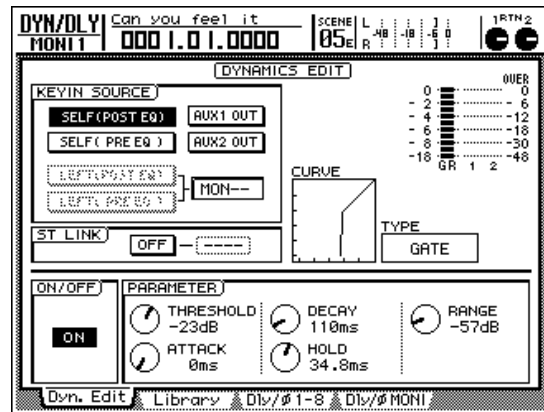
3 Make sure that the EQ is on for the selected channel. (If it is off, move the cursor to the EQ ON button and press the [ENTER] key to turn it on.)

4 Use the cursor keys to set the various EQ parameters.

• **Channel 1: Kick**

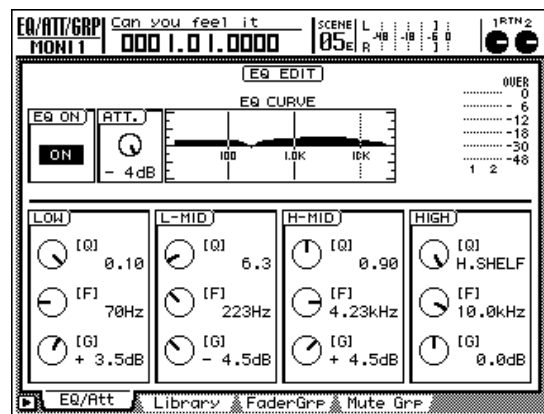
DYNAMICS Gate

Threshold	Range	Attack	Hold	Decay
-23 dB	-57 dB	0ms	34.8 dB	110 ms



EQ (ATT -4 dB)

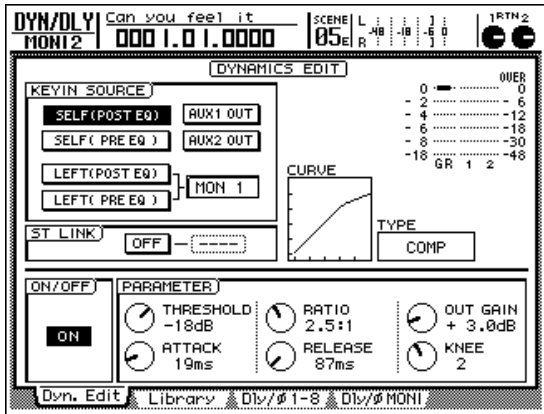
	LOW	L-MID	H-MID	HIGH
Q	L.SHLF	6.3	0.9	H.SHLF
F	70 Hz	223 Hz	4.23 kHz	10.0 kHz
G	+3.5 dB	-4.5 dB	4.5 dB	0.0 dB



- **Channel 2: Snare**

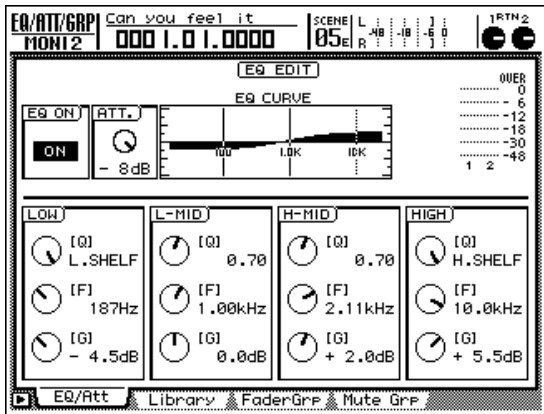
DYNAMICS Comp

Threshold	Ratio	Out Gain	Attack	Release	Knee
-18dB	2.5:1	3.0dB	19ms	87ms	2



EQ (ATT -8 dB)

	LOW	L-MID	H-MID	HIGH
Q	L.SHLF	0.70	0.70	H.SHLF
F	187 Hz	1.00 kHz	2.11 kHz	10.0 kHz
G	-4.5 dB	0.0 dB	+2.0 dB	5.5 dB



■ **Channels 3/4: Drum overhead mics**

These tracks contain the cymbals and toms. By adding a 3.5 dB boost to the HIGH 14.2 kHz region we will clarify the metallic edge. By lowering the H-MID 157 Hz region by 6.5 dB we give a light touch to the snare sound that is also recorded on these tracks.

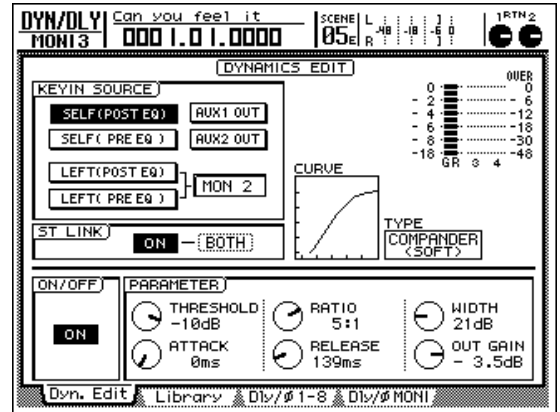
- 1 Press the channel 3 [SEL] key to select the overhead mic channel.
- 2 Press the MIXER section [DYN] key to access the dynamics parameters.
- 3 In the TYPE area, "Compander-Soft" should be selected (the default setting). Move the cursor to "ON/OFF" and turn dynamics "ON" for the selected channel.

4 Use the CURSOR keys and the [DATA/JOG] dial to make the following dynamics settings for the overhead mic channels. (Since channels 3 and 4 are paired, adjusting the EQ on track 3 will automatically make the same setting on track 4.)

- **Channels 3 and 4: Drum overhead and tom**

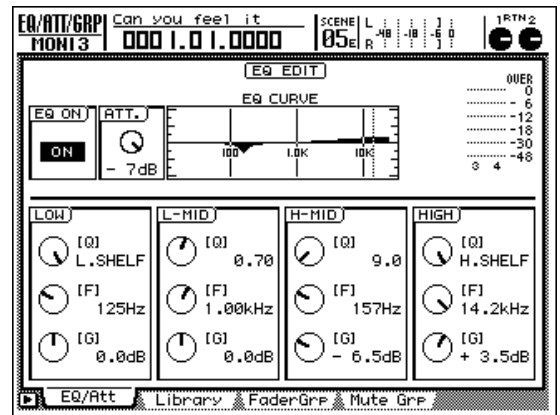
Compander-Soft

Threshold	Ratio	Out Gain	Attack	Release	Width
-10 dB	5:1	-3.5 dB	0 ms	139 ms	21 dB



EQ (ATT -7 dB)

	LOW	L-MID	H-MID	HIGH
Q	L.SHLF	0.70	9.0	H.SHLF
F	125 Hz	1.00 kHz	157 Hz	14.2 kHz
G	0.0 dB	0.0 dB	-6.5 dB	3.5 dB



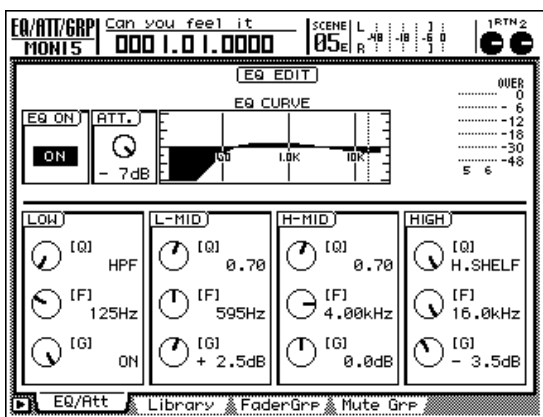
■ Channel 5: Hi-hat

By using a HPF (high pass filter) to cut the sound below the LOW 125 Hz point, we will simultaneously remove sounds other than the hi-hat. By adding a 2.5 dB boost to the L-MID 595 Hz region, we will emphasize the crispness of the hi-hat, clarifying the sense of beat.

- 1 Press the channel 5 [SEL] key to select the hi-hat channel.
- 2 Press the MIXER section [EQ] key.
- 3 Make sure that EQ is on for the selected channel.
- 4 Use the CURSOR keys and the [DATA/JOG] dial to set the EQ as follows.

EQ (ATT -7 dB)

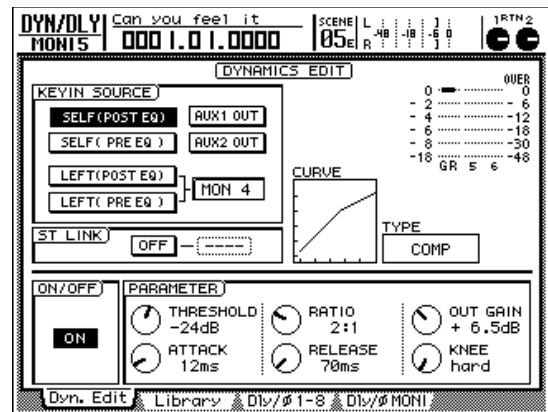
	LOW	L-MID	H-MID	HIGH
Q	HPF	0.70	0.70	H.SHLF
F	125 Hz	595 Hz	4.00 kHz	16.0 kHz
G	ON	2.5 dB	0.0 dB	-3.5 dB



- 5 Press the MIXER section [DYN] key to access the dynamics parameters.
- 6 In the TYPE area, "COMP" should already be selected (the default setting). Move the cursor to "ON/OFF" and turn dynamics "ON" for the selected channel.
- 7 Use the CURSOR keys and the [DATA/JOG] dial to make the following dynamics settings.

DYNAMICS Comp

Threshold	Ratio	Out Gain	Attack	Release	Knee
-24 dB	2:1	6.5 dB	12ms	70 ms	hard



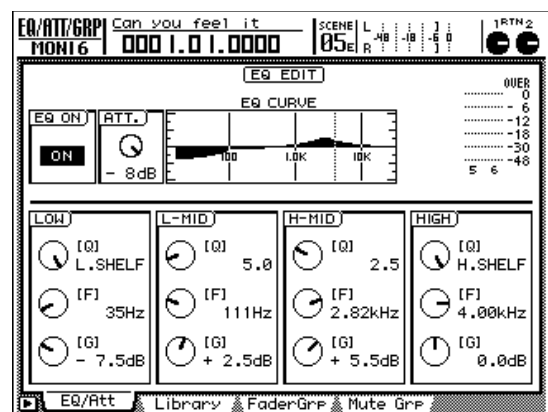
■ Channel 6: Acoustic bass

We will lower the LOW 35 Hz region by -7.5 dB to add warmth to the sound. By lowering the L-MID 111 Hz region by 2.5 dB we will clarify the sense of pitch, and by adding a 5.5 dB boost at the H-MID 2.82 kHz region we will emphasize the fingerboard noise to enhance the characteristic flavor of an acoustic bass.

- 1 Press the channel 6 [SEL] key to select the bass channel.
- 2 Press the MIXER section [EQ] key.
- 3 Make sure that the EQ of the selected channel is turned on.
- 4 Use the CURSOR keys and the [DATA/JOG] dial, or the EQ controls at the right of the display, to make the following EQ settings for the bass.

EQ (ATT -8 dB)

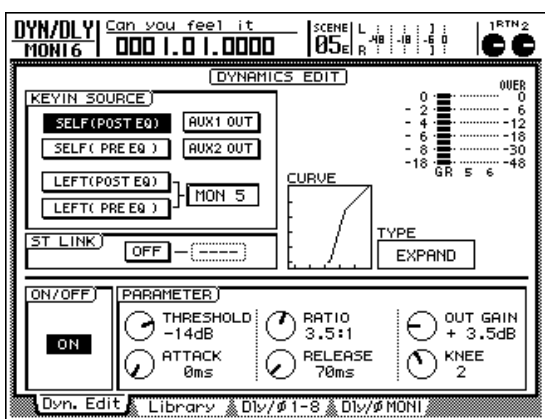
	LOW	L-MID	H-MID	HIGH
Q	L.SHLF	5.0	2.5	H.SHLF
F	35 Hz	111 Hz	2.82 kHz	4.00 kHz
G	-7.5 dB	2.5 dB	5.5 dB	0.0 dB



- 5 Press the MIXER section [DYN] key to access the dynamics parameters.
- 6 Press the DYN button, and then press the [F2] key located below the screen.
In this screen, load a library whose TYPE field is displayed as "EXP." Move the cursor to "ON/OFF" and turn dynamics "ON" for the selected track.
- 7 Use the CURSOR keys and the [DATA/JOG] dial to make the following dynamics settings.

DYNAMICS Expander

Threshold	Ratio	Out Gain	Attack	Release	Knee
-14 dB	3.5:1	3.5 dB	0 ms	70 ms	2

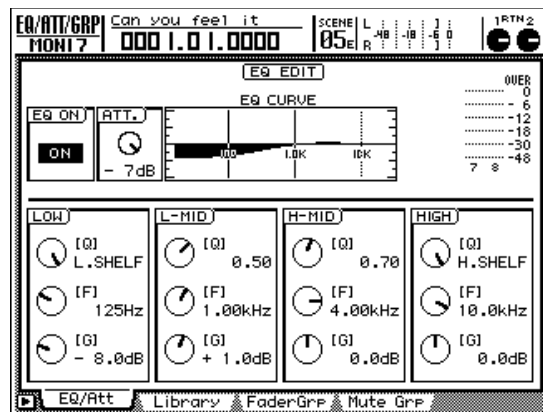


■ Channel 7: Percussion

For the percussion channel, we will cut the 125 Hz region by -8.0 dB to reduce the weight of the low range, making the sound a bit lighter. In the dynamics section, we will use a compander to increase the perceived loudness to compensate for the reduction in the low range.

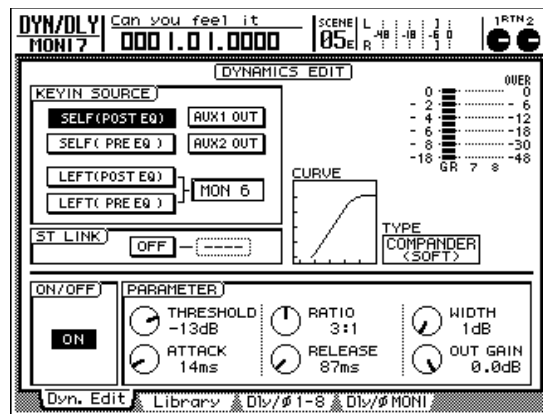
EQ (ATT -7 dB)

	LOW	L-MID	H-MID	HIGH
Q	L.SHELF	0.50	—	—
F	125 Hz	1.00 kHz	—	—
G	-8.0 dB	1.0 dB	0.0	0.0



Type Componder soft

Threshold	Ratio	Out Gain	Attack	Release	Width
-13 dB	3:1	0.0 dB	14 ms	87 ms	1 dB

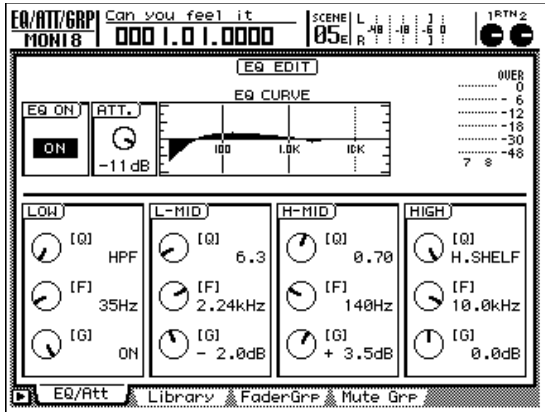


■ Channel 8: Acoustic guitar

We will not make any changes to the relaxed feel in the high range of the acoustic guitar, but will apply a slight boost to thicken the low-mid range, and use a compander to even out the loudness.

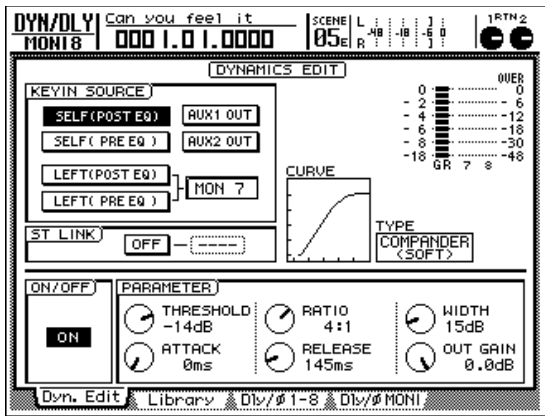
EQ (ATT -11 dB)

	LOW	L-MID	H-MID	HIGH
Q	HPF	6.3	0.70	—
F	35 Hz	2.24 kHz	140 Hz	—
G	ON	-2.0 dB	3.5 dB	—



Type Compander Soft

Threshold	Ratio	Out Gain	Attack	Release	Width
-14 dB	4:1	0.0 dB	0 ms	145 ms	15 dB



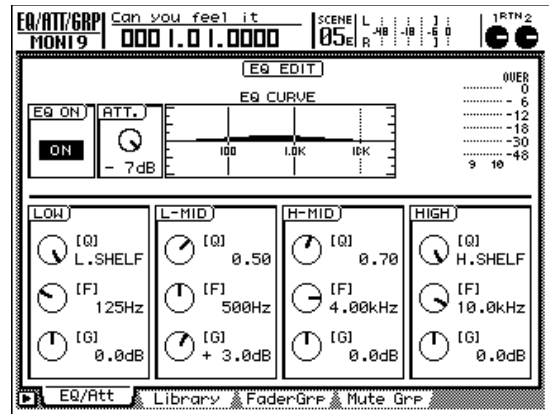
■ Channel 9: Piano

Since this has an overall familiar tone, we will leave it essentially unchanged. A slight boost in the 500 Hz region will bring out the core of the sound.

DYNAMICS OFF

EQ (ATT -7 dB)

	LOW	L-MID	H-MID	HIGH
Q	—	0.5	—	—
F	—	500 Hz	—	—
G	—	3.0 dB	—	—



■ Channel 10: Synthesizer

We will use the EQ to enhance the high range, emphasizing the tonal hardness characteristic of synthesizers. To make the phrasing crisper, we will apply a hard compander.

Type Compander Hard

Threshold	Ratio	Out Gain	Attack	Release	Width
-17 dB	2.5:1	-6.5 dB	0 ms	70 ms	7 dB

EQ (ATT -7 dB)

	LOW	L-MID	H-MID	HIGH
Q	L.SHELF	0.45	0.40	—
F	99 Hz	1.26 kHz	5.99 kHz	—
G	-11.5 dB	2.0 dB	5.5 dB	—

■ Channel 11: Organ

We will boost the mid range that adds a distinctive character to the organ sound.

DYNAMICS OFF

EQ (ATT -7 dB)

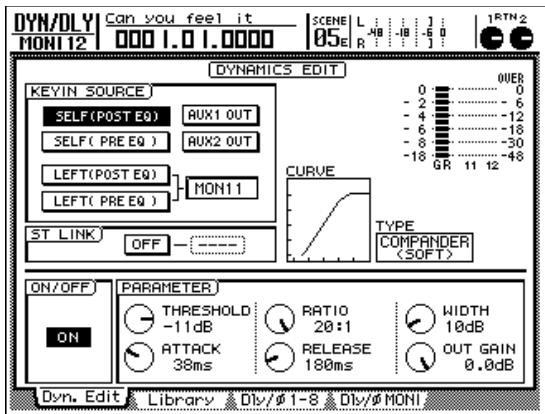
	LOW	L-MID	H-MID	HIGH
Q	—	—	1.6	—
F	—	—	749 Hz	—
G	—	—	5.5 dB	—

■ Channel 12: Electric guitar

Keeping in mind the balance with other parts, we will lower the low range and boost the mid range of the electric guitar, giving it a brighter sound. To restrain the loudness, we will apply a soft compander with a high RATIO setting.

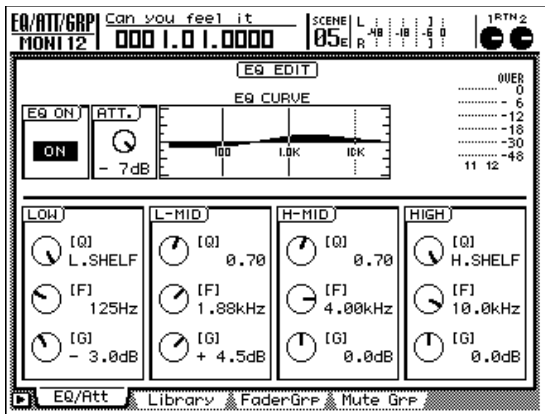
- **Dynamics settings for electric guitar: Compander soft**

Threshold	Ratio	Out Gain	Attack	Release	Width
-11 dB	20:1	0.0 dB	38 ms	180 ms	10 dB



- **EQ settings for electric guitar: ATT -7 dB**

	LOW	L-MID	H-MID	HIGH
Q	L.SHELF	0.70	—	—
F	125 Hz	1.88 kHz	—	—
G	-3.0 dB	4.5 dB	—	—



■ Channels 13/14/15: Chorus

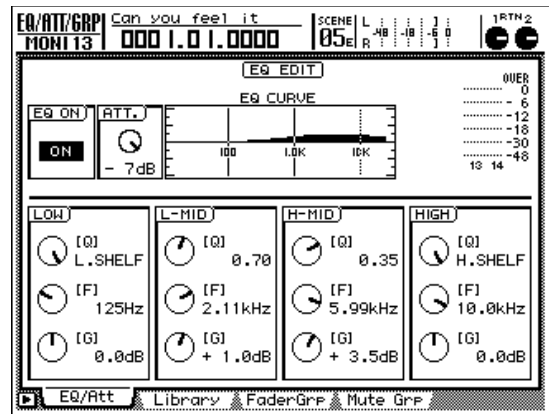
The chorus in channels 13 and 14 are the high (stereo) + low (monaural) tracks. High is panned to L and R, and low is panned slightly left. Make appropriate level and panning adjustments to create a good mix with the chorus 3 (middle/monaural) of channel 15.

So that it does not interfere with the lead vocal, we will emphasize part of the mid-range so that the voice carries sufficiently. In addition, we will use a compander on chorus 1 and 2 to restrain changes in dynamics, tightening up the sound and cutting the noise.

- **Chorus 1 and 2 (high & low)**

EQ (ATT -7 dB)

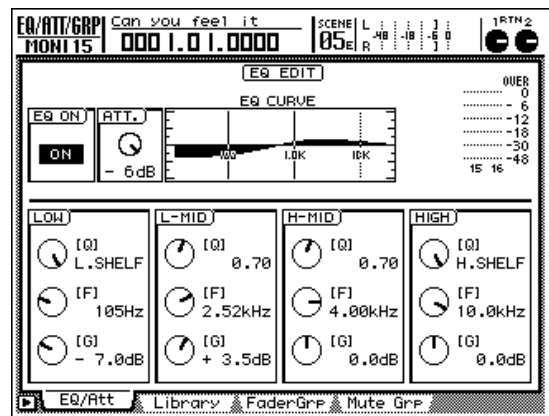
	LOW	L-MID	H-MID	HIGH
Q	—	0.70	0.35	—
F	—	2.11 kHz	5.99 kHz	—
G	—	1.0 dB	3.5 dB	—



- **Chorus 3 (middle)**

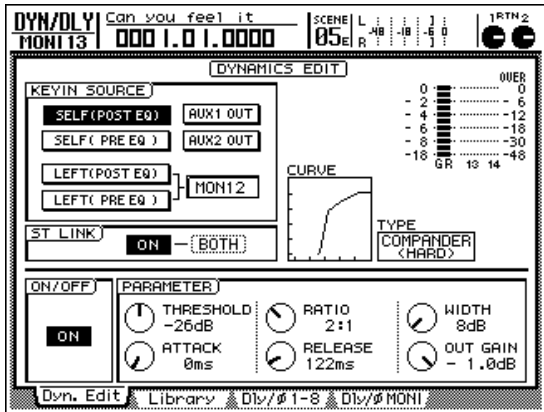
EQ (ATT -6 dB)

	LOW	L-MID	H-MID	HIGH
Q	L.SHELF	0.70	—	H.SHELF
F	105 Hz	2.52 kHz	—	10.0 kHz
G	-7.0 dB	3.5 dB	—	0.0



- **Dynamics settings for chorus 1 and 2 (Compander Hard)**

Threshold	Ratio	Out Gain	Attack	Release	Width
-26 dB	2:1	-1.0 dB	0 ms	122 ms	8 dB



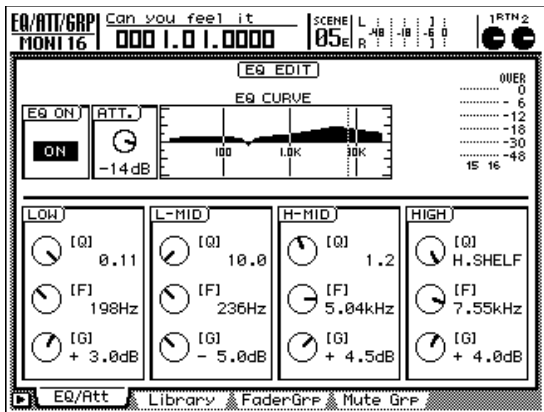
- **Dynamics settings for chorus 3: OFF**

■ Channel 16: Lead vocal

The lead vocalist on this channel has a strong and rich low-mid range, but in order to give the sound more definition, we will set L-Mid to 236 Hz and cut it by -5.0 dB. In addition, we will use a soft compander on the lead vocal to cut the noise and apply compression to emphasize the vocal strength and create a “hi-fi” feeling.

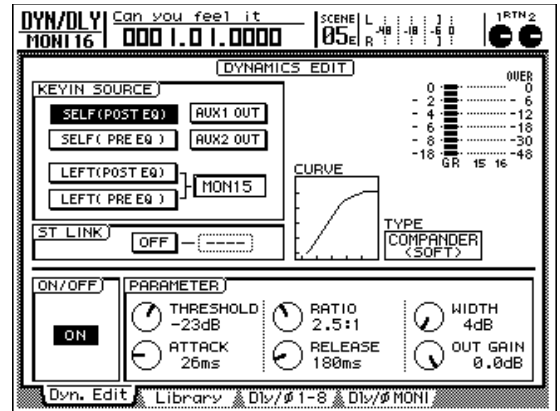
EQ (ATT -14dB)

	LOW	L-MID	H-MID	HIGH
Q	0.11	10.0	1.2	H.SHELF
F	198 Hz	236 Hz	5.04 kHz	7.55 kHz
G	3.0 dB	-5.0 dB	4.5 dB	4.0 dB



- **Dynamics settings (Compander Soft)**

Threshold	Ratio	Out Gain	Attack	Release	Width
-23 dB	2.5:1	0 dB	26 ms	180 ms	4 dB



When adjusting the EQ or dynamics, you should also adjust the fader level as appropriate. Since the level is also affected when you adjust EQ or dynamics, you will find it necessary to adjust it as well.

■ Saving the song

To save the song, press the WORK NAVIGATE section [SONG] key to access the SONG screen. If necessary, press the [F1] key to display the Song List page. Move the cursor in the screen to “SAVE” and press the [ENTER] key. When the confirmation message appears, move the cursor to the “OK” button and press the [ENTER] key. The song has now been saved.

Step 4. Adding ambience

Ambience-type effects such as reverb, delay, and echo can be used to add spaciousness and warmth. Up to this point in the process, you have been working with the “dry” sound, unprocessed by effects, but there are many engineers and artists who prefer to work with ambience-type effects already applied. Many artists also like to monitor the “wet” sound (i.e., with an effect) while they record. There is no hard and fast rule as to when in the mixing process ambience should be added, but in this tutorial we will handle it as a separate process. This is because unlike EQ or compressor, ambience effects do not directly affect the actual sound of the tracks. Ambience does not modify the sound, but rather adds sound.

To create a sense of unity, we will apply only one type of reverb to the entire song. Since the AW2816 contains two internal effect units, it is easy to apply two different reverbs or other effects to separate tracks, but to convey the “liveness” of this song, simpler effect settings will be more effective.

Applying excessive reverb to all tracks is the worst possible thing you can do. Use ambience effects with a light touch. Since reverb accumulates, applying even a small amount to each track will result in a significant amount when the entire mix is played back. In the beginning, you will need to repeatedly keep adjusting the reverb send of each track, but as you gain experience, you will learn the appropriate amounts to use.

- **Preset scene**

By recalling the preset scene number 04 “STEP4 MIX” you can hear the reverb and other settings that will be explained below. By now you probably know how to recall a scene, but if you are not sure, turn back to a previous section.

■ Using effect 1 send, and selecting an effect

1 Press the FADER MODE section [AUX5] key. Now the faders will act as the AUX send controls for the corresponding track. On the AW2816, AUX5 is assigned to internal effect 1, and AUX6 is assigned to internal effect 2. Here we will use only the AUX5 send.

2 Press the [F2] key to access the Effect Library page.

The default Reverb Hall effect is a bit too big, so we will select the Reverb PLATE effect which has a warmth and presence that is just right for this song.

3 From the effect library list, use the [DATA/ JOG] dial to select Reverb PLATE. Then move the cursor to the RECALL button and press the [ENTER] key.

A message will ask you for confirmation, so move the cursor to “OK” and press the [ENTER] key.

4 Press the [F1] key to access the Effect Edit page, and make sure that the “BYPASS” setting is OFF. (If it is ON, move the cursor to “BYPASS” and turn it OFF.)

Effects used in “Can you feel it?”

EFFECT 1

Reverb PLATE
Reverb time 0.8s

EFFECT 2

Symphonic

■ Adding ambience to tracks as needed

In AUX5 mode, use the faders to add just the necessary amount of the Reverb PLATE effect to each track. As in the other stages of the mixing process, you will frequently be turning each channel on/off to hear how a certain track sounds with the effect, or how it sounds in combination with other tracks. As discussed earlier, you should use the channel [ON] keys to turn channels on/off, rather than using the Solo function.

■ Channels 1/2: Kick and snare

When recording drums, you record the dry sound as on the tracks of the demo song. Adding just a slight amount of reverb will create a dramatically wider sense of space. However, be careful not to apply too much. Sometimes for a ballade you will year fairly heavy reverb on the drums, but even in this case it is applied only to a specific drum (such as the snare). In order to do this, it is obviously necessary to record the snare on its own track. On the other hand, it is just fine to leave the drum sound completely dry. In the demo song, we set the reverb time to 0.8 seconds to create a light reverb that will not “muddy” the drums, and lightly apply the reverb only to the snare and percussion. Raise the channel 2 and channel 7 AUX5 faders to about -25 dB.

In the MIXER VIEW screen (accessed by pressing the MIXER section [VIEW] key), you can view and make fine adjustments to the fader settings of the selected channel. The AUX5 fader in the lower right of the screen indicates the current level. You can move the cursor here and turn the [DATA/JOG] dial to make accurate adjustments. If you want to go back to the channel fader and make additional reverb adjustments, press the FADER MODE section [AUX5] key.

■ Channels 3 and 4: Overhead drum mics

These tracks combine the toms and hi-hat of the drum set. This is a stereo track. So that we do not impair the clarity of the hi-hat work, we will not apply any effect.

■ Channel 7: Percussion

The tambourine and handclaps are recorded on this channel. It might be nice to apply an effect to the handclaps, but since we don't want to blur the place of the tambourine in the rhythm section, we will not apply effects to this track either.

■ Channel 8: Acoustic guitar

To give a sense of spaciousness to the phrases played by the acoustic guitar, we will apply some light reverb. Raise the AUX5 track 8 fader to about -25 dB.

■ Channel 9: Piano

We will add a certain amount of reverb to the piano to make the sound richer.

■ Channel 10: Synthesizer

We will intentionally refrain from applying reverb to the synthesizer. Instead we will use “Symphonic” for effect 2. This effect is used mainly to add depth, a sense of speed, and a stereo feeling (horizontal spread) to synthesizer sounds. By increasing the EQ.G parameter we will give the sound more edge, and then raise FREQ to give the sound an increased sense of speed.

■ Channel 11: Organ

It is difficult to decide on an appropriate amount of reverb for instruments like organ. Since the sound is sustained, a large amount of reverb can occur before you realize it, ruining your mix. In the case of this song, we will simulate a narrow space (such as a garage) by not applying an effect.

■ Channel 12: Electric guitar

Since the electric guitar takes a solo, we will add a certain amount of reverb in order to add richness to the sound.

■ Channels 13/14/15: Chorus

We will apply just enough reverb to make the backing vocals blend together. Be careful, since more reverb will make the sound richer but will also make the lyrics less understandable, and will blur the overall mix. Don't overdo the reverb for channels 13/14/15.

■ Channel 16: Lead vocal

It is common to apply quite a bit of reverb on the lead vocal, but please listen carefully to the result. The less reverb is used, the better you will be able to hear the result. Apply reverb gradually, and stop when you sense that the sound has become a bit warmer and plumper. In particular, the detail and expressiveness of the AW2816's “24 bit high-quality reverb” can be best appreciated when it is applied lightly.

Since each adjustment performed during the mix will affect the audible balance, adjust the fader levels as necessary.

• Saving the song

It is very important to save the song frequently while you are working on it. If you have been working hard for several hours and the power cable is accidentally disconnected or a power failure occurs, or someone operates a key or fader, your hard work will be for nothing.

To save the song, press the WORK NAVIGATE section [SONG] key to access the SONG screen. If necessary press the [F1] key to display the Song List page. Move the cursor in the screen to “SAVE,” and press the [ENTER] key. When the confirmation message appears, move the cursor to “OK” and press the [ENTER] key to save the song.

Step 5. Completing the mix and making automation settings

The basic mix is now nearly complete. Effects have been added, and now it's time to listen carefully to the entire song and make final adjustments. As you listen to the mix, you may decide that you are not satisfied with having a single "average" mix throughout the entire song. That's where automation comes in. In the days before automation was available, a recording engineer had to make this type of adjustment manually while the actual master recording was being made. If the changes involved multiple faders or controls, it was sometimes necessary to obtain the help of other people. Of course, timing is vital, so if the changes were not made at the right time, the mixing process had to be repeated over and over until it was perfect. On the AW2816, the faders, channel on/off, pan, and EQ can all be automated, so it's easy to create a perfect automix.

The automix in the demo song uses a combination of automated fader operations, channel on/off, and pan. For details on recording and editing automation, you can refer to the Operation Guide. Here we will provide a brief explanation of the changes we made to the presets, and the reasons for the change. Turn automix on, and watch how the faders and channel [ON] keys change as the song progresses.

Use the following procedure to turn automix on.

- 1** In the AUTOMATION section, press the [AUTOMIX] key. If necessary, press the [F1] key to display the Main page.
- 2** Move the cursor to AUTOMIX, and press the [ENTER] key to select ENABLE.
- 3** As explained earlier in this tutorial, return to the VIEW screen or another desired screen.

• Automix

We will be explaining the progress of automix according to the absolute time counter. Please be aware that the times are approximate.

Listen to the recorded automix

This automix is stored with a title of "Can you feel it," so press the "AUTOMIX" button to access the "AUTOMIX" screen. Then press the "AUTOMIX" key several times to access the "MEMORY" screen, and recall "Can you feel it."

Next, turn the "AUTOMIX" setting to "ENABLE" so the automix will be reflected in the playback.

About the contents of the "Can you feel it?" automix

At each point in the demo song, the automix pushes forward "the sound that is most important at that point" by adjusting the level of each part (the faders will move).

During the electric guitar solo, automix will also adjust the depth of the effect (Reverb PLATE).

The automix is recorded according to the following time-line. Listen to the actual sound as you read through this, and use it as a source of ideas for your own automixes.

• Main contents of automix

1) Initial automix scene

The automix starts from the "AUTOMIX" scene memory.

2) Guitar

"0:10–0:45": The faders are adjusted to make the guitar backing and melody stand out.

3) Piano

For approximately the first 40 seconds of the song, the level is adjusted by raising the fader briefly to emphasize the backing in the lower register.

4) Synth

Approximately 1:30 into the song, the fader will be turned "ON." Then at about 2:25 the fader will be lowered, creating silence during the break. At about 2:40, the fader is raised once again.

5) Acoustic guitar

"1:35–": During the acoustic guitar solo phrase, automix controls the effect send level to adjust the crispness and resonance of the sound.

6) Handclaps

In the climactic section from 2:40, the sense of "liveness" is emphasized by slightly raising the handclap fader.

Mastering

Once you have completed the mixdown, you will perform mastering before writing the song to a CD-R disc. Mastering is the process of making overall adjustments to the song mixed to a stereo track. It may seem as though the song itself is essentially complete when you finish the mixdown. However, this does not guarantee that it will sound right when played back on a CD player. For example, it may be that the overall volume is low, so that you will have to turn up the volume further than when listening to other songs on CD, or the overall tone may be muffled, or there may be too much low-range sound so that the speaker distorts when you turn the volume up a bit.

Instead of simply writing the mix to CD-R, you perform the mastering process to adjust the overall balance so that the song will be more “listenable.”

Although this is sometimes thought of as consisting of “fine adjustments,” it is actually a very important step that determines the overall quality of the sound.

Normally, EQ and compressor are used to adjust the sound during mastering. Professional engineers sometimes add a tiny amount of reverb to the overall sound to create more depth, or pass the digitally-recorded sound through an analog device to give it the warmth characteristic of analog processing.

When multiple songs are recorded on one CD, significant differences in volume and tonal character between songs can make it unpleasant to listen to the CD. Thus, the mastering process also includes adjustments to the volume of each song, and determines the spacing between songs.

In this section we are going to explain the process from making mastering settings through writing the song to a CD-R disc to make a CD that can be played back on a conventional CD player.

■ Accurate monitoring is essential!

Although this can also be said for the mixing process, a good monitoring environment is essential for mastering. This is because not only the amp and speakers, but also the room and everything in it will affect the sound. If we wanted to be more particular, a great deal more could be said about this. If you use different equipment and a different room for monitoring, there will obviously be differences in the sound you that hear. For example in your private home studio, you might feel that the bass is weak, and boost the low range, but may be surprised to find that you hear nothing but bass when you play the song back at someone else’s home.

The ideal mastering environment is one with as little reverberation as possible, and in which the recorded sound and effects are reproduced as faithfully as possible (the technical term is “with a flat frequency response”). However in reality, only real professionals are probably able to do their mastering in a large recording studio.

So how can you create the best sound during mastering? Through their experience in mixing down and mastering at a particular studio, professional engineers have gained a sense of how the music heard in that studio will sound on an average stereo system or “boom box.” In other words, the best mastering is that which results in a song that sounds good when played back on any system. You should make an effort to listen to your song in a wide variety of locations. Listen to it on expensive stereo systems, cheap cassette players, portable audio devices, on a car stereo, ...and you will begin to see where your mastering is excessive and where it is lacking.

Setting master EQ and dynamics

It is not necessarily a rule that you must use EQ and compression when mastering. In this example, we will apply only a compressor to adjust the sound, and will not apply EQ.

Press the STEREO channel [SEL] key, and use the MIXER section [DYN] key to access the dynamics parameters. On the AW2816, you can adjust the master EQ and dynamics settings while listening to their effect on the overall sound.

While you are mastering you may feel like returning to the mixdown and changing something. For normal recording it is not possible to redo the mixdown once you are in the mastering process, but on the AW2816 you can recall scene memories and automix settings to go back and forth between the mixdown and mastering processes whenever you like.

In general, mastering is a matter of “fine adjustments,” as mentioned earlier, so if your mixdown has been brought to a high level of completion, you will have less to do during mastering. If mastering causes an abrupt change in the sound, you may want to reconsider the mixdown.

■ Equalizer (EQ)

Mastering EQ is used sparingly, in cases where you want to adjust the overall outline of the sound after it has been mixed, or if the low range just doesn’t sound quite sufficient. Conversely, you might cut the appropriate frequency range a bit to make the sound cleaner if the low range was excessive, or if too much sound ended up in the mid-range.

In this example we will not be applying EQ to the demo song, but we recommend that you adjust the parameters while the song plays back, and notice how the sound changes when adjust each frequency region.

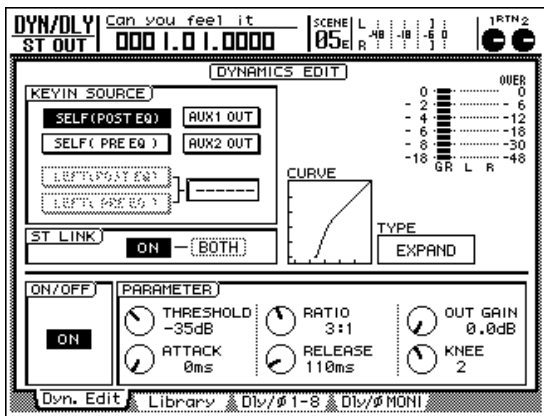
■ Compressor

By using a compressor during mastering, you can not only improve the overall balance of the song, but sometimes also give the sound more punch and speed, or emphasize the groove. This may be somewhat difficult until you get the knack, but once you do, you will be able to make your mix “sound better” every time.

The compressor settings for the demo song are nothing extreme, but here too, you can learn by trying out various settings as you did with the EQ, and noticing how the sound is affected.

■ Master compressor settings for the demo song

Threshold	Ratio	Out Gain	Attack	Release	Knee
-35 dB	3:1	0.0 dB	0 ms	110 ms	2



Recording the song to the stereo track

On the AW2816, you must first record the mixed song onto the stereo track, and then write that stereo track to the CD. Once you are satisfied with the master EQ and compressor settings, use the following procedure to record the song to the stereo track.

- 1 Press the [ST] key to enter STEREO track recording mode.
(The key indicator will blink.)
- 2 Return to the beginning of the song, and start recording.
(Simultaneously press the [REC] key and [PLAY] key.)
- 3 When the song ends, press the [STOP] key.

Writing the song to a CD-R disc

This procedure is explained in detail in the AW2816’s “Owner’s Manual,” so please refer to the appropriate pages.

Are you happy with your new CD?

The next step

If you have worked through the preceding pages, you now have a basic understanding of the process.

The AW2816 supports many other recording methods and mixdown functions that we were not able to introduce in these pages. We hope you will make full use of these capabilities, and even develop techniques that are not mentioned in the AW2816's "Owner's Manual."

As you spend time with the AW2816, it is sure to become a favorite partner in music production.

We hope that the AW2816 will continue to make your musical life even more wonderful!

Glossary

■ A/D converter

A circuit that converts an analog audio signal into a digital audio signal.

■ AD/DA

Conversion of an audio signal from analog to digital, or from digital to analog. All processing within the AW2816 is performed in digital form, but when an analog audio signal is input, it passes through AD conversion, and when sound from the AW2816 is monitored (*see entry), it passes through DA conversion.

■ AES/EBU

This is one of the professional formats for exchanging digital audio signals, and is a versatile format used on many devices. The MY8-AE (separately sold option) which can be installed in the YGDAI slot (*see entry) provides a D-sub 25 pin connector that can simultaneously transmit and receive eight channels of digital audio signals.

■ ATAPI

A specification for CD-RW drives that can be installed in the AW2816. The specification is the same as IDE, but on the AW2816 this term is used to distinguish it from the internal hard disk.

■ Audio source

A collective term for the signals that are input to a mixer or recorder. In the field of recording, the similar terms “tone generator” or “sound module” usually refer to an electronic instrument that produces sound, such as a synthesizer.

■ Automix

A function by which operations of mixer parameters such as knobs and faders are recorded along the time axis defined by the AW2816’s internal time code or externally-received MTC (*see entry), and can reproduce these movements during playback.

■ AUX

Stands for “auxiliary.” Signal output destinations used when using the two internal effects of the AW2816, or when using an external effect processor.

■ Bus

An audio signal route within the AW2816’s mixer section, used to combine multiple channels (*see entry). Normally you will not need to be aware of buses if you use the QUICK REC function to prepare for recording. However you can also use buses to perform more sophisticated recording or mixdown techniques.

■ Channel

A signal routing unit through which a sound that is input to the mixer section is adjusted by volume and pan (*see entry) and then output. The mixer section of the AW2816 provides a total of 28 channels, including the recorder playback and the outputs of the two effects.

■ Chase

A state in which the AW2816 is receiving MTC (*see entry) from an external device and running in synchronization with it. A standby state in which synchronization operation is possible is sometimes called “chase on” or “chase standby.”

■ Coaxial

Refers to a type of connector that carries IEC60958 (S/P DIF) format digital audio signals.

■ Compressor

An effect that lowers the volume when the input sound exceeds the specified Threshold level, or boosts the sound when it is below this level, in this way making the overall volume more consistent.

■ D/A converter

A circuit that converts a digital audio signal into an analog audio signal.

■ Default setting

The state of a setting when a device is purchased or powered-on. Also called “factory setting” or “initial setting.” The AW2816 can be restored to the default settings by recalling scene memory 00.

■ Dithering

When a digital audio signal is transmitted to a device with a lower quantization (*see entry), dithering combines some of the rounded-off portion with the data that is retained (i.e., instead of simply discarding the lower-value bits), in order to reduce the noise that is generated by this conversion. Since this changes the data itself, there are situations in which it is better not to apply dithering.

■ Dynamic range

The range from maximum volume to silence, expressed in dB (decibels). This is one aspect from which you can determine the accuracy with which a certain device can handle audio signals.

■ Dynamics

Refers to changes in the volume; for example if the volume varies dramatically between loud and soft, one might say that there is “a lot of variation in the dynamics.” Effects such as compressor (*see entry) or limiter (*see entry) that are used to compensate the volume are referred as “dynamics effects.”

■ Equalizer

A function that adjusts the sound by boosting/cutting a specific frequency band (*see entry) of the sound that is input to that channel. On the AW2816, a four-band parametric equalizer with adjustable frequency and AW2816 (*see entry) is provided on every channel.

■ Frequency band

Refers to a point or area on the frequency axis of sound, from low to high ranges. This term is used when specifying the point at which an equalizer (*see entry) will adjust the sound.

■ Gain

A knob that adjusts the sensitivity of the head amp (*see entry) in the input section of the AW2816. If this control is adjusted to keep the input volumes consistent at this point, it will be easier to use the faders of each channel to create a balance.

■ Head amp (HA)

A circuit placed before the A/D converter (*see entry) of an AW2816 input jack, used to adjust the analog input signal to a level that is suitable for digital conversion. (Also called mic preamp.)

■ Impedance

Resistance to alternating current. In general, this refers to the load of a signal input or output. The input/output jacks of the AW2816 have specific impedances depending on their type or intended input/output signal, and must be connected to a device of the same or similar impedance. Even if its cable connector has the same form as a line input, a high-impedance source such as a guitar must be connected to a high-impedance jack, not to a regular input.

■ Internal arithmetic precision (bits)

The arithmetic precision with which digital signals are processed inside a device. The AW2816 uses 32 bit arithmetic internally, guaranteeing an excellent dynamic range (*see entry) of 192 dB.

■ Jitter

When digital audio signals are transferred, the word clock (*see entry) of the devices must match. If this word clock is not generated accurately, a type of noise called jitter will occur. Less variation in the word clock rate as compared to a square wave with precise spacing (i.e., a more stable clock) will mean less jitter and better audio quality.

■ Library

Preset settings for the AW2816's equalizers (*see entry), dynamics processors (*see entry), and the two effect units, created with a wide range of uses in mind.

■ Limiter

An effect that limits the volume to prevent overload when the input sound exceeds a specified threshold.

■ Mastering

The process of adjusting the overall tone and volume of a song that has been mixed down. On the AW2816, the term is used in reference to the process up to creating an audio CD.

■ Mini YGDAI

The YGDAI (*see entry) input/output expansion slot found on the rear panel of the AW2816.

■ Mixdown

Also called "track down." The process of combining multiple tracks of sound into a final two-track mix that can be played back on an audio CD player, etc.

■ MMC (MIDI Machine Control)

A group of MIDI messages used to control recorder operations such as Play, Stop, and Record.

■ Monitor

The headphones or speakers used to reproduce the sound that is output from the AW2816. Also used to refer to the act of listening to the playback from the headphones or speakers.

■ Moving faders

Faders that automatically move to a position that corresponds to the value of the parameters that were recalled, for example when you switch the selection of the MIXING LAYER section or recall another scene from scene memory. On the AW2816, all nine faders (including the ST channel) are moving faders. This is very convenient, since the faders will move according to the parameter changes during automix, providing visual confirmation of the mixdown status.

■ MTC (MIDI Time Code)

A type of MIDI message used to convey time data in realtime over a MIDI cable, in order to synchronize the operation of the AW2816 and devices such as rhythm machines, sequencer software, or other recorders.

■ Nominal level

The "nominal level" referred to on a mixer or recorder indicates the standard level setting for that device. When all parameters are set to the nominal level, the audio quality will be the closest to the specifications given in the catalog.

■ Optical

Refers to a type of connector to which an optical cable is connected. For consumer audio, a format called IEC60958 (S/P DIF) is used. However, the MY8-AT (separately sold) option that can be installed in the YGDAI (*see entry) slot of the AW2816 provides an optical connector that uses the ALESIS ADAT format, and allows eight channels of digital audio to be input or output when connected to a compatible device.

■ Overdubbing

A technique that can be used on multi-track recorders such as the AW2816, in which (for example) drums are recorded first, and then other instruments such as guitar and bass are recorded on other tracks while the musician listens to the previously-recorded tracks, in this way accumulating a larger number of tracks.

■ Pan

A term derived from "panorama," referring to a parameter that specifies the location of a sound within the stereo field. Normally if a sound that is originally stereo is assigned to two monaural channels, the pan controls of the two channels are set to far left and far right so that the sound can be monitored in its original spatial state.

■ Phantom power

Power that is supplied via the cable of a microphone, and is normally required when using a condenser mic. This is defined as 48 volts.

■ Pop guard

A thin mesh card placed between the vocalist's mouth and the mic to reduce "breath" noise or "pop" noise when recording a vocal. Tissue paper is sometimes used.

■ **Punch-in/punch-out**

When you want to re-record just a specified area of a previously-recorded track, the action of switching from playback into record mode at the beginning of that area is called “punch-in,” and the action of switching from record mode back into playback at the end of that area is called “punch-out.”

■ **Q**

A parameter of the parametric-type equalizers (*see entry) provided by the AW2816. Q specifies the width of the frequency band (*see entry) that will be boosted or cut. High settings of Q will make the band narrower, producing a steeper curve of change.

■ **Quantization (number of bits)**

The resolution of the data when an analog input signal is converted into a digital signal.

■ **Restore**

The action of recalling a previously backed-up song from CD-R/CD-RW back into the internal hard disk.

■ **SCSI (Small Computer System Interface)**

This was originally a specification used to transfer data between a computer and an external storage device, but the AW2816 also uses this connector to connect external hard disks or external CD-R/RW drives. (*Do not connect the SCSI connector of the AW2816 directly to a computer. Doing so may damage both devices.)

■ **S/N**

The ratio of audio signal to noise. In dB (decibel) units, this indicates the level of the residual noise that is produced when absolutely no sound is being output.

■ **S/P DIF**

Stands for Sony/Philips Digital Audio Interface. The specification is formally called IEC60958, but is more generally known as S/P DIF. This is a consumer format for transferring digital audio signals, and simultaneously transmits or receives two channels (one stereo pair) of audio.

■ **Sampling rate**

Also called Sampling Frequency. The number of times per second that an analog sound is converted into digital data. A sampling rate of 44.1 kHz means that 44,100 digital conversions are being performed each second. If this number is higher, a broader frequency range of sound can be captured as data.

■ **Scene memory**

A function that collectively saves the parameter settings of the AW2816's mixer section. A scene that you saved can be recalled at any time to reproduce those settings.

■ **Solo**

A function that allows you to listen only to the sound of a desired channel during mixdown, etc.

■ **Time code**

Time data that is used when making the AW2816 operate in synchronization with a rhythm machine, sequencer program, or another recorder. The AW2816 is able to transmit and receive MTC (*see entry).

■ **Track**

A number assigned to an audio signal that is recorded or played back by a recorder. The AW2816 has 16 tracks x 8 virtual tracks (*see entry), for a total of 128 tracks.

■ **Virtual track**

Although the AW2816 can play back 16 tracks simultaneously, each track actually has eight tracks, and you can select one of these tracks for playback. The eight tracks that can be selected for each track are called “virtual tracks.”

■ **Word clock**

A synchronization signal used when transferring digital audio data, which is used to ensure that the audio data is received at the same rate it is being transmitted. When two or more devices are digitally connected, all devices must be using the same word clock. If not, it may be impossible to transfer audio signals, or noise may occur in the signal.

■ **XLR connector**

This is type of three-pin connector used for mics. It has a locking mechanism that prevents the cable from being pulled out accidentally.

■ **YGDAI**

Stands for Yamaha General Digital Audio Interface. Digital mixers or digital recorders that have a YGDAI slot allow you to install separately-sold I/O cards that support various professional digital audio formats or provide AD/DA functionality. There are two types of cards; YGDAI cards (CD series) that can be used by the Yamaha 02R and 03D, and Mini YGDAI cards (MY series) that can be used by the Yamaha 01V, D24, and AW4416. One optional Mini YGDAI card can be installed in the AW2816.

