

Note: For battery replacement use any brand CR2032, 3-volt, lithium battery such as Duracell, Eveready, Radio Shack, Sanyo, etc. Be sure to insert positive side up as marked on battery holder.

ANGEL CITY AUDIO

TURBO-DW OWNER'S MANUAL

4th edition

BY

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I M P O R T A N T ! ! !

DO NOT TOUCH OR REMOVE TURBO FROM PACKAGE BEFORE READING
INSTALLATION INSTRUCTIONS. DO NOT TOUCH TURBO BOARD UNTIL YOU ARE
READY TO INSTALL IT !!!

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I: INSTALLATION

IMPORTANT!!!! DO NOT TOUCH TURBO OR REMOVE IT FROM THE PACKAGE UNTIL YOU READ THE INSTALLATION INSTRUCTIONS!!!!!!

The installation of TURBO is surprisingly simple, and that is one of its beauties.

There are no special skills or tools required, although a ROM extractor, which is available from Radio Shack type stores for a few dollars is helpful. A phillips head screwdriver is required. If you do not have a chip extractor, use the plastic prong on the cap of a Bic pen instead. In general, never use any metallic object to pry out an integrated circuit chip, since it could be magnetized and destroy the programming of the chip. A flashlight may come in handy.

The main thing to be cautious of is static electricity. If a discharge of static electricity makes contact with TURBO or any of the internal components of your DW 8000 it might damage the components. In order to avoid this please read the following carefully.

Static electricity is less likely to build up in a humid environment. It is most likely in dry environments caused by winter heating when cold air from outside is heated inside the home and needs far more moisture to maintain its relative humidity levels than it did outside. If you experience static electricity discharges in your home you will certainly need to take precautions. Fortunately these are all quite simple. Humidify your work area by boiling water until condensation forms on the windows. Avoid wool and other static causing materials. Avoid carpeted areas. Do not wear a sweater! If static is still a problem you will need to ground yourself before working inside the DW or touching TURBO. In no case ground yourself if you will be touching anything remotely connected to electricity! Unplug all electrical connections first and do not touch anything connected to electricity. Better yet, use the safety grounding straps available at Radio Shack, which only ground the small type of discharges associated with static electricity. By observing these precautions you needn't worry about static. Static electricity is not likely to cause any problems during the Turbo installation, nor is the TURBO board especially sensitive, but it is wise to take precautions when working on all integrated electronics components.

- 1) Make a backup copy of your sounds on tape ! Sounds will not normally be lost when installing Turbo, but it could happen accidentally or if it becomes necessary to do the "initialization" procedure.
- 2) Disconnect all cables and power cords from the DW. Make sure it is cool. If it has recently been used, wait until it cools down.
- 3) On a clear work table, turn the DW upside down but be careful not to break the joystick. It is safer to let the joystick hang over the edge of the table. Have the front (key side) towards you so that the joystick is now on your right, face down.
- 4) Note the positions of the 5 large screws on the raised portion of the back panel and note the two sizes used all around the edge. Before removing the five large screws and the two types of screws around the edge, please note their locations with tape or pencil so that you will know which screws go where when you replace them. Remove these screws. Do not remove the four rubber feet or the 4 smaller screws located to the left and right of the rear left rubber foot.
- 5) Grasp the DW at either end and hold the top and bottom halves together while turning it back right side up. Let it rest on the table on its rubber feet so that the keyboard is facing towards you. The joystick is on the left now. Make sure the left side, including the joysticks, hangs over the edge of your work table.
- 6) Stop! Before opening the DW you should understand that the top half is rather heavy and is connected to the bottom by several wires and bundles of wires. The most common problem in Turbo installations are caused by accidentally tugging on these wires and straining connections. There is one set on the right which is connected to the power supply near the on/off switch on the back panel. The most delicate set is on the other end, near the audio output jacks. There is also a set of bundled wiring harnesses in the center of the back panel. The amount of slack in any of these wires may vary between instruments. Proceed slowly and very carefully. Lift up the top half, containing the keyboard and control panel just enough to detach it from the lower half. Try not to jerk it and slowly lift up the front so that you can see inside. Note the wires and watch them as you proceed so that you can see that they are not being strained. You are going to lay the top section down, back to back with the front, so that it's components are exposed (facing up.) In some DW's this may not be possible if the wiring is too tight. In that case you should have a friend hold the top in the vertical position while you do the installation. You might also consider placing a book or other object under the top half to keep it an inch or two above the table. Be careful not to break the joystick. The lower half is now facing you and exposed for the installation of TURBO. In no case should you unplug any wires! If you accidentally unplug any connectors, you may have difficulty getting a good contact when they are re-connected because the wires can be pulled away from the metal contacts inside the plugs. This will prevent current from flowing even though the plug is in the socket. Disconnecting

certain wires can scramble the memory contents and the DW will require re-initialization. Disconnecting the set of blue and white wires (or pulling them away from contacts inside the plug) will disconnect some keys on the keyboard. Being careful with these wires will insure that your installation is easy and trouble free.

7) You should now orient yourself: You are facing the DW's lower half from it's front. You will observe a large green component board at the left, another similar one in the center and three smaller components at the right. All of the following pertains only to the green component board in the center.

8) Note the round lithium battery in the center of the board. Between this and the right edge you will see that there is one IC chip that is different from the rest. It is in a socket instead of being directly connected to the board. This is the ROM chip which is designed to be replaceable. This is the chip that you will remove, and you will install Turbo in its socket.

9) Remove the ROM and be careful not to damage its delicate pins in case you wish to use it in the future. Place it inside the plastic TURBO box for storage. Try to avoid handling the tiny connector pins on this chip and on the TURBO -DW, since the oil left behind can cause corrosion. If you don't have an IC extractor, carefully pry up the chip from either end with the plastic prong on a Bic pen cap. Try not to damage this chip or its pins.

10) When the ROM chip is successfully removed, you are ready to install the TURBO-DW. You may carefully remove it from its package. Examine it if you are curious, but don't touch the two rows of metal extension pins on the bottom side. The foam material inside the plastic box is an anti-static material and this is a good place to store your KORG ROM chip. On the TURBO board you will see a replaceable battery, two RAM memory chips and a ROM chip directly behind the battery. The ROM chip contains all of the software that controls the DW/TURBO operation (it too is removeable). The RAM chips are for the expanded memory. The independent battery allows for the seperate protection of all TURBO memory, even when the board is not installed in a DW. Observe the cable and plastic plunger clip. Do not pull or break this jumper cable. Hold the board so that the round lithium battery is at the forward left side. This is the position it will have (relative to you) when plugged into the DW-8000. Be certain not to plug the board in backwards! The DW-8000 will not function if it is installed backwards.

11) Carefully line up the fourteen pins in each row with the socket. Make sure all pins are aligned before pressing them into the socket. Use the plastic pen cap to make delicate adjustments if necessary. Don't try to insert the extension pins into the socket yet, just make sure they are all lined up. You should sight along the 2 rows of pins at eye level to make sure they are all straight and going into the socket. A flashlight is very handy here! Once you are certain of alignment, you can begin to insert TURBO in this manner: hold the edge of the TURBO board gently in one hand, and use the thumb of the other hand to press down

directly on the large chip that is directly behind the round lithium battery. Press down on the center of that chip only.

Slowly press the board down into place, a bit at a time, watching the pins to make sure all are aligned and do not bend or get crushed. Do not apply pressure to any other place on the board, since this could crack the board. Relax and take as much time as you need to gradually insert the pins into the socket. Start gently, until you are sure that all the pins are aligned and started into their sockets. Then use firmer pressure to seat the installation. You will need to apply strong pressure to get the pins all the way into the socket. Do it this way: Once the board is started and you have double-checked alignment with a flashlight, use both thumbs to press directly downward on the large chip that is directly behind the round lithium battery. This will cause the DW's circuit board to bend. It looks scary when it bends, but if you press down as described, it's OK! Just don't pound or hit with a hammer! Press with your thumbs as described using as much weight as necessary. Go slowly and check often to see if it is all the way in. If it goes almost all the way and then stops, that's OK, as long as the gap isn't thicker than about 5 or 6 sheets of paper. Make sure both rows are even! If the TURBO-DW is not fully installed, it will not function or will function unreliably. Or it may stop working some day after you have moved the DW or when you hit the keys hard. It may even come out when you close the DW. So take your time to get it all the way in!

12) The pins on the TURBO-DW are intentionally larger than those on the original ROM chip in order to hold TURBO securely in place.

13) Now locate the point of connection for the address bus clip. Observe a large chip with many feet that is directly behind the center of the TURBO board. To the left of that component you will see 6 smaller chips that are all very similar to each other and arranged in two rows of three each. Some of these have 14 pins others have 16. The one you are looking for is in the rear center and has 14 pins, white printing on the circuit board identifies it as IC number 29 ("IC29"). This number is printed on the circuit board on the far side of the chip. The chip will have the following identification printed directly on it: SN74HC32N. This is the chip you are looking for. Observe the pin closest to you on the right side. You will attach the hook from the plunger clip around this pin. Be sure that you double check afterwards to be sure that you actually connected to this pin! There are many pins and many chips, it's easy to look away and then look back at the wrong chip!

14) Handle the jumper cable carefully, do not twist or bend it roughly! Hold the plastic plunger and experiment with it's operation. Note that a tiny copper hook sticks out when the plunger is pressed fully. Make sure the cable is straight and untwisted and that the copper hook has its open side towards the front of the DW (towards you). This hook inserts from between the pin we previously identified and the one directly behind it. You will probably have to carefully turn the copper hook (now extended) a bit to get it between the pins and then re-adjust it to get the hook around the front pin. Once in place you can

release the plunger and it will remain securely and definitely attached to that pin, unable to wiggle free or touch any other pins. The plastic shaft of the clip will point up in the air at an angle in the direction of the right front. You should check this to make sure the clip is secure and will not wiggle free. Those who are technically inclined may be tempted to solder the jumper and dispense with the clip. This is not recommended nor necessary. In no case should it be done until you are certain the TURBO is installed and working correctly. If the plastic plunger is correctly installed it won't come loose no matter how much the DW is shaken.

15) Before closing the DW, make sure that you have securely connected everything to its correct location and that everything is in order. Re assemble the DW. You may wish to wait until after you have checked the power-up test before inserting the screws. Just remember to hold the two-halves together securely when turning the DW right side up.

16) Turn on the DW and make sure the message 8008 appears in the display when the power is turned on. This replaces the original "8000" display. After a few seconds, the display will show the regular patch and parameter information, as usual. If the display "8008" does not appear, turn it off immediately and check your work for errors. By the way, once TURBO is installed, the DW will remember what patch number was called up when the DW was turned off and it will select this patch when it comes back on.

INITIALIZATION:

If the 8008 display does appear, then the TURBO board is correctly installed and you can go on to the initialization procedure. In many cases initialization will not be necessary and TURBO will be ready to use as soon as it is installed. However, you may use this procedure to eliminate garbled data that results from problems that may have arisen during TURBO-installation or from any other source of problems such as a dead battery, etc. Initialization will erase all of the patches that were in the DW-8000 before initialization, but it will not erase any banks that may be stored in the TURBO-DW. You should follow this procedure any time TURBO has been accidentally disconnected while the power was on or if the display shows garbled or strange characters. If garbled display persists after initialization, you have made some error in installation and may wish to call for advice.

To initialize the DW 8000: Turn power off. Press the 5 and 8 buttons and hold them down while you turn the power switch on. You must hold these buttons down until the 8008 display changes to 11-11-16. This will erase all memory in the DW and replace it with a legal set of blank patches with all parameters set to their lowest values. These patches will not make any sounds. The purpose of initialization is to remove garbled data that will confuse the DW's operating procedures and to clear garbled characters from the display. TURBO is normally sold with all 8 banks filled with blank (initialized) patches. Occasionally you might find some patches there that were used to test it's memory and not erased before shipping.

You have successfully completed and verified your installation!

If you have problems not explained by the manual please call! Most problems are easily solved in a few minutes with a simple explanation and instructions if you give us accurate and complete information about the problem. Don't try to guess, just tell us exactly what happened!

You are now ready to load sounds into the eight memory banks. Be sure to read the entire section on memory before loading sounds into the DW! I strongly suggest taking an hour to read the entire manual before beginning to use the Turbo-charged DW. Congratulations, you are now the owner of a unique and wonderful synthesizer!

If you are uncertain about your ability to open the DW and handle its components carefully, please refer the installation to a qualified technician. We highly recommend that in such case you select an authorized KORG service center. This is not the same thing as an authorized DEALER. KORG will be happy to give you the name of a service facility near you if you call them at 1-800-645-3188. Obviously, TURBO-DW is the product of Angel City Audio, not KORG, and any technical or support calls should be directed to us. Remember to bring the instruction manual along with the kit! Unfortunately, most service technicians will not want to take the time to read and understand the Turbo installation instructions. Please find a technician who will cooperate. We highly recommend that you do the installation yourself. You will probably do a better job than the average technician who will not read the instructions and will therefore not install the TURBO fully in the socket. This will invariably lead to problems later on.

ANGEL CITY TELEPHONE SUPPORT: 8am-4pm eastern time, mon-fri. 203-347-5166.

INSTALLING THE INDEX LABEL: This peel-off backing type label is designed to attach directly to the right of the blue DW 8000 logo. It will cover the smaller "programmable waveform" text. Test the location and then remove only a tiny piece of the backing paper at the left edge. Do this by cutting off a tiny strip of backing with a pair of scissors and then laying the paper back over the adhesive. Once the adhesive touches the DW it will not be possible to remove or adjust it. Attach this corner, then check alignment before gradually peeling off the rest of the backing. Work slowly from left to right to remove any air bubbles as you go. Replacement labels are available for \$1.00 each.

II: TURBO PATCH PARAMETERS: 18,27,28,36,37,38 and 61

These parameters are independently programmable for each patch. For instructions on "global" parameters ((78,84,85,86,87,88)) see section V: MIDI.)

Please read the entire section, since many of the features are interactive with each other. For convenience, instructions for each feature are listed under a separate heading. Features are listed in the order best suited to the tutorial form of this manual, rather than in numerical order.

parameter 37: (range= 0-63) This parameter determines where the keyboard split will be located, defining an upper and lower zone. If the value is set to 0, the split will not effect the DW's keyboard, since it will be located to the left of the bottom note. Similarly, if set to 63, it will be set one note above the highest note, and will not effect the keyboard. The default value is 0. You may choose to include a split point here, even though you do not use split mode in this patch, for reasons explained under "MIDI."

parameter 36: (range= 1-8) This parameter determines which TURBO MODE this sound will use. The eight TURBO modes are:

- 1) Normal DW 8000 operation (Except arpeggiator:see that section.)
- 2) Split: Normal operation above the split, local-off below the split. This means that the lower keyboard will send on MIDI but will not play the DW sound, which is useful when using the DW to control other synthesizers/modules.
- 3) Split: The same as above but with the upper keyboard turned off and normal operation on the lower zone.
- 4) Split: The split point is active for MIDI transmission on one or two channels, but neither zone plays the DW sounds. Particularly useful when working with sequencers.
- 5) Split: Sound A in the lower zone and sound B in the upper zone. Sound A is the regular DW sound at this memory location. Sound B is a second DW sound, stored at some other location, but addressed through parameter 18 at this location.
- 6) Split: The opposite of 5: Sound A is in the upper zone and sound B in the lower zone.
- 7) Layer: Both Sound A&B are played simultaneously (layered) in the lower zone. Set the split point accordingly if you wish to use the entire keyboard, part of it, or just the first or last note.
- 8) Layer: The same as 7, but the sounds are active in the upper zone. In either case, the other zone can be used to control other modules.

parameter 18: Here you select a second program from the current bank of 64 patches. (range= 11-88) The Up and Down buttons

control the selection. The edit slider gives quicker access, in larger increments and decrements. The patch selected here will always be referred to as "Sound B." Although Sound A is a normal DW 8000 patch, Sound B is different. It derives some of its parameter settings from Sound A. This is due to the internal architecture of the DW 8000 and the way that TURBO-DW manages to interpose itself into that architecture. So, sound B will not necessarily sound the same as it would if called at its own location. These are the parameters determined by A: Digital Delay (p71-p76), LFO or MG modulation (p61-65 and 81), Resonance (p32), Noise (p26), and Oscillator Mix Amounts (p13,p23).

In addition to these "hard" limitations, there is a more flexible type of limitation imposed: The selection of waveforms for sound B is partially determined by A as follows:

The 16 waveforms are divided into two groups, upper and lower. The lower group contains waveforms 1-8 and the upper contains 9-16. As in normal DW operation, each sound contains an independent waveform for each of its two oscillators. However, sound B waveforms must be from the same group as the corresponding oscillator in A. Examples: A= waveforms 3 and 14. Then, B can have its first waveform from 1-8 and its second from 9-16. If A= waves 5 and 5, then both of B's must be in the lower group 1-8, etc. So there are now four types of situations:

upper/upper
lower/lower
upper/lower
lower/upper

In the last two cases, the waveforms can be easily exchanged between oscillators, so there are actually only three types of groups. (Be sure to remember to reset applicable oscillator-specific parameters p11,p21,p14,p13,p23,p25 when necessary.) You will quickly find that this option allows you many benefits as well as its limitations. This is because TURBO automatically resets waveforms when the selected sound B does not line up with A's waveforms. Thus, you will find many cases where really good and useful sounds are available as Sound B that do not exist elsewhere in your Bank. The ANGEL CITY VOLUME 9 contains several examples of this. Since the essential envelope and filter settings remain in effect, and all of the extras (modulation, digital delay, etc.) assume the aspect of sound A, switching waveforms is more likely to produce interesting results than one might first suspect. When programming with TURBO, I usually try all available sounds in a bank for suggestions, by toggling the parameter 18 settings. Then I reverse the waveforms of A, when applicable, and see what turns up in the B sounds. If you are already very familiar with DW programming you will find that you quickly develop an intuitive and rather exciting grasp of the inherent possibilities for complex layers and splits using the TURBO features. ANGEL CITY volume 9 is designed both as a starter set of programming and as a tutorial in TURBO programming.

parameter 38: (range= 1-7) This adjusts the balance between A and B. The volumes are equal when set to 4. Lower values decrease the volume of B and higher values decrease the volume of A.

parameter 28: (range= 0-6) Similar to p25, this adjusts detuning. However, the detuning is between A and B, rather than between oscillators of A. This can be combined with p25 setting of both A and B. Particularly useful in layers, this works well when a sound is layered to itself, giving the effect of Unison mode, but remaining polyphonic.

parameter 27: (range= 0-12) Transposition amount. This allows TURBO to automatically transpose the pitch of sound A from what you play on the keyboard (or is received via MIDI) in semi tone increments up to a full octave. Sound B assumes the transposition value assigned to it at its own location. Besides being useful for playing songs in different keys than you are accustomed to, it allows for octave shifts in layers and one finger chords in conjunction with p24, p11, and p 21 for both A and B. If you layer a sound with itself, sound B will assume the settings already written to memory and sound A will reflect the edits currently in the buffer (see : MEMORY.) Transposition merely effects the patch to which it is programmed and is not transmitted via MIDI. When receiving, remember that transposition amounts are added to any incoming MIDI transpositions.

parameter 61: (new range= 0-4) TURBO-DW adds a fifth value to the types of modulation available. It is selected as value 4 and is a random (sample/hold) modulation nearly identical to that found in the DX7 in available speeds, intensities and quality. The beauty of this is best demonstrated at sounds 87 and 88 in ANGEL CITY volume 9.

III: MEMORY: architecture, operation and interface

BUFFER It is important to understand the BUFFER concept in order to understand both PATCH and BANK memory operation.

A memory buffer is an active memory area, which can store data temporarily. When new data is stored into the buffer it will erase previous data stored there. There are several buffers in the DW for different types of information. Turbo adds others and makes the whole memory system more comprehensive.

An unaltered DW has a buffer to store 64 patch memories (we will call this a bank, but don't confuse it with KORG'S use of the same word to also indicate a group of eight patches with the same first digit (11-18 for example.) The normal DW also has a buffer for a single patch that is being used to play or edit. This buffer is not protected by battery, so when the normal DW is shut off the edit is lost. The DW also had a buffer to remember some other parameters that weren't stored in the patch buffer such as p87, 85 and 84. Previously, p86 was not remembered when power was shut off.

TURBO-DW adds 8 new storage locations for the 64-patch buffer. So, now there are 8 different storage locations, each containing the complete contents of a 64 patch buffer, for a total of 512 patches in memory. These can be instantly loaded into the regular 64 patch buffer as needed. TURBO also adds an edit buffer so that you can compare an edit with the original patch. This edit buffer is not battery backed, so contents will be lost when the DW is shut off. However, the DW will remember what patch you were using last and will return to it when power is restored. As long as you remember to save all edits to memory before shutting off the DW (or calling a new patch into the edit/play buffers) you will not lose any data. Turbo includes all "global" MIDI parameters in one battery protected buffer, so p86 will now be saved along with p78, p84, p85, p87 and p88. These settings will effect all patches and all banks. They will remain active until changed. It is not necessary to "write" them to memory. Their settings will remain as you last set them until you change them. It is possible to write the patch to memory with a global parameter showing to facilitate editing any global parameter which you frequently change.

BANK BUFFER: When sounds are loaded into the DW through tape or MIDI, they will be stored in the normal buffer memory. This memory is secure only until another group of sounds is loaded into it. So, always be sure that this data has been saved to one of the 8 storage locations if you wish to recall it without loading from tape or MIDI. Naturally, if the data is already stored in one of the 8 Turbo storage banks you don't need to store it again. Don't forget to re-save a bank after you have made edits to any of it's patches. As in the past, the bank buffer is protected by the original KORG lithium battery.

TO SAVE BANK BUFFER (CURRENT BANK) TO STORAGE BANK: press the write button (write protect switch must be off) and when the

display flashes, press the bank hold button once. Display will now show: SAuE b __. This means "save to bank (b) ____." (however the number following "SAuE b" does not indicate the storage bank you will save to, since it doesn't yet know this. Rather, it tells you the last storage bank accessed.) Use the keypad to enter a number from 1-8. As soon as you press this button, you will have copied the entire bank into that storage location, erasing any previous contents. Display will return to normal. The bank will continue to remain in the Buffer memory until some other sounds are loaded. Be sure to keep a list of which storage banks have sounds in them so that you will not accidentally over-write them in the future. Continue to save banks to tape for secure storage outside the DW. Also: remember to write any patch edit into the bank buffer before saving the bank buffer memory to bank storage memory.

ABORT: You may abort the "WRITE" procedure while the display is flashing by pressing the "PARAMETER" button.

LOAD SOUNDS FROM BANK STORAGE TO BANK BUFFER: It is just as easy to load sounds into the BUFFER as it is to store them from the BUFFER: Press the bank hold button once: the decimal point will appear in the display as usual. Press it a second time: the display will shift to "LoAd b __".(Again, the number shown after "b" only refers to the last bank accessed.) Enter a number from 1-8 to load that stored bank of sounds. This will erase the previous contents of the BUFFER MEMORY. The new bank will be loaded into the buffer, the display will return to normal, but the individual patch buffer will still contain the last patch used until you call up a new patch.

ABORT: Simply press the bank hold button a third time,(or press the program or parameter buttons.)

CAUTION: You will activate the LOAD operation when using the BANK HOLD switch for it's normal functions. It is VERY IMPORTANT that you do not use the BUFFER MEMORY as the only storage location for any sounds or bank of sounds until you are familiar with TURBO. You may inadvertantly load a bank into bank buffer memory while attempting to exit the BANK HOLD function. BEWARE:This happens! I normally write my BUFFER bank and all edits to a permanent location every time I create or edit a patch to avoid accidentally loosing programs. In all cases: if you enter the load bank procedure,and don't wish to load a new bank, stop and think before proceeding beyond the LOAD display!!!! Always press the bank hold button again to exit before doing anything else. Once you get accustomed to this, you will not be likely to make mistakes.

MOVING PATCHES BETWEEN STORAGE BANKS: When you load a new bank of sounds into the bank buffer memory, you will not clear the patch buffer memory. This allows you to write the current sound to a location within the new bank. However, once you select a new sound, the contents of the patch buffer will be erased. Remember to re- write the bank to its permanent storage location after writing a new sound into it. Otherwise the new addition will be lost the first time you re-load the bank buffer memory. So, to move sound 21 in bank 3 to location 11 in bank 1: Load bank 3.

Call sound 21. Load bank 1, write to location 11. Write bank to bank 1 to store new bank arrangement. Then go to other banks to collect other sounds for storage in bank 1.

COMPARE TO EDIT FUNCTION: Turbo now allows you to compare the current edit in the patch buffer memory to the original patch stored at that location. Do this by pressing PROGRAM and PARAMETER simultaneously with two fingers. A "C" appears in place of PROGRAM NO. to indicate that you are now hearing the original sound at the current location rather than the contents of the buffer memory. Repeat the procedure to return to the buffer memory. When you become familiar with the concepts of Sound A and Sound B in the PROGRAMMABLE FEATURES section of this manual, you will note that sound B is not part of the patch buffer, but is simply addressed through this buffer. So if a sound is layered to itself and is thus both Sound A and B, changes made in the edit buffer will not effect sound B until it is written to memory. When layering a sound with itself, it is easy to become confused, especially when the compare function is being used. Be sure to check the results after writing the new edit to memory by clearing the buffer with a new sound, and then returning to the stored edit to make sure it was stored the way you thought. Sometimes it may be necessary to store the edit at a location different than the original one in order to layer it to itself while making some changes, such as transposition, which you don't want to apply to both sounds. A simple example of this: If you layer sound 11 to itself and edit p27 to cause an octave transposition of the edit to the original sound, and then attempt to store it at location 11: The result will not be a layer of 11 at the original octave + 11 an octave higher, it will be a layer of 11 twice at the higher octave. In this case you would store the edit to 12, or set p27 to appear in the display when sound 11 was called up, and then use the edit slider to adjust to the octave transposition. Once the concept of BUFFER and PERMANENT STORAGE are differentiated and clearly understood these operations will become obvious.

MEMORY LEVELS: (summary)

Level 1 (same as in normal DW 8000) SINGLE PATCH BUFFER:

Contains one patch which can be played and edited. Data can be entered to this buffer from the keypad (in "parameter" mode) but it will not be stored in the bank buffer unless you use the "write" procedure. Loading a new patch into the buffer will erase the current contents.

Level 2 (same as in normal DW 8000) BANK BUFFER:

Contains a set of 64 patches, any one of which can be put into the patch buffer by entering its number (11-88.) You can load patches into the Bank Buffer from tape, MIDI, or from any of the 8 Turbo Banks. Loading will erase old contents of buffer.

Level 3 (this level is new to TURBO-DW) TURBO BANKS # 1-8:

Eight independent locations in which to store a complete bank of 64 patches.

see diagram on next page

MEMORY TO TAPE AND MIDI INTERFACES:

TURBO-DW allows you to use any existing DW editing/librarian software. To do this it was necessary to prohibit the new parameters from being sent or received via MIDI. So, as far as your software is concerned, it is still communicating with a normal DW 8000.

One interesting feature of TURBO allows you to automatically assign settings for the new TURBO parameters to sounds being loaded into the DW from Sys Ex. Midi dump. Although this is not documented in Oliver's specifications, I have found that sounds being loaded in via sys.ex dump will acquire the settings for all Turbo parameters according to the settings that were previously made to sound ll of the patches in the buffer before the sys ex dump. Thus you can set up a template to add your own preferred TURBO set-ups to all incoming sys-ex data.

TAPE INTERFACE: You can save all new Turbo features to tape except for "global" MIDI parameters. You can reload from tapes. All operations are identical as in the past, except new parameteres are included. You may load non-Turbo tapes, and you may load Turbo tapes into non-Turbo DW's except that the new parameters will not be used by the non Turbo DW. However you may notice some strange behavior when loading TURBO tapes into normal DW's since the display may sometimes show parameters which don't exist. Of course, there will be no way to use these parameters on a normal DW and any attempt to access them will be impossible. You might also note an interesting phenomenon which is that TURBO parameters can be passed on to software via a non TURBO DW. Since the non TURBO DW is not designed to block SYS EX transmission of Turbo parameters, it can sometimes load them and pass them on via SYS EX dumps to external software. If you have 2 DW's and want to write software to take advantage of this you can create a TURBO librarian after all. Generally, if you are distributing patches to non-turbo DW owners, set all Turbo-parameters to their lowest value before making data cassettes. Also, remember not to have a TURBO parameter appear as the default parameter in the display. Failure to take this precaution will cause the recipient of your data cassette to experience problems when trying to transfer your data into his SYS EX system which will not be expecting illegal parameters.

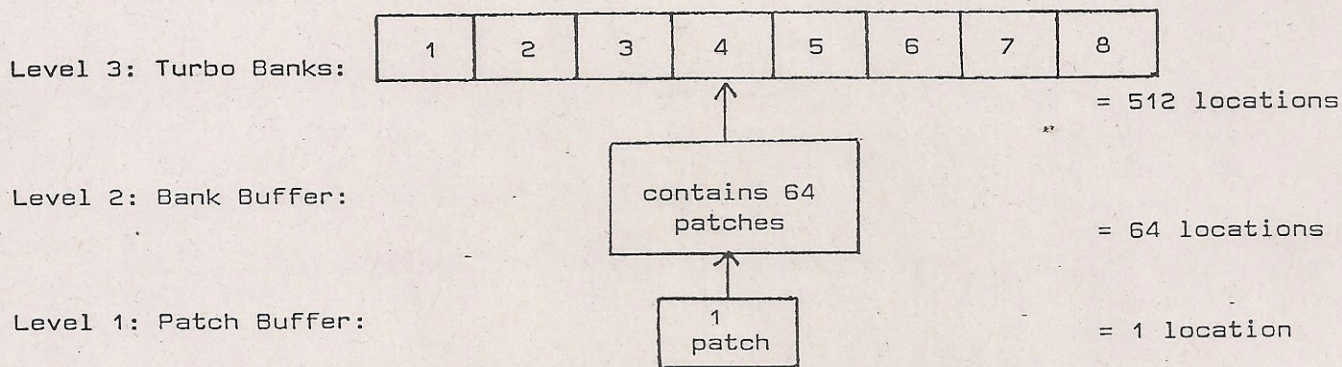


Figure 1: Memory Level Diagram

IV: OTHER FEATURES;

POLYPHONY, VOICE ALLOCATION: Turbo does not change the polyphony of the DW, it allows you to allocate it more flexibly. You still have a maximum of eight note polyphony. When you are in split mode it does not matter where you play on the keyboard, since the eight available voices are dynamically allocated to whatever combination of sounds you happen to be playing at that moment. You can play up to a total of eight notes at one time, regardless of what side of the split they are on.

LAYERED MODE: In these modes each key on the DW keyboard actually plays two notes, one of Sound A and one of Sound B. So, eight voice polyphony is reached when four keys are depressed.

UNISON MODE: Both DW unison modes are still available as in the past. They can also be used in conjunction with modes that employ a split keyboard with local off. (See PRORAMMABLE FEATURES) You can not use Unison modes when using either a split or layer, (Turbo modes 5-8) since all eight voices are needed to play a single note in Unison Mode.

ARPEGGIATOR

The arpeggiator has many new operating modes, depending on the combined settings of p78 and p36. In all cases the arpeggiator now accepts velocity information. However, this information is utilized in an unusual way: all arpeggiated notes are played with the same velocity, but this velocity is determined by the last note played, so that it can constantly update the velocity value as new notes are played on the keyboard. The full implication of this will be realized when examining the following possibilities.

1) Parameter 78 set to 1: Parameter 36 set to:

1= normal operation with velocity.

2= normal operation with sound A. Note entry from upper keyboard only. Lower keyboard can effect velocity.

3= same as 2, but from lower keyboard. Upper effects velocity

4= no operation.

5= operates and recognizes split point as determined by p37.

6= same.

7= operates with A and B in layer. Lower keyboard and upper keyboard active. Lower keyboard normal, upper keyboard adds silent notes and velocity.

8= same as 7, upper keyboard normal, lower keyboard adds silent notes.

2) Parameter 78 set to 2: Similar to above, but only A or B will play, not both. Which one plays depends solely on which was the last one used before the arpeggiator was turned on.

3) Parameter 78 set to 3: same as in 2.

Please note that it is not possible to use the arpeggiator with an external source of note data (such as a remote keyboard or pre-

recorded sequence) unless the "Latch" button is engaged on the DW 8000. It is, of course possible to use an external source to control clock timing using parameter 87 (as always.)

SUSTAIN PEDAL OPERATION IN MODE 6

The only bug I have found in the current version of TURBO is the strange operation of the sustain pedal when in mode 6. If a note is played in one zone, sustained by the pedal, and the fingers removed from the keys, the voice will be cut short as soon as a note is played in the other zone. If two notes are sustained, and one note is played in the other zone only one of the two voices will be silenced. In short, as many voices as are played in a given zone, that many will be cancelled in the other zone if they are merely being sustained by the pedal. This applies even though there may be plenty of voices free, a fact which can be verified by duplicating the situation while holding the notes down. In this case, operation will be normal. When this presents a problem it is suggested that you can set up the split using Mode 5 instead of Mode 6.

PATCH CHANGE PROTOCOL:

Unmodified DW 8000's allowed the user to sustain a note while changing patches, although the transition could be quite abrupt depending on the particular sounds. Turbo does not allow this, and like the newer KORG M and T series instruments, shuts off all sounds when patches are changed. However, you can sustain notes through a bank change since the patch buffer is not changed.

MIDI PROGRAM CHANGE COMMANDS:

Turbo allows you to send patch changes from 00-127 to any gear connected via MIDI cable. Normally the DW only sends 00 (patch 11) through 63 (patch 88). Holding the "PROGRAM" button while entering a patch number adds the value 64 to the command. So, "Program+11"=64 and "program=88"=127.

POLY 2 KEY ASSIGN MODE:

Turbo does not recognize Poly 2 as key assign mode and will treat as if it were Poly 1. Since Poly 2 is rarely (if ever) used, it was replaced with the 8 TURBO key assign modes found at parameter 36.

TURBO-DW MIDI IMPLEMENTATION

In addition to normal DW Midi functions, TURBO adds the ability to send and receive on a second channel when desired. We will discuss MIDI send and MIDI receive operation in this section.

Although the three types of TURBO operation can be performed at the same time, it is easier to think of them as independent functions. These three operations are:

- 1) PLAY MODE: The DW keyboard is used to play one or two internal sounds.
 - 2) MIDI SEND: The DW keyboard is used to play external devices or to send data for recording in a sequencer.
 - 3) MIDI RECEIVE: The DW sound(s) are played from a remote keyboard connected to the DW by a MIDI cable or from previously recorded sequences.
-

Here is a list of all old and new DW MIDI parameters and their functions: (The same list is printed on the self-adhesive index label supplied with TURBO-DW.) All MIDI parameters are GLOBAL and are not stored in individual patch memory but in a separate memory buffer that now remains active when the DW is turned off.

- 78:(new) Selects MIDI mode, number of channels and other functions in a way that is interactive with other parameters and which will be detailed later. Values: 1, 2 or 3.
- 84:(old) Selects the primary MIDI channel. Values: 1-16
- 85:(old) Selects whether the DW transmits all data or simply note-data on it's primary channel. Value: 1 or 2.
- 86:(old) Selects whether the DW receives MIDI in OMNI on or off mode. Values: 0 or 1.
- 87:(old) Selects whether arpeggiator responds to internal or external clock and value of each clock pulse. (unchanged.)
- 88:(new) Selects the secondary MIDI channel. Only note data is transmitted on this channel. Values: 1-16.
-

TURBO-DW MIDI IMPLEMENTATION : SEND

Send operation is quite simple and is not effected by TURBO mode. Select whether you wish to send on one channel or two by setting p78 =1 (Transmits on the channel selected at p84); p78=2 (Transmits on the channel selected at p84 from the keys above the point set at p 37 and transmits on the MIDI channel selected at p88*for the keys below the split point.); p78=3 (Transmits on the channel selected at p84 from the lower keyboard and from the channel selected at p88 from the upper keyboard.)

Parameters involved in MIDI send:

p37=splitpoint; p78=selection of single or double channel and assignment of primary and secondary channel to opposite sides of the split point selected at p37. Although MIDI parameters are global, p37 is retained in patch memory.

p84/88=selection of primary and secondary channels.

TURBO-DW MIDI IMPLEMENTATION: MIDI RECEIVE

Play and transmit functions are relatively straight-forward, as we have seen in the above paragraphs. When you use your TURBO-DW to receive Midi data from an external controller or sequencer the operation will be equally logical but a bit more complex. There are a surprisingly large number of ways in which TURBO can be set up to respond to MIDI data with a surprisingly small number of parameters. This is achieved through interactive relationships between the parameters. Once you understand the logic of each parameter you should find it easy to predict how they will interact. This understanding will make most of the following explanation and diagrams unnecessary. However, those who need to see examples or who are new to MIDI may find this detailed listing of combinations helpful.

The following parameters are involved in the Midi receive operation: P84 selects the first MIDI channel, p88 selects the second Midi channel, p86 determines whether TURBO ignores MIDI channel assignments (OMNI ON) or observes them (OMNI OFF.) P78 has three values. When it is set to value 1 it operates interactively with p36, recognizing the particular features of each TURBO mode (when receiving) in a way similar to its operation when playing internal sounds from the DW keyboard. However, when set to a value of 2 or 3, the setting of p36 and consequently the split point are ignored and TURBO simply assigns one of the two Midi channels to sound A and the other to sound B. Most of the complexity is thus only an issue when p78 is set to a value of 1. Otherwise operation remains consistent and simple regardless of the settings of p86, 36 and 37. This arrangement allows for intuitive operation and also for detailed and complex features suited to particular needs. You can select those set-ups which suit your own needs and ignore the dozens of other possible arrangements.

The most important point to keep in mind is that the DW 8000 may respond differently to MIDI than it does to it's own keyboard, depending on the configuration you have set-up, particularly when p78=1. You may be surprised the first time you hear sound B playing when you never set out to set up a split or layer. Remembering that Midi may have access to sound B even when it is not playable from the keyboard is an important first step towards feeling familiar and comfortable with TURBO receive protocol.

A quick review of parameters may make the following charts unnecessary if your mind can follow interactive logic:

p36, value 1=sound A across the entire keyboard.

value 2=sound A above the split point, local off below.

value 3=sound A below the split point, local off above.

value 4=local off both sides of split.

value 5=A on lower, B on upper.

value 6=B on lower, A on upper.

value 7=A+B on lower, local off above.

value 8=A+B on upper, local off below.

These play mode setups will only be operative in MIDI receive

situations when p78=1. When p78 =2, Turbo assigns sound A to whichever Midi channel is set at p84 and sound B to whichever channel is set at p88, regardless of other settings.(3=reverse.)

When p86 is on, Midi channel settings are ignored and TURBO responds exactly as it would in play mode to commands from the keyboard as long as p78 is set to 1. So, it would not respond to Midi messages in MODE 4 any more than it would respond to its own keyboard.(When 78=2 only sound A plays. When 78 =3 only sound B will play.)

Setting p86 to "off" and p78 to 1 will also give similar results except sounds A and B will be further restricted by their association with a specific Midi channel selected at p84 and p88.

Setting p86 to "off" and p78 to 2 or 3 will give the results described previously at the top of this page.

The two charts which follow and the ensuing tutorial simply elaborate on the logical consequences of these simple rules. Remember that most controller information is global for the entire DW 8000. So expect sustain, pitch bend*, aftertouch* and patch change commands to work as in an unmodified DW 8000. Although A and B will respond to pitch bend with whatever amount is set individually for each at p66, they will both respond to pitch bend on any channel on which TURBO is receiving data. Patch changes will likewise select a new patch along with a different setting for p36, 37, 38, 18, and 28. For these reasons and others, most Midi users will use the more standard settings of 2 or 3 for p78.

Be sure to set p38,37,28 and 18 accordingly if you are planning on Midi reception that will involve sound B,even if these settings have no effect on the operation from the keyboard. Forgetting about sound B can result in surprises upon playback of your sequences!

Remember that p85 allows you to filter out everything but note data when transmitting on the channel selected at p84. Which side of the split you assign this to will depend on which module you wish to receive control, patch change, sustain and after-touch information. The channel selected at p88 only transmits note data including note on, velocity and note off. This may or may not be convenient depending on the features of your external devices and the particular requirements of your performance. Although TURBO does not add every feature we wish, it adds enough to radically improve the DW 8000. More importantly, it adds those features which cannot be added by external hardware. An MX8 or other MIDI processor can split channel assignments with far better control of details, but it cannot turn local off within the DW 8000!

*NOTE: Although sounds A and B respond globally to pitch bend and after-touch commands being received by TURBO on any recognized MIDI channel, they will respond with the amounts programmed within each sound (patch.) You can set p66 to 0 if you don't want that sound to respond to bend commands. Likewise you can set p81,p82 and p83 to limit after touch response. However, remember that p81 (LFO-modulation-of pitch-via after-touch intensity) is contro-

TURBO-DW MIDI IMPLEMENTATION : MIDI RECEIVE WITH OMNI "ON"(p86=1)
 (all MIDI channel assignments ignored)

| | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|-----------------|-----|-----|----|----|---|--|---|----|---|--|---|---|-----------------|----|--|-----|----|---|--|---|----|---|--|---|
| <p>TURBO MODE 1:</p> <table> <tr> <td>parameter 78 =1</td> <td>A</td> <td> </td> <td>A</td> </tr> <tr> <td>=2</td> <td>A</td> <td> </td> <td>A</td> </tr> <tr> <td>=3</td> <td>B</td> <td> </td> <td>B</td> </tr> </table> | parameter 78 =1 | A | | A | =2 | A | | A | =3 | B | | B | <p>TURBO MODE 2:</p> <table> <tr> <td>parameter 78 =1</td> <td>NO</td> <td> </td> <td>A</td> </tr> <tr> <td>=2</td> <td>A</td> <td> </td> <td>A</td> </tr> <tr> <td>=3</td> <td>B</td> <td> </td> <td>B</td> </tr> </table> | parameter 78 =1 | NO | | A | =2 | A | | A | =3 | B | | B |
| parameter 78 =1 | A | | A | | | | | | | | | | | | | | | | | | | | | | |
| =2 | A | | A | | | | | | | | | | | | | | | | | | | | | | |
| =3 | B | | B | | | | | | | | | | | | | | | | | | | | | | |
| parameter 78 =1 | NO | | A | | | | | | | | | | | | | | | | | | | | | | |
| =2 | A | | A | | | | | | | | | | | | | | | | | | | | | | |
| =3 | B | | B | | | | | | | | | | | | | | | | | | | | | | |
| <p>TURBO MODE 3:</p> <table> <tr> <td>parameter 78 =1</td> <td>A</td> <td> </td> <td>NO</td> </tr> <tr> <td>=2</td> <td>A</td> <td> </td> <td>A</td> </tr> <tr> <td>=3</td> <td>B</td> <td> </td> <td>B</td> </tr> </table> | parameter 78 =1 | A | | NO | =2 | A | | A | =3 | B | | B | <p>TURBO MODE 4:</p> <table> <tr> <td>parameter 78 =1</td> <td>NO</td> <td> </td> <td>NO</td> </tr> <tr> <td>=2</td> <td>A</td> <td> </td> <td>A</td> </tr> <tr> <td>=3</td> <td>B</td> <td> </td> <td>B</td> </tr> </table> | parameter 78 =1 | NO | | NO | =2 | A | | A | =3 | B | | B |
| parameter 78 =1 | A | | NO | | | | | | | | | | | | | | | | | | | | | | |
| =2 | A | | A | | | | | | | | | | | | | | | | | | | | | | |
| =3 | B | | B | | | | | | | | | | | | | | | | | | | | | | |
| parameter 78 =1 | NO | | NO | | | | | | | | | | | | | | | | | | | | | | |
| =2 | A | | A | | | | | | | | | | | | | | | | | | | | | | |
| =3 | B | | B | | | | | | | | | | | | | | | | | | | | | | |
| <p>TURBO MODE 5:</p> <table> <tr> <td>parameter 78 =1</td> <td>A</td> <td> </td> <td>B</td> </tr> <tr> <td>=2</td> <td>A</td> <td> </td> <td>A</td> </tr> <tr> <td>=3</td> <td>B</td> <td> </td> <td>B</td> </tr> </table> | parameter 78 =1 | A | | B | =2 | A | | A | =3 | B | | B | <p>TURBO MODE 6:</p> <table> <tr> <td>parameter 78 =1</td> <td>B</td> <td> </td> <td>A</td> </tr> <tr> <td>=2</td> <td>A</td> <td> </td> <td>A</td> </tr> <tr> <td>=3</td> <td>B</td> <td> </td> <td>B</td> </tr> </table> | parameter 78 =1 | B | | A | =2 | A | | A | =3 | B | | B |
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| =3 | B | | B | | | | | | | | | | | | | | | | | | | | | | |
| parameter 78 =1 | B | | A | | | | | | | | | | | | | | | | | | | | | | |
| =2 | A | | A | | | | | | | | | | | | | | | | | | | | | | |
| =3 | B | | B | | | | | | | | | | | | | | | | | | | | | | |
| <p>TURBO MODE 7:</p> <table> <tr> <td>parameter 78 =1</td> <td>A+B</td> <td> </td> <td>NO</td> </tr> <tr> <td>=2</td> <td>A</td> <td> </td> <td>A</td> </tr> <tr> <td>=3</td> <td>B</td> <td> </td> <td>B</td> </tr> </table> | parameter 78 =1 | A+B | | NO | =2 | A | | A | =3 | B | | B | <p>TURBO MODE 8:</p> <table> <tr> <td>parameter 78 =1</td> <td>NO</td> <td> </td> <td>A+B</td> </tr> <tr> <td>=2</td> <td>A</td> <td> </td> <td>A</td> </tr> <tr> <td>=3</td> <td>B</td> <td> </td> <td>B</td> </tr> </table> | parameter 78 =1 | NO | | A+B | =2 | A | | A | =3 | B | | B |
| parameter 78 =1 | A+B | | NO | | | | | | | | | | | | | | | | | | | | | | |
| =2 | A | | A | | | | | | | | | | | | | | | | | | | | | | |
| =3 | B | | B | | | | | | | | | | | | | | | | | | | | | | |
| parameter 78 =1 | NO | | A+B | | | | | | | | | | | | | | | | | | | | | | |
| =2 | A | | A | | | | | | | | | | | | | | | | | | | | | | |
| =3 | B | | B | | | | | | | | | | | | | | | | | | | | | | |

HOW TO READ THIS CHART:

Each of the eight Turbo modes that can be selected at parameter 36 are illustrated with a diagram. The line dividing the center of the diagram is the split point as set by parameter 37. Each row of the diagram indicates which sound will play on either side of the split point when parameter 78 has been set to the value indicated in that row. Please note that when parameter 78 is set to "2" sound B will always play, regardless of TURBO mode; and that when the value is "3" sound A will play. The chart shows this redundant information for clarity and completeness.

Other Midi parameters. Since OMNI MODE is "ON" all MIDI channels are recognized and settings of p84 and 88 are not relevant. Please remember that if controller data such as program change, sustain pedal, pitch bend or after touch is being sent to TURBO on any MIDI channel it will be recognized "globally" which means it will effect the entire DW 8000 operation including programmed amounts for sound A or B.

In the case of MIDI RECEIVE, sound B is active as indicated in these charts. Remember to set Volume at p38, selection a p18 and detuning at p28.

TURBO-DW MIDI IMPLEMENTATION : MIDI RECEIVE WITH OMNI "OFF"(p86=0)
 (all MIDI channel assignments of sending device and both TURBO
 MIDI channels selected at p84 and p88 are pertinent.)

| | | | | | | | | | | | | | | | | | | | |
|--|----------------------------|----------------------------|----------------|----|-------------------------|--------------|----|--------------|--------------|--|----|---------------------------|-----------------|----|-------------------------|--------------|----|--------------|--------------|
| <p>TURBO MODE 1: p78=</p> <table border="1"> <tbody> <tr> <td>1:</td> <td>84=A 88=no</td> <td>84=A 88=no</td> </tr> <tr> <td>2:</td> <td>84=A 88=B</td> <td>84=A 88=B</td> </tr> <tr> <td>3:</td> <td>84=B 88=A</td> <td>84=B 88=A</td> </tr> </tbody> </table> | 1: | 84=A 88=no | 84=A 88=no | 2: | 84=A 88=B | 84=A 88=B | 3: | 84=B 88=A | 84=B 88=A | <p>TURBO MODE 2: p78=</p> <table border="1"> <tbody> <tr> <td>1:</td> <td>84=no 88=no</td> <td>84=A 88=no</td> </tr> <tr> <td>2:</td> <td>84=A 88=B</td> <td>84=A 88=B</td> </tr> <tr> <td>3:</td> <td>84=B 88=A</td> <td>84=B 88=A</td> </tr> </tbody> </table> | 1: | 84=no 88=no | 84=A 88=no | 2: | 84=A 88=B | 84=A 88=B | 3: | 84=B 88=A | 84=B 88=A |
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| 3: | 84=B 88=A | 84=B 88=A | | | | | | | | | | | | | | | | | |
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| 3: | 84=B 88=A | 84=B 88=A | | | | | | | | | | | | | | | | | |
| <p>TURBO MODE 3: p78=</p> <table border="1"> <tbody> <tr> <td>1:</td> <td>84=A 88=no</td> <td>84=no 88=no</td> </tr> <tr> <td>2:</td> <td>84=A 88=B</td> <td>84=A 88=B</td> </tr> <tr> <td>3:</td> <td>84=B 88=A</td> <td>84=B 88=A</td> </tr> </tbody> </table> | 1: | 84=A 88=no | 84=no 88=no | 2: | 84=A 88=B | 84=A 88=B | 3: | 84=B 88=A | 84=B 88=A | <p>TURBO MODE 4: p78=</p> <table border="1"> <tbody> <tr> <td>1:</td> <td>84=no 88=no</td> <td>84=no 88=no</td> </tr> <tr> <td>2:</td> <td>84=A 88=B</td> <td>84=A 88=B</td> </tr> <tr> <td>3:</td> <td>84=B 88=A</td> <td>84=B 88=A</td> </tr> </tbody> </table> | 1: | 84=no 88=no | 84=no 88=no | 2: | 84=A 88=B | 84=A 88=B | 3: | 84=B 88=A | 84=B 88=A |
| 1: | 84=A 88=no | 84=no 88=no | | | | | | | | | | | | | | | | | |
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| 3: | 84=B 88=A | 84=B 88=A | | | | | | | | | | | | | | | | | |
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| 2: | 84=A 88=B | 84=A 88=B | | | | | | | | | | | | | | | | | |
| 3: | 84=B 88=A | 84=B 88=A | | | | | | | | | | | | | | | | | |
| <p>TURBO MODE 5: p78=</p> <table border="1"> <tbody> <tr> <td>1:</td> <td>84=A 88=no</td> <td>84=B 88=no</td> </tr> <tr> <td>2:</td> <td>84=A 88=B</td> <td>84=A 88=B</td> </tr> <tr> <td>3:</td> <td>84=B 88=A</td> <td>84=B 88=A</td> </tr> </tbody> </table> | 1: | 84=A 88=no | 84=B 88=no | 2: | 84=A 88=B | 84=A 88=B | 3: | 84=B 88=A | 84=B 88=A | <p>TURBO MODE 6: p78=</p> <table border="1"> <tbody> <tr> <td>1:</td> <td>84=B 88=no</td> <td>84=A 88=no</td> </tr> <tr> <td>2:</td> <td>84=A 88=B</td> <td>84=A 88=B</td> </tr> <tr> <td>3:</td> <td>84=B 88=A</td> <td>84=B 88=A</td> </tr> </tbody> </table> | 1: | 84=B 88=no | 84=A 88=no | 2: | 84=A 88=B | 84=A 88=B | 3: | 84=B 88=A | 84=B 88=A |
| 1: | 84=A 88=no | 84=B 88=no | | | | | | | | | | | | | | | | | |
| 2: | 84=A 88=B | 84=A 88=B | | | | | | | | | | | | | | | | | |
| 3: | 84=B 88=A | 84=B 88=A | | | | | | | | | | | | | | | | | |
| 1: | 84=B 88=no | 84=A 88=no | | | | | | | | | | | | | | | | | |
| 2: | 84=A 88=B | 84=A 88=B | | | | | | | | | | | | | | | | | |
| 3: | 84=B 88=A | 84=B 88=A | | | | | | | | | | | | | | | | | |
| <p>TURBO MODE 7: p78=</p> <table border="1"> <tbody> <tr> <td>1:</td> <td>84=A+B 88=no</td> <td>84=no 88=no</td> </tr> <tr> <td>2:</td> <td>84=A 88=B</td> <td>84=A 88=B</td> </tr> <tr> <td>3:</td> <td>84=B 88=A</td> <td>84=B 88=A</td> </tr> </tbody> </table> | 1: | 84=A+B 88=no | 84=no 88=no | 2: | 84=A 88=B | 84=A 88=B | 3: | 84=B 88=A | 84=B 88=A | <p>TURBO MODE 8: p78=</p> <table border="1"> <tbody> <tr> <td>1:</td> <td>84=no 88=no</td> <td>84=A+B 88=no</td> </tr> <tr> <td>2:</td> <td>84=A 88=B</td> <td>84=A 88=B</td> </tr> <tr> <td>3:</td> <td>84=B 88=A</td> <td>84=B 88=A</td> </tr> </tbody> </table> | 1: | 84=no 88=no | 84=A+B 88=no | 2: | 84=A 88=B | 84=A 88=B | 3: | 84=B 88=A | 84=B 88=A |
| 1: | 84=A+B 88=no | 84=no 88=no | | | | | | | | | | | | | | | | | |
| 2: | 84=A 88=B | 84=A 88=B | | | | | | | | | | | | | | | | | |
| 3: | 84=B 88=A | 84=B 88=A | | | | | | | | | | | | | | | | | |
| 1: | 84=no 88=no | 84=A+B 88=no | | | | | | | | | | | | | | | | | |
| 2: | 84=A 88=B | 84=A 88=B | | | | | | | | | | | | | | | | | |
| 3: | 84=B 88=A | 84=B 88=A | | | | | | | | | | | | | | | | | |

HOW TO READ THIS CHART:

Each of the eight Turbo modes that can be selected at parameter 36 is illustrated with a diagram. The verticle line dividing the center of each diagram represents the split point selected at parameter 37. Your setting for the value of parameter 78 (1,2 or 3) determines which of the three rows in each diagram will be relevant. Please note that the listing for p78=2 and p78=3 are the same in all eight diagrams. This redundant information is given for clarity and completeness. The listings to the left of the split indicate which sounds will be played below the split point. Those to the right are played above the split point. The numbers 84 and 88 are used to indicate whichever of the 16 MIDI channels happens to be selected at p84 and p88.

TURBO-DW MIDI IMPLEMENTATION
MIDI RECEIVE

If the logic of Turbo implementation of MIDI was not clear to you and the charts on the preceeding page have not helped, then please read on a bit further and I will explain these charts in greater detail.

TURBO-DW can receive MIDI data on two channels at one time. These channels are set at parameters 84 and 88. You can select any two channels you wish (1-16) and both can be set to the same channel if you wish. The preceeding chart shows you what sound or sounds (A, B, both or neither) will be played by incoming MIDI data on any given channel.

For example, in chart 5, if parameter 78 is set to value 1, then sound A will play any data it receives on the channel selected at p84, as long as the note value is below the split point set at p37 for that patch. It will play sound B for any notes above the split point on that same channel. It will not play notes that it receives on any other channel, including the channel selected at p88 (unless, of course this is the same channel as is selected at p84.)

If you want A and B to play independantly on seperate channels, then it doesn't matter what mode you are in and where the split point is at, since this will all be ignored. You can verify this by observing that if you set P78 to 2, it will have the effect of assigning sound A to whatever channel is selected at p84 and sound B to whatever channel you have selected at p88. This is true for all eight diagrams. In a sense, these diagrams make a very simple situation look complicated, but they also can be helpful in clarifying the situation when you are under pressure.

Setting p78 to 3 will reverse the assignment of A and B to the two Midi Channels. Of course, you could reverse the settings of p88 and p84 almost as easily. Since many interactive parameters are involved, there are naturally going to be many ways to achieve the same results. For most purposes, the best way to use TURBO in MIDI receive situations is to turn OMNI "off" (p86=0) and set parameter 78 to either 2 or 3. However it is not difficult to imagine situations in which the more complicated possibilities might be extremely useful. I frequently change settings of p36 while working with my sequencer, depending on whether I am playing parts that will eventually be played on the DW, playing parts on remote modules, having the sequencer play the DW, or some combination of the above. The simplest way to work with a sequencer is one in which the sequencer has the ability to take the data being sent to it from the DW and pass it on, via the sequencer MIDI out jack, to all connected modules including the DW 8000. In this case it is ideal if you can engage or disengage this function easily and you should also be able to re-channelize the data onto whatever Midi channel you wish. If you can't re-channelize (it's hard to imagine why any sequencer would lack this feature) then you may need to be more systematic and consistent in order to avoid MIDI loops in which the DW is being played twice: once from it's own keyboard, and again from the data being passed back on the same channel from the sequencer out jack.