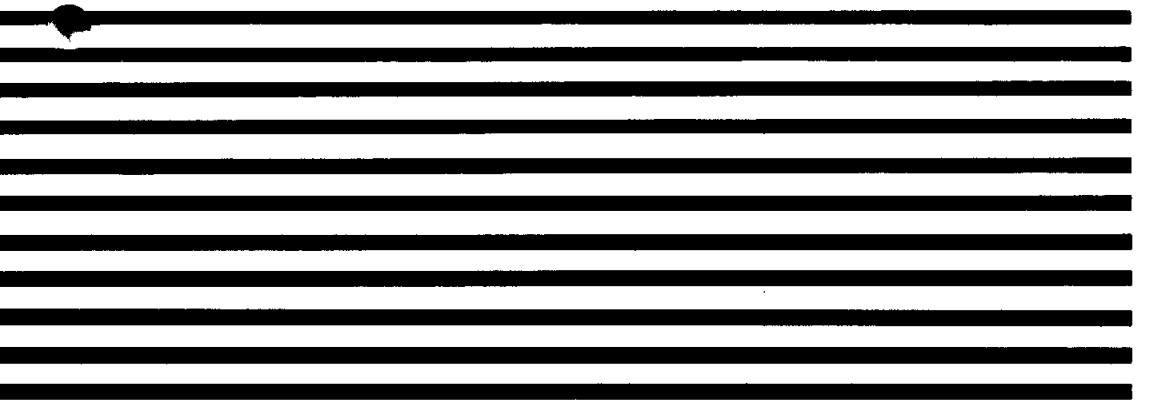
YAMAHA

TONE GENERATOR

TG77



OPERATING MANUAL

FCC INFORMATION (U.S.A.)

1. IMPORTANT NOTICE: DO NOT MODIFY THIS UNIT!
   This product, when installed as indicated in the instructions contained in this manual, meets FCC requirements. Modifications not expressly approved by Yamaha may void your authority, granted by the FCC, to use the product.
2. IMPORTANT: When connecting this product to accessories and/or another product use only high quality shielded cables. Cable/s supplied with this product MUST be used. Follow all installation instructions. Failure to follow instructions could void your FCC authorization to use this product in the USA.
3. NOTE: This product has been tested and found to comply with the requirements listed in FCC Regulations, Part 15 for Class "B" digital devices. Compliance with these requirements provides a reasonable level of assurance that your use of this product in a residential environment will not result in harmful interference with other electronic devices. This equipment generates/uses radio frequencies and, if not installed and used according to the instructions found in the users manual, may cause interference harmful to the operation of other electronic devices. Compliance with FCC regulations does not guarantee that interference will not occur in all installations. If this product is found to be the source of interference, which can be determined by turning the unit "OFF" and "ON", please try to eliminate the problem by using one of the following measures:

   Relocate either this product or the device that is being affected by the interference.

   Utilize power outlets that are on different branch (circuit breaker or fuse) circuits or install AC line filter/s.

   In the case of radio or TV interference, relocate/reorient the antenna. If the antenna lead-in is 300 ohm ribbon lead, change the lead-in to co-axial type cable.

   If these corrective measures do not produce satisfactory results, please contact the local retailer authorized to distribute this type of product. If you can not locate the appropriate retailer, please contact Yamaha Corporation of America, Electronic Service Division, 6600 Orangethorpe Ave, Buena Park, CA 90620

   The above statements apply ONLY to those products distributed by Yamaha Corporation of America or its subsidiaries.

* This applies only to products distributed by YAMAHA CORPORATION OF AMERICA.

Litiumbatteri!
Bör endast bytas av servicepersonal.
Explosionsfara vid felaktig hantering.

VAROITUS!
Lithiumparisto, Räjähdysvaara.
Pariston saa vaihtaa ainoastaan alan ammattimies.

ADVARSEL!
Lithiumbatteri!
Eksplosionsfare. Udskiftning må kun foretages af en sagkyndig, – og som beskrevet i servicemanualen.

IMPORTANT NOTICE FOR THE UNITED KINGDOM

Connecting the Plug and Cord

IMPORTANT: The wires in this mains lead are coloured in accordance with the following code:

BLUE : NEUTRAL
BROWN : LIVE

As the colours of the wires in the mains lead of this apparatus may not correspond with the coloured markings identifying the terminals in your plug proceed as follows:

The wire which is coloured BLUE must be connected to the terminal which is marked with the letter N or coloured BLACK.

The wire which is coloured BROWN must be connected to the terminal which is marked with the letter L or coloured RED.

* This applies only to products distributed by YAMAHA-KEMBLE MUSIC (U.K.) LTD.

CANADA

THIS DIGITAL APPARATUS DOES NOT EXCEED THE "CLASS B" LIMITS FOR RADIO NOISE EMISSIONS FROM DIGITAL APPARATUS SET OUT IN THE RADIO INTERFERENCE REGULATION OF THE CANADIAN DEPARTMENT OF COMMUNICATIONS.

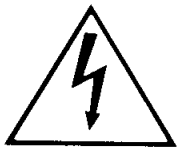
LE PRESENT APPAREIL NUMERIQUE N'EMET PAS DE BRUITS RADIOELECTRIQUES DEPASSANT LES LIMITES APPLICABLES AUX APPAREILS NUMERIQUES DE LA "CLASSE B" PRESCRITES DANS LE REGLEMENT SUR LE BROUILLAGE RADIOELECTRIQUE EDICTE PAR LE MINISTERE DES COMMUNICATIONS DU CANADA.

* This applies only to products distributed by YAMAHA CANADA MUSIC LTD.

SUPPLEMENTAL MARKING INFORMATION

Yamaha Digital Musical Instrument Products will have either a label similar to the graphic shown below or a molded/stamped facsimile of the graphic on its enclosure. The explanation of these graphics appears on this page. Please observe all cautions indicated.

The exclamation point within an equilateral triangle is intended to alert the user to the presence of important operating and maintenance (servicing) instructions in the literature accompanying the product.



The lightning flash with arrowhead symbol, within an equilateral triangle, is intended to alert the user to the presence of uninsulated "dangerous voltage" within the product's enclosure that may be of sufficient magnitude to constitute a risk of electric shock to persons.

* This applies only to products distributed by YAMAHA CORPORATION OF AMERICA.

SPECIAL MESSAGE SECTION

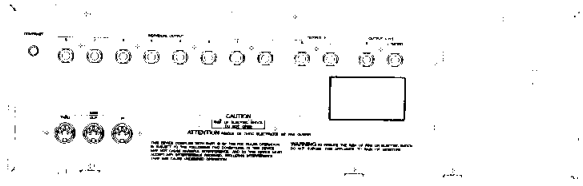
ELECTROMAGNETIC INTERFERENCE (RFI): Your Yamaha Digital Musical Instrument Product has been type tasted and found to comply with all applicable regulations. However, if it is installed in the immediate proximity of other electronic devices, some form of interference may occur. For additional RFI information see FCC Information section located in this manual.

IMPORTANT NOTICE: This product has been tested and approved by independent safety testing laboratories in order that you may be sure that when it is properly installed and used in its normal and customary manner, all foreseeable risks have been eliminated. DO NOT modify this unit or commission others to do so unless specifically authorized by Yamaha. Product performance and/or safety standards may be diminished. Claims filed under the expressed warranty may be denied if the unit is/has been modified. Implied warranties may also be affected.

SPECIFICATIONS SUBJECT TO CHANGE: The information contained in this manual is believed to be correct at the time of printing. Yamaha reserves the right to change or modify specifications at any time without notice or obligation to update existing units.

NOTICE: Service charges incurred due to a lack of knowledge relating to how a function or effect works (when the unit is operating as designed), are not covered by the manufacturer's warranty. Please study this manual carefully before requesting service.

NAMEPLATE LOCATION: The following graphic indicates the location of the Name Plate on your Yamaha Digital Musical Instrument. The Model, Serial Number, Power requirements, etc., are indicated on this plate.



You should note the model, serial number and the date of purchase in the spaces provided below and retain this manual as a permanent record of your purchase.

Model _____

Serial No. _____

Purchase Date _____

STATIC ELECTRICITY CAUTION: Some Yamaha Digital Musical Instrument products have modules that plug into the unit to perform various function. The contents of a plug-in module can be altered/damaged by static electricity discharges. Static electricity build-ups are more likely to occur during cold winter months (or in areas with very dry climates) when the natural humidity is low. To avoid possible damage to the plug-in module, touch any metal object (a metal desk lamp, a door knob, etc.) before handling the module, If static electricity is a problem in your area, you may want to have your carpet treated with a substance that reduces static electricity build-up. See your local carpet retailer for professional advice that relates to your specific situation.

* This applies only to products distributed by YAMAHA CORPORATION OF AMERICA.

IMPORTANT
SAFETY AND INSTALLATION INSTRUCTIONS

INFORMATION RELATING TO POSSIBLE PERSONAL INJURY, ELECTRIC SHOCK, AND FIRE HAZARD POSSIBILITIES HAS BEEN INCLUDED IN THIS LIST.

WARNING — When using electronic products, basic precautions should always be followed, including the following:

1. Read all Safety and Installation Instructions, Supplemental Marking and Special Message Section data, and any applicable assembly instructions BEFORE using this product.
2. Check unit weight specifications BEFORE you attempt to move this product.
3. Main power supply verification. Yamaha Digital Musical Instrument products are manufactured specifically for use with the main supply voltage used in the area where they are to be sold. The main supply voltage required by these products is printed on the name plate. For name plate location please refer to the graphic in the Special Message section. If any doubt exists please contact the nearest Yamaha Digital Musical Instrument retailer.
4. Some Yamaha Digital Musical Instrument products utilize external power supplies or adapters. Do NOT connect products of this type to any power supply or adapter other than the type described in the owners manual or as marked on the unit.
5. This product may be equipped with a plug having three prongs or a polarized line plug (one blade wider than the other). If you are unable to insert the plug into the outlet, contact an electrician to have the obsolete outlet replaced. Do NOT defeat the safety purpose of the plug. Yamaha products not having three prong or polarized line plugs incorporate construction methods and designs that do not require line plug polarization.
6. WARNING — Do NOT place objects on the power cord or place the unit in a position where any one could walk on, trip over, or roll anything over cords of any kind. An improper installation of this type can create the possibility of a fire hazard and/or personal injury.
7. Environment: Your Yamaha Digital Musical Instrument should be installed away from heat sources such as heat registers and/or other products that produce heat.
8. Ventilation: This product should be installed or positioned in a way that its placement or location does not interfere with proper ventilation.
9. Yamaha Digital Musical Instrument products are frequently incorporated into "Systems" which are assembled on carts, stands, or in racks. Utilize only those carts, stands, or racks that have been designed for this purpose and observe all safety precautions supplied with the products. Pay special attention to cautions that relate to proper assembly, heavier units being mounted at the lower levels, load limits, moving instructions, maximum usable height and ventilation.
10. Yamaha Digital Musical Instrument products, either alone or in combination with amplification, headphones, or speakers, may be capable of producing sound levels that could cause permanent hearing loss. Do NOT operate at high volume levels or at a level that is uncomfortable. If you experience any discomfort, ringing in the ears, or suspect any hearing loss, you should consult an audiologist.
11. Do NOT use this product near water or in wet environments. For example, near a swimming pool, spa, in the rain, or in a wet basement.
12. Care should be taken so that objects do not fall, and liquids are not spilled into the enclosure.
13. Yamaha Digital Musical Instrument products should be serviced by a qualified service person when:
    a. The power supply/power adapter cord or plug has been damaged; or
    b. Objects have fallen, or liquid has been spilled into the product; or
    c. The unit has been exposed to rain; or
    d. The product does not operate, exhibits a marked change in performance; or
    e. The product has been dropped, or the enclosure of the product has been damaged.
14. When not in use, always turn your Yamaha Digital Musical Instrument equipment "OFF". The power supply cord should be unplugged from the outlet when the equipment is to be left unused for a long period of time. NOTE: In this case, some units may lose some user programmed data. Factory programmed memories will not be affected.
15. Electromagnetic Interference (RFI). Yamaha Digital Musical Instruments utilize digital (high frequency pulse) technology that may adversely affect Radio/TV reception. Please read FCC Information (inside front cover) for additional information.
16. Do NOT attempt to service this product beyond that described in the user maintenance section of the owners manual. All other servicing should be referred to qualified service personnel.

PLEASE KEEP THIS MANUAL FOR FUTURE REFERENCE!

* This applies only to products distributed by YAMAHA CORPORATION OF AMERICA.

PRECAUTIONS

Data backup

It is possible for data in internal memory to be lost as a result of inappropriate operation or other reasons. We recommend that you keep backups of important voice data on a memory card (MCD64). It is also possible for the data in a memory card to be lost as a result of static electricity, magnetic fields, or other causes. For very important data it is always a good idea to make double backups.

Multi Play mode

If many multi-element voices are played simultaneously when in Multi Play mode, note timing may sometimes be slightly delayed. In such cases, select voices that use fewer elements, or reduce the number of notes.

Backup battery

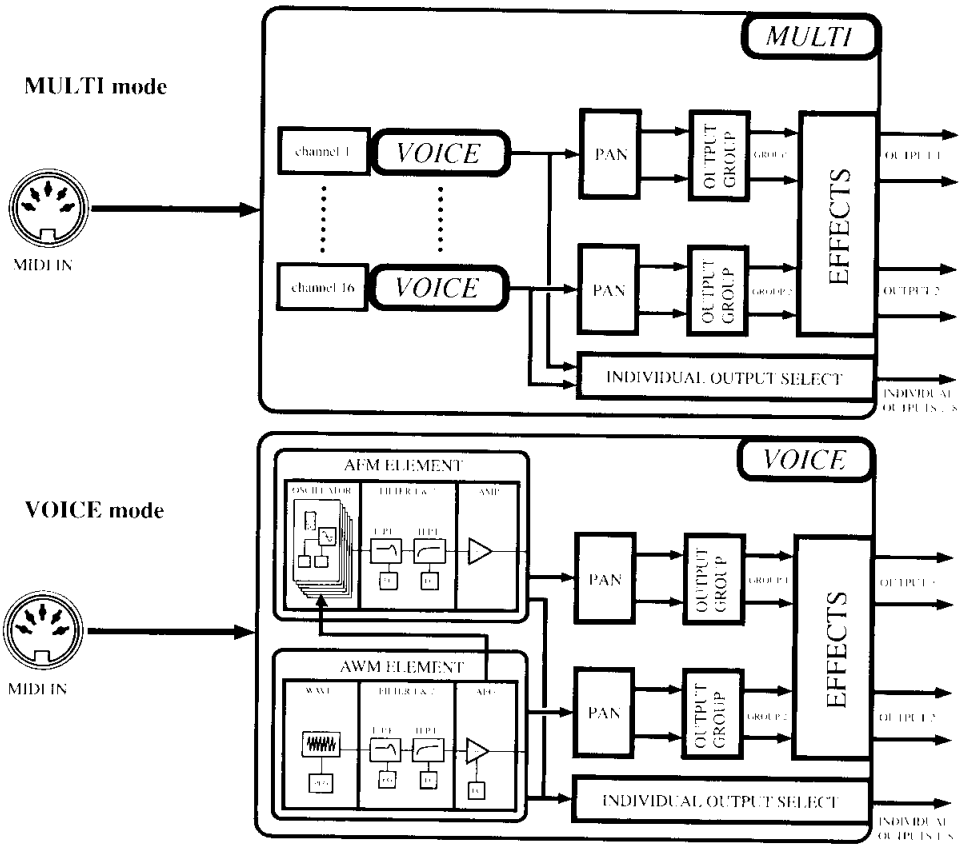
The TG77 contains a backup battery which preserves settings such as for voice and multi data when the power is turned off. The life of this battery is approximately 5 years. However depending on the date of purchase, battery life may be shorter than this.

If the backup battery runs low, a message "Change int Battery!" will appear in the display when the power is turned on. If the backup battery runs down completely, the voice and multi data will be lost, so when this display appears, immediately store your data to a memory card and contact the dealer where you purchased the TG77 or your nearby Yamaha service station to have the battery replaced. When the battery is replaced, the internal voice and multi data will be lost, so be sure to save the data to a memory card first.

Third-party Software

Yamaha can not take any responsibility for software produced for this product by third-party manufacturers. Please direct any questions or comments about such software to the manufacturer or their agents.

The TG77 is always in either Multi mode or Voice mode.



INTRODUCTORY SECTION

REFERENCE SECTION

APPENDIX

Thank you for purchasing the Yamaha TG77 tone generator. The TG77 represents a new generation of Yamaha synthesis technology; the Realtime Convolution and Modulation (RCM) hybrid tone generation system, which uses Advanced Frequency Modulation (AFM) tone generation and Advanced Wave Memory (AWM) tone generation in conjunction with realtime digital filtering.

The TG77 can function as up to 16 independent synthesizers, with both dynamic and static voice allocation.

To take full advantage of the TG77 and enjoy long and trouble-free use, please read this manual carefully.

How to use this manual

This manual is divided into three sections; an introductory section, a reference section, and an appendix.

Introductory section: This section contains the information you need to start using your TG77 right away.

- Introducing the TG77: Please be sure to read this section. It will tell you how to play the TG77 from a MIDI keyboard, about the main features of the TG77, and about basic operation.
- How to use Multi mode: This explains how to use the TG77 in Multi mode to function as up to 16 independent MIDI tone generators. Read it when you want to play the TG77 from an external sequencer.
- How to edit a Voice: Read this when you want to modify a voice or create a completely new voice.

Reference section: This section contains a full explanation of all the TG77's functions. Once you have worked through the introductory section and are comfortable with basic operation, glance through this section to get an idea of the TG77's capabilities. Refer to the details when necessary.

Appendix: This section contains technical information that may be of interest to advanced users or programmers.

Conventions in this manual

In order to present information as clearly as possible, the following conventions are used in this manual.

- The names of front panel buttons and controls are set in small capital type; e.g., press the EDIT button.
- Italics are used mainly when referring to a section in this manual; e.g., for details refer to *AFM element job 5. AFM sensitivity.*
- Most of the LCDs in the TG77 have a unique Page Jump number to which you can jump by pressing JUMP and entering the number. These numbers will be prefixed by a "#" sign; e.g, JUMP #312.
- Function names will be capitalized when they first occur or when necessary for emphasis, but will be uncapitalized in subsequent occurrences; e.g., adjust the LFO Speed ... after adjusting the LFO speed, ...
- The beginning of each two-page subsection in the introductory section contains a short abstract or summary of the entire subsection, printed in bold type.
- Three periods between two numbers are used to indicate that a parameter can be set to any value in this range; e.g., Velocity Sensitivity (–7...+7). Since some parameters can be set to negative values, this avoids the possibility of confusing a dash with a minus sign.

CONTENTS

INTRODUCTORY SECTION

REFERENCE SECTION

APPENDIX

INTRODUCTORY SECTION

INTRODUCING THE TG77

This section will tell you how to play the sounds, introduce you to the main features of the TG77, and explain basic operation.

Contents of this section

How to setup and play

The first thing you will probably want to do is play the voices (sounds) of your new TG77. Here's how to select and play the TG77's voices.

Connections

Make sure that your amp/speaker system and the TG77 are switched off. Connect the rear panel output OUTPUT 1/1+2 jacks (L/MONO and R) to the inputs of your amp/speaker system. Or, if you are using a set of stereo headphones, plug them into the front panel PHONES jack.

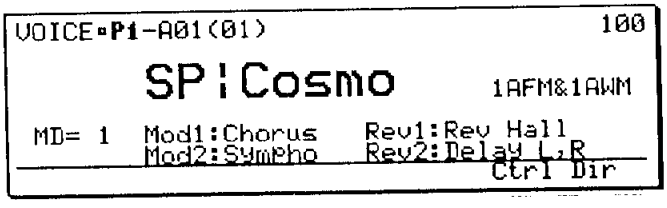
Use a MIDI cable to connect the MIDI OUT of your keyboard (or other MIDI instrument) to the MIDI IN of the TG77.

Note:

To use the TG77, you will need a separate MIDI instrument such as a MIDI keyboard, MIDI wind controller, MIDI guitar, MIDI sequencer, or other device capable of transmitting MIDI data. In this manual, we will assume you are playing the TG77 from a MIDI keyboard. If you are using a different type of MIDI controller, read all references to "MIDI keyboard" in this manual as referring to your MIDI controller.

Turn the power on

Turn down both of the TG77's two concentric VOLUME knobs to the MIN position. The knobs are located at the left side of the front panel. Then turn the power on by pressing the POWER switch located at the lower left. After displaying a greeting message for about two seconds, a display similar to the following should appear. If the TG77 was in Voice Play mode when the power was last turned off, the upper left of the LCD will read "VOICE".



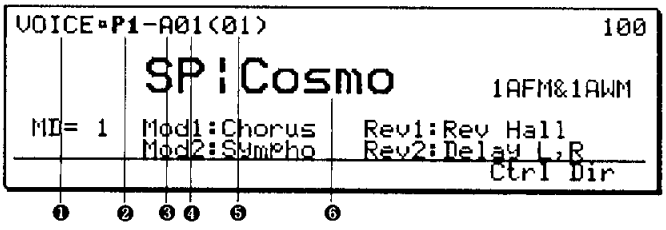
If the upper line of the display does not show VOICE then press the VOICE button located at the upper left of the front panel.

Make sure that the volume of your amp/speaker system is turned down, and turn its power on. Set the volume of your amp/speaker system to an appropriate level, and gradually raise the TG77's OUTPUT 1 and 2 knobs while playing your MIDI keyboard. If you don't hear anything, re-check MIDI and audio connections, and make sure that your amp/speaker system is functioning correctly.

How to select and play voices

The sound produced by the TG77 in response to a single incoming channel of MIDI data is defined as a Voice. In Voice mode (i.e., when the VOICE LED is lit) you can select and play one voice at a time. The TG77 has 128 voices that are preset in permanent memory, and 64 memories for you to store your own newly created voices. An optional RAM or ROM card can be inserted into the VOICE card slot to provide 64 more voices.

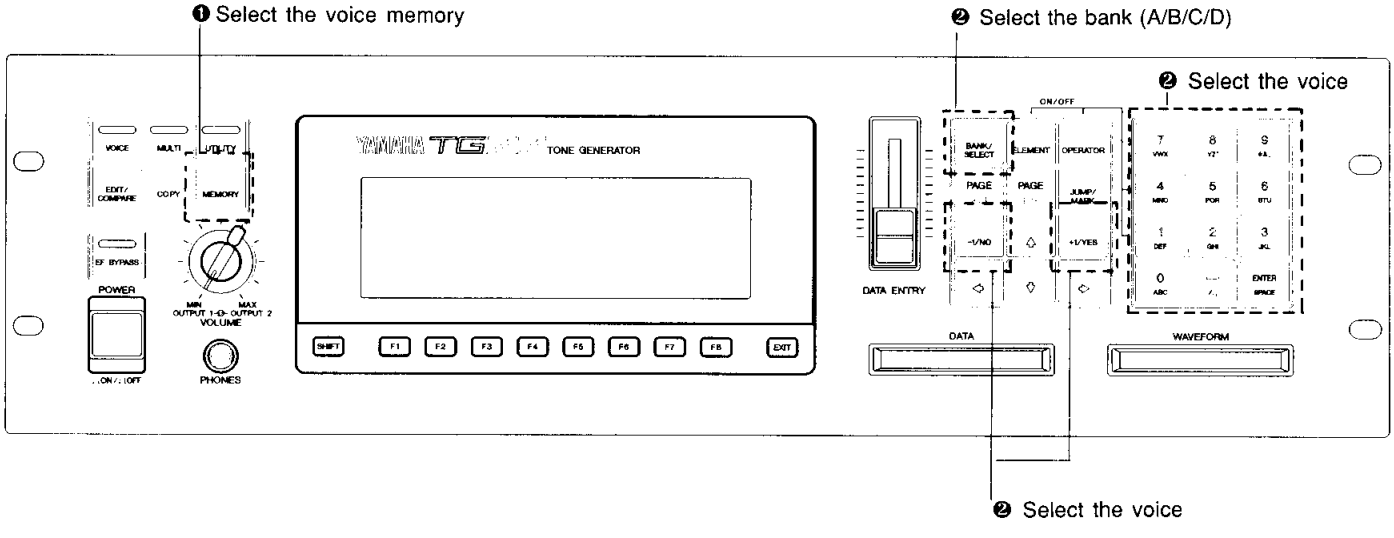
The preset voices are organized into two locations; PRESET 1 and PRESET 2. Each of these has four banks (A–D) with 16 voices in each. The LCD shows the ten-character voice name, and also tells you which memory the voice is from. The number in parentheses indicates what number the voice would be if we started counting from the beginning of the bank.



❶ This indicates that you are in Voice Play mode.
❷ Memory PRESET 1.
❸ Bank A.
❹ Voice number "1" of bank A.
❺ If we count from the beginning of the bank, this is Voice number 1.
❻ The voice name is "SP¦Cosmo".

You will learn about the other parts of the display later. For now, here's how to select voices.

1. Press the MEMORY button to select the voice memory. Each time you press the MEMORY button, you will cycle through Preset 1, Preset 2, Internal, and Card (if a card is inserted into the DATA slot). The upper left of the LCD will indicate the selected memory.
2. Select a voice 1–64 by pressing the –1 +1 keys or by using the numeric key-pad to enter a one or two digit number and pressing ENTER.
   You can also press the BANK/SELECT button to cycle through banks A, B, C, and D. The upper left of the LCD will indicate the selected bank.



Note:

You can also select TG77 voices by transmitting program change messages from your keyboard. When shipped, the TG77 is set up so that MIDI program change messages 1–64 will select the 64 voices in the currently selected voice memory. Press the MEMORY key to cycle through Internal, Card (if a card is inserted into the DATA slot), Preset 1, and Preset 2.

If the program change messages you transmit do not select the desired voice, refer to MIDI Utility, 2. Program change, page 175, and set the Program Change parameter to "normal".

Go ahead and try out each of the preset voices. When you are ready to learn more about the TG77, continue reading.

PRESET 1 (64 voices)

#	Bank A	Bank B	Bank C	Bank D
1	SP:Cosmo	BR:Plucky	ME:St.Mick	ST.Ripper
2	SP:Metroid	BR:BigBand	ME:Blade	ST:Violins
3	SP:Diamond	BR:1980	ME:Forest	ST:Section
4	SP.Sqrpad	BR:Trmpets	ME.Gargoyl	ST.SynStrg
5	SP:Arianne	BR.ModSyn	ME:Pikloop	ST.Chamber
6	SP:Sawpad	BR:Ensembl	ME:Aquavox	BA:Frtless
7	SP:Darkpad	BR:FrHorn	ME:Alps	BA:Starred
8	SP:Mystery	BR:Soul	ME.Cycles	BA.HardOne
9	SP.Padfaze	BR.FM Bite	WN.Bluharp	BA:VC1
10	SP:Twilite	EP:IceRing	WN:Tenor	BA:VC2
11	SP:Annapad	EP.Synbord	WN:Clarino	BA.VC3
12	AP.Ivory	EP.GS77	WN:AltoSax	BA.Rox
13	AP:CP77	EP:Knocker	WN:Moothie	BA:Woodbas
14	AP:Bright	EP:Beltine	WN:Saxion	BA.Round
15	AP:Hammer	EP:Dynomod	WN.Flute	BA:Erix
16	AP:Grand	EP.Urbane	WN:Ohboy	BA.FMFrtls

PRESET 2 (64 voices)

#	Bank A	Bank B	Bank C	Bank D
1	SC:Neworld	KY:Bosh	OR.YC45D	SE*Goto>1
2	SC.Stratos	KY:Wahclav	OR:Pipes	SE.Xpander
3	SC.Ripples	KY.Wires	OR:Jazzman	SE*Inferno
4	SC.Digitak	KY:Tradclv	OR.Combo	SE*Them!!!
5	SC.Hone	KY.Thumper	PC.Marimba	OR*Gassman
6	SC:Spaces	KY:Modclav	PC:OzHamer	BR*ZapBras
7	SC:Sybaby	PL.Sitar	PC:Tobago	BR*BrasOrc
8	SC:Icedrop	PL.Harp	PC.Vibes	PL*Stairwy
9	SC:Wired	PL:Saratog	PC:Glass	ST*Widestg
10	SL.Gnome	PL:Steel	PC:Island	ST*Symflow
11	SL.SawMono	PL:Twelve	PC:GrtWall	ST*Quartet
12	SL:SqrMono	PL:Shonuff	CH.Itopia	ST*Tutti
13	SL.Pro77	PL:MutGtr	CH:GaChoir	ME*Voyager
14	SL.Nester	PL.Guitar	CH:Chamber	ME*Galaxia
15	SL:Eazy	PL.Shami	CH:Spirit	DR Both
16	SL:Lips	PL:Koto	CH:ChorMst	DR Group2

Preset voice names

The first two characters of each preset voice name indicate the type of voice, and the third character indicates how many elements the voice uses. As explained later, a voice that uses more elements will be able to play fewer simultaneous notes.

The first two characters of preset voice names indicate the type of voice

SP	Synth Pad
AP	Acoustic Piano
BR	Brass
EP	Electric Piano
ME	Musical Effect
WN	Winds
ST	Strings
BA	Basses
SC	Synth Comp
SL	Synth Lead
PL	Plucked
KY	Keyboards
OR	Organ
PC	Percussion
CH	Choir
SE	Sound Effects
DR	Drum Voices

The third character of preset voice names indicates the number of elements used by the voice

.	1 element	1AFM or 1AWM
:	2 elements	2AFM or 2AWM
¦	2 elements	1AFM & 1AWM
*	4 elements	4AFM or 4AWM or 2AFM & 2AWM

Note when using SY77 voice cards

When using the TG77 to play voices (either from a voice data card or loaded via MIDI bulk dump) that were created for the SY77, be aware that many SY77 voices are designed to take advantage of the SY77's unique MODULATION 2 wheel, for example to fade between components of the sound, or to control the tone. To check the controller assignments of a voice, refer to *12. (F1–F4) Controller set* on pages 108–110.

If the SY77 voice you are playing on your TG77 is set to respond to MIDI Control Change number 13 (the default assignment of the SY77's MODULATION 2 wheel), MIDI control number, you have two options. If your MIDI keyboard allows you to specify the messages transmitted by each controller (wheel, pedal, etc.), set a controller to transmit MIDI Control Change 13. If your MIDI keyboard does not allow you to do this, you will have to edit the voice so that it responds to a Control Change number that is transmitted by your keyboard.

How to load and play the ROM demo songs

The TG77 contains demo songs which take advantage of its capabilities. These songs are stored in ROM (permanent memory), and cannot be erased or modified. Here's how to play the songs.

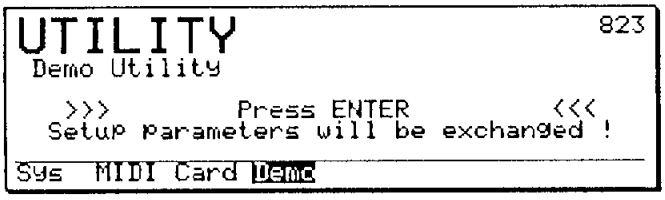
Note:

The setup parameters (the Utility mode settings for master tuning, velocity curve, etc.) will be overridden in demo mode. When you exit demo mode, the setup parameters will be restored.

Enter Utility mode and load the demo data

Press the UTILITY button, and then press F4 (Demo) to get the following display.

If you have been editing voice or multi data, the top line of the LCD will blink "AUTO-STORE". If you wish to keep the edited data, refer to page 87 (Store voice) or page 159 (Store multi). Otherwise, press F7 (Quit).



If the EF BYPASS button has been pressed, effect bypass will be turned off when the demo data is loaded.

Select the demo song from which to begin

When you press ENTER to load the demo data, the Top Song Select display will appear. The TG77's demo song play function plays all songs in continuous rotation, starting from the song you select. Use the DATA ENTRY slider, the –1/+1 keys, or the numeric keypad to select the demo song from which to begin playing.

Begin playing from the selected demo song

After selecting a demo song from which to begin, press the F8 (Play) button. The LCD will indicate the number and name of the currently playing song, and vertical VU-meter-style bar graphs will indicate when each channel (1–16) is sounding.

When one song ends, the next will begin immediately.

To stop the demo songs, press F8 (Stop).

To resume playing, press F8 (Play).

To exit Demo Play mode, stop the demo playback and then press EXIT or a mode key VOICE, MULTI, or UTILITY.

While the demo songs are playing, you can press the following keys.

F1 (Ch): A VU meter-style graphic indicates when each channel is sounding.

F2 (Note): A VU meter-style graphic indicates the notes played.

F3 (Kbd): Both keyboard and VU-meter graphics will be displayed.

F4 (Name): The names of the voices in the multi will be displayed.

F5 (Time): The display will indicate the elapsed time since the beginning of the currently playing song, and the elapsed time since the play button was pressed.

F6 (Auto): The above graphics will automatically alternate approximately every five seconds.

F8 (Stop): Stop the demo.

How to use the TG77 with a sequencer

In Multi mode, the TG77 is able to function as 16 independent synthesizers, each controlled on its own MIDI channel. This makes the TG77 especially suitable for use with a MIDI sequencer. This section will explain the simplest way to use the TG77 as a tone generator module for a multi-track MIDI sequencer.

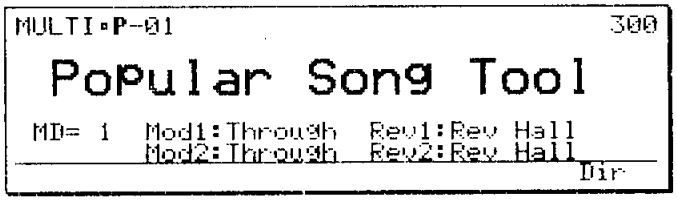
Make connections and prepare your sequencer for playback

Connect the MIDI OUT of your sequencer to the MIDI IN of the TG77. Load data into your sequencer, and prepare it to playback.

Select a Multi

In multi mode the TG77 can function as 16 independent synthesizers. The multi settings determine which voices are played by each incoming channel of MIDI data, how the voices are output, and many other aspects of the sound. A more extensive tutorial is provided beginning from page 33, but this page will give you an idea of how to use multi mode.

1. Press MULTI to enter multi mode. The MULTI LED will light red, and a display similar to the following will appear.



2. If the upper left of the LCD does not already show "P" (preset), press the MEMORY button until the "P" appears.
3. Use the –1/+1 keys or the numeric keypad to select one of the 16 preset multis. The following chart shows the voice numbers used for each channel of the preset multis.

Note 1:

Check the data in your sequencer to see which MIDI channels it uses, and select a preset multi on the TG77 that will be appropriate. For most of the preset multis, a drum-type voice is assigned to MIDI channel 16. If the data in your sequencer contains a drum part, set it to transmit on channel 16. You may need to change the note numbers of your sequencer drum part to be more appropriate for the selected drum voice of the TG77.

Note 2:

None of the preset multis use all 16 MIDI channels, but of course you can edit your own multi to use all 16 channels if you wish. The preset multis (and this example) are purposely kept simple. The tutorial beginning on page 33 will explain more possibilities of the TG77's multi mode.

Start playback on your sequencer

Start playback on your sequencer. When the TG77 receives MIDI data, the MULTI LED will blink. If the TG77 produces no sound even though the MULTI LED blinks, check that the channels being transmitted from the sequencer match the channels for which the selected TG77 multi has assigned a voice.

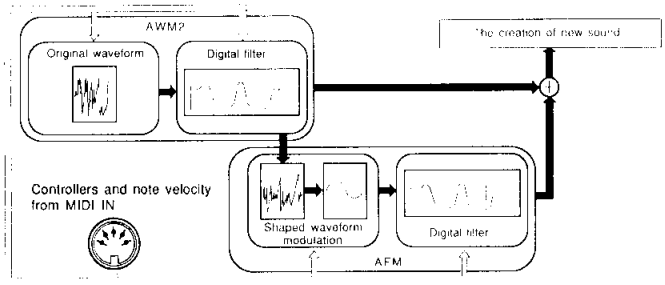
No.	Multi Name	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1	Popular Song Tool	P1-B14	P1-A14	P1-D08	P2-B10	P1-B04	P1-D03	P1-C14	P2-A11	P2-C12	P2-C03	[off]	[off]	[off]	[off]	P2-D16	P2-D15
		EP:Beltine	AP:Bright	BA:HardOne	PL:Steel	BR:Trmpets	ST:Section	WN:Saxion	SL:SawMono	CH:Itopia	OR:Jazzman					DR Group2	DR Both
2	Modern Tune	P1-A13	P1-D11	P1-B05	P1-A01	P2-B12	P2-A14	[off]	[off]	[off]	[off]	[off]	[off]	[off]	[off]	[off]	P2-D15
		AP:CP77	BA:VC3	BR:ModSyn	SP:Cosmo	PL:Shonuff	SL:Nester										DR Both
3	Funky Staff	P1-B11	P1-D07	P1-B03	P2-C13	P2-A15	P1-C10	[off]	[off]	[off]	[off]	[off]	[off]	[off]	[off]	P2-D16	P2-D15
		EP:Synbord	BA:Starred	BR:1980	CH:GaChoir	SL:Easy	WN:Tenor									DR Group2	DR Both
4	Ballad Scene	P1-B10	P1-A12	P1-D6	P1-D03	P1-C15	P1-A10	P2-B08	[off]	[off]	[off]	[off]	[off]	[off]	[off]	[off]	P2-D15
		EP:IceRing	AP:Ivory	BA:Frtless	ST:Section	WN:Flute	SP:Twilite	PL:Harp									DR Group2
5	Jazz Quintet	P1-A16	P1-D13	P2-B10	P1-C15	P1-C10	[off]	[off]	[off]	[off]	[off]	[off]	[off]	[off]	[off]	[off]	P2-D16
		AP:Granc	BA:WoodBas	PL:Steel	WN:Flute	WN:Tenor											DR Group2
6	Big Band Jazz	P1-A16	P1-D13	P1-C15	P1-C11	P1-C12	P1-C10	P1-B04	P1-B06	[off]	[off]	[off]	[off]	[off]	[off]	[off]	P2-D16
		AP:Grand	BA:WoodBas	WN:Flute	WN:Clarino	WN:AltoSax	WN:Tenor	BR:Trmpets	BR:Ensembl								DR Group2
7	Beethoven Symphony	P1-C15	P1-C16	P1-C11	P1-C16	P1-B07	P1-B04	P1-B06	P1-D03	P1-D05	P1-D03	P1-D05	P1-D13	[off]	[off]	[off]	P2-D16
		WN:Flute	WN:Ohboy	WN:Clarino	WN:Ohboy	BR:FrHorn	BR:Trmpets	BR:Ensembl	ST:Section	ST:Chamber	ST:Section	ST:Chamber	BA:Woodbas			DR Group2	DR Group2
8	Wind Ensemble	P2-B08	P1-C15	P1-C16	P1-C11	P1-C12	P1-C10	P1-B04	P1-B06	P1-B05	P1-D13	P1-A01	P1-A01	[off]	[off]	[off]	P2-D16
		PL:Harp	WN:Flute	WN:Ohboy	WN:Clarino	WN:AltoSax	WN:Tenor	BR:Trmpets	BR:Ensembl	BR:ModSyn	BA:Woodbas	SP:Cosmo	SP:Cosmo				DR Group2
9	South America	P1-B13	P2-C10	P1-D03	P2-B13	P2-C04	P2-C07	P1-C15	P1-B04	[off]	[off]	[off]	[off]	[off]	[off]	P2-D16	P2-D15
		EP:Knocker	PC:Island	BA:HardOne	PL:MutGtr	OR:Combo	PC:Tobago	WN:Flute	BR:Trmpets							DR Group2	DR Both
10	Folklore	P1-C13	P1-A15	P1-D13	P2-B08	P1-D02	P1-C15	P1-C11	[off]	[off]	[off]	[off]	[off]	[off]	[off]	P2-D16	P2-D15
		WN:Moothie	AP:Hammer	BA:WoodBas	PL:Harp	ST:Violins	WN:Flute	WN:Clarino								DR Group2	DR Both
11	Country & Western	P2-B10	P1-A14	P1-D14	P1-C09	P2-A16	P1-A01	[off]	[off]	[off]	[off]	[off]	[off]	[off]	[off]	[off]	P2-D16
		PL:Steel	AP:Bright	BA:Round	WN:Bluharp	SL:Lips	SP:Cosmo										DR Group2
12	Baroque Quartet	P2-B03	P1-D02	P1-C16	P1-C15	[off]	[off]	[off]	[off]	[off]	[off]	[off]	[off]	[off]	[off]	[off]	[off]
		KY:Wires	ST:Violins	WN:Ohboy	WN:Flute												
13	Pot Pourri	P1-A16	P1-D03	P1-B04	P2-C09	P2-A11	P2-D12	P1-B11	P1-D13	P2-C05	P2-B14	P1-C15	P2-C07	P2-C01	P1-D06	P2-B09	P2-D16
		AP:Grand	ST:Section	BR:Trmpets	PC:Glass	SL:SawMono	ST:Tutti	EP:Synbord	BA:WoodBas	PC:Marimba	PL:Guitar	WN:Flute	PC:Tobago	OR:YC45D	BA:Frtless	PL:Saratog	DR Group2
14	iT's CooL!!!	P1-A12	P1-B02	P1-D16	P1-B16	P1-B12	P2-B07	P1-B07	P1-D03	P2-C12	P2-D16	P2-B06	P2-A16	P2-A06	P2-D10	P2-C03	P2-B09
		AP:Ivory	BR:BigBand	BA:FMFrtls	EP:Urbane	EP:GS77	PL:Sitar	BR:FrHorn	ST:Section	CH:Itopia	DR Group2	KY:Modclav	SL:Lips	SC:Spaces	ST:Symflow	OR:Jazzman	PL:Saratog
15	Powerplay	P2-B05	P2-B13	P1-D01	P1-D03	P1-B10	P2-C09	P1-B04	P2-C12	P1-B05	P1-B05	P1-B03	P1-B11	P1-A14	P2-D14	P2-B12	P2-D16
		KY:Thumper	PL:MutGtr	BR:Plucky	ST:Section	EP:IceRing	PC:Glass	BR:Trmpets	CH:Itopia	BR:ModSyn	BR:ModSyn	BR:1980	EP:Synbord	AP:Bright	ME:Galaxia	PL:Shonuff	DR Group2
16	House Demo P Ellis	P1-A01	P1-C06	P1-C03	P1-C05	P1-D07	P2-D16	P1-C02	P2-C13	P1-D03	P2-D16	P2-A16	P2-C14	P2-D01	P1-B11	P2-D16	P2-D15
		SP:Cosmo	ME:Aquavox	ME:Cycles	ME:Picoop	BA:Starred	DR Group2	ME:Blade	CH:GaChoir	BR:1980	DR Group2	SL:Lips	CH:Chamber	BE:Goto>1	EP:Synbord	DR Group2	DR Both

Note: Preset multis 13–16 are used in the ROM demo songs. See page 8.

About the TG77: RCM hybrid synthesis

The TG77's RCM hybrid tone generation system fuses the realism of digital samples with the expressive power of FM. It uses Advanced Wave Memory 2 (AWM2) and Advanced Frequency Modulation (AFM) in conjunction with digital filters to allow a wide variety of sound creation techniques.

System diagram



Advanced Wave Memory 2 (AWM2)

AWM2 uses 16 bit linear sample reproduction with proprietary Yamaha convolution technology (digital filtering) that allows you to emphasize or cut any desired portion of the frequency spectrum with full realtime control.

Advanced Frequency Modulation (AFM)

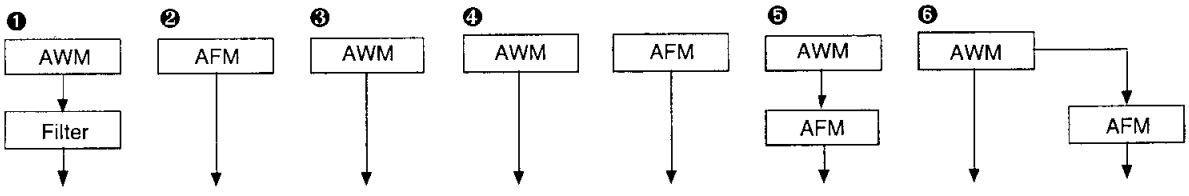
In addition to advancing beyond the FM synthesis capabilities of the DX7 and previous Yamaha synthesizers, AFM allows you to filter and envelope any AWM waveform and use the shaped waveform it as part of an FM algorithm to apply frequency modulation, creating partials that were not present in the original AWM waveform. This modulated waveform can be processed by additional digital filtering.

Dynamic touch and control

One of the greatest advantages of RCM hybrid tone generation is that it fuses the realism of digital sampling with the expressive power of FM. Keyboard dynamics and controllers can be used to control nearly any aspect of the sound, allowing great musical expresiveness.

The possibilities of RCM hybrid synthesis

The TG77 allows a wide variety of synthesis techniques to be used, and digital filtering is always provided for each AFM or AWM element. The following diagrams show how the RCM hybrid synthesis system can simulate many of the analog and digital synthesizers of the past.



❶ Filter style "analog" synthesis: Single cycle AWM waveforms can be enveloped and filtered to simulate analog synthesizers. (Various sawtooth and pulse waves are provided, and the TG77's filters can be configured as 24dB/octave filters with resonance adjustable into oscillation.)

❷ Traditional FM: The AFM tone generator can be used alone to produce any sound that the DX series was capable of, and much more.

❸ AWM sample playback: The AWM tone generator can be used alone, to playback high quality digital samples from internal AWM memory or an optional waveform card.

❹ AWM sample playback mixed with FM: The sounds of the AWM and AFM tone generators can be layered.

❺ FM modulated by AWM: AWM digital samples can be used to modulate one or more operators in an FM algorithm, for very complex FM sounds.

❻ AWM sample playback + FM modulated by AWM: In a variation of ❺, the original sound of the AWM sample can be mixed with the complex AFM sound.

For techniques which use both AWM and AFM (❹ ❺ ❻) there are two additional possibilities.

- Both AFM and AWM can be used to create sustaining sounds.
- The AFM and AWM tone generators can be used to create different components of the sound, with short transient AWM waveforms used to create an attack and the AFM tone generator used to create the sustain component of the sound (or vice versa).

Since each voice can use one, two, or four AFM or AWM elements, these synthesis strategies can be combined in complex ways.

About the TG77: AFM and AWM voices

The TG77 produces sound using two proprietary Yamaha technologies; Advanced Frequency Modulation (AFM) synthesis and Advanced Wave Memory (AWM). A special Drum Voice assigns a different AWM percussion sound to each of the 61 notes in the range C1–C6.

AFM — Advanced Frequency Modulation

Frequency Modulation (FM) is a patented Yamaha technology for producing complex and musical controllable sounds, and was first made famous by the DX7 synthesizer. The TG77's Advanced FM (AFM) takes FM synthesis to new levels of realism, expression, and programmability.

Each of the six FM operators in the TG77 can use one of 16 different waveforms, and be connected to each other in 45 basic algorithms (patterns). In addition, each operator has two inputs which can be modulated by feedback from any other operator, from a noise generator, or from an AWM sample. Compared to previous FM instruments, many parameters have a wider range of control, and the TG77 envelope generators have six segments with looping.

AFM can produce sounds that change dramatically in response to your playing, allowing a wide range of expressiveness.

AWM — Advanced Wave Memory

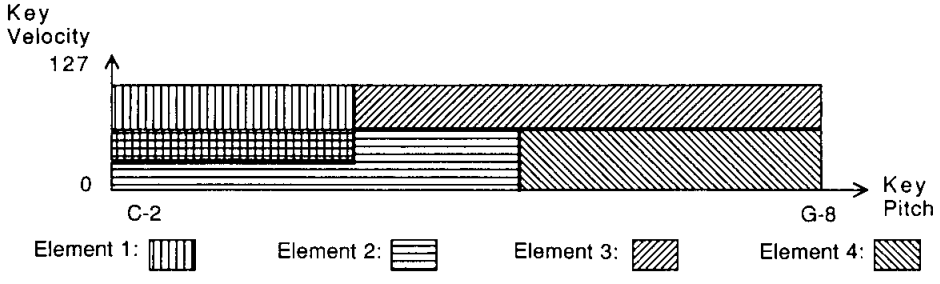
Advanced Wave Memory (AWM) is a patented Yamaha technology for storing and reproducing digital sound. The TG77 contains 2 Mwords (4 Mbytes) of AWM samples in Read Only Memory (ROM), including piano, strings, choir, and percussive sounds among many others. Optional cards can be inserted into the front panel WAVEFORM slot to make additional sounds available. The sounds are sampled in 16-bit linear format with a maximum sampling frequency of 48 kHz.

AWM sounds are high-quality digital recordings of actual instruments.

A voice consists of one, two, or four Elements

Each sound that you have been playing is defined as a Voice, and consists of one, two, or four Elements. (The drum voice explained below is a special case.) Each of these elements is actually the equivalent of an independent synthesizer; either AFM or AWM.

An element can be set to produce sound for only a specific range of the keyboard, or for a specific range of velocities. This allows you to create a voice which produces different sounds for different ranges of the keyboard, or for loudly or softly played notes.



The one, two, or four elements in a voice can produce many types of keyboard split and layer effects.

On earlier Yamaha synthesizers such as the DX7-II, layers and splits were created by combining two or more Voices into a "Performance". This meant that sometimes you played Voices and other times you played Performances. However on the TG77, layers and splits can be included in a voice, so you can simply select a voice and play without considering whether it contains layers or splits.

Two realtime digital filters for each element

Each AFM or AWM element in a voice includes two 12 dB/octave realtime digital filters, each filter independently controlled by its own envelope generator (EG). One filter is fixed as a Low Pass Filter (LPF) and the other filter can be used either as a LPF or a High Pass Filter (HPF). This allows you to use the two in conjunction to create a 12 dB/octave Band Pass Filter (BPF) or a 24 dB/octave LPF. Veterans of analog synthesizers will be happy to hear that the filter resonance (or "Q") can be adjusted all the way into filter oscillation.

Since a voice can consist of one, two, or four elements, a single voice can use 2, 4 or 8 independent filters.

AFM x AWM x Filtering = the TG77

The TG77 can utilize most of the programming techniques of previous synthesizers; FM, sample playback, and realtime filtering. This means that the TG77 can produce the sounds of the classic 24 dB/octave analog synthesizers of the past, the FM sounds of the DX series, the sampled sounds of many of today's instruments ... and also sounds that have never been heard before.

Play up to 16 AFM notes and 16 AWM notes at once

The TG77 contains two tone generators; an AFM tone generator and an AWM tone generator. The AFM tone generator can produce up to 16 simultaneous notes of FM sound, and the AWM tone generator can produce up to 16 simultaneous notes of digitally sampled sound.

Some voices consist of only one element, some of two elements, and others of four elements. (The Voice mode setting inside each voice determines how many elements are used.) The important thing to remember is that up to a total of 16 notes of AFM sound and 16 notes of AWM sound can be sounding at any time. If a voice plays two or more elements for a single key, the sound will be more complex and richer, but you will be able to play fewer simultaneous notes.

A Drum voice consists of 61 percussive sounds

In addition to the "normal" voices explained above which consist of one, two, or four elements, the TG77 provides a special type of voice; the Drum voice. A drum voice has no elements, but consists of a different AWM sample for each of the 61 keys in the range C1–C6.

A drum voice can be played from your MIDI keyboard (or other MIDI controller) just like a normal voice. Usually you will use a sequencer to play a drum voice, providing drums and percussion accompaniment.

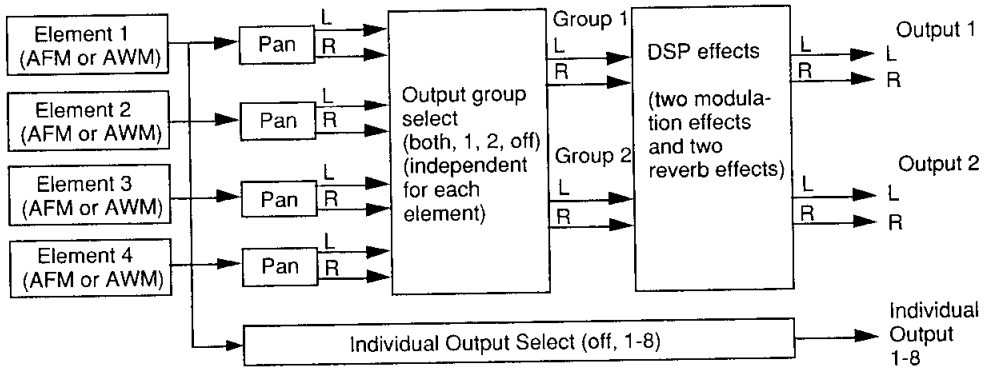
There is no distinction between normal voice memory and drum voice memory; either type of voice can be stored in any of the voice memories.

About the TG77: pan, effects, and output

Each of the one, two, or four elements in a voice has two independent digital filters, and is sent through its own pan table. The TG77 also has four built-in digital effect processing (DSP) effect units, and effect settings are stored as part of each voice. In addition to the two pairs of stereo outputs from the DSP effect system, the TG77 provides 8 individual outputs to which you can assign the un-panned un-processed sound of a voice.

Dynamic pan table for each element

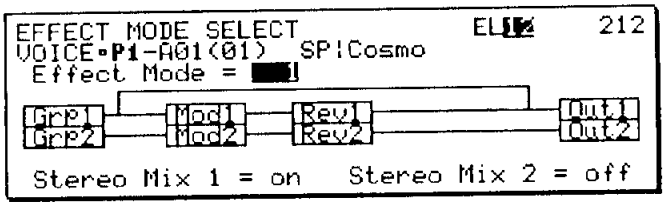
Each element in a voice is sent through a pan table (64 preset and 32 user pan tables are provided) that determines how the sound will move between the left and right outputs. Each pan table has its own EG, and also allows you to select a pan source (velocity, key note number, or LFO). Another controller can be used to further bias the panning movement.



Four DSP effects

The stereo output from the voice is sent through the voice output group selector (both, group 1, group 2, or off) to the DSP effects section. The TG77 contains two modulation-type effect units and two reverb-type effect units.

Each modulation-type effect unit can produce four different effects: chorus, flanger, symphonic, or tremolo. Each reverb-type effect unit can produce 40 different effects, including several types of reverb, delay, tone control, distortion, and various combinations of these. All effect parameters are fully adjustable. The sound from the two output groups can be sent through these four effect units in three different routes.



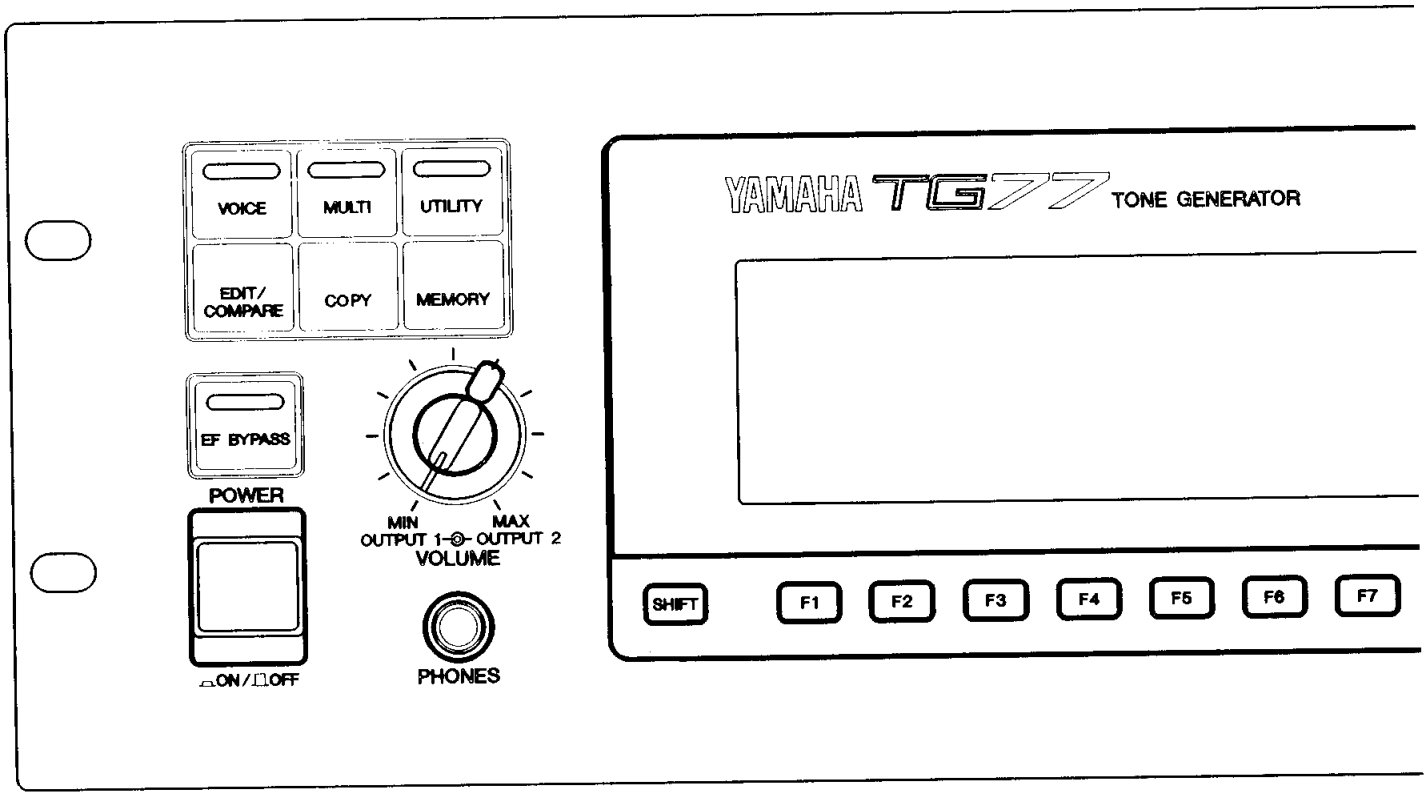
Eight individual outputs

In addition to the two pairs of stereo outputs from the DSP effect system, the TG77 provides 8 individual outputs to which you can assign the un-panned unprocessed sound of a voice. This is convenient when you wish to use an external effects device or mixer to add special processing to a specific voice. For example when playing the TG77 in voice mode, you might want to route sound through a fuzz box connected to individual output 1 whenever you select a guitar voice.

In multi mode, each voice has full control of pan and output group, exactly the same as in voice mode. (The DSP effect system is shared by all 16 voices of the multi.) Each voice in the multi also has its own individual output assignment, and two or more voices of the multi can use the same individual output if desired. For example, you might send a guitar voice from individual output 1 to an external fuzz box, while sending an organ voice from individual output 2 to an external rotary speaker.

Front panel

In order to understand the rest of this manual and take full advantage of the TG77, you will need to know the names and uses of the controls and other features of the front panel.



VOICE, MULTI, UTILITY (mode select keys)

The functions of the TG77 are divided into three main modes. Press one of these buttons to select the mode, and the LED above the button will light to indicate the selected mode. The tone generation circuitry of the TG77 is always in one of two modes; Voice mode or Multi mode. One of the LEDs above these two keys will always be lit to indicate the selected mode.

To enter Utility mode, press the UTILITY button and the LED will light. To exit utility mode, press VOICE or MULTI.

EDIT/COMPARE

Press this button to edit the data of the currently selected Voice or Multi. Once you are in edit mode, pressing this button allows you to compare the original data with the edited data. While you are in compare mode, the VOICE or MULTI LED will flash. In compare mode it is not possible to modify parameter values. To return to editing mode, press EDIT/COMPARE once again.

COPY

While editing, this button is used to copy and store various types of data.

MEMORY

To select a preset, internal, or card memory (if a card is inserted), repeatedly press this button until the desired memory is selected. The LCD will show the selected memory.

EF.BYPASS (Effect bypass)

At any time, pressing this button will allow you to hear the sound without the DSP effects. The LED will light to indicate that the effects are bypassed. To defeat effect bypass, press the button again.

POWER switch

The power is on when this switch is pressed. The front panel display will light when the power is turned on.

VOLUME controls

These two concentric rotary controls regulate the output volume from the two pairs of stereo output on the rear panel.

PHONES

A pair of stereo headphones can be connected here to hear the combined stereo sounds of outputs 1 and 2.

Liquid Crystal Display (LCD)

The 240 x 64 pixel LCD is backlit for readability even in dark locations. Adjust the CONTRAST control on the rear panel for best visibility.

SHIFT

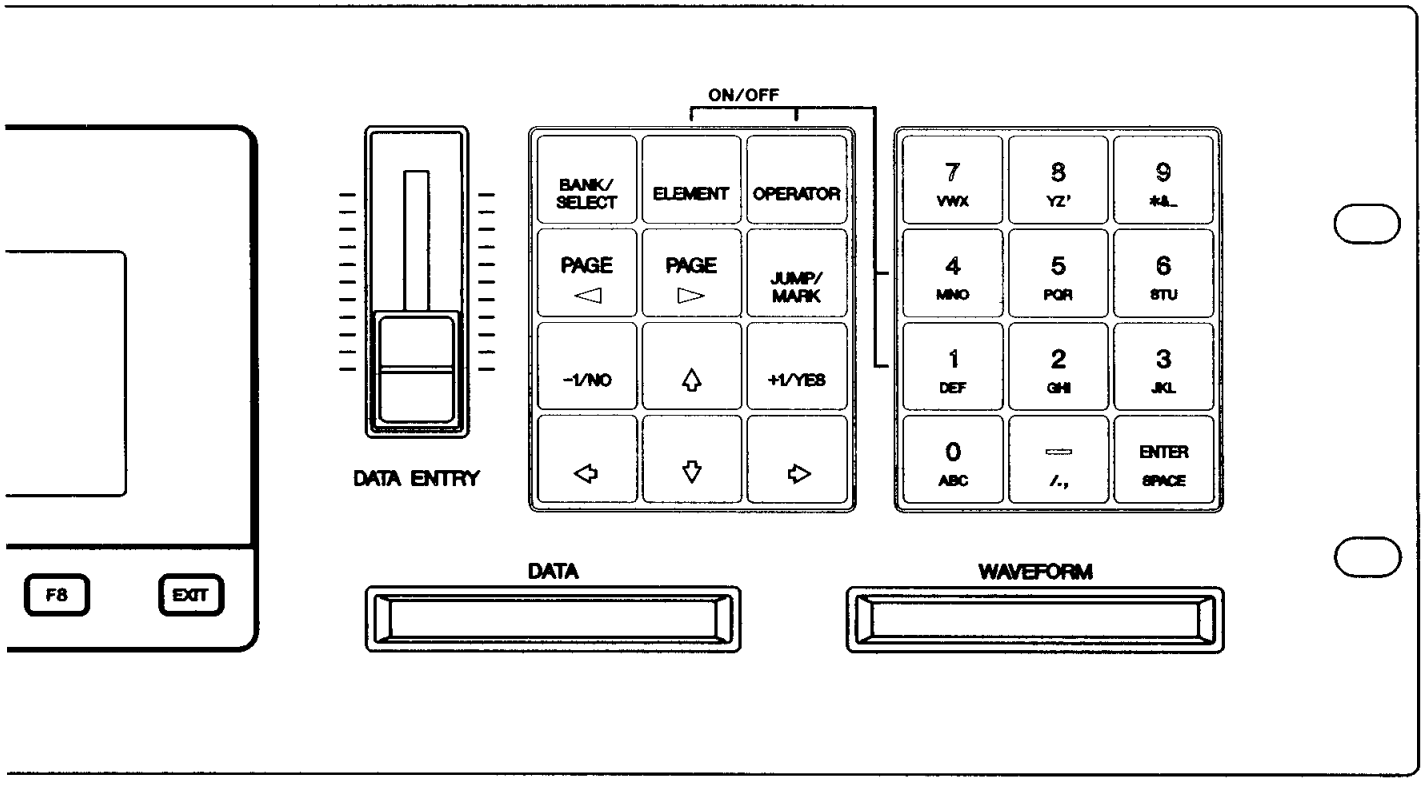
When the lower right of the LCD shows an inverse "S" mark, you can press and hold the SHIFT button to make the function keys F1–F8 perform alternate functions. The shifted functions will be displayed in the lower line in place of the regular functions F1–F8.

Pressing the JUMP key while SHIFT is held down will mark the current location.

In Voice Play or Voice Edit mode, pressing the numeric keys 0...9 , '–', and SPACE while holding SHIFT will play the notes of the octave. This is useful for checking audio connections, etc.

Function keys F1–F8

In some jobs the bottom line of the LCD will display a function for F1–F8, and pressing a function key will select the corresponding function such as selecting a menu item, moving the cursor, or executing a function. If nine or more functions are available, the lower right of the LCD will show an inverse "S" mark, indicating that you may hold SHIFT and press a function key to access functions 9–16.



EXIT

Press this key to move back to where you last were before entering the current level; i.e., to move back to the previous branch of the function tree.

DATA ENTRY slider

The DATA ENTRY slider is used to set the data value indicated by the cursor. When you move the slider, the data will immediately change to the value corresponding to the current slider position. Using the slider is convenient when you wish to set the currently selected parameter to a value such as "maximum", or "about 2/3rds", regardless of the actual range of values.

BANK/SELECT

Whenever you are selecting a voice, you can press this button to cycle through the four voice banks A–D. The LCD will indicate the selected bank.

In Voice Edit mode, this button is also to select elements and operators. See ELEMENT and OPERATOR below.

ELEMENT

This button is used in voice edit mode to select and turn on/off elements.

To select an element for editing, hold the BANK/SELECT button and press ELEMENT to cycle through the one, two, or four elements that make up the voice. The currently selected element number and type is displayed after the voice name in all voice editing displays.

To turn off an element, hold ELEMENT and press a numeric key 1–4 to turn off the corresponding element. The on/off status of elements 1–4 is displayed in the top line of all voice editing displays.

OPERATOR

This button is used in voice edit mode to select and turn on/off the operators of an AFM element.

To select an operator for editing, hold the BANK/SELECT button and press OPERATOR to cycle through the six operators in each AFM element. (This works only when the LCD shows the data for a single AFM operator.)

To turn off an operator, hold OPERATOR and press a numeric key 1–6 to turn off the corresponding operator. Whenever you are editing an AFM element, the LCD will indicate the on/off status of the six operators.

PAGE ◁ ▷

These keys move to the next or previous function within the same level; i.e., they move from branch to branch of the tree of functions.

JUMP/MARK

The LCD for most functions in the TG77 has a "system page number", which is displayed at the upper right of each LCD. If you know the number of the page to which you want to jump; press JUMP, use the numeric key pad to enter the page number, press ENTER, and you will be taken to the specified page.

If you press MARK while holding SHIFT, the current page will be marked. Later when you are in another page and wish to return to the marked page, press JUMP and then ENTER, and you will be taken to the previously marked page. (The page you jumped from will now be marked.)

For details on jumping and marking, see page 26.

-1/+1

The –1/+1 buttons will decrease/increase the current data value in steps of one. If you continue holding down the –1 or +1 key, the value will continue changing. These keys also act as "yes/no" or "on/off" for various functions, and can be used to select voices or multis.

Cursor keys (◁ ▷ △ ▽)

Use these keys to move the cursor in the LCD to select items or data. In some cases, cursor movement will modify parameters or select programs.

Numeric key pad

Use these keys to enter data as an absolute number.

- to select a voice or multi
- after pressing JUMP to specify the page to which you want to jump
- to directly enter a value for the data indicated by the cursor
- to directly select an item from a directory

When specifying a voice name etc., use the numeric key pad to enter the characters printed below each key.

To enter a value, use keys 0–9 to specify the value, press +/– to change the sign if necessary, and press ENTER. For details on using the numeric key pad, see page 30.

DATA card slot

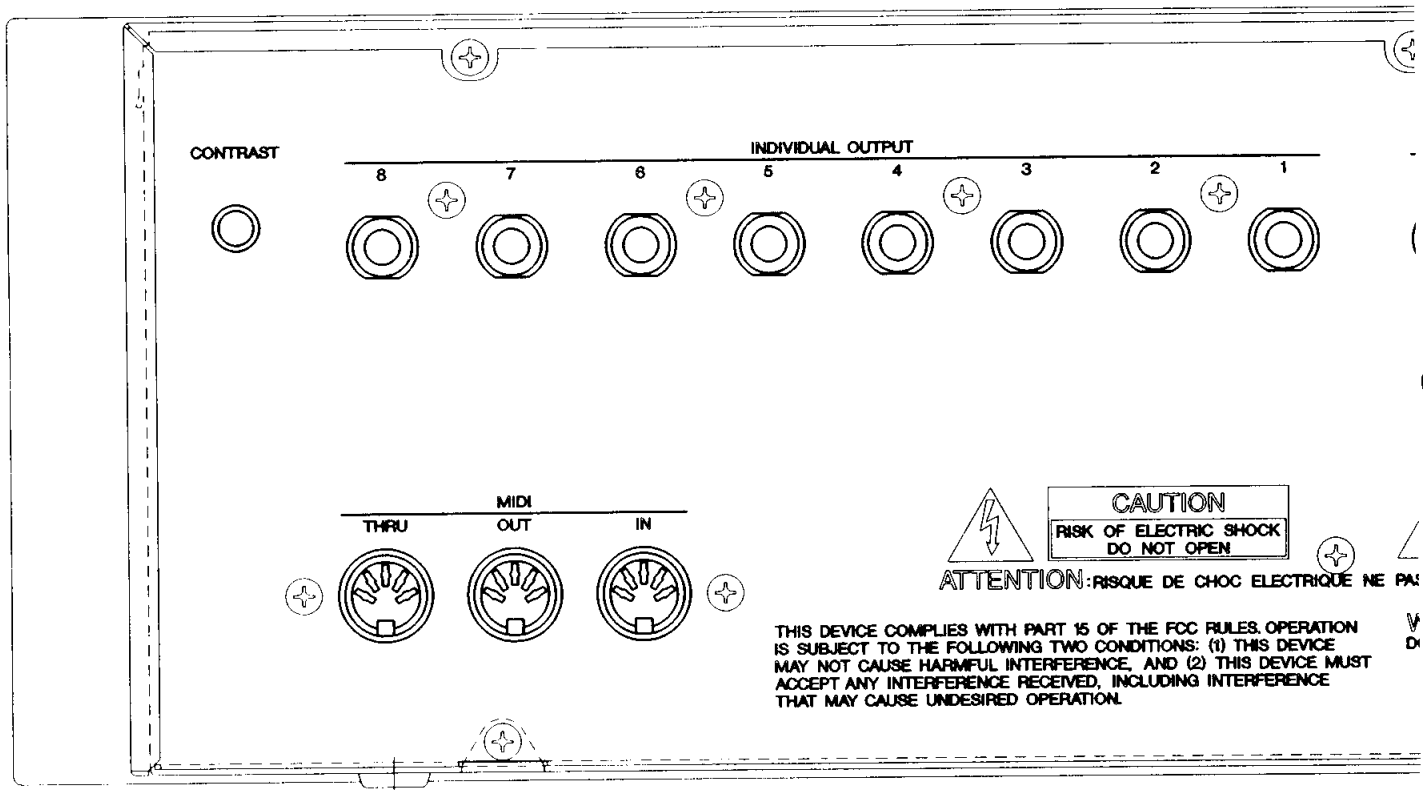
An optional RAM card (MCD64) can be inserted into the DATA slot to store TG77 data.

WAVEFORM card slot

An optional waveform ROM card can be inserted into the WAVEFORM slot to provide additional AWM sounds.

Rear panel

In order to connect the TG77 to other devices (an amp/speaker system, MIDI equipment, footswitches, etc.), you will need to know the names and uses of the various items on the rear panel.



MIDI IN, OUT, THRU

Any MIDI device (sequencer, keyboard, WX7/11 wind controller, G10 guitar controller, etc.) can be connected to MIDI IN to play the sounds of the TG77.

The data received at MIDI IN is re-transmitted unchanged from MIDI THRU. Another MIDI device connected to this terminal will receive the same MIDI data that the TG77 receives.

The data in TG77 memory can be transmitted as a MIDI system exclusive message from MIDI OUT to be received by another TG77 or MIDI storage device.

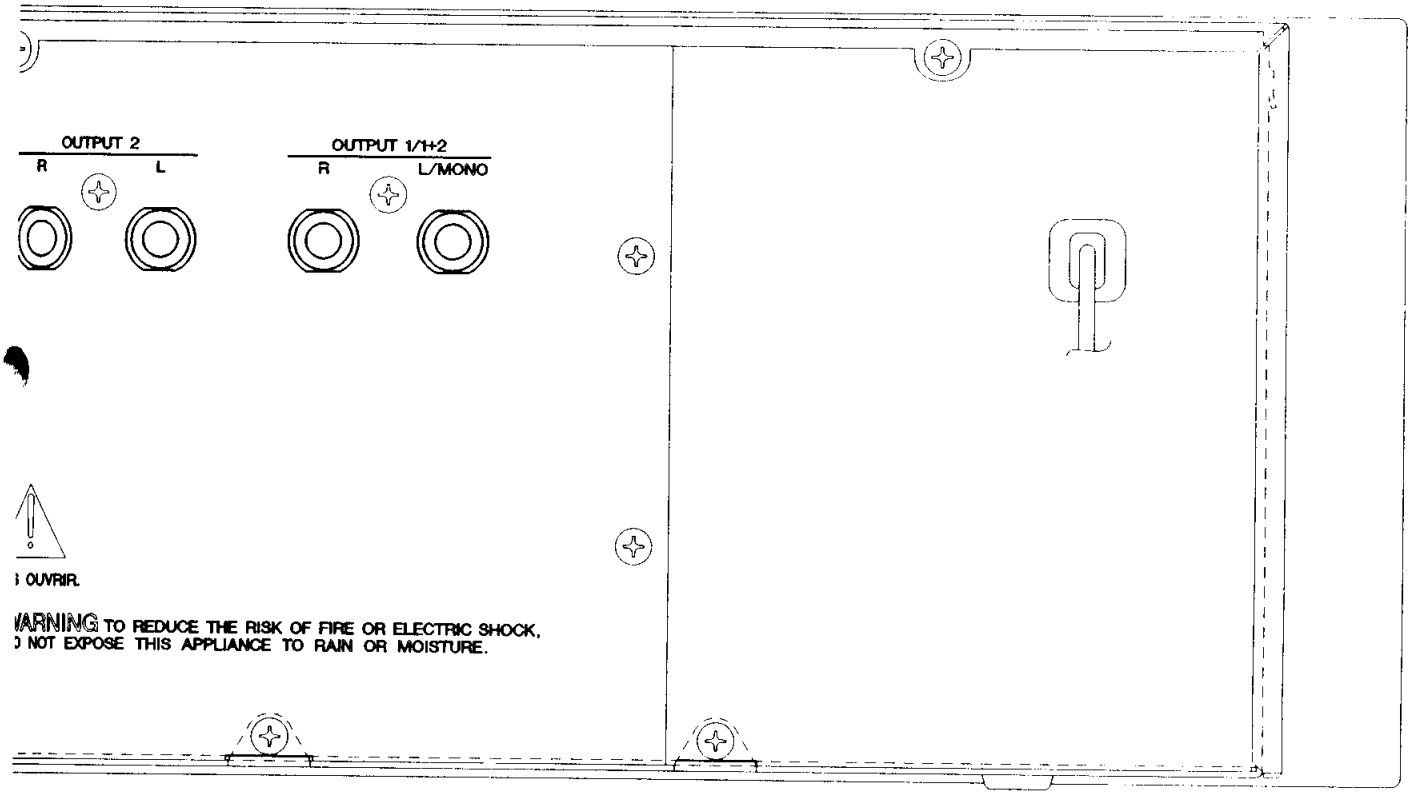
CONTRAST

This knob adjusts the contrast of the LCD. Adjust it for best visibility. (At extreme settings the display will not be readable.)

OUTPUT 1/1+2 (L/MONO, R)

If the OUTPUT 2 L/R jacks are not plugged in, these jacks will output the combined stereo signal from group 1 and group 2 of the DSP effects system. If the OUTPUT 2 L/R jacks are plugged in, these jacks will output the sound from the group 1 stereo output of the DSP effects system.

If only the L/MONO jack is used, it will carry the combined output of L and R. (Use the L/MONO jack if your mixer/amp system has only one input.)



OUTPUT 2 (L, R)

These jacks output the sound from the group 2 stereo output of the DSP effects system. If your mixer/amp system has four or more inputs, using both the OUTPUT 1 and the OUTPUT 2 jacks will allow you to treat the two output groups in different ways, perhaps by panning them to different locations, or processing them through different external effect devices.

INDIVIDUAL OUTPUT 1–8

Each voice (and each channel of a multi) can be assigned to one of the 8 individual outputs. The output is taken from the un-panned un-processed sound of a voice, allowing you to use an external effects device or mixer to add special processing to a specific voice.

It is not possible to output a voice from an individual output and from the stereo outputs at the same time.

Power cable

Plug the power cable into an AC outlet of the correct voltage.

How to move around: job directories

The functions of the TG77 are organized into three main Modes and two editing modes. Some modes have a Job Directory that shows the various Jobs (functions) in the mode. Move to the desired function by selecting a job from the job directory.

Three main modes (1)

The TG77 operates in three main modes. Press one of the three mode select buttons to enter the corresponding mode. (An LED will light to indicate the selected mode.)

Press	to enter	where you can
VOICE	Voice mode	Select and play a Voice.
MULTI	Multi mode	Select and play a Multi.
UTILITY	Utility mode	Make overall settings for the TG77, manage card data, etc.

Play modes and Edit modes (2)

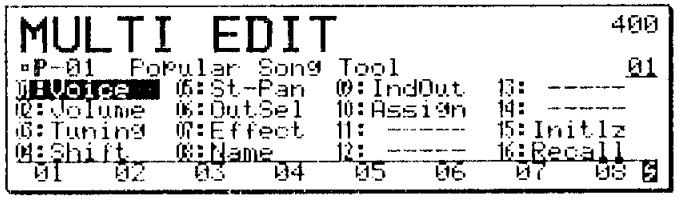
While in voice or multi mode, press EDIT to move to the corresponding edit mode. Voice Edit mode is where you modify the settings that make up a voice, and Multi Edit mode is where you modify the data that makes up a multi. (There is no "utility edit" mode.)

Press	to enter	then press	to enter
VOICE	Voice mode	EDIT	Voice Edit mode
MULTI	Multi mode	EDIT	Multi Edit mode

To leave an edit mode, simply re-select any of the three main modes (or press EXIT from the top level of an edit mode to return to the main mode from which you came).

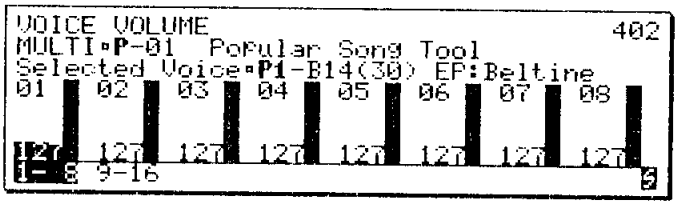
Select a job from the job directory (3)

Whenever a mode or function is sub-divided into more than one job, there will be a "job directory" that lists the various items or operations. For example, when you enter Multi Edit mode, the following display will appear.



This lists the various parameters that can be adjusted in Multi Edit mode; 1.Voice, 2.Volume, 3.Tuning, etc.

To select an item from a job directory, use the arrow keys to move the cursor to the desired item and press ENTER. For example, if from the above display you press ▽ once to move the cursor to "2.Volume" and press ENTER, the following display will appear.



To return to the job directory, press EXIT.

Function keys (4)

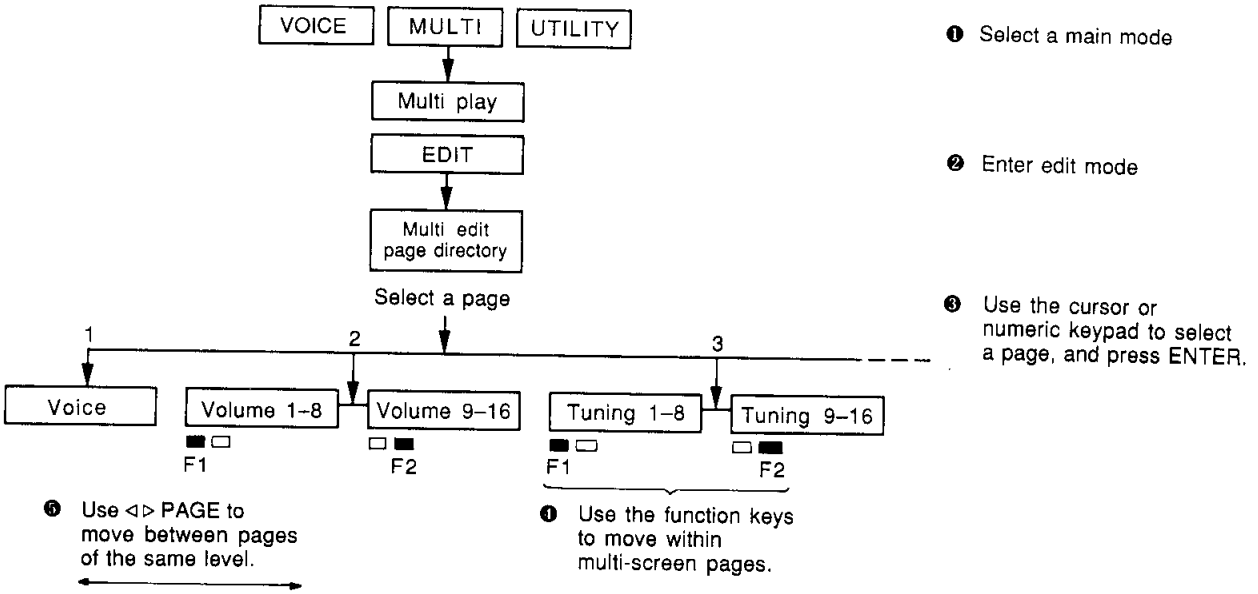
Sometimes a job will be divided into two or more screens. For example, "2.Volume" is divided into two jobs; one to set the volume for voices 1–8 and the other to set the volume for voices 9–16. Notice that the bottom line shows "1–8" (above function key F1) and "9–16" (above function key F2). The "1–8" is displayed in inverse video to indicate that the volumes of voices 1–8 can be edited. To edit the volumes of voices 9–16, press function key F2.

Whenever function key assignments are displayed in the bottom line of the LCD, the current selection is indicated in reverse video. Press a function key to move to the desired job.

Move between jobs using ◁▷ (page) (5)

Suppose that you wanted to move from the "2.Volume" job to the "3.Tuning" job. You could press EXIT to return to the job directory, and then press 3 and ENTER to move to "3.Tuning", but there is a faster way.

To move between jobs of the same level (i.e., inside the same job directory), use the PAGE ◁▷ keys. For example if you are now in the "2.Volume" job, pressing PAGE ◁ would take you to the "1.Voice" job, and pressing PAGE ▷ would take you to the "3.Tuning" job. When moving to a nearby job, this is usually faster than returning to the job directory.



How to move around: the jump function

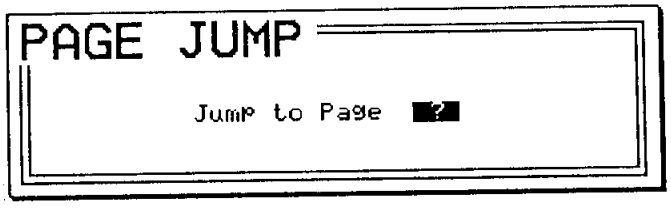
If you already know the exact function you need to use, it is possible to Jump directly to a specific page number instead of working your way through the job directories. The jump function also allows you to repeatedly jump back and forth between two jobs.

Jump to a specified page number

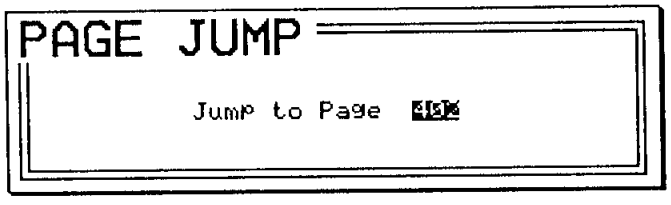
If you need to move to a distant job, it may sometimes be necessary to press EXIT several times, and then move down through two or more job directories. In such cases, it is much faster to jump directly to a specific page.

You may have noticed that most page displays have a unique three-digit number in the upper right corner. This is the Display Page number. For example, "Multi edit 2. Multi Volume" is JUMP #402. If you frequently need to adjust the settings of this page, remember this page number. Then, no matter where you are, you can press JUMP, 4, 0, 2, and ENTER to jump instantly to that page.

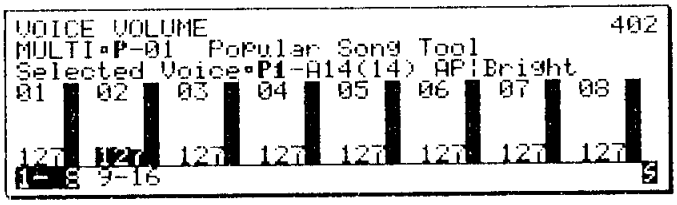
1. Press JUMP.



2. Enter the three digit page number.



3. Press ENTER and you will jump to the specified page.



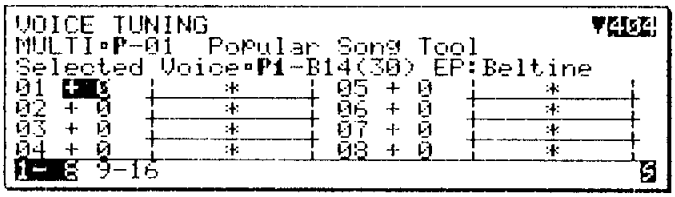
While you are becoming familiar with the TG77 it will probably be easier for you to select the desired page while viewing a page directory. However as you gain more experience, you may find it convenient to use the JUMP key to go directly to frequently-used pages.

Jump between two marked pages

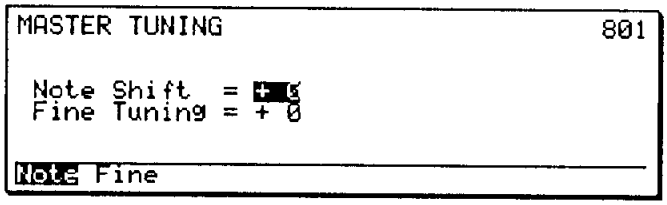
It often happens that you will need to repeatedly make adjustments in two different pages, which may be widely separated. The jump/mark function allows you to jump back and forth between two pages.

Suppose you are editing the tuning of the voices in a multi (*Multi edit, 3. Voice tuning*, JUMP #404) and you wish to check the master tuning (*System Utility, 1. Master tuning*, JUMP #801).

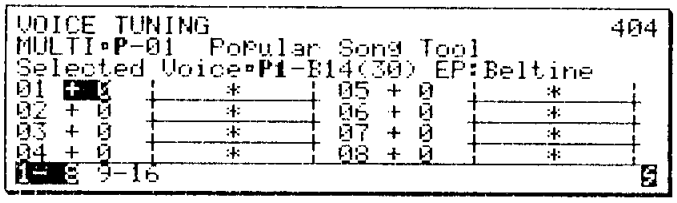
1. Hold down the SHIFT key and press JUMP. The current page will be marked, and the page number will displayed in inverse with a triangle mark to indicate this.



2. Then move to the other page, either by jumping to the page number, or by moving through the job directories.



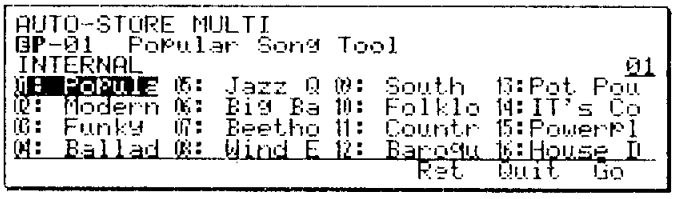
3. To return to the previously marked page press JUMP and then ENTER without entering a page number.



4. To jump back to the Master Tuning page, press JUMP and then ENTER again. In this way, pressing JUMP and then ENTER will jump back and forth between the two pages. Each time you jump, the mark is shifted to the page you jumped from. If you return to that page by moving through the modes and job directories in the usual way, you will find that it is marked by the inverted page number and triangle.

Note:

The two pages used in this example are located in two different modes. Whenever you leave multi edit (or voice edit) mode after modifying the data, either by pressing EXIT or by using the Jump function, you will pass through the Auto-Store screen, and must press F6 (Ret) to return to editing mode, F7 (Quit) to quit without storing the changes, or F8 (Go) to store the data.



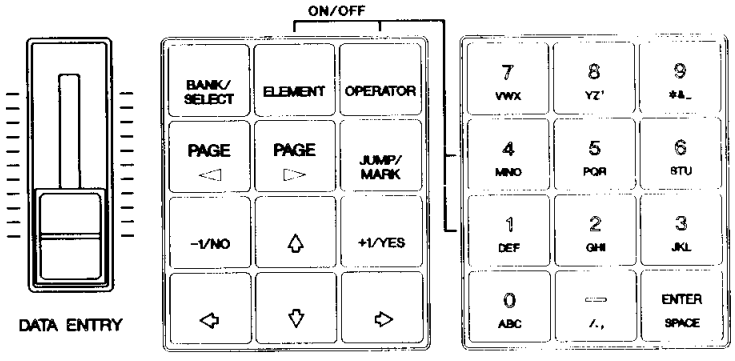
If the data has not been modified, this Auto-Store screen will not appear.

How to enter data

To select a voice, adjust a parameter, or give a name to a newly created setting, you will need to enter various types of data into the TG77. The –1/+1 keys and data entry slider provide various ways to enter data. Use the data entry method that is most appropriate for each situation. (The following page explains how to use the numeric key pad.)

Select the data to enter

First, use the arrow keys ◁ ▷ △ ▽ to move the inverse cursor to the data you want to modify.



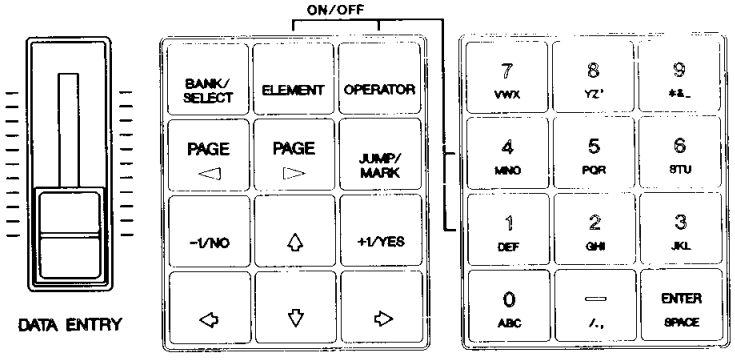
Move the cursor in the LCD

Next you will modify the value using one of the following; –1/+1 keys, data entry slider, or the numeric key pad. The method you use will depend on how you want to modify the data.

–1/+1 (no/yes)

If you want to decrease or increase the existing data value, use the –1/+1 keys. Each time you press the –1 or +1 key, the data will decrease or increase one step. This method allows you to move in precise steps, but can take a long time when you need to make a major change in the value.

Some parameters consist of a "off/on" setting, and sometimes you will be asked to reply "no/yes" to a question (such as "do you really want to do this?"). In such cases, press –1 to turn something off or to answer "no", and press +1 to turn something on or to answer "yes".



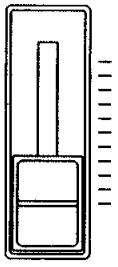
Decrease/increase the data one step at a time

Data entry slider

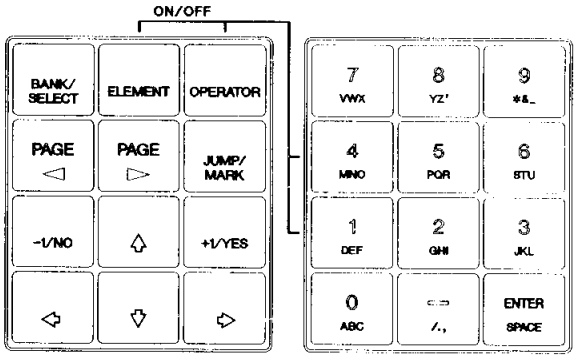
If you want to set a data value to some setting relative to the entire range of that value (for example "maximum", "minimum", or "about 90% of maximum"), use the data entry slider. When you move the slider, the data value is immediately changed to correspond to the position of the slider. The range of the slider will match the range of the parameter value. For example if the parameter being modified has a value range of 0–127, pulling the slider fully down will set a value of 0, and pushing the slider fully up will set a value of 127. Setting the slider exactly in the middle of its range would set a value of 64.

Since the range of the slider always matches the range of the parameter you are adjusting, there is no need to remember the range of the parameter; just move the slider to the position that corresponds to the relative setting you want.

Range of parameter	0–99	0–7	–50 – +50
Position of DATA ENTRY slider	99	7	+50
	50	3	+0
	0	0	–50



DATA ENTRY

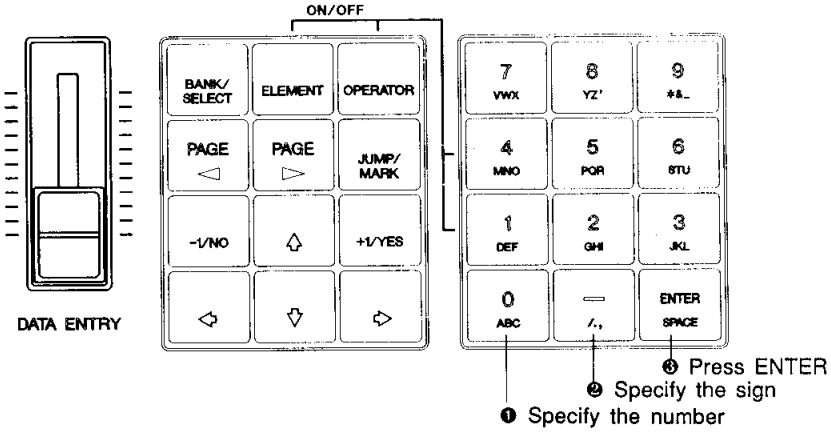


How to use the numeric key pad

The numeric key pad can be used to enter an absolute data value, and also to enter characters for a memory name.

How to enter absolute numerical data

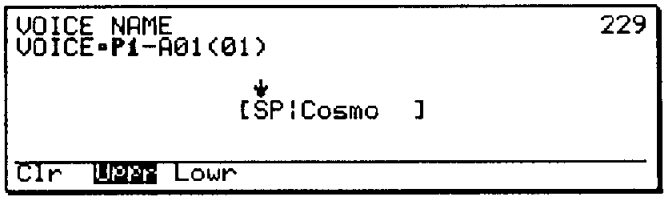
If you want to set a data value to some specific number (for example "57" or "121"), use the numeric key pad. Press one or more keys 0–9 to specify the number, press the – key to change the sign if necessary (when entering a negative number), and press ENTER. For example if you wanted to enter the number "–18", you would press 1, 8, –, ENTER. Even if the data value has a three-place range (such as 0–127), there is no need to add a zero in front.



In most displays, the digits you enter from the numeric key pad will be displayed blinking. When you press the ENTER key the number will be finalized.

How to enter character data

You will sometimes need to enter character data to specify a voice name, multi name, etc. When the currently selected parameter requires that you enter character data, the numeric key pad will act in a different way than usual. To try this out, jump to the Voice Name page by pressing the following keys in order; JUMP, 2, 2, 9, ENTER. The following display will appear.



This display is essentially the same as for any other job that requires you to enter character data. Press F1 (Clr) to clear the currently set name, and press F2 (Uppr) or F3 (Lowr) to select uppercase or lowercase letters.

Notice that below the 0 key are printed the characters "A", "B", and "C". Press the 0 key, and the numeral "0" will appear. Press it again for the character "A", again for "B", and again for "C". Press it once more and "0" will reappear. In this way, each time you press a key, the character indicated by the cursor will alternate through the alphabetical characters printed below it and the numeral printed on the key itself. (If you press another of the numeric keys, the cycle will begin from the first character.) Notice that the third press of 8 is an apostrophe, that 9 gives you an asterisk, ampersand, and an underline character, and that – enters a hyphen, slash, period, and comma.

Other characters are available in addition to the characters entered using the numeric key pad. These characters can be selected using the DATA ENTRY slider or the –1 +1 keys. Moving the DATA ENTRY slider will scroll through all available characters in the following order.

(Space) ! " # $ % & ' ( ) * + , – . / 0 ~ 9 : ;
< = > ? @ A ~ Z [\ ] ^ _ ` a ~ z { | } ~ (Space.)

Use the ◁ ▷ keys to move the cursor, and enter characters for the desired name. Pressing the ENTER (space) key will enter a blank and move the cursor to the right.

HOW TO USE MULTI MODE

This section is a step by step explanation of how to use the TG77 in Multi mode to function as up to 16 independent MIDI tone generators. When the TG77 is used in multi mode in conjunction with an external sequencer, it can produce the sounds of a sixteen part ensemble.

Contents of this section **page**

Multi edit: initialize a multi and select voices

When the TG77 is used in Multi mode, it will function as 16 independent synthesizers. This allows each incoming channel of MIDI data to play a different voice.

About this tutorial

In the following pages of this section, we will be explaining the process of creating your own Multi to play from an external MIDI sequencer. We assume that you have an external MIDI sequencer (either a dedicated hardware sequencer such as the QX5FD or QX3, or a software program running on your personal computer), and know how to operate it to record and playback multi-track MIDI sequences.

To keep this tutorial simple, we will assume that your sequencer is transmitting the following four tracks of data: the piano part is being transmitted on channel 1, the bass part on channel 2, the brass part on channel 3, and the drum part on channel 16.

The data in your sequencer

Channel	Contents
1	Piano part
2	Bass part
3	Brass part
...	...
16	Drum part

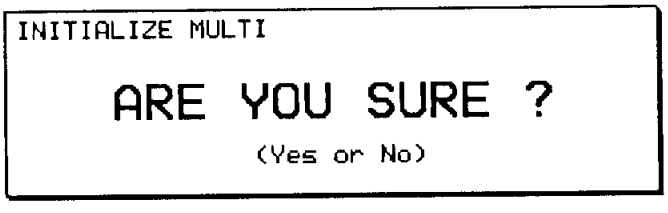
We will assume that the MIDI OUT of your sequencer is connected to the MIDI IN of the TG77, and that the OUTPUT 1 left and right jacks of the TG77 are connected to a stereo mixer/amp system.

Note when playing a TG77 drum voice

Each note of a drum voice is normally assigned to sound a different instrument. For example in the preset voice P2-D15 Drum 1, the note C3 plays a Crash cymbal. You may need to edit your sequencer data so that appropriate note numbers are being sent to the TG77 drum voice. Page 187 has a table of the instrument/note assignments for the two preset drum voices P2-D15 DR Both and P2-D16 DR Group2. Of course, you can create your own drum voices with different assignments if you wish, to match the rhythm note assignments of your sequence data. Editing a TG77 drum voice is explained on page 148.

Start by initializing a multi

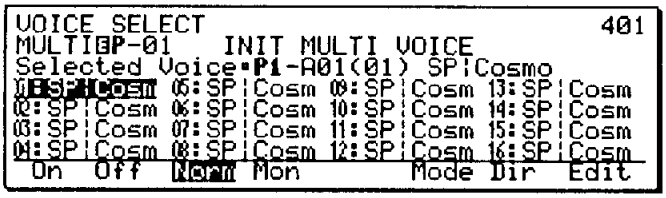
Although it is possible to create a multi by editing one which already exists, in this example we will start from the initialized or "basic" settings. Press MULTI, then press EDIT/COMPARE. While holding SHIFT press F7 (15) to select the Initialize job.



Press +1/YES. The display will show "Completed!". Press EXIT to return to the Multi Edit job directory.

Select a voice for each channel of the multi

Press F1 (01) (or JUMP #401) to get the following display.



Specify the voice that will be played by each channel 1–16 of incoming MIDI data.

1. Move the cursor to the channel for which you want to select a voice.
2. Use the MEMORY button to select a memory; Internal, Preset 1, or Preset 2. (It is not possible for an Internal or Preset multi to use Card voices, nor is it possible for a Card multi to use Internal voices.)
3. Select a voice. You can use the DATA ENTRY slider, the –1 +1 keys, or the numeric keypad to select voices 1–64 of the currently selected voice memory. Or, you can press BANK/SELECT to cycle through banks A–D and use –1 +1 to select voices in that bank.
4. Repeat steps 1–3 to select the following voices for channels 1, 2, 3, and 16 of the multi.

Multi ch. no.	Voice no.	Voice name
1	P1-A16	AP Grand
2	P1-D13	BA Woodbas
3	P1-C12	WN AltoSax
...	...	...
16	P2-D16	DR Group2

5. Select the "off" voice for all other channels, by moving the cursor to the channel selection and pressing F2 (Off), or moving the DATA ENTRY slider to the lowest position.

You can playback your sequencer while editing a multi

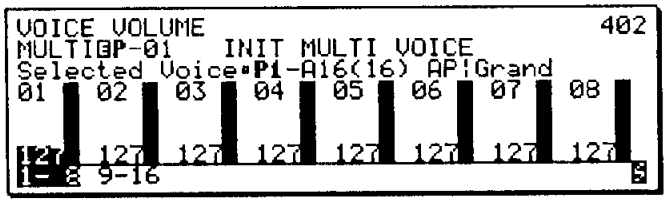
From here on, you might want to keep your sequencer running so that you can hear the results as you continue editing the multi. Start your sequencer now, and check that the piano, bass, brass, and drum parts are played by appropriate voices. Don't worry if the pitch range or volume balance is inappropriate. We will be adjusting these in the following pages.

Multi edit: volume, note shift, and panning

Volume, pitch, and many other adjustments can be made independently for each channel of a multi. In addition, you can set each channel either to a static pan position, or specify that the voice selected for a channel use its own pan settings.

Volume settings adjust the level balance

Press EXIT to return to the Multi Edit job directory, and press F2 (02) to move to 2.Volume (JUMP #402). Or you can simply press PAGE ▷ to move from 1. Voice to 2. Volume.



The volumes of each channel are displayed as vertical bar graphs. Move the cursor to the channel whose volume you wish to adjust, and use the DATA ENTRY slider, the –1 +1 keys, or the numeric keypad to set the volume.

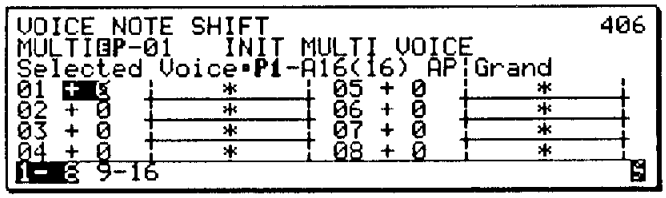
The voice number and name of the channel indicated by the cursor is shown in the LCD after "Selected Voice".

The LCD can show the settings for eight channels at a time. To view and adjust the settings for channels 9–16, press F2 (9–16).

Note shift settings adjust transposition

Since the sounds you used when recording your sequence may have been in different pitch ranges than the TG77 sounds you are now playing, it is possible that the pitches are in an inappropriate octave. This can be corrected using the Note Shift parameter.

Press EXIT to return to the Multi Edit job directory, and press F4 (04) to move to 4. Shift (JUMP #406). Or you can simply press PAGE ▷ twice to move from 2. Volume to 4. Shift.



The note shift setting of each channel is displayed as a horizontal bar graph. Move the cursor to the channel whose note shift you wish to adjust, and specify the note shift setting to transpose the pitch over a range of –64...+63 half-steps.

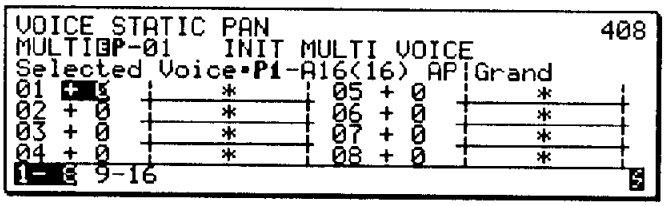
Note:

The multi edit parameter Note Shift has no effect on a drum voice.

Pan settings determine stereo placement

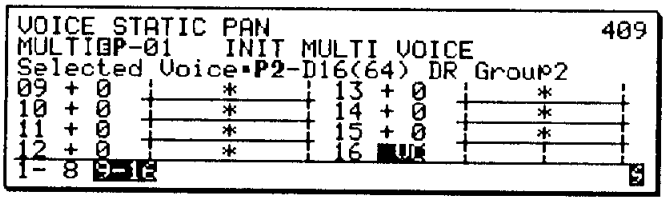
Press EXIT to return to the Multi Edit job directory, and press F5 (05) to move to 5. Static Pan (JUMP #408). Or you can simply press PAGE ▷ once to move from 4. Shift to 5. Static Pan.

The static pan setting of each channel is displayed as a horizontal bar graph. Move the cursor to the channel whose static pan setting you wish to adjust, and specify the static pan position over a range of –31...+31 or "VC".



By selecting "VC" (the selection below –31), you can make the voice selected for this channel of the multi use its own pan settings that have been stored as part of the voice parameters. As explained earlier, each of the one, two, or four elements in a voice has its own panning envelope and other pan settings. If pan settings of a voice are musically important, you should set this multi edit parameter to "VC".

To try this out, move the cursor to channel 16 of the multi. Notice the LCD shows that "P2-D16 DR Group2" is being played by channel 16. Playback the track of your sequencer that is transmitting the drum part on channel 16. Adjust the TG77 static pan for channel 16 over the range of –31...+31 and notice that the entire drum kit is panned to the same location. Now move the DATA ENTRY slider all the way down so that "VC" is selected for channel 16. Notice that each instrument in the drum voice is panned to its own stereo location, as specified in by the parameters for that voice.



When you are finished making pan settings, press EXIT to return to the multi edit job directory.

Multi edit: output and effects

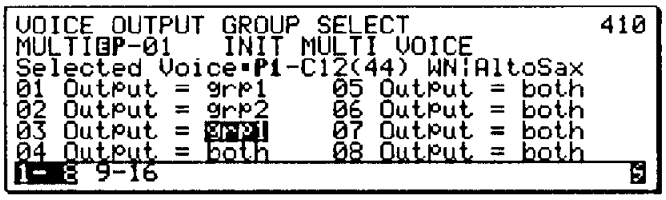
The stereo pan output from each of the 16 voices in a multi can be sent from either or both output groups 1 and 2. These output groups are connected to the two input groups of the TG77's effect system, which contains four DSP effect units.

Select the output group for each channel

The multi edit parameter Output Group Select allows you to assign the stereo output from each of the 16 channels in a multi to either or both output groups 1 and 2. These output groups are connected to the two input groups of the effect system.

From the multi edit job directory, select 06:OutSel (JUMP #410) and press ENTER.

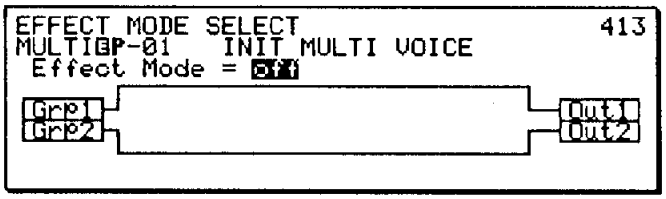
In this example, we will assign channels 1 and 3 (piano and brass) to output group 1 ("grp1"), and channel 2 (Bass) to output group 2 ("grp2"). This will allow us to apply different effects to the piano and brass without affecting the bass (or vice versa).



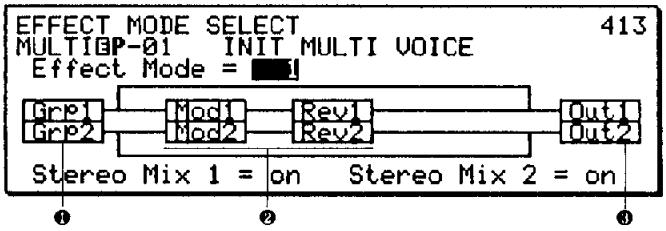
Since channel 16 is using a drum-type voice, its output group selection is determined by the output group selection for each individual note, and cannot be set as a multi edit parameter. (The drum voice selected in this example, P2-D16 DR Group2, assigns all notes to group 2.) For details on editing a drum voice, refer to *Drum set data, 2. Wave data set*, page 148.

Select the effect mode

Press PAGE ▷ once to move from 6. Output select to 7. Effect (JUMP #412), and press F1 (01) to select "01.Effect Mode".



The effect system of the TG77 contains four effect units; two modulation-type units and two reverb-type units. The Effect Mode determines how these four effect units are connected. There are three ways of connecting the effects; modes 1, 2, and 3. You can also select "off" to bypass the effect units. Use the –1/+1 keys to select the various modes 1–3 and note how the LCD graphically indicates the flow from the pan output at left to the final Out1 and Out2 at right.

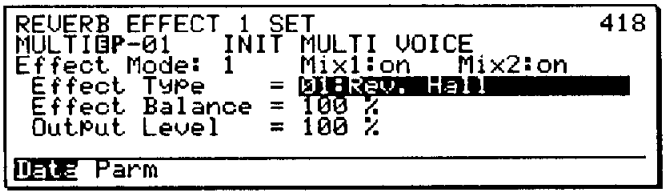


❶ The output from the stereo pan of each voice
❷ is processed through the effects
❸ and sent out from the rear panel Out1/Out2 jacks.

For this example select effect mode 1.

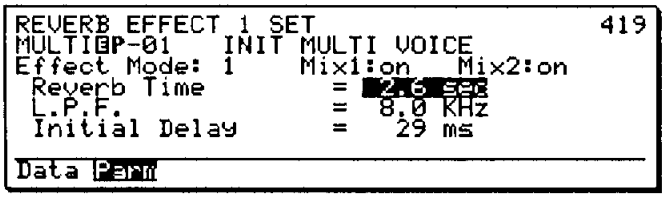
Select and adjust a reverb effect

Press PAGE ▷ three times to select Reverb Effect 1 Set. This parameter is divided into two jobs. Press F1 (Data), move the cursor to Effect Type, and use the –1 +1 keys to select 01:Rev.Hall.



With your sequencer playing back, notice the piano and brass (channels 1 and 3) have a feeling of spacious ambience as if the instruments were being played in a large, reverberant hall. If the effect is not noticeable, move the cursor to Effect Balance or Output Level and set a higher value.

To adjust the parameters of the reverb effect, press F2 (Parm). Move the cursor to Reverb Time and experiment with various settings. Higher settings will make the reverb longer. You can experiment with various settings of the L.P.F. (Low Pass Filter) and Initial Delay as well.



Select and adjust other effect units

If desired, you can use the PAGE ◁ and PAGE ▷ keys to select and adjust the other effect units (Reverb 2, Modulation 1, and Modulation 2).

Bypass the effects to hear the unprocessed sound

Whether or not you are editing the effect, you can press the EF BYPASS button at any time to bypass all effects. When you press EF BYPASS the LED will light, and you can hear the sound without effects. Press it once again, and the LED will go out and effects will be applied once again.

How to use an individual output

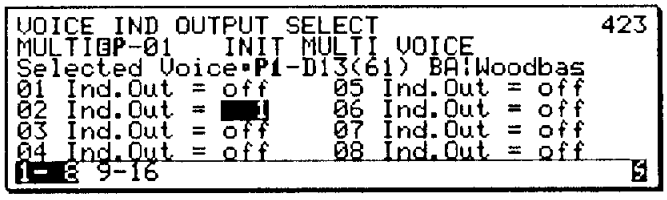
In this example, piano and brass (channels 1 and 3) are being processed through Modulation 1 and Reverb 1, while bass and drums (channels 2 and 16) are being processed through Modulation 2 and Reverb 2.

Suppose you wanted to process just the bass through an external effects unit or mixer, and did not wish to have it share reverb settings with the drums.

In order to do this, simply select individual output 1 for channel 2 (the bass) in the Voice Individual Output Select display (JUMP #423).

Note:

If you set the individual output of a channel to any value other than off, that channel will not be output from the stereo outputs 1 and 2.



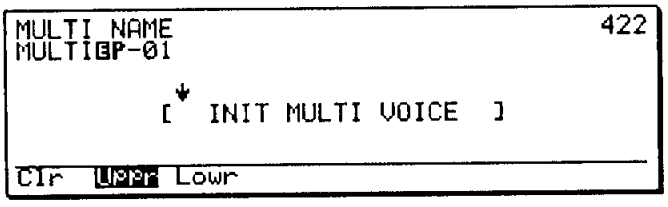
Now connect the rear panel INDIVIDUAL OUTPUT 1 to your external effects device or mixer. The bass will not appear in the effects or stereo output of the TG77, but you can process it externally and use an external mixer to mix it back into the TG77 stereo output.

How to name and store your new multi

These few pages have shown you some of the possibilities when creating your own multi. Now give the edited multi a name and store it for future use.

Enter a 20-character multi name

From the multi edit job directory, select 8:Name.

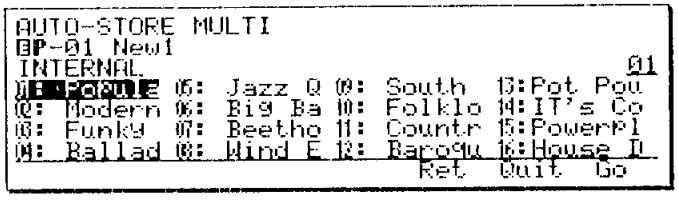


Press F1 (Clr) to clear the currently set multi name, and use the numeric keypad to enter a name for your newly created multi. To select uppercase characters press F2 (Uppr). To select lowercase characters press F3 (Lowr). To move the cursor use the ◁ ▷ keys.

For example to enter the multi name "New1", use ◁ to move the cursor to the beginning of the line, and press the following buttons; F2 to select uppercase, 4 three times to enter "N", ▷, F3 to select lowercase, 1 three times to enter "e", ▷, 7 three times to enter "w", ▷, and 1 once to enter "1".

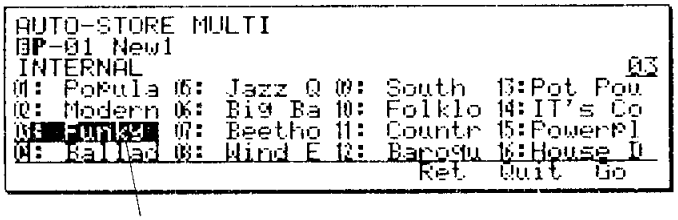
Store the edited multi

When you have finished entering the multi name, press the mode select key MULTI to exit multi edit mode. Since the multi data has been edited, the top line of the display will ask "AUTO-STORE MULTI".



The LCD will show the first seven characters of the names of the sixteen multis in the selected memory. Select a memory into which to store your new multi. If a RAM card is selected, you can press the MEMORY key to select internal or card memories. Remember that storing data will overwrite the data that previously occupied that memory.

For example, if you were about to store the multi in internal memory 3 replacing a multi named "Funky", the LCD would appear as follows.



The multi will be stored into this memory

Press F8 (Go), and the bottom line will ask "Are you sure ? (Yes or No)". If you are sure you want to store the edited multi, press +1/YES and the bottom line of the LCD will show "Store completed". If you decide not to store, press –1/NO to return to the previous display.

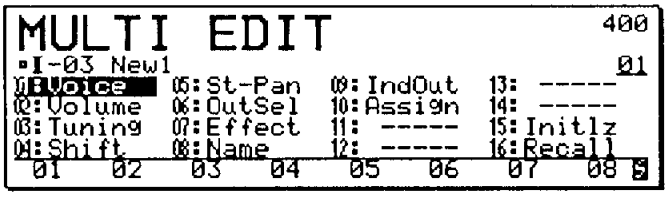
You will then return to multi play mode.

How to edit a voice from inside multi edit mode

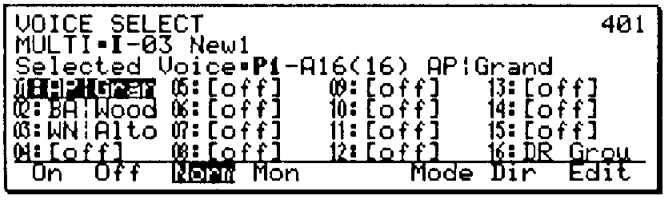
The TG77 allows you to edit one of the voices in a multi while remaining inside multi edit mode. You can leave your sequencer running, and edit a voice while listening to the voice being played in its musical context.

Enter multi edit mode

If you have been following the tutorial of the last few pages, you should now be in multi play mode with your new multi selected. Start your sequencer playing, and press EDIT/COMPARE to enter multi edit mode.

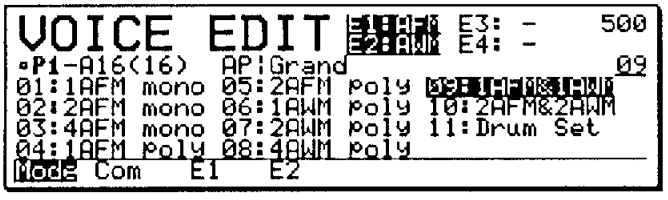


Press F1 (01) to enter the Voice Select display. Use the ◁ ▷ △ ▽ keys to move the cursor to the voice you wish to edit. In this example we will edit the P1-A16 AP|Grand voice that we assigned to channel 1.



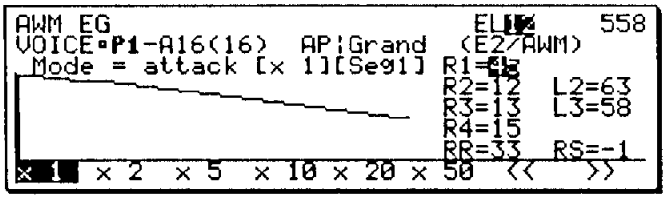
Edit the selected voice of the multi

Press F8 (Edit) to get the following display.



The P1-A16 AP|Grand voice in this example uses one AFM element and one AWM element. The main body of the sound is created by the AWM element, and the AFM element is used as reinforcement. As a simple example of voice editing, we will slow down the attack of the AWM element. For a more detailed explanation of voice editing, refer to the following major section, *How to edit a voice*.

Press F4 (E2) to select element 2, which is an AWM element in this voice. Press the ▽ key once to select 02:EG, and press ENTER to get the following display. Press ▷ once to move the cursor to R1.

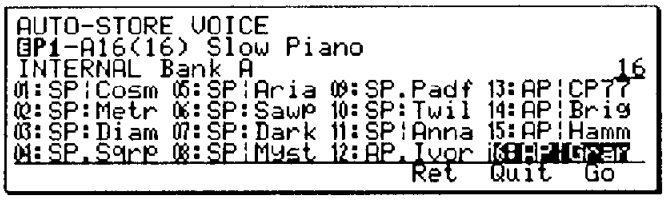


While your sequencer continues playing, use the DATA ENTRY slider to gradually decrease the value of R1 from 45 to about 15. Notice that the attack of the piano sound is slower, and somewhat similar to a bowed string instrument.

Name and store the edited voice

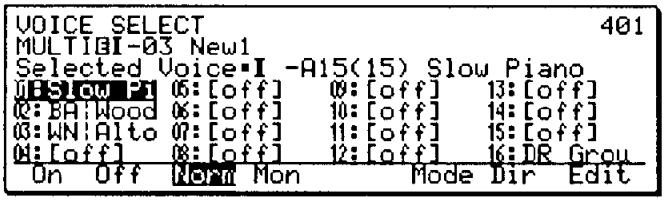
Press EXIT and then F2 (Com) to get the voice common data job directory, select 13:Name, and press ENTER.

Assign a new name like "Slow Piano" to the voice. Then press EXIT twice to exit voice edit mode. Since you have modified the data, the auto-store display will appear.



Select a memory into which to store your edited voice, and press F8 (Go). The lower line of the display will ask "Are you sure?". Press YES. Your edited voice will be stored, and you will return to the multi edit mode Voice Select display from which you entered voice edit mode.

Notice that the original unedited piano voice has returned. If you wish to use the "Slow Piano" voice which you edited and saved, you must select it as shown in the following display.



Remember to add 300 to the JUMP number when editing a voice in multi edit mode

As we have already mentioned, most of the displays in the TG77 have a display page number, which allows you to use the JUMP/MARK key to jump directly to a desired page without having to work your way through the job directories. The JUMP number is listed at the right of the title for each entry in the reference section beginning on page 81.

If you have entered voice edit mode from voice play mode, the displays will be numbered beginning with #200, as listed in the reference section. For example, the AWM EG parameters will be on display JUMP #258. However if you are editing a voice from inside multi edit mode, the corresponding AWM EG parameters will be on JUMP #558.

Remember to add 300 to the JUMP number when editing a voice from inside multi edit mode.

HOW TO EDIT A VOICE

This section explains how to edit an existing voice or create a new voice from scratch. Although it is possible to enjoy the TG77 just by playing preset voices, we suggest that you take some time to learn how to edit your own voices. It will take a bit of practice to create the sounds you want, but as you become more experienced you will find that creating voices is enjoyable and rewarding.

Contents of this section **page**

Each Normal voice consists of settings for one, two, or four AFM or AWM elements (Element data) and settings which affect the entire voice (Common data). Each Drum voice consists of a different AWM sampled sound for each of the 61 keys over the range C1–C6.

The Voice Mode determines the number of elements

The TG77 contains a 16 note AFM tone generator and a 16 note AWM tone generator. The Voice Mode setting determines how these tone generators are used to create a Voice, and how many elements are used for each note you play. Each voice uses one of these eleven voice modes.

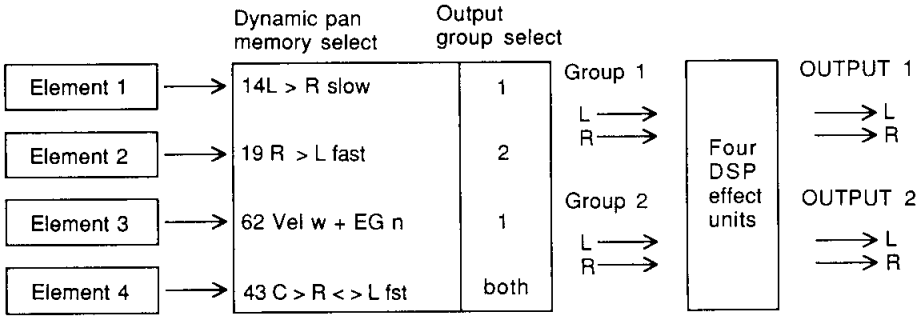
Mode	Element	E1	E2	E3	E4
01	1AFM mono	AFM	—	—	—
02	2AFM mono	AFM	AFM	—	—
03	4AFM mono	AFM	AFM	AFM	AFM
04	1AFM poly	AFM	—	—	—
05	2AFM poly	AFM	AFM	—	—
06	1AWM poly	AWM	—	—	—
07	2AWM poly	AWM	AWM	—	—
08	4AWM poly	AWM	AWM	AWM	AWM
09	1AFM & 1AWM poly	AFM	AWM	—	—
10	2AFM & 2AWM poly	AFM	AFM	AWM	AWM
11	Drum Set	61 AWM waves			

A normal voice uses one, two, or four elements

Voices created using modes 1–10 consist of Common data that affects all elements, and Element data for one, two, or four elements.

Common data includes a complete set of Effect data for the four DSP units, Controller data such as pitch bend and aftertouch assignments, and Other data such as microtuning table selection, random pitch fluctuation, and portamento settings. Common data also contains settings such as element volume level, detune, note shift, note limit, and velocity limit for each element.

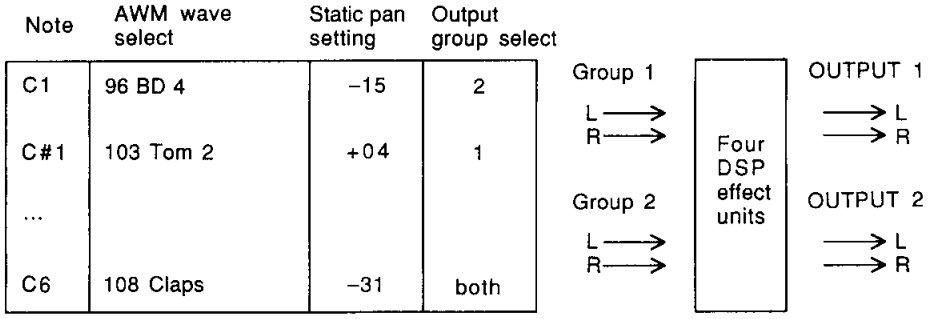
Element data includes AFM or AWM data for one, two, or four AFM or AWM elements. The voice mode will determine whether each element uses AFM tone generation or AWM tone generation. Details of AFM and AWM element data are covered separately in the following sections.



A drum voice uses 61 AWM samples

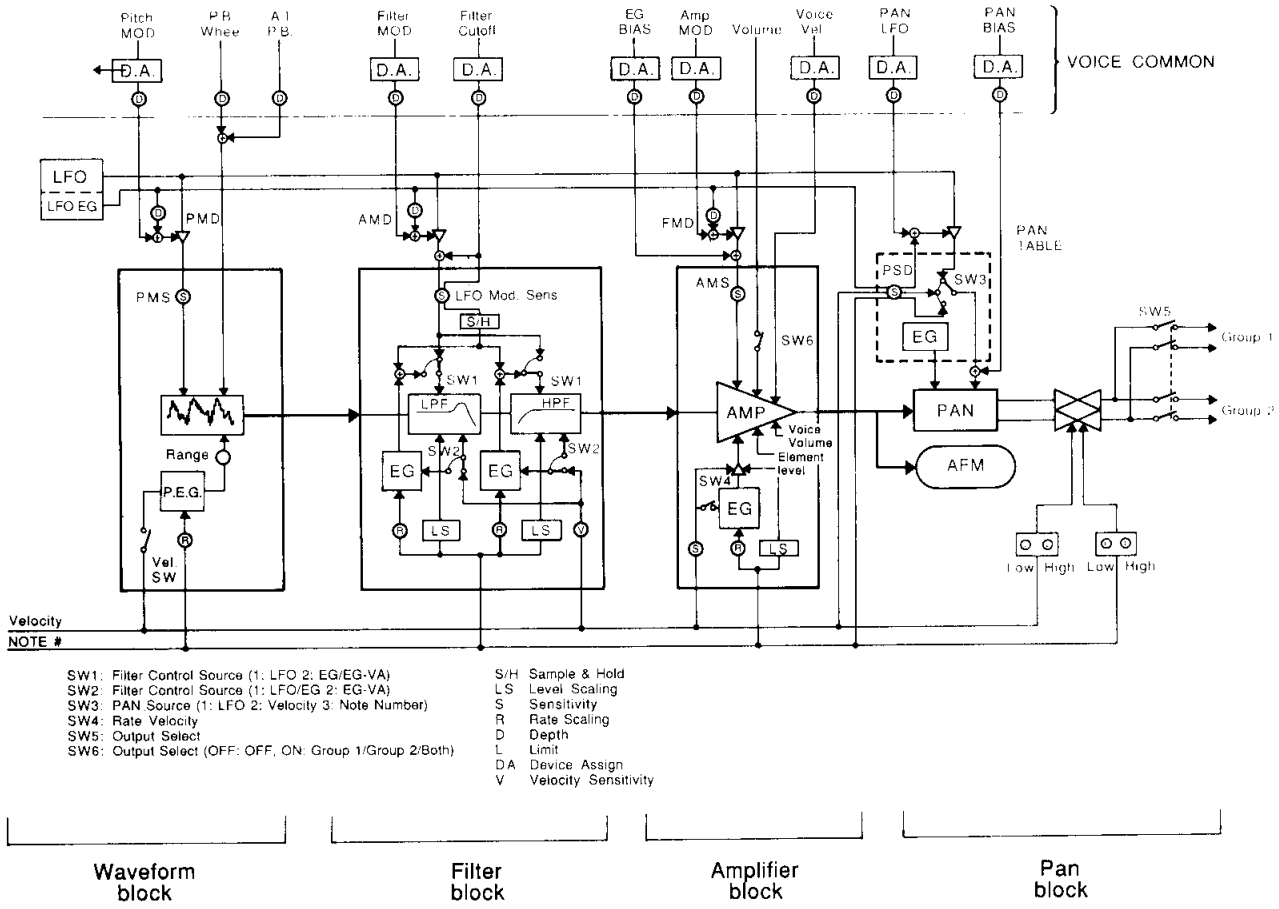
Voices created using mode 11 will have a different AWM sample assigned to each of the 61 keys over the range C1–C6. Each key also has independent settings for volume, tuning, note shift, pan, etc.

This type of voice is most often used to arrange drums and percussion sounds across the keyboard so that each key will produce a different percussive sound. For example a bass drum might be assigned to C3, a snare to C#3, and a cymbal to D3. Drum voices can be played from a keyboard just like any other voice, but if your sequencer has a "rhythm pattern" track, it may be convenient to use this to play TG77 drum voices. Page 187 has a table of the percussion instrument assignments for each key C1–C6 of the two preset drum voices P2-D15 and P2-D16. Details of how to edit drum voices are given at the end of this section.



What is an AWM element

An AWM element consists of four main blocks. The Waveform block plays back a sampled sound and determines the pitch, the Filter block modifies the tone, the Amplifier block modifies the volume, and the Pan block moves the sound between left and right outputs. Each block can be controlled in a variety of ways.



The above diagram shows how the various blocks in an AWM element are related, and how they can be controlled.

Many different ways to control sound

All interesting sounds are constantly changing. For instruments such as piano, the tone and volume of each note changes in a predictable way over time. For other instruments such as violin, the volume, tone, or pitch can be continuously and freely modified by the musician. The TG77 provides several ways to control various aspects of the sound.

- Envelope Generator (EG): An EG produces a fixed pattern of change over time. For example to simulate the attack and decay of a piano, you would set the volume EG to be loud when the note is first played and then gradually diminish in volume.

- Note Number: The number of the note which is played can be used to affect various aspects of the sound. For example, high notes can be made to decay more rapidly than low notes. Or, low notes can be made to change in pitch, tone, or volume more than high notes.
- Key Velocity: The velocity (speed) with which you play each key can affect various aspects of the sound. For example, strongly and softly played notes can differ in pitch, tone, or volume.
- Low Frequency Oscillator (LFO): The LFO produces various patterns of cyclical change. Vibrato is the result when the LFO is applied to the waveform block; wah-wah when applied to the filter block; and tremolo when applied to the amplitude block.
- Controllers: Controllers on your MIDI keyboard such as the pitch and modulation wheels, aftertouch, and foot controllers can be used to control the sound in various ways. Some controllers such as the pitch bend wheel can directly determine the pitch. Other aspects of the sound can be controlled by the controller you assign. For example if your keyboard is able to transmit Channel Aftertouch messages, you might assign Aftertouch so that the amount of vibrato (LFO modulation to the Waveform block) is increased as you press down on the keyboard.

The waveform block determines the pitch and basic tone

The basic sound of each AWM element is produced by a waveform (a digitally sampled sound). The TG77 contains 112 different waveforms in internal ROM, and an optional waveform card can be inserted into the WAVEFORM slot to provide additional waveforms.

The waveform block can be controlled in various ways to modify the *pitch* of the sound. The pitch EG can be used to give each note a fixed pattern of pitch change, and this pitch change can also be affected by the note number or by key velocity. Vibrato (pitch modulation) can be created using the LFO, and the amount of vibrato can be regulated by a controller. The pitch can be controlled directly using the pitch bend wheel and/or aftertouch.

The filter block modifies the tone

The filter block can be controlled in various ways to modify the *tone* of the sound. Each note can be given a fixed pattern of tonal change by using the filter EG, and this can be also affected by the note number or key velocity. Wah-wah (filter modulation) can be created using the LFO, and wah-wah depth can be regulated by a controller. The tone can also be directly affected by a controller.

The amplifier block modifies the volume

The amplifier block can be controlled in various ways to control the *volume* of the sound. Each note can be given a fixed pattern of volume change by using the amplitude EG, and this can also be affected by the note number or key velocity. Tremolo (volume modulation) can be created using the LFO, and tremolo depth can be regulated by a controller. The volume can also be directly affected by a controller.

The pan block moves the sound

The pan block can be controlled in various ways to move the sound between left and right outputs. Each note can be given a fixed pattern of panning by using the pan EG, and this panning can be further affected by either note number, key velocity, or LFO.

The basics of FM synthesis

FM synthesis is a patented Yamaha method for using Frequency Modulation (FM) to produce complex waveforms that can be controlled in musically useful ways.

Interesting sounds have complex waveforms

The sounds produced by most musical instruments have a very complex waveform, which is constantly changing. We hear these complex waveforms as "interesting" or "acoustic-sounding".

Electronic instruments use an oscillator to produce a waveform. Unfortunately, electronic oscillators are best at producing simple and repetitive waveforms. These waveforms sound "artificial" or "electronic", and are not very interesting to listen to. A major concern of electronic musical instrument design is to find a simple way to electronically produce a complex waveform and be able to control it.

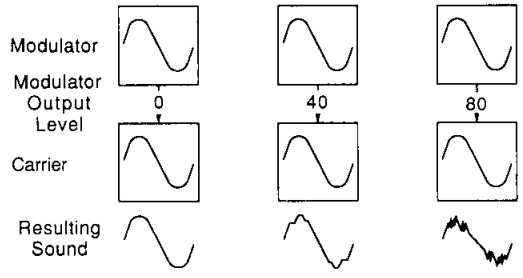
Complex waveform
= interesting sound

Simple waveform
= boring sound

FM is a simple way to make a complex waveform

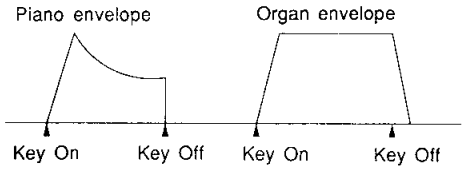
The advantage of FM synthesis is that waveforms with very complicated harmonic structure can be simply and economically created, and controlled in many different musically useful ways. In FM synthesis, one waveform is used to modulate another waveform. Even if the two original waveforms are simple, the result can be a complex and interesting sound.

In the following diagram, the upper oscillator is called the Modulator and the lower oscillator is called the Carrier. The complexity or brightness of the resulting waveform that we hear will depend on the output level of the Modulator; i.e., as we increase the modulation, the complexity or brightness will increase. Increasing the output level of the Carrier will simply increase the volume.



Interesting sounds change over time

Many instruments have a characteristic pattern with which the sound changes as time goes by. This "shape in time" is called the Envelope. The following diagram shows how a piano envelope differs from an organ envelope. A piano begins loud and then gradually diminishes in volume and tonal complexity. An organ however maintains the same volume and tone as long as the key is pressed.



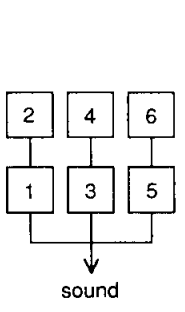
In synthesizers, a device called an Envelope Generator (EG) is used to produce a "shape in time" which can be used to control various aspects of the sound.

An algorithm is an arrangement of six operators

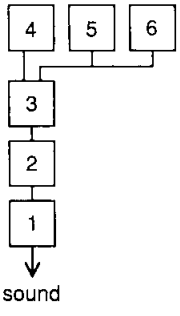
In Yamaha FM synthesizers, each oscillator has its own Envelope Generator (EG) to vary its output level over time. This package of oscillator and EG is called an Operator.

The FM tone generator of the TG77 uses six operators to produce sounds. These six operators can be arranged in 45 different basic Algorithms (patterns or combinations). Each operator acts either as a modulator or carrier depending on its *location* in the algorithm. Only operators that appear at the *bottom* of an algorithm are *carriers*.

For example algorithm 42 uses the six operators as three separate FM pairs; operators 2, 4, and 6 (the modulators) are modulating operators 1, 3, and 5 (the carriers). On the other hand, algorithm 6 has only one carrier; operators 4, 5, and 6 are all modulating operator 3, which is modulating operator 2, which is modulating operator 1.



Algorithm 42



Algorithm 6

How to change the tone of an FM sound

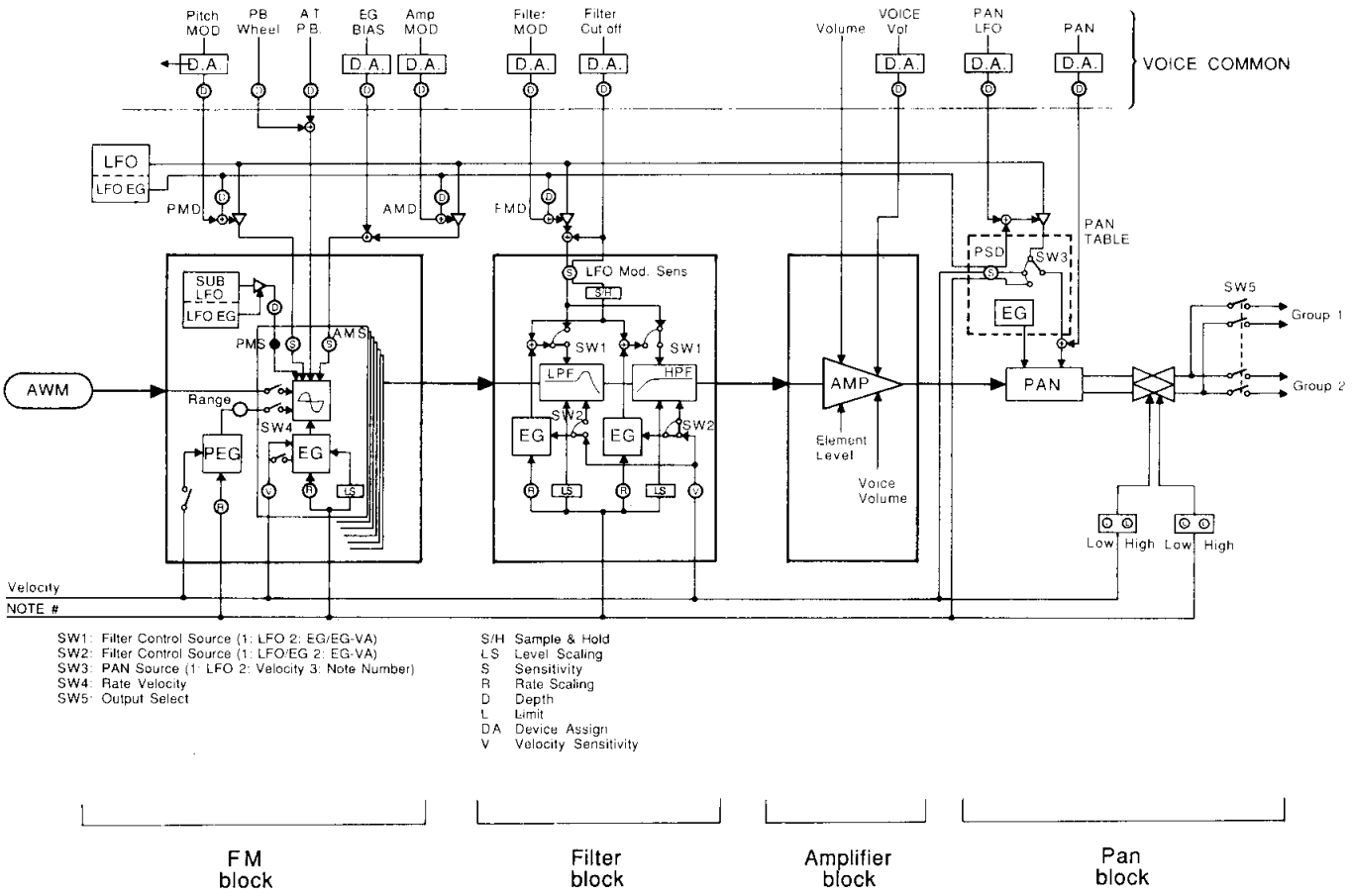
We have learned that the output level of a modulator operator determines how complex or bright the resulting sound will be. This means that changing the output level of a modulator will affect the tone. The output of the carrier operator is what we actually hear, so changing the output level of a carrier will affect the volume.

Before you begin editing an FM sound, check the algorithm to see how the operators are arranged. Notice which operators are acting as carriers and which are acting as modulators. Then you can adjust the output levels of the various operators to modify the tone or volume.

Each operator has its own EG to vary the operator output level over time. Adjusting the EG of a modulator will modify how the tone will change over time. Adjusting the EG of a carrier will modify how volume will change over time.

What is an AFM element

An AFM element consists of four main blocks. The FM block uses six operators to create a complex sound and determines the pitch and basic tone, the Filter block modifies the tone, the Amplifier block modifies the volume, and the Pan block moves the sound between left and right outputs. Each block can be controlled in a variety of ways.



The above diagram shows how the various blocks in an AFM element are related, and how they can be controlled.

Many different ways to control sound

As explained in the previous section "What is an AWM element", an AFM element can be controlled in various ways using EG, note number, key velocity, LFO, and controllers.

The FM block determines pitch, tone, and volume

The basic sound of each AFM element is produced by six FM operators arranged in an algorithm. The FM block can be controlled in various ways to modify the *pitch*, *tone*, and *volume* of the sound.

- EGs of the six operators determine how the volume and tone will change over time. Each operator EG can also be affected by the note number or key velocity.

- Pitch EG determines how each note will change in pitch over time. This pitch change can also be affected by the note number or by key velocity.
- LFO signal can be used to create vibrato (by modulating operator pitch) or tremolo (by modulating the output level of a carrier operator) or wah-wah (by modulating the output level of a modulator operator). The amount of pitch modulation or amplitude modulation from the main LFO can be regulated by a controller. In addition, the FM block of an AFM element contains a Sub LFO that can be used to modulate the pitch independently of the main LFO.
- The pitch of all operators can be controlled directly using the pitch bend wheel and/or aftertouch of your MIDI keyboard.
- As indicated by the "AWM" in the oval at the far left of the diagram, an AWM digital sample can be used to modulate an FM operator. This is one of the most significant features of the TG77's tone generation system.

The filter block modifies the tone

The filter block can be controlled in various ways to modify the *tone* of the sound. Each note can be given a fixed pattern of tonal change by using the filter EG, and this can be also affected by the note number or key velocity. Wah-wah (filter modulation) can be created using the LFO, and wah-wah depth can be regulated by a MIDI controller. The tone can also be directly affected by a controller.

The filter blocks of AFM and AWM elements are identical.

The amplifier block modifies the volume

The amplifier block can be controlled directly by an assigned controller. Since the change in volume over time of an AFM element is determined by the EGs of carrier operators in the FM block, the amplifier block of an AFM element does not have its own EG.

The pan block moves the sound

The pan block can be controlled in various ways to move the sound between left and right outputs. Each note can be given a fixed pattern of panning by using the pan EG, and this panning can be further affected by either note number, key velocity, or LFO.

The pan blocks of AFM and AWM elements are identical.

The process of voice editing

Editing a voice is a three-step process; select a voice, modify parameters as necessary, and store the edited voice. If you do not store the voice after editing it, the original voice will reappear and your edits will be lost.

1. Select the voice to edit

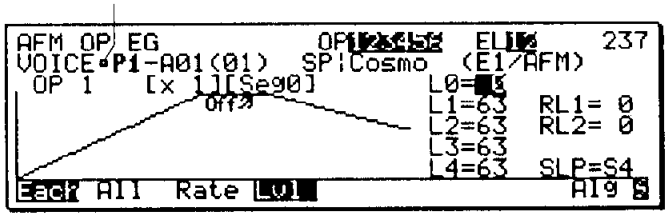
The first step in the voice editing process is to select the voice you wish to edit. Although it is possible to create a voice starting with the initialized data (a voice where all parameters are set to zero or some basic value), it is usually more efficient to start with a voice that is similar to what you want, and edit it to meet your requirements.

To select a voice, press VOICE to enter voice play mode. The VOICE LED will light. Press MEMORY to select a voice memory; Internal, (Card), Preset 1, or Preset 2. Press BANK/SELECT to select bank A, B, C, or D, and use –1/+1 to select a voice. Or, you can use the numeric keys to directly select a voice 1–64 in the selected memory. The LCD will show the selected voice name.

2. Edit parameters/ compare with the original voice

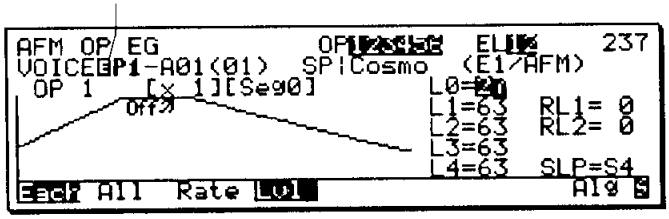
Now that you have selected a voice, press EDIT to edit it. The upper left of the LCD will show "VOICE EDIT". Press the F3 button and then ENTER to select a voice edit parameter. The actual display may be completely different than the following, but don't worry about what the setting actually means. Here we are simply learning the *process* of voice editing. Notice that a small square is displayed between "VOICE" and the voice number. This indicates that the data has not yet been edited.

original data unchanged



Move the DATA ENTRY slider up and down to modify any parameter that happens to be selected. The voice data has now been edited, and this is indicated by the small square being replaced by an inverse "E".

data has been edited

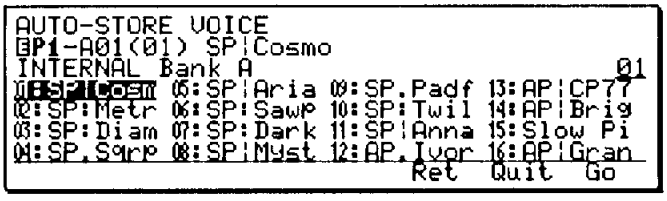


When editing, it is often useful to see and hear the original data you started with. To temporarily bring back the original data, press EDIT/COMPARE. Notice that the VOICE LED blinks, and that a "C" is now displayed, indicating that you are in Compare mode. While in compare mode you can view the various parameters, but will not be able to modify them. To return to edit mode, press EDIT/COMPARE once again.

Compare mode is available in most, but not all editing displays. For details refer to page 87.

3. Store the edited voice

When you have finished editing, you must store the voice if you want to keep it. After you finish editing, exit voice edit mode by pressing EXIT or any mode select key VOICE, MULTI, or UTILITY. If you have edited the voice data in any way, the top line of the display will ask "AUTO-STORE VOICE" ?



Note:

Voices which use voice mode 3 (4AFM mono), 8 (4AWM poly), and 10 (2AFM&2AWM) occupy extra memory, and can be stored only in bank D. The AUTO-STORE display for such voices will automatically show bank D, and will show "Use bank D" in the bottom line as a reminder.

Voices which use other voice modes can be stored in bank D as well.

The LCD will show the first seven characters of the voicenames in the currently selected bank of voices. The voice name displayed in inverse indicates the voice memory into which the edited data will be stored.

Storing data will overwrite the data that previously occupied that memory, so if you do not want to overwrite the original data, press MEMORY to specify the voice memory, select a bank A–D, and select the voice memory 1–16 in which you want to store your newly edited voice.

Procedure:

When: you exit editing mode and LCD blinks "AUTO-STORE VOICE"

Specify: the memory into which you wish to store the voice.

To return: to edit mode and continue editing without storing, press F6 (Ret).

To quit: editing and return to voice play mode without storing the edited data, press F7 (Quit). You will exit voice edit mode, and the bottom line of the LCD will show "Store cancelled !" until you press another button.

To store: the data press F8 (Go). The bottom line will ask "Are you sure ? (Yes or No)". If you are sure you want to store the edited voice, press +1/YES and the bottom line of the LCD will show "Store completed". If you decide not to store, press –1/NO to return to the previous display.

How voice edit mode is organized

The parameters of a voice are organized into two or more Job Directories, depending on the voice mode. Each job directory lists several groups of parameters. Select a job from the job directory, and edit the parameters in each job.

Normal voice

If a voice mode of 1–10 is selected, the voice will consist of 1, 2, or 4 elements. Each element will be either an AFM element or an AWM element, depending on the selected voice mode.

Voice parameters will be organized into the following job directories. Press a function key F1–F6 to see the job directories, and select the job you want to edit.

F1 (Mode)

Specify the Voice Mode

1. 1AFM mono
2. 2AFM mono
3. 4AFM mono
4. 1AFM poly
5. 2AFM poly
6. 1AWM poly
7. 2AWM poly
8. 4AWM poly
9. 1AFM&1AWM poly
10. 2AFM&2AWM poly
11. Drum set

F2 (Com)

Common data edit job directory

1. Element level
2. Element detune
3. Element note shift
4. Element note limit
5. Element velocity limit
6. Element dynamic pan
7. Output select
8. Random pitch
9. Portamento
10. Effect set
11. Micro tuning set
12. Controller set
13. Voice name
14. Individual output select
15. Initialize voice
16. Recall voice

F3 (E1) F4 (E2)

AFM element edit job directory

1. Algorithm
2. Oscillator
3. AFM EG
4. AFM operator output
5. AFM sensitivity
6. AFM LFO
7. AFM pitch EG
8. AFM filter

...

15. Initialize AFM element
16. Recall AFM element

OR

F5 (E3) F6 (E4)

AWM element edit job directory

1. AWM waveform set
2. AWM EG
3. AWM output
4. AWM sensitivity
5. AWM LFO
6. AWM pitch EG
7. AWM filter

...

15. Initialize AWM element
16. Recall AWM element

Drum voice

If voice mode 11 has been selected, the voice will consist of 61 AWM digital samples, with a sample assigned to each key of the 61 notes C1–C6. Voice parameters will be organized into the following job directories. Press a function key F1–F2 to see the job directories, and select the job you want to edit.

F1 (Mode)

Specify the Voice Mode

1. 1AFM mono
2. 2AFM mono
3. 4AFM mono
4. 1AFM poly
5. 2AFM poly
6. 1AWM poly
7. 2AWM poly
8. 4AWM poly
9. 1AFM&1AWM poly
10. 2AFM&2AWM poly
11. Drum set

F2 (Com)

Drum Set edit job directory

1. Voice volume
2. Wave data set
3. Effect set
4. Controller set
5. Name

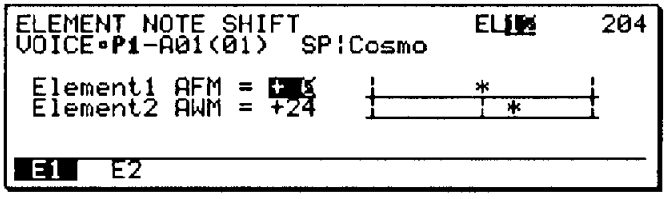
...

7. Initialize
8. Recall

How to select a job

Suppose that you are editing a normal voice and want to edit the Note Shift settings for each element. Press F2 to select the Voice Common data job directory.

Notice that the note shift parameter is job 03. Use the cursor keys or press 0 then 3 on the numeric key pad to move the inverse cursor to "03.NtShift". Then press ENTER and you will enter the Element Note Shift job.



To return to the job directory, press EXIT.

You can use the ◁▷ (PAGE) keys to move to other jobs in the same directory. For example from the note shift job, pressing ◁ would take you to job 02.Element Detune, and pressing ▷ would take you to job 04.Note Limit.

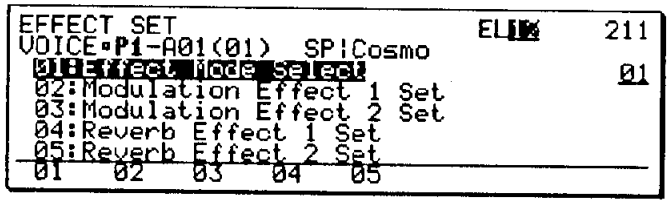
Simple editing: reverb (Effect)

The DSP effect unit adds chorus, echo, reverb, and other effects of spatial ambience. Adjusting the effect is an easy way to change the overall character of a voice.

Select a voice and enter edit mode

Press VOICE and select a voice. So that it will be easy to hear the result of this editing example (and the editing examples in the following sections), select any bright, sustained voice.

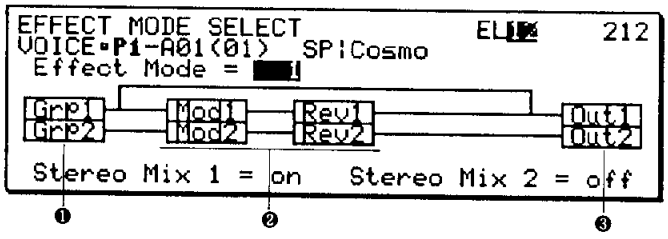
Press EDIT to enter voice edit mode. Press F2 to select the voice edit Common data job directory, and press 1 then 0 or use the arrow keys to select "10.Effect". Press ENTER and the Effect parameter job directory will appear.



First we will be selecting the Effect Mode. Press F1 to select "01.Effect Mode".

Select one of three effect modes

The TG77 contains four DSP effects; two modulation-type effects (Mod1 and Mod2) and two reverb-type effects (Rev1 and Rev2). The Effect Mode determines how these four effects are connected. There are three ways of connecting the effects; modes 1, 2, and 3. You can also turn the effect mode Off to bypass the effect units. Use the –1/+1 keys to select the various modes 1–3 and note how the LCD graphically indicates the flow from the pan output at left to the final Out1 and Out2 at right.

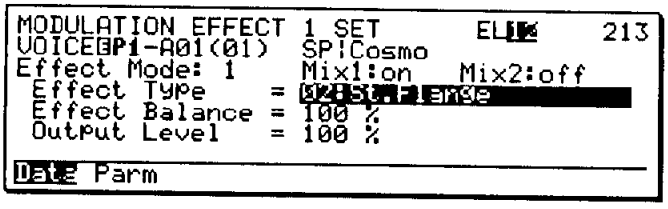


❶ The stereo sound from the voice pan ❷ is processed through the effects ❸ and sent out from the rear panel Out1/Out2 jacks.

For this example select effect mode 1.

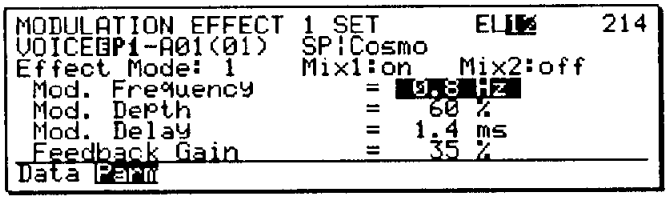
Select and adjust a modulation effect

Press the PAGE ▷ button to move to Modulation Effect 1 Set. This parameter is divided into two jobs. Press F1 (Data) and move the cursor to Effect Type. Use the –1/+1 keys to select 02.St.Flange (stereo flanging).



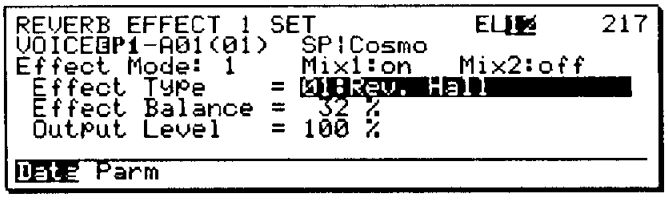
Play the keyboard and notice the swirling or swishing effect. If the effect is not noticeable, move the cursor to Effect Balance or Output Level and set a higher value.

To adjust the parameters of the modulation effect, press F2 (Parm). Move the cursor to Mod.Frequency and use the –1/+1 keys to increase or decrease the speed of modulation while playing the keyboard to hear the result. You can experiment with various settings of the Mod.Depth, Mod.Delay, and Feedback Gain settings as well.



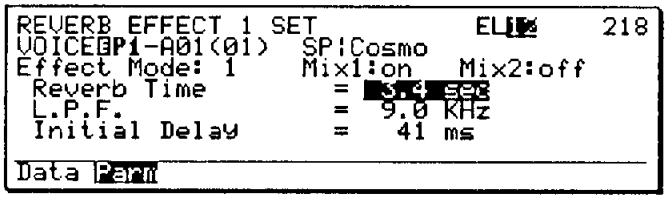
Select and adjust a reverb effect

Press PAGE ▷ twice to select Reverb Effect 1 Set. This parameter is also divided into two jobs. Press F1 (Data), move the cursor to Effect Type, and select 01:Rev.Hall.



Play the keyboard and notice the feeling of spacious ambience as if the instrument were being played in a large, reverberant hall. If the effect is not noticeable, move the cursor to Effect Balance or Output Level and set a higher value.

To adjust the parameters of the reverb effect, press F2 (Parm). Move the cursor to Reverb Time and experiment with various settings. Higher settings will make the reverb longer. You can experiment with various settings of the L.P.F. (Low Pass Filter) and Initial Delay as well.



When finished, press EXIT twice to return to the voice edit Common data job directory.

Bypass the effect to hear the unprocessed sound

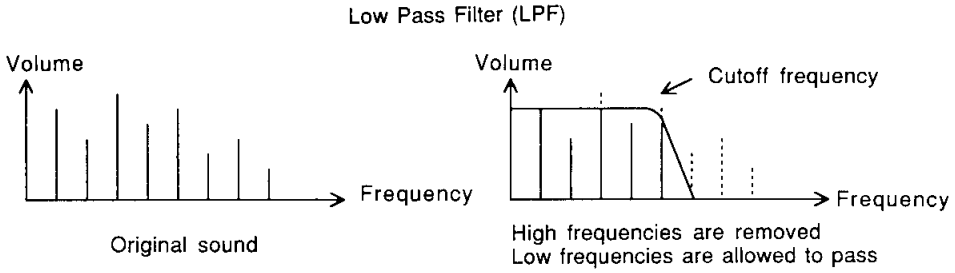
Whether or not you are editing the effect, you can press the EF BYPASS button at any time to bypass the effect. When you press EF BYPASS the LED will light, and you can hear the sound without the effect. Press it once again, and the LED will go out and the effect will be applied once again.

Simple editing: tone (Filter)

Each element in a voice has two filters which can be used to make overall adjustments in tone. A filter can be controlled in various ways. Controlling a filter by key-on velocity is a simple way to make a voice respond expressively to your keyboard playing.

What is a filter

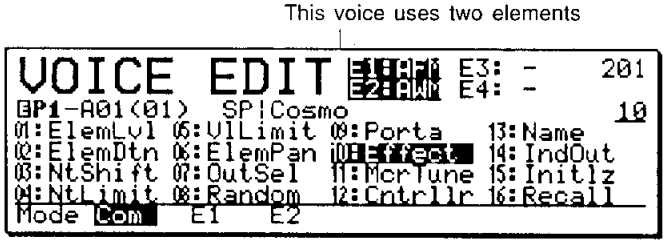
In electronic musical instruments, a filter removes a specified range of frequencies from the sound, and allows the rest to pass through. For example if the high frequencies are removed and the low frequencies allowed to pass through, the sound will be made darker. This type of filter is called a Low Pass Filter (LPF). The frequency at which the filter begins to affect the sound is called the Cutoff Frequency.



Each of the one, two, or four elements in a normal voice contains two filters, which can be controlled independently. One filter is fixed as a Low Pass Filter (LPF). The other filter can be used either as a LPF or as a High Pass Filter (HPF); i.e., a filter that allows only high frequencies to pass, resulting in a thinner tone.

Turn off unwanted elements

Each normal voice consists of one, two, or four elements, and each element has its own set of two filters. If the voice you are editing contains two or four elements, it may be helpful to listen to only one element as you adjust its filters. To the right of the voice name displayed in the voice edit job directory is a list of the elements used by the currently selected voice.

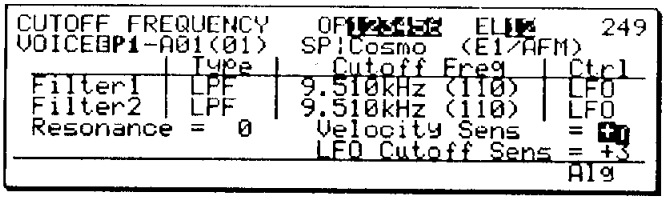


The voice selected in the above display uses two elements. Hold down the ELEMENT key and press numeric key 2 to turn off element 2. Now you will hear only element 1. Repeat the same procedure to turn the element back on again. You can turn each element on/off at any time while editing.

Specify the type of filter and the cutoff frequency

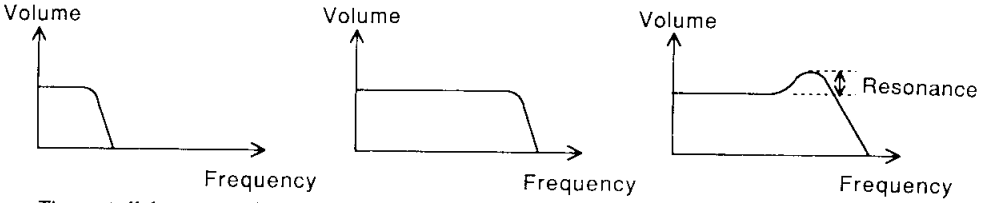
Press F3 to select the voice edit Element 1 job directory, select 08:Filter, and press ENTER.

Filter parameters are divided into three jobs. Press F1 to select 01:Cutoff Frequency.



Set both filters 1 and 2 to LPF and 9.510 kHz, and set Velocity Sens = +7. Play notes on your MIDI keyboard, softly and then strongly. (Be sure that your keyboard is set to be sensitive to key-on velocity.) Notice that as the keyboard is played more strongly, the tone is brighter. This is because the velocity sensitivity setting of +7 allows the key velocity to increase the cutoff frequency of the filter.

Increasing the Resonance setting will boost the frequencies at the cutoff point, making the effect of the filter more noticeable.



The cutoff frequency is lower for softly played notes = dark tone

The cutoff frequency is higher for strongly played notes = bright tone

Resonance adds a boost or peak at the cutoff point

Other ways to control the filter

The TG77 provides many ways to control the filter in addition to key velocity.

EG: Each of the two filters has its own independent EG, which can be used to give each note a fixed pattern of tonal change, such as the characteristic "whaaa" of a brass instrument.

Note Number: The note number can affect the rate at which each filter EG changes the tone, and/or affect the width of the change in tone. For example high notes can be made to change in tone more rapidly than low notes, or low notes can be made to change in tone more greatly than high notes.

Key velocity: Key velocity can be used to affect the amount of tonal change produced by each filter EG. For example strongly played notes can be made to have a greater change in tone.

LFO: Wah-wah (cyclical tone change) occurs when the LFO is applied to the filter block.

Controllers: A specified controller (such as modulation wheel or foot controller) can be used to adjust the depth of the wah-wah (Filter Modulation) caused by the LFO.

For example if you have a modulation wheel on your MIDI keyboard that transmits MIDI Control Change number 001, and wish to use it to control the TG77's filter cutoff, make the following settings.

1. go to Voice Common job 12. Controller set (JUMP #228) and press F4 (Other).
2. select 001 Modulation as the MIDI controller for Cutoff Depth, and set the Value to the amount of control you wish
3. go to element filter page (for an AFM element JUMP #249, for an AWM element JUMP #265) and set Ctrl to "LFO" for one or both filters
4. in the same page, set the LFO Cutoff Sens for the amount of control you wish

5. If the LFO has already been assigned to affect filter cutoff, you may wish to decrease the LFO F.Mod Depth (for an AFM element JUMP #224, for an AWM element JUMP #261).

Or, a device can be used to adjust the offset of the entire filter EG. For details refer to *Ctrl=EG* and *Ctrl=EG-VA* in *8.1 Cutoff Frequency*, page 131.

Simple editing: vibrato (LFO)

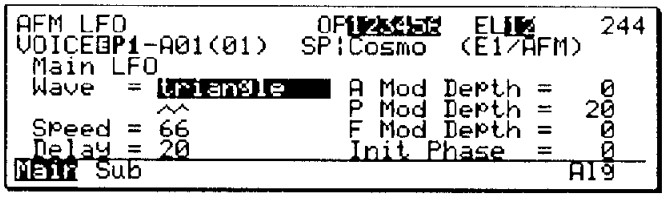
The LFO produces a cyclicly repeating pattern of change. Vibrato is created by applying the LFO to the pitch.

What is an LFO

A Low Frequency Oscillator (LFO) is a device that produces a waveform at a slow speed (low frequency). This slowly repeating waveform can be applied to various aspects of the sound to cause cyclicly repeating patterns of change. When the LFO is applied to the pitch, vibrato is the result. When the LFO is applied to the filter, wah-wah is the result. When the LFO is applied to the volume, tremolo is the result.

Adjust the LFO

In this example we will use the LFO to add vibrato to the sound. Move to the Voice Edit job directory, and press F3 to get the Element 1 job directory. If element 1 is AWM, select job 05:LFO. If element 1 is AFM, select job 06:LFO and press F1 to select the Main LFO.



The Main LFOs of AWM and AFM elements are the same. (AFM elements have a Sub LFO which we will not be using in this example.)

Increase the P Mod Depth setting (Pitch Modulation Depth) while playing a note, and you will hear vibrato. If you do not hear any change when you increase the LFO P Mod Depth, you may need to increase the Pitch Modulation Sensitivity (PMS) as explained in the last two paragraphs below.

Other LFO parameters — Speed and Wave

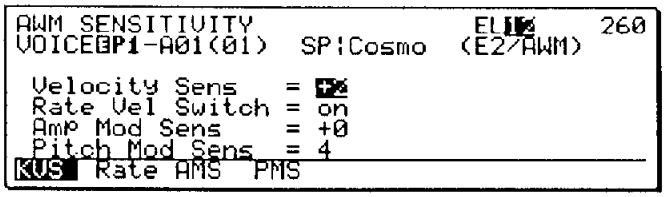
To regulate the speed of vibrato, move the cursor to Speed and adjust the value over a range of 0–99. Extremely high settings will result in a buzzing sound, and extremely low settings will result in a very slow pitch change.

To modify the shape of the vibrato, move the cursor to Wave and select a different LFO waveform. The selected LFO waveform will be graphically shown in the line below.

Before you proceed to the next section of this example, set P Mod Depth to 0.

Increase the modulation sensitivity for a AWM element

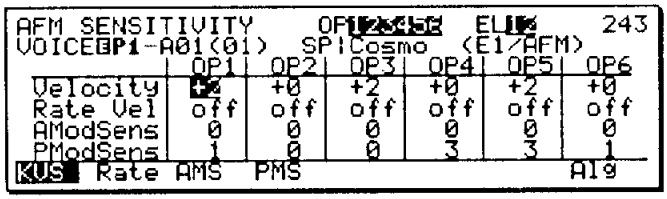
Press EXIT to return to the Element 1 job directory, and select 04:Sensitv (sensitivity).



Pitch Mod Sense (pitch modulation sensitivity) determines how sensitive the pitch will be to modulation from the LFO. Increase the Pitch Mod Sense until you hear vibrato.

Increase the modulation sensitivity for a AFM element

Press EXIT to return to the Element 1 job directory and select 05:Sensitv (sensitivity).



PModSens (pitch modulation sensitivity) is adjustable independently for each operator over a range of 0–7. To create normal vibrato, all operators must be pitch modulated equally by the LFO. Increase the PModSens equally for all operators. (If the LFO affects the pitch of some operators more than others, the harmonic structure of the sound will cyclicly change, which can be an interesting effect in its own right.)

Simple editing: using a controller

Many acoustic instruments allow the musician to modify the volume, tone, or pitch while a note is being played. The controllers on your MIDI keyboard can be used to continuously affect various aspects of the sound for musically expressive control.

Control makes musical expressiveness possible

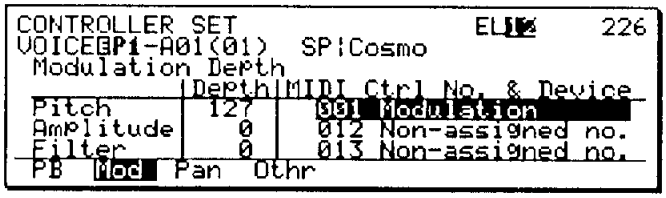
On instruments such as piano or organ, there is little that the musician can do to modify the sound once the note has been struck. However on instruments such as wind, brass, or strings, the volume, tone, or pitch can be continuously and freely modified even while sound is being produced. The controllers on your MIDI keyboard (pitch and modulation wheels, aftertouch, foot controllers, etc.) can be used to control various aspects of the sound over the duration of a note. This allows the TG77 to be played with the musical expressiveness of an acoustic instrument.

Note:

The MIDI implementation chart in the back of the owners manual for your MIDI keyboard or other controller device will tell you which messages the device is able to transmit. The following explanation assumes that your keyboard has a modulation wheel which transmits MIDI control change number 1, a pitch bend wheel, and is able to transmit Channel Aftertouch.

Assign a controller to regulate vibrato

In the voice edit job directory, press F2 to get the Common data job directory and select 12:Cntrllr (controller). In this example, press F2 (Mod) to get the LFO modulation controller assignment job.

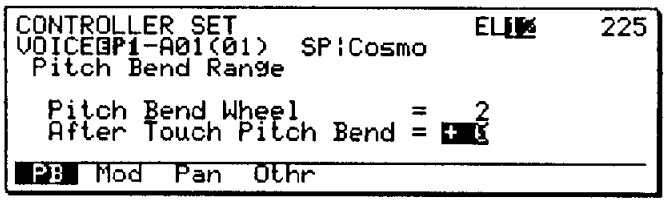


Move the cursor to the Pitch row. Set Depth to its maximum value of 127 and set 001 Modulation. With this setting, the modulation wheel will regulate the depth of pitch modulation over its full range. Move the modulation wheel and notice that vibrato deepens as you move the wheel forward. You will probably find that when the wheel is fully forward, the effect is too extreme to be musically useful. Decrease the Depth setting so that the full range of the wheel is musically useful.

In this example, you assigned the modulation wheel to control pitch modulation, but any other controller could have been used instead. It is also possible to assign two or more parameters to be regulated by the same controller.

Adjust the pitch bend range

The control assignments for pitch bend are fixed; you can bend the pitch of a TG77 voice using the pitch bend wheel and/or channel aftertouch.
Press F1 (PB) to get the following display.



With the settings as shown in the display, the pitch bend wheel will bend the pitch up or down by two half steps, and aftertouch will have no effect on pitch. Modify the Pitch Bend Wheel value in the display, and move the pitch bend wheel up and down to hear how the the pitch is affected.

Next move the cursor to After Touch Pitch Bend and try out both positive and negative settings while playing a note and then varying the pressure on the keyboard.

Other controller assignments

F3 (Pan) allows you to set make controller assignments for pan, and F4 (Othr) for various other parameters.

Except for pitch bend, a different controller can be freely assigned to each parameter.

Simple editing: attack (EG)

The Envelope Generator (EG) determines how a sound attacks (begins) and decays (ends).

What is an envelope generator

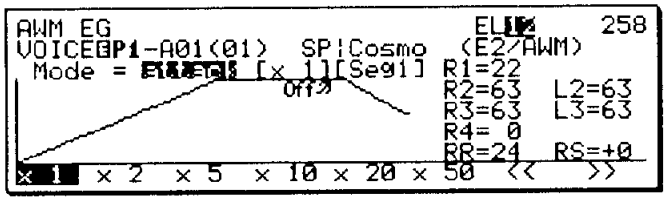
Most instruments have a characteristic pattern in which the volume or tone changes over time. In electronic instruments, this is determined by the envelope generator (EG). The EG produces a fixed pattern of change over time. For example to simulate the attack and decay of a piano, you would set the volume EG to be loud when the note is first played and then gradually diminish in volume. The EGs of the TG77 allow you to specify a change over time by settings Levels and Rates. The levels are volume levels, and the rates determine the speed of change that leads to the next level.

In this example, we will be adjusting only R1 (rate 1) to change the attack of the sound.

AWM element EGs are slightly different from AFM element EGs. If you are editing an AWM element, continue to the next section "Adjusting the attack of an AWM element". If you are editing an AFM element, skip to the last section "Adjusting the attack of an AFM element".

Adjusting the attack of an AWM element

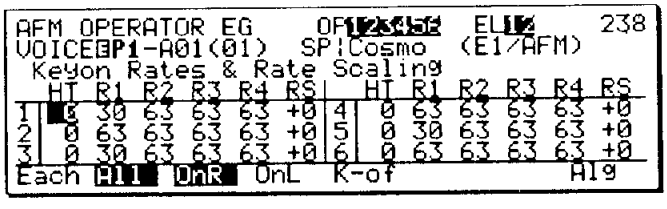
For an AWM element, the amplifier block EG determines how the volume of each note will change over time. From the AWM element 1 job directory, select 02:EG. If the Mode is set to "hold", change it to "attack".



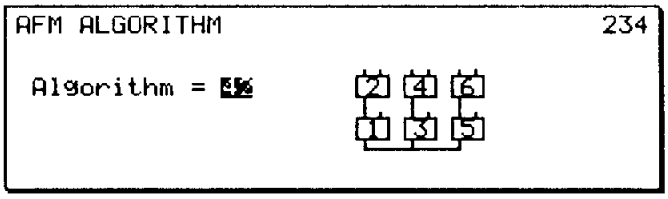
Move the cursor to R1 (rate 1) and decrease the value while repeatedly playing notes. Notice that as R1 decreases, the attack becomes slower.

Adjusting the attack of an AFM element

For an AFM element, the EG of each operator determines how each note will change over time. From the AFM element 1 job directory, select 03:EG. Press F2 (All) and then press F3 (OnR) (key-on rates).



The EGs of carrier operators determine how the volume will change over time, and the EGs of modulator operators determine how the tone will change over time. To see which operators are acting as carriers, press F8 (Alg) to get a graphic display of the algorithm. The operators in the bottom row are acting as carriers.



Move the cursor to R1 (rate 1) of the carrier operator(s), and decrease the value while repeatedly playing notes. Notice that as R1 decreases, the attack becomes slower.

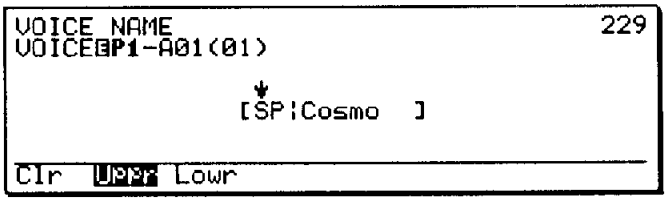
Depending on how the modulator operators are being used, it may be necessary to decrease R1 for modulator operators as well.

How to name and store your new voice

If you have followed along with the last five "Simple editing" sections, the voice is now probably quite different than when you first selected it. Even if the voice sounds rather strange, give it a new name and store it as explained in this section.

Enter a 10-character voice name

From the voice edit Common data job directory, select 13:Name.

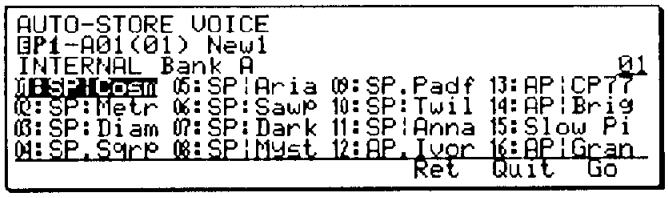


Press F1 (Clr) to clear the currently set voice name, and use the numeric keypad to enter the characters printed below each key. Press F2 to select uppercase characters and press F3 to select lowercase characters. Use ◁▷ to move the cursor.

For example to enter the voice name "New1", use ◁ to move the cursor to the beginning of the line, and press the following buttons; F2 to select uppercase, 4 three times to enter "N", ▷, F3 to select lowercase, 1 three times to enter "e", ▷, 7 three times to enter "w", ▷, and 1 once to enter "1".

Store the edited voice

When you have finished entering the voice name, press the mode select key VOICE to exit to the voice edit Common job directory, and press EXIT once again to exit voice edit mode. Since the voice data has been edited, the top line of the display will blink "AUTO-STORE VOICE"



Note:

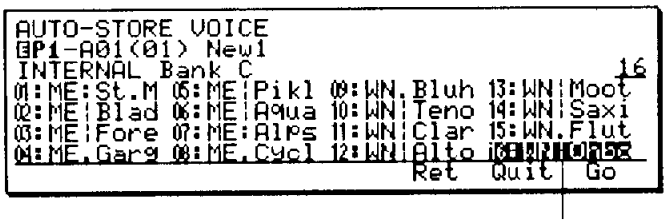
Voices which use voice mode 3 (4AFM mono), 8 (4AWM poly), and 10 (2AFM&2AWM) occupy extra memory, and can be stored only in bank D. The AUTO-STORE display for such voices will automatically show bank D, and blink "Use bank D" in the bottom line as a reminder.

Voices which use other voice modes can be stored in bank D as well.

The LCD will show the first seven characters of the voicenames in the currently selected bank of voices. The voice name displayed in inverse indicates the voice memory into which the edited data will be stored.

Press MEMORY to select internal or card memory (if a RAM card is inserted into the DATA slot). Then select a voice memory in which to store your newly edited voice by pressing BANK/SELECT to select a bank A–D and pressing -1 +1 or using the numeric keypad to directly specify a voice 1–16 in that bank.

For example to store your new voice in Internal memory bank C memory number 16, press MEMORY so that the LCD shows "INTERNAL", press BANK/SELECT so that the LCD shows "Bank C", and use the numeric keypad to enter 1, then 6.



The voice will be stored into this memory

Press F8 (Go), and the bottom line will ask "Are you sure ? (Yes or No)". If you are sure you want to store the edited voice, press +1/YES. You will then return to voice play mode, and the bottom line of the LCD will show "Store completed".

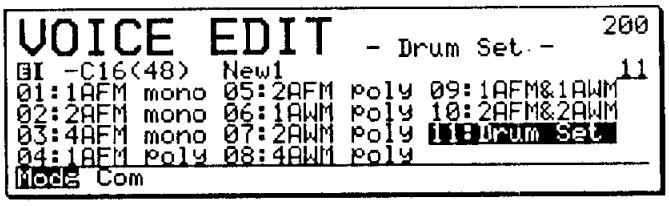
If you decide not to store, then press F7 (Quit) to return to voice play mode.

How to edit a drum voice

A drum voice is a special type of voice which plays a different AWM sampled wave from each of the 61 notes C1–C6. This is normally used to assign drums and percussion sounds to the keyboard when creating rhythm accompaniments.

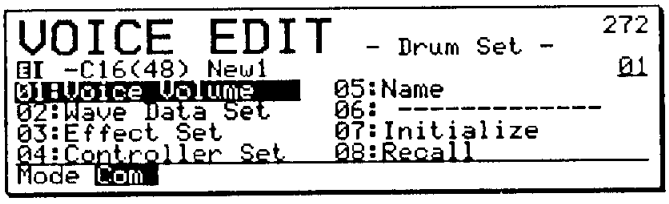
Set the voice mode to Drum Voice

In the top level of voice edit mode, press F1 (Mode) to get the voice mode job and select 11:Drum Set.



Drum voice parameters

Press F2 (Com) to get the voice common data job directory. All drum voice parameters are contained in this job directory.

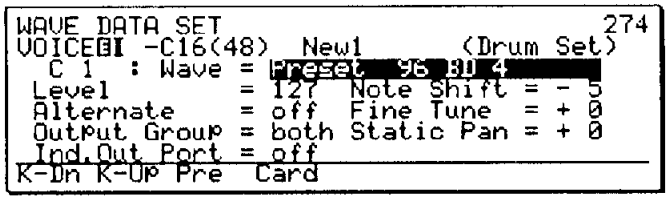


As when editing a normal voice, a drum voice allows you to set the overall volume of the voice (01:Voice volume), make settings for the DSP effect units (03:Effect Set), specify the controller which will regulate the volume of the voice 04:Controller Set), and assign a name (05:Drum Set Name).

A drum voice differs from other voices mainly in the second parameter job, 02:Wave Data Set.

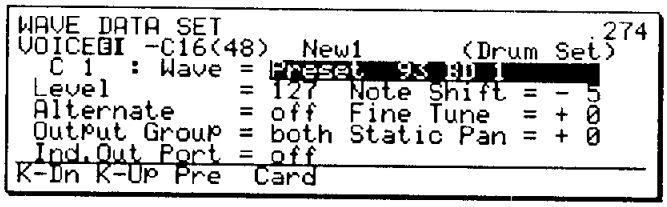
Wave Data Set — select a wave for each key

From the voice common data job directory, select 02:Wave Data Set.

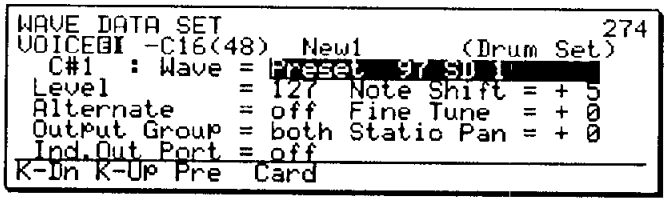


This job is where you specify the AWM wave played by each key. Adjustments for level, pan, etc. can also be made independently for each key.

Press the C1 key on your MIDI keyboard, or press F1 (K-Dn) or F2 (K-Up) to select C1. Move the cursor to Waveform and select preset wave number 93 BD 1 (bass drum).



Next select note C#1 and specify preset wave number 97 SD 1 (snare drum).



In this way, make the following settings for notes C1–F# to create the simple seven-instrument drum set shown in the table below. For notes F and F# set Alternate to "on".

Note	Wave no.	Wave name	Alternate
C1	93	BD 1	off
C#1	97	SD 1	off
D1	102	Tom 1	off
D#1	103	Tom 2	off
E1	107	Ride	off
F1	104	HH closed	on
F#1	105	HH open	on

Alternate On/Off

Play notes C1–F#1 to play your new drum set. Notice that when you play F#1 (hi-hat open) and then quickly play F1 (hi-hat closed), the open hi-hat will stop sounding when the closed hi-hat sound begins. It is impossible for a real hi-hat to produce closed and open sounds at the same time, and this is the reason that we set these two waves to Alternate On. When two or more waves are set to alternate On, the last-played wave will take priority and the previously played wave will be turned off.

Other wave data settings

The volume of each note is adjusted by Level. The tuning of each note is adjusted in half steps by Note Shift and finely by Fine Tune. The stereo position of each note is determined by Static Pan.

The *Voice edit mode, Drum set data* section explains the details of these and other parameters.

Name and store your new drum voice

As explained in the previous section, give your newly created drum voice a name and store it into memory.

REFERENCE SECTION

VOICE PLAY MODE

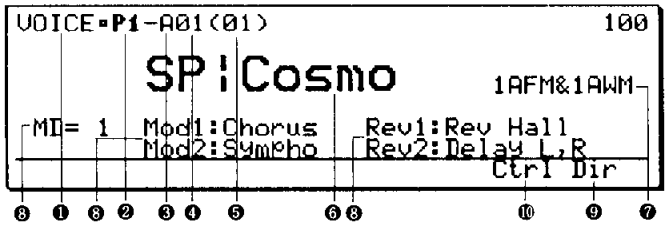
You will normally play the TG77 in voice play mode. In voice play mode you can do the following things.

- Select voices from preset, internal, or card memory.
- View a directory of the 16 voices in the currently selected bank of internal, card, or preset memory.
- Copy the currently selected voice to any internal or card memory.
- View the controller assignments for the currently selected voice.
- Hold down the SHIFT key and press the keys of the numeric keypad to play the notes of the octave using the selected voice.

Voice select

JUMP #100

Press VOICE to enter voice play mode. The following LCD will appear.



❶ VOICE: This indicates that you are in Voice Play mode.
❷ Voice memory (I, C, P1, P2): This indicates the voice memory; Internal, Card, Preset 1, or Preset 2.
❸ Bank (A–D): This indicates the voice memory bank.
❹ Voice number in individual bank (1–16): This indicates the number of the voice in the bank.
❺ Voice number in banks A–D (1–64): This indicates the voice as a number between 1 (voice 1 of bank A) to 64 (voice 16 of bank D).
❻ Voice name: The voice name is displayed in large characters.
❼ Voice mode: This indicates the type and number of elements used by this voice. For details refer to *Voice Edit mode, Voice Mode Select.*
❽ Effect settings: This area indicates the effect mode (off, 1–3) and type of effect selected by this voice for each of the four DSP units; Modulation 1 and 2, and Reverb 1 and 2. For details refer to *Voice Edit mode, Common Data job 10. Effect set.*
❾ Refer to the following section *Voice directory.*
❿ Refer to the following section *Controller view.*

To select a voice use the following buttons. The voice will change immediately when a new memory or bank is selected.

- To select a voice memory (internal, card, preset 1, or preset 2) press MEMORY.
- To select a bank A–D, press BANK/SELECT.
- To select the next or previous voice in the selected voice memory, press the -1 or +1 keys.
- To directly select a voice 1–64 from the selected voice memory, use the numeric keypad to enter a one or two digit number and press ENTER.

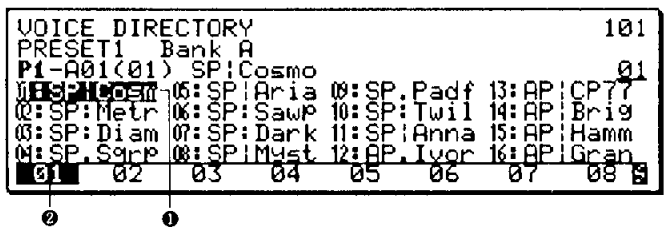
Voice directory

JUMP #101

Summary: This function allows you select voices while viewing a directory of the sixteen voices in the currently selected voice bank.

Procedure:

From:	voice play mode	(JUMP #100)
Select:	F8 (Dir)	(JUMP #101)
Specify:	one of the displayed voices	
To quit:	and return to the voice play display press EXIT.	



❶ The first seven characters of each ten-character voice name will be displayed. When you select a different voice memory (internal, card, preset 1, or preset 2) and voice bank (A–D) the sixteen voices in the newly selected bank will be displayed. In addition to the usual methods of selecting a voice, you can also use the arrow keys to select a voice. When the voice directory is displayed, pressing a memory select button or bank select button will immediately select a voice.

❷ Pressing F1–F8 (01)–(08) will select a voice 1–8 from the displayed voice bank. Holding SHIFT and pressing F1–F8 (09)–(16) will select a voice 9–16 from the displayed voice bank.

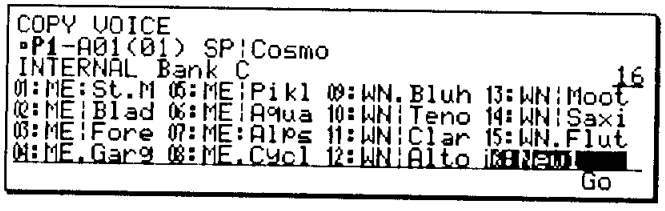
To return to the voice play display with the single voice name displayed in large characters press EXIT.

Copy voice

Summary: Anytime in voice play mode you can copy the currently selected voice to another voice memory.

Procedure:

From: voice play mode (JUMP #100)
Press: COPY
Specify: the destination to which the voice will be copied.
To execute: the copy operation press F8 (Go).
To quit: without executing press EXIT.



The names of the sixteen voices in the currently selected bank of Internal or Card memory are displayed as explained in *Voice Directory*. Specify the copy destination in the same way as when selecting a voice.

After specifying the copy destination press F8 (Go). You will be asked "Are you sure?" If you are sure you want to copy the voice, press YES and the data will be copied. To quit without copying press NO.

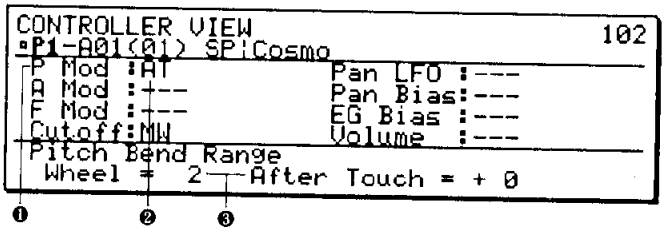
Controller view

JUMP #102

Summary: This function allows you to view the controller assignments for the voice as a reminder of how the voice can be controlled.

Procedure:

From: voice play (JUMP #100)
Select: F7 (Ctrl) (JUMP #102)
To quit: and return to voice play mode press EXIT.



❶ Parameter: The left side of each column displays the parameter which is being controlled. The actual effect that a controller will have on the parameter to which it is assigned will depend on the depth that is specified for each controller assignment as explained in *Voice Common job 12. Controller set.*

❷ Controller: The right side of each column displays the controller which is assigned to control each parameter. Controllers which are commonly supported on most MIDI devices will be displayed. '–' will be displayed to indicate all other controllers, or to indicate that the parameter's depth has been set in such a way that the controller has no effect. (Refer to Voice Common, Controller set.) The range is not displayed.

❸ Pitch Bend Range: This area shows the range over which the PITCH wheel can raise or lower the pitch, and the maximum pitch change that will result when you press down on the keyboard after playing a note (Aftertouch).

This function allows you to only view the controller assignments. To edit them, refer to *Voice Common job 12. Controller set.*

VOICE EDIT MODE

This section explains the details of all Voice Edit parameters.

Contents of this section

The organization of Voice Edit mode will depend on whether the voice is a Normal voice or a Drum voice.

F1 (Mode)	F2 (Com)	F3 (E1)	F4 (E2)	F5 (E3)	F6 (E4)
Specify the Voice Mode	Common data edit job directory	AFM element edit job directory	OR	AWM element edit job directory	
1. 1AFM mono	1. Element level	1. Algorithm		1. AWM waveform set	
2. 2AFM mono	2. Element detune	2. Oscillator		2. AWM EG	
3. 4AFM mono	3. Element note shift	3. AFM EG		3. AWM output	
4. 1AFM poly	4. Element note limit	4. AFM operator output		4. AWM sensitivity	
5. 2AFM poly	5. Element velocity limit	5. AFM sensitivity		5. AWM LFO	
6. 1AWM poly	6. Element dynamic pan	6. AFM LFO		6. AWM pitch EG	
7. 2AWM poly	7. Output select	7. AFM pitch EG		7. AWM filter	
8. 4AWM poly	8. Random pitch	8. AFM filter			
9. 1AFM&1AWM poly	9. Portamento				
10. 2AFM&2AWM poly	10. Effect set				
11. Drum set	11. Micro tuning set				
	12. Controller set				
	13. Voice name				
	14. Individual output select	...		...	
	15. Initialize voice	15. Initialize AFM element		15. Initialize AWM element	
	16. Recall voice	16. Recall AFM element		16. Recall AWM element	

Note:

At any time in voice edit mode, you can hold down the SHIFT key and press the keys of the numeric keypad to play the notes of the middle C octave using the voice currently being edited or compared. This may sometimes be more convenient than reaching for a keyboard to hear the results of your editing.

Compare

When you are in edit mode but have have not yet modified the data, a small square ■ is displayed at the left of the voice number to indicate that the voice has not yet been edited. If the data is edited in any way, this will change to a inverse "E".

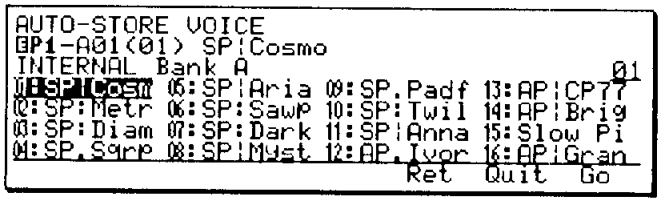
If you want to see and hear the original data press EDIT (COMPARE) and the inverse "E" will change to a "C" indicating that you are in compare mode. To return to edit mode press EDIT (COMPARE) once again and the "C" will change back to an "E".

Note:

- *The Compare function is not available in the job directory displays, nor while editing Dynamic Pan or Micro Tuning.*
- *If the Voice Mode has been changed, the Compare function will not be available.*
- *While comparing, it is not possible to modify parameter values. (However there are some exceptions.)*
- *If you compare while editing a card voice, a card error will cancel compare after displaying an error message.*
- *While comparing, EXIT, mode select, page, cursor, JUMP, COPY, and some of the F1–F8 keys will not function.*

Store voice

When you press EXIT or use the JUMP button to exit Voice Edit mode after editing the data, the top line of the display will blink "AUTO-STORE VOICE".



Note 1:

Four-element voices, i.e., voices using voice mode 3 (4AFM mono), 8 (4AWM poly), or 10 (2AFM&2AWM) occupy extra memory, and can be stored only in bank D. The AUTO-STORE display for such voices will automatically show bank D, and blink "Use bank D" in the bottom line as a reminder.

Voices which use other voice modes can be stored in bank D as well.

Note 2:

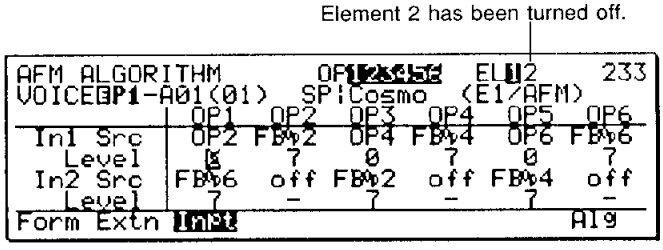
When storing a voice which uses an AWM waveform card, make sure that the correct card is inserted when you store, since the waveform card ID number is stored as part of the voice.

The LCD will show the first seven characters of the voice names in the currently selected bank of voices. The voice name displayed in inverse indicates the voice memory into which the edited data will be stored.

1. Press MEMORY to specify internal or card memory, and specify a voice memory 1–64 in which you want to store your newly edited voice.
2. Press F8 (Go), and the bottom line will ask "Are you sure ? (Yes or No)".
3. If you are sure you want to store the edited voice, press +1/YES and the bottom line of the LCD will show "Store completed". If you decide not to store, press -1/NO to return to the store destination select display.
4. You will then return to voice play mode or the jump destination.

Element on/off

When editing a voice which uses two or more elements, it is often useful to hear only the element being edited. At any time while editing a normal voice, you can hold the ELEMENT button and press numeric keys 1–4 to turn the corresponding element off or on. The on/off status of each element is shown in the LCD. Elements which are turned on are displayed in inverse. In the following LCD, element 2 has been turned off, and will not be heard.

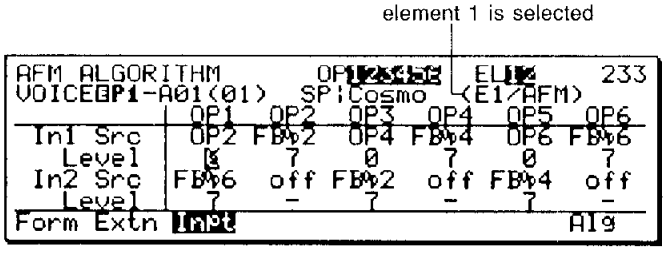


When editing a drum voice, it is not possible to turn elements off/on.

When you move to the Voice Mode Select display, the element on/off settings will automatically be cancelled.

Element select

At any time while editing the element data of a normal voice, you can hold the BANK/SELECT button and repeatedly press ELEMENT to cycle through the elements of the voice. The LCD shows the number and type of the currently selected element.



It is possible to move to another element by returning to the top level of voice edit mode, but it is faster to use BANK/SELECT + ELEMENT.

While editing Voice Common data or Drum Set data, it is not possible to select elements.

Voice mode select

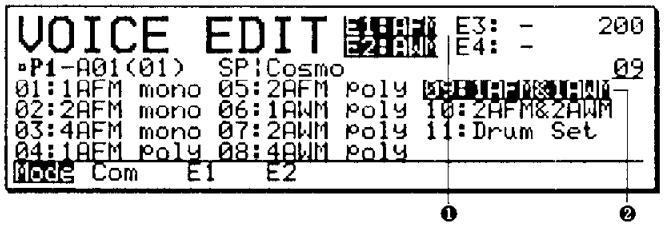
Summary: The voice mode setting determines whether a voice will consist of one two or four AWM or AFM elements (modes 1–10), or 61 AWM waves (mode 11).

Procedure:

From: the top level of voice edit mode
(JUMP #200, #201, #230, #256)

Press: F1 (Mode) to get the following display
(JUMP #200)

Specify: the desired voice mode.



❶ This area shows the number (1, 2, or 4) and type (AWM or AFM) of elements in the selected voice mode.

❷ Move the cursor to the desired voice mode 1–11. The selected voice mode will become effective immediately.

01: 1AFM mono: The voice consists of one AFM element.

02: 2AFM mono: The voice consists of two AFM elements.

03: 4AFM mono: The voice consists of four AFM elements. (See note)

04: 1AFM poly: The voice consists of one AFM element.

05: 2AFM poly: The voice consists of two AFM elements.

06: 1AWM poly: The voice consists of one AWM element.

07: 2AWM poly: The voice consists of two AWM elements.

08: 4AWM poly: The voice consists of four AWM elements. (See note)

09: 1AFM&1AWM: The voice consists of one AFM and one AWM element.

10: 2AFM&2AWM: The voice consists of two AFM and two AWM elements. (See note)

11: Drum Set: The voice consists of sixty-one AWM samples.

Mono modes (1–3): Voices which use modes 1–3 are monophonic. Only one note can be produced at a time. If a note is played while the previous note is still sounding, the previous note will be cut off. Mono mode is useful when simulating instruments that naturally produce only one note at a time. Mono mode also allows you to use a special type of portamento; *fingered portamento.* For details refer to *Voice Common 9. Portamento.*

Polyphonic modes (4–10): Voices which use modes 4–10 are polyphonic, and will allow you to play chords of as many notes as can be produced by the TG77. The AWM and AFM tone generators can each produce up to 16 simultaneous notes. For some voice modes more than one element may be sounded by a single key, and this will correspondingly reduce the number of simultaneous notes you can play.

Drum Set mode (11): Drum set voices use only the AWM tone generator, and up to 16 AWM samples can be sounded simultaneously.

Note: Four-element voices (modes 3, 8, and 10) can be stored only in bank D.

Common data

COMMON DATA

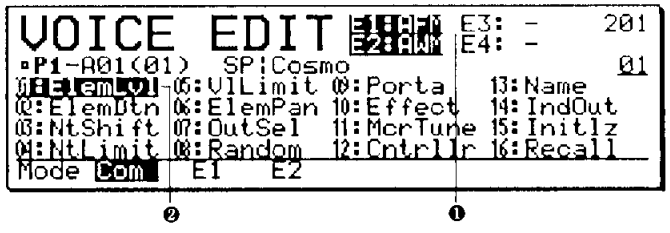
Common data job directory

JUMP #201

Summary: This job directory shows the jobs containing data that affects all elements in the voice.

Procedure:

From: the top level of voice edit mode
When: editing a normal voice
Press: F2 (Com) (JUMP #201)
Select: the desired job



❶ This area shows the number (1, 2, or 4) and type (AWM or AFM) of elements in the selected voice mode.

❷ Move the cursor in this area to select a job.

01: ElemLvl (Element level): Total voice volume, and element level
02: ElemDtn (Element detune): Fine tuning for each element
03: NtShift (Element note shift): Transpose each element
04: NtLimit (Element note limit): Range of notes that play each element
05: VlLimit (Element velocity limit): Range of key-on velocities that play each element
06: ElemPan (Element dynamic pan): Dynamic panning table for each element
07: OutSel (Output group select): Output group for each element
08: Random (Random pitch): Random pitch variation for entire voice
09: Porta (Portamento): Portamento mode and time
10: Effect (Effect set): Effect set job directory
11: McrTune (Micro tuning): Micro tuning select for entire voice, and element off/on
12: Cntrllr (Controller set): Controller assignments and depth for pitch bend, modulation, pan, etc.
13: Name (Voice name): Ten-character voice name
14: IndOut (Individual output select): Select an individual output 1–8 from which to output the un-panned, un-processed sound of the voice
15: Initlz (Initialize voice): Initialize the voice common data being edited
16: Recall (Recall voice): Recall all data (common and element) of the previously edited voice

COMMON DATA

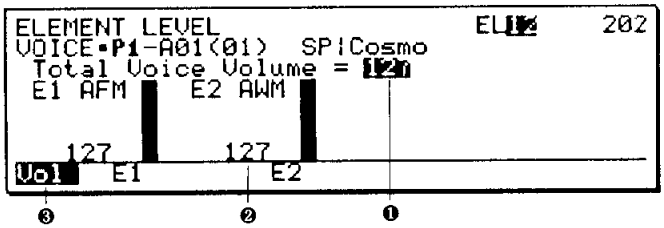
1. Element level

JUMP #202

Summary: Adjust the overall volume of the entire voice, and the volume of individual elements 1–4.

Procedure:

From: voice common job directory (JUMP #201)
Select: job 01:ElemLvl (JUMP #202)
Specify: the total voice volume and the levels of each element



❶ Total voice volume (0...127): This determines the overall volume of the entire voice.

❷ Element level (0...127) E1–E4: These determine the volume level of each element. Press F2, F4, F6, F8 to move the cursor to elements 1–4. The level of each element is displayed as a vertical bar graph.

❸ Pressing F1 will move the cursor to Total Voice Volume. Pressing F2, F4, F6, F8 will move the cursor to elements 1–4.

Remarks: Since the total voice volume setting is part of the voice data, it can be used to even out the volume differences between voices. This is important when editing a set of voices for live performance, and allows you to avoid any sudden jumps in volume when a voice is selected.

COMMON DATA

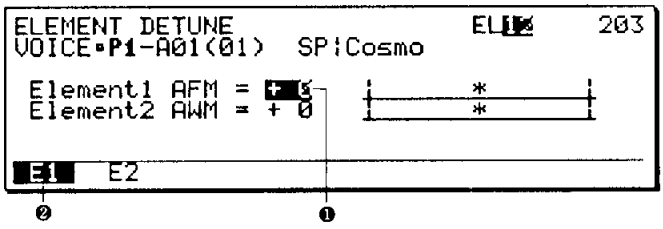
2. Element detune

JUMP #203

Summary: Adjust the fine tuning of individual elements 1–4.

Procedure:

From: voice common job directory (JUMP #201)
Select: job 02:ElemDtn (JUMP #203)
Specify: the tuning of each element



❶ Detune (–7...+7) E1–E4: When this is set to 0, the element will play the correct pitch for the key that was pressed. Negative settings will lower the pitch, and positive settings will raise the pitch. The tuning of each element is displayed as a horizontal bar graph.

❷ Pressing F1–F4 will move the cursor to elements 1–4.

Remarks: If you are creating a voice that plays two or more elements for a single note, slightly detuning the elements will create a natural chorus effect, giving a richer quality to the sound.

Element detune is intended to change the *relative* pitch of two or more elements. Setting all elements to the same detune value will not be useful, nor will this setting be useful if the voice contains only one element.

COMMON DATA

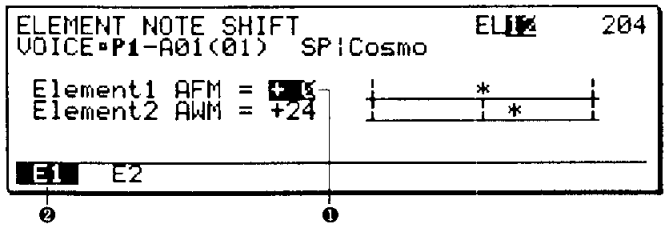
3. Element note shift

JUMP #204

Summary: Transpose the pitch of individual elements 1–4.

Procedure:

From: voice common job directory (JUMP #201)
Select: job 03:NtShift (JUMP #204)
Specify: the transposition of each element



❶ Note Shift (–64...+63) E1–E4: When this is set to 0, the element will play the correct pitch for the key that was pressed. This setting adjusts the pitch in units of a half step. For example if set to –12 the pitch will be one octave lower than normal, and if set to +24 the pitch will be two octaves higher than normal.

❷ Pressing F1–F4 will move the cursor to elements 1–4.

Remarks: For voices which play two or more elements for each key, note shift can be used to create automatic parallel harmony.

COMMON DATA

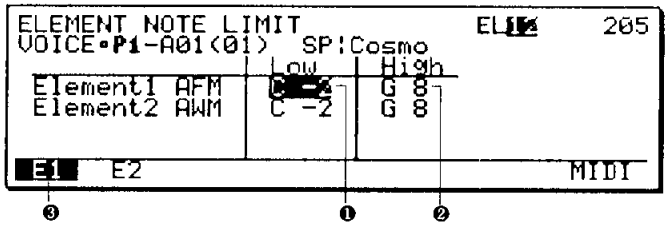
4. Element note limit

JUMP #205

Summary: Specify the range of notes that will play each element.

Procedure:

From: voice common job directory (JUMP #201)
Select: job 04:NtLimit (JUMP #205)
Specify: the note range for each element



❶ Low Note Limit (C-2...G8) E1–E4: This specifies the lowest note that will be played by the element.

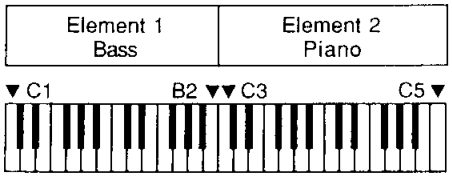
❷ High Note Limit (C-2...G8) E1–E4: This specifies the highest note that will be played by the element.

❸ Pressing F1–F4 will move the cursor to elements 1–4.

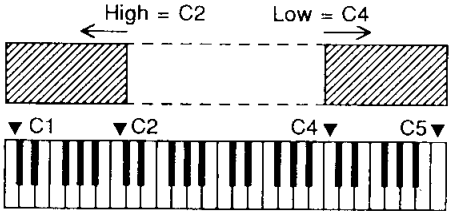
Remarks: After moving the cursor to the parameter you want to set, you can modify the data in the usual way or press F8 (MIDI) and then press a key of your MIDI keyboard to enter a note.

If you want to play an element over the entire range of the keyboard, leave this parameter set at Low=C-2 and High=G8.

This parameter can be used to create keyboard split effects where different elements are played by different keyboard areas. For example in a two-element voice where element 1 is a bass sound and element 2 is a piano sound, set element 1 to Low=C1 and High=B2 and set element 2 to Low=C3 and High=C5. With these settings, notes below middle C will play bass (element 1) and notes above middle C will play piano (element 2).



It is possible to set the low limit above the high limit. In this case, the element will be played by notes above the low limit and below the high limit. The following diagram shows the keyboard range that would play an element set to Low=C4 and High=C2.



Note: This note limit setting will be ignored if the voice mode is mono (voice mode 1:1AFM mono, 2:2AFM mono, and 3:4AFM mono).

COMMON DATA

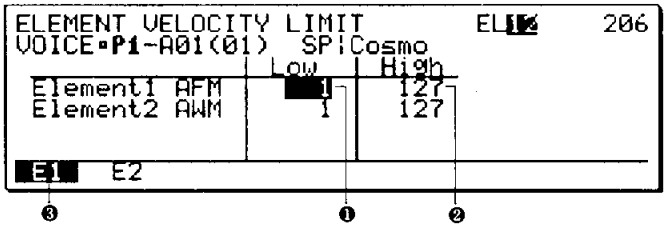
5. Element velocity limit

JUMP #206

Summary: Specify the range of key-on velocities that will play each element.

Procedure:

From: voice common job directory (JUMP #201)
Select: job 05:VlLimit (JUMP #206)
Specify: the range of velocities for which the element will sound

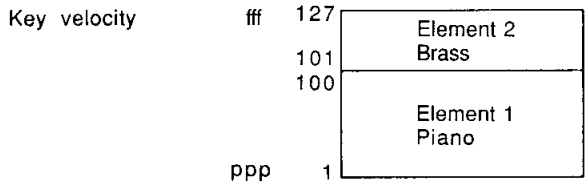


❶ Low Velocity Limit (1...127): This is the lowest key-on velocity for which the element will sound.

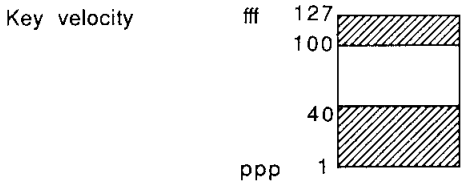
❷ High Velocity Limit (1...127): This is the highest key-on velocity for which the element will sound.

❸ Press F1–F4 to move the cursor to elements 1–4.

Remarks: If you want to play an element over the full range of key velocities, leave this parameter set at Low=1 and High=127. This parameter can be used to make strongly played notes play different elements than softly played notes. For example in a two-element voice where element 1 is a piano sound and element 2 is a brass sound, set element 1 to Low=1 and High=100 and set element 2 to Low=101 and High=127. With these settings, soft notes will play the piano (element 1) and strong notes will play brass (element 2). If desired, you could overlap the velocity limits of the elements, or use more than two elements.



It is possible to set the low limit above the high limit. In this case, the element will be sounded by key-on velocities outside the limits. The following diagram shows the velocity range that would play an element set to Low=100 and High=40.



COMMON DATA

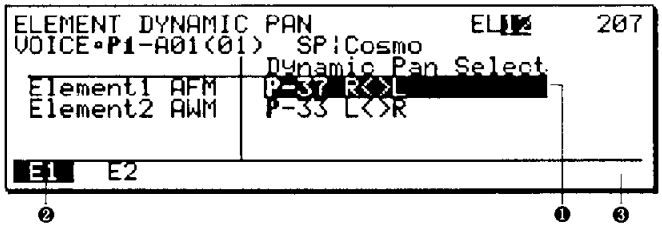
6. Element dynamic pan

JUMP #207

Summary: Select the Dynamic Pan data used by each element. The selected dynamic pan data will determine how the stereo position of the element will change over time.

Procedure:

From: Voice Common job directory (JUMP #201)
Select: job 06:ElemPan (JUMP #207)
Specify: the Dynamic Pan data used by each element



❶ Dynamic Pan Select (I1...32, C1...32, P1...64): This specifies the dynamic pan data that will move the stereo position of this element over time. The number and name of the selected pan data will be displayed. For an internal voice, select a pan data memory from Internal or Preset. For a card voice, select a pan data memory from Card or Preset.

❷ Pressing F1–F4 will move the cursor to elements 1–4.

❸ Press F8 to edit the currently selected pan data. (Only Internal pan data can be edited.)

Remarks: Each Dynamic Pan memory contains the following data.

- a Pan Source which allows the panning movement to be controlled by velocity, note number, or LFO
- EG settings which determine panning movement over time
- a Pan Name

64 preset dynamic pan memories are provided, as explained in the following table. In addition, 32 internal memories are provided for you to store your own pan data, and a RAM card can accommodate 32 more pan data memories. The following section 6.0 Dynamic Pan Edit explains how to edit the Dynamic Pan data.

Preset Dynamic Pan data

#	Name	Description
1	Center	fixed at center
2	Right 6	fixed full right
3	Right 5	...
4	Right 4	...
5	Right 3	...
6	Right 2	...
7	Right 1	fixed slightly right
8	Left 6	fixed full left
9	Left 5	...
10	Left 4	...
11	Left 3	...
12	Left 2	...
13	Left 1	fixed slightly left
14	L>R slow	slowly move L→R
15	L>R	move L→R
16	L>R fast	quickly move L→R
17	R>L slow	slowly move R→L
18	R>L	move R→L
19	R>L fast	quickly move R→L
20	C>R slow	slowly move C→R
21	C>R	move C→R
22	C>R fast	quickly move C→R
23	C→R slow	pause at center then slowly move C→R
24	C→R	pause at center then move C→R
25	C→R fast	pause at center then quickly move C→R
26	C>L slow	slowly move C→L
27	C>L	move C→L
28	C>L fast	quickly move C→L
29	C→L slow	pause at center then slowly move C→L
30	C→L	pause at center then move C→L
31	C→L fast	pause at center then quickly move C→L
32	L<>R slow	start at L then slowly move between LR
33	L<>R	start at L then move between LR
34	L<>R narrow	start at L then move (narrowly) between LR
35	L<>R fast	start at L then move quickly between LR
36	R<>L slow	start at R then slowly move between RL
37	R<>L	start at R then move between RL
38	R<>L narrow	start at R then move narrowly betweenRL
39	R<>L fast	start at R then move quickly between RL
40	C>R<>L slw	start at C then move slowly between RL
41	C>R<>L s&n	start at C then move slowly and narrowly between RL
42	C>R<>L	start at C then move between RL
43	C>R<>L fst	start at C then move quickly between RL
44	C→R<>L sl	pause at C then move slowly between RL
45	C→R<>L	pause at C then move between RL
46	C→R<>L fs	pause at C then move quickly between RL
47	C>L<>R slw	start at C then move slowly between LR
48	C>L<>R s&n	start at C then move slowly and narrowly between LR
49	C>L<>R	start at C then move between LR
50	C>L<>R fst	start at C then move quickly between LR
51	C→L<>R sl	pause at C then move slowly between LR
52	C→L<>R	pause at C then move between LR
53	C→L<>R fs	pause at C then move quickly between LR
54	LFO MWheel	controller regulates the width (initially 0) of LFO panning
55	LFO wide	broad panning by LFO
56	Note wide	broad panning by note number
57	Note narrw	narrow panning by note number
58	Notew+EG n	broad panning by note number + narrow LR movement
59	Noten+EG w	narrow panning by note number + broad LR movement
60	Vel wide	broad panning by key velocity
61	Vel narrow	narrow panning by key velocity
62	Vel w+EG n	broad panning by key velocity + narrow LR movement
63	R&L 1	variation of repeated LR movement
64	R&L 2	variation of repeated LR movement

COMMON DATA / ELEMENT DYNAMIC PAN

6.0 Dynamic pan edit

Summary: This function allows you to edit the currently selected Dynamic Pan data.

Procedure:

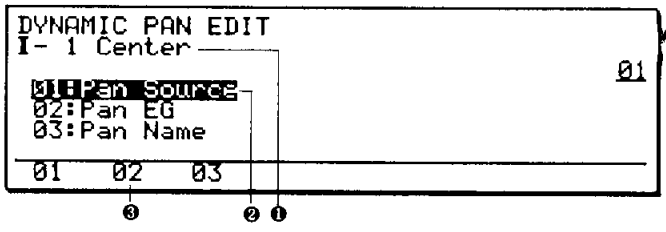
From: Voice Common job 06.ElemPan (JUMP #207)

When: an Internal dynamic pan memory is selected

Press: F8 (Edit)

Select: the Dynamic Pan parameter you wish to edit

Editing is possible only when an Internal pan memory is selected. If you want to edit one of the preset pan memories, press COPY to copy it to an Internal pan memory as explained in the following section 6.0.1 Copy Pan Data.



❶ The name and number of the currently selected Dynamic Pan data are displayed.

❷ Move the cursor in this area to select a job.
- 01: Pan Source: Select a control source (velocity, note number, or LFO) to affect dynamic panning. (See 6.1 Pan Source)
- 02: Pan EG: Set the panning EG. (See 6.2 Pan EG)
- 03: Pan Name: Assign a ten-character name to the pan data. (See 6.3 Pan Name)

❸ Pressing F1–F3 will select the corresponding job.

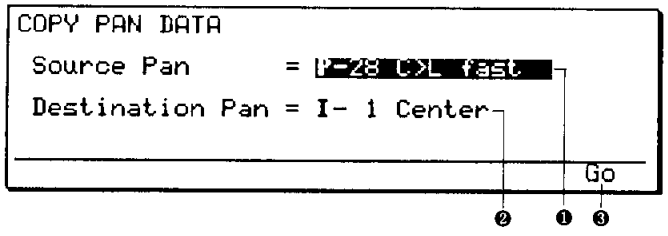
COMMON DATA / ELEMENT DYNAMIC PAN

6.0.1 Copy pan data

Summary: This function copies dynamic pan data from another memory into an Internal pan data memory.

Procedure:

When: editing dynamic pan data
Press: COPY to get the following display.
Specify: the source and destination pan.
To copy: the pan data press F8.
To quit: without copying press EXIT.



❶ Source Pan: Select the dynamic pan data to copy.
❷ Destination Pan: Select the dynamic pan data (internal 1–32) into which to copy the Source Pan data.
❸ After selecting Source Pan and Destination Pan, press F8 (Go) to copy the data. You will be asked "Are you sure?". Press YES and the data will be copied.

Remarks: Only Internal Pan Data memories can be edited. If you want to edit one of the preset pan tables, use this function to copy it into an Internal pan memory.

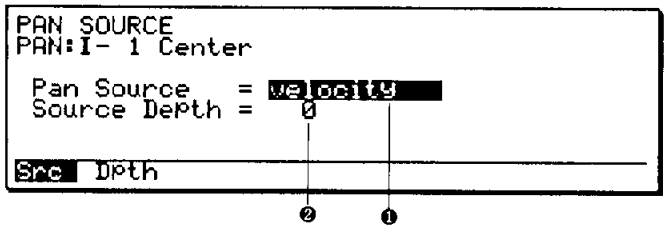
COMMON DATA / ELEMENT DYNAMIC PAN

6.1 Pan source

Summary: This determines how the dynamic panning will be affected; either by Velocity, or Note Number, or LFO.

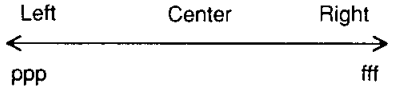
Procedure:

From: Dynamic Pan Edit job directory
Select: 01:Pan Source
Specify: the pan source and depth

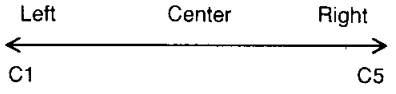


❶ Pan Source (Velocity, Key Note Number, LFO): Select the control source which will affect dynamic panning. When velocity is selected, the playing strength of each note will affect panning. When note number is selected, notes above middle C will be panned more to the right, and notes below middle C will be panned more to the left. When LFO is selected, the LFO of the element will continuously pan the sound.
❷ Source Depth (0...127): This determines how much the selected Pan Source will affect panning. When this is set to 0, the selected pan source will have no effect. When this is set to 127, the selected pan source will pan the element over the range of full left to full right.

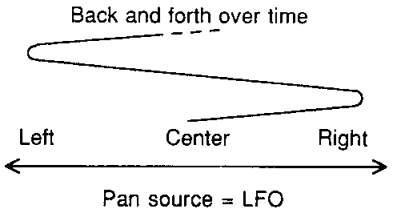
Pan source = Velocity



Pan source = Key note number



Pan source = LFO



❸ Pressing F1–F2 will move the cursor to the corresponding parameter.

Remarks: Dynamic panning is controlled by two factors working together; the Pan Source and the Pan EG. Refer to the diagram in 6.2 Pan EG for an example of this.

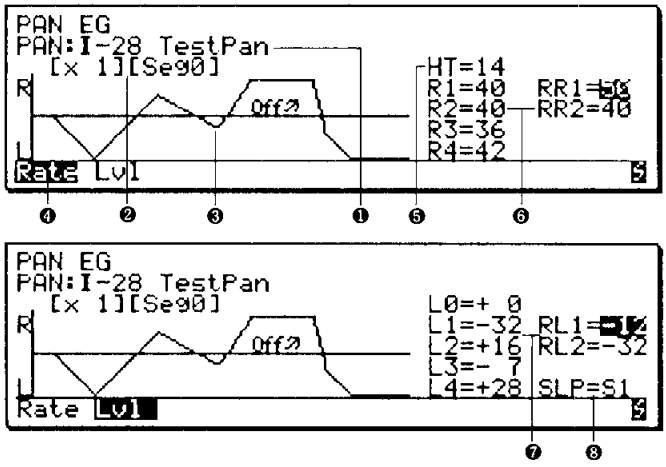
COMMON DATA / ELEMENT DYNAMIC PAN

6.2 Pan EG

Summary: Specify how the element will be panned over time, starting when each note is played.

Procedure:

From: Dynamic Pan Edit job directory
Select: 02:Pan EG.
Press: F1 (Rate) to set pan EG rates.
Press: F2 (Lvl) to set pan EG levels.



❶ The number and name of the currently selected Dynamic Pan data are displayed.

❷ This indicates the displayed segment and range of the EG graphic display. To change the range, hold SHIFT and press F1–F6 (x1, x2, x5, x10, x20, x50). To shift the EG graphic display to a different segment, hold SHIFT and press F7 or F8 to select Seg0–Seg4, Rel1.

❸ The pan EG is graphically displayed.

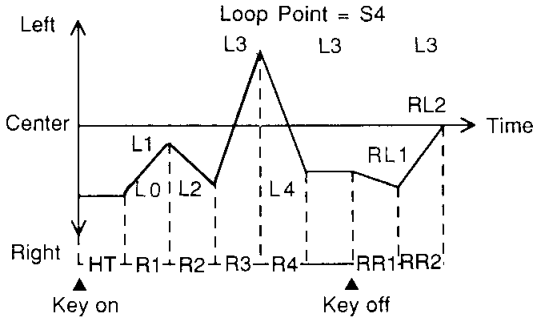
❹ Press F1 (Rate) to set EG rates. Press F2 (Lvl) to set EG levels.

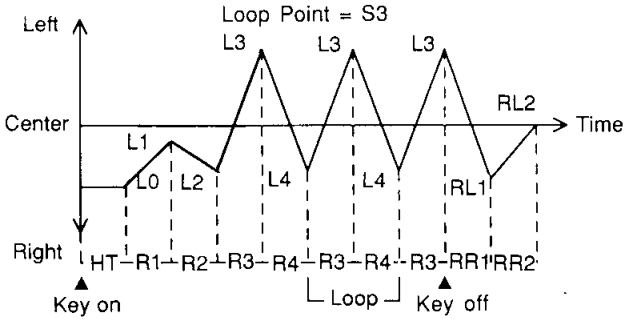
❺ HT (Keyon Delay Time 63...0): When this is set to 0, the pan EG will begin immediately after a key is pressed. For higher settings, there will be an increasingly longer delay before the pan EG begins.

❻ R1–R4, RR1–RR2 (Keyon Rates, Release Rates 0...63): Keyon Rates 1–4 and Release Rates 1–2 determine the speed of the pan EG. Higher settings result in faster change. Refer to the following diagram.

❼ L0–L4, RL1–2 (Keyon Levels, Release Levels –32...+32): Keyon Levels 0–4 and Release Levels 1–2 determine the panning direction and distance of the pan EG. Negative settings move left, and positive settings move right. Refer to the following diagram.

❽ SLP (Loop Point S1–S4): This specifies the segment from which the EG will continue looping if a key remains depressed after the EG has come to the end. Refer to the following diagram.





When you press a key, the sound will be output at the pan position of L0. When the specified hold time (HT) has elapsed, the pan position will change at the rate of R1 to level L1. When the pan position reaches L1, it will change at the rate of R2 to the position of L2. When the pan position reaches L2, it will change at the rate of R3 to the position of L3. When the pan position reaches L3, it will change at the rate of R4 to the position of L4. When the pan position reaches L4, the EG will begin looping from the specified segment (in the above diagram, SLP=S3).

When you release the key, the pan position will change at the rate of RR1 to the position of RL1. When the pan position reaches RL1, it will change at the rate of RR2 to the position of RL2.

Remarks: Hold Time (HT) is a *time* setting, but the various Rates are *speed*. Higher settings for Hold Time will result in a longer delay before the pan EG begins, but higher settings for Rates will result in faster change. The final result of the Pan EG will depend on the Pan Source settings.

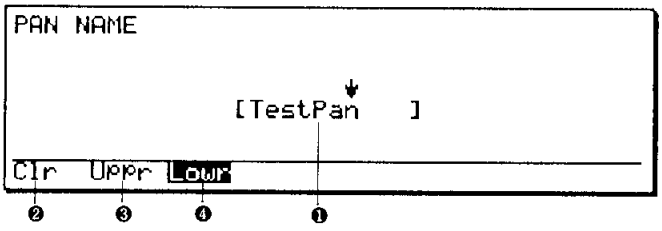
COMMON DATA / ELEMENT DYNAMIC PAN

6.3 Pan name

Summary: Specify a ten-character name for the internal Pan data memory being edited.

Procedure:

From: Dynamic Pan Edit job directory
Select: 03:Pan Name
Specify: a name for the pan memory



❶ Enter a ten-character name for the Pan data.
❷ To clear the currently entered name press F1 (Clr).
❸ To switch to upper-case characters press F2 (Uppr).
❹ To switch to lower-case characters press F3 (Lowr).

Methods of entering character data are explained in *Introducing the TG77, How to use the numeric key pad,* on page 30.

COMMON DATA

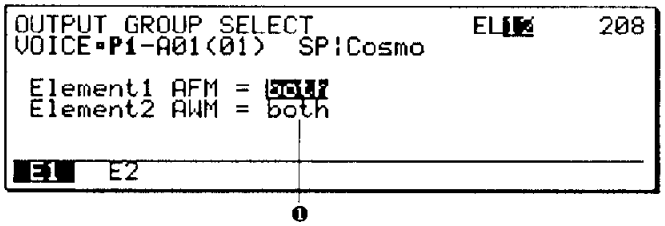
7. Output group select

JUMP #208

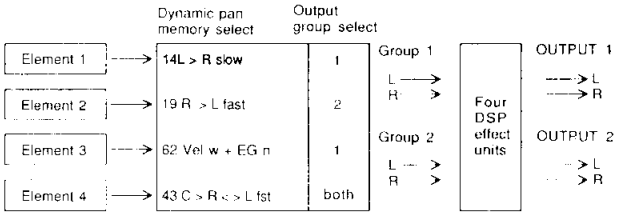
Summary: Specify the output group for each element.

Procedure:

From: voice common job directory (JUMP #201)
Select: job 07:OutSel (JUMP #208)
Specify: the output group for each element



❶ Element 1–4 (off, grp1, grp2, both): Each of the elements in a voice is independently panned by a dynamic pan memory, and the stereo signal for each element is sent to the DSP effect units via Output Group 1 and/or 2. The selected Output Group(s) will determine how each element is processed through the effects units. (Refer to Voice Common data job 10.1 Effect Mode for details.) If output group is turned off, that element will not be heard.



COMMON DATA

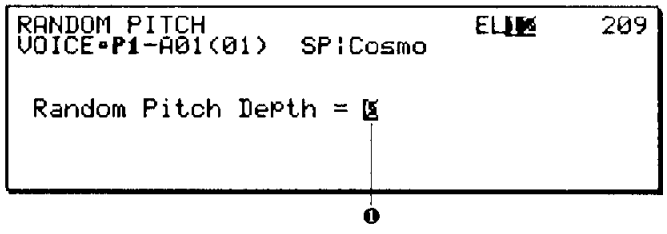
8. Random pitch

JUMP #209

Summary: Specify the amount of random pitch variation for the voice.

Procedure:

From: voice common job directory (JUMP #201)
Select: job 08:Random (JUMP #209)
Specify: the amount of random pitch variation



❶ Random Pitch Depth (0...7): For a setting of 0, a key will produce the same pitch each time it is pressed. For settings of 1...7, a key will produce a random deviation in pitch. Higher settings result in greater deviation from the standard key pitch.

Remarks: This parameter is helpful when simulating instruments which have a naturally unsteady pitch.

The random pitch deviation is applied separately to each element in the voice, meaning that pitch differences may appear between elements.

COMMON DATA

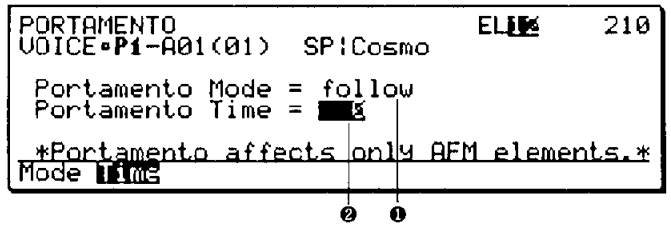
9. Portamento

JUMP #210

Summary: Specify the Portamento mode and time. Portamento creates a smooth glide in pitch between one note and the next.

Procedure:

From: voice common job directory (JUMP #201)
Select: job 09:Porta (JUMP #210)
Specify: the portamento mode and time



❶ Portamento Mode: If the currently selected voice mode is polyphonic (voice modes 4–10), the portamento mode is fixed at Follow mode. If the currently selected voice mode is monophonic (voice modes 1–3), the portamento mode can be set either to Fingered or Full time.

Fingered portamento: Portamento is applied only if you press a note before releasing the previous one; i.e., when you play legato.

Full Time portamento: Portamento is applied between all notes.

❷ Portamento Time (0...127): This determines the time of the pitch glide between notes. Higher settings result in a longer (slower) glide.

Remarks: If you do not want portamento, set Portamento Time to 0 so that the pitch change between notes is instantaneous.

As noted in the display, portamento applies only to AFM elements. It will have no effect on voices which use only AWM elements (voice modes 6–8). If a voice uses both AFM and AWM elements (voice modes 9 and 10), portamento will apply only to the AFM elements in the voice.

COMMON DATA

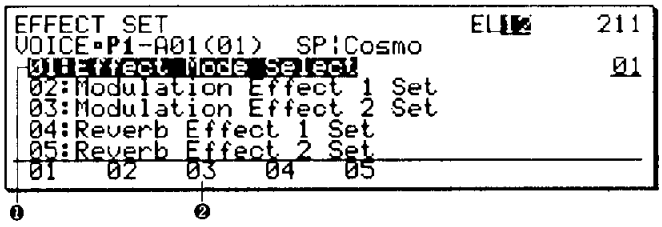
10. Effect set

JUMP #211

Summary: Specify how the effects units are connected, select an effect type for each unit, and make settings for each effect.

Procedure:

From: voice common job directory (JUMP #201)
Select: job 10:Effect (JUMP #211)
Select: the effect parameter you wish to edit



❶ Move the cursor in this area to select a job.

01: Effect Mode Select: Specify how the four effect units will be connected. See 10.1 Effect Mode Select.

02: Modulation Effect 1 Set: Select an effect type and set parameters for modulation effect 1. See 10.2 Modulation Effect 1 Set.

03: Modulation Effect 2 Set: Select an effect type and set parameters for modulation effect 2. This is set in exactly the same way as explained for Modulation Effect 1. See 10.2 Modulation Effect 1 Set.

04: Reverb Effect 1 Set: Select an effect type and set parameters for reverb effect 1. See 10.4 (F1) Reverb effect 1 set.

05: Reverb Effect 2 Set: Select an effect type and set parameters for reverb effect 2. This is set in exactly the same way as Reverb Effect 1. See 10.4 (F1) Reverb effect 2 set.

❷ Pressing F1–F5 will select the corresponding job.

COMMON DATA / EFFECT SET

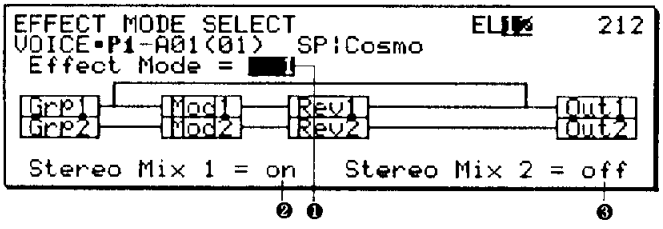
10.1 Effect mode select

JUMP #212

Summary: This determines how the four effects will be arranged to process the sound from the two stereo groups 1 and 2.

Procedure:

From: Effect Set job directory (JUMP #201)
Select: 01:Effect Mode Select (JUMP #212)
Specify: the effect mode



❶ Effect Mode (off, 1, 2, 3): This determines how the four effects will be arranged to process the sound from the two stereo groups 1 and 2. The effect mode will be graphically shown in the display.

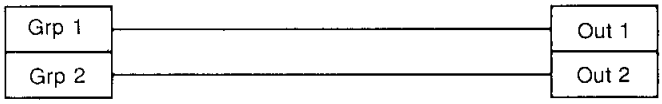
When the Effect Mode is Off, the stereo groups 1 and 2 will be sent directly to output groups 1 and 2 without passing through the effect units.

When an Effect Mode of 1, 2, or 3 is selected, the stereo groups 1 and 2 will be processed through the effect units as shown in the following diagram.

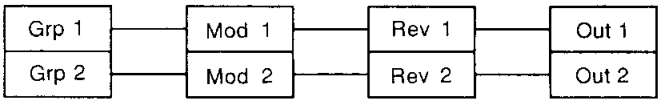
❷ Stereo Mix 1 (off, on): When this is turned on, the unprocessed sound from group 1 will be added to the processed sound sent from output group 1.

❸ Stereo Mix 2 (off, on): When this is turned on, the unprocessed sound from group 2 will be added to the processed sound sent from output group 2. If effect mode 3 is selected, the Stereo Mix 2 cannot be set.

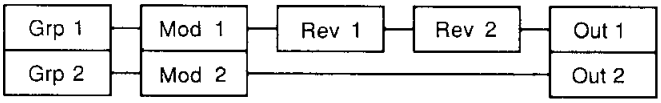
Effect mode: off



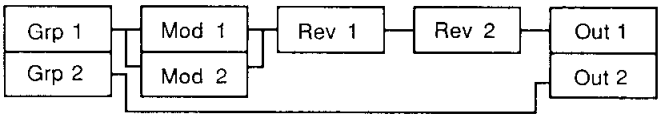
Effect mode: 1



Effect mode: 2



Effect mode: 3



Remarks:

- The settings in *Voice Common data 7. Output group select* (JUMP #208) will determine whether each element of the voice is sent to Group 1 or Group 2.

- All modulation effects are stereo-in stereo-out. Reverb effects 35–40 are also stereo-in stereo-out. Reverb effects 1–34 are mono-in stereo-out, and the incoming stereo signal to each effect unit is combined into a mono signal before it is processed.

  Effect Mode 3 is an exception. Only the Lch output of modulation effect 1 and the Rch output of modulation effect 2 will be used for the Reverb effect 1 input.

- If you want the Dynamic Pan to be heard when using reverb effects 1–34, you must turn the Stereo Mix on to allow the direct stereo signal from the element pan to be combined with the output from the effect units.

The following sections 10.2 and 10.4 explain how to make settings for the four effect units.

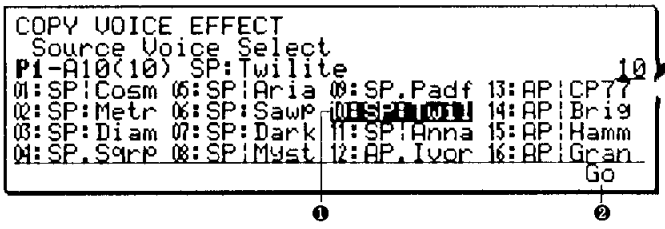
COMMON DATA / EFFECT SET

10.1.1 Copy voice effect

Summary: This function copies Effect data from another voice into the effect data of the currently edited voice.

Procedure:

When: editing Effect data (jobs 10.1–10.5)
Press: COPY to get the following display.
Specify: the voice from which to copy the effect data
To copy: the data press F8
To quit: without copying press EXIT



❶ Select a source voice from which to copy the Effect data.

❷ Press F8 (Go) and you will be asked "Are you sure?". If you are sure you want to copy the effect data, press YES and the effect data will be copied from the selected voice to the voice being edited.

COMMON DATA / EFFECT SET

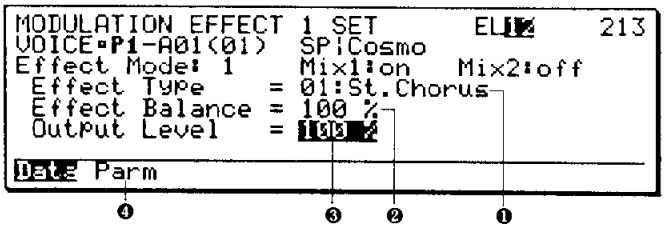
10.2 (F1) Modulation effect 1 set (Data)

JUMP #213

Summary: Select an effect type for modulation effect 1, and set the effect balance and output level. This explanation also applies to modulation effect 2.

Procedure:

From: Effect Set job directory (JUMP #211)
Select: 02:Modulation Effect 1 Set
Press: F1 (Data) (JUMP #213)
Specify: the effect type, effect balance, and output level

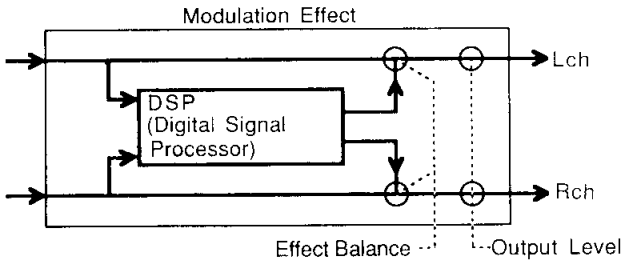


❶ Effect Type: Four types of effect can be selected for the modulation effect unit. Refer to the list of modulation-type effects in the following section 10.2 (F2).

❷ Effect Balance (0...100%): This determines the balance of processed and unprocessed sound. At a setting of 0% the output of the effect unit will be only unprocessed sound, and at a setting of 100% the output of the effect unit will be only processed sound.

❸ Output Level (0...100%): This determines the volume level of the effect output. At a setting of 0% the effect unit will output no sound, and at a setting of 100% the output of the effect unit will be at full volume.

❹ To set the parameters of the selected Effect Type, press F2 (Parm). (See the following section 10.2 (F2).)



Remarks: All modulation effects are stereo-in stereo-out.

Note: Changing the Effect Type will initialize the Parameter settings of F2 (Parm).

COMMON DATA / EFFECT SET

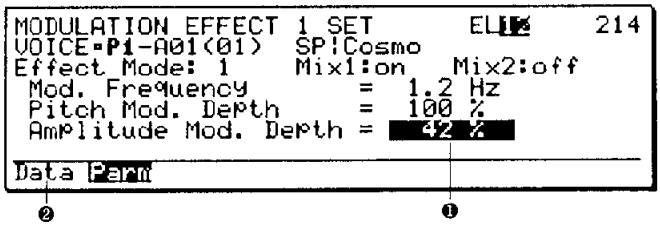
10.2 (F2) Modulation effect 1 set (Parameters)

JUMP #214

Summary: Set effect parameters of the effect type selected for modulation effect 1. This explanation also applies to modulation effect 2.

Procedure:

From: Effect Set job directory (JUMP #211)
Select: 02:Modulation Effect 1 Set
Press: F2 (Parm) (JUMP #214)
Specify: parameter settings for the selected effect



❶ The number and type of effect parameters will depend on the selected Effect Type. Refer to the following parameter lists for each effect type. Through has no parameters.

❷ To select an Effect Type and set Effect Balance and Output level, press F1 (Data). (See the previous section 10.2 (F1).)

Note: Changing the Effect type in F1 (Data) will initialize these Parameter settings.

Through: The input sound will be output without any processing.

1:St.Chorus (stereo chorus)
Modulation Frequency (0.2...20.0 Hz)
Pitch Mod. Depth (0...100%)
Amplitude Modulation Depth (0...100%)

2:St.Flange (stereo flanger)
Modulation Frequency (0.2...20 Hz)
Modulation Depth (0...100%)
Modulation Delay Time (0.2...15 ms)
Feed Back Gain (0...99%)

3:Symphonic
Modulation Frequency (0.2...20 Hz)
Modulation Depth (0...100%)

4:Tremolo
Modulation Frequency (0.2...20 Hz)
Modulation Depth (0...100%)
Phase (–8...+8)

Modulation effect parameters: The parameters of the modulation effects are explained below in alphabetical order.

Amplitude Modulation Depth: The amount of tremolo; i.e., cyclical change in volume.
Feedback Gain: For effects with very short delays such as 2.St.Flange, this will adjust the character of the effect.
Modulation Depth: The depth of the cyclical change.
Modulation Delay Time: For effects with very short delays such as 2.St.Flange, this will adjust the character of the effect.
Modulation Frequency: The speed of the cyclical change; i.e., the speed of chorusing, flanging, etc.
Pitch Modulation Depth: The amount of vibrato; i.e., cyclical change in pitch.
Phase: The phase of the pitch shifted signal.

COMMON DATA / EFFECT SET

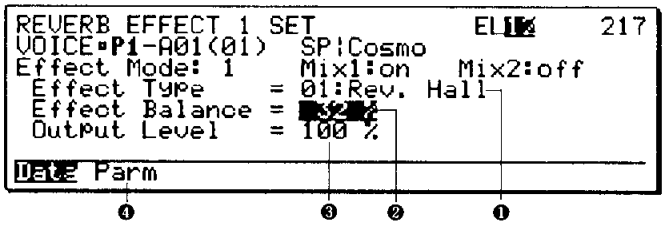
10.4 (F1) Reverb effect 1 set (Data)

JUMP #217

Summary: Select an effect type for Reverb effect 1, and set the effect balance and output level. This explanation also applies to reverb effect 2.

Procedure:

From: Effect Set job directory (JUMP #211)
Select: 04:Reverb Effect 1 Set
Press: F1 (Data) (JUMP #217)
Specify: the effect type, effect balance, and output level

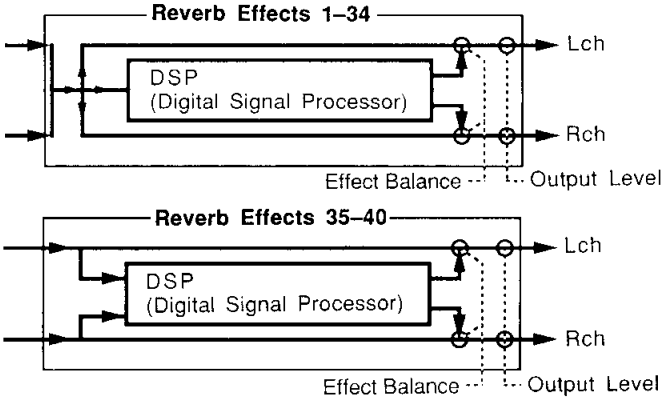


❶ Effect Type: Forty types of effects can be selected for the reverb effect unit. Refer to the list of reverb-type effects in the following section 10.4 (F2).

❷ Effect Balance (0...100%): This determines the balance of processed and unprocessed sound. At a setting of 0% the output of the effect unit will be only unprocessed sound, and at a setting of 100% the output of the effect unit will be only processed sound.

❸ Output Level (0...100%): This determines the volume level of the effect output. At a setting of 0% the effect unit will output no sound, and at a setting of 100% the output of the effect unit will be at full volume.

❹ To set the parameters of the selected Effect Type, press F2 (Parm). (See the following section 10.4 (F2).)



Remarks: Reverb effects 1:Rev.Hall to 34:Distortion are mono-in stereo-out. In other words, the incoming stereo signal from the element Dynamic Pan is combined into a mono signal and processed to create a stereo effect.
Reverb effects 35:Ind.Delay to 40:Ind.Rev&Delay are stereo-in stereo-out, with independently settable parameters for left and right.

Note: Changing the Effect Type will initialize the Parameter settings of F2 (Parm).

COMMON DATA / EFFECT SET

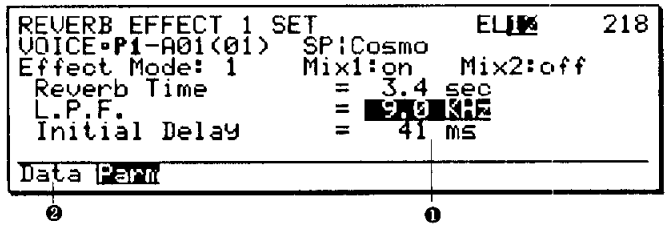
10.4 (F2) Reverb effect 1 set (Parameters)

JUMP #218

Summary: Set effect parameters of the effect type selected for reverb effect 1. This explanation also applies to reverb effect 2.

Procedure:

From: Effect Set job directory (JUMP #211)
Select: 04:Reverb Effect 1 Set
Press: F2 (Parm) (JUMP #218)
Specify: parameter settings for the selected effect



❶ The type of effect parameters will depend on the selected Effect Type. Refer to the following parameter lists for each effect type. 00:Off(Through) has no parameters.
❷ To select an Effect Type and set Effect Balance and Output level, press F1 (Data). (See the previous section 10.4 (F1).)

Note: Changing the Effect Type in F1 (Data) will initialize these Parameter settings.

1:Reverb Hall, 2:Reverb Room, 3:Reverb Plate, 4:Reverb Church, 5:Reverb Club, 6:Reverb Stage, 7:Reverb Bath Room, 8:Reverb Metal
Reverb Time (0.3...10.0 sec)
L.P.F. (1.25...12 KHz, Through)
Initial Delay (0.1...50 ms)

9:Single Delay
Delay Time (0.1...300 ms)
FB Delay Time (0.1...300 ms)
Feedback Gain (0...99%)

10:Delay L,R,
Lch Delay Time (0.1...300 ms)
Rch Delay Time (0.1...300 ms)
Feedback Gain (0...99%)

11:Stereo Echo
Lch Delay Time (0.1...152 ms)
Rch Delay Time (0.1...152 ms)
Feedback Gain (0...99%)

12:Doubler 1
Delay Time (0.1...50 ms)
H.P.F. (Thru, 160...1000 Hz)
L.P.F. (1.25...12 KHz, Thru)

13:Doubler 2
Lch Delay Time (0.1...50 ms)
Rch Delay Time (0.1...50 ms)
L.P.F. (1.25...12 KHz, Thru)

14:Ping-Pong Echo
Delay Time (0.1...152 ms)
Pre-Delay Time (0.1...80 ms)
Feedback Gain (0...99%)

15:Pan Reflection
Room Size (0.5...3.2)
Feedback Gain (0...99%)
Direction (L→R, L←R)

16:Early Reflection, 17:Gate Reverb, 18:Reverse Gate
Room Size (0.5...3.2)
L.P.F. (1.25...12 KHz, Thru)
Initial Delay (0.1...50 ms)

19:Feedback Early Reflection, 20:Feedback Gate, 21:Feedback Reverse
Room Size (0.5...3.2)
L.P.F. (1.25...12 KHz, Thru)
Feedback Gain (0...99%)

22:Single Delay & Reverb
Reverb Time (0.3...10.0 sec)
Delay Time (0.1...152 ms)
Feedback Gain (0...99%)

23: Delay L/R & Reverb
Reverb Time (0.3...10.0 sec)
Lch Delay Time (0.1...152 ms)
Rch Delay Time (0.1...152 ms)

24:Tunnel Reverb
Reverb Time (0.3...10.0 sec)
Delay Time (0.1...152 ms)
Feedback Gain (0..99%)

25:Tone Control 1
Low Gain (–12...+12 dB at 800 Hz)
Mid Gain (–12...+12 dB at 1260 Hz)
High Gain (–12...+12 dB at 4 KHz)

26:Single Delay + Tone Control 1,
27:Delay L/R + Tone Control 1
Brilliance (0...12)
Delay Time (0.1...300 ms)
Feedback Gain (0...99%)

28:Tone Control 2
H.P.F (Thru, 160...1000 Hz)
Mid Gain (–12...+12 dB at 1260 Hz)
L.P.F. (1.25...12 KHz, Thru)

29:Single Delay + Tone Control 2,
30:Delay L/R + Tone Control 2
Brilliance (0...12)
Delay Time (0.1...300 ms)
Feedback Gain (0...99%)

31:Distortion + Reverb
Reverb Time (0.3...10.0 sec)
Distortion Level (0...100%)
Dist & Rev Balance (0...100%)

32:Distortion + Single Delay,
33:Distortion + Delay L/R
Delay Time (0.1...300 ms)
Feedback Gain (0...99%)
Distortion Level (0...100%)

34:Distortion
Distortion Level (0...100%)
H.P.F. (Thru, 160...1000 Hz)
L.P.F. (1.25...12 KHz, Thru)

35:Ind. Delay
Lch Delay Time (0.1...152 ms)
Rch Delay Time (0.1...152 ms)
Feedback Gain (0...99%)

36:Ind. Tone Control
Lch Brilliance (0...12)
Rch Brilliance (0...12)
Mid Gain (–12...+12 dB at 1260 Hz)

37:Ind. Distortion
Lch Dist. Level (0...100%)
Rch Dist. Level (0...100%)
L.P.F. (1.25...12 KHz, Thru)

38:Ind. Reverb
Lch Reverb Time (0.3...10.0 sec)
Rch Reverb Time (0.3...10.0 sec)
High Control (0.1...1.0)

39:Ind. Delay & Reverb
Lch Delay Time (0.1...152 ms)
Lch Feedback Gain (0...99%)
Rch Reverb Time (0.3...10.0 sec)

40:Ind. Reverb & Delay
Lch Reverb Time (0.3...10.0 sec)
Rch Delay Time (0.1...152 ms)
Rch Feedback Gain (0...99%)

Reverb effect parameters: The parameters of the reverb effects are explained below in alphabetical order.

Brilliance: the overall brightness of the sound
Delay Time: the delay before the echoed sound
Direction: the direction in which the echoes will be panned
Dist & Rev Balance: the balance between distortion and reverb
Distortion Level: the amount of the distorted sound
FB Delay Time: the delay between repeated echoes of the sound
Feedback Gain: the volume ratio of each echo to the previous one
H.P.F.: frequencies higher than this will be allowed to pass
High Control: the proportion at which high frequency reverb will decay
High Gain: the amount of boost or cut at 4 KHz
Initial Delay: the delay before the effect processed sound will be heard
L.P.F.: frequencies lower than this will be allowed to pass
Lch Brilliance: the overall brightness of the left channel
Lch Delay Time: the delay between repeated echoes in the left channel
Lch Dist. Level: the amount of distortion for the left channel
Lch Feedback Gain: the volume ratio of each successive left channel echo
Lch Reverb Time: the time for the left channel reverb to decrease 60 dB
Low Gain: the amount of boost or cut at 800 Hz
Mid Gain: the amount of boost or cut at 1260 Hz
Pre-Delay Time: the time delay before delay will begin
Rch Brilliance: the overall brightness of the right channel
Rch Delay Time: the delay between repeated echoes in the right channel
Rch Dist. Level: the amount of distortion for the right channel
Rch Feedback Gain: the volume ratio of each successive right channel echo
Rch Reverb Time: the time for the right channel reverb to decrease 60 dB
Reverb Time: the time for the reverb to decrease 60 dB
Room Size: the size (in arbitrary units) of the reverberant room

COMMON DATA

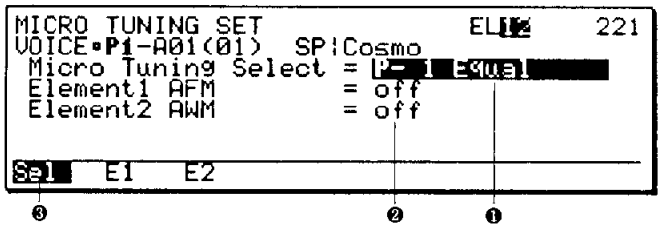
11. Micro tuning

JUMP #221

Summary: Select a micro tuning for the entire voice, and specify whether or not each element will use this micro tuning.

Procedure:

From: Voice Common job directory (JUMP #201)
Select: job 11:McrTune (JUMP #221)
Specify: the micro tuning, and element micro tuning on/off



❶ Micro Tuning Select (I-1, I-2, C-1, C-2, P-1... P-64): Select a micro tuning to be used by the voice. 64 micro tuning memories are preset inside the TG77 (see the following remarks). Two of your own micro tunings can be stored in Internal memory, and a card can accommodate another two micro tunings. Internal voices cannot use card micro tunings, nor can card voices use internal micro tunings.

❷ Element 1–4 (off, on): When this is turned on, the element will use the micro tuning selected by Micro Tuning Select. When this is turned off, the element will use equal temperament scale instead of the selected micro tuning.

❸ Pressing F1 (Sel) will move the cursor to Micro Tuning Select. Pressing F2–F5 will move the cursor to Element 1–4.

Remarks: As with Pan data, Micro Tuning data is not part of the voice. This Micro Tuning Select setting merely specifies which micro tuning will be used.

The sixty four micro tunings preset inside the TG77 are as follows.

01 Equal temperament: The "compromise" tuning used for most of the last 200 years of Western music, and found on most electronic keyboards. Each half step is exactly 1/12th of an octave, and music can be played in any key with equal ease. However, none of the intervals are perfectly in tune.

02–13 Pure major (C...B): This tuning is designed so that most of the intervals (especially the major third and perfect fifth) in the major scale are pure. This means that other intervals will be correspondingly out of tune. You need to specify the key (C...B) you will be playing in.

14–25 Pure minor (A...G#): The same as Pure Major, but designed for the minor scale.

26–37 Mean tone (C...B): This is an adjustment of the Pure and Pythagorean tunings. The interval between the root and fifth is tuned slightly flat, so that the interval between the root and second degree is exactly halfway between a major and minor pure second; i.e., an average or "mean".

38–49 Pythagorean (C...B): This scale is derived by tuning pure perfect fifths upward from the root. This causes the octave to be flat, so one of the fourths is mistuned to compensate. (In the key of C, the Ab – Eb interval.)

50 Werckmeister: Andreas Werckmeister, a contemporary of Bach, designed this tuning so that keyboard instruments could be played in any key. Each key has a unique character.

51 Kirnberger: Johan Philipp Kirnberger was also concerned with tempering the scale to allow performances in any key.

52 Vallotti & Young: Francescantonio Vallotti and Thomas Young (both mid-1700s) devised this adjustment to the Pythagorean tuning in which the first six fifths are lower by the same amount.

53 1/4 shifted equal: This is the normal equal tempered scale shifted up 50 cents.

54 1/4 tone: Twenty-four equally spaced notes per octave. (Play twenty-four notes to move one octave.)

55 1/8 tone: Forty-eight equally spaced notes per octave. (Play forty-eight notes to move one octave.)

56 JustAdjust: This is a special tuning used to make fine adjustments in the pitch of an AWM waveform.

57 Big Chord: The pitch is adjusted down one octave for every 8 half notes, allowing chords to be played anywhere without becoming overly heavy.
58 Log Equal: A variation of conventional equal temperament.
59 1/4 Tonelo: The same as micro tuning 54, but lower in pitch.
60 Harmonic A: The white keys will play the harmonic series beginning on A, and the black keys will play the harmonic series beginning on E.
61 Reverse: The conventional equal tempered scale is inverted.
62 Far East: The black keys and white keys will each play a different eastern scale.
63 Blue: The white keys will play the blues scale. The black keys add a blue flavor
64 EP AWM2: This is a special tuning used in preset voice P1-B15 EP:Dynomod.

Editing: To edit the currently selected Internal micro tuning, press F8 (Edit). Preset or Card micro tunings cannot be edited. If you want to edit a preset or card micro tuning, you must first copy it to an internal micro tuning memory.

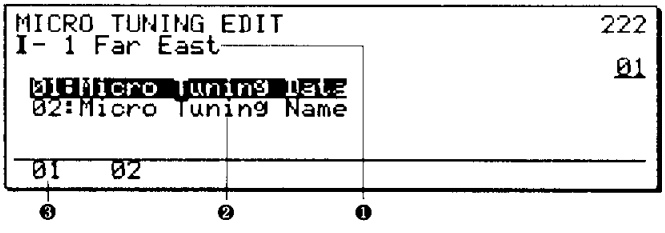
COMMON DATA / MICRO TUNING SET

11.0 Micro tuning edit

JUMP #222

Summary: This function allows you to edit the currently selected Micro Tuning data.
Procedure:
From: Voice Common job 11. Micro Tuning Set (JUMP #221)
When: an Internal micro tuning is selected
Press: F8 (Edit) (JUMP #222)
Select: the micro tuning data you wish to edit

Editing is possible only when an Internal micro tuning memory is selected. If you want to edit a Preset or Card micro tuning memory, press COPY to copy it to an Internal micro tuning memory as explained in the following section 11.0.1 Copy Micro Tuning.



❶ The number and name of the currently selected Micro Tuning data are displayed.
❷ Move the cursor in this area to select a job, and press ENTER.
01: Micro Tuning Data: Edit the tuning for each note of the scale. See 11.1 Micro Tuning Data.
02: Micro Tuning Name: Assign a ten-character name to the micro tuning data. See 11.2 Micro Tuning Name.
❸ Pressing F1 or F2 will select the corresponding job.

COMMON DATA / MICRO TUNING SET

11.0.1 Copy micro tuning

Summary: This function copies micro tuning data from another memory into an Internal micro tuning memory.

Procedure:

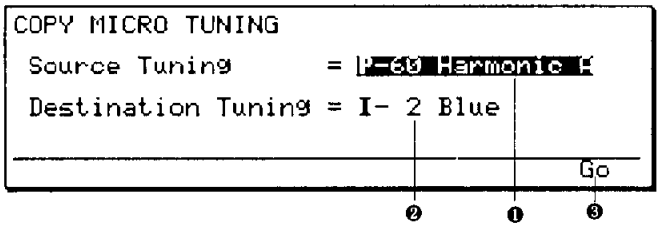
When: editing micro tuning data (JUMP #223, #224)

Press: COPY to get the following display.

Select: the micro tuning copy source and destination

To copy: the data press F8

To quit: without copying press EXIT



❶ Source Tuning (I-1, I-2, C-1, C-2, P-1...P-64): Select the micro tuning data to copy. C-1 and C-2 (card) can be selected only if a VOICE card is inserted.

❷ Destination Tuning (I-1, I-2): Select the micro tuning (internal 1 or 2) into which to copy the Source Tuning data.

❸ After selecting Source Tuning and Destination Tuning, press F8 (Go) to copy the data. You will be asked "Are you sure?". Press YES and the data will be copied.

Remarks: Only Internal micro tuning data can be edited. If you want to edit one of the preset or card micro tunings, use this function to copy it into an Internal micro tuning memory.

COMMON DATA / MICRO TUNING SET

11.1 Micro tuning data

JUMP #223

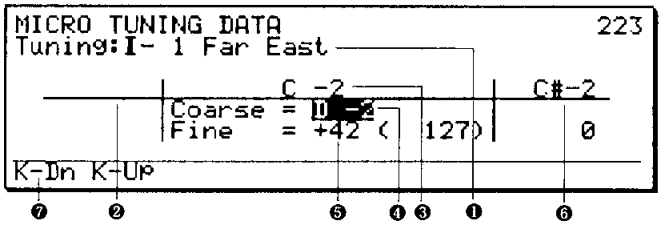
Summary: Edit the tuning for each note of the selected micro tuning data.

Procedure:

From: Micro Tuning Edit job directory (JUMP #222)

Select: 01:Micro Tuning Data (JUMP #223)

Specify: the tuning for each note



❶ The number and name of the micro tuning data being edited are displayed.

❷ The previous note and its absolute tuning value.

❸ The note whose tuning you are editing.

❹ Coarse Tuning (C#-2...G8): With the cursor located at Coarse, adjust the tuning of the currently edited note in half steps.

❺ Fine Tuning (–43 or –42...+42): With the cursor located at Fine, adjust the tuning of the currently edited note in fine steps of 1.171875 cents. The absolute tuning value displayed in parentheses indicates the number of these steps starting from 0 steps at C#-2. The lowest setting of this parameter will be either –43 or –42 depending on the Coarse Tuning value.

❻ The next note name and its absolute tuning value.

❼ Pressing F1 (K-Dn) or F2 (K-Up) will move to the previous or next note. You can also play a note on your MIDI keyboard to select a note at any time.

Remarks: First use F1 (K-Dn) and F2 (K-Up) to select the note whose tuning you want to edit. You can also use your MIDI keyboard to select the note. The currently edited note will appear in the center of the display, with the previous note shown at left and the next note shown at right.

Next set the Coarse and Fine tuning for the selected note. If you adjust Fine Tuning beyond the range of ±42, the Coarse Tuning will be moved up or down as appropriate.

COMMON DATA / MICRO TUNING SET

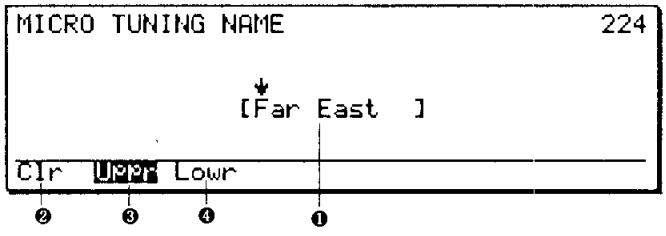
11.2 Micro tuning name

JUMP #224

Summary: Specify a ten-character name for the internal Micro Tuning memory being edited.

Procedure:

From: Micro Tuning Edit job directory (JUMP #222)
Select: 02:Micro Tuning Name (JUMP #224)
Specify: a name for the micro tuning data



❶ Enter a ten-character name for the Micro Tuning data.
❷ To clear the currently entered name press F1 (Clr).
❸ To switch to upper-case characters press F2 (Uppr).
❹ To switch to lower-case characters press F3 (Lowr).

Remarks: Methods of entering character data are explained in *Introducing the TG77, How to use the numeric key pad,* on page 30.

COMMON DATA

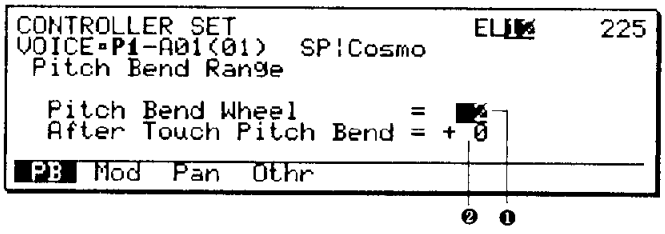
12. (F1) Controller set (Pitch bend)

JUMP #225

Summary: Specify the range over which the pitch bend wheel and channel aftertouch of your MIDI keyboard will affect the pitch.

Procedure:

From: Common Data job directory (JUMP #201)
Select: job 12:Cntrllr
Press: F1 (PB) (JUMP #225)
Specify: the pitch bend effect of the pitch bend wheel and aftertouch



❶ Pitch Bend Wheel (0...12): This determines the range (0...12 half steps) over which the pitch bend wheel will affect the pitch. When this is set to 12, the pitch bend wheel will move the pitch one octave up or down. When this is set to 0, the pitch bend wheel will have no effect.
❷ After Touch Pitch Bend (–12...+12): This determines how aftertouch will affect the pitch. Pressing strongly down on the keyboard after playing a note will move the pitch down one octave (with a maximum setting of –12) and up one octave (with a maximum setting of +12). Make sure that your keyboard is transmitting Channel Aftertouch. The TG77 does not respond to Polyphonic Aftertouch.

COMMON DATA

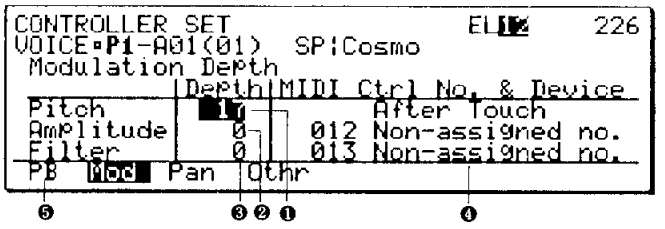
12. (F2) Controller set (Modulation)

JUMP #226

Summary: Specify the controller device that will add vibrato (pitch modulation), tremolo (amplitude modulation), and wah-wah (filter modulation).

Procedure:

From: Common Data job directory (JUMP #201)
Select: job 12:Cntrllr
Press: F2 (Mod) (JUMP #226)
Specify: the controller and depth for each parameter



❶ Pitch Modulation Depth (0...127): This setting determines the range over which the specified device will add vibrato (pitch modulation). For a setting of 127, the selected controller will be able to add the maximum amount of vibrato. For a setting of 0, the selected controller will not be able to add vibrato.

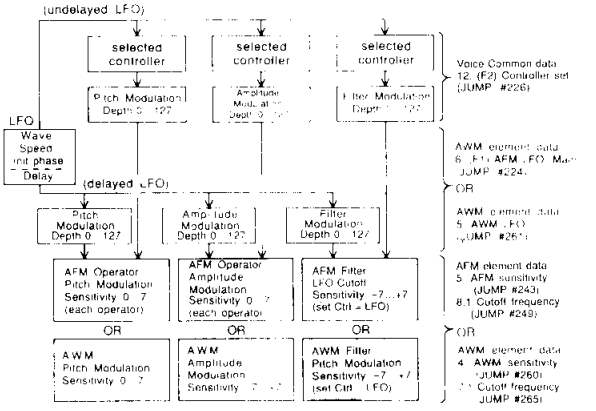
❷ Amplitude Modulation Depth (0...127): This setting determines the range over which the specified device will add tremolo (amplitude modulation). Details are the same as in ❶.

❸ Filter Modulation Depth (0...127): This setting determines the range over which the specified device will add wah-wah (filter modulation). Details are the same as in ❶.

❹ MIDI Ctrl No. & Device (0...120, After Touch): These settings determine the controller devices that will add Pitch modulation, Amplitude modulation, and Filter modulation. The selected MIDI control number (0...120) is displayed at the left, and the function which is defined for that number is displayed at the right.

❺ To make controller settings for Pitch Bend, Pan, or Other, press F1, F3, or F4. Refer to sections 12.(F1), 12.(F3), or 12.(F4).

Remarks: As shown by the following diagram, the controllers selected here will be able to *add* pitch, amplitude, and filter modulation *in addition to* the pitch, amplitude, and filter modulation specified by the PModDepth, AModDepth, and FModDepth settings of each element LFO. The effect of the resulting modulation will depend on the *sensitivity* settings of each element.



MIDI control number and device: MIDI implementation chart in the back of the owners manual for your MIDI keyboard will list the Control Change messages it is able to transmit. The official MIDI standard does not define the purpose of all of the MIDI Control Change messages 0–120. If the purpose of the selected control number is not defined by the standard, the LCD will show "Non-assigned no.". If your MIDI keyboard is able to transmit control change messages of these numbers, you can use them just like any other control number. "Non-assigned no." simply means that there is yet no official agreement as to the use of that control number.

Since the MIDI standard defines Aftertouch not as a control change but as a different type of message, it has no control number.

COMMON DATA

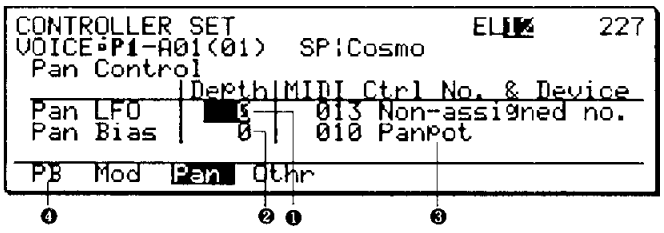
12. (F3) Controller set (Pan)

JUMP #227

Summary: Specify the controller device that will regulate the depth of the cyclical panning movement (Pan LFO), and the controller that will directly adjust the pan position (Pan Bias).

Procedure:

From: Voice Common job directory (JUMP #201)
Select: job 12:Cntrllr
Press: F3 (Pan) (JUMP #227)
Specify: the controller and depth for each parameter



❶ Pan LFO Depth (0...127): This determines the range over which the specified controller will regulate the depth of the Pan LFO. When this is set to 127, the selected controller will regulate LFO panning over the full range from no LFO panning to maximum LFO panning. When this is set to 0, the selected controller will have no effect on LFO panning.

❷ Pan Bias Depth (0...127): This determines the range over which the specified controller will affect pan position.

❸ MIDI Ctrl No. & Device (0...120, After Touch): These settings determine which controllers will regulate the depth of LFO panning and Pan Bias.

❹ To make controller settings for Pitch Bend, Modulation, or Other, press F1, F2, or F4. Refer to sections 12. (F1), 12. (F2), or 12. (F4).

MIDI Ctrl No. & Device: For details refer to *12. (F2) Controller set (Modulation).*

***Note:** When a voice is used in Multi Play mode, these Pan Control settings will be effective only if the Static Pan is set to Voice. Refer to Multi Edit 5. Voice static pan (JUMP #408, #409).*

COMMON DATA

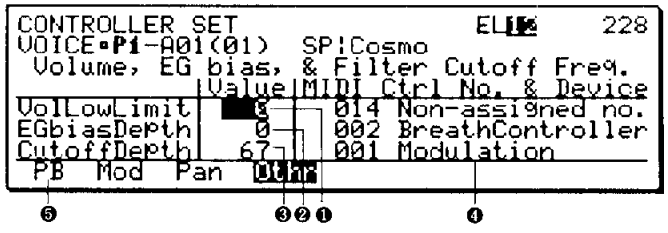
12. (F4) Controller set (Other)

JUMP #228

Summary: Specify controller devices that will regulate the volume, the EG bias and the Cutoff Frequency of the filters in each element of the voice.

Procedure:

From: Voice Common job directory (JUMP #201)
Select: job 12:Cntrllr
Press: F4 (Othr) (JUMP #228)
Specify: the controller and depth for each parameter



❶ VolLowLimit (Volume Low Limit 0...127): This determines the lowest volume that can be set by the specified controller. For example when this is set to 80, the controller will reduce the volume no lower than 80. When this is set to 0, the controller can reduce the volume to silence. When this is set to 127, the controller will have no effect on the volume. The MIDI standard defines Control Change number 7 as MIDI volume. If you select control change 7 for VolLowLimit, the controller will regulate volume over the full range regardless of the "Value" setting. The LCD will display "Limit ignored!" to remind you of this.

❷ EGbiasDepth (EG Bias Depth 0...127): This determines the range over which the specified controller will control the EG bias. The result of controlling EG Bias for an AFM element will depend on the AModSens setting for each operator. If AModSens is set for carrier operators, the controller assigned to EG Bias will affect the volume of an AFM element. If AModSens is set for modulator operators, the controller assigned to EG Bias will affect the tone of an AFM element. For details refer to Voice AFM Element job 5. Sensitivity. For an AWM element, this setting will affect the Volume.

❸ CutoffDepth (Filter Cutoff Depth 0...127): This determines the range over which the specified controller will increase the cutoff frequency specified for the filters of each element. Higher settings will allow the controller to brighten the tone. If the filter cutoff frequencies are already at maximum, this will have no effect. See the remarks below for details.

❹ MIDI Ctrl No. & Device (0...120, Aftertouch): These settings determine which controllers will regulate each parameter.

❺ To make controller settings for Pitch Bend, Modulation, or Pan, press F1, F2, or F3. Refer to sections 12. (F1), 12. (F2), or 12. (F3).

MIDI Ctrl No. & Device: For details refer to *12. (F2) Controllers set (Modulation).*

Filter Cutoff Depth: The controller assigned to CutoffDepth can be used in two ways to affect the filter, depending on the Control Source setting of each filter. Refer to *Voice AFM Element 8.3 Cutoff EG* or *Voice AWM Element 7.3 Cutoff EG.*

- Continuously control the filter cutoff: If the Control Source of a filter is set to LFO then the controller assigned to CutoffDepth can be used to continuously control the cutoff frequency even while a note is sounding.
- Control the filter cutoff at key-on: If the Control Source of a filter is set to EG or EG-VA then the controller assigned to CutoffDepth will be used only at the instant the note is played; i.e., after playing a note you can move the controller without affecting the sound. This can be used to give different filter cutoffs to individual notes as you play them.

COMMON DATA

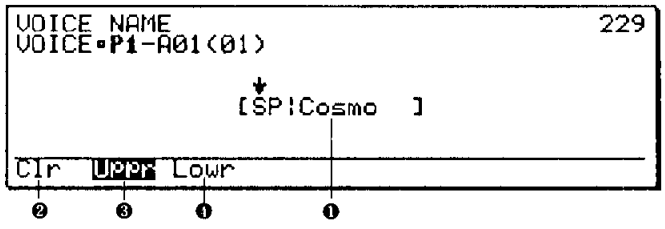
13. Voice name

JUMP #229

Summary: Specify a ten-character name for the voice being edited. In voice play mode, this voice name will be displayed in large characters.

Procedure:

From: Voice Common job directory (JUMP #201)
Select: job 13:Name (JUMP #229)
Specify: the voice name



❶ Enter a ten-character name for the voice.
❷ To clear the currently entered name press F1 (Clr).
❸ To switch to upper-case characters press F2 (Uppr).
❹ To switch to lower-case characters press F3 (Lowr).

Remarks: Methods of entering character data are explained in *Introducing the TG77, How to use the numeric key pad,* on page 30.

COMMON DATA

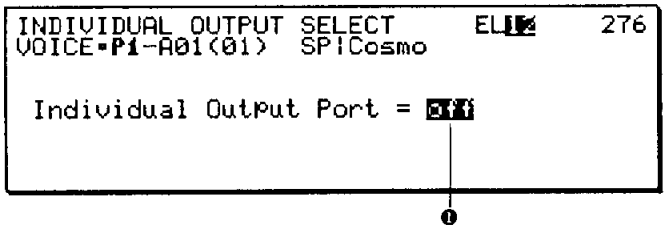
14. Individual output select

JUMP #276

Summary: Specify an individual output port 1–8 from which the un-panned un-processed sound of the voice will be output.

Procedure:

From: Voice Common job directory (JUMP #201)
Select: job 14:IndOut (JUMP #276)
Specify: the individual output port



❶ Individual Output Port (off, 1...8): Select the individual output port from which the voice will be output. The output is taken from before the element pan, and therefore is not affected by Pan nor Effect settings. When a voice is used in a multi, this voice parameter setting will be ignored, and the individual output port settings for each voice of the multi will be used instead. Refer to *Multi edit, 9. Voice individual output select* on page 165.

Note:

It is not possible for a voice to be output both from a stereo output group and from an individual output.

- *If the Individual Output Port is set to 1–8, (i.e., other than "off"), no sound will be output from the stereo output group selected in Common data, 7. Output group select (see page 97).*
- *If Common data, 7. Output group select is "off", no sound will be output from an Individual Output Port.*

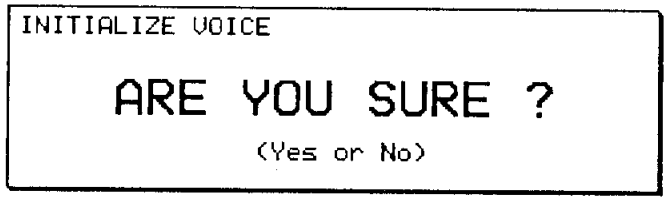
COMMON DATA

15. Initialize voice

Summary: Initialize the Voice Common data being edited to a set of standard values. The Voice Mode will not change.

Procedure:

From: Voice Common job directory (JUMP #201)
Select: job 15:Init
To execute: initialization press YES
To quit: without initializing press NO



This function sets all voice common data values to the minimum or simplest possible setting. When creating your own new voices, it is usually best to begin by editing an existing voice. However if you want to start from scratch, this Initialize function can often be helpful.

If you are sure you want to initialize the voice data, press YES and the voice common data of the voice being edited will be set to the values shown below. If you decide not to initialize, press NO.

This function initializes only Voice Common data. Other initialize functions are provided for initializing AFM Element or AWM Element data. Refer to *Voice AFM Element 15. Initialize* or *Voice AWM Element 15. Initialize*.

Initialized settings for Voice Common Data

01 Element Levels
Voice Volume = 127
Element level = 127 (all elements)

02 Element Detune
Element detune = ±0 (all elements)

03 Element Note Shift
Shift = ±0 (all elements)

04 Element Note Limit
Low Limit = C-2 (all elements)
High Limit = G8 (all elements)

05 Element Velocity Limit
Low Limit = 1
High Limit = 127

06 Element Dynamic Pan
Element Preset 1-01 "Center" (all elements)
(Pan Source = velocity, Source Depth = 0,
Pan EG; HT=0, R1–RR2=63, L0–RL2=0, SLP=S1)

07 Output Select
Output Group = Both (all elements)

08 Random Pitch
Random Pitch Depth = 0

09 Portamento
Mode = Follow (poly)/ Fingered (mono)
Speed = 0

10 Effect Set
Effect Mode = off
Stereo Mix = 1 and 2 both on
Effect Type = 00:through (all effects)
Effect Balance = 100% (all effects)
Output Level = 100% (all effects)

11 Micro Tuning Set
Preset–01 Equal Temperament
Element = off (all elements)

12 Controller Set
Pitch Bend Wheel Depth = 2
Aftertouch Pitch Bend Depth = 0
Pitch Modulation Depth = 64
Pitch Modulation Device = 1
Amplitude Modulation Depth = 64
Amplitude Modulation Device = 12
Filter Modulation Depth = 0
Filter Modulation Device = 1
Pan LFO Depth = 64
Pan LFO Device = 13
Pan Bias Depth = 0
Pan Bias Device = 10
Volume Low Limit = 0
Volume Low Device = 14
EG Bias Depth = 0
EG Bias Device = 2
Filter Cutoff Frequency Depth = 0
Filter Cutoff Frequency Device = 12

13 Name Voice
Name = INIT VOICE

14 Individual Output Select = off

COMMON DATA

16. Recall voice

Summary: Recall the previously edited voice data.
Procedure:

From: Voice Common job directory (JUMP #201)
Select: job 16:Recall
To recall: the data press YES
To quit: without recalling press NO

RECALL VOICE

ARE YOU SURE ?

(Yes or No)

If after editing a voice you exit voice edit mode without storing, the edited voice data will be lost. In such cases, you can use this function to recall the previously edited voice data into the editing buffer.

If you are sure you want to recall, press YES and the previously edited voice data will be recalled into the editing buffer. If you decide not to recall, press NO.

This function recalls all voice data; element data as well as common data. The same function is also available when editing AFM Element or AWM Element data.

AFM element data

AFM ELEMENT DATA

AFM element job directory

JUMP #230

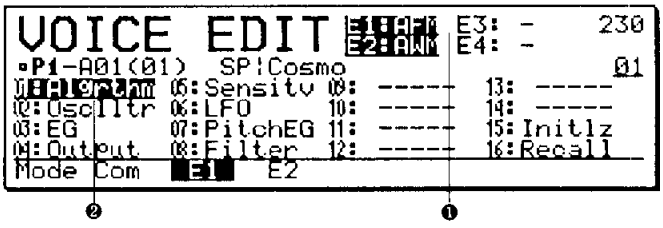
Summary: This job directory shows the editing jobs for an AFM element.

Procedure:

From: voice edit mode (JUMP #200 or #201)

When: editing a normal voice that contains AFM elements

Select: an AFM element F3–F6 (JUMP #230) (E1–E4).



❶ This area shows the number (1–4) and type (AFM or AWM) of elements in the selected voice mode.

❷ Move the cursor in this area to select a job and press ENTER to go to the selected job.

01:Algrthm (Algorithm):

F1; The algorithm determines how the six operators are connected. Three feedback sources can be selected and sent to other operators.

F2; Each operator can be modulated from an external source such as an AWM waveform or the noise generator.

F3; Each operator has two inputs In1 and In2 with input levels settings for each input.

02:Oscllt (AFM oscillator): The frequency produced by each operator can either be fixed or made to change according to the note played.

03:EG (AFM operator EG):

F1; Make operator EG settings for an individual operator while viewing a graphic display.

F2; Make operator EG settings for all operators.

04:Output (AFM operator output):

F1; The output level of each operator can be made to vary across the keyboard.

F2; The output level of each operator can be set.

05:Sensitv (AFM sensitivity): The output level and frequency of each operator can be affected by key-on velocity or the LFO, and the EG rates of each operator can also be affected by key-on velocity.

06:LFO (AFM LFO):

F1; The Main LFO is used to create tremolo (amplitude modulation), vibrato (pitch modulation), or wah-wah (filter modulation).

F2; The Sub LFO is used to create vibrato (pitch modulation).

07:PitchEG (AFM pitch EG): The pitch EG creates a fixed shape of pitch change over time, and can be switched on/off for each operator.

08:Filter (AFM filter): The two filters of each element can be used to control the tone in various ways. The filter EG creates a fixed pattern of tonal change over time, and a cyclically repeating signal from the LFO can be applied to the filter to create wah-wah.

15:Initlz (Initialize AFM element): The AFM element data being edited can be set to the minimum or simplest possible setting as a convenience when creating an element from scratch.

16:Recall (Recall voice): All data of the previously edited voice.

AFM ELEMENT DATA

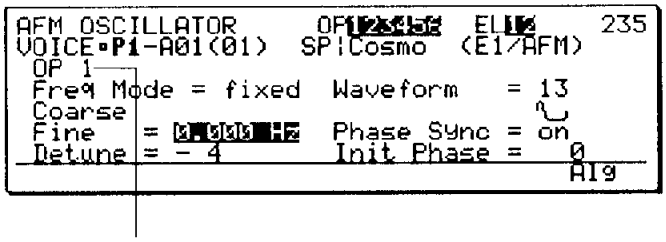
Operator select

Summary: Any time while editing an AFM parameter which is set independently for each operator, you can select the operator 1–6 to view and edit. However this is not possible if the LCD shows all six operators at once.

Procedure:

From: AFM element jobs
(JUMP #235, 236, 237, 241)

Press: the OPERATOR key while holding the BANK/SELECT key to cycle through operators 1–6.



The selected operator is displayed in the LCD.

Remarks: It is not possible to select an operator which has been turned off.

AFM ELEMENT DATA

Operator on/off

Summary: Any time while editing an AFM element, you can turn the output of each operator off/on. This is useful when you want to hear how each operator affects the others, or when you want to hear only certain operators.

Procedure:

From: any job in the AFM job directory

Press: the numeric keys 1–6 while holding the OPERATOR key to turn operators 1–6 off/on.

The on/off condition of each operator is shown in the upper right of the LCD when editing an AFM element. Operators that are on are displayed in inverse.

Remarks: If you turn off all the carrier operators there will be no sound.

This function is provided for convenience of editing. Operator on/off settings are not stored as part of voice data.

When you select a different AFM or AWM element or exit element editing, all operators you turned off will be turned back on.

AFM ELEMENT DATA

AFM algorithm

JUMP #234

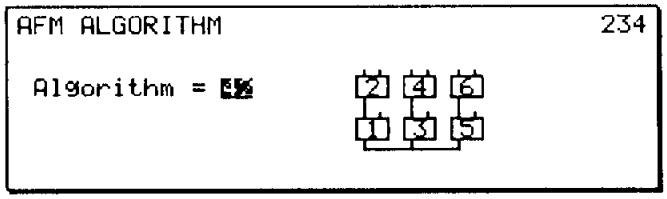
Summary: You can view a graphic display of the current algorithm at any time while editing an AFM element and select a different algorithm if you wish. Since the algorithm determines how each operator functions, you should always be aware of the algorithm when editing AFM operator data.

Procedure:

From: any job in the AFM job directory (JUMP #231–#255)

Press: F8 (Alg) (JUMP #234)

To exit: to the previous editing job press EXIT



To return to the previous display, press EXIT.

Note: When you select an algorithm, all settings which modify the routings in the algorithm (feedback, input, etc.) will be cleared to their initial settings.

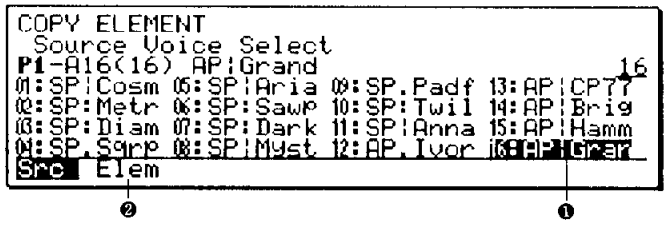
AFM ELEMENT DATA

Copy element

Summary: While editing AFM element parameters other than EG, Output, Filter, or Effect, you can copy data from an element of another voice to the element you are now editing.

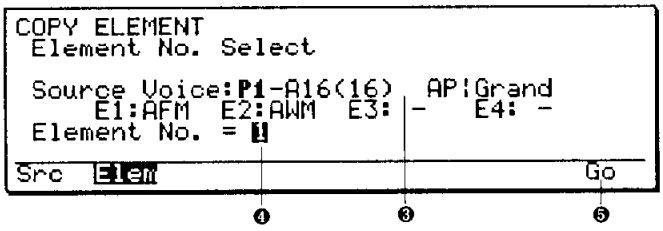
Procedure:

From: AFM element job 1, 2, 6, or 7
Press: COPY
Press: F1 (Src) and select the source voice
Press: F2 (Elem) and select the source element
To execute: the copy operation press F8 (Go)



❶ Use the MEMORY button, BANK/SELECT button, DATA ENTRY slider, -1 +1 keys, or the numeric keypad to select a voice from which to copy an element. If you select a voice which contains no elements of the same type (AFM or AWM) as the voice you are editing, the bottom line of the LCD will show "Element type mismatch!".

❷ When you have selected a voice from which to copy an element, press F2 (Elem).



❸ Source Voice: The selected source voice and the number and type of elements are displayed.

❹ Element No.: Select the element from which to copy. You will only be able to select elements of the same type (AFM or AWM) as the element you were editing when you entered this Copy Element function.

❺ After specifying the source voice and element, press F8 (Go). The display will ask "Are you sure?". If you are sure you want to copy the element data then press YES, and the data will be copied.

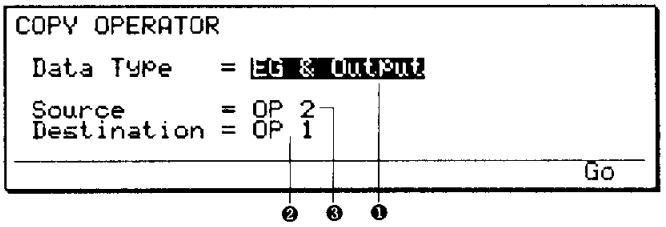
AFM ELEMENT DATA

Copy operator

Summary: While editing the parameters for operator EG or Output, you can copy EG and Output data from one operator to another.

Procedure:

From: AFM element job 3 or 4 (JUMP #236–242)
Press: COPY
Select: the data type, source operator, and destination operator
To execute: the copy operation press F8 (Go)



❶ Data Type: Select one of the following types of data to be copied.
EG&OUTPUT: Envelope generator, output level and scaling
EG: Envelope generator
OUTPUT: Output level and scaling

❷ Source: The specified data will be copied from this operator.

❸ Destination: The specified data will be copied to this operator.

Remarks: It is often the case that many or all operators in a voice have similar settings, especially for EG parameters. In such cases you can save time by setting the average EG for the voice on one operator, and then copying it to the others.

AFM ELEMENT DATA

1. (F1) AFM algorithm (Form)

JUMP #231

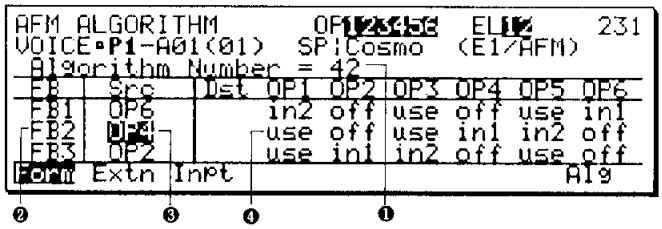
Summary: Select the Algorithm and specify feedback routings between operators.

Procedure:

From: AFM Element job directory (JUMP #230)

Select: job 01:Algrthm., and press F1 (Form) (JUMP #231)

Specify: the algorithm number, and feedback sources and destinations



❶ Algorithm Number (1...45): Select the algorithm to determine the "arrangement" of the six operators in an AFM element. Refer to the following chart of the 45 algorithms. When you change the Algorithm, the Src ❸ and Dst ❹ settings explained below and the external input settings explained in the following section will be initialized.

❷ FB1–FB3: Feedback can be drawn from three of the operators in the algorithm and applied to any operator that has an unused input.

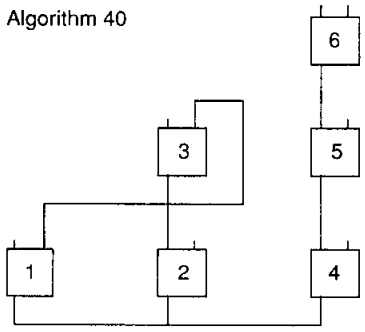
❸ Src 1–3 (OP1...OP6): Select the source of feedback for the three feedback routings. Any operator can be selected as the source of feedback. (In some algorithms, one or more feedback sources may be fixed by the choice of algorithm, and cannot be changed. In such cases, an "F" will be displayed after the Source (e.g., OP3F) and the Destination operator explained in ❹ will be displayed in uppercase characters (e.g., IN1)

❹ Dst OP1...OP6 (in1, in2): Select the destination of each feedback source. Each feedback source can be sent to as many destinations as you like. Each operator has two inputs, and an operator can be selected as a feedback destination only if at least one of its inputs is free. It makes no difference whether in1 or in2 is used, but remember that the input levels of each operator are set independently for in1 and in2. Refer to the following section 1. (F3) AFM algorithm (Input level).

If both inputs of an operator are already used by the algorithm connection, or if both inputs are already used because of a feedback assignment, "use" will be displayed. If the algorithm has a fixed feedback loop, the feedback destination operator will be displayed in uppercase characters (e.g., IN1). The cursor cannot be moved to the Dst setting for such operators.

Having three selectable feedback sources which can be sent to any or all other operators allows you to connect the operators in very complex ways. The following diagrams show how the operators would be connected for algorithm 40 when feedback sources and destinations are set as shown in the following table. Thin lines indicate the connections defined by the algorithm, and heavy lines indicate the feedback connections. Whether a connection between two operators is the result of the algorithm or the result of feedback routing has no influence on the sound.

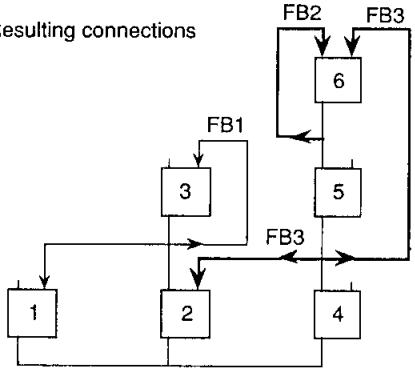
Algorithm 40



Feedback settings

FB	Src	Dst	OP1	OP2	OP3	OP4	OP5	OP6
FB1	OP3F		off	use	IN2	off	off	use
FB2	OP6		off	use	off	off	off	in1
FB3	OP5		off	in2	off	off	off	in2

Resulting connections



Note: *If a carrier operator is used as a feedback source, the amount of feedback will vary depending on the number of carriers, since carrier output levels are automatically adjusted according to the number of carriers.*

Remarks: In previous Yamaha 6-operator FM synthesizers, you had a choice of 32 algorithms each of which included one feedback loop. The TG77 provides broader possibilities with 45 algorithms, and three feedback loops that can be sent to more than one operator. In addition, operators can be modulated by external waveforms.

AFM ELEMENT DATA

1. (F2) AFM algorithm (External input)

JUMP #232

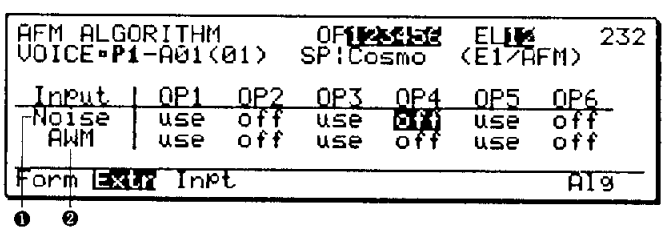
Summary: Modulate an operator from an external source such as AWM waveform or the noise generator.

Procedure:

From: AFM Element job directory (JUMP #230)

Select: job 01:Algrthm., and press F2 (Extn) (JUMP #232)

Specify: noise and/or AWM input for each operator

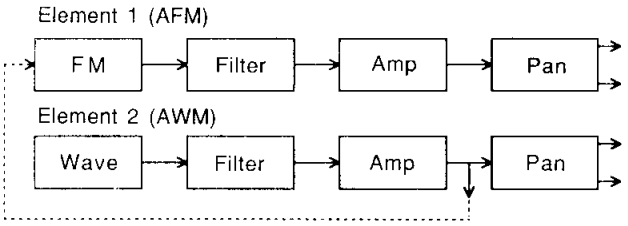


❶ Noise (off, in1, in2): The TG77 contains a noise generator which produces a type of white noise. This can be sent to any free operator input to modulate the operator.

❷ AWM (off, in1, in2): If the voice contains both AFM and AWM elements (ie., if the voice mode is either 9:1AFM&1AWM or 10:2AFM&2AWM), an AWM waveform can be received at any free operator input to modulate the operator. Since the AWM signal is taken from the point after *Common data 1. Element Level* (JUMP #202), the AWM element level must be above 0. If you wish to use the AWM waveform only to modulate an AFM operator, and do not wish to hear the straight AWM sound, turn off the AWM element in *Voice common 7. Output group select* (JUMP #208).

For voice mode 9:1AFM&1AWM, the waveform of AWM element 2 will be used to modulate AFM element 1. For voice mode 10:2AFM&2AWM, the waveform of AWM element 3 will be used to modulate AFM element 1, and the waveform of AWM element 4 will be used to modulate AFM element 2.

❶ and ❷: If both inputs of an operator are already used by the algorithm connection, or if both inputs are already used because of a feedback assignment, "use" will be displayed. The cursor cannot be moved to the Dst setting for such operators.



Remarks: Noise modulation makes it possible to create sounds that were difficult for previous FM synthesizers.

By using an AWM waveform to modulate one or more AFM operators, new harmonics can be added to the AWM sample. A simple example of this is given in *Using RCM Hybrid Synthesis* in the appendix.

AFM ELEMENT DATA

1. (F3) AFM algorithm (Input level)

JUMP #233

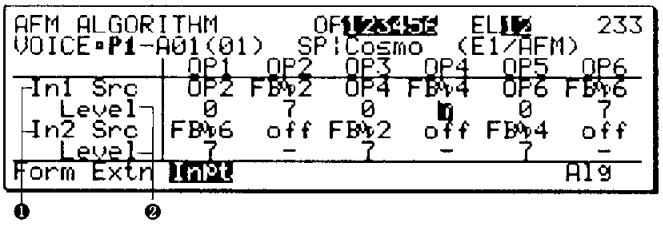
Summary: Set input levels In1 and In2 for each operator.

Procedure:

From: AFM Element job directory (JUMP #230)

Select: job 01:Algrthm. and press F3 (Inpt) (JUMP #233)

Specify: the input level for each operator input



❶ In1 Src, In2 Src: This displays the input sources for input In1 and In2 of each operator, as determined by Algorithm and Feedback settings (F1) and External input settings (F2). The input sources cannot be changed from this job.

❷ In1 Level, In2 Level (0...7): Adjust the input level of In1 and In2 for each operator.
If an operator input is not used, the Src will display "off" and the "Level will display "–". The cursor cannot be moved to the Level setting for such operators.

Remarks: Previous FM synthesizers allowed you to set only the output level of each operator. However on the TG77, the input levels in1 and in 2 of each operator can also be set. If the input source is the feedback from another operator, the input level setting functions as the feedback level.

Correct adjustment of input levels is especially important when bringing in AWM to AFM as a modulator.

AFM ELEMENT DATA

2. AFM oscillator

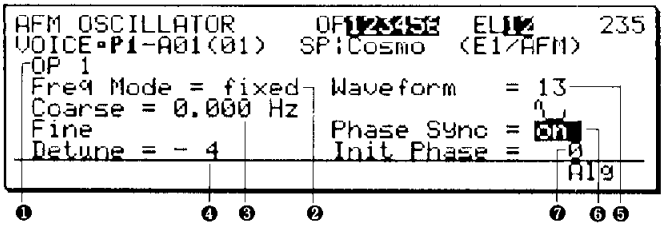
JUMP #235

Summary: Set frequency-related parameters for each operator.

Procedure:

From: AFM Element job directory (JUMP #230)

Select: job 02:Osclltr (JUMP #235)



❶ Operator (1–6): This displays the operator being edited. To move to another operator, hold the BANK/SELECT key and repeatedly press OPERATOR to cycle through operators 1–6.

❷ Freq Mode (fixed, ratio): When "fixed" is selected the operator will produce the same pitch regardless of what note is played. When "ratio" is selected the operator pitch will depend on the note that is played.

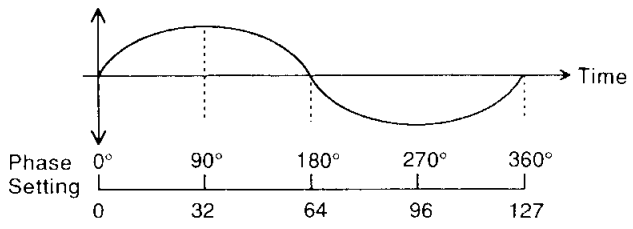
❸ Coarse/Fine (0 Hz...9762 Hz in Fixed Frequency mode, 0.5...61.69 in Ratio Frequency mode): This setting specifies the pitch produced by the operator. By moving the cursor to coarse or fine you can adjust the pitch in large steps or in small steps. When the Freq Mode is set to "fixed" the range is 0 Hz...9762 Hz. When the Freq Mode is set to "ratio" the range is 0.5...61.69. (In "ratio" mode with a Coarse/Fine setting of 1.0 the A3 key will produce the standard pitch of 440 Hz.)

❹ Detune (–15...+15): The pitch of each operator can be adjusted in fine steps of 1.171875 cents.

❺ Waveform (1...16): Each operator can produce sixteen different waveforms; a sine wave with no harmonics, and fifteen other more complex waveforms containing additional harmonics. This allows you to create complex waveforms using fewer operators. A graphic display of the selected waveform is shown below the waveform number. The table below shows the harmonic content of each waveform.

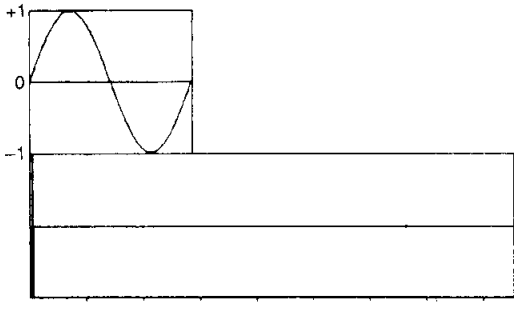
❻ Phase Sync (on, off): When phase sync is on, the selected waveform will be re-started each time a key is pressed.

❼ Init Phase (0...127): This determines the initial phase position from which the selected waveform will be re-started when phase sync is on. The init phase range of 0...127 corresponds to a range of 0...360 degree starting phase. This setting is effective only when Phase Sync is on.

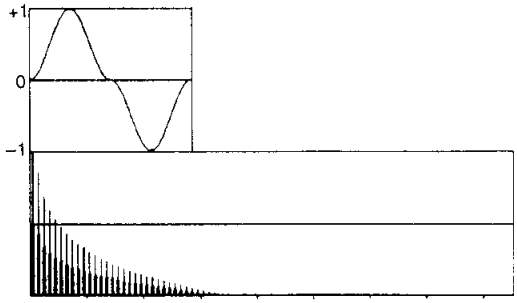


Waveform: The sixteen waveforms that can be produced by each operator are not modeled after any "real" instrument but are mathematical transformations of sinewaves. The following chart shows the harmonic content of each waveform. The amplitude of each harmonic partial is given as a percentage of the fundamental.

1

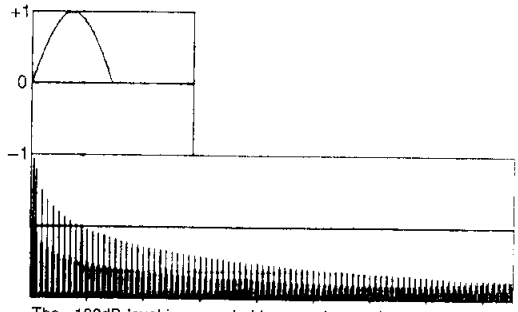


2



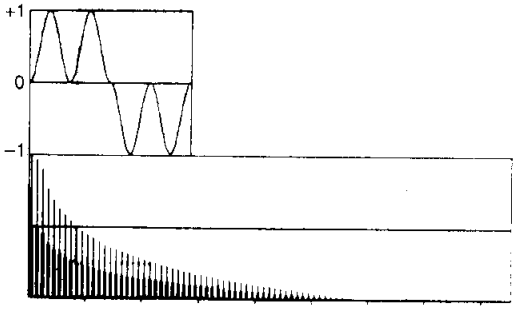
The –100dB level is exceeded by odd harmonics up to the 65th harmonic.

3



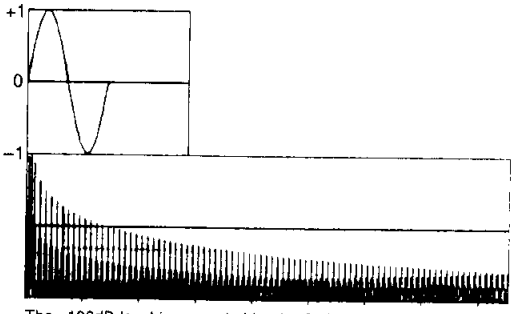
The −100dB level is exceeded by even harmonics up to the 392nd harmonic.

4



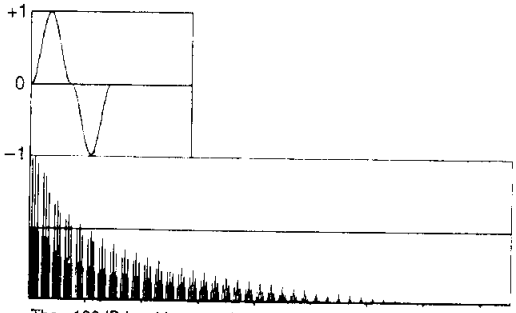
The −100dB level is exceeded by odd harmonics up to the 113th harmonic.

5



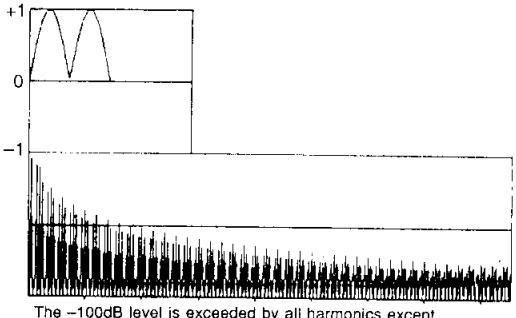
The −100dB level is exceeded by the 2nd harmonic, and all odd harmonics.

6



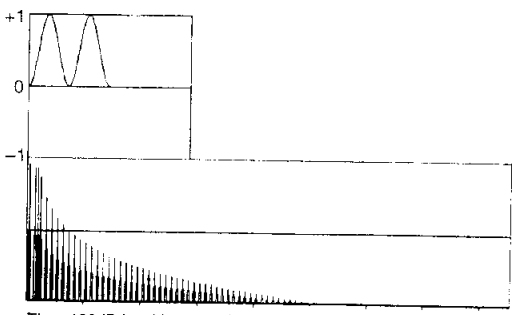
The −100dB level is exceeded by harmonics up to the 130th harmonic. [4th terms do not exist]

7



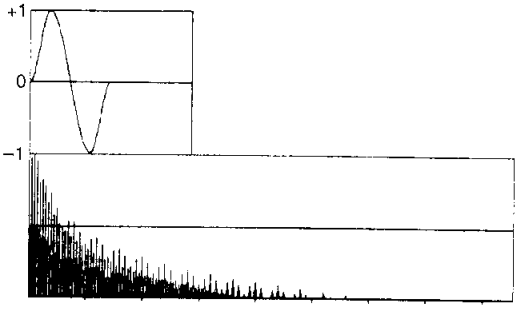
The −100dB level is exceeded by all harmonics except (4n-2) terms which do not exist.

8



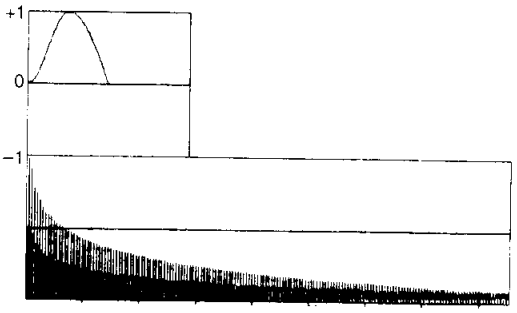
The −100dB level is exceeded by the 4th harmonic, and odd harmonics up to the 99th harmonic.

9



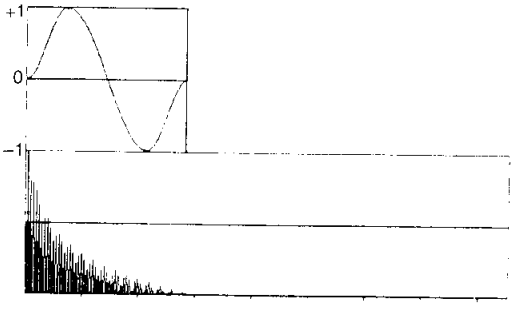
The −100dB level is exceeded by even harmonics up to the 112th harmonic, and odd harmonics up to the 73rd harmonic.

10



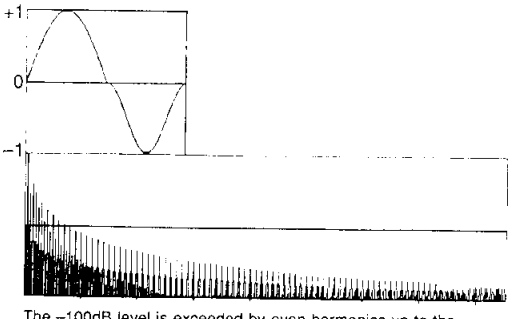
The −100dB level is exceeded by all harmonics up to the 270th harmonic.

11



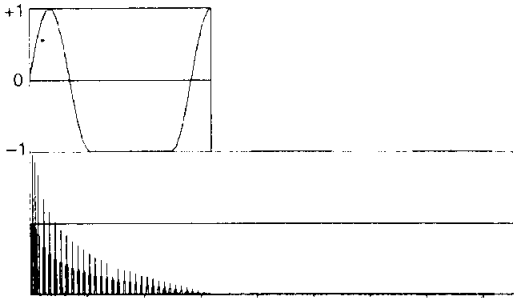
The −100dB level is exceeded by harmonics up to the 66th harmonic.

12



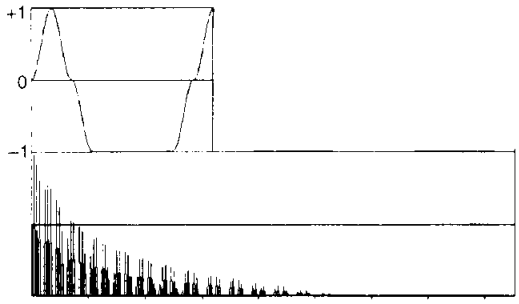
The −100dB level is exceeded by even harmonics up to the 310th harmonic, and odd harmonics up to the 49th harmonic.

13



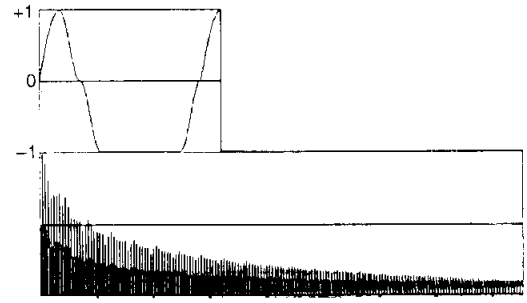
The –100dB level is exceeded by the 21st harmonic, and odd numbered harmonics up to the 63rd harmonic.

14



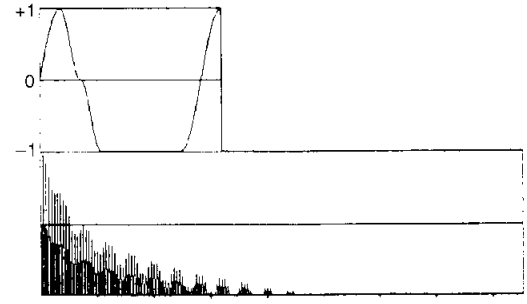
The –100dB level is exceeded by harmonics up to the 105th harmonic. [4th terms do not exist]

15



The –100dB level is exceeded by all harmonics up to the 300th harmonic.

16



The –100dB level is exceeded by harmonics up to the 91st harmonic.

AFM ELEMENT DATA

3. (F1) AFM operator EG (Each operator)

JUMP #236

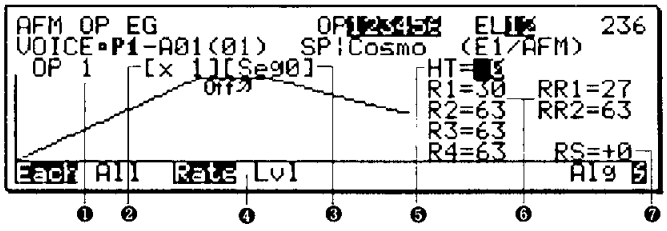
Summary: Make EG settings for a single operator while viewing a graphic display of the operator envelope.

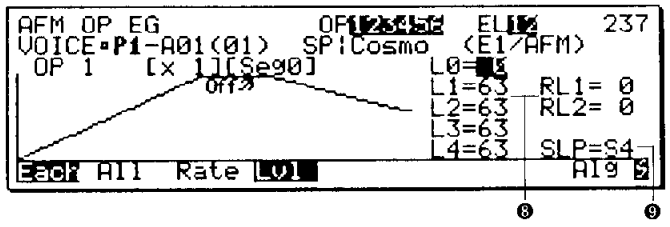
Procedure:

From: AFM Element job directory (JUMP #230)

Select: job 03:EG and press F1 (Each)
EG rates press F3 (Rate) (JUMP#236)
EG levels press F4 (Lvl) (JUMP#237)

Specify: envelope parameters for the selected operator





❶ The number of the currently selected operator is displayed. To move to another operator, hold the BANK/SELECT key and repeatedly press OPERATOR to cycle through operators 1–6.

❷ This indicates the time range of the EG graphic display. A range of "x1" shows the shortest time and gives the greatest detail. To change the range, hold SHIFT and press F1–F6 (x1, x2, x5, x10, x20, x50).

❸ This indicates the segment from which the EG graphic display begins. To shift the display to a different segment, hold SHIFT and press F7 or F8 to select Seg0–Seg4 or Rel1.

❹ Press F3 (Rate) to set EG rates. Press F4 (Lvl) to set EG levels.

❺ HT (Keyon Delay Time 63...0): When this is set to 0, the operator EG will begin immediately after a key is pressed. For higher settings, there will be an increasingly longer delay before the operator EG begins.

❻ R1–R4, RR1–RR2 (Keyon Rates, Release Rates 0...63): Keyon Rates 1–4 and Release Rates 1–2 determine the speed of the operator EG. Higher settings result in faster change.

❼ RS (Rate Scaling –7...+7): Rate Scaling allows the operator EG rates to be increased or decreased depending on the key that is played. For positive settings the EG rates will increase as you play higher notes, resulting in shorter envelopes. For negative settings the EG rates will decrease as you play higher notes, resulting in longer envelopes.

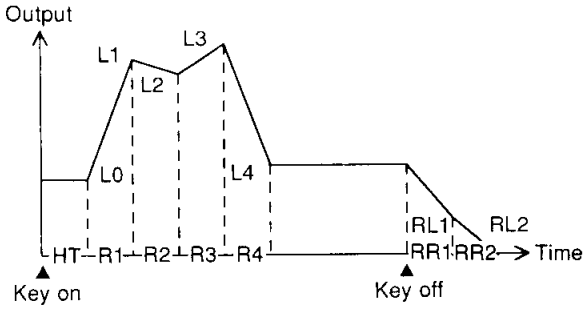
❽ L0–L4, RL1–2 (Keyon Levels, Release Levels 0...63): Keyon Levels 0–4 and Release Levels 1–2 determine the levels of the operator EG.

❾ SLP (Segment Loop Point S1...S4): This specifies the segment from which the EG will continue looping if a key remains depressed after the EG has arrived at level L4.

Rates and Levels: When you press a key, the operator output will be at the level of L0. When the specified hold time (HT) has elapsed, the level will change at the rate of R1 to level L1. When the level reaches L1, it will change at the rate of R2 to the level of L2. When the level reaches L2, it will change at the rate of R3 to the level of L3. When the level reaches L3, it will change at the rate of R4 to the level of L4. When the level reaches L4, the EG will begin looping from the specified segment.

When you release the key, the level will change at the rate of RR1 to the level of RL1. When the level reaches RL1, it will change at the rate of RR2 to the level of RL2.

Remember that Hold Time (HT) is a *time* setting, but the various Rates are *speed* settings. Higher settings for Hold Time will result in a longer delay before the operator EG begins, but higher settings for Rates will result in faster change.



Segment Loop Point: The SLP setting determines the Level from which the EG will loop. If you continue holding a note after Level 4 is reached, when SLP is set to ...

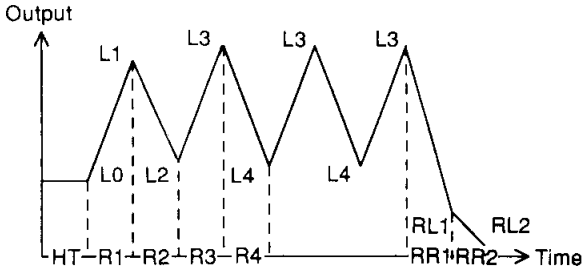
SLP=S1 the level will change L4 → L1 → L2 → L3 → L4 → L1 → ...

SLP=S2 the level will change L4 → L2 → L3 → L4 → L2 → ...

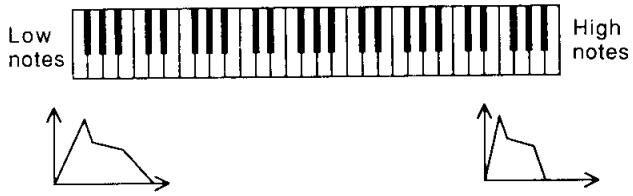
SLP=S3 the level will change L4 → L3 → L4 → L3 → ...

SLP=S4 the level will remain at L4

The following diagram shows how EG levels would change when SLP=S3.



Rate Scaling: On most acoustic instruments, high notes have a naturally shorter attack and decay. This can be simulated by setting rate scaling to a positive value (+1...+7). The following diagram shows how higher notes will have faster rates (shorter EGs). Negative settings will have the opposite effect.



AFM ELEMENT DATA

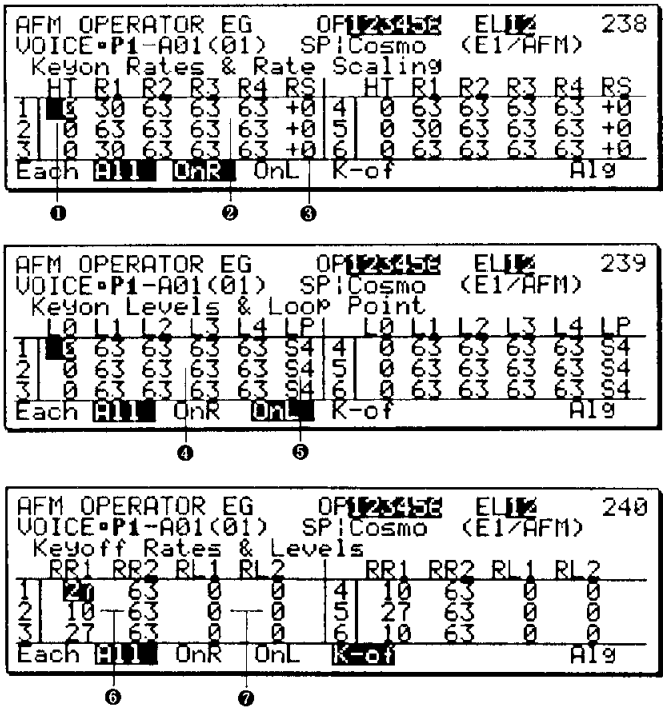
3. (F2) AFM operator EG (All operators)

JUMP #238

Summary: Make operator EG settings for all operators while viewing the data for all operator EGs in a single screen.

Procedure:

From: AFM Element job directory (JUMP #230)
Select: job 03:EG and press F2 (All)
Specify: EG key-on rates (R1–R4) (JUMP #238)
EG key-on levels (L1–L4) (JUMP #239)
EG key-off rates and levels (RR1–2, RL1–2) (JUMP #240)



❶ HT (Keyon Delay Time 63...0): This specifies the time by which the beginning of the EG will be delayed after a key is pressed.

❷ R1–R4 (Keyon Rates 0...63): Keyon Rates 1–4 determine the speed of the operator EG while a key is being pressed.

❸ RS (Rate Scaling –7...+7): Rate Scaling determines how the key position will affect the operator EG rates.

❹ L0–L4 (Keyon Levels 0...63): These determine the levels to which the operator EG will move while a key is being pressed.

❺ LP (Segment Loop Point S1...S4): This specifies the segment from which the EG will continue looping if a key remains depressed after the EG has arrived at level L4.

❻ RR1, RR2 (KeyOff Rates 0...63): These determine the speed with which the operator EG will change levels after a key is released.

❼ RL1, RL2 (KeyOff Levels 0...63): These determine the levels to which the operator EG will change after a key is released.

The meaning of these EG parameters is explained in the previous section *3. (F1) AFM operator EG (Each operator).*

AFM ELEMENT DATA

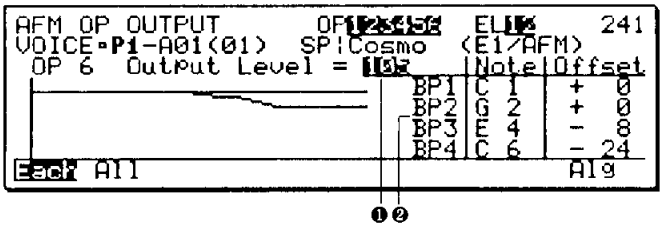
4. (F1) AFM operator output (Each)

JUMP #241

Summary: Set output level and scaling for a single operator while viewing a graphic display of the scaling.

Procedure:

From: AFM Element job directory (JUMP #230)
Select: job 04:Output and press F1 (Each) (JUMP #241)
Specify: the output level and scaling for the selected operator



❶ Output Level (0...127): The output level of the operator.

❷ BP1–4 (Break Point 1–4): Note (C-2...G-8) and Offset (–127...#127) of each Break Point determine how the output level of each operator will vary across the keyboard. When the cursor is located at note, you can press F7 (MIDI) and press a key on your MIDI keyboard to enter the new note setting.

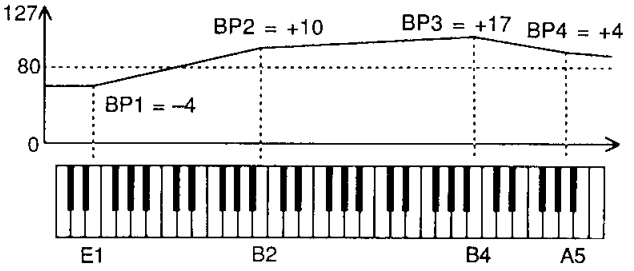
Output Level: This sets the output level of each operator. The output level of a carrier operator will affect the volume, and the output level of a modulator operator will affect the tone. Remember that the input levels of each operator input In1 and In2 can also be adjusted as explained in *1. (F3) AFM algorithm (Input level)* (JUMP #233). Even if the output level of an operator is raised, it will have no effect on another operator to which it is connected if the corresponding input level of the operator is set at 0.

Break Point: The operator output level can be made to vary depending on the note that is played. On most acoustic instruments, notes differ in volume and tone depending on the range in which they are played. For example the low notes of a piano are more tonally complex and louder than the high notes.

Use the four break points to specify how the operator output level will be adjusted across the keyboard.

- Offset (–127...+127) determines the output level adjustment for each of the four points specified by Note.
- The four note settings must be in ascending order. It is not possible to set a break point to a note lower or higher than the note settings of the neighboring break points.

The following diagram shows how the operator output level would be adjusted across the keyboard for the following break point settings.



Each offset is added to the overall operator output level of 80. For example the offset at break point 1 (E1) is –4, so the resulting operator output level at E1 is 76. The resulting operator output level is limited to the range of 0...127.

AFM ELEMENT DATA

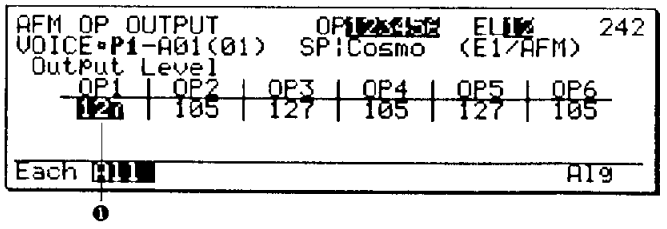
4. (F2) AFM operator output (All)

JUMP #242

Summary: Set operator output level while viewing output levels for all operators. (Output scaling cannot be set in this job.)

Procedure:

From: AFM Element job directory (JUMP #230)
Select: job 04:Output and press F2 (All) (JUMP #242)
Specify: the output level of each operator



❶ Output Level OP1–OP6 (0...127): Set the output level of each operator. This is the same setting as explained in ❶ of the previous section *4. (F1) AFM operator output (Each)*. The difference is that here you can view and set the output level for all six operators at once. However break point Levels and Offsets cannot be set here.

Remarks: Refer to *4. (F1) AFM operator output (Each)* for details.

Note: *In algorithms with two or more carriers, some Velocity Sensitivity settings may cause distortion. In this case, reduce carrier levels.*

AFM ELEMENT DATA

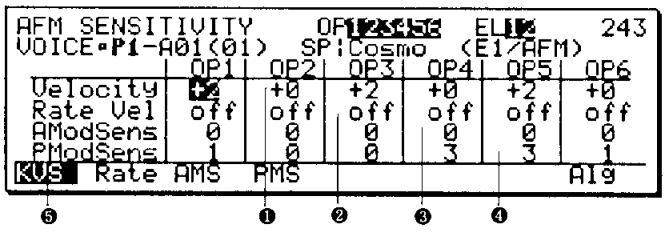
5. AFM sensitivity

JUMP #243

Summary: These settings determine how each operator will be affected by key-on velocity and by the LFO.

Procedure:

From: AFM Element job directory (JUMP #230)
Select: job 05:Sensitv (JUMP #243)
Specify: the sensitivity of each operator



❶ Velocity (–7...+7): This determines how the output level of each operator will be affected by key-on velocity. For positive settings (+1...+7) the output level will increase as you play more strongly. For negative settings (–1...–7) the output level will decrease as you play more strongly.

❷ Rate Velocity (on/off): When the Rate Velocity switch is "on", key-on velocity will affect the operator EG R1. The result will depend on the Velocity setting.

Velocity = +1...+7: If Rate Velocity is on, strongly played notes will cause the operator EG R1 to increase, resulting in a faster attack. For notes played with maximum velocity, R1 will be at the value specified by the EG settings.

Velocity = –1...–7: If Rate Velocity is on, strongly played notes will cause the operator EG R1 to decrease, resulting in a slower attack. To hear the effect of negative settings you will need to lower the operator output level.

When the Rate Velocity switch is "off", the operator EG R1 will not be affected by key-on velocity.

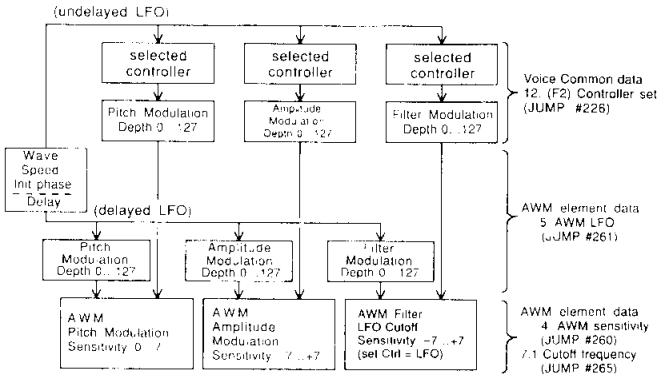
❸ AModSens (0...7): Amplitude Modulation Sensitivity determines how greatly the output level of each operator will be affected by Amplitude Modulation from the LFO.

❹ PModSens (0...7): Pitch Modulation Sensitivity determines how greatly the pitch of each operator will be affected by Pitch Modulation from the LFO.

❺ Pressing F1 (KVS), F2 (Rate), F3 (AMS), or F4 (PMS) will move the cursor to Velocity, Rate Vel, AModSens, or PModSens.

AModSens and PModSens: These settings determine the *sensitivity* of each operator to the Amplitude Modulation Depth (AMD) and/or Pitch Modulation Depth (PMD) produced by the LFO. Refer to *6.(F1) AFM LFO (Main)* (JUMP #244). If the LFO settings for AMD and/or PMD are set to 0, these AModSens and PModSens settings will have no effect.

PModSens determines the sensitivity of each operator to PMD from the Main LFO. Independently of this, the pitch of an AFM element can also be affected by the Sub LFO. Refer to *6. (F2) AFM LFO (Sub)* (JUMP #245).



AFM ELEMENT DATA

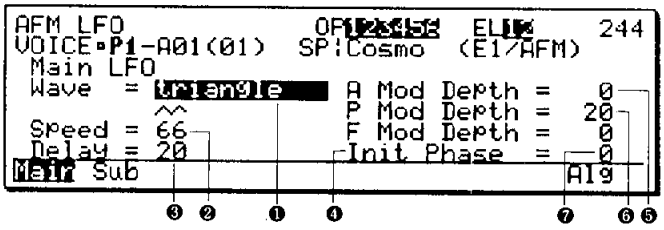
6. (F1) AFM LFO (Main)

JUMP #244

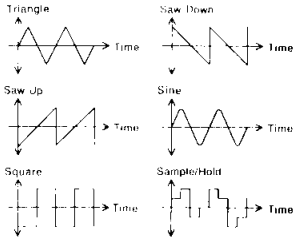
Summary: The Main LFO creates a cyclically changing control signal that can be used to create tremolo (amplitude modulation), vibrato (pitch modulation), and wah-wah (filter modulation).

Procedure:

From: AFM Element job directory (JUMP #230)
Select: job 06:LFO and press F1 (Main) (JUMP #244)
Specify: parameters for the main LFO



❶ Wave (triangle, saw down, saw up, square, sine, sample&hold): This selects the wave (shape of modulation) produced by the Main LFO. The selected wave is graphically displayed in the LCD. When sample&hold is selected, the LFO will produce a control signal whose level will change randomly at intervals of time determined by the Speed setting.



❷ Speed (0...99): The speed of the LFO modulation. Higher settings result in faster modulation.

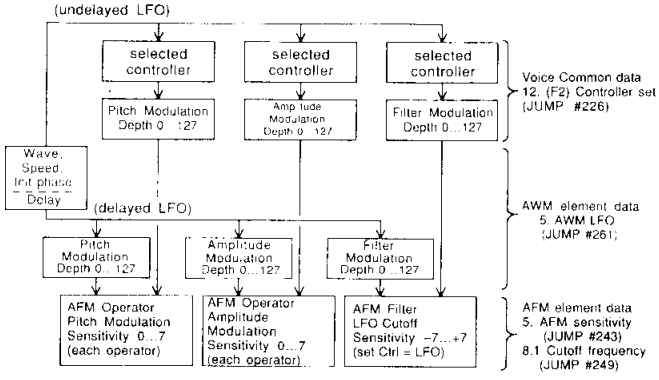
❸ Delay (0...99): The time delay before the LFO modulation begins.

❹ Init Phase (0...99): Initial Phase determines the point of the waveform from which the LFO will begin when a key is pressed. The LFO waveform always starts over again from this initial phase point when each note is played. An initial phase setting of 0...99 corresponds to a phase of 0...360 degrees.

❺ A Mod Depth (0...127): Amplitude Modulation Depth determines how much the LFO will affect the output level (amplitude) of the operators. For this setting to have an effect, the AModSens (amplitude modulation sensitivity) of an operator must be set above 0. Refer to *5. AFM sensitivity.*

❻ P Mod Depth (0...127): Pitch Modulation Depth determines how much the LFO will affect the pitch of the operators. For this setting to have an effect, the PModSens (pitch modulation sensitivity) of an operator must be set above 0. Refer to *5. AFM sensitivity.*

❼ F Mod Depth (0...127): Filter Modulation Depth determines how much the LFO will affect the cutoff frequency of the filter. For this setting to have an effect, the Ctrl setting of a filter must be set to "LFO", and the LFO Cutoff Sens setting must not be 0. Refer to *8.1 AFM filter (Cutoff frequency).*



AFM ELEMENT DATA

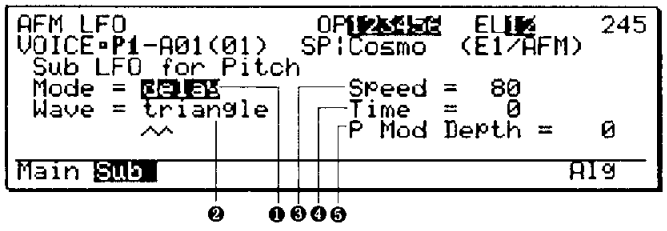
6. (F2) AFM LFO (Sub)

JUMP #245

Summary: The Sub LFO is completely independent of the Main LFO, but can be used only to create vibrato (pitch modulation). This will apply equally to all operators, and is not affected by pitch modulation sensitivity.

Procedure:

From: AFM Element job directory (JUMP #230)
Select: job 06:LFO and press F2 (Sub) (JUMP #245)
Specify: parameters for the sub LFO



❶ Mode (delay, decay): When this is set to "delay", the Sub LFO will begin after the time delay specified by ❹ Time. When this is set to "decay", the Sub LFO will begin fading out after the time specified by ❹ Time.

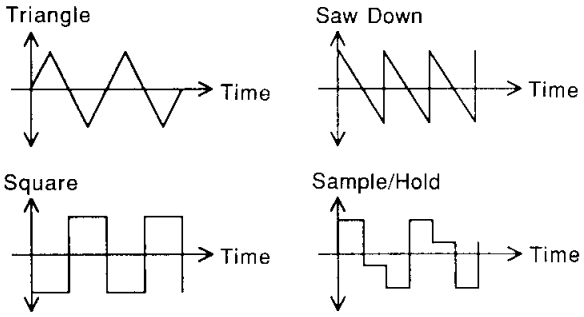
❷ Wave (triangle, saw down, square, sample& hold): The wave produced by the Sub LFO.

❸ Speed (0...99): The speed of the LFO modulation. Higher settings result in faster modulation. The speed of the sample&hold wave will be faster than the other waves.

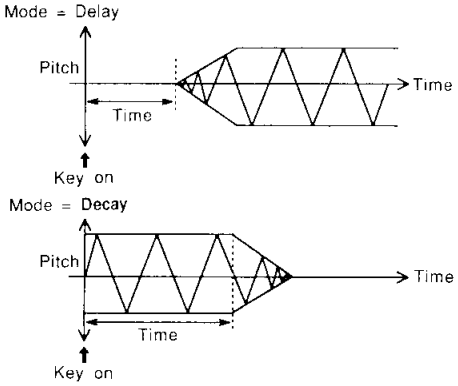
❹ Time (0...99): The time length used for Sub LFO delay or decay.

❺ P Mod Depth (0...127): The depth of pitch modulation produced by the Sub LFO.

Wave: The following four waveforms can be selected for the Sub LFO.



Mode and Time: The mode and time settings work together to determine how the Sub LFO will begin or end. When Mode=delay the Sub LFO will begin after the time delay specified by ❹ Time. When Mode=decay the Sub LFO will affect the sound beginning immediately from when the key is pressed, but will gradually die out after the time delay specified by ❹ Time.



AFM ELEMENT DATA

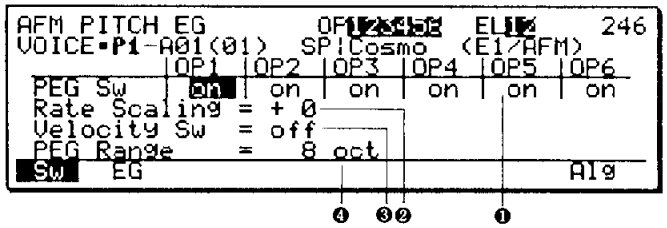
7. (F1) AFM pitch EG (Switch)

JUMP #246

Summary: The pitch change over time created by the pitch EG can be switched on/off for each operator. To set the shape of the pitch EG, see *7. (F2) AFM pitch EG (EG settings).*

Procedure:

From: AFM Element job directory (JUMP #230)
Select: job 07:PitchEG and press F1 (Sw) (JUMP #246)
Specify: pitch EG switches, scaling, and range



❶ PEG Sw (off, on): When the Pitch EG Switch is "off" for an operator, it will not be affected by the pitch EG.

❷ Rate Scaling (–7...+7): Pitch EG Rate Scaling determines how pitch EG rates will change according to the note played. When this is set to +1...+7, the pitch EG will be faster for higher notes. When this is set to –1...–7, the pitch EG will be slower for higher notes. When this is set to 0, the pitch EG will be the same rate for all notes.

❸ Velocity Sw (off, on): When this is on, strongly played notes will cause the pitch EG to change over a greater range.

❹ Range (1/2 oct, 1 oct, 2 oct, 8 oct): This determines the maximum range of the AFM pitch EG, from 1/2 octave to 8 octaves.

PEG Sw: When using the Pitch EG to make the pitch of a sound change over time, you will normally turn the PEG switch on for *all* operators. If the pitch of a modulator operator changes while the pitch of another operator it is modulating remains constant (or vice versa), the *carrier:modulator* ratio will shift during the duration of the sound, changing the overtone structure. This can be an interesting effect in its own right.

Rate Scaling: This setting determines how Pitch EG Rates (the speed of pitch change) will be affected by the key number of each note. The following diagram shows the result when Pitch EG Rate Scaling is set to +7. Notice that high notes have a shorter pitch EG (faster EG rates) than lower notes.

Velocity Sw (velocity switch): When this is "on", strongly played notes will cause the pitch EG to change over a greater range.

AFM ELEMENT DATA

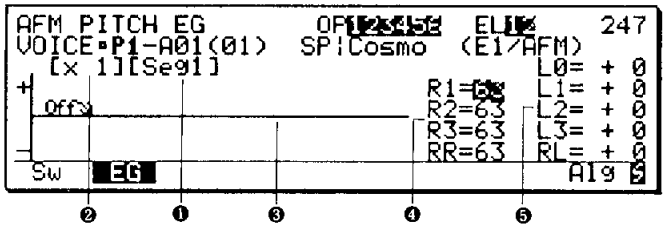
7. (F2) AFM pitch EG (EG settings)

JUMP #247

Summary: The pitch EG creates a fixed shape of pitch change over time for each note. To switch the pitch EG on/off for each operator, see *7. (F1) AFM pitch EG (Switch).*

Procedure:

From: AFM Element job directory (JUMP #230)
Select: job 07:PitchEG and press F2 (EG) (JUMP #247)
Specify: pitch EG parameters



❶ This indicates the EG segment ("seg1–3" or "rel1") from which the pitch EG graphic display begins. If the EG is too long to be fully shown in the LCD, hold SHIFT and press F7 or F8 to move the pitch EG graphic display to a different segment.

❷ This indicates the time length shown by the graphic display. To change this, hold SHIFT and press F1–F6 (x1, x2, x5, x10, x20, x50). The exact length of time will depend on the range. When the pitch EG range is 1 octave, the graphic display will cover approximately 0.5 seconds at "x1" and approximately 25 seconds at "x50".

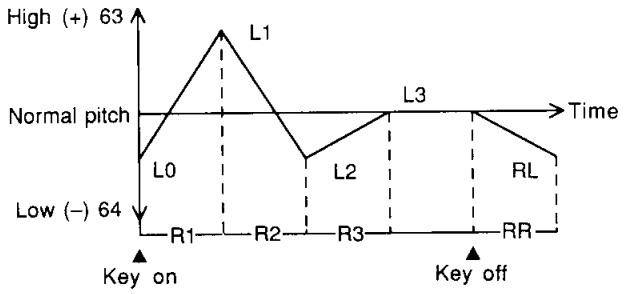
❸ The pitch EG is graphically displayed.

❹ R1–R3, RR1 (0...63): Keyon Rates 1–3 and the Release Rate determine the speed of the pitch EG. Higher settings result in faster change. A rate of 63 will make the pitch jump instantly to the next level.

❺ L0–L3, RL (–64...+63): Keyon Levels 0–3 and the Release Level determine the levels of the pitch EG. Positive settings raise the pitch and negative settings lower the pitch.

Rates and Levels: When you press a key, the pitch will begin at the level of L0, and will change at the rate of R1 to level L1. When the level reaches L1, the pitch will change at the rate of R2 to the level of L2. When the pitch reaches L2, it will change at the rate of R3 to the level of L3 and will stay at L3 as long as the key is pressed.

When the key is released, the pitch will change at the rate of RR to the level of RL.



Note: Even if the AFM pitch EG and the AWM pitch EG have identical Rate settings, there will be slight differences in the timing of the pitch change.

AFM ELEMENT DATA

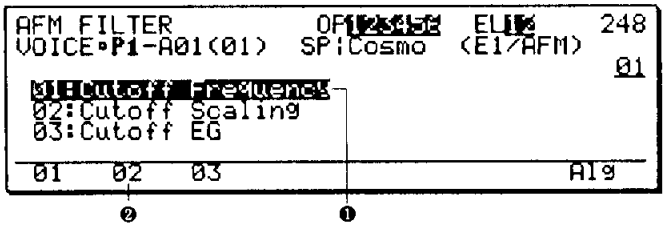
8. AFM filter

JUMP #248

Summary: The two filters of each element can be used to control the tone in various ways.

Procedure:

From: AFM Element job directory (JUMP #230)
Select: job 08:Filter (JUMP #248)
Specify: the desired job and press ENTER



❶ Move the cursor in this area to select a job and press ENTER to move to the selected job.
- 01: Cutoff Frequency: Make overall settings for the filters.
- 02: Cutoff Scaling: Specify how each filter will be adjusted across the keyboard.
- 03: Cutoff EG: Specify how each filter will change over time.

❷ Pressing F1–F3 will select the corresponding job.

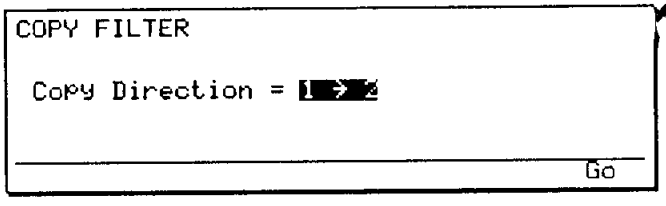
AFM ELEMENT DATA / AFM FILTER

8.0 Copy filter

Summary: Any time while editing a filter, you can copy the data from one filter to the other filter.

Procedure:

From: 8.1 Cutoff Frequency (JUMP #249)
8.2 Cutoff Scaling (JUMP #250)
8.3 Cutoff EG (JUMP #252–#255)
Press: COPY
Select: the copy direction (1→2 or 2→1)
To execute: the copy operation press F8 (Go)
To quit: without copying press EXIT



Specify whether to copy the data from filter 1 to filter 2 (1→2) or from filter 2 to filter 1 (2→1). Press F8 (Go) and the data will be copied. If you decide not to copy the data, press EXIT to exit without copying.

The filter type (HPF/LPF/THRU) will not be copied.

AFM ELEMENT DATA / AFM FILTER

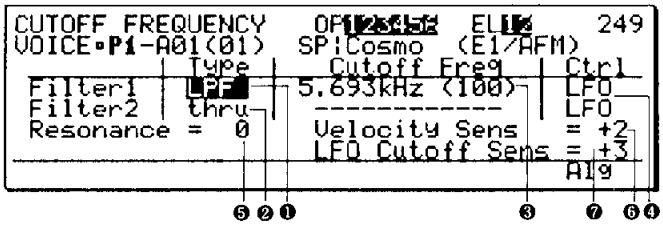
8.1 Cutoff frequency

JUMP #249

Summary: Each filter can be set to a different type, cutoff frequency, and control source. Overall resonance, velocity sensitivity, and LFO Cutoff Sensitivity can also be specified.

Procedure:

From: AFM Element job (JUMP #248)
directory 8. AFM filter
Select: 01:Cutoff Frequency (JUMP #249)
Specify: parameters for filters 1 and 2



❶ Filter 1 Type (Thru, LPF, HPF): Filter 1 can be used either as a Low Pass Filter (LPF) or as a High Pass Filter (HPF). When "Thru" is selected the filter will have no effect.

❷ Filter 2 Type (Thru, LPF): Filter 2 can be used only as a LPF.

❸ Cutoff Freq (HPF = 0 Hz ... 11.66 kHz (0...114); LPF = 0 Hz ... 22.43 kHz (0...127)): The cutoff frequency of each filter can be adjusted independently. The number 0...127 displayed in parentheses indicates the data value input when using the numeric keypad. Note that the highest HPF setting is 11.66 kHz.

❹ Ctrl (EG, LFO, EG-VA): Each of the two filters can be controlled in a different way. For details, see the explanations below for *Ctrl = EG, Ctrl = LFO, Ctrl = EG-VA*.

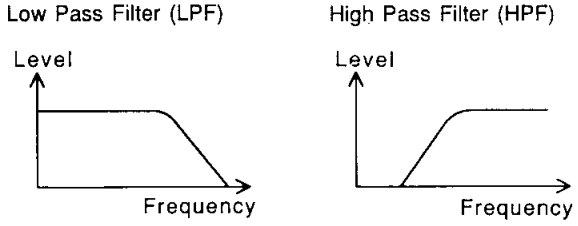
❺ Resonance (0...99): Higher settings of resonance will result in a more pronounced peak of emphasis at the cutoff frequency. This setting will apply to both filters 1 and 2.

❻ Velocity Sens (–7...+7): This determines how the cutoff frequency of both filters will be affected by key-on velocity. For positive settings (+1...+7) the cutoff frequency will increase as you play more strongly, resulting in a brighter sound. For negative settings (–1...–7) the cutoff frequency will decrease as you play more strongly, resulting in a darker sound.

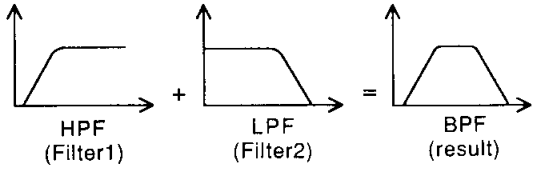
❼ LFO Cutoff Sens (–7...+7): This determines how Filter Modulation from the Main LFO will affect the filters. This setting also determines how sensitive the filters will be to the controller assigned to Filter Bias in *Voice common data 12. (F4) Controller set* (JUMP #228). Negative settings will reverse the effect of the assigned controller.

Type and Cutoff Freq: Filter 1 can be used either as a Low Pass Filter (LPF) or as a High Pass Filter (HPF), and filter 2 can be used only as a LPF.

When set to LPF, filters 1 and 2 will allow sound lower than the cutoff frequency to pass unchanged, and will diminish the sound above the cutoff frequency. When set to HPF, filter 1 will allow sound higher than the cutoff frequency to pass, and will diminish the sound below the cutoff frequency.

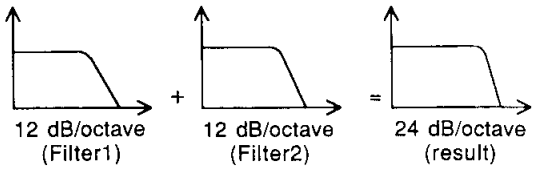


By setting filter 1 to HPF and filter 2 to LPF, you can create a Band Pass Filter that passes only a central band of frequencies.



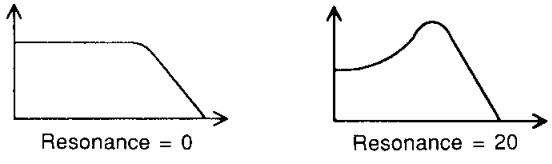
Each of the TG77's filters has a slope of 12 dB/octave. This means that if the cutoff frequency of a LPF is 1 kHz, frequencies at 2 kHz will be reduced by 12 dB and frequencies at 4 kHz will be reduced by 24 dB. If you set both filters 1 and 2 to LPF, set both to the same cutoff frequency, and set both filter EGs in the

same way, the result will be the equivalent of a single 24 dB/octave filter. The filter copy function explained in *8.0 Copy filter* is a quick way to give both filters the same settings.



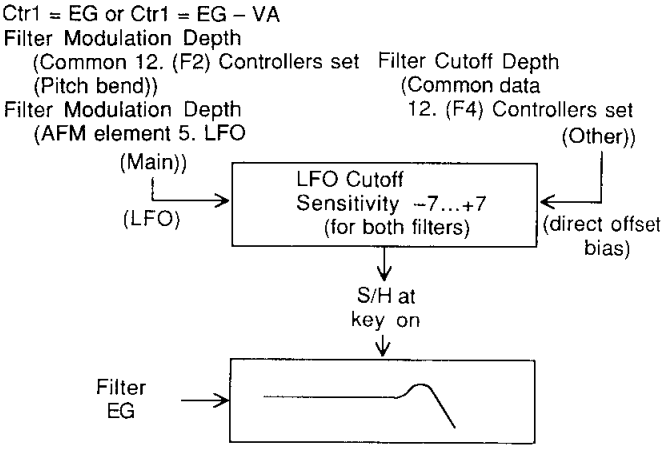
24 dB/octave filtering creates a sharp cutoff which is quite obvious, while 12 dB/octave filtering is a more subtle effect. Analog synthesizers of the past have used both types. 12 dB/octave filtering was considered especially suitable for strings, and 24 dB/octave filtering was for brass or synth bass sounds.

Resonance: Resonance lowers the level of sound below the cutoff frequency, creating an increased peak of emphasis. (This may reduce the overall volume.) High settings of resonance will make changes in cutoff frequency quite easy to notice. When the two filters are being used in tandem as a Band Pass Filter (i.e., when filter 1 is set to HPF), resonance will have no effect.



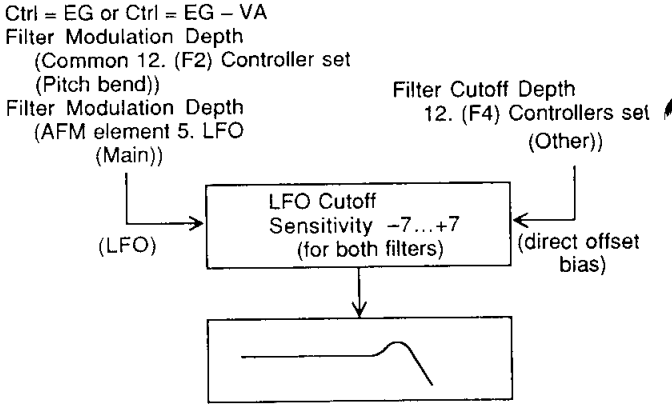
Extremely high settings of filter resonance will make the filter oscillate so that it produces a pitch of its own. This is a technique often used on analog synthesizers of the past.

Ctrl = LFO: When Ctrl is set to LFO, the filter will be controlled both by the Main LFO and by the controller which has been assigned to Filter Cutoff Depth. (Refer to *Voice common data 12. (F4) Controller set.*) Key velocity will shift the cutoff frequency.



Ctrl = EG: When Ctrl is set to EG, the filter will be controlled by its own filter EG as explained in the following section *8.3 Cutoff EG*. If Velocity Sense is set to a value other than 0, key velocity will shift the overall offset of the EG. The position of the controllers assigned to Filter Modulation Depth and Filter Cutoff Depth will be sampled at the beginning of the note (key on), but will have no effect *during* the note.

Ctrl = EG-VA: When Ctrl is set to EG-VA (EG voice attack), the filter will be controlled by its own filter EG as explained in the following section *8.3 Cutoff EG*. If Velocity Sense is set to a value other than 0, key velocity will modify L1 (level 1) and R1 (rate 1) of the filter EG.



Note: *When Ctrl=EG or Ctrl=EG-VA, the effect of the controller on the cutoff frequency will be fixed when the note is played. Moving the controller after playing the note will have no effect.*

AFM ELEMENT DATA / AFM FILTER

8.2 Cutoff scaling

JUMP #250

Summary: The cutoff frequency of each filter can be adjusted across the keyboard.

Procedure:

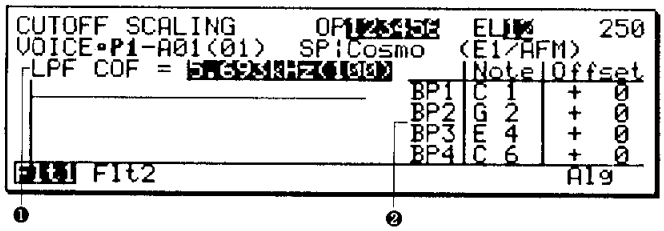
From: AFM element job directory 8. AFM filter (JUMP #248)

Select: 02:Cutoff Scaling

filter 1 press F1 (Flt1) (JUMP #250)

filter 2 press F2 (Flt2) (JUMP #251)

Specify: filter scaling parameters



❶ This indicates the type of the filter being edited, and its cutoff frequency. The cutoff frequency can be modified from this job, but to modify the type of filter you must use job *8.1 Cutoff frequency.*

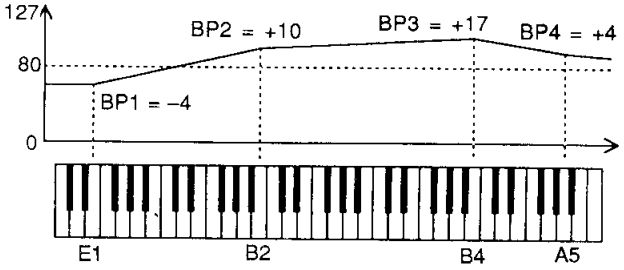
❷ BP1–4 (Break Point): Note (C-2...G-8) and Offset (–127...+127) of each Break Point determine how the cutoff frequency level of the filter will vary across the keyboard. When the cursor is located at note, you can press F7 (MIDI) and play a note on your MIDI instrument to enter the new note setting.

Break Point: The filter cutoff frequency can be made to vary depending on the note that is played. On most acoustic instruments, notes differ in tone depending on the range in which they are played.

Use the four break points to specify how the filter cutoff frequency will be adjusted across the keyboard. Offset (–127...+127) determines how the cutoff frequency will be adjusted at each of the four points specified by Note (C-2...G-8).

The four note settings must be in ascending order. It is not possible to set a break point to a note lower or higher than the note settings of the neighboring break points.

The following diagram shows how the filter cutoff frequency would be adjusted across the keyboard.



The offset at each break point is added to the cutoff frequency of 80. For example the offset at break point 1 (E1) is –4, so the resulting cutoff frequency at E1 is 76. The resulting cutoff frequency is limited to the range of 0...127.

AFM ELEMENT DATA / AFM FILTER

8.3 Cutoff EG

JUMP #252

Summary: The cutoff frequency of each filter can be moved over time by its own EG to make the tone change.

Procedure:

From: AFM element job directory 8. AFM filter (JUMP #248)

Select: 03:Cutoff EG

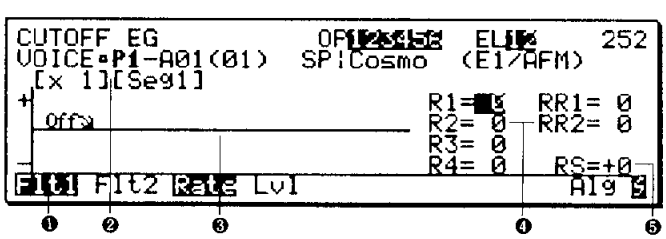
filter 1 rates press F1 (Flt1), F3 (Rate) (JUMP #252)

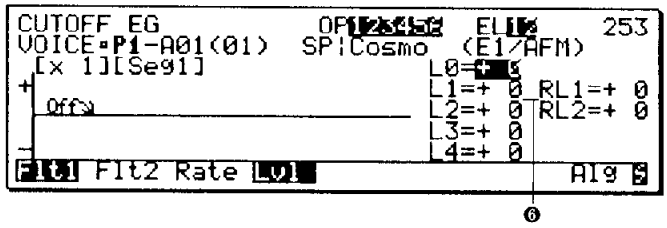
filter 1 levels press F1 (Flt1), F4 (Lvl) (JUMP #253)

filter 2 rates press F2 (Flt2), F3 (Rate) (JUMP #254)

filter 2 levels press F2 (Flt2), F4 (Lvl) (JUMP #255)

Specify: filter EG parameters





❶ This indicates whether you are editing the EG of filter 1 or 2.

❷ This indicates the displayed segment and range of the EG graphic display. To change the display range, hold SHIFT and press F1–F6 (x1, x2, x5, x10, x20, x50). To shift the display to a different segment, hold SHIFT and press F7 or F8 (Seg1...Seg4, Rel1).

❸ The filter EG is graphically displayed.

❹ R1–R4, RR1–RR2 (Keyon Rates, Release Rates 0...63): Keyon Rates 1–4 and Release Rates 1–2 determine the speed of the filter EG. Higher settings result in faster change.

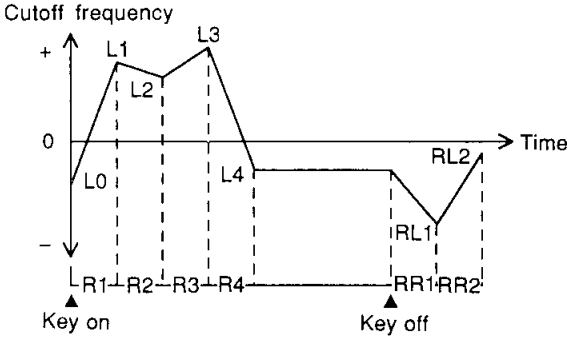
❺ RS (Rate Scaling –7...+7): Rate Scaling allows the filter EG rates to be increased or decreased depending on the key that is played. For positive settings the EG rates will increase as you play higher notes, resulting in shorter envelopes. For negative settings the EG rates will decrease as you play higher notes, resulting in longer envelopes.

❻ L0–L4, RL1–2 (Keyon Levels, Release Levels –64...+63): Keyon Levels 0–4 and Release Levels 1–2 determine how the filter EG will increase or decrease the cutoff frequency specified for the filter.

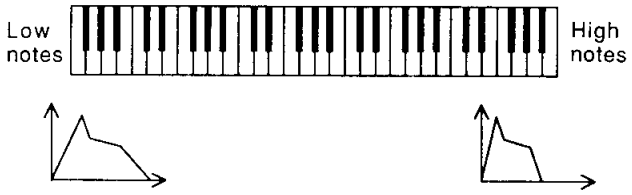
Rates and Levels: The levels of the filter EG do not directly determine the cutoff frequency of the filter, but rather *adjust* the filter cutoff frequency you set in *8.1 Cutoff frequency*.

When a note is played, the filter cutoff will be adjusted by the amount of L0, and will change at the rate of R1 to level L1. When the level reaches L1, it will change at the rate of R2 to the level of L2. When the level reaches L2, it will change at the rate of R3 to the level of L3. When the level reaches L3, it will change at the rate of R4 to the level of L4. The filter cutoff frequency will remain at the level of L4 as long as you continue pressing the key.

When you release the key, the filter cutoff frequency will change at the rate of RR1 to the level of RL1. When the level reaches RL1, it will change at the rate of RR2 to the level of RL2.



Rate Scaling: On most acoustic instruments, high notes have a naturally shorter attack and decay. This can be simulated by setting rate scaling to a positive value (+1...+7). The following diagram shows how higher notes will have faster rates (shorter EGs). Negative settings will have the opposite effect.



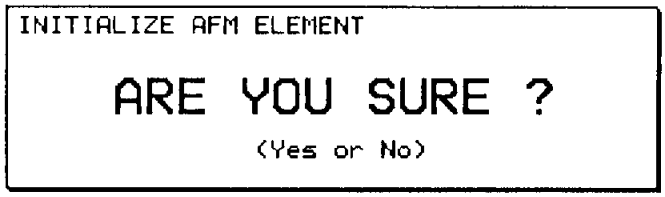
AFM ELEMENT DATA

15. Initialize AFM element

Summary: Initialize the AFM element data being edited to a set of basic values.

Procedure:

From: AFM Element job directory (JUMP #230)
Select: job 15:Initlz
To execute: the initialize operation press YES
To quit: without executing press NO or EXIT



This function sets all AFM element data values to the minimum or simplest possible setting. When creating your own new voices it is usually best to begin by editing an existing voice. However if you want to start from scratch, this Initialize function can be helpful.

If you are sure you want to initialize the AFM element data, press YES. The AFM element data being edited will be set to the values shown below. If you decide not to initialize, press NO or EXIT.

This function initializes only AFM element data. Other initialize functions are provided for initializing Voice Common data and AWM element data. Refer to *Voice Common 15. Initialize voice* or *AWM element 15. Initialize AWM element.*

Initialized settings for AFM element data

01 Algorithm Set
- Algorithm number = 30
- Feedback 1 = none (free)
- Feedback 2 = none (free)
- Feedback 3 = none (free)
- Input Level 1 = 7 (operator 1–5)
- Input Level 1 = 0 (operator 6)
- Input Level 2 = 0 (all operators)
- Noise = Off (all operators)
- AWM Wave = Off (all operators)

02 Operator Oscillator (all operators)
- Freq.Mode = Ratio
- Freq = 1.00
- Detune = ±0
- Waveform = 1 (sine)
- Phase Sync = On
- Init Phase = 0

03 Operator EG (all operators)
- Keyon Hold Time = 0
- Keyon Rates 1–4 = 63
- Keyoff Rates 1–2 = 63
- Rate Scaling = ±0
- Keyon Level 0 = 0
- Keyon Levels 1–4 = 63
- Keyoff Levels 1–2 = 0
- Loop Point = S4

04 Operator Output
- Output Level = 127 (operator 1)
- Output Level = 0 (operators 2–6)
- Break Point 1 Note = C1
- Break Point 2 Note = G2
- Break Point 3 Note = E4
- Break Point 4 Note = C6
- Break Point Levels = 0 (break points 1–4)

05 Operator Sensitivity (all operators)
- Keyon Velocity Sens = 0
- Rate Velocity Switch = off
- AMS = 0
- PMS = 3

06 LFO
Main LFO
- Wave = triangle
- Speed = 35
- Delay Time = 0
- AMD, PMD, FMD = 0
- Init Phase = 0

Sub LFO
- Mode = delay
- Wave = triangle
- Speed = 80
- Time = 0
- PMD = 0

07 Pitch EG
- Operator On/Off = on (all operators)
- Rate Scaling = ±0
- Velocity Switch = off
- Range = 8 oct
- Keyon Rates 1–3 = 63
- Keyoff Rate 1 = 63
- Keyon Levels 1–3 = ±0
- Keyoff Level 1 = ±0

08 Filter
- Resonance = 0
- Cutoff Mod Sens = ±0
- Keyon Velocity Sens = ±0

*** following data is same for both filters ***
- Filter Type = thru
- Filter Control = LFO
- Cutoff Frequency = 127
- Break Point 1 Note = C1
- Break Point 2 Note = G2
- Break Point 3 Note = E4
- Break Point 4 Note = C6
- Break Point Offset = 0 (BP 1–4)
- Keyon Rates 1–4 = 63
- Keyoff Rates 1–2 = 63
- Rate Scaling = ±0
- Keyon Levels 0–4 = ±0
- Keyoff Levels 1–2 = ±0

AFM ELEMENT DATA

16. Recall voice

Summary: Recall all data of the previously edited voice.

Procedure:

From: AFM Element job directory (JUMP #230)
Select: job 16:Recall voice
To execute: the recall operation press YES
To quit: without executing press NO or EXIT.

Note: *This operation recalls all voice data, not just AFM element data, and is also available while editing Common data, AWM Element data, or Drum Set data. For details refer to Voice Common 16. Recall.*

AWM element data

AWM ELEMENT DATA

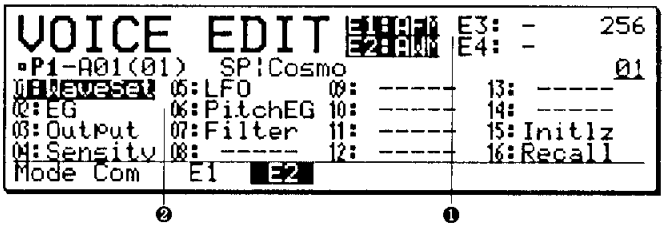
AWM element job directory

JUMP #256

Summary: This directory shows the jobs which edit AWM element data.

Procedure:

From: voice edit mode (JUMP #200 or #201)
When: editing a normal voice that contains AWM elements
Select: an AWM element F3–F6 (JUMP #256) (E1–E4)



❶ This area shows the number (E1–E4) and type (AFM or AWM) of elements in the selected voice mode. Elements which are turned on are displayed in inverse video. Elements can be turned on/off as explained on page 88.

❷ Move the cursor in this area to select a job and press ENTER to go to the selected job.

01:WaveSet (AWM waveform set): Select an AWM sampled waveform from preset memory or a WAVEFORM card, and specify the pitch at which it will sound.

02:EG (AWM EG): The AWM Amplitude EG determines how the volume of each note will change over time.

03:Output (AWM output): The output level of an AWM element can be adjusted across the keyboard.

04:Sensitv (AWM sensitivity): Key-on velocity can affect the volume or the speed of attack and decay. The control signal from the AWM LFO can create vibrato, tremolo, or wah-wah.

05:LFO (AWM LFO): The AWM element LFO creates a cyclically changing control signal that can be used for tremolo, vibrato, or wah-wah.

06:PitchEG (AWM pitch EG): The pitch of each note can be made to change in a fixed way over time.

07:Filter (AWM filter): The tone of an AWM element can be made to change in a fixed way over time, or can be controlled by a controller or the LFO.

15:Initlz (Initialize AWM element): When you are creating a voice from scratch, it is sometimes convenient to set all AWM element data to the basic or minimum values.

16:Recall (Recall voice): All data of the previously edited voice can be recalled.

AWM ELEMENT DATA

Copy element

Summary: While editing any AWM parameter (except for 7. AWM filter), you can copy data from an AWM element of another voice into the AWM element you are now editing.

Procedure:

From: AWM element job 1, 2, 3, 4, 5, or 6
Press: COPY
Press: F1 (Src) and select the source voice
Press: F2 (Elem) and select the source element
To execute: the copy operation press F8 (Go).

- This copy operation is identical to the operation explained in *AFM element data, Copy element* (page 116). Please refer to that section for details.
- This copy operation is possible only while *inside* one of the AWM editing jobs. It is not available from the AWM job directory.
- Pressing COPY while editing 7. *AWM filter* will access the Copy Filter operation. For details, refer to *AFM element data, 8.0 Copy filter*, page 130.

AWM ELEMENT DATA

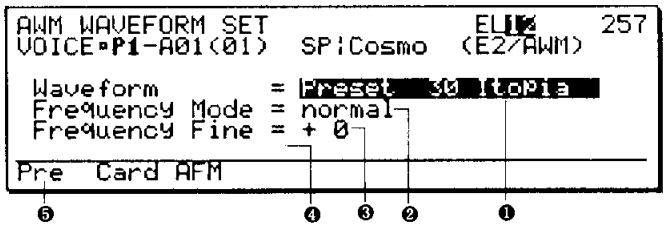
1. AWM waveform set

JUMP #257

Summary: Select an AWM waveform and specify the pitch at which it will sound.

Procedure:

From: AWM Element job directory (JUMP #256)
Select: job 01:WaveSet (JUMP #257)
Specify: the waveform and frequency



❶ Waveform (Preset 1...112, Card 1...99, AFM): Select an AWM waveform from internal presets 1...112. Refer to *Preset waveforms* below. If a waveform card is inserted into the WAVEFORM slot, you will also be able to select Card waveforms. The number of card waveforms will depend on each card. If the voice mode includes both AWM and AFM elements, you will be able to select AFM as well. For details see *Waveform = AFM* below.

❷ Frequency Mode (normal, fixed): When this is set to "normal", each note of the keyboard will play the selected waveform at a different pitch. When this is set to "fixed", the waveform will be played back at the pitch specified by ❹ Note Number regardless of which note was played.

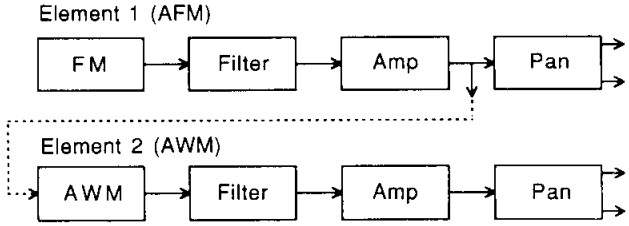
❸ Frequency Fine (–64...+63): For both normal and fixed modes, this adjusts the fine pitch of the waveform.

❹ Note Number (C-2...G8): The note number setting will appear only if frequency mode is set to "fixed". This determines the pitch at which the selected waveform will be played back. When the cursor is located at Note Number, you can press F8 (Kbd) and then press a key to specify the note number.

❺ Pressing F1 (Pre) will select preset waveforms, F2 (Card) will select card waveforms, and pressing F3 (AFM) will select the sound from the AFM element if the voice includes an AFM element.

Note when using card waveforms: Remember that it is not possible to use two waveform cards at once. If the same Multi uses two or more AWM voices which use AWM waveforms from different cards, at least one AWM voice will be using the wrong waveform. In the same way, it is not possible for two AWM elements in a single voice to use AWM waveforms from different cards.

Waveform = AFM: For voice modes 09:1AFM&1AWM and 10:2AFM&2AWM, you have the option of setting "Waveform = AFM". When this is selected, the output from the AFM element will be used instead of a AWM waveform. This means that the AFM sound will be processed through the two filters of the AFM element and also through the two filters of the AWM element, allowing you to create complex filtering effects.



When "Waveform = AFM" is selected, the AWM element common data (note shift, etc.) and AWM pitch-related data such as pitch EG and LFO pitch modulation will be ignored. The result is essentially a single AFM element processed through two pairs of filters.

Preset waveforms: The preset waveforms in ROM can be broadly divided into the following six categories.

Multi-sampled Acoustic instruments sampled at two or more points across the keyboard to preserve the realism of the original sound.

1	Piano	18	Thumping
2	Trumpet	19	Popping
3	Mute Tp	20	Fretless
4	Horn	21	Wood Bass
5	Flugel	22	Shamisen
6	Trombone	23	Koto
7	Brass	24	Violin
8	Flute	25	Pizz
9	Clarinet	26	Strings
10	Tenor Sax	27	AnlgBass
11	Alto Sax	28	Anlg Brs
12	GtrSteel	29	Chorus
13	EG Sngl	30	Itopia
14	EG Humbk	31	Vib
15	EG Harmo	32	Marimba
16	EG mute	33	Tubular
17	E.Bass		

Waves Fairly short samples, especially useful when used with an AFM element. Most are sampled at one point.

34	Cele Wv	46	12Str Wv
35	HarpsiWv	47	Bass Wv
36	E.P. Wv	48	Cello Wv
37	Pipe Wv	49	ContraWv
38	Organ Wv	50	Xylo Wv
39	Tuba Wv	51	Glock Wv
40	Picco Wv	52	Harp Wv
41	S.Sax Wv	53	Sitar Wv
42	BassonWv	54	StlDrmWv
43	Reco Wv	55	MtReedWv
44	MuteTpWv	56	OhAttack
45	Gut Wv		

Oscillator Basic waveforms such as the sawtooth or square waves used in analog synthesizers.

57	AnlgSaw1	62	Pulse 10
58	AnlgSaw2	63	Pulse 25
59	Digital1	64	Pulse 50
60	Digital2	65	Tri
61	Digital3		

Transients Short samples that are especially useful when used as the attack of a sound.

66	Piano Np	72	Bottle 3
67	E.P. Np	73	Tube
68	Vibe Np	74	Vocal Ga
69	DmpPiano	75	Vocal Ba
70	Bottle 1	76	Sax trans
71	Bottle 2	77	Bow trans

Other Various waveforms usable as sound effects or as part of other sounds.

78	Bulb	86	Steam
79	Tear	87	Narrow
80	Bamboo	88	Airy
81	Cup Echo	89	Styroll
82	Digi Atk	90	Noise
83	Temp Ra	91	Bell mix
84	Giri	92	Haaa
85	Water		

Drumset Drums and other rhythm instruments. These can be used not only in a Drum Set voice, but also as the waveform for an AWM element of a normal voice.

93	BD1	103	Tom 2
94	BD2	104	HHclosed
95	BD3	105	HH open
96	BD4	106	Crash
97	SD1	107	Ride
98	SD2	108	Claps
99	SD3	109	Cowbell
100	SD roll	110	Tambrn
101	Rim	111	Shaker
102	Tom 1	112	Analg Perc

AWM ELEMENT DATA

2. AWM EG

JUMP #258

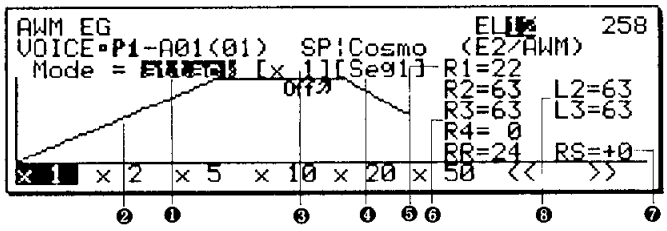
Summary: This determines how the volume of an AWM element will change over time.

Procedure:

From: AWM Element job directory (JUMP #256)

Select: job 02:EG. (JUMP #258)

Specify: volume EG parameters



❶ EG Mode (Mode = hold, attack): This setting determines whether the first segment of the AWM EG will begin from level 0 (attack mode) or from maximum level (hold mode).

❷ The AWM EG is graphically displayed.

❸ This indicates the time range of the EG graphic display; "x1" displays the shortest time with the greatest detail. To change the time range, press F1–F6 (x1, x2, x5, x10, x20, x50).

❹ This indicates the segment from which the EG is displayed. To begin the graphic display from a different segment, press F7 or F8 to select Seg1...Seg4 or Rel1.

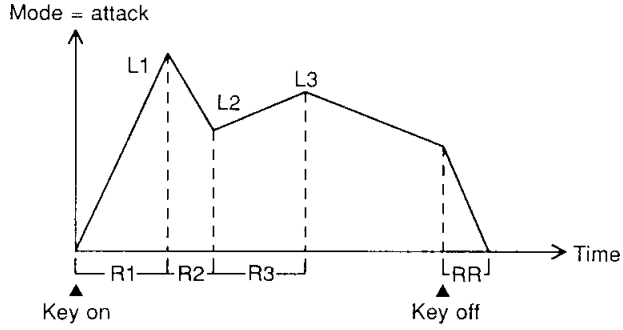
❺ Hold Time or Rate 1 (HT=63...0 or R1=0...63): If the EG Mode is set to "hold" this will determine the Hold Time for which the level of the waveform is held at maximum. A setting of HT=63 results in the longest time. If the EG Mode is set to "attack" this will determine Rate 1 of the EG. A R1 setting of 63 results in the fastest attack.

❻ Keyon Rate 2–4, Release Rate (R2–R4 = 0...63, RR = 0...63): These settings determine the speed of the operator EG. Higher values result in faster change.

❼ Rate Scaling (RS = –7...+7): Rate Scaling allows the operator EG rates to be increased or decreased depending on the key that is played. For positive settings the EG rates will increase as you play higher notes, resulting in shorter envelopes. For negative settings the EG rates will decrease as you play higher notes, resulting in longer envelopes.

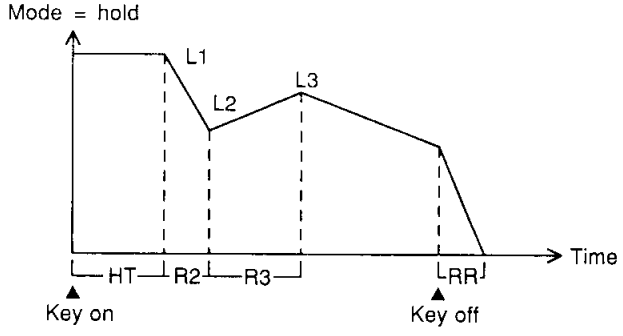
❽ Keyon Levels 2–3 (L2–L3 = 0...63): These determine the levels of the AWM EG. There is no L1 setting since the AWM EG either begins from 0 and moves toward maximum level (in attack mode), or begins at maximum level and stays there until the hold time has elapsed (hold mode). Nor is there a L4 setting since the level of the AWM EG immediately begins to move toward 0 after reaching L3. If you want the sound to continue sustaining as long as you press a key, set R4 to 0. However some AWM waveforms naturally decay to zero, so setting R4 to 0 will not make these waveforms sustain.

Rates and Levels: The AWM EG will function in two ways depending on the Mode setting.



In normal mode the AWM EG level will begin from 0 and rise at the rate of R1 to maximum level. When maximum level is reached it will move at the rate of R2 to level L2. When level L2 is reached it will move at the rate of R3 to level L3. When level L3 is reached it will begin moving at the rate of R4 to 0. (If rate R4 is 0, the sound will move at an infinitely slow rate toward zero; i.e., it will sustain at level L3 as long as the key is pressed.)

When you release the key, the level will move at the rate of RR to a level of 0.

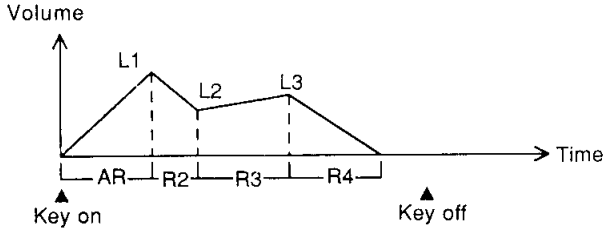


In hold mode the AWM EG level will begin at maximum and stay there for the duration of the specified hold time HT. When the hold time has elapsed, the level will change at the rate of R2 to level L2. The rest of the EG is the same as for normal mode.

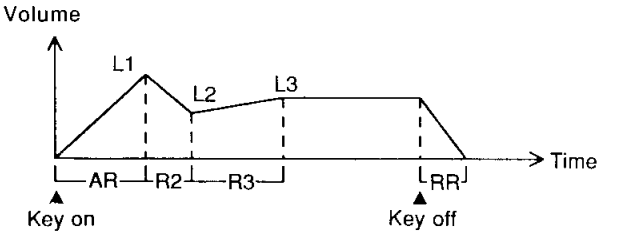
Using the AWM EG in hold mode is especially effective when you are using an AWM waveform which includes a definite attack. Keeping the level at maximum for a while allows the natural attack of the AWM sample to be heard. After the natural sampled attack is over the AWM waveform will continue sustaining, and you can use the remaining AWM EG parameters to create an appropriate decay and release.

Rate 4 and Release Rate: Rate 4 (R4) and Release Rate (RR) can be used in conjunction to create a variety of AWM EG shapes.

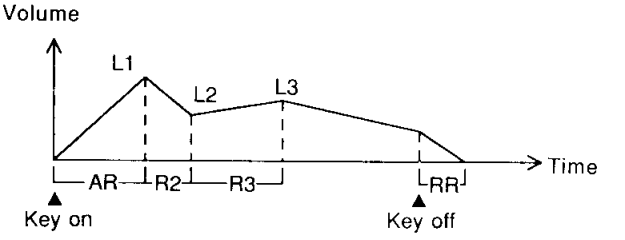
- If R4 is greater than 0 and you continue holding a note, after the level reaches L3 it will decrease at the rate R4 and will move to 0 even though you continue holding the note.



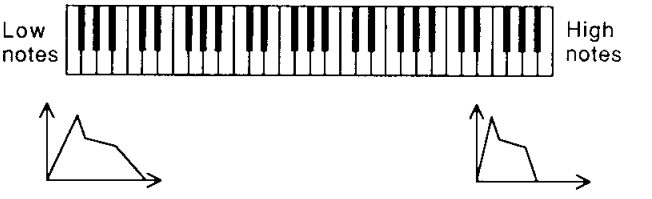
- If R4=0 and you continue holding a note, after the level reaches L3 it will stay at L3 as long as you hold the note. When you release the note, the level will decrease at the rate of RR to a level of 0.



- After reaching L3 the level will decrease at the rate R4, but when you release the note the level will begin decreasing at the rate RR.



Rate Scaling: On most acoustic instruments, high notes have a naturally shorter attack and decay. This can be simulated by setting rate scaling to a positive value (+1...+7). The following diagram shows how higher notes will have faster rates (shorter EGs). Negative settings will have the opposite effect.



AWM ELEMENT DATA

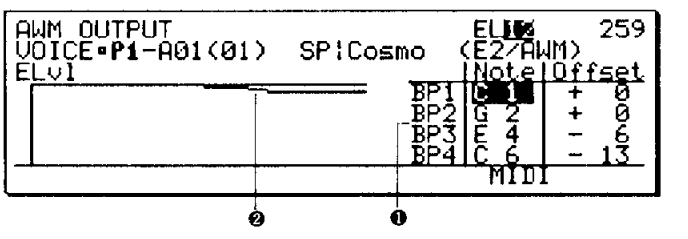
3. AWM output

JUMP #259

Summary: The Element Level of an AWM element can be adjusted across the keyboard.

Procedure:

From: AWM Element job directory (JUMP #256)
Select: job 03:Output. (JUMP #259)
Specify: the output level scaling



❶ Break Point 1–4 (BP1–4): Note (C-2...G8) and Offset (–127...+127) of each break point determine how the level specified in *Voice common data, 1. Element level* (JUMP #202) will be adjusted across the keyboard. When the cursor is located at note, you can press F7 (MIDI) and press a key on your MIDI keyboard to enter it as the new note setting.

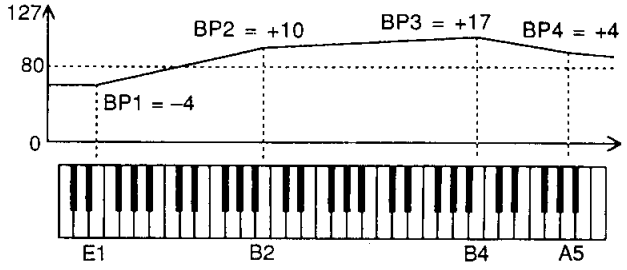
❷ The keyboard level scaling is graphically displayed.

Break Point: The AWM Element Level can be adjusted according to the note that is played. On most acoustic instruments, notes differ in volume and tone depending on the range in which they are played. For example the low notes of a piano are louder than the high notes.

Use the four break points to specify how the AWM element level will be adjusted across the keyboard. Offset (–127...+127) determines the output level adjustment for each of the four points specified by Note (C-2...G8).

The four note settings must be in ascending order. It is not possible to set a break point to a note lower or higher than the note settings of the neighboring break points.

The following diagram shows how the AWM element level would be adjusted across the keyboard for the following break point settings.



Each offset is added to the element level (80 in this example). For example the offset at break point 1 (E1) is –4, so the resulting element level at E1 is 76. The resulting element level is limited to the range of 0...127.

AWM ELEMENT DATA

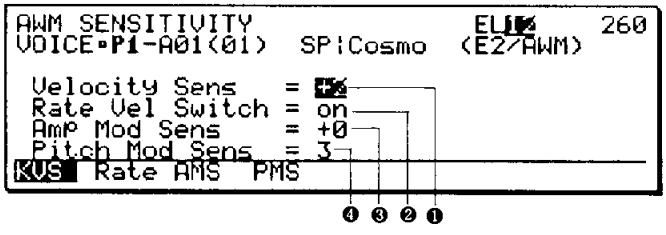
4. AWM sensitivity

JUMP #260

Summary: These settings determine how the AWM element will be affected by key-on velocity and by the LFO.

Procedure:

From: AWM Element job directory (JUMP #256)
Select: job 04:Sensitv (JUMP #260)
Specify: sensitivity to velocity and modulation



❶ Velocity Sensitivity (–7...+7): This determines how the output level of the AWM element will be affected by key-on velocity. For positive settings (+1...+7) the output level will increase as you play more strongly. For negative settings (–1...–7) the output level will decrease as you play more strongly. For negative settings to have an effect the element level must be lowered.

❷ Rate Velocity Switch (on, off): When the Rate Velocity switch is on, key-on velocity will affect the AWM EG attack rate (R1). The effect will depend on the Velocity Sensitivity setting.

Velocity = +1...+7: If Rate Velocity is on, strongly played notes will cause the AWM R1 to increase, resulting in a faster attack. For the strongest possible velocity, the EG attack will change at the speed specified by the EG R1 setting.

Velocity = –1...–7: If Rate Velocity is on, strongly played notes will cause the AWM R1 to decrease, resulting in a slower attack.

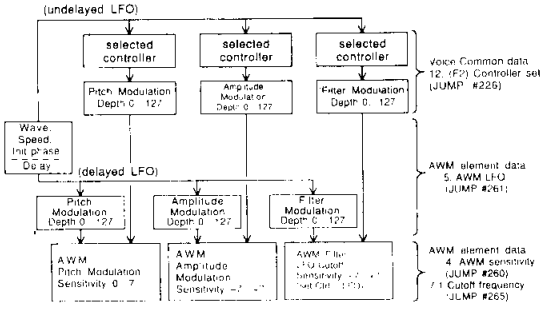
When the Rate Velocity switch is off, the AWM EG attack rate will not be affected by key-on velocity.

❸ Amplitude Modulation Sensitivity (Amp Mod Sens = –7...+7): Amplitude Modulation Sensitivity determines how greatly the output level of the AWM element will be affected by Amplitude Modulation from the LFO. Increasingly higher positive settings (+1...+7) will allow the LFO to have a greater effect.

Negative settings (–1...–7) are effective only for EG Bias. When Amplitude Modulation Sensitivity is set to a negative value, the controller assigned to EG Bias by the setting in *Voice common data, 12. (F4) Controller set* (JUMP #228) will decrease the amplitude of the AWM element, and the LFO will have no effect. For example, two AWM elements in a voice might be given opposite Amplitude Modulation Sensitivity settings, so that the controller assigned to *EGbiasDepth* would crossfade between the two elements.

❹ Pitch Modulation Sensitivity (Pitch Mod Sens = 0...7): Pitch Modulation Sensitivity determines how greatly the pitch of the AWM element will be affected by Pitch Modulation from the LFO.

Amplitude Modulation Sensitivity and Pitch Modulation Sensitivity: These settings determine the *sensitivity* of the AWM element to the Amplitude Modulation Depth (AMD) and/or Pitch Modulation Depth (PMD) produced by the AWM element LFO. If the LFO settings for AMD and/or PMD are set to 0, these settings will have no effect.



AWM ELEMENT DATA

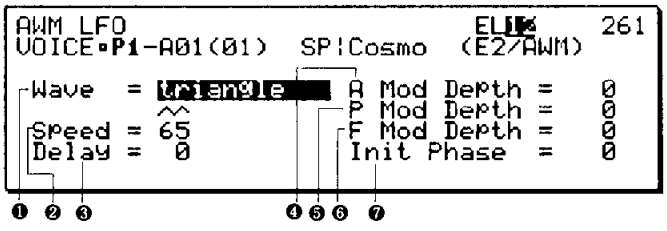
5. AWM LFO

JUMP #261

Summary: The AWM element LFO creates a cyclically changing control signal that can be used to create tremolo (Amplitude modulation), vibrato (pitch modulation), and wah-wah (filter modulation).

Procedure:

From: AWM Element job directory (JUMP #256)
Select: job 05:LFO (JUMP #261)
Specify: the LFO parameters



❶ Wave (triangle, saw down, saw up, square, sine, sample&hold): This selects the wave (shape of modulation) produced by the AWM LFO. The selected wave is graphically displayed in the LCD. When sample&hold is selected, the LFO will produce a control signal whose level will change randomly at intervals of time determined by the Speed setting.

❷ Speed (0...99): The speed of the LFO modulation. Higher settings result in faster modulation.

❸ Delay (0...99): The time delay before the LFO modulation begins.

❹ Amplitude Modulation Depth (0...127): This determines how greatly the LFO will affect the output level (amplitude) of the AWM element.

❺ Pitch Modulation Depth (0...127): This determines how greatly the LFO will affect the pitch of the AWM element.

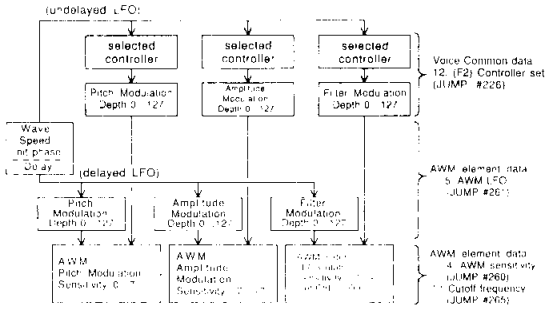
❻ Filter Modulation Depth (0...127): This determines how greatly the LFO will affect the cutoff frequency of the filter.

❼ Initial Phase (0...99): This determines the point of the LFO waveform from which the LFO will start each time a key is pressed.

Wave, Speed, Delay, Initial Phase: Detailed explanations and diagrams of these parameters are given in *AFM element job 6. (F1) AFM LFO (Main).*

Amplitude Modulation Depth and Pitch Modulation Depth: For these setting to have an effect, the AModSens (amplitude modulation sensitivity) or PModSens (pitch modulation sensitivity) of the AWM element must be set above 0. Make these settings in *AWM element job 4. AWM sensitivity* (JUMP #260).

Filter Modulation Depth: For this setting to have an effect, the Ctrl setting of a filter must be set to "LFO", and the LFO Cutoff Sens setting must not be 0. Make these settings in *AWM element data, 7.1 Cutoff frequency* (JUMP #265).



AWM ELEMENT DATA

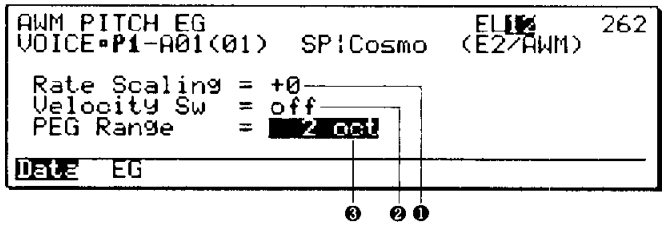
6. (F1) AWM pitch EG (Data)

JUMP #262

Summary: The pitch change over time created by the pitch EG can be affected by key-on velocity and the speed of pitch change can be adjusted across the keyboard. To set the shape of the pitch EG, see *6. (F2) AWM pitch EG (EG settings).*

Procedure:

From: AWM Element job directory (JUMP #256)
Select: job 06:PitchEG and press F1 (Data) (JUMP #262)
Specify: pitch EG scaling, velocity, and range

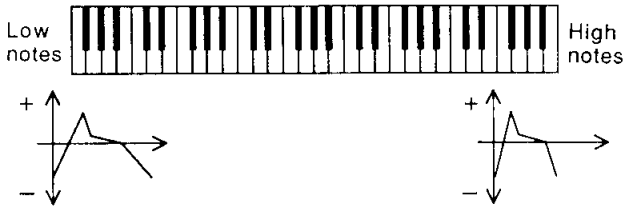


❶ Rate Scaling (–7...+7): Pitch EG Rate Scaling determines how pitch EG rates will change according to the note played. When this is set to +1...+7, the pitch EG will be faster for higher notes. When this is set to –1...–7, the pitch EG will be slower for higher notes. When this is set to 0, the pitch EG will be the same rate for all notes.

❷ Velocity Sw (off, on): When this is on, strongly played notes will change in pitch more than softly played notes.

❸ Range (1/2 oct, 1 oct, 2 oct): This determines the maximum range of the AWM pitch EG, from 1/2 octave to 2 octaves. (Note that the 8 octave range of the AFM pitch EG is not available for the AWM pitch EG.)

Rate Scaling: This setting determines how Pitch EG Rates (the speed of pitch change) will be affected by the key number of each note. The following diagram shows the result when Pitch EG Rate Scaling is set to +7. Notice that high notes have a shorter pitch EG (faster EG rates) than lower notes.



Velocity Sw (velocity switch): When this is on, strongly played notes will change in pitch more than softly played notes.

AWM ELEMENT DATA

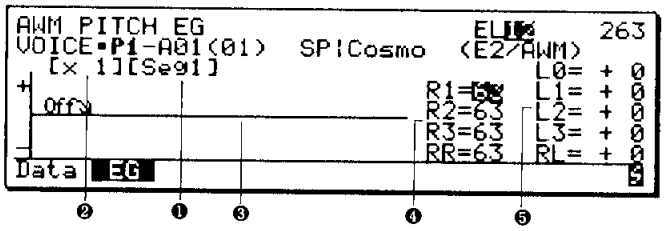
6. (F2) AWM pitch EG (EG settings)

JUMP #263

Summary: The pitch EG creates a fixed shape of pitch change over time for each note. To adjust speed of pitch change across the keyboard, see *6. (F1) AWM pitch EG (Data).*

Procedure:

From: AWM Element job directory (JUMP #256)
Select: job 06:PitchEG and press F2 (EG) (JUMP #263)
Specify: pitch EG parameters



❶ This indicates the EG segment ("seg1–3" or "rel1") from which the pitch EG graphic display begins. If the EG is too long to be fully shown in the LCD, hold SHIFT and press F7 or F8 to change the segment from which the display begins.

❷ This indicates the time length shown by the graphic display. To change this, hold SHIFT and press F1–F6 (x1, x2, x5, x10, x20, x50). The exact length of time will depend on the range. When the pitch EG range is 1 octave, the graphic display will cover approximately 0.5 seconds at "x1" and approximately 25 seconds at "x50".

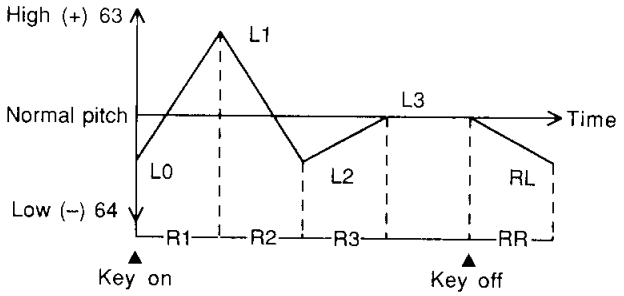
❸ The pitch EG is graphically displayed.

❹ R1–R3, RR1 (0...63): Keyon Rates 1–3 and the Release Rate determine the speed of the pitch EG. Higher settings result in faster change. A rate of 63 will make the pitch jump immediately to the following level.

❺ L0–L3, RL (–64...+63): Keyon Levels 0–3 and the Release Level determine the levels of the pitch EG. Positive settings raise the pitch and negative settings lower the pitch.

Rates and Levels: When you press a key, the pitch will begin at the level of L0, and will change at the rate of R1 to level L1. When the level reaches L1, the pitch will change at the rate of R2 to the level of L2. When the pitch reaches L2, it will change at the rate of R3 to the level of L3 and will stay at L3 as long as the key is pressed.

When the key is released, the pitch will change at the rate of RR to the level of RL.



Note: Even if the AWM pitch EG and the AFM pitch EG have identical Rate settings, there will be slight differences in the timing of the pitch change.

AWM ELEMENT DATA

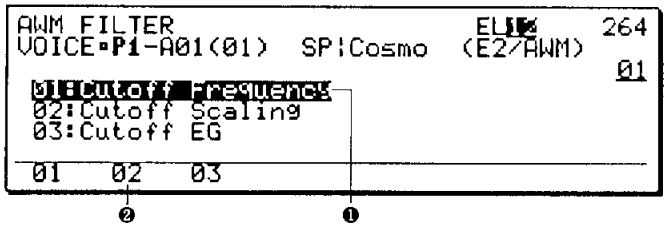
7. AWM filter

JUMP #264

Summary: The two filters of each element can be used to control the tone in various ways.

Procedure:

From: AWM Element job directory (JUMP #256)
Select: job 07:Filter (JUMP #264)
Specify: the desired filter edit job and press ENTER



❶ Move the cursor in this area to select a job and press ENTER to move to the selected job.
- 01: Cutoff Frequency: Make overall settings for the filters. (JUMP #265)
- 02: Cutoff Scaling: Specify how each filter will be adjusted across the keyboard. (JUMP #266, #267)
- 03: Cutoff EG: Specify how each filter will change over time. (JUMP #268, #269, #270, #271)

❷ Pressing F1–F3 will select the corresponding job.

Note: Filter settings for an AWM element are exactly the same as for an AFM element. For details, refer to AFM element job 8. AFM filter.

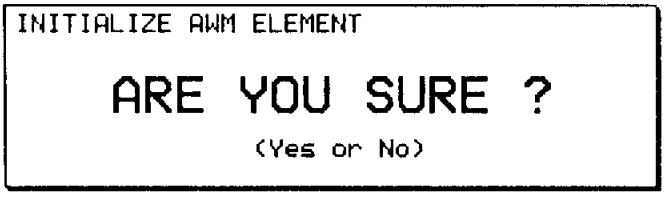
AWM ELEMENT DATA

15. Initialize AWM element

Summary: Initialize the AWM Element data being edited to a set of basic values.

Procedure:

From: AWM Element job directory (JUMP #256)
Select: job 15:Initlz
To execute: the initialize operation press YES
To quit: without initializing press NO or EXIT



This function sets all AWM element data values to the minimum or simplest possible setting. When creating your own new voices it is usually best to begin by editing an existing voice. However if you want to start from scratch, it is often useful to start from an initialized setting rather than having to reset all the parameters.

If you are sure you want to initialize the AWM element data, press YES. The AWM element data being edited will be set to the values shown below. If you decide not to initialize, press NO.

This function initializes only AWM element data. Other initialize functions are provided for initializing Voice Common data and AFM element data. Refer to *Voice Common 15. Initialize voice* or *AFM Element 15. Initialize AFM element.*

Initialized settings for AWM Element data

01 AWM Waveform Select
- Waveform = Preset 65 (triangle wave)
- Frequency Mode = normal
- Fixed Mode Note # = C3
- Frequency Fine = ±0

02 AWM Amplitude EG
- Mode = normal
- Keyon Rates 1, 2, 3 = 63
- Keyon Rate 4 = 0
- Keyoff Rate 1 = 63
- Rate Scaling = ±0
- Keyon Level 2, 3 = 63

03 AWM Output
- Break Point 1 Note = C1
- Break Point 2 Note = G2
- Break Point 3 Note = E4
- Break Point 4 Note = C6
- BP1–4 Offset = ±0

04 AWM Sensitivity
- Velocity Sens = ±0
- Rate Velocity Switch = off
- AMS = 0
- PMS = 3

05 AWM LFO
- Wave = Triangle
- Speed = 65
- Delay Time = 0
- AMD, PMD, FMD = 0
- Init Phase = 0

06 AWM Pitch EG
- Rate Scaling = ±0
- Velocity Switch = off
- Range = 2 octaves
- Keyon Rates 1–3 = 63
- Keyon Levels 0–3 = ±0
- Keyoff Rate 1 = 63
- Keyoff Level 1 = ±0

07 AWM Filter

Resonance	= 0
Cutoff Mod Sens	= ±0
Keyon Velocity Sens	= ±0

*** following data is same for both filters ***

Filter Type	= thru
Filter Control	= LFO
Cutoff Frequency	= 127
Break Point 1 Note	= C1
Break Point 2 Note	= G2
Break Point 3 Note	= E4
Break Point 4 Note	= C6
Break Point Offset	= 0 (BP 1–4)
Keyon Rates 1–4	= 63
Keyoff Rates 1–2	= 63
Rate Scaling	= ±0
Keyon Levels 0–4	= ±0
Keyoff Levels 1–2	= ±0

AWM ELEMENT DATA

16. Recall voice

Summary: Recall all data of the previously edited voice.

Procedure:

From: AWM Element job directory (JUMP #256)
Select: job 16:Recall
To execute: the recall operation press YES
To quit: without executing press NO or EXIT.

Note: *This operation recalls all voice data, not just AWM element data, and is also available while editing Common data, AFM element data, or Drum Set data. For details refer to Voice common data, 16. Recall voice.*

Drum set data

DRUM SET DATA

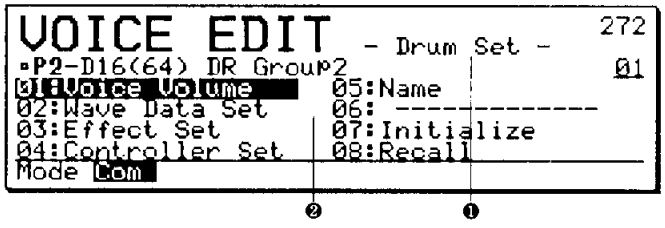
Drum set job directory

JUMP #272

Summary: This job directory shows the jobs containing data for a drum voice.

Procedure:

From: voice edit mode (JUMP #200)
When: the Voice Mode is set to 11:Drum Set
Select: the drum set job directory (JUMP #272)
F2 (Com)



❶ This area indicates that "Drum Set" is the selected voice mode.

❷ Move the cursor in this area to select a job and press ENTER to go to the selected job.

01: Voice Volume: Adjust the overall volume of the entire drum voice.

02: Wave Data Set: Select a waveform for each note of the TG77's 61-note drum set, and specify tuning and pan for each.

03: Effect Set: Specify how the four DSP effect units will be connected, select an effect type for each unit, and make settings for each effect.

04: Controller Set: The overall volume of a drum set voice can be adjusted using a specified controller.

05: Name: Specify a ten-character name for the voice being edited.

07: Initialize: Initialize the drum set data being edited to the basic or minimum settings.

08: Recall: Recall the previously edited voice into the editing buffer.

DRUM SET DATA

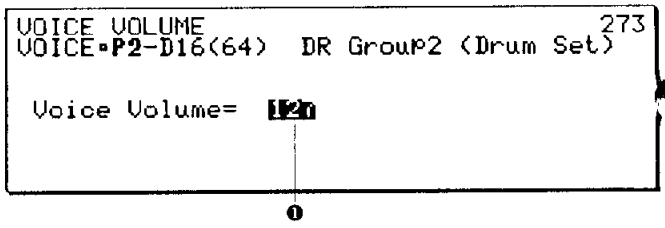
1. Voice volume

JUMP #273

Summary: Adjust the overall volume of the entire drum voice.

Procedure:

From: drum set job directory (JUMP #272)
Select: 01:Voice Volume (JUMP #273)
Specify: the volume of the entire drum set



❶ Voice Volume (0...127): This determines the overall volume of the entire drum voice.

DRUM SET DATA

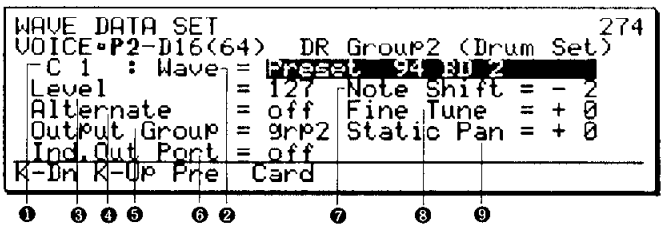
2. Wave data set

JUMP #274

Summary: Select a waveform for each key of the TG77's 61-note keyboard, and specify tuning and pan for each.

Procedure:

From: drum set job directory (JUMP #272)
Select: 02:Wave Data Set (JUMP #274)
Specify: parameters for each key note number



❶ Key Note Number (C1...C6): Press a key on your MIDI keyboard to select a key note number, and it will be displayed here. (It is not possible to move the cursor here.)

❷ Waveform (Preset 1...112, Card 1...99): Select the AWM sample that will be played by the corresponding Key Note Number. A list of the 112 preset waveforms is given in *AWM element edit, 1. AWM Waveform Set* (page 138).

❸ Level (0...127): This determines the volume of the waveform.

❹ Alternate (on, off): When this is "on" for two or more key note numbers, the last-played key will take priority and the waveform of the previously played key will be turned off.

❺ Output Group (off, grp1, grp2, both): Select the output group from which the waveform selected for this key note number will be output.

❻ Individual Output Port (off, 1...8): Select the individual output port from which the waveform selected for this key note number will be output.

❼ Note Shift (–48...+36 in half steps): Adjust the tuning of the waveform in half steps.

❽ Fine Tuning (–64...+63 in units of 1.171875 cents): Adjust the tuning of the waveform in fine steps.

❾ Static Pan (–31...+31 = Left...Right): Specify the stereo position for each key note number.

Use the following two steps to make settings ❷–❾ for each note of the keyboard. Repeat the two steps as necessary.

1. Press a key on your MIDI keyboard to select a key note number. The selected key note number will be displayed in ❶.
2. Make settings ❷–❾ for the selected key note number.

Alternate: If two or more waveforms would sound unnatural if they were played at the same time, select alternate "on" for each of these waveforms. For example it is impossible for a real drum set to sound the closed hi-hat and open hi-hat at the same time. By selecting alternate "on" for the two key note numbers that play the closed hi-hat and open hi-hat waveforms, playing the closed hi-hat will make the open hi-hat stop, and vice versa.

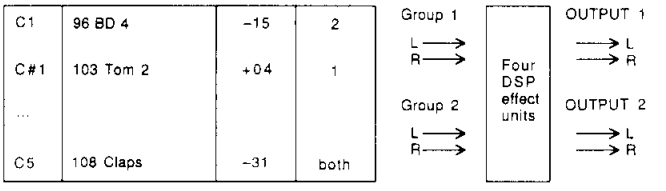
There is only one alternate group for the entire drum voice; i.e., it is not possible to specify two or more *pairs* of key note numbers to play alternately. You may select alternate "on" for as many key note numbers as you like but they will all be in the same alternate group, and only the one of them will sound at any time.

Static Pan: The stereo position of the waveform played by each key note number is determined by the static pan setting. The "dynamic" pan of an AFM or AWM element can be moved over time by an EG or LFO, but the "static" pan for each key note number of a drum voice cannot be moved over time.

When using a drum set voice in a Multi, these static pan settings will be used if the multi static pan is set to "VC" (voice). Refer to *Multi edit, 5. Voice static pan.*

Output Group: The stereo signal from the static pan of each key note number is sent to output group 1, 2, or both. If output group is set "off" the waveform for that key note number will not be heard. The selected output group will determine how each waveform of the drum voice will be processed through the effect units.

Note	AWM wave select	Static pan setting	Output group select
C1	96 BD 4	–15	2
C#1	103 Tom 2	+04	1
...			
C5	108 Claps	–31	both



Individual Output Port: If this is set to 1–8 (i.e.,other than "off"), no sound will be output from the stereo output groups. If the Output Group (see above) is set "off", there will be no sound either from the stereo output groups *or* from the individual output selected here.

DRUM SET DATA

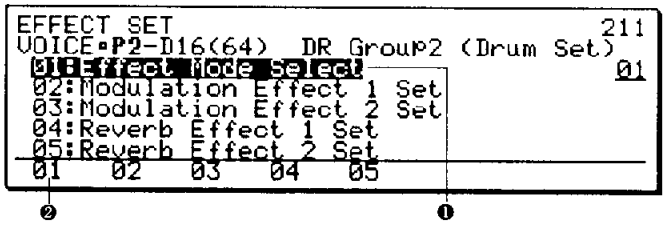
3. Effect set

JUMP #211

Summary: Specify how the four DSP effect units will be connected, select an effect type for each unit, and make settings for each effect.

Procedure:

From: drum set job directory (JUMP #272)
Select: 03:Effect Set (JUMP #211)
Specify: the effect job you wish to edit and press ENTER



❶ Move the cursor in this area to select a job.
01: Effect Mode Select: Specify how the four effect units will be connected. (JUMP #212)
02: Modulation Effect 1 Set: Select an effect type and set parameters for modulation effect 1. (JUMP #213, #214)
03: Modulation Effect 2 Set: Select an effect type and set parameters for modulation effect 2. These are set in exactly the same way as explained for Modulation Effect 1. (JUMP #215, #216)
04: Reverb Effect 1 Set: Select an effect type and set parameters for reverb effect 1. (JUMP #217, #218)
05: Reverb Effect 2 Set: Select an effect type and set parameters for reverb effect 2. These are set in exactly the same way as Reverb Effect 1. (JUMP #219, #220)

❷ Pressing F1–F5 will select the corresponding job.

Note: Effect settings for a drum set voice are made in exactly the same way as for a normal voice. For details on effect settings, refer to Common Data job 10. Effect set.

DRUM SET DATA

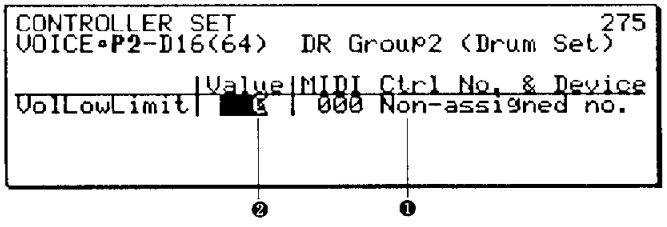
4. Controller set

JUMP #275

Summary: The overall volume of a drum set voice can be adjusted using a specified controller.

Procedure:

From: drum set job directory (JUMP #272)
Select: 04:Controller Set (JUMP #275)
Specify: the minimum level and controller for drum voice volume



❶ Device (MIDI Control #): Select a controller number 0–120 or aftertouch. For example when "001 Modulation" is selected, the modulation wheel on your MIDI keyboard will regulate the volume of the drum voice. For a detailed explanation of controller numbers, refer to *Voice Common job 12. (F2) Controller set.*

❷ Vol Low Limit (Value 0...127): This determines the lowest volume that can be set by the selected controller. For example when this is set to 80, the lowest position of the controller will set the volume of the drum voice to 80. When this is set to 0 the lowest position of the controller will reduce the volume of the drum voice to silence. When this is set to 127 the controller will have no effect on the volume.

The MIDI standard defines Control Change number 7 as MIDI volume. If you select control change 7 for VolLowLimit, the controller will regulate volume over the full range regardless of the "Value" setting. The LCD will display "Limit ignored!" to remind you of this.

DRUM SET DATA

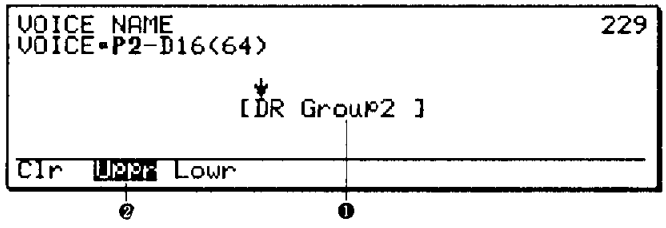
5. Voice name

JUMP #229

Summary: Specify a ten-character name for the voice being edited. In voice play mode this voice name will be displayed in large characters.

Procedure:

From: drum set job directory (JUMP #272)
Select: 05:Drum Set Name (JUMP #229)
Specify: the drum voice name



❶ Enter a ten-character name for the drum voice.
❷ To clear the currently entered name press F1 (Clr). To switch to upper-case characters press F2 (Uppr). To switch to lower-case characters press F3 (Lowr).

For a detailed explanation of how to enter character data, refer to *How to enter data* of the *Introductory section.*

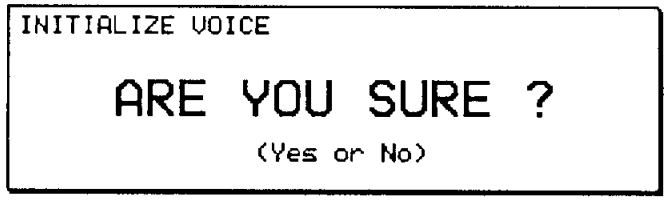
DRUM SET DATA

7. Initialize voice

Summary: Initialize the drum set data being edited to the basic or minimum settings.

Procedure:

From: drum set job directory (JUMP #271)
Select: 07:Initialize
To execute: the initialize operation press YES
To quit: without executing press NO or EXIT



This function sets all drum set data to the basic or minimum settings. If you are creating an entirely new voice, using this initialize function may be faster than resetting all the parameters by hand.

If you are sure you want to initialize the drum set data press YES and the data will be set to the values shown below. If you decide not to initialize, press NO.

This function initializes only Drum Set data. Other initialize functions are provided for initializing Voice Common data, AFM Element data, or AWM Element data.

Initialized settings for Drum Set data

01 Voice volume
Voice volume = 127

02 Wave data set (for each Key Note Number)
Level = 127 (all key note numbers)
Output Group = both (all key note numbers)
Individual Output Port = off (all key note numbers)
Fine tuning = ±0 (all key note numbers)
Alternate = off (all key note numbers except A2 HI-HAT CLOSED and B2 HI-HAT OPEN)

Key note number	Waveform (preset)	Note shift	Static pan
C1	96 BASS DRUM 4	–5	±0
C#1	96 BASS DRUM 4	+5	±0
D1	95 BASS DRUM 3	–5	±0
D#1	95 BASS DRUM 3	+5	±0
E1	103 TOM 2	–9	+24
F1	103 TOM 2	–3	–8
F#1	103 TOM 2	+3	+8
G1	103 TOM 2	+9	+24
G#1	94 BASS DRUM 2	±0	±0
A1	93 BASS DRUM 1	±0	±0
A#1	99 SNARE DRUM 3	±0	±0
B1	102 TOM 1	–9	–24
C2	102 TOM 1	–3	–8
C#2	98 SNARE DRUM 2	±0	±0
D2	102 TOM 1	+3	–8
D#2	101 RIM SHOT	±0	+12
E2	97 SNARE DRUM 1	±0	±0
F2	102 TOM 1	+9	+24
F#2	108 CLAPS	±0	–12
G2	109 COWBELL	±0	–20
G#2	111 SHAKER	±0	+20
A2	104 HI-HAT CLOSED		±0
A#2	110 TAMBOURINE	±0	–10
B2	105 HI-HAT OPEN	±0	+24
C3	106 CRASH	±0	+10
C#3	100 SNARE DRUM ROLL	±0	±0
D3	107 RIDE	–4	–24
D#3	107 RIDE	+4	–24
E3	73 TUBE	–10	–26
F3	73 TUBE	–5	–20
F#3	73 TUBE	+5	–14
G3	82 DIGITAL ATTACK	–7	±0
G#3	82 DIGITAL ATTACK	+7	±0
A3	112 ANALOG PERCUSSION	–5	±0
A#3	112 ANALOG PERCUSSION	+5	±0
B3	77 BOW TRAN	–5	±0
C4	77 BOW TRAN	+5	±0
C#4	80 BAMBOO	±0	+20

Key note number	Waveform (preset)	Note shift	Static pan
D4	75 VOCAL "Ba"	–5	+24
D#4	75 VOCAL "Ba"	+5	+24
E4	83 TEMP RA	±0	±0
F4	71 BOTTLE 2	±0	±0
F#4	70 BOTTLE 1	±0	±0
G4	72 BOTTLE 3	±0	±0
G#4	81 CUP ECHO	±0	±0
A4	74 VOCAL "Ga"	–5	–24
A#4	74 VOCAL "Ga"	+5	–24
B4	79 TEAR	±0	±0
C5	59 OH ATTACK C	–12	±0
C#5	59 OH ATTACK C#	–11	±0
D5	59 OH ATTACK D	–10	±0
D#5	59 OH ATTACK D#	–9	±0
E5	59 OH ATTACK E	–8	±0
F5	59 OH ATTACK F	–7	±0
F#5	59 OH ATTACK F#	–6	±0
G5	59 OH ATTACK G	–5	±0
G#5	59 OH ATTACK G#	–4	±0
A5	59 OH ATTACK	–3	±0
A#5	59 OH ATTACK A#	–2	±0
B5	59 OH ATTACK B	–1	±0
C6	59 OH ATTACK C high	±0	±0

03 Effect set
*** same as normal voice initial data ***

04 Controller set
Volume Low Limit = 0
Device = 14

05 Drum set name
Name = INIT VOICE

DRUM SET DATA

8. Recall voice

Summary: Recall all data of the previously edited voice.

Procedure:

From: drum set job directory (JUMP #271)
Select: 08:Recall
To execute: the recall operation press YES
To quit: without executing press NO or EXIT.

RECALL VOICE

ARE YOU SURE ?

(Yes or No)

If after editing a voice you exit voice edit mode without storing, the edited voice data will be lost. In such cases you can use this function to recall the previously edited data into the editing buffer.

Note: *This operation recalls voice data, not just Drum Voice data, and is also available while editing Common data, AFM Element data, or AWM Element data. For details refer to Voice Common 16. Recall.*

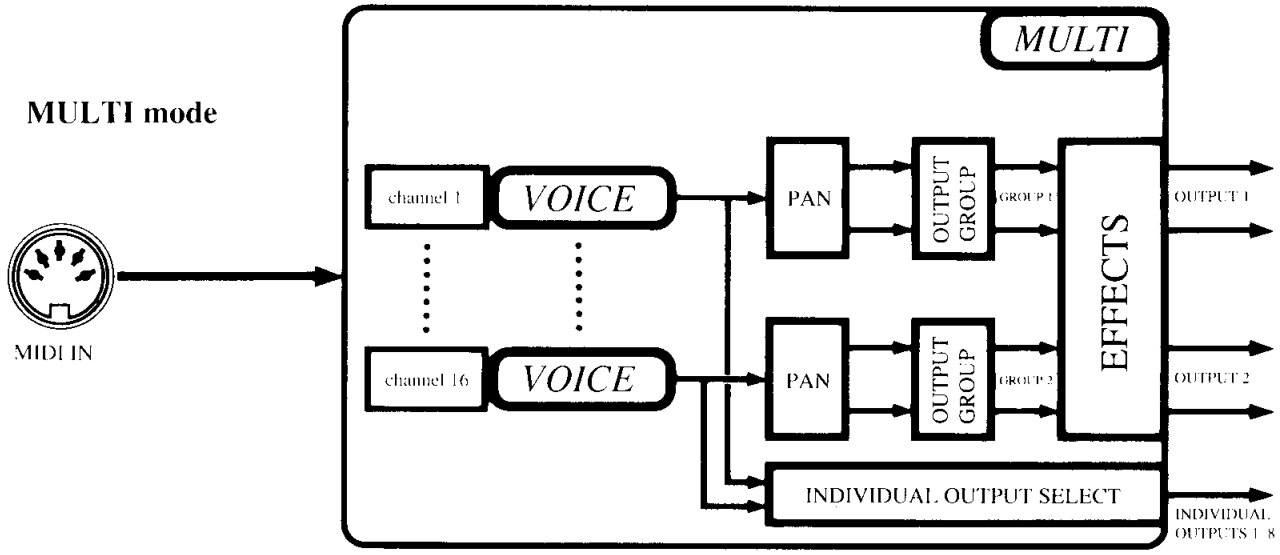
MULTI PLAY MODE

Multi mode allows the TG77 to function as sixteen completely independent synthesizers. In multi play mode you can do the following things.

- Select multis from preset, internal, or card memory.
- View a directory of the 16 multis in an internal, card, or preset memory.
- Copy the currently selected multi to any internal or card memory.

Multi mode allows the TG77 to function as sixteen completely independent synthesizers, each being controlled on its own MIDI channel.

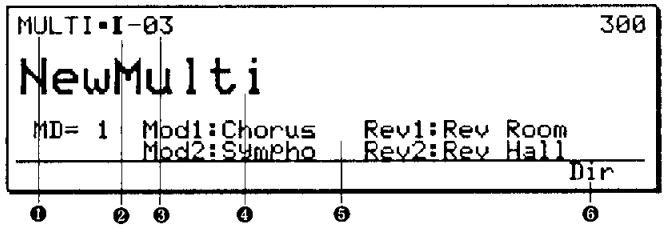
MULTI mode



Multi select

JUMP #300

Press MULTI to enter multi play mode. The following LCD will appear.



❶ MULTI: This indicates that you are in Multi Play mode.

❷ Multi memory (I, C, P): This indicates the multi memory; Internal, Card, or Preset. Preset memory contains only a single bank of 16 Multis.

❸ Multi number (1–16): This indicates the number of the multi.

❹ The Multi name is displayed in large characters.

❺ Effect settings: The effect mode is indicated as "MD=", and the type of effect selected by this multi is shown for each of the four DSP units; Modulation 1 and 2, and Reverb 1 and 2. For details refer to *Multi Edit mode, job 7. Effect set.*

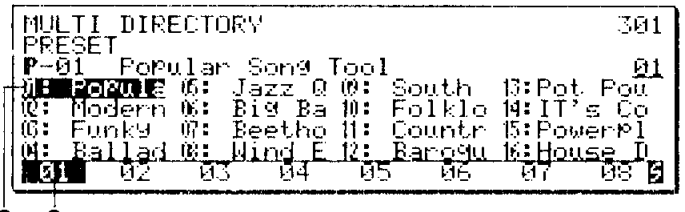
❻ Refer to the following section *Multi Directory.*

To select a multi, press MEMORY to select internal, card, or preset multis. Then use the -1 +1 keys or the numeric key pad to select a multi 1–16.

Multi directory

JUMP #301

Summary: While in multi play mode you can press F8 (Dir) to view a directory of the sixteen multis in the currently selected multi memory. The following display will appear.



❶ The first seven characters of each twenty-character multi name will be displayed. When you select a different multi memory (internal, card, or preset) the sixteen multis in the newly selected memory will be displayed. In addition to the usual methods of selecting a multi, you can also use the arrow keys to select a multi.

❷ Pressing F1–F8 (01)–(08) will select a multi 1–8 from the displayed multi directory. Holding SHIFT and pressing F1–F8 (09)–(16) will select a multi 9–16.

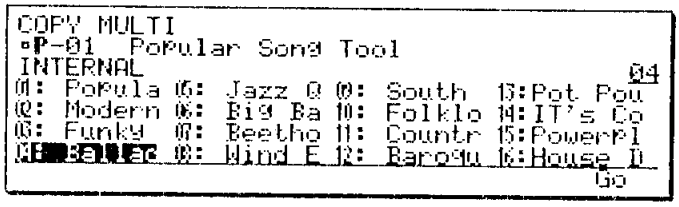
To return to the multi play display with the name of the selected multi displayed in large characters press EXIT.

Copy multi

Summary: Anytime in multi play mode you can copy the currently selected multi to another multi memory.

Procedure:

From: multi play mode (JUMP #300, #301)
Press: COPY
Specify: the destination to which the multi will be copied.
To execute: the copy operation press F8 (Go).
To quit: without executing press EXIT.



The names of the sixteen multis in Internal or Card memory are displayed as explained in *Multi Directory*. Press MEMORY to select internal or card memory, and use -1 +1 or the numeric keypad to specify a copy destination 1–16.

After specifying the copy destination press F8 (Go). You will be asked "Are you sure?" If you are sure you want to copy the multi, press YES and the data will be copied. To quit without copying press NO.

Note: *If you copy a multi from internal memory to card memory, all internal voice numbers used by that multi will be converted into card voice numbers. In the same way, if you copy a multi from card memory to internal memory, all card voice numbers used by that multi will be converted into internal voice numbers.*

MULTI EDIT MODE

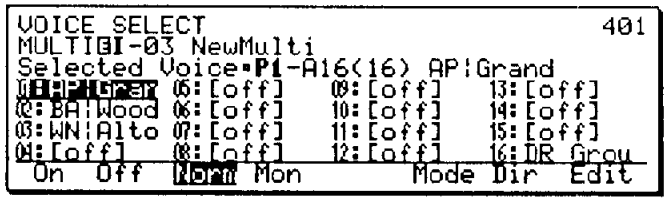
This section explains the details of all Multi Edit parameters.

From multi play mode press EDIT to enter multi edit mode. Unlike voice edit mode, multi edit mode has only a single job directory.

Compare

When you are in edit mode but have not yet modified the data, a small square ■ is displayed at the left of the multi number to indicate that the voice has not yet been edited. If the data is edited in any way, this will change to a inverse "E".

The multi has been edited

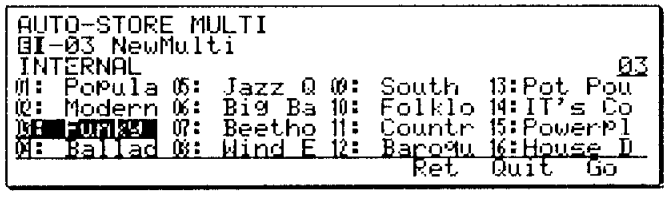


If you want to see and hear the original data press EDIT (COMPARE) and the inverse "E" will change to a "C" indicating that you are in compare mode. To return to edit mode, press EDIT (COMPARE) once again and the "C" will change back to an "E".

Note: While comparing, the mode select keys, the cursor keys, EXIT, PAGE, JUMP, COPY, and some of the F1–F8 keys will not function.

Store multi

When you press EXIT or use the JUMP button to exit Multi Edit mode after editing the data, the top line of the display will ask "AUTO-STORE MULTI".



The LCD will show the first seven characters of the multi names in the currently selected internal or card multi memory. The multi name displayed in inverse indicates the multi memory into which the edited data will be stored.

1. Press MEMORY to specify the multi memory, and select the multi memory 1–16 in which you want to store your newly edited multi.
2. Press F8 (Go), and the bottom line will ask "Are you sure ? (Yes or No)".
3. If you are sure you want to store the edited multi, press +1/YES and the bottom line of the LCD will show "Store completed". If you decide not to store, press -1/NO to return to the store destination select display.
4. You will then return to multi play mode or the jump destination.

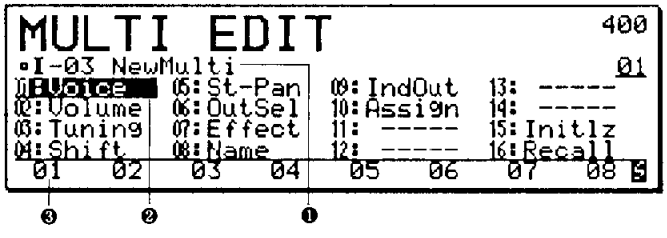
Multi edit job directory

JUMP #400

Summary: The parameters of Multi Edit mode are divided into the jobs shown in this job directory.

Procedure:

From: multi play mode (JUMP #300)
Select: EDIT (JUMP #400)
Specify: the desired multi edit job and press ENTER.



❶ This area shows the number and name of the selected multi.

❷ Move the cursor in this area to select a job and press ENTER to go to the selected job.

❸ Pressing F1–F8 will select the corresponding job 1–8. Holding SHIFT and pressing F1, F2, F7 or F8 will select job 9, 10, 15 or 16.

01: Voice (Voice Select): A multi consists of sixteen voices which are controlled by MIDI channels 1–16. A different voice can be selected for each of the sixteen channels in the multi.

02: Volume (Voice Volume): The volume of the voice played by each channel of the multi can be adjusted.

03: Tuning (Voice Tuning): The fine tuning of the voice played by each channel of the multi can be adjusted in steps of 1.1718875 cents.

04: Shift (Voice Note Shift): The pitch of the voice played by each channel of the multi can be adjusted in half steps.

05: St-Pan (Voice Static Pan): A fixed stereo position can be specified for the voice played by each channel of the multi, or a voice can use its own pan settings.

06: OutSel (Voice Output Select): All voices played by the multi are sent from output groups 1 and/or 2 to the effect unit. The selected output group determines how the voice will be processed through the effect unit.

07: Effect (Effect Set): The four effects in the effect unit can be arranged in various ways to add modulation and reverb to the sound.

08: Name (Name Multi): The multi being edited can be given a twenty-character name. In multi play mode this name will be displayed in large characters.

09: IndOut (Individual Output Select): The voice of each channel in the multi can be sent from any one of the individual outputs 1–8.

10: Assign (Assign Mode Select): The simultaneous note production capability of the TG77 can be allocated among the voices of the multi automatically (DVA) or statically (SVA).

15: Initlz (Initialize Multi): The multi data being edited can be initialized to a set of standard values.

16: Recall (Recall Multi): The previously edited Multi data can be recalled for additional editing.

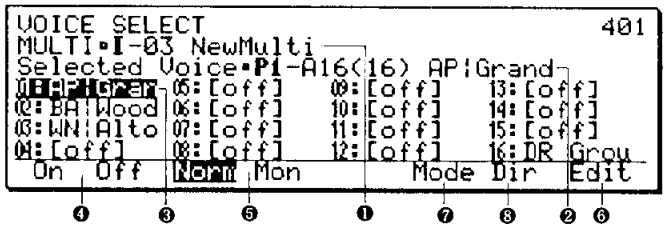
1. Voice select

JUMP #401

Summary: A multi consists of sixteen voices which are controlled by MIDI channels 1–16. A different voice can be selected for each of the sixteen channels in the multi.

Procedure:

From: multi job directory (JUMP #400)
Select: job 01:Voice (JUMP #401)
Specify: the voice for each channel of the multi



❶ This displays the number and name of the multi you are editing.

❷ This displays the number and name of the voice where the cursor is located.

❸ Move the cursor in this area and select a voice for each of the sixteen channels in the multi. This area displays only the first seven characters of the selected voice name, but the voice number and name are fully displayed in ❷. Each channel of the multi can use any voice from internal, card, or preset memories, or can be set to an "off" voice. See *Off Voice* below for details.

A multi in card memory can use only card or preset voices. A multi in internal memory can use only internal or preset voices.

If a selected voice contains an AWM element which uses card waveform data, and if the wrong card is inserted into the WAVEFORM slot, an X mark will be displayed instead of the number 1–16, and an incorrect wave will sound. (Each AWM waveform card has a unique ID number which is stored as part of the data for an AWM element.)

❹ F1 (On), F2 (Off): To turn off the voice selected by the cursor, press F1 (Off). To turn the voice on again, press F2 (On). For details, see Off Voice, below.

❺ F3 (Norm), F4 (Mon): When in Multi edit mode, you have a choice of MIDI input modes; Normal or Monitor.

When normal mode is selected, each incoming channel of MIDI data will play only the voice of the corresponding channel.

When monitor mode is selected, all incoming channels of MIDI data will play the voice where the cursor is located in this Voice Select display. This is useful when you wish to check the voices of a multi without changing the transmit channel of your keyboard. Monitor mode remains effective when editing other multi parameters. If monitor mode has been turned on, you will be reminded of this in other multi edit displays. The top line of the display will show (for example) "<Mon 4Ch>", indicating that all incoming MIDI messages will play the voice selected for channel 4 of the multi.

❻ To edit the voice selected by the cursor, press F8 (Edit). You will enter voice edit mode. Details are the same as explained in *Voice edit mode*, but when you press EXIT to exit voice edit mode you will return to this *Multi edit 1. Voice select* job. However you will not be able to edit effect settings of the voice, and depending on the Voice static Pan setting of the multi, modifying the output select settings or dynamic pan settings of the voice may have no effect.

You can use this function to edit one of the voices in a multi *while that multi is being played from your external sequencer.* This capability is very useful, since it allows you to edit a voice while it is being played in a musical context with other instruments.

❼ To check the voice mode of each voice in the multi, press F6 (Mode).

❽ To see a directory listing of the voices in memory, press F7 (Dir) and use MEMORY and BANK.

Off Voice: Each channel of the multi can use any voice from internal, card, or preset memories, or can be turned "off". When turned off, the multi will not play a voice in response to data on that channel.

If you set the output level of an unwanted channel of the multi to 0 (see *Multi edit 2. Voice volume*) it will not be heard, but will still use the TG77's tone generator whenever notes on that MIDI channel are received, and will therefore reduce the simultaneous notes available for the other voices. This is why you should turn unneeded channels of the multi "off".

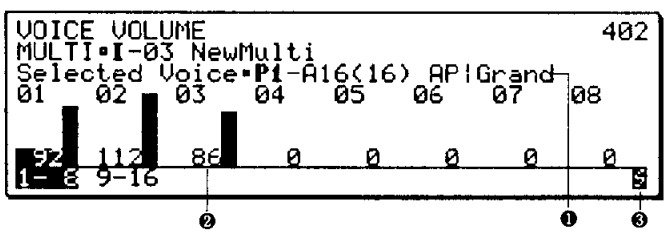
2. Voice volume

JUMP #402

Summary: Set the volume of the voice played by each channel of the multi.

Procedure:

From: multi job directory (JUMP #400)
Select: job 02:Volume
Specify: the volume for each channel
for channels 1–8 press F1 (1–8) (JUMP #402)
for channels 9–16 press F2 (9–16) (JUMP #403)



❶ Selected Voice: This displays the number and name of the voice played by the multi channel where the cursor is located.

❷ Voice Volume (0...127): Set the volume for each voice played by the sixteen channels of the multi. The volume for each voice is displayed as a vertical bar graph.

❸ Holding SHIFT and pressing F1–F8 will move the cursor to voices 1–8 or to voices 9–16, depending on whether F1 or F2 has been pressed.

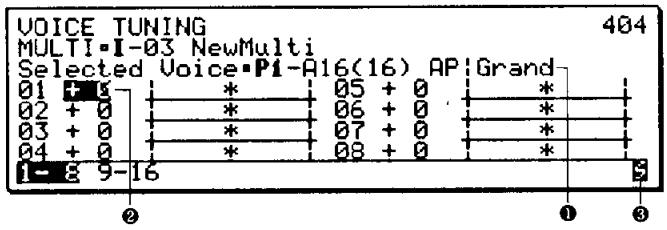
3. Voice tuning

JUMP #404

Summary: Adjust the fine tuning of the voice played by each channel of the multi.

Procedure:

From: multi job directory (JUMP #400)
Select: job 03:Tuning
Specify: the tuning for each channel
for channels 1–8 press F1 (1–8) (JUMP #404)
for channels 9–16 press F2 (9–16) (JUMP #405)



❶ Selected Voice: This displays the number and name of the voice played by the multi channel where the cursor is located.

❷ Voice Tuning (–63...+63 in steps of 1.171875 cents): Set the tuning for each voice played by the sixteen channels of the multi. The tuning for each voice is displayed as a horizontal bar graph.

❸ Holding SHIFT and pressing F1–F8 will move the cursor to voices 1–8 or to voices 9–16, depending on whether F1 or F2 has been pressed.

Note: The actual pitch at which a voice will sound is affected by many other factors; System utility settings 1. Master tuning, Voice common data 2. Element detune, 3. Element note shift, 11. Micro tuning, AFM element data 2. AFM oscillator, 7. AFM pitch EG, and AWM element data 1. AWM waveform set, 6. AWM pitch EG.

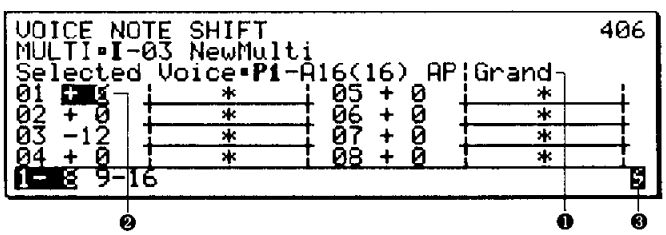
4. Voice note shift

JUMP #406

Summary: Adjust the note shift (transposition) of the voice played by each channel of the multi.

Procedure:

From: multi job directory (JUMP #400)
Select: job 04:Shift
Specify: the note shift for each channel
for channels 1–8 press F1 (1–8) (JUMP #406)
for channels 9–16 press F2 (9–16) (JUMP #407)



❶ Selected Voice: This displays the number and name of the voice played by the multi channel where the cursor is located.

❷ Voice Note Shift (–64...+63 in half steps): Set the note shift (transposition) for each voice played by the sixteen channels of the multi. The note shift setting for each voice is displayed as a horizontal bar graph.

❸ Holding SHIFT and pressing F1–F8 will move the cursor to voices 1–8 or to voices 9–16, depending on whether F1 or F2 has been pressed.

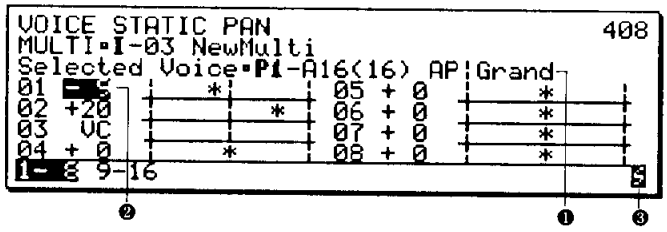
5. Voice static pan

JUMP #408

Summary: Specify the stereo position for the voice played by each channel of the multi.

Procedure:

From: multi job directory (JUMP #400)
Select: job 05:St-Pan
Specify: the static pan position for each channel
for channels 1–8 press F1 (1–8) (JUMP #408)
for channels 9–16 press F2 (9–16) (JUMP #409)



❶ Selected Voice: This displays the number and name of the voice played by the multi channel where the cursor is located.

❷ Voice Static Pan (VC or –31...+31 = left...right): Set the static pan position for each voice played by the sixteen channels of the multi. The static pan setting for each voice is displayed as a horizontal bar graph.

It is also possible to select "VC", when the voice will use its own pan data. If "VC" is not selected, the pan data of the voice will be ignored and the static pan setting you specify here will be used. If "VC" is not selected for a drum voice, all the drum sounds will be panned to the same pan position –31...+31 you specify here.

❸ Holding SHIFT and pressing F1–F8 will move the cursor to voices 1–8 or to voices 9–16, depending on whether F1 or F2 has been pressed.

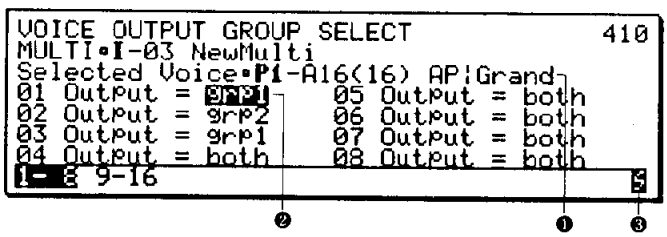
6. Voice output group select

JUMP #410

Summary: Each voice can be sent from either or both output groups, to determine how the voice will be processed through the effect units.

Procedure:

From: multi job directory (JUMP #400)
Select: job 06:OutSel
Specify: the output group for each channel
for channels 1–8 press F1 (1–8) (JUMP #410)
for channels 9–16 press F2 (9–16) (JUMP #411)



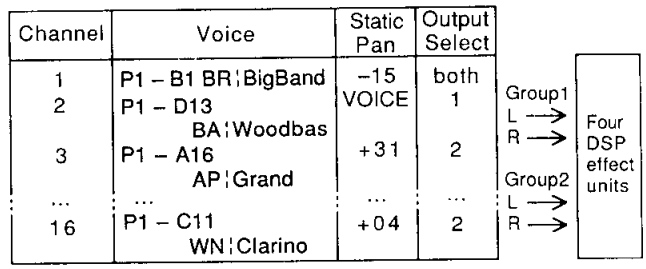
❶ Selected Voice: This displays the number and name of the voice played by the multi channel where the cursor is located.

❷ Output (off, grp1, grp2, both): Each voice played by a multi is independently panned according to the setting of *5. Voice static pan*, and this stereo output of each voice is sent to the DSP effects unit via Output Group 1, 2, or both. The output group setting of the voice itself will be ignored unless this is set "off".

Multi edit settings cannot determine the output group for a multi channel that plays a drum voice, and the cursor cannot be moved to these voices. The display will show "Output = drum", and the drum voice data will determine which output group is used by each drum sound. Refer to *Drum set data, 2. Wave data set* (JUMP #274).

❸ Holding SHIFT and pressing F1–F8 will move the cursor to voices 1–8 or to voices 9–16, depending on whether F1 or F2 has been pressed.

Output: The selected Output Group(s) will determine how the voice is processed by the effect units as you specify in *7. Effect set.* If the output group is "Off" the voice will not be processed through the effect units. The unprocessed sound of the voice will be heard if the Stereo Mix of the effect unit is turned on.



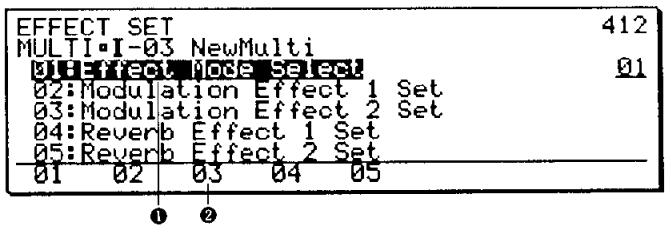
7. Effect set

JUMP #412

Summary: The four effects in the effect unit can be arranged in various ways to add modulation and reverb to the sound.

Procedure:

From: multi job directory (JUMP #400)
Select: job 07:Effect (JUMP #412)



❶ Move the cursor in this area to select a job.

01: Effect Mode Select: Specify how the four effect units will be connected. (JUMP #413)

02: Modulation Effect 1 Set: Select an effect type and set parameters for modulation effect 1. (JUMP #414, #415)

03: Modulation Effect 2 Set: Select an effect type and set parameters for modulation effect 2. (JUMP #416, #417)

04: Reverb Effect 1 Set: Select an effect type and set parameters for reverb effect 1. (JUMP #418, #419)

05: Reverb Effect 2 Set: Select an effect type and set parameters for reverb effect 2. (JUMP #420, #421)

❷ Pressing F1–F5 will select the corresponding job.

The sixteen voices played by a multi are processed through the effect units as determined by the output group selected for each voice. Refer to the previous section, *6. Voice output group select.*

Job 1.Effect Mode Select determines how the two input groups are routed through the four effect units, and jobs 2–5 determine how each effect unit will process the sound.

Effect settings in multi mode are exactly the same as explained in voice mode. For details, refer to *Voice common data 10.1, 10.2, 10.4.*

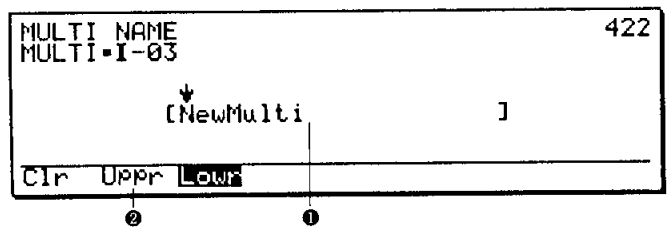
8. Multi name

JUMP #422

Summary: The multi being edited can be given a twenty-character name. In multi play mode, this multi name will be displayed in large characters.

Procedure:

From: multi job directory (JUMP #400)
Select: job 08:Name (JUMP #422)
Specify: the name for the multi



❶ Enter a twenty-character name for the multi.

❷ To clear the currently entered name press F1 (Clr). To switch to upper-case characters press F2 (Uppr). To switch to lower case characters press F3 (Lowr).

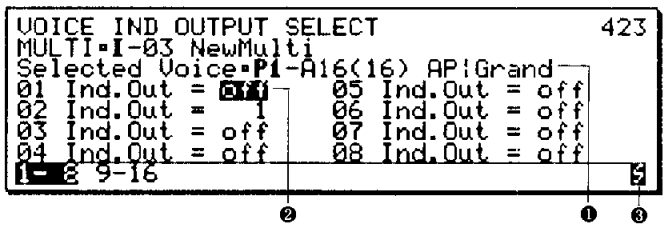
Remarks: Methods of entering character data are explained in *Introducing the TG77, How to use the numeric key pad,* on page 30.

9. Voice individual output select

JUMP #423

Procedure: Specify the individual output used by the voice played by each channel of the multi.

From: multi job directory (JUMP #400)
Select: job 09:IndOut
Specify: an individual output 1–8 for each voice
for channels 1–8 press F1 (1-8) (JUMP #423)
for channels 9–16 press F2 (9-16) (JUMP #424)



❶ Selected Voice: This displays the number and name of the voice played by the multi channel where the cursor is located.

❷ Individual Output (off, 1–8): Specify the individual output for the voice played by each channel. This setting has no effect on the multi edit parameter *6. Voice output group select.*
Two or more channels of the multi may use the same individual output port if desired.

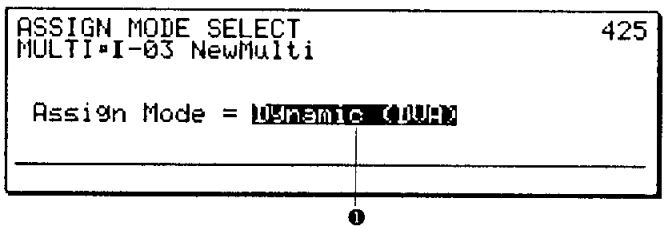
❸ Holding SHIFT and pressing F1–F8 will move the cursor to voices 1–8 or to voices 9–16, depending on whether F1 or F2 has been pressed.

10. Assign mode select

JUMP #425

Procedure: Specify the way in which the simultaneous note production capability of the TG77 is assigned to the voices of the multi.

From: multi job directory (JUMP #400)
Select: job 10:Assign (JUMP #425)
Select: the assign mode (Dynamic or Static)



❶ Assign Mode (Dynamic, Static): This determines the voice assign mode of the entire multi.

The TG77 contains two tone generator circuits; an AFM tone generator capable of producing up to 16 simultaneous notes of AFM sound, and an AWM tone generator capable of producing up to 16 simultaneous notes of digitally sampled sound. Especially when you play complex music using two-element or four-element voices, the TG77 may run out of available sound producing circuitry, and must turn off an older note before starting to produce a newly requested note. The Assign Mode parameters allow you to specify how such situations are handled.

Dynamic Voice Allocation (DVA): When DVA is selected, the oldest sounding note (of any channel) of the multi will be turned off to make room for any newly requested note (of any channel) which would exceed the TG77's simultaneous note capacity. DVA has the advantage of allowing you to fully use the simultaneous note generation capabilities of the TG77. However, the disadvantage is that the oldest note will be cut off regardless of whether it is musically important, such as a string sound held over several measures.

Static Voice Allocation (SVA): When SVA is selected, you can specify a fixed number of notes to be allocated to each channel. When SVA mode is used, the response to a note-on message may be slightly faster, since the TG77 needs to perform fewer calculations.

After selecting SVA, press F8 (Edit) to make SVA settings. You have two ways of making SVA settings. Refer to the following section, *10.0 SVA edit*.

10.0 SVA edit

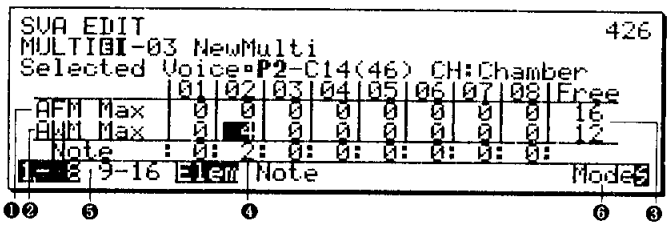
JUMP #426

Procedure: Specify the way in which the simultaneous note production capability of the TG77 is assigned to the voices of the multi.

From: multi edit job 10.Assign (JUMP #425)
When: assign mode is SVA
Press: F8 (Edit) (JUMP #426)
Press: F3 to set SVA independently for AFM and AWM elements (JUMP #426)
Press: F4 to set SVA by total number of notes (JUMP #428)

When making SVA settings using either method, it may be helpful to press F8 (Mode) to see how many AFM and AWM elements are being used for each note of each voice.

By element: Press F3 (Elem) to set SVA independently for AFM and AWM elements. This allows you to make most efficient use of the TG77.



❶ AFM Max: The maximum number of AFM elements that can be used simultaneously by this voice. The total for channels 1–16 of this row cannot exceed 16.

❷ AWM Max: The maximum number of AWM elements that can be used simultaneously by this voice. The total for channels 1–16 of this row cannot exceed 16.

❸ Free: The number of unassigned AFM and AWM elements is displayed here.

❹ Note: This area displays the resulting number of notes that can be produced simultaneously by each channel of the multi. This will depend on the number of AFM and AWM elements used by the voice selected for each channel of the multi.

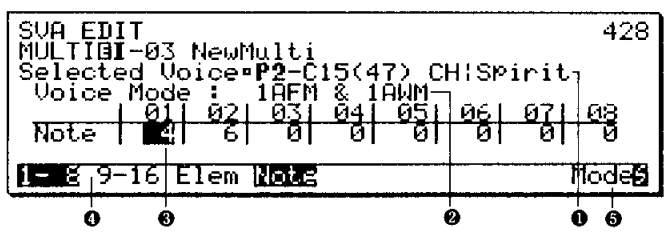
❺ Press F1 (1-8) to make settings for channels 1–8. Press F2 (9-16) to make settings for channels 9–16.

❻ Press F8 (Mode) to view the voice mode of the sixteen voices used in the multi. Press EXIT to return to the SVA Edit display.

AFM Max, AWM Max, Note: Setting the number of SVA notes independently for AWM and AFM elements allows you to take maximum advantage of the TG77's tone generating circuitry when all-AFM or all-AWM voices are used in the multi.

For example in the above LCD, the CH:Chamber voice used in channel 2 of the multi "3.NewMulti" is a 2AWM element voice; i.e., each note uses two AWM notes. For this voice, setting AWM Max of multi channel 2 to 4 would allow that voice to produce up to two simultaneous notes. The AFM Max setting for the voice can be set at 0, for use by a different voice which uses only AFM elements.

By note: Press F4 (Note) to set SVA by total note numbers. This is easier, but may be slightly wasteful if the multi uses all-AFM or all-AWM voices.



❶ Selected Voice: This displays the number and name of the voice selected by the cursor.

❷ Voice Mode: This displays the number and type of elements used in the voice selected by the cursor.

❸ Note: Specify the number of notes that can be played simultaneously by each channel of the multi. The total number of elements used by all voices cannot exceed 16 AFM or 16 AWM elements.

❹ Press F1 (1-8) to make settings for channels 1–8. Press F2 (9-16) to make settings for channels 9–16.

❺ Press F8 (Mode) to view the voice mode of the sixteen voices used in the multi. Press EXIT to return to the SVA Edit display.

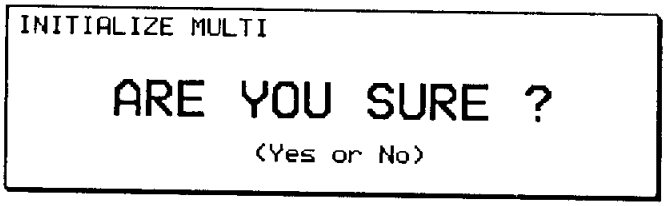
In the above LCD, channel 2 of this multi uses the CH:Chamber voice, which is 2AWM element voice. If we allow this voice 6 notes, it will use up 12 AWM elements. The 1AFM&1AWM CH¦Spirit voice used by channel 1 of the multi uses 1 AWM element for each voice, and can be allowed 4 notes, which beings the total of AWM elements to the maximum of 16.

15. Initialize multi

Summary: The multi data being edited can be initialized to a set of standard values.

Procedure:

From: multi job directory (JUMP #400)
Select: job 15:Initlz
To execute: the initialize operation press YES.
To quit: without executing press NO or EXIT.



This function sets all multi data values to the minimum or simplest possible setting. When you are creating a new multi it is often convenient to start with the initial settings.

If you are sure you want to initialize the multi data, press YES and the data of the multi being edited will be set to the values shown below. If you decide not to initialize, press NO.

Initialized settings for Multi data

01 Voice select
Preset 1 A01(01) GrandPiano (all channels)

02 Voice volume
Volume = 127 (maximum) (all channels)

03 Voice tuning
Tuning = ±0 (all channels)

04 Voice note shift
Note Shift = ±0 (all channels)

05 Voice static pan
Pan = ±0 (= center) (all channels)

06 Voice output group select
Output = both (all channels)

07 Effect set
*** same as for normal voice ***

08 Name multi
Name = INIT MULTI VOICE

09 Voice individual output select
off (all channels)

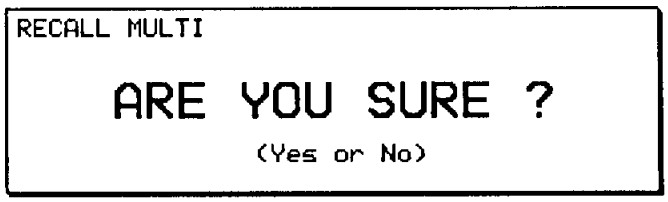
10 Assign mode select
Assign mode = DVA
Max number of elements
AFM = 16, AWM = 16 (channel 1)
AFM = 0, AWM = 0 (channels 2–16)

16. Recall multi

Summary: The previously edited Multi data can be recalled for additional editing.

Procedure:

From: multi job directory (JUMP #400)
Select: job 16:Recall
To execute: the recall operation press YES.
To quit: without executing press NO or EXIT.



If after editing a multi you exit multi edit mode without storing, the edited multi data will be lost. In such cases, you can use this function to recall the previously edited multi data into the editing buffer.

If you are sure you want to recall, press YES and the previously edited multi data will be recalled into the editing buffer. If you decide not to recall, press NO.

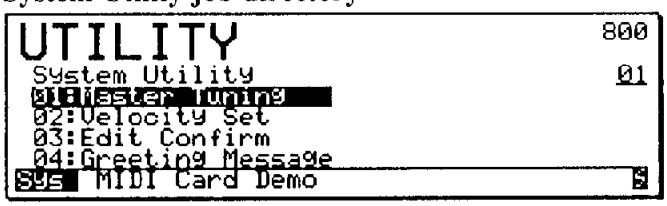
UTILITY MODE

In utility mode you can make settings that affect the TG77's overall system, make settings for MIDI transmission and reception, transmit bulk data via MIDI, and save or load data on card. You can also play the built-in demo songs.

Contents of this section **page**

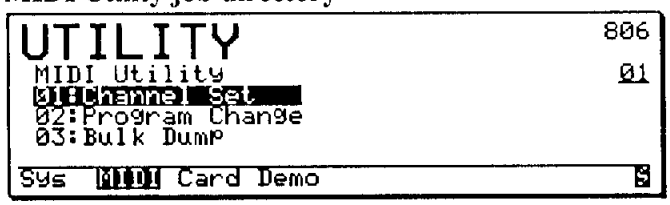
In Utility mode you can make settings that affect the TG77's overall system, make settings for MIDI transmission and reception, transmit bulk data via MIDI, save or load data on card, or play the built-in demo songs. The functions of utility mode are divided into four job directories; System Utility, MIDI Utility, Card Utility, and Demo Utility. When you press UTILITY the last-selected of these directories will appear. Select a job directory by pressing F1–F4.

System Utility job directory



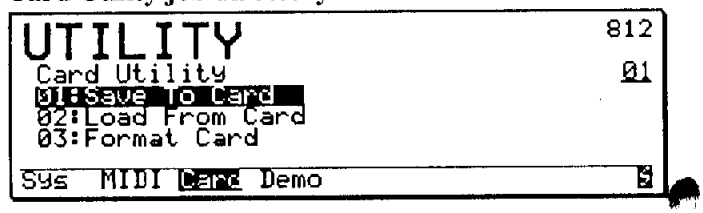
01:Master Tuning: The overall tuning of the TG77 can be adjusted both in half steps and fine tuning.
02:Velocity Set: A velocity curve can be selected to allow the TG77 to respond in different ways to note-on velocity.
03:Edit Confirm: The "Are you sure?" message that appears when you store, recall, or initialize data can be turned on/off.
04:Greeting Message: Edit the two-line message that is briefly displayed when the TG77 power is turned on.

MIDI Utility job directory



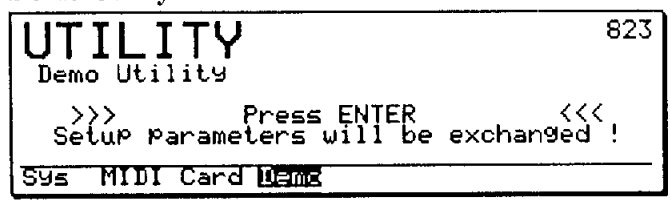
01:Channel Set: The TG77 will receive and transmit MIDI data as determined by the MIDI channels and settings specified here.
02:Program Change: MIDI program change messages will be received as specified here.
03:Bulk Dump: Various types of TG77 data can be transmitted via MIDI to another TG77 or other device.

Card Utility job directory



01:Save To Card: Data can be saved to a RAM card.
02:Load From Card: Data can be loaded from a RAM or ROM card.
03:Format Card: Before a RAM card can be used it must be formatted to accept TG77 data.

Demo Utility



The TG77 contains data for ten demo songs in ROM (permanent memory). This data can be loaded, and the ten songs played in succession. You can select a song to begin playing from.

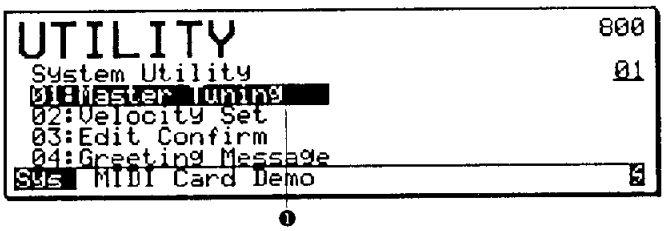
System utility

JUMP #800

Summary: System utility settings affect the entire TG77 system.

Procedure:

From: MIDI Utility, Card Utility, or Demo Utility (JUMP #806, #812, #823)
Press: F1 (Sys) (JUMP #800)
Select: the desired system utility job and press ENTER.



❶ Move the cursor in this area to select one of the following jobs and then press ENTER.

01: Master Tuning: The overall tuning of the TG77 can be adjusted both in half steps and fine tuning.
02: Velocity Set: The TG77 can be set to respond to note-on velocity in various ways.
03: Edit Confirm: The "Are you sure?" message that appears when you store, recall, or initialize data can be turned on/off.
04: Greeting Message: The two-line message that is briefly displayed when the TG77 power is turned on can be edited.

❷ Holding SHIFT and pressing F1–F4 will select the corresponding System Utility job.

SYSTEM UTILITY

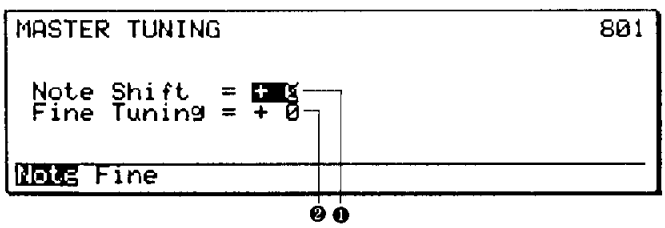
1. Master tuning

JUMP #801

Summary: The overall tuning of the TG77 can be adjusted both in half steps and fine tuning.

Procedure:

From: system utility job directory (JUMP #800)
Select: 01:Master Tuning (JUMP #801)
Specify: the overall tuning in half steps and fine steps



❶ Note Shift (–64...+63): This adjusts the pitch of the entire TG77 in half steps.
❷ Fine Tuning (–64...+63): This adjusts the pitch of the entire TG77 in steps of 1.171875 cents.

Remarks: To adjust the pitch of only specific voices, refer to *Voice Common job 2. Element detune* and *3. Note shift.*

Note Shift: This note shift setting does not affect drum voices. A drum voice has its own note shift settings, which are set independently for each note. Refer to *Drum set data, 2. Wave data set*, page 148.

SYSTEM UTILITY

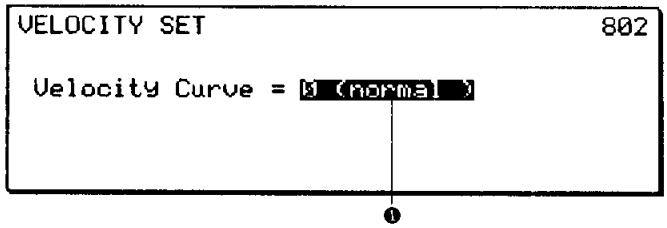
2. Velocity set

JUMP #802

Summary: The TG77 can be set to respond to note-on velocity in various ways.

Procedure:

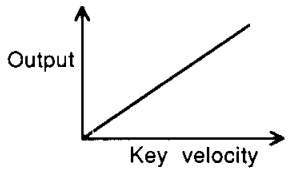
From: system utility job directory (JUMP #800)
Select: 02:Velocity Set (JUMP #802)
Specify: the velocity curve



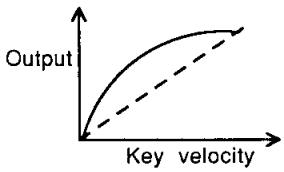
❶ Velocity Curve (0...7): This determines the way in which the TG77 tone generator will respond to your playing velocity as shown in the following diagrams.

Velocity curves 6 (cross-1) and 7 (cross-2) allow you to crossfade between two elements using key velocity. Set one element to positive key velocity sensitivity and the other to negative key velocity sensitivity. Refer to *AFM element data 5. AFM sensitivity* (JUMP #243) and *AWM element data 4. AWM sensitivity* (JUMP #260).

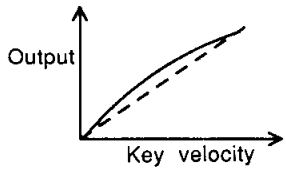
0. Normal



1. Soft – 1

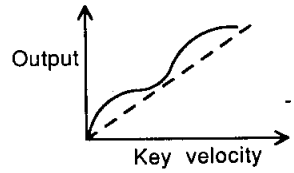


2. Soft – 2



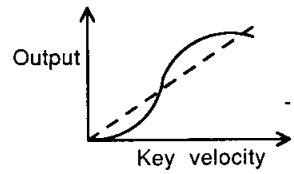
- - - is the Normal velocity curve

3. Easy



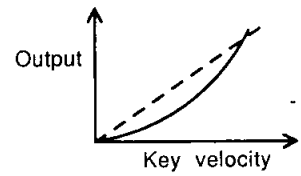
- - - is the Normal velocity curve

4. Wide



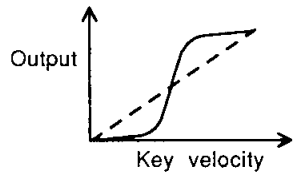
- - - is the Normal velocity curve

5. Hard

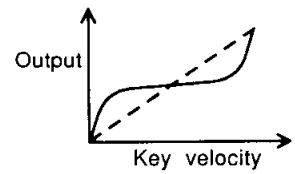


- - - is the Normal velocity curve

6. Cross – 1



7. Cross – 2



- - - is the Normal velocity curve

SYSTEM UTILITY

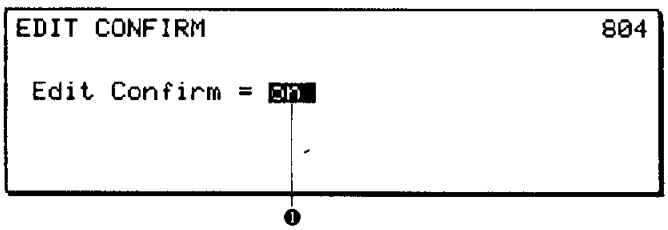
3. Edit confirm

JUMP #804

Summary: The "Are you sure?" message that appears when you store, recall, or initialize data can be turned on/off.

Procedure:

From: system utility job directory (JUMP #800)
Select: 03:Edit Confirm (JUMP #804)
Specify: whether or not the confirm message will appear



❶ Edit Confirm (on, off): When this is on you will be asked "Are you sure?" whenever an operation that erases or replaces data is about to be performed. When this is off the operation will be executed without asking for confirmation.

Remarks: Until you are familiar with the TG77 we recommend that you leave this on.

SYSTEM UTILITY

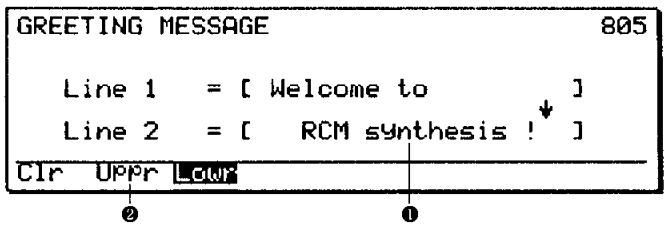
4. Greeting message

JUMP #805

Summary: Edit the two-line message that is briefly displayed when the TG77 power is turned on.

Procedure:

From: system utility job directory (JUMP #800)
Select: 04:Greeting Message (JUMP #805)
Specify: the greeting message



❶ Enter the two-line x 20 character greeting message.

❷ To clear the currently entered message press F1 (Clr). To switch to upper-case characters press F2 (Uppr). To switch to lower-case characters press F3 (Lowr).

Remarks: Methods of entering character data are explained in *How to enter data* of *Introducing the TG77*.

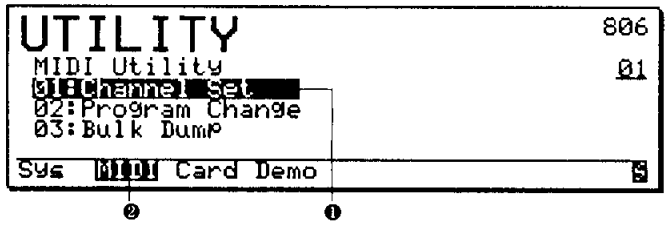
MIDI utility

JUMP #806

Summary: MIDI utility settings determine how MIDI data is transmitted and received.

Procedure:

From: System Utility, Card Utility, or Demo Utility (JUMP #800, #812, #823)
Press: F2 (MIDI) (JUMP #806)
Select: the desired MIDI utility job and press ENTER.



❶ Move the cursor in this area to select one of the following jobs and then press ENTER.
01: Channel Set: The TG77 will receive and transmit MIDI data as determined by the MIDI channels and settings specified here.
02: Program Change: MIDI program change messages will be received and transmitted as specified here.
03: Bulk Dump: Various types of TG77 data can be transmitted via MIDI to another TG77 or other device.

❷ Holding SHIFT and pressing F1–F3 will select the corresponding MIDI Utility job.

MIDI UTILITY

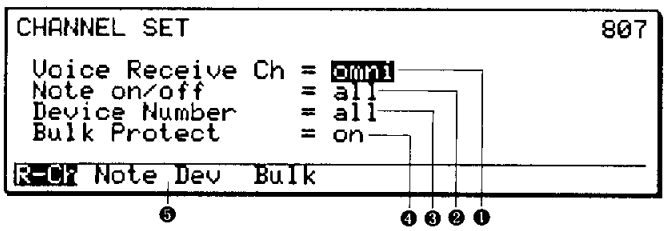
1. Channel set

JUMP #807

Summary: The TG77 will receive and transmit MIDI data as determined by the MIDI channels and settings specified here.

Procedure:

From: MIDI utility job directory (JUMP #806)
Select: 01:Channel Set (JUMP #807)
Specify: MIDI transmit and receive channels and settings



❶ Voice Receive Channel (1...16, omni): This determines the channel on which the TG77 can be played when in voice play mode. When "omni" is selected the TG77 will respond to any channel. In multi play mode, program changes received on this channel will select multis.

❷ Note on/off (all, odd, even): When set to "all" the TG77 will produce sound in response to all notes received at MIDI IN. When set to "odd" or "even", the TG77 will respond only to odd or even notes.

❸ Device Number (off, 1...16, all): This determines the channel on which the TG77 will receive and transmit MIDI system exclusive messages such as parameter changes and bulk data. When off is selected system exclusive messages will not be received. When "all" is selected system exclusive messages will be received on any channel 1...16.

❹ Bulk Protect (off, on): The TG77 is able to receive system exclusive bulk data at any time, and the newly received data will replace the data in memory. By setting bulk protect on you can prevent unexpectedly arriving bulk data from overwriting important data.

❺ Pressing F1–F4 will move the cursor to the corresponding item in the display.

Note on/off: This setting can be used to increase the number of simultaneous notes. Each TG77 is able to produce up to 16 notes of AFM sound and 16 notes of AWM sound at once. By sending the same MIDI data to two TG77s and setting one to note "odd" and the other to note "even", you can double the number of simultaneous notes that can be produced.

MIDI UTILITY

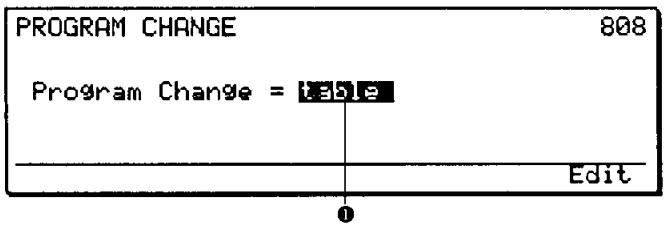
2. Program change

JUMP #808

Summary: MIDI program change messages will be received as specified here.

Procedure:

From: MIDI utility job directory (JUMP #806)
Select: 02:Program Change (JUMP #808)
Specify: how program changes will be received



❶ Program Change (off, normal, direct, table): This determines what the TG77 does when a program change message is received at MIDI IN.

Program Change = off: Incoming program change messages will be ignored.

Program Change = normal: When in voice mode, incoming program changes 0–63 will select voices 1–64. Program changes 64–127 will be ignored.

When in multi mode, incoming program changes 0–63 will select voices 1–64 for the corresponding channel of the multi. Program changes 64–79 on the voice receive channel will select multis 1–16. Program changes 80–127 will be ignored.

Program change = direct: This allows any voice or multi memory to be selected using program changes. Program changes 0–116 will be received just as in "normal".

Incoming program changes 117–124 will select a voice memory, and must be immediately followed by a program change 0–63 to select the voice number. Incoming program changes 125–127 will select a multi memory, and must be immediately followed by a program change 64–79 to select the multi number.

Incoming program changes 119 and 120 are not distinguished, since a internal multi is not allowed to use card voices, nor vice versa.

No.	Mode	Type	Memory
117	Voice mode	Voice	Preset 2
118	Multi mode	Voice	Preset 2
119	Multi mode	Voice	Internal
120	Multi mode	Voice	Card
121	Multi mode	Voice	Preset 1
122	Voice mode	Voice	Internal
123	Voice mode	Voice	Card
124	Voice mode	Voice	Preset 1
125	Multi mode	Multi	Internal
126	Multi mode	Multi	Card
127	Multi mode	Multi	Preset

Program change = table: Each incoming program change 1–128 will select the voice or multi you specify in the Program Change Table. To edit the program change table, press F8 (Edit) and refer to the following section *2.0 Program change table edit* for details.

MIDI UTILITY

2.0 Program change table edit

JUMP #820

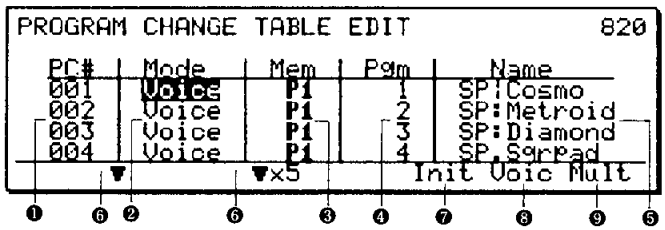
Summary: When the MIDI utility parameter 2. Program Change is set to Table, each incoming program change 1–128 will select the voice or multi specified by the table.

Procedure:

From: MIDI utility job 2.Program Change (JUMP #808)

Press: F8 (Edit) (JUMP #820)

Specify: a voice or multi for each incoming program change 1–128



❶ PC#: This indicates the number of the incoming MIDI program change message.

❷ Mode (Voice, Multi, Ind.V): You can specify whether the incoming program change will select a voice, a multi, or a voice for an individual channel of a multi.

Voice: The TG77 will enter voice play mode and will select the voice specified in ❸ Mem and ❹ Pgm.

Multi: The TG77 will enter multi play mode and will select the multi specified in ❸ Mem and ❹ Pgm.

Ind.V: If the TG77 is in voice play mode it will remain in voice play mode and will select the voice specified in ❸ Mem and ❹ Pgm. If the TG77 is in multi play mode it will remain in multi mode and will select the voice specified in ❸ Mem and ❹ Pgm for the channel of the multi which matches the MIDI channel of the incoming program change message.

❸ Mem (voice I/C/P1/P2, multi P/C/I): Specify the memory of the voice (I/C/P1/P2) or multi (P/C/I).

❹ Pgm (voice 1–64, multi 1–16): Specify the number of the voice (1–64) or multi (1–16) to be selected.

❺ Name: The first ten characters of the selected voice or multi name are displayed here.

❻ F1–F4 (△, ▽, △ x 5, ▽ x 5): Press F1 or F2 to move through the program change table in steps of four lines. Press F3 or F4 to move through the program table in steps of five screens (twenty lines).

❼ F6 (Init): To restore the Program Change Table to the initial settings where program changes 1–128 select preset voices P1-A01...P2-D16, press F6. You will be asked "Are you sure?". If you are sure you want to initialize the program change table, press YES. The lower line of the LCD will show "Completed".

❽ F7 (Voic): Press F7 to view a list of the sixteen voices in the selected bank. Only the first seven characters of the voice names will be displayed. You can press MEMORY or BANK/SELECT to view other voice banks. This function is provided as a convenience when editing the Program Change Table.

❾ F8 (Mult): Press F8 to view a list of the sixteen multis in the selected memory. Only the first seven characters of the multi names will be displayed. You can press MEMORY to view other multi memories. This function is provided as a convenience when editing the Program Change Table.

MIDI UTILITY

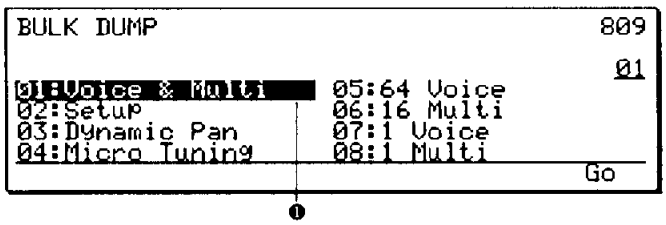
3. Bulk dump

JUMP #809

Summary: Various types of TG77 data can be transmitted via MIDI to another TG77 or other device.

Procedure:

From: MIDI utility job directory (JUMP #806)
Select: 03:Bulk Dump (JUMP #809)
Specify: the type of data to be transmitted
To execute: data transmission press F8 (Go).
To quit: without executing press EXIT.



❶ Move the cursor in the area to select the type of data you wish to transmit. Then press F8 (Go).
- 01: Voice & Multi: All internal voice, multi, pan, and micro tuning data
- 02: Setup: System setup data
- 03: Dynamic Pan: All internal pan data
- 04: MicroTuning: All internal micro tuning data
- 05: 64 Voice: All internal voices
- 06: 16 Multi: All internal multis
- 07: 1 Voice: A single specified voice
- 08: 1 Multi: A single specified multi

Go: When you press F8 (Go) transmission will begin and the bottom line of the LCD will display "Now transmitting !" When transmission ends the bottom line will display "Complete !"

1 Voice: If you select 07:1 Voice and press F8 (Dir) a directory of the sixteen voices in the currently selected bank will appear. Select a bank A–D, and select a voice 1–16. Then press F8 (Go) and the data of the selected voice will be transmitted. Only internal voices can be dumped.

1 Multi: If you select 08:1 Multi and press F8 (Dir) a directory of the sixteen multis in the internal memory will appear. Select a multi 1–16. Then press F8 (Go) and the data of the selected multi will be transmitted. Only internal multis can be dumped.

Remarks: For the data to be received by another TG77, the device number settings of the two units must match.

Data transmitted by 07:1 Voice or 08:1 Multi will be received into the editing buffer of the receiving device. If you select another memory before storing it into a memory, the newly received data will be lost.

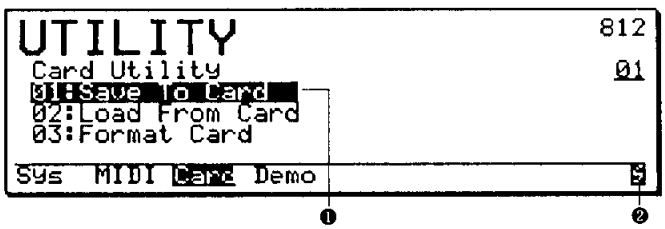
Card utility

JUMP #812

Summary: Card utility jobs allow you to transfer data to and from a card, and to format a card to accept TG77 data.

Procedure:

From: System Utility, MIDI Utility, or Demo Utility (JUMP #800, #806, #823)
Press: F3 (Card) (JUMP #812)
Select: the desired card utility job and press ENTER.



❶ Move the cursor in this area to select one of the following jobs and then press ENTER.
- 01: Save To Card: Data can be saved to a RAM card.
- 02: Load From Card: Data can be loaded from a RAM or ROM card.
- 03: Format Card: Before you use a new RAM card, you must use this operation to format it so that the card can be used by the TG77.

❷ Holding SHIFT and pressing F1–F3 will select the corresponding Card Utility job.

CARD UTILITY

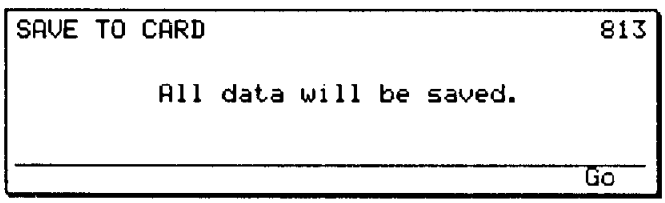
1. Save to card

JUMP #813

Summary: Data can be saved to a RAM card.

Procedure:

From: card utility job directory (JUMP #812)
Select: 01:Save To Card (JUMP #813)
To execute: the operation press F8 (Go).
To quit: without executing press EXIT.



This job saves all data to a RAM card inserted in the DATA card slot. Before a newly purchased RAM card can be used by the TG77 it must be formatted using the *3. Format card* function explained later in this section.

Press F8 (Go) to save the data to card. The display will ask "Are you sure?" so if you are sure you want to save the data press YES.

If the card inserted in the DATA card slot has not been formatted for the TG77 the LCD will show "Warning: Format Error !" Press EXIT to exit from the error message.

This function saves the following data to RAM card.

- Setup data (system data, pan data, micro tuning data, program change table data)
- Internal voices 1–64
- Internal multis 1–16

CARD UTILITY

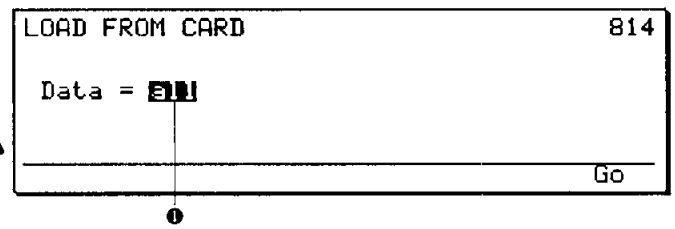
2. Load from card

JUMP #814

Summary: Data can be loaded from a RAM or ROM card.

Procedure:

From: card utility job directory (JUMP #812)
Select: 02:Load From Card (JUMP #814)
Specify: the type of data to be loaded.
To execute: the load operation press F8 (Go).
To quit: without executing press EXIT.



❶ Data Type (all, voice & multi (pan, mct), setup): You can load all or part of the data from card. When "all" is selected all the data will be loaded. When "voice&multi (pan, mct)" is selected multi, voice, pan, and microtuning data will be loaded. When "setup" is selected the system data will be loaded.

This function loads the specified type of voice & multi data from a RAM or ROM card inserted in the DATA card slot. After selecting the data type to load, press F8 (Go) to load the data from card. The display will ask "Are you sure?" so if you are sure you want to load the data press YES.

If the card inserted in the DATA card slot has not been formatted for the TG77 the LCD will show "Warning: Format Error !" Press EXIT to exit from the error message.

CARD UTILITY

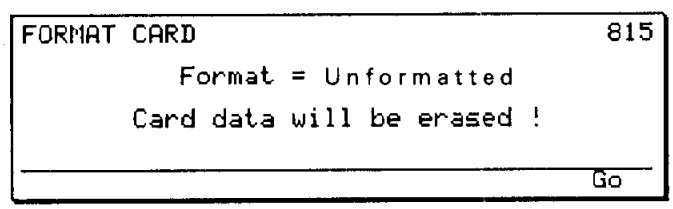
3. Format card

JUMP #815

Summary: Before you use a new RAM card, you must format it so that the card can be used by the TG77.

Procedure:

From: card utility job directory (JUMP #812)
Select: 03:Card Format (JUMP #815)
To execute: the operation press F8 (Go).
To quit: without executing press EXIT.



This function prepares a MCD64 RAM card (sold separately) for use by the TG77. If there is no card inserted into the DATA card slot, the display will show "Format = No Card !".

Insert the card into the DATA card slot and press F8 (Go). The display will ask "Are you sure?" so if you are sure you want to format the card press YES.

If the card is a type that cannot be used by the TG77 or if it is faulty the LCD will show an error message. Press EXIT to exit from the error message.

Demo utility

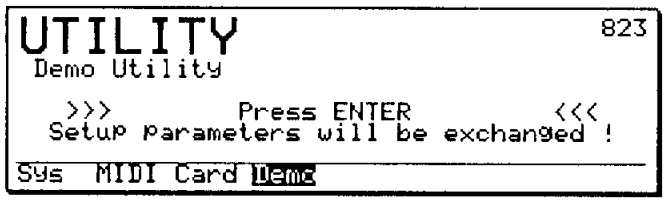
JUMP #823

Summary: This function allows you to load and play the ROM demo songs. These songs are stored in ROM (permanent memory), and cannot be erased or modified.

Warning: Loading the demo song data will temporarily override the setup parameters (the Utility mode settings for master tuning, velocity curve, etc.) and the EF.BYPASS switch. These settings will be restored when you exit demo mode.

Procedure:

From: System Utility, MIDI Utility, or Card Utility (JUMP #800, #806, #812)
Press: F4 (Demo) (JUMP #823)



Press: ENTER
Select: the song from which to begin playing
Press: F8 (Play) to begin playing
Press: F8 (Stop) to stop playing

Use the cursor keys to select a song from which to begin.

To start the demo songs press F8 (Play). All demo songs will be played in continuous rotation, starting from the song you selected.

If the EF BYPASS button has been pressed, effect bypass will be turned off when the demo data is loaded.

While the demo is playing you can press one of the following keys.

F1 (Ch): A VU meter-style graphic indicates when each channel is sounding.
F2 (Note): A VU meter-style graphic indicates the notes played.
F3 (Kbd): Both keyboard and VU-meter graphics will be displayed.
F4 (Name): The names of the voices in the multi will be displayed.
F5 (Time): The display will indicate the elapsed time since the beginning of the currently playing song, and the elapsed time since the play button was pressed.
F6 (Auto): The above graphics will automatically alternate approximately every five seconds.
F8 (Stop): Stop the demo.

APPENDIX

APPENDIX

This section contains various supplementary information that may be useful to advanced users or programmers.

Contents of this section **page**

Explanation of the preset voices

Preset 1

A-1 **SP¦Cosmo** Rich, breathy, analog pad. MW = filter control
A-2 **SP:Metroid** Brass type filter envelope
A-3 **SP:Diamond** Powerful octave synth with smooth decay. MW = filter control
A-4 **SP:Sqrpad** Hollow sounding pad with rising attack pitch EG. MW = filter control
A-5 **SP¦Arianne** Warm filter sweep with percussive overlay.
A-6 **SP:Sawpad** Bright pad with fast attack. MW = vibrato
A-7 **SP:Darkpad** Smooth, string-style pad.
A-8 **SP¦Mystery** Bell and string layer. MW = filter control
A-9 **SP.Padfaze** Slow filter swept pad with slow panning.
A-10 **SP:Twilite** Delicate synth-vox pad with a crystalline edge.
A-11 **SP¦Annapad** Deep chorusing and velocity attack filter.
A-12 **AP.Ivory** A refined classical piano. MW = filter control
A-13 **AP¦CP77** Electric grand type piano.
A-14 **AP¦Bright** Harder, rock piano. MW = filter control
A-15 **AP¦Hammer** Slightly detuned tack-piano. MW = filter control
A-16 **AP¦Grand** Full, grand piano. MW = filter control

B-1 **BR:Plucky** Synth brass with fast initial attack and decay. Hold for full effect.
B-2 **BR¦BigBand** Octave brass with lots of velocity sensitivity.
B-3 **BR:1980** 'Stadium rock' synth brass with pitch swept attack.
B-4 **BR¦Trmpets** Dual trumpet. MW = filter control, AT = vibrato
B-5 **BR.ModSyn** Powerful synth brass with velocity attack filter. MW = filter control, AT = vibrato
B-6 **BR¦Ensembl** Mellow brass.
B-7 **BR¦FrHorn** Solo french horn.
B-8 BR¦Soul A mixture of sampled trumpet and synth brass.
B-9 **BR.FMBite** Sharp, cutting brass. MW = filter control
B-10 **EP¦IceRing** Tine electric piano with subtle decaying choir background.
B-11 **EP.Synbord** Synth style electric piano with strong velocity sensitivity. MW = filter control
B-12 **EP.GS77** Single element electric piano.
B-13 **EP¦Knocker** A very dynamic electric piano with lots of key noise. MW = LFO panning
B-14 **EP:Beltine** Classic FM type electric piano. MW = tremolo effect
B-15 **EP¦Dynomod** Dynamic imitative electric piano with bottom end distortion. MW = filter control
B-16 **EP.Urbane** An effect type sound with electric piano overtones.

C-1 **ME:St.Mick** Heavenly choirs. Discover paradise on MW!
C-2 **ME¦Blade** Evolutionary modulation and filter effect.
C-3 **ME¦Forest** Sunlight streaming through a leafy glade. Very restful.
C-4 **ME.Gargoyl** Played lightly a pipe organ can be heard. With more velocity unusual things happen.
C-5 **ME¦Pickloop** A choir, a plucked sound, looped envelopes, flanging, panning: adds up to constant motion.
C-6 **ME¦Aquavox** A slow choir with bubbling high harmonics slipping round the stereo field.
C-7 **ME:Alps** A modulated filter sweep that is effective across its full range.
C-8 **ME.Cycles** Starts as a plucked sound with a gradually slowing modulation effect. Sustained notes produce cyclic effect. MW = filter control
C-9 **WN.Bluharp** Blues harmonica with distortion.
C-10 **WN¦Tenor** Tenor sax with velocity controlled 'cough'. MW = vibrato and tremolo
C-11 **WN¦Clarino** Woody clarinet that becomes more mellow as MW is introduced.

C-12 **WN¦AltoSax** Soft, breathy alto sax.
C-13 **WN¦Moothie** Harmonica for chromatic style playing. Flutter effect on MW.
C-14 **WN¦Saxion** Sax section. MW = vibrato and tremolo
C-15 **WN.Flute** AT modulation flute.
C-16 **WN¦Ohboy** AT modulation oboe.

D-1 **ST.Ripper** Bright 'open filter' analog strings. MW = filter control
D-2 **ST:Violins** A realistic small violin section.
D-3 **ST¦Section** Orchestral string section.
D-4 **ST.Synstrg** FM type strings. MW = filter control
D-5 **ST.Chamber** Strings with a slightly extended decay. MW = fast tremolo
D-6 **BA¦Frtless** A mixture of FM and sampled fretless bass. AT = vibrato
D-7 **BA¦Starred** Attacking synth bass with a mixture of resonant and non-resonant filtering.
D-8 **BA.HardOne** FM bass.
D-9 **BA:VC1** Monophonic 'single trigger' type analog bass. MW = filter control
D-10 **BA:VC2** High resonance analog bass. MW = filter control
D-11 **BA:VC3** Short filter envelope analog bass. MW = filter control
D-12 **BA:Rox** Highly touch sensitive hard FM bass.
D-13 **BA¦Woodbas** Upright bass, MW controls mix between elements.
D-14 **BA.Round** Pick bass.
D-15 **BA:Erix** Velocity switched slap bass.
D-16 **BA.FM Frtls** Single element fretless bass with AT controlled string 'buzz'.

Preset 2

A-1 **SC:Neworld** High resonance decaying filter sweep. MW = filter control
A-2 **SC.Stratos** Percussive suitar-like synth voice, which evolves into pad on sustained notes.
A-3 **SC.Ripples** Digital percussive synth voice which evolves into rippling effect on sustained notes.
A-4 **SC.Digitak** Clav style attack slowly moves to a more delicate conclusion. MW = filter control
A-5 **SC.Hone** Viciously touch sensitive. Use staccato style of playing for extra 'buzz'.
A-6 **SC:Spaces** Powerful bell-like sound with gentle looped chimes when held. MW = LFO panning
A-7 **SC¦Sybaby** Highly touch sensitive guitar type sound. Hold for 'sighing' effect.
A-8 **SC¦Icedrop** A 'snowy' sound melting on a warm background.
A-9 **SL¦Wired** A hammered steel string sound.
A-10 **SL.Gnome** Octave lead with portamento.
A-11 **SL.SawMono** Sawtooth wave monophonic lead sound. MW = filter control, AT = vibrato
A-12 **SL:SqrMono** Detuned square wave monophonic lead. MW = vibrato
A-13 **SL.Pro77** Very powerful 'American' lead sound.
A-14 **SL.Nester** Narrow pulse width lead. Upper harmonic will develop when held. MW = vibrato
A-15 **SL:Eazy** Thick resonant lead sound with longer decay and portamento.
A-16 **SL:Lips** The sound of someone whistling.

B-1 **KY¦Bosh** Velocity controlled attack synth with additional filter velocity. MW = filter control
B-2 **KY¦Wahclav** MW filter effect clavinet.
B-3 **KY.Wires** Harpsichord-like synth sound.
B-4 **KY:Tradclv** Traditional clavinet sound with MW chorusing effect.
B-5 **KY.Thumper** Percussive FM synth sound.
B-6 **KY¦Modclav** MW damped clavinet.
B-7 **PL.Sitar** The sound of India.
B-8 **PL.Harp** Single element harp.
B-9 **PL¦Saratog** A 'new age' electric guitar sound.
B-10 **PL¦Steel** Folk guitar. AT = vibrato
B-11 **PL¦Twelve** A twelve string acoustic guitar simulation.
B-12 **PL¦Shonuff** Feedback lead electric guitar.
B-13 **PL¦MutGtr** Velocity switching between muted and unmuted electric guitar.
B-14 **PL.Guitar** A steel strung acoustic guitar useful for solos.

B-15 **PL.Shami** Shamisen. An oriental plucked string instrument.
B-16 **PL:Koto** Another oriental plucked string instrument.

C-1 **OR.YC45D** Percussive organ.
C-2 **OR¦Pipes** Church organ with MW 'stop' effect.
C-3 **OR:Jazzman** Jazz organ with MW leslie effect.
C-4 **OR.Combo** Sixties electronic organ. MW = filter control
C-5 **PC.Marimba** Marimba sampled sound.
C-6 **PC¦OzHamer** Percussive loop effect.
C-7 **PC:Tobago** Realistic steel drum sound.
C-8 PC.Vibes Smooth vibes sound with MW tremolo.
C-9 **PC¦Glass** Glassy sounding bells.
C-10 **PC¦Island** A cross between marimba and steel drums.
C-11 **PC¦GrtWall** Celebrate Chinese New Year with this sound. MW = filter control
C-12 **CH.Itopia** Smooth, rich choir sound.
C-13 **CH:GaChoir** Percussive vocal sound making 'ga' noise. MW = filter effect
C-14 **CH:Chamber** Cathedral choir.
C-15 **CH¦Spirit** Ethereal, shimmering choir.
C-16 **CH:ChorMst** A slow sweeping choir in fifths. Try playing triads.

D-1 **SE*Goto>1** The Beatles did this once.
D-2 **SE.Xpander** A never ending ice-cream van.
D-3 **SE*Inferno** A long evolutionary sound.
D-4 **SE*Them!!!** Will the giant ants take over the earth?
D-5 **OR*Gassman** Full sounding organ. MW adds percussion and additional harmonics.
D-6 **BR*ZapBras** Powerful synth brass. Using MW while playing makes this very expressive.
D-7 **BR*BrasOrc** Orchestral sound with lots of velocity sensitivity. MW = filter control
D-8 **PL*Stairwy** Thick guitar-like sound.
D-9 **ST*Widestg** Responsive orchestral strings.
D-10 **ST*Symflow** Smooth, clear strings. MW = volume control
D-11 **ST*Quartet** String quarted sound. Staccato playing gives string bowing effect.
D-12 **ST*Tutti** Tutti orchestra. Lower keys have velocity switch timpani. MW introduces bells.
D-13 **ME*Voyager** Choir with sweeping synth background.
D-14 **ME*Galaxia** A trip to the stars made more impressive with increased velocity.
D-15 **DR Both** Power drum kit.
D-16 **DR Group2** Drum kit designed for use in Multi mode. All voices sent to group 2.

Preset drum voice key assignments

Drum Set	Preset2-D15 DR Both		Preset2-D16 DR Group2	
Note Num	Waveform Name	No.	Waveform Name	No.
C1	BD2	94	BD2	94
C#1	BD4	96	BD2	94
D1	SD roll	100	BD1	93
D#1	Crash	106	BD1	93
E1	Tom1	102	BD3	95
F1	Tom1	102	BD3	95
F#1	Tom1	102	BD4	96
G1	Tom1	102	BD4	96
G#1	BD3	95	BD1	93
A1	BD1	93	BD1	93
A#1	SD1	97	Tom2	103
B1	Tom2	103	Tom2	103
C2	Tom2	103	Tom2	103
C#2	SD3	99	SD3	99
D2	Tom2	103	Tom2	103
D#2	Rim	101	Rim	101
E2	SD2	98	SD2	98
F2	Tom2	103	Tom2	103
F#2	Claps	108	Claps	108
G2	Cowbell	109	Cowbell	109
G#2	Shaker	111	Shaker	111
A2	HHclosed	104	HHclosed	104
A#2	Tambrn	110	Tambrn	110
B2	HHopen	105	HHopen	105
C3	Crash	106	Crash	106
C#3	Crash	106	Crash	106
D3	Ride	107	Ride	107
D#3	Ride	107	Ride	107
E3	Tom2	103	Ride	107
F3	Tom2	103	Ride	107
F#3	Cowbell	109	Crash	106

Drum Set	Preset2-D15 DR Both		Preset2-D16 DR Group2	
Note Num	Waveform Name	No.	Waveform Name	No.
G3	Cowbell	109	Cowbell	109
G#3	Cowbell	109	StlDrmWv	54
A3	SD2	98	Cowbell	109
A#3	SD2	98	StlDrmWv	54
B3	SD2	98	Tom1	102
C4	SD2	98	Tom1	102
C#4	EG mute	16	SD1	97
D4	EG mute	16	Tom1	102
D#4	EG mute	16	SD1	97
E4	EG mute	16	Tom1	102
F4	EG mute	16	Tom1	102
F#4	EG mute	16	SD3	99
G4	EG mute	16	SD2	98
G#4	EG mute	16	SD3	99
A4	EG mute	16	SD2	98
A#4	EG mute	16	SD2	98
B4	EG mute	16	SD2	98
C5	EG mute	16	AnlgPerc	112
C#5	EG mute	16	AnlgPerc	112
D5	EG mute	16	Tambrn	110
D#5	EG mute	16	Tambrn	110
E5	EG mute	16	HHopen	105
F5	EG mute	16	Crash	106
F#5	EG mute	16	Crash	106
G5	EG mute	16	Crash	106
G#5	EG mute	16	Crash	106
A5	EG mute	16	Crash	106
A#5	EG mute	16	SD roll	100
B5	EG mute	16	SD roll	100
C6	EG mute	16	*Shaker	111

* This sound is set to a volume of zero for use as a mute for other alternately-assigned sounds.

Using RCM hybrid synthesis

Suggestions for using AWM + AFM (Voice modes 9 & 10)

The ability to use an AWM voice as an input to an operator is one of the radical innovations of the TG77. Since the architecture is so flexible it will be a long time before this capability can be fully explored. This section will suggest one possible starting point for experimentation.

1. Select the voice mode

   From: Voice edit mode
   Select: Voice mode (F1) (JUMP #200)
   Select: Voice Mode 9 (1AFM&1AWM)
   Press: F2 (Com)

2. Initialize the voice common data

   From: Voice edit (JUMP #201)
   Select: 15:Initialz (Initialize voice)
   Press: ENTER
   Press: YES at the "Are you sure?" prompt
   Press: EXIT at the "Completed !" prompt

3. Initialize the AFM element

   From: Voice edit (JUMP #201)
   Press: F3 (E1) AFM Element (JUMP #230)
   Select: 15:Initialz (Initialize AFM element)
   Press: ENTER
   Press: YES at the "Are you sure?" prompt
   Press: EXIT at the "Completed !" prompt

4. Initialize the AWM element

   From: Voice edit (JUMP #230)
   Press: F4 (E2) AWM element (JUMP #256)
   Select: 15:Initialz (Initialize AWM element)
   Press: ENTER
   Press: YES at the "Are you sure?" prompt
   Press: EXIT at the "Completed !" prompt

5. Select an AWM wave

   Press: F4 (E2) to edit the AWM element (JUMP #256)
   Select: 1:WaveSet (AWM waveform set) (JUMP #257)
   Press: the -1 +1 buttons or use the slider to select the wave you wish to use.

When you play a note you will notice that all waves will sound with the initialized "organ type" EG, and no velocity or filtering. You will probably want to add final touches later. EG filtering and dynamic information are carried over into the FM operator. However for now we will use only a raw wave in order to explain the mechanics of RCM hybrid voicing.

Before trying to use an AWM wave in an AFM algorithm it is useful to turn off the AWM direct output. This is not necessary for final voicing since many voices use *both* the direct AWM sound and the hybrid AWM/AFM combination. However it is easier to understand the effect of the hybrid system if the direct output of the AWM element is temporarily turned off.

6. To turn off the AWM:

   From: Voice Edit (JUMP #201)
   Select: 7:OutSel (JUMP #208)
   Press: F2 (E2) to select element 2.
   Press: -1 three times to turn element output off.
   Press: EXIT to return to the voice edit job directory

7. Select Algorithm 30 (default in INIT AFM voice)

Note: *Any algorithm will work with hybrid voicing. However we will use the default algorithm 30 in this demonstration, so this step is not necessary.*

8. Set operators 1 and 2 to fixed frequency, zero frequency.

   Press: F3 to select the AFM job directory (JUMP #230)
   Select: 2:Oscltr (JUMP #235)
   Press: Operator Select button 1 to choose operator 1

Select: Freq Mode and use -1 +1 to change "ratio" to "fixed"
Select: Coarse and use -1 +1 to change 1.0 to 0.00
Press: Operator select button to choose OP2 and repeat the above operation.
Press: EXIT to return to the AFM job directory

9. Introduce the AWM wave into operator 2 of the FM algorithm

From: Voice Edit
Press: F3 (E1) to select the AFM element for editing (JUMP #246)
Select: 1:Algrthm (AFM algorithm) (JUMP #232)
Press: F2 (Extn) This page selects the external inputs to each operator.

Use the cursor keys to position the cursor over the "off" on the AWM line under OP2. Press YES to change the "off" to In1.

Press: EXIT to return to the AFM job directory

10. Raise the output level of operator 2.

From: AFM job directory
Select: 4:Output and press F2 (All) (JUMP #242)
Move: the cursor to OP2 and use the data slider to gradually raise the level until you hear the AWM wave.

Important note: Depending on the harmonic content of the selected wave, the sound may become distorted as you increase the output level of OP2. If it does, exit to the AFM job directory, select 1:Algrthm and press F3 (Inpt) (JUMP #233). Note that under the AWM indicator beneath OP2 there is a number 7. Lower this value to 4 and then return to 4:Output (JUMP #242) and adjust the OP2 output level again. The level set for each operator in the Algorithm Input acts as a multiplier for the value specified in Output. To avoid distorting the sound appearing at Op2, you must set the correct gain values. Of course, distortion can be an interesting effect in its own right. By adjusting the operator output and operator input, a wide range of AWM input levels can be used.

The steps outlined so far may not result in a very interesting sound, but the following points will illustrate some of the possibilities of RCM hybrid synthesis.

- The AFM operator into which the AWM waveform was introduced can be modulated by other operators, or can modulate other operators.
- The same AWM waveform can be introduced into two or more AFM operators, perhaps with each operator set to a different pitch.
- Since the AWM waveform is routed through the filter of the AWM element before being introduced into the AFM operator, its filter settings can be continuously varied, resulting in a realtime filtered waveform which can be modulated by and can modulate other operators (waveforms); i.e., *Realtime Convolution and Modulation* — RCM hybrid synthesis. ("Convolution" refers to proprietary Yamaha digital filtering technology.)

It is beyond the scope of this manual to provide detailed instruction in the use of this new hybrid system although additional programming guides will be forthcoming. The only steps required for using RCM hybrid synthesis are to turn on the AWM in the Inpt page and select voice mode 9 or 10. The rest is up to you. This is simply a very basic guide which you may use as a starting point.

Error messages

MIDI

MIDI buffer full !
When the TG77 attempted to receive or transmit a large amount of MIDI data, its handling capacity was exceeded.

MIDI data error !
An error occurred when receiving MIDI data.

MIDI checksum err !
An error occurred when receiving bulk data.

Device number is off !
Since the device number is off, bulk data cannot be transmitted or received.

Device number mismatch !
Since the device numbers did not match, the bulk data was not received.

Data card

Data card not ready !
The data card is not correctly inserted into the slot.

Card protected !
Since the memory protect switch of the card is on, data cannot be saved to the card.

Illegal format !
The card is the wrong format.

Verify error !
The data was not correctly saved.

Wave card

Wave card not ready !
The wave card is not correctly inserted into the slot.

Different wave card (ID=) !
The wave card which is inserted is not the one used by the voice or multi.

ID Number mismatch !
A multi includes voices which use two or more wave cards.

Battery

Change internal battery !
The internal backup battery needs to be replaced.

Change card battery !
The card backup battery needs to be replaced.

Other

Use bank D !

4 element voices can be stored (or copied) only to bank D.

Illegal mark !

You attempted to mark a display which does not allow marking.

Multi data blank chart

MULTI DATA		Multi Name								Date							
Voice Name	01		02		03		04										
	05		06		07		08										
	09		10		11		12										
	13		14		15		16										

MIDI Channel	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16
Voice Volume																
Voice Tuning																
Voice Note Shift																
Voice Static Pan																
Voice Output Select																
Voice Individual Output																
Assign Mode (DVA/SVA)																
AFM Max Elements																
AWM Max Elements																

Effect / Mode	Stereo Mix 1		Stereo Mix 2	
	Mod. Effect 1	Mod. Effect 2	Rev. Effect 1	Rev. Effect 2
Effect Type				
Effect Balance				
Output Level				
Parameter 1				
Parameter 2				
Parameter 3				
Parameter 4				

Specifications

Tone generator: Realtime Convolution and Modulation (RCM)
- AWM2: 16 bit linear waveform data, maximum 48 kHz sampling frequency
- AFM: 6 operators, 45 algorithms, 3 feedback loops, 16 waveforms, modulation from AWM output
- Filter: Time variant IIR (infinite impulse response) digital filters, 2 filters for each element (maximum of 8 filters per voice)
- Maximum simultaneous notes: 16 notes AWM + 16 notes AFM
- Maximum simultaneous timbres: 16
- Note assignment: Last note priority, DVA (dynamic voice allocation), SVA (static voice allocation)

DSP effects: (reverb effect + modulation effect) x 2
- Reverb effects: 40 types
- Modulation effects: 4 types

Memory:
- Preset memory: 128 voices, 16 multis
- Internal memory: 64 voices, 16 multis
- Waveform memory: 2 Mwords (4 Mbytes), 112 sounds
- Card slots: parameter data x 1, waveform data x 1

Controllers:
- Switches: Power on/off, VOICE, MULTI, UTILITY, EDIT/COMPARE, COPY, MEMORY, EF.BYPASS, SHIFT, function keys F1–F8, EXIT, BANK/SELECT, ELEMENT, OPERATOR, PAGE ◁, PAGE ▷, JUMP/MARK, –1/NO, +1/YES, cursor △ ▽ ◁ ▷, numeric keypad 0–9, minus (–), ENTER
- Rotary controls: VOLUME (dual concentric, OUTPUT 1/OUTPUT 2), LCD contrast (on rear panel)

Sliders: DATA ENTRY

Display:
- LCD: 240 x 64 pixels (with backlight)
- LED: red x 4

Terminals:
- Audio output: OUTPUT 1/1+2 (L/MONO, R), OUTPUT 2 (L, R), PHONES, INDIVIDUAL OUTPUT 1–8
- MIDI: IN, OUT, THRU

Power requirements:
- US and Canadian models: 120V
- General model: 220–240V

Power consumption:
- US and Canadian models: 28W
- General model: 28W

Dimensions:
- 3U: 480(W) x 132(H) x 390(D) mm (18-7/8 x 5-1/4 x 15-1/4 inches)

Included items: MIDI cable (3m) x 1

Weight: 8 kg (17 lb 10 oz)

Output levels: measured with a single note (AFM) 1 kHz sine wave, all terminals connected, and volume at maximum

Individual outputs: +5 dBm (10 kΩ)

Headphone: +5 dBm (150 Ω)

Stereo outputs: –1 dBm (10 kΩ)

**Specifications and appearance are subject to change without notice.*

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