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OWNER'S MANUAL

DK 700 - PROGRAMMABLE MIDI MASTER SYNTHESIZER

GUIDE FOR THE IMMEDIATE UTILIZATION OF THE DK 700

First of all verify that the line voltage is in accordance with local voltage. To switch on the DK 700 connect the cable to the socket on the rear of the instrument and then plug in the power cord.
Connect the 1/9" phone Jack OUT to the input of an amplifier or of a mixer.
If needed, connect the special optional pedal to the LATCH/SUSTAIN socket.
Reduce DK 700 and amplifier's master volume knobs to zero.
Switch power on to both devices and set their volumes to an acceptable level (usually the instrument's volume should not exceed 3/4 of maximum level).
The instrument is now ready to be played.

There are two different working modes for the DK 700:
- DK 700
- MASTER KEYBOARD.

Selection of one of these two modes is possible by sliding the USER MODE switch, placed on the top left of the control panel to the desired position.

In the DK 700 mode (USER MODE switch upward) the instrument will function as a normal synthesizer with 73 internal PRESETS
To change timbre digit the number you want (pick one from the list of timbres attached) on the switch panel and then press ENTER
It is also possible to run through the different programs for selection with the 'forward' 'backward' tabs (marked by an arrow): in this case it is not necessary to press ENTER.

When in MASTER KEYBOARD mode (USER MODE switch downward) the instrument will function as a master keyboard able to control up to 3 keyboards/expanders besides the internal module or A external keyboards/expanders linked by MIDI cables.
Other 55 programs are available, making it possible to memorize 55 (00-54) timbric change PATCHES and parameters relative to the " SLAVES which can be controlled by the MASTER KEYBOARD.

For detailed information on the utilization of the DK 700 and its programming possibilities, we suggest you read the operation manual very carefully.

INTRODUCTION

The DK 700 is a polyphonic synthesizer with voice assignment It actually contains 6 complete and individual synth modules (termed voices or channels). It is fully programmable and able to store up to 73 programs in its memory when in DK 700 mode and 55 PATCHES for the simultaneous control of 4 SLAVES when in MASTER KEYBOARD mode.
Each voice contains two digitally controlled oscillators (to ensure the best pitch reliability on the whole extension of the Well Tempered scale) with analog waveforms.
It also comprises a 24 dB/octave low pass Voltage-Controlled filter and an envelope generator; this means that the DK 700 has 12 oscillators, 6 filters, 6 envelope generators and 4 low frequency oscillators providing parallel modulations of parameters such as pitches, square waves P.W., filters.
ALL this is controlled by specific controls and memorized in the heart of the DK 700: the "PROGRAMMING UNIT", which also provides to the management of the 73 timbric programs and 55 PATCHES.

POWER CONNECTION

Check that the line voltage is in accordance with local voltage. To switch on the DK 700 connect the power cable to the 3-contact fixture on the back panel and then connect the other end to a properly grounded outlet. The ground cable is connected directly to the instrument's chassis.
Connect the 1/4" phone jack OUTPUT to the input of an amplifier or audio mixer. Now verify that only one of the two devices either the DK 700 or the amplifier (better the amplifier) is grounded in order to avoid ground-loops which could cause low-level hum.
Reduce DK 700 and amplifier's master volume knobs to zero. Switch on DK 700 and amplifier and set their volume knobs to an acceptable level (usually the instrument's volume should not exceed 3/4 of maximum level).

DK 700 MODE

Slide the USER MODE switch upward.

PROGRAMMING

PROGRAM SELECT

On power-up, with USER MODE upward, the DK 700 automatically selects the timbric program number corresponding to the last program used (see PROGRAM/PARAMETER display).
The programs are numbered from 00 through 72; to change over to second program simply digit the number desired on the switch-panel and then press ENTER on the PROGRAMMING UNIT.
It is possible to run through the programs using the 'backward'forward' tabs. In this case it is not necessary to press ENTER.

PROGRAM EDIT

To modify or re-memorize a program is very easy. On the top section of the instrument is a table of the controllable parameters. The parameters are divided into functional groups and for each parameter the following data are specified:

1) THE SECTION
2) THE NAME
3) THE NUMBER
4) THE RANGE OF VALUES

If you want to change any factory sound parameters, follow the instructions hereunder:

A) Press the EDIT PARAMETER switch on the PROGRAMMING UNIT section. The upper display shows the parameter number and the lower display shows the value of the parameter selected.
A decimal point to the right of the first number, just above 'PRM' (upper display) shows that the instrument is in PARMETERS DK 700 position; another blinking decimal point to the left of the last number indicates that the switch-panel is enabled to recall the numbers shown on the upper display, i.e. the parameter numbers.

B) Choose a parameter you want to edit by digiting any number on the switch-panel and press ENTER, or advance and/or go back with the 'backward' 'forward' tabs, marked with arrows. If the selection occurs by digiting a number on the switch panel, the display will flash until you give the ENTER command, while if it is made with the 'backward' forward' tabs the display will not flash and there will be no need for you to press ENTER.

C) After recalling the parameter to be modified (UPPER DISPLAY SHOWS THE NUMBER CHOSEN - DISPLAY NOT FLASHING) press the SELECT PRM/VALUE tab, which has the same function as the ENTER tab. Now the blinking decimal point is moved to the lower display to indicate that DK 700 is enabled to the modification of the values.

D) Edit the values within the ranges shown on the table on the top section of the instrument. To modify the values you can use either the switch-panel or the 'backward''forward' tabs. In the former case the lower display flashes waiting for the 'ENTER' command.

E) To go back to the parameter selection (decimal point blinking on the upper display), you must press SELECT PRM/VALUE again.

F) To return to the timbric program selection, press the MODE RECALL PRG tab; the lower display will go off while the upper display will show DK 700's timbric programs.

The numerical displays show:

Upper Display:
1) when in PROGRAM position: the number of timbric program in use.
2) when in PARAMETERS position: the number of parameter you want to edit.

Lower Display:
1) The value of the parameter you have enabled.

PROGRAM RECORD

IMPORTANT: on power-up the DK 700 is not enabled to record new programs.

A) PRESS the EDIT PRM tab (PROGRAMMING UNIT section) ;
B) SELECT number 91 corresponding to parameter WRITE ENABLE ;
C) PRESS ENTER: No.00 (OFF - disabled) appears on the lower display;
D) PRESS SELECT PRM/VALUE; the blinking decimal point is moved to the lower display;
E) PRESS the 'upward' tab to select value 01 (ON - enabled) ;

Now the DK 700 is ready to record new programs. To exit the record phase, switch off the instrument or reselect value 00 (OFF - disabled) following the same operations as described above.

Now, to modify and record a program proceed as follows:

- PRESS MODE RECALL PRG to visualize again the numbers of the timbric presets;
- CHOOSE a preset from 00 to 72;
- PRESS ENTER;
- SELECT the PARAMETERS function pressing the EDIT PRM tab; the upper display shows the parameter number, while the lower display shows the value of the parameter selected;
- SELECT the number of parameter you want to edit, for example No.40 corresponding to the filter CUTOFF;

- PRESS ENTER;
- PRESS SELECT PRM/VALUE; the blinking decimal point is moved to the lower display. Now you can change the parameter value in memory which, in this case, ranges from 00 to 255 (see parameters table);
- CHANGE, with the 'backward' 'forward' tabs, the value of the selected parameter. Remember that it is possible to change the value also by digiting the desired number on the switch panel; in this case the ENTER command must always follow the operation.

Now you can edit other parameters;

- GO BACK to the PARAMETERS position pressing SELECT PRM/VALUE;
- DIGIT No.20 corresponding to the PINK NOISE;
- PRESS ENTER;
- PRESS SELECT PRM/VALUE; the blinking decimal point is moved to the lower display;
- CHANGE, with the 'backward' 'forward' tabs, the value shown on the lower display (in this case from 00 to 255).

In this way it will be possible for you to modify all the parameters you like until you obtain a completely different timbre.
Should you wish to compare the new sound with the old one in memory, use the COMPARE parameter:

- ENTER the PARAMETERS function by pressing EDIT PRM;
- DIGIT No.90 (COMPARE parameter);
- PRESS ENTER;
- PRESS SELECT PRM/VALUE; the blinking decimal point appears on the lower display;
- SELECT values 1 and 2 with the 'forward' 'backward' tabs to listen to the edited preset or to the original one respectively (NEW-OLD).

To record a new sound proceed as follows:

- SELECT parameter 92 (WRITE);
- PRESS ENTER; value 73 appears on the lower display;
- PRESS SELECT PRM/VALUE; the blinking decimal point will appear on the lower display;
- SELECT any number between 00 and 72 on the switch-panel
- PRESS ENTER. (REMEMBER:IF YOU SELECT THE VALUE WITH THE 'BACKWARD' 'FORWARD' TABS, THE ENTER FUNCTION IS AUTOMATICAL AND YOU DO NOT NEED TO PRESS THE ENTER TAB).

N.B. The WRITE operation can be stopped if before pressing ENTER you change parameter.

WARNING : before recording a program to any memory location, verify that the location is not occupied by a program you wish to keep memorized.

REMOTE SEQUENCER

The DK 700 is complete with a REMOTE control for an external sequencer.
From your synthesizer it is possible to start a sequencer connected via MIDI pressing the START tab, stop it with the STOP tab, start it again from the point where you had previously stopped it with the CONTINUE tab. You can also adjust its execution speed with the SEQ.SPEED knob in the MASTERS section.

MASTERS

- SENSITIVITY

This knob controls the Keyboard Dynamic Range.

- TUNE

General pitch control (shifts the keyboard up or down by about 1 semitone) to tune the DK 700 to other instruments.

- SEQ.SPEED

Remote control of the execution speed of external sequencers linked-up via MIDI with the DK 700.

- VOLUME

Adjusts general volume.

PARAMETERS - DK 700 SECTION

D.C.O. 1 (Digitally Controlled Oscillator)

- 00 - WAVE

Parameter 00 enables selection of a square wave, a saw-tooth wave, or both for the synthesizer section with the following values:

0=OFF
1=SAW-TOOTH WAVE
2=SQUARE WAVE
3=SAW-TOOTH+SQUARE

-01- OCTAVE

If the waveform is selected, parameter 01 adjusts its footage with the following values:

1=16'
2= 8'
3= 4'

- 02 - P.W. (Pulse Width)

Parameter 02 makes it possible to adjust the harmonic content of the square wave by setting its duty cycle from approximately 1% to 99%.At the extreme values (0-255) the square wave pulses will thin out until they degenerate to dc, resulting in no audio output.

D.C.O. 2 (Digitally Controlled Oscillator)

- 10 - WAVE

Parameter 10 enables selection of a square wave, a saw-tooth wave, or both for the synthesizer section with the following values:

0=OFF
1=SAW-TOOTH WAVE
2=SQUARE WAVE
3= SAW-TOOTH+SQUARE

- 11 - OCTAVE

If the waveform is selected, parameter 11 adjusts its footage with the following values:

1=16'
2= 8'
3= 4'

- 12 - P.W. (Pulse Width)

Parameter 12 makes it possible to adjust the harmonic content of the square wave by setting its duty cycle from approximately 1% to 99%.At the extreme values (0-255) the square wave pulses will thin out until they degenerate to dc, resulting in no audio output.

- 13 - COARSE TUNE

Controls the pitch of the second oscillator with respect to the first one for a frequency interval of 8 semitones down (255=tuned).

- 14 - FINE TUNE

Controls the fine pitch of the second oscillator with respect to the first one for a frequency interval of about half semitone (127=tuned).

- 15 - VOLUME

Selects the output level of oscillator B at approximately 6dB below the volume level of oscillator A.

0=FULL
1=HALF

NOISE

- 20 - LEVEL

This parameter determines the volume of the pink noise -(i.e. the combination of all the frequencies having the same volume energy in every octave of the spectrum)- entering the VCF-VCA and then the audio output.

DYNAMIC A.D.S.R.

The envelope generator A.D.S.R. applies to the VCF and/or VCA sections through the ATTACK, DECAY, SUSTAIN and RELEASE controls.

The envelope voltage generated by the four stages (A-D-S-R) can be used to change a timbre over time (operating VCF) or to modify an amplitude over time (operating VCA).

The envelope function is initiated when a key is struck (each note has its individual envelope) and proceeds through its attack and decay periods at the rate determined by the setting of the SPEED values of the various sections. The sustain level of each note is determined by the SUSTAIN value; the note will remain at the level set by SUSTAIN until the key is released. When the key is released, the RELEASE function is activated and proceeds at a rate determined by the RELEASE value setting.

- 30 - ATTACK

Adjusts the length of time for the amplifier and/or filter of each voice to go from 0 level (when one or more keys are initially pressed) to maximum level. This function is adjusted by parameter 30 with values ranging from 00 to 255.

- 31 - DECAY

Adjusts the length of time for the amplifier and/or filter of each voice to go from maximum level (achieved after the attack stage) to SUSTAIN level. If the SUSTAIN value is set to the maximum, DECAY will have no effect. This function is controlled by parameter 31 with values from 00 to 255.

- 32 - SUSTAIN

Adjusts the sustain level of the filter and/or amplifier. This is a level control, not a time control. (Sustain time is the period between the end of the DECAY period and the beginning of the RELEASE period. This is determined by

touch). This function is adjusted by parameter 32 with values ranging from 00 to 255.

- 33 - RELEASE

Adjusts the length of time for the filter and/or amplifier of each voice to fall from SUSTAIN level to 0 after the key is released. If the key (or keys) is released before the ATTACK and DECAY periods have elapsed, the RELEASE value determines the time taken for the filter and/or amplifier of each voice to drop to 0 from their level when the key was released.If the SUSTAIN level is set to 0 and the ATTACK and DECAY periods have elapsed, the RELEASE value setting is irrelevant, because there is no level for the filter and/or amplifier to release from. This function is regulated by parameter 33 whose values range from 00 to 255.

- 34 - A.D.S.R. TO

Determines the destinations of the A.D.S.R. functions: to the filter, to the amplifier or to both. This function is controlled by parameter 34 whose values are:

0=OFF
1=VCF
2=VCA
3=VCA+VCF

- 35 - VELOCITY TO

The keyboard is controlled by a microprocessor which constantly reveals the speed at which the keys are struck, which is directly proportional to the touch. This data is used to adjust the 'feeling' of a performance, the filter's and/or amplifier's amplitide and/or the attack speeds of the notes. The values of parameter 35 are 0-1-2-3:

0=OFF

1= A.D.S.R. LEVEL - it applies the keyboard dynamic control to the maximum A.D.S.R. amplitude; if the A.D.S.R. is addressed to the VCF, you will obtain timbre variations determined by the touch; if the A.D.S.R. is addressed to the VCA , you will obtain volume variations depending on the touch; if the A.D.S.R. is addressed to both, you will have variations in timbre and volume depending on the touch.

2= ATTACK TIME - it activates the keyboard dynamic control on the attack time whose minimum levels are determined by the ATTACK value. When the touch is 'harder' the attack periods will correspond to those selected in the A.D.S.R. section; the lighter the touch the longer the attack periods. Also this control is polyphonic, thus you can play simultaneously notes with different attack times in accordance with the touch used in the performance.

3= A.D.S.R. LEVEL + ATTACK TIME - it applies the keyboard dynamic control to the maximum envelope amplitudes and and attack periods.

V.C.F. (Voltage Controlled Filter)
This section is controlled by parameters 40-41-42-43.

- 40 - CUTOFF
This parameter adjusts the cutoff frequency of the 24dB octave (4 pole) Low-Pass filter. It is rather like a tone control. "Cutoff" is the frequency below which all elements of the mixer's output signal are let through. The higher-frequency components of the input signal (i.e. all those above the cutoff frequency) are suppressed. The higher the knob setting, the higher the knob frequencies are which pass through the filter. Thus, the higher the sound.

This function is adjusted by parameter 40 whose values range from 00 to 255.

- 41 - RESONANCE
The RESONANCE ("EMPHASIS", "REGENERATION", or "Q") adjusts the amount of filter resonance and raises the frequency region round the cutoff, thus increasing the harmonic content of that region. The higher the resonance, the more 'nasal' the sound. This function is controlled by parameter 41 with values from 00 to 255.

- 42 - KEYBOARD TRACKING
When on, the keyboard voltage control applies to the filter frequency cutoff. This 'interaction' of the Well-Tempered scale on the filter makes it possible to have a consistency of timbre over the whole keyboard range.
This function is controlled by parameter 42 with values 0-1.
0=OFF
1=ON

- 43 - EG LEVEL (Envelope Generator level)
Determines the EG (ENVELOPE GENERATOR) level on the filter. With value 00, the envelope has no effect on the filter. This function is controlled by parameter 43 whose values range from 00 to 255.

L.F.O. 1-2 (Low Frequency Oscillators)
This section contains two sub-audio free-in-phase oscillators whose depth, rate and envelope are set by the same depth (INITIAL LEVEL,FINAL LEVEL), speed (FREQUENCY) and envelope (A.D.S.R.) parameters.
The destinations of these sine oscillators are respectively: LFO 1 for oscillator A, LFO 2 for oscillator B.
If you address the LFO 1-2 modulation source to one of the two audio-oscillators or to both, you will have a periodic pitch variation known as VIBRATO.

- 50 - FREQUENCY
Adjusts the modulation rate of the LFO 1 and LFO 2 oscillators. The values of parameter 50 go from 00 to 255.

- 51 - FINAL LEVEL
Adjusts the amplitudes that LFO 1 and LFO 2 will take on

as final value after the A.D.S.R. function. This function is controlled by parameter 51 with values from 00 to 15.

- 52 - INITIAL LEVEL

Adjusts the amplitudes that LFO 1 and LFO 2 will take on as initial value before the A.D.S.R. phase starts. This function is controlled by parameter 52 with values from 00 to 15.

- 53 - ATTACK

Adjusts the length of time for LFO 1 and 2 to go from the INITIAL level to the FINAL level of modulation. This function is controlled by parameter 53 whose values range from 00 to 15.

- 54 - DECAY

Adjusts the time for LFO 1 and 2 to go back from the FINAL level of modulation to SUSTAIN level.
If the SUSTAIN value is set to 0, the decay will go from FINAL level to INITIAL level. If SUSTAIN is set to the maximum, the modulation decay will have no effect.
Decay is adjusted by parameter 54 with values from 00 to 15.

- 55 - SUSTAIN

Adjusts the sustain level of the modulation.
This is a level control,not a time control (ATTACK, DECAY and RELEASE are time controls) and is determined by touch.
This function is controlled by parameter 55 with values from 00 to 15.

- 56 - RELEASE

Adjusts the time for LFO 1 and 2 to go from SUSTAIN level to INITIAL level after the key has been released.
The modulation RELEASE obviously depends on the introduction of a RELEASE in the sound generation (DCO 1-2).
This function is controlled by parameter 56 with values from 00 to 15.

L.F.O. TO

Chooses the destination of the LFO 1-2 modulation with values 0-1-2-3:

0=OFF
1=DCO-A
2=DCO-B
3=DCO-A + DCO-B

L.F.O. 3 (Low Frequency Oscillator)

This section contains a sub-audio oscillator whose depth, speed and envelope are controlled by the INITIAL LEVEL-FINAL LEVEL, FREQUENCY, A.D.S.R. parameters . The destinations of this sine oscillator, whose wave shape can be selected, are the P.W. of the different oscillators and the filter.
With the P.W. modulation you have an harmonic modification caused by the periodic variation of the square-wave P.W.
If both the LFO 3 DEPTH and P.W. values are set to approximately the maximum, you will obtain a very deep

modulation enabling you to hear the sound disappear and then appear again at the frequency rate set by LFO 3.

- 60 - FREQUENCY

Parameter 60 adjusts the modulation speed of LFO 3. Its values range from 00 to 255.

- 61 - FINAL LEVEL

Adjusts the amplitude that LFO 3 will take on as final value after the A.D.S.R. function. This is controlled by parameter 61 with values from 00 to 15.

- 62 - INITIAL LEVEL

Adjusts the amplitude that LFO 3 will take on as initial value before the A.D.S.R. function starts. This is controlled by parameter 62 with values from 00 to 15.

- 63 - ATTACK

Adjusts the length of time for LFO 3 to go from the INITIAL level to the FINAL level of modulation. This function is controlled by parameter 63 whose values range from 00 to 15.

- 64 - DECAY

Adjusts the time for LFO 3 to go form the FINAL level of modulation to SUSTAIN level.
If the SUSTAIN value is set to 0, the decay will go from FINAL level to INITIAL level. If SUSTAIN is set to the maximum, the modulation decay will have no effect.
This function is adjusted by parameter 64 whose values range from 00 to 15.

- 65 - SUSTAIN

Adjusts the sustain level of the modulation.
This is a level control,not a time control (ATTACK, DECAY and RELEASE are time controls) and is determined by touch.
This function is controlled by parameter 65 with values from 00 to 15.

- 66 - RELEASE

Adjusts the time for LFO 3 to go from SUSTAIN level to the INITIAL level of modulation after the key has been released.
The modulation RELEASE obviously depends on the introduction of a RELEASE in the sound generation (DCO 1-2).
Parameter 66 range of values is from 00 to 15.

- 67 - L.F.O. P.W.M.

Chooses the destination of the LFO 3 modulation in the P.W. section of DCO-A and DCO-B with values 0-1-2-3:

0=OFF
1=DCO-A
2=DCO-B
3=DCO-A + DCO-B

- 68 - WAVE

Enables selection of a triangle wave, a square wave, or both. If you select the triangle wave, you will obtain a periodic linear modulation (first increasing then decreasing) with no discontinuity points.
If you select the square wave, you will obtain a periodic modulation with sharp changes from maximum to minimum values, thus with discontinuity points.
It is also possible to have modulations with the sum of the two wave shapes (triangle wave + square wave).
This function is controlled by parameter 68 with values 1-2-3:

1=TRIANGLE WAVE
2=SQUARE WAVE
3=TRIANGLE WAVE + SQUARE WAVE

- 69 - V.C.F. (Voltage Controlled Filter)

Parameter 69 assigns LFO 3 to the filter. Its values are 0-1:

0=OFF
1=ON

WHEELS

The DK 700 is provided with a wheel system for modulation enabling you to instantly change some of the already programmed controls. The destinations of the modulations are programmable; for example, it is possible to obtain momentary pitch-bend of one of the two oscillators or of both, or to increase one or more modulation depths.

- 70 - PITCH TO

Assigns the first wheel control to the DCO-A and DCO-B pitches. This function is controlled by parameter 70 with values 1-2-3:

1=DCO-A
2=DCO-B
3=DCO-A + DCO-B

- 71 - DEPTH TO

This parameter assigns the second wheel control to the already memorized depths of LFO 1/2/3 with values 1-2-3:

1=LFO1-2
2=LFO 3
3=LFO 1-2 + LFO 3

S & H (Sample & Hold)

This is a casual modulation which makes it possible to have non-periodic effects. It can be addressed both to DCO-B (for random pitch-bends) and to the filter (for random filter variations).

- 80 - FREQUENCY

Parameter 80 adjusts the modulation speed of SAMPLE & HOLD with a range of values from 00 to 15.

- 81 - DEPTH

Adjusts the modulation depth of S & H. The values of parameter 81 go from 00 to 15.

- 82 - S & H TO

Assigns the S & H modulation to DCO-B, to the filter, or to both. This function is controlled by parameter 82 with values 0-1-2-3:

0=OFF
1=VCF
2=DCO-B
3=VCF + DCO-B

- 90 - COMPARE

You can playback the edited preset (NEW) or the original one (OLD); this function is useful during the memorization of a new timbre in order to compare it with the one already in memory. This is possible with parameter 90 with values 1-2

1=NEW
2=OLD

- 91 - WRITE ENABLE

Parameter 91 enables program recording. Its values are 0-1:

0=OFF
1=ON

- 92 - WRITE

This parameter enables to record the current timbric program to the memory selected.This function is controlled by parameter 92 with values ranging from 00 to 72.

TAPE

This type of interface enables you to transfer all 73 programs to tape for tape storage, and also to load another group of programs to your DK 700 from tape.

- Use an AC-supply with portable recorders. Using (weak) batteries may cause tape speed variations outside the interface's range.

- Possibly use tape-recorders featuring VU METER recording level indicator.

- Use the same recorder both for recording and for data transfer from tape to DK 700 (to avoid errors in tape playback).

The DK 700 is provided with 73 Factory Programs which can be edited at will. They are also included on a cassette with each DK 700.

CONNECTION TO TAPE-RECORDER

- Connect "TO" (DK 700 TAPE section) to your recorder's "IN" LEFT or RIGHT jack.

- Connect "FROM" (DK 700 TAPE section) to your recorder's "OUT" LEFT or RIGHT jack.

WARNING : VERIFY YOU HAVE USED THE SAME LEFT **OR** RIGHT

CHANNELS FOR THE RECORDER'S IN AND OUT JACKS.

- 93 - SAVE (Data loading from instrument to tape)

- Connect recorder to DK 600 as alreday explained.
- Enter the PARAMETERS position and select parameter 93 (SAVE).
- Set your tape-recorder in REC/PAUSE to adjust record level.
- Press the SELECT PARAMETERS/VALUE tab and select value 1 (SAVE START).
- Adjust record level; recorders with VU METERS should be at 0dB. When the SAVE function is completed, the value of parameter 93 automatically resets to 0=STOP.
- Disable pause on your recorder: wait a moment for the tape leader to pass, then set the recording speed indicator to 0.
- Select value 1=START again.
- When the transfer period is completed, parameter 93 automatically resets to value 0.
- Rewind to start of tape.

To verify that all programs have been transferred without errors,you must compare all DK 700 memories to those you have memorized to tape. This is possible with the VERIFY function.

- 94 - LOAD (Data loading from tape)

Selecting this function the DK 700 will be loaded with the 73 programs contained in the cassette, thus cancelling the ones previously memorized.

- Connect recorder to DK 700 as already explained.
- Select parameter 94 (LOAD)
- Rewind to start of tape.
- Use only tapes which have been already verified (with the VERIFY operations).
- Press PLAY on recorder.
- Choose value 1=START of parameter 94.
- With loading completed parameter 94 automatically resets to 0.

- 95 - VERIFY (Verification of correct data memorization)

- Select parameter 95 (VERIFY).

- Rewind to start of tape.

- Press PLAY on tape-recorder and wait for the first acoustic signal.

- Choose value 1=START of parameter 95 to initiate recording verification.

- With tape verification completed 0=OK should appear on display to indicate that the recording was correct.
If after verification the display shows number 2=ERROR, an error has occurred in recording or verification.
Repeat VERIFY operation. If verification fails a second time repeat SAVE operation.
The errors which occur more frequently are: volume in record and/or play positions too low or too high; low-level hum in data recording.

TO AVOID ERRORS RECORD AND/OR LISTEN TO THE DATA USING DIFFERENT VOLUMES; IN CASE OF PROBLEMS DUE TO LOW-LEVEL HUM DISCONNECT AC GROUND OF EITHER THE INSTRUMENT OR THE RECORDER.

MIDI MASTER KEYBOARD MODE

Slide the USER MODE switch downward.

PROGRAMMING

PROGRAM SELECT

With USER MODE downward (MIDI MASTER KEYBOARD) the first display (PROGRAM/PARAMETER) shows the number of a MIDI MASTER KEYBOARD program corresponding to the last program used.
The programs are numbered from 00 through 54; to change over to second program simply digit the number desired on the switch-panel and then press ENTER on the PROGRAMMING UNIT.
It is possible to run through the programs using the 'backward'forward' tabs. In this case it is not necessary to press ENTER after selection.

The DK 700 does not have pre-programmed MIDI MASTER KEYBOARD programs because they must be created depending on the keyboards or expanders connected to the instrument.

Now the DK 700 is ready to 'talk' with other peripheral units and transmit simultaneously up to 4 different program changes, 4 different note data (SPLIT, TRANSPOSE), 4 types of PITCH BENDS and MODULATIONS besides keyboard DYNAMICS and SENSITIVITY information, PEDAL and SUSTAIN/LATCH data.

CREATE A PROGRAM

To create a MASTER KEYBOARD program is very easy. On the left part of the instrument is a table of the controllable parameters. The parameters are divided into functional groups and for each parameter the following data are specified:

1) THE SECTION
2) THE NUMBER
3) THE RANGE OF VALUES

If you want to memorize some MASTER KEYBOARD patches, follow the instructions hereunder:

A) Press the MODE switch (EDIT M.M.K. PRM) on the PROGRAMMING UNIT section.
The upper display shows the parameter number and the lower display shows the value of the parameter selected. A decimal point between the first and the second number, just above 'PRM M.K.'(upper display) shows that the instrument is in PARMETERS MIDI MASTER KEYBOARD position.
Another blinking point to the left of the last number indicates that the switch-panel is enabled to recall the numbers shown on the upper display, i.e. the parameter numbers.

B) Choose a parameter you want to edit by digiting any number on the switch-panel and press ENTER, or advance and/or go back with the 'backward' 'forward' tabs, marked

with arrows. If the selection occurs by digiting a number on the switch panel, the display will flash until you give the ENTER command, while if it is made with the 'backward' 'forward' tabs the display will not flash and there will be no need for you to press ENTER.

C) After recalling the parameter to be modified (UPPER DISPLAY SHOWS THE NUMBER CHOSEN - DISPLAY NOT FLASHING) press the SELECT PRM/VALUE tab, which has the same function as the ENTER tab. Now the blinking decimal point is moved to the lower display to indicate that DK 700 is enabled to the modification of the values.

D) Edit the values within the ranges shown on the table on the left section of the instrument. To modify the values you can use either the switch-panel or the 'backward''forward' tabs. In the former case the lower display flashes waiting for the 'ENTER' command.
The tab marked +/- can be used for those parameters which have also negative values.

E) To go back to the parameter selection (decimal point blinking on the upper display), you must press SELECT PRM/VALUE again.

F) To return to the MIDI MASTER KEYBOARD program selection, press MODE (RECALL PRG); the lower display will go off, while the upper display will show DK 700's MIDI MASTER KEYBOARD programs.

The numerical displays show:

Upper Display:
1) when in PROGRAM position: the number of MIDI MASTER KEY-BOARD program in use.
2) when in PARAMETERS position: the number of parameter you want to edit.

Lower Display:
1) The value of the parameter you have enabled.

When in MIDI MASTER KEYBOARD mode, it is possible to edit the parameters of the DK 700 which, in this case, is a SLAVE of the MASTER KEYBOARD.

To activate the EDIT function of the SLAVE DK 700 you must:

- Press the EDIT PARAMETERS tab (SLAVES);

- The upper display shows the parameter number with a luminous point to the right of the first number, just above 'PRM SLAVES';

- For the modification of DK 700's parameters, follow the instructions given in the DK 700 MODE section of this manual.

PROGRAM RECORD

When in MIDI MASTER KEYBOARD mode, the instrument is always enabled to the recording of new programs.
To record a MIDI MASTER KEYBOARD program proceed as follows:

- SELECT PARAMETERS position (upper display shows the parameter with a luminous decimal point between the first and the second number,a blinking decimal point to the left of the last number).

- Digit any number between 00 and 54 on the switch-panel;

- The number starts flashing on display;

- To record the program to the memory location selected, press the WRITE M.K. tab.

- After this operation, the display shows the number you had previously selected.

N.B.: The 'WRITE' function can be stopped if before pressing the WRITE M.K. tab you change parameter.

WARNING : before recording a program to any memory location, verify that the location is not occupied by a program you wish to keep memorized.

MIDI MASTER KEYBOARD PARAMETERS

The parameters section of MIDI MASTER KEYBOARD is divided into two groups:

- SINGLE
- GLOBAL

In fact, the SLAVEs connected can be controlled both by the single parameters (SINGLE) and by the general setting parameters (GLOBAL).

SINGLE

The SINGLE parameters are subdivided into 4 sections A-B-C-D which represent the 4 instruments connected to the MASTER KEYBOARD.

0 1 2 3 - PROGRAM SELECT

Parameters 0-1-2-3 determine the program changes for each instrument connected (respectively A-B-C-D).
The values of these parameters (in this case the numbers of the timbres to recall for each instrument) range from 00 to 127.

4 5 6 7 MIDI CH. SELECT

Parameters 4-5-6-7 select the MIDI channels of each instrument connected (respectively A-B-C-D).
The values of these parameters (in this case the MIDI channels numbers)are 0=OFF and all the channels from 1 to 16.
To assign the DK 700 internal generation to one of the A-B-C-D slaves, you must select for the slave MIDI channel 1.

8 9 10 11 - TRANSPOSE

Parameters 8-9-10-11 determine the transpose values of each instrument connected (respectively A-B-C-D). The values of these parameters (in this case the detune semitones) go from -24 (2 octaves under the normal tuning) to +24 (2 octaves above the normal tuning) with 0=TUNED and 'shifts' of 1 semitone at a time.

12 13 14 15 - BEND RANGE

Parameters 12-13-14-15 determine the PITCH BEND ranges of the 4 slaves connected (respectively A-B-C-D) with values from 00 to 127.

16 17 18 19 - MODULATION RANGE

Parameters 16-17-18-19 adjust the MODULATION WHEELS ranges of the 4 slaves connected (respectively A-B-C-D).

20 21 22 23 - MINIMUM DYNAMICS

Parameters 20-21-22-23 control the minimum levels of the dynamics received by the 4 slaves (respectively A-B-C-D).
Their values range from 00 to 127.

24 25 26 27 - VELOCITY SENSITIVITY

These parameters control the sensitivity of the dynamics received by the slaves (respectively A-B-C-D) with values

from 00 to 127. Such values can be modified globally by the SENSITIVITY knob in the MASTER section.

28 29 30 31 - PEDAL MODE

Parameters 28-29-30-31 control the Sustain and/or Latch pedals of the slaves (respectively A-B-C-D). Their values are:

0=OFF
1=SUSTAIN
2=LATCH
3=SUSTAIN + LATCH

32 33 34 35 - VOICE MODE

Parameters 32-33-34-35 enable the three keyboard modes of the slaves connected (respectively A-B-C-D) with values 0-1-2:

0=POLY
1=MONO
2=CHORD

The slave instrument will thus play in polyphonic mode, monophonic mode, or, pressing one key, it will play the chord memorized with parameter 39 (CHORD PROGRAM) of the GLOBAL section.

GLOBAL

36 - GLOBAL TRANSPOSE

Parameter 36 makes it possible to transpose all the instruments linked-up with the Master Keyboard by +/- 24 semitones. Its values range from -24 to +24.

37 - FIXED SPLIT

Parameter 37 splits the keyboard at the desired point. With split keyboard, Slave A plays the right hand section while Slaves B-C-D play the left-hand section. The split point can be chosen with values from 00 to 60. The Fixed Split function depends on the KEY ASSIGNMENT MODE function of parameter 38.

38 - KEY ASSIGNMENT MODE

This parameter enables selection of 15 different keyboard modes with values from 00 to 14:

00=UNISON

All the slaves play simultaneously; the FIXED SPLIT function is disabled.

01=ROLLING

The slaves play alternately; every time you press a key again, the note is assigned to a new slave; the FIXED SPLIT function is disabled.

02=FIRST AVAILABLE

The first note played is assigned to the first slave; if the key is released and then pressed again, the note will be assigned to the same slave; if you keep the key pressed , the

second note played will be assigned to the second slave, and so on. The FIXED SPLIT function is disabled.

03=SPLIT-UNISON
The FIXED SPLIT function is enabled. The keyboard right-hand section plays slave A while the keyboard left-hand section plays the B-C-D slaves in UNISON mode.

04=SPLIT-ROLLING
The FIXED SPLIT function is enabled. The right-hand section plays slave A, while the left-hand section plays the B-C-D slaves in ROLLING mode.

05=SPLIT FIRST-AVAILABLE
The FIXED SPLIT function is enabled. The right-hand section plays slave A, while the left-hand section plays the B-C-D slaves in FIRST AVAILABLE mode.

06=UNISON-SPLIT
This function is similar to 03, with keyboard split inverted.

07=ROLLING-SPLIT
This function is similar to 04, with keyboard split inverted.

08=FIRST AVAILABLE-SPLIT
This function is similar to 05, with keyboard split inverted.

09=FLOAT-UNISON
Disables FIXED SPLIT and enables a floating split which follows the execution giving the possibility of having, at any point of the keyboard, a timbre for the right hand and a different one for the left hand.
The right-hand section plays slave A, while the left-hand section plays the B-C-D slaves in UNISON mode.

10=FLOAT-ROLLING
This function is similar to 09, but the left-hand section plays in ROLLING mode.

11=FLOAT-FIRST AVAILABLE
This function is similar to 09, but the left-hand section plays in FIRST AVAILABLE mode.

12=UNISON-FLOAT
This function is similar to 09, with keyboard split inverted.

13=ROLLING-FLOAT
This function is similar to 10, with keyboard split inverted.

14=FIRST AVAILABLE-FLOAT
This function is similar to 11, with keyboard split inverted.

39 - CHORD PROGRAM

Parameter 39 enables memorization of a chord you want to play in CHORD MODE with parameters 32-33-34-35 (VOICE MODE section).
Select parameter 39, press ENTER.
CH (CHORD) appears on the lower display.
Press the SELECT PRM/VALUE tab (same function as ENTER).
Press the desired chord notes on the keyboard and, without releasing them, press ENTER again.

DK 700 PROGRAMS

The letters next to the names of each preset stand for:

VA = Velocity control to AMPLIFIER
VF = Velocity control to FILTER
VAF= Velocity control to AMPLIFIER and FILTER
VT = Velocity control to attack TIME
MP = Wheel Modulation to PITCH
MF = Wheel Modulation to FILTER
MW = Wheel Modulation to P.W.
MPF= Wheel Modulation to PITCH and FILTER
MWF= Wheel Modulation to P.W. and FILTER

00- BRASS	VAF/MP	10- STRINGS	VA/MP
01- CHORUS BRASS	VAF/MP	11- H.STRINGS	VA/MP
02- GLIDE BRASS	VAF/MP	12- STRINGS REL.	VA/MP
03- FANFARE BRASS	VAF/MP	13- H.STRINGS REL.	VA/MP
04- Q-BRASS 1	VAF/MP	14- JUMP.STRINGS	VA/MP
05- Q-BRASS 2	VAF/MP	15- H.JUMP.STRINGS	VA/MP
06- PUNCHY BRASS	VAF/MP	16- CELLO	VA/MP
07- TROMBONE	VA/MF	17- VIOLIN	VA/MP
08- FLUTE	VA/MF	18- SWEEP 1	VA/MP
09- CLARINET	VA/MP	19- SWEEP 2	MP
20- ORGAN 1	MP	30- METAL GUITAR 1	VA/MP
21- ORGAN 2	MP	31- METAL GUITAR 2	VA/MP
22- CHORUS ORGAN 1	MP	32- NYLON GUITAR	VAF/MW
23- CHORUS ORGAN 2	MP	33- HARP	VA/MF
24- TCH.ORGAN	VT/MP	34- CELESTE	VA/MP
25- PIPE ORGAN 1	MP	35- KOTO 1	MP
26- PIPE ORGAN 2	MP	36- KOTO 2	MP
27- PIPE ORGAN 3	MP	37- DISCO CLAV.1	VAF/MP
28- PIPE FLUTE	VA/MF	38- DISCO CLAV.2	VAF/MP
29- HARMONIUM	VA/MF	39- DISCO CLAV.3	MP
40- SYNTH.PIANO 1	VAF/MP	50- SLAP FUNK	VF/MP
41- SYNTH.PIANO 2	VAF/MP	51- TCH.SYNTH	VT/MP
42- P.W. MODUL.	MW	52- SLAP BASS	VF/MF
43- POLY SQUARE 1	VT/MP	53- SYNTH BASS	VF/MP
44- POLY SQUARE 2	VA/MP	54- MELLOW BASS	
45- E.VOICE 1	MP	55- HARMONICA	VA/MF
46- E.VOICE 2	MP	56- ACCORDION	VA/MWF
47- GHOST		57- SQUARE LEAD	MP
48- HONKY TONK	VAF/MW	58- LEAD SYNTH 1	MP
49- CARILLON	VA/MP	59- LEAD SYNTH 2	MP
60- PERCUSSION	VAF/MF	70- TEST 1	
61- SYNDRUM	VAF/MF	71- TEST 2	
62- BELL GONGS 1	VA/MP	72- TEST 3	
63- BELL GONGS 2	VT/MP		
64- NOISE SWEEP	MF		
65- REVERSE SWEEP			
66- REVERSE SQ.SWEEP			
67- WIND	MF		
68- HELICOPTER	MF		
69- EXPLOSION			

MIDI FUNCTION

DK 700 MODE

On power-up the DK 700 sends to all 16 MIDI channels the program number shown on display followed by the 'OMNI MODE ON' control change.

On power-up the DK 700 is always in 'OMNI MODE ON' 'POLY MODE ON' position. If the instrument receives the 'OMNI MODE OFF' command, it sets to 'OMNI MODE OFF' - 'POLY MODE ON' on channel 1.

When in DK 700 mode, the instrument is ready to transmit and receive the following MIDI codes:

KEY DOWN: 90-NN-VV NN=KEY NUMBER (36-96)
KEY UP : 80-NN-VV VV=VELOCITY (0-127)

CHANGE PROGRAM: C0-XX XX=PROGRAM NUMBER (00-72)

PITCH BENDER:E0-LOB-HOB HOB RANGE (00H-40H-7FH)

MODULATION: B0-01-HOB,B0-33-LOB HOB RANGE (00H-7FH)

HOB= MOST SIGNIFICANT BYTE
LOB= LESS SIGNIFICANT BYTE

All the above mentioned messages are transmitted and received also in 'FREE RUNNING'.

REAL TIME MESSAGES
START: FAH
CLOCK: F8H CLOCK RANGE: 40-250 BEATS PER MINUTE
STOP : FCH
CONTINUE: FBH

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SYSTEM EXCLUSIVE MESSAGES

'DUMP REQUEST'

With SYSTEM EXCLUSIVE it is possible to request the data of the 73 DK 700 voice programs.

For data request send the following string to DK 700:
F0H-21H-7FH-00H-7DH-0FH-0DH-00H-0CH-01H-02H-07H-00H-F7H

The string data have the following meaning:
F0H: SYSTEM EXCLUSIVE
21H: SIEL ID
7FH: DATA TRANSMISSION PROTOCOL
00H: MIDI CHANNEL
7DH: REQUEST FOR DK 700 DATA TRANSMISSION

0FH-0DH-00H-0CH: ADDRESS:C0DFH	START DATA ADDRESS (THE VALUES ARE IN NIBBLE FORMAT AND THE FIRST NIBBLE IS THE LESS SIGNIFICANT BYTE OF THE 16 BIT ADDRESS).
01H-02H-07H-00H: BYTE NUMBER:0721H(1825D)	BYTE NUMBER (NUMBER OF REQUESTED BYTES - THE VALUES ARE IN NIBBLE FORMAT AND THE FIRST NIBBLE IS THE LESS SIGNIFICANT BYTE).
F7H:	END OF SYSTEM EXCLUSIVE

Once the string has been transmitted, DK 700 will answer sending the data of the 73 voice programs loaded on R.A.M. in the following format:
F0H-21H-7FH-00H-05H-0FH-0DH-00H-0CH-LN1-HN1-LN2-HN2----------F7H

F0H 21H 7FH 00H	THESE 4 BYTES HAVE THE SAME MEANING AS THE STRING OF DATA REQUEST
05H	DK 700 CODE NUMBER
0FH-0DH-00H-0CH	START DATA ADDRESS

After the 4 bytes 'START DATA ADDRESS' follows transmission of the data in Nibble format. The less significant byte is the first to be sent.
The number of transmitted bytes will be 1825x2=3650 (73 programs of 25 bytes each).

DATA FORMAT EXAMPLE

LN1: LOW NIBBLE BYTE 1
HN1: HIGH NIBBLE BYTE 1
LN2: LOW NIBBLE BYTE 2
HN2: HIGH NIBBLE BYTE 2

F7H: END OF SYSTEM EXCLUSIVE

See meaning of the 25 bytes composing a DK 700 voice program on TABLE 1.

You can also request the data of a single program or information on a single data of a program. This is possible by properly setting the START DATA ADDRESS and the number of requested bytes.

DUMP

To load data (DUMP) from an external source (computer) to the DK 700, use the format that DK 700 sends in reply to a DUMP request (REQUEST TO SEND).

MASTER KEYBOARD MODE

When in M.K. MODE, on power-up the instrument sends the program numbers contained in parameters 0-1-2-3 relative to the MASTER KEYBOARD program shown on display.
These programs, which are sent in 'PROGRAM CHANGE' format, will be transmitted in accordance with the MIDI channels of parameters 4-5-6-7 relative to the program shown on display.
Each 'PROGRAM CHANGE' message will be followed by 2 'CONTROL CHANGE' messages always transmitted in accordance with the MIDI channels, as already explained.
The 2 'CONTROL CHANGE' messages are: 'OMNI MODE OFF' and 'POLY MODE ON'

For example:

If only 2 MIDI channels are enabled (parameter M.K. 4=1, parameter M.K. 5=2, parameters M.K. 6-7=0=OFF) with parameter 0=4 and parameter 1=5, on power-up DK 700 will send the following string:

C0H-04H	PROGRAM CHANGE	CHANNEL 1=4
B0H-7CH-00H	OMNI MODE OFF	CHANNEL 1
B0H-7FH-00H	POLY MODE ON	CHANNEL 1
C1H-05H	PROGRAM CHANGE	CHANNEL 2=5
B1H-7CH-00H	OMNI MODE OFF	CHANNEL 2
B1H-7FH-00H	POLY MODE ON	CHANNEL 2

For each MASTER KEYBOARD program change, the instrument will send strings of the type shown above to the MIDI OUT according to what has been recorded in parameters 0-1-2-3 and 4-5-6-7.

In M.K. mode, the KEY DOWN-KEY UP functions can be transmitted in accordance with the keyboard modes.

The PITCH BENDER can be transmitted in accordance with the MIDI parameters.

The same applies for the MODULATION function.

REAL TIME MESSAGES
See DK 700 mode.

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SYSTEM EXCLUSIVE MESSAGES

In M.K. mode the following functions are available:
'REQUEST TO SEND' the DK 700 voice data, 'DUMP' of the DK 700 voice data, 'REQUEST TO SEND' M.K. program data and 'DUMP' of M.K. program data.

'DUMP REQUEST'

With SYSTEM EXCLUSIVE you can request the data of the 55 M.K. programs.

This is possible by sending the following string to DK 700:
F0H-21H-7FH-00H-7EH-01H-06H-00H-02H-05H-08H-07H-00H-F7H

The string data have the following meaning:
F0H: SYSTEM EXCLUSIVE
21H: SIEL ID
7FH: DATA TRANSMISSION PROTOCOL
00H: MIDI CHANNEL
7EH: REQUEST FOR M.K. DATA TRANSMISSION

01H-06H-00H-02H: ADDRESS:2061H	START DATA ADDRESS (THE VALUES ARE IN NIBBLE FORMAT AND THE FIRST NIBBLE IS THE LESS SIGNIFICANT BYTE OF THE 16 BIT ADDRESS).
05H-08H-07H-00H: BYTE NUMBER:0785H(1925D)	BYTE NUMBER (NUMBER OF REQUESTED BYTES - THE VALUES ARE IN NIBBLE FORMAT AND THE FIRST NIBBLE IS THE LESS SIGNIFICANT BYTE).
F7H:	END OF SYSTEM EXCLUSIVE

Once the string has been transmitted, DK 700 will answer sending the data of the 55 M.K. programs loaded on R.A.M. in the following format:
F0H-21H-7FH-00H-7FH-01H-06H-00H-02H-LN1-HN1-LN2-HN2----------F7H

F0H	THESE 4 BYTES HAVE THE SAME
21H	MEANING AS THE STRING OF DATA
7FH	REQUEST
00H	
7FH	M.K. CODE NUMBER
01H-06H-00H-02H	START DATA ADDRESS

After the 4 bytes 'START DATA ADDRESS' follows transmission of the data in Nibble format. The less significant byte is the first to be sent.
The number of transmitted bytes will be 1925x2=3850 (55 programs of 35 bytes each).

See meaning of the 35 bytes composing a M.K. program on TABLE 2.

You can also request the data of a single program or information on a single data of a program. This is possible by properly setting the START DATA ADDRESS and the number of requested bytes.

DUMP

To load M.K.data (DUMP) from an external source (computer) to DK 700, use the format that DK 700 sends in reply to a DUMP request (REQUEST TO SEND) of M.K. data.

TABLE 1

Byte 1	FREQ S/H	+ DEPTH	
Byte 2	FINAL LEVEL	+ INITIAL LEVEL	LFO 1/2
Byte 3	ATTACK	+ DECAY	
Byte 4	SUSTAIN	+ RELEASE	
Byte 5	FINAL LEVEL	+ INITIAL LEVEL	LFO 3
Byte 6	ATTACK	+ DECAY	
Byte 7	SUSTAIN	+ RELEASE	
Byte 8	SPEED	0 -> 255	LFO 1/2
Byte 9	SPEED	0 -> 255	LFO 3
Byte 10	PWA	0 -> 255	(-128, 0,127)
Byte 11	NOISE	0 -> 255	
Byte 12	PWB	0 -> 255	(-128, 0,127)
Byte 13	FINE >	0 -> 255	(-128, 0,127)
	>DETUNE		
Byte 14	COARSE>	0 -> 255	
Byte 15	ATTACK	0 -> 255	
Byte 16	DECAY	0 -> 255	
Byte 17	SUSTAIN	0 -> 255	
Byte 18	RELEASE	0 -> 255	
Byte 19	DEG LEV	0 -> 255	
Byte 20	CUTOFF	0 -> 255	
Byte 21	RESONANCE	0 -> 255	
Byte 22	FLAG 1	8 bit	
Byte 23	FLAG 2	8 bit	
Byte 24	FLAG 3	8 bit	
Byte 25	FLAG 4	8 bit	

				DCO A	DCO B	DCO A-DCO B
FLAG 1	CO7D	bit 0>		1	0	1
		>PITCH				
		bit 1>		0	1	1
				LFO 1/2	LFO 3	LFO 1/2-LFO 3
		bit 2>		1	0	1
		>DEPTH				
		bit 3>		0	1	1
			OFF	DCO A	DCO B	DCO A-DCO B
		bit 4>LFO 1/2	0	1	0	1
		bit 5>DEST	0	0	1	1
				TRIANGLE	SQUARE	TRGLE-SQUARE
		bit 6>WAVES		1	0	1
		bit 7>LFO 3		0	1	1

			OFF	DCO A	DCO B	DCO A-DCO B
FLAG 2	CO7E	bit 0	0	1	0	1
LFO 3		bit 1	0	0	1	1
DEST			LFO 3 to VCF			
			OFF	ON		
VCF		bit 2	0	1		
			OFF	TRIANGLE	SQUARE	TRGLE-SQUARE
WAVE DCO A		bit 3	0	1	0	1
		bit 4	0	0	1	1
			OFF	TRIANGLE	SQUARE	TRGLE-SQUARE
WAVE DCO B		bit 5	0	1	0	1
		BIT 6	0	0	1	1
			OFF	ON		

HALF VOLUME	bit 7	1	0		
		OFF	ADSR	AT.TIME	ADSR+AT.TIME
FLAG 3 C07F					
DYNAMICS	bit 0	0	1	0	1
DESTINATIONS	bit 1	0	0	1	1
		OFF	VCF	VCA	VCF+VCA
ADSR	bit 2	0	1	0	1
DESTINATIONS	bit 3	0	0	1	1
		OFF	1/4	1/2	FULL
KEYBOARD	bit 4	0	1		
TRACKING					
PROTAMENTO	bit 5	0	1		
FLAG 4 C05F-C07E		16'	8'	N.U.	4'
DCO A FOOTAGE	bit 0	0	1	0	1
	bit 1	0	0	1	1
DCO B FOOTAGE	bit 2	0	1	0	1
	bit 3	0	0	1	1
		OFF	VCF	DCO B	VCF+DCO B
S/H	bit 4	0	1	0	1
	bit 5	0	0	1	1

TABLE 2

* * * * * * * PROGRAM DATA FORMAT * * * * * * *
WORK AREA 35 bytes

	Bytes	No.	Parameter No.	
PROG:	4		(0)	PROGRAM VOICE CODES BIT 7=1 = DISABLED
CHANEL:	4		(4)	CHANNEL ASSIGN AND ENABLES BITS 0-3 = CHANNEL No. BIT 4 = SUSTAIN PEDAL ENABLE BIT 5 = MIDDLE PEDAL ENABLE
TRANS:	4		(8)	PROGRAM TRANSPOSE
PBENDR:	4		(12)	PITCH BEND RANGE
MODR:	4		(16)	MODULATION RANGE
TCENT:	4		(20)	TIMBRE CENTER
TSENS:	4		(24)	TIMBRE SENSITIVITY
GTRANS:	1		(28)	GLOBAL TRANSPOSE
SPLIT:	4		(29)	FIXED SPLIT POSITION
MODE:	4		(30)	KEY ASSIGNMENT MODE BITS 0 - 3 0000= UNISON 0001= ROLLING 0010= FIRST AVAILABLE 0011= SPLIT/UNISON 0100= SPLIT/ROLLING 0101= SPLIT/FIRST AVAILABLE 0110= UNISON/SPLIT 0111= ROLLING/SPLIT 1000= FIRST AVAILABLE/SPLIT 1001= FLOAT/UNISON 1010= FLOAT/ROLLING 1011= FLOAT/FIRST AVAILABLE 1100= UNISON/FLOAT 1101= ROLLING/FLOAT 1110= FIRST AVAILABLE/FLOAT
CHORD:	4		(31)	STORAGE FOR 5 NOTE CHORD