

Because the SIEL Company went bankrupt and very few people own the manual, I put the most important parts (the complete manual has 70 pages) online.

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# Keytek CTS-2000 - OWNERS MANUAL

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The **Keytek CTS-2000** digital programmable synthesizer belongs to a family of professional keyboards that feature a new method of sound synthesis, **Cross Table Sampling**.

**CTS** is a method of reproducing complex sounds while requiring significantly less memory than direct sampling. A digitally recorded sound is processed mathematically to derive a wave table. In use, the **CTS** machine re-synthesizes the original waveform from wave tables.

Using wave tables reduces the amount of memory required for each sound while at the same time preserving the fidelity of the sample. This means more sounds "on line" without sacrificing the quality of the sample.

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## FEATURES

- 333 digitally sampled waveforms which are used as the basic building blocks for CTS sounds.
- Control of up to six wave tables per voice allowing combining tables for complex effects.
- Complete analog processing for each voice including, 24db per octave DCF (Digitally Controlled Filter), 2 five parameter envelope generators and three LFO's.
- Six data entry sliders allow for easy editing of all parameters.
- Eight voice polyphonic with two digital oscillators pro voice.
- Polytimbric, the keyboard is divided into five 1 octave zones. Each zone can be assigned to a different preset, have a different multichannel number and be transposed to a different pitch range.
- 48 user presets each storing all parameters including MIDI assignment and polytimbric setups.
- External RAM cartridge for storing 96 additional user programs.
- Output Level and pan control settings for each of the five octaves stored in each preset.
- 61 key weighted keyboard with full dynamic control.
- Full MIDI setup including MIDI transpose, channel number and program change for each of the five octaves.

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## WHAT IS CROSS TABLE SAMPLING?

Keytek professional keyboards use an advanced signal processing technique called Cross Table Sampling.

Going beyond sampling CTS starts with a digitally recorded signal and uses external digitally signal processing to modify and compress the original sample.

Using the Keytek Computer Sound Design Laboratory, we can compress a 200,000 byte sample down to 384 bytes.

This data is then put into a wave table and stored with other compressed samples in the CTS-2000 sound ROM (Read Only Memory).

This substantial reduction in the amount of memory required to store each sound allows Keytek CTS-2000 instruments to store a complete library of sounds in the space normally required for one sample.

The key to using Cross Table Sampling in re-synthesizing sounds is the use of multiple wave tables over time. To read or "play back" a wave table, Keytek CTS instruments use digital oscillators.

The CTS-2000 lets you set up two digital oscillators for each of its eight voices.

Each digital oscillator can read up to three wave tables at a time.

A digital oscillator can start reading one wave table, "fade" or cross into a second wave table and finish by crossing into a third.

This gives you all the sounds from each wave table plus all the sounds from combinations of wave tables.

After the digital oscillator has re-synthesized a sample waveform, it is possible to further process the signal.

The CTS-2000 has a 24dB per octave DCF (Digital Controlled Filter) and a DCA (Digitally Controlled Amplifier) for each voice.

In addition, there are three 6 stage envelope generators for each voice.

This allows you to create a whole universe of new sounds the possible combinations are staggering!

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## INSIDE THE CTS-2000

### Wave Tables

Most of the 333 wave tables in the CTS-2000 sound ROM derived from acoustic instruments (piano, guitar, vibes etc.) Others have been sampled from Linear FM instruments and from analog synthesizers (square wave, sine, saw tooth etc.). The wave tables in the sound ROM cannot be modified. They are your "data bank" to create new sounds.

### Sound

To read or "play back" a wave table, the CTS-2000 let you set up two digital oscillators for each of its eight voices.

Each digital oscillator can read up to three wave tables in sequence with the time and frequency of play back programmable.

You can use up to 6 wave tables for each zone (octave) on the keyboard.

After the digital oscillator, it is possible to further process the signal.

The CTS-2000 has a 24dB per octave DCF (Digitally Controlled Filter) and a DCA (Digitally Controlled Amplifier) for each voice.

In addition, there are three 6 stage envelope generators for each voice.

## Presets

Each sound created can be assigned to its own ZONE (1 octave section) on the keyboard. The group of 5 ZONES across the keyboard are stored as a preset. The ZONES in a preset are completely independent of each other. Because of its independence of ZONES, it is possible to create polytimbric presets that have, for example, 2 octaves of acoustic bass combined with 3 octaves of vibraphone.

You can even have 5 separate sounds in a preset.

More than just the sounds are stored in a preset. The volume and stereo panning for each zone is stored along with all the MIDI data for each zone. You can receive on different MIDI channels and transmit on 5 others in a preset. It is possible to map MIDI program change numbers per zone so that calling up a single preset out 5 different MDI program change numbers.

The CTS-2000 allows complete control of the instrument using presets.

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# CONNECTIONS

## Sound System

The CTS-2000 can be connected for either STEREO or MONO output

Stereo uses two separate audio channels for "LEFT" and "RIGHT".

The CTS-2000 lets you program the level and stereo position for each ZONE.

MONO sums (adds) the Left and Right stereo outputs to provide a single output.

## For STEREO

Connect a ¼" phone cable to the Left out of the CTS-2000 and route it to the Left input of your mixer or amplifier.

Connect a ¼" phone cable to the Right/MONO out of the CTS-2000 and route it to the Right input of your mixer or amplifier.

## For MONO

Use the Right/MONO out of the CTS-2000 and run a phone cable to your amplifier or mixer.

As long as nothing is plugged into the left out of the CTS-2000, both left and right signals will automatically be routed to the Right/MONO jack.

## **MIDI**

The CTS-2000 has MIDI IN, OUT, and THRU jacks.

Please see the section on MIDI for more information (from page 55).

## **Pedals and Accessories**

Connect the release pedal to the corresponding jack; at the back of the instrument.

Headphones may be connected to the 1/4" stereo phone jack on the rear panel.

The expansion cartridge (optional) plugs into the "cartridge" slot on the front panel.

**IMPORTANT:** do NOT plug or unplug the cartridge with power ON

## **POWER**

After everything is connected, first turn on your (CTS-2000 then any MIDI and effects device you are using and last your mixer and power amps.

When turning off your system reverse the order (power amps off first, then mixer, MIDI and effects, and last your keyboard.

## **VOLUME**

Set the Volume control to: 3/4 of the maximum, 'then adjust your amplifier's volume controls to the desired level.

Under some conditions, you may need to adjust the settings to compensate for different amplifier or mixer input sensitivity.

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# USING THE CTS-2000

The CTS-2000 has 48 factory presets that have been programmed at the factory.

These are arranged into two sets, or "Banks" of 24 each.

You can alter these but you might want to note any sounds you like so you can reprogram them later.

The CTS-2000 also has external cartridges (optional) that can store 48 additional presets.

The cartridge supplied with your instrument contains a copy of the factory programs.

**IMPORTANT:** do NOT plug or unplug external cartridges with the power ON.

## There are three modes Of CTS-2000 operation:

**Standard Mode, - Edit Mode, and - Record Mode.**

**STANDARD Mode** is the default mode of the CTS-2000 (Whenever power is applied, the instrument "wakes up" in Standard Mode. The right side pushbuttons call up the user presets, The LCD displays the current program name and number. This is the performance mode of the CTS-2000.

The Standard Mode is automatically entered whenever power is applied to the CTS-2000 regardless of the mode when last switched off.

**EDIT Mode** permits changing all programmable parameters of the CTS-2000. The right side pushbuttons call up the different sections of a patch and the six Data Entry slider allow you to change values. As each parameter is selected the LCD will show the parameter name, the old value and the new value.

**RECORD Mode** stores user programs to the internal memory or to the external cartridge. Every time the CTS-2000 is turned on, the instrument wakes up in protected mode. You must set Record Enable from EDIT Mode. In addition to this safety feature, another nice thing about the Record Mode is the backup command that will completely copy the internal memory to cartridge with one command.

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# Presets (preset selection)

## Internal

If you press the INTERNAL button (to the right of the LCD), buttons 1 to 24 will select internal presets 1 to 24. The LCD will show the preset number, the bank (A or B) and the name of the preset. For example:

```
INT PRESET 1A  
XXXXXXXXXXXX
```

The example shows INTERNAL PRESET number 1 in bank A named XXXXXXXXXXXX.

The Internal memory capacity of the CTS-2000 is 48 presets divided into 2 banks (A and B) of 24 presets each.

To recall any of the internal presets, select the bank (A or B) and the button of the desired voice (1 to 24) or vice versa.

## Cartridge

You may use 2 kinds of cartridge (ROM cartridge and RAM cartridge) which will allow you to have more presets online.

The ROM cartridge (supplied with the instrument) enables only reading. It contains a copy of the factory presets and its memory capacity is of 48 presets divided into 2 banks (A and B) of 24 presets each, selectable by means of the BANK A/B button.

The RAM cartridge (optional) enables both recording and reading. Its memory capacity is 96 presets divided into 2 banks (1 and 2) of 48 presets each.

Bank 1 or Bank 2 can be selected by means of a button on the cartridge.

Each bank contains two banks of 24 presets each (A and B) selectable with tab BANK A/B.

The RAM cartridge has a second button ON-W.OFF which is a protection against unintentional recording (when in W.OFF).

**IMPORTANT:** remember to plug or unplug the cartridge in the "cartridge" slot with the CTS-2000 power OFF.

If you press the CARTRIDGE button (immediately above the INTERNAL button), buttons 1 to 24 will select from the cartridge.

**If there is no cartridge in the instrument the LCD will display:**

**CARTRIDGE  
NOT PRESENT**

**IMPORTANT:** do NOT plug or unplug external cartridges with the power ON.

**If YOU press the CARTRIDGE buttons with a cartridge in the instrument, the LCD display will show for example:**

**CTR PRESET 1A  
XXXXXXXXXXXXXX**

This example shows CaRtridge PRESET number 1 in bank A named XXXXXXXXXXXX.

The display will now show the memory, INTERNAL or CARTRIDGE, and the top line along with the preset number (1 to 24), and the bank (A or B). The second line of the display is the preset name.

A special note: because the current preset is stored in battery powered memory, it is possible to use a cartridge preset, turn the power off and remove the cartridge then turn the power back on and still have the cartridge sound in memory. If you then try to change presets without selecting INTERNAL, the display will keep telling you "CARTRIDGE NOT PRESENT", No problem, just press INTERNAL to continue.

The memory capacity of the CTS-2000 is 48 presets. This is organized into two "Banks" of 24 presets each. The external, cartridges are also set up in two 24 preset banks.

With a cartridge in the instrument, you have 96 presets available at once.

To review: select INTERNAL or CARTRIDGE memory with the appropriate buttons (to the right of the LCD).

Choose bank A or B using the BANK A/B pushbutton (above the INTERNAL, EXTERNAL pushbuttons).

Select the preset number by pressing one of the 24 buttons on the right side of the front panel.

Another method of selecting presets is to use the up and down arrow keys to the left of the LCD.

You can sequentially step through all programs both INTERNAL and CARTRIDGE.



## Pitch

The PITCH wheel, on the left of the keyboard provide means of "bending" notes played on the keyboard up or down in pitch. The range is fully programmable and is stored in the preset.

## Modulation

The MODULATION wheel, also to the left of the keyboard allows varying the amount of modulation used in a preset manually.

You can program any or all of the 3 LFO's (Low Frequency Oscillators) to route through the MODULATION wheel to several destinations.

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## MIDI

The MIDI buttons, to the left of the LCD, control MIDI ON/OFF and local or remote operations.

### On/Off

This turns the CTS-2000 MIDI ON or OFF. With MIDI set to OFF the CTS-2000 will neither receive nor transmit MIDI data.

When MIDI is on the right side of the LCD will show the current configuration (see LOCAL/REMOTE).

### Midi Local/Remote:

The **LOCAL/REMOTE** button selects the response of the CTS-2000 to MIDI program change commands.

The LCD shows the mode of operation on the right digit on the top and bottom rows (see example below).

- In **LOCAL** operation pressing the preset buttons on the CTS-2000 will change the internal presets but will not transmit MIDI program change commands.
- In **REMOTE** operation pressing the preset buttons sends the MIDI program change commands programmed for each zone of the preset button pressed but does not change the CTS-2000 preset selected.

In this way you can send up to five different MIDI program change commands at once.

The CTS-2000 will respond to MIDI program change commands while in REMOTE mode.

The MIDI channel programmed for ZONE 1 is used to receive MIDI program changes.

The MIDI program numbers are used sequentially from MIDI PGM 01 (INT PRE 1 BANK A), through MIDI PGM 25 (INT PRESET 1 BANK B), all the way to MIDI PGM 96 (CRT PRESET 24 BANK B)

With both **LOCAL & REMOTE** operation enabled, the preset buttons will transmit MIDI program change commands and change the CTS-2000 internal presets.

Immediately on the right of the LCD is the legend "LOCAL" for the top row, and "REMOTE" for the button row.

- With **MIDI OFF** the last digit on the right of each row of the LCD is blank.
- With **MIDI ON**, the last digit now shows which modes are enabled.
- An "0" in the display means that mode is OFF (disabled).
- An "\*" means that mode is ON (enabled)

For example:

```
Midi Off INT PRESET 1A      -- Local
PIANOFORTE                  -- Remote

Midi On INT PRESET 1A *    -- Local
Local PIANOFORTE 0        -- Remote

Midi On INT PRESET 1A 0    -- Local
Remote PIANOFORTE *      -- Remote

Midi On INT PRESET 1A *    -- Local
Local & Remote PIANOFORTE * -- Remote
```

---

## Release Pedal

The CTS-2000 is supplied with a RELEASE pedal as a standard accessory. The envelope generators have a separate programmable release time control to use with the release pedal.

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## EDIT MODE

**EDIT Mode** allows you to change any or all of the parameters in a preset.

For the complete list and explanation to the parameters function see the section "**PARAMETERS**".

When in **EDIT mode**, any modification made will be cancelled when you change presets. If you want to save the changes you will have to **RECORD** the new settings (see the section **RECORD MODE**).

To enter **EDIT mode**, select the preset you want to modify

Then press the **EDIT PRESET/PARAMETER** button. To exit **EDIT mode**, press the **PRESET/PARAMETER** button again.

**IMPORTANT** when in **EDIT mode** the 24 buttons on the right side of the front panel now select the parameter family to edit.

**IMPORTANT** in **EDIT mode** the tabs which enable selection of presets in Standard mode will allow you to choose the corresponding **PARAMETER FAMILIES**.

**After entering EDIT mode, the display will show:**

**SELECT ZONE  
PARAMETERS**

The CTS-2000 is now in **ZONE EDIT mode**. You may select and alter the parameters for one zone at a time. If you want to alter ALL the zones in a preset at once, press the **ZONE/GLOBAL button**.

**The display now shows:**

**SELECT GLOBAL  
PARAMETERS**

The **CTS-2000** is now in **GLOBAL EDIT mode**. Any parameter changes made will apply to all zones. The **ZONE/GLOBAL button** alternates between those two modes, so pressing it once more will return you to the **ZONE EDIT mode**.

To exit the **EDIT** at any time, press the **ZONE/GLOBAL button**. This will return you to the **STANDARD mode**. You can also exit the **EDIT mode** by pressing either the **CARTRIDGE** or **INTERNAL** preset button.

## Choosing a parameter family

All **CTS-2000** parameters are grouped in **PARAMETER FAMILIES**. Each parameter family can have up to 6 parameter one for each of the **DATA ENTRY sliders**.

After you are in **EDIT mode**, either **ZONE** or **GLOBAL** pressing any one of the 24 buttons on the right of the front panel will recall that parameter family for editing.

For instance, after pressing button e (**DCA 1 ENVELOPE GENERATOR**).

The display will show:

**DCA1 ENVELOPE  
GENERATOR**

The six **DATA ENTRY sliders** now control the parameters of **DCA 1 ENVELOPE GENERATOR**.

## Zone Editing

Above each pushbutton on the right side of the front panel is a list of the parameter controlled by each **DATA ENTRY slider** for that parameter family.

For number 8, **DCA 1 ENVELOPE GENERATOR**, these are:

**Slider A = ATTACK**  
**Slider B = DECAY**  
**Slider C = BREAK POINT**  
**Slider D = SLOPE**  
**Slider E = SUSTAIN**  
**Slider F = RELEASE/PED.**

If you choose a different parameter family, the function controlled by each slider will change. If a parameter family has less than 6 parameters to edit, the sliders not used will be inactive.

While in **ZONE EDIT mode**, moving a **DATA ENTRY slider** will cause the **LCD** to display the name of that parameter, the zone you are editing and the old/new value for that parameter.

Returning to the old example at hand, moving **DATA ENTRY slider A** will display:

**ATTACK TIME (z)**  
**OLD xx NEW yy where**

(z) **ZONE** number (shown in reverse image)  
xx the original value for the parameter  
yy the new value set by the slider.

**IMPORTANT:** remember that you are editing one zone at a time to select a zone for editing, simply press any key in that zone.

The display will always show the zone number in reverse image at the upper right corner of the **LCD**.

The zones on **CTS-2000** are in fixed locations as follows:

<b>ZONE</b>	<b>FIRST KEY</b>	<b>LAST KEY</b>
0	C0	D0
1	C1	B1
2	C2	B2
3	C3	B3
4	C4	C5

To exit the **EDIT mode** at any time, press the **ZONE/GLOBAL button**.

This will return you to the **STANDARD mode**.

You can also exit the **EDIT mode** by pressing either the **CARTRIDGE or INTERNAL** preset button.

After editing a preset and returning to standard mode the display will show a flashing rectangle next to the preset number. Any edits made are only in effect as long as you stay in the preset. If you change presets the new parameter values are not saved.

If you wish to save the changes made you must **RECORD** the new settings before changing presets (see **RECORD MODE**)

## Global Editing

If you want to change parameters in all zones at once you can use the **GLOBAL EDIT mode**.

**GLOBAL EDIT mode**, the parameter family buttons and the **DATA ENTRY sliders** work much same as in **ZONE EDIT mode** except that they now control all zones at once.

As you change values in **GLOBAL mode**, you are changing the relative values in each zone. That is, you are adding or subtracting the same amount from the settings in each zone.

In our continuing example, if we are in **GLOBAL edit mode, DCA1. ENVELOPE GENERATOR**, and move slider A, the display shows:

**ATTACK TIME 1**  
**GLOBAL = 0**

As you change slider **A**, the **0** value changes.

The value is added to or subtracted from the parameter in each of the 5 zones.

If the **ATTACK TIME 1** values in each zone was:

<b>ZONE</b>	<b>ATTACK TIME 1 value</b>
<b>0</b>	<b>10</b>
<b>1</b>	<b>3</b>
<b>2</b>	<b>1</b>
<b>3</b>	<b>20</b>
<b>4</b>	<b>8</b>

And we change **GLOBAL to +5**, the **Attack Time values** of each zone now becomes:

<b>ZONE</b>	<b>ATTACK TIME 1 value</b>
<b>0</b>	<b>15</b>
<b>1</b>	<b>8</b>
<b>2</b>	<b>9</b>
<b>3</b>	<b>25</b>
<b>4</b>	<b>13</b>

Of course it is not possible to change a parameter beyond maximum range. Adding (or subtracting) a larger value will set the parameter to the maximum (or minimum).

To exit the **EDIT mode** at any time, press the **ZONE/GLOBAL button**, this will return you to the **STANDARD mode**; you can also exit the **EDIT mode** by pressing either the **CARTRIDGE** or **INTERNAL** preset button.

After editing a preset and returning to standard mode the display will show a flashing rectangle next to the preset number. Any edits made are only in effect as long as you stay in the preset.

If you change presets the new parameter value are not saved.

If you wish to save the changes made you must **RECORD** the new settings before changing presets (see **RECORD MODE**).

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## Creating and initializing a preset

To create a new preset, you can use the INITIALIZE PRESET function. All zones will be set to the same set of basic parameters.

The main parameters are set as follows for example:

- Both oscillators (1 and 2) are set to generate a simple waveform (saw tooth)
- The tuning between the two oscillators is slightly beating
- The oscillator's level is set at maximum.
- The DCA 1-2 envelopes are set with immediate attack and maximum sustain.
- The filter has maximum Cutoff, minimum Resonance, minimum E.G. Level and Keyboard Tracking 0. Etc.

To initialize a preset, you must be in standard mode (exit edit mode).

- Select the bank and preset number you want to initialize.
- Push to INITIALIZE button.

The display will now show:

**PRESS ENTER  
TO INITIALIZE**

If you do not want to initialize, press the **INITIALIZE** button or any preset button.

Pressing **ENTER** will initialize the preset. If you do **NOT** want to initialize, press the **INITIALIZE** button or any **preset button**.

After initializing, you must enter **EDIT** mode to continue creating a new preset. Initialize is only a short cut in editing.

If you do not **RECORD** the new preset, it will **NOT** be saved in memory (see **RECORDING A PRESET**).

Of course if you have just initialized your favorite patch by mistake, you can recover it completely at this point by pressing the preset button again.

---

## RECORD MODE

The **RECORD mode** on the **CTS-2000** allows you to store preset programs in memory for instant recall when needed.

**WARNING:** recording a preset erases the previous values for that preset.

To make sure you are not erasing a preset you wish to keep, use the **EDIT/COMPARE function** (number 24) before recording.

Using the **EDIT/COMPARE** will, allow you to listen to other presets without losing your edited version.

By using external memory cartridges, you can save everything without running out of memory.

## Preparation

**IMPORTANT:** Every time the CTS-2000 is turned on, the memory is set to write protect. Before you can record, you must go to edit parameter 21, **WRITE/COPY**, and using slider A enable the write mode.

If YOU try to record a preset when in Write, Global Back-Up, Copy or Zone Copy, the display will show:

**WRITE DISABLE  
SELECT PARAM. 21**

Enter the **EDIT Mode** and select parameter 21.

**WRITE/COPY**

Use **slider A**, as you move it the display will change from

**WRITE  
DISABLE  
to  
WRITE  
ENABLE**

Exit the **EDIT Mode** and you can now record a preset.



## Recording a preset

**IMPORTANT:** each blank in the CTS-2000 has its own set of wave tables. Because the tables are different in the two bank **YOU CANNOT SAVE A PRESET TO A DIFFERENT BANK.**

All recording operations are effected in **Standard Mode**

After you have set all the parameters you want in **EDIT mode** exit **EDIT mode** (by pressing **PRESET/PARAMETER**).

**RECORD** a preset press the **WRITE button**.

**The display will show:**

```
WRITE INT PRESET or WRITE CRT PRESET  
xxx IN INT ( ) yyy xxx IN CRT ( ) yyy
```

depending upon whether or not you are saving to **CARTRIDGE**.

**xxx** Is the number and bank of preset you are saving

**yyy** Is the number and bank where you are going to record the new preset.

[ ] Is a flashing rectangle in the display.

**Normally xxx = yyy.**

The display has a flashing rectangle to indicate that you may choose a different preset number.

Just select the preset number and location, **INTERNAL** or **CARTRIDGE**.

After selecting the number and location where you want to record the preset, operate as follows:

- Press the **ENTER** or **WRITE** button once.

**The LCD will display:**

```
ENTER TO RECORD  
WRITE TO ESCAPE
```

- If you do not want to complete this operation, you may exit at any time by pressing the **WRITE** button the LCD will then display:

```
WRITE ABORTED
```

You will be automatically returned to the **Standard Modes** showing the initial preset.

- Then press **ENTER** to record and the display will show for a few seconds:

**WRITE COMPLETED**

The CTS-2000 will, then automatically exit record and return to the **Standard Mode**, showing the new preset.

## GLOBAL Recording

**GLOBAL BACKUP** allows you to record and load at the time the contents of the internal memory onto the external Cartridge (only RAM cartridge) or vice versa from Cartridge (RAM or ROM cartridge) to internal memory.

All, recording operations are to be effected in **Standard Mode**.

**IMPORTANT:** whenever switched on, the CTS-2000 is prepared to write protect.

**If you try to operate in Write, Global Backup, Copy or Zone Copy, the display will show:**

**WRITE DISABLE 1**  
**SELECT PARAM. 21**  
**GLOBAL Backup (internal to cartridge)**

- Insert a RAM cartridge in the appropriate location.
- Pressing the first button on the cartridge, select the bank where you wish to record (1 or 2).

**IMPORTANT:** make sure that the location selected does not contain a preset you wish to keep, otherwise it will be cancelled.

- Press the record button on the cartridge (ON).
- Make sure that the CTS is in RECORD position (see recording a preset page 16).
- Press and hold the ZONE GLOBAL button.
- And hold the INTERNAL button; the LCD will display.

**GLOBAL BACKUP**  
**PRESS WRITE**

While keeping the ZONE GLOBAL and INTERNAL buttons pressed, press the WRITE tab:

**FROM INT TO CRT**  
**PRESS ENTER**

- Release all buttons, and then press ENTER to record. The display will show for a few seconds.

## GLOBAL BACK-UP COMPLETED

And will exit the record phase, returning to the **Standard Mode**.

**IMPORTANT:** If you wish to exit record before having completed it, press **WRITE** or any of the **24 preset buttons**.

After you have completed the cartridge recording, do not forget to place the protection button to **W.Off**.

\*) **W.OFF** = Protected (Protection ON)

You may see the following error messages appear on the screen:

### INSERT CARTRIDGE WITH WRITE ON

Shows two kinds of errors: the cartridge has not been plugged, or, when plugged in, the second button is in **WRITE OFF**.

### ERROR Read Only Memory

you have inserted a **ROM** cartridge instead of a **RAM** cartridge.

## Global Backup (cartridge to internal)

- Insert either RAM or ROM cartridge.
- Verify that the CTS is in RECORD enable (see RECORD ENABLE).
- Press and hold the ZONE GLOBAL button.
- Press and hold the CARTRIDGE button, you will see on the LCD:

### GLOBAL BACK-UP PRESS WRITE

- while keeping both ZONE GLOBAL and CARTRIDGE pressed, press the WRITE button.

**The display will show:**

### FROM CRT TO INT PRESS ENTER

- release all buttons and press ENTER to record. The LCD will display for a few seconds:

**GLOBAL BACK-UP  
COMPLETED**

And will return to the Standard mode.

**IMPORTANT:** if you wish to exit record before having completed it, press **WRITE** or any of the **24 preset buttons**.

You may see the following message appear on the screen:

**CARTRIDGE NOT PRESENT**

it means the cartridge has not been plugged into the appropriate location.

---

## PARAMETERS

(z) = keyboard zone (octave).  
**OLD xx** = parameter value before modification.  
**NEW yy** = value of modified parameter.

**IMPORTANT:** Remember that the changes for parameters having a negative figure on the display will be valid **ONLY FOR THE CURRENT ZONE (z)** and will be identified by number (z).

The **ZONES** (octaves) are identified as follows:

<b>ZONE</b>	<b>first key</b>	<b>Last key</b>
<b>0</b>	<b>C0</b>	<b>B0</b>
<b>1</b>	<b>C1</b>	<b>B1</b>
<b>2</b>	<b>C2</b>	<b>B2</b>
<b>3</b>	<b>C3</b>	<b>B3</b>
<b>4</b>	<b>C4</b>	<b>C5</b>

To enter another **ZONE** press any key within the desired **ZONE** (octave). You may then enter zones **0, 1, 2, 3, 4** relative to the octaves of your keyboard by inserting **5** different values.

The following parameters are described in relation to the **ZONE EDIT mode**, which allows modification of the current zone only. To change the value of a parameter on all **5** zones of a time, you must use the **GLOBAL EDIT mode**.

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# MIDI IMPLEMENTATION CHART

MODEL KEYTEK CTS2000

DATE: 09.06.1987

VERSION 1.0

FUNCTION		TRANSMITTED	RECOGNIZED	REMARKS
Basic	Default	1	1 - 16	
Channel	Channel	1 - 16	1 - 16	
Mode	Default	Mode 1	Mode 1	
	Messages	X	X	
	Altered	X	X	Mono ignored
Note		0 - 127	36 - 96	
	True Voice		36 - 96	
Velocity	Note ON	0	0	
	Note OFF	0	X	
After Touch	Key's	X	X	
	Ch's	X	X	
Pitch Bender		0	0	
Control Change	1	0	0	Modulation
	64	0	0	Hold
Program Change	True nc	1 - 96	1 - 96	
System Exclusive		0	0	
System	: Song Pos.	X	X	
	: Song Sel.	X	X	
Common	: Tune	X	X	
System Real Time	: Clock	X	X	
	: Commands	X	X	
Aux Msgs	: Local ON/OFF	X	X	
	ALL Notes OFF	0	0	
	Active Sense	X	X	
	Reset	0	0	
Mode 1: OMNI ON, POLY		Mode 2 OMNI ON, MONO		0 = YES
Mode 3: OMNI OFF, POLY		Mode 4 OMNI OFF, MONO		X + NO

Manufactures ID = 21H (S.I.E.L.) = 00100001

TRANSMITTED DATA

Status	Second	Third	Description
1000 NNNN	OKKK KKKK	OVVV VVVV	NOTE OFF KKKKKKK = 36-96 * VVVVVVV = 1
1001 NNNN	OKKK KKKK	OVVV VVVV	NOTE ON NKKKKKK = 36-96 VVVVVVV = 1-127
1011 NNNN	0100 0000	0111 1111	HOLD ON
1011 NNNN	0100 0000	0000 0000	HOLD OFF
1110 NNNN	0000 0000	OVVV VVVV	PITCH BENDER CHANGE VVVVVVV = 0-127 64 = TUNED
1011 NNNN	0000 0001	OXXX XXXX	MODULATION XXXXXXXX 0-127
1011 NNNN	0111 1011	0000 0000	ALL NOTES OFF
1100 NNNN	OPPP PPPP		PROGRAM CHANGE pp:ppppp = 00-127

RECOGNIZED RECEIVE DATA

Status	Second	Third	Description
1000 NNNN	OKKK KKKK	OVVV VVVV	NOTE OFF VELOCITY IGNORED KKKKKKK = 36-96 *
1001 NNNN	OK KKKK	0000 0000	NOTE OFF KKKKKKK = 36 *
1001 NNNN	OKKK KKKK	OVVV VVVV	NOTE ON KKKKKKK = 36-96 * VVVVVVV 1-127
1011 NNNN	0100 0000	OXXX XXXX	HOLD ON XXXXXXXX 64-127
1011 NNNN	0100 0000	OXXX XXXX	HOLD OFF XXXXXXXX 0-63
1011 NNNN	0000 0001	OXXX XXXX	MODULATION XXXXXXXX 0-127
1011 NNNN	OMMM MMMM	0000 0000	ALL NOTES OFF MMMMMM 123-127
1100 NNNN	OPPP PPPP		PROGRAM CHANGE FPPPPPF = 1-48 = INTERNAL. 40 96 = CARTRIDGE
1110 NNNN	OYYY YYYY	OVVV VVVV	PITCH BENDER CHANGE YYYYYYY = IGNORED VVVVVVV = 0-127 64 = TUNED

# BANK A

## INITIAL WAVES

NUMBER	TYPE	OCTAVE	0	1	2	3	4	5
00A	ACOUSTIC PIANO		*	*	*	*	*	*
01A	F.M. PIANO		*	*	*	*	*	*
02A	EL.PIANO		*	*	*	*	*	*
03A	VIBES		*	*	*	*	*	-
04A	FOLK GUITAR		*	*	*	*	*	-
05A	BRASS		*	*	*	*	*	-
06A	BOWED STRINGS		*	*	*	*	*	-
07A	HUMAN VOICES		*	*	*	*	*	-
08A	FINGERED E. BASS		*	*	-	-	-	-
09A	PICKED E. BASS		*	*	-	-	-	-
10A	UP-RIGHT BASS		*	*	-	-	-	-
11A	SLAPPED E. BASS		*	*	-	-	-	-

## CENTRAL WAVES

NUMBER	TYPE	OCTAVE	0	1	2	3	4	5
20A	ACOUSTIC PIANO		*	*	*	*	*	*
21A	F.M. PIANO		*	*	*	*	*	*
22A	EL.PIANO		*	*	*	*	*	*
23A	VIBES		*	*	*	*	*	-
24A	FOLK GUITAR		*	*	*	*	*	-
25A	BRASS		*	*	*	*	*	-
26A	BOWED STRINGS		*	*	*	*	*	-
27A	HUMAN VOICES		*	*	*	*	*	-
28A	FINGERED E. BASS		*	*	-	-	-	-
29A	PICKED E. BASS		*	*	-	-	-	-
30A	UP-RIGHT BASS		*	*	-	-	-	-
31A	SLAPPED E. BASS		*	*	-	-	-	-

## FINAL & ANALOG WAVES

NUMBER	TYPE	OCTAVE	0	1	2	3	4	5
40A	ACOUSTIC PIANO		*	*	*	*	*	*
41A	F.M. PIANO		*	*	*	*	*	*
42A	EL.PIANO		*	*	*	*	*	*
43A	VIBES		*	*	*	*	*	-
44A	FOLK GUITAR		*	*	*	*	*	-
45A	BRASS		*	*	*	*	*	-
46A	BOWED STRINGS		*	*	*	*	*	-
47A	HUMAN VOICES		*	*	*	*	*	-
48A	FINGERED E. BASS		*	*	-	-	-	-
49A	PICKED E. BASS		*	*	-	-	-	-
50A	UP-RIGHT BASS		*	*	-	-	-	-
51A	SLAPPED E. BASS		*	*	-	-	-	-
60A	SAWTOOTH		*	*	*	*	*	*
61A	PULSE-WIDTH		*	*	*	*	*	*

\* = YES      - = N

# BANK B

## INITIAL WAVES

NUMBER	TYPE	OCTAVE	0	1	2	3	4	5
00B	ELECTROM.PIANO		*	*	*	*	*	*
01B	DISTORTED E.GUITAR		*	*	*	*	*	-
02B	REED		*	*	*	*	*	-
03B	FM BRASS		*	*	*	*	*	*
04B	ELECTRIC GUITAR		*	*	*	*	*	-
05B	STOPPED E.GUITAR		*	*	*	*	*	-
06B	JAZZ ORGAN 1		*	*	*	*	*	*
07B	PIPE ORGAN 1		*	*	*	*	*	*
08B	FINGERED E. BASS		*	*	-	-	-	-
09B	PICKED E. BASS		*	*	-	-	-	-
10B	UP-RIGHT BASS		*	*	-	-	-	-
11B	FM BASS		*	*	-	-	-	-

## CENTRAL WAVES

NUMBER	TYPE	OCTAVE	0	1	2	3	4	5
20B	ELECTROM.PIANO		*	*	*	*	*	*
21B	DISTORTED E.GUITAR		*	*	*	*	*	-
22B	REED		*	*	*	*	*	-
23B	FM BRASS		*	*	*	*	*	*
24B	ELECTRIC GUITAR		*	*	*	*	*	-
25B	STOPPED E.GUITAR		*	*	*	*	*	-
26B	JAZZ ORGAN 2		*	*	*	*	*	*
27B	PIPE ORGAN 2		*	*	*	*	*	*
28B	FINGERED E. BASS		*	*	-	-	-	-
29B	PICKED E. BASS		*	*	-	-	-	-
30B	UP-RIGHT BASS		*	*	-	-	-	-
31B	FM BASS		*	*	-	-	-	-

## FINAL & ANALOG WAVES

NUMBER	TYPE	OCTAVE	0	1	2	3	4	5
40B	ELECTROM.PIANO		*	*	*	*	*	*
41B	DISTORTED E.GUITAR		*	*	*	*	*	-
42B	REED		-	-	-	-	-	-
43B	FM BRASS		*	*	*	*	*	*
44B	ELECTRIC GUITAR		*	*	*	*	*	-
45B	STOPPED E.GUITAR		*	*	*	*	*	-
46B	JAZZ ORGAN 3		*	*	*	*	*	*
47B	PIPE ORGAN 3		*	*	*	*	*	*
48B	FINGERED E. BASS		*	*	-	-	-	-
49B	PICKED E. BASS		*	*	-	-	-	-
50B	UP-RIGHT BASS		*	*	-	-	-	-
51B	FM BASS		*	*	-	-	-	-
60B	SAWTOOTH		*	*	*	*	*	*
61B	PULSE-WIDTH		*	*	*	*	*	*

\* = YES

- = NO



# PRESETS

## BANK A

- 1A AC PIANO (W)
- 2A FM PIANO (W)
- 3A EL. PIANO (W)
- 4A FOLK GUITAR (W)
- 5A VIBRAPHONE (W)
- 6A XYLOPHONE (W)
- 7A MALLET (W)
- 8A FAST VOICE (W)
- 9A SLOW VOICE (W)
- 10A GUIVOICE (L)
- 11A FAT BRASS (W)
- 12A MELLOW BRASS (W)
- 13A GROWL (W)
- 14A MALLBRASS (L)
- 15A ANALOG STRINGS (W)
- 16A BOWED SOLO (W)
- 17A QUARTET (U)
- 18A PIANSAMBLE (L)
- 19A FINGERED BASS - FM PIANO (S)
- 20A PICKED BASS
- 21A SLAP BASS - MALLBRASS (B) (L)
- 22A TRIO JAZZ (ACOUSTIC BASS - VIBRAPHONE - GROWL) (B)
- 23A MULTI 1 (PICKED/SLAP BASS - GUIVOICE - MONOVOICE - MALLET) (S) (L)
- 24A MULTI 2 (PICKED BASS - MALLBRASS - ANALOGLEAD (S) (L)

## BANK B

- 1B CP70 PIANO (W)
- 2B OCTV PIANO (W)
- 3B LESPALU (W)
- 4B ROCK LEAD (W)
- 5B FM BRASS (W)
- 6B JAZZ ORGAN 1 (W)
- 7B JAZZ ORGAN 2 (W)
- 8B JAZZ ORGAN 3 (W)
- 9B JAZZ ORGAN 4 (W)
- 10B PIPE ORGAN 1 (W)
- 11B PIPE ORGAN 2 (W)
- 12B PIPE FLUTE (W)
- 13B FUNKY GUITAR (W)
- 14B GUITORGAN (L)
- 15B ORGANSAMBLE (L)
- 16B CROSSING (L)
- 17B POLYREED (W)
- 18B PURPLE (S)
- 19B FINGERED BASS - CP70 PIANO (S)
- 20B ACOUSTIC BASS - JAZZ ORGAN (S)
- 21B PICKED BASS - ELECTRIC GUITAR (S)
- 22B FM BASS - FM BRASS (S)
- 23B JAKO - FIFTH (B)
- 24B MULTI 3 (FM BASS - CP70 PIANO - REVERS FILTERED BASS) (S)

W = WHOLE    S = SPLIT    1 = LIER

## ROM 03 - (SUPPLIED WITH CTS-2000)

BANK A				BANK B			
1.	A	VIBEPIANO	!	1.	B	ORGAN PLUS	**
2.	A	BEN RHODES	*	2.	B	SMURF OROAN	**
3.	A	FM VOICE	*	3.	B	WARM ORGAN **	
4.	A	XYLOPHONE	=	4.	B	HOT ORGAN	**
5.	A	FOLK GUIT.	=	5.	B	ORGAN 1	=
6.	A	BELL SD	**	6.	B	ORGAN 2	=
7.	A	BRASS PLUS	*	7.	B	P. ORGAN 1	=
8.	A	GROWL	=	8.	B	PIPE ORGAN 2	=
9.	A	UIBE STRING	*	9.	B	PIPE FLUTE	=
10.	A	SYNTH PIPE	**	10.	B	ORGAN VOICE	!
11.	A	PIPE STRING	**	11.	B	VM BRASS	*
12.	A	PIANENSEMBLE	=	12.	B	PERC. BRASS	!
13.	A	FS VOICE	=	13.	B	BOWED STRING	!
14.	A	MELL VOICE	=	14.	B	ELEC STRING	**
15.	A	VORGAN	**	15.	B	CHORUS GUITAR	!
16.	A	PIAN VOICE	!	16.	B	GTR / ORGAN	*
17.	A	SUICINE	**	17.	B	PIZZICATO	!
18.	A	BASS - FM PIANO	!	18.	B	CROSSING	=
19.	A	SLP BASS - FM PIANO	!	19.	B	BELLS 1	**
20.	A	JAZZ BAND	!	20.	B	BELLS 2	**
21.	A	MULTI 1	!	21.	B	F.BASS - CP 70 P	=
22.	A	MULTI 2	!	22.	B	A BASS SPACE	!
23.	A	XYLOSIZER	**	23.	B	SCARY	**
24.	A	---	**	24.	B	REAL SCARY	**

CTS 2000 PROGRAMMING BY:

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