TR-1000

Digital Music Study Recorder
Users Manual

Version 1.2
April 9, 2000

The TR-1000 was designed by
Reed Kotler
And
Bruce Rittenbach

Reed Kotler Music, Inc.
855 Kifer Road, Suite E
Sunnyvale, CA 94086
(408) 245-6980, fax (408)245-6628
reed@reedkotler.com
http://www.reedkotler.com

NOTE: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio of television reception, which can be determined by turning the equipment off and on, the user is encouraged to try and correct the interference by on or more of the following measures:

---Reorient or locate the receiving antenna.

---Increase the separation between the equipment and receiver.

---Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.

---Consult the dealer or an experienced radio/TV technician for help.

This Class B digital apparatus complies with Canadian ICES-003 .

Cet appareil numérique de la classe B est conforme à la norme NMB-003 du Canada .

Congratulations on your purchase of the TR-1000 Digital Music Study Recorder.

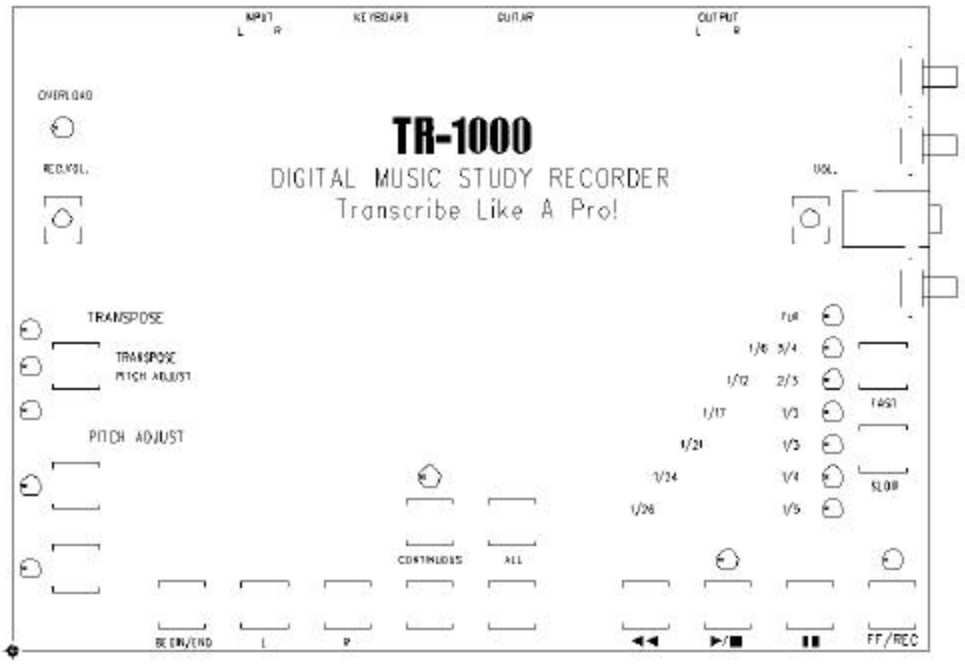
The TR-1000 has been designed to provide a lifetime of enjoyment.

Take minute to inspect the contents of this box.

You should find:

1) TR-1000 digital music study recorder
2) 120 volt, 60hz AC power adapter, 9 VDC, 500 mA, positive inside terminal, negative sleeve
3) Registration Card
4) Warranty Information
5) This manual

We have made this manual as short as possible so that it is practical for someone to read it carefully and thoroughly. Please take the time to do this now and feel free to follow the instructions with your unit as you read through the manual.



Note: Accelerator keys

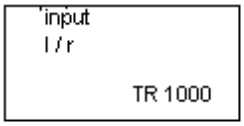
Certain keys on the TR-1000 are called accelerator keys. The function of these keys will accelerate if the key is held down as opposed to just pressed and released immediately.

The keys L(eft), R(ight), ⊖, ⊕, ◂◂, FF/REC are accelerator keys.

Setting up your TR-1000

First place your TR-1000 on a flat table.

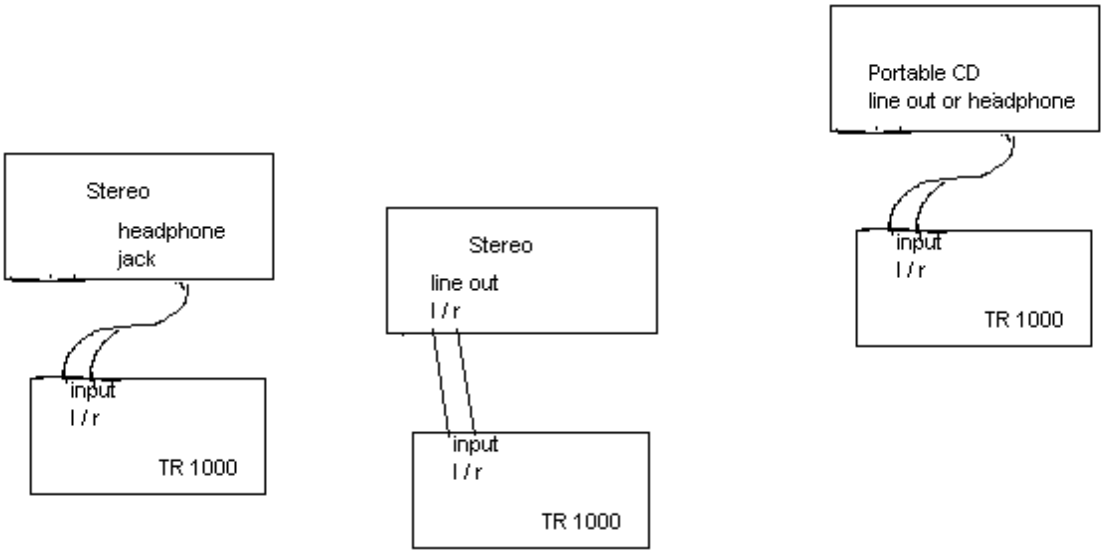
Locate the audio input RCA jacks on the top left-hand side of the TR 1000.



The l/r are the left and right inputs to the TR 1000.

Connect an audio source (CD player, stereo output, tape recorder) to the input section of your TR-1000.

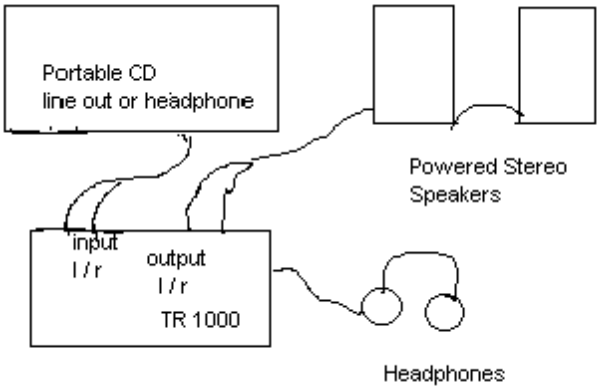
The TR-1000 can be hooked up to either the line out of the audio source or the headphone output. Various typical configurations are illustrated below.



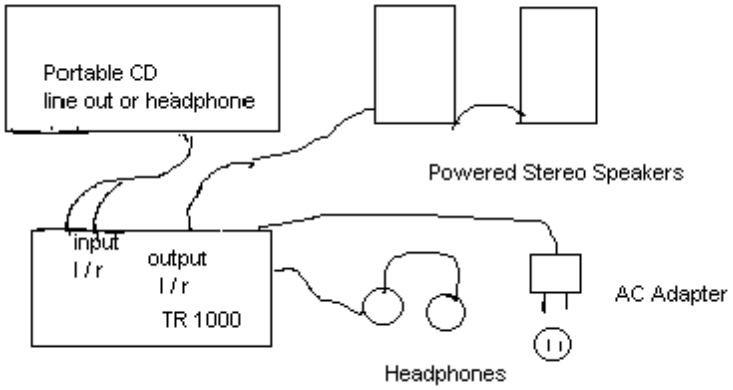
The input section requires input from one or two RCA male jacks. When connecting from a stereo source you will connect both audio jacks. When connecting from a mono source (such as an older tape recorder), you can connect to either the left or right input jack on the TR-1000.

If the source is stereo, (the usual situation), be sure that the cable is a stereo cable. Typical cables would be stereo RCA jack cables, stereo 1/4“ to stereo RCA jacks, stereo mini plug to stereo RCA jacks. When connecting to a mono source, just connect to either the L or R input jack and set the corresponding L/R switch on the side of the TR-1000 unit where the headphone jack is. The exact cable depends on the configuration you choose. If you are unsure, discuss this with the retail dealer where you purchased the unit. All the various cable types can be purchased from Radio Shack (as well as many other stores).

Now you need to connect the TR-1000 to either a pair of headphones and/or a stereo (or pair of powered speakers). The volume control for the headphone is located just to the left of the headphone jack.

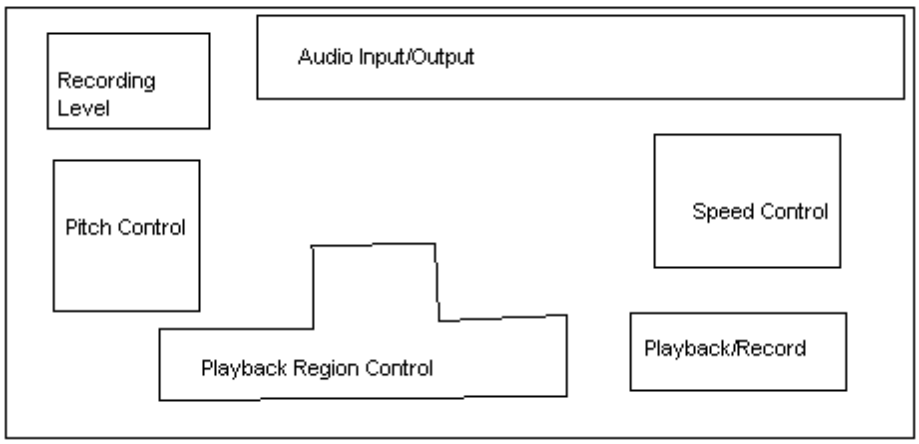


Now you are ready to hook up the AC adapter that comes supplied with the TR-1000.



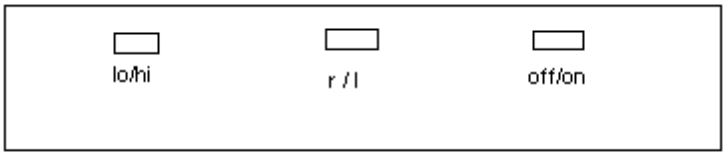
Overview of the TR-1000 front panel.

Shown below is a diagram of the functional groupings of TR-1000 components.



Turning the unit on.

The unit may now be turned on. See the picture below of the side of the TR-1000 (that the headphone is plugged into).



The LO/HI switch selects the sampling rate used by the TR-1000 when recording. Set this to HI for now. The HI sampling rate will in general produce better sound quality at the expense of less sampling time. The HI rate is 22khz and can record up to 95 seconds of music. The LO rate is 11khz and can record up to 190 seconds of music.

The R/L determines whether the left or right audio input will be recorded. Usually the particular instrument you are transcribing is more strongly heard on the left or right audio input. Set the R/L switch appropriately.

If you have hooked up a monophonic input device and you hooked up the left channel then you should select L, and if the right channel then R.

Turn the OFF/ON switch to ON.

The led above the FF/REC should start blinking slowly and the led to the right of FULL should be lit.

Recording some music

When the led above the FF/REC is blinking slowly, then the unit is in the record standby state. That means it is ready to begin recording. Whenever the unit is in the stopped state (this will be explained later), pressing the FF/REC will cause the unit to enter the record standby state. (If you ever accidentally press this key and enter the record standby state, you can cancel it by hitting the ▸/■ key).

Before recording, we want to set the recording level to get the best fidelity on playback and also to avoid recording “too hot” which will result in a digital clipping noise.

In the upper left corner of the TR-1000 is the recording level control and OVERLOAD indicator led.

Best fidelity will be achieved when the recording level is just below the point at which the OVERLOAD led will start to blink. As you listen to your music, make this adjustment right now before recording. If you think that a later section of the music may be much louder, you may want to fast forward ahead and set the record level using a later point in the music.

You are now ready to record some music. (Make sure that you are in the record standby state. I.e. that the led above the FF/REC is blinking slowly.)

Play some music from your audio source (CD player, tape player, stereo).

When your music reaches the point at which you want to start recording, press the FF/REC key. The led above the FF/REC key should now begin blinking more rapidly. This means that the unit has entered the record state (i.e. is now recording).

When the FF/REC led stops blinking, that means it has finished recording and is in the stopped state. It will stop recording when all the memory for recording is used up (i.e. after 95 seconds at 22khz or 190 seconds at 11khz). While it is recording, you can also make it stop recording before the memory for recording is used up by pressing FF/REC again. In either case, the led above the FF/REC should be off when the unit has stopped recording.

The music recorded by the unit shall be referred to as the “recording”.

Playing back some music

The various playback keys of the unit operate on a portion of the recording called the playback region. When you first record some music, the playback region is the entire recording. Later we will see that it is possible to restrict the playback region to be just a portion of the recording. At any time, the playback region may be reverted to its original state of being the entire recording by pressing the ALL key.

The unit has three playback states: stopped, play and pause.

The led above the ▶/■ indicates the current playback state. The state is:
1) stopped if the led is off;
2) play if the led is blinking;
3) pause if the led is on continuously.

There is also associated with playback, the notion of the playback position. Initially the playback position is at the beginning of the playback region. As the music plays, the playback position moves towards the end of the playback region.

Pressing the ▶/■ will cause the following to happen:

1) If the unit is in the play state, it will cause the unit to stop playing. The playback position will be left at the place it was when the ⏵/■ key was pressed.
2) If the unit is in the stopped state, it will cause the unit to play (enter the play state) from the beginning of the playback region.

When in the play state, pressing the ⏸ key will cause the unit to enter the pause state and the playback position will remain where it was when the pause state was entered. When in the pause state, no sound will be heard. To leave the pause state, press the ⏸ key again which will cause the unit to reenter the play state.

The two remaining playback keys are the ⏪ (rewind) key and the FF/REC key.

The ⏪ key will operate when the unit is either in the play or stopped state. Its effect will be to move the playback position back towards the beginning of the playback region. When in the stopped state, the unit will reenter the play state as soon as the ⏪ key is released.

The FF/REC key will only function as fast forward when the unit is in the play state. Otherwise, it will cause you to enter record standby mode. If you accidentally enter record standby mode, you can cancel it by hitting the ⏵/■ key .

Fast forward will cause the playback position to move rapidly towards the end of the playback region.

Try playing back some music, rewinding, stopping, etc. in order to get a feel for how these keys work.

Slowing the music down

To slow music down, you use the FAST and SLOW keys. The leds to the left of those keys indicate the amount of slowdown. In this section we will discuss the method of slowing down music and in the next section we will discuss ways to adjust the slowdown process for best sound fidelity.

The FAST and SLOW keys may be pressed while the unit is in the stopped state or play state.

The legend to the left of the leds for the FAST and SLOW keys explains how to interpret the led pattern.

When a single led is lit, they correspond to Full, 3/4, 2/3, 1/2, 1/3, 1/4 and 1/5 speed. When two leds are lit, they correspond to 1/5, 1/6, 1/7, 1/8/, 1/9, 1/10, and 1/11 speed. When three leds are lit, they correspond to 1/12, 1/13, 1/14, 1/15 and 1/16 speed. When four leds are lit, they correspond to 1/17, 1/18, 1/19 and 1/20 speed. When 5 leds are lit, they correspond to 1/21, 1/22 and 1/23. When 6 leds are lit, they correspond to 1/24 and 1/25 speed. When all 7 leds are lit, they correspond to 1/26 speed.

Try playing back some music and making it go slower or faster by pressing the FAST and SLOW keys.

Note: if you press FAST when you are at Full speed, you will go to the slowest speed (1/26). Similarly if you are at the slowest speed (1/26) and press SLOW, you will go to full speed.

Adjusting the slowdown process for best sound fidelity

The TR-1000 has 7 presets for the slowdown process.

We have chosen the default preset (upon "power up") to cover the widest number of situations (instrument, speed, etc).

However you may choose any of the presets for playback. Each one has a little different quality and you will have to experiment to find the one you like best for a given recording.

To change the preset, while in the stopped state press down the BEGIN/END key, hold it down and then press the ⏵/■ key, continuing to hold the BEGIN/END key down. You will notice that one of the seven leds normally used for the playback speed will blink. The blinking led indicates which preset (1-7) is currently selected. By continuing to hold down the BEGIN/END key and pressing the FAST/SLOW key, you can change which preset number you are using.

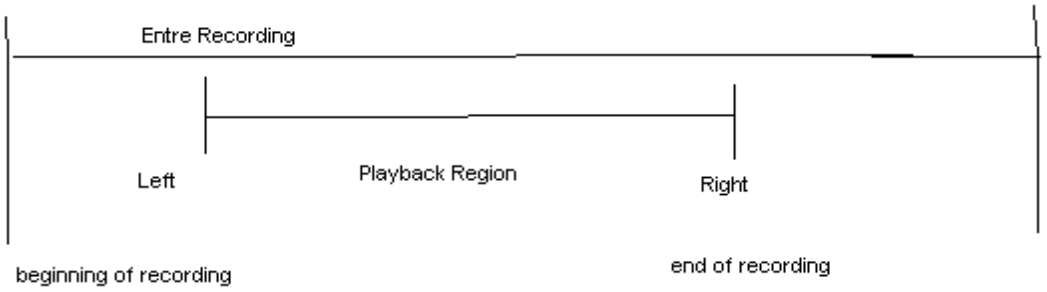
Presets 1, 3, 5, 6 are essentially unique presets. Preset 1 is the default and will work very well in almost any situation. Preset 3 has a lot of presence and will give especially good sound for medium tempo saxophone, bass and jazz guitar. Preset 5 is for very fast saxophone and other complex sound instruments. Preset 6 is for very fast music, especially very fast guitar. Presets 1,3,5, and 6 may have a slight pulsating noise component if the music has a very large dynamic range (like with solo piano). Usually the sound is not there at all, is so faint that it won't even be noticed or can easily be ignored. If the sound bothers you, you can switch the next preset (i.e. 1->2, 3->4 and 6->7). In other words preset 2 is preset 1 with that noise removed. However removing that noise is at the expense of some clarity in the original sound so it's really up to you which preset you choose. The thing to remember with all of this is that the TR-1000 is a tool and the most important thing is to choose the preset which allows you to hear most clearly the notes, length of notes and position of the notes in time. (Note: preset 5 does not have an alternate preset like the others.)

Setting up a playback region

When transcribing music, usually we do not want to keep listening to the entire recording.

Thus we want a playback region that consists of the portion of the music that we are currently transcribing.

The playback region has a left and a right boundary in time. For example, the playback region might be that portion of the recording starting at 5 seconds and ending at 10



seconds.

When you first make a recording, the playback region is set to the entire recording. Thus if you recorded 80 seconds of music, the left edge of the playback region is at time 0 seconds and the right edge of playback region is at time 80 seconds.

There are numerous ways to alter to playback region.

The left and right edge of the playback region may be set using the BEGIN/END key.

The following steps are taken:
1) Enter the play state.
2) When the playback reaches the part of the recording that you want to be the beginning of the playback region, press the BEGIN/END key and hold it down.
3) When playback reaches where you want the playback region to end, let go of the BEGIN/END key.

You may also set just the left edge alone by entering the play state, pressing the BEGIN/END key, holding it down and pressing the L key. Similarly the you can set just the right edge alone by entering the play state, holding down the BEGIN/END key and pressing the R key.

<u>Making the playback region bigger or smaller</u>

The playback region is made bigger or smaller by moving (in time) the right or left edge of the playback region.

Pressing the ⊕ key will make the playback region bigger by moving the right edge forward in time. Similarly, pressing the ⊖ key will make the playback region smaller by moving the right edge backward in time.

Pressing the BEGIN/END key, holding it down and pressing the ⊕ key will make the playback region bigger by moving the left edge backward in time. Similarly, pressing the BEGIN/END key, holding it down and pressing the ⊖ key will make the playback region smaller by moving the left edge forward in time

Pressing the ⊕/⊖ with a single press will move the applicable edge 0.1 seconds. Holding the key down will accelerate as far as how much the applicable edge moves. These keys will have this effect while the unit is in the play or stopped state.

Moving the playback region forward or backward in time

It is possible to move the entire playback region (left and right edge simultaneously) forward or backward in time.

Pressing the L key will move the playback region backward in time (to the left) and pressing the R key will move the playback region forward in time (to the right).

Pressing the R or L key with a single press will move the playback region 0.1 seconds. Holding down the key will accelerate in the applicable direction as far as how far the edge moves.

The ALL key

The ALL key will reset the playback region to be the entire recording.

Pressing the ALL key, holding it down and pressing the L key will cause the left edge to be set to the beginning of the entire recording but will leave the right edge at its current position.

Pressing the ALL key, holding it down and pressing the R key will cause the right edge to be set to the end of the entire recording but will leave the left edge at its current position.

The ALL key will have the above effects if used when the unit is in either the stopped or play state.

Continuous Playback

Normally when we reach the end of the playback region, the unit will enter the stopped state. If you wish for it to go back to the beginning of the playback region and playback again (in other words to loop) then you press the CONTINUOUS key. The led above the CONTINUOUS key will remain lit. To disable CONTINUOUS playback, just press the CONTINUOUS key again.

One application of continuous playback is its use in transcribing chords. One can enable continuous playback and then create a small playback region that just surrounds the chord you are trying to transcribe. Experiment with different speed selections to get the best

sound. The chord should ring out and you can try matching the chord on your instrument until it sounds the same as the one that the TR-1000 is playing.

Transposing the pitch

You may transpose the pitch of the recording up or down 12 semitones (half steps).

The middle led of the set under TRANSPOSE must be off. If it is not off, then press the key next to the middle led.

The # and b keys will transpose up and down respectively.

The top and bottom leds under TRANSPOSE indicate whether the recording has been transposed up or down. When neither led is lit, then there is no transpose in effect.

Transposing the pitch of recording will effect its speed. Transposing up will make it go faster and transposing down will make it go slower.

It is also possible to transpose down or up an octave using the sample rate switch. This is a strange application of that switch but some may find it useful in certain situations.

If a recording was made in HI sampling rate, putting the switch to LO before entering the play state will result in the pitch dropping an octave (and the speed going to half speed). This will give the precise effect of the half speed tape recorders.

If the recording was made in LO sampling rate, putting the switch on HI before entering the play state will result in the pitch going up an octave and the speed going to double it's original speed.

Adjusting the pitch

You may adjust the pitch of the recording up or down 100 cents (1 semitone). This feature is used primarily to make fine adjustments in order to match the pitch of a recording.

The middle led of the set under TRANSPOSE must be lit. If it is not lit then press the key next to the middle led which should cause that led to become lit.

The # and b keys will adjust the pitch up or down, 10 cents at a time.

The top and bottom leds under PITCH ADJUST indicate whether the pitch of the recording has been adjusted up or down. When neither led is lit then there is no pitch adjustment is in effect.

Playing along with your guitar or keyboard

You may connect your guitar into the guitar input jack of your TR-1000 unit. Adjust the volume of your guitar using the volume control on your guitar.

You may also connect your keyboard line output or headphone output to the keyboard input of your TR-1000 unit. Adjust the volume by using either the keyboard or keyboard headphone volume control (depending on which keyboard output you used).

The HI/LO switch

When recording, the HI/LO switch on the side of the TR-1000 near the headphone jack determines the sampling rate. HI meaning 22khz and LO meaning 11khz.

Normally you will want to select HI since it will provide the best sound fidelity.

Transcribing bass parts

There is a function of the TR-1000 that we call the bass isolator. It will in general filter out all instruments except for the bass.

When you use this option, it changes the recorded sound so it's an irreversible process.

To use the bass isolator, after recording the music, press the RECORD key, release it, and then press the PAUSE key and release it. Both the RECORD and PLAY leds will go on for a few seconds.

When the leds go off, you can play back the music again.

You can apply the bass isolator more than once to get increasing bass isolation but the sound will deteriorate if you apply it too many times.

After creating the isolated bass, you may find it still useful to transpose the pitch up one octave to even better hear the bass. This will cause the speed to increase so you will want to slow the speed down after that.

Conclusion

Happy transcribing.

Reed Kotler and Bruce Rittenbach

Specifications

Features include:

- Digitally records 95 seconds of music at 22khz or 190 seconds of music at 11khz. (sound at 11khz is very acceptable for this application)
- Playback speed full, 3/4, 2/3, 1/2, 1/3, 1/4, 1/5, 1/6, 1/7, 1/8, 1/9, …. 1/26
- Playback controls play, rewind, pause, fast forward
- Playback region selection controls
  begin/end region, expand region, contract region, shift region left, shift region right, continuous loop, all (select entire recorded music as playback region)
- Transpose +/- 12 semitones
- Pitch Adjust +/- 100 cents
- Sample rate select 22khz, 11khz
- Left/Right channel select on record
- The unit uses a socketed pre-programmed microcontroller which may be upgraded with new features and improvements as they become available.

Inputs:
2 RCA jack stereo line input with line adjust control and led overload indicator
¼ inch Guitar input
¼ inch Stereo/Mono Keyboard input

Outputs:
2 RCA jack stereo line output
Stereo Headphone output
Headphone volume control

Power: 9 volt external power adapter (included).