The Tiny CMOS Keyers:
TiCK-1, TiCK-2, & TiCK-2B
DATASHEET

Congratulations on your purchase of the Tiny CMOS Keyer chip. The TiCK-1 features Iambic modes A and B, adjustable speed control, tune function, paddle select, sidetone on/off, and straight key mode. The TiCK-2 offers all the TiCK-1 features, plus a 20-25 character message memory. The TiCK-2B includes all these features, plus single button access to memory, and a Beacon mode. All the TiCKs utilizes the latest in RISC-based microcontroller technology. All TiCK chips can be made operational with as few as four (4) external components!

TiCK User Interface
The Single Button Interface (SBI) makes the TiCK simple to use. The general idea is that as long as the user holds the pushbutton down, the TiCK will allow sequential access to its various functions. After the code for the desired function is output through the sidetone, the user simply releases the button to access that particular function. Once the function is completed, via paddle or possibly pushbutton input, the user is returned to operational or "keyer" mode.

User Interface Description (shaded areas denotes functions specific to the TiCK-2 and TiCK-2B chips)

ACTION	TiCK RESPONSE	FUNCTION
Press pushbutton	"**S**" (dit-dit-dit)	**SPEED** Adjust: press dit to decrease, dah to increase speed
Hold Pushbutton Down	**"M"** (dah-dah)	**MEMORY** Playback: this will play the message from memory, using the keyline and sidetone (if enabled)
Hold Pushbutton Down	"**T**" (dah)	**TUNE**: to unkey rig, press either paddle or pushbutton
Hold Pushbutton Down	**"A"** (dit-dah)	**ADMIN** mode: this allows the user to access various setup parameters of the TiCK-2 & 2B chips.
Hold Pushbutton Down	**"I"** (dit-dit)	**INPUT** mode: allows the user to enter a message. User hits pushbutton when input is completed.
Hold Pushbutton Down	"**P**" (dit-dah-dah-dit)	**PADDLE** select: press paddle you want to designate as DIT paddle
Hold Pushbutton Down	"**A**" (dit-dah)	**AUDIO** select: press DIT to enable sidetone, DAH to disable. Default: enabled.
Hold Pushbutton Down	"**SK**" (dit-dit-dit, dah-dit-dah)	**STRAIGHT KEY** select: pressing either paddle toggles the TiCK to/from Straight Key/Keyer Mode. Default: Keyer Mode.
Hold Pushbutton Down	"**M**" (dah-dah)	**MODE** select: pressing the DIT paddle puts the TiCK into Iambic Mode A, DAH Iambic Mode B (default).
Hold Pushbutton Down	"**B**" (dah-dit-dit-dit)	**BEACON** select: pressing either paddle toggles the TiCK to/from Beacon/No-Beacon Mode. Default: No-Beacon Mode.
Hold Pushbutton Down	"**K**" (dah-dit-dah)	**KEYER** mode. If the user releases the pushbutton, keyer returns to normal operation.
Hold Pushbutton Down	"**S**" (dit-dit-dit)	Cycle repeats with **SPEED** adjust.

SHADING	DENOTES…
	TiCK-1/2/2B Feature
	TiCK-2 and TiCK-2B Feature
	TiCK-2B Feature Only

Functions: Functions above which are shaded are only available with the TiCK-2/2B chips. If the user holds the pushbutton down continuously, the keyer will rotate through the functions listed. If the user releases the pushbutton after entering ADMIN mode, then pushing the button will allow access to the ADMIN functions: memory input, paddle select, audio select, straight key mode, and mode select. Completing any function within ADMIN mode returns the user to normal KEYER mode.

Speed adjust: speed adjust continues as long as paddle is pressed; when paddle is released, speed is set at that point. Once the initial paddle is pressed, pressing the opposite paddle will cause the speed change to occur more quickly.

Memory Message - the TiCK-2 & 2B support a 20-25 character message memory. In input mode, the these TiCKs starts consuming memory with the first element entered. Memory consumption ceases when either the user has pressed the pushbutton, or memory is totally consumed.

Message Playback: this allows the playback of a message previously input to memory. If either paddle is hit during the playback, the message playback will be terminated. **IMPORTANT**: *On the TiCK-2B, a momentary button press will send the memory message. The TiCK-2B never sounds an "M" in code to the user.*

Straight Key Mode: in order for straight key mode to function with a straight key, a mono (two wire) jack needs to be wired in parallel with the stereo (3 wire) paddle input jack. It is vital that one wire from the mono jack go to the ground jack on the paddle input; the other wire will work with either the dit or dah input.

Keyer Parameters: the TiCK uses its own internal Random Access Memory (RAM) to store its operating parameters such as speed, dit/dah paddles, Iambic mode, memory, etc. When power to the TiCK is cycled, the values in RAM are lost and upon powerup the TiCK uses its default values.

Audio Sidetone - if you elect to use a piezo audio device with the sidetone, it is to your benefit to power the TiCK-1 with as close to 5V DC as possible, in order to obtain the highest volume. Attach one piezo lead to PIN 3, the other to GROUND.

Beacon Mode – the TiCK-2B can be put into Beacon mode. In this mode, when the memory message is played, it will play and repeat until one of the paddles is hit.

Pushbutton - it is important that a Normally Open (NO) switch be used for input on PIN 4.

Current Usage - the TiCK, when not receiving input from the pushbutton or paddle inputs, will immediately go into "sleep" mode. In this state, the device draws about one microamp of current.

A schematic has also been supplied with this data sheet. It demonstrates an example circuit which we have built and tested. You may find the information helpful in building up the TiCK into a working circuit. The TiCK PC board supports this schematic. Please note that the voltage divider and capacitors on PIN 3 (Audio) may vary depending on the rig you're interfacing to.

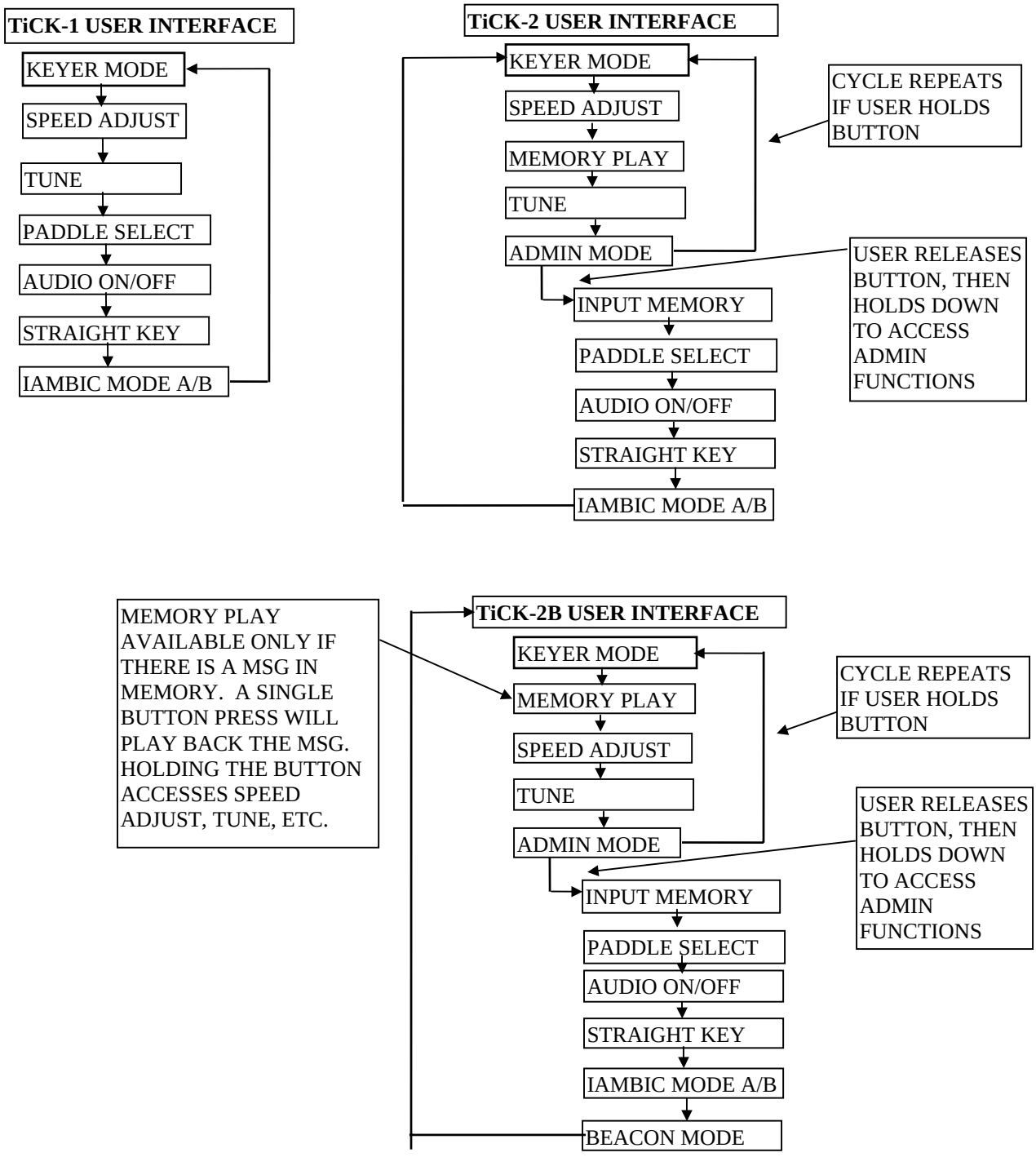
It is our sincere wish that you find the TiCK to be a great keyer in a small package. If you embed the TiCK into your favorite rig, let us know! We will compile a list of modifications, and of course give you credit for your contribution.

In addition to offering the TiCK chips, we also offer full TiCK kits which include all board mounted parts, keyline and paddle jacks, piezo audio transducer, pushbutton, and PC board.

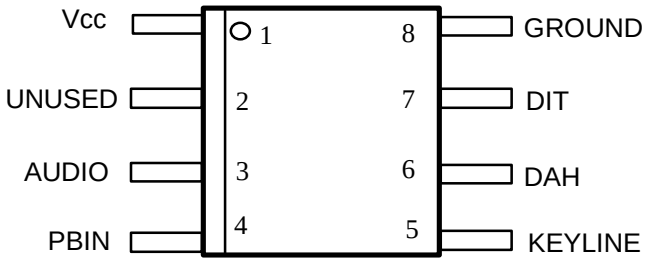
We're happy to provide you with products utilizing the latest in microcontroller technology for your Amateur Radio station. If you have any comments or ideas for current or future products, please contact us! We welcome you to visit our webpage to view our variety of accessories for your amateur radio needs.

Embedded Research
PO Box 92492
Rochester, NY 14692

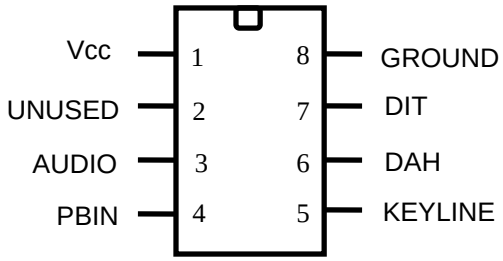
embres@frontiernet.net
http://www.frontiernet.net/~embres



TiCK-1 / 2 / 2B PINOUTS	
PIN	**DESCRIPTION**
1	VCC - 3-5 VDC
2	UNUSED
3	AUDIO - 625Hz NOMINAL
4	PBIN - N.O. PUSHBUTTON INPUT
5	KEYLINE - LOGIC HIGH = KEYED, LOGIC LOW = UNKEYED
6	DAH - INPUT
7	DIT - INPUT
8	GROUND



TiCK-1/2/2B
PIC12C508/9
8 PIN SOIC
SURFACE MOUNT
PACKAGE



TiCK-1/2/2B
PIC12C508/9
8 PIN DIP
THROUGH -HOLE
PACKAGE

Upon power-up:
The **TiCK-1** will send “dit-dit” through the audio pin, and is identified by a **RED** dot.
The **TiCK-2** will send “dit-dit-dit” through the audio pin, and is identified by a **BLUE** dot.
The **TiCK-2B** will send “dah-dit-dit-dit” through the audio pin, and is identified by a **SILVER** dot.