The TiCK-4
DATASHEET

Congratulations on your purchase of the **Ti**ny **C**MOS **K**eyer 4. The TiCK-4 features Iambic modes A and B, adjustable speed control, tune function, paddle select, sidetone on/off, and straight key mode. In addition, the TiCK-4 offers (2) 50 character message memories, plus single button access to memory, a Beacon mode, and non-volatile parameter storage. The TiCK-4 utilizes the latest in RISC-based microcontroller technology. The TiCK-4 chip can be made operational with as few as four (4) external components!

TiCK-4 User Interface

The Single Button Interface (SBI) makes the TiCK-4 simple to use. The general idea is that as long as the user holds the pushbutton down, the TiCK-4 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

ACTION	TiCK RESPONSE	FUNCTION
Hold Pushbutton Down MOMENTARILY	**NONE**	**PLAYS** back message #1 (assuming message #1 has been entered into the TiCK-4's memory.
Hold Pushbutton Down	**DIT**	**PLAYS** back message #2 (assuming message #2 has been entered into the TiCK-4's memory.
Hold Pushbutton Down	"**S**" (dit-dit-dit)	**SPEED** Adjust: press dit to decrease, dah to increase speed
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-4 chips.
Hold Pushbutton Down MOMENTARILY	**"I"** (dit-dit)	**INPUT** mode: allows the user to enter message input mode.
Hold Pushbutton Down	"**1**" (dit-dah-dah-dah-dah)	**MSG #1 INPUT:** allows the user to enter message #1
Hold Pushbutton Down	"**2**" (dit-dah-dah-dah-dah)	**MSG #2 INPUT:** allows the user to enter message #2
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 **MEMORY PLAYBACK**, **SPEED** adjust, etc.

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Functions: 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. **Upon power-up**, the **TiCK-4** will send "dit-dit-dit-dit, dah" ("4") through the audio pin, and is identified by a **YELLOW** dot.

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-4 supports (2) 50 character message memories. The TiCK-4 starts consuming memory with the first element entered. Memory consumption ceases when either the user has pressed the pushbutton, or memory is totally consumed. When you have completed entering the message, hit the pushbutton to end input mode. Between the last element input and the press of the pushbutton, the TiCK-4 is entering spaces into memory (possibly a useful feature in Beacon Mode!).

Message Playback: This option is not available, unless there is at least one message in memory. If message #1 is in memory, a single momentary press of the pushbutton will play it back. If message #2 is desired, then the pushbutton is pressed until a single "dit" is heard.

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-4 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-4 is cycled, the values in RAM are lost and upon powerup the TiCK-4 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-4 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-4 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. To repeat a given message, just play the message like you would if the TiCK-4 was not in Beacon mode.

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

Current Usage - the TiCK-4, 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.

Parameters – the TiCK-4 utilizes EEPROM memory for storing operating parameters. This means that you can power off the chip, and upon power-up, it will "remember" its parameters: speed, mode, paddle select, audio on/off. Note: memory messages are NOT stored in EEPROM memory, and will be lost when the power is turned off.

A schematic has also been supplied with this data sheet. It demonstrates an example circuit that we have built and tested. You may find the information helpful in building up the TiCK-4 into a working circuit. The TiCK-4 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.

One last thing: the TiCK-4 has a built-in timer to prevent it from loitering in the parameter setting menu. After approximately 8-10 seconds, the TiCK-4 will send a "K" and automatically exit the menu and go back to normal operating mode.

In addition to offering the TiCK-4 chips, we also offer full TiCK kits that 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.

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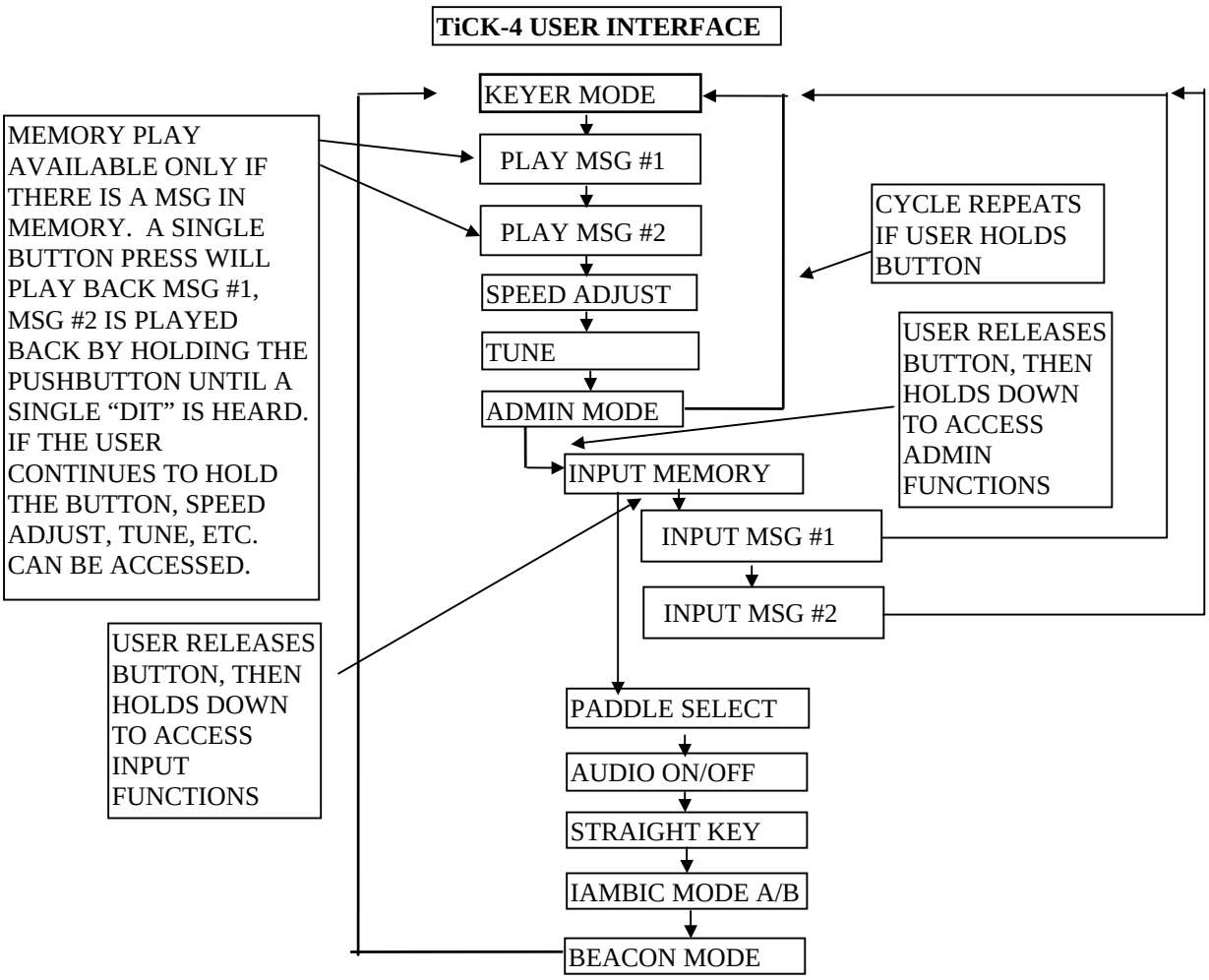
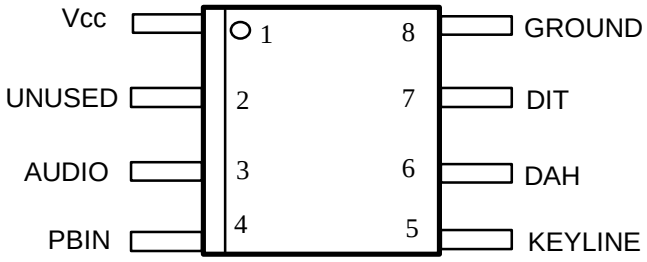
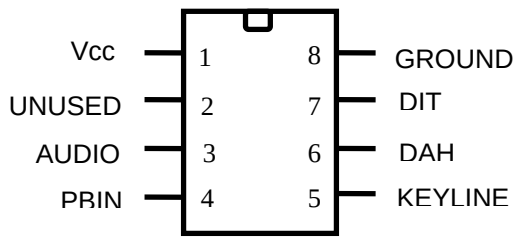


PIN	DESCRIPTION	PIN	DESCRIPTION
1	VCC - 3-5 VDC	**5**	KEYLINE - LOGIC HIGH = KEYED, LOGIC LOW = UNKEYED
2	UNUSED	**6**	DAH - INPUT
3	AUDIO - 625Hz NOMINAL	**7**	DIT - INPUT
4	PBIN - N.O. PUSHBUTTON INPUT	**8**	GROUND



TiCK-4
PIC12CE674
8 PIN SOIC
SURFACE MOUNT PACKAGE



TiCK-4
PIC12CE674
8 PIN DIP
THROUGH –HOLE PACKAGE

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Operating Scenarios

1. Entering a message into Memory #1

Press and hold pushbutton until "**A**" (**A**dmin Mode) is heard, then release.
Press and hold pushbutton until "**I**" (**I**nput Mode) is heard, then release.
Press and hold pushbutton until "**1**" (Msg #**1**) is heard, then release.

Now with the first character you enter on the paddles, the TiCK-4 begins entering the message into memory. The TiCK-4 will allow you to enter characters until memory is full. If your message is less than 50 characters, momentarily press the pushbutton when you are done entering the message. This will have two effects: first, it will keep the TiCK-4 from entering spaces at the end of your message. Second, it will signal the exit of input mode, and will play the message back for you to hear through the audio output (pin 3).

Helpful hints: let the TiCK-4 add spaces to the end of your message, if your aim is to use it in Beacon mode. Then when you play back the message, there will be a space between message playbacks. If you entered an incorrect message, you will need to go back into memory input mode as described above. If you do not want to hear your entire message played back, you can hit either paddle to interrupt the TiCK-4. This puts you back into normal keyer mode, and you will follow the above procedure to get back into memory input mode. One more hint: if you get into memory input mode, but do not wish to alter the message, simply press the pushbutton momentarily. This will have the effect of merely playing the message back out through the audio output (pin 3), and will not change the message.

2. Entering a message into Memory #2

Press and hold pushbutton until "**A**" (**A**dmin Mode) is heard, then release.
Press and hold pushbutton until "**I**" (**I**nput Mode) is heard, then release.
Press and hold pushbutton until "**1**" (Msg #**1**) is heard, and KEEP holding the pushbutton down until "**2**" is heard, then release.

Now enter message #2; when done, press the pushbutton momentarily to end message #2 input and return to normal keyer mode.

3. Playing back a message

Playing back message #1 requires only a momentary press of the pushbutton. Playing back message #2 requires pressing the pushbutton and holding it until a single "dit" is heard. If the user continues holding the pushbutton down, then he will access speed adjust, tune, etc.

If there are messages in memory, then the above user interface is in effect. If there are no messages in memory, then pressing (and holding) the pushbutton will lead the user first to speed adjust, tune, etc.

When playing back a message, hitting either paddle will interrupt the outgoing message. This is helpful when you continue calling "CQ" and someone answers while your re-sending.

4. Resetting EEPROM Parameters to factory settings

Should you need to reset the TiCK's operating parameters, you can power off the TiCK and power it on with the pushbutton depressed. Once you hear the TiCK's power-up sequence ("dit-dit-dit-dit-dah"), you can release the pushbutton – your parameters are now set, as they were when you first received the TiCK!

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