# Constructing and Operating:

The Island Memory

## Construction:

**General notes about building:**

Insert the components a few at a time, solder them in place and then clip the leads. Note that all the leads for any particular pad should be inserted prior to soldering to prevent clogging the holes. The pads and traces are small and delicate - a small tipped, low power (25 watts or less) soldering iron should be used.

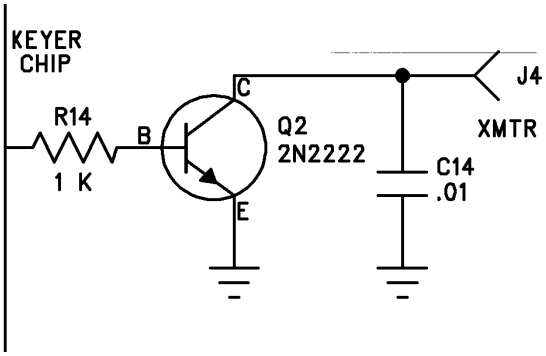
Also, I used machined pin SIP sockets (not supplied) to provide the connection points to the off-board components, I then was able to plug the wires from the components into the SIP sockets which simplifies moving the unit in and out of the enclosure. The builder might also consider using these sockets for the recording select jumper. The machined pin sockets are available in snappable strips from most of the mail order surplus electronics parts suppliers.

Finally, the two DIP (Dual Inline Package) integrated circuits (ICs) are both CMOS devices. This means that they should be handled as little as possible to prevent static damage. The builder should use a grounding strap and anti-static mat if available or at the very least, work on a grounded metal surface and be sure to touch ground prior to touching the ICs.

**Step 1: Make sure that your keyer is compatible**

The Island Memory will do NOTHING if it isn't connected to a compatible keyer. The connection is made via 5 wires (power, ground, dit, dah and keyer output). Use this checklist to make sure that your keyer is compatible with the Island Memory:

1) Supply voltage of the keyer chip/s should be in the 3 to 6 volt range.
2) Dits and Dahs are generated by switch closures to ground.
3) Keyer chip outputs a positive voltage (digital 1) when sending a dit / dah.




Most keyers on the market today have an output circuit similar to the one at the left (from the Island Keyer). The keyer chip drives a generic NPN transistor through a series resistor. A keyed logic "1" from the keyer chip is inverted

by the open collector output of the transistor.

The Island Memory has been used successfully with the following keyer chips:

Accu Keyer (with 74HC series chips)
Atomic Keyer (AK-1) from Embedded Research
C1S from Radio Adventures
8044 from Curtis Electro Devices
Island Keyer from Jackson Harbor Press
TiCK-1 from Embedded Research

But the Island Memory should work with any keyer that meets the 3 checklist items.

**Step 2: Get the parts together**

All of the essential board mounted components have been supplied. Inventory the parts using the stocklist. You will still have to provide offboard / optional items from the stocklist to fully implement the Island Memory including the switches, wire, solder, LEDs and resistors.

The LEDs require series current limiting resistors , R1 & R2. You can calculate the value for these resistors using the following formula:

R = (VCC-VOL-VFLED) / IFLED where VCC = power supply voltage
VOL = output low voltage of chip
VFLED = forward LED voltage
IFLED = desired LED current

If VCC = 5V, VOL = .4V, VFLED = 1.7V and IFLED = 10 ma then
R = (5-.4-1.7) / .01 or 290 ohms

If you have specs for your LEDs, you should be able to look up the VFLED and IFLED specifications - 1.7 V and 10 ma are common values.

To make it easy, I just usually use a 1k resistor, but that may not be bright enough.

**Step 3: Identify and orient the components**

Most of the components should be fairly easy to identify and place except for the ceramic resonator and the ceramic bypass caps. The resonator is a small light blue box with 3 leads. Orientation of the resonator isn't important.

The .1 uf and .01 uf capacitors can be very similar in appearance. They are both very small parts with 2 radial leads spaced .1" apart. You may need a magnifying glass to see the markings on these parts. The .1 uf part is marked 104. The seven

.01 uf caps are marked 103 and have longer leads. The .01 uf caps may be blue or yellow in color.

**Step 4: Mount and solder the components on the board**

Use the parts placement diagram for the placement and orientation of the parts.

I would suggest starting by inserting and soldering the 2 IC sockets.

Then insert the 7 bypass capacitors on the right side of the board. Then insert wires of appropriate length in the holes to the left of the capacitors. Solder the connections and clip leads.

Continue working to the left of the board by inserting and soldering the rest of the components and leads as shown on the placement diagram. Note the orientation of the electrolytic cap as shown on the parts placement diagram.

**Step 5: Check your work**

Before proceeding, take the time to check the bottom of the board for solder bridges. Use the Bottom view diagram as a guide to visually check for these shorts. It may help to clean the flux from the board and then use a strong light in conjunction with a magnifying glass too see these problems. Also, double check the orientation of the electrolytic capacitor. After you are convinced that the board is OK and after you have formed the leads of the ICs to fit in the sockets, insert the ICs into their sockets, being sure to follow the parts placement diagram for proper orientation.

Next, attempt to power up the board using a VOM to measure the current drawn. Active current draw at 5 V should be about 3 ma (with the LEDs OFF). Idle current draw at 5 V should be less than 6 ua. Current used will jump between the two levels as the memory buttons are pressed (active state) and as the unit times out after a second of inactivity (sleep state).

If you see significantly higher currents, power down immediately and check again for shorts and/or opens. If the currents look reasonable, then power down and proceed to the next step.

**Step 6: Wire the Island Memory to the external components**

The dit and dah connections can be made at the paddle jack. The power and ground connections should be made to the keyer chip power and ground. The only tricky connection for the Island Memory is the one to the output of the keyer chip. Here is a table of connection points for the keyers mentioned above:

| keyer | keyer chip pin number for: | | | | |
|---|---|---|---|---|---|
| chip | output | ground | power | dit | dah |
| Accu Keyer | U7, 6 | U7,7 | U7,14 | U2,9 | U1,1 |

| | | | | | |
|---|---|---|---|---|---|
| Atomic Keyer | 18 | 5 | 14 | 1 | 2 |
| C1S | 10 | 5 | 14 | 12 | 13 |
| 8044 | 14 | 1 | 16 | 2 | 7 |
| Island Keyer | 4 | 10 | 9 | 18 | 17 |
| TiCK-1 | 5 | 8 | 1 | 7 | 6 |

After hookup is complete, try the Island Memory by pressing and releasing one of the memory buttons - a short test message has been recorded in each of the four memories.

**Gotchas:**

If you don't hear anything after you press any / all of the memory buttons then recheck your connections to the dit and dah paddles as well as your power and ground connections.

If you hear about a second of straight dits or dahs but no message your power, ground, dit and dah connections are fine but you don't have the keyer output connected correctly. You need to connect the Island Memory (Keyer True Output, pin 11) directly to the keyer chip output itself. Note that a connection at the base or collector of the keying transistor will not work correctly.

Note that the LEDs AND the switches have common connections to VCC (+5V) NOT to ground. This may seem a little strange but it minimizes the external components needed for the switches and it increases the current available to drive the LEDs. Hooking the common connections to ground will not harm the Island Memory chip but the unit will NOT function correctly.

If you are using a keyer with a default practice mode (like the Atomic Keyer) you will need to exit that mode before the Island Memory will function because the Island Memory requires that the keyer output be active - practice mode disables the keyer output but leaves the sidetone on for code practice use.

**Notes:**

The builder might consider adding a switch in series with the keying line to the transmitter. This will allow easy verification of memory contents or just practice with the keyer without keying the transmitter or having to unplug the keying line.

If you are using batteries and the memories suddenly stop working, the battery voltage is probably too low for the EEPROM to function. The EEPROM is specified to work down to 2.5V.

# Operation:

The Island Memory switches are actuated by a press AND release. The message will not start playing until after the switch is released. This allows using a press and hold method of starting the recording of a memory rather than using a separate record key as was used in the Island Keyer.

**Truncate or Overflow**

The record mode of the Island Memory can be set to either Truncate or Overflow by setting the select jumper to VCC (truncate) or ground (overflow). Truncate will simply stop recording the memory when the last location is filled. Overflow will let the operator continue recording past the last memory location into the next memory.

Normally, I just solder a jumper wire from the select pin to VCC and leave my unit in truncate mode.

**Playing the memories:**

1) press and release the switch for the memory
   The Island Memory should begin playing the stored message.

**Recording (Programming) the memories:**

First, you may wish to disconnect the transmitter before recording to prevent accidentally sending your message over the air during the process.

To program a memory:

1) press and hold the switch for that memory for two seconds
   the PAUSE LED will light and
   a string of question marks will be sent until you
2) let up on the switch
   you will then hear either a T (for truncate) or an O (for overflow)
3) enter your message -
   note that recording will not start until the first touch of the paddle
   also note that the RECORD PROGRESS LED will light after the
   memory is 75% full and will start blinking during the last 16 bytes
4) end the recording by pressing any of the memory buttons
   the PAUSE LED should go OFF.

**Pausing a message after playback has started:**

You can pause a message by pressing any of the memory switches during playback. The Pause LED should light. The Island Memory will stay paused for 60 seconds - after 60 seconds, the Island Memory will time out and go into sleep mode.

To resume playback of the message, press and release any of the memory switches. The Pause LED should go out.

To kill the message, press and release any two of the memory switches at the same time. The Pause LED should go out.

**Stopping a message after playback has started:**

You can kill a message by pressing any two of the memory switches at the same time. You can also kill a message by hitting either of the paddle switches - this method may be less desirable since you will be sending the interrupting dits or dahs but it may be more convenient. The paddle kill is also less predictable since the Island Memory is unable to sense a paddle switch closure when it is actually asserting the same switch.

**Embedding a pause into a message during record:**

A pause can be embedded in a message by sending 8 dahs in a row while recording. During playback, the message will pause at the point the 8 dahs were recorded - the message can be resumed by pressing and releasing any of the memory switches. As with a manual pause, the embedded pause will time out after 60 seconds and can be killed by pressing and releasing any two memory switches at the same time.

**Operations Notes:**

The capacity of the memories depends greatly on your keying style because the Island Memory attempts to duplicate your spacing. You should get at least 60 average characters (the standard Morse word, PARIS, can be stored at least 12 times).

If the memories are not long enough they can be run together by jumpering the select pin 14 to overflow (ground). Memory 1 can thus play at least 240 characters, memory 2 - 180 characters, memory 3 - 120 characters.

If you enter the record mode accidentally you must power down the Island Memory to prevent the memory from being erased.



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# Island Memory Stocklist

| Qty | Ref. | Part Name | Source, part # | Description |
|---|---|---|---|---|
| 1 | U1 | 68HC705J1A | Jackson Harbor Press | programmed microcontroller |
| 1 | U2 | 93LC66 | Digikey, 93LC66/P | 256 x 16 serial EEPROM |
| 7 | C1-4,7-9 | CAP, .01 uf | Hosfelt, 15-861 | .1" lead space multi-layer radial |
| 1 | C5 | CAP, .1 uf | Hosfelt, 15-860 | .1" lead space multi-layer radial |
| 1 | C6 | CAP, 22 uf | Digikey, P6224 | .079" lead space radial electrolytic |
| 1 | CERE1 | CERES w/caps | Digikey, PX200 | 2 MHz ceramic resonator |

The following items are not included in the kit:

| | | | | |
|---|---|---|---|---|
| 2 | R1,2 | R1/4W | various | LED series resistor - value depends on LED and desired brightness - 1 k is a good value |
| 4 | SW1-4 | SW-MOM | various | SPST normally-open,momentary |
| 2 | D1,2 | LED | various | LED |