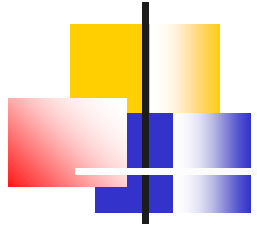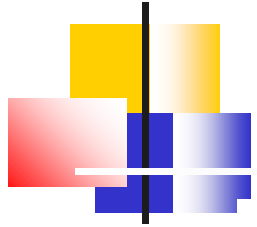# jeforth DTMF

**Forth2020
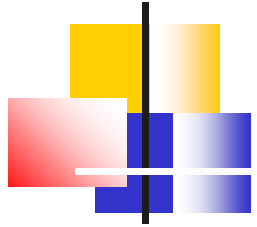C. H. Ting
April 10, 2021**

DTMF

- **Dual Tone Multi-Frequency**
- **It was used in touch-tone telephones, to dial a phone number and to provide user input on a phone with a keypad.**
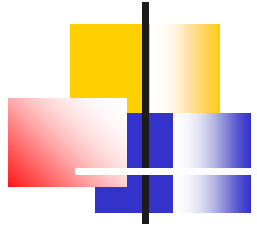
DTMF Keypad

DTMF keypad frequencies (with sound clips)[11]

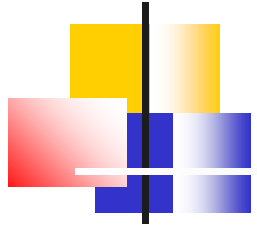|	1209 Hz	1336 Hz	1477 Hz	1633 Hz
697 Hz	1	2	3	A
770 Hz	4	5	6	B
852 Hz	7	8	9	C
941 Hz	*	0	#	D

DTMF

- **It is almost a trivial application of jeforth, since jeforth can produce music chords with 6 voices.**
- **The low voice produces a tone of 597, 770, 852 or 941 Hz.**
- **The high voice is a tone of 1206, 1336, 1477, or 1635 Hz.**

DTMF Frequencies

697 constant l1
770 constant l2
852 constant l3
941 constant l4
1206 constant h1
1336 constant h2
1477 constant h3
1635 constant h4

Dual Tone Table

create dtmf
(0) l4 , h2 ,   **(1) l1 , h1 ,**
(2) l1 , h2 ,   **(3) l1 , h3 ,**
(4) l2 , h1 ,   **(5) l2 , h2 ,**
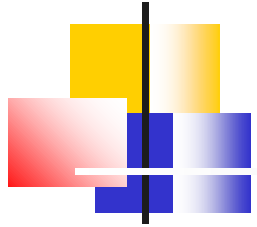**(6) l2 , h3 ,**   **(7) l3 , h1 ,**
(8) l3 , h2 ,   **(9) l3 , h3 ,**
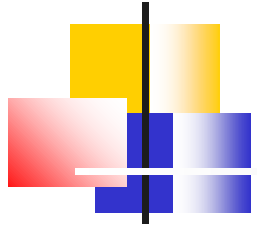
Digits in a Number

```
: digit ( n ) 2 * >r
 dtmf r@ array@ dtmf r> 1 +
  array@ 300 play ;
: /mod ( n d -- r q )
 dup 10 mod swap 10 / floor ;
: digits ( n -- ... )
 begin /mod dup while repeat
  drop ;
```

Play a Number

```
: d ( n )
 -1 swap digits
 begin dup 0>= while digit
  repeat drop ;

1234567890 d
```
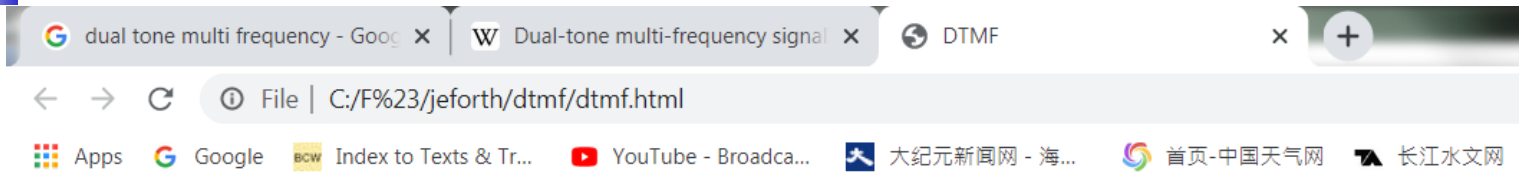
DTMF.html

- **In the AudioContext, all oscillators produce sine waves instead of square waves.**
- **On the web page, the document box displays the text of dtmf.txt.**

DTMF.html

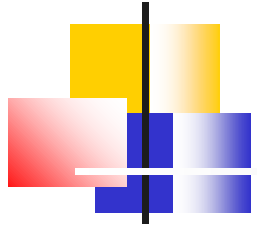In input box, enter text and hit return key:

```
( Hit return to run this small demo.)
: square dup * ;
: quad square square ;
: octet quad quad ;
8 octet . 4 octet .
```

jeforth 6.23

(Lessons)

```
( lesson 21. DTMF player )

decimal
0 constant bass
0 constant tenor
0 constant alto
0 constant soprano
0 constant flute
0 constant pedal
0 constant z
: init z to bass z to tenor z to alto z to soprano
z to pedal z to flute ;
: |  1000 ms ;
: notes ( duration -- )
  >r 0.1 bass tenor alto soprano pedal flute r>
poly ;
: play ( n1 n2 duration -- )
  >r to soprano to alto
  r@ 0.7 * notes 0.1 z z z z z z r> 0.3 * poly ;
697  constant l1
770  constant l2
852  constant l3
941  constant l4
1206  constant h1
1336  constant h2
1477  constant h3
```

Jeforth 6.23

- **Fix bugs in array operations.**
- **'dump' is made to dump only new words created by user.**
- **Words dumped out can be used to extend the words array in dictionary. We can now build turnkey applications.**