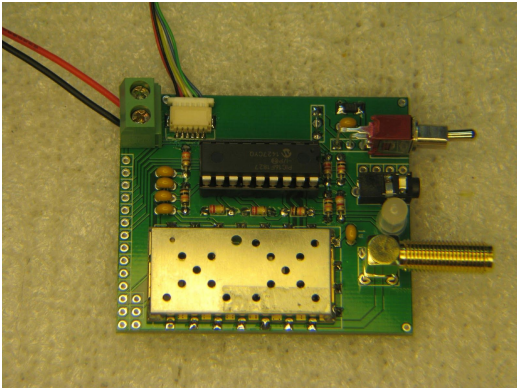


BYONICS

Micro-Fox PicCon Manual



The Micro-Fox PicCon (MF-PC) is a ½ watt fox hunting transceiver. It can currently be configured and remotely controlled via DTMF tones. It runs off 3 AA batteries for approximately 8 hours continuous, and 12 hours at a 50% duty cycle.

It is based on the Byonics MT-1000 High Altitude Balloon tracker, and uses the same hardware, but a different firmware. The MicroFox-PicCon is not currently sold directly, but users can purchase a MT-1000, and then follow the instructions here to convert it to a MicroFox-PicCon by loading in new firmware.

Firmware Update

Follow these instructions to convert a MT-1000 to a MicroFox-PicCon, or to update to a newer version of the MF-PC firmware. Notes that this firmware may only be run on the MT-1000 or other Omega compatible boards. It will not work on the MF-15, MT-RTG, or MT-AIO hardware.

To update the firmware, you will need:

- The firmware file. This file ends with the .t3f extension, such as mf-pc_v0.53.t3f
- A serial or USB cable with a 2.5mm (3/32") stereo jack with RS-232 serial levels.
- A copy of the TeraTerm Pro terminal program <https://www.ayera.com/teraterm/>

Instructions for updating the firmware:

- Connect the Micro-Fox to the computer serial port with a MT-AIO programming cable. (Female DB-9 to 3/32" stereo, 5 to shield, pin 3 to ring, and pin 2 to tip), or AIO USB cable
- Start Tera Term Pro, and under Serial Port..., select the connected COM port, 19200 baud, and a transmit delay of 1 msec/char
- In the terminal program, press and hold the 'b' key
- Apply power to the MT-1000/MF-PC
- The terminal should display "_1". If it doesn't, reset power to try again, keeping the 'b' key held.
- Release the 'b' key
- Press (and release) the 's' key. Nothing will be changed in the terminal.
- Choose File, Send File..., check the binary box, and select the desired .t3f file
- During the upload, nothing should be displayed on the terminal
- After the upload was successful, the terminal should display a '*'. If it does not, repeat from the press and hold 'b' step. There may be up to 30 seconds delay after the Send File dialog closes and the '*' appears.
- Quit Tera Term Pro
- Cycle power on the MF-PC

Transmissions

The MicroTrak-PicCon sends transmissions intended for hidden transmitter hunts. The transmissions consists of a looping sequence as follows:

- **a pre-tones delay** - This delay allows for multiple units, each programmed with a different pre-tones delay, to be all started simultaneously, and operate in sequence. The A1mmss command sets the pre-tones duration. During the pre-tones delay, the transmitter is off the air.
- **a looping tones transmission** - This is the primary transmission for hunting. It consists of a looped tone sequence, set by the C2 command below, which are played at the speed set by the B1xx command. The A2mmss command sets the tones transmission duration.
- **a Morse code ID** - After the tones transmission, a Morse code callsign ID is sent to keep the transmitter legal. The Morse code ID or message is set with the C1 command, and plays at the speed set by B2xx command, and in the tone set by the B3xx command. The duration of the code ID depends on the speed and characters used in the ID.
- **an off the air delay** - Finally, the transmitter stops sending for the remainder of the sequence until it begins again. When the transmitter is not sending, it is able to listen to new DTMF commands. The duration of this delay depends on the durations all the elements above, plus the A3mmss loop time.

The total time for all 4 elements above is set by the A2mmss command. The sequence is restarted from the beginning at this rate.

DTMF Commands

The follow DTMF commands can be sent from another radio to configure and control the MF-PC. This other radio should be set to transmit on the MF-PC receive frequency, by default, 146.565MHz and only when the MF-PC is not transmitting, so it can receive. The MF-PC LED will flash quickly when DTMF is being received. Note: the control radio must have all 16 DTMF keys, including 0-9, #, *, and A, B, C, D. Sometimes the A, B, C, D keys are not labeled.

DTMF commands can be locked out by entering DTMF D. After this, all DTMF tones will be ignored until the MF-PC receives the 4 digit DTMF unlock code. The unlock code defaults to 1234 and can be changed with the A6xxxx command. The LED will not flash quickly when DTMF commands are locked.

DTMF Control Codes

DTMF	Function
1	Begin transmission
2	Toggle transmission state (if transmitting, stop, if not transmitting, begin)
3	Stop transmission
D	Lockout DTMF commands

DTMF Configuration Codes

DTMF	Function																																																
A1mmss	Set pre tones delay to mm minutes and ss seconds. This sets a pre-tones off the air delay for each transmission. To set the MF-PC to delay 15 seconds before sending tones after being started, send A10015.																																																
A2mmss	Set tones duration to mm minutes and ss seconds. To set the tones to play for 30 seconds, send A20030.																																																
A3mmss	Set loop time to mm minutes and ss seconds. For example, to set the MF-PC to repeat the tone sequence every minute, send A30100 or A30060.																																																
A4xxxx	Set transmit frequency to 14x.xxx MHz. For example, send A46565 to set the transmit frequency to 146.565MHz.																																																
A5xxxx	Set receive frequency 14x.xxx MHz. For example, send A56565 to set the receive frequency to 146.565MHz.																																																
A6xxxx	Set the 4 digit unlock code. For example, send A61234 set the unlock code to 1234, which is also the default.																																																
B1xx	Set tone sequence speed in 5ms units. So to set a fast tone sequence speed of 25ms per tone, send B105.																																																
B2xx	Set morse speed in words per minute. For example, send B213 to set the ID speed to 13 word per minute.																																																
B3xx	Set morse ID audio tone. Use the 2 digit codes in the C2 Set Tone Sequence below. For example: B322.																																																
B4xx	Set flags. The possible flags are: • 1 for random tones, instead of the C2 sequence. • 2 for random tone speed for each tone, instead of the B1xx setting. • 4 for random morse tone each ID, instead of the B3xx setting. • 8 for auto start, to force MF-PC to begin transmitting right after powerup, rather than waiting for a DTMF 1 or 2. to set more than 1, just add the numbers. For example: to disable all flags, send B400. To enable random tones speed, send B402. To enable random tone speed and auto start (2+8=10), send B410.																																																
C1 xx xx xx ... #	Set morse callsign. Use the table below to find 2 digit code for letter and numbers. End with the pound # key. For example, to set the callsign to N6BG, send C1 14 36 02 07 #. <table><tr><td>00</td><td>space</td><td>10</td><td>J</td><td>20</td><td>T</td><td>30</td><td>0</td><td>40</td><td>!</td><td>50</td><td>AR</td></tr><tr><td>01</td><td>A</td><td>11</td><td>K</td><td>21</td><td>U</td><td>31</td><td>1</td><td>41</td><td>"</td><td>51</td><td>,</td></tr><tr><td>02</td><td>B</td><td>12</td><td>L</td><td>22</td><td>V</td><td>32</td><td>2</td><td>42</td><td>SK</td><td></td><td></td></tr><tr><td>03</td><td>C</td><td>13</td><td>M</td><td>23</td><td>W</td><td>33</td><td>3</td><td>43</td><td>\$</td><td></td><td></td></tr></table>	00	space	10	J	20	T	30	0	40	!	50	AR	01	A	11	K	21	U	31	1	41	"	51	,	02	B	12	L	22	V	32	2	42	SK			03	C	13	M	23	W	33	3	43	\$		
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02	B	12	L	22	V	32	2	42	SK																																								
03	C	13	M	23	W	33	3	43	\$																																								

04	D	14	N	24	X	34	4	44	%
05	E	15	O	25	Y	35	5	45	AS
06	F	16	P	26	Z	36	6	46	'
07	G	17	Q	27	-	37	7	47	(
08	H	18	R	28	.	38	8	48	)
09	I	19	S	29	/	39	9	49	*

SK, AS, and AR are procedural signs.

C2 xx xx xx ... #

Set tone sequence. 01 is silence, 02 is the lowest tone, 49 is the highest tone. End with the pound # key.

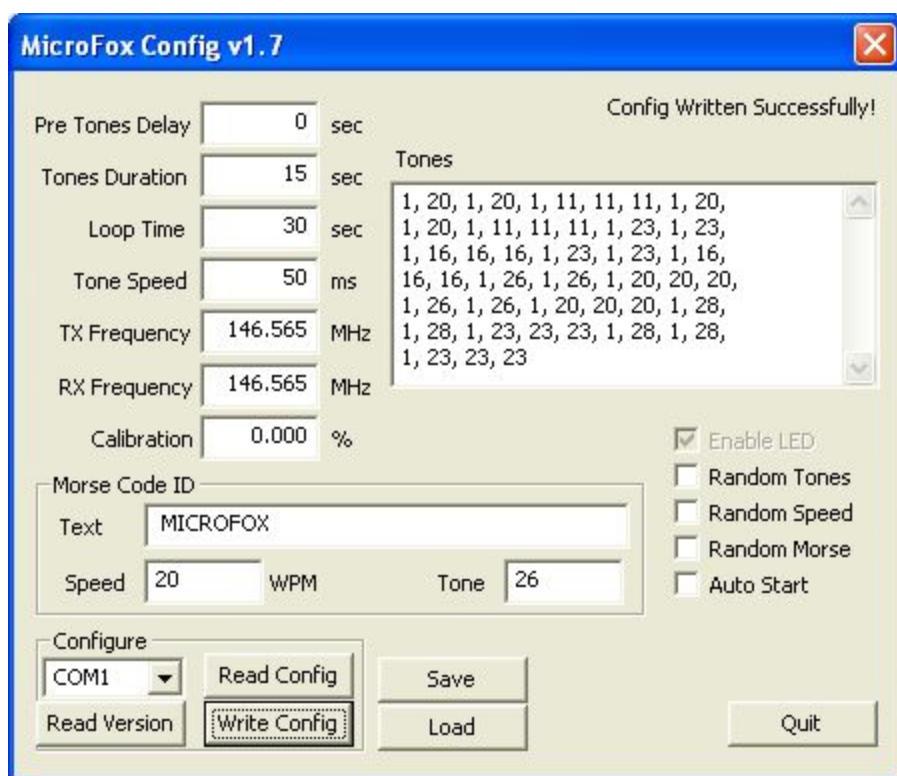
code	note	frequency
01	silence	
02	A ₃	220
03	A [#] ₃	233
04	B ₃	247
05	C ₄	262
06	C [#] ₄	277
07	D ₄	294
08	D [#] ₄	311
09	E ₄	330
10	F ₄	349
11	F [#] ₄	370
12	G ₄	392
13	G [#] ₄	415
14	A ₄	440
15	A [#] ₄	466
16	B ₄	494
17	C ₅	523

code	note	frequency
18	C [#] ₅	554
19	D ₅	587
20	D [#] ₅	622
21	E ₅	659
22	F ₅	698
23	F [#] ₅	740
24	G ₅	784
25	G [#] ₅	831
26	A ₅	880
27	A [#] ₅	932
28	B ₅	987
29	C ₆	1046
30	C [#] ₆	1109
31	D ₆	1175
32	D [#] ₆	1244
33	E ₆	1318
34	F ₆	1397

code	note	frequency
35	F [#] ₆	1480
36	G ₆	1568
37	G [#] ₆	1661
38	A ₆	1760
39	A [#] ₆	1864
40	B ₆	1975
41	C ₇	2093
42	C [#] ₇	2218
43	D ₇	2350
44	D [#] ₇	2489
45	E ₇	2636
46	F ₇	2793
47	F [#] ₇	2960
48	G ₇	3136
49	G [#] ₇	3323

Configuration Program

In addition to being able to be configured from DTMF tones, the MF-PC can be configured via a computer serial port and a Windows Configuration program called MicroFoxConfig.EXE. Using this program requires a 2.5mm stereo serial interface cable, such as the Byonics AIO USB or AIO Serial cable. Connect this cable between the computer USB or DB-9 serial port, and the 2.5mm jack on the MF-PC. It may require a little force to get the cable fully seated into the jack. Power up the MF-PC, launch the MicroFoxConfig.EXE program, select the COM port, and click Read Version to confirm a valid connection.



The settings in the Config program are similar to the DTMF settings above. One option that is available in the Config program but not in the DTMF settings is Calibration. Calibration can be used to tweak the long term timing of a MF-PC. If you determine that the MF-PC is running 0.03% slow, set the calibration to -0.03% to correct that.

Specifications

Dimensions	2.2 X 1.9 inches, not including the SMA RF connector which overhangs the end of the board by .54 inches.
Weight	Transmitter: Less than .9 ounce 3 AA battery enclosure: 1 ounce, empty
Programming Input	Kenwood compatible 2.5mm 3 conductor cable (Not included) Byonics offers these cables optionally as both standard serial and USB types. See www.byonics.com
GPS Input	6 pin, 1mm connector for Byonics GPS4OEM receiver. Not used for the MF-PC

Power input	Two pin screw terminal. 4.5 to 5 Volts DC. DO NOT EXCEED 5 VOLTS INPUT!
Current	During transmissions the current consumption is approximately 250 mA. Power output and current draw will increase with a supply voltage of not more than 5 Volts, and will decrease as batteries decay.

MicroFox-PicCon Schematic (OMEGA Board)

