VERTEX program CE5.exe EEPROM DATA EDITOR (CE-5) v 4.10

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Version 0.1

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The following analysis was done by running the VERTEX program CE5.exe EEPROM DATA EDITOR (CE-5) v 4.10 on Windows 95 and analyzing the files that were saved after entering values into the user interface. CE5.EXE requires a computer that is less than 500MHz, and only works on specific versions of DOS. I have verified that this program works with my VERTEX FTL-2011 radio using a serial cable designed for it.

According to the splash screen, this program supports

FTL-1011

37-48MHz

FTL-2011

134-168MHz (A)

148-174MHz (B)

FTL-7011

400-430 MHz (A)

450-486 MHz (B)

486-512 MHz (C)

The data in the file is stored in 25 rows of 16 bytes. The first row is common “Environmental” data. The following 24 rows are channel specific rows.

Bytes 190-19C are the filename that this is stored in.

Initially the program comes up in the channel editing screen. If you press F2 (Common) you can edit the Environmental variables:

[EDIT COMMON DATA]

Common Settings

Scan Resume:

Priority During Scan:

Priority Speed:

Talk Back:

Home Channel:

Off Hook:

Monitor:

Tx Time Out:

Time-out Resume:

Tx Carrier Delay:

A Key:

2-Tone Decoder:

These were the values that my radio was set to:

Scan Resume: 5s

Priority During Scan: Enabled

Priority Speed: Slow

Talk Back: Disabled (when enabled Home channel is greyed out)

Home Channel: Scan Start ch

Off Hook: Disabled

Monitor: Enabled

Tx Time Out: 7.5 min

Time-out Resume: 0 sec

Tx Carrier Delay: disabled

A Key: High/Low

2-Tone Decoder: Group 1,2,3

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Orig.ch

For this analysis all bytes and bits discussed are zero based.

Lowest order bit is bit zero.

Bit Number – Hex Value

0 - 1

1 - 2

2 - 4

3 - 8

4 - 10

5 - 20

6 - 40

7 - 80

Scan Resume: Byte 05 Bit 7  0 = 5s / Byte 05 Bit 7  0 = 1  carrier

Priority During Scan: Byte 05 Bit 6  0 = Enabled / Byte 05 Bit 6  1=Disabled

Priority Speed: Slow Byte 05 Bit 5 0 = Slow /  Byte 05 Bit 5 0 1 = Fast

Talk Back: Disabled Byte 05 Bits 3 and 5 = 0 /  Enabled (when enabled Home channel is greyed out) (Bit 5 = 1 and Bit 3 = 1)

Home Channel: Byte 05 (Bit 5 = 0) Scan Start ch / Byte 05 Bit 5 = 1 Pri-1ch

Off Hook: Disabled – Byte 05 Bit 3=1 /Enabled Byte 05 Bit 3=0

Monitor: Enabled Byte 5 bit 4 =0 /Enabled Byte 5 bit 4 = 1

Tx Time Out: 7.5 min

Disabled Byte 06 = OC

0.5 Min Byte 06 = 1C

1.0 Min Byte 06 = 2C

1.5 Min Byte 06 = 3C

2.0 Min Byte 06 = 4C

2.5 Min Byte 06 = 5C

3.0 Min Byte 06 = 6C

3.5 Min Byte 06 = 7C

4.0 Min Byte 06 = 8C

4.5 Min Byte 06 = 9C

5.0 Min Byte 06 = AC

5.5 Min Byte 06 = BC

6.0 Min Byte 06 = CC

6.5 Min Byte 06 = DC

7.0 Min Byte 06 = EC

7.5 Min Byte 06 = FC

Time-out Resume: Note that if Time out resume is not zero, then Tx Carrier Delay (see below) is automatically enabled

Byte 06

 Bit 2 Bit 3

0 Sec 1 1

6 Sec 0 1

20 Sec 1 0

60 Sec 0 0

Tx Carrier Delay: Disabled - Byte 04 Bit 3 = 0 / Enabled - Byte 04 Bit 3 = 1

A Key: High/Low

Byte 07

 Bit 6 Bit 7

High/Low 1 0

Talk Around 0 0

Call 0 1

Acc 1 1

2-Tone Decoder: Group 1,2,3 / Group 4,5,6 / Custom Tone

Byte 07

 Bit 3 Bit 4

Group 1,2,3 0 0

Group 4,5,6 1 0

Custom Tone 0 1

2 Tone Decode Values:

Stores a code for B-Tone and A-Tone in the bottom 7 bits of Byte Y4 (where Y is the channel row number) and Byte Y5 respectively. The code is based on the value of “2-Tone Decoder” above.

Note that the frequencies in these tables are NOT in numerical order.

Byte Y4 Bit 7 =1 if 2-Tone Decoder is ON. If it is 0, then the tone is off (although it still stores the previous tone value so that it will appear again if you turn tone back on.)

If you turn the tone on for a specific channel, then that channel is automatically no longer hidden.

Group 1,2,3

Menu is

288.5

296.5

304.7

313.0

330.5

349.0

368.5

389.0

410.8

433.7

457.9

483.5

510.5

539.0

569.1

600.9

634.5

669.9

707.3

746.8

788.5

832.5

879.0

928.1

953.7

979.9

1006.9

1034.7

1063.2

1092.4

Group 4,5,6

Menu is

1153.4

1185.2

1217.8

1251.4

321.7

339.6

358.6

378.6

399.8

422.1

445.7

470.5

496.8

524.6

553.9

584.8

617.4

651.9

688.3

726.8

767.4

651.9

688.3

726.8

767.4

810.2

855.5

903.2

1285.8

1321.2

1357.6

1395.0

1433.4

1122.5

569.1

979.9

Custom Tone List

01-32

Byte 15 is 16

Byte 25 is 16

Byte 35 is 16

Byte C4 is 80

Byte C5 is 16

Tone Code for Group 1,2,3

288.5 - 15

296.5 - 16

304.7 -17

313.0 -18

330.5 – 00

349.0 - 01

368.5 -02

389.0 - 03

410.8 -04

433.7 -05

457.9 -06

1283.5 - 07

510.5   - 8

539.0 - 9

569.1 - A

600.9 - B

634.5 - C

669.9 - D

707.3 - E

746.8 - F

788.5 - 10

832.5 - 11

879.0 - 12

928.1 - 13

953.7 - 19

979.9 - 1A

1006.9 - 1B

1034.7 - 1C

1063.2 - 1D

1092.5 - 14

Group 2 hex encoding - byte y5 value

1153.4 15

1185.2 16

1217.8 17

1251.4 18

321.7 00

339.6  01

358.6 02

378.6 03

399.8 04

422.1 05

445.7 06

470.5 07

496.8 08

524.6 09

553.9 0A

584.8 0B

617.4 0C

651.9 0D

688.3 0E

726.8 0F

767.4 10

810.2  11

855.5 12

903.2 13

1285.8 19

1321.2 1A

1357.6  1B

1395.0  1C

1433.4 1D

1122.5 14

569.1 1E

979.9 1F

Custom Tone –

The binary value of the byte is stored in the bottom 7 bits of Y4 and Y5. There are 32 valid values from 01 – 32.

Hardware Environment Screen –

The first 3 settings require that the program be launched with the -p switch:

The help has the following information

[information from the F1 key]

CAUTION: Do not change Hardware Environment Parameters unless you are certain that the transceiver hardware is suitable for the new value.  Editing Prescaling, Channel Step and IF Parameters requires that this program be started with the -p switch on the command line.  Otherwise the settings can only be viewed.

Scan Resume: The "5s timer" selection causes scanning to resume after a 5-second pause.  The "carrier" selection causes scanning to resume after squelch closes.

Priority During Scan: Enable to allow checking of the Priority channel during scanning.  Disable to disallow.

Priority Speed: Fast checks the priority channel more often, slow less often.

Talk Back: Enable to allow transmission on channel where scanning stops.  Disable permits transmission only on Home Channel (see below) when scanning stops.

Home Channel: For transmissions after scanning stops: select whether operation shifts to Priority Ch 1 or to the channel selected when scanning started.  Talk Back must be DISabled to allow Home Channel selection.

Off Hook: Enable/disable squelch override via the microphone hanger (when the microphone is removed from the hanger)

Monitor: Enable/disable squelch override via the MON button.

Tx Time-Out: Transmitter Time-Out Timer enabled (to limit length of transmissions, 0.5 to 7.5 minutes\_ or disabled.

Time-Out Resume: Minimum time to wait (0, 6, 20 or 60 sec) after Tx Time-Out before transmitter can be reactivated.

Tx Carrier Delay: When the CTCSS option is installed and active and this feature is enabled, releasing the PTT switch will leave the transmitter active (without modulation) for an extra 400ms, eliminating the squelch tail at the receiving end.

A Key: Select the function of the auxillary "A" button on the front panel.  Choices are:

Noise Blanker: reduce the background noise (low band only)

Talk Around: activate simplex to bypass repeater(s)

Call: blink LED when call received while unattended,

and Accessory (customer-defined function)

2-tone group: Select which tone group will be used for 2-tone editing.  Choices are:

Group 1,2,3

Group 4,5,6

Custom tone (based on the location of the PROM).

Default:

Prescaling: 1/64

Channel Step: 5.0/6.25 kHz

IF: 21.4 MHz

Advanced Setting options:

Prescaling: 1/64  (Byte 00 bit 4 =0 ) /  1/128  (Byte 00 bit 4 = 1)

Channel Step: 5.0/6.25 kHz (Byte 00 bit 2 =0)  / 10.0,12.5kH (warning that this may invalidate some channels) (Byte 00 bit 2 = 1)

IF: 21.4 MHz (can enter 3 digits here) - (Byte 2 and 3 have this in

BCD) - 21.4 is 21 in byte 2, and 40 in byte 3.)

Regular options defaults

Local Offset: Lower

Default Split: Simplex

Scan Speed: 50ms

Memory channel: 4 ch

Local Offset: Lower Byte 00 bit 1 = 0/Upper Byte 00 bit 1 = 1

Default Split: Simplex - Byte 0B bit 1 =1 / 5 MHz Byte 0B bit 1 = 0

Scan Speed: 5/ 10 / 20 / 25 / 30 / 35 / 40 /45 /50 (default) / 55 / 60 / 65 / 70 / 75 / 80

The upper 4 bits of byte 01 = (speed value / 5) -1

e.g. Scan Speed 5 - Byte 01 = 0 / Scan Speed 10 = Byte 01 10 hex /15 = 20 hex

Memory channel:  4 ch (20ch4 - THIS ONE IS DEFAULT RIGHT NOW) byte 04 bit 2 high / 24ch (20ch24) - byte 04 bit 3 and 4 high / 12 ch (20ch12) = Byte 04 bit 3 high, bit 4 0. = looks like byte 4 is the number of channels (4 = 04, 12 = 0C, 24 = 18)

Main screen help: [From the F1 key]

[Priority Channel Selection/Unhide Channel Data]

For 12- or 24-channel versions, selection Priority channels for scanning.  Digits "1" or "2" in this field indicate current selections.  Press [1] or [2] select the current channel (and deselect the previous).  The channel may either be displayed or hidden (it will become unhidden).

Up/Down Arrows: Choose a channel.

[1] or [2]: Activate the chosen channel for Priority.

NOTE! In 4-channel sets, "..." is displayed, and a Priority channel cannot be selected.   Other channel data can still be edited after pressing the Arrow Keys.

[Edit channel number for Display on the Transceiver]

The Space Bar or keys 0-9 can be pressed to either enter a blank and a number, two numbers (up to 99) or two blanks.  Press enter to accept the displayed digit(s).

Arrow keys: Change field (no change in channel number)

Space bar: input a blank

0-9: input a digit

Backspace: Erase last input key

Enter Key: Accept displayed input

Esc Key: Cancel displayed input (Before pressing enter)

[Edit Rx/Simplex Frequency & Hid/Unhide Channel data]

Use 0-9 to enter the desired channel frequency, and press Enter.  This frequency will be adjusted if it doesn't match the channel step parameter (in Environ data), and will also appear in the Tx freq field.  You do not need to enter all 8 digits: empty digits to the right are zero-filled.

Pressing [.] (period) after several digits forces them to MHz.  Press period first to change only to KHz.

Pressing the Space Bar without entering a number toggles the data for the entire channel between hidden and unhidden (except the first channel which cannot be hidden).  Hidden channels display "--" in place of field entries, and are not used for operation (although they are still stored in hidden for for possible recall later.)

NOTE! Any entries or changes to this field will also occur in the Tx Freq. field, so you may need to edit that field after making changes here.

[Toggle Subaudible CTCSS Decoder, and set CTCSS frequency]

Press the Space Bar to toggle the decoder on/off, or press Enter to display the tone select window, from which you may select a frequency with the Arrow Keys (pressing Enter again to accept, or Esc to cancel).

If you know the CTCSS frequency you want, you can enter it directly with the 0-9 and [.] (period) keys.  When the desired CTCSS frequency is displayed, press Enter to accept.  If the frequency was invalid (not among the standard tones), the Tone Select Window will appear as described above, with the nearest valid frequency pre-selected.

Turning on CTCSS turns off DCS (both cannot be on).

Turning off CTCSS also turns off BTLO (tone) if it was on.

[Toggle DCS Decoder, and set DCS Code]

Press the Space Bar to toggle the decoder on/off, or press Enter to display the Code Select window, from which you may select a DCS Code with the Arrow Keys (pressing Enter again to accept, or Esc to cancel.)

If you know the 3-digit DCS Code you want, you can enter it directly with the 0-9 keys.  When the desired Code is displayed, press Enter to accept.  If the Code was invalid, (not among the standard Code numbers), the Code Select window will appear as described above, with the nearest valid Code pre-selected.

Turning on DCS turns off CTCSS (both cannot be on.)

Turning off DCS also turns off BTLO (tone), if it was on.

[Busy Channel/Tone Lock Out: Carrier/Tone/Off Toggle]

The Space Bar (or Backspace Key) toggles the BCLO/BTLO selection between Carrier Control (cw), CTCSS/DCS Control (tone) or off.  If both the CTCSS and DCS Decoders were off, selecting "tone" here will turn CTCSS on, and the tone frequency will be displayed in the CTCSS Dec Field.

[Scan Stop/Skip Toggle]

If scanning is enabled in the Common Data, the Space Bar selects whether this channel will be included in the scanning (stop) or be skipped over.

If "..." is displayed in this field, scanning is disabled in the Common Data, and no selection is possible unless Common Data is first edited to enable scanning.

[Transmit Time-Out Timer on/off toggle]

Press the Space Bar to toggle the Transmit Time-Out Timer on and off.  When on, the transmitting time on this channel is limited to the Tx Time-Out Time set in the Common Data (1/2-7 1/2 minutes)

Main channel editing screen

Priority Channel - Priority channel 1 is in byte 08 - channel 1 is stored as 0, channel 12 is 0B

Priority Channel 2 is in Byte 9 - channel 1 is stored as 0, channel 12 is OB.

Channel Number to be displayed for that row - is stored in byte Y1 - where Y is the channel row number  If the digit is to be blank, then an F is used.

Example -  if 11 is in byte 11 then the first channel is number 11.

If F9 is stored in byte 91, then <space> 9 is displayed for the 9th channel.

Rx Frequency in BCD stored in Y8 Y9 YA where Y is the channel row number

(e.g. 140.125 for channel row number 2: Byte 28 is 14 29 is 01 2A is 25)

Tx Frequency in BCD in YB YC YD – same scheme as Rx.

Channel is "hidden" if bit 7 of byte Y0 is high.

For the CTCSS Tone Byte 03 has a tone:

Byte 3 Bit 7 = 1 means tone is on

80 - 67.0

81 - 71.9

82 - 74.4

83 - 77.0

84 - 79.7

85 - 82.5

86 - 85.4

87 - 88.5

88 - 91.5

89  - 94.8

8A - 97.4

8B - 100.0

8C - 103.5

8D - 107.2

8E - 110.9

8F - 114.8

90 - 118.8

91 - 123.0

92 - 127.3

93 - 131.8

94 - 136.5

95 - 141.3

96 - 146.2

97 - 151.4

98 - 156.7

99 - 162.2

9A - 167.9

9B - 173.8

9C - 179.9

9D - 186.2

9E - 192.8

9F - 203.5

A0 - 210.7

A1 - 218.1

A2 - 225.7

A3 - 233.6

A4 - 241.8

A5 - 250.3

For transmit CTCSS, stored in Byte Y7 (same scheme)

For DCS Rx, byte Y2 gets 88, and byte Y3 gets the DCS tone number in binary.

For DCS Tx, byte Y6 gets 88 and byte Y7 gets the DCS tone number in binary.

For BCLO/BTLO  (cw/tone/off)

For Off Y0 byte Y0 bit 2 and 3 low

For CW Y0 Byte Y0 bit 3 high

For Tone Y0 Byte Y0 bit 2 high

Scan - for a 4 channel unit, this is not available. (stop/skip)

stop/skip/stop/skip...

Byte Y0 - if stop then bit 2 is 0, if skip then bit 2 is high..

Transmit power byte Y0 if bit 4 is low then transmit power is high, if it is high, then transmit power is low.

TOT - byte Y0 bit 5 if 0 then TOT is off, if 1 then TOT is on.