Operations Manual for Holley Commander Pro 950 Auto-Tune Software

October 13, 2009

Revision History

Date	Version	Description
10/13/09	2.1	- Shifted compensation thresholds used by narrow band oxygen sensor from 95-105% to 90-100%. - Replaced analysis message “NO - Oxygen volts changing too much” with “NO - vehicle is decelerating”. - Added communication and setup progress bar.

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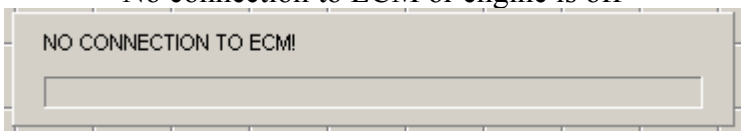
1. **Installation**
   This program is intended for use on PC's running Windows (2000, XP, Vista). Copy the program to the desktop. It will attempt to communicate to the Holley Commander 950 Pro ECU via a user selectable RS232 serial port.

2. **Features**
   a) **Version Information -** The version information appears at the top of the program.

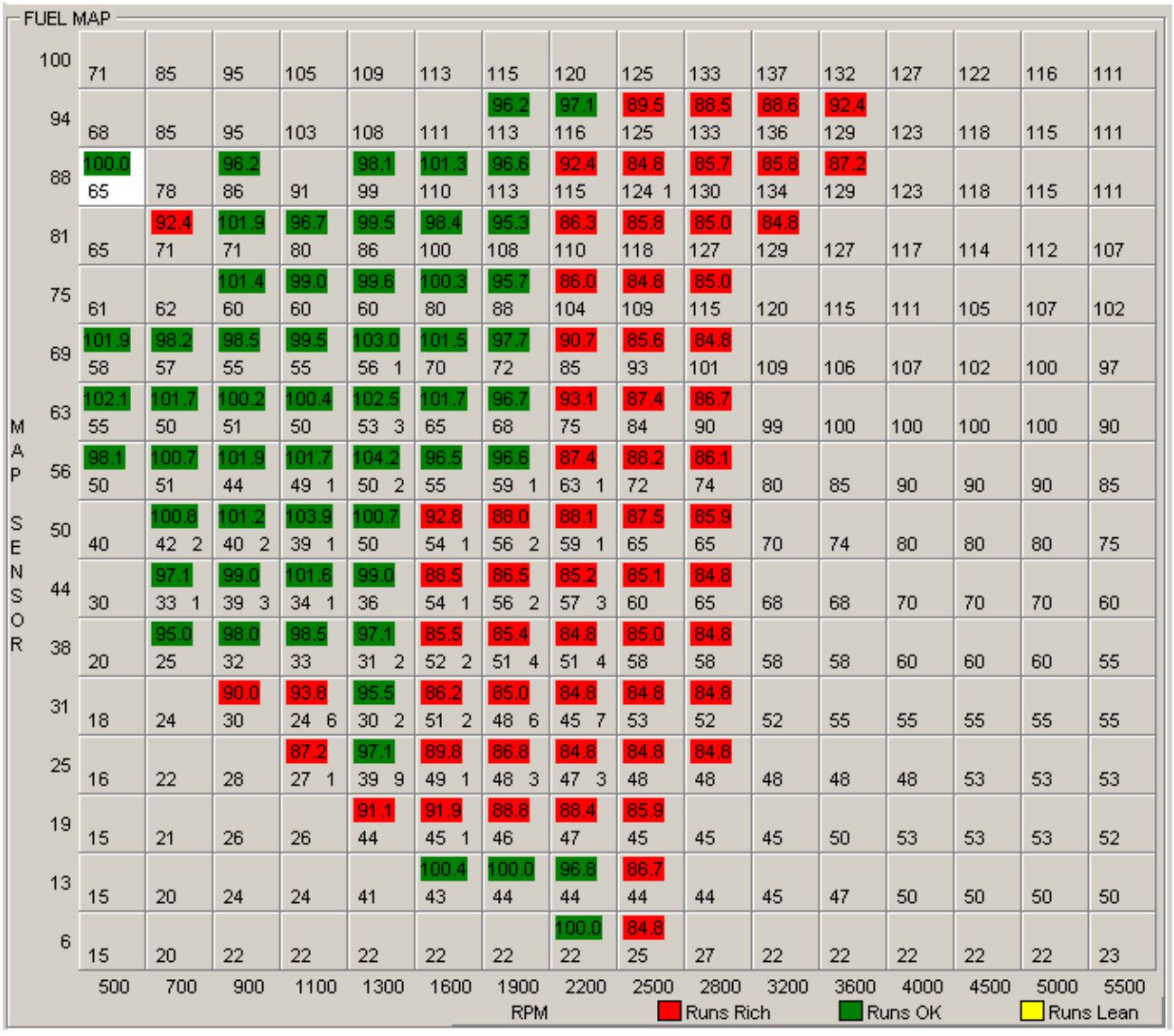
   b) **Communications & Setup Progress Bar -** This appears whenever the program needs to collect setup information.

No connection to ECM or engine is off



During collection of setup parameters

c) **Main Fuel Map -** This is similar to the fuel map table seen with the software supplied by Holley.



MAP SENSOR	500	700	900	1100	1300	1600	1900	2200	2500	2800	3200	3600	4000	4500	5000	5500
100	71	85	95	105	109	113	115	120	125	133	137	132	127	122	116	111
94	68	85	95	103	108	111	96.2 113	97.1 116	89.5 125	88.5 133	88.6 136	92.4 129	123	118	115	111
88	100.0 65	78	96.2 86	91	98.1 99	101.3 110	96.6 113	92.4 115	84.8 124 1	85.7 130	85.8 134	87.2 129	123	118	115	111
81	65	92.4 71	101.9 71	96.7 80	99.5 86	98.4 100	95.3 108	86.3 110	85.8 118	85.0 127	84.8 129	127	117	114	112	107
75	61	62	101.4 60	99.0 60	99.6 60	100.3 80	95.7 88	86.0 104	84.8 109	85.0 115	120	115	111	105	107	102
69	101.9 58	98.2 57	98.5 55	99.5 55	103.0 56 1	101.5 70	97.7 72	90.7 85	85.6 93	84.8 101	109	106	107	102	100	97
63	102.1 55	101.7 50	100.2 51	100.4 50	102.5 53 3	101.7 65	96.7 68	93.1 75	87.4 84	86.7 90	99	100	100	100	100	90
56	98.1 50	100.7 51	101.9 44	101.7 49 1	104.2 50 2	96.5 55	96.6 59 1	87.4 63 1	88.2 72	86.1 74	80	85	90	90	90	85
50	40	100.8 42 2	101.2 40 2	103.9 39 1	100.7 50	92.8 54 1	88.0 56 2	88.1 59 1	87.5 65	85.9 65	70	74	80	80	80	75
44	30	97.1 33 1	99.0 39 3	101.6 34 1	99.0 36	88.5 54 1	86.5 56 2	85.2 57 3	85.1 60	84.8 65	68	68	70	70	70	60
38	20	95.0 25	98.0 32	98.5 33	97.1 31 2	85.5 52 2	85.4 51 4	84.8 51 4	85.0 58	84.8 58	58	58	60	60	60	55
31	18	24	90.0 30	93.8 24 6	95.5 30 2	86.2 51 2	85.0 48 6	84.8 45 7	84.8 53	84.8 52	52	55	55	55	55	55
25	16	22	28	87.2 27 1	97.1 39 9	89.8 49 1	86.8 48 3	84.8 47 3	84.8 48	84.8 48	48	48	48	53	53	53
19	15	21	26	26	91.1 44	91.9 45 1	88.8 46	88.4 47	85.9 45	45	45	50	53	53	53	52
13	15	20	24	24	41	100.4 43	100.0 44	96.8 44	86.7 44	44	45	47	50	50	50	50
6	15	20	22	22	22	22	22	100.0 22	84.8 25	27	22	22	22	22	22	23

The horizontal axis is engine RPM, and the vertical axis is MAP Sensor vacuum.

There are three fields that appear in each cell.

The number in the top is either:

1. Closed loop compensation when a narrow band oxygen sensor is installed. It will appear:
    a. Red (rich) if the compensation is less than 90%.
    b. Yellow (lean) if the compensation is greater than 100%.
    c. Green (good) if the compensation is between 90% and 100%.

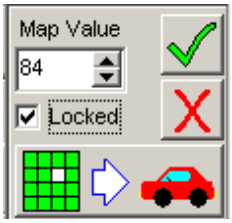
2. Air/Fuel ratio when a wide band oxygen sensor is installed. It will appear:
    a. Red (rich) when the A/F ratio is 0.2 below the target value*
    b. Yellow (lean) when A/F ratio is 0.2 above target value*
    c. Green (good) when A/F ratio is within 0.2 of target value*

*Target A/F ratios are setup with Holley supplied software.

The number in the lower left is the lookup table value, same as seen with the Holley software. When locked, it will appear bold and underlined:

The number in the lower right is the number of times the auto-tune algorithm has modified the lookup table value.

d) **Editing Individual Map Values –** The lookup table value for any cell can altered and/or locked. After moving the mouse cursor to the desired cell, press the right mouse button to bring up the following panel:



Pressing this button will save the new value to the internal map:

Pressing this button will save the new value to both the internal map and the ECU:

e) **Fuel Map Updates -** Checking the following "Automatic Fuel Map Updates" option (below) allows the tuning algorithm to transmit new cell values to the ECU.

Note: This option is disabled in demo versions.

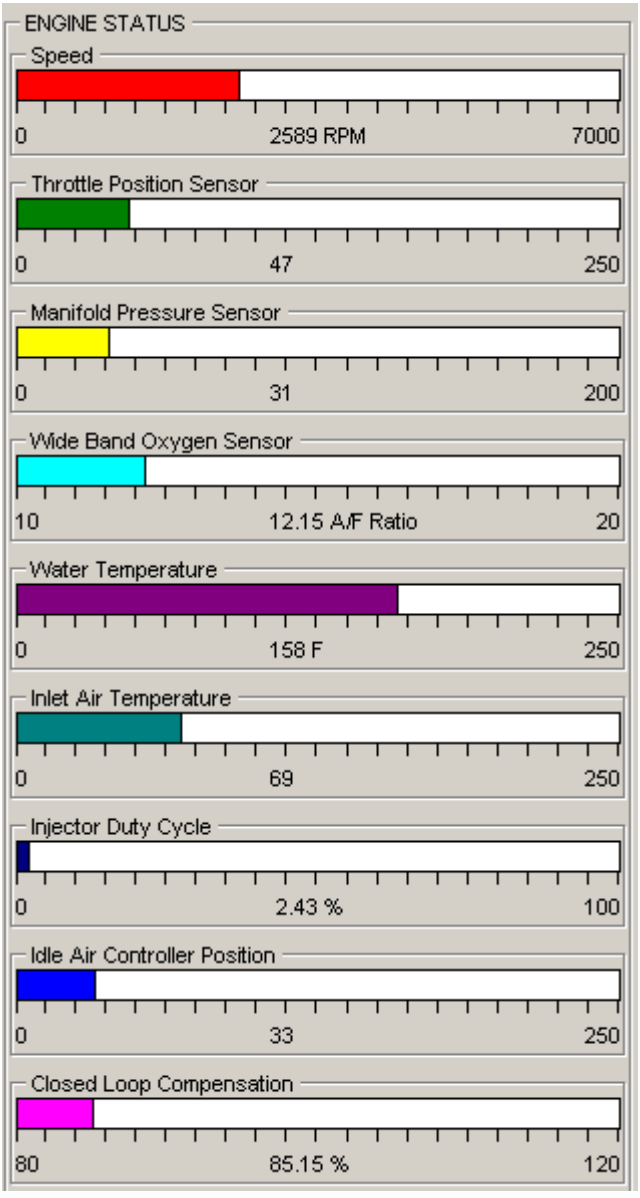
f) **Data Logging –** Checking the "Data Logging" option (below) will result in all sensor samples being saved to the file "RawSensorData.D95". The format of this file is the same as software supplied by Holley.

g) **Analysis Messages** - While driving the vehicle, the following messages will appear in the analysis message box:

Message	Description
NO – RPM is changing too much	Tuning algorithm is rejecting sensor data because engine RPM is changing too much.
NO - coolant temperature too low	Tuning algorithm is rejecting sensor data because engine hasn't fully warmed up.
NO - MAT modifier too high	Tuning algorithm is rejecting sensor data because incoming air temperature is cold enough to require additional enrichment.
NO - coolant modifier too high	Tuning algorithm is rejecting sensor data because engine temperature is cold enough to require additional enrichment.
NO - vehicle is decelerating	Tuning algorithm is rejecting sensor data because RPM is inconsistent with TPS signal.
NO - Engine not running	Tuning algorithm is disabled.
NO - no sensor data	Tuning algorithm is disabled.
YES	Tuning algorithm is enabled and processing sensor data.

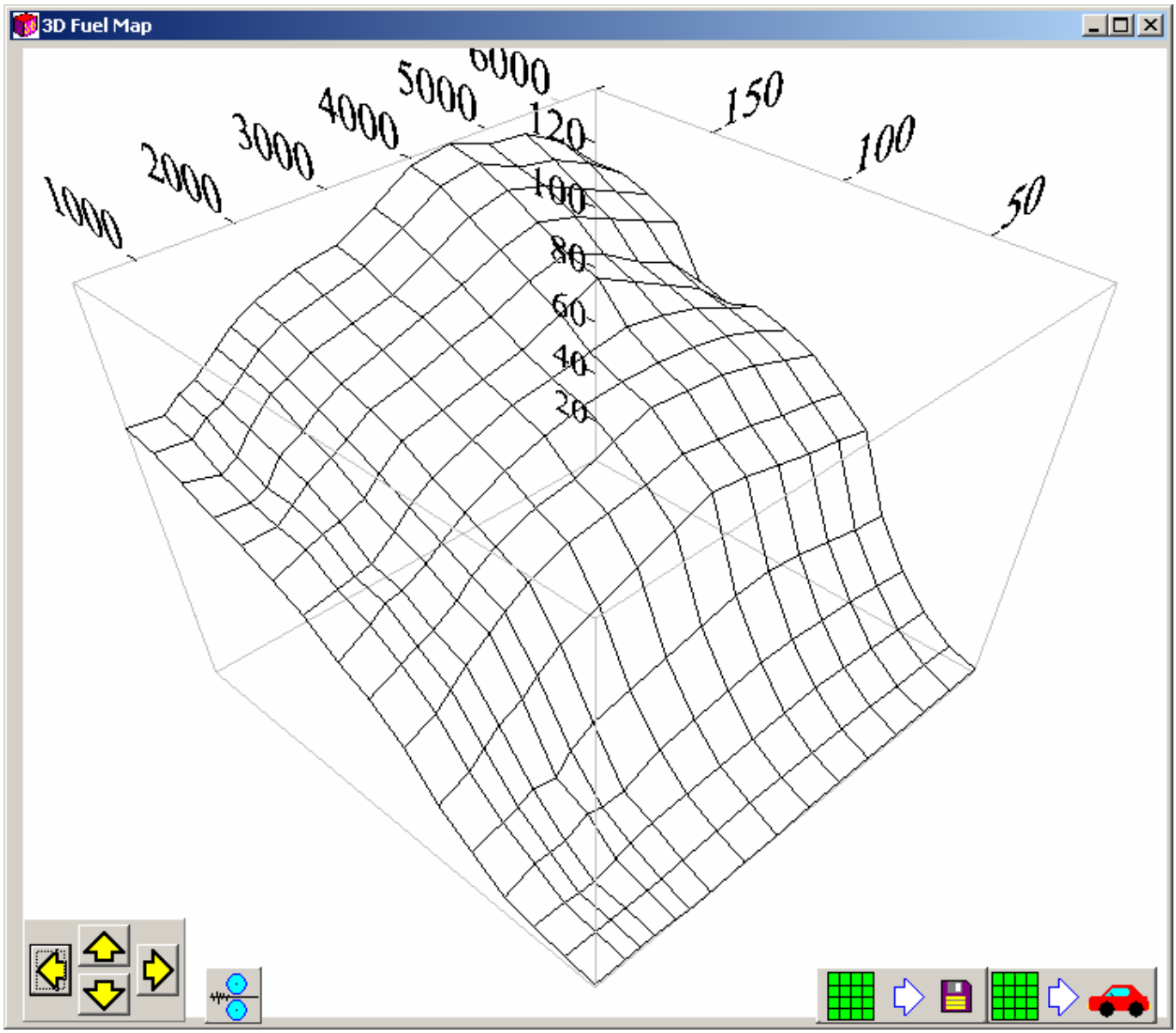
h) **Reading Data From Log Files –** This program can 'play back' sensor samples from previously recorded log files. Checking the "Read From Files" box (below) will bring up two dialogs. One for selecting the appropriate setup parameter file (*.950) and another for the logged data file (*.D95):

i) Engine Gauges

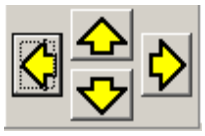


These gauges are updated approximately every 100 milliseconds.

j) **3D Viewing –** Pressing this button will show a three dimensional view of the fuel map:



Use these buttons to rotate the 3D graph up, down, left and right:



Press this button to “smooth” the fuel map:

Notes:

a. The smoothing algorithm makes modest adjustments. It may be necessary to “smooth” more than once.

b. Only 'unlocked' cells can be adjusted/smoothed.

Press this button to save the “smoothed” map to a text file for reference:

Press this button to send the “smoothed” map to the ECU:

k) **Limitations**:

- Closed loop operation only – engine should be warmed up before use
- Speed Density Mode
- Only adjusts fuel map, no provision for adjusting spark map

3. Operation

Once the engine is warm enough to begin closed operation, shut down the Holley software, and start this program. With the engine idling verify gauges are showing correct values. The fuel map should highlight the cell with the current RPM and MAP sensor reading. As the vehicle is driven, the highlighted cell should move around, and the status numbers should appear.

If “Automatic Fuel Map Updates” is checked, the auto-tune algorithm will attempt to make any necessary corrections to the lookup table values. It will then update the number in the lower right hand corner of the current cell. If the initial fuel map is relatively close, very few adjustments will be needed. If the map is off a lot, many adjustments will be needed.

The following output text files will be created:

Filename	Description
RawSensorData.D95	Unprocessed sensor values are appended to this file when data logging is enabled. The format is the same as the Holley software, so this file can be viewed graphically. For archiving purposes, rename this file at the end of data logging.
ProcessedSensorData.txt	Processed sensor values are appended to this file when data logging is enabled.
FuelMapUpdates.txt	Fuel Map updates are appended to this file when this feature is enabled.
EFI_Tuning.ini Note: This file will be created if it doesn't exist. Once cerated. It will be updated whenever there is a change to the com port or runtime parameters.	1. Com Port number is saved as: `COM_PORT = n` (where *n* is between 1 and 16) Note: this setting is useful when there are many wireless com ports installed. 2. The locked status of each fuel map cell. 3. The last state (e.g. rich, lean) of each fuel map cell.

4. Technical Support

If you have any questions, please email them to tomzeect@netscape.net.