

The Extraordinary LDG Electronics Autotuning Technology

Nothing Better or, for that matter, Really Even Close!

1 Tuning Modes

- **Auto Tuning:** Tuner begins a tuning cycle whenever the SWR exceeds the Auto Tune Threshold (2:1 preset or user selected in some models). A **Memory Tune** occurs first and, if a match isn't found, is followed by a **Full Tune**.
- **Semi Tuning:** Tuner begins a tuning cycle only when you press the Tune button (on tuner or, in some cases, on the radio). User can cause either a **Memory Tune** or **Full Tune** to occur.
- **Manual Tuning:** Some tuners provide controls for the user to select the L and C values to tweak the tuning ... rarely ever needed.

2 Full Tune

The **Full Tune** utilizes the LDG tuning algorithm to intelligently search for the L-C combination that produces the lowest SWR. This L-C pair is maintained by the tuner (latched or unlatched relays depending upon the tuner used) and is stored as an L-C data set in Memory. This tuning process typically takes seconds depending upon the amount of impedance mismatch.

3 Last In First Out Memory Tune
Z-100, AT-897, & AT-1000

MEMORY STRUCTURE

Data Bins 1 2 3 4 5 6 195 200

Most Recent Tune Next Most Recent And So On Oldest Possible Tune Data

4 Frequency-Sensing Memory Tune

Z-11Pro, AT-100Pro, & AT-200Pro

LDG 3-D MEMORY STRUCTURE

Bank 4
Bank 3
Bank 2
Bank 1

Frequency Bins Low-Freq High-Freq

Frequency-Sensing Memory (FSM) divides the ham bands into about 2,000 incremental frequency intervals/bins with the bandwidth of the intervals being smaller for the lower bands and wider for the upper bands.

LDG autotuners with FSM measure the transmitted frequency and determine the appropriate data bin to either read or store L-C data, which is done in mere milliseconds.

The AT-100Pro & AT-7000 have a single memory bank per antenna port. The Z-11Pro & AT-200Pro have the LDG 3-D memory structure with four memory banks per antenna port. This allows up to four antennas per frequency bin to be used. In a FSM Tune, the frequency is measured and the four L-C values are tried in order to achieve an SWR < 1.5:1. If not achieved, then a Full Tune is performed and the L-C data is stored.

- When the tuner is activated, the processor first attempts a Memory Tune and if not successful, it performs a Full Tune, which means the unique LDG tuning algorithm is used to determine the L-C combination for lowest SWR.
- For a Memory Tune, the processor examines the stored L-C data sets in a LIFO manner. It selects the first data set that yields an SWR < 1.5:1, and is quite quick!
- Each new Full Tune produces an L-C data set that is stored in Memory data bin 1 while all stored data sets are essentially shifted to the right. Once a data set storage bin # is > 200, the data set is removed.

You can use LIFO Memory Tune to **Fast Tune** different antennas by "training" your tuner (see Training Tip). Remember that you need to have more data bins on the low bands than the high bands. Not as good of course as the Frequency-Sensing Memory Tune, but often does the job just fine!

W4WB COOL TIP

You don't need a whip to **train** your LDG autotuner, just a little investment of time. Think first how you will generate a carrier of about 10 W. This could be using AM and your mic's PTT, or a special cable that connects the radio and autotuner to provide carrier generation when you press the tune button. **Organized Training** is simple and does not take very long. Select an antenna and start on its lowest band at the lowest frequency of interest to you. Perform a Full Tune and then QSY up the band a bit and retune. Continue until you get to the top of the band, and then go to the next band and repeat the procedure. LDG preprograms the frequency intervals by band for the FSM. For the LIFO memory, you have to decide how you want to use the 200 data bins.

W4WB COOL TIP

What the heck is the **Tuner Bypass**? Any tuner has a certain insertion loss. The LDG design minimizes this loss, but you can get the most from your radio system by using the Bypass Mode when the antenna system SWR is < 1.5:1. Remember that SWR = 1.5:1 is < 0.2 dB loss and anything < 0.5 dB is essential user undetectable.

W4WB COOL TIP

A really nice feature of LDG autotuners having FSM Tuning is that once you have your tuner "trained" for your antennas, you will rarely ever need to do another Full Tune and can use **Dynamic Autotuning**. Set to the Auto Tune Mode. Now whenever you transmit, the autotuner senses the frequency and measures the SWR. If the SWR is above the threshold, then it uses the stored L-C data for the measured frequency bin to get the SWR < 1.5. Say you QSY from 20 m to 75 m and just start talking ... you are in tune in a fraction of a second!

W4WB COOL TIP