GEARING FOR YOUR LETHAL WEAPON II

Here are some **RECOMMENDED FINAL DRIVE RATIOS** to be used as starting points, but due to the variety in motors, batteries, and tracks, these are **JUST STARTING POINTS**. You will need to experiment to achieve the best ratio for your vehicle at different race tracks.

RATIOS FOR 2WD CAR OFF-ROAD

(X 2.22) FINAL DRIVE	APPROX. MOTOR WIND	
11.83		HOT WIND
11.46	14 TURN	
11.21		
10.86	15 TURN	
10.33		
9.83	17 TURN	
9.38		
9.08	19 TURN	
8.69		
8.32	21 TURN	
7.99		
7.73	27 TURN	
7.42	STOCK	MILD WIND

RATIOS FOR TRUCKS OFF-ROAD

(X 2.22) FINAL DRIVE	APPROX. MOTOR WIND	
14.20	13 TURN	HOT WIND
13.32		
11.84		
11.21	15 TURN	
10.65		
10.14	17 TURN	
9.26		
8.88	21 TURN	
7.89		
7.34	STOCK	MILD WIND

FINAL DRIVE RATIO is arrived at by dividing spur gear size by pinion gear size, then multiplying that number by the trannies internal gear ratio. The **LETHAL WEAPON II** has an internal ratio of 2.22 - so a 90 tooth spur divided by a 25 tooth pinion = 3.6, then 3.6 X 2.22 = 7.99 final drive ratio. Charts inside have final drives for given spur pinion combinations. **(NOTE, THE FINAL DRIVE FOR THE ASSOCIATED STEALTH IS 2.25 WHILE THE LOSI IS 2.18)**

In a final drive ratio you are looking for optimum acceleration with maximum top speed at the cost of run time & motor life. A correctly geared motor will deliver maximum performance and a run time of 4 Min. 30 Sec. without excessive motor heat. If overheating is evident, your final drive ratio is too low, 6.78 is lower than 7.98. A final drive ratio of 6.5 means the motor turns 6.5 time for every drive wheel revolution. The closer you get to 1 to 1, the harder the motor works.

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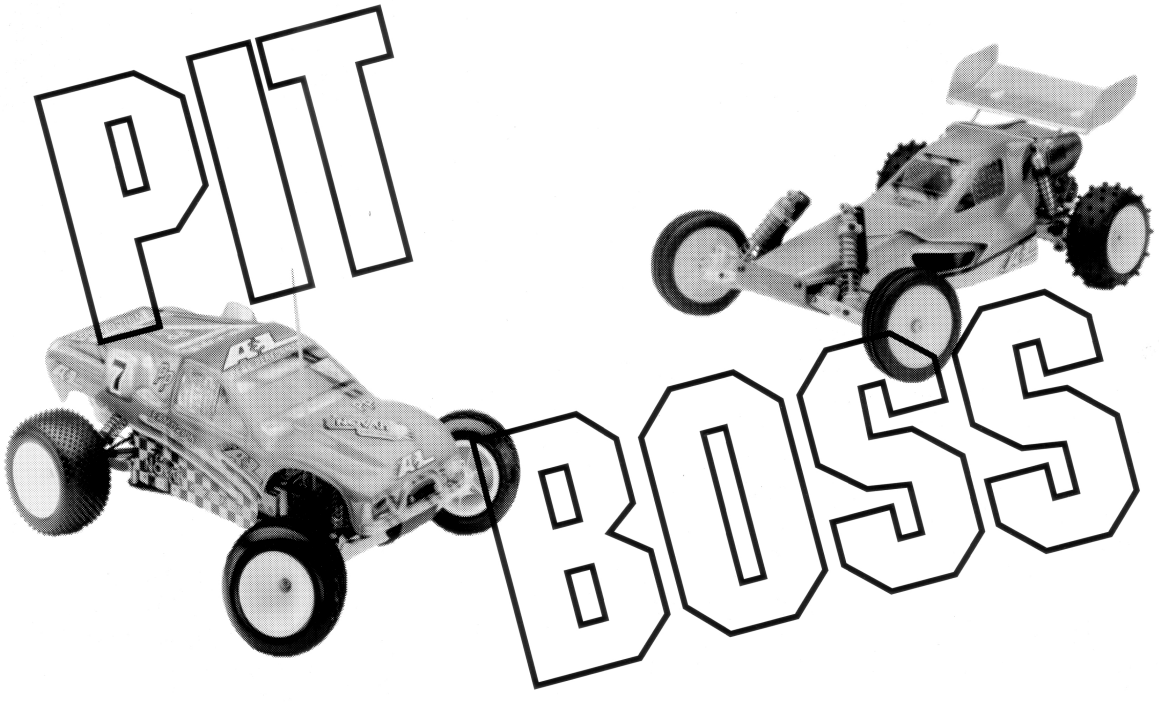

LETHAL WEAPON II GEAR SELECTOR GUIDE

Suggested Gear Ratios for:
Stock Car & Sprint

PINION GEAR	SPUR GEAR 76	78	81	83
26			6.91	7.08
27			6.66	6.82
28			6.42	6.58
29			6.20	6.35
30			5.99	6.14
31			5.80	5.94
32		5.41	5.61	5.75
33		5.24	5.44	5.58
34	4.96	5.09	5.28	5.41
35	4.82	4.94	5.13	5.26
36	4.68	4.81	4.99	5.11
37	4.56	4.68	4.86	4.98
38	4.44	4.55	4.73	4.84
39	4.32	4.44	4.61	4.72
40	4.21	4.32	4.49	4.60

Suggested Gear Ratios for:
Modified Car & Sprint

PINION GEAR	SPUR GEAR 83	87	89	90
23	8.01	8.39		
24	7.67	8.04	8.23	8.32
25	7.37	7.72	7.90	7.99
26	7.08	7.42	7.59	7.68
27	6.82	7.15	7.31	7.40
28	6.58	6.89	7.05	7.13
29	6.35	6.66	6.81	6.88
30	6.14	6.43	6.58	6.66
31	5.94	6.23	6.37	6.44
32	5.75	6.03	6.17	6.24
33	5.58	5.85	5.98	6.05
34	5.41	5.68	5.81	5.87
35	5.26	5.51	5.64	5.70
36		5.36	5.48	5.55
37		5.22	5.34	5.40
38			5.19	5.25

6) HOW DO I KNOW WHEN TO REPLACE THE DIFF RINGS, THRUST ASSEMBLY AND THE DIFF BALLS?
When you take apart the diff for regular maintenance, clean all parts and inspect the diff rings for excessive wear. There will be a light groove; this is natural. But, if the grooves are deep and you have had numerous runs on the car, it may be time to place the diff rings. Remember, the diff rings can be flipped over and the other sides used. While you have the diff apart, inspect the diff balls. One way to tell if they need replacing is by the shine. When the balls become worn, the balls have a dull finish. When this happens, it is time to replace them. When inspecting the thrust assembly, check the cone washers; if they are flat, replace them. Inspect the thrust plates and balls the same way as the diff balls and rings.

7) MY DIFF KEEPS BACKING OUT OF ADJUSTMENT
Repeated adjustments of the diff is the most common problem. Using your diff as a slipper clutch will wear out the nylock nut. Once the diff has been set, there should be no need to adjust it again. If you adjust the diff a lot, you're going to have to replace the 3/48 locknut (#238) more frequently. The second most common problem is putting the set screw in too far. Read line 5 on diff assembly in your instructions.

8) CAN I OVER TIGHTEN THE DIFF?
Yes, you can brake the outside thrust washer and cause the cone washers in the thrust assembly to flatten out. Also, an over tightened diff will make the car handle poorly. To check for an over tightened diff, hold the car and spin one tire while holding the spur gear. The other tire should spin in the opposite direction - both tires should spin freely. If the tire spins in the same direction, your diff is too tight. If this is the case, refer to "Diff Set-up" in your instructions.

9) CAN WORN OR BENT UNIVERSAL OR DOG BONES HURT MY TRANNY?
The major cause of out drive failure is worn or bent universals/dog bones. When the dog bone end wears out, it causes slop and backlash in the outdrives. This will cause excessive wear to the outdrives, which will then need replacing. If the universal/dog bones are bent, it may cause premature bearing wear and allow the dog bone to pop out of the outdrives.

10) CAN I ORDER PARTS STRAIGHT FROM A & L MANUFACTURING?
Yes and No. A & L prefers that all customers support their local hobby shop or race track. If you need a part, have your hobby shop order it for you. But if you're unable to fine the part, then we are here to help. A & L is not able at this time to accept credit cards, but if you need a part, send a check or money order and include $4.00 for shipping & handling (California residents include 7.75% sales tax). By pre-paying you save on COD charges. All COD orders are cash only. UPS 2nd Day and Next Day deliveries
are available please call for prices.

PERFORMANCE TIPS

THE 10 MOST ASKED QUESTIONS ABOUT THE LETHAL WEAPON 2

1) WHAT ARE THE ADVANTAGES OF LETHAL WEAPON BELT DRIVE?
Under load, chain trannys have drag when the chain disengages from the teeth; gear trannys have drag from the teeth rubbing each other. These both limit top speed. Under load situations, our belt drive is more efficient, delivers more acceleration, top speed and run time. Note: You will need to use less brake in the car as a belt tranny will come to a stop more quickly.

2) WHAT SHOULD I CLEAN MY TRANNY WITH?
To remove old grease from diff gears, use a quality motor cleaner. Some motor cleaner will attack plastic, so be careful not to spray on plastic parts or on body. A & L tranny case, gears and pulleys are made of nylon, not plastic, so motor spray will not harm the tranny.

When cleaning center diff gear, use pipe cleaners to get hard to reach places such as ball holes. When cleaning bearings, spray or soak bearing with motor cleaner until bearings spin freely. If bearing does not spin after cleaning, then it is time to replace it with a new one. Once the bearing has been cleaned, use a good bearing oil such as Dan's Banana Lube. Before reassembling tranny, inspect all parts for wear.

3) WHAT ARE THE ADVANTAGES OF RUNNING A POWER CLUTCH?
The advantage is two fold: 1) The Power Clutch will improve handling by controlling excessive tire spin - this eliminates fish-tailing and spin-outs; 2) Power Clutch will improve tranny and drive train life by absorbing destructive torque, saving tranny gears, belt and diff parts.

4) WHAT HAPPENS WHEN I RUN MY DIFF TOO LOOSE?
The friction caused by running a loose diff will generate heat that can break down diff lube, thus causing premature wear of diff parts. A diff should not be used as a slipper clutch! For proper diff adjustment refer to "Diff set-up" in your instructions.

5) WHEN, IF EVER, SHOULD I REPLACE THE OUTDRIVES?
A & L team drivers have driven for over one year on the same outdrives without any problems. A & L uses hardened steel when making the outdrives so they will last. But eventually they will wear down and need replacement. Look for grooves or notches in the outdrive slots. If the dog bone or universal binds when sliding back and forth, it is time to replace the outdrives.

$$\text{Overall Gear Ratio} = \frac{\text{Spur Gear}}{\text{Pinion Gear}} \times \text{Tranny Ratio (2.22)}$$

Suggested Gear Ratios for:
Stock Truck

	SPUR GEAR			
	83	87	89	90
PINION GEAR				
23	8.01	8.39	8.59	8.68
24	7.67	8.04	8.23	8.32
25	7.37	7.72	7.90	7.99
26	7.08	7.42	7.59	7.68
27	6.82	7.15	7.31	7.40
28	6.58	6.89	7.05	7.13
29	6.35	6.66	6.81	6.88
30	6.14	6.43	6.58	6.66
31	5.94	6.23	6.37	6.44
32	5.75	6.03	6.17	6.24
33	5.58	5.85	5.98	6.05
34	5.41	5.68	5.81	5.87

Suggested Gear Ratios for:
Modified Truck

	SPUR GEAR				
	87	89	90	93	96
PINION GEAR					
20	9.56	9.87	9.99	10.32	10.65
21	9.19	9.40	9.51	9.83	10 1.4
22	8.77	8.98	9.08	9.38	9.68
23	8.39	8.59	8.68	8.97	9.26
24	8.04	8.23	8.32	8.60	8.88
25	7.72	7.90	7.99	8.25	8.52
26	7.42	7.59	7.68	7.94	8.19
27	7.15	7.31	7.40	7.64	7.89
28	6.89	7.05	7.13	7.37	7.61
29	6.66	6.81	6.88	7.11	7.34
30	6.43	6.58	6.66	6.89	7.10
31	6.23	6.37	6.44	6.66	6.87

OVAL TRACK RATIOS

Suggested Gear Ratios for:

Stock Car

PINION GEAR	SPUR GEAR 83	87	89	90	93
17	10.83	11.36	11.62		
18	10.23	10.73	10.97		
19	9.69	10.16	10.39	10.51	
20	9.21	9.65	8.87	9.99	10.32
21	8.77	9.19	9.40	9.51	9.83
22	8.37	8.77	8.98	9.08	9.38
23	8.01	8.39	8.59	8.68	8.97
24	7.67	8.04	8.23	8.32	8.60
25	7.37	7.72	7.90	7.99	8.25
26	7.08	7.42	7.59	7.68	7.94
27	6.82	7.15	7.31	7.40	7.64
28	6.58	6.89	7.05	7.13	7.37
29	6.35	6.66	6.81	6.88	7.11
30	6.14	6.43	6.58	6.66	6.88

Suggested Gear Ratios for:

Modified Car

PINION GEAR	SPUR GEAR 83	87	89	90	93
15	12.28	12.87	13.17	13.32	13.76
16	11.51	12.07	12.34	12.48	12.90
17	10.83	11.36	11.62	11.75	12.14
18	10.23	10.73	10.97	11.10	11.47
19	9.69	10.16	10.39	10.51	10.86
20	9.21	9.65	8.87	9.99	10.32
21	8.77	9.19	9.40	9.51	9.83
22	8.37	8.77	8.98	9.08	9.38
23	8.01	8.39	8.59	8.68	8.97
24	7.67	8.04	8.23	8.32	8.60
25	7.37	7.72	7.90	7.99	8.25
26	7.08	7.42	7.59	7.68	7.94
27	6.82	7.15	7.31	7.40	7.64
28		6.89	7.05	7.13	7.37

$$\text{Overall Gear Ratio} = \frac{\text{Spur Gear}}{\text{Pinion Gear}} \times \text{Tranny Ratio (2.22)}$$

Suggested Gear Ratios for:

Stock Truck

PINION GEAR	SPUR GEAR 89	90	93	96
16	12.34	12.48	12.90	13.32
17	11.62	11.75	12.14	12.53
18	10.97	11.10	11.47	11.84
19	10.39	10.51	10.86	11.21
20	8.87	9.99	10.32	10.65
21	9.40	9.51	9.83	10.14
22	8.98	9.08	9.38	9.68
23	8.59	8.68	8.97	9.26
24	8.23	8.32	8.60	8.88
25	7.90	7.99	8.25	8.52
26	7.59	7.68	7.94	8.19
27	7.31	7.40	7.64	7.89
28	7.05	7.13	7.37	7.61

Suggested Gear Ratios for:

Modified Truck

PINION GEAR	SPUR GEAR 89	90	93	96
13	15.19	15.36	15.88	16.35
14	14.11	14.27	14.74	15.22
15	13.17	13.32	13.76	14.20
16	12.34	12.48	12.90	13.32
17	11.62	11.75	12.14	12.53
18	10.97	11.10	11.47	11.84
19	10.39	10.51	10.86	11.21
20	8.87	9.99	10.32	10.65
21	9.40	9.51	9.83	10.14
22	8.98	9.08	9.38	9.68
23	8.59	8.68	8.97	9.26
24	8.23	8.32	8.60	8.88
25	7.90	7.99	8.25	8.52

OFF-ROAD RATIOS