SG., T.G., U.G., Y.G. Prefix Douglas Gearboxes,

Fitted with 9 Diametral Pitch 20º stub teeth, Gear pairs teeth total 37.

Gear Pair	A	B	C	D	E	F	G
Teeth	13/24	14/23	15/22	16/21	17/20	18/19	19/18
Reduction	0.542	0.609	0.682	0.762	0.850	0.947	1.056

Possible combinations of above gear pairs: (Shaded cells improbable)

B*B	B*C	B*D	B*E	B*F	B*G	B*A
C*C	C*D	C*E	C*F	C*G	C*A	C*B
D*D	D*E	D*F	D*G	D*A	D*B	D*C
E*E	E*F	E*G	E*A	E*B	E*C	E*D
F*F	F*G	F*A	F*B	F*C	F*D	F*E
G*G	G*A	G*B	G*C	G*D	G*E	G*F

Possible ratios with combinations of above gear pairs: (reciprocal of product)

2.699	2.410	2.156	1.933	1.734	1.556	3.033
2.151	1.925	1.725	1.548	1.389	2.708	2.410
1.723	1.544	1.385	1.243	2.423	2.156	1.925
1.384	1.242	1.115	2.172	1.933	1.725	1.544
1.114	1.000	1.949	1.734	1.548	1.385	1.242
0.896	1.749	1.556	1.389	1.243	1.115	1.000

Note: The above inter-box ratios can be used for either first or second (top is direct), except: due to interference with the shift yolk, do not use an *x**G combination for second gear. It is unlikely B**x* exists (sleeve gear would be too small), but a C**x* and E**x* does definitely exist. These improbable combinations are grayed out. A**x* is out of the question, so not shown! Valid first and second combinations must come from the same row (since they share the same initial gear pair reduction), mindful that you chose a higher reduction ratio for first than second! It is also possible to have second the same as third (direct), and is as equally undesirable. Multiply the above table by the final ratio in top gear for road ratios. An example is given below.

Road ratios with 4.8:1 top:

12.955	11.566	10.350	9.277	8.324	7.471	14.558
10.325	9.240	8.282	7.431	6.669	12.997	11.566
8.269	7.412	6.650	5.968	11.631	10.350	9.240
6.644	5.961	5.350	10.425	9.277	8.282	7.412
5.348	4.800	9.354	8.324	7.431	6.650	5.961
4.308	8.395	7.471	6.669	5.968	5.350	4.800

Several Dirt Track gearboxes I have taken apart have the following gear pairs. The arrows indicate flow of power. The column on the left is the lay shaft.

⇓ Input
20-17⇐ Initial gear pair, “E” (sleeve gear set)
18-19⇒ Secondary gear pair, 2nd gear, “F” (sliding gear set)
16-21⇒ Secondary gear pair, 1st gear, “D” (free gear set)
⇓ Output

So in the tables above this is an E*D, E*F combination for 1st and 2nd (top is direct.)

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