

Introduction:

The charts here are an attempt to relate the threading charts from the 9" and 10K model C South Bend lathes to the calculations which were used to create them. Each spreadsheet starts with data taken directly from an SBL gearing chart (shown in yellow). The rightmost columns show the rotation rates of the various parts, ending with the calculated feed rates.

Definitions:

Stud Gear- Outer gear of the pair driven by the Reversing Assembly, which rotates at the spindle rate.

Gear 1- Idler or compound gear driven by the Stud Gear and which drives either the Screw Gear or Gear 2, if present. For cutting metric threads Gear 1 is a 100/127T transposing pair.

Gear 2- Idler or compound gear required for some threading pitches. When present, it is driven by Gear 1 and drives the Screw Gear.

Screw Gear- (or Gearbox Gear on the Model A) The Gear which drives the Lead Screw in Models B & C or the QC Gearbox in the model A. - May be changed to alter the threading pitch.

Lead Screw- Has 1/8" pitch. Drives the Carriage directly when the half-nuts are engaged for threading.

9 or 10K Model C - English Lead Screw (1/8" pitch)

SBL Chart														Rev / Spindle Rev				Spindle Rev. / in. Carriage
TPI	Stud Gear	Fig.	Screw Gear	Feeds per Rev.	Gear 1		Gear 2		Stud Gear	Gear 1	Gear 2	Lead Screw						
					In	Out	In	Out										
4	24	1	48	---	80	80	18	72	1	0.3000	1.3333	2.0000	4.0					
4 1/2	24	1	54	---	80	80	18	72	1	0.3000	1.3333	1.7778	4.5					
5	16	1	40	---	80	80	18	72	1	0.2000	0.8889	1.6000	5.0					
5 1/2	16	1	44	---	80	80	18	72	1	0.2000	0.8889	1.4545	5.5					
6	16	1	48	---	80	80	18	72	1	0.2000	0.8889	1.3333	6.0					
6 1/2	16	1	52	---	80	80	18	72	1	0.2000	0.8889	1.2308	6.5					
7	16	1	56	---	80	80	18	72	1	0.2000	0.8889	1.1429	7.0					
7 1/2	16	1	60	---	80	80	18	72	1	0.2000	0.8889	1.0667	7.5					
8	32	2	32	---	80	80	---	---	1	0.4000	---	1.0000	8.0					
9	32	2	36	---	80	80	---	---	1	0.4000	---	0.8889	9.0					
10	32	2	40	---	80	80	---	---	1	0.4000	---	0.8000	10.0					
11	32	2	44	---	80	80	---	---	1	0.4000	---	0.7273	11.0					
11 1/2	32	2	46	---	80	80	---	---	1	0.4000	---	0.6957	11.5					
12	32	2	48	---	80	80	---	---	1	0.4000	---	0.6667	12.0					
13	32	2	52	---	80	80	---	---	1	0.4000	---	0.6154	13.0					
14	32	2	56	---	80	80	---	---	1	0.4000	---	0.5714	14.0					
16	24	2	48	---	80	80	---	---	1	0.3000	---	0.5000	16.0					
18	24	2	54	---	80	80	---	---	1	0.3000	---	0.4444	18.0					
20	16	2	40	---	80	80	---	---	1	0.2000	---	0.4000	20.0					
22	16	2	44	---	80	80	---	---	1	0.2000	---	0.3636	22.0					
24	16	2	48	---	80	80	---	---	1	0.2000	---	0.3333	24.0					
26	16	2	52	---	80	80	---	---	1	0.2000	---	0.3077	26.0					
27	16	2	54	---	80	80	---	---	1	0.2000	---	0.2963	27.0					
28	16	2	56	---	80	80	---	---	1	0.2000	---	0.2857	28.0					
30	16	2	60	---	80	80	---	---	1	0.2000	---	0.2667	30.0					
32	32	3	32	---	72	18	80	80	1	0.4444	0.1000	0.2500	32.0					
36	32	3	36	---	72	18	80	80	1	0.4444	0.1000	0.2222	36.0					
40	32	3	40	---	72	18	80	80	1	0.4444	0.1000	0.2000	40.0					
44	32	3	44	---	72	18	80	80	1	0.4444	0.1000	0.1818	44.0					
46	32	3	46	---	72	18	80	80	1	0.4444	0.1000	0.1739	46.0					
48	32	3	48	---	72	18	80	80	1	0.4444	0.1000	0.1667	48.0					
52	32	3	52	---	72	18	80	80	1	0.4444	0.1000	0.1538	52.0					
54	32	3	54	---	72	18	80	80	1	0.4444	0.1000	0.1481	54.0					
56	32	3	56	---	72	18	80	80	1	0.4444	0.1000	0.1429	56.0					
60	32	3	60	---	72	18	80	80	1	0.4444	0.1000	0.1333	60.0					
64	16	3	32	0.0156	72	18	80	80	1	0.2222	0.0500	0.1250	64.0					
72	16	3	36	0.0139	72	18	80	80	1	0.2222	0.0500	0.1111	72.0					
80	16	3	40	0.0125	72	18	80	80	1	0.2222	0.0500	0.1000	80.0					
88	16	3	44	0.0114	72	18	80	80	1	0.2222	0.0500	0.0909	88.0					
92	16	3	46	0.0109	72	18	80	80	1	0.2222	0.0500	0.0870	92.0					
96	16	3	48	0.0104	72	18	80	80	1	0.2222	0.0500	0.0833	96.0					
104	16	3	52	0.0096	72	18	80	80	1	0.2222	0.0500	0.0769	104.0					
112	16	3	56	0.0089	72	18	80	80	1	0.2222	0.0500	0.0714	112.0					
120	16	3	60	0.0083	72	18	80	80	1	0.2222	0.0500	0.0667	120.0					

9 or 10K Model C - English Lead Screw (1/8" pitch)

SBL Chart									Rev / Spindle Rev				Spindle Rev. / in. Carriage
TPI	Stud Gear	Fig.	Screw Gear	Feeds per Rev.	Gear 1		Gear 2		Stud Gear	Gear 1	Gear 2	Lead Screw	
					In	Out	In	Out					
160	48	4	80	0.0063	54	18	72	18	1	0.8889	0.2222	0.0500	160.0
---	40	4	80	0.0052	54	18	72	18	1	0.7407	0.1852	0.0417	192.0
---	32	4	80	0.0042	54	18	72	18	1	0.5926	0.1481	0.0333	240.0
---	24	4	80	0.0031	54	18	72	18	1	0.4444	0.1111	0.0250	320.0
---	16	4	80	0.0021	54	18	72	18	1	0.2963	0.0741	0.0167	480.0

Item	Rev. per Spindle Rev.	Example - Rev. per Spindle Rev. @ 4 TPI
Stud Gear	= 1	= 1
Gear 1	$(\text{Stud Gear}) \times N_{\text{Stud}} / N_{1\text{in}}$	$1 \times 24 / 80 = 0.30$
Gear 2	$(\text{Gear 1}) \times N_{1\text{out}} / N_{2\text{in}}$ [If present]	$0.30 \times 80 / 18 = 1.3333\dots$
Lead Screw	$(\text{Gear 2}) \times N_{2\text{out}} / N_{\text{ScrG}}$ [If Gear 2 present]	$1.3333\dots \times 72 / 48 = 2.000$
	$(\text{Gear 1}) \times N_{1\text{out}} / N_{\text{ScrG}}$ [If no Gear 2]	---
Motion of Carriage	Spindle Rev. / Inch	Spindle Rev. / Inch
	$1 / (\text{Lead Screw}) \times 8 \text{ TPI}$	$1 / 2.000 \times 8 = 4.0 \text{ TPI}$

Gear Set	
16	
24	
32	(2)
36	
40	
44	
46	
48	
52	
54	
56	
60	
80	
80	Idler
54/18	Compound
72/18	Compound

9 or 10K Models B & C - English Lead Screw (1/8" pitch) - using Metric Transposing Gear

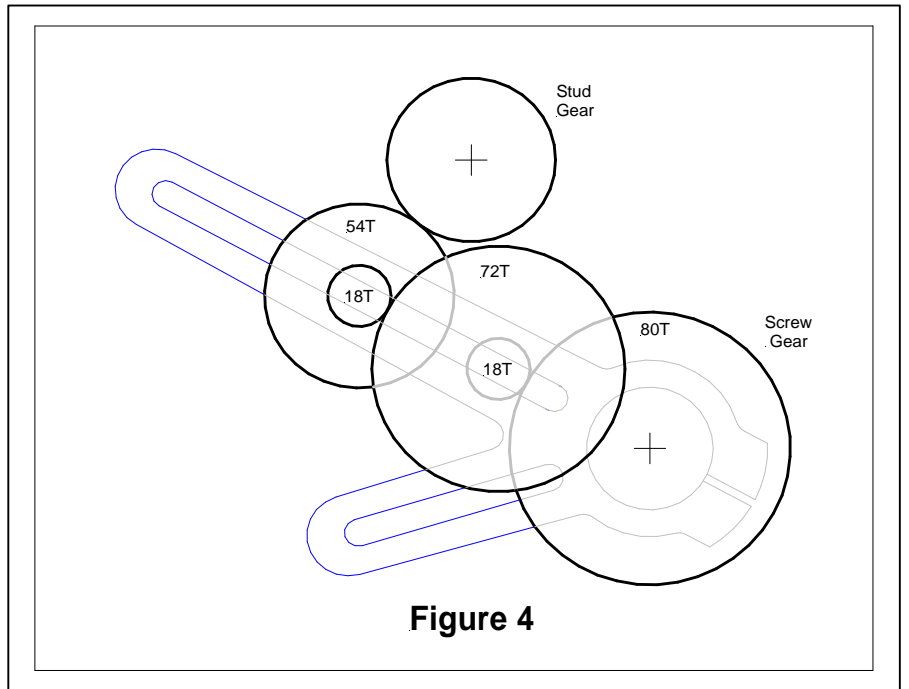
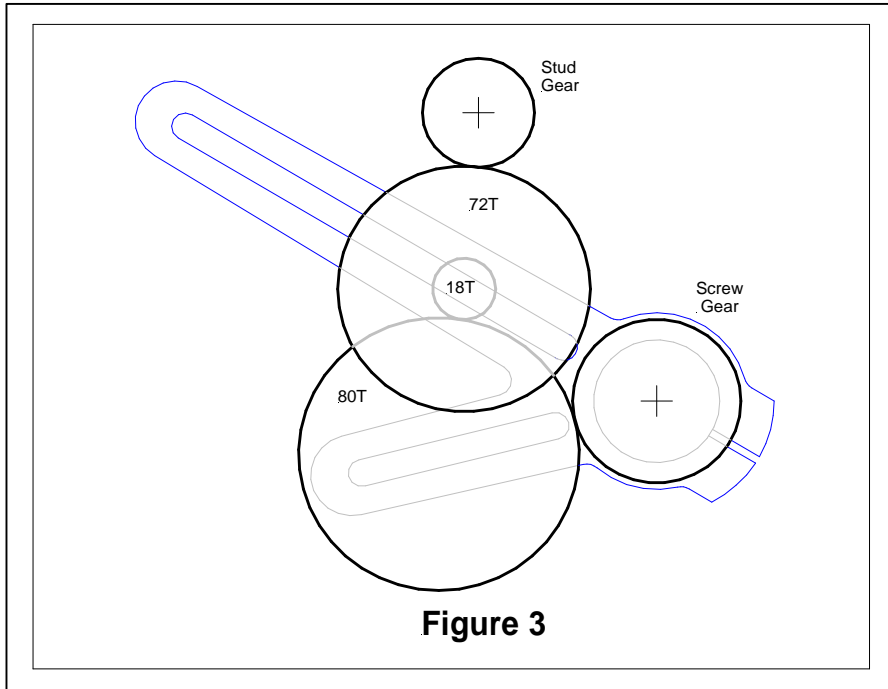
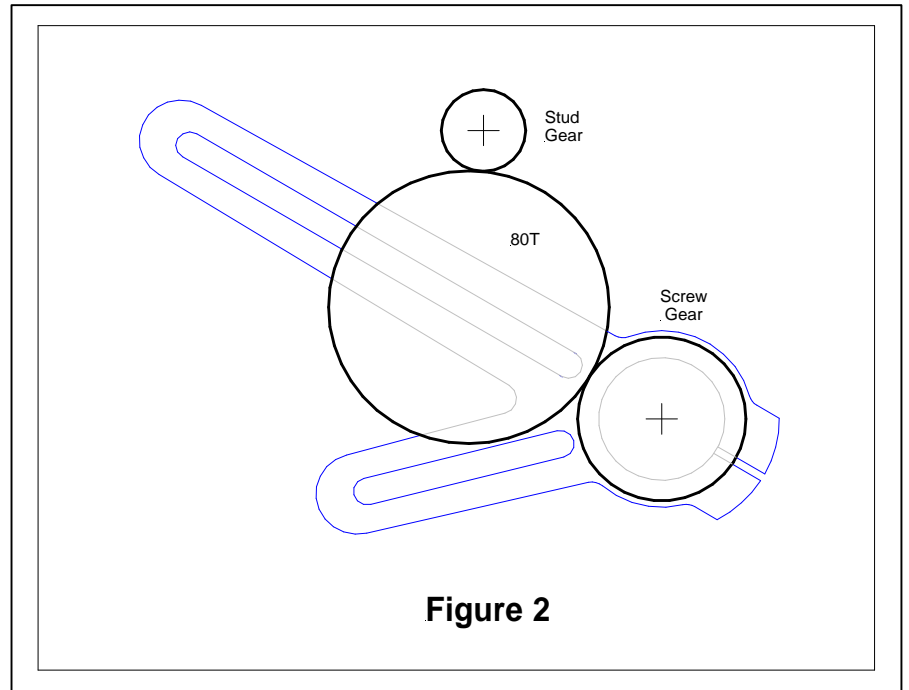
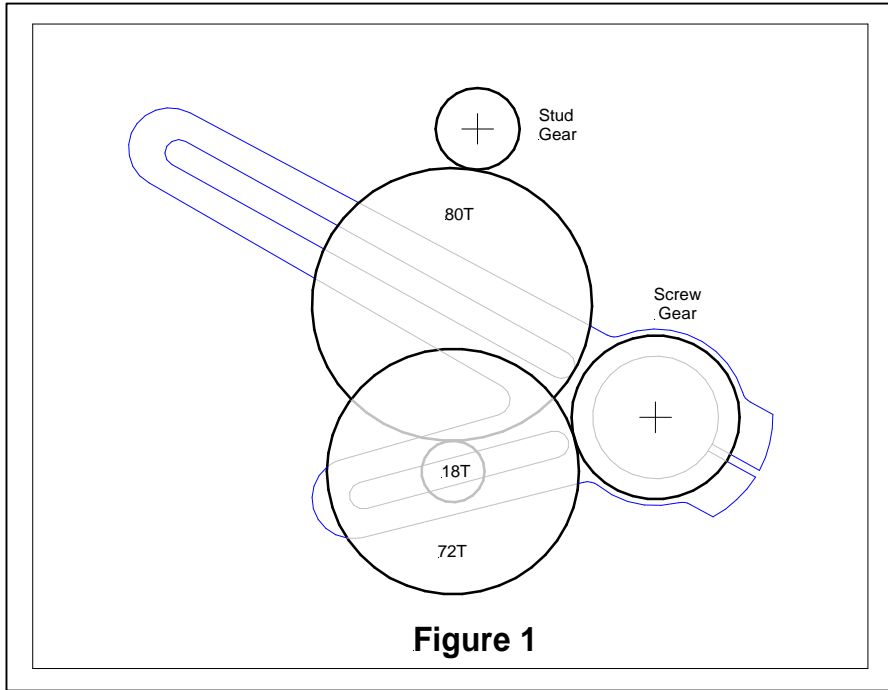
9 or 10K Models B & C - English Lead Screw (1/8" pitch) - using Metric Transposing Gear													
SBL Chart								Rev / Spindle Rev				Carriage	
M/M	Stud Gear	Fig.	Screw Gear	Gear 1		Gear 2		Stud Gear	Gear 1	Gear 2	Lead Screw	Spindle Rev. / in.	M/M / Spindle Rev.
				In	Out	In	Out						
6.00	48	1	20	127	100	72	72	1	0.3780	0.5249	1.8898	4.2333	6.00
5.50	44	1	20	127	100	72	72	1	0.3465	0.4812	1.7323	4.6182	5.50
5.00	40	1	20	127	100	72	72	1	0.3150	0.4374	1.5748	5.0800	5.00
4.50	36	1	20	127	100	72	72	1	0.2835	0.3937	1.4173	5.6444	4.50
4.00	32	1	20	127	100	72	72	1	0.2520	0.3500	1.2598	6.3500	4.00
3.50	28	1	20	127	100	72	72	1	0.2205	0.3062	1.1024	7.2571	3.50
3.00	48	1	40	127	100	72	72	1	0.3780	0.5249	0.9449	8.4667	3.00
2.75	44	1	40	127	100	72	72	1	0.3465	0.4812	0.8661	9.2364	2.75
2.50	32	1	32	127	100	72	72	1	0.2520	0.3500	0.7874	10.1600	2.50
2.25	36	1	40	127	100	72	72	1	0.2835	0.3937	0.7087	11.2889	2.25
2.00	32	1	40	127	100	72	72	1	0.2520	0.3500	0.6299	12.7000	2.00
1.75	56	2	80	127	100	72	72	1	0.4409	0.6124	0.5512	14.5143	1.75
1.50	48	2	80	127	100	72	72	1	0.3780	0.5249	0.4724	16.9333	1.50
1.40	56	2	100	127	100	72	72	1	0.4409	0.6124	0.4409	18.1429	1.40
1.30	52	2	100	127	100	72	72	1	0.4094	0.5687	0.4094	19.5385	1.30
1.25	40	2	80	127	100	72	72	1	0.3150	0.4374	0.3937	20.3200	1.25
1.20	48	2	100	127	100	72	72	1	0.3780	0.5249	0.3780	21.1667	1.20
1.10	44	2	100	127	100	72	72	1	0.3465	0.4812	0.3465	23.0909	1.10
1.00	40	2	100	127	100	72	72	1	0.3150	0.4374	0.3150	25.4000	1.00
0.90	36	2	100	127	100	72	72	1	0.2835	0.3937	0.2835	28.2222	0.90
0.80	32	2	100	127	100	72	72	1	0.2520	0.3500	0.2520	31.7500	0.80
0.75	24	2	80	127	100	72	72	1	0.1890	0.2625	0.2362	33.8667	0.75
0.70	28	2	100	127	100	72	72	1	0.2205	0.3062	0.2205	36.2857	0.70
0.65	26	2	100	127	100	72	72	1	0.2047	0.2843	0.2047	39.0769	0.65
0.60	24	2	100	127	100	72	72	1	0.1890	0.2625	0.1890	42.3333	0.60
0.55	22	2	100	127	100	72	72	1	0.1732	0.2406	0.1732	46.1818	0.55
0.50	20	2	100	127	100	72	72	1	0.1575	0.2187	0.1575	50.8000	0.50
0.45	18	2	100	127	100	72	72	1	0.1417	0.1969	0.1417	56.4444	0.45
0.40	16	3	100	127	100	72	72	1	0.1260	0.1750	0.1260	63.5000	0.40
0.35	56	3	100	127	100	72	18	1	0.4409	0.6124	0.1102	72.5714	0.35
0.30	48	3	100	127	100	72	18	1	0.3780	0.5249	0.0945	84.6667	0.30
0.25	40	3	100	127	100	72	18	1	0.3150	0.4374	0.0787	101.6000	0.25
0.20	32	3	100	127	100	72	18	1	0.2520	0.3500	0.0630	127.0000	0.20

9 or 10K Models B & C - English Lead Screw (1/8" pitch) - using Metric Transposing Gear

Item	Rev. per Spindle Rev.	Example - Rev. per Spindle Rev. @ 6 M/M
Stud Gear	= 1	= 1
Gear 1	$(\text{Stud Gear}) \times N_{\text{Stud}} / N_{1_{\text{in}}}$	$1 \times 48 / 127 = 0.3780\dots$
Gear 2	$(\text{Gear 1}) \times N_{1_{\text{out}}} / N_{2_{\text{in}}}$	$0.3780\dots \times 100 / 72 = 0.5249\dots$
Lead Screw	$(\text{Gear 2}) \times N_{2_{\text{out}}} / N_{\text{SG}}$	$0.5249\dots \times 72 / 20 = 1.8898\dots$
Motion of Carriage	Spindle Rev. / Inch or M/M / Rev.	Spindle Rev. / Inch or M/M / Rev.
	Rev./In. = $1 / (\text{Lead Screw}) \times 8$ M/M / Rev. = $25.4 / (\text{Rev./In.})$	$1 / 1.8898\dots \times 8 = 4.2333\dots$ Rev. / In. $25.4 / 4.2333\dots = 6.00$ M/M / Rev.

Gear Set	
16	
18	
20	
22	
24	
28	
32	(2)
36	
40	
44	
48	
52	
56	
80	
100	
72/18	Compound
100/127	Compound

9 or 10K Model C - English Lead Screw



9 or 10K Models B & C - English Lead Screw - With metric Transposing Gear

