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Charles Sawyer, *Secretary*

Coast and Geodetic Survey
Robert F. A. Studds, *Director*

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PLANE COORDINATE PROJECTION TABLES
TENNESSEE

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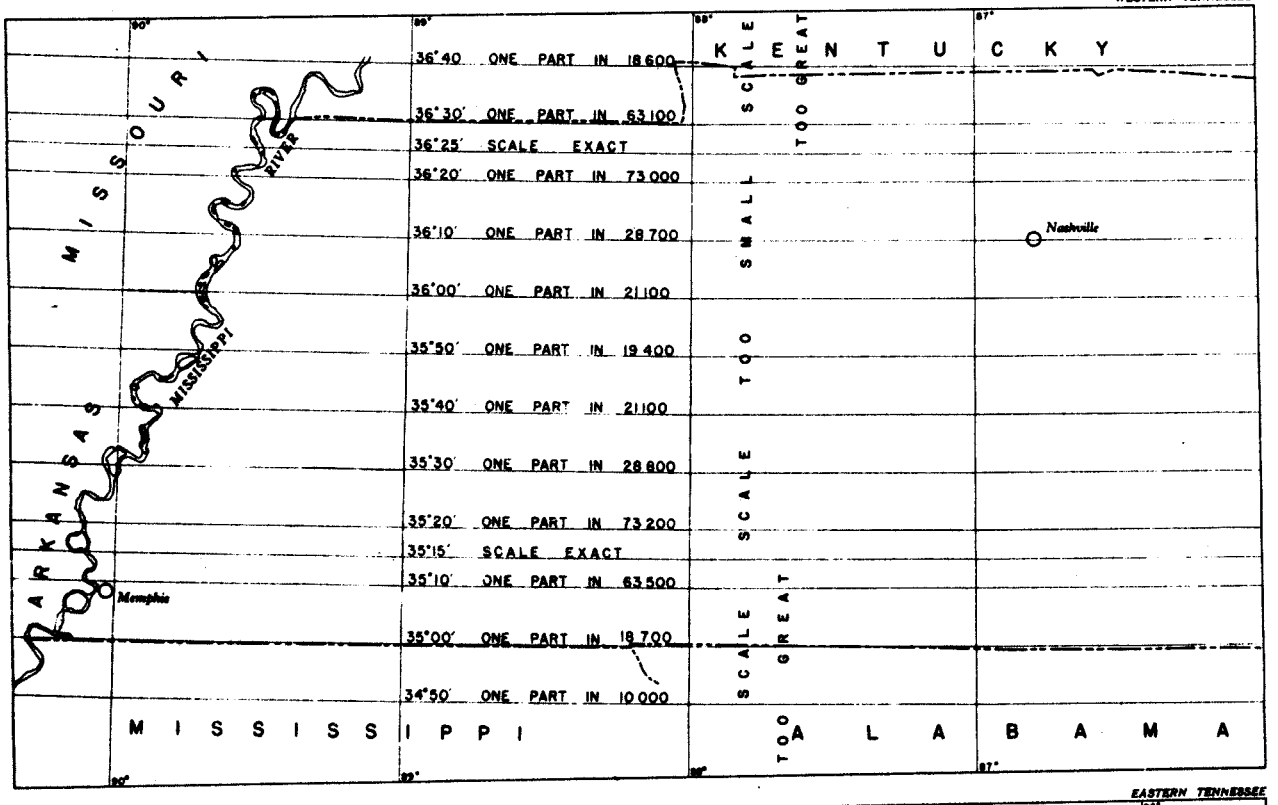
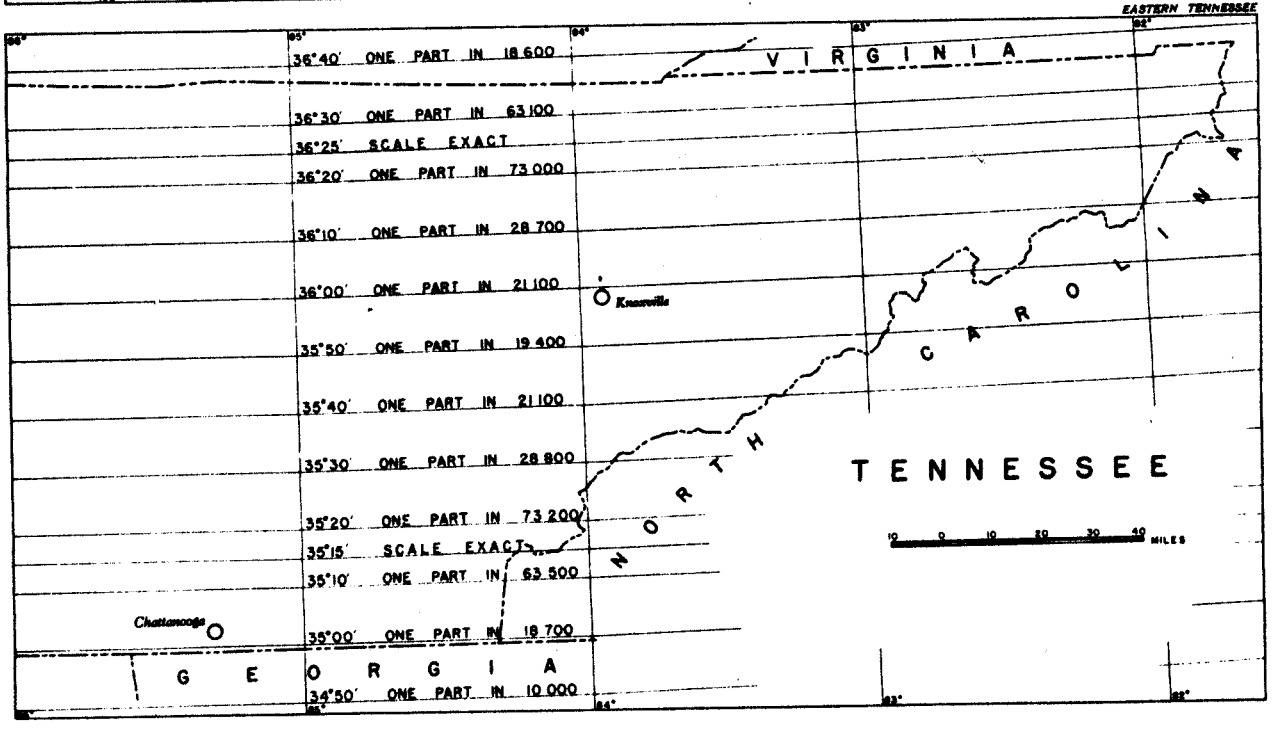
WESTERN TENNESSEE



EASTERN TENNESSEE



Foreword

The plane coordinate system used in this State is based on the Lambert conformal conic projection with two standard parallels for each zone. The tables in this publication are to be used for the conversion of geographic positions to plane coordinates or plane coordinates to geographic positions. The constants of the projection are listed with the tables.

The methods of computation have been designed for machine calculation, using tables of natural trigonometric functions. A table of these functions has been published by the Coast and Geodetic Survey to ten decimal places with ten-second intervals for 0° to 6° in Special Publication No. 246 and is sold for a nominal sum by the Superintendent of Documents, U.S. Government Printing Office, Washington 25, D.C.

The formulas and sample computations which follow show the general methods for computing either type of coordinates.

Plane Coordinates from Geographic Positions

$$x = R \sin \theta + C$$

$$y = R_b - R \cos \theta$$

Grid azimuth = geodetic azimuth - θ + second term

where

R is the radius for the latitude of the station,

R_b is a constant for a zone,

θ is the mapping angle for the longitude of the station,

and

C is the value of x assigned to the Central Meridian for a zone.

The second term for the reduction of geodetic to grid azimuths may be neglected for most work. However, for lines five miles or more in length, if the same degree of accuracy is desired as is obtained by geographic computations, this term should be evaluated and used.

$$\text{Second term} = \frac{x_2 - x_1}{2\rho_0^2 \sin 1''}\left(y_1 - y_o + \frac{y_2 - y_1}{3}\right)$$

Geographic Positions from Plane Coordinates

The formulas show the method of computing R and θ from which the latitude and longitude may be obtained.

$$x' = x - C$$

$$\tan\theta = x' \div (R_b - y)$$

$$R = (R_b - y) \div \cos\theta$$

$$\Delta\lambda = \theta \div \ell$$

$$\lambda = \text{Central Meridian} - \Delta\lambda$$

where

R, R_b, θ, and C are the same as previously defined

and

ℓ is a constant for a zone.

DEPARTMENT OF COMMERCE
U. S. COAST AND GEODETIC SURVEY
Form 725 d

PLANE COORDINATES ON LAMBERT PROJECTION

(Condensed form for calculating-machine computation)

$X = R \sin\theta + C$ $\quad$ $Y = R_b - R\cos\theta$ $\quad$ State-Zone Tennessee

$C =$ 2,000,000.00 $\quad$ $R_b =$ 29,535,149.91 $\quad$ Grid Az. = Geod. Az. $- \theta$

Station	Latitude / Longitude	R / θ	sin θ / cos θ	X / Y
1 Alpine, 1935	36 21 48.503	28,817,513.83	+0.00784 50519	2,226,074.89
	85 13 55.967	+ 0 26 58.1747	0.99996 92271	718,522.88
	Grid azimuth to azimuth mark			290° 42' 03"
2 Duke, 1934	36 30 08.410	28,766,959.82	-0.02777 15249	1,201,097.66
	88 43 05.849	-1 35 29.0248	0.99961 42968	779,285.60
	Grid azimuth to azimuth mark			123° 47' 29"
3				
	Grid azimuth to azimuth mark			° ' "
4				
	Grid azimuth to azimuth mark			° ' "
5				
	Grid azimuth to azimuth mark			° ' "
6				
	Grid azimuth to azimuth mark			° ' "
7				
	Grid azimuth to azimuth mark			° ' "
8				
	Grid azimuth to azimuth mark			° ' "
9				
	Grid azimuth to azimuth mark			° ' "
10				
	Grid azimuth to azimuth mark			° ' "
11				
	Grid azimuth to azimuth mark			° ' "
12				
	Grid azimuth to azimuth mark			° ' "

DEPARTMENT OF COMMERCE
U. S. COAST AND GEODETIC SURVEY
Form 742 b

6

GEODETIC POSITIONS FROM LAMBERT COORDINATES

(CALCULATING MACHINE COMPUTATION)

STATE – ZONE Tennessee ℓ = 0.58543 97296

Station Alpine, 1935

C	– 2,000,000.00	R_b	29,535,149.91
X	2,226,074.89	Y	– 718,522.88
$X' = X - C$	+ 226,074.89	$R_b - Y$	28,816,627.03
$\tan\theta = X' \div (R_b - Y)$	+ 0.00784 52933	θ	+ 1618".1747
θ	+ 0° 26' 58".1747	$\Delta\lambda = \theta \div \ell$	+ 2764".033
$\cos\theta$	0.99996 92271	$\Delta\lambda$	+ 0° 46' 04".033
$R = (R_b - Y) \div \cos\theta$	28,817,513.83	Central Meridian	86° 00' 00".000
ϕ	36° 21' 48".503	λ = C.M. – $\Delta\lambda$	85° 13' 55".967

Station Duke, 1934

C	– 2,000,000.00	R_b	29,535,149.91
X	1,201,097.66	Y	– 779,285.60
$X' = X - C$	– 798,902.34	$R_b - Y$	28,755,864.31
$\tan\theta = X' \div (R_b - Y)$	– 0.02778 22406	θ	– 5729".0248
θ	– 1° 35' 29".0248	$\Delta\lambda = \theta \div \ell$	– 9785".849
$\cos\theta$	0.99961 42968	$\Delta\lambda$	– 2° 43' 05".849
$R = (R_b - Y) \div \cos\theta$	28,766,959.82	Central Meridian	86° 00' 00".000
ϕ	36° 30' 08".410	λ = C.M. – $\Delta\lambda$	88° 43' 05".849

Station

C	–	R_b	
X		Y	–
$X' = X - C$		$R_b - Y$	
$\tan\theta = X' \div (R_b - Y)$		θ	"
θ	° ' "	$\Delta\lambda = \theta \div \ell$	"
$\cos\theta$		$\Delta\lambda$	° ' "
$R = (R_b - Y) \div \cos\theta$		Central Meridian	° ' "
ϕ	° ' "	λ = C.M. – $\Delta\lambda$	° ' "

Station

C	–	R_b	
X		Y	–
$X' = X - C$		$R_b - Y$	
$\tan\theta = X' \div (R_b - Y)$		θ	"
θ	° ' "	$\Delta\lambda = \theta \div \ell$	"
$\cos\theta$		$\Delta\lambda$	° ' "
$R = (R_b - Y) \div \cos\theta$		Central Meridian	° ' "
ϕ	° ' "	λ = C.M. – $\Delta\lambda$	° ' "

M-2545-2

Constants for Tennessee

C	2,000,000.00 ft.
Central Meridian	86° 00' 00".000
R_b	29,535,149.91 ft.
y_o	524,918.82 ft.
ℓ	0.58543 97296
$\frac{1}{2\rho_o^2 \sin 1''}$	2.360×10^{-10}
$\log \frac{1}{2\rho_o^2 \sin 1''}$	0.372 9619 - 10
$\log \ell$	9.76748 21915 - 10
log K	7.63207 03805

LAMBERT PROJECTION FOR TENNESSEE

TABLE I.

Lat.	R ft.	y' y value on central meridian ft.	Tabular difference for 1 sec. of Lat. ft.	Scale in units of 7th place of logs	Scale expressed as a ratio
34° 40'	29,435,149.91	100,000.00	101.11183	+668.9	1.0001540
41	29,429,083.20	106,066.71	101.11167	+643.7	1.0001482
42	29,423,016.50	112,133.41	101.11133	+618.8	1.0001425
43	29,416,949.82	118,200.09	101.11100	+594.2	1.0001368
44	29,410,883.16	124,266.75	101.11083	+570.1	1.0001313
45	29,404,816.51	130,333.40	101.11050	+546.3	1.0001258
34° 46'	29,398,749.88	136,400.03	101.11017	+522.8	1.0001204
47	29,392,683.27	142,466.64	101.11000	+499.7	1.0001151
48	29,386,616.67	148,533.24	101.10983	+477.0	1.0001098
49	29,380,550.08	154,599.83	101.10950	+454.6	1.0001047
50	29,374,483.51	160,666.40	101.10917	+432.6	1.0000996
34° 51'	29,368,416.96	166,732.95	101.10900	+410.9	1.0000946
52	29,362,350.42	172,799.49	101.10883	+389.6	1.0000897
53	29,356,283.89	178,866.02	101.10867	+368.7	1.0000849
54	29,350,217.37	184,932.54	101.10850	+348.1	1.0000802
55	29,344,150.86	190,999.05	101.10833	+327.9	1.0000755
34° 56'	29,338,084.36	197,065.55	101.10800	+308.1	1.0000709
57	29,332,017.88	203,132.03	101.10800	+288.6	1.0000665
58	29,325,951.40	209,198.51	101.10767	+269.5	1.0000621
59	29,319,884.94	215,264.97	101.10767	+250.7	1.0000577
35° 00	29,313,818.48	221,331.43	101.10733	+232.3	1.0000535
35° 01'	29,307,752.04	227,397.87	101.10733	+214.3	1.0000493
02	29,301,685.60	233,464.31	101.10733	+196.6	1.0000453
03	29,295,619.16	239,530.75	101.10700	+179.3	1.0000413
04	29,289,552.74	245,597.17	101.10700	+162.4	1.0000374
05	29,283,486.32	251,663.59	101.10683	+145.8	1.0000336
35° 06'	29,277,419.91	257,730.00	101.10683	+129.6	1.0000298
07	29,271,353.50	263,796.41	101.10667	+113.8	1.0000262
08	29,265,287.10	269,862.81	101.10667	+ 98.3	1.0000226
09	29,259,220.70	275,929.21	101.10667	+ 83.2	1.0000192
10	29,253,154.30	281,995.61	101.10650	+ 68.4	1.0000157
35° 11'	29,247,087.91	288,062.00	101.10633	+ 54.0	1.0000124
12	29,241,021.53	294,128.38	101.10650	+ 40.0	1.0000092
13	29,234,955.14	300,194.77	101.10633	+ 26.3	1.0000061
14	29,228,888.76	306,261.15	101.10633	+ 13.0	1.0000030
15	29,222,822.38	312,327.53	101.10633	0.0	1.0000000

LAMBERT PROJECTION FOR TENNESSEE

TABLE I (Cont'd)

Lat.	R ft.	y' y value on central meridian ft.	Tabular difference for 1 sec. of Lat. ft.	Scale in units of 7th place of logs	Scale expressed as a ratio
35° 16'	29,216,756.00	318,393.91	101.10633	- 12.6	0.9999971
17	29,210,689.62	324,460.29	101.10633	- 24.8	0.9999943
18	29,204,623.24	330,526.67	101.10633	- 36.7	0.9999915
19	29,198,556.86	336,593.05	101.10650	- 48.2	0.9999889
20	29,192,490.47	342,659.44	101.10633	- 59.3	0.9999863
35° 21'	29,186,424.09	348,725.82	101.10650	- 70.1	0.9999839
22	29,180,357.70	354,792.21	101.10650	- 80.5	0.9999815
23	29,174,291.31	360,858.60	101.10650	- 90.5	0.9999792
24	29,168,224.92	366,924.99	101.10650	-100.2	0.9999769
25	29,162,158.53	372,991.38	101.10667	-109.5	0.9999748
35° 26'	29,156,092.13	379,057.78	101.10683	-118.5	0.9999727
27	29,150,025.72	385,124.19	101.10683	-127.1	0.9999707
28	29,143,959.31	391,190.60	101.10683	-135.3	0.9999688
29	29,137,892.90	397,257.01	101.10700	-143.2	0.9999670
30	29,131,826.48	403,323.43	101.10717	-150.7	0.9999653
35° 31'	29,125,760.05	409,389.86	101.10733	-157.8	0.9999637
32	29,119,693.61	415,456.30	101.10733	-164.6	0.9999621
33	29,113,627.17	421,522.74	101.10750	-171.0	0.9999606
34	29,107,560.72	427,589.19	101.10767	-177.1	0.9999592
35	29,101,494.26	433,655.65	101.10783	-182.8	0.9999579
35° 36'	29,095,427.79	439,722.12	101.10800	-188.1	0.9999567
37	29,089,361.31	445,788.60	101.10817	-193.0	0.9999556
38	29,083,294.82	451,855.09	101.10833	-197.6	0.9999545
39	29,077,228.32	457,921.59	101.10867	-201.8	0.9999535
40	29,071,161.80	463,988.11	101.10867	-205.7	0.9999526
35° 41'	29,065,095.28	470,054.63	101.10900	-209.2	0.9999518
42	29,059,028.74	476,121.17	101.10917	-212.3	0.9999511
43	29,052,962.19	482,187.72	101.10933	-215.0	0.9999505
44	29,046,895.63	488,254.28	101.10967	-217.4	0.9999499
45	29,040,829.05	494,320.86	101.10983	-219.4	0.9999495
35° 46'	29,034,762.46	500,387.45	101.11000	-221.0	0.9999491
47	29,028,695.86	506,454.05	101.11050	-222.3	0.9999488
48	29,022,629.23	512,520.68	101.11050	-223.2	0.9999486
49	29,016,562.60	518,587.31	101.11100	-223.8	0.9999485
50	29,010,495.94	524,653.97	101.11117	-224.0	0.9999484

LAMBERT PROJECTION FOR TENNESSEE

TABLE I (Cont'd)

Lat.	R ft.	y' y value on central meridian ft.	Tabular difference for 1 sec. of Lat. ft.	Scale in units of 7th place of logs	Scale expressed as a ratio
35° 51'	29,004,429.27	530,720.64	101.11150	-223.8	0.9999485
52	28,998,362.58	536,787.33	101.11167	-223.3	0.9999486
53	28,992,295.88	542,854.03	101.11217	-222.4	0.9999488
54	28,986,229.15	548,920.76	101.11233	-221.2	0.9999491
55	28,980,162.41	554,987.50	101.11283	-219.6	0.9999494
35° 56'	28,974,095.64	561,054.27	101.11300	-217.6	0.9999499
57	28,968,028.86	567,121.05	101.11350	-215.3	0.9999504
58	28,961,962.05	573,187.86	101.11367	-212.6	0.9999510
59	28,955,895.23	579,254.68	101.11417	-209.5	0.9999518
36° 00	28,949,828.38	585,321.53	101.11450	-206.0	0.9999526
36° 01'	28,943,761.51	591,388.40	101.11483	-202.2	0.9999534
02	28,937,694.62	597,455.29	101.11533	-198.0	0.9999544
03	28,931,627.70	603,522.21	101.11567	-193.4	0.9999555
04	28,925,560.76	609,589.15	101.11600	-188.5	0.9999566
05	28,919,493.80	615,656.11	101.11650	-183.2	0.9999578
36° 06'	28,913,426.81	621,723.10	101.11683	-177.5	0.9999591
07	28,907,359.80	627,790.11	101.11733	-171.5	0.9999605
08	28,901,292.76	633,857.15	101.11783	-165.1	0.9999620
09	28,895,225.69	639,924.22	101.11817	-158.3	0.9999636
10	28,889,158.60	645,991.31	101.11867	-151.2	0.9999652
36° 11'	28,883,091.48	652,058.43	101.11917	-143.7	0.9999669
12	28,877,024.33	658,125.58	101.11950	-135.8	0.9999687
13	28,870,957.16	664,192.75	101.12017	-127.5	0.9999706
14	28,864,889.95	670,259.96	101.12050	-118.9	0.9999726
15	28,858,822.72	676,327.19	101.12117	-109.9	0.9999747
36° 16'	28,852,755.45	682,394.46	101.12150	-100.6	0.9999768
17	28,846,688.16	688,461.75	101.12217	- 90.9	0.9999791
18	28,840,620.83	694,529.08	101.12267	- 80.8	0.9999814
19	28,834,553.47	700,596.44	101.12317	- 70.3	0.9999838
20	28,828,486.08	706,663.83	101.12367	- 59.5	0.9999863
36° 21'	28,822,418.66	712,731.25	101.12417	- 48.3	0.9999889
22	28,816,351.21	718,798.70	101.12483	- 36.8	0.9999915
23	28,810,283.72	724,866.19	101.12533	- 24.9	0.9999943
24	28,804,216.20	730,933.71	101.12600	- 12.6	0.9999971
25	28,798,148.64	737,001.27	101.12650	0.0	1.0000000

LAMBERT PROJECTION FOR TENNESSEE

TABLE I (Cont'd)

Lat.	R ft.	y' y value on central meridian ft.	Tabular difference for 1 sec. of Lat. ft.	Scale in units of 7th place of logs	Scale expressed as a ratio
36° 26'	28,792,081.05	743,068.86	101.12717	+ 13.0	1.0000030
27	28,786,013.42	749,136.49	101.12767	+ 26.4	1.0000061
28	28,779,945.76	755,204.15	101.12833	+ 40.2	1.0000093
29	28,773,878.06	761,271.85	101.12900	+ 54.3	1.0000125
30	28,767,810.32	767,339.59	101.12967	+ 68.8	1.0000158
36° 31'	28,761,742.54	773,407.37	101.13017	+ 83.7	1.0000193
32	28,755,674.73	779,475.18	101.13083	+ 98.9	1.0000228
33	28,749,606.88	785,543.03	101.13150	+114.5	1.0000264
34	28,743,538.99	791,610.92	101.13217	+130.5	1.0000300
35	28,737,471.06	797,678.85	101.13283	+146.8	1.0000338
36° 36'	28,731,403.09	803,746.82	101.13367	+163.5	1.0000376
37	28,725,335.07	809,814.84	101.13417	+180.6	1.0000416
38	28,719,267.02	815,882.89	101.13500	+198.1	1.0000456
39	28,713,198.92	821,950.99	101.13550	+215.9	1.0000497
40	28,707,130.79	828,019.12	101.13633	+234.1	1.0000539
36° 41'	28,701,062.61	834,087.30	101.13717	+252.7	1.0000582
42	28,694,994.38	840,155.53	101.13783	+271.6	1.0000625
43	28,688,926.11	846,223.80	101.13850	+290.9	1.0000670
44	28,682,857.80	852,292.11	101.13933	+310.6	1.0000715
45	28,676,789.44	858,360.47	101.14000	+330.6	1.0000761
36° 46'	28,670,721.04	864,428.87	101.14083	+351.0	1.0000808
47	28,664,652.59	870,497.32	101.14150	+371.8	1.0000856
48	28,658,584.10	876,565.81	101.14250	+393.0	1.0000905
49	28,652,515.55	882,634.36	101.14317	+414.5	1.0000954
50	28,646,446.96	888,702.95	101.14400	+436.4	1.0001005
36° 51'	28,640,378.32	894,771.59	101.14467	+458.7	1.0001056
52	28,634,309.64	900,840.27	101.14567	+481.3	1.0001108
53	28,628,240.90	906,909.01	101.14633	+504.3	1.0001161
54	28,622,172.12	912,977.79	101.14733	+527.7	1.0001215
55	28,616,103.28	919,046.63	101.14800	+551.4	1.0001270
36° 56'	28,610,034.40	925,115.51	101.14900	+575.5	1.0001325
57	28,603,965.46	931,184.45	101.14983	+600.0	1.0001382
58	28,597,896.47	937,253.44	101.15067	+624.9	1.0001439
59	28,591,827.43	943,322.48	101.15167	+650.1	1.0001497
37° 00	28,585,758.33	949,391.58		+675.7	1.0001556

Lambert Projection for Tennessee

Table II

1" of Long. = 0".58543973 of θ

Long.	θ	Long.	θ	Long.	θ
81° 30'	+2° 38' 04".1236				
31	+2 37 28.9972	82° 06'	+2° 16' 59".5738	82° 41'	+1 56' 30".1504
32	+2 36 53.8709	07	+2 16 24.4474	42	+1 55 55.0240
33	+2 36 18.7445	08	+2 15 49.3210	43	+1 55 19.8976
34	+2 35 43.6181	09	+2 15 14.1947	44	+1 54 44.7712
35	+2 35 08.4917	10	+2 14 39.0683	45	+1 54 09.6448
81° 36'	+2 34 33.3653	82° 11'	+2 14 03.9419	82° 46'	+1 53 34.5185
37	+2 33 58.2389	12	+2 13 28.8155	47	+1 52 59.3921
38	+2 33 23.1126	13	+2 12 53.6891	48	+1 52 24.2657
39	+2 32 47.9862	14	+2 12 18.5627	49	+1 51 49.1393
40	+2 32 12.8598	15	+2 11 43.4364	50	+1 51 14.0129
81° 41'	+2 31 37.7334	82° 16'	+2 11 08.3100	82° 51'	+1 50 38.8865
42	+2 31 02.6070	17	+2 10 33.1836	52	+1 50 03.7602
43	+2 30 27.4806	18	+2 09 58.0572	53	+1 49 28.6338
44	+2 29 52.3542	19	+2 09 22.9308	54	+1 48 53.5074
45	+2 29 17.2279	20	+2 08 47.8044	55	+1 48 18.3810
81° 46'	+2 28 42.1015	82° 21'	+2 08 12.6780	82° 56'	+1 47 43.2546
47	+2 28 06.9751	22	+2 07 37.5517	57	+1 47 08.1282
48	+2 27 31.8487	23	+2 07 02.4253	58	+1 46 33.0018
49	+2 26 56.7223	24	+2 06 27.2989	59	+1 45 57.8755
50	+2 26 21.5959	25	+2 05 52.1725	83° 00'	+1 45 22.7491
81° 51'	+2 25 46.4696	82° 26'	+2 05 17.0461	83° 01'	+1 44 47.6227
52	+2 25 11.3432	27	+2 04 41.9197	02	+1 44 12.4963
53	+2 24 36.2168	28	+2 04 06.7934	03	+1 43 37.3699
54	+2 24 01.0904	29	+2 03 31.6670	04	+1 43 02.2435
55	+2 23 25.9640	30	+2 02 56.5406	05	+1 42 27.1172
81° 56'	+2 22 50.8376	82° 31'	+2 02 21.4142	83° 06'	+1 41 51.9908
57	+2 22 15.7113	32	+2 01 46.2878	07	+1 41 16.8644
58	+2 21 40.5849	33	+2 01 11.1614	08	+1 40 41.7380
59	+2 21 05.4585	34	+2 00 36.0351	09	+1 40 06.6116
82° 00'	+2 20 30.3321	35	+2 00 00.9087	10	+1 39 31.4852
82° 01'	+2 19 55.2057	82° 36'	+1 59 25.7823	83° 11'	+1 38 56.3589
02	+2 19 20.0793	37	+1 58 50.6559	12	+1 38 21.2325
03	+2 18 44.9530	38	+1 58 15.5295	13	+1 37 46.1061
04	+2 18 09.8266	39	+1 57 40.4031	14	+1 37 10.9797
05	+2 17 34.7002	40	+1 57 05.2768	15	+1 36 35.8533

Lambert Projection for Tennessee

Table II (Cont'd)

1" of Long. = 0".58543973 of θ

Long.	θ	Long.	θ	Long.	θ
83° 16'	+1° 36' 00".7269	83° 51'	+1° 15' 31".3035	84° 26'	+0° 55' 01".8801
17	+1 35 25.6006	52	+1 14 56.1771	27	+0 54 26.7537
18	+1 34 50.4742	53	+1 14 21.0507	28	+0 53 51.6273
19	+1 34 15.3478	54	+1 13 45.9244	29	+0 53 16.5009
20	+1 33 40.2214	55	+1 13 10.7980	30	+0 52 41.3745
83° 21'	+1 33 05.0950	83° 56'	+1 12 35.6716	84° 31'	+0 52 06.2482
22	+1 32 29.9686	57	+1 12 00.5452	32	+0 51 31.1218
23	+1 31 54.8423	58	+1 11 25.4188	33	+0 50 55.9954
24	+1 31 19.7159	59	+1 10 50.2924	34	+0 50 20.8690
25	+1 30 44.5895	84° 00'	+1 10 15.1661	35	+0 49 45.7426
83° 26'	+1 30 09.4631	84° 01'	+1 09 40.0397	84° 36'	+0 49 10.6162
27	+1 29 34.3367	02	+1 09 04.9133	37	+0 48 35.4899
28	+1 28 59.2103	03	+1 08 29.7869	38	+0 48 00.3635
29	+1 28 24.0840	04	+1 07 54.6605	39	+0 47 25.2371
30	+1 27 48.9576	05	+1 07 19.5341	40	+0 46 50.1107
83° 31'	+1 27 13.8312	84° 06'	+1 06 44.4078	84° 41'	+0 46 14.9843
32	+1 26 38.7048	07	+1 06 09.2814	42	+0 45 39.8579
33	+1 26 03.5784	08	+1 05 34.1550	43	+0 45 04.7316
34	+1 25 28.4520	09	+1 04 59.0286	44	+0 44 29.6052
35	+1 24 53.3256	10	+1 04 23.9022	45	+0 43 54.4788
83° 36'	+1 24 18.1993	84° 11'	+1 03 48.7758	84° 46'	+0 43 19.3524
37	+1 23 43.0729	12	+1 03 13.6494	47	+0 42 44.2260
38	+1 23 07.9465	13	+1 02 38.5231	48	+0 42 09.0996
39	+1 22 32.8201	14	+1 02 03.3967	49	+0 41 33.9732
40	+1 21 57.6937	15	+1 01 28.2703	50	+0 40 58.8469
83° 41'	+1 21 22.5673	84° 16'	+1 00 53.1439	84° 51'	+0 40 23.7205
42	+1 20 47.4410	17	+1 00 18.0175	52	+0 39 48.5941
43	+1 20 12.3146	18	+0 59 42.8911	53	+0 39 13.4677
44	+1 19 37.1882	19	+0 59 07.7648	54	+0 38 38.3413
45	+1 19 02.0618	20	+0 58 32.6384	55	+0 38 03.2149
83° 46'	+1 18 26.9354	84° 21'	+0 57 57.5120	84° 56'	+0 37 28.0886
47	+1 17 51.8090	22	+0 57 22.3856	57	+0 36 52.9622
48	+1 17 16.6827	23	+0 56 47.2592	58	+0 36 17.8358
49	+1 16 41.5563	24	+0 56 12.1328	59	+0 35 42.7094
50	+1 16 06.4299	25	+0 55 37.0065	85° 00'	+0 35 07.5830

Lambert Projection for Tennessee

Table II (Cont'd)

1" of Long. = 0".58543973 of θ

Long.	θ	Long.	θ	Long.	θ
85° 01'	+0° 34' 32".4566	85° 36'	+0° 14' 03".0332	86° 11'	-0° 06' 26".3902
02	+0 33 57.3303	37	+0 13 27.9068	12	-0 07 01.5166
03	+0 33 22.2039	38	+0 12 52.7804	13	-0 07 36.6430
04	+0 32 47.0775	39	+0 12 17.6541	14	-0 08 11.7694
05	+0 32 11.9511	40	+0 11 42.5277	15	-0 08 46.8958
85° 06'	+0 31 36.8247	85° 41'	+0 11 07.4013	86° 16'	-0 09 22.0221
07	+0 31 01.6983	42	+0 10 32.2749	17	-0 09 57.1485
08	+0 30 26.5720	43	+0 09 57.1485	18	-0 10 32.2749
09	+0 29 51.4456	44	+0 09 22.0221	19	-0 11 07.4013
10	+0 29 16.3192	45	+0 08 46.8958	20	-0 11 42.5277
85° 11'	+0 28 41.1928	85° 46'	+0 08 11.7694	86° 21'	-0 12 17.6541
12	+0 28 06.0664	47	+0 07 36.6430	22	-0 12 52.7804
13	+0 27 30.9400	48	+0 07 01.5166	23	-0 13 27.9068
14	+0 26 55.8137	49	+0 06 26.3902	24	-0 14 03.0332
15	+0 26 20.6873	50	+0 05 51.2638	25	-0 14 38.1596
85° 16'	+0 25 45.5609	85° 51'	+0 05 16.1375	86° 26'	-0 15 13.2860
17	+0 25 10.4345	52	+0 04 41.0111	27	-0 15 48.4124
18	+0 24 35.3081	53	+0 04 05.8847	28	-0 16 23.5387
19	+0 24 00.1817	54	+0 03 30.7583	29	-0 16 58.6651
20	+0 23 25.0554	55	+0 02 55.6319	30	-0 17 33.7915
85° 21'	+0 22 49.9290	85° 56'	+0 02 20.5055	86° 31'	-0 18 08.9179
22	+0 22 14.8026	57	+0 01 45.3792	32	-0 18 44.0443
23	+0 21 39.6762	58	+0 01 10.2528	33	-0 19 19.1707
24	+0 21 04.5498	59	+0 00 35.1264	34	-0 19 54.2970
25	+0 20 29.4234	86° 00'	0 00 00.0000	35	-0 20 29.4234
85° 26'	+0 19 54.2970	86° 01'	-0 00 35.1264	86° 36'	-0 21 04.5498
27	+0 19 19.1707	02	-0 01 10.2528	37	-0 21 39.6762
28	+0 18 44.0443	03	-0 01 45.3792	38	-0 22 14.8026
29	+0 18 08.9179	04	-0 02 20.5055	39	-0 22 49.9290
30	+0 17 33.7915	05	-0 02 55.6319	40	-0 23 25.0554
85° 31'	+0 16 58.6651	86° 06'	-0 03 30.7583	86° 41'	-0 24 00.1817
32	+0 16 23.5387	07	-0 04 05.8847	42	-0 24 35.3081
33	+0 15 48.4124	08	-0 04 41.0111	43	-0 25 10.4345
34	+0 15 13.2860	09	-0 05 16.1375	44	-0 25 45.5609
35	+0 14 38.1596	10	-0 05 51.2638	45	-0 26 20.6873

Lambert Projection for Tennessee

Table II (Cont'd)

1" of Long. = 0".58543973 of θ

Long.	θ	Long.	θ	Long.	θ
86° 46'	-0° 26' 55".8137	87° 21'	-0° 47' 25".2371	87° 56'	-1° 07' 54".6605
47	-0 27 30.9400	22	-0 48 00.3635	57	-1 08 29.7869
48	-0 28 06.0664	23	-0 48 35.4899	58	-1 09 04.9133
49	-0 28 41.1928	24	-0 49 10.6162	59	-1 09 40.0397
50	-0 29 16.3192	25	-0 49 45.7426	88° 00	-1 10 15.1661
86° 51'	-0 29 51.4456	87° 26'	-0 50 20.8690	88° 01'	-1 10 50.2924
52	-0 30 26.5720	27	-0 50 55.9954	02	-1 11 25.4188
53	-0 31 01.6983	28	-0 51 31.1218	03	-1 12 00.5452
54	-0 31 36.8247	29	-0 52 06.2482	04	-1 12 35.6716
55	-0 32 11.9511	30	-0 52 41.3745	05	-1 13 10.7980
86° 56'	-0 32 47.0775	87° 31'	-0 53 16.5009	88° 06'	-1 13 45.9244
57	-0 33 22.2039	32	-0 53 51.6273	07	-1 14 21.0507
58	-0 33 57.3303	33	-0 54 26.7537	08	-1 14 56.1771
59	-0 34 32.4566	34	-0 55 01.8801	09	-1 15 31.3035
87° 00'	-0 35 07.5830	35	-0 55 37.0065	10	-1 16 06.4299
87° 01'	-0 35 42.7094	87° 36'	-0 56 12.1328	88° 11'	-1 16 41.5563
02	-0 36 17.8358	37	-0 56 47.2592	12	-1 17 16.6827
03	-0 36 52.9622	38	-0 57 22.3856	13	-1 17 51.8090
04	-0 37 28.0886	39	-0 57 57.5120	14	-1 18 26.9354
05	-0 38 03.2149	40	-0 58 32.6384	15	-1 19 02.0618
87° 06'	-0 38 38.3413	87° 41'	-0 59 07.7648	88° 16'	-1 19 37.1882
07	-0 39 13.4677	42	-0 59 42.8911	17	-1 20 12.3146
08	-0 39 48.5941	43	-1 00 18.0175	18	-1 20 47.4410
09	-0 40 23.7205	44	-1 00 53.1439	19	-1 21 22.5673
10	-0 40 58.8469	45	-1 01 28.2703	20	-1 21 57.6937
87° 11'	-0 41 33.9732	87° 46'	-1 02 03.3967	88° 21'	-1 22 32.8201
12	-0 42 09.0996	47	-1 02 38.5231	22	-1 23 07.9465
13	-0 42 44.2260	48	-1 03 13.6494	23	-1 23 43.0729
14	-0 43 19.3524	49	-1 03 48.7758	24	-1 24 18.1993
15	-0 43 54.4788	50	-1 04 23.9022	25	-1 24 53.3256
87° 16'	-0 44 29.6052	87° 51'	-1 04 59.0286	88° 26'	-1 25 28.4520
17	-0 45 04.7316	52	-1 05 34.1550	27	-1 26 03.5784
18	-0 45 39.8579	53	-1 06 09.2814	28	-1 26 38.7048
19	-0 46 14.9843	54	-1 06 44.4078	29	-1 27 13.8312
20	-0 46 50.1107	55	-1 07 19.5341	30	-1 27 48.9576

Lambert Projection for Tennessee

Table II (Cont'd)

1" of Long. = 0".58543973 of θ

Long.	θ	Long.	θ	Long.	θ
88° 31'	-1° 28' 24".0840	89° 06'	-1° 48' 53".5074	89° 41'	-2° 09' 22".9308
32	-1 28 59.2103	07	-1 49 28.6338	42	-2 09 58.0572
33	-1 29 34.3367	08	-1 50 03.7602	43	-2 10 33.1836
34	-1 30 09.4631	09	-1 50 38.8865	44	-2 11 08.3100
35	-1 30 44.5895	10	-1 51 14.0129	45	-2 11 43.4364
88° 36'	-1 31 19.7159	89° 11'	-1 51 49.1393	89° 46'	-2 12 18.5627
37	-1 31 54.8423	12	-1 52 24.2657	47	-2 12 53.6891
38	-1 32 29.9686	13	-1 52 59.3921	48	-2 13 28.8155
39	-1 33 05.0950	14	-1 53 34.5185	49	-2 14 03.9419
40	-1 33 40.2214	15	-1 54 09.6448	50	-2 14 39.0683
88° 41'	-1 34 15.3478	89° 16'	-1 54 44.7712	89° 51'	-2 15 14.1947
42	-1 34 50.4742	17	-1 55 19.8976	52	-2 15 49.3210
43	-1 35 25.6006	18	-1 55 55.0240	53	-2 16 24.4474
44	-1 36 00.7269	19	-1 56 30.1504	54	-2 16 59.5738
45	-1 36 35.8533	20	-1 57 05.2768	55	-2 17 34.7002
88° 46'	-1 37 10.9797	89° 21'	-1 57 40.4031	89° 56'	-2 18 09.8266
47	-1 37 46.1061	22	-1 58 15.5295	57	-2 18 44.9530
48	-1 38 21.2325	23	-1 58 50.6559	58	-2 19 20.0793
49	-1 38 56.3589	24	-1 59 25.7823	59	-2 19 55.2057
50	-1 39 31.4852	25	-2 00 00.9087	90° 00'	-2 20 30.3321
88° 51'	-1 40 06.6116	89° 26'	-2 00 36.0351	90° 01'	-2 21 05.4585
52	-1 40 41.7380	27	-2 01 11.1614	02	-2 21 40.5849
53	-1 41 16.8644	28	-2 01 46.2878	03	-2 22 15.7113
54	-1 41 51.9908	29	-2 02 21.4142	04	-2 22 50.8376
55	-1 42 27.1172	30	-2 02 56.5406	05	-2 23 25.9640
88° 56'	-1 43 02.2435	89° 31'	-2 03 31.6670	90° 06'	-2 24 01.0904
57	-1 43 37.3699	32	-2 04 06.7934	07	-2 24 36.2168
58	-1 44 12.4963	33	-2 04 41.9197	08	-2 25 11.3432
59	-1 44 47.6227	34	-2 05 17.0461	09	-2 25 46.4696
89° 00'	-1 45 22.7491	35	-2 05 52.1725	10	-2 26 21.5959
89° 01'	-1 45 57.8755	89° 36'	-2 06 27.2989	90° 11'	-2 26 56.7223
02	-1 46 33.0018	37	-2 07 02.4253	12	-2 27 31.8487
03	-1 47 08.1282	38	-2 07 37.5517	13	-2 28 06.9751
04	-1 47 43.2546	39	-2 08 12.6780	14	-2 28 42.1015
05	-1 48 18.3810	40	-2 08 47.8044	15	-2 29 17.2279

Lambert Projection for Tennessee

Table II (Cont'd)

1" of Long. = 0".58543973 of θ

Long.	θ
90° 16'	-2° 29' 52".3542
17	-2 30 27.4806
18	-2 31 02.6070
19	-2 31 37.7334
20	-2 32 12.8598
90° 21'	-2 32 47.9862
22	-2 33 23.1126
23	-2 33 58.2389
24	-2 34 33.3653
25	-2 35 08.4917
90° 26'	-2 35 43.6181
27	-2 36 18.7445
28	-2 36 53.8709
29	-2 37 28.9972
30	-2 38 04.1236

CORRECTIONS TO NATURAL SCALE RATIOS*
(in units of the 7th decimal place)

For Lambert Projection

$\Delta\phi'$ as argument

$\Delta\phi'$	Corr'n (Plus)	$\Delta\phi'$	Corr'n (Plus)
1	0	31	34
2	0	32	36
3	0	33	38
4	1	34	40
5	1	35	43
6	1	36	45
7	2	37	48
8	2	38	51
9	3	39	53
10	4	40	56
11	4	41	59
12	5	42	62
13	6	43	65
14	7	44	68
15	8	45	71
16	9	46	74
17	10	47	77
18	11	48	81
19	13	49	84
20	14	50	88
21	15	51	91
22	17	52	95
23	19	53	98
24	20	54	102
25	22	55	106
26	24	56	110
27	26	57	114
28	27	58	118
29	29	59	122
30	32	60	126

$\Delta\phi'$ is the difference in latitude in minutes of the ends of the line.

For Lambert or transverse Mercator Projection

Δy or Δx	Corr'n (Plus)
10,000	0
20,000	0
30,000	1
40,000	2
50,000	2
60,000	3
70,000	5
80,000	6
90,000	8
100,000	10
110,000	11
120,000	14
130,000	16
140,000	19
150,000	21
160,000	24
170,000	27
180,000	31
190,000	34
200,000	38
210,000	42
220,000	46
230,000	50
240,000	55
250,000	59
260,000	64
270,000	69
280,000	74
290,000	80
300,000	86
310,000	91
320,000	97
330,000	103
340,000	110
350,000	116

*Scale ratio interpolated for mean latitude or mean x' of the ends of a line and corrected by the above table is a true mean value accurate to within one in the seventh decimal place.

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