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pdZIP User Guide

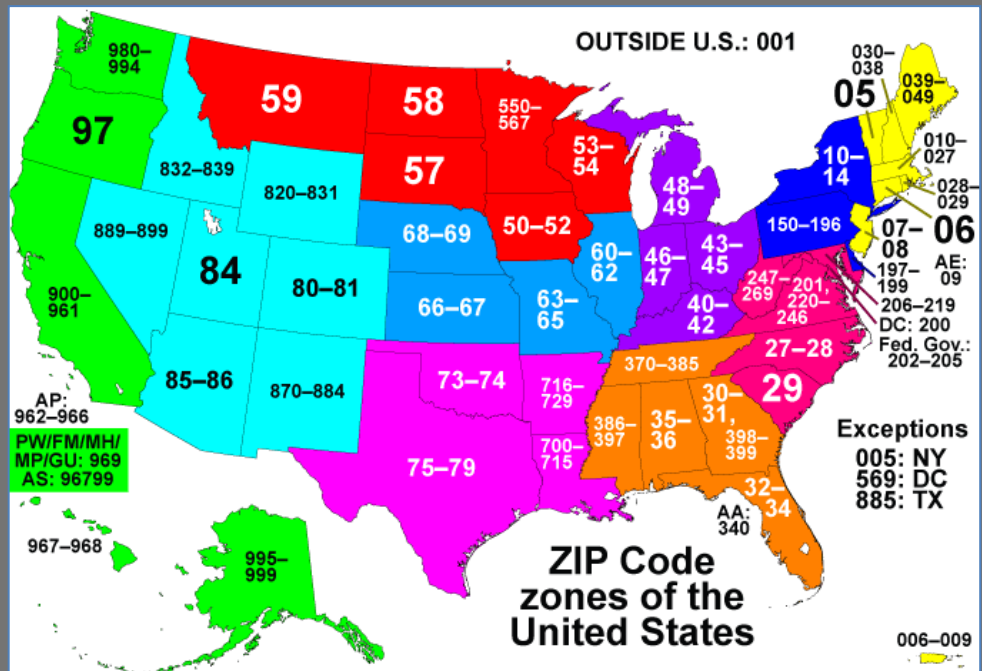
4 and 5 Digit ZIP Code Databases

An easy-to-use, comprehensive, and up-to-date package that offers core United States Postal Service (USPS) information, along with time zones, area codes, GeoCoding data, a host of useful demographic variables, and some new twists on the concept of ZIP Code databases.

The *Standard* edition provides a 5-digit ZIP Code database. The *Pro* edition has both 5-digit and 4-digit ZIP Code databases.

The software covers all 50 states, the District of Columbia, military posts, and island areas.

The package also includes an alternate places reference file.



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INTRODUCTION



There are more than 41,000 United States Postal Service (USPS) 5-digit ZIP Codes, and more than 68 million USPS ZIP+4 codes, in the 50 U.S. states, the District of Columbia (federal district), military posts, insular areas, and associated island areas. **pdZIP** provides core USPS information about them, along with time zones, area codes, GeoCoding data, a host of useful demographic variables, and some new twists on the concept of ZIP Code databases.

This easy-to-use, comprehensive, and up-to-date package is designed for those who want to create custom databases or applications, stylize the address information on their mailings, or go beyond what is available from USPS address cleaning services such as Coding Accuracy Support System (CASS) standardization and Delivery Sequence File Second Generation (DSF²) processing.

The base information is drawn from USPS data, the U.S. Census Bureau *TIGER/Line*[®] *Shapefiles*, 2010 census tabulations, and American Community Survey (ACS) estimates; but the product is also enriched with millions of proprietary enhancements.

The package also incorporates an alternate places reference file listing preferred cities and acceptable and unacceptable alternate places for USPS ZIP Codes.

pdZIP is available in **Pro** and **Standard** editions. This guide covers both versions.

PRO EDITION

The 46.3 million record *Pro* edition has 5-digit ZIP Code and ZIP+4 databases along with an alternate places reference file. All records include core USPS data, the ZIP5 GeoCoding and demographics are tabulated or estimated at both the Zip Code Tabulation Area (ZCTA) level and county level, and the ZIP+4 GeoCoding and demographics are tabulated or estimated at the census block group level or smaller. The files encompass all 50 states, the District of Columbia (federal district), military posts, insular areas, and associated island areas.

STANDARD EDITION

The more than 116,000 record *Standard* edition has the same 5-digit ZIP Code database and alternate places reference file, but does not include the ZIP+4 information. All records include core USPS data, and the GeoCoding and demographics are tabulated or estimated at both the Zip Code Tabulation Area (ZCTA) level and county level. The files encompass all 50 states, the District of Columbia (federal district), military posts, insular areas, and associated island areas.

QUICK START

pdZIP is 4 and 5 digit ZIP Code database software. It is easy to use and provides a multitude of features, including some new twists on the concept of ZIP Code databases. The package is available in Pro and Standard editions. The following is a brief description of the product and how it is used:

Both the *Pro* and *Standard* editions include a 41,000 record 5-digit ZIP Code file and a 75,000 record alternate places reference database. The *Pro* edition adds a 46.2 million record ZIP+4 file. They provide core USPS information, along with time zones, area codes, GeoCoding data, and a host of useful demographic variables.

The ZIP5 file is organized with one record per United States Postal Service (USPS) 5-digit ZIP Code. The *Pro* edition ZIP+4 file is organized with one record for each USPS ZIP+4 address range area. Both encompass the 50 U.S. states, the District of Columbia (federal district), military posts, insular areas, and associated island areas.

The software is designed to be compatible with any database system. It comes in multiple file formats, uses only the ANSI character set, and has a well-defined layout.

The first field in the databases is a unique identification number for each record. It serves as the primary key and no two records in the database have this same exact number.

The fields following the primary key provide core information about the USPS 5-digit ZIP Code delivery areas or ZIP+4 address range delivery areas, including:

- 5-digit ZIP Code (*ZIP5 and ZIP+4 files*)
- Plus4 Add-on Code range (*ZIP+4 files*)
- State postal abbreviation (*ZIP5 and ZIP+4 files*)
- Preferred city (*ZIP5 and ZIP+4 files*)
- ZIP+4 address ranges (*ZIP+4 files*)
- 5-digit ZIP classification codes (*ZIP5 and ZIP+4 files*)
- ZIP+4 classification codes (*ZIP+4 files*)
- Company data (*ZIP+4 files*)
- Puerto Rican urbanization (*ZIP+4 files*)

The ZIP+4 address ranges in the *Pro* edition allow precise matching of addresses on residential and business lists to the correct USPS ZIP+4 record. Matching is against a range of addresses and, if there is a unit number, a range of unit numbers.

In address range matching, the included address ranges point to a sequential line of potential addresses and not individual addresses. All possible structure numbers are included in the range, from the first structure to the last, and all structure numbers of the same parity (odd, even, or both) in between, regardless of if the actual structure currently exists.

Like structure numbers, unit numbers are also provided as a range and the included unit ranges point to a sequential line of potential units and not individual units. All possible unit numbers are included in the range, from

the first unit to the last, and all unit numbers of the same unit parity (odd, even, or both) in between, regardless of if the actual unit currently exists.

The parity of an address (ADDRPARITY) and unit (UNITPARITY) is important because ranges can include structure or unit numbers of only the same odd/even parity, or may have both odd and even structure or unit numbers (assigned a “B” in the respective parity field), and must be considered.

After the core USPS information, there are fields with time zones, Coordinated Universal Time (UTC) offsets, Daylight Savings Time flags, and area codes.

To establish geographic location, GeoCoding is run on all United States Postal Service (USPS) 5-digit ZIP Codes and ZIP+4 address ranges in the 50 U.S. states, the District of Columbia (federal district), and the Commonwealth of Puerto Rico (insular area). The ZIP5 file is geo coded at both the Zip Code Tabulation Area (ZCTA) level and county level. The *Pro* edition ZIP+4 database is geo coded at the census block group level or smaller.

GeoCoding provides internal point latitude and longitude coordinates, which are presented in multiple formats, along with total area sizes, total land area, total water area, urban and rural indicators, and geographic location information.

The demographics provided at the end of the ZIP5 and ZIP+4 files are among the most important parts of the package. They are available in both the *Pro* and *Standard* editions and encompass all 50 states, the District of Columbia (federal district), and the Commonwealth of Puerto Rico (insular area).

The ZIP5 demographics are tabulated or estimated at both the Zip Code Tabulation Area (ZCTA) level and county level, and the ZIP+4 demographics are tabulated or estimated at the census block group level.

Population, household, group quarter, and housing unit variables are tabulations, aggregates, averages, and medians from *2010 Census Summary File 1* data and subsequent updates. Economic variables are estimates from American Community Survey (ASC) interviews conducted between 2007 and 2011.

pdZIP utilizes United States Postal Service (USPS) and U.S. Census Bureau coding conventions. It is fully compatible with raw USPS and U.S. Census Bureau data and other databases and applications that make use of their coding conventions.

Both the *Pro* and *Standard* editions also have an alternate places reference file listing preferred place names and acceptable and unacceptable alternate place names for United States Postal Service (USPS) 5-digit ZIP Codes.

In the ZIP5 files, the acceptable alternate place count (PLACECNT) provides the total number of acceptable places listed for that five-digit code in the alternate places reference file. If the number is “1”, it means the city name given in the ZIP5 file is the only acceptable place name for mailings to the five-digit zone. If the number is greater than one, there are other acceptable place names for the five-digit code, and the alternative place reference file can be employed for additional information on their correct use. In the *Pro* edition ZIP+4 files, the correct preferred city is identified for each address range.

This quick start explanation is just the beginning. Much more is also available. Read on for more information...

IMPORTING DATA INTO YOUR SYSTEM

pdZIP is designed to be compatible with any database system. It comes in multiple file formats, uses only the ANSI character set, and has a well-defined layout.

INCLUDED DATABASE FILES

Both the *Pro* and *Standard* editions include a 41,000 record 5-digit ZIP Code file and a 75,000 record alternate places reference database. The *Pro* edition adds a 46.2 million record ZIP+4 file.

5-DIGIT ZIP CODE FILE

Both the *Pro* and *Standard* editions have the same 5-digit ZIP Code database. It is divided into two files, one with GeoCoding and demographics tabulated or estimated at the Zip Code Tabulation Area (ZCTA) level, and the other at the county level. Both parts have the same core USPS data.

4-DIGIT ZIP CODE FILE

The *Pro* edition has a ZIP+4 Code database with core USPS data along with GeoCoding and demographics tabulated or estimated at the census block group level or smaller. It is separated into one or two files for each of the 50 U.S. states, the District of Columbia (federal district), overseas military areas (AA, AE, and AP), insular areas, and associated island areas. Most states and areas have one file but, due to size, California, Florida, New York, and Texas are in two parts.

ALTERNATE PLACES FILE

Both the *Pro* and *Standard* editions have an alternate places reference file listing preferred place names and acceptable and unacceptable alternate place names for United States Postal Service (USPS) 5-digit ZIP Codes.

FILE FORMATS

The database is available in three common file formats. Each format contains the same data.

Available file formats are:

CSV-COMMA SEPARATED VALUES

Files in Comma Separated Values (CSV) format (also known as Comma Delimited) separate fields with commas, and alpha/numeric character fields are usually delimited with double quotes (in case some of the field content includes commas). This format is the most commonly used. It is a native format for Microsoft Excel and is compatible with nearly all database management systems and spreadsheets.

TXT-FIXED LENGTH

Files in Fixed Length (TXT) format (also known as Standard Data Format or SDF) use constant field positions and lengths for all records. In other words, each field starts and ends at the same place in the text file and each record is on a separate line. While not as popular as comma separated values, this format is preferred by many due to its input precision and is widely used to transfer data between different software programs. It is compatible with most database management systems and spreadsheets.

DBF-DATABASE

Files in DBF database format (also known as xBase) are native to Microsoft FoxPro and Visual FoxPro, dataBased Intelligence dBase, Alaska Software XBase++, Apollo Database Engine, Apycom Software DBFView, Astersoft DBF Manager, DS-Datasoft Visual DBU, Elsoft DBF Commander, GrafX Software Clipper and Vulcan.NET, Multisoft FlagShip, Recital Software Recital, Software Perspectives Cule.Net, and xHarbour.com xHarbour. They are also compatible with any database management system that can import the DBF (xBase) format, such as Microsoft Access, Microsoft SQL Server, and numerous others.

CHARACTER SET

The ANSI character set is utilized for all database records. This includes ASCII values 0 to 127 and extended values 128 to 255. These are also known as the extended Latin alphabet. Some users may need to configure their database system to import the extended values. In many cases the option will be labeled the “Latin-1” character set.

FILE LAYOUTS AND DATA DEFINITIONS

Below are the complete layout specifications and data definitions of all files provided with *pdZIP*.

Each line below contains the following information: **FIELD NUMBER**: field position number. **FIELD NAME**: name of field. **FIELD TYPE**: field data type; “Chr” = alpha/numeric characters, “Num” = numbers. **FIELD LENGTH**: length of field. **DECIMAL PLACES**: number of decimal places (if any). **START POSITION**: field starting position. **END POSITION**: field ending position. **DESCRIPTION**: data definition of field contents.

LAYOUT OF 5-DIGIT ZIP CODE FILES

Field Count: 88

Total Length: 774

Record Count: 41,753

FIELD NUMBER	FIELD NAME	FIELD TYPE	FIELD LENGTH	DECIMAL PLACES	START POSITION	END POSITION	DESCRIPTION
1	PEACOCK_ID	Chr	15		1	15	Primary key; unique identifier for each record
2	ZIP	Chr	5		16	20	USPS 5-digit ZIP Code
3	STATEAB	Chr	2		21	22	USPS state postal abbreviation
4	USPSCITY	Chr	28		23	50	USPS preferred city name
5	CITY	Chr	28		51	78	Formatted city name
6	CITY13	Chr	13		79	91	Abbreviated city name
7	CITYFLAG	Chr	1		92	92	City Standardization Flag: S = Formatted city name (CITY) is standardized A = USPS favors the abbreviated city name (CITY13)
8	PLACECNT	Num	3		93	95	Acceptable alternate place count
9	ZIPCLASS	Chr	1		96	96	ZIP Classification Code: S = Standard Zip Code for multiple addresses M = Military ZIP Code P = ZIP Code for PO Boxes only U = Unique ZIP Code assigned to a specific organization
10	CRCD	Chr	1		97	97	City-Delivery Carrier Routes Indicator: Y = Post office has city-delivery carrier routes N = Post office does not have city-delivery carrier routes

11	CRMS	Chr	1		98	98	Bulk Mail Sort/Merge Indicator: A = Carrier route rates are available and merging is permitted B = Carrier route rates are available and merging is not permitted C = Carrier route rates are not available and merging is permitted D = Carrier route rates are not available and merging is not permitted
12	FINUM	Chr	6		99	104	Finance Number
13	TIMEZONE	Chr	4		105	108	Time Zone: AKST = Alaska Standard Time AST = Atlantic Standard Time CST = Central Standard Time ChST = Chamorro Standard Time EST = Eastern Standard Time HST = Hawaii Standard Time KOST = Kosrae Time MHT = Marshall Islands Time MST = Mountain Standard Time PONT = Pohnpei Standard Time PST = Pacific Standard Time PWT = Palau Time SST = Samoa Standard Time
14	UTCOFFSET	Num	3		109	111	Coordinated Universal Time (UTC) Offset (-12 to 12 hours)
15	DST	Chr	1		112	112	Daylight Savings Time Indicator: Y = Daylight Savings Time is observed N = Daylight Savings Time is not observed
16	AREACODE	Chr	28		113	140	Area Code List
17	GEOFLAG	Chr	1		141	141	GeoCoding Confidence Flag: 1 = Highest GeoCoding confidence Blank = Record did not meet the requirements for GeoCoding
18	GEOID	Chr	7		142	148	Geographic Identifier
19	LATITUDE	Chr	11		149	159	Internal point latitude coordinate in degrees (7 decimal places)
20	LONGITUDE	Chr	12		160	171	Internal point longitude coordinate in degrees (7 decimal places)
21	LATRAD	Num	18	15	172	189	Internal point latitude coordinate converted to radians for use in trigonometry functions (15 numeric places)
22	LONRAD	Num	18	15	190	207	Internal point longitude coordinate converted to radians for use in trigonometry functions (15 numeric places)
23	LATDMS	Chr	14		208	221	Internal point latitude coordinate in degrees/minutes/seconds

24	LONDMS	Chr	15		222	236	Internal point longitude coordinate in degrees/minutes/seconds
25	AREA	Num	14		237	250	Total area in square meters
26	ALAND	Num	14		251	264	Total land area in square meters
27	AWATER	Num	14		265	278	Total water area in square meters
28	UR	Chr	1		279	279	Urban/Rural Indicator: U = Urban R = Rural M = Mixed
29	REGION	Chr	1		280	280	Region: 1 = Northeast 2 = Midwest 3 = South 4 = West 9 = Not in a region
30	DIVISION	Chr	1		281	281	Division: 1 = New England 2 = Middle Atlantic 3 = East North Central 4 = West North Central 5 = South Atlantic 6 = East South Central 7 = West South Central 8 = Mountain 9 = Pacific 0 = Not in a division
31	STATEFP	Chr	2		282	283	State FIPS Code
32	STATENM	Chr	38		284	321	State Name
33	COUNTYFP	Chr	3		322	324	County FIPS Code
34	COUNTYNM	Chr	25		325	349	County Name
35	POPULATION	Num	9		350	358	Population
36	MALES	Num	9		359	367	Males
37	FEMALES	Num	9		368	376	Females
38	MDAGE	Num	5	1	377	381	Median age: Both genders
39	MDAGEMALES	Num	5	1	382	386	Median age: Males
40	MDAGEFEMLS	Num	5	1	387	391	Median age: Females
41	WHITE	Num	9		392	400	White
42	BLACK	Num	9		401	409	Black or African American
43	NATIVE	Num	9		410	418	American Indian or Alaska Native
44	ASIAN	Num	9		419	427	Asian
45	HAWAIIAN	Num	9		428	436	Native Hawaiian or other Pacific Islander
46	OTHERRACE	Num	9		437	445	Other race
47	MULTIRACE	Num	9		446	454	Two or more races
48	LATINO	Num	9		455	463	Hispanic or Latino
49	SPKSPANHM	Num	9		464	472	Speaks Spanish at home (age 5 and over)
50	ENROLLPK12	Num	9		473	481	Enrolled in PK-12 (age 3 and over)
51	ENROLLCOLG	Num	9		482	490	Enrolled in college
52	VETERANS	Num	9		491	499	Veterans (age 18 and over)
53	MILQTRPOP	Num	9		500	508	Military quarters population
54	STUHSEPOP	Num	9		509	517	College/University student housing population

55	NURSFACPOP	Num	9		518	526	Nursing/Skilled-nursing facility population
56	ACORFACPOP	Num	9		527	535	Adult correctional facilities population
57	JUVFACPOP	Num	9		536	544	Juvenile facilities population
58	PERCAPINC	Num	6		545	550	Per capita income
59	UNEMPCVPOP	Num	9		551	559	Unemployed civilian population (age 16 and over)
60	HOUSEHOLDS	Num	9		560	568	Households
61	AVGHHSIZE	Num	5	2	569	573	Average household size
62	MDHHINC	Num	6		574	579	Median household income
63	POVERTY	Num	9		580	588	Households with income below the poverty level (in the past 12 months)
64	FAMHH	Num	9		589	597	Family households
65	AVGFAMSIZE	Num	5	2	598	602	Average family size
66	MDFAMINC	Num	6		603	608	Median family income
67	NOFAMHH	Num	9		609	617	Non-family households
68	MDNOFAMINC	Num	6		618	623	Median non-family income
69	HOUSUNITS	Num	9		624	632	Housing units
70	MDNUMROOMS	Num	5	1	633	637	Median number of rooms
71	MDYRBUILT	Num	4		638	641	Median year built
72	OCCUHU	Num	9		642	650	Occupied housing units
73	HWHITE	Num	9		651	659	Householder who is White
74	HBLACK	Num	9		660	668	Householder who is Black or African American
75	HNATIVE	Num	9		669	677	Householder who is American Indian or Alaska Native
76	HASIAN	Num	9		678	686	Householder who is Asian
77	HHAWAIIAN	Num	9		687	695	Householder who is Native Hawaiian or other Pacific Islander
78	HOTHERRACE	Num	9		696	704	Householder who is another race
79	HMULTIRACE	Num	9		705	713	Householder who is two or more races
80	HLATINO	Num	9		714	722	Hispanic or Latino householder
81	AVGNUMVEH	Num	5	1	723	727	Average number of vehicles
82	OWNEROCU	Num	9		728	736	Owner-occupied housing units
83	MDHOMEVAL	Num	7		737	743	Median home value
84	RENTEROCHU	Num	9		744	752	Renter-occupied housing units
85	MDGRENTPCT	Num	5	1	753	757	Median gross rent as a percentage of income
86	MDGRENT	Num	4		758	761	Median gross rent
87	MDCRENT	Num	4		762	765	Median contract rent
88	VACANTHU	Num	9		766	774	Vacant housing units

LAYOUT OF ZIP+4 FILES

*Field Count: 117**Total Length: 1,053**Record Count: 46,201,978*

FIELD NUMBER	FIELD NAME	FIELD TYPE	FIELD LENGTH	DECIMAL PLACES	START POSITION	END POSITION	DESCRIPTION
1	PEACOCK_ID	Chr	20		1	20	Primary key; unique identifier for each record
2	ZIP	Chr	5		21	25	USPS 5-digit ZIP Code
3	FROMPLUS4	Chr	4		26	29	From (low) USPS 4-digit Plus4 Add-on Code
4	TOPLUS4	Chr	4		30	33	To (high) USPS 4-digit Plus4 Add-on Code
5	STATEAB	Chr	2		34	35	USPS state postal abbreviation
6	USPSCITY	Chr	28		36	63	USPS preferred city name
7	CITY	Chr	28		64	91	Formatted city name
8	CITY13	Chr	13		92	104	Abbreviated city name
9	CITYFLAG	Chr	1		105	105	City Standardization Flag: S = Formatted city name (CITY) is standardized A = USPS favors the abbreviated city name (CITY13)
10	FROMHN	Chr	10		106	115	From (low) house or structure number
11	TOHN	Chr	10		116	125	To (high) house or structure number
12	ADDRPARITY	Chr	1		126	126	Address Parity Indicator: O = Odd E = Even B = Both or not applicable
13	FULLNAME	Chr	39		127	165	Formatted full street address line (e.g., N Main St, Pennsylvania Ave SW)
14	PREDIR	Chr	2		166	167	Street prefix direction (e.g., N, W, SE, SW)
15	USPSSN	Chr	28		168	195	USPS base street name (e.g., MAIN, LAWSON CRK, 52ND)
16	STREETNAME	Chr	28		196	223	Formatted base street name (e.g., Main, Lawson Creek, 52nd)
17	SNFLAG	Chr	1		224	224	Street Standardization Flag: S = Formatted base street name (STREETNAME) is standardized
18	STREETTYPE	Chr	4		225	228	Street type (e.g., Ave, Rd, St, Blvd)
19	SUFDIR	Chr	2		229	230	Street suffix direction (e.g., N, W, SE, SW)
20	UNITTYPE	Chr	4		231	234	Unit Type (e.g., Apt, Rm, Ste, Bldg)
21	FROMUNIT	Chr	8		235	242	From (low) unit number
22	TOUNIT	Chr	8		243	250	To (high) unit number

23	UNITPARITY	Chr	1		251	251	Unit Parity Indicator: O = Odd E = Even B = Both or not applicable
24	ZIPCLASS	Chr	1		252	252	ZIP Classification Code: S = Standard Zip Code for multiple addresses M = Military ZIP Code P = ZIP Code for PO Boxes only U = Unique ZIP Code assigned to a specific organization
25	CRCD	Chr	1		253	253	City-Delivery Carrier Routes Indicator: Y = Post office has city-delivery carrier routes N = Post office does not have city-delivery carrier routes
26	CRMS	Chr	1		254	254	Bulk Mail Sort/Merge Indicator: A = Carrier route rates are available and merging is permitted B = Carrier route rates are available and merging is not permitted C = Carrier route rates are not available and merging is permitted D = Carrier route rates are not available and merging is not permitted
27	FINUM	Chr	6		255	260	Finance Number
28	CRRT	Chr	4		261	264	Carrier Route
29	DELTYPE	Chr	1		265	265	Delivery Type Indicator: A = Street alias F = Firm, company, or organization G = General delivery H = Highrise or building P = PO box R = Rural route or highway contract S = Street
30	ALIASFLAG	Chr	1		266	266	Street Alias Flag: A = Alias is an abbreviated form of a street name C = Alias is an old name which local government officially changed N = Alias is a nickname or other name by which a street is known P = Alias is a locally preferred form of a street name
31	ALIASDATE	Chr	10		267	276	Street Alias Date
32	ALTREC	Chr	1		277	277	Alternate Record Indicator: A = The address is an alternate record for another preferred address record

33	LACS	Chr	1		278	278	Locatable Address Conversion System (LACS) Indicator: L = At least one address in the address range is in the USPS LACS database
34	MOVED	Chr	1		279	279	Move Indicator: M = Address moved to another ZIP Code
35	COMPANY	Chr	50		280	329	Company or organization name; this field is also used to identify base street names associated with alias street names and addresses that move from a different five-digit zone
36	URB	Chr	28		330	357	Puerto Rico Urbanization
37	TIMEZONE	Chr	6		358	363	Time Zone: AKST = Alaska Standard Time AST = Atlantic Standard Time CST = Central Standard Time ChST = Chamorro Standard Time EST = Eastern Standard Time HST = Hawaii Standard Time KOST = Kosrae Time MHT = Marshall Islands Time MST = Mountain Standard Time PONT = Pohnpei Standard Time PST = Pacific Standard Time PWT = Palau Time SST = Samoa Standard Time
38	UTCOFFSET	Num	3		364	366	Coordinated Universal Time (UTC) Offset (-12 to 12 hours)
39	DST	Chr	1		367	367	Daylight Savings Time Indicator: Y = Daylight Savings Time is observed N = Daylight Savings Time is not observed
40	AREACODE	Chr	28		368	395	Area Code List
41	GEOFLAG	Chr	1		396	396	GeoCoding Confidence Flag: 1 = Highest GeoCoding confidence 2 = Medium-High confidence 3 = Medium confidence 4 = Medium-Low confidence 5 = Lowest GeoCoding confidence Blank = Record did not meet the requirements for GeoCoding
42	GEOID	Chr	12		397	408	Geographic Identifier
43	LATITUDE	Chr	11		409	419	Internal point latitude coordinate in degrees (7 decimal places)
44	LONGITUDE	Chr	12		420	431	Internal point longitude coordinate in degrees (7 decimal places)

45	LATRAD	Num	18	15	432	449	Internal point latitude coordinate converted to radians for use in trigonometry functions (15 numeric places)
46	LONRAD	Num	18	15	450	467	Internal point longitude coordinate converted to radians for use in trigonometry functions (15 numeric places)
47	LATDMS	Chr	14		468	481	Internal point latitude coordinate in degrees/minutes/seconds
48	LONDMS	Chr	15		482	496	Internal point longitude coordinate in degrees/minutes/seconds
49	AREA	Num	14		497	510	Total area in square meters
50	ALAND	Num	14		511	524	Total land area in square meters
51	AWATER	Num	14		525	538	Total water area in square meters
52	UR	Chr	1		539	539	Urban/Rural Indicator: U = Urban R = Rural M = Mixed
53	REGION	Chr	1		540	540	Region: 1 = Northeast 2 = Midwest 3 = South 4 = West 9 = Not in a region
54	DIVISION	Chr	1		541	541	Division: 1 = New England 2 = Middle Atlantic 3 = East North Central 4 = West North Central 5 = South Atlantic 6 = East South Central 7 = West South Central 8 = Mountain 9 = Pacific 0 = Not in a division
55	STATEFP	Chr	2		542	543	State FIPS Code
56	STATENM	Chr	38		544	581	State Name
57	COUNTYFP	Chr	3		582	584	County FIPS Code
58	COUNTYNM	Chr	25		585	609	County Name
59	TRACT	Chr	6		610	615	Census Tract
60	BLOCKGRP	Chr	1		616	616	Census Block Group
61	PLACEFP	Chr	5		617	621	Place FIPS Code
62	CD	Chr	2		622	623	Congressional District FIPS Code: 01 to 53 = Congressional district number 00 = At large (single district for state) 98 = Nonvoting delegate
63	ZCTA5	Chr	5		624	628	Census 5-digit ZIP Code Tabulation Area (ZCTA)
64	POPULATION	Num	9		629	637	Population
65	MALES	Num	9		638	646	Males
66	FEMALES	Num	9		647	655	Females

67	MDAGE	Num	5	1	656	660	Median age: Both genders
68	MDAGEMALES	Num	5	1	661	665	Median age: Males
69	MDAGEFEMLS	Num	5	1	666	670	Median age: Females
70	WHITE	Num	9		671	679	White
71	BLACK	Num	9		680	688	Black or African American
72	NATIVE	Num	9		689	697	American Indian or Alaska Native
73	ASIAN	Num	9		698	706	Asian
74	HAWAIIAN	Num	9		707	715	Native Hawaiian or other Pacific Islander
75	OTERRACE	Num	9		716	724	Other race
76	MULTIRACE	Num	9		725	733	Two or more races
77	LATINO	Num	9		734	742	Hispanic or Latino
78	SPKSPANHM	Num	9		743	751	Speaks Spanish at home (age 5 and over)
79	ENROLLPK12	Num	9		752	760	Enrolled in PK-12 (age 3 and over)
80	ENROLLCOLG	Num	9		761	769	Enrolled in college
81	VETERANS	Num	9		770	778	Veterans (age 18 and over)
82	MILQTRPOP	Num	9		779	787	Military quarters population
83	STUHSEPOP	Num	9		788	796	College/University student housing population
84	NURSFACPOP	Num	9		797	805	Nursing/Skilled-nursing facility population
85	ACORFACPOP	Num	9		806	814	Adult correctional facilities population
86	JUVFACPOP	Num	9		815	823	Juvenile facilities population
87	PERCAPINC	Num	6		824	829	Per capita income
88	UNEMPCVPOP	Num	9		830	838	Unemployed civilian population (age 16 and over)
89	HOUSEHOLDS	Num	9		839	847	Households
90	AVGHHSIZE	Num	5	2	848	852	Average household size
91	MDHHINC	Num	6		853	858	Median household income
92	POVERTY	Num	9		859	867	Households with income below the poverty level (in the past 12 months)
93	FAMHH	Num	9		868	876	Family households
94	AVGFAMSIZE	Num	5	2	877	881	Average family size
95	MDFAMINC	Num	6		882	887	Median family income
96	NOFAMHH	Num	9		888	896	Non-family households
97	MDNOFAMINC	Num	6		897	902	Median non-family income
98	HOUSUNITS	Num	9		903	911	Housing units
99	MDNUMROOMS	Num	5	1	912	916	Median number of rooms
100	MDYRBUILT	Num	4		917	920	Median year built
101	OCCUHU	Num	9		921	929	Occupied housing units
102	HWHITE	Num	9		930	938	Householder who is White
103	HBLACK	Num	9		939	947	Householder who is Black or African American
104	HNATIVE	Num	9		948	956	Householder who is American Indian or Alaska Native
105	HASIAN	Num	9		957	965	Householder who is Asian
106	HHAWAIIAN	Num	9		966	974	Householder who is Native Hawaiian or other Pacific Islander
107	HOTERRACE	Num	9		975	983	Householder who is another race
108	HMULTIRACE	Num	9		984	992	Householder who is two or more races

109	HLATINO	Num	9		993	1001	Hispanic or Latino householder
110	AVGNUMVEH	Num	5	1	1002	1006	Average number of vehicles
111	OWNERCHU	Num	9		1007	1015	Owner-occupied housing units
112	MDHOMEVAL	Num	7		1016	1022	Median home value
113	RENTEROCHU	Num	9		1023	1031	Renter-occupied housing units
114	MDGRENTPCT	Num	5	1	1032	1036	Median gross rent as a percentage of income
115	MDGRENT	Num	4		1037	1040	Median gross rent
116	MDCRENT	Num	4		1041	1044	Median contract rent
117	VACANTHU	Num	9		1045	1053	Vacant housing units

LAYOUT OF ALTERNATE PLACES FILE

Field Count: 9

Total Length: 108

Record Count: 75,068

FIELD NUMBER	FIELD NAME	FIELD TYPE	FIELD LENGTH	DECIMAL PLACES	START POSITION	END POSITION	DESCRIPTION
1	PID	Chr	15		1	15	Primary key; unique identifier for each record
2	ZIP	Chr	5		16	20	USPS 5-digit ZIP Code
3	PLACEFLAG	Chr	1		21	21	Place Flag: A = Place is acceptable for use on the last line of mailings U = Place is unacceptable for use on the last line of mailings
4	PLACE	Chr	28		22	49	Place Name
5	PLACE13	Chr	13		50	62	Abbreviated place name
6	PREFER	Chr	28		63	90	Preferred place name
7	PREFER13	Chr	13		91	103	Abbreviated preferred place name
8	STATEAB	Chr	2		104	105	USPS state postal abbreviation
9	COUNTYFP	Chr	3		106	108	County FIPS Code

Note that the layouts above are also available in Excel XLS files provided with the database. Programmers can use these files to create table shells for the pdZIP data.

DATABASE VERSION NUMBER

Depending on the file format, the version number of each copy of *pdZIP* is written in the first or second row of the first or second column of the database files in X.X.X.YYYY.X.X format. The first number is the main version number of the release. The number after the first dot is the update for the version indicated. The number after the second dot references a minor revision. The number after the third dot indicates the year of release. The number after the fourth dot is the USPS data update for the year indicated. The number after the fifth dot references a minor revision to the USPS data update.

USING THE PDZIP DATABASE

This easy-to-use, comprehensive, and up-to-date package is designed for those who want to create custom databases or applications, stylize the address information on their mailings, or go beyond what is available from USPS address cleaning services such as Coding Accuracy Support System (CASS) standardization and Delivery Sequence File Second Generation (DSF²) processing.

The *Standard* edition provides a 5-digit ZIP Code database. The *Pro* edition has both 5-digit and 4-digit ZIP Code databases.

The *pdZIP* databases encompass the following:

- The 50 U.S. states
- District of Columbia (federal district)
- Overseas military areas
 - U.S. Armed Forces Americas (except Canada)
 - U.S. Armed Forces Europe (which serves Europe, Canada, Africa, and the Middle East)
 - U.S. Armed Forces Pacific (which serves Asia and the Pacific)
- Insular areas:
 - American Samoa
 - Commonwealth of the Northern Mariana Islands
 - Commonwealth of Puerto Rico
 - Guam
 - Midway Islands (also known as Midway Atoll; now inhabited only by caretakers)
 - U.S. Virgin Islands
 - Wake Island (also known as Wake Atoll; now inhabited only by civilian contractors)
- Associated island areas:
 - Republic of the Marshall Islands
 - Federated States of Micronesia
 - Republic of Palau

The base information is drawn from USPS data, the U.S. Census Bureau *TIGER/Line*[®] *Shapefiles*, 2010 census tabulations, and American Community Survey (ACS) estimates; but the product is also enriched with millions of proprietary enhancements.

The package also incorporates an alternate places reference file listing preferred cities and acceptable and unacceptable alternate places for USPS ZIP Codes.

DATABASE ORGANIZATION

The product has both a 5-digit ZIP Code database and, with the *Pro* edition, a ZIP+4 file. The ZIP5 database is divided into two files, one with GeoCoding and demographics tabulated or estimated at the Zip Code Tabulation Area (ZCTA) level, and the other at the county level. The ZIP+4 database in the *Pro* edition is separated into one or two files for each of the 50 U.S. states, the District of Columbia (federal district), overseas military areas (AA, AE, and AP), insular areas, and associated island areas. Most states and areas have one file but, due to size, California,

Florida, New York, and Texas are in two parts. The ZIP+4 files provide GeoCoding and demographics tabulated or estimated at the census block group level or smaller.

The ZIP5 file is organized with one record per United States Postal Service (USPS) 5-digit ZIP Code. The *Pro* edition ZIP+4 file is organized with one record for each USPS ZIP+4 address range area.

The first field is the PEACOCK_ID primary key, a unique identifier for each record, followed by a series of fields with core USPS information, followed by time zones and area codes, followed by GeoCoding data, followed by demographic tabulations and estimates.

The database structure is organized as follows:

- [Peacock ID—unique identification number](#) (*first field in all files*)
- [Core USPS information](#) (*ZIP5 fields 2–12; ZIP+4 fields 2–36*)
- [Time Zone, UTC Offset and Daylight Saving Time](#) (*ZIP5 fields 13–15; ZIP+4 fields 37–39*)
- [Area Code List](#) (*ZIP5 field 16; ZIP+4 field 40*)
- [GeoCoding confidence](#) (*ZIP5 field 17; ZIP+4 field 41*)
- [Geo ID—hierarchy identification number](#) (*ZIP5 field 18; ZIP+4 field 42*)
- [Latitude and longitude coordinates](#) (*ZIP5 fields 19–24; ZIP+4 fields 43–48*)
- [Land and water area](#) (*ZIP5 fields 25–27; ZIP+4 fields 49–51*)
- [Urban and rural indicator](#) (*ZIP5 field 28; ZIP+4 field 52*)
- [Geographic areas](#) (*ZIP5 fields 29–34; ZIP+4 fields 53–63*)
- [Demographics](#) (*ZIP5 fields 35–88; ZIP+4 fields 64–117*)

Review [File Layout and Data Definitions](#) for more information.

Note the following symbols used in the field descriptions below:

- ④ = Field is in the ZIP+4 files
- ⑤ = Field is in the ZIP5 files

PEACOCK ID (UNIQUE IDENTIFICATION NUMBER)

The first field in the database is a unique identification number for each record. It serves as the primary key and no two records in the database have this same exact number.

In the 5-digit ZIP Code files, it is a concatenation of a two-character file identifier (“5z” in the ZCTA part or “5c” in the county part), the USPS 5-digit ZIP Code (ZIP), the two-character state postal abbreviation (STATEAB), and the six-digit post office finance number (FINUM).

In the *Pro* edition ZIP+4 files, it is a concatenation of a two-character file identifier (“4z”), the two-character state postal abbreviation (STATEAB), the three-digit County FIPS Code (COUNTYFP), the USPS 5-digit ZIP Code (ZIP), the four-digit USPS Plus4 Add-on Code (or the lowest numbered add-on code if there is a range), and a four-digit sequential number for each address range at the same hierarchy.

FIELDS

- **PEACOCK_ID** | Primary Key ④⑤

Each record is identified by a 15-character (ZIP5 file) or 20-character (ZIP+4 file) alpha/numeric primary key that is unique for each record.

CORE USPS INFORMATION

The first fields following the primary key are core information about the USPS 5-digit ZIP Code delivery areas or ZIP+4 address range delivery areas. The fields are different for both databases.

USPS 5-DIGIT ZIP CODE

The first field after the primary key is the United States Postal Service (USPS) 5-digit ZIP Code. The term “ZIP Code” is an acronym for “Zone Improvement Plan Code”, and it is often shortened to the abbreviation “ZIP” (in UPPER case). It is a five-digit code that generally identifies the individual post office or metropolitan area delivery station associated with an address. ZIP Codes were established in 1963 and made mandatory for second and third-class bulk mailers in 1967. The first three digits identify the delivery area of a sectional center facility or a major-city post office serving the delivery address area. The next two digits (the fourth and fifth digits) identify the delivery area of an associate post office, post office branch, or post office station. All post offices are assigned at least one unique five-digit code.

FIELDS

- **ZIP** | USPS 5-digit ZIP Code ④⑤

The USPS 5-digit zone is identified by a five-character numeric code.

USPS PLUS4 ADD-ON CODE

In the *Pro* edition ZIP+4 files, the two fields following the United States Postal Service (USPS) ZIP Code indicate the low and high numeric range of the USPS Plus4 Add-on Codes for the ZIP+4 address range. For most standard street address ranges, the low and high add-on codes will be the same; but for post office boxes, buildings, and other special circumstances, there may be a sequential range.

Plus4 Add-on Codes, established in 1983, are an enhancement to the USPS 5-digit ZIP Code that use an additional four digits to represent a geographic segment within the five-digit delivery area, such as a city block, a group of apartments, an individual high-volume receiver of mail, or any other unit that could use an extra identifier to aid in efficient mail sorting and delivery. Initial attempts to promote universal use of the new format met with public resistance, and today the Plus4 Add-on Code is not required because the multiline optical character readers (MLOCR) used by the USPS can directly determine the correct add-on code from the street address, along with the two-digit delivery point code.

Post office boxes general, but not always, have their own ZIP+4 code. The add-on code is typically one of the following: the last four digits of the box number (example, PO Box 482161, Kaunakakai, HI 96748- 2161), zero plus the last three digits of the box number (example, PO Box 17861, Louisville, KY 40217-0861) or, if the box number

consists of fewer than four digits, enough zeros are attached to the front of the box number to produce a four-digit number (example, PO Box 61, New York, NY 10035-0061). However, there is no uniform rule, so the add-on code must be looked up individually for each box.

It is common to use add-on code 9998 for mail addressed to the postmaster (to which requests for pictorial cancellations are usually addressed), 9999 for general delivery, other high-numbered add-on codes for business reply mail and, for a unique ZIP Code, the add-on code is usually 0001.

Note that not all mailing addresses have a USPS Plus4 Add-on Code assigned to them.

FIELDS

- **FROMPLUS4** | From (low) USPS 4-digit Plus4 Add-on Code ④
In the ZIP+4 files, the lowest numbered USPS 4-digit Plus4 Add-on in the address range is identified by a four-character numeric code.
- **TOPLUS4** | To (high) USPS 4-digit Plus4 Add-on Code ④
In the ZIP+4 files, the highest numbered USPS 4-digit Plus4 Add-on in the address range is identified by a four-character numeric code.

STATE (OR EQUIVALENT) ABBREVIATION

Until 1963 the (then called) U.S. Post Office preferred the state and territorial names be written out in full to avoid confusion, but accepted the popular public practice of abbreviation. The Post Office published lists of preferred state abbreviations in the 1831 *Table of Post Offices in the United States* and in the *United States Official Postal Guide*, first published in 1874. Most of the preferred abbreviations in 1874 remained the same for nearly the next 90 years.

When the Post Office implemented the 5-digit ZIP Code in 1963, which was placed after the state name in the last line of an address, to provide room for the new code in the address line, the department also published an initial list of state abbreviations in the June 27, 1963 issue of the *Postal Bulletin*. Many of these initial abbreviations consisted of four letters.

Four months later, in October 1963, the Post Office published the now-familiar list of two-letter state abbreviations in *Publication 59, Abbreviations for Use with ZIP Codes*. Implementation was gradual; initially they were intended for optional use only by large business mailers in conjunction with ZIP Codes.

To date, only one change has been made to the abbreviations issued in October 1963. In November 1969, at the request of the Canadian postal administration, the abbreviation for Nebraska, originally “NB”, was changed to “NE”, to avoid confusion with New Brunswick in Canada.

FIELDS

- **STATEAB** | USPS State Postal Abbreviation ④ ⑤
The state or equivalent entity is identified by a two-character alphabetic USPS postal abbreviation.

HISTORY OF STATE ABBREVIATIONS

The U.S. Post Office made several revisions in preferred abbreviations for states and territories. The table below shows the history of state postal abbreviations from 1831 to the present.

STATE	1831	1874	1943	6/1963	10/1963	1969
Alabama	Al.	Ala.	Ala.	ALA	AL	AL
Alaska	--	Alaska	Alaska	ALSK	AK	AK
Arizona	--	Ariz.	Ariz.	ARIZ	AZ	AZ
Arkansas	Ar. T.	Ark.	Ark.	ARK	AR	AR
California	--	Cal.	Calif.	CALIF	CA	CA
Colorado	--	Colo.	Colo.	COL	CO	CO
Connecticut	Ct.	Conn.	Conn.	CONN	CT	CT
Delaware	De.	Del.	Del.	DEL	DE	DE
District of Columbia	D. C.	D. C.	D. C.	DC	DC	DC
Florida	Fl. T.	Fla.	Fla.	FLA	FL	FL
Georgia	Ga.	Ga.	Ga.	GA	GA	GA
Hawaii	--	--	Hawaii	HAW	HI	HI
Idaho	--	Idaho	Idaho	IDA	ID	ID
Illinois	Il.	Ill.	Ill.	ILL	IL	IL
Indiana	Ia.	Ind.	Ind.	IND	IN	IN
Iowa	--	Iowa	Iowa	IOWA	IA	IA
Kansas	--	Kans.	Kans.	KANS	KS	KS
Kentucky	Ky.	Ky.	Ky.	KY	KY	KY
Louisiana	La.	La.	La.	LA	LA	LA
Maine	Me.	Me.	Maine	ME	ME	ME
Maryland	Md.	Md.	Md.	MD	MD	MD
Massachusetts	Ms.	Mass.	Mass.	MASS	MA	MA
Michigan	Mic. T.	Mich.	Mich.	MICH	MI	MI
Minnesota	--	Minn.	Minn.	MINN	MN	MN
Mississippi	Mi.	Miss.	Miss.	MISS	MS	MS
Missouri	Mo.	Mo.	Mo.	MO	MO	MO
Montana	--	Mont.	Mont.	MONT	MT	MT
Nebraska	--	Nebr.	Nebr.	NEB	NB	NE
Nevada	--	Nev.	Nev.	NEV	NV	NV
New Hampshire	N. H.	N. H.	N. H.	NH	NH	NH
New Jersey	N. J.	N. J.	N. J.	NJ	NJ	NJ
New Mexico	--	N. Mex.	N. Mex.	NM	NM	NM
New York	N. Y.	N. Y.	N. Y.	NY	NY	NY
North Carolina	N. C.	N. C.	N. C.	NC	NC	NC
North Dakota	--	--	N. Dak.	ND	ND	ND
Ohio	O.	Ohio	Ohio	OHIO	OH	OH
Oklahoma	--	--	Okla.	OKLA	OK	OK
Oregon	--	Oreg.	Oreg.	ORE	OR	OR
Pennsylvania	Pa.	Pa.	Pa.	PA	PA	PA
Puerto Rico	--	--	P. R.	PR	PR	PR
Rhode Island	R. I.	R. I.	R. I.	RI	RI	RI
South Carolina	S. C.	S. C.	S. C.	SC	SC	SC
South Dakota	--	--	S. Dak.	SD	SD	SD
Tennessee	Te.	Tenn.	Tenn.	TENN	TN	TN
Texas	--	Tex.	Tex.	TEX	TX	TX
Utah	--	Utah	Utah	UTAH	UT	UT

Vermont	Vt.	Vt.	Vt.	VT	VT	VT
Virginia	Va.	Va.	Va.	VA	VA	VA
Washington	--	Wash.	Wash.	WASH	WA	WA
West Virginia	--	W. Va.	W. Va.	W VA	WV	WV
Wisconsin	--	Wis.	Wis.	WIS	WI	WI
Wyoming	--	Wyo.	Wyo.	WYO	WY	WY

Sources include, 1831, *Table of Post Offices in the United States*; 1874 and 1943, *United States Official Postal Guide*; 6/1963, *Postal Bulletin 20368*; 10/1963, *Post Office Department Publication 59, Abbreviations for Use with ZIP Codes*; 1969, at the request of the Canadian postal administration, the abbreviation for Nebraska, originally "NB", was changed to "NE", to avoid confusion with New Brunswick in Canada.

CITY AND ALTERNATE PLACES

Preferred cities are selected for use in the last line of mailings based on local addressing customs and USPS standards. For example, the city name "Hollywood" is desired by certain businesses in some Los Angeles 5-digit ZIP Codes. Another example, if a five-digit locale has a large number of towns and villages, one may be chosen by the USPS as the preferred city name.

When the five-digit codes were first implemented in 1963, each five-digit delivery area had only one preferred city for use in mailing addresses. Now addresses in the same five-digit zone can have different preferred cities, and ZIP+4 processing is required to precisely determine the correct preferred city for each individual address.

In the ZIP5 files, a preferred city is given for each five-digit code, and an alternate places reference database is provided to assist selecting the best preferred city. In the *Pro* edition ZIP+4 files, the correct preferred city is identified for each address range.

There are three preferred city fields and one (ZIP+4 file) or two (ZIP5 file) flags to provide additional information about their correct use. The USPS preferred city name (USPSCITY) presents the city name in accordance with local addressing customs and USPS standards. The formatted city name (CITY) gives the city formatted in Mixed Case, and in a small percentage of cases includes standardization to make searching easier and for better presentation on mailings. If there is any standardization, an "S" is entered in City Standardization Flag (CITYFLAG).

Formatted city names (CITY) longer than 13 characters in length also have an abbreviation entered in the abbreviated city name field (CITY13) that fits a 13-character standard. If an "A" is entered in the City Standardization Flag (CITYFLAG), it means local addressing customs or USPS standards explicitly favor the abbreviated form of the city name used in mailings.

In the ZIP5 files, the acceptable alternate place count (PLACECNT) provides the total number of acceptable places listed for that five-digit code in the alternate places reference file. If the number is "1", it means the city name given in the ZIP5 file is the only acceptable place name for mailings to the five-digit zone. If the number is greater than one, there are other acceptable place names for the five-digit code, and the alternative place reference file can be employed for additional information on their correct use.

FIELDS

- **USPSCITY** | USPS Preferred City Name ④ ⑤

The USPS preferred city is identified by an up to 28-character alpha/numeric descriptive name.

- **CITY** | Formatted City Name ④ ⑤
The city is identified by an up to 28-character alpha/numeric descriptive name in Mixed Case; the spelling is based on the USPS preferred city name (USPSCITY), but may include additional standardization.
- **CITY13** | Abbreviated City Name ④ ⑤
Addresses with a formatted city name (CITY) longer than 13 characters in length also have an abbreviation that fits a 13-character standard.
- **CITYFLAG** | City Standardization Flag ④ ⑤
Records have a single-character alphabetic code indicating if the formatted city name (CITY) includes standardization or if the abbreviated city name (CITY13) is favored by the USPS for mailings:
S = Formatted city name (CITY) is standardized
A = USPS favors the abbreviated city name (CITY13)
- **PLACECNT** | Acceptable Alternate Place Count ⑤
In the ZIP5 files, the number of acceptable alternate place names listed in the alternate places reference file for the USPS 5-digit ZIP Code is identified by an up to three-digit integer.

ADDRESS RANGES

The *Pro* edition ZIP+4 files provide address ranges allowing precise matching of addresses on residential and business lists to the correct USPS ZIP+4 record. Matching is against a range of addresses and, if there is a unit number, a range of unit numbers.

FIELDS

- **FROMHN** | From (low) house or structure number ④
- **TOHN** | To (high) house or structure number ④
- **ADDRPARITY** | Address Parity Indicator ④
In the ZIP+4 files, addresses with a structure number have a single-character alphabetic code identifying the parity of the structure number:
O = Odd
E = Even
B = Both or not applicable
- **FULLNAME** | Full street address line in Mixed Case; concatenation of the street prefix direction (PREDIR), base street name (STREETNAME), street type (STREETTYPE), and suffix direction (SUFDIR), as available with a space between each part; examples, “N Main St”, “Pennsylvania Ave SW” ④
- **PREDIR** | Street prefix direction; examples, “N”, “W”, “SE”, “SW” ④
- **USPSSN** | USPS base street name; examples, “MAIN”, “LAWSON CRK”, “52ND” ④
- **STREETNAME** | Base street name in Mixed Case; examples, “Main”, “Lawson Creek”, “52nd” ④

- **SNFLAG** | Street Standardization Flag ④

In the ZIP+4 files, addresses with standardization in the formatted base street name (STREETNAME) are indicated by a single-character alphabetic code:

S = Formatted base street name (STREETNAME) is standardized

- **STREETTYPE** | Street type in Mixed Case; examples, “Ave”, “Rd”, “St”, “Blvd” ④
- **SUFDIR** | Street suffix direction; examples, “N”, “W”, “SE”, “SW” ④
- **UNIT TYPE** | Unit type; examples, “Apt”, “Rm”, “Ste”, “Bldg” ④
- **FROMUNIT** | From (low) unit number ④
- **FROMUNIT** | From (high) unit number ④
- **UNITPARITY** | Unit Parity Indicator ④

In the ZIP+4 files, addresses with a unit number have a single-character alphabetic code identifying the parity of the unit number:

O = Odd

E = Even

B = Both or not applicable

In address range matching, the included address ranges point to a sequential line of potential addresses and not individual addresses. All possible structure numbers are included in the range, from the first structure to the last, and all structure numbers of the same parity (odd, even, or both) in between, regardless of if the actual structure currently exists.

Like structure numbers, unit numbers are also provided as a range and the included unit ranges point to a sequential line of potential units and not individual units. All possible unit numbers are included in the range, from the first unit to the last, and all unit numbers of the same unit parity (odd, even, or both) in between, regardless of if the actual unit currently exists.

The address range fields are set up for the easiest matching possible considering the involvedness. Matching can be against the full street address line (FULLNAME) or the parsed address fields—street prefix direction (PREDIR), USPS base street name (USPSSN), formatted base street name (STREETNAME), street type (STREETTYPE), and street suffix direction (SUFDIR)—along with the USPS 5-digit ZIP Code (ZIP), USPS preferred city name (USPSCITY), formatted city name (CITY), abbreviated city name (CITY13), from structure number (FROMHVN), to structure number (TOHVN), address parity indicator (ARRDPARITY), from unit number (FROMUNIT), to unit number (TOUNIT), and unit parity indicator (UNITPARITY), as needed.

Designed similar to the USPS preferred city name field, the USPS base street name (USPSSN) presents the street name in accordance with local addressing customs and USPS standards. The formatted base street name (STREETNAME) gives the street name formatted in Mixed Case, and in a small percentage of cases includes standardization to make searching easier and for better presentation in mailings. If there is any standardization, an “S” is entered in Street Standardization Flag (SNFLAG).

The parity of an address (ADDRPARITY) and unit (UNITPARITY) is important because ranges can include structure or unit numbers of only the same odd/even parity, or may have both odd and even structure or unit numbers (assigned a “B” in the respective parity field), and must be considered.

Note that address ranges can include structure numbers and unit numbers with alphabetic characters, which help to uniquely identify addresses; or hyphens, which separate the structure number or unit number from other address elements, such as avenue numbers, private road designators, and grid cell numbers.

USPS 5-DIGIT ZIP CLASSIFICATION CODES

The United States Postal Service (USPS) classifies all 5-digit ZIP Code areas as to the type of delivery area and the availability of city-delivery and carrier route rates for bulk mail merging. Also, to collect cost and statistical data and compile revenue and expense data, the USPS has a unique finance number identifying each postal facility—post offices have a single finance number even when they serve multiple ZIP Codes. The finance number can be used to match records in other USPS files.

FIELDS

- **ZIPCLASS** | ZIP Classification Code ④ ⑤
The five-digit delivery area type is classified by a single-character alphabetic code:
 - M = Military ZIP Code
 - P = ZIP Code for PO Boxes only
 - S = Standard Zip Code for multiple addresses
 - U = Unique ZIP Code assigned to a specific organization
- **CRCD** | City-Delivery Carrier Routes Indicator ④ ⑤
City-delivery carrier routes are indicated for five-digit zones by a logical single-character alphabetic code:
 - Y = Post office has city-delivery carrier routes
 - N = Post office does not have city-delivery carrier routes
- **CRMS** | Bulk Mail Sort/Merge Indicator ④ ⑤
The availability of carrier route rates in five-digit zones for bulk mail sort/merge preparation is indicated by a single-character alphabetic code:
 - A = Carrier route rates are available and merging is permitted
 - B = Carrier route rates are available and merging is not permitted
 - C = Carrier route rates are not available and merging is permitted
 - D = Carrier route rates are not available and merging is not permitted
- **FINUM** | Finance Number ④ ⑤
The postal facility (usually a post office) is identified by a six-character numeric finance number code; post offices have a single finance number even when they serve multiple ZIP Codes.

USPS ZIP+4 CLASSIFICATION CODES

The United States Postal Service (USPS) provides a series of classification codes for each record in the ZIP+4 database, including information about postal carrier routes, delivery points, street aliases, alternate records, entries in the USPS Locatable Address Conversion System (LACS) database, and addresses that moved to a different five-digit delivery area.

A postal carrier route is the group of addresses to which the USPS assigns the same code to aid in mail delivery or collection. Carrier route codes have four characters, one letter for the carrier route type followed by a three-digit carrier route number. Carrier route types are:

- **B###** = PO Box delivery
- **C###** = City delivery where mail is delivered on foot by a postal service employee
- **G###** = General Delivery
- **H###** = Highway contract
- **L###** = Landmark area
- **R###** = Rural route where mail is delivered via automobile
- **V###** = Void area (non-delivery)

The type of delivery point is flagged in the Delivery Type Indicator (DELTYPE). If the delivery point is an alias for another street name, an "A" is entered, and the type of street alias is entered in the Street Alias Flag (ALIASFLAG), and the date when the street alias record was created or last changed is entered in the Street Alias Date field (ALIASDATE). Additionally, a reference to the base address is provided in the Company field (COMPANY) discussed below.

Indicators are also provided if the street address is an alternate record for a preferred street address record also in the database, when at least one address in the address range is listed in the USPS Locatable Address Conversion System (LACS) database, and if the street address has moved to another 5-digit ZIP Code delivery area. In the case of a move, the new location is entered in the Company field (COMPANY) discussed below.

FIELDS

- **CRRT** | Carrier Route ④
In the ZIP+4 files, the carrier route is identified by a four-character alpha/numeric code.
- **DELTYPE** | Delivery Type Indicator ④
In the ZIP+4 files, the delivery point type is indicated by a single-character alphabetic code:
 - A = Street alias
 - F = Firm, company, or organization
 - G = General Delivery
 - H = Highrise or building
 - P = PO Box
 - R = Rural route or highway contract
 - S = Street

- **ALIASFLAG** | Street Alias Flag ④
In the ZIP+4 files, street aliases are classified by type by a single-character alphabetic code:
 - A = Alias is an abbreviated form of a street name
 - C = Alias is an old name which local government officially changed
 - N = Alias is a nickname or other name by which a street is known
 - P = Alias is a locally preferred form of a street name
- **ALIASDATE** | Street Alias Date ④
In the ZIP+4 files, the date a street alias was created or last change is identified by a ten-character value in MM-DD-YYYY format.
- **ALTREC** | Alternate Record Indicator ④
In the ZIP+4 files, addresses that have a preferred alternate address record elsewhere in the database are indicated by a single-character alphabetic code:
 - A = The address is an alternate record for another preferred address record
- **LACS** | Locatable Address Conversion System (LACS) Indicator ④
In the ZIP+4 files, address ranges that have at least one individual address listed in the USPS Locatable Address Conversion System (LACS) database are indicated by a single-character alphabetic code:
 - L = At least one address in the address range is in the USPS LACS database
- **MOVED** | Move Indicator ④
In the ZIP+4 files, street address that moved to another five-digit delivery area are indicated by a single-character alphabetic code; the new location is listed in the Company field (COMPANY):
 - M = Address moved to another ZIP Code

COMPANY FIELD

In the *Pro* edition ZIP+4 files, the basic design of the Company field (COMPANY) is to hold the name or description of a company or organization associated with the ZIP+4 address range, but it can also hold additional information about alias street names and addresses that moved to a different five-digit delivery area.

FIELDS

- **COMPANY** | Company or Organization Name ④
In the ZIP+4 files, records have an up to 50-character alpha/numeric company or organization name identifier; this field is also used to identify base street names associated with alias street names and addresses that move from a different five-digit delivery area.

PUERTO RICO URBANIZATION

In the *Pro* edition ZIP+4 files, the urbanization field (URB) provides descriptive urbanization address elements used in Puerto Rican mailings that denotes an area, sector, or development within a geographic area. If used, the postal urbanization line is placed above the delivery address line.

Many Puerto Rican street addresses are ambiguous without urbanization. For example, USPS ZIP Code “00784” has six streets named “Calle 1” with door number “A1” in the house number range, all having the same delivery line “A1 Calle 1” in “Guayama, PR 00784”. Puerto Rican urbanization is necessary to distinguish between these four addresses. For example, the distinguishing descriptive elements for these six addresses include, “Urb Bello Horizonte”, “Urb Vistamar”, “Jard De Guamani”, “Valles De Guayama”, “Villa Rosa 1”, and “Villa Rosa 3”.

FIELDS

- **URB** | Puerto Rico Urbanization ④

In the ZIP+4 files, urbanized Puerto Rico addresses have an up to 28-character alpha/numeric postal urbanization line; if used, the postal urbanization line is placed above the delivery address line.

TIME ZONE, UTC OFFSET AND DAYLIGHT SAVINGS TIME

The United States, including insular areas and associated island areas, observes 13 time zones. A time zone is a region that has a uniform standard time for legal, commercial, and social purposes. It is convenient for areas in close proximity to keep the same time, so time zones tend to follow the boundaries of countries and their subdivisions.

Most time zones on land are offset from Coordinated Universal Time (UTC) by a whole number of hours (UTC-12 to UTC+12), but a few are offset by 30 or 45 minutes (examples, Newfoundland Standard Time is UTC-03:30 and Nepal Standard Time is UTC+05:45). Most states in the United States and some higher latitude countries observe daylight saving time for part of the year, typically by changing clocks by an hour. Many land time zones are skewed toward the west of the corresponding nautical time zones, which creates a permanent daylight saving time effect.

FIELDS

- **TIMEZONE** | Time Zone ④ ⑤

The time zone is identified by an up to four-character alphabetic abbreviation:

AKST = Alaska Standard Time (UTC-09)
 AST = Atlantic Standard Time (UTC-04)
 CST = Central Standard Time (UTC-06)
 ChST = Chamorro Standard Time (UTC+10)
 EST = Eastern Standard Time (UTC-05)
 HST = Hawaii Standard Time (UTC-10)
 KOST = Kosrae Time (UTC+11)
 MHT = Marshall Islands Time (UTC+12)
 MST = Mountain Standard Time (UTC-07)
 PONT = Pohnpei Standard Time (UTC+11)
 PST = Pacific Standard Time (UTC-08)
 PWT = Palau Time (UTC+09)
 SST = Samoa Standard Time (UTC-11)

- **UTCOFFSET** | Coordinated Universal Time (UTC) Offset ④ ⑤

The Coordinated Universal Time (UTC) offset for the time zone (TIMEZONE) is identified by an up to two-digit integer ranging from -12 to 12 hours.

- **DST** | Daylight Savings Time Indicator ④ ⑤

Observance of Daylight Savings Time is indicated by a logical single-character alphabetic code:

Y = Daylight Savings Time is observed

N = Daylight Savings Time is not observed

AREA CODE LIST

A telephone area code is provided for most USPS 5-digit ZIP Code locales. If more than one telephone area code is associated with the same five-digit zone, multiple telephone area codes are sequentially listed and delimited with comas.

FIELDS

- **AREACODE** | Area Code List ④ ⑤

The telephone area code is identified by a three-character numeric code; if a five-digit zone has more than one area code, multiple telephone area codes are sequentially listed and delimited with comas.

GEOCODING CONFIDENCE

To establish geographic location, GeoCoding is run on all United States Postal Service (USPS) 5-digit ZIP Codes and ZIP+4 address ranges in the 50 U.S. states, the District of Columbia (federal district), and the Commonwealth of Puerto Rico (insular area). Once the geographic location is determined, area size data, urban and rural indicators, and demographic variables are assigned to individual records based on the geo coded results.

The GeoCoding Confidence Flag (GEOFLAG) is designed so the confidence codes range from a highest confidence of “1” to a lowest confidence of “5”. A confidence of “1” means the geographic information is precisely determined. If any estimates are required, a code of “2”, “3”, “4”, or “5” is assigned depending on the confidence in the assessment. The ZIP5 files only use a GeoCoding confidence of “1” because the geographic areas do not need to be estimated.

FIELDS

- **GEOFLAG** | GeoCoding Confidence Flag ④ ⑤

GeoCoding confidence is indicated by a single-character numeric code; only confidence level “1” is found in the ZIP5 files; if the field is blank, the record did not meet the requirements for GeoCoding.

1 = Highest GeoCoding confidence (highest precision) ④ ⑤

2 = Medium-High confidence ④

3 = Medium confidence ④

4 = Medium-Low confidence ④

5 = Lowest GeoCoding confidence ④

IMPORTANT

If the GeoCoding Confidence Flag (GEOFLAG) is blank, the record did not meet the requirements for GeoCoding. In these cases, an attempt is made to determine at least the latitude and longitude coordinates of the general area. If any coordinates are provided for records that have a blank entry in the GEOFLAG field, the information has been gathered from third-party sources and historical data, and should not be regarded with high confidence or compared with records that were successfully geo coded.

About 79 percent of the ZCTA ZIP5 file, 98 percent of the County ZIP5 file, and 76 percent of the ZIP+4 records have been successfully geo coded. In the *Pro* edition ZIP+4 files, GeoCoding can generally be successfully processed only on address ranges with structure number-street name style addresses. It does not process rural route and post office box addresses because these do not reference a specific geographic area and latitude and longitude coordinates cannot be applied. It also does not process information for some small places where the USPS provides only post office box service, as well as single address-address ranges, including out-of-parity and out-of-sequence ranges that cover only a single structure number.

GEO ID (HIERARCHY IDENTIFICATION NUMBER)

A geographic identifier (GEOID) provides a unique hierarchically defined code for geo coded areas. The identifiers are determined from GeoCoding. GeoCoding is run on all United States Postal Service (USPS) 5-digit ZIP Codes and ZIP+4 address ranges in the 50 U.S. states, the District of Columbia (federal district), and the Commonwealth of Puerto Rico (insular area).

The ZIP5 file is geo coded at both the Zip Code Tabulation Area (ZCTA) level and county level. In the ZCTA part, the geographic identifier is a concatenation of the two-digit State FIPS Code (STATEFP) and the USPS 5-digit ZIP Code (ZIP). In the county part, the geographic identifier is a concatenation of the two-digit State FIPS Code (STATEFP) and the three-digit County FIPS Code (COUNTYFP).

The *Pro* edition ZIP+4 database is geo coded at the census block group level (except as noted below), and the geographic identifier is a concatenation of the two-digit State FIPS Code (STATEFP), the three-digit County FIPS Code (COUNTYFP), the six-digit census tract (TRACT), and the one-digit census block group (BLOCKGRP).

FIELDS

- **GEOID** | Geographic Identifier ④⑤
Records are identified with a five-character (County ZIP5 file), seven-character (ZCTA ZIP5 file), or 12-character (ZIP+4 file) numeric code that uniquely hierarchically defines the geographic area processed in the GeoCoding.

IMPORTANT

In the *Pro* edition ZIP+4 files, the longitude and latitude coordinates, as well as other geographic identifiers and indicators, are geo coded at the address range level for added precision; these coordinates are for the specific addresses and not for the entire census block group. The area size data, urban and rural indicators, and demographic variables are all tabulated or estimated at the census block group level.

LATITUDE AND LONGITUDE COORDINATES

Any location on Earth can be described with two numbers—its latitude and its longitude. If a pilot or a ship's captain wants to specify a position on a map, these are the coordinates they would use. In actuality, these coordinates are angles, measured in degrees, minutes of arc, and seconds of arc.

Internal point latitude and longitude coordinates are a calculated point that is at or near the geographic center of the entity. For some irregularly shaped entities (such as those shaped like a crescent), the calculated geographic center may be located outside the boundaries of the area. In such instances, the internal point is identified as a point inside the entity boundaries nearest or near the calculated geographic center.

The database provides internal point latitude and longitude coordinates for geographic areas presented in multiple formats. The examples given below are for the same latitude and longitude coordinates in Apache County, Arizona.

FIELDS

- **LATITUDE** | Latitude coordinate in degrees ④ ⑤
- **LONGITUDE** | Longitude coordinate in degrees ④ ⑤
Seven decimal places; examples, +34.0874945, -109.3283640.
- **LATRAD** | Latitude coordinate converted to radians ④ ⑤
- **LONRAD** | Longitude coordinate converted to radians ④ ⑤
15 numeric places; useful for trigonometry functions; examples, 0.594939012780458, -1.908139917618838.
- **LATDMS** | Latitude coordinate in degrees/minutes/seconds ④ ⑤
- **LONDMS** | Longitude coordinate in degrees/minutes/seconds ④ ⑤
Useful when printing out coordinates in documents and on websites; examples, 34° 5' 15" N, 109° 19' 42" W.

Latitude and longitude coordinates are demined from GeoCoding. GeoCoding is run on all United States Postal Service (USPS) 5-digit ZIP Codes and ZIP+4 address ranges in the 50 U.S. states, the District of Columbia (federal district), and the Commonwealth of Puerto Rico (insular area).

The ZIP5 latitude and longitude coordinates are calculated at both the Zip Code Tabulation Area (ZCTA) level and county level. In the ZCTA part, coordinates are internal points of ZCTAs. In the county part, they are internal points of counties.

In the *Pro* edition ZIP+4 files, latitude and longitude coordinates are internal points of the census blocks where the ZIP+4 address ranges are located.

Note that while degree coordinates have seven decimal places, the positional accuracy of these coordinates may not be as great as the seven decimal places suggest because spatial accuracy varies with the source materials used. Therefore, the data may not be suitable for high-precision measurement applications such as engineering problems, property transfers, or other uses requiring highly accurate measurements of the earth's surface.

LATITUDE

Latitude gives a location north or south of the equator. On a map it is represented by horizontal lines (or parallels) that circle the globe. Many will tell you that the size of one degree of latitude is the same anywhere on the globe, but in reality it increases slightly from the equator to the poles as a result of the earth's polar flattening.

The important lines of latitude are:

- 0° - The Equator
- 23.5°N and S - The Tropics (called Cancer in the north and Capricorn in the south)
 - between these two, at some time of the year, the sun is directly overhead
 - beyond each of these the sun is never directly overhead
- 66.5°N and S - The Polar Circles
- 90°N and S - The Poles
 - beyond the Poles and the Polar Circles 24 hours of daylight (midnight sun) is possible in summer and 24 hours without any daylight is possible in winter

LONGITUDE

Longitude gives a location east or west of the prime meridian. On a map it is represented by vertical lines that circle the globe and are divided into 360 degrees. The prime meridian (the meridian of Greenwich, England) is at 0 degrees longitude, and the east and west meridians (lines of longitude) converge on the opposite side of the earth to meet at 180 degrees longitude, the anti-prime meridian, which also defines, with some diversions to pass around various territories and island groups, the International Date Line. Longitude coordinates east of the prime meridian are east longitude (and are given positive numbers when used in equations). Longitude coordinates west of the prime meridian are west longitude (and are given negative numbers when used in equations).

DISTANCE FORMULAS

At the equator one degree of latitude is 68.7 miles, at the poles it is 69.4 miles, and at 45 degrees it is 69.1 miles. As you can see, the distance varies, but only a small amount. Conversely, the size of one degree of longitude varies greatly. At the equator one degree of longitude is 69.2 miles, about the same size as a degree of latitude; however, the size gradually decreases to zero as the meridians converge at the poles. At 45 degrees one degree of longitude is 49 miles.

This large variation in the size of a degree of longitude, dependent on where it is located, is the main stumbling block in distance formulas. Some calculations are approximations that completely or largely ignore these variations and accept a margin of error which can be more than ten percent. Other more precise calculations take the variations into account, but they are considerably more complex.

FORMULA 1

This approximation formula, based on the Pythagorean theorem ($a^2 + b^2 = c^2$), named after Greek mathematician Pythagoras (ca. 570 BC–ca. 495 BC), is the simplest, but it has a considerable margin of error. Both

versions of the equation are the same but use different notation. The radical (“√”) in the first equation indicates the square root should be calculated from the value within it. The square root of a number n is a number r such that $r^2 = n$, or, in other words, a number r whose square (the result of multiplying the number by itself) is n .

$$d = \sqrt{x^2 + y^2} \quad ; \quad \text{distance} = \text{sqrt}(x * x + y * y)$$

Where: $x = 69.1 \times (\text{lat}_2 - \text{lat}_1)$
 $y = 53.0 \times (\text{long}_2 - \text{long}_1)$

Excel: $=\text{SQRT}((69.1 * (\text{lat}_2 - \text{lat}_1))^2 + (53 * (\text{long}_2 - \text{long}_1))^2)$

FORMULA 2

This approximation formula variation of Formula 1 adds a cosine math function to improve accuracy. The cosine of a right-angled triangle is the length of the side adjacent to the right angle divided by the length of the hypotenuse (the longest side of a right-angled triangle, at the side opposite the right angle); or, stated as an equation: $\cos = \frac{a}{h}$.

$$d = \sqrt{x^2 + y^2} \quad ; \quad \text{distance} = \text{sqrt}(x * x + y * y)$$

Where: $x = 69.1 \times (\text{lat}_2 - \text{lat}_1)$
 $y = 69.1 \times (\text{long}_2 - \text{long}_1) \times \cos\left(\frac{\text{lat}_1}{57.3}\right)$

Excel: $=\text{SQRT}((69.1 * (\text{lat}_2 - \text{lat}_1))^2 + (69.1 * (\text{long}_2 - \text{long}_1) * \text{COS}(\text{lat}_1 / 57.3))^2)$

FORMULA 3

This formula, which falls under the class of Great Circle Distance Calculations and derives from the Spherical Law of Cosines, is significantly more accurate than the approximation formulas above; however, it can have large rounding errors if the distance is small. It requires first converting the latitude and longitude coordinates to radians by dividing them by $\left(\frac{180}{\pi}\right)^\circ$ (approximately 57.2957795130824 degrees). This is because angles need to be in radians to pass them to trigonometry functions. Fortunately, with Peacock Data database products, the degrees-to-radians conversions are already included in separate fields. Note that *acos* is sometimes used to mean the same as *arccos*. Also note that carrying degrees-to-radians calculations out to more decimal places provides greater precision (15 numeric places is ideal).

$$d = R \times \arccos[\sin(\varphi_1) \times \sin(\varphi_2) + \cos(\varphi_1) \times \cos(\varphi_2) \times \cos(\lambda_2 - \lambda_1)]$$

Where: $\varphi_1, \varphi_2 =$ latitude of the points in radians
 $\lambda_1, \lambda_2 =$ longitude of the points in radians
 $R =$ radius of the earth:

- Statute miles: $R = 3959$
- Kilometers: $R = 6371$
- Nautical miles: $R = 3440$

Excel: $=R * \text{ACOS}(\text{SIN}(\text{lat}_1) * \text{SIN}(\text{lat}_2) + \text{COS}(\text{lat}_1) * \text{COS}(\text{lat}_2) * \text{COS}(\text{long}_2 - \text{long}_1))$

The radiuses of the earth are mean values. The equatorial radius is 6,378.1 kilometers. The polar radius is 6,356.8 kilometers. Also note that a nautical mile is the average length of one minute of one degree along the Great Circle of the Earth (about one minute of arc of latitude measured along any meridian; or about one minute of arc of longitude at the equator). In 1929 it was internationally agreed that a nautical mile would be exactly 1,852 meters (6,076 feet $1\frac{25}{64}$ inches). Prior to this time, different countries had different definitions of a nautical mile.

FORMULA 4

This variation of Formula 3 includes the degrees-to-radians conversions in the equation itself.

$$d = R \times \arccos \left[\sin \left(\frac{\varphi_1}{rad} \right) \times \sin \left(\frac{\varphi_2}{rad} \right) + \cos \left(\frac{\varphi_1}{rad} \right) \times \cos \left(\frac{\varphi_2}{rad} \right) \times \cos \left(\frac{\lambda_2 - \lambda_1}{rad} \right) \right]$$

Where: φ_1, φ_2 = latitude of the points in degrees
 λ_1, λ_2 = longitude of the points in degrees
 $rad = \left(\frac{180}{\pi} \right)^\circ \approx 57.2957795130824^\circ$
 R = radius of the earth:

- Statute miles: $R = 3959$
- Kilometers: $R = 6371$
- Nautical miles: $R = 3440$

Excel: $=R*ACOS(SIN(lat_1/57.2957795130824)*SIN(lat_2/57.2957795130824) + COS(lat_1/57.2957795130824)*COS(lat_2/57.2957795130824)*COS(long_2/57.2957795130824-long_1/57.2957795130824))$

FORMULA 5

This is known as the Haversine formula which also falls under the class of Great Circle Distance Calculations. It is a special case of a more general formula in spherical trigonometry, the Law of Haversines. It is numerically better-conditioned for small distances than the Great Circle formulas previously discussed; however, it also suffers from rounding errors for the special (and somewhat unusual) case of antipodal points (on opposite ends of the sphere). The use of this formula became simplified with the availability of tables for the haversine function (the first equation in the formula). Remember that angles need to be in radians to pass them to trigonometry functions (see Formula 3). You can also apply the degrees-to-radians conversions in the equation itself (similar to the example in Formula 4).

The Haversine formula (as referenced by R. W. Sinnott, "Virtues of the Haversine", *Sky and Telescope*, Volume 68, Number 2, 1984, page 159) is:

$$\text{Haversine: } a = \sin^2 \left(\frac{\varphi_2 - \varphi_1}{2} \right) + \cos(\varphi_1) \times \cos(\varphi_2) \times \sin^2 \left(\frac{\lambda_2 - \lambda_1}{2} \right)$$

$$\text{Formula: } c = 2 \times \text{atan2} \left(\sqrt{a}, \sqrt{1-a} \right)$$

$$d = R \times c$$

Where: φ_1, φ_2 = latitude of the points in radians

λ_1, λ_2 = longitude of the points in radians

R = radius of the earth:

- o Statute miles: $R = 3959$
- o Kilometers: $R = 6371$
- o Nautical miles: $R = 3440$

Excel: $=R*2*ATAN2(SQRT(1-(SIN((lat_2-lat_1)/2)^2+COS(lat_1)*COS(lat_2)*SIN((long_2-long_1)/2)^2)),SQRT(SIN((lat_2-lat_1)/2)^2+COS(lat_1)*COS(lat_2)*SIN((long_2-long_1)/2)^2))$

FORMULA 6

While the most precise formulas presented so far have a margin of error that can be less than a meter, even more exacting equations are available. Among the most precise are found in Vincenty's formulae, two related iterative methods developed by Thaddeus Vincenty (1920–2002; born Tadeusz Szpila), a Polish American geodesist who received the U.S. Department of Commerce Medal for Meritorious Service for his work. The formulae, published in 1975, use an accurate ellipsoidal model of the earth (as opposed to the spherical model utilized in the equations above). They are widely employed in Geodesy (a scientific discipline that deals with the measurement and representation of the Earth) because the system can have a precision within 0.5 mm (0.000015 inches).

Vincenty's formulae are:

NOTATION

Define the following notation:

a = length of semi-major axis of the ellipsoid (radius at equator; 6 378 137.0 meters in WGS 1984)

f = flattening of the ellipsoid (1/298.257 223 563 in WGS 1984)

$b = (1 - f)a$ = length of semi-minor axis of the ellipsoid (radius at the poles)

φ_1, φ_2 = latitude of the points

$U_1 = \arctan[(1 - f) \tan \varphi_1]$ = reduced first latitude (first latitude on the auxiliary sphere)

$U_2 = \arctan[(1 - f) \tan \varphi_2]$ = reduced second latitude (second latitude on the auxiliary sphere)

$L = L_2 - L_1$ = difference in longitude points

λ_1, λ_2 = longitude of the points on the auxiliary sphere

α_1, α_2 = forward azimuths at the points

α = azimuth at the equator

s = ellipsoidal distance between the two points

σ = arc length between points on the auxiliary sphere

INVERSE PROBLEM

Given the coordinates of the two points (φ_1, L_1) and (φ_2, L_2) , the inverse problem finds the azimuths α_1, α_2 and the ellipsoidal distance s .

Calculate U_1, U_2 , and L , and set initial value of $\lambda = L$. Then iteratively evaluate the following equations until λ converges:

$$\sin \sigma = \sqrt{(\cos U_2 \sin \lambda)^2 + (\cos U_1 \sin U_2 - \sin U_1 \cos U_2 \cos \lambda)^2}$$

$$\cos \sigma = \sin U_1 \sin U_2 + \cos U_1 \cos U_2 \cos \lambda$$

$$\sigma = \arctan \frac{\sin \sigma}{\cos \sigma}$$

$$\sin \alpha = \frac{\cos U_1 \cos U_2 \sin \lambda}{\sin \sigma}$$

$$\cos^2 \alpha = 1 - \sin^2 \alpha$$

$$\cos(2\sigma_m) = \cos \sigma - \frac{2 \sin U_1 \sin U_2}{\cos^2 \alpha}$$

$$C = \frac{f}{16} \cos^2 \alpha [4 + f(4 - 3 \cos^2 \alpha)]$$

$$\lambda = L + (1 - C)f \sin \alpha \{ \sigma + C \sin \sigma [\cos(2\sigma_m) + C \cos \sigma (-1 + 2 \cos^2(2\sigma_m))] \}$$

When the change in λ is negligible (e.g., $10^{-12} \approx 0.06 \text{ mm}$), evaluate the following:

$$u^2 = \cos^2 \alpha \frac{a^2 - b^2}{b^2}$$

$$A = 1 + \frac{u^2}{16384} \{4096 + u^2[-768 + u^2(320 - 175u^2)]\}$$

$$B = \frac{u^2}{1024} \{256 + u^2[-128 + u^2(74 - 47u^2)]\}$$

$$\Delta\sigma = B \sin \sigma \left\{ \cos(2\sigma_m) + \frac{1}{4}B \left[\cos \sigma (-1 + 2 \cos^2(2\sigma_m)) - \frac{1}{6}B \cos(2\sigma_m) (-3 + 4 \sin^2 \sigma) (-3 + 4 \cos^2(2\sigma_m)) \right] \right\}$$

$$s = bA(\sigma - \Delta\sigma)$$

$$\alpha_1 = \arctan \left(\frac{\cos U_2 \sin \lambda}{\cos U_1 \sin U_2 - \sin U_1 \cos U_2 \cos \lambda} \right)$$

$$\alpha_2 = \arctan \left(\frac{\cos U_1 \sin \lambda}{-\sin U_1 \cos U_2 - \cos U_1 \sin U_2 \cos \lambda} \right)$$

Between two nearly antipodal points, the iterative formula may fail to converge; this will occur when the first approximation at λ as computed by the equation above is greater than π in absolute value.

DIRECT PROBLEM

Given an initial point (φ_1, L_1) and initial azimuth, α_1 , and a distance, s , along the geodesic the problem is to find the end point (φ_2, L_2) and azimuth, α_2 .

Start by calculating the following:

$$\tan U_1 = (1 - f) \tan \varphi_1$$

$$\sigma_1 = \arctan\left(\frac{\tan U_1}{\cos \alpha_1}\right)$$

$$\sin \alpha = \cos U_1 \sin \alpha_1; \cos^2 \alpha = (1 - \sin \alpha)(1 + \sin \alpha)$$

$$u^2 = \cos^2 \alpha \frac{a^2 - b^2}{b^2}$$

$$A = 1 + \frac{u^2}{16384} \{4096 + u^2[-768 + u^2(320 - 175u^2)]\}$$

$$B = \frac{u^2}{1024} \{256 + u^2[-128 + u^2(74 - 47u^2)]\}$$

Then, using an initial value $\sigma = \frac{s}{bA}$ iterate the following equations until there is no significant change in σ :

$$2\sigma_m = 2\sigma_1 + \sigma$$

$$\Delta\sigma = B \sin \sigma \left\{ \cos(2\sigma_m) + \frac{1}{4}B \left[\cos \sigma (-1 + 2 \cos^2(2\sigma_m)) - \frac{1}{6}B \cos(2\sigma_m) (-3 + 4 \sin^2 \sigma) (-3 + 4 \cos^2(2\sigma_m)) \right] \right\}$$

$$\sigma = \frac{s}{bA} + \Delta\sigma$$

Once σ is obtained to sufficient accuracy, evaluate:

$$\varphi_2 = \arctan\left(\frac{\sin U_1 \cos \sigma + \cos U_1 \sin \sigma \cos \alpha_1}{(1 - f)\sqrt{\sin^2 \alpha + (\sin U_1 \sin \sigma - \cos U_1 \cos \sigma \cos \alpha_1)^2}}\right)$$

$$\lambda = \arctan\left(\frac{\sin \sigma \sin \alpha_1}{\cos U_1 \cos \sigma - \sin U_1 \sin \sigma \cos \alpha_1}\right)$$

$$C = \frac{f}{16} \cos^2 \alpha [4 + f(4 - 3 \cos^2 \alpha)]$$

$$L = \lambda - (1 - C)f \sin \alpha \{ \sigma + C \sin \sigma [\cos(2\sigma_m) + C \cos \sigma (-1 + 2 \cos^2(2\sigma_m))] \}$$

$$\alpha_2 = \arctan\left(\frac{\sin \alpha}{-\sin U_1 \sin \sigma + \cos U_1 \sin \sigma \cos \alpha_1}\right)$$

If the initial point is at the North or South pole then the first equation is indeterminate. If the initial azimuth is due East or West then the second equation is indeterminate. If a double valued atan2 type function is used then these values are usually handled correctly.

VINCENY'S MODIFICATION

In a letter to the Survey Review in 1976, Vincenty suggested replacing his series expressions for A and B with simpler formulas using German geodesist Friedrich Robert Helmert's (1843–1917; best known for his writing on "propagation of uncertainty") expansion parameter k_1 :

$$A = \frac{1 + \frac{1}{4}(k_1)^2}{1 - k_1}$$

$$B = k_1 \left(1 - \frac{3}{8}(k_1)^2\right)$$

Where: $k_1 = \frac{\sqrt{(1+u^2)}-1}{\sqrt{(1+u^2)+1}}$

NEARLY ANTIPODAL POINTS

As noted above, the iterative solution to the inverse problem fails to converge or converges slowly for nearly antipodal points. An example of slow convergence is $(\varphi_1, L_1) = (0^\circ, 0^\circ)$ and $(\varphi_2, L_2) = (0.5^\circ, 179.5^\circ)$ for the WGS 1984 ellipsoid. This requires about 130 iterations to give a result accurate to 1 mm. Depending on how the inverse method is implemented, the algorithm might return the correct result (19 936 288.579 meters), an incorrect result, or an error indicator.

An example of a failure of the inverse method to converge is $(\varphi_1, L_1) = (0^\circ, 0^\circ)$ and $(\varphi_2, L_2) = (0.5^\circ, 179.7^\circ)$ for the WGS 1984 ellipsoid. In an unpublished report, Vincenty gave an alternative iterative scheme to handle such cases. This converges to the correct result of 19 944 127.421 meters after about 60 iterations; however, in other cases many thousands of iterations are required.

LAND AND WATER AREA

The database provides the total area size, total land area, and total water area characteristics for geographic areas.

FIELDS

- **AREA** | Total area for the geographic area in whole square meters 4 5
- **ALAND** | Total land area for the geographic area in whole square meters 4 5
- **AWATER** | Total water area for the geographic area in whole square meters 4 5

Area size values are demined from GeoCoding. GeoCoding is run on all United States Postal Service (USPS) 5-digit ZIP Codes and ZIP+4 address ranges in the 50 U.S. states, the District of Columbia (federal district), and the Commonwealth of Puerto Rico (insular area).

The ZIP5 area size values are calculated at both the Zip Code Tabulation Area (ZCTA) level and county level. In the ZCTA part, values are for ZCTAs. In the county part, they are for counties.

In the *Pro* edition ZIP+4 files, area size values are for the census block groups where the ZIP+4 address ranges are located.

Total, land, and water area sizes for entities are 14-character numeric values given in whole square meters. Note the following conversion formulas:

- To convert square meters to square miles:
 $mi^2 = m^2 \times 0.00000038610215854781$
- To convert square meters to square yards:
 $yd^2 = m^2 \times 1.1959900463011$
- To convert square meters to square feet:
 $ft^2 = m^2 \times 10.76391041671$
- To convert square meters to square inches:
 $in^2 = m^2 \times 1550.0031000062$
- To convert square meters to acres:
 $ac = m^2 \times 0.00024710538146717$
- To convert square meters to square kilometers:
 $km^2 = m^2 \times 0.000001$
- To convert square meters to square centimeters:
 $cm^2 = m^2 \times 10000$
- To convert square meters to square millimeters:
 $mm^2 = m^2 \times 1000000$
- To convert square meters to hectares:
 $ha = m^2 \times 0.0001$

URBAN AND RURAL INDICATOR

Urban areas are classified as all territory, population, and housing units located within urbanized areas and urban clusters, both defined using U.S. Census Bureau criteria. The U.S. Census Bureau delineates urban area and urban cluster boundaries that represent densely developed territory, encompassing residential, commercial, and other nonresidential urban land uses. In general, this territory consists of areas of high population density and urban land use resulting in a representation of the “urban footprint.” Rural areas consist of all territory, population, and housing units located outside urban areas and urban clusters.

FIELDS

- **UR** | Urban/Rural Indicator **4 5**
Urban and rural areas are indicated by a single-character alphabetic code:
U = Urban
R = Rural
M = Mixed urban/rural

Urban and rural indicator values are demined from GeoCoding. GeoCoding is run on all United States Postal Service (USPS) 5-digit ZIP Codes and ZIP+4 address ranges in the 50 U.S. states, the District of Columbia (federal district), and the Commonwealth of Puerto Rico (insular area).

The ZIP5 urban and rural indicators are calculated at both the Zip Code Tabulation Area (ZCTA) level and county level. In the ZCTA part, indicators are for ZCTAs. In the county part, they are for counties.

In the *Pro* edition ZIP+4 files, urban and rural indicators are for the census block groups where the ZIP+4 address ranges are located.

GEOGRAPHIC AREAS

To establish geographic locations, GeoCoding is run on all United States Postal Service (USPS) 5-digit ZIP Codes and ZIP+4 address ranges in the 50 U.S. states, the District of Columbia (federal district), and the Commonwealth of Puerto Rico (insular area). The results are provided in a series of geographic area fields.

REGION

These are groupings of states and the District of Columbia (federal district) that subdivide the United States. There are four regions: Northeast, Midwest, South, and West. Each region is divided into two or more divisions. Insular areas, associated island areas, and military posts outside the 50 U.S. states and District of Columbia (federal district) are not part of any region.

IDENTIFICATION FIELDS

- **REGION** | Region of the United States ④ ⑤
The region is identified by a single-character numeric code:
 - 1 = Northeast
 - 2 = Midwest
 - 3 = South
 - 4 = West
 - 9 = Not in a region

DIVISION

These are groupings of states and the District of Columbia (federal district) that subdivide the four regions. There are nine divisions. Insular areas, associated island areas, and military posts outside the 50 U.S. states and District of Columbia (federal district) are not part of any division.

IDENTIFICATION FIELDS

- **DIVISION** | Division of the United States ④⑤

The division is identified by a single-character numeric code:

- 1 = New England
- 2 = Middle Atlantic
- 3 = East North Central
- 4 = West North Central
- 5 = South Atlantic
- 6 = East South Central
- 7 = West South Central
- 8 = Mountain
- 9 = Pacific
- 0 = Not in a division

STATE (OR EQUIVALENT)

These are the primary governmental divisions of the United States. In the databases, states include:

- The 50 U.S. states ([see abbreviations](#))

The following are treated as state equivalents:

- District of Columbia (DC) (federal district)
- Overseas military areas
 - U.S. Armed Forces Americas (AA) (except Canada)
 - U.S. Armed Forces Europe (AE) (which serves Europe, Canada, Africa, and the Middle East)
 - U.S. Armed Forces Pacific (AP) (which serves Asia and the Pacific)
- Insular areas:
 - American Samoa (AS)
 - Commonwealth of the Northern Mariana Islands (MP)
 - Commonwealth of Puerto Rico (PR)
 - Guam (GU)
 - Midway Islands (HI) (also known as Midway Atoll; now inhabited only by caretakers)
 - U.S. Virgin Islands (VI)
 - Wake Island (HI) (also known as Wake Atoll; now inhabited only by civilian contractors)

- Associated island areas:
 - Republic of the Marshall Islands (MH)
 - Federated States of Micronesia (FM)
 - Republic of Palau (PW)

FIELDS

- **STATEFP** | State FIPS Code ④ ⑤
The state or equivalent entity is identified by a two-character numeric Federal Information Processing Series (FIPS) code.
- **STATENM** | State Name ④ ⑤
The state or equivalent entity is identified by an up to 38-character descriptive name.

COUNTY (OR EQUIVALENT)

These are the primary legal divisions of most states. In Louisiana, these divisions are known as parishes. In Alaska, which has no counties, the equivalent entities are the organized boroughs, city and boroughs, municipalities, and census areas; the latter of which are delineated cooperatively for statistical purposes by the state of Alaska and the U.S. Census Bureau. In four states (Maryland, Missouri, Nevada, and Virginia), there are one or more incorporated places that are independent of any county organization and constitute primary divisions of the states. These incorporated places are known as independent cities and are treated as equivalent entities for purposes of data presentation. The District of Columbia (federal district), the Commonwealth of the Northern Mariana Islands (insular area), Guam (insular area); and associated island areas have no primary divisions, and each area is considered an equivalent entity for purposes of data presentation. Military posts are given a County FIPS Code of “999” and no value is entered as the county name (COUNTYNM).

FIELDS

- **COUNTYFP** | County FIPS Code ④ ⑤
The county or equivalent entity is identified by a three-character numeric Federal Information Processing Series (FIPS) code based on alphabetical sequence that is unique within states; military posts are given a County FIPS Code of “999”.
- **COUNTYNM** | County Name ④ ⑤
The county or equivalent entity is identified by an up to 25-character descriptive name.

CENSUS TRACT

In the *Pro* edition ZIP+4 files, these are small, relatively permanent statistical subdivisions of a county or equivalent entity that are updated by local participants prior to each decennial census as part of the U.S. Census Bureau *Participant Statistical Areas Program*. The bureau delineates census tracts in situations where no local participant exists or where state, local, or tribal governments decline to participate. The primary purpose of census tracts is to provide a stable set of geographic units for the presentation of statistical data.

Census tracts generally have a population size between 1,200 and 8,000 people, with an optimum size of 4,000 people. A census tract usually covers a contiguous area; however, the spatial size of census tracts varies widely depending on the density of settlement. Census tract boundaries are delineated with the intention of being maintained over a long time so that statistical comparisons can be made from census to census. Census tracts occasionally are split due to population growth or merged as a result of substantial population decline.

Census tract boundaries generally follow visible and identifiable features. They may follow nonvisible legal boundaries, such as minor civil division (MCD) or incorporated place boundaries in some states and situations, to allow for census-tract-to-governmental-unit relationships where the governmental boundaries tend to remain unchanged between censuses. State and county boundaries always are census tract boundaries in the standard census geographic hierarchy.

Census tracts are identified by an up to four-digit integer number and may have an optional two-digit suffix; for example 1457.02 or 23. The census tract codes consist of six digits with an implied decimal between the fourth and fifth digit corresponding to the basic census tract number but with leading zeroes and trailing zeroes for census tracts without a suffix. The tract number examples above would have codes of 145702 and 002300, respectively.

Some ranges of census tract numbers in the 2010 census are used to identify distinctive types of census tracts. The code range in the 9400s is used for those census tracts with a majority of population, housing, or land area associated with an American Indian area and matches the numbering used in the 2000 census. The code range in the 9800s is new for 2010 and is used to specifically identify special land-use census tracts; that is, census tracts defined to encompass a large area with little or no residential population with special characteristics, such as large parks or employment areas. The range of census tracts in the 9900s represents census tracts delineated specifically to cover large bodies of water. This is different from the 2000 census when water-only census tracts were assigned codes of all zeroes ("000000"); "000000" is no longer used as a census tract code for the 2010 census.

The U.S. Census Bureau uses suffixes to help identify census tract changes for comparison purposes. Census tract suffixes may range from .01 to .98. As part of local review of existing census tracts before each census, some census tracts may have grown enough in population size to qualify as more than one census tract. When a census tract is split, the split parts usually retain the basic number but receive different suffixes. For example, if census tract 14 is split, the new census tract numbers would be 14.01 and 14.02. In a few counties, local participants request major changes to, and renumbering of, the census tracts; however, this is generally discouraged. Changes to individual census tract boundaries usually do not result in census tract numbering changes.

FIELDS

- **TRACT** | Tract Census Code ④

In the ZIP+4 files, the census tract is identified by a six-character numeric census code that is unique within counties and equivalent entities with an implied decimal between the fourth and fifth digit to accommodate an optional suffix.

CENSUS BLOCK GROUP

In the *Pro* edition ZIP+4 files, these are statistical divisions of census tracts generally defined to contain between 600 and 3,000 people and used to control census block numbering. A census block group consists of clusters of census blocks within the same census tract that have the same first digit of their four-digit census block number. For example, census blocks 3001, 3002, 3003, through 3999 in census tract 1210.02 belong to census block group 3 in that census tract. Most census block groups were delineated by local participants in the U.S. Census Bureau *Participant Statistical Areas Program*. The U.S. Census Bureau delineated census block groups only where a local or tribal government declined to participate, and a regional organization or State Data Center was not available to participate.

A census block group usually covers a contiguous area. Each census tract contains at least one census block group, and census block groups are uniquely numbered within the census tract. Within the standard census geographic hierarchy, census block groups never cross state, county, or census tract boundaries but may cross the boundaries of any other geographic entity.

Census block groups have a valid code range of 0 through 9. Census block groups beginning with a zero only contain water area and are generally in coastal and Great Lakes water and territorial seas, but also in larger inland water bodies. For the 2010 census, a census block group 0 for the water portion can be delineated in any census tract and not just those census tracts also defined to only include water area. This is a change from the 2000 census, when census block groups coded 0 only existed in census tracts with a code of 0. To differentiate between county-based census block groups and Tribal Block Groups, the codes for Tribal Block Groups use an alphabetic character.

FIELDS

- **BLOCKGRP** | Block Group Census Code ⓘ
In the ZIP+4 files, the census block group is identified by a single-character numeric census code ("0" through "9") based on the first digit of the census block.

PLACE

In the *Pro* edition ZIP+4 files, these are made up of incorporated places and census designated places (CDP). Incorporated places are those reported to the U.S. Census Bureau as legally in existence as of January 1, 2010, as reported in the latest *Boundary and Annexation Survey (BAS)*, under the laws of their respective states. An incorporated place is established to provide governmental functions for a concentration of people as opposed to a minor civil division, which generally is created to provide services or administer an area without regard, necessarily, to population. Places always are within a single state or equivalent entity, but may extend across county and county subdivision boundaries. An incorporated place usually is a city, town, village, or borough, but can have other legal descriptions.

Census designated places (CDP) are the statistical counterparts of incorporated places, and are delineated to provide data for settled concentrations of population that are identifiable by name but are not legally incorporated under the laws of the state in which they are located. The boundaries usually are defined in cooperation with local or tribal officials and are generally updated prior to each decennial census. These boundaries, which usually

coincide with visible features or the boundary of an adjacent incorporated place or another legal entity boundary, have no legal status, nor do these places have officials elected to serve traditional municipal functions. CDP boundaries may change from one decennial census to the next with changes in the settlement pattern; a CDP with the same name as in an earlier census does not necessarily have the same boundary. CDPs must be contained within a single state and may not extend into an incorporated place. There are no population size requirements for CDPs.

Hawaii is the only state that has no incorporated places recognized by the U.S. Census Bureau. All places shown for Hawaii are CDPs. By agreement with the state of Hawaii, the U.S. Census Bureau does not show data separately for the city of Honolulu, which is coextensive with Honolulu County. In the Commonwealth of Puerto Rico (insular area), which also does not have incorporated places, the U.S. Census Bureau recognizes only CDPs and refers to them as *comunidades* or *zonas urbanas*.

A five-digit Federal Information Processing Series (FIPS) place code is assigned based on alphabetical sequence within a state. If place names are duplicated within a state and they represent distinctly different areas, a separate code is assigned to each place name alphabetically by the primary county in which each place is located, or if both places are in the same county, they are assigned alphabetically by their legal descriptions, such as “city” before “village”.

IDENTIFICATION FIELDS

- **PLACEFP** | Place FIPS Code ④

In the ZIP+4 files, the place is identified by a five-character numeric Federal Information Processing Series (FIPS) code usually based on alphabetical sequence within states.

CONGRESSIONAL DISTRICT

In the *Pro* edition ZIP+4 files, these are the 435 areas from which people are elected to the U.S. House of Representatives. After the apportionment of congressional seats among the states based on decennial census population counts, each state with multiple seats is responsible for establishing congressional districts for the purpose of electing representatives. Each congressional district is to be as equal in population to all other congressional districts in a state as practicable.

FIELDS

- **CD** | Congressional District FIPS Code ④

In the ZIP+4 files, the congressional district is identified by a two-character numeric Federal Information Processing Series (FIPS) code:

- 01 to 53 = Congressional district number
- 00 = At large (single district for state)
- 98 = Nonvoting delegate

CENSUS 5-DIGIT ZIP CODE TABULATION AREA (ZCTA)

In the *Pro* edition ZIP+4 files, these are approximate area representations of United States Postal Service (USPS) 5-digit ZIP Code service areas that the U.S. Census Bureau creates using whole census blocks to present statistical data from censuses and surveys. The U.S. Census Bureau defines ZIP Code Tabulation Areas (ZCTA) by allocating each block that contains addresses to a single ZCTA, usually to the ZCTA that reflects the most frequently occurring ZIP Code for the addresses within that census block. Census blocks that do not contain addresses but are completely surrounded by a single ZCTA (enclaves) are assigned to the surrounding ZCTA; those surrounded by multiple ZCTAs are added to a single ZCTA based on limited buffering performed between multiple ZCTAs. The U.S. Census Bureau identifies five-digit ZCTAs using a five-character numeric code that represents the most frequently occurring USPS 5-digit ZIP Code within that ZCTA, and this code may contain leading zeros.

There are significant changes to the 2010 census ZCTA delineation from that used in the 2000 census. Coverage was extended to include the Island Areas for 2010 so that the 50 U.S. states, the District of Columbia (federal District), the Commonwealth of Puerto Rico, and other insular area have ZCTAs. Unlike the 2000 census, when areas that could not be assigned to a ZCTA were given a generic code ending in "XX" (land area) or "HH" (water area), for the 2010 census there is no universal coverage by ZCTAs, and only legitimate five-digit areas are defined. The 2010 ZCTAs better represent the actual ZIP Code service areas because the U.S. Census Bureau initiated a process before the creation of 2010 census blocks to add census block boundaries that split polygons with large numbers of addresses using different ZIP Codes.

Users should not employ ZCTAs to identify the official USPS 5-digit ZIP Codes for mail delivery. The USPS makes periodic changes to ZIP Codes to support more efficient mail delivery. The ZCTA process used primarily residential addresses and was biased towards ZIP Codes used for city-style mail delivery, so there can be ZIP Codes that are primarily nonresidential or boxes only that may not have a corresponding ZCTA.

FIELDS

- **ZCTA5** | ZCTA Census Code ④

In the ZIP+4 files, the ZCTA is identified by a five-character numeric census code usually based on the most frequently occurring USPS 5-digit ZIP Code within census blocks.

DEMOGRAPHICS

The population, household, group quarter, housing unit, and economics demographics provided are among the most important parts of the package. They are available in both the *Pro* and *Standard* editions and encompass all 50 states, the District of Columbia (federal district), and the Commonwealth of Puerto Rico (insular area).

The ZIP5 demographics are tabulated or estimated at both the Zip Code Tabulation Area (ZCTA) level and county level, and the ZIP+4 demographics are tabulated or estimated at the census block group level.

Population, household, group quarter, and housing unit variables are tabulations, aggregates, averages, and medians from *2010 Census Summary File 1* data and subsequent updates. Economic variables are estimates from American Community Survey (ASC) interviews conducted between 2007 and 2011.

DEMOGRAPHIC VARIABLES

pdZIP demographics include the following variables:

ZIP5 FIELD NUMBER	ZIP+4 FIELD NUMBER	FIELD NAME	VARIABLE
35	64	POPULATION	Population
36	65	MALES	Males
37	66	FEMALES	Females
38	67	MDAGE	Median age: Both genders
39	68	MDAGEMALES	Median age: Males
40	69	MDAGEFEMLS	Median age: Females
41	70	WHITE	White
42	71	BLACK	Black or African American
43	72	NATIVE	American Indian or Alaska Native
44	73	ASIAN	Asian
45	74	HAWAIIAN	Native Hawaiian or other Pacific Islander
46	75	OTHERRACE	Other race
47	76	MULTIRACE	Two or more races
48	77	LATINO	Hispanic or Latino
49	78	SPKSPANHM	Speaks Spanish at home (age 5 and over)
50	79	ENROLLPK12	Enrolled in PK-12 (age 3 and over)
51	80	ENROLLCOLG	Enrolled in college
52	81	VETERANS	Veterans (age 18 and over)
53	82	MILQTRPOP	Military quarters population
54	83	STUHSEPOP	College/University student housing population
55	84	NURSFACPOP	Nursing/Skilled-nursing facility population
56	85	ACORFACPOP	Adult correctional facilities population
57	86	JUVFACPOP	Juvenile facilities population
58	87	PERCAPINC	Per capita income
59	88	UNEMPCVPOP	Unemployed civilian population (age 16 and over)
60	89	HOUSEHOLDS	Households
61	90	AVGHHSIZE	Average household size
62	91	MDHHINC	Median household income
63	92	POVERTY	Households with income below the poverty level (in the past 12 months)
64	93	FAMHH	Family households

65	94	AVGFAMSIZE	Average family size
66	95	MDFAMINC	Median family income
67	96	NOFAMHH	Non-family households
68	97	MDNOFAMINC	Median non-family income
69	98	HOUSUNITS	Housing units
70	99	MDNUMROOMS	Median number of rooms
71	100	MDYRBUILT	Median year built
72	101	OCCUHU	Occupied housing units
73	102	HWHITE	Householder who is White
74	103	HBLACK	Householder who is Black or African American
75	104	HNATIVE	Householder who is American Indian or Alaska Native
76	105	HASIAN	Householder who is Asian
77	106	HHAWAIIAN	Householder who is Native Hawaiian or other Pacific Islander
78	107	HOTHERRACE	Householder who is another race
79	108	HMULTIRACE	Householder who is two or more races
80	109	HLATINO	Hispanic or Latino householder
81	110	AVGNUMVEH	Average number of vehicles
82	111	OWNEROCHU	Owner-occupied housing units
83	112	MDHOMEVAL	Median home value
84	113	RENTEROCHU	Renter-occupied housing units
85	114	MDGRENTPCT	Median gross rent as a percentage of income
86	115	MDGRENT	Median gross rent
87	116	MDCRENT	Median contract rent
88	117	VACANTHU	Vacant housing units

COMPATIBILITY

pdZIP utilizes United States Postal Service (USPS) and U.S. Census Bureau coding conventions. It is fully compatible with raw USPS and U.S. Census Bureau data and other databases and applications that make use of their coding conventions.

USING THE ALTERNATE PLACES REFERENCE FILE

Both the *Pro* and *Standard* editions have an alternate places reference file listing preferred place names and acceptable and unacceptable alternate place names for United States Postal Service (USPS) 5-digit ZIP Codes.

Preferred cities are selected for use in mailings based on local mailing customs and USPS standards. For example, the city name “Hollywood” is desired by certain businesses in some Los Angeles USPS 5-digit ZIP Codes. Another example, if a five-digit locale has a large number of towns and villages, one may be chosen as the preferred city name.

When the five-digit codes were first implemented in 1963, each five-digit delivery area had only one preferred city for use in mailing addresses. Now addresses in the same five-digit zone can have different preferred cities, and ZIP+4 processing is required to precisely determine the correct preferred city for each individual address.

In the 5-digit ZIP Code files, a preferred city is given for each five-digit delivery area, and the alternate places reference database is provided to assist selecting the best preferred city. In the *Pro* edition ZIP+4 files, the correct preferred city is identified for each address range.

As noted above, in the ZIP5 files, the acceptable alternate place count (PLACECNT) provides the total number of acceptable places listed for that five-digit code in the alternate places reference file. If the number is “1”, it means the city name given in the ZIP5 file is the only acceptable place name for mailings to the five-digit zone. If the number is greater than one, there are other acceptable place names for the five-digit code, and the alternative place reference file can be employed for additional information on their correct use.

PID FIELD

The first field in the database is a unique identification number for each record. It serves as the primary key and no two records in the database have this same exact number. It is a concatenation of a one-character file identifier (“a”), the USPS 5-digit ZIP Code (ZIP), the one-character place flag (PLACEFLAG) in lower case, a three-digit sequential number for records at the same ZIP Code hierarchy, and a three-digit sequential number for records with the same place flag within the same ZIP Code hierarchy.

FIELDS

- **PID** | Primary Key

Each record is identified by a 15-character alpha/numeric primary key that is unique for each record.

USPS 5-DIGIT ZIP CODE

The first field after the primary key is the United States Postal Service (USPS) 5-digit ZIP Code. The term “ZIP Code” is an acronym for “Zone Improvement Plan Code”, and it is often shortened to the abbreviation “ZIP” (in UPPER case). It is a five-digit code that generally identifies the individual post office or metropolitan area delivery station associated with an address. ZIP Codes were established in 1963 and made mandatory for second and third-class bulk mailers in 1967. The first three digits identify the delivery area of a sectional center facility or a major-city post office serving the delivery address area. The next two digits (the fourth and fifth digits) identify the delivery area of an associate post office, post office branch, or post office station. All post offices are assigned at least one unique five-digit code.

FIELDS

- **ZIP** | USPS 5-digit ZIP Code

The USPS 5-digit zone is identified by a five-character numeric code.

PLACE FIELDS

The place field (PLACE) lists acceptable and unacceptable place names for use in the last line of mailings. Their acceptability is indicated in the Place Flag (PLACEFLAG). The place names are formatted in Mixed Case, and in a small percentage of cases includes standardization to make searching easier and for better presentation on mailings. Each place name that is longer than 13 characters in length also has an abbreviation entered in the abbreviated place name field (PLACE13) that fits a 13-character standard.

FIELDS

- **PLACEFLAG** | Place Flag
The name in the place field (PLACE) is identified as acceptable or unacceptable for use in the last line of mailings by a single-character alphabetic code:
 - A = Place is acceptable for use in the last line of mailings
 - U = Place is unacceptable for use in the last line of mailings
- **PLACE** | Place Name
The place name is identified by an up to 28-character alpha/numeric descriptive name.
- **PLACE13** | Abbreviated Place Name
Place names longer than 13 characters in length also have an abbreviation that fits a 13-character standard.

PREFER FIELDS

The place name favored by the USPS is entered in the preferred place name field (PREFER). The preferred place names are formatted in Mixed Case, and in a small percentage of cases includes standardization to make searching easier and for better presentation in mailings. Each preferred place name that is longer than 13 characters in length also has an abbreviation entered in the abbreviated preferred place name field (PREFER13) that fits a 13-character standard.

FIELDS

- **PREFER** | Preferred Place Name
The preferred place name is identified by an up to 28-character alpha/numeric descriptive name.
- **PREFER13** | Abbreviated Preferred Place Name
Preferred place names longer than 13 characters in length also have an abbreviation that fits a 13-character standard.

STATE (OR EQUIVALENT) ABBREVIATION

These are the primary governmental divisions of the United States. In the databases, states include:

- The 50 U.S. states ([see abbreviations](#))

The following are treated as state equivalents:

- District of Columbia (DC) (federal district)
- Overseas military areas
 - U.S. Armed Forces Americas (AA) (except Canada)
 - U.S. Armed Forces Europe (AE) (which serves Europe, Canada, Africa, and the Middle East)
 - U.S. Armed Forces Pacific (AP) (which serves Asia and the Pacific)
- Insular areas:
 - American Samoa (AS)
 - Commonwealth of the Northern Mariana Islands (MP)
 - Commonwealth of Puerto Rico (PR)
 - Guam (GU)
 - Midway Islands (HI) (also known as Midway Atoll; now inhabited only by caretakers)
 - U.S. Virgin Islands (VI)
 - Wake Island (HI) (also known as Wake Atoll; now inhabited only by civilian contractors)
- Associated island areas:
 - Republic of the Marshall Islands (MH)
 - Federated States of Micronesia (FM)
 - Republic of Palau (PW)

Until 1963 the (then called) U.S. Post Office preferred the state and territorial names be written out in full to avoid confusion, but accepted the popular public practice of abbreviation. The Post Office published lists of preferred state abbreviations in the 1831 *Table of Post Offices in the United States* and in the *United States Official Postal Guide*, first published in 1874. Most of the preferred abbreviations in 1874 remained the same for nearly the next 90 years.

When the Post Office implemented the 5-digit ZIP Code in 1963, which was placed after the state name in the last line of an address, to provide room for the new code in the address line, the department also published an initial list of state abbreviations in the June 27, 1963 issue of the *Postal Bulletin*. Many of these initial abbreviations consisted of four letters.

Four months later, in October 1963, the Post Office published the now-familiar list of two-letter state abbreviations in *Publication 59, Abbreviations for Use with ZIP Codes*. Implementation was gradual; initially they were intended for optional use only by large business mailers in conjunction with ZIP Codes.

To date, only one change has been made to the abbreviations issued in October 1963. In November 1969, at the request of the Canadian postal administration, the abbreviation for Nebraska, originally “NB”, was changed to “NE”, to avoid confusion with New Brunswick in Canada.

FIELDS

- **STATEAB** | USPS State Postal Abbreviation

The state or equivalent entity is identified by a two-character alphabetic USPS postal abbreviation.

COUNTY (OR EQUIVALENT) FIPS CODE

These are the primary legal divisions of most states. In Louisiana, these divisions are known as parishes. In Alaska, which has no counties, the equivalent entities are the organized boroughs, city and boroughs, municipalities, and census areas; the latter of which are delineated cooperatively for statistical purposes by the state of Alaska and the U.S. Census Bureau. In four states (Maryland, Missouri, Nevada, and Virginia), there are one or more incorporated places that are independent of any county organization and constitute primary divisions of the states. These incorporated places are known as independent cities and are treated as equivalent entities for purposes of data presentation. The District of Columbia (federal district), the Commonwealth of the Northern Mariana Islands (insular area), Guam (insular area); and associated island areas have no primary divisions, and each area is considered an equivalent entity for purposes of data presentation. Military posts are given a County FIPS Code of "999".

FIELDS

- **COUNTYFP** | County FIPS Code

The county or equivalent entity is identified by a three-character numeric Federal Information Processing Series (FIPS) code based on alphabetical sequence that is unique within states; military posts are given a County FIPS Code of "999".

USER GUIDE UPDATES

User guides are updated based on information gained from user experience. It is suggested that users regularly check the Support section of the Peacock Data website for updates. Look for a date newer than the date below:

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