Technical Reports

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UNICODE HAN DATABASE (UNIHAN)

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Summary

This document describes the organization and content of the Unihan database.

Status

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Please submit corrigenda and other comments with the online reporting form [Feedback]. Related information that is useful in understanding this annex is found in Unicode Standard Annex #41, "Common References for Unicode Standard Annexes." For the latest version of the Unicode Standard, see [Unicode]. For a list of current Unicode Technical Reports, see [Reports]. For more information about versions of the Unicode Standard, see [Versions]. For any errata which may apply to this annex, see [Errata].

Contents

1 Introduction

The Unihan database is the repository for the Unicode Consortium's collective knowledge regarding the CJK Unified Ideographs contained in the Unicode Standard. It contains mapping data to allow conversion to and from other coded character sets and additional information to help implement support for the various languages which use the Han ideographic script.

Formally, ideographs are defined within the Unicode Standard via their mappings. That is, the Unicode Standard does not formally define what the ideograph U+4E00 is; rather, it defines it as being the equivalent of, say, 0x523B in GB/T 2312, 0x14421 in CNS 11643, 0x306C in JIS X 0208, and so on.

In practice, implementation of ideographs requires large amounts of ancillary data. Input methods require information such as pronunciations, as do collation algorithms. Data in character sets not included in the world of international standards bodies needs to be converted. Relationships between ideographs need to be defined to allow for fuzzy string matching. Beyond all this, it's important to track not only what properties a given ideograph has, but who claims it has those properties.

Unlike characters in Western scripts such as Latin and Greek, whose basic property is their sound, which stays largely constant across languages, the basic property for Han ideographs is their meaning. This isn't to say that ideographs are truly ideographic, in that they represent abstract ideas; but they generally have one root meaning from which the others derive, and generally retain the bulk of their semantic content across linguistic boundaries. Most ideographs are divided into a determinative, which gives a vague sense of meaning, and a phonetic, which gives a vague sense of pronunciation. The Unihan database therefore includes structural analyses and definitions for ideographs.

This document is a guide to that data, describing the mechanics of the Unihan database, the nature of its contents, and the status of the various fields.

2 Mechanics

2.1 Database Design

~~The working copy of the Unihan database is maintained privately by the Unicode Consortium. The two public versions are snapshots of this data at a particular point of time.~~

The database consists of a number of fields containing data for each Han ideograph in the Unicode Standard. The fields are all named, and the names consist entirely of ASCII letters and digits with no spaces or other punctuation except for underscore. For historical reasons, they all start with a lowercase "k."

~~Most of these are made available in the public releases. The fields not part of the public releases are, with one exception, either needed only for internal accounting or similar purposes. The remaining private field is a convenience field only; because its value can be determined algorithmically from other data in the database, there is no need to actually include it in the public releases. It is:~~

- ~~*UTF8*~~

  ~~This is the character's UTF-8 encoding. It is also the only field name not starting with "k".~~

All data in the Unihan database is stored in UTF-8 using Normalization Form C (NFC). Note, however, that the "Syntax" descriptions below, used for validation of field values, operate on Normalization Form D (NFD), primarily because that makes the regular expressions simpler.

2.1.1 Extension of Unihan Properties to Non-Unihan Characters

Some characters which are not unified ideographs are considered equivalent to unified ideographs. As such, some of the properties defined in this document are applicable to these characters as well, where appropriate. For example, `U+2F8D KANGXI RADICAL INSECT` is equivalent to `U+866B`; therefore, properties such as `kCantonese` ("cung4"), or `kCangije` ("LMI") may be inferred as needed for `U+2F8D KANGXI RADICAL INSECT`.

This extension process is particularly useful for the `kRSUnicode` and `kTotalStrokes` properties.

The `Equivalent_Unified_Ideograph` property in the Unicode Character Database is used to indicate which non-ideographs and and unified ideographs are considered equivalent for these purposes. It is explicitly intended to provide `kRSUnicode` and `kTotalStrokes` values for non-ideographs. See [UAX44] for more information.

2.1.2 Sorting Algorithm Used by the Radical-Stroke Charts

The Unicode Standard includes a set of radical-stroke charts for ease in determining the code point of encoded ideographs. Each CJK Unified Ideograph will occur one or more times in the radical-stroke charts, with one occurrence per value of its `kRSUnicode` field in the Unihan Database. Entries in the radical-stroke charts are ordered using a 64-bit collation key calculated as follows:

Bits 0-19 represent the character's code point. This is more space than is actually needed, but it has the advantage of aligning the code point along a four-bit boundary.

Bits 20-27 represent the character's block. This block value is 0 for characters in the CJK Unified Ideographs block, 1 for characters in the CJK Unified Ideographs Extension A, 2 for characters in the CJK Unified Ideographs Extension B block, and so on. The special values 254 (0xFE) and 255 (0xFF) are used for characters in the CJK Compatibility Ideographs and CJK Compatibility Ideographs Supplement blocks, respectively. This allows accommodation for future CJK Unified Ideograph Extension blocks and guarantees that compatibility ideographs always follow non-compatibility ideographs. Note that additional compatibility ideograph blocks will not be encoded in the future.

Bits 28-31 are used to indicate whether the entry has a simplified form for the radical or not. The value of 1 indicates the simplified form of the radical (e.g., 钅); a value of 0 indicates the traditional form for the radical (e.g., 金).

Bits 32-35 are reserved to hold the entry's first residual stroke, as defined by the IRG (the Ideographic Research Group, a part of ISO/IEC JTC1/SC2/WG2). Data for the first residual stroke is currently unavailable. Therefore, these bits are set to 0 in the current data.

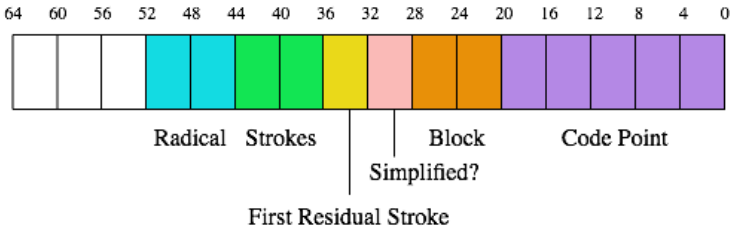
Bits 36-43 are used for the entry's residual stroke count. If the residual stroke count is negative, 0 is substituted.

Bits 44-51 are used for the entry's Kangxi radical.

Bits 52-63 are unused.

This collation key is defined in such a fashion that it can easily be parsed by eye. Figure 1 illustrates its overall structure.

Figure 1. Radical-Stroke Chart Collation Key Schema



Examples:

- U+4E95 (井) is assigned the collation key `0x0000702000004E95`
- U+3687 (㚇) has two values in its `kRSUnicode` field and therefore two entries in the radical-stroke charts. These two entries are assigned the collation keys `0x0002306000103687` and `0x0004206000103687`
- U+F936 (虜) is assigned the collation key `0x0001C1000FE0F936`
- U+21FEB (冗) is assigned the collation key `0x0002F00000221FEB`
- U+2B50E (镽) is assigned the collation key `0x000A70C01032B50E`

2.2 Unihan.zip

Included with the Unicode Character Database is a file called Unihan.zip. This is a snapshot of the public contents of the Unihan database as of the release date for this version of the standard.

The zip file is an archive of eight text files, each in UTF-8, NFC, and using Unix line endings. Each file contains the values for some of the fields in the Unihan database.

Each file contains those properties which belong to one of the general categories described below; that is, Readings.txt contains all data for all the fields in the Readings category, and so on.

Each file uses the same structure. Blank lines may be ignored. Lines beginning with # are comment lines used to provide the header and footer. Each of the remaining lines is one entry, with three, tab-separated fields: the Unicode Scalar Value, the database field name, and the value for the database field for the given Unicode Scalar Value. For most of the fields, if multiple values are possible, the values are separated by spaces. No character may have more than one instance of a given field associated with it, and no empty fields are included in any of the files archived inside `Unihan.zip`.

There is no formal limit on the lengths of any of the field values. Any Unicode characters may be used in the field values except for double quotes and control characters (especially tab, newline, and carriage return). Most fields have a more restricted syntax, such as the `kKangXi` field which consists of multiple, space-separated entries, with each entry consisting of four digits 0 through 9, followed by a period, followed by three more digits.

The data lines are sorted by Unicode Scalar Value and field-type as primary and secondary keys, respectively.

Each file's header includes a summary of the fields the file contains.

2.3 Web Access

The URI for interactive access to the contents of the Unihan database is http://www.unicode.org/charts/unihan.html. For production reasons, the version available for interactive access may not be immediately updated to the latest available version of the Unihan.zip file.

Links to Chinese and Japanese compound data are presented with this Web front end such as to the online CEDICT and Jim Breen's EDICT projects. These additional data are not available in the other versions.

There are also two indices: a grid index grouping the characters in blocks of 256 and a radical-stroke index. A search page is also available. Individual characters can be accessed through the index or via the "Lookup" button and text field above. You enter the four- or five-digit hexadecimal identifier for the character, and click "Lookup". You will be taken to an information page for the character. The "Use text, not images" check-box allows you to control whether UTF-8 text or embedded GIFs will be used in to display ideographs. The latter technique is less dependent on your browser and system support for Unicode but is much slower.

3 Field Types

The data in the Unihan database serves a multitude of purposes, and the fields are most conveniently grouped into categories according to the purpose they fulfil. We provide here a general discussion of the various categories, followed by a detailed description of the individual fields, alphabetically arranged.

~~Again, it is important to remember that all data in the Unihan database has been donated to the Unicode Consortium. Unicode currently has no staff with the responsibility to maintain or update the Unihan database. This means that, for example, the data is more complete for Chinese than for other languages simply because more data has been donated for Chinese than for other languages.~~

3.1 IRG Sources

Among the few normative parts of the Unihan database, and the most exhaustively checked fields, are the IRG source fields: `kIRG_GSource` (China PRC and Singapore), `kIRG_HSource` (Hong Kong SAR), `kIRG_JSource` (Japan), `kIRG_KPSource` (North Korea), `kIRG_KSource` (South Korea), `kIRG_MSource` (Macao SAR), `kIRG_SSource` (SAT Daizōkyō Text Database Committee), `kIRG_TSource` (TCA), `kIRG_UKSource` (UK), `kIRG_USource` (Unicode), and `kIRG_VSource` (Vietnam).

These represent the official mappings between Unihan and the various encoded character sets or collections which have been submitted by IRG members. The versions of these standards may differ from the published versions generally available, particularly for PRC standards. This is because in the early days of Unicode, the PRC would occasionally add characters to their standards on an ad hoc basis in order to make sure they were included. The various procedures involved in submitting characters to the IRG for consideration no longer make this necessary.

The values for the U-source were, in the past, only references to the Unicode Standard itself and were always equal to the character's Unicode Scalar Value. This changed with the inclusion of Extension C in version 5.2.0 of the Unicode Standard. The values now include indices as described in [UAX45].

The syntax for the values used in the various IRG source fields matches that found in ISO/IEC 10646:2011.

Detailed descriptions of the syntax used are to be found in *Section 4.1 Alphabetical Listing below.*

Note that we do not include the four IRG dictionary fields in this category, largely because they are not normative parts of the standard.

The `kIICore` field is also defined by the IRG and normative.

3.2 Other Mappings

There are twenty-four fields in this category. They consist of mapping tables between the ideographic portions of Unicode and those of encoded character sets or character collections *not* used by the IRG in its work, although some of the character sets covered do mirror official IRG sources. For example, data for mapping GB/T 12345 is included, even though GB/T 12345 is a part of the IRG's G-source. The difference between the two is that the `kGB1` field maps all of GB/T 12345 to Unicode, and not just that portion included in the G-source, and it doesn't map any of the informal extensions to GB/T 12345.

3.3 Dictionary Indices

There are three main reasons for providing indices into standard dictionaries.

First, standard dictionaries provide a "paper trail" for fields such as the English gloss (`kDefinition`) and the various pronunciations or readings, as well as variant data.

Second, standard dictionaries provide a reference for scholars or students who wish more information about a character.

Third, standard dictionaries are a source for unencoded characters. This is particularly important for Cantonese, where the Cantonese lexicon is not standardized and has been neglected by the authors and architects of previous character set encodings other than HKSCS.

~~As elsewhere, the set of dictionaries covered represent data that has been volunteered. There are important dictionaries (for example, the *Hanyu Da Cidian*, the *Shuowen*) for which formal indices should be provided. And as elsewhere, the data which has been volunteered is weighted heavily in favor of Chinese.~~

Four of the dictionary fields represent official IRG indices for the dictionaries used in the four dictionary sorting algorithm. Two (`kIRGHanyuDaZidian` and `kIRGKangXi`) are still being used by the IRG, but the other two (`kIRGDaeJaweon` and `kIRGDaiKanwaZiten`) are not. We have, nonetheless, retained their data for reference purposes.

For all four, there are clone fields to hold Unicode indices into the same four dictionaries. By and large, the data in the IRG fields and their Unicode counterparts is the same—but not always.

The remaining dictionaries can be grouped into three categories: general-purpose Chinese (including classical Chinese and Mandarin), Cantonese, and Japanese.

- The general-purpose Chinese dictionary fields are: `kCihaiT`, `kFennIndex`, `kGSR`, `kKarlgren`, `kMatthews`, `kSBGY`, `kTGHZ2013` and `kXHC1983`. These represent large, standard Chinese-Chinese, Chinese-English dictionaries, or definitive sinological studies.
- The Cantonese dictionary fields are `kCheungBauerIndex`, `kCowles`, `kLau`, and `kMeyerWempe`. All but Cheung-Bauer are large character-based Cantonese-English dictionaries.
- At present, the only Japanese field is `kNelson`, the character's index in the first edition of Andrew N. Nelson's *Modern Reader's Japanese-English Character Dictionary*.

~~In selecting dictionaries for inclusion—outside of the general consideration of who is willing to volunteer what data—we aim for including large dictionaries rather than small ones, and standard dictionaries such as serious students might have on their shelves.~~

3.4 Readings

We include in this category the pronunciations for a given character in Mandarin, Cantonese, Tang-dynasty Chinese, Japanese, Sino-Japanese, Korean, and Vietnamese. We also include here the English gloss for a given character.

Any attempt at providing a reading or set of readings for a character is bound to be fraught with difficulty, because the readings will vary over time and from place to place, even within a language. Mandarin is the official language of both the PRC and Taiwan (with some differences between the two) and is the primary language over much of northern and central China, with vast differences from place to place. Even Cantonese, the modern language covered by the Unihan database with the least geographical range, is spoken throughout Guangdong Province and in much of neighboring Guangxi Province, and covers four large urban centers (Guangzhou, Shenzhen, Macao, and Hong Kong). There are therefore distinct regional variations in pronunciation and vocabulary.

Indeed, even the same speaker will pronounce the same word differently depending on the speaker or even the social context. This is particularly true for languages such as Cantonese, where there has been comparatively little government effort to standardize the language.

Add to this the fact that in none of these languages—the various forms of Chinese, Japanese, Korean, Vietnamese—is the syllable the fundamental unit of the language. As in the West, it's the word, and the pronunciation of a character is tied to the word of which it is a part. In Chinese (followed by Vietnamese and Korean), the rule is one ideograph/one syllable, with most words written using multiple ideographs. In most cases, an ideograph has only one reading (or only one important reading), but there are numerous exceptions.

In Japanese, the situation is enormously more complex. Japanese has two pronunciation systems, one derived from Chinese (the *on* pronunciation, or Sino-Japanese), and the other from Japanese (the *kun* pronunciation).

The *on* readings derive from Chinese loan-words. They depend on factors such as when (and from which part of China) the loan-word was borrowed, and changes to Japanese since then. *On* readings can therefore have little obvious relationship to modern Chinese readings, and the same Chinese reading for a given *kanji* can be reflected in multiple *on* readings in Japanese. Contrary to Chinese practice, *on* readings may be polysyllabic.

Kun readings, on the other hand, derive from native Japanese words for which either existing *kanji* were adopted or new *kanji* coined.

The net result is that multiple readings are the rule for Japanese *kanji*. These multiple readings may bear no relationship to one another and are highly context-sensitive. Even a native Japanese reader may not know the correct pronunciation of a proper noun if it is written only in *kanji*.

Finally, some characters have rare pronunciations known only to a minority of native speakers, or are so rare themselves that few, if any, native speakers know how to pronounce them (for example, U+40DF 磾, used in a Hong Kong place name). In many cases, the pronunciations given by professional lexicographers are little more than educated guesses.

Thus, unlike mappings between Unicode and other character sets, providing definitive data on pronunciations or, similarly, providing a definitive English gloss is impossible, and not something which has been achieved. While we make every effort to

use our sources judiciously, we are aware of the fact that this data can always be improved and extended. Users should not naïvely assume that learning to pronounce an East Asian language is all about learning to pronounce the individual ideographs, or that reading is done by parsing the ideographs, one at a time.

Despite these caveats, the reading and definition data is very useful both for the student attempting to learn these languages, and for the professional attempting to use them, and so the data is included in the Unihan database.

3.5 Dictionary-like Data

This category is something of a hodge-podge, consisting of various fields including information one might find in a dictionary (such as a character's *cangjie* input code), or data useful in determining levels of support (such as frequency), or structural analyses which can be helpful in lookup systems (such as the character's phonetic).

As with the readings and English gloss, this data does not cover as much of Unihan as is theoretically possible, although it does cover the bulk of what is used day-to-day.

3.6 Radical-Stroke Counts

We include three radical-stroke counts for Unihan~~, although only three (~~: `kRSAdobe_Japan1_6`, `kRSKangXi`, and `kRSUnicode`~~) can be considered complete; the others (`kRSJapanese`, `kRSKanWa`, and `kRSKorean`) are placeholders to be filled in later. Three are based on IRG standard dictionaries: the *Hanyu Da Zidian*, which uses a slightly different radical system from the others, is not included, although *Hanyu Da Zidian* radical-stroke data can be calculated using the `kHDZRadBreak` field.~~

All the radical-stroke fields are based on the radical-system introduced by the 18th-century *Kang Xi* dictionary. Each ideograph is assigned one of 214 radicals. In most cases, the radical assigned is the natural radical, giving a clue as to the character's meaning; in the rest, the radical is arbitrary, based on the character's structure. One also counts the character's residual strokes, that is, the number of brush strokes required to write everything in the character except the radical.

To find a character using the radical-stroke system, one determines its radical and the number of residual strokes, then looks through the list of characters with those characteristics. This is a clumsy system compared to alphabetical lookup, but is one of the most widespread systems throughout East Asia. Unfortunately, it is also ambiguous.

First of all, if a character does not have a natural radical, it can sometimes be hard to tell what the radical ought to be (for example, 井 being assigned arbitrarily the radical 二). Even if the character naturally falls into radical-like pieces, it can be hard to tell which is the radical and which the phonetic (for example, 和, which looks like it belongs to the radical 禾, actually belongs to the radical 口). Moreover, since Unicode encodes characters, not glyphs, two different glyphs for the same character may have different residual strokes (such as 者, which can be written either with or without a dot, altering its stroke count between nine and eight, respectively).

~~We include multiple radical-stroke systems to allow for this. Three of the radical-stroke fields represent the character's radical-stroke count as determined by its position within a standard IRG dictionary. Two more (`kRSJapanese` and `kRSUnicode`) are intended to cover a "typical" Japanese radical-stroke count, and everything else, respectively. Finally, there is the `kRSAdobe_Japan1_6` field which contains more detailed information on the glyph used for the character in the Adobe-Japan-1-6 character set.~~

The primary use for the `kRSUnicode` field is to cover the normative radical-stroke value defined by ISO/IEC 10646. However, it is also used for cases where there is sufficient ambiguity that a reasonable person might look for a character in multiple places, particularly where one of our source dictionaries categorizes a character under a different radical or with a different stroke count.

The `kRSUnicode` field also uses an apostrophe after the radical number to indicate that the character uses a standard simplification. In simplified Chinese, many radicals have standard, simplified forms, such as 讠, which is the simplified form of the radical 言

There is, by the way, no standard way of ordering characters within a given radical-stroke group. Unicode's radical-stroke charts order characters with the same radical-stroke count by the Unicode block in which they occur. If looking for a character with radical 64 (手) and ten residual strokes, one knows that of the 275 candidates in Unicode 13.0, the most common ones come towards the head of the list and the less common ones later.

The IRG is in the process of adopting a common system of assigning the first stroke of the phonetic element to one of five categories, and sorting by those categories. When this "first stroke" data is available for all of Unihan, it will be added to the Unihan database and simplify the process of finding a character within a particular radical-stroke block.

3.7 Variants

Although Unicode encodes characters and not glyphs, the line between the two can sometimes be hard to draw, particularly in East Asia. There, thousands of years worth of writing have produced thousands of pairs which can be used more-or-less interchangeably.

To deal with this situation, the Unicode Standard has adopted a three-dimensional model for determining the relationship between ideographs, and has formal rules for when two forms may be unified. Both are described in some detail in the Unicode Standard. Briefly, however, the three-dimensional model uses the x-axis to represent meaning, and the y-axis to represent abstract shape. The z-axis is used for stylistic variations.

To illustrate, 說 and 貓 have different positions along the x-axis, because they mean two entirely different things (*to speak* and *cat*, respectively). 貓 and 猫 mean the same thing and are pronounced the same way but have different abstract shapes, so they have the same position on the x-axis (semantics) but different positions on the y-axis (abstract shape). They are said to be *y*-variants of one another. On the other hand, 說 and 説 have the same meaning and pronunciation and the same abstract shape, and so have the same positions on both the x- and y-axes but different positions on the z-axis. They are z-variants of one another.

Ideally, there would be no pairs of z-variants in the Unicode Standard; however, the need to provide for round-trip compatibility with earlier standards, and some out-and-out mistakes along the way, mean that there are some. These are marked using the `kZVariant` field.

The remaining variant fields are used to mark different types of y-variation.

3.7.1 Simplified and Traditional Chinese Variants

The `kTraditionalVariant` and `kSimplifiedVariant` fields are used in character-by-character conversions between simplified and traditional Chinese (SC and TC, respectively). For any character X, when converting between SC and TC, there are four possible cases:

1. X is used in both SC and TC and is unchanged when mapping between them. An example would be 井 U+4E95. This is the most common case, and is indicated by both the `kSimplifiedVariant` and `kTraditionalVariant` fields being empty.
2. X is used in TC but not SC, that is, it is changed when converting from TC to SC, but not vice versa. In this case, the `kSimplifiedVariant` field lists the character(s) to which it is mapped and the `kTraditionalVariant` field is empty. An example would be 書 U+66F8 whose `kSimplifiedVariant` field is 书 U+4E66.
3. X is used in SC but not TC, that is, it is changed when converting from SC to TC, but not vice versa. In this case, the `kTraditionalVariant` field lists the character(s) to which it is mapped and the `kSimplifiedVariant` field is empty. An example would be 学 U+5B66 whose `kTraditionalVariant` field is 學 U+5B78.
4. X is used in both SC and TC and may be changed when mapping between them. This is the most complex case, because there are two distinct sub-cases:
    1. X may be mapped to itself or to another character when converting between SC and TC. In this case, the character is its own simplification as well as the simplification for other characters. An example would be 后 U+540E, which is the simplification for itself and for 後 U+5F8C. When mapping TC to SC, it is left alone, but when mapping SC to TC it may or may not be changed, depending on context. In this case, both `kTraditionalVariant` and `kSimplifiedVariant` fields are defined and X is included among the values for both.
    2. X is used for different words in SC and TC. When converting between the two, it is always changed. An example would be 苧 U+82E7. In traditional Chinese, it is pronounced zhù and refers to a kind of nettle. In simplified Chinese, it is pronounced níng and means limonene (a chemical found in the rinds of lemons and other citrus fruits). When converting TC to SC it is mapped to 苎 U+82CE, and when converting SC to TC it is mapped to 檸 U+85B4. In this case, both `kTraditionalVariant` and `kSimplifiedVariant` fields are defined but X is not included in the values for either.

In practice, conversion between simplified and traditional Chinese is complicated by three factors:

1. The conversion is almost always one-to-one, but in some cases may be one-to-many, and context may need to be evaluated to determine which specific mapping to use. When converting SC to TC, 脏 U+810F is mapped to 臟 U+81DF when it means "viscera" and to 髒 U+9AD2 when it means "dirty."
2. An SC character may be used in actual TC text and, more rarely, vice versa. This is particularly true in handwritten and ancient texts. Indeed, many SC forms originated as handwritten forms or ancient synonyms. It also occurs when one of a number of synonymous TC characters is identified as the preferred or correct character to use in SC. For example, both 猫 U+732B and 貓 U+8C93 are acceptable TC characters meaning "cat," but only 猫 U+732B should be used in SC.
3. Political divisions within the Chinese-speaking community have resulted in different coinages in different locales for various modern terms, and so actual conversion between SC and TC is ideally done on a word-by-word basis, not a character-by-character basis. A hard disk, for example, is called 硬盘 in the PRC, and 硬碟 in Taiwan.

3.7.2 Semantic Variants

~~The remaining~~Two variation fields, `kSemanticVariant` and `kSpecializedSemanticVariant`, are used to mark cases where two characters have identical and overlapping meanings, respectively.

Thus U+514E 兎 and U+5154 兔 are *y*-variants of one another; both mean *rabbit*. U+4E3C 丼 and U+4E95 井 are not pure *y*-variants of one another. 井 means *a well*, and although 丼 can also mean *a well* and be used for 井, it can also mean *a bowl of food*. We use `kSemanticVariant`, then, for the former pair, and `kSpecializedSemanticVariant` for the latter. In many cases, data is provided listing the Unihan sources which indicate the variant relationship. The syntax is described in detail below, but as an example, U+792E 礮 has the `kSemanticVariant` value `U+70AE<kMeyerWempe U+7832<kLau,kMatthews,kMeyerWempe U+791F<kLau,kMatthews`. This means that the Mathews, Lau, and Meyer-Wempe dictionaries all say that it is a *y*-variant of U+7832 砲, whereas only Mathews and Lau identify it as a variant of U+791F 礮 and only Meyer-Wempe identifies it as a variant of U+70AE 炮.

3.7.3 Spoofing Variants

The kSpoofingVariant field is used to denote a *spoofing variant*, which is a special class of variant. Spoofing variants are potentially used in bad faith to direct users to unexpected URIs, evade spam filters, or otherwise deceive end-users. Determining whether or not two characters are spoofing variants is based entirely on the glyph shape, without regard for semantics. Etymologically unrelated pairs such as U+571F 土 and U+58EB 士 or U+672A 未 and U+672B 末 are considered spoofing variants. A common source of spoofing variants is deliberate confusion between radicals moon (月) and meat (肉). These two radicals, when used in Han characters, look very similar or identical (e.g., in U+3B35 胶 and U+80F6 胶). Similarly, even if the visual appearance of two radicals is distinct, they may be similar enough that a user might overlook the distinction (e.g., 冫 and 氵), especially in a spoofing context such as https://清水.org vs. https://清水.org. Spoofing variants also include instances where two highly similar shapes are separately encoded because of source code separation, without regard to other considerations. Such cases include include pairs such as: U+672C 本 and U+5932 夲; U+520A 刊 and U+520B; and 刋 U+5E7A 幺 and U+4E48 么.

Spoofing variants might be sufficiently dissimilar in shape that they can be distinguished at large point sizes, or dissimilar in meaning so that they can be distinguished in running text. They might also be visually distinct in one font but not another, due to the language or region that the font supports. These considerations are irrelevant to their status, as such pairs could nonetheless be used to misdirect users (particularly when URIs are displayed at small point sizes).

Because *z*-variant pairs are, by definition, either identical or unifiable, they should all be considered spoofing variants as well. The same consideration holds true for compatibility variants. Because of these considerations, the kSpoofingVariant field only includes spoofing variants which are not also *z*-variants or compatibility variants.

As with some other variant properties concerning CJK variants, the value of the kSpoofingVariant field is symmetric (if *A* is a spoofing variant of *B*, then *B* is a spoofing variant of *A*) and transitive (if *A* is a spoofing variant of *B* and *B* is a spoofing variant of *C*, then *A* is a spoofing variant of *C*).

The kSpoofingVariant field only covers CJK Unified Ideographs. Other CJK-related spoofing data is found in the EquivalentUnifiedIdeographs.txt file

3.8 Numeric Values

Finally, we have three fields, kAccountingNumeric, kOtherNumeric, and kPrimaryNumeric to indicate the numerical values an ideograph may have. Traditionally, ideographs were used both for numbers and words, and so many ideographs have (or can have) numeric values. The various kinds of numeric values are specified by these three fields.

4 The Fields

We now give two listings of the fields in the Unihan database. The first is an alphabetical listing, with information on the field contents and syntax. The second is a listing of the fields by the release of the Unicode Standard in which they were first found.

4.1 Alphabetical Listing

For each field we give the following information in the alphabetical listing: its *Property* tag, its Unicode *Status*, its *Category* as defined above, the Unicode version in which it was *Introduced*, its *Delimiter*, its *Syntax*, and its *Description*.

The *Property* name is the tag used in the Unihan database to mark instances of this field.

The Unicode *Status* is either *Normative*, *Informative*, or *Provisional*, depending on whether it is a normative part of the standard, an informative part of the standard, or neither. We may also include *Deprecated* as a Unicode Status if the field is no longer to be used.

Fields which allow multiple values have a *Delimiter* defined as “space”. Fields which do not have multiple values (such as the IRG source fields) have this defined as “N/A”. Some fields do not currently have multiple values in the data but may do so in the future.

For most fields with multiple values, the order of the values is arbitrary and has no particular significance. The most common order in such cases is alphabetical. For example, see the kCantonese field.

However, for certain fields the ordering of values may be significant; in such cases, the significance is specified in the Description for the field. For example, see the kMandarin field. In later versions of the Unicode Character Database, a field may change from arbitrary order to a specified order.

Validation is done as follows: The entry is split into subentries using the *Delimiter* (if defined), and each subentry converted to Normalization Form D (NFD). The value is valid if and only if each normalized subentry matches the field’s *Syntax* regular expression. Note that the value for any given field's *Syntax* is not guaranteed to be stable and may change in the future.

Finally, the *Description* contains not only a description of what the field contains, but also source information, known limitations, methodology used in deriving the data, and so on.

The fields covered in the table are: kAccountingNumeric, kBigFive, kCangjie, kCantonese, kCCCII, kCheungBauer, kCheungBauerIndex, kCihaiT, kCNS1986, kCNS1992, kCompatibilityVariant, kCowles, kDaeJaweon, kDefinition, kEACC, kFenn, kFennIndex, kFourCornerCode, kFrequency, kGB0, kGB1, kGB3, kGB5, kGB7, kGB8, kGradeLevel, kGSR, kHangul, kHanYu, kHanyuPinlu, kHanyuPinyin, kHDZRadBreak, kHKGlyph, kHKSCS, kIBMJapan, kIICore, kIRG_GSource, kIRG_HSource, kIRG_JSource, kIRG_KPSource, kIRG_KSource, kIRG_MSource, kIRG_SSource, kIRG_TSource,

kIRG_UKSource, kIRG_USource, kIRG_VSource, kIRGDaeJaweon, kIRGDaiKanwaZiten, kIRGHanyuDaZidian, kIRGKangXi, kJa, kJapaneseKun, kJapaneseOn, kJinmeiyoKanji, kJis0, kJis1, kJIS0213, kJoyoKanji, kKangXi, kKarlgren, kKorean, kKoreanEducationHanja, kKoreanName, kKPS0, kKPS1, kKSC0, kKSC1, kLau, kMainlandTelegraph, kMandarin, kMatthews, kMeyerWempe, kMorohashi, kNelson, kOtherNumeric, kPhonetic, kPrimaryNumeric, kPseudoGB1, kRSAdobe_Japan1_6, kRSJapanese, kRSKangXi, kRSKanWa, kRSKorean, kRSUnicode, kSBGY, kSemanticVariant, kSimplifiedVariant, kSpecializedSemanticVariant, kSpoofingVariant, kTaiwanTelegraph, kTang, kTGH, kTGHZ2013, kTotalStrokes, kTraditionalVariant, kVietnamese, kXerox, kXHC1983, and kZVariant.

Property	kAccountingNumeric
Status	Informative
Category	Numeric Values
Introduced	3.2
Delimiter	space
Syntax	[0-9]+
Description	The value of the character when used in the writing of accounting numerals. Accounting numerals are used in East Asia to prevent fraud. Because a number like ten (十) is easily turned into one thousand (千) with a stroke of a brush, monetary documents will often use an accounting form of the numeral ten (such as 拾) in their place. The three numeric-value fields should have no overlap; that is, characters with a kAccountingNumeric value should not have a kPrimaryNumeric or kOtherNumeric value as well.

Property	kBigFive
Status	Provisional
Category	Other Mappings
Introduced	2.0
Delimiter	N/A
Syntax	[0-9A-F]{4}
Description	The Big Five mapping for this character in hexadecimal; note that this does not cover any of the Big Five extensions in common use, including the ETEN extensions.

Property	kCangjie
Status	Provisional
Category	Dictionary-like Data
Introduced	3.1.1
Delimiter	N/A
Syntax	[A-Z]+
Description	The cangjie input code for the character. This incorporates data from the file cangjie-table.b5 by Christian Wittern.

Property	kCantonese
Status	Provisional
Category	Readings
Introduced	2.0
Delimiter	space
Syntax	[a-z]{1,6}[1-6]
Description	The Cantonese pronunciation(s) for this character using the jyutping romanization. A full description of jyutping can be found at https://en.wikipedia.org/wiki/Jyutping. The main

	differences between jyutping and the Yale romanization previously used are: 1) Jyutping always uses tone numbers and does not distinguish the high falling and high level tones. 2) Jyutping always writes a long a as “aa”. 3) Jyutping uses “oe” and “eo” for the Yale “eu” vowel. 4) Jyutping uses “c” instead of “ch”, “z” instead of “j”, and “j” instead of “y” as initials. 5) A non-null initial is always explicitly written (thus “jyut” in jyutping instead of Yale’s “yut”). Cantonese pronunciations are sorted alphabetically, not in order of frequency. N.B., the Hong Kong dialect of Cantonese is in the process of dropping initial NG- before non-null finals. Any word with an initial NG- may actually be pronounced without it, depending on the speaker and circumstances. Many words with a null initial may similarly be pronounced with an initial NG-. Similarly, many speakers use an initial L- for words previously pronounced with an initial N-. Cantonese data are derived from the following sources: Casey, G. Hugh, S.J. Ten Thousand Characters: An Analytic Dictionary. Hong Kong: Kelley and Walsh,1980 (kPhonetic). Cheung Kwan-hin and Robert S. Bauer, The Representation of Cantonese with Chinese Characters, Journal of Chinese Linguistics Monograph Series Number 18, 2002. Roy T. Cowles, A Pocket Dictionary of Cantonese, Hong Kong: University Press, 1999 (kCowles). Sidney Lau, A Practical Cantonese-English Dictionary, Hong Kong: Government Printer, 1977 (kLau). Bernard F. Meyer and Theodore F. Wempe, Student’s Cantonese-English Dictionary, Maryknoll, New York: Catholic Foreign Mission Society of America, 1947 (kMeyerWempe). 饒秉才, ed. 廣州音字典, Hong Kong: Joint Publishing (H.K.) Co., Ltd., 1989. 中華新字典, Hong Kong:中華書局, 1987. 黃港生, ed. 商務新詞典, Hong Kong: The Commercial Press, 1991. 朗文初級中文詞典, Hong Kong: Longman, 2001.

Property	kCCCII
Status	Provisional
Category	Other Mappings
Introduced	2.0
Delimiter	space
Syntax	[0-9A-F]{6}
Description	The CCCII mapping for this character in hexadecimal.

Property	kCheungBauer
Status	Provisional
Category	Dictionary-like Data
Introduced	5.0

Delimiter	space
Syntax	[0-9]{3}\/[0-9]{2};[A-Z]*;[a-z1-6\[\]\/,]+
Description	Data regarding the character in Cheung Kwan-hin and Robert S. Bauer, _The Representation of Cantonese with Chinese Characters_, Journal of Chinese Linguistics, Monograph Series Number 18, 2002. Each data value consists of three pieces, separated by semicolons: (1) the character's radical-stroke index as a three-digit radical, slash, two-digit stroke count; (2) the character's cangjie input code (if any); and (3) a comma-separated list of Cantonese readings using the jyutping romanization in alphabetical order.

Property	kCheungBauerIndex
Status	Provisional
Category	Dictionary Indices
Introduced	5.0
Delimiter	space
Syntax	[0-9]{3}\.[01][0-9]
Description	The position of the character in Cheung Kwan-hin and Robert S. Bauer, _The Representation of Cantonese with Chinese Characters_, Journal of Chinese Linguistics, Monograph Series Number 18, 2002. The format is a three-digit page number followed by a two-digit position number, separated by a period.

Property	kCihaiT
Status	Provisional
Category	Dictionary-like Data
Introduced	3.2
Delimiter	space
Syntax	[1-9][0-9]{0,3}\.[0-9]{3}
Description	The position of this character in the Cihai (辭海) dictionary, single volume edition, published in Hong Kong by the Zhonghua Bookstore, 1983 (reprint of the 1947 edition), ISBN 962-231-005-2. The position is indicated by a decimal number. The digits to the left of the decimal are the page number. The first digit after the decimal is the row on the page, and the remaining two digits after the decimal are the position on the row.

Property	kCNS1986
Status	Provisional
Category	Other Mappings
Introduced	2.0
Delimiter	N/A
Syntax	[12E]-[0-9A-F]{4}
Description	The CNS 11643-1986 mapping for this character in hexadecimal.

Property	kCNS1992
Status	Provisional
Category	Other Mappings
Introduced	2.0
Delimiter	N/A
Syntax	[1-9]-[0-9A-F]{4}

Description	The CNS 11643-1992 mapping for this character in hexadecimal.

Property	kCompatibilityVariant
Status	Normative
Category	IRG Sources
Introduced	3.2
Delimiter	N/A
Syntax	U\+[23]?[0-9A-F]{4}
Description	The canonical Decomposition_Mapping value for the ideograph, derived from UnicodeData.txt. This field is derived by taking the non-null Decomposition_Mapping values from Field 5 of UnicodeData.txt, for characters contained within the CJK Compatibility Ideographs block and the CJK Compatibility Ideographs Supplement block.

Property	kCowles
Status	Provisional
Category	Dictionary Indices
Introduced	3.1.1
Delimiter	space
Syntax	[0-9]{1,4}(\.[0-9]{1,2})?
Description	The index or indices of this character in Roy T. Cowles, A Pocket Dictionary of Cantonese, Hong Kong: University Press, 1999. The Cowles indices are numerical, usually integers but occasionally fractional where a character was added after the original indices were determined. Cowles is missing indices 1222 and 4949, and four characters in Cowles are part of Unicode's "Hangzhou" numeral set: 2964 (U+3025), 3197 (U+3028), 3574 (U+3023), and 4720 (U+3027).

Property	kDaeJaweon
Status	Provisional
Category	Dictionary Indices
Introduced	2.0
Delimiter	N/A
Syntax	[0-9]{4}\.[0-9]{2}[01]
Description	The position of this character in the Dae Jaweon (Korean) dictionary used in the four-dictionary sorting algorithm. The position is in the form "page.position" with the final digit in the position being "0" for characters actually in the dictionary and "1" for characters not found in the dictionary and assigned a "virtual" position in the dictionary. Thus, "1187.060" indicates the sixth character on page 1187. A character not in this dictionary but assigned a position between the 6th and 7th characters on page 1187 for sorting purposes would have the code "1187.061" The edition used is the first edition, published in Seoul by Samseong Publishing Co., Ltd., 1988.

Property	kDefinition
Status	Provisional
Category	Readings
Introduced	2.0

Delimiter	N/A
Syntax	[^\t"]+
Description	An English definition for this character. Definitions are for modern written Chinese and are usually (but not always) the same as the definition in other Chinese dialects or non-Chinese languages. In some cases, synonyms are indicated. Fuller variant information can be found using the various variant fields. Definitions specific to non-Chinese languages or Chinese dialects other than modern Mandarin are marked, e.g., (Cant.) or (J). Major definitions are separated by semicolons, and minor definitions by commas. Any valid Unicode character (except for tab, double-quote, and any line break character) may be used within the definition field.

Property	kEACC
Status	Provisional
Category	Other Mappings
Introduced	2.0
Delimiter	N/A
Syntax	[0-9A-F]{6}
Description	The hexadecimal code point of this character in the East Asian Character Code for Bibliographic Use (ANSI/NISO Z39.64 [1989], withdrawn in 2012). EACC is used by the Library of Congress for the CJK portions of MARC-8; MARC-8 itself is one of the character sets used by the Library of Congress for encoding bibliographic information. EACC's original repertoire was derived from earlier versions of CCCII (see kCCCII) and is therefore identical with CCCII for many characters. The kEACC field was originally derived from data supplied and proofed by the Research Libraries Group. It has since been extended and corrected with mapping data supplied by the Library of Congress.

Property	kFenn
Status	Provisional
Category	Dictionary-like Data
Introduced	3.1.1
Delimiter	space
Syntax	[0-9]+a?[A-KP*]
Description	Data on the character from _The Five Thousand Dictionary_ (aka _Fenn's Chinese-English Pocket Dictionary_) by Courtenay H. Fenn, Cambridge, Mass.: Harvard University Press, 1979. The data here consists of a decimal number followed by a letter A through K, the letter P, or an asterisk. The decimal number gives the Soothill number for the character's phonetic, and the letter is a rough frequency indication, with A indicating the 500 most common ideographs, B the next five hundred, and so on. P is used by Fenn to indicate a rare character included in the dictionary only because it is the phonetic element in other characters. An asterisk is used instead of a letter in the final position to indicate a character which belongs to one of Soothill's phonetic groups but is not found in Fenn's dictionary.

	Characters which have a frequency letter but no Soothill phonetic group are assigned group 0.

Property	kFennIndex
Status	Provisional
Category	Dictionary Indices
Introduced	4.1
Delimiter	space
Syntax	[0-9][0-9]{0,2}\.[01][0-9]
Description	The position of this character in _Fenn's Chinese-English Pocket Dictionary_ by Courtenay H. Fenn, Cambridge, Mass.: Harvard University Press, 1942. The position is indicated by a three-digit page number followed by a period and a two-digit position on the page.

Property	kFourCornerCode
Status	Provisional
Category	Dictionary-like Data
Introduced	5.0
Delimiter	space
Syntax	[0-9]{4}(\.[0-9])?
Description	The four-corner code(s) for the character. This data is derived from data provided in the public domain by Hartmut Bohn, Urs App, and Christian Wittern. The four-corner system assigns each character a four-digit code from 0 through 9. The digit is derived from the "shape" of the four corners of the character (upper-left, upper-right, lower-left, lower-right). An optional fifth digit can be used to further distinguish characters; the fifth digit is derived from the shape in the character's center or region immediately to the left of the fourth corner. The four-corner system is now used only rarely. Full descriptions are available online, e.g., at http://en.wikipedia.org/wiki/Four_corner_input. Values in this field consist of four decimal digits, optionally followed by a period and fifth digit for a five-digit form.

Property	kFrequency
Status	Provisional
Category	Dictionary-like Data
Introduced	3.2
Delimiter	N/A
Syntax	[1-5]
Description	A rough frequency measurement for the character based on analysis of traditional Chinese USENET postings; characters with a kFrequency of 1 are the most common, those with a kFrequency of 2 are less common, and so on, through a kFrequency of 5.

Property	kGB0
Status	Provisional
Category	Other Mappings
Introduced	2.0
Delimiter	N/A

Syntax	[0-9]{4}
Description	The GB/T 2312-1980 mapping for this character in ku/ten form.

Property	kGB1
Status	Provisional
Category	Other Mappings
Introduced	2.0
Delimiter	N/A
Syntax	[0-9]{4}
Description	The GB/T 12345-1990 mapping for this character in ku/ten form.

Property	kGB3
Status	Provisional
Category	Other Mappings
Introduced	2.0
Delimiter	N/A
Syntax	[0-9]{4}
Description	The GB/T 13131 (unpublished GB/T 7589-1987 unsimplified form) mapping for this character in ku/ten form.

Property	kGB5
Status	Provisional
Category	Other Mappings
Introduced	2.0
Delimiter	N/A
Syntax	[0-9]{4}
Description	The GB/T 13132 (unpublished GB/T 7590-1987 unsimplified form) mapping for this character in ku/ten form.

Property	kGB7
Status	Provisional
Category	Other Mappings
Introduced	2.0
Delimiter	N/A
Syntax	[0-9]{4}
Description	The "General Purpose Hanzi List for Modern Chinese Language, and General List of Simplified Hanzi" mapping for this character in ku/ten form.

Property	kGB8
Status	Provisional
Category	Other Mappings
Introduced	2.0
Delimiter	N/A
Syntax	[0-9]{4}
Description	The GB/T 8565.2-1988 mapping for this character in ku/ten form.

Property	kGradeLevel
Status	Provisional
Category	Dictionary-like Data
Introduced	3.2
Delimiter	N/A
Syntax	[1-6]
Description	The primary grade in the Hong Kong school system by which a student is expected to know the character; this data is derived from 朗文初級中文詞典, Hong Kong: Longman, 2001.

Property	kGSR
Status	Provisional
Category	Dictionary Indices
Introduced	4.0.1
Delimiter	space
Syntax	[0-9]{4}[a-vx-z]\'?
Description	The position of this character in Bernhard Karlgren's Grammata Serica Recensa (1957). This dataset contains a total of 7,405 records. References are given in the form DDDDa('), where "DDDD" is a set number in the range [0001..1260] zero-padded to 4-digits, "a" is a letter in the range [a..z] (excluding "w"), optionally followed by apostrophe ('). The data from which this mapping table is extracted contains a total of 10,023 references. References to inscriptional forms have been omitted. ・Release notes: Changes since the initial release: Added: [U+25053] : 0995m (2009-01-01); Added: [U+65d6] : 0001l' (2008-11-17). 22-Dec-2003: Initial release. The following 32 references are to unencoded forms: 0059k, 0069y, 0079d, 0275b, 0286a, 0289a, 0289f, 0293a, 0325a, 0389o, 0391h, 0392s, 0468h, 0480a, 0516a, 0526o, 0566g', 0642y, 0661a, 0739i, 0775b, 0837h, 0893r, 0969a, 0969e, 1019e, 1062b, 1112d, 1124l, 1129c', 1144a, 1144b. In some cases a variant mapping has been substituted in the mapping table, in other cases the reference is omitted. ・Bibliographic information: Karlgren, Klas Bernhard Johannes 高本漢 (1889-1978): 2000. Grammata Serica Recensa Electronica. Electronic version of GSR, including indices, syllable canon, and images of the original Karlgren (1957) text. Prepared for the STEDT Project http://stedt.berkeley.edu/ by Richard Cook; based in part on work by Tor Ulving and Ferenc Tafferner (see below), used by permission. Berkeley: University of California. Karlgren 1957. Grammata Serica Recensa. First published in the Bulletin of the Museum of Far Eastern Antiquities (BMFEA) No. 29, Stockholm, Sweden. Reprinted by Elanders Boktrycker Aktiebolag, Kungsbacka, [1972]. Reprinted also by SMC Publishing Inc., Taipei, Taiwan, ROC, [1996]. ISBN: 957-638-269-6. Karlgren 1940. Grammata Serica: Script and Phonetics in Chinese and Sino-Japanese 《中日漢字形聲論》Zhong-Ri Hanzi Xingsheng Lun [A study of Sino-Japanese semantic-phonetic compound characters:] BMFEA No. 12. Reprinted, Taipei: Ch'eng-Wen Publishing Company, [1966].

	Ulving, Tor: 1997. Dictionary of Old and Middle Chinese: Bernhard Karlgren's Grammata Serica Recensa Alphabetically Arranged. With Ferenc Tafferner. Göteborg, Sweden: Acta Universitatis Gothoburgensis. Orientalia Gothoburgensia, 11. ISBN: 91-7346-294-2.

Property	kHangul
Status	Provisional
Category	Readings
Introduced	5.0
Delimiter	space
Syntax	[\x{1100}-\x{1112}][\x{1161}-\x{1175}][\x{11A8}-\x{11C2}]?:[01EN]{1,3}
Description	The modern Korean pronunciation(s) for this character in Hangul, with its source(s) following a colon. A value of 0 corresponds to KS X 1001, a value of 1 corresponds to KS X 1002, a value of E corresponds to 한문 교육용 기초 한자 (漢文教育用基礎漢字), and a value of N corresponds to 인명용 한자 (人名用漢字).

Property	kHanYu
Status	Provisional
Category	Dictionary Indices
Introduced	2.0
Delimiter	space
Syntax	[1-8][0-9]{4}\.[0-3][0-9][0-3]
Description	The position of this character in the Hanyu Da Zidian (HDZ) Chinese character dictionary (bibliographic information below). The character references are given in the form "ABCDE.XYZ", in which: "A" is the volume number [1..8]; "BCDE" is the zero-padded page number [0001..4809]; "XY" is the zero-padded number of the character on the page [01..32]; "Z" is "0" for a character actually in the dictionary, and greater than 0 for a character assigned a "virtual" position in the dictionary. For example, 53024.060 indicates an actual HDZ character, the 6th character on Page 3,024 of Volume 5 (i.e. 鿢 [U+7C49]). Note that the Volume 8 "BCDE" references are in the range [0008..0044] inclusive, referring to the pagination of the "Appendix of Addendum" at the end of that volume (beginning after p. 5746). The first character assigned a given virtual position has an index ending in 1; the second assigned the same virtual position has an index ending in 2; and so on. -- Release information -- This data set contains a total of 56098 HDZ references, 54729 of which are actual HDZ character references (positions are given for all HDZ head entries, including source-internal unifications), and 1369 of which are virtual character positions (see note below). A total of 55818 distinct Unihan characters are assigned mappings in this data. Because of IRG source-internal unifications, a given character may have more than one HDZ reference. Source-internal unifications are of two types: (1) unifications of graphical variants; (2) unifications of duplicate head entries. The proofing of all references was done primarily on the basis of cross-checks of three versions of the reference data: (1) the original print source; (2) the "kIRGHanyuDaZidian" field of the Unihan database

	(release 3.1.1d1); (3) “HDZ.txt”, originally produced and proofed for Academia Sinica’s Institute of Information Technology (Document Processing Laboratory). In addition, the data was checked against the “kHanYu” and “kAlternateHanYu” fields of the Unihan database (release 3.1.1d1), which the present data set supersedes. String value, string length, compound key, field count, and page total validations were all performed. Altogether, 578 omissions/ errors in source (2) were identified/corrected. Any remaining errors will likely relate to virtual positions, or to the ordering of actual characters within a given page. It is unlikely that errors across page breaks remain. Possible future deunifications of source-internal unifications will necessitate update of USV for some references. Under no circumstances should the source-internal unification (duplicate USV) mappings be removed from this data set. Note: Source (3) contributed only actual HDZ character references to the proofing process, while source (2) contributed all virtual positions. It seems that the compilers of source (2) usually assigned virtual positions based on stroke count, though occasionally the virtual position brings the virtual character together with the actual HDZ character of which it is a variant, without regard to actual stroke count. -- Bibliographic information for the print source -- <Hanyu Da Zidian> [‘Great Chinese Character Dictionary’ (in 8 Volumes)]. XU Zhongshu (Editor in Chief). Wuhan, Hubei Province (PRC): Hubei and Sichuan Dictionary Publishing Collectives, 1986-1990. ISBN: 7-5403-0030-2/H.16. 《漢語大字典》。許力以主任，徐中舒主編，（漢語大字典工作委員會）。武漢：四川辭書出版社，湖北辭書出版社,1986-1990. ISBN: 7-5403-0030-2/H.16. Note that the field name is kHanYu instead of kHanyu to maintain compatibility with earlier versions of this file, where it was inappropriately spelled with an uppercase Y.

Property	kHanyuPinlu
Status	Provisional
Category	Readings
Introduced	4.0.1
Delimiter	space
Syntax	[a-z\x{300}-\x{302}\x{304}\x{308}\x{30C}]+\([0-9]+\)
Description	The Pronunciations and Frequencies of this character, based in part on those appearing in 《現代漢語頻率詞典》 <Xiandai Hanyu Pinlu Cidian> (XDHYPLCD) [Modern Standard Beijing Chinese Frequency Dictionary] (complete bibliographic information below). Data Format This dataset contains a total of 3799 records. (The original data provided to Unihan 2003/02/04 contained a total of 3800 records, including 〇 [U+3007] líng ‘IDEOGRAPHIC NUMBER ZERO’, not included in Unihan since it is not a CJK UNIFIED IDEOGRAPH.) Each entry is comprised of two pieces of data. The Hanyu Pinyin (HYPY) pronunciation(s) of the character. Immediately following the pronunciation, a numeric string appears in parentheses: e.g. in “ā(392)” the

	numeric string “392” indicates the sum total of the frequencies of the pronunciations of the character as given in HYPLCD. Where more than one pronunciation exists, these are sorted by descending frequency, and the list elements are “space” delimited. Release Information The XDHYPLCD data here for Modern Standard Chinese (Putonghua) cuts across 4 genres (“News,” “Scientific,” “Colloquial,” and “Literature”), and was derived from a 1,807,389 character corpus. See that text for additional information. The 8548 entries (8586 with variant writings) from p. 491-656 of XDHYPLCD were input by hand and proof-read from 1994/08/04 to 1995/03/22 by Richard Cook. Current Release Date above reflects date of last proofing. HYPY transcription for the data in this release was semiautomated and hand-corrected in 1995, based in part on data provided by Ross Paterson (Department of Computing, Imperial College, London). Tom Bishop http://www.wenlin.com is also due thanks for early assistance in proof-reading this data. The character set used for this digitization of HYPLCD (a “simplified” mainland PRC text) was (Mac OS 7-9) GB/T 2312-1980 (plus 嗐). These data were converted to Big5 (plus 腈), and both GB and Big5 versions were separately converted to Unicode 4.0, and then merged, resulting in the 3800 records in the original release. Frequency data for simplified polysyllabic words has been employed to generate both simplified and traditional character frequencies. Bibliographic information for the primary print source 《現代漢語頻率詞典》，北京語言學院語言教學研究所編著。 <Xiandai Hanyu Pinlu Cidian> = XDHYPLCD First edition 1986/6, 2nd printing 1990/4. ISBN 7-5619-0094-5/H.67.

Property	kHanyuPinyin
Status	Provisional
Category	Readings
Introduced	5.2
Delimiter	space
Syntax	(\d{5}\.\d{2}0,)*\d{5}\.\d{2}0:([a-z\x{300}-\x{302}\x{304}\x{308}\x{30C}]+,)*[a-z\x{300}-\x{302}\x{304}\x{308}\x{30C}]+
Description	The 漢語拼音 Hànyǔ Pīnyīn reading(s) appearing in the edition of 《漢語大字典》 Hànyǔ Dà Zìdiǎn (HDZ) specified in the “kHanYu” property description (q.v.). Each location has the form “ABCDE.XYZ” (as in “kHanYu”); multiple locations for a given pīnyīn reading are separated by commas. The list of locations is followed by a colon, followed by a comma-separated list of one or more pīnyīn readings. Where multiple pīnyīn readings are associated with a given mapping, these are ordered as in HDZ (for the most part reflecting relative commonality). The following are representative records.

	| U+34CE | 浸 | 10297.260: qīn,qìn,qǐn | | U+34D8 | 凰 | 10278.080,10278.090: sù | | U+5364 | 卤 | 10093.130: xī,lǔ 74609.020: lǔ,xī | | U+5EFE | 廾 | 10513.110,10514.010,10514.020: gǒng | For example, the "kHanyuPinyin" value for 卤 U+5364 is "10093.130: xī,lǔ 74609.020: lǔ,xī". This means that 卤 U+5364 is found in "kHanYu" at entries 10093.130 and 74609.020. The former entry has the two pīnyīn readings xī and lǔ (in that order), whereas the latter entry has the readings lǔ and xī (reversing the order). This data was originally input by 井作恆 Jǐng Zuòhéng, proofed by 聃媽歌 Dān Māgē (Magda Danish, using software donated by 文林 Wénlín Institute, Inc. and tables prepared by 曲理查 Qū Lǐchá), and proofed again and prepared for the Unicode Consortium by 曲理查 Qū Lǐchá (2008-01-14). -- Release Notes -- This data set includes readings for 34,130 distinct HDZ Hànzì, 34,302 HDZ references, and 1,457 distinct pīnyīn syllables.

Property	kHDZRadBreak
Status	Provisional
Category	Dictionary-like Data
Introduced	4.1
Delimiter	N/A
Syntax	[\x{2F00}-\x{2FD5}]\[U\+2F[0-9A-D][0-9A-F]\]:[1-8][0-9]{4}\.[0-3][0-9]0
Description	Indicates that 《漢語大字典》 Hanyu Da Zidian has a radical break beginning at this character's position. The field consists of the radical (with its Unicode code point), a colon, and then the Hanyu Da Zidian position as in the kHanyu field.

Property	kHKGlyph
Status	Provisional
Category	Dictionary-like Data
Introduced	3.1.1
Delimiter	space
Syntax	[0-9]{4}
Description	The index of the character in 常用字字形表 (二零零零年修訂本),香港: 香港教育學院, 2000, ISBN 962-949-040-4. This publication gives the "proper" shapes for 4759 characters as used in the Hong Kong school system. The index is an integer, zero-padded to four digits.

Property	kHKSCS
Status	Provisional
Category	Other Mappings
Introduced	3.1.1
Delimiter	N/A
Syntax	[0-9A-F]{4}
Description	Mappings to the Big Five extended code points used for the Hong Kong Supplementary Character Set-2008 (HKSCS-2008).

Property	kIBMJapan
Status	Provisional
Category	Other Mappings
Introduced	2.0

Delimiter	space
Syntax	F[ABC][0-9A-F]{2}
Description	The IBM Japanese mapping for this character in hexadecimal.

Property	kIICore
Status	Normative
Category	IRG Sources
Introduced	4.1
Delimiter	space
Syntax	[ABC][GHJKMPT]{1,7}
Description	Used for characters which are in IICore, the IRG-produced minimal set of required ideographs for East Asian use. A character is in IICore if and only if it has a value for the kIICore field. Each value consists of a letter (A, B, or C), indicating priority value, and one or more letters (G, H, J, K, M, P, or T), indicating source. The source letters are the same as used for IRG sources, except that "P" is used instead of "KP".

Property	kIRGDaeJaweon
Status	Provisional
Category	Dictionary Indices
Introduced	3.0
Delimiter	space
Syntax	[0-9]{4}\.[0-9]{2}[01]
Description	The position of this character in the Dae Jaweon (Korean) dictionary used in the four-dictionary sorting algorithm. The position is in the form “page.position” with the final digit in the position being “0” for characters actually in the dictionary and “1” for characters not found in the dictionary and assigned a “virtual” position in the dictionary. Thus, “1187.060” indicates the sixth character on page 1187. A character not in this dictionary but assigned a position between the 6th and 7th characters on page 1187 for sorting purposes would have the code “1187.061” This field represents the official position of the character within the Dae Jaweon dictionary as used by the IRG in the four-dictionary sorting algorithm. The edition used is the first edition, published in Seoul by Samseong Publishing Co., Ltd., 1988.

Property	kIRGDaiKanwaZiten
Status	Provisional
Category	Dictionary Indices
Introduced	3.0
Delimiter	space
Syntax	[0-9]{5}\'?
Description	The index of this character in the Dai Kanwa Ziten, aka Morohashi dictionary (Japanese) used in the four-dictionary sorting algorithm. This field represents the official position of the character within the DaiKanwa dictionary as used by

	the IRG in the four-dictionary sorting algorithm. The edition used is the revised edition, published in Tokyo by Taishuukan Shoten, 1986.

Property	kIRGHanyuDaZidian
Status	Provisional
Category	Dictionary Indices
Introduced	3.0
Delimiter	space
Syntax	[1-8][0-9]{4}\.[0-3][0-9][01]
Description	The position of this character in the Hanyu Da Zidian (PRC) dictionary used in the four-dictionary sorting algorithm. The position is in the form “volume page.position” with the final digit in the position being “0” for characters actually in the dictionary and “1” for characters not found in the dictionary and assigned a “virtual” position in the dictionary. Thus, “32264.080” indicates the eighth character on page 2264 in volume 3. A character not in this dictionary but assigned a position between the 8th and 9th characters on this page for sorting purposes would have the code “32264.081” This field represents the official position of the character within the Hanyu Da Zidian dictionary as used by the IRG in the four-dictionary sorting algorithm. The edition of the Hanyu Da Zidian used is the first edition, published in Chengdu by Sichuan Cishu Publishing, 1986.

Property	kIRGKangXi
Status	Provisional
Category	Dictionary Indices
Introduced	3.0
Delimiter	space
Syntax	[01][0-9]{3}\.[0-7][0-9][01]
Description	The official IRG position of this character in the 《康熙字典》 Kang Xi Dictionary used in the four-dictionary sorting algorithm. The position is in the form “page.position” with the final digit in the position being “0” for characters actually in the dictionary and “1” for characters not found in the dictionary but assigned a “virtual” position in the dictionary. Thus, “1187.060” indicates the sixth character on page 1187. A character not in this dictionary but assigned a position between the 6th and 7th characters on page 1187 for sorting purposes would have the code “1187.061”. The edition of the Kang Xi Dictionary used is the 7th edition published by Zhonghua Bookstore in Beijing, 1989.

Property	kIRG_GSource
Status	Normative
Category	IRG Sources
Introduced	3.0
Delimiter	N/A
Syntax	G[013578EKS]-[0-9A-F]{4} | G4K(-\d{4})?

	| G(DZ|GH|RM|WZ|XC|XH|ZH)-\d{4}\.\d{2} | G(BK|CH|CY|HC)(-\d{4}\.\d{2})? | GKX-\d{4}\.\d{2,3} | G(HZ|HZR)-\d{5}\.\d{2} | G(CE|FC|IDC|OCD|XHZ)-\d{3} | G(H|HF|LGYJ|PGLG|T)-\d{4} | G(CYY|JZ|KJ|ZFY|ZJW|ZYS)-\d{5} | GFZ-[0-9A-F]{4} | GGFZ-\d{6} | G(LK|Z)-\d{7} | GU-[023][0-9A-F]{4}
Description	The IRG “G” source mapping for this character in hexadecimal or decimal. The IRG G source consists of data from the following national standards, publications, and lists from the People’s Republic of China and Singapore. The versions of the standards used are those provided by the PRC to the IRG and may not always reflect published versions of the standards generally available. G0 GB/T 2312-1980 (formerly GB 2312-80) G1 GB/T 12345-1990 (formerly GB/T 12345-90) G3 GB/T 13131 (unpublished GB/T 7589-1987 unsimplified forms) G5 GB/T 13132 (unpublished GB/T 7590-1987 unsimplified forms) G7 General Purpose Hanzi List for Modern Chinese Language, and General List of Simplified Hanzi G8 GB/T 8565.2-1988 (formerly GB 8565.2-88) GE GB/T 16500-1998 GK GB/T 12052-1989 (formerly GB 12052-89) GS Singapore Characters G4K Siku Quanshu (四庫全書) GDZ Geographic Publishing House Ideographs (地质出版社用字) GGH Gudai Hanyu Cidian (古代汉语词典) GRM People’s Daily Ideographs (人民日报用字) GWZ Hanyu Dacidian Publishing House Ideographs (漢語大詞典出版社用字) GXC Xiandai Hanyu Cidian (现代汉语词典) GXH Xinhua Zidian (新华字典) GZH ZhongHua ZiHai (中华字海) GBK Chinese Encyclopedia (中國大百科全書) GCH Ci Hai (辞海) GCY Ci Yuan (辭源) GHC Hanyu Dacidian (漢語大詞典) GKX Kangxi Dictionary ideographs (康熙字典) 9th edition (1958) including the addendum (康熙字典)補遺 GHZ Hanyu Dazidian ideographs (漢語大字典) GHZR 汉语大字典编辑委员会:《汉语大字典（第二版）》, 武汉: 湖北长江出版集团崇文书局 & 成都：四川出版集团四川辞书出版社 , 2010, ISBN 978-7-5403-1744-7 GCE Names of newly-discovered chemical elements as assigned by the China National Committee for Terms in Sciences and Technologies and the China National Language and Character Working Committee" (全国科学技术名词审定委员会，国家语言文字工作委员会); the value is the atomic number of the element GFC Modern Chinese Standard Dictionary (现代汉语规范词典第二版。主编:李行健。北京:外语 教学与研究出版社) 2010, ISBN:978-7-5600-9518-9 GIDC ID system of the Ministry of Public Security of China, 2009 GOCD Oxford English-Chinese Chinese-English Dictionary (牛津英汉汉英词典。主编:Julie Kleeman, 于海江。牛津:牛津大学出版社。2010年。ISBN:978-0-19-920761-9) GXHZ Xinhua Da Zidian (新华大字典) GH GB/T 15564-1995

	GHF 鄭賢章:《漢文佛典疑難俗字彙釋與研究》, 成都: 巴蜀書社, 2016, ISBN 978-7-5531-0700-4 GLGYJ ZhuangLiaoSongsResearch,《壮族嘹歌研究》2008年广西民族出版社,ISBN78-7-5363-5069-4 GPGLG Zhuang Folk Song Culture Series - Pingguo County Liao Songs (壮族民歌文化丛书·平果嘹歌) 2004-2006, ISBN 7-5363-[4820-7 | 5012-0 | 5013-9 |5014-7 | 5015-5] GT 标准电码本（修订本） (Standard Telegraph Codebook (revised)), 1983 GCYY Chinese Academy of Surveying and Mapping Ideographs (中国测绘科学院用字) GJZ Commercial Press Ideographs (商务印书馆用字) GKJ Terms in Sciences and Technologies (科技用字) approved by the China National Committee for Terms in Sciences and Technologies (CNCTST) GZFY Hanyu Fangyan Dacidian (汉语方言大词典) GZJW Yinzhou Jinwen Jicheng Yinde (殷周金文集成引得) GZYS Chinese Ancient Ethnic Characters Research (中国民族古文字研究), 1984 GFZ Founder Press System (方正排版系统) GGFZ Tongyong Guifan Hanzi Zidian (通用规范汉字字典) GLK 《龍龕手鑑》（續古逸叢書） GZ Ancient Zhuang Character Dictionary, (古壮字字典) 1989, ISBN 7-5363-0614-8 GU The source reference for this character has been moved; the value is its code point.

Property	kIRG_HSource
Status	Normative
Category	IRG Sources
Introduced	3.1
Delimiter	N/A
Syntax	H-[0-9A-F]{4} | H(B[012]|D)-[0-9A-F]{4} | HU-[023][0-9A-F]{4})
Description	The IRG “H” source mapping for this character in hexadecimal. The IRG “H” source consists of data from the following sources: H Hong Kong Supplementary Character Set - 2008 HB0 Big-5: Computer Chinese Glyph and Character Code Mapping Table, Technical Report C-26, 電腦用中文字型與字碼對照表, 技術通報C-26, 1984, Symbols HB1 Big-5, Level 1 HB2 Big-5, Level 2 HD Hong Kong Supplementary Character Set - 2016 HU The source reference for this character has been moved; the value is its code point.

Property	kIRG_JSource
Status	Normative
Category	IRG Sources
Introduced	3.0
Delimiter	N/A
Syntax	J[014]-[0-9A-F]{4} | J3A?-[0-9A-F]{4} | J13A?-[0-9A-F]{4} | J14-[0-9A-F]{4} | JA[34]?-[0-9A-F]{4} | JARIB-[0-9A-F]{4} | JH-(JT[ABC][0-9A-F]{3}S?|IB\d{4}|\d{6})

	| JK-\d{5} | JMJ-\d{6}
Description	The IRG “J” source mapping for this character in hexadecimal or decimal. The IRG “J” source consists of data from the following national standards and lists from Japan. J0 JIS X 0208-1990 J1 JIS X 0212-1990 J4 JIS X 0213:2004 level-4 J3 JIS X 0213:2004 level-3 J3A JIS X 0213:2004 level-3 addendum from JIS X 0213:2000 level-3 J13 JIS X 0213:2004 level-3 characters replacing J1 characters J13A JIS X 0213:2004 level-3 character addendum from JIS X 0213:2000 level-3 replacing J1 characters J14 JIS X 0213:2004 level-4 characters replacing J1 characters JA Unified Japanese IT Vendors Contemporary Ideographs, 1993 JA3 JIS X 0213:2004 level-3 characters replacing JA characters JA4 JIS X 0213:2004 level-4 characters replacing JA characters JARIB Association of Radio Industries and Businesses (ARIB) ARIB STD-B24 Version 5.1, March 14 2007 JH Hanyo-Denshi Program (汎用電子情報交換環境整備プログラム), 2002-2009 JK Japanese KOKUJI Collection JMJ Moji Joho Kiban Project (文字情報基盤整備事業)

Property	kIRG_KPSource
Status	Normative
Category	IRG Sources
Introduced	3.1.1
Delimiter	N/A
Syntax	KP([01]-[0-9A-F]{4}|U-[023][0-9A-F]{4})
Description	The IRG “KP” source mapping for this character in hexadecimal. The IRG “KP” source consists of data from the following national standards and lists from the Democratic People’s Republic of Korea (North Korea). KP0 KPS 9566-97 KP1 KPS 10721-2000 KPU The source reference for this character has been moved; the value is its code point.

Property	kIRG_KSource
Status	Normative
Category	IRG Sources
Introduced	3.0
Delimiter	N/A
Syntax	K[0-6]-[0-9A-F]{4} | KC-\d{5} | KU-[023][0-9A-F]{4}
Description	The IRG “K” source mapping for this character in hexadecimal or decimal. The IRG “K” source consists of data from the following national standards and lists from the Republic of Korea (South Korea). K0 KS X 1001:2004 (formerly KS C 5601-1987) K1 KS X 1002:2001 (formerly KS C 5657-1991) K2 KS X 1027-1:2011 (formerly PKS C 5700-1 1994)

	K3 KS X 1027-2:2011 (formerly PKS C 5700-2 1994) K4 KS X 1027-3:2011 (formerly PKS 5700-3:1998) K5 KS X 1027-4:2011 (formerly Korean IRG Hanja Character Set 5th Edition: 2001) K6 KS X 1027-5:2014 KC Korean History On-Line (한국 역사 정보 통합 시스템) KU The source reference for this character has been moved; the value is its code point. Note that the K4 and K5 sources are expressed in hexadecimal, but unlike the K0 through K3 sources, they are not organized in row/column format. Also note that the KC source is expressed as a zero-padded five-digit decimal value.

Property	kIRG_MSource
Status	Normative
Category	IRG Sources
Introduced	5.2
Delimiter	N/A
Syntax	MAC-\d{5}
Description	The IRG “M” source mapping for this character in decimal. The IRG “M” source corresponds to MSCS (Macao Supplementary Character Set).

Property	kIRG_SSource
Status	Normative
Category	IRG Sources
Introduced	13.0
Delimiter	N/A
Syntax	SAT-\d{5}
Description	The IRG “S” source mapping for this character that corresponds to Taishō Shinshū Daizōkyō (大正新脩大藏經), 1924-1934, which is accessible in the SAT Daizōkyō Text Database. The source references consist of “SAT” followed by a hyphen and five decimal digits, zero padded.

Property	kIRG_TSource
Status	Normative
Category	IRG Sources
Introduced	3.0
Delimiter	N/A
Syntax	T([1-7A-F]|13)-[0-9A-F]{4}|U-[023][0-9A-F]{4}
Description	The IRG “T” source mapping for this character in hexadecimal. The IRG “T” source consists of data from the following ~~national~~ standards and lists. “TCA” stands for “Taipei Computer Association,” and “CNS” stands for “Chinese National Standard.” T1 TCA-CNS 11643-1992 1st plane T2 TCA-CNS 11643-1992 2nd plane T3 TCA-CNS 11643-1992 3rd plane with some additional characters T4 TCA-CNS 11643-1992 4th plane T5 TCA-CNS 11643-1992 5th plane T6 TCA-CNS 11643-1992 6th plane T7 TCA-CNS 11643-1992 7th plane TA《化學命名原則(第四版)》 (Chemical Nomenclature: 4th Edition), 臺北市: 國立編譯館 (Taipei City: National Compilation Librarian), 2009, ISBN 978-986-02-0826-9

	TB TCA-CNS Ministry of Education, Hakka dialect, May 2007 TC TCA-CNS 11643-1992 12th plane TD TCA-CNS 11643-1992 13th plane TE TCA-CNS 11643-1992 14th plane TF TCA-CNS 11643-1992 15th plane T13 TCA-CNS 11643 19th plane (pending new version) TU The source reference for this character has been moved; the value is its code point. CNS 11643-1992 (p. 319) lists the following reference works: 參考文件: (1) "教育部常用國字標準字體表", 正中書局, 民國 71 年 9 月。['ROC Ministry of Education: Table Standardizing Common Characters'. Sept., 1982.] (2) "教育部次常用國字標準字體表", 教育部, 民國 71 年 12 月。['ROC Ministry of Education: Table Standardizing Less-Common Characters'. Dec., 1982.] (3) "教育部罕用字體表", 正中書局, 民國 72 年 10 月。['ROC Ministry of Education: Table Standardizing Rare Characters'. Oct., 1983.] (4) "教育部異體國字字表", 教育部, 民國 73 年 3 月。['ROC Ministry of Education: Table of Character Variants'. Mar., 1984.] (5) "通用漢字標準交換碼 — 使用者加字區交換碼, 行政院主計處理資料中心, 民國 77 年 6 月。['Standard Interchange Encoding of Common Characters — Private-Use Area Codes (Executive Office, Central Accounting Data Processing Center, ROC)'. June, 1988.] (6) 《中文大辭典》, 中國文化大學出版部, 民國 71 年 8 月。['Zhōng Wén Dà Cídiǎn: Encyclopedic Dictionary of Written Chinese'. Aug., 1982. http://ap6.pccu.edu.tw/Dictionary/] (7) 《康熙字典》, 第六版, 中華書局, 民國 78 年 2 月。 ['Kāng Xī Dictionary'. Feb., 1989] (8) 國字標準字體研習會資料, 民國 80 年 7 月。['National Script Standardization Conference Data Resources'. July, 1991.] (9) 警政署常用字頻率分析。['High-frequency characters in police reports'.] (10) 國中教科書用字整理分析報告, 資訊工業策進會。['Statistical analysis of common characters in junior highschool (grades 7-9) textbooks'.] (11) "Information Technology — Universal Multi-Octet Coded Character Set (UCS), Part 1: Architecture and Basic Multi-Lingual Plane", Working Document, ISO/IEC DIS 10646 - 1.2, Dec. 26, 1991.

Property	kIRG_UKSource
Status	Normative
Category	IRG Sources
Introduced	13.0
Delimiter	N/A
Syntax	UK-\d{5}
Description	The IRG "UK" source mapping for this character in decimal. The source references consist of "UK" followed by a hyphen and five decimal digits, zero padded. The IRG "UK" source consists of data from the documents IRG N2107R2 and IRG N2232R.

Property	kIRG_USource
Status	Normative
Category	IRG Sources
Introduced	4.0.1
Delimiter	N/A
Syntax	UTC-\d{5}
Description	The IRG "U" source mapping for this character. U-source references are a reference into the U-source ideograph database; see UAX #45. They consist of "UTC" followed by a hyphen and a five-digit, zero-

	padded index into the database.

Property	kIRG_VSource
Status	Normative
Category	IRG Sources
Introduced	3.0
Delimiter	N/A
Syntax	V[0-4U]-[023]?[0-9A-F]{4}
Description	The IRG “V” source mapping for this character in hexadecimal. The IRG “V” source consists of data from the following national standards and lists from Vietnam. V0 TCVN 5773:1993 V1 TCVN 6056:1995 V2 VHN 01:1998 V3 VHN 02: 1998 V4 Dictionary on Nom 2006, Dictionary on Nom of Tay ethnic 2006, Lookup Table for Nom in the South 1994 VU Vietnamese horizontal extensions; the value is its code point

Property	kJa
Status	Provisional
Category	Other Mappings
Introduced	8.0.0
Delimiter	space
Syntax	[0-9A-F]{4}S?
Description	The source identifier for this character in 'Unified Japanese IT Vendors Contemporary Ideographs, 1993' (JA). This field is used for characters whose original kIRG_JSource was JA and later changed to a different source standard.

Property	kJapaneseKun
Status	Provisional
Category	Readings
Introduced	2.0
Delimiter	space
Syntax	[A-Z]+
Description	The Japanese pronunciation(s) of this character.

Property	kJapaneseOn
Status	Provisional
Category	Readings
Introduced	2.0
Delimiter	space
Syntax	[A-Z]+
Description	The Sino-Japanese pronunciation(s) of this character.

Property	kJinmeiyoKanji
Status	Provisional

Category	Other Mappings
Introduced	11.0
Delimiter	space
Syntax	(20[0-9]{2})(:U\+[23]?[0-9A-F]{4})?
Description	The year that corresponds to the Jinmei-yō Kanji (人名用漢字) list in which the ideograph appears, and followed by a colon and the code point of its standard form if it is considered a variant. Published by Japan's Ministry of Justice (法務省) in 2010 and amended in 2015 and 2017 with one additional ideograph during each year, Jinmei-yō Kanji (人名用漢字) includes 863 ideographs for use in personal names in Japan. http://www.moj.go.jp/content/001131003.pdf The version year is either 2010 (861 ideographs), 2015 (one ideograph), or 2017 (one ideograph), and 230 ideographs are variants for which the code point of the standard Japanese form is specified.

Property	kJis0
Status	Provisional
Category	Other Mappings
Introduced	2.0
Delimiter	space
Syntax	[0-9]{4}
Description	The JIS X 0208-1990 mapping for this character in ku/ten form.

Property	kJIS0213
Status	Provisional
Category	Other Mappings
Introduced	3.1.1
Delimiter	space
Syntax	[12],[0-9]{2},[0-9]{1,2}
Description	The JIS X 0213:2004 mapping for this character in men,ku,ten form.

Property	kJis1
Status	Provisional
Category	Other Mappings
Introduced	2.0
Delimiter	space
Syntax	[0-9]{4}
Description	The JIS X 0212-1990 mapping for this character in ku/ten form.

Property	kJoyoKanji
Status	Provisional
Category	Other Mappings
Introduced	11.0
Delimiter	space
Syntax	(20[0-9]{2})|(U\+[23]?[0-9A-F]{4})
Description	The year that corresponds to the Jōyō Kanji (常用漢字) list in which the ideograph appears, or the code point

	of the JIS X 0208 variant for ideographs that are specific to the JIS X 0213 standard and allowed for compatibility with implementations that support only JIS X 0208. Published by Japan's Agency for Cultural Affairs (文化庁) in 2010, Jōyō Kanji (常用漢字) includes 2,136 ideographs for common use in Japan. http://www.bunka.go.jp/kokugo_nihongo/sisaku/joho/joho/kijun/naikaku/pdf/joyokanjihyo_20101130.pdf The current version year is 2010, and there are only four ideographs that are considered JIS X 0208 variants of JIS X 0213 ideographs.

Property	kKangXi
Status	Provisional
Category	Dictionary Indices
Introduced	2.0
Delimiter	space
Syntax	[0-9]{4}\.[0-9]{2}[01]
Description	The position of this character in the 《康熙字典》 Kang Xi Dictionary used in the four-dictionary sorting algorithm. The position is in the form “page.position” with the final digit in the position being “0” for characters actually in the dictionary and “1” for characters not found in the dictionary but assigned a “virtual” position in the dictionary. Thus, “1187.060” indicates the sixth character on page 1187. A character not in this dictionary but assigned a position between the 6th and 7th characters on page 1187 for sorting purposes would have the code “1187.061”. The edition of the Kang Xi Dictionary used is the 7th edition published by Zhonghua Bookstore in Beijing, 1989.

Property	kKarlgren
Status	Provisional
Category	Dictionary Indices
Introduced	3.1.1
Delimiter	space
Syntax	[1-9][0-9]{0,3}[A*]?
Description	The index of this character in _Analytic Dictionary of Chinese and Sino-Japanese_ by Bernhard Karlgren, New York: Dover Publications, Inc., 1974. If the index is followed by an asterisk (*), then the index is an interpolated one, indicating where the character would be found if it were to have been included in the dictionary. Note that while the index itself is usually an integer, there are some cases where it is an integer followed by an “A”.

Property	kKorean
Status	Provisional
Category	Readings
Introduced	2.0
Delimiter	space
Syntax	[A-Z]+
Description	The Korean pronunciation(s) of this character, using the Yale romanization system. (See

	http://en.wikipedia.org/wiki/Korean_romanization for a discussion of the various Korean romanization systems.) Use of the kKorean field is not recommended. The kHangul field, which is aligned to the KS X 1001 and KS X 1002 standards, 한문 교육용 기초 한자 (漢文教育用基礎漢字), and 인명용 한자 (人名用漢字), is recommended to be used instead.

Property	kKoreanEducationHanja
Status	Provisional
Category	Other Mappings
Introduced	11.0
Delimiter	space
Syntax	20[0-9]{2}
Description	The year that corresponds to the 한문 교육용 기초 한자 (漢文教育用基礎漢字) list of 1,800 ideographs for general use in which the ideograph appears. The Supreme Court of Korea published a large list of ideographs for use in personal names, and this property corresponds to an 1,800-ideograph subset that is separate from those intended only for use in personal names and covered by the kKoreanName property. https://help.scourt.go.kr/nm/images/hanja/hanja_2015.pdf The current version year is 2007.

Property	kKoreanName
Status	Provisional
Category	Other Mappings
Introduced	11.0
Delimiter	space
Syntax	(20[0-9]{2})(:U\+[23]?[0-9A-F]{4})*
Description	The year that corresponds to the 인명용 한자 (人名用漢字) list in which the ideograph appears, and followed by a colon and the code point(s) of its standard form(s) if it is considered a variant. The Supreme Court of Korea published this list of ideographs, and this property excludes 1,800 ideographs that represent a subset that the kKoreanEducationHanja property covers. https://help.scourt.go.kr/nm/images/hanja/hanja_2015.pdf The current version year is 2015.

Property	kKPS0
Status	Provisional
Category	Other Mappings
Introduced	3.1.1
Delimiter	space
Syntax	[0-9A-F]{4}
Description	The KPS 9566-97 mapping for this character in hexadecimal form.

Property	kKPS1

Status	Provisional
Category	Other Mappings
Introduced	3.1.1
Delimiter	space
Syntax	[0-9A-F]{4}
Description	The KPS 10721-2000 mapping for this character in hexadecimal form.

Property	kKSC0
Status	Provisional
Category	Other Mappings
Introduced	2.0
Delimiter	space
Syntax	[0-9]{4}
Description	The KS X 1001:1992 (KS C 5601-1989) mapping for this character in ku/ten form.

Property	kKSC1
Status	Provisional
Category	Other Mappings
Introduced	2.0
Delimiter	space
Syntax	[0-9]{4}
Description	The KS X 1002:1991 (KS C 5657-1991) mapping for this character in ku/ten form.

Property	kLau
Status	Provisional
Category	Dictionary Indices
Introduced	3.1.1
Delimiter	space
Syntax	[1-9][0-9]{0,3}
Description	The index of this character in A Practical Cantonese-English Dictionary by Sidney Lau, Hong Kong: The Government Printer, 1977. The index consists of an integer. Missing indices indicate unencoded characters which are being submitted to the IRG for inclusion in future versions of the standard.

Property	kMainlandTelegraph
Status	Provisional
Category	Other Mappings
Introduced	2.0
Delimiter	space
Syntax	[0-9]{4}
Description	The PRC telegraph code for this character, derived from “Kanzi denpou koudo henkan-hyou” (“Chinese character telegraph code conversion table”), Lin Jinyi, KDD Engineering and Consulting, Tokyo, 1984.

Property	kMandarin
Status	Informative

Category	Readings
Introduced	2.0
Delimiter	space
Syntax	[a-z\x{300}-\x{302}\x{304}\x{308}\x{30C}]+
Description	The most customary pinyin reading for this character. When there are two values, then the first is preferred for zh-Hans (CN) and the second is preferred for zh-Hant (TW). When there is only one value, it is appropriate for both. This field is targeted specifically for use by CLDR collation and transliteration. As such, it is subject to considerations that help keep pinyin-based Han collation (and its tailorings) and transliteration reasonably stable. The values may not in all cases track the preferred use in some dictionaries.

Property	kMatthews
Status	Provisional
Category	Dictionary Indices
Introduced	2.0
Delimiter	space
Syntax	[1-9][0-9]{0,3}(a|\.5)?
Description	The index of this character in Mathews' Chinese-English Dictionary by Robert H. Mathews, Cambrige: Harvard University Press, 1975. Note that the field name is kMatthews instead of kMathews to maintain compatibility with earlier versions of this file, where it was inadvertently misspelled.

Property	kMeyerWempe
Status	Provisional
Category	Dictionary Indices
Introduced	3.1
Delimiter	space
Syntax	[1-9][0-9]{0,3}[a-t*]?
Description	The index of this character in the Student's Cantonese-English Dictionary by Bernard F. Meyer and Theodore F. Wempe (3rd edition, 1947). The index is an integer, optionally followed by a lower-case Latin letter if the listing is in a subsidiary entry and not a main one. In some cases where the character is found in the radical-stroke index, but not in the main body of the dictionary, the integer is followed by an asterisk (e.g., U+50E5, which is listed as 736* as well as 1185a).

Property	kMorohashi
Status	Provisional
Category	Dictionary Indices
Introduced	2.0
Delimiter	space
Syntax	[0-9]{5}\'?
Description	The index of this character in the Dai Kanwa Ziten, aka Morohashi dictionary (Japanese) used in the four-dictionary sorting algorithm. The edition used is the revised edition, published in Tokyo by Taishūkan Shoten, 1986.

Property	kNelson

Status	Provisional
Category	Dictionary Indices
Introduced	2.0
Delimiter	space
Syntax	[0-9]{4}
Description	The index of this character in The Modern Reader's Japanese-English Character Dictionary by Andrew Nathaniel Nelson, Rutland, Vermont: Charles E. Tuttle Company, 1974.

Property	kOtherNumeric
Status	Informative
Category	Numeric Values
Introduced	3.2
Delimiter	space
Syntax	[0-9]+
Description	The numeric value for the character in certain unusual, specialized contexts. The three numeric-value fields should have no overlap; that is, characters with a kOtherNumeric value should not have a kAccountingNumeric or kPrimaryNumeric value as well.

Property	kPhonetic
Status	Provisional
Category	Dictionary-like Data
Introduced	3.1
Delimiter	space
Syntax	[1-9][0-9]{0,3}[A-D]?*?
Description	The phonetic index for the character from _Ten Thousand Characters: An Analytic Dictionary_, by G. Hugh Casey, S.J. Hong Kong: Kelley and Walsh, 1980.

Property	kPrimaryNumeric
Status	Informative
Category	Numeric Values
Introduced	3.2
Delimiter	space
Syntax	[0-9]+
Description	The value of the character when used in the writing of numbers in the standard fashion. The three numeric-value fields should have no overlap; that is, characters with a kPrimaryNumeric value should not have a kAccountingNumeric or kOtherNumeric value as well.

Property	kPseudoGB1
Status	Provisional
Category	Other Mappings
Introduced	2.0
Delimiter	N/A
Syntax	[0-9]{4}
Description	A "GB/T 12345-1990" code point assigned to this character for the purposes of including it within Unihan. Pseudo-GB1 codes were used to provide official code points for characters not already in

	national standards, such as characters used to write Cantonese, and so on.

Property	kRSAdobe_Japan1_6
Status	Provisional
Category	Radical-Stroke Counts
Introduced	4.1
Delimiter	space
Syntax	[CV]\+[0-9]{1,5}\+[1-9][0-9]{0,2}\.[1-9][0-9]?\.[0-9]{1,2}
Description	Information on the glyphs in Adobe-Japan1-6 as contributed by Adobe. The value consists of a number of space-separated entries. Each entry consists of three pieces of information separated by a plus sign: 1) C or V. “C” indicates that the Unicode code point maps directly to the Adobe-Japan1-6 CID that appears after it, and “V” indicates that it is considered a variant form, and thus not directly encoded. 2) The Adobe-Japan1-6 CID. 3) Radical-stroke data for the indicated Adobe-Japan1-6 CID. The radical-stroke data consists of three pieces separated by periods: the Kangxi radical (1-214), the number of strokes in the form the radical takes in the glyph, and the number of strokes in the residue. The standard Unicode radical-stroke form can be obtained by omitting the second value, and the total strokes in the glyph from adding the second and third values.

~~Property~~	~~kRSJapanese~~
~~Status~~	~~Provisional~~
~~Category~~	~~Radical-Stroke Counts~~
~~Introduced~~	~~2.0~~
~~Delimiter~~	~~space~~
~~Syntax~~	~~[1-9][0-9]{0,2}\.[0-9]{1,2}~~
~~Description~~	~~The Japanese radical/stroke count for this character in the form “radical.additional strokes”.~~

Property	kRSKangXi
Status	Provisional
Category	Radical-Stroke Counts
Introduced	2.0
Delimiter	space
Syntax	[1-9][0-9]{0,2}\.-?[0-9]{1,2}
Description	The Kangxi radical/stroke count for this character consistent with the value of the kKangXi field in the form “radical.additional strokes”.

~~Property~~	~~kRSKanWa~~
~~Status~~	~~Provisional~~
~~Category~~	~~Radical-Stroke Counts~~
~~Introduced~~	~~2.0~~
~~Delimiter~~	~~space~~
~~Syntax~~	~~[1-9][0-9]{0,2}\.[0-9]{1,2}~~
~~Description~~	~~The Morohashi radical/stroke count for this character in the form “radical.additional strokes”.~~

~~Property~~	~~kRSKorean~~
~~Status~~	~~Provisional~~
~~Category~~	~~Radical-Stroke Counts~~
~~Introduced~~	~~2.0~~
~~Delimiter~~	~~space~~
~~Syntax~~	~~[1-9][0-9]{0,2}\.[0-9]{1,2}~~
~~Description~~	~~The Korean radical/stroke count for this character in the form "radical.additional strokes".~~

Property	kRSUnicode
Status	Informative
Category	IRG Sources
Introduced	2.0
Delimiter	space
Syntax	[1-9][0-9]{0,2}\'?\.-?[0-9]{1,2}
Description	The standard radical/stroke count for this character in the form "radical.additional strokes". The radical is indicated by a number in the range (1..214) inclusive. An apostrophe (') after the radical indicates a simplified version of the given radical. The "additional strokes" value is the residual stroke-count, the count of all strokes remaining after eliminating all strokes associated with the radical. This field is also used for additional radical-stroke indices where either a character may be reasonably classified under more than one radical, or alternate stroke count algorithms may provide different stroke counts. The residual stroke count may be negative. This is because some characters (e.g., U+225A9, U+29C0A) are constructed by removing strokes from a standard radical.

Property	kSBGY
Status	Provisional
Category	Dictionary Indices
Introduced	3.2
Delimiter	space
Syntax	[0-9]{3}\.[0-7][0-9]
Description	The position of this character in the Song Ben Guang Yun (SBGY) Medieval Chinese character dictionary (bibliographic and general information below). The 25334 character references are given in the form "ABC.XY", in which: "ABC" is the zero-padded page number [004..546]; "XY" is the zero-padded number of the character on the page [01..73]. For example, 364.38 indicates the 38th character on Page 364 (i.e. 澍). Where a given Unicode Scalar Value (USV) has more than one reference, these are space-delimited. -- Release information (20080814) -- This release corrects several mappings. This data set now contains a total of 25334 references, for 19583 different hanzi. -- Release information (20031005) -- This release corrects several mappings.

-- Release information (20020310) --

This data set contains a total of 25334 references, for 19572 different hanzi (up from 25330 and 19511 in the previous release).

This release of the kSBGY data fixes a number of mappings, based on extensive work done since the initial release (compare the initial release counts given below). See the end of this header for additional information.

-- Initial release information (20020310) --

The original data was input under the direction of Prof. LUO Fengzhu at Taiwan Taoyuanxian Yuan Zhi University (see below) using an early version of the Big5-based CDP encoding scheme developed at Academia Sinica. During 2000-2002 this raw data was processed and revised by Richard Cook as follows: the data was converted to Unicode encoding using his revised kHanYu mapping tables (first provided to the Unicode Consortium for the Unihan database release 3.1.1d1) and also using several other mapping tables developed specifically for this project; the kSBGY indices were generated based on hand-counts of all page totals; numerous indexing errors were corrected; and the data underwent final proofing.

-- About the print sources --

The SBGY text, which dates to the beginning of the Song Dynasty (c. 1008, edited by 陳彭年 CHEN Pengnian et al.) is an enlargement of an earlier text known as 《切韻》 Qie Yun (dated to c. 601, edited by 陸法言 LU Fayan). With 25,330 head entries, this large early lexicon is important in part for the information which it provides for historical Chinese phonology. The GY dictionary employs a Chinese transcription method (known as 反切) to give pronunciations for each of its head entries. In addition, each syllable is also given a brief gloss.

It must be emphasized that the mapping of a particular SBGY glyph to a single USV may in some cases be merely an approximation or may have required the choice of a “best possible glyph” (out of those available in the Unicode repertoire). This indexing data in conjunction with the print sources will be useful for evaluating the degree of distinctive variation in the character forms appearing in this text, and future proofing of this data may reveal additional Chinese glyphs for IRG encoding.

-- Bibliographic information on the print sources --

《宋本廣韻》 <<Song Ben Guang Yun>> [‘Song Dynasty edition of the Guang Yun Rhyming Dictionary’], edited by 陳彭年 CHEN Pengnian et al. (c. 1008).

Two modern editions of this work were consulted in building the kSBGY indices:

《新校正切宋本廣韻》。台灣黎明文化事業公司 出版，林尹校訂1976 年出版。[This was the edition used by Prof. LUO (台灣桃園縣元智大學中語系羅鳳珠), and in the subsequent revision, conversion, indexing and proofing.]

《新校互註·宋本廣韻》。香港中文大學,余迺永 1993, 2000 年出版。ISBN: 962-201-413-5; 7-5326-0685-6. [Textual problems were resolved on the basis of this extensively annotated modern edition of the text.]

-- Additional Information --

	For further information on this index data and the databases from which it is excerpted, see: Cook, Richard S. 2003. 《說文解字·電子版》 Shuo Wen Jie Zi - Dianzi Ban: Digital Recension of the Eastern Han Chinese Grammaticon. PhD Dissertation. Department of Linguistics. Berkeley: University of California.

Property	kSemanticVariant
Status	Provisional
Category	Variants
Introduced	2.0
Delimiter	space
Syntax	U\+[23]?[0-9A-F]{4}(<k[A-Za-z0-9]+(:[TBZFJ]+)?(,k[A-Za-z0-9]+(:[TBZFJ]+)?)*)?
Description	The Unicode value for a semantic variant for this character. A semantic variant is an *x*- or *y*-variant with similar or identical meaning which can generally be used in place of the indicated character. The basic syntax is a Unicode scalar value. It may optionally be followed by additional data. The additional data is separated from the Unicode scalar value by a less-than sign (<), and may be subdivided itself into substrings by commas, each of which may be divided into two pieces by a colon. The additional data consists of a series of field tags for another field in the Unihan database indicating the source of the information. If subdivided, the final piece is a string consisting of the letters T (for tòng, U+540C 同) B (for bù, U+4E0D 不), Z (for zhèng, U+6B63 正), F (for fán, U+7E41 繁), or J (for jiǎn U+7C21 簡/U+7B80 简). T is used if the indicated source explicitly indicates the two are the same (e.g., by saying that the one character is “the same as” the other). B is used if the source explicitly indicates that the two are used improperly one for the other. Z is used if the source explicitly indicates that the given character is the preferred form. Thus, kHanYu indicates that U+5231 刱 and U+5275 創 are semantic variants and that U+5275 創 is the preferred form. F is used if the source explicitly indicates that the given character is the traditional form. J is used if the source explicitly indicates that the given character is the simplified form. Data on simplified and traditional variations can be included in this field to document cases where different sources disagree on the nature of the relationship between two characters. The `kSemanticVariant` and `kSpecializedSemanticVariant` fields need not be consulted when interconverting between traditional and simplified Chinese.

Property	kSimplifiedVariant
Status	Provisional
Category	Variants
Introduced	2.0
Delimiter	space
Syntax	U\+[23]?[0-9A-F]{4}
Description	The Unicode value(s) for the simplified Chinese variant(s) for this character. A full discussion of the kSimplifiedVariant and kTraditionalVariant fields is found in section 3.7.1 above.

	Much ~~of the~~ of the data on simplified and traditional variants was graciously supplied by Wenlin Institute, Inc. http://www.wenlin.com.

Property	kSpecializedSemanticVariant
Status	Provisional
Category	Variants
Introduced	2.0
Delimiter	space
Syntax	U\+[23]?[0-9A-F]{4}(<k[A-Za-z0-9]+(:[TBZFJ]+)?(,k[A-Za-z0-9]+(:[TBZFJ]+)?)*)?
Description	The Unicode value for a specialized semantic variant for this character. The syntax is the same as for the kSemanticVariant field. A specialized semantic variant is an *x*- or *y*-variant with similar or identical meaning only in certain contexts ~~(such as accountants' numerals)~~.

Property	kSpoofingVariant
Status	Provisional
Category	Variants
Introduced	13.0
Delimiter	space
Syntax	U\+[23]?[0-9A-F]{4}:.
Description	The spoofing variants for the character, if any. Spoofing variants include character pairs which look similar, particularly at small point sizes, which are not already *z*-variants or compatibility variants. See §3.7.3 for a full description of spoofing variants. The syntax consists of the character's code point followed by the character itself, separated by a colon. Review note: The syntax above is suggested, and the actual syntax may be different. Feedback on the syntax is requested.

Property	kTaiwanTelegraph
Status	Provisional
Category	Other Mappings
Introduced	2.0
Delimiter	space
Syntax	[0-9]{4}
Description	The Taiwanese telegraph code for this character, derived from "Kanzi denpou koudo henkan-hyou" ("Chinese character telegraph code conversion table"), Lin Jinyi, KDD Engineering and Consulting, Tokyo, 1984.

Property	kTang
Status	Provisional
Category	Readings
Introduced	2.0
Delimiter	space
Syntax	*?[A-Za-z()\x{E6}\x{251}\x{259}\x{25B}\x{300}\x{30C}]+
Description	The Tang dynasty pronunciation(s) of this character, derived from or consistent with _T'ang Poetic Vocabulary_ by Hugh M. Stimson, Far Eastern Publications, Yale Univ. 1976. An asterisk indicates that

	the word or morpheme represented in toto or in part by the given character with the given reading occurs more than four times in the seven hundred poems covered.

Property	kTGH
Status	Provisional
Category	Other Mappings
Introduced	11.0
Delimiter	space
Syntax	20[0-9]{2}:[1-9][0-9]{0,3}
Description	The year that corresponds to the Tōngyòng Guīfàn Hànzìbiǎo (通用规范汉字表) list in which the ideograph appears, followed by a colon and its one- to four- digit index number in that list. Published by the Chinese government in 2013, this list includes 8,105 ideographs in three levels containing 3,500 (index numbers 1 through 3500), 3,000 (3501 through 6500), and 1,605 (6501 through 8105) ideographs, respectively. Ideographs for more general use are in the first two levels, with those in the first level being more frequently used. The ideographs in the third level are used for personal names, place names, and for science and technology. http://www.gov.cn/gzdt/att/att/site1/20130819/tygfhzb.pdf The current version year is 2013, and the index numbers range from 1 to 8105.

Property	kTGHZ2013
Status	Provisional
Category	Readings
Introduced	13.0
Delimiter	space
Syntax	[0-9]{3}\.[0-9]{3}(,[0-9]{3}\.[0-9]{3})*:[a-z\x{300}-\x{302}\x{304}\x{308}\x{30C}]+
Description	One or more Hànyǔ Pīnyīn readings as given in Tōngyòng Guīfàn Hànzì Zìdiǎn (full bibliographic information below). Each pīnyīn reading is preceded by the character's location(s) in the dictionary, separated from the reading by a colon; multiple locations for a given reading are separated by commas; multiple "location:reading" values are separated by a space. Each location reference is of the form /[0-9]{3}\.[0-9]{3}/. The number preceding the period is the page number, zero-padded to three digits. The first two digits of the number following the period are the entry's position on the page, zero-padded. The third digit is 0 for a main entry and greater than 0 for a parenthesized or bracketed variant of the main entry. - Bibliographical information - 《通用规范汉字字典》(Tōngyòng Guīfàn Hànzì Zìdiǎn = TGHZ; 'General Purpose Normalized Hanzi Dictionary'). 商务印书馆辞书研究中心编 (Dictionary Research Center of the Commercial Press, eds.). 北京: 商务印书馆, 2013 [2013年7月第1版; 2013年9月北京第3次印刷; 印张 22⅔; ISBN 978-7-100-05961-9]. http://www.cp.com.cn/book/366cddb0-1.html - Release Notes - This data was input and prepared by Jaemin Chung (initial release 2019-04-24).

	Distinct Unihan hànzì: 8,105 Distinct pīnyīn syllables: 1,296

Property	kTotalStrokes
Status	Informative
Category	Dictionary-like Data
Introduced	3.1
Delimiter	space
Syntax	[1-9][0-9]{0,2}
Description	The total number of strokes in the character (including the radical). When there are two values, then the first is preferred for zh-Hans (CN) and the second is preferred for zh-Hant (TW). When there is only one value, it is appropriate for both. The preferred value is the one most commonly associated with the character in modern text using customary fonts. This field is targeted specifically for use by CLDR collation and transliteration. As such, it is subject to considerations that help keep pinyin-based Han collation (and its tailorings) and transliteration reasonably stable.

Property	kTraditionalVariant
Status	Provisional
Category	Variants
Introduced	2.0
Delimiter	space
Syntax	U\+[23]?[0-9A-F]{4}
Description	The Unicode value(s) for the traditional Chinese variant(s) for this character. A full discussion of the kSimplifiedVariant and kTraditionalVariant fields is found in section 3.7.1 above. Much ~~of the~~ of the data on simplified and traditional variants was graciously supplied by Wenlin Institute, Inc. http://www.wenlin.com.

Property	kVietnamese
Status	Provisional
Category	Readings
Introduced	3.1.1
Delimiter	space
Syntax	[A-Za-z\x{110}\x{111}\x{300}-\x{303}\x{306}\x{309}\x{31B}\x{323}]+
Description	The character's pronunciation(s) in Quốc ngữ.

Property	kXerox
Status	Provisional
Category	Other Mappings
Introduced	2.0
Delimiter	space
Syntax	[0-9]{3}:[0-9]{3}
Description	The Xerox code for this character.

Property	kXHC1983
Status	Provisional
Category	Readings
Introduced	5.1
Delimiter	space
Syntax	[0-9]{4}\.[0-9]{3}*?(,[0-9]{4}\.[0-9]{3}*?)*:[a-z\x{300}\x{301}\x{304}\x{308}\x{30C}]+
Description	One or more Hànyǔ Pīnyīn readings as given in the Xiàndài Hànyǔ Cídiǎn (full bibliographic information below). Each pīnyīn reading is preceded by the character's location(s) in the dictionary, separated from the reading by a colon; multiple locations for a given reading are separated by commas; multiple "location: reading" values are separated by a space. Each location reference is of the form /[0-9]{4}\.[0-9]{3}*?/ . The number preceding the period is the page number, zero-padded to four digits. The first two digits of the number following the period are the entry's position on the page, zero-padded. The third digit is 0 for a main entry and greater than 0 for a parenthesized variant of the main entry. A trailing "*" (asterisk) on the location indicates an encoded variant substituted for an unencoded character (see below). -- Bibliographical information -- 《现代汉语词典》 [Xiàndài Hànyǔ Cídiǎn = XHC; 'Modern Chinese Dictionary']. 中国社会科学院语言研究所词典编辑室编 [Chinese Academy of Social Sciences, Linguisitics Research Institute, Dictionary Editorial Office, eds.]. 北京: 商务印书馆, 1983 [1978 年 12 月第 1 版; 1983 年 1 月第 2 版; 1984 年 1 月北京第 49 次印刷印张 54; 统一书号: 17017.91]. Note that there are subsequent editions of this important PRC dictionary, reflecting later developments and refinements in language and orthographic standardization, and other editions should not be used in future revision of this field. -- Release Notes -- The Unihan version of this data was originally prepared by Richard Cook (initial release 2007-12-12), proofing and revising a subset of data contributed by Dr. George Bell (who input it with the help of Joy Zhao Rouzer, Steve Mann, et al., as one part of their "Quick and Easy Index of Chinese Characters with Attributes"; Bell 1995-2005). Distinct Unihan hànzì: 10,992; Distinct hànzì: 11,190; Distinct pīnyīn syllable types: 1,337; As of the present writing (Unicode 5.1), the XHC source data contains 204 unencoded characters (198 of which were represented by PUA or CJK Compatibility [or in one case, by non-CJK, see below] characters), for the most part simplified variants. Each of these 198 characters in the source is replaced by one or more encoded variants (references in all 204 cases are marked with a trailing "*"; see above). Many of these unencoded forms are already in the pipeline for future encoding, and future revisions of this data will eliminate trailing asterisks from mappings. The print source and data also include a lexical entry ○ U+3007 : "0719.100: líng" (IDEOGRAPHIC NUMBER ZERO)

	which is currently excluded from Unihan data (as not being a CJK Unified Ideograph); see 零 U+96F6.

Property	kZVariant
Status	Provisional
Category	Variants
Introduced	2.0
Delimiter	space
Syntax	U\+[23]?[0-9A-F]{4}(<k[A-Za-z0-9]+(:[TBZ]+)?(,k[A-Za-z0-9]+(:[TBZ]+)?)*)?
Description	The *z*-variants for the character, if any. *Z*-variants are instances where the same abstract shape has been encoded multiple times, either in error or because of source separation. *Z*-variant pairs also have identical semantics. The basic syntax is a Unicode scalar value. It may optionally be followed by additional data. The additional data is separated from the Unicode scalar value by a less-than sign (<), and may be subdivided itself into substrings by commas. The additional data consists of a series of field tags for another field in the Unihan database indicating the source of the information.

4.2 Listing by Date of Addition to the Unicode Standard

The table below lists the fields of the Unihan database by the release where they were first added. Also included are fields which were dropped in a particular release. ~~These are indicated by italics.~~

Version	Fields Added	Fields Dropped
13.0.0	kIRG_SSource, kIRG_UKSource, kSpoofingVariant, kTGHZ2013	kRSJapanese, kRSKanWa, kRSKorean
12.0.0		kDefaultSortKey (private field)
11.0.0	kJinmeiyoKanji, kJoyoKanji, kKoreanEducationHanja, kKoreanName, kTGH	
8.0.0	kJa	
5.2	kHanyuPinyin, kIRG_MSource	
5.1	kXHC1983	
5.0	kCheungBauer, kCheungBauerIndex, kFourCornerCode, kHangul	
4.1	kFennIndex, kIICore, kRSAdobe_Japan1_6	kAlternateKangXi, kAlternateMorohashi
4.0.1	kGSR, kHanyuPinlu, kIRG_USource	
3.2	kAccountingNumeric, kCihaiT, kCompatibilityVariant, kFrequency, kGradeLevel, kOtherNumeric, kPrimaryNumeric, kSBGY	kAlternateHanYu
3.1.1	kCangjie, kCowles, kFenn, kHKGlyph, kHKSCS, kIRG_KPSource, kJIS0213, kKPS0, kKPS1, kKarlgren, kLau, kVietnamese	
3.1	kIRG_HSource, kMeyerWempe, kPhonetic, kTotalStrokes	kAlternateJEF, kRSMerged
3.0	kAlternateJEF, kIRGDaeJaweon, kIRGDaiKanwaZiten, kIRGHanyuDaZidian, kIRGKangXi, kIRG_GSource, kIRG_JSource, kIRG_KSource, kIRG_TSource, kIRG_VSource, kRSMerged, kSemanticVariant (reintroduced), kSpecializedSemanticVariant (reintroduced)	
2.1		kSemanticVariant, kSpecializedSemanticVariant
2.0	kAlternateHanYu, kAlternateKangXi, kAlternateMorohashi, kCNS1992,	

	kCantonese, kDaeJaweon, kDefinition, kHanYu, kJapaneseKun, kJapaneseOn, kKangXi, kKorean, kMainlandTelegraph, kMandarin, kMatthews, kMorohashi, kNelson, kRSJapanese, kRSKanWa, kRSKangXi, kRSKorean, kRSUnicode, kSemanticVariant , kSimplifiedVariant, kSpecializedSemanticVariant, kTaiwanTelegraph, kTang, kTraditionalVariant, kZVariant	

The remaining fields were added prior to Unicode 2.0.

4.3 Listing by Location within Unihan.zip

The table below lists the fields of the Unihan database. They are organized into groups according to the file within Unihan.zip where their values are found. Each field name also links to its description.

File Name	Fields Within File
Unihan_DictionaryIndices.txt	kCheungBauerIndex, kCowles, kDaeJaweon, kFennIndex, kGSR, kHanYu, kIRGDaeJaweon, kIRGDaiKanwaZiten, kIRGHanyuDaZidian, kIRGKangXi, kKangXi, kKarlgren, kLau, kMatthews, kMeyerWempe, kMorohashi, kNelson, kSBGY
Unihan_DictionaryLikeData.txt	kCangjie, kCheungBauer, kCihaiT, kFenn, kFourCornerCode, kFrequency, kGradeLevel, kHDZRadBreak, kHKGlyph, kPhonetic, ~~kTotalStrokes~~
Unihan_IRGSources.txt	kCompatibilityVariant, kIICore, kIRG_GSource, kIRG_HSource, kIRG_JSource, kIRG_KPSource, kIRG_KSource, kIRG_MSource, kIRG_SSource, kIRG_TSource, kIRG_UKSource, kIRG_USource, kIRG_VSource, kRSUnicode, kTotalStrokes
Unihan_NumericValues.txt	kAccountingNumeric, kOtherNumeric, kPrimaryNumeric
Unihan_OtherMappings.txt	kBigFive, kCCCII, kCNS1986, kCNS1992, kEACC, kGB0, kGB1, kGB3, kGB5, kGB7, kGB8, kHKSCS, kIBMJapan, kJa, kJinmeiyoKanji, kJis0, kJis1, kJIS0213, kJoyoKanji, kKoreanEducationHanja, kKoreanName, kKPS0, kKPS1, kKSC0, kKSC1, kMainlandTelegraph, kPseudoGB1, kTaiwanTelegraph, kTGH, kXerox
Unihan_RadicalStrokeCounts.txt	kRSAdobe_Japan1_6, ~~kRSJapanese,~~ kRSKangXi, ~~kRSKanWa, kRSKorean~~
Unihan_Readings.txt	kCantonese, kDefinition, kHangul, kHanyuPinlu, kHanyuPinyin, kJapaneseKun, kJapaneseOn, kKorean, kMandarin, kTang, kTGHZ2013, kVietnamese, kXHC1983
Unihan_Variants.txt	kSemanticVariant, kSimplifiedVariant, kSpecializedSemanticVariant, kSpoofingVariant, kTraditionalVariant, kZVariant

4.4 Listing of Characters Covered by the Unihan Database

The following table lists the characters covered by the Unihan database, together with the version in which they were added to the Unicode Standard.

Code Point Range	Block Name	Version	Count
U+3400..U+4DB5	CJK Unified Ideographs Extension A	3.0	6,582
U+4DB6..U+4DBF		13.0	10
U+4E00..U+9FA5	CJK Unified Ideographs	1.1	20,902
U+9FA6..U+9FBB		4.1	22
U+9FBC..U+9FC3		5.1	8
U+9FC4..U+9FCB		5.2	8
U+9FCC		6.1	1
U+9FCD..U+9FD5		8.0	9
U+9FD6..U+9FEA		10.0	21
U+9FEB..U+9FEF		11.0	5
U+9FF0..U+9FFC		13.0	13
U+F900..U+FA2D	CJK Compatibility Ideographs†	1.1	302

U+FA2E..U+FA2F		6.1	2
U+FA30..U+FA6A		3.2	59
U+FA6B..U+FA6D		5.2	3
U+FA70..U+FAD9		4.1	106
U+20000..U+2A6D6	CJK Unified Ideographs Extension B	3.1	42,711
U+2A6D7..U+2A6DD		13.0	7
U+2A700..U+2B734	CJK Unified Ideographs Extension C	5.2	4,149
U+2B740..U+2B81D	CJK Unified Ideographs Extension D	6.0	222
U+2B820..U+2CEA1	CJK Unified Ideographs Extension E	8.0	5,762
U+2CEB0..U+2EBE0	CJK Unified Ideographs Extension F	10.0	7,473
U+30000..U+3134A	CJK Unified Ideographs Extension G	13.0	4,939
U+2F800..U+2FA1D	CJK Compatibility Supplement	3.1	542
Total			93,858

† Note: 12 code points in the CJK Compatibility Ideographs block (U+FA0E, U+FA0F, U+FA11, U+FA13, U+FA14, U+FA1F, U+FA21, U+FA23, U+FA24, U+FA27, U+FA28, and U+FA29) lack a canonical Decomposition_Mapping value in UnicodeData.txt and so are not actually CJK *compatibility* ideographs. These twelve characters should be treated as CJK *unified* ideographs.

Note that some CJK characters *do not* explicitly have property data in the Unihan database, such as:

Code Point Range	Block Name	Version	Count
U+2E80..U+2E99	CJK Radicals Supplement	3.0	26
U+2E9B..U+2EF3		3.0	88
U+2F00..U+2FD5	Kangxi Radicals	3.0	214
U+2FF0..U+2FFB	Ideographic Description Characters	3.0	12
U+3000..U+3037	CJK Symbols and Punctuation	1.1	56
U+3038..U+303A		3.0	3
U+303B..U+303D		3.2	3
U+303E		3.0	1
U+303F		1.1	1
U+3105..U+312C	Bopomofo	1.1	39
U+312D		5.1	1
U+312E		10.0	1
U+312F		11.0	1
U+3190..U+319F	Kanbun	1.1	16
U+31A0..U+31B7	Bopomofo Extended	3.0	24
U+31B8..U+31BA		6.0	3
U+31BB..U+31BF		13.0	5
U+31C0..U+31CF	CJK Strokes	4.1	16
U+31D0..U+31E3		5.1	19
U+3220..U+3243	Enclosed CJK Letters and Months	1.1	36
U+3244..U+324F		5.2	12
U+3280..U+32B0		1.1	49
U+32C0..U+32CB		1.1	12
U+32D0..U+32FE		1.1	47
U+32FF		12.1	1

U+3358..U+3370	CJK Compatibility	1.1	25
U+337B..U+337F		1.1	5
U+33E0..U+33FE		1.1	31
U+1F210..U+1F231	Enclosed Ideographic Supplement	5.2	34
U+1F232..U+1F23A		6.0	9
U+1F23B		9.0	1
U+1F240..U+1F248		5.2	9
U+1F250..U+1F251		6.0	2

5 History

The Unihan database originated as a Hypercard stack using data provided by such organizations as Apple, RLG, and Xerox. Printed versions are found in *The Unicode Standard, Version 1.0,* volume 2. Electronic versions were available on floppy disk in the form of a file called CJKXREF.TXT.

The first general electronic release of CJKXREF.TXT (961 kB) was included with Unicode 1.1.5 in July 1995. This version of the file is in a multi-column format and includes the data used in printing *The Unicode Standard, Version 1.0,* volume 2 with the exception of the Fujitsu mappings, which were found to be incorrect and withdrawn.

The electronic version of the Unihan database was substantially revised for the publication of Unicode 2.0.0 in July 1996. The file was renamed UNIHAN.TXT; its permanent, archival link is Unihan-1.txt (7.9 MB). The format of the file is essentially the same as the current release, although consolidated into a single file. The fields were explicitly named for the first time. The data was at the time maintained using custom, MacApp-based database software. The source code for this software used an enumerated type for the numeric field tags, and the enumerator names (each beginning with a "k" indicating their use as a constant) were used in the text file as field names.

Unihan-1.txt was at some point accidentally truncated on line 330,553 (partway through the data for U+8BC1). No corrected version of the file was made available. Instead, it was superseded by the Unihan-2.txt (10 MB) file released with Unicode 2.1.2 in May 1998.

The difficulty of downloading a file 19 MB in size with the technology of the time led to the Unihan database being made available as both a single text file and compressed archives of that text file as of Unicode 3.1.0 in March 2001. The format of the Unihan database remained essentially unchanged until Unicode 5.1.0 (April 2008), when the text file was no longer included and the database became available only as a zipped archive.

Finally, the archive was changed from containing one text file to containing multiple text files as of Unicode 5.2.0 (October 2009).

References

For references for this annex, see Unicode Standard Annex #41, “Common References for Unicode Standard Annexes.”

Modifications

The following summarizes modifications from the previous revision of this annex.

Revision 28

- **Proposed update** for Unicode 13.0.0.
- Updated regular expressions for kIRG_GSource, kIRG_HSource, kIRG_JSource, kIRG_KPSource, kIRG_KSource, kIRG_TSource, kIRG_USource, and kIRG_VSource
- Added kIRG_SSource, kIRG_UKSource, kTGHZ2013, and kSpoofingVariant fields.
- Removed kRSJapanese, kRSKanWa, and kRSKorean fields
- Revised format of tables in Sections 4.2, 4.3, and 4.4 for legibility.
- Added a "Count" column to the tables in Section 4.4.

Revision 27

- **Reissued** for Unicode 12.0.0.
- Removed discussion of `kDefaultSortKey` and added description of the sorting algorithm used for radical-stroke charts.
- Updated syntax and description for `kIRG_GSource`.
- Updated syntax for `kIRG_JSource` and `kIRG_MSource`.
- Updated description and syntax for for `kIRG_KSource`, `kIRG_TSource`, and `kIRG_USource`.

Revision 26 being a proposed update, only changes between revisions 25 and 27 are noted here.

Modifications for previous versions are listed in those respective versions.
