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Historical Overview of the Duployéan and adaptations

The Duployéan shorthands and stenographies are used as a secondary shorthand for writing French, English, German, Spanish, Rumanian, and as an alternative primary script for Chinook Jargon and several Salishan languages including Okanagan, Lilooet, Shushwap, and North Thompson. It was invented by Emile Duployé, published in 1860, as a stenographic shorthand for French. It is one of the two most commonly used shorthand systems in France, being more popular in southern France and adjacent French speaking areas of other countries. Adaptations of Duployéan are known to have been developed for the representation of English, German, Spanish, and Rumanian. The basic inventory of consonant and vowel signs - given in the chart as "Duployan Letters" - have been augmented over the years to provide more efficient shorthands for these languages and to adapt it to the phonologies of these languages and the languages using Chinook writing.

The Chinook script was an adaptation and augmentation of the Duployéan shorthand by fr. Jean Marie Raphael LeJeune, used for writing the Chinook Jargon and other languages of 19th c. interior British Columbia. Its original use and greatest surviving attestation is from the run of the *Kamloops Wawa*, a (mostly) Chinook Jargon newsletter of the Catholic diocese of Kamloops, British Columbia, published 1891-1923. At the time, the Chinook Jargon trade language was spoken in an area from SE Alaska to northern California, from the Pacific to the Rockies, and sporadic communities in other nearby areas. Although the Chinook Jargon was the lingua franca in many communities in this geographic area, it was generally a spoken, rather than written language. Most attempts at documentation used the Latin script to approximate Jargon phonology, and indeed, dictionaries of the Chinook Jargon are still readily available in these Latinate orthographies. In contrast, the archives of the *Kamloops Wawa*, written in Chinook, includes a considerable dictionary, but also constitutes an unparalelled 3+ decade corpus of Chinook Jargon usage during the height of its spread and utility. There currently exists no formal encoding, in any context, for the representation of the Chinook writing, and the only informal representation is transliteration by means of the Latin orthographies used in writing the Chinook Jargon. Indeed, the submission of the Duployan Shorthands and Chinook script to the Unicode Consortium
has necessitated the creation, from scratch, of the first Duployéan/Chinook font, such an effort currently underway with glyph images available for review.

In 1984, the "Students' Practical Encyclopedia" (*Enciclopedia practicÄƒ a copiilor*) was published in Romania, containing the "Curs de Stenografie" by Margaret SfinÅ£escu. This shorthand was an adaptation of the Duployéan for Romanian, and the additional characters are included in the Duployan Shorthands and Chinook block as "Romanian stenographic letters" and "Romanian shorthand" characters. The Romanian shorthand uses a few of the Chinook and Duployan shorthand compound letters as basic letterforms, and uses several basic vowel forms with diacritics. It also makes use of a "doubling mark" to indicate a general duplication of a word or phonemic form.

The Pernin shorthand was originally published by Helen M. Pernin as "Pernin's Universal Phonography" no later than 1882, and is an English adaptation of the Duployéan shorthand. There is an alternate version of the Pernin shorthand published as "Pernin's Practical Reporter", that differs in the affixes used. In that same year of 1882, John Mathew Sloan published the Sloan-Duployan method. Both systems share many characters with Chinook and each other, but any unique characters are identified as "Pernin[/Sloan] letter[s]", "Pernin[/Sloan] Shorthand", or "Pernin Reporters" characters. The most significant anomalies of the two systems are the unique Pernin W and U, the quarter-circle compound consonants mostly shared between the two systems (though with different values), the extensive use of vowel diacritics in Sloan, and heavy shading of letters - like voiced consonants in Pitman-based systems - to indicate

"r" flavored letters.

Currently, materials are unavailable to attempt including Carl Brandt's English Duployéan adaptation or George Galloway's extension of the Sloan-Duployan in the current encoding. Also, documentation of adaptations to German and Spanish are not currently being sought, so these systems are not included in the current encoding, although allocation space is being included to accomodate extensions for these and other extensions of the Duployéan shorthand.

Script Structure

The core repertoire of the Duployéan writing contains several classes of letters, differentiated by visual form - hence script function - and phonetic value. Letter classes include the line and arc consonants, circle vowels (A and O vowels), nasal vowels, and arc vowels (U/Eu,I/E). In addition, the Chinook writing contains the spacing letters H and X, compound consonants, W-vowels, and one known logograph. The extended Duployéan shorthand includes four other letter classes, the complex letters (multisyllabic symbols), and high, low, and connecting terminals for common word endings. Both the Romanian stenography and Pernin orthographies add a few letters or letter forms and have some shorthand signs or complex letters. Since the Duployéan was originally developed as a shorthand system, strings of letters are joined together cursively into words in Duployéan, Romanian, and Pernin, or nominally syllabic units in Chinook - with a single circle vowel for each unit. Most "core" letters have related variant forms in Chinook, including the addition of ancillary dots representing an H flavoring or a phonemic alteration, and compounding of vowels. The original Duployéan and its offshoots all encourage or prescribe overlapping concatenated behaviors for initialisms and abbreviations. Excepting for backward stroke direction of a few letters, Duployéan and Chinook are written LTR - either word by word or syllable by syllable - in horizontal lines proceeding down the page, as with most modern scripts.

Duployan Shorthand and Chinook v.5.3

Glyphs

Names

xx00 CHINOOK LETTER H
xx01 DUPLOYAN LETTER P
xx02 DUPLOYAN LETTER T
xx03 DUPLOYAN LETTER F
xx04 DUPLOYAN LETTER K
xx05 DUPLOYAN LETTER L
xx06 DUPLOYAN LETTER M
xx07 DUPLOYAN LETTER N
xx08 DUPLOYAN LETTER J
xx09 DUPLOYAN LETTER S
xx0A DUPLOYAN LETTER O
xx0B DUPLOYAN LETTER A
xx0C DUPLOYAN LETTER I
xx0D DUPLOYAN LETTER U
xx0E DUPLOYAN LETTER OU

xx0F CHINOOK LETTER OW
xx10 CHINOOK LETTER X
xx11 DUPLOYAN LETTER B
xx12 DUPLOYAN LETTER D
xx13 DUPLOYAN LETTER V
xx14 DUPLOYAN LETTER G
xx15 DUPLOYAN LETTER R
xx16 DUPLOYAN LETTER IN
xx17 DUPLOYAN LETTER UN
xx18 PERNIN LETTER AN
xx19 DUPLOYAN LETTER ON
xx1A PERNIN LETTER AM
xx1B DUPLOYAN LETTER AN
xx1C DUPLOYAN LETTER E
xx1D DUPLOYAN LETTER EU
xx1E ROMANIAN STENOGRAPHIC LETTER I
xx1F ROMANIAN STENOGRAPHIC LETTER U
xx20 DUPLOYAN SHORTHAND LETTER U-N
xx21 DUPLOYAN SHORTHAND LETTER P-N
xx22 DUPLOYAN SHORTHAND LETTER D-S
xx23 DUPLOYAN SHORTHAND LETTER F-N
xx24 DUPLOYAN SHORTHAND LETTER K-M
xx25 DUPLOYAN SHORTHAND LETTER R-S
xx26 DUPLOYAN SHORTHAND LETTER M-S
xx27 DUPLOYAN SHORTHAND LETTER N-S
xx28 DUPLOYAN SHORTHAND LETTER J-S
xx29 DUPLOYAN SHORTHAND LETTER S-S
xx2A DUPLOYAN SHORTHAND AFFIX -MENT
xx2B DUPLOYAN SHORTHAND AFFIX -IEN
xx2C DUPLOYAN SHORTHAND AFFIX -EUR
xx2D DUPLOYAN SHORTHAND AFFIX -IFICATION
xx2E DUPLOYAN SHORTHAND AFFIX -ISME
xx2F DUPLOYAN SHORTHAND AFFIX -EUSE
xx30 DUPLOYAN SHORTHAND LETTER J-N
xx31 DUPLOYAN SHORTHAND LETTER J-N-S
xx32 DUPLOYAN SHORTHAND LETTER M-N
xx33 DUPLOYAN SHORTHAND LETTER N-M
xx34 DUPLOYAN SHORTHAND LETTER J-M
xx35 DUPLOYAN SHORTHAND LETTER S-J
xx36 DUPLOYAN SHORTHAND LETTER M-N-S
xx37 DUPLOYAN SHORTHAND LETTER N-M-S
xx38 DUPLOYAN SHORTHAND LETTER J-M-S
xx39 DUPLOYAN SHORTHAND LETTER S-J-S
xx3A DUPLOYAN SHORTHAND AFFIX -CION
xx3B DUPLOYAN SHORTHAND AFFIX -ION
xx3C DUPLOYAN SHORTHAND AFFIX -IE
xx3D DUPLOYAN SHORTHAND AFFIX -IERE
xx3E DUPLOYAN SHORTHAND AFFIX -LITE
xx3F **<RESERVED>**
xx40 DUPLOYAN SHORTHAND AFFIX -ENCHE
xx41 DUPLOYAN SHORTHAND AFFIX -ANT
xx42 DUPLOYAN SHORTHAND AFFIX -SIONAIRE
xx43 ROMANIAN SHORTHAND AFFIX SUB-
xx44 ROMANIAN SHORTHAND AFFIX -ISM
xx45 **<RESERVED>**

xx46 DUPLOYAN LETTER AOU
xx47 DUPLOYAN LETTER OA
xx48 PERNIN LETTER CH
xx49 ROMANIAN STENOGRAPHIC LETTER SH
xx4A PERNIN LETTER SHORT I
xx4B PERNIN LETTER EE
xx4C DUPLOYAN LETTER IE
xx4D DUPLOYAN LETTER UI
xx4E DUPLOYAN LETTER YE
xx4F **<RESERVED>**
xx50 **<RESERVED>**
xx51 **<RESERVED>**
xx52 **<RESERVED>**
xx53 **<RESERVED>**
xx54 **<RESERVED>**
xx55 **<RESERVED>**
xx56 ROMANIAN SHORTHAND SIGN MILOC
xx57 CHINOOK LETTER NG
xx58 CHINOOK LETTER CH
xx59 CHINOOK LETTER TS
xx5A CHINOOK LETTER WO
xx5B CHINOOK LETTER WA
xx5C CHINOOK LETTER WE
xx5D **<RESERVED>**
xx5E ROMANIAN SHORTHAND LETTER O-U
xx5F ROMANIAN SHORTHAND DOUBLE MARK
xx60 **<RESERVED>**
xx61 CHINOOK LETTER TH
xx62 CHINOOK LETTER DH
xx63 SLOAN LETTER DH
xx64 **<RESERVED>**
xx65 **<RESERVED>**
xx66 SLOAN LETTER J
xx67 CHINOOK LETTER KK
xx68 CHINOOK LETTER HL
xx69 CHINOOK LETTER LH
xx6A CHINOOK LETTER RH
xx6B **<RESERVED>**
xx6C **<RESERVED>**
xx6D **<RESERVED>**
xx6E **<RESERVED>**
xx6F CHINOOK PUNCTUATION FULL STOP
xx70 PERNIN LETTER W
xx71 PERNIN LETTER U
xx72 SLOAN LETTER UH
xx73 SLOAN LETTER OOH
xx74 SLOAN LETTER U
xx75 **<RESERVED>**
xx76 SLOAN LETTER OW
xx77 **<RESERVED>**
xx78 SLOAN LETTER EH
xx79 SLOAN LETTER EE
xx7A PERNIN LETTER LONG I
xx7B **<RESERVED>**
xx7C SLOAN LETTER AN

xx7D SLOAN LETTER EN
xx7E SLOAN LETTER ON
xx7F SLOAN COMBINING R
xx80 PERNIN REPORTERS AFFIX SUB-
xx81 PERNIN REPORTERS AFFIX TRANS-
xx82 PERNIN REPORTERS AFFIX SUPER-
xx83 PERNIN SHORTHAND AFFIX CONTRA-
xx84 **<RESERVED>**
xx85 **<RESERVED>**
xx86 PERNIN SHORTHAND LETTER ST
xx87 PERNIN SHORTHAND LETTER STR
xx88 PERNIN SHORTHAND LETTER SP
xx89 PERNIN SHORTHAND LETTER SPR
xx8A SLOAN SHORTHAND LETTER ST
xx8B SLOAN SHORTHAND LETTER S-ST
xx8C SLOAN SHORTHAND LETTER W
xx8D SLOAN SHORTHAND LETTER SW
xx8E SLOAN SHORTHAND LETTER WH
xx8F **<RESERVED>**
xx90 PERNIN REPORTERS AFFIX EXTRA-
xx91 PERNIN REPORTERS AFFIX INTER-
xx92 PERNIN REPORTERS AFFIX CONTRA-
xx93 PERNIN SHORTHAND AFFIX EXTRA-
xx94 **<RESERVED>**
xx95 **<RESERVED>**
xx96 **<RESERVED>**
xx97 **<RESERVED>**
xx98 PERNIN SHORTHAND LETTER SK
xx99 PERNIN SHORTHAND LETTER SKR
xx9A **<RESERVED>**
xx9B **<RESERVED>**
xx9C PERNIN SHORTHAND LETTER KRS
xx9D PERNIN SHORTHAND LETTER GRS
xx9E **<RESERVED>**
xx9F **<RESERVED>**
xxA0 **<RESERVED>**
xxA1 **<RESERVED>**
xxA2 **<RESERVED>**
xxA3 **<RESERVED>**
xxA4 **<RESERVED>**
xxA5 **<RESERVED>**
xxA6 **<RESERVED>**
xxA7 **<RESERVED>**
xxA8 **<RESERVED>**
xxA9 **<RESERVED>**
xxAA **<RESERVED>**
xxAB **<RESERVED>**
xxAC **<RESERVED>**
xxAD **<RESERVED>**
xxAE **<RESERVED>**
xxAF **<RESERVED>**
xxB0 CHINOOK SIGN LIKALISTI
xxB1 ROMANIAN SHORTHAND SIGN SENS
xxB2 ROMANIAN SHORTHAND SIGN ICI
xxB3 **<RESERVED>**

xxB4 **<RESERVED>**
xxB5 **<RESERVED>**
xxB6 **<RESERVED>**
xxB7 **<RESERVED>**
xxB8 **<RESERVED>**
xxB9 **<RESERVED>**
xxBA **<RESERVED>**
xxBB **<RESERVED>**
xxBC **<RESERVED>**
xxBD **<RESERVED>**
xxBE **<RESERVED>**
xxBF **<RESERVED>**

Character data files:
Incomplete working OT font, Proposal Duployan font and accompanying Unibook nameslist, Windows keyboard layout (may not be fully functional in all versions of Windows), and draft collation rules with examples.

Support and Funding

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Character Ordering and Roadmap to the Duployan Shorthand and Chinook character block

Ordering of the characters in the Duployéan-based scripts is generally undefined - most cite in Latin alphabetical order - so allocation order in the Duployan Shorthand and Chinook character block is revisable up to inclusion in the standard. The currently proposed allocation ordering and its basis is as follows: Columns 0 and 1 are occupied mostly by characters that make up the core inventory of the different Duployan shorthands and the Chinook script. Most Duployan orthographies will use almost all of the characters in these two columns, and optimization algorithms may be able to take advantage of the fact that these characters constitute the vast majority found in texts written in any of the Duployan orthographies. Columns 2 and 3 contain the French Duployéan compound letters and affixes. Several of these characters are also in the core and suplementary inventory of the other orthographies. Column 4 is a mixture of diphthongs, affixes, and core characters for Duployéan, and Romanian. Columns 5 and 6 contain contain the Chinook compound letters, and a few similar letters and signs from the Romanian shorthand and Sloan systems, and the Chinook Full Stop punctuation. Column 7 contains vowels unique to Pernin and the Sloan-Duployan, ending with the Sloan "R", which is a combining character that functions like a format. Columns 8 and 9 have two parts, each beginning with Pernin suffixes, and containing the quarter-circle arcs for Pernin and Sloan. Finally, column 11 has logographic signs from Chinook and Romanian shorthand. Column 10 is reserved for any additions needed for the Brandt and Galloway systems, while room has been left, especially in columns 5 and 6, for the Spanish and German adaptations of Duployéan. This allocation provides for all non-logographic characters needed for French Duployéan in columns 0-4, Romanian shorthand in 0-5, Chinook in 0-6, with Pernin and Sloan using through column 9.

Script and Character Names

The Duployéan and Chinook scripts have gone by many names. The character block name of "Duployan Shorthand and Chinook" reflects the history of the script and its names in several ways. "Duployan" is the simplest English rendering of the original French adjective, with "Shorthand" reflecting the use of the script, generally, as a phonetic shorthand, complete with rules for the omission of non-contrastive segments, and expanded to include multi-syllabic complex letters. The "Chinook" represents what was called "Wawa writing", "Chinook shorthand", and "Chinook Pipa" - the adaptation of Duployéan to the Chinook Jargon and Salish languages in British Columbia, and which comprises the adaptation of Duployéan used as a primary-use orthography.

In naming, characters are identified by their orthography - as Duployan, Chinook, Romanian, Pernin, or Sloan - with shared characters identified with the first applicable. Characters come in four varieties - (stenographic) letters, shorthand letters, shorthand affixes, and (shorthand) signs. *Letters* are core to the scripts in which they are used. Chinook is a pure phongraphic writing system, and as such, none of the charcters used in Chinook are classified as *shorthand letters*, which are part of an extended repertoire in a writing system that allows for language-specific common patterns to be symbolized by simple letterforms instead of being spelled out. *Shorthand affixes* and *Reporters' affixes*
similarly represent common word prefixes and endings. Signs are independent symbols representing a word, idea, or root in a script. Lastly, *punctuation*
signifies a self-explanatory set of characters. The letter, sign, and affix names are those of the character in its primary orthography, with compound letters represented as X-X, and affixes as -XXX or XXX- depending on its use as a suffix or prefix. Punctuation names reflect the most concise and specific inclusive name for the character.

Collation

No information is available on canonical collation order, as the dictionary portions of the *Chinook Rudiments text* are given in roughly Latin alphabetical order. Other sources group words by novel alphabetization, no more or less official than any other. The most logical collation, given the structure of the script, is to collate by general shape, corresponding roughly to consonant flow. In order to do this, the collation algorithm should first break a word into syllables, if not explicitly defined, breaking before the consonant immediately prior to each vowel - with I + a vowel or a vowel + I/E considered a single vowel, all other vowel combinations intervened by a syllable break. Second, syllables should be collated by their initial consonant clusters, with primacy given to the *last* consonant, the one closest to the vowel, and moving outward, and in the order none/H/X, P/B, T/D, F/V, K/G, L/R, M, N, J, S. All Chinook compounds and variants should be collated directly after their base, ie non-H, letters, eg ... K, Kh, Kk, G, L, Lh, hL, R, Rh, M, N, Ng ... . Next, syllables should be collated by their trailing consonants, in the same order as above, but with primacy on the first consonant, again, working out from the vowel. Lastly, syllables should be collated by their vowels, in the order O/Wo/Oi, A/Wa/Ai, I/E/We/Y+vowel, U/Eu, Ou, Ow, none, and In/Un/On/An. The complex Duployéan letters should be collated as two or three syllables, as appropriate, with no vowels (except for U-N). If two words are not unambiguously collated before their terminals, they should be collated -ment/-cion, -ien/ion, continuing as high/low pairs down the third annd fourth columns of the allocation, finally ending in allocation order, ie -enche, -ant, -sionaire, (sub-), -ism. This collation order corresponds significantly with the order of words in the Romanian "Curs de Stenografie", except that F/V comes after K/G, A comes before O, and collation is done letter-by-letter.

Principles of the Duployan Shorthands and Chinook scripts

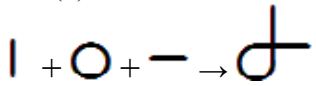
Rendering Duployan Characters.

Duployan characters, like characters from other shorthand-based scripts, can cursively connect, combine, and change shape depending on their context. Its appearance is affected by its ordering with respect to other characters, the font used to render the character, and the application or system environment. These variables can cause the apearance of Duployan and Chinook characters to differ from their nominal glyphs (used in the code charts).

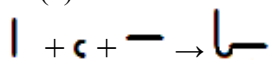
Vowel Letters. Duployan vowels can be classified into four classes based on behavior and nominally on shape: 1) **Circle vowels**
that connect to preceding and following characters based on the shape and stroke direction of those characters and can take contextual forms with the adjacent characters completing the general outline of the vowel implicitly. 2) **Orienting vowels**
that have a consistent connection to preceding characters and orient to connect to that character's stroke. The general orienting vowels come in pairs that skew in opposite directions, but are indistinguishable in most contexts adjacent two connecting characters. 3) **Invariant**
vowels act like consonants, in that they have a consistent orientation and shape, though they can have contextual stroke direction. 4) **Nasal vowels**
render like an invariant vowel when at the beginning or end of a word or other separate text unit, and displace when adjacent characters fore and aft, rendering as a mark either above or below the new intersection of those adjacent characters.

Figure 1. Vowel types

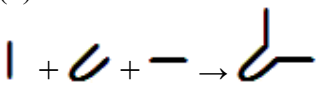
(1) **P + O + T**



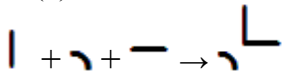
(2) **P + I + T**



(3) **P + Pernin U + T**



(4) **P + In + T**



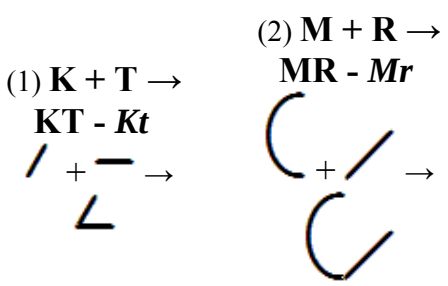
Consonant Letters.
Each consonant has a length relative to the length of other letters, a shape (arcs, lines, hybrids), an orientation, an inherent stroke direction, and many derived and compound forms with markings (crosses or dots). They will usually cursively connect to the preceding and following characters, but can also connect to a following character through the use of shorthand overlap control characters. A few consonant letters are classified as spaced characters that do not interact typographically with adjacent characters except as a word or text break.

It can be assumed in the following that the letters D, D-S, TH, and DH have the same cursive, overlapping, and other connecting properties as the character on which it is based, ie T. Likewise, variations of N - N-S, N-M, N-M-S, and Ng - connect like an N, and so on. The consonants can therefore be grouped into P-type, T-type, F-type, K-type, L-type, M-type, N-type, J-type, and S-types. Furthermore, the P,T,F,K, and L-types can be grouped as Line consonants, and the M,N,J, and S-types are grouped as Arc consonants. The Pernin and Sloan compound consonants in columns 8 and 9 constitute the quarter-arc letters group

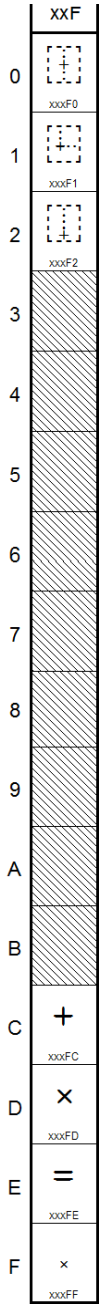
Lastly, the Sloan Combining R functions as a type of control, causing the previous character to be rendered bold. A fully rendering font implementation of Duployan and Chinook will also have truncated or lengthened forms of all consonants except the spaced consonants in order to account for or mitigate the loss of line length when interacting with circle vowels in some contexts.

Default text flow: cursive joining, left-to-right. The most common form of character interaction is that of the cursive connection. The termination of a character stroke leads directly into the beginning of the next character. Vowel signs begin at the termination of a consonant stroke, and a following consonant stroke begins at the end of the vowel stroke. Vowel combining rules are developed in a separate discussion below. Consonants, as a rule, have a stroke direction towards the right and down. For 'K' based letters, the stroke direction is down but left, and for 'L' based letters, the stroke direction is right but upward. The Pernin 'W', like 'L', has a rising stroke, and all Pernin shorthand letters and nasal vowels rendered in-line (see vowels below) have inherent stroke directions that must be observed for proper rendering in many situations.

Figure 2. Cursive Joining



Text flow - overlap: single letter and continuing overlap. The use of overlapping letters to indicate abbreviations and initialisms is well-attested in many systems of shorthand. As such, the current proposal includes allocations for a separate block containing shorthand control characters, placed between any characters with non-default text flow. Included are two overlap control characters: the first (U+xF0) indicating a single overlapping character, with the text continuing to flow as if that overlapping character did not exist, and the second (U+xF1) indicating an overlap where the text flow proceeds from the overlapping character. The overlapping behavior in Duployan shorthands and Chinook is fairly straightforward: for line consonants, the two characters overlap at approximately 2/3 along the stroke of the first character and 1/3 along the stroke of a second consonant. For arc consonant and line consonants overlapping,



Shorthand Controls and Stenographic Characters block

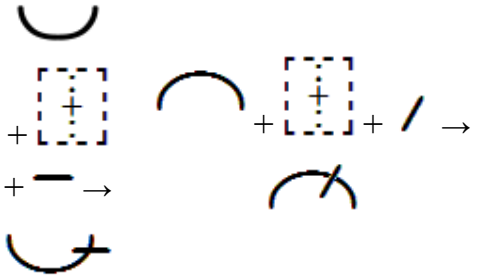
```
xxF0 SHORTHAND CONTROL LETTER OVERLAP
xxF1 SHORTHAND CONTROL OVERLAP
xxF2 SHORTHAND CONTROL DOWN
xxF3 <Reserved>
xxF4 <Reserved>
xxF5 <Reserved>
xxF6 <Reserved>
xxF7 <Reserved>
xxF8 <Reserved>
xxF9 <Reserved>
xxFA <Reserved>
xxFB <Reserved>
xxFC STENOGRAPHIC PLUS SIGN
xxFD STENOGRAPHIC MULTIPLICATION SIGN
xxFE STENOGRAPHIC EQUALS SIGN
xxFF STENOGRAPHIC PERIOD
```

the arc consonant is split into the first and second half of the arc for being a following or leading consonant in an overlap, respectively. The line consonant will overlap the arc at a perpendicular angle, or at the end closest to perpendicular, the middle being one of these ends. Two arc consonants will overlap like two line consonants, at approximately 3/5 and 2/5 of the stroke length. It is unknown if or how M-type and N-type or J-type and S-type would overlap until such a time as examples of this occurance are documented. As indicated above, the flow of text continues either with the first character in the case of U+xF0, or with the second in the case of U+xF1. An overlapping letter can also take another overlapping letter before returning the text flow back to the original text flow. Also, in the Romanian shorthand, long line consonants (U+x11-U+x15) can take two overlapping characters, indicated by two Letter-Overlap control characters (U+xF0 + U+xF0) followed by the two overlapping characters. In this case, the first overlapping character overlaps at approximately 1/3 of the stroke length of the base character, with the overlapping character acting as normal.

Figure 3. Use of and rendering with overlapping controls

(1) **S + U+xF0 + T →** **ST_x - *Sahalie Tyee***

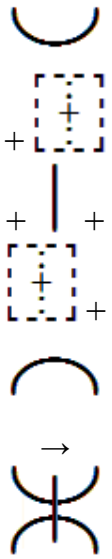
(2) **Sh + U+xF0 + K → JK_x - *Jesu Kri***



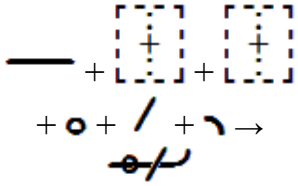
(3) **S + U+xF0**

(4) **D + xF0 + xF0 + A + K + On →**

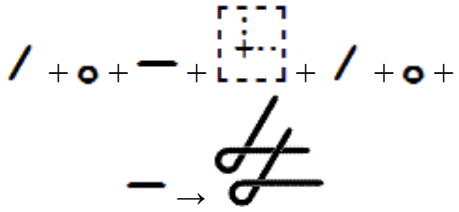
+ B +
U+xF0
+ J →
SBJ$_X$



Don(A$_X$K) -
Din aceastÄƒ cauzÄƒ



(5) **K + A + T + U+xF1 + K + A + T →**
KAT(KAT)$_X$ - *cu atÃ®t mai mult cu cÃ®t*

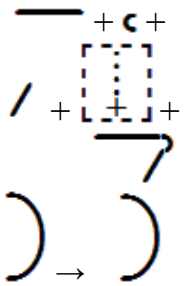


Text flow - vertical

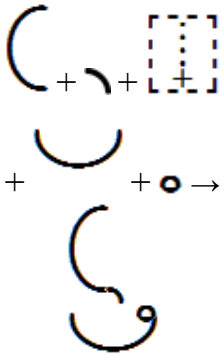
The Romanian shorthand prescribes that a certain set of word endings be indicated by letters following not in the default direction of text flow - to the right, but below the word. As such, a shorthand control has been defined (U+xF2) that indicates the following character should be rendered below the previous character, with any subsequent joined characters proceeding relative to the lowered glyph. Any spacing characters, ZWNJ, spaces, or characters from other scripts would proceed from the original base line of the text.

Figure 4. Use of and rendering with stenographic control down

(1) **D + I + K + U+xF2 + N → DIK$_{(n)}$ - *DicÅ£ionar***



(2) **M + In + U+xF2 + S + A → MIn$_{(sa)}$ - *MenÅ£ioneza***



Zero Width Non-Joiner and Zero Width Joiner

The Duployan script has a cursive conjoining property similar to Arabic (without the alternate forms) that is effected by the use of Zero Width Non-Joiner. Zero Width Joiner is used in the rare situation of preventing displaced rendering of nasal vowels adjacent connecting consonants. The Zero Width Non-Joiner (ZWNJ) encodes a break within a word, that separates cursive joining of adjacent letters, ie, it overrides the normal joining *behaviour* rather than indicating a joining *form*, as in Arabic. As a general rule, this break is present at nominally syllabic boundaries in Chinook texts, and is used in Romanian shorthand texts where a single separated letter indicates a common prefix or suffix. This break is smaller than a word space, and in some instances will actually involve negative kerning of adjacent syllables. It will also change the standard diacritic positioning of intra-word nasal vowels to an in-line positioning (see nasal vowels below). A Zero Width Non-Joiner is unnecessary to indicate the mandatory separation around any spacing letters or non-letter signs used in Duployan shorthands. The Chinook texts indicate that a break should always occur between syllables containing circle or W- vowels. Word processor algorithms would best address these mandatory syllabic breaks and should not be defined by standard, as there are no absolute rules, except those defined by word lists.

Circle Vowels.
The first major group of vowels is called the circle vowels. The circle vowels are O, A, Ou, Ow, AOU, and OA. Not included in the circle vowels are semi-circular or oval-shaped characters like the Romanian U and Romanian OU, except that these characters decompose into one or more circle vowels in medial context. The Chinook W-vowels generally act like orienting vowels, but some implementations may treat them (especially Wo and Wa) stylistically as circle vowels. In their nominal (code chart) form, circle vowels are circles of varying sizes, some with dots and marks inside the circle. Care should be taken in not misidentifying the Duployan Shorthand Affixes -ification and -iere as circle vowels. In their contextual form, circle vowels will attach to adjacent consonants at a tangent, and a gap is formed when the stroke proceeds from end of the preceding consonant, around the arc of the circle, and then into the following consonant stroke. The gap is filled because the adjacent consonant strokes cross each other very close to the vowel, thus completing the circle.

When circle vowels are adjacent two line consonants, the vowel sits outside the angle that the two consonants make, so they cross over each other to meet the tangent of the circle vowel. When circle vowels are adjacent to only a single line consonant, they sit on top of L-,T-, and F-types and right of F-,P-, and K-types, and this positioning relative to the first consonant is retained when a circle vowel is adjacent same type line consonants that do not form an angle with each other.

When adjacent arc consonants, circle vowels sit inside the end of the arc. When two arc consonants are adjacent a circle vowel, the vowel sits inside the first consonant, and may or may not sit inside the second: Adjacent any combinations of M-type and S-type or N-type and J-type, a circle vowel will be inside the arc of both consonants. M + N or J, N + M or S, J + M or S, or S + N or J will produce a circle vowel inside the arc of only the first consonant.

When adjacent an arc consonant and a line consonant, circle vowels are positioned generally inside the arc of the arc consonant, except in the following exceptions: K-type+S-type, T-type+N-type, L-type+N-type, M-type+L-type, and J-type+K-type. This is due to the conflicting stroke directions and angles of these characters, or the supremacy of position relative to the line consonant.

There is a single reverse circle vowel, the Sloan-Duployan OW, that is the same size as Duployan A, but orients exactly opposite.

Orienting vowels.
The second category of vowels are the orienting vowels. The orienting vowels are I, U, E, Eu, Romanian I, Romanian U, and Romanian OU. In their nominal forms, these vowels have a given shape and orientation. This is the orientation of these characters when they appear in isolation, but not cursively connected to adjacent letters. As with the circle vowels, orienting vowels change their direction to accomodate adjacent consonants. Unlike circle vowels, orienting vowels position so adjacent consonants will not cross. They are termed orienting vowels as they do not change their shape in response to context, but do orient themselves to the angle of the preceding character. As mentioned above, the most common of these orienting vowels come in pairs, with the two members running in opposite directions when adjacent only a single consonant or two similar (same angle) consonants.

When orienting vowels are adjacent two line consonants, the vowel sits inside the angle that the two consonants make, so they do not cross over each other. When the primary orienting vowels - I, U, Romanian U, and Romanian OU - are adjacent only a single line, they sit on top of and right of the consonants, same as circle vowels. The secondary orienting vowels - E, Eu, and Romanian I - sit on the other side of the consonant. The Romanian U and Romanian OU have alternate medial forms, and hence do not participate in any of the connecting properties adjacent two consonants. The properties of these characters and their forms are addressed later.

When adjacent arc consonants, primary orienting vowels curve inside the end of the arc, and secondary orienting vowels outside. When two arc consonants are adjacent an orienting vowel, the vowel may curve inside both, either, or neither. In a few instances, both primary and secondary direction is available, and is determined by the inherent direction of the vowel. Combinations allowing for both directions are: P+J, T+N, M+T, M+N, N+M, J+P, J+S, and S+J. Orienting vowels adjacent identical arc consonants will flow oustide the arc of both consonants. Combinations with flow inside the arc consonants are: M+L, M+J, J+K, and J+M. Combinations with flow outside the arc consonant are M+P/F/L/S, J+T/F/L/N, N+ anything but M, and S+ anything but J.

Invariant vowels.
The third category of vowels is the invariant vowels. The invariant vowels are Pernin Long I, Pernin U, Pernin W (doubles as the vowel OO), Pernin Short I, EE, IE, UI, and Ye. These vowels do not alter shape or orientation, although they can have alternate stroke direction, dependent on the preceding consonant. In addition, Pernin W has a special hook form when following a K or G.

Nasal Vowels.
The last category of vowels are the nasal vowels. The nasal vowels have a combining behaviour unlike any other characters in Duployan. The nasal vowels will render displaced - as a diacritic either above or below a consonant intersection - if adjacent two consonants that will cursively connect as if immediately adjacent each other. In all other circumstances, a nasal vowel will be rendered cursively connected to the adjacent consonant and unconnected to a following vowel, space, or other graphic break. ZWNJ either directly before or after a nasal vowel will override displaced rendering by splitting one adjacent consonant into another graphic unit. A nasal vowel + ZWJ can override displaced rendering by connecting the nasal vowel to both the preceding (by default) and following (explicitly) consonants. Note that the use of ZWNJ with nasal vowels is consistent with the use of ZWNJ in encoding syllable breaks in Chinook texts. Note that some implementations of Chinook will render all in-line nasal vowels as if they were a small version of U (U+x0D). For the purposes of transcribing Chinook documents, it is suggested that In (U+x16) be used as the default neutral in-line nasal vowel, due to its distinct orientation relative to all classes of consonants, and its collation order at the beginning of the nasal vowels.

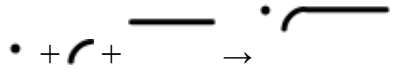
The choice of the location of a displaced vowel is dependent on the angle of the adjacent consonants. It will appear outside the angle of the two consonants, like circle vowels, except that displaced nasal vowels do not connect to the adjacent characters.

Figure 5. Nasal Vowel rendering

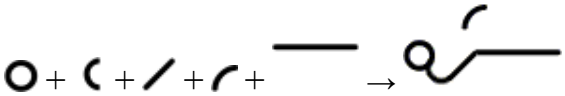
(1) **D + An + S → D^{an}S**

(2) **L + Un + Ch → L$_{un}$Ch**

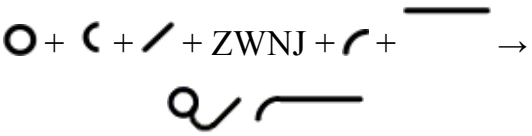
(3) **H + An + D → H.AnD**



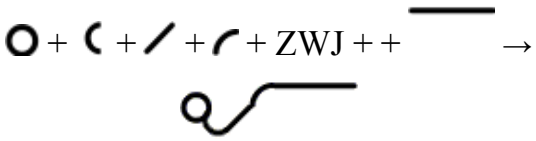
(4) **A + I + L + An + D → AIL^{an}D**



(5) **A + I + L + ZWNJ + An + D → AIL.AnD**



(6) **A + I + L + An + ZWJ + D → AILAnD**



Combining diacritical marks on vowels.
Most Duployéan scripts commonly use several combining diacritical marks, including an over- dot, underdot, diaeresis, and under-diaeresis with the vowels I, E, and A. The macron, acute, and breve are also found in Chinook Salish exts, used with O, Ou, or Ow. These last three diacritics do not place directly above (or below) their base letter, but are instead shifted right, so their left-hand extreme is directly over the center of the base letter. In addition, the under-macron (U+0331) is also used in Chinok texts, but only in combination with acute, as some writers (mostly LeJeune) move the macron below a vowel to avoid collision with the acute placed above that vowel. In the Sloan-Duployan, however, the under-macron is used in combination with the letter O independently.

Ligating consonants.
The Sloan Combining R functions as a type of control character, causing the previous letter to be rendered bold. This can be considered a type of ligature behavior akin to the Devanagari half-forms. The R-form characters connect, overlap, and orient the same as the unmarked character. The phonetic value of the characters generally follows the form Line Consonant + r, Vowel + r, Quarter-Arc + r, and r + Arc Consonant.

When two line consonants of the same type (same angle) meet, different systems deal with the ambiguity of reading, eg LL or R, in several different ways. The French Duployéan places a small tic at the intersection of the two consonants. Sloan-Duployan places a small jog at the intersection. The Chinook, Pernin, and Romanian do not specify a rule for repeating type line consonants, and any or no indication should not negatively effect legibility.

Affixes.
Except for Chinook, every Duployan script makes extensive use of a set of to quickly symbolize many of the suffixes and prefixes common to the languages. These marks come in these in one of two forms: first, exemplified by the high and low Duployan affixes (U+x2a-2f, U+x3a-3e) act much like spaced characters - the marks are written above or below the beginning or final letter of a word (for prefixes and suffixes respectively) but have an advance width so successive affixes can be combined. Second, exemplified by the Other affixes (U+x40, x41, x44, etc.) are the affixes that touch or cross the first or last letter of a word (again for prefixes or suffixes), and the location of the touching or crossing is symbolized by the dotted line in the charts. The character names list specifies if the character rotates to complement the angle of the base letter. Any affixes that lack the dotted line, but are listed in the character names list as a high or low affix will attach to the adjacent letter as if it were a letter. Again, the character names list specifies as to whether the letter orients to the adjacent letter or attaches unaltered like a consonant.

Other Characters
in the Duployéan - the letter "X", Full Stop, and "Likalisti", "Miloc", "Sens", and "Ici" signs - do not typographically interact with other letters. The letter "X" acts like an "H" and splits the syllabic graphic unit fore and aft, but should not constitute a word break for any purposes unless adjacent a spacing character. The Chinook Full Stop character is used fairly frequently like a period or colon, probably due to these punctuations' similarity to the Chinook letter "H". The logograph "Likalisti", meaning *eucharist*
is found in several texts and constitutes a word, and should be set off by spaces. In Romanian, Miloc, Ici, and Sens can take affixes and do not inherently constitute words for the purposes of searching, collation, or line breaking.

Numbers.
There are three distinct systems of expressing numbers that are unique to and use Duployan characters. These are the Chinook, Romanian, and French Duployéan number orthographies. The Chinook uses Duployan characters and general combining marks to indicate numbers. The Romanian shorthand and French Duployéan use regular European/Arabic numerals in conjunction with Duployan characters or combining marks to indicate ordinals or powers of ten.

Chinook numbers.
The Chinook number characters are 1-P, 2-T, 3-F, 4-K, 5-R, 6-M, 7-N, 8-J, 9-S, 0-O, 10-O or A, 100-Wa, and

1000-Combining Enclosing Circle (U+20DD). The numbers can be indicated Hanzi-style with {P-S} combining with O, A, or Wa to indicate value, although an O, A, or Wa must be preceded by a P to indicate a single hundred or ten, unlinke Hanzi numerals. {P-S} connect to O, A, and Wa the same as in text, and may or may not follow the graphic breaking on "syllables" pervasive in Chinook writing. O is used unconnected to indicate a zero or connected for the tens if there is no ones digit, while A is used when connecting the tens to the ones digit. The thousands' Combining Enclosing Circle surrounds the entire group of up to five characters {P-S} Wa {P-S} A/O {P-S}, and can nest inside itself to indicate millions - a separate circle surrounding a following thousands group. Chinook numbers can also be indicated Indian/Arabic style, with the digits 0-9 having place value. This is especially common when writing years or when numbering items, as opposed to enumerating them. The digits generally connect cursively, the same as in Hanzi-style numbering. For most Chinook writers, the numeral forms of M, N, J, and S are about half-size normal, and a fully featured Chinook font will have these as a stylistic alternate. UTC input is needed as to whether Variation sequences should be defined for these small arc consonant-numbers.

Romanian numbers.
The Romanian number system uses the European/Arabic numerals to indicate numbers 0-99, with marks to indicate further powers of ten: an overdot (U+0307) for hundreds, a dot to the right (UTC input needed regarding choice of a middle dot, Chinook H, or a new combining character) for thousands, a dot below (U+0323) for millions, and a left dot (again, needing UTC input) for thousand millions. Multiplicative forms (with the prefix *Ã®n-*) use the character An (U+x1B) before a number, percentages with Combining Ring Above (U+030A), and degrees with the degree sign following. Ordinals are symbolized by a T (U+x02), while fractions are written numerator over denominator, with no solidus or line. This is probably best considered a presentation form of already encoded fraction signs or left to higher-level markup.

Pernin numbers.
The Pernin number system uses the European/Arabic numberals to write numbers, although periods (U+002E) can be used instead of zeros. An underline indicates ordinals (first, second...), while an overline indicates the numerical adverbs (once, twice...). It is suggested, however, the "when large numbers are to be written ... it is better to indicate ... us[ing] a corresponding shorthand contraction for thousand, million, etc."

French Duployéan numbers.
The French Duployéan number system, like the Romanian, uses the European/Arabic numerals with letters below the number indicating powers of ten. Documentation is currently imcomplete for a full description of the system.

Character properties.
As a general rule, Duployan and Chinook letters and shorthand letters have the character type Lo. Affixes are type Mn or Mc. All signs are type So, and the Sloan combining R is Mn. In the Shorthand Controls and Stenographic Symbols block, the shorthand controls are type Cf or possibly Mn, stenographic symbols are So, with the stenographic period and Chinook full stop type Po.

ÅŸÃ¢-

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